

Thermal motor protector  
Temperature limiter  
Thermal cut-out

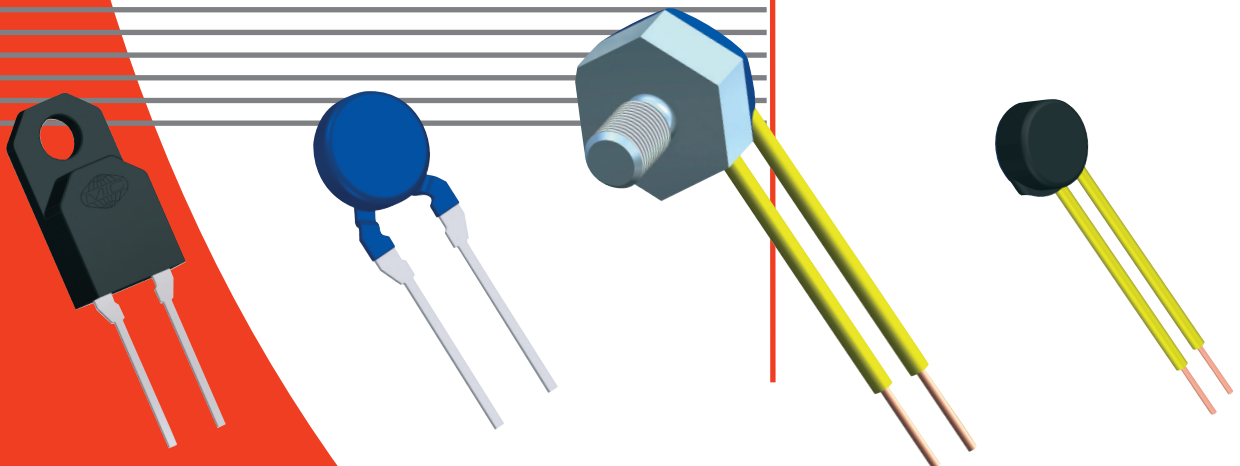
13  
20  
23

## 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


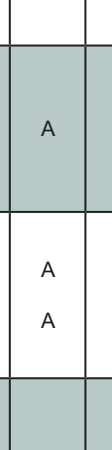

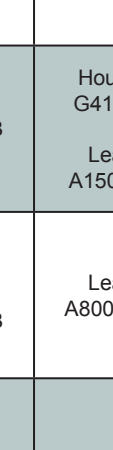
## Standard wire ( length 100 ± 10 mm, stripped 6 ± 1 mm )

| 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>         |           |
| white               | LCFB          | 200 °C           | 600 V                  | 0.90 mm             | AWG24 / 0.24 mm <sup>2</sup>         | 3557      |
| white               | LEFB          |                  |                        | 1.26 mm             | AWG20 / 0.61 mm <sup>2</sup>         |           |
| black <sup>2)</sup> | ASFA          | 150 °C           | 300 V                  | 1.65 mm             | AWG20 / 0.81 mm                      | 3266/3398 |
| yellow              | DCFB          | 200 °C           | 300 V                  | 1.21 mm             | AWG24 / 0.51 mm                      | 1180      |
| yellow              | DEFB          |                  |                        | 1.51 mm             | AWG20 / 0.81 mm                      |           |


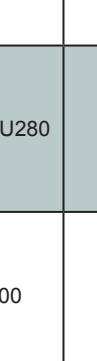
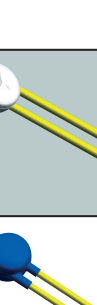

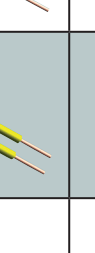
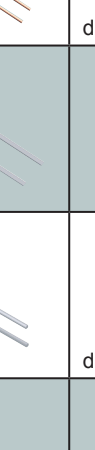
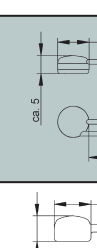
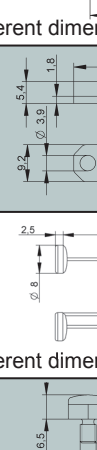
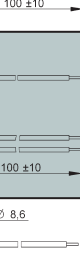
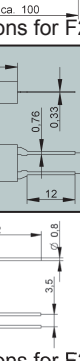


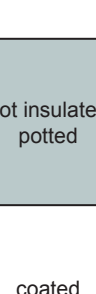
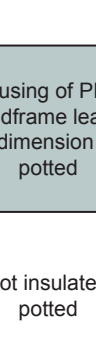
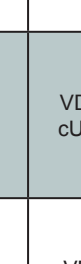
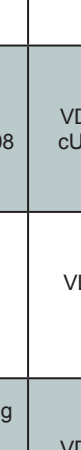
<sup>1)</sup> AWG24 is recommended    <sup>2)</sup> Solid Wire

Note: Additional wires available upon request.

