

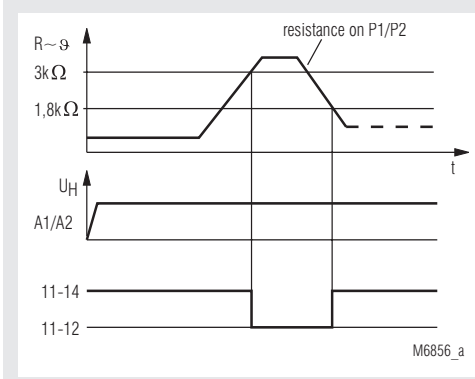
## VARIMETER

### Thermistor Motor Protection Relay BA 9038, AI 938

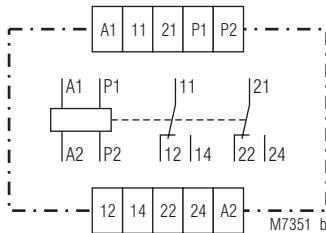


- According to DIN VDE 0660 part 302 (pr EN 60 947-8) and part 303
- 1 input for PTC-resistors or bimetal contacts
- Broken wire detection in sensor circuit
- Optionally with no voltage reclosing interlock
- Closed circuit operation
- 1 or 2 changeover contacts
- Width 45 mm

### Function Diagram



### Circuit Diagram



BA 9038.12, AI 938.002, M7351\_b

### Approvals and Marking



\* see variants

### 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.

### Function

As sensors special PTC-resistors are use, which are normally built into the motor windings. Up to 6 PTC resistors can be connected in series. When the resistance reaches a certain value, the output relay deenergizes. An LED comes on. The thermistor motor protection relay works with closed circuit operation and also detects broken wire on the sensor circuit. Please note, that contact 11-12 and 21-22 may be closed for a short moment while the voltage is switched on.

The models AI 938.001/03 and BA 9038.11/003 include a thermal reclosing interlock. When the response temperature is reached the output relay deenergizes and the push button on the relay front comes out after approx. 1 s. This unit has no indicator LED.

The model BA 9038.\_\_\_/100 includes an electromagnetic reclosing interlock. When the response temperature is reached the output relay deenergizes and the push button on the relay front comes out immediately. This model has 2 LEDs. One indicates connected auxiliary supply, the other one overtemperature.

The output relay of the units with reclosing interlock remains deenergized, also when the temperature goes back to normal. The interlock is no voltage safe, so also on loss of voltage its actual state is stored (VDE 0113 § 5.4.2). By pressing the button on the front the module can be reset again.

### Notes

The wires of the sensor circuit must not be influenced by other voltages therefore they should be routed separately or screened and earthed at one end only. The total resistance of the wiring should not exceed 100 Ω.

### Technical Data

#### Input Circuit

|                           |             |
|---------------------------|-------------|
| <b>Response value:</b>    | ≥ 3 kΩ      |
| <b>Release value:</b>     | ≤ 1.8 kΩ    |
| <b>Number of sensors:</b> | 1 ... 6 pcs |
| <b>Operate delay:</b>     | ≤ 20 ms     |
| <b>Release delay:</b>     | ≤ 15 ms     |

#### Auxiliary Circuit

|  |                                 |
|--|---------------------------------|
| <b>Auxiliary voltage U<sub>H</sub>:</b>    | AC 24, 42, 110, 127, 230, 240 V |
| <b>Voltage range of U<sub>H</sub>:</b>     | 0.8 ... 1.1 U <sub>N</sub>      |
| <b>Nominal consumption:</b>                | 2.2 VA                          |
| <b>Nominal frequency of U<sub>H</sub>:</b> | 50 / 60 Hz                      |

## Technical Data

### Output

### Contacts

|             |                       |
|-------------|-----------------------|
| BA 9038.11: | 1 changeover contact  |
| AI 938.001: | 1 changeover contact  |
| BA 9038.12: | 2 changeover contacts |
| AI 938.002: | 2 changeover contacts |

### Thermal current $I_{th}$ :

5 A

### Switching capacity

|             |                |                   |
|-------------|----------------|-------------------|
| to AC 15    |                |                   |
| NO contact: | 3 A / AC 230 V | IEC/EN 60 947-5-1 |
| NC contact: | 1 A / AC 230 V | IEC/EN 60 947-5-1 |

### Electrical life

|                           |                                    |  |
|---------------------------|------------------------------------|--|
| to AC 15 at 3 A, AC 230 V |                                    |  |
| 2 changeover contacts:    | $0.5 \times 10^5$ switching cycles |  |
| 1 changeover contact:     | $2.5 \times 10^5$ switching cycles |  |
| at 0.05 A:                |                                    |  |
| 2 changeover contacts:    | $10 \times 10^6$ switching cycles  |  |
| 1 changeover contact:     | $30 \times 10^6$ switching cycles  |  |

### Short-circuit strength

max. fuse rating: 4 A gL IEC/EN 60 947-5-1

Mechanical life:  $> 30 \times 10^6$  switching cycles

## General Data

Operating mode: Continuous operation

Temperature range: -20 ... +60°C

### Clearance and creepage distances

rated impuls voltage / pollution degree: 4 kV / 2 IEC 60 664-1

### EMC

Electrostatic discharge: 6 kV (air) IEC/EN 61 000-4-2

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

Surge voltages between

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

between wired and ground: 2 kV IEC/EN 61 000-4-5

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 0.35 mm, IEC/EN 60 068-2-6 frequency 10 ... 55 Hz

Climate resistance: 20 / 060 / 04 IEC/EN 60 068-1

Terminal designation: EN 50 005

Wire connection: 2 x 2.5 mm<sup>2</sup> solid or 2 x 1.5 mm<sup>2</sup> stranded wire with sleeve DIN 46 228-1/-2/-3/-4

Wire fixing: Flat terminals with self-lifting clamping piece IEC/EN 60 999-1

### Screw fixing:

AI 938: 35 x 50 mm and 35 x 60 mm

Mounting: DIN rail IEC/EN 60 715

### Weight:

BA 9038: 250 g

AI 938: 240 g

## Dimensions

### Width x height x depth:

BA 9038: 45 x 74 x 124 mm

AI 938: 45 x 77 x 127 mm

## Standard Types

BA 9038.11/003 AC 230 V 50 / 60 Hz

Article number: 0028829 stock item

• Output: 1 changeover contact

• Auxiliary voltage  $U_H$ : AC 230 V

• with thermal reclosing interlock (manual reset)

• Width: 45 mm

## Variants

BA 9038.11: without thermal reclosing interlock (manual reset function)

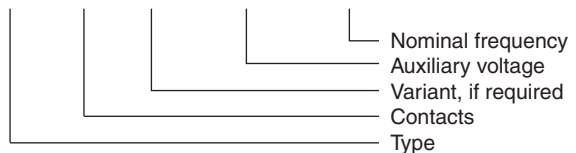
BA 9038. \_\_ /100: with electro magnetic reclosing interlock (manual reset function)

AI 938.001: without thermal reclosing interlock (manual reset function)

AI 938. \_\_ /60: with CSA approval

## Ordering example for variants

BA 9038 . \_ \_ / \_ \_ AC 230 V 50/60 Hz



## Application Example

