



**VARIMETER EX**  
**Thermistor Motor Protection Relay**  
**MK 9163N ATEX**

Translation  
of the original instructions

ITS

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Before installing, operating or maintaining this device, these instructions must be carefully read and understood.



The installation must only be done by a qualified electrician!



Do not dispose of household garbage!  
The device must be disposed of in compliance with nationally applicable rules and requirements.



Storage for future reference

To help you understand and find specific text passages and notes in the operating instructions, we have important information and information marked with symbols.

### Symbol and Notes Statement



**DANGER:**  
Indicates that death or severe personal injury will result if proper precautions are not taken.



**WARNING:**  
Indicates that death or severe personal injury can result if proper precautions are not taken.



**CAUTION:**  
Indicates that a minor personal injury can result if proper precautions are not taken.



**INFO:**  
Referred information to help you make best use of the product.



**ATTENTION:**  
Warns against actions that can cause damage or malfunction of the device, the device environment or the hardware / software result.

### General Notes

The product hereby described was developed to perform functions as a part of a whole installation or machine. A complete system normally includes sensors, evaluation units, signals and logical modules for safe disconnections. The manufacturer of the installation or machine is responsible for ensuring proper functioning of the whole system. DOLD cannot guarantee all the specifications of an installation or machine that was not designed by DOLD. The total concept of the control system into which the device is integrated must be validated by the user. DOLD also takes over no liability for recommendations which are given or implied in the following description. The following description implies no modification of the general DOLD terms of delivery, warranty or liability claims.

### Designated Use

Temperature monitoring of explosion protected Motors by „extended safety“ Ex e EN 60079-7, „pressure proof enclosure“ Ex d EN 60079-1 or „overpressure enclosure“ Ex px in gas containing atmosphere as well as „protection by enclosures“ Ex tb resp. Ex tc EN 60079-31 in dust containing atmosphere. The thermistor Motor protection relay protects Standard and Explosion proof Motor against overheating due to overload according to EN 60079-14 and EN 60079-0.

### Safety Notes



#### **Risk of electrocution!** **Danger to life or risk of serious injuries.**

- Disconnect the system and device from the power supply and ensure they remain disconnected during electrical installation.
- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The contact protection of the elements connected and the insulation of the supply cables must be designed in accordance with the requirements in the operating instructions / data sheet.
- Note the VDE and local regulations, particularly those related to protective measures.



#### **Risk of explosion and fire or other thermal hazards!** **Danger to life, risk of serious injuries or property damage.**

- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.



#### **Functional error!** **Danger to life, risk of serious injuries or property damage.**

- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.



#### **Installation fault!** **Danger to life, risk of serious injuries or property damage.**

- The relay must only be replaced by equivalent devices marked according to the relevant safety rules.
- For the test and the maintenance of motor protection devices for explosion proof machines, the EN 60079-17 and the safety rules that result from the motor application and the corresponding type of protection have to be respected (EU ATEX Directive 2014/34/EU and EN 60079-14).
- Details of the motor supplier and the details about the explosion protection from the EC-type examination certificates for explosion proof motors have to be respected.
- If variants are used that have no no-voltage safe reset function additional measures have to be applied in order to disable safely the restart of the motor until the fault is removed if this leads to a dangerous situation.
- The motor protection relay has to switch off the motor immediately also when it is controlled by an inverter. The control circuit must allow this. In this case the sensor wires must be lead separately. The use of wires inside the motor connection cable is not allowed.



#### **Attention!**

- Opening the device or implementing unauthorized changes voids any warranty.
- Devices that show obvious transportation damage must not be used in safety relevant applications.



