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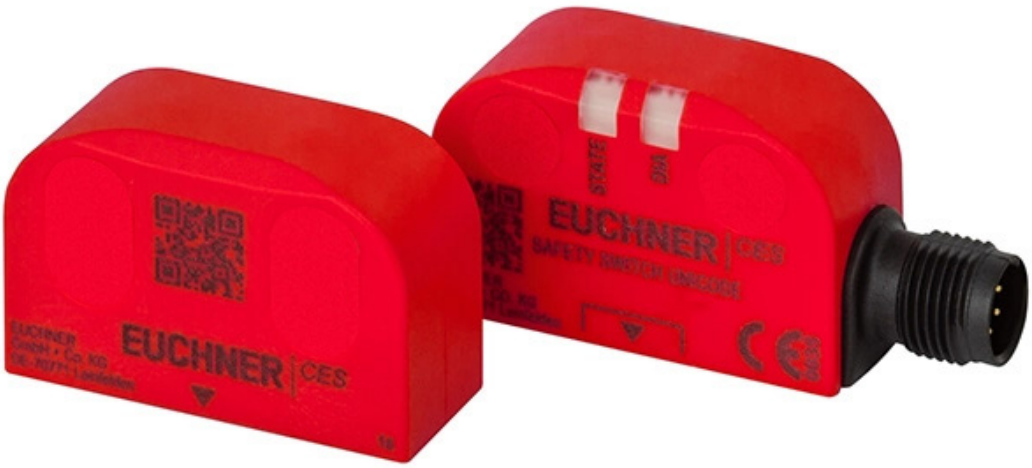
Application



“Switching by Interruption” Application with Safety Switch CES-C07

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Contents

1. About this document

1.1. Version

Version	Date	Change/addition	Chapter
01-11/25	10/09/2025	Prepared	All

1.2. Scope

This document explains the “Switching by interruption” application. The application is described for safety switches series CES-C07.

1.3. Target group

Design engineers and installation planners for safety systems on machines, as well as setup and servicing staff possessing special expertise in handling safety components.

1.4. Supplementary documents

The overall documentation for this application consists of the following documents:

Document title (document number)	Contents	
Operating instructions (2528734)	Operating instructions for non-contact safety switch CES-I-BP-.-C07-…	
Safety information (2525460)	Information sheet with important safety information	
Any associated data sheets	Item-specific information about deviations or additions	

1.5. Notice

This application is based on the operating instructions for non-contact safety switch CES-I-BP-.-C07-… and explains the “Switching by interruption” application. For the technical details of the devices and further information about connection and operation, refer to the operating instructions for the switch used.

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2. Components/modules used

The principle is suitable for all safety switches CES-I-..-.-C07 with actuator CES-A-BTN-C07-….

Description	Order number / item number
Safety switch	All devices of series CES-C07
Actuator	All actuators CES-A-BTN-C07-…

Tip: More information and downloads about the aforementioned EUCHNER products can be found at www.euchner.com. Simply enter the order number in the search box.

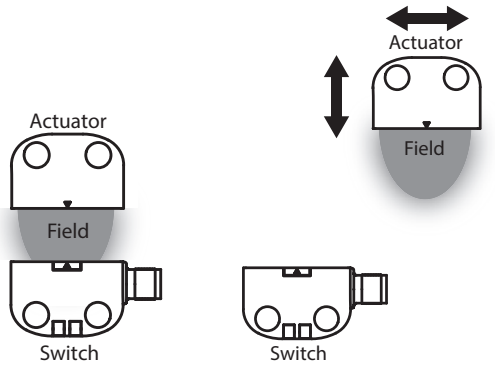
3. Functional description

3.1. Principle of operation of transponder-coded safety switches (RFID)

Safety switches with transponder consist of a switch and an actuator. When the actuator is in the actuating range (field) of the switch, the RFID chip in the actuator is activated and sends a signal to the switch.

The switch detects that the actuator is in the actuating range and switches the safety outputs (FO1A and FO1B) to HIGH. As soon as the actuator leaves the actuating range, the safety outputs switch back to LOW.

The switching operation is affected by the distance between the switch and the actuator (switching by distance).

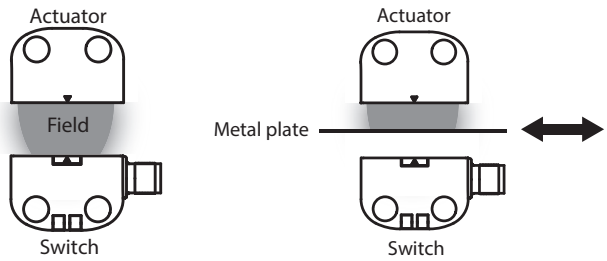


3.2. What is different about switching by interruption?

With switching by interruption, a metal plate is positioned between the switch and the actuator to prevent the actuator from being read. The metal plate blocks the transponder field, and the safety outputs switch to LOW. The safety outputs switch to HIGH when the metal plate is removed.

The switch and the actuator always remain in their respective positions in this process.

The principle is similar to that of a light barrier. When the light beam is interrupted, the safety outputs switch to LOW. In this application, it is the transponder field that is interrupted.



