

Thermal motor protector

Temperature limiter

Thermal cut-out

T

10

11

12

22



#### Applications

- Motors
- Transformers
- Coils
- Electronics, sensors

#### Benefits

- Temperature and current sensitive or only temperature sensitive
- Small dimensions
- High power rating
- No vibration noise

## Description

Switches of the **T1 and T2 type series** are based on a **two-contact system**. A thermo-bimetal snap-disc, which is influenced by temperature, switches on or closes a circuit when the permanently set switching temperature is reached. In this case, the electr. current directly through the bimetallic discharge element, and thus allows a **combination of temperature and current sensitive monitoring**.

The temperature will thereby be applied to the inner precision switching unit from all sides. The current sensitivity of the switching element is particularly effective when the motor is blocked, and the current flow is considerably higher: the drive is **switched off very quickly** and thus damage to the device is prevented through an increased temperature.

Beside the standard counters in single implementation the protectors are also offered in **twin and triplet configuration**.



## Technical data

| type ratings  | control                                    |               |  |                                |               |
|---|--|---------------|--|--------------------------------|---------------|
|   | T11 A / E                                  | T12 A / E     | T22 A  | T10B / G                       | T22 B         |
| version   | normally closed                            |               |  | normally open                  |               |
| rated current at 250 V 50/60 Hz ( power factor 0.95 / 0.6 )                   | 2.5 A / 1,6 A                              | 6.3 A / 2.5 A | 20.0 A / 3.0 A                                 | 2.0 A / 1.6 A                  | 3.5 A / 2.0 A |
| switching cycles under rated current  | 10,000                                     |               |  |                                |               |
| max. current under failure conditions at 250 V 50/60 Hz ( power factor 0.95 ) | 10.0 A                                     | 12.0 A        | 30.0 A   | 10.0 A                         | 20.0 A        |
| switching cycles under max. current   | 300  |               | 600  | 300                            | 1,000         |
| temperature rating T <sub>A</sub> ( steps in 5 °C )                           | (50) 70 °C... 180 °C <sup>1)</sup>         |               |  | 80 °C ... 160 °C <sup>2)</sup> |               |
| tolerances  | Standard: ± 5 °K                           |               |  |                                |               |
| feature of automatic action   | 1.C.M, 2.C                                 |               | 2.B, 1.C, 3.C                                  | 1.B, 2.C                       |               |
| contact resistance ( incl. wire of 100 mm )                                   | < 50 mΩ                                    |               |  |                                |               |
| hysteresis  | 30 °K ± 15 °K <sup>3)4)</sup>              |               |  |                                |               |
| dielectric strength ( standard insulation )                                   | 2 kV                                       |               |  |                                |               |
| vibration resistance (10 to 60 Hz)  | 100 m/s <sup>2</sup>                       |               |  |                                |               |
| resistances to impregnation   | tight against ordinary resins and lacquers |               |  |                                |               |
| degrees of protection provided by enclosures ( EN 60529 )                     | IP00                                       |               |  |                                |               |
| suitable for use in protection category                                       | I, II                                      |               |  |                                |               |
| approvals   | VDE / ENEC                                 |               | EN 60730-1 / -2-9                              |                                |               |
|   | UL   |               | UL 2111 / UL 873 <sup>5)</sup>                 |                                | -             |
|   | CSA / cUL                                  |               | C22.2 No. 77 / C22.2 No. 24 <sup>5)</sup>      |                                | -             |
|   | CQC  |               | GB14536.1-1998 / GB14536.10-1996 <sup>5)</sup> |                                |               |

<sup>1)</sup> T<sub>A</sub> up to 50°C on request <sup>2)</sup> approval to EN60730-2-2 up to 180°C <sup>3)</sup> with ± 3 K tolerances and smaller hysteresis on request

<sup>4)</sup> at the T<sub>A</sub> (upper and lower) limits the hysteresis could deviate <sup>5)</sup> on request

The variety of our product variations is nearly infinite. Microtherm distinguishes itself by a high expert's know-how in the area of customised developments. We will be pleased to give you specific advice during a personal consultation and present you all the options suitable for your application:

- application of plug connectors
- unique packaging and overmolding variations
- specific cable assemblies and many more



## Versions

| control type    | n.c. | n.o. | code      | illustration  | drawing dimensions ( mm )  | technical specification  | approvals    |
|-----------------|------|------|-----------|---|--|--|--------------|
| T10<br>T11, T12 | A    | B    |           |    |    | no insulation, potted  | VDE, UL, cUL |
| T10<br>T11, T12 | A    | B    | U250      |    |    | shrink cap, potted   | VDE, UL, cUL |
| T22             | A    | B    | U256      |   | different dimensions for T22   |  |              |
| T10<br>T11, T12 | A    | B    | U174      |    |    | cap of PPS, potted   | VDE, UL, cUL |
| T10<br>T11, T12 | A    | B    | U112      |    |    | coated, T <sub>A</sub> max. 160 °C   | VDE, UL, cUL |
| T11, T12        | A    |      | A334      |   |    | no insulation<br>PCB connector<br>grid dimension 5.08                            | VDE, UL, cUL |
| T11, T12        | A    |      | A334 U314 |  |   | cap of PPS<br>PCB connector<br>grid dimension 5.08                               | VDE, UL, cUL |
| T11, T12        | A    |      | A334 U315 |  |   | cap of PPS<br>PCB connector<br>grid dimension 5.08                               | VDE, UL, cUL |
| T10<br>T11, T12 | A    | B    | U293      |  |  | housing of PPS, potted   | VDE, UL, cUL |
| T10<br>T11, T12 | E    | G    | G502      |  |  | potted aluminium housing<br>anodized black<br>M4x6<br>T <sub>A</sub> max. 150 °C | VDE, UL, cUL |
| T10<br>T11, T12 | A    | B    | B199      |  |  | CuBe mounting cap<br>combined with<br>U174 / U250 / U112                         | VDE, UL, cUL |
| T22             | A    | B    |           |  |  | no insulation, potted  | VDE, UL, cUL |
| T22             | A    | B    | U112      |  |  | coated, T <sub>A</sub> max. 160 °C   | VDE, UL, cUL |