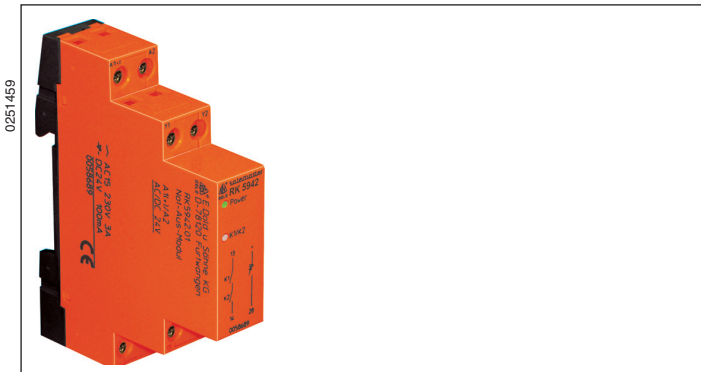
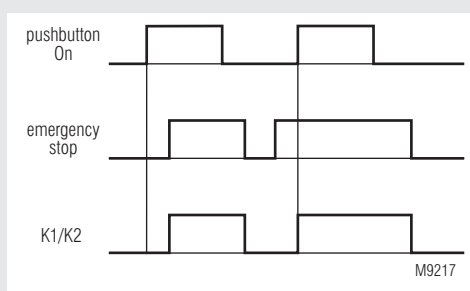


SAFEMASTER Emergency Stop Module, Extremely Small RK 5942



- According to
 - Performance Level (PL) e and category 4 to EN ISO 13849-1: 2008
 - SIL Claimed Level (SIL CL) 3 to IEC/EN 62061
 - Safety Integrity Level (SIL) 3 to IEC/EN 61508 and IEC/EN 61511
- 1- or 2-channel operation
- Output: 1 NO contact and 1 semiconductor monitoring output
- LED-indicator for relay 1 / 2 and supply voltage
- Width 17.5 mm and 64 mm depth

Function Diagramm



Approvals and Markings



Applications

- Protection of people and machines
- Emergency stop circuits on machines

Indicators

LED Power: on, when supply connected
LED K1/K2: on, when relay K1 and K2 energized

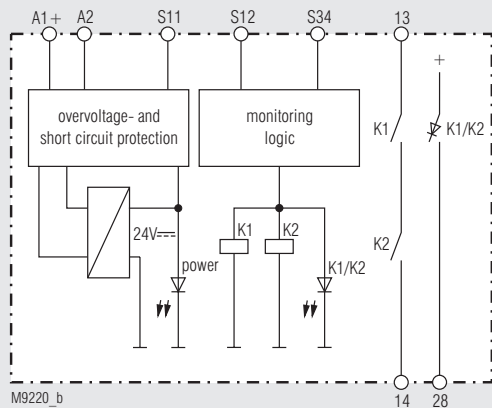
Note

ATTENTION - AUTOMATIC START!

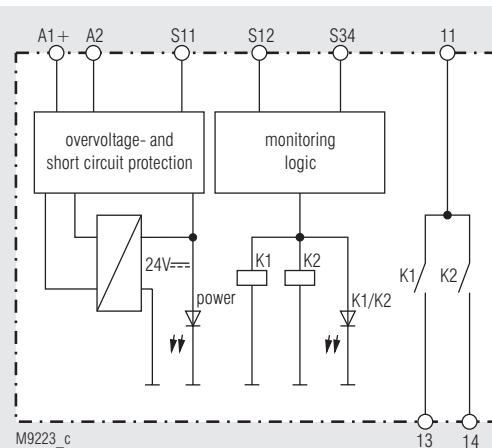


According to IEC/EN 60 204-1 part 9.2.5.4.2 and 10.8.3 it is not allowed to restart automatically after emergency stop. Therefore the machine control has to disable the automatic start after emergency stop.

