

BTDIN 60 MCB Phase+Neutral, neutral on right side

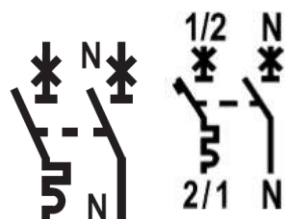
Cats n°(s) : FN881B6, FN881B10, FN881B16, FN881B20, FN881C6,
FN881C10, FN881C16, FN881C20, FN881C25, FN881C32, FN881C40

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

Magnetic tripping curves:

- . C curve (between 5 and 10 In)
- . B curve (between 3 and 5 In)

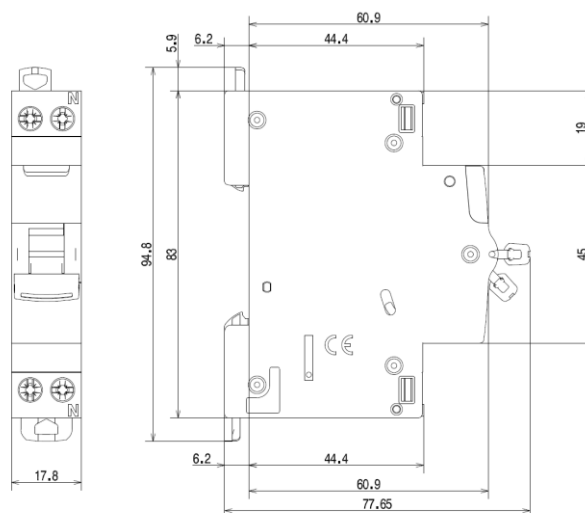
Rated voltage and frequency:

- . 230 V ~, 50 Hz with standard tolerances

Breaking capacity:

- . Icn = 6000 A in accordance with standard EN/IEC 60898-1
- . Icu = 10 kA in accordance with standard EN/IEC 60947-2

3. OVERALL DIMENSIONS

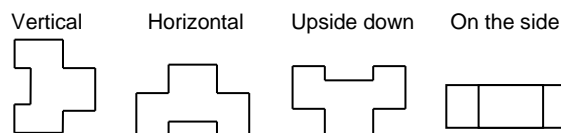


4. PREPARATION - CONNECTION

Mounting:

- . On symmetrical 35 mm rail EN/IEC 60 715

Operating position:



Power supply:

- . Either from the top or the bottom

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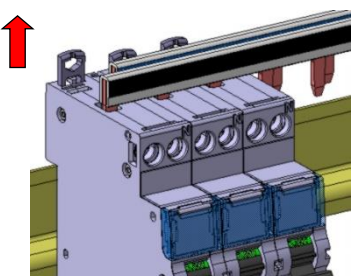
Cats n°(s) : FN881B6, FN881B10, FN881B16, FN881B20, FN881C6,
FN881C10, FN881C16, FN881C20, FN881C25, FN881C32, FN881C40

4. PREPARATION - CONNECTION (continued)

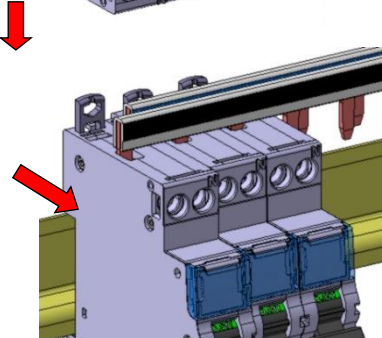
Module maintenance:

- . A circuit breaker may be replaced in the middle of a row supplied with busbars without disconnecting the other products.

