

## Btdin-RS MCB Phase + Neutral, neutral on right

Cat. N°(s): FC881C6, FC881C10, FC881C16, FC881C20,  
FC881C25, FC881C32, FC881C40



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### 1. DESCRIPTION - USE

Thermal-magnetic circuit breaker (MCB) with positive contact indication for control, protection against short-circuits and overloads, and isolation of electrical circuits.

#### Symbol:



#### Technology:

- . Limiting device
- . The Neutral contact closes before and opens after the Phase contact
- . The Phase pole provides protection and isolation for the Phase circuit
- . The neutral pole provides isolation for the Neutral circuit

### 2. RANGE

#### Polarity:

- . 2 poles including 1 protected pole and 1 neutral pole

#### Width:

- . 1 module (17.8 mm)

#### Rated currents In:

- . 6 / 10 / 16 / 20 / 25 / 32 / 40 A, C curve

#### Magnetic tripping curves:

- . C curve (between 5 and 10 In)

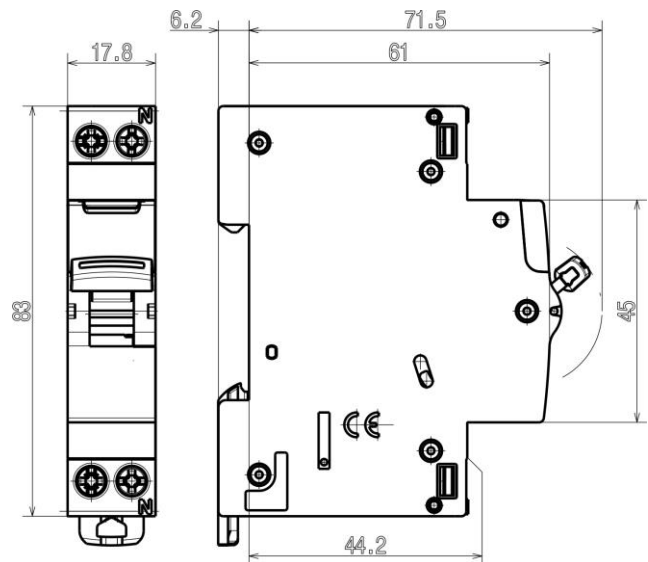
#### Rated voltage and frequency:

- . 230 V ~, 50 Hz with standard tolerances

#### Breaking capacity:

- . Icn = 4500 A in accordance with standard EN/IEC 60898-1
- . Icu = 6 kA in accordance with standard EN/IEC 60947-2

### 3. OVERALL DIMENSIONS



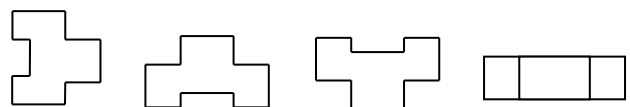
### 4. POSITIONING - CONNECTION

#### Mounting:

- . On symmetrical EN 60.715 rail or DIN 35 rail

#### Operating position:

- . Vertical
- . Horizontal
- . Upside down
- . On the side



#### Power supply:

- . Either from the top or the bottom

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### 4. POSITIONING - CONNECTION (continued)

#### Connection:

- Terminals protected against direct contact IP20, wired device
- Cage terminals, with release and captive screws
- Terminals fitted with shutters preventing a cable being placed under the terminal, with the terminal partly open or closed
- Alignment and spacing of the terminals permitting connection with the other products in the range via prong supply busbars
- Terminal depth: 14 mm at the top and 13 mm at the bottom
- Screw head: mixed, slotted and Pozidriv no. 2
- Tightening torques:
  - Recommended: 1.6 to 2 Nm
  - Min.: 1.2 Nm
  - Max.: 2.8 Nm

#### Conductor type:

- Copper cable or supply busbar
- Cable cross-section

	Without ferrule	With ferrule
Rigid cable	1 x 0.75 to 16 mm <sup>2</sup> 2 x 0.75 to 6 mm <sup>2</sup>	-
Flexible cable	1 x 0.75 to 10 mm <sup>2</sup> 2 x 0.75 to 4 mm <sup>2</sup>	1 x 0.75 to 10 mm <sup>2</sup>

- Prong busbar, alone or with a flexible wire (without ferrule) 10 mm<sup>2</sup> or a connection terminal in the same terminal.