Block Diagrams

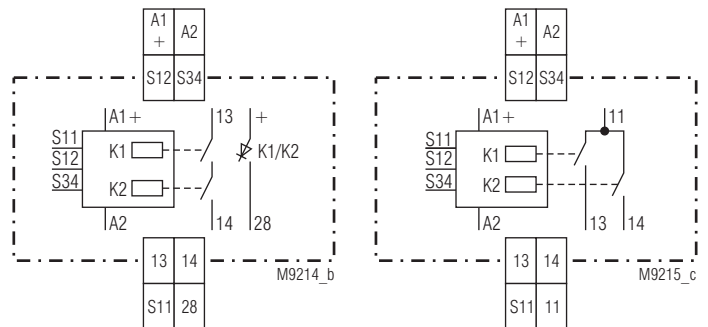


RK 5942.02



RK 5942.03

Circuit Diagrams



RK 5942.02

RK 5942.03

Connection Terminals

Terminal designation	Signal designation
A1+	+ / L
A2	- / N
S12, S34	Inputs
S11	Output
11, 13, 14	Forcibly guided NO contacts for release circuit
28	Semiconductor monitoring output

Technical Data	
Input	
Nominal voltage U_N:	
RK 5942.02:	DC 24 V
RK 5942.03:	DC 24 V
Voltage range:	
at 10 % residual ripple:	DC 0.9 ... 1.1 U_N
Nominal consumption	
DC 24 V:	DC 2.2 W
Control voltage on S11	
DC 24 V:	typ. DC 22.5 V
Control current	
DC 24 V:	typ. DC 95 mA
Recovery time:	
	0.5 s

Output

Contacts	
RK 5942.02:	1 NO contact, 1 semiconductor monitoring output
RK 5942.03:	2 NO contacts, with common source terminal

ATTENTION ! The relay with semiconductor output is available as DC device only. The semiconductor output can only be used for monitoring.

Operate delay	
DC 24 V:	typ. DC 80 ms
Release delay	
DC 24 V:	typ. DC 70 ms
Contact type:	
	forcibly guided
Thermal current I_{th}:	
	max. 5 A (see continuous current limit curve)

Nominal output voltage:	
	AC 250 V
Switching capacity	
to AC 15:	
NO contacts:	3 A / AC 230 V IEC/EN 60 947-5-1
to DC 13:	
NO contacts:	2 A / 24 V IEC/EN 60 947-5-1

Electrical life	
at 5 A, AC 230 V $\cos \varphi = 1$: according to DC 13 semiconductor output:	> 10^5 switching cycles DC 24 V, 100 mA, short circuit strong
Output voltage at 100 mA:	21.5 V
Permissible operating frequency:	
	600 switching cycles / h
Short circuit strength	
max. fuse rating:	6 A gL IEC/EN 60 947-5-1
line circuit breaker:	B 6
Mechanical life:	
	10×10^6 switching cycles

General Data

Operating mode:	
	Continuous operation
Temperature range	
operation:	- 15 ... + 55 °C
storage :	- 25 ... + 85 °C
altitude:	
	< 2.000 m
Clearance and creepage distances	
rated impuls voltage / pollution degree:	4 kV / 2 (basis insulation) IEC 60 664-1
EMC	
Electrostatic discharge:	8 kV (air) IEC/EN 61 000-4-2
HF-irradiation:	10 V / m IEC/EN 61 000-4-3
Fast transients:	2 kV IEC/EN 61 000-4-4
HF-wire guided:	10 V IEC/EN 61 000-4-6
Interference suppression:	Limit value class B EN 55 011
Degree of protection	
Housing:	IP 40 IEC/EN 60 529
Terminals:	IP 20 IEC/EN 60 529
Housing:	
	Thermoplastic with V0 behaviour according to UL subject 94
Vibration resistance:	
	Amplitude 0.35 mm frequency 10 ... 55 Hz, IEC/EN 60 068-2-6
Climate resistance:	
	15 / 055 / 04 IEC/EN 60 068-1

Technical Data	
Terminal designation:	
	EN 50 005
Wire connection	
cross section:	1 x 0.5 ... 6 mm ² solid or stranded ferruled (isolated)
Wire fixing:	
	Plus-minus terminal screws M 3.5 box terminals
Mounting:	
	DIN rail IEC/EN 60 715
Weight:	
	110 g
Dimensions	
Width x height x depth:	
	17.5 x 90 x 71 mm
Mounting depth:	
	64 mm
Safety Related Data	

