

Thermo-magnetic circuit-breaker Btdin 160 up to 63A (1 module per pole)

Codes:FT81C10 / C63, FT81NC6 / C63, FT82C6 / C63, FT83C10 / C63,
FT84C6 / C63

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Thermo-magnetic circuit-breaker Btdin 160 up to 63A (1 module per pole)

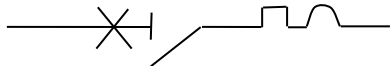
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1. DESCRIPTION – USE:

. Thermo-magnetic circuit breaker for command, protection and disconnection of electric circuits.

Symbol :



Technology:

. Current limiting circuit-breaker
. 1 Module (17,8) per pole

2. RANGE:

Polarity:

. 1P / 1P+N (only C curve) / 2P / 3P / 4P

Rated currents, In:

. 6 / 10 / 16 / 20 / 25 / 32 / 40 / 50 / 63A C curve

Instantaneous tripping characteristics according to IEC/EN 60947-2:

. C type = $7 I_n \pm 20\%$

Time-current characteristic according to IEC/EN 60947-2:

. Reference temperature: 40° C
. Non-tripping current: 1,05 I_n .
. Tripping current: 1,3 I_n

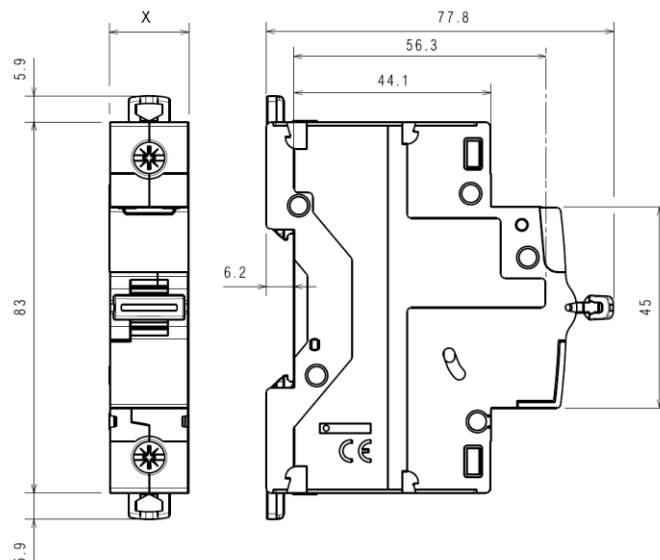
Maximum operational voltage:

. 440 V ~ with possible derating of the breaking capacity

Breaking capacity and Rated voltage (50/60 Hz):

. 16 kA cat. A according to IEC/EN 60947-2
230 V ~ / 400 V~

3. OVERALL DIMENSIONS :



	X
1P	17.8 mm
2P / 1P+N	35.6 mm
3P	53.4 mm
4P	71.2 mm

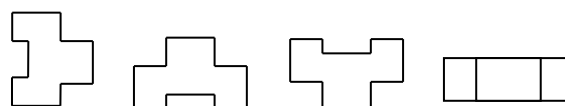
4. PREPARATION - CONNECTION

Fixing:

. On symmetric rail EN/IEC 60715 or DIN 35 rail.

Operating positions:

. Vertical Horizontal Upside down On the side



Supply:

. From the top or the bottom.

Connection:

. Inputs and outputs via screw terminals
The location of the terminals allows supplying by traditional HX³ pin busbar and fork busbar.

Terminal depth:

. 14 mm

Stripping length recommended:

. 11 mm

Screw head:

. Mixed, slotted and Pozidriv 2.

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4. PREPARATION - CONNECTION *(continued)*

Recommended tightening torque:

- . Recommended: 2.5 Nm.
- . Min: 2 Nm. Max: 3 Nm.

Tools required:

- . For the terminals: Pozidriv n° 2 or flat screwdriver 5,5 mm (6 mm maximum).
- . For fixing: flat screwdriver 5,5 mm (6 mm maximum).

Connectable section:

	Cavi in rame	
	Senza bussola	Con bussola (capicorda)
Cavo rigido	1 x 1,5 mm ² a 35 mm ² 2 x 1,5 mm ² a 16 mm ²	-
Cavo flessibile	1 x 1,5 mm ² a 25 mm ² 2 x 1,5 mm ² a 10 mm ²	1 x 1,5 mm ² a 25 mm ²

Aluminium cable with cross-section > 10 mm²: it is necessary to use the accessory with cat. F80ALU63

Manual actuation of the MCB:

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

Contact status display:

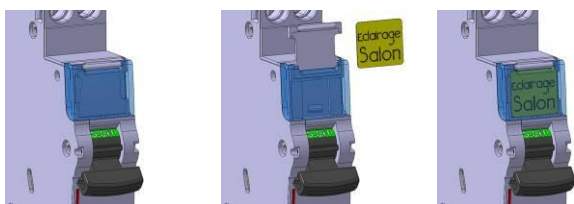
- . By marking of the handle
 - "O-OFF" in white on a green background = contacts open
 - "I-ON" in white on a red background = contacts closed

Sealing:

- . Possible in "Open" position (OFF) or "Close" position (ON).

