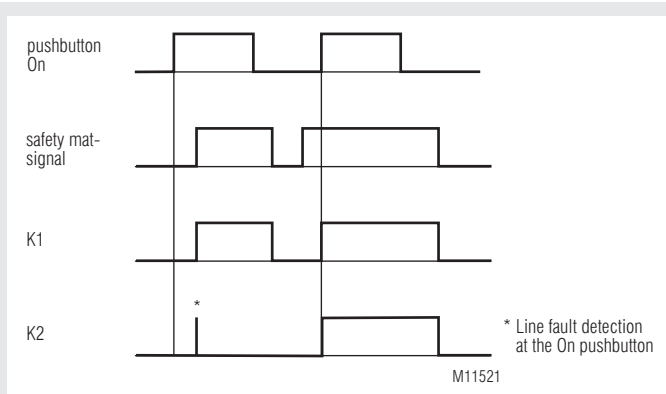




0224210

- 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
- Safety-mat switch gear with manual or automatic restart
- can also be used for safety edges
- Output: max. 3 NO contacts
- Line fault detection on On-button
- Manual restart or automatic restart when connecting the supply voltage, switch S2
- LED indicator for state of operation
- Indicator for status of switching element
- LED indicator for channel 1 and 2
- 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/-4
- Width 22,5 mm

Function Diagram



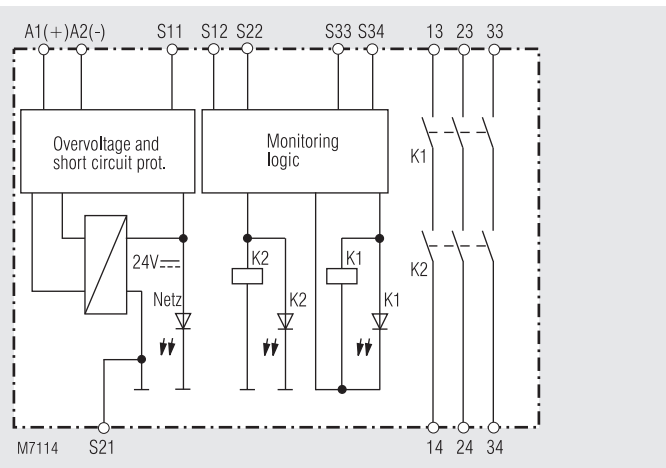
Approvals and Markings



Applications

- Protection of people and machines
- Emergency stop circuits on machines
- Monitoring of safety gates
- Switch gear for lightbars
- Switch gear for safety mats and safety edges

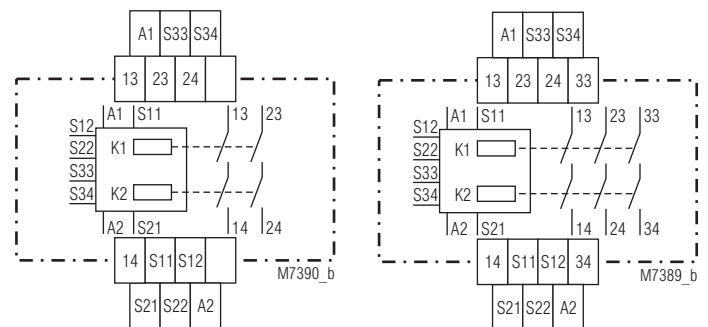
Block Diagram



Indicators

upper LED: ON when supply connected
lower LEDs: ON when relay K1 and K2 energized

