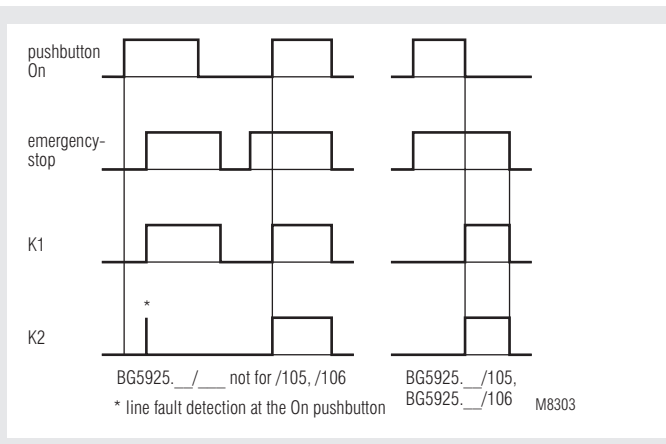


SAFEMASTER Emergency Stop Module BG 5925



- 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
- Output: max. 3 NO contacts, see contacts
- Single and 2-channel operation
- Line fault detection on On-button
- Manual restart or automatic restart, switch S2
- With or without cross fault monitoring in the E-stop loop, switch S1
- LED indicator for channel 1 and 2 and Power
- Removable terminal strips
- Wire connection: also 2 x 1.5 mm² stranded ferruled (isolated), DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm² stranded ferruled DIN 46 228-1/-2/-3
- Width 22.5 mm

Function Diagram



Approvals and Marking



* see variants

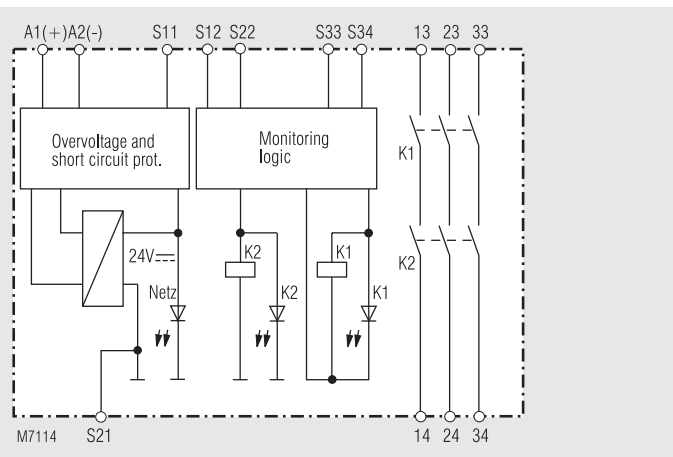
Applications

- Protection of people and machines
- Emergency stop circuits on machines
 - Monitoring of safety gates

Indicators

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

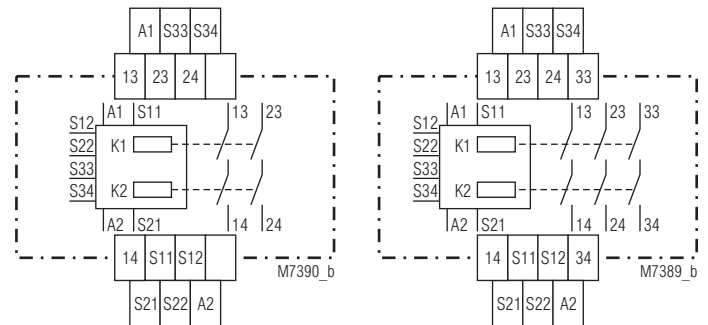
Block Diagram



Connection Terminals

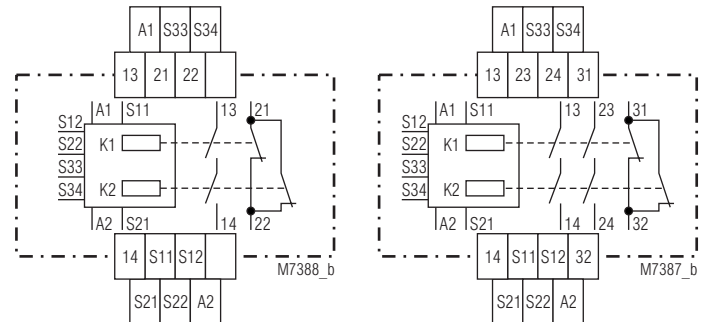
Terminal designation	Signal designation
A1+	+ / L
A2	- / N
S12, S22, S33, S34	Inputs
S11, S21	Outputs
13, 14, 23, 24, 33, 34	Forcibly guided NO contacts for release circuit
21, 22, 31, 32	Forcibly guided indicator output

