

## VARIMETER EX Thermistor Motor Protection Relay MK 9163N



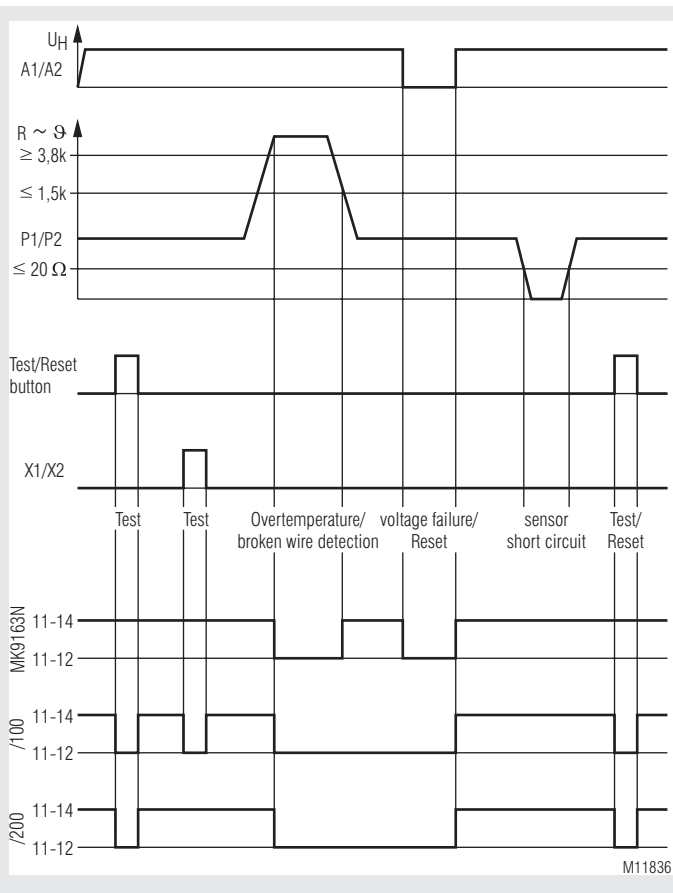
### Your advantages

- Reliable temperature monitoring of motors
- Rapid fault location

### Features

- According to EN 60947-5-1, EN 60947-8
- Monitoring of
  - overtemperature
  - broken wire detection in sensor circuit
  - short circuit detection in sensor circuit
- 1 input for 1 to 6 PTC-resistors
- De-energized on trip
- LED-indicator for
  - auxiliary supply
  - state of contact
- Output with 2 changeover contacts
- As option with manual reset, internal reset button and external remote reset X1/X2
- Wire connection: also 2 x 1.5 mm<sup>2</sup> stranded ferruled, or 2 x 2.5 mm<sup>2</sup> solid DIN 46 228-1/-2/-3/-4
- As option with pluggable terminal blocks for easy exchange of devices
  - with screw terminals
  - or with cage clamp terminals
- Width 22.5 mm

### Function Diagram



### Approvals and Markings



<sup>1)</sup> Approval not for all variants; on request

### Applications

- To protect against thermal overload of motors caused by high switching frequency, heavy duty starting, phase failure on one phase, bad cooling, high ambient temperature
- Temperature monitoring of bearings, transmissions, oil and cooling liquids.

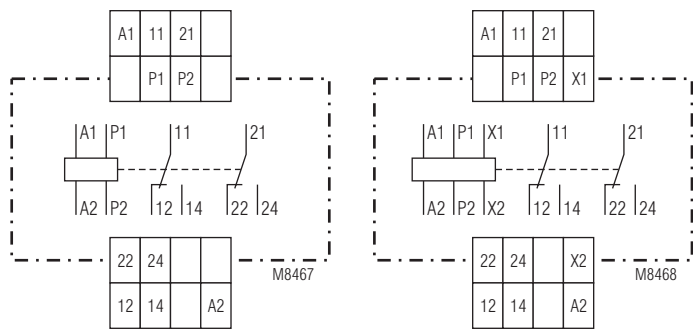
### Function

If one of the sensors in the measuring circuit reaches the response temperature (or broken wire is detected), the device indicates failure. This failure is stored in the device with manual reset, even if the temperature goes back to normal. The unit can be reset by pressing the Test/Reset button, by bridging X1/X2 for a short moment or by disconnecting the auxiliary supply for a short time.

**Test/Reset button:**

Besides the reset function this button provides in normal operation a test facility. The unit indicates fault as long as the button is activated (see also under "Variants").