Labelling:

- . Identification of the circuit by insertion of a label in the label holder.

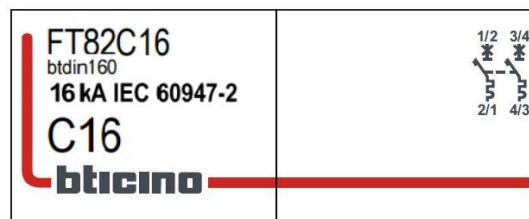


5. GENERAL CHARACTERISTICS

Front side marking:

- . By indelible marking showing:

- Cat No:
- Trade name: Btdin 160
- Icu (in kA): Extreme breaking capacity according to IEC/EN 60947-2
- Breaking curve
- Rated current (in A)
- Electrical diagram
- Mark: bticino



Marking on the side:

- Production information and COPY-TRACER (The Copy-tracer number ensures that a product is traced and guarantees its production quality).
Info: <http://www.legrand-copytracer.com/>

Short-circuit breaking capacity:

- . Alternate current 50/60Hz, single-phase or three-phase network, in accordance with standard: EN/IEC 60947-2

Un		1P / 1P + N	2P	3P / 4P
110V~	Icu	25 kA	32 kA	-
230V~		16 kA	25 kA	25 kA
400V~		-	16 kA	16 kA

110V~	Ics	75% di Icn	75% di Icn	75% di Icn
230V~				
400V~				

Short-circuit breaking capacity on one pole:

- . Three-phase network 400 V~

- in TN neutral system, I_{su} = 16 kA
- in IT distribution system, I_{lit} = 4 kA

- . Three-phase network 230 V~

- in TN neutral system, I_{su} = 25 kA
- in IT distribution system, I_{lit} = 6 kA

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5. GENERAL CHARACTERISTICS *(continued)*:

Minimum operating voltage:

. 12 V

Pulse rated voltage:

. $U_{imp} = 4 \text{ kV}$

Insulation rated voltage:

. $U_i = 500 \text{ V}$

Pollution degree:

. 2 according to IEC/EN 60898-1.

. 3 according to IEC/EN 60947-2.

Dielectric strength at power frequency:

. 2500 V

Operation at 400Hz:

. The instantaneous tripping threshold increase by 45%.

Force necessary to close and to open by the handle.

. 0.1 Nm per pole to close.

. 0.075 Nm per pole to open.

Mechanical and electrical endurance:

. 20000 operations without load.

. 10000 operations with load (under $I_n \cdot \cos \varphi = 0,9$).

Enclosure material:

. Glow-wire test at 960° C according to IEC/EN 60898-1 and IEC 60695-2-12

. Halogens-free

Average weight per pole:

. 0,150 kg

Volume when packed:

	Volume (dm ³)
1P	0,163
1P+N / 2P	0,334
3P / 4P	0,680

Ambient operating temperature:

. Min. = -25° C. Max. = +70° C

Ambient storage temperature:

. Min. = -40° C. Max. = +70° C

5. GENERAL CHARACTERISTICS *(continued)*:

Degree of protection:

. Degree of protection in the terminals area:

IP 20, (in accordance with standards IEC/EN 60898-1 and IEC/EN 60529).

. Degree of protection of the remaining parts:

IP 40 (in accordance with standards IEC/EN 60529).

. Protection index against mechanical shocks:

IK 02 (in accordance with standards IEC/EN 62262).

Sinusoidal vibration resistance in accordance with IEC/EN 60068-2-6:

. Axis: x, y, z.

. Frequency range: 5 ÷ 100 Hz; duration 90 minutes

. Displacement (5 ÷ 13,2 Hz): 1mm

. Acceleration (13,2 ÷ 100 Hz): 0,7g ($g=9,81 \text{ m/s}^2$)

Recognition:

. Recognition of the circuits by label in the "label holder" on the front-side of m.c.b.

