With contactor relay enabling circuits

Design

The solid-state safety relays can be used in EMERGENCY-STOP devices according to EN 418 and in safety circuits according to EN 60204-1 (11.98), for example, for moving covers and protective doors. Depending on the device type and the external circuit, the maximum category that can be achieved is Category 4 of EN 954-1 or SIL 3 according to IEC 61508.

With these devices, solid-state safety relays are connected with contactor relays. The combination is supplied as a complete unit, fully wired up and tested, for snapping onto a standard mounting rail. This unit combines the advantages of a solid-state safety relay and those of contactor relays with positively-driven contacts in a single device. It has been certified by the appropriate authorities as a complete unit.

Basic units, Category 3

The 3TK28 50, 3TK28 51 and 3TK28 52 solid-state safety relays have two contactor relays snapped onto the safety solid-state unit as floating switching blocks. Three LEDs indicate the operating state and the function. During operation, all internal circuit elements are monitored cyclically for faults. Up to Category 3 according to EN 954-1 is achieved, depending on the external circuit.

Basic units, Category 4

The 3TK28 53 solid-state safety relay has two contactor relays snapped onto the safety solid-state units as floating switching blocks, as well as a safe solid-state output, a safe input for cascading and one input for normal switching duty. Three LEDs indicate the operating state and the function.

During start-up, the device runs through a self-test in which the internal electronics are checked for correct functioning. During operation, all internal circuit elements are monitored cyclically for faults.

Expansion units, namely 3TK28 30, 3TK28 56, 3TK28 57, 3RA7 11 to 3RA7 14, as well as external actuators or loads can be connected using the safe solid-state output (terminal 2). Cascading with the 3TK28 41, 3TK28 42, 3TK28 45 and 3TK28 53 safety relays as well as with the 3RA7 11 load feeder is also possible using the safe solid-state output (terminal 2).

Mounting

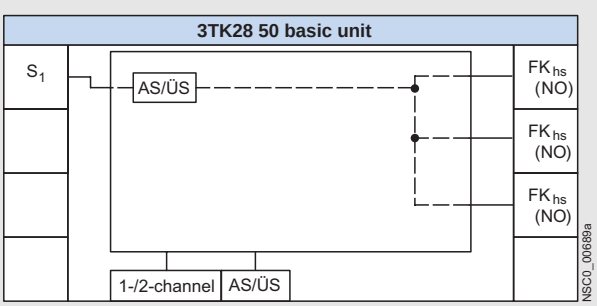
For snap-on mounting on TH 35 standard mounting rail according to EN 60715. Screw mounting is also possible for the devices by means of 2 additional 3RP19 03 push-in lugs.

