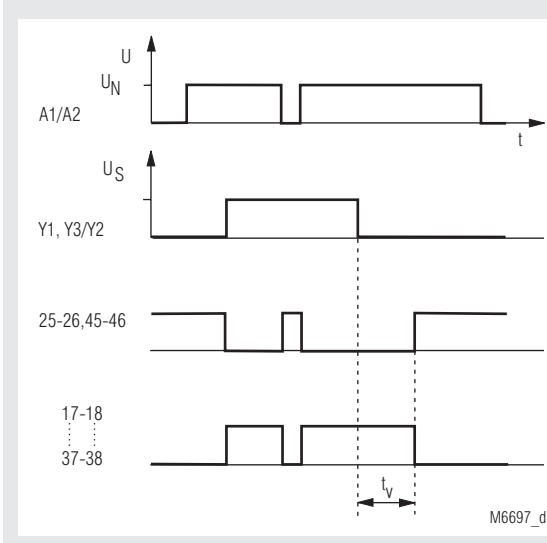


SAFEMASTER Delay module, release delay BG 7925, BH 7925



- According to
 - Performance Level (PL) d and category 2 to EN ISO 13849-1: 2008
 - SIL Claimed Level (SIL CL) 2 to IEC/EN 62061
 - Safety Integrity Level (SIL 2) to IEC/EN 61508
 - Category 2 nach EN 954-1
- Variants / _ 2 to / _ 3
 - Performance Level (PL) d and category 3 to EN ISO 13849-1: 2008
 - SIL Claimed Level (SIL CL) 2 to IEC/EN 62061
 - Safety Integrity Level (SIL 2) to IEC/EN 61508
 - Category 3 to EN 954-1
- Adjustable time delay
- Long time stability by digital timing circuit
- With auxiliary voltage
- 1 timing circuit
- BH 7925 in dual voltage version
- BH 7925 optionally for AC 230 V
- Output: 1 NC contact, 1 NO contact, forcibly guided or 1 NC contact, 3 NO contacts, forcibly guided
- Indication of state of operation
- 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
- Optionally with 2 timing circuits
- Optionally fixed time delay
- Optionally without auxiliary voltage on BH 7925
- Optionally for switching small loads
- BG 7925: width 22.5 mm
- BH 7925: width 45 mm

Function Diagram for devices with auxiliary voltage



Approvals and Markings

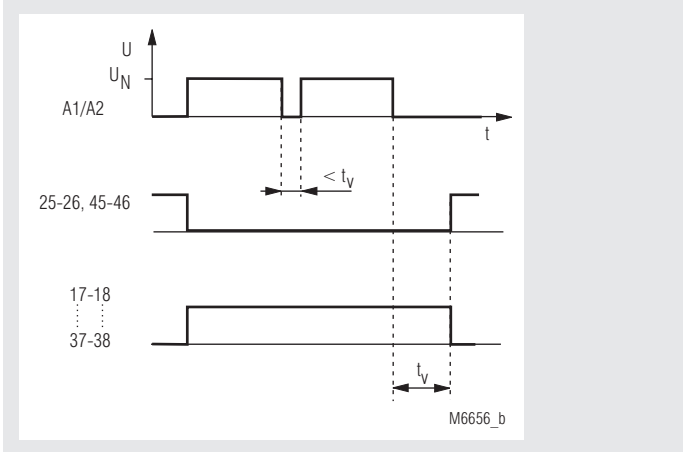


* see variants ¹⁾ only for BH 7925

Application

Delayed switch-off in safety-control circuits, stop-category 1 according to IEC/EN 60 204-1

