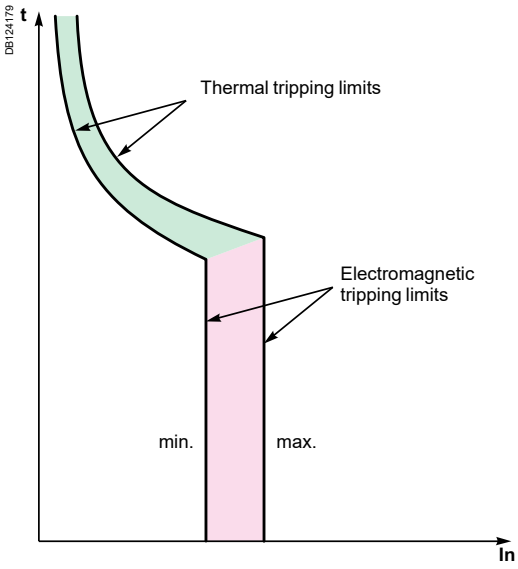
Tripping curves



The following curves show the total fault current breaking time, depending on its amperage. For example: based on the curve on page 3, an iC60 circuit breaker of curve C, 20 A rating, will interrupt a current of 100 A (5 times the rated current In) in:

- 0.45 seconds at least
- 6 seconds at most.

The circuit breakers' tripping curves consist of two parts:

- tripping of overload protection (thermal tripping device): the higher the current, the shorter the tripping time
- tripping of short-circuit protection (magnetic tripping device): if the current exceeds the threshold of this protection device, the breaking time is less than 10 milliseconds. For short-circuit currents exceeding 20 times the rated current, the time-current curves do not give a sufficiently precise representation. The breaking of high short-circuit currents is characterized by the current limiting curves, in peak current and in energy. The total breaking time can be estimated at 5 times the value of the ratio $(I^2t)/(\hat{I})^2$.

Verification of the selectivity between two circuit breakers

By superimposing the curve of a circuit breaker on that of the circuit breaker installed upstream, one can check whether this combination will be discriminating in cases of overload (selectivity for all current values, up to the magnetic threshold of the upstream circuit breaker). This verification is useful when one of the two circuit breakers has adjustable thresholds; for fixed-threshold devices, this information is provided directly by the selectivity tables.
To check selectivity on short circuit, the energy characteristics of the two devices must be compared.

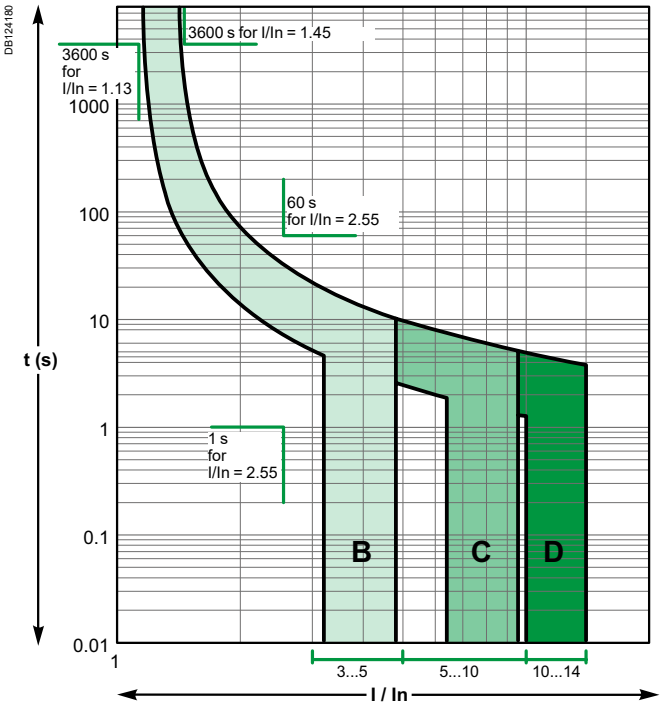
Tripping curves
According to IEC/EN 60898-1 standards

Alternative current 50/60 Hz

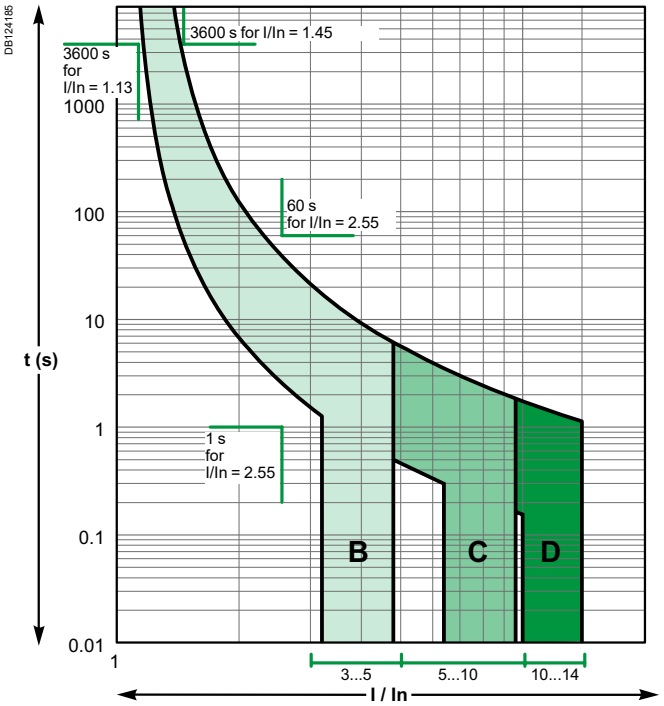
iC60a/N/H/L

According to IEC/EN 60898-1 (reference temperature 30°C)

Curves B, C, D rating up to 4 A



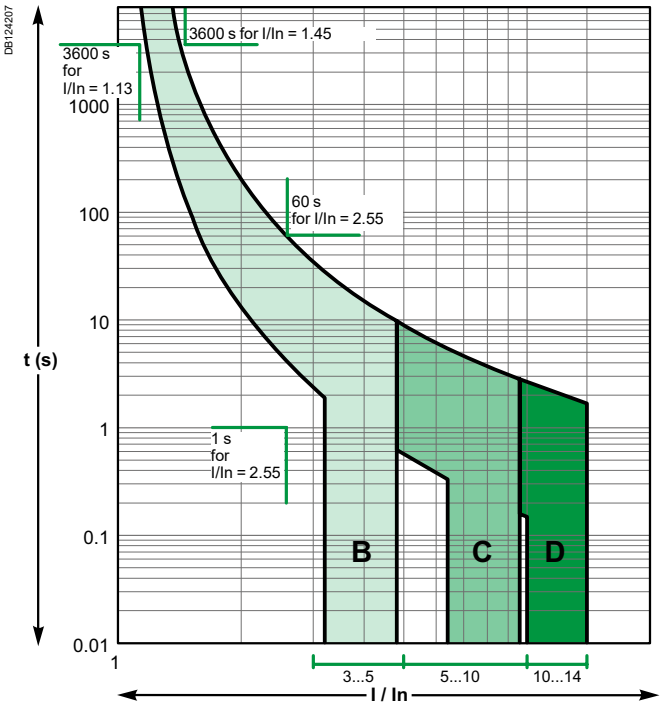
Curves B, C, D rating 6 A to 63 A



C120N/H

According to IEC/EN 60898-1 (reference temperature 30°C)

