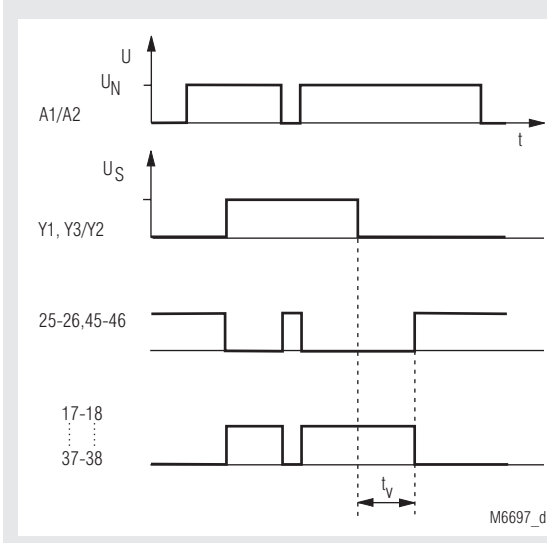


## SAFEMASTER Delay module, release delay BG 7925, BH 7925



- 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 mm<sup>2</sup> stranded ferruled (isolated), DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm<sup>2</sup> 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

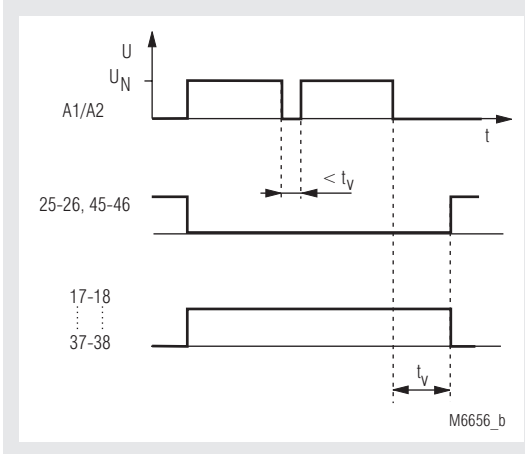


\* see variants <sup>1)</sup> only for BH 7925

### Application

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

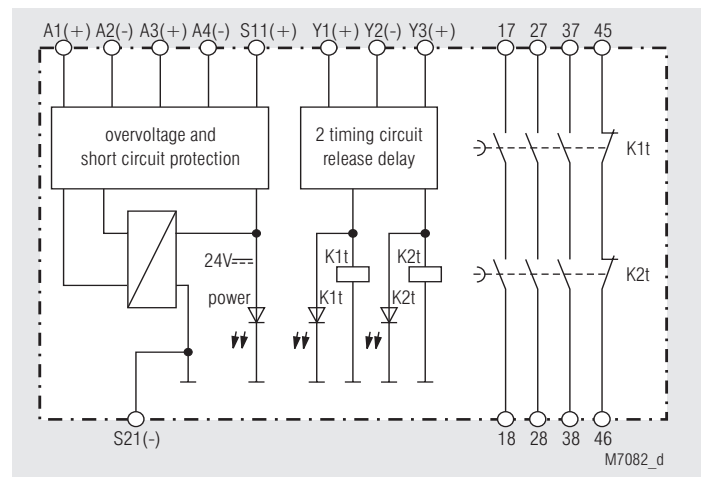
### Function Diagram for devices without auxiliary voltage



### 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.

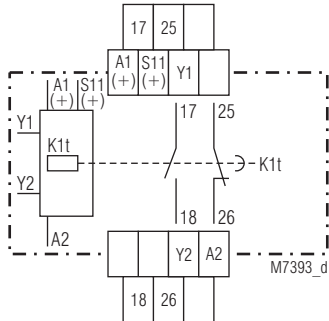
For units with auxiliary supply the control of the time circuits is made via terminals Y1, Y3/Y2 (see application examples). Plus is connected to Y1, Y3 and minus to Y2. Units without auxiliary supply are controlled with the nominal voltage  $U_n$ .