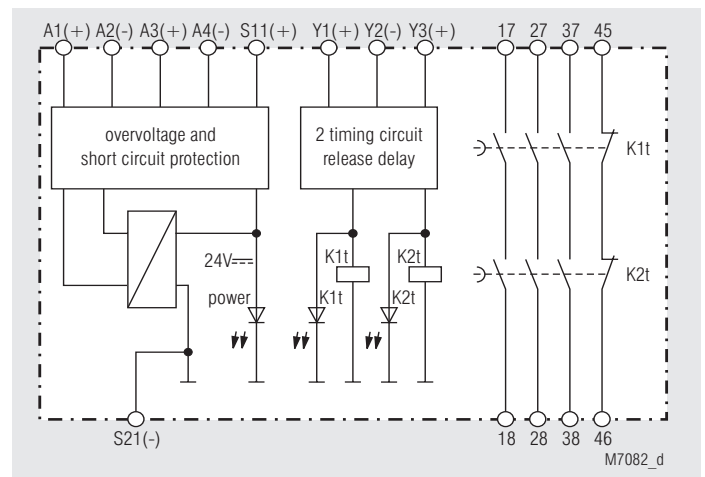
Function Diagram for devices without auxiliary voltage



Indication

- LED "Power": on, when operating voltage applied
- LED K1t: on, when output relay K1t activated
- LED K2t: on, when output relay K2t activated

Block Diagram



Block diagram for units with 2 timing circuits.
In units with only 1 circuit K2t is missing.

Notes

The output contacts of the two timing circuits are connected in series. This results in so-called switch off redundancy, i.e. the contact path is opened reliably after expiry of the predefined delay time, even if a contact in this path is welded.

AC-models can be connected to DC 24 V via terminals A3-A4.

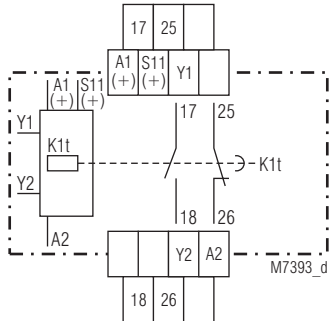
For units with auxiliary supply the control of the time circuits is made via terminals Y1, Y3/Y2 (see application examples). Plus is connected to Y1, Y3 and minus to Y2. Units without auxiliary supply are controlled with the nominal voltage U_n .

Attention!

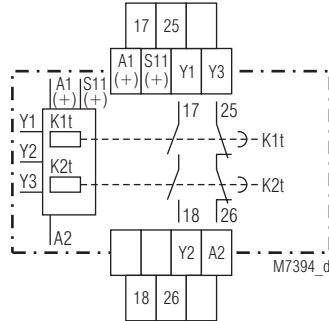
Before activating the unit it has to be checked by monitoring the NC contacts 45, 46, if both relays have been de-energized.

The gold plated contacts of the BG 7925.21/40_ 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.

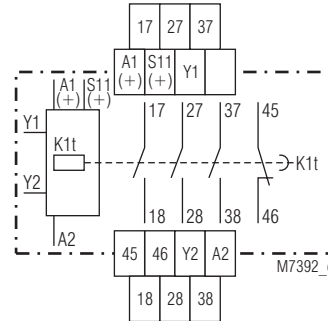
Circuit Diagrams



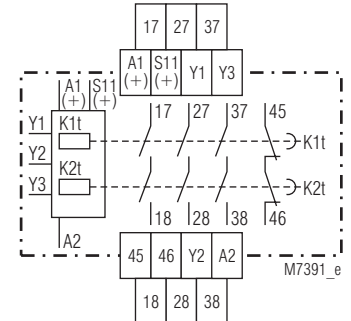
BG 7925.21, BG 7925.21/001
1 timing circuit



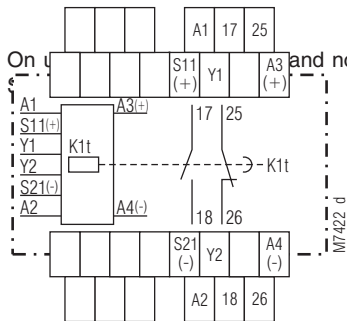
BG 7925.21/002, BG 7925.21/003
2 timing circuits



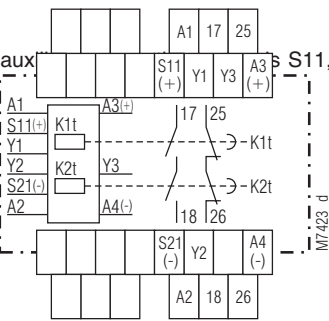
BG 7925.96, BG 7925.96/001
1 timing circuit