## Circuit Diagrams



MK 9163N.12

MK 9163N.12/100, MK 9163N.12/200

## Connection Terminals

Terminal designation	Signal designation
A1, A2	operating voltage
P1, P2	Thermistor input
X1, X2	External remote reset
11, 12, 14; 21, 22, 24	Changeover contacts

## Indicators

green LED:	on, when auxiliary supply connected
red LED:	on, when overtemperature or broken wire, short circuit is detected

## Technical Data

### Input Circuit

<b>Response value:</b>	3.2 ... 3.8 k $\Omega$
<b>Release value:</b>	1.5 ... 1.8 k $\Omega$
<b>Broken wire detection:</b>	> 3.8 k $\Omega$
<b>Short circuit on measuring circuit:</b>	< 20 $\Omega$
<b>Loading of measuring circuit:</b>	< 5 mW (bei R = 1.5 k $\Omega$ )
<b>Measuring voltage:</b>	$\leq$ 2 V (bei R = 1.5 k $\Omega$ )

### Auxiliary Circuit

<b>Auxiliary voltage <math>U_H</math>:</b>	AC/DC 24 V AC 110, 230, 400 V 50 / 60 Hz
<b>Voltage range:</b>	AC 0.8 ... 1.1 $U_H$ DC 0.9 ... 1.25 $U_H$
<b>at 10 % residual ripple:</b>	DC 0.8 ... 1.1 $U_H$
<b>at 48 % residual ripple:</b>	DC: 0.85 W
<b>Nominal consumption:</b>	AC: 1.5 VA
<b>Nominal frequency:</b>	50 / 60 Hz
<b>Frequency range:</b>	45 ... 65 Hz
<b>Max. bridging time on failure of aux. supply:</b>	20 ms
<b>Operate delay:</b>	< 40 ms
<b>Release delay:</b>	< 100 ms

### External Remote Reset X1/X2

<b>Function:</b>	External remote reset X1/X2 with NO contact (voltage free)
<b>Remark:</b>	This input is not galvanic separated from measuring input P1/P2

### Output

<b>Contacts:</b>	2 changeover contacts
<b>Thermal current <math>I_{th}</math>:</b>	5 A
<b>Switching capacity</b>	
to AC 15	
NO contacts:	2 A / AC 230 V IEC/EN 60 947-5-1
NC contacts:	1 A / AC 230 V IEC/EN 60 947-5-1
to DC 13:	1 A / DC 24 V IEC/EN 60 947-5-1
<b>Electrical life</b>	
at 4 A, AC 230 V, $\cos\phi = 0.6$ :	1.5 x 10 <sup>6</sup> switching cycles
<b>Short-circuit strength</b>	
max. line circuit breaker:	C 16 A DIN EN 60 947-5-1
<b>Mechanical life:</b>	$\geq$ 30 x 10 <sup>6</sup> switching cycles

## Technical Data

### General Data

<b>Operating mode:</b>	Continuous operation
<b>Temperature range:</b>	
Operation:	- 20 ... + 60°C
Storage:	- 20 ... + 60°C
<b>Altitude:</b>	< 2.000 m

### Clearance and creepage distances

rated impulse voltage / pollution degree:	4 kV / 2	IEC/EN 60 664-1
<b>EMC</b>	IEC/EN 60947-8	

Interference suppressions:	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 0.2 mm, frequency 10 ... 55 Hz, IEC/EN 60 068-2-6  
20 / 060 / 04 IEC/EN 60 068-1

### Climate resistance:

IEC/EN 60 068-1  
EN 50 005

### Terminal designation:

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

### Wire connection

#### Screw terminals

<b>(integrated):</b>	1 x 4 mm <sup>2</sup> solid or 1 x 2.5 mm <sup>2</sup> stranded ferruled or 2 x 1.5 mm <sup>2</sup> stranded ferruled or 2 x 2.5 mm <sup>2</sup> solid
----------------------	---

Insulation of wires or sleeve length:

8 mm

#### Plug in with screw terminals

max. cross section

for connection: 1 x 2.5 mm<sup>2</sup> solid or  
1 x 2.5 mm<sup>2</sup> stranded ferruled

Insulation of wires or sleeve length:

8 mm

#### Plug in with cage clamp terminals

max. cross section

for connection: 1 x 4 mm<sup>2</sup> solid or  
1 x 2.5 mm<sup>2</sup> stranded ferruled

min. cross section

for connection: 0.5 mm<sup>2</sup>

Insulation of wires or sleeve length:

