

Thermal motor protector  
Temperature limiter  
Thermal cut-out

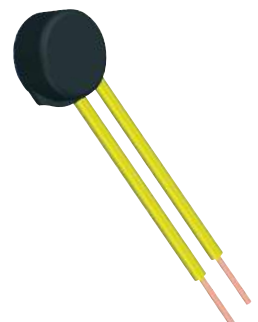
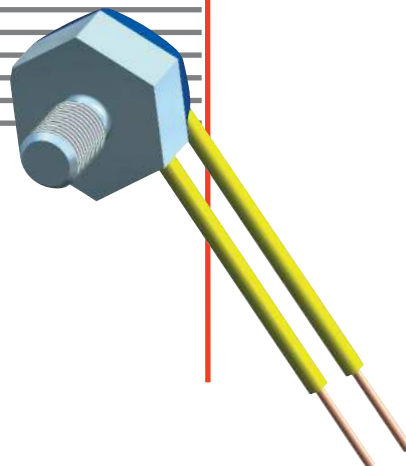
13  
20  
23

## Applications

- Motors
- Transformers
- Coils
- Electronics, sensors





## Benefits

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



CANTHERM

# Technical data

ratings		control type			
		F20A / E	F13A <sup>1)</sup>	F23A / E	F20B / 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 <sub>a</sub> ( steps in 5 K )		70 °C ... 190 °C			70 °C ... 185 °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 <sup>2)</sup>			
dielectric strength ( standard insulation )		2 kV			
shock / vibration testing ( similar to EN 50155 )		400 m/s <sup>2</sup> sine half wave / 100 m/s <sup>2</sup> 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 File Number E46827			
	cUL	 C22.2 No. 77 / C22.2 No. 24 <sup>1)</sup>			
	CQC	 GB14536.1-1998 / GB14536.10-1996 <sup>3)</sup>			

<sup>1)</sup> details on request    <sup>2)</sup> at the T<sub>a</sub> (upper and lower) limits the hysteresis could deviate    <sup>3)</sup> different power rating


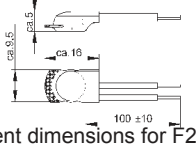
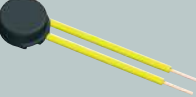
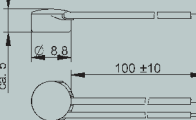
## Standard wire ( length 100 ± 10 mm, stripped 6 ± 1 mm )

Cantherm lead	Cantherm code	temperature max.	operating voltage max.	diameter insulation	cross section diameter <sup>1)</sup>	UL style
black	ACFA	150 °C	300 V	1.57 mm	AWG24 / 0.24 mm <sup>2</sup>	3266/3398
yellow	AEFC			1.80 mm	AWG20 / 0.48 mm <sup>2</sup>	
black	KCFA	200 °C	600 V	1.2 mm	AWG24 / 0.25 mm <sup>2</sup>	10086
black	KEFA			1.6 mm	AWG20 / 0.50 mm <sup>2</sup>	
black <sup>2)</sup>	ASFA	150 °C	300 V	1.65 mm	AWG20 / 0.81 mm	3266/3398
white	DCFB	200 °C	300 V	1.21 mm	AWG24 / 0.51 mm	1180
white	DEFB			1.51 mm	AWG20 / 0.81 mm	

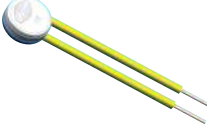
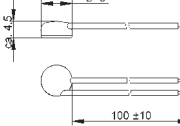
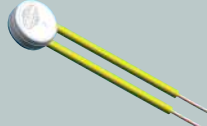
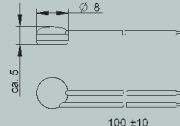

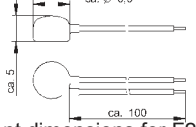
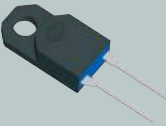
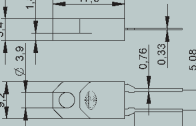

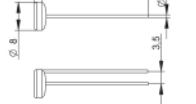
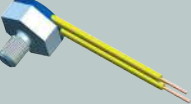
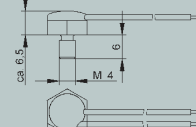
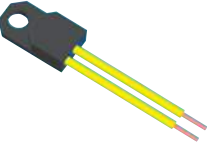
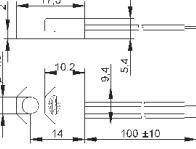
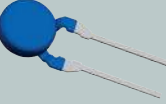
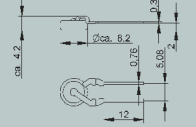
<sup>1)</sup> AWG24 is recommended    <sup>2)</sup> Solid Wire

Note: Additional wires available upon request.