Curves B, C, D



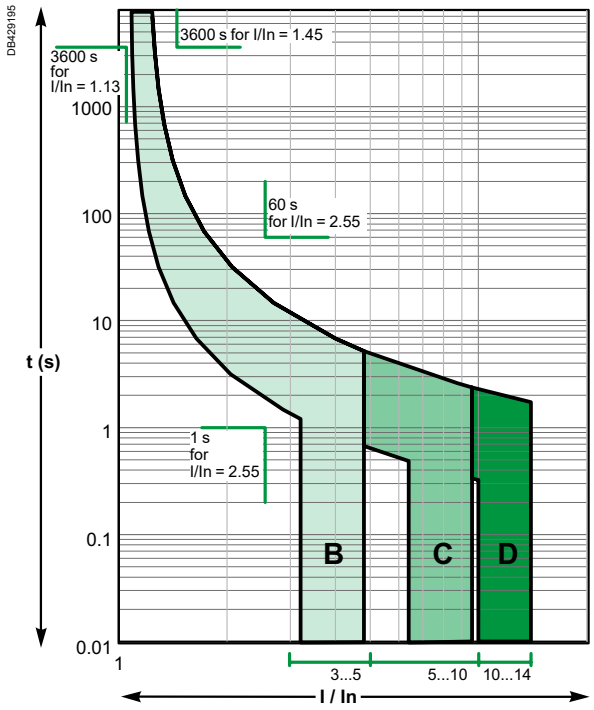
Tripping curves
According to IEC/EN 60898-1 standards

Alternative current 50/60 Hz

Acti9 iC40, iC40 ARC

According to IEC/EN 60898-1 (reference temperature 30°C)

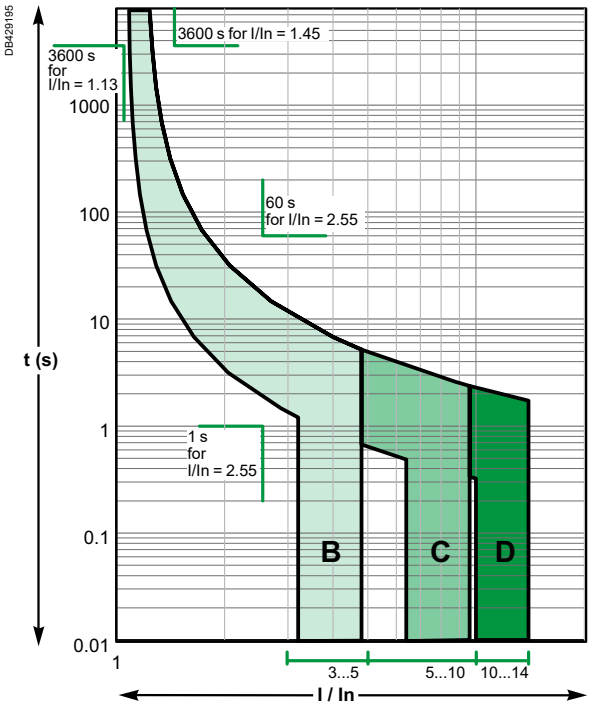
Curves B, C, D



iDPN, iDPN ARC

According to IEC/EN 60898-1 (reference temperature 30°C)

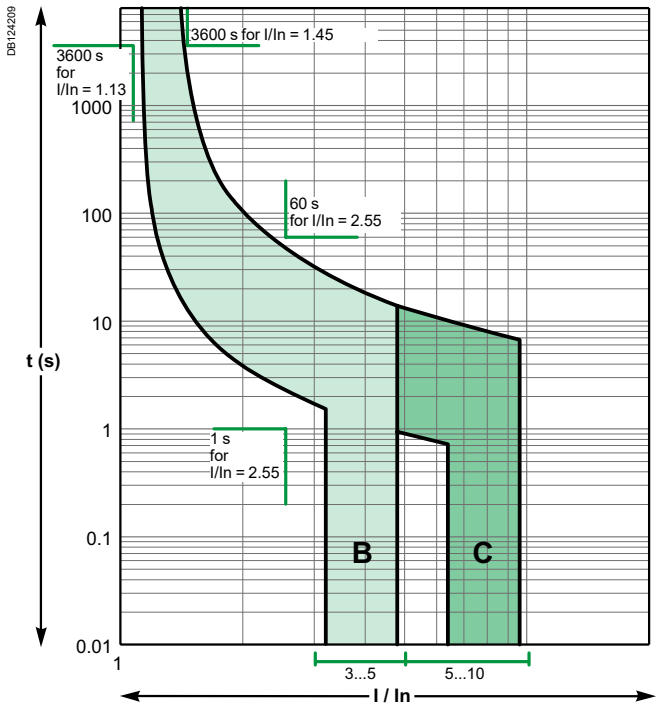
Curves B, C, D



iK60

According to IEC/EN 60898-1 (reference temperature 30°C)

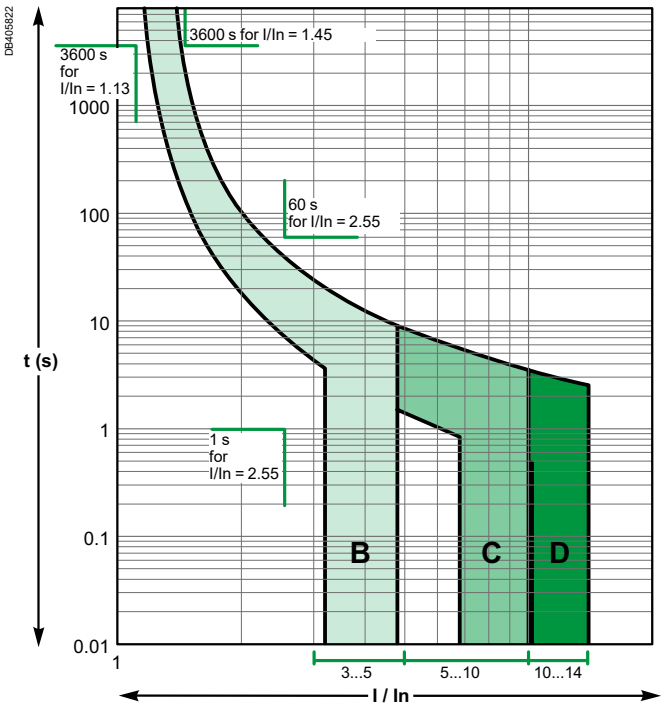
Curves B, C



C60

According to IEC/EN 60898-1 (reference temperature 30°C)

