



Basic device for Emergency-Stop, Safety Gate, Switching Mat and Light Grille Applications

PI 0125-0903 E

SNO 4063K
SNO 4063KM
SNO 4063KR



EN 60204-1	Stop category	0
EN 954-1	Safety category	4

- Base device to IEC 60204-1 and EN 954-1 for single-channel and two-channel emergency stop monitoring.
- Category 4 to EN954-1
- Stop category 0 to EN 60204-1
- Manual or automatic start
- With/without cross monitoring
- Feedback circuit for monitoring external contactors
- 3 enabling current paths, NO contacts, positively driven
- For processing signals from the output signal switching devices (OSSD) of a light grille acc. to DIN EN 61496-1
- For connecting to a switching mat acc. to DIN EN 1760-1 (SNO 4063KM)
- Input debouncing (SNO 4063KM safety gate and light grille application)
- Power-on reset on SNO 4063KR (without starting lockout)

Device style

SNO 4063K / KR / KM with screw terminals

SNO 4063K-A / KR-A / KM-A with plug-in terminals

Description of Device and Function

SNO 4063K This device is a two-channel safety switching device for emergency stop applications with self-monitoring on each ON-OFF cycle. It conforms to EN 60204-1 and is equipped with positively driven relays.

Basic function: After supply voltage has been connected to terminals A1/A2 and the safety inputs closed, operating the reset button closes the enabling current paths (manual start). When the safety inputs are opened/de-excited the enabling current paths will open.

Operating modes / system functions

- **One- or two-channel activation** With single-channel activation both safety channels CH1 and CH2 are connected in parallel, with two-channel activation they are connected separately.
- **Without cross monitoring** Both safety channels are connected to positive potential (S12 and S31 to S11).
- **With cross monitoring** Safety channel CH1 is connected to positive potential (S11 to S12) and safety channel CH2 to negative potential (S21 to S22).
- **Manual start** When the safety inputs are closed, a button is used to open reset input S34 (triggering with falling edge) or to close reset input S35 (triggering with rising edge).
- **Automatic start** Reset input S35 is connected to S33. The device starts with the rising edge of the signal on safety input S12.
- **Starting lockout** After supply voltage has been connected and the safety inputs closed, the enabling paths will not close. Starting is only possible after the reset button has been operated. For starting lockout the reset inputs have to be activated with the button, as in manual start mode.
- **Restarting lockout** No restart after the safety inputs have been opened and closed. Restarting is only possible after the reset button has been operated. For restarting lockout the reset inputs have to be activated with the button, as in manual start mode.
- **OSSD-compatible** OSSD signals from a light barrier or other safety sensors with semiconductor outputs can be processed. Test pulses $< t_{TP}$ do not influence the device functions. Test pulses $> t_{TP}$ can lock the device.
- **Synchro-check** With two-channel activation both safety channels are monitored together with synchronous time t_s . Safety channel CH1 must close before CH2 and bridge S33/S35 must be connected. If CH2 closes before CH1, the synchronous time $t_s = \infty$.

SNO 4063KR The functions of this device correspond to those of the SNO 4063K without starting lockout. I.e. after supply voltage has been connected and the safety inputs closed, the enabling current paths will close, independent of the start mode.

SNO 4063KM The functions correspond to those of SNO 4063K without simultaneity monitoring. The device is suitable for connecting to short-circuit-forming 4-wire switching mats, switching strips and switching edges (without monitoring resistance). The device must be operated with two channels and cross monitoring. If there is resistance $< 50 \Omega$ /channel and a short circuit between the channels (S11/S12 and S21/S22) the enabling paths open and the SUPPLY LED flashes. Input debouncing prevents fast consecutive switching of the enabling outputs when the safety inputs open for shorter than t_{ASP} . When the safety inputs open for longer than t_{ASP} the enabling paths open after t_R . Restarting is prevented for time t_{SP} .

Please observe instructions from safety authorities.