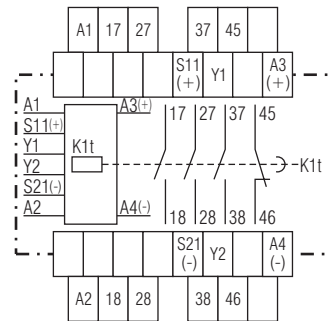
BG 7925.96/002, BG 7925.96/003
2 timing circuits



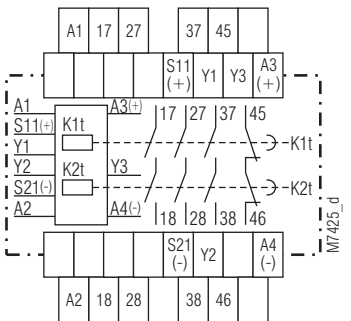
BH 7925.21/_00, BH 7925.21/_01
1 timing circuit



BH 7925.21/_02, BH 7925.21/_03
2 timing circuits



BH 7925.96/_00, BH 7925.96/_01
1 timing circuit



BH 7925.96/_02, BH 7925.96/_03
2 timing circuits

On units with 1 timing circuit and no auxiliary supply the terminals S11, S21, Y1 and Y2 do not exist.

Connection Terminals

Terminal designation	Signal designation
A1 (+), A3 (+)	+ / L
A2 (-), A4 (-)	- / N
Y1(+), Y2(-), Y3 (+)	Inputs
S11(+), S21 (-)	Outputs
17,18, 27, 28, 37, 38	Positive guided NO contacts for release circuit
25, 26, 45, 46	NC contact positive guided for release circuit

Technical Data

Time circuit

Time delay t_v:	adjustable	fixed
	0.1 ... 1 s	1 s
	0.3 ... 3 s	3 s
	0.5 ... 5 s	5 s
	1 ... 10 s	10 s
	3 ... 30 s	30 s
	10 ... 100 s	
	30 ... 300 s	
	3 ... 30 min	

Longer time on request. Units without auxiliary supply are available only up to 10 s with 1 timing circuit or 5 s with 2 timing circuits.

Repeat accuracy:	± 1 % of the setting value
Min. turn-on time:	10 % of full scale value 50 % of full scale value for units without auxiliary supply

Input

Nominal voltage U_N (Auxiliary voltage U_H)

BG 7925:	AC/DC 24 V
BH 7925:	AC/DC 24 V ¹⁾ and AC 230 V ²⁾
	¹⁾ on terminals A3 - A4
	²⁾ on terminals A1 - A2

Voltage range:	AC 0.8 ... 1.1 U_N
with 10 % residual ripple:	DC 0.9 ... 1.1 U_N
with 48 % residual ripple:	DC 0.8 ... 1.1 U_N

Nominal frequency:	50 / 60 Hz
Nominal consumption:	typically DC 2.0 W typically AC 4.2 VA

Control voltage U_s at Y1, Y2, Y3:	typically DC 24 V
current in Y1, Y3:	typically 6.5 mA

Output

Contacts

BG 7925.21, BH 7925.21:	1 NO contact, 1 NC contact
BG 7925.96, BH 7925.96:	3 NO contacts, 1 NC contact
Contact type:	Relay, forcibly guided

Release delay typ. at U_N

BG7925, BH7925/0xx	
Disconnecting the supply:	35 ms
Disconnecting Y1, Y2, Y3:	35 ms + t_v

BH5925/1xx	
Disconnecting the supply:	35 ms + t_v
Disconnecting Y1, Y2, Y3:	35 ms + t_v

Nominal output voltage:	AC 10 ... 250 V
	DC 10 ... 110 V
	max. 5 A

Thermal current I_{th} : Switching capacity

to AC 15		
NO contact:	3 A / AC 230 V	IEC/EN 60 947-5-1
BG/BH 7925.21		
NC contact:	1 A / AC 230 V	IEC/EN 60 947-5-1
BG/BH 7925.96		
NC contact:	2 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13		
BG/BH 7925.21		
NO contact:	2 A / DC 24 V	IEC/EN 60 947-5-1
NC contact:	2 A / DC 24 V	IEC/EN 60 947-5-1
BG/BH 7925.96		
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
to DC 13		
BG/BH 7925.96		
NO contact:	4 A / DC 24 V at 0.1 Hz	
NC contact:	4 A / DC 24 V at 0.1 Hz	