Curves B, C, D



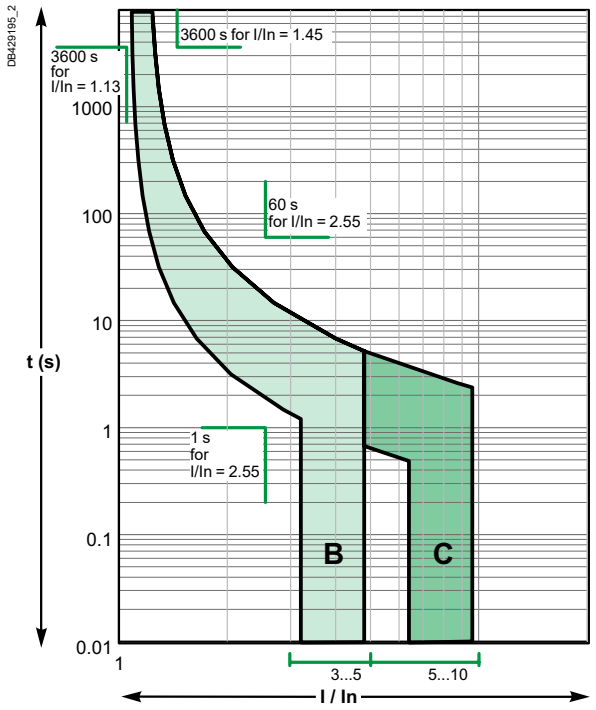
Tripping curves
According to IEC/EN 61009-1 standards

Alternative current 50/60 Hz

Acti9 iCV40, iCV40N, iCV40H

According to IEC/EN 61009-1 (reference temperature 30°C)

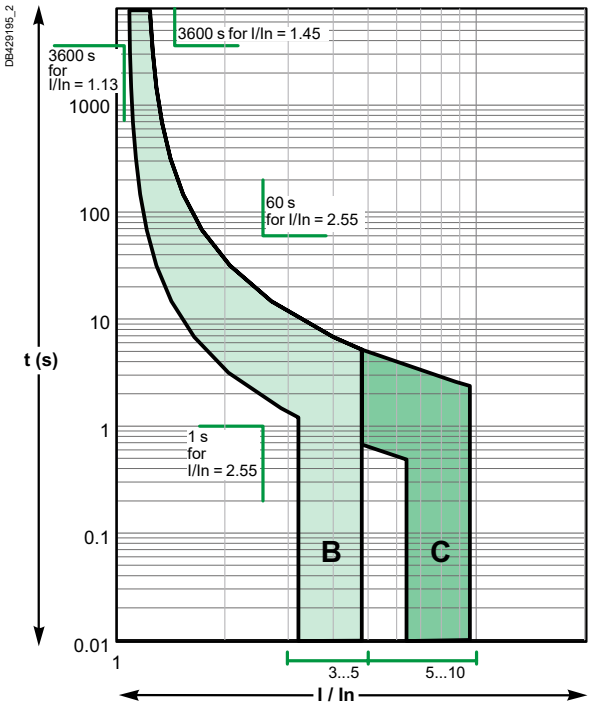
Curves B, C



Acti9 iCV40 ARC, iCV40N ARC, iCV40H ARC

According to IEC/EN 61009-1 (reference temperature 30°C)

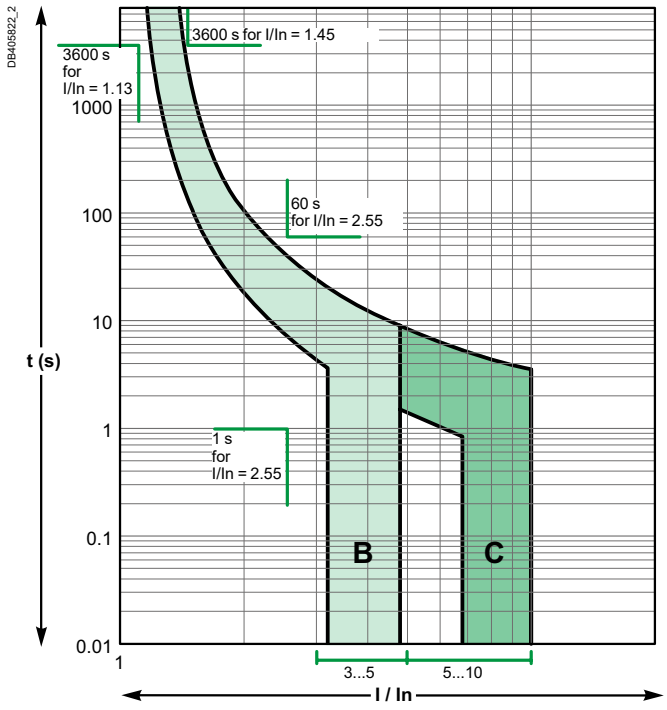
Curves B, C



iC60 RCBO

According to IEC/EN 61009-1 (reference temperature 30°C)

Curves B, C



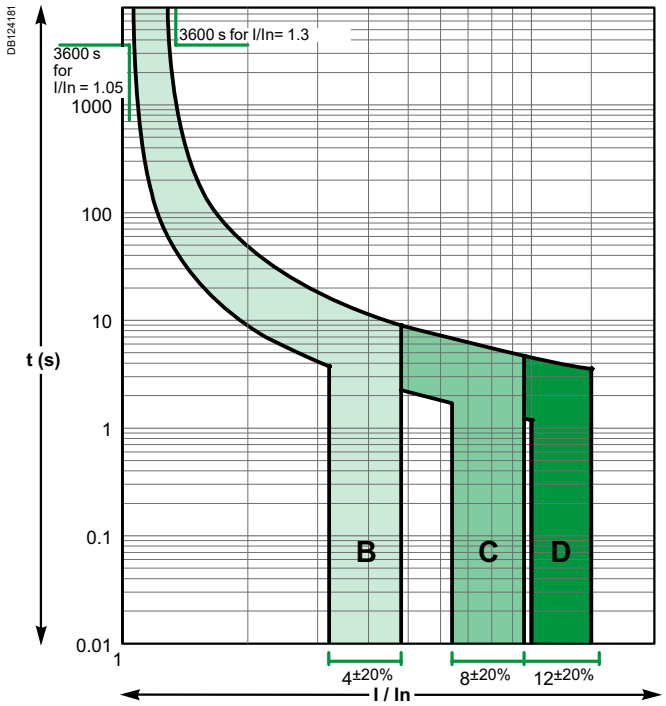
Tripping curves
According to IEC/EN 60947-2 standards