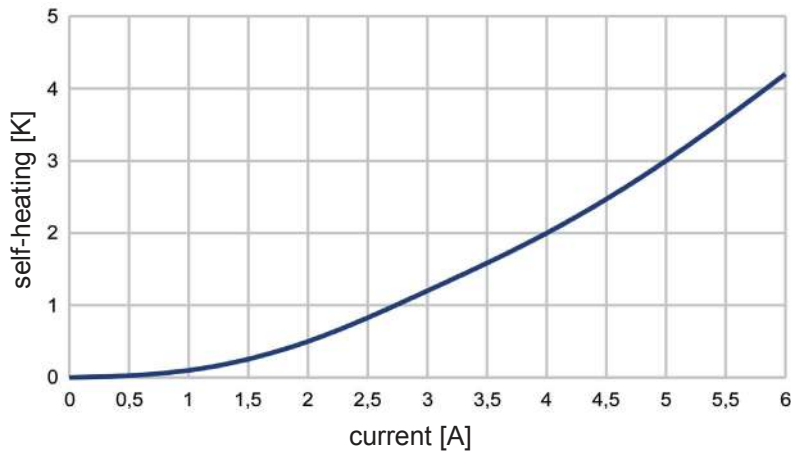
## Standard insulation

control type	nc	no	Cantherm code	illustration	drawing dimensions ( mm )	technical specification	approvals
F13 F20, F23	A A	 B	U102   B U106   F		 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	Cantherm code	illustration	drawing dimensions ( mm )	technical specification	approvals
F13	A		Insulation None   0			not insulated potted	VDE, UL, cUL
F20, F23	A	B	Insulation None   0			not insulated potted	VDE, UL, cUL, CSA
F13 F20, F23	A A	 B	Insulation U112   L		 different dimensions for F20, F23	coated	VDE, UL, cUL
F20, F23	A	B	Housing G410   6 Leads A150   36			housing of PPS leadframe leads grid dimension 5.08 potted	VDE, UL, cUL, CSA
F13 F20, F23	A A	 B	Leads A800   IZA		 different dimensions for F20, F23	not insulated potted	VDE, UL, cUL
F20, F23	E	G	G700   B			aluminium housing thread M4x6 potted T <sub>a</sub> max. 150 °C	VDE, UL, cUL, CSA
F13	A		G410   6 Leads   ACFA			housing of PPS potted	VDE, UL, cUL
F13 F20, F23	A A	 B	A150   36 U112   L		 different dimensions for F20, F23	leadframe leads grid dimension 5.08 coated	VDE, UL, cUL, CSA

# Heating by current



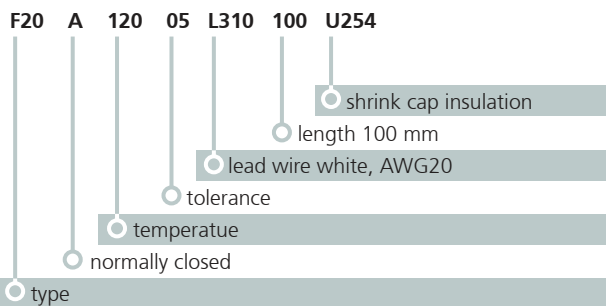
The characteristic curve in the diagram is measured with a thermal control without any insulation in an oil bath.

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 (Microtherm)



Deviations from standard controls on request.

## Marking

**F20A** type (F20 nc)

**12005** response temperature (120°C), tolerance ( $\pm 5K$ )

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

## Cantherm Ordering Example [ F20A12005ACFA06E ]

F20	A	120	05	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

**F20A** type (F20 nc)

**12005** response temperature (120°C), tolerance ( $\pm 5K$ )

**065C** date of manufacture (June 2015), country (C = Canada)



# CANTHERM™

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