## VARIMETER EX Thermistor Motor Protection Relay MK 9163N ATEX



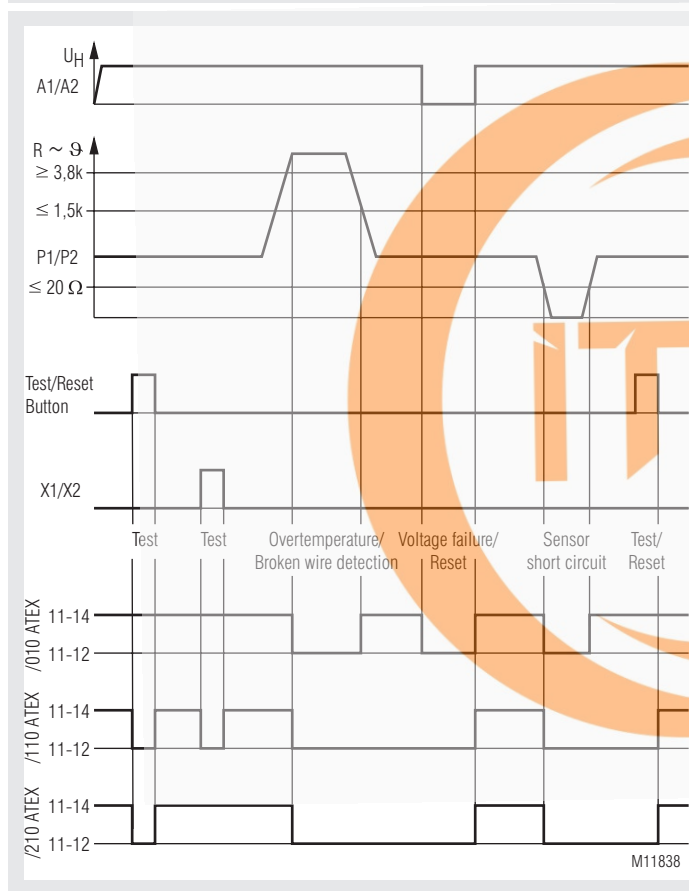
### Your advantages

- Reliable temperature monitoring of motors
- Rapid fault location

### Features

- According to EN 60947-5-1, EN 60947-8, EN 60079-14, EN 61508, EN 50495, EN 13849
- Monitoring of
  - overtemperature
  - broken wire detection in sensor circuit
  - short circuit detection in sensor circuit
- 1 input for 3 or 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> For devices with ATEX-approval

Directive 2014/34/EU

EU-Test certificate no. PTB 03 ATEX 3117

Marking



II (2) G [Ex e] [Ex d] [Ex px] [Ex n]  
II (2) D [Ex tb] [Ex tc]

### 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

### Devices with ATEX-approval:

Temperature monitoring of explosion protected Motors by „extended safety“ Ex e EN 60079-7, „pressure proof enclosure“ Ex d EN 60079-1 or „overpressure enclosure“ Ex px in gas containing atmosphere as well as „protection by enclosures“ Ex tb resp. Ex tc EN 60079-31 in dust containing atmosphere. The thermistor motor protection relay protects standard and explosion proof motor against overheating due to overload according to EN 60079-14 and EN 60079-0.

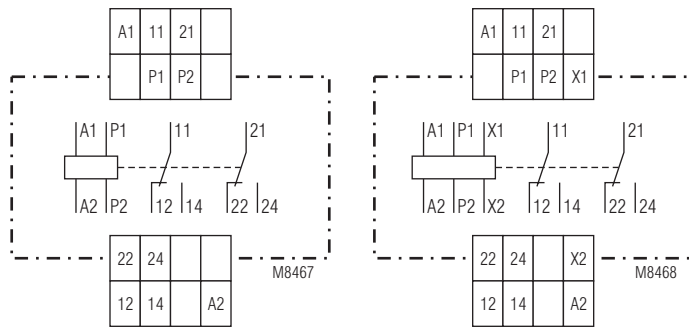
### Function

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.12/010-ATEX

MK 9163N.12/110-ATEX,  
MK 9163N.12/210-ATEX

## 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

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

### Auxiliary Circuit

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

### External Remote Reset X1/X2

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

### Output

**Contacts:** 2 changeover contacts  
**Thermal current  $I_{th}$ :** 5 A  
**Switching capacity**  
to AC 15: 3 A / AC 230 V IEC/EN 60947-5-1  
to DC 13: 2 A / DC 24 V IEC/EN 60947-5-1  
**Electrical life**  
at 4 A, AC 230 V,  $\cos \phi = 0.6$ :  $1.5 \times 10^6$  switching cycles  
**Short-circuit strength** IEC/EN 60947-5-1  
**NC contact:**  
max. fuse rating: 6 A gG / gL  
**NO contact:**  
max. fuse rating: 10 A gG / gL  
**Mechanical life:**  $\geq 30 \times 10^6$  switching cycles

