



Safe and efficient monitoring of safety doors, protective hoods and hatches

Electronic and mechanical safety switches in series circuits

Safety for man and machine

For safe and cost-effective monitoring of safety doors, protective hoods and hatches, BERNSTEIN offers the possibility to integrate mechanical switches into the series circuit of the electronic safety sensor CSMS. Thanks to this solution approved by TÜV, the effort in material and labour for the installation can be reduced.

➤ INFO: The contactless safety sensor CSMS

- **Safety series connection** with max. 32 CSMS up to **PL e / SIL 3 (category 4)**
- **Reduction in cost** – no additional external monitoring is needed
- **Flexible application** – a manual and automatic start is possible with the same CSMS
- **Guaranteed future** – the CSMS fulfils the requirement of ISO 14119 (successor to EN 1088) regarding an individual coding (high-level coding)
- **Economic system installation** due to the **simple and fast installation** with M12 plug technology
- **Time saving** – error free installation
- **Time saving** – the system status is displayed on the **diagnosis interface**
- **Reduction in costs** – no door or hood guides are necessary



Simply scan the QR code and experience the CSMS online

Contactless safety sensors and mechanical switches

For monitoring movable safety guards, BERNSTEIN offers contactless safety sensors and well-proven contactless mechanical switches.

The **CSMS safety sensors** based on RFID are contactless and fulfil the highest requirement (high-level coding) of protection against manipulation of ISO 14119. They are used individually or in serial connection with max. 32 CSMS up to PL e / SIL 3 (category 4).

Mechanical switches are the low budget version and are ideal wherever high performance level is not required. These include maintenance hoods and hatches that are seldom opened.

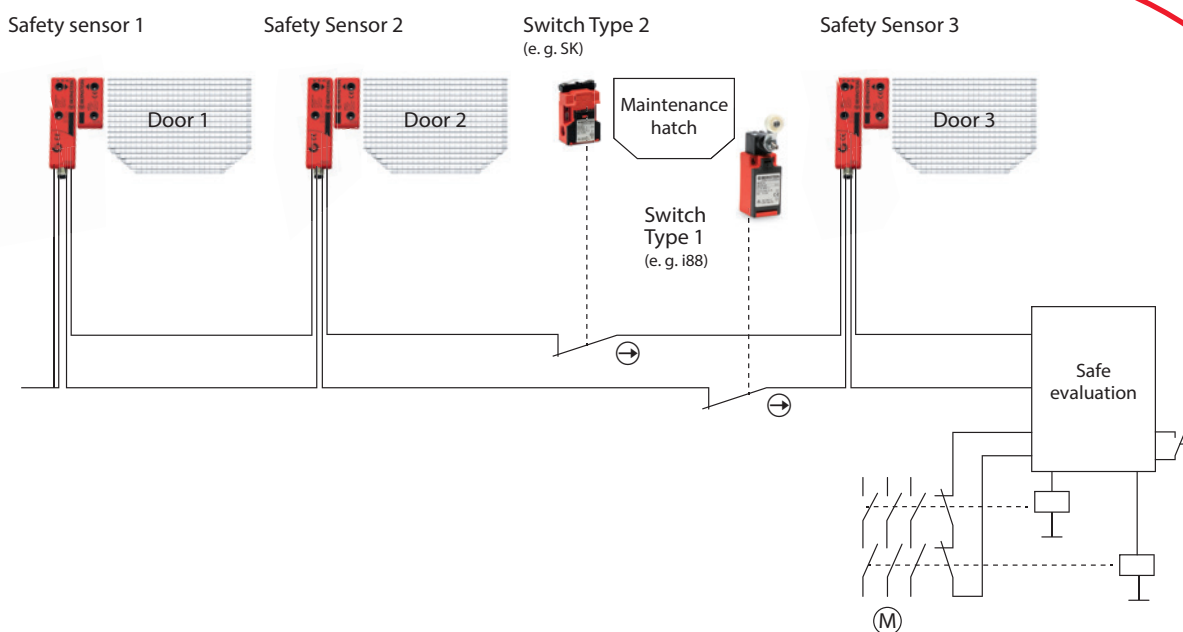
Safety switches require separate safety relays, additional wiring to the control cabinet, corresponding terminal material and sufficient control cabinet space.

Sorting, sawing, drilling, milling, turning, labeling and packaging

The monitoring of all safety doors and maintenance hatches of a plant consisting of several machines can be a real challenge. Depending on the size of the plant, distance to the control cabinet and number of safety guards, the costs for material and installation can put in question the efficient use of mechanical switches.

Combine CSMS safety sensors and mechanical switches in series circuits

Simply monitor three doors electronically and one maintenance hatch mechanically – with only one series connection. It does not work? With BERNSTEIN, it works: ❶ Analyse every risk ❷ Integrate mechanical switches ❸ Reduce costs



Application example

Requirements

- Installation of a maximum of one mechanical locking system between two safety sensors
- Recourse to a risk analysis of the final application that covers an **error masking**
- Compliance with all necessary measures and requirements of ISO 13849-1 and ISO 14119 for the integration of the CSMS and the mechanical switches (according to EN 60947-5-1 Annex K) as well as for all further parts of the safety function
- Validation of the safety functions according to ISO 13849-2

➤ INFO: Error masking

An error masking is existent if an error has been covered or masked by another error.

Results evaluation of the risk analysis

No error masking possible

For monitoring maintenance hatches with mechanical safety switches, **PL d, cat 3** can be achieved.

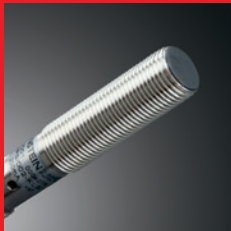
Error masking possible

PL c, cat 1 is achieved. If a higher level of PL is required, it will be determined whether and by which measures it can be achieved (e.g. plausibility assessment of the switching process by the NO contacts of the switches, piped lines etc.).

PL c, cat 1 (provided you have the necessary $MTTF_d$) can always be achieved, even with a mechanical switch with 2 NC contacts.



**Switch systems –
Economy meets safety**



**Sensor systems –
Compact intelligence**



**Enclosure systems –
Function and design**

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