

DX³ RCBO 6000A Phase + Neutral, neutral on right

Cat. N° (s) : 4 109 93, 97, 99, 4 110 00, 02, 03, 04, 05, 06,
4 110 21, 22, 24, 25, 26, 27, 28, 41, 47, 48, 50, 51, 52, 53,
4 110 54, 91, 92, 94, 95, 96, 97, 98



CONTENTS PAGE

1. Description, use	1
2. Range	1
3. Overall dimensions	1
4. Preparation – Connection	1
5. General characteristics	3
6. Compliance and approvals	18
7. Curves	19
8. Auxiliaries and accessories	24
9. Safety	24

1. DESCRIPTION - USE

Residual Current Circuit Breaker with Overload (RCBO) with positive contact indication for control, protection against short-circuits and overloads, and isolation of electrical circuits, protecting people from direct and indirect contact and protecting installations from insulation faults.

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:

- . 2 modules (2 x 17.8 mm)

Rated current In:

- . 3 / 6 / 10 / 16 / 20 / 25 / 32 / 40 A

Magnetic tripping curve:

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

Type:

- . AC (sinusoidal differential alternating current)
- . A (residual currents with a DC component)
- . F (additional immunity to unwanted tripping and detection of high frequency fault currents).
- F products are also A type.

Sensitivity:

- . 10 mA in AC type
- . 30 mA in AC type, A type and F type
- . 300 mA in AC type

2. RANGE (continued)

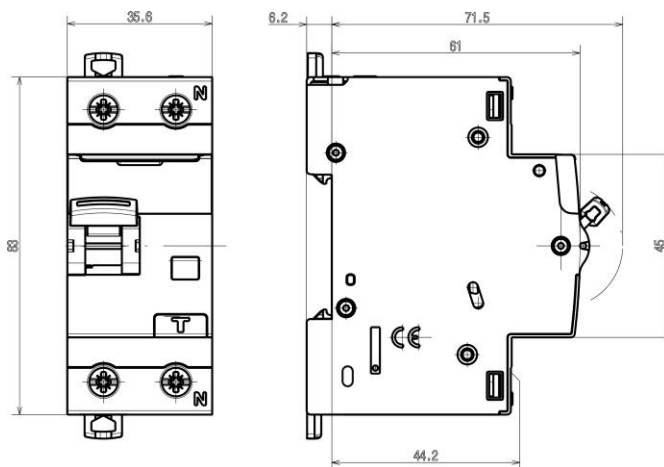
Rated voltage and frequency:

- . 230 V~, 50 Hz with standard tolerances
- . 240 V ~, 50 Hz with standard tolerances

Breaking capacity:

- . Icn = 6000 A in accordance with standard EN/IEC 61009-1
- . Icu = 10 kA in accordance with standard EN/IEC 60947-2

3. OVERALL DIMENSIONS



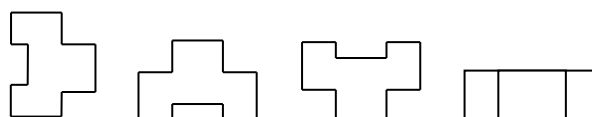
4. PREPARATION - CONNECTION

Mounting:

- . On symmetrical rail EN 60715 or DIN 35 rail

Operating positions:

Vertical Horizontal Upside down flat



Trip indication on residual current fault:

- . Yellow indicator on the front

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4. PREPARATION - CONNECTION *(continued)*

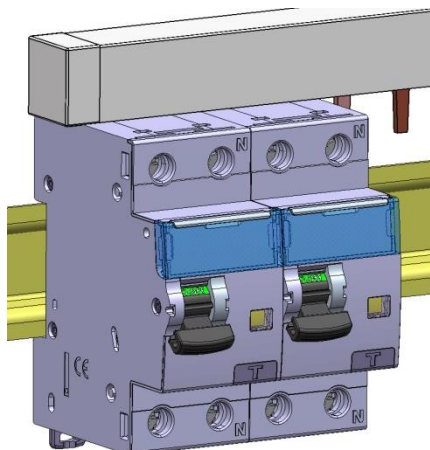
Power supply:

- . Either from the top or the bottom

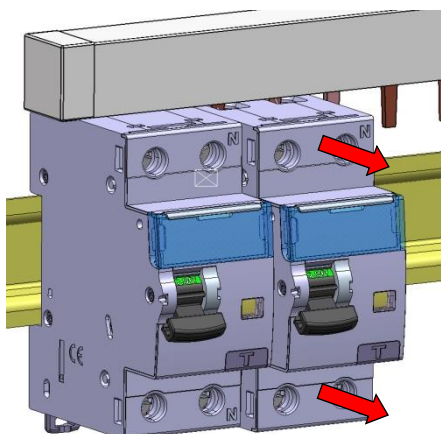
Module maintenance:

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

Put the clamp
in the
unlocking
position

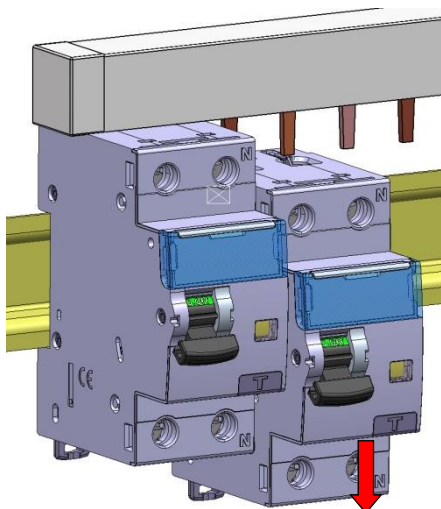


Put the clamp in
the unlocking
position



Unscrew both
upper
terminals

Pull the device
forward in
order to
release it from



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

4. PREPARATION - CONNECTION *(continued)*

Connection:

- . Terminals protected against direct finger contact IP20 when 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 shutters with the other products via pin and fork supply busbars
- . Terminal depth: 14 mm
- . Terminal capacity: 60 mm²
- . Screw head: mixed head, slotted head and Philips / Pozidriv no. 2
- . Tightening torques:
 - Minimum / Maximum: 1.2 Nm / 3.5 Nm
 - Recommended: 2.5 Nm

Conductor type:

- . Copper cable at the top and bottom of the product
- . Cable cross-section

	Without ferrule	With ferrule
Rigid cable	1 x 0.75 to 50 mm ² 2 x 0.75 to 16 mm ²	-
Flexible cable	1 x 0.75 to 35 mm ² 2 x 0.75 to 16 mm ²	1 x 0.75 mm ² to 25 mm ²

- . Prong busbar, alone or with a 10 mm² flexible wire (without ferrule) or a connection terminal in the same terminal.

Required tools:

- . For the terminals:
 - 5.5 mm / 6.5 mm blade screwdriver recommended
 - Pozidriv n° 2 / Philips N° 2 screwdriver recommended
- . For the latching:
 - 5.5 mm blade screwdriver recommended / 6 mm maximum
 - Pozidriv n° 2 / Philips N° 2 screwdriver recommended

Manual actuation of the RCBO:

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

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. 4 063 03) and Ø 5 mm padlock (Cat. No. 4 063 13) or Ø 6 mm padlock (Cat. No. 0 227 97)
- . 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.



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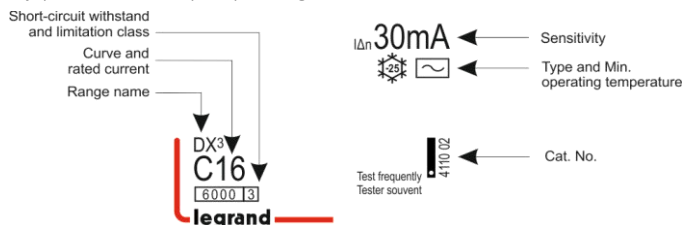
5. GENERAL CHARACTERISTICS

Neutral earthing system:

. IT, TT, TN

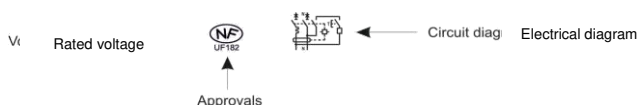
Marking on the front side:

. 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.

Maximum operating voltage:

. U = 250 V

Test operating voltages :

I _{Δn}	10mA	30 mA	300 mA
min. U	110V ~	180 V~	170 V~
max. U	264 V~	264 V~	264 V~

Breaking capacity:

. With a single-phase network (with alternating current 50 Hz)

Standard	Breaking capacity	Voltage between poles	Breaking capacity	
EN/IEC 61009-1	I _{cs}	127 V	10 kA	Only for sensitivities 10mA
	I _{cn}		10 kA	
	I _{cs}	230 V	6 kA	
	I _{cn}		6 kA	
EN/IEC 60947-2	I _{cu}	230 V	10 kA	
	I _{cs}		100 % I _{cu}	

Breaking capacity on one single pole (phase pole):

. In accordance with I_{IT} EN60947-2 – Appendix H (double fault in IT system): 1.5 kA at 400 V~ and 3 kA at 230 V~

. In accordance with I_{cn1} EN60898-1: 4.5 kA at 230 V~ and 10 kA at 127V~ (only for 10mA sensitivity)

Residual breaking capacity:

. In accordance with standard EN/IEC 61009-1 section 9.12.11.4d (I_{Δm}: short-circuit to earth) I_{Δm} = 4.5 kA

Insulation voltage:

. U_i = 250 V in accordance with standard EN/IEC 61009-1

5. GENERAL CHARACTERISTICS (continued)

Isolation distance:

. The distance between the contacts is greater than 5.5 mm with the handle in the open position.