**Attention!**

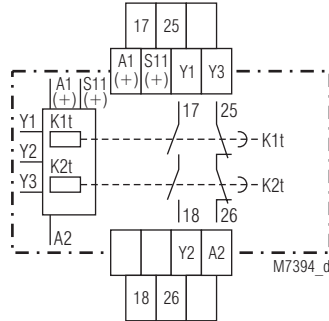
Before activating the unit it has to be checked by monitoring the NC contacts 45, 46, if both relays have been de-energized.

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.

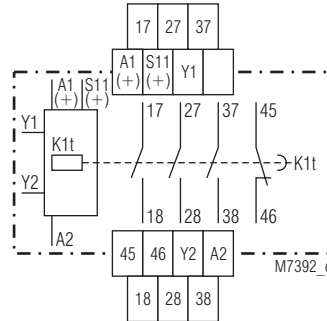
**Circuit Diagrams**



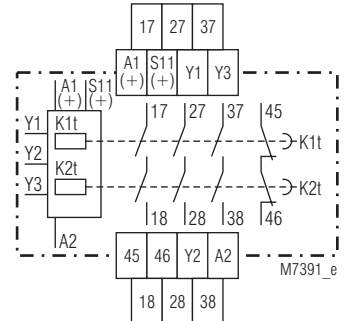
BG 7925.21, BG 7925.21/001  
1 timing circuit



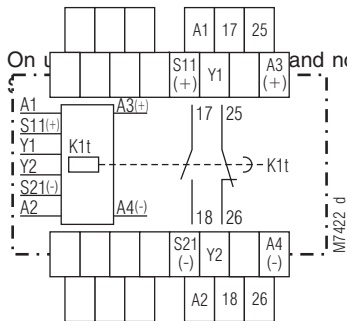
BG 7925.21/002, BG 7925.21/003  
2 timing circuits



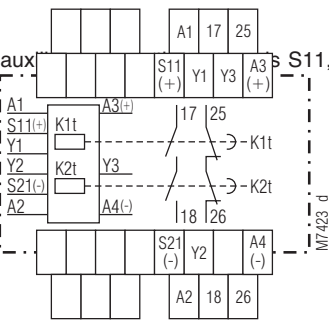
BG 7925.96, BG 7925.96/001  
1 timing circuit



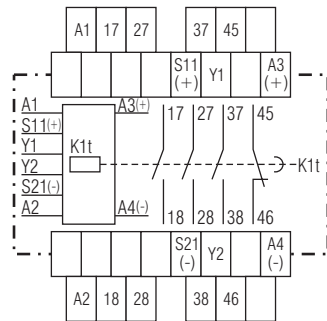
BG 7925.96/002, BG 7925.96/003  
2 timing circuits



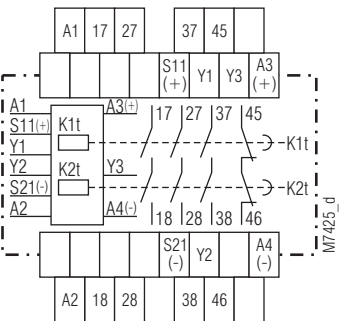
BH 7925.21/\_00, BH 7925.21/\_01  
1 timing circuit



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	1 s
0.3 ... 3 s	3 s	3 s
0.5 ... 5 s	5 s	5 s
1 ... 10 s	10 s	10 s
3 ... 30 s	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.

<b>Repeat accuracy:</b>	±1 % of the setting value
<b>Min. turn-on time:</b>	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 <sup>1)</sup> and AC 230 V <sup>2)</sup>
	<sup>1)</sup> on terminals A3 - A4
	<sup>2)</sup> on terminals A1 - A2

#### Voltage range:

with 10 % residual ripple:  
with 48 % residual ripple:

AC 0.8 ... 1.1  $U_N$

DC 0.9 ... 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

to AC 15 at 3 A, AC 230 V: ≥ 2.5 x 10<sup>6</sup> switching cycles IEC/EN 60 947-5-1