Alternative current 50/60 Hz

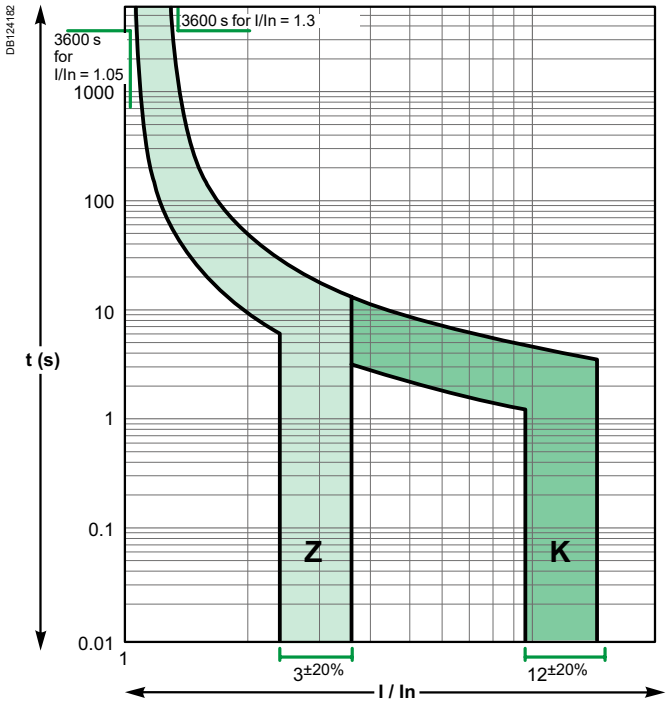
iC60N/H/L MCB

According to IEC/EN 60947-2 for MCB and IEC/EN 61009-1 for RCBO (reference temperature 50°C)

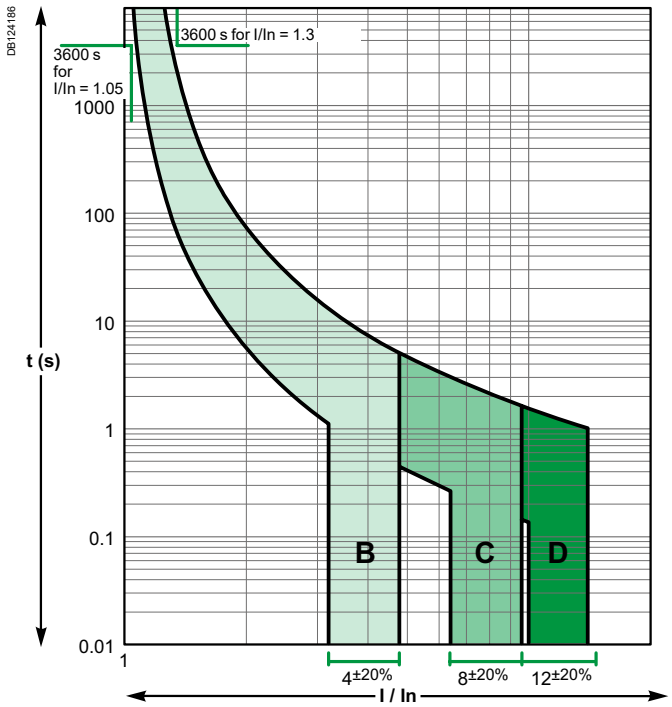
Curves B, C, D rating up to 4 A



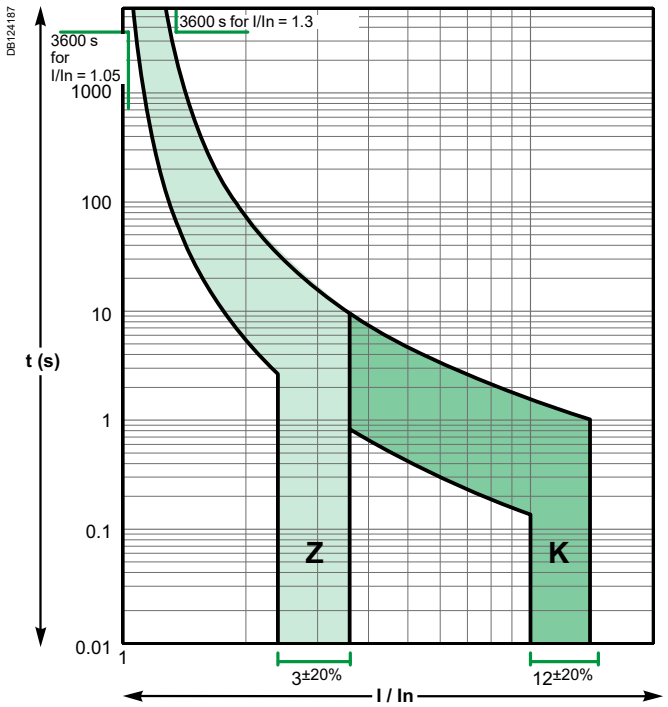
Curves Z, K rating up to 4 A



Curves B, C, D rating 6 A to 63 A



Curves Z, K rating 6 A to 63 A



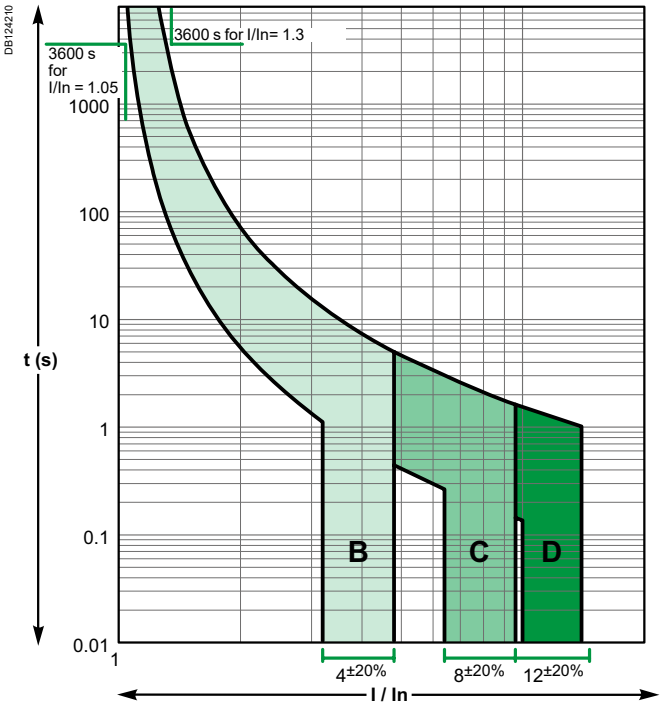
Tripping curves
According to IEC/EN 60947-2 standards