12  $\pm$ 0.5 mm

#### Wire fixing:

Plus-minus terminal screws M 3.5  
box terminals with wire protection or  
cage clamp terminals

#### Fixing torque:

max. 0.8 Nm

#### Mounting:

DIN rail IEC/EN 60 715

#### Weight:

160 g

## Dimensions

### Width x height x depth

MK 9163N:	22.5 x 90 x 102 mm
MK 9163N PC:	22.5 x 111 x 102 mm
MK 9163N PS:	22.5 x 104 x 102 mm

## CCC-Data

<b>Thermal current <math>I_{th}</math>:</b>	4 A
---	-----

### Switching capacity

to AC 15:	1,5 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13:	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.

### Standard Type

MK9163N.12/100 AC230 V 50/60 Hz  
 Article number: 0054097

- with Test/Reset button
- Output: 2 changeover contacts
- Nominal voltage  $U_N$ : AC 230 V
- Width: 22.5 mm

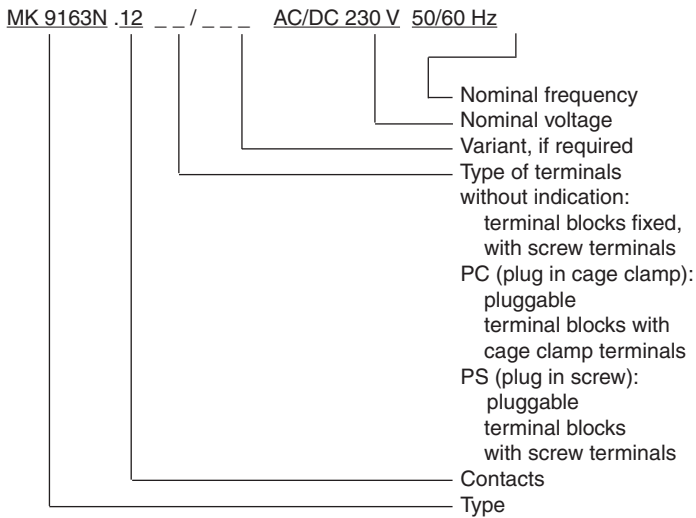
### Variants

MK 9163N.12 /

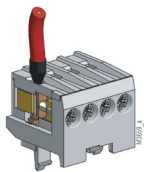
- 0 free
- 0 without short circuit detection
- 0 without RESET
- 1 with RESET and test function via built in button and X1/X2
- 2 with RESET and test function via built in button, at X1/X2 RESET function only

Available variants  
 MK 9163N.12  
 MK 9163N.12/100  
 MK 9163N.12/200

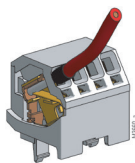
### Ordering example for variants



### Options with Pluggable Terminal Blocks



Screw terminal (PS/plugin screw)

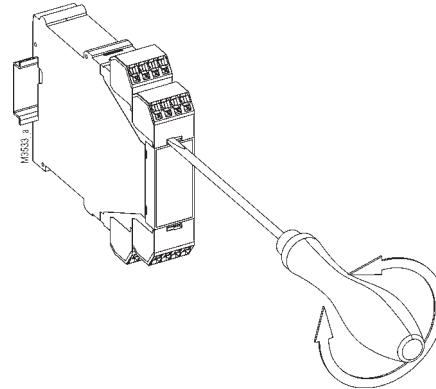


Cage clamp terminal (PC/plugin cage clamp)

### Notes

Removing the terminal blocks with cage clamp terminals

1. The unit has to be disconnected.
2. Insert a screwdriver in the side recess of the front plate.
3. Turn the screwdriver to the right and left.
4. Please note that the terminal blocks have to be mounted on the belonging plug in terminations.



### Additional Remarks

#### Installation

The DC 24 V version has no galvanic separation between auxiliary supply (A1, A2) and the sensor circuit (P<sub>1</sub>, P<sub>2</sub>). These units are only allowed to be connected to transformers according to DIN EN 61 558 or to battery supply.

#### Wiring

The sensor and control wires have to be installed separately from the motor wires. When strong inductive or capacitive influence is expected from parallel installed high current wires, screened wire should be used.

#### Wire length

The max. wire length of the sensor circuit is:

Diameter (mm <sup>2</sup> ):	4	2.5	1.5	0.5
max. wire length (m):	2 x 550	2 x 250	2 x 150	2 x 50

### Application Example