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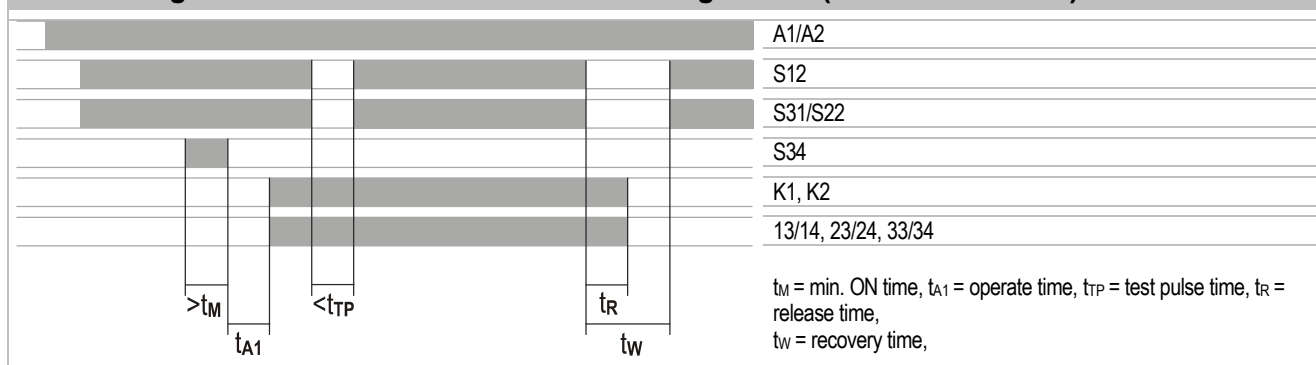
Proper Use

The devices are safety switching devices. They must only be used as components of safety equipment on machines intended to protect persons, material and plant.

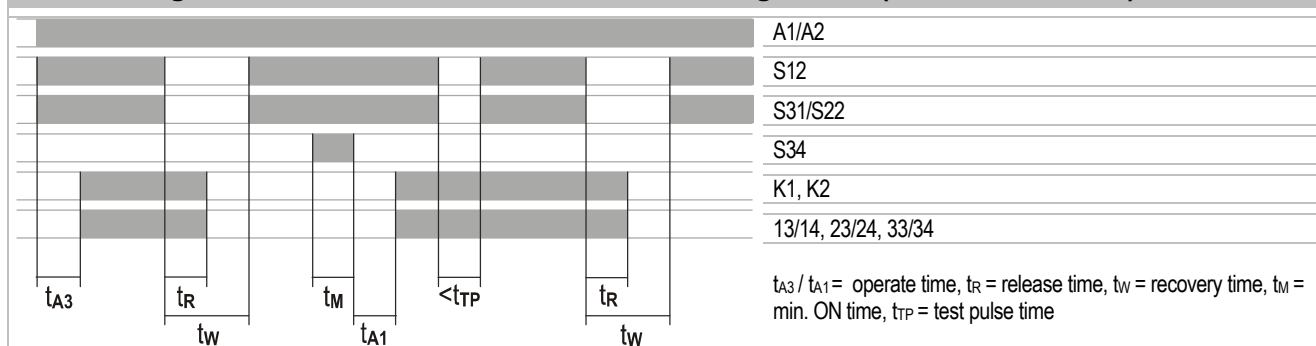
Notes

- The safety category acc. to EN 954-1 depends on the external circuitry, the choice of control devices and their location on the machine.
- The indicated times must be observed when the device is operated, otherwise the device could lock. Locking can be cancelled by opening the safety inputs properly.
- SNE expansion devices or external contactors with positively driven contacts can be used to duplicate the enabling current paths.
- The device and the contacts must be protected at max. 6 A utilization category gG.
- The devices are equipped with overload protection (for short-circuit). After the malfunction has been dealt with, the device is operational again in approx. 3 s.
- Control output S11 is exclusively for connecting control devices as defined in the operating instructions and not for connecting external consumers such as lamps, relays or contactors.
- The devices must be installed in a cabinet with a protection class of at least IP 54.