## Technical Data

### General Data

**Operating mode:** Continuous operation  
**Temperature range**  
Operation: - 20 ... + 60°C  
Storage: - 20 ... + 60°C  
**Altitude:** < 2000 m

### Clearence and creepage distances

Rated impulse voltage / pollution degree: 4 kV / 2 IEC/EN 60664-1

**EMC**  
Interference suppressions: IEC/EN 60947-8  
Limit value class B EN 55011

### Degree of protection

Housing: IP 40 IEC/EN 60529  
Terminals: IP 20 IEC/EN 60529

### Housing:

### Vibration resistance:

### Climate resistance:

### Terminal designation:

### Wire fixing:

### Fixing torque:

### Mounting:

### Weight:

### 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

### Standard Type

MK 9163N.12/110-ATEX AC 230 V 50/60 Hz  
Article number: 0056453  
• with Test/Reset button  
• Output: 2 changeover contacts  
• Nominal voltage  $U_N$ : AC 230 V  
• Width: 22.5 mm

### Variant

MK 9163N.12 /

- ATEX with approval
- 0 Free
- 0 Without short circuit detection
- 1 With short circuit detection (ATEX)
- 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.12/010 ATEX  
MK 9163N.12/110 ATEX  
MK 9163N.12/210 ATEX

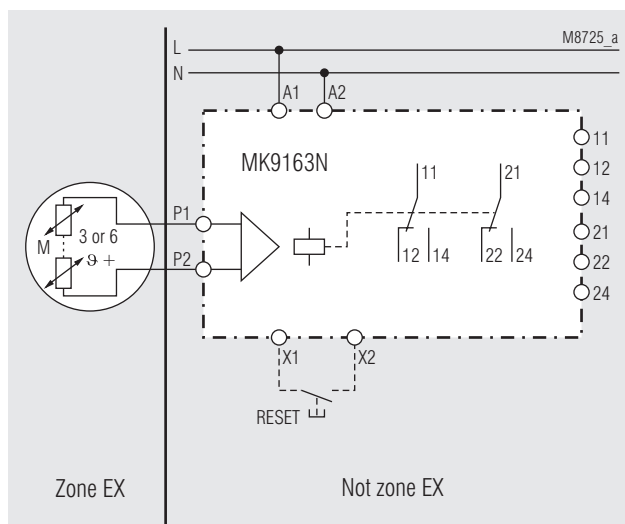


## Ordering example for variants

MK 9163N .12 \_ \_ / \_ \_ ATEX AC/DC 230 V 50/60 Hz

Nominal frequency  
Nominal voltage  
Variant, if required  
Type of terminals  
Without indication:  
Terminal blocks fixed,  
with screw terminals  
PC (plug in cage clamp):  
Pluggable  
terminal blocks with  
cage clamp terminals  
PS (plug in screw):  
Pluggable  
terminal blocks  
with screw terminals  
Contacts  
Type

## Application Example



## Manufacturing Data

Each unit is marked with the manufacturing date e.g. "Bj. KW 01/20".  
The unit had been produced in week 01 – 2020.

## Troubleshooting

Failure	Potential cause
Device cannot be activated	- Power supply not connected - Unit defective

## Additional Remarks

### Use on motors in explosion hazardous areas

Thermal protection on motors that are equipped with PTC sensors acc. to DIN VDE V 0898-1-401 or EN 60034-11 type A (EN 60947-8). When used on motors of protection degree EX and EX d only the sensor wire leads through the Ex-area. The motor protection relay has to be mounted outside the Ex-area, but monitors devices operated in the Ex-area.

### Safety integrity level SIL 1

To fulfil SIL 1 a cyclic function test of the protection device has to be provided.  
This can be done manually during maintenance (see below).

**The function test must be carried out all 2 years.**

### Test facilities for set-up and maintenance

A test of the unit can be made by simulating the resistance on the sensor input. During maintenance these tests can also be made.

- Test of short circuit detection: Bridge sensor input (this test is possible without disconnection of the sensor).
- Test of broken wire detection: Disconnect sensor wire.
- Test of overtemperature function: Change resistance on input from low 50 ... 1500  $\Omega$  to 4 k $\Omega$ .

The RESET button can also be used for test purpose (see Function Diagram)

### Installation

The AC/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 EN 61558 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

## Maintenance and repairs

- The device contains no parts that require maintenance.
- In case of failure, do not open the device but send it to manufacturer for repair.