**Permissible operating frequency:** max. 2000 switching cycles / h  
please note minimum closing time

**Short circuit strength**

**max. fuse rating:** 6 A gL IEC/EN 60 947-5-1

**Mechanical life:** 10 x 10<sup>6</sup> switching cycles

### General Data

**Operating mode:** Continuous operation

#### 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

**Wire connection:** 1 x 4 mm<sup>2</sup> solid or

1 x 2.5 mm<sup>2</sup> stranded ferruled (isolated) or

2 x 1.5 mm<sup>2</sup> stranded ferruled (isolated)

DIN 46 228-1/-2/-3/-4 or

2 x 2.5 mm<sup>2</sup> stranded ferruled

DIN 46 228-1/-2/-3

**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 <sub>d</sub> :	210.1	a (year)
DC / DC <sub>avg</sub> :	98.5	%
d <sub>op</sub> :	365	d/a (days/year)
h <sub>op</sub> :	24	h/d (hours/day)
t <sub>Zyklus</sub> :	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:	0	
DC / DC <sub>avg</sub> :	98.5	%
SFF	99.5	%
PFH <sub>D</sub> :	8,26E-09	h <sup>-1</sup>
T <sub>i</sub> :	20	a (year)

## Technical Data

### Safety Related Data BG7925/\_ \_2 and / \_ \_3

#### Values according to EN ISO 13849-1:

Category:	3	
PL:	d	
MTTF <sub>d</sub> :	210.1	a
DC / DC <sub>avg</sub> :	98.5	%
d <sub>op</sub> :	365	d/a (days/year)
h <sub>op</sub> :	24	h/d (hours/day)
t <sub>Zyklus</sub> :	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 <sub>avg</sub> :	98.5	%
SFF	99.5	%
PFH <sub>D</sub> :	3.76E-10	h <sup>-1</sup>
T <sub>1</sub> :	20	a (year)

<sup>1)</sup> 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<sub>N</sub>:

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<sub>N</sub>:

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

#### Thermal current I<sub>th</sub>:

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

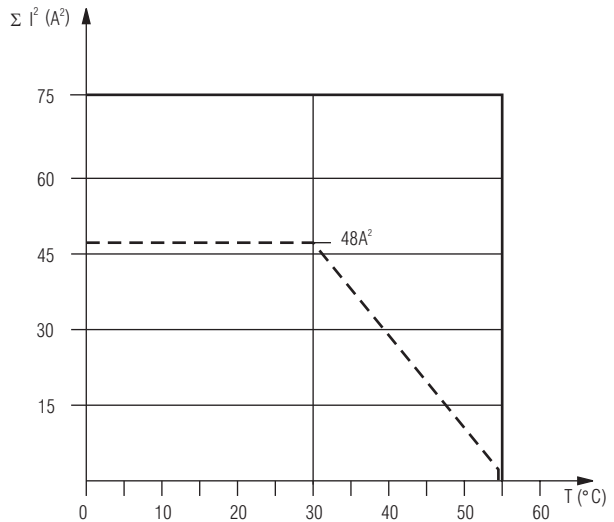
#### Switching capacity

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

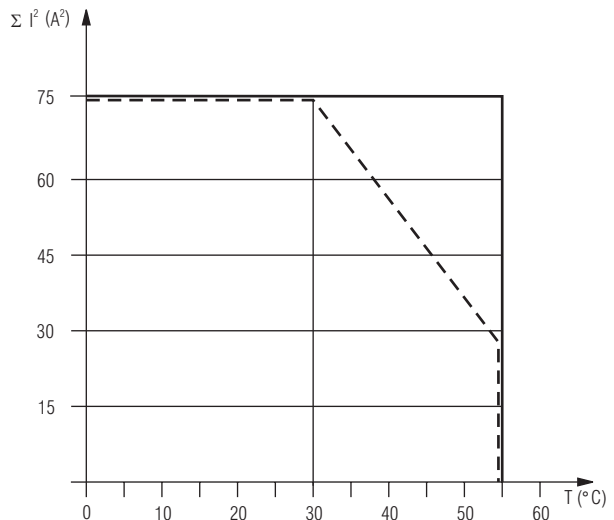
device mounted on distance with air circulation.  
max. current at 55°C over  
3 contactrows = 5A ≙ 3x5²A²=75A²