Technical Data

Electrical life	IEC/EN 60 947-5-1
to AC 15 at 3 A, AC 230 V:	$\geq 2.5 \times 10^6$ switching cycles

Permissible operating frequency:	max. 2000 switching cycles / h please note minimum closing time
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Short circuit strength	
max. fuse rating:	6 A gL IEC/EN 60 947-5-1
Mechanical life:	10×10^6 switching cycles

General Data

Operating mode:	Continuous operation
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Temperature range	
Operation:	- 15 ... + 55°C
Storage:	- 25 ... + 85°C

Clearance and creepage distances	
rated impuls voltage / pollution degree:	4 kV / 2 IEC 60 664-1

EMC	
Electrostatic discharge:	8 kV (air) IEC/EN 61 000-4-2
Fast transients:	2 kV IEC/EN 61 000-4-4

Surge voltages between wires for voltage supply:	1 kV IEC/EN 61 000-4-5
between wire and ground:	2 kV IEC/EN 61 000-4-5
HF irradiation:	10 V IEC/EN 61 000-4-6
Interference suppression:	limit value class B EN 55011

Degree of protection	
Housing:	IP 40 IEC/EN 60 529
Terminal plate:	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
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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
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Wire fixing:	Terminal screws M 3.5 Box terminal with wire protection
Mounting:	DIN rail IEC/EN 60 715
Weight:	210 g

Dimensions

Width x height x depth	
BG 7925:	22,5 x 84 x 121 mm
BH 7925:	45 x 84 x 121 mm

Safety Related Data BG7925/_ _ 0 and / _ _ 1

Values according to EN ISO 13849-1:

Category:	2	
PL:	d	
MTTF _d :	210.1	a (year)
DC / DC _{avg} :	98.5	%
d _{op} :	365	d/a (days/year)
h _{op} :	24	h/d (hours/day)
t _{Zyklus} :	3600	s/Zyklus
	$\cong 1$	/h (hour)

Values according to IEC/EN 62061 / IEC/EN 61508:

SIL CL:	2	IEC/EN 62061
SIL	2	IEC/EN 61508
HFT:	0	
DC / DC _{avg} :	98.5	%
SFF	99.5	%
PFH _D :	8,26E-09	h ⁻¹
T _i :	20	a (year)

Technical Data

Safety Related Data BG7925/_ _2 and / _ _3

Values according to EN ISO 13849-1:

Category:	3	
PL:	d	
MTTF _d :	210.1	a
DC / DC _{avg} :	98.5	%
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:	2	IEC/EN 62061
SIL	2	IEC/EN 61508
HFT:	1	
DC / DC _{avg} :	98.5	%
SFF	99.5	%
PFH _D :	3.76E-10	h ⁻¹
T ₁ :	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:

BG7925, /001, /002, /003: AC/DC 24V

Ambient temperature:

- 15 ... + 55°C

Switching capacity

NO contact: Pilot duty B300
5A 250Vac Resistive
5A 24Vdc Resistive or G.P.

NC contact: 5A 250Vac Resistive
5A 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 Sol Torque 0.8 Nm



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

CCC-Data

Nominal voltage U_N:

BH 7925: AC/DC 24 V und AC 230 V

Thermal current I_{th}:

max. 4 A
(see quadratic total current limit curve)

