

Thermal motor protector
Temperature limiter
Thermal cut-out

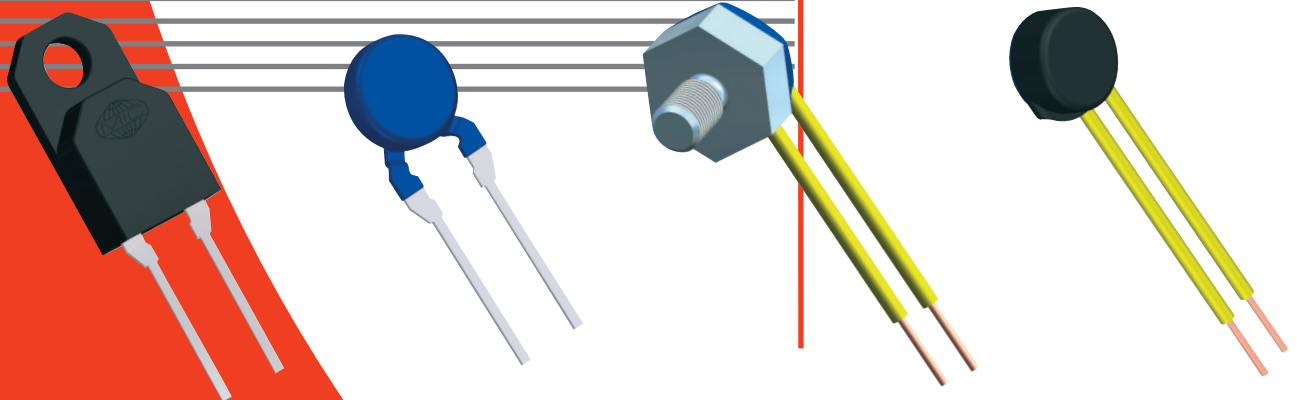
13
20
23

Applications

- Motors
- Transformers
- Coils
- Electronics, sensors

Benefits





- Small dimensions
- Shock and vibration tested
- Leadframe version
- Various kinds of insulations



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Technical data

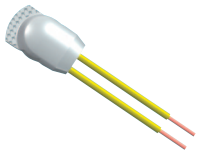
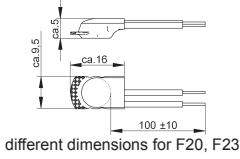
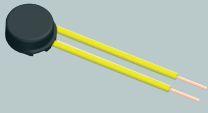
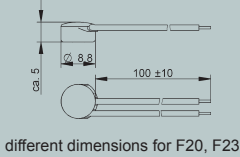
ratings		control type	F13A	F23A / E	F20B / G
version			normally closed		normally open
rated current at 250 V 50/60 Hz (power factor 0.95 / 0.6)			3.0 A / 2.5 A	3.0 A / 3.0 A	2.0 A / 1.6 A
switching cycles under rated current			10,000	10,000	7,000
max. current under failure condition at 250 V 50/60 Hz (power factor 0.95)			4.0 A	5.0 A	4.0 A
switching cycles under max. current			3,000		
temperature rating T _a (steps in 5 K)			70 °C ... 160 °C		70 °C ... 155 °C
tolerances			standard: ± 5 K		
feature of automatic action			1.B, 2.B.M, 1.C		2.B, 1.C
contact resistance (incl. wire of 100 mm)			< 50 mΩ		
hysteresis			30 K ± 15 K ²⁾		
dielectric strength (standard insulation)			2 kV		
shock / vibration testing (similar to EN 50155)			400 m/s ² sine half wave / 100 m/s ² 5 Hz ... 2,000 Hz sine		
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 ¹⁾		
	cUL		C22.2 No. 77 / C22.2 No. 24 ¹⁾		
	CQC		GB14536.1-1998 / GB14536.10-1996 ¹⁾		

¹⁾ on request ²⁾ at the T_a (upper and lower) limits the hysteresis could deviate

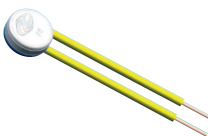
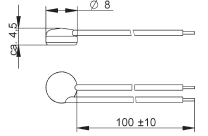
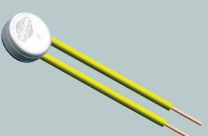
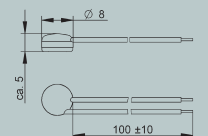
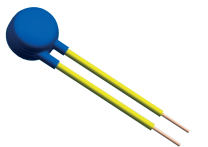
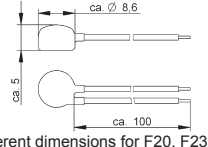
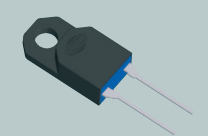
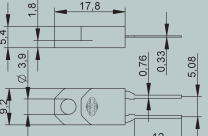

