ADDENDUM – 2022 2nd edition
Electrical installation solutions for buildings – Technical details

Complementary volume to the catalogue
“Electrical installation solutions
for buildings”

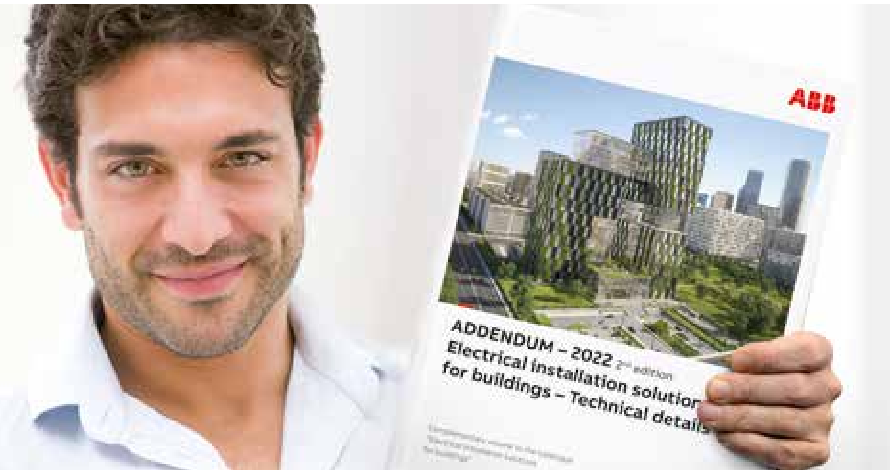
- Detailed product specification and characteristics
- Operating curves, connection diagrams, application examples etc.

Electrical installation solutions for buildings
Technical details

Two volumes, one objective: to always find the best solution

From a single catalogue with two complementary volumes: streamline to simplify, analyse to choose.

The catalog Electrical installation solutions for buildings comes in two separate but integrated volumes: one dedicated to the description and easy selection of products code and one for professionals searching for in-depth details and specifications, installation examples and special technical solutions.



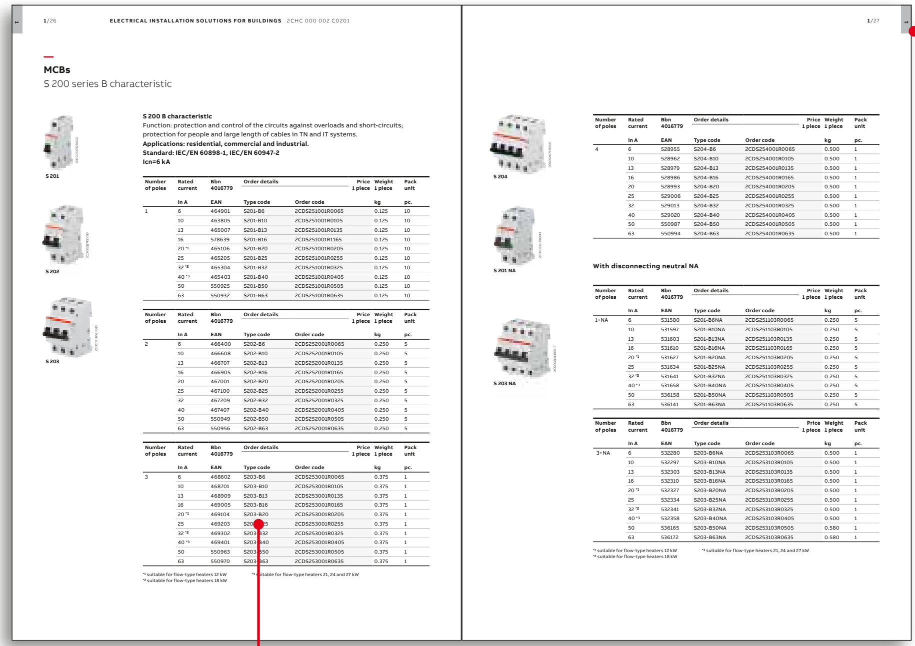
Electrical installation solutions for buildings
An indispensable tool for those who are looking for easy selection of a completely reliable range of products

The main catalogue summarizes all the technical-commercial characteristics of the products, allows one to navigate between the main characteristics, descriptions, specifications, accessories, product pictures, illustrations and information about the individual codes.
The catalogue is a helpful product guide, which makes easier the orientation in a very complex product range of ABB products for electrical installation in buildings.

Electrical installation solutions for buildings - Technical details
Technical details and information, application examples, installation solutions: the complete ABB know how at the service of professionals

The technical addendum dedicated to technical-applicative details provides professionals with a series of specialized information such as the operating curve, selectivity tables, connection diagrams, etc. The numbers of chapters in the technical addendum match with the same chapters in the main catalog.

Two volumes that reference each other, which are manageable and easily consultable, designed for those who wish to find the clearest solution in the least possible time.



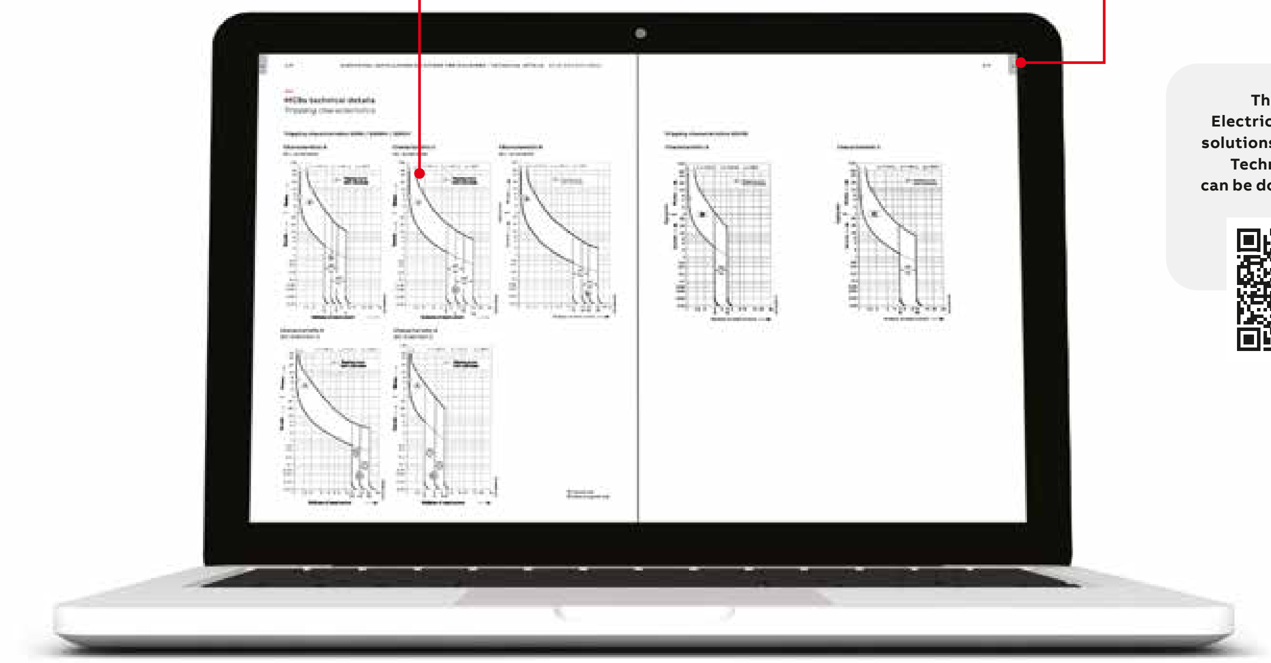
The volume
Electrical installation solutions for buildings
can be downloaded here

TIP:
You can always find a detailed online information about the particular product item:

Just type down this URL address: **http://new.abb.com/products/** and add the product order code at the end like e.g. http://new.abb.com/products/**2CDS274337R0158**)

Arguments developed in the same logical sequence

Same reference heading



The volume
Electrical installation solutions for buildings - Technical details
can be downloaded here

Notes

Electrical installation solutions for buildings – Technical details

MCBs

Index

MCBs technical details

Definitions according to standards for miniature circuit breakers

Rated insulation voltage (Ui) according IEC/EN 60664-1:
Root mean square (R.M.S.) withstand voltage value assigned by the manufacturer to the equipment or to a part of it, characterizing the specified (long-term) withstand capability of its insulation.

NOTE:
The rated insulation voltage is not necessarily equal to the rated voltage of the equipment which is primarily related to functional performance.

IEC/EN 60898-1
Miniature Circuit Breakers according IEC/EN 60898-1 are intended for the protection against overcurrents of wiring installations of buildings and similar applications; they are designed for use by uninstructed people and for not being maintained. This part of IEC/EN 60898 applies for a.c. air-break circuit-breakers for operation at 50 Hz or 60 Hz, having a rated voltage not exceeding 440 V (between phases), a rated current not exceeding 125 A and a rated short-circuit capacity not exceeding 25.000 A.
As far as possible, it is in line with the requirements contained in IEC/EN 60947-2.

Rated short-circuit capacity (Icn)
The rated short-circuit capacity of a circuit-breaker is the value of the ultimate short-circuit breaking capacity assigned to that circuit-breaker by the manufacturer.
The sequence of operations shall be: O – t – CO.*

Service short-circuit capacity (Ics)
A circuit-breaker having a given rated short-circuit capacity has a corresponding fixed service short-circuit capacity (Ics). This is therefore generally not indicated.

Rated operational voltage (Un)
The rated voltage of a circuit-breaker is the value of voltage, assigned by the manufacturer, to which its performance (particularly the short-circuit performance) is referred.
The same circuit-breaker may be assigned a number of rated voltages and associated rated short-circuit capacities.

2The voltage which appears across the terminals of a pole of a circuit-breaker after the breaking of the current.
The value of the power frequency recovery voltage shall be equal to 110 % of the rated voltage of the circuit-breaker under test.

IEC/EN 60947-2
This part of the IEC/EN 60947 applies to circuit-breakers, the main contacts of which are intended to be connected to circuits, the rated voltage of which does not exceed 1.000 V a.c. or 1.500 V d.c..
It applies whatever the rated currents, the method of construction or the proposed applications of the circuit-breakers may be.
The circuit-breakers are designed for use by instructed people.

Rated ultimate short-circuit breaking capacity Icu
The rated ultimate short-circuit breaking capacity of a circuit-breaker is the value of ultimate short-circuit breaking capacity assigned to that circuit-breaker by the manufacturer for the corresponding rated operational voltage. It is expressed as the value of the prospective breaking current, in kA (r.m.s. value of the a.c. component in the case of a.c.).

The sequence of operations shall be: O – t – CO.*

Rated service short-circuit breaking capacity Ics
The rated service short-circuit breaking capacity of a circuit-breaker is the value of service short-circuit breaking capacity assigned to that circuit-breaker by the manufacturer for the corresponding rated operational voltage. It is expressed as a value of prospective breaking current, in kA, corresponding to one of the specified percentages of the rated ultimate short-circuit breaking capacity and rounded up to the nearest whole number.
It may be expressed as a % of Icu (for example Ics = 25 % Icu).

The sequence of operations shall be: O – t – CO – t – CO.*

* The following symbols are used for defining the sequence of operatons:
O represents an opening operation.
CO represents a closing operation followed by an automatic opening.
t represents the time interval between two short-circuit operations.

MCBs technical details

Definitions according to standards for miniature circuit breakers

Rated operational voltage (Ue)
The rated operational voltage of an equipment is a value of voltage which, combined with a rated operational current, determines the application of the equipment and to which the relevant tests and the utilization categories are referred. For single-pole equipment it is generally stated as the voltage across the pole. For multi pole equipment it is generally stated as the voltage between phases.
An equipment my be assigned a number of combinations of rated operational voltage and associated making and breaking capacities for different duties and utilization categories.

Max. power frequency recovery voltage (Umax)
Voltage which appears across the terminals of a pole of a switching device after the breaking of the current.

For all breaking capacities and short-circuit breaking capacity tests, the value of the power-frequency recovery voltage shall be 105 % of the value of the rated operational voltage. This value shall be within the specified tolerance (voltage 0 / + 5%).

NOTE:
The value of 1.05 times the rated operational voltage for the power frequency recovery voltage, together with the test voltage tolerance resulting in a maximum voltage of 1.1 times the rated operational voltage, is deemed to cover the effects of variations of the system voltage under normal service conditions.

UL 489
The requirements of this standard cover molded-case circuit breakers, circuit breaker and ground-fault circuit-interrupters, fused circuit breakers, and accessory high-fault protectors. These circuit breakers are specifically intended to provide service entrance, feeder, and branch circuit protection in accordance with the National Installation Codes in Annex B, Ref. No.1.
This standard also covers instantaneous-trip circuit breakers (circuit interrupters) specifically intended for use as part of a combination motor controller in accordance with the National Installation Codes in Annex B, Ref. No. 1.

UL489B
These requirements cover molded-case circuit breakers, molded-case switches, and circuit-breaker enclosures rated up to 1000 V dc, intended for use with photovoltaic (PV) systems and Article 690 of the National Electrical Code, ANSI/NFPA-70. These requirements are intended to be used in conjunction with the requirements in the Standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, UL 489.

UL 1077
These requirements apply to supplementary protectors intended for use as overcurrent, or over- or under-voltage protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
Compliance with this standard is acceptable for use as a component of an end product.

MCBs technical details

Tripping characteristics

Tripping characteristics S 200 / S 200 M / S 200 P / S 200 S / S 200 MUC / SN 201 L / SN 201 / SN 201 M / S200C

			Thermal release ②			**Electromagnetic release ①**		
Acc. to	Tripping characteristic and rated current		Current:		Tripping time	Currents:		Tripping time
			conventional non-tripping current	conventional tripping current		hold current surges	trip at least at	
IEC/EN 60898-1	B	6 to 63 A	$1.13 \cdot I_n$		> 1 h	$3 \cdot I_n$		> 0.1 s
				$1.45 \cdot I_n$	< 1 h		$5 \cdot I_n$	< 0.1 s
	C	0.5 to 63 A	$1.13 \cdot I_n$		> 1 h	$5 \cdot I_n$		> 0.1 s
				$1.45 \cdot I_n$	< 1 h		$10 \cdot I_n$	< 0.1 s
	D	0.5 to 63 A	$1.13 \cdot I_n$		> 1 h	$10 \cdot I_n$		> 0.1 s
				$1.45 \cdot I_n$	< 1 h		$20 \cdot I_n$	< 0.1 s
IEC/EN 60947-2	K	0.2 to 63 A	$1.05 \cdot I_n$		> 1 h	$10 \cdot I_n$		> 0.2 s
				$1.2 \cdot I_n$	< 1 h ③		$14 \cdot I_n$	< 0.2 s
				$1.5 \cdot I_n$	< 2 min. ③			
				$6.0 \cdot I_n$	> 2 s (T1)			
	Z	0.5 to 63 A	$1.05 \cdot I_n$		> 1 h	$2 \cdot I_n$		> 0.2 s
				$1.2 \cdot I_n$	< 1 h ③		$3 \cdot I_n$	< 0.2 s

① The indicated electromagnetic tripping values apply to a frequency range of 16 2/3 ... 60 Hz. For different network frequencies or direct current the values change according to the multiplier in the table below
② The thermal releases are calibrated to a nominal reference ambient temperature; for Z and K, the value is 20 °C, for B and C = 30 °C. In the case of higher ambient temperatures, the current values fall by ca. 6 % for each 10 K temperature rise.
③ As from operating temperature (after I_1 > 1 h or, as applicable, 2 h).

Tripping characteristics S300P

Acc. to	Tripping characteristics	Rated current	Thermal release [2]			Electromagnetic release [1]		
			Currents:		Tripping time	Currents:		Tripping time
			conventional non-tripping current	conventional tripping current		hold current surges	trip at least at	
IEC/EN 60898-1	B	06 to 63 A	$1.13 \cdot I_n$		> 1 h	$3 \cdot I_n$		> 0.1 s
				$1.45 \cdot I_n$	< 1 h		$5 \cdot I_n$	< 0.1 s
	C	0.5 to 63 A	$1.13 \cdot I_n$		> 1 h	$5 \cdot I_n$		> 0.1 s
				$1.45 \cdot I_n$	< 1 h		$10 \cdot I_n$	< 0.1 s
	D	0.5 to 63 A	$1.13 \cdot I_n$		> 1 h	$10 \cdot I_n$		> 0.1 s
				$1.45 \cdot I_n$	< 1 h		$20 \cdot I_n$	< 0.1 s
IEC/EN 60947-2	K	0.2 to 63 A	$1.05 \cdot I_n$		> 1 h	$10 \cdot I_n$		> 0.2 s
				$1.3 \cdot I_n$	< 1 h [3]		$14 \cdot I_n$	< 0.2 s
	Z	0.5 to 63 A	$1.05 \cdot I_n$		> 1 h	$2 \cdot I_n$		> 0.2 s
				$1.3 \cdot I_n$	< 1 h [3]		$3 \cdot I_n$	< 0.2 s

[1] The indicated electromagnetic tripping values apply to a frequency range of 16 2/3... 60 Hz. For different network frequencies or direct current the values change according to the multipler in the table below
[2] The thermal releases are calibrated to a nominal reference ambient temperature; for Z and K, the value is 40°C, for B, C and D is 30°C. In the case of higher ambient temperatures, the current values fall by ca. 6% for each 10 K temperature rise.

[3] As from operating temperature (after I_1 > 1h or, as applicable, 2h).

MCBs technical details
Tripping characteristics

Tripping characteristics S 200 / S 200 M / S 200 P / S 200 S / S 200 MUC / SN 201 L / SN 201 / SN 201 M

	AC			DC
	100 Hz	200 Hz	400 Hz	
Multiplier	1.1	1.2	1.5	1.5

The thermal tripping performance is independent from the network frequency

Tripping characteristics SU200 M

Acc. to	Tripping characteristics	Rated current	Thermal release [1]			Electromagnetic release [2]		
			Currents:		Tripping time	Range of instantaneous tripping		Tripping time
			conventional non-tripping current	conventional tripping current				
		In	I1	I2				
UL 489	C	0.5 to 63 A	$1.03 \cdot I_n$		> 1 h	$5 \cdot I_n$		> 0.2 s
				$1.25 \cdot I_n$	< 1 h [3]		$10 \cdot I_n$	< 0.2 s
	K	0.2 to 63 A	$1.03 \cdot I_n$		> 1 h	$10 \cdot I_n$		> 0.2 s
				$1.25 \cdot I_n$	< 1 h [3]		$14 \cdot I_n$	< 0.2 s
	Z	0.5 to 63 A	$1.03 \cdot I_n$		> 1 h	$2 \cdot I_n$		> 0.2 s
				$1.25 \cdot I_n$	< 1 h [3]		$3 \cdot I_n$	< 0.2 s

[1] The thermal releases are calibrated to a nominal reference ambient temperature e.g. for UL 489 of 40°C.
In the case of higher ambient temperatures, the current values fall by approx. 4 % for each 10 K temperature rise.
[2] The indicated tripping values of electromagnetic tripping devices apply to a frequency of 50/60 Hz. The thermal release operates independent of frequency.

[3] As from operating temperature (after I1 > 1h)

Tripping characteristics S200 80-100A

Acc. to	Tripping characteristics	Rated current	Thermal release [1]			Electromagnetic release [2]		
			Currents:		Tripping time	Range of instantaneous tripping		Tripping time
			conventional non-tripping current	conventional tripping current				
		I_n	I1	I2				
IEC/EN 60898-1	B	80 up to 100 A	$1.13 \cdot I_n$		> 2 h	$3 \cdot I_n$		0.1 ... 90 s
				$1.45 \cdot I_n$	< 2 h		$5 \cdot I_n$	< 0.1 s
	C	80 up to 100 A	$1.13 \cdot I_n$		> 2 h	$5 \cdot I_n$		0.1 ... 30 s
				$1.45 \cdot I_n$	< 2 h		$10 \cdot I_n$	< 0.1 s

[1] The thermal releases are calibrated to a nominal reference ambient temperature; for B and C the reference value is 30 °C.
In the case of higher ambient temperatures, the current values fall by approx. 6 % for each 10 K temperature rise.
[2] The indicated tripping values of electromagnetic tripping devices apply to a frequency of 50/60 Hz. The thermal release operates independent of frequency.

Tripping characteristics S 750 DR

Tripping characteristic	**Reference ambient temperature**	**Delayed overload tripping**			**Short-time delayed selective tripping**		
		Conventional non-tripping current	Conventional tripping current	Tripping time	Delayed tripping current	Short-time delayed tripping current	Tripping time
	T_{ref} [1]	I_{nt}	I_t	t	I_{tv}	I_{tk}	t
$E_{selective}$	30 °C	$1.05 \times I_n$		≥ 2 h	$5 \times I_n$		$0.05 s < t < 5 s$ ($I_n \leq 32$ A) $0.05 s < t < 10 s$ ($I_n > 32$ A)
			$1.2 \times I_n$	< 2 h		$6.25 \times I_n$	0.01 s < t < 0.3 s
$K_{selective}$	30 °C	$1.05 \times I_n$		≥ 2 h	$8 \times I_n$		0.05 s < t < 10 s
			$1.2 \times I_n$	< 2 h		$12 \times I_n$	0.01 s < t < 0.3 s

[1] Reference ambient temperature 30 °C (in the case of higher ambient temperatures, the current values are reduced by ca. 5 % per each 10 K)

MCBs technical details

Tripping characteristics

Tripping characteristic S800

			Thermal release ②			Electromagnetic release ①		
Acc. to	Tripping characteristic and rated current		Current		Tripping time	Current		Tripping time
			conventional non-tripping current	conventional tripping current		hold current surges	trip at least at	
IEC/EN 60898-1	B	10 to 80 A	1.13 · I_n		> 1 h ③	3 · I_n		> 0.1 s
				1.45 · I_n	< 1 h ④		5 · I_n	< 0.1 s
	C	10 to 80 A	1.13 · I_n		> 1 h ③	5 · I_n		> 0.1 s
				1.45 · I_n	< 1 h ④		10 · I_n	< 0.1 s
	D	10 to 80 A	1.13 · I_n		> 1 h ③	10 · I_n		> 0.1 s
				1.45 · I_n	< 1 h ④		20 · I_n	< 0.1 s
IEC/EN 60947-2	B	0.5 to 125 A	1.05 · I_n		> 1 h ③	3.2 · I_n		> 0.1 s
				1.3 · I_n	< 1 h ④		4.8 · I_n	< 0.1 s
	C	0.5 to 125 A	1.05 · I_n		> 1 h ③	6.4 · I_n		> 0.1 s
				1.3 · I_n	< 1 h ④		9.6 · I_n	< 0.1 s
	D	0.5 to 125 A	1.05 · I_n		> 1 h ③	10.4 · I_n		> 0.1 s
				1.3 · I_n	< 1 h ④		15.6 · I_n	< 0.1 s
	K	0.5 to 125 A	1.05 · I_n		> 1 h ③	10.4 · I_n		> 0.1 s
				1.2 · I_n	< 1 h ④		15.6 · I_n	< 0.1 s
	KM	20 to 80 A				10.4 · I_n		> 0.1 s
							15.6 · I_n	< 0.1 s
	UCB (DC only)	0.5 to 125 A	1.05 · I_n		> 1 h ③	4.8 · I_n		> 0.1 s
				1.3 · I_n	< 1 h ④		7.2 · In	< 0.1 s
	UCK (DC only)	0.5 to 125 A	1.05 · I_n		> 1 h ③	8.8 · I_n		> 0.1 s
				1.2 · I_n	< 1 h ④		13.2 · I_n	< 0.1 s
	PV-SP (DC only)	5 to 125 A	1.05 · I_n		> 1 h ③	4.8 · I_n		> 0.1 s
				1.3 · I_n	< 1 h ④		6 · I_n	< 0.1 s
UL489	Z	10 to 100 A	1 · I_n		> 1 h	3.2 · I_n		> 0.1 s
				1.35 · I_n	< 1 h		4.8 · I_n	< 0.1 s
	K	10 to 100 A	1 · I_n		> 1 h	10.4 · I_n		> 0.1 s
				1.35 · I_n	< 1 h		15.6 · I_n	< 0.1 s
	UCZ (DC only)	10 to 80 A	1 · I_n		> 1 h	8.8 · I_n		> 0.1 s
				1.35 · I_n	< 1 h		13.2 · I_n	< 0.1 s
UL489B	PV-S (DC only)	5 A	1.13 · I_n		> 1 h	4.8 · I_n		> 0.1 s
				1.3 · I_n	< 1 h		6 · I_n	< 0.1 s

① The indicated electromagnetic tripping values apply to a frequency of 50/60 Hz.
② The thermal release are calibrated to a nominal reference ambient temperature; for B, C, D, UCB and PVS it is 30 °C, for K, UCK it is 20 °C for Z, K and UCZ it is 25 °C, for PVS acc. to UL489B it is 50 °C.
③ t > 2 h for I_n > 63 A
④ t < 2 h for I_n > 63 A

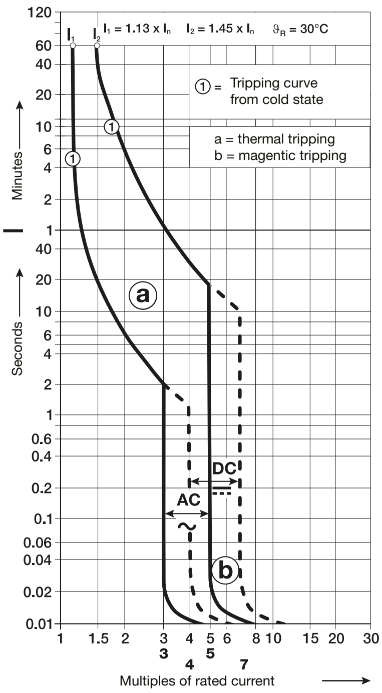
MCBs technical details

Tripping characteristics

Tripping characteristics S200 / S200M / S200P

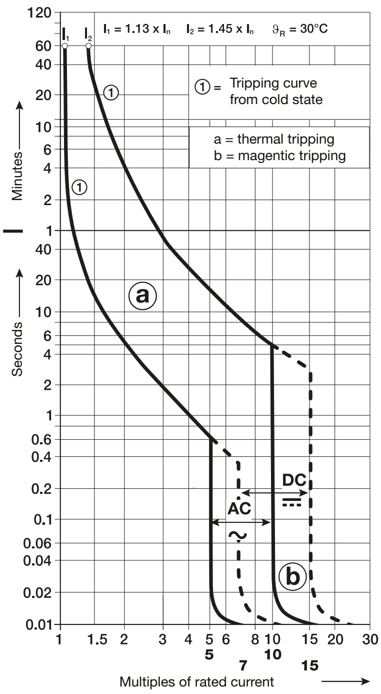
Characteristic B

IEC-EN60898



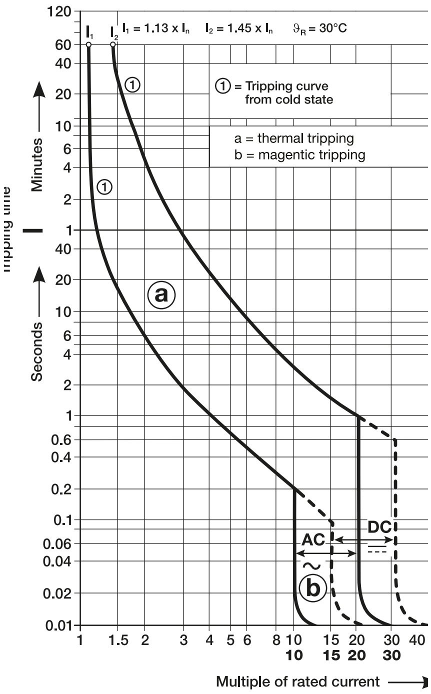
Characteristic C

IEC-EN60898



Characteristic D

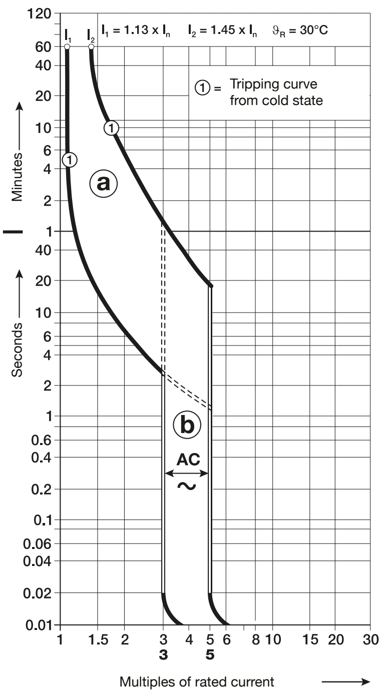
IEC-EN60898



Tripping characteristics SN201 and S200C

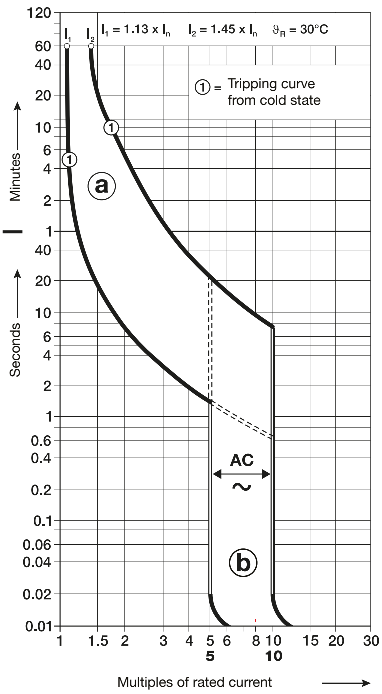
Characteristic B

IEC/EN 60898-1



Characteristic C

IEC/EN 60898-1



a thermal trip

b electromagnetic trip

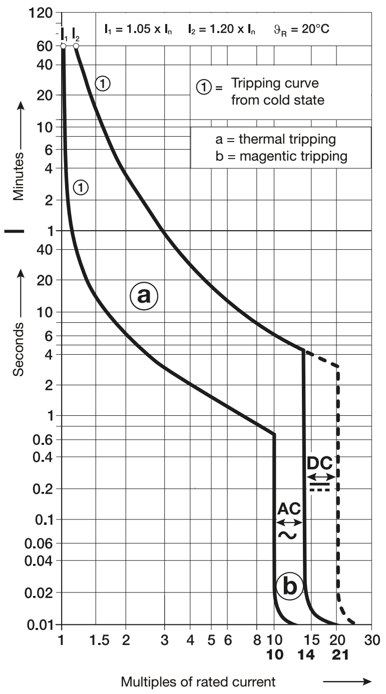
MCBs technical details

Tripping characteristics

Tripping characteristics S200 / S200M / S200P

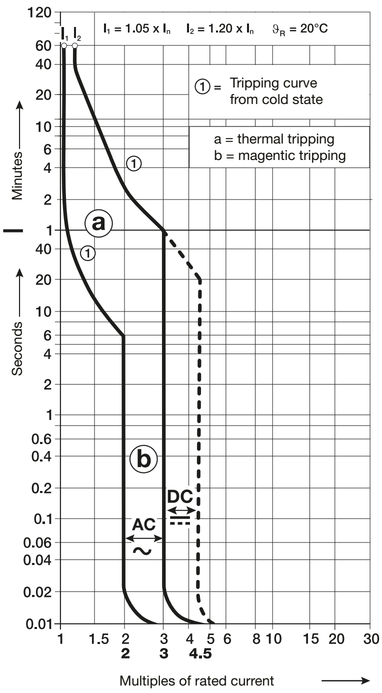
Characteristic K

IEC-EN60947-2



Characteristic Z

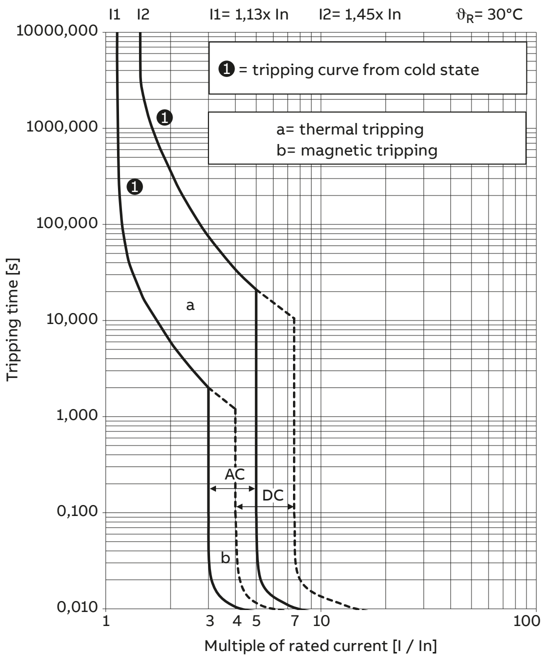
IEC-EN60947-2



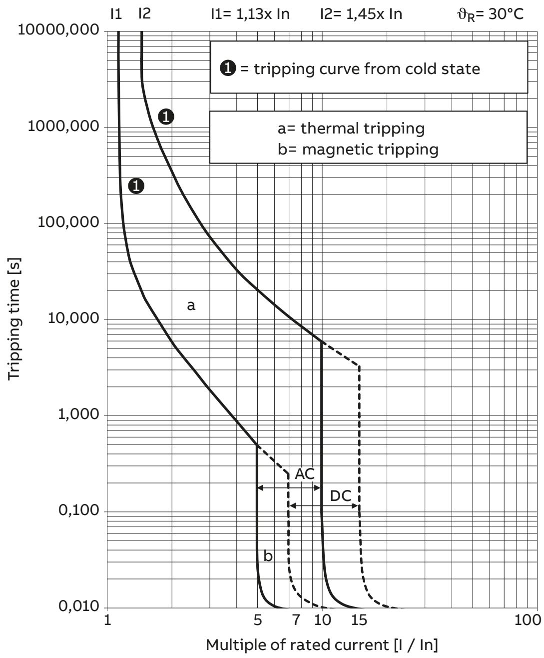
MCBs technical details
Tripping characteristics

Tripping characteristics S300P

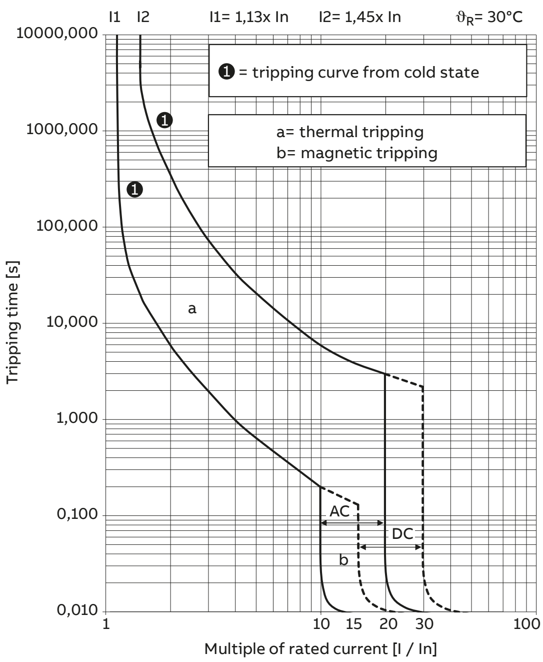
MCB Type S300P - B (3 … 5 x In AC)
Tripping Characteristic IEC/EN 60898-1



MCB Type S300P - C (5 … 10 x In AC)
Tripping Characteristic IEC/EN 60898-1



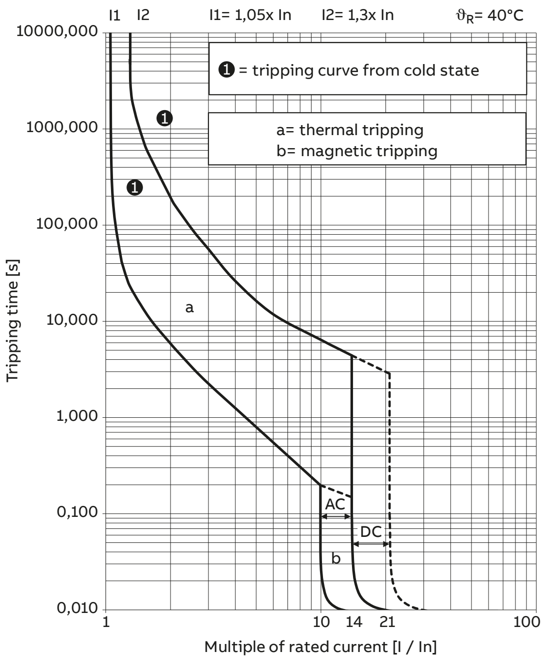
MCB Type S300P - D (10 … 20 x In AC)
Tripping Characteristic IEC/EN 60898-1



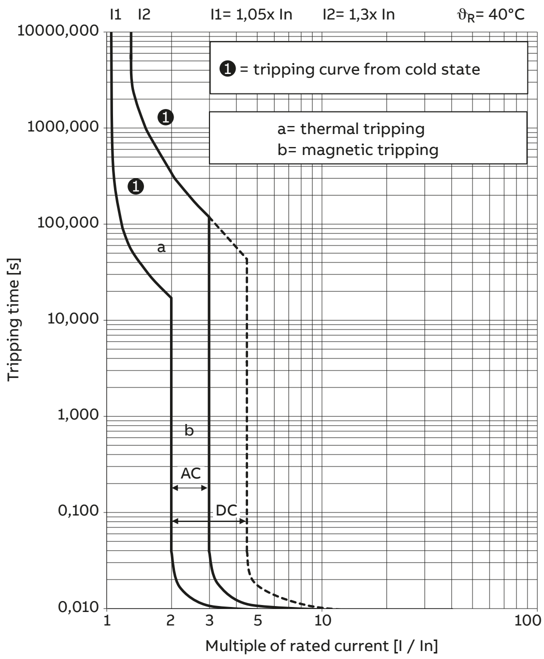
MCBs technical details
Tripping characteristics

Tripping characteristics S300P

MCB Type S300P - K (10 ... 14 x In AC)
Tripping Characteristic IEC/EN 60947-2



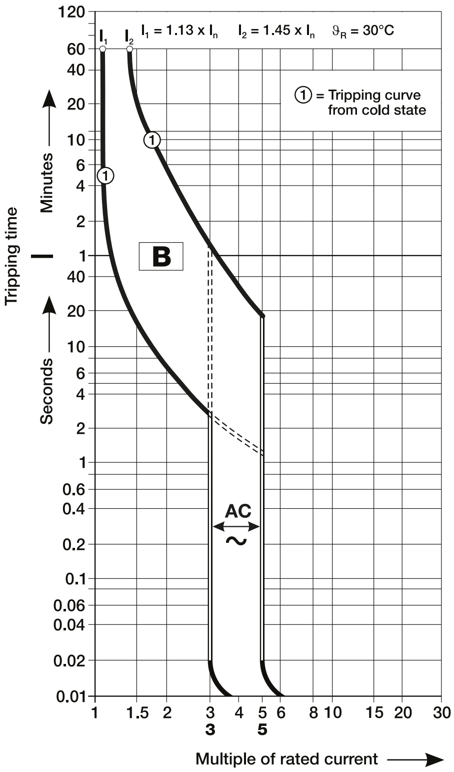
MCB Type S300P - Z (2 ... 3 x In AC)
Tripping Characteristic IEC/EN 60947-2



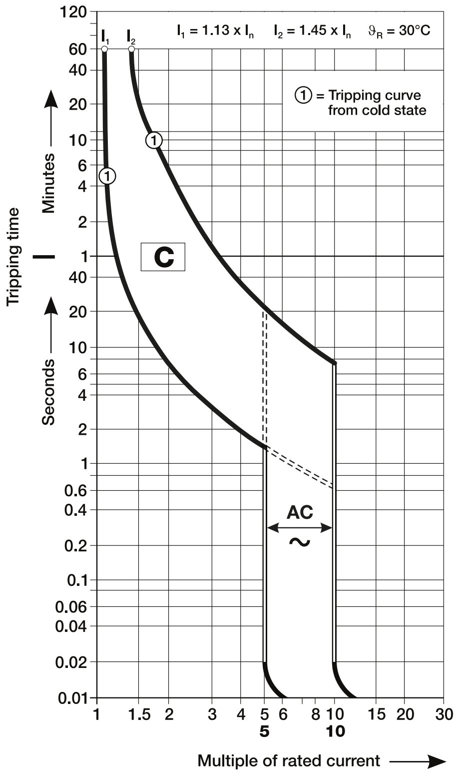
MCBs technical details
Tripping characteristics

Tripping characteristics S200S

Characteristic B



Characteristic C

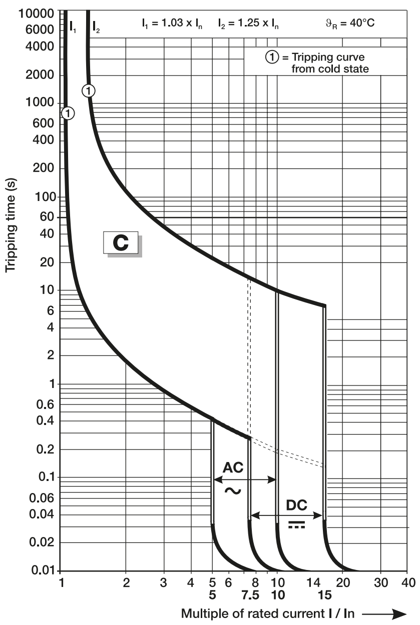


MCBs technical details

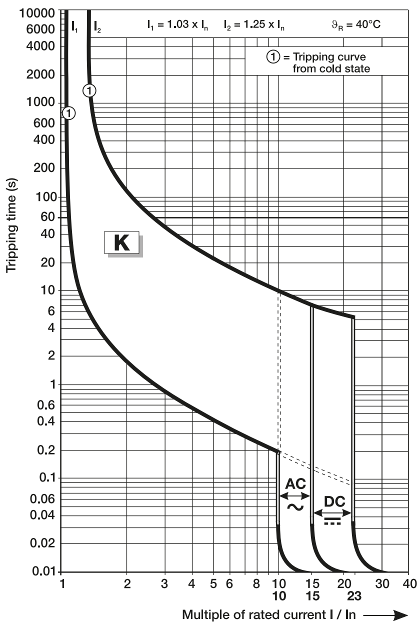
Tripping characteristics

Tripping characteristics SU200 M

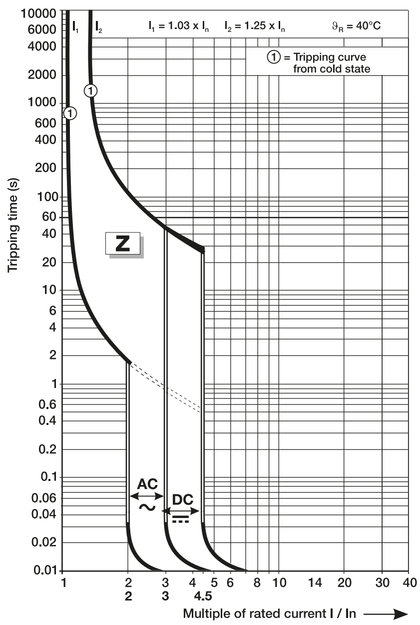
Characteristic C



Characteristic K



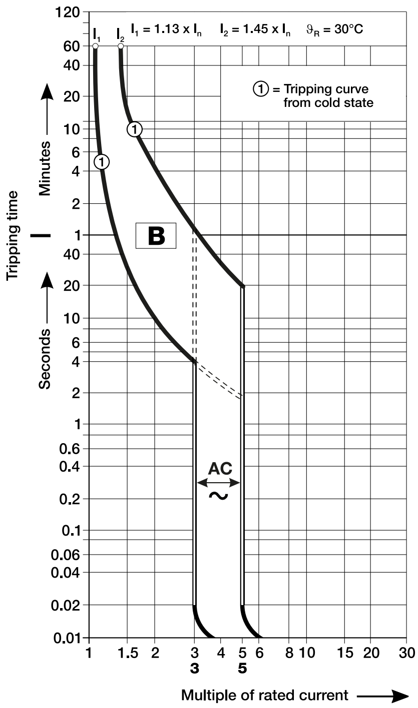
Characteristic Z



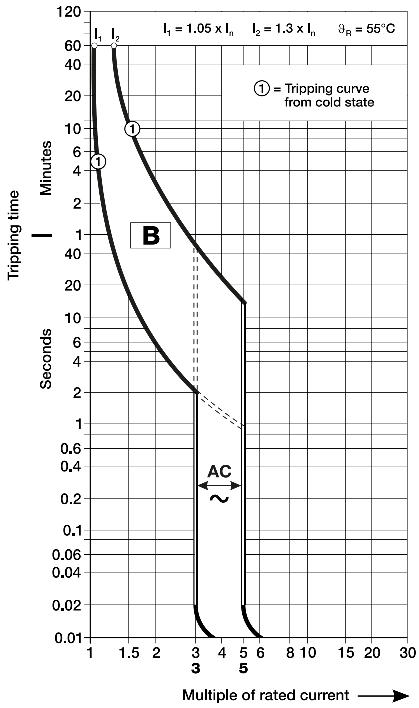
MCBs technical details
Tripping characteristics

Tripping characteristics S200 80-100A

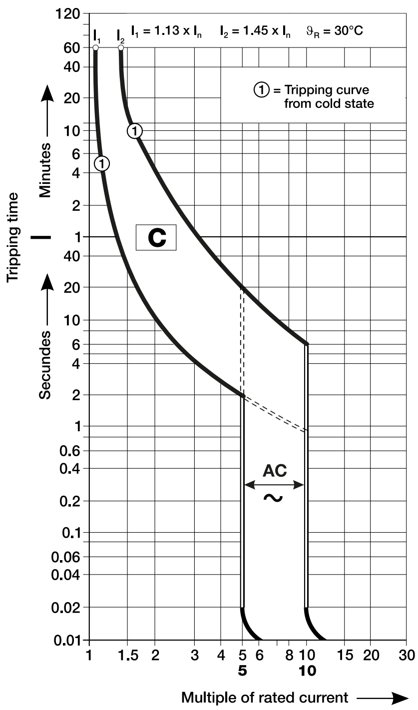
Characteristic B
IEC-EN60898-1



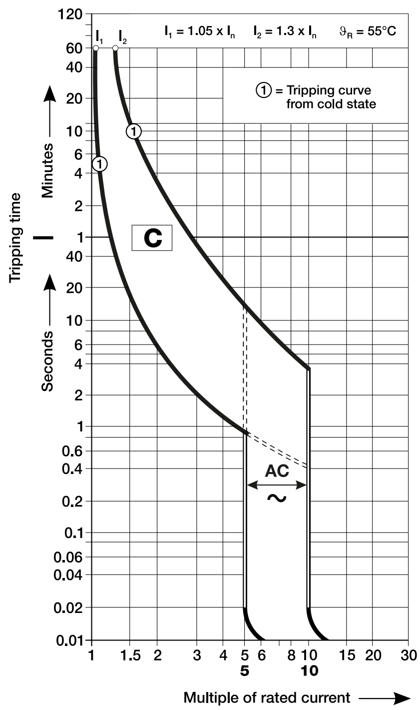
Characteristic B
IEC-EN60947-2



Characteristic C
IEC-EN60898-1



Characteristic C
IEC-EN60947-2

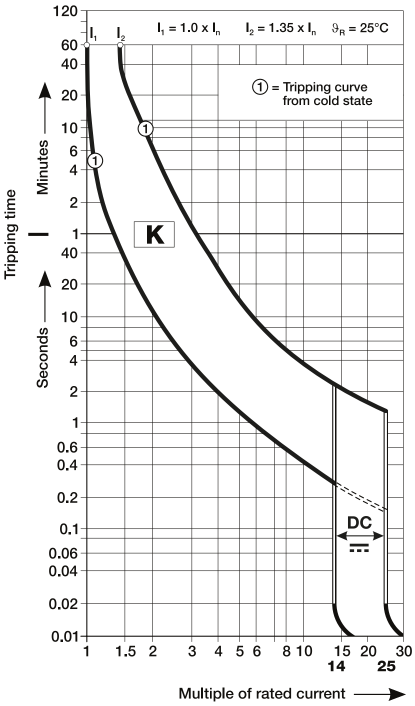


MCBs technical details

Tripping characteristics

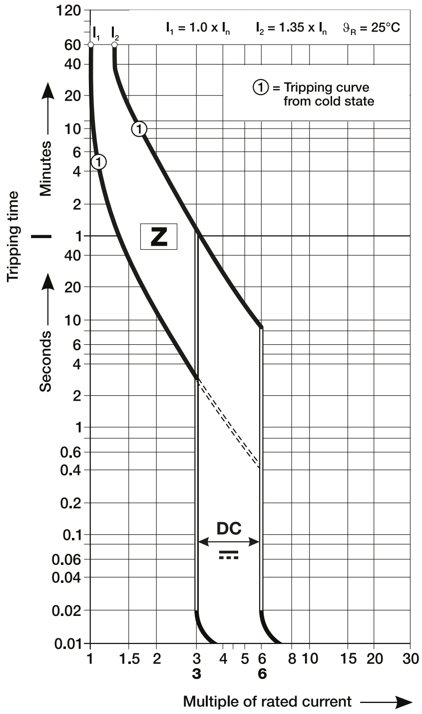
Characteristic K

S 200 UDC



Characteristic Z

S 200 UDC



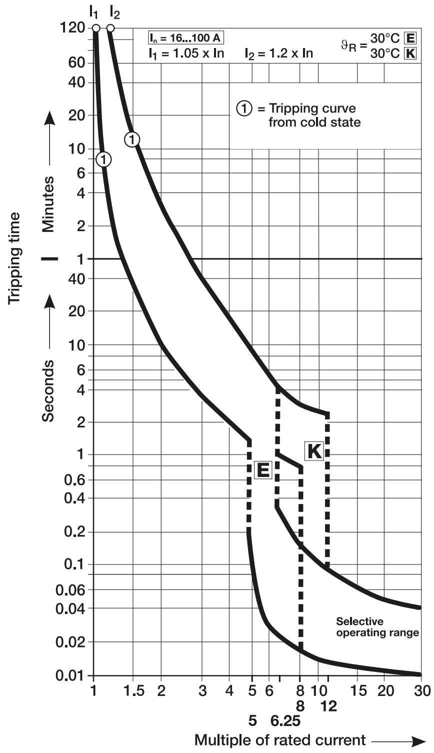
① thermal trip
② electromagnetic trip

MCBs technical details

Tripping characteristics

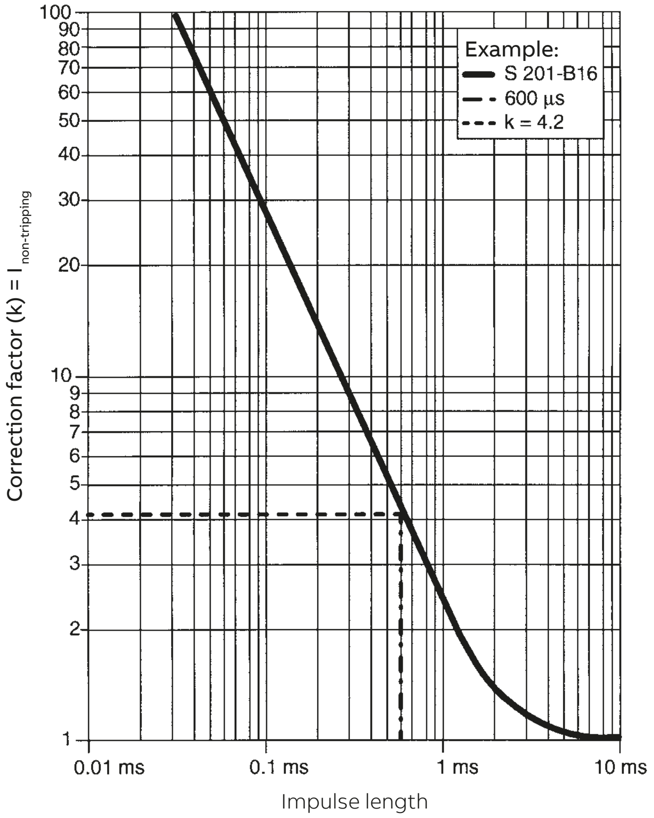
Characteristic $E_{selective}$, $K_{selective}$

S 750 DR - 16 … 100 A



MCBs technical details

Tripping characteristics



Example: Non-tripping current (Electromagnetic release)

S 201-B16

$I_{non-tripping}$ = k x non-tripping current

$I_{non-tripping}$ = 4,2 x 3 x 16

$I_{non-tripping}$ = 201,6 A

B-Characteristic = 3 x I_n

C-Characteristic = 5 x I_n

D-Characteristic = 10 x I_n

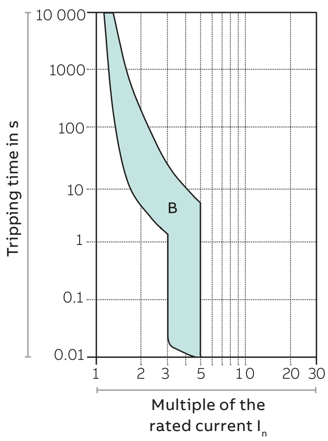
K-Characteristic = 10 x I_n

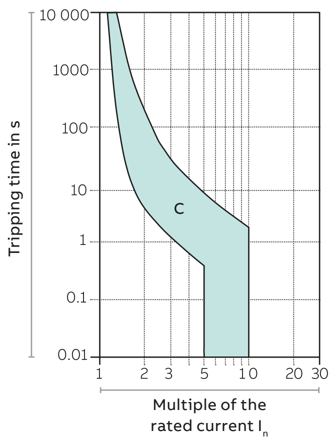
Z-Characteristic = 2 x I_n

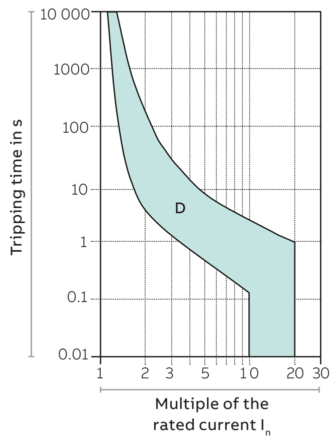
The S 201-B16 does not trip at an impulse of 600 es at a current up to 201,6 A.

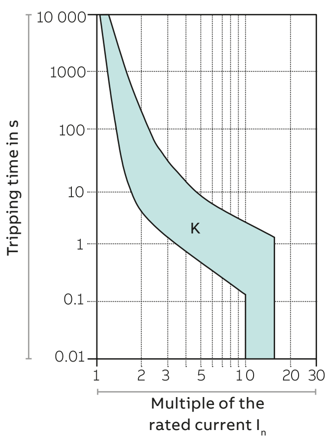
MCBs technical details
Tripping characteristics

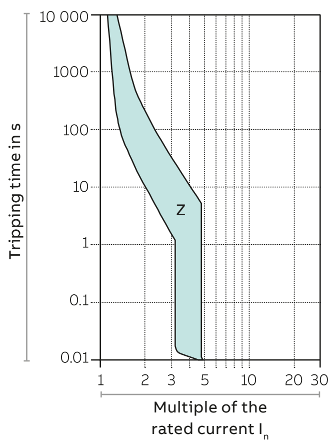
S800

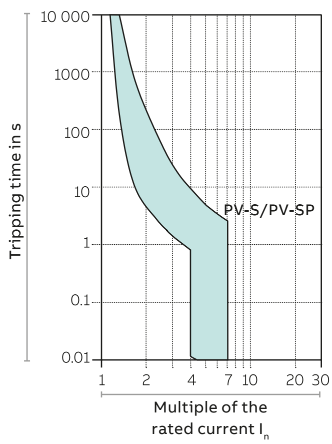


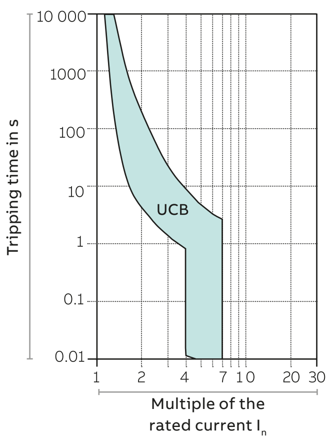


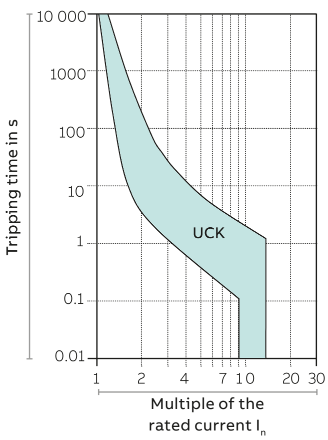


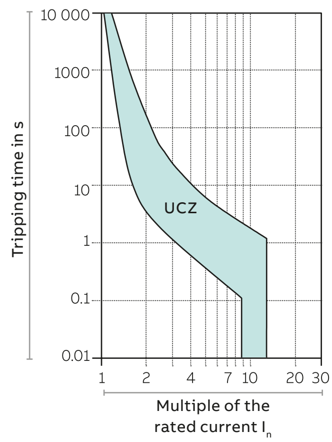












MCBs technical details

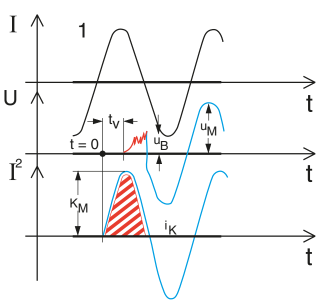
Limitation of specific let-through energy I^2t

Limitation of specific let-through energy
Tripping of an installation circuit by circuit-breaker when there is a short-circuit requires a certain amount of time depending on the characteristics of the circuit-breaker and the entity of the short-circuit current. During this period of time, some or all of the short-circuit current flows into the installation; the parameter I^2t defines the “specific let-through energy”, ie. the specific energy that the breaker allows through when there is a short-circuit current Icc during the tripping time t.
In this way, we can determine the capacity of a circuit-breaker to limit, ie. break high currents up to the rated breaking power of the device, by reducing the peak value of the above-mentioned currents to a value which is considerably lower than the estimated current.

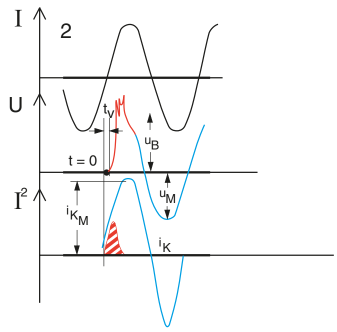
This can be achieved using mechanisms which open very rapidly and have the following advantages:

- they limit the thermal and dynamic effects both on the circuit-breaker and on the protected circuit;
- they reduce the dimensions of the current-limiting circuit-breaker without reducing breaking capacity;
- they considerably reduce ionized gases and sparklers emitted during the short-circuit and therefore they avoid the danger of ignition and fires.

Irms = perspective simmetrical short-circuit current



Non-current limiting circuit-breaker



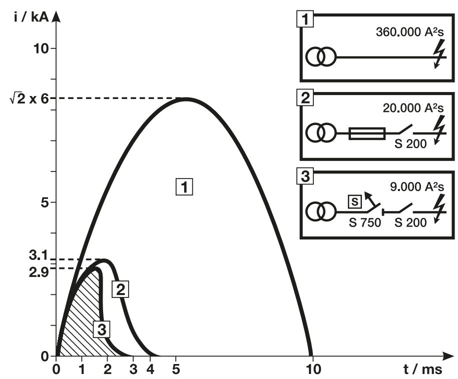
Current limiting circuit-breaker

Oscillogram of short-circuit breaks on two circuit-breakers:

1 = traditional non-current limiting circuit-breaker
2 = current limiting circuit-breaker
u_B = arc voltage (red)
u_M = rest voltage (blue)

Short-circuit current
red = effective short-circuit current squared
blue = estimated short-circuit current squared (shunted circuit-breaker)
iK_M = maximum values of symmetrical component of short-circuit current squared
shaded in
red = specific let-through energy in two cases

Limiting of let-through energy
Main selective circuit breakers (SMCB) like S 750 DR support downstream MCBs in clearing short-circuit currents. They additionally reduce let-through energies without tripping. This increases the operational availability of the electrical supply and reduces drawbacks to the feeding grid and the installed equipment.



MCBs technical details

Limitation of specific let-through energy I^2t

Max. withstanding specific let-through energy of cables

Section mm²	PVC	EPR	HEPR
50	33,062,500	39,062,500	51,122,500
35	16,200,625	19,140,625	25,050,025
25	8,265,625	9,765,625	12,780,625
16	3,385,600	4,000,000	5,234,944
10	1,322,500	1,562,500	2,044,900
6	476,100	562,500	736,164
4	211,600	250,000	327,184
2.5	82,656	97,656	127,806
1.5	29,756	35,156	46,010

The selection of the cables depends both from the breakers' specific let-through energy and from carrying capacity and voltage drop of the line.

Data of the previous table are referred to the following cables:

PVC	EPR	HEPR
FM9 FM9OZ1 N07V-K FROR	H07RN-F	N07G9-K FTG10OM1 RG7OR FG7OM1 FG7OR

Designation

Cable's reference to the standards	harmonized	H
	national cable recognized by CENELC	A
Rated voltage Uo/U	100/100 ≤ Uo/U < 300/300	01
	300/300 V	03
	300/500 V	05
	450/750 V	07
	750/1000 V	1
Insulating materials and non-metallic sheath	ethylene-vinylacetate	G
	mineral	M
	polyvinyl chloride	V
Conductor's shape	flexible conductor of a cable for fixed installation	K

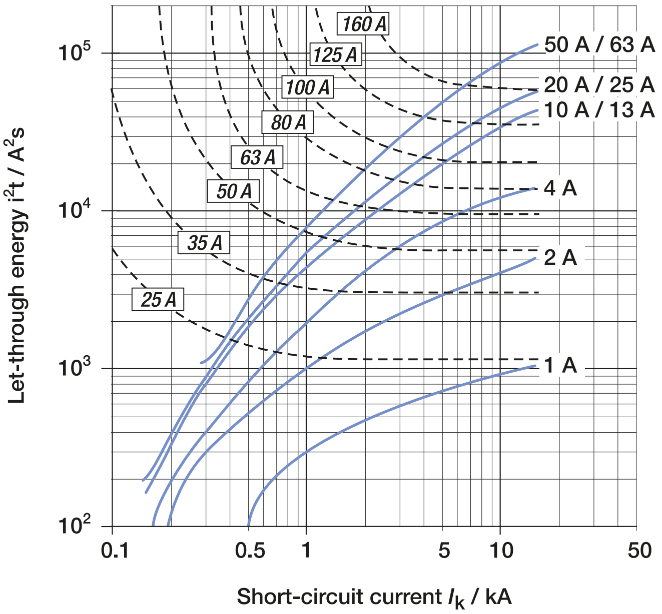
Some cables on the market are identified with different names according with the designation UNEL 35011.

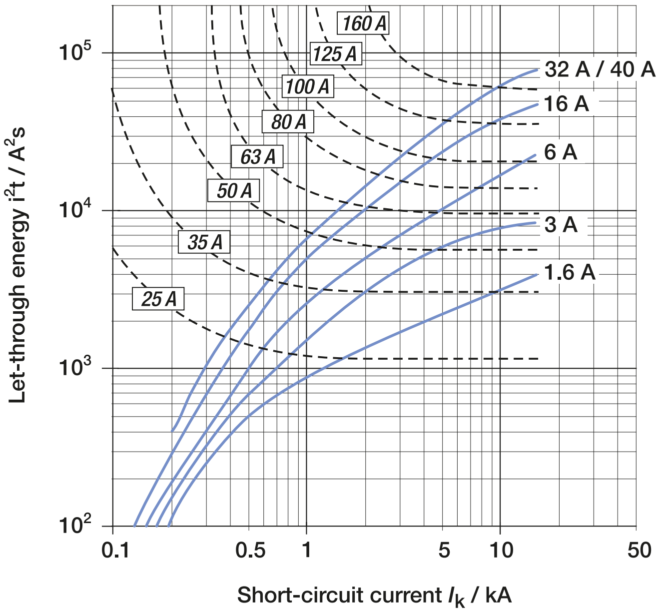
MCBs technical details

Limitation of specific let-through energy I²t

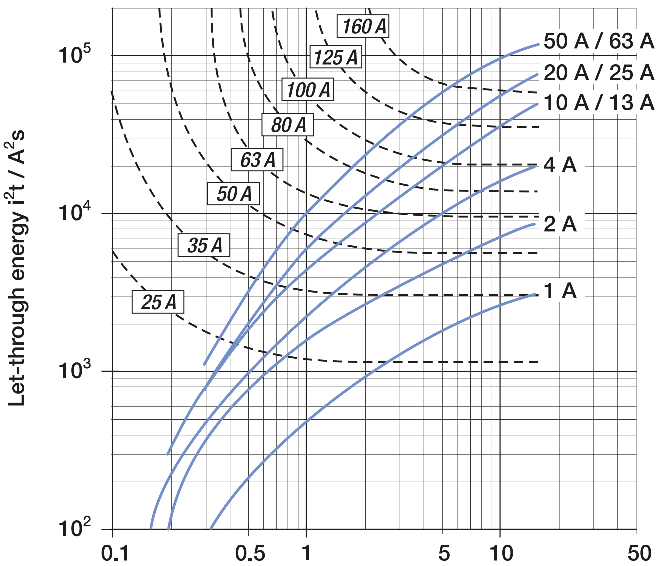
I²t diagrams - Specific let-through energy value I²t
The I²t curves give the values of the specific let-through energy expressed in A²s (A=amps; s=seconds) in relation to the perspective short-circuit current (Irms) in kA.

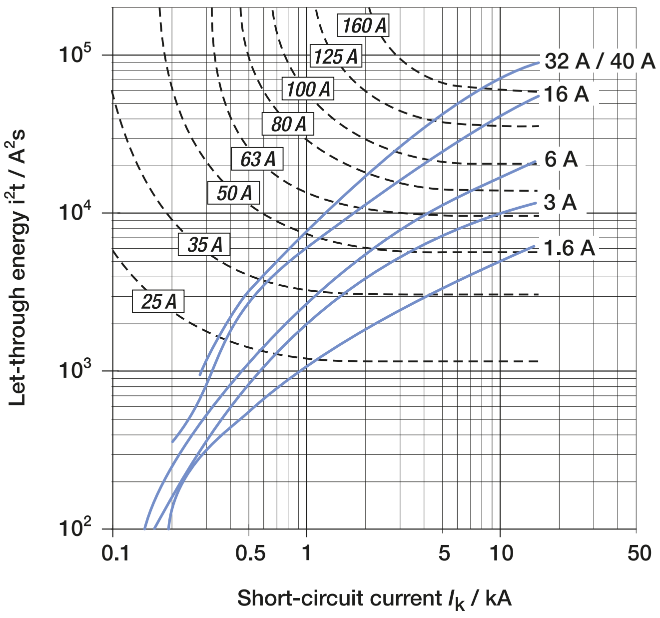
S 200-S 200 M-S 200 P, characteristics B and C
230/400 V let-through energy





S 200-S 200 M-S 200 P, characteristics D-K
230/400 V let-through energy



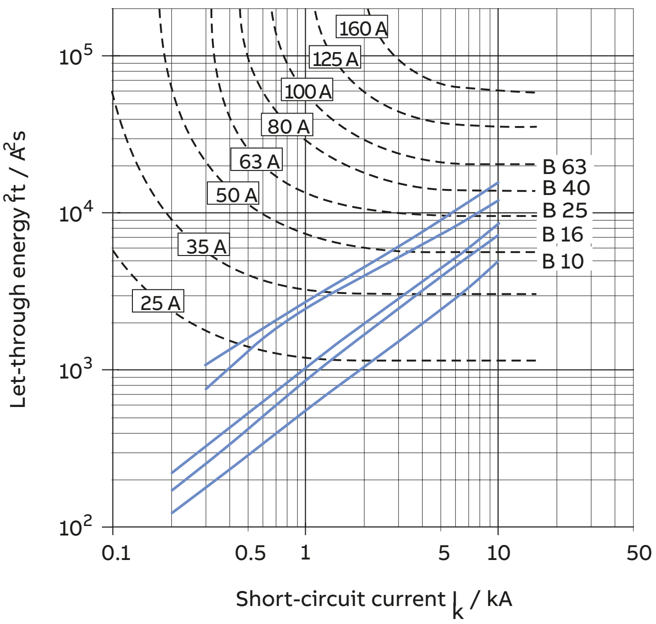


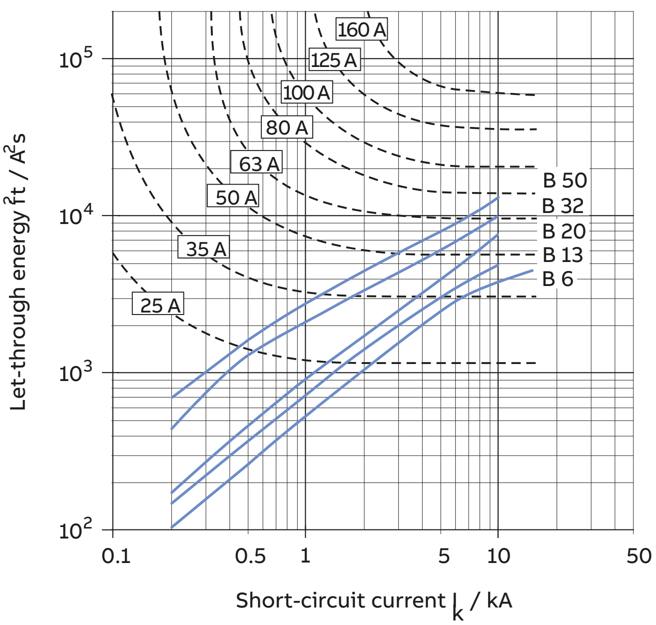
MCBs technical details

Limitation of specific let-through energy I²t

S200MUC-B B-characteristic

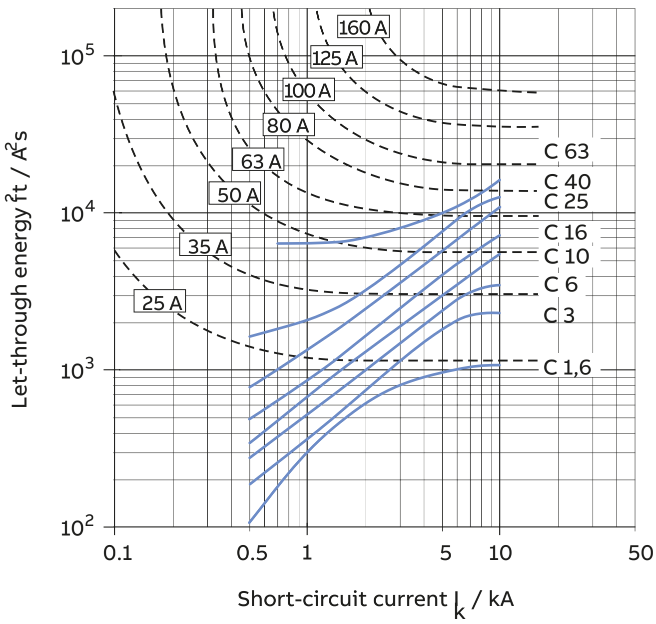
1p: 220 V DC, 2 p: 440 V DC let-through energy

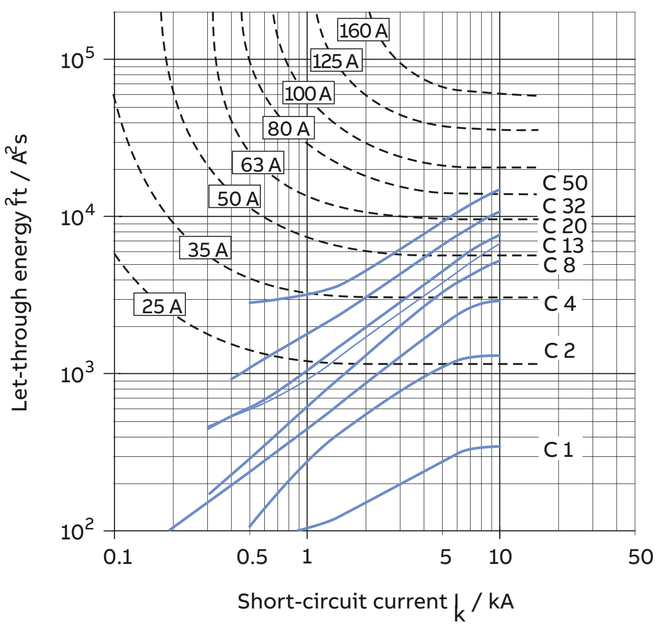




S200MUC-C C-characteristic

1p: 220 V DC, 2 p: 440 V DC let-through energy



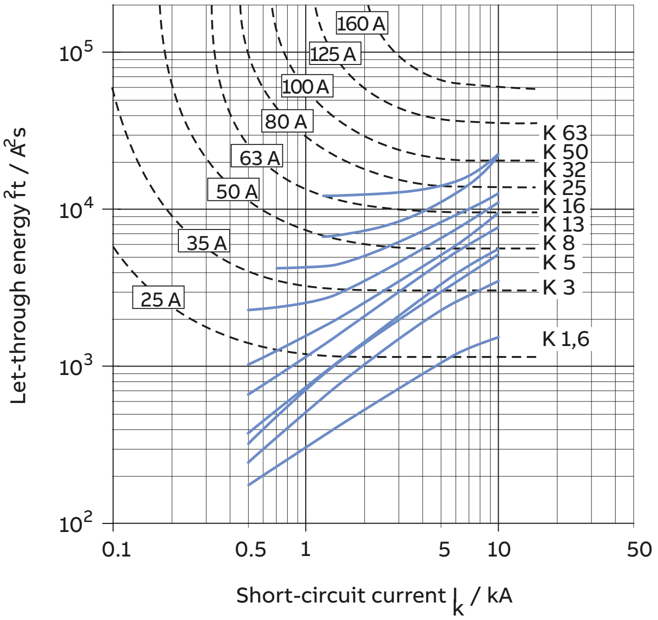


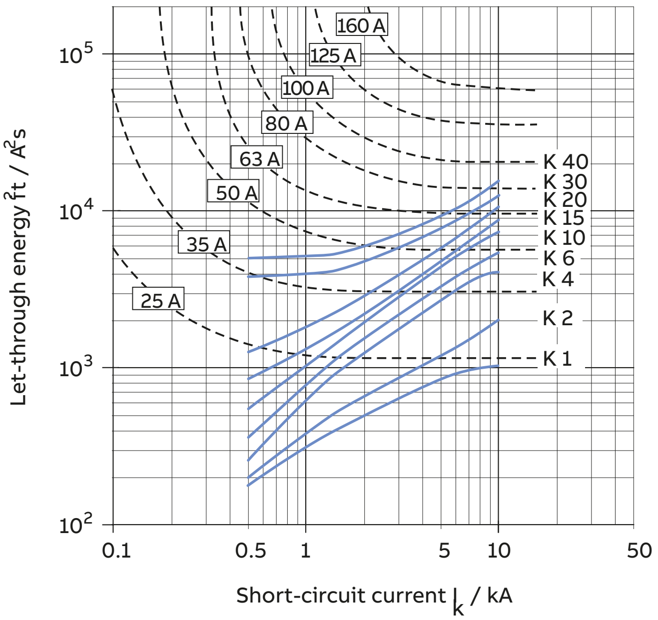
MCBs technical details

Limitation of specific let-through energy I^2t

S200MUC-K K-characteristic

1p: 220 V DC, 2 p: 440 V DC let-through energy



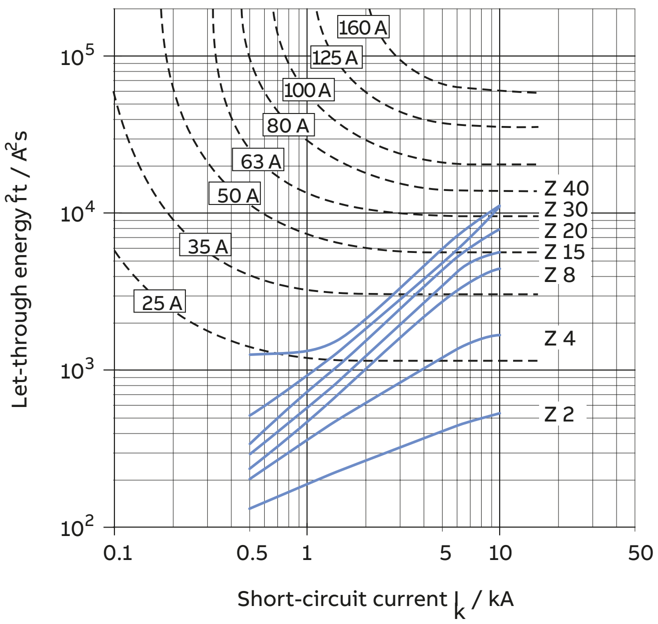


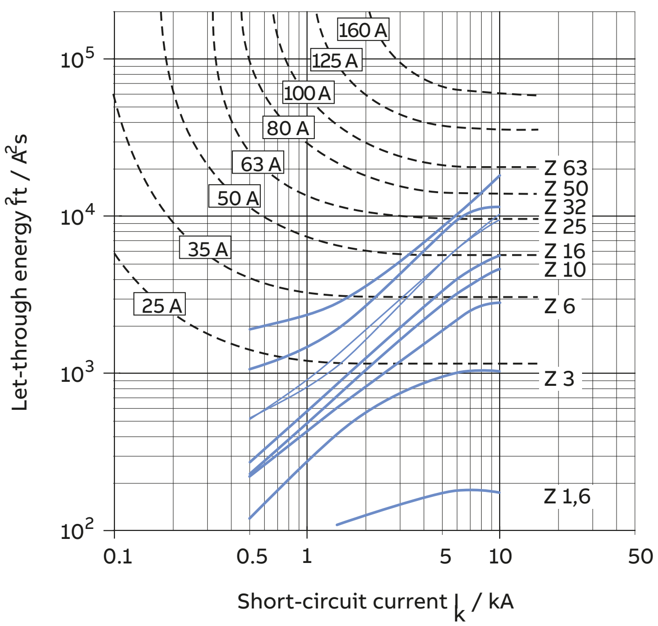
MCBs technical details

Limitation of specific let-through energy I^2t

S200MUC-Z Z-characteristic

1p: 220 V DC, 2 p: 440 V DC let-through energy



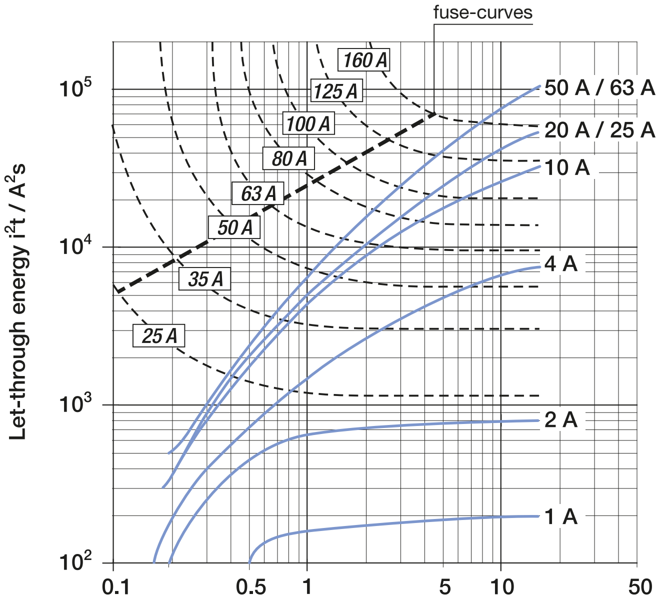


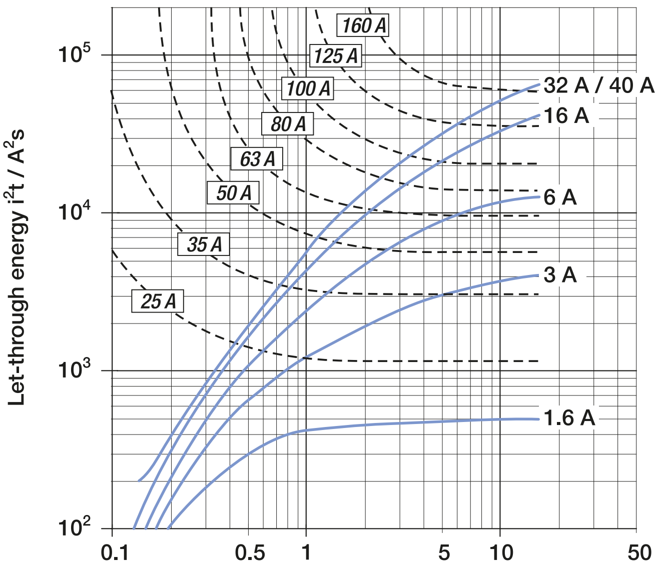
MCBs technical details

Limitation of specific let-through energy I²t

S 200-S 200 M-S 200 P, characteristic Z

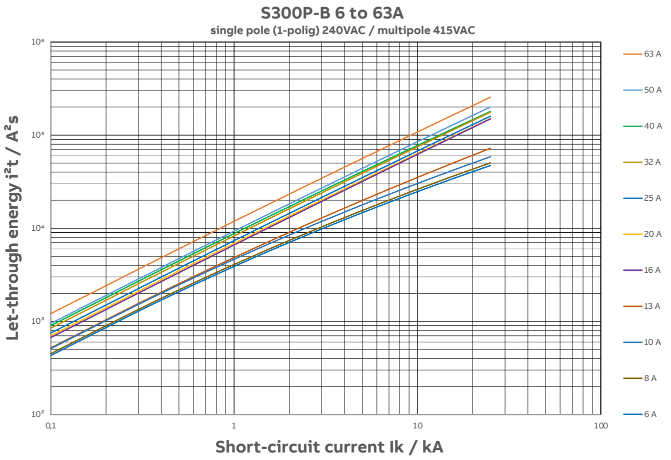
230/400 V let-through energy

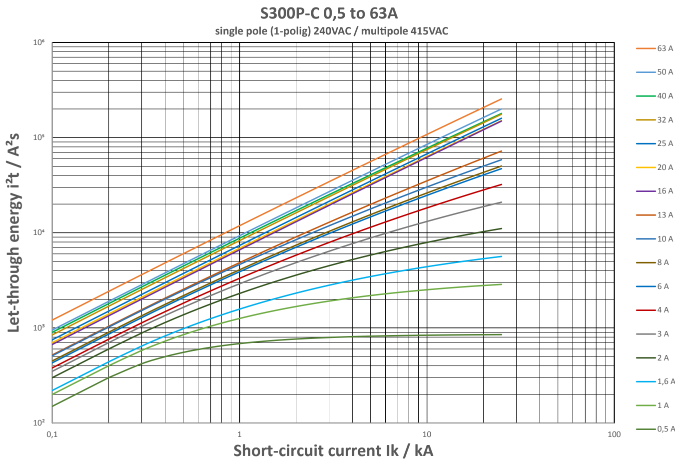




S 300 P, characteristic B, C

240/415 V let-through energy



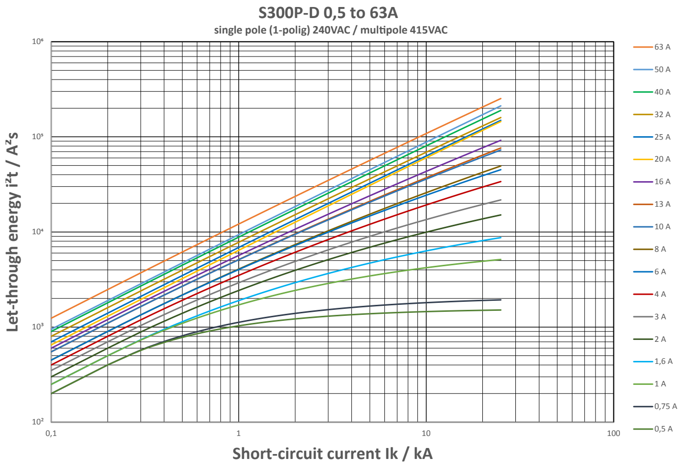


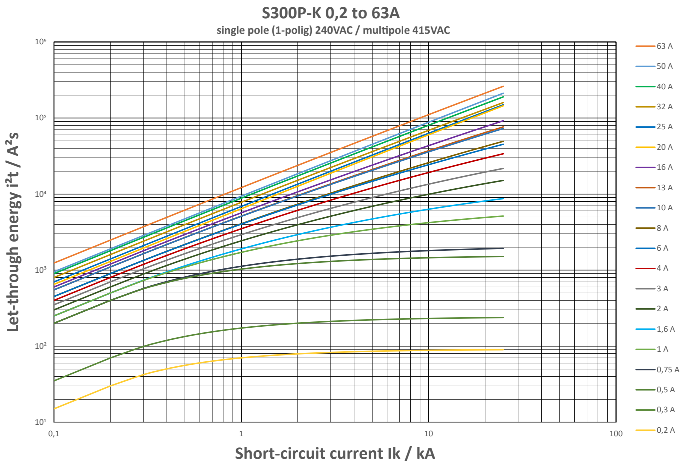
MCBs technical details

Limitation of specific let-through energy I^2t

S 300 P, characteristic D, K

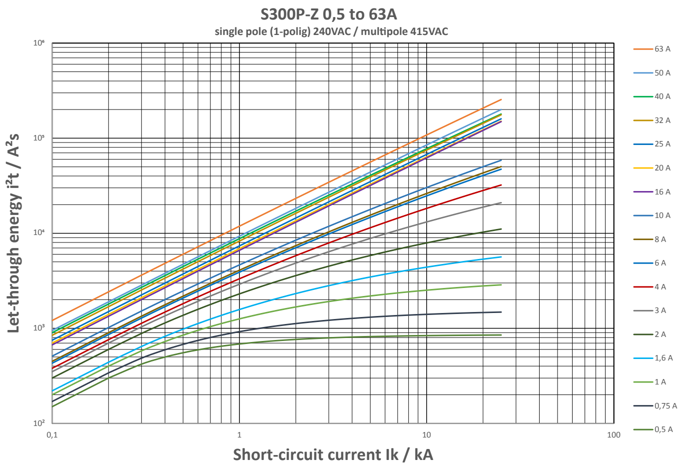
240/415 V let-through energy





S 300 P, characteristic Z

240/415 V let-through energy

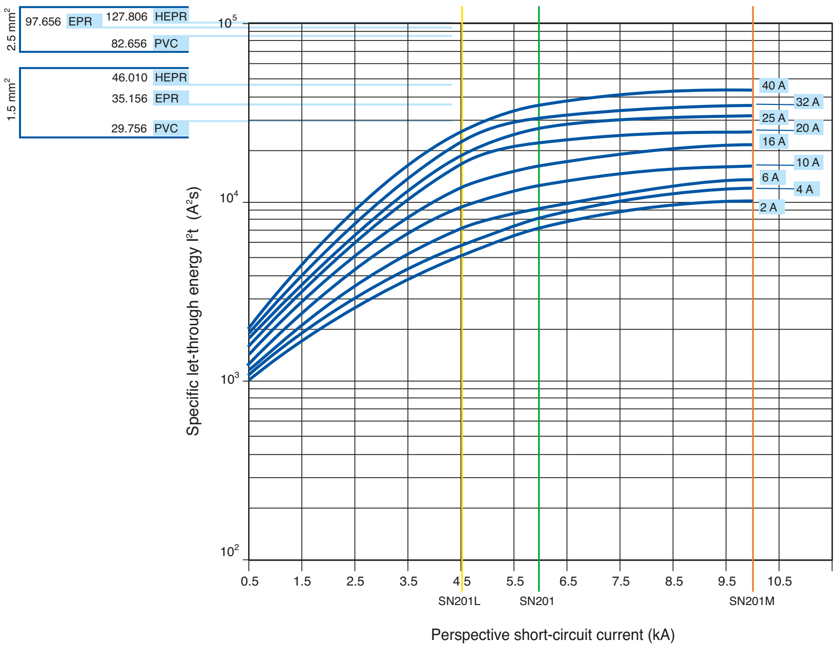


MCBs technical details

Limitation of specific let-through energy I^2t

SN201 L-SN201-SN201 M, characteristics B

230 V let-through energy

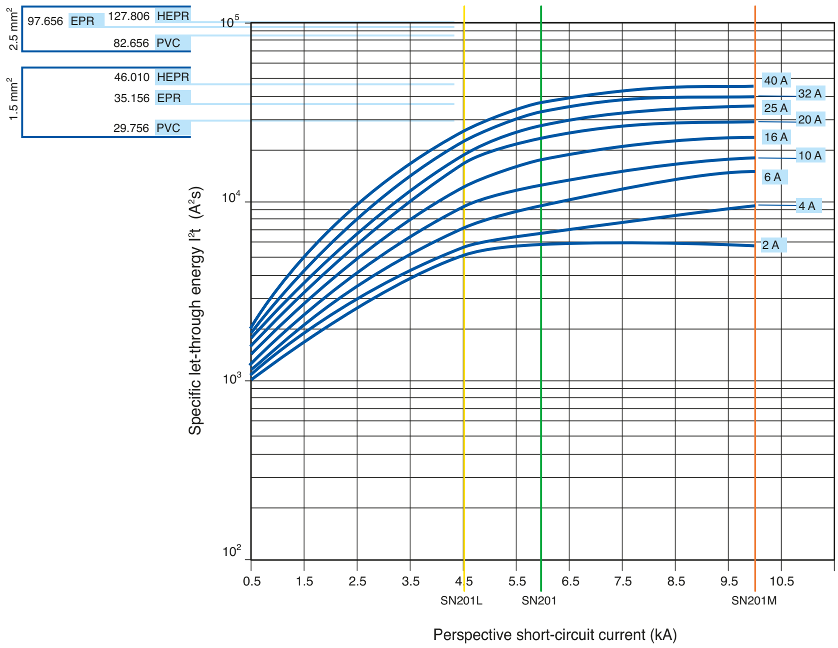


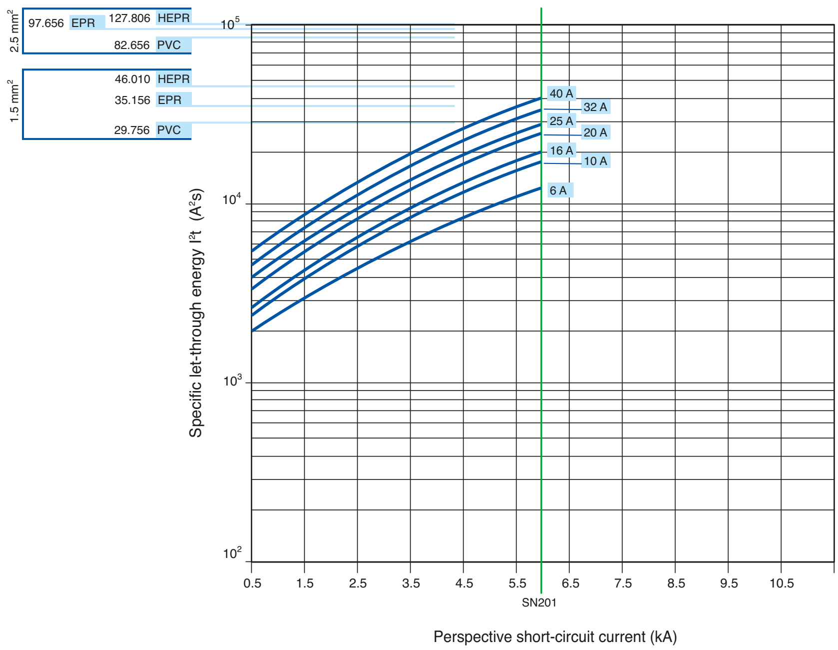
MCBs technical details

Limitation of specific let-through energy I^2t

SN201 L-SN201-SN201 M, characteristics C

230 V let-through energy





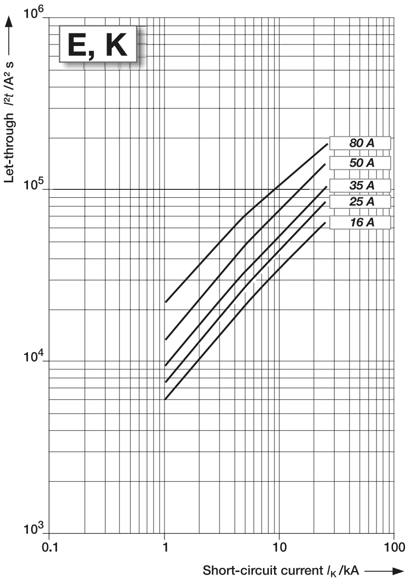
MCBs technical details

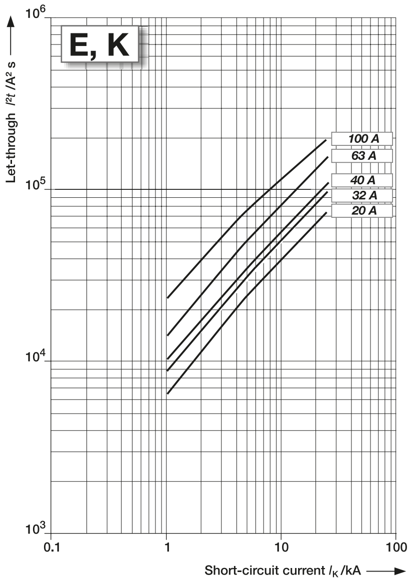
Limitation of specific let-through energy I^2t

S 750 DR characteristic $E_{selective}$, $K_{selective}$

diagram of let-through values

I^2t 16 ... 100 A





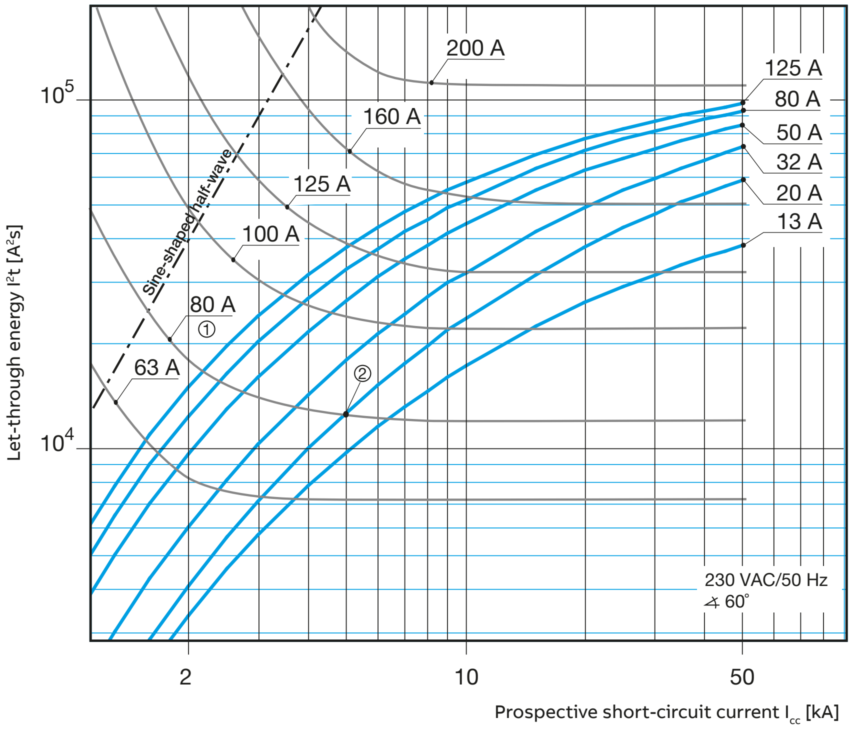
Notes

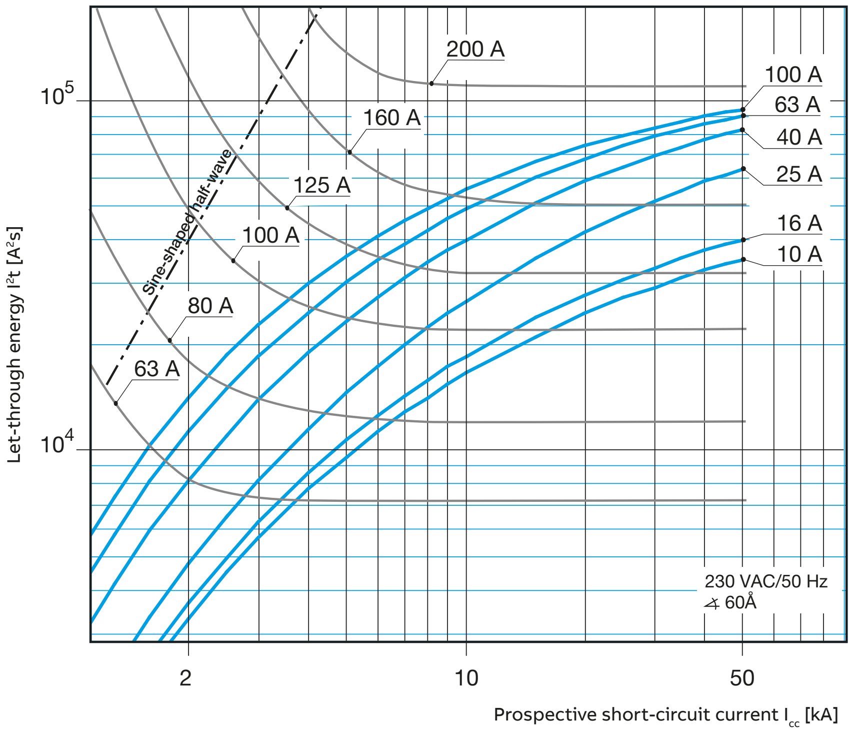
MCBs technical details

Limitation of specific let-through energy I^2t

S800 S characteristics B, C, D and K

230 V let-through energy





① Min. pre-arching I^2t, e.g. NH80 A gL/gG
② Max. let-through I^2t, e.g. S801S-C20

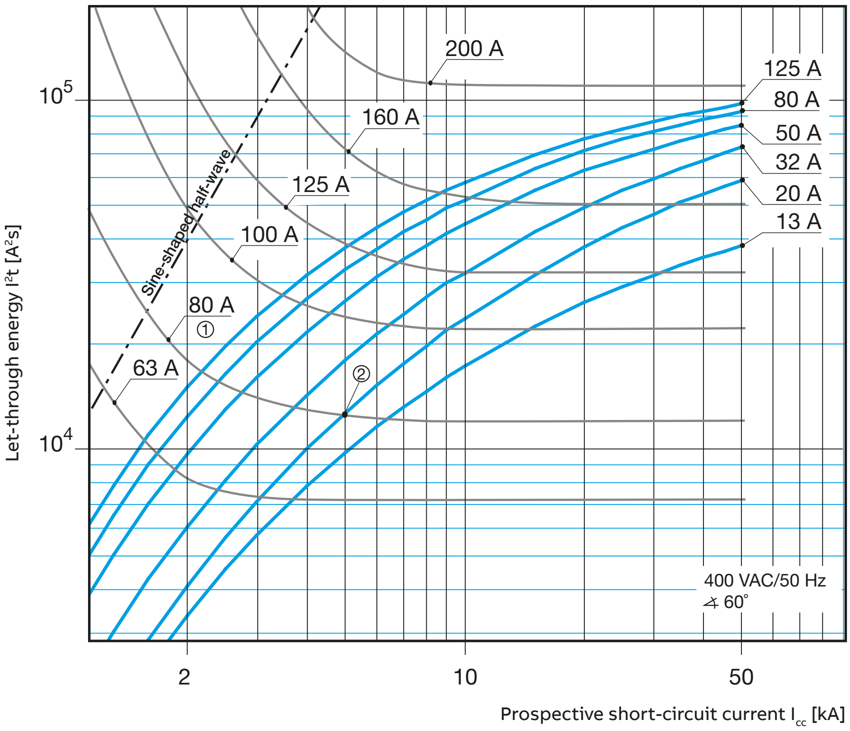
Selectivity with respect to the upstream fuse to the point of intersection of both curves 1 and 2, e.g. S801S-C20 to NH80A gL/gG: Selectivity up to min. 5 kA.

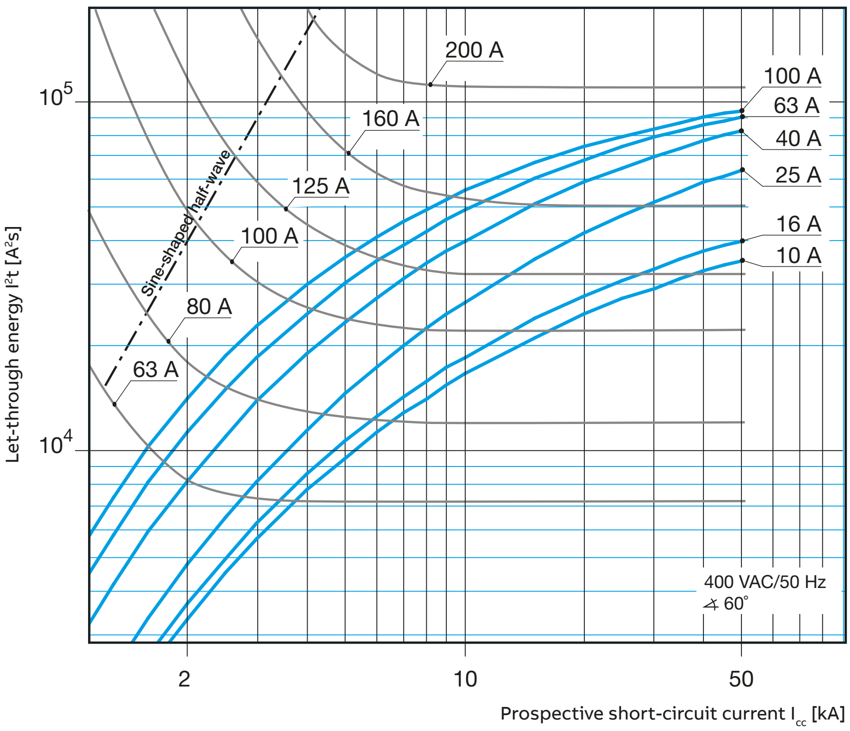
MCBs technical details

Limitation of specific let-through energy I^2t

S800 S characteristics B, C, D and K

400 V let-through energy





① Min. pre-arching I^2t, e.g. NH80 A gL/gG
② Max. let-through I^2t, e.g. S803S-C20

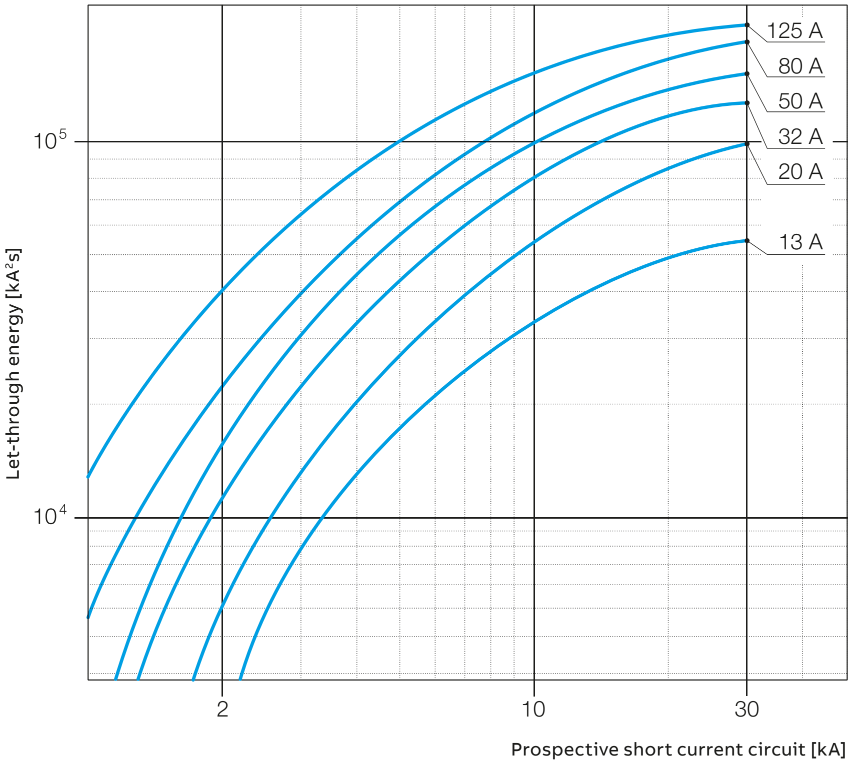
Selectivity with respect to the upstream fuse to the point of intersection of both curves 1 and 2, e.g. S801S-C20 to NH80A gL/gG: Selectivity up to min. 5 kA.

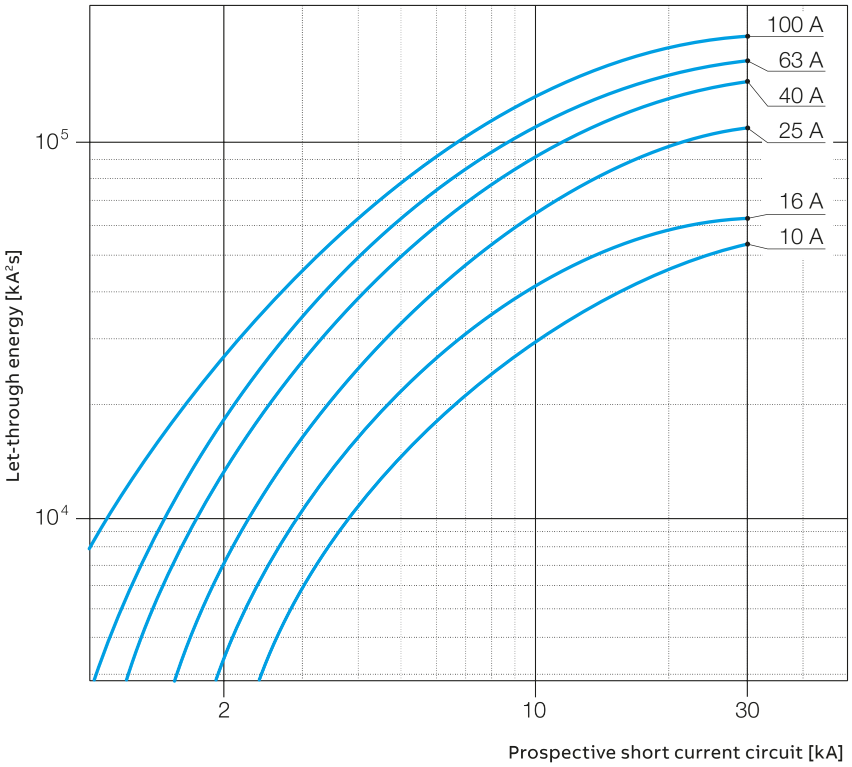
MCBs technical details

Limitation of specific let-through energy I²t

S800 S characteristics B, C, D and K

440 V let-through energy



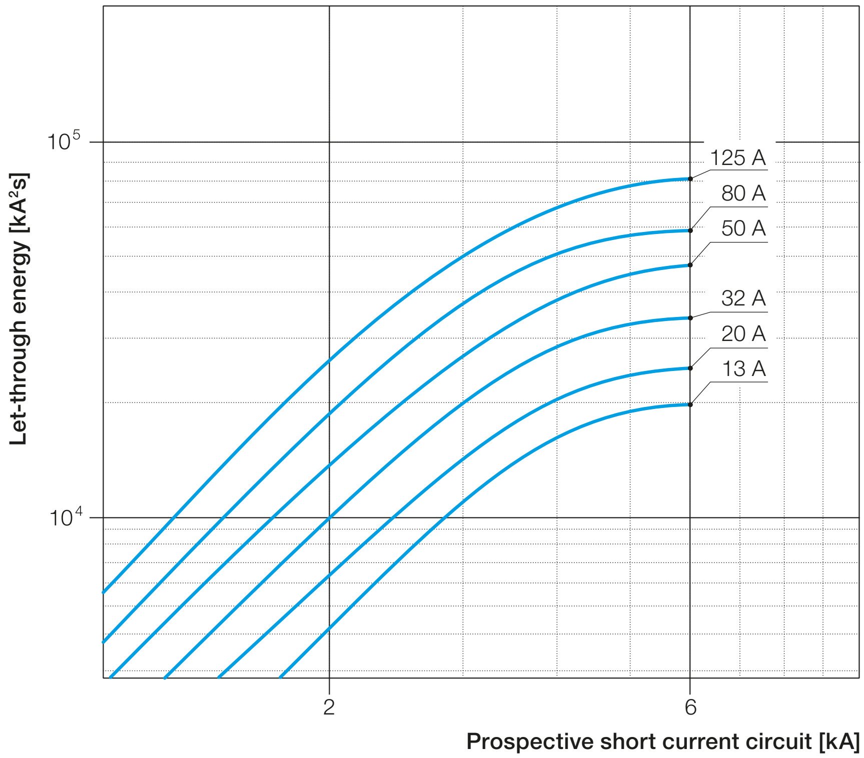


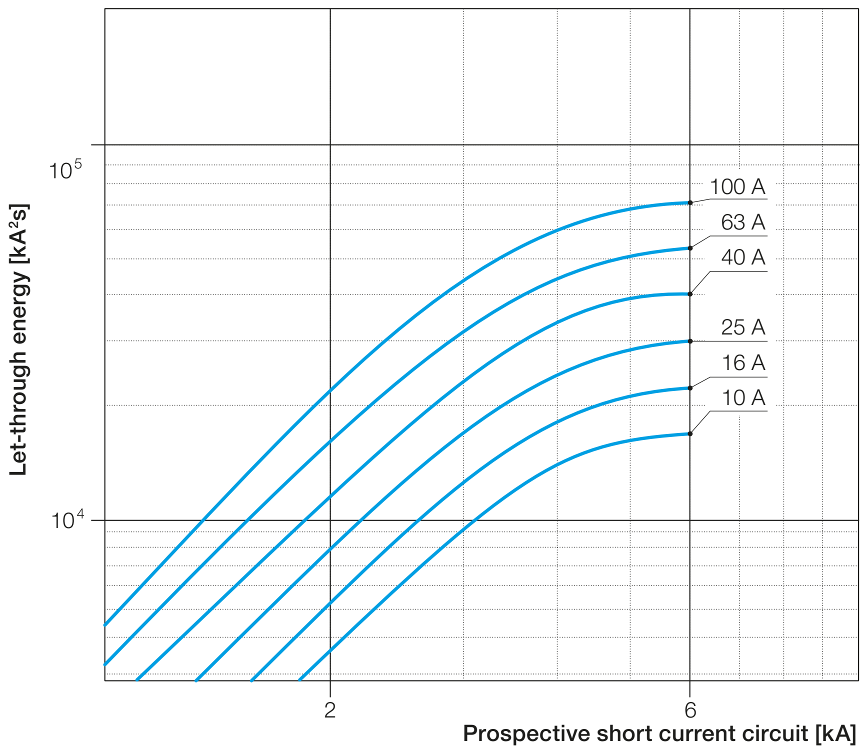
MCBs technical details

Limitation of specific let-through energy I²t

S800 S characteristics B, C, D and K

690 V let-through energy



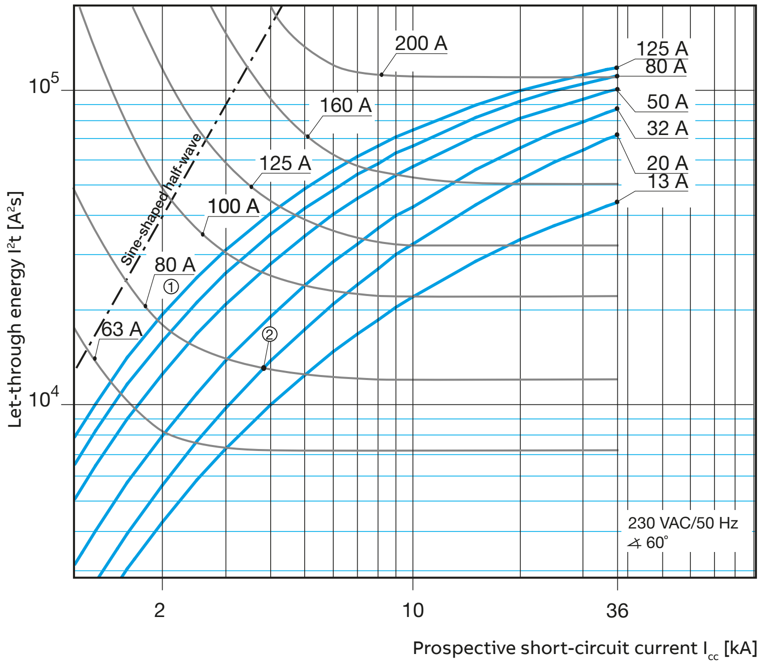


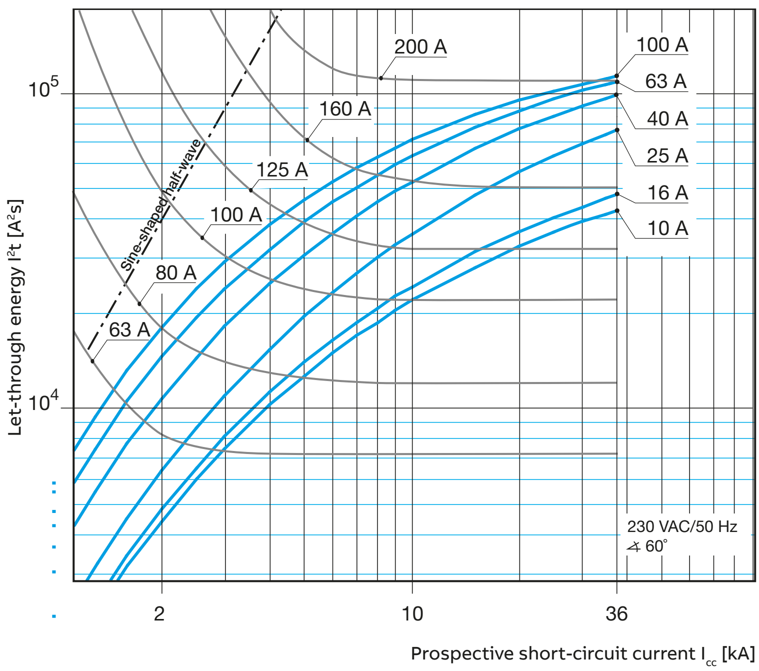
MCBs technical details

Limitation of specific let-through energy I²t

S800 N characteristics B, C and D

230 V let-through energy





① Min. pre-arching I²t, e.g. NH80 A gL/gG
② Max. let-through I²t, e.g. S801N-C20

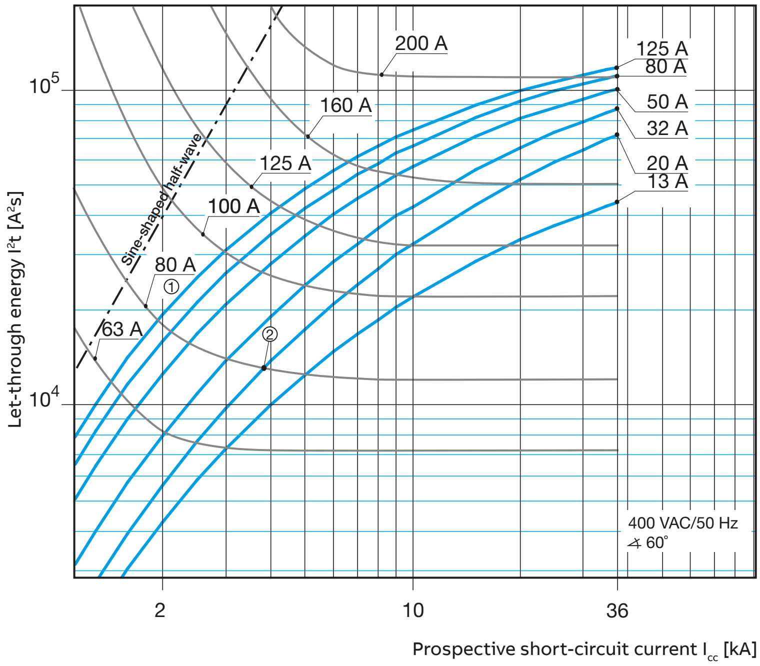
Selectivity with respect to the upstream fuse to the point of intersection of both curves 1 and 2, e.g. S801N-C20 to NH80A gL/gG: Selectivity up to min. 3.8 kA.

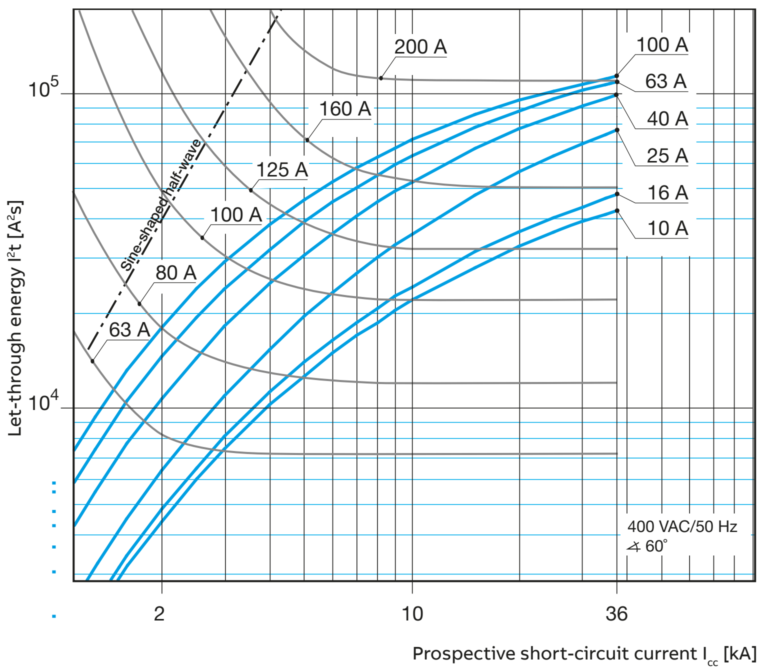
MCBs technical details

Limitation of specific let-through energy I²t

S800 N characteristics B, C and D

400 V let-through energy





① Min. pre-arching I²t, e.g. NH80 A gL/gG
② Max. let-through I²t, e.g. S803N-C20

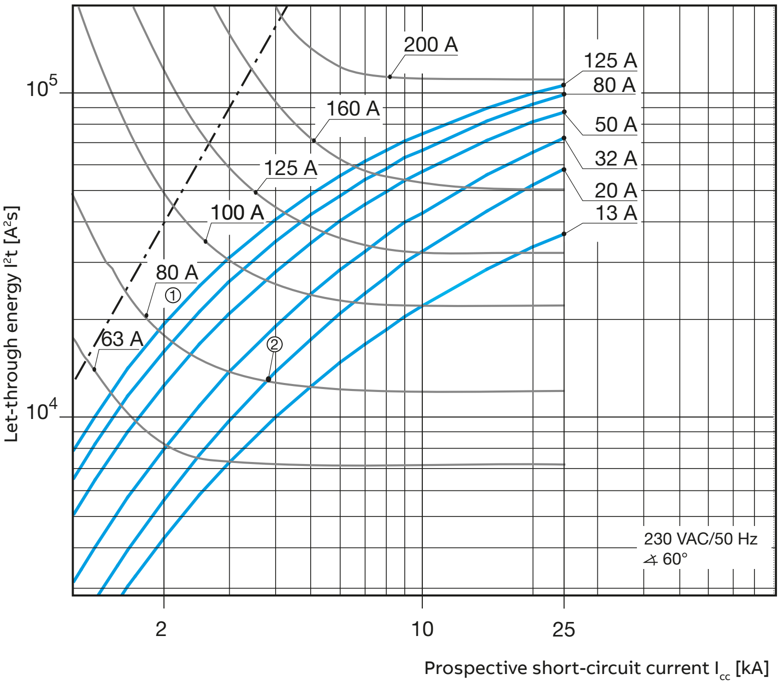
Selectivity with respect to the upstream fuse to the point of intersection of both curves 1 and 2, e.g. S801N-C20 to NH80A gL/gG: Selectivity up to min. 3.8 kA.

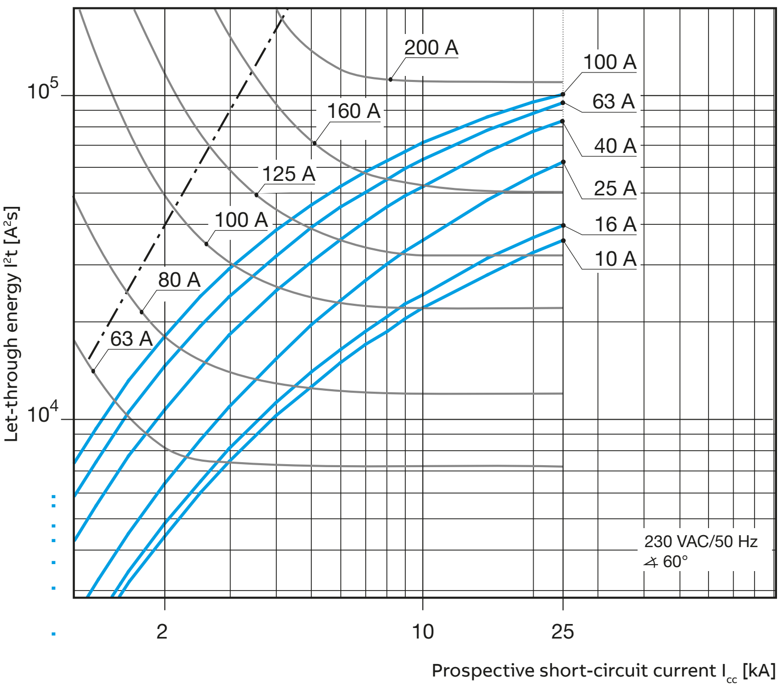
MCBs technical details

Limitation of specific let-through energy I^2t

S800 C characteristics B, C, D and K

230 V let-through energy





① Min. pre-arching I^2t, e.g. NH80 A gL/gG
② Max. let-through I^2t, e.g. S801C-C20

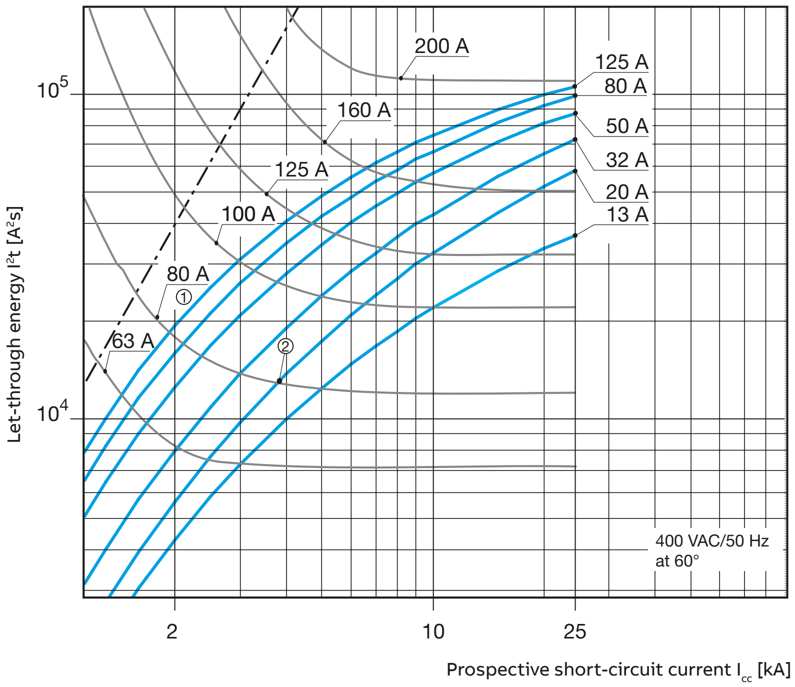
Selectivity with respect to the upstream fuse to the point of intersection of both curves 1 and 2, e.g. S801C-C20 to NH80A gL/gG: Selectivity up to min. 3.8 kA

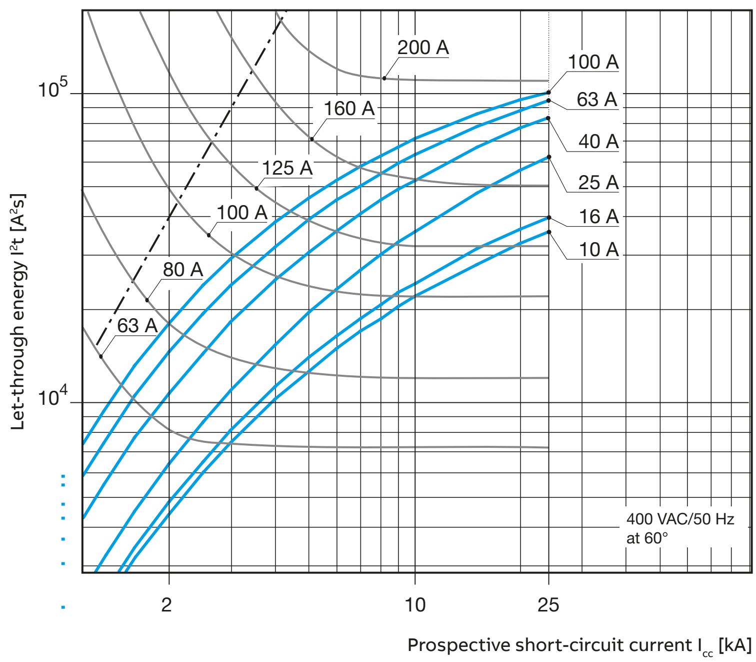
MCBs technical details

Limitation of specific let-through energy I^2t

S800 C characteristics B, C, D and K

400 V let-through energy





① Min. pre-arching I^2t, e.g. NH80 A gL/gG
② Max. let-through I^2t, e.g. S803C-C20

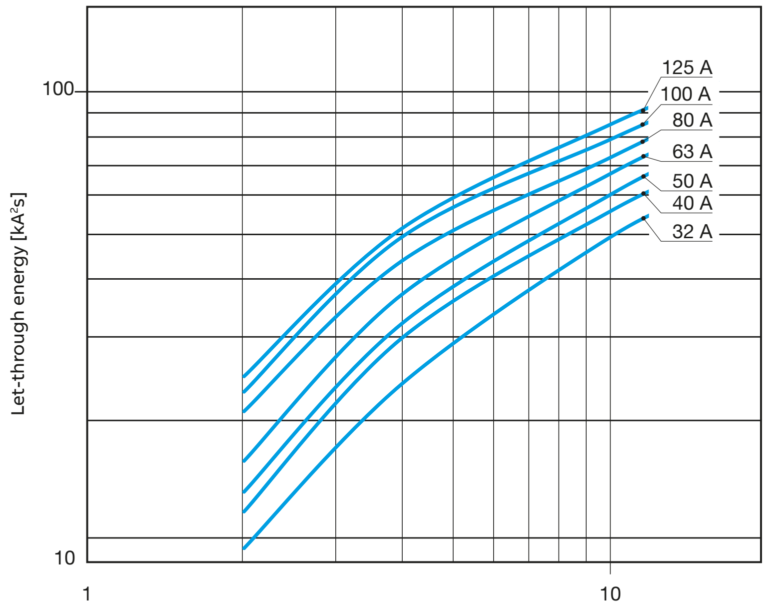
Selectivity with respect to the upstream fuse to the point of intersection of both curves 1 and 2, e.g. S801C-C20 to NH80A gL/gG: Selectivity up to min. 3.8 kA

MCBs technical details

Limitation of specific let-through energy I^2t

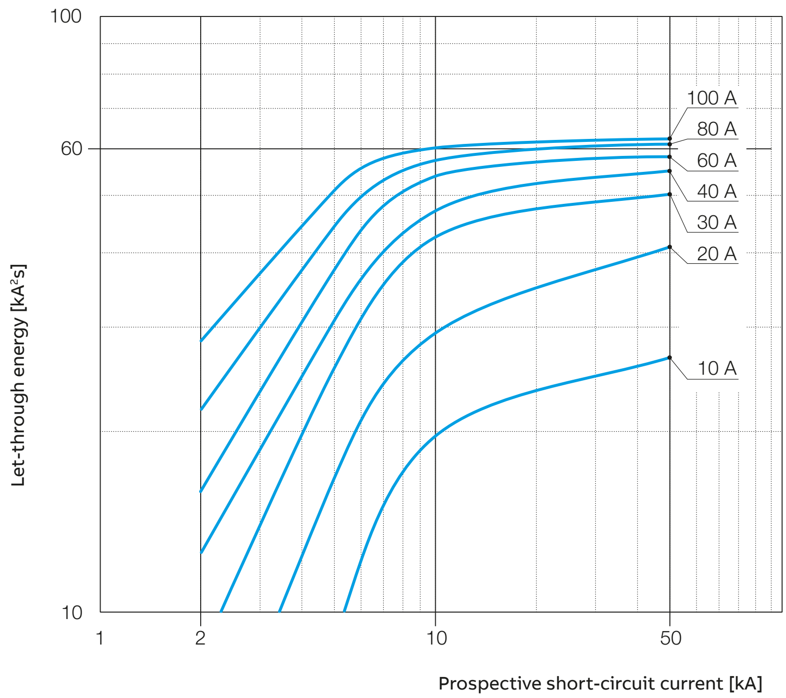
S800B characteristics B, C, D and K

230/400 V let-through energy



S800 U characteristics Z and K

240 V let-through energy



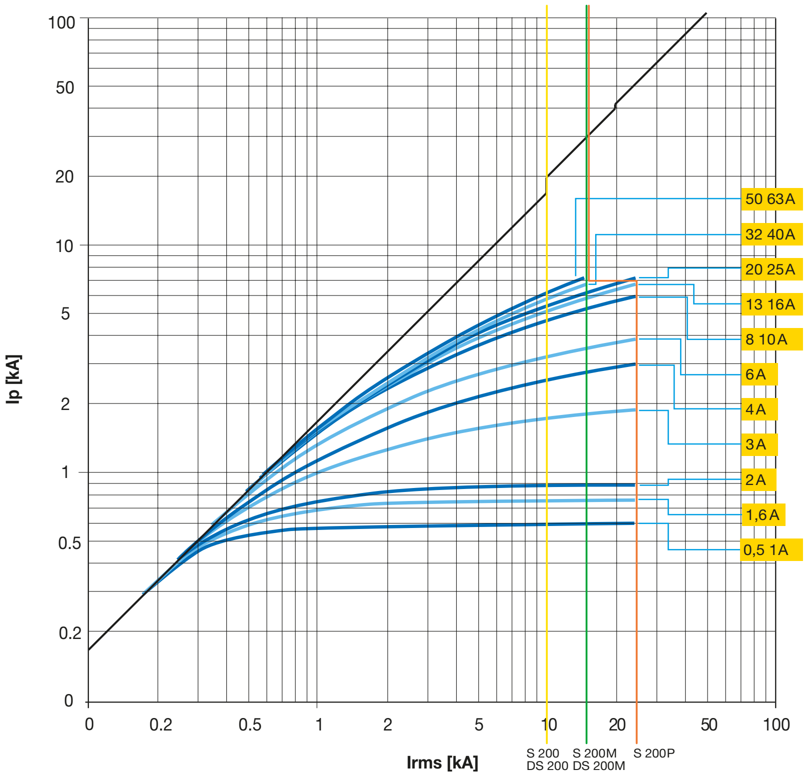
MCBs technical details

Peak current I_p

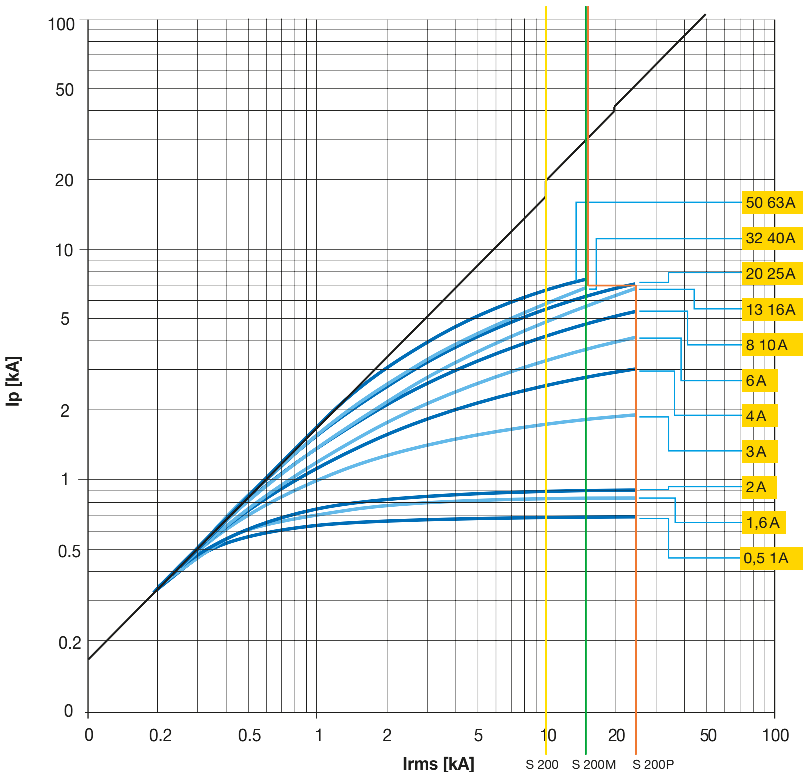
Limitation curves - Peak current values

The Ip curves give the values of the peak current, expressed in kA, in relation to the perspective symmetrical short-circuit current (kA).

S 200-S 200 M-S 200 P, characteristics B-C; DS 200-DS 200 M, characteristics B-C



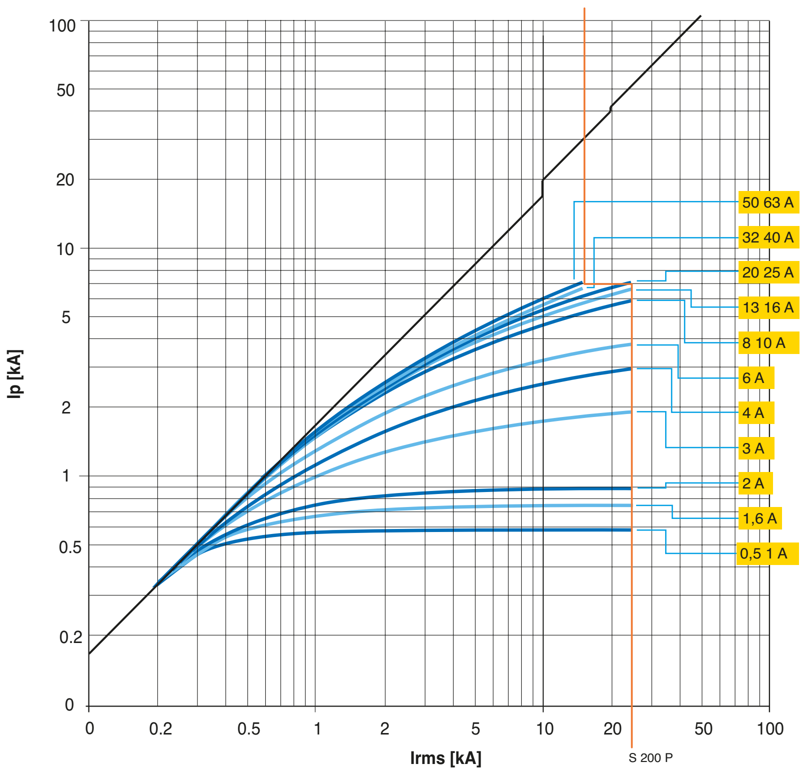
S 200-S 200 M-S 200 P, characteristics K-D



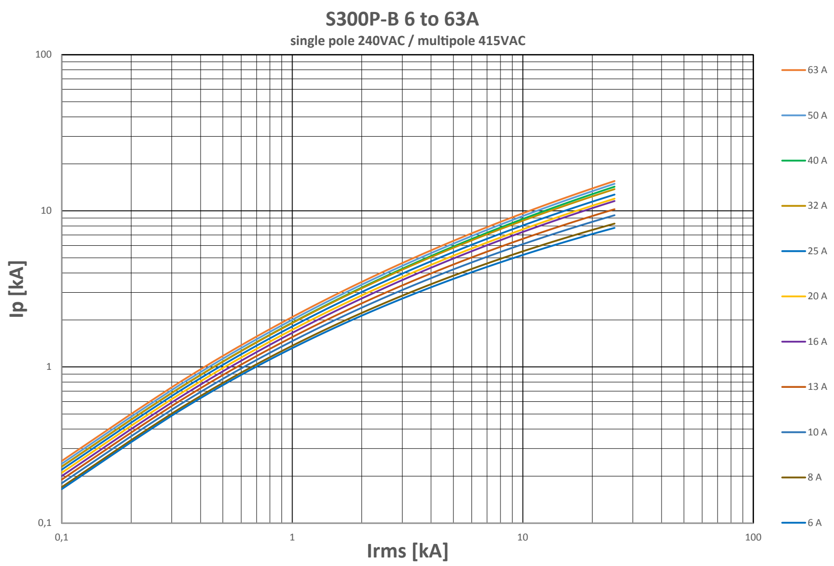
MCBs technical details

Peak current I_p

S 200-S 200 M-S 200 P, characteristic Z



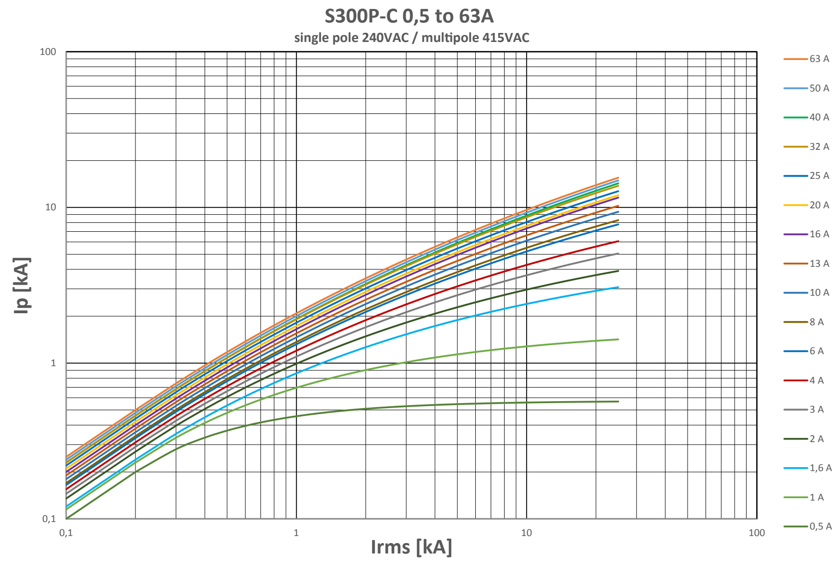
S 300 P, characteristic B



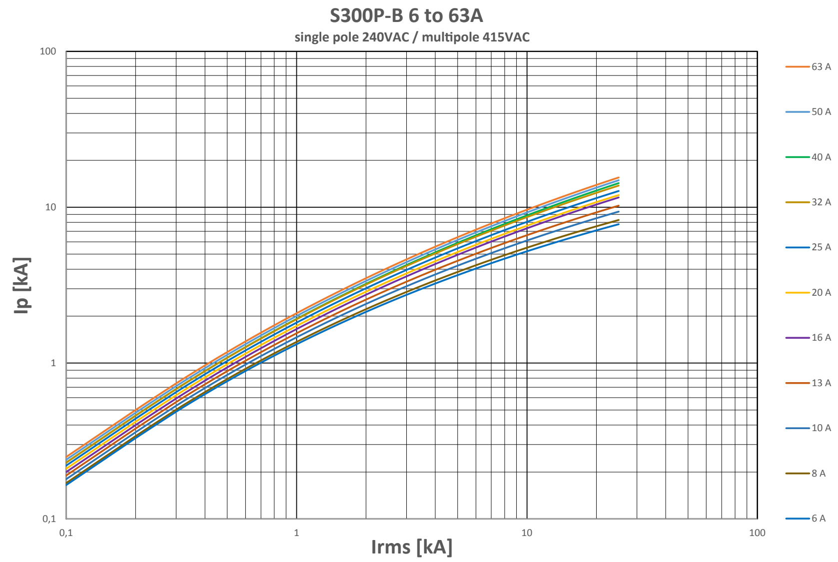
MCBs technical details

Peak current I_p

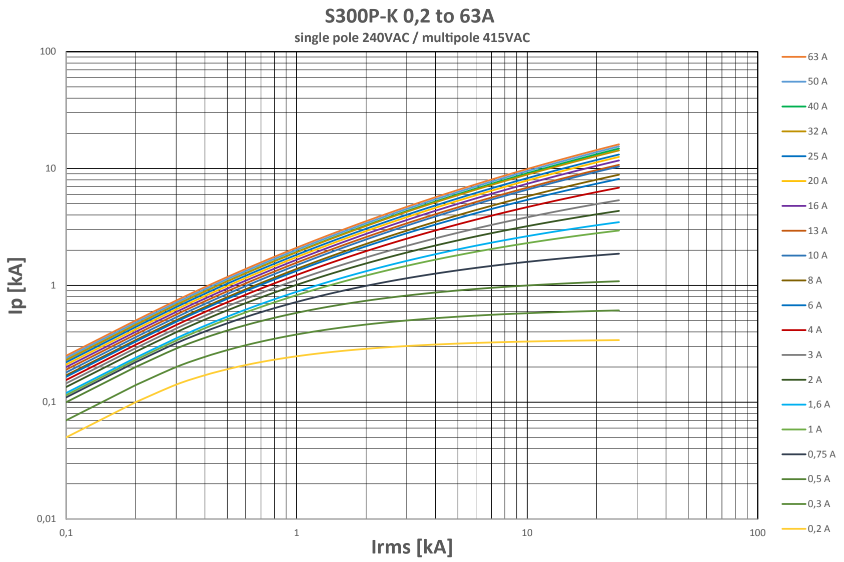
S 300 P, characteristic C



S 300 P, characteristic D



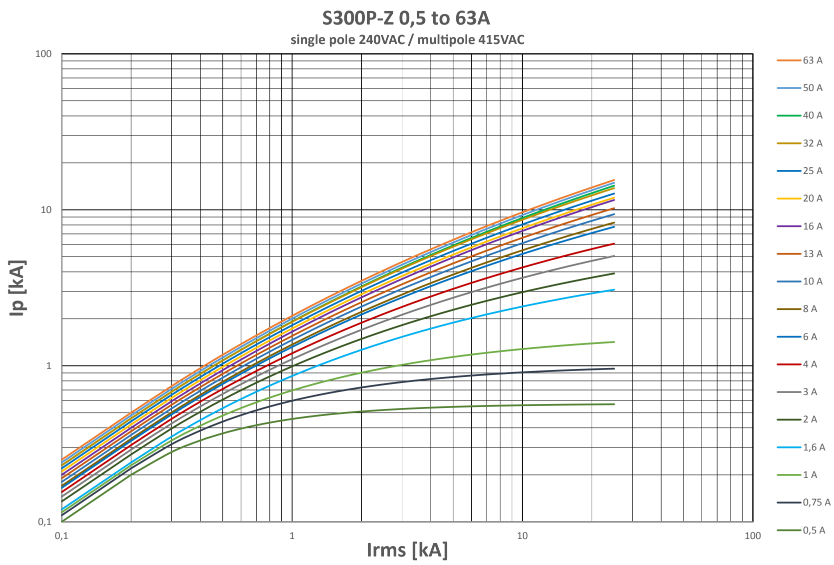
S 300 P, characteristic K



MCBs technical details

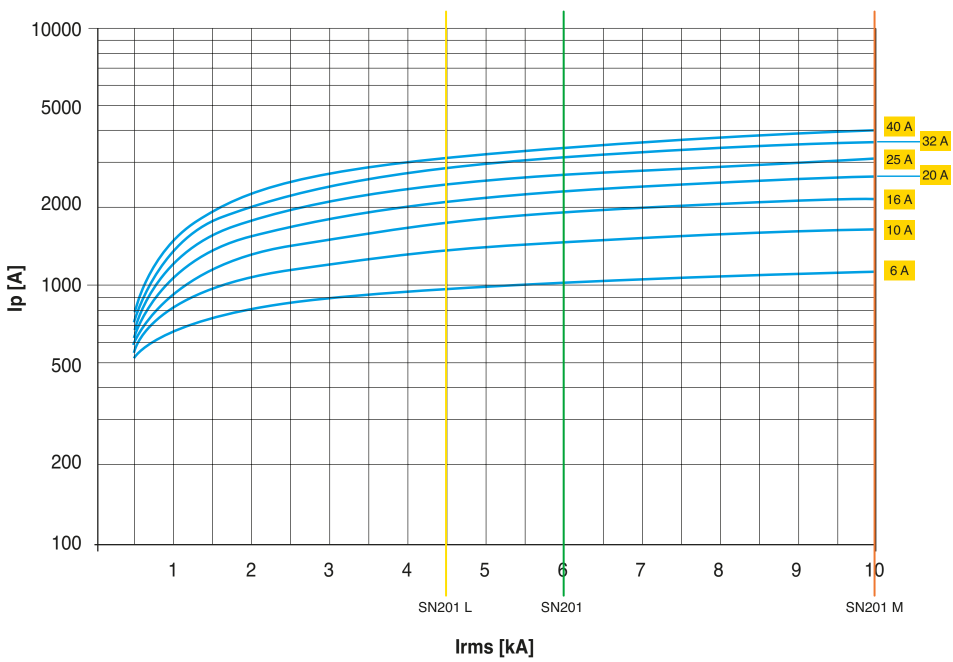
Peak current I_p

S 300 P, characteristic Z



SN 201 L, SN 201, SN 201 M, characteristic B

230 V

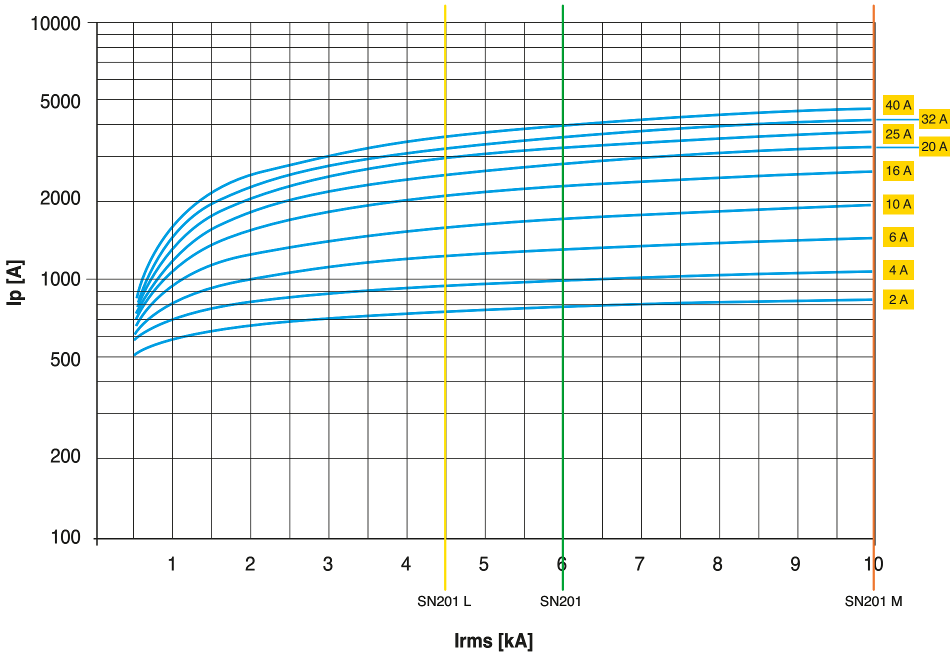


MCBs technical details

Peak current I_p

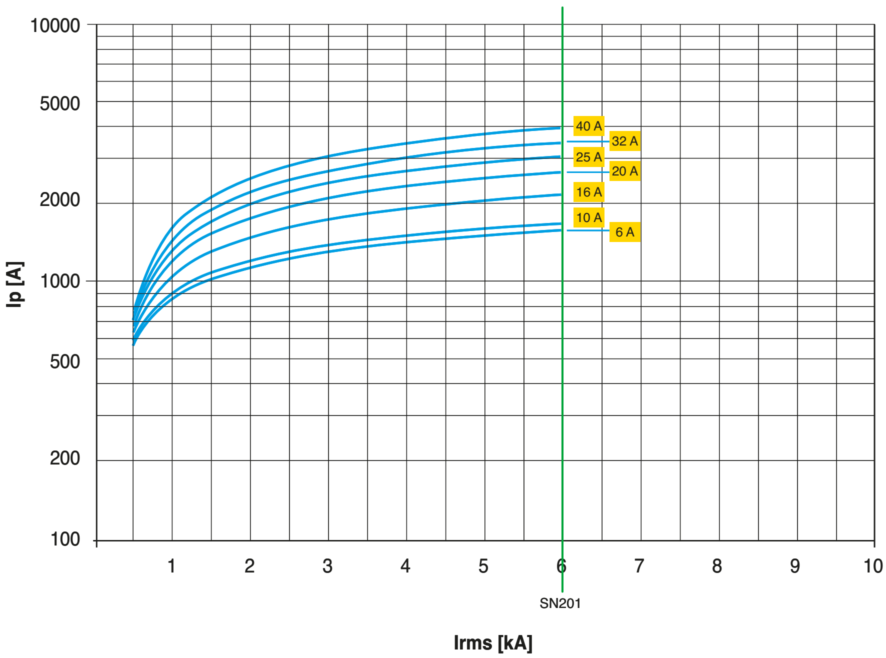
SN 201 L, SN 201, SN 201 M, characteristic C

230 V



SN 201, characteristic D

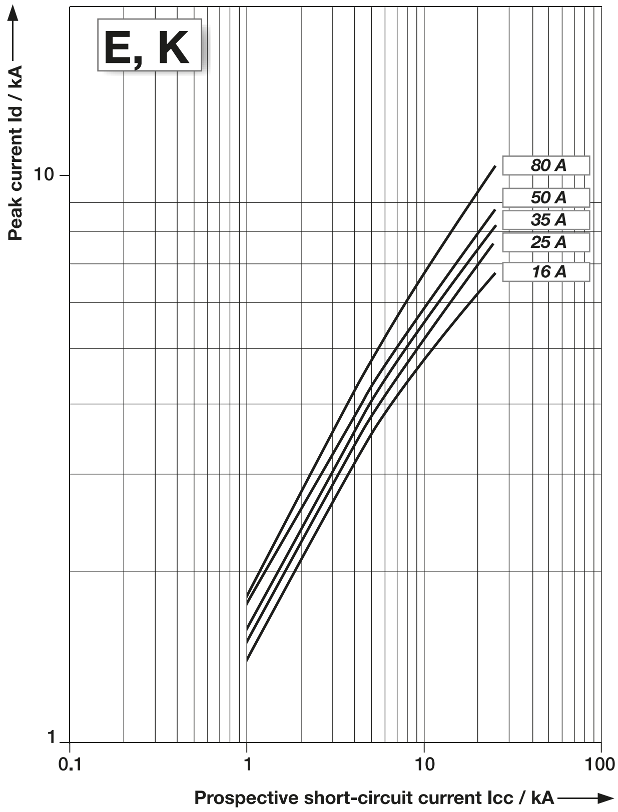
230 V



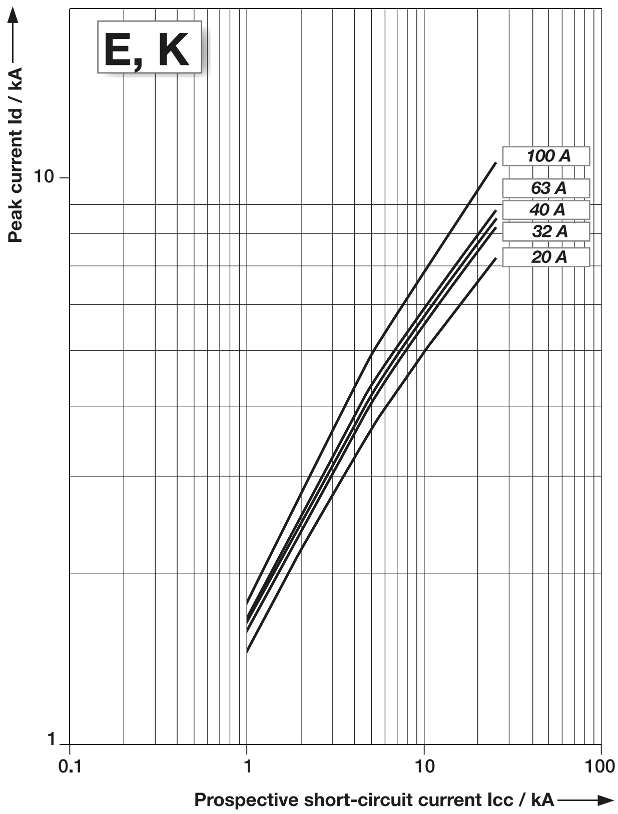
MCBs technical details

Peak current I_p

S 750 DR characteristics $E_{selective}$, $K_{selective}$



230 VAC/50 Hz
∢ 60°

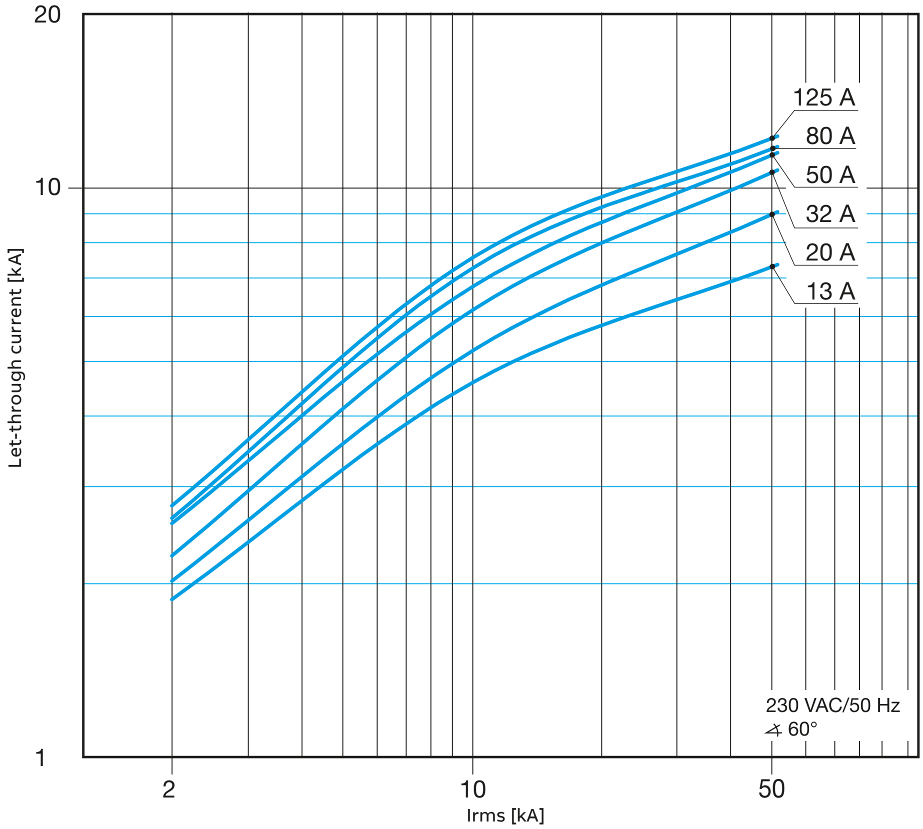


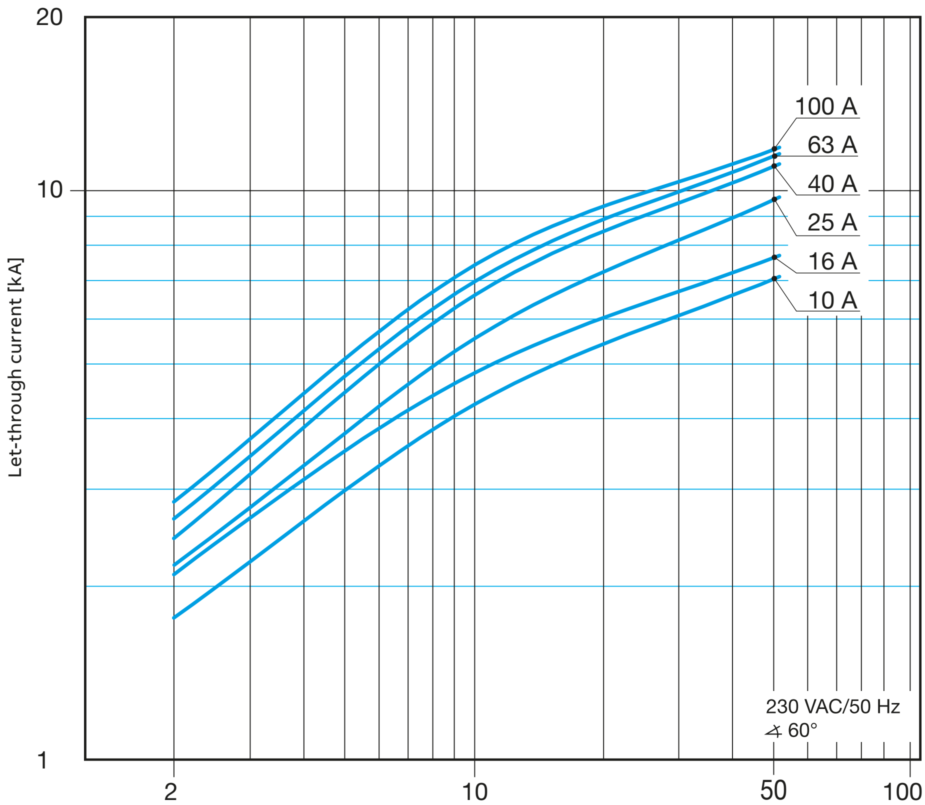
MCBs technical details

Peak current I_p

S 800 S characteristics B, C, D and K

230/400 V let-through current



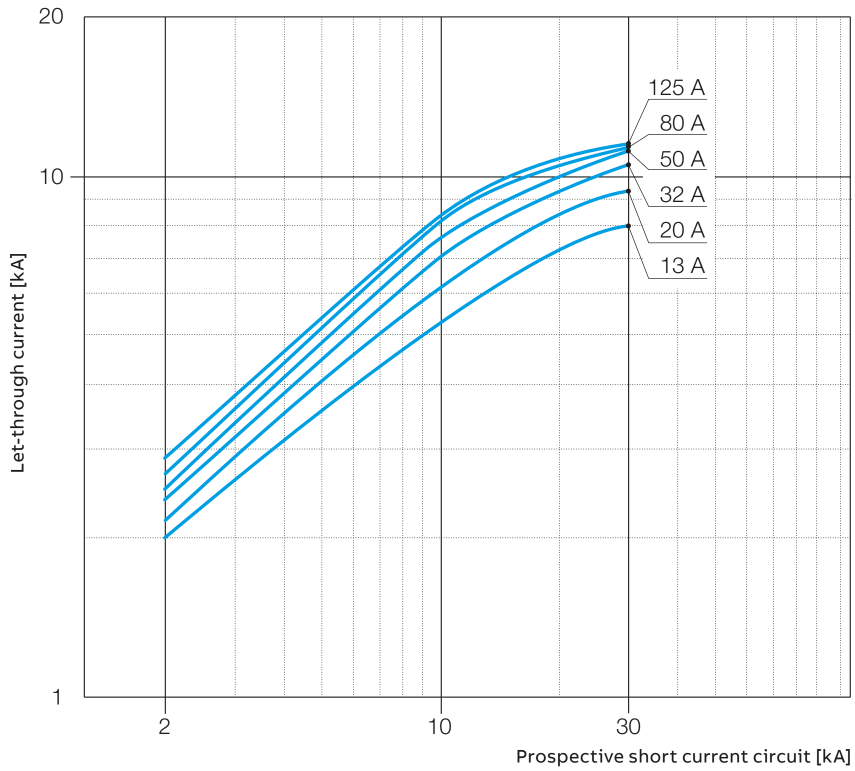


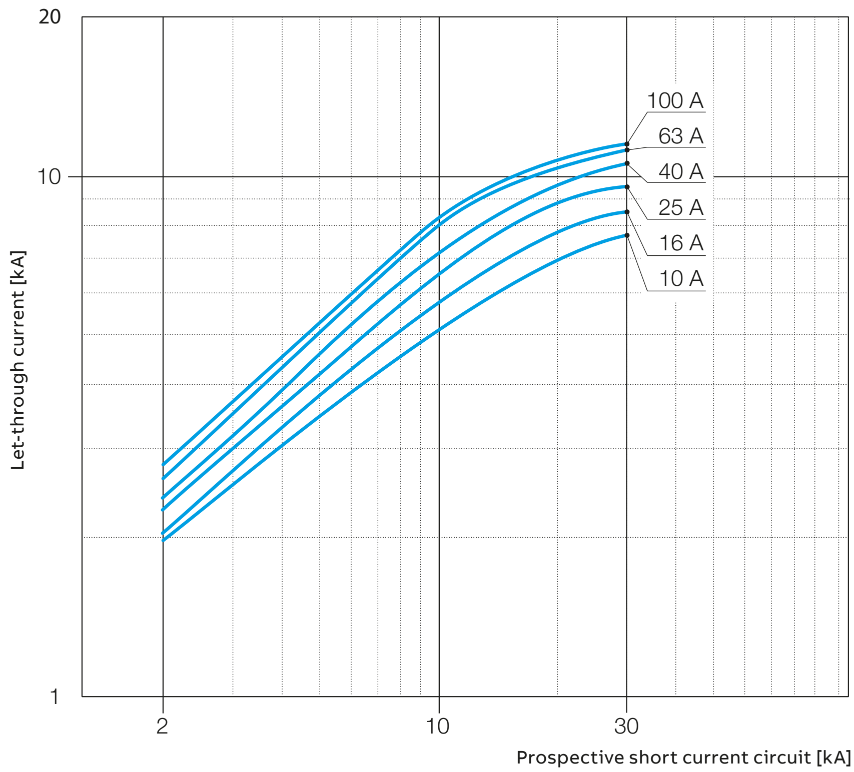
MCBs technical details

Peak current I_p

S 800 S characteristics B, C, D and K

440 V let-through current



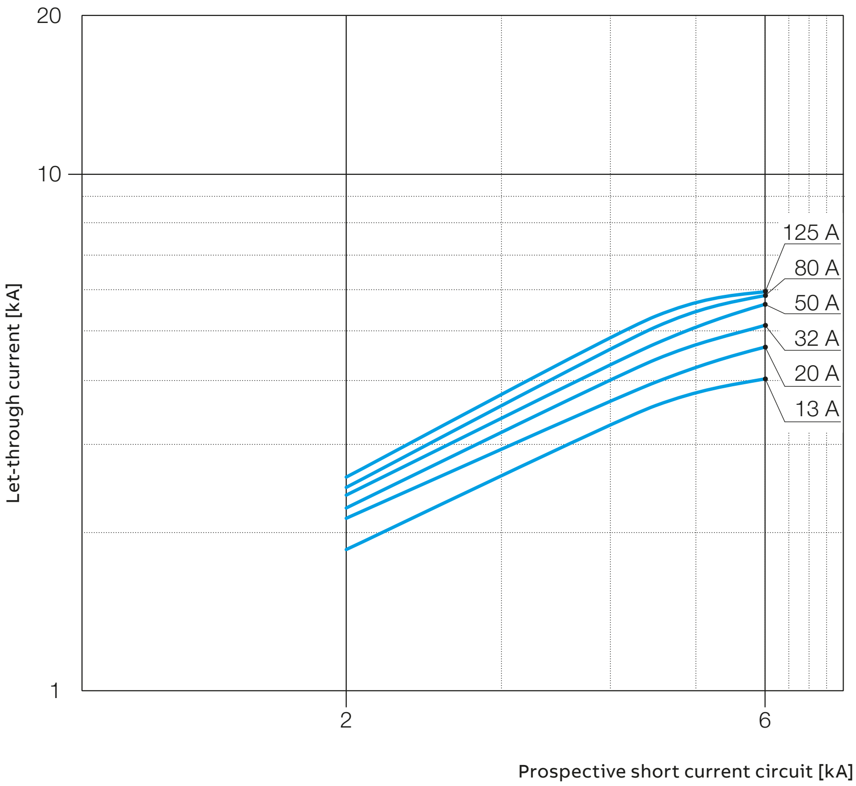


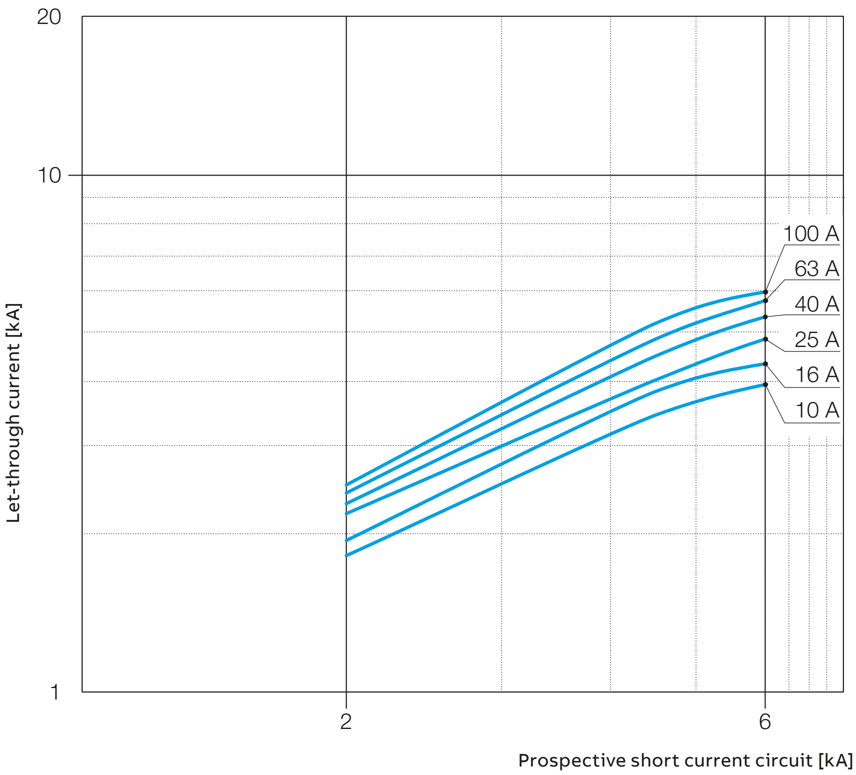
MCBs technical details

Peak current I_p

S 800 S characteristics B, C, D and K

690 V let-through current



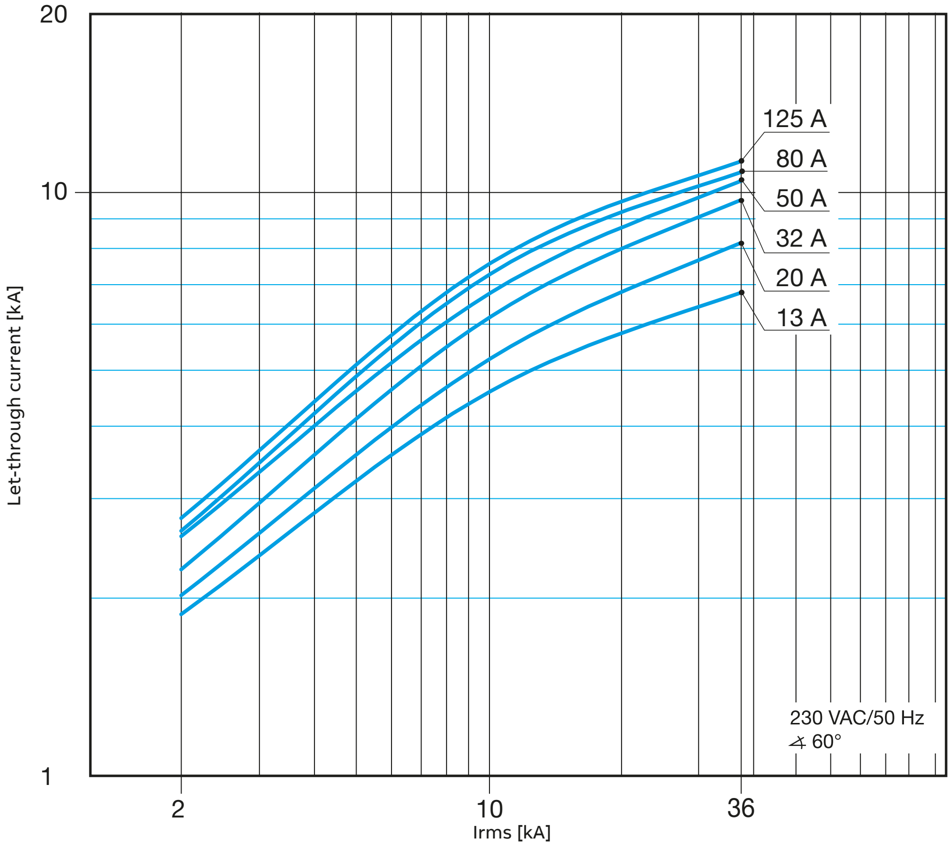


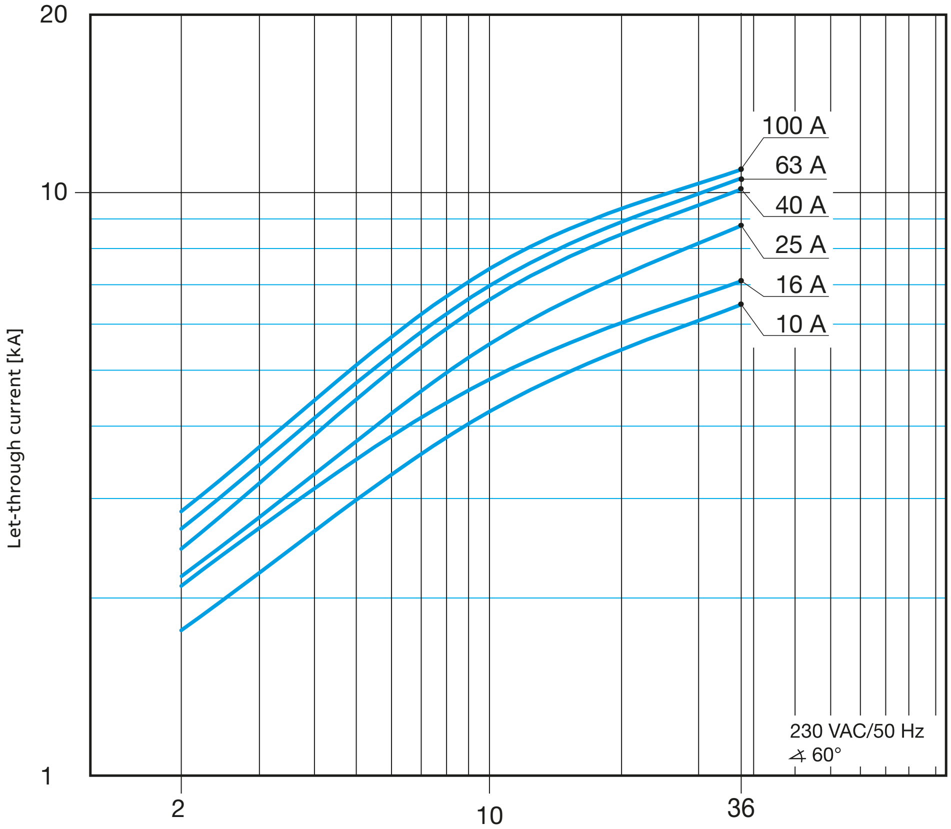
MCBs technical details

Peak current I_p

S 800 N characteristics B, C and D

230/400 V let-through current



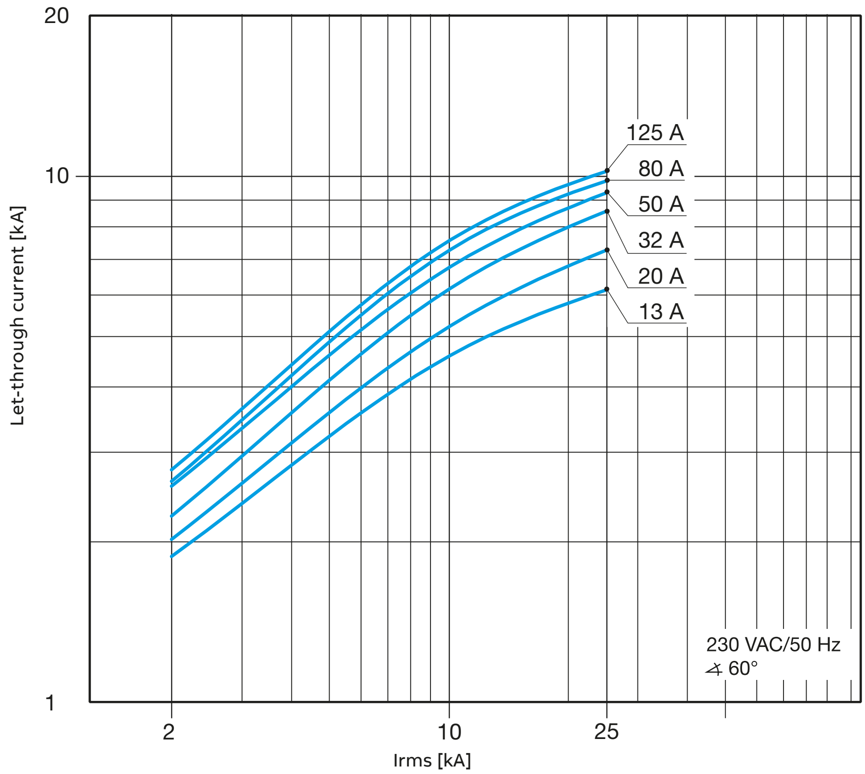


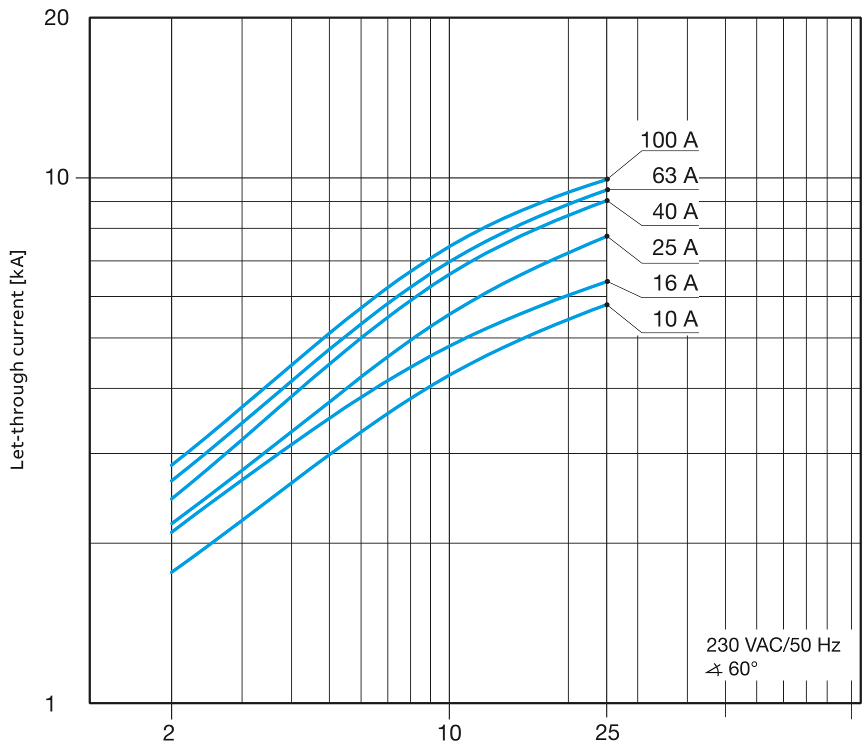
MCBs technical details

Peak current I_p

S 800 C characteristics B, C, D and K

230/400 V let-through current



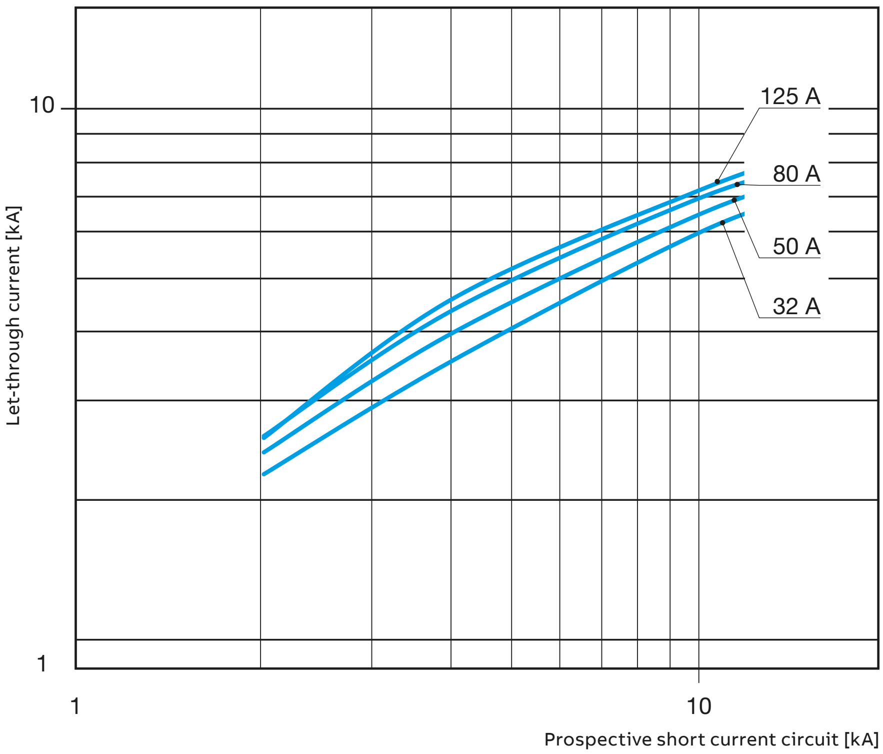


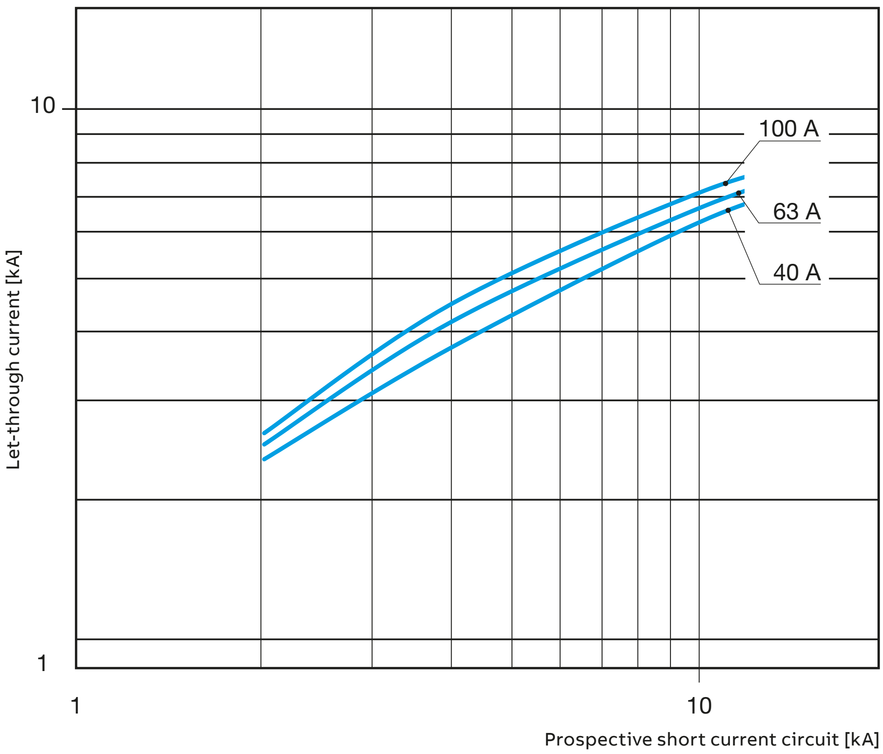
MCBs technical details

Peak current I_p

S 800 B characteristics B, C, D and K

230/400 V let-through current



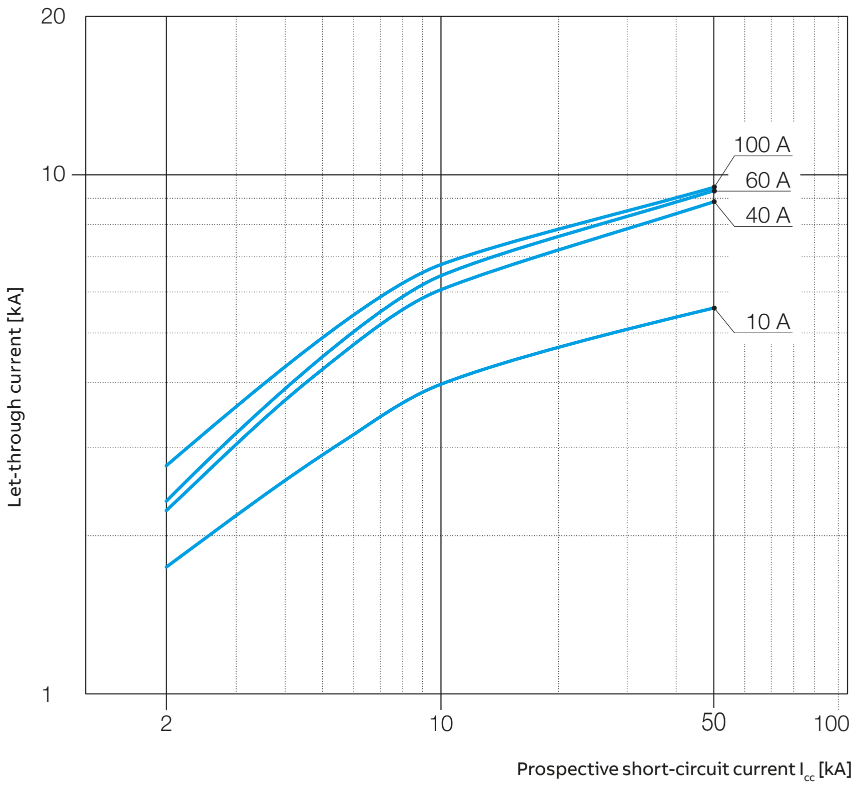


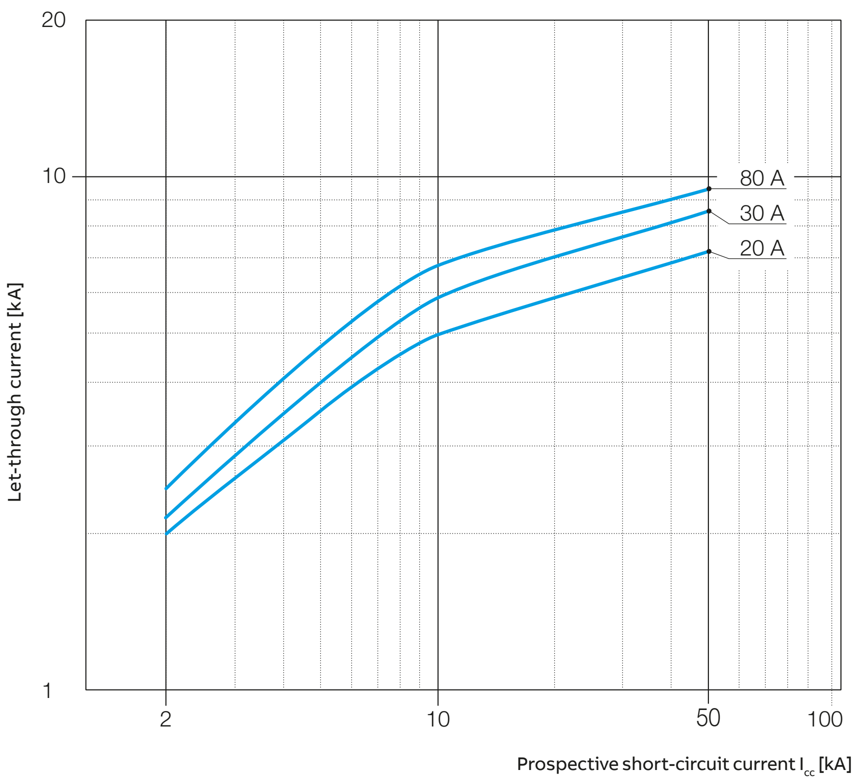
MCBs technical details

Peak current I_p

S 800 U characteristics Z and K

240 V let-through current





MCBs technical details

SOC - Selected Optimized Coordination

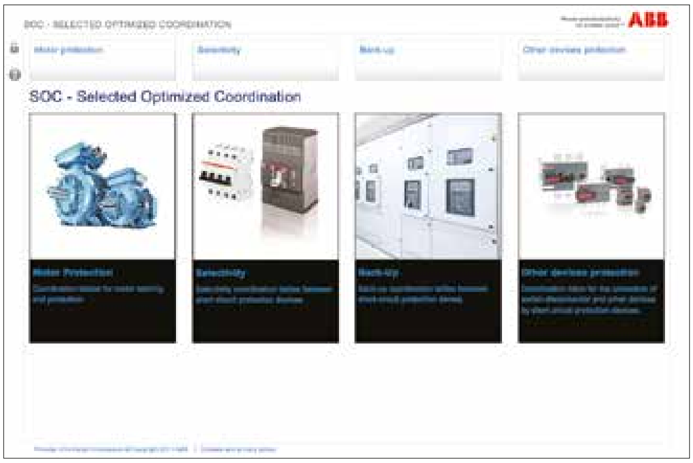
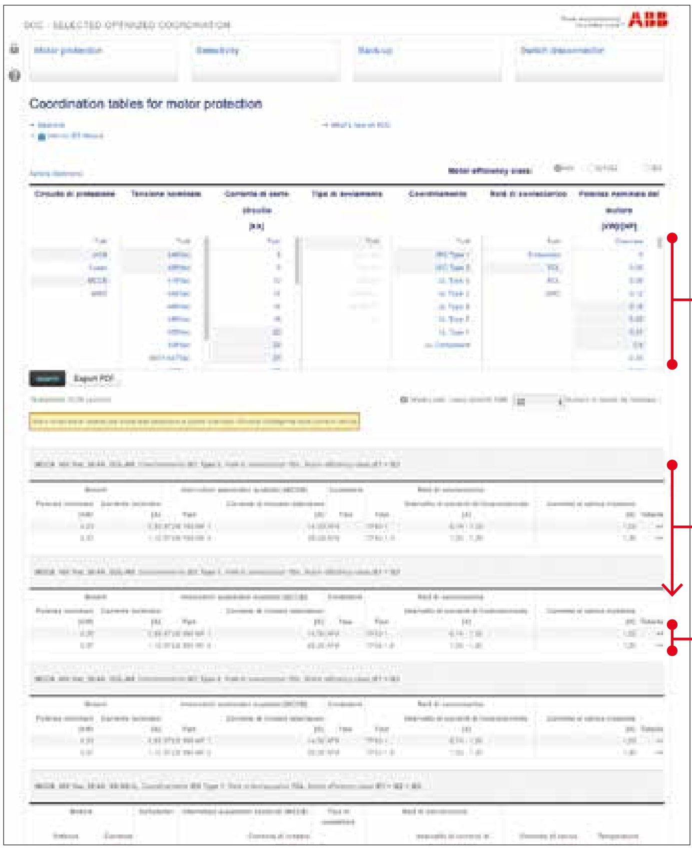


ABB is constantly improving or developing new products. Coordination between these products is therefore constantly updated. Providing always the up-to-date version in an environmental-friendly way the World Wide Web is a perfect platform. Therefor ABB offers a new tool online, SOC – Selected Optimized Coordination.