Values according to EN ISO 13849-1:		
Category:	4	
PL:	e	
MTTF _d :	1442.5	a
DC _{avg} :	99.0	%
d _{op} :	365	d/a (days/year)
h _{op} :	24	h/d (hours/day)
t _{Zyklus} :	3600	s/Zyklus
	= 1	/h (hour)

Values according to IEC/EN 62061 / IEC/EN 61508 / IEC/EN 61511:		
SIL CL:	3	IEC/EN 62061
SIL	3	IEC/EN 61508 / IEC/EN 61511
HFT ¹⁾ :	1	
DC _{avg} :	99.0	%
SFF	99.8	%
PFH _D :	3,21E-11	h ⁻¹
T ₁ :	20	a (years)

¹⁾ HFT = Hardware-Failure Tolerance



The values stated above are valid for the standard type. Safety data for other variants are available on request.

The safety relevant data of the complete system has to be determined by the manufacturer of the system.

Standard types

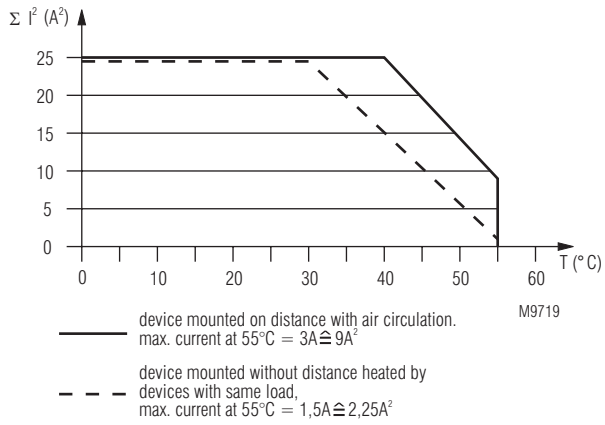
RK 5942.02 DC 24 V

Article number:

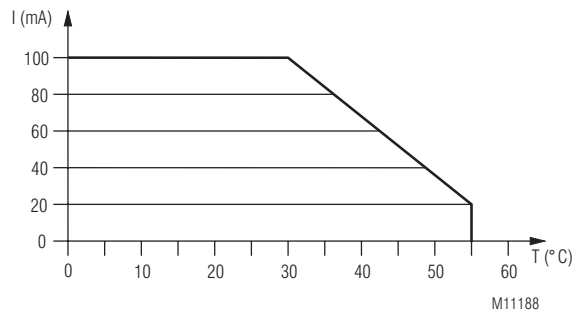
0058690

- Output: 1 NO contact, 1 semiconductor output
- Nominal voltage U_N : DC 24 V
- Width: 17.5 mm

Characteristics

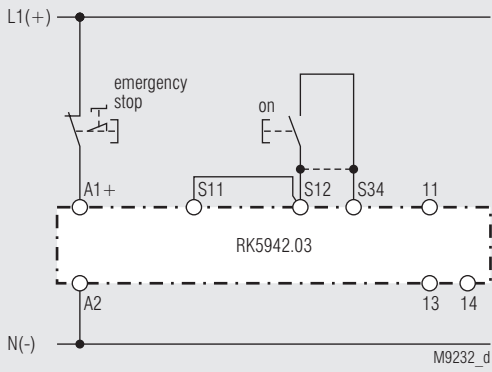


Continuous current limit curve



Continuous current limit curve semiconductor outputs

Application Examples



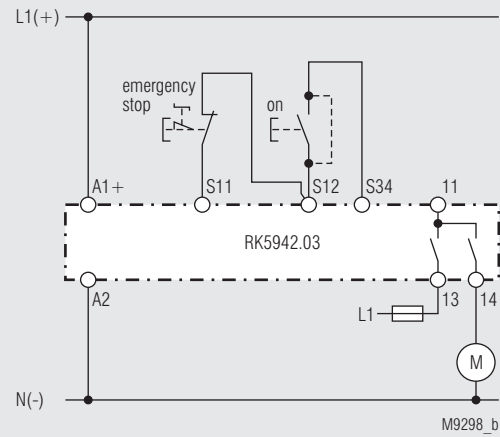
Single channel emergency-stop circuit without feed back loop, with or without automatic restart.