Power dissipated per pole (W) :

. Type C Circuit-breakers

I_n	6 A	10 A
1P ÷ 4P	1,1	1.8

I_n	16 A	20 A	25 A	32 A	40 A	50A	63A
1P ÷ 4P	2	2.2	2.7	3.2	4	4.5	5,5

. Impedance per pole (Ω) = $\frac{P_{\text{dissipated}}}{I_n^2}$

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5. GENERAL CHARACTERISTICS *(continued)*:

Derating of circuit-breakers according to ambient temperature:

. The nominal characteristics of a circuit breaker are modified according to the ambient temperature inside the cabinet or the enclosure where the circuit breaker is located.

. Reference temperature: 40° C in accordance with EN/IEC 60947-2

In (A)	Ambient Temperature / In									
	- 25° C	- 10° C	0° C	10° C	20° C	30° C	40° C	50° C	60° C	70° C
6	8.2	7.5	7.0	6.6	6.4	6.2	6.0	5.8	5.6	5.4
10	14.0	12.5	11.5	11.1	10.7	10.3	10.0	9.7	9.3	9.0
16	21.9	20.0	18.7	18.0	17.3	16.6	16.0	15.4	14.7	14.1
20	27.7	25.0	23.2	22.4	21.6	20.8	20.0	19.2	18.4	17.6
25	34.5	31.5	29.5	28.3	27.2	26.0	25.0	24.0	22.7	21.7
32	45.8	41.0	37.8	36.5	34.9	33.3	32.0	30.7	29.1	27.8
40	55.5	51.0	48.0	46.0	44.0	42.0	40.0	38.0	36.0	34.0
50	70.0	64.0	60.0	57.5	55.0	52.5	50.0	47.5	45.0	42.5
63	88.1	80.6	75.6	72.5	69.9	66.1	63.0	59.8	56.1	52.9

Derating of MCB for use with fluorescent lights:

Ferromagnetic and electronic ballasts have a high inrush current for a short time. These currents can cause the tripping of circuit breakers. At the time of the installation, it should take into account the maximum number of ballasts per circuit breaker that the manufacturers of lamps and ballasts indicate in their catalogues.

Influence of the altitude:

	≤2000 m	3000 m	4000 m
Dielectric holding	3000 V	2500 V	2000 V
Max operational Voltage	400 V	400 V	400 V
Derating at 30° C	none	none	none

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

When several MCBs are juxtaposed and operate simultaneously, the thermal evacuation of the poles is limited. This results in an increase in operating temperature of the circuit breakers which can cause unwanted tripping. It is recommended to apply the following coefficients to the rated currents.

Number of circuit breakers side by side	Coefficient
2 - 3	0.9
4 - 5	0.8
6 - 9	0.7
≥ 10	0.6

These values are given by the recommendation of IEC/EN 60439-1.

To avoid using these coefficients, it is necessary to allow a good ventilation and to separate the devices with 0.5 module spacing elements (cat. N° F80/05D).

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6. CONFORMITIES AND APPROVALS

In accordance with standards:

- . IEC/EN 60947-2 with 16 kA breaking capacity
- . EU guidelines: 2014/35/EU + 2014/30/EU
- . Legrand circuit-breakers can be used under the conditions of use as defined by IEC/EN 60947.
- . The performance of circuit-breakers can be influenced by particular climates: hot dry, cold dry, hot humid, salt fog atmosphere

Classification according to Annex Q (standard IEC/EN 60947-1):

- . Category C with a range test temperature -25 ° C / +70 ° C
- . Salt fog atmosphere according IEC 60068-2-52

Environment respect – Compliance with EU directives:

- . Compliance with Directive 2011/65/EU of 08/06/11 (RoHS) and subsequent modifications and integrations.

Precious metal:

- . Silver: 0,04 g per pole $I_n \leq 16$ A; 0.08 g per pole $I_n \geq 20$ A
- . No gold

Packaging:

- . Design and manufacture of packaging in accordance with Directive 94/62/EC

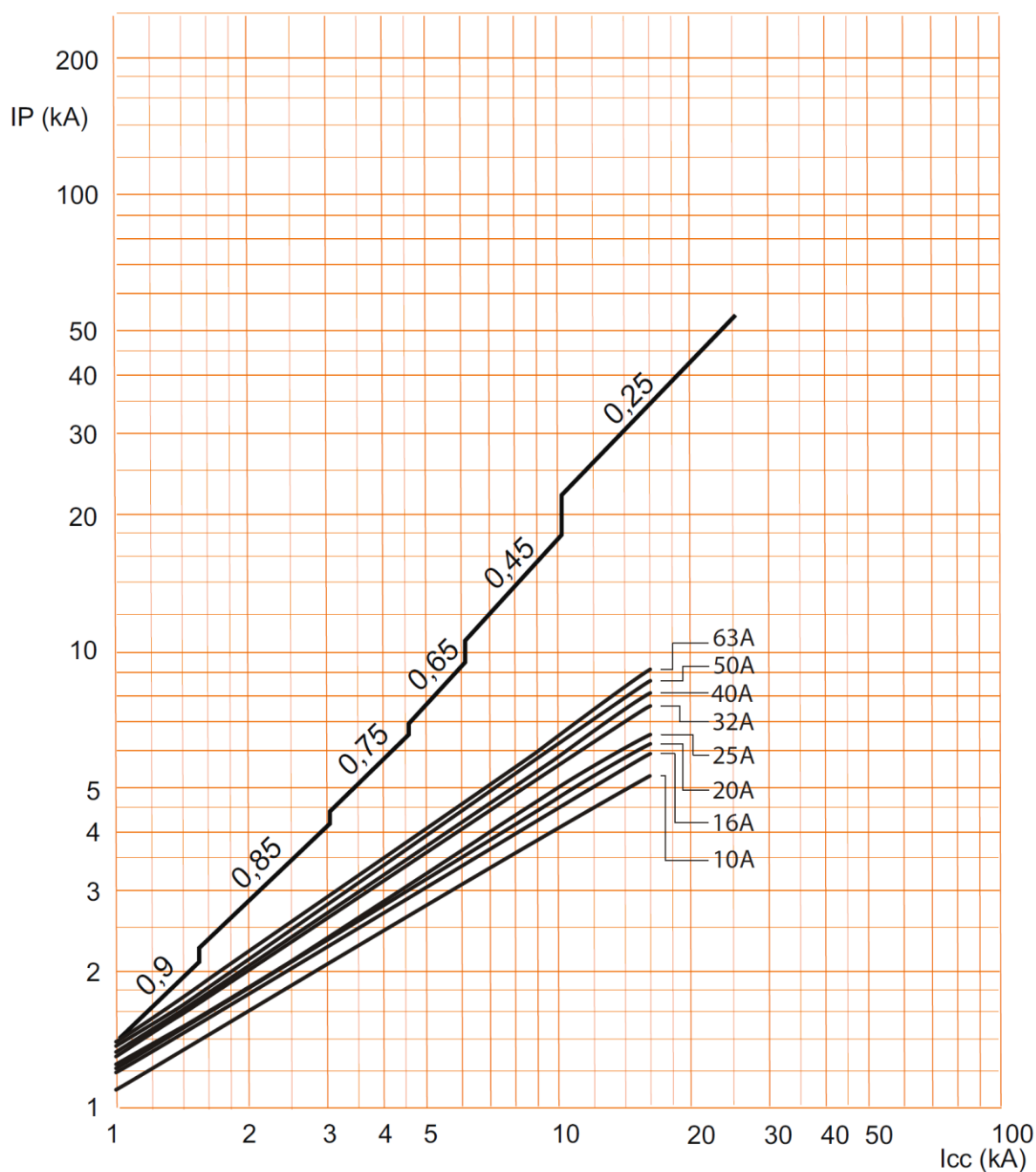
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7. CHARACTERISTIC CURVES :

Limiting current curve: circuit breakers C:



. Icc = Square value of symmetric component of the short circuit current (kA).

. IP = Max peak value (kA)