SOC is a web tool for the selection of ABB products in these applications:

- Motor starting and protection
- Selectivity between protection devices
- Back-up protection
- Other devices protection

Please check out under:
http://applications.it.abb.com/SOC_SNB



In the on line coonfigurator you can choose among many filters, it is possible to select more than one filter at the same time.

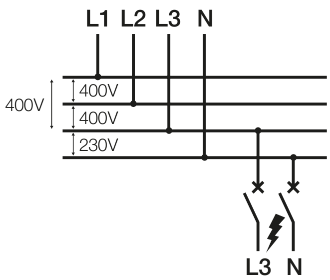
Results are shown in the bottom part of the page. If a search does not produce any result, "Smart Search" will show the closest tables matching the search criteria.

Click on ">>" on the rightmost part of each record, to view the whole coordination table, tables can be printed or saved as PDF files.

MCBs technical details
Coordination tables

Back-up protection
The tables given provide the value (in kA, referring to the breaking capacity according to the IEC 60947-2 Standard) for which the back-up protection among the combination of selected circuit-breakers is verified. The tables cover the possible combinations between ABB SACE Tmax series of moulded-case circuit-breakers and those between the above-mentioned circuit-breakers and the ABB series of modular circuit-breakers.
The values indicated in the tables refer to the voltage:
- Vn of 230/240 V AC for coordination with modular SN 201 circuit-breakers
- Vn of 400/415 V AC for all the other coordinations.

Selective protection
The tables given provide the value (in kA, referring to the breaking capacity according to the IEC 60947-2 Standard) for which the selective protection is verified among the combination of selected circuit-breakers. The tables cover the possible combinations between ABB SACE Tmax series of moulded-case circuit-breakers, and the ABB series of modular circuit-breakers. The values in the table represent the maximum value obtainable of discrimination between supply side circuit-breaker and load side circuit-breaker referring to the voltage:
- Vn of 230/240 V AC for the SN 201 circuit-breakers and Vn of 400/415 V AC for the supply side circuit-breakers in the coordination between MCB with the modular SN 201 circuit-breakers (see picture).
- Vn of 400/415 V AC for all the other coordinations.



Note
The following tables give the breaking capacities at 415 V AC for circuit-breakers SACE Tmax.

Tmax @ 415 V AC	
Version	**Icu [kA]**
B	16
C	25
N	36
S	50
H	70
L (T2)	85
L (T4, T5)	120
V	200

Caption
MCB = miniature circuit-breakers (SN 201, S 2, S 800)
MCCB = moulded-case circuit-breakers (Tmax)

For moulded-case or air circuit-breakers:
TM = thermomagnetic release
– TMD (Tmax)
– TMA (Tmax)
M = magnetic only release
– MF (Tmax)
– MA (Tmax)
EL = electronic release
– PR221DS - PR222DS (Tmax)

For miniature circuit-breakers:
B = trip characteristic (Im=3...5In)
C = trip characteristic (Im=5...10In)
D = trip characteristic (Im=10...20In)
K = trip characteristic (Im=10...14In)
Z = trip characteristic (Im=2...3In)

For solutions not shown in these tables, please consult the website: http://bol.it.abb.com or contact ABB SACE

For solutions not shown in these tabels referring to SMISSLINE or S800 please use: leaflet 2CCC451039L02xx

MCBs technical details

Coordination tables: back-up

MCB -MCB @240 V

			Supply s.	S200	S200M	S200P	S200P	25gG	40gG	50gG	63gG	80gG	100gG
	Char.			B-C	B-C	B-C	B-C						
		Icu [kA]		20	25	40	25						
Load s.			In [A]	0,5…63	0,5…63	0,5…25	32…63						
SN201 L	B,C	6	2...40	20	25	40	25	35	25	20	15	10	10
SN201	B,C,D	10	2...40	20	25	40	25	35	25	20	15	10	10
SN201 M	B,C	10	2...40	20	25	40	25	35	25	20	15	10	10
S200	B,C, K,Z	20	0,5…63		25	40	25						
S200 M	B,C,D	25	0,5…63			40							
S200 P	B,C	40	0,5…25										
	D,K,Z	25	32…63										

MCBs technical details

Coordination tables: back-up

MCB - MCB @ 415 V

Load S.	Char.	Icu [kA]	Supply S.	S200	S200M	S200P	
			Char.	B-C	B-C	B-C	
			Icu [kA]	10	15	25	15
			In [A]	0.5..63	0.5..63	0.5..25	32..63
S200	B,C,K,Z	10	0.5..63		15	25	15
S200M	B,C	15	0.5..63			25	
S200P	B,C, D,K,Z	25	0.5..25				
		15	32..63				

S800S – SN201 @ 230/240 V

Load s.	Char.	Icu [kA]	Supply s.	S800S							
			Char.	B, C, D, K							
			Icu [kA]	50							
			In [A]	25	32	40	50	63	80	100	125
SN201	B, D	10	6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50

S800S – SN201 @ 230/240 V

Load s.	Char.	Icu [kA]	Supply s.	S800S							
			Char.	B, C, D, K							
			Icu [kA]	50							
			In [A]	25	32	40	50	63	80	100	125
SN201	C	10	2	50	50	50	50	50	50	50	50
			4	50	50	50	50	50	50	50	50
			6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50

MCBs technical details

Coordination tables: back-up

S800S – SN201 L @ 230/240 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
SN201 L	B, C	6	2	50	40	25	25	18	15	15	15
			4	50	40	25	25	18	15	15	15
			6	50	40	25	25	18	15	15	15
			10	50	40	25	25	18	15	15	15
			16	50	40	25	25	18	15	15	15
			20		40	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
			40					18	15	15	15

S800S – SN201 M @ 230/240 V

		Upstream		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
SN201 M	B	10	6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50

S800S - SN201 M @ 230/240 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
SN201 M	C	10	2	50	50	50	50	50	50	50	50
			4	50	50	50	50	50	50	50	50
			6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50

MCBs technical details

Coordination tables: back-up

S800S – S200 @230/400 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5...6	50	50	50	50	50	50	50	50
			8	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

S800S – S200L @230/400 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200L	C	6	6...8	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50

MCBs technical details
Coordination tables: back-up

S800S – S200M @230/400 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

S800S – S200P @230/400 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
		15	32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
		15	32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

MCBs technical details

Coordination tables: back-up

S800S – S400E @230/400 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400E	B	Icn [kA] 6	6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400E	C	Icn [kA] 6	0.5…6	50	50	50	50	50	50	50	50
			8	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

MCBs technical details
Coordination tables: back-up

S800S – S400M @230/400 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS403M	B, D	Icn [kA] 10	4*...16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

* for B characteristic only

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	C, K	50	0.5...2	50	50	50	50	50	50	50	50
		25	3...20	50	50	50	50	50	50	50	50
		15	25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

S800S – S400M @254/440 V

		Supply s.		S800S							
	Char.			B, C, D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	C. K	15	0.5...2	30	30	30	30	30	30	30	30
		10	3...10	30	30	30	30	30	30	30	30
		6	13	30	30	30	30	30	30	30	30
			16	30	30	30	30	30	30	30	30
			20		30	30	30	30	30	30	30
			25			30	30	30	30	30	30
			32				30	30	30	30	30
			40					30	30	30	30
			50						30	30	30
			63							30	30

MCBs technical details
Coordination tables: back-up

S800N – S200 @ 230/400 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			13	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5…6	36	36	36	36	36	36	36	36
			8	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			13	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

S800N – S200L @ 230/400 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200L	C	6	6…8	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			13	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36

MCBs technical details

Coordination tables: back-up

S800N – S200M @ 230/400 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

S800N – S200P @ 230/400 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
		15	32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
		15	32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

MCBs technical details

Coordination tables: back-up

S800N – S400E @230/400 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400E	B	Icn [kA] 6	6	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			13	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400E	C	Icn [kA] 6	0.5...6	36	36	36	36	36	36	36	36
			8	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			13	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

MCBs technical details

Coordination tables: back-up

S800N – S400M @230/400 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401MB FS403MB	B, D	Icn [kA] 10	4*...16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

* for B characteristic only

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401MC FS403MC	C, K	10	0.5...2	36	36	36	36	36	36	36	36
		25	3...20	36	36	36	36	36	36	36	36
		15	25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

S800N – S400M @254/440 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		20							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	C, K	15	0.5...2	20	20	20	20	20	20	20	20
		10	3...10	20	20	20	20	20	20	20	20
		6	13	20	20	20	20	20	20	20	20
			16	20	20	20	20	20	20	20	20
			20		20	20	20	20	20	20	20
			25			20	20	20	20	20	20
			32				20	20	20	20	20
			40					20	20	20	20
			50						20	20	20
			63							20	20

MCBs technical details

Coordination tables: back-up

S800N – SN201 @ 230/240 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
SN201	B, D	10	6	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36

S800N – SN201 @ 230/240 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
SN201	C	10	2	36	36	36	36	36	36	36	36
			4	36	36	36	36	36	36	36	36
			6	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36

S800N – SN201L @ 230/240 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
SN201 L	B, C	6	2	36	36	25	25	18	15	15	15
			4	36	36	25	25	18	15	15	15
			6	36	36	25	25	18	15	15	15
			10	36	36	25	25	18	15	15	15
			16	36	36	25	25	18	15	15	15
			20		36	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
			40					18	15	15	15

MCBs technical details

Coordination tables: back-up

S800N – SN201M @ 230/240 V

		Supply s.		S800N							
	Char.			B, C, D							
Load.s		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
SN201 M	B	10	6	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36

S800N – SN201M @ 230/240 V

		Supply s.		S800N							
	Char.			B, C, D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
SN201 M	C	10	2	36	36	36	36	36	36	36	36
			4	36	36	36	36	36	36	36	36
			6	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36

S800C – S200 @ 230/400 V

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			13	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

MCBs technical details

Coordination tables: back-up

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5…6	25	25	25	25	25	25	25	25
			8	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			13	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

S800C – S200M @ 230/400 V

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6…16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5…16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

MCBs technical details

Coordination tables: back-up

S800C – S200P @ 230/400 V

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6…16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
		15	32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5…16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
		15	32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

S800C – SN201 @ 230/240 V

		Supply s.		S800C							
	Char.			B, C, D, K							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
SN201	B, D	10	6	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25

MCBs technical details

Coordination tables: back-up

S800C – SN201 @ 230/240 V

		Supply s.		S800C							
	Char.			B, C, D, K							
Load.s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
SN201	C	10	2	25	25	25	25	25	25	25	25
			4	25	25	25	25	25	25	25	25
			6	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25

S800C – SN201L @ 230/240 V

		Supply s.		S800C							
	Char.			B, C, D, K							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
SN201L	B, C	6	2	25	25	25	25	18	15	15	15
			4	25	25	25	25	18	15	15	15
			6	25	25	25	25	18	15	15	15
			10	25	25	25	25	18	15	15	15
			16	25	25	25	25	18	15	15	15
			20		25	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
			40					18	15	15	15

S800C – SN201M @ 230/240 V

		Supply s.		S800C							
	Char.			B, C, D, K							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
SN201M	B	10	6	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25

MCBs technical details

Coordination tables: back-up

S800C – SN201M @ 230/240 V

		Supply s.		S800C							
	Char.			B, C, D, K							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
SN201M	C	10	2	25	25	25	25	25	25	25	25
			4	25	25	25	25	25	25	25	25
			6	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25

MCBs technical details

Coordination tables: back-up

S800C – S400E @ 230/400 V

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S400E	B	Icn [kA] 6	6	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			13	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	32		40	50	63	80	100	125
S400E	C	Icn [kA] 6	0.5…6	25	25	25	25	25	25	25	25
			8	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			13	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

MCBs technical details

Coordination tables: back-up

S800C – S400M @ 230/400 V

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	B, D	Icn [kA] 10	4*...16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	C	25	3...20	25	25	25	25	25	25	25	25
		15	25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

		Supply s.		S800C							
	Char.			B, C, D							
Load s.		Icu [kA]		25							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	25	3...20	25	25	25	25	25	25	25	25
		10	25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
			50						25	25	25
			63							25	25

MCBs technical details
Coordination tables: back-up

S800B – S200 @ 230/400 V

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
S200	B	10	6	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
			50					16	16	16
			63					16	16	16

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
S200	C, D, K, Z	10	0.5…6	16	16	16	16	16	16	16
			8	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
			50					16	16	16
			63					16	16	16

* only S800B-B,C
back-up values indicated in kA

MCBs technical details

Coordination tables: back-up

S800B – S400E @230/400 V

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125
S400E	B, C	6	6	16	16	16	16	16	16	16
			8	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
			50					16	16	16
			63					16	16	16

S800B – S400M @230/400 V

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
S400M	B, D	10	6**	16	16	16	16	16	16	16
			8**	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
			50					16	16	16
			63					16	16	16

* only S800B-B, C
** only S400M-B

MCBs technical details

Coordination tables: back-up

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125
S400M	C	10	2	16	16	16	16	16	16	16
			3	16	16	16	16	16	16	16
			4	16	16	16	16	16	16	16
			6	16	16	16	16	16	16	16
			8	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
			50					16	16	16
			63					16	16	16

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125
S400M	K	10	0.5...6	16	16	16	16	16	16	16
			8	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
			50					16	16	16
			63					16	16	16

MCBs technical details

Coordination tables: back-up

S800B – S200M @ 230/400 V

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
S200M	B	15	6	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
		10	50					16	16	16
			63					16	16	16

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
S200	C, D K, Z	15	0.5…6	16	16	16	16	16	16	16
			8	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
		10	50					16	16	16
			63					16	16	16

* only S800B-B,C

S800B – SN201 @ 230/240 V

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
SN201	B, D	10	6	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16

MCBs technical details
Coordination tables: back-up

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
SN201	C	10	2	16	16	16	16	16	16	16
			4	16	16	16	16	16	16	16
			6	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
SN201 L	B, C	6	2	16	16	16	16	15	15	15
			4	16	16	16	16	15	15	15
			6	16	16	16	16	15	15	15
			10	16	16	16	16	15	15	15
			16	16	16	16	16	15	15	15
			20	16	16	16	16	15	15	15
			25		16	16	16	15	15	15
			32			16	16	15	15	15
			40				16	15	15	15

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125*
SN201 M	B	10	6	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16

MCBs technical details

Coordination tables: back-up

		Supply s.		S800B						
	Char.			B, C, D, K						
Load s.		Icu [kA]								
			In [A]	32	40	50	63	80	100	125
SN201 M	C	10	2	16	16	16	16	16	16	16
			4	16	16	16	16	16	16	16
			6	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16

* only S800B-B,C
back-up values indicated in kA

S800U – S200 @ 230/400 V

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	0.5...6	50	50	50	50	50	50	50	50
			8	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

MCBs technical details

Coordination tables: back-up

S800U – S200M @ 230/400 V

Load s.	Char.	Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

Load s.	Char.	Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

S800U – S200P @ 230/400 V

Load s.	Char.	Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
		15	32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

MCBs technical details

Coordination tables: back-up

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5...16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
		15	32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

S800U – S400E @230/400 V

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400E	B	Icn [kA] 6	6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400E	C	Icn [kA] 6	0.5...6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

MCBs technical details

Coordination tables: back-up

S800U – S400M @230/400 V

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	B, D	Icn [kA] 10	4*...16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	C	25	3...20	50	50	50	50	50	50	50	50
		15	25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

		Supply s.		S800U							
	Char.			K, Z							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	25	3...20	50	50	50	50	50	50	50	50
		10	25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

MCBs technical details

Coordination tables: back-up

Class J fuse – S800U (1 pole) @240 V AC

		Supply s.		FUSE	
	Char.				
Load s.		Icu [kA]			
			In [A]	max. 250	max. 250
S800U	K, Z	30	10…80	30	30
			10…100	30	30

Class J fuse – S800U (multipole) @240 V AC

		Supply s.		FUSE	
	Char.				
Load s.		Icu [kA]			
			In [A]	max. 250	max. 250
S800U	K, Z	50	10…80	50	50
			10…100	50	50

Sace Tmax – S800U (1 pole) @240V AC

		Supply s.		T4					T5				
	Char.			N	S	H	L	V	N	S	H	L	V
Load s.		Icu [kA]		65	100	150	200	200	65	100	150	200	200
			In [A]	20…250	20…250	20…250	20…250	20…250	max. 600	max. 600	max. 600	max. 600	max. 600
S800U	K, Z	30	10…80	30	30	30	30	30	30	30	30	30	30
			90…100	30	30	30	30	30	30	30	30	30	30

Sace Tmax – S800U (multipole) @240V AC

		Supply s.		T4					T5				
	Char.			N	S	H	L	V	N	S	H	L	V
Load s.		Icu [kA]		65	100	150	200	200	65	100	150	200	200
			In [A]	20…250	20…250	20…250	20…250	20…250	max. 600	max. 600	max. 600	max. 600	max. 600
S800U	K, Z	50	10…80	50	50	50	50	50	50	50	50	50	50
			90…100	50	50	50	50	50	50	50	50	50	50

MCBs technical details
Coordination tables: back-up

MCCB - MCB @ 415 V

			Supply s.	XT1			XT2	XT3	XT4	XT1	XT2	XT3	XT4	XT1	XT2	XT4	XT2	XT4	XT2	XT4
			Version	B	C	N				S				H			L		V	
Load s.	Carat.	In [A]	Icu [kA]	18	25	36				50				70			120		150	
S200	B,C,K,Z	0,5..10 / 13..63	10	18	25	30	36	36 / 20	36	30	36	40 / 20	40	30	40	40	40	30	40	30
S200M	B,C,D,K,Z	0,5..10 / 13..63	15	18	25	30	36	36 / 25	36	30	50	40 / 25	40	30	50	40	50 / 50	30	50 / 50	30
S200P	B,C,D,K,Z	0,5..10	25			30	36	36	36	30	50	40	40	30	60	40	60	30	60	30
		13..25				30	36	30	36	30	50	30	40	30	50	40	50	30	50	30
		32..63	15	18	25	30	36	25	36	30	50	25	40	30	50	40	50	30	50	30
S800N	B,C,D	6..125	36							50	50	50	50	70	70	70	120	120	150	150
S800S	B,C,D,K	6..125	50											70	70	70	120	120	150	150
S800C	B,C,D,K	10..125				36	36	36	36	50	50	50	50	70	70	70	120	120	150	150

XT – S800B @ 230/400 V

			Supply s.	XT1	XT1	XT1	XT2	XT3	XT4	XT1	XT2	XT3	XT4	XT1	XT2	XT4	XT2	XT4	XT2	XT4
			Version	B	C	N				S				H			L		V	
Load s.	Char.	In [A]	Icu [kA]	18	25	36				50				70			120		150	
S800B	B, C	32...100	16	18	25	36	36	36	36	50	50	50	50	70	70	70	120	120	150	150
	D, K	125*		18	25	36	36	36	36	50	50	50	50	70	70	70	120	120	150	150

MCBs technical details

Coordination tables: back-up

Fuse - S300P @ 415V AC

			Supply s.	NH 00									
				gG									
Load s.	Char.	Icu [kA]	Iu [A] In [A]	100 20	25	35	40	63	80	100	125	160	200
S300P	B	25	6	100	100	100	100	100	50	50	50	45	
			10	100	100	100	100	100	50	50	50	45	
			13...16	100	100	100	100	100	50	50	50	35	
			20	100	100	100	100	100	100	50	50	30	
			25	100	100	100	100	100	100	100	50	30	
			32...40	100	100	100	100	100	100	100	100	30	50
			50...63	100	100	100	100	100	100	100	100	100	50

Fuse - S300P @ 415V AC

			Supply s.	NH 00									
				gG									
Load s.	Char.	Icu [kA]	Iu [A] In [A]	100 20	25	35	40	63	80	100	125	160	200
S300P	C	25	3...4	100	100	100	100	50	50	50	50		
			6...8	100	100	100	100	100	50	50	50	45	
			10	100	100	100	100	100	50	50	50	45	
			13...16	100	100	100	100	100	100	50	50	35	
			20...25	100	100	100	100	100	100	100	50	30	
			32...40	100	100	100	100	100	100	100	100	30	50
			50...63	100	100	100	100	100	100	100	100	100	50

Fuse - S300P @ 415V AC

			Supply s.	NH 00									
				gG									
Load s.	Char.	Icu [kA]	Iu [A] In [A]	100 20	25	35	40	63	80	100	125	160	200
S300P	D	25	3	100	100								
			4	100	100	100							
			6	100	100	100	100	100					
			8...10	100	100	100	100	100	100	50	45	45	
			13...16	100	100	100	100	100	100	45	40	35	
			20	100	100	100	100	100	100	100	35	30	
			25	100	100	100	100	100	100	100	100	30	
			32...63	100	100	100	100	100	100	100	100	100	50

Fuse - S300P @ 415V AC

			Supply s.	NH 00									
				gG									
Load s.	Char.	Icu [kA]	Iu [A] In [A]	100 20	25	35	40	63	80	100	125	160	200
S300P	K	25	3	100	100								
			4	100	100	100							
			6	100	100	100	100	100					
			8...10	100	100	100	100	100	100	50	45	45	
			13...16	100	100	100	100	100	100	45	40	35	
			20	100	100	100	100	100	100	100	35	30	
			25	100	100	100	100	100	100	100	100	30	
			32...63	100	100	100	100	100	100	100	100	100	50

MCBs technical details

Coordination tables: back-up

Fuse - S300P @ 415V AC

			Supply s.	NH 00									
				gG									
Load s.	Char.	Icu [kA]	In [A]	100 20	25	35	40	63	80	100	125	160	200
S300P	Z	25	3	100	100								
			4	100	100	100							
			6	100	100	100	100	100					
			8	100	100	100	100	100	100				
			10...20	100	100	100	100	100	100	100			
			25	100	100	100	100	100	100	100	100		
			32...63	100	100	100	100	100	100	100	100	100	50

S300P - S200 @ 415V AC

			Supply s.	S300P
				B, C, D, K, Z
Load s.	Char.	Icu [kA]	In [A]	25 0,2…63
S200	B, C, D, K, Z	10	0,2…63	25

S300P - S200M @ 415V AC

			Supply s.	S300P
				B, C, D, K, Z
Load s.	Char.	Icu [kA]	In [A]	25 0,2…63
S200M	B, C, D, K, Z	15	0,2…63	25

S300P - S200 2 pole @ 240V AC

			Supply s.	S300P
				B, C, D, K, Z
Load s.	Char.	Icu [kA]	In [A]	40 0,2…63
S200	B, C, D, K, Z	20	0,2…63	40

S300P - S200M 2 pole @ 240V AC

			Supply s.	S300P
				B, C, D, K, Z
Load s.	Char.	Icu [kA]	In [A] In [A]	40 0,2…63
S200M	B, C, D, K, Z	25	0,2…63	40

MCBs technical details

Coordination tables: back-up

S300P - SN201L 2 pole @ 240V AC

			Supply s.	S300P
				B, C, D, K, Z
Load s.	Char.	Icu [kA]	In [A]	40 0,2…63
SN201L	B, C	6	2…40	40

S300P - SN201 2 pole @ 240V AC

			Supply s.	S300P
				B, C, D, K, Z
Load s.	Char.	Icu [kA]	In [A]	40 0,2…63
SN201	B, D	10	6…40	40
	C	10	2…40	40

S300P - SN201M 2 pole @ 240V AC

			Supply s.	S300P
				B, C, D, K, Z
Load s.	Char.	Icu [kA]	In [A]	40 0,2…63
SN201M	B	10	6…40	40
	C	10	2…40	40

S300P - S200L @ 415V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Carat.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
S200L	B, C, D	6	0,5…16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							25
			50							
			63							

S300P - S200 @ 415V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
S200	B, C, D, K, Z	10	0,2…16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							25
			50							
			63							

MCBs technical details

Coordination tables: back-up

S300P - S200M @ 415V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
S200M	B, C, D, K, Z	15	0,2…16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							25
			50							
			63							

S300P - SN201L @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
SN201L	B, C	6	2…16			25	25	25	25	18
			20				25	25	25	18
			25					25	25	18
			32						25	18
			40							18

S300P - SN201 @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
SN201	B, D	10	2…16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							25
	C	10	2…16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							25

S300P - SN201M @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
SN201M	B, D	10	2…16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							25
	C	10	2…16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							20

MCBs technical details

Coordination tables: back-up

S800N - S300P @ 415V AC

			Supply s.	S800N							
				B, C, D							
				36							
Load s.	Char.	Icu [kA]	In [A]	25	32	40	50	63	80	100	125
S300P	B, C, D, K, Z	25	0,2…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
			50						36	36	36
			63							36	36

S800S - S300P @ 415V AC

			Supply s.	S800S							
				B, C, D, K							
				50							
Load s.	Carat.	Icu [kA]	In [A]	25	32	40	50	63	80	100	125
S300P	B, C, D, K, Z	25	0,2…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
			50						50	50	50
			63							50	50

XT - S300P @ 415V AC

			Supply s.																						
			Series	XT1	XT2	XT3	XT4	XT5	XT1	XT2	XT3	XT4	XT5	XT1	XT2	XT4	XT5	XT2	XT4	XT5	XT2	XT4	XT5	XT4	XT5
			Version	N					S					H				L			V			X	X
Load S.	Char.	Icu [kA]		36					50					70				120			150		200	200	200
			In[A]	16..160	1.6..160	63..250	16..250	320/400	16..160	1.6..160	63..250	16..250	320/400	16..160	1.6..160	16..250	320/400	1.6..160	16..250	320/400	1.6..160	16..250	320/400	16..250	320/400
S300P	B, C, D, K, Z	25	0,2…10	30	36	36	36	36	50	60	50	50	40	70	70	40	40	85	40	40	60	40	40	40	40
			13…25	30	36	30	36	36	50	50	50	50	40	70	60	40	40	60	40	40	50	40	40	40	40
			32…63	30	36	25	36	35	35	50	35	40	35	50	60	40	35	60	40	35	50	40	35	40	35

S300P - DSE201M @ 415V AC

			Supply s.	S300P						
				B, C, D, K						
				25						
Load s.	Char.	Icu [kA]	In [A]	10	16	25	32	40	50	63
DSE201M	B, C	15	6..16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25
			40							25

MCBs technical details

Coordination tables: back-up

S300P - DS203NC L @ 415V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
DS203NC L	C	6	6..16			25	25	25	25	18
			20				25	25	25	18
			25					25	25	18
			32						25	18

S300P - DS203NC L @ 415V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
DS203NC	B, C, K	10	6..16			25	25	25	25	25
			20				25	25	25	25
			25					25	25	25
			32						25	25

S300P - DS201L @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
DS201L	C	6	6..32	25	25	25	25	25	25	25

S300P - DS201 @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
DS201	B, C, K	10	1…40	25	25	25	25	25	25	25

S300P - DS201M @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
DS201M	B, C, K	10	6…40	25	25	25	25	25	25	25

S300P - DS202C @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
DS202C	B, C, K	10	1…40	25	25	25	25	25	25	25

S300P - DS202CM @ 240V AC

			Supply s.	S300P						
				B, C, D, K						
Load s.	Char.	Icu [kA]	In [A]	25 10	16	25	32	40	50	63
DS202CM	B, C, K	10	6…40	25	25	25	25	25	25	25

MCBs technical details

Coordination tables: back-up

Breaking capacities

Definition: B and C acc. to IEC EN 60 898, Icn
K and Z acc. to IEC EN 60 947-2, Icu

Type Tripping characteristic Nominal current		AC				DC	Back up protection up to ultimate short-circuit capacity of short-circuit protective device.	
		1 phase		2/3 phases		1 phase		
		133 V~	230 V~	230 V~ 133/230 V~	400 V~ 230/400 V~	60 V⎓	Fuse	Selective MCB
	A	kA/cosφ	kA/cosφ	kA/cosφ	kA/cosφ	kA/T ≤ ms	gG	S 750 DR
	6						63 A	100 A
	10 … 20						100 A	100 A
S 200-B S 200 M-B	25 … 32	10/0,5	6/0,7 10/0,5 (S 200 M-B)	10/0,5	6/0,7 10/0,5 (S 200 M-B)	10/4,0	100 A	100 A
	40						125 A	100 A
	50 … 63						160 A	100 A
	0,5 … 2	100 kA					not required	
	3 … 4						20 A	–
	6						40 A	100 A
	8						63 A	100 A
S 200-C S 200 M-C	10 … 20	10/0,5	6/0,7 10/0,5 (S 200 M-C)	10/0,5	6/0,7 10/0,5 (S 200 M-C)	10/4,0	100 A	100 A
	25 … 32						100 A	100 A
	40						125 A	100 A
	50 … 63						160 A	100 A
	0,5 … 2	100 kA					not required	
	3						20 A	–
	4						25 A	–
	6 … 10						63 A	100 A
S 200-K S 200 M-K	16 … 20	10/0,5	6/0,7 10/0,5 (S 200 M-K)	10/0,5	6/0,7 10/0,5 (S 200 M-K)	10/4,0	80 A	100 A
	25 … 32						100 A	100 A
	40						125 A	100 A
	50 … 63						160 A	100 A
	0,5 … 2	100 kA					not required	
	3 … 4						20 A	–
	6						35 A	100 A
	8						40 A	100 A
S 200-Z S 200 M-Z	10 … 16	10/0,5	6/0,7 10/0,5 (S 200 M-Z)	10/0,5	6/0,7 10/0,5 (S 200 M-Z)	10/4,0	63 A	100 A
	20 … 25						80 A	100 A
	32 … 40						100 A	100 A
	50 … 63						125 A	100 A

1. In symmetrically eathed DC networks 2 pole MCBs can be applied at up to 125 V DC (series connection). In this case the breaking capactiy is one level higher compared to an equivalent 1 pole installation. Polarity does not have to be considered. Thus any connection mode is permitted.
2. Back up protection is only required when the prospective short circuit current exceeds the rated breaking capacity.

MCBs technical details

Coordination tables: back-up

Breaking capacities

Definition: B and C acc. to IEC EN 60 898, Icn
K and Z acc. to IEC EN 60 947-2, Icu

Type Tripping characteristic Nominal current		AC				DC	Back up protection up to ultimate short-circuit capacity of short-circuit protective device.	
		1 phase		2/3 phases		1 phase		
		133 V∼	230 V∼	230 V∼ 133/230 V∼	400 V∼ 230/400 V∼	60 V⎓	Fuse	Selective MCB
	A	kA/cosj	kA/cosj	kA/cosj	kA/cosj	kA/T ≤ ms	gG	S 750 DR
S 200 P-B	6					10/4,0	63 A	100 A
	10, 13	25/0,25	25/0,25	25/0,25	25/0,25		80 A	100 A
	16 ... 25					15/4,0	100 A	100 A
	32 ... 40	15/0,25	15/0,25	15/0,25	15/0,25		125 A	100 A
	50 ... 63					10/4,0	160 A	100 A
S 200 P-C	0,5 ... 2	100 kA					not required	
	3, 4						32 A	100 A
	6, 8	25/0,25	25/0,25	25/0,25	25/0,25	10/4,0	63 A	100 A
	10 ... 13						80 A	100 A
	16 ... 25					15/4,0	100 A	100 A
	32 ... 40	15/0,25	15/0,25	15/0,25	15/0,25		125 A	100 A
	50 ... 63					10/4,0	160 A	100 A
S 200 P-K, Z	0,5 ... 2	100 kA					not required	
	3						25 A	–
	4					10/4,0	35 A	–
	6	25/0,25	25/0,25	25/0,25	25/0,25		63 A	100 A
	8						80 A	100 A
	10 ... 20					15/4,0	100 A	100 A
	25					15/4,0	125 A	100 A
	32 ... 63	15/0,25	15/0,25	15/0,25	15/0,25	10/4,0	160 A	100 A

1. In symmetrically eathed DC networks 2 pole MCBs can be applied at up to 125 V DC (series connection). Polarity does not have to be considered. Thus any connection mode is permitted.
2. Back up protection is only required when the prospective short circuit current exceeds the rated breaking capacity.

MCBs technical details

Coordination tables: back-up

Fuse gG - MCB S 200, S 200 M

240 V	Supply s.		Fuse gG	S 750 DR
Load s.	Characteristic	In [A]	In [A]	In [A]
S200 S200 M	B	6	63	100
		10...20	100	100
		25...32	100	100
		40	125	100
		50...63	160	100
S200 S200 M	C	3...4	20	—
		6	40	100
		8	63	100
		10...20	100	100
		25...32	100	100
		40	125	100
		50...63	160	100
S200	K	3	20	—
		4	25	—
		6...10	63	100
		16...20	80	100
		25...32	100	100
		40	125	100
		50...63	160	100
S200	Z	3...4	20	—
		6	35	100
		8	40	100
		10...16	63	100
		20...25	80	100
		32...40	100	100
		50...63	125	100

This table shows coordination between an MCB and the upstream fuse maximum current value. Combination of the two protections allows the breaking capacity to be elevated up to that of the combined fuse.
I.e. downstream MCB breaker S 201-C16, upstream fuse with In up to 100 A (breaking capacity: 100 kA). MCB breaker protection up to 100 kA.

MCBs technical details
Coordination tables: back-up

Fuse gG - MCB S 200 P

240 V	Supply s.		Fuse gG	S 750 DR
Load s.	Characteristic	In [A]	In [A]	In [A]
S200 P	B	6	63	100
		10, 13	80	100
		16...25	100	100
		32...40	125	100
		50...63	160	100
S200 P	C	3, 4	40	100
		6, 8	63	100
		10, 13	100	100
		16...25	100	100
		32...40	125	100
		50...63	160	100
S200 P	K, Z	3	25	—
		4	35	—
		6	63	100
		8	80	100
		10...20	100	100
		25	125	100
		32...63	160	100

This table shows coordination between an MCB and the upstream fuse maximum current value. Combination of the two protections allows the breaking capacity to be elevated up to that of the combined fuse.
I.e. downstream MCB breaker S 201-C16, upstream fuse with In up to 100 A (breaking capacity: 100 kA). MCB breaker protection up to 100 kA.

MCBs technical details

Coordination tables: selectivity

Selective protection
Selectivity between SN 201 and S 200 upstream and downstream modular circuit-breakers
In the case, selectivity is amperometric and so the selectivity limit is given simply by the magnetic threshold of the upstream breaker, which is fixed. The selectivity value is obtained if a minimum ratio of 1.3 (In upstream/In downstream > 1.3) is observed between the rated currents of the two breakers.

MCB - SN201 @ 230/240 V

	Supply S.2			S800 N-S							
Load S.1	Char.			B							
		Icu [kA]		36-50							
			In [A]	25	32	40	50	63	80	100	125
SN201 L	B, C	6	2		0.433	0.6	1.3	4	**T**	**T**	**T**
			4			0.45	0.8	1.5	2.5	4	**T**
			6				0.6	1.2	1.6	2.6	3.8
			10				0.5	1.1	1.4	2	3
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
			40								1.6
SN201	B, C, D	10	2		0.433	0.6	1.3	4	9	**T**	**T**
			4			0.45	0.8	1.5	2.5	4	7.3
			6				0.6	1.2	1.6	2.6	3.8
			10				0.5	1.1	1.4	2	3
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
			40								1.6
SN201 M	B, C	10	2		0.433	0.6	1.3	4	9	**T**	**T**
			4			0.45	0.8	1.5	2.5	4	7.3
			6				0.6	1.2	1.6	2.6	3.8
			10				0.5	1.1	1.4	2	3
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
			40								1.6

[1] Load side circuit-breaker 1P+N (230/240 V)
[2] For networks with 230/240 V AC ⇒ two-pole circuit-breaker (phase + neutral)
for networks at 400/415 V AC ⇒ four-pole circuit-breaker (load side circuit branched between one phase and the neutral)
[3] Only for curve B

MCBs technical details

Coordination tables: selectivity

Example

Upstream circuit-breaker	S 200 P, curve D 50 A
Downstream circuit-breaker	SN 201 L, curve B 10 A
Selectivity limit	10 In=500 A

S800 N-S								S800 N-S							
C								D							
36-50								36-50							
25	32	40	50	63	80	100	125	25	32	40	50	63	80	100	125
0.43	0.55	1.2	3	**T**	**T**	**T**	**T**	1.3	4.1	**T**	**T**	**T**	**T**	**T**	**T**
	0.43	0.75	1.3	2.1	3.9	**T**	**T**	0.8	1.6	3	5.4	**T**	**T**	**T**	**T**
		0.55	1.1	1.5	2.5	3.6	5.5	0.6	1.3	2	3.2	3.9	**T**	**T**	**T**
		0.45	1	1.3	1.9	2.8	4.2	0.5	1.2	1.65	2.6	3.1	**T**	**T**	**T**
			0.75	1.1	1.6	2.3	3.6		0.9	1.4	1.8	2.6	5	**T**	**T**
				0.9	1.4	1.9	3.3			1.3	1.6	2.2	4.2	5.4	**T**
					1.2	1.6	2.7				1.5	1.9	3.5	4.5	**T**
					1	1.5	2.5					1.8	2.8	4.2	5.5
						1.4	2.1					1.7	2.7	4	5
0.43	0.55	1.2	3	6.6	**T**	**T**	**T**	1.3	4.1	**T**	**T**	**T**	**T**	**T**	**T**
	0.43	0.75	1.3	2.1	3.9	6.6	**T**	0.8	1.6	3	5.4	7.6	**T**	**T**	**T**
		0.55	1.1	1.5	2.5	3.6	5.5	0.6	1.3	2	3.2	3.9	8	**T**	**T**
		0.45	1	1.3	1.9	2.8	4.2	0.5	1.2	1.65	2.6	3.1	6.2	8.6	**T**
			0.75	1.1	1.6	2.3	3.6		0.9	1.4	1.8	2.6	5	6.3	8.8
				0.9	1.4	1.9	3.3			1.3	1.6	2.2	4.2	5.4	7.6
					1.2	1.6	2.7				1.5	1.9	3.5	4.5	6.6
					1	1.5	2.5					1.8	2.8	4.2	5.5
						1.4	2.1					1.7	2.7	4	5
0.43	0.55	1.2	3	6.6	**T**	**T**	**T**	1.3	4.1	**T**	**T**	**T**	**T**	**T**	**T**
	0.43	0.75	1.3	2.1	3.9	6.6	**T**	0.8	1.6	3	5.4	7.6	**T**	**T**	**T**
		0.55	1.1	1.5	2.5	3.6	5.5	0.6	1.3	2	3.2	3.9	8	**T**	**T**
		0.45	1	1.3	1.9	2.8	4.2	0.5	1.2	1.65	2.6	3.1	6.2	8.6	**T**
			0.75	1.1	1.6	2.3	3.6		0.9	1.4	1.8	2.6	5	6.3	8.8
				0.9	1.4	1.9	3.3			1.3	1.6	2.2	4.2	5.4	7.6
					1.2	1.6	2.7				1.5	1.9	3.5	4.5	6.6
					1	1.5	2.5					1.8	2.8	4.2	5.5
						1.4	2.1					1.7	2.7	4	5

MCBs technical details

Coordination tables: selectivity

Fuse - SN201 @ 230/240 V

	Im	Icu [kA]	In [A]	25	32	40	50	63	80	100	125
SN201 L	B-C	6	2	1.5	2.5	**T**	**T**	**T**	**T**	**T**	**T**
		6	4	1	2	4.5	**T**	**T**	**T**	**T**	**T**
		6	6	1	1.5	4	4.5	**T**	**T**	**T**	**T**
		6	10		1.2	3.5	4	**T**	**T**	**T**	**T**
		6	16		1	3	3.5	5	**T**	**T**	**T**
		6	20		1	3	3.5	5	**T**	**T**	**T**
		6	25		1	2	3	4.5	**T**	**T**	**T**
		6	32		1	2	3	4.5	5	**T**	**T**
		6	40			1.5	2.5	4	5	**T**	**T**
SN201	B-C-D	10	2	1.5	2.5	5	**T**	**T**	**T**	**T**	**T**
		10	4	1	2	4.5	5	**T**	**T**	**T**	**T**
		10	6	1	1.5	4	4.5	7	**T**	**T**	**T**
		10	10		1.2	3.5	4	6	**T**	**T**	**T**
		10	16		1	3	3.5	5	**T**	**T**	**T**
		10	20		1	3	3.5	5	8	**T**	**T**
		10	25		1	2	3	4.5	6.5	**T**	**T**
		10	32		1	2	3	4.5	5	8	**T**
		10	40			1.5	2.5	4	5	6.5	**T**
SN201 M	B-C	10	2	1.5	2.5	5	7	**T**	**T**	**T**	**T**
		10	4	1	2	4.5	5	8	**T**	**T**	**T**
		10	6	1	1.5	4	4.5	7	**T**	**T**	**T**
		10	10		1.2	3.5	4	6	**T**	**T**	**T**
		10	16		1	3	3.5	5	9	**T**	**T**
		10	20		1	3	3.5	5	8	**T**	**T**
		10	25		1	2	3	4.5	6.5	9	**T**
		10	32		1	2	3	4.5	5	8	**T**
		10	40			1.5	2.5	4	5	6.5	9

MCBs technical details

Coordination tables: selectivity

MCB S 759 DR - SN201 @ 230/240 V

	Im			E	E	E	E	E	E	E	E
		Icu [kA]		25	25	25	25	25	25	25	25
			In [A]	20	25	32	40	50	63	80	100
SN201 L	B-C	6	2	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		6	4	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		6	6	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		6	10	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		6	16		**T**	**T**	**T**	**T**	**T**	**T**	**T**
		6	20			**T**	**T**	**T**	**T**	**T**	**T**
		6	25				**T**	**T**	**T**	**T**	**T**
		6	32					**T**	**T**	**T**	**T**
		6	40						**T**	**T**	**T**
SN201	B-C-D	10	2	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	4	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	6	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	10	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	16		**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	20			**T**	**T**	**T**	**T**	**T**	**T**
		10	25				**T**	**T**	**T**	**T**	**T**
		10	32					**T**	**T**	**T**	**T**
		10	40						**T**	**T**	**T**
SN201 M	B-C	10	2	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	4	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	6	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	10	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	16		**T**	**T**	**T**	**T**	**T**	**T**	**T**
		10	20			**T**	**T**	**T**	**T**	**T**	**T**
		10	25				**T**	**T**	**T**	**T**	**T**
		10	32					**T**	**T**	**T**	**T**
		10	40						**T**	**T**	**T**

MCBs technical details

Coordination tables: selectivity

MCCB XT1@415V - SN201 @230/240V

			Supply S.	XT1										
			Version	B,C,N,S,H										
			Release	TM										
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160
SN201 L	B,C	6	≤ 4	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T
			10			3	3	3	4,5	T	T	T	T	T
			16					3	4,5	5	T	T	T	T
			20						3	5	T	T	T	T
			25							5	T	T	T	T
			32								T	T	T	T
			40									T	T	T
SN201	B,C,D,K	10	≤ 4	T	T	T	T	T	T	T	T	T	T	T
			6	6	6	6	6	6	6	T	T	T	T	T
			8			3	3	3	4,5	7,5	8,5	T	T	T
			10			3	3	3	4,5	7,5	8,5	T	T	T
			13					3	4,5	5	7,5	T	T	T
			16					3	4,5	5	7,5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7,5	T	T
			40									7,5	T	T
SN201 M	B,C	10	≤ 4	T	T	T	T	T	T	T	T	T	T	T
			6	6	6	6	6	6	6	T	T	T	T	T
			10			3	3	3	4,5	7,5	8,5	T	T	T
			13					3	4,5	5	7,5	T	T	T
			16					3	4,5	5	7,5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7,5	T	T
			40									7,5	T	T

MCBs technical details
Coordination tables: selectivity

MCCB XT2@415V - SN201 @230/240V

			Supply S.	XT2															
			Version	N,S,H,L,V															
			Release	TM											EL				
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160	10	25	63	100	160
SN201 L	B,C	6	≤ 4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 ①	3	3	3	4,5	T	T	T	T	T		T	T	T	T
			16				3 ①	3	4,5	5	T	T	T	T			T	T	T
			20				3 ①		3	5	T	T	T	T			T	T	T
			25						3 ①	5	T	T	T	T			T	T	T
			32						3 ①		T	T	T	T			T	T	T
			40								T	T	T	T				T	T
SN201	B,C,D,K	10	≤ 4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			8		3 ①	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			10		3 ①	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			13				3 ①	3	4,5	5	7,5	T	T	T			T	T	T
			16				3 ①	3	4,5	5	7,5	T	T	T			T	T	T
			20				3 ①		3	5	6	T	T	T			T	T	T
			25						3 ①	5	6	T	T	T			T	T	T
			32						3 ①		6	7,5	T	T			T	T	T
			40								6 1	7,5	T	T				T	T
SN201 M	B,C	10	≤ 4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 ①	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			13				3 ①	3	4,5	5	7,5	T	T	T			T	T	T
			16				3 ①	3	4,5	5	7,5	T	T	T			T	T	T
			20				3 ①		3	5	6	T	T	T			T	T	T
			25						3 ①	5	6	T	T	T			T	T	T
			32						3 ①		6	7,5	T	T			T	T	T
			40								6 1	7,5	T	T				T	T

① Value valid in case of Supply S. breaker only magnetic

MCBs technical details

Coordination tables: selectivity

MCCB XT3@415V - SN201 @230/240V

			Supply S.	XT3						
			Version	N,S						
			Release	TM						
Load S.	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
SN201 L	B,C	6	≤ 4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
			25	5	T	T	T	T	T	T
			32		T	T	T	T	T	T
			40		T	T	T	T	T	T
SN201	B,C,D,K	10	≤ 4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			8	7,5	8,5	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 ①	7,5	T	T	T	T
SN201 M	B,C	10	≤ 4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 ①	7,5	T	T	T	T

① Value valid in case of Supply S. breaker only magnetic

Tmax T1 – S800S @400/415 V

		Supply s.		T1										
	Char.			B, C, N										
		Trigger		TM										
Load s.		Icu [kA]	Iu [A]	160										
			In [A]	16	20	25	32	40	50	63	80	100	125	160
S800S	B , C, D, K	50	10			4.5	4.5	4.5	4.5	8	10	20*	25*	36*
			13				4.5	4.5	4.5	7.5	10	15	25*	36*
			16					4.5	4.5	7.5	10	15	25*	36*
			20						4.5	7.5	10	15	25*	36*
			25							6	10	15	20*	36*
			32								7.5	10	20*	36*
			40									10	20*	36*
			50										15	36*
			63											36*
			80											36*
			100											36*
			125											

MCBs technical details
Coordination tables: selectivity

MCCB XT4@415V - SN201 @230/240V

			Supply S.	XT4																	
			Version	N,S,H,L,V																	
			Release	TM													EL				
Load S.	Char	Icu [kA]	In[A]	20	25	32	40	50	63	80	100	125	160	200	225	250	40	63	100	160	250
SN201 L	B,C	6	≤ 4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3 ①	3	3	3	4,5	T	T	T	T	T	T	T	T	3	T	T	T	T
			16			3 ①	3	4,5	5	T	T	T	T	T	T	T	3	T	T	T	T
			20			3 ①		3	5	T	T	T	T	T	T	T		T	T	T	T
			25					3 ①	5	T	T	T	T	T	T	T		T	T	T	T
			32					3 ①		T	T	T	T	T	T	T		T	T	T	T
			40							T	T	T	T	T	T	T			T	T	T
SN201	B,C,D,K	10	≤ 4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			8	3 1	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	3	T	T	T	T
			10	3 ①	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	3	T	T	T	T
			13			3 ①	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			16			3 ①	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			20			3 ①		3	5	6	T	T	T	T	T	T		T	T	T	T
			25					3 ①	5	6	T	T	T	T	T	T		T	T	T	T
			32					3 ①		6	7,5	T	T	T	T	T		T	T	T	T
			40							6 ①	7,5	T	T	T	T	T			T	T	T
SN201 M	B,C	10	≤ 4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3 ①	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	3	T	T	T	T
			13			3 ①	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			16			3 ①	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			20			3 ①		3	5	6	T	T	T	T	T	T		T	T	T	T
			25					3 ①	5	6	T	T	T	T	T	T		T	T	T	T
			32					3 ①		6	7,5	T	T	T	T	T		T	T	T	T
			40							6 ①	7,5	T	T	T	T	T			T	T	T

① Value valid in case of Supply S. breaker only magnetic

Tmax T3 – S800S @400/415 V

		Supply s.		T3						
	Char.			N, S						
		Trigger		TM						
Load s.		Icu [kA]	Iu [A]	250						
			In [A]	63	80	100	125	160	200	250
S800S	B , C, D, K	50	10	8	10	20	25	36	36	50*
			13	7.5	10	15	25	36	36	50*
			16	7.5	10	15	25	36	36	50*
			20	7.5	10	15	25	36	36	50*
			25	6	10	15	20	36	36	50*
			32		7.5	10	20	36	36	50*
			40			10	20	36	36	50*
			50				15	36	36	50*
			63					36	36	50*
			80						36	50*
			100							50*
			125							50*

MCBs technical details

Coordination tables: selectivity

S800S - S200 @ 230/400 V

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6			0.4	0.5	0.7	1	1.5	2.6
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.3	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	T	T
			4		0.4	0.6	0.7	1	1.7	3.1	T
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	D	10	0.5	T	T	T	T	T	T	T	T
			1	0.8	4.5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	T	T
			4		0.4	0.4	0.7	1	1.7	3	T
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	K	10	0.5	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.1	T	T	T	T	T
			2	0.3	0.5	0.7	2.1	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	T	T
			4		0.4	0.4	0.7	1	1.7	3	T
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	0.6	T	T	T	T	T	T	T
			2	0.5	1	T	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.1	T	T	T
			4	0.3	0.4	0.7	1	1.5	2.6	T	T
			6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			8		0.3	0.4	0.5	0.7	0.9	1.3	2
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	D	10	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	T	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	T	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	T
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	K	10	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	T	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	T	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	T
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char:			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6	0.5	1	1.2	2	2.8	T	T	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	T
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	T
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

			E.	S800S							
	Char:			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
			3	0.7	2.2	4.4	T	T	T	T	T
			4	0.7	1.3	2.2	4.4	T	T	T	T
			6	0.5	1	1.2	2	2.8	T	T	T
			8	0.4	0.6	0.8	1.1	1.4	2.8	3.9	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	T
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char:			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	D	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	T	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

			E.	S800S							
	Char:			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200	K	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	T	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

S800S - S200 M @ 230/400 V

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6			0.4	0.5	0.7	1	1.5	2.6
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.3	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	8.8	T
			4		0.4	0.6	0.7	1	1.7	3.1	7
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	D	15	0.5	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	K	15	0.5	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	0.6	T	T	T	T	T	T	T
			2	0.5	1	T	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.1	6.4	T	T
			4	0.3	0.4	0.7	1	1.5	2.6	6.1	T
			6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			8		0.3	0.4	0.5	0.7	0.9	1.3	2
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	D	15	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	6.4	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	6.2	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	6.4
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

			E.	S800S							
	Char.			C							
L.		I_{cu} [kA]		50							
			I_n [A]	25	32	40	50	63	80	100	125
S200M	K	15	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	6.4	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	6.2	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	6.4
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6	0.5	1	1.2	2	2.8	T	T	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

			E.	S800S							
	Char.			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
			3	0.7	2.2	4.4	T	T	T	T	T
			4	0.7	1.3	2.2	4.4	7.7	T	T	T
			6	0.5	1	1.2	2	2.8	9.9	T	T
			8	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	D	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	7.7	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

			E.	S800S							
	Char.			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200M	K	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	7.7	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

S800S - S200 P @ 230/400 V

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6			0.4	0.5	0.7	1	1.5	2.6
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
		15	32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.2	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	8.8	T
			4		0.4	0.6	0.7	1	1.7	3.1	7
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
		15	32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			B							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	K	25	0.2	T	T	T	T	T	T	T	T
			0.3	T	T	T	T	T	T	T	T
			0.5	T	T	T	T	T	T	T	T
			0.75	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.1	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
		15	32								
			40								
			50								
			63								

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6			0.4	0.5	0.7	1	1.5	2.6
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
		15	32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			C							
L.		I_{cu} [kA]		50							
			I_n [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.3	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	8.8	T
			4		0.4	0.6	0.7	1	1.7	3.1	7
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
		15	32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

			E.	S800S							
	Char.			C							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	K	25	0.2	T	T	T	T	T	T	T	T
			0.3	T	T	T	T	T	T	T	T
			0.5	T	T	T	T	T	T	T	T
			0.75	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
		15	32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6	0.5	1	1.2	2	2.8	9.9	21.3	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
		15	32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

			E.	S800S							
	Char.			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
			3	0.7	2.2	4.4	T	T	T	T	T
			4	0.7	1.3	2.2	4.4	7.7	T	T	T
			6	0.5	1	1.2	2	2.8	9.9	22	T
			8	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
		15	32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800S							
	Char.			D							
L.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S200P	K	25	0.2	T	T	T	T	T	T	T	T
			0.3	T	T	T	T	T	T	T	T
			0.5	T	T	T	T	T	T	T	T
			0.75	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	7.7	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	12	24.2	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	9.9
			10	0.5	0.7	1.1	1.5	2	4	5.5	9.9
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25						1.8	2.2	3.2
		15	32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

S800S – S400E/S450E @230/400 V

		Supply s.		S800S							
	Char.			B							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400E S450E FS401E FS451E FS403E FS453E	B, C	Icn [kA] 6	6			0.4	0.5	0.6	0.9	1.4	2.4
			10				0.4	0.5	0.7	0.9	1.3
			13					0.5	0.7	0.9	1.2
			16						0.7	0.9	1.2
			20							0.9	1.2
			25							0.9	1.2
			32							0.7	1
			40							0.7	1
			50								0.9
			63								0.9

		Supply s.		S800S							
	Char.			C							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400E S450E FS401E FS451E FS403E FS453E	B, C	Icn [kA] 6	6		0.4	0.5	0.6	0.9	1.3	2.2	4.4
			10		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			13		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			16		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			20			0.4	0.5	0.6	0.8	1.1	1.6
			25			0.4	0.5	0.6	0.8	1.1	1.6
			32				0.4	0.5	0.7	0.9	1.3
			40					0.5	0.7	0.9	1.3
			50						0.7	0.9	1.2
			63							0.8	1.1

		Supply s.		S800S							
	Char.			D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400E S450E FS401E FS451E FS403E FS453E	B, C	Icn [kA] 6	6	0.5	0.9	1.1	1.8	2.5	T	T	T
			10	0.4	0.5	0.8	1	1.3	2.5	3.5	T
			13	0.4	0.5	0.8	1	1.3	2.3	3	5.1
			16		0.5	0.8	1	1.3	2.3	3	5.1
			20			0.7	1	1.2	2.1	2.7	4.3
			25			0.7	1	1.2	2.1	2.7	4.3
			32				0.9	1	1.7	2.2	3.4
			40					1	1.7	2.2	3.4
			50						1.4	1.7	2.1
			63							1.6	2.1

MCBs technical details

Coordination tables: selectivity

S800S – S400M @230/400 V

		Supply s.		S800S							
	Char.			B							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	B	Icn [kA] 10	6			0.4	0.5	0.6	0.9	1.4	2.4
			10				0.4	0.5	0.7	0.9	1.3
			13					0.5	0.7	0.9	1.2
			16						0.7	0.9	1.2
			20							0.9	1.2
			25							0.9	1.2
			32							0.7	1
			40							0.7	1
			50								0.9
			63								0.9

		Supply s.		S800S							
	Char.			B							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	C	50	0.5	T	T	T	T	T	T	T	T
			1	3	T	T	T	T	T	T	T
			1.6	1	1	T	T	T	T	T	T
			2	0	1	1.2	T	T	T	T	T
		25	3		0	0.6	0.7	1	2.4	T	T
			4		0	0.5	0.6	0.9	1.5	2.8	T
			6			0.4	0.5	0.6	0.9	1.4	2.4
			8				0.4	0.5	0.7	0.9	1.3
			10				0.4	0.5	0.7	0.9	1.3
			13					0.5	0.7	0.9	1.2
			16						0.7	0.9	1.2
			20							0.9	1.2
		15	25							0.9	1.2
			32							0.7	1
			40							0.7	1
			50								0.9
			63								0.9

MCBs technical details

Coordination tables: selectivity

		Supply s.		S800S							
	Char.			B							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	D	Icn [kA] 10	6				0.5	0.7	1.1	1.8	3.3
			10					0.6	0.9	1.2	1.8
			13						0.9	1.2	1.8
			16							1	1.4
			20								1.4
			25								
			32								
			40								
			50								
			63								

		Supply s.		S800S							
	Char.			B							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	50	0.5	T	T	T	T	T	T	T	T
			1	1	5	T	T	T	T	T	T
			1.6	0	1	2.1	T	T	T	T	T
			2	0	1	0.7	2.1	T	T	T	T
		25	3		0	0.4	0.7	1.1	2.3	7.8	T
			4		0	0.4	0.6	0.9	1.5	2.8	7
			6				0.5	0. 7	1.1	1.8	3.3
			8					0.6	0.9	1.2	1.8
			10						0.9	1.2	1.8
			13							1	1.4
			16								1.4
			20								
		10	25								
			32								
			40								
			50								
			63								

MCBs technical details

Coordination tables: selectivity

S800S – S400M @230/400 V

		Supply s.		S800S							
	Char.			C							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	B	Icn [kA] 10	6		0.4	0.5	0.6	0.9	1.3	2.2	4.4
			10		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			13		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			16		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			20			0.4	0.5	0.6	0.8	1.1	1.6
			25			0.4	0.5	0.6	0.8	1.1	1.6
			32				0.4	0.5	0.7	0.9	1.3
			40					0.5	0.7	0.9	1.3
			50						0.7	0.9	1.2
			63							0.9	1.1

		Supply s.		S800S							
	Char.			C							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	C	50	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	1	T	T	T	T	T	T	T
			2	0	0.9	T	T	T	T	T	T
		25	3	0	0.4	0.7	1.1	1.9	5.8	T	T
			4	0	0.4	0.6	0.9	1.3	2.4	5.5	T
			6		0.4	0.5	0.6	0.9	1.3	2.2	4.4
			8		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			10		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			13		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			16		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			20			0.4	0.5	0.6	0.8	1.1	1.6
		15	25			0.4	0.5	0.6	0.8	1.1	1.6
			32				0.4	0.5	0.7	0.9	1.3
			40					0.5	0.7	0.9	1.3
			50						0.7	0.9	1.2
			63							0.8	1.1

MCBs technical details

Coordination tables: selectivity

		Supply s.		S800S							
	Char.			C							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	D	Icn [kA] 10	6		0.4	0.5	0.7	1	1.6	2.9	5.8
			10			0.5	0.6	0.8	1.1	1.6	2.2
			13				0.6	0.8	1.1	1.6	2.5
			16					0.7	0.9	1.3	1.8
			20						0.9	1.3	1.8
			25							0.9	1.3
			32								1.3
			40								
			50								
			63								

		Supply s.		S800S							
	Char.			C							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	50	0.5	T	T	T	T	T	T	T	T
			1	2	T	T	T	T	T	T	T
			1.6	1	2.1	T	T	T	T	T	T
			2	0	0.7	2.1	T	T	T	T	T
		25	3	0	0.4	0.7	1.1	2	5.8	T	T
			4	0	0.4	0.6	0.9	1.3	2.4	5.6	T
			6		0.4	0.5	0.7	1	1.6	2.9	5.8
			8			0.5	0.6	0.8	1.1	1.6	2.5
			10				0.6	0.8	1.1	1.6	2.5
			13					0.7	0.9	1.3	1.8
			16						0.9	1.3	1.8
			20							0.9	1.3
		10	25								1.3
			32								
			40								
			50								
			63								

MCBs technical details

Coordination tables: selectivity

S800S – S400M @230/400 V

Load s.	Char.	Supply s.		S800S							
				D, K							
		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	B	Icn [kA] 10	6	0.5	0.9	1.1	1.8	2.5	9	T	T
			10	0.4	0.5	0.8	1	1.3	2.5	3.5	6.7
			13	0.4	0.5	0.8	1	1.3	2.3	3	5.5
			16		0.5	0.8	1	1.3	2.3	3	5.1
			20			0.7	1	1.2	2.1	2.7	4.3
			25			0.7	1	1.2	2.1	2.7	4.3
			32				0.9	1	1.7	2.2	3.4
			40					1	1.7	2.2	3.4
			50						1.4	1.7	2.1
			63							1.6	2.1

Load s.	Char.	Supply s.		S800S							
				D, K							
		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	C	50	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
		25	3	0.7	2	4	T	T	T	T	T
			4	0.6	1.2	2	4	7	T	T	T
			6	0.5	0.9	1.1	1.8	2.5	9	T	T
			8	0.4	0.5	0.8	1	1.3	2.5	3.5	6.7
			10	0.4	0.5	0.8	1	1.3	2.5	3.5	6.7
			13	0.4	0.5	0.8	1	1.3	2.3	3	2.1
			16		0.5	0.8	1	1.3	2.3	3	5.1
			20			0.7	1	1.2	2.1	2.7	4.3
		15	25			0.7	1	1.2	2.1	2.7	4.3
			32				0.9	1	1.7	2.2	3.4
			40					1	1.7	2.2	3.4
			50						1.4	1.7	2.1
			63							1.6	2.1

MCBs technical details

Coordination tables: selectivity

		Supply s.		S800S							
	Char.			D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	D	Icn [kA] 10	6	0.5	0.8	1.4	2.3	3.3	T	T	T
			8	0.5	0.6	1	1.4	1.8	3.6	5	9
			10	0.5	0.6	1	1.4	1.8	3.6	5	9
			13		0.5	0.8	1.1	1.4	2.4	3.1	4.7
			16			0.8	1.1	1.4	2.4	3.1	4.7
			20				0.8	1	1.6	2	2.9
			25					1	1.6	2	2.9
			32						1.5	1.8	2.6
			40							1.7	2.4
			50								2
			63								

		Supply s.		S800S							
	Char.			D, K							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	50	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.1	T	T	T	T	T	T	T
		25	3	0.7	1.2	4	T	T	T	T	T
			4	0.6	0.9	2	4	7	T	T	T
			6	0.5	0.8	1.4	2.3	3.3	T	T	T
			8	0.5	0.6	1	1.4	1.8	3.6	5	T
			10	0.5	0.6	1	1. 4	1.8	3.6	5	T
			13		0.5	0.8	1.1	1.4	2.4	3.1	4.7
			16			0.8	1.1	1.4	2.4	3.1	4.7
			20				0.8	1	1.6	2	2.9
		10	25					1	1.6	2	2.9
			32						1.5	1.8	2.8
			40							1.7	2.4
			50								2
			63								

MCBs technical details

Coordination tables: selectivity

S800N - S200 @ 230/400 V

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6			0.4	0.5	0.7	1	1.5	2.6
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.2	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	T	T
			4		0.4	0.6	0.7	1	1.7	3.1	T
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	D	10	0.5	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	T	T
			4		0.4	0.4	0.7	1	1.7	3	T
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	K	10	0.5	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	T	T
			4		0.4	0.4	0.7	1	1.7	3	T
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	0.6	T	T	T	T	T	T	T
			2	0.5	1	T	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.1	T	T	T
			4	0.3	0.4	0.7	1	1.5	2.6	T	T
			6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			8		0.3	0.4	0.5	0.7	0.9	1.3	2
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	D	10	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	T	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	T	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	T
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	K	10	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	T	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	T	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	T
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	B	10	6	0.5	1	1.2	2	2.8	T	T	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	T
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	C	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
			3	0.7	2.2	4.4	T	T	T	T	T
			4	0.7	1.3	2.2	4.4	T	T	T	T
			6	0.5	1	1.2	2	2.8	T	T	T
			8	0.4	0.6	0.8	1.1	1.4	2.8	3.9	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	T
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	D	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	T	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200	K	10	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	T	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

S800N - S200M @ 230/400 V

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6			0.4	0.5	0.7	1	1.5	2.6
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.3	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	8.8	T
			4		0.4	0.6	0.7	1	1.7	3.1	7
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
			32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details
Coordination tables: selectivity

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	D	15	0.5	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	K	15	0.5	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	0.6	T	T	T	T	T	T	T
			2	0.5	1	T	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.1	6.4	T	T
			4	0.3	0.4	0.7	1	1.5	2.6	6.1	T
			6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			8		0.3	0.4	0.5	0.7	0.9	1.3	2
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			13		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
			50						0.7	0.9	1.3
			63							0.9	1.2

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

		E.		S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	D	15	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	6.4	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	6.2	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	6.4
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

		E.		S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	K	15	0.5	T	T	T	T	T	T	T	T
			1	2.1	T	T	T	T	T	T	T
			1.6	0.8	2.3	T	T	T	T	T	T
			2	0.4	0.7	2.3	T	T	T	T	T
			3	0.3	0.5	0.7	1.2	2.2	6.4	T	T
			4	0.3	0.4	0.7	1	1.4	2.6	6.2	T
			6		0.4	0.6	0.8	1.1	1.8	3.2	6.4
			8			0.5	0.7	0.9	1.2	1.8	2.8
			10				0.7	0.9	1.2	1.8	2.8
			13					0.7	1	1.4	2
			16						1	1.4	2
			20							1	1.4
			25								1.4
			32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	B	15	6	0.5	1	1.2	2	2.8	T	T	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	C	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
			3	0.7	2.2	4.4	T	T	T	T	T
			4	0.7	1.3	2.2	4.4	7.7	T	T	T
			6	0.5	1	1.2	2	2.8	T	T	T
			8	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	D	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	7.7	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200M	K	15	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	7.7	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	T	T	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	T
			10	0.5	0.7	1.1	1.5	2	4	5.5	T
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
			32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

S800N - S200P @ 230/400 V

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.3	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	8.8	T
			4		0.4	0.6	0.7	1	1.7	3.1	7
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
		15	32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details
Coordination tables: selectivity

			E.	S800N							
	Char.			B							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	K	25	0.2	T	T	T	T	T	T	T	T
			0.3	T	T	T	T	T	T	T	T
			0.5	T	T	T	T	T	T	T	T
			0.75	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.1	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
		15	32								
			40								
			50								
			63								

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6			0.4	0.5	0.7	1	1.5	2.6
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
		15	32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5	T	T	T	T	T	T	T	T
			1	3.3	T	T	T	T	T	T	T
			1.6	0.6	1.3	T	T	T	T	T	T
			2	0.4	0.7	1.3	T	T	T	T	T
			3		0.4	0.6	0.7	1.1	2.6	8.8	T
			4		0.4	0.6	0.7	1	1.7	3.1	7
			6			0.4	0.5	0.7	1	1.5	2.6
			8				0.4	0.6	0.7	1	1.4
			10				0.4	0.6	0.7	1	1.4
			13					0.5	0.7	0.9	1.3
			16						0.7	0.9	1.3
			20							0.9	1.3
			25							0.9	1.3
		15	32							0.8	1.1
			40							0.8	1.1
			50								1
			63								0.9

			E.	S800N							
	Char.			C							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	K	25	0.2	T	T	T	T	T	T	T	T
			0.3	T	T	T	T	T	T	T	T
			0.5	T	T	T	T	T	T	T	T
			0.75	T	T	T	T	T	T	T	T
			1	0.8	5	T	T	T	T	T	T
			1.6	0.5	1	2.3	T	T	T	T	T
			2	0.3	0.5	0.7	2.3	T	T	T	T
			3		0.4	0.5	0.7	1.2	2.5	8.6	T
			4		0.4	0.4	0.7	1	1.7	3	7.7
			6				0.6	0.8	1.2	2	3.6
			8					0.7	0.9	1.3	2
			10						0.9	1.3	2
			13							1	1.5
			16								1.5
			20								
			25								
		15	32								
			40								
			50								
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	B	25	6	0.5	1	1.2	2	2.8	9.9	21.3	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
		15	32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	C	25	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
			3	0.7	2.2	4.4	T	T	T	T	T
			4	0.7	1.3	2.2	4.4	7.7	T	T	T
			6	0.5	1	1.2	2	2.8	9.9	22	T
			8	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			13	0.4	0.6	0.8	1.1	1.4	2.5	3.3	5.6
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
		15	32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
			50						1.5	1.9	2.3
			63							1.7	2.3

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

			E.	S800N							
	Char.			D							
L.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S200P	K	25	0.2	T	T	T	T	T	T	T	T
			0.3	T	T	T	T	T	T	T	T
			0.5	T	T	T	T	T	T	T	T
			0.75	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.3	T	T	T	T	T	T	T
			3	0.7	1.3	4.4	T	T	T	T	T
			4	0.7	1	2.2	4.4	7.7	T	T	T
			6	0.6	0.8	1.5	2.5	3.6	12	24.2	T
			8	0.5	0.7	1.1	1.5	2	4	5.5	9.9
			10	0.5	0.7	1.1	1.5	2	4	5.5	9.9
			13		0.6	0.9	1.2	1.5	2.6	3.4	5.2
			16			0.9	1.2	1.5	2.6	3.4	5.2
			20				0.9	1.1	1.8	2.2	3.2
			25					1.1	1.8	2.2	3.2
		15	32						1.7	2	2.9
			40							1.9	2.6
			50								2.2
			63								

E. = feed side
L. = load side
T = Total selectivity up to breaking capacity of the switch on load side
Selectivity limit values indicated in kA

MCBs technical details

Coordination tables: selectivity

S800N – S400E/S450E @230/400 V

		Supply s.		S800N							
	Char.			B							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400E S450E FS401E FS451E	B, C	Icn [kA] 6	6			0.4	0.5	0.6	0.9	1.4	2.4
			10				0.4	0.5	0.7	0.9	1.3
			13					0.5	0.7	0.9	1.2
			16						0.7	0.9	1.2
			20							0.9	1.2
			25							0.9	1.2
			32							0.7	1
			40							0.7	1
			50								0.9
			63								0.9

		Supply s.		S800N							
	Char.			C							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400E S450E FS401E FS451E	B, C	Icn [kA] 6	6		0.4	0.5	0.6	0.9	1.3	2.2	4.4
			10		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			13		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			16		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			20			0.4	0.5	0.6	0.8	1.1	1.6
			25			0.4	0.5	0.6	0.8	1.1	1.6
			32				0.4	0.5	0.7	0.9	1.3
			40					0.5	0.7	0.9	1.3
			50						0.7	0.9	1.2
			63							0.8	1.1

		Supply s.		S800N							
	Char.			D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400E S450E FS401E FS451E FS403E FS453E	B, C	Icn [kA] 6	6	0.5	0.9	1.1	1.8	2.5	T	T	T
			10	0.4	0.5	0.8	1	1.3	2.5	3.5	T
			13	0.4	0.5	0.8	1	1.3	2.3	3	5.1
			16		0.5	0.8	1	1.3	2.3	3	5.1
			20			0.7	1	1.2	2.1	2.7	4.3
			25			0.7	1	1.2	2.1	2.7	4.3
			32				0.9	1	1.7	2.2	3.4
			40					1	1.7	2.2	3.4
			50						1.4	1.7	2.1
			63							1.6	2.1

MCBs technical details

Coordination tables: selectivity

S800N – S400M @230/400 V

		Supply s.		S800N							
	Char.			B							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	B	Icn [kA] 10	6			0.4	0.5	0.6	0.9	1.4	2.4
			10				0.4	0.5	0.7	0.9	1.3
			13					0.5	0.7	0.9	1.2
			16						0.7	0.9	1.2
			20							0.9	1.2
			25							0.9	1.2
			32							0.7	1
			40							0.7	1
			50								0.9
			63								0.9

		Supply s.		S800N							
	Char.			B							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	C	50	0.5	T	T	T	T	T	T	T	T
			1	3	T	T	T	T	T	T	T
			1.6	1	1	T	T	T	T	T	T
			2	0	1	1.2	T	T	T	T	T
		25	3		0	0.6	0.7	1	2.4	T	T
			4		0	0.5	0.6	0.9	1.5	2.8	T
			6			0.4	0.5	0.6	0.9	1.4	2.4
			8				0.4	0.5	0.7	0.9	1.3
			10				0.4	0.5	0.7	0.9	1.3
			13					0.5	0.7	0.9	1.2
			16						0.7	0.9	1.2
			20							0.9	1.2
		15	25							0.9	1.2
			32							0.7	1
			40							0.7	1
			50								0.9
			63								0.9

MCBs technical details

Coordination tables: selectivity

		Supply s.		S800N							
	Char.			B							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	D	Icn [kA] 10	6				0.5	0.7	1.1	1.8	3.3
			10					0.6	0.9	1.2	1.8
			13						0.9	1.2	1.8
			16							1	1.4
			20								1.4
			25								
			32								
			40								
			50								
			63								

		Supply s.		S800N							
	Char.			B							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	50	0.5	T	T	T	T	T	T	T	T
			1	1	5	T	T	T	T	T	T
			1.6	0	1	2.1	T	T	T	T	T
			2	0	1	0.7	2.1	T	T	T	T
		25	3		0	0.4	0.7	1.1	2.3	7.8	T
			4		0	0.4	0.6	0.9	1.5	2.8	7
			6				0.5	0. 7	1.1	1.8	3.3
			8					0.6	0.9	1.2	1.8
			10						0.9	1.2	1.8
			13							1	1.4
			16								1.4
			20								
		10	25								
			32								
			40								
			50								
			63								

MCBs technical details

Coordination tables: selectivity

S800N – S400M @230/400 V

		Supply s.		S800N							
	Char.			C							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	B	Icn [kA] 10	6		0.4	0.5	0.6	0.9	1.3	2.2	4.4
			10		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			13		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			16		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			20			0.4	0.5	0.6	0.8	1.1	1.6
			25			0.4	0.5	0.6	0.8	1.1	1.6
			32				0.4	0.5	0.7	0.9	1.3
			40					0.5	0.7	0.9	1.3
			50						0.7	0.9	1.2
			63							0.8	1.1

		Supply s.		S800S							
	Char.			C							
Load s.		Icu [kA]		50							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	C	50	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	1	T	T	T	T	T	T	T
			2	0	0.9	T	T	T	T	T	T
		25	3	0	0.4	0.7	1.1	1.9	5.8	T	T
			4	0	0.4	0.6	0.9	1.3	2.4	5.5	T
			6		0.4	0.5	0.6	0.9	1.3	2.2	4.4
			8		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			10		0.3	0.4	0.5	0.6	0.8	1.2	1.8
			13		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			16		0.3	0.4	0.5	0.6	0.8	1.2	1.7
			20			0.4	0.5	0.6	0.8	1.1	1.6
		15	25			0.4	0.5	0.6	0.8	1.1	1.6
			32				0.4	0.5	0.7	0.9	1.3
			40					0.5	0.7	0.9	1.3
			50						0.7	0.9	1.2
			63							0.8	1.1

MCBs technical details

Coordination tables: selectivity

		Supply s.		S800N							
	Char.			C							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	D	Icn [kA] 10	6		0.4	0.5	0.7	1	1.6	2.9	5.8
			10			0.5	0.6	0.8	1.1	1.6	2.2
			13				0.6	0.8	1.1	1.6	2.5
			16					0.7	0.9	1.3	1.8
			20						0.9	1.3	1.8
			25							0.9	1.3
			32								1.3
			40								
			50								
			63								

		Supply s.		S800N							
	Char.			C							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	50	0.5	T	T	T	T	T	T	T	T
			1	2	T	T	T	T	T	T	T
			1.6	1	2.1	T	T	T	T	T	T
			2	0	0.7	2.1	T	T	T	T	T
		25	3	0	0.4	0.7	1.1	2	5.8	T	T
			4	0	0.4	0.6	0.9	1.3	2.4	5.6	T
			6		0.4	0.5	0.7	1	1.6	2.9	5.8
			8			0.5	0.6	0.8	1.1	1.6	2.5
			10				0.6	0.8	1.1	1.6	2.5
			13					0.7	0.9	1.3	1.8
			16						0.9	1.3	1.8
			20							0.9	1.3
		10	25								1.3
			32								
			40								
			50								
			63								

MCBs technical details

Coordination tables: selectivity

S800N – S400M @230/400 V

		Supply s.		S800N							
	Char.			D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	B	Icn [kA] 10	6	0.5	0.9	1.1	1.8	2.5	9	T	T
			10	0.4	0.5	0.8	1	1.3	2.5	3.5	6.7
			13	0.4	0.5	0.8	1	1.3	2.3	3	5.5
			16		0.5	0.8	1	1.3	2.3	3	5.1
			20			0.7	1	1.2	2.1	2.7	4.3
			25			0.7	1	1.2	2.1	2.7	4.3
			32				0.9	1	1.7	2.2	3.4
			40					1	1.7	2.2	3.4
			50						1.4	1.7	2.1
			63							1.6	2.1

		Supply s.		S800N							
	Char.			D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M FS401M FS451M FS403M FS453M	C	50	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T
		25	3	0.7	2	4	T	T	T	T	T
			4	0.6	1.2	2	4	7	T	T	T
			6	0.5	0.9	1.1	1.8	2.5	9	T	T
			8	0.4	0.5	0.8	1	1.3	2.5	3.5	6.7
			10	0.4	0.5	0.8	1	1.3	2.5	3.5	6.7
			13	0.4	0.5	0.8	1	1.3	2.3	3	2.1
			16		0.5	0.8	1	1.3	2.3	3	5.1
			20			0.7	1	1.2	2.1	2.7	4.3
		15	25			0.7	1	1.2	2.1	2.7	4.3
			32				0.9	1	1.7	2.2	3.4
			40					1	1.7	2.2	3.4
			50						1.4	1.7	2.1
			63							1.6	2.1

MCBs technical details

Coordination tables: selectivity

		Supply s.		S800N							
	Char.			D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	D	Icn [kA] 10	6	0.5	0.8	1.4	2.3	3.3	T	T	T
			8	0.5	0.6	1	1.4	1.8	3.6	5	9
			10	0.5	0.6	1	1.4	1.8	3.6	5	9
			13		0.5	0.8	1.1	1.4	2.4	3.1	4.7
			16			0.8	1.1	1.4	2.4	3.1	4.7
			20				0.8	1	1.6	2	2.9
			25					1	1.6	2	2.9
			32						1.5	1.8	2.6
			40							1.7	2.4
			50								2
			63								

		Supply s.		S800N							
	Char.			D							
Load s.		Icu [kA]		36							
			In [A]	25	32	40	50	63	80	100	125
S400M S450M	K	50	0.5	T	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T	T
			1.6	T	T	T	T	T	T	T	T
			2	2.1	T	T	T	T	T	T	T
		25	3	0.7	1.2	4	T	T	T	T	T
			4	0.6	0.9	2	4	7	T	T	T
			6	0.5	0.8	1.4	2.3	3.3	T	T	T
			8	0.5	0.6	1	1.4	1.8	3.6	5	T
			10	0.5	0.6	1	1. 4	1.8	3.6	5	T
			13		0.5	0.8	1.1	1.4	2.4	3.1	4.7
			16			0.8	1.1	1.4	2.4	3.1	4.7
			20				0.8	1	1.6	2	2.9
		10	25					1	1.6	2	2.9
			32						1.5	1.8	2.6
			40							1.7	2.4
			50								2
			63								

MCBs technical details

Coordination tables: selectivity

Fuse - S300P @ 415V AC

		Supply s.		NH 00								
	Char.			gG								
Load s.		Icu [kA]	Iu [A]	100								
			In [A]	25	35	40	50	63	80	100	125	160
S300P	B, C	25	3	0.9	4	T25	T25	T25	T25	T25	T25	T25
			4	0.7	2.5	3.5	T25	T25	T25	T25	T25	T25
			6	0.6	1.3	1.5	2.5	5.5	12	T25	T25	T25
			8...13	0.4	0.8	1	1.5	2.3	3.5	5	10	T25
			16		0.7	0.9	1.4	2	3	4	8	T25
			20...25			0.7	1.2	1.9	2.7	3.8	7	15
			32...40					1.7	2.5	3.5	6	10
			50...63							4	6	8

Fuse - S300P @ 415V AC

		Supply s.		NH 00								
	Char.			gG								
Load s.		Icu [kA]	Iu [A]	100								
			In [A]	25	35	40	50	63	80	100	125	160
S300P	D, K	25	3	0.9	4	5	T25	T25	T25	T25	T25	T25
			4	0.7	2.5	3.5	6	T25	T25	T25	T25	T25
			6	0.6	1.3	1.5	2.5	5.0	9	T25	T25	T25
			8..13	0.4	0.8	1	1.5	2	3.2	4.5	9	T25
			16		0.7	0.9	1.2	1.8	2.8	3.8	7.5	20
			20..25			0.7	1.1	1.7	2.5	3.5	6	12
			32..40					1.5	2.2	3	5	8
			50..63							2.2	3.3	5.5

Fuse - S300P @ 415V AC

		Supply s.		NH 00								
	Char.			gG								
Load s.		Icu [kA]	Iu [A]	100								
			In [A]	25	35	40	50	63	80	100	125	160
S300P	Z	25	3	0.9	4	T25	T25	T25	T25	T25	T25	T25
			4	0.8	2.5	4	7	T25	T25	T25	T25	T25
			6	0.6	1.3	2	2.8	6	T25	T25	T25	T25
			8..10	0.4	0.8	1.2	1.5	2.3	3.5	6	20	T25
			16		0.7	0.9	1.5	1.9	2.9	4.5	10	T25
			20..25			0.7	1.3	2	2.8	4.4	8	15
			32..40					1.8	2.7	4	6	12
			50..63							3	4.5	8

MCBs technical details
Coordination tables: selectivity

Fuse - S300P @ 415V AC

		Supply s.		DIAZET								
	Char.											
Load s.		Icu [kA]	Iu [A]	50								
			In [A]	10	16	20	25	35	50	63	80	100
S300P	B, C	25	3	0.5	0.5	0.8	0.9	2.2	4.5	T25	T25	T25
			4	0.5	0.5	0.6	0.8	1.8	3.6	9.7	T25	T25
			6		0.5	0.5	0.6	1.4	2.4	5.5	T25	T25
			8...13					1.3	1.9	3.3	5	9.4
			16					1.2	1.8	3.2	4.4	8
			20...25						1.7	2.8	3.8	6.5
			32...40								3.5	5.9
			50...63									5.5

Fuse - S300P @ 415V AC

		Supply s.		DIAZET								
	Char.											
Load s.		Icu [kA]	Iu [A]	50								
			In [A]	10	16	20	25	35	50	63	80	100
S300P	D, K	25	3	0.5	0.5	0.6	0.9	2.3	4.3	T25	T25	T25
			4		0.5	0.6	0.9	2	3.8	9.5	T25	T25
			6			0.5	0.7	1.5	2.6	5.3	9.1	T25
			8..13					1.2	1.8	3.2	4.6	8.6
			16						1.6	2.7	4	7.4
			20..25							2.4	3.4	6.2
			32..40									4.8
			50..63									

Fuse - S300P @ 415V AC

		Supply s.		DIAZET								
	Char.											
Load s.		Icu [kA]	Iu [A]	50								
			In [A]	10	16	20	25	35	50	63	80	100
S300P	Z	25	3	0.5	0.5	0.8	0.9	2.2	4.5	T25	T25	T25
			4	0.5	0.5	0.6	0.8	1.8	3.6	9.7	T25	T25
			6		0.5	0.5	0.6	1.4	2.4	5.5	T25	T25
			8..10					1.3	1.9	3.3	5	9.4
			16					1.2	1.8	3.2	4.4	8
			20..25						1.7	2.8	3.8	6.5
			32..40								3.5	5.9
			50..63									5.5

MCBs technical details

Coordination tables: selectivity

Fuse - S300P @ 415V AC

		Supply s.		NEOZET								
	Char.											
Load s.		Icu [kA]	Iu [A]	50								
			In [A]	10	16	20	25	35	50	63	80	100
S300P	B, C	25	3	0.5	0.5	0.5	0.6	1.9	5.2	T25	T25	T25
			4	0.5	0.5	0.5	0.6	1.6	4	7.6	T25	T25
			6		0.5	0.5	0.5	1.2	2.7	4.5	T25	T25
			8...13					1.1	2.2	3	4.9	T25
			16					1.1	2.1	2.8	4.4	9.5
			20...25						1.9	2.5	3.8	7.8
			32...40								3.5	7
			50...63									6.5

Fuse - S300P @ 415V AC

		Supply s.		NEOZET								
	Char.											
Load s.		Icu [kA]	Iu [A]	50								
			In [A]	10	16	20	25	35	50	63	80	100
S300P	D, K	25	3	0.5	0.5	0.5	0.7	1.8	4.8	9.3	T25	T25
			4		0.5	0.5	0.7	1.7	4.6	7.7	T25	T25
			6			0.5	0.5	1.3	2.9	4.5	9	T25
			8..13					1.1	2.1	2.9	4.6	T25
			16						1.9	2.6	3.9	9
			20..25							2.2	3.4	7.5
			32..40									5.7
			50..63									

Fuse - S300P @ 415V AC

		Supply s.		NEOZET								
	Char.											
Load s.		Icu [kA]	Iu [A]	50								
			In [A]	10	16	20	25	35	50	63	80	100
S300P	Z	25	3	0.5	0.5	0.5	0.6	1.9	5.2	T25	T25	T25
			4	0.5	0.5	0.5	0.6	1.6	4	7.6	T25	T25
			6		0.5	0.5	0.5	1.2	2.7	4.5	T25	T25
			8..10					1.1	2.2	3	4.9	T25
			16					1.1	2.1	2.8	4.4	9.5
			20..25						1.9	2.5	3.8	7.8
			32..40								3.5	7
			50..63									6.5

MCBs technical details

Coordination tables: selectivity

S300P - S200 @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200	B	10	2	0.1	0.3	0.3	0.4	0.5	0.6	0.7	0.7	0.8
			3		0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
			4		0.1	0.2	0.4	0.5	0.5	0.6	0.6	0.7
			6		0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			8			0.1	0.2	0.4	0.4	0.4	0.5	0.7
			10			0.03	0.2	0.3	0.3	0.4	0.4	0.5
			13					0.1	0.3	0.3	0.4	0.5
			16					0.05	0.2	0.3	0.4	0.5
			20						0.07	0.3	0.4	0.5
			25							0.3	0.4	0.5
			32								0.4	0.5
			40									0.5
			50									
			63									

S300P - S200 @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200	C	10	0,5	0.02	0.03	T	T	T	T	T	T	T
			1	0.02	0.03	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6	0.02	0.03	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2	0.02	0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3	0.02	0.03	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4		0.03	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6			0.05	0.2	0.3	0.3	0.3	0.4	0.5
			8			0.05	0.06	0.2	0.2	0.3	0.4	0.5
			10				0.06	0.08	0.2	0.3	0.4	0.5
			13					0.08	0.1	0.3	0.4	0.5
			16						0.1	0.3	0.4	0.5
			20							0.12	0.4	0.5
			25							0.12	0.15	0.5
			32								0.15	0.2
			40									0.2
			50									
			63									

S300P - S200 @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200	D, K	10	0,5	0.02	0.03	T	T	T	T	T	T	T
			1	0.02	0.03	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6	0.02	0.03	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2	0.02	0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3	0.02	0.03	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4		0.03	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6			0.05	0.2	0.3	0.3	0.3	0.4	0.5
			8			0.05	0.06	0.2	0.2	0.3	0.4	0.5
			10				0.06	0.08	0.2	0.3	0.4	0.5
			13					0.08	0.1	0.3	0.4	0.5
			16						0.1	0.3	0.4	0.5
			20							0.12	0.4	0.5
			25							0.12	0.15	0.5
			32								0.15	0.2
			40									0.2
			50									
			63									

MCBs technical details

Coordination tables: selectivity

S300P - S200M @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200M	B	15	2	0.1	0.3	0.3	0.4	0.5	0.6	0.7	0.7	0.8
			3		0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
			4		0.1	0.2	0.4	0.5	0.5	0.6	0.6	0.7
			6		0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			8			0.1	0.2	0.4	0.4	0.4	0.5	0.7
			10			0.03	0.2	0.3	0.3	0.4	0.4	0.5
			13					0.1	0.3	0.3	0.4	0.5
			16					0.05	0.2	0.3	0.4	0.5
			20						0.07	0.3	0.4	0.5
			25							0.3	0.4	0.5
			32								0.4	0.5
			40									0.5
			50									
			63									

S300P - S200M @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200M	C	15	0,5	0.02	0.03	T	T	T	T	T	T	T
			1	0.02	0.03	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6	0.02	0.03	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2	0.02	0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3	0.02	0.03	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4		0.03	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6			0.05	0.2	0.3	0.3	0.3	0.4	0.5
			8			0.05	0.06	0.2	0.2	0.3	0.4	0.5
			10				0.06	0.08	0.2	0.3	0.4	0.5
			13					0.08	0.1	0.3	0.4	0.5
			16						0.1	0.3	0.4	0.5
			20							0.12	0.4	0.5
			25							0.12	0.15	0.5
			32								0.15	0.2
			40									0.2
			50									
			63									

S300P - S200M @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200M	D, K	15	0,5	0.02	0.03	T	T	T	T	T	T	T
			1	0.02	0.03	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6	0.02	0.03	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2	0.02	0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3	0.02	0.03	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4		0.03	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6			0.05	0.2	0.3	0.3	0.3	0.4	0.5
			8			0.05	0.06	0.2	0.2	0.3	0.4	0.5
			10				0.06	0.08	0.2	0.3	0.4	0.5
			13					0.08	0.1	0.3	0.4	0.5
			16						0.1	0.3	0.4	0.5
			20							0.12	0.4	0.5
			25							0.12	0.15	0.5
			32								0.15	0.2
			40									0.2
			50									
			63									

MCBs technical details

Coordination tables: selectivity

S300P - S200L @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200L	B	10	2	0.1	0.3	0.3	0.4	0.5	0.6	0.7	0.7	0.8
			3		0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
			4		0.1	0.2	0.4	0.5	0.5	0.6	0.6	0.7
			6		0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			8			0.1	0.2	0.4	0.4	0.4	0.5	0.7
			10			0.03	0.2	0.3	0.3	0.4	0.4	0.5
			13					0.1	0.3	0.3	0.4	0.5
			16					0.05	0.2	0.3	0.4	0.5
			20						0.07	0.3	0.4	0.5
			25							0.3	0.4	0.5
			32								0.4	0.5
			40									0.5
			50									
			63									

S300P - S200L @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200L	C	10	0,5	0.02	0.03	T	T	T	T	T	T	T
			1	0.02	0.03	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6	0.02	0.03	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2	0.02	0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3	0.02	0.03	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4		0.03	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6			0.05	0.2	0.3	0.3	0.3	0.4	0.5
			8			0.05	0.06	0.2	0.2	0.3	0.4	0.5
			10				0.06	0.08	0.2	0.3	0.4	0.5
			13					0.08	0.1	0.3	0.4	0.5
			16						0.1	0.3	0.4	0.5
			20							0.12	0.4	0.5
			25							0.12	0.15	0.5
			32								0.15	0.2
			40									0.2
			50									
			63									

S300P - S200L @ 415V AC

		Supply s.		S300P								
	Char.			B								
Load s.		Icu [kA]		25								
			In [A]	6	10	16	20	25	32	40	50	63
S200L	D, K	10	0,5	0.02	0.03	T	T	T	T	T	T	T
			1	0.02	0.03	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6	0.02	0.03	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2	0.02	0.03	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3	0.02	0.03	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4		0.03	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6			0.05	0.2	0.3	0.3	0.3	0.4	0.5
			8			0.05	0.06	0.2	0.2	0.3	0.4	0.5
			10				0.06	0.08	0.2	0.3	0.4	0.5
			13					0.08	0.1	0.3	0.4	0.5
			16						0.1	0.3	0.4	0.5
			20							0.12	0.4	0.5
			25							0.12	0.15	0.5
			32								0.15	0.2
			40									0.2
			50									
			63									

MCBs technical details

Coordination tables: selectivity

S300P - S200 @ 415V AC

		Supply s.		S300P											
	Char.			C											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200	B	10	2					0.3	0.4	0.5	0.6	0.7	0.7	0.8	1.0
			3					0.2	0.4	0.5	0.6	0.7	0.7	0.8	1.0
			4					0.1	0.3	0.5	0.6	0.7	0.7	0.7	0.9
			6					0.03	0.3	0.4	0.5	0.6	0.6	0.6	0.8
			8						0.2	0.3	0.4	0.5	0.5	0.5	0.7
			10						0.04	0.3	0.4	0.5	0.5	0.5	0.6
			13							0.05	0.4	0.5	0.3	0.4	0.5
			16								0.06	0.4	0.4	0.4	0.5
			20										0.3	0.4	0.5
			25										0.3	0.4	0.5
			32											0.4	0.5
			40												0.5
			50												
			63												

S300P - S200 @ 415V AC

		Supply s.		S300P											
	Char.			C											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200	C	10	0,5	0.01	0.02	0.02	0.03	0.05	T	T	T	T	T	T	T
			1	0.01	0.02	0.02	0.03	0.05	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6			0.02	0.03	0.05	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2			0.02	0.03	0.05	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3				0.03	0.05	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4				0.02	0.05	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6					0.05	0.08	0.2	0.3	0.3	0.3	0.5	0.7
			8							0.1	0.2	0.2	0.3	0.4	0.7
			10							0.1	0.15	0.2	0.3	0.4	0.5
			13								0.15	0.2	0.3	0.4	0.5
			16								0.07	0.16	0.3	0.4	0.5
			20									0.1	0.3	0.4	0.5
			25										0.3	0.4	0.5
			32											0.4	0.5
			40												0.5
			50												
			63												

S300P - S200 @ 415V AC

		Supply s.		S300P											
	Char.			C											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200	D, K	10	0,5	0.01	0.02	0.02	0.03	0.05	T	T	T	T	T	T	T
			1	0.01	0.02	0.02	0.03	0.05	0.3	0.5	0.7	0.9	0.9	1.3	1.5
			1,6			0.02	0.03	0.05	0.2	0.4	0.4	0.5	0.5	1.1	1.5
			2			0.02	0.03	0.05	0.08	0.1	0.3	0.5	0.5	1.1	1.5
			3				0.03	0.05	0.08	0.1	0.2	0.3	0.5	0.5	1.1
			4				0.02	0.05	0.08	0.1	0.15	0.3	0.5	0.5	1.1
			6					0.05	0.08	0.1	0.15	0.16	0.3	0.4	0.5
			8						0.08	0.1	0.15	0.16	0.3	0.4	0.5
			10						0.05	0.1	0.15	0.16	0.2	0.4	0.5
			13								0.07	0.16	0.2	0.25	0.5
			16									0.1	0.2	0.25	0.4
			20										0.1	0.25	0.3
			25											0.15	0.3
			32												0.2
			40												
			50												
			63												

MCBs technical details

Coordination tables: selectivity

S300P - S200M @ 415V AC

Load s.	Char.	Icu [kA]	In [A]	2	3	4	6	10	16	20	25	32	40	50	63
		Supply s.		S300P											
	Char.			C											
		Icu [kA]		25											
S200M	B	15	2					0.3	0.4	0.5	0.6	0.7	0.7	0.8	1.0
			3					0.2	0.4	0.5	0.6	0.7	0.7	0.8	1.0
			4					0.1	0.3	0.5	0.6	0.7	0.7	0.7	0.9
			6					0.03	0.3	0.4	0.5	0.6	0.6	0.6	0.8
			8						0.2	0.3	0.4	0.5	0.5	0.5	0.7
			10						0.04	0.3	0.4	0.5	0.5	0.5	0.6
			13							0.05	0.4	0.5	0.3	0.4	0.5
			16								0.06	0.4	0.4	0.4	0.5
			20										0.3	0.4	0.5
			25										0.3	0.4	0.5
			32											0.4	0.5
			40												0.5
			50												
			63												

S300P - S200M @ 415V AC

Load s.	Char.	Icu [kA]	In [A]	2	3	4	6	10	16	20	25	32	40	50	63
		Supply s.		S300P											
	Char.			C											
		Icu [kA]		25											
S200M	C	15	0,5	0.01	0.02	0.02	0.03	0.05	T	T	T	T	T	T	T
			1	0.01	0.02	0.02	0.03	0.05	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6			0.02	0.03	0.05	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2			0.02	0.03	0.05	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3				0.03	0.05	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4				0.02	0.05	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6					0.05	0.08	0.2	0.3	0.3	0.3	0.5	0.7
			8							0.1	0.2	0.2	0.3	0.4	0.7
			10							0.1	0.15	0.2	0.3	0.4	0.5
			13								0.15	0.2	0.3	0.4	0.5
			16								0.07	0.16	0.3	0.4	0.5
			20									0.1	0.3	0.4	0.5
			25										0.3	0.4	0.5
			32											0.4	0.5
			40												0.5
			50												
			63												

S300P - S200M @ 415V AC

Load s.	Char.	Icu [kA]	In [A]	2	3	4	6	10	16	20	25	32	40	50	63
		Supply s.		S300P											
	Char.			C											
		Icu [kA]		25											
S200M	D, K	15	0,5	0.01	0.02	0.02	0.03	0.05	T	T	T	T	T	T	T
			1	0.01	0.02	0.02	0.03	0.05	0.3	0.5	0.7	0.9	0.9	1.3	1.5
			1,6			0.02	0.03	0.05	0.2	0.4	0.4	0.5	0.5	1.1	1.5
			2			0.02	0.03	0.05	0.08	0.1	0.3	0.5	0.5	1.1	1.5
			3				0.03	0.05	0.08	0.1	0.2	0.3	0.5	0.5	1.1
			4				0.02	0.05	0.08	0.1	0.15	0.3	0.5	0.5	1.1
			6					0.05	0.08	0.1	0.15	0.16	0.3	0.4	0.5
			8						0.08	0.1	0.15	0.16	0.3	0.4	0.5
			10						0.05	0.1	0.15	0.16	0.2	0.4	0.5
			13								0.07	0.16	0.2	0.25	0.5
			16									0.1	0.2	0.25	0.4
			20										0.1	0.25	0.3
			25											0.15	0.3
			32												0.2
			40												
			50												
			63												

MCBs technical details

Coordination tables: selectivity

S300P - S200L @ 415V AC

		Supply s.		S300P											
	Char.			C											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200L	B	10	2					0.3	0.4	0.5	0.6	0.7	0.7	0.8	1.0
			3					0.2	0.4	0.5	0.6	0.7	0.7	0.8	1.0
			4					0.1	0.3	0.5	0.6	0.7	0.7	0.7	0.9
			6					0.03	0.3	0.4	0.5	0.6	0.6	0.6	0.8
			8						0.2	0.3	0.4	0.5	0.5	0.5	0.7
			10						0.04	0.3	0.4	0.5	0.5	0.5	0.6
			13							0.05	0.4	0.5	0.3	0.4	0.5
			16								0.06	0.4	0.4	0.4	0.5
			20										0.3	0.4	0.5
			25										0.3	0.4	0.5
			32											0.4	0.5
			40												0.5
			50												
			63												

S300P - S200L @ 415V AC

		Supply s.		S300P											
	Char.			C											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200L	C	10	0,5	0.01	0.02	0.02	0.03	0.05	T	T	T	T	T	T	T
			1	0.01	0.02	0.02	0.03	0.05	0.7	1.0	1.0	1.3	1.3	1.5	1.7
			1,6			0.02	0.03	0.05	0.5	0.8	0.8	1.1	1.1	1.3	1.5
			2			0.02	0.03	0.05	0.2	0.3	0.5	0.5	0.5	0.5	0.7
			3				0.03	0.05	0.2	0.2	0.4	0.4	0.4	0.5	0.7
			4				0.02	0.05	0.2	0.2	0.3	0.3	0.4	0.4	0.5
			6					0.05	0.08	0.2	0.3	0.3	0.3	0.5	0.7
			8							0.1	0.2	0.2	0.3	0.4	0.7
			10							0.1	0.15	0.2	0.3	0.4	0.5
			13								0.15	0.2	0.3	0.4	0.5
			16								0.07	0.16	0.3	0.4	0.5
			20									0.1	0.3	0.4	0.5
			25										0.3	0.4	0.5
			32											0.4	0.5
			40												0.5
			50												
			63												

S300P - S200L @ 415V AC

		Supply s.		S300P											
	Char.			C											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200L	D, K	10	0,5	0.01	0.02	0.02	0.03	0.05	T	T	T	T	T	T	T
			1	0.01	0.02	0.02	0.03	0.05	0.3	0.5	0.7	0.9	0.9	1.3	1.5
			1,6			0.02	0.03	0.05	0.2	0.4	0.4	0.5	0.5	1.1	1.5
			2			0.02	0.03	0.05	0.08	0.1	0.3	0.5	0.5	1.1	1.5
			3				0.03	0.05	0.08	0.1	0.2	0.3	0.5	0.5	1.1
			4				0.02	0.05	0.08	0.1	0.15	0.3	0.5	0.5	1.1
			6					0.05	0.08	0.1	0.15	0.16	0.3	0.4	0.5
			8						0.08	0.1	0.15	0.16	0.3	0.4	0.5
			10						0.05	0.1	0.15	0.16	0.2	0.4	0.5
			13								0.07	0.16	0.2	0.25	0.5
			16									0.1	0.2	0.25	0.4
			20										0.1	0.25	0.3
			25											0.15	0.3
			32												0.2
			40												
			50												
			63												

MCBs technical details

Coordination tables: selectivity

S300P - S200 @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200	B	10	2						0.5	0.6	0.7	0.8	0.8	0.9	1.0
			3						0.5	0.6	0.7	0.8	0.8	0.9	1.0
			4						0.4	0.6	0.7	0.8	0.8	0.8	0.9
			6						0.4	0.5	0.6	0.7	0.7	0.7	0.8
			8						0.3	0.4	0.5	0.7	0.7	0.6	0.7
			10							0.4	0.5	0.6	0.6	0.6	0.6
			13								0.4	0.6	0.6	0.5	0.5
			16									0.5	0.5	0.5	0.5
			20										0.5	0.5	0.5
			25										0.5	0.5	0.5
			32											0.5	0.5
			40												0.5
			50												
			63												

S300P - S200 @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200	C	10	0,5	0.02	0.03	0.04	0.06	0.1	T	T	T	T	T	T	T
			1	0.02	0.03	0.04	0.06	0.1	0.7	1.0	1.0	1.5	1.5	3.5	5.5
			1,6			0.04	0.06	0.1	0.5	0.8	0.8	1.1	1.5	3.5	5.5
			2			0.04	0.06	0.1	0.2	0.3	0.5	1.1	1.5	2.6	3.5
			3				0.06	0.1	0.2	0.2	0.4	1.1	1.1	1.5	2.6
			4				0.03	0.1	0.2	0.2	0.3	1.1	1.1	1.1	1.5
			6					0.1	0.2	0.2	0.3	0.5	0.7	1.1	1.5
			8						0.2	0.2	0.25	0.5	0.7	1.1	1.5
			10						0.2	0.2	0.25	0.5	0.7	0.9	1.5
			13								0.25	0.4	0.5	0.7	1.1
			16									0.4	0.5	0.7	1.1
			20									0.3	0.5	0.6	1.1
			25										0.5	0.6	1.1
			32											0.6	0.9
			40												0.9
			50												
			63												

S300P - S200 @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200	D, K	10	0,5	0.02	0.03	0.04	0.06	0.1	T	T	T	T	T	T	T
			1	0.02	0.03	0.04	0.06	0.1	0.5	0.7	0.9	1.5	1.5	3.5	5.5
			1,6				0.06	0.1	0.3	0.5	0.7	1.1	1.5	3.5	5.5
			2				0.06	0.1	0.2	0.2	0.5	1.1	1.5	2.6	3.5
			3				0.06	0.1	0.2	0.2	0.3	1.1	1.1	1.5	1.5
			4					0.1	0.2	0.2	0.3	1.1	1.1	1.1	1.5
			6						0.2	0.2	0.2	0.5	0.7	1.1	1.5
			8								0.2	0.4	0.7	1.1	1.5
			10									0.4	0.7	0.9	1.1
			13									0.4	0.7	0.7	1.1
			16										0.5	0.7	1.1
			20											0.6	0.9
			25											0.6	0.9
			32												0.7
			40												0.7
			50												
			63												

MCBs technical details

Coordination tables: selectivity

S300P - S200M @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200M	B	15	2						0.5	0.6	0.7	0.8	0.8	0.9	1.0
			3						0.5	0.6	0.7	0.8	0.8	0.9	1.0
			4						0.4	0.6	0.7	0.8	0.8	0.8	0.9
			6						0.4	0.5	0.6	0.7	0.7	0.7	0.8
			8						0.3	0.4	0.5	0.7	0.7	0.6	0.7
			10							0.4	0.5	0.6	0.6	0.6	0.6
			13								0.4	0.6	0.6	0.5	0.5
			16									0.5	0.5	0.5	0.5
			20										0.5	0.5	0.5
			25										0.5	0.5	0.5
			32											0.5	0.5
			40												0.5
			50												
			63												

S300P - S200M @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200M	C	15	0,5	0.02	0.03	0.04	0.06	0.1	T	T	T	T	T	T	T
			1	0.02	0.03	0.04	0.06	0.1	0.7	1.0	1.0	1.5	1.5	3.5	5.5
			1,6			0.04	0.06	0.1	0.5	0.8	0.8	1.1	1.5	3.5	5.5
			2			0.04	0.06	0.1	0.2	0.3	0.5	1.1	1.5	2.6	3.5
			3				0.06	0.1	0.2	0.2	0.4	1.1	1.1	1.5	2.6
			4				0.03	0.1	0.2	0.2	0.3	1.1	1.1	1.1	1.5
			6					0.1	0.2	0.2	0.3	0.5	0.7	1.1	1.5
			8						0.2	0.2	0.25	0.5	0.7	1.1	1.5
			10						0.2	0.2	0.25	0.5	0.7	0.9	1.5
			13								0.25	0.4	0.5	0.7	1.1
			16									0.4	0.5	0.7	1.1
			20									0.3	0.5	0.6	1.1
			25										0.5	0.6	1.1
			32											0.6	0.9
			40												0.9
			50												
			63												

S300P - S200M @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200M	D, K	15	0,5	0.02	0.03	0.04	0.06	0.1	T	T	T	T	T	T	T
			1	0.02	0.03	0.04	0.06	0.1	0.5	0.7	0.9	1.5	1.5	3.5	5.5
			1,6				0.06	0.1	0.3	0.5	0.7	1.1	1.5	3.5	5.5
			2				0.06	0.1	0.2	0.2	0.5	1.1	1.5	2.6	3.5
			3				0.06	0.1	0.2	0.2	0.3	1.1	1.1	1.5	1.5
			4					0.1	0.2	0.2	0.3	1.1	1.1	1.1	1.5
			6						0.2	0.2	0.2	0.5	0.7	1.1	1.5
			8								0.2	0.4	0.7	1.1	1.5
			10									0.4	0.7	0.9	1.1
			13									0.4	0.7	0.7	1.1
			16										0.5	0.7	1.1
			20											0.6	0.9
			25											0.6	0.9
			32												0.7
			40												0.7
			50												
			63												

MCBs technical details
Coordination tables: selectivity

S300P - S200L @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200L	B	10	2						0.5	0.6	0.7	0.8	0.8	0.9	1.0
			3						0.5	0.6	0.7	0.8	0.8	0.9	1.0
			4						0.4	0.6	0.7	0.8	0.8	0.8	0.9
			6						0.4	0.5	0.6	0.7	0.7	0.7	0.8
			8						0.3	0.4	0.5	0.7	0.7	0.6	0.7
			10							0.4	0.5	0.6	0.6	0.6	0.6
			13								0.4	0.6	0.6	0.5	0.5
			16									0.5	0.5	0.5	0.5
			20										0.5	0.5	0.5
			25										0.5	0.5	0.5
			32											0.5	0.5
			40												0.5
			50												
			63												

S300P - S200L @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200L	C	10	0,5	0.02	0.03	0.04	0.06	0.1	T	T	T	T	T	T	T
			1	0.02	0.03	0.04	0.06	0.1	0.7	1.0	1.0	1.5	1.5	3.5	5.5
			1,6			0.04	0.06	0.1	0.5	0.8	0.8	1.1	1.5	3.5	5.5
			2			0.04	0.06	0.1	0.2	0.3	0.5	1.1	1.5	2.6	3.5
			3				0.06	0.1	0.2	0.2	0.4	1.1	1.1	1.5	2.6
			4				0.03	0.1	0.2	0.2	0.3	1.1	1.1	1.1	1.5
			6					0.1	0.2	0.2	0.3	0.5	0.7	1.1	1.5
			8						0.2	0.2	0.25	0.5	0.7	1.1	1.5
			10						0.2	0.2	0.25	0.5	0.7	0.9	1.5
			13								0.25	0.4	0.5	0.7	1.1
			16									0.4	0.5	0.7	1.1
			20									0.3	0.5	0.6	1.1
			25										0.5	0.6	1.1
			32											0.6	0.9
			40												0.9
			50												
			63												

S300P - S200L @ 415V AC

		Supply s.		S300P											
	Char.			D, K											
Load s.		Icu [kA]		25											
			In [A]	2	3	4	6	10	16	20	25	32	40	50	63
S200L	D, K	10	0,5	0.02	0.03	0.04	0.06	0.1	T	T	T	T	T	T	T
			1	0.02	0.03	0.04	0.06	0.1	0.5	0.7	0.9	1.5	1.5	3.5	5.5
			1,6				0.06	0.1	0.3	0.5	0.7	1.1	1.5	3.5	5.5
			2				0.06	0.1	0.2	0.2	0.5	1.1	1.5	2.6	3.5
			3				0.06	0.1	0.2	0.2	0.3	1.1	1.1	1.5	1.5
			4					0.1	0.2	0.2	0.3	1.1	1.1	1.1	1.5
			6						0.2	0.2	0.2	0.5	0.7	1.1	1.5
			8								0.2	0.4	0.7	1.1	1.5
			10									0.4	0.7	0.9	1.1
			13									0.4	0.7	0.7	1.1
			16										0.5	0.7	1.1
			20											0.6	0.9
			25											0.6	0.9
			32												0.7
			40												0.7
			50												
			63												

MCBs technical details

Coordination tables: selectivity

S302P - S200 @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			C						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200	B	10	2	1.0	2.5	5.5	14.0	T	T	T
			3	0.4	0.8	1.5	3.6	9.0	T	T
			4	0.3	0.5	0.8	1.3	2.1	6.0	10.0
			6	0.2	0.4	0.5	0.8	1.2	2.0	2.4
			8	0.1	0.3	0.4	0.6	0.8	1.3	1.7
			10		0.3	0.4	0.6	0.8	1.3	1.7
			13		0.2	0.3	0.5	0.7	1.1	1.4
			16			0.2	0.3	0.6	0.9	1.2
			20				0.3	0.3	0.7	0.7
			25					0.3	0.7	0.7
			32						0.5	0.7
			40							0.4
			50							
			63							

S302P - S200 @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			C						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200	C	10	0,5	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T
			1,6	1.0	2.4	2.8	10.0	T	T	T
			2	1.0	2.4	2.8	10.0	T	T	T
			3	0.4	0.8	1.5	3.5	9.0	T	T
			4	0.3	0.5	0.8	1.2	1.6	6.0	10.0
			6	0.2	0.4	0.5	0.8	1.2	2.0	2.2
			8		0.3	0.4	0.6	0.8	1.3	1.6
			10		0.3	0.4	0.6	0.8	1.3	1.6
			13			0.2	0.5	0.6	1.0	1.3
			16				0.3	0.6	0.9	1.1
			20					0.3	0.6	0.9
			25						0.4	0.5
			32							0.4
			40							0.3
			50							
			63							

S302P - S200M @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			C						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200M	B	15	2	1.0	2.5	5.5	14.0	T	T	T
			3	0.4	0.8	1.5	3.6	9.0	T	T
			4	0.3	0.5	0.8	1.3	2.1	6.0	10.0
			6	0.2	0.4	0.5	0.8	1.2	2.0	2.4
			8	0.1	0.3	0.4	0.6	0.8	1.3	1.7
			10		0.3	0.4	0.6	0.8	1.3	1.7
			13		0.2	0.3	0.5	0.7	1.1	1.4
			16			0.2	0.3	0.6	0.9	1.2
			20				0.3	0.3	0.7	0.7
			25					0.3	0.7	0.7
			32						0.5	0.7
			40							0.4
			50							
			63							

MCBs technical details

Coordination tables: selectivity

S302P - S200M @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			C						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
			0,5	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T
			1,6	1.0	2.4	2.8	10.0	T	T	T
			2	1.0	2.4	2.8	10.0	T	T	T
			3	0.4	0.8	1.5	3.5	9.0	T	T
			4	0.3	0.5	0.8	1.2	1.6	6.0	10.0
			6	0.2	0.4	0.5	0.8	1.2	2.0	2.2
			8		0.3	0.4	0.6	0.8	1.3	1.6
S200M	C	15	10		0.3	0.4	0.6	0.8	1.3	1.6
			13			0.2	0.5	0.6	1.0	1.3
			16				0.3	0.6	0.9	1.1
			20					0.3	0.6	0.9
			25						0.4	0.5
			32							0.4
			40							0.3
			50							
			63							

S302P - S200L @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			C						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
			2	1.0	2.5	5.5	14.0	T	T	T
			3	0.4	0.8	1.5	3.6	9.0	T	T
			4	0.3	0.5	0.8	1.3	2.1	6.0	10.0
			6	0.2	0.4	0.5	0.8	1.2	2.0	2.4
			8	0.1	0.3	0.4	0.6	0.8	1.3	1.7
			10		0.3	0.4	0.6	0.8	1.3	1.7
			13		0.2	0.3	0.5	0.7	1.1	1.4
S200L	B	10	16			0.2	0.3	0.6	0.9	1.2
			20				0.3	0.3	0.7	0.7
			25					0.3	0.7	0.7
			32						0.5	0.7
			40							0.4
			50							
			63							
			63							

S302P - S200L @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			C						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
			0,5	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T
			1,6	1.0	2.4	2.8	10.0	T	T	T
			2	1.0	2.4	2.8	10.0	T	T	T
			3	0.4	0.8	1.5	3.5	9.0	T	T
			4	0.3	0.5	0.8	1.2	1.6	6.0	10.0
			6	0.2	0.4	0.5	0.8	1.2	2.0	2.2
			8		0.3	0.4	0.6	0.8	1.3	1.6
S200L	C	10	10		0.3	0.4	0.6	0.8	1.3	1.6
			13			0.2	0.5	0.6	1.0	1.3
			16				0.3	0.6	0.9	1.1
			20					0.3	0.6	0.9
			25						0.4	0.5
			32							0.4
			40							0.3
			50							
			63							

MCBs technical details

Coordination tables: selectivity

S302P - S200 @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			D, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200	B	10	2	1.1	2.6	5.8	15.0	T	T	T
			3	0.5	0.9	1.6	3.8	9.5	T	T
			4	0.4	0.6	0.9	1.4	2.3	7.1	12.0
			6	0.3	0.5	0.6	0.9	1.3	2.2	2.6
			8	0.2	0.4	0.5	0.7	0.9	1.5	1.9
			10	0.2	0.4	0.5	0.7	0.9	1.5	1.9
			13		0.3	0.4	0.6	0.8	1.3	1.6
			16			0.3	0.4	0.7	1.1	1.4
			20				0.4	0.5	0.8	1.1
			25					0.5	0.8	0.8
			32						0.6	0.8
			40							0.5
			50							
			63							

S302P - S200 @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			D, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200	C	10	0,5	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T
			1,6	1.1	2.6	5.8	15.0	T	T	T
			2	1.1	2.6	5.8	15.0	T	T	T
			3	0.5	0.9	1.6	3.8	9.5	T	T
			4	0.4	0.6	0.9	1.4	1.9	7.1	12.0
			6	0.3	0.5	0.6	0.9	1.3	2.2	2.6
			8		0.4	0.5	0.7	0.9	1.5	1.9
			10		0.4	0.5	0.7	0.9	1.5	1.9
			13			0.3	0.6	0.8	1.3	1.6
			16			0.1	0.4	0.7	1.1	1.4
			20				0.4	0.5	0.9	1.1
			25					0.1	0.6	0.7
			32						0.2	0.7
			40							0.5
			50							
			63							

S302P - S200M @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			D, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200M	B	15	2	1.1	2.6	5.8	15.0	T	T	T
			3	0.5	0.9	1.6	3.8	9.5	T	T
			4	0.4	0.6	0.9	1.4	2.3	7.1	12.0
			6	0.3	0.5	0.6	0.9	1.3	2.2	2.6
			8	0.2	0.4	0.5	0.7	0.9	1.5	1.9
			10	0.2	0.4	0.5	0.7	0.9	1.5	1.9
			13		0.3	0.4	0.6	0.8	1.3	1.6
			16			0.3	0.4	0.7	1.1	1.4
			20				0.4	0.5	0.8	1.1
			25					0.5	0.8	0.8
			32						0.6	0.8
			40							0.5
			50							
			63							

MCBs technical details

Coordination tables: selectivity

S302P - S200M @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			D, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200M	C	15	0,5	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T
			1,6	1.1	2.6	5.8	15.0	T	T	T
			2	1.1	2.6	5.8	15.0	T	T	T
			3	0.5	0.9	1.6	3.8	9.5	T	T
			4	0.4	0.6	0.9	1.4	1.9	7.1	12.0
			6	0.3	0.5	0.6	0.9	1.3	2.2	2.6
			8		0.4	0.5	0.7	0.9	1.5	1.9
			10		0.4	0.5	0.7	0.9	1.5	1.9
			13			0.3	0.6	0.8	1.3	1.6
			16			0.1	0.4	0.7	1.1	1.4
			20				0.4	0.5	0.9	1.1
			25					0.1	0.6	0.7
			32						0.2	0.7
			40							0.5
			50							
			63							

S302P - S200L @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			D, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200L	B	10	2	1.1	2.6	5.8	15.0	T	T	T
			3	0.5	0.9	1.6	3.8	9.5	T	T
			4	0.4	0.6	0.9	1.4	2.3	7.1	12.0
			6	0.3	0.5	0.6	0.9	1.3	2.2	2.6
			8	0.2	0.4	0.5	0.7	0.9	1.5	1.9
			10	0.2	0.4	0.5	0.7	0.9	1.5	1.9
			13		0.3	0.4	0.6	0.8	1.3	1.6
			16			0.3	0.4	0.7	1.1	1.4
			20				0.4	0.5	0.8	1.1
			25					0.5	0.8	0.8
			32						0.6	0.8
			40							0.5
			50							
			63							

S302P - S200L @ 240V AC, 2pole

		Supply s.		S300P						
	Char.			D, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	32	40	50	63
S200L	C	10	0,5	T	T	T	T	T	T	T
			1	T	T	T	T	T	T	T
			1,6	1.1	2.6	5.8	15.0	T	T	T
			2	1.1	2.6	5.8	15.0	T	T	T
			3	0.5	0.9	1.6	3.8	9.5	T	T
			4	0.4	0.6	0.9	1.4	1.9	7.1	12.0
			6	0.3	0.5	0.6	0.9	1.3	2.2	2.6
			8		0.4	0.5	0.7	0.9	1.5	1.9
			10		0.4	0.5	0.7	0.9	1.5	1.9
			13			0.3	0.6	0.8	1.3	1.6
			16			0.1	0.4	0.7	1.1	1.4
			20				0.4	0.5	0.9	1.1
			25					0.1	0.6	0.7
			32						0.2	0.7
			40							0.5
			50							
			63							

MCBs technical details

Coordination tables: selectivity

S750 - S300P @ 415V AC

		Supply s.		S750DR						
	Char.			E, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	35	40	50	63
S300P	B	25	6	T25	T25	T25	T25	T25	T25	T25
			10	T25	T25	T25	T25	T25	T25	T25
			13	T25	T25	T25	T25	T25	T25	T25
			16		T25	T25	T25	T25	T25	T25
			20			T25	T25	T25	T25	T25
			25				T25	T25	T25	T25
			32					T25	T25	T25
			40						T25	T25
			50							
			63							

S750 - S300P @ 415V AC

		Supply s.		S750DR						
	Char.			E, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	35	40	50	63
S300P	C	25	0,5...2	T25	T25	T25	T25	T25	T25	T25
			3	T25	T25	T25	T25	T25	T25	T25
			4	T25	T25	T25	T25	T25	T25	T25
			6	T25	T25	T25	T25	T25	T25	T25
			8	T25	T25	T25	T25	T25	T25	T25
			10	T25	T25	T25	T25	T25	T25	T25
			13	T25	T25	T25	T25	T25	T25	T25
			16		T25	T25	T25	T25	T25	T25
			20			T25	T25	T25	T25	T25
			25				T25	T25	T25	T25
			32					T25	T25	T25
			40						T25	T25
			50							
			63							

MCBs technical details

Coordination tables: selectivity

S750 - S300P @ 415V AC

		Supply s.		S750DR						
	Char.			E, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	35	40	50	63
S300P	D, K	25	0,1...2	T25	T25	T25	T25	T25	T25	T25
			3	T25	T25	T25	T25	T25	T25	T25
			4	T25	T25	T25	T25	T25	T25	T25
			6	T25	T25	T25	T25	T25	T25	T25
			8	T25	T25	T25	T25	T25	T25	T25
			10	T25	T25	T25	T25	T25	T25	T25
			13	T25	T25	T25	T25	T25	T25	T25
			16		T25	T25	T25	T25	T25	T25
			20			T25	T25	T25	T25	T25
			25				T25	T25	T25	T25
			32					T25	T25	T25
			40						T25	T25
			50							
			63							

S750 - S300P @ 415V AC

		Supply s.		S750DR						
	Char.			E, K						
Load s.		Icu [kA]		25						
			In [A]	16	20	25	35	40	50	63
S300P	Z	25	0,5...2	T25	T25	T25	T25	T25	T25	T25
			3	T25	T25	T25	T25	T25	T25	T25
			4	T25	T25	T25	T25	T25	T25	T25
			6	T25	T25	T25	T25	T25	T25	T25
			8	T25	T25	T25	T25	T25	T25	T25
			10	T25	T25	T25	T25	T25	T25	T25
			16		T25	T25	T25	T25	T25	T25
			20			T25	T25	T25	T25	T25
			25				T25	T25	T25	T25
			32					T25	T25	T25
			40						T25	T25
			50							
			63							

MCBs technical details

Coordination tables: selectivity

Fuse 63A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 63A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	B, C	25	0,5...2	15	15	15	15		
			3	15	15	15	15		
			4	15	15	15	15		
			6	10	10	10	10		
			8	7	6	6	5		
			10	7	6	6	5		
			13	6	6	6	5		
			16	6	6	6	6		
			20	5	6	6	6		
			25		6	6	6		
			32			4	3.5		
			40				3		
			50						
			63						

Fuse 63A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 63A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	D, K	25	0,2...2	15	15	15	15		
			3	15	15	15	15		
			4	15	15	15	15		
			6	10	10	10	10		
			8	7	6	6	5		
			10	7	6	6	5		
			13	6	6	6	5		
			16	6	6	6	5		
			20	5	5	4.5	4.5		
			25		4.5	4.5	4		
			32			4	3.5		
			40				3		
			50						
			63						

Fuse 63A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 63A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	Z	25	0,5...2	15	15	15	15		
			3	15	15	15	15		
			4	15	15	15	15		
			6	10	10	10	10		
			8	7	6	6	5		
			10	7	6	6	5		
			13	6	6	6	5		
			16	6	6	6	5		
			20	5	5	4.5	4.5		
			25		4.5	4.5	4		
			32			4	3.5		
			40				3		
			50						
			63						

MCBs technical details

Coordination tables: selectivity

Fuse 80A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 80A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	B, C	25	0,5...2	T25	T25	T25	T25		
			3	T25	T25	15	15		
			4	20	20	15	15		
			6	17	16	15	14		
			8	10	10	10	8		
			10	10	10	10	8		
			13	9	8	8	7		
			16	9	8	8	7		
			20	8	7	7	6.5		
			25		7	6	6		
			32			6	5.5		
			40				5		
			50						
			63						

Fuse 80A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 80A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	D, K	25	0,2...2	T25	T25	T25	T25		
			3	T25	T25	15	15		
			4	20	20	15	15		
			6	17	16	15	14		
			8	10	10	10	8		
			10	10	10	10	8		
			13	9	8	8	7		
			16	9	8	8	7		
			20	8	7	7	6.5		
			25		7	6	6		
			32			6	5.5		
			40				5		
			50						
			63						

Fuse 80A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 80A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	Z	25	0,5...2	T25	T25	T25	T25		
			3	T25	T25	15	15		
			4	20	20	15	15		
			6	17	16	15	14		
			8	10	10	10	8		
			10	10	10	10	8		
			13	9	8	8	7		
			16	9	8	8	7		
			20	8	7	7	6.5		
			25		7	6	6		
			32			6	5.5		
			40				5		
			50						
			63						

MCBs technical details

Coordination tables: selectivity

Fuse 100A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 100A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	B, C	25	0,5...2	T25	T25	T25	T25		
			3	T25	T25	T25	T25		
			4	T25	T25	T25	T25		
			6	T25	20	20	20		
			8	20	20	15	15		
			10	20	15	15	15		
			13	15	15	15	15		
			16	12	12	10	10		
			20	12	12	10	10		
			25		10	10	10		
			32			10	10		
			40				9		
			50						
			63						

Fuse 100A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 100A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	D, K	25	0,2...2	T25	T25	T25	T25		
			3	T25	T25	T25	T25		
			4	T25	T25	T25	T25		
			6	T25	20	20	20		
			8	20	20	15	15		
			10	20	15	15	15		
			13	15	15	15	15		
			16	12	12	10	10		
			20	12	12	10	10		
			25		10	10	10		
			32			10	10		
			40				9		
			50						
			63						

Fuse 100A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 100A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	Z	25	0,5...2	T25	T25	T25	T25		
			3	T25	T25	T25	T25		
			4	T25	T25	T25	T25		
			6	T25	T20	20	20		
			8	20	20	15	15		
			10	20	15	15	15		
			13	15	15	15	15		
			16	12	12	10	10		
			20	12	12	10	10		
			25		10	10	10		
			32			10	10		
			40				9		
			50						
			63						

MCBs technical details

Coordination tables: selectivity

Fuse 125A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 125A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	B, C	25	0,5...2	T25	T25	T25	T25		
			3	T25	T25	T25	T25		
			4	T25	T25	T25	T25		
			6	T25	T25	T25	T25		
			8	T25	T25	T25	T25		
			10	T25	T25	T25	T25		
			13	22	22	20	18		
			16	22	22	20	18		
			20	20	20	20	18		
			25		15	15	15		
			32			15	15		
			40				15		
			50						
			63						

Fuse 125A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 125A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	D, K	25	0,2...2	T25	T25	T25	T25		
			3	T25	T25	T25	T25		
			4	T25	T25	T25	T25		
			6	T25	T25	T25	T25		
			8	T25	T25	T25	T25		
			10	T25	T25	T25	T25		
			13	22	22	20	18		
			16	22	22	20	18		
			20	20	20	20	18		
			25		15	15	15		
			32			15	15		
			40				15		
			50						
			63						

Fuse 125A+S750DR - S300P @ 415V AC

		Supply s.		Fuse 125A gG + S750DR					
	Char.			E, K					
Load s.		Icu [kA]		25					
			In [A]	35	40	50	63	80	100
S300P	Z	25	0,5...2	T25	T25	T25	T25		
			3	T25	T25	T25	T25		
			4	T25	T25	T25	T25		
			6	T25	T25	T25	T25		
			8	T25	T25	T25	T25		
			10	T25	T25	T25	T25		
			13	22	22	20	18		
			16	22	22	20	18		
			20	20	20	20	18		
			25		15	15	15		
			32			15	15		
			40				15		
			50						
			63						

MCBs technical details

Coordination tables: selectivity

TmaxXT - S300P @ 415V AC

		Supply s.		XT1										
	Char.	Version		B, C, N, S, H										
		Relay		TM										
		Iu [A]		160										
Load s.		Icu [kA]		18, 25, 36, 50, 70										
			In [A]	16	20	25	32	40	50	63	80	100	125	160
S300P	B, C	25	0,5...4	T	T	T	T	T	T	T	T	T	T	T
			6	5.5	5.5	5.5	5	6	6	10	T	T	T	T
			8		5.5	5.5	5	6	6	10	T	T	T	T
			10			3	3	3	4.5	7.5	8.5	15	T	T
			13				3	3	4.5	7.5	7.5	12.5	15	T
			16					3	4.5	5	7.5	12.5	15	T
			20						3	5	6	10	10	T
			25							5	6	6	6	T
			32							3	6	6	6	15
			40									6	6	15
			50										3	10
			63										3	10
			50											
			63											

TmaxXT - S300P @ 415V AC

		Supply s.		XT2											
	Char.	Version		N, S, H, L, V											
		Relay		TM											
		Iu [A]		160											
Load s.		Icu [kA]		18, 25, 36, 50, 70											
			In [A]	12.5	16	20	25	32	40	50	63	80	100	125	160
S300P	B, C	25	0,5...4	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25
			6		5.5	5.5	5.5	5	6	6	10	T25	T25	T25	T25
			8			5.5	5.5	5	6	6	10	T25	T25	T25	T25
			10				3	3	3	4.5	7.5	8.5	15	T25	T25
			13					3	3	4.5	7.5	7.5	12.5	15	T25
			16						3	4.5	5	7.5	12.5	15	T25
			20							3	5	6	10	10	T25
			25								5	6	6	6	T25
			32								3	6	6	6	15
			40										6	6	15
			50											3	10
			63											3	10

TmaxXT - S300P @ 415V AC

		Supply s.		XT3						
	Char.	Version		N, S						
		Relay		TM						
		Iu [A]		250						
Load s.		Icu [kA]		36, 50						
			In [A]	63	80	100	125	160	200	250
S300P	B, C	25	0,5...4	T25	T25	T25	T25	T25	T25	T25
			6	10	T25	T25	T25	T25	T25	T25
			8	10	T25	T25	T25	T25	T25	T25
			10	7.5	7.5	15	T25	T25	T25	T25
			13	7.5	7.5	12.5	15	T25	T25	T25
			16	5	7.5	12.5	15	T25	T25	T25
			20	5	6	10	10	T25	T25	T25
			25	5	6	6	6	T25	T25	T25
			32	3	6	6	6	15	15	15
			40			6	6	15	15	15
			50				3	10	15	15
			63				3	10	15	15

MCBs technical details

Coordination tables: selectivity

TmaxXT - S300P @ 415V AC

Load s.	Char.	Icu [kA]	Supply s.	XT4												
			Version	N, S, H, L, V, X												
			Relay	TM												
			Iu [A]	250												
			Icu [kA]	36, 50, 70, 120, 150												
			In [A]	20	25	32	40	50	63	80	100	125	160	200	225	250
S300P	B, C	25	0,5...4	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	7.5	7.5	7.5	7.5	7.5	10	T	T	T	T	T	T	T
			8	7.5	7.5	7.5	7.5	7.5	10	T	T	T	T	T	T	T
			10	3	5	5	5	6.5	7.5	9	T	T	T	T	T	T
			13		5	5	5	6.5	7.5	8	T	T	T	T	T	T
			16		3	5	5	5	6.5	8	T	T	T	T	T	T
			20				5	5	5	7.5	T	T	T	T	T	T
			25					5	5	7.5	T	T	T	T	T	T
			32						5	7.5	15	15	15	15	15	15
			40							6.5	15	15	15	15	15	15
			50								15	15	15	15	15	15
			63								5	7.5	15	15	15	15

TmaxXT - S300P @ 415V AC

Load s.	Char.	Icu [kA]	Supply s.	XT2				
			Version	N, S, H, L, V				
			Relay	EL				
			Iu [A]	160				
			Icu [kA]	36, 50, 70, 120, 150				
			In [A]	20	25	32	40	50
S300P	B, C	25	0,5...4	T25	T25	T25	T25	T25
			6		T25	T25	T25	T25
			8		T25	T25	T25	T25
			10		T25	T25	T25	T25
			13		T25	T25	T25	T25
			16			T25	T25	T25
			20			T25	T25	T25
			25			T25	T25	T25
			32			15	15	15
			40				15	15
			50				10	10
			63					6

TmaxXT - S300P @ 415V AC

Load s.	Char.	Icu [kA]	Supply s.	XT4					
			Version	N, S, H, L, V					
			Relay	EL					
			Iu [A]	250					
			Icu [kA]	36, 50, 70, 120, 150					
			In [A]	40	63	100	160	250	250
S300P	B, C	25	0,5...4	T25	T25	T25	T25	T25	10
			6	T25	T25	T25	T25	T25	10
			8	T25	T25	T25	T25	T25	10
			10	T25	T25	T25	T25	T25	10
			13	T25	T25	T25	T25	T25	10
			16	T25	T25	T25	T25	T25	10
			20	T25	T25	T25	T25	T25	10
			25		T25	T25	T25	T25	10
			32		15	15	15	15	10
			40			15	15	15	10
			50			15	15	15	10
			63			15	15	15	10

MCBs technical details

Coordination tables: selectivity

TmaxXT - S300P @ 415V AC

		Supply s.		XT1										
	Char.	Version		B, C, N, S, H										
		Relay		TM										
		Iu [A]		160										
Load s.		Icu [kA]		18, 25, 36, 50, 70										
			In [A]	16	20	25	32	40	50	63	80	100	125	160
S300P	D,K	25	0,2...4	T	T	T	T	T	T	T	T	T	T	T
			6	5.5	5.5	5.5	5	5	5	10	T	T	T	T
			8		5.5	5.5	5.5	5.5	5	10	10	T	T	T
			10			2	2	3	3	5	8.5	15	T	T
			13					2	2	3	6	7.5	13.5	T
			16					2	2	3	6	7.5	13.5	T
			20						2	3	6	6	11	T
			25							3	6	6	10	T
			32								4	6	9.5	15
			40										8	15
			50										5	10
			63											10

TmaxXT - S300P @ 415V AC

		Supply s.		XT2											
	Char.	Version		N, S, H, L, V											
		Relay		TM											
		Iu [A]		160											
Load s.		Icu [kA]		36, 50, 70, 120, 150											
			In [A]	12.5	16	20	25	32	40	50	63	80	100	125	160
S300P	D,K	25	0,2...4	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25
			6	5.5	5.5	5.5	5.5	5.5	5.5	5.5	10	T25	T25	T25	T25
			8			5.5	5.5	5.5	5.5	5.5	10	10	T25	T25	T25
			10				3	3	3	4.5	5	8.5	15	T25	T25
			13					3	3	4.5	3	6	7.5	13.5	T25
			16						3	4.5	3	6	7.5	13.5	T25
			20							3	3	6	6	11	T25
			25								3	6	6	10	T25
			32									4	6	9.5	15
			40											8	15
			50											5	10
			63												10

TmaxXT - S300P @ 415V AC

		Supply s.		XT3						
	Char.	Version		N, S						
		Relay		TM						
		Iu [A]		250						
Load s.		Icu [kA]		36, 50						
			In [A]	63	80	100	125	160	200	250
S300P	D,K	25	0,2...4	T25	T25	T25	T25	T25	T25	T25
			6	10	T25	T25	T25	T25	T25	T25
			8	10	10	T25	T25	T25	T25	T25
			10	5	7.5	15	T25	T25	T25	T25
			13	3	6	7.5	13.5	T25	T25	T25
			16	3	6	7.5	13.5	T25	T25	T25
			20	3	6	6	11	T25	T25	T25
			25	3	6	6	10	T25	T25	T25
			32		4	6	9.5	15	15	15
			40				8	15	15	15
			50				5	10	15	15
			63					10	15	15

MCBs technical details

Coordination tables: selectivity

TmaxXT - S300P @ 415V AC

		Supply s.		XT4												
	Char.	Version		N, S, H, L, V, X												
		Relay		TM												
		Iu [A]		250												
Load s.		Icu [kA]		36, 50, 70, 120, 150												
			In [A]	20	25	32	40	50	63	80	100	125	160	200	225	250
S300P	D,K	25	0,2...4	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25	T25
			6	7.5	7.5	7.5	7.5	7.5	10	T25	T25	T25	T25	T25	T25	T25
			8	7.5	7.5	7.5	7.5	7.5	10	T25	T25	T25	T25	T25	T25	T25
			10	5	5	5	5	6	6	9	T25	T25	T25	T25	T25	T25
			13				4.5	4.5	5	5.5	T25	T25	T25	T25	T25	T25
			16						5	5.5	T25	T25	T25	T25	T25	T25
			20						5	5	T25	T25	T25	T25	T25	T25
			25							5	T25	T25	T25	T25	T25	T25
			32							5	15	15	15	15	15	15
			40							5	15	15	15	15	15	15
			50							5	5	15	15	15	15	15
			63											15	15	15

TmaxXT - S300P @ 415V AC

		Supply s.		XT2				
	Char.	Version		N, S, H, L, V				
		Relay		EL				
		Iu [A]		160				
Load s.		Icu [kA]		36, 50, 70, 120, 150				
			In [A]	10	25	63	100	160
S300P	D,K	25	0,2...4	T25	T25	T25	T25	T25
			6		T25	T25	T25	T25
			8		T25	T25	T25	T25
			10		T25	T25	T25	T25
			13			T25	T25	T25
			16			T25	T25	T25
			20			T25	T25	T25
			25			T25	T25	T25
			32			15	15	15
			40				15	6
			50				6	6
			63					3

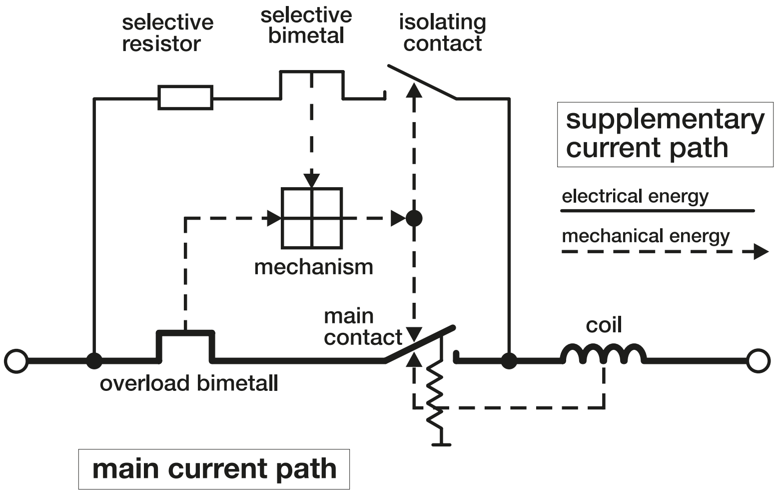
TmaxXT - S300P @ 415V AC

		Supply s.		XT4				
	Char.	Version		N, S, H, L, V				
		Relay		EL				
		Iu [A]		250				
Load s.		Icu [kA]		36, 50, 70, 120, 150				
			In [A]	40	63	100	160	250
S300P	D,K	25	0,2...4	T25	T25	T25	T25	T25
			6	T25	T25	T25	T25	T25
			8	T25	T25	T25	T25	T25
			10	T25	T25	T25	T25	T25
			13	T25	T25	T25	T25	T25
			16	T25	T25	T25	T25	T25
			20	T25	T25	T25	T25	T25
			25		T25	T25	T25	T25
			32		15	15	15	15
			40			15	15	15
			50			15	15	15
			63			15	15	15

MCBs technical details

Coordination tables: selectivity

Functional diagram of selective main circuit breakers S 750 (DR)



Back-up protection

Selective main circuit breakers of the S 750 DR series are capable of switching off short-circuit currents of up to 25 kA automatically in networks with a rated voltage of 230/400 V. Back-up protection is necessary only when the prospective short-circuit current may exceed 25 kA prosp. at the installation point. Further information on back-up protection on request.

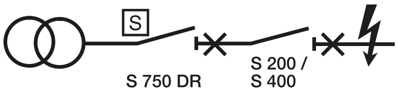
Short circuit discrimination

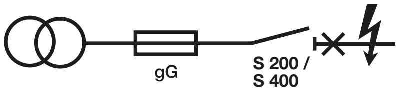
When ABB miniature circuit-breaker are used in combination with the S 750 DR, higher short-circuit currents can be disconnected than indicated as permissible rated switching capacity of the device. Considering the values given in the table, the S 750 DR operates selectively with respect to the combination with the final device.
If other MCBs are used selectivity for 6 kA and 10 kA devices is available up to the rated switching capacity of the final device.

MCBs technical details
Coordination tables: selectivity

Discrimination of S750 DR with respect to downstream MCB S200 / S400 compared to fuse protection

MCBs



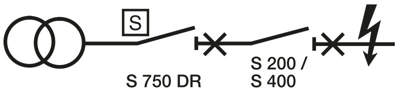


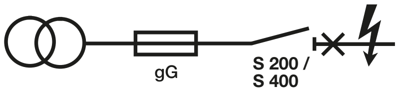
	supply side:			S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200 S400E	B, C	6	≤2	10	10	10	10	10	10	10	10	10	0.3	0.7	1.2	4.6	5	10	10	10	10
			3	10	10	10	10	10	10	10	10	10	0.3	0.7	1.2	4.6	5	10	10	10	10
			4	10	10	10	10	10	10	10	10	10	0.3	0.6	0.9	2.8	3.5	6	10	10	10
			6	10	10	10	10	10	10	10	10	10	0.2	0.5	0.8	2	2.5	3.3	5.5	10	10
			8	10	10	10	10	10	10	10	10	10			0.7	1.5	2	2.5	3.5	5	6
			10	10	10	10	10	10	10	10	10	10			0.7	1.5	2	2.5	3.5	5	6
			13	10	10	10	10	10	10	10	10	10			0.7	1.5	2	2.5	3.5	5	6
			16		10	10	10	10	10	10	10	10				1.3	1.4	2	2.9	4.1	6
			20			10	10	10	10	10	10	10					0.7	1.8	2.6	3.5	5
			25				10	10	10	10	10	10					0.7	1.8	2.6	3.5	5
			32					10	10	10	10	10							2.2	3	4
			40						10	10	10	10							2.2	3	4
			50							10	10	10									3.5
			63								10	10									3.5

Limited overload selectivity

Discrimination of S750 DR with respect to downstream MCB S200 / S400 compared to fuse protection

MCBs





	supply side:			S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200 S400E	K	6	≤2	10	10	10	10	10	10	10	10	10	0.3	1.2	4	6	10	10	10	10	10
			3	10	10	10	10	10	10	10	10	10	0.3	0.7	1.2	4.6	5	10	10	10	10
			4	10	10	10	10	10	10	10	10	10	0.3	0.6	0.9	2.8	3.5	6	10	10	10
			6	10	10	10	10	10	10	10	10	10			0.7	1.7	2.5	3	5.9	9	10
			8	10	10	10	10	10	10	10	10	10			0.4	0.8	1	1.7	2.5	4	6
			10	10	10	10	10	10	10	10	10	10			0.4	0.8	1	1.7	2.5	4	6
			16		10	10	10	10	10	10	10	10				0.7	0.9	1.2	2.2	3.1	4.6
			20			10	10	10	10	10	10	10					0.7	1.1	1.7	2.6	3.5
			25				10	10	10	10	10	10					0.7	1.1	1.7	2.6	3.5
			32					10	10	10	10	10							1.5	2.2	3.5
			40						10	10	10	10							1.5	2.2	3.5
			50							10	10	10									2.2
			63								10	10									2.2

Limited overload selectivity

MCBs technical details

Coordination tables: selectivity

Discrimination of S750 DR with respect to downstream MCB S200 / S400 compared to fuse protection

MCBs

			supply side:	S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200 S400E	Z	6	≤2	10	10	10	10	10	10	10	10	10	0.5	2	6	6	10	10	10	10	10
			3	10	10	10	10	10	10	10	10	10	0.3	0.7	1.8	6	10	10	10	10	10
			4	10	10	10	10	10	10	10	10	10	0.3	0.6	1.3	3.5	4	7	10	10	10
			6	10	10	10	10	10	10	10	10	10	0.2	0.5	0.9	1.3	2.7	3.8	6	10	10
			8	10	10	10	10	10	10	10	10	10		0.4	0.6	1.3	1.5	2.4	4	6	6
			10	10	10	10	10	10	10	10	10	10		0.4	0.6	1.3	1.5	2.4	4	6	6
			16		10	10	10	10	10	10	10	10			0.5	1.1	1.5	1.7	3	4.5	6
			20			10	10	10	10	10	10	10					0.7	1.4	2	3	4.4
			25				10	10	10	10	10	10					0.7	1.4	2	3	4.4
			32					10	10	10	10	10							2	3	4
			40						10	10	10	10							2	3	4
			50							10	10	10									3
			63								10	10									3

Limited overload selectivity

MCBs technical details

Coordination tables: selectivity

Discrimination of S750 DR with respect to downstream MCB S200M / S400M compared to fuse protection

MCBs

	supply side:			S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200M S400M	B, C	10	≤2	15	15	15	15	15	15	15	15	15	1	1.2	4	10	10	15	15	15	15
			3	15	15	15	15	15	15	15	15	15	0.3	0.7	1.2	4.6	5	15	15	15	15
			4	15	15	15	15	15	15	15	15	15	0.3	0.6	0.9	2.8	3.5	6	15	15	15
			6	15	15	15	15	15	15	15	15	15	0.2	0.5	0.8	2	2.5	3.3	5.5	15	15
			8	15	15	15	15	15	15	15	15	15			0.7	1.5	2	2.5	3.5	5	6
			10	15	15	15	15	15	15	15	15	15			0.7	1.5	2	2.5	3.5	5	6
			13	15	15	15	15	15	15	15	15	15			0.7	1.5	2	2.5	3.5	5	6
			16		15	15	15	15	15	15	15	15				1.3	1.4	2	2.9	4.1	6
			20			15	15	15	15	15	15	15					0.7	1.8	2.6	3.5	5
			25				15	15	15	15	15	15					0.7	1.8	2.6	3.5	5
			32					15	15	15	15	15							2.2	3	4
			40						15	15	15	15							2.2	3	4
			50							15	15	15									3.5
			63								15	15									3.5

Limited overload selectivity

Discrimination of S750 DR with respect to downstream MCB S200M / S400M compared to fuse protection

MCBs

	supply side:			S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200M S400M	K	10	≤2	15	15	15	15	15	15	15	15	15	0.3	1.2	4	10	10	15	15	15	15
			3	15	15	15	15	15	15	15	15	15	0.3	0.7	1.2	4.6	5	15	15	15	15
			4	15	15	15	15	15	15	15	15	15	0.3	0.6	0.9	2.8	3.5	6	15	15	15
			6	15	15	15	15	15	15	15	15	15			0.7	1.7	2.5	3	5.9	9	15
			8	15	15	15	15	15	15	15	15	15			0.4	0.8	1	1.7	2.5	4	6
			10	15	15	15	15	15	15	15	15	15			0.4	0.8	1	1.7	2.5	4	6
			16		15	15	15	15	15	15	15	15				0.7	0.9	1.2	2.2	3.1	4.6
			20			15	15	15	15	15	15	15					0.7	1.1	1.7	2.6	3.5
			25				15	15	15	15	15	15					0.7	1.1	1.7	2.6	3.5
			32					15	15	15	15	15							1.5	2.2	3.5
			40						15	15	15	15							1.5	2.2	3.5
			50							15	15	15									2.2
			63								15	15									2.2

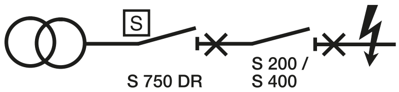
Limited overload selectivity

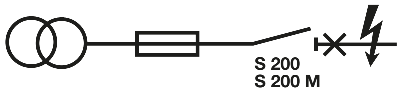
MCBs technical details

Coordination tables: selectivity

Discrimination of S750 DR with respect to downstream MCB S200M / S400M compared to fuse protection

MCBs





	supply side:			S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200M S400M	Z	10	≤2	15	15	15	15	15	15	15	15	15	0.5	2	10	10	15	15	15	15	15
			3	15	15	15	15	15	15	15	15	15	0.3	0.7	1.8	6	15	15	15	15	15
			4	15	15	15	15	15	15	15	15	15	0.3	0.6	1.3	3.5	4	7	15	15	15
			6	15	15	15	15	15	15	15	15	15	0.2	0.5	0.9	1.3	2.7	3.8	6	15	15
			8	15	15	15	15	15	15	15	15	15		0.4	0.6	1.3	1.5	2.4	4	6	6
			10	15	15	15	15	15	15	15	15	15		0.4	0.6	1.3	1.5	2.4	4	6	6
			16		15	15	15	15	15	15	15	15			0.5	1.1	1.5	1.7	3	4.5	6
			20			15	15	15	15	15	15	15					0.7	1.4	2	3	4.4
			25				15	15	15	15	15	15					0.7	1.4	2	3	4.4
			32					15	15	15	15	15							2	3	4
			40						15	15	15	15							2	3	4
			50							15	15	15									3
			63								15	15									3

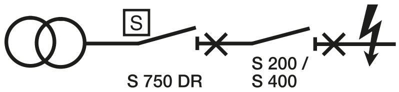
Limited overload selectivity

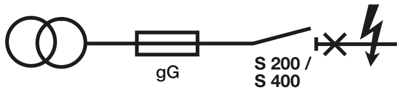
MCBs technical details

Coordination tables: selectivity

Discrimination of S750 DR with respect to downstream MCB S200P compared to fuse protection

MCBs



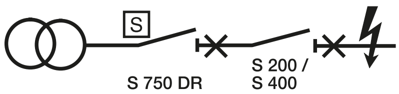


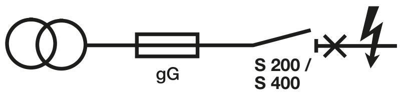
	supply side:			S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200P	B	25	6	25	25	25	25	25	25	25	25	25	0.2	0.4	0.6	1.3	2.5	3	5.5	12	25
			10	25	25	25	25	25	25	25	25	25			0.6	1	1.5	1.8	2.5	3.7	5.5
			13	25	25	25	25	25	25	25	25	25			0.6	1	1.5	1.8	2.5	3.7	5.5
			16		25	25	25	25	25	25	25	25				1	1.4	1.6	2	3	5
			20			25	25	25	25	25	25	25					0.7	1.5	2	3	4
			25				25	25	25	25	25	25					0.7	1.5	2	3	4
		15	32					15	15	15	15	15							1.9	2.7	3.5
			40						15	15	15	15							1.9	2.7	3.5
			50							15	15	15								2.7	3.4
			63								15	15								2.7	3.4

Limited overload selectivity

Discrimination of S750 DR with respect to downstream MCB S200P compared to fuse protection

MCBs





	supply side:			S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200P	C	25	≤2	25	25	25	25	25	25	25	25	25	0.3	0.8	1.5	6	10	25	25	25	25
			3	25	25	25	25	25	25	25	25	25	0.3	0.8	1.5	6	10	25	25	25	25
			4	25	25	25	25	25	25	25	25	25	0.3	0.6	1	3.3	4	6	25	25	25
			6	25	25	25	25	25	25	25	25	25	0.2	0.4	0.6	1.3	2.5	3	5.5	12	25
			8	25	25	25	25	25	25	25	25	25			0.6	1	1.5	1.8	2.5	3.7	5.5
			10	25	25	25	25	25	25	25	25	25			0.6	1	1.5	1.8	2.5	3.7	5.5
			13	25	25	25	25	25	25	25	25	25			0.6	1	1.5	1.8	2.5	3.7	5.5
			16		25	25	25	25	25	25	25	25				1	1.4	1.6	2	3	5
			20			25	25	25	25	25	25	25					0.7	1.5	2	3	4
			25				25	25	25	25	25	25					0.7	1.5	2	3	4
		15	32					15	15	15	15	15							1.9	2.7	3.5
			40						15	15	15	15							1.9	2.7	3.5
			50							15	15	15								2.7	3.4
			63								15	15								2.7	3.4

Limited overload selectivity

MCBs technical details

Coordination tables: selectivity

Discrimination of S750 DR with respect to downstream MCB S200P compared to fuse protection

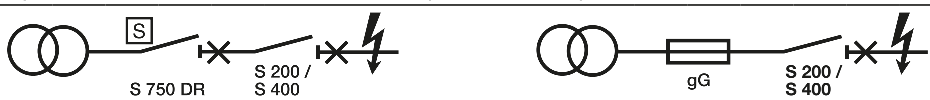
MCBs

			supply side:	S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200P	K	25	≤2	25	25	25	25	25	25	25	25	25	0.3	0.8	1.5	6	7.5	25	25	25	25
			3	25	25	25	25	25	25	25	25	25	0.3	0.8	1.5	6	7.5	25	25	25	25
			4	25	25	25	25	25	25	25	25	25	0.3	0.6	1	3.3	3.5	6	25	25	25
			6	25	25	25	25	25	25	25	25	25			0.6	1.3	1.5	3	5.5	9	25
			8	25	25	25	25	25	25	25	25	25			0.4	0.8	1	1.6	2.2	3.2	5.5
			10	25	25	25	25	25	25	25	25	25			0.4	0.8	1	1.6	2.2	3.2	5.5
			13	25	25	25	25	25	25	25	25	25			0.4	0.8	1	1.6	2.2	3.2	5.5
			16		25	25	25	25	25	25	25	25				0.7	0.9	1.5	2	3	5
			20			25	25	25	25	25	25	25					0.7	1.1	1.7	2.5	3.5
			25				25	25	25	25	25	25					0.7	1.1	1.7	2.5	3.5
		15	32					15	15	15	15	15							1.5	2.2	3.1
			40						15	15	15	15							1.5	2.2	3.1
			50							15	15	15									2.2
			63								15	15									2.2

Limited overload selectivity

Discrimination of S750 DR with respect to downstream MCB S200P compared to fuse protection

MCBs



			supply side:	S750DR									fuse								
final circuit:	Char.			E/K									gG								
		I_{cu} [kA]		25																	
			I_n [A]	16	20	25	32	40	50	63	80	100	16	20	25	35	40	50	63	80	100
S200P	Z	25	≤2	25	25	25	25	25	25	25	25	25	0.3	0.6	1.8	4	25	25	25	25	25
			3	25	25	25	25	25	25	25	25	25	0.3	0.6	1.8	4	25	25	25	25	25
			4	25	25	25	25	25	25	25	25	25	0.3	0.6	0.8	2.5	4	7	25	25	25
			6	25	25	25	25	25	25	25	25	25			0.6	1.3	2	2.8	6	25	25
			8	25	25	25	25	25	25	25	25	25			0.4	0.8	1.2	1.5	2.3	3.7	6
			10	25	25	25	25	25	25	25	25	25			0.4	0.8	1.2	1.5	2.3	3.7	6
			16		25	25	25	25	25	25	25	25				0.7	0.9	1.5	1.9	2.9	4.5
			20			25	25	25	25	25	25	25					0.7	1.3	2	2.8	4.4
			25				25	25	25	25	25	25					0.7	1.3	2	2.8	4.4
		15	32					15	15	15	15	15							1.8	2.7	4
			40						15	15	15	15							1.8	2.7	4
			50							15	15	15									3
			63								15	15									3

Limited overload selectivity

MCBs technical details

Coordination tables: selectivity

Short-circuit discrimination (in kA) apply for combinations[1)]: fuse gL / gG – S 750 DR – S 200 / S 400 E

			fuse:	63 A gG				80 A gG					100 A gG					
			supply side:	S 750 DR														
final circuit:	Char.			E / K														
		I_{cu} [kA]		25														
			I_n [A]	32	40	50	63	32	40	50	63	80	32	40	50	63	80	100
S 200 S 400 E	B, C, D, K, Z	6	≤ 2	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			3	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			6	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			8	7	6	6	5	10	10	10	8	7	10	10	10	10	10	10
			10	7	6	6	5	10	10	10	8	7	10	10	10	10	10	10
			13	6	6	6	5	9	8	8	7	6	10	10	10	10	10	10
			16	6	6	6	5	9	8	8	7	6	10	10	10	10	9	8
			20	5	5	4.5	4.5	6	7	7	6.5	5.5	10	10	10	10	9	8
			25		4.5	4.5	4		7	6	6	5.5		10	10	10	9	8
			32			4	3.5			6	5.5	5			9	9	8	7
			40				3				5	4				8	7	6
			50									2					5	4
			63															4

[1)] The selectivity limit current I_{s1} results from the let-through I^2t-value of S 750 DR plus S 200 / S 400 and the pre-arcing (melting) I^2t-value of a fuse acc. to IEC / EN 60269

Short-circuit discrimination (in kA) apply for combinations[1)]: fuse gL / gG – S 750 DR – S 200 / S 400 E

			fuse:	125 A gG						160 A gG					
			supply side:	S 750 DR											
final circuit:	Char.			E / K											
		I_{cu} [kA]		25											
			I_n [A]	32	40	50	63	80	100	32	40	50	63	80	100
S 200 S 400 E	B, C, D, K, Z	6	≤ 2	15	15	15	15	15	15	15	15	15	15	15	15
			3	10	10	10	10	10	10	10	10	10	10	10	10
			4	10	10	10	10	10	10	10	10	10	10	10	10
			6	10	10	10	10	10	10	10	10	10	10	10	10
			8	10	10	10	10	10	10	10	10	10	10	10	10
			10	10	10	10	10	10	10	10	10	10	10	10	10
			13	10	10	10	10	10	10	10	10	10	10	10	10
			16	10	10	10	10	10	10	10	10	10	10	10	10
			20	10	10	10	10	10	10	10	10	10	10	10	10
			25		10	10	10	10	10		10	10	10	10	10
			32			10	10	10	10			10	10	10	10
			40				10	10	10				10	10	10
			50					10	10					10	10
			63						9						10

[1)] The selectivity limit current I_{s1} results from the let-through I^2t-value of S 750 DR plus S 200 / S 400 and the pre-arcing (melting) I^2t-value of a fuse acc. to IEC / EN 60269

MCBs technical details

Coordination tables: selectivity

Short-circuit discrimination (in kA) apply for combinations[1)]: fuse gL / gG – S 750 DR – S200M / S400M

			fuse:	63 A gG				80 A gG					100 A gG					
			supply side:	S 750 DR														
	Char.			E / K														
final circuit:		I_{cu} [kA]		25														
			I_n [A]	32	40	50	63	32	40	50	63	80	32	40	50	63	80	100
S 200 M S 400 M	B, C, D, K, Z	6	≤ 2	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			3	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			4	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			6	10	10	10	10	15	15	15	14	14	15	15	15	15	15	15
			8	7	6	6	5	10	10	10	8	7	15	15	15	15	15	14
			10	7	6	6	5	10	10	10	8	7	15	15	15	15	15	14
			13	6	6	6	5	9	8	8	7	6	10	10	10	10	15	14
			16	6	6	6	5	9	8	8	7	6	10	10	10	10	9	8
			20	5	5	4.5	4.5	6	7	7	6.5	5.5	10	10	10	10	9	8
			25		4.5	4.5	4		7	6	6	5.5		10	10	10	9	8
			32			4	3.5			6	5.5	5			9	9	8	7
			40				3				5	4				8	7	6
			50									2					5	4
			63															4

1) The selectivity limit current I_{s1} results from the let-through I^2t-value of S 750 DR plus S200M / S400M and the pre-arcing (melting) I^2t-value of a fuse acc. to IEC / EN 60269

Short-circuit discrimination (in kA) apply for combinations[1)]: fuse gL / gG – S 750 DR – S200M / S400M

			fuse:	125 A gG						160 A gG					
			supply side:	S 750 DR											
	Char.			E / K											
final circuit:		I_{cu} [kA]		25											
			I_n [A]	32	40	50	63	80	100	32	40	50	63	80	100
S 200 M S 400 M	B, C, D, K, Z	6	≤ 2	15	15	15	15	15	15	15	15	15	15	15	15
			3	15	15	15	15	15	15	15	15	15	15	15	15
			4	15	15	15	15	15	15	15	15	15	15	15	15
			6	15	15	15	15	15	15	15	15	15	15	15	15
			8	15	15	15	15	15	15	15	15	15	15	15	15
			10	15	15	15	15	15	15	15	15	15	15	15	15
			13	15	15	15	15	15	15	15	15	15	15	15	15
			16	15	15	15	15	15	15	15	15	15	15	15	15
			20	15	15	15	15	15	15	15	15	15	15	15	15
			25		15	15	15	15	12		15	15	15	15	15
			32			15	15	15	12			15	15	15	15
			40				14	12	10				15	15	15
			50					10	10					15	15
			63						9						15

1) The selectivity limit current I_{s1} results from the let-through I^2t-value of S 750 DR plus S200M / S400M and the pre-arcing (melting) I^2t-value of a fuse acc. to IEC / EN 60269

MCBs technical details

Coordination tables: selectivity

Short-circuit discrimination (in kA) apply for combinations[1)]: fuse gL / gG – S 750 DR – S 200 P

			fuse:	63 A gG				80 A gG					100 A gG					
			supply side:	S 750 DR														
final circuit:	Char.			E / K														
		I_{cu} [kA]		25														
			I_n [A]	32	40	50	63	32	40	50	63	80	32	40	50	63	80	100
S 200 P	B, C, D, K, Z	25	≤ 2	15	15	15	15	25	25	25	25	25	25	25	25	25	25	25
			3	10	10	10	10	25	25	15	15	25	25	25	25	25	25	25
			4	10	10	10	10	20	20	15	15	15	25	25	25	25	25	25
			6	10	10	10	10	17	16	15	14	14	25	25	20	20	20	20
			8	7	6	6	5	10	10	10	8	7	20	20	15	15	15	14
			10	7	6	6	5	10	10	10	8	7	20	15	15	15	15	14
			13	6	6	6	5	9	8	8	7	6	15	15	15	15	15	14
			16	6	6	6	5	9	8	8	7	6	12	12	10	10	9	8
			20	5	5	4.5	4.5	6	7	7	6.5	5.5	12	12	10	10	9	8
		15	25		4.5	4.5	4		7	6	6	5.5		10	10	10	9	8
			32			4	3.5			6	5.5	5			10	10	8	7
			40				3				5	4				9	7	6
			50									2					5	4
			63															4

[1)] The selectivity limit current I_{s1} results from the let-through I^2t-value of S 750 DR plus S 200 P and the pre-arcing (melting) I^2t-value of a fuse acc. to IEC / EN 60269

Short-circuit discrimination (in kA) apply for combinations[1)]: fuse gL / gG – S 750 DR – S 200 P

			fuse:	125 A gG						160 A gG					
			supply side:	S 750 DR											
final circuit:	Char.			E / K											
		I_{cu} [kA]		25											
			I_n [A]	32	40	50	63	80	100	32	40	50	63	80	100
S 200 P	B, C, D, K, Z	25	≤ 2	25	25	25	25	25	25	25	25	25	25	25	25
			3	25	25	25	25	25	25	25	25	25	25	25	25
			4	25	25	25	25	25	25	25	25	25	25	25	25
			6	25	25	25	25	25	25	25	25	25	25	25	25
			8	25	25	25	25	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	20	25	25	25	25	25	25
			13	22	22	20	20	20	18	22	22	20	20	25	25
			16	22	22	20	18	18	15	22	22	20	18	25	25
			20	20	20	20	18	18	15	20	20	20	18	25	25
		15	25		15	15	15	15	12		15	15	15	15	15
			32			15	15	15	12			15	15	15	15
			40				15	12	10				15	15	15
			50					10	10					15	15
			63						9						15

[1)] The selectivity limit current I_{s1} results from the let-through I^2t-value of S 750 DR plus S 200 P and the pre-arcing (melting) I^2t-value of a fuse acc. to IEC / EN 60269

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

Internal resistance and power loss of the miniature circuit-breakers
Internal resistance per pole in mΩ, power loss per pole in W

Type	Rated current	Device series (internal resistance and power loss per device) B, C, D	
	I_n A	mΩ	W
SN201 L SN201 SN201 M	2	520	2.1
	4	147.5	2.4
	6	64	2.3
	10	19	1.9
	16	14	3.6
	20	12	4.8
	25	7.1	4.4
	32	6.5	6.7
	40	4.7	7.5

Power losses S200C series (per device)

I_n (A)	1P+1P (W)	2P (W)	3P (W)	4P (W)
2	2.2	2.2	3.3	4.4
4	2.7	2.7	4.0	5.4
6	3.0	3.0	4.6	6.1
10	3.3	3.3	4.9	6.6
13	3.8	3.8	NA	NA
15	NA	3.9	NA	NA
16	4.2	4.2	6.3	8.4
20	5.0	5.0	7.6	10.1
25	NA	6.2	9.3	12.4
32	NA	7.6	11.4	15.2
40	NA	8.9	NA	NA

Type	Rated current	Device series							
		B, C ①		D		K		Z	
	I_n A	mΩ	W	mΩ	W	mΩ	W	mΩ	W
S 200 and S 200 M	0.5	5500	1.4	4300	1.1	4300	1.1	8100	2.4
	1	1440	1.4	1250	1.25	1250	1.25	2100	2.3
	1.6	630	1.6	600	1.5	600	1.5	1000	2.8
	2	460	1.8	410	1.65	410	1.65	619	2.5
	3	150	1.3	130	1.2	130	1.2	235	2.4
	4	110	1.8	105	1.7	105	1.7	149	2.4
	6	55	2.0	52	1.9	52	1.9	75	3.2
	8	23	1.5	24	1.5	24	1.5	27	2.0
	10	19	2.1	16	1.6	13.5	1.4	24	2.7
	13	14	2.3	14	2.2	13.5	1.4	–	–
	16	8.5	2.5	8.5	2.5	7.7	2.0	10.9	2.8
	20	6.25	2.5	6.1	2.3	6.7	2.7	6.0	2.4
	25	5.0	3.2	4.3	3.1	4.6	2.9	4.5	3.3
	32	3.6	3.7	3.5	3.6	3.5	3.6	3.5	3.6
	40	3.0	4.8	2.2	4.2	2.8	4.5	2.5	4.1
	50	1.3	3.25	1.25	2.9	1.25	3.1	1.5	4.1
	63	1.2	4.8	1.2	4.8	1.0	4.4	1.3	5.2

① Current intensities 0.5 – 4 apply exclusively to C-type trip characteristics.

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

Internal resistance and power loss of the miniature circuit-breakers
Internal resistance per pole in mΩ, power loss per pole in W

Type	Rated current	Device series									
		B		C		D		K		Z	
	I_n A	mΩ	W	mΩ	W	mΩ	W	mΩ	W	mΩ	W
S 200 P	0.2	-	-	-	-	-	-	42500.0	1.7	-	-
	0.3	-	-	-	-	-	-	20000.0	1.8	-	-
	0.5	-	-	5500.0	1.4	5500.0	1.4	6340.0	1.6	10100.0	2.5
	0.75	-	-	-	-	-	-	2500.0	1.4	-	-
	1	-	-	1440.0	1.4	1440.0	1.4	1400.0	1.4	2270.0	2.3
	1.6	-	-	630.0	1.6	630.0	1.6	625.0	1.6	1100.0	2.8
	2	-	-	460.0	1.8	460.0	1.8	480.0	1.8	619.0	2.5
	3	-	-	211.0	1.9	211.0	1.9	211.0	1.9	211.0	1.9
	4	-	-	150.0	2.4	150.0	2.4	163.0	2.6	163.0	2.6
	6	61.0	2.2	61.0	2.2	61.0	2.2	67.0	2.4	104.0	3.7
	8	45.0	2.9	45.0	2.9	45.0	2.9	45.0	2.9	55.0	3.5
	10	14.0	1.4	14.0	1.4	14.0	1.4	19.0	1.9	21.0	2.1
	13	13.3	2.3	13.3	2.3	13.3	2.3	-	-	-	-
	16	9.0	2.5	9.0	2.5	9.0	2.5	8.2	2.1	10.9	2.8
	20	7.3	2.9	7.3	2.9	7.3	2.9	7.3	2.9	7.3	2.9
	25	5.6	3.5	5.6	3.5	5.6	3.5	5.6	3.5	5.6	3.5
	32	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.2
	40	4.0	6.4	4.0	6.4	4.0	6.4	4.0	6.4	4.0	6.4
	50	1.2	3.0	1.2	3.0	1.2	3.0	1.2	3.0	1.8	4.4
	63	1.4	5.6	1.4	5.6	1.4	5.6	1.3	5.2	1.3	5.2

Type	Rated current	Device series									
		B		C		D		K		Z	
	I_n A	mΩ	W	mΩ	W	mΩ	W	mΩ	W	mΩ	W
S 300 P	0,2	-	-	-	-	-	-	28000.0	1.1	-	-
	0,3	-	-	-	-	-	-	12566.7	1.1	-	-
	0,5	-	-	5312.0	1.3	5088.0	1.3	5088.0	1.3	8596.0	2.1
	0,75	-	-	-	-	-	-	2005.3	1.1	-	-
	1	-	-	1436.0	1.4	1298.0	1.3	1298.0	1.3	2197.0	2.2
	1,6	-	-	526.6	1.3	496.9	1.3	496.9	1.3	944.9	2.4
	2	-	-	343.0	1.4	334.3	1.3	334.3	1.3	540.0	2.2
	3	-	-	152.7	1.4	142.0	1.3	142.0	1.3	247.7	2.2
	4	-	-	88.3	1.4	88.3	1.4	88.3	1.4	136.8	2.2
	6	28.5	1.0	24.3	0.9	22.2	0.8	45.0	1.6	68.5	2.5
	8	24.8	1.6	24.8	1.6	21.1	1.4	19.0	1.2	28.1	1.8
	10	14.0	1.4	14.5	1.5	12.0	1.2	13.4	1.3	20.1	2.0
	13	9.5	1.6	7.7	1.3	7.7	1.3	-	-	-	-
	16	6.6	1.7	6.6	1.7	6.3	1.6	5.5	1.4	7.8	2.0
	20	5.8	2.3	5.8	2.3	5.8	2.3	5.3	2.1	6.3	2.5
	25	3.7	2.3	3.7	2.3	3.7	2.3	5.1	3.2	5.3	3.3
	32	2.8	2.9	2.8	2.9	2.8	2.9	2.8	2.9	3.0	3.1
	40	1.8	2.9	1.8	2.9	1.8	2.9	2.1	3.4	3.1	4.9
	50	1.5	3.7	1.5	3.7	1.4	3.4	1.6	3.9	2.1	5.2
	63	1.5	6.0	1.5	6.0	1.5	6.0	1.5	6.0	1.5	6.0

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

Internal resistance and power loss per pole

Internal resistance in mΩ per pole in cold state, power loss in W per pole at rated current

Type	Tripping characeristics	Rated current	R_i	P_{Vmax}
		A	mΩ	W
S 200 S	B, C	6	52.1	2.16
	C	8	22.9	1.65
	B, C	10	19.0	2.20
	B, C	13	13.7	2.62
	B, C	16	9.1	3.28
	B, C	20	6.2	3.14

SU200 M

Rated current	C, K characteristics		Z characteristics	
	Internal resistance per pole	Power loss	Internal resistance per pole	Power loss
I_n	R_i	P_v	R_i	P_v
A	mΩ	W	mΩ	W
0.2	42500	1.7	-	-
0.3	18889	1.7	-	-
0.5	5600	1.4	9000	2.3
0.75	2489	1.4	-	-
1	1400	1.4	2200	2.2
1.6	703	1.8	1000	2.6
2	450	1.8	650	2.6
3	178	1.6	250	2.3
4	113	1.8	140	2.2
5	50	1.3	100	2.5
6	56	2.0	70	2.5
8	23	1.5	28	1.8
10	21	2.1	21	2.1
13	14	2.3	17	2.9
15	11	2.4	13	2.9
16	9.8	2.5	10	2.6
20	6.3	2.5	6.5	2.6
25	5.1	3.2	5.1	3.2
30	3.9	3.5	3.9	3.5
32	3.6	3.7	3.6	3.7
35	3.3	4.1	3.3	4.1
40	2.8	4.5	2.8	4.5
50	1.8	4.5	1.8	4.5
60	1.4	4.9	1.4	4.9
63	1.4	5.4	1.4	5.4

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

S200 80-100A

Tripping characteristic	Rated current	Internal resistance	Power loss
	I_n	R_i	P_v
	A	mΩ	W
B, C	80	0.9	8.1
B, C	100	0.8	9.8

	S750DR E		S750DR K	
Rated current I_n / A	Internal resistance[1] R_i / mΩ	Power loss[2] P_V / W	Internal resistance[1] R_i / mΩ	Power loss[2] P_V / W
16	15.3	4.1	14.5	3.9
20	11.3	5.4	10.7	5.1
25	8.7	5.9	8.3	5.5
35	4.5	6.3	4.3	6.2
40	3.4	6.1	3.2	5.8
50	2.9	7.6	2.8	7.2
63	2.1	8.7	2.1	8.7
80	1.6	10.5	1.6	10.5
100	1.3	12.0	1.3	12.0

[1] in cold state [2] at rated current

S800PV-SP, S800PV-SD and S800PV-M-H

Typical internal resistances and power losses at 25 °C ambient temperature (per pole)

Rated current I_n [A]	Internal resistance R_i [mΩ]			Power loss P_V [W]		
	PV-SP	PV-SD	PV-M-H	PV-SP	PV-SD	PV-M-H
5	57.9			1.5		
6	51.7			1.8		
8	27.2			1.7		
10	15.2			1.5		
13	12.1			2.0		
16	12.1			3.1		
20	8.7			3.5		
25	6.8			4.3		
32	3.1	1.8	1.8	3.2	1.8	1.8
40	2.3			3.7		
50	1.7			4.3		
63	1.6	0.9	0.9	6.4	3.6	3.6
80	1.0			6.4		
100	0.8			8.0		
125	0.6	0.5	0.6	9.4	7.8	6.0

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

S800S - S800N - S800C - S800HV

Typical internal resistances and power losses at 25 °C ambient temperature (per pole)

Rated current I_n	Internal resistance R_i			Power loss P_v		
	[mΩ]			[W]		
[A]	B, C, D, K ①	KM ②	UCB, UCK ②	B, C, D, K	KM ②	UCB, UCK ②
0.5	8124.6	-	8124.6	2	-	2
1	1627.2	-	1627.2	1.6	-	1.6
1.6	1118.6	-	1118.6	2.9	-	2.9
2	556.6	-	556.6	2.2	-	2.2
2.5	399.3	-	399.3	2.5	-	2.5
3	270.3	-	270.3	2.4	-	2.4
4	126.4	-	126.4	2	-	2
5	57.9	-	57.9	1.5	-	1.5
6	51.7	-	51.7	1.8	-	1.8
8	27.2	-	27.2	1.7	-	1.7
10	15.2	2.7	15.2	1.5	0.27	1.5
13	12.1	-	12.1	2	-	2
16	12.1	2.7	12.1	3.1	0.69	3.1
20	8.7	2.7	8.7	3.5	1.1	3.5
25	6.8	3	6.8	4.3	1.9	4.3
32	3.1	1.7	3.1	3.2	1.7	3.2
40	2.3	1.6	2.3	3.7	2.6	3.7
50	1.7	1.1	1.7	4.3	2.8	4.3
63	1.6	1	1.6	6.4	4	6.4
80	1	0.75	1	6.4	5	6.4
100	0.8	–	0.8	8	–	8
125	0.6	–	0.6	9.4	–	9.4

① K Applicable only for S800S, S800C, S800HV ② KM, UCB, UCK Applicable only for S800S

S800B

Typical internal resistances and power losses at 25 °C ambient temperature (per pole)

Rated current I_n	Internal resistance R_i		Power loss P_v	
	[mΩ]		[W]	
[A]	B, C	D, K	B, C	D, K
32	3.1	3.1	3.2	3.2
40	2.3	2.3	3.7	3.7
50	1.7	1.7	4.3	4.3
63	1.6	1.6	6.4	6.4
80	1.0	1.0	6.4	6.4
100	0.8	0.8	8.0	8.0
125	0.7	0.7	10.9	10.9

S800U

Typical internal resistances and power losses at 25 °C ambient temperature (per pole)

Rated current I_n [A]	Internal resistance R_i [mW]	Power loss P_v [W]
	K, Z	K, Z
10	15.2	1.5
15	12.1	2.7
20	8.7	3.5
25	6.8	4.2
30	3.1	2.8
40	2.3	3.7
50	1.7	4.3
60	1.6	5.8
70	1.0	4.9
80	1.0	6.4
90	0.8	6.5
100	0.8	8.3

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

S800S - S800N - S800C

Maximum permissible earth-fault loop impedance Z_s at U_o 230 V* to ensure compliance with the requirements of IEC 60364-4.

The instantaneous release of the MCB ensures an operating time of max. 0.1 s (TN system). Determined according to IEC 60364-5-52 / VDE 0100-520 and DIN VDE 0100-520 sheet 2:2002 (source impedance 300 mW, c = 0.95 and conductor temperature 70 °C = factor 0.8).
The internal resistance of the MCB is included. Values below 10 A are available upon request.

* U_o: rated voltage against earthed conductor; for U_o: AC 240 V multiply Z_s by 1.04, for U_o: AC 254 V multiply Z_s by 1.10, for U_o: AC 400 V multiply Z_s by 1.74

Rated current (A)	B	C max. Zs (Ω)	D	K
10	4.8	2.4	1.5	1.5
13	3.7	1.8	1.1	1.1
16	3.0	1.5	0.9	0.9
20	2.4	1.2	0.7	0.7
25	1.9	1.0	0.6	0.6
32	1.5	0.7	0.5	0.5
40	1.2	0.6	0.4	0.4
50	1.0	0.5	0.3	0.3
63	0.8	0.4	0.2	0.2
80	0.6	0.3	0.2	0.2
100	0.5	0.2	0.1	0.1
125	0.4	0.2	0.1	0.1

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

Maximum permissible earth-fault loop impedance ZS at U0 = 230 V~ b to ensure compliance with the operation conditions pursuant to IEC 60364-4.
Operating time < 0.4 s; at 400 V~ < 0.2 s and at > 400 V~ < 0.1 s The instantaneous release of the MCB ensures an operating time of ≤ 0.1 s (TN system).

Determined according to DIN VDE 0100-520 sheet 2:2002-11(source impedance = 300 mΩ and conductor temperature 70 °C. The internal resistance of the MCB is already considered.

S 200 and S 200 M

Rated current I_n A	B	C	D	K	Z
	max. ZS	max. ZS	max. ZS	max. ZS	max. ZS
	q	q	q	q	q
0.5	-	40.4	18.5	28.4	145.6
1	-	21.4	10.0	14.9	74.6
1.6	-	13.5	6.3	9.4	46.8
2	-	10.8	5.1	7.5	37.6
3	-	7.2	3.4	5.1	25.1
3	-	7.2	3.4	5.1	25.1
4	-	5.4	2.5	3.7	18.8
6	7.3	3.5	1.6	2.4	12.5
8	5.5	2.6	1.1	1.7	9.3
10	4.3	2.0	0.8	1.3	7.4
13	3.2	1.5	0.6	1.0	-
16	2.6	1.1	0.4	0.7	4.5
20	2.0	0.8	0.3	0.5	3.5
25	1.5	0.6	0.2	0.4	2.8
32	1.1	0.4	0.1	0.2	2.1
40	0.9	0.3	0.0	0.1	1.6
50	0.6	0.2	0.0	0.0	1.2
63	0.4	0.1	0.0	0.0	0.9

b U0 = rated voltage against earthed conductor; for U0 = 240 V~ is ZS · 1.04; for U0 = 127 V~ is ZS · 0.55

MCBs technical details

MCBs internal resistance, power loss and max. permissible earth-fault loop impedance

S 200 P

Rated current I_n A	B	C	D	K	Z
	max. ZS	max. ZS	max. ZS	max. ZS	max. ZS
	q	q	q	q	q
0.2	-	-	-	39.5	-
0.3	-	-	-	34.8	-
0.5	-	46.0	27.4	26.5	143.0
0.75	-	-	-	19.4	-
1	-	23	15	15	74.4
1.6	-	14.4	9.6	9.6	47.9
2	-	11.5	7.8	7.8	38.3
3	-	7.7	11.8	5.3	25.3
4	-	5.8	8.8	3.9	19.1
6	7.6	3.8	5.9	2.6	12.7
8	-	2.8	5.7	2.0	9.5
10	4.6	2.3	3.5	1.6	7.6
13	3.5	1.7	2.7	-	-
16	2.9	1.4	2.2	1.0	4.7
20	2.3	1.1	1.7	0.8	3.8
25	1.8	0.9	1.4	0.6	3.0
32	1.4	0.7	1.1	0.5	2.4
40	1.1	0.6	0.9	0.4	1.9
50	0.9	0.5	0.7	0.3	1.5
63	0.7	0.4	0.6	0.25	1.1

S 300 P

Rated current I_n A	B	C	D	K	Z
	max. ZS	max. ZS	max. ZS	max. ZS	max. ZS
	q	q	q	q	q
0.2	-		-	41.2	-
0.3	-	-	-	36.3	-
0.5	-	46.0	27.4	27.7	143.0
0.75	-	-	-	20.2	-
1	-	24.0	15.7	15.7	77.6
1,6	-	15.0	10.0	10.0	50.0
2	-	12.0	8.1	8.1	40.0
3	-	8.0	12.3	5.5	26.4
4	-	6.1	9.2	4.1	19.9
6	7.9	4.0	6.2	2.7	13.3
8	-	2.9	5.9	2.1	9.9
10	4.8	2.4	3.7	1.7	7.9
13	3.7	1.8	2.8	-	-
16	3.0	1.5	2.3	1.0	4.9
20	2.4	1.1	1.8	0.8	4.0
25	1.9	0.9	1.5	0.6	3.1
32	1.5	0.7	1.1	0.5	2.5
40	1.1	0.6	0.9	0.4	2.0
50	0.9	0.5	0.7	0.3	1.6
63	0.7	0.4	0.6	0.3	1.1

b U0 = rated voltage against earthed conductor; for U0 = 240 V~ is ZS · 1.04; for U0 = 127 V~ is ZS · 0.55

Take into account the voltage drop:
e.g. in the case of a 1.5 mm^2 conductor, protected by a B 16 circuit-breaker, the maximum cable length is 82 m. If the voltage drop is below 3%, this would result in a maximum cable length (2-strand) of 17 m. For more details on this topic, get your own copy of the technical information leaflet "Maximum cable lengths".