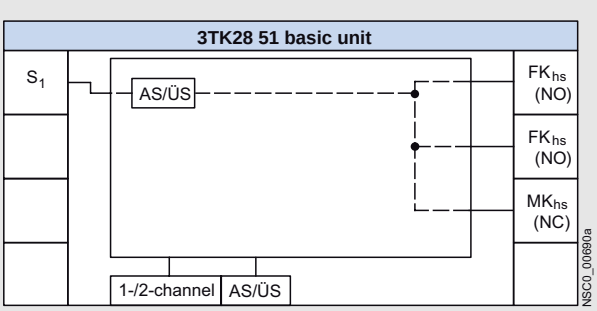
Function

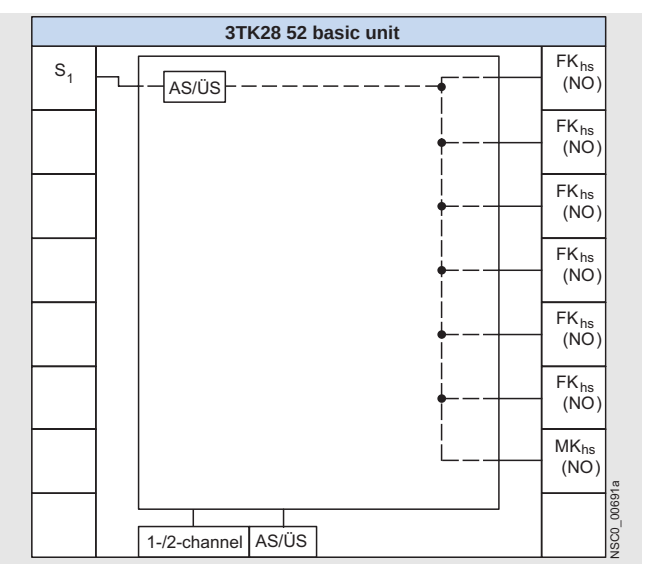
Basic units

3TK28 50 to 3TK28 52

The devices 3TK28 50 to 3TK28 52 each have one sensor input and a varying number of contactor relay enabling circuits and signaling outputs. If the signal is no longer applied to the sensor input, the enabling circuits are isolated immediately.







Legend

Sensor interface

S_x: Sensor input

Safety logic

AS/ÜS: Automatic or monitored start depending on the parameterization

Parameters

1-/2-channel: One-channel / two-channel sensor connection
AS/ÜS: Automatic or monitored start depending on the parameterization

Actuator interface

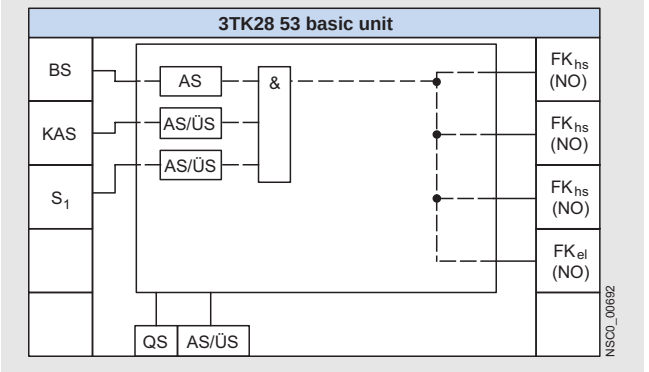
FK_{hs}: Enabling circuit, contactor relay (floating)
MK_{hs}: Signaling circuit, contactor relay (floating)
NO: NO contact
NC: NC contact

With contactor relay enabling circuits

Basic units

3TK28 53

The 3TK28 53 has one sensor input and one input for normal switching duty and one cascading input. On the output side is a varying number of solid-state enabling circuits or contactor relay enabling circuits. If the signal is no longer applied to one of the inputs, the enabling circuits are isolated immediately. Autostart or monitored start can be selected in the parameterization.



Legend

Sensor interface

S_X: Sensor input
KAS/BS: Cascading input or normal switching duty.
Normal switching duty: Connection of a PLC output for example. The enabling circuits and hence the connected loads can then be operated by the machine control.
The safety function is on a higher level.

Safety logic

AS: Automatic start. Device starts automatically once the enabling conditions are fulfilled. If a START button is integrated in the feedback circuit, a manual start is also possible (up to Category 3 according to EN 954-1).
AS/ÜS: Automatic or monitored start depending on the parameterization

Parameters

QS: With or without crossover monitoring
AS/ÜS: Automatic or monitored start depending on the parameterization

Time delay, OFF-delay

Actuator interface

FK_{el}: Enabling circuit, solid-state (non-floating)
FK_{hs}: Enabling circuit, contactor relay (floating)
MK_{hs}: Signaling circuit, contactor relay (floating)
NO: NO contact
NO_{tv}: NO contact, time-delayed
NC: NC contact

Expansion units

3TK28 56 and 3TK28 57

The 3TK28 56 and 3TK28 57 devices each have one one input for normal switching duty and one cascading input. On the output side is a varying number number of solid-state enabling circuits or contactor relay enabling circuits and signaling outputs. If the signal is no longer applied to one of the inputs, the enabling circuits are isolated immediately or according to the set delay time.