Safety switching device
Output expansion SNE 4008S

Output expansion with relay for base devices in safety applications

- Stop category 0 according to EN 60204-1 (see “Notes”)
- Applications up to safety category 4 according to EN 954-1 (see “Notes”)
- Expansion of a base device’s enabling current paths
- Contact expansion in safety equipment
- 8 enabling current paths, 3 signaling current paths, 1 feedback current path

Applications

- Expansion of a base device’s enabling current paths
- Contact expansion in safety equipment
- Up to 8 safe enables through a control signal

Function

Device description

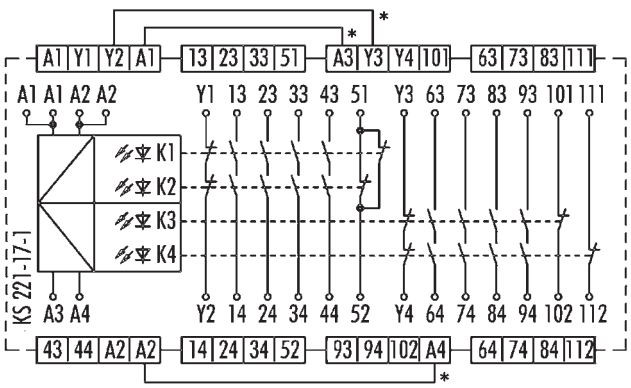
The device is designed with a single channel redundant with positively driven relays. It has a feedback current path with a serial NC contact chain of positively driven relays involved in the switching operation for a safe feedback to the base device. Two serially switched NO contacts (one NO contact for each redundant relay) form an enabling current path. Due to this design it is generally possible to establish a safety circuit with self-monitoring on each ON-OFF cycle (SK4) in conjunction with a suitable base device. As the device is designed with a single channel, it must be installed in a control cabinet with permanent wiring in order to prevent short circuits of the control lines. A basic isolation separates the enabling current paths from one another as well as from the control circuits and the signaling path.

Description of functions

Input voltage to the device is routed via one or two enabling current paths of a base device. When the input voltage is applied relays K1, K2, K3 and K4 switch into the ON position. After this switch-on phase the enabling current paths 13/14, 23/24, 33/34, 43/44 and 63/64, 73/74, 83/84, 93/94 are closed and the feedback current path Y1/Y4 as well as the signaling current paths 51/52, 101/102 and 111/112 are opened. This is displayed through the LEDs K1, K2, K3 and K4 which are assigned to relays K1, K2, K3 and K4. When the enabling current paths of the base device are opened through the operation of the emergency stop button, relays K1, K2, K3 and K4 switch back into the OFF position. The enabling current paths open and the feedback current path closes. Feedback current path Y1/Y4 prevents the base device from switching on again before K1, K2, K3 and K4 releases. The feedback current path Y1/Y2 must be wired to the reset or feedback loop of the base device.

Circuit diagram

SNE 4008S



*** pre-wired by the manufacturer**

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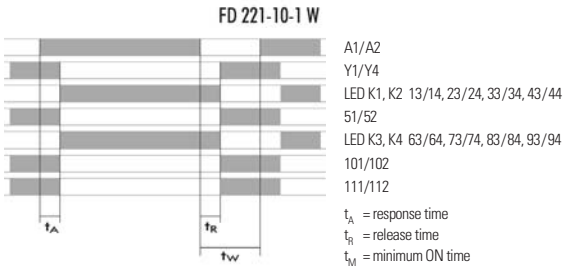
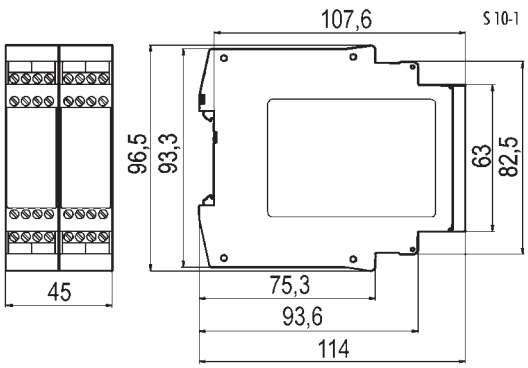
Function diagram

SNE 4008S

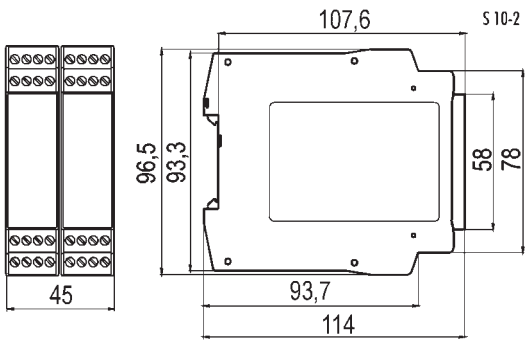


Dimension diagram

SNE 4008S



SNE 4008S-A



Notes

Proper use

The device can only be used as expansion device for safety switching devices.