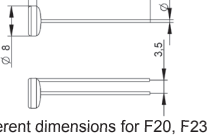
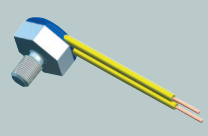
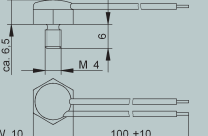
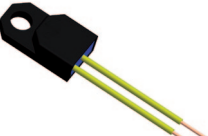
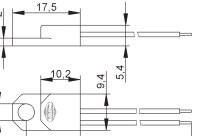
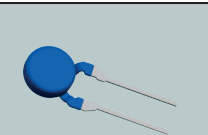
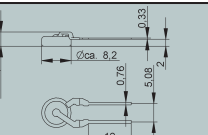
Standard wire (length 100 ± 10 mm, stripped 6 ± 1 mm)

lead	code	temperature max.	operating voltage max.	approx. diameter insulation	approx. cross section diameter ¹⁾	UL style
stranded white	L300	150 °C	300 V	1.50 mm	AWG24 / 0.25 mm ²	3398
	L310			1.82 mm	AWG20 / 0.50 mm ²	
	L360	200 °C	600 V	1.20 mm	AWG24 / 0.25 mm ²	10086
	L370			1.60 mm	AWG20 / 0.50 mm ²	
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	

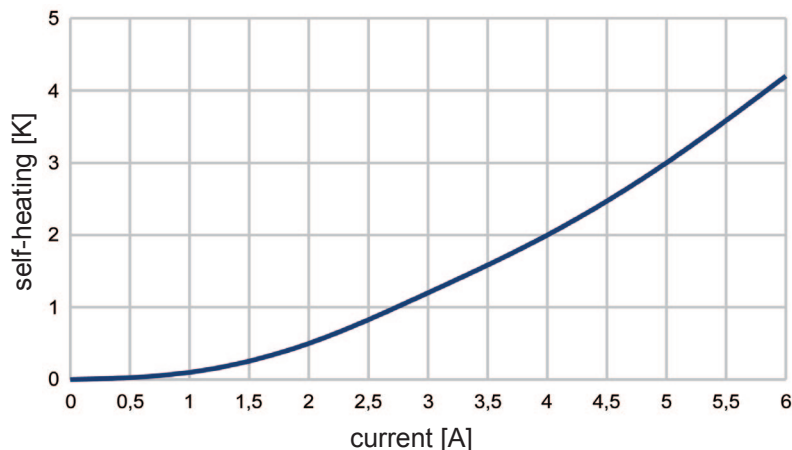
¹⁾ AWG24 is recommended

control type	nc	no	code	illustration	drawing dimensions (mm)	technical specification	approvals
F13 F20, F23	A A	 B	U254		 different dimensions for F20, F23	shrink cap potted	VDE, UL, cUL
F13 F20, F23	A A	 B	U198 U185		 different dimensions for F20, F23	cap of PPS potted	VDE, UL, cUL

Specific variations

control type	nc	no	code	illustration	drawing dimensions (mm)	technical specification	approvals
F13 F20, F23	A A	 B				not insulated potted	VDE, UL, cUL
F20, F23	A	B				not insulated potted	VDE, UL, cUL
F13 F20, F23	A A	 B	U112		 different dimensions for F20, F23	coated	VDE, UL, cUL
F20, F23	A	B	A150 U280			housing of PPS leadframe leads grid dimension 5.08 potted	VDE, UL, cUL
F13 F20, F23	A A	 B	A800		 different dimensions for F20, F23	not insulated potted	VDE, UL, cUL
F20, F23	E	G	G700			aluminium housing thread M4x6 potted T_a max. 150 °C	VDE, UL, cUL
F13	A		U282			housing of PPS potted	VDE, UL, cUL
F13 F20, F23	A A	 B	A150 U112		 different dimensions for F20, F23	leadframe leads grid dimension 5.08 coated	VDE, UL, cUL

Heating by current



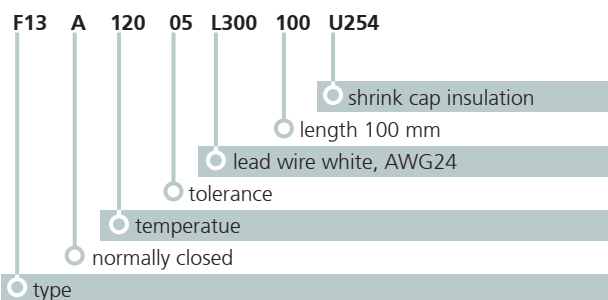
The characteristic curve in the diagram is measured with a thermal control without any insulation in an oil bath.

Attention:

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

Ordering and marking example

Ordering example



Marking

- F13A** type (F13 nc)
- 12005** response temperature (120°C), tolerance (± 5 K)
- 051D** date of manufacture (May 2011), country (D=Germany)



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Deviations from standard controls on request.

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