Safety switching device
Output expansion SNE 4004K / SNE 4004KV

Output expansion with relay for base devices in safety applications

- Stop category 0 and 1 according to EN 60204-1 (see "Notes")
- Applications up to safety category 4 according to EN 954-1 (see "Notes")
- Single-channel or two-channel control
- SNE 4004K: 4 enabling current paths, undelayed (NO contact)
  3 signaling current paths, undelayed (NC contact)
- SNE 4004KV: 4 enabling current paths, OFF-delayed (NO contact)
  3 signaling current paths, OFF-delayed (NC contact),
  Time buffering

Applications

- Expansion of a base device's enabling current paths
- Contact expansion in safety equipment

Function

SNE 4004K

Supply voltage to the SNE devices is routed via an enabling current path of a base device. When the supply voltage is applied relays K1 and K2 switch into the ON position. After this switch-on phase the four enabling current paths 13/14, 23/24, 33/34, 43/44 (of the SNE 4004K) or 17/18, 27/28, 37/38, 47/48 (of the SNE 4004KV) are closed and the feedback current path Y1/Y2 is open. This is displayed through two LEDs that are assigned to relays K1 and K2.
When the enabling current paths of the base device are opened through the operation of the emergency stop button, relays K1 and K2 on the SNE 4004K switch back into the OFF position. The enabling current paths open and the feedback current path closes. Feedback current path Y1/Y2 prevents the base device from switching on again before K1 or K2 releases.

SNE 4004KV

The functions of this device correspond to those of the SNE 4004K.
The SNE 4004KV is available with the following four OFF-delay times t_{R1}: 0.5 s; 1 s; 2 s and 3 s. The device has an OFF-delay time that is enabled through capacitors. This causes the OFF-delay time $_{R1}$ to elapse completely even in case of failure of the power supply (A1/A2). It cannot be deleted before it has elapsed. Upon timing-out the relays K1 and K2 switch into the OFF position. OFF-delay times of > 0 s correspond to stop category 1.

SNE 4004K-A und SNE 4004KV-A

The functions of these devices correspond to those of the SNE 4004K or SNE 4004KV. Devices with the -A identification in their type designation are equipped with four removable pluggable terminals (see the K4-2 dimension diagram). This feature allows a quick installing/removing operation. The terminal locations are coded and not interchangeable.

Notes

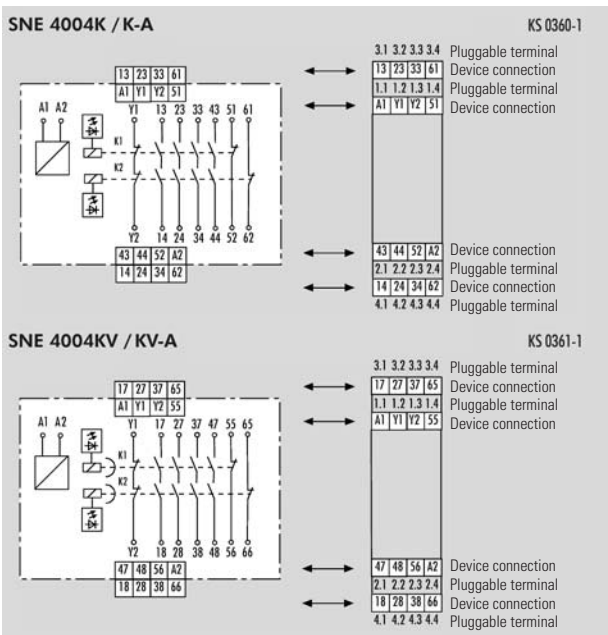
Proper use

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

- The stop and safety categories achieved by the SNE 4004K/KV always depend on the categories of the base device. The category of the expansion device cannot exceed that of the base device. By using the SNE 4004KV max. category 3 according to EN 954-1 can be achieved.
- The expansion relays K1 and K2 are controlled via one or two enabling current paths, depending on the required level of safety.
- The devices can be combined with all safety switching devices (base devices). The feedback current path Y1/Y2 must be wired to the reset or feedback loop of the base device.
- 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.
- For connecting magnetic switches with reed contacts or sensors with semiconductor outputs the peak input current must be considered (see "Technical data").
- 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.