- The stop and safety categories achieved by the SNE 4008S depend on the categories of the base device (the category of the expansion device cannot exceed that of the base device).
- The expansion devices are controlled via one or two enabling current paths, depending on the required level of safety.
- The device and the contacts must be protected with max. 6 A utilization category gG or through circuit breakers with trigger characteristic B or C.
- The devices must be installed in a control cabinet with a protection degree of at least IP 54.

Please also note the information provided by your trade association.

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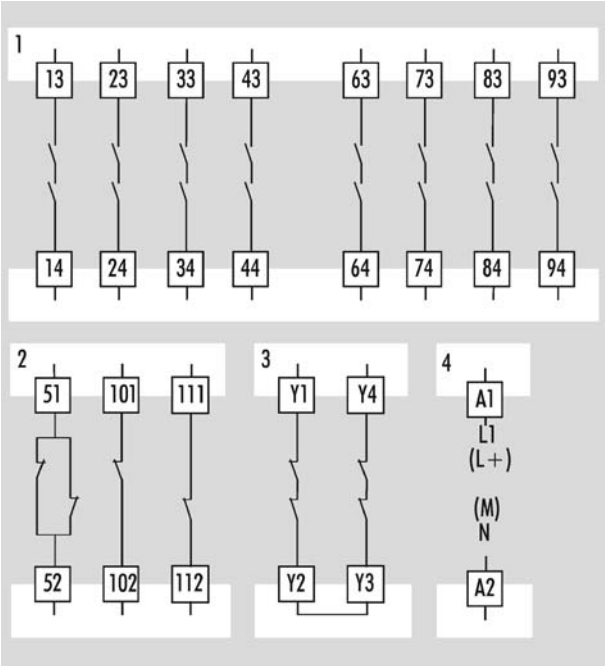
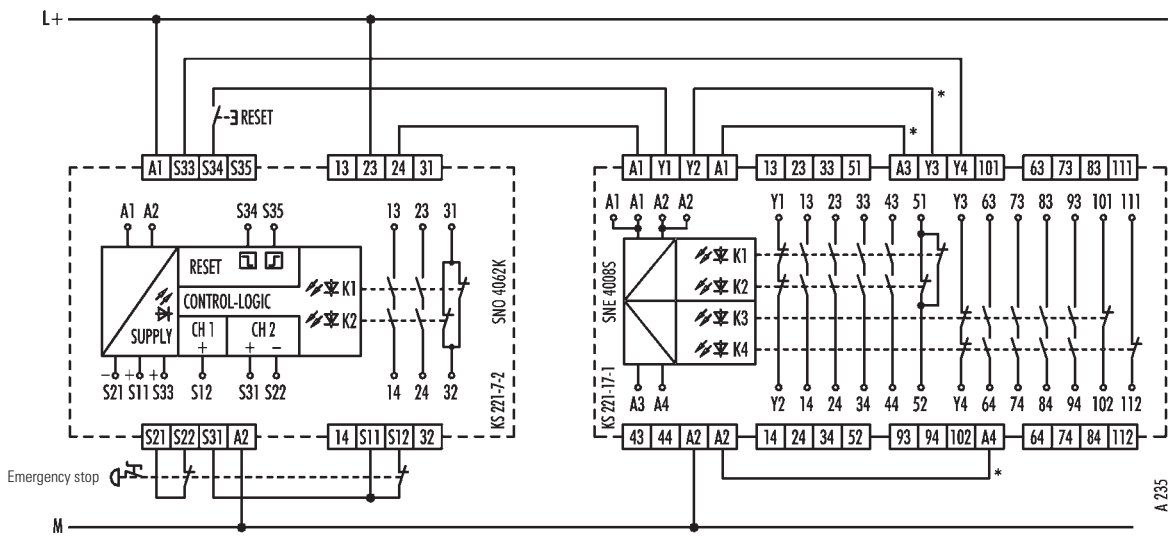
Installation



	Please consult the circuit diagram during installation.
1	**8 enabling current paths (NO contact)**
2	**3 signaling current paths (NC contact)**
3	**1 feedback current path (NC contact)**
4	**Control circuit (power supply)**



Application example

Two-channel emergency stop application (with cross monitoring) with reset button monitoring and contact expansion
Base device SNO 4062K with expansion device SNE 4008S

The two-channel emergency stop application with expansion device SNE 4008S switches off the device even if one of the two contacts of emergency stop button does not open. If an error occurs (for example when the emergency stop contact connected to terminal S12 does not open), the second (redundant) contact S22 will activate safety circuit. The enabling current paths 13/14 and 23/24 open. In case of a short circuit in the lines leading to the emergency stop button, the voltage applied to S11, S21 is short-circuited (cross monitoring). The electronic fuse is triggered and the relays K1, K2 switch back into the OFF position. The devices are reset with a button. If a line short circuit occurs in the reset button after the relay has been activated, this will be recognized by the cyclical self test when reactivating the device. This will inhibit the enabling current paths from closing again. It is possible to perform a restart after an emergency stop, provided that all relays are back into their OFF position.