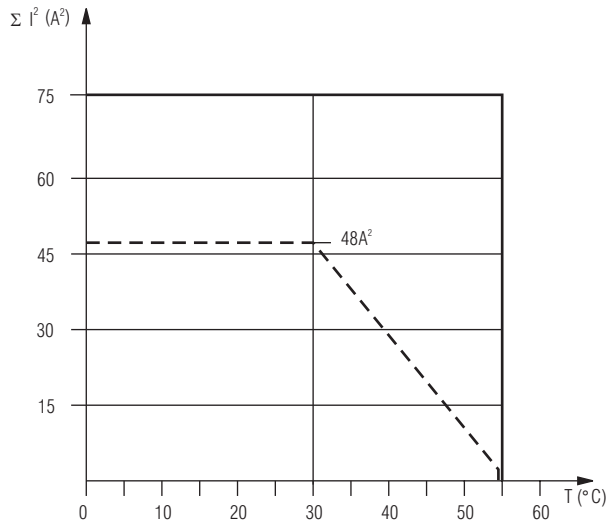
Switching capacity

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



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

Characteristics



M7601_a

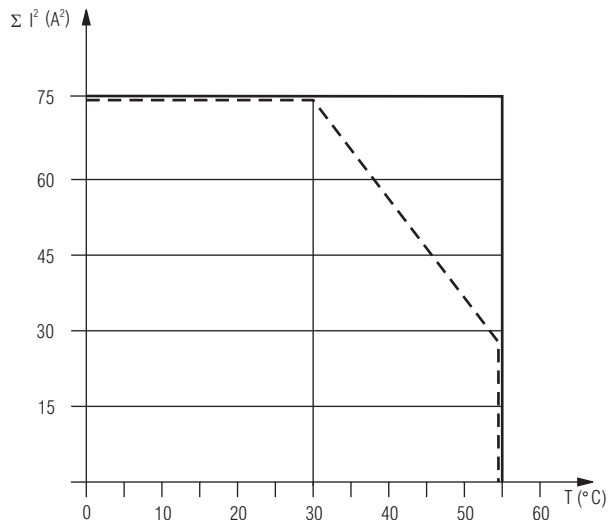
device mounted on distance with air circulation.
max. current at 55°C over
3 contactrows = 5A ≙ 3x5²A²=75A²

device mounted without distance heated by
devices with same load,
max current at 55°C over
3 contactrows = 1A ≙ 3x1²A²=3A²

$$\Sigma I^2 = I_1^2 + I_2^2 + I_3^2$$

I₁, I₂, I₃ - current in contactrows

Total current limit curve BG 7925



M9940

device mounted on distance with air circulation.
max. current at 55°C over
3 contactrows = 5A ≙ 3x5²A²=75A²

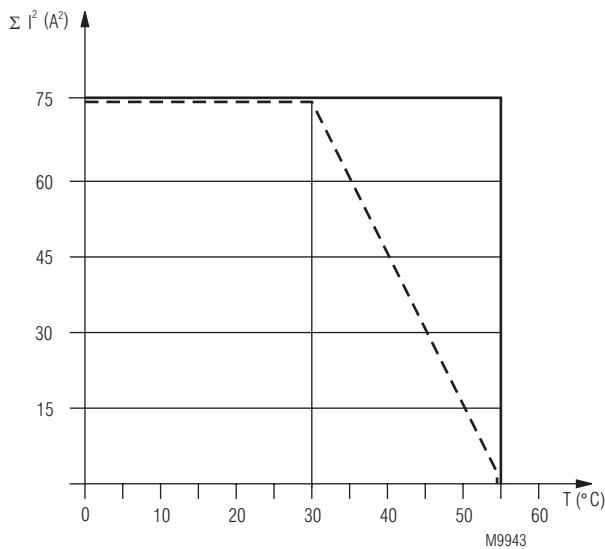
device mounted without distance heated by
devices with same load,
max current at 55°C over
3 contactrows = 3A ≙ 3x3²A²=27A²

$$\Sigma I^2 = I_1^2 + I_2^2 + I_3^2$$

I₁, I₂, I₃ - current in contactrows

Total current limit curve BH 7925 AC/DC 24 V

Characteristic



— device mounted on distance with air circulation.
max. current at 55°C over
3 contactrows = $5A \cong 3 \times 5^2 A^2 = 75A^2$

- - - device mounted without distance heated by
devices with same load,
max current at 55°C over
3 contactrows = $1A \cong 3 \times 1^2 A^2 = 3A^2$

$$\Sigma I^2 = I_1^2 + I_2^2 + I_3^2$$

I_1, I_2, I_3 - current in contactrows

Total current limit curve BH 7925 AC 230 V

Standard types

BG 7925.21 AC/DC 24 V 50/60 Hz 1 ... 10 s

Article number: 0049628

- With auxiliary voltage
- 1 timing circuit
- Adjustable time delay 1 ... 10 s
- Output: 1 NO contact, 1 NC contact
- Nominal voltage U_N : AC/DC 24 V
- Width: 22,5 mm