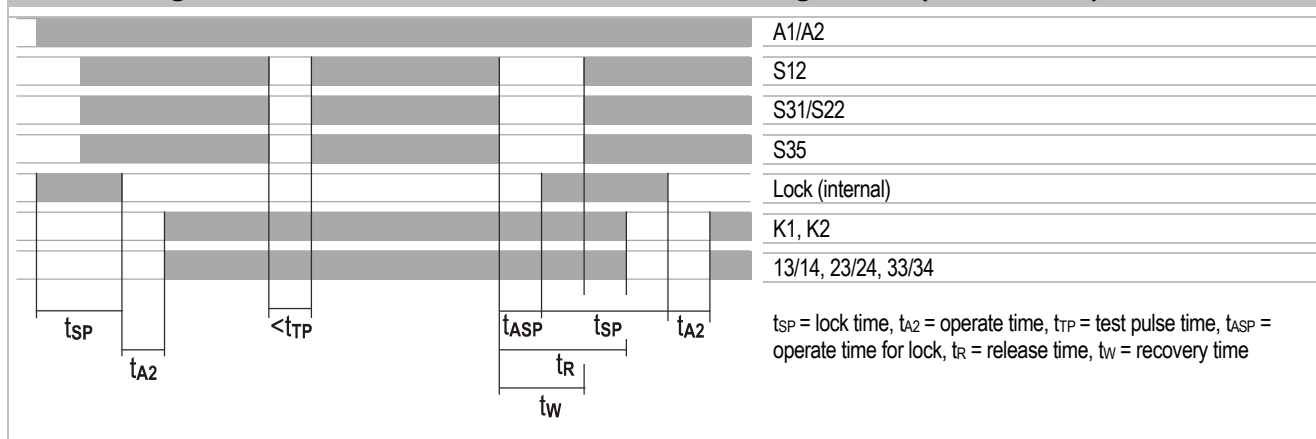
Function diagram SNO 4063K manual start with starting lockout (installation 1 and 3)



Function diagram SNO 4063KR manual start without starting lockout (installation 1 and 3)



Function diagram SNO 4063KM automatic start without starting lockout (installation 5)



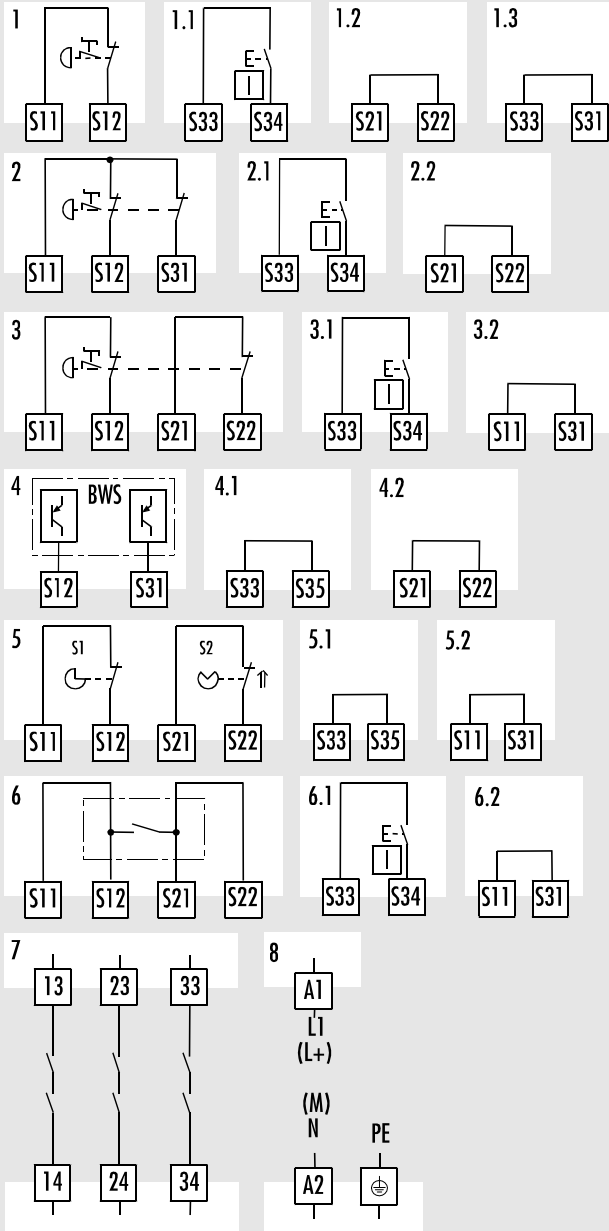


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Installation



	Please consult the connection diagram during installation.
1	Emergency stop button single-channel, manual start (for DC devices)
1.1	Reset button
1.2	Bridge
1.3	Bridge
2	Emergency stop button two-channel, manual start, without cross monitoring (for DC devices)
2.1	Reset button
2.2	Bridge
3	Emergency stop button two-channel, manual start, with cross monitoring
3.1	Reset button
3.2	Bridge (for DC devices)
4	OSSD actuation two-channel, automatic start, without cross monitoring (for DC devices)
4.1	Bridge
4.2	Bridge
5	Safety grille two-channel, automatic start, with cross monitoring
5.1	Bridge
5.2	Bridge (for DC devices)
6	Switching mat (SNO 4063KM) two-channel, manual start, with cross monitoring, switching mat shown not operated
6.1	Reset button
6.2	Bridge
7	Enabling current paths 3 NO contacts, positively driven
8	Supply voltage (PE on AC devices only)