Circuit Diagrams

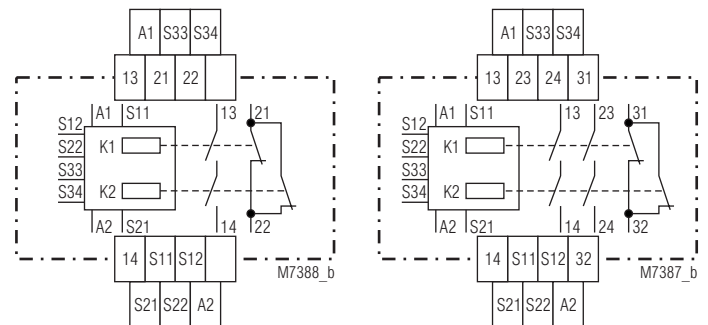


BG 5925.02/910

BG 5925.03/910

Connection Terminals

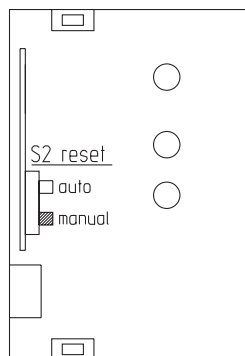
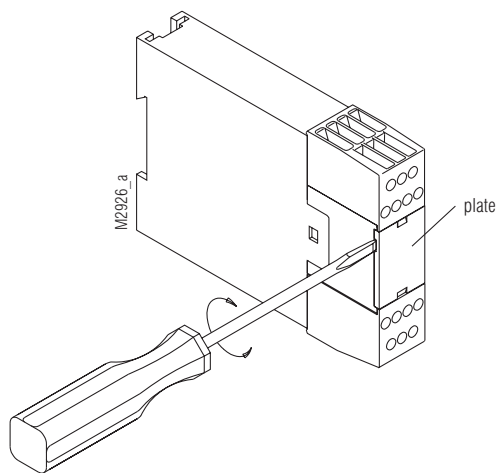
Terminal designation	Signal designation
A1 (+)	+ / L
A2 (-)	- / N
S12, S22, S34	Inputs
S11, S21, S33	Outputs
13, 14, 23, 24, 33, 34	Positive driven NO contacts for release circuit
21, 22, 31, 32	Positive guided indicator output



BG 5925.16/910

BG 5925.22/910

Unit programming



M6374

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.

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.

With the model BG 5925/910 control unit for safety mats, the switch S1 must always be set to cross fault monitoring. Depending on the operation of the machine, the switch S2 is set to automatic or manual restart.

ATTENTION - AUTOMATIC START!



According to IEC/EN 60 204-1 part 9.2.5.4.2 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
Voltage range at 10% residual ripple:	0,9 ... 1,1 U_N
Nominal consumption:	DC approx. 2 W
Min. Off-time:	1 s
Control voltage on S11:	approx. DC 23 V at U_N
Max. permissible contact resistance of safety mat:	30 Ω
Cross fault current between line S11-S12 and line S21-S22 with active safety mat or safety edge start-up:	max. 0,4 A for approx. 2 ms
continuously:	approx. 29 mA 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 fuse rating
Overvoltage protection:	Internal VDR

Output

Contacts	
BG 5925.02/910:	2 NO contacts
BG 5925.03/910:	3 NO contact
BG 5925.16/910:	1 NO, 1 NC contact
BG 5925.22/910:	2 NO, 1 NC contact

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:	200 ms

Release delay typ. at U_N :

Disconnecting the supply:	50 ms
Disconnecting S12, S22:	15 ms
Contact type:	forcibly guided

Nominal output voltage:

	AC 250 V
	DC: see limit curve for arc-free operation
Switching of low loads: (contact 5 μ Au)	≥ 100 mV
Thermal current I_{th}:	≥ 1 mA
	5 A (see current limit curve)

Switching capacity

to AC 15		
NO contact:	3 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	2 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13:		
NO contact:	1 A / DC 24 V	IEC/EN 60 947-5-1
NC contact:	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:	> 150 x 10 ³ switching cycles

Permissible operating frequency:

max. 1 200 operating cycles / h

Short circuit strength

max. fuse rating:	6 A gL	IEC/EN 60 947-5-1
line circuit breaker:	C 8 A	
Mechanical life:	10 x 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/-4	
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} :	3.60E+03	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 :	2.09E-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: DC 24 V

Ambient temperature: -15 ... +55°C

Switching capacity:

Ambient temperature 25°C Pilot duty B300
5A 250Vac Resistive
5A 24Vdc Resistive or G.P.

Ambient temperature 55°C: Pilot duty B300
3A 250Vac Resistive
3A 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.

