Protection devices must take into consideration the maximum and the minimum short-circuit currents that are reported below

MAXIMUM SHORT-CIRCUIT CURRENT

Voltage Calculation for Alternative Current:

$$S \geq = \frac{Icc \sqrt{T}}{C}$$

The maximum short circuit current accepted by a conductor:
S is calculated with the following formula:

$$Icc\ (max) = \frac{S \cdot C}{\sqrt{T}}$$

Key:
T = short circuit duration (seconds)
S = cross-section of copper conductor (mm2)
Icc = short circuit current (A)
C = 115 for PVC copper cables (160 °C)
143 for G7 rubber copper cables (250 °C)

NOTE:
The formula above is valid for intermediate breaks (a maximum of 5 sec.).
For calculating effective short-circuit current allowed by shielding, see the CEI 64-8 standard, appendix D

Celsius coefficient values for copper conductors dependent on the difference in temperature between start and end of short-circuit acc. to the table 2.02.02 of the CEI 11-17 standard.

Starting temperature Θo °C	Ending temperature Θo °C					
	140	**160**	**180**	**200**	**220**	**250**
90	86	100	112	122	131	143
85	90	104	115	125	134	146
80	94	108	119	129	137	149
75	99	111	122	132	140	151
70	13	115	125	135	143	154
65	107	119	129	138	146	157
60	111	122	132	141	149	160
50	118	129	139	147	155	165
40	126	136	145	153	161	170
30	133	143	152	159	166	176

MINIMUM SHORT-CIRCUIT CURRENT

Minimum short-circuit current happens during a short-circuit between phase and neutral (or between phase and phase, for a non distributed neutral), at the farthest point of the conduit.
In a system powered by multiple origins, the only source to be taken into consideration is the one corresponding to the minimum value.
The minimum short-circuit current can be calculated using the formulas a) and b), considering: 50% resistance increase at 20 °C (due to the heating of conductors) and 80% rated voltage reduction, due to the effect of the short-circuit on the current carrying capacities.
If the impedance of the incoming circuit is well-known, the coefficient 0,8 must be replaced by a specific value.

$$\text{a) } Icc = \frac{0{,}8\,U}{1{,}5\,\rho\,\frac{2\,L}{S}} \qquad \text{b) } Icc = \frac{0{,}8\,U_o}{1{,}5\,\rho\,(1+m)\,\frac{L}{S}}$$

Key:

a) for a neutral not distributed conductor, where:

U = line voltage supplied, linked rated voltage volts
ρ = resistivity of the conductor compounds at 20 °C, ohm • mm2 (0,018 for copper - 0,027 for aluminum)
L = length of protected conductor in meters
S = conductor cross-section in mm^2
Icc = short-circuit current

b) for a neutral distributed conductor, where:

Uo = phase rating voltage, volts
m = ratio of the neutral conductor resistance and the phase conductor resistance
(if composed of the same material, the ratio is the result between the phase conductor cross-section and the neutral conductor cross-section)