Alternative current 50/60 Hz

Reflex iC60N/H

According to IEC/EN 60947-2 (reference temperature 50°C)

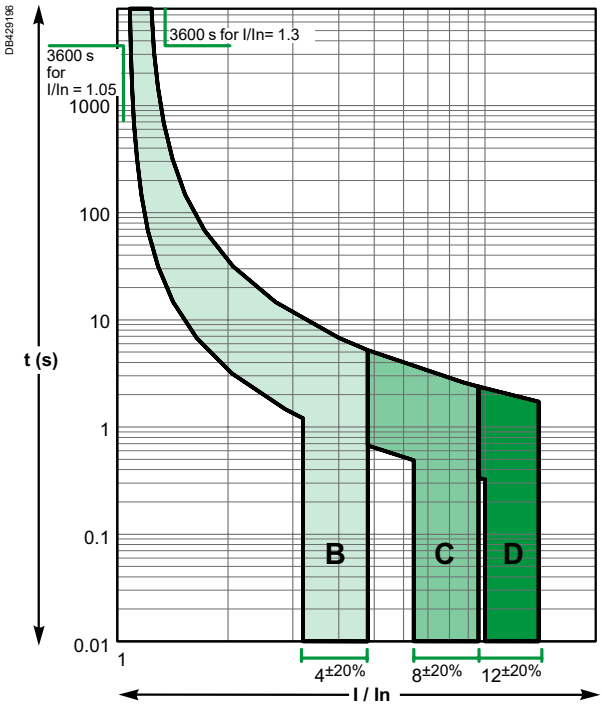
Curves B, C, D



Acti9 iC40

According to IEC/EN 60947-2 (reference temperature 50°C)

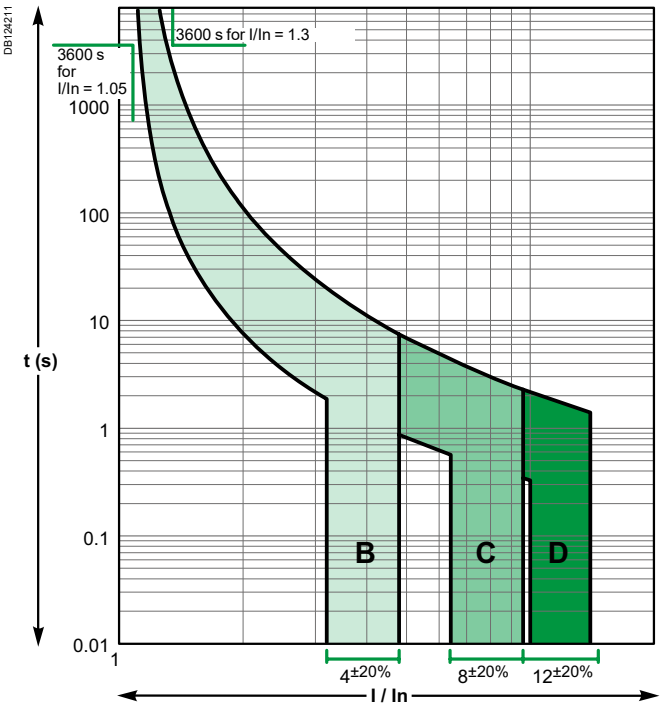
Curves B, C, D



NG125a/N/H/L

According to IEC/EN 60947-2 (reference temperature 40°C)

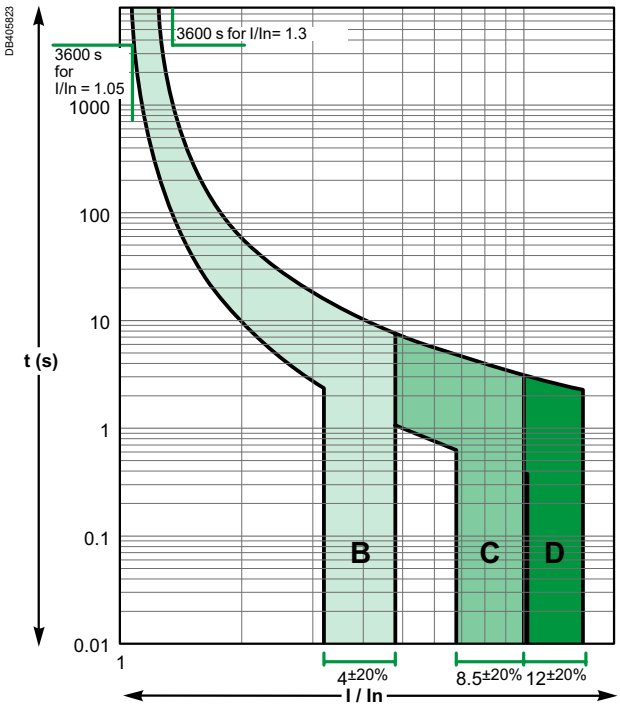
Curves B, C, D



C60

According to IEC/EN 60947-2 (reference temperature 50°C)

Curves B, C, D



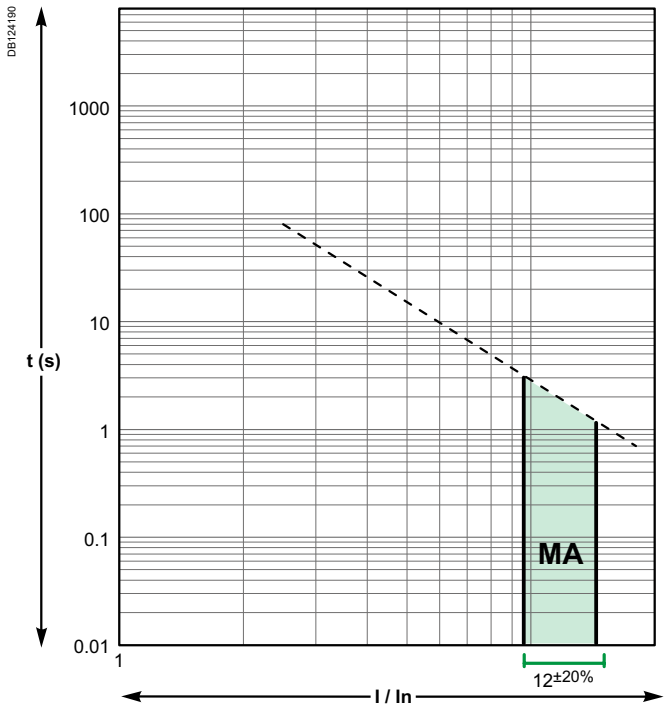
Tripping curves
According to IEC/EN 60947-2 standards