Circuit Diagrams



BG 5925.02

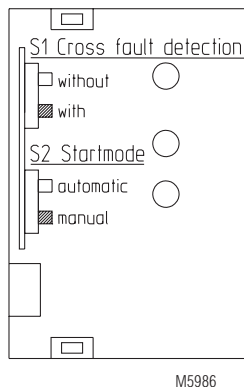
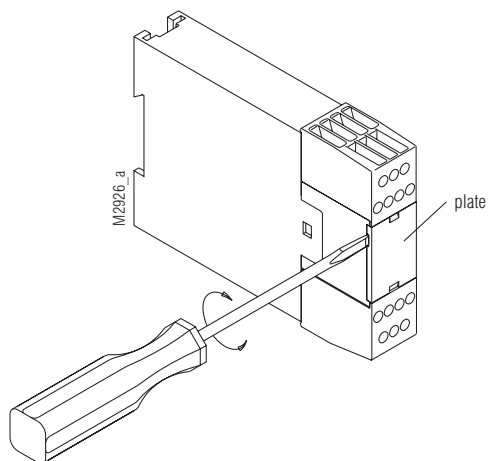
BG 5925.03



BG 5925.16

BG 5925.22

Unit programming



	S1	S2	Function
	available in unit		
BG 5925	yes	yes	
BG 5925._./101	yes	yes	
BG 5925._./102	no	no	automatic + without
BG 5925._./103	no	no	manual + with
BG 5925._./104	no	no	automatic + with
BG 5925._./105	no	yes	without
BG 5925._./106	no	yes	with

Disconnect unit before setting of S1
Drawing shows setting at the state of delivery

Notes

Line fault detection on On-button:

The line fault detection is only active when S12 and S22 are switched simultaneously. If the On-button is closed before S12, S22 is connected to voltage (also when line fault across On-Button), the output contacts will not close. A line fault across the On-button which occurred after activation of the relay, will be detected with the next activation and the output contacts will not close. If a line fault occurs after the voltage has been connected to S12, S22, the unit will be activated because this line fault is similar to the normal On-function. The gold plated contacts of the BG 5925 mean that this module is also suitable for switching small loads of 1 mVA - 7 VA, 1 mW - 7 W in the range 0.1 - 60 V, 1 - 300 mA. The contacts also permit the maximum switching current. However since the gold plating will be burnt off at this current level, the device is no longer suitable for switching small loads after this (not for variant BG 5925.22/102).

The terminal S21 permits the operation of the device in IT-systems with insulation monitoring, serves as a reference point for testing the control voltage and is used to connect the E-stop loop when cross fault monitoring is selected.

Connecting the terminal S21 to the protective ground bridges the internal short-circuit protection of Line A2 (-). The short-circuit protection of line A1 (+) remains active.

To alter the functions automatic start - manual start and with or without cross fault monitoring, the switches S1 and S2 are used. These are located behind the front cover (see unit programming).

The setting with or without cross fault monitoring on E-stop buttons is made with S1. S2 is used to change between automatic and manual restart. On automatic start also the terminals S33 - S34 have to be linked. For connection please see application examples.

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.