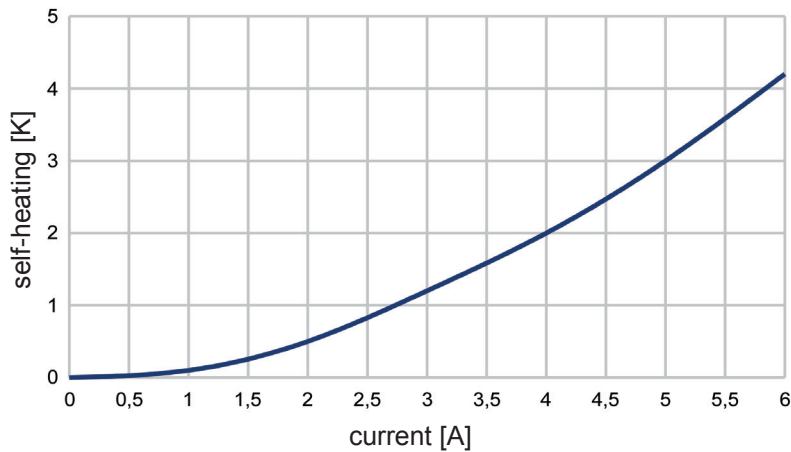
## Standard insulation

| control type    | nc     | no    | Cantherm code        | MIC code     | illustration   | drawing dimensions ( mm )  | technical specification | approvals    |
|-----------------|--------|-------|----------------------|--------------|--|--|-------------------------|--------------|
| F13<br>F20, F23 | A<br>A | <br>B | U102   B<br>U106   F | U254         |  | <br>different dimensions for F20, F23 | shrink cap potted       | VDE, UL, cUL |
| F13<br>F20, F23 | A<br>A | <br>B | U198<br>U185         | U198<br>U185 |  | <br>different dimensions for F20, F23 | cap of PPS potted       | VDE, UL, cUL |

## Specific variations

| control type    | nc     | no    | Cantherm code                       | MIC 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<br>F20, F23 | A<br>A | <br>B | Insulation U112   L                 | U112      |    | <br>different dimensions for F20, F23   | coated  | VDE, UL, cUL      |
| F20, F23        | A      | B     | Housing G410   6<br>Leads A150   36 | A150 U280 |    |   | housing of PPS leadframe leads grid dimension 5.08 potted | VDE, UL, cUL, CSA |
| F13<br>F20, F23 | A<br>A | <br>B | Leads A800   IZA                    | A800      |  | <br>different dimensions for F20, F23 | not insulated potted                                      | VDE, UL, cUL      |
| F20, F23        | E      | G     | G700   B                            | G700      |  |                                       | aluminium housing thread M4x6 potted<br>$T_a$ max. 150 °C | VDE, UL, cUL, CSA |
| F13             | A      |       | G410   6<br>Leads   ACFA            | U282      |  |                                       | housing of PPS potted                                     | VDE, UL, cUL      |
| F13<br>F20, F23 | A<br>A | <br>B | A150   36<br>U112   L               | A150 U112 |  | <br>different dimensions for F20, F23 | leadframe leads grid dimension 5.08 coated                | VDE, UL, cUL, CSA |

# Heating by current



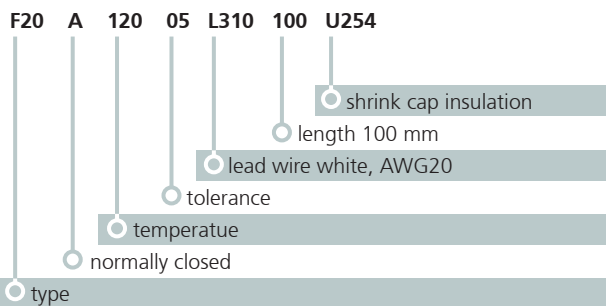
The characteristic curve in the diagram is measured with a thermal control without any insulation in an oil bath.

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<br>+/-5°C | wire<br>leads<br>UL3398<br>24<br>AWG | lead<br>length<br>F=6" | color<br>black | no<br>insulation | housing<br>- G410<br>E06 | strip<br>.25" |

## Marking

**F20A** type (F20 nc)

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

**065C** date of manufacture (June 2015), 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](http://www.cantherm.com)

E-Mail: [sales@cantherm.com](mailto:sales@cantherm.com)