

## Motor phase and temperature control relay - 35 mm HWTM Part number 84873027



- Control of 3-phase networks : phase sequence, phase failure
- Multi-voltage
- True RMS measurement
- Motor temperature control via PTC probes
- With line break or probe short-circuit detection
- Version with fault latching function and reset / test
- LED status indication

### Part numbers

|          | Type | Functions  | Nominal voltage (V) | Phase control voltage range |
|----------|------|--|---------------------|-----------------------------|
| 84873027 | HWTM | Phase sequence, phase failure, motor temperature via PTC probe, test, memory | 24 →240 V AC/DC     | 3 x 208 →3 x 480 V AC       |

### Specifications

#### Supply

|  |                        |
|--|------------------------|
| Supply voltage Un                              | 24 V →240 V AC/DC      |
| Voltage supply tolerance                       | -15 % / +10 %          |
| Operating range                                | 20,4 V →264 V AC/DC    |
| Polarity with DC voltage                       | No                     |
| AC supply voltage frequency                    | 50 / 60 Hz ± 10 %      |
| Galvanic isolation of power supply/measurement | No (current limiting)  |
| Power consumption at Un                        | 4 VA in AC/0.5 W in DC |
| Immunity from micro power cuts                 | 20 ms / 20,4 V         |

#### Inputs and measuring circuit

##### 3-phase control

|                              |                        |
|------------------------------|------------------------|
| Measurement ranges           | 3 x 208 →3 x 480 VAC * |
| Operating range              | 176 →528 VAC           |
| Frequency of measured signal | 50 / 60 Hz ±10 %       |
| Input resistance             | 602 KΩ / line          |

##### Contrôle thermique

|  |                               |
|--|-------------------------------|
| Maximum voltage of heat detection circuit    | 3.6 V (T1-T2 open)            |
| Short-circuit current                        | 7 mA (T1, T2 short-circuited) |
| Maximum heat detector resistance at 20 °C    | 1500 Ω                        |
| Trip threshold                               | 3100 Ω± 10 %                  |
| Reset threshold                              | 1650 Ω± 10 %                  |
| Short-circuit detection range                | 0 →15 Ω± 5 Ω                  |
| Resistance measurement temperature drift     | ± 0,1 % / °C max.             |
| Repetition accuracy with constant parameters | ± 0,5 %                       |

#### Timing

|   |   |
|---|---|
| Delay on threshold crossing                   | 300 ms max. (phase)<br>300 ms typical (temperature) |
| Y1 input response time (Y1-T1 contact) and PB | typically 50 ms                                     |
| Reset time                                    | 10 s max. at 264 V AC                               |
| Delay on pick-up                              | 500 ms  |

#### Output

|   |  |
|---|--|
| Type of output                                | 2 NO relays                              |
| Type of contacts                              | No cadmium                               |
| Maximum breaking voltage                      | 250 V AC/DC                              |
| Max. breaking current                         | 5 A AC/DC                                |
| Min. breaking current                         | 10 mA / 5 V AC/DC                        |
| Electrical life (number of operations)        | 1 x 10 <sup>4</sup>                      |
| Breaking capacity (resistive)                 | 1250 VA AC                               |
| Maximum rate                                  | 360 operations/hour at full load         |
| Operating categories acc. to IEC/EN 60947-5-1 | AC12, AC13, AC14, AC15, DC12, DC13, DC14 |
| Mechanical life (operations)                  | 30 x 10 <sup>6</sup>                     |

#### Insulation

|  |  |
|--|--|
| Nominal insulation voltage IEC/EN 60664-1        | 400 V  |
| Insulation coordination (IEC/EN 60664-1)         | Overvoltage category III : degree of pollution 3 |
| Rated impulse withstand voltage (IEC/EN 60664-1) | 4 kV (1,2 / 50 μs)                               |
| Dielectric strength (IEC/EN 60664-1)             | 2 kV AC 50 Hz 1 min.                             |