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

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

I<sub>1</sub>, I<sub>2</sub>, I<sub>3</sub> - 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

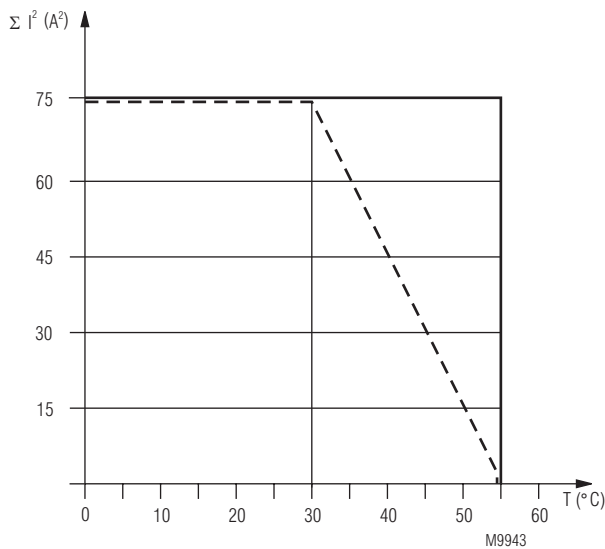
device mounted without distance heated by  
devices with same load,  
max current at 55°C over  
3 contactrows = 3A ≙ 3x3²A²=27A²

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

I<sub>1</sub>, I<sub>2</sub>, I<sub>3</sub> - 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:

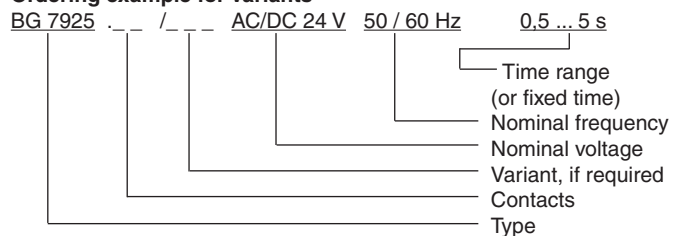
with UL approval

	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

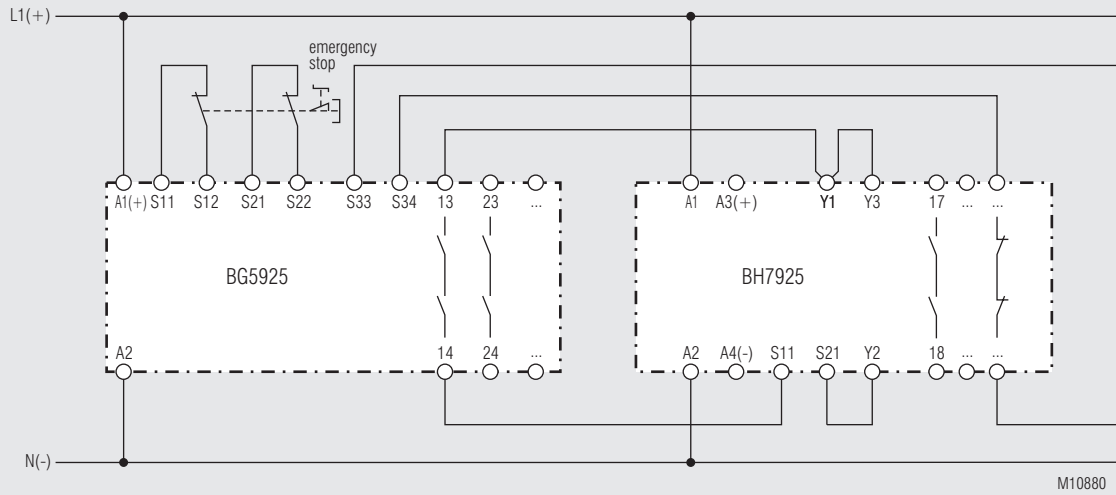
BG 7925 modules require auxiliary voltage. BH 7925 modules are available with or without auxiliary voltage.