#### Recommended tools:

- For the terminals, screwdriver with 5.5 mm blade or Pozidriv no. 2 screwdriver
- For attaching or removing the DIN rail, screwdriver with 5.5 mm blade or Pozidriv no. 2 screwdriver

#### Manual actuation of the MCB:

- Ergonomic 2-position handle
- "I-ON": Device closed
- "O-OFF": Device open

#### Contact status display:

- By marking of the handle
- "O-OFF" in white on a green background = contacts open
- "I-ON" in white on a red background = contacts closed

#### Locking:

- Possible in the open or closed positions with padlock support (Cat. No. F80BL) and Ø5 mm padlock or Ø6 mm padlock.
- Possible in the open or closed positions

#### Labelling:

- Circuit identification by way of a label inserted in the label holder situated on the front of the product.



### 5. GENERAL CHARACTERISTICS

#### Neutral earthing system:

- IT, TT, TN

#### Marking on the front side:

- By permanent ink pad printing

#### Marking on the upper panel:

- By permanent ink pad printing

- The terminals upstream and downstream of the neutral pole are marked with an "N" moulded close to the screw heads.

#### Minimum operating voltage:

- U = 12 V AC/DC

#### Maximum operating voltage:

- U = 250 V

#### Breaking capacity on one single pole (phase pole):

- In accordance with I<sub>IT</sub> EN60947-2 – Appendix H: (double fault in IT system): 3 kA at 400 V ~ and 3 kA at 230 V ~
- In accordance with I<sub>cn1</sub> EN60898-1: 4.5 kA at 230 V ~ and 10 kA at 127V ~

#### Breaking capacity:

Standard	Breaking capacity	Voltage between poles	Breaking capacity
EN/IEC 60898-1	I <sub>cs</sub>	230 V	4.5 kA
	I <sub>cn</sub>		4.5 kA
EN/IEC 60947-2	I <sub>cu</sub>	230 V	6 kA
	I <sub>cs</sub>		4.5 kA

#### Isolation distance:

- The distance between the contacts is greater than 5.5 mm with the handle in the open position.
- The MCB is suitable for isolation in accordance with standard EN/IEC 60898-1.

#### Insulation voltage:

- U<sub>i</sub> = 250 V in accordance with standard EN/IEC 60898-1

#### Degree of pollution:

- 2 in accordance with standard EN/IEC 60898-1

#### Dielectric strength:

- 2,000 V

#### Rated impulse withstand voltage:

- U<sub>imp</sub> = 4 kV

**5. GENERAL CHARACTERISTICS** *(continued)*

**Degree or class of protection:**

- . Terminals protected against direct contact. Class of protection against solid objects and liquids (wired device): IP20 in accordance with standards IEC 529 – EN 60529 and NF 20-010
- . Front panel protected against direct contact: IP40
- . Class II in relation to metallic conductive parts
- . Class of protection against mechanical impacts IK02 in accordance with standard EN 62262.

**Plastic materials:**

- . Polyamide and P.B.T.

**Enclosure heat and fire resistance:**

- . Resistance to glow wire tests at 960°C, in accordance with standard EN/IEC 60898-1
- . Classification V2, in accordance with standard UL94

**Higher heating potential:**

- . The heat potential is assessed at: 1.32 MJ

**Closing and opening force via the handle:**

- . 2 N on opening
- . 9 N on closing

**DC operation:**

- . 60 V DC:
  - I<sub>cn</sub> = 4500 A in accordance with standard EN/IEC 60898-1
  - Magnetic threshold overrating:
    - C curve: 5 to 15 In

**Mechanical endurance:**

- . Compliant with standard EN/IEC 60898-1
- . Tested with 20,000 operations with no load

**Ambient temperatures:**

- . Operation: from - 25°C to + 70°C
- . Storage: from - 40°C to + 70°C

**Resistance to tremors:**

- . In accordance with standard EN/IEC 60898-1

**Sinusoidal vibration resistance in accordance with IEC 60068.2.6:**

- . Axes: x – y – z
- . Frequency: 10 to 55 Hz
- . Acceleration: 3g (1g = 9.81m.s<sup>-2</sup>)

**Electrical endurance:**

- . Compliant with standard EN/IEC 60898-1
- . Tested with 10,000 operations with load (In x Cos φ 0.9)

**Frequency:**

- . Operation at 400 Hz: yes
- . Magnetic tripping depending on the frequency
  - from 16<sup>2/3</sup> Hz to 60 Hz: no correction
  - 400 Hz: the magnetic tripping threshold increases by 45%

**Packaged volume:**

Packaging	Volume (dm <sup>3</sup> )
<b>Per 1</b>	<b>0.195</b>
<b>Per 10</b>	<b>1.62</b>

