

ESR Electronic Safety Relays

Description

Fields of application

Electronic safety relays are used for monitoring safety control circuits. The requirements for electrical equipment of machines are defined in accordance with IEC/EN 60 204. The machine user must assess the risk of the machine in accordance with EN 954-1, and implement a control system which meets the requirements for the relevant safety category 1, 2, 3, or 4.

Construction

The electronic safety relay consists of a power section, the electronics and two redundant relays with interlocked opposing contacts for the enabling and signalling paths.

Product range overview

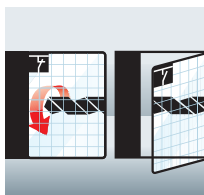
The range includes relays for:



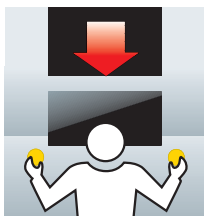
Emergency-Stop circuits



Monitoring of safety mats and safety bumpers



Monitoring of protective guards



Monitoring of two-hand controls

Contact expansion modules with and without time delay are also available.

Safety category

ESR electronic safety relays are approved by the workplace liability associations and comply with safety category 3 or 4. The safety category of a control system results from its combination with the external circuitry, for which the machine user is responsible.

The electronic safety relays are tolerant of one fault, in other words, a single fault in the safety circuit does not result in a dangerous state. EN 954-1 excludes the possibility of two independent faults occurring at the same time.

Stop category

IEC/EN 60 204-1 stipulates two relevant stop categories for stopping in the event of an emergency:

- STOP category 0: Stopping by means of immediate disconnection of power from the machine.
- STOP category 1: Controlled stopping, with power available to the machine, in order to achieve termination of machine movement. Power is not removed until the stop is achieved.

The safety relays for Emergency-Stop applications and non-delayed expansion modules are suitable for Stop category 0. Delayed contact expansion modules meet the requirements of Stop category 1.

Function

In fault-free operation, following the starting command, the safety circuits are monitored by the electronics, and the enabling paths are activated via the relay. Following the switch Off command, and also in the event of a fault (earth fault, faulty insulation, wire breakage, etc.), the enabling paths are blocked immediately (STOP category 0) or with a time delay (STOP category 1), and the motor is disconnected from the mains supply. In redundant safety circuits, a short-circuit does not result in danger, so only when the circuit is re-energized is the fault detected and starting prevented.

Single/dual channel design

Safety relays for stopping in the event of an emergency and for monitoring of protective guards are available for single- and dual channel applications. The single channel construction enables earth-fault monitoring of the safety circuit. For the dual channel application, the Emergency-Stop circuit or the protective guard circuit is constructed as a redundant circuit. In this way monitoring for short-circuits and wire insulation faults is also implemented.

Furthermore, the device can be used with or without reset monitoring. The device is started and the enabling paths switched only as a result of the falling edge of the On button being detected. An application for the device without restart monitoring is for example, for monitoring protective doors for an automatic restart.