|   |   |
|---|---|
| Insulation resistance (IEC/EN 60664-1)                | > 500 MΩ / 500 V DC   |
| <b>General characteristics</b>                        |   |
| "Phase" relay status indication                       | Yellow LED  |
| "Temperature" relay status indication                 | Yellow LED  |
| Display power supply                                  | Green LED   |
| Casing  | 35 mm   |
| Mounting  | On 35 mm symmetrical DIN rail, IEC/EN 60715   |
| Mounting position                                     | All positions   |
| Material : enclosure plastic type VO to UL94 standard | Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11   |
| Protection (IEC/EN 60529)                             | Terminal block : IP20<br>Casing : IP30  |
| Weight  | 107.1 g   |
| Connecting capacity IEC/EN 60947-1                    | Rigid : 1 x 4 <sup>2</sup> - 2 x 2.5 <sup>2</sup> mm <sup>2</sup><br>1 x 11 AWG - 2 x 14 AWG<br>Flexible with ferrules : 1 x 2.5 <sup>2</sup> - 2 x 1.5 <sup>2</sup> mm <sup>2</sup><br>1 x 14 AWG - 2 x 16 AWG |
| Max. tightening torques IEC/EN 60947-1                | 0,6 → 1 Nm / 5,3 → 8,8 Lbf.In   |
| Operating temperature IEC/EN 60068-2                  | -20 → +50 °C  |
| Storage temperature IEC/EN 60068-2                    | -40 → +70 °C  |
| Humidity IEC/EN 60068-2-30                            | 2 x 24 hr cycle 95 % RH max. without condensation 55 °C   |
| Vibrations according to IEC/EN 60068-2-6              | 10 → 150 Hz, A = 0.035 mm   |
| Shocks IEC/EN 60068-2-6                               | 5 g   |
| <b>Standards</b>                                      |   |
| Marking   | CE (LVD) 73/23/EEC - EMC 89/336/EEC   |
| Product standard                                      | NF EN 60255-6 / IEC 60255-6 / CEI 60034-11-2 / UL 508 / CSA C22.2 N°14  |
| Electromagnetic compatibility                         | Immunity EN 61000-6-2/IEC 61000-6-2<br>Emission EN 61000-6-4/EN 61000-6-3<br>IEC 61000-6-4/IEC 61000-6-3<br>Emission EN 55022 class B   |
| Certifications  | UL, CSA, GL   |
| Conformity with environmental directives              | RoHS, WEEE  |
| <b>Comments</b>                                       |   |

## Accessories

| Description                               | Code     |
|---|----------|
| Removable sealable cover for 35 mm casing | 84800001 |

## Principles



### Overview

Relays HWTM and HWTM2 check the availability of the 3-phase network and the temperature of the motors using integrated PTC probes.

The "phase" and "temperature" control functions are independent of one another.

The 3-phase (208 to 480 V) network control verifies the sequence of phases L1, L2, L3 and their presence :

- the complete failure of a phase is detected, also in the event of regeneration (U measured < 0.7 x Un).

The result of the check is indicated by the status of the "phase" output relay. NO contact 21-24 will be open in case of fault.

The temperature control accepts up to 6 PTC probes (positive temperature coefficient resistor) wired in series between terminals T1 and T2.

A fault is reported if the resistance of the thermal detector circuit exceeds 3100 Ω.

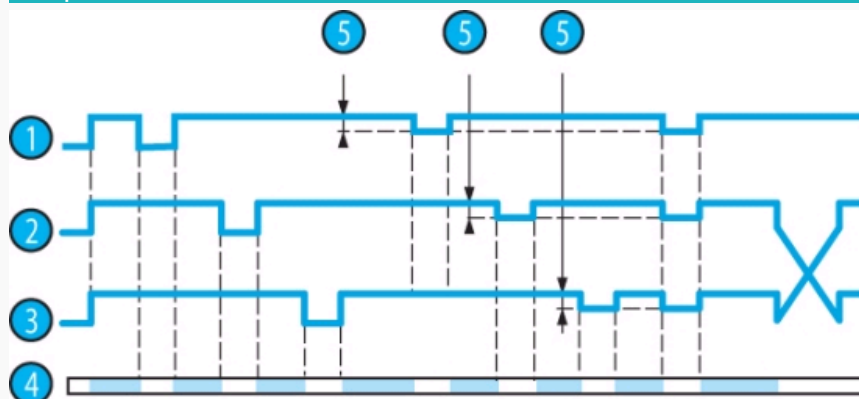
Return to normal is verified when the resistance falls below 1650 Ω.