. The RCBO is suitable for isolation in accordance with standard EN/IEC 61009-1.

Degree of pollution:

. 2 in accordance with standard EN/IEC 61009-1.

Dielectric strength:

. 2,000 V

Rated impulse withstand voltage

. U_{imp} = 4 kV (wave 1.2/50 μs)

Protection from false tripping:

. 8/20 μs wave resistance:

250 A for AC / A type

3000 A for F type

. 0.5 μs/100 kHz damped recurring wave resistance:

200 A for AC type and A / F type

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 side 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 61009-1

. Classification V2, in accordance with standard UL94

Higher heating potential:

. The heat potential is assessed at: 2.1MJ

Closing and opening force via the handle:

. 4 N on opening

. 10 N on closing

Mechanical endurance:

. Compliant with standard EN/IEC 61009-1

. Tested with 20,000 operations with no load

Electrical endurance:

. Compliant with standard EN/IEC 61009-1

. Tested with 10,000 operations with load (at I_n x Cos φ 0.9)

. Tested with 2,000 residual current trip operations using the Test button or the fault current

Sinusoidal vibration resistance (in accordance with IEC 68.2.6):

. Axes: x – y – z

. Frequency: 10 to 55 Hz

. Acceleration: 3g (1g = 9.81 m.s⁻²)

Resistance to tremors:

. In accordance with standard NF EN 61009-1

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5. GENERAL CHARACTERISTICS *(continued)*

Ambient temperature:

- . Operation: from - 25° C to + 60° C
- . Storage: from - 40°C to +70°C

DC operation:

- . No

Frequency:

- . Operation at 400Hz: No
- . Operation at 60Hz: can be used at 60Hz, except "A" types, with sensitivity 30mA, which can be replaced by F types of equivalent ratings and sensitivity.

Packaged volume and quantity:

	Volume (dm ³)	Packaging
For all ratings	0.4	Per 1

Derating of RCBOs function of the number of devices placed side by side:

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

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

These values are provided by recommendation IEC 60439-1 and the standards NF C 63421 and EN 60439-1.

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. 4 063 07 (0.5 module).

Impact of height:

	≤ 2000 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

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

5. GENERAL CHARACTERISTICS *(continued)*

Product weight:

Catalogue Number	Description	Weight (kg)
4 109 93	C16 AC type 10 mA	0.25
4 109 97	C3 AC type 30 mA	0.25
4 109 99	C6 AC type 30 mA	0.24
4 110 00	C10 AC type 30 mA	0.24
4 110 02	C16 AC type 30 mA	0.25
4 110 03	C20 AC type 30 mA	0.24
4 110 04	C25 AC type 30 mA	0.25
4 110 05	C32 AC type 30 mA	0.26
4 110 06	C40 AC type 30 mA	0.26
4 110 21	C6 AC type 30 mA	0.23
4 110 22	C10 AC type 300 mA	0.23
4 110 24	C16 AC type 300 mA	0.24
4 110 25	C20 AC type 300 mA	0.24
4 110 26	C25 AC type 300 mA	0.25
4 110 27	C32 AC type 300 mA	0.25
4 110 28	C40 AC type 300 mA	0.25
4 110 41	C16 A type 10 mA	0.25
4 110 47	C6 A type 30 mA	0.24
4 110 48	C10 A type 30 mA	0.24
4 110 50	C16 A type 30 mA	0.24
4 110 51	C20 A type 30 mA	0.24
4 110 52	C25 A type 30 mA	0.25
4 110 53	C32 A type 30 mA	0.25
4 110 54	C40 A type 30 mA	0.26
4 110 91	C6 F type 30 mA	0.24
4 110 92	C10 F type 30 mA	0.24
4 110 94	C16 F type 30 mA	0.24
4 110 95	C20 F type 30 mA	0.24
4 110 96	C25 F type 30 mA	0.25
4 110 97	C32 F type 30 mA	0.25
4 110 98	C40 F type 30 mA	0.25

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5. GENERAL CHARACTERISTICS *(continued)*

Dissipated power (W):

. C curve RCBOs in In/Un

RATED CURRENT	3 A	6 A	10 A	16 A	20 A	25 A	32 A	40 A
Power (W) Phase pole	0.7 W	0.7 W	1.9 W	3.3 W	4.9 W	3.7 W	5.7 W	7.6 W
Power (W) Neutral pole	0.0 W	0.2 W	0.5 W	1.5 W	2.3 W	2.6 W	4.2 W	5.3 W

Derating of RCBOs 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 RCBO is located.

. Reference temperature: 30° C in accordance with standard EN/IEC 61009-1.