BH 7925.21/100 AC/DC 24 V + AC 230 V 50/60Hz 1 ... 10 s

Article number:

- Without auxiliary voltage
- 1 timing circuit
- Adjustable time delay 1 ... 10 s
- Output: 1 NO contact, 1 NC contact
- Nominal voltage U_N : AC/DC 24 V + AC 230 V
- Width: 45 mm

Variants

BG 7925/61:

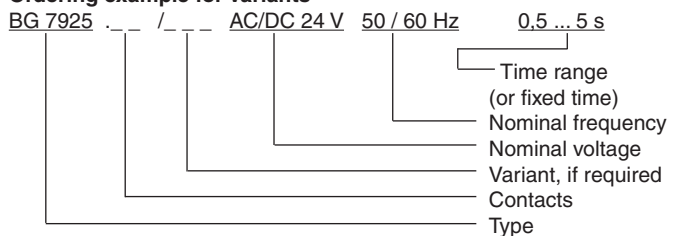
with UL approval

	Gold plated contacts 5 µm Au	Without auxiliary supply	With auxiliary supply	AC/DC 24 V	AC/DC 24 V + AC 230 V	1 timing circuit		2 timing circuits	
						adjustable	fixed	adjustable	fixed
BG 7925.21			X	X		X			
BG 7925.21/001			X	X			X		
BG 7925.21/002			X	X				X	
BG 7925.21/003			X	X					X
BG 7925.21/400	X		X	X		X			
BG 7925.21/401	X		X	X			X		
BG 7925.21/402	X		X	X				X	
BG 7925.21/403	X		X	X					X
BG 7925.96			X	X		X			
BG 7925.96/001			X	X			X		
BG 7925.96/002			X	X				X	
BG 7925.96/003			X	X					X
BH 7925.21			X		X	X			
BH 7925.21/001			X		X		X		
BH 7925.21/002			X		X			X	
BH 7925.21/003			X		X				X
BH 7925.96			X		X	X			
BH 7925.96/001			X		X		X		
BH 7925.96/002			X		X			X	
BH 7925.96/003			X		X				X
BH 7925.21/100	X				X	X			
BH 7925.21/101	X				X		X		
BH 7925.21/102	X				X			X	
BH 7925.21/103	X				X				X
BH 7925.96/100	X				X	X			
BH 7925.96/101	X				X		X		
BH 7925.96/102	X				X			X	
BH 7925.96/103	X				X				X

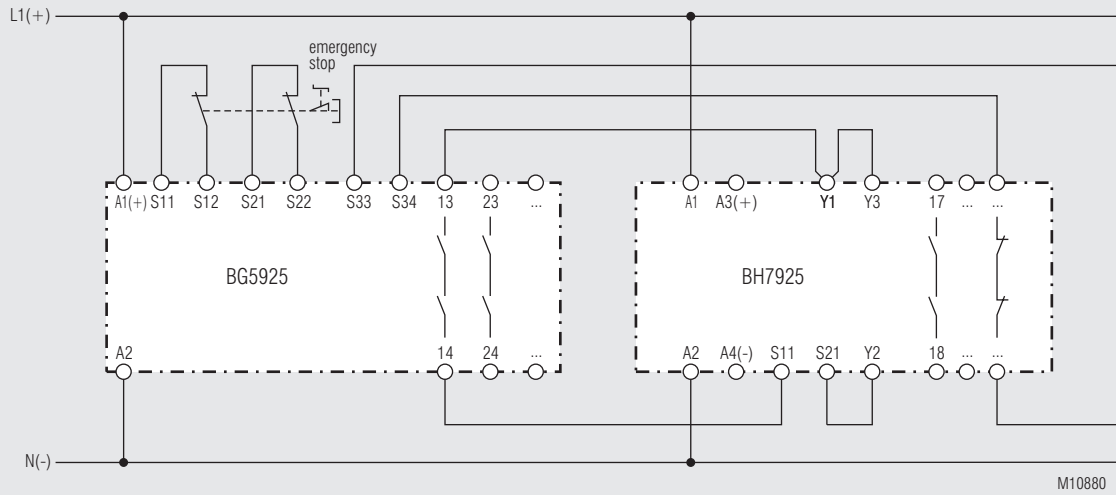
BG 7925 modules require auxiliary voltage. BH 7925 modules are available with or without auxiliary voltage.