The result of the check is indicated by the status of the "temperature" output relay. NO contact 11-14 will be open in case of fault.

Opening of the thermal detector circuit has the same effect as high temperature (resistance exceeding 3100 Ω) and is therefore interpreted as a fault.

Total short-circuit of the thermal probe (s), detected when resistance is less than 15 Ω ± 5 Ω is treated as a fault.

## Principles



**Control of 3-phase network**

As soon as the phase sequence (L1 L2 L3) and phase amplitude symmetry ( $D < 30\%$ ) are considered correct, the contact of the output relay closes and, subject to the result of the temperature check, LED "R2" lights up.

In case of total failure or a drop in the amplitude of a phase (absence of phase with regeneration) or inversion of the phase sequence, the contact of the output relay opens and LED "R2" is extinguished.

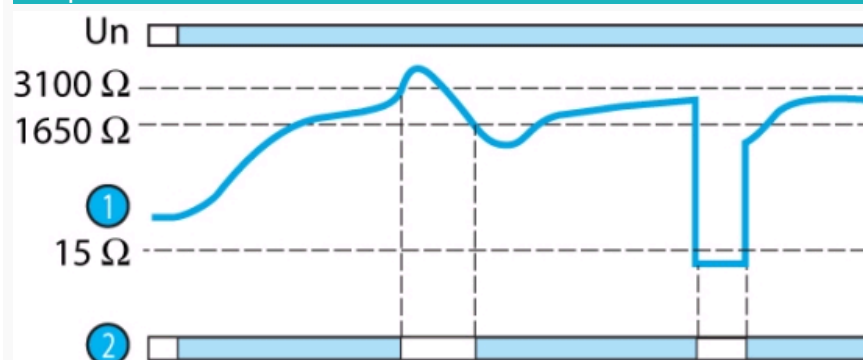
**Temperature control without latching**

As soon as it is verified that the resistance of the thermal detector is between 15 and  $3,100\Omega$ , the contact of the output relay closes and, subject to the result of the phase control check, LED "R1" lights up.

If the resistance of the thermal detector circuit exceeds  $3,100\Omega$ , the output relay opens and LED "R1" is extinguished. After an overheating fault, the resistance must fall below  $1,650\Omega$  for the output relay contact to reclose and, subject to the result of the phase check, LED "R1" to light up.

If the resistance falls below  $15\Omega$  (short-circuit), the output relay opens and LED "R1" is extinguished. As soon as it returns to between 15 and  $3,100\Omega$ , the contact of the output relay closes again and, subject to the result of the phase control check, LED "R1" lights up.

| N° | Legend        |
|----|---------------|
| ①  | Phase L1      |
| ②  | Phase L2      |
| ③  | Phase L3      |
| ④  | Relay R2      |
| ⑤  | 30 % of $U_n$ |

**Principles****Control of 3-phase network**

As soon as the phase sequence (L1 L2 L3) and phase amplitude symmetry ( $D < 30\%$ ) are considered correct, the contact of the output relay closes and, subject to the result of the temperature check, LED "R2" lights up.

In case of total failure or a drop in the amplitude of a phase (absence of phase with regeneration) or inversion of the phase sequence, the contact of the output relay opens and LED "R2" is extinguished.

**Temperature control without latching**

As soon as it is verified that the resistance of the thermal detector is between 15 and  $3,100\Omega$ , the contact of the output relay closes and, subject to the result of the phase control check, LED "R1" lights up.