Motor curve

iC60L-MA

According to IEC/EN 60947-2

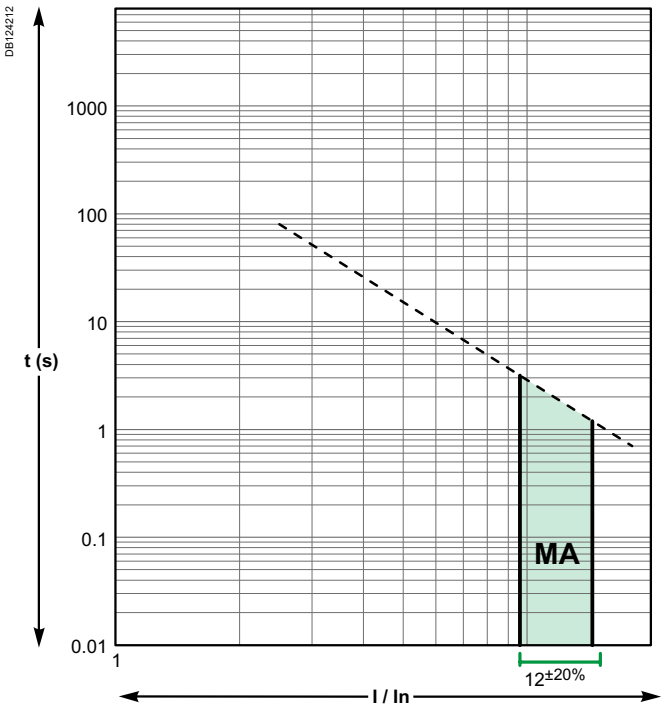
Curve MA



NG125L-MA

According to IEC/EN 60947-2

Curve MA



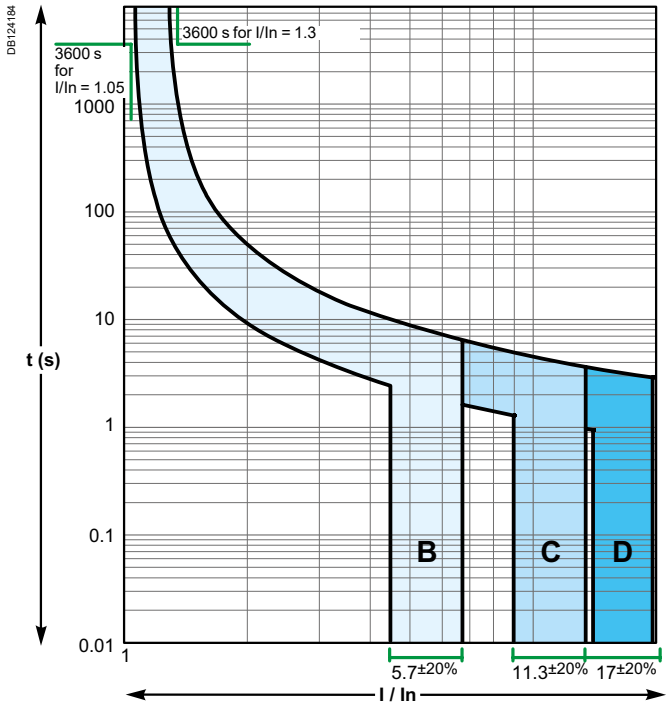
Tripping curves
According to IEC/EN 60947-2 standards

Direct current

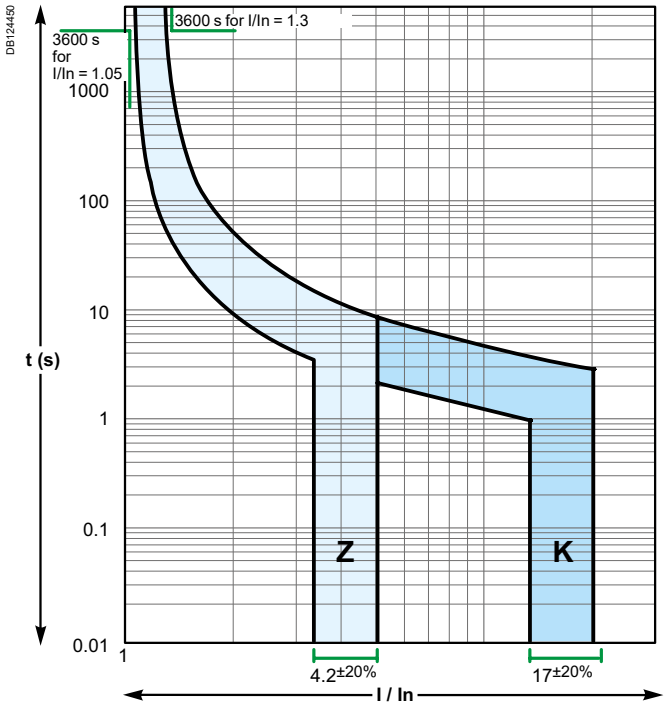
iC60N/H/L

According to IEC/EN 60947-2 (reference temperature 50°C)

