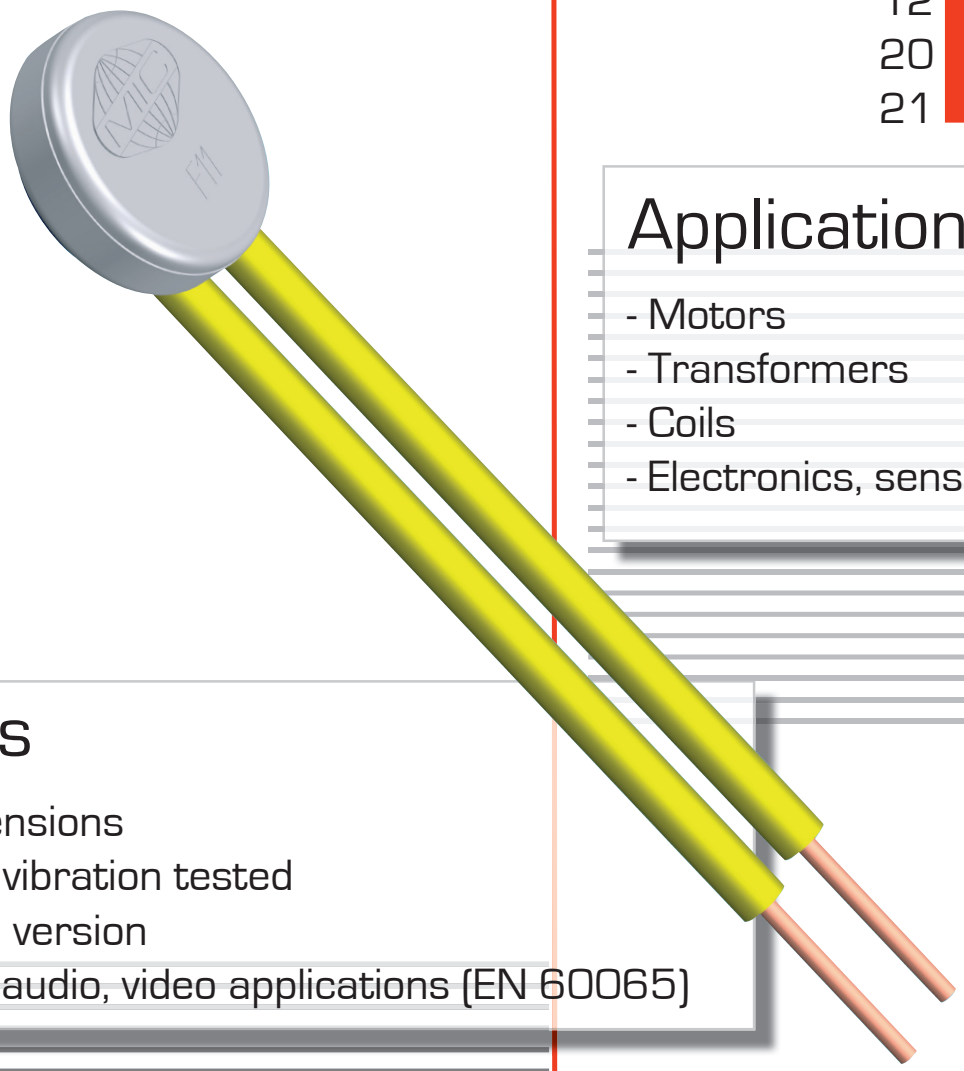
Thermal motor protector
Temperature limiter
Thermal cut-out