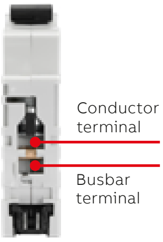
Maximum cable lengths in the case of different voltages and cross sections on request.

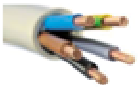
MCBs technical details

Terminal capacity of S200, S200M, S200MUC, S300P

Rigid cable

Stripping length 10…12mm, max terminal capacity

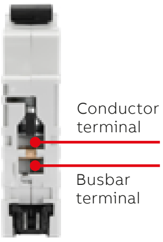




Conductor terminal			Busbar terminal			
2	x	0,75 mm²	2	x	0,75 mm²	or busbar
2	x	1 mm²	2	x	1 mm²	or busbar
2	x	1,5 mm²	2	x	1,5 mm²	or busbar
2	x	2,5 mm²	1	x	2,5 mm²	or busbar
2	x	4 mm²	1	x	4 mm²	or busbar
2	x	6 mm²	1	x	6 mm²	or busbar
2	x	10 mm²	1	x	10 mm²	or busbar
2	x	16 mm²				busbar
1	x	25 mm²				busbar
1	x	35 mm²				busbar

Flexible cable

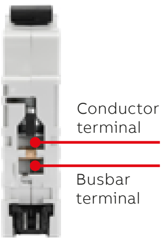
Stripping length 10…12mm, max terminal capacity



Conductor terminal			Busbar terminal			
2	x	0,75 mm²	2	x	0,75 mm²	or busbar
2	x	1 mm²	2	x	1 mm²	or busbar
2	x	1,5 mm²	2	x	1,5 mm²	or busbar
2	x	2,5 mm²	1	x	2,5 mm²	or busbar
2	x	4 mm²	1	x	4 mm²	or busbar
2	x	6 mm²	1	x	6 mm²	or busbar
2	x	10 mm²				busbar
1	x	16 mm²				busbar
1	x	25 mm²				busbar

Flexible cable with ferrule without collar

Stripping length 10…12mm, max terminal capacity[1]



Conductor terminal			Busbar terminal			
2	x	0,75 mm²	2	x	0,75 mm²	or busbar
2	x	1 mm²	2	x	1 mm²	or busbar
2	x	1,5 mm²	2	x	1,5 mm²	or busbar
2	x	2,5 mm²	1	x	2,5 mm²	or busbar
2	x	4 mm²	1	x	4 mm²	or busbar
2	x	6 mm²	1	x	6 mm²	or busbar
2	x	10 mm²				busbar
1	x	16 mm²				busbar
1	x	25 mm²				busbar

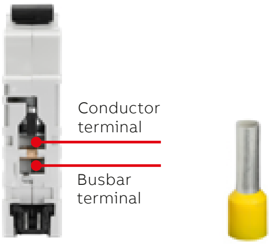
[1] Valid for ABB crimpage tool FER9500, FER9501 and ERG4

MCBs technical details

Terminal capacity of S200, S200M, S200MUC, S300P

Flexible cable with ferrule with collar

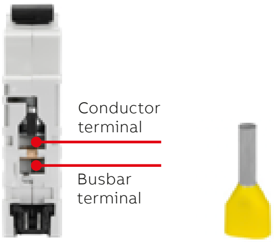
Stripping length 10…12mm, max terminal capacity[1]



Conductor terminal			Busbar terminal			
2	x	0,75 mm²	2	x	0,75 mm²	or busbar
2	x	1 mm²	2	x	1 mm²	or busbar
2	x	1,5 mm²	2	x	1,5 mm²	or busbar
2	x	2,5 mm²	1	x	2,5 mm²	or busbar
2	x	4 mm²	1	x	4 mm²	or busbar
2	x	6 mm²	1	x	6 mm²	or busbar
1	x	10 mm²				busbar
1	x	16 mm²				busbar
1	x	25 mm²				busbar

Flexible cable with twin-ferrule with collar

Stripping length 10…12mm, max terminal capacity[1]



Conductor terminal			Busbar terminal			
(2)	x	0,75 mm²	(2)	x	0,75 mm²	or busbar
(2)	x	1 mm²	(2)	x	1 mm²	or busbar
(2)	x	1,5 mm²	(2)	x	1,5 mm²	or busbar
(2)	x	2,5 mm²	(2)	x	2,5 mm²	or busbar
(2)	x	4 mm²	(2)	x	4 mm²	or busbar
(2)	x	6 mm²	(2)	x	6 mm²	or busbar
(2)	x	10 mm²	(2)	x	6 mm²	or busbar

(2) means two conductors in one twin ferrules

[1] Valid for ABB crimpage tool FER9500, FER9501 and ERG4

Miniature Circuit breakers S300P

Derating

For installations of miniature circuit breakers at other temperatures than the reference value and installations of several miniature circuit breakers directly side by side, derating factors have to be considered.

Deviating ambient temperature

The rated value of the current of a miniature circuit breaker refers to a temperature of 40 °C for circuit-breakers with characteristics K and Z and 30 °C for characteristics B, C and D. The following table contains the derating of load capability of S300P MCBs with temperature from -40 °C to 70 °C for the curves B, C, D, K, and Z.

Tripping characteristics	Rated Current In (A)	Max. Operating currents depending on the ambient temperature T (°C)											
		-40	-30	-20	-10	0	10	20	30	40	50	60	70
B, C and D	0,5	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,4
	1	1,2	1,2	1,2	1,1	1,1	1,1	1,0	1,0	1,0	0,9	0,9	0,9
	1,6	1,9	1,9	1,8	1,8	1,7	1,7	1,6	1,6	1,6	1,5	1,5	1,4
	2	2,4	2,4	2,3	2,2	2,2	2,1	2,1	2,0	1,9	1,9	1,8	1,8
	3	3,6	3,5	3,5	3,4	3,3	3,2	3,1	3,0	2,9	2,8	2,7	2,6
	4	4,8	4,7	4,6	4,5	4,4	4,2	4,1	4,0	3,9	3,8	3,6	3,5
	6	7,3	7,1	6,9	6,7	6,5	6,4	6,2	6,0	5,8	5,6	5,5	5,3
	8	9,7	9,4	9,2	9,0	8,7	8,5	8,2	8,0	7,8	7,5	7,3	7,0
	10	12,1	11,8	11,5	11,2	10,9	10,6	10,3	10,0	9,7	9,4	9,1	8,8
	13	15,5	15,5	15,0	14,5	14,0	14,0	13,5	13,0	12,5	12,0	12,0	11,5
	16	19,5	19,0	18,5	18,0	17,5	17,0	16,5	16,0	15,5	15,0	14,5	14,0
	20	24,0	23,5	23,0	22,5	22,0	21,0	20,5	20,0	19,5	19,0	18,0	17,5
	25	30,5	29,5	29,0	28,0	27,5	26,5	26,0	25,0	24,5	23,5	23,0	22,0
	32	38,5	38,0	37,0	36,0	35,0	34,0	33,0	32,0	31,0	30,0	29,0	28,0
	40	48,5	47,0	46,0	45,0	43,5	42,5	41,0	40,0	39,0	37,5	36,5	35,0
	50	60,5	59,0	57,5	56,0	54,5	53,0	51,5	50,0	48,5	47,0	45,5	44,0
	63	76,0	74,5	72,5	70,5	68,5	67,0	65,0	63,0	61,0	59,0	57,5	55,5
K and Z	0,2	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	0,3	0,4	0,4	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
	0,5	0,7	0,6	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,4
	0,75	1,0	1,0	0,9	0,9	0,9	0,8	0,8	0,8	0,8	0,7	0,7	0,7
	1	1,3	1,3	1,2	1,2	1,2	1,1	1,1	1,0	1,0	1,0	0,9	0,9
	1,6	2,1	2,1	2,0	1,9	1,9	1,8	1,7	1,7	1,6	1,5	1,5	1,4
	2	2,7	2,6	2,5	2,4	2,3	2,2	2,2	2,1	2,0	1,9	1,9	1,8
	3	4,0	3,9	3,7	3,6	3,5	3,3	3,2	3,1	3,0	2,9	2,8	2,7
	4	5,3	5,2	5,0	4,8	4,6	4,5	4,3	4,1	4,0	3,9	3,7	3,6
	6	8,0	7,7	7,5	7,2	6,9	6,7	6,5	6,2	6,0	5,8	5,6	5,4
	8	10,7	10,3	9,9	9,6	9,3	8,9	8,6	8,3	8,0	7,7	7,4	7,1
	10	13,4	12,9	12,4	12,0	11,6	11,2	10,8	10,4	10,0	9,6	9,3	8,9
	13	17,5	17,0	16,0	15,5	15,0	14,5	14,0	13,5	13,0	12,5	12,0	11,5
	16	21,5	20,5	20,0	19,0	18,5	18,0	17,0	16,5	16,0	15,5	15,0	14,5
	20	26,5	26,0	25,0	24,0	23,0	22,5	21,5	20,5	20,0	19,5	18,5	18,0
	25	33,5	32,0	31,0	30,0	29,0	28,0	27,0	26,0	25,0	24,0	23,0	22,5
	32	43,0	41,5	40,0	38,5	37,0	35,5	34,5	33,0	32,0	31,0	29,5	28,5
	40	53,5	51,5	49,5	48,0	46,5	44,5	43,0	41,5	40,0	38,5	37,0	35,5
	50	67,0	64,5	62,0	60,0	58,0	56,0	54,0	52,0	50,0	48,0	46,5	44,5
	63	84,5	81,0	78,5	75,5	73,0	70,5	67,5	65,5	63,0	60,5	58,5	56,5

MCBs technical details

Performances at different ambient temperatures

Derating of load capability of MCBs
Derating of MCBs load capability takes in consideration 2 factors: ambient temperature and influence of adjacent devices (see page 1/163). The rules to obtain the effective value of I_n are the following:
1. Deviating ambient temperature:
The rated value of the current of a miniature circuit-breaker refers to a temperature of 20 °C for circuit-breakers with characteristics K and Z and 30 °C for characteristics B, C and D. The following tables contain the derating of load capability of **S 200/S 200 M/S 200 P/S 200 S MCBs*** with temperature from -40 °C to 70 °C for the curves B, C, D and K, Z.

Max. operating current depending on the ambient temperature of a circuit-breaker in load circuit of characteristics type B, C, D, K, Z.

Tripping charac-teristics	Rated current I_n A	Maximum operating current at ambient temperature T °C											
		-40	-30	-20	-10	0	10	20	30	40	50	60	70
B, C and D[1]	0,5	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,4
	1	1,2	1,2	1,2	1,1	1,1	1,1	1,0	1	1,0	0,9	0,9	0,9
	1,6	1,9	1,9	1,8	1,8	1,7	1,7	1,6	1,6	1,6	1,5	1,5	1,4
	2	2,4	2,4	2,3	2,2	2,2	2,1	2,1	2	1,9	1,9	1,8	1,8
	3	3,6	3,5	3,5	3,4	3,3	3,2	3,1	3	2,9	2,8	2,7	2,6
	4	4,8	4,7	4,6	4,5	4,4	4,2	4,1	4	3,9	3,8	3,6	3,5
	6	7,3	7,1	6,9	6,7	6,5	6,4	6,2	6	5,8	5,6	5,5	5,3
	8	9,7	9,4	9,2	9,0	8,7	8,5	8,2	8	7,8	7,5	7,3	7,0
	10	12,1	11,8	11,5	11,2	10,9	10,6	10,3	10	9,7	9,4	9,1	8,8
	13	15,7	15,3	15,0	14,6	14,2	13,8	13,4	13	12,6	12,2	11,8	11,4
	16	19,4	18,9	18,4	17,9	17,4	17,0	16,5	16	15,5	15,0	14,6	14,1
	20	24,2	23,6	23,0	22,4	21,8	21,2	20,6	20	19,4	18,8	18,2	17,6
	25	30,3	29,5	28,8	28,0	27,3	26,5	25,8	25	24,3	23,5	22,8	22,0
	32	38,7	37,8	36,8	35,8	34,9	33,9	33,0	32	31,0	30,1	29,1	28,2
	40	48,4	47,2	46,0	44,8	43,6	42,4	41,2	40	38,8	37,6	36,4	35,2
	50	60,5	59,0	57,5	56,0	54,5	53,0	51,5	50	48,5	47,0	45,5	44,0
	63	76,2	74,3	72,5	70,6	68,7	66,8	64,9	63	61,1	59,2	57,3	55,4
K, Z	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	0,3	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,2
	0,5	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,4	0,4	0,4
	0,75	0,9	0,9	0,9	0,8	0,8	0,8	0,75	0,7	0,7	0,7	0,6	0,6
	1	1,2	1,2	1,2	1,1	1,1	1,0	1	1,0	0,9	0,9	0,9	0,8
	1,6	2,0	1,9	1,9	1,8	1,7	1,7	1,6	1,5	1,5	1,4	1,4	1,3
	2	2,5	2,4	2,3	2,2	2,2	2,1	2	1,9	1,9	1,8	1,7	1,7
	3	3,7	3,6	3,5	3,3	3,2	3,1	3	2,9	2,8	2,7	2,6	2,5
	4	5,0	4,8	4,6	4,5	4,3	4,1	4	3,9	3,7	3,6	3,4	3,3
	6	7,5	7,2	6,9	6,7	6,5	6,2	6	5,8	5,6	5,4	5,2	5,0
	8	9,9	9,6	9,3	8,9	8,6	8,3	8	7,7	7,4	7,1	6,9	6,6
	10	12,4	12,0	11,6	11,2	10,8	10,4	10	9,6	9,3	8,9	8,6	8,3
	13	16,2	15,6	15,0	14,5	14,0	13,5	13	12,5	12,1	11,6	11,2	10,8
	16	19,9	19,2	18,5	17,8	17,2	16,6	16	15,4	14,8	14,3	13,8	13,3
	20	24,9	24,0	23,1	22,3	21,5	20,7	20	19,3	18,5	17,9	17,2	16,6
	25	31,1	30,0	28,9	27,9	26,9	25,9	25	24,1	23,2	22,3	21,5	20,7
	32	39,8	38,4	37,0	35,7	34,4	33,2	32	30,8	29,7	28,6	27,5	26,5
	40	49,7	48,0	46,3	44,6	43,0	41,5	40	38,5	37,1	35,7	34,4	33,1
	50	62,2	60,0	57,8	55,8	53,8	51,9	50	48,2	46,4	44,7	43,0	41,4
	63	78,3	75,5	72,9	70,3	67,7	65,3	63	60,7	58,4	56,3	54,2	52,2

1) For dedicated availibility, see catalogue

MCBs technical details
Performances at different ambient temperatures

SU200 M - IEC/EN 60947-2

	Ambient temperature T (°C)											
I_n (A)	-40	-30	-20	-10	0	10	25	30	40	50	60	70
0.2 1)	0.26	0.25	0.24	0.23	0.22	0.22	0.21	0.20	0.19	0.19	0.18	0.17
0.3 1)	0.39	0.37	0.36	0.35	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26
0.5	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.5	0.48	0.46	0.45	0.43
0.75 1)	0.97	0.93	0.90	0.87	0.84	0.81	0.78	0.75	0.72	0.70	0.67	0.65
1	1.29	1.24	1.20	1.16	1.12	1.08	1.04	1.00	0.96	0.93	0.89	0.86
1.6	2.06	1.99	1.92	1.85	1.78	1.72	1.66	1.6	1.54	1.48	1.43	1.38
2	2.58	2.49	2.40	2.31	2.23	2.15	2.07	2.00	1.93	1.85	1.79	1.72
3	3.87	3.73	3.60	3.47	3.35	3.23	3.11	3.00	2.89	2.78	2.68	2.58
4	5.16	4.97	4.80	4.63	4.46	4.30	4.15	4.00	3.85	3.71	3.57	3.44
5	6.45	6.22	6.00	5.78	5.58	5.38	5.19	5.00	4.82	4.64	4.47	4.30
6	7.74	7.46	7.20	6.94	6.69	6.45	6.22	6.00	5.78	5.56	5.36	5.16
8	10.32	9.95	9.59	9.25	8.92	8.60	8.30	8.00	7.70	7.42	7.14	6.88
10	12.90	12.44	11.99	11.56	11.15	10.75	10.37	10.00	9.63	9.27	8.93	8.60
13	16.76	16.17	15.59	15.03	14.50	13.98	13.48	13.00	12.52	12.06	11.61	11.18
15	19.34	18.65	17.99	17.35	16.73	16.13	15.56	15.00	14.45	13.91	13.40	12.90
16	20.63	19.90	19.19	18.50	17.84	17.21	16.59	16.00	15.41	14.84	14.29	13.76
20	25.79	24.87	23.98	23.13	22.30	21.51	20.74	20.00	19.26	18.55	17.86	17.20
25	32.24	31.09	29.98	28.91	27.88	26.88	25.93	25.00	24.08	23.18	22.33	21.50
30	38.69	37.31	35.98	34.69	33.45	32.26	31.11	30.00	28.89	27.82	26.79	25.80
32	41.27	39.79	38.37	37.01	35.69	34.41	33.18	32.00	30.82	29.68	28.58	27.52
35	45.14	43.53	41.97	40.47	39.03	37.64	36.30	35.00	33.71	32.46	31.26	30.10
40	51.58	49.74	47.97	46.26	44.61	43.01	41.48	40.00	38.52	37.09	35.72	34.40
50	64.48	62.18	59.96	57.82	55.76	53.77	51.85	50.00	48.15	46.37	44.65	43.00
60	77.38	74.61	71.95	69.39	66.91	64.52	62.22	60.00	57.78	55.64	53.58	51.60
63	81.24	78.35	75.55	72.85	70.25	67.75	65.33	63.00	61.00	58.00	56.00	54.00

1) Current ratings 0.2, 0.3 and 0.75 A available with K characteristic only

MCBs technical details

Performances at different ambient temperatures

SU200 M - UL 489

	Ambient temperature T (°C)											
I_n (A)	-40	-30	-20	-10	0	10	25	30	40	50	60	70
0.2 [1]	0.27	0.26	0.25	0.24	0.23	0.22	0.22	0.21	0.20	0.19	0.19	0.18
0.3 [1]	0.40	0.39	0.37	0.36	0.35	0.33	0.32	0.31	0.30	0.29	0.28	0.27
0.5	0.67	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.48	0.46	0.45
0.75 [1]	1.00	0.97	0.93	0.90	0.87	0.84	0.81	0.78	0.75	0.72	0.70	0.67
1	1.34	1.29	1.24	1.20	1.16	1.12	1.08	1.04	1.00	0.96	0.93	0.89
1.6	2.14	2.06	1.99	1.92	1.85	1.78	1.72	1.66	1.6	1.54	1.48	1.43
2	2.67	2.58	2.49	2.40	2.31	2.23	2.15	2.07	2.00	1.93	1.85	1.79
3	4.01	3.87	3.73	3.60	3.47	3.35	3.23	3.11	3.00	2.89	2.78	2.68
4	5.35	5.16	4.97	4.80	4.63	4.46	4.30	4.15	4.00	3.85	3.71	3.57
5	6.69	6.45	6.22	6.00	5.78	5.58	5.38	5.19	5.00	4.82	4.64	4.47
6	8.02	7.74	7.46	7.20	6.94	6.69	6.45	6.22	6.00	5.78	5.56	5.36
8	10.70	10.32	9.95	9.59	9.25	8.92	8.60	8.30	8.00	7.70	7.42	7.14
10	13.37	12.90	12.44	11.99	11.56	11.15	10.75	10.37	10.00	9.63	9.27	8.93
13	17.38	16.76	16.17	15.59	15.03	14.50	13.98	13.48	13.00	12.52	12.06	11.61
15	20.06	19.34	18.65	17.99	17.35	16.73	16.13	15.56	15.00	14.45	13.91	13.40
16	21.40	20.63	19.90	19.19	18.50	17.84	17.21	16.59	16.00	15.41	14.84	14.29
20	26.75	25.79	24.87	23.98	23.13	22.30	21.51	20.74	20.00	19.26	18.55	17.86
25	33.43	32.24	31.09	29.98	28.91	27.88	26.88	25.93	25.00	24.08	23.18	22.33
30	40.12	38.69	37.31	35.98	34.69	33.45	32.26	31.11	30.00	28.89	27.82	26.79
32	42.79	41.27	39.79	38.37	37.01	35.69	34.41	33.18	32.00	30.82	29.68	28.58
35	46.81	45.14	43.53	41.97	40.47	39.03	37.64	36.30	35.00	33.71	32.46	31.26
40	53.49	51.58	49.74	47.97	46.26	44.61	43.01	41.48	40.00	38.52	37.09	35.72
50	66.87	64.48	62.18	59.96	57.82	55.76	53.77	51.85	50.00	48.15	46.37	44.65
60	80.24	77.38	74.61	71.95	69.39	66.91	64.52	62.22	60.00	57.78	55.64	53.58
63	84.25	81.24	78.35	75.55	72.85	70.25	67.75	65.33	63.00	60.67	58.42	56.26

1) Current ratings 0.2, 0.3 and 0.75 A available with K characteristic only

S200 80-100A

B and C	Ambient temperature T (°C)											
I_n (A)	-40	-30	-20	-10	0	10	25	30	40	50	60	70
80	96.8	94.4	92.0	89.6	87.2	84.8	82.4	80.0	77.6	75.2	72.8	70.4
100	121.0	118.0	115.0	112.0	109.0	106.0	103.0	100.0	97.0	94.0	91.0	88.0

SN201

B, C and D										
I_n (A)	-25	-20	-10	0	10	20	30	40	50	55
2	2.37	2.32	2.26	2.18	2.12	2.06	2.00	1.95	1.91	1.89
4	4.74	4.60	4.53	4.37	4.24	4.12	4.00	3.90	3.85	3.79
6	7.20	7.00	6.80	6.40	6.30	6.20	6.00	5.90	5.80	5.70
10	11.80	11.60	11.30	10.90	10.60	10.30	10.00	9.80	9.70	9.50
16	18.10	17.70	17.40	46.90	16.60	16.30	16.00	15.80	15.70	15.50
20	23.70	23.20	22.60	21.80	21.20	20.60	20.00	19.60	19.10	18.90
25	29.40	29.00	28.20	27.40	26.70	26.00	25.00	24.20	23.50	23.10
32	38.70	38.10	37.20	36.20	34.60	33.00	32.00	31.30	30.50	30.00
40	48.30	47.50	45.80	44.40	42.70	41.00	40.00	39.50	38.60	38.20

MCBs technical details

Performances at different ambient temperatures

S2011C and S202C

B and C char

Rated current I_n (A)	Temperature T (°C)										
	-25	-20	-10	0	10	20	25	30	40	50	55
2	2,60	2,55	2,45	2,34	2,23	2,12	2,06	2,00	1,87	1,74	1,67
4	5,13	5,03	4,84	4,65	4,44	4,23	4,11	4,00	3,76	3,51	3,37
6	7,54	7,42	7,15	6,88	6,60	6,30	6,15	6,00	5,68	5,35	5,17
10	12,86	12,62	12,14	11,64	11,11	10,57	10,29	10,00	9,40	8,77	8,43
13	16,42	16,14	15,56	14,96	14,33	13,68	13,35	13,00	12,28	11,52	11,11
15	18,93	18,61	17,95	17,26	16,54	15,79	15,40	15,00	14,16	13,26	12,78
16	20,2	19,8	19,1	18,4	17,6	16,8	16,4	16,0	15,1	14,1	13,6
20	25,4	24,9	24,0	23,1	22,1	21,1	20,5	20,0	18,9	17,6	17,0
25	30,9	30,4	29,4	28,4	27,3	26,2	25,6	25,0	23,8	22,5	21,8
32	39,3	38,7	37,5	36,2	34,8	33,5	32,7	32,0	30,5	28,8	28,0
40	48,1	47,4	46,0	44,6	43,1	41,6	40,8	40,0	38,4	36,6	35,7

S203C and S204C

B and C char

Rated current I_n (A)	Temperature T (°C)										
	-25	-20	-10	0	10	20	25	30	40	50	55
2	2,48	2,44	2,36	2,27	2,18	2,09	2,05	2,00	1,89	1,78	1,73
4	5,23	5,13	4,92	4,70	4,48	4,25	4,12	4,00	3,74	3,45	3,31
6	7,15	7,05	6,85	6,65	6,44	6,22	6,11	6,00	5,73	5,44	5,29
10	13,11	12,86	12,33	11,78	11,21	10,62	10,31	10,00	9,31	8,57	8,19
16	19,33	19,05	18,49	17,90	17,29	16,66	16,33	16,00	15,24	14,44	14,03
20	24,33	23,97	23,23	22,46	21,67	20,85	20,43	20,00	18,79	17,51	16,83
25	35,37	34,54	32,83	31,04	29,15	27,15	26,09	25,00	22,67	20,11	18,73
32	43,09	42,18	40,32	38,38	36,35	34,23	33,13	32,00	29,38	26,55	25,04

S 750 DR

$E_{selective}$	Maximum operating current at ambient temperature T (°C)							
Rated current I_n (A)	-20	-10	0	10	20	30	40	50
16	21.4	20.4	19.3	18.2	17.1	16.0	15.2	14.4
20	26.8	25.4	24.1	22.7	21.4	20.0	19.0	18.0
25	33.5	31.8	30.1	28.4	26.7	25.0	23.8	22.5
32	42.9	40.7	38.5	36.4	34.2	32.0	30.4	28.8
40	53.6	50.9	48.2	45.4	42.7	40.0	38.0	36.0
50	67.0	63.6	60.2	56.8	53.4	50.0	47.5	45.1
63	84.5	80.2	75.9	71.6	67.3	63.0	59.9	56.8
80	107.2	101.8	96.3	90.9	85.4	80.0	76.0	72.1
100	134.1	127.2	120.4	113.6	106.8	100.0	95.1	90.1

$K_{selective}$	Maximum operating current at ambient temperature T (°C)							
Rated current I_n (A)	-20	-10	0	10	20	30	40	50
16	21.4	20.4	19.3	18.2	17.1	16.0	15.2	14.4
20	26.8	25.4	24.1	22.7	21.4	20.0	19.0	18.0
25	33.5	31.8	30.1	28.4	26.7	25.0	23.8	22.5
32	42.9	40.7	38.5	36.4	34.2	32.0	30.4	28.8
40	53.6	50.9	48.2	45.4	42.7	40.0	38.0	36.0
50	67.0	63.6	60.2	56.8	53.4	50.0	47.5	45.1
63	84.5	80.2	75.9	71.6	67.3	63.0	59.9	56.8
80	107.2	101.8	96.3	90.9	85.4	80.0	76.0	72.1
100	134.1	127.2	120.4	113.6	106.8	100.0	95.1	90.1

DDA200 + S200, DS200 with B, C and D characteristics

Max. operating current depending on the ambient temperature of a circuit-breaker in load circuit.

B and C	Ambient temperature T (°C)

MCBs technical details

Performances at different ambient temperatures

I_n (A)	-25	-20	-10	0	10	20	30	40	50	55
0.5	0.64	0.62	0.60	0.58	0.55	0.53	0.50	0.47	0.44	0.43
1	1.27	1.25	1.20	1.15	1.11	1.05	1.00	0.94	0.88	0.85
1.6	2.04	2.00	1.92	1.85	1.77	1.69	1.60	1.51	1.41	1.36
2	2.54	2.49	2.40	2.31	2.21	2.11	2.00	1.89	1.76	1.70
3	3.80	3.70	3.60	3.50	3.30	3.20	3.00	2.80	2.60	2.50
4	5.10	5.00	4.80	4.60	4.40	4.20	4.00	3.80	3.50	3.40
6	7.60	7.50	7.20	6.90	6.60	6.30	6.00	5.70	5.30	5.10
8	10.15	10.00	9.60	9.20	8.80	8.40	8.00	7.50	7.10	6.80
10	12.70	12.50	12.00	11.50	11.10	10.50	10.00	9.40	8.80	8.50
13	16.50	16.20	15.60	15.00	14.40	13.70	13.00	12.30	11.50	11.10
16	20.40	20.00	19.20	18.50	17.70	16.90	16.00	15.10	14.10	13.60
20	25.40	24.90	24.00	23.10	22.10	21.10	20.00	18.90	17.60	17.00
25	31.80	31.20	30.00	28.90	27.60	26.40	25.00	23.60	22.00	21.20
32	40.60	39.90	38.50	37.00	35.40	33.70	32.00	30.20	28.20	27.20
40	50.80	49.90	48.10	46.20	44.20	42.20	40.00	37.70	35.30	34.00
50	63.50	62.40	60.10	57.70	55.30	52.70	50.00	47.10	44.10	42.50
63	80.00	78.60	75.70	72.70	69.60	66.40	63.00	59.40	55.60	53.50

DDA200 + S200, DS200 (K and Z characteristics)

Max. operating current depending on the ambient temperature of a circuit-breaker in load circuit.

K and Z	**Ambient temperature T (°C)**									
I_n (A)	-25	-20	-10	0	10	20	30	40	50	55
0,5	0.63	0.61	0.59	0.56	0.53	0.50	0.47	0.43	0.40	0.38
1	1.25	1.22	1.17	1.12	1.06	1.00	0.94	0.87	0.79	0.75
1,6	2.00	1.96	1.88	1.79	1.70	1.60	1.50	1.39	1.26	1.20
2	2.50	2.45	2.35	2.24	2.12	2.00	1.87	1.73	1.58	1.50
3	3.75	3.70	3.50	3.40	3.20	3.00	2.80	2.60	2.40	2.30
4	5.00	4.90	4.70	4.50	4.20	4.00	3.70	3.50	3.20	3.00
6	7.5	7.30	7.00	6.70	6.40	6.00	5.60	5.20	4.70	4.5
8	10.0	9.80	9.40	8.90	8.50	8.00	7.50	6.90	6.30	6.0
10	12.5	12.20	11.70	11.20	10.60	10.00	9.40	8.70	7.90	7.5
13	16.3	15.90	15.20	14.50	13.80	13.00	12.20	11.30	10.30	9.8
16	20.0	19.60	18.80	17.90	17.00	16.00	15.00	13.90	12.60	12.0
20	25.0	24.50	23.50	22.40	21.20	20.00	18.70	17.30	15.80	15.0
25	31.3	30.60	29.30	28.00	26.50	25.00	23.40	21.70	19.80	18.8
32	40.0	39.20	37.50	35.80	33.90	32.00	29.90	27.70	25.30	24.0
40	50.0	49.00	46.90	44.70	42.40	40.00	37.40	34.60	31.60	30.0
50	62.5	61.20	58.60	55.90	53.00	50.00	46.80	43.30	39.50	37.5
63	78.8	77.20	73.90	70.40	66.80	63.00	58.90	54.60	49.80	47.2

MCBs technical details

Performances at different ambient temperatures

Derating of load capacity of S800

The table refers to the product standard IEC 60947-2. These values are only valid if the circuit-breaker is mounted in free air according to the test conditions of the standard IEC 60 947-2.
The rated value of the current of the S800 refers to a calibration temperature of 30°C for characteristics B, C and D.
For characteristics K and UCK it refers to 40°C and the UL-version (S800U) refers to calibration temperature od 25°C.
Max. operating current depending on the ambient temperature of S800 with characteristics B, C, D, UCB.

B, C, D, UCB	**Ambient temperature T (°C)**																	
I_n (A)	−25	−20	−15	−10	−5	0	5	10	15	20	25	30	35	40	45	50	55	60
0,5	0,6	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,4
1	1,2	1,2	1,2	1,1	1,1	1,1	1,1	1,1	1	1	1	1	1	0,9	0,9	0,9	0,9	0,9
1,6	1,9	1,9	1,8	1,8	1,8	1,8	1,7	1,7	1,7	1,7	1,6	1,6	1,6	1,5	1,5	1,5	1,4	1,4
2	2,4	2,3	2,3	2,3	2,3	2,2	2,1	2,1	2,1	2,1	2	2	2	1,9	1,9	1,8	1,8	1,8
2,5	3	2,9	2,9	2,8	2,8	2,7	2,7	2,7	2,6	2,6	2,5	2,5	2,5	2,4	2,4	2,3	2,3	2,2
3	3,6	3,5	3,5	3,4	3,4	3,3	3,2	3,2	3,1	3,1	3	3	2,9	2,9	2,8	2,8	2,7	2,7
4	4,8	4,7	4,6	4,5	4,5	4,4	4,3	4,3	4,2	4,1	3,1	4	3,9	3,8	3,8	3,7	3,6	3,5
5	6	5,9	5,8	5,7	5,6	5,5	5,4	5,3	5,2	5,2	5,1	5	4,9	4,8	4,7	4,6	4,5	4,4
6	7,2	7,1	7	6,9	6,8	6,7	6,6	6,4	6,3	6,2	6,1	6	5,9	5,8	5,7	5,6	5,4	5,3
8	9,6	9,5	9,3	9,2	9	8,9	8,7	8,6	8,4	8,3	8,1	8	7,9	7,7	7,6	7,4	7,3	7,1
10	12	11,8	11,7	11,5	11,3	11,1	10,9	10,7	10,6	10,4	10,2	10	9,8	9,6	9,4	9,3	9,1	8,9
13	15,5	15,5	15	15	14,5	14,5	14	14	13,5	13,5	13	13	13	12,5	12,5	12	12	11,5
16	19	19	18,5	18,5	18	18	17,5	17	17	16,5	16,5	16	16	15,5	15	15	14,5	14
20	24	23,5	23,5	23	22,5	22	22	21,5	21	20,5	20,5	20	20	19,5	19	18,5	18	18
25	30	29,5	29	28,5	28	28	27,5	27	26,5	26	25,5	25	25	24	23,5	23	22,5	22
32	38,5	38	37,5	36,5	36	35,5	35	34,5	34	33	32,5	32	32	31	30	29,5	29	28,5
40	48	47,5	46,5	46	45	44,5	43,5	43	42	41,5	40,5	40	40	38,5	38	37	36,5	35,5
50	60	59	58,5	57,5	56,5	55,5	54,5	53,5	53	52	51	50	50	48	47	46,5	45,5	44,5
63	75,5	74,5	73,5	72	71	70	69	67,5	66,5	65,5	64	63	63	60,5	59,5	58,5	57	56
80	96	95	93	92	90	89	87	86	84	83	82	80	80	77	76	74	73	71
100	120	118	116	115	113	111	109	107	106	104	102	100	98	96	94	93	91	89
125	150	148	146	143	141	139	137	134	132	130	127	125	123	120	118	116	114	111

Max. operating current depending on the ambient temperature of S800 with characteristic K, UCK, PV-SP (from 5 A)

K, UCK, PV-SP	**Ambient temperature (°C)**																	
I_n [A]	−25	−20	−15	−10	−5	0	5	10	15	20	25	30	35	40	45	50	55	60
0,5	0,6	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
1	1,2	1,2	1,2	1,2	1,2	1,1	1,1	1,1	1,1	1,1	1	1	1	1	1	1	0,9	0,9
1,6	2	1,9	1,9	1,9	1,8	1,8	1,8	1,8	1,7	1,7	1,7	1,7	1,6	1,6	1,6	1,5	1,5	1,5
2	2,5	2,4	2,4	2,3	2,3	2,3	2,2	2,2	2,2	2,1	2,1	2,1	2	2	2	1,9	1,9	1,8
2,5	3,1	3	3	2,9	2,9	2,8	2,8	2,7	2,7	2,7	2,6	2,6	2,5	2,5	2,5	2,4	2,4	2,3
3	3,7	3,6	3,6	3,5	3,5	3,4	3,4	3,3	3,2	3,2	3,1	3,1	3	3	2,9	2,9	2,8	2,8
4	4,9	4,8	4,8	4,7	4,6	4,5	4,5	4,4	4,3	4,3	4,2	4,1	4,1	4	3,9	3,8	3,8	3,7
5	6,1	6	6	5,9	5,8	5,7	5,6	5,5	5,4	5,3	5,2	5,2	5,1	5	4,9	4,8	4,7	4,6
6	7,4	7,3	7,2	7,1	7	6,9	6,8	6,7	6,6	6,4	6,3	6,2	6,1	6	5,9	5,8	5,7	5,6
8	9,9	9,8	9,6	9,5	9,3	9,2	9	8,9	8,7	8,6	8,4	8,3	8,2	8	7,9	7,7	7,6	7,4
10	12,4	12,2	12	11,8	11,7	11,5	11,3	11,1	10,9	10,7	10,6	10,4	10,2	10	9,8	9,6	9,4	9,3
13	16,1	15,9	15,6	15,4	15,1	14,9	14,7	14,4	14,2	14	13,7	13,5	13,2	13	12,8	12,5	12,3	12
16	20	19,5	19	19	18,5	18,5	18	18	17,5	17	17	16,5	16,5	16	15,5	15,5	15	15
20	25	24,5	24	23,5	23,5	23	22,5	22	22	21,5	21	20,5	20,5	20	19,5	19,5	19	18,5
25	31	30,5	30	29,5	29	28,5	28	28	27,5	27	26,5	26	25,5	25	24,5	24	23,5	23
32	39,5	39	38,5	38	37,5	36,5	36	35,5	35	34,5	34	33	32,5	32	31,5	31	30	29,5
40	49,5	49	48	47,5	46,5	46	45	44,5	43,5	43	42	41,5	40,5	40	39,5	38,5	38	37
50	62	61	60	59	58,5	57,5	56,5	55,5	54,5	53,5	53	52	51	50	49	48	47	46,5
63	78	77	75,5	74,5	73,5	72	71	70	69	67,5	66,5	65,5	64	63	62	60,5	59,5	58,5
80	99	98	96	95	93	92	90	89	87	86	84	83	82	80	79	77	76	74
100	124	122	120	118	117	115	113	111	109	107	106	104	102	100	98	96	95	93
125	155	153	150	148	146	143	141	139	137	134	132	130	137	125	123	120	118	116

MCBs technical details

Performances at different ambient temperatures

Max. operating current depending on the ambient temperature of S800U

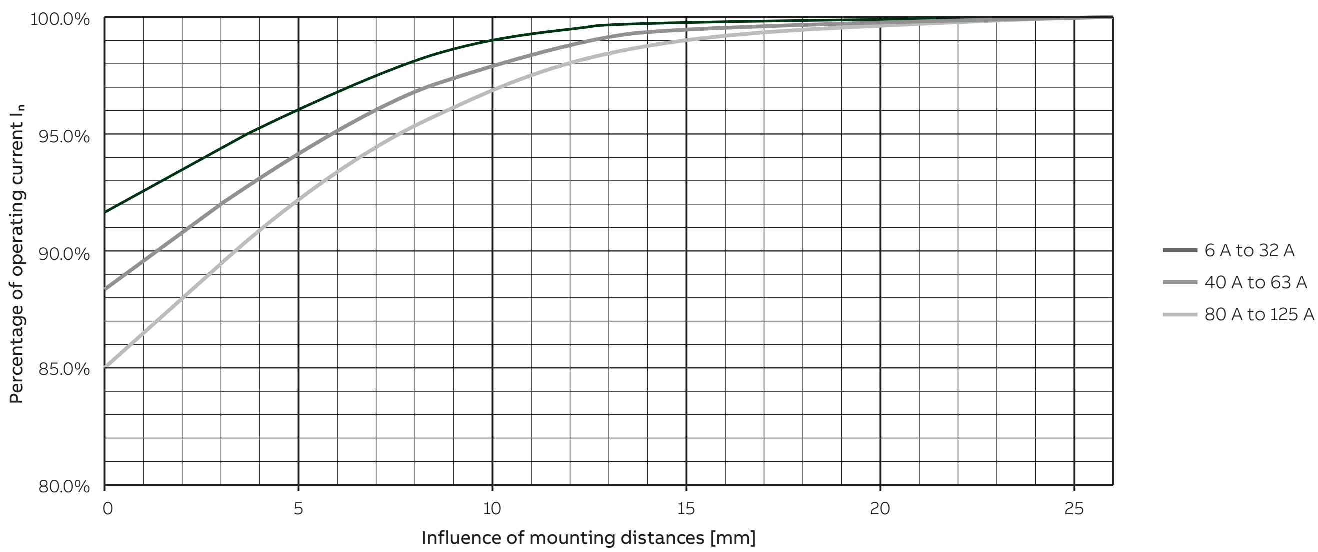
U-K, Z, UCZ	Ambient temperature T (°C)																	
I_e (A)	−25	−20	−15	−10	−5	0	5	10	15	20	25	30	35	40	45	50	55	60
10	11,8	11,7	11,5	11,3	11,1	10,9	10,7	10,6	10,4	10,2	10	9,8	9,6	10	9,3	9,1	8,9	8,7
13	15,4	15,1	14,9	14,7	14,4	14,2	14	13,7	13,5	13,2	13	12,8	12,5	13	12	11,8	11,6	11,3
16	19	18,5	18,5	18	18	17,5	17	17	16,5	16,5	16	15,5	15,5	16	15	14,5	14	14
20	23,5	23,5	23	22,5	22	22	21,5	21	20,5	20,5	20	19,5	19,5	20	18,5	18	18	17,5
25	29,5	29	28,5	28	28	27,5	27	26,5	26	25,5	25	24,5	24	25	23	22,5	22	22
32	38	37,5	36,5	36	35,5	35	34,5	34	33	32,5	32	31,5	31	32	29,5	29	28,5	28
40	47,5	46,5	46	45	44,5	43,5	43	42	41,5	40,5	40	39,5	38,5	40	37	36,5	35,5	35
50	59	58,5	57,5	56,5	55,5	54,5	53,5	53	52	51	50	49	48	50	46,5	45,5	44,5	43,5
63	74,5	73,5	72	71	70	69	67,5	66,5	65,5	64	63	62	60,5	63	58,5	57	56	55
80	95	93	92	90	89	87	86	84	83	82	84	79	77	76	74	73	71	70
100	118	117	115	113	111	109	107	106	104	102	100	98	96	95	93	91	89	87

Max. operating current depending on the ambient temperature of S804U - PVSP5, - PVS5

- PVSP5, - PVS5	Ambient temperature T (°C)																	
I_n (A)	−25	−20	−15	−10	−5	0	5	10	15	20	25	30	35	40	45	50	55	60
5	6,50	6,40	6,30	6,20	6,10	6,00	5,90	5,80	5,70	5,60	5,50	5,40	5,30	5,2	5,10	5,00	4,90	4,80

Influence of mounting distances between the devices

Multiply the rated current referring to your max. occurrent temperature with the factor of “influence of mounting distances”.
Example: 2 x S802B-B125 at T = 40 °C with distance
I_n = 120.4 A x 92.1 % = 110.9 A



Further influencing factors, which can lead to a reduction of the maximum operating current, are:
- Shortening the cable lenght compared to IEC 60947-1/2
- Reducing the cable cross section compared to IEC 60947-1/2
- Accumulation of cables

MCBs technical details

Performances at different ambient temperatures

2. Multiply the rated current (equivalent) referring to the new temperature by another factor only in case of presence of several devices installed alongside each other; see table.

Example: S 202 C 16 with T=40 °C

Type of use	Values to use	Formula	Calculation	Result
Load at ambient temperature	I_n (amb. t°) -see tables-			I_n=15.5 A
Load at ambient temperature with 8 adj. devices	I_n (amb. t°) -see tables- Fm (0.77)	I_n (amb. t°)x0.77	15.5x0.77	I_n=11.94 A

S200, DS200, DDA200+S200 Influence of adjacent devices Correction factor Fm

No. of adjacent devices	Fm
1	1
2	0.95
3	0.9
4	0.86
5	0.82
6	0.8
7	0.78
8	0.77
9	0.76
>9	0.76

S300 Influence of adjacent devices Correction factor Fm

No. of adjacent devices	Fm
1	1.00
2, 3	0.9
4, 5	0.8
≥ 6	0.75

SU200 M Influence of adjacent devices Correction factor Fm

No. of adjacent devices	Fm
1	1.00
2, 3	0.9
4, 5	0.8
> 6	0.75

Influent of adjacent devices for S200C series

Number of devices	Fm
2 or 3	0.9
4 or 5	0.8
6 to 9	0.7
> 10	0.6

No. of adjacent devices	Fm
1	1.00
2, 3	0.9
4, 5	0.8
> 6	0.75

SN201 Influence of adjacent devices Correction factor Fm

No. of adjacent devices	Fm
1	1.00
2	0.99
3	0.97
4	0.96
5	0.94
6	0.93
7	0.92
8	0.91
9	0.90
> 9	0.90

DS201 Influence of adjacent devices Correction factor Fm

No. of adjacent devices	Fm
1	1.00
2	0.95
3	0.91
4	0.88
5	0.87
6	0.86
7	0.85
> 7	0.85

DS202CR Influence of adjacent devices Correction factor Fm

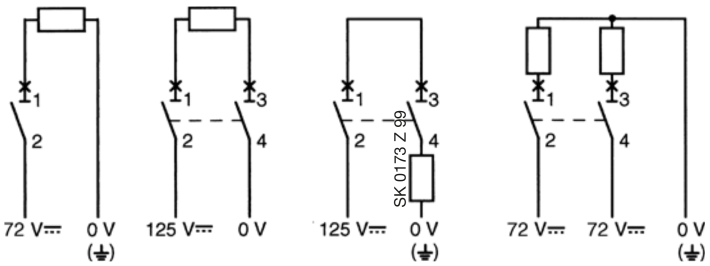
Number of devices	Fm
2 or 3	0.9
4 or 5	0.8
6 to 9	0.7
> 10	0.6

MCBs technical details

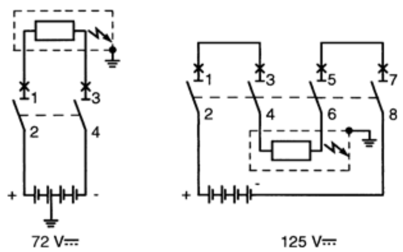
Use of MCBs in direct current circuits

Use of S 200/S 200 M/S 200 P miniature circuit-breakers in direct current circuits 72 VDC/125 VDC
In DC systems up to 72 VDC or, as the case may be, series connection up to 125 VDC, customary S 200/S 200 M series MCBs can be used. Polarity does not need to be taken into consideration, the outgoing circuit may be implemented from above or below the device.
For higher direct voltage up to 440 VDC devices of the S 280 UC series must be used.

Example for max. permissible voltages between conductors depending on the number of poles and type of connection.



Examples for different voltages between a conductor and earth where voltages between conductors are identical:



MCBs technical details

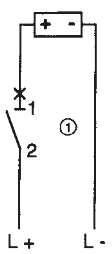
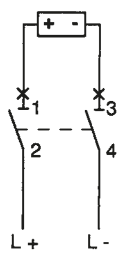
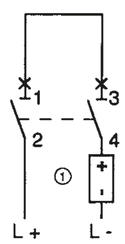
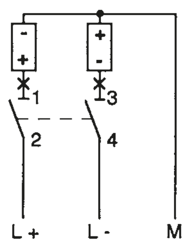
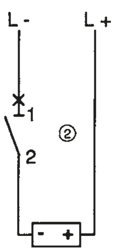
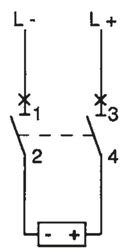
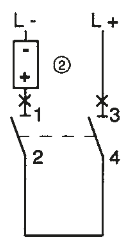
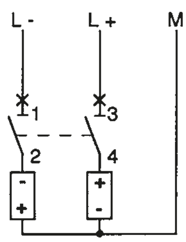
S 200 UDC series DC Applications

DC = Direct Current
S 200 UDC MCBs can be used in the one-pole version as 60 V DC (125 V DC up to 40 A), and in the 2-pole version with series connection of two poles up to 125 V DC (250 V DC up to 40 A).

S 200 UDC contains fitted permanent magnets, which assists in the forced extinguishing of the arc.
If voltages to earth exceeding 60 V DC may occur, 2-pole S 200 UDC is to be used for one-pole disconnection.

For DC incoming supply from above S 200 UDC-… MCBs have, in the area of arc chutes, permanent magnets, it is therefore necessary to take into account the polarity during the installation process.
Doing so ensures that in the case of a short circuit the magnetic field of the permanent magnets corresponds with the electromagnetic field of the short-circuit current, therefore safely leading the short circuit into the arc chute. Incorrect polarities may cause damage to the MCB. This is why – in the case of top-fed devices – terminal 1 must be connected to (-) and terminal to 3 (+).

Example for permissible voltages between the conductors depending on the number of poles and circuit layout:

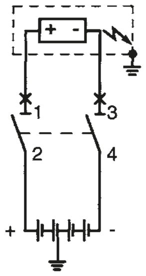
voltage between conductors	U_n	60 V DC (125 V DC up to 40 A)	125 V DC (250 V DC up to 40 A)	125 V DC (250 V DC up to 40 A)	125 V DC (250 V DC up to 40 A)
voltage between conductor and earth	U_n	60 V DC (125 V DC up to 40 A)	60 V DC (125 V DC up to 40 A)	125 V DC (250 V DC up to 40 A)	60 V DC (125 V DC up to 40 A)
MCB		1-pole	2-pole	2-pole	2-pole
		S 201 UDC	S 202 UDC	S 202 UDC	S 202 UDC
supply from below					
supply from above					

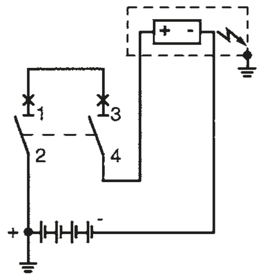
MCBs technical details

S 200 UDC series DC Applications

Examples for different voltage levels betweeen conductor and earth in the case of identical voltage between conductors:

voltage between conductors	U_n	125 V– all-pole disconnection	125 V– 1-pole disconnection
voltage between conductor and earth	U_n	60 V– circuit symmetrically earthed	125 V– circuit unsymmetrically earthed
MCB		2-pole	2-pole
		S 202 UDC	S 202 UDC





① in the circuit diagram, the negative pole is earthed.
② in the circuit diagram, the positive pole is earthed.

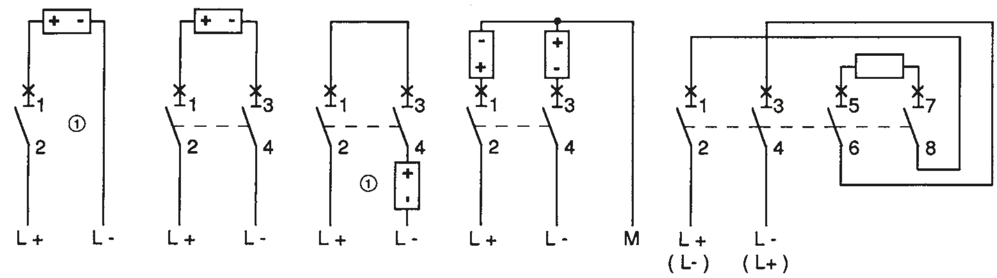
MCBs technical details

S 200 MUC series AC/DC Applications

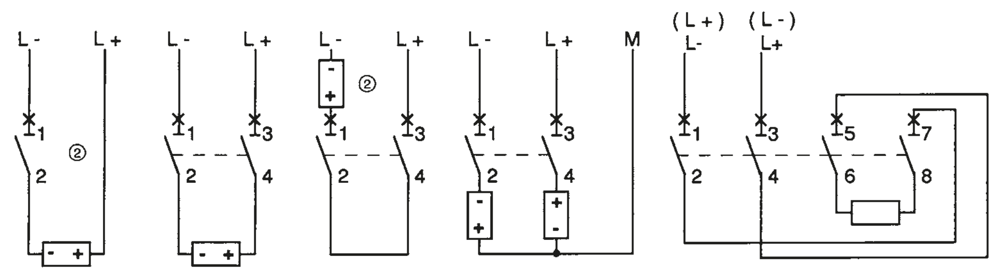
UC = Universal Current = AC/DC
S 200 MUC MCBs can be used in the one-pole version as 220 V DC, and in the 2-pole or 4-pole version with series connection of two poles up to 440 V DC.
S 200 MUC contains fitted permanent magnets, which assists in the forced extinguishing of the arc.
If voltages to earth exceeding 220 V DC may occur, 2-pole S 200 MUC is to be used for one-pole disconnection, and four-pole S 200 MUC for all-pole disconnection.
For DC incoming supply from above S 200 MUC-… MCBs have, in the area of arc chutes, permanent magnets, it is therefore necessary to take into account the polarity during the installation process.
Doing so ensures that in the case of a short circuit the magnetic field of the permanent magnets corresponds with the electromagnetic field of the short-circuit current, therefore safely leading the short circuit into the arc chute.
Incorrect polarities may cause damage to the MCB. This is why – in the case of top-fed devices – terminal 1 must be connected to (-) and terminal to 3 (+).
Example for permissible voltages between the conductors depending on the number of poles and circuit layout:

voltage between conductors	U_n	220 V–	440 V–	440 V–	440 V–	440 V– (voltage reversal)
voltage between conductor and earth	U_n	220 V–	220 V–	440 V–	220 V–	220 V–
MCB		1-pole	2-pole	2-pole	2-pole	4-pole
		S 201 MUC	S 202 MUC	S 202 MUC	S 202 MUC	S 204 MUC

supply from below

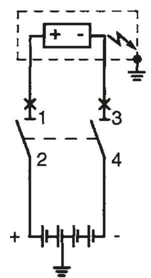


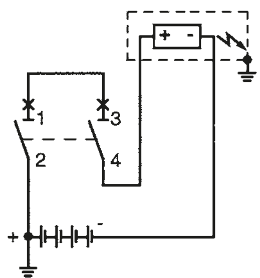
supply from above



Examples for different voltage levels betweeen conductor and earth in the case of identical voltage between conductors:

voltage between conductors	U_n	440 V– all-pole disconnection	440 V– 1-pole disconnection	440 V– all pole disconnection
voltage between conductor and earth	U_n	220 V– circuit symmetrically earthed	440 V– circuit unsymmetrically earthed	440 V– circuit unearthed or unsymmetrically earthed
MCB		2-pole	2-pole	4-pole
		S 202 MUC	S 202 MUC	S 204 MUC



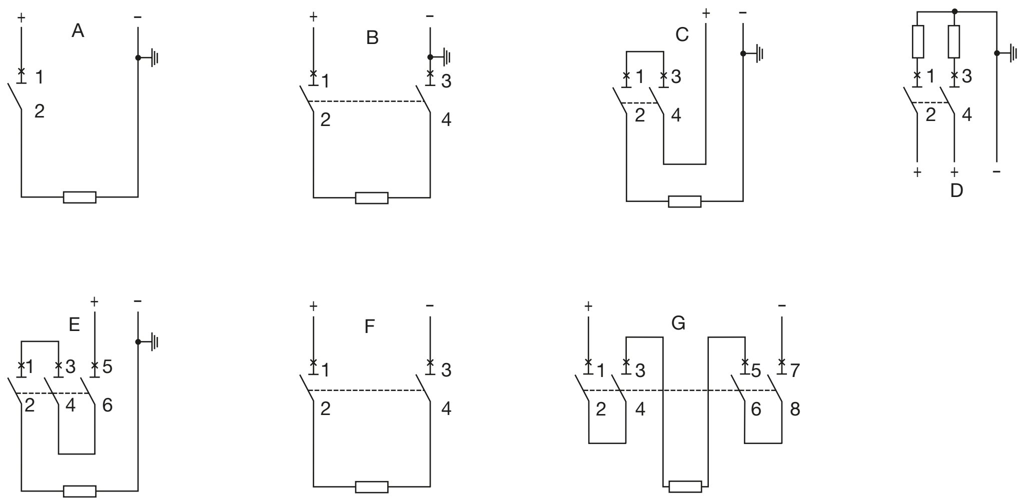


① in the circuit diagram, the negative pole is earthed. ② in the circuit diagram, the positive pole is earthed.

MCBs technical details
S800 series DC applications

S800S-UC: The first choice as DC high performance MCB
The S800S-UC DC high performance MCB is in a wide range of DC applications at home. Due to their high rated operational voltage of up to 1000 V DC the max. rated current of 125 A and the high breaking capaicty of up to 50 kA, make these devices suitable for applications, e.g.:
- DC track
- Galavanic applications
- Photovoltaics

S800S, N, and C: Up to 125 V DC on each pole
The AC range is also an interesting choice for DC applications up to 125 V DC per pole.



S800S-UC

Graphic	Short-circuit between output terminals	Contact to ground between output terminals and - earth
A	250 V DC	250 V DC
B	500 V DC	250 V DC
C	500 V DC	500 V DC
D	250 V DC	250 V DC
E	750 V DC	750 V DC
F	500 V DC	250 V DC (double failure)
G	750 V DC / 1000 V DC	500 V DC (double failure)

S800S, S800N, S800C

Graphic	Short-circuit between output terminals	Contact to ground between output terminals and - earth
A	125 V DC	125 V DC
B	250 V DC	125 V DC
C	250 V DC	250 V DC
D	125 V DC	125 V DC
E	375 V DC	375 V DC
F	250 V DC	125 V DC (double failure)
G	500 V DC	125 V DC (double failure)

MCBs technical details

S800 series DC applications

String protection with S800PV-SP

A large proportion of the costs for photovoltaic systems is tied up in the equipment for the DC generation. The S800PV-SP protects these investments in the event of a fault.

Convincing:	Suitable for up to 1500 V DC
Loadable:	String protection up to 125 A
	Reliable protection at high ambient temperatures
Tested:	Rated ultimate short-circuit breaking capacity Icu of 5 kA in accordance with IEC 60947-2 and Annex P
Fast:	Reclosable for minimum standstill times
Safe:	Disconnector properties, switching under load
Flexible:	Extensive range of accessories for remote shutdown and fault signalling

System isolation with S800PV-SD

The use of a DC isolator can be implemented reliably and in the minimum of space. Either you can choose the pole-independent S800PV-SD. The S800PV-SD is available as 2-,3- and 4-pole version up to 1500 V DC.

Convincing:	Suitable for up to 1500 V DC
Loadable:	System isolation up to 125 A
	No change in operating behaviour up to 60°C ambient temperature
	Reliable switching of ohmic loads including moderate overloads
Compact:	Minimum dimensions with maximum efficiency
Tested:	Short-time withstand current Icw of 1.5 kA in accordance with IEC 60947-3
Safe:	Disconnector properties, switching under load

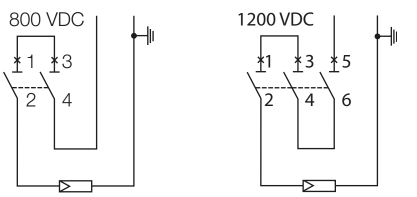
Maximum device voltages

Article	2-pole	3-pole	4-pole
S800PV-SP			
I_e 5 ... 125A	800 V DC	1200 V DC	1500 V DC
S800PV-SD			
I_e 32, 63, 125 A	800 V DC	1200 V DC	1500 V DC

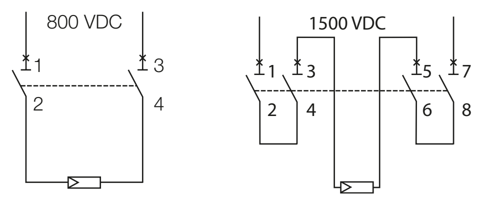
ABB recommends to fulfill national and/or international standards as e. g. IEC 61439-1 Low-voltage switchgear and controlgear assemblies

Exemplary circuit diagrams

Earthed network

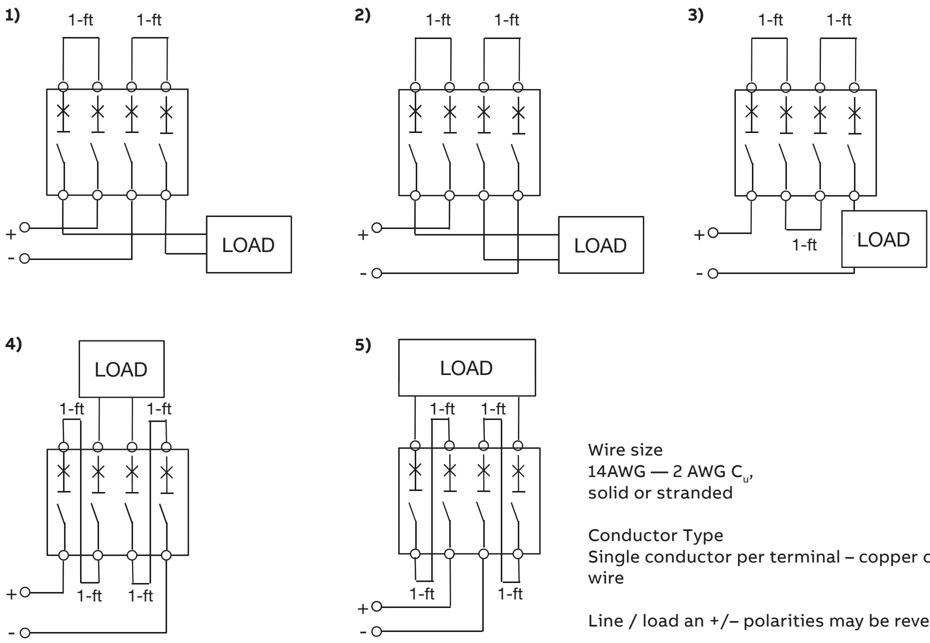


Non-earthed network



MCBs technical details
S800 series DC applications

GFDI = Ground Fault Detector Interrupter
The S804U-PVS5 is for GFDI application (Ground-Fault Detector Interrupter) in photovoltaic systems, with rated current 5 A and short-circuit current rating of 3 kA. The breaker is tested acc. to UL489B for 1000 V DC.



Wire size
14AWG — 2 AWG C_u,
solid or stranded

Conductor Type
Single conductor per terminal – copper only, 75C wire

Line / load an +/– polarities may be reversed

Circuit **1, 2, 3, 4, 5**	:ungrounded supplies
Circuit **3**	:grounded supplies

MCBs technical details

Use of MCBs in altitude and different network frequency

Performance in altitude of MCBs
Up to the height of 2000 m, MCBs do not undergo any alterations in their rated performances. Over this height the properties of the atmosphere change in terms of composition, dielectric capacity, cooling capacity and pressure, therefore the performances of the MCBs undergo derating, which can basically be measured in terms of variations in significant parameters, such as the maximum operating voltage and the rated current.

Miniature circuit breaker

Altitude	[m]	2000	3000	4000	5000
Rated voltage U_n		U_n	0.887 x U_n	0.775 x U_n	0.676 x U_n
Rated current I_n		I_n	0.96 x I_n	0.93 x I_n	0.90 x I_n

The derating of the rated voltage is valid for AC and DC voltages.

Variation of tripping thresholds of MCBs according to network frequency
The circuit-breakers are calibrated for a current with a frequency range between 50 and 60 Hz.

	AC			DC
	100 Hz	**200 Hz**	**400 Hz**	
Multiplier	1.1	1.2	1.5	1.5

The thermal tripping performance is independent from the network frequency.

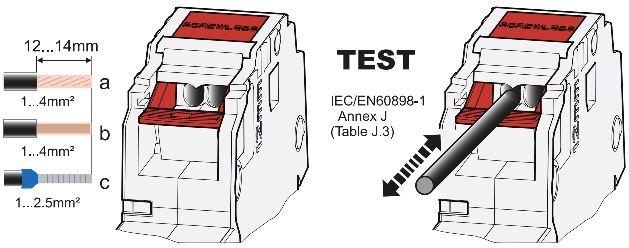
Example:
S 202 C10 supplied at 50-60 Hz, the electro-magnetic tripping current is: 50 A≤Im≤100 A;
S 202 C10 supplied at 400 Hz, the electro-magnetic tripping current is: 75 A≤Im≤150 A.

MCBs technical details

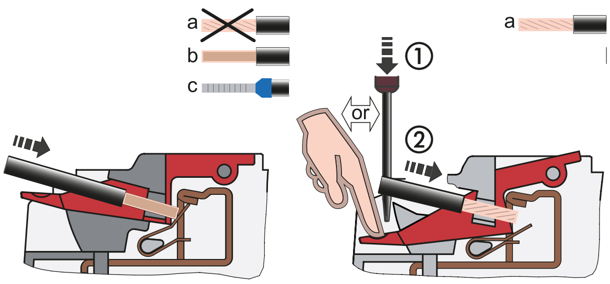
Instruction for use of S 200 S

Connection and disconnection of different types of cables on the load side

Type of cables and cross sections

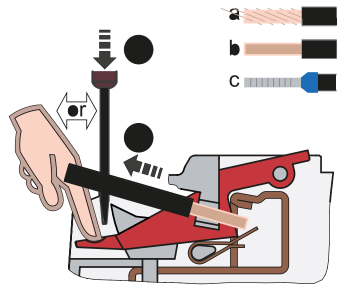


Connection of cables



- Connection of one cable per opening.
- Rigid and flexible cables with end sleeves may be directly connected.
- If flexible cables without end sleeves are to be connected, the terminal
  must be opened. Splicing of the wires must be avoided.
- The cable must be inserted into the terminal either as far as possible
  or in such a way that a sufficient connection is obvious.
- The tightness of the connection must be checked.

Disconnection of cables



The cables may only be removed after operating the terminal's opening mchanism.

- If one cable is removed, the correct position of the remaining cable must be checked.

Processing instructions

The screwless terminal at the load side of the S 200 S is designed so that copper cables basically may be connected without further preparation. If end sleeves are used as splicing protection for flexible cables, the compression
of the end sleeves must comply with the pull-out forces in accordance with standard IEC/EN 60898-1 table J.3.

Recommended tools for flexible cables with end sleeves

Crimp tool with trapezoid compression profile

Wire stripping length / size of end sleeves for all cables

Wire stripping length and end sleeve length 12 (+2) mm

Distribution boards with metal cover

The distance from a metallic cover to the "shoulder" of the miniature circuit breaker must be at least 6 mm on the load side due to the arrangement of the easiliy accessible measurement point.

MCBs technical details

Particular supply sources and loads

Lighting circuit protection
Selection of circuit-breakers for the protection of lighting circuit and calculation of their rated current
To select the correct circuit-breaker for use in the protection of lighting circuits you need to know the type of load based on which you will work out the breaker's rated current. The protection circuit utilization current can be calculated simply starting with the rated power and the lighting voltage, or it may be supplied directly by the device manufacturer. Considering the utilization current, it is important to select the version of the breaker with a rated current just above the value calculated, defining the cable cross-section accordingly. The tables below show the rated current values of the circuit-breakers to be used according to the type and power of the device connected.

Table 1 High pressure discharge lamps
230 V and 400 V AC three-phase with or without power factor correcting capacitors, star or delta connection

Mercury vapour fluorescent lamp	Pw [W]	<700	<1000	<2000
	I [A]	6	10	16
Mercury vapour metal halogen lamp	Pw [W]	<375	<1000	<2000
	I [A]	6	10	16
High pressure sodium discharge lamp	Pw [W]	<400		<1000
	I [A]	6		16

Table 2 Fluorescent lamps
230 VAC single-phase/three-phase with neutral (400 V), with star connection.
The tables indicate the rated current of the circuit-breakers according to the lamp power and type of power supply.

Example of calculation
- Starter dissipated power: 25% of lamp power
- Reference temperature: 30 and 40 °C according to circuit-breaker
- Power factor: lamp without capacitors cos ϕ=0.6
  lamp with capacitors cos ϕ=0.86

Method of calculation
- IB = (PL * n°L * KST * KC) / (Un * cos ϕ) where:
  - Un = rated voltage 230 V
  - cos ϕ = power factor
  - PL = lamp power
  - n°L = number of lamps per phase
  - KST = 1.25
  - KC = 1 for star connection and 1.732 for delta connection

Type of lamp	Tube diss. pwr. [W]	Number of lamps per phase													
Single without capacitors	18	4	9	14	29	49	78	98	122	157	196	245	309	392	490
	36	2	4	7	14	24	39	49	61	78	98	122	154	196	245
	58	1	3	4	9	15	24	30	38	48	60	76	95	121	152
Single with capacitors	18	7	14	21	42	70	112	140	175	225	281	351	443	562	703
	36	3	7	10	21	35	56	70	87	112	140	175	221	281	351
	58	2	4	6	13	21	34	43	54	69	87	109	137	174	218
Double with capacitors	2x18=36	3	7	10	21	35	56	70	87	112	140	175	221	281	351
	2x36=72	1	3	5	10	17	28	35	43	56	70	87	110	140	175
	2x58=116	1	2	3	6	10	17	21	27	34	43	54	68	87	109
I_n [A] - 2P and 4P circuit-breakers		1	2	3	6	10	16	20	25	32	40	50	63	80	100

MCBs technical details

Particular supply sources and loads

Fluorescent lamps. 230 VAC three-phase – Delta connection

Type of lamp	Tube diss. pwr. [W]	Number of lamps per phase													
Single without capacitors	18	2	5	8	16	28	45	56	70	90	113	141	178	226	283
	36	1	2	4	8	14	22	28	35	45	56	70	89	113	141
	58	0	1	2	5	8	14	17	21	28	35	43	55	70	87
Single with capacitors	18	4	8	12	24	40	64	81	101	127	162	203	255	324	406
	36	2	4	6	12	20	32	40	50	64	81	101	127	162	203
	58	1	2	3	7	12	20	25	31	40	50	63	79	100	126
Double with capacitors	2x18=36	2	4	6	12	20	32	40	50	64	81	101	127	162	203
	2x36=72	1	2	3	6	10	16	20	25	32	40	50	63	81	101
	2x58=116	0	1	1	3	6	10	12	15	20	25	31	39	50	63
In [A] - 3P circuit-break.		1	2	3	6	10	16	20	25	32	40	50	63	80	100

Transformer protection

Insertion current

When the LV/LV transformers are powered up, very strong currents occur, which must be considered when selecting the protective device. The peak value of the first current wave often reaches a value between 10 and 15 times the transformer's effective rated current.

For power ratings below 50 kVA, it may reach between 20 and 25 times the rated current. This transient current decreases very rapidly with a time constant T varying from several ms to 10, 20 ms.

Main protection on the primary side

The tables below are the result of a set of tests on co-ordination between circuit-breakers and BT/BT transformers. The transformers used in the tests are normalized. The table, referring to a primary supply voltage of 230 or 400 V and to single-phase and three-phase transformers, indicate which circuit-breaker should be used according to the transformer power rating. The transformers considered have the primary winding outside the secondary winding.

The circuit-breakers suggested allow:

- transformer protection in the event of maximum short-circuit;
- prevention of unwanted tripping when the primary winding is powered up using
  1. modular circuit-breakers with a high magnetic threshold, curve D or K
- 2. circuit-breakers with magnetic only releaser;
- guaranteed circuit-breaker electrical life.

Protection on the secondary side

Due to the transformer's high insertion current, the circuit-breaker on the primary winding may not guarantee thermal protection for the transformer and its feeder line on the primary side.

This is typical of modular circuit-breakers which must have a higher rated current than the transformers. In such cases, in the event of a single-phase short-circuit at the transformer's primary terminals (minimum Icc at end of line), check that the circuit-breaker's magnetic releaser is tripped. In the normal application in distribution panels, this condition is always satisfied provided that the length of the feeder lines is reduced.

The transformer can be provided with thermal protection by installing a circuit-breaker with a rated current less than or equal to that of the transformer secondary winding immediately downstream of the LV/LV transformer.

In lighting systems protection against overloads is not necessary if the number of light points is clearly defined (no overloads).

Moreover, the Standard in force for these systems recommends the omission of protection against overloads in circuits in which unwanted tripping may prove hazardous, e.g.: circuits which supply fire-fighting equipment.

MCBs technical details

Particular supply sources and loads

Single-phase transformer (primary voltage 230 V)-1P and 1P+N MCBs

P_n [kVA]	I_n [A]	u_{cc} (%)	Circuit-breaker on primary side (1) and (2)
0.1	0.4	13	S 2* D1 o K1
0.16	0.7	10.5	S 2* D2 o K2
0.25	1.1	9.5	S 2* D3 o K3
0.4	1.7	7.5	S 2* D4 o K4
0.63	2.7	7	S 2* D6 o K6
1	4.2	5.2	S 2* D10 o K10
1.6	6.8	4	S 2* D16 o K16
2	8.4	2.9	S 2* D16 o K16
2.5	10.5	3	S 2* D20 o K20
4	16.9	2.1	S 2* D40 o K40
5	21.1	4.5	S 2* D50 o K50
6.3	27	4.5	S 2* D63 o K63

Single-phase transformer (primary voltage 400 V)-2P MCBs

P_n [kVA]	I_n [A]	u_{cc} (%)	Circuit-breaker on primary side (1) and (2)
1	2.44	8	S 2* D6 o K6
1.6	3.9	8	S 2* D10 o K10
2.5	6.1	3	S 2* D16 o K16
4	9.8	2.1	S 2* D20 o K20
5	12.2	4.5	S 2* D32 o K32
6.3	15.4	4.5	S 2* D40 o K40
8	19.5	5	S 2* D50 o K50
10	24	5	S 2* D63 o K63
12.5	30	5	S 2* D63 o K63

Three-phase transformer (primary voltage 400 V)-3P, 3P+N and 4P MCBs

P_n [kVA]	I_n [A]	u_{cc} (%)	Circuit-breaker on primary side (1) and (2)
5	7	4.5	S 2* D20 o K20
6.3	8.8	4.5	S 2* D20 o K20
8	11.6	4.5	S 2* D32 o K32
10	14	5.5	S 2* D32 o K32
12.5	17.6	5.5	S 2* D40 o K40
16	23	5.5	S 2* D63 o K63
20	28	5.5	S 2* D63 o K63

S 2*.. = S 200, S 200 M, S 200 P
(1) With modular or magnetic only circuit-breakers, without thermal adjustment, thermal protection is required for the transformer's secondary winding.
(2) Breaking capacity selected according to estimated Icc at the point where the breaker is installed.

MCBs technical details
Particular supply sources and loads

Double tampoprinting of S 200 P
The breaking capacity
For the modular circuit-breakers realized according to IEC/EN 60898 standard, the breaking capacity is expressed by the Icn quantity, indicated in Ampere, contained within a rectangle on the front side of the device. The max value of rated short-circuit capacity (Icn) considered by this standard is 25000 A.

Always according to IEC/EN 60898 standard, the ratio between the service short-circuit capacity (Ics) and the rated short-circuit capacity (Icn) – K factor – shall have to be conforming to the enclosed table.

I_{cn}	K
< 6000 A	1
> 6000 A < 10000 A	0.75(*)
>10000 A	0.5(**)

(*) Ics minimum value: 6000 A (**) Ics minimum value: 7500 A

Limiting class
The Manufacturer of the circuit-breaker has the right to declare the energy limiting class of the device. According to IEC/EN 60898 standard, the Manufacturer classifies the circuit-breaker with a limiting class which ranges from 1 to 3 according to the I2t values let though by the circuit-breaker for rated current up to 16 A and rated currents exceeding 16 A up to 32 A included, according to the table below.

Rated current up to 16 A:

Short-circuit rated capacity	Limited energy classes				
	1	2		3	
	I^2t max (A^2s)	I^2t max (A^2s)		I^2t max (A^2s)	
(A)	B-C Type	B Type	C Type	B Type	C Type
3000	No limits are specified	31000	37000	15000	18000
4500		60000	75000	25000	30000
6000		100000	120000	35000	42000
10000		240000	290000	70000	84000

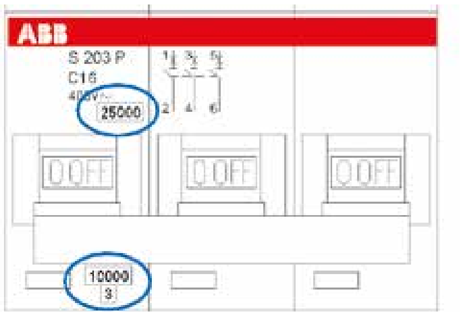
Rated current exceeding 16 A up to 32 A included:

Short-circuit rated capacity	Limited energy classes				
	1	2		3	
	I^2t max (A^2s)	I^2t max (A^2s)		I^2t max (A^2s)	
(A)	B-C Type	B Type	C Type	B Type	C Type
3000	No limits are specified	40000	50000	18000	22000
4500		80000	100000	32000	39000
6000		130000	160000	45000	55000
10000		310000	370000	90000	110000

MCBs technical details

Particular supply sources and loads

wFor instance, a circuit-breaker with rated current 16 A, B characteristic, with short-circuit rated capacity equal to 6 kA belongs to class 3 if it lets through max 35000 A^2s of specific energy.
The limiting class value (1, 2 or 3) is indicated on the front side of the device, within a square, in addition to the breaking capacity.



As regards the miniature circuit-breakers S200P series, two different breaking capacities are indicated on the front side of the device, contained in a rectangle.
The breaking capacity indicated above the operating toggle is the one of the device, according to IEC/EN 60898 standard, the breaking capacity indicated under the lever is regarding the limiting class which, according to the standard, can be expressed only for values up to 10000 A.

MCBs technical details
S800 range features

The S800S, -N, -C, -B and -HV high performance MCBs: safe innovation
The S800 high performance MCB limits energy and current in case of a short-circuit power cutt off. The specially designed double arcing chamber system, i. e. per pole are two arcing chambers, ensures excellent operating characteristics. The new S800B has only one arcing chamber. Additional exceptional features of the S800 series are:

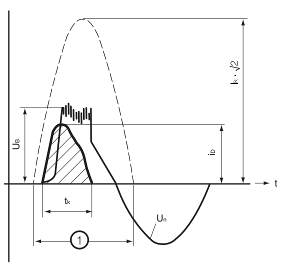
Convincing:	Selectivity to upstream overcurrent protection devices due to a total switch-off time of only ≤ 2.5 ms.
Safe:	Excellent backup protection by limiting the energy to a value ≤ 100 000 A^2s (125A / 50 kA). In case of short-circuit, there is a low load to the circuit and the location of the damage due to the high limitation of the let-through energy.
Loads:	Up to 125 A rated current
Checked:	S series up to 50 kA rated ultimate short-circuit breaking capacity I_{cu} N series up to 36 kA rated ultimate short-circuit breaking capacity I_{cu} C series up to 25 kA rated ultimate short-circuit breaking capacity I_{cu} B series up to 16 kA rated ultimate short-circuit breaking capacity I_{cu} HV series up to 4 kA rated ultimate short-circuit breaking capacity I_{cu}
Selectable:	Characteristics:
S series:	B, C, D, K, KM, UCB, UCK
N series:	B, C, D
C series:	B, C, D, K
B series:	B, C, D, K
HV series:	C, K
Compact:	Slight 27 mm width per pole
Flexible:	Accessories installed by the customer.

S800UP, -U, -U-UCZ, -U-PVS: Highest safety now also ensured for UL applications

Convincing:	Covering of different voltage ranges (240 V AC, 480Y/277 V AC, 600 V DC, 1000 V DC)
Safe:	Excellent backup protection due to limitation of energy.
Loads:	Up to 100 A rated current
Checked:	K-, Z series up to 50kA breaking capacity UCZ series up to 10kA breaking capacity PVS series up to 3kA breaking capacity
Selectable:	Characteristics: K, Z, UCZ, PVS
Compact:	Smallest sizes.
Flexible:	Accessories installed by the customer.
Standards:	UL489, UL489B, IEC 60947-2

Short description
Two triggers detect overcurrents, effect the switching station and provide short-circuit protection.

1. The thermal trip for overload protection with time delay.
2. The electromagnetic fast-acting trip with concrete anchor for short-circuit protection.



① 1 sinus half-wave
50 Hz ≙ T/2 = 10 ms

$I_k \times \sqrt{2}$	peak value of the prospective short-circuit current
i_D	max. let-through current of the S800 high performance MCB
U_n	supply voltage
U_B	build up and collapse of the arc voltage
t_K	Turn-off time of S800 high performance MCB

MCBs technical details

S800 range features

Play it safe: display the operational state
The mechanical drive of the S800 high performance MCB is equipped with a trip-free release. It therefore switches independent of the actuating force or speed on the actuating lever.
The trip position display thereby always reliably displays the exact position of the moving contact. The trip position provides additional trip detection allowing you to easily find the reason for the cut-off. Because the switch lever moves to the middle position in case of thermal or magnetic tripping, the user sees at a glance that this is an error state and can then initiate suitable measures.

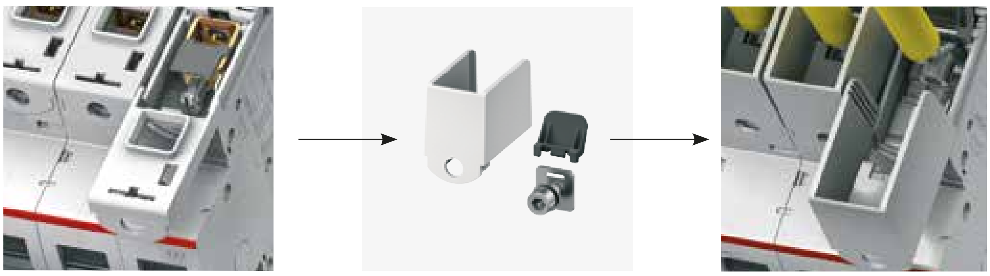
*Middle position of switch lever, see picture

Reliable: the disconnector properties
In OFF position (0 position), the S800 high performance MCB guarantees safe electrical isolation of the circuit compliant to IEC 60947-2.

Flexible: the installation
The S800 high performance MCB can be directly mounted onto any position on the DIN mounting rail without any impairment to its characteristics. Because the pole dimensions are identical for all rated currents, installation in switching systems is simplified.
The S800 can be installed in different ways:

- together with other breakers in the same DIN rail horizontally or vertically
- as an individual breaker in a single fixed compartment where the breaker is switched on/off with a rotary handle from the door, and the breaker is mounted on the wall of the panel
- as an individual breaker in a single withdrawable module, when requirements for high availability in the installation are a must

Cage and ring terminals
When ordering you can choose between cage terminals or ring terminal connectors. No matter which type you select, both connection options guarantee a high degree of reliability.



Doesn't let go: the replaceable terminal adapter*
The S800 standard equipment with interchangeable terminal adapter for wires, cables and rigid conductors guarantees a high level of flexibility and comfort. Fast and safe connection of the conductors is ensured by the "onboard terminal shutter" integrated into the body of the terminal, thereby preventing incorrect underclamping of the connections.

* Available for the S, N, C, U and PV series.

MCBs technical details

S800 range features

Extra safe: Fire protection acc. to NF F 16-101 and NF F 16-102 (prEN45545-2)
The S800 high performance MCB provides standard compliance to the requirements of Standard prEN45545-2 (Railway applications – Fire Protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components). This standard is based on the French standard NF F 16-101/ NF F 16-102 and makes new requirements of the fire behaviour of the materials used. The main focus of attention with relation to fire protection is on the following:
- Flame spread
- Rate of heat release
- Smoke development
- Toxicity

The S800 high performance automatic meets the following classification compliant to NF F 16-101 and NF F 16-102:
- I3F2
- I3 no permanent flame at 850°C
- F2 index of fume density and toxicity ≤ 40

More information regarding the use of S800 breakers in rolling stock applications is available in the Technical catalogue 'DIN-Rail components for rolling stock applications 2CDC002053D0204'

MCBs technical details

S800-SCL-SR range features

Group protection

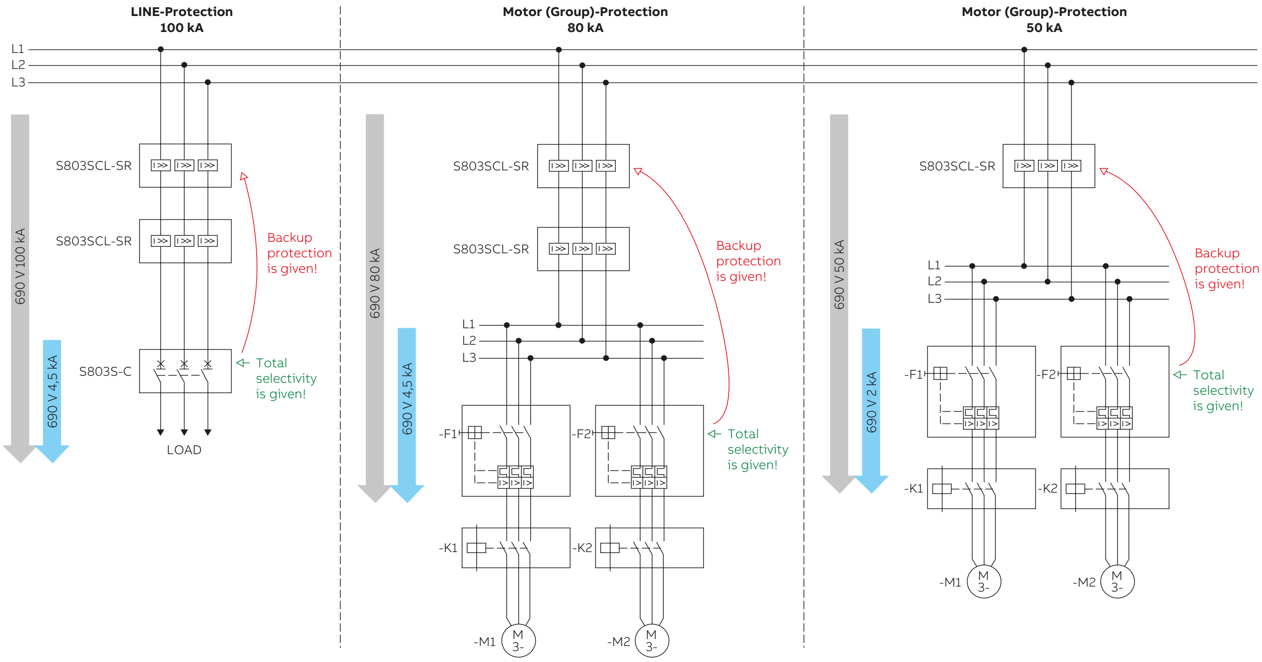
The the main application of the S800S-SCL-SR is group protection. In comparison to other short-circuit limiter you need only one S800S-SCL-SR for several motor starters or high performance miniature circuit breakers. With the requirement that the rated current of the short-circuit limiter does not exceed the total sum of the rated S800S currents of all downstream motor starters or circuit breakers. Furthermore the sum of all load currents including inrush currents shall not exceed the maximum permissible load of the S800S-SCL-SR. Several downstream motor protection combinations or several high performance miniature circuit breakers can be protected with only one S800S-SCL-SR.

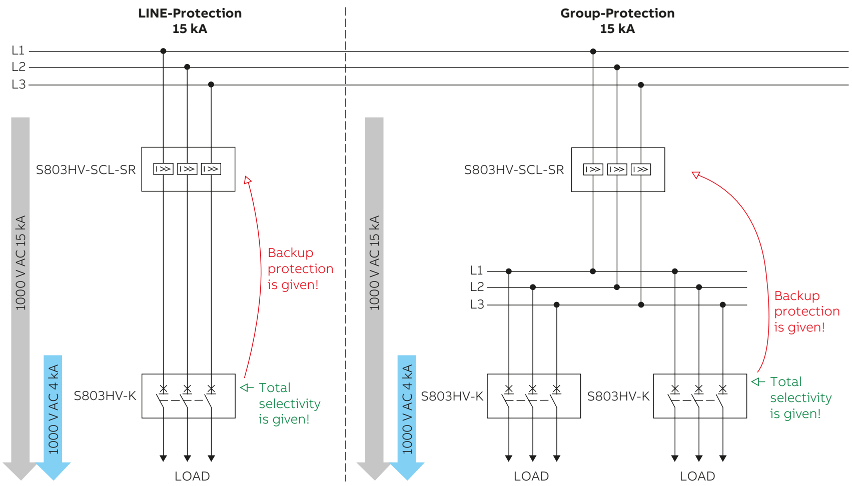
Current continuity

In case of a failure by using the S800-SCL-SR as group protection only the defective device will trip; all other devices will keep doing their work.
Therefore you will have a very low breakdown, because only one motor will stop and not all of them.

Maximum system availability is given.

Schematic examples for rated currents up to 100 A





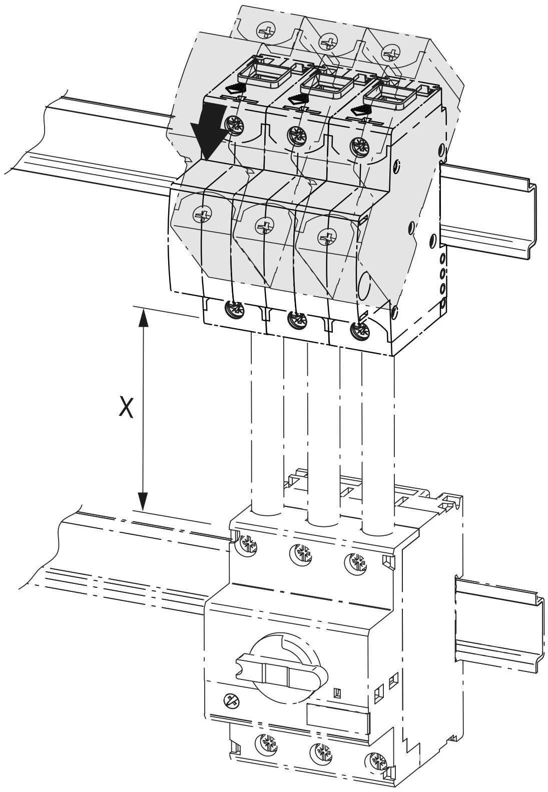
Short-circuit breaking capacity only downstream device
Short-circuit breaking capacity coordinated group S800-SCL-SR

MCBs technical details

S800-SCL-SR range features

S800-SCL-SR
Self-resetting short-circuit limiter
The S800-SCL-SR can be used together with S800S High Performance MCB or Manual Motor Starters. It limits the short-circuit current until the downstream means of protection trips. Its current continuity makes it as the ideal solution for group protection. All parallel branches remain operative.

Minimum cable length between S800-SCL-SR and downstream devices (Connection has to be shortcircuit proofed acc. to IEC 61439-1)



MS/M0325
MS/M0132
S800

S800-SCL-SR	min. length X	min. cross section
32 A	80 mm	6 mm^2
63 A	80 mm	16 mm^2
100/125 A	250 mm	35 mm^2

MCBs technical details

S800-SCL-SR range features

Approved combinations with high performance MCB S800

Downstream devices	Upstream devices		
	S800S-SCL-SR/S803W-SCL-SR Self resetting short-circuit limiter		
Rated current Ie [A]	**32**	**63**	**100**
S800S Characteristic B			
6	■		
8	■		
10	■	■	■
13	■	■	■
16	■	■	■
20	■	■	■
25	■	■	■
32	■	■	■
40		■	■
50		■	■
63		■	■
80			■
100			■
125			
S800S Characteristic C			
6	■		
8	■		
10	■	■	■
13	■	■	■
16	■	■	■
20	■	■	■
25	■	■	■
32		■	■
40		■	■
50		■	■
63			■
80			■
100			
125			
S800S Characteristic D/K			
6	■		
8	■		
10	■	■	■
13	■	■	■
16	■	■	■
20		■	■
25		■	■
32		■	■
40		■	■
50			■
63			
80			
100			
125			

MCBs technical details

S800-SCL-SR range features

Approved combinations with motor starter/S800S-KM

Downstream devices	Upstream devices		
	S800S-SCL-SR/S803W-SCL-SR Self resetting short-circuit limiter		
Rated current I_e [A]	**32**	**63**	**100**
MS/MO325			
0.1– 2.5	■	■	■
4	■	■	■
6.3	■	■	■
9	■	■	■
12.5	■	■	■
16	■	■	■
20		■	■
25		■	■
MS/MO132			
0.1– 2.5	■	■	
4	■	■	
6.3	■	■	■
10	■	■	■
16	■	■	■
20		■	■
25		■	■
32		■	■
S800S-KM			
20		■	■
25		■	■
32		■	■
40		■	■
50			■
63			■
80			

Approved combinations with S803HV-K

Downstream devices	Upstream devices S803HV-SCL-SR Self resetting short-circuit limiter		
Rated operational current I_e [A]	**32**	**63**	**100**
6	■		
8	■		
10	■	■	■
13	■	■	■
16		■	■
20		■	■
25		■	■
32		■	■
40		■	■
50			■
63			■
80			
100			
125			

* Motor starter combinations acc. to IEC 60947-4-1

MCBs technical details

S800-SCL-SR range features

■ Applies for all voltages according to the table below

		S800S-SCL-SR	S803W-SCL-SR	S803HV-SCL-SR
Rated ultimate short-circuit breaking capacity				
$I_{cu} = I_{cs}$ according to IEC 60947-2				
(AC) 50/60 Hz 240/415 V	kA	100	100	
(AC) 50/60 Hz 254/440 V	kA	100	100	
(AC) 50/60 Hz 277/480 V	kA	65	65	
(AC) 50/60 Hz 289/500 V	kA	65	65	
(AC) 50/60 Hz 346/600 V	kA	65	65	
(AC) 50/60 Hz 400/690 V	kA	50	50	
(AC) 50/60 Hz 580/1000 V	kA			I_{cu} = 15 kA I_{cs} = 10 kA
Short-circuit rating according to UL 508, CSA 22.2				
(AC) 50/60 Hz 480 V	kA		65	
(AC) 50/60 Hz 600 V	kA		65	

MCBs technical details
S800-SCL-SR range features

Internal resistance at 25 °C ambient temperature and nominal power losses

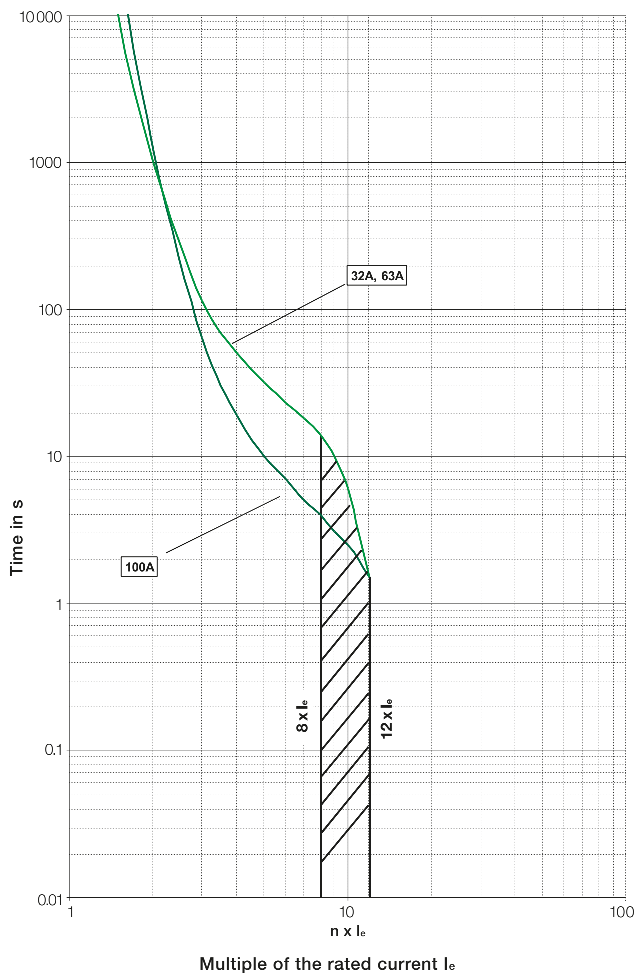
Rated operational current I_e	Internal resistance R_i	Power losses P_{Vn}
[A]	[mΩ]	[W]
32	2.8	3.6
63	1.3	5.7
100	0.7	7.8

Influence of ambient temperature – single mounted devices

Rated operational current I_e [A]	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
32	38.2	37.2	35.8	35.2	34.2	33.3	32	30.7	29.8	28.8	27.8	26.5	25.1
63	75.3	73.2	70.6	69.3	67.4	65.5	63	60.5	58.6	56.7	54.8	52.3	49.8
100	119.5	116.2	112	110	107	104	100	96	93	90	87	84	80

Installation requirements
The total sum of the rated currents of all downstream motor starters or circuit breakers shall not exceed the rated current of the S800-SCL-SR (valid also for HV version). Furthermore the sum of all load currents including inrush currents shall not exceed the maximum permissible load of the S800-SCL-SR (valid also for HV version).

Maximum load



Example:
If you have 8 manual motor starters with each 5A as rated operational current
Sum: 8 x 5A = 40A
Then you have to use either the 63A or 100A S803-SCL-SR. In this example we use the 63A version.
We know that our maximum load is 245A. Thus we have to calculate if this maximum load can be handled with the 63A version and, if yes, for how many seconds.
245A / 63A = 3.89 ~ 4
So now you can check where the multiplier „4“ crosses the graph of the 63A version to know for how many seconds this load can be handled. In this example a load of 245 A can be handled for max. 50 seconds.
Please note: always use the S800-SCL-SR in the left area of this graphic, since it would be damaged otherwise.

Notes

Electrical installation solutions for buildings – Technical details

RCDs

Index

RCDs technical details

Functions and classification criteria for RCDs

Overview of the RCCB types

The variety of residual current protective devices (RCDs) has increased continuously over the last few decades following technological development and the massive introduction of electronics in all areas of application.

In accordance with the possibility of recognizing the most varied forms of residual current and the relatively demanding device testing, the spectrum of RCD types today ranges from protecting pure AC consumers to high-frequency consumers. The level of protection is shifting more and more from the AC and A types to the F and B types.

Type F

Full Type A AP-R functionality
+ Pulsating current with direct current components max. 10 mA
+ Detection of mixed frequency current up to 1 kHz.

Type B

Full Type F functionality
+ detection of smooth direct currents, high-frequency currents up to 2 kHz, high system availability.

Type A AP-R

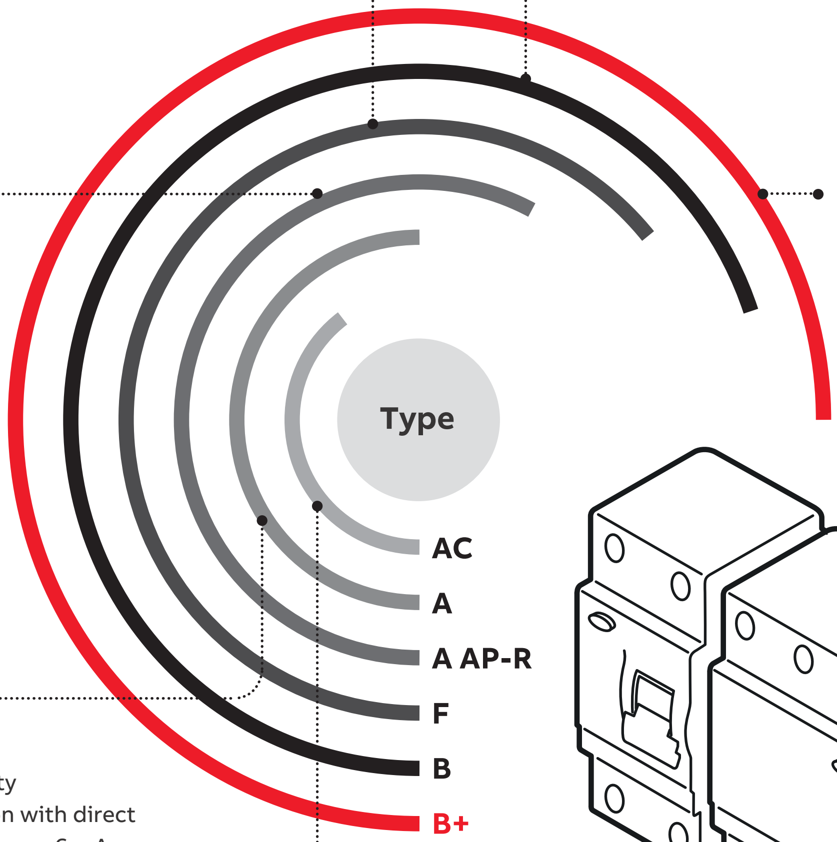
AP-R

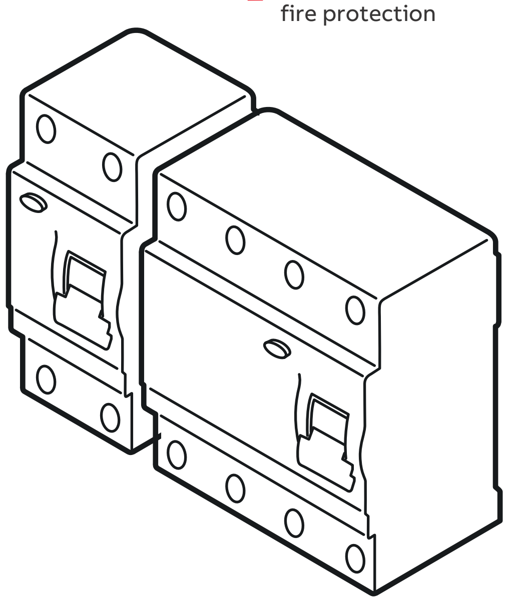
Full Type A functionality
+ high sensitivity against unwanted tripping (short time delay).

Type B+

kHz

Full Type B functionality
+ detection of high-frequency currents up to 20 kHz, including superior, preventive fire protection





Type A

Full Type AC functionality
+ pulse current detection with direct current components of max. 6 mA.

Type AC

AC current only.

RCDs technical details

Functions and classification criteria for RCDs

Functions and classification criteria for RCDs
A residual current operated circuit-breaker is an amperometric protection device which is tripped when the system leaks a significant current to earth.

This device continuously calculates the vector sum of the single-phase or three-phase system line currents and while the sum is equal to zero allows electricity to be supplied. This supply is rapidly interrupted if the sum exceeds a value preset according to the sensitivity of the device.

Residual current operated circuit-breakers can be classed according to four parameters:
- type of construction
- detectable wave form
- tripping sensitivity
- tripping time.

Depending on the type of construction, RCDs may be classed as:
- RCBOs (magnetothermic with overcurrent protection)
- RCCBs (without overcurrent protection releaser incorporated)
- RCD blocks.

RCBOs combine, in a single device, the residual current function and the overcurrent protection function typical of MCBs. RCBOs are tripped by both current leakage to earth and overloads and short-circuits and they are self-protecting up to a maximum short-circuit current value indicated on the label.
RCCBs are only sensitive to current leakage to earth. They must be used in series with an MCB or fuse which protects them from the potentially damaging thermal and dynamic stresses of any overcurrents.

These devices are used in systems already equipped with MCBs which preferably limit the specific energy passing through, also acting as the main disconnecting switches upstream of any derived MCBs (e.g.: domestic consumer unit).
RCD blocks are residual current devices suitable for assembly with a standard MCB. IEC/EN 61009 app. G only allows assembly of RCBOs once on site, that is to say outside the factory, using adaptable RCD blocks and the appropriate MCBs. Any subsequent attempts to separate them must leave permanent visible damage. The residual current operated circuit-breaker obtained in this way maintains both the electrical characteristics of the MCB and those of the RCD block.

According to the wave form of the earth leakage currents they are sensitive to, the RCDs may be classed as:
- AC type (for alternating current only)
- A type (for alternating and/or pulsating current with DC components)
- F type (for alternating and/or pulsating current with DC components with detection of high frequency currents up to 1 kHz.)
- B type (for alternating and/or pulsating current with DC components and continuous fault current).

AC type RCDs are suitable for all systems where users have sinusoidal earth current.

They are not sensitive to impulsive leakage currents up to a peak of 250 A (8/20 wave form) such as those which may occur due to overlapping voltage impulses on the mains (e.g.: insertion of fluorescent bulbs, X-ray equipment, data processing systems and SCR controls).

A type RCDs are not sensitive to impulsive currents up to a peak of 250 A (8/20 wave form).

They are particularly suitable for protecting systems in which the user equipment has electronic devices for rectifying the current or phase cutting adjustment of a physical quantity (speed temperature, light intensity, etc.) supplied directly by the mains without the insertion of transformers and insulated in class I (class II is, by definition, free of faults to earth). These devices may generate a pulsating fault current with DC components which the A type RCD can recognise.
F type RCDs can detect sinusoidal AC currents as well as pulsating DC currents. In addition to this, they are also tested according to IEC/EN 62423 which foresees the application of a simulated multi-frequency residual current with appropriate coefficient associated to the each level of frequency up to 1kHz.
The intervention characteristic has a short-time delayed which prevents unwanted tripping in case pulsed leakage currents of up to ten milliseconds occur at activation of filters.
The RCDs Type F have a surge current withstand capacity of more than 3kA and can accept superimposed smooth DC residual currents of up to 10mA without affecting their standard functionality.
Main area of use are the circuits of single phase inverters regulating the speed of motors by supplying a variable frequency, from 10 to 1000 Hz.

RCDs technical details

Functions and classification criteria for RCDs

B type RCDs are recommended for use with drives and inverters for supplying motors for pumps, lifts, textile machines, machine tools, etc., since they recognise a continuous fault current with a low level ripple.
Type AC, A and B RCDs comply with IEC/EN 61008/61009, moreover type B is covered by IEC 62423 Ed. 1 and by IEC/EN 60755 for residual current operated protective devices.
According to tripping sensitivity (IΔn value), RCDs may be divided into the following categories:

- low-sensitivity (IΔn >0.03 A), not suitable for protection against direct contacts; co-ordinated with the earth system according to the formula IΔn <50/R, to provide protection against indirect contacts;
- high-sensitivity (IΔn: 0.01…0.03 A), or “physiologically sensitivity” for protection against indirect contacts, with simultaneous additional protection against direct contacts.
- against fire (up to 500 mA) according to IEC/EN 60364

Residual current sensitivity and environment

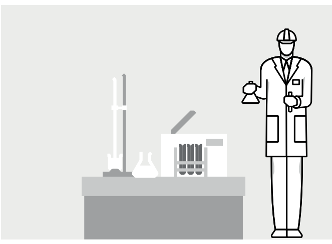
Household and special environments

IΔn
≤30 mA

High-sensitivity or physiologically sensitive RCDs

IEC/EN 60364 makes the use of these devices mandatory in all bathrooms, showers and private and public swimming pools and environments in which plugs and sockets may be installed without insulating or low safety voltage transformers.

Laboratories, service industry and small industry



IΔn
from 30 mA
to 500 mA

Low-sensitivity RCDs

Large service industry and industrial complex

IΔn
from 500 mA
to 1000 mA

According to their tripping time, RCDs can be classed as:
- instantaneous (or rapid or general)
- type S selective (or - incorrectly - delayed).

Selective RCDs (RCBOs - RCCBs or RCD-blocks) have a delayed tripping action and are installed upstream of other rapid residual current operated circuit-breakers to guarantee selectivity and limit the power out only to the portion of the system affected by a fault.

RCDs technical details

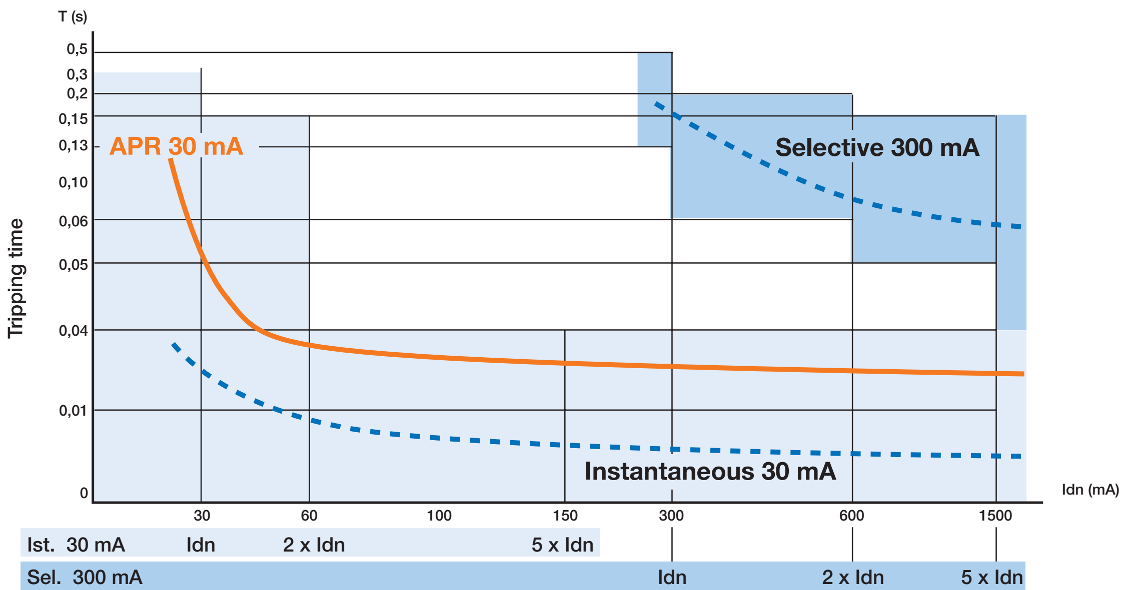
Functions and classification criteria for RCDs

The tripping time is not adjustable. It is set according to a predetermined time – current characteristic with an intrinsic delay for small currents, tending to disappear as the current grows. IEC/EN 61008 and 61009 establish the tripping times relative to the type of RCD and the IΔn.

Type AC	In [A]	IΔ [A]	Tripping times (s)xcurrents			
			1xIΔ	2xIΔ	5xIΔ	500A
Generic	Any	Any	0.3	0.15	0.04	0.04
S (selective)	Any	>0.030	0.13-0.5	0.06-0.2	0.05-0.15	0.04-0.15

The indicated maximum tripping times are also valid for A type RCDs, but increasing the current values of factor 1.4 for RCDs with IΔn > 0.01 A and of factor 2 for RCDs with IΔn ≤ 0.01 A.
The range of ABB RCDs also includes AP-R (anti-disturbance) devices which trip according to the limit times allowed by the Standards for instantaneous RCDs. This function is due to the slight tripping delay (approx. 10 ms) relative to the standard instantaneous ones.
The graph shows the comparison of the qualitative tripping curves for:

- a 30 mA instantaneous RCD
- a 30 mA AP-R instantaneous RCD
- a 100 mA selective RCD (type S)



Note: this is a qualitative chart; it is referred only to industrial frequencies of 50-60 Hz.

RCDs technical details

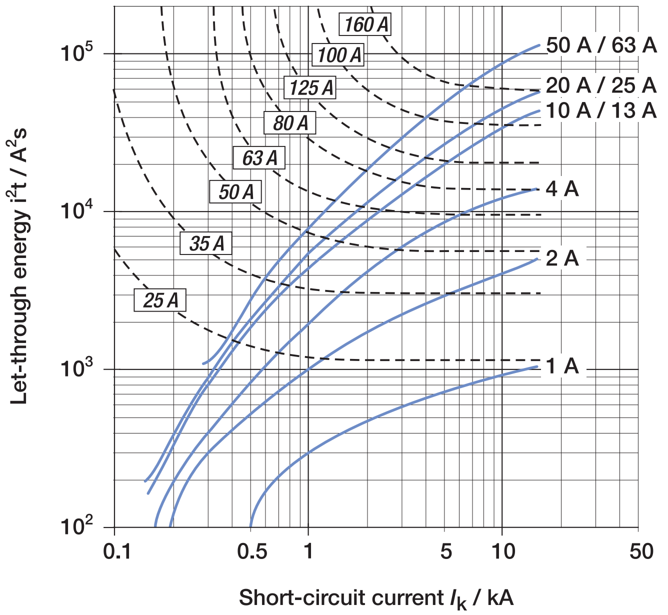
Limitation of specific let-through energy I²t

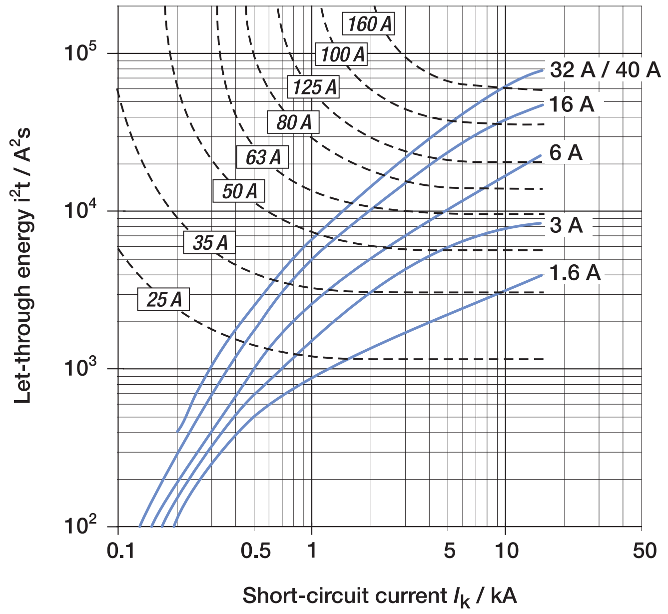
I²t diagrams - Specific let-through energy value I²t

The I²t curves give the values of the specific let-through energy expressed in A²s (A=amps; s=seconds) in relation to the perspective short-circuit current (Irms) in kA.

DS 200-DS 200 M, characteristics B and C

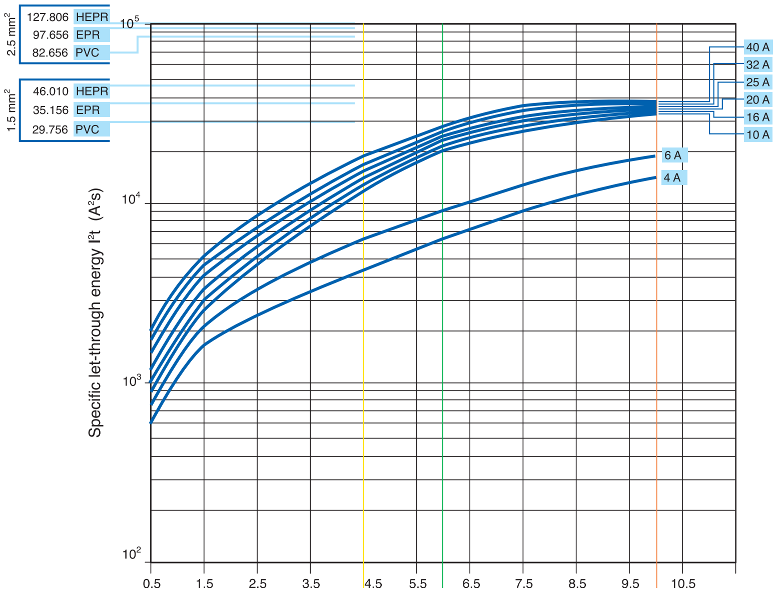
230/400 V let-through energy





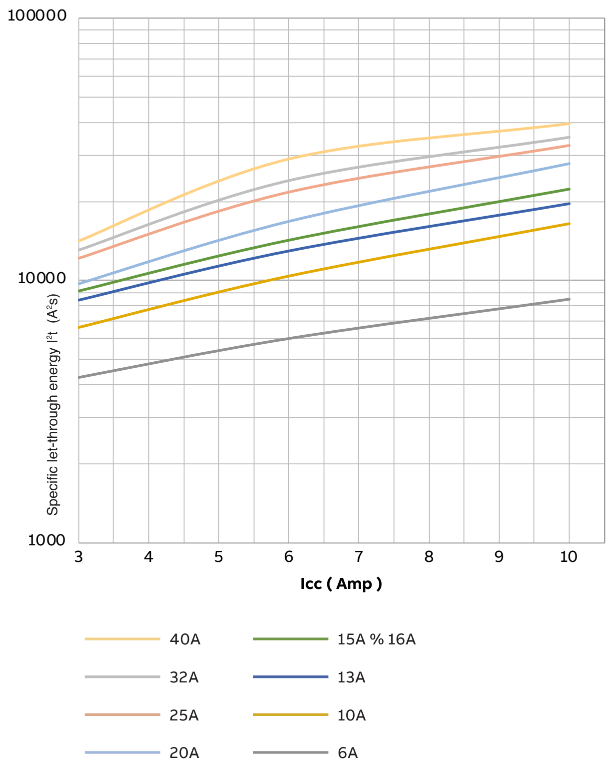
DS201 L - DS201 - DS201 T - DS201 M characteristics B and C

230 V let-through energy



DS202CR - DS202CR M characteristics B and C

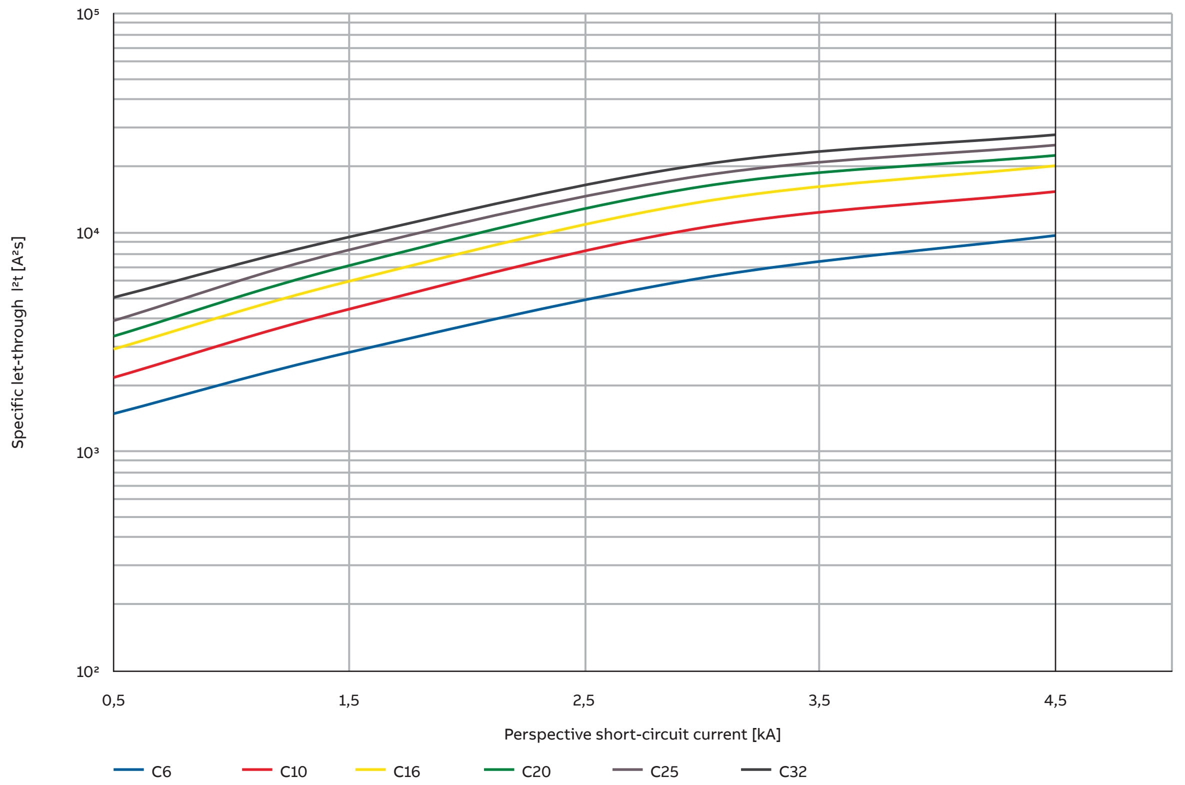
230 V let-through energy



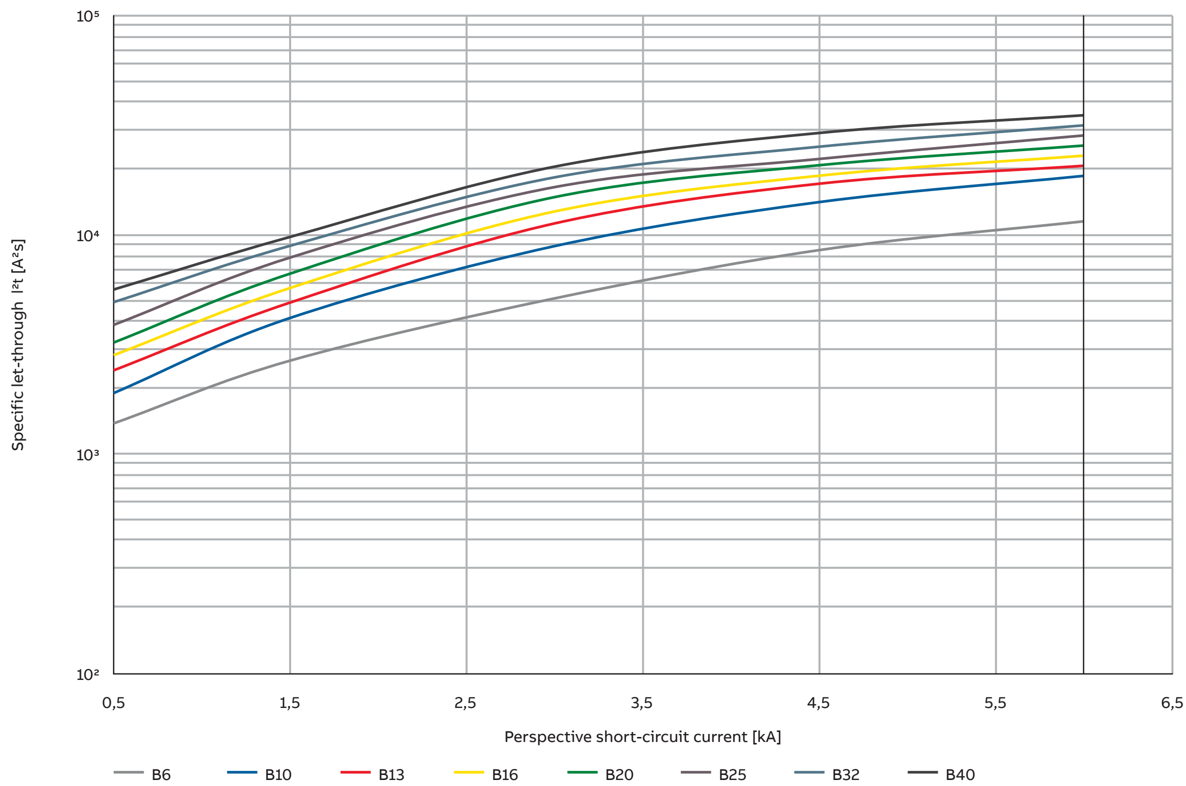
RCDs technical details

Limitation of specific let-through energy I²t

Specific let-through energy I²t DS201L - Characteristic C



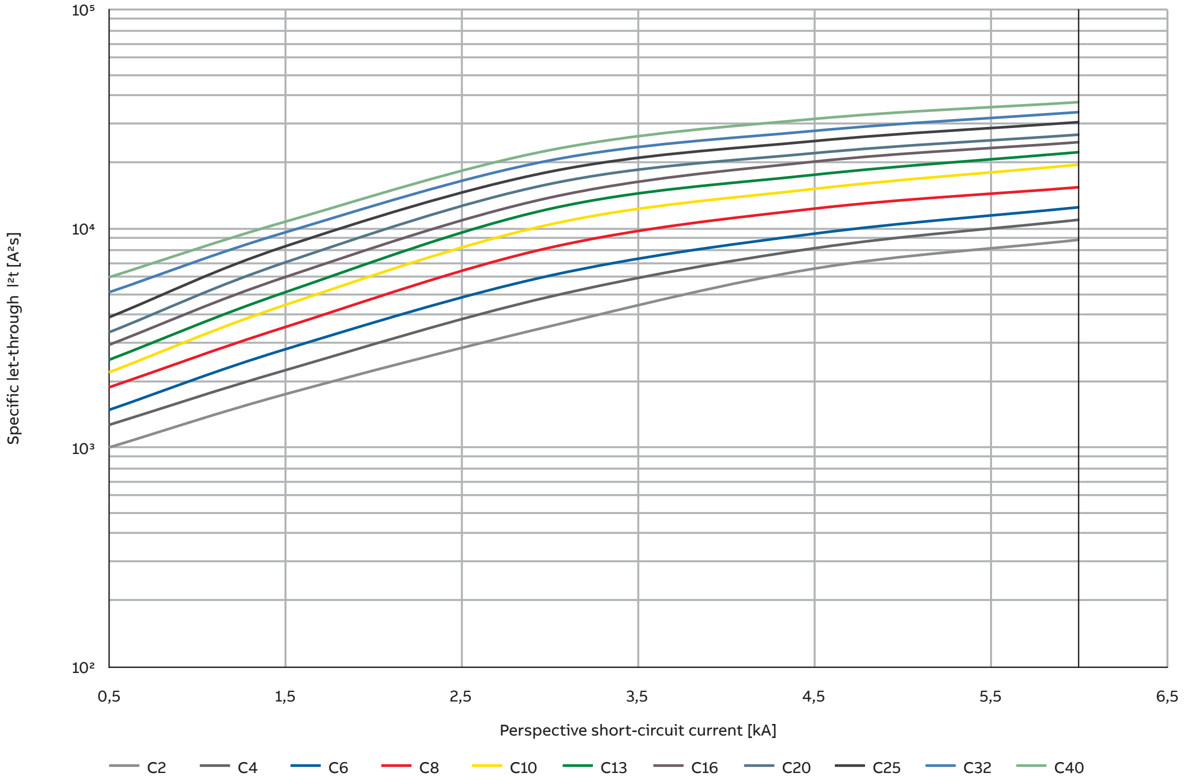
Specific let-through energy I²t DS201 - Characteristic B



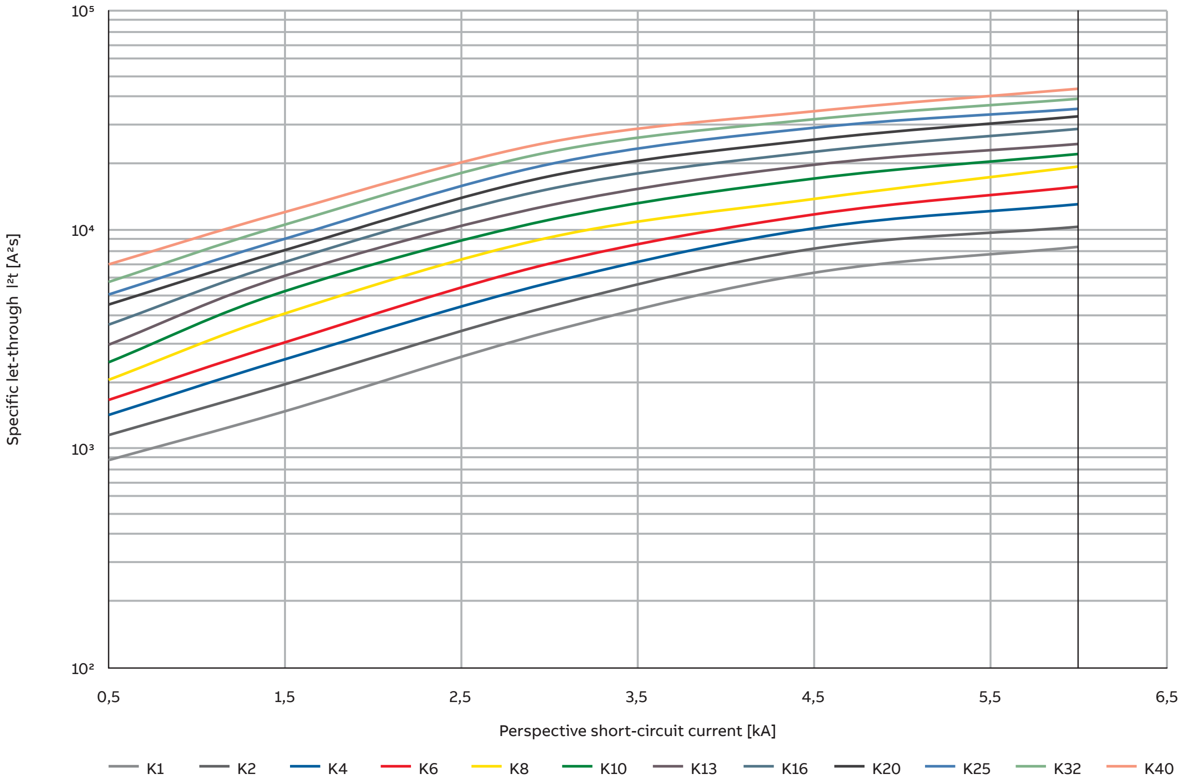
RCDs technical details

Limitation of specific let-through energy I^2t

Specific let-through energy I²t DS201 - Characteristic C



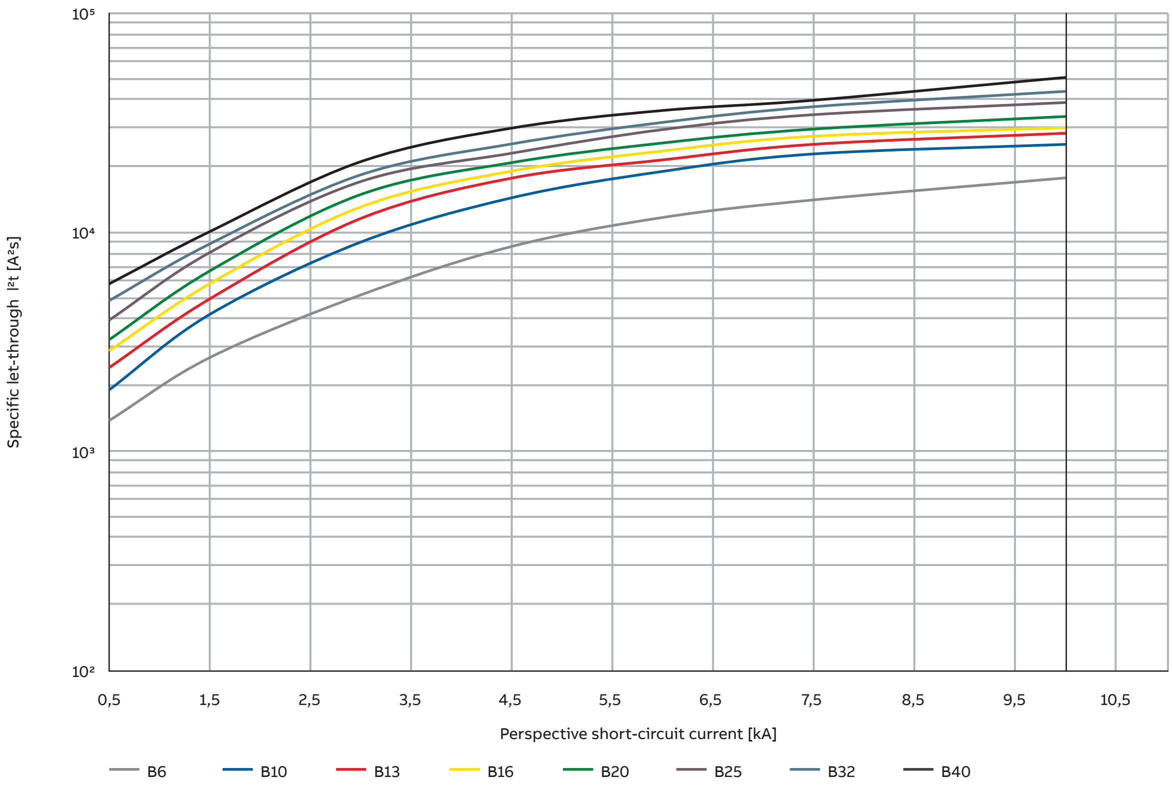
Specific let-through energy I²t DS201 - Characteristic K



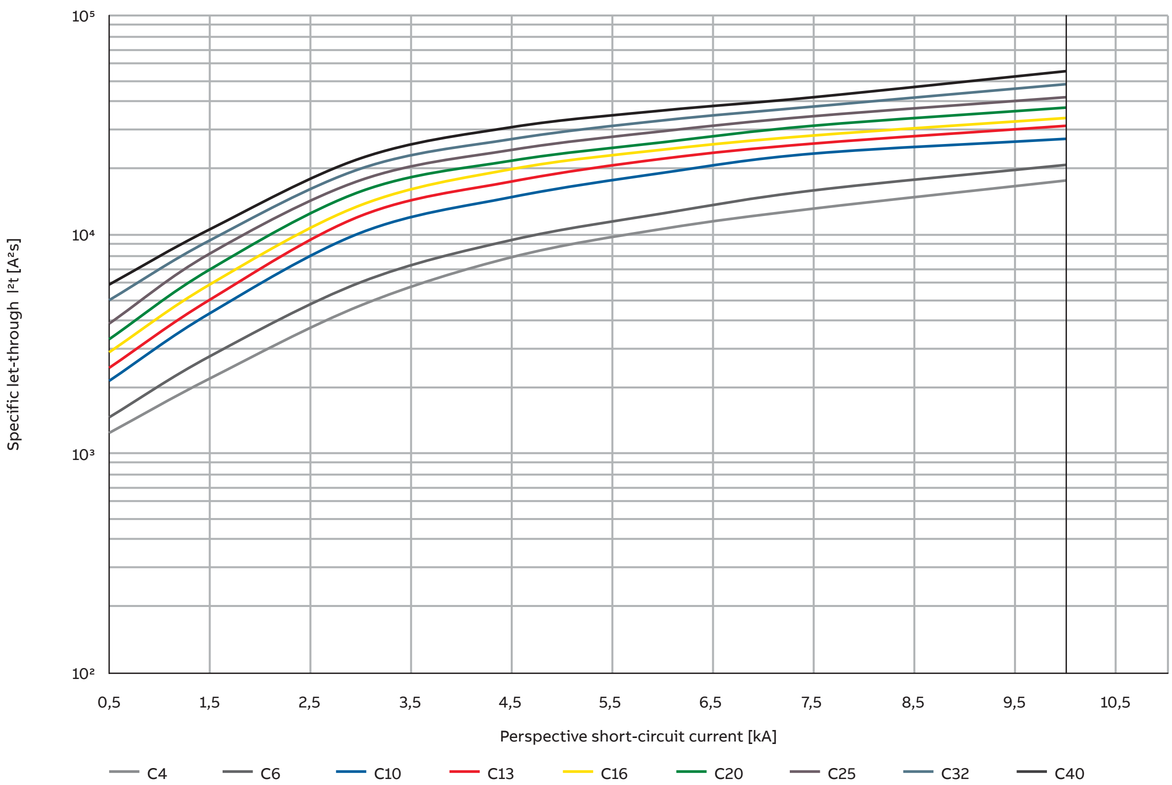
RCDs technical details

Limitation of specific let-through energy I^2t

Specific let-through energy I^2t DS201M - Characteristic B



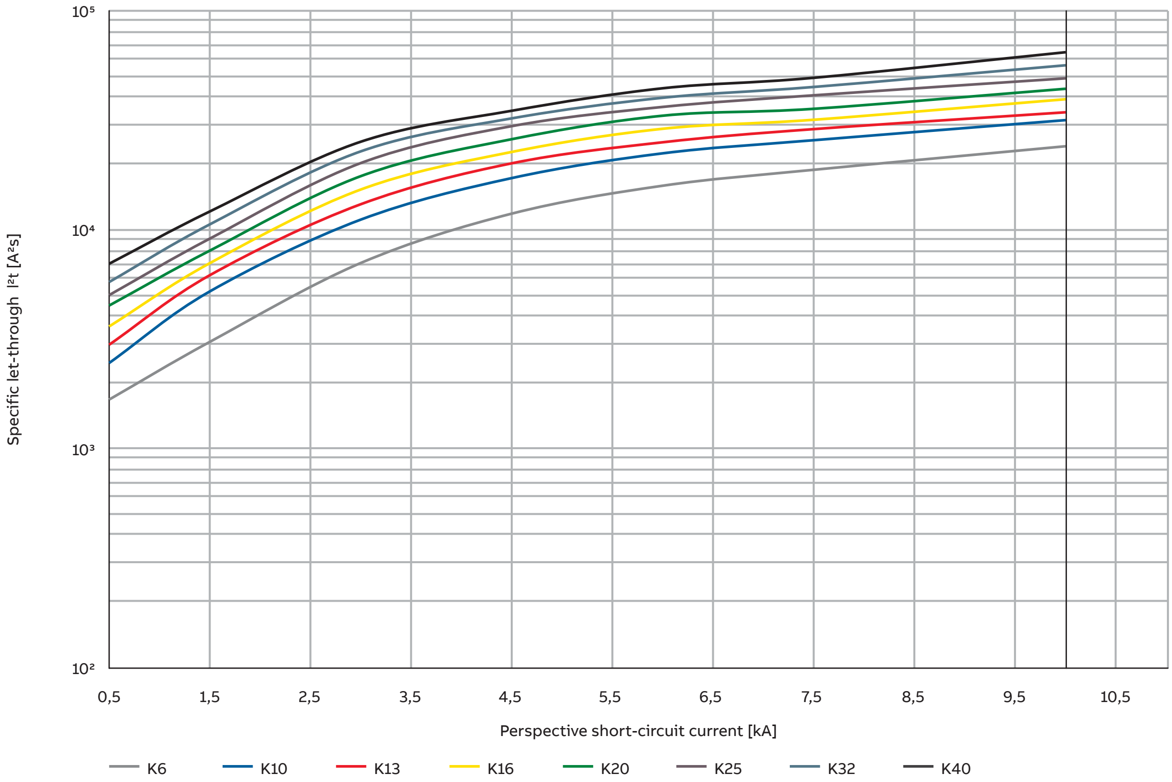
Specific let-through energy I^2t DS201M - Characteristic C



RCDs technical details

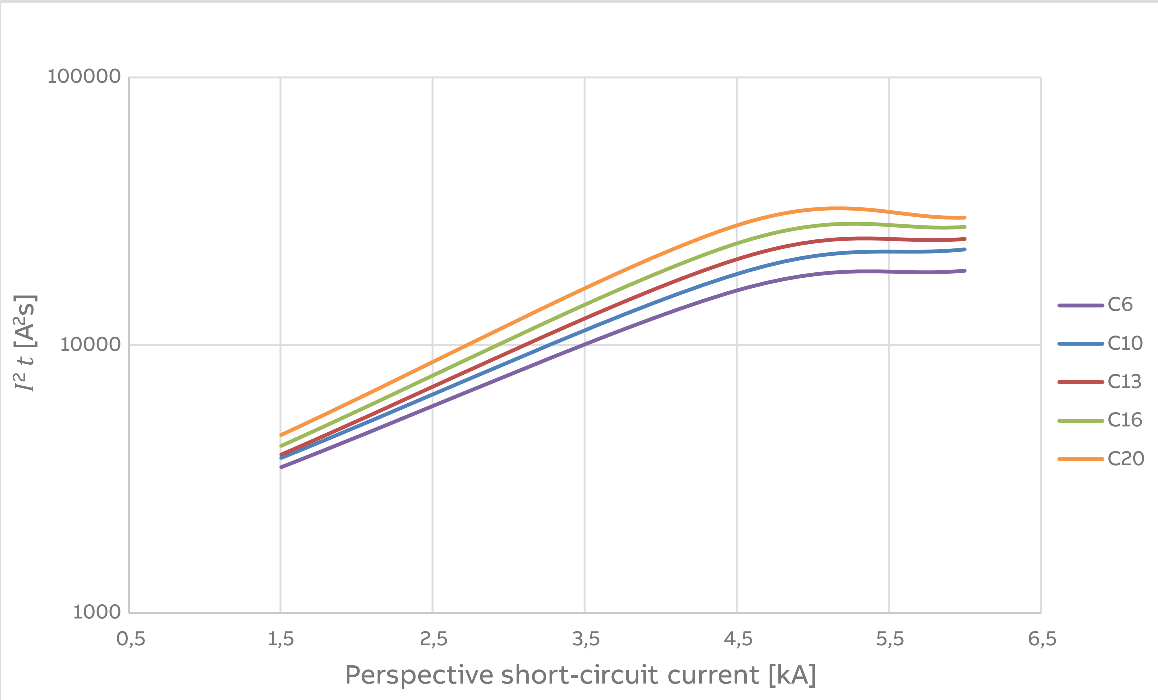
Limitation of specific let-through energy I^2t

Specific let-through energy I^2t DS201M - Characteristic K

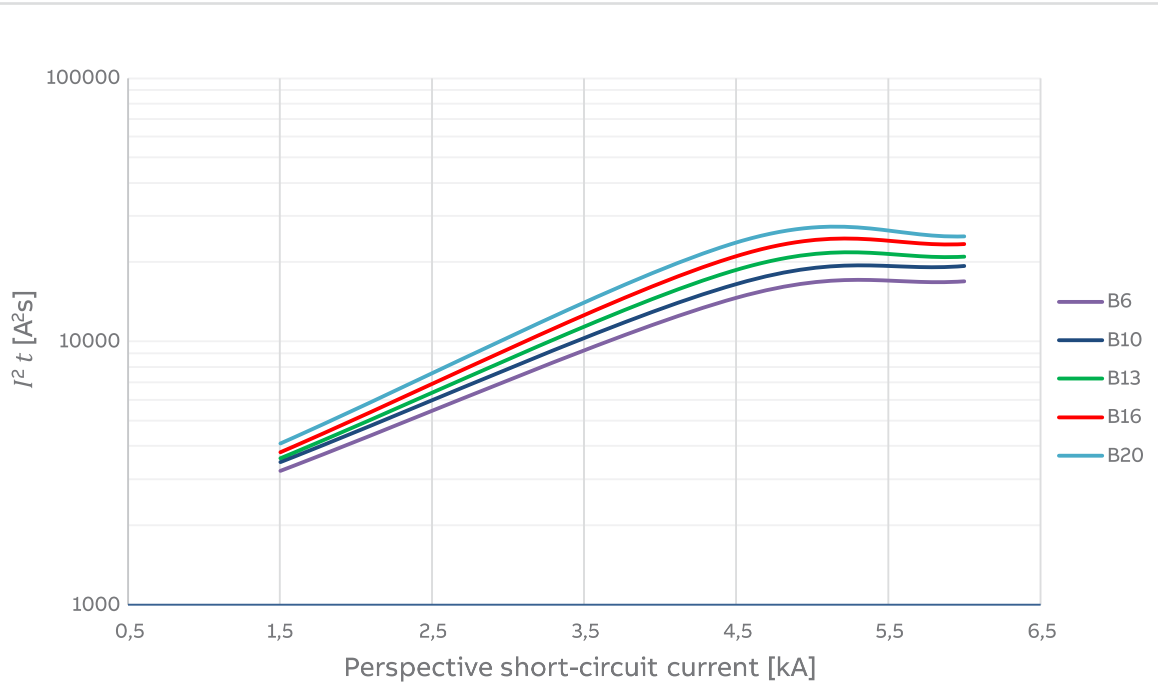


RCBO DS301C
Technical data

Specific let-through energy I²t DS301C—Characteristic C



Specific let-through energy I²t DS301C—Characteristic B

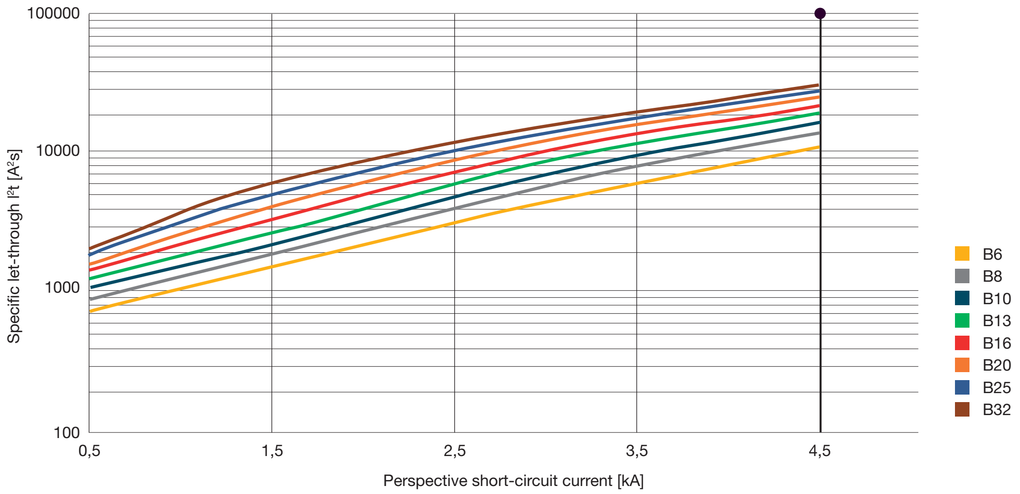


RCDs technical details

Limitation of specific let-through energy I^2t

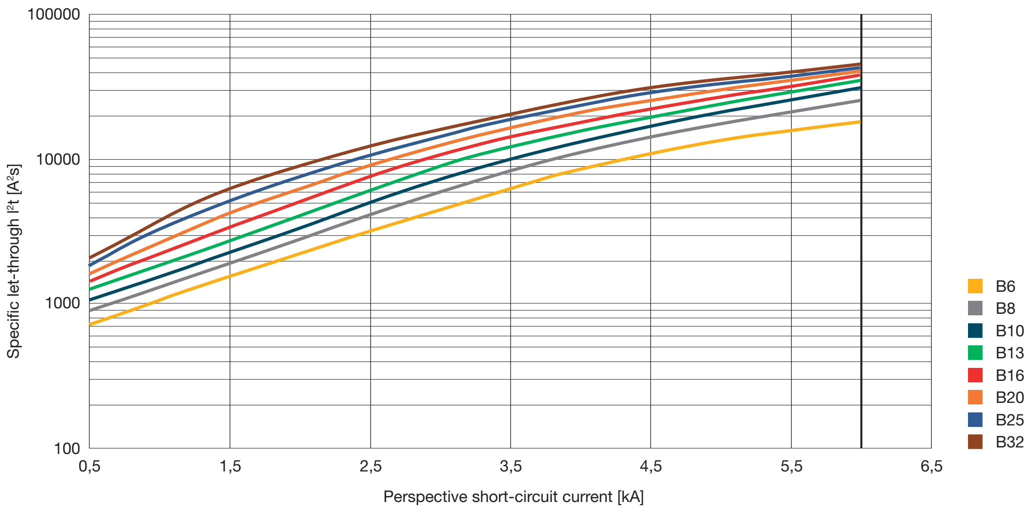
DS203NC L, characteristic B

400 V let-through energy



DS203NC, characteristic B

400 V let-through energy

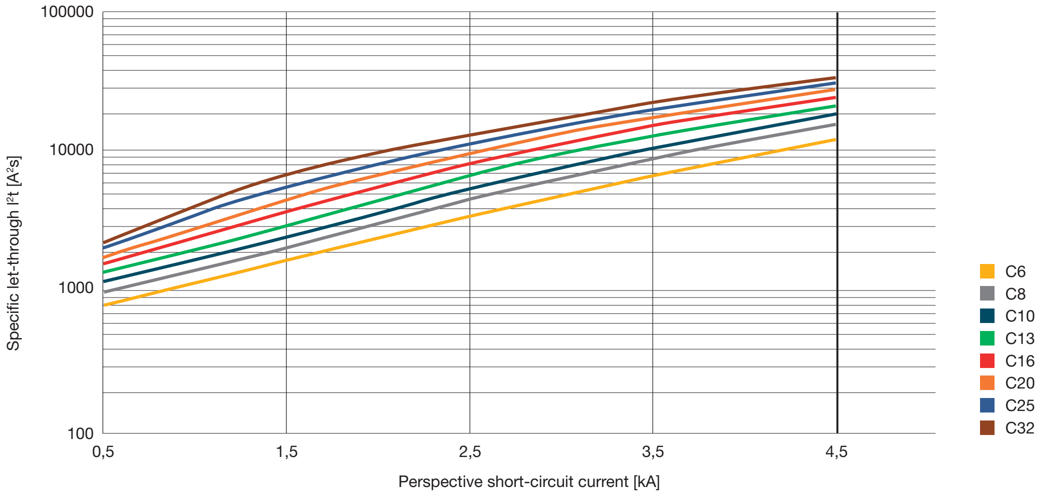


RCDs technical details

Limitation of specific let-through energy I²t

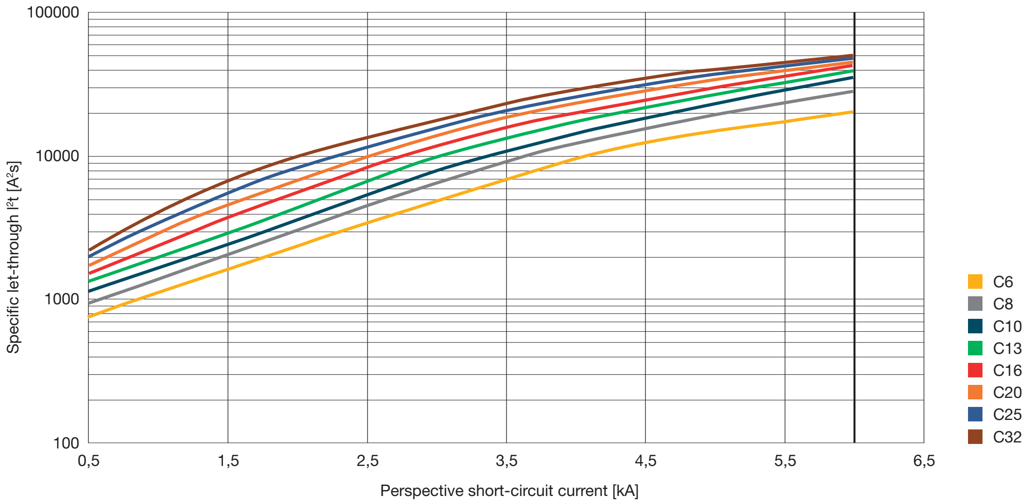
DS203NC L, characteristic C

400 V let-through energy



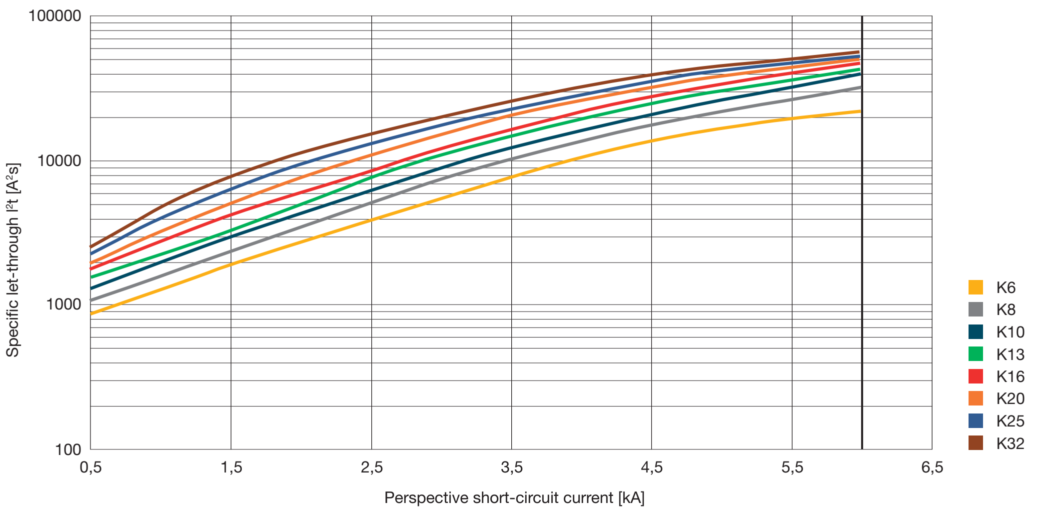
DS203NC, characteristic C

400 V let-through energy



DS203NC, characteristic K

400 V let-through energy

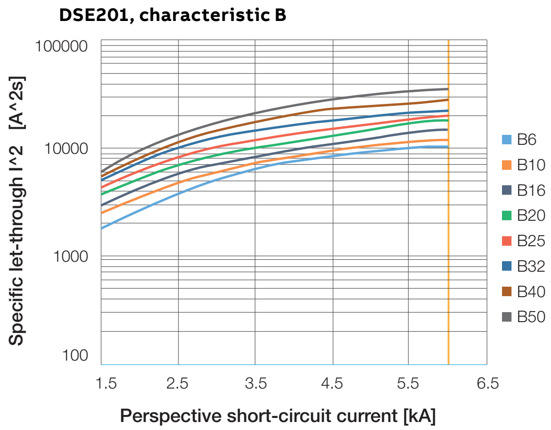


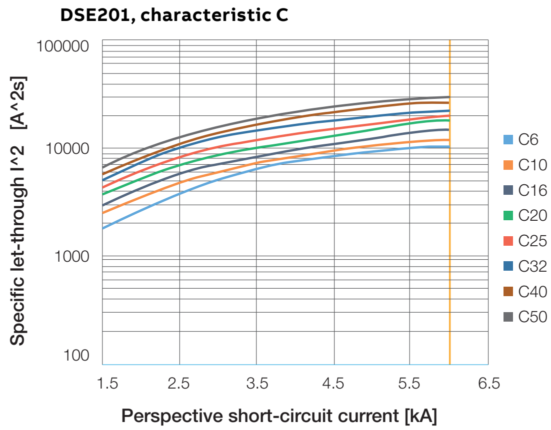
RCDs technical details

Limitation of specific let-through energy I^2t

DSE201

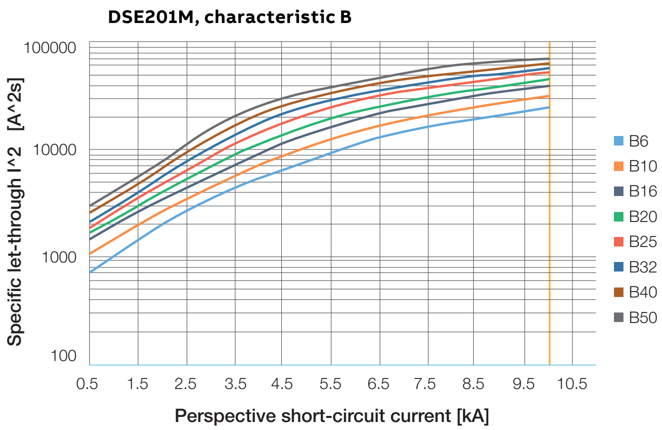
230 V let-through energy

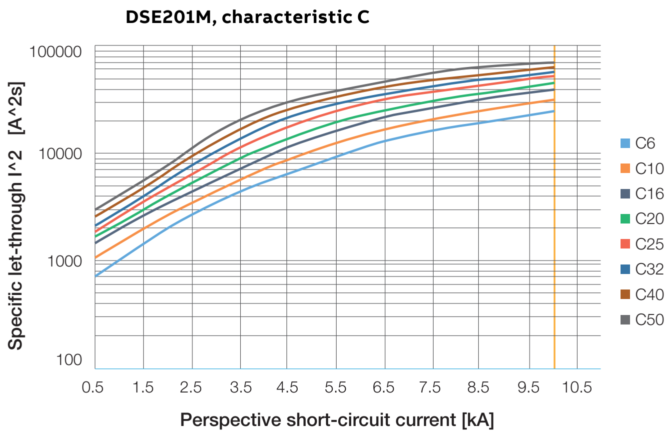




DSE201 M

230 V let-through energy

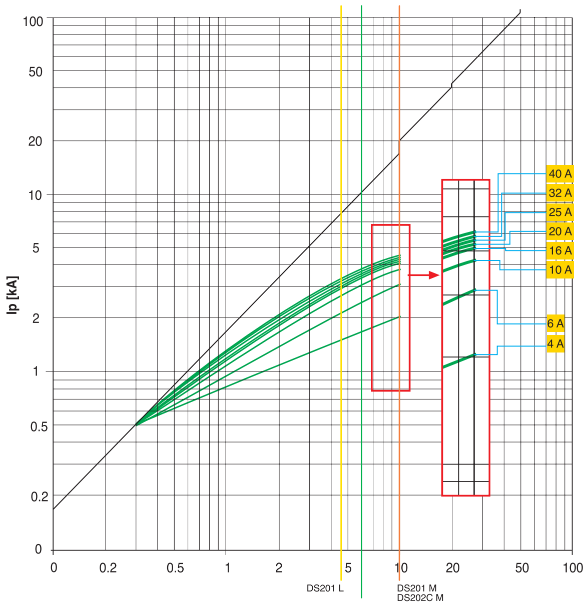




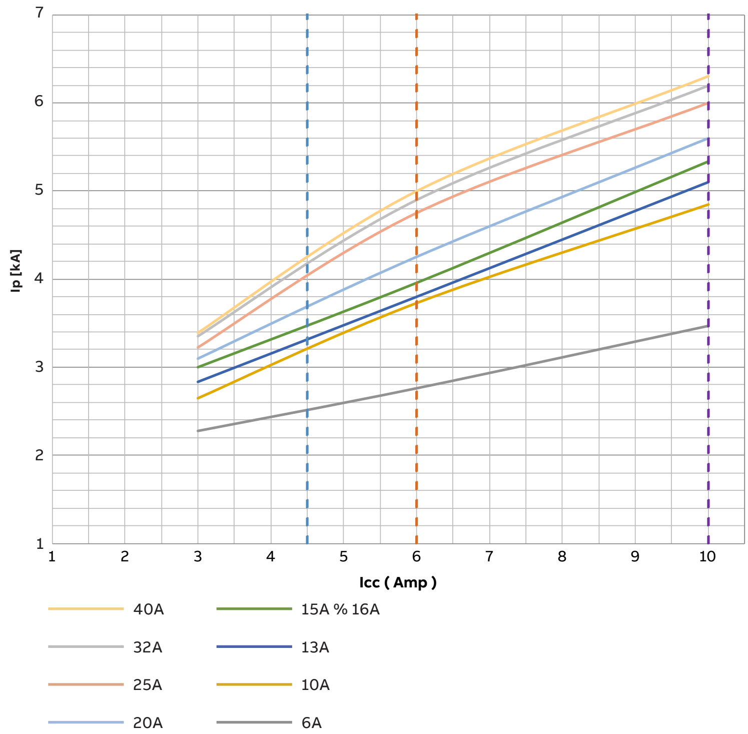
RCDs technical details

Peak current Ip

DS201 L - DS201 - DS201 T - DS201 M
characteristics B e C
230 V



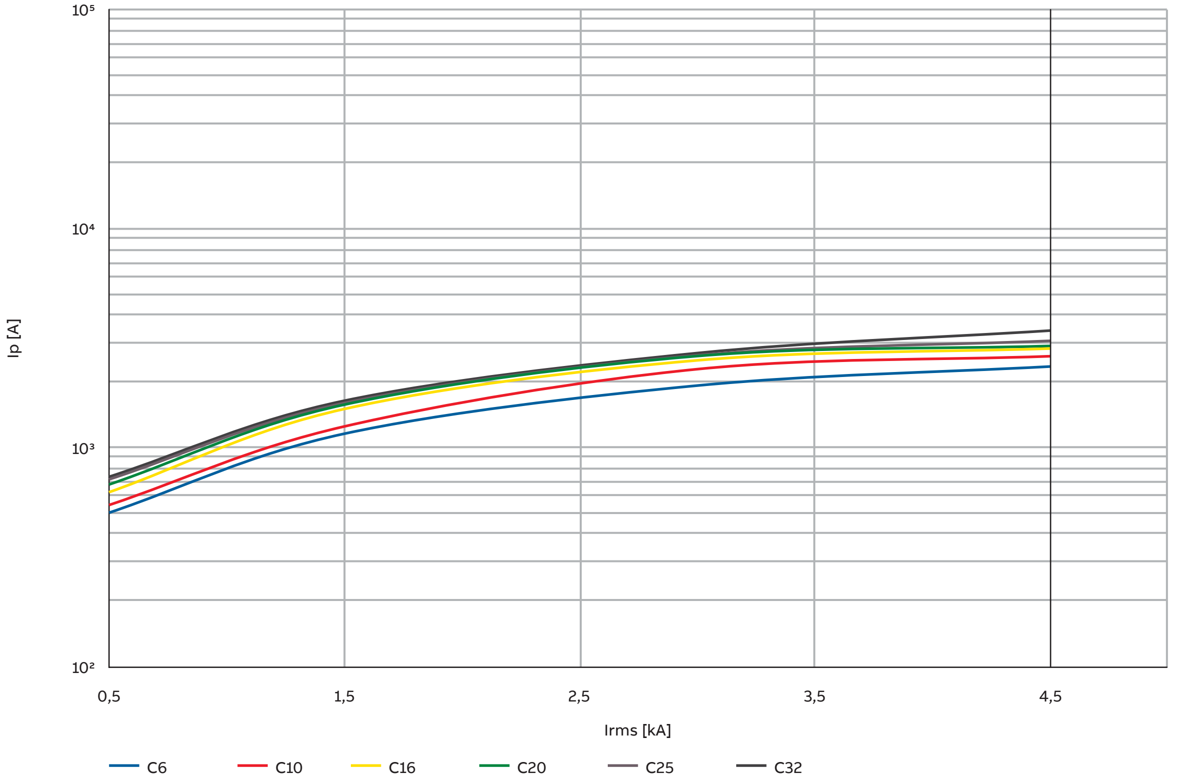
DS202CR - DS202CR M
characteristics B and C
230 V



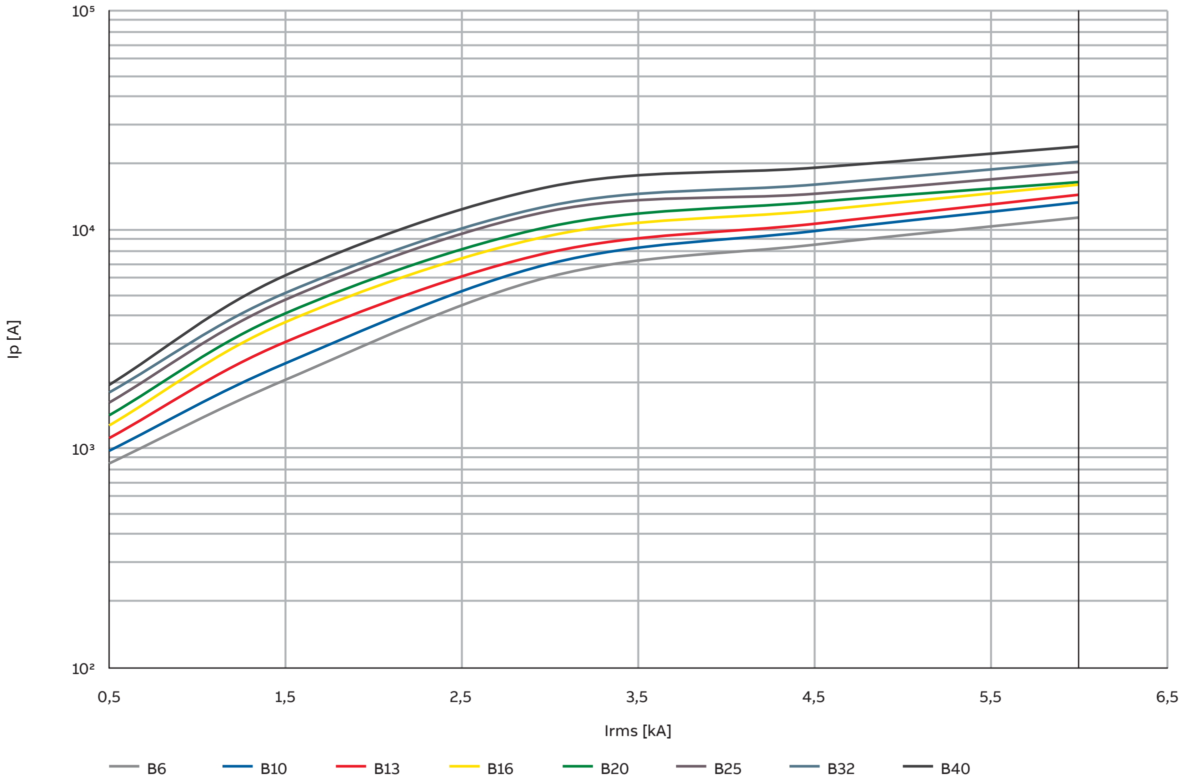
RCDs technical details

Peak current Ip

Ipeak DS201L - Characteristic C



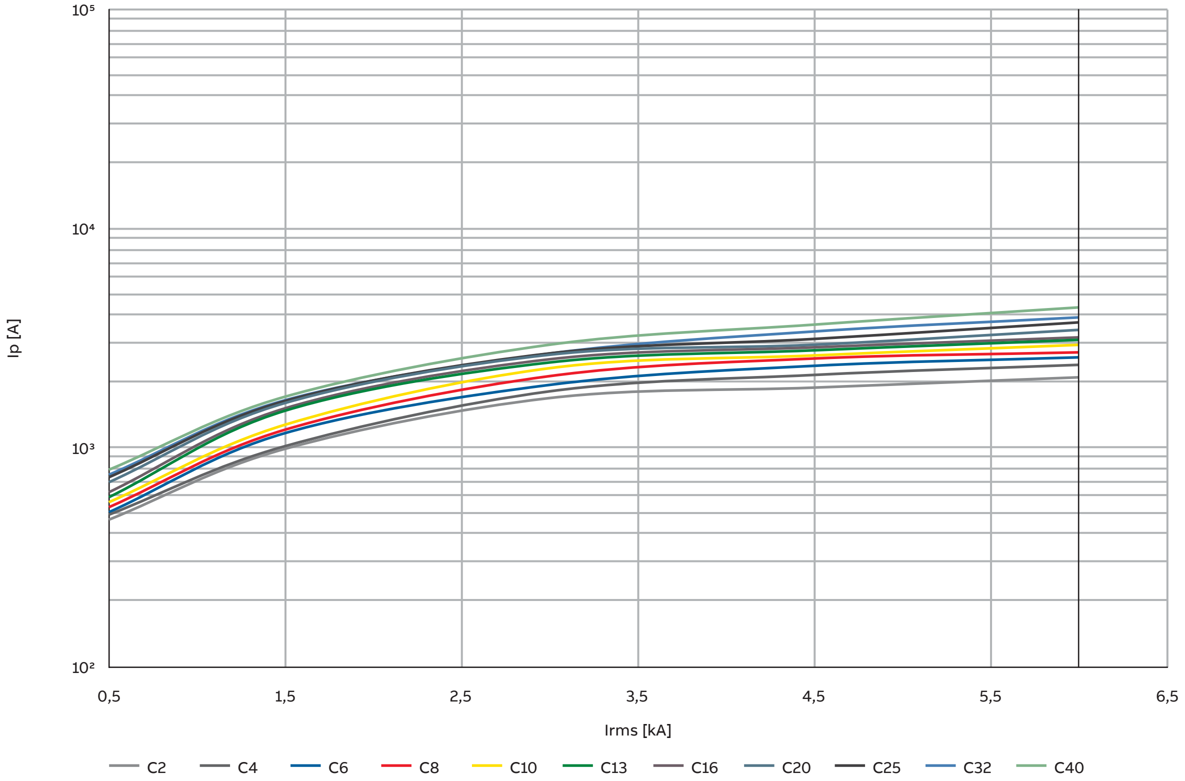
Ipeak DS201 - Characteristic B



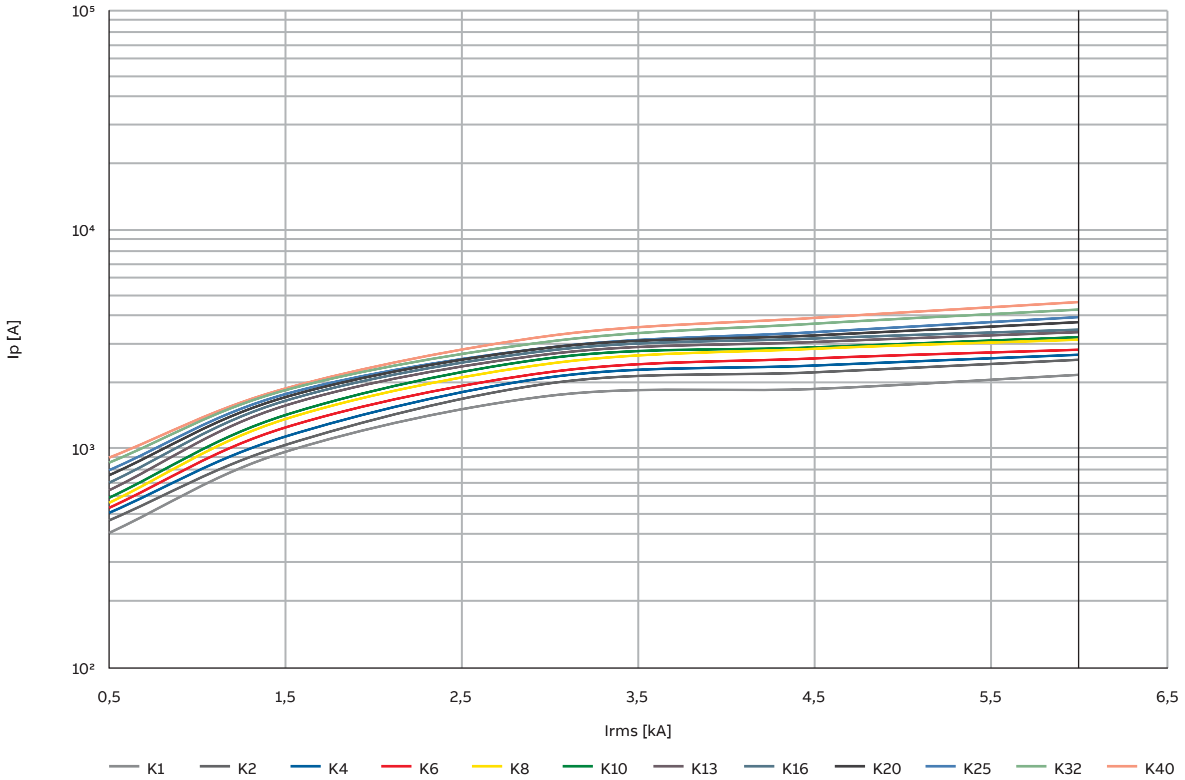
RCDs technical details

Peak current Ip

Ipeak DS201 - Characteristic C

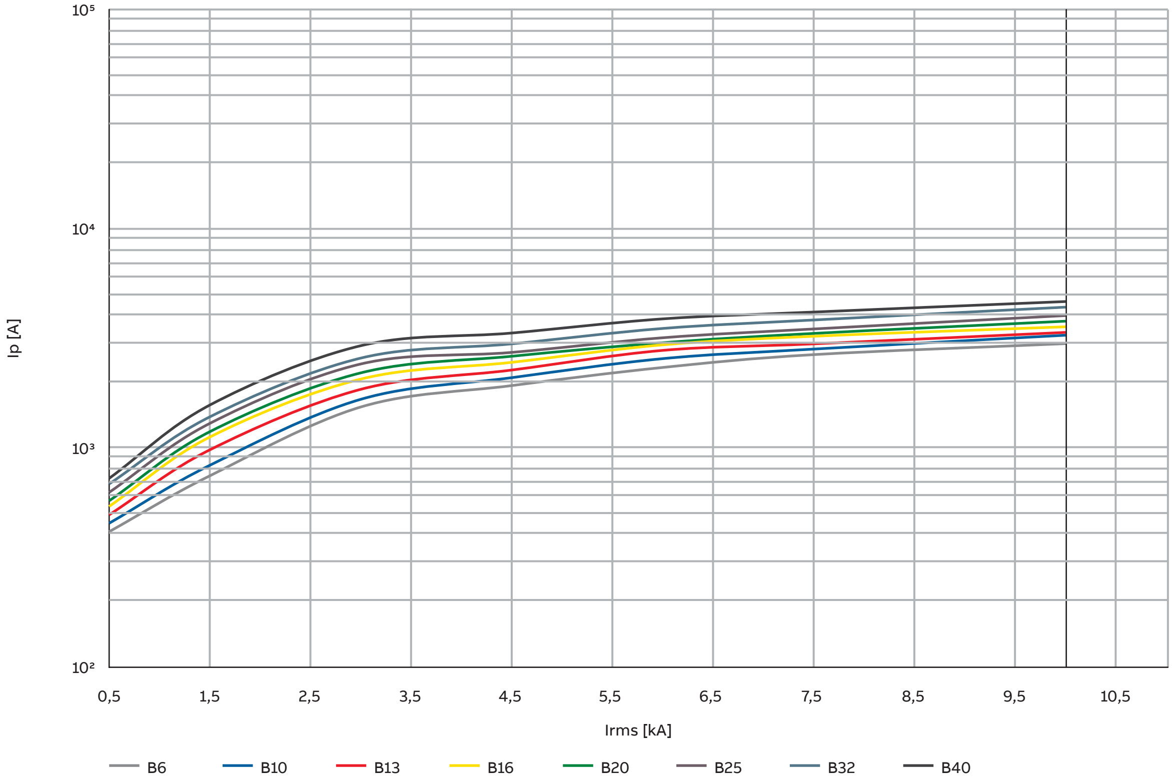


Ipeak DS201 - Characteristic K

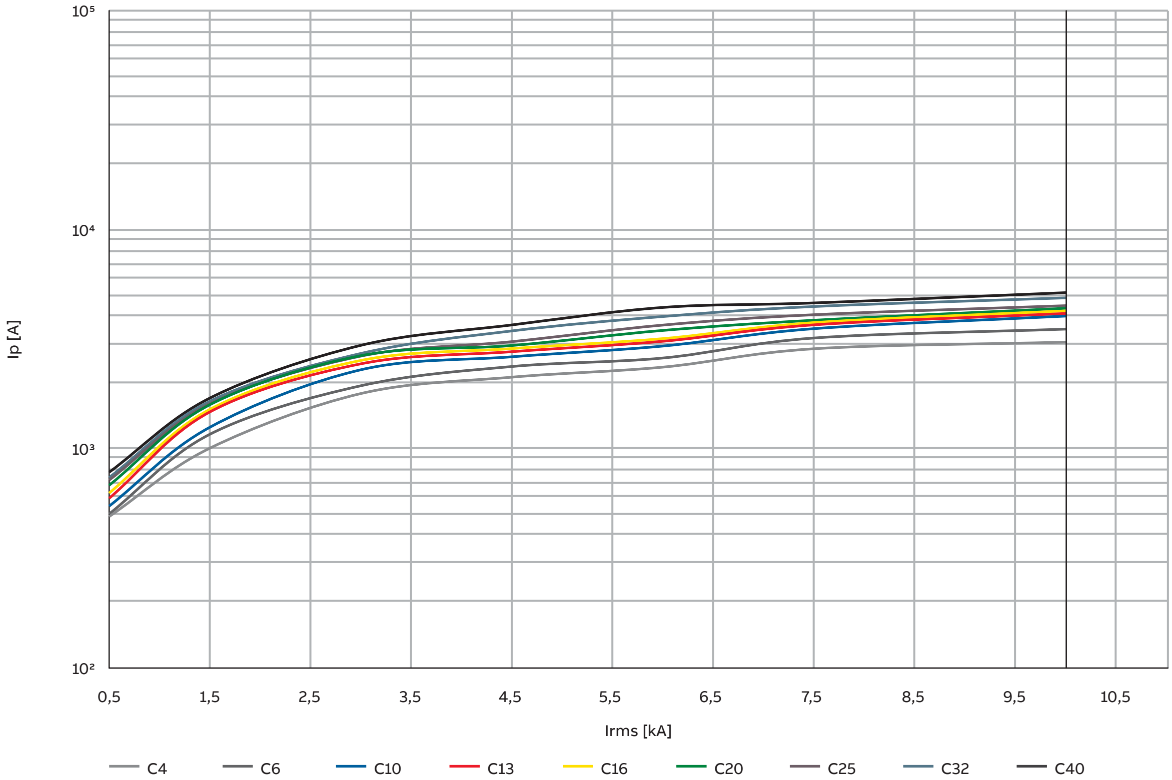


RCDs technical details
Peak current Ip

Ipeak DS201M - Characteristic B



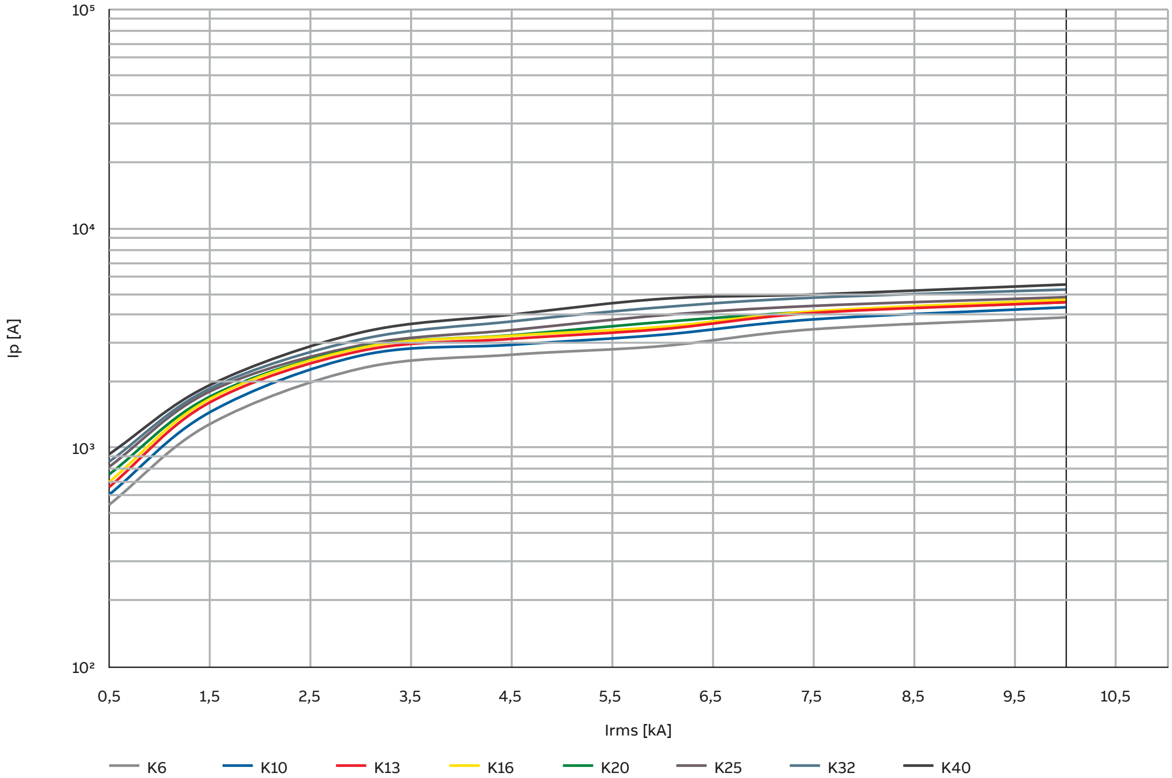
Ipeak DS201M - Characteristic C



RCDs technical details

Peak current Ip

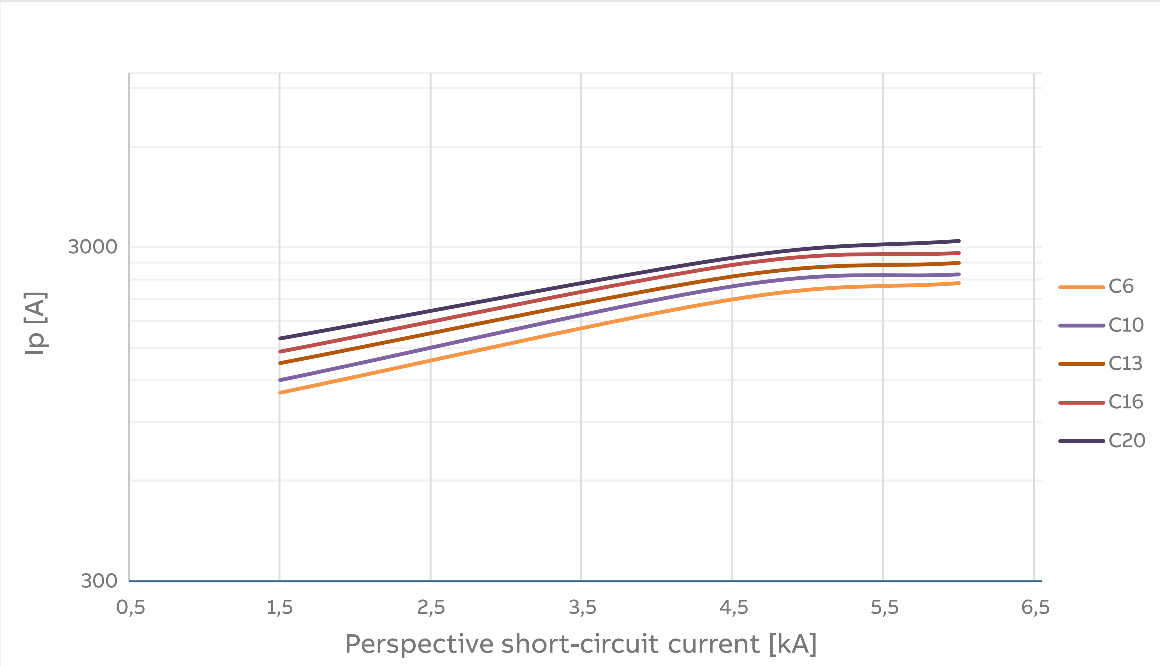
Ipeak DS201M - Characteristic K



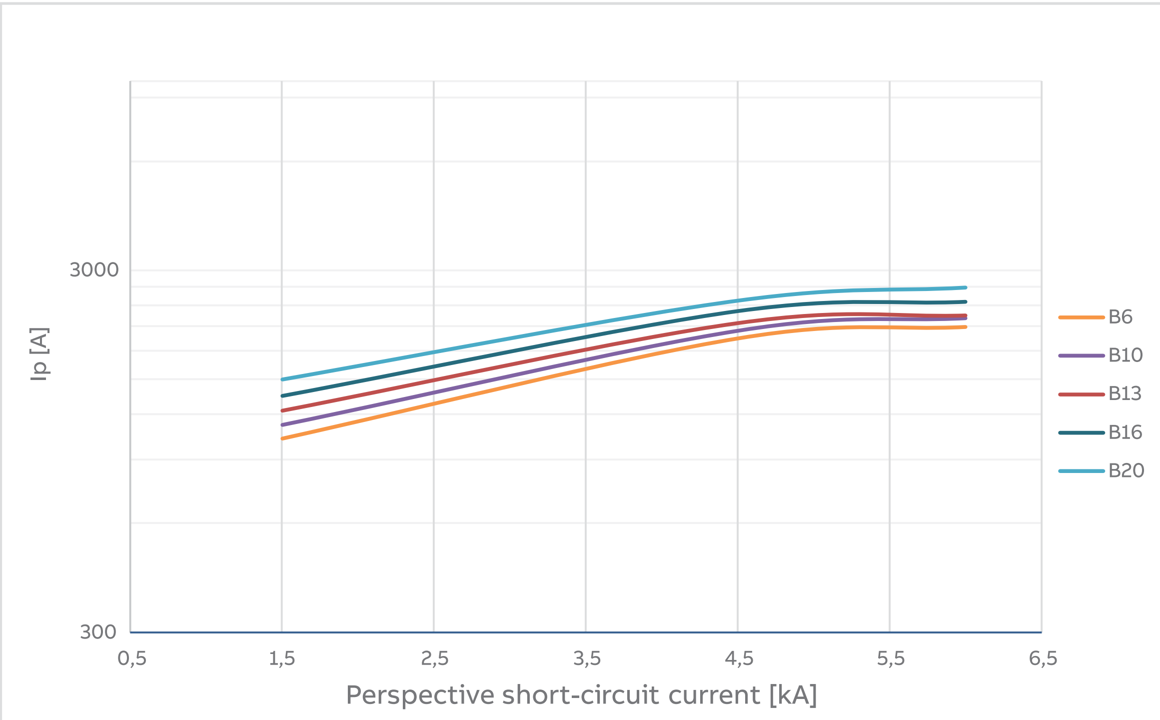
RCBO DS301C

Technical data

Ipeak DS301C—Characteristic C



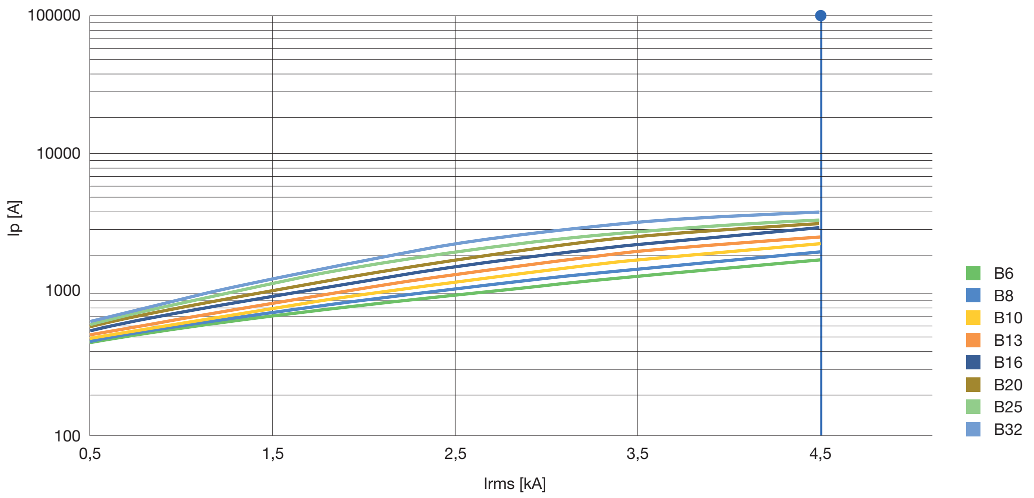
Ipeak DS301C—Characteristic B



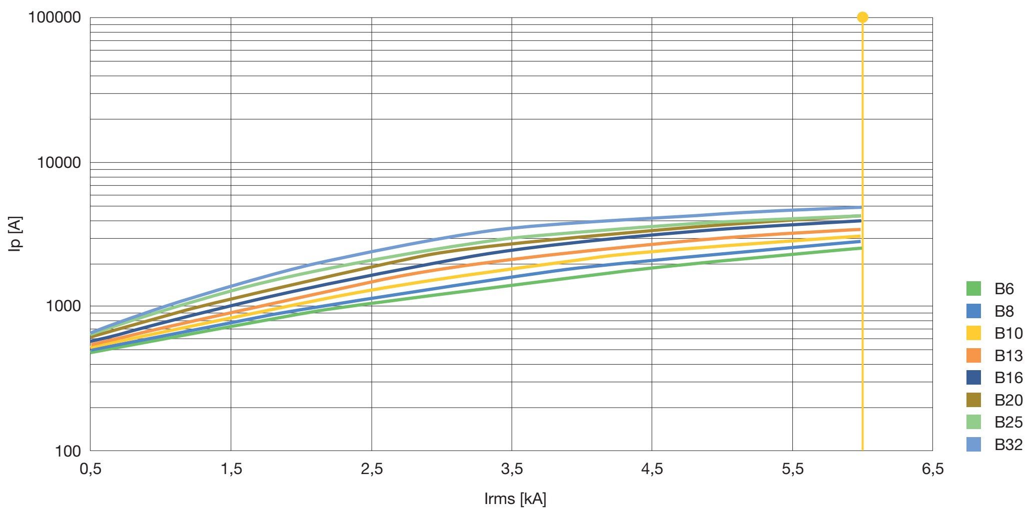
RCDs technical details

Peak current Ip

DS203NC L, characteristic B



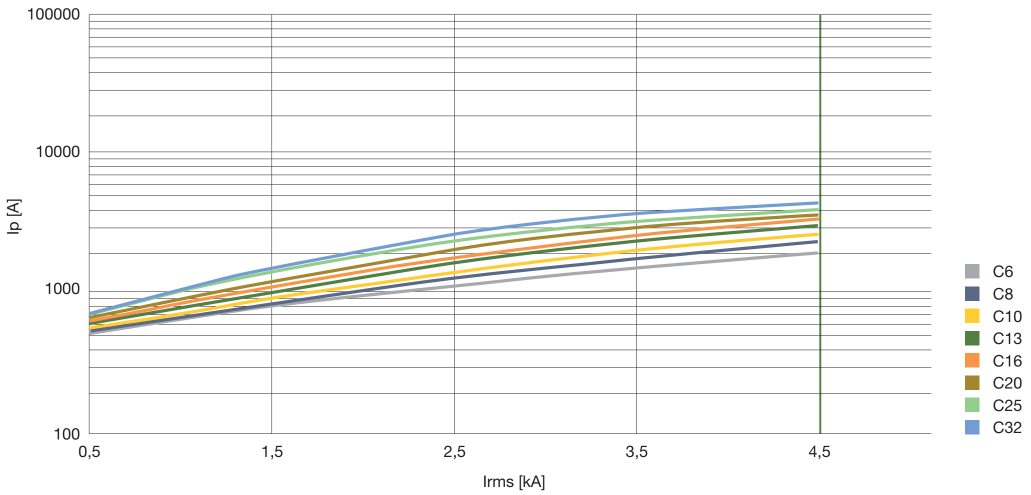
DS203NC, characteristic B



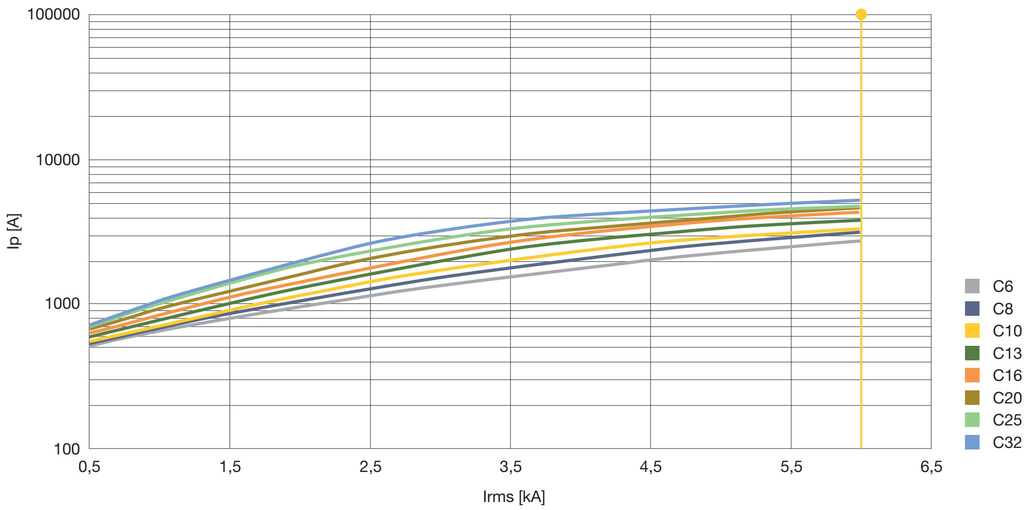
RCDs technical details

Peak current Ip

DS203NC L, characteristic C



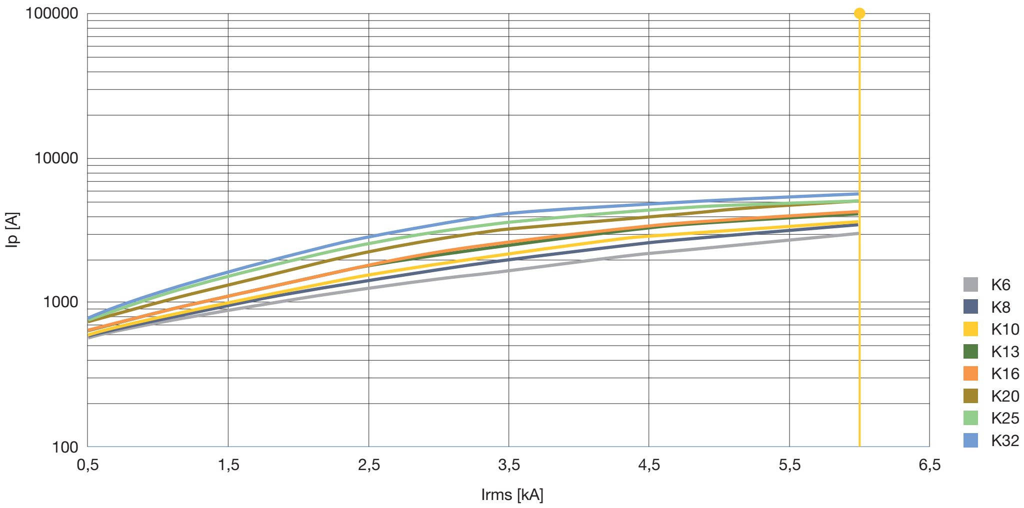
DS203NC, characteristic C



RCDs technical details

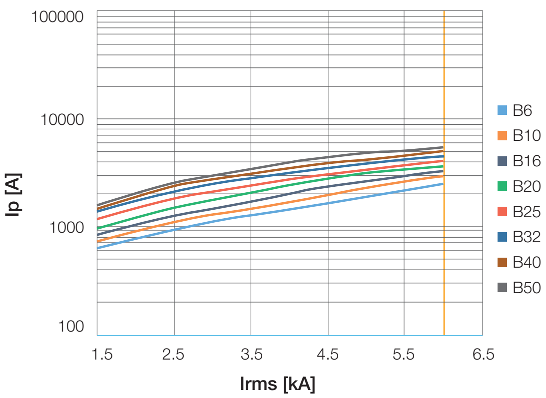
Peak current Ip

DS203NC, characteristic K

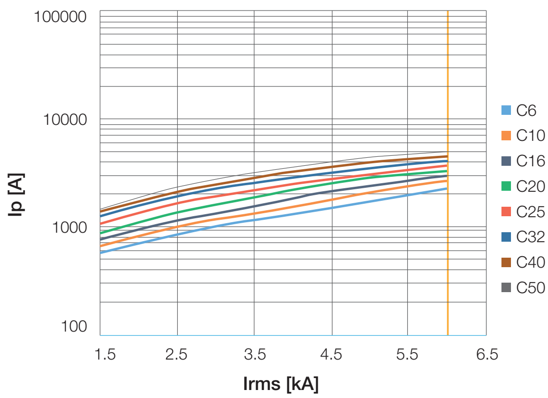


DSE201

DSE201, characteristic B

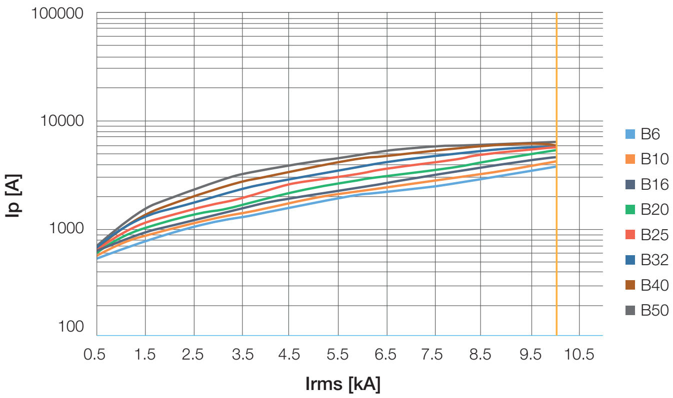


DSE201, characteristic C

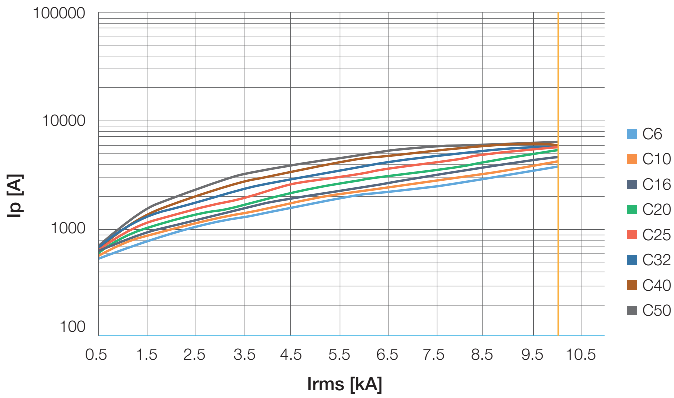


DSE201 M

DSE201M, characteristic B



DSE201M, characteristic C



RCDs technical details

Coordination tables: F 200 RCCBs

Coordination tables between Short Circuit Protection Devices (SCPD) and F 200 RCCBs
If you are using an RCCB you must verify that the Short Circuit Protection Device (SCPD) protects it from the effects of high current that arise under short-circuit conditions. The IEC/EN 61008 provides some tests to verify the behaviour of RCCB in short-circuit conditions. The tables below provide the maximum withstanding short-circuit current expressed in eff. kA for which the RCCBs are protected thanks to the coordination with the SCPD installed upstream or downstream. The tests are performed with SCPD with a rated current (thermal protection) less than or eqaul to the rated current of the associated RCCB.