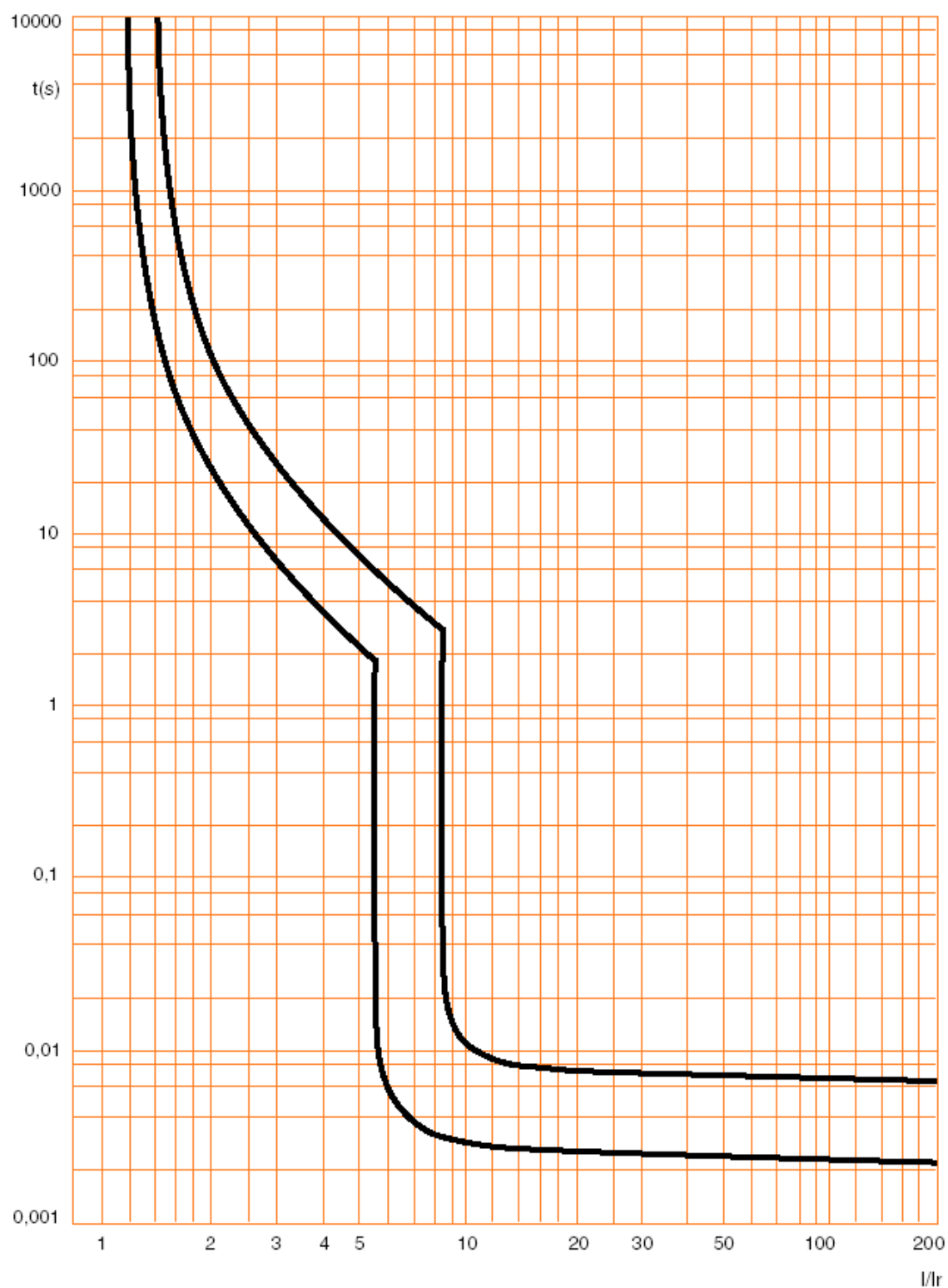
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7. CHARACTERISTIC CURVES *(continued)*

Operating characteristic of circuit breakers C curve:



Thermo-magnetic circuit-breaker

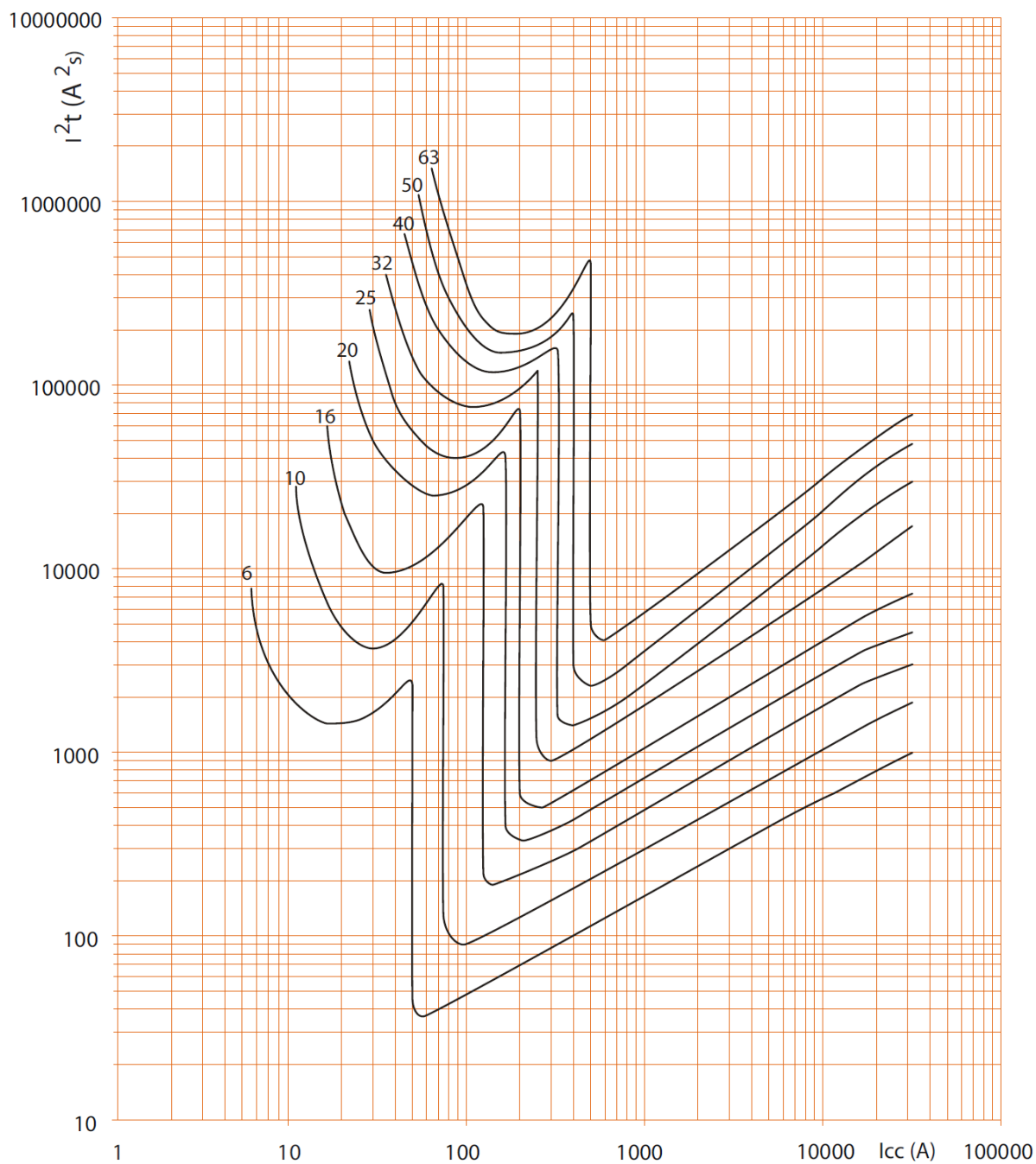
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7. CHARACTERISTIC CURVES *(continued)*

. Limiting thermal energy curve of circuit breakers C curve, 2P (230V~ / 50Hz):



. I_{cc} = Square value of symmetric component of the short circuit current (kA).

. I^2t = Thermal energy limited (A^2s).