In (A)	- 25°C	- 10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C
3	3.75	3.6	3.45	3.3	3.15	3	2.91	2.82	2.73	2.64
6	7.5	7.2	6.9	6.6	6.3	6	5.82	5.64	5.46	5.28
10	12.5	12	11.5	11	10.5	10	9.7	9.4	9.1	8.8
16	20	19.2	18.4	17.6	16.8	16	15.52	15.04	14.56	14.08
20	25	24	23	22	21	20	19.4	18.8	18.2	17.6
25	31.25	30	28.75	27.5	26.25	25	24.25	23.5	22.75	22
32	40	38.4	36.8	35.2	33.6	32	31.04	30.08	29.12	28.16
40	50	48	46	44	42	40	38.8	37.6	36.4	35.2

Specific use:

. Appropriate to operate in humid atmosphere and polluted by a chlorinated environment (pool-type).

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6. COMPLIANCE AND APPROVALS

In accordance with standard:

- . NF EN 61009-1 / IEC 61009-1
- . NF EN 62423 / IEC 62423 (F type)

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

Approvals obtained:

- . France: NF

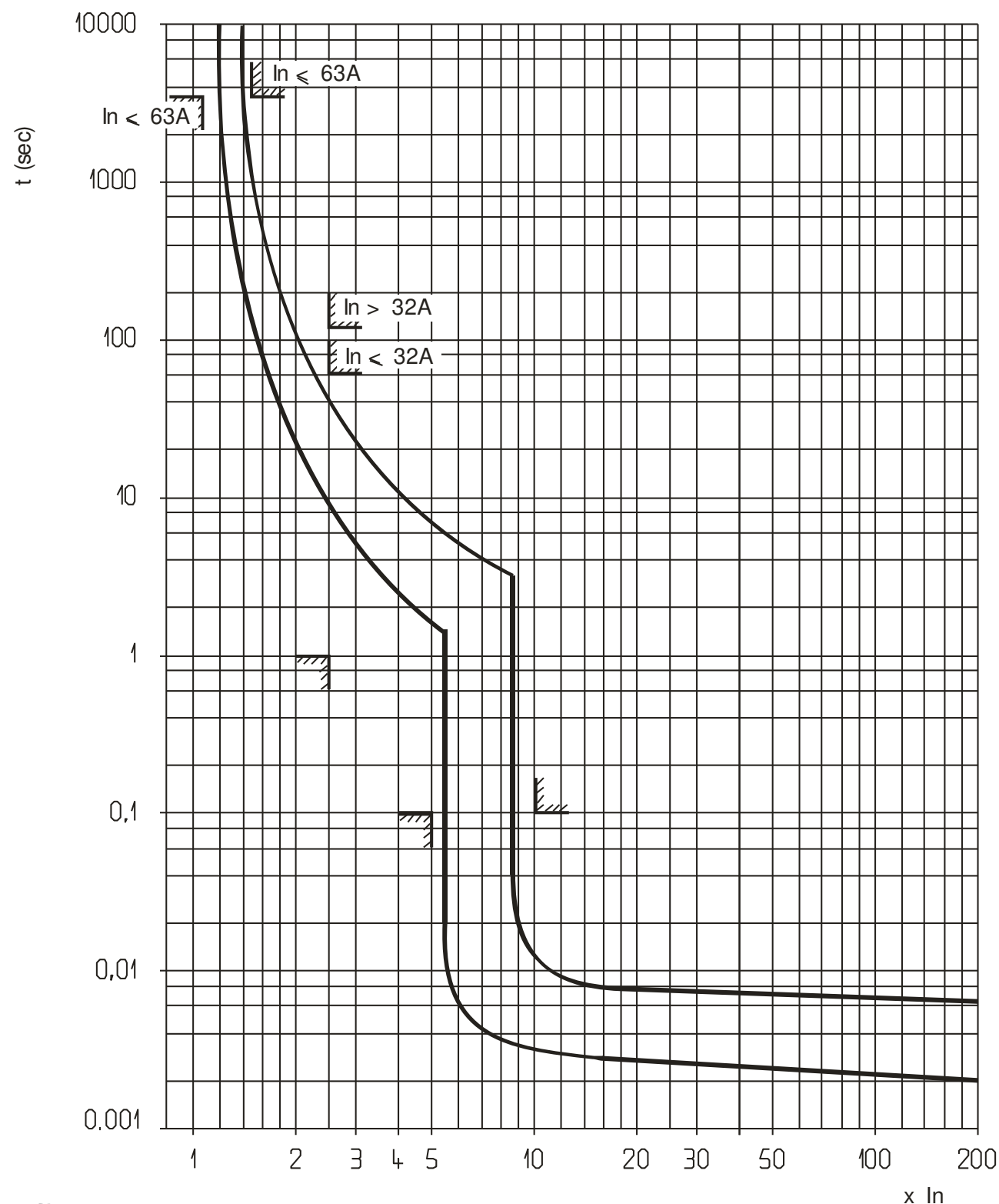
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7. CURVES