F 202

	Single-phases 230-240 V circuit					
	25 A	40 A	63 A	80 A	100 A	125 A
SN201L/S201L Na	4.5	4.5				
SN201/S201 Na	6	6				
SN201M/S201M Na	10	10				
S202L	10	10				
S202	20	20	20			
S202M	25	25	25			
S202P	40	25	25			
S300P	40	25	25			
S702	10	10	10	10	10	
S752	10	10	10			
S802N	36	36	36	36	36	36
S802S	50	50	50	50	50	50
Fuse 25 gG	100					
Fuse 40 gG	60	60				
Fuse 63 gG	20	20	20			
Fuse 100 gG	10	10	10	10	10	
Fuse 125 gG						10

F 202

	400-415 V circuits with isolated neutral (IT) under double faults					
	25 A	40 A	63 A	80 A	100 A	125 A
SN201N/SN201/SN201M	3	3				
S201L/S201L Na/S202L	4.5	4.5				
S201/S201 Na/S202	6	6	6			
S201M/S201M Na/S202M	10	10	10			
S201P/S201P Na/S202P	25	15	15			
S300P	25	15	15			
S801N/S802N	20	20	20	20	20	20
S801S/S802S	25	25	25	25	25	25

RCDs technical details

Coordination tables: F 200 RCCBs

F 204

	Three-phases circuits with neutral (y/D) 230-240 V/400-415 V*					
	25 A	40 A	63 A	80 A	100 A	125 A
SN201L/S201L/S201LNa*	4.5	4.5				
SN201/S201/S201Na*	6	6				
SN201M/S201M/S201MNa*	10	10				
S202L*	10	10				
S202*	20	20	20			
S202M*	25	25	25			
S202P*	40	25	25			
S300P	40	25	25			
S702	10	10	10	10	10	
S752	10	10	10			
S802N*	36	36	36	36	36	36
S802S*	50	50	50	50	50	50
Fuse 25 gG	100					
Fuse 40 gG	60	60				
Fuse 63 gG	20	20	20			
Fuse 100 gG	10	10	10	10	10	
Fuse 125 gG						10

* The switches are considered between phase and neutral (230/240V)

F 204

	Three-phases circuits with neutral (y/D) 230-240 V/400-415 V					
	25 A	40 A	63 A	80 A	100 A	125 A
S203L/S204L	4.5	4.5				
S203/S204	6	6	6			
S203M/S204M	10	10	10			
S203P/S204P	25	15	15			
S300P	25	15	15			
S702	10	10	10	10	10	
S752	10	10	10			
S803N/S804N	20	20	20	20	20	20
S803S/S804S	25	25	25	25	25	25
Fuse 25 gG	50					
Fuse 40 gG	30	30				
Fuse 63 gG	20	20	20			
Fuse 100 gG	10	10	10	10	10	
Fuse 125 gG						10

RCDs technical details

Coordination tables: F 200 RCCBs

F 204

	Three-phases circuits with neutral (y/D) 133-138V/230-240V					
	25 A	40 A	63 A	80 A	100 A	125 A
SN201L	10	10				
SN201	15	15				
S201M	20	20				
S203L/S204L	10	10				
S203/S204	20	20	20			
S203M/S204M	25	25	25			
S203P/S204P	40	25	25			
S300P	40	25	25			
S702	10	10	10	10	10	
S752	10	10	10			
S803N-S804N	36	36	36	36	36	36
S803S-S804S	50	50	50	50	50	50
Fuse 25 gG	100					
Fuse 40 gG	60	60				
Fuse 63 gG	20	20	20			
Fuse 100 gG	10	10	10	10	10	
Fuse 125 gG						10

RCDs technical details

Coordination tables: back-up DS201

Fuses - DS201 (2019) @ 230/240V

		Supply side		Fuses gG					
Load side	**Char**	**Icu [kA]**	**In[A]**	**25**	**40**	**50**	**63**	**80**	**100**
DS201 (2019) L	C	6	6…32	35	25	25	25	15	10
DS201 (2019)	B,C,K	10	1…40	35	25	25	25	15	10
DS201 (2019) M	B,C,K	15	4…40	35	25	25	25	15	15

MCCB Tmax XT @ 415V - DS201 (2019) @ 230/240V

		Supply side		**XT1**	**XT1**	**XT1**	**XT2**	**XT3**	**XT4**	**XT1**	**XT2**	**XT3**	**XT4**	**XT1**	**XT2**	**XT4**	**XT2**	**XT4**	**XT2**	**XT4**
		Version		**B**	**C**	**N**	**N**	**N**	**N**	**S**	**S**	**S**	**S**	**H**	**H**	**H**	**L**	**L**	**V**	**V**
Load side	**Char**	**Icu [kA]**		**18**	**25**	**36**	**36**	**36**	**36**	**50**	**50**	**50**	**50**	**70**	**70**	**70**	**120**	**120**	**150**	**150**
			In[A]	**160**	**160**	**160**	**160**	**250**	**250**	**160**	**160**	**250**	**250**	**160**	**160**	**250**	**160**	**250**	**250**	**250**
DS201 (2019) L	C	6	6…25	18	18	18	20	10	18	18	20	10	18	18	20	18	20	18	18	18
			32	10	10	10	10	10	10	10	18	10	10	10	18	10	18	10	10	10
DS201 (2019)	B,C,K	10	1…25	18	18	18	25	18	20	20	25	18	20	20	25	20	25	20	20	20
			32, 40	18	18	18	18	18	10	10	18	18	10	10	18	10	18	10	10	10
DS201 (2019) M	B,C,K	15	4…25	18	18	18	25	18	20	20	25	18	20	20	25	20	25	20	20	20
			32, 40	18	18	18	18	18	15	15	18	18	15	15	18	15	18	15	15	15

MCCB Tmax T @ 415V - DS201 (2019)@230/240V

		Supply side		**T1**	**T1**	**T1**	**T2**	**T3**	**T2**	**T3**	**T2**	**T2**
		Version		**B**	**C**	**N**	**N**	**N**	**S**	**S**	**H**	**L**
Load side	**Char**	**Icu [kA]**		**16**	**25**	**36**	**36**	**36**	**50**	**50**	**70**	**120**
			In[A]	**160**	**160**	**160**	**160**	**250**	**160**	**160**	**160**	**160**
DS201 (2019) L	C	6	6…25	16	16	16	20	10	20	10	20	20
			32	10	10	10	16	10	16	10	16	16
DS201 (2019)	B,C,K	10	1…25	16	16	16	25	16	25	16	25	25
			32, 40	16	16	16	16	16	16	16	16	16
DS201 (2019) M	B,C,K	15	4…25	16	16	16	25	16	25	16	25	25
			32, 40	16	16	16	16	16	16	16	16	16

RCDs technical details

Coordination tables: back-up DS201

S200 -DS201 (2019) @ 230/240V

		Supply side		S200	S200M	S200P	S300P	S200P	S300P
		Version		B,C	B,C	B,C	B,C	B,C	B,C
Load side	Char	Icu [kA]		20	25	40	40	25	25
			In[A]	0,5..63	0.5…63	0.5…25	0.5…25	32…63	32…63
DS201 (2019) L	C	6	6…32	20	25	40	40	25	25
DS201 (2019)	B,C,K	10	1…40	20	25	40	40	25	25
DS201 (2019) M	B,C,K	15	4…40	20	25	40	40	25	25

DS201 (2019) - SN201 @ 230/240V

		Supply side		DS201 (2019)	DS201 (2019) M
		Version		B,C,K	B,C,K
Load side	Char	Icu [kA]		10	15
			In[A]	1..40	2..40
SN201 L	B,C	6	2…40	10	15
SN201	B,C,D	10	2…40	10	15

S800S - DS201 (2019) @ 230/240V

		Supply side		S800S							
		Version		B,C,D,K							
Load side	Char	Icu [kA]		50							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6	50	40	25	25	18	15	15	15
			10	50	40	25	25	18	15	15	15
			16	50	40	25	25	18	15	15	15
			20		40	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
DS201 (2019)	B,C,K	10	1	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50
			4	50	50	50	50	50	50	50	50
			6	50	50	50	50	50	50	50	50
			8	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
DS201 (2019) M	B,C,K	15	4	50	50	50	50	50	50	50	50
			6	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50

RCDs technical details

Coordination tables: back-up DS201

S800N - DS201 (2019) @ 230/240V

Load side	Char	Supply side		S800N							
		Version		B,C,D							
		Icu [kA]		36							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6	36	36	25	25	18	15	15	15
			10	36	36	25	25	18	15	15	15
			16	36	36	25	25	18	15	15	15
			20		36	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
DS201 (2019)	B,C,K	10	1	36	36	36	36	36	36	36	36
			2	36	36	36	36	36	36	36	36
			4	36	36	36	36	36	36	36	36
			6	36	36	36	36	36	36	36	36
			8	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			13	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
DS201 (2019) M	B,C,K	15	4	36	36	36	36	36	36	36	36
			6	36	36	36	36	36	36	36	36
			10	36	36	36	36	36	36	36	36
			13	36	36	36	36	36	36	36	36
			16	36	36	36	36	36	36	36	36
			20		50	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36

RCDs technical details

Coordination tables: back-up DS201

S800C - DS201 (2019) @ 230/240V

		Supply side		S800C							
		Version		B,C,D,K							
Load side	Char	Icu [kA]		25							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6	25	25	25	25	18	15	15	15
			10	25	25	25	25	18	15	15	15
			16	25	25	25	25	18	15	15	15
			20		25	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
DS201 (2019)	B,C,K	10	1	25	25	25	25	25	25	25	25
			2	25	25	25	25	25	25	25	25
			4	25	25	25	25	25	25	25	25
			6	25	25	25	25	25	25	25	25
			8	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			13	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
DS201 (2019) M	B,C,K	15	4	25	25	25	25	25	25	25	25
			6	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			13	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25

RCDs technical details

Coordination tables: back-up DS201

S800B - DS201 (2019) @ 230/240V

Load side	Char	Supply side		S800B						
		Version		B,C,D,K						
		Icu [kA]		16						
			In[A]	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6	16	16	16	16	15	15	15
			10	16	16	16	16	15	15	15
			16	16	16	16	16	15	15	15
			20	16	16	16	16	15	15	15
			25		16	16	16	15	15	15
			32			16	16	15	15	15
DS201 (2019)	B,C,K	10	1	16	16	16	16	16	16	16
			2	16	16	16	16	16	16	16
			4	16	16	16	16	16	16	16
			6	16	16	16	16	16	16	16
			8	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
DS201 (2019) M	B,C,K	15	4	16	16	16	16	16	16	16
			6	16	16	16	16	16	16	16
			10	16	16	16	16	16	16	16
			13	16	16	16	16	16	16	16
			16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16

RCDs technical details

Coordination tables: back-up DS201

S800U - DS201 (2019) @ 230/240V

		Supply side		S800U								
		Version		K,Z								
Load side	Char	Icu [kA]		50								
			In[A]	25	30	40	50	60	70	80	90	100
DS201 (2019) L	C	6	6	50	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50	50
			25			50	50	50	50	50	50	50
			32				50	50	50	50	50	50
DS201 (2019)	B,C,K	10	1	50	50	50	50	50	50	50	50	50
			2	50	50	50	50	50	50	50	50	50
			4	50	50	50	50	50	50	50	50	50
			6	50	50	50	50	50	50	50	50	50
			8	50	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50	50
			25			50	50	50	50	50	50	50
			32				50	50	50	50	50	50
			40					50	50	50	50	50
DS201 (2019) M	B,C,K	15	4	50	50	50	50	50	50	50	50	50
			6	50	50	50	50	50	50	50	50	50
			10	50	50	50	50	50	50	50	50	50
			13	50	50	50	50	50	50	50	50	50
			16	50	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50	50
			25			50	50	50	50	50	50	50
			32				50	50	50	50	50	50
			40					50	50	50	50	50

RCDs technical details

Coordination tables: back-up DS201

S750 DR - DS201 (2019) @ 230/240V

		Supply side		S750 DR								
		Version		**Eselective; Kselective**								
Load side	**Char**	**Icu [kA]**		**25**								
			In[A]	**16**	**20**	**25**	**35**	**40**	**50**	**63**	**80**	**100**
DS201 (2019) L	C	6	6	20	20	20	20	20	20	20	20	20
			10	20	20	20	20	20	20	20	20	20
			16			20	20	20	20	20	20	20
			20				20	20	20	20	20	20
			25					20	20	20	20	20
			32						20	20	20	20
DS201 (2019)	B,C,K	10	1	20	20	20	20	20	20	20	20	20
			2	20	20	20	20	20	20	20	20	20
			4	20	20	20	20	20	20	20	20	20
			6	20	20	20	20	20	20	20	20	20
			8	20	20	20	20	20	20	20	20	20
			10	20	20	20	20	20	20	20	20	20
			13		20	20	20	20	20	20	20	20
			16			20	20	20	20	20	20	20
			20				20	20	20	20	20	20
			25					20	20	20	20	20
			32						20	20	20	20
			40							20	20	20
DS201 (2019) M	B,C,K	15	4	20	20	20	20	20	20	20	20	20
			6	20	20	20	20	20	20	20	20	20
			10	20	20	20	20	20	20	20	20	20
			13		20	20	20	20	20	20	20	20
			16			20	20	20	20	20	20	20
			20				20	20	20	20	20	20
			25					20	20	20	20	20
			32						20	20	20	20
			40							20	20	20

RCDs technical details

Coordination tables: back-up DS201

S750 - DS201 (2019) @ 230/240V

		Supply side		S750						
		Version		Eselective; Kselective						
Load side	Char	Icu [kA]		25						
			In[A]	16	20	25	35	40	50	63
DS201 (2019) L	C	6	6	20	20	20	20	20	20	20
			10	20	20	20	20	20	20	20
			16			20	20	20	20	20
			20				20	20	20	20
			25					20	20	20
			32						20	20
DS201 (2019)	B,C,K	10	1	20	20	20	20	20	20	20
			2	20	20	20	20	20	20	20
			4	20	20	20	20	20	20	20
			6	20	20	20	20	20	20	20
			8	20	20	20	20	20	20	20
			10	20	20	20	20	20	20	20
			13		20	20	20	20	20	20
			16			20	20	20	20	20
			20				20	20	20	20
			25					20	20	20
			32						20	20
			40							20
DS201 (2019) M	B,C,K	15	4	20	20	20	20	20	20	20
			6	20	20	20	20	20	20	20
			10	20	20	20	20	20	20	20
			13		20	20	20	20	20	20
			16			20	20	20	20	20
			20				20	20	20	20
			25					20	20	20
			32						20	20
			40							20

RCBO DS301C

Coordination tables: back-up DS301C

Fuses - RCBOs DS301C @230/240 V

				Supply side					
				Fuses gG					
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**40**	**50**	**63**	**80**	**100**
RCBOs DS301C	B, C	6	6...20	10	10	10	10	10	10

MCCB Tmax XT @ 415 V - RCBOs DS301C @230/240 V

			Supply side	**XT1**	**XT1**	**XT1**	**XT2**	**XT3**	**XT4**	**XT1**	**XT2**	**XT3**	**XT4**	**XT1**	**XT2**	**XT4**	**XT2**	**XT4**	**XT2**	**XT4**
			Version	**B**	**C**	**N**	**N**	**N**	**N**	**S**	**S**	**S**	**S**	**H**	**H**	**H**	**L**	**L**	**V**	**V**
			Icu (kA)	**18**	**25**	**36**	**36**	**36**	**36**	**50**	**50**	**50**	**50**	**70**	**70**	**70**	**120**	**120**	**150**	**150**
Load side	**Char**	**Icu (kA)**	**In (A)**	**160**	**160**	**160**	**160**	**250**	**250**	**160**	**160**	**250**	**250**	**160**	**160**	**250**	**160**	**250**	**250**	**250**
RCBOs DS301C	B, C	6	6...20	16	20	23	23	10	16	23	23	10	16	23	23	16	23	16	23	16

S200 - RCBOs DS301C @230/240 V

			Supply side	**S200**	**S200M**	**S200P**	**S300P**	**S200P**	**S300P**
			Version	**B, C**	**B, C**	**B, C**	**B, C**	**B, C**	**B, C**
			Icu (kA)	**20**	**25**	**40**	**40**	**25**	**25**
Load side	**Char**	**Icu (kA)**	**In (A)**	**0,5… 63**	**0,5… 63**	**0,5… 25**	**0,5… 25**	**32… 63**	**32… 63**
RCBOs DS301C	B, C	6	6...20	10	10	10	10	10	10

RCBOs DS301C @230/240 V - SN201 @ 230/240V

			Supply side	**SN201**	**SN201M**
			Version	**B, C, D**	**B, C**
			Icu (kA)	**10**	**10**
Load side	**Char**	**Icu (kA)**	**In (A)**	**2… 40**	**2… 40**
RCBOs DS301C	B, C	6	6...20	10	10

S800S - RCBOs DS301C @230/240 V

			Supply side	**S800S**							
			Version	**B, C, D, K**							
			Icu (kA)	**35**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	30	25	18	18	18	15	15	15
			10	30	25	18	18	18	15	15	15
			13	30	25	18	18	18	15	15	15
			16	30	25	18	18	18	15	15	15
			20		25	18	18	18	15	15	15

S800N - RCBOs DS301C @230/240 V

			Supply side	**S800N**							
			Version	**B, C, D**							
			Icu (kA)	**36**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	30	25	18	18	18	15	15	15
			10	30	25	18	18	18	15	15	15
			13	30	25	18	18	18	15	15	15
			16	30	25	18	18	18	15	15	15
			20		25	18	18	18	15	15	15

RCBO DS301C

Coordination tables: back-up DS301C

S800C - RCBOs DS301C @230/240 V

			Supply side	**S800C**							
			Version	**B, C, D, K**							
			Icu (kA)	**25**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	25	25	18	18	18	15	15	15
			10	25	25	18	18	18	15	15	15
			13	25	25	18	18	18	15	15	15
			16	25	25	18	18	18	15	15	15
			20		25	18	18	18	15	15	15

S800B - RCBOs DS301C @230/240 V

			Supply side	**S800B**						
			Version	**B, C, D, K**						
			Icu (kA)	**16**						
Load side	**Char**	**Icu (kA)**	**In (A)**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	15	15	15	15	15	15	15
			10	15	15	15	15	15	15	15
			13	15	15	15	15	15	15	15
			16	15	15	15	15	15	15	15
			20	15	15	15	15	15	15	15

S800U - RCBOs DS301C @230/240 V

			Supply side	**S800 U**								
			Version	**K, Z**								
			Icu (kA)	**50**								
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	100
RCBOs DS301C	B, C	6	6	50	50	40	40	40	30	30	25	25
			10	50	50	40	40	40	30	30	25	25
			13	50	50	40	40	40	30	30	25	25
			16		50	40	40	40	30	30	25	25
			20		50	40	40	40	30	30	25	25

RCBO DS301C

Coordination tables: back-up DS301C

S750 DR - RCBOs DS301C @230/240 V

			Supply side	**S750 DR**								
			Version	**Eselective, Kselective**								
			Icu (kA)	**25**								
Load side	**Char**	**Icu (kA)**	**In (A)**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
RCBOs DS301C	B, C	6	6	25	25	25	25	22	22	22	22	22
			10	25	25	25	25	22	22	22	22	22
			13		25	25	25	22	22	22	22	22
			16			25	25	22	22	22	22	22
			20				25	22	22	22	22	22

S750 - RCBOs DS301C @230/240 V

			Supply side	**S750**						
			Version	**Eselective, Kselective**						
			Icu (kA)	**25**						
Load side	**Char**	**Icu (kA)**	**In (A)**	**16**	**20**	**25**	**32**	**40**	**50**	**63**
RCBOs DS301C	B, C	6	6	25	25	25	25	22	22	22
			10	25	25	25	25	22	22	22
			13		25	25	25	22	22	22
			16			25	25	22	22	22
			20				25	22	22	22

RCDs technical details

Coordination tables: back-up DS202CR

MCB/Fuses - DS202CR @ 230 V

			Supply s.	S200	S200M	S200P	S300P	S200P	S300P	25gG	40gG	50gG	63gG	80gG	100gG
	Char.			B-C	B-C	B-C	B-C	B-C	B-C						
		Icu [kA]		20	25	40	40	25	25						
Load s.			In [A]	0,5…63	0,5…63	0,5…25	0,5…25	32…63	32…63						
DS202CR	B,C	10	2...40	20	25	40	40	25	25	35	25	20	15	10	10
DS202CR M	B,C	10	2...40	20	25	40	40	25	25	35	25	20	15	10	10

S800 - DS202CR @230/400V

			Supply s.	S800S	S800N	S800C	S800B
	Char.			B-C	B-C	B-C	B-C
		Icu [kA]		50	36	25	16
Load s.			In [A]	80...125	80...125	80...125	80...125
DS202CR	B,C	10	2...40	50	36	25	-
DS202CR M	B,C	10	2...40	50	36	25	-

RCDs technical details

Coordination tables: back-up DS202CR

MCCB @ 415V - DS202CR @ 230 V

			Supply side	XT1	XT1	XT1	XT2	XT3	XT4	XT1	XT2	XT3	XT4	XT1	XT2	XT4	XT2	XT4	XT4
			Version	B	C	N	N	N	N	S	S	S	S	H	H	H	L	L	V
Load side	Char.	Icu [kA]	In [A]	18	25	36	36	36	36	50	50	50	50	70	70	70	85	120	150
DS202CR	B,C, D,K	10	2..25	18	18	18	25	18	20	20	25	18	20	20	25	20	25	20	20
			32, 40				18		10	10	18		10	10	18	10	18	10	10
DS202CR M	B,C	10	2..25	18	18	18	25	18	20	20	25	18	20	20	25	20	25	20	20
			32, 40				18		10	10	18		10	10	18	10	18	10	10

RCDs technical details

Coordination tables: back-up DS203NC

Fuses-DS203NC @ 400V

		Supply side		gL/gG						
Load side	Char	Icu [kA]	In[A]	25	40	63	80	100	125	160
DS203NC L	C	6	6…32	100	70	40	15	15	10	10
DS203NC	B,C,K	10	6…32	100	70	40	15	15	10	10

MCCB @ 415V - DS203NC @ 400V

		Supply side		XT1	XT1	XT1	XT2	XT3	XT4	XT1	XT2	XT3
	Char			B	C	N	N	N	N	S	S	S
Load side		Icu[KA]	In [A]	18	25	36	36	36	36	50	50	50
DS203NC L	C	6	6…25	16	16	16	20	10	10	16	20	10
			32	10	10	10	16	10	10	10	16	10
DS203NC	B,C,K	10	6…16	16	16	16	25	16	25	16	25	16
			20…25				25		16		25	
			32				16		16		16	

		Supply side		XT4	XT1	XT2	XT4	XT2	XT4	XT2	XT4
	Char			S	H	H	H	L	L	V	V
Load side		Icu[KA]	In [A]	50	70	70	70	120	120	150	150
DS203NC L	C	6	6…25	10	16	20	10	20	10	20	10
			32	10	10	16	10	16	10	16	10
DS203NC	B,C,K	10	6…16	25	16	25	25	25	25	25	25
			20…25	16		25	16	25	16	25	16
			32	16		16	16	16	16	16	16

MCCB @ 415V - DS203NC @ 400V

		Supply side		T1	T1	T1	T2	T3	T4	T2	T3	T4	T2	T4	T2	T4	T4
	Char			B	C	N	N	N	N	S	S	S	H	H	L	L	V
Load side		Icu [kA]	In[A]	16	25	36	36	36	36	50	50	50	70	70	85	120	200
DS203NC L	C	6	6…25	16	16	16	20	10	10	20	10	10	20	10	20	10	10
			32	10	10	10	16	10	10	16	10	10	16	10	16	10	10
DS203NC	B,C,K	10	6…25	16	16	16	25	16	16	25	16	16	25	16	25	16	16
			32	16	16	16	16	16	16	16	16	16	16	16	16	16	16

S200 - DS203NC @ 400V

		Supply side		S200	S200M	S200P	S300P	S200P	S300P
	Char			B-C	B,C	B,C	B,C	B,C	B,C
Load side		Icu [kA]		20	25	40	40	25	25
			In[A]	0,5..63	0.5…63	0.5…25	0.5…25	32	32
DS203NC L	C	6	6…32	20	25	40	40	25	25
DS203NC	B,C,K	10	6…32	20	25	40	40	25	25

RCDs technical details

Coordination tables: back-up DS203NC

S800 - DS203NC @ 400V

		Supply side		S800N							
	Char			B,C,D							
Load side		Icu [kA]		36							
			In[A]	25	32	40	50	63	80	100	125
DS203NC L	C	6	6…16	36	36	25	25	18	15	15	15
			20		36	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
DS203NC	B,C,K	10	6…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36

		Supply side		S800S							
	Char			B,C,D,K							
Load side		Icu [kA]		50							
			In[A]	25	32	40	50	63	80	100	125
DS203NC L	C	6	6…16	50	40	25	25	18	15	15	15
			20		40	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
DS203NC	B,C,K	10	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
							50	50	50	50	50

		Supply side		S800B							
	Char			B,C,D,K							
Load side		Icu [kA]									
			In[A]	25	32	40	50	63	80	100	125*
DS203NC L	C	6	6	-	16	16	16	16	15	15	15
			8	-	16	16	16	16	15	15	15
			10	-	16	16	16	16	15	15	15
			13	-	16	16	16	16	15	15	15
			16	-	16	16	16	16	15	15	15
			20	-	16	16	16	16	15	15	15
			25	-		16	16	16	15	15	15
			32	-			16	16	15	15	15
DS203NC	B,C,K	10	6	-	16	16	16	16	16	16	16
			8	-	16	16	16	16	16	16	16
			10	-	16	16	16	16	16	16	16
			13	-	16	16	16	16	16	16	16
			16	-	16	16	16	16	16	16	16
			20	-	16	16	16	16	16	16	16
			25	-		16	16	16	16	16	16
			32	-			16	16	16	16	16

*Only S800B B,C

RCDs technical details

Coordination tables: back-up DS203NC

		Supply side		S800C							
	Char			B,C,D,K							
Load side		Icu [kA]		25							
			In[A]	25	32	40	50	63	80	100	125
DS203NC L	C	6	6	25	25	25	25	18	15	15	15
			8	25	25	25	25	18	15	15	15
			10	25	25	25	25	18	15	15	15
			13	25	25	25	25	18	15	15	15
			16	25	25	25	25	18	15	15	15
			20		25	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
DS203NC	B,C,K	10	6	25	25	25	25	25	25	25	25
			8	25	25	25	25	25	25	25	25
			10	25	25	25	25	25	25	25	25
			13	25	25	25	25	25	25	25	25
			16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25

RCDs technical details

Coordination tables: back-up DSE201

Fuses - DSE201 @ 230/240 V

			Supply side	Fuse 25gG	Fuse 40gG	Fuse 50gG	Fuse 63gG	Fuse 80gG	Fuse 100gG	Fuse 125gG	Fuse 160gG	Fuse 200gG
Load side	Icu [kA]	Char.	In [A]	25	40	50	63	80	100	125	160	200
DSE201	6	B,C	up to 20	25	25	20	10	10	10	10	10	10
			25-32	-	25	20	10	7,5	7,5	7,5	7,5	7,5

MCCB @ 415 V - DSE201 @ 230/240 V

			Supply side	T1	T2	T3	T4
Load side	Icu [kA]	Char.	In [A]	160	160	250	250
DSE201	6	B,C	up to 20	10	10	10	10
			25-32	7,5	7,5	7,5	7,5

MCCB @ 415 V - DSE201 @ 230/240 V

			Supply side	XT1	XT2	XT3	XT4
Load side	Icu [kA]	Char.	In [A]	160	160	250	250
DSE201	6	B,C	up to 20	10	10	10	10
			25-32	7,5	7,5	7,5	7,5

RCDs technical details

Coordination tables: back-up DSE201 M

Fuses/S750DR - DSE201 M @ 230/240 V

		Supply side		Fuse gG	S750DR
Load side	Char.	Icu [kA]	In [A]	In [A]	In [A]
DSE201 M	B	15	6	63	100
			10, 16, 20	100	100
			25, 32	100	100
			40	125	100
		10	50	160	100
	C	15	6	40	100
			10, 16, 20	100	100
			25, 32	100	100
			40	125	100
		10	50	160	100

This table shows coordination between DSE201 M and the Supply side fuse maximum current value. Combination of the two protections allows the breaking capacity to be elevated up to that of the combined fuse.

I.e. Load side RCBO DSE201 M-C16, Supply side fuse with In up to 100 A (breaking capacity: 100 kA). RCBO protection up to 100 kA

RCDs technical details

Coordination tables: back-up DSE201 M

MCCB @ 415 V - DSE201 M @ 230/240 V

		Supply side		XT1	XT1	XT1	XT2	XT3	XT4	XT1	XT2	XT3	XT4	XT1	XT2	XT4	XT2	XT4	XT2	XT4
				B	C	N	N	N	N	S	S	S	S	H	H	H	L	L	V	V
Load side	Char.	Icu [kA]	In [A]	18	25	36	36	36	36	50	50	50	50	70	70	70	120	120	150	150
DSE201 M	B,C	15	6, 10	18	25	30	36	36	36	30	50	40	40	30	70	40	40	30	40	30
			16…40					25				25			60		40		40	
		10	50	18	25	30	36	16	36	30	36	16	40	30	40	40	40	30	40	30

MCCB @ 415 V - DSE201M @ 230/240 V

		Supply side		T1	T1	T1	T2	T3	T4	T2	T3	T4	T2	T4	T2	T4	T4
				B	C	N	N	N	N	S	S	S	H	H	L	L	V
Load side	Char.	Icu [kA]	In [A]	16	25	36	36	36	36	50	50	50	70	70	85	120	200
DSE201 M	B,C	15	6, 10	16	25	30	36	36	36	50	40	40	70	40	85	40	40
			16…40					25			25		60		60		
		10	50	16	25	30	36	16	36	36	16	40	40	40	40	40	40

S800 - DSE201M @ 230/240 V

		Supply side		S800U							
				K,Z							
				50							
Load side	Char.	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
DSE201 M	B,C	15	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
		10	50						50	50	50

S800 - DSE201M @ 230/240 V

		Supply side		S800S							
				B,C,D,K							
				50							
Load side	Char.	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
DSE201 M	B,C	15	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50
		10	50						50	50	50

RCDs technical details

Coordination tables: back-up DSE201 M

S800 - DSE201M @ 230/240 V

		Supply side		S800N							
				B,C,D							
				36							
Load side	Char.	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
DSE201 M	B,C	15	6…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36
		10	50						36	36	36

S800 - DSE201M @ 230/240 V

		Supply side		S800C							
				B,C,D							
				25							
Load side	Char.	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
DSE201 M	B,C	15	6…16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25
		10	50						25	25	25

S800 - DSE201M @ 230/240 V

		Supply side		S800B						
				B,C,D,K						
				25						
Load side	Char.	Icu [kA]	In[A]	32	40	50	63	80	100	125
DSE201 M	B,C	15	6…16	16	16	16	16	16	16	16
			20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16
		10	50					16	16	16

S200P - DSE201M @ 230/240 V

		Supply side		S200P	S200P	S300P
				B,C	B,C	B,C
Load side	Char.	Icu [kA]	In[A]	0.5….25	32….63	32….63
DSE201 M	B,C	15	6…40	25	15	15
		10	50		15	15

S300P - DSE201M @ 230/240 V

		Supply side		S300P	S300P	S300P
				B,C	B,C	B,C
Load side	Char.	Icu [kA]	In[A]	0.5….25	32….63	32….63
DSE201 M	B,C	15	6…40	25	15	15
		10	50		15	15

RCDs technical details

Coordination tables: selectivity DS201

MCCB Tmax XT1 @ 415V - DS201 (2019) @ 230/240V

			Supply side	**XT1**										
			Version	**B,C,N,S,H**										
			Release	**TM**										
Load side	**Char**	**Icu [kA]**	**In[A]**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T	T	T	T	T
			10			3	3	3	4,5	T	T	T	T	T
			16					3	4,5	5	T	T	T	T
			20						3	5	T	T	T	T
			25							5	T	T	T	T
			32								T	T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T	T	T	T	T
			6	6	6	6	6	6	6	T	T	T	T	T
			8			3	3	3	4,5	7,5	8,5	T	T	T
			10			3	3	3	4,5	7,5	8,5	T	T	T
			13					3	4,5	5	7,5	T	T	T
			16					3	4,5	5	7,5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7,5	T	T
			40									7,5	T	T
DS201 (2019) M	B,C,K	15	4	T	T	T	T	T	T	T	T	T	T	T
			6	6	6	6	6	6	6	T	T	T	T	T
			10			3	3	3	4,5	7,5	8,5	T	T	T
			13					3	4,5	5	7,5	T	T	T
			16					3	4,5	5	7,5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7,5	T	T
			40									7,5	T	T

RCDs technical details

Coordination tables: selectivity DS201

MCCB Tmax XT2 @ 415V - DS201 (2019) @ 230/240V

			Supply side	XT2															
			Version	N,S,H,L,V															
			Release	TM											EL				
Load side	**Char**	**Icu [kA]**	**In[A]**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	**10**	**25**	**63**	**100**	**160**
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4,5	T	T	T	T	T		T	T	T	T
			16				3 [1]	3	4,5	5	T	T	T	T			T	T	T
			20				3 [1]		3	5	T	T	T	T			T	T	T
			25						3 [1]	5	T	T	T	T			T	T	T
			32						3 [1]		T	T	T	T			T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			8		3 [1]	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			13				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			16				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			20				3 [1]		3	5	6	T	T	T			T	T	T
			25						3 [1]	5	6	T	T	T			T	T	T
			32						3 [1]		6	7,5	T	T			T	T	T
			40								6 [1]	7,5	T	T				T	T
DS201 (2019) M	B,C, K	15	4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			13				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			16				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			20				3 [1]		3	5	6	T	T	T			T	T	T
			25						3 [1]	5	6	T	T	T			T	T	T
			32						3 [1]		6	7,5	T	T			T	T	T
			40								6 [1]	7,5	T	T				T	T

[1] Value valid in case of Supply S. breaker only magnetic

RCDs technical details

Coordination tables: selectivity DS201

MCCB Tmax XT3 @ 415V - DS201 (2019) @ 230/240V

			Supply side	XT3						
			Version	N,S						
			Release	TM						
Load side	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
			25	5	T	T	T	T	T	T
			32		T	T	T	T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			8	7,5	8,5	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 [1]	7,5	T	T	T	T
DS201 (2019) M	B,C,K	15	4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 [1]	7,5	T	T	T	T

RCDs technical details

Coordination tables: selectivity DS201

MCCB Tmax XT4 @ 415V - DS201 (2019) @ 230/240V

			Supply side	XT4																		
			Version	N,S,H,L,V																		
			Release	TM														EL				
Load side	Char	Icu [kA]	In [A]	16	20	25	32	40	50	63	80	100	125	160	200	225	250	40	63	100	160	250
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3	3 [1]	3	3	3	4,5	T	T	T	T	T	T	T	T	3	T	T	T	T
			16				3 [1]	3	4,5	5	T	T	T	T	T	T	T	3	T	T	T	T
			20				3 [1]		3	5	T	T	T	T	T	T	T		T	T	T	T
			25						3 [1]	5	T	T	T	T	T	T	T		T	T	T	T
			32						3 [1]		T	T	T	T	T	T	T		T	T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			8	3	3 [1]	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	3	T	T	T	T
			10	3	3 [1]	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	3	T	T	T	T
			13				3 [1]	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			16				3 [1]	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			20				3 [1]		3	5	6	T	T	T	T	T	T		T	T	T	T
			25						3 [1]	5	6	T	T	T	T	T	T		T	T	T	T
			32						3 [1]		6	7,5	T	T	T	T	T		T	T	T	T
			40								6 [1]	7,5	T	T	T	T	T			T	T	T
DS201 (2019) M	B,C, K	15	4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3	3 [1]	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	3	T	T	T	T
			13				3 [1]	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			16				3 [1]	3	4,5	5	7,5	T	T	T	T	T	T	3	T	T	T	T
			20				3 [1]		3	5	6	T	T	T	T	T	T		T	T	T	T
			25						3 [1]	5	6	T	T	T	T	T	T		T	T	T	T
			32						3 [1]		6	7,5	T	T	T	T	T		T	T	T	T
			40								6 [1]	7,5	T	T	T	T	T			T	T	T

RCDs technical details

Coordination tables: selectivity DS201

MCCB Tmax T1 @ 415V - DS201 (2019) @ 230/240V

			Supply side	**T1**										
			Version	**B,C,N**										
			Release	**TMD**										
Load side	**Char**	**Icu [kA]**	**In[A]**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T	T	T	T	T
			10			3	3	3	4,5	T	T	T	T	T
			16					3	4,5	5	T	T	T	T
			20						3	5	T	T	T	T
			25							5	T	T	T	T
			32								T	T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T	T	T	T	T
			6	6	6	6	6	6	6	T	T	T	T	T
			8			3	3	3	4,5	7,5	8,5	T	T	T
			10			3	3	3	4,5	7,5	8,5	T	T	T
			13					3	4,5	5	7,5	T	T	T
			16					3	4,5	5	7,5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7,5	T	T
			40									7,5	T	T
DS201 (2019) M	B,C,K	15	4	T	T	T	T	T	T	T	T	T	T	T
			6	6	6	6	6	6	6	T	T	T	T	T
			10			3	3	3	4,5	7,5	8,5	T	T	T
			13					3	4,5	5	7,5	T	T	T
			16					3	4,5	5	7,5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7,5	T	T
			40									7,5	T	T

RCDs technical details

Coordination tables: selectivity DS201

MCCB Tmax T2 @ 415V - DS201 (2019) @ 230/240V

			Supply side	T2															
			Version	N,S,H,L															
			Release	TMD, MA											EL				
Load side	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160	10	25	63	100	160
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4,5	T	T	T	T	T		T	T	T	T
			16				3 [1]	3	4,5	5	T	T	T	T			T	T	T
			20				3 [1]	3	3	5	T	T	T	T			T	T	T
			25						3 [1]	5	T	T	T	T			T	T	T
			32						3 [1]		T	T	T	T			T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			8		3 [1]	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			13				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			16				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			20				3 [1]	3	3	5	6	T	T	T			T	T	T
			25						3 [1]	5	6	T	T	T			T	T	T
			32						3 [1]		6	7,5	T	T			T	T	T
			40								6 [1]	7,5	T	T				T	T
DS201 (2019) M	B,C,K	15	4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4,5	7,5	8,5	T	T	T		T	T	T	T
			13				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			16				3 [1]	3	4,5	5	7,5	T	T	T			T	T	T
			20				3 [1]	3	3	5	6	T	T	T			T	T	T
			25						3 [1]	5	6	T	T	T			T	T	T
			32						3 [1]		6	7,5	T	T			T	T	T
			40								6 [1]	7,5	T	T				T	T

RCDs technical details

Coordination tables: selectivity DS201

MCCB Tmax T3 @ 415V - DS201 (2019) @ 230/240V

			Supply side	T3						
			Version	N,S						
			Release	TMD, MA						
Load side	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
			25	5	T	T	T	T	T	T
			32		T	T	T	T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			8	7,5	8,5	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 [1]	7,5	T	T	T	T
DS201 (2019) M	B,C,K	15	4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 [1]	7,5	T	T	T	T

RCDs technical details

Coordination tables: selectivity DS201

S800N / S800S (Char B) - DS201 (2019) @ 230/240V

		Supply side		S800N / S800S							
		Version		B							
Load side	Char	Icu [kA]		36 / 50							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6				0.6	1.2	1.6	2.6	3.8
			10				0.5	1.1	1.4	2	3
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
DS201 (2019)	B,C,K	10	1		0.5	0.8	1.6	5	10	T	T
			2		0.433	0.6	1.3	4	9	T	T
			4			0.45	0.8	1.5	2.5	4	7.3
			6				0.6	1.2	1.6	2.6	3.8
			8				0.55	1.3	1.5	2.4	3.5
			10				0.5	1.1	1.4	2	3
			13					0.9	1.3	1.9	2.8
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
			40								1.6
DS201 (2019) M	B,C,K	15	4			0.45	0.8	1.5	2.5	4	7.3
			6				0.6	1.2	1.6	2.6	3.8
			10				0.5	1.1	1.4	2	3
			13					0.95	1.3	1.7	2.8
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
			40								1.6

RCDs technical details

Coordination tables: selectivity DS201

S800N / S800S (Char C) - DS201 (2019) @ 230/240V

		Supply side		S800N / S800S							
		Version		C							
Load side	Char	Icu [kA]		36 / 50							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6			0.55	1.1	1.5	2.5	3.6	5.5
			10			0.45	1	1.3	1.9	2.8	4.2
			16				0.75	1.1	1.6	2.3	3.6
			20					0.9	1.4	1.9	3.3
			25						1.2	1.6	2.7
			32						1	1.5	2.5
DS201 (2019)	B,C,K	10	1	0.55	0.6	1.4	3.4	7.2	T	T	T
			2	0.43	0.55	1.2	3	6.6	T	T	T
			4		0.43	0.75	1.3	2.1	3.9	6.6	T
			6			0.55	1.1	1.5	2.5	3.6	5.5
			8			0.5	1.25	1.4	2.2	3.2	5
			10			0.45	1	1.3	1.9	2.8	4.2
			13			0.38	0.83	1.2	1.75	2.6	3.9
			16				0.75	1.1	1.6	2.3	3.6
			20					0.9	1.4	1.9	3.3
			25						1.2	1.6	2.7
			32						1	1.5	2.5
			40							1.4	2.1
DS201 (2019) M	B,C,K	15	4		0.43	0.75	1.3	2.1	3.9	6.6	T
			6			0.55	1.1	1.5	2.5	3.6	5.5
			10			0.45	1	1.3	1.9	2.8	4.2
			13			0.35	0.9	1.2	1.7	2.6	3.8
			16				0.75	1.1	1.6	2.3	3.6
			20					0.9	1.4	1.9	3.3
			25						1.2	1.6	2.7
			32						1	1.5	2.5
			40							1.4	2.1

RCDs technical details

Coordination tables: selectivity DS201

S800 N / S800S (Char D) - DS201 (2019) @ 230/240V

		Supply side		**S800N / S800S**							
		Version		**D**							
Load side	**Char**	**Icu [kA]**		**36 / 50**							
			In[A]	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
DS201 (2019) L	C	6	6	0.6	1.3	2	3.2	3.9	T	T	T
			10	0.5	1.2	1.65	2.6	3.1	T	T	T
			16		0.9	1.4	1.8	2.6	5	T	T
			20			1.3	1.6	2.2	4.2	5.4	T
			25				1.5	1.9	3.5	4.5	T
			32					1.8	2.8	4.2	5.5
DS201 (2019)	B,C,K	10	1	1.6	4.8	T	T	T	T	T	T
			2	1.3	4.1	T	T	T	T	T	T
			4	0.8	1.6	3	5.4	7.6	T	T	T
			6	0.6	1.3	2	3.2	3.9	8	T	T
			8	0.4	1.25	1.8	2.9	3.6	7	T	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		1.1	1.55	2.2	2.8	5.9	7.2	9.6
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5
DS201 (2019) M	B,C,K	15	4	0.8	1.6	3	5.4	7.6	T	T	T
			6	0.6	1.3	2	3.2	3.9	8	T	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13			1.55	2.1	2.8	5.6	7.1	9.5
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5

RCDs technical details

Coordination tables: selectivity DS201

S800S (Char K) - DS201 (2019) @ 230/240V

		Supply side		S800S							
		Version		K							
Load side	Char	Icu [kA]		36 / 50							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6		1.3	2	3.2	3.9	T	T	T
			10		1.2	1.65	2.6	3.1	T	T	T
			16		0.9	1.4	1.8	2.6	5	T	T
			20			1.3	1.6	2.2	4.2	5.4	T
			25				1.5	1.9	3.5	4.5	T
			32					1.8	2.8	4.2	5.5
DS201 (2019)	B,C,K	10	1	1.6	4.8	T	T	T	T	T	T
			2	1.3	4.1	T	T	T	T	T	T
			4	0.8	1.6	3	5.4	7.6	T	T	T
			6	0.6	1.3	2	3.2	3.9	8	T	T
			8	0.4	1.25	1.8	2.9	3.6	7	T	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		1.1	1.55	2.2	2.8	5.9	7.2	9.6
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5
DS201 (2019) M	B,C,K	15	4		1.6	3	5.4	7.6	T	T	T
			6		1.3	2	3.2	3.9	8	T	T
			10		1.2	1.65	2.6	3.1	6.2	8.6	T
			13			1.55	2.1	2.8	5.6	7.1	9.5
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5

RCDs technical details

Coordination tables: selectivity DS201

S800C (Char B) - DS201 (2019) @ 230/240V

		Supply side		S800C							
		Version		B							
Load side	Char	Icu [kA]		25							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6				0.6	1.2	1.6	2.6	3.8
			10				0.5	1.1	1.4	2	3
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
DS201 (2019)	B,C,K	10	1		0.5	0.8	1.6	5	10	T	T
			2		0.43	0.6	1.3	4	9	T	T
			4			0.45	0.8	1.5	2.5	4	7.3
			6				0.6	1.4	1.6	2.6	3.8
			8				0.55	1.3	1.5	2.4	3.5
			10				0.5	1.1	1.4	2	3
			13					0.9	1.3	1.9	2.8
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
			40								1.6
DS201 (2019) M	B,C,K	15	4			0.45	0.8	1.5	2.5	4	7.3
			6				0.6	1.2	1.6	2.6	3.8
			10				0.5	1.1	1.4	2	3
			13					0.95	1.3	1.7	2.8
			16					0.8	1.2	1.7	2.5
			20						1	1.5	2.1
			25							1.3	1.8
			32							1.1	1.7
			40								1.6

RCDs technical details

Coordination tables: selectivity DS201

S800C (Char C) - DS201 (2019) @ 230/240V

		Supply side		S800C							
		Version		C							
Load side	Char	Icu [kA]		25							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6			0.55	1.1	1.5	2.5	3.6	5.5
			10			0.45	1	1.3	1.9	2.8	4.2
			16				0.75	1.1	1.6	2.3	3.6
			20					0.9	1.4	1.9	3.3
			25						1.2	1.6	2.7
			32						1	1.5	2.5
DS201 (2019)	B,C,K	10	1	0.55	0.6	1.4	3.4	7.2	T	T	T
			2	0.43	0.55	1.2	3	6.6	T	T	T
			4		0.43	0.75	1.3	2.1	3.9	6.6	T
			6			0.55	1.1	1.5	2.5	3.6	5.5
			8			0.5	1.25	1.4	2.2	3.2	5
			10			0.45	1	1.3	1.9	2.8	4.2
			13			0.38	0.83	1.2	1.75	2.6	3.9
			16				0.75	1.1	1.6	2.3	3.6
			20					0.9	1.4	1.9	3.3
			25						1.2	1.6	2.7
			32						1	1.5	2.5
			40							1.4	2.1
DS201 (2019) M	B,C,K	15	4		0.43	0.75	1.3	2.1	3.9	6.6	T
			6			0.55	1.1	1.5	2.5	3.6	5.5
			10			0.45	1	1.3	1.9	2.8	4.2
			13			0.35	0.9	1.2	1.7	2.6	3.8
			16				0.75	1.1	1.6	2.3	3.6
			20					0.9	1.4	1.9	3.3
			25						1.2	1.6	2.7
			32						1	1.5	2.5
			40							1.4	2.1

RCDs technical details

Coordination tables: selectivity DS201

S800C (Char D) - DS201 (2019) @ 230/240V

		Supply side		S800C							
		Version		D							
Load side	Char	Icu [kA]		25							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6		1.3	2	3.2	3.9	T	T	T
			10		1.2	1.65	2.6	3.1	T	T	T
			16		0.9	1.4	1.8	2.6	5	T	T
			20			1.3	1.6	2.2	4.2	5.4	T
			25				1.5	1.9	3.5	4.5	T
			32					1.8	2.8	4.2	5.5
DS201 (2019)	B,C,K	10	1	1.6	4.8	T	T	T	T	T	T
			2	1.3	4.1	T	T	T	T	T	T
			4	0.8	1.6	3	5.4	7.6	T	T	T
			6	0.6	1.3	2	3.2	3.9	8	T	T
			8	0.4	1.25	1.8	2.9	3.6	7	T	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		1.1	1.55	2.2	2.8	5.9	7.2	9.6
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5
DS201 (2019) M	B,C,K	15	4		1.6	3	5.4	7.6	T	T	T
			6		1.3	2	3.2	3.9	8	T	T
			10		1.2	1.65	2.6	3.1	6.2	8.6	T
			13			1.55	2.1	2.8	5.6	7.1	9.5
			16			1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5

RCDs technical details

Coordination tables: selectivity DS201

S800C (Char K) - DS201 (2019) @ 230/240V

Load side	Char	Supply side		S800C							
		Version		K							
		Icu [kA]		25							
			In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6		1.3	2	3.2	3.9	T	T	T
			10		1.2	1.65	2.6	3.1	T	T	T
			16		0.9	1.4	1.8	2.6	5	T	T
			20			1.3	1.6	2.2	4.2	5.4	T
			25				1.5	1.9	3.5	4.5	T
			32					1.8	2.8	4.2	5.5
DS201 (2019)	B,C,K	10	1	1.6	4.8	T	T	T	T	T	T
			2	1.3	4.1	T	T	T	T	T	T
			4	0.8	1.6	3	5.4	7.6	T	T	T
			6	0.6	1.3	2	3.2	3.9	8	T	T
			8	0.4	1.25	1.8	2.9	3.6	7	T	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		1.1	1.55	2.2	2.8	5.9	7.2	9.6
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5
DS201 (2019) M	B,C,K	15	4		1.6	3	5.4	7.6	T	T	T
			6		1.3	2	3.2	3.9	8	T	T
			10		1.2	1.65	2.6	3.1	6.2	8.6	T
			13			1.55	2.1	2.8	5.6	7.1	9.5
			16			1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5

RCDs technical details

Coordination tables: selectivity DS201

S800B (Char B) - DS201 (2019) @ 230/240V

		Supply side		S800B						
		Version		B						
Load side	Char	Icu [kA]		16						
			In[A]	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6			0.6	1.2	1.6	2.6	3.8
			10			0.5	1.1	1.4	2	3
			16				0.8	1.2	1.7	2.5
			20					1	1.5	2.1
			25						1.3	1.8
			32						1.1	1.7
DS201 (2019)	B,C,K	10	1	0.5	0.8	1.6	5	10	T	T
			2	0.43	0.6	1.3	4	9	T	T
			4		0.45	0.8	1.5	2.5	4	7.3
			6			0.6	1.3	1.6	2.6	3.8
			8			0.55	1.1	1.5	2.4	3.5
			10			0.5	0.9	1.4	1.9	3
			13				0.9	1.3	1.7	2.8
			16					1.2	1.5	2.5
			20					1	1.3	2.1
			25						1.1	1.8
			32							1.7
			40							1.6
DS201 (2019) M	B,C,K	15	4		0.45	0.8	1.5	2.5	4	7.3
			6			0.6	1.2	1.6	2.6	3.8
			10			0.5	1.1	1.4	2	3
			13				0.95	1.3	1.7	2.8
			16				0.8	1.2	1.7	2.5
			20					1	1.5	2.1
			25						1.3	1.8
			32						1.1	1.7
			40							1.6

RCDs technical details

Coordination tables: selectivity DS201

S800B (Char C) - DS201 (2019) @ 230/240V

		Supply side		S800B						
		Version		C						
Load side	Char	Icu [kA]		16						
			In[A]	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6		0.55	1.1	1.5	2.5	3.6	5.5
			10		0.45	1	1.3	1.9	2.8	4.2
			16			0.75	1.1	1.6	2.3	3.6
			20				0.9	1.4	1.9	3.3
			25					1.2	1.6	2.7
			32					1	1.5	2.5
DS201 (2019)	B,C,K	10	1	0.6	1.4	3.4	7.2	T	T	T
			2	0.55	1.2	3	6.6	T	T	T
			4	0.43	0.75	1.3	2.1	3.9	6.6	T
			6		0.55	1.1	1.5	2.5	3.6	5.5
			8		0.5	1.25	1.4	2.2	3.2	5
			10		0.45	1	1.3	1.9	2.8	4.2
			13		0.38	0.82	1.2	1.75	2.6	3.9
			16			0.75	1.1	1.6	2.3	3.6
			20				0.9	1.4	1.9	3.3
			25					1.2	1.6	2.7
			32					1	1.5	2.5
			40						1.4	2.1
DS201 (2019) M	B,C,K	15	4	0.43	0.75	1.3	2.1	3.9	6.6	T
			6		0.55	1.1	1.5	2.5	3.6	5.5
			10		0.45	1	1.3	1.9	2.8	4.2
			13		0.35	0.9	1.2	1.7	2.6	3.8
			16			0.75	1.1	1.6	2.3	3.6
			20				0.9	1.4	1.9	3.3
			25					1.2	1.6	2.7
			32					1	1.5	2.5
			40						1.4	2.1

RCDs technical details

Coordination tables: selectivity DS201

S800B (Char D) - DS201 (2019) @ 230/240V

		Supply side		S800B						
		Version		D						
Load side	Char	Icu [kA]		16						
			In[A]	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6	1.3	3.2	3.2	3.9	T	T	T
			10	1.2	1.65	2.6	3.1	T	T	T
			16	0.9	1.4	1.8	2.6	5	T	T
			20		1.3	1.6	2.2	4.2	5.4	T
			25			1.5	1.9	3.5	4.5	T
			32				1.8	2.8	4.2	5.5
DS201 (2019)	B,C,K	10	1	4.8	T	T	T	T	T	T
			2	4.1	T	T	T	T	T	T
			4	1.6	3	5.4	7.6	T	T	T
			6	1.3	2	3.2	3.9	8	T	T
			8	1.25	1.8	2.9	3.6	7	T	T
			10	1.2	1.65	2.6	3.1	6.2	8.6	T
			13	1.1	1.55	2.2	2.8	5.9	7.2	9.6
			16	0.9	1.4	1.9	2.6	5	6.3	8.8
			20		1.3	1.8	2.2	4.2	5.4	7.6
			25			1.7	1.9	3.5	4.5	6.6
			32				1.8	2.8	4.2	5.5
			40				1.7	2.7	4	5
DS201 (2019) M	B,C,K	15	4	1.6	3	5.4	7.6	T	T	T
			6	1.3	2	3.2	3.9	8	T	T
			10	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		1.55	2.1	2.8	5.6	7.1	9.5
			16		1.4	1.8	2.6	5	6.3	8.8
			20		1.3	1.6	2.2	4.2	5.4	7.6
			25			1.5	1.9	3.5	4.5	6.6
			32				1.8	2.8	4.2	5.5
			40				1.7	2.7	4	5

RCDs technical details
Coordination tables: selectivity DS201

S800B (Char K) - DS201 (2019) @ 230/240V

		Supply side		S800B						
		Version		K						
Load side	Char	Icu [kA]		16						
			In[A]	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6	1.3	3.2	3.2	3.9	T	T	T
			10	1.2	1.65	2.6	3.1	T	T	T
			16	0.9	1.4	1.8	2.6	5	T	T
			20		1.3	1.6	2.2	4.2	5.4	T
			25			1.5	1.9	3.5	4.5	T
			32				1.8	2.8	4.2	5.5
DS201 (2019)	B,C,K	10	1	4.8	T	T	T	T	T	T
			2	4.1	T	T	T	T	T	T
			4	1.6	3	5.4	7.6	T	T	T
			6	1.3	2	3.2	3.9	8	T	T
			8	1.25	1.8	2.9	3.6	7	T	T
			10	1.2	1.65	2.6	3.1	6.2	8.6	T
			13	1.1	1.55	2.2	2.8	5.9	7.2	9.6
			16	0.9	1.4	1.9	2.6	5	6.3	8.8
			20		1.3	1.8	2.2	4.2	5.4	7.6
			25			1.7	1.9	3.5	4.5	6.6
			32				1.8	2.8	4.2	5.5
			40				1.7	2.7	4	5
DS201 (2019) M	B,C,K	15	4	1.6	3	5.4	7.6	T	T	T
			6	1.3	2	3.2	3.9	8	T	T
			10	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		1.55	2.1	2.8	5.6	7.1	9.5
			16		1.4	1.8	2.6	5	6.3	8.8
			20		1.3	1.6	2.2	4.2	5.4	7.6
			25			1.5	1.9	3.5	4.5	6.6
			32				1.8	2.8	4.2	5.5
			40				1.7	2.7	4	5

RCDs technical details

Coordination tables: selectivity DS201

S800U (Char K) - DS201 (2019) @ 230/240V

		Supply side		S800U								
		Version		K								
Load side	Char	Icu [kA]		50								
			In[A]	25	30	40	50	60	70	80	90	100
DS201 (2019) L	C	6	6	0.34	0.41	0.57	1.1	1.5	2	2.5	3.6	T
			10	0.23	0.3	0.45	1	1.3	1.6	1.9	2.8	T
			16		0.21	0.35	0.75	1.1	1.3	1.6	2.3	T
			20			0.22	0.6	0.9	1.1	1.4	1.9	5.4
			25						1	1.2	1.6	4.5
			32							1	1.5	4.2
DS201 (2019)	B,C,K	10	1	0.55	0.6	1.4	3.4	7.2	8	T	T	T
			2	0.44	0.55	1.2	3	6.6	7	T	T	T
			4	0.38	0.43	0.75	1.3	2.1	3	3.9	6.6	T
			6	0.34	0.38	0.56	1.1	1.5	2	2.5	3.6	T
			8	0.23	0.32	0.5	1.25	1.4	1.8	2.2	3.2	T
			10	0.2	0.28	0.45	1	1.3	1.6	1.9	2.8	8.6
			13		0.22	0.38	0.83	1.2	1.4	1.75	2.6	7.2
			16		0.19	0.35	0.75	1.1	1.3	1.6	2.3	6.3
			20			0.28	0.58	0.9	1.1	1.4	1.9	5.4
			25						1	1.2	1.6	4.5
			32							1.5	1.5	4.2
			40							1.4	1.4	4
DS201 (2019) M	B,C,K	15	4	0.38	0.43	0.75	1.3	2.1	3	3.9	6.6	T
			6	0.34	0.38	0.55	1.1	1.5	2	2.5	3.6	T
			10	0.2	0.28	0.45	1	1.3	1.6	1.9	2.8	8.6
			13			0.35	0.9	1.2	1.4	1.7	2.6	7.1
			16		0.19	0.34	0.75	1.1	1.3	1.6	2.3	6.3
			20			0.29	0.57	0.9	1.1	1.4	1.9	5.4
			25				0.53	0.6	0.9	1.2	1.6	4.5
			32					0.5	0.7	1	1.5	4.2
			40					0.3	0.5	0.8	1.4	4

RCDs technical details

Coordination tables: selectivity DS201

S750 DR - DS201 (2019) @ 230/240V

		Supply side		S750 DR								
		Version		Eselective; Kselective								
Load side	Char	Icu [kA]		25								
			In[A]	16	20	25	35	40	50	63	80	100
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T	T	T
			16			T	T	T	T	T	T	T
			20				T	T	T	T	T	T
			25					T	T	T	T	T
			32						T	T	T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T
			8	T	T	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T	T	T
			13		T	T	T	T	T	T	T	T
			16			T	T	T	T	T	T	T
			20				T	T	T	T	T	T
			25					T	T	T	T	T
			32						T	T	T	T
			40							T	T	T
DS201 (2019) M	B,C,K	15	4	T	T	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T	T	T
			13		T	T	T	T	T	T	T	T
			16			T	T	T	T	T	T	T
			20				T	T	T	T	T	T
			25					T	T	T	T	T
			32						T	T	T	T
			40							T	T	T

RCDs technical details

Coordination tables: selectivity DS201

S750 - DS201 (2019) @ 230/240V

		Supply side		S750						
		Version		Eselective; Kselective						
Load side	Char	Icu [kA]		25						
			In[A]	16	20	25	35	40	50	63
DS201 (2019) L	C	6	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			16			T	T	T	T	T
			20				T	T	T	T
			25					T	T	T
			32						T	T
DS201 (2019)	B,C,K	10	1	T	T	T	T	T	T	T
			2	T	T	T	T	T	T	T
			4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			8	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13		T	T	T	T	T	T
			16			T	T	T	T	T
			20				T	T	T	T
			25					T	T	T
			32						T	T
			40							T
DS201 (2019) M	B,C,K	15	4	T	T	T	T	T	T	T
			6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13		T	T	T	T	T	T
			16			T	T	T	T	T
			20				T	T	T	T
			25					T	T	T
			32						T	T
			40							T

RCDs technical details

Coordination tables: selectivity DS201

Fuses - DS201 (2019) @ 230/240V

		Supply side		Fuses gG							
Load side	Char	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
DS201 (2019) L	C	6	6	1	1.5	4	4.5	T	T	T	T
			10		1.2	3.5	4	T	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	T	T	T
			25		1	2	3	4.5	T	T	T
			32		1	2	3	4.5	5	T	T
DS201 (2019)	B,C,K	10	1	2.8	5.3	T	T	T	T	T	T
			2	2	4	5.8	T	T	T	T	T
			4	1.4	2.1	5.1	6.2		T	T	T
			6	1	1.5	4	4.5	7	T	T	T
			8		1.2	3.5	4	6	T	T	T
			10		1.2	3.5	4	6	T	T	T
			13		1	3	3.5	5	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	8	T	T
			25		1	2	3	4.5	6.5	T	T
			32		1	2	3	4.5	5	8	T
			40					3.7	4	6	8.7
DS201 (2019) M	B,C,K	15	4	1.1	1.6	4.2	T	T	T	T	T
			6	1	1.5	4	4.5	7	T	T	T
			10		1.2	3.5	4	6	10	10	T
			13		1.2	3.5	4	6	10	10	T
			16		1	3	3.5	5	10	10	T
			20		1	3	3.5	5	8	10	T
			25			2	3	4.5	6.5	10	T
			32				3	4.5	5	8	T
			40					3.4	3.8	5.5	8.2

RCBO DS301C

Coordination tables: selectivity DS301C

MCCB Tmax XT1 @ 415 V - RCBOs DS301C @230/240 V

			Supply side	**XT1**										
			Version	**B, C, N, S, H**										
			Release	**TM**										
Load side	**Char**	**Icu (kA)**	**In (A)**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
RCBOs DS301C	B, C	6	6	3	3	3	3	3	3	3	3	3	3	3
			10			3	3	3	3	3	3	3	3	3
			13				3	3	3	3	3	3	3	3
			16					3	3	3	3	3	3	3
			20						3	3	3	3	3	3

MCCB Tmax XT2 @ 415 V - RCBOs DS301C @230/240 V

			Supply side	**XT2**															
			Version	**N, S, H, L, V**															
			Release	**TM**											**EL**				
Load side	**Char**	**Icu (kA)**	**In (A)**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	**10**	**25**	**63**	**100**	**160**
RCBOs DS301C	B, C	6	6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3	3	3	3	4.5	T	T	T	T	T			T	T	T
			13				3	3	4.5	T	T	T	T	T			T	T	T
			16				3	3	4.5	T	T	T	T	T			T	T	T
			20				3	3	3	T	T	T	T	T			T	T	T

MCCB Tmax XT3 @ 415 V - RCBOs DS301C @230/240 V

			Supply side	**XT3**						
			Version	**N, S**						
			Release	**TM**						
Load side	**Char**	**Icu (kA)**	**In (A)**	**63**	**80**	**100**	**125**	**160**	**200**	**250**
RCBOs DS301C	B, C	6	6	1.5	4.5	4.5	4.5	4.5	4.5	4.5
			10	1.5	4.5	4.5	4.5	4.5	4.5	4.5
			13	1.5	4.5	4.5	4.5	4.5	4.5	4.5
			16	1.5	4.5	4.5	4.5	4.5	4.5	4.5
			20	1.5	4.5	4.5	4.5	4.5	4.5	4.5

MCCB Tmax XT4 @ 415 V - RCBOs DS301C @230/240 V

			Supply side	**XT4**																		
			Version	**N, S, H, L, V**																		
			Release	**TM**														**EL**				
Load side	**Char**	**Icu (kA)**	**In (A)**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**225**	**250**	**40**	**63**	**100**	**160**	**250**
RCBOs DS301C	B, C	6	6	3	3	3	3	3	3	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3	3	3	3	3	3	T	T	T	T	T	T	T	T	T	T	T	T	T
			13				3	3	3	T	T	T	T	T	T	T	T	T	T	T	T	T
			16				3	3	3	T	T	T	T	T	T	T	T	T	T	T	T	T
			20				3	3	3	T	T	T	T	T	T	T	T		T	T	T	T

RCBO DS301C

Coordination tables: selectivity DS301C

S800N / S800S (Char B) - RCBOs DS301C @230/240 V

			Supply side	**S800N / S800S**							
			Version	**B**							
			Release	**36 / 50**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6				0.2	0.2	0.5	0.5	0.5
			10				0.2	0.2	0.5	0.5	0.5
			13					0.2	0.5	0.5	0.5
			16					0.2	0.5	0.5	0.5
			20						0.5	0.5	0.5

S800N / S800S (Char C) - RCBOs DS301C @230/240 V

			Supply side	**S800N / S800S**							
			Version	**C**							
			Release	**36 / 50**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6			0.2	0.2	0.5	0.5	0.5	0.5
			10			0.2	0.2	0.5	0.5	0.5	0.5
			13				0.2	0.5	0.5	0.5	0.5
			16				0.2	0.5	0.5	0.5	0.5
			20					0.5	0.5	0.5	0.5

S800N / S800S (Char D) - RCBOs DS301C @230/240 V

			Supply side	**S800N / S800S**							
			Version	**D**							
			Release	**36 / 50**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	0.4	0.4	0.4	0.4	1	1	1	3
			10	0.4	0.4	0.4	0.4	1	1	1	3
			13		0.4	0.4	0.4	1	1	1	3
			16		0.4	0.4	0.4	1	1	1	3
			20			0.4	0.4	1	1	1	3

S800C (Char B) - RCBOs DS301C @230/240 V

			Supply side	**S800C**							
			Version	**B**							
			Release	**25**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6				0.2	0.4	0.5	0.5	1
			10				0.2	0.4	0.5	0.5	1
			13				0.2	0.2	0.5	0.5	1
			16					0.2	0.5	0.5	1
			20						0.5	0.5	1

RCBO DS301C

Coordination tables: selectivity DS301C

S800C (Char C) - RCBOs DS301C @230/240 V

			Supply side	S800C							
			Version	C							
			Release	25							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6			0.2	0.4	0.5	0.5	1	2
			10			0.2	0.4	0.5	0.5	1	2
			13			0.2	0.2	0.5	0.5	1	2
			16				0.2	0.5	0.5	1	2
			20					0.5	0.5	1	2

S800C (Char D) - RCBOs DS301C @230/240 V

			Supply side	S800C							
			Version	D							
			Release	25							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	0.4	0.4	0.6	0.6	1	1	1.5	3
			10	0.4	0.4	0.6	0.6	1	1	1.5	3
			13		0.2	0.6	0.6	1	1	1.5	3
			16		0.2	0.6	0.6	1	1	1.5	3
			20			0.6	0.6	1	1	1.5	3

S800C (Char K) - RCBOs DS301C @230/240 V

			Supply side	S800C							
			Version	K							
			Release	25							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	0.4	0.4	0.6	0.6	1	1	1.5	3
			10	0.4	0.4	0.6	0.6	1	1	1.5	3
			13		0.2	0.6	0.6	1	1	1.5	3
			16		0.2	0.6	0.6	1	1	1.5	3
			20			0.6	0.6	1	1	1.5	3

S800S (Char K) - RCBOs DS301C @230/240 V

			Supply side	S800S							
			Version	K							
			Release	36 / 50							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	0.2	0.4	0.6	0.6	1	2	2	2
			10	0.2	0.4	0.6	0.6	1	2	2	2
			13		0.4	0.6	0.6	1	2	2	2
			16		0.4	0.6	0.6	1	2	2	2
			20			0.6	0.6	1	2	2	2

RCBO DS301C

Coordination tables: selectivity DS301C

S800B (Char B) - RCBOs DS301C @230/240 V

			Supply side	S800B						
			Version	B						
			Release	16						
Load side	Char	Icu (kA)	In (A)	32	40	50	63	80	100	125
RCBOs DS301C	B, C	6	6		0.2	0.2	0.2	0.5	1	2
			10		0.2	0.2	0.2	0.5	1	2
			13		0.2	0.2	0.2	0.5	1	2
			16			0.2	0.2	0.5	1	2
			20				0.2	0.5	1	2

S800B (Char C) - RCBOs DS301C @230/240 V

			Supply side	S800B						
			Version	C						
			Release	16						
Load side	Char	Icu (kA)	In (A)	32	40	50	63	80	100	125
RCBOs DS301C	B, C	6	6		0.2	0.2	0.2	0.5	1	2
			10		0.2	0.2	0.2	0.5	1	2
			13		0.2	0.2	0.2	0.5	1	2
			16			0.2	0.2	0.5	1	2
			20				0.2	0.5	1	2

S800B (Char D) - RCBOs DS301C @230/240 V

			Supply side	S800B						
			Version	D						
			Release	16						
Load side	Char	Icu (kA)	In (A)	32	40	50	63	80	100	125
RCBOs DS301C	B, C	6	6	0.5	0.5	0.5	0.5	1.5	1.5	3
			10	0.5	0.5	0.5	0.5	1.5	1.5	3
			13	0.5	0.5	0.5	0.5	1.5	1.5	3
			16	0.5	0.5	0.5	0.5	1.5	1.5	3
			20		0.5	0.5	0.5	1.5	1.5	3

S800B (Char K) - RCBOs DS301C @230/240 V

			Supply side	S800B						
			Version	K						
			Release	16						
Load side	Char	Icu (kA)	In (A)	32	40	50	63	80	100	125
RCBOs DS301C	B, C	6	6	0.5	0.5	0.5	0.5	1.5	1.5	3
			10	0.5	0.5	0.5	0.5	1.5	1.5	3
			13	0.5	0.5	0.5	0.5	1.5	1.5	3
			16	0.5	0.5	0.5	0.5	1.5	1.5	3
			20		0.5	0.5	0.5	1.5	1.5	3

RCBO DS301C

Coordination tables: selectivity DS301C

S800U (Char K) - RCBOs DS301C @230/240 V

			Supply side	**S800U**								
			Version	**K**								
			Release	**16**								
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
RCBOs DS301C	B, C	6	6	0.4	0.4	0.6	0.6	0.6	0.6	1.5	1.5	1.5
			10	0.4	0.4	0.6	0.6	0.6	0.6	1.5	1.5	1.5
			13		0.2	0.6	0.6	0.6	0.6	1.5	1.5	1.5
			16		0.2	0.6	0.6	0.6	0.6	1.5	1.5	1.5
			20			0.6	0.6	0.6	0.6	1.5	1.5	1.5

S750 DR - RCBOs DS301C @230/240 V

			Supply side	**S750 DR**								
			Version	**Eselective, Kselective**								
			Release	**25**								
Load side	**Char**	**Icu (kA)**	**In (A)**	**16**	**20**	**25**	**35**	**40**	**50**	**63**	**80**	**100**
RCBOs DS301C	B, C	6	6	T	T	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T	T	T
			13		T	T	T	T	T	T	T	T
			16			T	T	T	T	T	T	T
			20				T	T	T	T	T	T

S750 - RCBOs DS301C @230/240 V

			Supply side	**S750**						
			Version	**Eselective, Kselective**						
			Release	**25**						
Load side	**Char**	**Icu (kA)**	**In (A)**	**16**	**20**	**25**	**35**	**40**	**50**	**63**
RCBOs DS301C	B, C	6	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13		T	T	T	T	T	T
			16			T	T	T	T	T
			20				T	T	T	T

Fuses - RCBOs DS301C @230/240 V

			Supply side	**Fuses gG**							
Load side	**Char**	**Icu (kA)**	**In (A)**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**
RCBOs DS301C	B, C	6	6	1.5	1.5	1.5	3	T	T	T	T
			10		1.5	1.5	3	T	T	T	T
			13		1.5	1.5	3	4.5	T	T	T
			16		1.5	1.5	3	4.5	T	T	T
			20		1.5	1.5	3	4.5	T	T	T

RCDs technical details

Coordination tables: selectivity DS203NC

Fuses-DS203NC @ 400V

			Supply S.	Fuse gL/gG							
Load S.	Char	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
DS203NC L	C	6	6	1	1.5	4	4.5	T	T	T	T
			8		1.2	3.5	4	T	T	T	T
			10		1.2	3.5	4	T	T	T	T
			13		1	3	3.5	5	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	T	T	T
			25		1	2	3	4.5	T	T	T
			32		1	2	3	4.5	5	T	T
DS203NC	B,C,K	10	6	1	1.5	4	4.5	7	T	T	T
			8		1.2	3.5	4	6	T	T	T
			10		1.2	3.5	4	6	T	T	T
			13		1	3	3.5	5	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	8	T	T
			25		1	2	3	4.5	6.5	T	T
			32		1	2	3	4.5	5	8	T

MCCB @ 415V - DS203NC @ 400V

			Supply S.	XT2	XT1-XT2						XT1-XT2-XT3					XT3	
			Version	B,C,N, S, H, L,V													
Load S.	Char	Icu [kA]	Release	TM													
			In[A]	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250
DS203NC L	C	6	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			8			3	3	3	4,5	T	T	T	T	T	T	T	T
			10			3	3	3	4,5	T	T	T	T	T	T	T	T
			13					3	4,5	5	T	T	T	T	T	T	T
			16					3	4,5	5	T	T	T	T	T	T	T
			20						3	5	T	T	T	T	T	T	T
			25							5	T	T	T	T	T	T	T
			32								T	T	T	T	T	T	T
DS203NC	B, C, K	10	6	6	6	6	6	6	6	T	T	T	T	T	T	T	T
			8			3	3	3	4,5	7,5	8,5	8,5	T	T	T	T	T
			10			3	3	3	4,5	7,5	8,5	8,5	T	T	T	T	T
			13					3	4,5	5	7,5	7,5	T	T	T	T	T
			16					3	4,5	5	7,5	7,5	T	T	T	T	T
			20						3	5	6	6	T	T	T	T	T
			25							5	6	6	T	T	T	T	T
			32								6	6	7,5	T	T	T	T

RCDs technical details

Coordination tables: selectivity DS202CR

MCCB@415V-DS202CR@230V

			Supply side	XT1						
			Version	B, C						
			Release	TM						
Load side	Char.	Icu [kA]	In [A]	40A	50A	63A	80A	100A	125A	160A
DS202CR	B,C	10	10	0.6	2	2	3	3	6	6
			13	0.6	2	2	3	3	6	6
			16	0.6	2	2	3	3	6	6
			20	0.6	2	2	3	3	6	6
			25	--	0.8	1	1	2	3	3
			32	--	--	1	1	2	3	3
			40	--	--	--	1	2	3	3
DS202CR M	B,C	10	10	0.6	2	2	3	3	6	6
			13	0.6	2	2	3	3	6	6
			16	0.6	2	2	3	3	6	6
			20	0.6	2	2	3	3	6	6
			25	--	0.8	1	1	2	3	3
			32	--	--	1	1	2	3	3
			40	--	--	--	1	2	3	3

			Supply side	XT1						
			Version	N						
			Release	TM						
Load side	Char.	Icu [kA]	In [A]	40A	50A	63A	80A	100A	125A	160A
DS202CR	B, C	10	10	1	2	2	3	3	6	6
			13	1	2	2	3	3	6	6
			16	1	2	2	3	3	6	6
			20	1	2	2	3	3	6	6
			25	1	1	1	1	2	3	3
			32	--	1	1	1	2	3	3
			40	--	--	--	1	2	3	3
DS202CR M	B, C	10	10	1	2	2	3	3	6	6
			13	1	2	2	3	3	6	6
			16	1	2	2	3	3	6	6
			20	1	2	2	3	3	6	6
			25	1	1	1	1	2	3	3
			32	--	1	1	1	2	3	3
			40	--	--	--	1	2	3	3

			Supply side	XT1						
			Version	S, H						
			Release	TM						
Load side	Char.	Icu[kA]	In[A]	40A	50A	63A	80A	100A	125A	160A
DS202CR	B, C	10	10	T	T	T	T	T	T	T
			13	T	T	T	T	T	T	T
			16	T	T	T	T	T	T	T
			20	3.5	T	T	T	T	T	T
			25	1.6	3.5	T	T	T	T	T
			32	--	--	T=10	T	T	T	T
			40	--	--	--	T	T	T	T
DS202CR M	B, C	10	10	T	T	T	T	T	T	T
			13	T	T	T	T	T	T	T
			16	T	T	T	T	T	T	T
			20	3.5	T	T	T	T	T	T
			25	1.6	3.5	T	T	T	T	T
			32	--	--	T =10	T	T	T	T
			40	--	--	--	T	T	T	T

RCDs technical details

Coordination tables: selectivity DS202CR

			Supply S.	XT2							
			Version	S, H, V							
			Release	TM					EL		
Load S.	Char	Icu [kA]	In[A]	63A	80A	100A	125A	160A	63A	125A	160A
DS202CR	B, C	10	10	6	6	T	T	T	T	T	T
			13	6	6	T	T	T	T	T	T
			16	6	6	T	T	T	T	T	T
			20	6	6	T	T	T	T	T	T
			25	1.2	6	T	T	T	T	T	T
			32	1.2	3	T	T	T	T	T	T
			40	--	3	T	T	T	T	T	T
DS202CR M	B, C	10	10	6	6	T	T	T	T	T	T
			13	6	6	T	T	T	T	T	T
			16	6	6	T	T	T	T	T	T
			20	6	6	T	T	T	T	T	T
			25	1.2	6	T	T	T	T	T	T
			32	1.2	3	T	T	T	T	T	T
			40	--	3	T	T	T	T	T	T

RCDs technical details

Coordination tables: selectivity DS202CR

			Supply S.	XT3						
			Version	N,S						
			Release	TM						
Load S.	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
DS202CR	B, C	10	6	T	T	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 [1]	7,5	T	T	T	T
DS202CR M	B, C	10	6	T	T	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T
			40		6 [1]	7,5	T	T	T	T

[1] Value valid in case of Supply S. breaker only magnetic

RCDs technical details

Coordination tables: selectivity DS202CR

			Supply S.	XT4									
			Version	N			S, H, V				S, H, V		
			Release	TM			TM				EL		
Load S.	Char	Icu [kA]	In[A]	160A	200A	250A	125A	160A	200A	250A	125A	160A	250A
DS202CR	B, C	10	10	T	T	T	T	T	T	T	T	T	T
			13	T	T	T	T	T	T	T	T	T	T
			16	T	T	T	T	T	T	T	T	T	T
			20	T	T	T	T	T	T	T	T	T	T
			25	T	T	T	T	T	T	T	T	T	T
			32	T	T	T	T	T	T	T	T	T	T
			40	T	T	T	T	T	T	T	T	T	T
DS202CR	B, C	10	10	T	T	T	T	T	T	T	T	T	T
			13	T	T	T	T	T	T	T	T	T	T
			16	T	T	T	T	T	T	T	T	T	T
			20	T	T	T	T	T	T	T	T	T	T
			25	T	T	T	T	T	T	T	T	T	T
			32	T	T	T	T	T	T	T	T	T	T
			40	T	T	T	T	T	T	T	T	T	T

RCDs technical details

Coordination tables: selectivity DS202CR

			Supply S.	S800											
			Version	S800B			S800C			S800N			S800S		
			Release	16			25			36			50		
Load S.	Char	Icu [kA]	In[A]	80A	100A	125A	80A	100A	125A	80A	100A	125A	80A	100A	125A
DS202CR	B	10	6A	1,2	1,7	3,0	1,2	1,7	3,0	1,2	1,7	3,0	1,2	1,7	3,0
			10A	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6
			16A	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5
			20A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			25A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			32A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			40A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
DS202CR M	B	10	6A	1,2	1,7	3,0	1,2	1,7	3,0	1,2	1,7	3,0	1,2	1,7	3,0
			10A	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6
			16A	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5
			20A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			25A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			32A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			40A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
DS202CR	C	10	6A	1,0	1,8	3,0	1,0	1,8	3,0	1,0	1,8	3,0	1,0	1,8	3,0
			10A	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6
			16A	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5
			20A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			25A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			32A		1,0	1,3		1,0	1,3		1,0	1,3		1,0	1,3
			40A		1,0	1,3		1,0	1,3		1,0	1,3		1,0	1,3
DS202CR M	C	10	6A	1,0	1,8	3,0	1,0	1,8	3,0	1,0	1,8	3,0	1,0	1,8	3,0
			10A	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6	0,9	1,2	1,6
			16A	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5	0,9	1,1	1,5
			20A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			25A		1,1	1,5		1,1	1,5		1,1	1,5		1,1	1,5
			32A		1,0	1,3		1,0	1,3		1,0	1,3		1,0	1,3
			40A		1,0	1,3		1,0	1,3		1,0	1,3		1,0	1,3

RCDs technical details

Coordination tables: selectivity DS203NC

			Supply S.	XT4												
			Version	B,C,N,S,H,L,V												
Load S.	Char	Icu [kA]	Release	TM												
			In[A]	20	25	32	40	50	63	80	100	125	160	200	225	250
DS203NC L	C	6	6	T	T	T	T	T	T	T	T	T	T	T	T	T
			8	3	3	3	4,5	T	T	T	T	T	T	T	T	T
			10	3	3	3	4,5	T	T	T	T	T	T	T	T	T
			13			3	4,5	5	T	T	T	T	T	T	T	T
			16			3	4,5	5	T	T	T	T	T	T	T	T
			20				3	5	T	T	T	T	T	T	T	T
			25					5	T	T	T	T	T	T	T	T
			32						T	T	T	T	T	T	T	T
DS203NC	B, C, K	10	6	6	6	6	6	T	T	T	T	T	T	T	T	T
			8	3	3	3	4,5	7,5	8,5	8,5	T	T	T	T	T	T
			10	3	3	3	4,5	7,5	8,5	8,5	T	T	T	T	T	T
			13			3	4,5	5	7,5	7,5	T	T	T	T	T	T
			16			3	4,5	5	7,5	7,5	T	T	T	T	T	T
			20				3	5	6	6	T	T	T	T	T	T
			25					5	6	6	T	T	T	T	T	T
			32						6	6	7,5	T	T	T	T	T

			Supply S.	XT2				XT4			
			Version	B,C,N,S,H,L,V							
Load S.	Char	Icu [kA]	Release	EL							
			In[A]	25	63	100	160	40	63	100, 160	250
DS203NC L	C	6	6	T	T	T	T	T	T	T	T
			8	T	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T	T
			13	T	T	T	T	T	T	T	T
			16		T	T	T	T	T	T	T
			20		T	T	T	T	T	T	T
			25		T	T	T		T	T	T
			32		T	T	T		T	T	T
DS203NC	B, C, K	10	6	T	T	T	T	T	T	T	T
			8	T	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T	T
			13	T	T	T	T	T	T	T	T
			16		T	T	T	T	T	T	T
			20		T	T	T	T	T	T	T
			25		T	T	T		T	T	T
			32		T	T	T		T	T	T

RCDs technical details

Coordination tables: selectivity DS203NC

MCCB @ 415V -DS203NC @ 400V

			Supply S.	T1										
			Version	B,C,N										
			Release	TM										
			Iu[A]	160										
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160
DS203NC L	C	6	6	T	T	T	T	T	T	T	T	T	T	T
			8			3	3	3	4,5	T	T	T	T	T
			10			3	3	3	4,5	T	T	T	T	T
			13					3	4,5	5	T	T	T	T
			16					3	4,5	5	T	T	T	T
			20						3	5	T	T	T	T
			25							5	T	T	T	T
			32							T	T	T	T	T
DS203NC	B,C,K	10	6	6	6	6	6	6	6	T	T	T	T	T
			8			3	3	3	4,5	7,5	8,5	T	T	T
			10			3	3	3	4,5	7,5	8,5	T	T	T
			13					3	4,5	5	7,5	T	T	T
			16					3	4,5	5	7,5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7,5	T	T

			Supply S.	T2														
			Version	N,S,H,L														
			Release	TM											EL			
			Iu[A]	160											160			
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160	25	63	100	160
DS203NC L	C	6	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			8		3	3	3	3	4,5	T	T	T	T	T	T	T	T	T
			10		3	3	3	3	4,5	T	T	T	T	T	T	T	T	T
			13				3	3	4,5	5	T	T	T	T		T	T	T
			16				3	3	4,5	5	T	T	T	T		T	T	T
			20				3		3	5	T	T	T	T		T	T	T
			25						3	5	T	T	T	T		T	T	T
			32						3		T	T	T	T		T	T	T
DS203NC	B,C,K	10	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			8		3	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	T
			10		3	3	3	3	4,5	7,5	8,5	T	T	T	T	T	T	T
			13				3	3	4,5	5	7,5	T	T	T		T	T	T
			16				3	3	4,5	5	7,5	T	T	T		T	T	T
			20				3		3	5	6	T	T	T		T	T	T
			25						3	5	T	T	T	T		T	T	T
			32						3		6	7,5	T	T		T	T	T

RCDs technical details

Coordination tables: selectivity DS203NC

			Supply S.	T3						
			Version	N,S						
			Release	TM, M						
			Iu[A]	250						
Load S.	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
DS203NC L	C	6	6	T	T	T	T	T	T	T
			8	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13	5	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
			25	5	T	T	T	T	T	T
			32		T	T	T	T	T	T
DS203NC L	B,C,K	10	6	T	T	T	T	T	T	T
			8	7,5	8,5	T	T	T	T	T
			10	7,5	8,5	T	T	T	T	T
			13	5	7,5	T	T	T	T	T
			16	5	7,5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7,5	T	T	T	T

S800-DS203NC @ 400V

		Supply S.	S800N-S					
	Char		B					
		Icu [kA]	36-50					
Load S.			In[A]	50	63	80	100	125
DS203NC L	C	6	6	0.6	1.2	1.6	2.6	3.8
			8	0.5	1.1	1.4	2	3
			10	0.5	1.1	1.4	2	3
			13		0.8	1.2	1.7	2.5
			16		0.8	1.2	1.7	2.5
			20			1	1.5	2.1
			25				1.3	1.8
			32				1.1	1.7
DS203NC	B,C,K	10	6	0.6	1.2	1.6	2.6	3.8
			8	0.5	1.1	1.4	2	3
			10	0.5	1.1	1.4	2	3
			13		0.8	1.2	1.7	2.5
			16		0.8	1.2	1.7	2.5
			20			1	1.5	2.1
			25				1.3	1.8
			32				1.1	1.7

RCDs technical details

Coordination tables: selectivity DS203NC

		Supply S.	S800N-S						
	Char		C						
		Icu [kA]	36-50						
Load S.			In[A]	40	50	63	80	100	125
DS203NC L	C	6	6	0.55	1.1	1.5	2.5	3.6	5.5
			8	0.45	1	1.3	1.9	2.8	4.2
			10	0.45	1	1.3	1.9	2.8	4.2
			13		0.75	1.1	1.6	2.3	3.6
			16		0.75	1.1	1.6	2.3	3.6
			20			0.9	1.4	1.9	3.3
			25				1.2	1.6	2.7
			32				1	1.5	2.5
DS203NC	B,C,K	6	6	0.55	1.1	1.5	2.5	3.6	5.5
			8	0.45	1	1.3	1.9	2.8	4.2
			10	0.45	1	1.3	1.9	2.8	4.2
			13		0.75	1.1	1.6	2.3	3.6
			16		0.75	1.1	1.6	2.3	3.6
			20			0.9	1.4	1.9	3.3
			25				1.2	1.6	2.7
			32				1	1.5	2.5

		Supply S.	S800 N-S								
	Char		D								
		Icu [kA]	36-50								
Load S.			In[A]	25	32	40	50	63	80	100	125
DS203NC L	C	6	6	0.6	1.3	2	3.2	3.9	T	T	T
			8	0.5	1.2	1.65	2.6	3.1	T	T	T
			10	0.5	1.2	1.65	2.6	3.1	T	T	T
			13		0.9	1.4	1.8	2.6	5	T	T
			16		0.9	1.4	1.8	2.6	5	T	T
			20			1.3	1.6	2.2	4.2	5.4	T
			25				1.5	1.9	3.5	4.5	T
			32					1.8	2.8	4.2	5.5
DS203NC	B,C,K	10	6	0.6	1.3	2	3.2	3.9	8	T	T
			8	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		0.9	1.4	1.8	2.6	5	6.3	8.8
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5

RCDs technical details

Coordination tables: selectivity DSE201

Fuses- DSE201 @ 230/240 V

			Supply side	Fuse 25gG	Fuse 40gG	Fuse 50gG	Fuse 63gG	Fuse 80gG	Fuse 100gG	Fuse 125gG	Fuse 160gG	Fuse 200gG
Load side	Char.	Icu [kA]	In [A]	25	40	50	63	80	100	125	160	200
DSE201	B,C	6	up to 20	1	side	3,5	T	T	T	T	T	T
			25-32		2	3	4,5	T	T	T	T	T

MCCB @ 415 V - DSE201 @ 230/240 V

			Supply side	T1						T2					
Load side	Char.	Icu [kA]	In [A]	50	63	80	100	125	160	50	63	80	100	125	160
DSE201	B,C	6	up to 20	3	5	T	T	T	T	3	5	T	T	T	T
			25-32		T	T	T	T	T		T	T	T	T	T

MCCB @ 415 V - DSE201 @ 230/240 V

			Supply side	T3							T4						
Load side	Char.	Icu [kA]	In [A]	63	80	100	125	160	200	250	63	80	100	125	160	200	250
DSE201	B,C	6	up to 20	5	T	T	T	T	T	T	5	T	T	T	T	T	T
			25-32		T	T	T	T	T	T		T	T	T	T	T	T

MCCB @ 415 V - DSE201 @ 230/240 V

			Supply side	XT1						XT2					
Load side	Char.	Icu [kA]	In [A]	50	63	80	100	125	160	50	63	80	100	125	160
DSE201	B,C	6	up to 20	3	5	T	T	T	T	3	5	T	T	T	T
			25-32		T	T	T	T	T		T	T	T	T	T

MCCB @ 415 V - DSE201 @ 230/240 V

			Supply side	XT3							XT4						
Load side	Char.	Icu [kA]	In [A]	63	80	100	125	160	200	250	63	80	100	125	160	200	250
DSE201	B,C	6	up to 20	5	T	T	T	T	T	T	5	T	T	T	T	T	T
			25-32		T	T	T	T	T	T		T	T	T	T	T	T

RCDs technical details

Coordination tables: selectivity DSE201 M

Fuses/S750DR - DSE201M @ 230/240V

		Supply side		Fuse gG							
Load side	Char.	Icu [kA]	In [A]	16	20	25	35	50	63	80	100
DSE201M	B,C	15	6	0.2	0.5	0.8	1.7	3.1	7	10	10
			10	0.2	0.4	0.7	1.4	2.3	3.4	4.8	7.5
			16				1.3	2	2.9	4.2	6
			20					1.9	2.7	3.8	5.6
			25					1.9	2.6	3.6	5.4
			32						2.4	3.2	4.2
			40							3.2	4.2
		10	50								3.5

Fuses/S750DR - DSE201M @ 230/240V

		Supply side		S750DR								
				25								
				E/K								
Load side	Char.	Icu [kA]	In[A]	16	20	25	35	40	50	63	80	100
DSE201M	B,C	15	6	15	15	15	15	15	15	15	10	10
			10	15	15	15	15	15	15	15	10	10
			16			15	15	15	15	15	10	10
			20				15	15	15	15	10	10
			25					15	15	15	10	10
			32						15	15	10	10
			40							15	10	10
		10	50								8	8

MCCB @ 415 V - DSE201M @ 230/240 V

			Supply side	XT1										
			Version	B,C,N,S,H										
			Release	TM										
			Iu [kA]	160										
			Icu [A]	18,25,36,50,70										
Load side	Char.	Icu [kA]	Icn [A]	16	20	25	32	40	50	63	80	100	125	160
DSE201M	B,C	15	6	3	3	3	5	6	6	10	T	T	T	T
			10			3	3	3	4.5	7.5	7.5	T	T	T
			16					3	4.5	5	7.5	12.5	T	T
			20						3	5	6	10	T	T
			25							5	6	10	10	T
			32							3	6	7.5	10	T
			40									7.5	10	T
		10	50										T	T

RCDs technical details

Coordination tables: selectivity DSE201 M

MCCB @ 415 V - DSE201M @ 230/240 V

			Supply side	XT2						XT3						
			Version	N,S,H,L,V						N,S						
			Release	TM						TM						
			Iu [kA]	160						250						
			Icu [A]	36,50,70,120,150						36,50						
Load side	Char.	Icu [kA]	Icn [A]	12.5	63	80	100	125	160	63	80	100	125	160	200	250
DSE201M	B,C	15	6	3	10	T	T	T	T	10	T	T	T	T	T	T
			10		7.5	7.5	T	T	T	7.5	7.5	T	T	T	T	T
			16		5	7.5	12.5	T	T	5	7.5	12.5	T	T	T	T
			20		5	6	10	T	T	5	6	10	T	T	T	T
			25		5	6	10	10	T	5	6	10	10	T	T	T
			32		3	6	7.5	10	T	3	6	7.5	10	T	T	T
			40				7.5	10	T			7.5	10	T	T	T
		10	50					T	T				10	10	T	T

MCCB @ 415 V - DSE201M @ 230/240 V

			Supply side	XT4												
			Version	N,S,H,L.V												
			Release	TM												
			Iu [kA]	250												
			Icu [A]	36,50,70,120,150												
Load side	Char.	Icu [kA]	Icn [A]	20	25	32	40	50	63	80	100	125	160	200	225	250
DSE201M	B,C	15	6	6	6	6	6	7.5	10	T	T	T	T	T	T	T
			10	3	3	4.5	5	6.5	7.5	9	T	T	T	T	T	T
			16		3	4.5	5	6.5	5	8	T	T	T	T	T	T
			20				5	5	5	7.5	T	T	T	T	T	T
			25					5	5	7.5	T	T	T	T	T	T
			32						5	6	T	T	T	T	T	T
			40							5	T	T	T	T	T	T
		10	50							5	T	T	T	T	T	T

MCCB @ 415 V - DSE201M @ 230/240 V

			Supply side	XT2					XT4				
			Version	N,S,H,L,V					N,S,H,L,V				
			Release	EL					EL				
			Iu [kA]	160					250				
			Icu [A]	36,50,70,120,150					36,50,70,120,150				
Load side	Char.	Icu [kA]	Icn [A]	10	25	63	100	160	40	63	100	160	250
DSE201M	B,C	15	6	T	T	T	T	T	T	T	T	T	T
			10		T	T	T	T	T	T	T	T	T
			16			T	T	T	T	T	T	T	T
			20			T	T	T	T	T	T	T	T
			25			T	T	T		T	T	T	T
			32			T	T	T		T	T	T	T
			40				T	T			T	T	T
		10	50				T	T			T	T	T

RCDs technical details

Coordination tables: selectivity DSE201 M

MCCB @ 415 V - DSE201M @ 230/240 V

			Supply side	T2				T1-T2					T1-T2-T3				T3
			Version				B,C,N, S, H, L						B,C,N, S, H, L, V				
			Release				TM										
Load side	Char.	Icu [kA]	In [A]	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250
DSE201M	B,C	15	6	5.5 [1]	5.5	5.5	5.5	5.5	5.5	5.5	10.5	T	T	T	T	T	T
			10			3 [1]	3	3	3	4.5	7.5	8.5	T	T	T	T	T
			16					3 [1]	3	4.5	5	7.5	12	T	T	T	T
			20					3 [1]		3	5	6	10	T	T	T	T
			25							3 [1]	5	6	10	T	T	T	T
			32							3 [1]		6	7.5	12	T	T	T
			40									5.5 [1]	7.5	12	T	T	T
		10	50									3 [1]	5 [2]	7.5	10.5	T	T

[1]) Value valid only for T2 magnetic only supply side circuit-breaker

[2]) Value valid only for T2-T3 magnetic only supply side circuit-breaker

MCCB @ 415 V - DSE201M @ 230/240 V

			Supply side						T4					T5
			Version						B,C,N,S,H,L,V					
			Release						TM					
Load side	Char.	Icu [kA]	In [A]	20	25	32	50	80	100	125	160	200	250	320-500
DSE201M	B,C	15	6	7.5	7.5 [3]	7.5	7.5	T	T	T	T	T	T	T
			10	5	5 [3]	5	6.5	9	T	T	T	T	T	T
			16		3 [3]	5	6.5	8	T	T	T	T	T	T
			20				5	7.5	T	T	T	T	T	T
			25				5	7.5	T	T	T	T	T	T
			32				5 [3]	7.5	T	T	T	T	T	T
			40					6.5	T	T	T	T	T	T
		10	50					5 [3]	T	T	T	T	T	T

[3]) Value valid only for T4 magnetic only supply side circuit-breaker

MCCB @ 415 V - DSE201M @ 230/240 V

			Supply side			T2			T4	T5
			Version					B,C,N,S,H,L,V		
			Release					EL		
Load side	Char.	Icu [kA]	In [A]	25	63	100	160	100,160	250,320	320-630
DSE201M	B,C	15	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			16		T	T	T	T	T	T
			20		T	T	T	T	T	T
			25		T	T	T	T	T	T
			32		T	T	T	T	T	T
			40			T	T	T	T	T
		10	50			10.5	10.5	T	T	T

RCDs technical details

Coordination tables: selectivity DSE201 M

S800 - DSE201M @230/240 V

			Supply side	S800 S					
				B					
				50					
Load side	Char.	Icu [kA]	In [A]	40	50	63	80	100	125
DSE201M	B,C	15	6	0.4	0.5	0.7	1	1.5	2.6
			10		0.4	0.6	0.7	1	1.4
			16				0.7	0.9	1.3
			20					0.9	1.3
			25					0.9	1.3
			32					0.8	1.1
			40					0.8	1.1
		10	50						1

S800 - DSE201M @230/240 V

			Supply side	S800 S							
				C							
				50							
Load side	Char.	Icu [kA]	In [A]	25	32	40	50	63	80	100	125
DSE201M	B,C	15	6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
		10	50						0.7	0.9	1.3

S800 - DSE201M @230/240 V

			Supply side	S800 S							
				D							
				50							
Load side	Char.	Icu [kA]	In [A]	25	32	40	50	63	80	100	125
DSE201M	B,C	15	6	0.5	1	1.2	2	2.8	T *	T	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
		10	50						1.5	1.9	2.3

*) 9.9 for C char

RCDs technical details

Coordination tables: selectivity DSE201 M

S800 - DSE201M @230/240 V

			Supply side	S800 N					
				B					
				36					
Load side	Char.	Icu [kA]	In [A]	40	50	63	80	100	125
DSE201M	B,C	15	6	0.4	0.5	0.7	1	1.5	2.6
			10		0.4	0.6	0.7	1	1.4
			16				0.7	0.9	1.3
			20					0.9	1.3
			25					0.9	1.3
			32					0.8	1.1
			40					0.8	1.1
		10	50						1

S800 - DSE201M @230/240 V

			Supply side	S800 N							
				C							
				36							
Load side	Char.	Icu [kA]	In [A]	25	32	40	50	63	80	100	125
DSE201M	B,C	15	6		0.4	0.5	0.7	0.9	1.4	2.4	4.8
			10		0.3	0.4	0.5	0.7	0.9	1.3	2
			16		0.3	0.4	0.5	0.7	0.9	1.3	1.9
			20			0.4	0.5	0.7	0.9	1.2	1.8
			25			0.4	0.5	0.7	0.9	1.2	1.8
			32				0.5	0.6	0.8	1	1.4
			40					0.6	0.8	1	1.4
		10	50						0.7	0.9	1.3

S800 - DSE201M @230/240 V

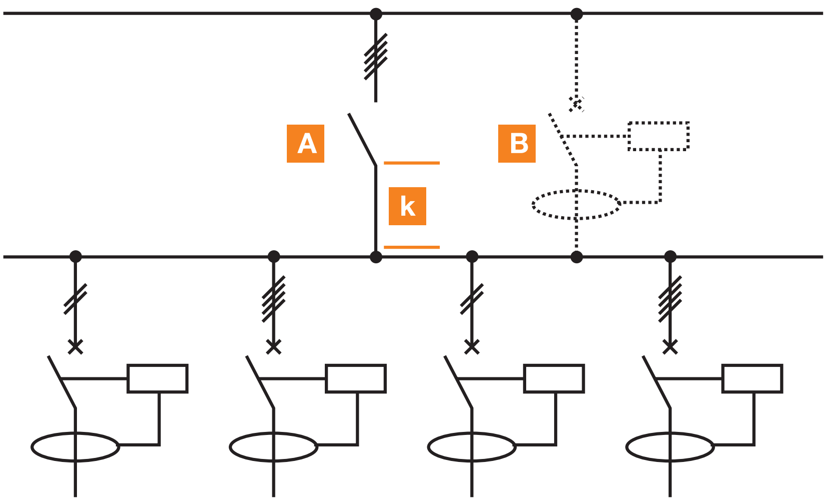
			Supply side	S800 N							
				D							
				36							
Load side	Char.	Icu [kA]	In [A]	25	32	40	50	63	80	100	125
DSE201M	B,C	15	6	0.5	1	1.2	2	2.8	T	T	T
			10	0.4	0.6	0.8	1.1	1.4	2.8	3.9	7.4
			16		0.6	0.8	1.1	1.4	2.5	3.3	5.6
			20			0.8	1.1	1.3	2.3	3	4.7
			25			0.8	1.1	1.3	2.3	3	4.7
			32				0.9	1.1	1.9	2.4	3.7
			40					1.1	1.9	2.4	3.7
		10	50						1.5	1.9	2.3

RCDs technical details

Coordination tables: residual current protection selectivity

Selectivity
RCDs raise similar issue to those surrounding the installation of MCBs, and in particular the need to reduce to a minimum the parts of the system out of order in the event of a fault. For RCBOs the problem of selectivity in the case of short-circuit currents may be handled with the same specific criteria as for MCBs.
However, for correct residual current protection, the more important aspects are linked to tripping times. Protection against contact voltages is only effective if the maximum times indicated on the safety curve are not exceeded.
If an electrical system has user devices with earth leakage currents which exceed the normal values (e.g.: presence of capacitor input filters inserted between the device phase and earth cables) or if the system consists of many user devices, it is good practice to install various RCDs, on the main branches, with an upstream main residual current or non-residual current device instead of a single main RCD.

Horizontal selectivity
The non-residual current main circuit-breaker provides “horizontal selectivity”, preventing an earth fault at any point on the circuit or small leakage from causing unwanted main circuit-breaker tripping, which would put the entire system out of order.
However, in this way, section k of the circuit between the main circuit-breaker and the RCDs remains without “active” protection. Using a main RCD to protect it would lead to problems with “vertical selectivity”, which require tripping of the various devices to be co-ordinated, so that service continuity and system safety are not compromised. In this case, selectivity may be amperometric (partial) or chronometric (total).



Vertical selectivity
Vertical selectivity may also be established for residual current tripping, bearing in mind that in working back from system peripheral branches to the main electrical panels the risk of unskilled persons coming into contact with dangerous parts is significantly reduced.

RCDs technical details

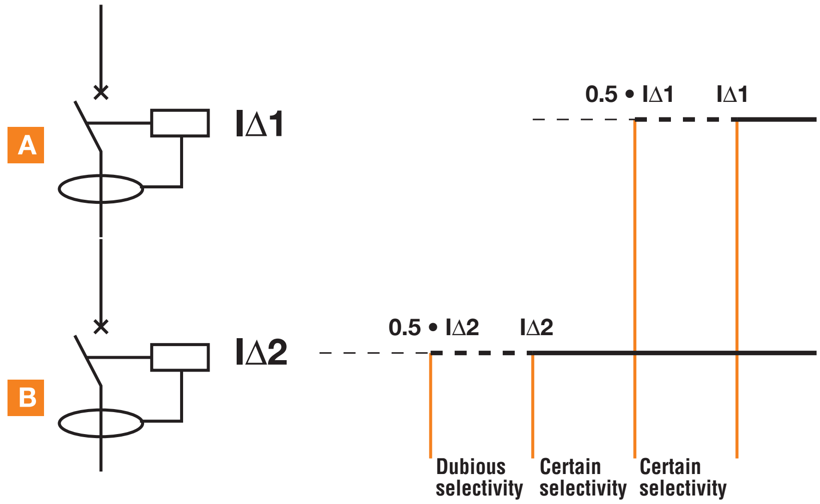
Coordination tables: residual current protection selectivity

Amperometric (partial) selectivity

Selectivity may be created by placing low-sensitivity RCDs upstream and higher-sensitivity RCDs downstream.

An essential condition which must be satisfied in order to achieve selective co-ordination is that the IΔ1 value of the breaker upstream (main breaker) is more than double the IΔ2 value of the breaker downstream. The operative rule to obtain an amperometric (partial) selectivity is IΔn of the upstream breaker = 3 x IΔn of the downstream breaker (e. g.: F 204, A type, 300 mA upstream; F 202, A type, 100 mA downstream).

In this case, selectivity is partial and only the downstream breaker trips for earth fault currents IΔ2< IΔm<0.5*IΔ1.



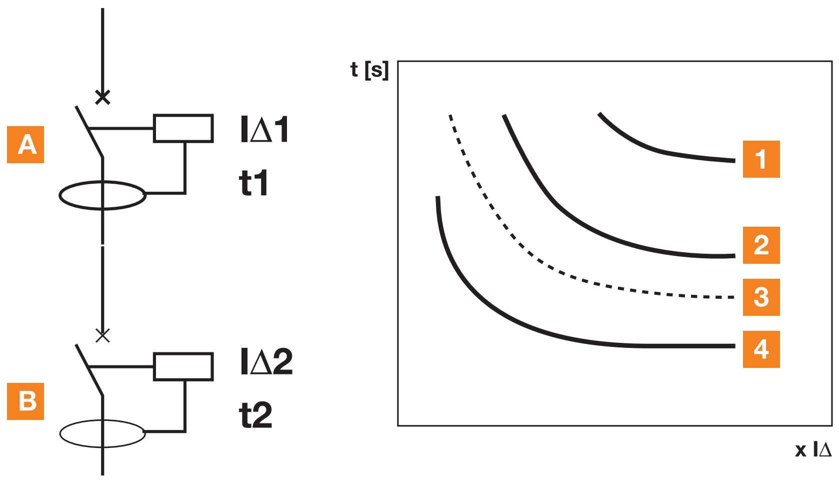
Chronometric (total) selectivity

To achieve total selectivity, delayed or selective RCDs must be installed.

The tripping times of the two devices connected in series must be co-ordinated so that the total interruption time t2 of the downstream breaker is less than the upstream breaker's no-response limit time t1, for any current value. In this way, the downstream breaker completes its opening before the upstream one.

To completely guarantee total selectivity, the IΔ value of the upstream device must also be more than double that of the downstream device in accordance with IEC 64-8/563.3, comments. The operative rule to obtain an choronometric (total) selectivity is IΔn of the upstream breaker = 3 x IΔn of the downstream breaker (e. g.: F 204, S type, 300 mA upstream; F 202, A type, 100 mA downstream).

For safety reasons, the delayed tripping times of the upstream breaker must always be below the safety curve.



Legend

1 Theoretical safety curve

2 RCD A tripping characteristic

3 No-response limit times

4 RCD B tripping characteristic

RCDs technical details

Coordination tables: residual current protection selectivity

Table of RCD selectivity

	Upstream IΔn [mA]	10	30	100	300	300	500	500	1000	1000
Downstream IΔn [mA]	inst	inst	inst	inst	inst	S	inst	S	inst	S
10	inst		▲	▲	▲	■	▲	■	▲	■
30	inst			▲	▲	■	▲	■	▲	■
100	inst				▲	■	▲	■	▲	■
300	inst								▲	■
300	S								▲	▲
500	inst									
500	S									
1000	inst									
1000	S									

inst = instantaneous S = selective ▲ = amperometric (partial) selectivity ■ = chronometric (total) selectivity

Back-up F-ATI Test and F-ARI Test

The values has to be delivered from the LAb

2P	Rated current [A]		25	40	63	80	100
Single phase circuit with neutral 230-240 V	Fuse gG 25A	kA	10				
	Fuse gG 40A		10	10			
	Fuse gG 63A		10	10	10		
	Fuse gG 100A		10	10	10		
	S800 S		6	9	10		
	S800 N		6	9	10		
	S200		7	7	5		
	S200 M		7	7	5		
	S200 P		7	7	5		
	S300 P		7	7	5		

4P	Rated current [A]		25	40	63	80	100
Three phase circuit with neutral 400-415 V	Fuse gG 25A		10				
	Fuse gG 40A		10	10			
	Fuse gG 63A		10	10	10		
	Fuse gG 100A		10	10	10	10	10
	S800 S		10	10	10	10	10
	S800 N		10	10	10	10	10
	S200		10	10	10	10	10
	S200 M		10	10	10	10	10
	S200 P		10	10	10	10	10
	S300 P		10	10	10	10	10

RCDs technical details

Coordination tables: residual current protection selectivity

Back-up F-ATI Test 2 & 4 pole with Selective SMCB S750

Upstream technology						MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB
	Product Range					SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB
		Series				S750	S750	S750	S750	S750	S750DR	S750DR	S750DR	S750DR	S750DR
			Characteristics			E,K	E,K	E,K	E,K	E,K	E,K	E,K	E,K	E,K	E,K
				Icu		25	25	25	25	25	25	25	25	25	25
					In	25	35	40	50	63	25	35	40	50	63
RCD	System pro M compact	F-ATI 2 Test	A	10	25	20					20				
			A	10	40	20	20	20			20	20	20		
			A	10	63	20	20	20	20	20	20	20	20	20	20
			A	10	25	20					20				
			A	10	40	20	20	20			20	20	20		
			A	10	63	20	20	20	20	20	20	20	20	20	20

Upstream technology						MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB
	Product Range					SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB	SMCB
		Series				S750	S750	S750	S750	S750	S750DR	S750DR	S750DR	S750DR	S750DR
			Characteristics			E,K	E,K	E,K	E,K	E,K	E,K	E,K	E,K	E,K	E,K
				Icu		25	25	25	25	25	25	25	25	25	25
					In	25	35	40	50	63	25	35	40	50	63
RCD	System pro M compact	F-ATI 4 Test	A	10	25	20					20				
			A	10	40	20	20	20			20	20	20		
			A	10	63	20	20	20	20	20	20	20	20	20	20
			A	10	25	20					20				
			A	10	40	20	20	20			20	20	20		
			A	10	63	20	20	20	20	20	20	20	20	20	20

RCDs technical details

Coordination tables: residual current protection selectivity

Back-up F-ATI Test 2 & 4 pole with MCB S800S, S800N

Upstream technology						MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB
	Product Range					S800	S800	S800	S800	S800	S800	S800	S800	S800	S800
		Series				S800S	S800S	S800S	S800S	S800S	S800N	S800N	S800N	S800N	S800N
			Characteristics			B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K	B,C,D	B,C,D	B,C,D	B,C,D	B,C,D
				Icu		50	50	50	50	50	36	36	36	36	36
					In	25	32	40	50	63	25	32	40	50	63
RCD	System pro M compact	F-ATI 2 Test	A	10	25	20					15				
			A	10	40	20	20	20			15	15	15		
			A	10	63	20	20	20	20	20	15	15	15	15	15
			A	10	25	20					15				
			A	10	40	20	20	20			15	15	15		
			A	10	63	20	20	20	20	20	15	15	15	15	15

Upstream technology						MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB
	Product Range					S800	S800	S800	S800	S800	S800	S800	S800	S800	S800
		Series				S800S	S800S	S800S	S800S	S800S	S800N	S800N	S800N	S800N	S800N
			Characteristics			B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K	B,C,D	B,C,D	B,C,D	B,C,D	B,C,D
				Icu		50	50	50	50	50	36	36	36	36	36
					In	25	32	40	50	63	25	32	40	50	63
RCD	System pro M compact	F-ATI 4 Test	A	10	25	20					15				
			A	10	40	20	20	20			15	15	15		
			A	10	63	20	20	20	20	20	15	15	15	15	15
			A	10	25	20					15				
			A	10	40	20	20	20			15	15	15		
			A	10	63	20	20	20	20	20	15	15	15	15	15

RCDs technical details

Coordination tables: residual current protection selectivity

Back-up F-ATI Test 2 & 4 pole with MCB S800S+S802S-SCL-SR

Upstream technology						MCB	MCB	MCB	MCB	MCB
	Product Range					S800	S800	S800	S800	S800
		Series				S800S+S802S-SCL-SR	S800S+S802S-SCL-SR	S800S+S802S-SCL-SR	S800S+S802S-SCL-SR	S800S+S802S-SCL-SR
			Characteristics			B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K
				Icu		100	100	100	100	100
					In	25	32	40	50	63
RCD	System pro M compact	F-ATI 2 Test	A	10	25	50				
RCD	System pro M compact	F-ATI 2 Test	A	10	40	50	50	50		
RCD	System pro M compact	F-ATI 2 Test	A	10	63	50	50	50	50	50
RCD	System pro M compact	F-ATI 2 Test	A	10	25	50				
RCD	System pro M compact	F-ATI 2 Test	A	10	40	50	50	50		
RCD	System pro M compact	F-ATI 2 Test	A	10	63	50	50	50	50	50

Upstream technology						MCB	MCB	MCB	MCB	MCB
	Product Range					S800	S800	S800	S800	S800
		Series				S800S+S803S-SCL-SR	S800S+S803S-SCL-SR	S800S+S803S-SCL-SR	S800S+S803S-SCL-SR	S800S+S803S-SCL-SR
			Characteristics			B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K	B,C,D,K
				Icu		50	50	50	50	50
					In	25	32	40	50	63
RCD	System pro M compact	F-ATI 4 Test	A	10	25	50				
RCD	System pro M compact	F-ATI 4 Test	A	10	40	50	50	50		
RCD	System pro M compact	F-ATI 4 Test	A	10	63	50	50	50	50	50
RCD	System pro M compact	F-ATI 4 Test	A	10	25	50				
RCD	System pro M compact	F-ATI 4 Test	A	10	40	50	50	50		
RCD	System pro M compact	F-ATI 4 Test	A	10	63	50	50	50	50	50

RCDs technical details

Power loss, derating and performance in altitude

Power loss and internal resistance of RCDs and RCBOs

RCCBs F200 series

Rated current	Power loss per pole W	
In [A]	[W]	
	2P	4P
16	1.5	-
25	1.0	1.3
40	2.4	3.2
63	3.2	4.4
80	4.5	5.3
100	6.5	8.2
125	-	7.5

RCCBs F200 Type B

Power Loss [W]	In [A]	Per Pole	Total
F202 B	16	0.26	0.82
	25	0.65	1.6
	40	1.65	3.6
	63	4.14	8.58
F204 B	25	0.74	3.42
	40	1.92	6.96 (9.26)*
	63	4.8	15.6 (17.9)*
	80	5	17.2
	125	11.2	35.8

* 500 mA

RCD-Blocks DDA200 series

Rated current	Power loss WIb* ①	
Ib [A]	[W]	
	2P	3P,4P
25	2.0	3.0
40	3.2	4.8
63	5.0	7.6

* The power loss W_{Ib} shown in the table refers to Ib. For use with circuit-breakers with lower rated current In the power loss W must be determined using the formula: W = (I / Ib) • W_{Ib}

RCBOs DS 200, DS 200 M series

Rated current	Power loss W ①			
In [A]	[W]			
	Characteristic B-C		Characteristic K	
	2P	3P/4P	2P	3P/4P
6	4.1	6.2	3.9	5.9
10	2.9	4.4	2.9	4.2
13	5.2	7.7	3.1	4.5
16	4.5	6.6	4.9	7.2
20	6.4	9.3	6.8	9.9
25	8.5	12.4	7.9	11.5
32	10.9	15.7	10.7	15.4
40	15	21.6	14.4	20.7
50	11.4	18.4	10.7	17.4
63	17.4	28.2	18.2	29.4

① datas available in the tables are reffered to the Power Loss per device

RCD-Blocks DDA800

Rated current	Power loss WIb* ①	
In [A]	[W]	
	2P	3P, 4P
63	9	13.5
100	7	10.5
125	-	16.6

* The power loss W_{Ib} shown in the table refers to Ib. For use with circuit-breakers with lower rated current In the power loss W must be determined using the formula: W = (I / Ib) • W_{Ib}

RCBOs DS201

	DS201	
Rated current In [A]	Power loss ①	Internal resistance
	[W]	[mΩ]
1	1.4	1400.0
2	1.6	400.0
4	2.2	137.5
6	2.4	66.7
8	1.9	29.7
10	1.8	18.0
13	2.5	15.0
16	3.3	12.8
20	3.6	9.0
25	5.5	8.8
32	6.4	6.3
40	5.0	3.1

RCBOs DS202CR series

In	Power loss [W] ①	Internal resistence [mΩ]
6	3,0	84,4
10	3,3	32,8
13	3,8	22,5
15	3,9	16,4
16	4,2	16,4
20	5,0	12,6
25	6,2	9,9
32	7,6	7,4
40	8,9	5,6

RCBOs DS203NC series

In	Power loss [W] ①	Internal resistence [mΩ]
6A	7.5	207.3
8A	4.2	66.4
10A	5.6	55.9
13A	7.2	42.5
16A	10.0	39.3
20A	11.8	29.5
25A	10.3	16.4
32A	15.1	14.8

DS800 and DS800 N series ①

Rated current	Rated current		
in [A]	2P	3P	4P
125	25.7	45.7	55.1

RCDs technical details

Power loss, derating and performance in altitude

RCBO DS301C - Voltage Drop, power loss, internal resistance, own consumption

Charateristic B

In (A)	Voltage drop (V)	Powerloss (W)				Internal Resistance (mΩ)
		Average per pole	Phase pole	Neutral pole	Total	
6 A	0.4	1.10	2.1	0.1	2.2	61.0
10 A	0.3	1.30	2.35	0.25	2.6	26.0
13 A	0.2	1.24	2.12	0.35	2.47	14.6
16 A	0.0	1.42	2.11	0.72	2.83	11.1
20 A	0.2	1.83	2.88	0.78	3.66	9.2
Characteristic C						
6 A	0.3	0.78	1.47	0.09	1.56	43.3
10 A	0.2	0.75	1.25	0.25	1.5	15.0
13 A	0.2	1.13	1.95	0.3	2.25	13.3
16 A	0.2	1.24	1.84	0.65	2.48	9.7
20 A	0.2	1.70	2.6	0.8	3.4	8.5

RCBO DSE201 series

In [A]	Voltage drop [V]	Power loss [W]	Internal resistance [mΩ]
6	0.42	2.5	70
10	0.25	2.5	25
16	0.24	3.8	15
20	0.27	5.5	14
25	0.15	3.8	6.1
32	0.16	5.2	5
40	0.14	5.5	3.4
50	0.11	5.3	2.1

RCBO DSE201 M series

In [A]	Voltage drop [V]	Power loss [W]	Internal resistance [mΩ]
6	0.30	1.8	49
10	0.18	1.8	18
16	0.15	2.4	9.5
20	0.15	3.0	7.6
25	0.13	3.3	5.3
32	0.14	4.4	4.3
40	0.14	5.5	3.4
50	0.11	5.3	2.1

Derating of load capability of RCBOs DS 200 series, DS201, DS202CR, DS203NC, DSE201 and DSE201 M
For DS 200 see tables for S 200 MCBs in technical details MCBs and dedicated tables for DS201 and DS202CR, within the range of temperatures from -25 °C to +55 °C.

Performance in altitude of RCDs
ABB RCDs are able to operate at altitude higher then foreseen by the relevant standard IEC/ EN 61008 and IEC/ EN 61009 taking into account the corrective factor below detailed:

Elevation	[m]	2000	3000	4000	5000	6000
Rated Current	[A]	1.0 x In	0.96 x In	0.94 x In	0.92 x In	0.90 x In
Rated Voltage	[V]	1.0 x Un	0.877 x Un	0.775 x Un	0.676 x Un	0.588 x Un

For altitude higher then 3.000 m the isolating characteristic is no longer available.

For DDA800 RCD Blocks according to IEC/EN 60947-2, up to 2000 meters above sea level, the rated characteristics remain unchanged.
With increasing altitude, the properties of the atmosphere change regarding composition, dielectricity, the cooling capacity and the pressure.

The characteristics of the DDA800 RCD Blocks therefore change: this can be measured for the most part using the change in significant parameters such as the maximum rated operational voltage and the rated current:

Elevation	[m]	2000	3000	4000	5000
Rated operational voltage Ue	[V]	690	600	540	470
Max rated current In	[A]	1x In	0.96 x In	0.93 x In	0.9 x In

RCDs technical details

Power loss, derating and performance in altitude

Derating in temperature for DS301C series

Max operating current depending on the ambient temperature (daily average ≤ 35°C) of cha-racteristics type B and C.

In	Temperature (°C)											
	-25	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**	**55**	**60**	**70**
6 A	8.3	7.8	7.3	7.0	6.7	6.3	6.0	6.0	5.9	5.8	5.7	5.7
10 A	13.8	13.5	12.7	12.1	11.0	10.4	10.0	9.5	9.2	9.0	8.9	8.8
13 A	17.8	17.1	16.5	15.8	14.8	13.9	13.0	12.4	12.2	12.0	11.9	11.8
16 A	20.6	19.9	19.0	18.4	17.7	16.6	16.0	15.4	15.0	14.8	14.6	14.5
20 A	25.8	24.8	23.5	22.9	21.9	20.8	20.0	19.4	18.7	18.2	18.0	17.9

Derating in temperature for DS203NC series

Max operating current depending on the ambient temperature of a circuit breaker in load circuit of characteristics type B, C, K. Daily average ambient temperature is intended to be ≤ +35 °C.

B, C	**Temperature (°C)**									
In	**-25**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**55**	**70**
6A	7.29	7.16	6.91	6.65	6.41	6.17	6.00	5.90	5.75	
8A	9.71	9.54	9.20	8.85	8.55	8.24	8.00	7.83	7.57	
10A	12.13	11.92	11.49	11.06	10.68	10.31	10.00	9.76	9.39	
13A	15.77	15.49	14.93	14.37	13.89	13.41	13.00	12.65	12.12	
16A	19.40	19.06	18.37	17.68	17.10	16.52	16.00	15.54	14.5	13.8
20A	23.66	23.32	22.63	21.94	21.26	20.57	20.00	19.53	18.84	
25A	29.00	28.65	27.96	27.27	26.46	25.65	25.00	24.53	23.83	
32A	38.67	38.13	37.04	35.96	34.48	33.00	32.00	31.47	29	27

K	**Temperature (°C)**									
In	**-25**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**55**	**70**
6A	7.2	6.9	6.6	6.4	6.2	6.0	5.8	5.7	5.6	
8A	9.5	9.2	8.9	8.5	8.2	8.0	7.8	7.6	7.4	
10A	11.9	11.5	11.1	10.7	10.3	10.0	9.7	9.5	9.1	
13A	15.5	14.9	14.4	13.9	13.4	13.0	12.6	12.3	11.7	
16A	19.2	18.4	17.7	17.1	16.5	16.0	15.5	15.1	14.5	13.8
20A	23.3	22.6	21.9	21.3	20.6	20.0	19.4	19.0	18.3	
25A	28.8	28.1	27.3	26.5	25.6	25.0	24.4	23.9	23.2	
32A	38.4	37.2	35.8	34.5	33.0	32.0	31.0	30.5	29	27

Derating in temperature for DS201 series

Max operating current depending on the ambient temperature of a circuit breaker in load circuit of characteristics type B, C. Daily average ambient temperature is intended to be ≤ +35 °C.

In (A)	**Temperature (°C)**												
	-25	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**	**55**	**60**	**65**	**70**
2A	3.9	3.6	3.2	2.9	2.7	2.4	2.0	1.8	1.7	1.6	1.5	1.4	1.3
4A	6.1	5.8	5.4	5.0	4.7	4.4	4.0	3.6	3.4	3.2	3.1	3.0	2.8
6A	8.7	8.4	7.7	7.3	7.0	6.4	6.0	5.5	5.3	5.1	4.9	4.7	4.6
8A	10.8	10.3	9.5	9.0	8.7	8.3	8.0	7.4	7.1	7.0	6.8	6.6	6.5
10A	13.5	13.0	12.1	11.5	11.0	10.6	10.0	9.4	9.0	8.8	8.6	8.4	8.3
13A	16.0	15.6	14.9	14.5	14.0	13.4	13.0	12.4	11.7	11.4	11.2	11.0	10.8
16A	18.9	18.6	18.1	17.5	17.0	16.4	16.0	15.3	14.8	14.5	14.3	14.1	14.0
20A	24.0	23.5	22.7	22.0	21.4	20.7	20.0	19.1	18.5	18.3	18.0	17.8	17.7
25A	27.9	27.5	27.1	26.6	26.0	25.3	25.0	24.3	23.6	23.4	23.2	23.0	22.8
32A	36.8	36.2	35.4	34.8	34.0	32.9	32.0	31.3	30.5	30.0	29.7	29.5	29.4
40A	44.8	44.6	44.0	43.2	42.1	41.0	40.0	39.0	38.1	37.9	37.6	37.4	37.2

RCDs technical details

Power loss, derating and performance in altitude

Max operating current depending on the ambient temperature of a circuit breaker in load circuit of characteristics type K. Daily average ambient temperature is intended to be ≤ +35 °C.

In (A)	Temperature (°C)												
	-25	-20	-10	0	10	20	30	40	50	55	60	65	70
1A	2.2	2.2	1.7	1.5	1.3	1.0	0.7	0.6	0.6	0.5	0.5	0.4	0.4
2A	3.5	3.2	2.8	2.8	2.4	2.0	1.8	1.8	1.7	1.6	1.5	1.5	1.4
4A	5.7	5.3	4.9	4.8	4.4	4.0	3.6	3.4	3.3	3.0	2.9	2.8	2.8
6A	8.0	7.7	7.4	7.0	6.5	6.0	5.4	5.3	5.2	4.8	4.7	4.6	4.5
8A	10.0	9.5	9.0	8.7	8.2	8.0	7.4	7.1	7.0	6.7	6.6	6.5	6.4
10A	12.6	12.1	11.5	11.0	10.5	10.0	9.4	9.1	8.9	8.8	8.6	8.4	8.3
13A	15.4	14.9	14.4	14.1	13.4	13.0	12.5	11.8	11.4	11.2	11.0	10.8	10.7
16A	18.7	18.2	17.5	17.0	16.4	16.0	15.4	14.7	14.6	14.3	14.2	14.0	13.9
20A	23.1	22.7	22.1	21.3	20.7	20.0	19.1	18.5	18.2	18.1	17.9	17.8	17.7
25A	27.4	27.1	26.5	26.0	25.4	25.0	24.3	23.6	23.4	23.2	23.0	22.8	22.6
32A	36.1	35.4	34.9	34.0	32.8	32.0	31.2	30.5	29.9	29.7	29.5	29.4	29.3
40A	44.4	43.9	43.2	42.1	40.9	40.0	39.0	38.2	37.7	37.4	37.2	37.0	36.8

Derating in temperature for DS202CR series

Max. operating current depending on the ambient temperature of a circuit-breaker in load circuit of characteristics type B and C. Daily average ambient temperature is intended to be ≤ +35 °C.

B, C	Temperature (°C)							
In (A)	0	10	20	25	30	40	50	60
6	7,2	6,8	6,4	6,2	6,0	5,5	5,1	4,5
10	12,2	11,5	10,8	10,4	10,0	9,1	8,2	7,1
13	15,7	14,8	13,9	13,5	13,0	12,0	10,9	9,6
16	19,1	18,2	17,1	16,6	16,0	14,8	13,4	11,9
20	24,0	22,8	21,4	20,7	20,0	18,4	16,6	14,5
25	30,2	28,6	26,9	26,0	25,0	22,9	20,6	18,0
32	37,6	35,9	34,0	33,0	32,0	29,9	27,5	25,0
40	46,5	44,4	42,3	41,2	40,0	37,5	34,9	31,9

RCDs technical details

Power loss, derating and performance in altitude

Derating in temperature for DSE201 series

Max operating current depending on the ambient temperature of a circuit breaker in load circuit of characteristics type B. C. Daily average ambient temperature is intended to be ≤ +35 °C.

	Temperature (°C)									
In	-25	-20	-10	0	10	20	30	40	50	55
6 A	8.1	8.0	7.8	7.4	6.9	6.5	6.0	5.9	5.8	5.7
10 A	13.8	13.5	13.0	12.3	11.6	10.8	10.0	9.9	9.7	9.7
16 A	19.7	19.5	19.1	18.5	17.6	16.6	16.0	15.8	15.5	15.4
20 A	23.7	23.5	23.2	22.7	21.6	20.5	20.0	19.7	19.4	19.2
25 A	30.2	29.2	29.2	28.4	27.0	25.7	25.0	24.6	24.1	23.9
32 A	39.4	37.7	37.7	36.4	34.7	33.0	32.0	31.4	30.7	30.4
40 A	50.3	47.9	47.9	45.6	43.6	41.5	40.0	39.0	38.4	38.1
50 A	61.1	59.2	59.2	57.1	54.4	51.7	50.0	48.8	48.0	47.9

Derating in temperature for DSE201 M series

Max operating current depending on the ambient temperature of a circuit breaker in load circuit of characteristics type B, C. Daily average ambient temperature is intended to be ≤ +35 °C.

	Temperature (°C)									
In	-25	-20	-10	0	10	20	30	40	50	55
6 A	7.3	7.2	6.9	6.7	6.4	6.2	6.0	5.9	5.9	5.8
10 A	13.0	12.9	12.2	11.4	10.9	10.4	10.0	9.8	9.7	9.5
16 A	20.2	19.7	18.7	17.8	17.3	16.6	16.0	15.8	15.4	15.2
20 A	26.0	19.7	24.0	22.8	21.9	20.7	20.0	19.8	19.6	19.5
25 A	32.6	25.2	30.4	29.0	27.5	26.0	25.0	24.6	24.2	23.9
32 A	41.1	31.5	38.0	36.3	34.8	33.1	32.0	30.9	29.8	29.6
40 A	50.3	49.4	47.9	45.6	43.7	41.5	40.0	39.0	38.4	38.1
50 A	61.1	60.4	59.2	57.1	54.4	51.7	50.0	48.8	48.0	47.9

Derating in temperature for F200 B series

Max operating current depending on the ambient temperature of the residual current circuit breaker.

	Temperature (°C)				
In	-25…50	55	60	65	70
16 A	16	16	16	16	16
25 A	25	25	25	25	25
40 A	40	40	40	40	32
63 A	63	55	48	40	32

RCDs technical details

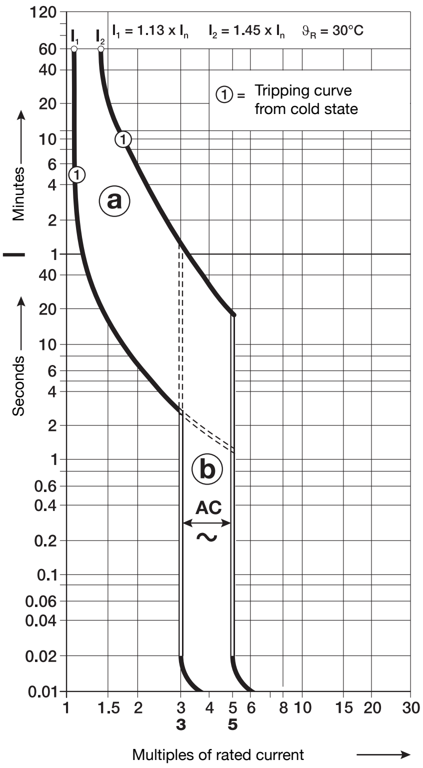
Tripping characteristic

Tripping characteristics valid for all the RCBOs

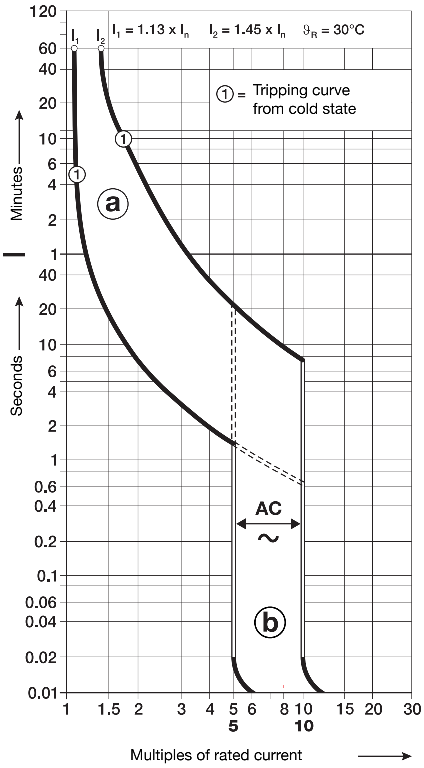
			Thermal relase ②			Electromagnetic relase ①		
Acc. to	Tripping characteristic and rated current		Current:		Tripping time	Currents:		Tripping time
			conventional non-tripping current	conventional tripping current		hold current surges	trip at least at	
IEC/EN 60898-1	B	6 to 40 A	1.13 · In		> 1 h	3 · In		> 0.1 s
				1.45 · In	< 1 h		5 · In	< 0.1 s
	C	2 to 40 A	1.13 · In		> 1 h	5 · In		> 0.1 s
				1.45 · In	< 1 h		10 · In	< 0.1 s
IEC/EN 60947-2	K	1 to 40 A	1.05 · In		> 1 h	10 · In		> 0.2 s
				1.2 · In	< 1 h ③		14 · In	< 0.2 s
				1.5 · In	< 2 min. ③			
				6.0 · In	> 2 s (T1)			

① The indicated electromagnetic tripping values apply to a frequency range of 16 2/3 … 60 Hz. For different network frequencies or direct current the valuec change according to the multiplier in the table below.
② The thermal releases are calibrated to a nominal reference ambient temperature; for Z and K, the value is 20 °C, for B and C = 30 °C.
In the case of higher ambient temperatures, the current values fall by ca. 6 % for each 10 K temperature rise.
③ As from operating temperature (after I_1 > 1h or, as applicable, 2 h).

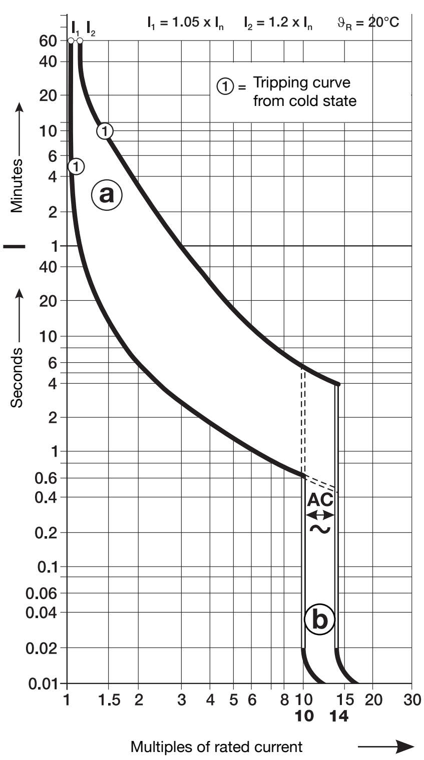
Characteristic B
IEC/EN 61009-1



Characteristic C
IEC/EN 61009-1



Characteristic K
IEC-EN60947-2



ⓐ thermal trip
ⓑ electromagnetic trip

RCDs technical details

Emergency stop using DDA 200 AE series

RCD-blocks type AE

Emergency stop using DDA 200 AE series RCD-blocks

The AE series RCD-block combines the protection supplied by the RCBOs with a positive safety emergency stop function for remote tripping.
In the AE version, the DDA 200 AE series RCD-blocks are available.

Operating principle (patented)

Two additional primary circuits powered with the same voltage and equipped with the same resistance have been added to the transformer; under normal conditions the same current would flow through, but since they are wound by the same number of coils in opposite directions they cancel each other out and do not produce any flow.
One of these two windings acts as the remote control circuit: the emergency stop is obtained by interrupting the current flow in this circuit.
The positive safety is therefore obvious: an accidental breakage in the circuit is equivalent to operating an emergency control button.

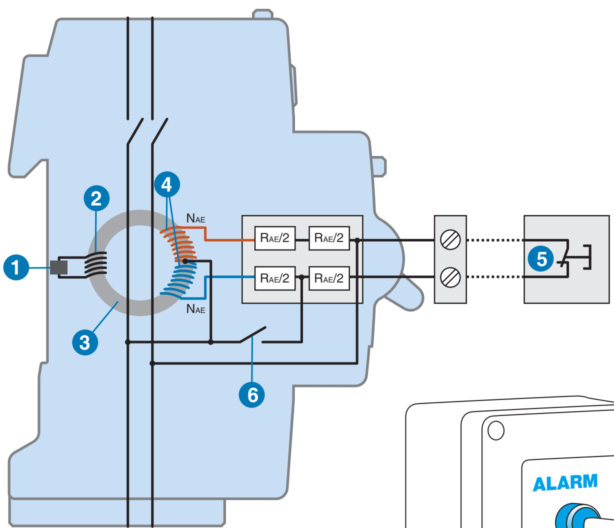
Advantages

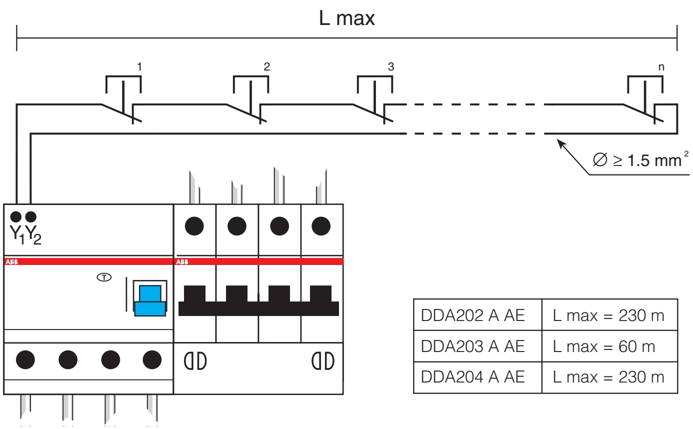
Compared with the devices which are normally used in emergency circuits, DDA 200 AE blocks have the following advantages:

- positive safety
- no unwanted tripping if there is a temporary reduction or interruption of the mains voltage
- efficient immediate operation even after long off-service periods of the installation

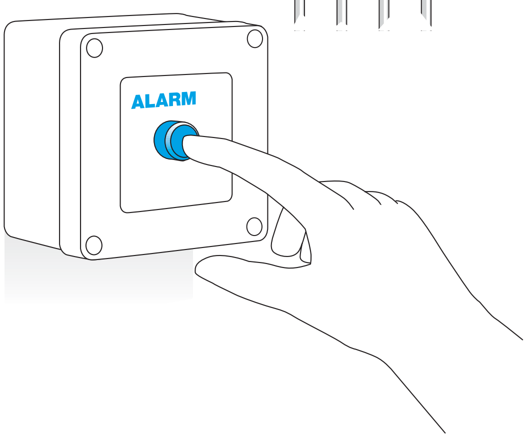
Use

Application of the DDA 200 AE blocks complies with the requirements of IEC 60364-8. They are therefore suitable, for example, for escalators, lifts, hoists, electrically operated gates, machine tools, car washes and conveyor belts.
No more than one DDA 200 AE can be controlled using the same control circuit. Each DDA 200 AE requires a dedicated control circuit.





DDA202 A AE	L max = 230 m
DDA203 A AE	L max = 60 m
DDA204 A AE	L max = 230 m



1 **Polarised relay**
2 **Sensor winding**
3 **Induction toroid**
4 **Supplementary primary windings**
5 **Single or multiple push-button unit**
6 **Test button**

RCDs technical details

Unwanted tripping - AP-R solution (high immunity)

Unwanted tripping
In the event of disturbance in the mains, the RCDs normally present in the system are tripped, breaking the circuit even in the absence of a true earth fault.
Disturbances of this kind are most often caused by:

- operation overvoltages caused by inserting or removing loads (opening or closing protection of control devices, starting and stopping motors, switching fluorescent lighting systems on and off, etc.)
- overvoltages of atmospheric origin, caused by direct or indirect discharges on the electrical line.

Under these circumstances, breaker tripping is unwanted, since it does not satisfy the need to avoid the risks due to direct and indirect contacts. On the contrary, the sudden and unjustified interruption of the power supply may result in very serious problems.

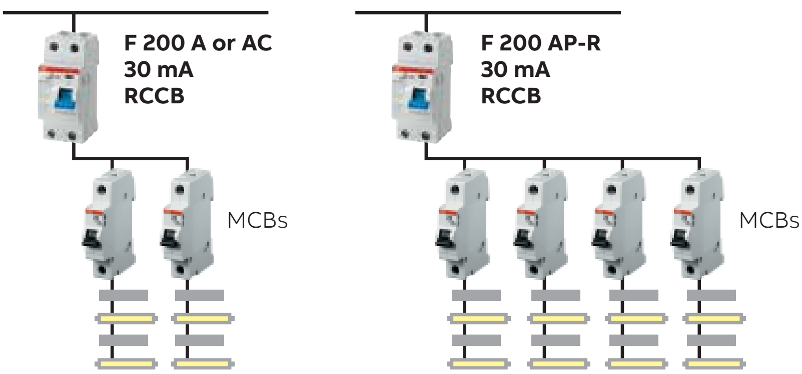
AP-R RCDs
The ABB range of AP-R anti-disturbance residual current circuit-breakers and blocks was designed to overcome the problem of unwanted tripping due to overvoltages of atmospheric or operation origin.
The electronic circuit in these devices can distinguish between temporary leakage caused by disturbances on the mains and permanent leakage due to actual faults, only breaking the circuit in the latter case.
AP-R residual current circuit-breakers and blocks have a slight delay into the tripping time, but this does not compromise the safety limits set by the Standards in force (release time at 2 IΔn=150 ms).

Guaranteeing conventional residual current protection, their installation in the electrical circuit therefore allows any unwanted tripping to be avoided in domestic and industrial systems in which service continuity is essential.

This delay makes the AP-R residual current devices especially suited for installations involving motor starters/ variable speed drives, fluorescent lamps or IT/electronic equipment.

The use of multiple electronic reactors for the supply of fluorescent lamps instead generates permanent leakage currents and inrush currents that can cause nuisance tripping of a standard residual current circuit breaker.
IT system loads and other electronic equipment (e.g. dimmers, computers, inverters) with capacitive input filters connected between the phases and ground can also generate permanent earth leakage currents whose sum may provoke the nuisance tripping of a standard residual current circuit breaker. For these situations, the AP-R breakers allow a greater number of devices to be connected to the installation.
Frequency converters include a rectifier section and an inverter section.

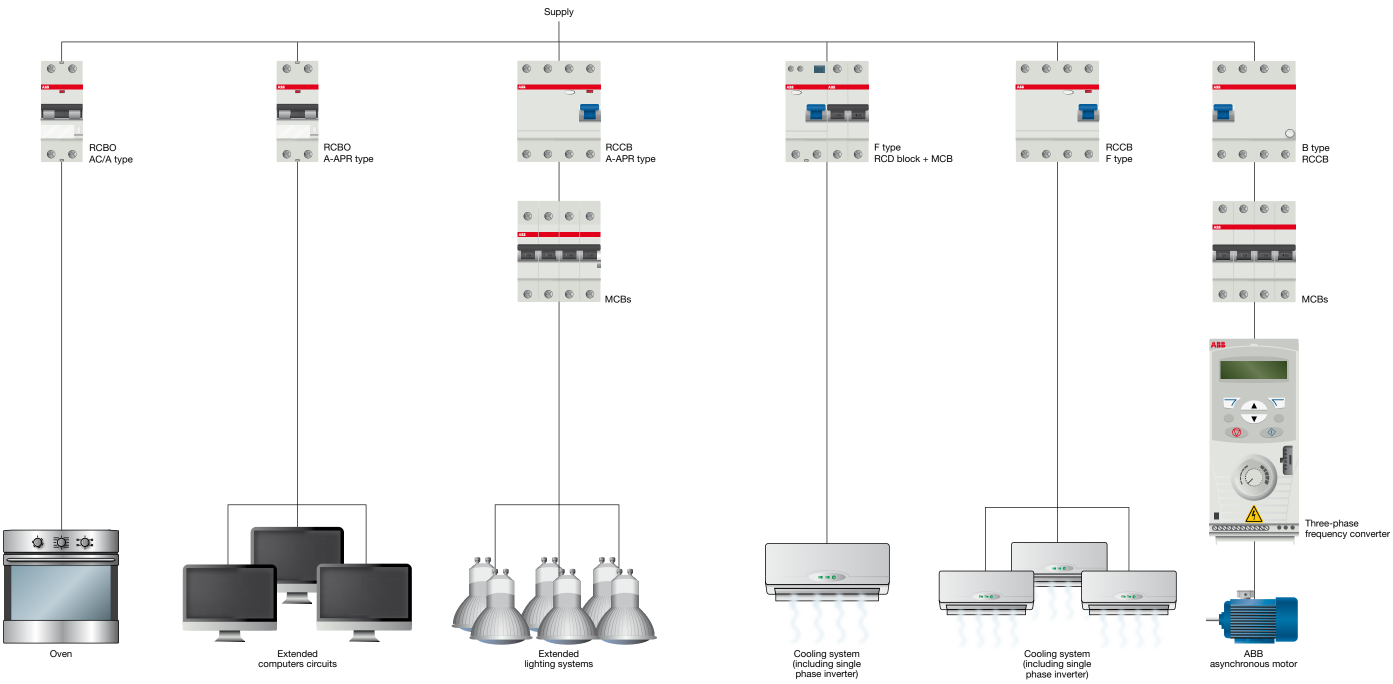
In case of fault within a single-phase frequency converter AP-R type RCDs provide complete protection, because an earth fault occurring downstream the inverter, produces an earth fault current with multi-frequency shape with high amount of harmonics.
While, in case of fault within a three-phase frequency converter, B type RCDs ensure complete protection because in case of insulation fault between the rectifier and the inverter or downstream the inverter we can have a smooth DC earth fault current.



Max 50 electronic reactors

RCDs technical details

Unwanted tripping - AP-R solution (high immunity)



Compared with standard type breakers, AP-R residual current breakers are therefore characterised, for any given sensibility, by:

- Higher residual trip current
- Tripping time delay
- Better resistance to overvoltages, harmonics and impulse disturbances.

Regulations

The tests set out in the IEC 61008 and IEC 61009 standards verify the resistance of residual current breakers to unwanted tripping provoked by operation overvoltages, using a ring wave impulse shape of 0.5 µs/100 kHz. All residual current circuit-breakers are required to pass this test with a peak current value of 200 A.

For what concerns atmospheric overvoltages, the IEC 61008 and 61009 standards prescribe the 8/20 µs surge test with a 3000 A peak current, but limit the requirement to residual current devices classified as selective; no test is required for other types.

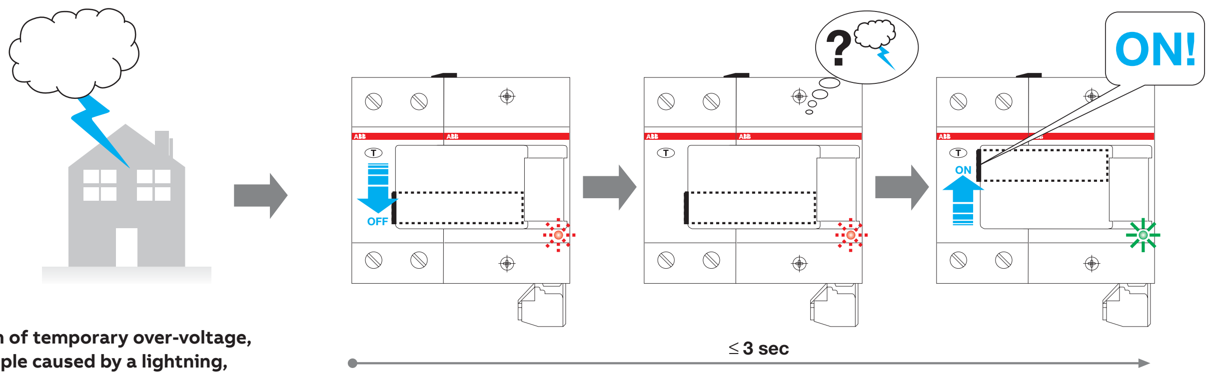
The ABB range of AP-R anti-nuisance tripping breakers and blocks pass the general 0.5 µs/100 kHz ring wave test and also withstand the 8/20 µs impulse test with the same peak current of 3000 A prescribed for selective devices.

	A or AC	AP-R	B	Selective
Resistance to unwanted tripping caused by network disturbances with wave shape (0.5 µs/100 kHz)	250	250	200	250
Resistance to nuisance tripping due to overvoltages (operational or atmospheric) peak (8/20 wave)	N.A.	3000	3000	5000

RCDs technical details

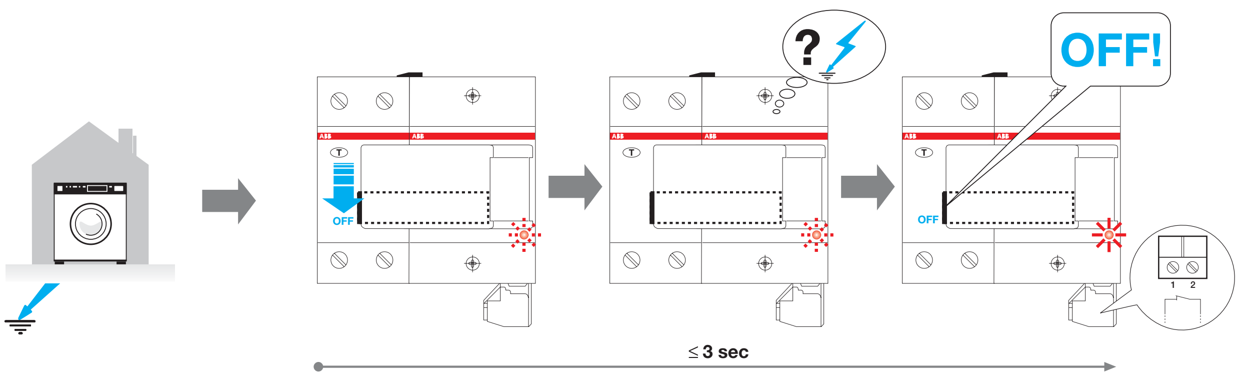
Unwanted tripping - F2C-ARH solution

The F2C-ARH is an auto-reclosing device particularly suited for household and similar uses. It doesn't require a separate low voltage power supply, and can be supplied by the associated RCCBs (2 pole RCCBs up to 63 A – 30 mA) at the 230 V a.c. rated voltage.
Another feature that makes the product ideal for home applications is an internal control unit that checks there are no insulation faults in the system before allowing the RCCB to reclose.
This ensures that reclosing occurs only in case of unwanted tripping of the RCCB (i.e. overvoltages induced by electrical storms), thus assuring continuity of power supply also in these situations.



Situation of temporary over-voltage, for example caused by a lightning, that causes RCCB's untimely tripping.

When the RCCB operates in presence of an effective insulation fault, the auto-reclosing device doesn't allow its reclosing and guarantees the system insulation.



Situation of permanent earth fault that causes RCCB's tripping.

RCDs technical details

Type B RCDs

Type B RCDs

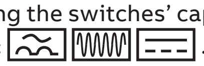
In industrial electrical applications it is more and more common to use devices where in the event of an earth fault current unidirectional direct currents or currents with a minimum residual ripple which flow through the PE conductor can emerge. These devices can be for example inverters, medical equipment (e.g. x-ray equipment and CAT), or UPS.

Type A RCDs sensitive to pulsating currents (in addition to sinusoidal currents detected by RCDs of type AC as well) cannot detect and break these earth fault direct currents or currents with a minimum level residual ripple. In case there are electrical appliances which generate this type of currents in the event of an earth fault the use of RCDs of type AC or type A would not be appropriate.

In addition to Type A RCDs, Type F RCDs with an intermediate characteristics are also tested according to IEC/EN 62423 which foresees the application of a simulated multi-frequency residual current with appropriate coefficient associated to the each level of frequency up to 1kHz. A single phase frequency converter, also named as inverter, is a commonly used electric drive which regulates the speed of an electric motor, operating on supply voltage and frequency.
During normal operation, the current generated by a single phase inverter in the downstream section is the result of the overlapping of mixed frequency components which varies from 10Hz (motor frequency), to 50Hz (rated frequency) and 1000Hz (switching frequency).
RCDs type F have been specifically designed for single phase inverters applications in order to meet the requirement to assure adequate protection level in case of an earth fault with such harmonic content, offering at the same time an increased resistance to nuisance tripping.
On the other side only RCD type B remain the only devices which are suitable to detect smooth DC components in the residual current caused by insulation faults in the DC section of a three phase frequency converter

Standard IEC 62423 specifies requirements and tests for type B RCDs (RCCBs and/or RCBOs) for household and similar uses. Requirements and tests given in this standard are in addition to the requirements of type A given in IEC 61008 (for RCCBs) or IEC 61009 (for RCBOs, including RCD-blocks). This means that RCDs of type B have to be compliant also to all the requirements of residual current devices of type A.

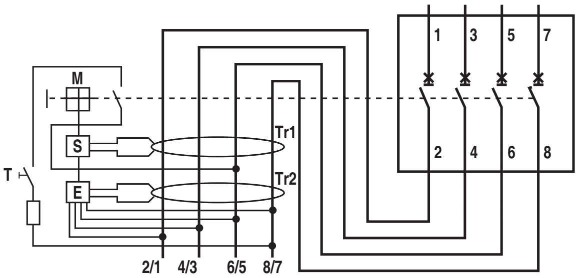
As already said, type B RCDs are not only sensitive to alternating and pulsating earth fault currents with DC components at a frequency of 50/60 Hz (type A), but they are also sensitive to:
- alternating currents up to a frequency of 1000 Hz;
- alternating and/or pulsating currents with DC components overlapping with a direct current;
- earth fault currents generated by a rectifier with two or more phases;
- direct earth fault currents without residual ripple

Type B RCDs must be marked with the following symbols highlighting the switches' capacity to detect every type of current:  .

RCDs technical details

Type B RCDs

Construction features
Type B RCDs consist of one section for the detection of alternating earth fault currents and unidirectional pulsating earth fault currents, which functions independently of the line voltage. For the detection of direct earth fault currents or currents with a minimum residual ripple, type B RCDs have a second electronic section, the functioning of which depends on the line voltage.
The structure of the product is illustrated in the following diagram.

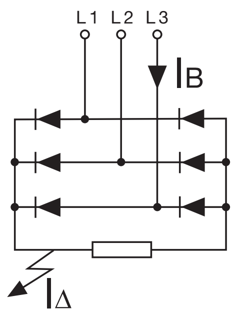


S Release
M Protection device mechanism
E Electronics for the intervention with direct unidirectional earth fault currents
T Test device
Tr1 Residual current transformer for the detection of sinusoidal earth fault currents
Tr2 Residual current transformer for the detection of direct unidirectional currents.

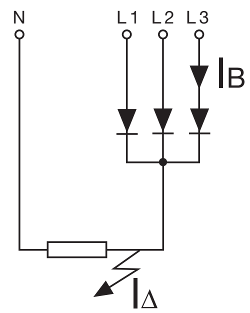
The residual current transformer Tr1 monitors the presence of pulsating and alternating earth fault currents in the electronic installation while residual current transformer Tr2 measures the direct unidirectional currents. In the event of a fault the second transformer transmits the opening command to the release S via the (printed) circuit board E. In type B RCCBs, the section whose functioning depends on the line voltage is supplied by all three-phase conductors and the neutral, so that the functioning as type B is guaranteed even if there is a voltage only in two of the 4 power conductors. In addition, the supply of the electronic section is sized in such a way that the device can safely intervene even if there is a voltage drop of 70%.
In this way an intervention takes place when direct unidirectional earth fault currents emerge, even in the event of faults in the electric power supply grid, for example if there is no neutral conductor.

Direct or similar earth fault currents
An increasing amount of industrial equipment is supplied by circuits which in the event of a fault generate direct earth fault currents with a very low residual ripple, which can be even less than 10%. For example with direct current supplied motor drives for pumps, elevators, textile machines etc. it is becoming more common to use inverters with a three-phase rectifier bridge.
In the event of an earth fault current the wave of the earth fault is as indicated in the figure below.

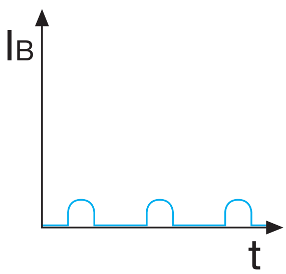
Three-phase rectifier bridge



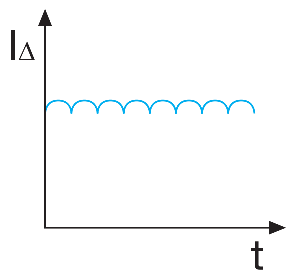
Three-phase wye rectifier



Phase currents



Earth fault current



RCDs technical details

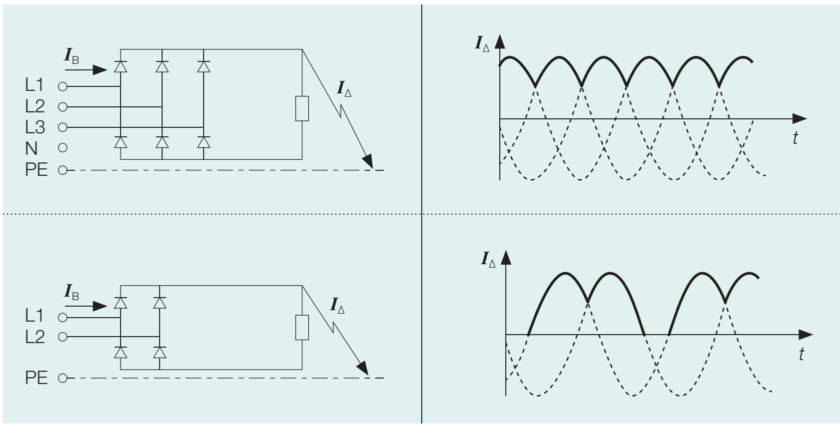
Type B RCDs

F200 B RCCBs provide additional protection against direct contact and are the right choice to ensure maximum system safety thanks to early detection of fault currents with continuous waveforms or high frequencies.

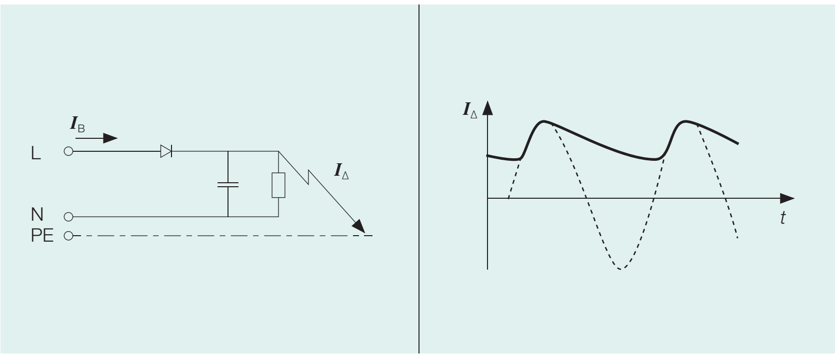
Selection of RCDs. General rules

Type B RCDs are suitable for non-linear circuits that can generate leakages with high direct current (> 6 mA) and/or high frequency components. Such components can be found in several industrial components and applications that embed or depend on electronics.
The main circuits that can be considered responsible for such leakages and the common applications where Type B could be demanded are:

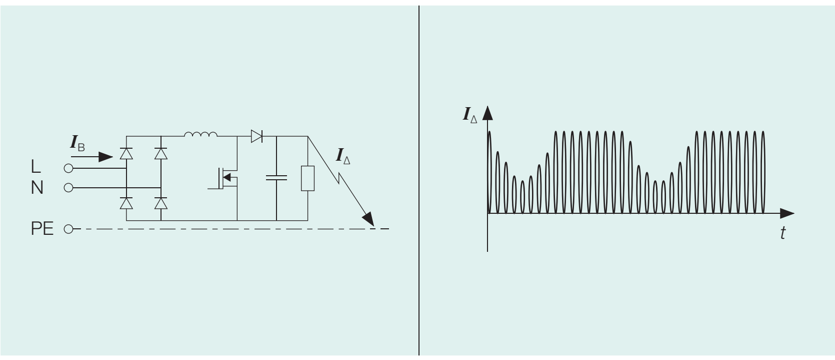
Circuits containing single and three-phase rectifiers



Circuits containing rectifiers with high levelling capacity



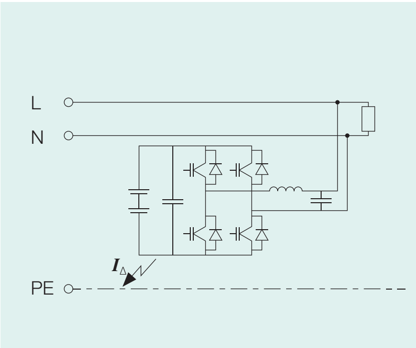
Circuits containing rectifiers with active power factor correction

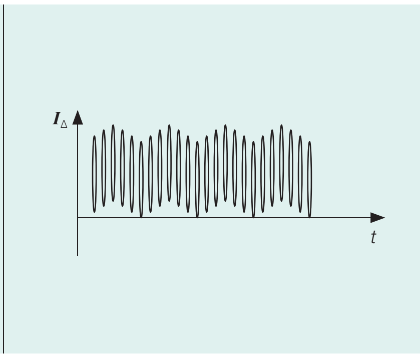


RCDs technical details

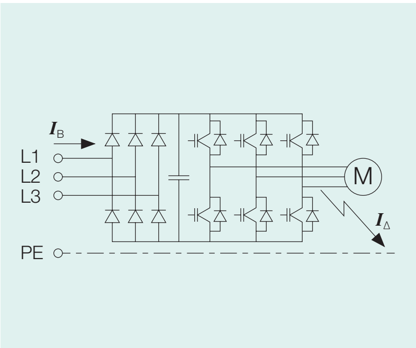
Type B RCDs

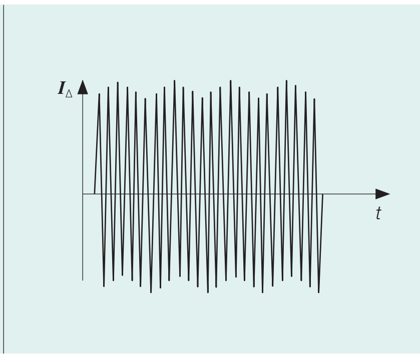
Circuits containing continuos voltage generators with no separation from a.c. network





Circuits containing continuos voltage generators





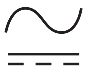
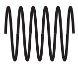
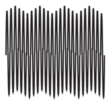
RCDs technical details

Type B RCDs

Immunity to nuisance tripping: advantages of Type B RCCBs
RCDs Type B are advance-designed products that, on one hand, are able to protect from different kinds of faults, regardless of their waveform; on the other hand, they are immune to unwanted trippings.

In order to be such an effective device in terms of protection, every Type B RCD must withstand successfully all the tests provided by the Standards. In the testplan are foreseen several tripping waveforms that are considered to represent the best approximation to a real fault condition in case of non linear circuits.

Tripping waveforms for Type B RCDs

	Residual current form	Limit value of tripping current
Alternating		0,5...1,0 $I_{\Delta n}$
Unidirectional pulsating		0,35...1,4 $I_{\Delta n}$
Unidirectional pulsating with phase angle mode		Cut-off angle 90° from 0,25 to 1,4 $I_{\Delta n}$
		Cut-off angle 135° from 0,11 to 1,4 $I_{\Delta n}$
Alternating sinusoidal residual current plus pulsating dc current, suddenly applied or smoothly increasing		Max. 1,4 $I_{\Delta n}$ + 0,4 $I_{\Delta n}$ d.c.
Unidirectional pulsating superimposed on direct		Max. 1,4 $I_{\Delta n}$ + 0,4 $I_{\Delta n}$ d.c.
Multi-frequency		From 0,5 to 1,4 $I_{\Delta n}$
Two-phase rectified		From 0,5 to 2,0 $I_{\Delta n}$
Three-phase rectified		
Direct without ripple		
Alternating up to 1 kHz		Current frequency 150 Hz from 0,5 to 2,4 $I_{\Delta n}$
		Current frequency 400 Hz from 0,5 to 6 $I_{\Delta n}$
		Current frequency 1000 Hz from 0,5 to 14 $I_{\Delta n}$

RCDs technical details

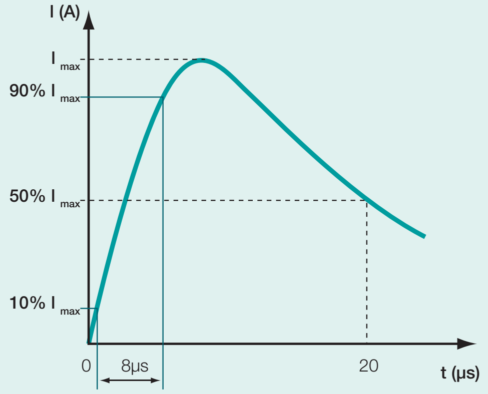
Type B RCDs

To prove their immunity to unwanted tripping, Type B residual current devices must successfully pass further severe tests such as:

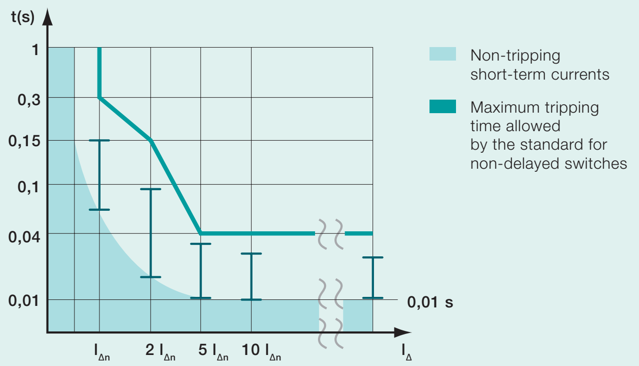
- 8/20 µs impulse up to 3000 A (s. fig. 1);
- 10 ms impulse up to10 IΔn (s. fig. 2).

These tests emulate the conditions that an RCD must withstand in case of overvoltages or leakages due to EMC filters or electronic loads. Type B and devices can be considered suitable for all difficult applications, not only in terms of protection, but of operational continuity as well.