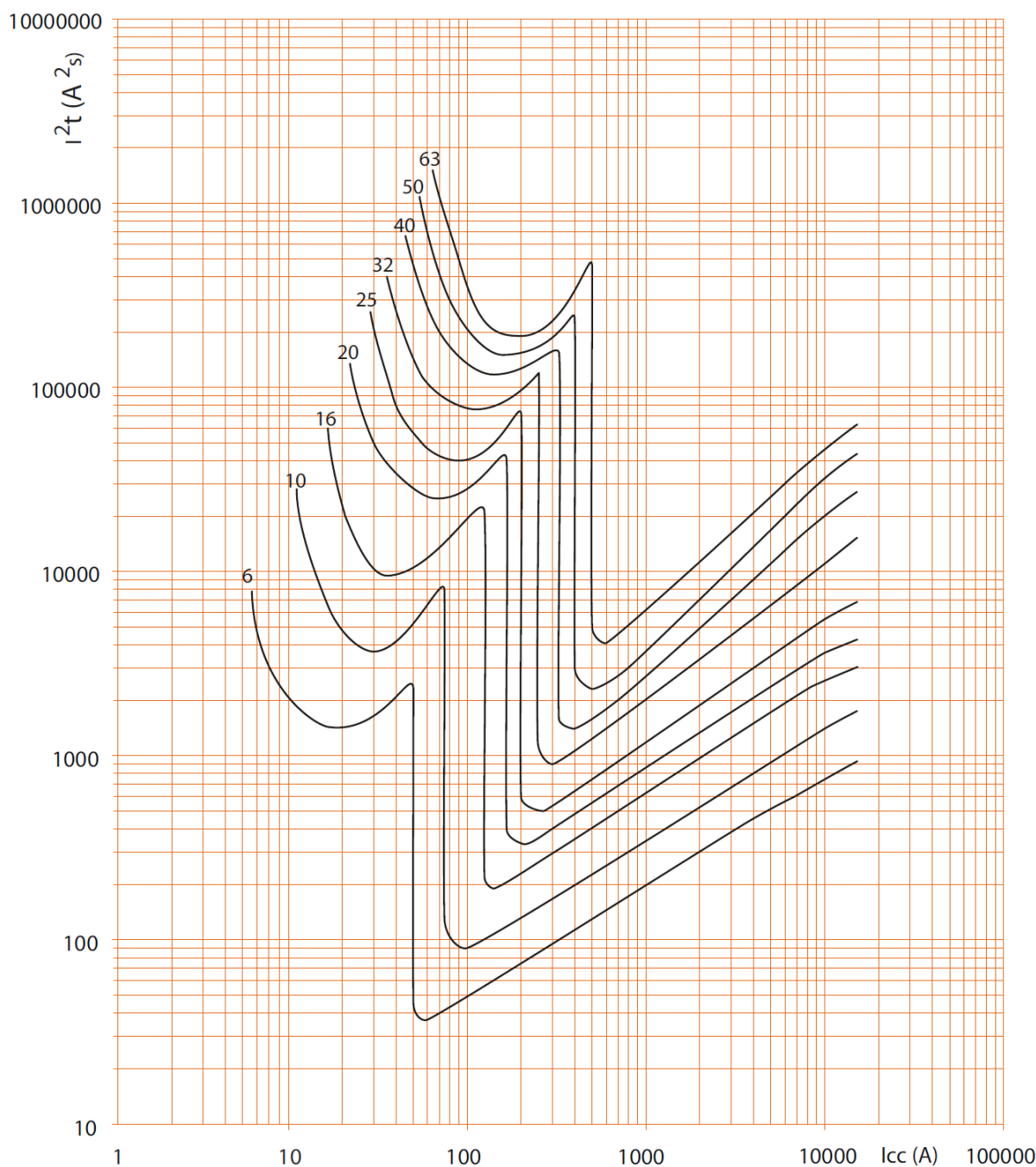
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7. CHARACTERISTIC CURVES *(continued)*

. Limiting thermal energy curve of circuit breakers C curve, 2P (400V~ / 50Hz):



. I_{cc} = Square value of symmetric component of the short circuit current (kA).

. I^2t = Thermal energy limited (A^2s).

Thermo-magnetic circuit-breaker

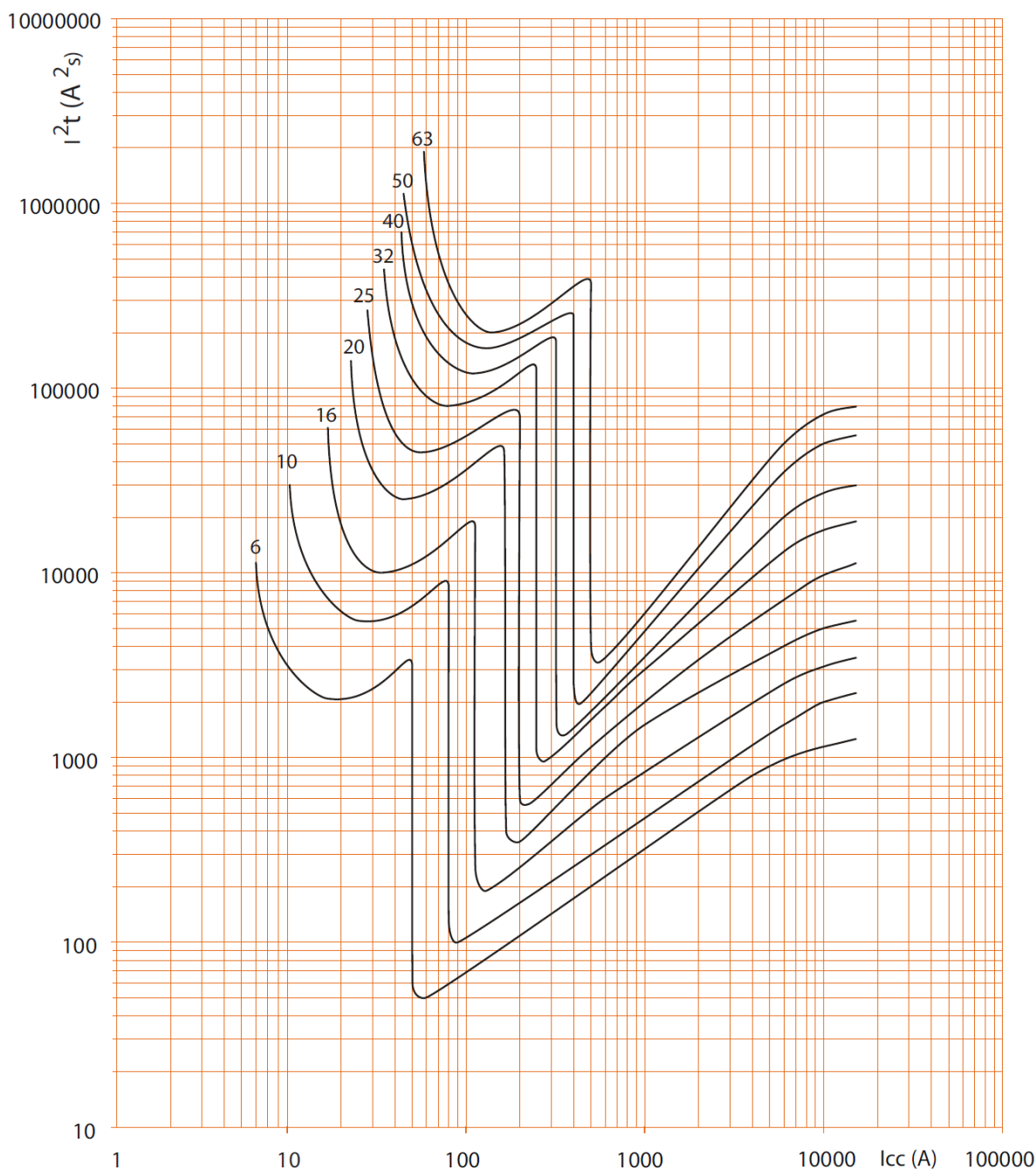
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7. CHARACTERISTIC CURVES *(continued)*