For automatic restart terminals S12 - S34 must be linked.

No ON-pushbutton necessary.

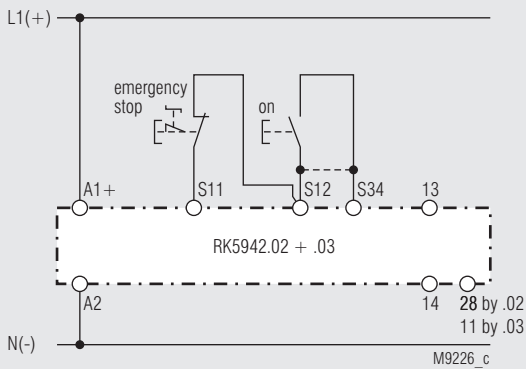
ATTENTION ! This application can only be used for RK 5942.03. Ge-suited up to SIL2, Performance Level d, Cat. 3

Application Examples



ATTENTION ! For applications of safety stops the load must be connected to the contacts in series with 2 NO contacts.

Suited up to SIL2, Performance Level d, Cat. 3

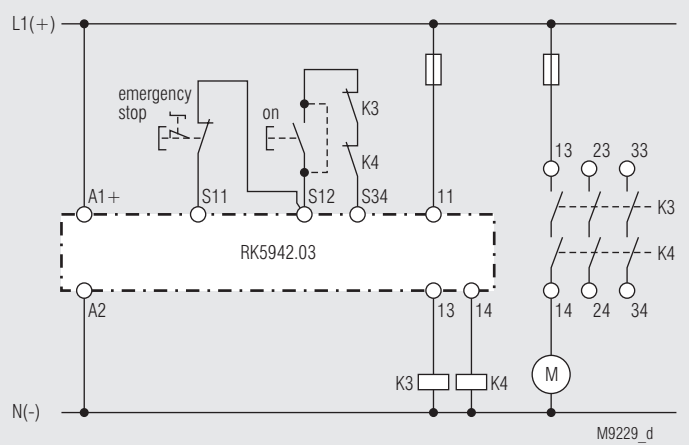


Single channel emergency-stop circuit without feed back loop, with or without automatic restart.

For automatic restart terminals S12 - S34 must be linked.

No ON-pushbutton necessary.

Suited up to SIL2, Performance Level d, Cat. 3



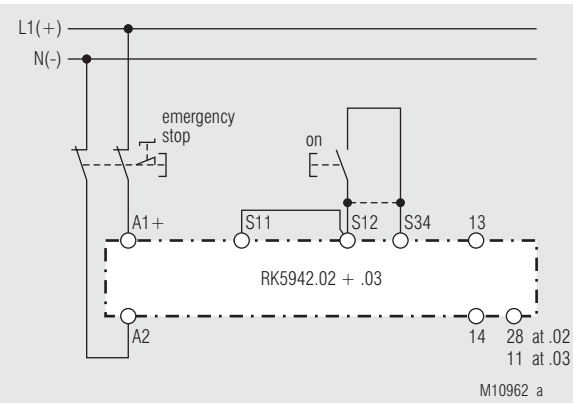
Contact reinforcement by external contactors.

At a thermal current $I_{th} > 5$ A the output contacts can be reinforced by external contactors with forcibly guided contacts.

Functioning of the external contactors is monitored by looping the NC contacts into the start circuit (S12 - S34).

ATTENTION ! For applications of safety stops the load must be connected to the contacts in series with 2 NO contacts.

Suited up to SIL2, Performance Level d, Cat. 3



2-channel emergency-stop circuit without feed back loop, as option with or without automatic restart.

For automatic restart terminals S12 - S34 must be linked.

No ON-pushbutton necessary.

ATTENTION ! When this application is used with RK5942.02, it must be guaranteed that the external circuit on contact 28 has no feedback influence. I.e. no external voltage must be connected to contact 28.

Suited up to SIL3, Performance Level e, Cat. 4

*) Suited up to SIL3, Performance Level e, Cat. 4, when the complete e-stop circuit is within the same cabinet.