The devices with gold plated contacts are suitable for switching small loads.

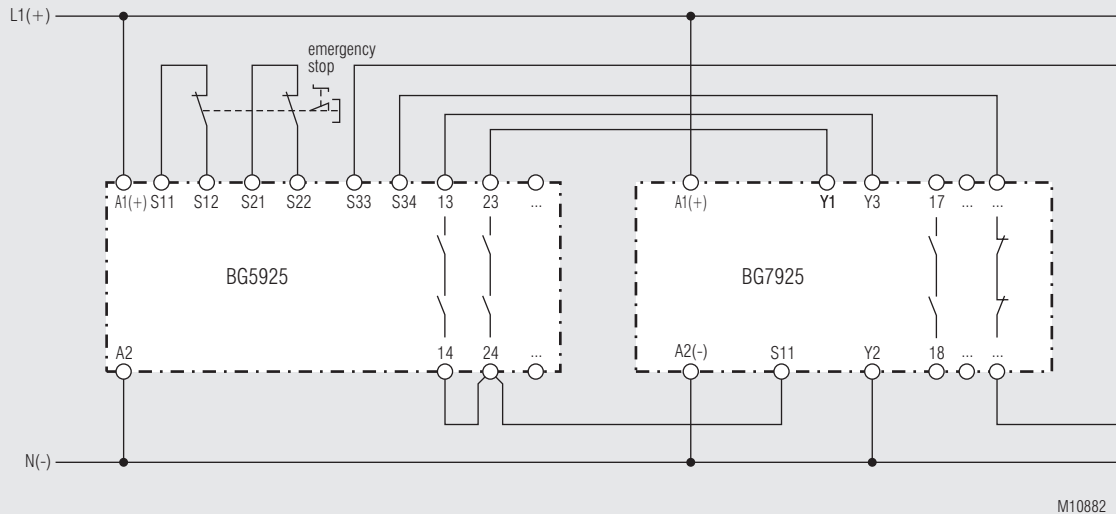
Ordering example for Variants



Application Examples

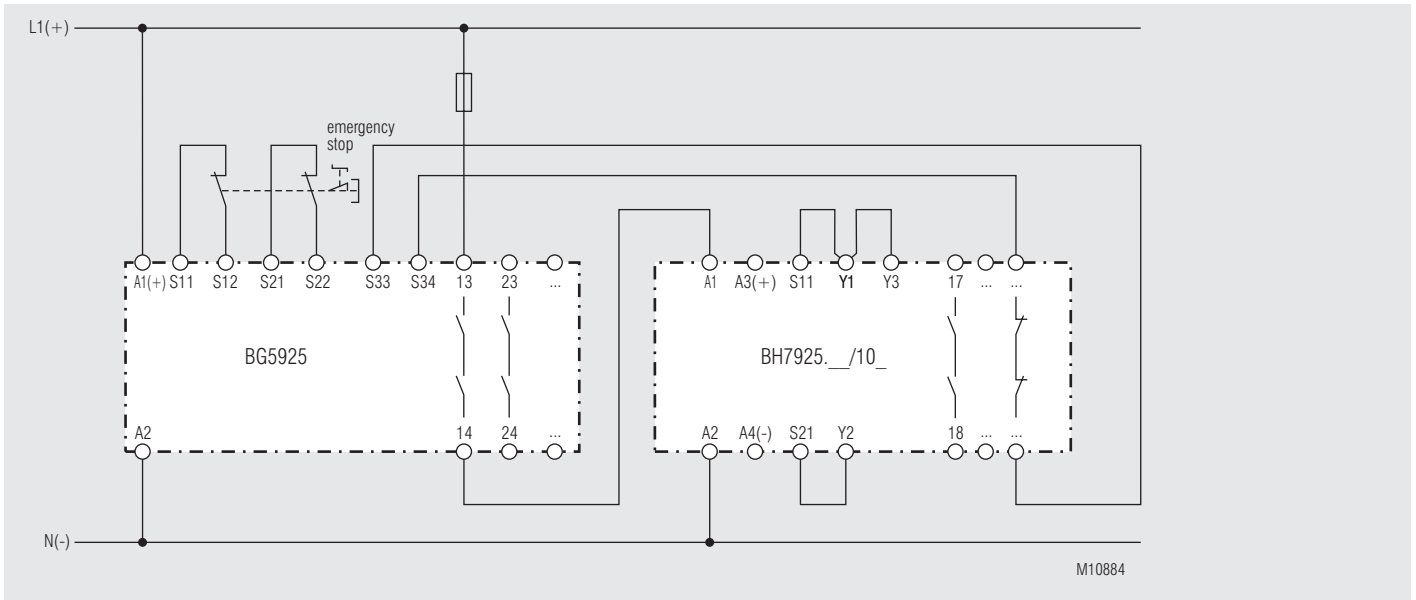


Versions with auxiliary voltage. Time control with internal voltage S11(+), S21(-). Suited up to SIL2 Performance Level d, Cat. 3

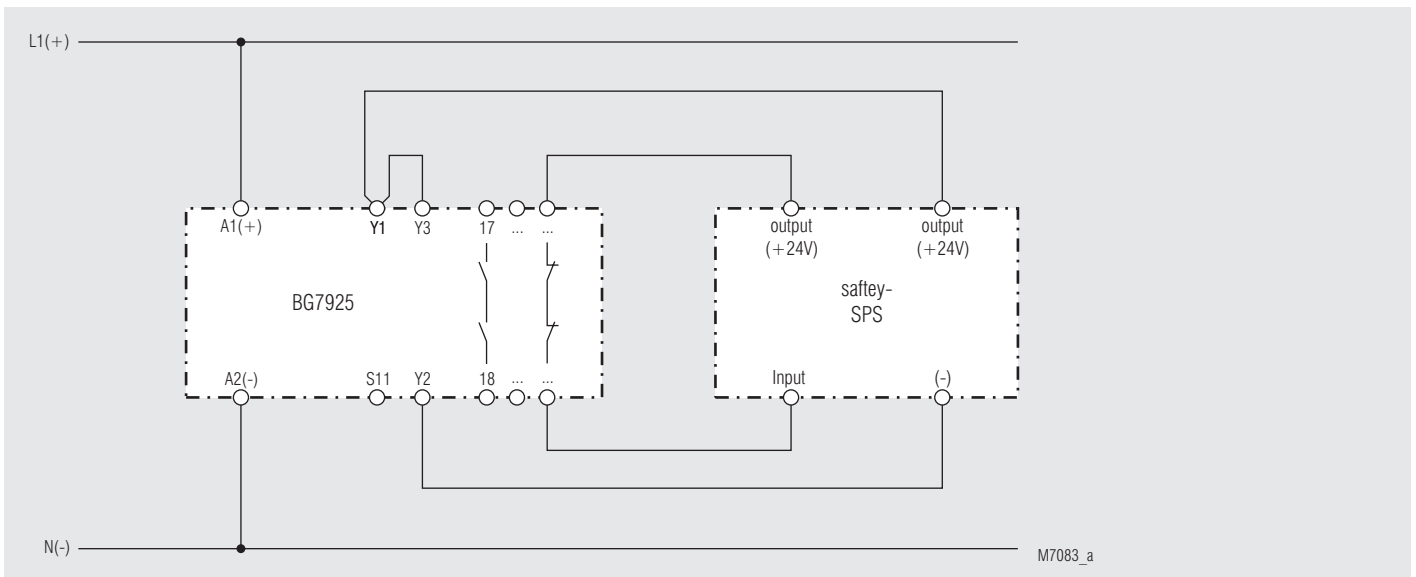


Versions with auxiliary voltage. Separate control of 2 timing circuits with internal voltage S11 (+). Suited up to SIL2 Performance Level d, Cat. 3

Application Examples



Versions without auxiliary voltage. Control of timing circuits over K1. Suited up to SIL2 Performance Level d, Cat. 3



Time control with external voltage (e.g. PLC). If voltage peaks ≥ 500 V are expected, they have to be limited by suitable means. Suited up to SIL2 Performance Level d, Cat. 3