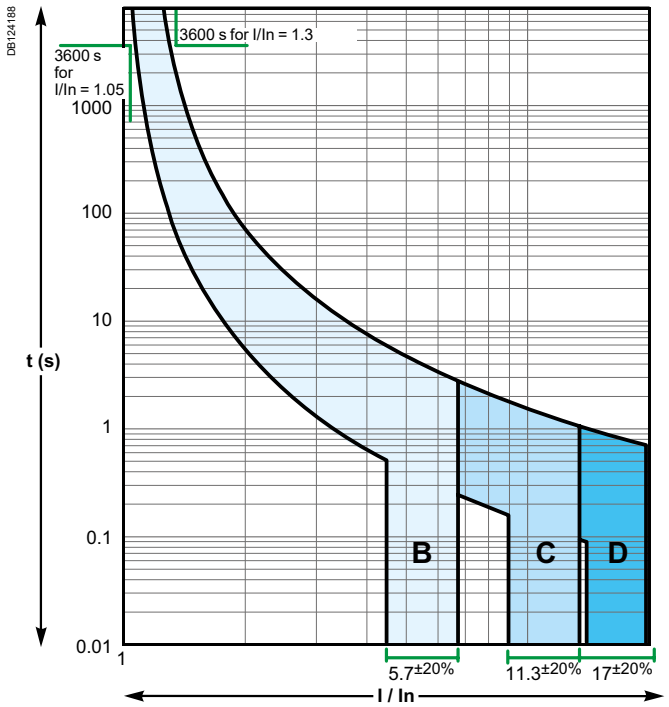
Curves B, C, D rating up to 4 A



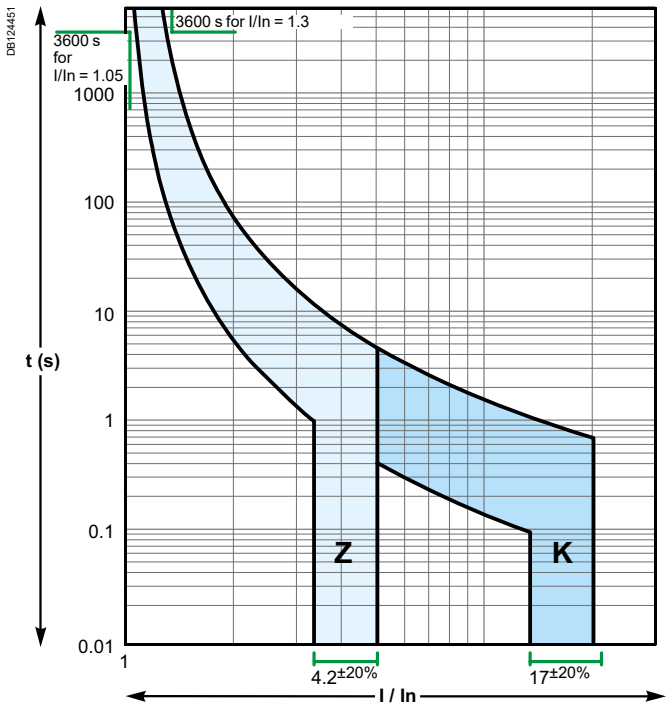
Curves Z, K rating up to 4 A



Curves B, C, D rating 6 A to 63 A



Curves Z, K rating 6 A to 63 A



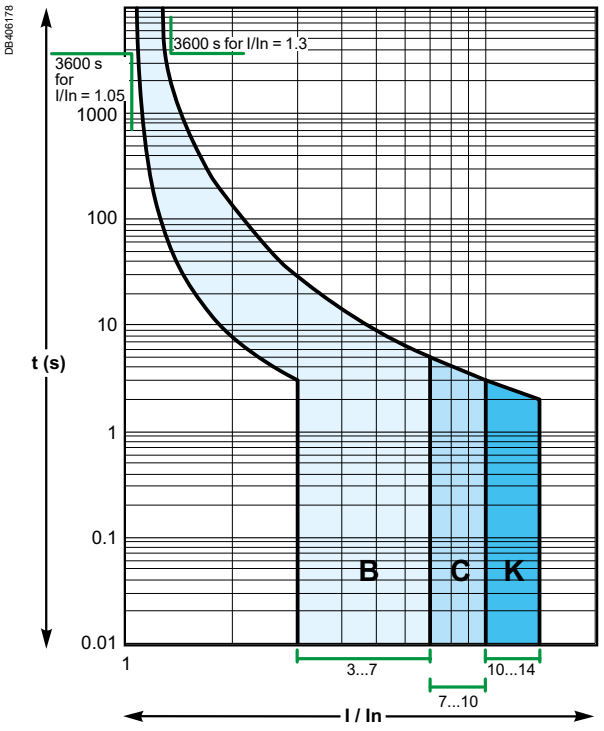
Tripping curves
According to IEC/EN 60947-2 standards

Direct current

C60H-DC

According to IEC/EN 60947-2 (reference temperature 25°C)

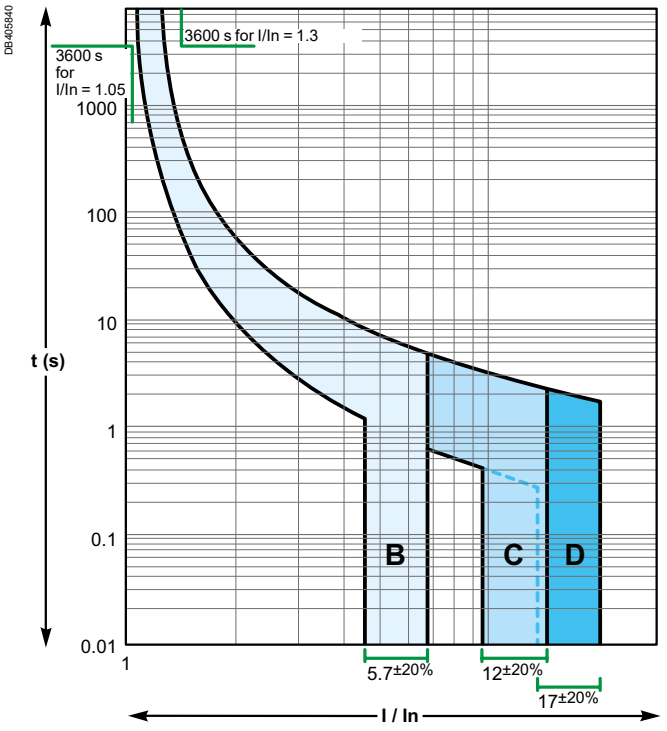
Curves B, C, K



C60

According to IEC/EN 60947-2 (reference temperature 50°C)

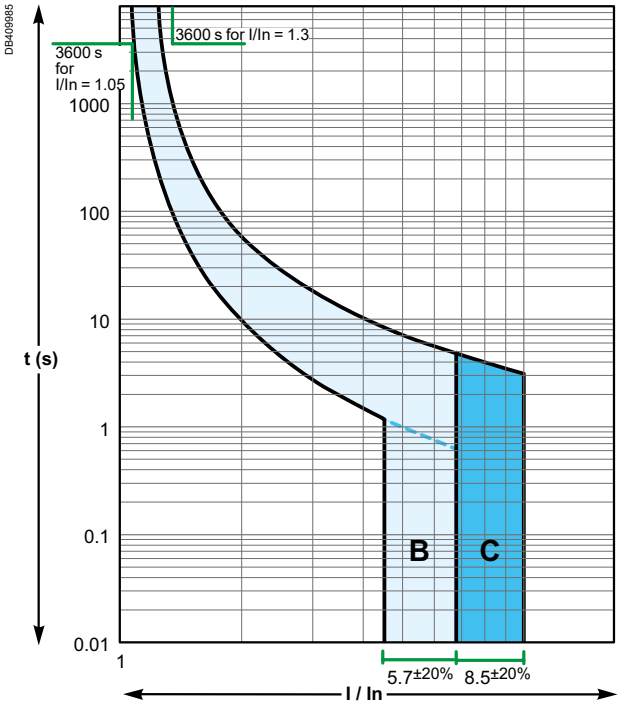
Curves B, C, D



C60PV-DC

According to IEC/EN 60947-2 (reference temperature 25°C)