Circuit diagram

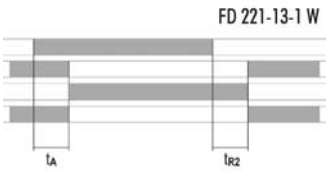


Safety switching device
Output expansion SNE 4004K / SNE 4004KV

safety

Function diagram

SNE 4004K



A1/A2 supply voltage
Y1/Y2 feedback path
13/14, 23/24, 33/34, 43/44, LED K1, LED K2
51/52, 61/62

t_A = response time
t_{R2} = release time

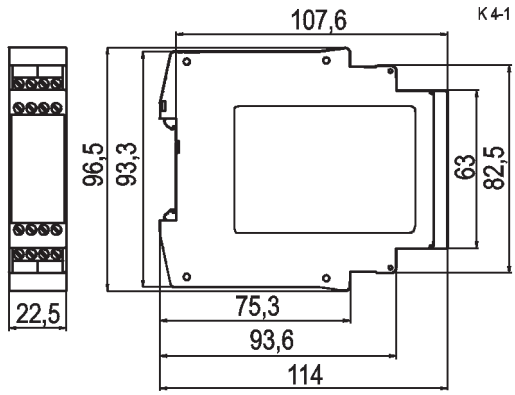
SNE 4004KV

A1/A2 supply voltage
Y1/Y2 feedback path
17/18, 27/28, 37/38, 47/48, LED K1, LED K2
55/56, 65/66

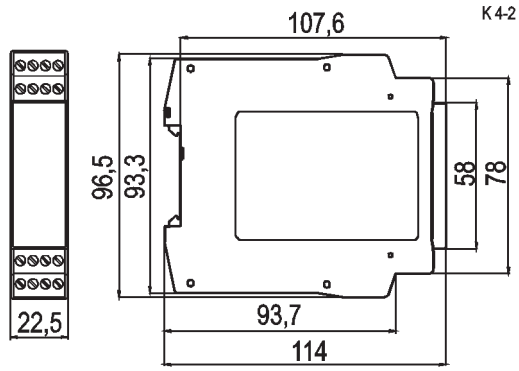
t_A = response time
t_{R1} = release time
t_M = minimum ON time

Dimension diagram

SNE 4004K / KV

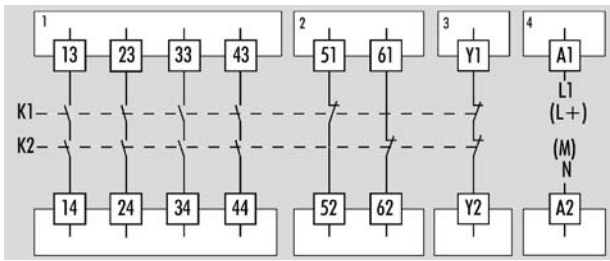


SNE 4004K-A / KV-A

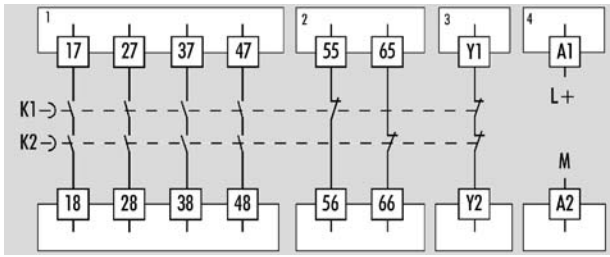


Installation

SNE 4004K



SNE 4004KV



	Please consult the circuit diagram during installation.
1	**4 enabling current paths (NO contact)**
2	**2 signaling current paths (NC contact)**
3	**1 feedback path (NC contact)** for coupling to the base device
4	**Supply voltage**