1



2

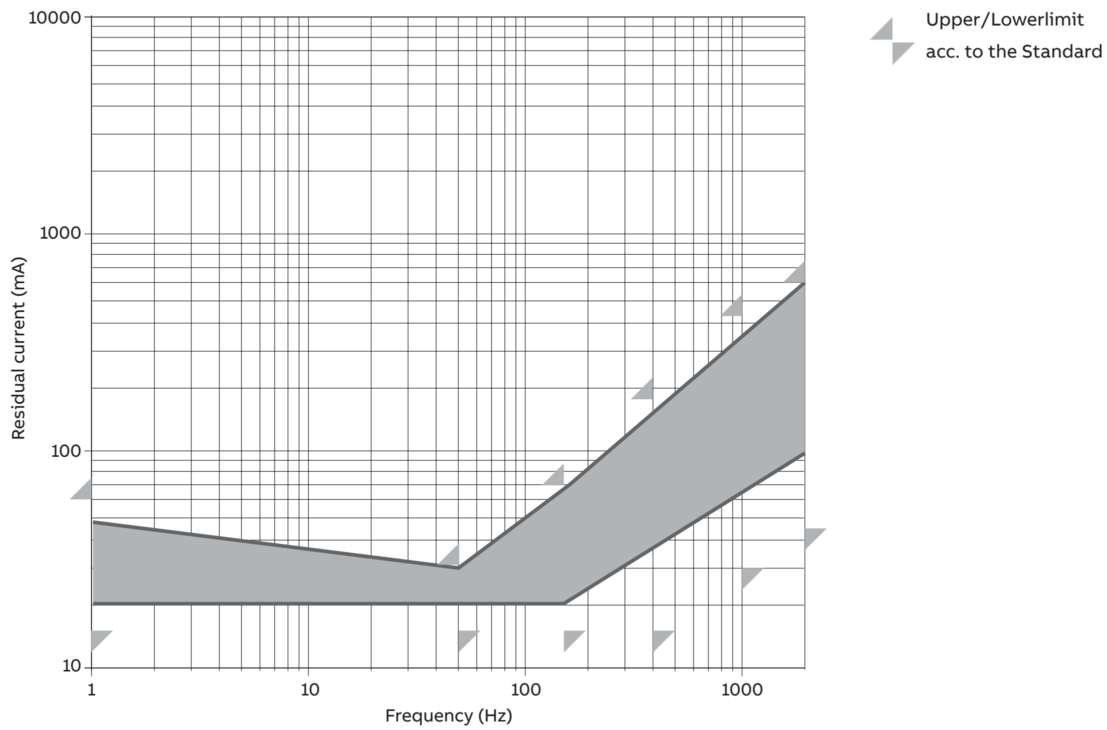


Tripping times					
Type	Fault currents	Tripping time at			
	Alternating currents	1 x IΔn	2 x IΔn	5 x IΔn	500 A
	Pulsating DC currents	1,4 x IΔn	2 x 1,4 x IΔn	5 x 1,4 x IΔn	500 A
	Smooth DC currents	2 x IΔn	2 x 2 x IΔn	5 x 2 x IΔn	500 A
Standard or short-time delay		Max. 0,3 s	Max. 0,15 s	Max. 0,04 s	Max. 0,04 s
Selectiv S		0,13 - 0,5 s	0,06 - 0,2 s	0,05 - 0,15 s	0,04 - 0,15 s

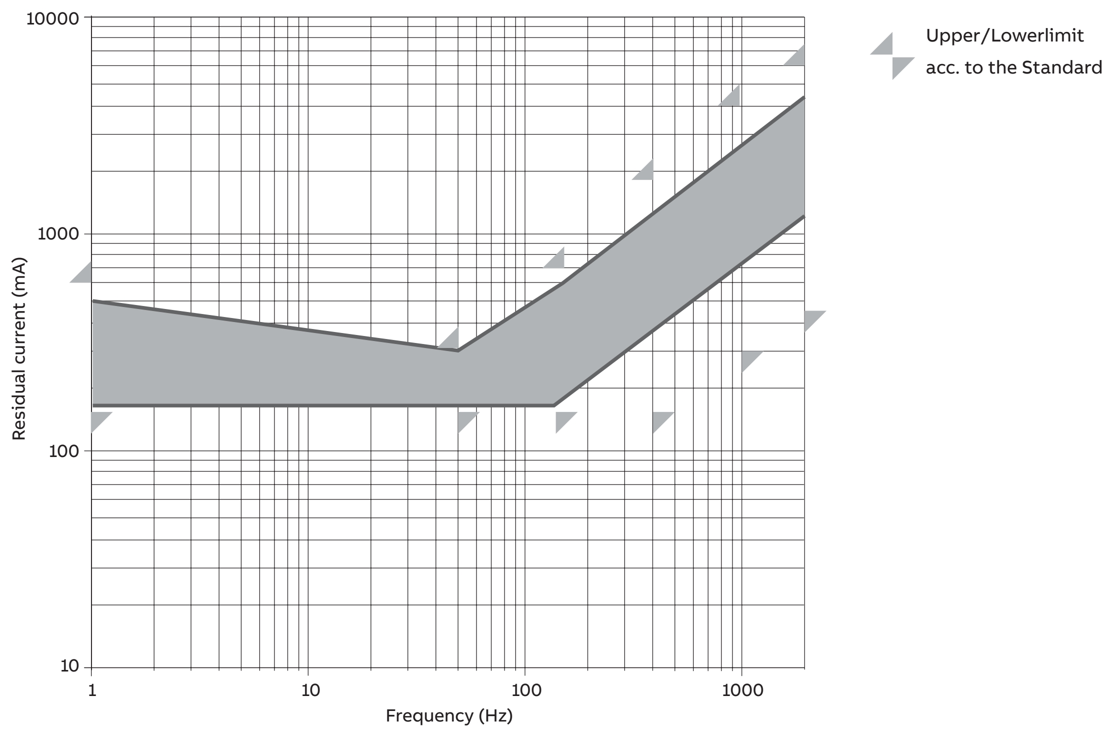
RCDs technical details
Type B RCDs

Variation of residual current tripping thresholds according to frequency

F200 B 30 mA



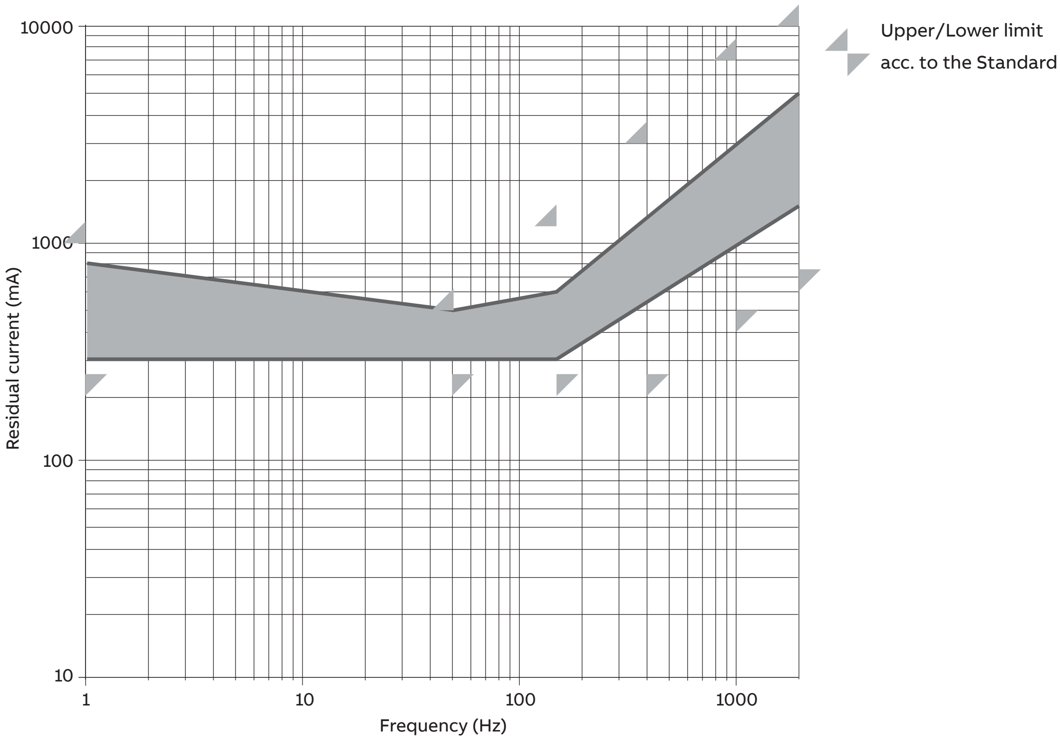
F200 B 300 mA



RCDs technical details

Type B RCDs

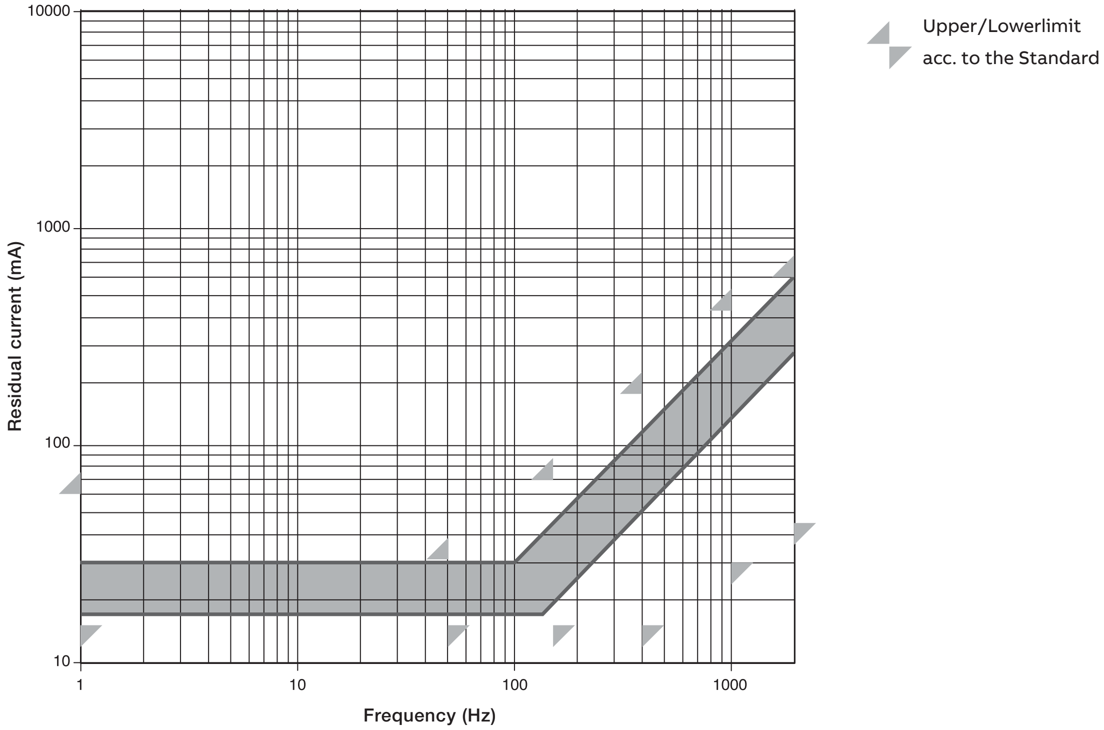
F200 B 500 mA



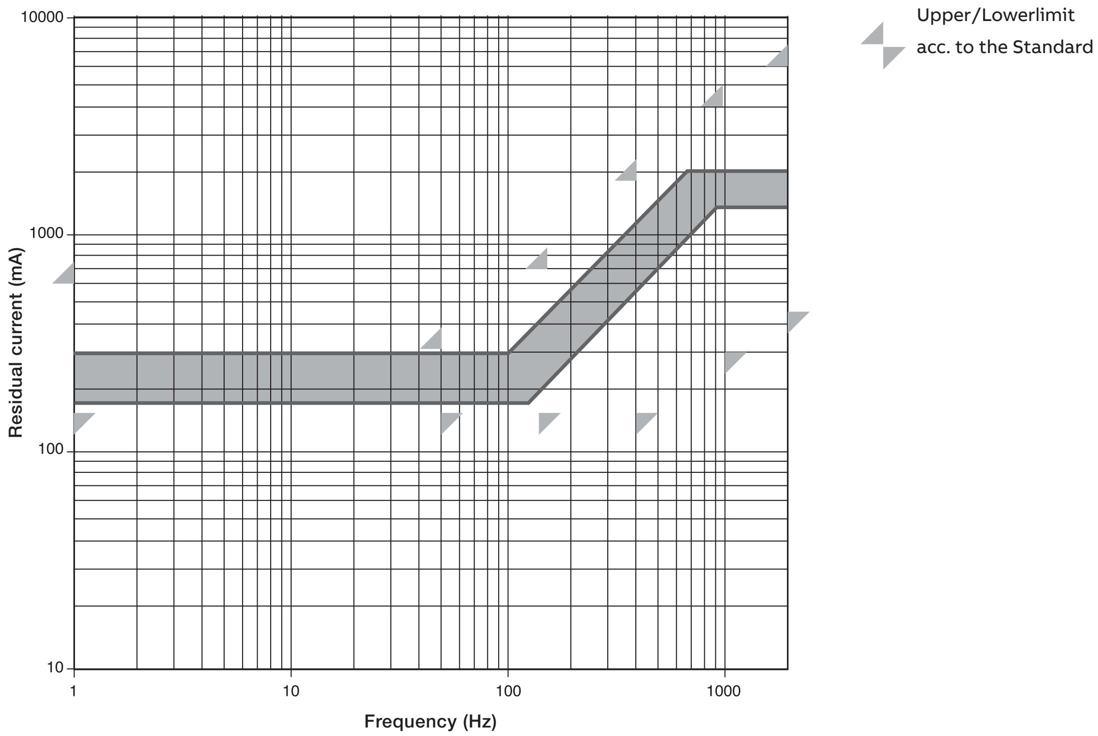
RCDs technical details
Type B RCDs

F200 B high ratings

F204 B 30 mA



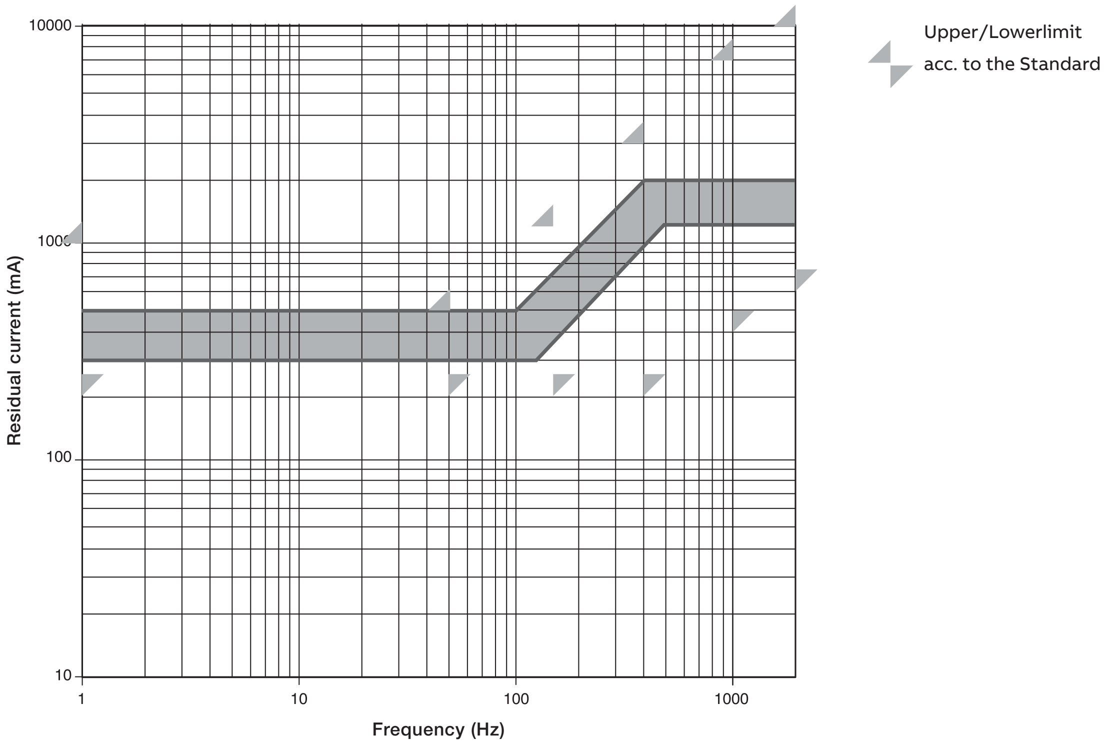
F204 B 300 mA



RCDs technical details

Type B RCDs

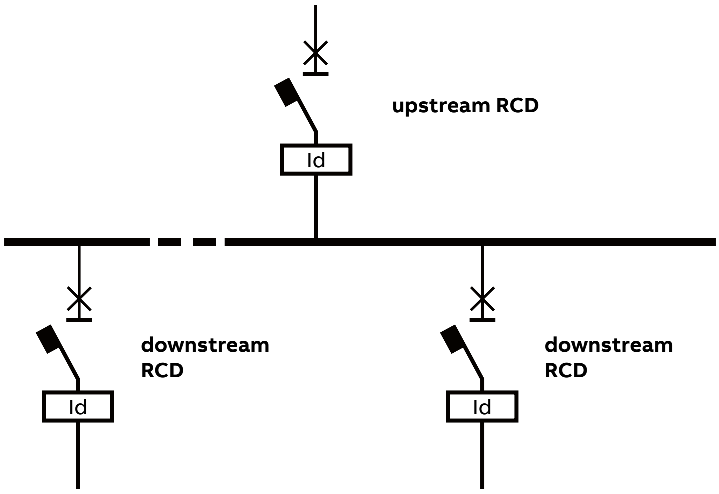
F204 B 500 mA



RCDs connected in series

This new section is a summary of "Guide to the selection of RCDs connected in series".
For more detailsand complete explanation please refer to the white paper with document ID 9AKK108467A1850.

In many installations, two or more RCDs are installed in series: one common upstream RCD protects the distribution circuit and one or more downstream RCDs protect the final circuits. We use the term "in series" for a connection as per figure below, as commonly intended in the installation practice. It remains understood that the upstream RCD does not necessarily see the same leakage current seen by any one of the downstream RCDs (as the correct, formal definition of "series" would require), for it generally collects the sum of said leakage currents. We believe that this abuse of terminology be for the sake of simplicity and brevity.



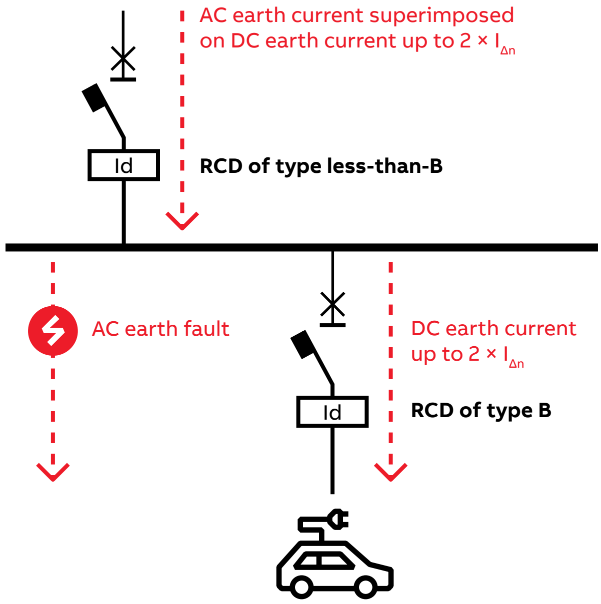
First, the correct types for downstream RCD(s) must be selected, basing on load characteristics.
This implies that the installation must be properly designed, so that protecting RCDs operated within their intrinsic limits. Then, the upstream RCD must be selected accounting for the total DC earth fault expected at the upstream point of installation, when the loads are in faulty and in fault-free conditions.
The following conditions hold:

- If a type B RCD is installed downstream, then the maximum DC earth current let through by it (and reaching the upstream RCD) is 2 × IΔn, because this is the tripping threshold of type B RCDs in case of DC residual current.
- If a type F RCD is installed downstream (and assuming that the installation had been properly designed, so that the type F RCD operated within its limits), then the maximum DC earth current expected through it (and reaching the upstream RCD) is 10 mA regardless of its IΔn, because this is the maximum DC earth fault that type F RCDs may tolerate.
- If a type A RCD is installed downstream (and assuming that the installation had been properly designed, so that the type A RCD operated within its limits), then the maximum DC earth current expected through it (and reaching the upstream RCD) is 6 mA regardless of its IΔn, because this is the maximum DC earth fault that type A RCDs may tolerate.
- Type AC RCDs are not expected to operate in presence of DC earth currents and therefore (assuming that the installation had been properly designed so that they operated safely) they do not contribute to the DC earth leakage that reaches the upstream RCD.

In case of two or more RCDs of type A/F/B installed in parallel downstream, the maximum DC earth current through the general upstream RCD, in the worst case, is the sum of the earth currents through each of the downstream RCDs. This is clearly a pessimistic scenario: in a real situation, DC components stemming from different subcircuits may not be simultaneously present (e.g., EV charging stations not necessarily operating at the same time), or the DC earth current from several parallel loads may at least partially compensate each other. Anyway, over long periods of time the likelihood of particularly unfavorable conditions rises, and the installation must be conservatively designed so to be on the safe side.

RCDs connected in series

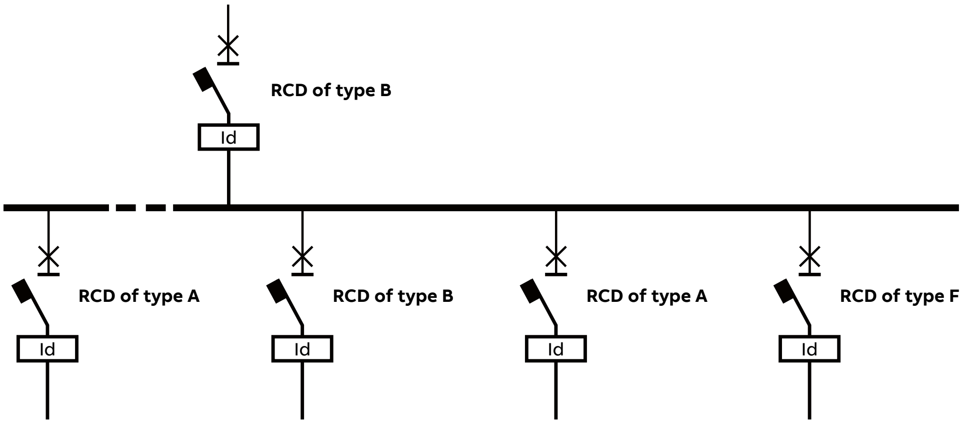
It is therefore essential to ensure the that RCDs installed upstream of one or more RCDs of type A, F or B are not blinded by an excessive DC earth current through them. Particularly, the RCD in- stalled upstream must always provide protection in the event of an AC fault in the system portion under its surveillance.
Some supplied loads like, e.g., electric vehicle charging, are expected to cause a non-negligible DC earth current compo- nent, also in fault free conditions. If such DC earth current component is large enough to impair the correct operation of the upstream RCD, the latter may fail to protect, e.g., a superimposed AC earth fault, as illustrated in Figure below, Typical example of installation where an upstream RCD of type AC/A/F (i.e., lessthan-B) may be blinded by an excessive DC earth current let thought by a downstream RCD of type B. If not properly selected, the upstream RCD may not operate correctly, therefore failing to clear a superimposed AC fault.



For the sake of simplicity, only a two-level installation will be dealt with, considering a single RCD upstream and one or more RCDs downstream. The general, multi-level case, which may also present a different number of levels in different portions, can be addressed similarly, starting from the low- est levels, then suitably selecting the RCDs of the levels immediately above, and then moving to the levels above until the top-most RCD. Anyway, two- level installations are way more common, the multi- level case being reserved to rare exceptions.

RCDs connected in series

The simplest solution: type B upstream

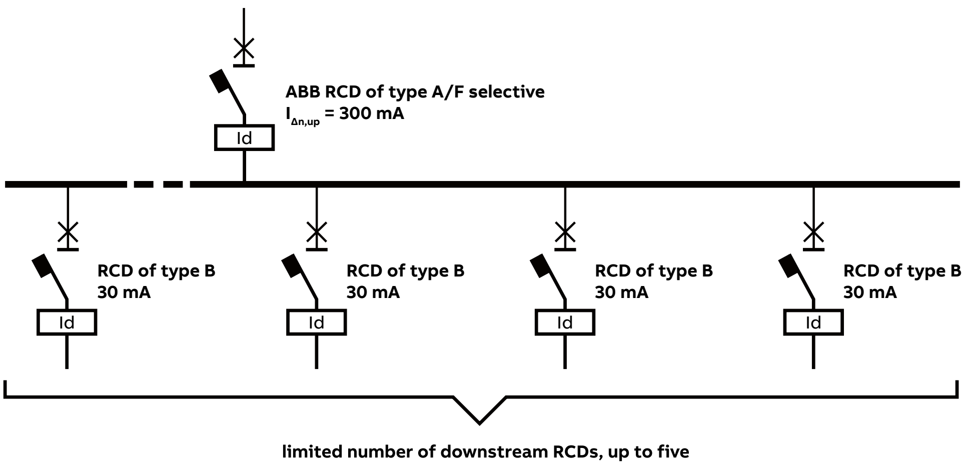


Alternative solution with ABB RCDs
In the following tables, selective RCDs (denoted by S) are also considered. Such RCDs are characterized an intentional delay before tripping (non-actuating time), to guarantee that downstream RCDs tripped before the upstream one, i.e., selectivity.
Time delayed industrial type ABB residual circuit breakers, including those with a separate toroid (MRCD), as per Annex B or Annex M of IEC 60947-2 [4], are equivalent to selective RCDs, and are thus included in relevant cases, if the non-actuating time is ≥ 0.06 s.

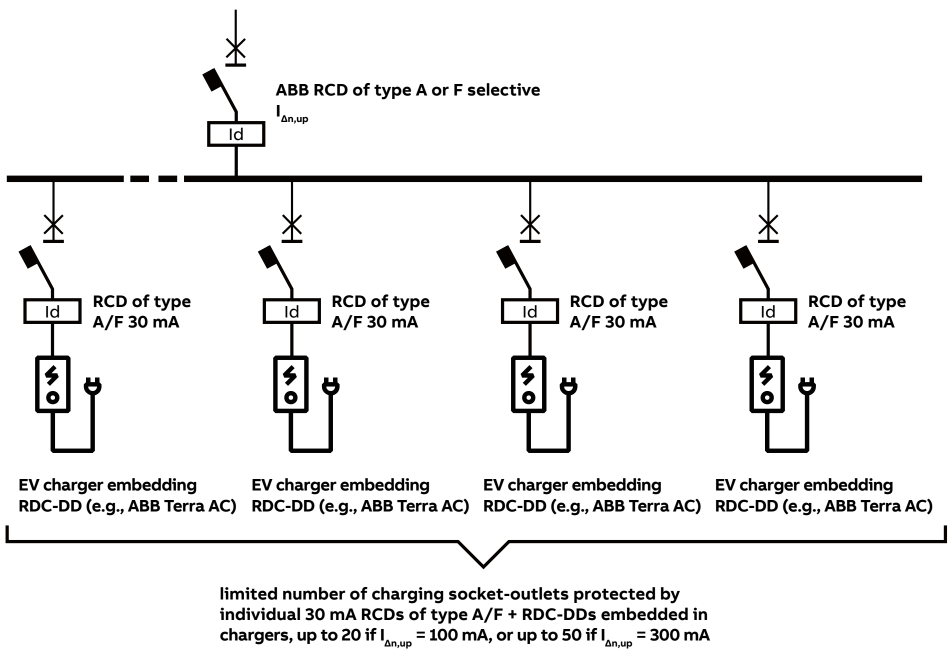
Important warning.
IEC 60364-5-53:2019/AMD1:2020 [1] is an international standard: in some countries, national standards may be more restrictive and, for instance, may not allow the second option. Therefore, installation engineers must always refer to applicable national rules for the correct selection of RCDs.

RCDs connected in series

Installations with type B RCDs downstream



Installations without type B RCDs downstream



RCDs connected in series

Selection of upstream RCD type, allowed when using B type ABB RCDs downstream

case	Downstream RCD					Upstream RCD			
	type	Poles	Rated Current	IΔn	Max q.ty	Type	Poles	Rated current	IΔn
1	B	2P and 4P	any	30 mA	1	F200 A type	4P	up to 63 A	100 mA
						F200 A type	2P	80-100 A	100 mA
						F200 A type	4P	80-100 A	100 mA
						DDA200 A type	3P/4P	up to 63 A	100 mA
						DS201 AP-R or F type	1P+N	up to 40 A	100 mA
2	B	2P and 4P	any	30 mA	2	F200 A type	2P	up to 63 A	300 mA
						F200 A type	4P	up to 63 A	300 mA
						F200 A type	2P	80-100 A	300 mA
						F200 A type	4P	80-100 A	300 mA
						DDA200 A type	2P	up to 63 A	300 mA
						DS201 A or AP-R or F type	1P+N	up to 40 A	300 mA
						F200 A type Selective	2P	up to 63 A	100 mA
						F200 A type Selective	4P	up to 63 A	100 mA
						F200 A type Selective	2P	80-100 A	100 mA
						F200 A type Selective	4P	80-100 A	100 mA
						DDA200 A type Selective	2P	63 A	100 mA
						DDA200 A type Selective	3P/4P	63 A	100 mA
3	B	2P and 4P	any	30 mA	5	F200 A type Selective	2P	up to 63 A	300 mA
						F200 A type Selective	4P	up to 63 A	300 mA
						F200 A type Selective	2P	80-100 A	300 mA
						F200 A type Selective	4P	80-100 A	300 mA
						DDA200 A type Selective	2P	63 A	300 mA

Please refer to your national standards for any restrictions in series connection of B type RCDs downstream

RCDs connected in series

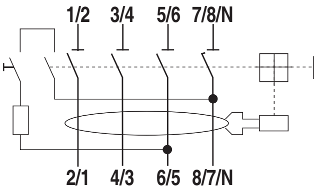
Selection of upstream RCD type, allowed when using without B type ABB RCDs downstream

case	Downstream RCD					Upstream RCD			
	type	Poles	Rated Current	IΔn	Max q.ty	Type	Poles	Rated current	IΔn
4	"A or (F + charger embedding RDC-DD, e.g., ABB Terra AC)"	2P and 4P	any	30 mA	10	F200 A type	4P	up to 63 A	100 mA
						F200 A type	2P	80-100 A	100 mA
						F200 A type	4P	80-100 A	100 mA
						DDA200 A type	3P/4P	up to 63 A	100 mA
						DS201 AP-R or F type	1P+N	up to 40 A	100 mA
5	"A or (F + charger embedding RDC-DD, e.g., ABB Terra AC)"	2P and 4P	any	30 mA	20	F200 A type	2P	up to 63 A	300 mA
						F200 A type	4P	up to 63 A	300 mA
						F200 A type	2P	80-100 A	300 mA
						F200 A type	4P	80-100 A	300 mA
						DDA200 A type	2P	up to 63 A	300 mA
						DS201 A or AP-R or F type	1P+N	up to 40 A	300 mA
						F200 A type Selective	2P	up to 63 A	100 mA
						F200 A type Selective	4P	up to 63 A	100 mA
						F200 A type Selective	2P	80-100 A	100 mA
						F200 A type Selective	4P	80-100 A	100 mA
						DDA200 A type Selective	2P	63 A	100 mA
						DDA200 A type Selective	3P/4P	63 A	100 mA
6	"A or (F + charger embedding RDC-DD, e.g., ABB Terra AC)"	2P and 4P	any	30 mA	50	F200 A type Selective	2P	up to 63 A	300 mA
						F200 A type Selective	4P	up to 63 A	300 mA
						F200 A type Selective	2P	80-100 A	300 mA
						F200 A type Selective	4P	80-100 A	300 mA
						DDA200 A type Selective	2P	63 A	300 mA

RCDs technical details

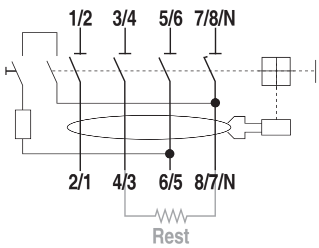
Use of 4P RCCBs in 3-phase system without neutral pole

Use of a 4P RCCB in a 3-phase circuit without neutral
The test button circuit of these RCCBs 4P F 200, regardless of the rating, is wired inside the device between terminal 5/6 and 7/8/N as indicated below, and has been sized for an operating voltage between 110V (170V for the 30mA version according to EN standard) and 254 V (110 and 277 V according to UL 1053).



In case of installation in a 3 phase circuit without neutral, if the concatenate voltage is between 110V (170V for the 30mA version according to EN standard) and 254 V (277 V according to UL 1053) for the correct working of the test button there are two possible solutions:
1) To connect the 3 phases to the terminals 3/4 5/6 7/8/N and the terminals 4/3 6/5 8/7/N (supply and load side respectively)
2) To connect the 3 phases normally (supply to terminals 1/2 3/4 5/6 and load to terminals 2/1 4/3 6/5) and to bridge terminal 1/2 and 7/8/N in order to bring to the terminal 7/8/N the potential of the first phase. In this way the test button is supplied with the phases' concatenate voltage.

If the circuit is supplied with a concatenate voltage higher than 254 V, as in the typical case of 3 phase net with concatenate voltage of 400 V - or 480 V according to UL 1053 - (and voltage between phase and neutral of 230 V or 277 V according to UL 1053), it is not possible to use these connections because the circuit of the test button will be supplied at 400 V and could be damaged by this voltage.

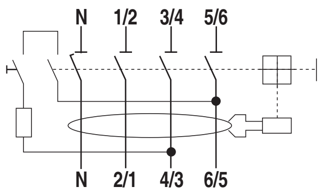


IΔn [A]	Rest [Ω]
0.03	2200*
0.03	3900
0.1	2200
0.3	2200
0.5	2200

* Only for IEC range and 125 A right-sided ratings

In order to allow the correct operation of the test button also in 3 phase nets at 400 V - 480 V according to UL 1053 - (concatenate voltage) it is necessary to connect normally the phases (supply to terminals 1/2 3/4 5/6 and load to terminals 2/1 4/3 6/5) and to bridge terminal 4/3 and 8/7/N by mean of an electric resistance as indicated above.
In this way the test button circuit is fed at 400 V - 480 V according to UL 1053 - but for example in an IEC compliant RCCB with IΔn=0.03 A there will be the Rest=3.3 kOhm resistance in series to the test circuit resistance. Rest will cause a voltage drop that leaves in the test circuit a voltage less than 254 V - 277 V according to UL 1053. Rest resistance must have a power loss higher than 4 W.
In the normal operation of the RCCB (test circuit opened) the Rest resistance is not fed so it does not cause any power loss.

The solution RCCBs with neutral pole on left side
The test button circuit of these RCCBs is wired inside the device between terminal 3/4 and 5/6 as indicated below, and it has been sized for an operating voltage between 195 V and 440 V - 480 V. In case of a three phase system without neutral with concatenate voltage between phases of 230 V or 400 V - 277 V or 480 V - it is enough to connect the 3 phases normally (supply to terminals 1/2 3/4 5/6 and load to terminals 2/1 4/3 6/5) without any bridge.



RCDs technical details

Operating voltage of test button

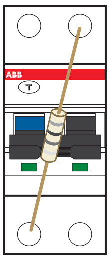
Operating voltage of test button

The operation of RCDs depends on the maximum and minimum operating voltage of the test button.

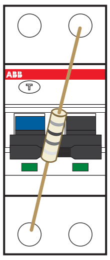
This symbol represents the circuit of test button

Maximum and minimum operating voltage of DS201 test button

DS201
Ut = 110-264 V;
for 30mA: Ut = 170-264V

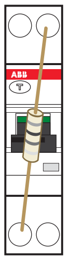


DS201 M 110V
Ut = 110-264V



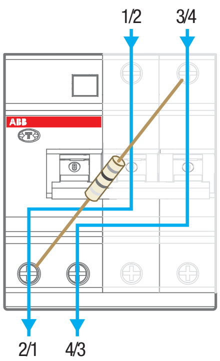
Between the two terminals there is a rated voltage of 110-264 V

DS301C
for 30mA; Ut = 170-264 V

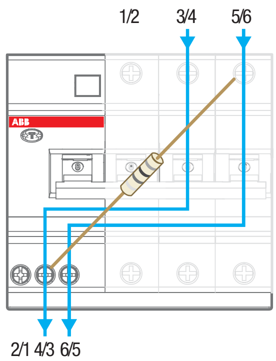


Maximum and minimum operating voltage of DS 200 and DDA 200 test button

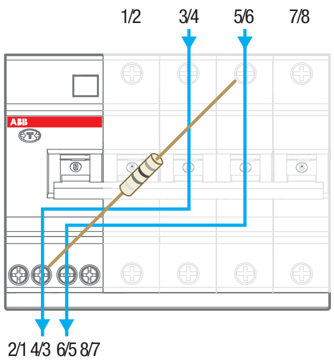
DDA 202 and DS 202
In = 25-40 A
Ut = 110 - 254 V;
for 30mA: Ut = 170-254V



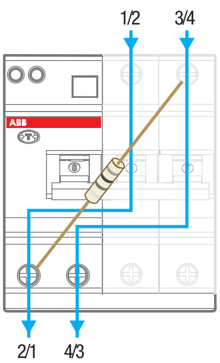
DDA 203 and DS 203
In = 25-40 A
Ut = 195 - 440 V;
for 30mA: Ut = 300-440V



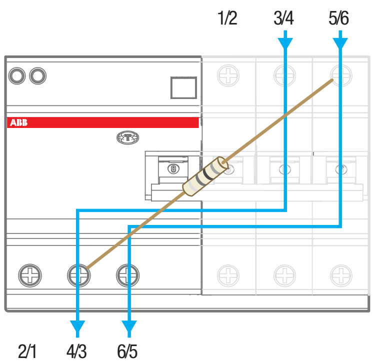
DDA 204 and DS 204
In = 25-40 A
Ut = 195 - 440 V;
for 30mA: Ut = 300-440V



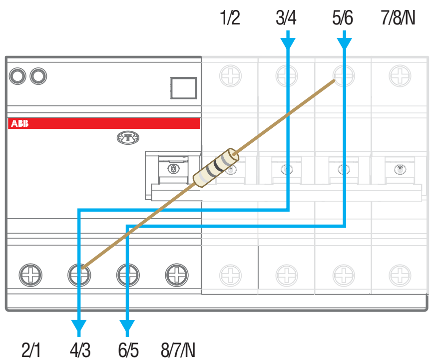
DDA 202 and DS 202
In = 63 A
Ut = 110 - 254 V;
for 30mA: Ut = 170-254V



DDA 203 and DS 203
In = 63 A
Ut = 195 - 440 V;
for 30mA: Ut = 300-440V



DDA 204 and DS 204
In = 63 A
Ut = 195 - 440 V;
for 30mA: Ut = 300-440V

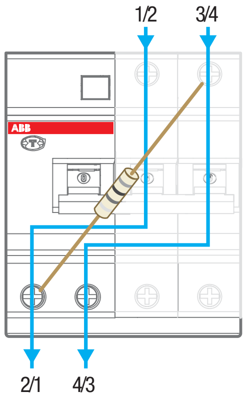


RCDs technical details

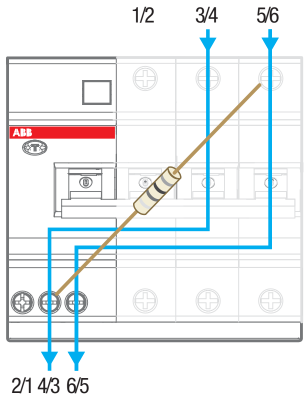
Operating voltage of test button

Maximum and minimum operating voltage of DDA 200, special version 110 V

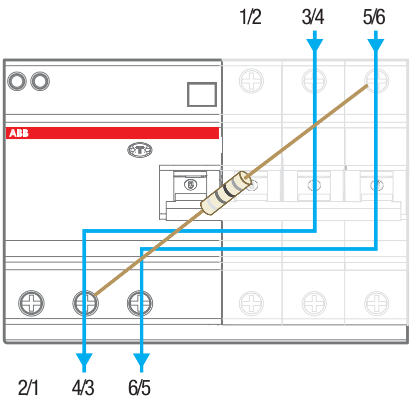
DDA 202 110 V
In = 25-40-63 A
Ut = 110-254 V



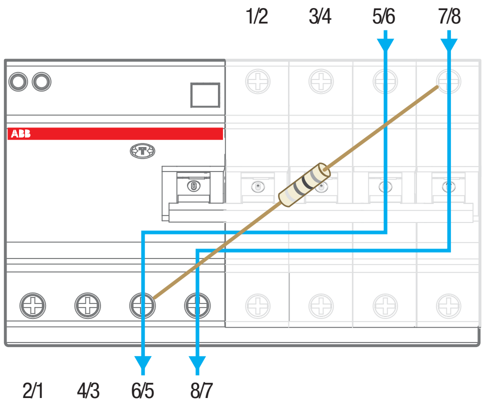
DDA 203 110 V
In = 40 A
Ut = 110-254 V



DDA 203 110 V
In = 63 A
Ut = 110-254 V

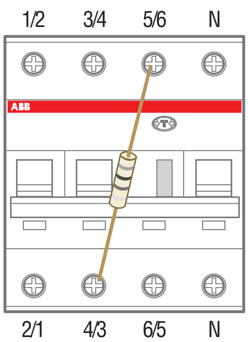


DDA 204 110 V
In = 63 A
Ut = 110-254 V



Maximum and minimum operating voltage of the DS203NC

DS203NC
Ut= 195-440V (300-440V for 30 mA)

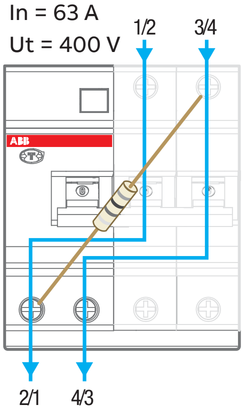


RCDs technical details

Operating voltage of test button

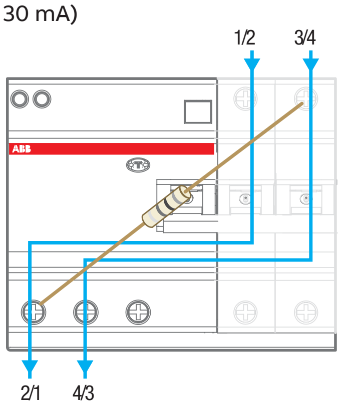
Maximum and minimum operating voltage of DDA 200, special version 400 V

DDA 202
In = 63 A
Ut = 400 V

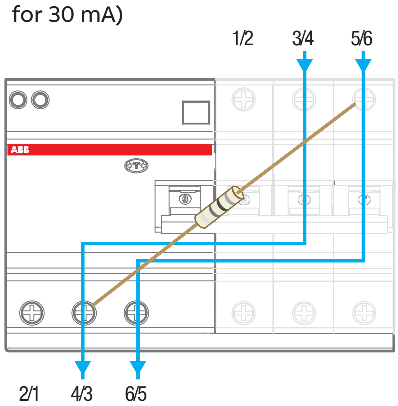


Maximum and minimum operating voltage of DDA 200 B type test button

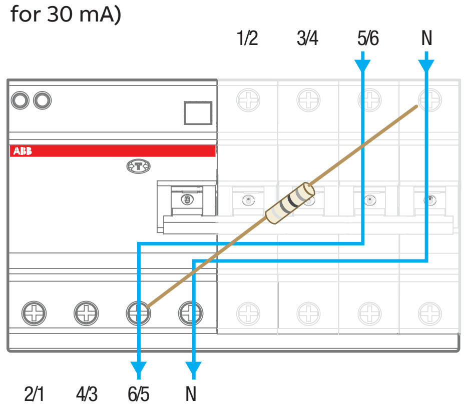
DDA 202 B
In = 63 A
Ut=195-254 V (170-254 V for 30 mA)



DDA 203 B
In = 63 A
Ut=310-440 V (300-440 V for 30 mA)

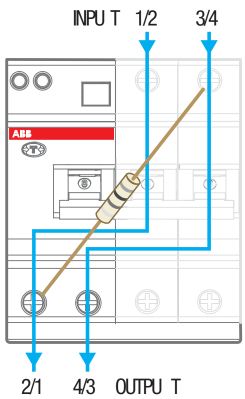


DDA 204 B
In = 63 A
Ut=195-254 V (300-440 V for 30 mA)

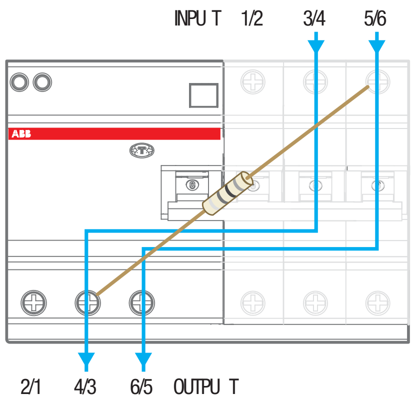


Maximum and minimum operating voltage of DDA 200 AE test button

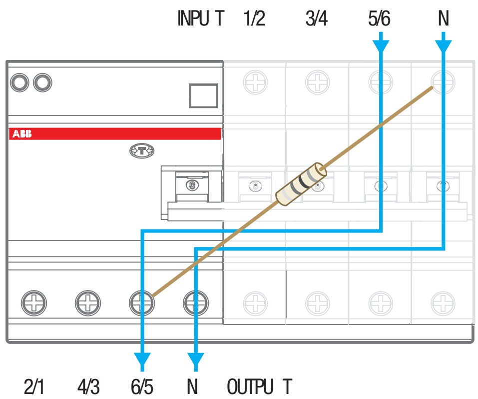
DDA 202 AE
In = 63 A
Ut = 184-264 V



DDA 203 AE
In = 63 A
Ut = 310-440 V



DDA 204 AE
In = 63 A
Ut = 184-264 V

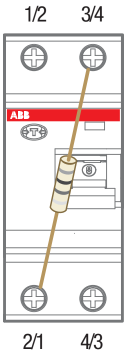


RCDs technical details

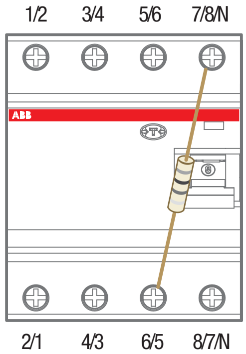
Operating voltage of test button

Maximum and minimum operating voltage of F 200 test button

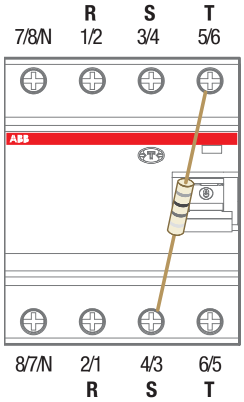
F 202
In = ≤ 100 A
Ut = 110 - 254 V;
for 30mA①: Ut = 170 - 254 V



F 204 neutral on right
In = ≤ 100 A
Ut = 110 - 254 V;
for 30mA①: Ut = 170 - 254 V

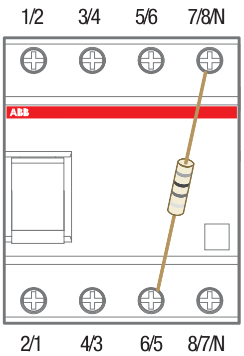


F 204 neutral on left
In = ≤ 100 A
Ut=195-440V; for 30mA: Ut = 250-440V



For use in 3-phases circuit without neutral at 400 V it is possible to connect the three phases R, S and T like in the figure.

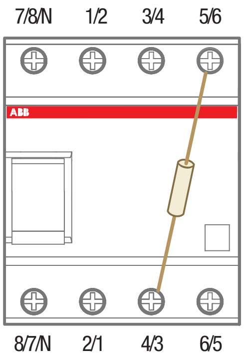
F 204 neutral on right
In = 125 A
Ut = 185 - 440 V;
for 30mA①: Ut = 150 - 250 V



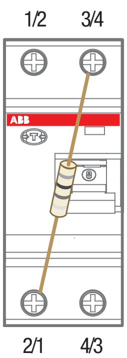
2CSC400436F0202

① Only for versions with marking according to EN 61008-1;EN 61008-2-1

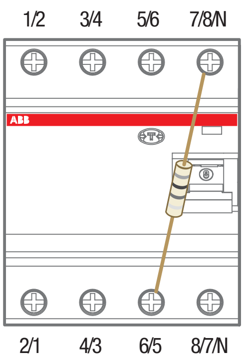
F 204 neutral on left
In = 125 A
Ut= 185 - 440V
for 30mA: Ut = 250 - 440 V



F202 110V
In ≤ 100 A
Ut = 110 - 254 V



F 204 110V
In ≤ 100 A
Ut = 110 - 254 V

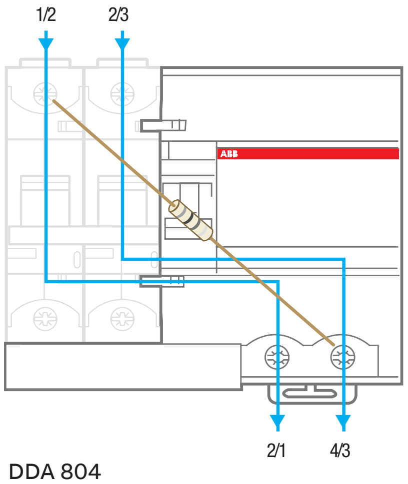


RCDs technical details

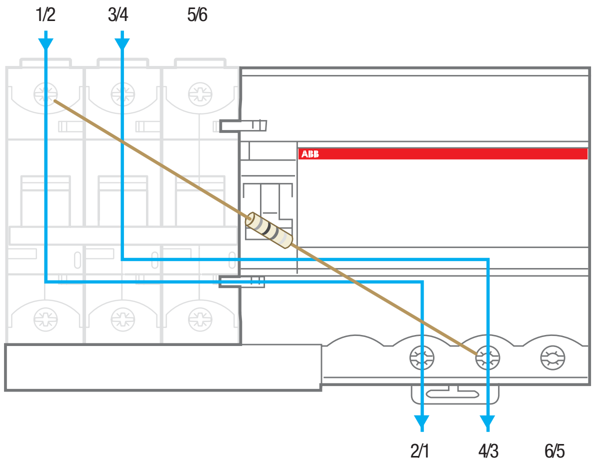
Operating voltage of test button

Maximum and minimum operating voltage of DDA 800 and DS800 test button

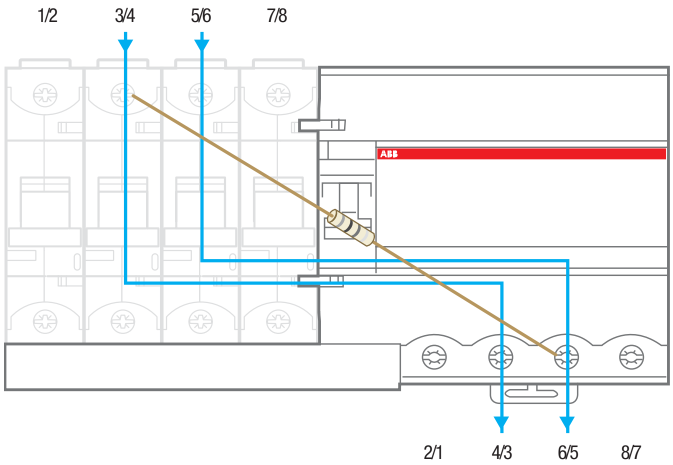
DDA 802
DS802
IN ≤ 125 A
Ut = 195-690 V



DDA 803
DS803
IN ≤ 125 A
Ut = 195-690 V



DDA 804
DS804
IN ≤ 125 A
Ut = 195-690 V



RCDs technical details

RD2 residual current relays

RD2 residual current monitors
They operate combined with appropriate toroidal transformers (in 9 different diameters).
The relay can command the tripping of the protection circuit-breaker release, thus opening the circuit.
According to the IEC 62020 Standard, these relays are “A Type”. They are sensitive to leakage sinusoidal currents and to leakage pulsanting currents with direct components.
Thus they can be defined as “A type”.

More technical characteristics

Calibration tolerances		- sensitivity	75% ± 10%
		- time	75% ± 10%
Power consumption	[W]	0.45 at 48 V AC/DC	
		1.2 at 110 V AC/DC	
		3.4 at 230 V AC	
		11 at 400 V AC	
Dielectric test voltage at ind. freq. for 1 min.	[kV]	2.5	
Max. peak current with 8/20 µs wave	[A]	5000	
Installation position		any	
Protection degree		IP20	

RCDs technical details

RD3 residual current relays

RD3 electronic residual current relay

RD3 is a residual current device that in combination with a toroidal transformer is able to detect and evaluate earth fault current. If used in combination with a shunt-trip or undervoltage release, it can realize the opening of a circuit breaker ensuring earth leakage current protection.

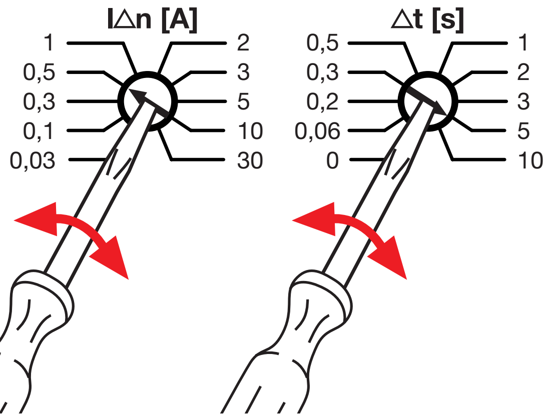
RD3

RD3M

RD3P

Setting of residual operating current and trip time delay.

Using the rotary selectors on the front of the device, it is possible to adjust the residual operating current and the trip time delay.



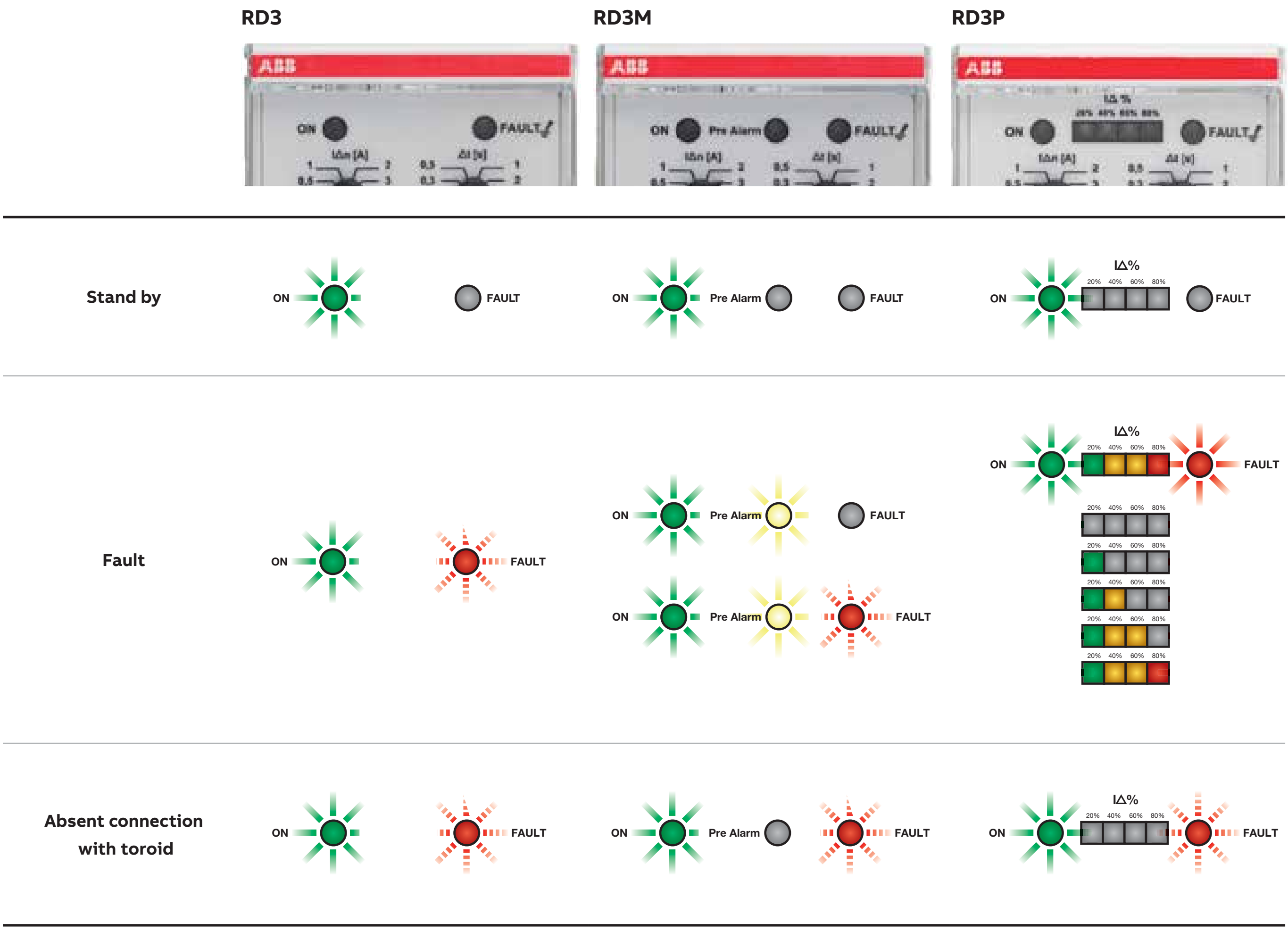
Adjustment of residual operating current (IΔn [A]) and trip time delay (Δt [s]).

Main features

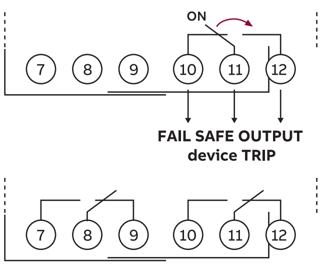
	Pre-alarm	Autoreset	Fail-safe
	Placing the dip-switch in the ON position enables the pre-alarm function: the output contact on terminals 7 8 9 will change state in the event of a residual current exceeding 60% IΔ.	Placing the dip-switch in the ON position enables the automatic Reset function: the Relay OUTPUT contacts revert to their original state once the fault condition ceases.	Built into the device (positive safety). In case of absence of supply to the device RD3 the output contact on terminals 10 11 12 will change state as shown in the figures.
RD3			■
RD3M	■		■
RD3P	■	■	■

RCDs technical details
RD3 residual current relays

Indicators

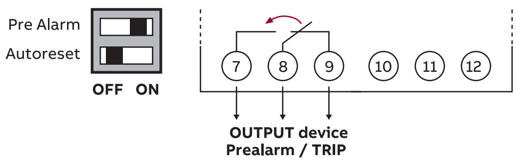


Fail-safe - RD3, RD3M, RD3P
Integrated in the device (positive safety). In case of power supply voltage failure of RD3 device, the output contacts numbered 10 11 12 will switch as shown below.

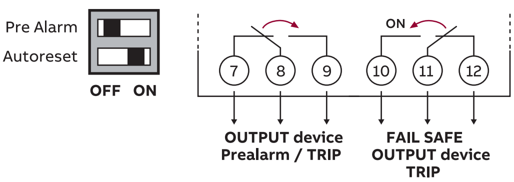


Contacts when the device is OFF

Pre-alarm - RD3P, RD3M
When the dip-switch is set to ON, the prealarm function is activated: the output contact marked by the 7 8 9 terminals will switch in case of a fault detected by the device exceeding 60% IΔ.



Autoreset - RD3P
When the dip-switch is set to ON, the automatic Reset function is activated: the output device contact will return to stand-by when the fault condition has been resolved.



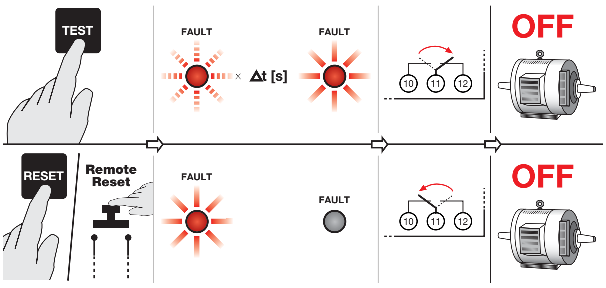
RCDs technical details

RD3 residual current relays

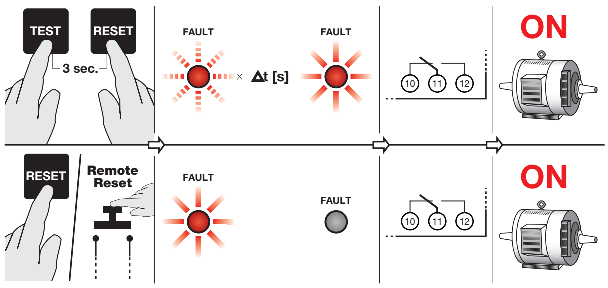
Test
To perform the relay test, press the button on the front. The relay can be reset via the front button or a remote button, as shown in the figure:

On RD3P version, a no trip test can also be performed by simultaneously pressing the front test and reset buttons for 3 seconds. In this case, the output contacts will not switch, as shown in the figure below:

Test



Test NO TRIP - RD3P



Associated circuit breakers (and relative releasers)
- Tmax range from T1 to T5, In up to 630 A, Ue up to 690 V, with UVR undervoltage release or SOR shunt opening release
- XT range from XT1 to XT4, In up to 250 A, Ue up to 690 V, with UVR undervoltage release or SOR shunt opening release
- pro M Compact S200 range with In up to 63 A, Ue up to 440 V, with S 2C-A shunt trip or S 2C-UA undervoltage release

Tripping time (RD3 output relay switching time), cumulative time (with associate circuit breakers), non-trip time limit:

RD3: tripping time. cumulative time. non intervention time

Time selection	**IΔn**		**2 IΔn**		**5 IΔn**		**10 IΔn**	
	tripping time	cumulative time with associate circuit breaker	tripping time	cumulative time with associate circuit breaker	tripping time	cumulative time with associate circuit breaker	tripping time	cumulative time with associate circuit breaker
Dt [s]	≤ [s]	≤ [s]	≤ [s]	≤ [s]	≤ [s]	≤ [s]	≤ [s]	≤ [s]
0	0.2	0.3	0.12	0.15	0.02	0.04	0.02	0.04
0.06	0.3	0.5	0.17	0.2	0.09	0.15	0.09	0.15
0.2	0.45	0.5	0.45	0.5	0.45	0.5	0.45	0.5
0.3	0.55	0.6	0.55	0.6	0.55	0.6	0.55	0.6
0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1	1.2	-	1.2	-	1.2	-	1.2	-
2	2.2	-	2.2	-	2.2	-	2.2	-
3	3.2	-	3.2	-	3.2	-	3.2	-
5	5.2	-	5.2	-	5.2	-	5.2	-
10	10.2	-	10.2	-	10.2	-	10.2	-

RCDs technical details

ELR front panel residual current relays

ELR: tripping time, cumulative time, non intervention time

	IΔn		2 IΔn			5 IΔn		10 IΔn	
Time selection Δt [s]	tripping time ≤ [s]	cumulative time with associate circuit breaker ≤ [s]	non-intervention time [s]	tripping time ≤ [s]	cumulative time with associate circuit breaker ≤ [s]	tripping time ≤ [s]	cumulative time with associate circuit breaker ≤ [s]	tripping time ≤ [s]	cumulative time with associate circuit breaker ≤ [s]
0	0.04	0.3	-	0.025	0.15	0.02	0.04	0.02	0.04
0.06	0.1	0.5	0.06	0.08	0.2	0.08	0.15	0.08	0.15
0.2	0.16 +15%	-	0.2	0.15 +15%	-	0.15 +15%	-	0.15 +15%	-
0.3	0.3 +15%	-	0.3	0.3 +15%	-	0.3 +15%	-	0.3 +15%	-
0.5	0.5 +15%	-	0.5	0.5 +15%	-	0.5 +15%	-	0.5 +15%	-
1	1 +15%	-	1	1 +15%	-	1 +15%	-	1 +15%	-
2	2 +15%	-	2	2 +15%	-	2 +15%	-	2 +15%	-
3	3 +15%	-	3	3 +15%	-	3 +15%	-	3 +15%	-
5	5 +15%	-	5	5 +15%	-	5 +15%	-	5 +15%	-

RCDs technical details

Toroidal transformers

Toroidal transformers
The choice of toroidal transformers is made according to the useful diameter and the minimum value of the leakage current to be detected.

Technical features of the toroidal transformers

Type	Toroid useful diameter [mm]	Max rated current [A] (1)	Min measurable current [mA]	Maximum capacity [A]
TRM	29	65	30	160
TR1	35	75	30	250
TR2	60	85	30	400
TR3	80	160	100	800
TR4	110	250	100	1250
TR4/A	110	250	300	1250
TR160	160	400	300	2000
TR160/A	160	400	500	2000
TR5	210	630	300	3200
TR5/A	210	630	500	3200
TR6	300	630	500	5000
TR6/A	300	630	1000	5000

(1) Toroidal transformers selection for use with ELR/RD3 according to IEC/ EN 60947-2 Annex M in combination with MCBs S200 range and MCCBs Tmax range up to T5 (630 A) and XT range up to XT4 (250 A)

RCDs technical details
Toroidal transformers

Technical characteristics

		TRM	TR1	TR2	TR3	TR4	TR4A	TR160	TR160A	TR5	TR5A	TR6	TR6A
Core		closed	closed	closed	closed	closed	open	closed	open	closed	open	closed	open
Available internal diameter	[mm]	29	35	60	80	110	110	160	160	210	210	300	300
Weight	[kg]	0.17	0.22	0.28	0.45	0.52	0.6	1.35	1.6	1.45	1.85	2.1	2.3
Minimum measurable current	[mA]	30	30	30	100	100	300	300	500	300	500	500	1000
Installation position		Any											
Operating temperature	[°C]	-10…+70											
Storage temperature	[°C]	-20…+80											
Transformation ratio		500/1											
Dielectric test voltage at industrial freq. for 1 min.	[kV]	2.5											
Max. insulating voltage	[V a.c.]	1000											
Max. thermal overload	[kA]	40/1 sec.											
Connections		Screw terminal boards, max. section 2.5 mm^2											
Protection degree		IP20											

Generality
They must be mounted with residual current monitors upstream the lines or loads to be protected; all active conductors (phases and neutral) of single-phase as well as of three-phases lines must pass through them.

In this way these devices perform the vector sum of line currents detecting the possible homopolar differential currents that leak to earth: their core of sheet iron has high magnetic properties that allow to detect even very low leakage currents.
The choice of a toroidal transformer depends on the conductor or on the bar to be used.
It is suggested to use the open versions in case of revamping or upgrading of an existing installation.

Installation
All active conductors can be introduced in the toroidal transformers without the need of respecting any specific sense of introduction (P1-P2 or P2-P1). The output signal must be picked up from terminals 1 (S1) and 2 (S2) and connected to the residual current monitor, while terminals 3 and 4 must be connected to the test output of those relays of FPP range with this function. With RD2 they must remain disconnected. For this connection it is better to use twisted or shielded cables, possibly far from busbars. The minimum recommended section of connection cables should have a maximum resistance of 3 Ω; anyway consider a maximum length of connection of 20 m for 0.5 mm^2 and of 100 m for 2.5 mm^2.

For versions with openable core it is necessary to control that the contact surface of the two semi-cores is clean, that bolts are tight and that connection cables connections on both sides are intact.

Connection cables with metallic shielding or armor must be earthed downstream the toroidal transformer; if they run within the transformer they must be earthed in the opposite direction.

Electrical installation solutions for buildings – Technical details

Arc Fault Detection Devices

Index

AFDD technical details

Functions and classification criteria for AFDD

Functions and classification criteria for AFDD
An AFDD (Arc Fault Detection Device) according to the product standard "IEC 62606 - General requirements for Arc Fault Detection Devices" is a device intended to mitigate the effects of arcing faults by disconnecting the circuit when an arc fault is detected: this product standard is partially derived from the UL 1699 standard.

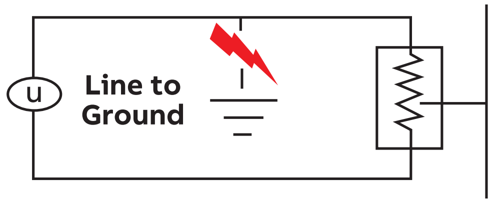
Three different type of products are described in IEC 62606 standard:

- **AFDD in series with protection device:**
  AFDD as one single device, comprising an AFD unit and opening means and intended to be connected in series with a suitable short circuit protective device declared by the manufacturer complying with one or more of the following standards IEC 60898-1, IEC 61009- 1 or IEC 60269 series.

- **Integrated solution:**
  AFDD as one single device, comprising an AFD unit integrated in a protective device complying with one or more of the following standards IEC 60898-1, IEC 61008-1, IEC 61009- 1 or IEC 62423.

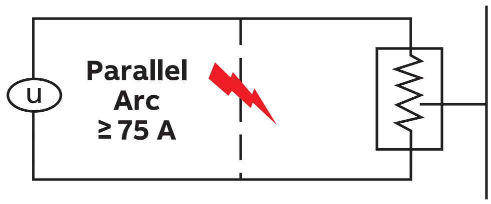
- **AFDD + protection device assembled on site:**
  AFDD according to Annex D, comprised of an AFD unit and a declared protective device, intended to be assembled on site.

AFDD can guarantee protection against all types of arc faults:



Eart arc fault
current is folowing from active conductor to the earth

Series arc fault
current is folowing within one conductor of the final circuit



Parallel arc fault
current is folowing between active conductors in parallel with the load of the circuit

Different levels of protection
RCDs are recognized efficient to reduce the risk of fire by detection of leakage current and arcing to ground as a consequence of tracking currents within an electrical installation. For this reason RCDs can detect only earth arc faults.

In case of parallel arc faults MCBs and fuses can trip only if their intervention time-current curves are compatible with the values of the current of the arc faults, thus the trip is not instantaneous.

Series arc faults are generally to weak to be detected by MCBs.

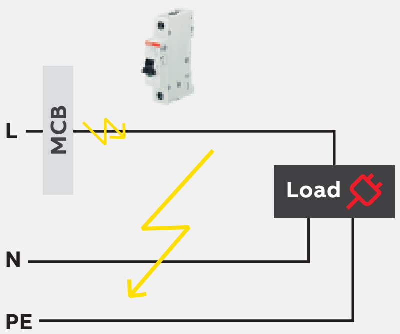
MCBs can not detect earth arc faults because the current values are in general rather low.

In order to ensure a complete protection against arc faults, it is required the installation of an AFDD.

AFDD technical details

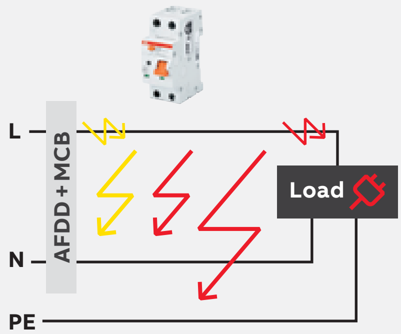
Functions and classification criteria for AFDD

01 MCB



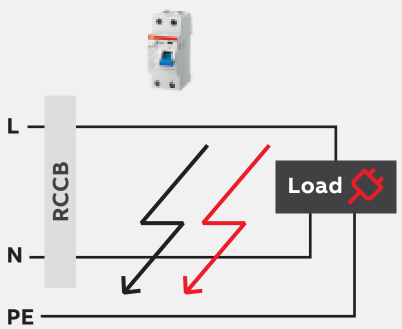
Protection against:
- Overcurrent (short circuits, overload)

01 S-ARC1 AFDD with integrated MCB



Protection against:
- Overcurrent (short circuits, overload)
- Series, parallel and earth arc faults

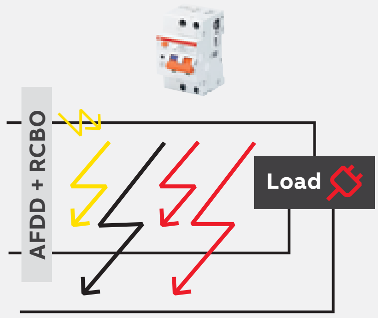
02 RCCB



Protection against:
- Earth faults currents
- Earth arc faults

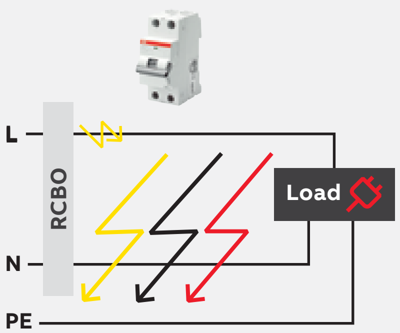
02 DS-ARC1 AFDD with integrated RCBO

Maximum Protection



Protection against:
- Overcurrent (short circuits, overload)
- Earth fault currents
- Series, parallel and earth arc faults

03 RCBO



Protection against:
- Overcurrent (short circuits, overload)
- Earth fault currents
- Earth arc faults

AFDD technical details

Power loss, derating and performance in altitude

Voltage drop, Internal resistance, Power loss and own consumption for S-ARC1 series

In [A]	Voltage drop [mV]	Internal resistance [mΩ]	Power loss [W]	Own consumption [W]
6	380	63.3	2.3	0.5
10	203	20.3	2.0	0.5
13	166	12.8	2.2	0.5
16	175	10.9	2.8	0.5
20	182	9.1	3.6	0.5
25	141	5.6	3.5	0.5
32	150	4.7	4.8	0.5
40	155	3.9	6.2	0.5

Derating in temperature for S-ARC1 series

Max operating current depending on the ambient temperature of a circuit breaker in load circuit of characteristics type B and C.
Daily average ambient temperature is intended to be ≤ +35 °C.

In (A)	Temperature (°C)								
	-25	**-20**	**0**	**10**	**20**	**25**	**30**	**40**	**50**	**55**
6	7.2	6.8	6.4	6.3	6.1	6.0	6.0	6.0	5.8	5.8
10	12.2	11.9	10.8	10.7	10.5	10.2	10.0	10.0	9.8	9.6
13	15.6	15.2	14.2	13.8	13.4	13.2	13.0	12.9	12.7	12.6
16	19.5	18.9	17.9	17.3	16.7	16.3	16.0	15.8	15.5	15.4
20	24.4	24.0	22.4	21.6	21.0	20.4	20.0	19.8	19.5	19.4
25	29.5	28.9	28.0	27.0	26.2	25.5	25.0	24.6	24.2	24.0
32	36.5	35.9	35.0	33.9	33.0	32.3	32.0	31.1	30.4	30.0
40	47.0	46.4	43.0	42.1	41.1	40.4	40.0	38.9	38.0	37.1

Performance in altitude for S-ARC1 series

Elevation	[m]	3000	4000	5000	6000
Rated Current	[A]	0,96 x In	0,94 x In	0,92 x In	0,90 x In
Rated Voltage	[V]	0,877 x Un	0,775 x Un	0,676 x Un	0,588 x Un

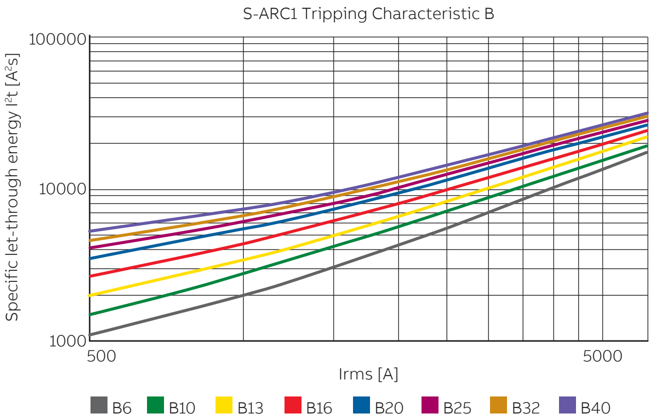
For altitude higher then 3.000 m the isolating characteristic is no longer available.

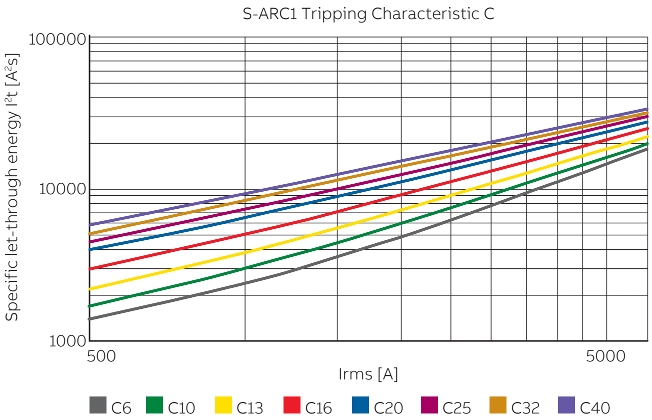
Influence of adjacent devices

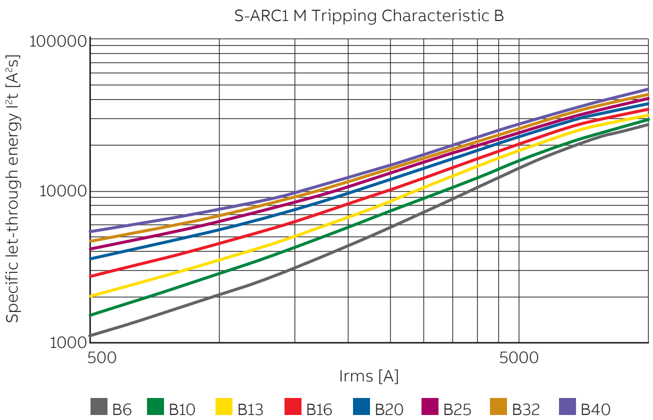
Number of devices	Correction factor
1	1
3	0,92
5	0,88
7	0,85
9	0,84

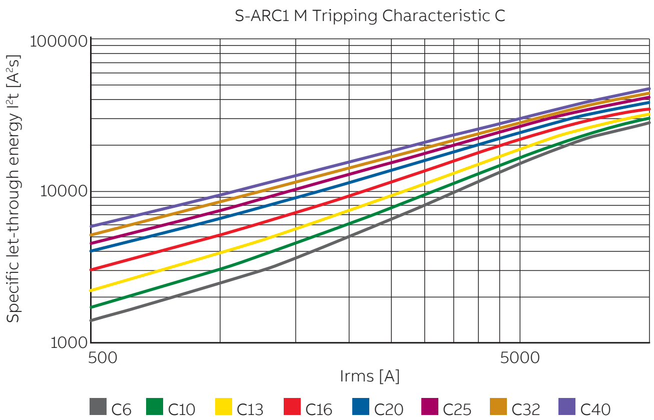
AFDD technical details

Specific let-through energy I²t S-ARC1 and S-ARC1 M









—
01 I²t
S-ARC1 Tripping
Characteristics B

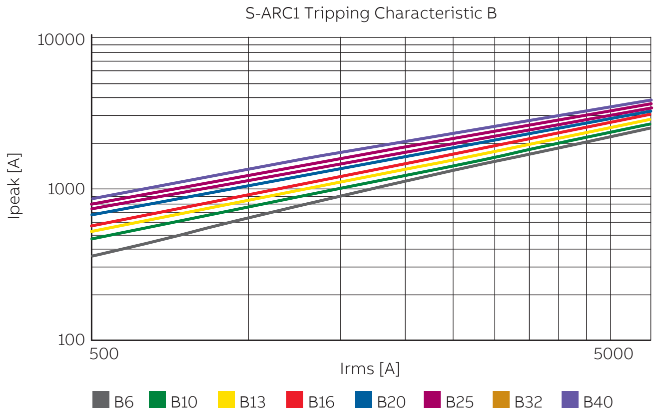
—
02 I²t
S-ARC1 Tripping
Characteristics C

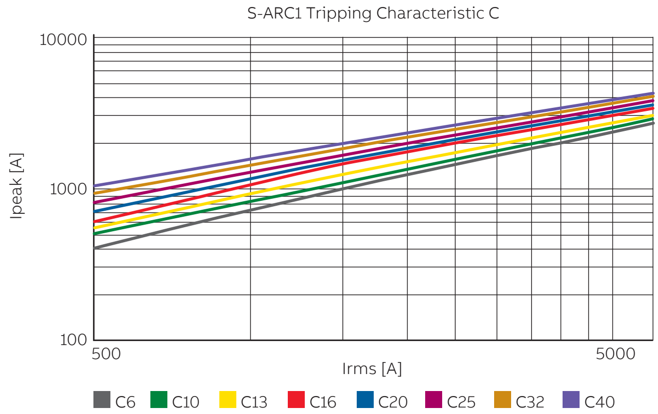
—
03 I²t
S-ARC1 M Tripping
Characteristics B

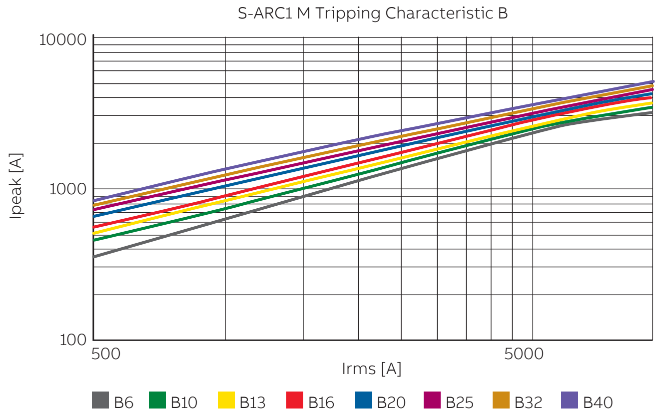
—
04 I²t
S-ARC1 M Tripping
Characteristics C

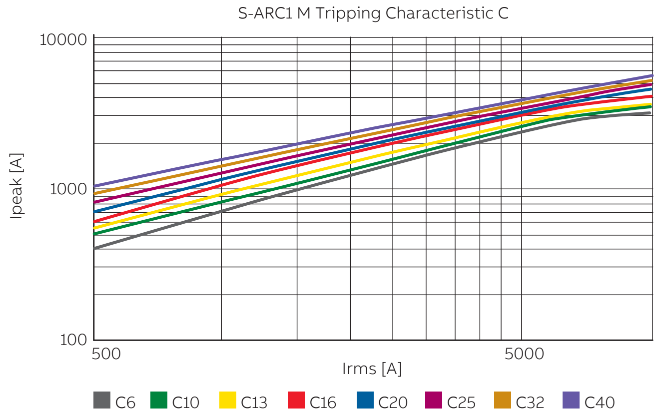
AFDD technical details

Ipeak S-ARC1 and S-ARC1 M









—
01 Ipeak
S-ARC1 Tripping
Characteristics B

—
02 Ipeak
S-ARC1 Tripping
Characteristics C

—
03 Ipeak
S-ARC1 M Tripping
Characteristics B

—
04 Ipeak
S-ARC1 M Tripping
Characteristics C

AFDD technical details

Coordination tables: S-ARC1, S-ARC1 M back-up

Fuses - S-ARC1, S-ARC1 M@230/230/240V

		Supply S.		gL/gG					
Load S.		Icu [kA]	In[A]	25	40	50	63	80	100
S-ARC1, S-ARC1 M	B,C	7.5 and 10	6…40	35	25	20	15	10	10

MCCB@415V - S-ARC1, S-ARC1 M@230/240V

		Upstream		XT1	XT1	XT1	XT2	XT3	XT4	XT1	XT2	XT3	XT4	XT1	XT2	XT4	XT2	XT4	XT2	XT4
	Char			B	C	N	N	N	N	S	S	S	S	H	H	H	L	L	V	V
Down-stream		Icu [kA]	In[A]	18	25	36	36	36	36	50	50	50	50	70	70	70	120	120	150	150
S-ARC1	B,C	7.5	6…25	16	16	16	20	10	10	16	20	10	10	16	20	10	20	10	20	10
			32, 40	10	10	10	16	10	10	10	16	10	10	10	16	10	16	10	16	10
S-ARC1M	B,C	10	6…16	16	16	16	25	16	25	16	25	16	25	16	25	25	25	25	25	25
			20, 25				25		16		25		16		25	16	25	16	25	16
			32, 40	16	16	16	16	16	10	16	16	16	10	16	16	10	16	10	16	10

MCCB @415V - S-ARC1 , S-ARC1 M@230/240V

		Supply S.		T1	T1	T1	T2	T3	T4	T2	T3	T4	T2	T4	T2	T4	T4
	Char			B	C	N	N	N	N	S	S	S	H	H	L	L	V
Load S.		Icu [kA]	In[A]	16	25	36	36	36	36	50	50	50	70	70	85	120	200
S-ARC1	B,C	7.5	6…25	16	16	16	20	10	10	20	10	10	20	10	20	10	10
			32, 40	10	10	10	16	10	10	16	10	10	16	10	16	10	10
S-ARC1M	B,C	10	6…25	16	16	16	25	16	25	25	16	16	25	16	25	16	16
			32, 40	16	16	16	16	16	16	16	16	16	16	16	16	16	16

S800S - S-ARC1, S-ARC1 M@ 230/240V

		Supply S.	S800S								
	Char		B,C,D,K								
Load S.		Icu [kA]	50								
			In[A]	25	32	40	50	63	80	100	125
S-ARC1	B,C	7.5	6…16	50	40	25	25	18	15	15	15
			20		40	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
			40					18	15	15	15
S-ARC1M	B,C	10	6…16	50	50	50	50	50	50	50	50
			20		50	50	50	50	50	50	50
			25			50	50	50	50	50	50
			32				50	50	50	50	50
			40					50	50	50	50

S800N - S-ARC1, S-ARC1 M@ 230/240V

		Supply S.	S800N								
	Char		B,C,D								
Load S.		Icu [kA]	36								
			In[A]	25	32	40	50	63	80	100	125
S-ARC1	B,C	7.5	6…16	36	36	25	25	18	15	15	15
			20		36	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
			40					18	15	15	15
S-ARC1M	B,C	10	6…16	36	36	36	36	36	36	36	36
			20		36	36	36	36	36	36	36
			25			36	36	36	36	36	36
			32				36	36	36	36	36
			40					36	36	36	36

AFDD technical details

Coordination tables: S-ARC1, S-ARC1 M back-up

S800C - S-ARC1, S-ARC1 M@ 230/240V

		Supply S.		S800C							
	Char			B,C,D,K							
Load S.		Icu [kA]		25							
			In[A]	25	32	40	50	63	80	100	125
S-ARC1	B,C	7.5	6…16	25	25	25	25	18	15	15	15
			20		25	25	25	18	15	15	15
			25			25	25	18	15	15	15
			32				25	18	15	15	15
			40					18	15	15	15
S-ARC1 M	B,C	10	6…16	25	25	25	25	25	25	25	25
			20		25	25	25	25	25	25	25
			25			25	25	25	25	25	25
			32				25	25	25	25	25
			40					25	25	25	25

S800B - S-ARC1, S-ARC M@ 230/240V

		Supply S.		S800B						
	Char			B,C,D,K						
Load S.		Icu [kA]		25						
			In[A]	32	40	50	63	80	100	125*
S-ARC1	B,C	7.5	6…20	16	16	16	16	15	15	15
			25		16	16	16	15	15	15
			32			16	16	15	15	15
			40				16	15	15	15
S-ARC1 M	B,C	10	6…20	16	16	16	16	16	16	16
			25		16	16	16	16	16	16
			32			16	16	16	16	16
			40				16	16	16	16

*Only S800B B,C

S200 - S-ARC1, S-ARC1 M@230/240V

		Supply S.		S200	S200M	S200P	S200P
	Char			B-C	B,C	B,C	B,C
Load S.		Icu [kA]		20	25	40	25
S-ARC1, S-ARC1 M	B,C	7.5 and 10	In[A]	0.5..63	0.5…63	0.5…25	32
			6…20	20	25	40	25

DS201 - S-ARC1, S-ARC1 M @230/240V

		Supply S.		DS201
	Char			B,C
Load S.		In[A]		2…40
S-ARC1, S-ARC1 M	B,C	6…40	Icu [kA]	10
			7.5 and 10	10

AFDD technical details

Coordination tables: S-ARC1, S-ARC1 M selectivity

Fuse gL/gG- S-ARC1, S-ARC M @ 230/400V

		Supply S.	Fuse gL/gG								
Load S.	Char	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
S-ARC1	B,C	7.5	6	1	1.5	4	4.5	T	T	T	T
			10		1.2	3.5	4	T	T	T	T
			13		1	3	3.5	5	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	T	T	T
			25		1	2	3	4.5	T	T	T
			32		1	2	3	4.5	5	T	T
			40			1.5	2.5	4	5	6.5	T
S-ARC1 M	B,C	10	6	1	1.5	4	4.5	7	T	T	T
			10		1.2	3.5	4	6	T	T	T
			13		1	3	3.5	5	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	8	T	T
			25		1	2	3	4.5	6.5	9	T
			32		1	2	3	4.5	5	8	T
			40			1.5	2.5	4	5	6.5	9

MCCB@415V - S-ARC1, S-ARC1 M @230/240V

			Supply S.	XT1										
			Version	B,C,N,S,H										
			Release	TM										
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160
S-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T
			10			3	3	3	4.5	T	T	T	T	T
			13					3	4.5	5	T	T	T	T
			16					3	4.5	5	T	T	T	T
			20						3	5	T	T	T	T
			25							5	T	T	T	T
			32								T	T	T	T
			40									T	T	T
S-ARC1 M	B,C	10	6	6	6	6	6	6	6	T	T	T	T	T
			10			3	3	3	4.5	7.5	8.5	T	T	T
			13					3	4.5	5	7.5	T	T	T
			16					3	4.5	5	7.5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7.5	T	T
			40									7.5	T	T

3

AFDD technical details

Coordination tables: S-ARC1, S-ARC1 M selectivity

MCCB@415V - S-ARC1, S-ARC1 M @230/240V

			Supply S.	XT2															
			Version	N,S,H,L,V															
			Release	TM											EL				
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160	10	25	63	100	160
S-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3[1]	3	3	3	4.5	T	T	T	T	T		T	T	T	T
			13				3[1]	3	4.5	5	T	T	T	T			T	T	T
			16				3[1]	3	4.5	5	T	T	T	T			T	T	T
			20				3[1]		3	5	T	T	T	T			T	T	T
			25						3 1	5	6	T	T	T			T	T	T
			32						3 1		T	T	T	T			T	T	T
			40								T	T	T	T				T	T
S-ARC1 M	B,C	10	6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3[1]	3	3	3	4.5	7.5	8.5	T	T	T		T	T	T	T
			13				3[1]	3	4.5	5	7.5	T	T	T			T	T	T
			16				3[1]	3	4.5	5	7.5	T	T	T			T	T	T
			20				3[1]		3	5	6	T	T	T			T	T	T
			25						3 1	5	6	T	T	T			T	T	T
			32						3 1		6	7.5	T	T			T	T	T
			40								6	7.5	T	T				T	T

[1] Value valid in case of Supply S. breaker only magnetic

MCCB@415V - S-ARC1, S-ARC1 M @230/240V

			Supply S.	XT3						
			Version	N,S						
			Release	TM						
Load S.	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
S-ARC1	B,C	7.5	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13	5	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7.5	T	T	T	T
			40		6[1]	7.5	T	T	T	T
S-ARC1 M	B,C	10	6	T	T	T	T	T	T	T
			10	7.5	8.5	T	T	T	T	T
			13	5	7.5	T	T	T	T	T
			16	5	7.5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7.5	T	T	T	T
			40		6[1]	7.5	T	T	T	T

[1] Value valid in case of Supply S. breaker only magnetic

AFDD technical details

Coordination tables: S-ARC1, S-ARC1 M selectivity

MCCB@415V - S-ARC1, S-ARC1 M @230/240V

			Supply S.	XT4																	
			Version	N,S,H,L,V																	
			Release	TM													EL				
Load S.	Char	Icu [kA]	In[A]	20	25	32	40	50	63	80	100	125	160	200	225	250	40	63	100	160	250
S-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3[1]	3	3	3	4.5	T	T	T	T	T	T	T	T	3	T	T	T	T
			13			3[1]	3	4.5	5	T	T	T	T	T	T	T	3	T	T	T	T
			16			3[1]	3	4.5	5	T	T	T	T	T	T	T	3	T	T	T	T
			20			3[1]		3	5	T	T	T	T	T	T	T		T	T	T	T
			25					3[1]	5	6	T	T	T	T	T	T		T	T	T	T
			32					3[1]		6	7.5	T	T	T	T	T		T	T	T	T
			40							6	7.5	T	T	T	T	T			T	T	T
S-ARC1 M	B,C	10	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3[1]	3	3	3	4.5	7.5	8.5	T	T	T	T	T	T	3	T	T	T	T
			13			3[1]	3	4.5	5	7.5	T	T	T	T	T	T	3	T	T	T	T
			16			3[1]	3	4.5	5	7.5	T	T	T	T	T	T	3	T	T	T	T
			20			3[1]		3	5	6	T	T	T	T	T	T		T	T	T	T
			25					3[1]	5	6	T	T	T	T	T	T		T	T	T	T
			32					3[1]		6	7.5	T	T	T	T	T		T	T	T	T
			40							6	7.5	T	T	T	T	T			T	T	T

[1] Value valid in case of Supply S. breaker only magnetic

MCCB@415V - S-ARC1, S-ARC1 M @230/240V

			Supply S.	T1										
			Version	B,C,N										
			Release	TMD										
			Iu[A]	160										
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160
S-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T
			10			3	3	3	4.5	T	T	T	T	T
			13					3	4.5	5	T	T	T	T
			16					3	4.5	5	T	T	T	T
			20						3	5	T	T	T	T
			25							5	T	T	T	T
			32							T	T	T	T	T
			40									T	T	T
S-ARC1 M	B,C	10	6	6	6	6	6	6	6	T	T	T	T	T
			10			3	3	3	4.5	7.5	8.5	T	T	T
			13					3	4.5	5	7.5	T	T	T
			16					3	4.5	5	7.5	T	T	T
			20						3	5	6	T	T	T
			25							5	6	T	T	T
			32								6	7.5	T	T
			40									7.5	T	T

AFDD technical details

Coordination tables: S-ARC1, S-ARC1 M selectivity

MCCB@415V - S-ARC1, S-ARC1 M @230/240V

			Supply S.	T2														
			Version	N,S,H,L														
			Release	TMD											EL			
			Iu[A]	160											160			
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160	25	63	100	160
S-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10		3	3	3	3	4.5	T	T	T	T	T	T	T	T	T
			13				3	3	4.5	5	T	T	T	T		T	T	T
			16				3	3	4.5	5	T	T	T	T		T	T	T
			20				3		3	5	T	T	T	T		T	T	T
			25						3	5	T	T	T	T		T	T	T
			32						3		T	T	T	T		T	T	T
			40								T	T	T	T			T	T
S-ARC1M	B,C	10	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10		3	3	3	3	4.5	7.5	8.5	T	T	T	T	T	T	T
			13				3	3	4.5	5	7.5	T	T	T		T	T	T
			16				3	3	4.5	5	7.5	T	T	T		T	T	T
			20				3		3	5	6	T	T	T		T	T	T
			25						3	5	6	T	T	T		T	T	T
			32						3		6	T	T	T		T	T	T
			40								6	7.5	T	T			T	T

MCCB@415V - S-ARC1@230/240V

			Supply S.	T3						
			Version	N,S						
			Release	TMD, MA						
			Iu[A]	250						
Load S.	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
S-ARC1	B,C	7.5	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13	5	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
			25	5	T	T	T	T	T	T
			32		T	T	T	T	T	T
			40		T	T	T	T	T	T
S-ARC1M	B,C	10	6	T	T	T	T	T	T	T
			10	7.5	8.5	T	T	T	T	T
			13	5	7.5	T	T	T	T	T
			16	5	7.5	T	T	T	T	T
			20	5	6	T	T	T	T	T
			25	5	6	T	T	T	T	T
			32		6	7.5	T	T	T	T
			40		6	7.5	T	T	T	T

S800N/S - S-ARC1 , S- ARC 1 M @230/240V

			Supply S.	S800N-S				
	Char			B				
Load S.		Icu [kA]		36-50				
			In[A]	50	63	80	100	125
S-ARC1, S-ARC1M	B,C	7.5 and 10	6	0.6	1.2	1.6	2.6	3.8
			10	0.5	1.1	1.4	2	3
			13		0.8	1.2	1.7	2.5
			16		0.8	1.2	1.7	2.5
			20			1	1.5	2.1
			25				1.3	1.8
			32				1.1	1.7
			40					1.6

AFDD technical details

Coordination tables: S-ARC1, S-ARC1 M selectivity

S800N/S-S-ARC1 , S-ARC 1 M @230/240V

			Supply S.	S800N-S					
	Char			C					
Load S.		Icu [kA]		36-50					
			In[A]	40	50	63	80	100	125
S-ARC1, S-ARC1 M	B,C	7.5 and 10	6	0.55	1.1	1.5	2.5	3.6	5.5
			10	0.45	1	1.3	1.9	2.8	4.2
			13		0.75	1.1	1.6	2.3	3.6
			16		0.75	1.1	1.6	2.3	3.6
			20			0.9	1.4	1.9	3.3
			25				1.2	1.6	2.7
			32				1	1.5	2.5
			40					1.4	2.1

S800N/S-S-ARC1, S-ARC1 M @230/240V

			Supply S.	S800 N-S							
	Char			D							
Load S.		Icu [kA]		36-50							
			In[A]	25	32	40	50	63	80	100	125
S-ARC1	B,C	7.5	6	32	40	50	63	80	100	125	T
			10	1.3	2	3.2	3.9	T	T	T	T
			13	1.2	1.65	2.6	3.1	T	T	T	
			16	0.9	1.4	1.8	2.6	5	T	T	
			20	0.9	1.4	1.8	2.6	5	T	T	
			25		1.3	1.6	2.2	4.2	5.4	T	
			32			1.5	1.9	3.5	4.5	T	T
			40				1.8	2.8	4.2	5.5	T
S-ARC1 M	B,C	10	6	0.6	1.3	2	3.2	3.9	8	T	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		0.9	1.4	1.8	2.6	5	6.3	8.8
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6
			25				1.5	1.9	3.5	4.5	6.6
			32					1.8	2.8	4.2	5.5
			40					1.7	2.7	4	5

S750 - S-ARC, S-ARC1 M @230/240V

			Supply S.	S750						
	Char			E, K						
Load S.		Icu [kA]		25						
			In[A]	16	20	25	32	40	50	63
S-ARC, S-ARC1 M	B,C	7.5 and 10	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13		T	T	T	T	T	T
			16		T	T	T	T	T	T
			20			T	T	T	T	T
			25			T	T	T	T	T
			32					T	T	T
			40						T	T

S750DR - S-ARC, S-ARC1 M @230/240V

			Supply S.	S750DR								
	Char			E, K								
Load S.		Icu [kA]		25								
			In[A]	16	20	25	32	40	50	63	80	100
S-ARC, S-ARC1 M	B,C	7.5 and 10	6	T	T	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T	T	T
			13		T	T	T	T	T	T	T	T
			16		T	T	T	T	T	T	T	T
			20			T	T	T	T	T	T	T
			25			T	T	T	T	T	T	T
			32					T	T	T	T	T
			40						T	T	T	T

AFDD technical details

Power loss, derating and performance in altitude DS-ARC1 and DS-ARC1 M

Derating

Influence of adjacent devices	Number of devices	1	3	5	7	9
	Correction factor	1	0.95	0.92	0.9	0.9

Derating in temperature	**In [A]**	**Temperature [°C]**										
Max operating current depending on the ambient temperature (daily average ≤ +35 °C) of characteristics type B and C.		**-25**	**-20**	**-10**	**0**	**10**	**20**	**25**	**30**	**40**	**50**	**55**
	6	7.9	7.8	7.7	7.3	6.9	6.3	6.1	6.0	5.9	5.8	5.7
	10	13.3	13.1	12.8	12.3	11.5	10.6	10.3	10.0	9.9	9.8	9.8
	13	17.0	16.7	16.2	15.5	14.5	13.6	13.3	13.0	12.7	12.6	12.5
	16	19.6	19.2	18.5	18.0	17.2	16.7	16.4	16.0	15.9	15.7	15.6
	20	24.3	23.8	23.2	22.3	21.4	20.7	20.3	20.0	19.8	19.5	19.3

Voltage Drop. power loss. internal resistance. own consumption	**In [A]**	**Voltage drop [mV]**	**Internal resistance [mΩ]**	**Power loss [W]**	**Own consumption [W]**
	6	408	68	2.5	0.5
	10	183	18	1.8	0.5
	13	195	20	2.0	0.5
	16	194	12	3.1	0.5
	20	212	11	4.2	0.5

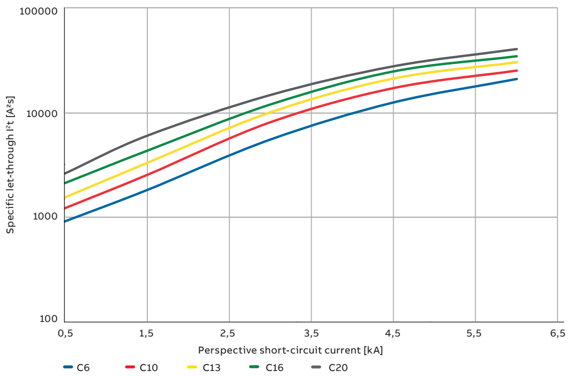
Performance in altitude	**Elevation [m]**	**3000**	**4000**	**5000**	**6000**
	Rated Current [A]	0.96 × In	0.94 × In	0.92 × In	0.90 × In
	Rated Voltage [V]	0.877 × Un	0.775 × Un	0.676 × Un	0.588 × Un

AFDD technical details

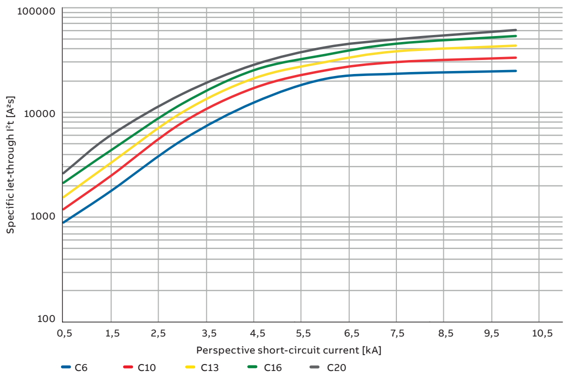
Specific let-through energy I^2t DS-ARC1 and DS-ARC1 M

— 01 I^2t DS-ARC1 Characteristics C

— 02 I^2t DS-ARC1 M Characteristics C



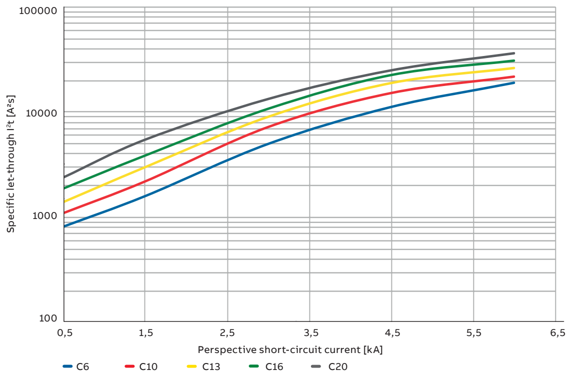
— 01



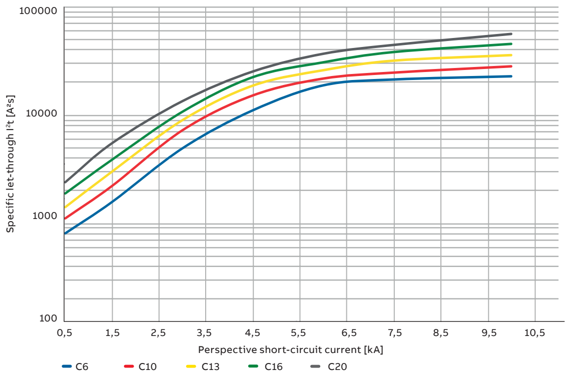
— 02

— 03 I^2t DS-ARC1 Characteristics B

— 04 I^2t DS-ARC1 M Characteristics B



— 03



— 04

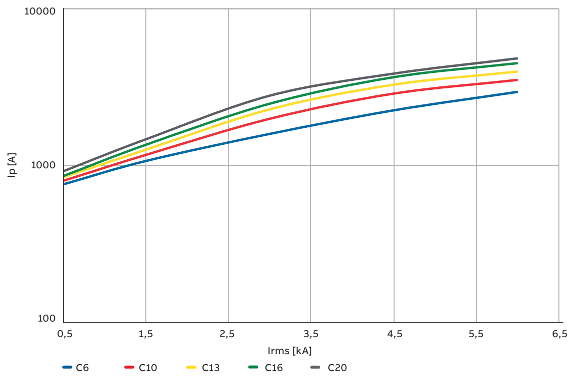
3

AFDD technical details

Ipeak DS-ARC1 and DS-ARC1 M

—
01 Ipeak
DS-ARC1,
Characteristic C

—
02 Ipeak
DS-ARC1 M
Characteristics C



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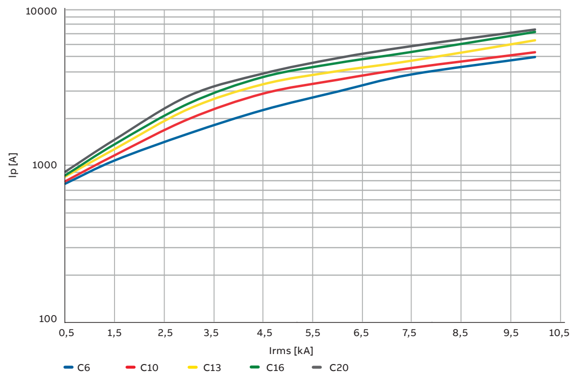
01



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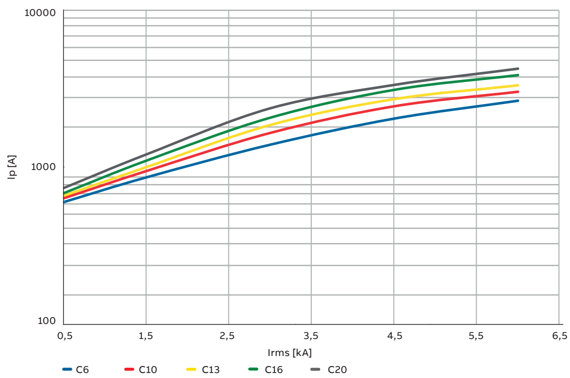
02

—
03 Ipeak
DS-ARC1
Characteristics B

—
04 Ipeak
DS-ARC1 M
Characteristics B



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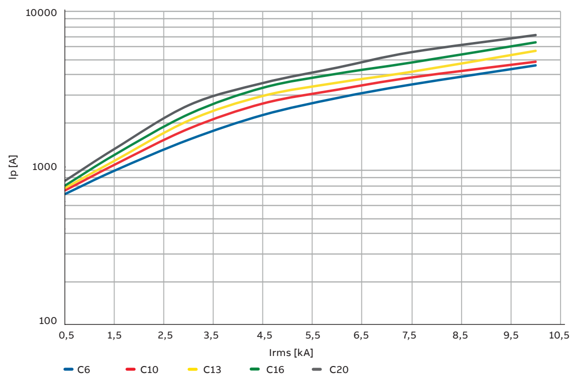
03



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04

AFDD technical details

Coordination tables: DS-ARC1, DS-ARC1 M back-up

Fuses - DS-ARC1, DS-ARC1 M@230/230/240V

		Supply S.		gL/gG					
Load S.		Icu [kA]	In[A]	25	40	50	63	80	100
DS-ARC1, DS-ARC1 M	B,C	7.5 and 10	6…20	35	25	20	15	10	10

MCCB@415V - DS-ARC1, DS-ARC1 M@230/240V

		Upstream		XT1	XT1	XT1	XT2	XT3	XT4	XT1	XT2	XT3	XT4	XT1	XT2	XT4	XT2	XT4	XT2	XT4
	Char			B	C	N	N	N	N	S	S	S	S	H	H	H	L	L	V	V
Down-stream		Icu [kA]	In[A]	18	25	36	36	36	36	50	50	50	50	70	70	70	120	120	150	150
DS-ARC1	B,C	7.5	6…20	16	16	16	20	10	10	16	20	10	10	16	20	10	20	10	20	10
DS-ARC1M	B,C	10	6…16	16	16	16	25	16	25	16	25	16	25	16	25	25	25	25	25	25
			20				25		16		25		16		25	16	25	16	25	16

MCCB @415V - DS-ARC1 , DS-ARC1 M@230/240V

		Supply S.		T1	T1	T1	T2	T3	T4	T2	T3	T4	T2	T4	T2	T4	T4
	Char			B	C	N	N	N	N	S	S	S	H	H	L	L	V
Load S.		Icu [kA]	In[A]	16	25	36	36	36	36	50	50	50	70	70	85	120	200
DS-ARC1	B,C	7.5	6…20	16	16	16	20	10	10	20	10	10	20	10	20	10	10
DS-ARC1M	B,C	10	6…20	16	16	16	25	16	25	25	16	16	25	16	25	16	16

S800S - DS-ARC1, DS-ARC1 M@ 230/240V

		Supply S.		S800S							
	Char			B,C,D,K							
Load S.		Icu [kA]		50							
			In[A]	25	32	40	50	63	80	100	125
DS-ARC1	B,C	7.5	6…16	50	40	25	25	18	15	15	15
			20	-	40	25	25	18	15	15	15
DS-ARC1M	B,C	10	6…16	50	50	50	50	50	50	50	50
			20	-	50	50	50	50	50	50	50

S800N - DS-ARC1, DS-ARC1 M@ 230/240V

		Supply S.		S800N							
	Char			B,C,D							
Load S.		Icu [kA]		36							
			In[A]	25	32	40	50	63	80	100	125
DS-ARC1	B,C	7.5	6…16	36	36	25	25	18	15	15	15
			20	-	36	25	25	18	15	15	15
DS-ARC1M	B,C	10	6…16	36	36	36	36	36	36	36	36
			20	-	36	36	36	36	36	36	36

AFDD technical details

Coordination tables: DS-ARC1, DS-ARC1 M back-up

S800C - DS-ARC1, DS-ARC1 M@ 230/240V

		Supply S.		S800C							
	Char			B,C,D,K							
Load S.		Icu [kA]		25							
DS-ARC1	B,C	7.5	In[A]	25	32	40	50	63	80	100	125
			6…16	25	25	25	25	18	15	15	15
			20	-	25	25	25	18	15	15	15
DS-ARC1 M	B,C	10	6…16	25	25	25	25	25	25	25	25
			20	-	25	25	25	25	25	25	25

S800B - DS-ARC1, S-ARC M@ 230/240V

		Supply S.		S800B						
	Char			B,C,D,K						
Load S.		Icu [kA]								
DS-ARC1	B,C	7.5	In[A]	32	40	50	63	80	100	125*
			6…20	16	16	16	16	15	15	15
DS-ARC1 M	B,C	10	6…20	16	16	16	16	16	16	16

*Only S800B B,C

S200 - DS-ARC1, DS-ARC1 M@230/240V

		Supply S.		S200	S200M	S200P	S200P
	Char			B-C	B,C	B,C	B,C
Load S.		Icu [kA]		20	25	40	25
DS-ARC1	B,C	7.5 and 10	In[A]	0.5..63	0.5…63	0.5…25	32
			6…20	20	25	40	25

DS201 - DS-ARC1, DS-ARC1 M @230/240V

		Supply S.		DS201
	Char			B,C
Load S.		In[A]		2…40
DS-ARC1	B,C	6…20	Icu [kA]	10
			7.5 and 10	10

AFDD technical details

Coordination tables: DS-ARC1, DS-ARC1 M selectivity

Fuse gL/gG- DS-ARC1, S-ARC M @ 230/400V

		Supply S.	Fuse gL/gG								
Load S.	Char	Icu [kA]	In[A]	25	32	40	50	63	80	100	125
DS-ARC1	B,C	7.5	6	1	1.5	4	4.5	T	T	T	T
			10		1.2	3.5	4	T	T	T	T
			13		1	3	3.5	5	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	T	T	T
DS-ARC1M	B,C	10	6	1	1.5	4	4.5	7	T	T	T
			10		1.2	3.5	4	6	T	T	T
			13		1	3	3.5	5	T	T	T
			16		1	3	3.5	5	T	T	T
			20		1	3	3.5	5	8	T	T

MCCB@415V - DS-ARC1, DS-ARC1 M @230/240V

			Supply S.	XT1										
			Version	B,C,N,S,H										
			Release	TM										
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160
DS-ARC1	B.C	7.5	6	T	T	T	T	T	T	T	T	T	T	T
			10			3	3	3	4.5	T	T	T	T	T
			13					3	4.5	5	T	T	T	T
			16					3	4.5	5	T	T	T	T
			20						3	5	T	T	T	T
DS-ARC1M	B.C	10	6	6	6	6	6	6	6	T	T	T	T	T
			10			3	3	3	4.5	7.5	8.5	T	T	T
			13					3	4.5	5	7.5	T	T	T
			16					3	4.5	5	7.5	T	T	T
			20						3	5	6	T	T	T

MCCB@415V - DS-ARC1, DS-ARC1 M @230/240V

			Supply S.	XT2															
			Version	N,S,H,L,V															
			Release	TM											EL				
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160	10	25	63	100	160
DS-ARC1	B.C	7.5	6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4.5	T	T	T	T	T		T	T	T	T
			13				3 [1]	3	4.5	5	T	T	T	T			T	T	T
			16				3 [1]	3	4.5	5	T	T	T	T			T	T	T
			20				3 [1]		3	5	T	T	T	T			T	T	T
DS-ARC1M	B.C	10	6	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T
			10		3 [1]	3	3	3	4.5	7.5	8.5	T	T	T		T	T	T	T
			13				3 [1]	3	4.5	5	7.5	T	T	T			T	T	T
			16				3 [1]	3	4.5	5	7.5	T	T	T			T	T	T
			20				3 [1]		3	5	6	T	T	T			T	T	T

[1] Value valid in case of Supply S. breaker only magnetic

AFDD technical details

Coordination tables: DS-ARC1, DS-ARC1 M selectivity

MCCB@415V - DS-ARC1. DS-ARC1 M @230/240V

			Supply S.	XT3						
			Version	N,S						
			Release	TM						
Load S.	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
DS-ARC1	B.C	7.5	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13	5	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
DS-ARC1M	B.C	10	6	T	T	T	T	T	T	T
			10	7.5	8.5	T	T	T	T	T
			13	5	7.5	T	T	T	T	T
			16	5	7.5	T	T	T	T	T
			20	5	6	T	T	T	T	T

MCCB@415V - DS-ARC1, DS-ARC1 M @230/240V

			Supply S.	XT4																	
			Version	N,S,H,L,V																	
			Release	TM													EL				
Load S.	Char	Icu [kA]	In[A]	20	25	32	40	50	63	80	100	125	160	200	225	250	40	63	100	160	250
DS-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3[1]	3	3	3	4.5	T	T	T	T	T	T	T	T	3	T	T	T	T
			13			3[1]	3	4.5	5	T	T	T	T	T	T	T	3	T	T	T	T
			16			3[1]	3	4.5	5	T	T	T	T	T	T	T	3	T	T	T	T
			20			3[1]		3	5	T	T	T	T	T	T	T		T	T	T	T
DS-ARC1M	B,C	10	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10	3[1]	3	3	3	4.5	7.5	8.5	T	T	T	T	T	T	3	T	T	T	T
			13			3[1]	3	4.5	5	7.5	T	T	T	T	T	T	3	T	T	T	T
			16			3[1]	3	4.5	5	7.5	T	T	T	T	T	T	3	T	T	T	T
			20			3[1]		3	5	6	T	T	T	T	T	T		T	T	T	T

[1] Value valid in case of Supply S. breaker only magnetic

AFDD technical details

Coordination tables: DS-ARC1, DS-ARC1 M selectivity

MCCB@415V - DS-ARC1, DS-ARC1 M @230/240V

			Supply S.	T1										
			Version	B,C,N										
			Release	TMD										
			Iu[A]	160										
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160
DS-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T
			10			3	3	3	4.5	T	T	T	T	T
			13					3	4.5	5	T	T	T	T
			16					3	4.5	5	T	T	T	T
			20						3	5	T	T	T	T
DS-ARC1M	B,C	10	6	6	6	6	6	6	6	T	T	T	T	T
			10			3	3	3	4.5	7.5	8.5	T	T	T
			13					3	4.5	5	7.5	T	T	T
			16					3	4.5	5	7.5	T	T	T
			20						3	5	6	T	T	T

MCCB@415V - DS-ARC1, DS-ARC1 M @230/240V

			Supply S.	T2														
			Version	N,S,H,L														
			Release	TMD											EL			
			Iu[A]	160											160			
Load S.	Char	Icu [kA]	In[A]	16	20	25	32	40	50	63	80	100	125	160	25	63	100	160
DS-ARC1	B,C	7.5	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10		3	3	3	3	4.5	T	T	T	T	T	T	T	T	T
			13				3	3	4.5	5	T	T	T	T		T	T	T
			16				3	3	4.5	5	T	T	T	T		T	T	T
			20				3		3	5	T	T	T	T		T	T	T
DS-ARC1M	B,C	10	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			10		3	3	3	3	4.5	7.5	8.5	T	T	T	T	T	T	T
			13				3	3	4.5	5	7.5	T	T	T		T	T	T
			16				3	3	4.5	5	7.5	T	T	T		T	T	T
			20				3		3	5	6	T	T	T		T	T	T

AFDD technical details

Coordination tables: DS-ARC1, DS-ARC1 M selectivity

MCCB@415V - DS-ARC1@230/240V

			Supply S.	T3						
			Version	N,S						
			Release	TMD, MA						
			Iu[A]	250						
Load S.	Char	Icu [kA]	In[A]	63	80	100	125	160	200	250
DS-ARC1	B,C	7.5	6	T	T	T	T	T	T	T
			10	T	T	T	T	T	T	T
			13	5	T	T	T	T	T	T
			16	5	T	T	T	T	T	T
			20	5	T	T	T	T	T	T
DS-ARC1 M	B,C	10	6	T	T	T	T	T	T	T
			10	7.5	8.5	T	T	T	T	T
			13	5	7.5	T	T	T	T	T
			16	5	7.5	T	T	T	T	T
			20	5	6	T	T	T	T	T

S800N/S - DS-ARC1 , S- ARC 1 M @230/240V

			Supply S.	S800N-S				
	Char			B				
Load S.		Icu [kA]		36-50				
			In[A]	50	63	80	100	125
DS-ARC1, DS-ARC1M	B,C	7.5 and 10	6	0.6	1.2	1.6	2.6	3.8
			10	0.5	1.1	1.4	2	3
			13		0.8	1.2	1.7	2.5
			16		0.8	1.2	1.7	2.5
			20			1	1.5	2.1

S800N/S-DS-ARC1 , S-ARC 1 M @230/240V

			Supply S.	S800N-S					
	Char			C					
Load S.		Icu [kA]		36-50					
			In[A]	40	50	63	80	100	125
DS-ARC1, DS-ARC1M	B,C	7.5 and 10	6	0.55	1.1	1.5	2.5	3.6	5.5
			10	0.45	1	1.3	1.9	2.8	4.2
			13		0.75	1.1	1.6	2.3	3.6
			16		0.75	1.1	1.6	2.3	3.6
			20			0.9	1.4	1.9	3.3

S800N/S-DS-ARC1, DS-ARC1 M @230/240V

			Supply S.	S800 N-S							
	Char			D							
Load S.		Icu [kA]		36-50							
			In[A]	25	32	40	50	63	80	100	125
DS-ARC1	B,C	7.5	6	0.6	1.3	2	3.2	3.9	T	T	T
			10	0.5	1.2	1.65	2.6	3.1	T	T	T
			13		0.9	1.4	1.8	2.6	5	T	T
			16		0.9	1.4	1.8	2.6	5	T	T
			20			1.3	1.6	2.2	4.2	5.4	T
DS-ARC1M	B,C	10	6	0.6	1.3	2	3.2	3.9	8	T	T
			10	0.5	1.2	1.65	2.6	3.1	6.2	8.6	T
			13		0.9	1.4	1.8	2.6	5	6.3	8.8
			16		0.9	1.4	1.8	2.6	5	6.3	8.8
			20			1.3	1.6	2.2	4.2	5.4	7.6

Electrical installation solutions for buildings – Technical details
Protection and safety

Protection and safety technical details

Protection and safety technical details

Overvoltage protection overview – IEC/EN standards

International safety standards establish a requirement for assessing protection against transient overvoltages (surges) as an integral part of satisfactory electrical system design. A summary is provided within IEC 60364 standard for electrical installations of buildings regarding the requirements of surge protective devices (SPDs)

IEC 60364 assesses the need to protect AC power circuits, although cross-references transient overvoltage or surge protection on other metallic services including data, signal and telecommunications lines, as defined by IEC/EN 62305 Standard for Lightning Protection.

It covers transient overvoltages of atmospheric origin (lightning) or as a result of electrical switching, through two sections:
- **Section 443** which defines the criteria for risk assessment to use SPDs, considering factors such as levels of consequential loss due to overvoltages and the equipment rated impulse voltage
- **Section 534** which outlines the parameters for selection and installation of SPDs as appropriate, to ensure satisfactory protection of the structure itself and its contents, its personnel and electronic systems and electrical equipment

Risk assessment
Section 443 establishes that SPD are required where the consequences caused by overvoltage leads to:
(a) results in serious injury to, or loss of, human life, (e.g. hospitals, care homes, home dialysis equipment)
(b) results in interruption of public services and/or damage to cultural heritage, (e.g. power stations, data centres, heritage status buildings like museums, castles)
(c) results in interruption of commercial or industrial activity (e.g. banks, hotels, supermarkets, industrial plants, farms)
(d) affects a large number of collocated individuals (e.g. offices, universities, schools, residential tower blocks)

For all other cases than above a simplified risk assessment to determine the Calculated Risk Level CRL shall be conducted.

Note that a comprehensive risk assessment method to (IEC/EN 62305-2) must be used for high risk installations such as nuclear or chemical sites where the consequences of transient overvoltages could lead to explosions, harmful chemical or radioactive emissions thus affecting the environment.

In all cases, IEC/ EN 62305 which would require installation of equipotential bonding SPDs where a structural lightning protection system (LPS) is installed, or there is a risk of a direct lightning stroke to a service line.

Selection & installation of SPDs
Section 534 provides guidance on the selection and installation of SPDs to limit transient overvoltages.

The selection of an SPD is dependent on its location within the installation, the equipment rated impulse voltage at this location, and the expected transient overvoltage energy that the SPD is required to limit. The largest transient overvoltages are expected at the service entrance, i.e. at the origin of the installation.

Additionally transient overvoltages can be anticipated at sensitive and critical equipment as a result of electrical switching within the installation. SPDs should therefore be installed as appropriate at main distribution board level, subdistribution board level to protect sensitive equipment, and locally to protect critical equipment.
Where multiple SPDs are installed on the same conductor, these should coordinate with each other to ensure protection levels are not compromised within the system.

Where SPDs are required they must tested in line with SPD product standards IEC/EN 61643 series. Power SPDs are classified to IEC/EN 61643-11 by Class /Type respectfully. High energy Class I/Type 1 tested SPDs (Type 1) must be installed at the service entrance where a structural LPS is installed or there is an overhead metallic service line at risk from a direct lightning stroke.

Class I tested/Type I SPDs however do not provide protection to electronic systems. Transient overvoltage SPDs (Class II tested/Type 2 and Class III tested/Type 3) are required downstream to protect sensitive and critical equipment. These SPDs protect against the transient overvoltages caused by indirect lightning (inductive or resistive coupling) and the electrical switching of large inductive loads.
Combined Class/Type SPDs are classified with more than one Class test/Type, e.g. Class I+II tested SPD to IEC or Type 2+3 to EN. Such SPDs can provide both lightning current with overvoltage protection in addition to protection between all conductor combinations (or modes of protection) within a single unit. Combined Type SPDs provide high surge current handling combined with better overvoltage protection levels (Up) a performance parameter of an SPD.

The most important characteristic for an SPD is its voltage protection level (Up) and not its energy withstand (e.g. I_{imp}). SPDs with lower voltage protection levels (or let-through voltage) offer much better protection to sensitive and critical electronic systems, including:
- Minimal equipment stress (i.e. keeping circuit degradation to a minimum)
- Reduced risk from additive inductive voltages on the SPDs connecting leads
- Reduced risk from downstream voltage oscillations

Protection and safety technical details

IEC/ EN 61643 SPD standard series focus

ABB SPDs meet the performance parameters defined in International & European SPD product standards:

- IEC/**EN 61643-11** Surge protective devices connected to low-voltage power systems - requirements and tests.
- IEC/**EN 61643-21** Surge protective devices connected to telecommunications and signalling networks - performance requirements and testing methods.

These parts of the IEC/EN 61643 standard apply for all SPDs providing protection against lightning (direct and indirect) and transient overvoltages.

IEC/EN 61643-11 covers AC mains protection, for 50/60 Hz AC power circuits and equipment rated up to 1000 VRMS AC and 1500 V DC.

IEC/EN 61643-21 covers telecommunications and signalling networks with nominal system voltages up to 1000 VRMS AC and 1500 V DC.

Within these parts to the standard is defined:

- The electrical requirements for SPDs, including voltage protection and current limiting levels, status indication and minimum test performance.
- The mechanical requirements for SPDs, to ensure an appropriate quality of connection, and mechanical stability when mounted.
- The safety performance of the SPD, including its mechanical strength and its ability to withstand heat, overstress and insulation resistance.

The standard establishes the importance of testing SPDs to determine their electrical, mechanical and safety performance.

Electrical tests include impulse durability, current limiting, and transmission tests. Mechanical and safety tests establish levels of protection against direct contact, water, impact, the SPD installed environment etc.

For voltage and current limiting performance, an SPD is tested according to its Type (or Class to IEC), which defines the level of lightning current or transient overvoltage it is expected to limit/divert away from sensitive equipment.

Tests include Class I impulse current (10/350 waveform), Class I & II nominal discharge current (8/20 waveform), Class I & II voltage impulse and Class III combination wave tests for SPDs installed on power lines, and Class D (high energy), C (fast rate of rise), and B (slow rate of rise) for those on data, signal and telecoms lines.

SPDs are tested with the connections or terminations following manufacturer's instructions, as per the expected SPD installation.

Measurements are taken at the connectors/terminals. Three samples of an SPD are tested and all must pass before approval is granted.

SPDs which have been tested to IEC/EN 61643 should be suitably labelled and marked, to include the relevant performance data for their application.

SPD application and installation standards Within IEC/EN 61643 there are two further standards which provide recommendations on the selection and installation of SPDs.

These are:

- IEC/EN 61643-12 Surge protective devices connected to low-voltage power systems - selection and application principles.
- IEC/EN 61643-22 Surge protective devices connected to telecommunications and signalling networks - selection and application principles.

These application standards should be used with IEC/EN 61643-11 and IEC/EN 61643-21 respectively. Each application standard provides information and guidance on:

- Risk assessment and evaluating the need for SPDs in low-voltage systems, with reference to IEC/EN 62305. Lightning Protection standard and IEC 60364 Electrical installations for buildings.
- Important characteristics of an SPD (e.g. voltage protection level) in conjunction with the protection needs of equipment (i.e. its rated impulse voltage or impulse immunity – voltage).
- Selection of SPDs considering the entire installation environment, including their classification, function and performance.
- Coordination of SPDs throughout the installation (for power and data lines) and between SPDs and RCDs or overcurrent protective devices.

Through following the guidance in these documents, appropriate specification of SPDs to meet the installation requirement can be achieved.

ABB also provide SPDs tested to UL standards - a summary of the differences in between IEC SPD test standards and UL SPD test standards terminology can be found on the following pages.

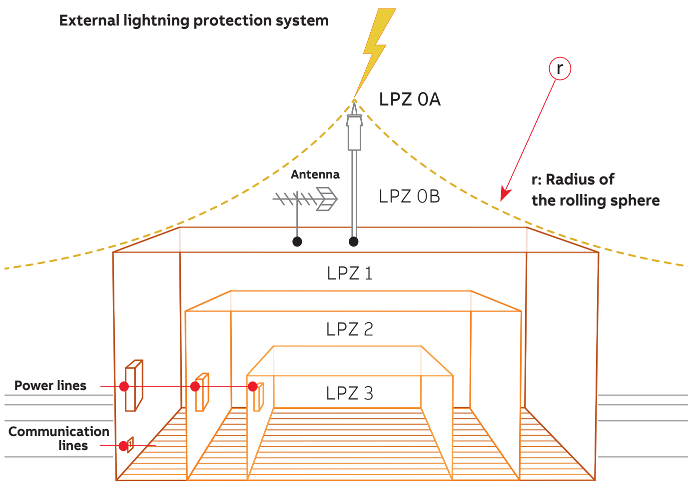
Protection and safety technical details

OVR Surge Protective Devices

Selection of surge protective devices
The IEC standard introduced the concept of lightning protection zones (LPZ) to help in selecting the correct surge protection. This concept ensure the gradual reduction by stages of the energies and overvoltage caused by lightning or switching operations. This logic of coordination in the protection is what we call the “stepping protection”.

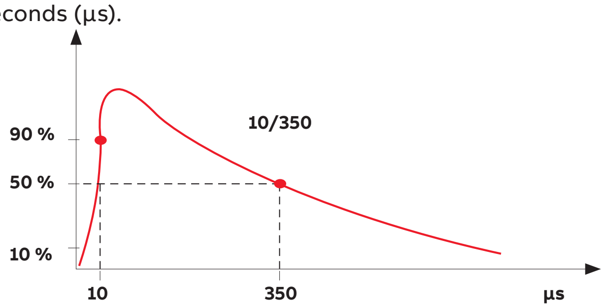
External Zones:
- LPZ 0A Unprotected zone outside the building subject to direct lightning strikes and therefore may have to handle to the full lightning current and lightning electromagnetic field.
- LPZ 0B Zone protected against direct lightning strikes by external air terminal and where the threat is the full lightning electromagnetic field.

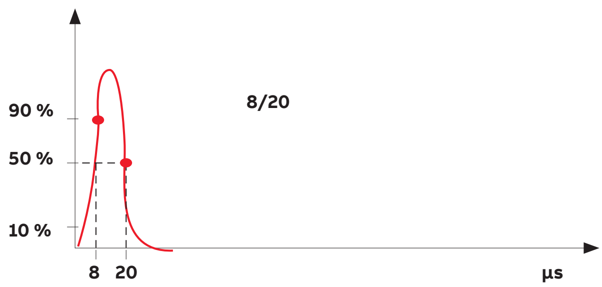
Internal Zones:
Zones inside the building which are protected against direct lightning flashes.
- LPZ 1 Zone subject to partial lightning or surge currents. Type I SPDs shall be installed at the boundary between LPZ OA and LPZ 1 to reduce the entrance of lightning currents through power lines.
- LPZ 2...n Zone where the surge current is limited by current sharing and where the surge energy is reduced by additional surge protection like SPDs. Type 2 SPDs are installed at the boundaries of each zone, i.e. LPZ 1 and LPZ 2, LPZ 2 and LPZ 3, etc.



Lightning protection zones description (IEC 62305-4):
It consists in dividing a building in several volumes: the protection zone. The objective is to ensure that the LPZ gives enough protection to the equipment inside this zone. To do so, SPDs are installed at the protection zone boundaries. Each time an SPD is installed, a new protection zone is created.

Current impulse:
The 10/350 and 8/20 impulse waves are used in the Class I and Class II SPDs tests. The first number gives the rising time of the current impulse to reach 90% of the peak level and the second number gives the time to half value in micro-seconds (µs).





Protection and safety technical details

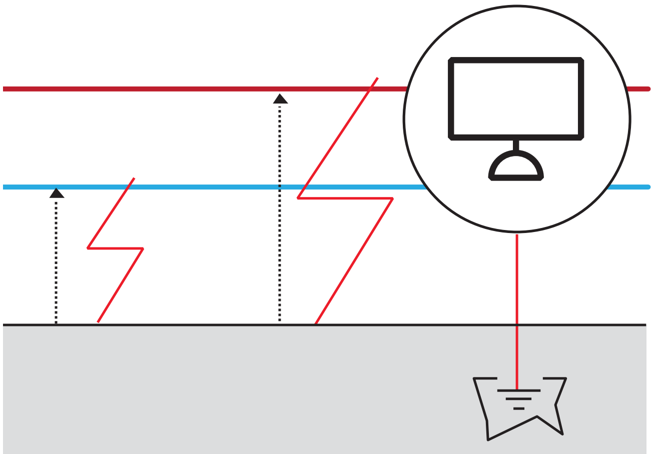
OVR Surge Protective Devices

Protection in common and/or differential mode

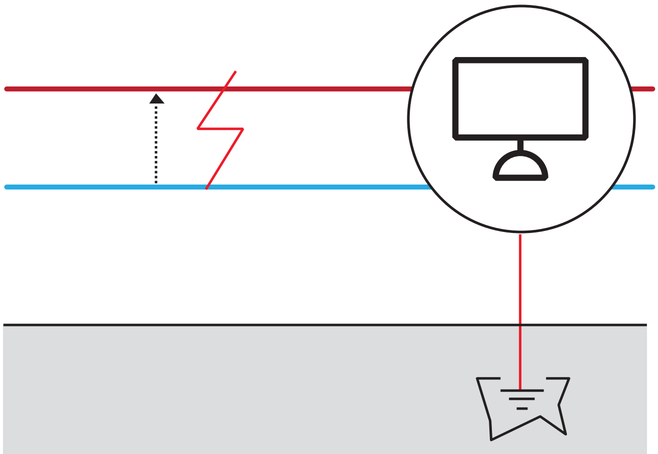
Common mode
Overvoltages in common mode concern all neutral point connections. They occur between the live conductors and earth (e.g. phase/earth or neutral/earth). The neutral conductor is a live cable, as well as the phase conductors.
This overvoltage mode destroys not only earthed equipment (Class I), but also non-earthed equipment (Class II) with insufficient electrical insulation (a few kilovolts) located close to an earthed mass.
Class II equipment that is not situated close to an earthed mass is theoretically protected from this type of attack.

Differential mode
Overvoltages in differential mode circulate between the live phase/phase or phase/neutral conductors. They can cause considerable damage to any equipment connected to the electrical network, particularly "sensitive" equipment.

These overvoltages concern TT earthing systems. They also affect TN-S systems if there is a significant difference in length between the neutral cable and the protective cable (PE).



Overvoltages in common mode

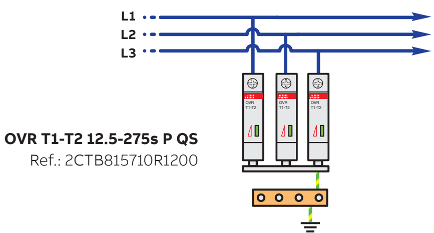


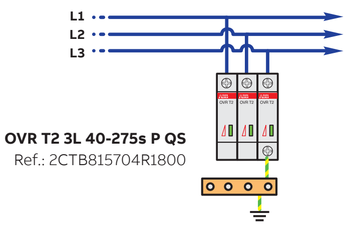
Overvoltages in differential mode

Different types of OVR configuration

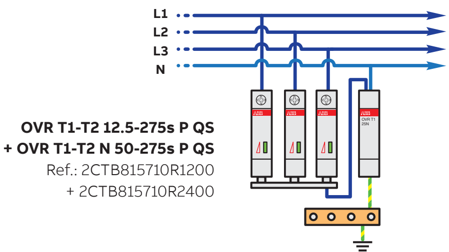
Either Common mode or differential mode of protection are required depending on the system configuration (IT, TNC, TNS, TT). For that purpose, you can find different OVR configuration (single pole, 3L, 4L, 1N, 3N).

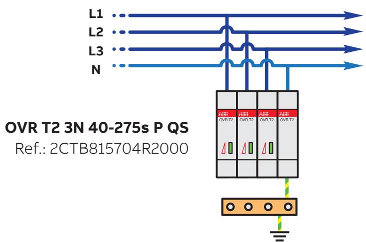
Common mode configurations (TNC networks)





Common and differential mode configurations (TNS, TT networks)





Protection and safety technical details

Coordination and wiring principles

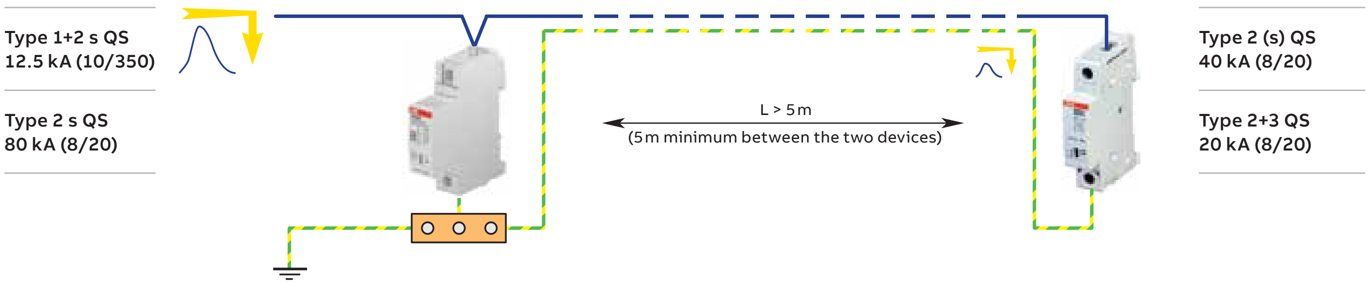
The SPD installed at the line entrance of an installation may not ensure an effective protection to the whole system. As a matter of fact, the selection of the voltage protection level (**U**$_p$) of SPDs depends on many parameters: Type of equipment to be protected, the length of the connections to the SPDs, the length in between the SPDs and the equipment to be protected.

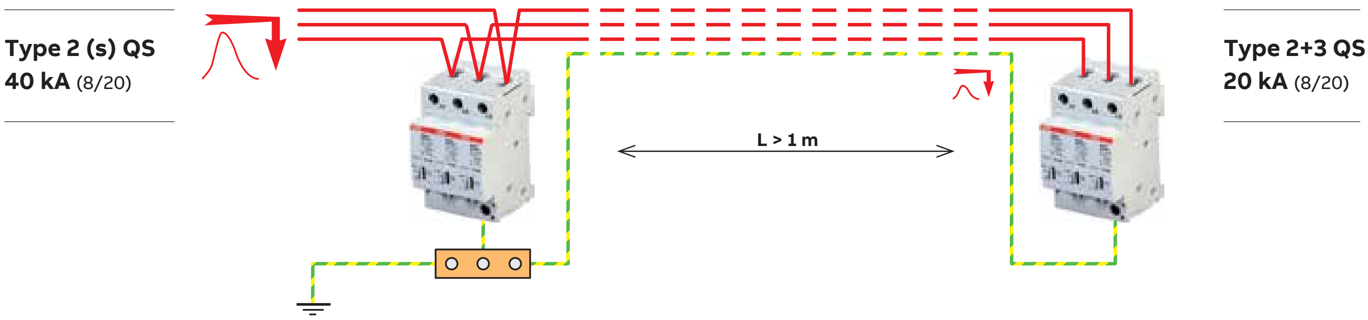
Coordination required if :
The protection level (**U**$_p$) of the SPDs is not low enough to protect the equipment.
If the distance in between the SPDs and the equipment is >10 m.

NOTE:
The first SPD is diverting most of the surge current to the ground, and the second SPD will ensure a good protection level to the equipment.

It is what we call the stepping protection.

Coordination between Type 1+2, Type 2 (with and without Safety System) and Type 2+3 surge protective device





Protection and safety technical details
Coordination and wiring principles

Type of Surge Protective Devices	Miniature circuit breaker maximum ratings* curve B or C — Prospective short circuit current at SPD location (IP) IP ≤ 6 kA	IP ≤ 10 kA	IP ≤ 15 kA	IP ≤ 50 kA	Fuses maximum ratings* (gG) IP ≤ 7 kA	IP ≤ 50 kA	IP ≤ 100 kA	Moulded Case Circuit Breaker IP<= 50kA
Type 1+2								
OVR T1-T2 pluggable Safety Reserve QuickSafe® Iimp 12.5 kA; Uc 275, 440 V	-	-	-	-	160 A	160 A	160 A	-
Type 2								
OVR T2 pluggable Safety Reserve QuickSafe® Imax 40 and 80 kA; Uc 275, 440 V	S 200 M - 63	S 200 M - 63	S 200 P - 63	S 800 S - 125	160 A fuse	160 A fuse	160 A fuse	
Type 2 pluggable QuickSafe® Imax 40 kA; Uc 275, 350, 440,	S 200 M - 63	S 200 M - 63	S 200 P - 63	S 800 S - 125	125 A fuse	125 A fuse	125 A fuse	@ Uc=275V, Tmax XT4S 250, Ekip LSI, I<3 In
Type 2+3								
OVR T2-T3 pluggable QuickSafe® Imax 20 kA; Uc 275, 350, 440	S 200 M - 63	S 200 M - 63	S 200 P - 63	S 800 S - 125	125 A fuse	125 A fuse	125 A fuse	@ Uc=275V, Tmax XT4S 250, Ekip LSI, I<3 In

* Maximum ratings, must be in accordance with the installation to follow coordination rules with main or upstream short circuit protection(s).

Service entrance SPDs	PE connection cable size
Type 1+2	16 mm^2
Type 2	4 mm^2
Type 2+3	4 mm^2

Backup disconnection

Type 2 QuickSafe® Characteristics	Prospective short circuit current at SPD location (Ip)	Circuit breaker* (curve B or C)	Fuses* (gG)
Maximum rating			
In: 5, 20, 20 kA Uc: 275, 350, 440	0.625 kA < Ip < 100 kA	S800S B or C - 125 A**	E90/125 125 A fuse (without Safety Reserve System) 160 A fuse (with Safety Reserve System)

*: The backup disconnection of the SPD shall always be coordinated with the circuit breakers used in the installation
**: up to Ip ≤ 50kA

Digital SPD—eOVR

Back up protection

		Maximum ratimg							
		MCB S200 style				MCB POD style	Fuse		
		IP ≤ 6 kA	IP ≤ 10 kA	IP ≤ 15 kA	IP ≤ 50 kA	IP ≤ 6 kA	IP ≤ 7 kA	IP ≤ 50 kA	IP ≤ 100 kA
eOVR	1P+N	-	-	-	-	-	160 A fuse + ILTS-E/H11		
	3P	-	-	-	-	-			
	3P+N	-	-	-	-	-			
eOVR	1P+N	S202 M - 63 + S2C - H6R			S802 S - 125 + S800 - AUX	2 x POD 1P1M	125 A fuse + ILTS-E/H11		
	3P	S202 M - 63 + S2C - H6R			S803 S - 125 + S800 - AUX	3 x POD 1P1M			
	3P+N	S202 M - 63 + S2C - H6R			S804 S - 125 + S800 - AUX	4 x POD 1P1M			
Comment	S2C-H6R can be connected to eOVR to track MCB tobble position This check is not possible by using POD MCB								

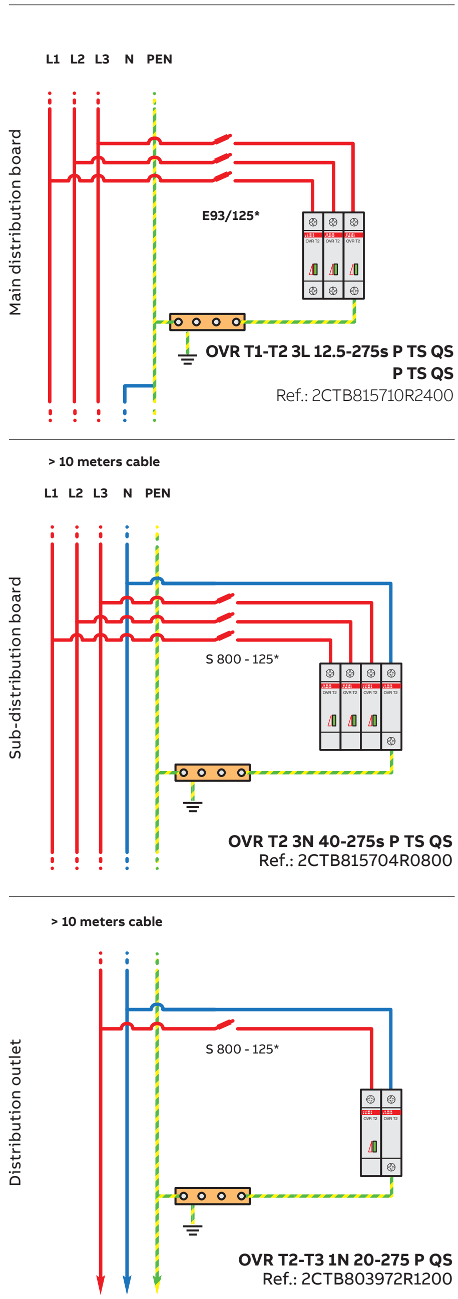
Notes

Protection and safety technical details

OVR Surge Protective Devices

Selection tool: TNC-S network 230/400 V
Industry, commercial building

Ip ≤ 100 kA



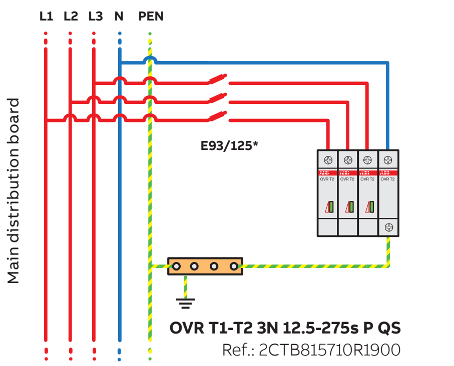
Ip: prospective short circuit current of the power supply.
* Must be according to the coordination rules with main or upstream short circuit protection(s).

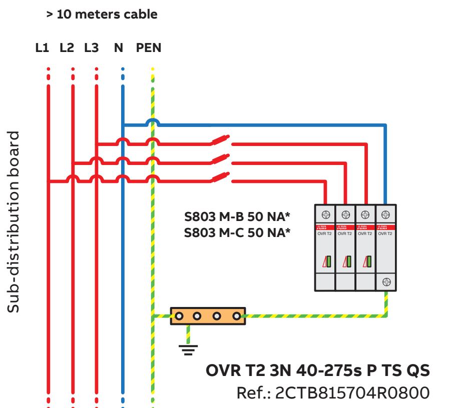
Protection and safety technical details

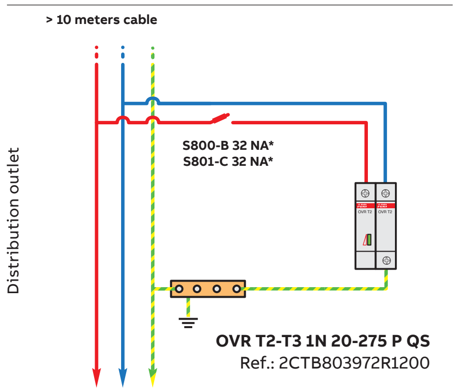
OVR Surge Protective Devices

Selection tool: TT network 230/400 V
Industry, commercial building

≤ 100 kA







Ip: prospective short circuit current of the power supply
* Must be according to the coordination rules with main or upstream short circuit protection(s).

5

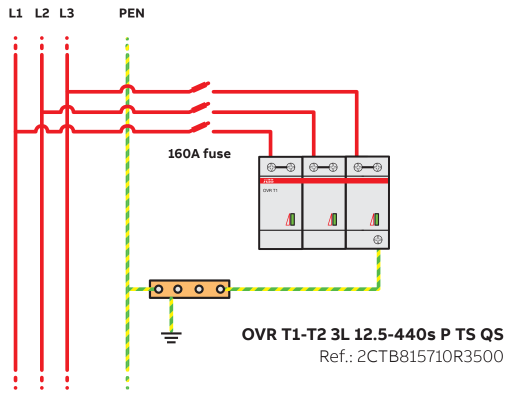
Protection and safety technical details

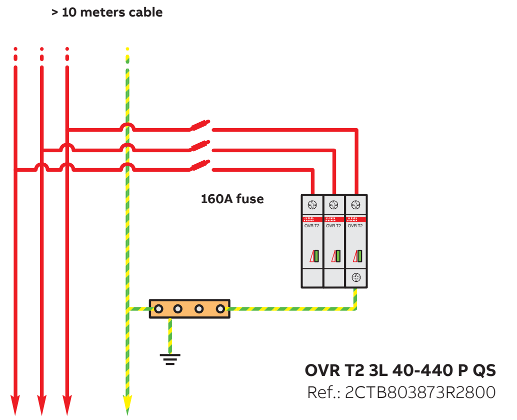
OVR Surge Protective Devices

Selection tool: IT network 230 V without neutral Commercial, residential

The IT system has all live parts at the source isolated from earth or one part connected to earth with a high impedance.

Configuration 1
I_p ≤ 100 kA





Ip: prospective short circuit current of the power supply
* Must be according to the coordination rules with main or upstream short circuit protection(s).

Protection and safety technical details

OVR Surge Protective Devices

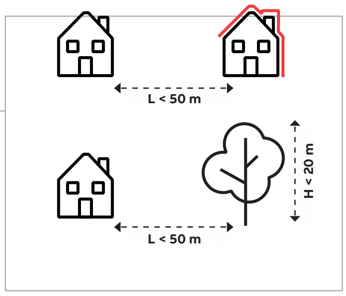
Selection tool: TNC, TNS/TT networks 230/400 V Residential

With external conductive parts (external lightning protection air terminal, antenna...) or powered by aerial lines

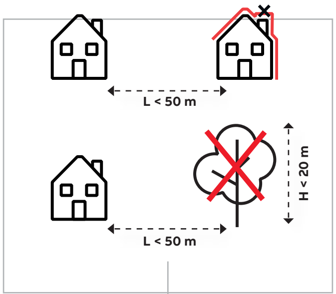
YES **NO**

Neighbour with external lightning protection system (or generally with earthed extraneous conductive parts), or proximity of high points

YES

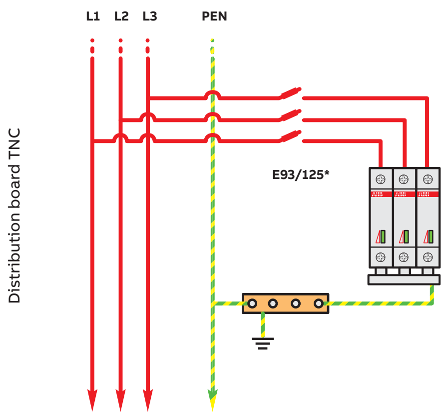


NO



Configuration 1

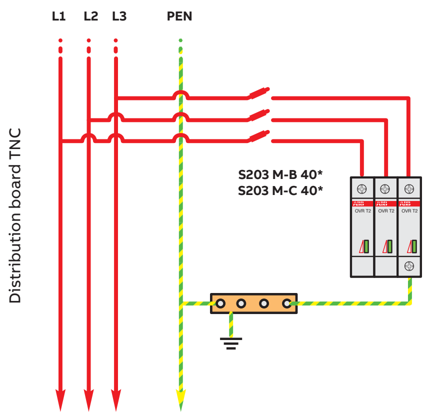
With risk of direct lightning current (external protection, aerial lines...)



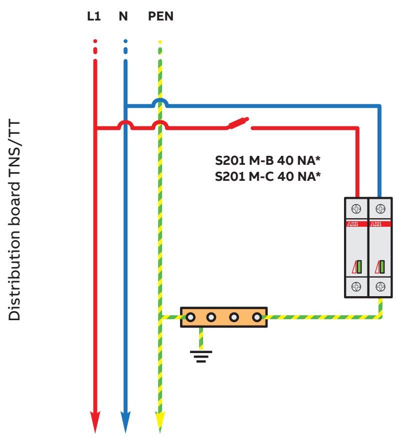
3 x OVR T1-T2 12.5-275s P QS
Ref.: 2CTB815710R1200

Configuration 2

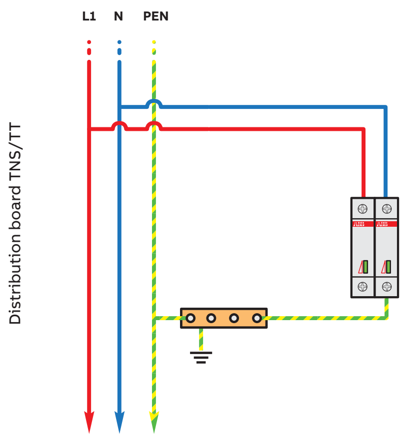
With risk of indirect lightning current, transient surges



OVR T2 3L 40-275s P QS
Ref.: 2CTB815704R1800



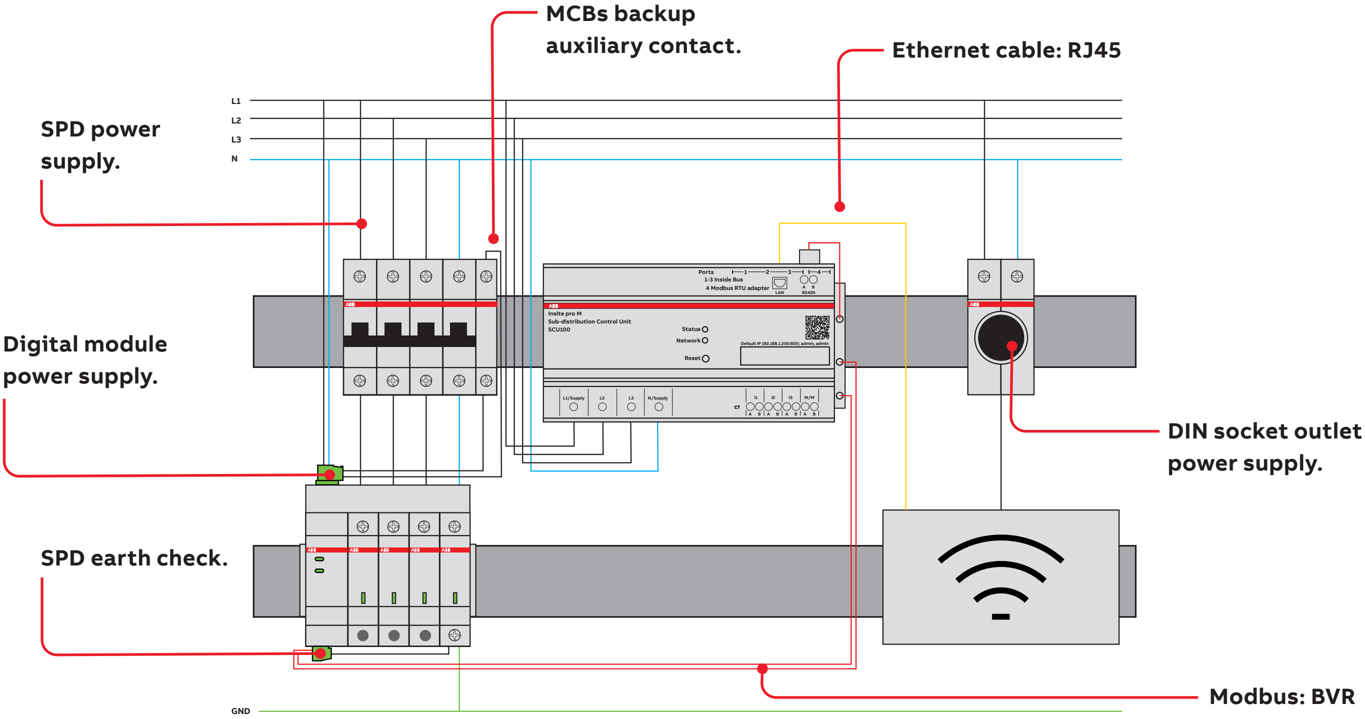
OVR T2 1N 40-275s P TS QS
Ref.: 2CTB815704R0200



OVR T2-T3 1N 20-275 P QS
Ref.: 2CTB803972R1200

* Should be according to the coordination rules with installed main breakers

Digital SPD—eOVR
Wiring



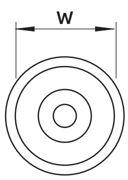
Wires	Type	Min section	Max section	Stripping lenght	Torque
		mm²	mm²	mm	N.m
SPD power supply	Rigid/stranded	2.5	16/10	12.5	2.8
Digital module power supply	Rigid/stranded	0.5	2.5	7 7	0.4
Earth check	Rigid/stranded	0.5	1.5		0.2
SPD earth	Rigid/stranded	2.5	25/16	12.5	2.8
Modbus	BVR	0.5	1.5	7	0.2
MCBs backup auxiliary contact	Rigid/stranded	0.5	1.5	7	0.2
Ethernet	RJ45	-	-	-	-
DIN socket outlet power supply	Rigid/stranded	2.5	25	12.5	2.8

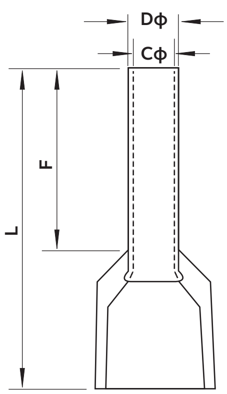
Ferrules:

Dimension(mm)						Cable size (mm²)
F	L	W	Dϕ	Cϕ	A.W.G	
8.0	14.0	2.6	1.3	1.0	#22	0.5
8.0	14.06	2.8	1.6	1.3	#20	0.8
8.0	14.4	3.0	1.7	1.4	#18	1.0
8.0	14.4	3.5	2.0	1.7	#16	1.5
8.0	15.2	4.0	2.6	2.3	#14	2.5

Materials: **Copper**

Insulation sheath material: **Nylon**





Notes

Protection and safety technical details

UL 1449 Ed4

The Underwriters Laboratories (UL) standard for surge protective devices (SPDs) has been the primary safety standard for surge protection since the first edition was published in 1985, the fourth edition became mandatory for AC SPDs in March 2016.

The objective of UL 1449 has always been to increase safety in terms of surge protection.

Change in the standard's name: From TVSS to SPDs
Prior to UL 1449 3rd Edition taking effect, the devices this standard covers were known as Transient Voltage Surge Suppressors (TVSS), operating on power circuits not exceeding 600 V. With the inception of the 3rd and 4th Edition, these devices are now known as Surge Protective Devices (SPDs), and may operate on power circuits not exceeding 1500 V DC.

This new designation moves the UL standard closer to the international designation and to IEC standards.

The different type designations of surge protective devices
The UL 1449 placed SPDs into five different Type categories based on installation location within an electrical system. While Type 1, Type 2 and Type 3 categories refer to different types of SPDs that can be installed at specific locations, Type 4 and Type 5 categories refer to components used in an SPDs configuration.

Type 1 – “Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service equipment overcurrent device.”
Type 2 – “Permanently connected SPDs intended for installation on the load side of the service equipment overcurrent device.”
Type 3 – “Point of utilization SPDs, installed at a minimum conductor length of 10 meters (30 feet) from the electrical service panel.”
Type 4 - Component assemblies – “Component assembly consisting of one or more Type 5 components together with a disconnect (integral or external) or a means of complying with the limited current tests.”
Type 1, 2, 3 - Component assemblies – “Consists of a Type 4 component assembly with internal or external short circuit protection.”
Type 5 – “Discrete component surge suppressors, such as MOVs that may be mounted on a PWB, connected by its leads or provided within an enclosure with mounting means and wiring terminations.”

The closer an SPD is installed to the equipment, the better the protection is. This is a push in the direction of providing stepped protection including external and internal surge protection.

The measured voltage protection level
The Measured Limiting Voltage (MLV) is the maximum magnitude of voltage measured at the application of a specific impulse wave shape.

When applying a certain surge current on the SPD the measured voltage at the device terminals is the so called “let-through voltage.”

In UL 1449 2nd Edition, the let-through voltage was referred to as Suppressed Voltage Rating (SVR) and was calculated with a 0.5 kA surge wave form at 6 kV. The new designation is Voltage Protection Rating (VPR) and is calculated with a 3 kA surge wave form at 6 kV.

All products have been certified according to the UL 1449 4th Edition.

The MLV will allow comparison of different types of SPDs with regards to the let-through voltage. However, it is important to note that the surge current used to measure the let-through voltage is six times higher in the 3rd and 4th Edition than in the 2nd Edition. This means that, comparing the obsolete SVR designation with the new VPR ratings will not be valid, as VPR ratings will of course be higher than SVR ratings.

Protection and safety technical details
UL 1449 Ed4

List of OVR T2 UL products according to their certification

Type acc. To UL 1449 Ed4

Range	Type	Order code	Type 4 CA	Type 1 CA
T2 U	OVR T2 15-150 P U	2CTB802341R0000		■
	OVR T2 15-320 P U	2CTB802341R0400		■
	OVR T2 40-150 P U	2CTB802341R2000		■
	OVR T2 40-150 P TS U	2CTB802341R2100		■
	OVR T2 40-320 P U	2CTB802341R2400		■
	OVR T2 40-320 P TS U	2CTB802341R2500		■
	OVR T2 40-440 P TS U	2CTB802341R2900		■
	OVR T2 40-550 P TS U	2CTB802341R3300		■
	OVR T2 40-660 P TS U	2CTB802341R3700	■	
	OVR T2 70 N P U	2CTB802341R8000	■	
	OVR T2 1N 15-150 P U	2CTB802342R0000	■	
	OVR T2 1N 15-320 P U	2CTB802342R0400	■	
	OVR T2 1N 40-150 P U	2CTB802342R2000	■	
	OVR T2 1N 40-150 P TS U	2CTB802342R2100	■	
	OVR T2 1N 40-320 P TS U	2CTB802342R2500	■	
	OVR T2 1N 40-440 P TS U	2CTB802342R2900	■	
	OVR T2 1N 40-550 P TS U	2CTB802342R3300	■	
	OVR T2 1N 40-660 P TS U	2CTB802342R3700	■	
	OVR T2 2L 15-150 P U	2CTB802343R0000		■
	OVR T2 2L 15-320 P U	2CTB802343R0400		■
	OVR T2 2L 40-150 P TS U	2CTB802343R2100		■
	OVR T2 2L 40-320 P TS U	2CTB802343R2500		■
	OVR T2 2N 15-150 P U	2CTB802344R0000		■
	OVR T2 2N 15-320 P U	2CTB802344R0400	■	
	OVR T2 2N 40-150 P TS U	2CTB802344R2100	■	
	OVR T2 2N 40-320 P TS U	2CTB802344R2500	■	
	OVR T2 2N 40-440 P TS U	2CTB802344R2900	■	
	OVR T2 2N 40-550 P TS U	2CTB802344R3300	■	
	OVR T2 2N 40-660 P TS U	2CTB802344R3700	■	
	OVR T2 3L 15-150 P U	2CTB802345R0000		■
	OVR T2 3L 15-320 P U	2CTB802345R0400		■
	OVR T2 3L 40-150 P TS U	2CTB802345R2100		■
	OVR T2 3L 40-320 P TS U	2CTB802345R2500		■
	OVR T2 3L 40-440 P TS U	2CTB802345R2900		■
	OVR T2 3L 40-550 P TS U	2CTB802345R3300		■
	OVR T2 3N 15-150 P U	2CTB802346R0000	■	
	OVR T2 3N 15-320 P U	2CTB802346R0400	■	
	OVR T2 3N 40-150 P TS U	2CTB802346R2100	■	
	OVR T2 3N 40-320 P TS U	2CTB802346R2500	■	
	OVR T2 3N 40-440 P TS U	2CTB802346R2900	■	
	OVR T2 3N 40-550 P TS U	2CTB802346R3300	■	
	OVR T2 3N 40-660 P TS U	2CTB802346R3700	■	
	OVR T2 15-150 C U	2CTB802348R2500		■
	OVR T2 15-320 C U	2CTB802348R2700		■
	OVR T2 40-150 C U	2CTB802348R3500		■
	OVR T2 40-320 C U	2CTB802348R3700		■
	OVR T2 40-440 C U	2CTB802348R3900		■
	OVR T2 40-550 C U	2CTB802348R4100		■
	OVR T2 40-660 C U	2CTB802348R4300	■	
	OVR T2 70 N C U	2CTB802348R6500	■	

Protection and safety technical details

Products Standards, UL 1449 Ed4

Terminology of SPD electrical characteristics

SPD terminology

8/20 wave:
Current waveform which passes through equipment when subjected to an overvoltage (low energy).

Type 2 surge protective device (SPD)
Permanently connected SPDs intended for installation on the load side of the service equipment overcurrent device, including SPDs located at a branch panel. It has successfully passed testing to the standard with the 8/20 wave (class II test).

Metal oxide varistor (MOV)
A varistor is an electronic component with a "diode like" nonlinear current-voltage characteristic, used to protect circuits against excessive transient voltages. Most commonly composed of metal oxides.

Maximum continuous operating voltage (MCOV, Uc)
The maximum designated root mean square (rms) value of power frequency voltage that may be applied continuously between the terminals of the SPD.

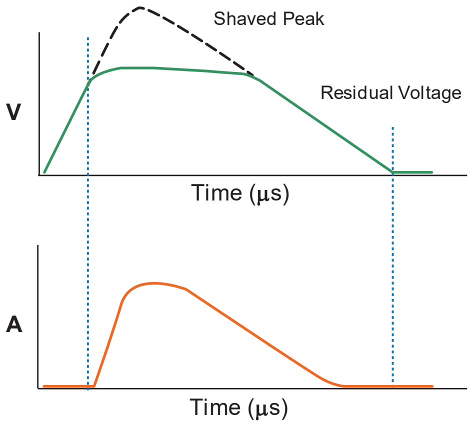
Nominal discharge current (In)
Peak current value of an 8/20 waveform which the SPD is rated for based on the test program.

Maximum discharge current (Imax)
Peak current value of an 8/20 waveform which can be safely discharged by the SPD, with an amplitude complying with the class II operating test sequence. Imax > In.

Short circuit current rating (SCCR)
Maximum symmetrical fault current, at rated voltage, that the SPD can withstand without sustaining damage that exceeds acceptable criteria or creates a hazardous operating condition.

Voltage protection rating (VPR)
The value of the VPR is determined as the nearest highest value, taken from Table 63.1 of ANSI/UL 1449 4^{th} Edition, to the measured limiting voltage determined during the transient voltage surge suppression test using the combination wave generator at a setting of 6 kV, 3 kA.

Voltage protection level (Up or Ures)
The voltage let through by the SPD while diverting surge current to ground must not exceed the voltage withstand value of the equipment connected downstream.



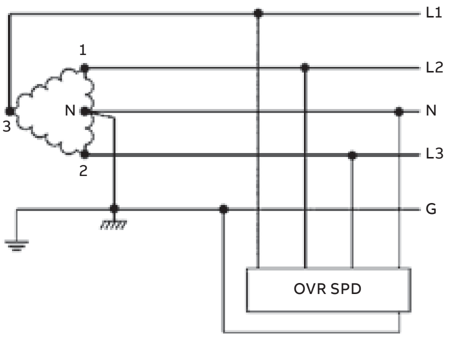
Notes:
Test wave 8/20 µs according to IEEE # C62.62-200/UL 1449
The first number corresponds to the time from 10% to 90% of its peak value (8 µs).
The second number corresponds to the time taken for the wave to descend to 50% of its peak value (20 µs).

Protection and safety technical details

OVR surge protective devices – UL Version

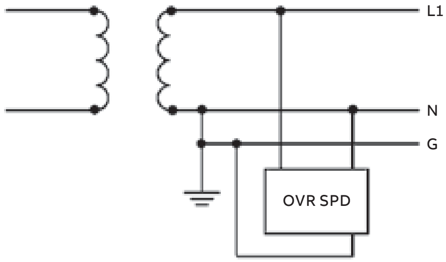
General wiring diagrams

Delta



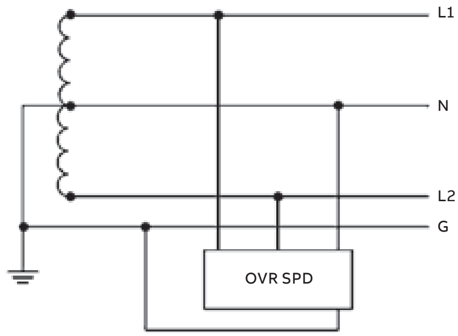
240 / 120 V HLD

Single phase



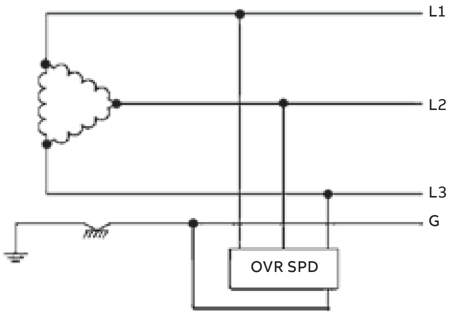
120 V, 240 V, 277 V

Split phase



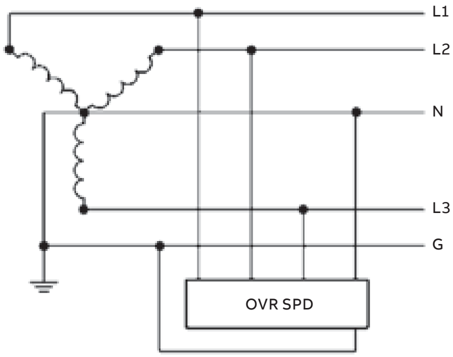
240 / 120 V, 480 / 240 V

Delta



240 V, 480 V

Wye



208 / 120 V, 480 / 277 V

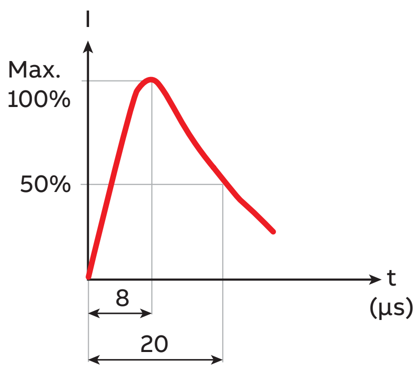
NOTE: Multiple pole SPDs shown. Wiring diagrams for reference only.

IEC SPD test standards–terminology

IEC 61643-11 Terminology	Description	UL 1449 Terminology
I_{imp}	The maximum surge current rating for an SPD when subjected to a 10 x 350µs wave shape	No equivalent
I_{max}	The maximum surge current rating for an SPD when subjected to an 8 x 20µs wave shape	Single surge current rating
I_n	Nominal surge discharge current 8 x 20µs wave shape	I_N
I_{SCCR}	Short Circuit Current Rating (withstand)	SCCR
U_P	Voltage Protection Level, let thru voltage level of the SPD when subjected to a test surge	VPR
U_C	Maximum Continuous Operational Voltage SPD can be exposed to without failure.	MCOV
U_N	Nominal Operational Voltage, or application voltage	Operational voltage

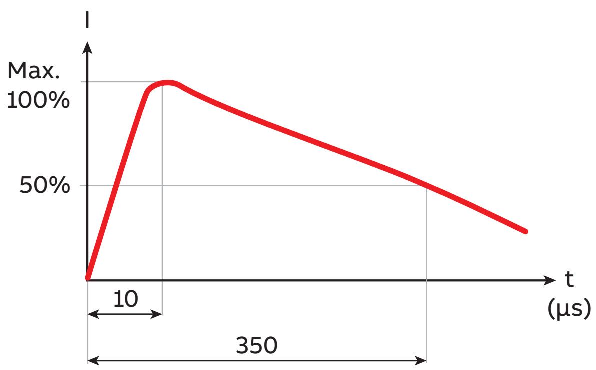
8 x 20µs wave shape

- Used for IEC Class II test (EN Type 2)
- I_{max} is the surge current value designation for IEC
- I_n is also tested using this wave shape
- U_L single surge current rating

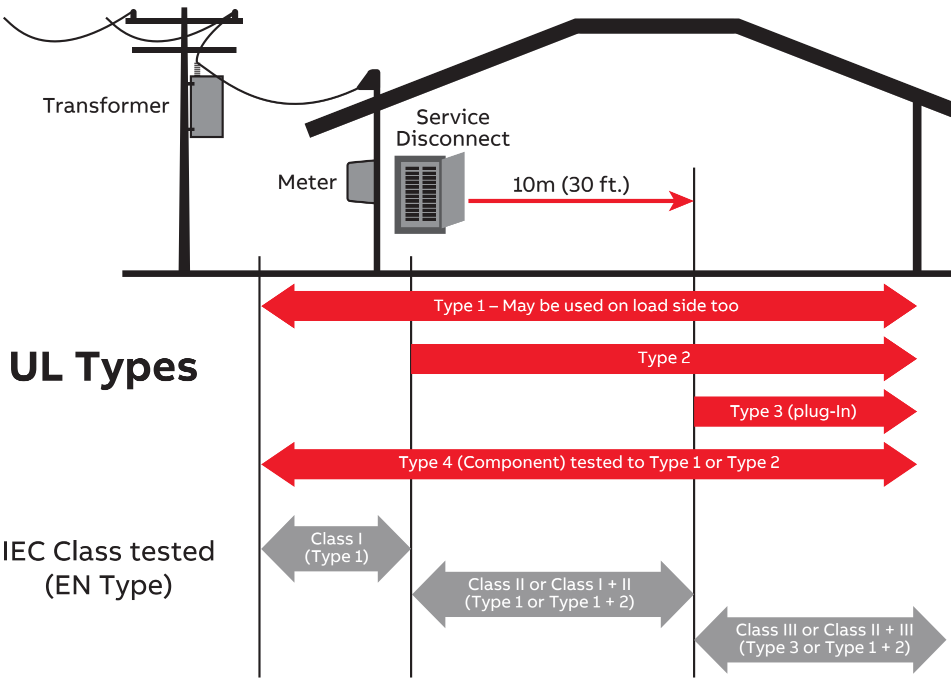


10 x 350µs wave shape (IEC only)

- Used for IEC 61643-11/ Class I tested SPD or EN 61643-11 Type 1
- SPD must survive 5 impulses increasing in magnitude to max I_{imp}
- I_{imp} is then the surge current value designation if SPD passes
- There is no equivalent test in the U_L standard



UL Types vs IEC Class tested SPDs and Locations



Protection and safety technical details

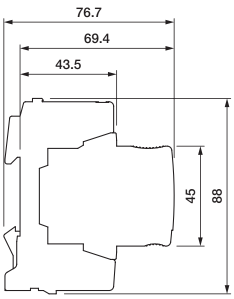
OVR Surge Protective Devices

Dimensional drawings of OVR surge protective devices

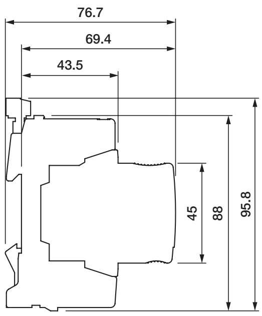
OVR T1-T2 12.5kA QS

Type	Width mm
OVR T1-T2 12.5-275s P TS QS	17.8
OVR T1-T2 12.5-275s P QS	17.8
OVR T1-T2 12.5-440s P TS QS	35.6
OVR T1-T2 12.5-440s P QS	35.6
OVR T1-T2 N 50-275s P QS	17.8
OVR T1-T2 N 50-440 P QS	17.8
OVR T1-T2 3L 12.5-275s P TS QS	53.4
OVR T1-T2 3L 12.5-275s P QS	53.4
OVR T1-T2 3L 12.5-440s P TS QS	106.8
OVR T1-T2 3L 12.5-440s P QS	106.8
OVR T1-T2 1N 12.5-275s P QS	35.6
OVR T1-T2 1N 12.5-275s P TS QS	35.6
OVR T1-T2 1N 12.5-440s P QS	53.4
OVR T1-T2 1N 12.5-440s P TS QS	53.4
OVR T1-T2 3N 12.5-275s P QS	71.2
OVR T1-T2 3N 12.5-275s P TS QS	71.2
OVR T1-T2 3N 12.5-440s P QS	124.6
OVR T1-T2 3N 12.5-440s P TS QS	124.6
OVR T1-T2 4L 12.5-275s P QS	71.2
OVR T1-T2 4L 12.5-275s P TS QS	71.2
OVR T1-T2 4L 12.5-440s P QS	142.4
OVR T1-T2 4L 12.5-440s P TS QS	142.4

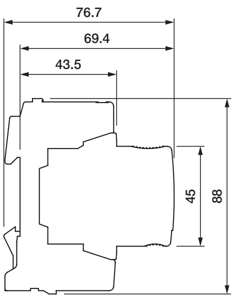
Main dimensions mm



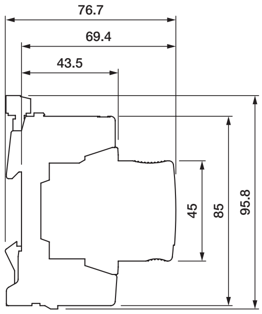
OVR T1-T2 12.5-275s P QS
OVR T1-T2 12.5-440s P QS
OVR T1-T2 N 50-275s P QS
OVR T1-T2 N 50-440s P QS



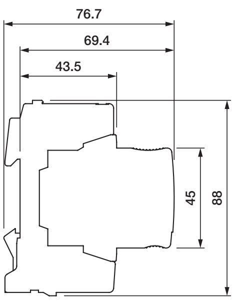
OVR T1-T2 12.5-275s P TS QS
OVR T1-T2 12.5-440s P TS QS



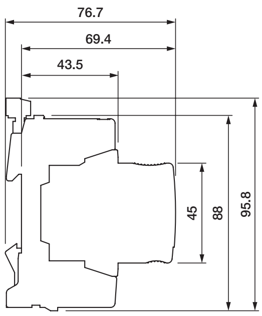
OVR T1-T2 3L 12.5-275s P QS
OVR T1-T2 3L 12.5-440s P QS



OVR T1-T2 3L 12.5-275s P TS QS



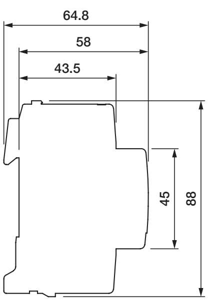
OVR T1-T2 1N 12.5-275s P QS
OVR T1-T2 1N 12.5-440s P QS
OVR T1-T2 3N 12.5-275s P QS
OVR T1-T2 3N 12.5-440s P QS
OVR T1-T2 4L 12.5-275s P QS
OVR T1-T2 4L 12.5-440s P QS



OVR T1-T2 1N 12.5-275s P TS QS
OVR T1-T2 1N 12.5-440s P TS QS
OVR T1-T2 3N 12.5-275s P TS QS
OVR T1-T2 3N 12.5-440s P TS QS
OVR T1-T2 4L 12.5-275s P TS QS
OVR T1-T2 4L 12.5-440s P TS QS

OVR T2 Single pole -Unpluggable

Type	Width mm
OVR T2 20-150	17.8
OVR T2 40-150	17.8
OVR T2 20-275	17.8
OVR T2 40-275	17.8



OVR T2 20-150
OVR T2 40-150
OVR T2 20-275
OVR T2 40-275

Protection and safety technical details

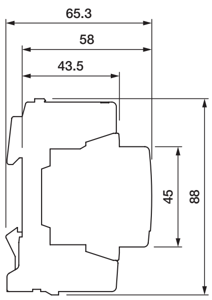
OVR Surge Protective Devices

Dimensional drawings of OVR surge protective devices

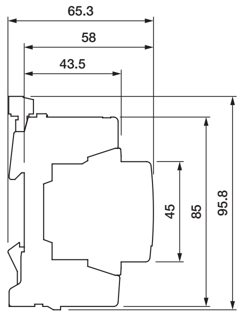
OVR T2 Pluggable

Type	Width mm
OVR T2 40-275 P QS	17.8
OVR T2 40-275 P TS QS	17.8
OVR T2 40-275s P QS	17.8
OVR T2 40-275s P TS QS	17.8
OVR T2 40-350 P QS	17.8
OVR T2 40-350 P TS QS	17.8
OVR T2 80-275s P QS	17.8
OVR T2 80-275s P TS QS	17.8
OVR T2 N 80-275 P QS	17.8
OVR T2 N 80-350 P QS	17.8
OVR T2 N 80-275s P QS	17.8
OVR T2 40-440 P QS	17.8
OVR T2 40-440 P TS QS	17.8
OVR T2 40-440s P QS	17.8
OVR T2 40-440s P TS QS	17.8
OVR T2 80-440s P QS	17.8
OVR T2 80-440s P TS QS	17.8
OVR T2 N 80-440 P QS	17.8
OVR T2 N 80-440s P QS	17.8

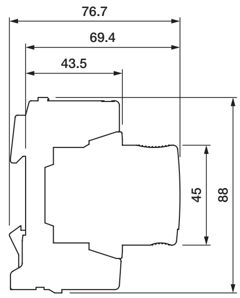
Main dimensions mm



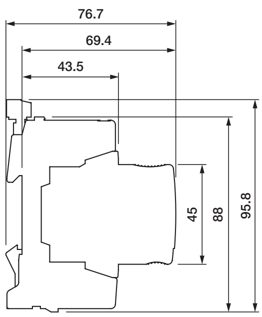
OVR T2 40-275 P QS
OVR T2 40-350 P QS
OVR T2 N 80-275 P QS
OVR T2 N 80-350 P QS
OVR T2 N 80-275S P QS



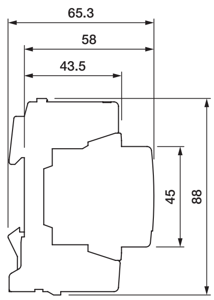
OVR T2 40-275 P TS QS
OVR T2 40-350 P TS QS



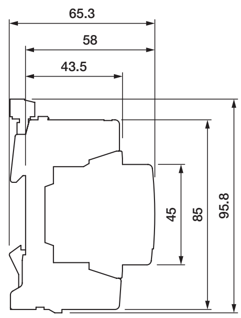
OVR T2 40-275S P QS
OVR T2 80-275S P QS



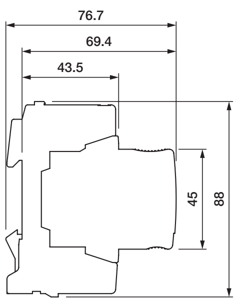
OVR T2 40-275s P TS QS
OVR T2 80-275s P TS QS



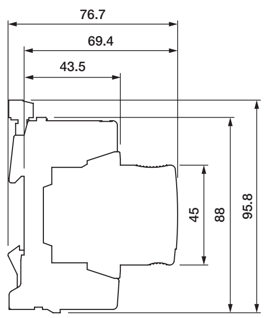
OVR T2 40-440 P QS
OVR T2 N 80-440 P QS



OVR T2 40-440 P TS QS



OVR T2 40-440s P QS
OVR T2 80-440s P QS
OVR T2 N 80-440s P QS



OVR T2 40-440s P TS QS
OVR T2 80-440s P TS QS

Protection and safety technical details

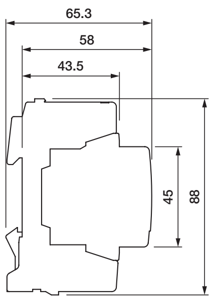
OVR Surge Protective Devices

Dimensional drawings of OVR surge protective devices

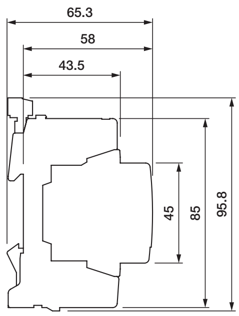
OVR T2 Pluggable

Type	Width mm
OVR T2 3L 40-275 P QS	53.4
OVR T2 3L 40-275 P TS QS	53.4
OVR T2 3L 40-275s P QS	53.4
OVR T2 3L 40-275s P TS QS	53.4
OVR T2 3L 80-275s P QS	53.4
OVR T2 3L 80-275s P TS QS	53.4
OVR T2 3L 40-350 P QS	53.4
OVR T2 3L 40-350 P TS QS	53.4
OVR T2 3L 40-440 P QS	53.4
OVR T2 3L 40-440 P TS QS	53.4
OVR T2 3L 80-440s P QS	53.4
OVR T2 3L 80-440s P TS QS	53.4

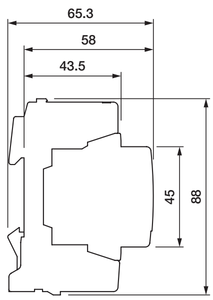
Main dimensions mm



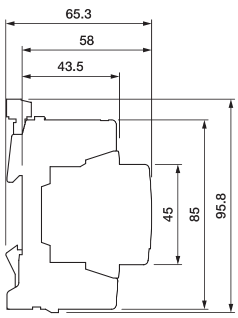
OVR T2 3L 40-275 P QS
OVR T2 3L 40-350 P QS



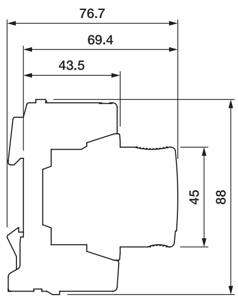
OVR T2 3L 40-275 P TS QS
OVR T2 3L 40-350 P TS QS



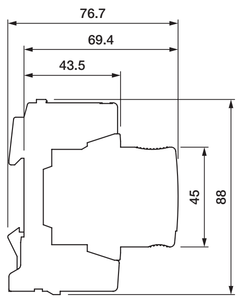
OVR T2 3L 40-440 P QS



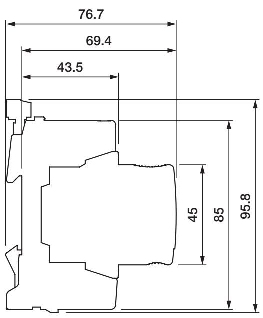
OVR T2 3L 40-440 P TS QS



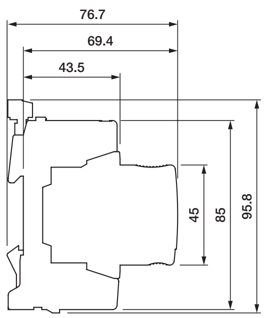
OVR T2 3L 80-440s P QS



OVR T2 3L 40-275s P QS
OVR T2 3L 80-275s P QS



OVR T2 3L 40-275s P TS QS
OVR T2 3L 80-275s P TS QS



OVR T2 3L 80-440s P TS QS

Protection and safety technical details

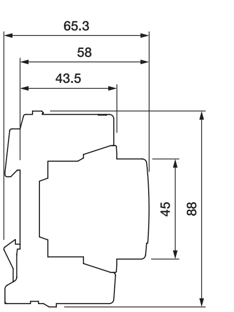
OVR Surge Protective Devices

Dimensional drawings of OVR surge protective devices

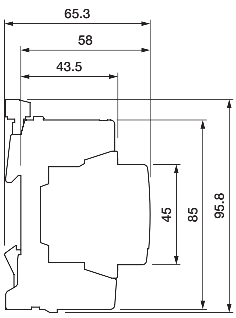
OVR T2 Pluggable

Type	Width mm
OVR T2 4L 40-275 P QS	71.2
OVR T2 4L 40-275 P TS QS	71.2
OVR T2 4L 40-275s P QS	71.2
OVR T2 4L 40-275s P TS QS	71.2
OVR T2 4L 80-275s P QS	71.2
OVR T2 4L 80-275s P TS QS	71.2
OVR T2 4L 40-440 P QS	71.2
OVR T2 4L 40-440 P TS QS	71.2
OVR T2 4L 80-440s P QS	71.2
OVR T2 4L 80-440s P TS QS	71.2

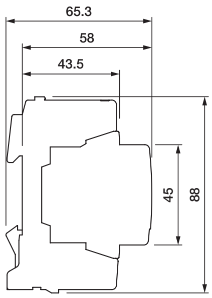
Main dimensions mm



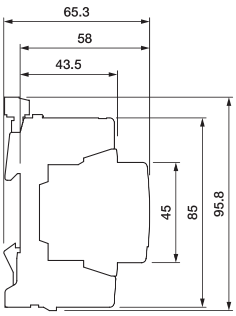
OVR T2 4L 40-275 P QS



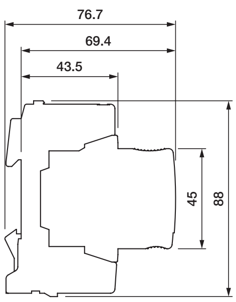
OVR T2 4L 40-275 P TS QS



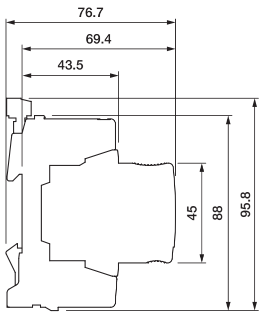
OVR T2 4L 40-440 P QS



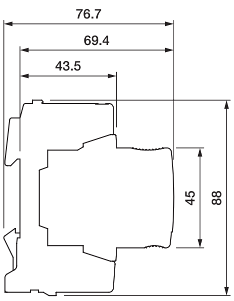
OVR T2 4L 40-440 P TS QS



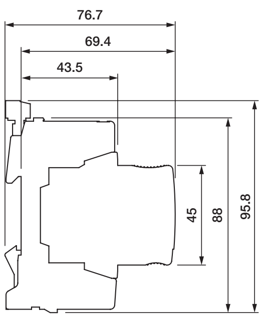
OVR T2 4L 40-275s P QS
OVR T2 4L 80-275s P QS



OVR T2 4L 40-275s P TS QS
OVR T2 4L 80-275s P TS QS



OVR T2 4L 80-440s P QS



OVR T2 4L 80-440s P TS QS

Protection and safety technical details

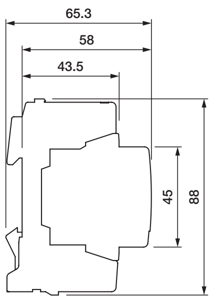
OVR Surge Protective Devices

Dimensional drawings of OVR surge protective devices

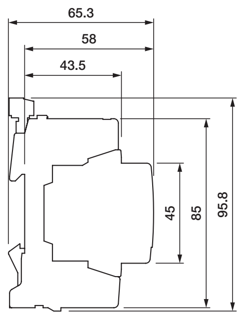
OVR T2 Pluggable

Type	Width mm
OVR T2 3N 40-275 P QS	71.2
OVR T2 3N 40-275 P TS QS	71.2
OVR T2 3N 40-275s P QS	71.2
OVR T2 3N 40-275s P TS QS	71.2
OVR T2 3N 80-275s P QS	71.2
OVR T2 3N 80-275s P TS QS	71.2
OVR T2 3N 40-350 P QS	71.2
OVR T2 3N 40-350 P TS QS	71.2
OVR T2 3N 40-440 P QS	71.2
OVR T2 3N 40-440 P TS QS	71.2
OVR T2 3N 40-440s P TS QS	71.2
OVR T2 3N 80-440s P QS	71.2
OVR T2 3N 80-440s P TS QS	71.2

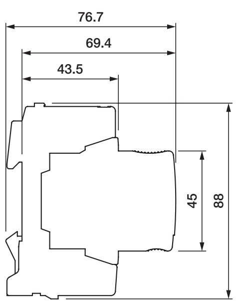
Main dimensions mm



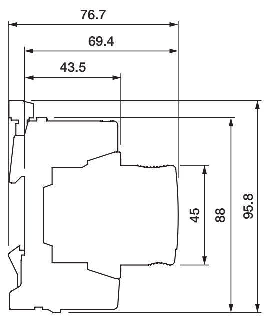
OVR T2 3N 40-275 P QS
OVR T2 3N 40-350 P QS
OVR T2 3N 40-440 P QS



OVR T2 3N 40-275 P TS QS
OVR T2 3N 40-350 P TS QS
OVR T2 3N 40-440 P TS QS



OVR T2 3N 40-275s P QS
OVR T2 3N 80-275s P QS
OVR T2 3N 80-440s P QS



OVR T2 3N 40-275s P TS QS
OVR T2 3N 80-275s P TS QS
OVR T2 3N 40-440s P TS QS
OVR T2 3N 80-440s P TS QS

Protection and safety technical details

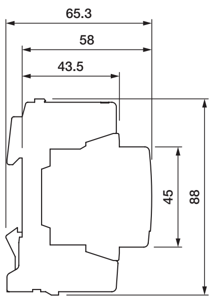
OVR Surge Protective Devices

Dimensional drawings of OVR surge protective devices

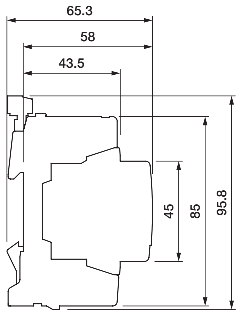
OVR T2-T3 Pluggable

Type	Width mm
OVR T2-T3 20-275 P QS	17.8
OVR T2-T3 20-275 P TS QS	17.8
OVR T2-T3 20-440 P QS	17.8
OVR T2-T3 20-440 P TS QS	17.8
OVR T2-T3 3L 20-275 P QS	53.4
OVR T2-T3 3L 20-275 P TS QS	53.4
OVR T2-T3 1N 20-275 P QS	35.6
OVR T2-T3 1N 20-275 P TS QS	35.6
OVR T2-T3 3N 20-275 P QS	71.2
OVR T2-T3 3N 20-275 P TS QS	71.2
OVR T2-T3 3N 20-440 P QS	71.2

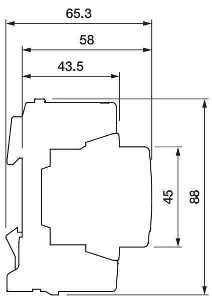
Main dimensions mm



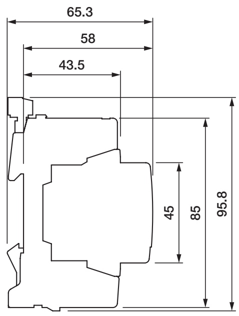
OVR T2-T3 20-275 P QS
OVR T2-T3 20-440 P QS



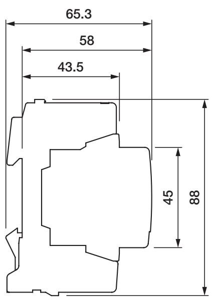
OVR T2-T3 20-275 P TS QS
OVR T2-T3 20-440 P TS QS



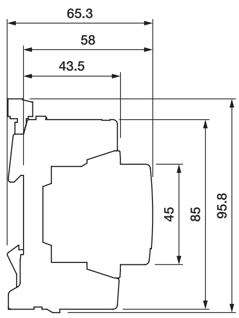
OVR T2-T3 3L 20-275 P QS



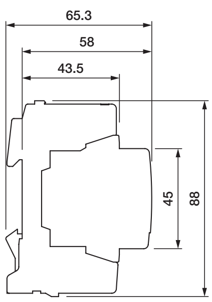
OVR T2-T3 3L 20-275 P TS QS



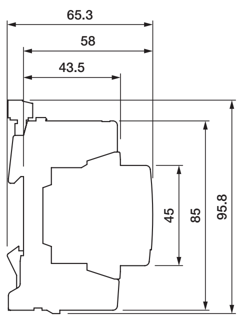
OVR T2-T3 1N 20-275 P QS



OVR T2-T3 1N 20-275 P TS QS



OVR T2-T3 3N 20-275 P QS
OVR T2-T3 3N 20-440 P QS



OVR T2-T3 3N 20-275 P TS QS

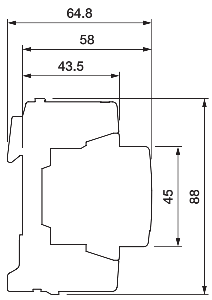
Protection and safety technical details

OVR Surge Protective Devices

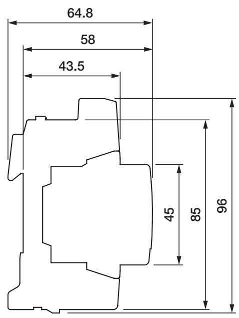
Single pole

Type	Width mm
OVR T2 15-150 P U	17.8
OVR T2 15-320 P U	17.8
OVR T2 40-150 P U	17.8
OVR T2 40-150 P TS U	17.8
OVR T2 40-320 P U	17.8
OVR T2 40-320 P TS U	17.8
OVR T2 40-440 P TS U	17.8
OVR T2 40-550 P TS U	17.8
OVR T2 40-660 P TS U	17.8
OVR T2 70 N P U	17.8

Main dimensions mm



OVR T2 15-150 P U
OVR T2 15-320 P U
OVR T2 40-150 P U
OVR T2 40-320 P U
OVR T2 70 N P U

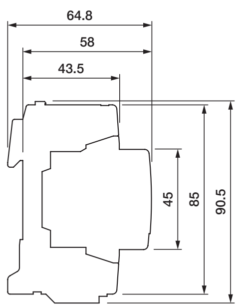


OVR T2 40-150 P TS U
OVR T2 40-320 P TS U
OVR T2 40-440 P TS U
OVR T2 40-550 P TS U
OVR T2 40-660 P TS U

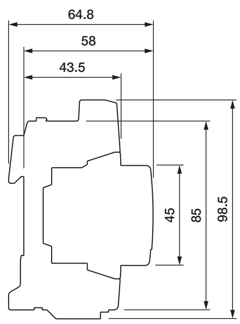
Single phase networks

Type	Width mm
OVR T2 1N 15-150 P U	35.6
OVR T2 1N 15-320 P U	35.6
OVR T2 1N 40-150 P U	35.6
OVR T2 1N 40-150 P TS U	35.6
OVR T2 1N 40-320 P TS U	35.6
OVR T2 1N 40-440 P TS U	35.6
OVR T2 1N 40-660 P TS U	35.6
OVR T2 1N 40-550 P TS U	35.6

Main dimensions mm



OVR T2 1N 15-150 P U
OVR T2 1N 15-320 P U
OVR T2 1N 40-150 P U

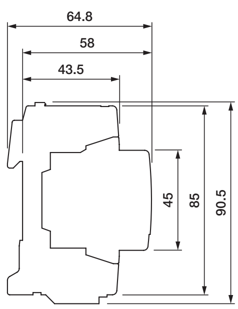


OVR T2 1N 40-150 P TS U
OVR T2 1N 40-320 P TS U
OVR T2 1N 40-440 P TS U
OVR T2 1N 40-550 P TS U
OVR T2 1N 40-660 P TS U

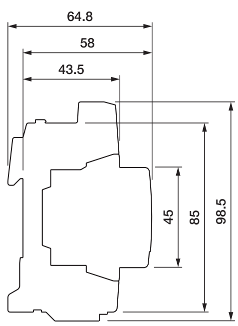
Delta networks

Type	Width mm
OVR T2 3L 15-320 P U	53.4
OVR T2 3L 40-320 P TS U	53.4
OVR T2 3L 40-550 P TS U	53.4

Main dimensions mm



OVR T2 3L 15-320 P U



OVR T2 3L 40-320 P TS U
OVR T2 3L 40-550 P TS U

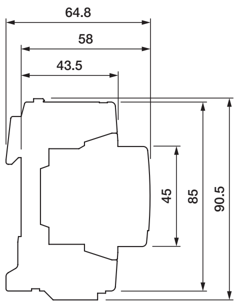
Protection and safety technical details

OVR Surge Protective Devices

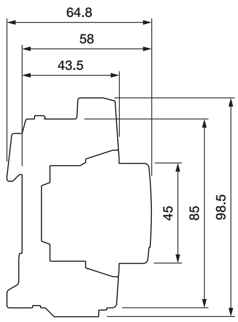
Split phase networks

Type	Width mm
OVR T2 2L 15-150 P U	35.6
OVR T2 2L 15-320 P U	35.6
OVR T2 2L 40-150 P TS U	35.6
OVR T2 2L 40-320 P TS U	35.6
OVR T2 2N 15-150 P U	53.4
OVR T2 2N 15-320 P U	53.4
OVR T2 2N 40-150 P TS U	53.4
OVR T2 2N 40-320 P TS U	53.4
OVR T2 2N 40-440 P TS U	53.4
OVR T2 2N 40-550 P TS U	53.4
OVR T2 2N 40-660 P TS U	53.4

Main dimensions mm



OVR T2 2L 15-150 P U
OVR T2 2L 15-320 P U
OVR T2 2N 15-150 P U
OVR T2 2N 15-320 P U

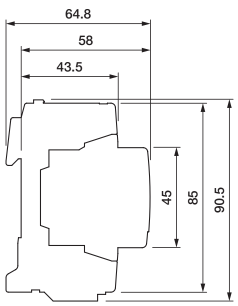


OVR T2 2L 40-150 P TS U
OVR T2 2L 40-320 P TS U
OVR T2 2N 40-150 P TS U
OVR T2 2N 40-320 P TS U
OVR T2 2N 40-440 P TS U
OVR T2 2N 40-550 P TS U
OVR T2 2N 40-660 P TS U

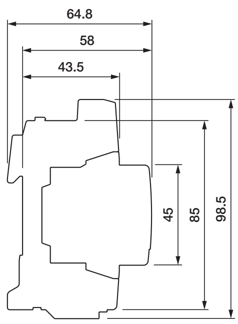
Grounded Wye networks

Type	Width mm
OVR T2 3L 15-150 P U	53.4
OVR T2 3L 40-150 P TS U	53.4
OVR T2 3L 40-440 P TS U	53.4
OVR T2 3N 15-150 P U	71.2
OVR T2 3N 15-320 P U	71.2
OVR T2 3N 40-150 P TS U	71.2
OVR T2 3N 40-320 P TS U	71.2
OVR T2 3N 40-440 P TS U	71.2
OVR T2 3N 40-550 P TS U	71.2
OVR T2 3N 40-660 P TS U	71.2

Main dimensions mm



OVR T2 3L 15-150 P U
OVR T2 3N 15-150 P U
OVR T2 3N 15-320 P U



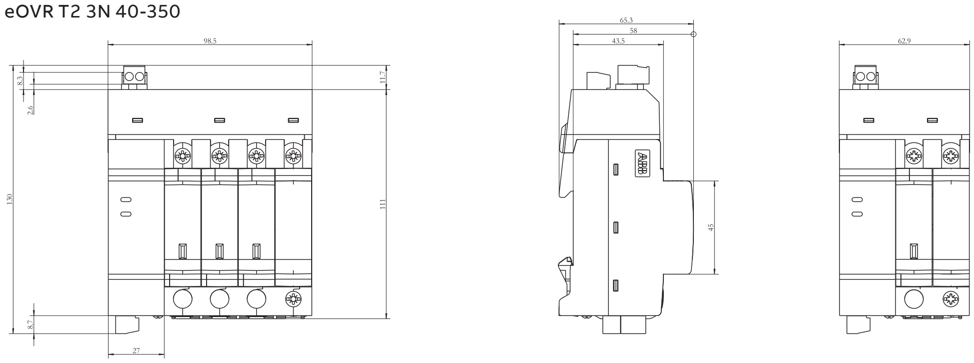
OVR T2 3L 40-150 P TS U
OVR T2 3L 40-440 P TS U
OVR T2 3N 40-150 P TS U
OVR T2 3N 40-320 P TS U
OVR T2 3N 40-440 P TS U
OVR T2 3N 40-550 P TS U
OVR T2 3N 40-660 P TS U

Digital SPD—eOVR

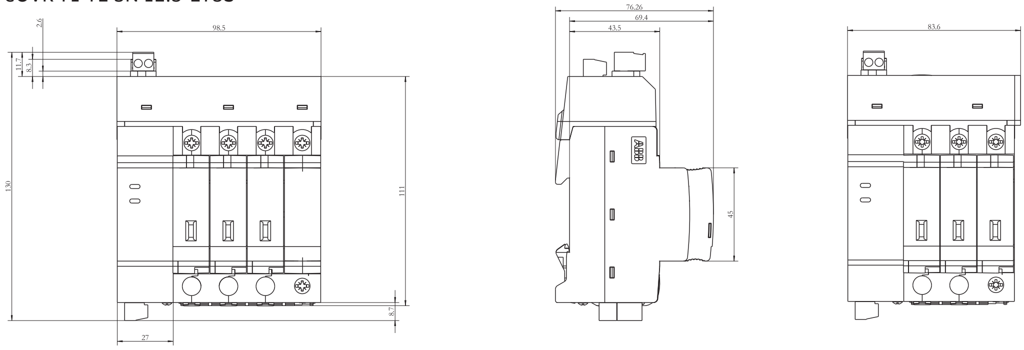
Overall dimensions

Type	Width mm	Heigh mm	Depth mm
eOVR T2-T3 1N 20-275	62.9	130	65.3
eOVR T2-T3 3N 20-275	98.5	130	65.3
eOVR T2 1N 40-350	62.9	130	65.3
eOVR T2 3N 40-350	98.5	130	65.3
eOVR T2 3N 80-440s	83.6	130	76.3
eOVR T1-T2 3N 12.5-275S	83.6	130	76.3
eOVR T1-T2 3N 12.5-440s	151.9	130	76.7
eOVR T2 3L 40-275s	83.6	130	76.3
eOVR T1-T2 3L 12.5-440s	151.9	130	76.7
eOVR T1-T2 4L 12.5-440s	151.9	130	76.7

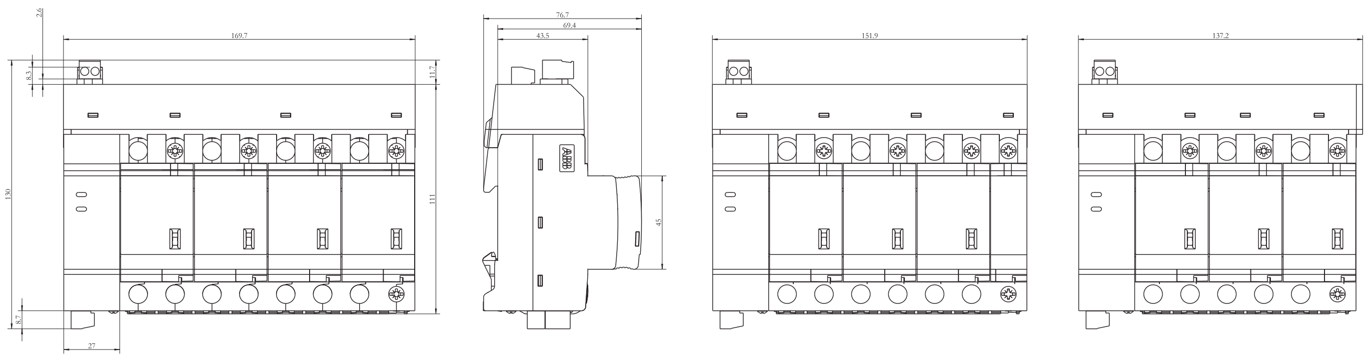
eOVR T2-T3 1N 20-275
eOVR T2 1N 40-350
eOVR T2-T3 3N 20-275
eOVR T2 3N 40-350



eOVR T2 3L 40-275S
eOVR T2 3N 80-440S
eOVR T1-T2 3N 12.5-275S



eOVR T2 3L 40-275S
eOVR T2 3N 80-440S
eOVR T1-T2 3N 12.5-275S



Notes

Protection and safety technical details

E 90 fuseholders

E 90 fuse-holders
IEC 60947-3: Switches, disconnectors, switch-disconnectors and fuse combination units
This standard sets out the requirements of devices for connect/disconnect and switching operations.