4. Safety assessment

Given correct mounting and application, the safety outputs switch to LOW as soon as the switch no longer detects the actuator. To ensure interruption, the following guidelines must be observed during mounting (see figures):

- Switch and actuator must be permanently mounted, and the active faces must be parallel and aligned with each other. Observe the permissible installation position (see *Fig. 1*).
- The distance between switch and actuator must be at least 3 mm and must not exceed 10 mm (see *Fig. 2*).
- The shielding plate must be dimensioned as follows:
  - It must fully cover the front faces of the switch and the actuator and must also extend beyond them by 4 mm in every direction.
  - The minimum size of the shielding plate is therefore 48 x 26 mm (see *Fig. 3*).
  - If there is a center offset between the switch and the actuator (e.g. due to mounting tolerances), the shielding plate must be enlarged accordingly in the direction of the offset.
  - If a position tolerance or movement tolerances of the shielding plate can occur in the application, the shielding plate must also be enlarged accordingly.
- The metal plate must be at least 1 mm thick.
- The following metals are suitable:
  - Aluminum
  - Steel/stainless steel
  - Copper

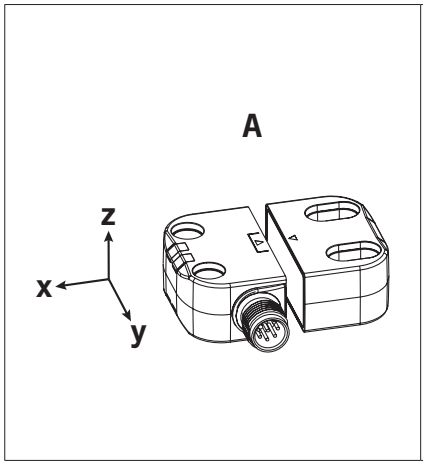


Fig. 1: Permissible installation position

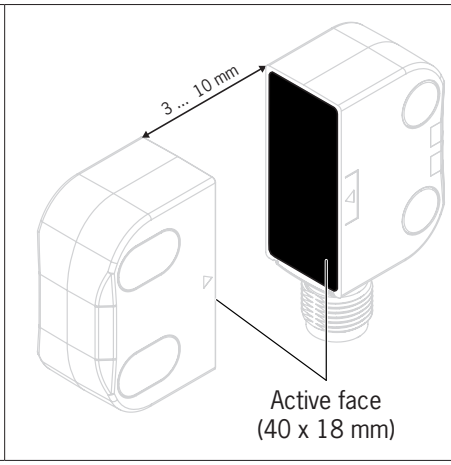


Fig. 2: Switch-to-actuator distance

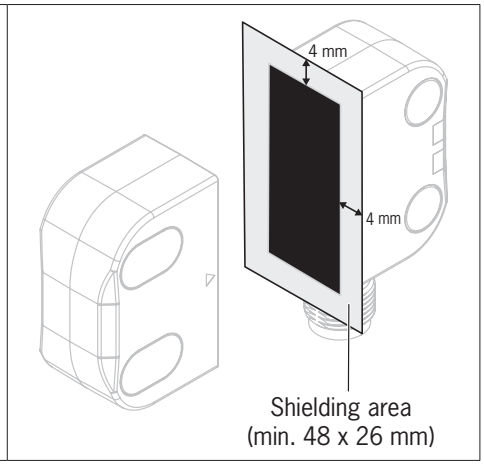


Fig. 3: Minimum shielding plate size

Important!

- Safe switch-off of the CES-I-...C07 is ensured only if the shielding plate is correctly sized and positioned.
- To ensure that the transponder field is safely interrupted, the metal plate must be at least large enough to account for all tolerances. Long-term effects, such as the settling or loosening of connections or guides, must also be considered.

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5. Important note – please observe carefully!

This document is intended for design engineers who possess the requisite knowledge in safety engineering and know the applicable standards, e.g. through training for qualification as a safety engineer. Only with the appropriate qualification is it possible to integrate the example provided into a complete safety chain.

The example represents only part of a complete safety chain and does not fulfill any safety function on its own. In order to fulfill a safety function, the energy switch-off function for the danger zone and the software must also be considered in the safety evaluation, for example.

The application introduced here is only an example for solving specific safety tasks for generating a shut-down signal. The example cannot be comprehensive due to the application-dependent and specific protection goals within a machine/ installation.

If questions concerning this example remain open, please contact us directly.

According to the Machinery Directive 2006/42/EC, the design engineer of a machine or installation has the obligation to perform a risk assessment and take measures to reduce the risk. While doing this, the engineer must comply with the applicable national and international safety standards. Standards generally represent the current state-of-the-art. Therefore, the design engineer should continuously inform himself about changes in the standards and adapt his considerations to them. Relevant standards include EN ISO 13849 and EN 62061. This application must be regarded only as assistance for the considerations about safety measures.

The design engineer of a machine/installation has the obligation to assess the safety engineering himself. The examples must not be used for an assessment, because only a small excerpt of a complete safety function was considered in terms of safety engineering here.

In order to be able to use the safety switch applications correctly on safety doors, it is indispensable to observe the standards EN ISO 13849-1, EN ISO 14119 and all relevant C-standards for the respective machine type. Under no circumstances does this document replace the engineer's own risk assessment, and it cannot serve as the basis for a fault assessment.

In particular in relation to a fault exclusion, it must be noted that a fault can be excluded only by the machine's or installation's design engineer and this action requires justification. A general fault exclusion is not possible. More information about fault exclusion can be found in EN ISO 13849-2.

Changes to products or within assemblies from third-party suppliers used in this example can lead to the function no longer being ensured or the safety assessment having to be adapted. In any event, the information in the operating instructions on the part of EUCHNER, as well as on the part of third-party suppliers, must be used as the basis before this application is integrated into an overall safety function. If contradictions should arise between the operating instructions and this document, please contact us directly.

Use of brand names and company names

All brand names and company names stated are the property of the related manufacturer. They are used only for the clear identification of compatible peripheral devices and operating environments in relation to our products.

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