Thermal-magnetic tripping range typical of C curve RCBOs:



Standard limits

Thermal tripping at ambient temperature = 30°C

I_n = RCBO rated current

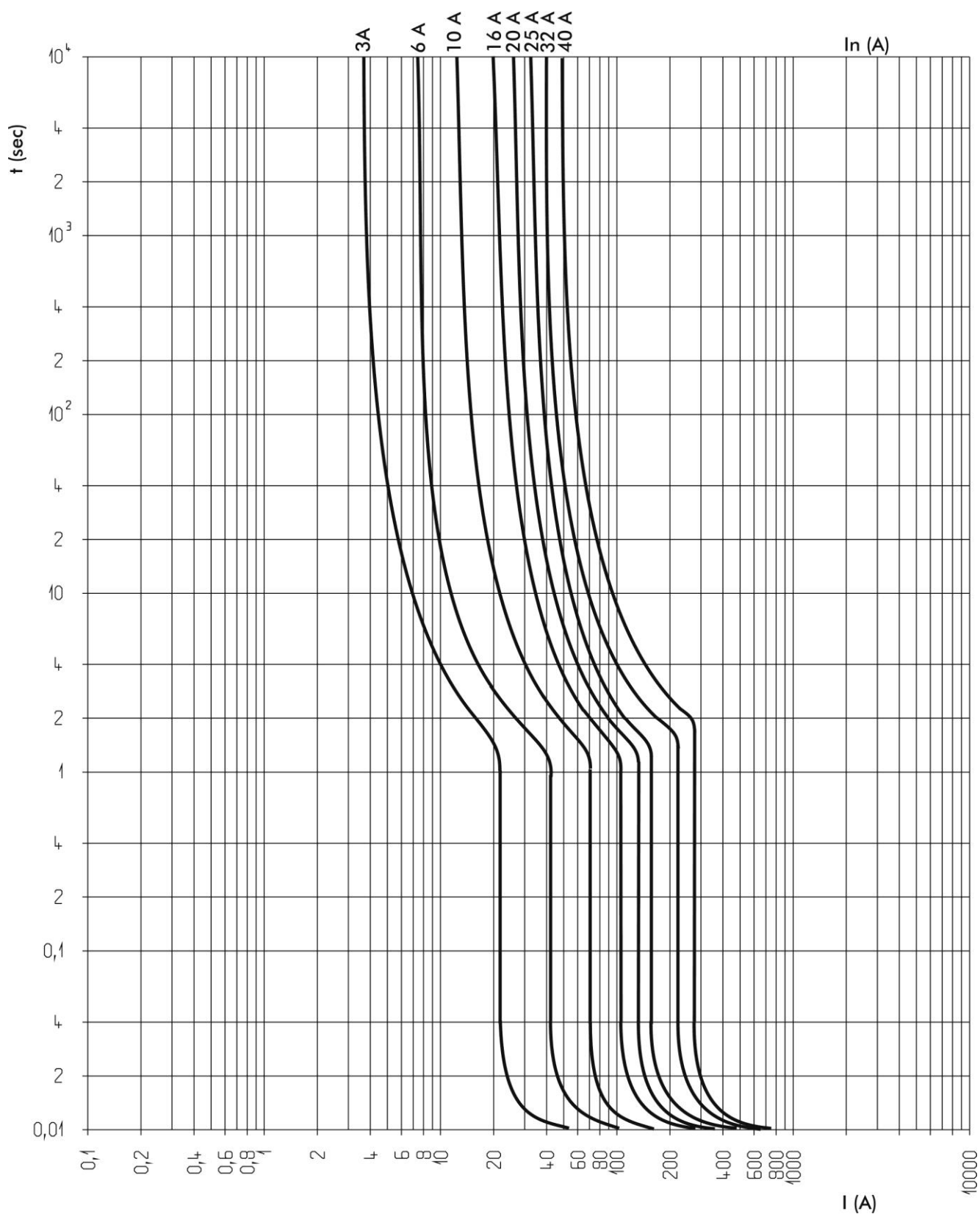
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7. CURVES *(continued)*

Average thermal-magnetic tripping curves range typical of C curve RCBOs:



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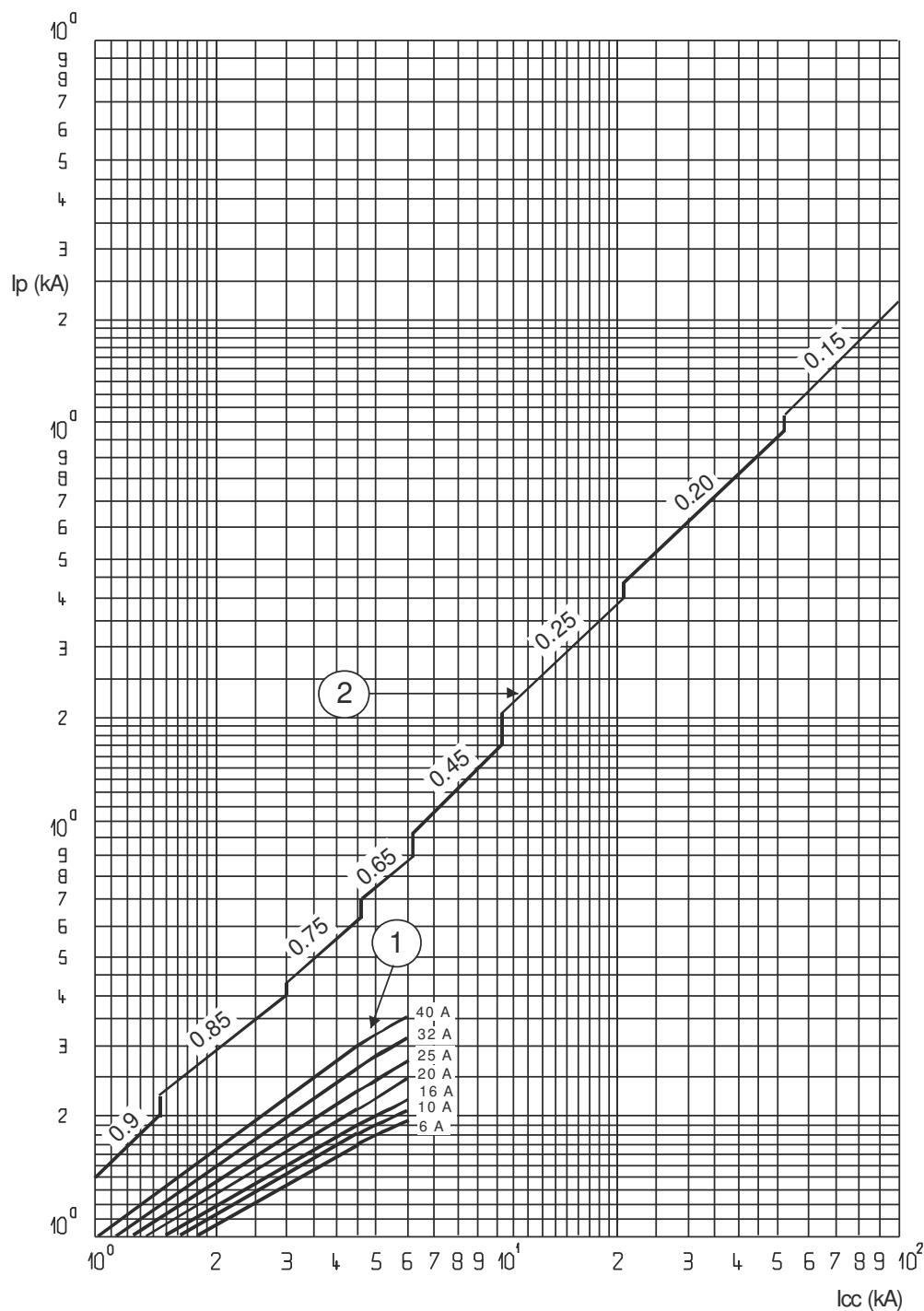
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7. CURVES *(continued)*

Current limiting curves:

. C curve RCBOs from 3 A to 40 A



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)