Disconnector:
The disconnector is a mechanical device that, in the open position, meets the requirements specified for the disconnect function by the international IEC 60947-3 standard. The opening of a disconnector guarantees that the downstream circuit is electrically isolated from the upstream circuit. This is a required condition before personnel can access the equipment on the network, for example to perform maintenance. The IEC 60364 standard prohibits carrying out maintenance on the installation if the circuits have not been disconnected.

Fuse disconnector:
This is the definition of a fuse carrier that performs a disconnect function. Not all fuse carriers are disconnectors: in order to be classified as such they must meet the requirements and pass the tests prescribed by the IEC 60947-3 standard.

Fuse switch-disconnector:
This is the designation given by the IEC 60947-3 standard to a fuse disconnector that permits switching under load. Not all fuse disconnectors allow this type of operation: in order to be classified as a fuse switch-disconnector, a device must have utilization category AC-21B or higher.

Utilization categories:
Not all connect/disconnect devices have the same performance specifications: the permitted operations depend on a parameter which defines the specific conditions of use, called the utilization category.

It specifies:
a. The type of network (a.c./d.c.)
b. The permitted type of operation (under no load, for resistive loads, for highly inductive loads, ecc...)
c. The frequency of use
The E90 fuse switch-disconnectors have utilization category AC-22B. The E 90 PV fuse disconnectors have utilization category DC-20B.

Type of current	Utilization category		Typical applications
	A	B	
Alternating current	AC-20A	AC-20B	Connecting and disconnecting under no load.
	AC-21A	AC-21B	Switching of resistive loads, including moderate overloads
	AC-22A	AC-22B	Switching of mixed, resistive and inductive loads, including moderate overloads
	AC-23A	AC-23B	Switching of motors or other highly inductive loads
Direct current	DC-20A	DC-20B	Connecting and disconnecting under no load.
	DC-21A	DC-21B	Switching of resistive loads including moderate overloads
	DC-22A	DC-22B	Switching of mixed, resistive and inductive loads, including moderate overloads (e.g. shunt motors)
	DC-23A	DC-23B	Switching of highly inductive loads (e.g. series connected motors)

What loads can be connected/disconnected by a product with utilization category AC-22B?
Utilization category AC-22B permits occasional switching of mixed, resistive and inductive loads, including moderate overloads, in alternating current circuits. Examples of mixed loads are: transformers, power-factor corrected motors, capacitor banks, discharge lamps, heating, etc..

What loads can be connected/disconnected by a product with utilization category AC-20B?
Utilization category AC-20B does not permit connecting or disconnecting under load. An additional load break device is required.

IEC 60269-1: Fuses with voltage rating not exceeding 1000 V for alternating current and 1500 V for direct current
This standard sets out the requirements for low voltage fuses, and consequently the requirements for the fuse carrier devices that hold them.
The standard has two separate sections with different requirements, depending on the type of person using the equipment.
IEC 60269-2: supplementary requirements for fuses for use by authorized persons, mainly for industrial applications.
IEC 60269-3: supplementary requirements for fuses for use by unskilled persons, mainly for household and similar applications.

Protection and safety technical details

E 90 fuseholders

Meaning	Suffix A	Frequent use
	Suffix B	Infrequent use

What is the difference between a fuse carrier conforming to the IEC 60947-3 standard and one conforming to the IEC 60269-2 standard?
These are two complementary standards: IEC 60269-2 sets out the characteristics of the fuses, which in turn also determine the general requirements for the fuse carriers. It is therefore the reference standard for overcurrent protection, but not for connecting/disconnecting and switching.

Is a fuse carrier conforming to IEC 60269-1 a disconnector?
A device conforming only to IEC 60269 has a “disconnect function” but is not classified as a disconnector under the more stringent IEC 60947-3 standard.

Why does the E 90 series have a lower direct current voltage rating under the IEC 60269-3 standard than under the IEC 60269-2 standard?
IEC 60269-2 sets out the requirements for industrial applications, and therefore the reference voltages are higher than those for the residential and commercial applications covered by IEC 60269-3. In other words, the rated voltage of the fuse carrier depends on the type of installation in which it is used, and the regulations applicable to it.

Is it possible to create multi-pole configurations using an assembly kit?
Multi-pole units made up using an assembly kit to combine single pole units will no longer conform to the reference standards.

In case of installations with many poles side by side, or installations in particular climate conditions, what derating of the nominal values should be taken into account?
The following tables give the parameters for derating the nominal current as a function of the number of poles installed side by side or the temperature and relative humidity.

Installation of multiple poles side by side:

E 91/32		E 91hN/32		E90 50/125	
Poles	Maximum current	Poles	Maximum current	Poles	Maximum current
1 ...4	In	1 ...3	In	1...3	In
5...7	0.8 x In	4...9	0.7 x In	4...6	0.95 x In
more than 7	0.7 x In	more than 10	0.6 x In	more than 7	0.9 x In

Climate conditions:

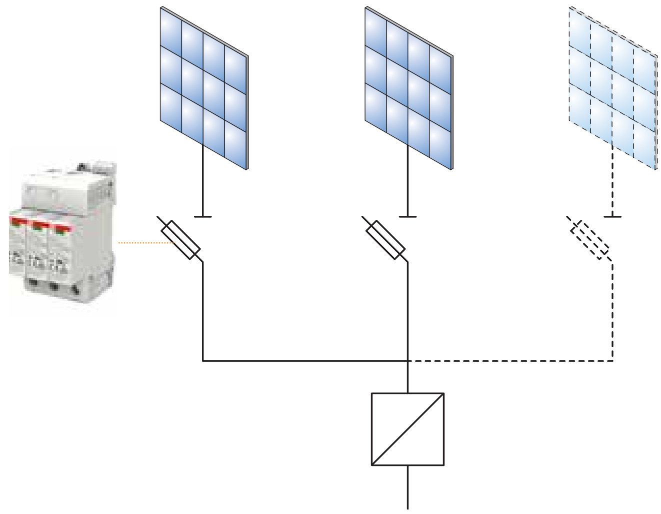
E90/32		E90 50/125	
Maximum temperature	**Maximum current**	**Maximum temperature**	**Maximum current**
20° C	In	20° C	In
30° C	In x 0.95	30° C	In x 0.95
40° C	In x 0.9	40° C	In x 0.9

Protection and safety technical details

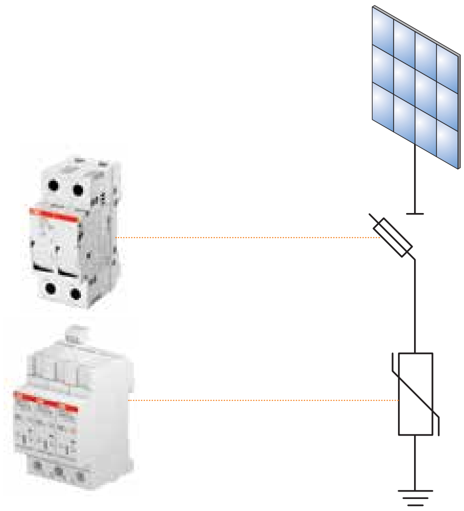
E 90 fuseholders

Protection and disconnection of 1000 V DC lines

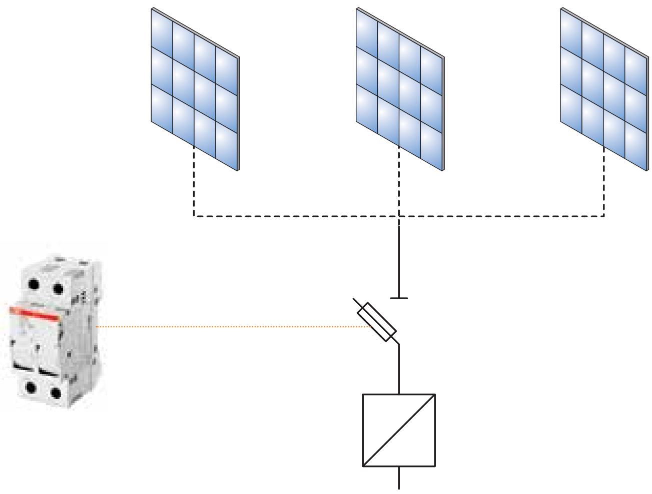
String protection
To avoid equipments damage on DC lines and to ensure isolation of the PV system in case of maintenance, E90 PV disconnectors fuses can be installed downstream the inverter to protect each single string. The fuses must be selected according to the rated current of the line and to the maximum dissipated power.



Back-Up Download
When the Icc short circuit current, at the point of installation, is greater than 10 kA (for 1000V & 1500V) DC, the OVR PVs Surge Protective Devices require a back-up protection with a specific type gR fuse.



DC side of the inverter
For small size photovoltaic systems, E 90 PV fuse disconnectors can be used to protect the DC side of the inverter. The fuse should be chosen according to the rated current of the inverter.



Protection and safety technical details

E 90 fuseholders

Protection system selection

Maximum fuse rated current

		Fuseholder			
Rated voltage		**E 90/20** **8.5 x 31.5 mm**	**E 90/32** **10.3 x 38 mm**	**E 90/50** **14 x 51 mm**	**E 90/125** **22 x 58 mm**
400 V a.c.	gG	20 A	32 A	-	-
	aM	10 A	32 A	-	-
500 V a.c.	gG	-	25 A	50 A	100 A
	aM	-	20 A	50 A	125 A*
690 V a.c.	gG	-	10 A	25 A	80 A
	aM	-	-	25 A	80 A

* = to be used in combination with a device which guarantees protection against overload.

In the table above you will find indication about the highest rated current fuse that you can host inside a fuseholder, depending on the rated voltage of the circuit, the fuse size and the tripping curve characteristic.

ABB fuses and fuseholders comply with all regulatory requirements and sometimes they allow to install a fuse with rated current higher than the one set by the Standard IEC EN 60269-2-1.

Protection and safety technical details

E9F fuses

E9F fuses

Can fuses with rated current values higher than the one indicated in the table be used? For example, can a 10.3 x 38 mm 32 A gG fuse be used in a 10.3 x 38 mm E 90/32 fuse holder?
Yes, by following the manufacturer’s instructions: you have to check that the power dissipated at the rated voltage value declared by the manufacturer for the size considered does not exceed the maximum dissipated power limit of the fuse holder. In this specific case, an E9F10 GG32 fuse dissipates 3 W at 400 V rated voltage.
Since an E 90/32 series fuse holder for 10.3 x 38 mm fuses achieves 3 W thermal dissipation, the fuse in question can be used at 400 V rated voltage or less.

Can a 10.3 x 38 mm 32 A gG fuse be used in a 10.3 x 38 mm E 90/32 fuse holder with a rated voltage exceeding 400 V?
In the specific case of E9F10 GG32, use of rated voltage exceeding 400 V fails to allow the equipment to comply with the maximum dissipated power limit.

Must the rated voltage always be derated if a fuse with a rated current exceeding the value in the table is used?
No, it depends on the technical specifications of the fuse. Derating is not required for E9F 8 gG 20 fuses since they ensure (at 400 V AC) 2.30 W dissipated power, which is lower than the 2.5 W limit imposed by the standard.

Maximum dissipated power value for cylindrical fuses according to IEC EN 60269-2-1 (Art. 5-5)

	Fuse			
Characteristic curve	E9F 8	E9F 10	E9F 14	E9F 22
	8.5 x 31.5 mm	10.3 x 38 mm	14 x 51 mm	22 x 58 mm
gG	2.5 W	3 W	5 W	9.5 W
aM	0.9 W	1.2 W	3 W	7 W

The table lists the maximum dissipated power values of the fuses, considering the size and the characteristic curve.
The highlighted values correspond to the maximum dissipated power limit for fuse holders.

E9F gG

Power dissipation [W]

In [A]	**E9F 8**	**E9F 10**	**E9F 14**	**E9F 22**
	Size 8.5x31.5 mm	**Size 10.3x38 mm**	**Size 14x51 mm**	**Size 22x58 mm**
0.5		0.07 W		
1	0.35 W	0.45 W		
2	0.45 W	0.5 W	0.75 W	
4	0.65 W	0.85 W	1.1 W	1.25 W
6	0.83 W	0.95 W	1.25 W	1.4 W
8	1 W	1.15 W	1.45 W	1.6 W
10	1.2 W	1.3 W	1.65 W	1.9 W
12	1.3 W	1.4 W	1.8 W	2 W
16	1.7 W	1.9 W	2.35 W	2.5 W
20	2 W	2.4 W	2.75 W	3.4 W
25	**2.4 W**	2.7 W	3.1 W	3.5 W
32		**2.8 W**	3.6 W	3.7 W
40			4 W	4.3 W
50			**4.8 W**	5.3 W
63				6.3 W
80				7.4 W
100				**8.3 W**
125				11.3 W

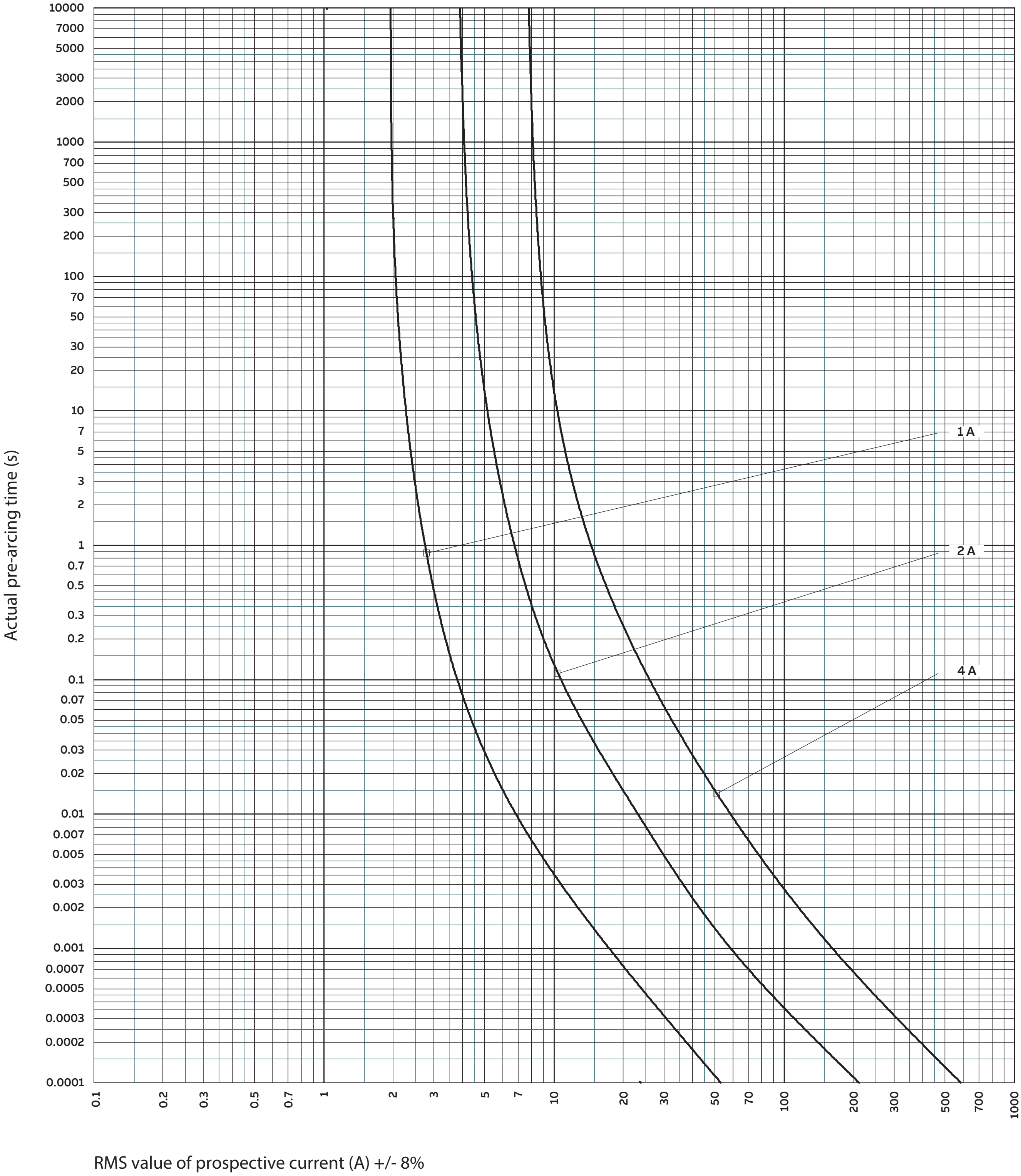
It is important verify that the power dissipation by the fuse does not exceed the limit allowed by the fuse it is hosted.
In **bold** are shown the maximum values of power dissipation according to IEC EN 60269-2-1.

Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 8 gG

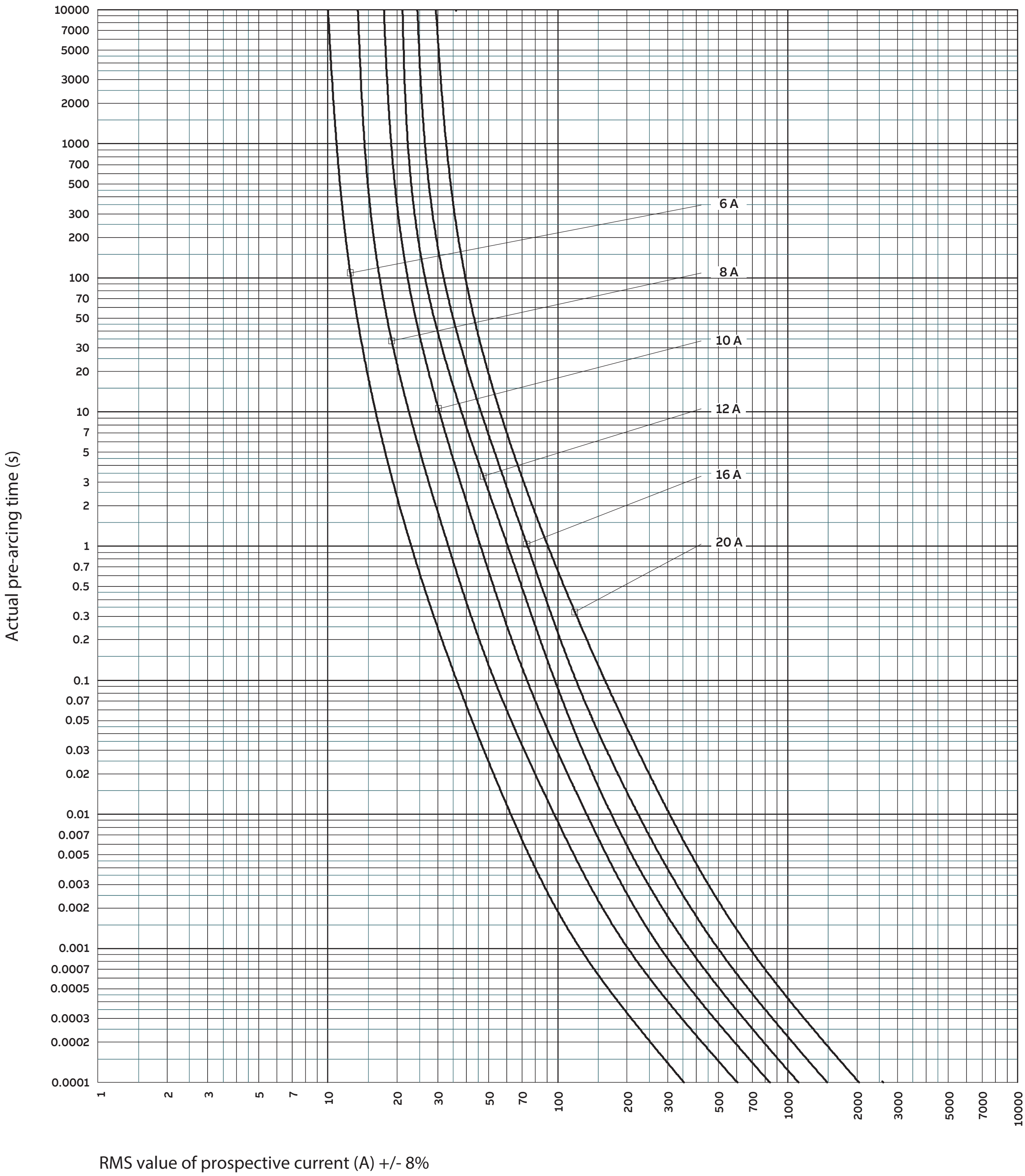


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 8 gG

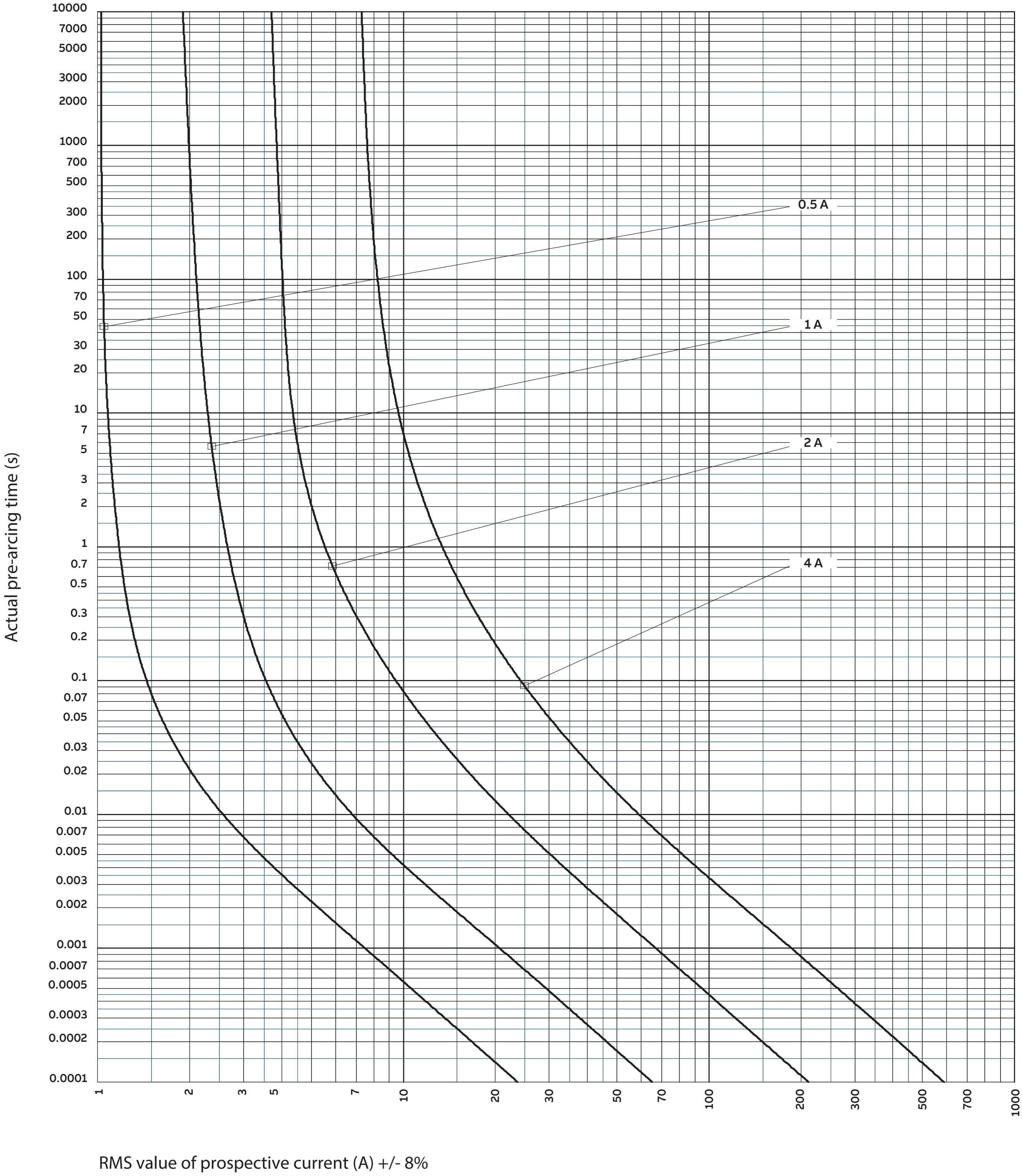


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 10 gG

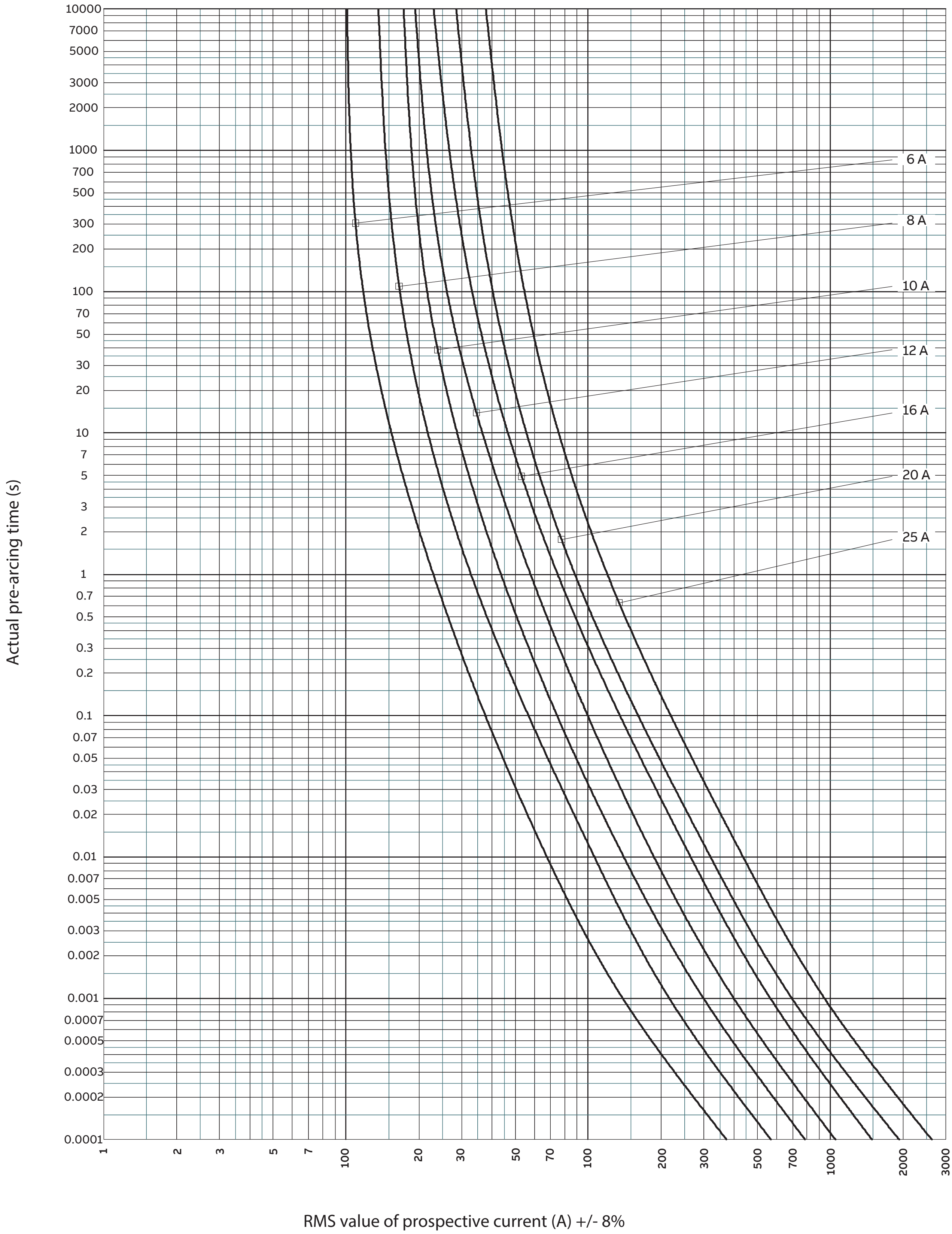


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 10 gG

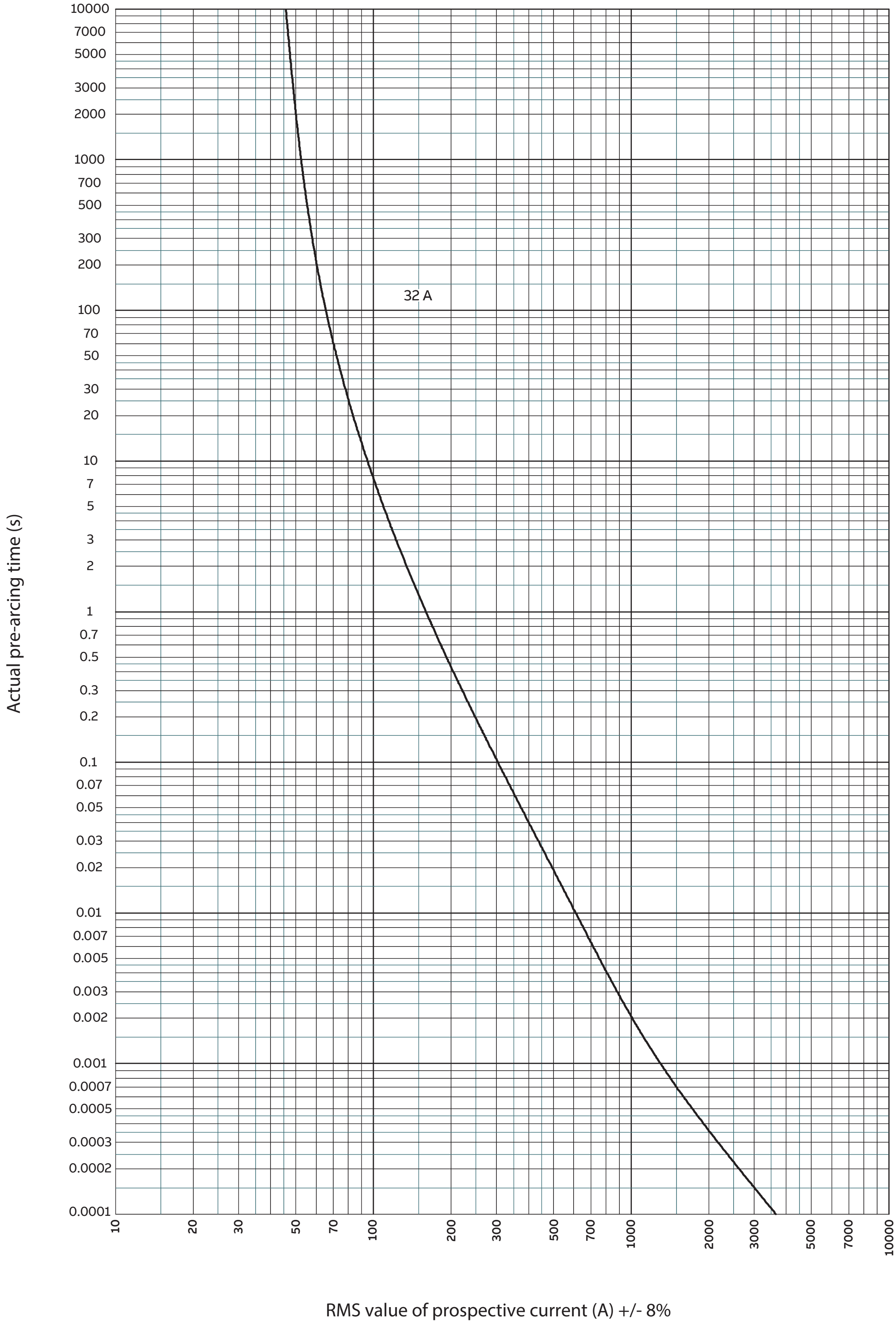


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 10 gG

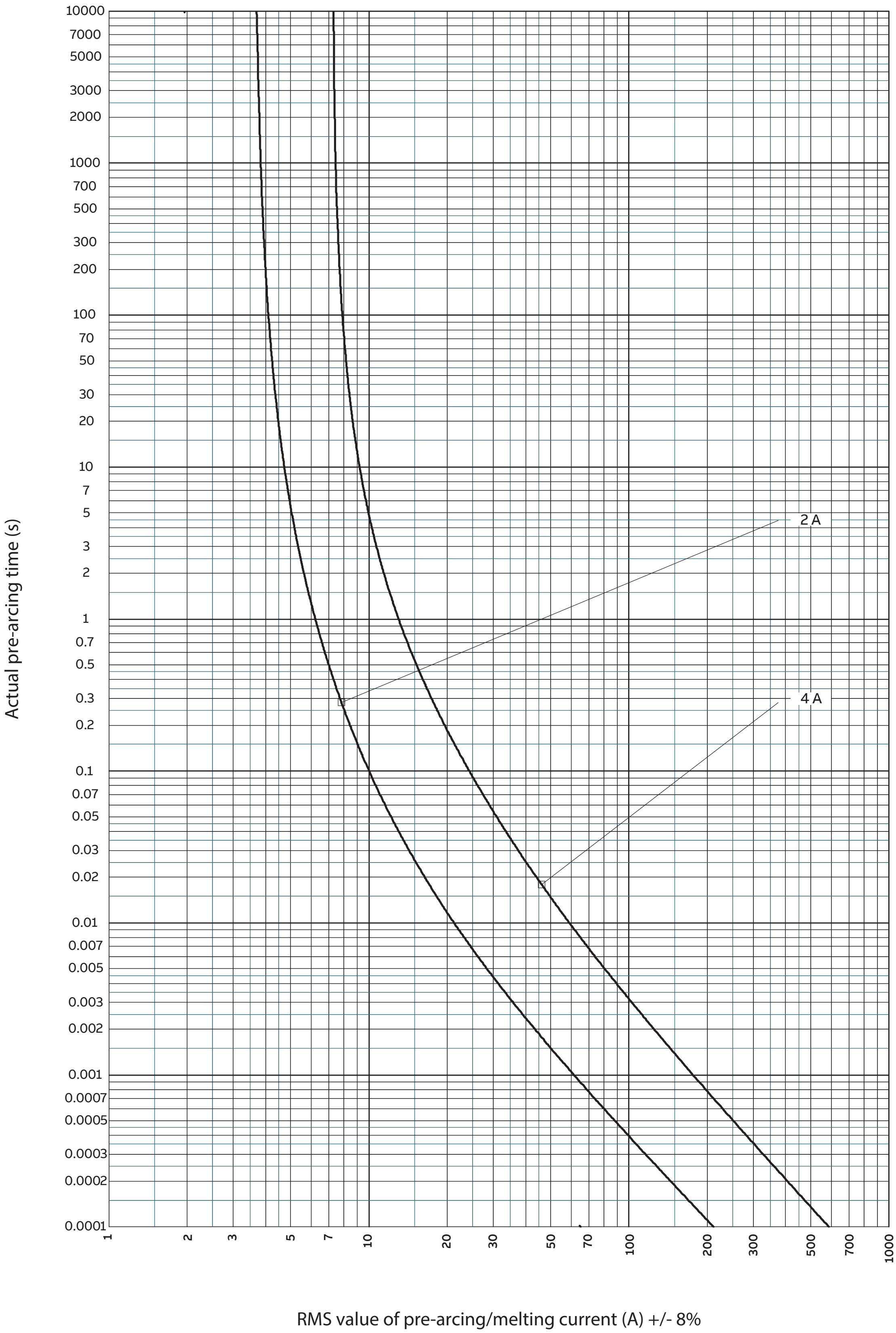


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 14 gG

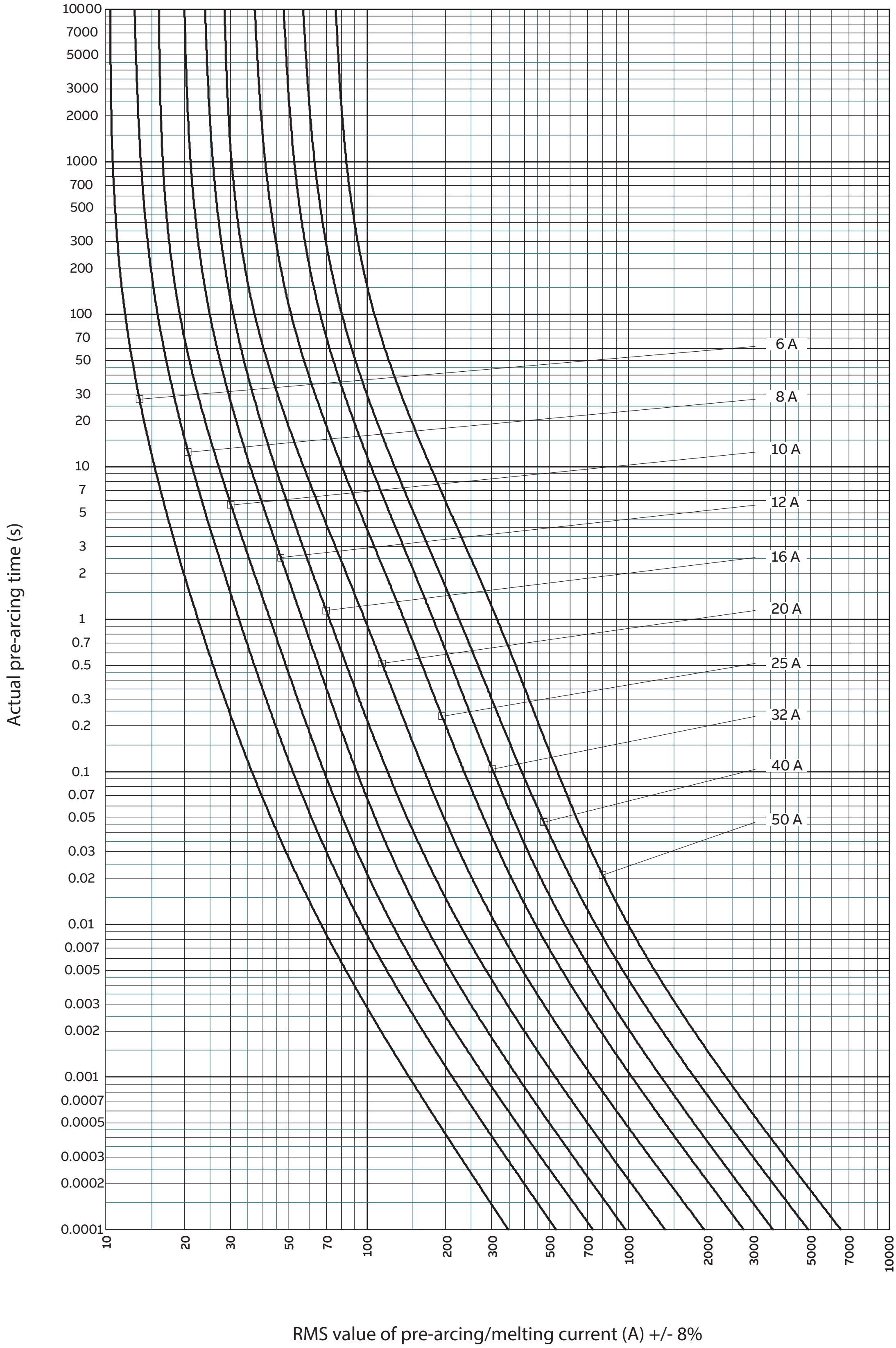


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 14 gG



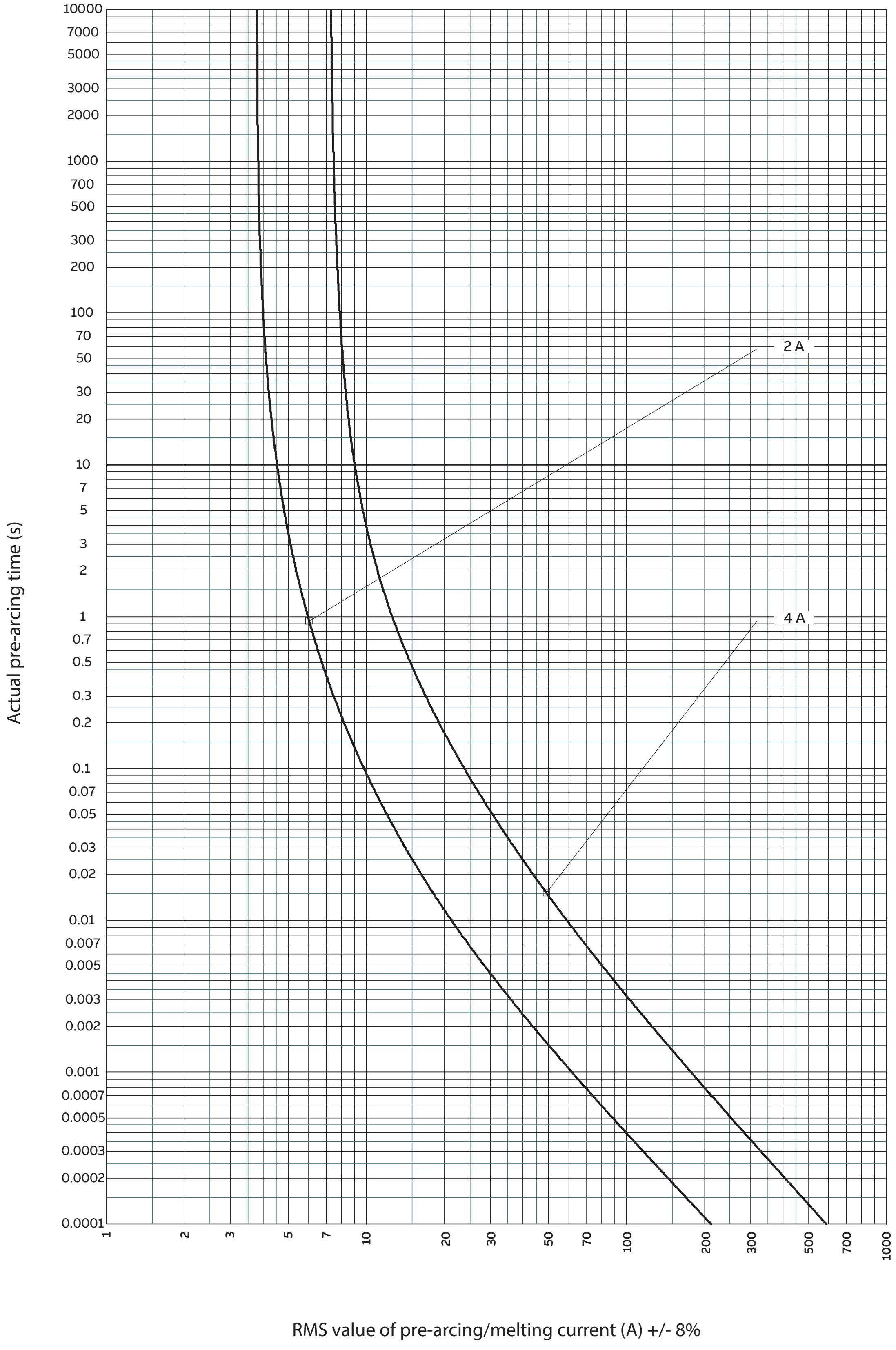
Protection and safety technical details

E9F fuses

5

Time current characteristic curves

E9F 22 gG

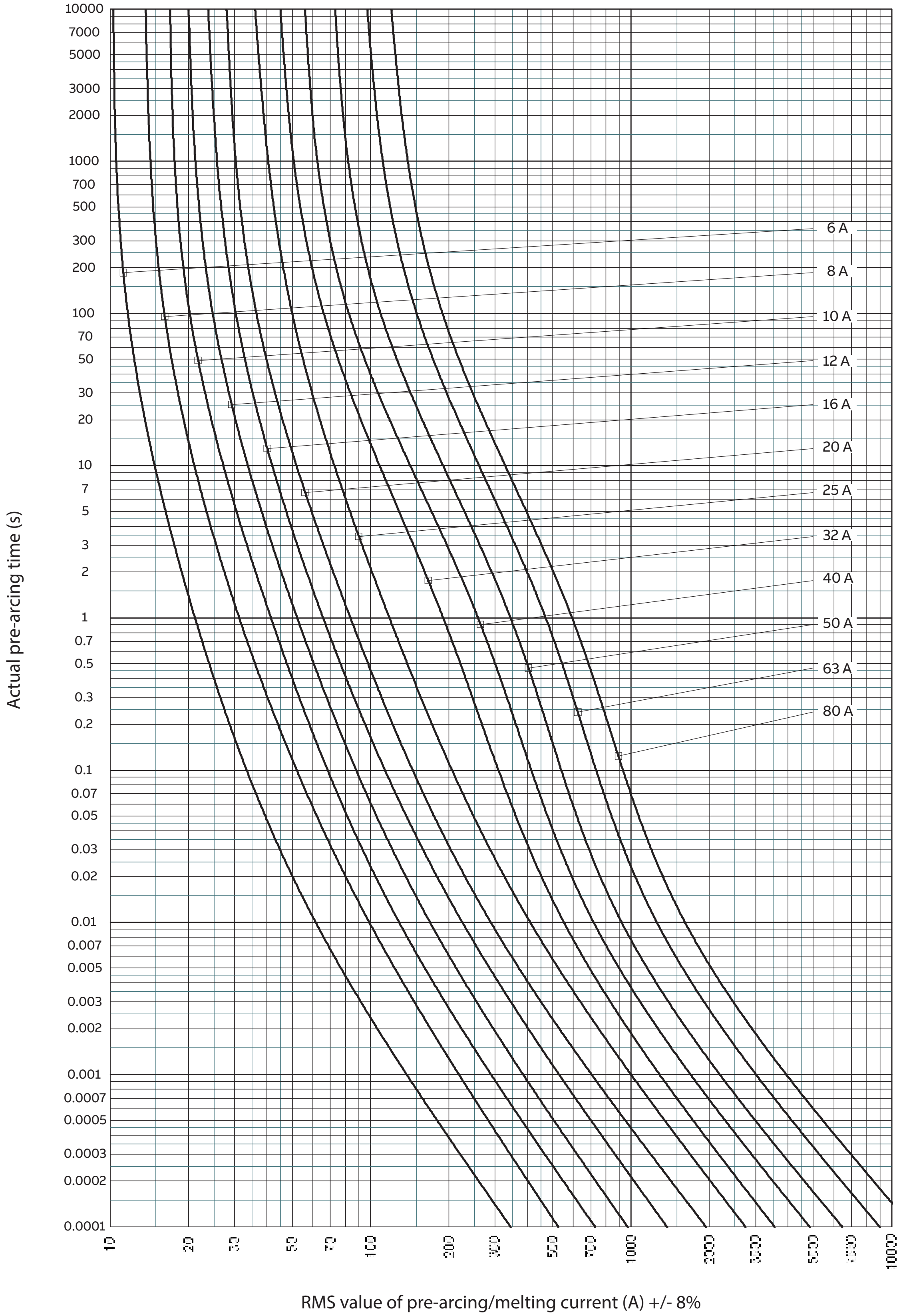


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 22 gG

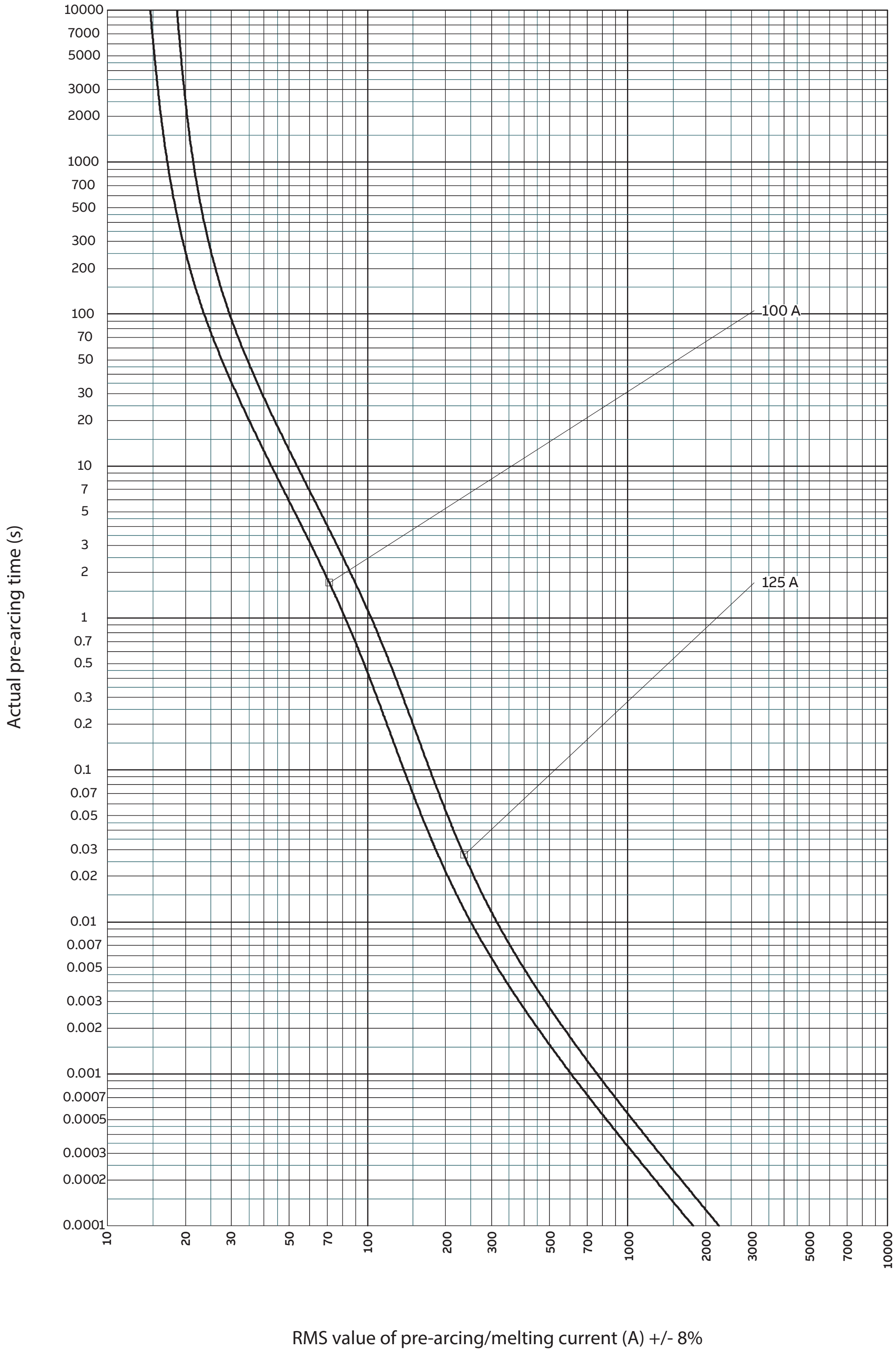


Protection and safety technical details

E9F fuses

Time current characteristic curves

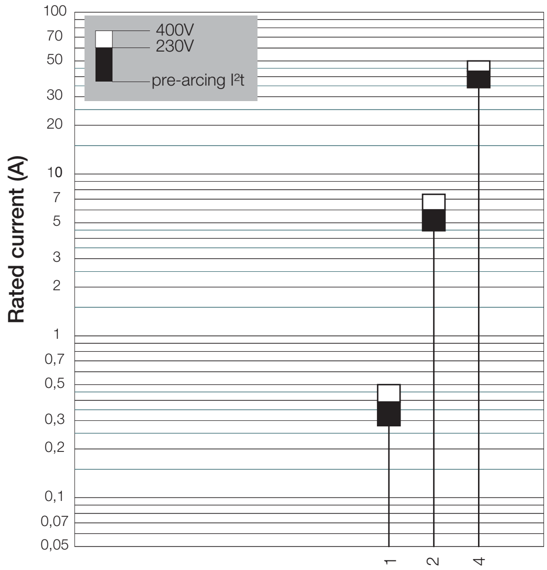
E9F 22 gG

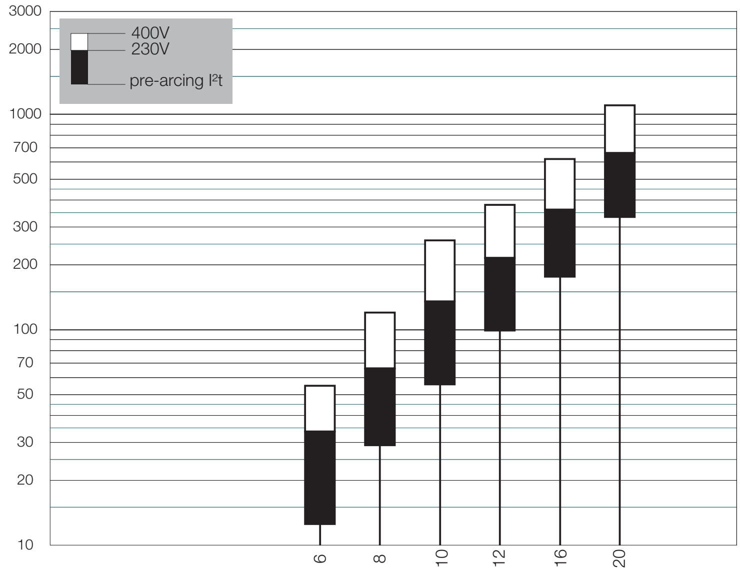


Protection and safety technical details
E9F fuses

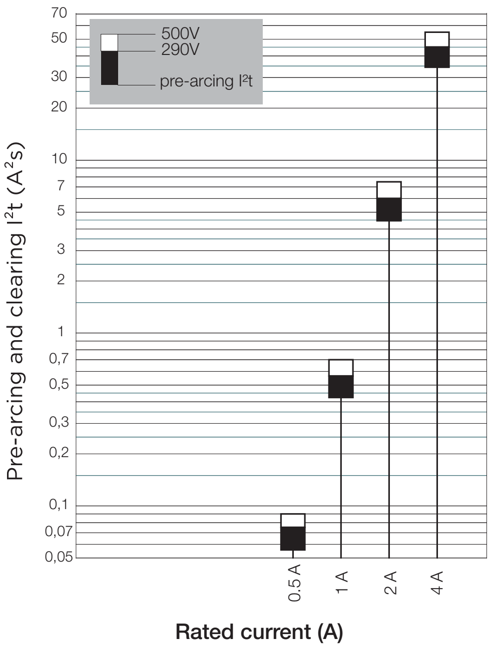
Operating I²T characteristics

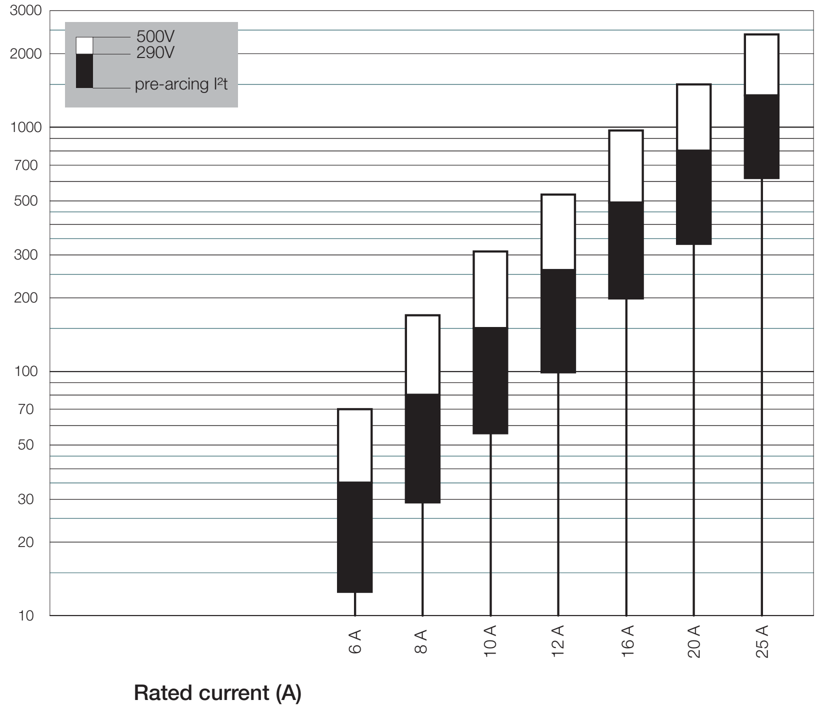
E9F 8 gG





E9F 10 gG



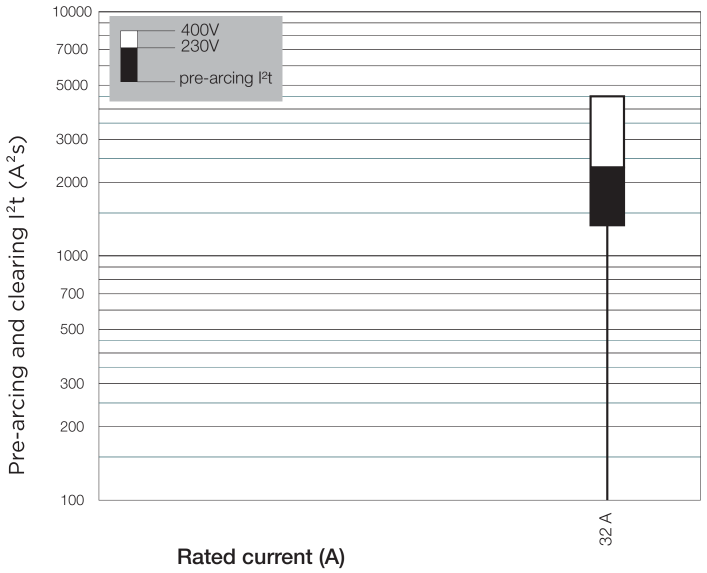


Protection and safety technical details

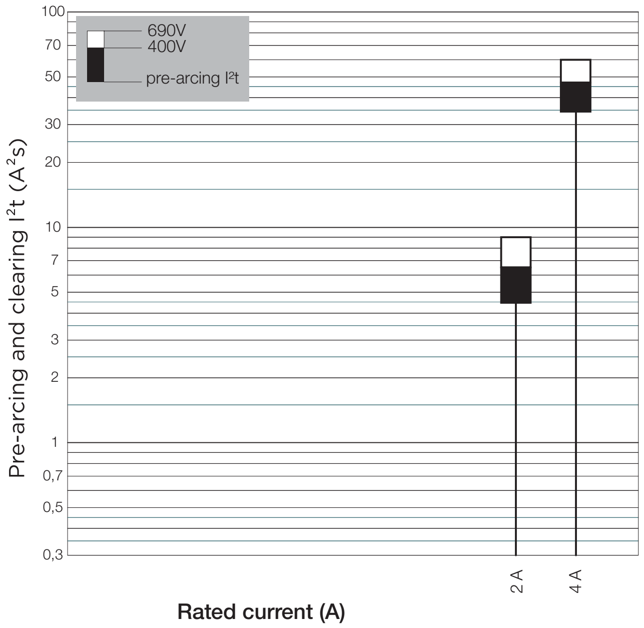
E9F fuses

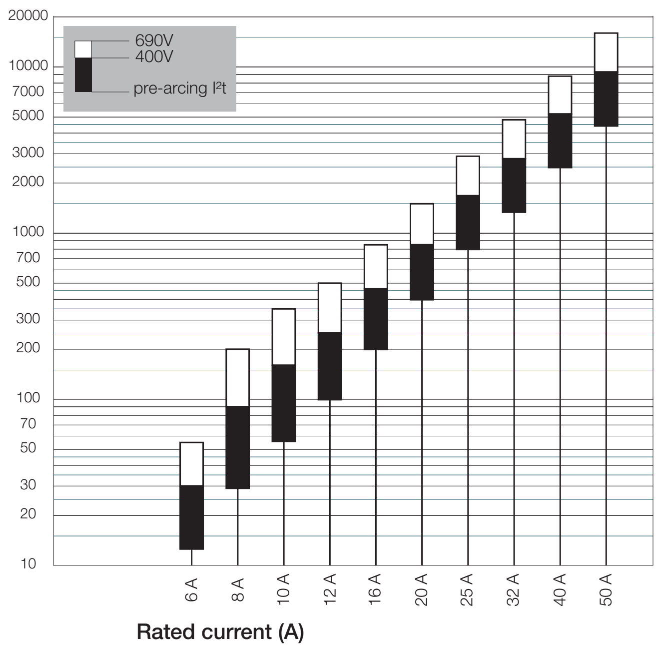
Operating I^2T characteristics

E9F 10 gG



E9F 14 gG



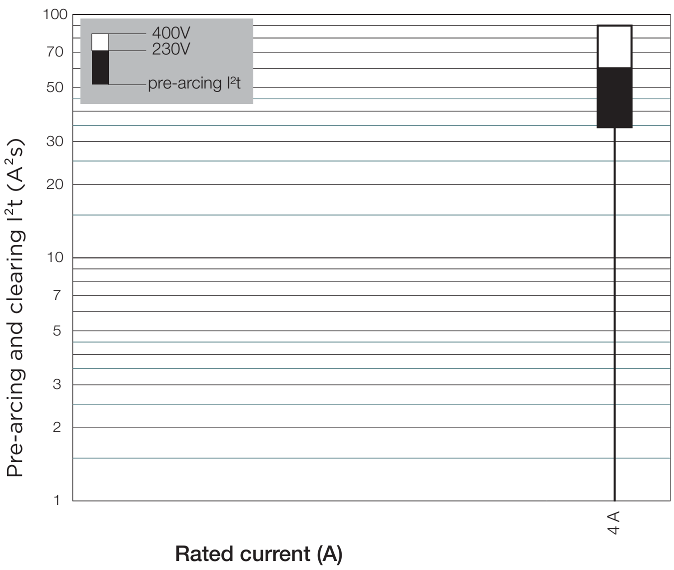


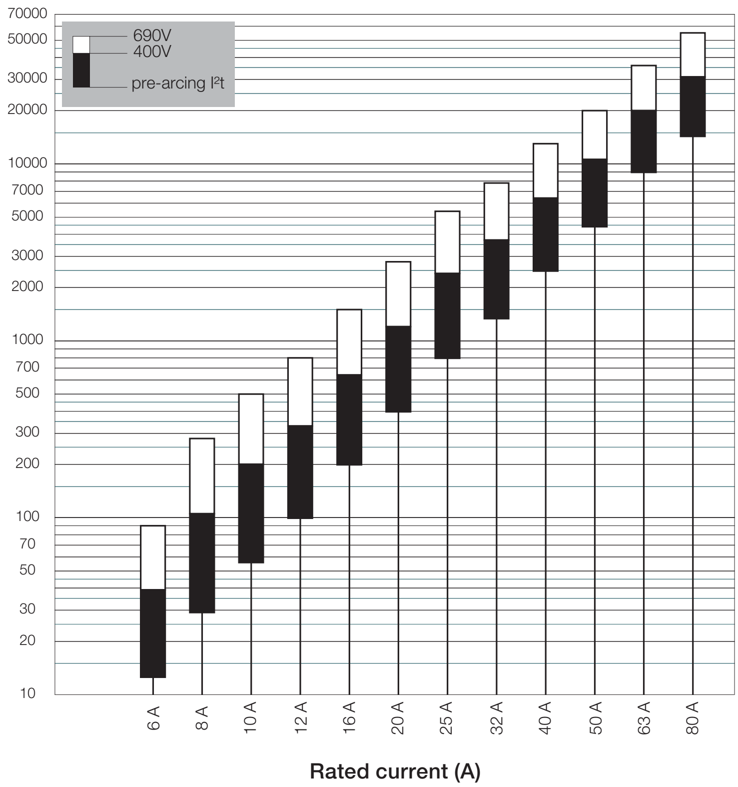
Protection and safety technical details

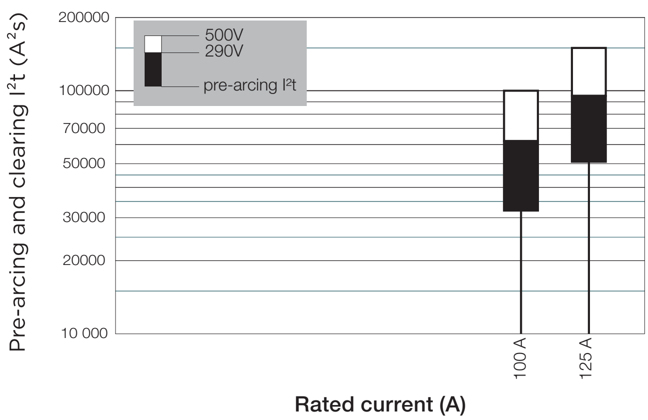
E9F fuses

Operating I²T characteristics

E9F 22 gG





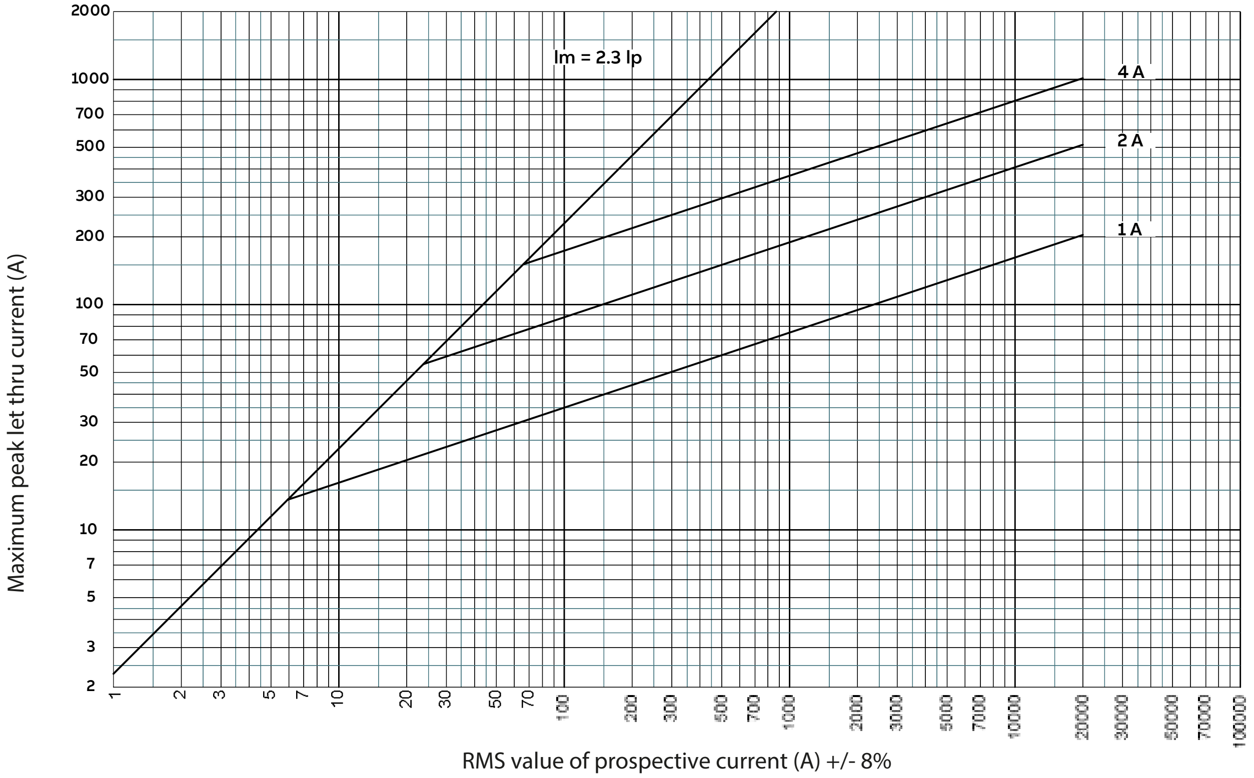


Protection and safety technical details

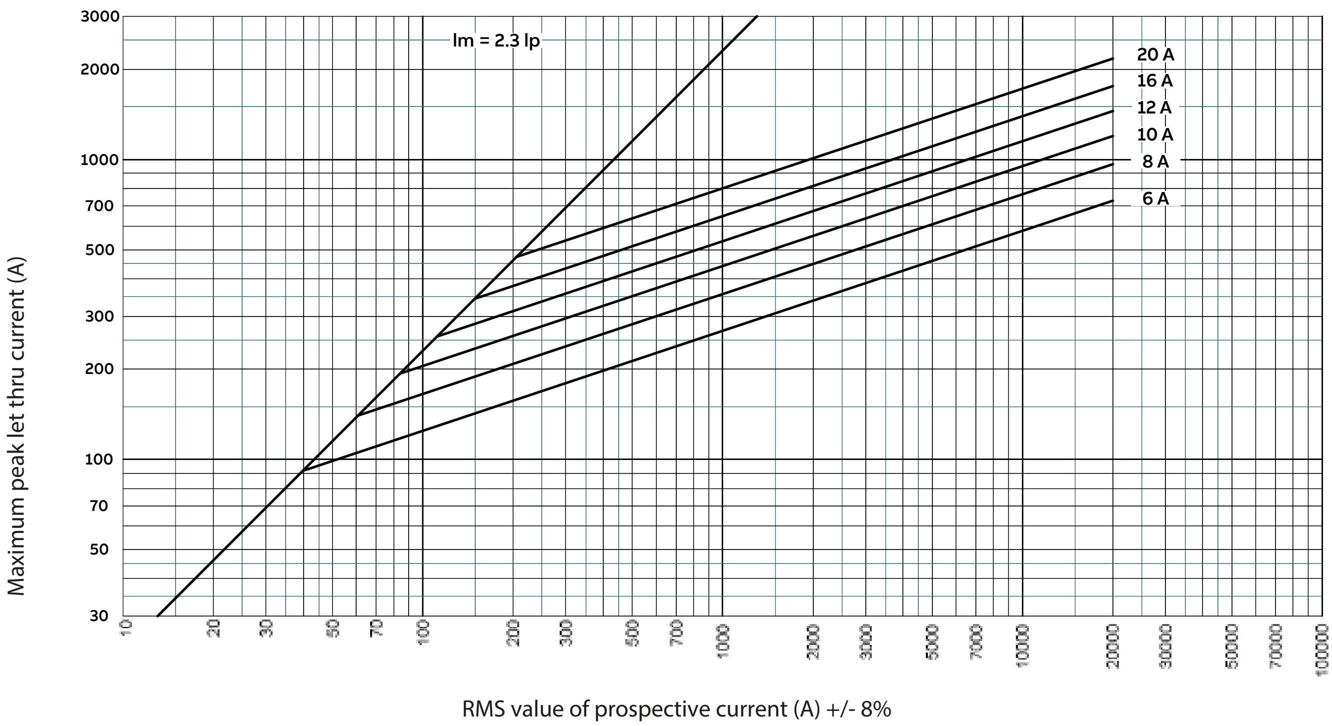
E9F fuses

Cut-off current characteristic

E9F 8 gG



E9F 8 gG

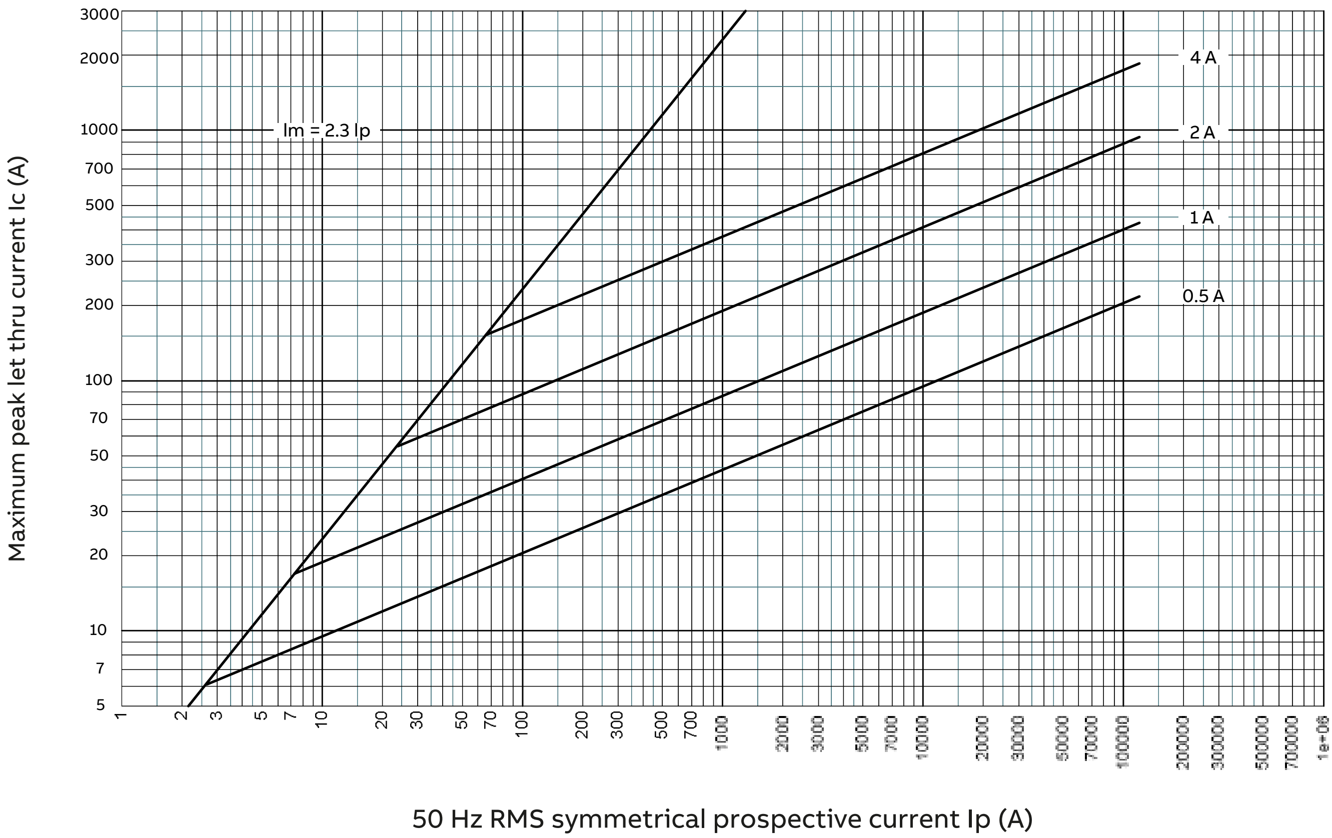


Protection and safety technical details

E9F fuses

Cut-off current characteristic

E9F 10 gG

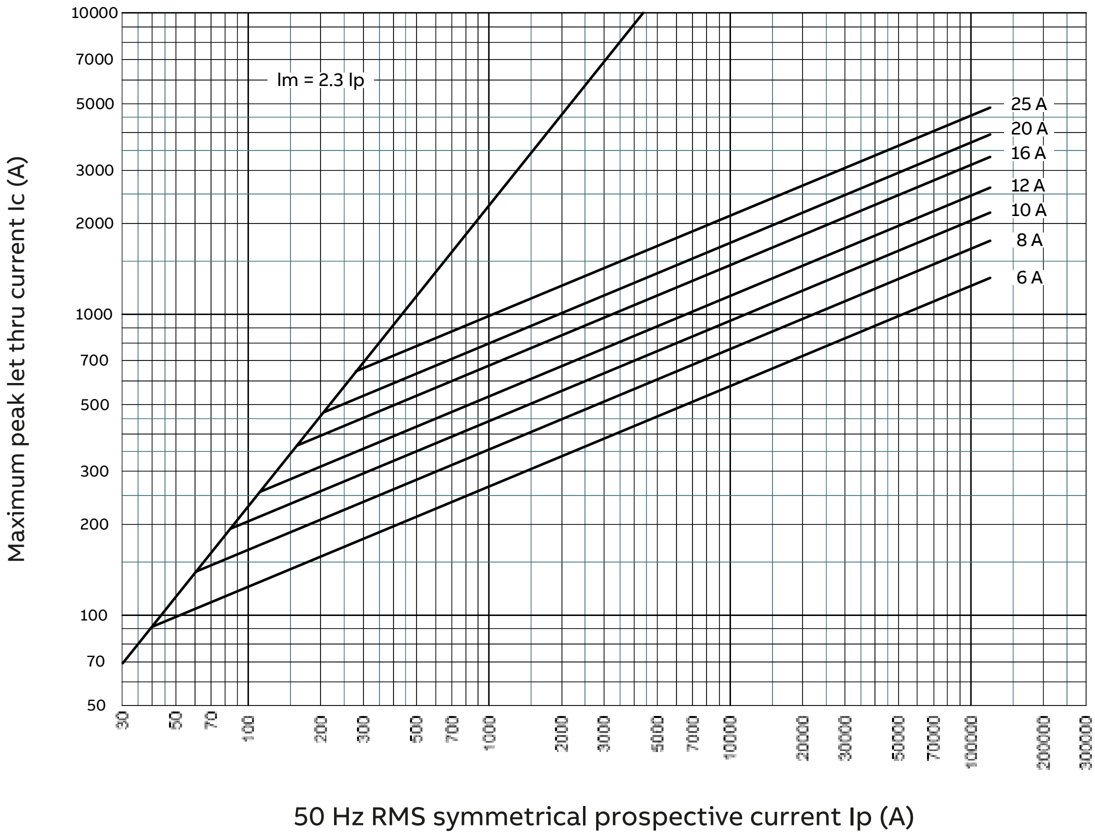


Protection and safety technical details

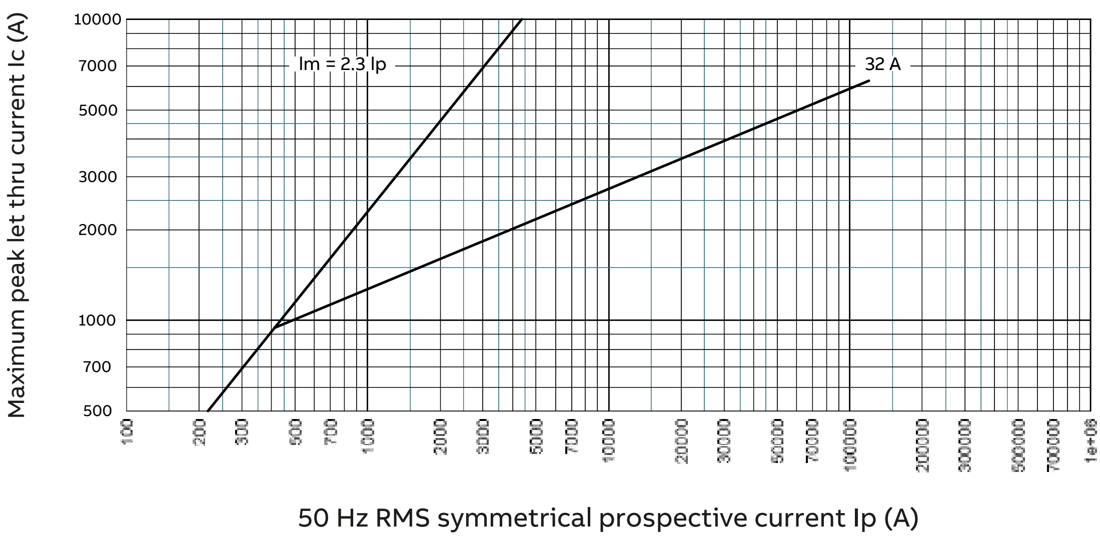
E9F fuses

Cut-off current characteristic

E9F 10 gG



E9F 10 gG

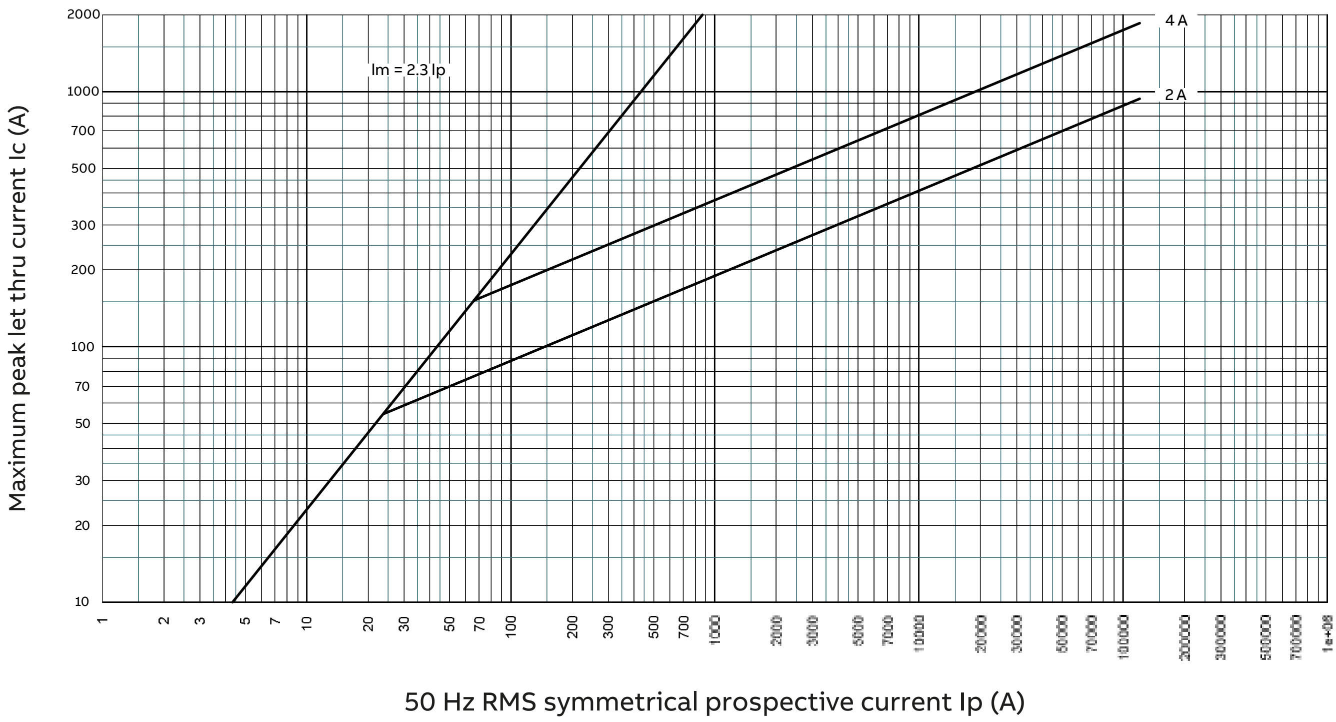


Protection and safety technical details

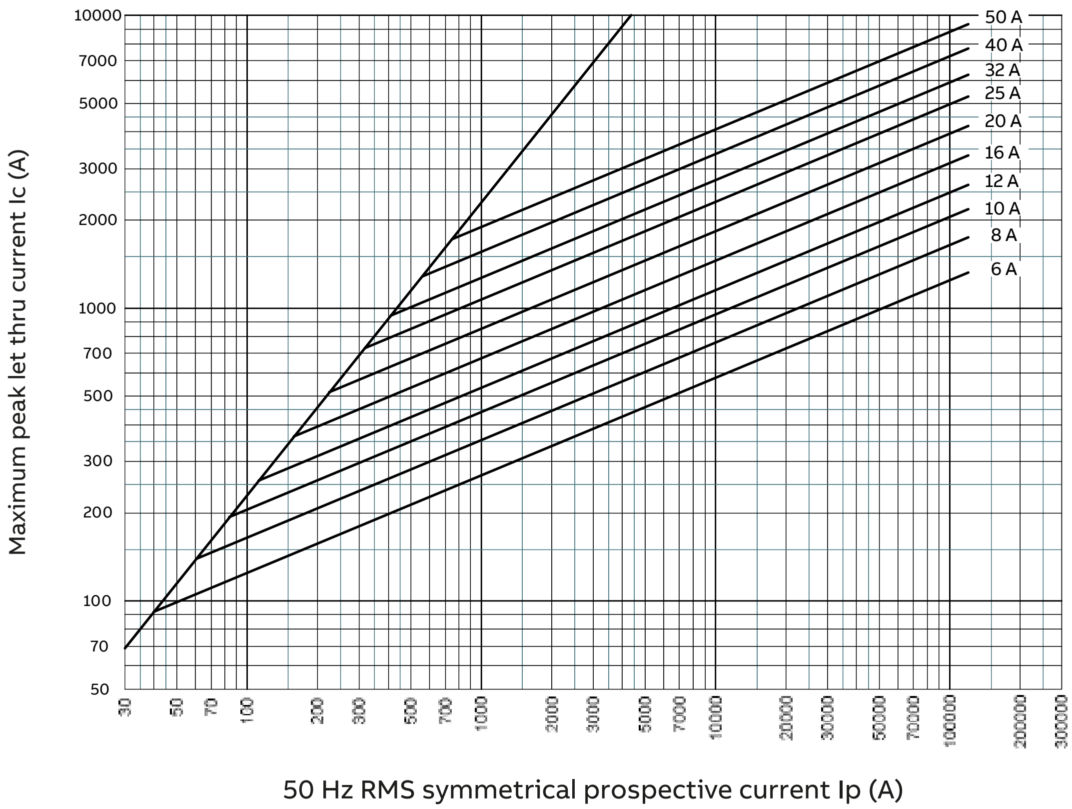
E9F fuses

Cut-off current characteristic

E9F 14 gG



E9F 14 gG

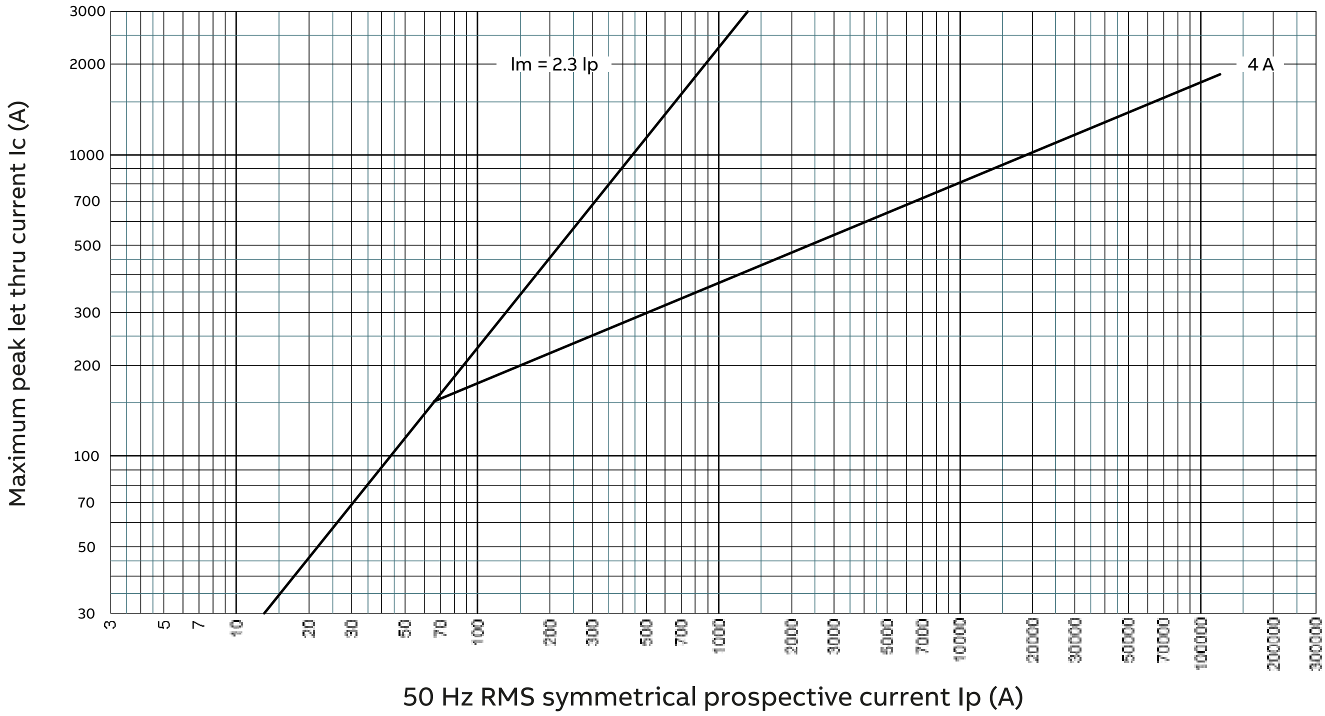


Protection and safety technical details

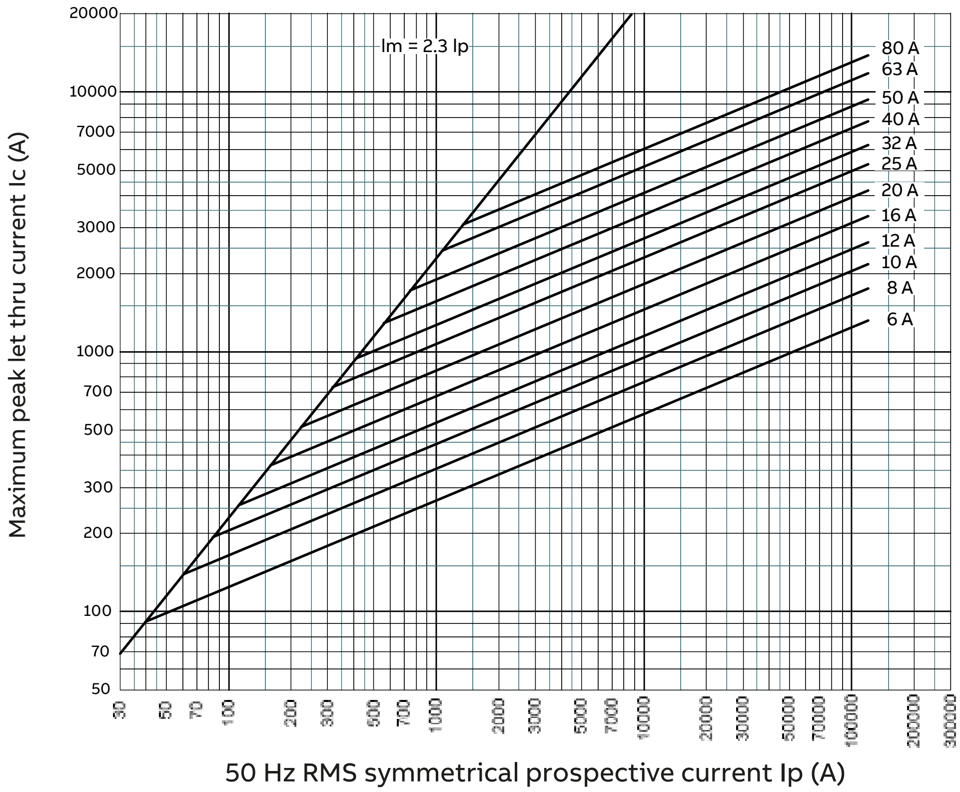
E9F fuses

Cut-off current characteristic

E9F 22 gG



E9F 22 gG

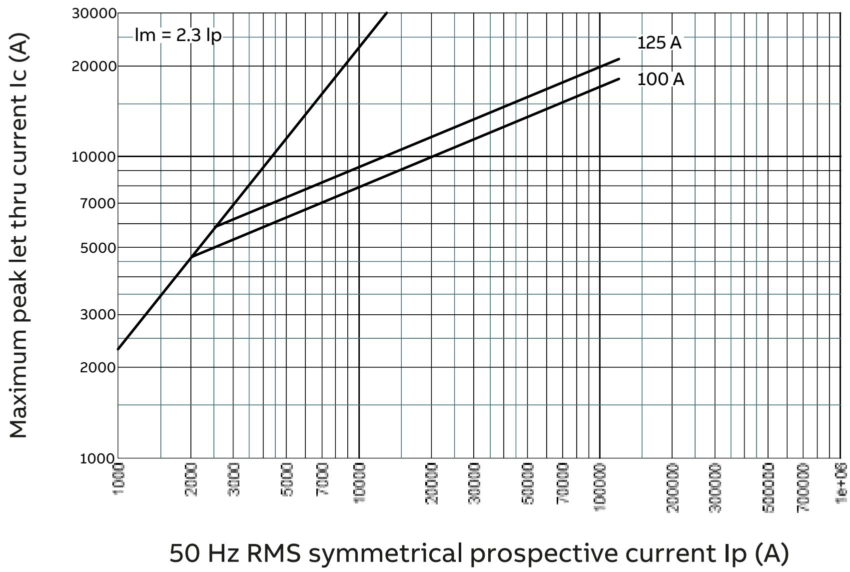


Protection and safety technical details

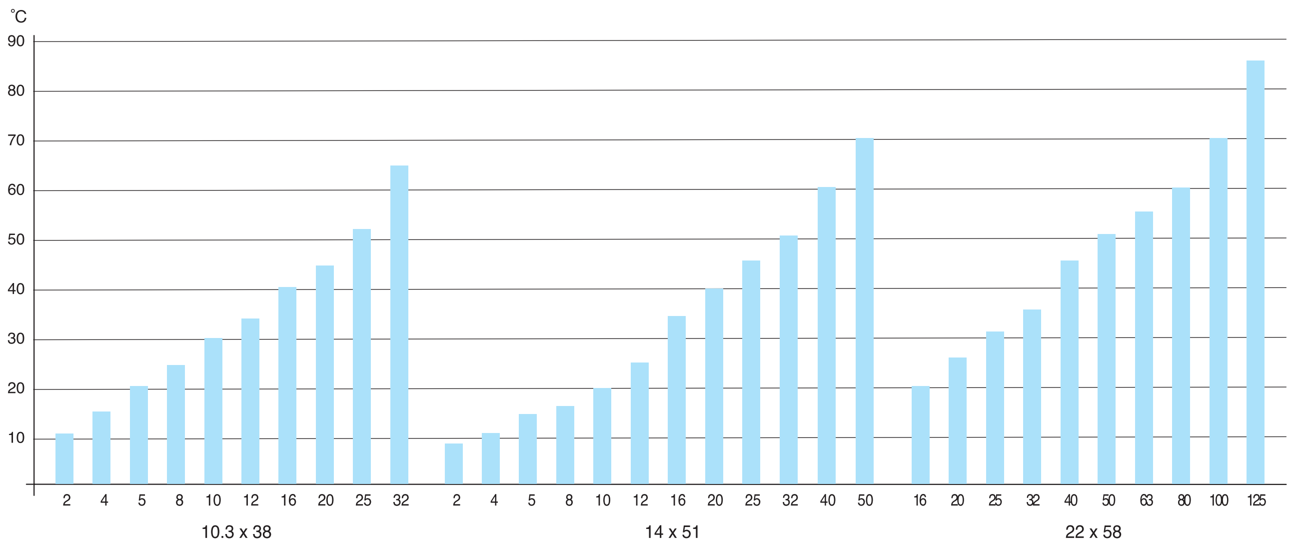
E9F fuses

Cut-off current characteristic

E9F 22 gG



E9F gG Temperature increase



Protection and safety technical details

E9F fuses

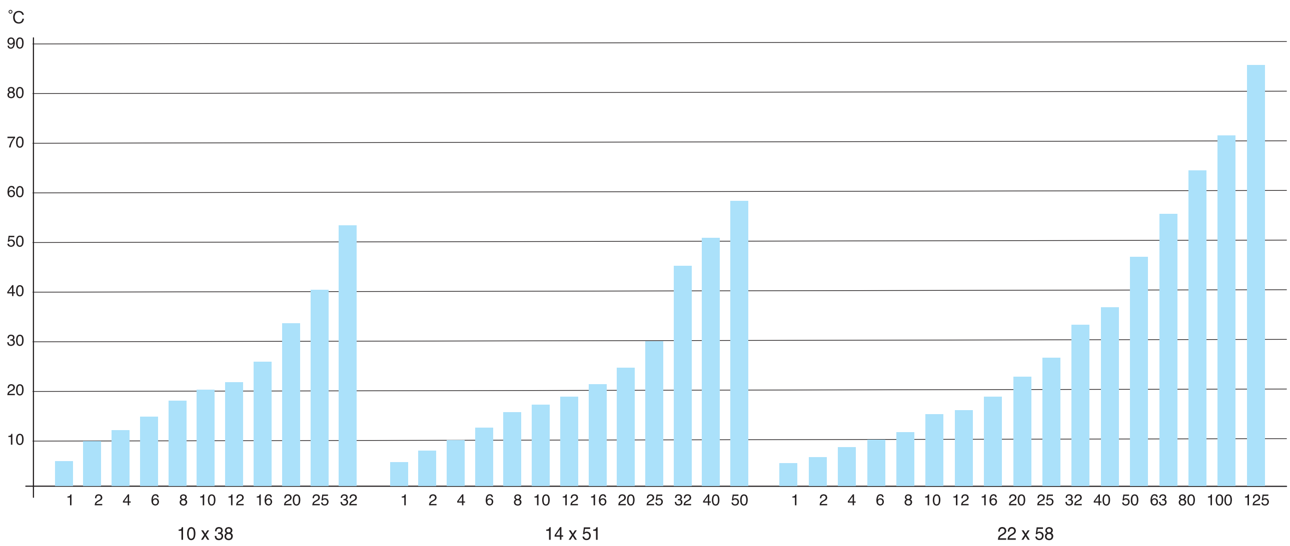
E9F aM

Power dissipation [W]

In [A]	E9F 8	E9F 10	E9F 14	E9F 22
	Size 8.5x31.5	Size 10.3x38	Size 14x51	Size 22x58
0.5	-	0.07 W	-	
1	0.09 W	0.1 W	0.13 W	-
2	0.15 W	0.14 W	0.18 W	-
4	0.26 W	0.28 W	0.28 W	-
6	0.35 W	0.38 W	0.42 W	0.45 W
8	0.47 W	0.55 W	0.55 W	0.6 W
10	0.55 W	0.62 W	0.65 W	0.75 W
12	-	0.82 W	0.75 W	0.85 W
16	-	0.87 W	1.05 W	1.15 W
20	-	1.05 W	1.3 W	1.35 W
25	-	**1.2 W**	1.55 W	1.7 W
32	-	1.8 W	2.05 W	2.2 W
40	-	-	2.65 W	2.7 W
45	-	-	2.85 W	-
50	-	-	**2.95 W**	3.6 W
63	-	-	-	4.8 W
80	-	-	-	6.2 W
100	-	-	-	**6.65 W**
125	-	-	-	9.9 W

It is important verify that the power dissipation by the fuse does not exceed the limit allowed by the fuse it is hosted.
In **bold** are shown the maximum values of power dissipation according to IEC EN 60269-2-1.

E9F aM Temperature increase (testing in superior contact)

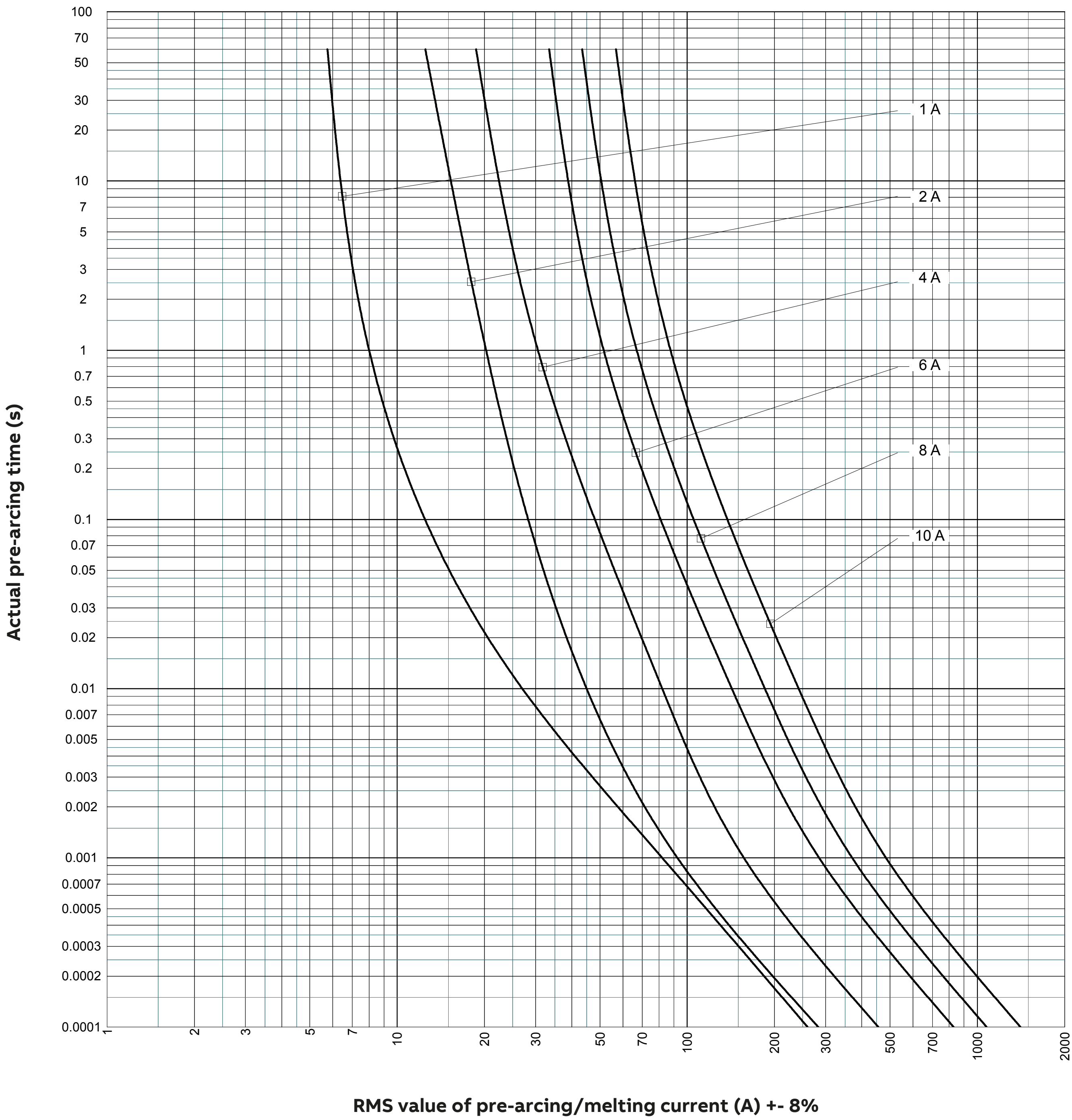


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 8 aM

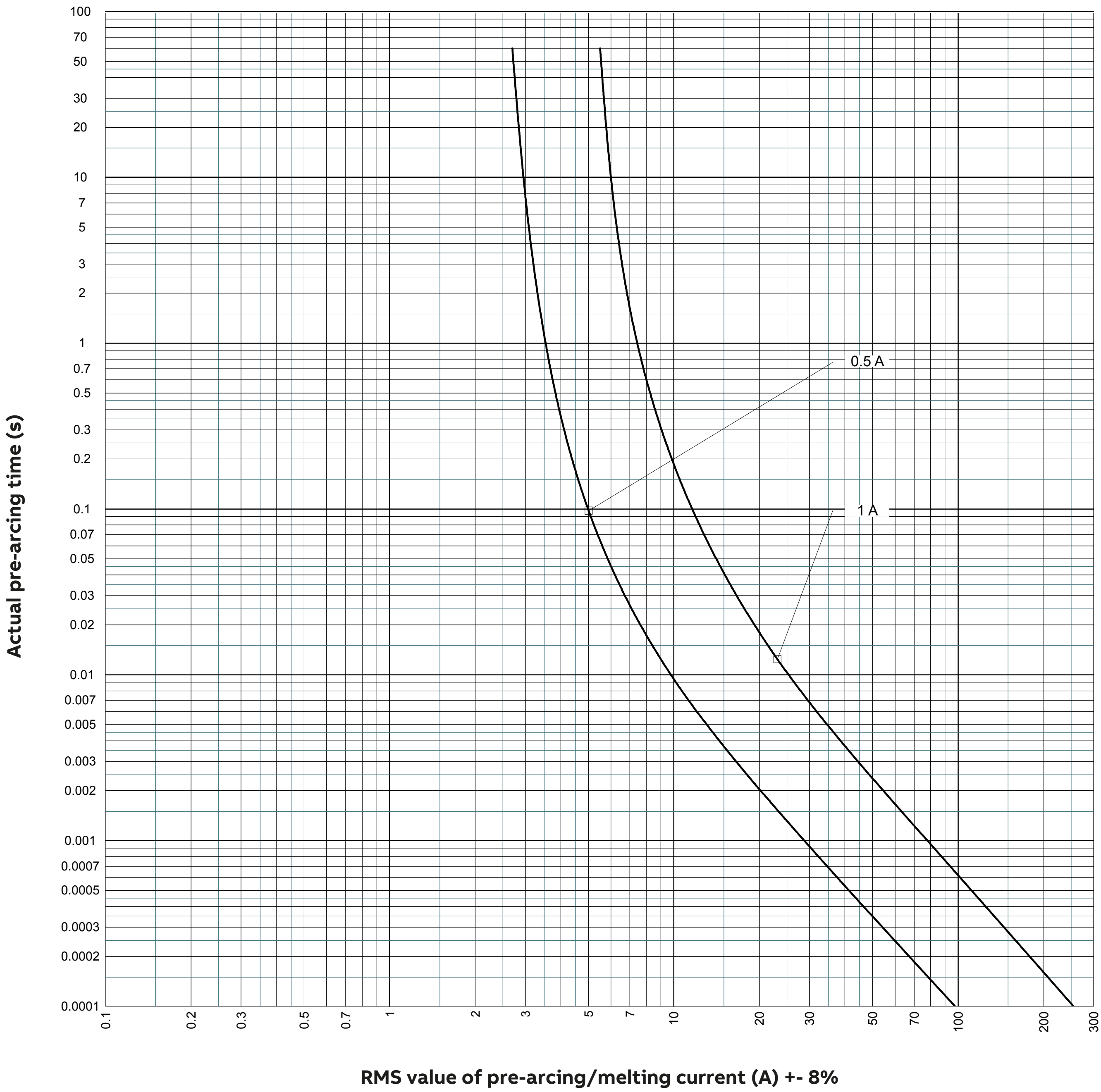


Protection and safety technical details

E9F fuses

Time current characteristic curves

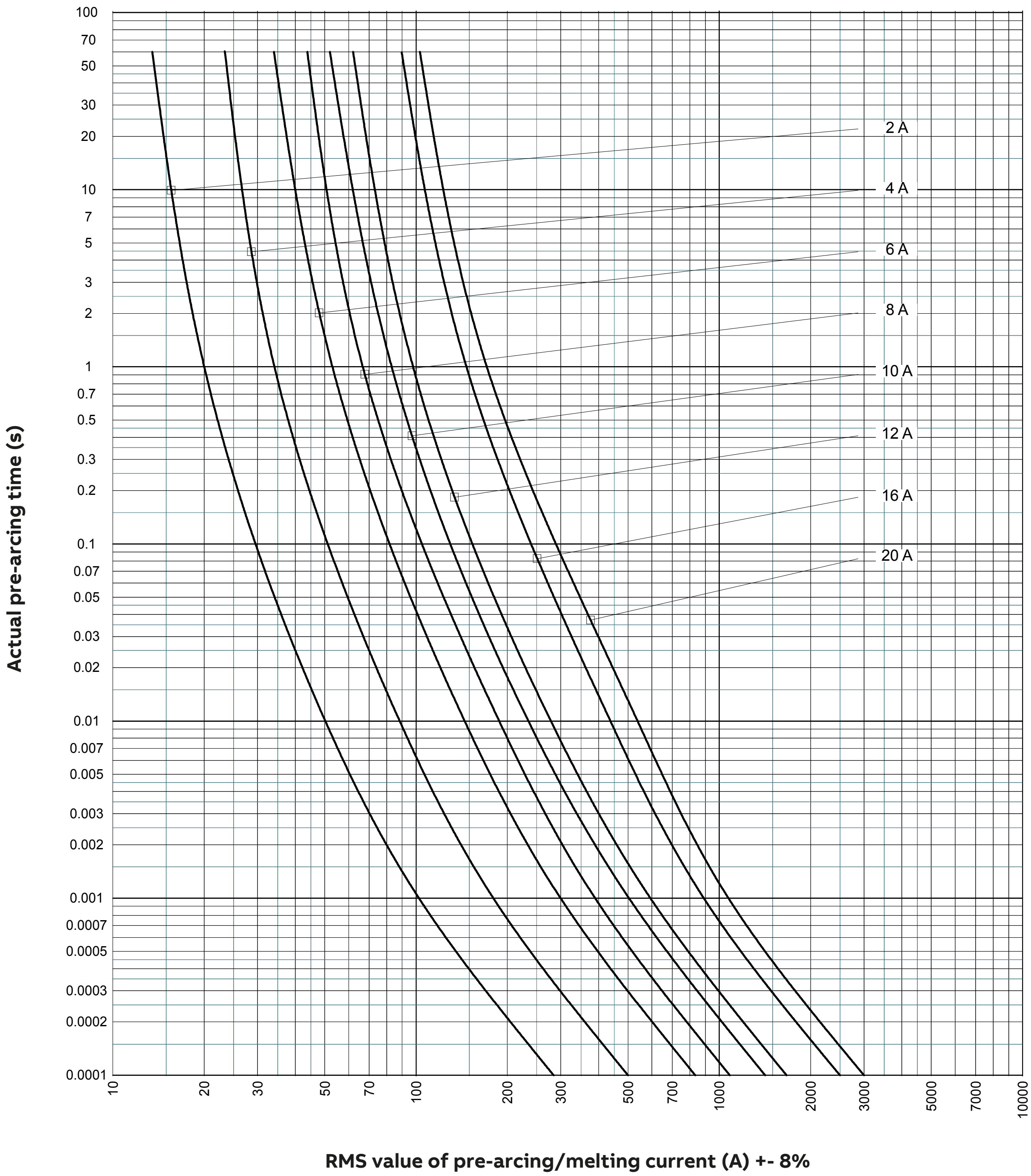
E9F 10 aM



Protection and safety technical details
E9F fuses

Time current characteristic curves

E9F 10 aM

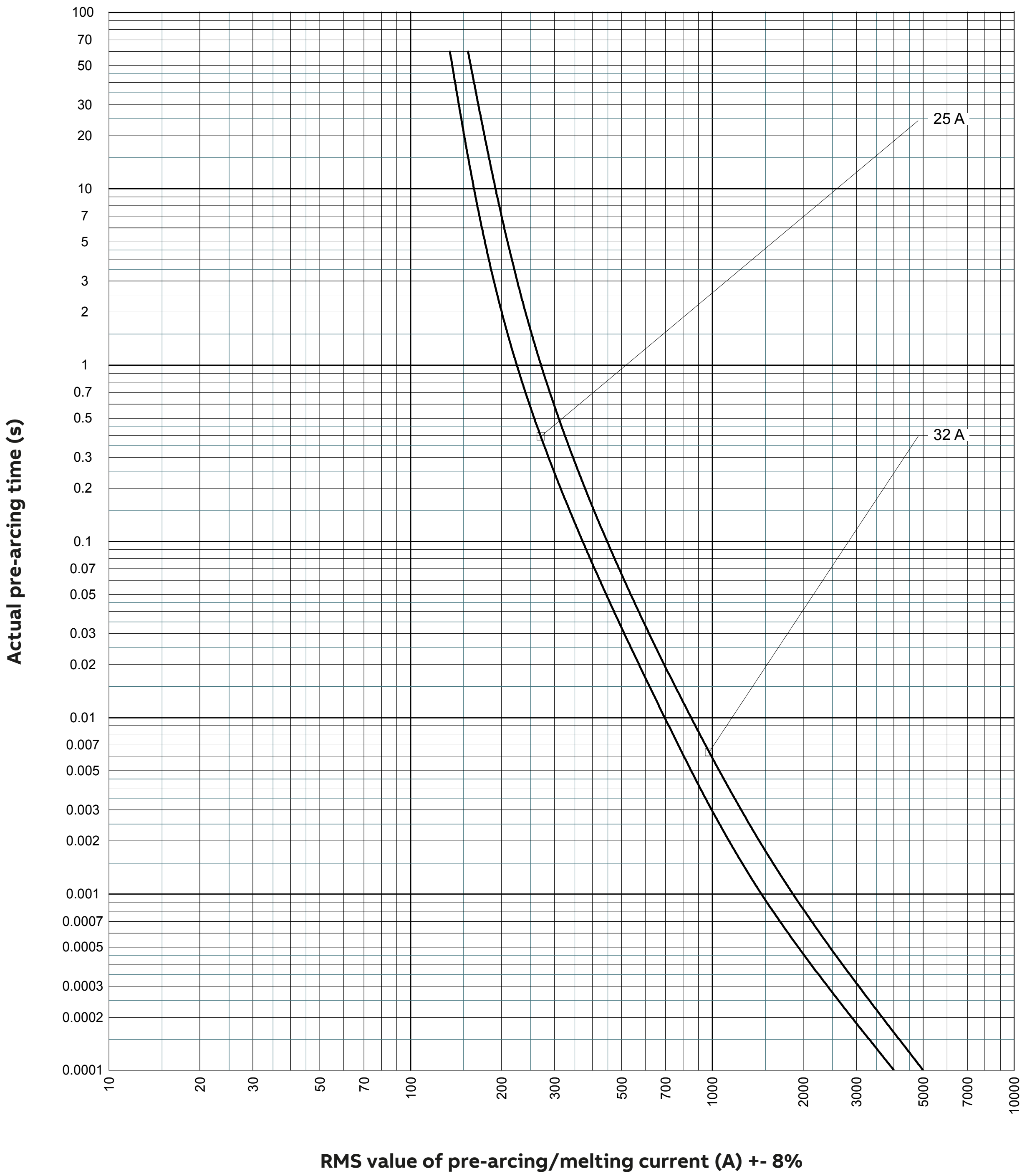


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 10 aM

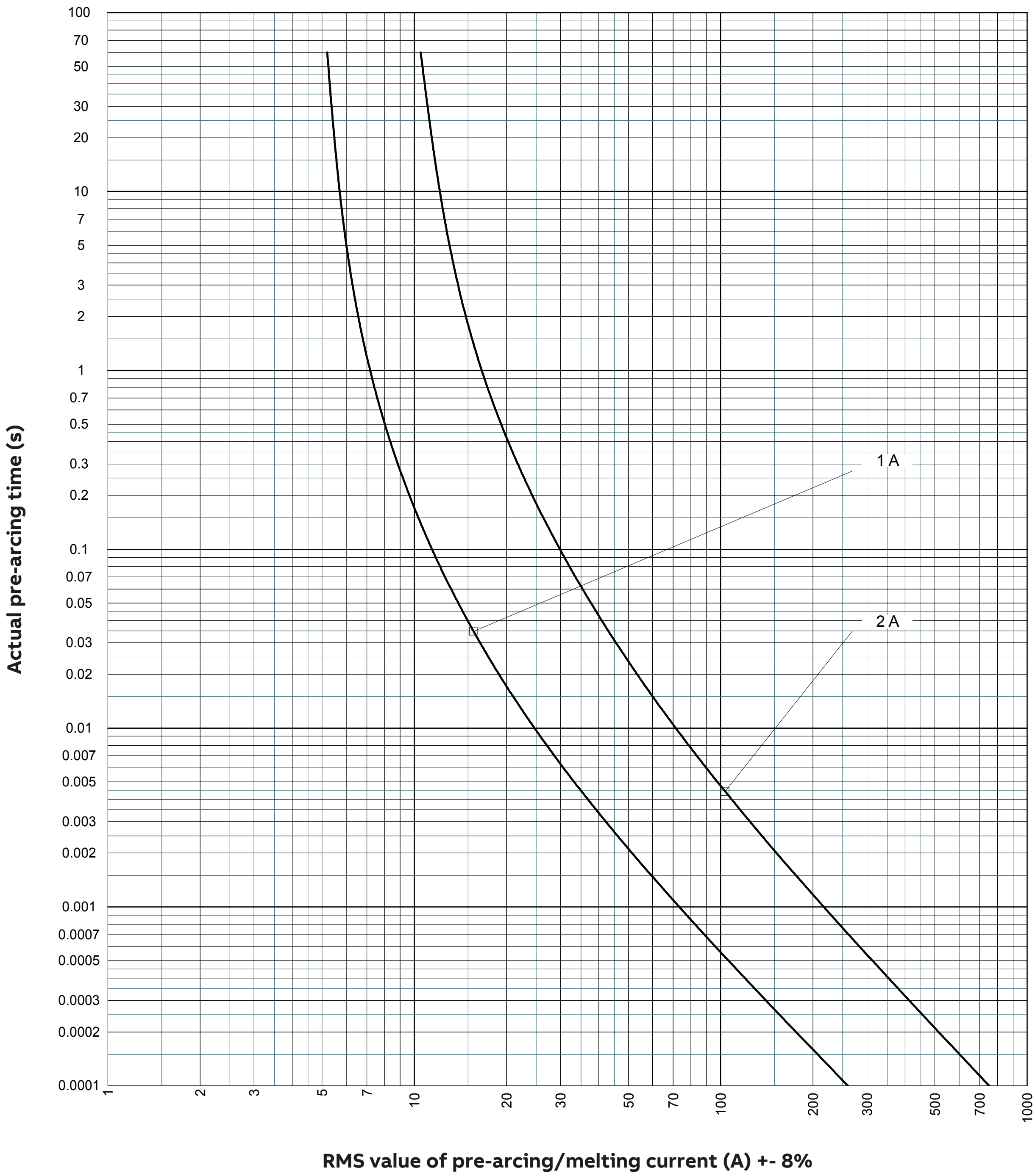


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 14 aM

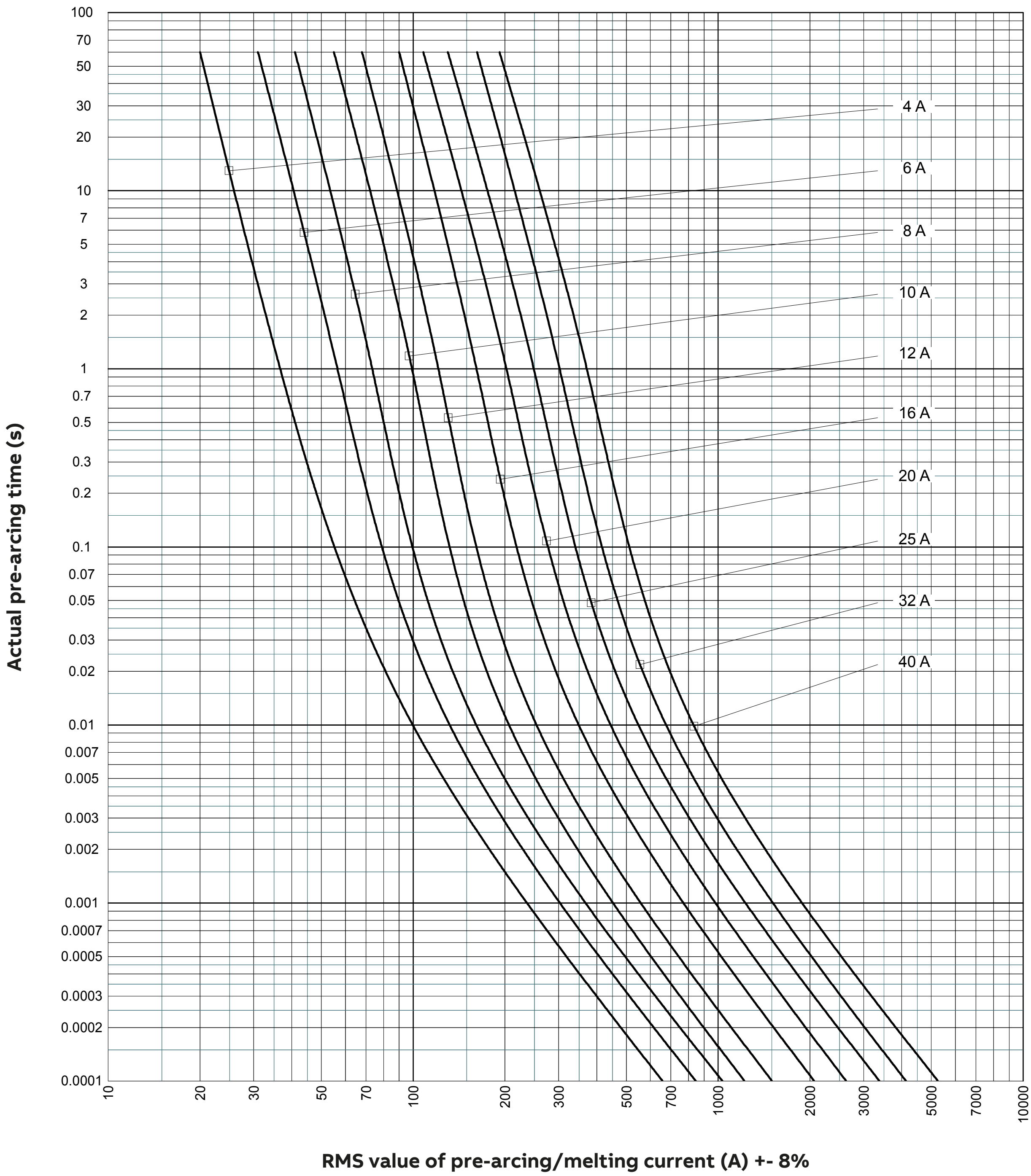


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 14 aM

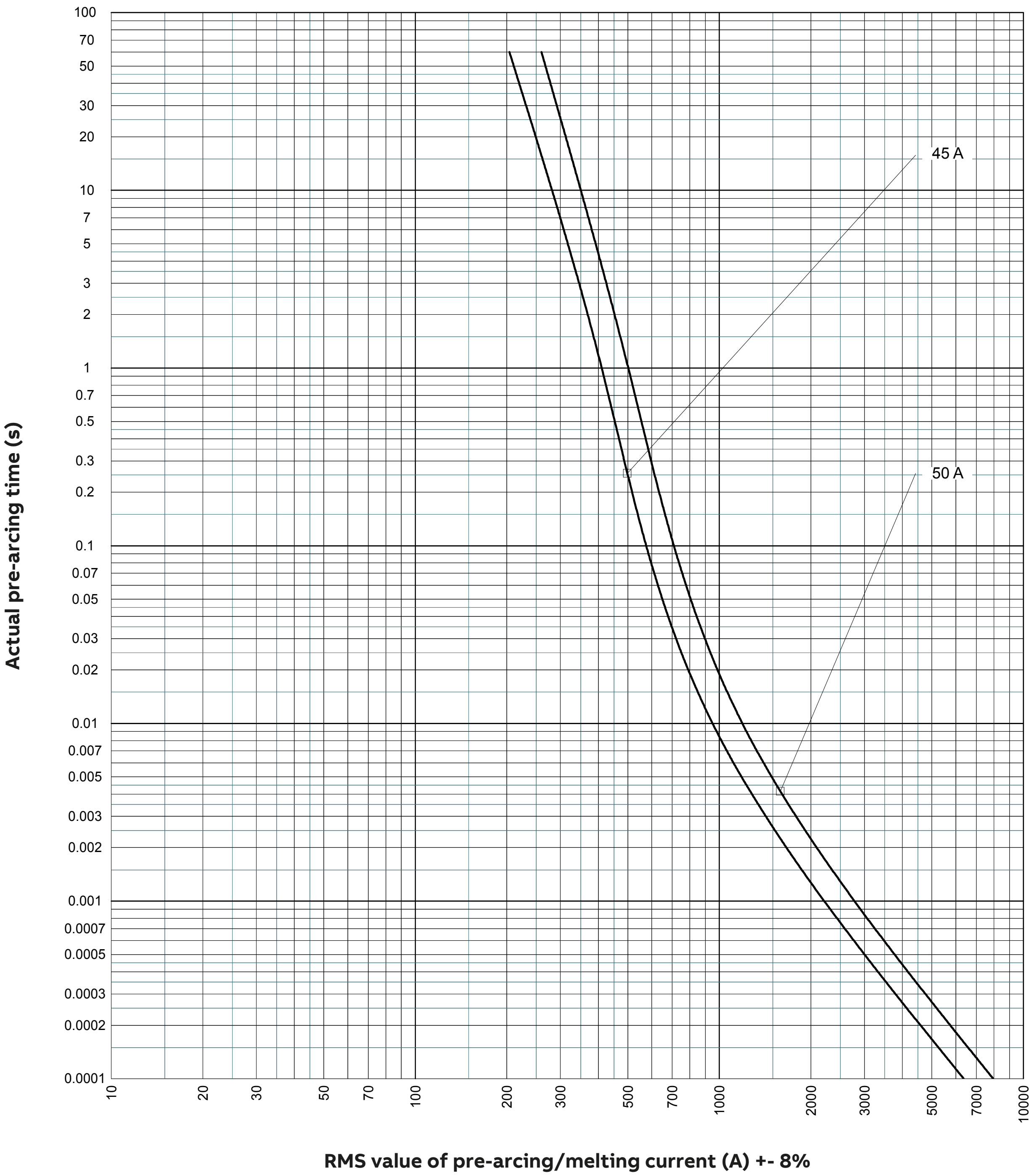


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F 14 aM

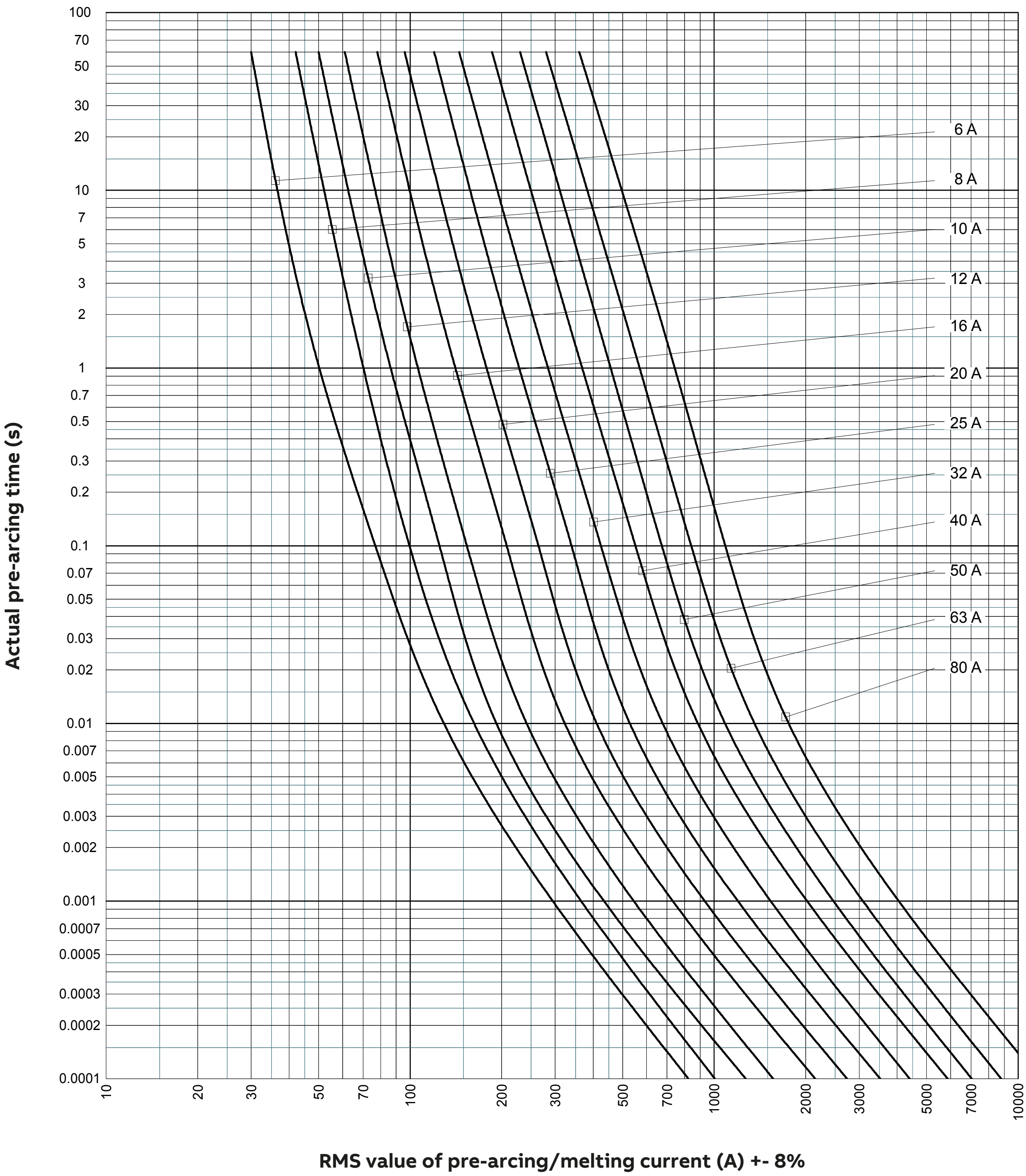


Protection and safety technical details

E9F fuses

Time current characteristic curves

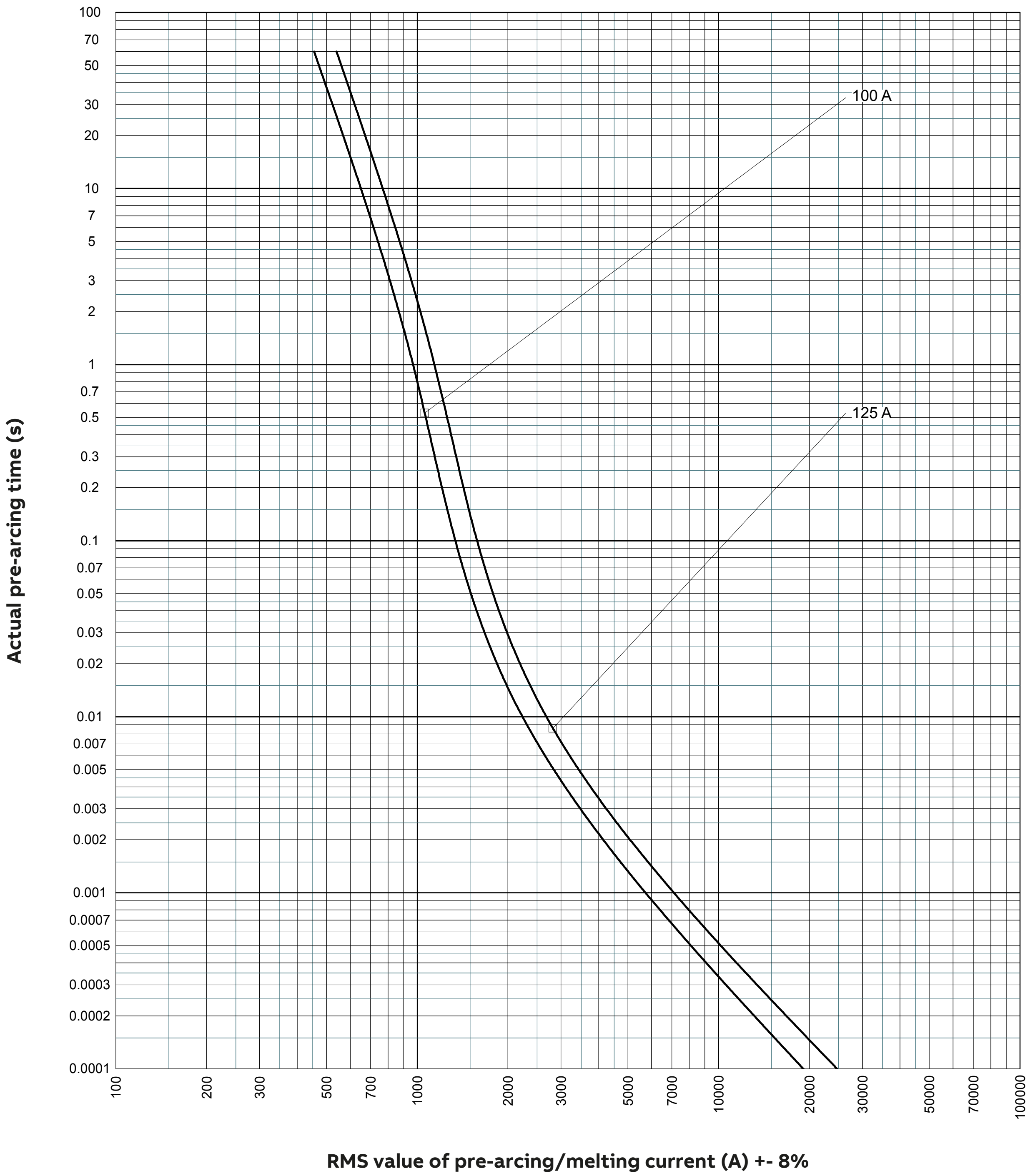
E9F 22 aM



Protection and safety technical details
E9F fuses

Time current characteristic curves

E9F 14 aM

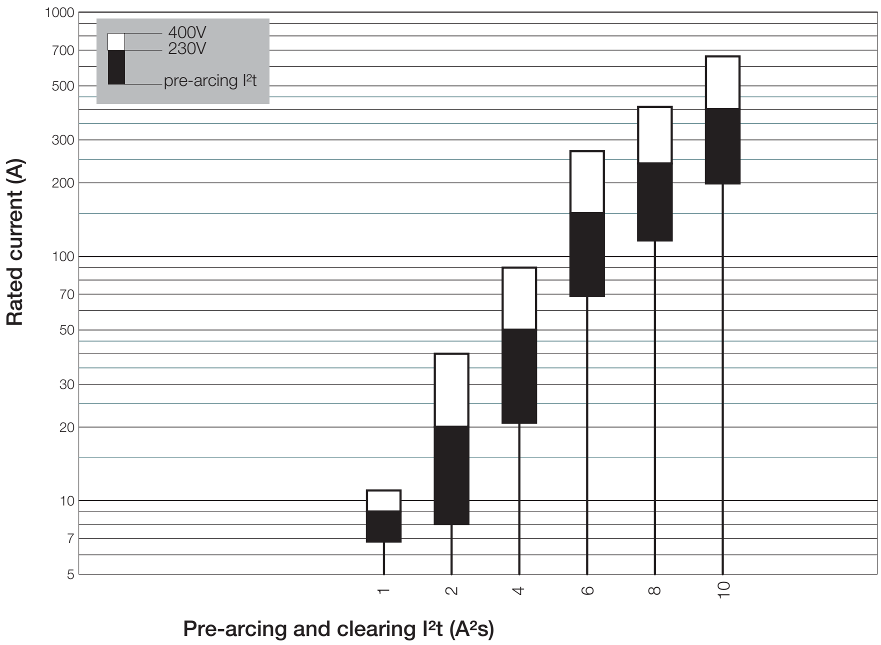


Protection and safety technical details

E9F fuses

Operating I^2T characteristics

E9F 8 aM

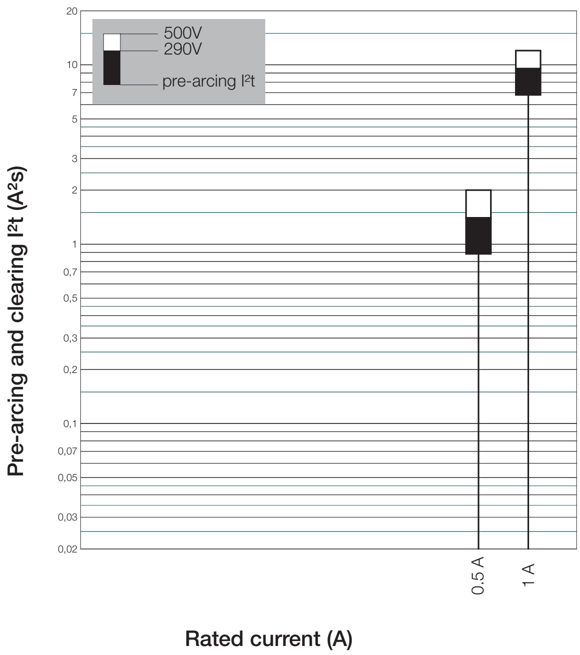


Protection and safety technical details

E9F fuses

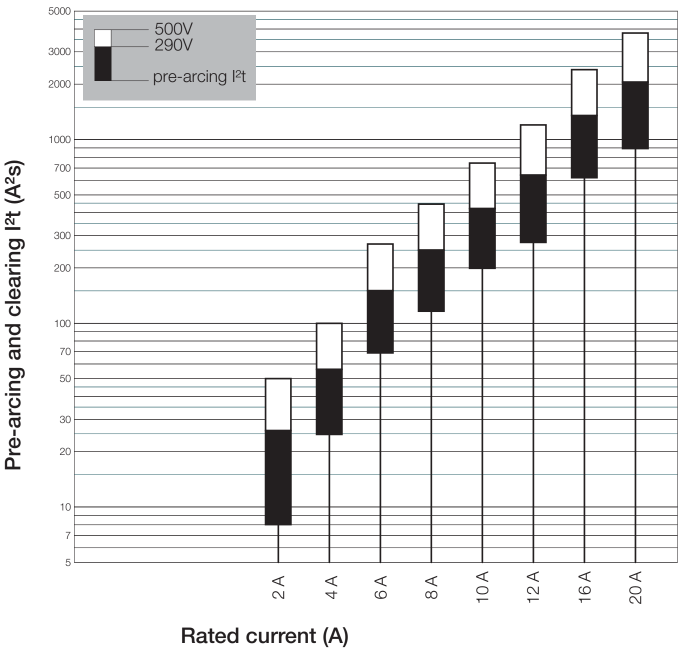
Operating I²T characteristics

E9F 10 aM

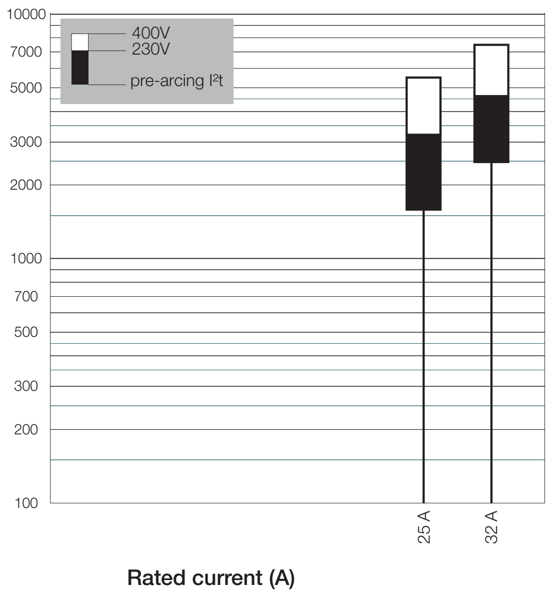


Operating I²T characteristics

E9F 10 aM



E9F 10 aM

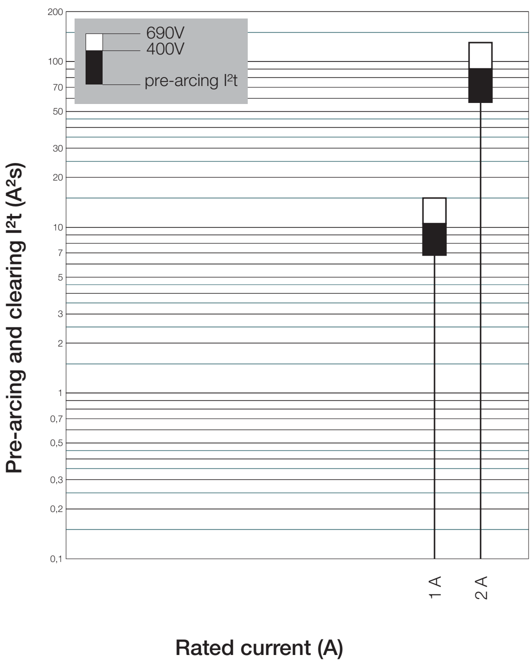


Protection and safety technical details

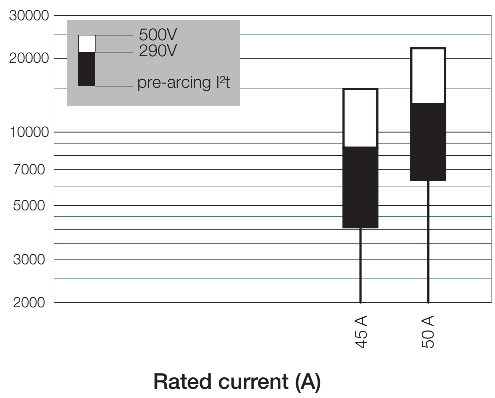
E9F fuses

Operating I²T characteristics

E9F 14 aM

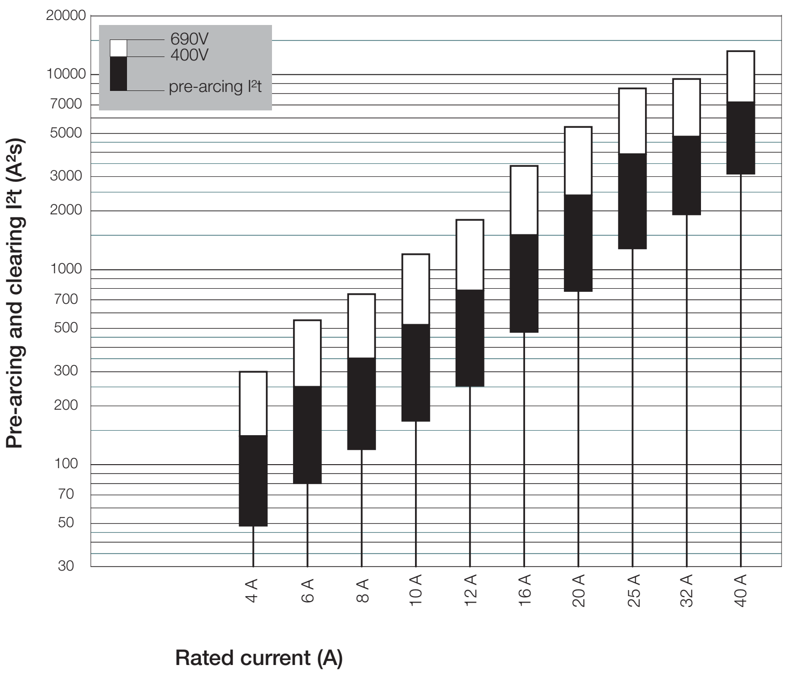


E9F 14 aM



Operating I²T characteristics

E9F 14 aM

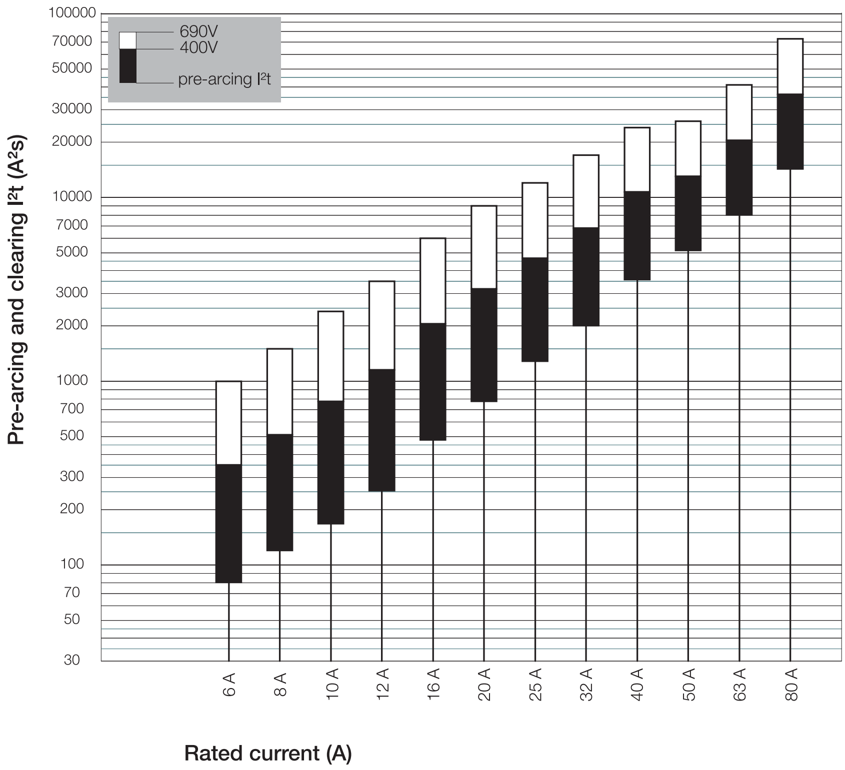


Protection and safety technical details

E9F fuses

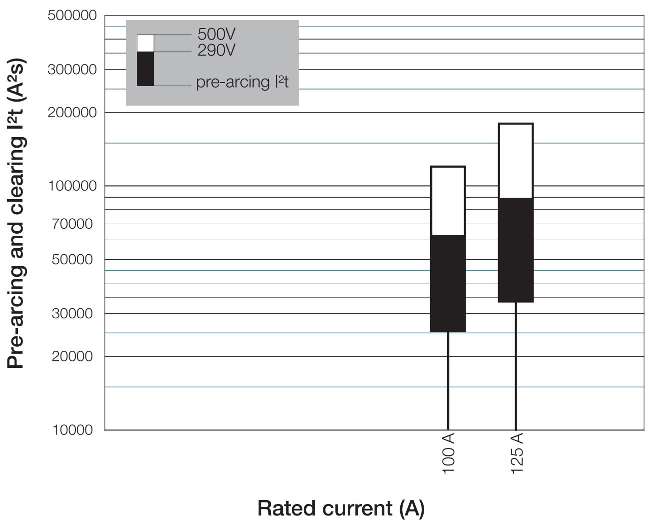
Operating I²T characteristics

E9F 22 aM



Operating I²T characteristics

E9F 22 aM

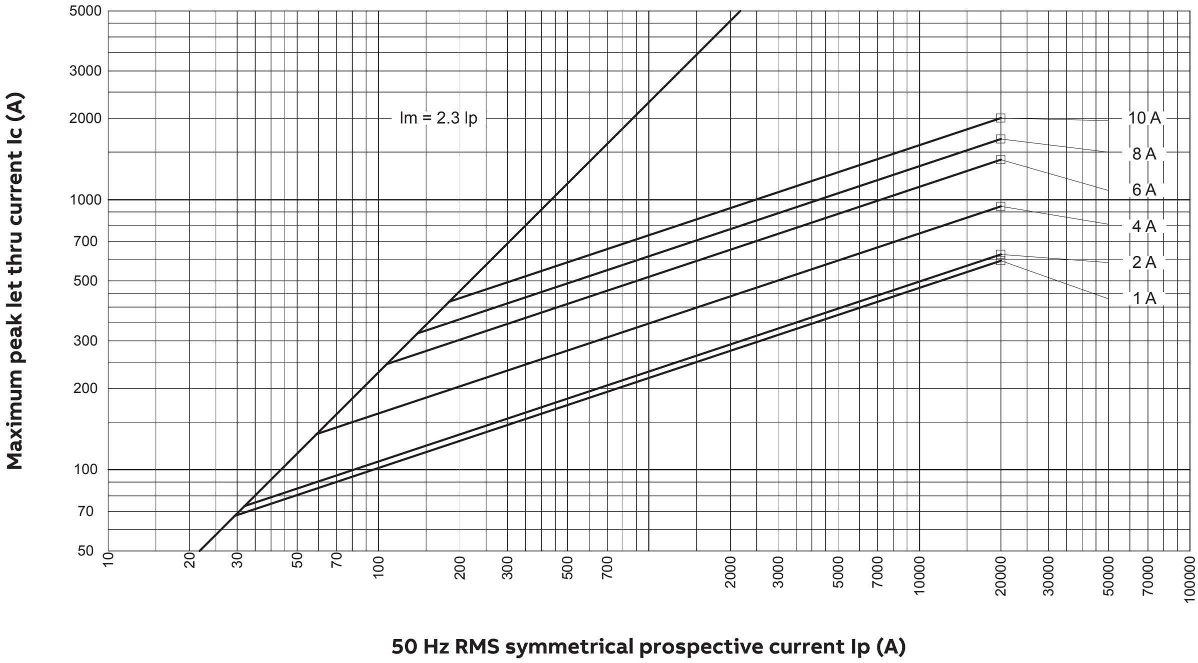


Protection and safety technical details

E9F fuses

Cut-off current characteristic

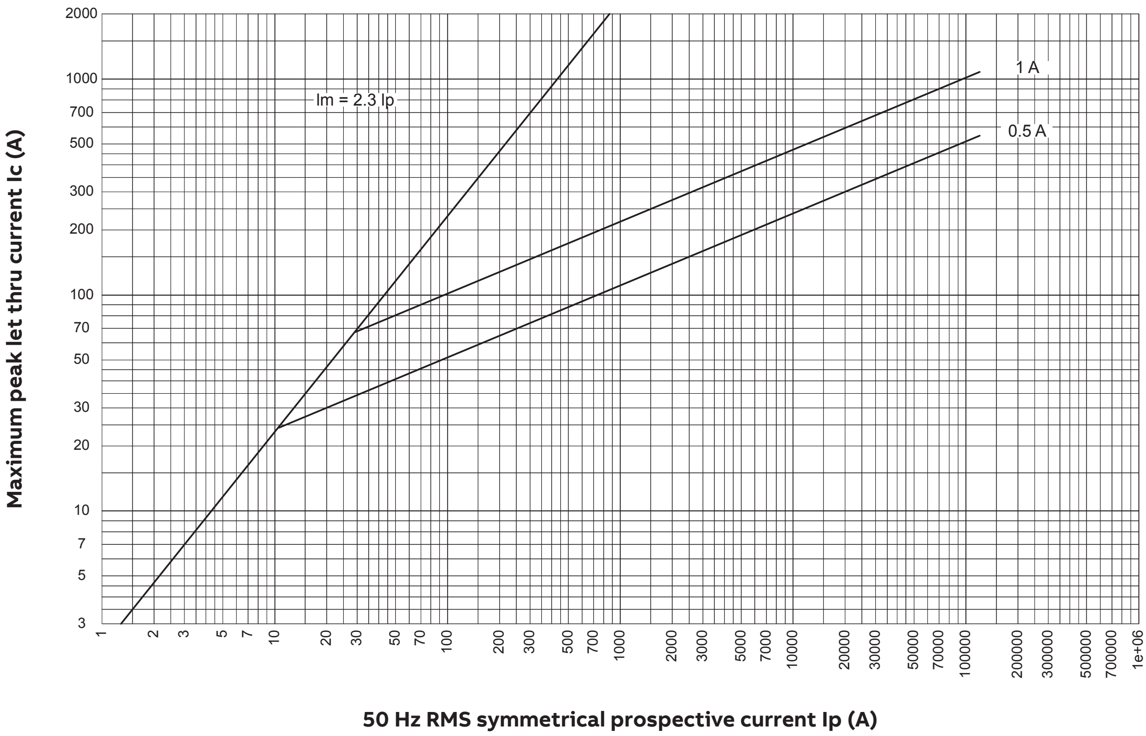
E9F 8 aM



Protection and safety technical details
E9F fuses

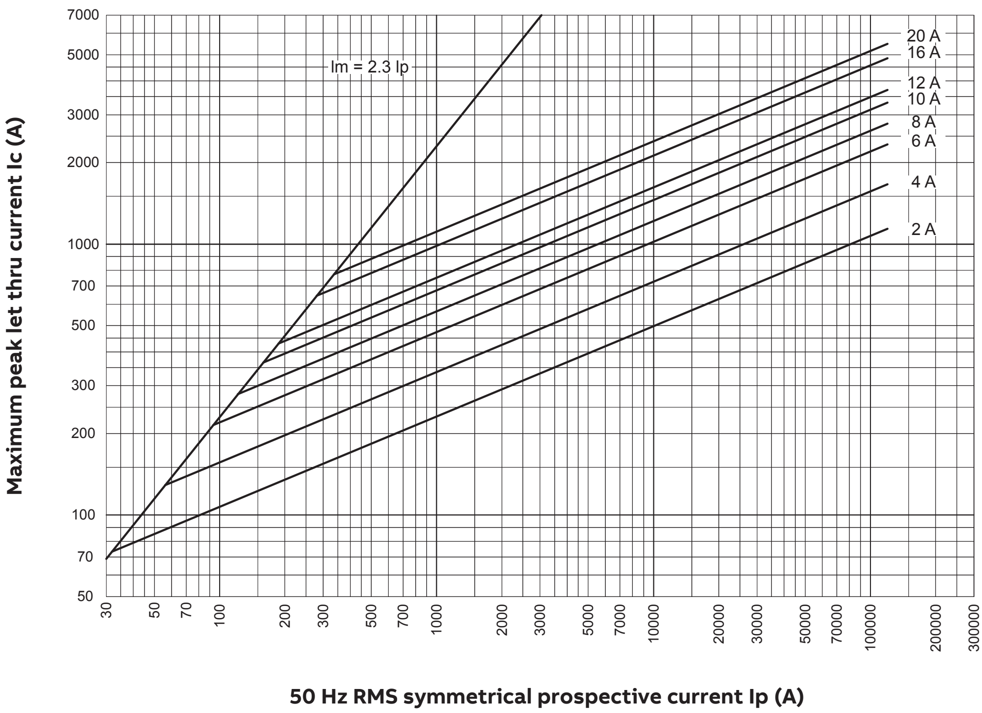
Cut-off current characteristic

E9F 10 aM



Cut-off current characteristic

E9F 10 aM

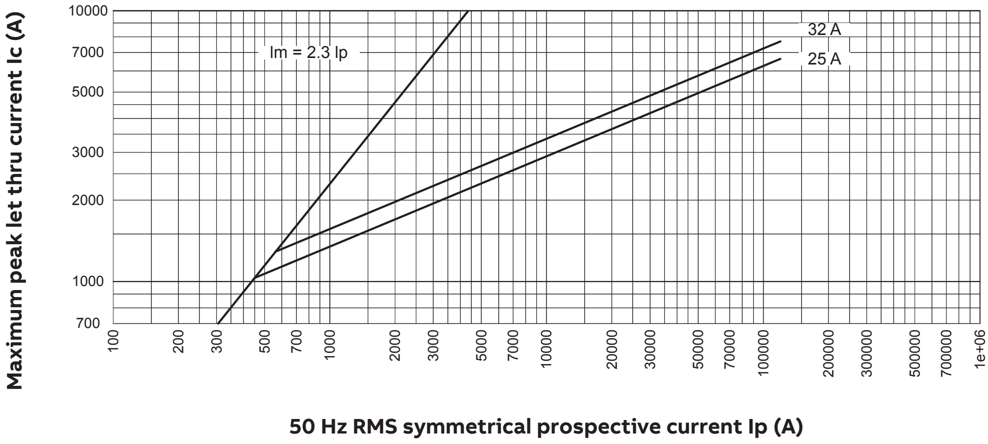


Protection and safety technical details

E9F fuses

Cut-off current characteristic

E9F 10 aM

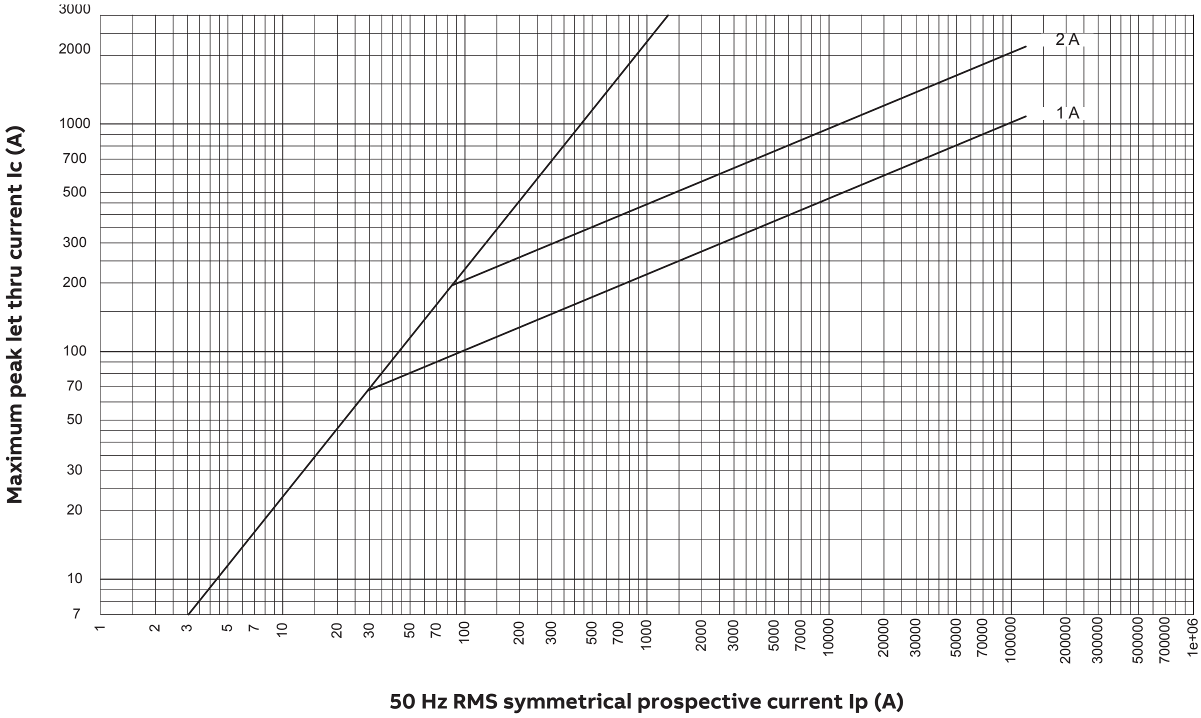


Protection and safety technical details

E9F fuses

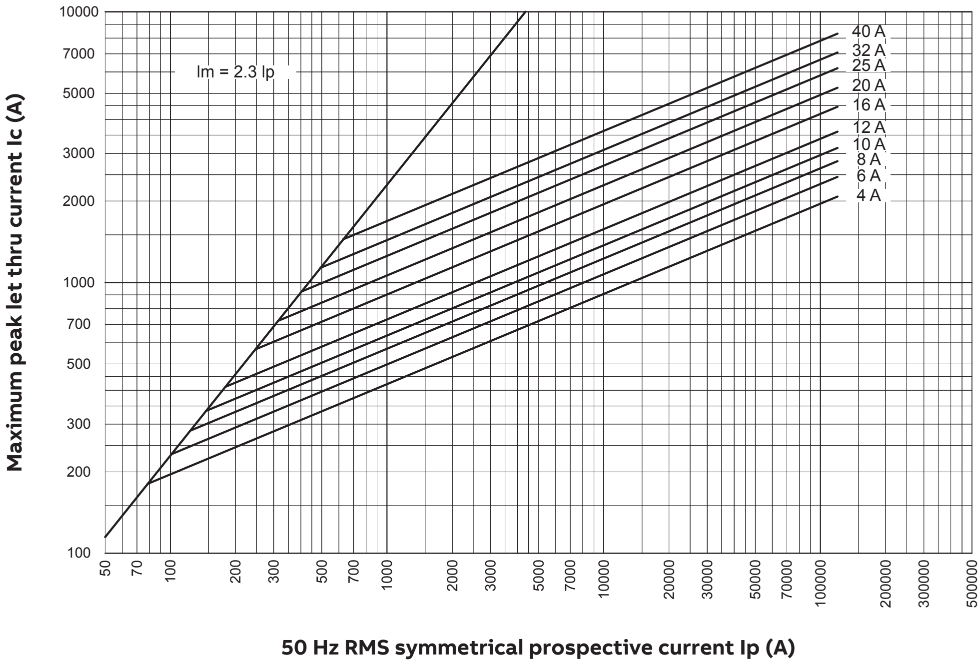
Cut-off current characteristic

E9F 14 aM



Cut-off current characteristic

E9F 14 aM

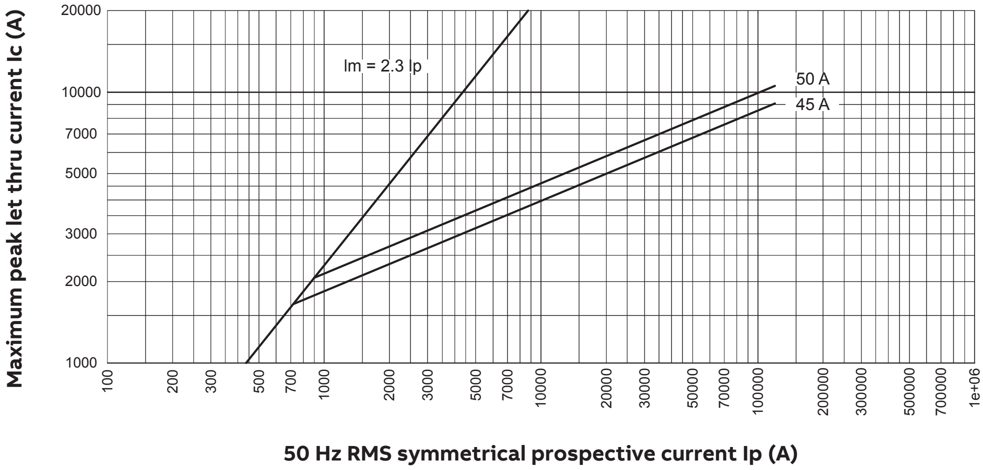


Protection and safety technical details

E9F fuses

Cut-off current characteristic

E9F 14 aM

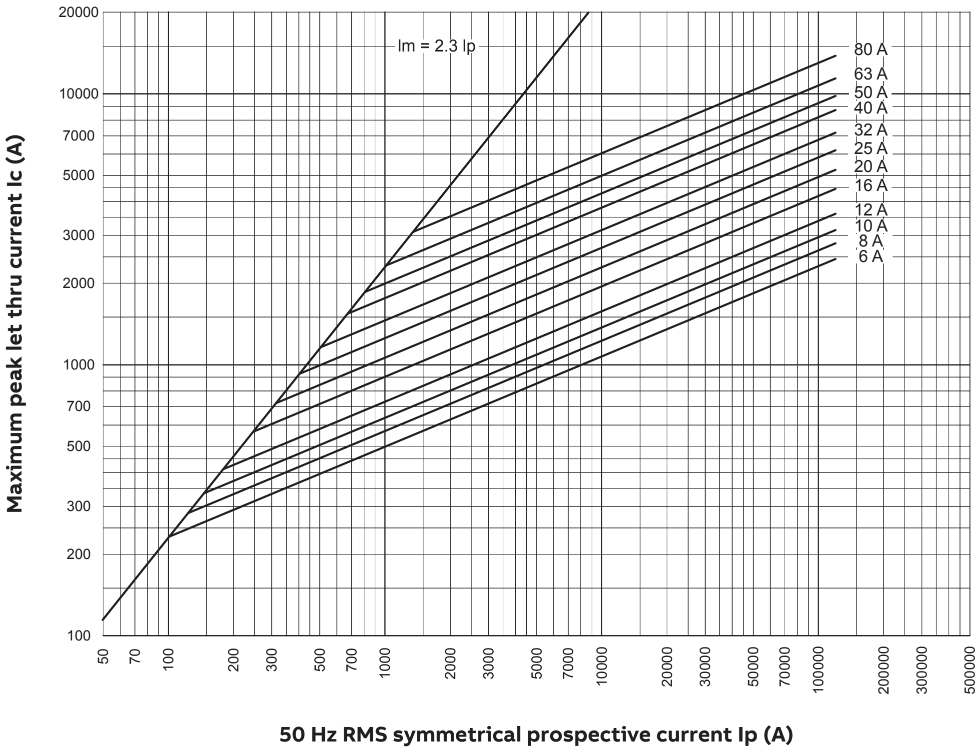


Protection and safety technical details

E9F fuses

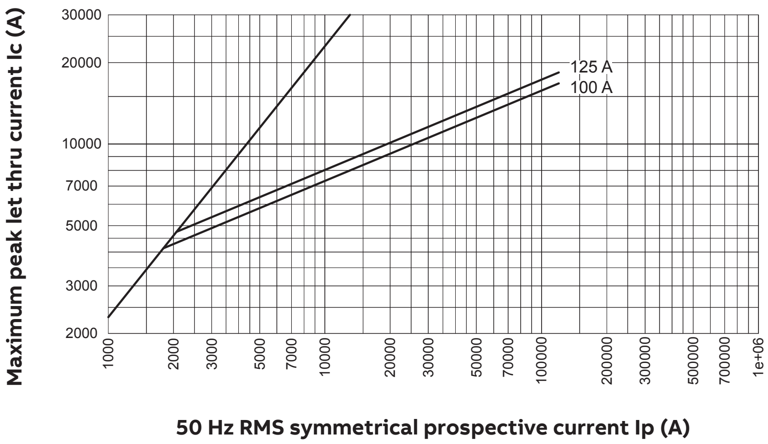
Cut-off current characteristic

E9F 22 aM



Cut-off current characteristic

E9F 22 aM



Protection and safety technical details

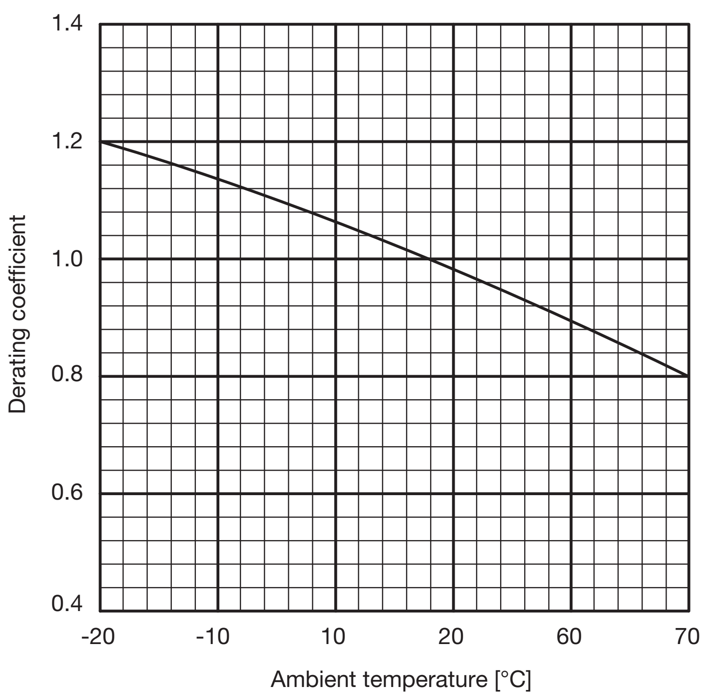
E9F fuses

E9F gPV 1000 V DC 10.3 x 38 mm cylindrical fuses

Type	Rated current [A]	Dissipated power 0.7 In [W]	Dissipated power 0.8 In [W]	Dissipated power In [W]
E9F1 PV	1	0.125	0.175	0.250
E9F2 PV	2	0.160	0.250	0.320
E9F3 PV	3	0.66	0.87	1.36
E9F4 PV	4	0.69	0.8	1.25
E9F5 PV	5	0.59	0.73	1.12
E9F6 PV	6	0.42	0.67	1.05
E9F7 PV	7	0.40	0.64	1.0
E9F8 PV	8	0.77	0.88	1.48
E9F10 PV	10	0.67	0.90	1.5
E9F12 PV	12	0.72	1.0	1.8
E9F15 PV	15	0.9	1.3	2.2
E9F20 PV	20	1.1	1.5	2.8
E9F25 PV	25	1.3	1.8	3.0
E9F30 PV	30	1.5	1.9	3.7

The power dissipation of the fuse cannot exceed the maximum power dissipation accepted by the fuseholder

Derating in combination with ambient temperature

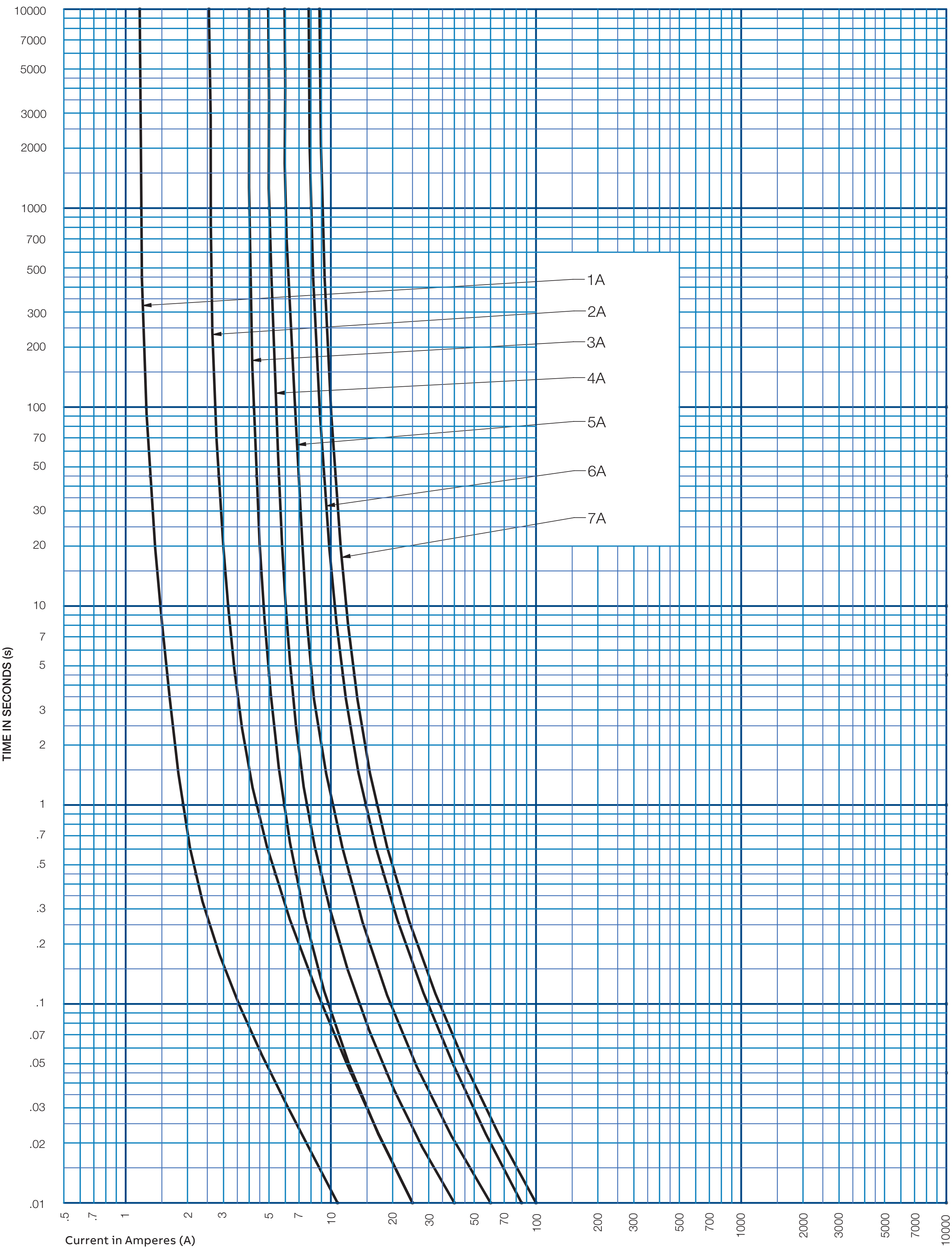


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F gPV 1000 V DC

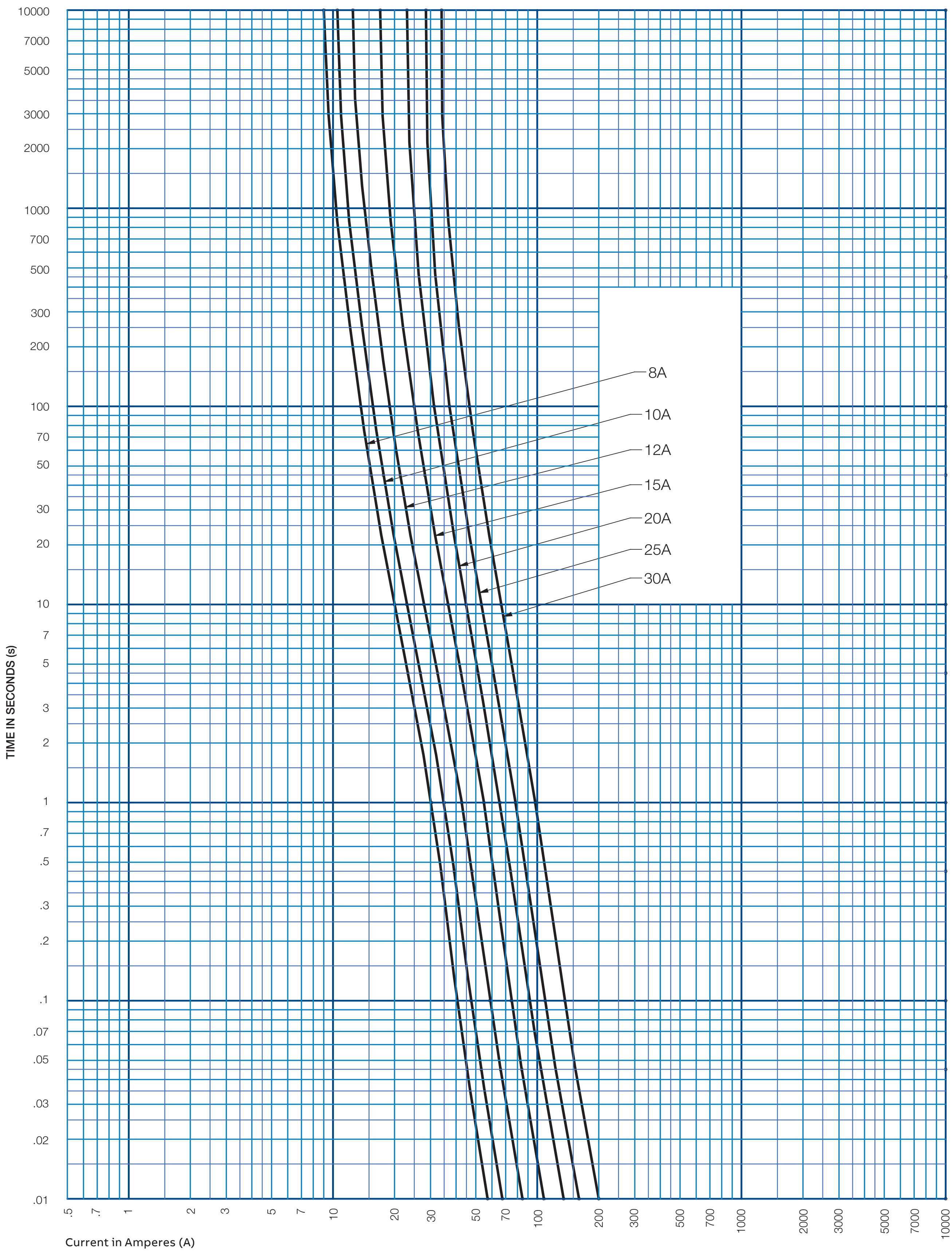


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F gPV 1000 V DC



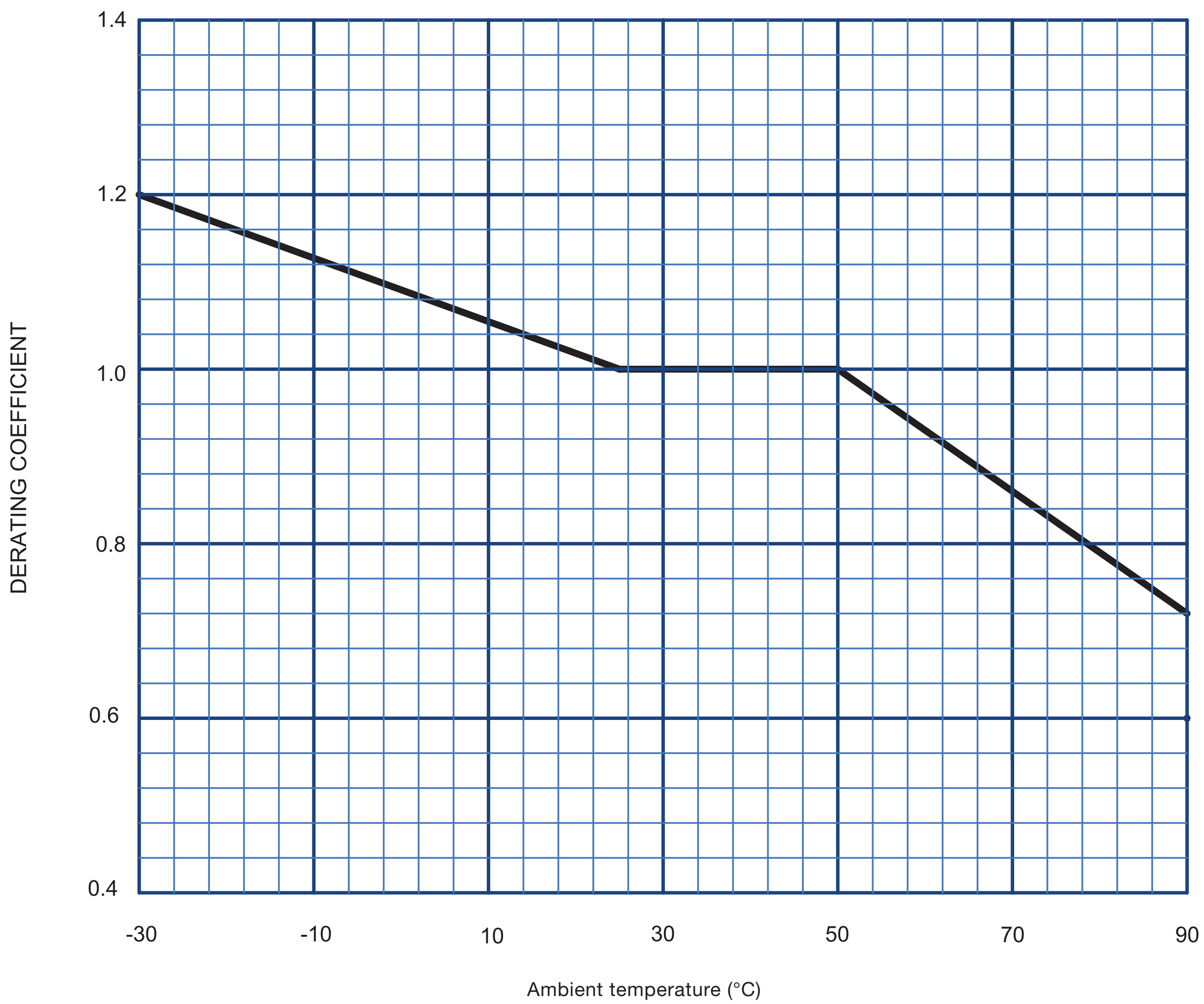
Protection and safety technical details

E9F fuses

E9F gPV 1500 V DC 10 x 85 mm cylindrical fuses

Type	Rated current In [A]	Power dissipation at 0.7xIn [W]	Power dissipation at 0.8xIn [W]	Power dissipation at 1.0xIn [W]
E9F4 PV1500	4	0.84	1.16	1.97
E9F5 PV1500	5	0.84	1.16	1.97
E9F6 PV1500	6	0.97	1.37	2.42
E9F7 PV1500	7	0.97	1.37	2.43
E9F8 PV1500	8	1.04	1.50	2.60
E9F10 PV1500	10	1.23	1.77	3.09
E9F12 PV1500	12	1.15	1.70	2.89
E9F15 PV1500	15	1.39	1.91	3.48
E9F20 PV1500	20	1.71	2.47	4.28
E9F25 PV1500	25	2.13	3.08	5.35
E9F30 PV1500	30	2.56	3.61	6.40
E9F32 PV1500	32	2.56	3.61	6.40

Ampere rating vs. Ambient temperature

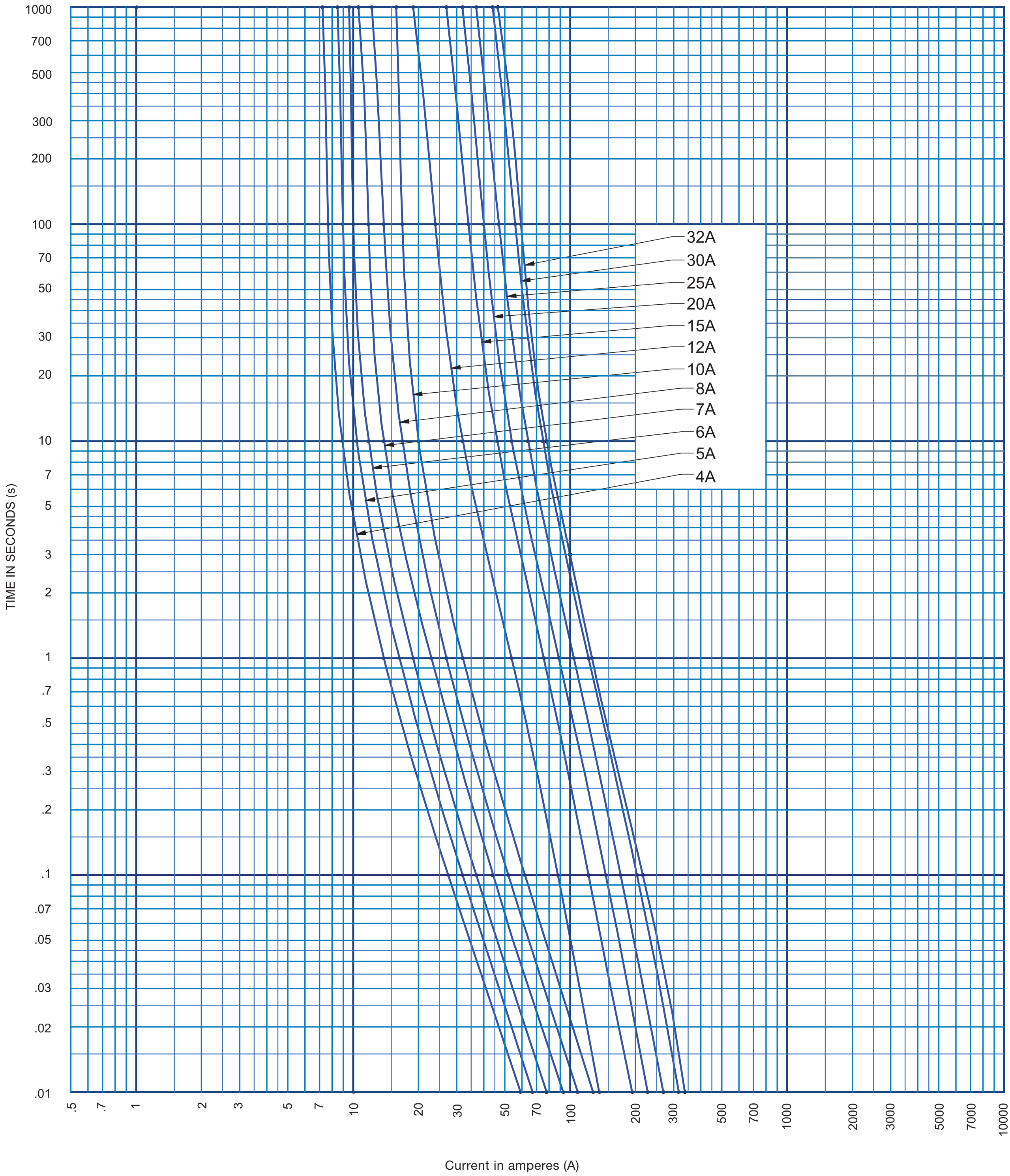


Protection and safety technical details

E9F fuses

Time current characteristic curves

E9F gPV 1500 V DC

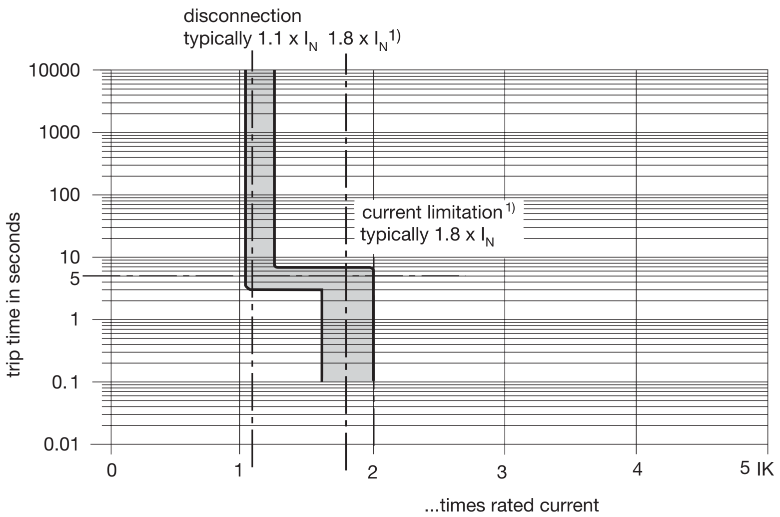


Protection and safety technical details

EPD 24-TB-101

EPD 24

Time/Current characteristic curve (TU = 25 °C)
The trip time is typically 3 s in the range between 1.1 and 1.8 x IN1).
Electronic current limitation occurs at typically 1.8 x IN1) which means that under all overload conditions (independent of the power supply and the resistance of the load circuit) the max. overload before disconnection will not exceed 1.8 x IN1) times the current rating. Trip time is between 100 ms and 3 sec (depending on overload or at short circuit).
Without this current limitation a considerably higher overload current would flow in the event of an overload or short circuit.