Technical Data

Input circuit

Nominal Voltage U_N:	DC 24 V, AC/DC 24 V AC 230 V with variant /105 and /106
Voltage range	DC AC/DC
at 10% residual ripple:	0.9 ... 1.1 U_N 0.95 ... 1.1 U_N
at 48% Residual ripple:	0.8 ... 1.1 U_N 0.8 ... 1.1 U_N
AC:	— 0.85 ... 1.1 U_N
Nominal consumption:	DC approx. 2 W
Min. Off-time:	250 ms
Control voltage on S11:	DC 23 V at U_N
Control current over S12, S22:	40 mA at U_N
Min. voltage between terminals S12, S22 and S21:	DC 21 V when relay activated and U_N on A1 - A2
Short-circuit protection:	Internal PTC
Overvoltage protection:	Internal VDR

Output

Contacts	2 NO contacts
BG 5925.02:	3 NO contact
BG 5925.03:	1 NO, 1 NC contact
BG 5925.16:	2 NO, 1 NC contact
BG 5925.22:	The NO contacts are safety contacts. ATTENTION! The NC contacts 21-22 or 31-32 can only be used for monitoring.

Operate delay typ. at U_N :

Manual start:	40 ms
automatic start:	250 ms
BG 5925._./101:	100 ms

Release delay typ. at U_N :

Disconnecting the supply:	50 ms
Disconnecting S12, S22:	15 ms

Contact type:

Nominal output voltage:	forcibly guided AC 250 V DC: see limit curve for arc-free operation
Switching of low loads: (contact 5 μ Au) (contact AgNi)	≥ 100 mV ≥ 1 mA ≥ 10 mA / DC 24 V
Thermal current I_{th}: on 1 contact path:	max. 5 A see current limit curve

Switching capacity

to AC 15:		
NO contacts:	3 A / AC 230 V	IEC/EN 60 947-5-1
NC contacts:	2 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13:		
NO contacts:	1 A / DC 24 V	IEC/EN 60 947-5-1
NC contacts:	1 A / DC 24 V	IEC/EN 60 947-5-1

Electrical contact life

to AC 15 at 2 A, AC 230 V:	10^5 switching cycles IEC/EN 60 947-5-1
to DC 13 at 1 A, DC 24 V:	$> 1.5 \times 10^5$ switching cycles

Permissible operating frequency:

max. 1 200 operating cycles / h

Short circuit strength

max. fuse rating:	6 A general-purpose IEC/EN 60 947-5-1
line circuit breaker:	C 8 A

Mechanical life:

10×10^6 switching cycles

Technical Data

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
Surge voltages between wires for power supply:	1 kV	IEC/EN 61 000-4-5
between wire and ground:	2 kV	IEC/EN 61 000-4-5
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 IEC/EN 60 068-2-6 frequency 10 ... 55 Hz	
Climate resistance:	15 / 055 / 04	IEC/EN 60 068-1
Terminal designation:	EN 50 005	
Wire connection:	1 x 4 mm ² solid or 1 x 2.5 mm ² stranded ferruled (isolated) or 2 x 1.5 mm ² stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm ² stranded ferruled DIN 46 228-1/-2/-3	
Wire fixing:	Box terminal with wire protection, removable terminal strips	
Mounting:	DIN rail	IEC/EN 60 715
Weight:	220 g	

Dimensions

Width x height x depth: 22.5 x 84 x 121 mm

Safety Related Data

Values according to EN ISO 13849-1:

Category:	4	
PL:	e	
MTTF _d :	236.3	a (year)
DC / 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:

SIL CL:	3	IEC/EN 62061
SIL:	3	IEC/EN 61508
HFT:	1	
DC / DC _{avg} :	99.0	%
SFF:	99.7	%
PFH _d :	1.97E-10	h ⁻¹
T _i :	20	a (year)

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.

UL-Data

The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508, "general use applications"

Nominal voltage U_N:

BG 5925, /101, /102, /103, /104: DC 24 V
AC/DC 24 V

Ambient temperature:

-15 ... +55°C

Switching capacity:

Ambient temperature 45°C Pilot duty B300
5A 250Vac Resistive
5A 24Vdc Resistive or G.P.

Ambient temperature 55°C:

Pilot duty B300
4A 250Vac Resistive
4A 24Vdc Resistive or G.P.

Wire connection:

60°C / 75°C copper conductors only
AWG 20 - 12 Sol Torque 0.8 Nm
AWG 20 - 14 Str Torque 0.8 Nm



Technical data that is not stated in the UL-Data, can be found in the technical data section.