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

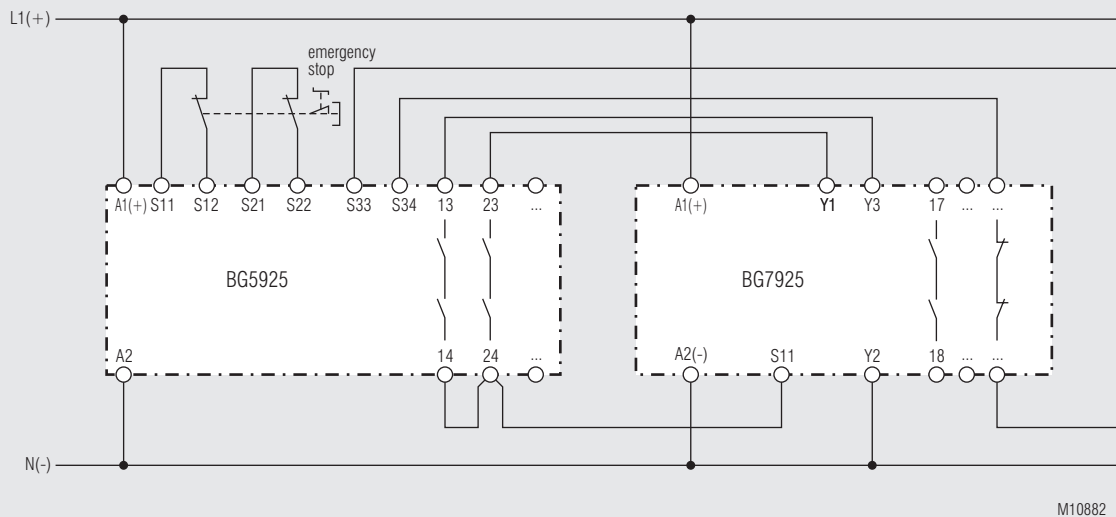
### Ordering example for Variants



## Application Examples

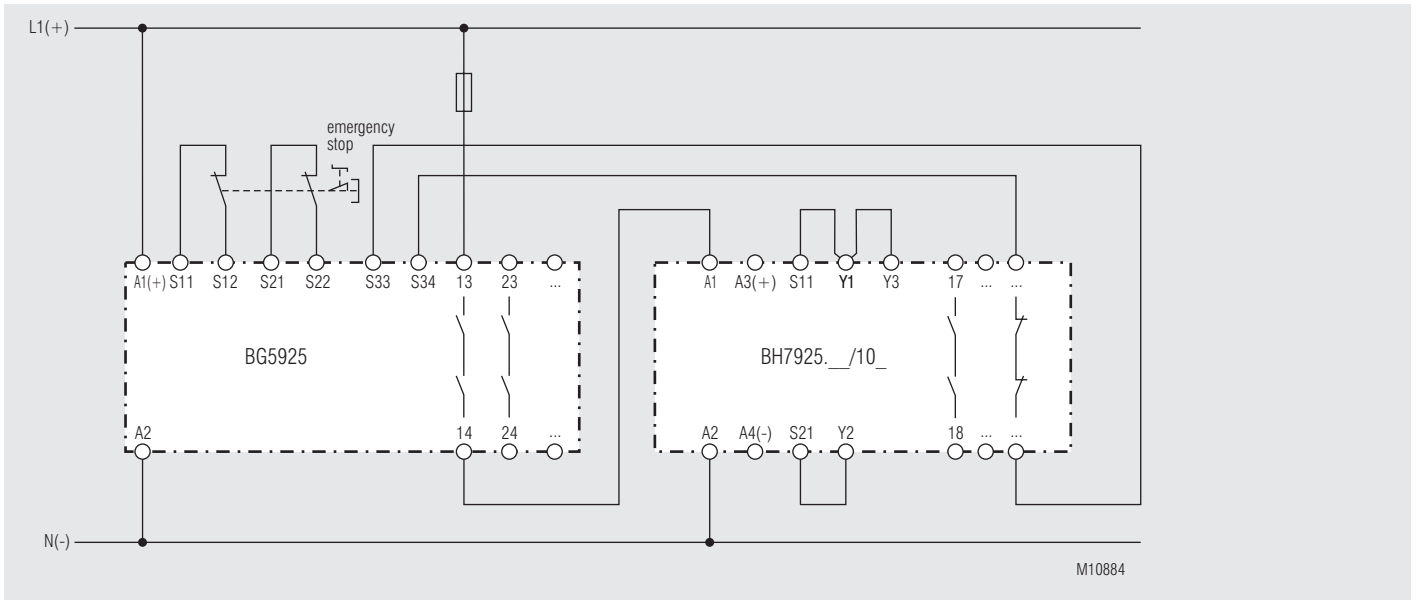


Versions with auxiliary voltage. Time control with internal voltage S11(+), S21(-). Suited up to SIL2 Performance Level d, Cat. 3