Standard Type

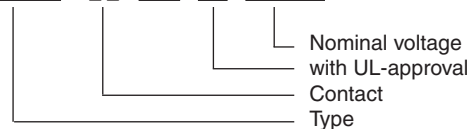
BG 5925.02/910/61 DC 24 V

Article number: 0049869 stock item

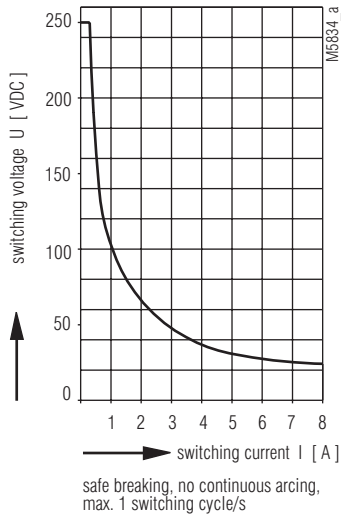
- Output: 2 NO contacts
- Nominal voltage U_N: DC 24 V
- Width: 22,5 mm

Ordering Example

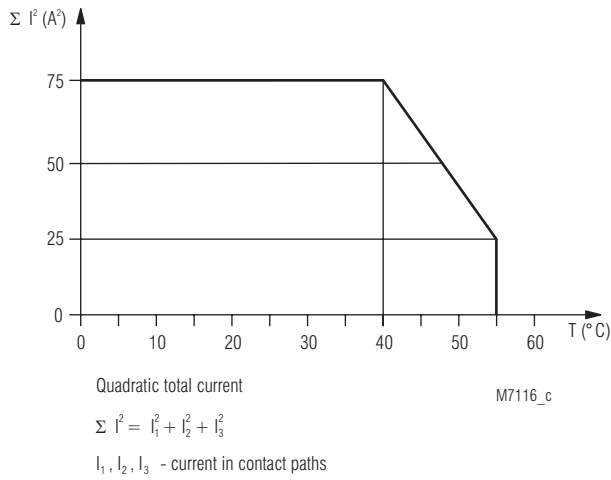
BG 5925 . . . /910 /61 DC 24 V



Characteristics

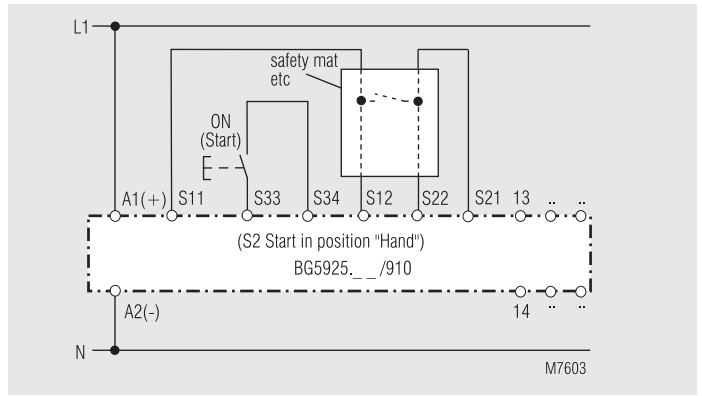


Arc limit curve under resistive load



Quadratic total current limit curve

Application Examples

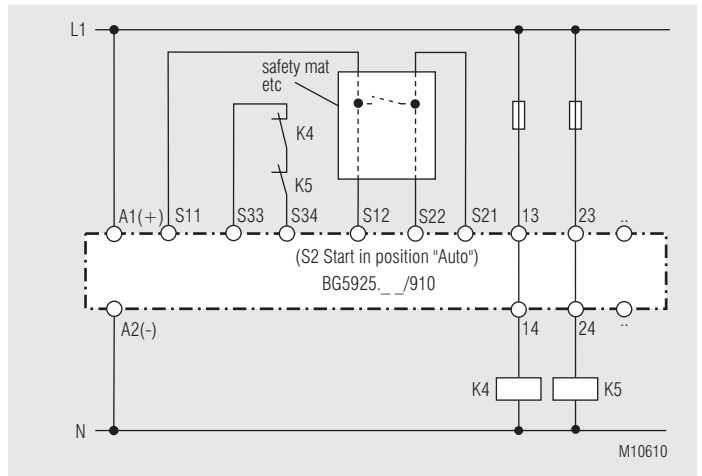


Switch gear for safety mats and edges

switch S2 position: Manual start

(For automatic restart S2 in position Autostart and link on S33-S34)

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



Switch gear for safety mats and edges

Contact reinforcement by external contactors, 2-channel.

switch S2 position: Auto start

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