

Thermal motor protector

Temperature limiter

Thermal cut-out

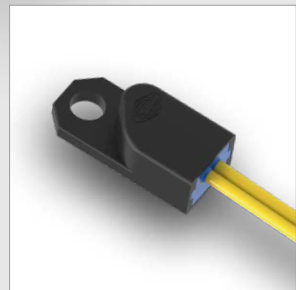
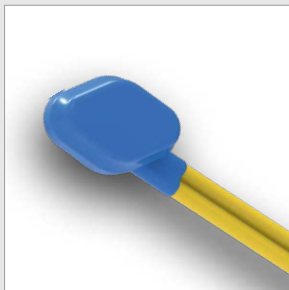
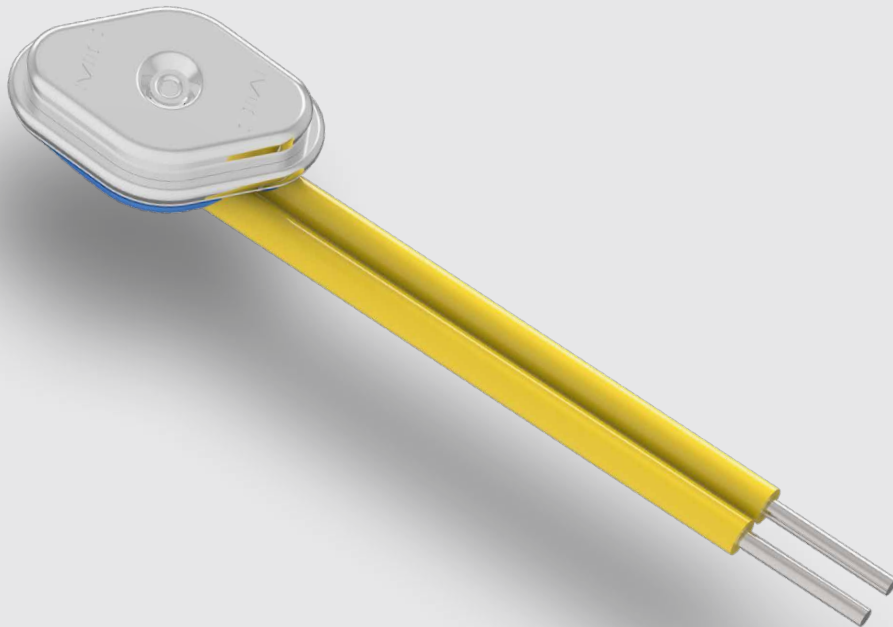
T

10

11

12

22



#### Applications

- Motors
- Transformers
- Coils
- Electronics, sensors

#### Benefits

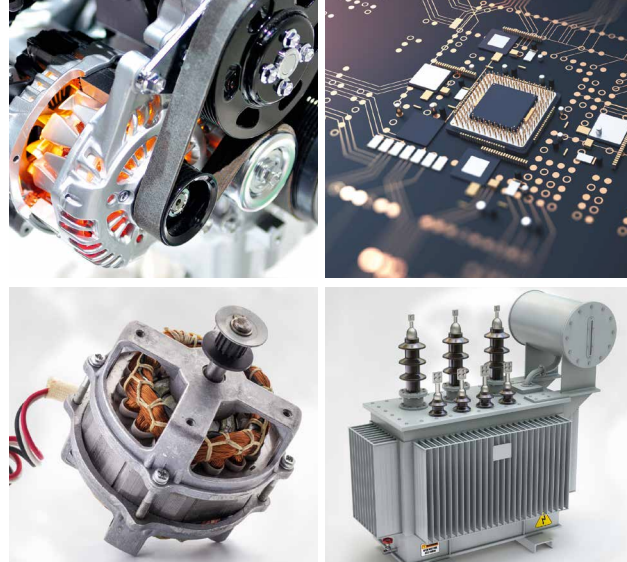
- Temperature and current sensitive or only temperature sensitive
- Small dimensions
- High power rating
- No vibration noise

