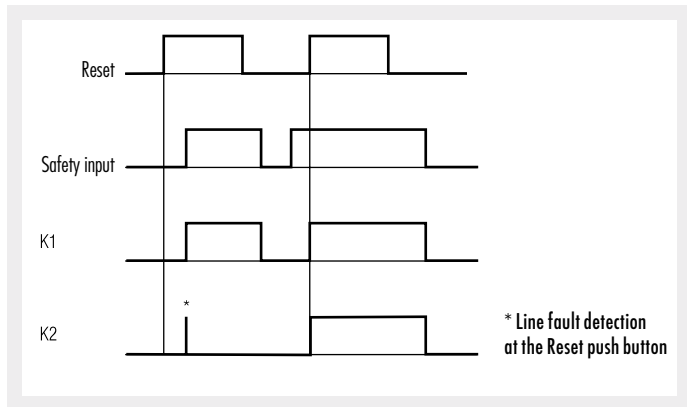
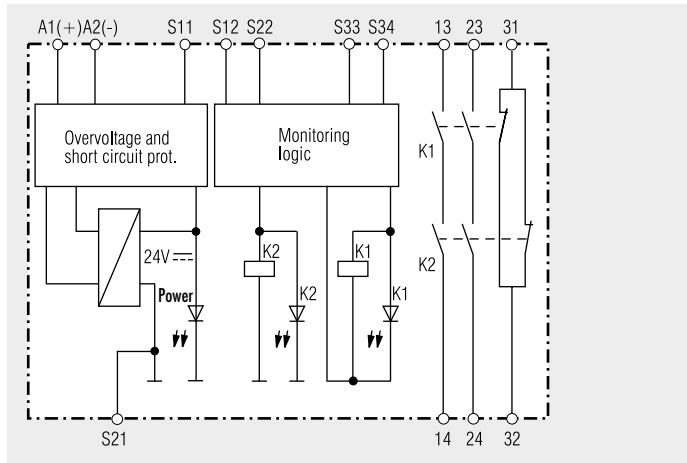


- According to EU directive for machines 98/37/EG
- According to IEC 204-1, EN 60 204-1, DIN VDE 0113-1, EN 954-1
- Safety-mat module with manual or automatic reset
- can also be used for safety edges (4 wire non resistive type)
- Safety category 4 according to DIN EN 954-1
- Output: 2 N/O + 1N/C contacts
- Monitoring of Reset-button function
- Manual reset or automatic reset when connecting the supply voltage, switch S1
- 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 mm<sup>2</sup> stranded ferruled (isolated), 2 x 2,5 mm<sup>2</sup> stranded ferruled DIN 46 228-1/-2/-3
- Width 22,5 mm

**Function diagram**



**Block diagram**



**Approvals and marking**



**Applications**

- Control unit for safety mats and safety edges (4 wire non resistive type)

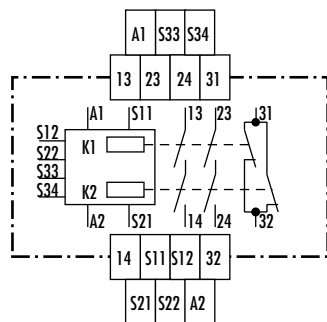
**Indicators**

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

**Notes**

Monitoring of Reset-button function:  
 Monitoring of Reset-button function is only active when S12 and S22 are switched simultaneously. If the Reset-button is closed before S12, S22 is connected to voltage (also when fault across Reset-Button), the output contacts will not close.  
 A fault across the Reset-button which occurred after activation of the relay, will be detected with the next activation and the output contacts will not close. If a fault occurs after the voltage has been connected to S12, S22, the unit will be activated because this fault is similar to the normal Reset-function. The gold plated contacts of the MSR23M 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.

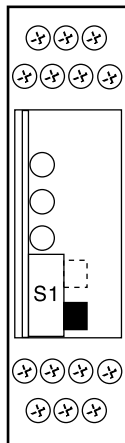
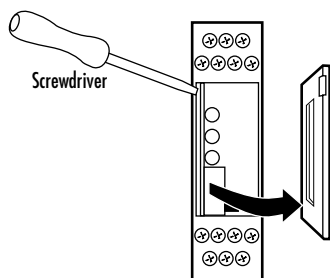
**Circuit diagrams**



## Unit programming



Isolate power before removing cover



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

Switch S1  
Upper position for Auto reset.  
Lower position for Manual reset.

### Notes

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. Depending on the operation of the machine, the switch S1 is set to automatic or manual restart.

### Technical data

#### Input circuit

<b>Nominal Voltage <math>U_N</math>:</b>	DC 24 V, AC/DC 24 V	
<b>Voltage range</b>	DC	AC/DC
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:	—	0,8 ... 1,1 $U_N$
<b>Nominal consumption:</b>	DC approx. 2 W	
<b>Min. Off-time:</b>	1 s	
<b>Control voltage on S11:</b>	approx. DC 23 V at $U_N$	
<b>Cross fault current</b> 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		
DC:	approx. 29 mA at $U_N$	
AC:	approx. 37 mA at $U_N$	
<b>Control current over S12, S22:</b>	40 mA at $U_N$	
<b>Min. voltage on S12, S22:</b>	DC 21 V when relay activated	
<b>Short-circuit protection:</b>	Internal PTC	
<b>Overvoltage protection:</b>	Internal VDR	