. Limiting thermal energy curve of circuit breakers C curve, 1P / 3P / 4P (400V~ / 50Hz):



. I_{cc} = Square value of symmetric component of the short circuit current (kA).

. I^2t = Thermal energy limited (A^2s).

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8. AUXILIARIES AND ACCESSORIES :

Connection with Add-on modules up to 63A :

m.c.b.	r.c.d.		
	2P	3P	4P
2P	X	-	-
3P	-	X	-
4P	-	-	X

Connection accessories:

- . Sealable screw cover (art. F80CV).
- . Insulating shields (art. F80S)
- . Terminal for aluminium cable (10 mm² to 50 mm²) necessary use (art. F80ALU63).

Signalling auxiliaries:

- . Auxiliary contact (½ module – art. F80CA05, 1 module art. F80CA).
- . Fault signalling changeover switch (½ module – art. F80CR05).
- . Auxiliary contact modifiable in default signal (½ module – art. F80RC05, 1 module art. F80RC).
- . Auxiliary contact + fault signalling switch - can be modified to 2 auxiliary contacts (1 module – art. F80CR).

Control auxiliaries:

- . Shunt releases (1 module - cat. n° . F80ST1 / ST2).
- . Under voltage release (1 module - cat. n° F80SV1 / SV2).
- . Overvoltage release (1 module – cat. n° F80SVP).
- . Autonomous shunt trip for NC push-button (1 module - cat. n° F80SVE1 / SVE2).

Motor driven control modules

- . Motor driven control 24-48V / 230V (1 module – cat n° F80MC24, F80MC230)
- . Motor driven control module with automatic resetting integrated (2 modules – cat n° F80MR24, F80MR230)

Automatic resetting:

- . Automatic resetting STOP & Go (art. F80SG, F80SGB, F80SGPN).

Possible combinations of m.c.b and auxiliaries:

- . Auxiliaries are clipped on the left of the m.c.b.
- . Maximum number of auxiliaries for one circuit-breaker: 3.
- . Two signalling auxiliaries max. (cat. n° F80CA05 / CA / CR05 / CR / RC05 / RC).
- . Only one control auxiliary (cat. n° F80ST1 / ST2 / SV1 / SV2 / SVP / SVE1 / SVE2).
- . One remote control or Stop & Go motor driven remote control
- . If signalling and control auxiliaries are associated on the same circuit breaker, the command auxiliary must be placed to the left of the signal auxiliary

8. AUXILIARIES AND ACCESSORIES : (continued)

Front external rotary handle

- . Black handle (art. F80KMN)
- . Yellow and red handle (art. F80KMR)

Locking:

- . By padlock whit support for padlock (F80BL).

9. USE IN DIRECT CURRENT

Operation in DC (direct current):

- . Refer to the IDP001518