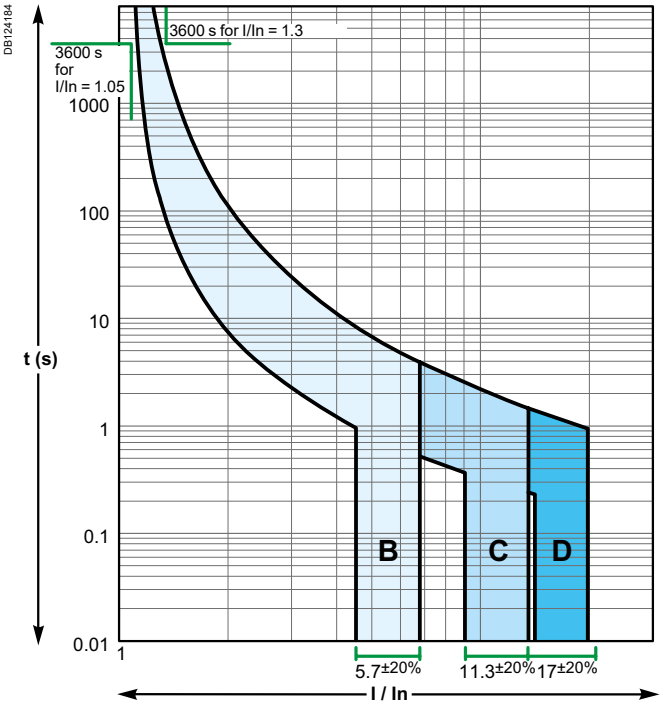
Curves B, C



NG125a/N/H/L

According to IEC/EN 60947-2 (reference temperature 40°C)

Curves B, C, D

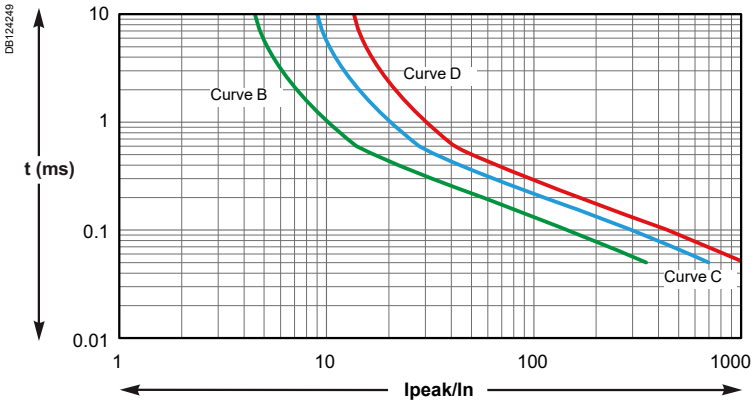


Tripping curves
Coordination with loads

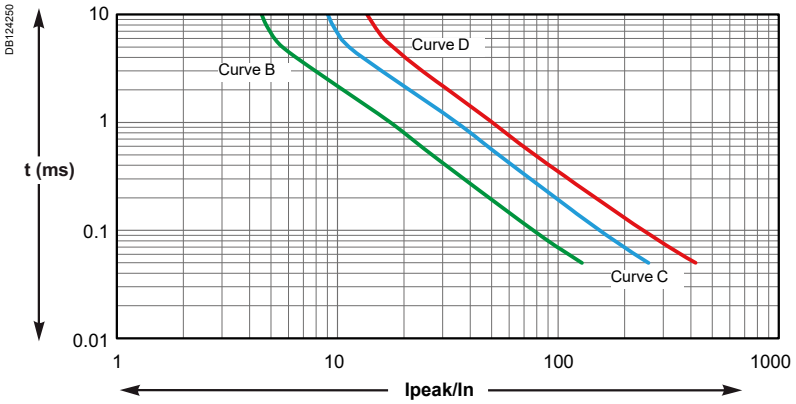
The circuit-breaker characteristics chosen depend on the type of load downstream of the installation.
The rating depends on the size of the cables to be protected and the curves depend on the load inrush current.

Product selection according to the load inrush current
When certain "capacitive" loads are switched on, very high inrush currents appear during the first milliseconds of operation. The following graphs show the average non-tripping curves of our products for this time range (50 µs to 10 ms).

iC60 / iC40



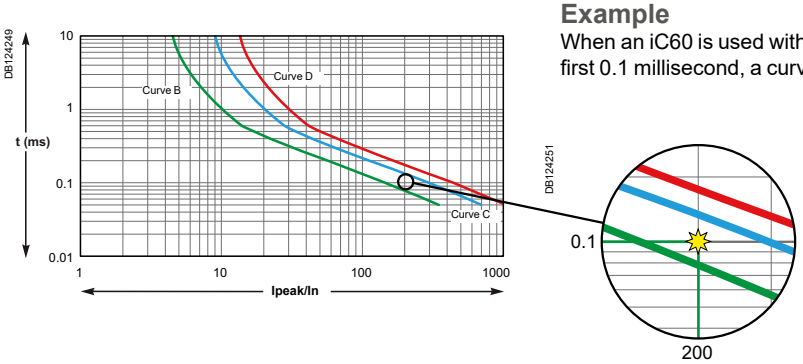
NG125 / C120



This information allows us to select the most appropriate product, according to the load specifications: curve and rating.

Example

When an iC60 is used with a load with current peaks in the order of 200 In during the first 0.1 millisecond, a curve C or D product must be installed.



Tripping curves

4.3	09/02/2021	Add curves for IEC 61009-1 standard	I. Flaubert
4.2	27/11/2018	Add iC40 on tripping curve of coordination with loads	I. Flaubert
4.1	19/06/2018	Add iC40 curves	Sonovision
4.0	04/04/2017	New charte	Sonovision
3.1	28/03/2017	Changed C60PV-DC curve page 9	Sonovision
3.0	4/12/2014	Add C60PV-DC curve page 9	Sedoc
2.9	5/10/2014	Add DPN H page 3	JPM
2.8	3/09/2013	Add RCBO in iC60 AC table page 5	Sedoc
2.7	25/04/2013	Change IIn/ C60, (curve C60H-DC, C60)	JPM
2.6	11/03/2013	Changed C60H-DC curves page 9	Sedoc
2.5	24/01/2013	Add page 10 "Coordination with loads"	Sedoc
2.4	13/07/2012	Add C60 curves	Sedoc
2.3	4/07/2012	Deleted C60 curves	Sedoc
2.2	06/06/2012	Change texts and add C60 curves	Sedoc
2.1	24/08/2011	Change Z, K curves pages 8	Sedoc
2.0	23/05/2011	InDesign CS5	Sedoc
1.2	16/04/2011	Add new curves C120, DPN, iK60, NG125, C60H-DC	Sedoc
1.1	25/03/2011	New curves	Sedoc
1.0	14/10/2009	Creation	Sedoc
Indice	**Date**	**Modification**	**Name**