## 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

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## Versions

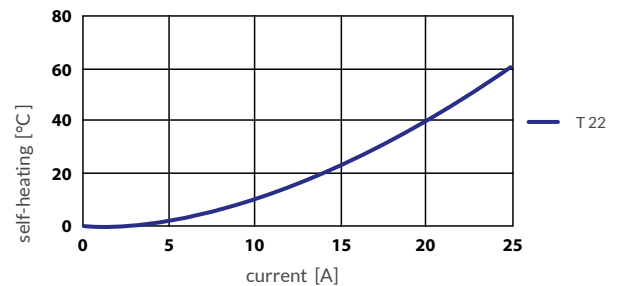
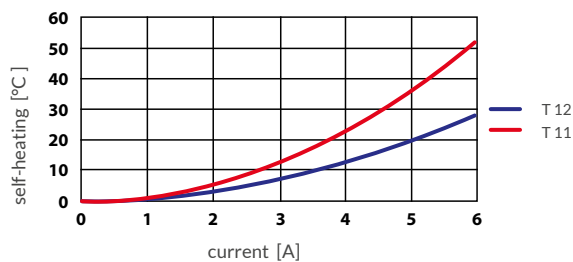
control type	n.c.	n.o.	code	illustration	drawing dimensions ( mm )	technical specification	approvals
T10 T11, T12	A	B				no insulation, potted	VDE, UL, cUL
T10 T11, T12	A	B	U250			shrink cap, potted	VDE, UL, cUL
T22	A	B	U256		 different dimensions for T22		
T10 T11, T12	A	B	U174			cap of PPS, potted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

## Standard wire

lead	code	temperature max.	operating voltage max.	approx. diameter-insulation	approx. cross section / diameter	UL style
stranded white	L300	150 °C	300 V	1,50 mm	AWG24 / 0,25 mm <sup>2</sup>	3398
	L310			1,82 mm	AWG20 / 0,50 mm <sup>2</sup>	
	L320 <sup>1)</sup>			2,10 mm	AWG18 / 1,00 mm <sup>2</sup>	
	L360	200 °C	600 V	1,10 mm	AWG24 / 0,25 mm <sup>2</sup>	10086
	L370			1,50 mm	AWG20 / 0,50 mm <sup>2</sup>	
	L380 <sup>1)</sup>			1,70 mm	AWG18 / 0,82 mm <sup>2</sup>	
solid yellow	L400	150 °C	300 V	1,35 mm	AWG24 / 0,50 mm	3398
	L410			1,66 mm	AWG20 / 0,80 mm	
	L430	200 °C	300 V	1,16 mm	AWG24 / 0,50 mm	1332
	L440			1,54 mm	AWG20 / 0,80 mm	

Standard length 100 ± 10 mm, stripped 6 ± 1 mm, for T10 AWG24 and for T11 / T12 AWG20 is recommended <sup>1)</sup> T22 only

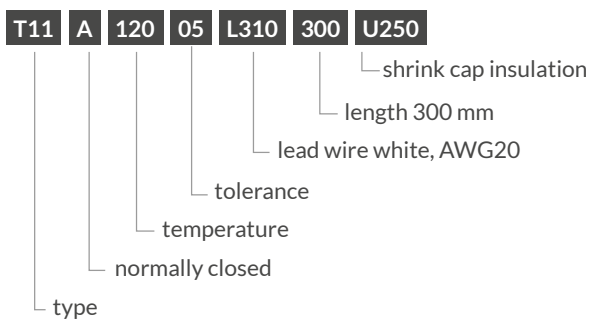
## Heating by current



The characteristic curve in the diagram is measured with a thermal switch without any insulation in an oil bath.

Note: The self-heating depends on the thermal conduction of the control to the equipment or part which should be protected.

## Ordering example



## Marking

<b>T11A</b>	type (T11 n.c.)
<b>12005</b>	response temperature (120°C), tolerance (± 5°C)
<b>101D</b>	date of manufacture (October 2021), country (D=Germany)

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