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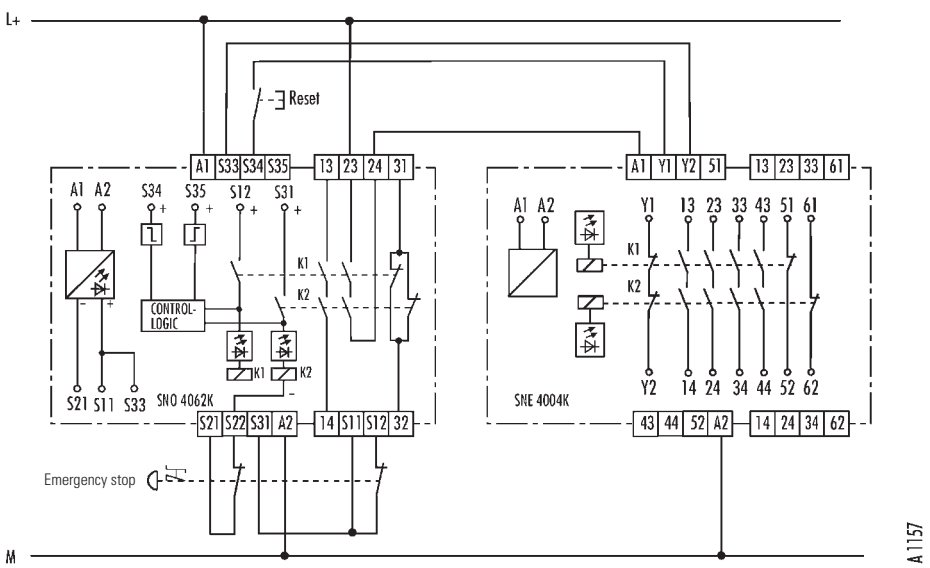
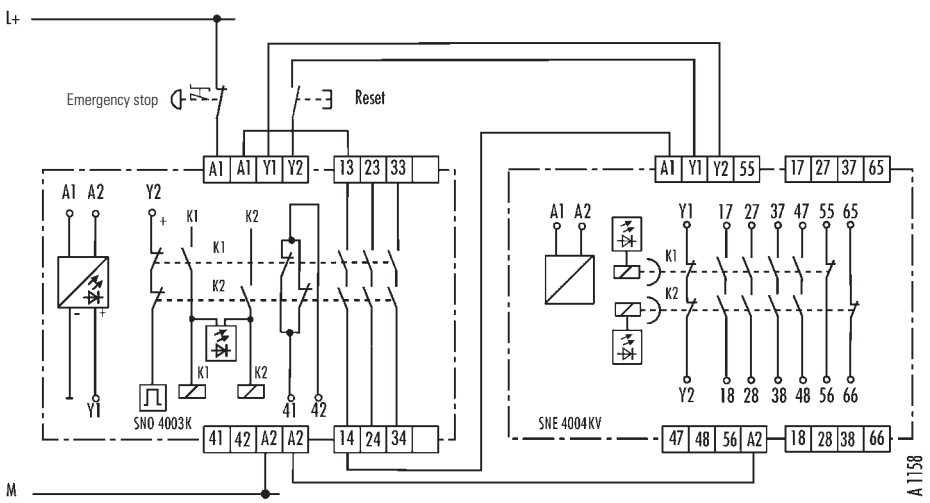
Output expansion SNE 4004K / SNE 4004KV



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 4004K

The two-channel emergency stop application with an expansion device 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 the 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.



Application example

Single-channel emergency stop application with contact expansion
Base device SNO 4003K with expansion device SNE 4004KV

If the number of the enabling current paths of a base device such as the SNO 4003 K are not sufficient or if an OFF-delay time of the enabling current paths is required, the SNE 4004KV can be used for expansion. The expansion switching relays K1 and K2 are triggered via one of the enabling current paths of the base device. The base device is triggered with the "Reset" command through the feedback current path of the expansion device.