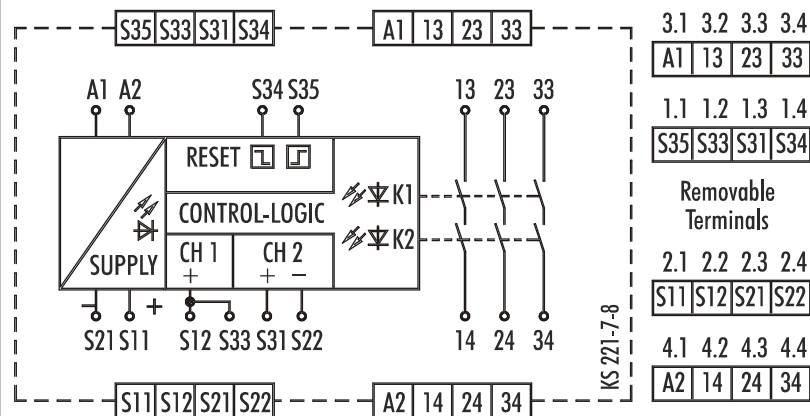
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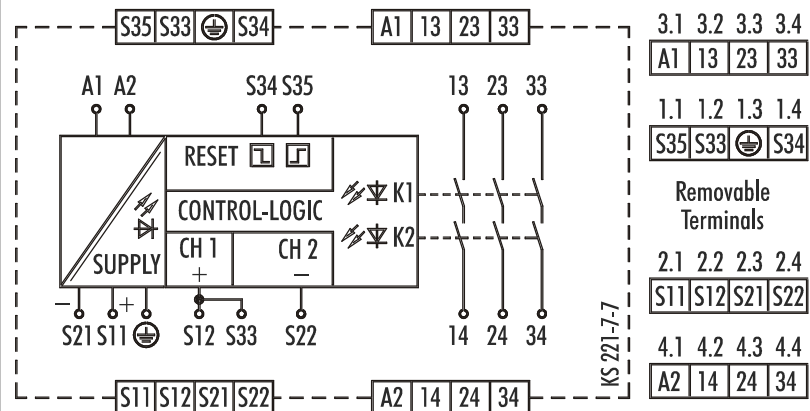
Connection Diagrams

SNO 4063K / KR / KM / K-A / KR-A / KM-A AC/DC 24 V



Removable Terminals only on devices with style -A (plug-in terminals)

SNO 4063K / KR / K-A / KR-A AC 115 V / AC 230 V



Removable Terminals only on devices with style -A (plug-in terminals)