Input voltage A1/A2 of the SNE 4008S is switched through an enabling current path 23/24 of the base device. When the input voltage is applied relays K1, K2, K3 and K4 switch into the ON position. After this switch-on phase the enabling current paths 13/14, 23/24, 33/34, 43/44 and 63/64, 73/74, 83/84, 93/94 are closed and the feedback current path Y1/Y4 as well as the signaling current paths 51/52, 101/102 and 111/112 are opened. This is displayed through the LEDs K1, K2, K3 and K4 which are assigned to relays K1, K2, K3 and K4. When the enabling current paths of the base device are opened through the operation of the emergency stop button, relays K1, K2, K3 and K4 switch back into the OFF position. The enabling current paths open and the feedback current path closes. Feedback current path Y1/Y4 prevents the base device from switching on again before K1, K2, K3 and K4 releases. The feedback current path Y1/Y2 must be wired to the reset circuit of the base device.

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safety

Technical data		SNE 4008S		
Function according to EN 60204-1		Emergency stop expansion relay		
Function display		4 LEDs green		
Function diagram		FD 221-10-1 W		
Control circuit		min.	typ.	max.
Rated voltage U_N		AC/DC 20.4 V	AC/DC 24 V	AC/DC 26.4 V
Rated consumption DC			2.4 W	2.9 W
Rated consumption AC			2.8 W/4.9 VA	3.4 W/6.0 VA
Residual ripple DC				2.4 V_{SS}
Rated frequency AC		50 Hz		60 Hz
Rated current / peak current			125 mA/2000 mA	150 mA/3500 mA
Response time t_A			20 ms	40 ms
Release time t_R			35 ms	50 ms
Recovery time t_W				100 ms
Feedback current path Y1/Y4		1 NC contact, positively driven		
Rated switching voltage U_N		AC/DC 24 V		
Max. continuous current I_n		1 A		
Contact material		Ag alloy, gold-plated		
Output circuits				
Enabling current paths		8 NO contacts, positively driven		
Rated switching voltage U_n		AC 230 V/DC 300 V		
Max. continuous current I_n/max. total current 13/14, 23/24, 33/34, 43/44		6 A/12 A		
Max. continuous current I_n/max. total current 63/64, 73/74, 83/84, 93/94		6 A/12 A		
Application category according to EN 60947-5-1	3600 h^{-1}	AC-15: U_e 230 V, I_e 6 A / DC-13: U_e 24 V, I_e 3 A		
	360 h^{-1}	DC-13: U_e 24 V, I_e 6 A		
Short-circuit protection, max. fuse insert		6 A class gG or circuit breaker with trigger characteristic B or C		
Contact material		Ag alloy, gold-plated		
Signaling current paths 51/52, 101/102, 111/112		3 NC contacts, positively driven		
Rated operating voltage U_n		AC 230 V/DC 300 V		
Max. continuous current I_n		6 A		
Contact material		Ag alloy, gold-plated		
General data				
Creepage distances and clearances between the circuits		according to EN 60664-1		
Safe isolation		no		
Isolation	Control circuits – output circuits	Basic isolation		
	Output circuit – output circuit	Basic isolation		
Overvoltage category		III		
Rated impulse voltage		4 kV		
Rated voltage		AC 300 V		
Test AC voltage		2 kV		
Degree of pollution of the device: inside / outside		2/3		
Protection degree according to DIN EN 60529 (housing / terminals)		IP 40/IP 20		
Ambient temperature / storage temperature		-25 – +55 °C/-25 – +75 °C		
Dimension diagram		S10-1 (screw terminals)/S 10-2 (pluggable terminals)		
Rated cross sections fine-stranded/solid		2x0.14 – 0.75 mm^2/1x0.14 – 2.5 mm^2		
or fine-stranded with ferrules		1x0.25 – 2.5 mm^2/2x0.25 – 0.5 mm^2		
Permissible tightening torque		0.5 – 0.6 Nm		
Weight		0.44 kg		
Accessories		–		
Approvals				

Overview of the devices/Part numbers

Type	Rated voltage	Terminals	Part No.	Std. Pack
SNE 4008S	AC/DC 24 V 50 – 60 Hz	Terminal block, rising cage termination	R1.188.1290.0	1
SNE 4008S-A	AC/DC 24 V 50 – 60 Hz	Pluggable connector, rising cage termination	R1.188.1300.0	1