CSA-Data

Nominal voltage U_N:

BG 5925/113, /114: DC 24 V
AC/DC 24 V

Ambient temperature:

-15 ... +55°C

Switching capacity:

5A 230Vac

Wire connection:

60°C / 75°C copper conductors only
AWG 20 - 12 Sol Torque 0.8 Nm
AWG 20 - 14 Str Torque 0.8 Nm



Technical data that is not stated in the UL-Data, can be found in the technical data section.

Standard Type

BG 5925.03/61 AC/DC 24 V

Article number: 0049169

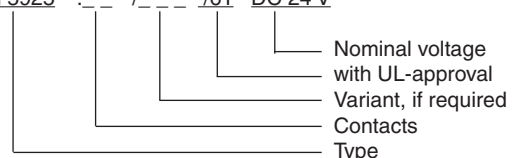
- Output: 3 NO contacts
- Nominal voltage U_N: AC / DC 24 V
- Width: 22.5 mm

Variants

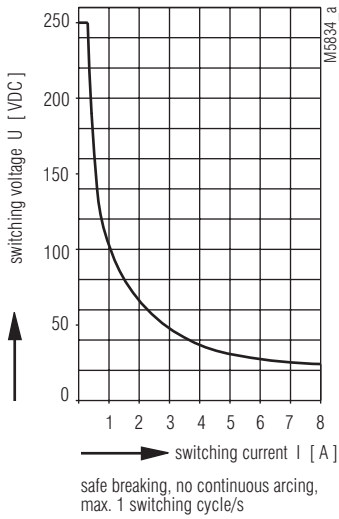
BG 5925.___/60:	CSA-approval
BG 5925.___/61:	UL-approval
BG 5925.___/101:	E-stop with fast automatic start without line fault detection on the ON-button
BG 5925.___/102:	Automatic-restart, without crossfault monitoring
BG 5925.02/103:	Manual restart, with crossfault monitoring for DC 24 V Switching capacity to AC 15: 5 A / 230 V Contact fuse 6 A fast / 4 A slow without internal switches S1 and S2
BG 5925.02/104:	Automatic restart, with cross fault monitoring for DC 24 V Switching capacity to AC 15: 5 A / 230 V Contact fuse 6 A fast / 4 A slow without internal switches S1 and S2
BG 5925.___/105:	With switch S1 and without crossfault monitoring for AC 230 V
BG 5925.___/106:	With switch S2 and with crossfault monitoring for AC 230 V