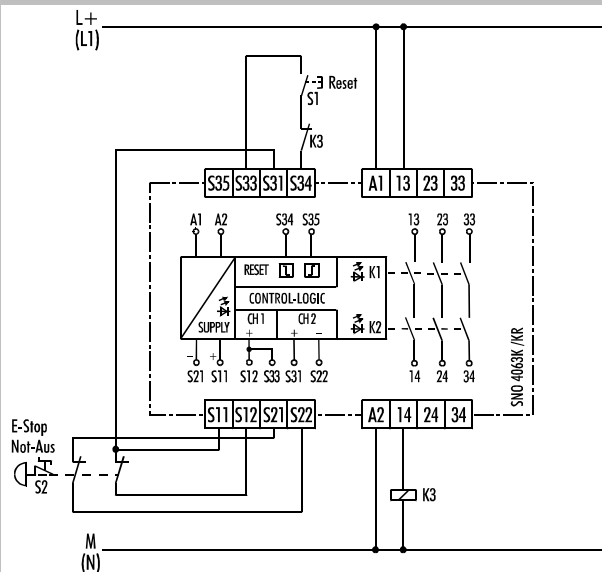


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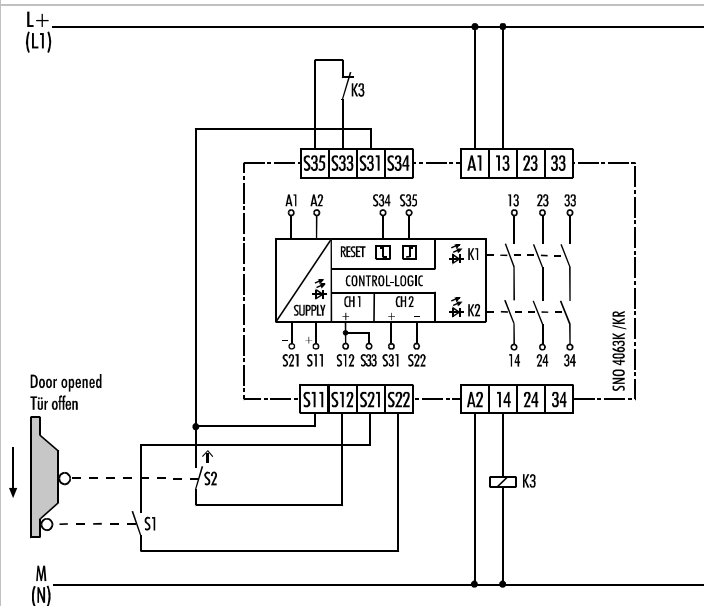
Application Examples



Two-Channel E-STOP, Cross Monitoring manual Start

The two-channel E-STOP circuit will switch off even if one of the two contacts of the E-STOP button does not open. If a fault occurs (for instance if the E-STOP button contact connected to S12 does not open), then the safety circuit is activated by the second (redundant) contact S22. The enabling current paths 13/14, 23/24, and 33/34 open. New start is possible with the RESET button after release the E-STOP button (manual start).

If the lines leading to the E-STOP button are short circuited, the voltage at S11, YS21 is short circuited (cross-monitoring). The relays K1, K2 drop back into their initial position, and the electronic fuse responds. A line short through the RESET button, which has occurred after the relay has been activated, is detected by means of the cyclic self-test with a new switching process, and the enabling current paths are prevented from switching through.



Two-Channel Protective Gate Monitoring, Cross-Monitoring, Automatic START

The position of the sliding protective gate is monitored via channel 1 (S12) and channel 2 (S22). A synchronous check of $t_s \approx 0,5$ s approx is performed when closing channel 1 before channel 2. If channel 2 is closed before channel 1 there is no check ($t_s = \infty$). If the sliding protective gate is opened enabling paths 13/14, 23/24, 33/34 open. If the protective gate is closed again, the NC contact of the contactor K3 allow the device to activate again (automatic START).

Supply voltage reset on SNO 4063KR is performed. I.e. after supply voltage has been connected and the safety inputs closed, the enabling current paths will close.



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Technical data

Power circuitry	SNO 4063K / -A SNO 4063KR / -A	SNO 4063KM / -A
Rated voltage U_N	DC 12 V, AC/DC 24 V AC 115 - 120 V, AC 230 V	AC/DC 24 V
Rated power DC	DC 2.0 W	DC 2.1 W
Rated power AC	AC 2.4 W / 4.4 VA	AC 2.5 W / 4.6 VA
Residual ripple U_{SS}	2.4 V	
Rated frequency	50 ... 60 Hz	
Operating voltage range	0.85 ... 1.1 x U_N	
Protection for control circuit supply	Short-circuit-proof	
Control circuit		
Outputs (S11, S21)		
Rated output voltage (S11 to S21)	DC 22 V	
No-load voltage (AC devices only)	< 40 V	
Output current	100 mA	
Short-circuit-proof / current limiting	Yes / --	Yes / 250 mA
Inputs (S12/S33, S31/S22, S34, S35)		
Input voltage range (DC devices only)	DC 17.4 V to DC 26.4 V	
Rated current / peak current (safety inputs S12/S33, S31/S22)	40 mA / 100 mA	
Rated current / peak current (reset inputs S34, S35)	5 mA / 50 mA	
Times		
Permissible test pulse time t_{TP} / test frequency	$\leq 1000 \mu\text{s} / \leq 10 \text{ s}^{-1}$	
Operate time t_{A1} (reset input S34)	20 ms to 40 ms	
Operate time t_{A2} (reset input S35)	200 ms to 600 ms	20 ms to 80 ms
Operate time t_{A3} (only SNO 4063KR)	100 ms to 400 ms	---
Min. ON time t_M (reset inputs S34, S35)	> 80 ms	
Lock time t_{SP}	---	70 ms to 130 ms
Operate time of lock t_{ASP}	---	> 7 ms
Recovery time t_W	$\geq 100 \text{ ms}$	
Release time t_R (K1, K2)	< 25 ms	
Synchronous time t_S	$\approx 0.2 \text{ s}$	---
Output circuit		
Enabling paths		
Contact equipment	3 NO contacts, positively driven	
Rated switching voltage U_n	AC 230 V / DC 300 V	
Max. continuous current I_n per current path	6 A	
Max. total current for all current paths AC 12 V, AC/DC 24 V	12 A	
AC 115 - 120 V, AC 230 V	8 A	
Utilization category according to IEC 947-5-1	AC-15: U_e 230 V, I_e 4 A (3600 h ⁻¹) DC-13: U_e 24 V, I_e 4 A (3600 h ⁻¹) AC-15: U_e 230 V, I_e 3 A (3600 h ⁻¹) DC-13: U_e 24 V, I_e 2.5 A (3600 h ⁻¹)	
Mechanical service life (switching cycles)	10x10 ⁶	
General data		
Clearance/creepage distance between circuits	to DIN VDE 0110 Part 1: 04.97	
Rated impulse withstand level	4 kV	
Contamination level of device: inside / outside	2 / 3	
Rated voltage	AC 300 V	
Protection class to DIN VDE 0470 Part 1: housing / terminals	IP 40 / IP 20	
Ambient / storage temperature	-25 ... +55 / -25 ... +75 °C	
Weight	DC device	0.21 kg
	AC device	0.25 kg
Terminals and connection		
Single-core or finely stranded	1 x 0.14 mm ² to 2.5 mm ²	2 x 0.14 mm ² to 0.75 mm ²