F

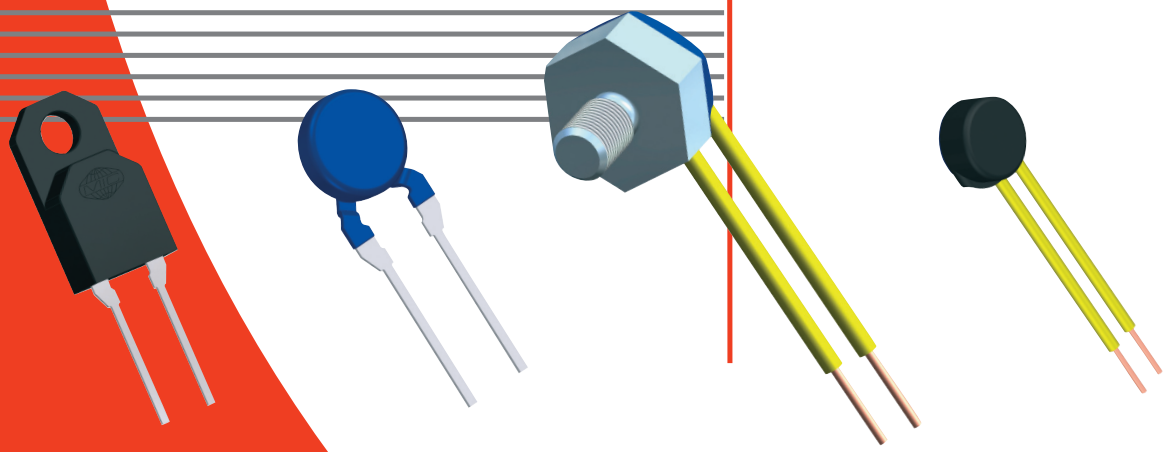


Applications

- Motors
- Transformers
- Coils
- Electronics, sensors

Benefits

- Small dimensions
- Shock and vibration tested
- Leadframe version
- Tested for audio, video applications (EN 60065)



CANTHERM

Technical data

ratings \ control type		F11A F20A / E	F12A [1]	F21A / E	F20B / G F21B / G
version		normally closed			normally open
rated current at 250 V 50/60 Hz (power factor 0.95 / 0.6)		2.0 A / 1.6 A	3.0 A / 2.5 A	3.0 A / 3.0 A	2.0 A / 1.6 A
switching cycles under rated current		7,000	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/s² sine half wave / 100 m/s² 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 / -2-3 [3] /-2-9			
	UL	UL 2111 / UL 873 [1]			
	CSA / cUL	C22.2 No. 77 / C22.2 No. 24 [1]			
	CQC	GB14536.1-1998 / GB14536.10-1996 [1]			

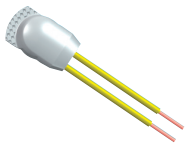
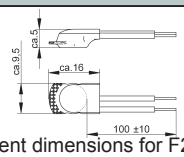
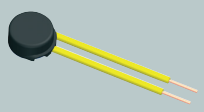
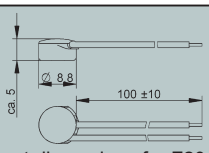
[1] details on request [2] at the T_a (upper and lower) limits the hysteresis could deviate [3] different power rating

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

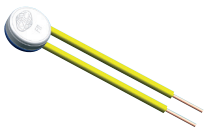
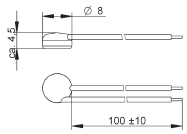
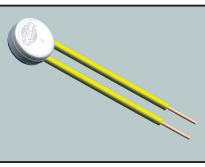
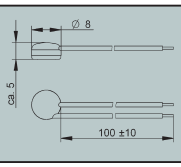
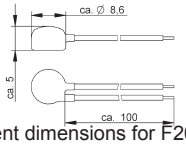
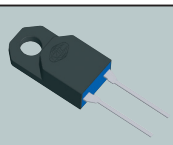
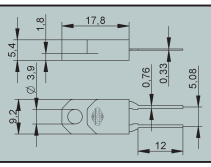
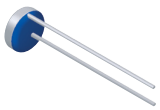
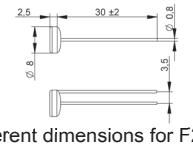
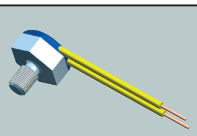
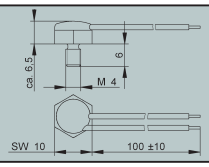
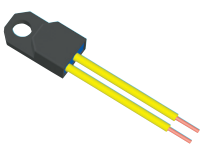
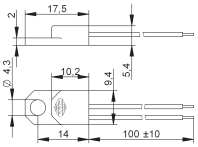
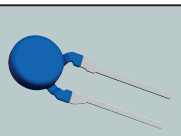
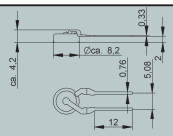
Cantherm lead	Cantherm code	MIC code	temperature max.	operating voltage max.	diameter insulation	cross section diameter [1]	UL style
black	ACFA	L300	150 °C	300 V	1.57 mm	AWG24 / 0.24 mm²	3398
yellow	AEFC	L310			1.80 mm	AWG20 / 0.48 mm²	
white	LCFB	L330	200 °C	600 V	0.90 mm	AWG24 / 0.24 mm²	3557
white	LEFB	L340			1.26 mm	AWG20 / 0.61 mm²	
yellow		L400	150 °C	300 V	1.40 mm	AWG24 / 0.51 mm	3398
black	ASFA	L410			1.65 mm	AWG20 / 0.81 mm	
yellow	DCFB	L430	200 °C	300 V	1.21 mm	AWG24 / 0.51 mm	1180
yellow	DEFB	L440			1.51 mm	AWG20 / 0.81 mm	

