

CSMS RRS

Monitor safely and efficiently safety doors and shutdowns

Electronic safety sensors and mechanical emergency stop devices in series circuits

Combining CSMS safety sensors and emergency stop devices in series circuits

The BERNSTEIN CSMS RRS with integrated monitored feedback loop and manual start function can be used to integrate emergency stop devices without a separate safety relay required. However, the same safety function must be performed.

Requirements

- 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, ISO 14119 and ISO 13850 for the integration of the CSMS and the emergency stop device (according to EN 60947-5-5) as well as for all further parts of the safety function
- Validation according to ISO 13849-2

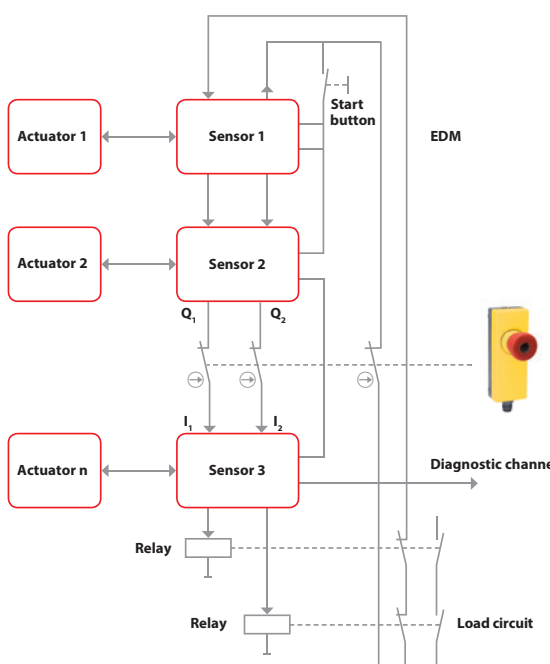
Results evaluation of the risk analysis

- **No error masking possible**
PL e, cat 4 can be achieved for the emergency stopping function
- **Error masking possible**
The reason for the error masking is determined, as well as the measures that can be carried out to reach the required PLr (e.g. protected lines (piped) to and from the emergency stopping device or separately installed lines).

Application examples for monitoring three guard devices with three CSMS RRS

Application 1

Integration of emergency stop devices with three NC contacts in the CSMS series



Wiring for integrating an emergency stop device with three positive-break NC contacts

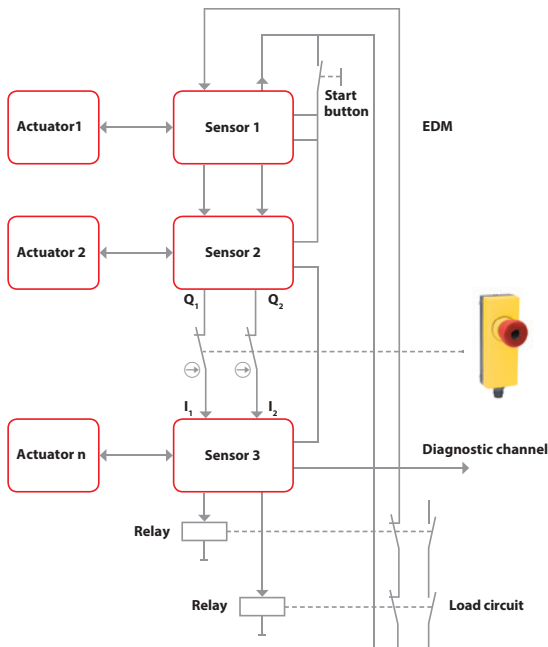
- The safety outputs (Q1 and Q2) of the CSMS 2 are connected in series via the positive-break contacts of the emergency stop device to the safe inputs (I1 and I2) of the CSMS 3.
- In the monitored feedback loop of the contactors, which is governed by the first CSMS, the third positive-break contact of the emergency stop device will be switched in series with the NC contacts of the contactors.
- According to DIN EN ISO 13850 a manual start button must be incorporated.

Behavior when actuating the emergency stop device

When actuating the emergency stop device, the positive-break contacts open the safety circuit. The effect is maintained until manually reset. The machine can only be restarted after unlocking the emergency stop device and actuating the start button.

Application 2

Integration of emergency stop devices with two NC contacts in the CSMS series



Wiring for integrating an emergency stop device with two positive-break NC contacts

- The safety outputs (Q1 and Q2) of the CSMS 2 are connected in series via the positive-break contacts of the emergency stop device to the safe inputs (I1 and I2) of the CSMS 3.
- The monitored feedback loop of the contactors is governed by the first CSMS.
- According to DIN EN ISO 13850 a manual start button must be incorporated.

Behavior when actuating the emergency stopping device

When actuating the emergency stop device, the positive-break contacts open the safety circuit. The effect is maintained until manually reset.



The use of the system requires a risk analysis by the user in terms of the described system behaviour with a particular focus on the start-up of the machine. When unlocking the emergency stop device, the following instructions have to be heeded according to EN 13850:

- According to EN 13850, the unlocking of the emergency stop device requires an act of any person on the device, on which the command was carried out.
- The unlocking must not restart the machinery.
- For technical reasons, a restart within three seconds after pressing the start button and then unlocking the emergency stop device is possible.
- As long as the emergency stop device is pressed, a restart is not possible.
- If the time between pressing the start button and then unlocking the emergency stop device is greater than three seconds, a restart is not possible.
- The planned sequence of operation is the unlocking of the emergency stop device and the subsequent restart of the machine by pressing the start button.
- In many applications, the emergency stop device and the start button are adequately separated from each other in space. Pressing the start button and unlocking the emergency stop device within three seconds if then not possible.

➤ INFO: Error masking

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



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