1) Current limitation typically 1.8 x I_N at I_N = 0.5 A...6 A
Current limitation typically 1.5 x I_N at I_N = 8 A or 10 A
Current limitation typically 1.3 x I_N at I_N = 12 A

Maximum cable lenghts
EPD24 reliably trips from 0 Ω up to max. circuit resistance Rmax.

Calculation of Rmax		
Selected rating IN (A)	3	6
Operating voltage US (V DC) (= 80 % of 24 V) 2)	19.2	19.2
Trip current Iab = 1.25 x IN (A) (EPD24 trips after 3 s)	3.75	7.50
Rmax (Ω) = (UB/Iab) -0.050	5.07	2.51

2) Voltage drop of EPD24 and tolerance of trip point (typically 1.1 x IN = 1.05 ... 1.35 x IN) have been taken into account

Protection and safety technical details

EPD 24-TB-101

Selection table for the incoming cable lengths with different cable cross-sections

Cable cross section A (mm²)	**0.14**	**0.25**	**0.34**	**0.5**	**0.75**	**1.00**	**1.50**
Cable length L (m) (= single length)	cable resistance (Ω) = (ρ_0 x 2 x L) / A 3)						
5	1.27	0.71	0.52	0.36	0.24	0.18	0.12
10	2.54	1.42	1.05	0.71	0.47	0.36	0.24
15	3.81	2.14	1.57	1.07	0.71	0.53	0.36
20	5.09	2.85	2.09	1.42	0.95	0.71	0.47
25	6.36	3.56	2.62	1.78	1.19	0.89	0.59
30	7.63	4.27	3.14	2.14	1.42	1.07	0.71
35	8.90	4.98	3.66	2.49	1.66	1.25	0.83
40	10.17	5.70	4.19	2.85	1.90	1.42	0.95
45	11.44	6.41	4.71	3.20	2.14	1.60	1.07
50	12.71	7.12	5.24	3.56	2.37	1.78	1.19
75	19.07	10.68	7.85	5.34	3.56	2.67	1.78
100	25.34	14.24	10.47	7.12	4.75	3.56	2.37
125	31.79	17.80	13.09	8.90	5.93	4.45	2.97
150	38.14	21.36	15.71	10.68	7.12	5.34	3.56
175	44.50	24.92	18.32	12.46	8.31	6.23	4.15
200	50.86	28.48	20.94	14.24	9.49	7.12	4.75
225	57.21	32.04	23.56	16.02	10.68	8.01	5.34
250	63.57	35.60	26.18	17.80	11.87	8.90	5.93

3) Resistivity of copper r0 = 0.0178 (Ω x mm2)/m

Example 1: max. length for 1.5 mm² and 3 A: 214 m
Example 2: max. length for 1.5 mm² and 6 A: 106 m
Example 3: mixed wiring: (Control cabinet --- sensor/actuator level)
R1 = 40 m for 1.5 mm² and R2 = 5 m for 0.25 mm²:
R1 = 0.95 Ω, R2 = 0.71 Ω, total (R1 + R2) = 1.66 Ω

Please note

The user should ensure that the cable cross sections of the relevant load circuit are suitable for the current rating of the EPD24 used.
Automatic start-up of machinery after shut down must be prevented (Machinery Directive 98/37/EG and EN 60204-1).
In the event of a short circuit or overload the load circuit will be disconnected electronically by the EPD24.

Protection and safety technical details

EPD 24-TB-101

Information on UL approvals/CSA approvals

UL1604

Operating Temperature Code T5
- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only

WARNING:
- Exposure to some chemicals may degrade the sealing properties of materials used in the following device: relay
  Sealant Material:
  Generic Name: Modified diglycidyl ether of bisphenol A
  Supplier: Fine Polymers Corporation
  Type: Epi Fine 4616L-160PK
  Casing Material:
  Generic Name: Liquid Crystal Polymer
  Supplier: Sumitomo Chemical
  Type: E4008, E4009, or E6008

RECOMMENDATION:
- Periodically inspect the device named above for any degradation of properties and replace if degradation is found

WARNING – EXPLOSION HAZARD:
- Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous
- Substitution of any components may impair suitability for Class I, Division 2

UL2367
Non-hazardous use

UL 508
Non-hazardous use

CSA C22.2 No. 213 (Class I, Division 2)
CSA C22.2 No. 142

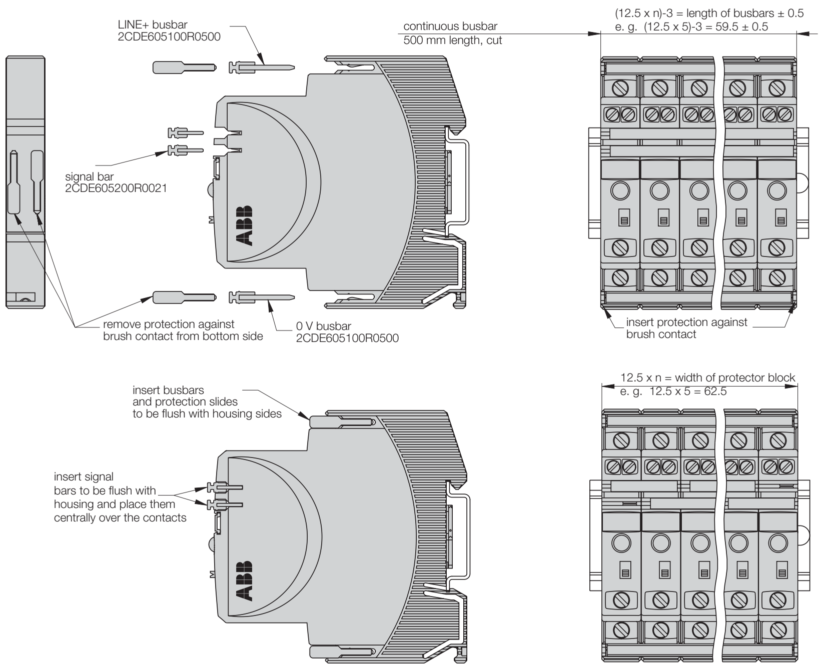
Class 2
Meets requirement for Class 2 current limitation
(EPD24 ... -0,5 A/1 A/2 A/3 A)

Protection and safety technical details

EPD 24-TB-101

The EPD24 features an integral power distribution system.
The following wiring modes are possible with various pluggable current and signal busbars:

- LINE+ (24 V DC)
- 0 V
  Caution: The electronic devices EPD24 require a 0 V connection
- Auxiliary contacts



Mounting procedure

Before wiring insert busbars into protector block. A maximum of 10 connection cycles are permissible using connecting busbars.

Recommendation

After 10 units the busbars should be interrupted and receive a new entry live.

Table of length for busbars

(Order code 2CDE605100R0500)									
No. of units	2	3	4	5	6	7	8	9	10
Length of busbar (mm) ± 0.5 mm	22	34.5	47	59.5	72	84.5	97	109.5	122

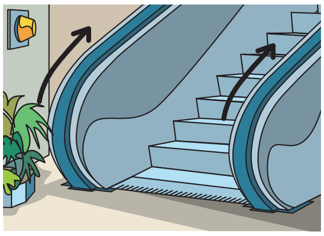
Protection and safety technical details

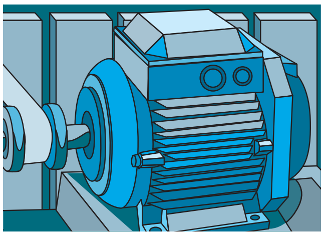
SQZ3 phase and sequence relays

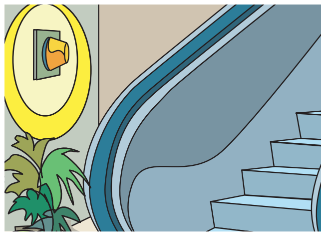
Operating principle
Through an output relay with contact in safety switching, the SQZ3 phase and sequence presence devices for 400 V a.c. three-phase networks enable the phase and sequence presence management monitoring also the minimum voltage (adjustable up to 70% of Vn). In case of any defect, the device operates within a range from 2 to 20 seconds, with the opportunity to control the appropriate acoustic signals, motor controlling contactors or circuit breakers.

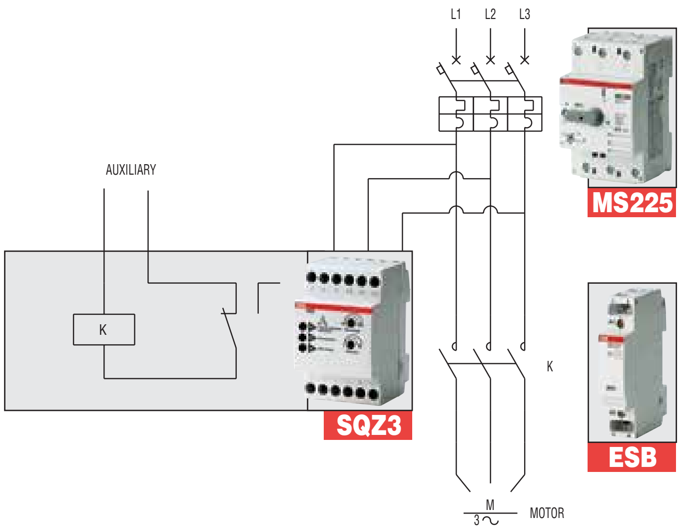
Application environments
The installation of the SQZ3 phase and sequence presence relays are particularly suitable for any environment and situation where it is necessary to control the three-phase network operation promptly signalling any defect.

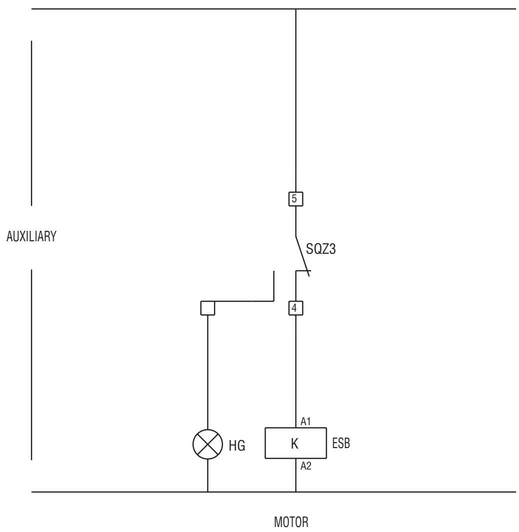
Example of installation
As shown in the diagrams, one of the possible applications is the installation of the SQZ3 phase and sequence presence relays in a department store, where the escalator supply circuit has a phase variation determining the SQZ3 relay intervention on the ESB contactor and causing the motor block and the alarm lighting indication.

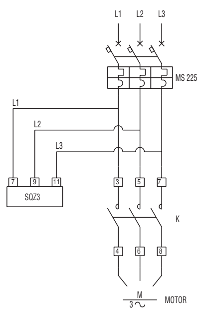








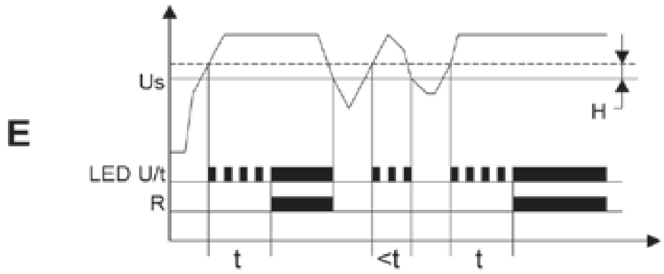




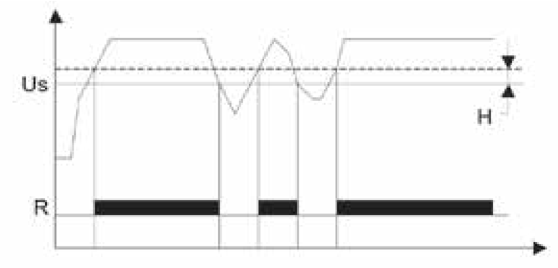
Protection and safety technical details

E 236 undervoltage monitoring relays

Function



Function E236-US 1.1D



Function E236-US 1.1, E 236-US 2.1, E 236-US 1 and E 236-US 2

Protection and safety technical details

Insulation monitoring devices
ISOLTESTER-DIG

ISOLTESTER-DIG is the insulation monitoring device specifically designed by ABB for group 2 medical locations. ISOLTESTER-DIG measures the insulation to earth in IT-M network and the thermal and electrical overload of the insulation transformer, in accordance with the international standards: EN 61557-1, EN 61557-8 and IEC 60364-7-710.

Functioning principle
Insulation resistance is measured by applying a direct current signal between insulated line and earth and determining the dispersion current generated. Effective measurement is granted thanks to a digital filter integrated in the device even if interferences and harmonic components occur.

Programming
Through its LCD display and four selection keys, the device offers easy programming possibilities by setting intervention thresholds without making any for the complete monitoring of all electrical parameters. ISOLTESTER-DIG tests the thermal and electrical overload of the medical insulation transformer, managing two temperature thresholds coming from both PT100 and PTC probes. By controlling temperature, the overload of the transformer can be monitored and the automatic circuit-breaker downstream of the secondary can be avoided. All faulty conditions are remotely controlled thanks to QSD-DIG 230/24 remote signalling panels, granting a proper prompt technical supervision.

Self-testing system
Error-Link Fail system checks device proper functioning and controls wiring presence and properness at the end of the terminal blocks: it prevents the possibility to operate in group 2 medical locations when the insulation monitoring device is disconnected.

For better integration and improved monitoring
Thanks to the RS485 serial port, the ISOLTESTER-DIG-RS is able to communicate with the supervision system via ModbusRTU in order to collect all the required information of the monitored IT-M system in a centralized place. It also improves the monitoring activity with the possibility of logging mesaurements (max. and min. values). Logs can then be sent to the centralized control system via the communication protocol.

For higher safety
Thanks to a codified signal, the new ISOLTESTER-DIG-PLUS IT networks insulation monitoring device grants absolute reliability of measurement in any operational condition, even if high network interferences occur. Furthermore it is fitted with a RS485 serial port through which it can be perfectly integrated with communication systems such as PLC/PC by using ModbusRTU protocol. The measurement of network maximum and minimum values enables a wider monitoring and an easier plant checking in case of any fault. Finally, the programmable output relay allows to manage any warning condition signalled in a dedicated way.

- **Quality:** the recognized standard in hospital insulation control
- **Flexibility:** adjustable intervention thresholds according to all the parameters monitored
- **Completeness:** all electrical and thermal parameters controlled by a single device
- **Integration:** alarms sent up to 4 medical locations attended by medical and healthy staff, thanks to remote signalling panels. Only for RS and PLUS versions, ablility to interact with supervising systems through ModbusRTU protocol via RS485 serial port

Protection and safety technical details

Insulation monitoring devices
ISOLTESTER-DIG

Frontal operators functioning

Green LED, SET:
Tool programming status

3 digit display

Red LED, R:
Insulation resistance (kΩ)

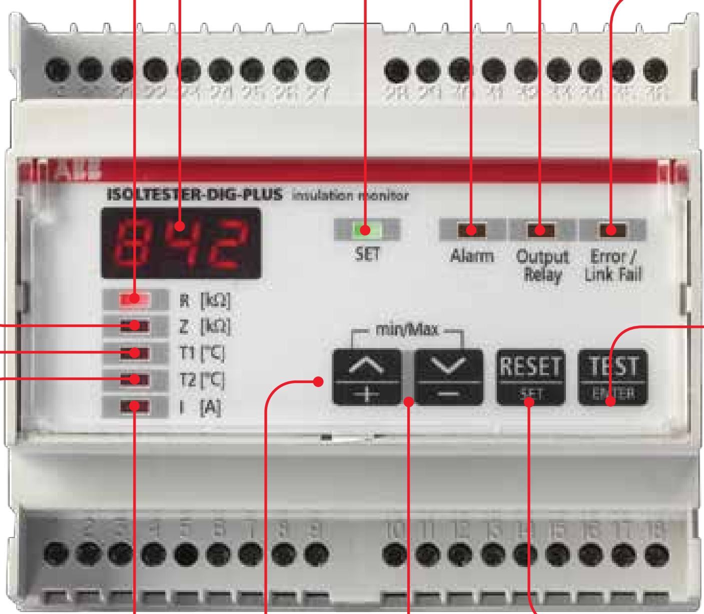
Red LED, Z:
Insulation impedance and line capacity (only for ISOLTESTER-DIG-PLUS)

Red LED, T1:
Primary winding temperature control

Red LED, T2:
Secondary winding temperature control

Red LED, I:
Line current

Easy programming by four pushbuttons



Yellow LED, Alarm:
Parameter out of threshold

Red LED, Output Relay:
Auxiliary relay status

Red LED, Error/Link Fail:
Internal fault alarm, faulty wiring to the line to be controlled, PT100 temperature probe open or under short-circuit

TEST | ENTER:
Device and remote signalling panels testing and SETUP settings confirmation

RESET | SET:
Device programming access, alarm disconnection and memorized values cancellation

+/-:
Selection of the parameter to be displayed, settings adjustment and memorized maximum and minimum values display (only for ISOLTESTER-DIG-PLUS/RS)

Protection and safety technical details

Insulation monitoring devices
ISOLTESTER-DIG-PLUS

Wherever it is necessary to guarantee safety and operational continuity and prevent power supply interruptions, such as in hospitals and in other medical locations, insulation transformers and devices detecting and signalling any first fault to earth have to be used.

Operating theaters equipment can generate interference within the network

A traditional monitoring device can generate an unwanted alarm in operating theaters

Risks arising from the use of a traditional insulation monitor:

- **Imposibility to distinguish between interference and real fault**
- **Carelessness of the medical staff**
- **Unjustified intervention of specialized technical stuff**

ISOLTESTER-DIG-PLUS is the device for insulation monitoring in IT-M networks. It ensures absolute reliability of measurement by means of a codified signal able to detect interferences generated by common equipment in operating theatres and avoid unwanted alarms signalling.

Despite network interferences...

ISOLTESTER-DIG-PLUS avoids unwanted alarms.

Advantages of ISOLTESTER-DIG-PLUS:

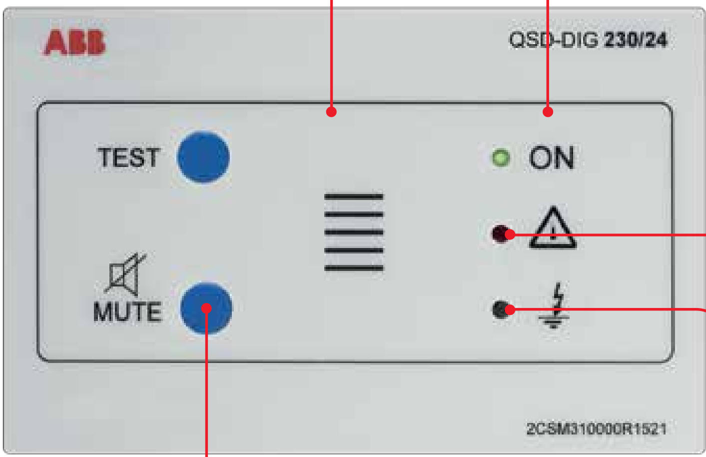
- **Monitoring reliability**
- **Integration with supervision systems**
- **Proper fault analysis**
- **Complete control of network parameters**

Protection and safety technical details
Insulation monitoring devices

QSD-DIG 230/24

TEST
Pushbutton

Green LED
device is working properly



Red LED
overload alarm

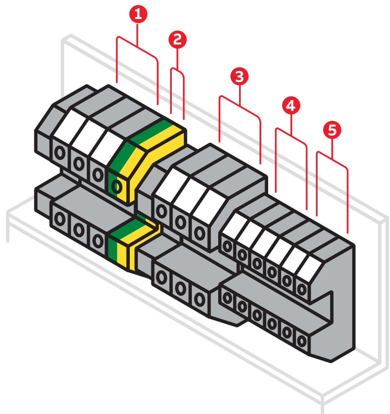
MUTE
Pushbutton

Yellow LED
fault alarm

Protection and safety technical details

TI insulating transformers for medical locations

Wirings and serial number location



1. **Primary winding**
   0-230: Primary
   SCH: Metallic shield
2. **PE**
3. **Secondary winding**
   0-230: Secondary
   SCH: Central socket
4. **Probe 1**
   1: to ISOLTESTER-DIG 28 terminal block
   2: to ISOLTESTER-DIG 28 terminal block
   3: to ISOLTESTER-DIG 30 terminal block
5. **Probe 2**
   4: to ISOLTESTER-DIG 25 terminal block
   5: to ISOLTESTER-DIG 25 terminal block
   6: to ISOLTESTER-DIG 27 terminal block

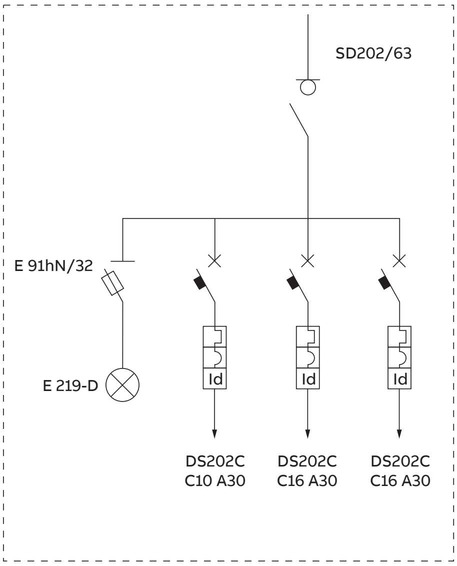
Serial number
printed on the label attached at the metallic base, to be provided when requesting testing certificate

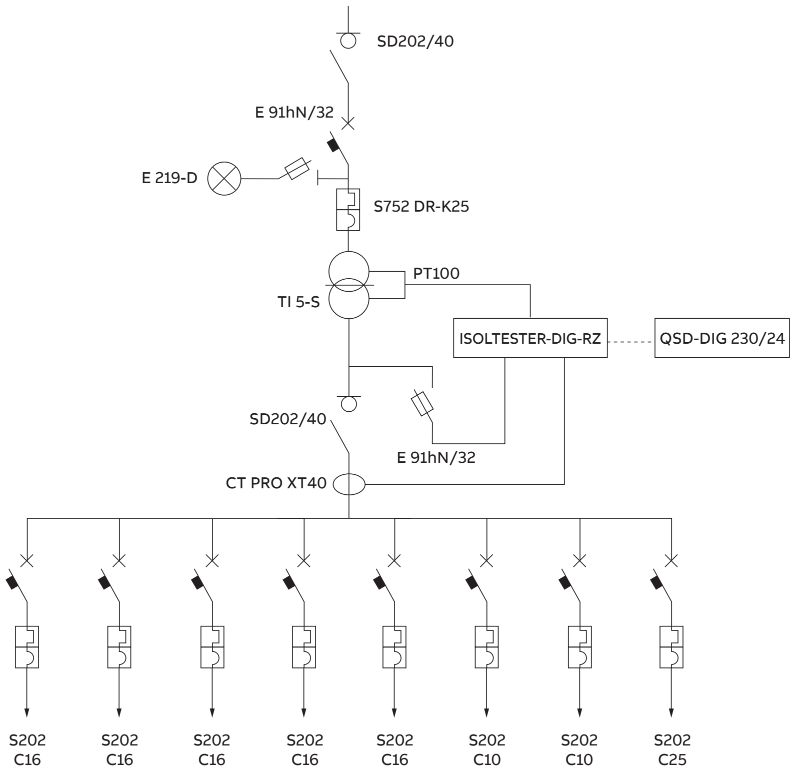
Protection and safety technical details

QSO switchboard for medical locations

Operating diagrams

QSO S



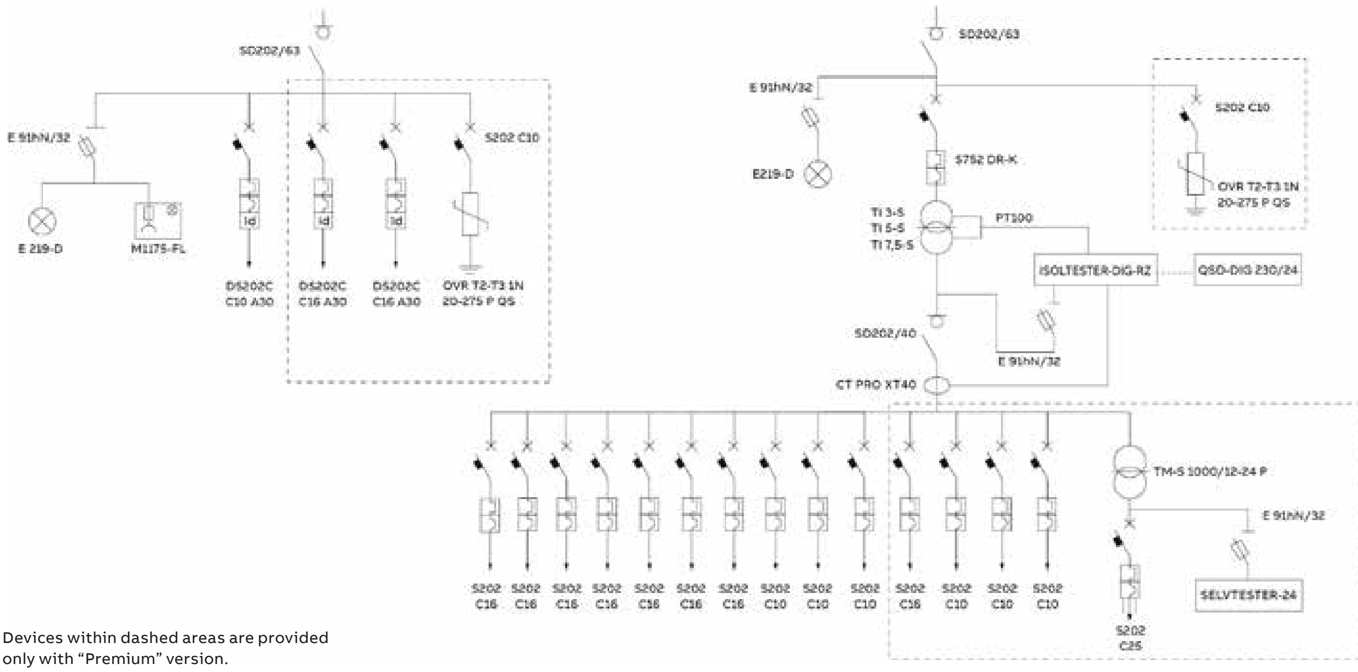


Devices within dashed areas are provided only with “Premium” version.

Description	QSO 3S Classic	QSO 5S Classic	QSO 3S Premium	QSO 5S Premium
2P 40 A SD202/40 disconnector	2	2	2	2
2P 63 A SD202/63 disconnector			1	1
E 91hN/32 fuse-holder	2	2	3	3
E219-D green light indicator power supply presence	1	1	2	2
ISOLTESTER-DIG-RZ insulation monitoring device	1	1	1	1
6 kA 2P C10 S202 miniature circuit-breaker	2	2	2	2
6 kA 2P C16 S202 miniature circuit-breaker	5	5	5	5
6 kA 2P C25 S202 miniature circuit-breaker	1	1	1	1
25 kA 2P S752 DR-K25 miniature circuit-breaker	1	1	1	1
1N 10 A 0,03 A DS202 C C10 A30 residual current breaker with overcurrent protection			1	1
1N 16 A 0,03 A DS202 C C16 A30 residual current breaker with overcurrent protection			2	2
AMM damper set	4	4	4	4
CT PRO XT40 current transformer	1	1	1	1
Medical insulation transformer with 3000 VA 230/230 V TI 3-S probes	1		1	
Medical insulation transformer with 5000 VA 230/230 V TI 5-S probes				1
10 x 38 gG 2A E9F10 GG2 fuse	4	4	6	6

Protection and safety technical details
QSO switchboard for medical locations

QSO M

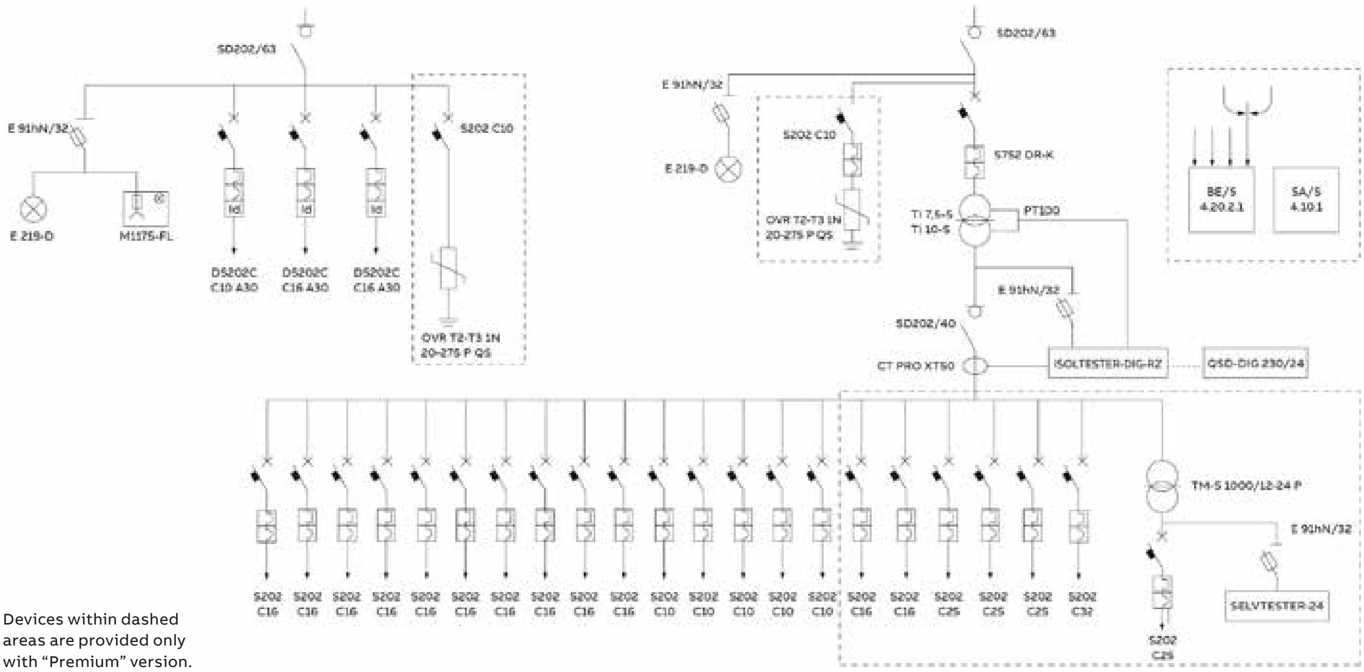


Devices within dashed areas are provided only with “Premium” version.

Description	QSO 3M Classic	QSO 5M Classic	QSO 7,5M Classic	QSO 3M Premium	QSO 5M Premium	QSO 7,5M Premium
2P 63 A SD202/63 disconnector	3	3	3	3	3	3
E 91hN/32 fuse-holder	3	3	3	4	4	4
E219-D green light indicator power supply presence	2	2	2	2	2	2
ISOLTESTER-DIG-RZ insulation monitoring device	1	1	1	1	1	1
24 V SELVTESTER-24 insulation monitoring device				1	1	1
OVR T2-T3 1N 20-275 P QS surge protective device				2	2	2
6 kA 2P C10 S202 miniature circuit-breaker	3	3	3	8	8	8
6 kA 2P C16 S202 miniature circuit-breaker	7	7	7	8	8	8
6 kA 2P C25 S202 miniature circuit-breaker				1	1	1
M1175-FL 2P+T 16 A schucko socket with indicator lamp and fuse	1	1	1	1	1	1
25 kA 2P S752 DR-K25 miniature circuit-breaker	1	1		1	1	
25 kA 2P S752 DR-K40 miniature circuit-breaker			1			1
1N 10 A 0,03 A DS202 C C10 A30 residual current breaker with overcurrent protection	1	1	1	1	1	1
1N 16 A 0,03 A DS202 C C16 A30 residual current breaker with overcurrent protection				2	2	2
AMM damper set	4	4	4	8	8	8
CT PRO XT40 current transformer	1	1	1	1	1	1
TM-S 1000/12-24 P. 230-400V S. 24V control and safety transformer				1	1	1
Medical insulating transformer with 3000 VA 230/230 V TI 3-S probes	1			1		
Medical insulating transformer with 5000 VA 230/230 V TI 5-S probes		1			1	
Medical insulating transformer with 7500 VA 230/230 V TI 7,5-S probes			1			1
10 x 38 gG 2A E9F10 GG2 fuse	6	6	6	8	8	8

Protection and safety technical details
QSO switchboard for medical locations

QSO L



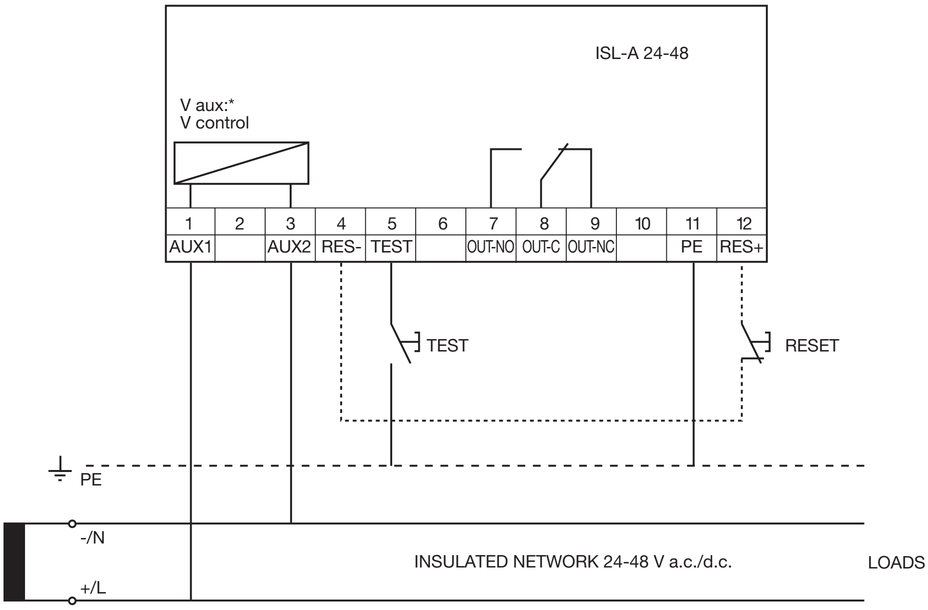
Devices within dashed areas are provided only with "Premium" version.

Description	QSO 10L Classic	QSO 7.5 L Premium	QSO 10 L Premium
2P 63 A SD202/63 disconnector	3	3	3
E 91hN/32 fuse-holder	3	4	4
E219-D green light indicator power supply presence	2	2	2
BE/S 4.20.2.1 4 channel binary input terminal			1
ISOLTESTER-DIG-RZ insulation monitoring device	1	1	1
24 V SELVTESTER-24 insulation monitoring device		1	1
10 A SA/S 4.10.1 4 channel output terminal			1
OVR T2-T3 1N 20-275 P QS surge protective device		2	2
S2-CS/H6R auxiliary contact 1 exchange			1
6 kA 2P C10 S202 miniature circuit-breaker	6	8	8
6 kA 2P C16 S202 miniature circuit-breaker	9	11	11
6 kA 2P C25 S202 miniature circuit-breaker		3	3
6 kA 2P C32 S202 miniature circuit-breaker		1	1
M1175-FL 2P+T 16 A schucko socket with indicator lamp and fuse	1	1	1
25 kA S752 DR-K40 miniature circuit-breaker		1	
25 kA S752 DR-K50 miniature circuit-breaker	1		
25 kA S 752 DR-K50+S750DR-AUX miniature circuit-breaker			1
1N 10A 0,03A DS202 C C10 A30 residual current breaker with overcurrent protection	1	1	1
1N 16A 0,03A DS202 C C16 A30 residual current breaker with overcurrent protection	2	2	2
AMM damper set	4	8	8
CT PRO XT50 current transformer	1	1	1
TM-S 1000/12-24 P. 230-400 V S.24 V control and safety transformer		1	1
Medical insulating transformer with 7500 VA 230/230 V TI 7,5-S probes		1	
Medical insulating transformer with 10000 VA 230/230 V TI 10-S probes	1		1
10 x 38 gG 2A E9F10 GG2 fuse	6	8	6

Protection and safety technical details
Insulation monitoring devices

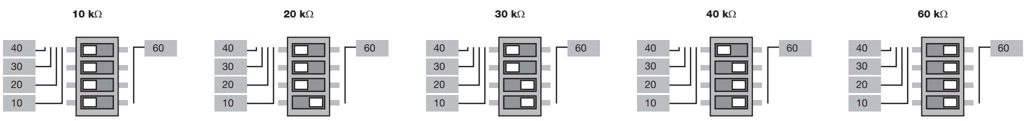
Insulation monitoring devices ISL for industrial applications

ISL-A 24-48



MICROSWITCH SETTINGS

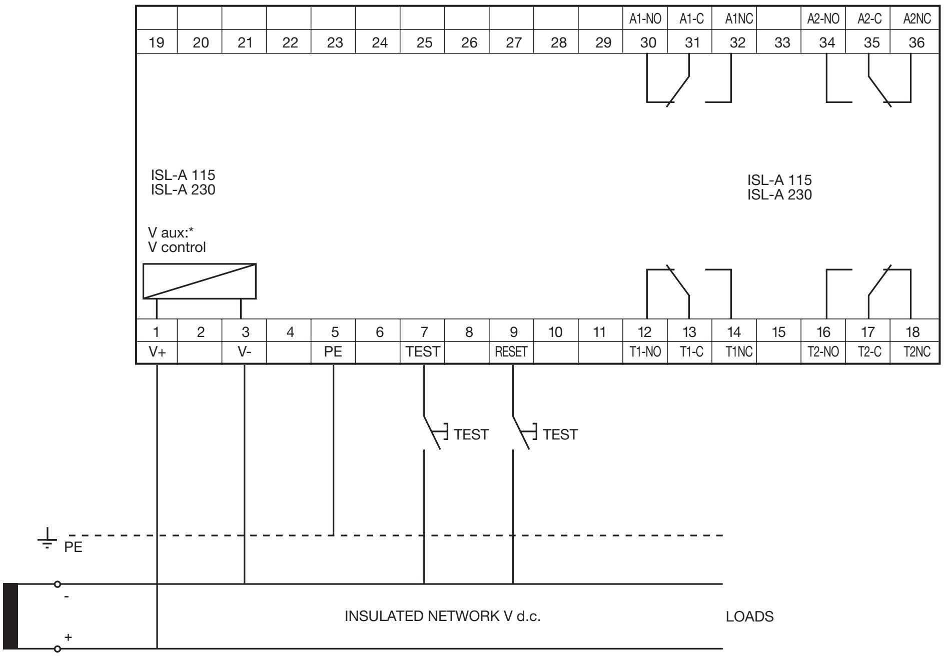
The front microswitches allow the insulation threshold level to be adjusted between 10 and 60 kΩ, as shown below:



Protection and safety technical details

Insulation monitoring devices

ISL-A 115 and ISL-A 230



MICROSWITCH SETTINGS
The front microswitches are used for adjusting the insulation threshold level, enabling the fail-safe function and configuring the reset mode for both the alarm and trip thresholds.

Microswitches A, B, C, D for programming the trip and alarm thresholds:

ALARM		TRIP	
300 kΩ:	A=0, B=0, C=0, D=0	100 kΩ:	A=0, B=0, C=0, D=0
150 kΩ:	A=1, B=0, C=0, D=0	60 kΩ:	A=1, B=0, C=0, D=0
80 kΩ:	A=1, B=1, C=0, D=0	40 kΩ:	A=1, B=1, C=0, D=0
50 kΩ:	A=1, B=1, C=1, D=0	20 kΩ:	A=1, B=1, C=1, D=0
30 kΩ:	A=1, B=1, C=1, D=1	10 kΩ:	A=1, B=1, C=1, D=1

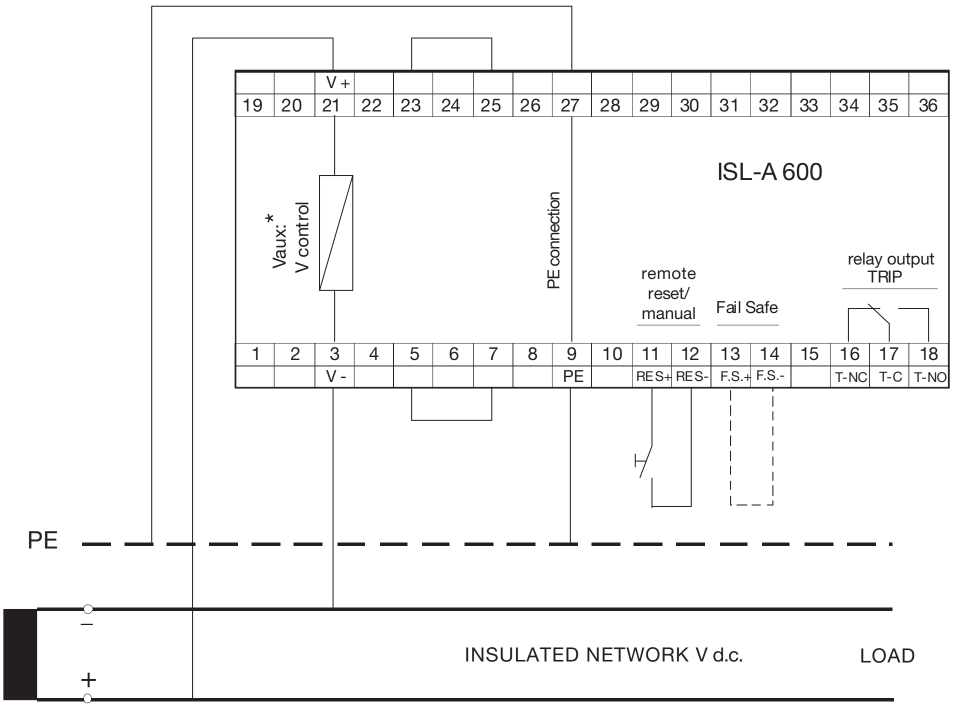
Microswitch E for configuring the FAIL SAFE mode
E=0 fail safe mode disabled
E=1 fail safe mode enabled

Microswitch F for configuring the RESET mode
F=0 manual reset
F=1 automatic reset

Protection and safety technical details

Insulation monitoring devices

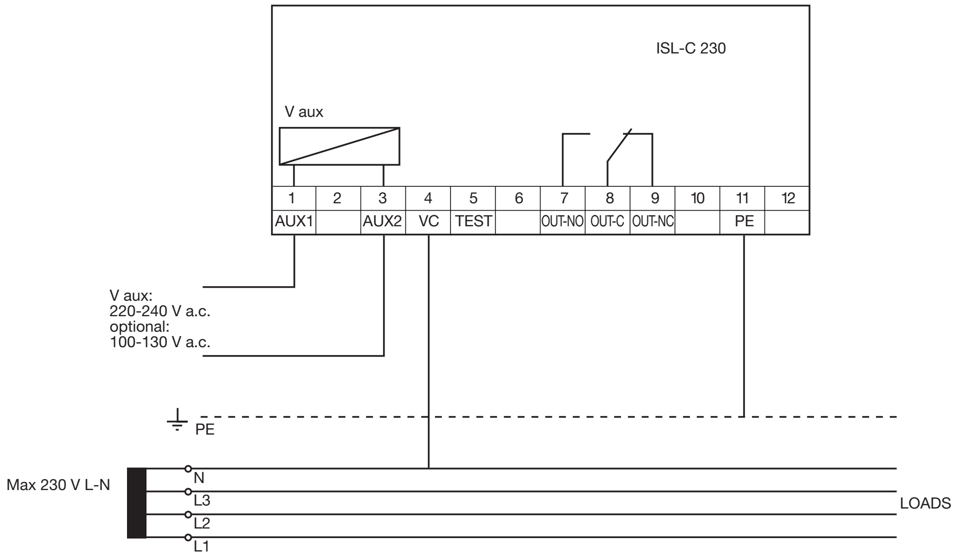
ISL-A 600



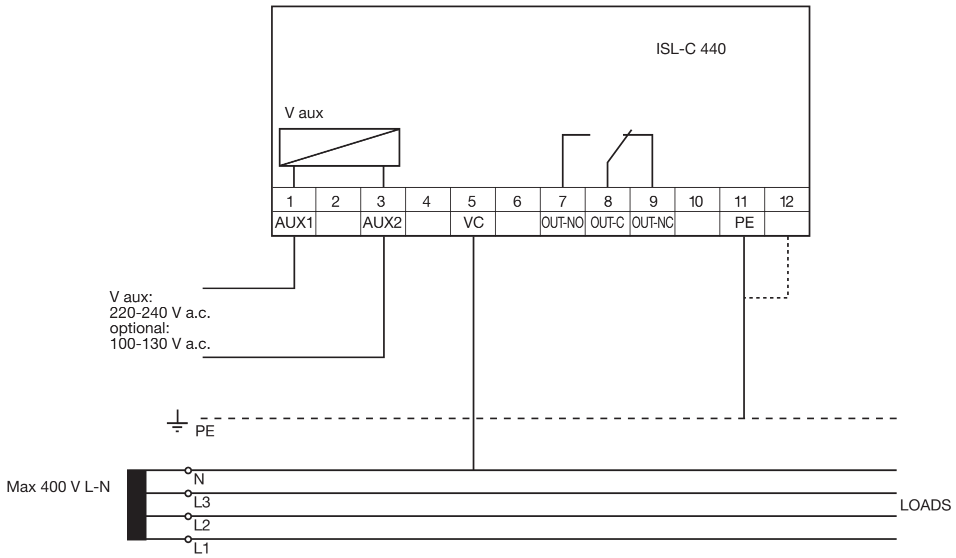
Protection and safety technical details

Insulation monitoring devices

ISL-C 230

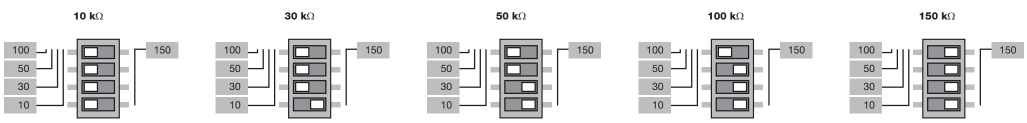


ISL-C 440



MICROSWITCH SETTINGS

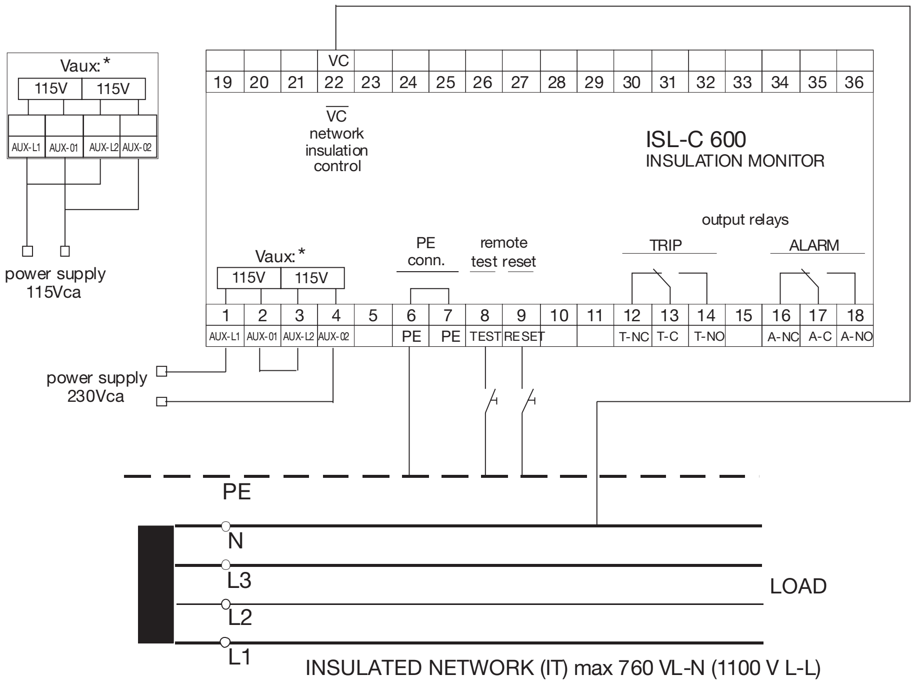
The front microswitches are used for adjusting the insulation threshold level between 10 and 150 kΩ, as shown below:



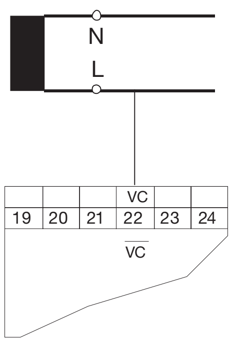
Protection and safety technical details

Insulation monitoring devices

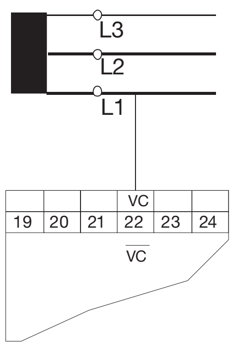
ISL-C 600



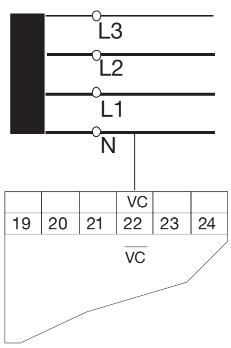
Max 760V L-N



Three-phase network
without neutral
Max 760V L-L



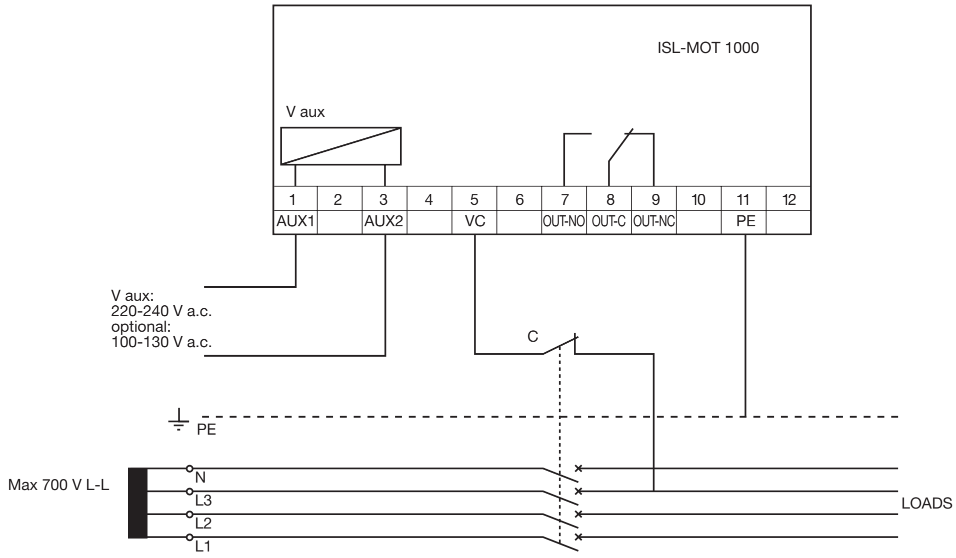
Three-phase network
with neutral
Max 1100V L-L



Protection and safety technical details

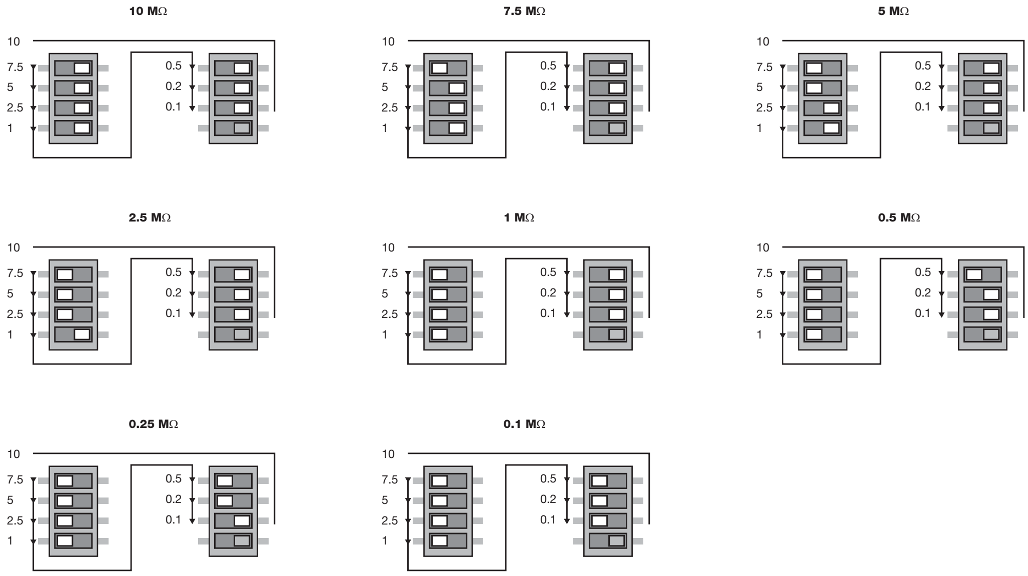
Insulation monitoring devices

ISL-MOT 1000



MICROSWITCH SETTINGS

The front microswitches are used for adjusting the insulation threshold level between 0.1 and 10 MΩ. A total of 7 microswitches are used, divided into two groups as shown below:

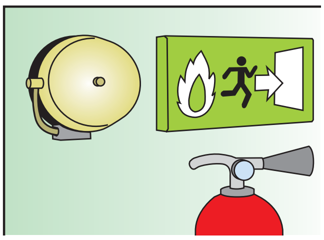


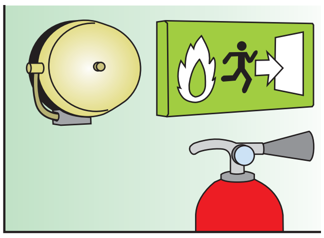
Protection and safety technical details
Insulation monitoring devices

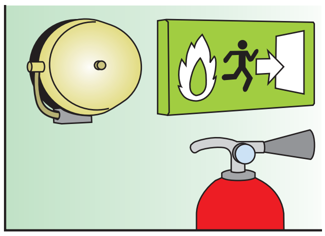
Operating principle
In IT electrical distribution systems that supply critical applications, where operational continuity is essential, ISL insulation monitoring devices assure continuous surveillance to promptly detect any insulation loss.

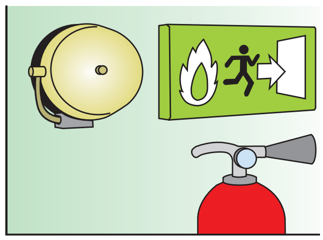
Application environments
All IT distribution systems in which operational continuity is a critical factor, and in particular:
- 24-28 V, 100-144 V and 220 V d.c. networks
- 24-48 V, 100-144 V and 380-415 V a.c. networks
- 20-700 V a.c./d.c. voltageless networks

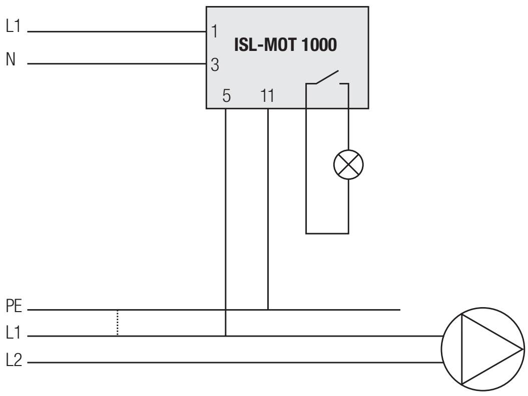
Example of installation
ISL-MOT 1000 is suitable for preventive protection of voltageless circuits such as alarm and fire-fighting systems, pumps, etc.
ISL-MOT 1000 continually monitors the insulation level between the line and earth, to guarantee that the system will function correctly when needed.
The trip threshold is programmable, and insulation loss can be signalled via a change-over contact, which can also be used for switching loads.











Notes

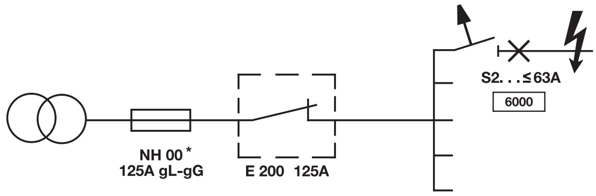
Electrical installation solutions for buildings – Technical details
Command and signaling

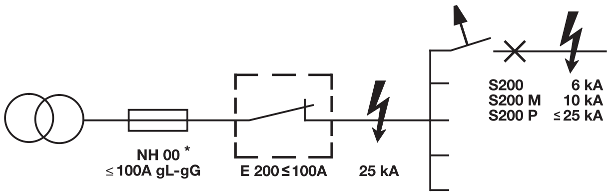
Index

Command and signaling technical details

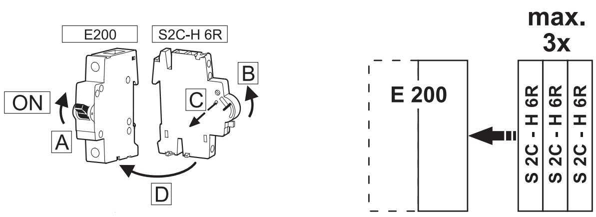
E 200 switches

E200 Short-circuit withstand capacity

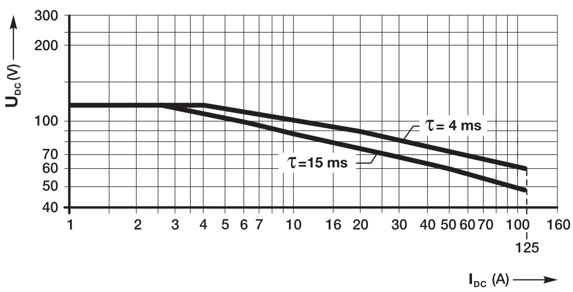




Assembling of S2C-H 6R and E 200

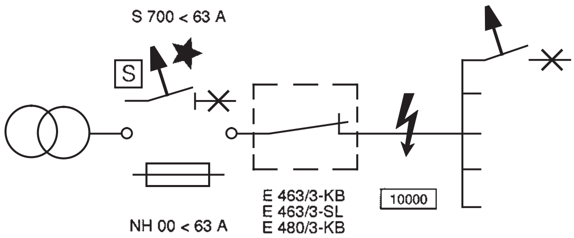


E 200 DC switching capacity



Command and signaling technical details
E 463 switches

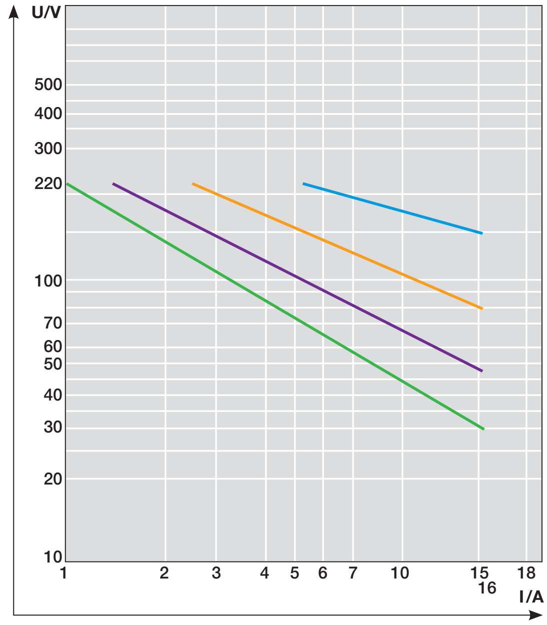
E463 / E480 Short-circuit withstand capacity



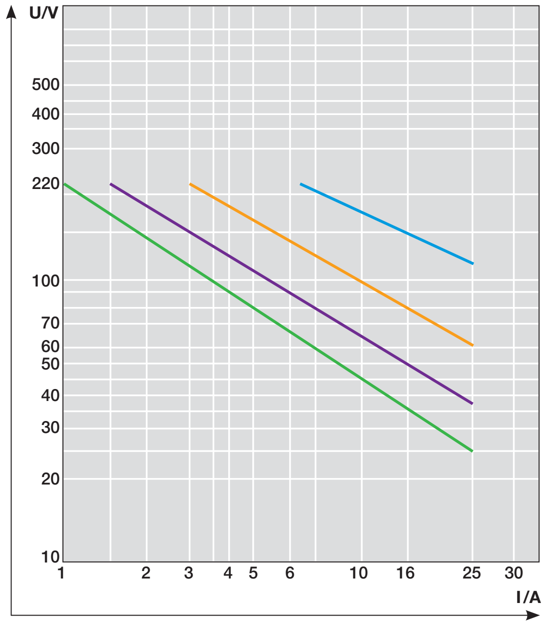
Command and signaling technical details

E 210 switches

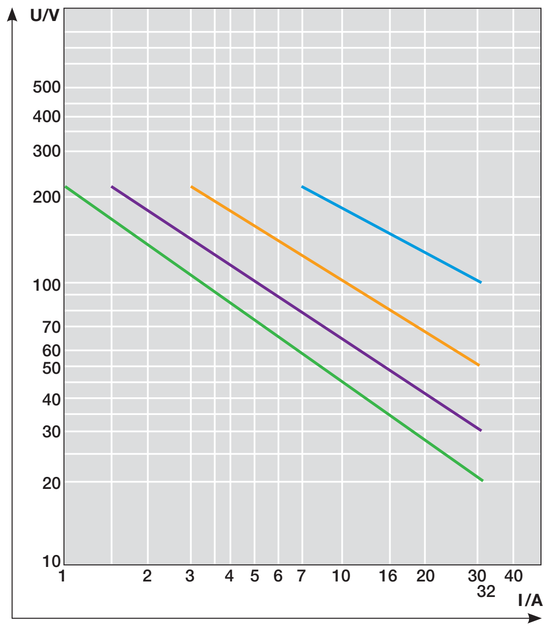
DC switching capacity E211 16A



DC switching capacity E211 25A



DC switching capacity E211 32A



Ohmic load
- Normally-open contact (blue)
- Normally-closed contact (orange)

Load with time constant
t = 15ms (inductive load)
- Normally-open contact (purple)
- Normally-closed contact (green)

Command and signaling technical details

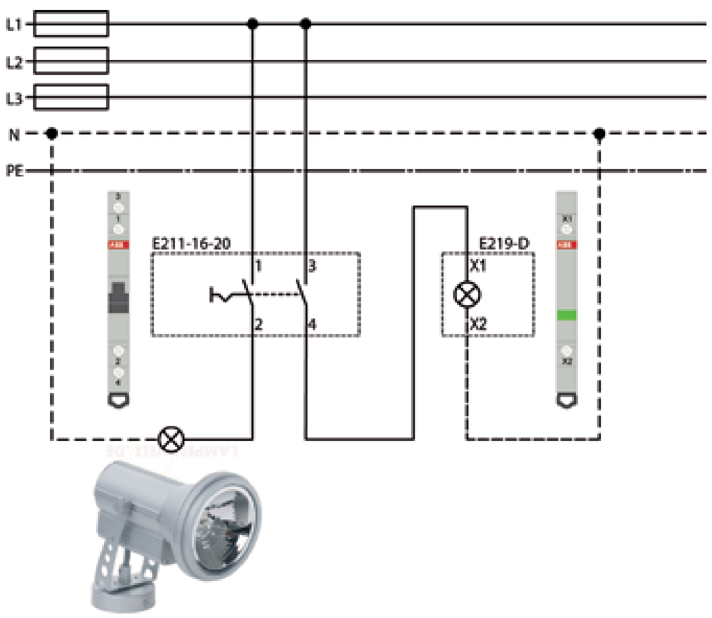
Technical data – Pushbuttons and indicator lights

Overview of general meanings of the colours of operator control parts (excerpt from VDE 0199 or DIN EN 60073).

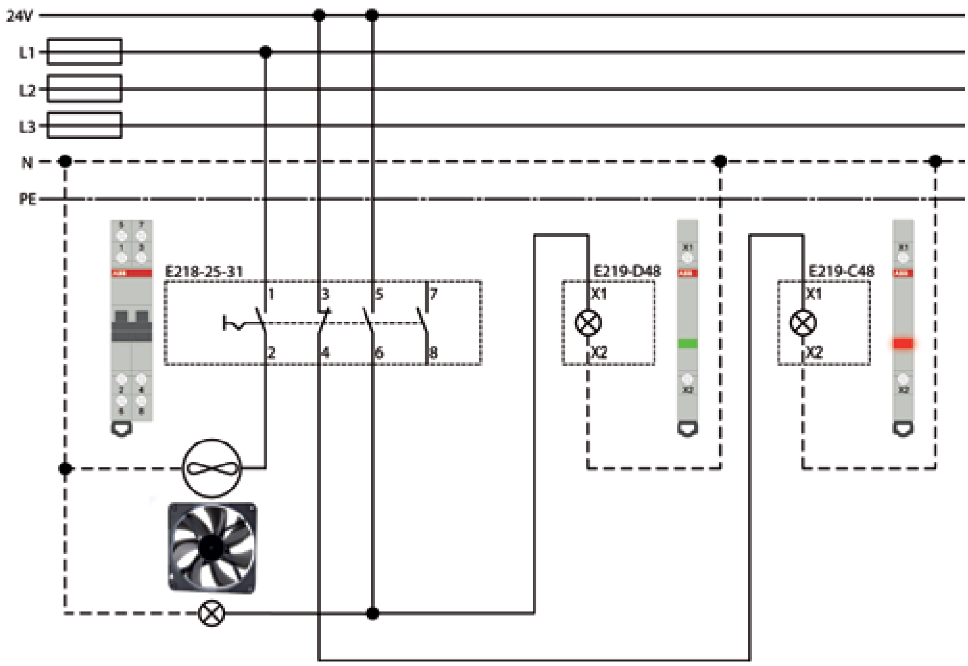
Colour	Meaning	Explanation	Application examples
RED	Emergency	Action in hazardous situations or emergency	EMERGENCY STOP, STOP or OFF with EMERGENCY STOP pushbutton Initiating an emergency function
YELLOW	Abnormal	Action if an abnormal condition is present	Intervention required to suppress the abnormal condition, manual intervention to restart an interrupted automatic cycle
GREEN	Safety	Action in safe conditions or to prepare a normal condition	Activation
BLUE	Regulation	Status requiring action	Reset function
WHITE GREY BLACK	Non-specific	Functions start	Available for any functions except, except for emergency stop, e.g. ON/OFF; Stop/Start

Command and signaling technical details

Sample applications – On-off switches and control switches



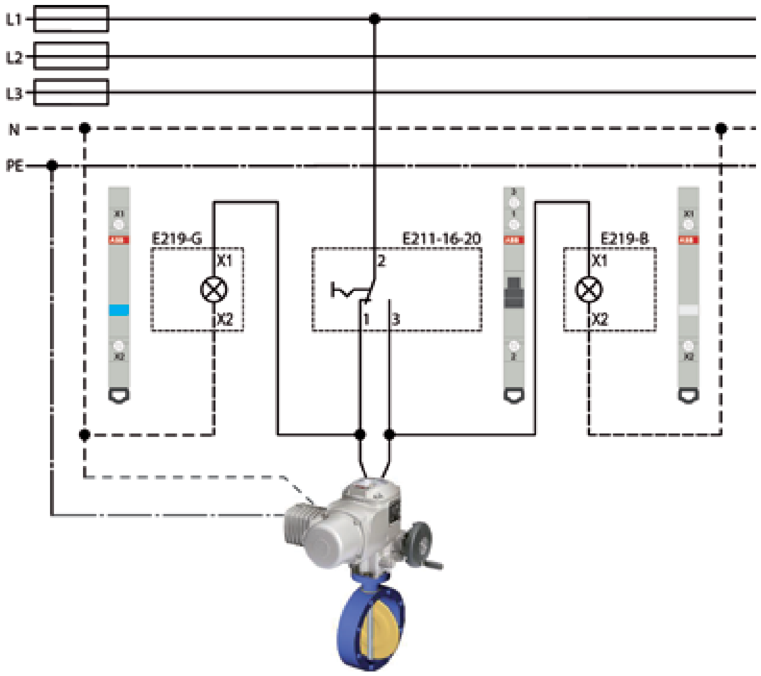
Additional garden lighting
On-off switches E211-16-20 (2NO contacts) and indicator lights E219-D
- On-off control for additional garden light
- The green indicator light in the cetral distribution board shows whether the garden light is ON or OFF



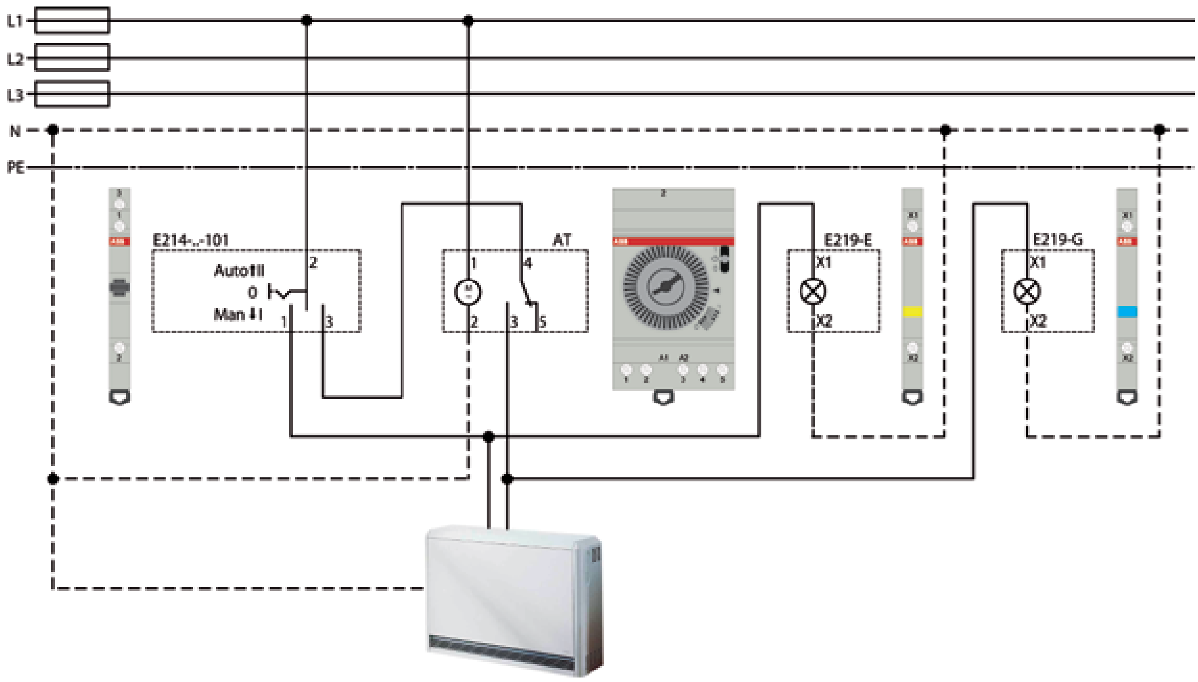
Room ventilator with status display
Control switches E218-25-31 (3NO + 1NC contacts) and E219-D48; E219-C48
- On-off function control of a ventilator
- Integrated signal lamp 24 V for status detection is directly embedded at the ventilator
- The green and red indicator lights 12-48 V show the current operating position in the central distribution board

Command and signaling technical details

Sample applications – Change over switches and group switches



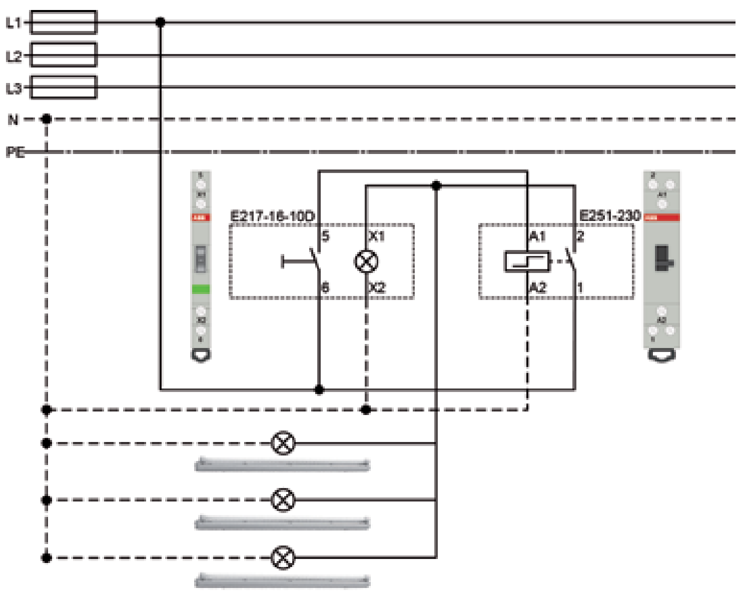
Flap gate control
Change over switches E213-16-001 with position I-II (1CO contact) and E219-G; E219-B
- Contol of a manual flap gate position with central visualization
- The blue indicator light shows that the flap gate is open
- The white indicator light shines in closed state



Electrical room heater
Group switches E214-16-101 with position I-0-II (1CO contact) and E219-E; E219-G
- Changeover switching of manual control to time switch mode, e. g. for an additional heater
- The yellow indicator light shows that the control mode occurs manually
- The heater is set on automatic control when the blue E219-G shines

Command and signaling technical details

Sample applications – Push buttons

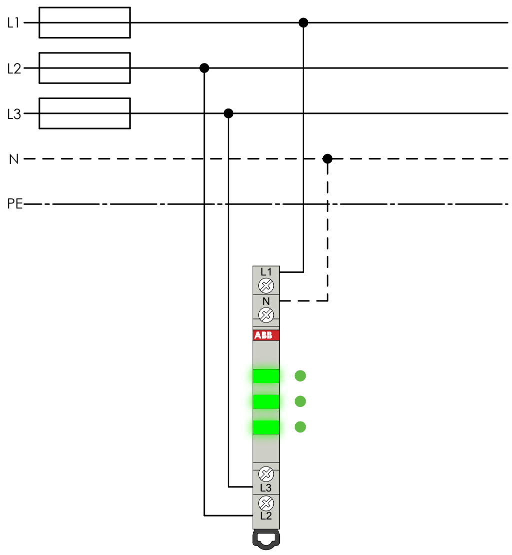


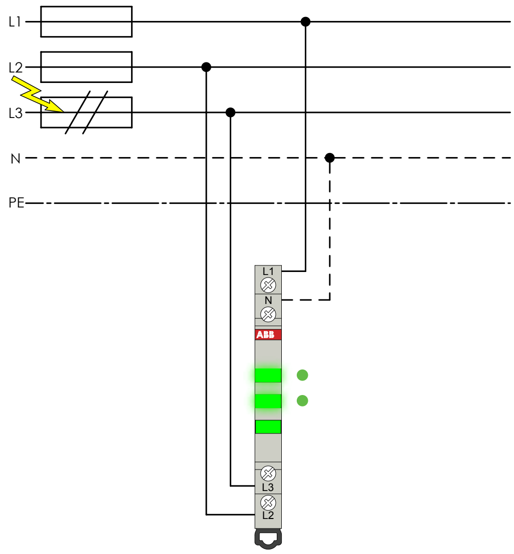
Room lighting (fluorescent-tubes)
Pushbuttons mit 1NO contact (impulse) with geen LED

- Lighting system with latching relay (impulse switching relais)
- The green LED which is integrated in the pushbutton shines when the lighting group has the status ON

Command and signaling technical details

Sample applications – Multiple indicator lights

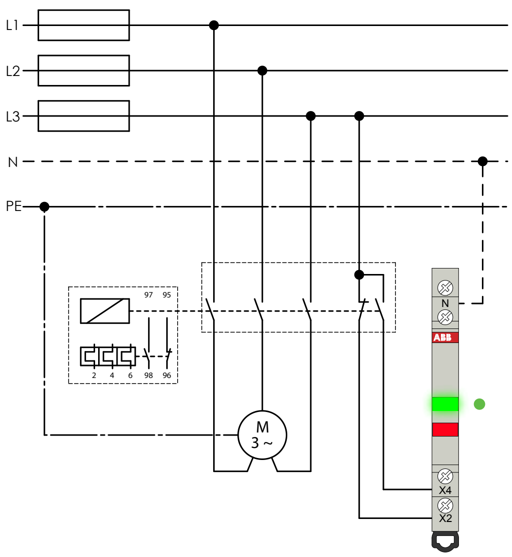


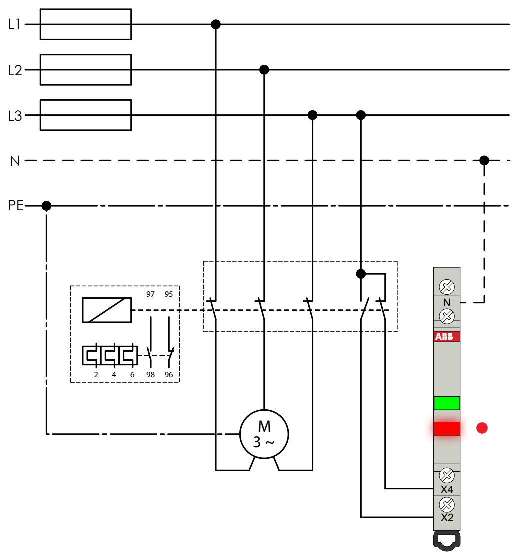


Network and phase control

Multiple indicator lights E219-3D (3x green LEDs)

- All LEDs shine → Net is working
- If one phase breaks down, the green LED turns off
  → Attention! Phase break down in the network





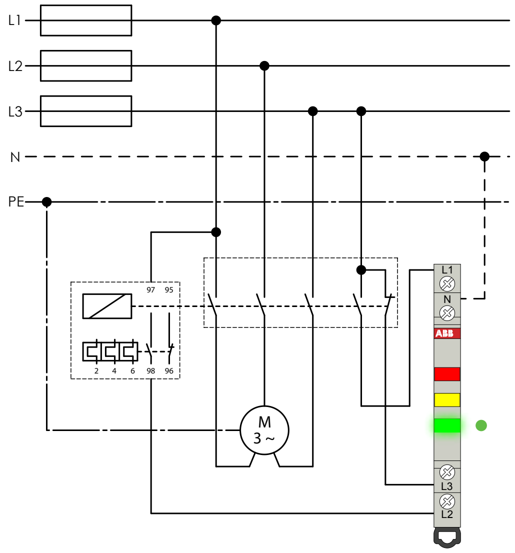
Motor status display

Multiple indicator lights E219-2CD (1x green, 1x red LED)

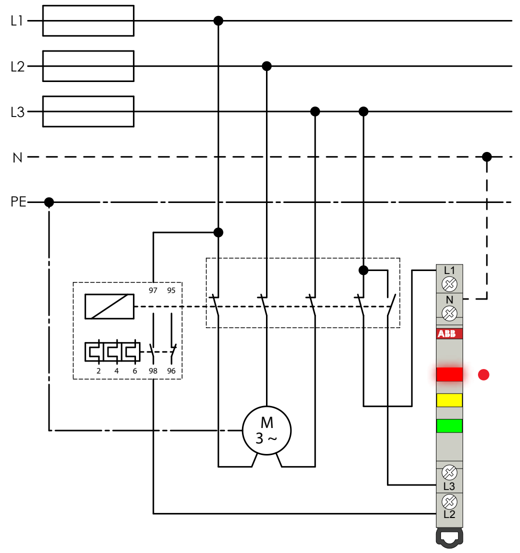
- ABB three-phase contactor (remote controlled with 2 auxiliary contacts (1NO + 1NC))
- The current operating mode of the motor drive is visualized over auxiliary contacts.

Command and signaling technical details

Sample applications – Multiple indicator lights



Signaling motor OFF



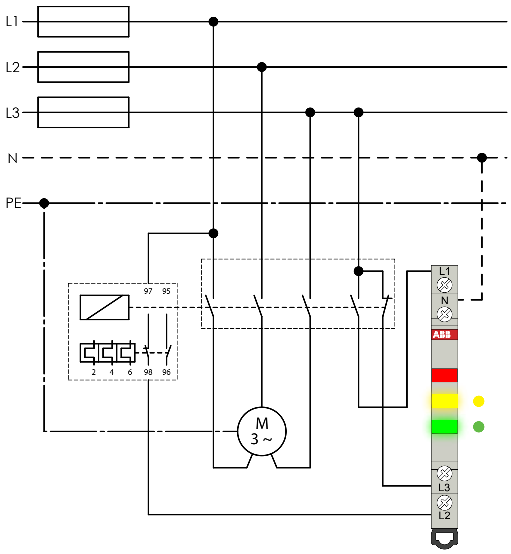
Signaling motor ON

Motor status display
Multiple indicator lights E219-3CDE (1x green, 1x yellow, 1x red LED)

- ABB polyphase contact gate (remote control) with 2 auxiliary contacts (1NO + 1NC)
- The current operating mode of the motor drive is visualized over contactor auxiliary contacts
- The error indication occurs over the signalling contact of the motor protection relay

Command and signaling technical details

Sample applications – Multiple indicator lights



Signaling motor interference on basis of thermal overload

Motor status display (off and interuption)
Multiple indicator lights E219-3CDE (1x green, 1x yellow, 1x red LED)

- A thermal activation is signalized by the use of motor protection relay contacts
- Motor off = green LED on; closed motor protection relay contact = yellow LED shows interference

Command and signaling technical details

Installation contactors

Technical data main circuit

Main circuit – Utilization characteristics according to IEC/EN

Contactor type		ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
Standards		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 61095					
Rated operational voltage U_e		220 V DC 250 V AC	220 V DC 250 V AC	220 V DC 400 V AC	220 V DC 400 V AC	220 V DC 400 V AC	220 V DC 400 V AC
Rated frequency		DC, 50/60 Hz	DC, 50/60 Hz	DC, 50/60 Hz	DC, 50/60 Hz	DC, 50/60 Hz	DC, 50/60 Hz
AC-1/AC-7a utilization category for air temperature near the contactor ≤ 55 °C							
Rated operational current I_e AC-1/AC-7a	NO	16 A	20 A	25 A	40 A	63 A	100 A
	NC	16 A	20 A	25 A	30 A	30 A	-
Rated operational power AC-1	230 V 1 phase	3.7 kW	4.6 kW	5.8 kW	9.2 kW	14.5 kW	23 kW
	400 V 3 phases	–	–	17.3 kW	27.7 kW	43.6 kW	69.3 kW
AC-3/AC-7b utilization category for air temperature close to contactor ≤ 55 °C							
Rated operational current AC-3/AC-3e/AC-7b	230 V 1 phase	6 A	9 A	9 A	22 A	30 A	–
	400 V 3 phases	–	–	9 A	22 A	30 A	–
Rated operational power AC-3/AC-3e	230 V 1 phase	0.9 kW	1.3 kW	1.3 kW	3.7 kW	5 kW	–
	400 V 3 phases	–	–	4 kW	11 kW	15 kW	–
Rated making capacity acc. to IEC 60947-4-1		10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	–
Rated breaking capacity acc. to IEC 60947-4-1		10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	10 x I_e/AC-3 13 x I_e/AC-3e	–
Rated short-time withstand current I_{cw} at 40 °C ambient temp. in free air, from a cold state	10 s	48 A	72 A	72 A	176 A	240 A	–
Power loss per pole		0.9 W	1.4 W	2 W	3 W	4.5 W	6 W
Maximum electrical switching frequency	AC-1/AC-7a	300 cycles/h	300 cycles/h	300 cycles/h	300 cycles/h	300 cycles/h	150 cycles/h
	AC-3/AC-7b	600 cycles/h	600 cycles/h	600 cycles/h	600 cycles/h	600 cycles/h	–
Electrical durability	AC-1/AC-7a	150,000 cycles	150,000 cycles	130,000 cycles	150,000 cycles	100,000 cycles	70,000 cycles
	AC-3/AC-7b	150,000 cycles	150,000 cycles	500,000 cycles	150,000 cycles	240,000 cycles	–
Mechanical durability		1,000,000 cycles					

Command and signaling technical details

Installation contactors

Technical data main circuit

Short circuit protection with Fuses - Type 1 coordinated

Fuses type	ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
gG coordinated up to 10kA	**230 V**	**230 V**	**400 V**	**400 V**	**400 V**	**400 V**
	20 A	20 A	35 A	63 A	80 A	125 A

Short circuit protection with MCBs - Type 1 coordinated

MCB	Characteristic	Icu	In	ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
				230 V	**230 V**	**400 V**	**400 V**	**400 V**	**400 V**
S200	B, C	10 kA	16 A	6 kA	6 kA	6 kA	6 kA	6 kA	6 kA
			20 A	-	6 kA	6 kA	6 kA	6 kA	6 kA
			25 A	-	-	6 kA	6 kA	6 kA	6 kA
			40 A	-	-	-	6 kA	6 kA	6 kA
			63 A	-	-	-	-	6 kA	6 kA
S200M	B, C	15 kA	16 A	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
			20 A	-	10 kA	10 kA	10 kA	10 kA	10 kA
			25 A	-	-	10 kA	10 kA	10 kA	10 kA
			40 A	-	-	-	10 kA	10 kA	10 kA
			63 A	-	-	-	-	10 kA	10 kA

Short circuit protection with RCDs - Type 1 coordinated

RCD	Characteristic	Icu	In	ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
				230 V	**230 V**	**400 V**	**400 V**	**400 V**	**400 V**
DS201	B, C	6 kA	16 A	6 kA	6 kA	6 kA	6 kA	6 kA	6 kA
			20 A	-	6 kA	6 kA	6 kA	6 kA	6 kA
			25 A	-	-	6 kA	6 kA	6 kA	6 kA
			40 A	-	-	-	6 kA	6 kA	6 kA
			63 A	-	-	-	-	6 kA	6 kA
DS201M DS203NC	B, C	10 kA	16 A	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
			20 A	-	10 kA	10 kA	10 kA	10 kA	10 kA
			25 A	-	-	10 kA	10 kA	10 kA	10 kA
			40 A	-	-	-	10 kA	10 kA	10 kA
			63 A	-	-	-	-	10 kA	10 kA

Command and signaling technical details

Installation contactors

Technical data main circuit and control circuit

Main circuit – Utilization characteristics according to UL/CSA

Contactor type		ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
Standards		UL 60947-1, UL 60947-4-1					
General use rating	240 V	16 A	20 A	–	–	–	–
	480 V	–	–	25 A	40 A	63 A	100 A
Motor rating							
Full load current	220 ... 240 V 1 phase	6.9 A	8 A	–	–	–	–
	220 ... 240 V 3 phases	–	–	9.6 A	22 A	28 A	–
	440 ... 480 V 3 phases	–	–	7.6 A	21 A	21 A	–
Horse power rating	220 ... 240 V 1 phase	0.8 hp	1 hp	–	–	–	–
	220 ... 240 V 3 phases	–	–	3 hp	7.5 hp	10 hp	–
	440 ... 480 V 3 phases	–	–	5 hp	15 hp	15 hp	–
Short-circuit protection for contactors without thermal O/L relay - Motor protection excluded							
	Fuse rating	20 A	20 A	25 A	40 A	75 A	125 A
	Fuse type 480 V/5kA	K5	K5	K5	K5	K5	K5
Max. electrical switching frequency							
	for general use	300 cycles/h	300 cycles/h	300 cycles/h	300 cycles/h	300 cycles/h	150 cycles/h
	for motor use	600 cycles/h	600 cycles/h	600 cycles/h	600 cycles/h	600 cycles/h	–

General technical data

Contactor type		ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
Rated insulation voltage U_i acc. to IEC 60947-4-1 and VDE 0110 (Gr. C)		400 V	400 V	500 V	500 V	500 V	500 V
Rated impulse withstand voltage U_{imp}		6 kV	ESB: 6 kV EN: 6 kV	ESB: 6 kV EN: 4 kV/6 kV with protection cover		6 kV	6 kV
Ambient air temperature range (1)	operation	-25 ... +55 °C	-25 ... +55 °C	-25 ... +55 °C	-25 ... +55 °C	-25 ... +55 °C	-25 ... +55 °C
	storage	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C
Maximum operating altitude permissible		2000 m	2000 m	2000 m	2000 m	2000 m	2000 m
Vibration (sinusoidal) according to IEC/EN 60068-2-6 (Fc)		1 g/3-150 Hz	1 g/3-150 Hz	1 g/3-150 Hz	1 g/3-150 Hz	1 g/3-150 Hz	
Shock (half-sine) according to IEC/EN 60947-1 Annex. Q		Category E	Category E	Category E	Category E	Category E	Category E
Shock (half-sine) according to IEC/EN 60068-2-27 (Ea)		15g/11ms	15g/11ms	15g/11ms	15g/11ms	15g/11ms	15g/11ms

1) If several contactors are mounted adjacently and the duty time is longer than one hour, every second contactor needs a distance piece, Type ESB-DIS (1/2 module). This is not necessary at an ambient temperature ≤ 40 °C or on Type ESB16..N, ESB/EN20..N and ESB100..N

Magnet system characteristics

Contactor type			ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
Coil operating limits acc. to IEC/EN60947-4-1			0.85 ... 1.1 x U_C (at θ ≤ 55 °C)					
Rated frequency			DC, 50/60/400 Hz					
Frequency range			DC, 40 ... 450 Hz					
Coil consumption	pull-in	50 Hz	2.5 VA	2.5 VA	4 VA	4.5 VA	60 VA	90 VA
		60 Hz	2.5 VA	2.5 VA	4 VA	4.5 VA	60 VA	90 VA
		DC	2.5 W	2.5 W	4 W	5 W	70 W	100 W
	holding	50 Hz	2.5 VA	2.5 VA	4 VA	4.5 VA	4.5 VA	7.5 VA
		60 Hz	2.5 VA	2.5 VA	4 VA	4.5 VA	4.5 VA	7.5 VA
		DC	2.5 W	2.5 W	4 W	5 W	5 W	8.5 W

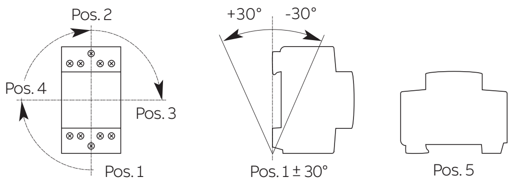
Command and signaling technical details

Installation contactors

Technical data main circuit and control circuit

Mounting characteristics and conditions for use

Contactor type	ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
Mounting position	Position 1 to 5					
Mounting on DIN rail	TH35-15 (35 x 15 mm Mounting Rail) acc. to IEC 60715 TH35-7.5 (35 x 7.5 mm Mounting Rail) acc. to IEC 60715					



Main circuit - Connecting characteristics

Contactor type	ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
Connecting capacity						
Rigid	1x 1 ... 10 mm² 2x 1 ... 4 mm²	1x 1 ... 10 mm² 2x 1 ... 4 mm²	1x 1.5 ... 10 mm² 2x 1.5 ... 4 mm²	1x 1.5 ... 25 mm² 2x 1.5 ... 10 mm²	1x 1.5 ... 25 mm² 2x 1.5 ... 10 mm²	1x 10 ... 50 mm²
Flexible with ferrule	1x 1 ... 6 mm² 2x 1 ... 2.5 mm²	1x 1 ... 6 mm² 2x 1 ... 2.5 mm²	1 x 1.5 ... 10 mm² 2x 1.5 ... 2.5 mm²	1x 1.5 ... 16 mm² 2x 1.5 ... 10 mm²	1x 1.5 ... 16 mm² 2x 1.5 ... 10 mm²	1x 10 ... 35 mm²
Flexible with insulated ferrule	1x 1 ... 6 mm² 2x 1 ...1.5 mm²	1x 1 ... 6 mm² 2x 1 ...1.5 mm²	1 x 1 .5 ... 10 mm² 2x 1 .5 mm²	1x 1.5 ... 16 mm² 2x 1.5 ... 10 mm²	1x 1.5 ... 16 mm² 2x 1.5 ... 10 mm²	1x 10 ... 35 mm²
Flexible	1x 1 ... 6 mm² 2x 1... 4 mm²	1x 1 ... 6 mm² 2x 1... 4 mm²	1 x 1.5 ... 10 mm² 2x 1.5 ... 4 mm²	1x 1.5 ... 16 mm² 2x 1.5 ... 10 mm²	1x 1.5 ... 16 mm² 2x 1.5 ... 10 mm²	1x 10 ... 35 mm²
Stranded acc. to UL/CSA	14-8 AWG	14-8 AWG	16-8 AWG	16-4 AWG	16-4 AWG	8-0 AWG
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20
Wire stripping length	10 mm	10 mm	10 mm	13 mm	13 mm	15 mm
Tightening torque	1.2 N·m/ 11 lb.in	1.2 N·m/ 11 lb.in	1 N·m/ 9 lb.in	2.5 N·m/ 20 lb.in	2.5 N·m/ 20 lb.in	3 N·m/ 27 lb.in
Recommended screw driver	Pozidriv 1	Pozidriv 1	Pozidriv 1	Pozidriv 2	Pozidriv 2	Pozidriv 2

Control circuit - Connecting characteristics

Contactor type	ESB16..N	ESB20..N/ EN20..N	ESB25..N/ EN25..N	ESB40..N/ EN40..N	ESB63..N	ESB100..N
Connecting capacity						
Rigid	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²
Flexible with ferrule	1x 0.75 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 0.75 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 0.75 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 0.75 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 0.75 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 0.75 ... 2.5mm² 2x 0.75 ... 1 mm²
Flexible with insulated ferrule	1x 1 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 1 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 1 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 1 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 1 ... 2.5 mm² 2x 0.75 ... 1 mm²	1x 1 ... 2.5 mm² 2x 0.75 ... 1 mm²
Flexible	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²	1x 1 ... 4 mm² 2x 1 ... 2.5 mm²
Stranded acc. to UL/CSA	16-10 AWG	16-10 AWG	16-10 AWG	16-10 AWG	16-10 AWG	16-10 AWG
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20
Wire stripping length	7 mm	7 mm	7 mm	7 mm	7 mm	7 mm
Tightening torque	0.9 N·m/8 lb.in	0.9 N·m/8 lb.in	0.9 N·m/8 lb.in	0.9 N·m/8 lb.in	0.9 N·m/8 lb.in	0.9 N·m/8 lb.in
Recommended screw driver	Pozidriv 1	Pozidriv 1	Pozidriv 1	Pozidriv 1	Pozidriv 1	Pozidriv 1

Command and signaling technical details
Installation contactors
Technical data auxiliary circuit

Auxiliary circuit - Utilization characteristics according to IEC/EN

For ambient temperature T_u = 40 °C if not stated otherwise.

Contactor type			EH04-xxN
Standards			IEC/EN 60947-1, IEC/EN 60947-5-1
Rated operational voltage U_e			500 V AC
			250 V DC
Rated frequency			DC, 50/60 Hz
Rated operational current I_e AC-15	24 V	NO/NC	6 A/6 A
	120 V	NO/NC	6 A/6 A
	240 V	NO/NC	4 A/4 A
	415 V	NO/NC	3 A/3 A
	500 V	NO/NC	2 A/2 A
Rated operational current I_e DC-13	125 V	NO/NC	0.55 A/0.55 A
	250 V	NO/NC	0.27 A/0.27 A
Minimum switching capacity			17 V/5 mA
Short-circuit protective devices			10 A, gG type fuse
Mechanical durability			1,000,000 cycles
Electrical durability	AC-15	240 V/4 A	100,000 cycles
	DC-13	125 V/0.55 A	100,000 cycles
Maximum electrical switching frequency	AC-15		360 cycles/h
	DC-13		360 cycles/h

General technical data

Contactor type			EH04-xxN
Duty time			100%
Rated impulse withstand voltage U_{imp} acc. to IEC/EN 60947-1			4 kV
Rated insulation voltage U_i acc. to IEC/EN 60947-1			500 V
Pollution category acc. to IEC/EN 60664			2
Overvoltage category acc. to IEC/EN 60664			Up to III
Maximum operating altitude permissible			2000 m
Ambient air temperature range	Operation	Open	-25 °C ... +55 °C
	Storage		-40 °C ... +80 °C
Vibration (sinusoidal) acc. to IEC/EN 60068-2-6 (Fc)			5 g/3-150 Hz
Shock (half-sine) acc. to IEC/EN 60947-1 Annex. Q			Category E
Shock (half-sine) acc. to IEC/EN 60068-2-27 (Ea)			15 g/11 ms

Auxiliary circuit - Utilization characteristics according to UL/CSA

Contactor type		EH04-xxN
Standards		UL 60947-1, UL 60947-5-1
Max. operational voltage		600 V AC
Pilot duty		A600
Thermal continuous test current		10 A
General use rating	600 V AC per pole	5 A

Command and signaling technical details

Installation contactors

Technical data auxiliary circuit

Mounting characteristics and conditions for use

Contactor type	**EH04-xxN**		
Mounting position	Position 1	0°	Yes
	Position 2	180°	Yes
	Position 3	270°	Yes
	Position 4	90°	Yes
	Position 5	standing	Yes
	Position 6	upside down	Not allowed
Mounting on DIN rail	TH35-15 (35 x 15 mm Mounting Rail) acc. to IEC 60715 TH35-7.5 (35 x 7.5 mm Mounting Rail) acc. to IEC 60715		

Auxiliary circuit - Connecting characteristics

Contactor type		**EH04-xxN**
Connecting capacity		
	Rigid	1x 1 mm^2 ...4 mm^2 2x 1 mm^2 ... 1.5 mm^2
	Flexible with ferrule	1x 1 mm^2 ... 1.5 mm^2
	Flexible with insulated ferrule	-
	Flexible	1x 1 mm^2 ... 1x 2.5 mm^2
	Stranded acc. to UL/CSA	AWG 18.... AWG 12
Degree of protection		IP20
Wire stripping length (upper/lower)		17 mm (≤ 1.5mm^2 7 mm) / 9 mm (≤ 1.5mm^2 7 mm)
Tightening torque		0.9 N·m/ 8 lb.in
Recommended screw driver		Pozidriv 1

Command and signaling technical details
Installation contactors
DC switching table installation contactors

Type	Rated operational voltage	Contact	DC-1/A 1-pole	DC-3/A 1-pole
ESB16-..N	24 V DC	NO	16	12
	48 V DC		12	6
	60 V DC		12	4
	110 V DC		4	1.2
	220 V DC		0.4	0.2
	24 V DC	NC	11	5
	48 V DC		6	2
	60 V DC		4	1.5
	110 V DC		1.2	0.4
	220 V DC		0.2	0.1
ESB20-..N	24 V DC	NO	20	15
EN20-..N	48 V DC		15	7
	60 V DC		15	5
	110 V DC		5	1.5
	220 V DC		0.5	0.2
	24 V DC	NC	14	6
	48 V DC		7	3
	60 V DC		4.5	2
	110 V DC		1.5	0.6
	220 V DC		0.2	0.1

Type	Rated operational voltage	Contact	DC-1/A 3 poles in series	DC-3/A 3 poles in series
ESB25-..N	24 V DC	NO	24	24
EN25-..N	48 V DC		24	24
	60 V DC		24	24
	110 V DC		24	16
	220 V DC		13	4
	24 V DC	NC	24	19
	48 V DC		22	9.4
	60 V DC		17.5	7.5
	110 V DC		9.5	4.1
	220 V DC		3.8	1.6
ESB40-..N	24 V DC	NO	40	40
EN40-..N	48 V DC		40	40
	60 V DC		40	34
	110 V DC		30	18
	220 V DC		15	4.5
ESB63-..N	24 V DC	NO	63	63
	48 V DC		63	47
	60 V DC		60	38
	110 V DC		33	21
	220 V DC		17	5
ESB100-..N	24 V DC	NO	100	100
	48 V DC		100	70
	60 V DC		80	45
	110 V DC		50	25
	220 V DC		35	7

Notes

Command and signaling technical details

Installation contactors

Lamp load table

Please note that switching lamps is a capacitor load application where high inrush current peaks could occur. These are influenced by the length and cross section of the wire as well as the type of power supply unit and specifications of the lamp brand. For example, long cables can increase the possible number of lamps per pole. The table shows the allowed max. current, at 230 V AC, for one pole and considers already the startup current peaks.
The following selection table shows the current values and the maximum switchable capacitor load for compensated lamps. These two limits have to be considered in the selection of contactors.

		ESB16..N	ESB20..N EN20..N	ESB25..N EN25..N	ESB40..N EN40..N	ESB63..N	ESB100..N
Permitted compensating capacity per phase Cmax [μF]		45	75	100	350	500	650
Lamp types		Maximum load of the current paths during switching of electric lamps I_e [A]					
Incandescent and halogen lamps		4	6	7	20	30	45
Mixing lamps without ballast		4	6	7	20	30	45
Fluorescent lamps with conventional ballast	single lamp uncompensated	14	18	22	36	56	90
	single lamp parallel compensated	2	3	3.5	10	15	22
	series compensation, duo circuit	14	18	22	36	56	90
Fluorescent lamps with electronic ballast or CFL		4	6	7	20	30	45
LED lamps		4	6	7	20	30	45
High pressure mercury-vapor lamps	single lamp without compensation	7	9	11	18	28	45
	single lamp with parallel compensation	2	3	3.5	10	15	22
Halogen metal-vapor lamps	single lamp without compensation	7	9	11	18	28	45
	single lamp with parallel compensation	2	3	3.5	10	15	22
High pressure sodium-vapor lamps	single lamp without compensation	7	9	11	18	28	45
	single lamp with parallel compensation	2	3	3.5	10	15	22
Low pressure sodium-vapor lamps	single lamp without compensation	7	9	11	18	28	45
	single lamp with parallel compensation	2	3	3.5	10	15	22

Example for lamp load calculation
Due to many varieties of lamps and ballasts we advice to take the current load as base for reference. The lamp table considers already the inrush peaks and other lamp parameters. Please see the following examples for a reliable project lamp calculation.

Fluorescent lamp with conventional ballast, uncompensated
the lamp operating current I = 1.5 A, voltage U = 230 V
1 pole of ESB25..N can be loaded with max. 22 A,
see lamp table => 22 A/1.5 A = 14.66 => 14 lamps
1 pole of ESB20..N can be loaded with max. 18 A,
see lamp table => 18 A/1.5 A = 12 lamps

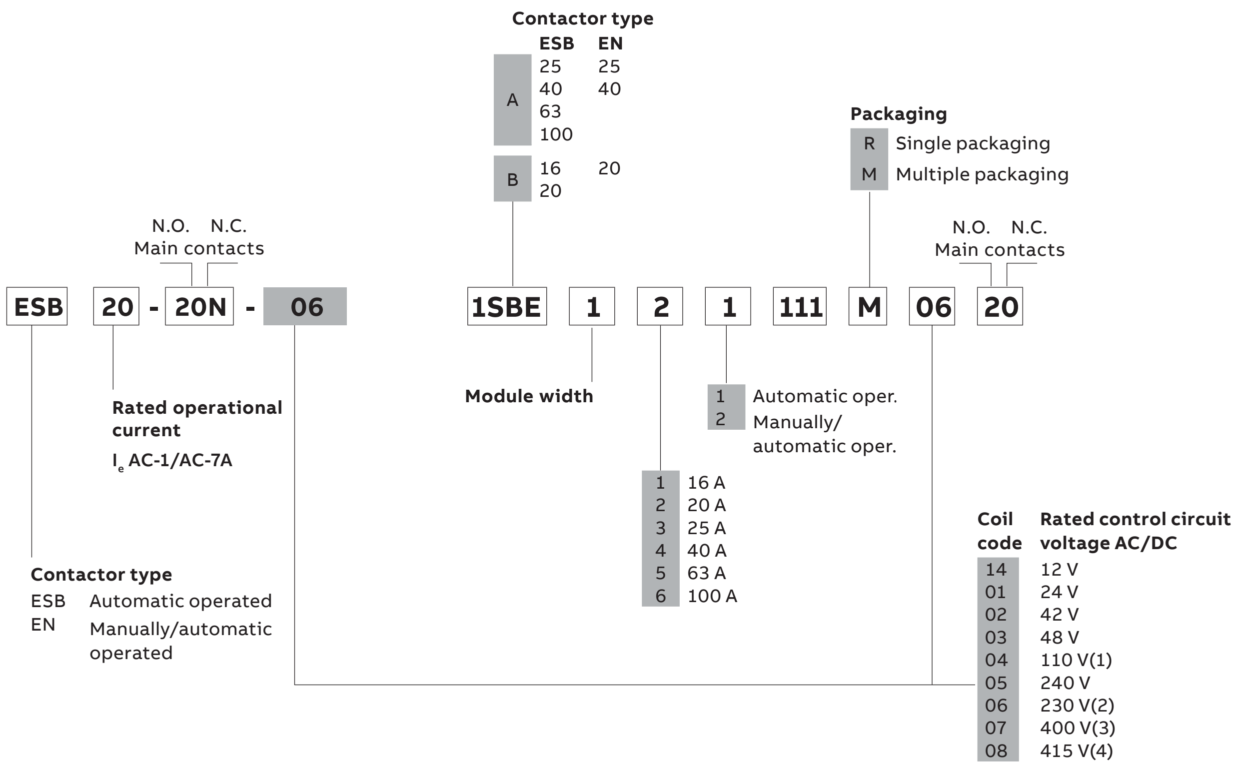
Please use the referring value in the table stated above and divide it with the current stated on the lamp. This will lead to the number of lamps which can be switched.

Example with picture: ESB25..N used for LED lamps:
7 A (= 7000 mA) / 85 mA = 82.23 => 82 lamps

Command and signaling technical details

Installation contactors

Voltage code table



(1) 110 V - 120 V for ESB25..N/EN25..N

(2) only coil 6 available with 230 V - 240 V for ESB25..N/EN25..N

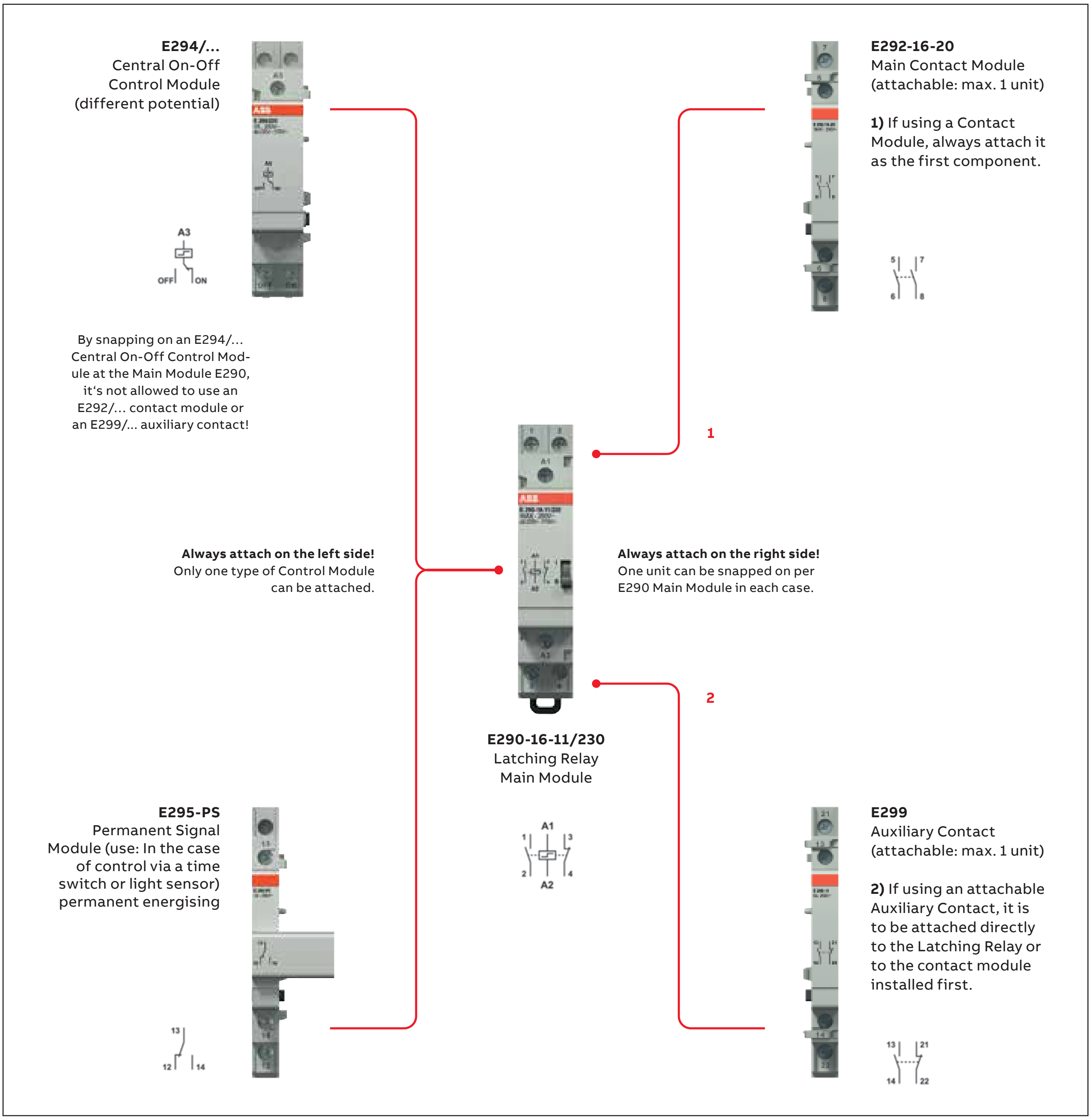
(3) only coil 7 available with 400 V - 415 V for ESB25..N

(4) Coil 8 available for ESB40-40N and ESB63-40N only.

Command and signaling technical details

E290 mechanical latching relays

Possible mounting variations (50 Hz only)



Safety information

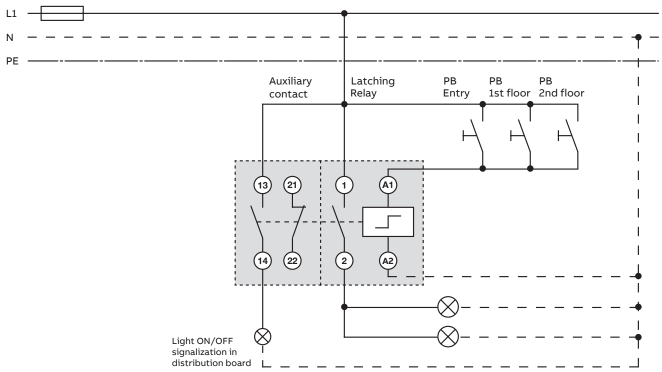
If more than one Latching Relay installed next to each other, it is recommended to use a intermediate piece (distance). This guarantees optimal heat dissipation by the main modules. The intermediate pieces (9 or 18mm wide) can be found in the order information as types ZLS725 or ZLS726 (the use depends on the application).

Command and signaling technical details

E290 mechanical latching relays

E290-16-10 + E299-11 – LATCHING RELAY WITH AUXILIARY CONTACT

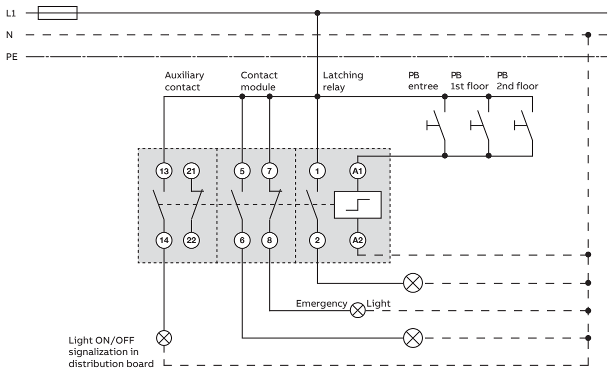
Application at a normal light control via different push buttons (PB): The snapped-on auxiliary contact (E299-11) displays the current switching state of the light control (ON/OFF).



E290-16-10 + E292-16-11 + E299-11 – LATCHING RELAY WITH AUXILIARY CONTACT (50 HZ ONLY)

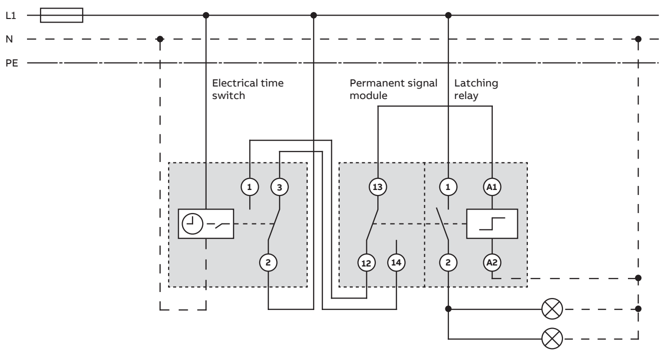
For latching relays with a frequency of 60Hz the combination of E290+E292+E299 is not possible (either E290+E292 or in a separate device combination E290+E299)

Latching Relay E290 with attached contact module E292-16-11 (additional main contact tracks) plus an auxiliary contact to externally display the switching state of the main contacts (ON/OFF).



E290-16-10 + 295-PS – LATCHING RELAY WITH PERMANENT SIGNAL MODULE

This combination permits control of the E290 coil via a permanent signal (e.g. directly controlled by a timer or a twilight switch).
When using this accessory, manual switching at the main unit is not possible.

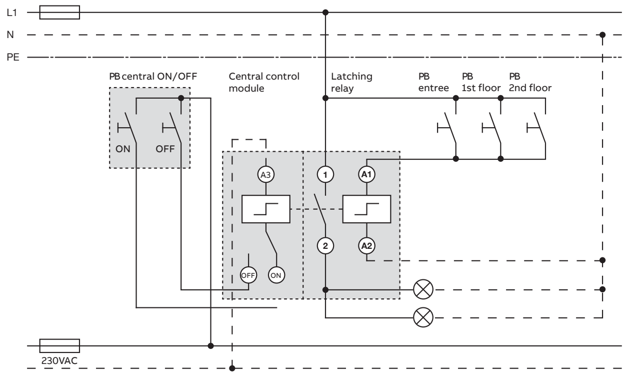


Command and signaling technical details

E290 mechanical latching relays

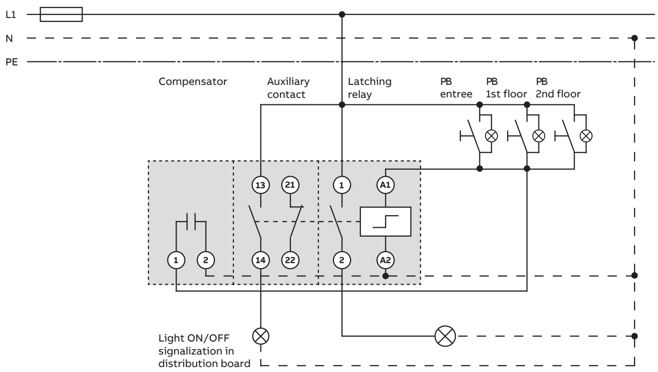
E290-16-10 + E294/230 – LATCHING RELAY WITH CENTRAL CONTROL MODULE

This is a second possibility to implement a Central ON/OFF control. When a E294/… accessory is snapped on, this Central ON/OFF device uses a different voltage source for coil control. The light control can be performed locally on site via the regular button. The Central ON/OFF button permits a general switching state change from a central location.



E296CP + E290-16-10 + E299-11 – LATCHING RELAY WITH AUXILIARY CONTACT PLUS COMPENSATOR

The compensator E296-CP is used every time a certain number of lit local buttons is exceeded.
See table in the catalog, page 16.



Command and signaling technical details

E290 latching relays

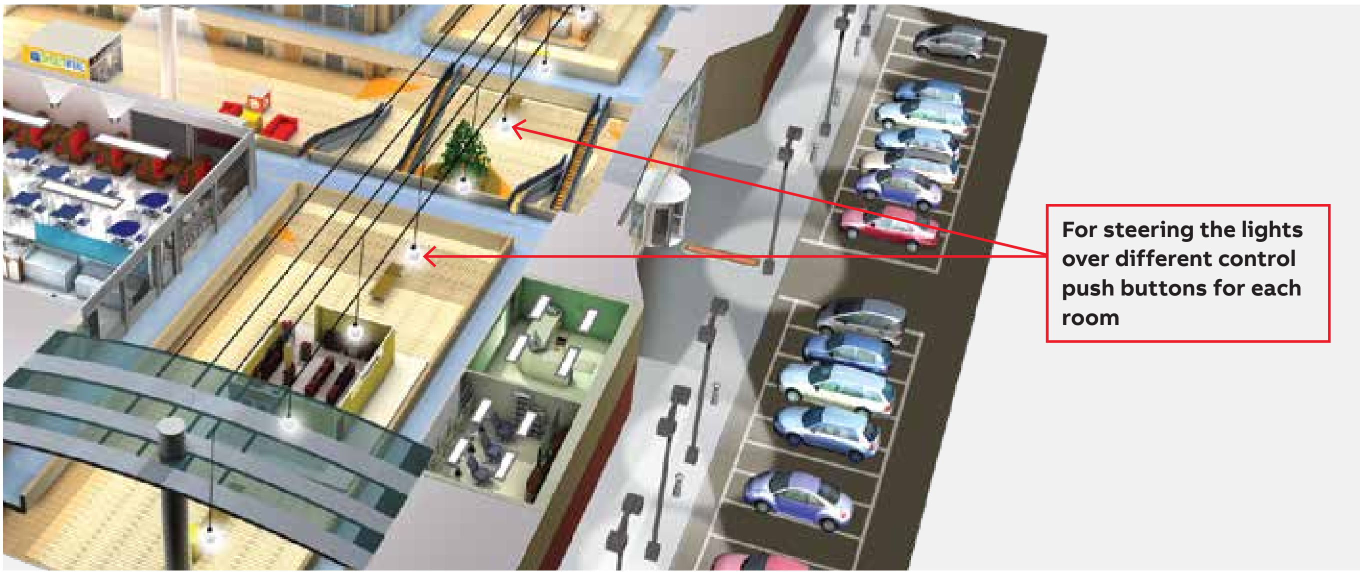
In an office building, supermarket or other large building complex, latching relays can be used to achieve a flexible, modern and reliable lighting control system for the whole site.

Application for an E290 Latching Relay:
Each time the impulse button is operated, an electrical pulse is applied to the latching relay that results in a change to the switching state. This state is held mechanically until the next pulse is received.

Switching sequence:
OFF – ON – OFF – ON

The main application for a latching relay is to simply switch various independent lighting areas on and off. Switching from „on" to „off" is carried out by means of a short impulse.
As the device coil of the latching relay is only excited by a pulse for a short time during switching, no additional holding energy is required. The contact position (on/off) is held by means of a mechanical interlock until the next pulse command is sent. In the event of a power failure, the current switch position will always be held. This technology considerably helps to reduce the temperature rise and current consumption of devices operated by magnetic coils, thus saving on unnecessary energy costs.

Example of use within a commercial building



Command and signaling technical details

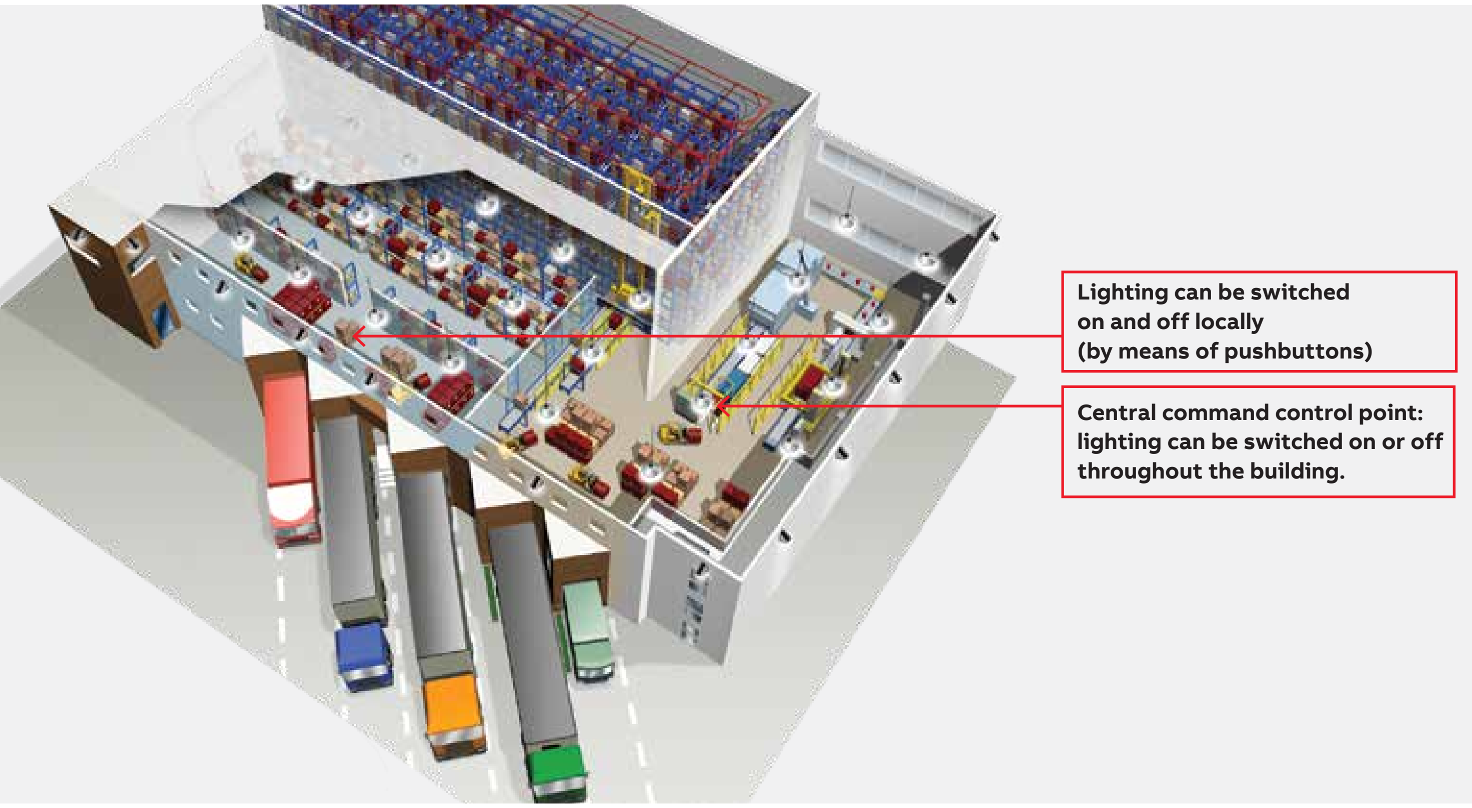
E290 latching relays

Application for an E290 Latching Relay in conjunction with an E293/X or E294 Central On-Off Control Module:
The interior lighting controlled by means of various impulse buttons can also be operated from a central control point by snapping on a central on-off control module onto the left side of the E290 latching relay.

Switching sequence:
Local => OFF – ON
Central => OFF – ON
(the central command is the superordinate command)

The combination of a Main device plus central on-off control module can be used to switch multiple lights on and off at the same time without any dependence on the current switch position of the devices. The actual switch position of the various devices (on/off) can be indicated by snapping an auxiliary contact (attachable on the right side) to the control center. Another possibility would be the combination of an E290 with an E294 central on-off control module for various control voltages. This combination enables for example the cooperation with a PLC (programmable logic controller). Any number of different logical activations in respect of latching relays can be recorded and visualised.

Example of use within an industrial warehouse

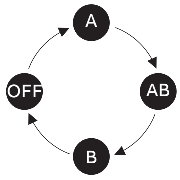


Command and signaling technical details

E291 sequential latching relays

Application using an E291S Sequential Latching Relay:
This independent special sequential latching relay switches the contact position in a preset fixed switching sequence.

Switching sequence:
OFF – A – AB – B – OFF

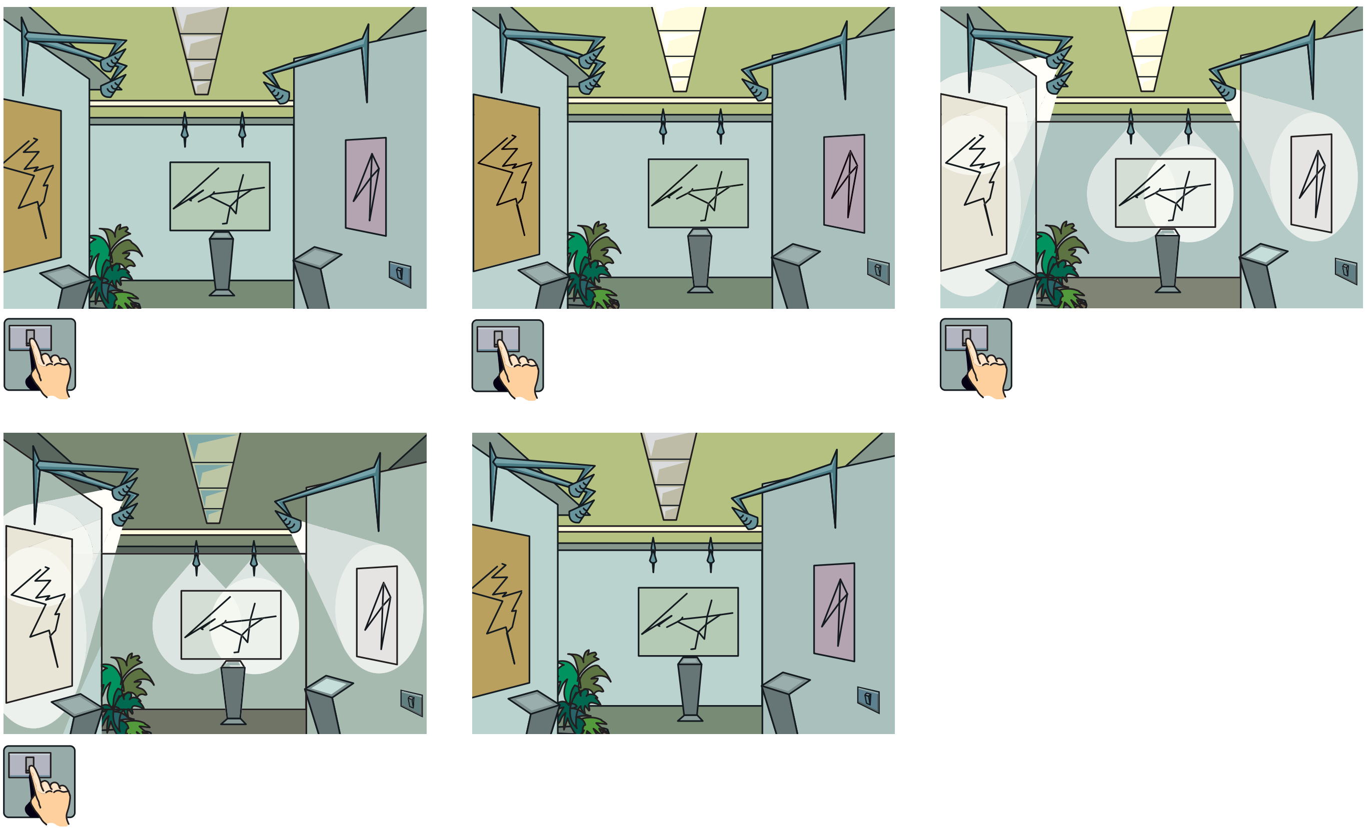


E291S latching relays with sequential contacts

Operating principle
The two contacts of the E291S latching relays switch indipendently their position (open/closed) at each impulse according to a preset sequence in the control circuit.

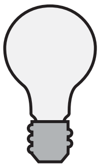
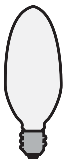
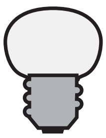
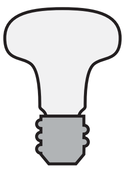
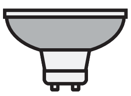
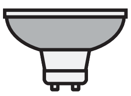
Application environments
The E291S latching relays are particularly indicated in environments and situations requiring the load sequential control through a single pushbutton circuit (offices, restaurants, etc.).

Example of installation
As shown in the diagrams, one of the possible applications is to mount the E291S latching relays inside the lighting system of an art gallery. The first pushbutton impulse will switch on the ceiling lights, the second triggers the wall lamps, the third switches off the ceiling lights and the fourth switches off the wall lamps.



Command and signaling technical details

LED lamp latching relays

	Application for (in W)	P [W] of the LED component	Number of LED components		
			Latching Relays (E290)		Installation Relays (E297)
			16 A	32 A	16 A
Switchable total power P (W) per contact path			**200**	**250**	**200**
LED E27 glow lamp shape					
	40	5.5	36	45	25
	40	6.0	33	42	23
	40	7.0	29	36	20
	60	9.0	22	28	16
	60	9.5	21	26	15
	60	10.0	20	25	14
	75	11.5	17	22	12
	75	13.0	15	19	11
	100	15.0	13	17	9
	100	18.0	11	14	8
LED E14 Candle-shaped bulb					
	25	3.0	67	83	40
	25	4.0	50	63	30
	40	6.0	33	42	20
	40	6.0	33	42	20
27/E14 Drop-shaped bulb					
	25	3.0	67	83	40
	25	4.0	50	63	30
	40	6.0	33	42	20
LED E27/E14 Reflectors					
	40	4.5	44	56	27
	50	5.5	36	45	22
	40	8.5	24	29	14
	40	9.5	21	26	13
	40	13.0	15	19	9
LED Low-voltage reflectors					
	20	3.4	59	74	35
	35	5.5	36	45	22
	35	6.5	31	38	18
	35	7.0	29	36	17
	50	8.0	25	31	15
LED High-voltage reflectors					
	35	3.5	57	71	34
	35	4.0	50	63	30
	50	4.5	44	56	27
	50	5.0	40	50	24
	50	5.4	37	46	22

Command and signaling technical details

LED lamp latching relays

	Application for (in W)	P [W] of the LED component	Number of LED components: Latching Relays (E290) 16 A	Latching Relays (E290) 32 A	Installation Relays (E297) 16 A
Switchable total power P (W) per contact path			200	250	200
LEDTube 0.6 m fluorescent lamp with electronic ballast					
	18	10.5	19	24	11
LEDTube 1.2 m fluorescent lamp with electronic ballast					
	36	16.5	12	15	7
	36	18.0	11	14	7
	36	21.0	10	12	6
LEDTube 1.52 m fluorescent lamp with electronic ballast					
	18	10.5	19	24	11
	36	16.5	12	15	7
	36	18.0	11	14	7
	36	21.0	10	12	6
	58	22.0	9	11	5
	58	26.0	8	10	5
LEDTube 1.5 m with concentional/low-loss ballast					
	58	20.0	10	13	6
	58	23.0	9	11	5
	58	25.0	8	10	5
LEDTube 1.2m with concentional/low-loss ballast					
	36	16.0	13	16	8
	36	18.0	11	14	7
LEDTube 0.6m with concentional/low-loss ballast					
	18	8.0	25	31	15
	18	9.0	22	28	13

Command and signaling technical details

E290 latching relays

Use of lighted pushbuttons

Latching relays can be controlled through lighted pushbuttons, without any limitations in terms of connection of three-terminal types.

In two-terminals pushbuttons the current that flows through pushbutton lamps can trigger an unwanted activation; in order to avoid this there is the E296-CP compensation module, installed in parallel on the coil.

Maximum Number of Illuminated buttons per main device (with 0.6 mA glxow lamp)

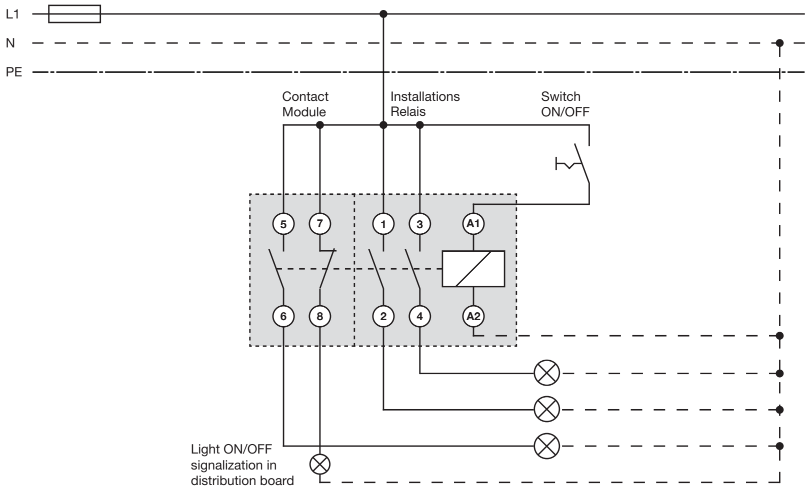
		Latching relay		Central ON/OFF, different potential
	contacts	**1 & 2**	**3 & 4**	**1 & 2**
	without compensator	8	9	12
+	with 1 compensator	18	22	21
+	with 2 compensators	45	38	58

Command and signaling technical details

E297 installation relay

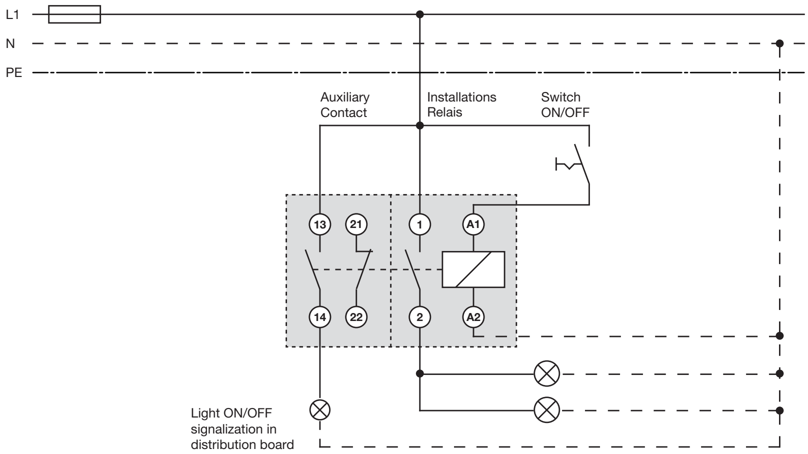
E297-16-20 + E298-16-11 — Installation Relay with Contact Module

Light control via an Installation Relay E297 with connected Contact Module E298-16-11 (additional main contacts) to externally signal the switching state of the main contacts (ON/OFF).



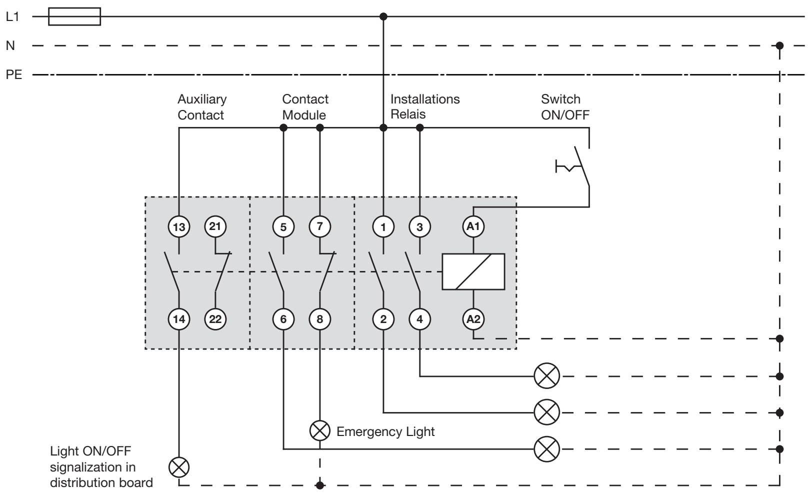
E297-16-10 + 299-11 — Installation Relay with Auxiliary Contact

Application with a normal light control via an ON/OFF switch. The current condition indication of the light control (ON/OFF) is implemented, e.g., in the distribution board, with the help of the auxiliary contact (E299-11).



E297-16-20 + E298-16-11 + 299-11 — Installation Relay with Contact Module and Auxiliary Contact

Combination of an installation relay E297 with an attached Contact Module E298-16-11 (additional main contacts) plus an Auxiliary Contact to clearly indicate the switching state of the main contacts (ON/OFF).



E297 Installation Relay
Application

Because of the individual options for using Installation Relays in building management systems, these devices can be used to realise a modern and reliable consumer control system.

APPLICATION FOR AN E297 INSTALLATION RELAY

When current is applied to an Installation Relay, the relay coil attracts one of the main contacts and changes the contact position. The coil of an Installation Relay has to remain energised in order to hold the contact position. If the voltage is removed from the coil, the Installation Relay always returns to the off position.

Switching sequence:
OFF – ON

Main areas of application include exterior lighting for office buildings or supermarket car parks as well as other big installations. An extremely flexible and modern lighting control system can be created, using E297 Installation Relays. Activation can be carried out by means of a twilight switch or a timer but also by means of a simple on-off switch or another electrical control unit.

Reliable switching of an exterior lighting system, for example, is realised by sending clear on and off control commands from an external control point. The magnetic coil has to be permanently energised in order for the Installation Relay to be held in the on position. The energy consumption of the Installation Relay is reduced to a minimum by the performance-optimised magnetic coil. The low switching noise also makes it suitable for professional use in closed inhabited areas.

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01 Example of use within a technical building

Command and signaling technical details

E297 installation relay

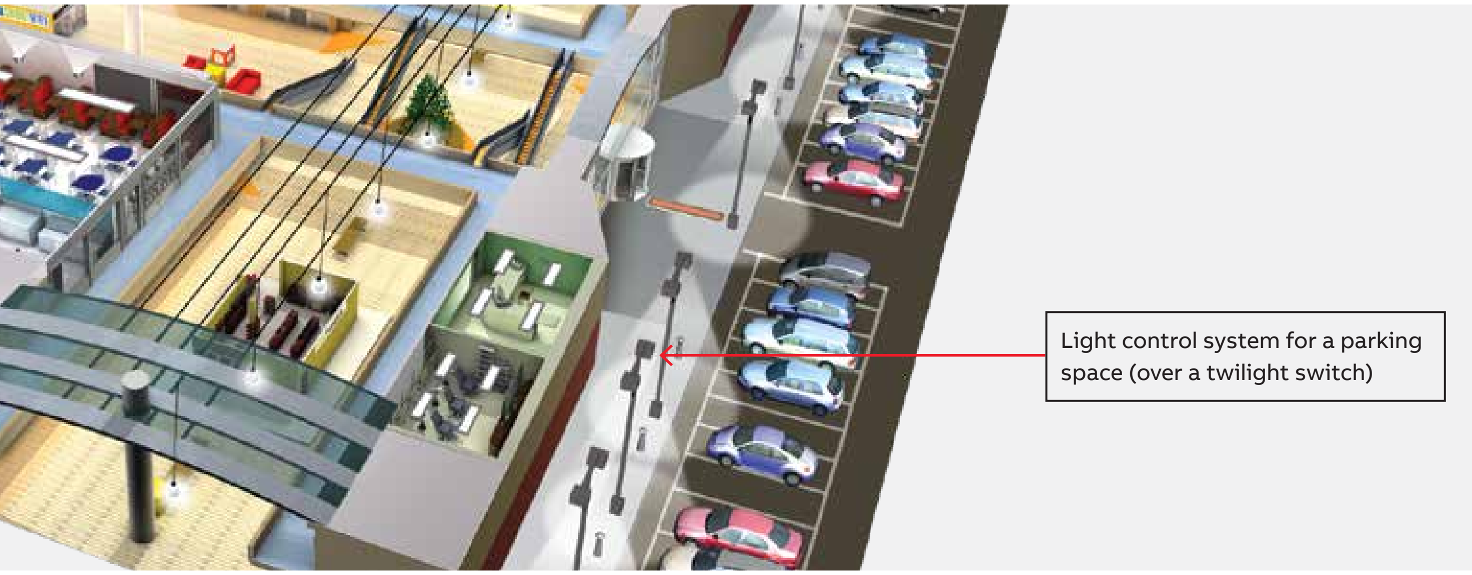
Because of the individual options for using the installation relays in building management systems, these devices can be used to realise a modern and reliable consumer control system.

Application for an E297 Installation Relay:
When current is applied to an installation relay, the relay coil attracts one of the main contacts and changes the contact position. The coil of an installation relay has to remain energised in order to hold the contact position. If the voltage is removed from the coil, the installation relay always returns to the off position.

Switching sequence:
OFF – ON

Main areas of application include exterior lighting for office buildings or supermarket car parks as well as other big installations. An extremely flexible and modern lighting control system can be created, using E297 installation relays. Activation can be carried out by means of a twilight switch or a timer but also by means of a simple on-off switch or another electrical control unit. Reliable switching of an exterior lighting system, for example, is realised by sending clear on and off control commands from an external control point. The magnetic coil has to be permanently energised in order for the installation relay to be held in the on position. The energy consumption of the installation relay is reduced to a minimum by the performance-optimised magnetic coil. The low switching noise also makes it suitable for professional use in closed inhabited areas.

Example of use within a commercial building

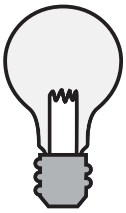
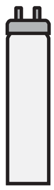
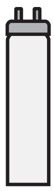
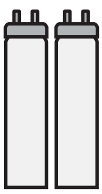
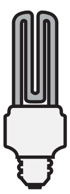


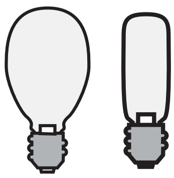
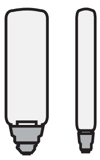
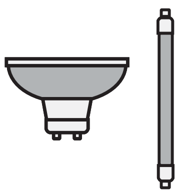
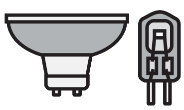
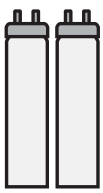
Command and signaling technical details

E297 installation relay

Lamp load table

Latching and Installation Relays

	Power in W	Latching Relays max. number for E290 16 A	Latching Relays max. number for E290 32 A	Installation Relays max. number for E297 16 A
Glow lamps				
	15	200	266	120
	25	120	160	72
	40	75	102	45
	60	50	65	30
	75	40	52	24
	100	30	40	18
	150	20	26	12
	200	15	20	9
	300	9	12	6
	500	5	7	3
Fluorescent lamps with starter				
	18	81	100	50
	36	44	58	25
	40	38	53	23
	58	29	35	16
	65	26	34	13
Fluorescent lamps with ballast				
	18	103	132	17
	36	63	81	13
	40	40	77	12
	58	29	35	10
	65	17	28	7
Fluorescent lamps with duo circuit				
	2x18	82	110	50
	2x36	41	55	25
	2x40	35	50	23
	2x58	23	34	16
	2x65	12	23	13
Energy saving lamps				
	1x18	83	112	38
	1x36	46	61	30
	1x58	31	38	17
	2x18	40	56	19
	2x36	23	30	15
	2x58	14	19	8

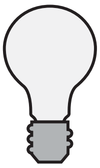
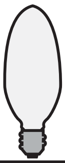
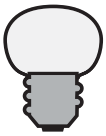
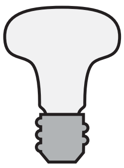
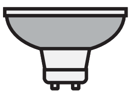
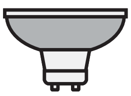
	Power in W	Latching Relays max. number for E290 16 A	Latching Relays max. number for E290 32 A	Installation Relays max. number for E297 16 A
Halogen lamps 230 V				
	55	27	36	6
	90	17	22	4
	135	11	14	3
	185	8	10	2
High-pressure sodium-vapour lamps				
	70	15	18	10
	150	8	10	5
	250	4	6	3
	400	3	3	2
	1000	1	1	–
Low-pressure sodium-vapour lamps				
	55	25	29	6
	90	16	20	4
	135	11	12	3
	185	4	5	2
High-pressure mercury-vapour lamps				
	150	20	27	12
	250	12	16	7
	300	10	13	6
	400	7	10	4
	500	6	8	3
	1000	3	4	2
Low-pressure mercury-vapour lamps				
	20	116	160	72
	50	46	64	29
	75	31	42	20
	100	24	32	15
	150	15	21	10
	200	12	16	7
	300	7	10	5
Fluorescent lamps with electronic ballast				
	1x18	83	112	38
	1x36	46	61	30
	1x58	31	38	17
	2x18	40	56	19
	2x36	23	30	15
	2x58	14	19	8

Command and signaling technical details

E297 installation relay

Lamp load table

Latching and Installation Relays

	Application for (in W)	P [W] of the LED component	Number of LED components		
			Latching Relays (E290)		Installation Relays (E297)
			16 A	32 A	16 A
Switchable total power P (W) per contact path			**200**	**250**	**200**
LED E27 glow lamp shape					
	40	5.5	36	45	25
	40	6.0	33	42	23
	40	7.0	29	36	20
	60	9.0	22	28	16
	60	9.5	21	26	15
	60	10.0	20	25	14
	75	11.5	17	22	12
	75	13.0	15	19	11
	100	15.0	13	17	9
	100	18.0	11	14	8
LED E14 Candle-shaped bulb					
	25	3.0	67	83	40
	25	4.0	50	63	30
	40	6.0	33	42	20
	40	6.0	33	42	20
27/E14 Drop-shaped bulb					
	25	3.0	67	83	40
	25	4.0	50	63	30
	40	6.0	33	42	20
LED E27/E14 Reflectors					
	40	4.5	44	56	27
	50	5.5	36	45	22
	40	8.5	24	29	14
	40	9.5	21	26	13
	40	13.0	15	19	9
LED Low-voltage reflectors					
	20	3.4	59	74	35
	35	5.5	36	45	22
	35	6.5	31	38	18
	35	7.0	29	36	17
	50	8.0	25	31	15
LED High-voltage reflectors					
	35	3.5	57	71	34
	35	4.0	50	63	30
	50	4.5	44	56	27
	50	5.0	40	50	24
	50	5.4	37	46	22

	Application for (in W)	P [W] of the LED component	Number of LED components		
			Latching Relays (E290)		Installation Relays (E297)
			16 A	32 A	16 A
Switchable total power P (W) per contact path			**200**	**250**	**200**
LEDTube 0.6 m fluorescent lamp with electronic ballast					
	18	10.5	19	24	11
LEDTube 1.2 m fluorescent lamp with electronic ballast					
	36	16.5	12	15	7
	36	18.0	11	14	7
	36	21.0	10	12	6
LEDTube 1.52 m fluorescent lamp with electronic ballast					
	18	10.5	19	24	11
	36	16.5	12	15	7
	36	18.0	11	14	7
	36	21.0	10	12	6
	58	22.0	9	11	5
	58	26.0	8	10	5
LEDTube 1.5 m with concentional/low-loss ballast					
	58	20.0	10	13	6
	58	23.0	9	11	5
	58	25.0	8	10	5
LEDTube 1.2m with concentional/low-loss ballast					
	36	16.0	13	16	8
	36	18.0	11	14	7
LEDTube 0.6m with concentional/low-loss ballast					
	18	8.0	25	31	15
	18	9.0	22	28	13

E27 Mostly used bulb fitting for standard lamps
E14 Up to 40 (rarely 60) W with candle-shaped bulb

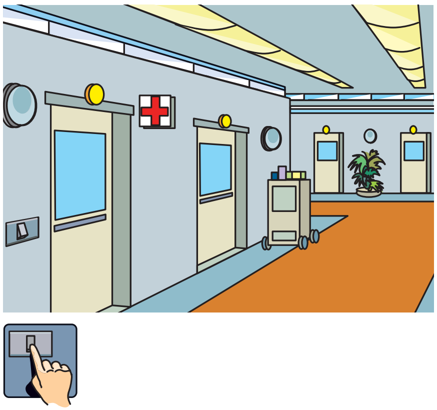
Command and signaling technical details

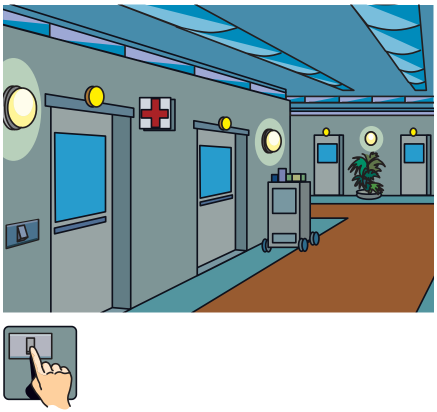
E297 installation relay

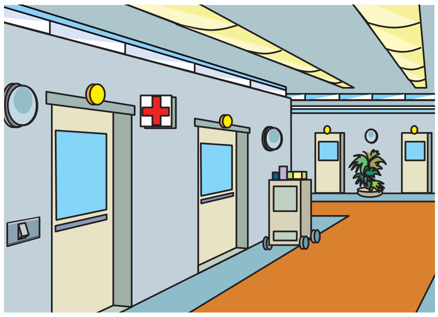
Operating principle
The E297 installation relays are 16 A contactors specifically engineered for residential and commercial applications and are available in a wide range of contact layouts and coil voltages.

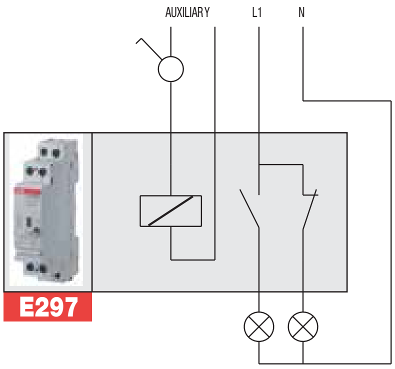
Application environments
The E297 installation relays are particularly indicated in residential and commercial buildings for lighting control.

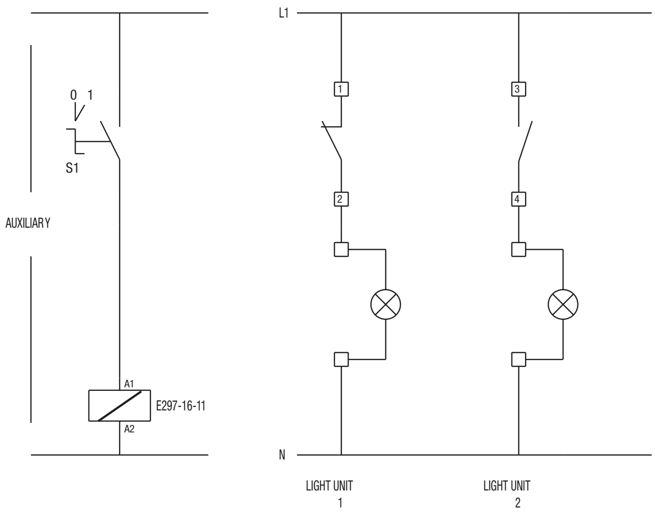
Example of installation
As shown in the diagrams, one of the possible applications is to mount the E297-16-11 installation relay with a NO and a NC contact inside the electric system of a hospital ward. The first control sent through a switch to the command circuit of the relay will turn off the ceiling lights and turn on the corridor lamps, while the second command returns to the previous state.







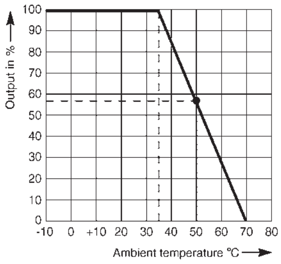




Command and signaling technical details

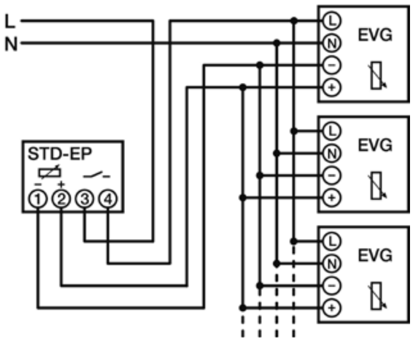
STD dimmers

Control power STD 50-3: 20-500 W/VA
STD 50-4: 40-420 W/VA

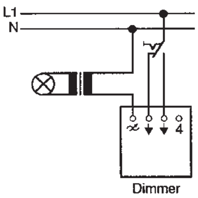


Influence of ambient temperature on the control power
The certified rated power is indicated on the dimmer.
Where higher ambient temperatures occur, reduce values as is specified in the diagram.
At 50 °C /122°F ambient temperature, the permissible load drops to 57%.

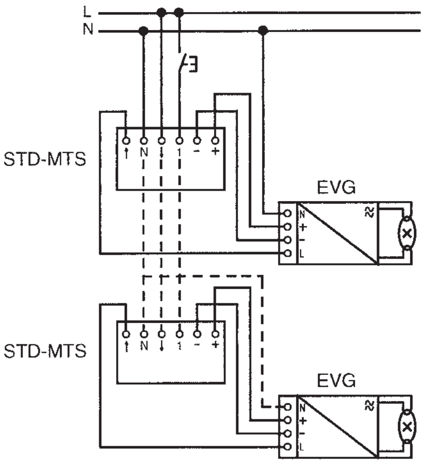
Electronic potentiometer



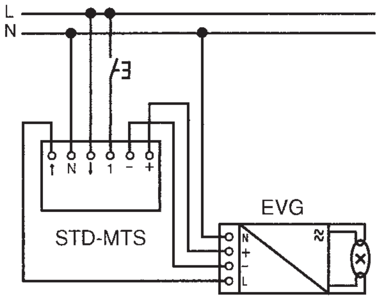
Dimmer STD 50-4 in two-way circuit, lv halogen lamps via electronic transformer



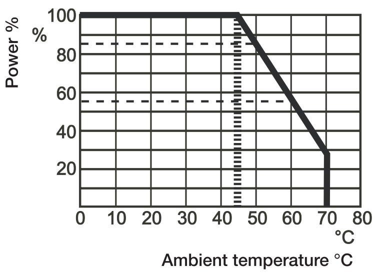
Brightness control of fluorescent lamps with 1 -10 V control input. Control of more than one memory touch controller STD-MTS via one push-button.

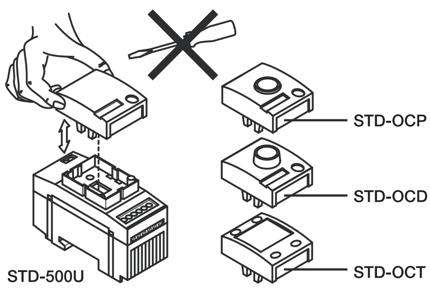


Brightness control of a fluorescent lamp with 1 - 10 V DC control input with memory touch controller STD-MTS with external pushbutton, e.g. E 225



Connected load / ambient temperature diagram





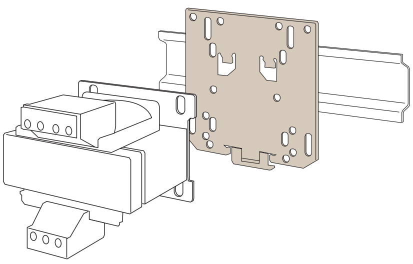
STD-500 U

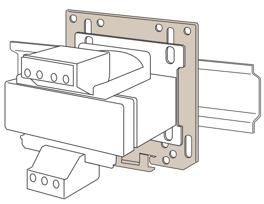
Command and signaling technical details

Modular transformers

Modular transformers
The range of System pro M compact modular transformers consists of a series of safety transformers for general use, TS-C with 12-24 V secondary and powers of 25, 40 and 63 VA, the TM range of bell transformers, with secondary voltages of 12-24 V and a maximum rated power of 10-15-30-40 VA, and the TS range of bell transformers, with secondary voltages of 8-12-24 V and a rated secondary power of 8-16-24 VA (some TS types are available with an integrated switch ON/OFF).

Modular safety transformers for general use TS-C, continuous functioning
Standard: IEC EN 61558-2-6
The TS-C safety transformer is an insulation transformer for supplying SELV circuits (with extremely low safety voltage) or PELV circuits (with extremely low protection voltage).
In contrast to the bell transformers, TS-C transformers can be used to continuously supply low voltage loads and they have a reduced voltage drop value. Even after a short-circuit they maintain their temperature below the specified limits. In addition they are equipped with a thermal sensitive restoring device which automatically restores power when the transformer is sufficiently cooled down or the overload has been removed.





Fail proof bell transformers TM series
Standard: IEC EN 61558-2-8
Following a short-circuit or an overload use the products may not continue to operate, but they continue assuring separation between primary and secondary circuits, safeguarding the user and adjacent electric parts: the serie includes 8 models with 10, 15, 30 and 40 VA power and 4, 8, 12 and 24 V output voltages.

Non-inherently short-circuit proof bell transformers TS series
Standard: IEC EN 61558-2-8
Even after a short-circuit they maintain their temperature below the specified limits. In fact they are equipped with a thermal protection device which automatically restores power when the transformer is sufficiently cooled down or the overload has been removed. The TS series includes 10 models with 8, 16, 24 VA power and output voltages of 4, 6, 8 and 12 and 24 V AC.
The TS8/SW series is equipped with an ON-OFF switch on the front side that allows the control of the load connected to transformer's secondary circuit. It includes 5 models with 8 VA power and output voltages of 4, 6, 8 and 12 V.

Command and signaling technical details

Control, isolating and safety transformers

Control, isolating and safety transformers
The choice of supply voltage for a control circuit must take into account two factors: the safety of users, and the functional reliability of the circuits, which can be dependent on the voltage drop.

Control transformer
Reference standard: CEI EN 61558-2-2:
Transformer for supplying control circuits, for example commands, signaling, interlocks, etc.

Isolating transformer
Reference standard: CEI EN 61558-2-4:
Transformer in which the primary and secondary windings are electrically separated by a double or reinforced insulation, to protect the circuit supplied by the secondary against hazards due to accidental simultaneous contact with earth and live parts, or grounded parts that may become live in the event of an insulation fault.

Safety transformer
Reference standard: CEI EN 61558-2-6:
Isolation transformer for supplying safety extra low voltage circuits (<50 V on no load). Accidental contact with the secondary winding phases can be withstood without any danger.

Impregnation and tropicalization
ABB transformers are fully impregnated using a thermal class F resin. This treatment improves the characteristics of the insulating materials, making the transformers suitable for installation in harsh environments. It also augments heat exchanges, thereby lowering the transformer temperature, prevents moisture from penetrating the windings and core, and minimises vibrations and the resultant noise.

Insulation classes
The duration of the insulation in the products depends on many factors, and in cases where the insulating material electrically segregates live parts from accessible parts, any alteration in its characteristics may put the safety of the user at risk.
The standards prescribe maximum temperature limits for transformer windings as a function of the insulation class. ABB transformers are constructed using class B materials. The maximum permitted ambient temperature is specified on the transformer rating plate as well as on this catalog.

Insulation class	T MAX
A	100 °C
E	115 °C
B	120 °C
F	140 °C
H	165 °C

Command and signaling technical details

Control, isolating and safety transformers

Protection of transformers

Protection on primary

On the primary side, the transformer cannot generate any overload by itself. During power up, however, a very high inrush current (approx. 20 In) is generated. Protections should therefore be calibrated in order to prevent their tripping during the transformer connection phase. The most suitable types of protection are:

- aM fuses
- S202 miniature circuit breakers, D characteristic.

Minimum protection on primary

Transformer power (VA)		230 V single phase	400 V single phase
50	aM fuse	0.5 A	0.315 A
100	aM fuse	1 A	0.63 A
	Breaker capacity	1.6 A	1 A
	Trip characteristic	D	D
160	aM fuse	1.6 A	1 A
	Breaker capacity	3 A	2 A
	Trip characteristic	D	D
200	aM fuse	2 A	1.25 A
	Breaker capacity	3 A	2 A
	Trip characteristic	D	D
250	aM fuse	2.5 A	1.6 A
	Breaker capacity	4 A	3 A
	Trip characteristic	D	D
320	aM fuse	3.15 A	2 A
	Breaker capacity	5 A	3 A
	Trip characteristic	D	D
400	aM fuse	4 A	2.5 A
	Breaker capacity	8 A	5 A
	Trip characteristic	D	D
630	aM fuse	6.3 A	4 A
	Breaker capacity	13 A	8 A
	Trip characteristic	D	D
1000	aM fuse	10 A	6 A
	Breaker capacity	20 A	13 A
	Trip characteristic	D	D
1600	aM fuse	16 A	10 A
	Breaker capacity	32 A	20 A
	Trip characteristic	D	D
2000	aM fuse	20 A	12 A
	Breaker capacity	40 A	25 A
	Trip characteristic	D	D
2500	aM fuse	25 A	16 A
	Breaker capacity	50 A	32 A
	Trip characteristic	D	D

Notes:
The protection specified in the table is the minimum "recommended" for protecting the supply line.
The breaking capacity of the primary miniature circuit breakers is a function of the supply line.

Protection on secondary

The secondary circuit must be protected against overload and short-circuit. Moreover, additional protection may need to be adopted depending on the distribution system type.

- Overload: The tripping current value of the protection used should be equal to or lower than the secondary current of the transformer.
- Short-circuit: Any short-circuit in the most distant point of the line should make the protection device trip in less than 5 seconds (IEC 60364). The protection of the transformer and the protection of the line may coincide when the transformer supplies power to a single line and a full compatibility has been ensured. The suitable secondary protection can be found on the selection tables.

Command and signaling technical details

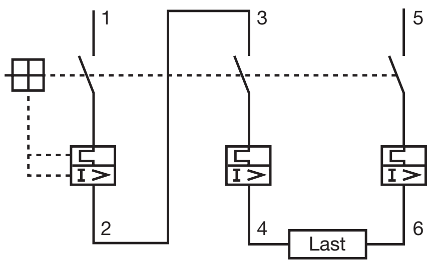
Control, isolating and safety transformers

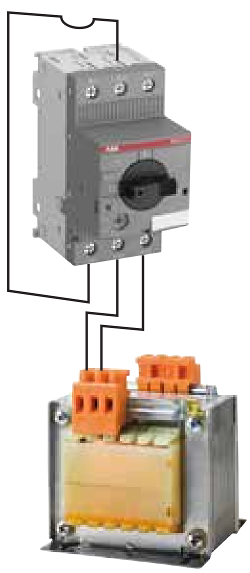
Transformer				Circuit Breaker for Transformer Protection		
Type	Rated Power (VA)	Input Voltage (V)	Nominal current (A)	Type	Ordering Code	Current setting (A)
TM-...50...	50	230	0.22	MS132-0.25T	1SAM340000R1002	0.22
TM-...100...	100	230	0.43	MS132-0.63T	1SAM340000R1004	0.43
TM-...160...	160	230	0.70	MS132-1.0T	1SAM340000R1005	0.70
TM-...200...	200	230	0.87	MS132-1.0T	1SAM340000R1005	0.87
TM-...250...	250	230	1.09	MS132-1.6T	1SAM340000R1006	1.09
TM-...320...	320	230	1.39	MS132-1.6T	1SAM340000R1006	1.39
TM-...400...	400	230	1.74	MS132-2.5T	1SAM340000R1007	1.74
TM-...630...	630	230	2.74	MS132-4.0T	1SAM340000R1008	2.74
TM-...1000...	1000	230	4.35	MS132-6.3T	1SAM340000R1009	4.35
TM-...1600...	1600	230	6.96	MS132-10T	1SAM340000R1010	6.96
TM-...2000...	2000	230	8.70	MS132-10T	1SAM340000R1010	8.70
TM-...2500...	2500	230	10.87	MS132-12T	1SAM340000R1012	10.87
TM-...50...	50	400	0.13	MS132-0.16T	1SAM340000R1011	0.13
TM-...100...	100	400	0.25	MS132-0.25T	1SAM340000R1002	0.25
TM-...160...	160	400	0.40	MS132-0.4T	1SAM340000R1003	0.40
TM-...200...	200	400	0.50	MS132-0.63T	1SAM340000R1004	0.50
TM-...250...	250	400	0.63	MS132-0.63T	1SAM340000R1004	0.63
TM-...320...	320	400	0.80	MS132-1.0T	1SAM340000R1005	0.80
TM-...400...	400	400	1.00	MS132-1.6T	1SAM340000R1006	1.00
TM-...630...	630	400	1.58	MS132-2.5T	1SAM340000R1007	1.60
TM-...1000...	1000	400	2.50	MS132-4.0T	1SAM340000R1008	2.50
TM-...1600...	1600	400	4.00	MS132-6.3T	1SAM340000R1009	4.00
TM-...2000...	2000	400	5.00	MS132-10T	1SAM340000R1010	6.30
TM-...2500...	2500	400	6.25	MS132-10T	1SAM340000R1010	6.30

Properties
Each type of transformer detailed in the table above can be supplied on the primary side with a line protected by the corresponding Manual Motor Starter.
The indicated devices are calibrated to prevent from tripping during the transformer connection phase.

Caution: the motor starter do not protect the transformer, for this scope another compulsory protection must be installed on the secondary side as detailed on the transformers datasheet.