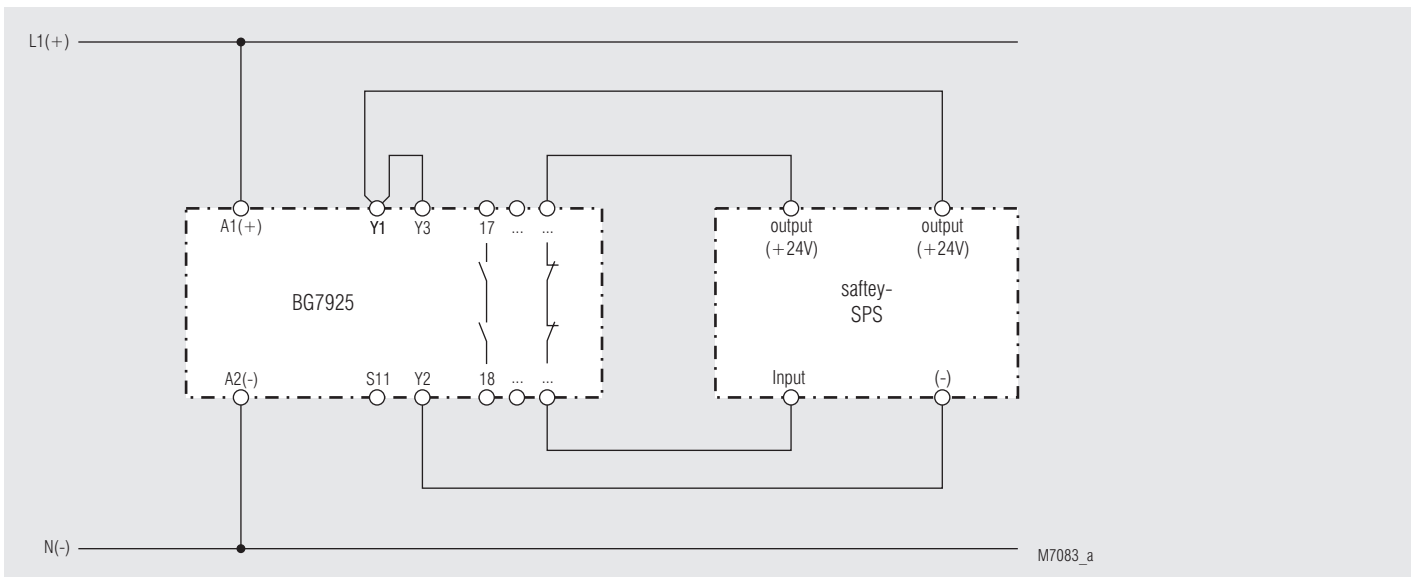


Versions with auxiliary voltage. Separate control of 2 timing circuits with internal voltage S11 (+). Suited up to SIL2 Performance Level d, Cat. 3

## 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  $\geq 500$  V are expected, they have to be limited by suitable means. Suited up to SIL2 Performance Level d, Cat. 3