Safety switching device
Output expansion SNE 4004K / SNE 4004KV

safety

Technical data		SNE 4004K / SNE 4004KV		
Function according to EN 60204-1		Emergency stop expansion relay		
Function display		2 LEDs green		
Function diagram		FD 221-13-1 W, FD 221-13-2 W		
Power supply circuit		min.	typ.	max.
Rated voltage U_N SNE 4004K		AC/DC 20.4 V	AC/DC 24 V	AC/DC 26.4 V
Rated voltage U_N SNE 4004KV		DC 20.4 V	DC 24 V	DC 26.4 V
Rated consumption DC			1.0 W	
Rated consumption AC			1.5 W/2.7 VA	
Residual ripple DC				2.4 V_{SS}
Rated frequency AC		50 Hz		60 Hz
Rated current / peak current			65 mA/1000 mA	80 mA/1800 mA
Response time t_A			20 ms	
Release time t_{B2} SNE 4004K with emergency stop			40 ms	
Minimum ON time t_M SNE 4004KV		75 ms		
Release time t_{B1} SNE 4004KV (buffered)			0.5 s/1 s/2 s/3 s	
Mean value of the error SNE 4004KV		± 20 %		
Dispersion SNE 4004KV		± 2 %		
Feedback current path Y1/Y2		1 NC contact, positively driven		
Rated switching voltage U_N		DC 24 V		
Max. continuous current I_n		0.1 A		
Contact material		Ag alloy, gold-plated		
Output circuits				
Enabling current paths		4 NO contacts, positively driven		
Rated switching voltage U_n		AC/DC 230 V		
Max. continuous current I_n/max. total current		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		
Mechanical life		10×10^6 switching cycles		
Contact material		Ag alloy, gold-plated		
Signaling current paths		2 NC contacts, positively driven		
Rated operating voltage U_n		AC/DC 230 V		
Max. continuous current I_n		2 A		
Contact material		Ag alloy, gold-plated		
General data				
Creepage distances and clearances between the circuits		according to EN 60664-1		
Overvoltage category		III		
Rated impulse voltage		4 kV		
Rated voltage		AC 300 V		
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		K 4-1 (screw terminals)/K 4-2 (pluggable terminals)		
Rated cross sections fine-stranded/solid		2 x 0.14 – 0.75 mm^2/1 x 0.14 – 2.5 mm^2		
or fine-stranded with ferrules		1 x 0.25 – 2.5 mm^2/2 x 0.25 – 0.5 mm^2		
Permissible tightening torque		0.5 – 0.6 Nm		
Weight		0.20 kg		
Accessories		–		
Approvals				

Overview of devices/part numbers

Type	OFF-delay	Rated voltage		Terminals	Part No.	Std. Pack
SNE 4004K	–	AC/DC 24 V	50 – 60 Hz	Terminal block, rising cage termination	R1.188.0520.0	1
SNE 4004K-A	–	AC/DC 24 V	50 – 60 Hz	Pluggable connector, rising cage termination	R1.188.0590.0	1
SNE 4004KV	0,5 s	DC 24 V		Terminal block, rising cage termination	R1.188.0550.0	1
	1 s	DC 24 V		Terminal block, rising cage termination	R1.188.0560.0	1
	2 s	DC 24 V		Terminal block, rising cage termination	R1.188.0570.0	1
	3 s	DC 24 V		Terminal block, rising cage termination	R1.188.0580.0	1
SNE 4004KV-A	0,5 s	DC 24 V		Pluggable connector, rising cage termination	R1.188.0460.0	1
	1 s	DC 24 V		Pluggable connector, rising cage termination	R1.188.0470.0	1
	2 s	DC 24 V		Pluggable connector, rising cage termination	R1.188.0480.0	1
	3 s	DC 24 V		Pluggable connector, rising cage termination	R1.188.0490.0	1