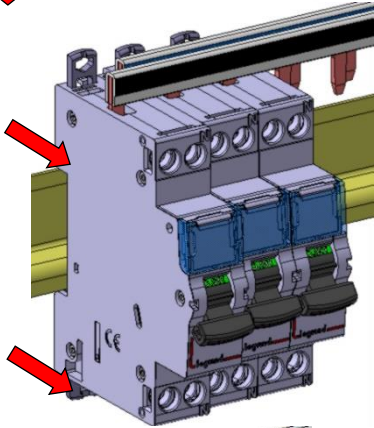
Put the clamp
in the unlocking
position



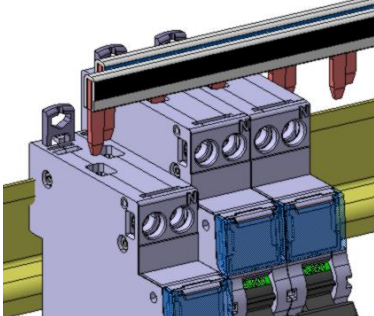
Put the clamp
in the unlocking
position



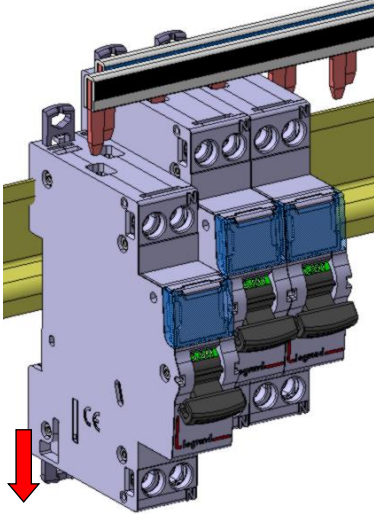
Unscrew both
upper terminals
completely



Pull the device
forward in order to
release it from the
rail



Pull the device
downward in order
to release it
completely from
the prongs of the
busbar



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 enabling connection with the others products of the row via prong supply busbars

4. PREPARATION - CONNECTION (continued)

Connection

- . Terminal depth: 14 mm at the top side and 13 mm at the bottom side
- . 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 ² 2 x 0.75 to 6 mm ²	-
Flexible cable	1 x 0.75 to 10 mm ² 2 x 0.75 to 4 mm ²	1 x 0.75 to 10 mm ²

- . Prong busbar, alone or with a flexible wire (without ferrule) 10 mm² 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:

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

Sealing:

- . Possible in the open and 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:

- . 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 Icn1 EN60898-1: 4.5 kA at 230 V ~ and 10 kA at 127V~

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5. GENERAL CHARACTERISTICS (continued)

Breaking capacity:

Standard	Breaking capacity	Voltage between poles	Breaking capacity
EN/IEC 60898-1	Ics	127 V	10 kA
	Icn		10 kA
	Ics	230 V	6 kA
	Icn		6 kA
EN/IEC 60947-2	Icu	230 V	10 kA
	Ics		50% Icu

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:

- . $U_i = 250$ 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:

- . $U_{imp} = 4$ kV

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
- . 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

Mechanical endurance:

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

Electrical endurance:

- . Compliant with standard EN/IEC 60898-1
- . Tested with 10,000 operations with load ($I_n \times \cos \varphi$ 0.9)

Sinusoidal vibration resistance in accordance with IEC 60068.2.6:

- . Axes: x – y – z
- . Frequency: 10 to 55 Hz
- . Acceleration: 3g ($1g = 9.81m.s^{-2}$)

Resistance to tremors:

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

Ambient temperatures:

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

DC operation:

- . 60 V DC:
 - $I_{cn} = 4500$ A in accordance with standard EN/IEC 60898-1
 - Magnetic threshold overrating:
 - B curve: 3 to 7.5 I_n C curve: 5 to 15 I_n

Frequency:

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

5. GENERAL CHARACTERISTICS (continued)

Packaged volume:

Packaging	Volume (dm ³)
Per 1	0.195
Per 10	1.62

Average unit weight per catalogue number:

- . 0.11 kg

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	0.9
4 - 5	0.8
6 - 9	0.7
≥ 10	0.6

These values are given in the IEC 60439-1 recommendation 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. F80/05D (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	2,000 V	1,750 V	1,500 V	1,250 V
Maximum operating voltage	230 V	230 V	230 V	230 V
Derating at 30°C	none	none	none	none

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5. GENERAL CHARACTERISTICS *(continued)*

Power dissipated in W for the phase pole in In:

. MCBs at In/Un

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

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

6. COMPLIANCE AND APPROVALS

In accordance with standards:

- . EN / IEC 60898-1
- . IMQ certification

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 1st 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:

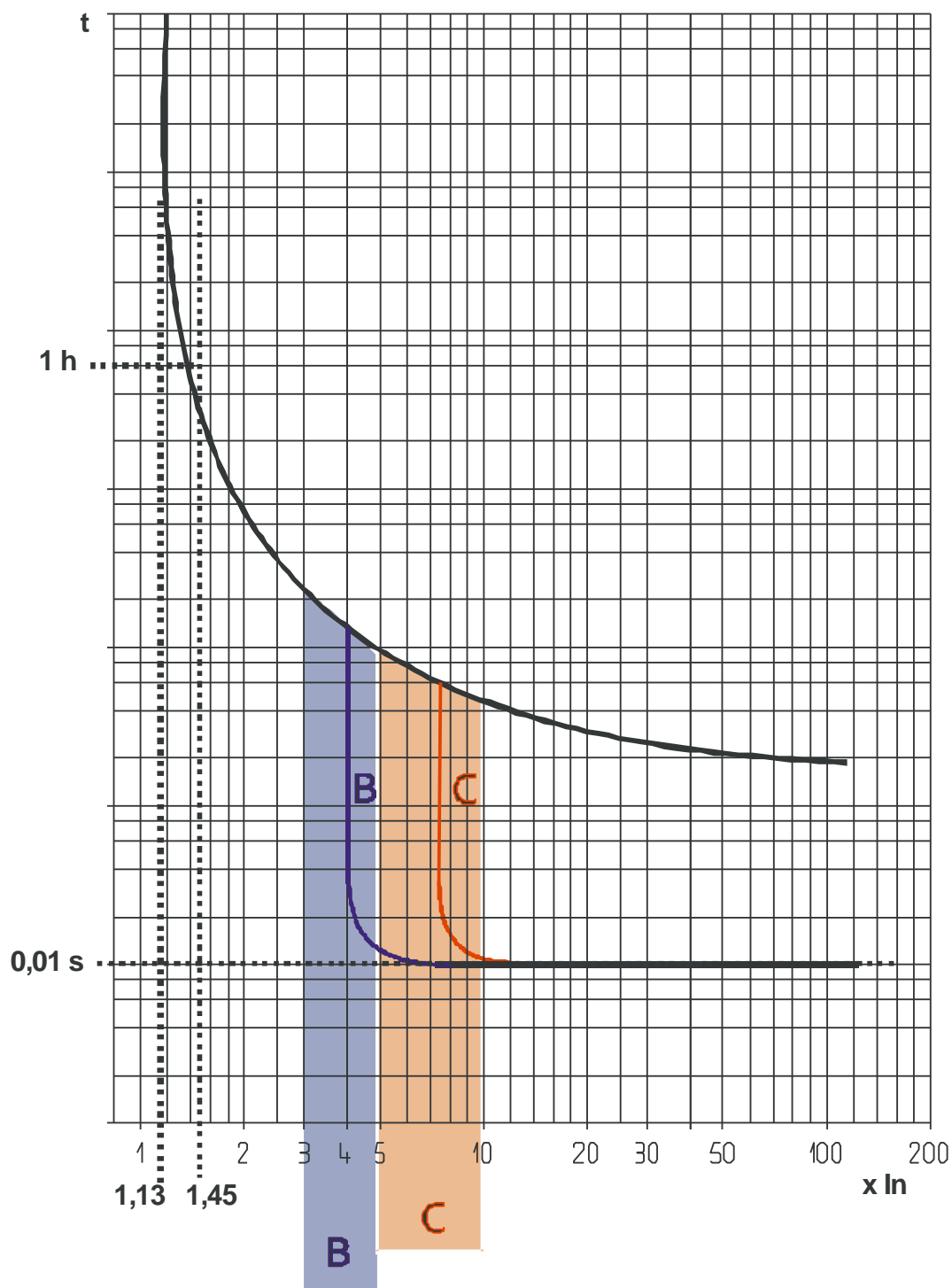
- . Design and manufacture of packaging compliant with decree 98-638 of 20/07/98 and Directive 94/62/EC

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7. CURVES

Typical thermal-magnetic tripping curve of MCBs B and C curves:



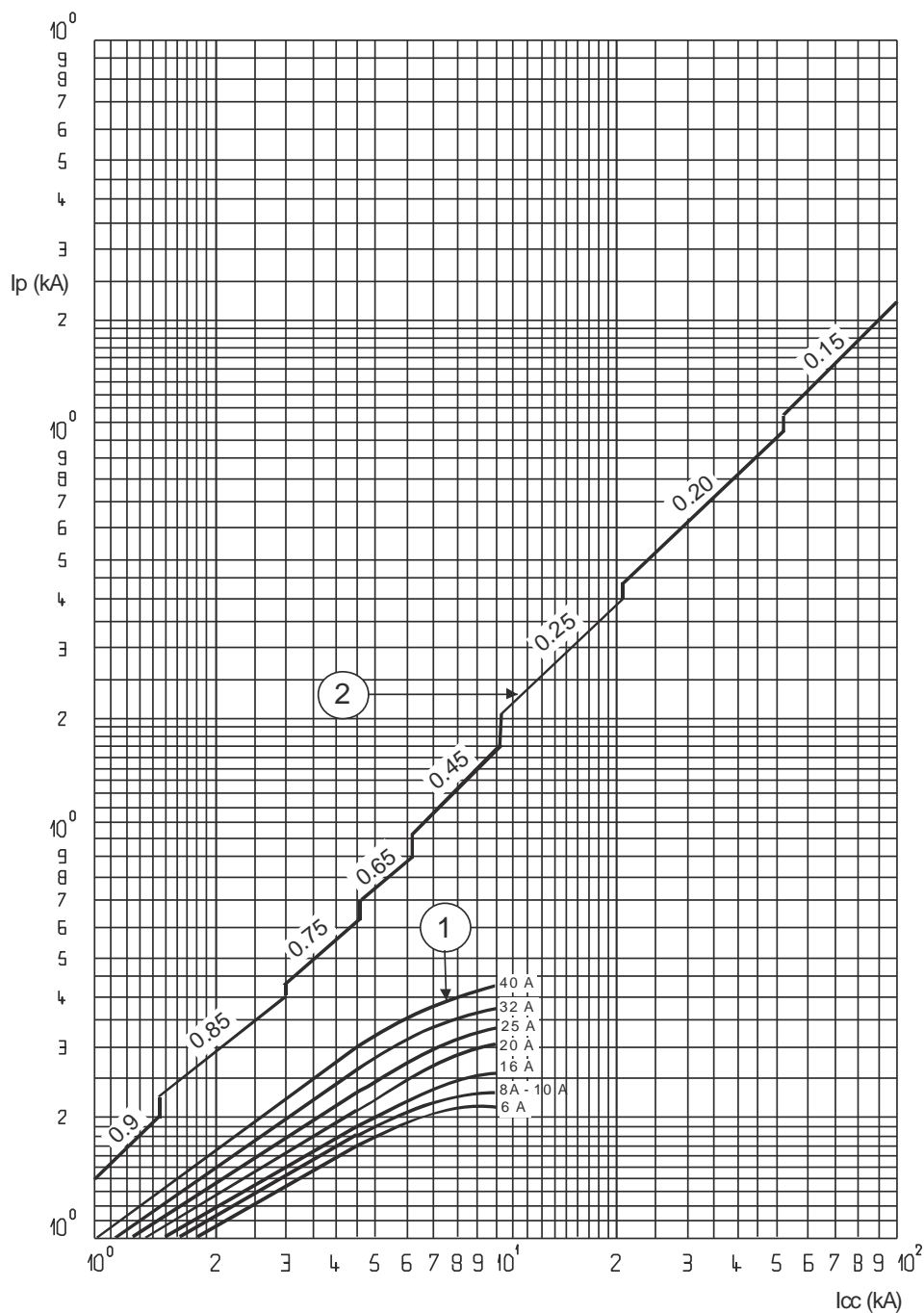
Thermal tripping at ambient temperature = 30°C
 I_n = circuit breaker rated current

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FN881C32, FN881C40

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)