[1] **AWG24 is recommended**

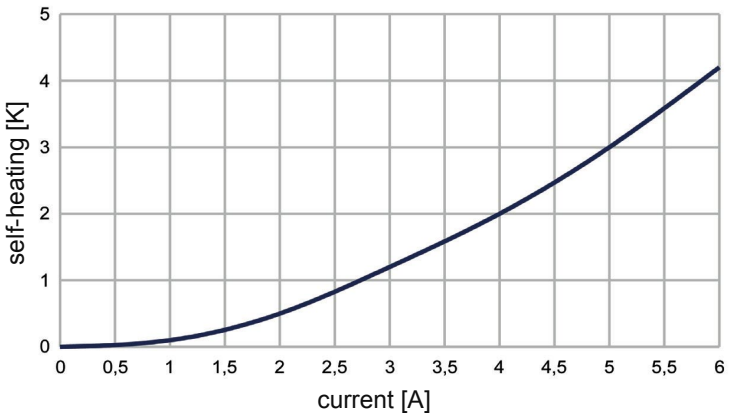
Standard insulation

control type	nc	no	Cantherm code	MIC code	illustration	drawing dimensions (mm)	technical specification	approvals
F11, F12 F20, F21	A A	 B	U102 | B U106 | F	U254		 different dimensions for F20, F21	shrink cap potted	VDE, UL, cUL
F11, F12	A		U198	U198		 different dimensions for F20, F21	cap of PPS potted	VDE, UL, cUL
F20, F21	A	B	U185	U185				

Specific variations

control type	nc	no	Cantherm code	MIC code	illustration	drawing dimensions (mm)	technical specification	approvals
F11, F12	A		Insulation None | 0				not insulated potted	VDE, UL cUL
F20, F21	A	B	Insulation None | 0				not insulated potted	VDE, UL, cUL, CSA
F11, F12 F20, F21	A A	 B	Insulation U112 | L	U112		 different dimensions for F20, F21	coated	VDE, UL cUL
F20, F21	A	B	Housing G410 | 6 Leads A150 | 36	A150 U280			housing of PPS leadframe leads grid dimension 5.08 potted	VDE, UL, cUL, CSA
F11, F12 F20, F21	A A	 B	Leads A800 | IZA	A800		 different dimensions for F20, F21	not insulated potted	VDE, UL cUL
F20, F21	E	G	G700 | B	G700			alluminium housing thread M4x6 potted T_a max. 150 °C	VDE, UL, cUL, CSA
F11, F12	A		G410 | 6 Leads | ACFA	U282			housing of PPS potted	VDE, UL cUL
F11, F12 F20, F21	A A	 B	A150 | 36 U112 | L	A150 U112		 different dimensions for F20, F21	leadframe leads grid dimension 5.08 coated	VDE, UL, cUL, CSA

Heating by current

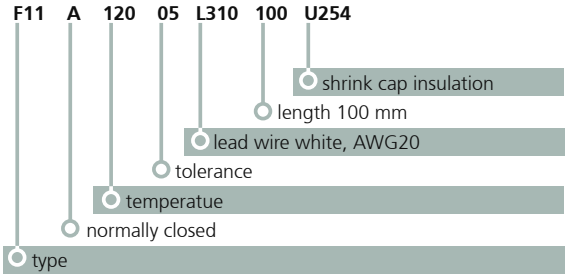


The characteristic curve in the diagram is measured with a thermal control without any insulation in an oil bath.

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 (MIC)



Deviations from standard controls on request.

Marking Example (MIC)

F11A type (F11 nc)

12005 response temperature (120°C), tolerance (± 5K)

049D date of manufacture (April 2009), country (D=Germany)

Cantherm Ordering Example [F20A12005ACFA06E]

F11	A	120	5	AC	F	A	0	6	E
type	Norm. Closed	Temp.	tolerance +/-5°C	wire leads UL3398 24 AWG	lead length F=6"	color black	no insulation	housing - G410 E06	strip .25"

Marking Example (Cantherm)

F11A type (F11 nc)

12005 response temperature (120°C), tolerance (± 5K)

049C date of manufacture (April 2009), country (C = Canada)

CANTHERM™ *Div. of Microtherm International Cooperation*

Canadian Thermostats & Control Devices, Ltd.
8415 Mountain Sights Ave.
Montreal, Canada H4P 2B8

Tel: (514) 739-3274 Fax: (514) 739-2902
1 (800) 561-7207
WEBSITE: www.cantherm.com
E-Mail: sales@cantherm.com

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