**Average unit weight per catalogue number:**

- . 0.11 kg

**Power dissipated in W for the phase pole in In:**

- . MCBs in In/Un

Rated current	6 A	10 A	16 A	20 A	25 A	32 A	40 A
Power (W) Phase pole	<b>2.5</b>	<b>1.6</b>	<b>3.3</b>	<b>4</b>	<b>4.2</b>	<b>3.3</b>	<b>5.6</b>
Power (W) Neutral pole	<b>0.1</b>	<b>0.3</b>	<b>1.1</b>	<b>1.2</b>	<b>1.1</b>	<b>1.6</b>	<b>2.8</b>

**5. GENERAL CHARACTERISTICS** *(continued)*

**Derating of MCBs function of the number of devices placed side by side:**

When several MCBs are installed side by side and operate simultaneously, the heat dissipation of one pole is limited. This results in an increased operating temperature for the circuit breakers which may cause false tripping. Applying the following coefficients to the operating currents is recommended.

Number of MCBs side by side	Coefficient
2 - 3	<b>0.9</b>
4 - 5	<b>0.8</b>
6 - 9	<b>0.7</b>
≥ 10	<b>0.6</b>

These values are given in the IEC 60439-1 recommendation and NF C 63421 and EN 60439-1 standards. In order to avoid having to use these coefficients there must be good ventilation and the devices must be kept apart using the spacing elements Cat. No. F80/05DS (0.5 module).

**Derating of MCBs in the event of use with fluorescent tubes:**

Electronic or ferromagnetic ballasts provide a high inrush current for a very short time. These currents are liable to cause tripping of the circuit breakers.

The maximum number of ballasts per MCB stated by the lamp and ballast manufacturers in their catalogues should be taken into account during installation.

**Impact of height:**

	≤2,000 m	3,000 m	4,000 m	5,000 m
Dielectric strength	<b>2,000 V</b>	<b>1,750 V</b>	<b>1,500 V</b>	<b>1,250 V</b>
Maximum operating voltage	<b>230 V</b>	<b>230 V</b>	<b>230 V</b>	<b>230 V</b>
Derating at 30°C	<b>none</b>	<b>none</b>	<b>none</b>	<b>none</b>

**Derating of MCBs depending on the ambient temperature:**

The nominal characteristics of a circuit breaker are modified depending on the ambient temperature which prevails in the cabinet or enclosure where the MCB is located.

Reference temperature: 30°C in accordance with standard EN/IEC 60898-1.

In (A)	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C
6	<b>7.2</b>	<b>6.9</b>	<b>6.6</b>	<b>6.3</b>	<b>6</b>	<b>5.7</b>	<b>5.4</b>	<b>5.1</b>	<b>4.8</b>
10	<b>12</b>	<b>11.5</b>	<b>11</b>	<b>10.5</b>	<b>10</b>	<b>9.5</b>	<b>9</b>	<b>8.5</b>	<b>8</b>
16	<b>19.2</b>	<b>18.4</b>	<b>17.6</b>	<b>16.8</b>	<b>16</b>	<b>15.2</b>	<b>14.4</b>	<b>13.6</b>	<b>12.8</b>
20	<b>24</b>	<b>23</b>	<b>22</b>	<b>21</b>	<b>20</b>	<b>19</b>	<b>18</b>	<b>17</b>	<b>16</b>
25	<b>30</b>	<b>28.7</b>	<b>27.5</b>	<b>26.2</b>	<b>25</b>	<b>23.7</b>	<b>22.5</b>	<b>21.2</b>	<b>20</b>
32	<b>38.4</b>	<b>36.8</b>	<b>35.2</b>	<b>33.6</b>	<b>32</b>	<b>30.4</b>	<b>28.8</b>	<b>27.2</b>	<b>25.6</b>
40	<b>48</b>	<b>46</b>	<b>44</b>	<b>42</b>	<b>40</b>	<b>38</b>	<b>36</b>	<b>34</b>	<b>32</b>

**6. COMPLIANCE AND APPROVALS**

**In accordance with standards:**

. EN / IEC 60898-1

**Usage in special conditions:**

. Category C compliant (testing temperature range from -25°C to +70°C, resistant to salt spray) in accordance with the classification defined in Appendix Q of standard IEC/EN 60947-1