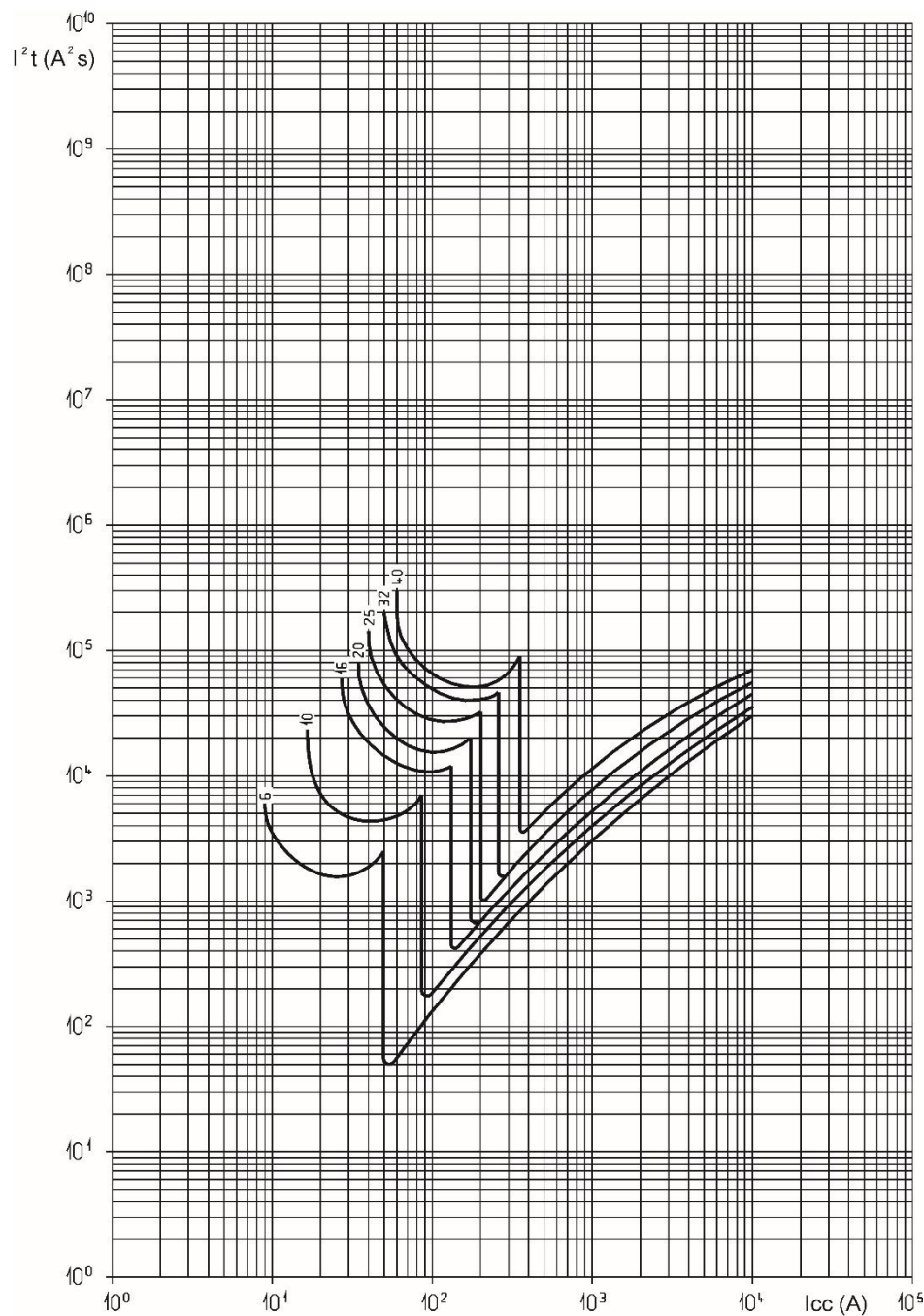
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FN881C32, FN881C40

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)²

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FN881C32, FN881C40

8. AUXILIARIES AND ACCESSORIES

Wiring accessories:

- . Sealable screwcover (cat. No. F80CV)

Signalling auxiliaries:

- . Auxiliary contact (0.5 module, Cat. No. F80CA05)
- . Fault signalling contact (0.5 module, Cat. No. F80CR05)
- . Auxiliary contact that can be changed into fault signalling contact (0.5 module, Cat. No. F80RC05)
- . Auxiliary contact + fault signalling contact that can be changed into 2 auxiliary contacts (1 module, Cat. No. F80CR)

Control auxiliaries:

- . Shunt trip (1 module, Cat. No. F80ST1 / F80ST2)
- . Under voltage release (1 module, Cat. No. F80SV1 / F80SV2)
- . Autonomous shunt trip release for N/C push-button (1.5 module, Cat. No. F80SVE2)
- . Power Overvoltage Protection (1 module, Cat. No. F80SVP)

Motor driven control modules:

- . Motor-driven control module (1 module, Cat. No. F80MC230)

Possible combinations of auxiliaries and MCBs:

- . The auxiliaries are installed to the left of the MCBs
- . Maximum number of auxiliaries = 3
- . Maximum number of 1 module signalling auxiliaries = 2
- . Maximum number of control auxiliaries = 1
- . The control auxiliary must mandatorily be placed to the left of the signalling auxiliaries where the auxiliaries from these 2 families are connected to the same MCB.

Sealing:

- . Possible in the open or closed positions

Locking options:

- . Padlock support (Cat. No. F80BL)