#### Output

#### Contacts

Contacts	2 NO, 1 NC contact
<b>Operate delay typ. at <math>U_N</math>:</b>	
Manual start:	40 ms
automatic start:	200 ms
<b>Release delay typ. at <math>U_N</math>:</b>	
Disconnecting the supply:	50 ms
Disconnecting S12, S22:	15 ms
<b>Contact type:</b>	positive guided
<b>Nominal output voltage:</b>	AC 250 V
	DC: see limit curve for arc-free operation
<b>Switching of low loads:</b> (contact 5 $A_u$ )	$\geq 100$ mV
	$\geq 1$ mA
<b>Thermal current <math>I_{th}</math>:</b> on 1 contact path:	see current limit curve
	max. 8 A
on more than 1 contact path:	max. 7 A per contact path

### Technical data

#### Switching capacity

to AC 15:	AC 3 A / 230 V	EN 60 947-5-1
	for NO contacts	
	AC 2 A / 230 V	EN 60 947-5-1
	for NC contact	

#### Electrical contact life

to AC 15 at 2 A, AC 230 V:	10 <sup>5</sup> switching cycles	EN 60 947-5-1
----------------------------	----------------------------------	---------------

#### Permissible operating frequency:

max. 1 200 operating cycles / h

#### Short circuit strength

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

line circuit breaker: C 8 A

#### Mechanical life:

10 x 10<sup>6</sup> switching cycles

### General data

#### Operating mode:

Continuous operation

#### Temperature range:

- 15 ... + 55 °C

#### Clearance and creepage distances

Overvoltage category /  
contamination level: 4 kV / 2 DIN VDE 0110-1 (04.97)

#### EMC

Electrostatic discharge: 8 kV (air) EN 61 000-4-2

HF irradiation: 10 V / m EN 61 000-4-3

Fast transients: 2 kV EN 61 000-4-4

#### Surge voltages

between

wires for power supply: 1 kV EN 61 000-4-5

between wire and ground: 2 kV EN 61 000-4-5

Interference suppression: Limit value class B EN 55 011

**Degree of protection:** Housing: IP 40 EN 60 529

Terminals: IP 20 EN 60 529

#### Housing:

Thermoplastic with V0 behaviour

according to UL subject 94

**Vibration resistance:** Amplitude 0,35 mm EN 60 068-2-6

frequency 10 ... 55 Hz

**Climate resistance:** 15 / 055 / 04 EN 60 068-1

#### Terminal designation:

EN 50 005

#### 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:

Box terminal with wire protection,

removable terminal strips

#### Mounting:

DIN rail

EN 50 022

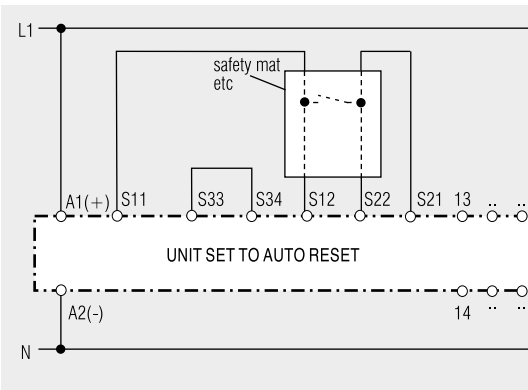
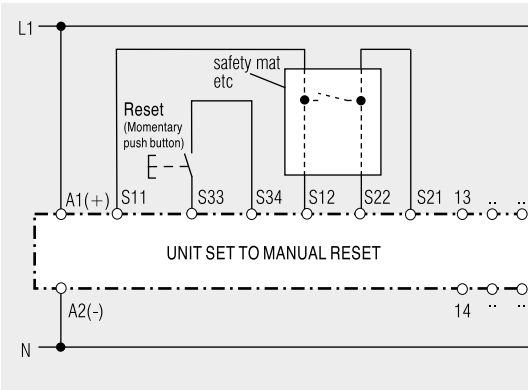
#### Weight:

220 g

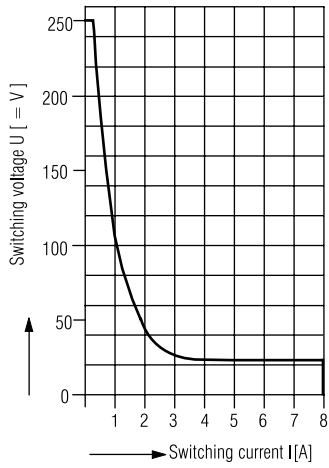
### Dimensions

**Width x height x depth:** 22,5 x 84 x 118 mm

## Application examples

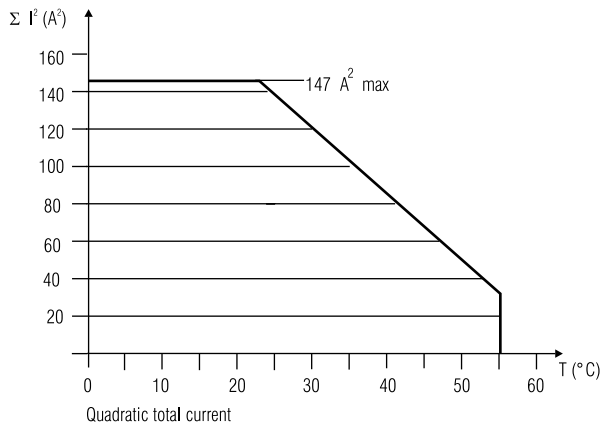


## Characteristics



----- safe braking, no continuous arcing  
max 1 switching cycle/s

## Arc limit curve under resistive load



$$\Sigma I^2 = \frac{2}{3} I_1^2 + \frac{1}{3} I_2^2 + I_3^2$$

$I_1, I_2, I_3$  - current in contact paths

## Quadratic total current limit curve



**Allen-Bradley**

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