Ordering example for variants

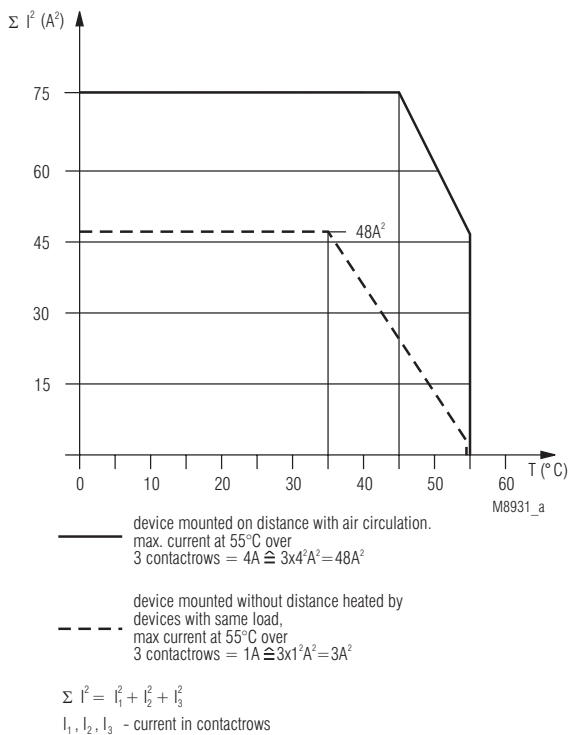
BG 5925 / /61 DC 24 V



Characteristics

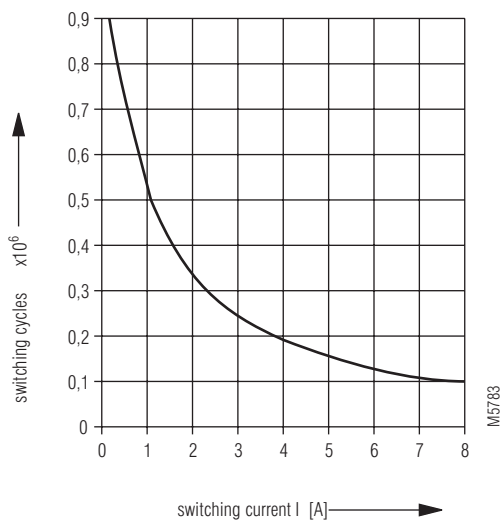


Arc limit curve under resistive load



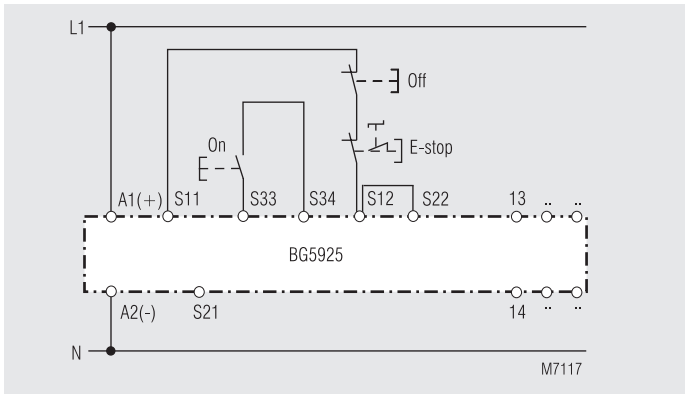
Quadratic total current limit curve

electric life DC13 24V DC / t_{on} 0,4s; t_{off} 9,6s
2 contacts in series



Contact service life

Application Examples

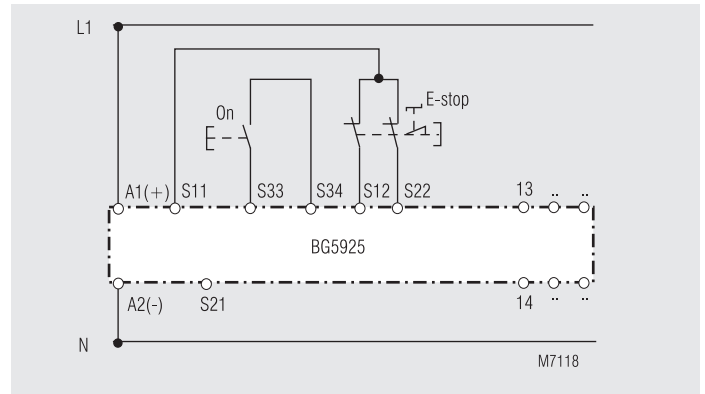


Single channel emergency stop circuit. This circuit does not have any redundancy in the emergency-stop control circuit.

Note: Refer to „Unit programming“!

Switches in pos.: S1 no cross fault detection
S2 manual start

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

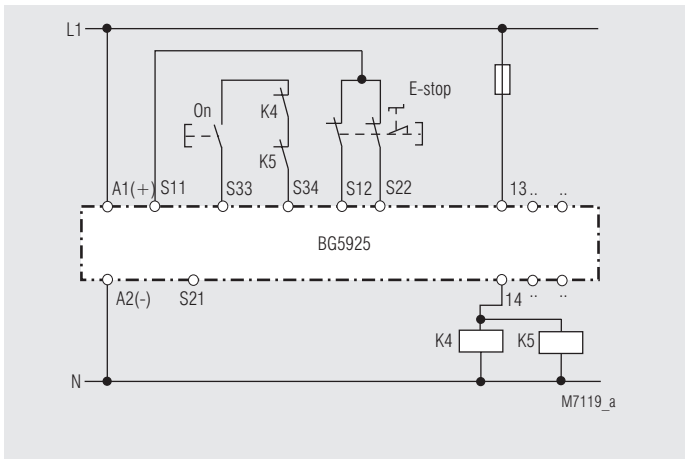


2-channel emergency stop circuit without cross fault monitoring.