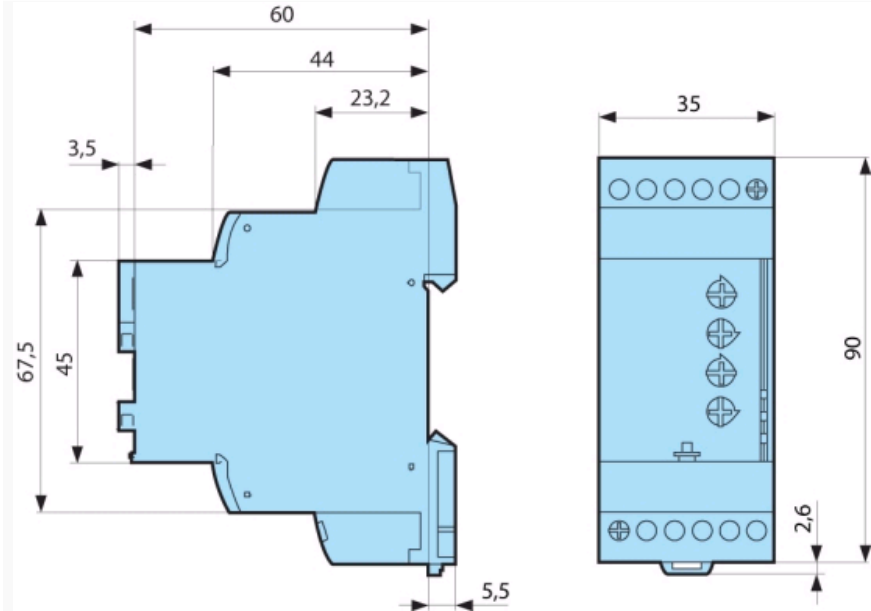
If the resistance of the thermal detector circuit exceeds  $3,100\Omega$ , the output relay opens and LED "R1" is extinguished. After an overheating fault, the resistance must fall below  $1,650\Omega$  for the output relay contact to reclose and, subject to the result of the phase check, LED "R1" to light up.

If the resistance falls below  $15\Omega$  (short-circuit), the output relay opens and LED "R1" is extinguished. As soon as it returns to between 15 and  $3,100\Omega$ , the contact of the output relay closes again and, subject to the result of the phase control check, LED "R1" lights up.

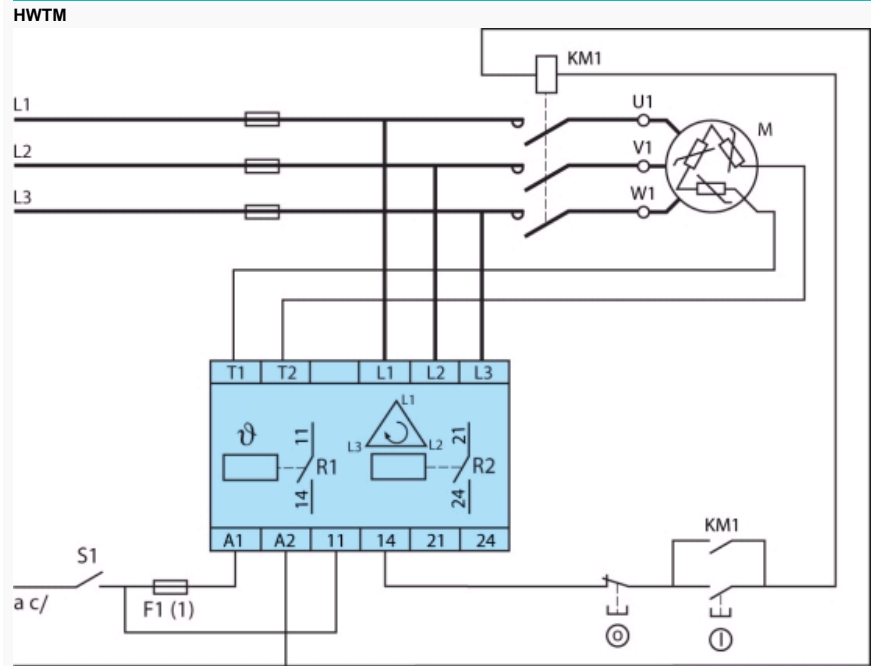
| N° | Legend                                 |
|----|--|
| ①  | Resistance between terminals T1 and T2 |
| ②  | Relay R1                               |

**Dimensions (mm)**

HWTM



Connections



| N° | Legend                        |
|----|-------------------------------|
| ①  | 1 A fast-blow fuse or cut-out |

Product adaptations

- Customisable colours and labels

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