**Respect for the environment – Compliance with European Union Directives:**

. Compliance with Directive 2002/95/EC of 27/01/03 known as "RoHS" which provides for a restriction on the use of dangerous substances such as lead, mercury, cadmium, hexavalent chromium and polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) brominated flame retardants from 1<sup>st</sup> July 2006

. Compliance with the Directive 91/338/EEC of 18/06/91 and decree 94-647 of 27/07/04

**Plastic materials:**

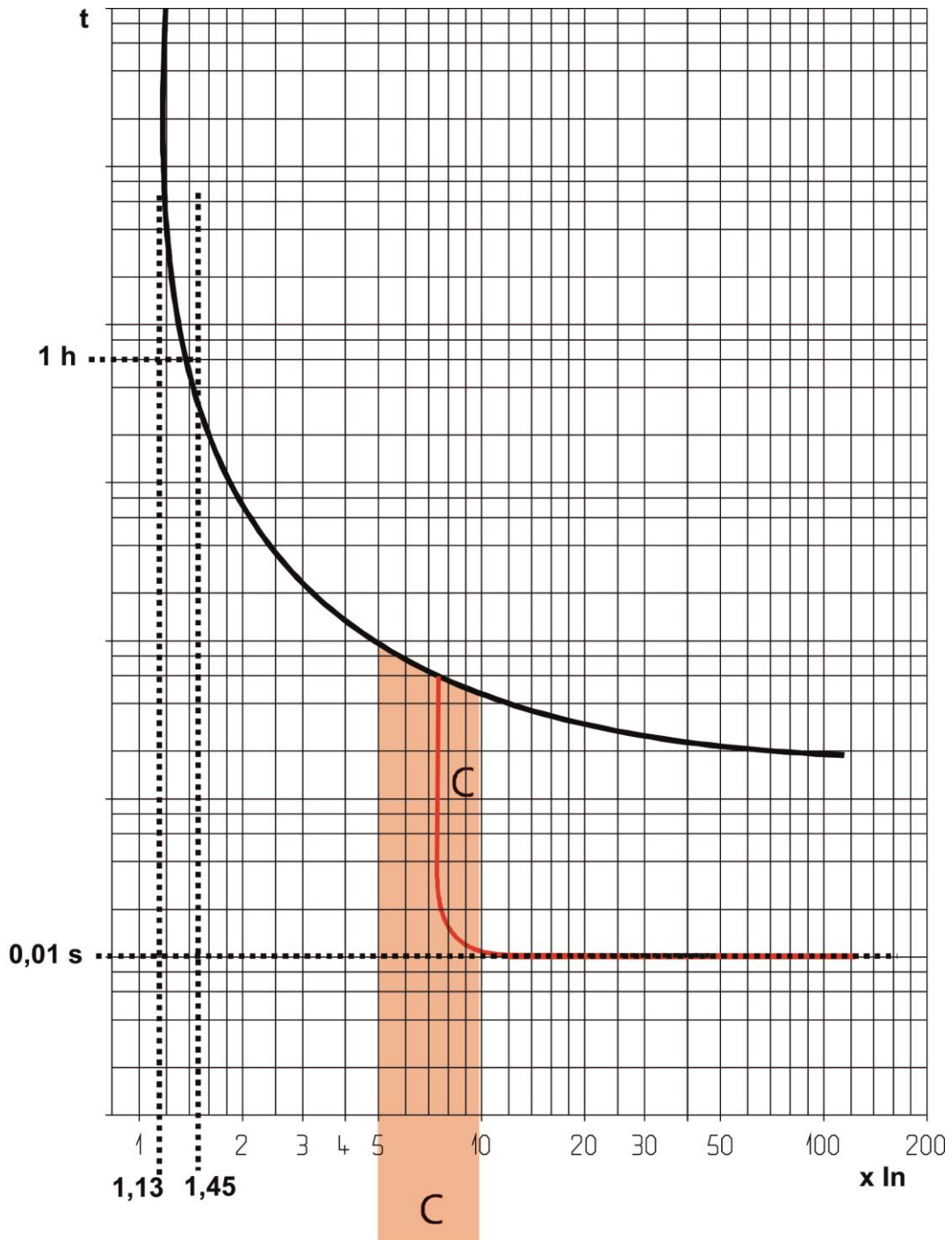
. Halogen free plastic materials.  
 . Labelling of parts compliant with ISO 11469 and ISO 1043.