Note: Refer to „Unit programming“!

Switches in pos.: S1 no cross fault detection
S2 manual start

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

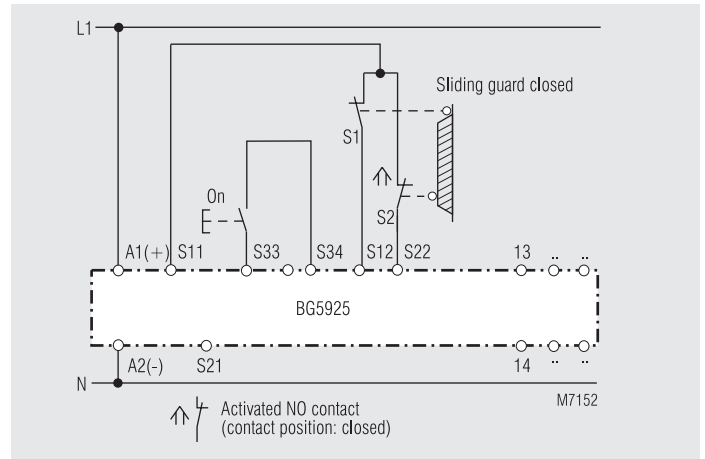


Contact reinforcement by external contactors controlled by one contact path.

Note: Refer to „Unit programming“!

Switches in pos.: S1 no cross fault detection
S2 manual start

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

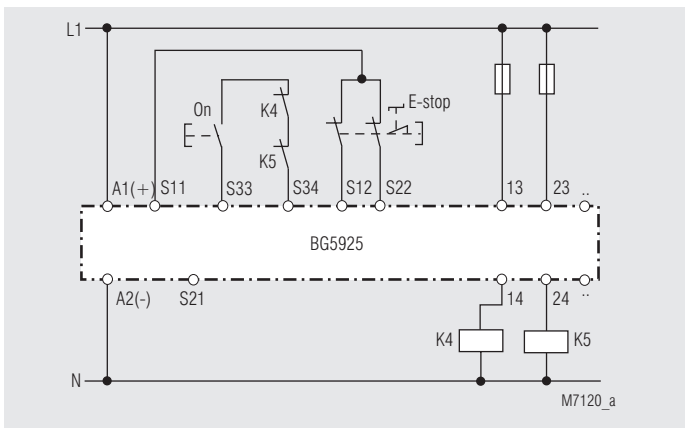


2-channel safety gate monitoring.

Note: Refer to „Unit programming“!

Switches in pos.: S1 no cross fault detection
S2 manual start

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

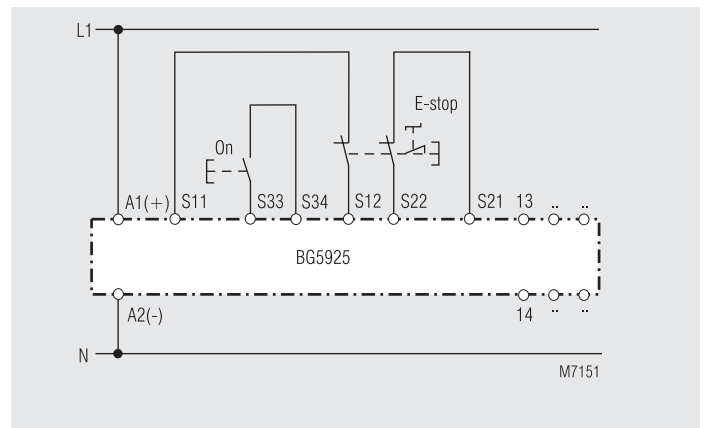


Contact reinforcement by external contactors, 2-channel controlled. The output contacts can be reinforced by external contactors with forcibly guided contacts for switching currents > 8 A. Functioning of the external contactors is monitored by looping the NC contacts into the closing circuit (terminals S33-S34).

Note: Refer to „Unit programming“!

Switches in pos.: S1 no cross fault detection
S2 manual start

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



2-channel emergency stop circuit with cross fault detection

Note: Refer to „Unit programming“!

Switches in pos.: S1 cross fault detection
S2 manual start

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