NB: For 3A rating, the limited values are less than 1kA

DX³ RCBO 6000A

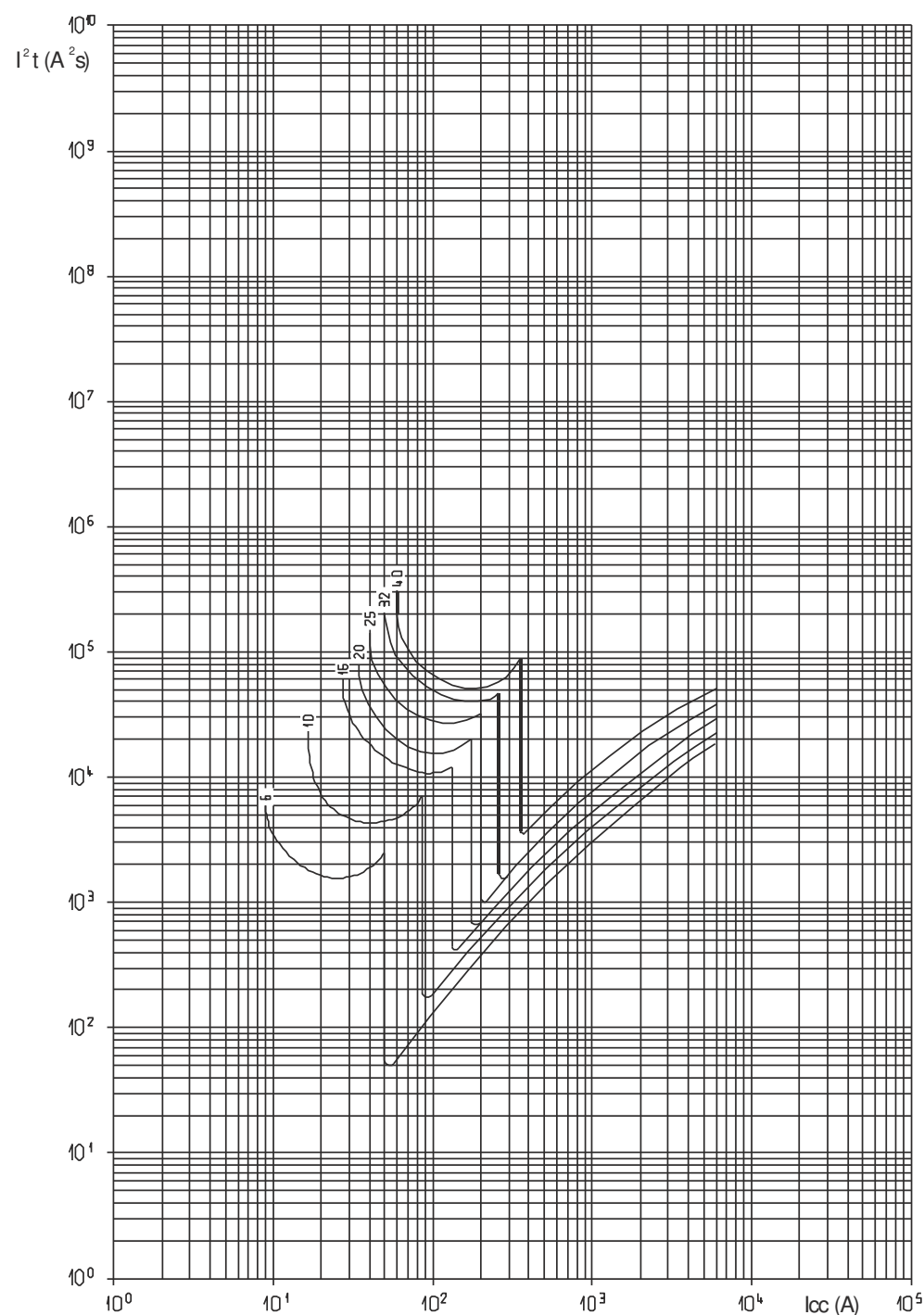
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7. CURVES *(continued)*

Thermal stress limiting curves:

. C curve RCBOs (230V/50Hz)



I_{cc} = Prospective short-circuit symmetrical current (rms value in A)

I^2t = Limited thermal stress (in $A s^2$)

NB:

-The 3A rating limits to values less than 3,000 $A s^2$

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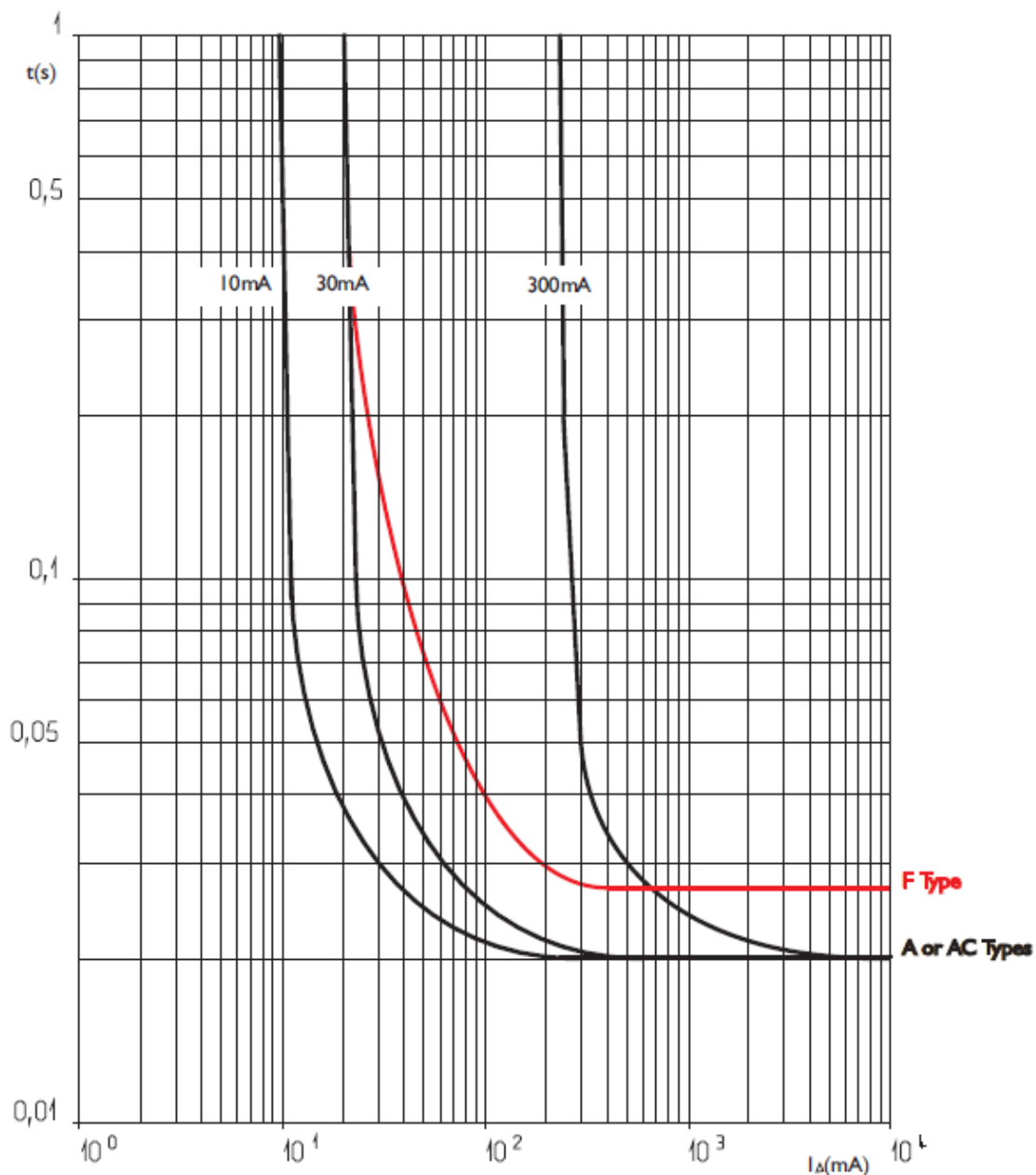
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7. CURVES *(continued)*