**Packaging:**

. Design and manufacture of packaging compliant with decree 98-638 of 20/07/98 and Directive 94/62/EC

**7. CURVES**

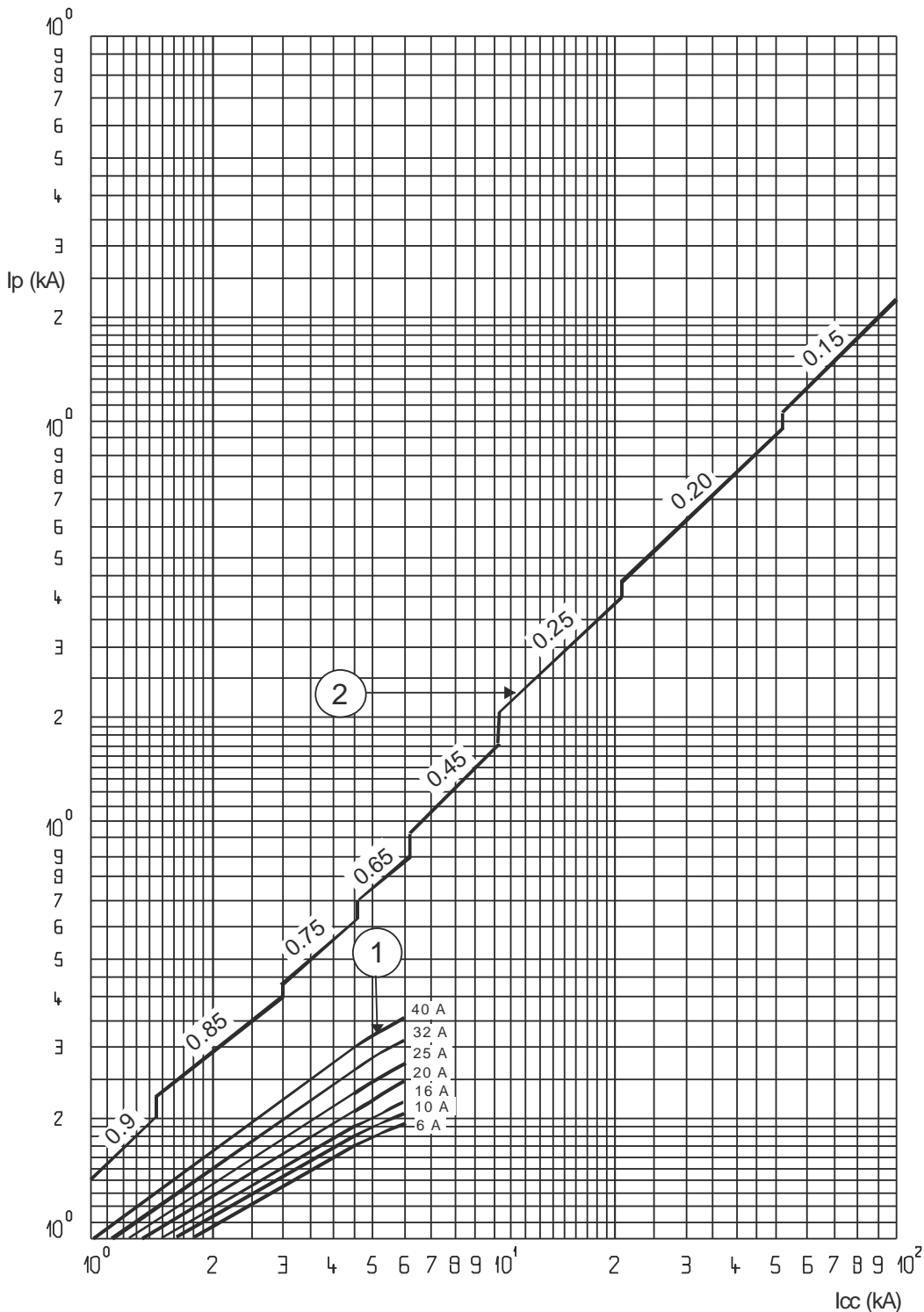
Thermal-magnetic tripping curve range typical of C curve MCBs:



Thermal tripping at ambient temperature = 30°C  
 $I_n$  = circuit breaker rated current

7. CURVES (continued)

Current limiting curves:

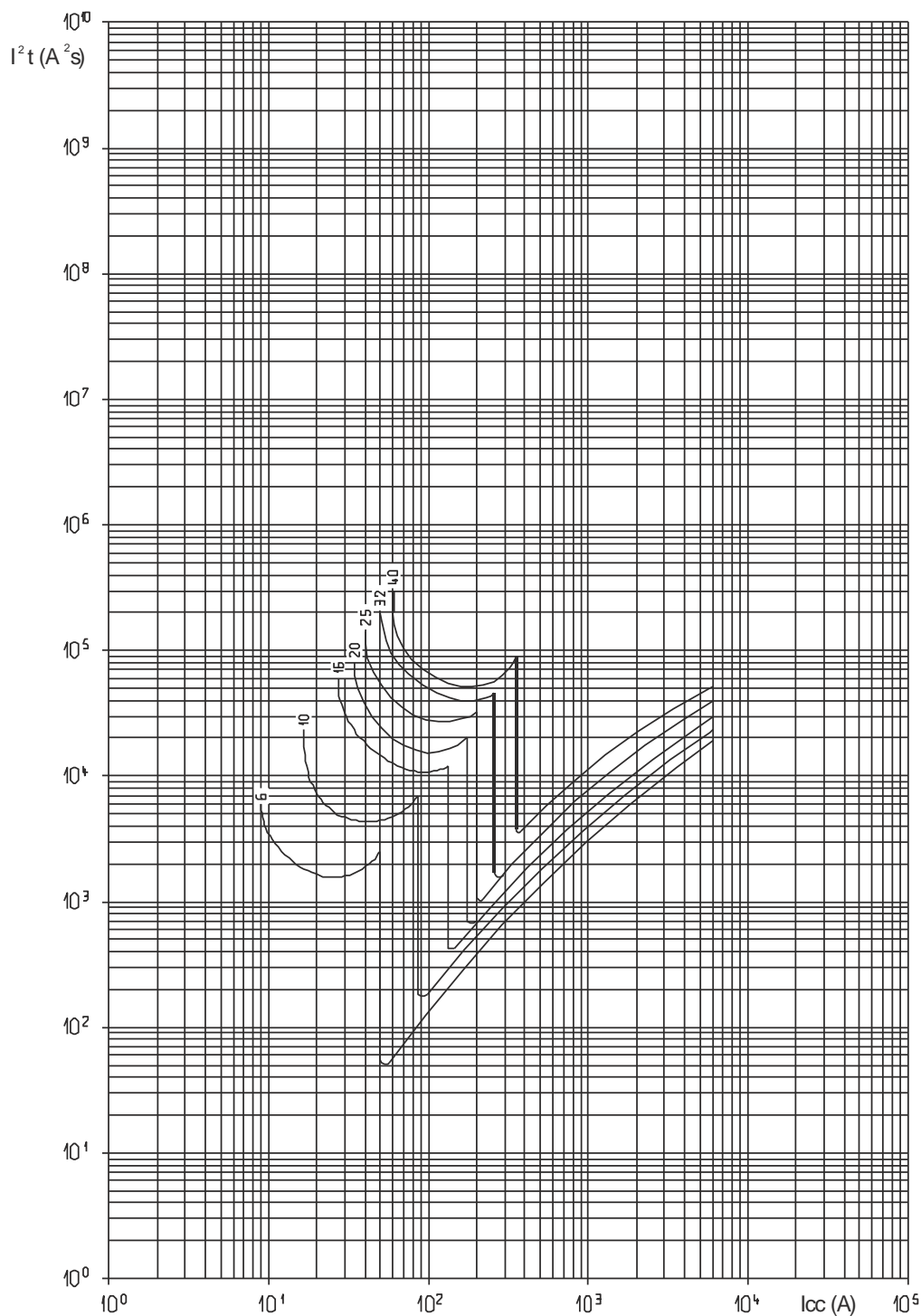


$I_{cc}$  = Prospective short-circuit symmetrical current (rms value in kA)  
 $I_p$  = Maximum peak value (in kA)  
 1 = Short-circuit rms currents (max. peak)  
 2 = Unlimited peak currents (max.), corresponding to power factors shown above (0.15 to 0.9)

**7. CURVES (continued)**

**Thermal stress limiting curves:**

. C curve MCBs (230V/50Hz)



$I_{cc}$  = prospective short-circuit symmetrical current (rms value in A)  
 $I^2t$  = limited thermal stress (in A s)<sup>2</sup>

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### 8. AUXILIARIES AND ACCESSORIES

#### Wiring accessories:

- . Supply busbar: Pin and Fork busbar (See Btcino catalogue)
- Sealable screw cover (Cat. No. F80CV1)

#### Sealing:

- . Possible in the open or closed positions

#### Locking options:

- . Via  $\varnothing$  5 mm padlock or  $\varnothing$  6 mm padlock and padlock support (Cat. No. F80BL)