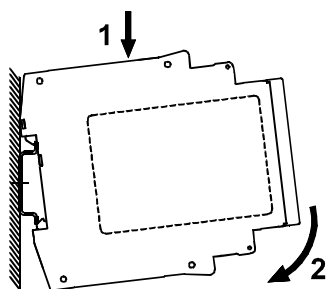
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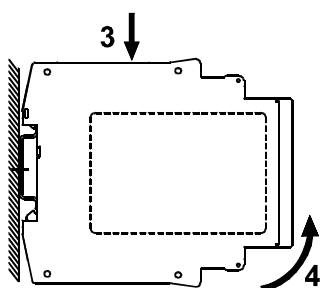
Stripping length	max. 8 mm	
Finely-stranded with wire-end ferrule to DIN 46228	1 x 0.25 mm ² to 2.5 mm ²	2 x 0.25 mm ² to 0.5 mm ²
Max. tightening torque	0.5 to 0.6 Nm	
For UL and CSA applications	Conductor sizes	AWG 18-16 use only Cu lines
	Max. tightening torque	0.79 in-lbs

Assembly



- 1 Attach device to DIN rail.
- 2 Press carefully onto the DIN rail (in direction of arrow) until it locks into place.

Disassembly

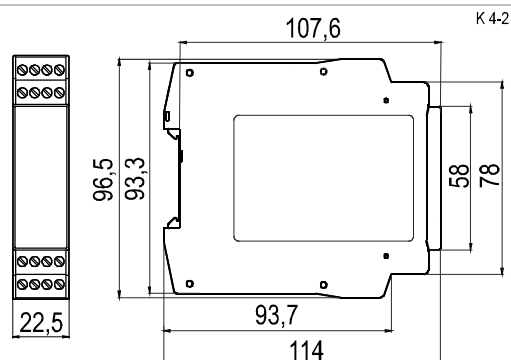
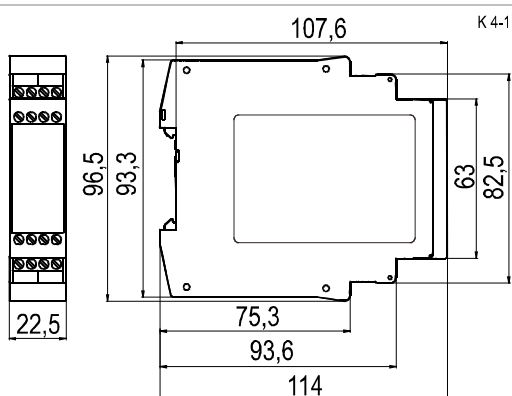


- 3 Push down (in direction of arrow)
- 4 Release and remove it from the DIN rail (see arrow)

Dimension Diagram

SNO 4063K / SNO 4063KR / SNO 4063KM

SNO 4063K-A / SNO 4063KR-A / SNO 4063KM-A



Subject to changes

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