Tripping current curves:

. Tripping time curve depending on the value of the fault current:



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8. AUXILIARIES AND ACCESSORIES

Wiring accessories:

- . Supply busbar: Pin and Fork busbar (See LEGRAND catalogue)
- . Connection terminals (Cat. No. 4 049 05)
- . Sealable screw cover (Cat. No. 4 063 04)
- . HX³ 125 A plug-in system (Cat. No. 4 052 22)

Signalling auxiliaries:

- . Auxiliary contact (0.5 module, Cat. No. 4 062 50 / 58)
- . Fault signalling contact (0.5 module, Cat. No. 4 062 52 / 60)
- . Auxiliary contact that can be changed into fault signalling contact (0.5 module, Cat. No. 4 062 56 / 62)
- . Auxiliary contact + fault signalling contact that can be changed into 2 auxiliary contacts (1 module, Cat. No. 4 062 64 / 66)

Control auxiliaries:

- . Shunt trip (1 module, Cat. No. 4 062 76 / 78)
- . Autonomous shunt trip release (1 module, Cat. No. 4 062 80 / 82)
- . Stand-alone release for N/C push-button (1.5 module, Cat. No. 4 062 87)
- . Pop auxiliary (Cat. No. 4 062 86)

Motor-driven control modules:

- . Motor-driven control module (1 module, Cat. No. 4 062 90 / 91)
- . Motor-driven control module with integrated automatic reset. (2 modules, Cat. Nos. 4 062 93, 4 062 95)

STOP&GO automatic resetting modules:

- . STOP&GO automatic resetting module (2 modules, Cat. No. 4 062 88)
- . STOP&GO automatic resetting module with auto-test (2 modules, Cat. Nos. 4 062 89)

Possible combinations of auxiliaries and RCBOs:

- . The auxiliaries are installed to the left of the RCBOs
- . Maximum number of auxiliaries = 3
- . Maximum number of 1 module signalling auxiliaries = 2
- . Maximum number of control auxiliaries (Cat. Nos. 4 062 76 to 4 062 87) = 1
- . The control auxiliary (Cat. Nos. 4 062 76 to 4 062 87) must mandatorily be placed to the left of the signalling auxiliaries (Cat. Nos. 4 062 50 to 4 062 66) where the auxiliaries from these 2 families are connected to the same RCBO

Sealing:

- . Possible in the open or closed positions

Locking options:

- . Via padlock 5 mm in diameter (Cat. No. 4 063 13) or padlock 6 mm in diameter (Cat. No. 0 227 97) and padlock support (Cat. No. 4 063 03)

Installation software:

- . XL PRO³

9. SAFETY:

For your safety your electrical installation is equipped with residual current protection which must be tested periodically.

In the absence of any national regulations on the time period required for this, Legrand recommends that this test be carried out every month: press the "T" test button, the device should trip. Please call an electrician immediately if this does not happen as the safety level of your installation has been reduced.

The presence of residual current protection does not remove the need to observe all the precautions associated with using electrical energy.