Wiring diagram with motorstarter

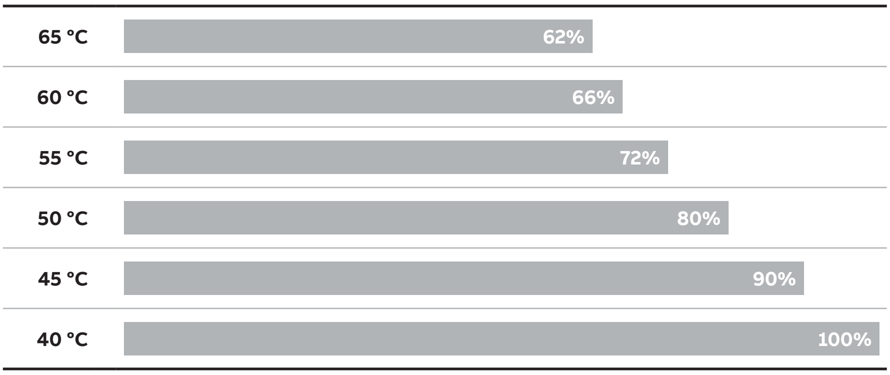




Command and signaling technical details

Control, isolating and safety transformers

Power draw according to temperature and altitude



Power draw % according to temperature

Power draw % according to altitude

TM-I

	Cable section			
	Primary		Secondary 115-230 V	
Power VA	Min. mm²	Min. mm²	Min. mm²	Min. mm²
50	0,5	4	0,5	4
100	0,5	4	0,5	4
160	0,5	1,5	0,5	1,5
200	0,5	1,5	0,5	1,5
250	0,5	1,5	0,5	1,5
320	0,5	1,5	0,5	1,5
400	0,5	1,5	0,5	1,5
630	0,5	2,5	0,5	2,5
1000	0,5	2,5	0,5	2,5
1600	0,5	2,5	0,5	2,5
2000	0,5	2,5	0,5	2,5
2500	0,5	2,5	0,5	2,5

Command and signaling technical details

Control, isolating and safety transformers

TM-S

	Cable section					
	Primary		Secondary 12-24V		Secondary 24-48V	
Power VA	Min. mm²	Min. mm²	Min. mm²	Min. mm²	Min.	Max.
50	0,5	4	0,5	4	0,5	4
100	0,5	4	0,5	4	0,5	4
160	0,5	1,5	0,5	1,5	0,5	1,5
200	0,5	1,5	0,5	1,5	0,5	1,5
250	0,5	1,5	0,5	1,5	0,5	1,5
320	0,5	1,5	0,5	2,5	0,5	2,5
400	0,5	1,5	0,5	2,5	0,5	2,5
630	0,5	2,5	0,5	2,5	0,5	2,5
1000	0,5	2,5	4	10	-	-
1600	0,5	2,5	1,5	50	-	-
2000	0,5	2,5	1,5	50	-	-
2500	0,5	2,5	1,5	50	-	-

TM-C

	Cable section					
	Primary		Secondary 12-24V		Secondary 24-48V	
Power VA	Min. mm²	Min. mm²	Min. mm²	Min. mm²	Min.	Max.
50	0,5	4	0,5	4	0,5	4
100	0,5	4	0,5	4	0,5	4
160	0,5	1,5	0,5	1,5	0,5	1,5
200	0,5	1,5	0,5	1,5	0,5	1,5
250	0,5	1,5	0,5	1,5	0,5	1,5
320	0,5	1,5	0,5	1,5	0,5	2,5
400	0,5	1,5	0,5	1,5	0,5	2,5
630	0,5	2,5	0,5	2,5	0,5	2,5
1000	0,5	2,5	0,5	2,5	4	10
1600	0,5	2,5	0,5	2,5	1,5	50
2000	0,5	2,5	0,5	2,5	1,5	50
2500	0,5	2,5	0,5	2,5	1,5	50

Transformer leaks

Power (VA)	No-load loss (W)	Load loss (W)
50	4	8.5
100	6,5	14
160	9	21
200	9	22
250	12	25
320	13	30
400	15	32
630	23	45
1000	36	60
1600	50	75
2000	60	90
2500	65	105

Command and signaling technical details

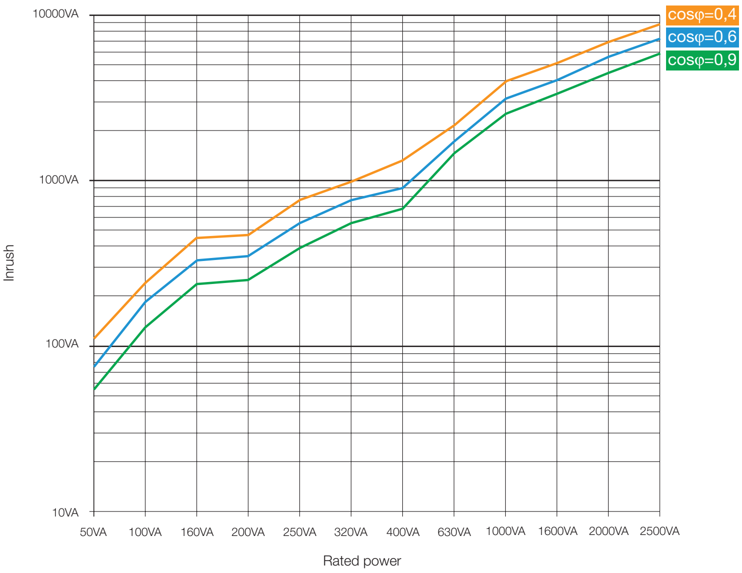
Control, isolating and safety transformers

Short circuit voltage, no-load output voltage variations

Power	(VA)	50	100	160	200	250	320	400	630	1000	1600	2000	2500
Vcc ①	(%)	10.6	7.5	5.2	4.8	9.5	6.9	6	4	3.5	3	2.8	2.3
ΔV ②	(%)	11	7.8	6	5.8	6.7	7	5.4	4.3	3.3	2.8	2	1.8

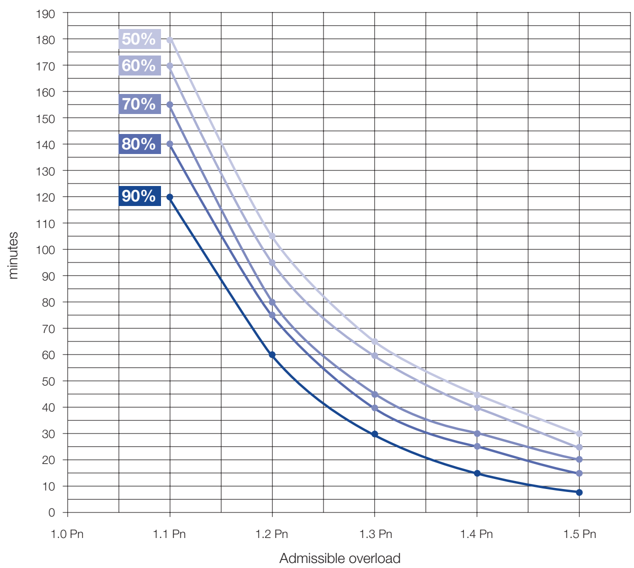
① Percent of rated supply voltage; ② Percent of rated output voltage

Inrush power trend



Admissible overload

If the transformer rated power is not drawn on a continuous basis, the transformer may be overloaded, according to the diagram below:



If a transformer is used with an intermittent duty cycle, it can be sized according to the formula:

$$P_{\text{transformer}} = P_{\text{intermittent}} * \sqrt{\frac{\text{operating time}}{\text{total cycle time (operating + pause time)}}}$$

with time expressed in minutes

Command and signaling technical details

Control, isolating and safety transformers

In control equipment, can I use the two secondary outputs of a single transformer to supply two different auxiliary circuits?
It is possible to simultaneously use both the secondary outputs of an ABB transformer to supply two circuits with different voltage ratings. The sum of the power draw from each circuit must not exceed the power rating of the transformer.

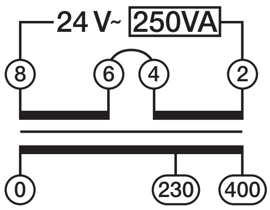
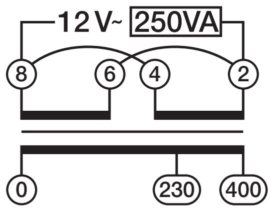
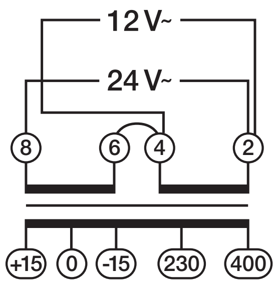
What type of transformer should be used to supply safety extra low voltage (SELV) circuits?
To construct a SELV circuit it is necessary to use a safety transformer compliant with the IEC EN 61558-2-6 standard, which guarantees both electrical separation of the systems by means of double insulation and the required extra low voltage (12-24 V±5%).

Can the secondary windings of two or more ABB single-phase transformers be connected in parallel?
It is possible to connect in parallel up to a maximum of 3 ABB transformers of equal power, bearing in mind that the total power which can be drawn will be equal to 90% of the sum of the individual powers. Pay great attention to terminal connection and, if necessary, test the circuit first in series and then in parallel.

In a piece of equipment supplied at 24 V a.c., I need to supply a cooling fan with a voltage rating of 230 V a.c. Can I use
a transformer, supplying it from the secondary?
It is possible to supply the transformers on the secondary side, but due to the nature of their construction, the voltage output from the primary may vary by 10-30% relative to the rated voltage.

How can I quickly size the power of a transformer?
P = 0.8 (Σ Pm + Σ Pr + Pa)
Σ Pm = Sum of all continuous power consumptions of contactors
Σ Pr = Sum of all the resistive powers
Pa = Inrush power of the largest contactor

Use of two output voltages at the same time

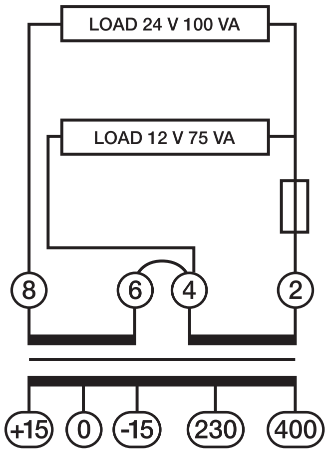
Case A	Case B	Case C
		
Use of one output voltage: 24 V	Use of one output voltage: in 12 V	Use of two output voltages: Output 1: 24 V Output 2: 12 V

Command and signaling technical details

Control, isolating and safety transformers

Wiring rules for case c:

- The combined power delivered of the two outputs must not exceed the rated power.
- The power delivered on the output with less voltage must be at most:
- lower voltageP ≤ 0,5 x (ratedP – higher voltageP)
- The protection device for the secondary must be positioned at the point of the passing current of the two outputs and selected based on the higher voltage of the two loads:



The fuse must be selected based on the higher voltage of the load and positioned in the point where the current of the two loads passes.

Example:
Transformer with ratedP 250 VA
12-24 V
Fuse 10 A gG or S 202 C10 automatic circuit breaker.

Examples:
Transformer with a rated power of 250 VA and 12/24 V secondary voltage:

	Power on 24 V output	Power on 12 V output	Comment
Es.1	250 VA	-	Case A is: the full power is delivered on the 24 V output
Es.2	-	250 VA	Case B is: the full power is delivered on the 12 V output
Es.3	100 VA	75 VA	Case C is: The power is delivered on the two outputs.
			Rule 1: Total power ≤ ratedP Total power ≤ 250 VA OK Rule 2: lower voltageP ≤ 0,5 x (ratedP – higher voltageP) lower voltageP ≤ 0,5 x (250 – 100) lower voltageP ≤ 75 VA OK

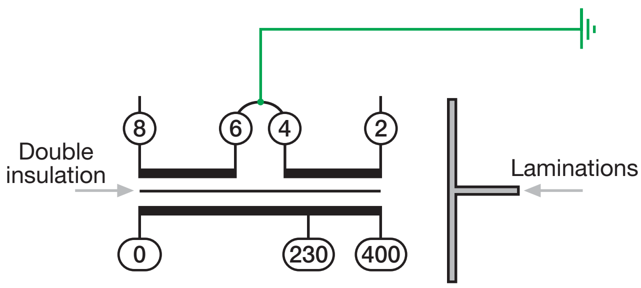
Connecting the transformer with the central point of the secondary to ground
Connection of the central point of the secondary of the transformer to ground makes it possible to decrease the potential of the secondary circuit in respect to ground, while maintaining the same output voltage.

Command and signaling technical details

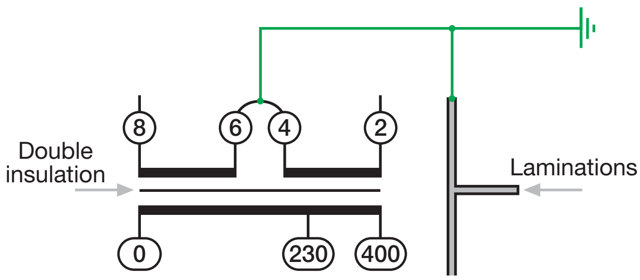
Control, isolating and safety transformers

Example:
with a transformer with 12/24 V output you can connect the central zero and deliver a voltage of -12 V / 0 V / +12 V. The voltage available to the secondary is always 24 V while the difference in potential in respect to the ground does not exceed 12 V, during normal operation.

Warning for grounding the central point for safety and insulating transformers:
If the lamination is grounded (with the Faston plug for example), the insulation properties of the safety and insulating transforms will be reduced: the insulation between the secondary and primary becomes one and not double/reinforced, thus decreasing the transformer properties.



Lamination not grounded
Connection 12-0-12 preserving double insulation



Lamination grounded
The insulation between the primary and secondary is reduced to that between the laminations and primary. Consequently, this assembly takes away the advantage of double insulation.

Command and signaling technical details

CP-D power supplies and the CP-D redundancy units

CP-D range – Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-D 12/0.83	CP-D 12/2.1
Input circuit - supply circuit		**L, N**	
Rated input voltage U_{in}		100-240 V AC	
Input voltage range		90-264 V AC / 120-375 V DC	
Frequency range AC		47-63 Hz	
Typical input current / typical power consumption	at 115 V AC	200 mA / 12.68 W	502 mA / 31.14 W
	at 230 V AC	128.3 mA / 13.01 W	277 mA / 31.2 W
Inrush current	at 115 / 230 V AC	16 A / 32 A	25 A / 50 A
Power failure buffering time		min. 30 ms	
Internal input fuse		1 A slow-acting / 250 V AC	2 A slow-acting / 250 V AC
Power factor correction (PFC)		no	
Indication of operational states			
Output voltage	DC ON: green LED	: output voltage applied	
	DC LOW: red LED	: output voltage too low	
Output circuit		**+, -**	**++, --**
Rated output voltage		12 V DC	
Tolerance of the output voltage		±1 %	
Adjustment range of the output voltage		-	12-14 V DC
Rated output power		10 W	25 W
Rated output current I_r	$T_a \leq 60$ °C	0.83 A	2.1 A
Derating of the output current	60 °C < $T_a \leq 70$ °C	2.5 %/°C	
Maximum deviation with	load change statical	max. 1 %	
	change of output voltage within the input voltage range	max. 1 %	
Control time		< 1 ms	
Starting time after applying the supply voltage	at I_r	1000 ms	
Rise time	at rated load	typ. 1 ms	
Residual ripple and switching peaks	BW = 20 MHz	50 mV	
Parallel connection		yes, using CP-D RU	
Series connection		yes, to increase voltage	
Resistance to reverse feed		18 V / 1 s	
Output circuit - No-load, overload and short-circuit behavior			
Characteristic curve of output		hiccup-mode	U/I characteristic curve
Short-circuit protection		continuous short-circuit stability	
Short-circuit behavior		continuation with output power limiting	
Current limiting at short circuit		typ. 1.4 A	typ. 5.9 A
Overload protection		output power limiting	
Overvoltage protection		15-16.5 V DC	
No-load protection		continuous no-load stability	
Starting of capacitive loads		unlimited	
General data			
Efficiency		typ. 78 %	typ. 82 %
Duty cycle		100 %	
Dimensions		see “Dimensional drawings”	
Material of housing		plastic	
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool	
Mounting position		horizontal	
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)	
Degree of protection	housing / terminals	IP20 / IP20	
Protection class		II	

Command and signaling technical details

CP-D power supplies and the CP-D redundancy units

CP-D range – Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		**CP-D 12/0.83**	**CP-D 12/2.1**
Electrical connection - Input circuit / Output circuit			
Connecting capacity	fine-strand with wire end ferrule	0.2-1.5 mm² (24-16 AWG)	0.2-2.5 mm² (24-14 AWG)
	rigid	0.2-2.5 mm² (26-12 AWG)	0.2-2.5 mm² (24-12 AWG)
Stripping length		4-5 mm (0.16-0.2 in)	7 mm (0.28 in)
Tightening torque		0.6 Nm (5 lb.in)	0.7 Nm (6 lb.in)
Environmental data			
Ambient temperature range	operation	-40…+70 °C (-40...+158 °F)	
	rated load	-40…+60 °C (-40...+131 °F)	
	storage	-40…+85 °C (-40...+185 °F)	
Altitude during operation	IEC/EN 60068-2-13	max. 4850 m	
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH	
Vibration (sinusoidal) (IEC/EN 60068-2-6)		50 m/s², 10 Hz - 2 kHz	
Shock (half-sine) (IEC/EN 60068-2-27)		40 m/s², 22 ms	
Isolation data			
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC	
Pollution degree		2	
Overvoltage category		II	
Standards / Directives			
Standards		IEC / EN 62368-1	
Low Voltage Directive		2014/35/EU	
EMC Directive		2014/30/EU	
RoHS Directive		2011/65/EU	
Protective low voltage		SELV (IEC60950-1)	
Electromagnetic compatibility			
Interference immunity to		IEC/EN 61000-6-2	
electrostatic discharge	IEC/EN 61000-4-2	level 4 (4 kV / 8 kV)	level 4 (4 kV / 15 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	level 3 (10 V/m)	
electrical fast transient/burst	IEC/EN 61000-4-4	level 4 (4 kV)	
surge	IEC/EN 61000-4-5	level 3 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	level 3 (10 V)	
Interference emission		IEC/EN 61000-6-3	
high-frequency radiated		class B	
high-frequency conducted		class B	

Command and signaling technical details

CP-D power supplies and the CP-D redundancy units

CP-D range – Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		**CP-D 24/0.42**	**CP-D 24/1.3**	**CP-D 24/2.5**	**CP-D 24/4.2**
Input circuit - supply circuit		**L, N**			
Rated input voltage U_{in}		100-240 V AC			
Input voltage range		90-264 V AC /120-375 V DC			
Frequency range AC		47-63 Hz			
Typical input current / typical power consumption	at 115 V AC	184 mA / 11.62 W	600 mA / 37.92 W	1120 mA / 69.3 W	1800 mA / 117.3 W
	at 230 V AC	120.6 mA / 12 W	344 mA / 38.16 W	660 mA / 70.1 W	900 mA / 114.4 W
Inrush current	at 115 / 230 V AC	max. 16 A / 32 A	max. 25 A / 50 A	max. 30 A / 60 A	
Power failure buffering time		min. 30 ms		min. 60 ms	
Internal input fuse		1 A slow-acting / 250 V AC	2 A slow-acting / 250 V AC		3.15 A slow-acting / 250 V AC
Power factor correction (PFC)		no			
Indication of operational states					
Output voltage	DC ON: green LED	⎍: output voltage applied			
	DC LOW: red LED	⎍: output voltage too low			
Output circuit		**+, -**		**++, --**	
Rated output voltage		24 V DC			
Tolerance of the output voltage		±1 %			
Adjustment range of the output voltage		-	24-28 V DC		
Rated output power		10 W	30 W	60 W	100 W
Rated output current I_r		Ta m 60 °C: 0.42 A	Ta m 60 °C: 1.3 A	Ta m 55 °C: 2.5 A	Ta m 60 °C: 4.2 A
Derating of the output current		60 °C < Ta m 70 °C: 2.5 %/°C	60 °C < Ta m 70 °C: 2.5 %/°C	55 °C < Ta m 70 °C: 2.5 %/°C	60 °C < Ta m 70 °C: 2.5 %/°C
Maximum deviation with	load change statical	max. 1 %			
	change of output voltage within the input voltage range	max. 1 %			
Control time		< 1 ms			
Starting time after applying the supply voltage	at I_r	1000 ms			
Rise time	at rated load	typ. 1 ms			
Residual ripple and switching peaks	BW = 20 MHz	50 mV			
Parallel connection		yes, using CP-D RU			
Series connection		yes, to increase voltage			
Resistance to reverse feed		35 V / 1 s			
Output circuit - No-load, overload and short-circuit behavior					
Characteristic curve of output		hiccup-mode	U/I characteristic curve		
Short-circuit protection		continuous short-circuit stability			
Short-circuit behavior		continuation with output power limiting			
Current limiting at short circuit		typ. 0.78 A	typ. 4.2 A	typ. 6.05 A	typ. 11.5 A
Overload protection		output power limiting			
Overvoltage protection		30-33 V DC			
No-load protection		continuous no-load stability			
Starting of capacitive loads		unlimited			
General data					
Efficiency		typ. 80 %	typ. 83 %	typ. 86 %	typ. 89 %
Duty cycle		100 %			
Dimensions		see “Dimensional drawings”			
Material of housing		plastic			
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool			
Mounting position		horizontal			
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)			
Degree of protection	housing / terminals	IP20 / IP20			
Protection class		II			

Command and signaling technical details

CP-D power supplies and the CP-D redundancy units

CP-D range – Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

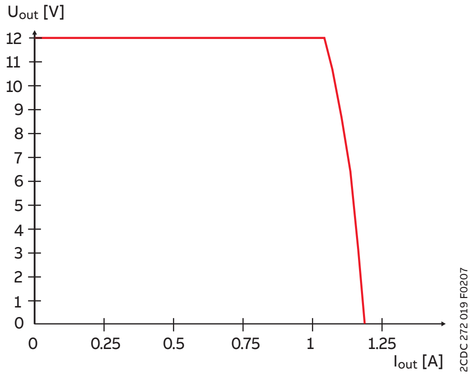
Type		CP-D 24/0.42	CP-D 24/1.3	CP-D 24/2.5	CP-D 24/4.2
Electrical connection - Input circuit / Output circuit					
Connecting capacity	fine-strand with wire end ferrule	0.2-1.5 mm² (24-16 AWG)	0.2-2.5 mm² (24-14 AWG)		
	rigid	0.2-2.5 mm² (26-12 AWG)	0.2-2.5 mm² (24-12 AWG)		
Stripping length		4-5 mm (0.16-0.2 in)		7 mm (0.28 in)	
Tightening torque		0.6 Nm (5 lb.in)		0.7 Nm (6 lb.in)	
Environmental data					
Ambient temperature range	operation	-40...+70 °C			
	rated load	-40...+60 °C		-40...+55 °C	-40...+60 °C
	storage	-40...+85 °C			
Altitude during operation	IEC/EN 60068-2-13	max. 4850 m			
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH			
Vibration (sinusoidal) (IEC/EN 60068-2-6)		50 m/s², 10 Hz - 2 kHz			
Shock (half-sine) (IEC/EN 60068-2-27)		40 m/s², 22 ms			
Isolation data					
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC		4 kV AC	3 kV AC
Pollution degree		2			
Overvoltage category		II			
Standards / Directives					
Standards		IEC / EN 62368-1			
Low Voltage Directive		2014/35/EU			
EMC Directive		2014/30/EU			
RoHS Directive		2011/65/EU			
Protective low voltage		SELV (IEC 60950-1)			
Electromagnetic compatibility					
Interference immunity to		IEC/EN 61000-6-2			
electrostatic discharge	IEC/EN 61000-4-2	level 4 (4 kV / 8 kV)	level 4 (4 kV / 15 kV)		level 4 (4 kV / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	level 3 (10 V/m)			
electrical fast transient/burst	IEC/EN 61000-4-4	level 4 (4 kV)			
surge	IEC/EN 61000-4-5	level 3 (2 kV L-L)			
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	level 3 (10 V)			
Interference emission		IEC/EN 61000-6-3			
high-frequency radiated		class B			
high-frequency conducted		class B			

Command and signaling technical details

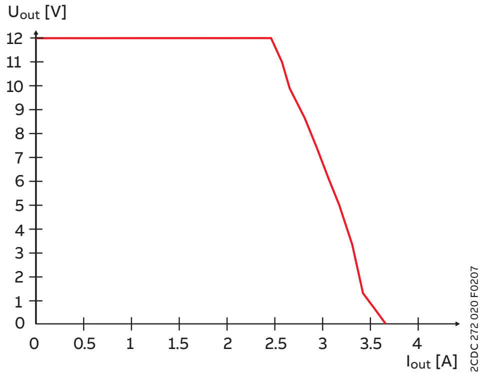
CP-D power supplies and the CP-D redundancy units

CP-D range – Technical diagrams

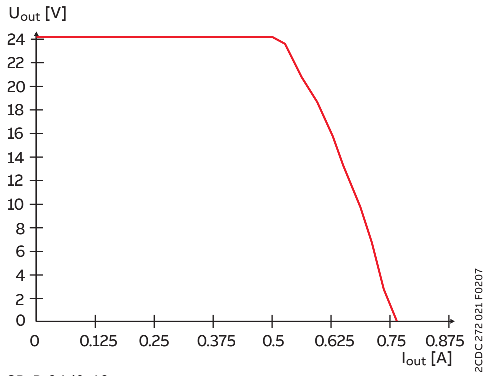
Characteristic curve of output at T_a = 25 °C



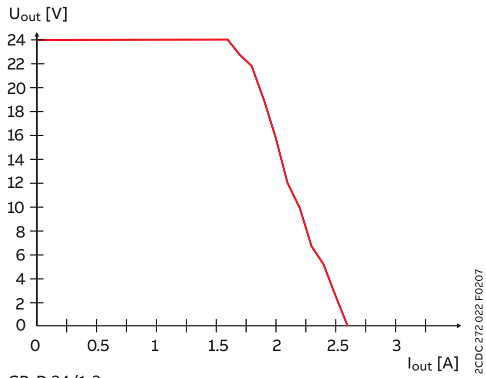
CP-D 12/0.83



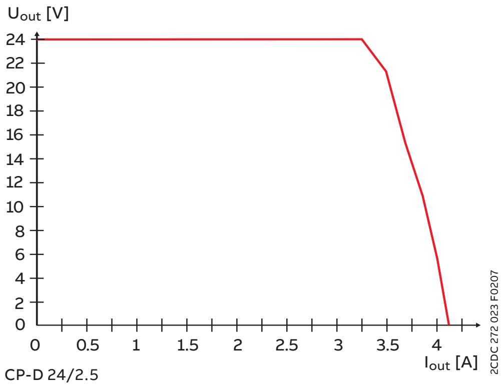
CP-D 12/2.1



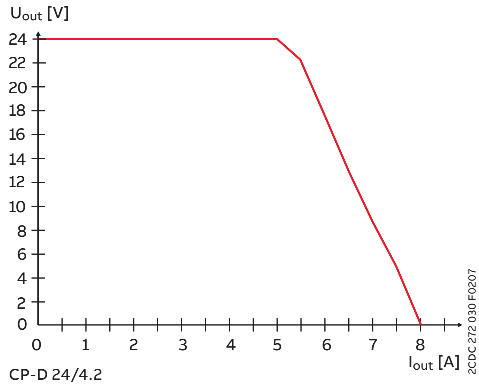
CP-D 24/0.42



CP-D 24/1.3

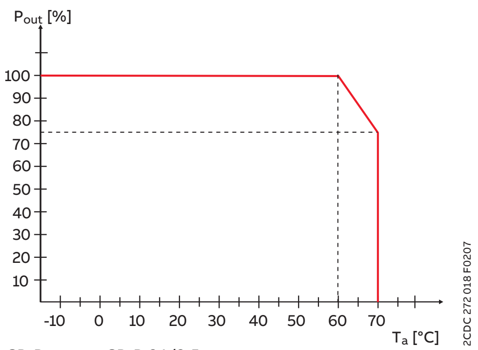


CP-D 24/2.5

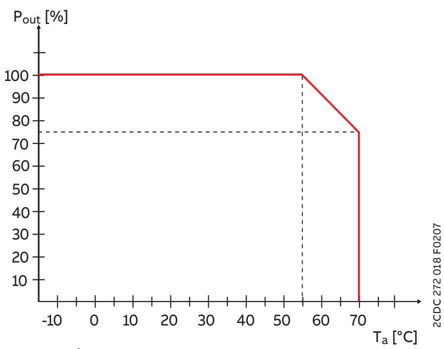


CP-D 24/4.2

Characteristic curve of temperature at rated output voltage



CP-D except CP-D 24/2.5



CP-D 24/2.5

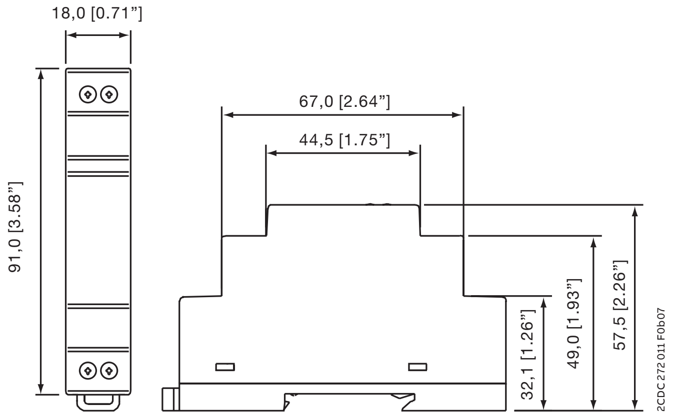
Command and signaling technical details

CP-D power supplies and the CP-D redundancy units

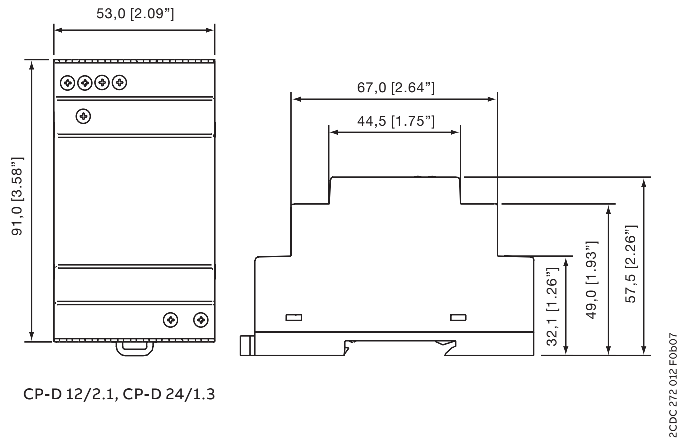
CP-D range – Technical diagrams

Dimensional drawings

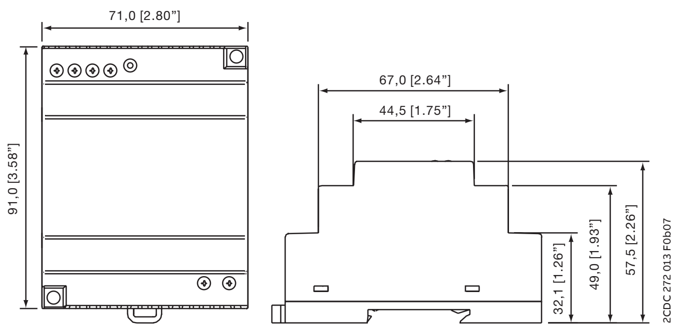
Dimensions in mm



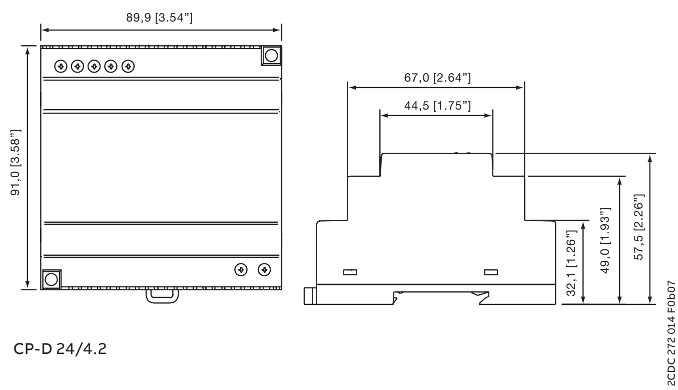
CP-D 12/0.83, CP-D 24/0.42



CP-D 12/2.1, CP-D 24/1.3



CP-D 24/2.5



CP-D 24/4.2

6

Command and signaling technical details

CP-D power supplies and the CP-D redundancy units

CP-D redundancy unit – Technical diagrams

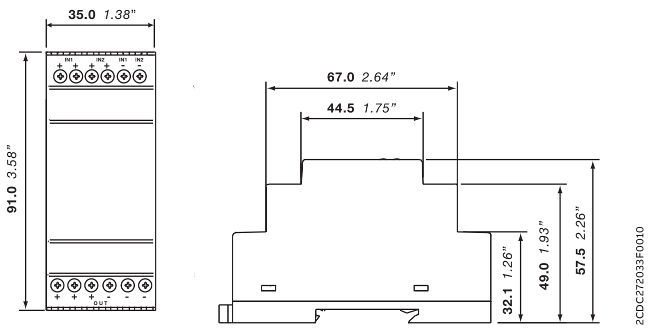
Type		**CP-D RU**
Input circuit - Supply circuit		**IN 1 + + -, IN 2 + + -**
Rated input voltage U_{in}		24 V DC
Input voltage range		9-35 V DC
Rated input current I_{in} per channel		5 A
Maximum input current per channel		10 A for 300 s
Transient overvoltage protection		no
Output circuit		**OUT + + +, - - -**
Rated output voltage U_{out}		24 V DC
Voltage drop		typ. 0.5 V
Rated output current I_{out}		10 A
Resistance to reverse feed		< 35 V
General data		
MTBF		on request
Duty cycle		100 %
Dimensions		see "Dimensional drawings"
Material of housing		plastic
Mounting		DIN rail, snap-on mounting without any tool
Mounting position		1, 7
Minimum distance to other units	horizontal / vertical	25 mm (0.98 in) / 25 mm (0.98 in)
Electrical connection - Input circuit / Output circuit		
Connecting capacity	fine-strand with (out)wire end ferrule	0.2-2.5 mm² (24-14 AWG)
	rigid	0.2-2.5 mm² (24-12 AWG)
Stripping length		7.0 mm (0.28 in)
Tightening torque		0.67 Nm (6 lb.in)
Environmental data		
Ambient temperature range	operation	-40...+70 °C
	storage	-40...+85 °C
Relative humidity	RH at 40 °C	20-95 %, no condensation
Vibration (IEC/EN 60068-2-6)		mounting by rail: 10-500 Hz, 2 G, along X, Y, Z each axis, 60 min for each axis
Shock (IEC/EN 60068-2-27)		15 G, 11 ms, 3 axis, 6 faces, 3 times for each face
Standards / Directives		
Standards		IEC/EN 62368-1, IEC/EN 61204-3
RoHS Directive		2011/65/EU
Electromagnetic compatibility		
Interference immunity to		EN 55024
electrostatic discharge	IEC/EN 61000-4-2	level 3, air discharge 8 kV, contact discharge 4 kV
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	level 3, 10 V/m
electrical fast transient/burst	IEC/EN 61000-4-4	level 3, 2 kV / 5 kHz
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	level 3, 10 V
Interference emission		EN 55022
high-frequency radiated	IEC/CISPR 22 / EN 55022	class B
high-frequency conducted	IEC/CISPR 22 / EN 55022	class B

Command and signaling technical details

CP-D power supplies and the CP-D redundancy units
CP-D redundancy unit – Technical diagrams

Dimensional drawings

Dimensions in mm



CP-D RU

Command and signaling technical details

Modular sockets

Modular sockets

This table gives an indication of the voltage, frequency and modular socket solutions in each country.

Please consider that installation rules may change in each country, and control the local regulations before installing.

Country	Volt.		Freq.		Modular sockets					
	110-130 V	220-250 V	50 Hz	60 Hz	M1011	M1363	M1170	M1173	M1174	M1175
Afghanistan		■	■				■	■	■	■
Albania		■	■				■	■	■	■
Algeria	■	■	■				■	■	■	■
American Samoa	■	■		■			■	■	■	■
Andorra		■	■				■	■	■	■
Angola		■	■				■	■	■	■
Argentina		■	■				■	■	■	■
Armenia		■	■				■	■	■	■
Aruba	■	■		■			■	■	■	■
Australia		■	■							
Austria		■	■				■	■	■	■
Azerbaijan		■	■				■	■	■	■
Azores		■	■				■	■	■	■
Bahrain		■	■			■				
Balearic Islands		■	■				■	■	■	■
Bangladesh		■	■			■	■	■	■	■
Belarus		■	■				■	■	■	■
Belgium		■	■						■	
Belize	■	■		■		■				
Benin		■	■						■	
Bhutan		■	■			■	■	■	■	■
Bolivia	■	■	■				■	■	■	■
Bosnia & Herzegovina		■	■				■	■	■	■
Botswana		■	■			■				
Brazil	■	■		■			■	■	■	■
Brunei		■	■			■				
Bulgaria		■	■				■	■	■	■
Burkina Faso		■	■				■	■	■	■
Burundi		■	■				■	■	■	■
Cambodia		■	■			■	■	■	■	■
Cameroon		■	■				■	■	■	■
Canary Islands		■	■				■	■	■	■
Cape Verde		■	■				■	■	■	■
Central African Republic		■	■				■	■	■	■
Chad		■	■				■	■	■	■
Channel Islands		■	■			■				
Chile		■	■				■	■	■	■
Comoros		■	■				■	■	■	■
Congo Dem.Rep. (Zaire)		■	■				■	■	■	■
Congo, People's Rep. of		■	■				■	■	■	■
Cook Islands		■	■							
Croatia		■	■				■	■	■	■
Cuba	■	■		■			■	■	■	■
Cyprus		■	■			■	■	■	■	■
Czech Republic		■	■						■	
Denmark		■	■				■	■	■	■
Djibouti		■	■				■	■	■	■
Dominica		■	■			■				
East Timor		■	■				■	■	■	■
Egypt		■	■				■	■	■	■
Equatorial Guinea		■	■				■	■	■	■
Eritrea		■	■				■	■	■	■
Estonia		■	■				■	■	■	■
Ethiopia		■	■		■		■	■	■	■
Faeroe Islands		■	■				■	■	■	■
Falkland Islands		■	■			■				
Fiji		■	■							
Finland		■	■				■	■	■	■
France		■	■						■	
French Guyana	■	■	■				■	■	■	■
Gabon		■	■				■	■	■	■
Gambia		■	■			■				
Georgia		■	■				■	■	■	■
Germany		■	■				■	■	■	■
Ghana		■	■			■				
Gibraltar		■	■			■	■	■	■	■
Greece		■	■				■	■	■	■
Greenland		■	■				■	■	■	■
Grenada		■	■			■				
Guadeloupe		■	■				■	■	■	■
Guatemala	■	■		■		■				
Guinea		■	■				■	■	■	■
Guinea-Bissau		■	■				■	■	■	■
Guyana		■		■		■				
Hong Kong		■	■			■				
Hungary		■	■				■	■	■	■
Iceland		■	■				■	■	■	■
India		■	■				■	■	■	■
Indonesia	■	■	■			■	■	■	■	■
Iran		■	■				■	■	■	■
Iraq		■	■			■	■	■	■	■
Ireland		■	■			■				
Isle of Man		■	■			■	■	■	■	■
Israel		■	■				■	■	■	■
Italy		■	■				■	■	■	■
Ivory Coast		■	■				■	■	■	■
Jordan		■	■		■	■	■	■	■	■
Kazakhstan		■	■				■	■	■	■
Kenya		■	■			■				
Kiribati		■	■							
Korea, North		■		■			■	■	■	■
Korea, South	■	■		■			■	■	■	■
Kuwait		■	■			■	■	■	■	■
Kyrgyzstan		■	■				■	■	■	■
Laos		■	■				■	■	■	■
Latvia		■	■				■	■	■	■

Main countries are highlighted

Command and signaling technical details

Modular sockets

Country	Volt. 110-130 V	Volt. 220-250 V	Freq. 50 Hz	Freq. 60 Hz	Modular sockets M1011	M1163	M1170	M1173	M1174	M1175
Lebanon	■	■	■			■	■	■	■	■
Lithuania		■	■				■	■	■	■
Luxembourg		■	■				■	■	■	■
Macau		■	■			■				
Macedonia		■	■				■	■	■	■
Madagascar	■	■	■				■	■	■	■
Madeira		■	■				■	■	■	■
Malawi		■	■			■				
Malaysia		■	■			■				
Maldives		■	■		■	■	■	■		
Mali		■	■				■	■	■	■
Malta		■	■			■				
Martinique		■	■				■	■	■	■
Mauritania		■	■				■	■	■	■
Mauritius		■	■			■	■	■	■	■
Moldova		■	■				■	■	■	■
Monaco		■	■				■	■	■	■
Mongolia		■	■				■	■	■	■
Montenegro		■	■				■	■	■	■
Morocco	■	■	■				■	■	■	■
Mozambique		■	■				■	■	■	■
Myanmar (form. Burma)		■	■				■	■	■	■
Nauru		■	■							
Nepal		■	■				■	■	■	■
Netherlands		■	■				■	■	■	■
Netherlands Antilles	■	■	■	■			■	■	■	■
New Caledonia		■	■				■	■	■	■
New Zealand		■	■							
Niger		■	■				■	■	■	■
Nigeria		■	■			■				
Norway		■	■				■	■	■	■
Oman		■	■			■				
Pakistan		■	■				■	■	■	■
Papua New Guinea		■	■							
Paraguay		■	■				■	■	■	■
Peru		■		■			■	■	■	■
Philippines		■		■			■	■	■	■
Poland		■	■				■	■	■	■
Portugal		■	■				■	■	■	■
Qatar		■	■			■				
Réunion Island		■	■						■	
Romania		■	■				■	■	■	■
Russian Federation		■	■				■	■	■	■
Rwanda		■	■		■		■	■	■	■

Country	Volt. 110-130 V	Volt. 220-250 V	Freq. 50 Hz	Freq. 60 Hz	Modular sockets M1011	M1163	M1170	M1173	M1174	M1175
Samoa		■	■							
San Marino		■	■				■	■	■	■
Saudi Arabia	■	■		■		■	■	■	■	■
Senegal		■	■				■	■	■	■
Serbia		■	■				■	■	■	■
Seychelles		■	■			■				
Sierra Leone		■	■			■				
Singapore		■	■			■				
Slovakia		■	■						■	
Slovenia		■	■				■	■	■	■
Somalia	■	■	■				■	■	■	■
Spain		■	■				■	■	■	■
Sri Lanka		■	■			■				
St. Kitts and Nevis		■		■		■				
St. Lucia		■	■			■				
St. Vincent		■	■			■	■	■	■	■
Sudan		■	■				■	■	■	■
Suriname	■	■		■			■	■	■	■
Sweden		■	■				■	■	■	■
Swiss		■	■		■		■	■	■	■
Syria		■	■				■	■	■	■
Tahiti	■	■		■			■	■	■	■
Tajikistan		■	■				■	■	■	■
Tanzania		■	■			■				
Thailand		■	■				■	■	■	■
Togo		■	■				■	■	■	■
Tonga		■	■							
Tunisia		■	■				■	■	■	■
Turkey		■	■				■	■	■	■
Turkmenistan		■	■				■	■	■	■
Uganda		■	■			■				
Ukraine		■	■				■	■	■	■
United Arab Emirates		■	■			■				
United Kingdom		■	■			■				
Uruguay		■	■				■	■	■	■
Uzbekistan		■	■				■	■	■	■
Vietnam	■	■	■			■	■	■	■	■
Yemen, Rep. of		■	■			■				
Zambia		■	■			■	■	■	■	■
Zimbabwe		■	■			■				

Fuse detail

2CSC400759F0001

Indicator light detail

6

Command and signaling technical details

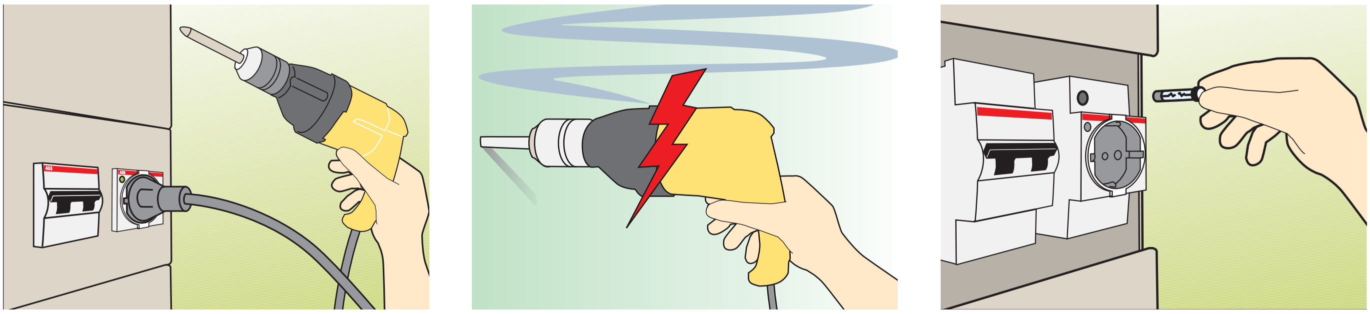
Modular sockets

M1175-FL modular socket with fuse

Operating principle
The modular sockets with fuse are ideal wherever continuity of service is essential. The embedded fuse protecting the phase prevents tripping of the main protection switch in the event of a malfunction of the device plugged into the socket.

Application environments
The modular sockets are suitable for all electrical distribution or automation panels, to allow connection of non modular equipment such as measuring and maintenance instruments etc.

Example of installation
As illustrated in the figures, a modular socket allows to supply non modular devices directly from the electrical panel.
If the connected device malfunctions, there is the risk that the entire electrical system will be put out of service due to tripping of an MCB.
This is prevented by blowing of the fuse incorporated into the socket, thus assuring continuity of service.



Electrical installation solutions for buildings – Technical details

Control and automation

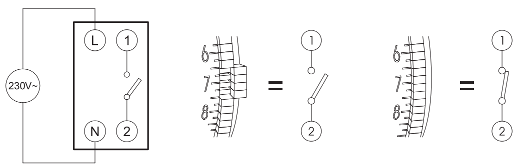
Index

Control and automation technical details

AG Timer electro-mechanical time switches

How to program AD1NO-15m - AD1NO-R-15m

Connection diagrams



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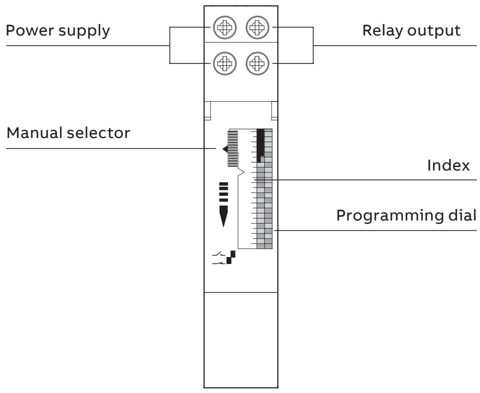
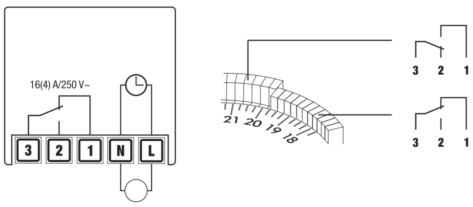


How to program AD1CO-15m - AD1CO-R-15m - AW1CO-R-120m

Connection diagrams



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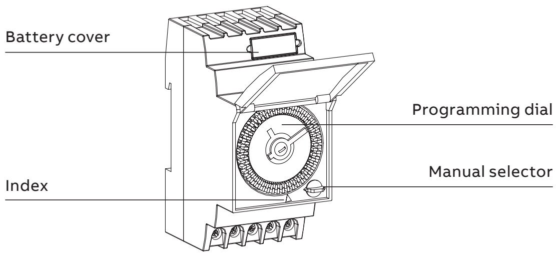
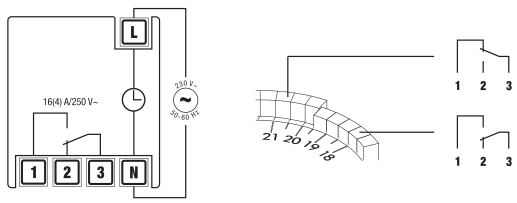
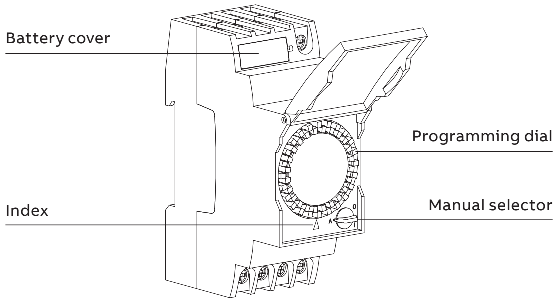


How to program AD1CO-30m - AD1CO-R-30m - AW1CO-R-210m

Connection diagrams

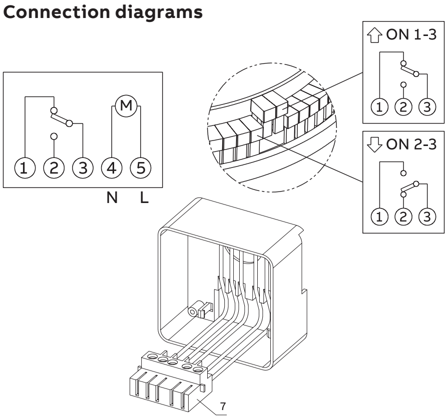


Description

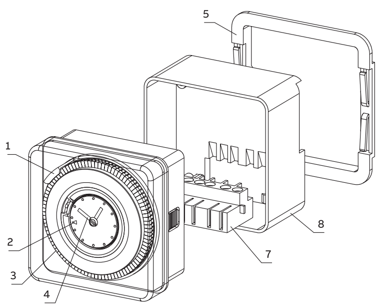


How to program AD1-R-15m-72

Connection diagrams



Description



1 - Selector switch
2 - Indicator
3 - Trippers for programming
4 - Trippers for programming
5 - Accessory for panel mounting
6 - Transparent protection cover
7 - Extractable terminal block
8 - Accessory for wall or DIN rail installation

Control and automation technical details

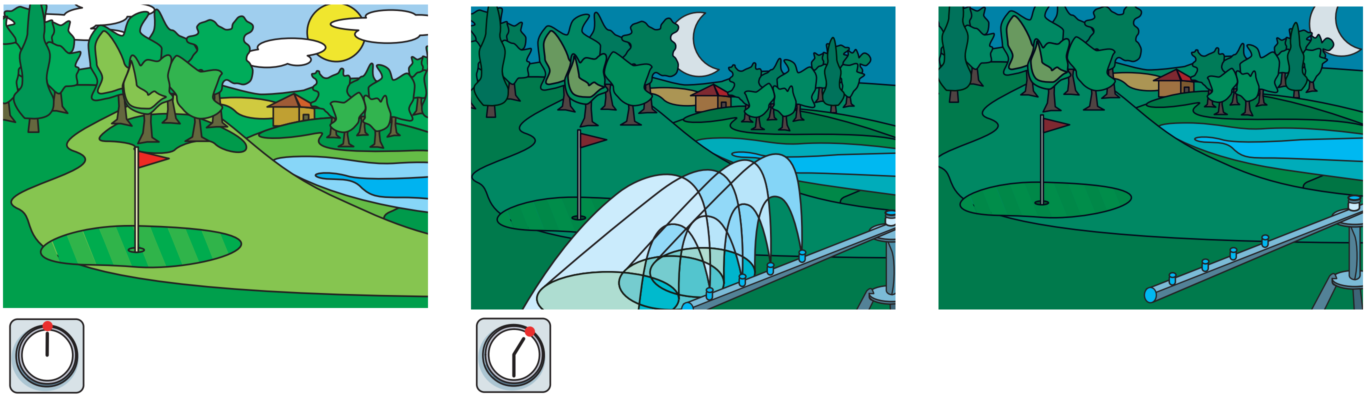
AG Timer electro-mechanical time switches

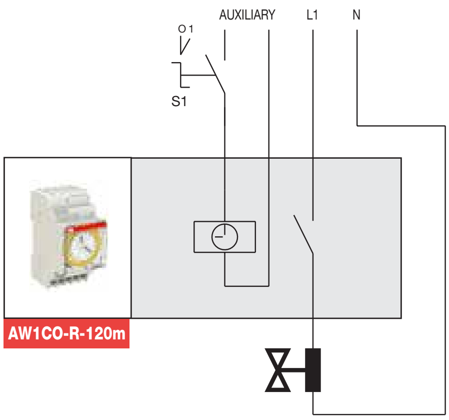
AG Timer with DIN rail mounting

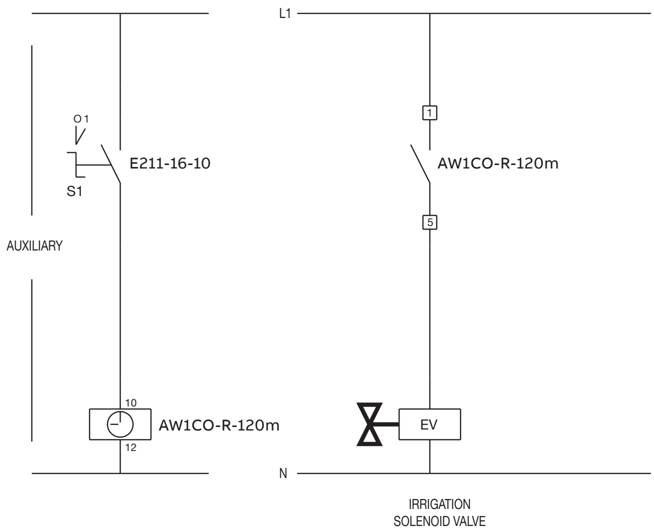
Operating principle
The AG Timer electro-mechanical time switches enable to control the circuit opening/closing according to a daily or weekly program or to manually set permanent ON/OFF operation.

Application environments
The AG Timer electro-mechanical time switches are particularly indicated in any environment and situation where it is necessary to program system load operation according to a daily or weekly frequency (shop lighting system, public buildings, heating systems, irrigation systems, etc.).

Example of installation
As shown in the diagrams, one of the possible applications is to mount the AW1CO-R-120m electro-mechanical time switch inside the power supply circuit of a golf field. In this case the device programming enables the daily activation of the irrigation system at a preset time.







Control and automation technical details

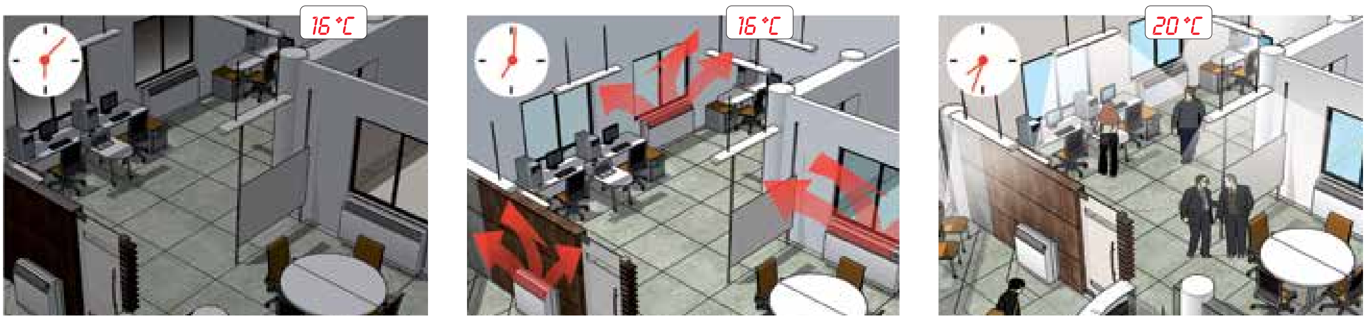
AG Timer electro-mechanical time switches

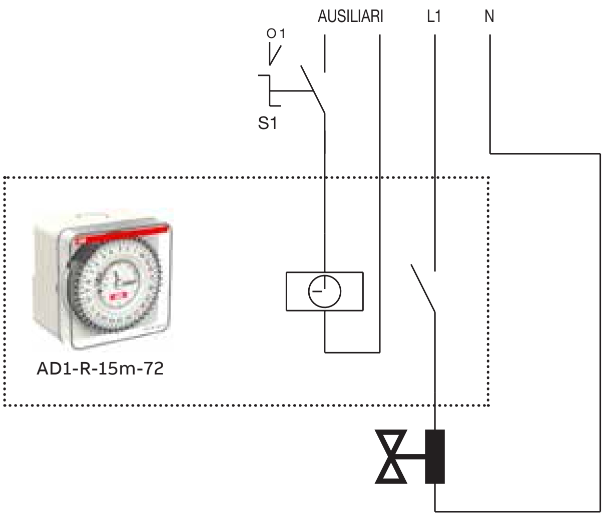
AG Timer with panel/wall mounting

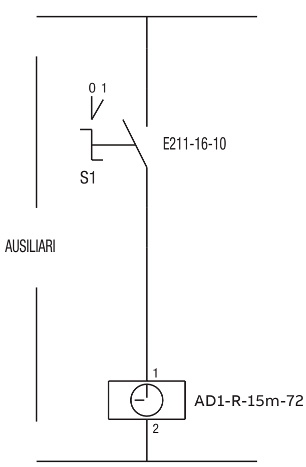
Operating principle
The AD1-R-15m-72 electro-mechanical switch enables to control the circuit opening/closing according to a daily program or to manually set permanent ON/OFF operation.

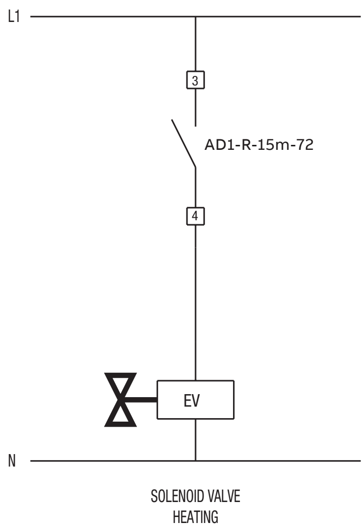
Application environments
The AD1-R-15m-72 electro-mechanical time switch is particularly indicated in any environment and situation where it is necessary to program system load operation according to a daily frequency (lighting system, heating systems, venting systems, etc.).

Example of installation
One of the possible applications is to use the AD1-R-15m-72 to command the heating activation at specific times during the day, allowing energy saving.









Control and automation technical details

DBT Timer digital time switches

Innovations

- DBT Timer range is equipped with impulse, cycle, random and holiday programs. They can have daily, weekly or annual mode.
- Holiday management with the possibility of programming them in various period throughout the year
- Menu programming with 4 simple keys
- Astronomical management allows automatical setting, for each day of the year, of sunrise and sunset times
- Minimum switching time is 1 second for pulse program
- Multilingual menu with 6 language choices

Bluetooth communication combined with the DBT Timer APP available for Android and iOs ensure smart configuration and quick visualization. This functionality also allows to transfer programs from one device to another simply using the Smartphone.

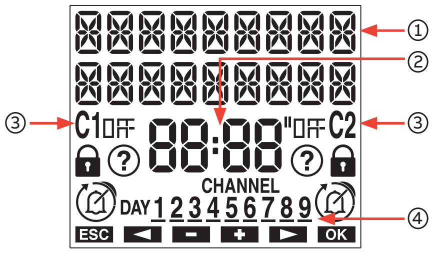
The DY DCF77 antenna that receives the DCF77 radio synchronisation signal transmitted by the atomic clock installed c/o Mainflingen, near Frankfort, increases digital clock precision.

The DY GPS antenna that receives time from the Global Positioning System, that offers a more accurate value than land transmissions in addition to the possibility of receiving the signal anywhere in the world.

Control and automation technical details

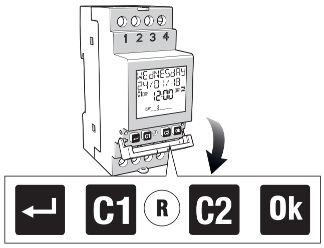
DBT Timer digital time switches

Display description



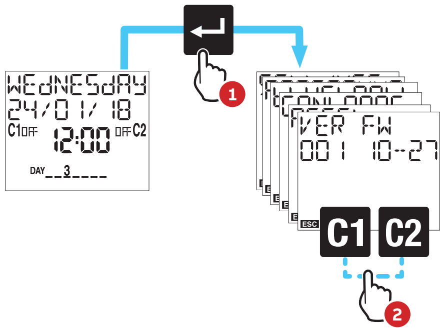
	Description
1	General indications
2	Time indication
3	Channel 1 / Channel 2 status indication On/OFF Active manual program + Blocked switchings + ? Active random switchings + On/OFF (flashing): active cycle switchings Active holiday program Active pulse program
4	Day of the week (DAY) indication

Access to device



Button	Function
↵	Turn on the display Access the menu ESC (one level back)
C1	Decrease datum Previous menu Switching channel 1 Lock channel 1
C2	Increase datum Next menu Switching channel 2 Lock channel 2
Ok	Confirm selection
R	Hardware reset
C1 + Ok 3 sec	Random switching channel 1
C2 + Ok 3 sec	Random switching channel 2
↵ + C1 3 sec	Active cycle switching on channel 1
↵ + C2 3 sec	Active cycle switching on channel 2

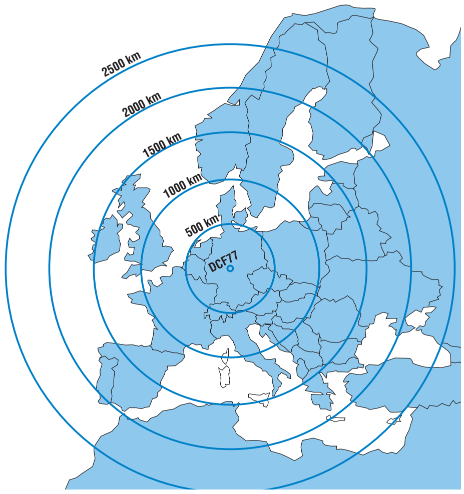
Menu description



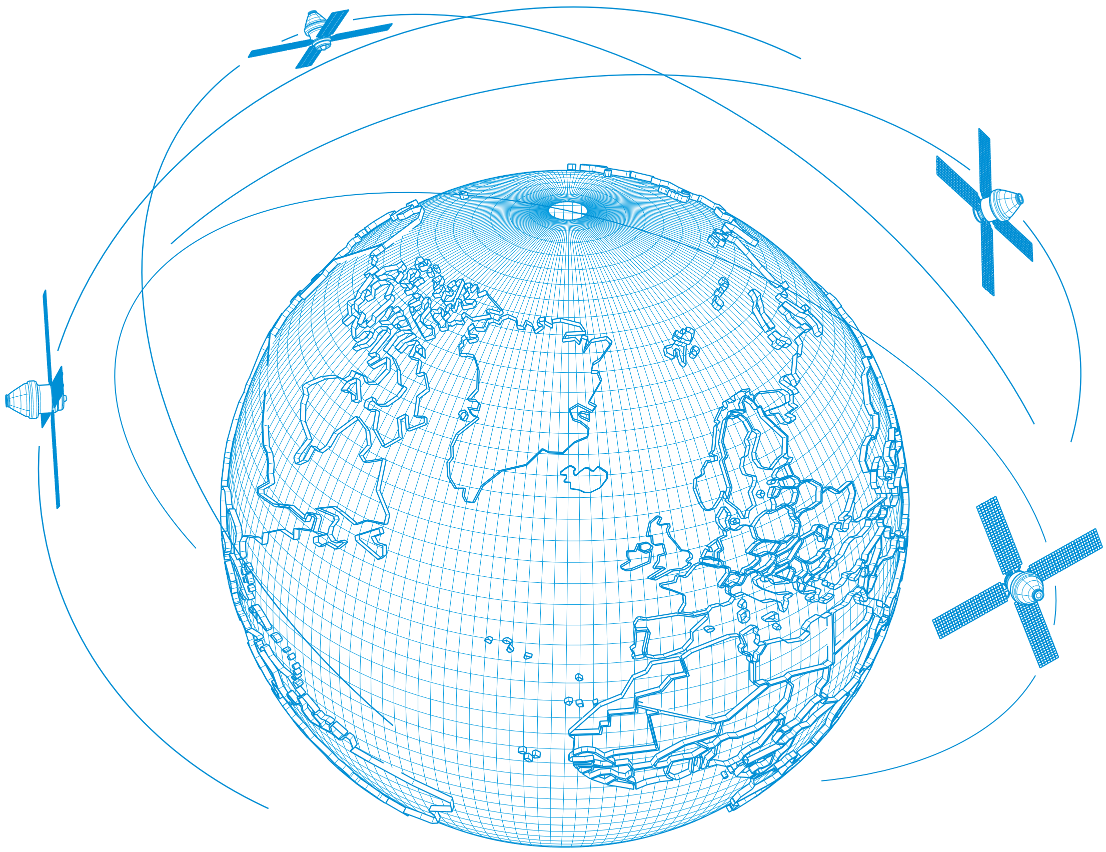
Menu	Description
Settings	Allows to change: language, date, time, daylight saving time (DST), astronomical coordinates, minimum and maximum duration of the interval between two switchings with random program, ON and OFF duration of cycle switchings and PIN for keyboard lock
Program	Allows to create a new program, check created programs, change or delete a created program, copy all created programs of channel 1 on channel 2 and vice versa.
Bluetooth	Allows to enable or disable the Bluetooth interface and to change the password used to associate devices (smartphone)
Hour counter	Allows to display the hours of usage (relay on) of connected load(s).
Reset	Allows to restore the initial state of the device
Firmware menu	Shows the firmware installed in the device

Control and automation technical details
DBT Timer digital time switches

DY DCF77 antenna
Operating principle:
This antenna receives scheduled messages broadcasted from the Frankfurt on Main (Germany) based DCF77 emitter.
Thanks to this signal, the time switches are automatically setted to: hour, date and proper daylight saving time.
The broadcast power is 50 kW and the range is approximately 2500 kilometers from Frankfurt on Main.
The signal is sometimes received intermittently and not in all locations, especially in countries far enough from the DCF77 emitter.
For optimal signal reception the arrow marked side of the antenna must be rotated towards Frankfurt on Main.



DY GPS antenna
Operating principle:
The Global Positioning System provides an accurate location and time information for an unlimited number of people in all weather, day or night, anywhere in the world.
The synchronization received from GPS is far more precise regarding to terrestrial broadcast.
The GPS system relays upon time from satellite based atomic clocks, constantly controlled and corrected from a ground stations network.
The time is derived from different sources simultaneously, the digital time switches can automatically compensate for propagation delays and other problems by providing more precise values than terrestrial.



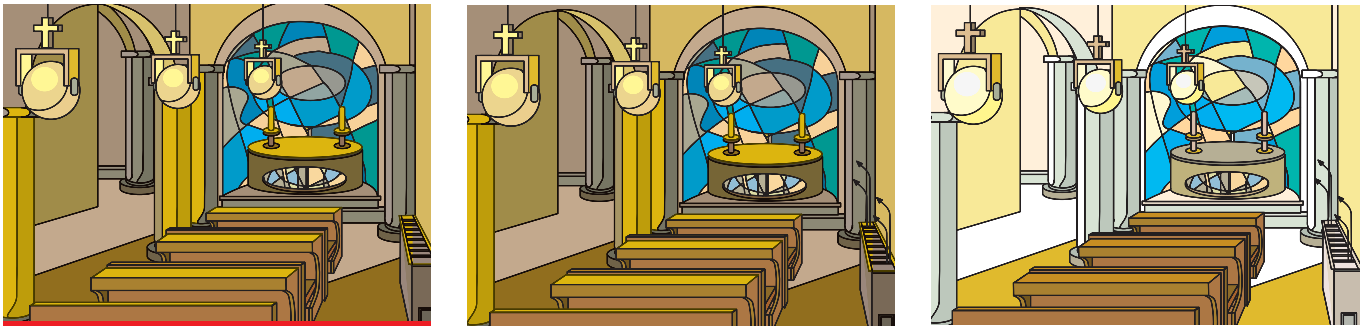
Control and automation technical details

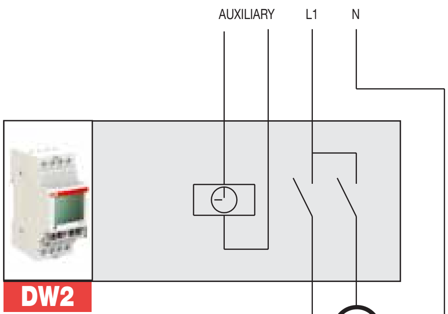
DBT Timer digital time switches

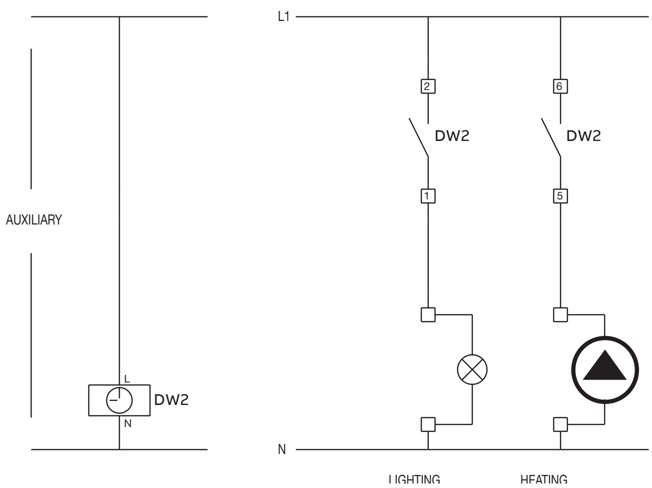
Operating principle
The DW2 two-channel digital weekly time switch enables to open and close circuits according to a daily or weekly program, controlling single loads or group ones even when they require different time controls with a common time reference. In this example, the digital time switch DW2 allows the operation of heating as well as lighting systems of a church when services are performed; when no service is performed, the device only controls the heating system.

Application environments
The DW2 two-channel digital weekly time switch is particularly indicated in environments and situations requiring the management of multiple loads according to a time program flexible enough to include or exclude their application based on the day of the week (offices, schools, public areas, etc.).

Example of installation
As shown in the diagrams, one of the possible applications is to mount the DW2 two-channel digital weekly time switch inside the power supply circuit of a church, where in the days when no service is performed only the heating system is activated (programmed on one of the two channels) at a preset time, while on Sundays and when services are performed the lighting system is also switched on (through a program on the second channel). According to the controlled system power, the activation is performed by an ESB contactor.







Control and automation technical details

DBT Timer digital time switches

DWA2

Astronomical version – DWA

- Astronomical and time programming
- Impulse, cycle, random and holiday program
- Automatic summer and winter time change
- Up to 120 storable events
- Opportunity to correct the astronomical time up to ±120 min
- Up to 400 pre-defined cities
- 1 or 2 changeover contacts
- latitude adjustment range from +90° North to -90° South.
- longitude adjustment range from 180° East to 180 ° West.
- Manual and permanent override, activated with one touch on the front of the device
- Clear display of contact status
- Unlosable hinged window
- The protection code PIN is used to prevent interference by unauthorised persons
- Android and iOS application for quick and ease programming
- Wiring diagram printed on the side of the product

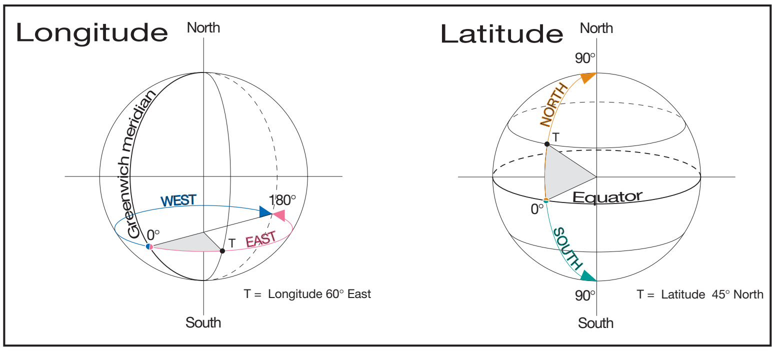
Programming example

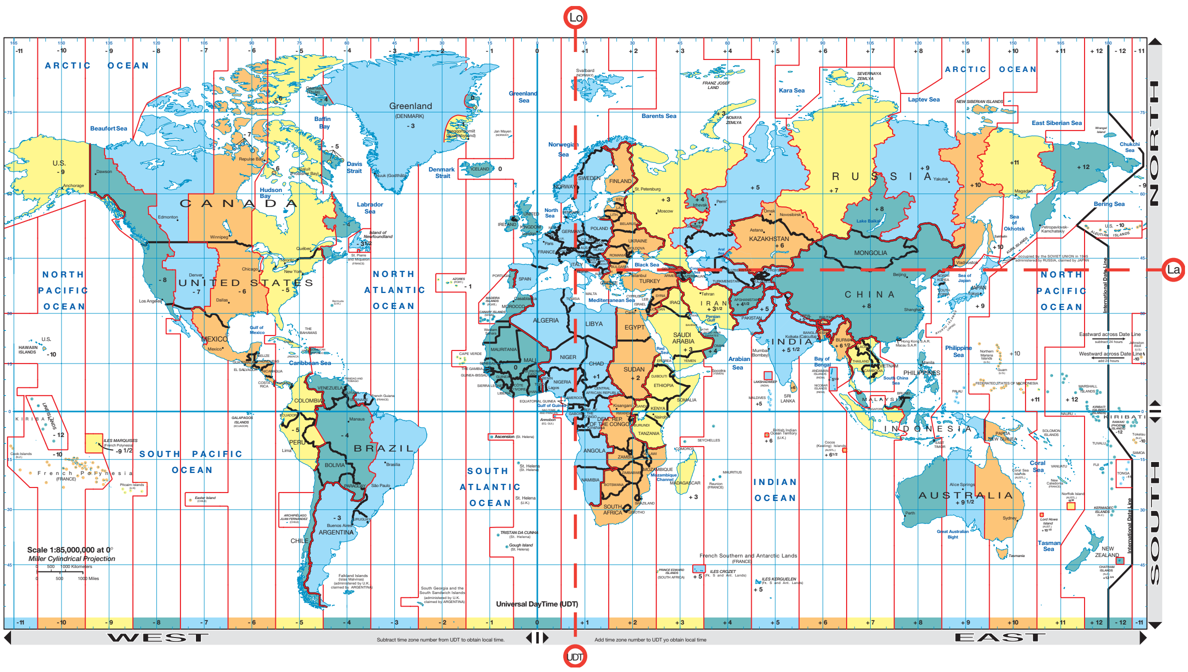
Ex: Rome

Lo Longitude 12° EAST

La Latitude 41° NORTH

UDT + 1 Universal Date Time = +1 hour



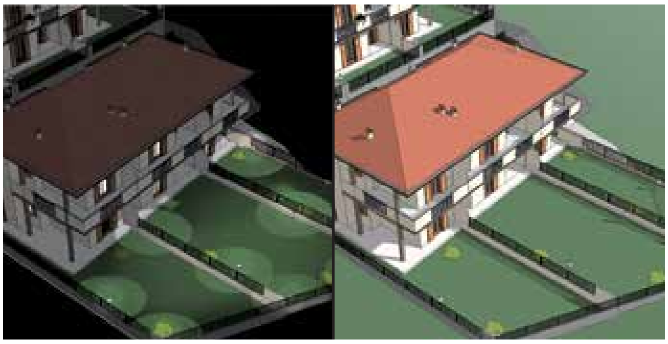


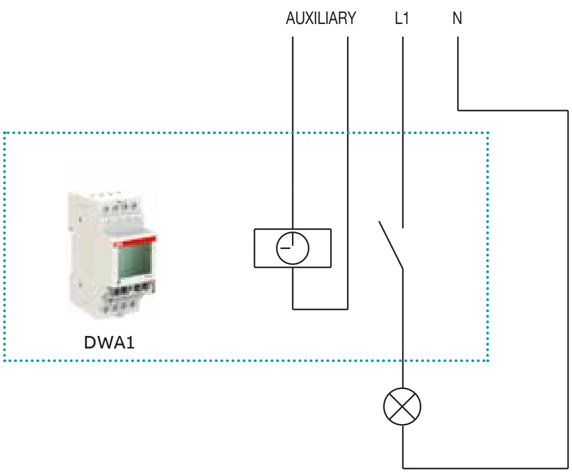
Control and automation technical details

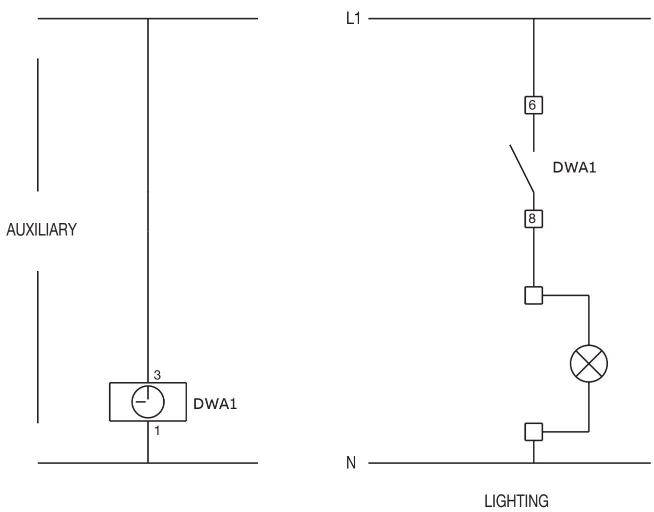
DBT Timer digital time switches

Operating principle
The installation of an astronomical time switch in a system is a particularly useful addition for settings and situations in which light sources, or other environmental conditions, can cause changes in the brightness level and falsify the reading. In these cases, the DWA1 and DWA2 astronomical switches can control the lighting system according to the sunrise and sunset times of the geographic zone in which the system is installed.

Application environments
The installation of the DWA1 and DWA2 astronomical time switches is particularly suitable for applications in which the operation of a twilight switch with external probe can be falsified or compromised by external agents (such as environmental pollution, overexposure to light, vandalism, etc.).
Example of installation
Atmospheric pollution is one of the causes of a reduction in the level of environmental light. Dust deposits on the external probe of a traditional twilight switch can compromise the operation of the device, preventing it from automatically switching off the controlled lighting system in the presence of external light.
As shown in the example, this problem can be solved by installing a DWA1 astronomical time switch that controls the lighting system according to the level of light calculated from the preset longitude and latitude parameters.



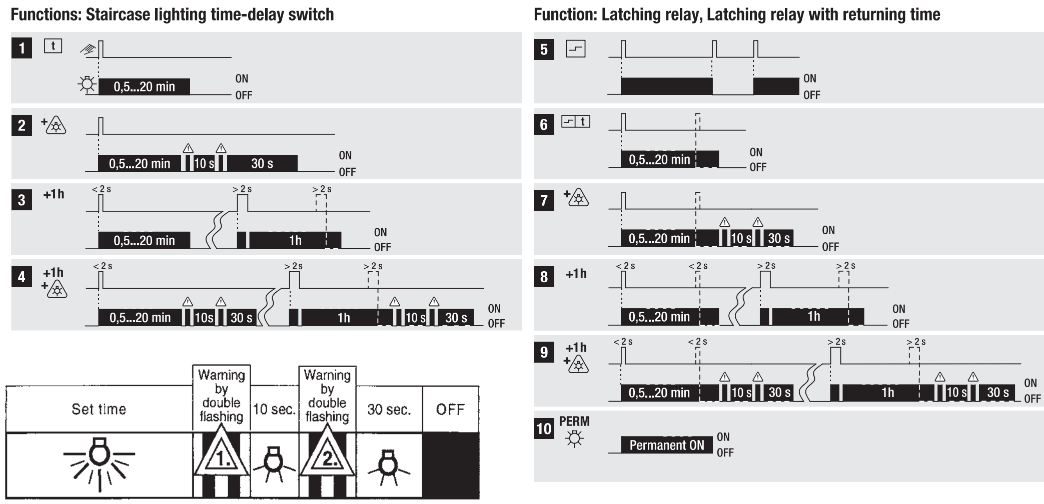




Control and automation technical details

E 232 staircase lighting time-delay switches

E 232E-230 Multi 10, 8/230 Multi 10



E232E-230 Multi10 and E232E-8/230 Multi10

DIN 18015-2
provides that "that the automatic disconnection of lighting equipment fitted in staircases of apartment buildings must provide for warning signals, e.g. dimming, in order to avoid sudden unexpected darkness".

Operating principle
Activated by a pulse command through a pushbutton, the E 232 staircase light switch turns on the installation's lights for a time T1. In order to avoid an unexpected darkness, the Multi10 devices are equipped with a switch-off warning (double flash).

Application environments
Installation of the E 232 staircase lighting with switch-off warning functionality is ideal wherever the lighting must be timed and unexpected darkness must be avoided (staircases and passageways in public places, cellars, garages, etc.).

Example of installation
One of possible applications of the E 232E-230 Multi 10 staircase switch is in the staircase lighting plant of a multistory building. Pushing the push-button, the timer of the E 232E-230 Multi 10 switch turns on the lights for a settable T1 time. At the end of the time the device gives a prewarning by blinking that the set time expires. The user can restart the timer again by pressing the button.

Control and automation technical details

E 234 CT-D time relays for building applications

Remarks

Legend

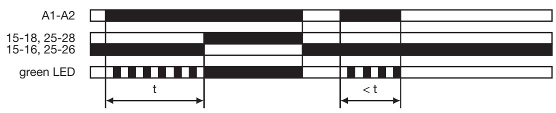
☐	Control supply voltage not applied / Output contact open
■	Control supply voltage applied / Output contact closed
A1-Y1/B1	Control input with voltage-related triggering

Terminal designations on the device and in the diagrams
The 1st c/o contact is always designated **15-17/18**.
The 2nd c/o contact is designated **25-27/28.**
The n/o contacts of the star-delta timers are designated with **17-18** and **17-28**.
Control supply voltage is always applied to terminals **A1-A2**.

Function of the yellow LED
The yellow LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

ON-delay
(Delay on make)
CT-ERD, CT-MFD

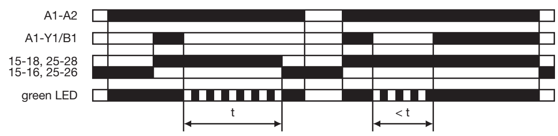
This function requires continuous control supply voltage for timing.
Timing begins when control supply voltage is applied.
The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



t = adjusted time delay

OFF-delay with auxiliary voltage
(Delay on break)
CT-AHD, CT-MFD

This function requires continuous control supply voltage for timing. If control input **A1-Y1/B1** is closed, the output relay energizes immediately. If control input **A1-Y1/B1** is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady. If control input **A1-Y1/B1** recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **A1-Y1/B1** re-opens. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



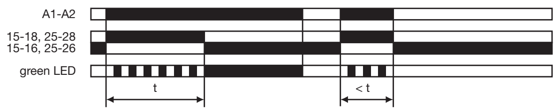
t = adjusted time delay

Control and automation technical details

E 234 CT-D time relays for building applications

Impulse-ON
(Interval)
CT-VWD, CT-MFD

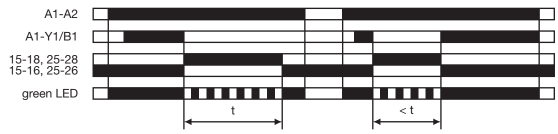
This function requires continuous control supply voltage for timing. The output relay energizes immediately when control supply voltage is
applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



t = adjusted pulse time

Impulse-OFF with auxiliary voltage
(Trailing edge interval)
CT-MFD

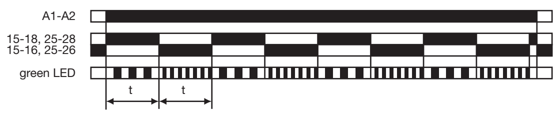
This function requires continuous control supply voltage for timing.
If control supply voltage is applied, opening control input **A1-Y1/B1** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.
Closing control input **A1-Y1/B1**, before the time delay is complete, de-energizes the output relay and resets the time delay. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

Flasher, starting with the ON time
(Recycling equal times, ON first)
CT-EBD, CT-MFD

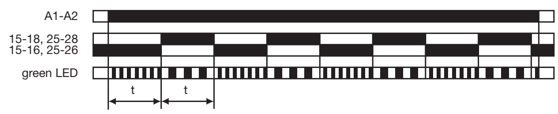
Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



t = adjusted flashing time

Flasher, starting with the OFF time
(Recycling equal times, OFF first)
CT-MFD

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



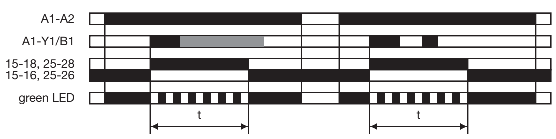
t = adjusted flashing time

Control and automation technical details

E 234 CT-D time relays for building applications

Pulse former (Single shot)
CT-MFD

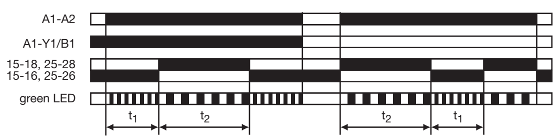
This function requires continuous control supply voltage for timing.
Closing control input **A1-Y1/B1** energizes the output relay immediately and starts timing. Operating the control contact switch **A1-Y1/B1** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **A1-Y1/B1**. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

Pulse generator, starting with the ON or OFF time
(Recycling unequal times, ON or OFF first)
CT-TGD

This function requires continuous control supply voltage for timing.
Applying control supply voltage, with open control input **A1-Y1/B1**, starts timing with an ON time first. Applying control supply voltage, with closed control input **A1-Y1/B1**, starts timing with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. The ON & OFF times are independently adjustable. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

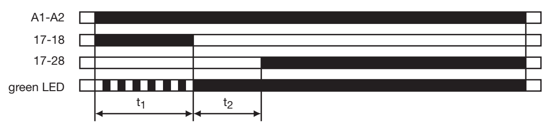


t_1 = adjusted OFF time
t_2 = adjusted ON time

Star-delta change-over
(Star-delta starting)
CT-SDD, CT-SAD

This function requires continuous control supply voltage for timing.
Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **17-18** and begins the set starting time t1. The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor.

Now, the transition time t2 starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals **17-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.



t_1 = adjusted starting time
t_2 = transition time
CT-SDD: t_2 = 50 ms
CT-SAD: t_2 adjustable

Control and automation technical details

E 234 CT-D time relays for building applications – Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

		CT-D with 1 c/o contact	CT-D with 2 c/o contacts	CT-MFD.21
Input circuit - Supply circuit				
Rated control supply voltage U_s		24-240 V AC / 24-48 V DC		12-240 V AC/DC
Rated control supply voltage U_s tolerance		-15...+10 %		
Rated frequency		DC or 50/60 Hz		
Frequency range AC		47-63 Hz		
Typical power consumption		max. 3.5 VA		
Power failure buffering time		min. 20 ms		
Release voltage		> 10 % of the minimum rated control supply voltage U_s		
Current consumption of the control input	24 V DC	3.8 mA (CT-AHD.12) 3.9 mA (CT-MFD.12) 1.0 mA (CT-TGD.12)	0.9 mA (CT-AHD.22, CT-TGD.22)	0.4 mA
	115 V AC	23.9 mA (CT-AHD.12) 23.0 mA (CT-MFD.12) 1.3 mA (CT-TGD.12)	3.2 mA (CT-AHD.22, CT-TGD.22)	0.3 mA
	230 V AC	26.9 mA (CT-AHD.12) 26.0 mA (CT-MFD.12) 1.6 mA (CT-TGD.12)	6.4 mA (CT-AHD.22, CT-TGD.22)	0.7 mA
Input circuit - Control circuit				
Control input, control function	A1-Y1/B1	start timing external		
Kind of triggering		voltage-related triggering		
Resistance to reverse polarity		yes		
Parallel load / polarized		yes / yes		
Maximum cable length to the control inputs		50 m - 100 pF/m		
Minimum control pulse length		20 ms		
Control voltage potential		see rated control supply voltage		
Current consumption of the control input		see data sheet		
Timing circuit				
Time ranges	7 time ranges 0.05 s - 100 h	1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 0.5-10 min 5.) 5-100 min 6.) 0.5-10 h 7.) 5-100 h		
	4 time ranges 0.05 s - 10 min (CT-SDD, CT-SAD)	1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 0.5-10 min		
Recovery time		< 50 ms		
Accuracy within the rated control supply voltage tolerance		Δt < 0.005 % / V		
Accuracy within the temperature range		Δt < 0.06 % / °C		
Repeat accuracy (constant parameters)		Δt < ± 0.5 %		
Setting accuracy of time delay		± 10% of full-scale value		
Star-delta transition time	CT-SDD/ CT-SAD	fixed 50 ms / adjustable: 20 ms, 30 ms, 40 ms, 50 ms, 60 ms, 80 ms or 100 ms		
Star-delta transition time tolerance	CT-SDD / CT-SAD	±3 ms		
Indication of operational states				
Control supply voltage / timing	U: green LED	: control supply voltage applied : timing		
Relay energized	R, R1, R2: yellow LED	: output relay energized		
Operating elements and controls				
Adjustment of the time range		front-face rotary switch, direct reading scales		
Fine adjustment of the time value		front-face potentiometer		
Preselection of the timing function at multifunction devices		front-face rotary switch, direct reading scales		
Adjustment of the transition time	CT-SAC	front-face potentiometer		

Control and automation technical details

E 234 CT-D time relays for building applications – Technical data

		CT-D with 1 c/o contact	CT-D with 2 c/o contacts	CT-MFD.21
Output circuit				
Kind of output	15-16/18	Relay, 1 c/o contact	-	
	15-16/18; 25-26/28	-	Relay, 2 c/o contacts	
	17-18; 17-28		Relay, 2 n/o contacts (CT-SDC, CT-SAC)	
Contact material		AgNi alloy, Cd free		
Rated operational voltage U_e		250 V		
Minimum switching voltage / minimum switching current		12 V / 100 mA		
Maximum switching voltage / maximum switching current		250 V AC / 6 A	250 V AC / 5 A	
Rated operational current I_e	AC-12 (resistive) at 230 V	6 A	5 A	
	AC-15 (inductive) at 230 V	3 A	3 A	n/o: 3 A n/c: 0.75 A
	DC-12 (resistive) at 24 V	6 A	5 A	
	DC-13 (inductive) at 24 V	2 A	2 A	1 A
AC rating (UL 508)	utilization category (Control Circuit Rating Code)	B 300		n/o: B 300 n/c: C 300
	max. rated operational voltage	300 V AC		
	maximum continuous thermal current at B300	5 A		n/o: 5 A
	maximum continuous thermal current at C300	-		n/c: 2.5 A
	max. making/breaking apparent power at B300	3600 VA / 360 VA		n/o: 3600/360 VA
	max. making/breaking apparent power at C300	-		n/c: 1800/180 VA
Mechanical lifetime		30 x 10^6 switching cycles		
Electrical lifetime		0.1 x 10^6 switching cycles		
Max. fuse rating to achieve short-circuit protection	n/c contact	6 A fast-acting		
	n/o contact	10 A fast-acting		6 A fast-acting
General data				
Mean time between failures (MTBF)		on request		
Duty time		100%		
Dimensions		see 'Dimensional drawings'		
Mounting		DIN rail (IEC/EN 60715), snap-mounting without any tool		
Mounting position		any		
Minimum distance to other units	horizontal / vertical	no / no		
Material of housing		UL 94 V-2		
Degree of protection	housing / terminals	IP50 / IP20		
Electrical connection				
Connecting capacity	fine-stranded with(out) wire and ferrule	2 x 0.5-1.5 mm^2 (2 x 20-16 AWG) 1 x 0.5-2.5 mm^2 (1 x 20-14 AWG)		
	rigid	2 x 0.5-1.5 mm^2 (2 x 20-16 AWG) 1 x 0.5-4 mm^2 (1 x 20-12 AWG)		
Stripping length		7 mm (0.28 in)		
Tightening torque		0.5-0.8 Nm (4.43-7.08 lb.in)		
Environmental data				
Ambient temperature range	operation / storage	-20 ... +60 °C / -40 ... +85 °C		
Climatic class	IEC/EN 60721-3-3	3k22		
Relative humidity range		25-85%		
Vibration, sinusoidal	IEC/EN 60068-2-6	20 m/s^2; 10 cycles, 10...150...10 Hz		
Shock (half-sine)	IEC/EN 60068-2-27	150 m/s^2, 11 ms		

Control and automation technical details

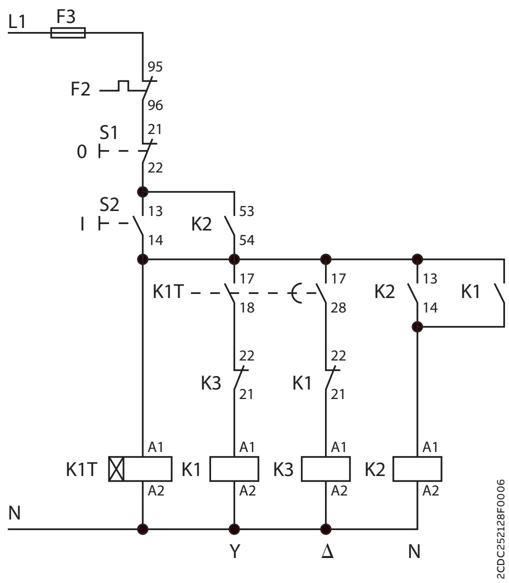
E 234 CT-D time relays for building applications – Technical data

		CT-D with 1 c/o contact	CT-D with 2 c/o contacts	CT-MFC.21
Isolation data				
Rated insulation voltage U_i	input circuit / output circuit	300 V		
	output circuit 1 / output circuit 2	not available	300 V	300 V
Rated impulse withstand voltage U_{imp}	between all isolated circuits	4 kV; 1.2/50 µs		
Power-frequency withstand voltage test(test voltage)	between all isolated circuits	2.5 kV; 50 Hz; 60 s		
Basic insulation (IEC/EN 60664-1)	input circuit / output circuit	300 V		
Protective separation (IEC/EN 60664-1)	input circuit / output circuit	250 V at pollution degree 2 / overvoltage category II		
Pollution degree (IEC/EN 60664-1)		3		
Overvoltage category (IEC/EN 60664-1)		III		
Standards / Directives				
Standards		IEC/EN 61812-1		
Low Voltage Directive		2014/35/EU		
EMC Directive		2014/30/EU		
RoHS Directive		2011/65/EU		
Electromagnetic compatibility				
Interference immunity to		IEC/EN 61000-6-2, IEC/EN 61000-6-1		
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V / m)		
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)		
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-L)		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)		
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4		
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B		
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B		

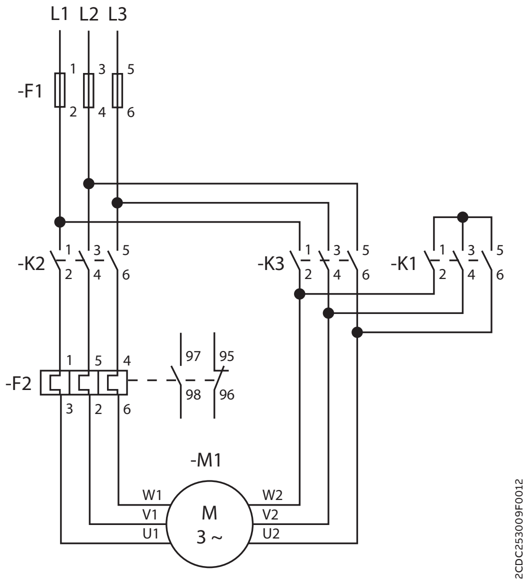
Control and automation technical details

E 234 CT-D time relays for building applications – Technical diagrams

Example of application - Star-delta changeover



Control circuit diagram



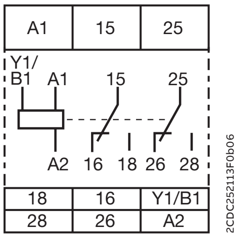
Power circuit diagram

Control and automation technical details

E 234 CT-D time relays for building applications – Technical diagrams

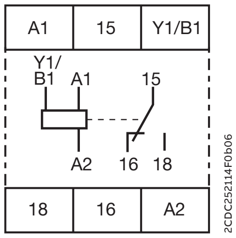
Connection diagrams

CT-MFD.21



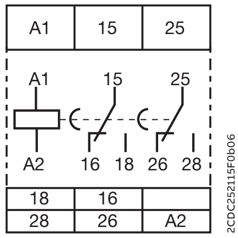
A1-A2	Supply: 12-240 V AC/DC
A1-Y1/B1	Control input
15-16/18	1st c/o contact
25-26/28	2nd c/o contact

CT-MFD.12



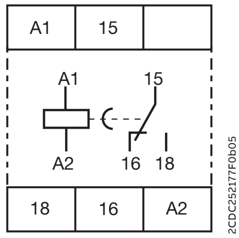
A1-A2	Supply: 24-48 V DC or 24-240 V AC
A1-Y1/B1	Control input
15-16/18	1st c/o contact

CT-ERD.22



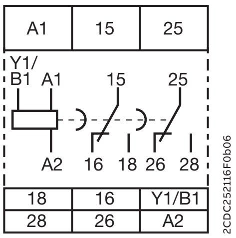
A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1st c/o contact
25-26/28	2nd c/o contact

CT-ERD.12



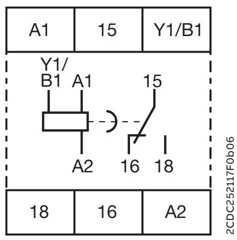
A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1st c/o contact

CT-AHD.22



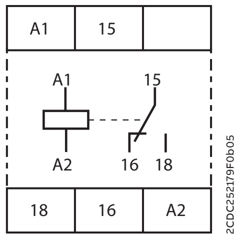
A1-A2	Supply: 24-48 V DC or 24- 240 V AC
A1-Y1/B1	Control input
15-16/18	1st c/o contact
25-26/28	2nd c/o contact

CT-AHD.12



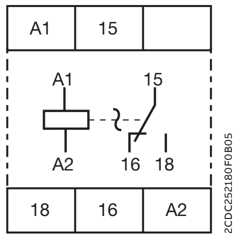
A1-A2	Supply: 24-48 V DC or 24- 240 V AC
A1-Y1/B1	Control input
15-16/18	1st c/o contact

1 CT-VWD.12



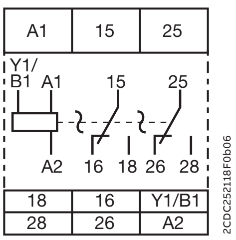
A1-A2	Supply: 24-48 V DC or 24- 240 V AC
15-16/18	1st c/o contact

CT-EBD.12



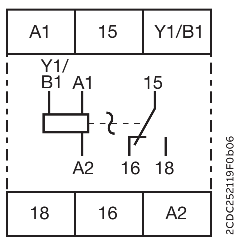
A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1st c/o contact

CT-TGD.22



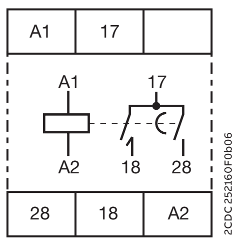
A1-A2	Supply: 24-48 V DC or 24-240 V AC
A1-Y1/B1	Control input
15-16/18	1st c/o contact
25-26/28	2nd c/o contact

CT-TGD.12



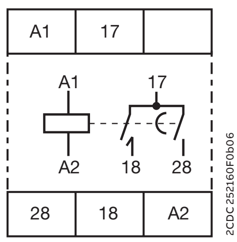
A1-A2	Supply: 24-48 V DC or 24- 240 V AC
A1-Y1/B1	Control input
15-16/18	1st c/o contact

CT-SDD.22



A1-A2	Supply: 24-48 V DC or 24-240 V AC
17-18	1st n/o contact (star contactor)
17-28	2nd n/o contact (delta contactor)

CT-SAD.22



A1-A2	Supply: 24-48 V DC or 24-240 V AC
17-18	1st n/o contact (star contactor)
17-28	2nd n/o contact (delta contactor)

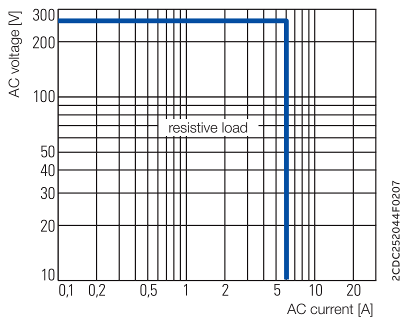
Control and automation technical details

E 234 CT-D time relays for building applications – Technical diagrams

Load limit curves

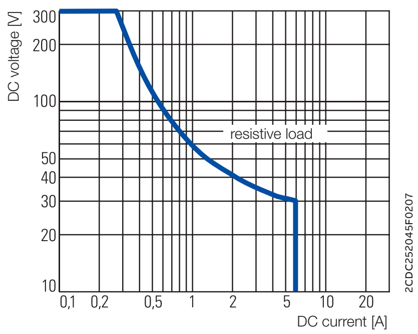
AC load (resistive)

CT-D.1x

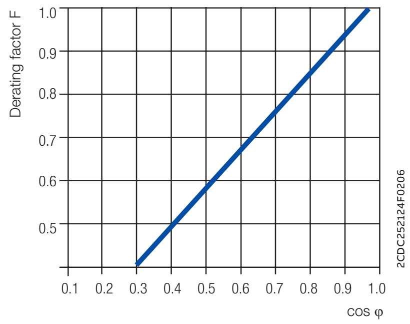


DC load (resistive)

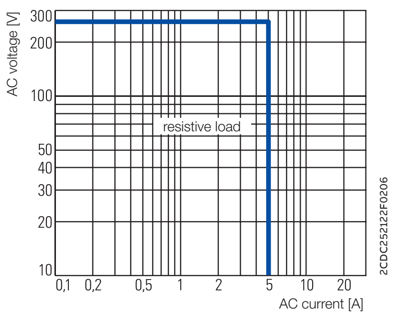
CT-D.1x



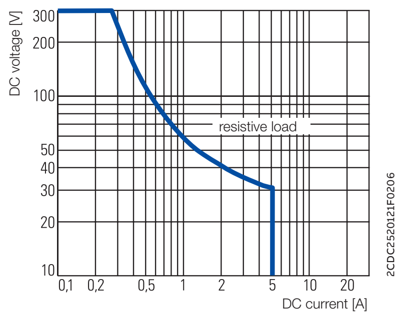
Derating factor F for inductive AC load



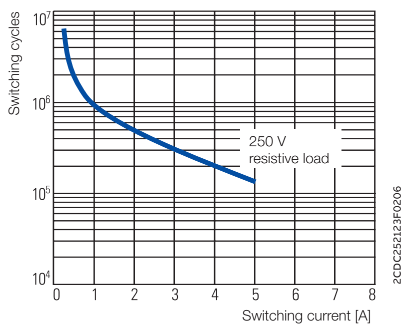
CT-D.2x



CT-D.2x

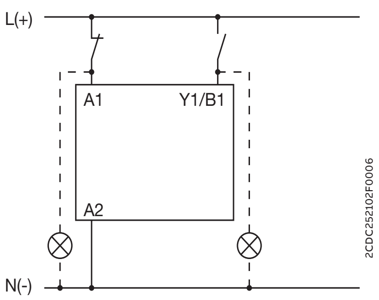


Contact lifetime



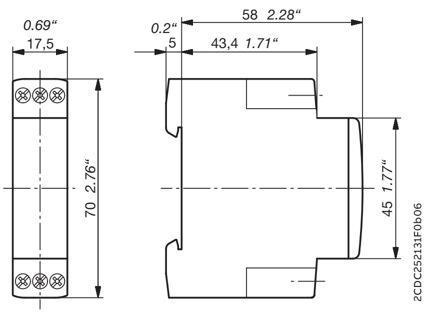
Wiring notes for devices with control input

A parallel load to the control input is possible

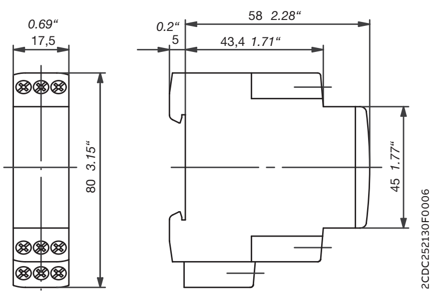


Dimensional drawings

CT-D devices with 1 c/o contact or 2 n/o contacts



CT-D devices with 2 c/o contacts



Dimensions in mm, inches

Control and automation technical details

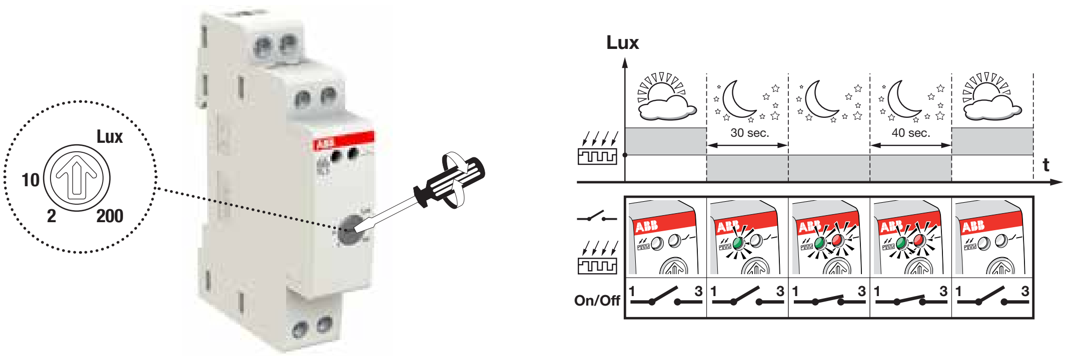
TL Line twilight switches

Main features of DIN rail version - TL1

DIN-Rail version

- 2 indication leds: one for contact status and one for threshold
- Adjustable switching delay
- Preset with 10 LUX from factory
- Brightness range from 2 to 200 lux
- Screw-less version
- 1 module width

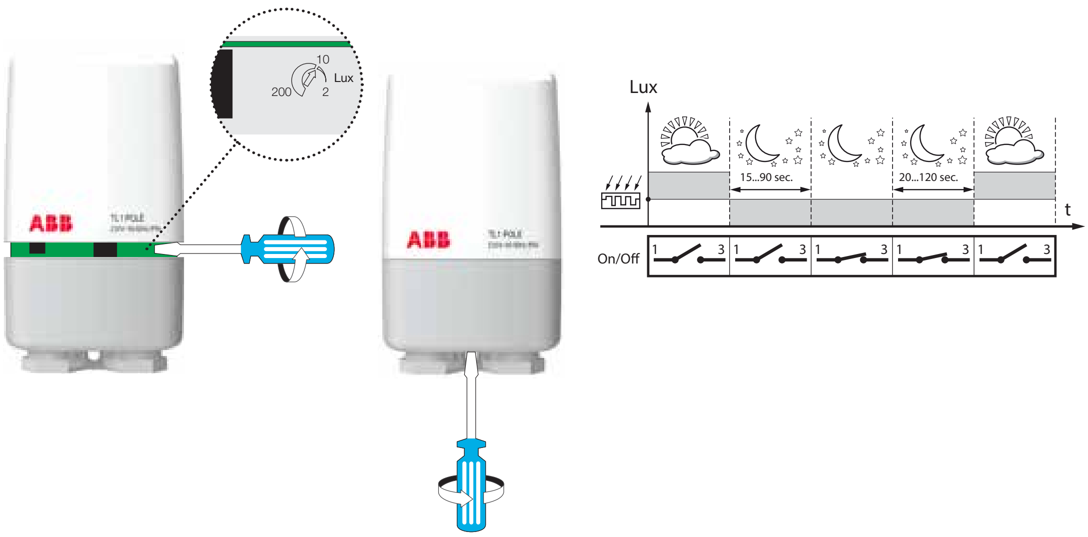
TL1 operating principle



Main features of pole version - TL1 Pole

- Innovative design for direct installation on a pole/wall
- Quick and easy to install, thanks to the simple wiring and ease of adjustment
- Laser etched connection diagram on the back of the product
- Integrated brightness sensor preset at 10 LUX from factory
- Adjustable threshold value from 2 to 200 LUX
- Switching delay of 25 sec. ±10% for ON and 35 sec. ±10% for OFF
- Unlosable screw terminals
- Protection degree IP54

TL1 Pole operating principle



Control and automation technical details

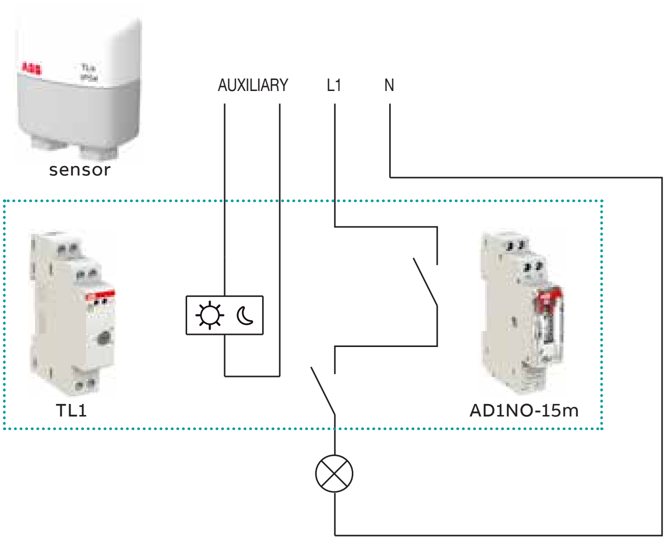
TL Line twilight switches

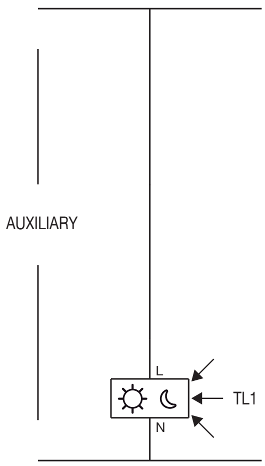
TL Line with DIN rail mounting – TL1

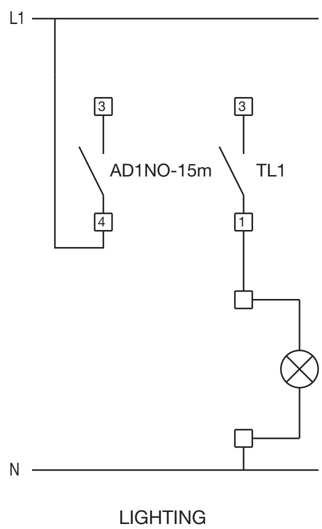
Operating principle
The diagram shows an example of the installation of the TL1 twilight switch in the lighting system of a commercial building. When the external light falls below a certain level (e.g. during the evening when the shop is closed), the device switches on the window lights and the shop sign. The lights can be switched off late evening to reduce power consumption thanks to the AD1NO-15m switch timer.

Application environments
The installation of the TL1 twilight switch with an AG Timer is particularly useful in settings and situations where energy saving is a prime concern (shops, office corridors and public passageways, car parks, parks, etc.).

Example of installation
As shown in the diagrams, one of the possible applications is the installation of a TL1 twilight switch in the lighting system of a commercial building.
When the external light falls below a certain level (e.g. when the shop is closed), the twilight switch switches on the window lights and the sign. The lights can be switched off late evening to reduce power consumption thanks to the AD1NO-15m switch timer which keeps the circuit open until the next morning. When the external light returns to above the threshold value, the twilight switch relay returns to the open position.







Control and automation technical details

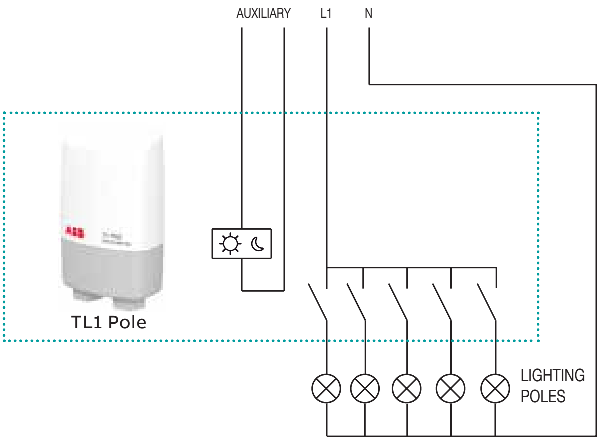
TL Line twilight switches

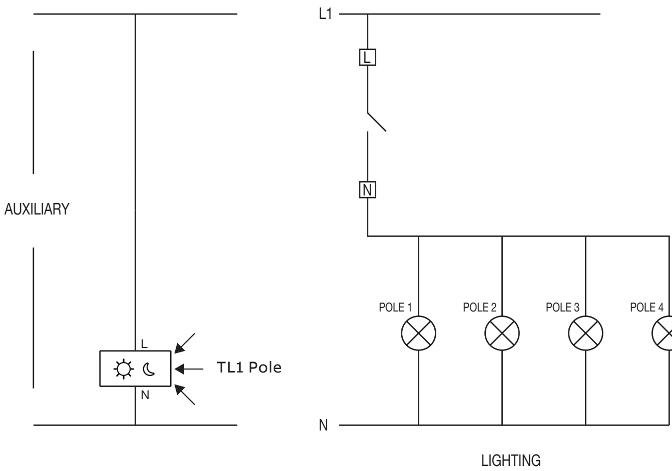
TL Line with pole/wall mounting – TL1 Pole

Operating principle
The diagram shows an example of the installation of the pole-mounted TL1 Pole twilight switch for motorway lighting systems. When the external light falls below a certain level, 10 lux for example, the device switches on the lights present in tunnels, service areas, near to junctions, etc. The lights are then switched off by the TL1 Pole in the morning when the 10 lux value is exceeded.

Application environments
The installation of the TL1 Pole twilight switch is particularly suitable for controlling public street lighting, thanks to the fact that they can be installed on poles, lamp standards, etc.

Example of installation
As shown in the diagrams, one of the possible applications is the installation of a TL1 Pole twilight switch in the motorway lighting system.
When the external light falls below a certain level (for example at sunset), the pole-mounted twilight switch switches on the lights to provide the correct lighting for the setting. At sunrise, the external brightness exceeds the threshold value and the twilight relay returns to the open position.





Control and automation technical details

LCR load management relay

Operating principle

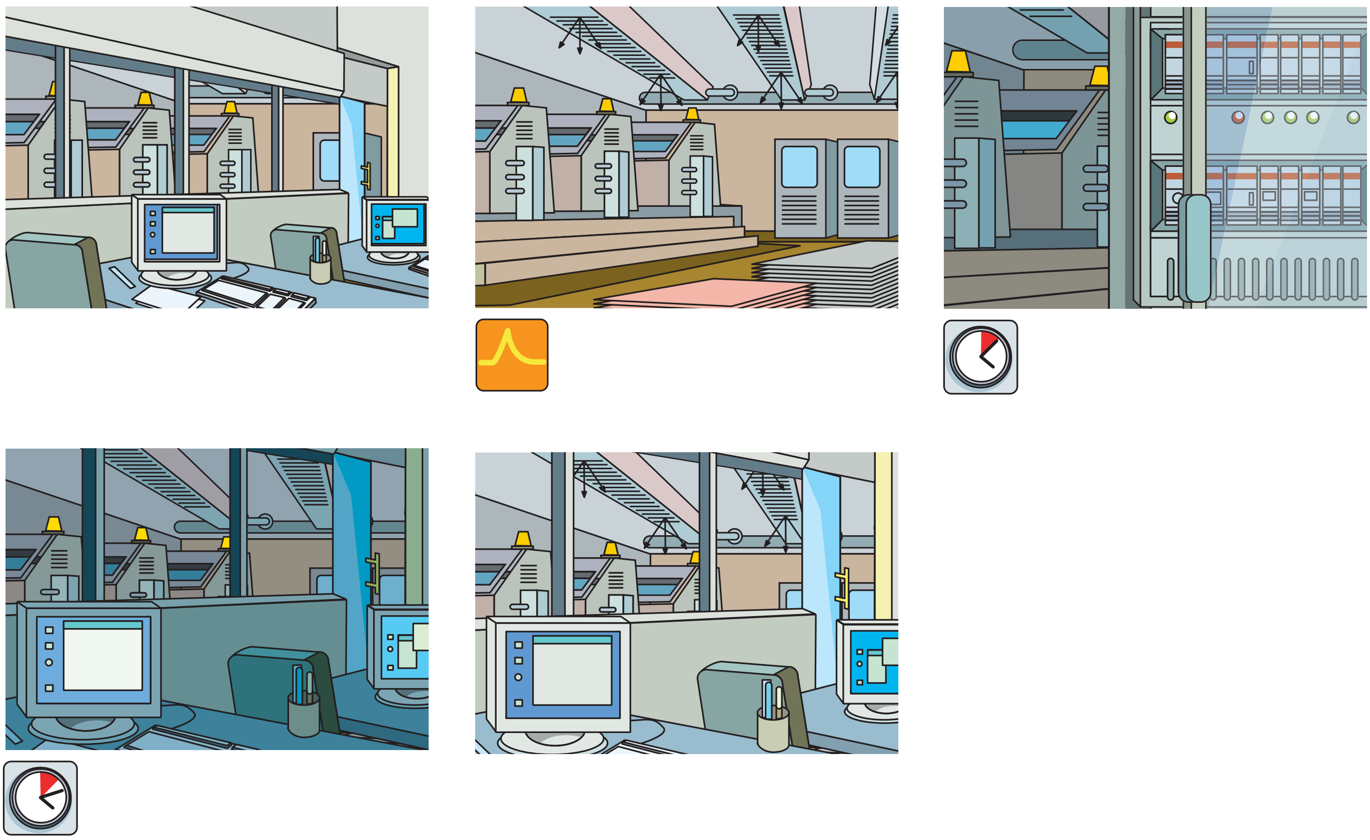
LCR load management relay are used in case of exceeding of consumption threshold allowed in the system by switching off in sequence one or two loads, if necessary. At preset intervals and until current consumption is not below the reference level, the switch tries to reset the disconnected loads.

Application environments

The installation of the LCR load management relay is suitable for any environment and situation where it is necessary to control electric energy consumption within consumption limits allowed in the system.

Example of installation

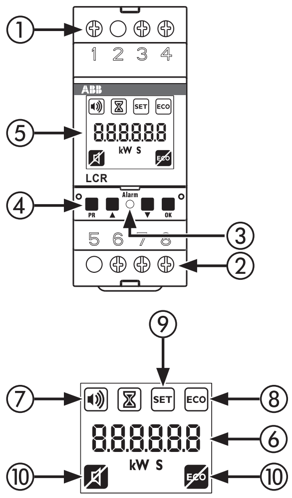
As shown in the diagrams, one of the possible applications is the installation of the LCR load shedding switches in a printing office system, where the conditioning switch-on causes the exceeding of the energy consumption threshold defined with the supplying company by contract. The LCR load shedding switch preserves printing machines operation by switching off one or two primary loads automatically (i.e. night conditioning and lighting), where ON red leds indicate temporary OFF. After a preset interval, the switch checks that current consumption values fall within the limits again trying to reset the previously disconnected loads.

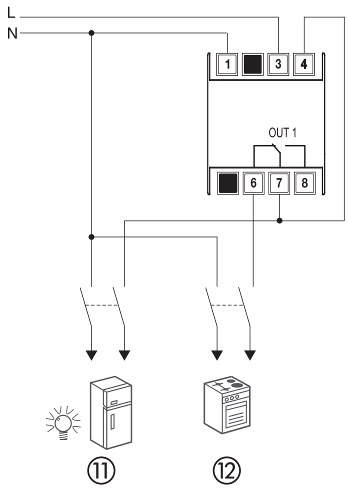


Control and automation technical details

LCR load management relay

Description

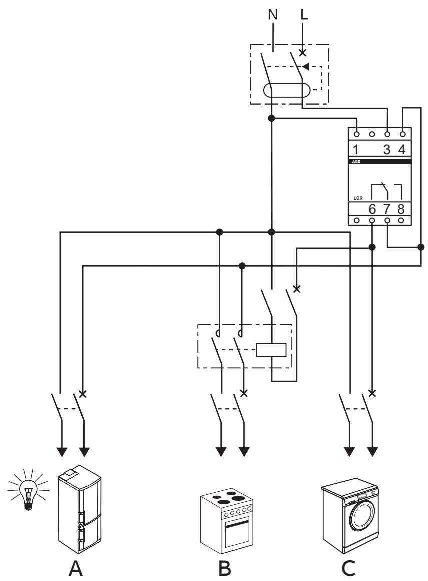




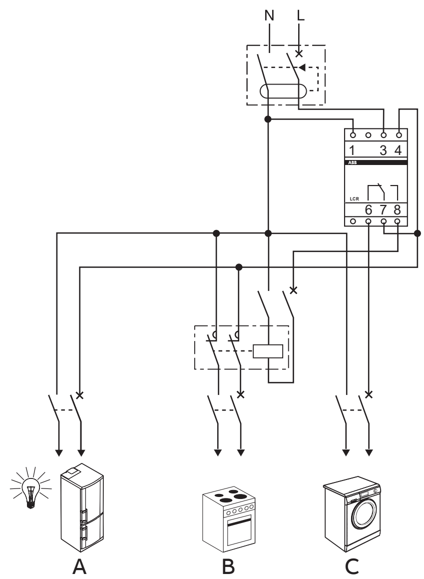
1 - Terminals for power supply and current measurement
2 - Relay terminals
3 - Red led: on indicates disconnected load
4 - Programming keys
5 - Backlit display (for 30 s from the pressure of one key)
6 - Measured power
7 - Active buzzer (Tbe)
8 - Disconnected load
9 - Setpoint is exceeded
10 - Icons for text guide keys function
- (PR) Buzzer silencing
- (OK) Disconnected load rejection

11 - Not disconnectable loads
12 - Disconnectable loads

Connection via normally open contacts NO with $I_c \leq 16$ A and $I_a+I_b+I_c \leq 32$ A



Connection via normally closed contacts NC with $I_c \leq 16$ A and $I_a+I_b+I_c \leq 32$ A



Notes

Electrical installation solutions for buildings – Technical details

Energy efficiency

Index

Energy efficiency technical details

Multimeters and network analysers

Communication networks with Modbus RTU protocol Modbus is a serial communication protocol created for use with programmable logic controllers (PLC). It has become an industry standard and is the most widely used protocol for connecting of industrial electronic devices.

Its principal benefits are:
- Ease of use
- Low resource requirements
- Openly published and royalty-free
- Allows communication between many devices connected to the same network

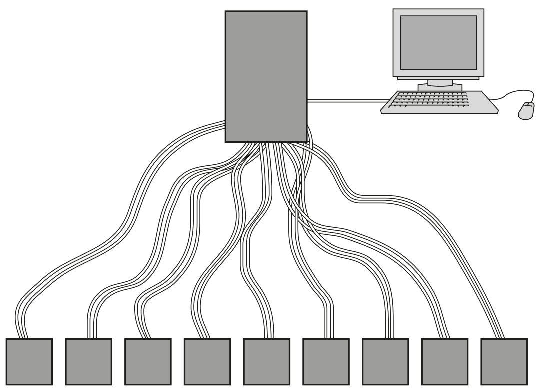
The Modbus support was created for controlling transfer on the line and pipeline monitoring. The system's flexibility and reliability make it suitable for a wide variety of processes and operations in nearly every industry.

Modbus determines how many MASTERS and SLAVES to recognise and connect together, how many senders and receivers are identified, how many messages are exchanged in an orderly manner and how many errors occur.
Every peripheral that needs to communicate via Modbus is assigned a unique address.
Any one of them can then send a Modbus command, although generally (necessarily, in the case of serial) only one peripheral acts as a master.
A Modbus command contains the Modbus address of the peripheral it is intended for, and only that peripheral will act on the command, even though all the others receive it as well.
All Modbus commands incorporate control information to ensure that the received command is correct.

Conventional I/O system

Plus
Field devices unaffected from wiring error caused by other devices
thanks to indipendend wiring
Devices are cheaper
Well known technology

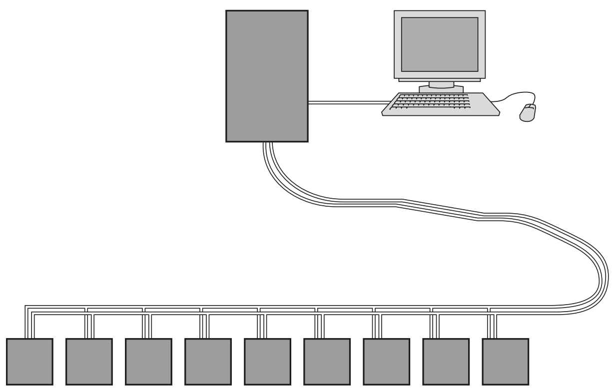
Minus
Higher installation complexity caused by:
point to point wiring
many terminal blocks, need additional rack space or more cabinets
troubleshouting on complex wiring
increased number of point of failure
longer initial check and start up
Expensive installation



Modbus Network

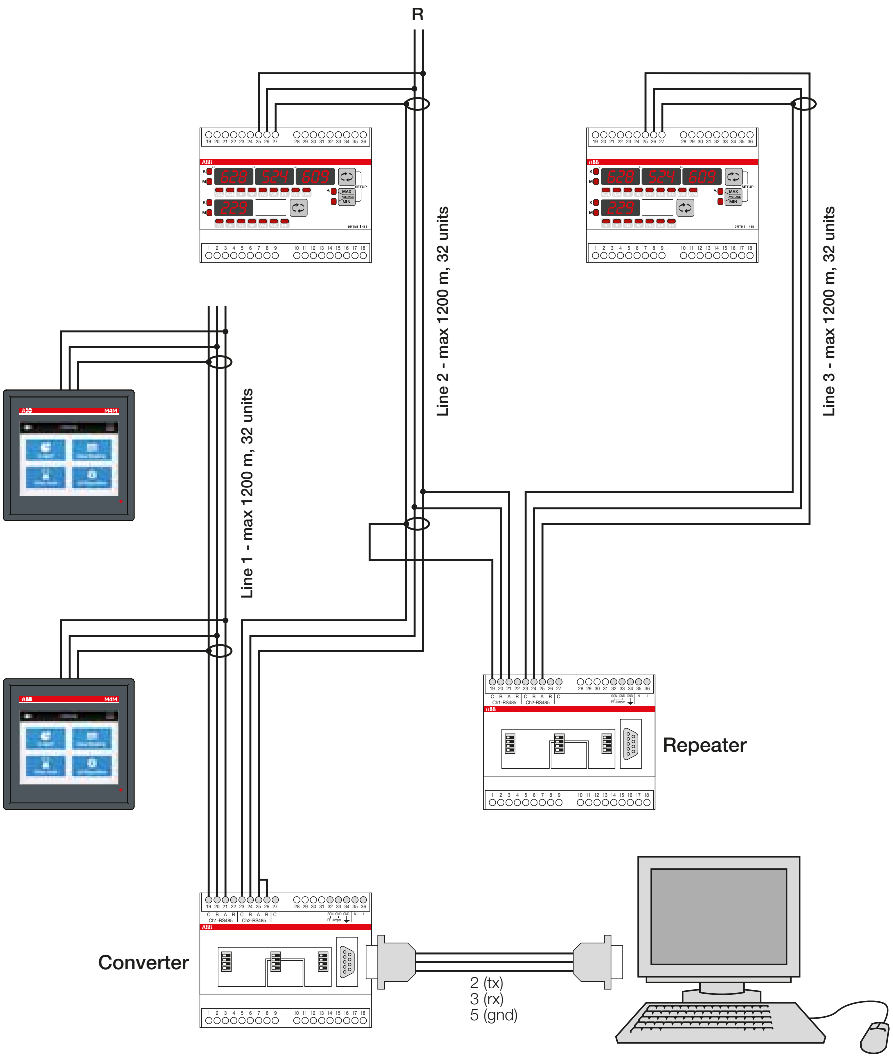
Plus
Well known protocol, fully documented
Many PLC, DCS and process systems are supporing this protocol
Many facilities already use it
Optimum choice when:
Modbus network or devices are being used
Modbus protocol is already used as a facility standard

Minus
Device operations require separate power
Limited diagnostic capabilities (device applications)
Limited use as a device bus



Energy efficiency technical details
Multimeters and network analysers

Application example

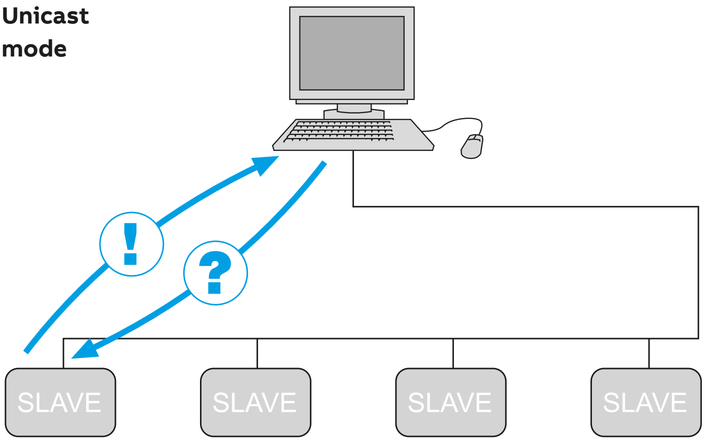


Energy efficiency technical details

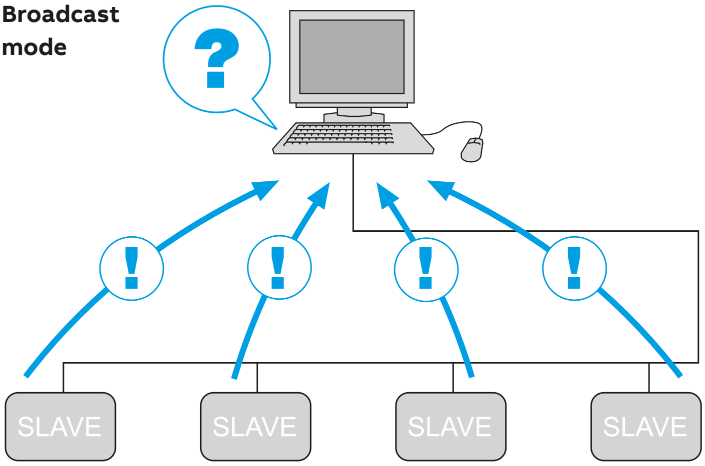
Multimeters and network analyser

Connection among the devices
The protocol has one Master and up to 247 Slaves on a common line covering a maximum distance of 1200 metres. Only the Master initiates transactions. The transactions are of the request/reply type (addressed to a single Slave) or of the broadcast/reply type (addressed to all Slaves).
Modbus is often used for connecting a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition systems (SCADA). There are two versions of the protocol: one for serial ports (RS232 by default, but also RS485) and one for Ethernet. Modbus uses a compact hexadecimal data representation. The RTU format appends to commands/ data a cyclic redundancy checksum (CRC) field, while the ASCII format uses an LRU type (longitudinal redundancy check) checksum.

Unicast mode



Broadcast mode



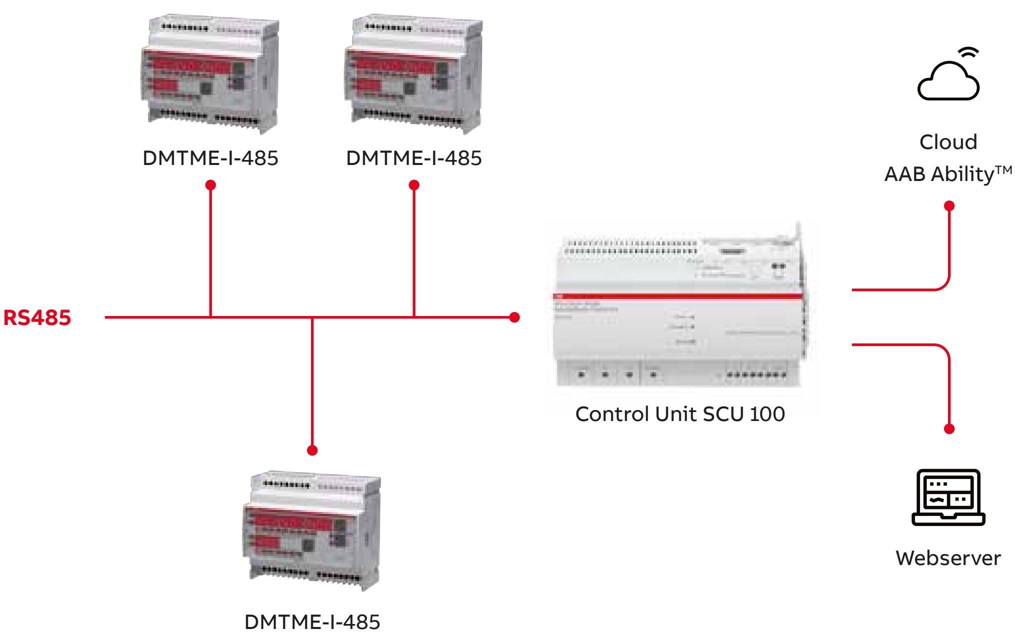
Energy efficiency technical details
DMTME multimeters

DMTME multimeters
The DMTME series instruments are digital multimeters that measure the true rms value of the principal electrical quantities in 230/400 V a.c. networks, with the ability to store in memory the maximum/minimum/average measured values, and meter active and reactive energy.
Four red LED displays provide a clear local readout of multiple measurements simultaneously.
The DMTME multimeters perform the functions of a voltmeter, ammeter, power factor meter, wattmeter, varmeter, frequency meter, active and reactive energy meter in a single instrument, thus substantially reducing installation space requirements and wiring time.

The DMTME-I-485 version is additionally equipped with a pulse output and RS485 port for communicating the measured parameters via a Modbus network.
All versions come with a mini CD containing the instruction manuals, technical documentation, communication protocol and the DMTME-SW software.
The main innovations of the range are:
- Automatic recognition of the CT connection polarity, which simplifies installation of the instrument, making it error-proof.
- An hour counter for scheduled maintenance and an instrument life time display, to assist the installer with routine activities.
- Separate auxiliary 115/230 V a.c. power supply on all models, with extractable terminal blocks.

Relying on softwares such as ABB Ability™, InSite and DMTME-SW, it is possible to perform real-time acquisition of all the readings of a DMTME multimeter or network of DMTME multimeters. The software integration allows the user to monitor, compare and structure measurements data. DMTME-SW also functions as a simple Modbus communication test instrument, allowing the installer to check the correct operation of the network prior to testing by the system integrator.

Below, a configuration example of networked DMTME multimeters.



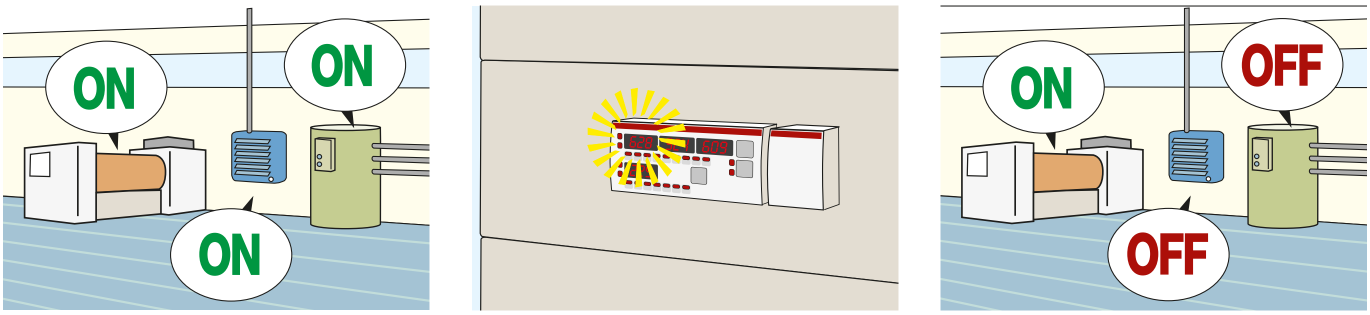
Energy efficiency technical details
DMTME multimeters

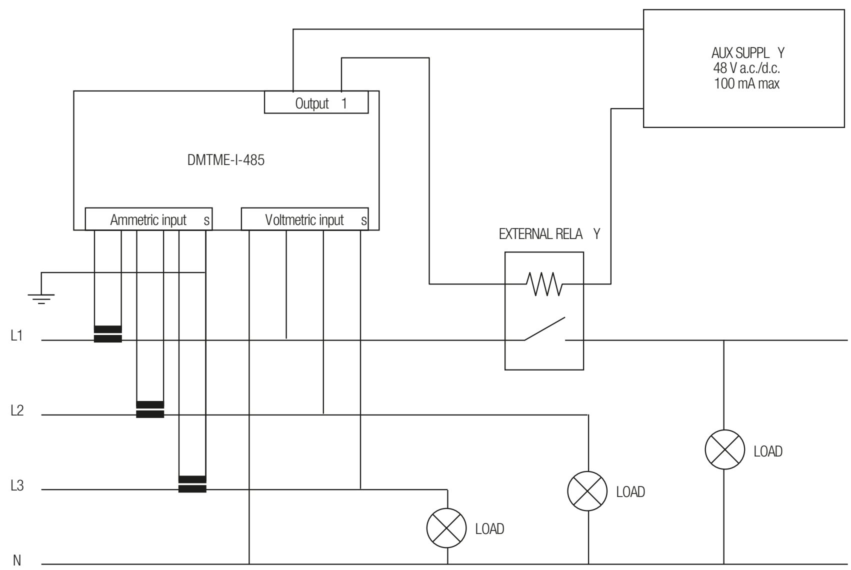
Operating principle
Beyond the custom functions of electric measure, the DMTME-I-485 multimeter is equipped with two programmable relays used as output alarms.
The setting of the alarm thresholds of all the network electrical parameters allows the customer to hold always under control its own system.

Application environments
The installation of DMTME-I-485 multimeter is adapt in all those cases in which the customer must hold under remote control its own system.
The use of the multimeter allows to set up system automation, to prevent malfunctions, dued to overloads and undervoltages, to manage maintainance and to prevent overcoming of the contractual power, avoiding penal from the energy supplyer.
The multimeter can carry out the same functions of the LSS1/2 load shedding switch, with the advantage of allowing installation in three-phase systems, instead of only single phase systems.

Example of installation
A possible application is the installation of DMTME-I-485 inside an electrical distribution switchboard of an industrial system.
It’s possible to set up an alarm based on the total absorbed power from the system. When the power exceeds the set up threshold, the switching of the multimeter inner contact excitates the coil of an auxiliary external relay.
The switching of the external relay, a ESB contactor or a E234 electronic timer, detaches a non primary load to lower the absorption levels of the entire system.

This application can be performed also by using M2M and ANR network analyser.





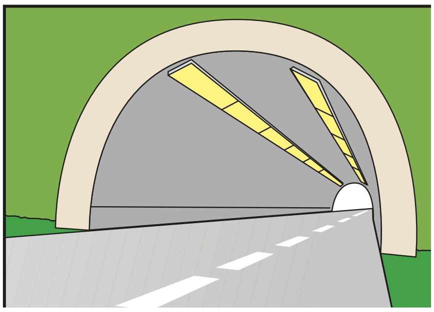
Energy efficiency technical details
DMTME multimeters

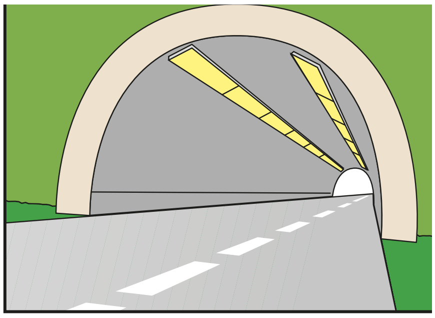
Operating principle
In addition to measuring the main electrical quantities, the DMTME-I-485-96 digital front panel multimeter has a serial port for implementing a communication network, and two digital outputs which can be configured as alarm outputs. Programmable alarm thresholds on all the electrical parameters of the network allow the user to continually monitor the entire installation.

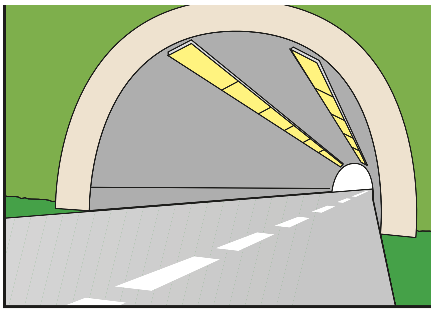
Application environments
The DMTME-I-485-96 multimeter is ideal for those situations where users must remotely monitor their installation.
The multimeter makes it possible to implement system automation, prevent malfunctions due to overloads and undervoltages, manage maintenance, and monitor the functioning of the installation.

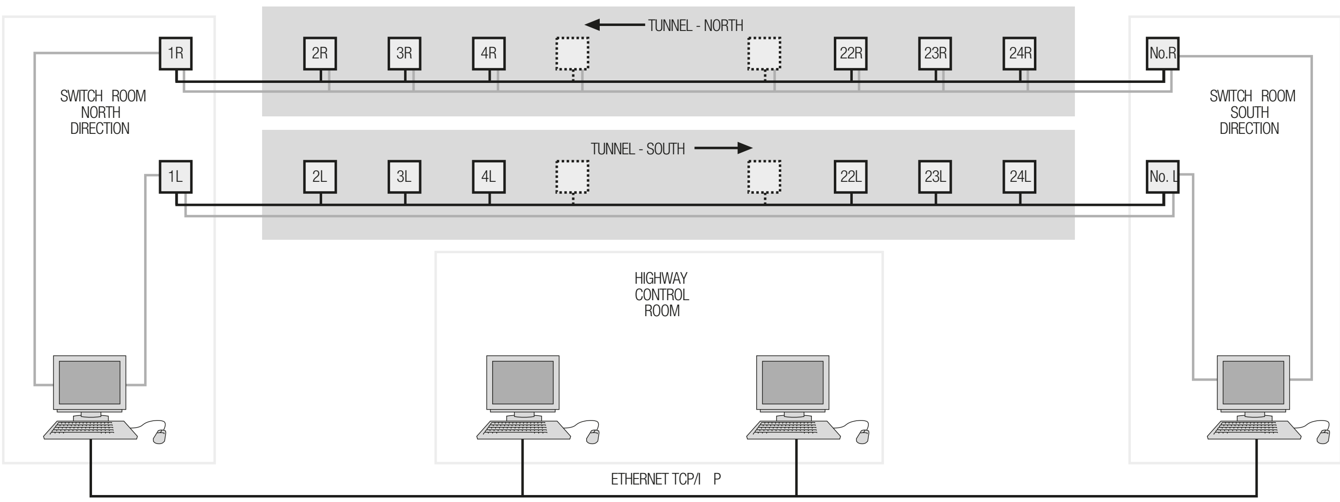
Example of installation
The figures show an application example in which the DMTME-I-485-96 is installed in a motorway tunnel panel, with an alarm threshold programmed on the total power consumption of the row of lights.
If one or more lamps burn out, the total power consumption drops and triggers an alarm.
Remote acquisition of this data thus allows a maintenance technicians to be sent out only when effectively needed.

This application can be performed also by using M2M and ANR network analyser.









Energy efficiency technical details

M4M Network analyzer

Operating principle
M4M is a network analyzer that can perform a variety of functions. Available in two versions M4M 30 and M4M 20. Some of M4M 30 functionalities are:

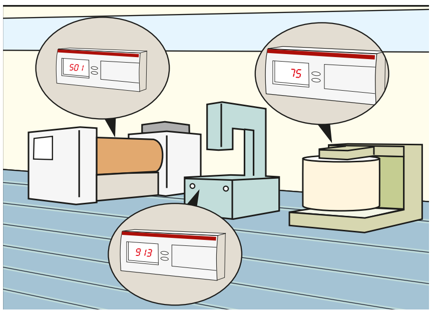
- **Complete electrical parameters measurement** (including avg/max/min, bi-directional metering)
- **Power quality** (THD, individual harmonics, unbalances, measured neutral current, power quality events, waveforms and phasors visualization)
- **Energy management** (max. demand, I/O, tariffs)
- **Log functionalities** (1-year flash memory for load profiles, max/min demand, energy trends)

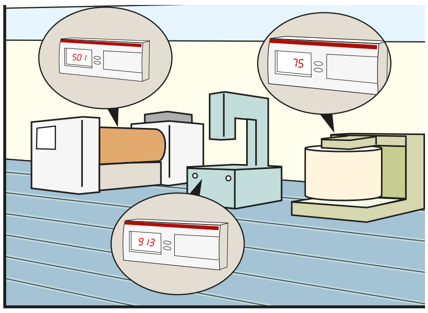
While M4M 20 functionalities are:

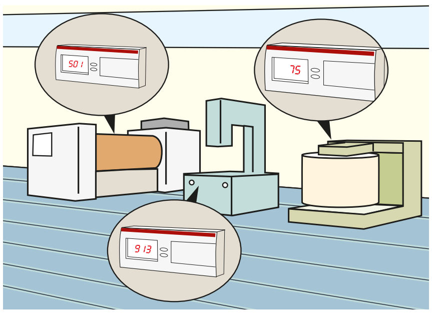
- **Complete electrical parameters** measurement (including avg/max/min, bi-directional metering)
- **Basic power quality** (THD, calculated neutral current)
- **Basic energy management** (max. demand, I/O)

Application environments
M4M is suitable for industrial and commercial buildings, facilities, data centers that requires accurate energy efficiency monitoring of all the energy assets.

Installation
As it is shown in the picture all terminals on M4M are removable, including the current transformers (CTs) inputs for current measurement, allowing to carry out the wiring directly on the terminals and speeding up the process.
Moreover, the vertical disposition of the terminals makes the cabling inside the switchboard more comfortable.
They are easily installed. Secure fix on the panel is ensured by the easy-to-use clips, with different thickness setup for compatibility with any panel. One-hand mounting of the device thanks to the hooks on the housing.
The reduced depth of only 57 mm inside the panel makes M4M suitable even in small-size switchboards.







Full communication
ABB Ability™ native network analyzers with complete communication protocols and I/O options for integration in any system.

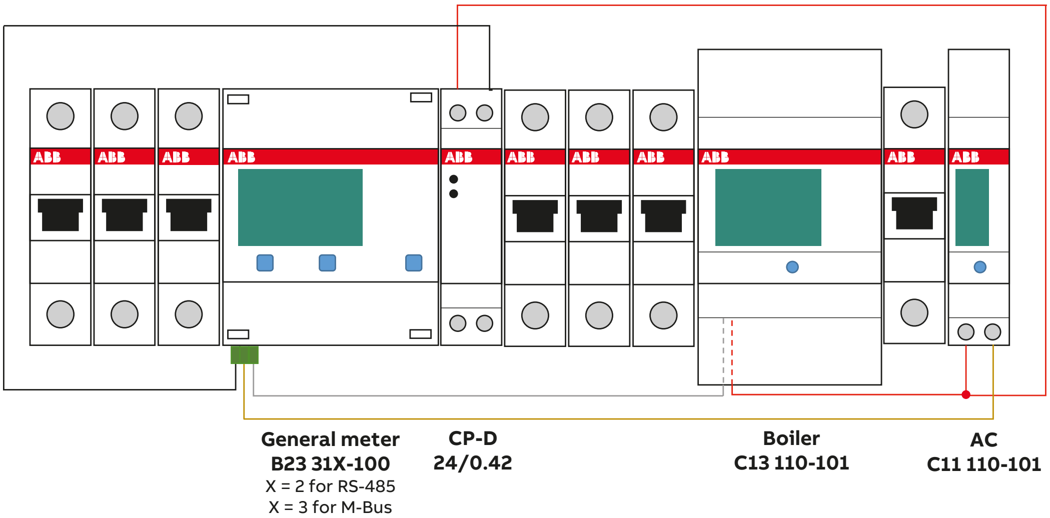
Easy to install
Fast one-hand mounting and comfortable installation with clips in only 57 mm depth inside the panel.

Fast wiring
All-removable terminals and one tool process to speed up the wiring activities.

Energy efficiency technical details

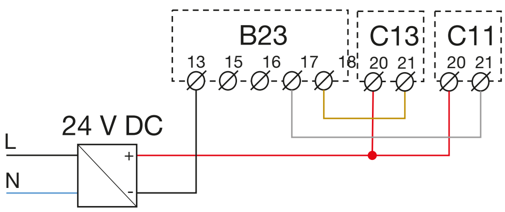
EQ meters pulse outputs and digital inputs

Using the input counters on an A or B series meter for read out of C series meters values
Now and then it can be useful to measure special loads like for example a boiler and an AC. These loads can be measured with C series meters which has their pulse outputs connected [1] to one A or B series meter in Silver level or higher for functionality. In this way the measured values of the C series meters can be read over Modbus or M-Bus networks by read out of input counters on the general A or B series meter.



Water, Gas, heat and other meters
Similar connections can be used for reading water, gas or heat meters for example as long as they can generate pulses according to the specification of the inputs of the EQ meters. The most common pulse output is called S0 and it is common on all sorts of meters. Please note that the EQ meters do not provide the power for the pulses.

Wiring diagram for the 24 V DC installation

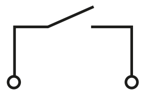
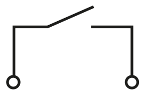
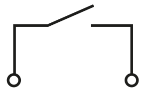
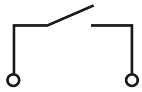


[1] Please be aware that the same inputs cannot be used for tariff shift if they are used for pulse counting. To shift four tariffs via input a minimum of two inputs is needed. Tariffs can be shifted via communication for meters above Silver level if it has RS-485 or M-Bus interface or internal clock if the meter is in Gold or platinum level.

Energy efficiency technical details

Digital instruments

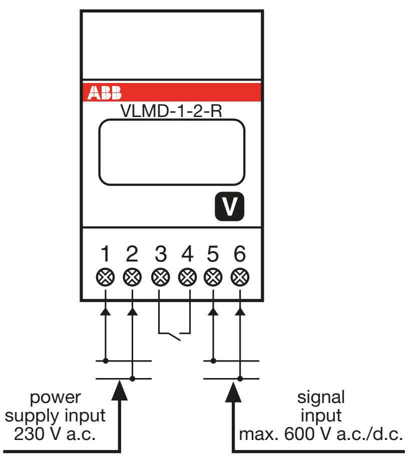
Alarm activation logic

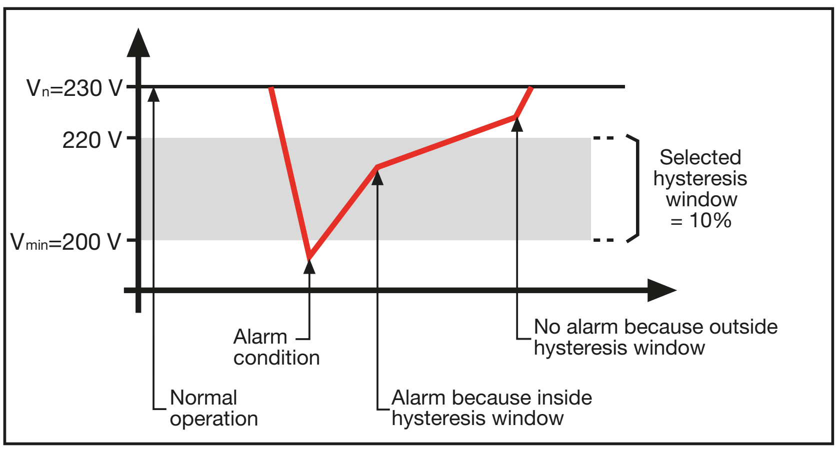
Device status	NO polarity (default)	NC polarity
Instrument not supplied		
Instrument supplied - no alarm		
Instrument supplied - alarm condition		

Digital measurement instruments with relays
Control of a load with the following characteristics:
In = 5 A (rated normal operating current)
Vn = 230 V a.c. (rated normal operating voltage)
Vmin = 200 V a.c. (RLV relay trip)

To scroll through the menu items press briefly (<3sec); to confirm press and hold (>3sec).

1 Connect as shown in the diagram (Vmin = 200 V).
2 Press and hold the key to enter the programming menu.
3 Scroll to the ACC menu item and confirm, then choose CC to select direct current operation, and confirm.
4 Set the full scale value to 300 V
5 Set the alarm threshold at 70 and confirm.
6 Adjust the Delay trimmer: scroll to the dLY menu item and confirm, then select the relay tripping delay (1…30 sec).
7 Program the alarm reset hysteresis (HySTeresis) at 10% of the threshold: scroll to the HSt menu item, confirm, and select the value 10. This results in a trip window between 200 and 220 V. The relay will be tripped at 200 V and return to normal operation at 220 V.
8 Set the alarm output polarity: scroll to the OUt menu item and confirm, then choose whether the contact opens or closes when an alarm is triggered (N.O. by default).

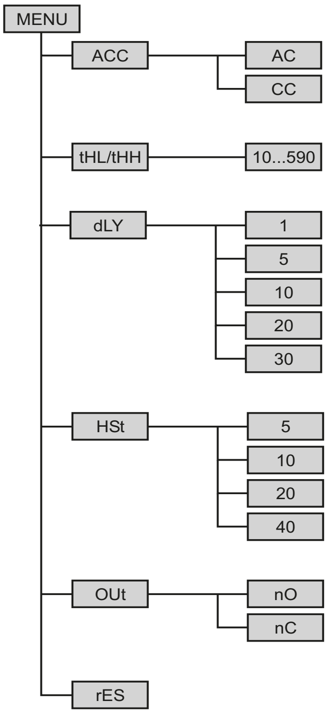




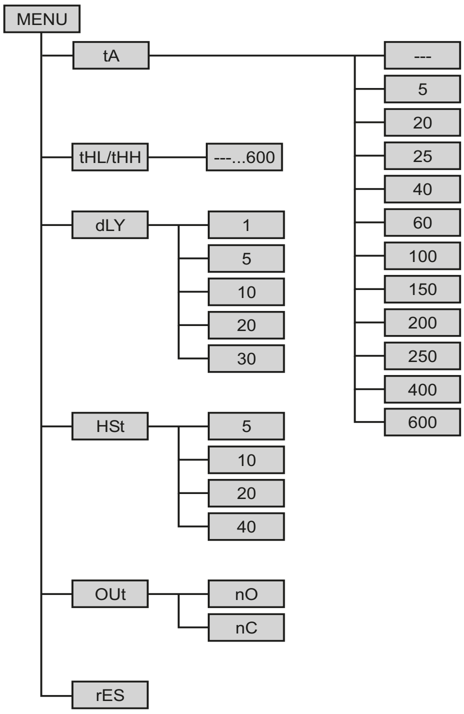
Energy efficiency technical details

Digital instruments

Voltmeters menu layout

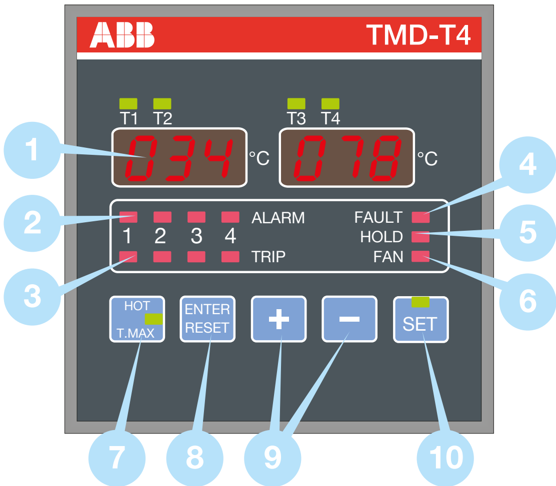


Ammeters menu layout

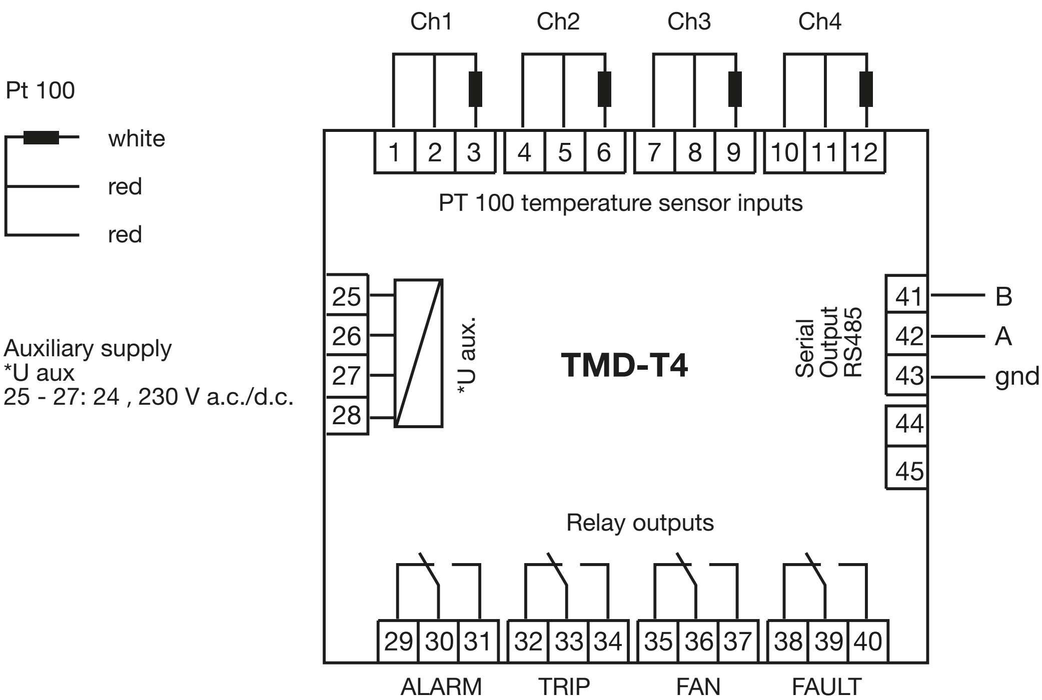


Energy efficiency technical details

TMD temperature control units



1. Display for viewing temperature values and settings
2. ALARM LED for viewing alarm status of measuring channels
3. TRIP LED for viewing trip status (second-level alarm) of measuring channels
4. FAULT LED for indicating temperature control unit and sensor faults
5. HOLD LED for indicating whether manual reset function is enabled
6. FAN LED for indicating whether fan output is enabled
7. MAX T. pushbutton for selecting to view the max temperature level
8. ENTER/RESET pushbutton for confirming the programmed settings and for manually resetting any alarms that have been tripped
9. +/- pushbuttons for selecting the measuring channels and for adjusting the programming parameters
10. SET pushbutton with status LED for accessing and programming the device's settings



Energy efficiency technical details

Measurement current transformers with through primary

Power consumption of copper cables between the device and the transformer

For 5 A secondary

Cable section mm²	Power (two-pole cable) VA VA					
	Distance					
	1 m	2 m	4 m	6 m	8 m	10 m
1.5	0.58	1.15	2.31	3.46	4.62	5.77
2.5	0.36	0.71	1.43	2.14	2.86	3.57
4	0.22	0.45	0.89	1.34	1.79	2.24
6	0.15	0.30	0.60	1.89	1.19	1.49
10	0.09	0.18	0.36	0.54	0.71	0.89

Maximum load (A) on copper bars according to DIN 43670 and 43671

Bar dimensions mm	Rated current (In) A		
	1 bar	2 bars	3 bars
20x5	325	560	
20x10	427	925	1180
30x5	379	672	896
30x10	573	1060	1480
40x5	482	836	1090
40x10	715	1290	1770
50x10	852	1510	2040
60x10	985	1720	2300
80x10	1240	2110	2790
100x10	1490	2480	3260

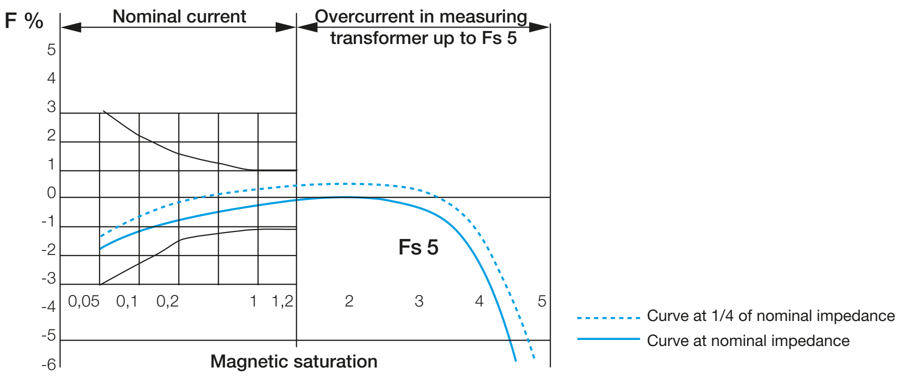
Rating	Ratio fault limit in %			
	0.05 In	0.2 In	In	1.2 In
0.5	±1	±0.75	±0.5	±0.5
1	±2	±1.5	±1	±1
3	From 0.5 In to 1.2 In = ± 3			

Rating	Angle fault limit in %			
	0.05 In	0.2 In	In	1.2 In
0.5	±1.8	±1.35	±0.9	±0.9
1	±3.6	±2.7	±1.8	±1.8
3	No prescriptions			

Accuracy rating

- 0.5 rating is required for power meters.
- 1 rating is required for unofficial power measures and power meters (measurements within the firm).
- 3 rating is required for relays and protection devices.

Error Curves



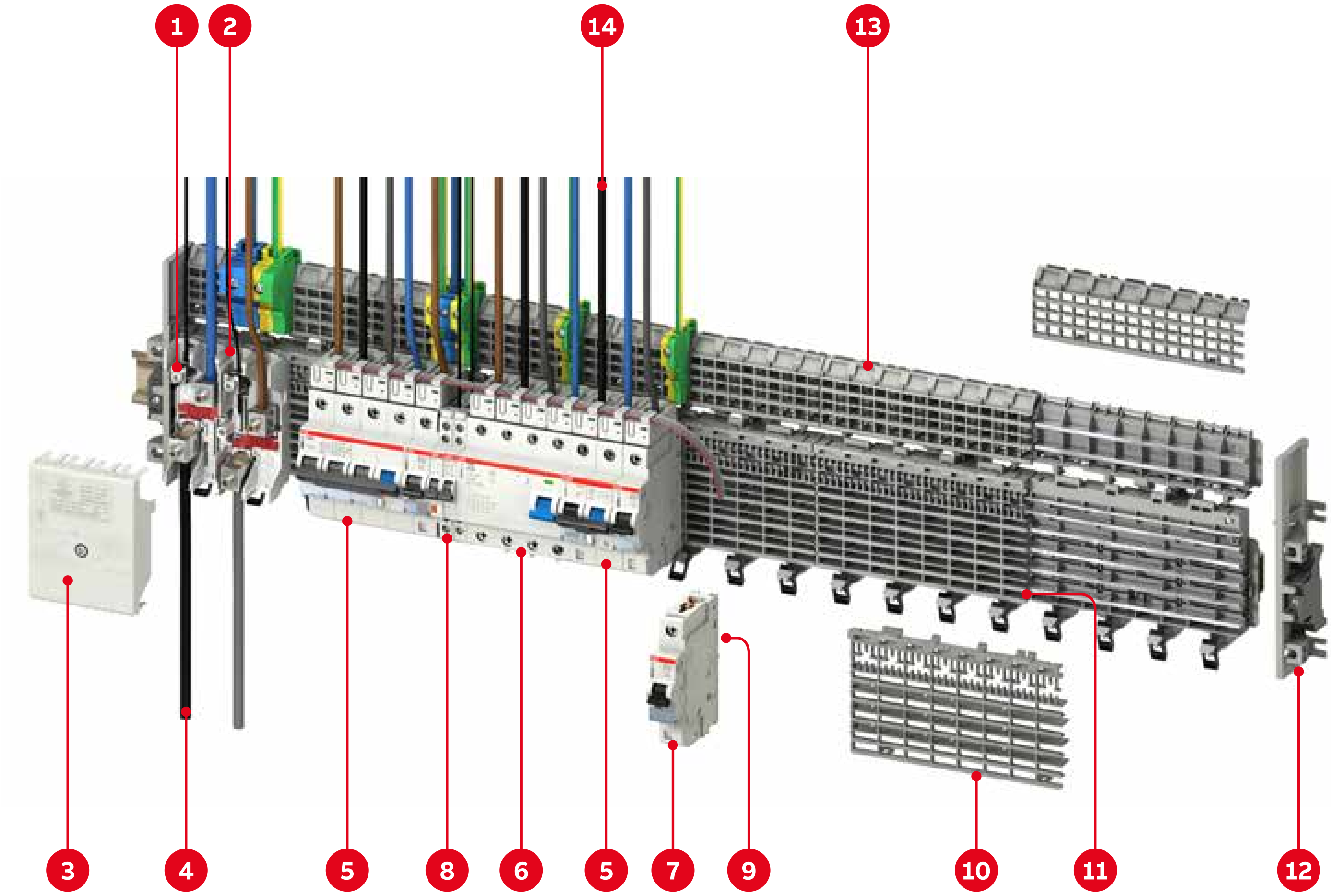
Notes

Electrical installation solutions for buildings – Technical details
SMISSLINE TP plug-in system

Index

SMISSLINE TP technical details

Busbar system 125 A Overview



1 **Supply terminal**

2 **Incoming terminal block with a max. current rating of 160 A 50 mm² (2 x 25 mm²) + 2 x 10 mm² (LA, LB)**

3 **Cover for incoming terminal block**

4 **Supply cable**

5 **Residual current operated circuit breaker with overcurrent protection RCBO FS401 and FS403**

6 **Residual-current circuit breaker F404**

7 **Miniature circuit breaker S401 M**

8 **Signal contact**

9 **Plug contacts**

10 **Cover for socket**

11 **Socket**

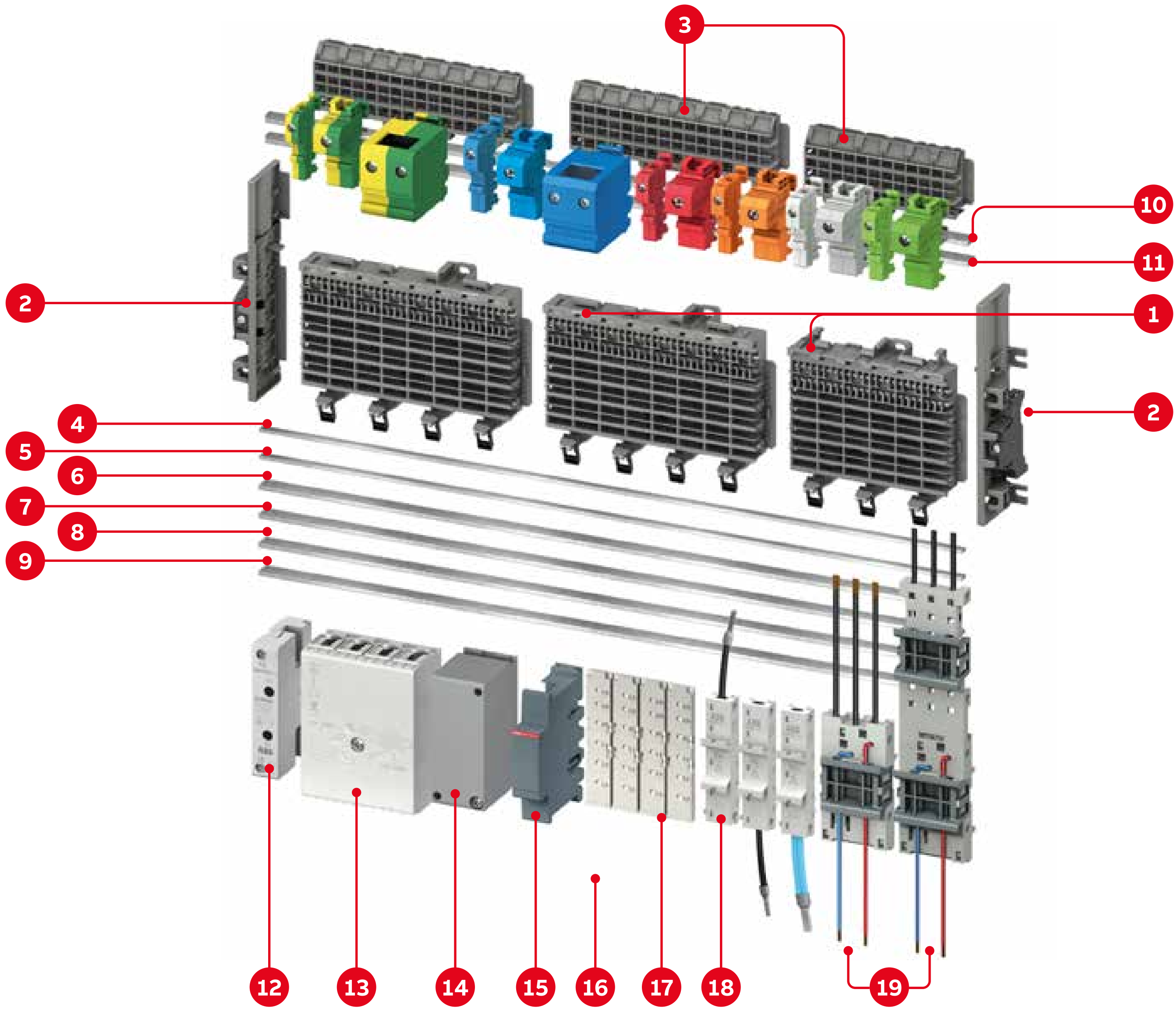
12 **End piece**

13 **Additional socket**

14 **Outgoing cable**

SMISSLINE TP technical details

Busbar system 125 A Overview



1 6 and 8-module socket

2 end piece on left and right

3 6 and 8 module additional socket

4 Busbar LA 40A

5 Busbar LB 40A

6 Busbar 125A N

7 Busbar 125A L1 or DC +, –

8 Busbar 125A L2 or DC +, –

9 Busbar 125A L3 or DC +, –

10 Busbar 125A PE

11 Busbar 125A N

12 Incoming terminal block 63A

13 Incoming terminal block 160A

14 Incoming terminal component, centre power supply 200 A, maximum 95 mm2

15 Isolator

16 DIN adapter

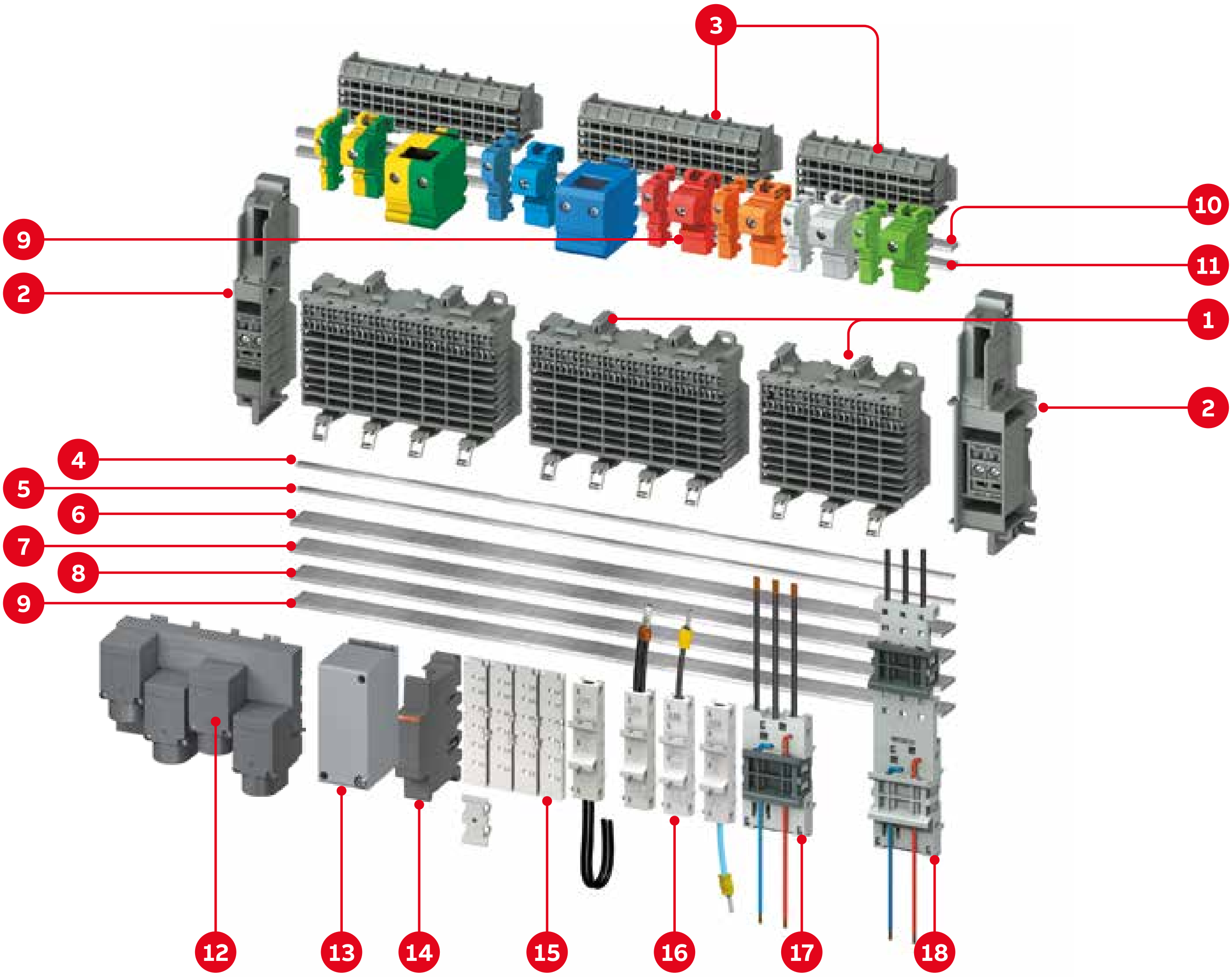
17 Spare way cover

18 Adapter for DIN rail components

19 Combi module with a current rating of 32 A

SMISSLINE TP technical details

Busbar system 250 A Overview



1 **6 and 8-module socket**

2 **end piece on left and right**

3 **6 and 8 module additional socket**

4 **Busbar LA 40 A**

5 **Busbar LB 40 A**

6 **Busbar 250 A N**

7 **Busbar 250 A L1 or DC +, –**

8 **Busbar 250 A L2 or DC +, –**

9 **Busbar 250 A L3 or DC +, –**

10 **Busbar 250 A PE**

11 **Busbar 250 A N**

12 **Incoming block, supply 250 A, M8 bolt on maximum 150 mm²**

13 **Incoming terminal component, supply 250 A, maximum 120 mm²**

14 **Isolator**

15 **Spare way cover**

16 **Adapter for DIN rail components**

17 **Adapter for Motor starter MS116/132**

18 **Combi module with a current rating of 32 A**

SMISSLINE TP technical details

Socket/additional socket/busbars

Socket bases ZLS906, ZLS908
The SMISSLINE socket system is a totally new kind of assembly and connection technology for the construction of distributions. Besides the classic method of snapping the devices onto 35-mm mounting rails, the new family of devices can be directly attached to the socket bases with integrated busbars. The time-consuming process of connecting up the supply is thereby no longer needed. In addition, in the event of rearrangement or expansion, the replacement of devices in existing systems is made significantly easier.

The socket sections and the wide range of accessories make it possible to plan with the capability for expansion and to construct distribution systems of any desired size in a short period of time.

6- and 8-module sockets are installed either by screwing them onto any flat surface or by snapping them onto a 35 mm DIN mounting rail. Lateral movement or detachment of the sockets again is possible before final fixing.

In order to determine the required socket length, the space necessary for
- the devices required
- the incoming terminal block and
- any reserve spaces needed must be determined.

Snap mounting
Pull down the slide with a screwdriver until it latches (socket can be moved).

Press on front of slid:
Fixed position
(Sockets fixed)

The key features
- System of any desired length (even number of poles)
- Integrated busbars
- Simple device change
- Long-term planning and problem free extension possible
- Significant time savings during assembly and connection

Busbars for the sockets and additional socket ZLS200
The busbars of size 10 x 3 mm can be loaded with currents up to 100 A. They are plated for perfect contact wiith the devices plug-in contacts. The maximum available busbar length is 1979 mm. The same busbar type is used, regardless whether it is fitted in the socket (L1, L2, L3, N) or in the additional socket (N, PE). The busbars are inserted in to the socket from the front.

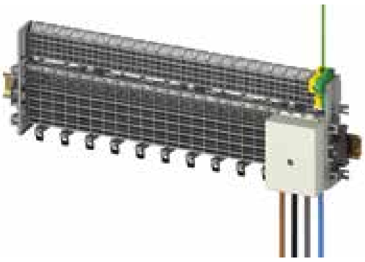
Auxiliary busbars for the socket ZLS202
The 5 x 2 mm auxiliary busbars are intended for a common power supply of auxiliary switches and signal contacts. They are also plated and their max. delivery length is 1979 mm.
Like the main busbars, the auxiliary busbars are inserted in holders LA and LB from the front.
Of course, only on auxiliary busbar can be fitted.

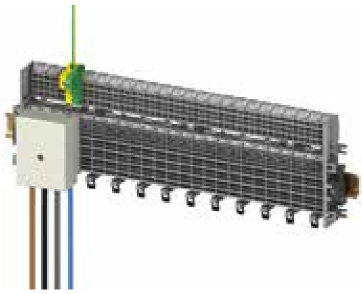
SMISSLINE TP technical details

Incoming terminal block/Incoming terminal components

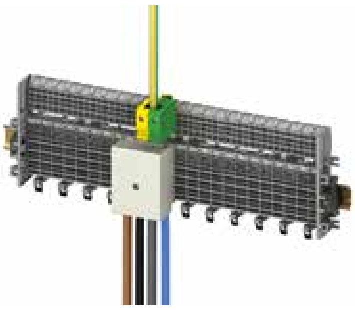
General
The incoming terminal block is used to connect cables directly to the busbars. The terminals act directly on the busbars and therefore fix the incoming terminal block. Removable terminal tops permit the connection of continous conductrors (risers) white horizontal or vertical cable entry is also possible.
Instead of using the incoming terminal block, the power supply can also be realized via a device (e.g. residual current operated circuit breaker, miniature circuit breaker or switch disconnector).

Power supply left or right, maximum 125 A.
Max. 35 °C Ambient air temperature for 125 A continuously.





Power supply in centre, maximum 160 A.
A maximum of 125 A is permitted on either side. A total of 160 A must not be exceeded.



4

ZLS924 right version

A standard incoming terminal block whose cover provides protection against accidental contact. Construction height 50 mm. The base plate can be fitted with a maximum of 4 main terminals L1, L2, L3 and N for the busbars, and 2 auxiliary termiinals LA and LB for the auxiliary busbars.

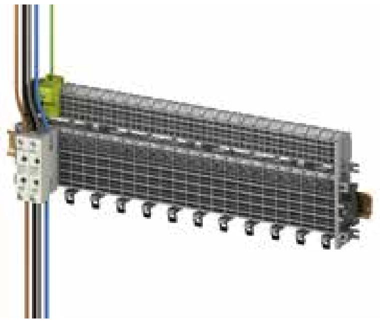
Feed block left and right
In order to prevent the cables from crossing, when two sockets rows are connected, it is a good solution to use a left and a right incoming block (see photo).

ZLS924 left version

SMISSLINE TP technical details

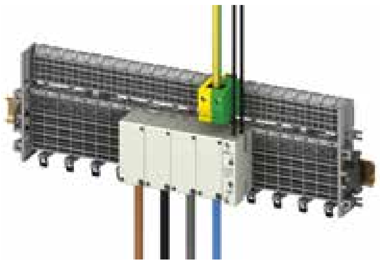
Incoming terminal block/Incoming terminal components

Incoming terminal blocks ZLS260 to 262
Compact terminal block with the construction width of 18 mm for 2 poles.
The maximum rated current is 63 A for L1, L2, L3N and 6 A for LA, LB.



Incoming maximum 63 A.

Incoming terminal component ZLS250 to 255
The incoming terminal component, with an installation width of 36 mm is available as a single-pole component for the line conductors L1, L2, L3 and as neutral. The terminals act directly on the busbars and thereby fix the incoming terminal component. The incoming terminal component, L1, L2, L3 and N can be combined to meet specific needs. A maximum cable cross-section of 95 mm² can be connected to the incoming terminal component.

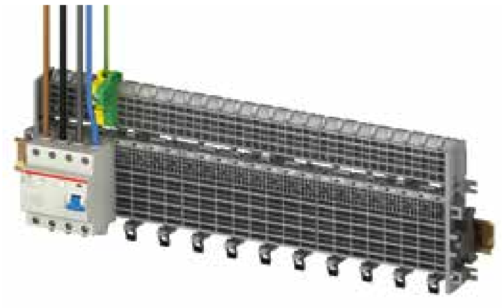


Incoming terminal component, in centre, maximum 200 A.
But on each side not more than 125 A.

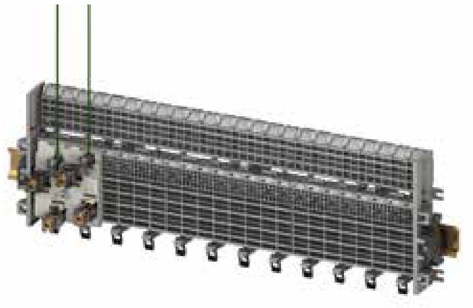
Incoming bolt-on solution M8 50 mm² up to 150 mm² or 4/0AWG for UL
This Incoming block can be used for side feed Incoming with 250A for IEC and UL applications. It is an bolt-on solution for a connection up to 150 mm². For a safe and strong connection to Incoming molded case circuit breaker upstream. Can only used for the 250 A Power Bar System.

SMISSLINE TP technical details

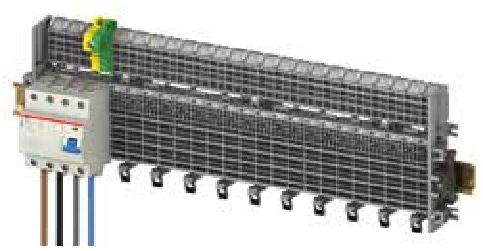
Power supply



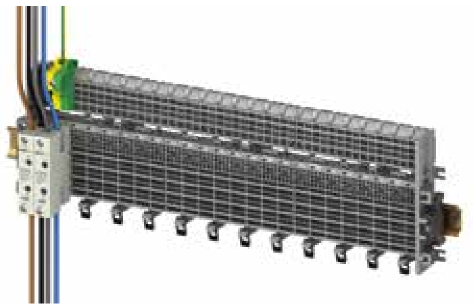
Indirect supply via residual current operated circuit breaker (RCCB) (or switch disconnector)
The supply cable is connected at the top of the RCCB. This supply variant gives the busbars and therefore all subsequent devices RCCB protection. If several RCCB groups are planned, the busbars should be separated and spaced using the dark grey busbar insulator ZLS938. Attention must then be paid to the regulations governing protection of the residual current circuit breaker by subsequent miniature circuit breakers. The supply can also be fed in through the switch disconnector.



Direct supply to residual current operated circuit breaker (or switch disconnector)
Instead of using the incoming terminal block, the power can also be supplied via a device
In this case, the supply cable is connected to the lower terminal of the device. The residual current operated circuit breaker or switch disconnector can be supplied with 63 A regardless of its rated current, since the plug-in connection arrangement of the device is suitable for this amount of current. For current in excess of 63 A, the incoming terminal block or the incoming terminal component should be used.



Supply of auxiliary busbars LA and LB
The two auxiliary busbars LA and LB can be supplied using the additional terminal ZLS 233 via a incoming terminal block. The maximum operating current of the auxiliary busbars is 40 A.



Incoming block for two auxiliary busbars LA, LB
The pluggable incoming block is especially for the two auxiliary busbars LA, LB. The maximum rated current is 6 A.

SMISSLINE TP technical details

Power supply SMISSLINE TP Power Bar System 250 A
IEC/EN 61439-6

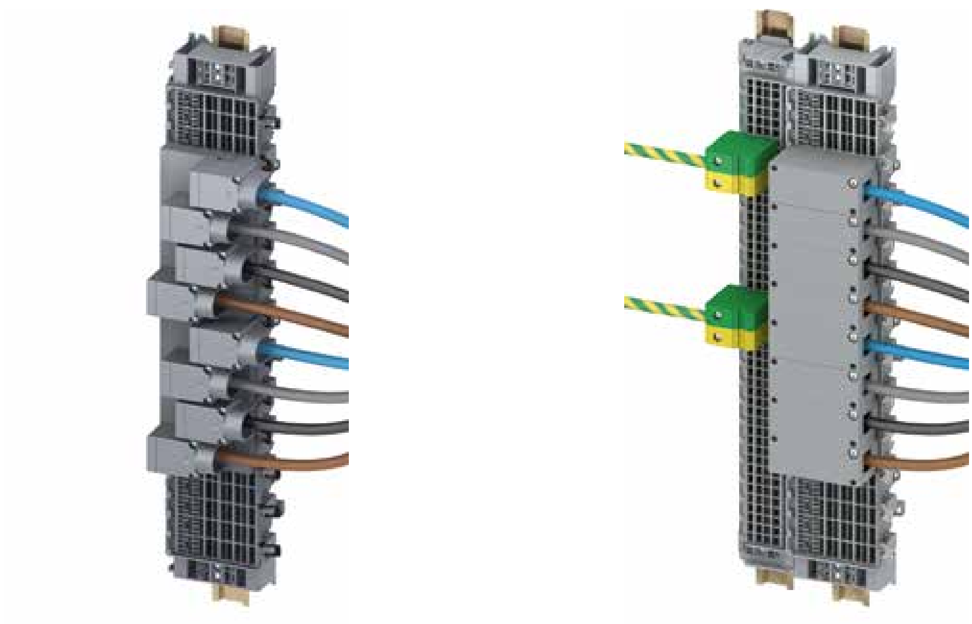
—
01 Power supply side feed, (ZLSP25X, ZLSP95X) with terminals for 50 mm² up to 120 mm² flexible wire with ferrule, max. 1 wire, 10 mm² – 25 mm² two wires, 250 A
—
02 Ring terminal solution M8, 50 mm² up to 150 mm² are possible. It is possible to run the connection cable through several SMISSLINE socket rows.
—
03 Central feed 400 A total. The cables in the connections must have the same length.
For 400 A Incoming for upstream protection are two fuses or XT breaker necessary.

Two power supply solution are possible for the 250A SMISSLINE TP System:

- Solution one is the 144 mm (8PLE) wide ring terminal solution (ZLSP934). This is directly attached to the Power Bar socket ZLSP908. The connection is made via ring terminal M8. It is possible to run the connection cable through several SMISSLINE socket rows.
- Solution two are the incoming terminal component (ZLSP25X, ZLSP95X) with terminals for 50 mm² up to 120 mm²

—
01

—
02



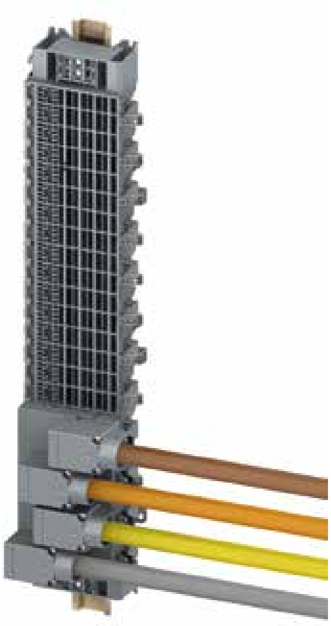
—
03

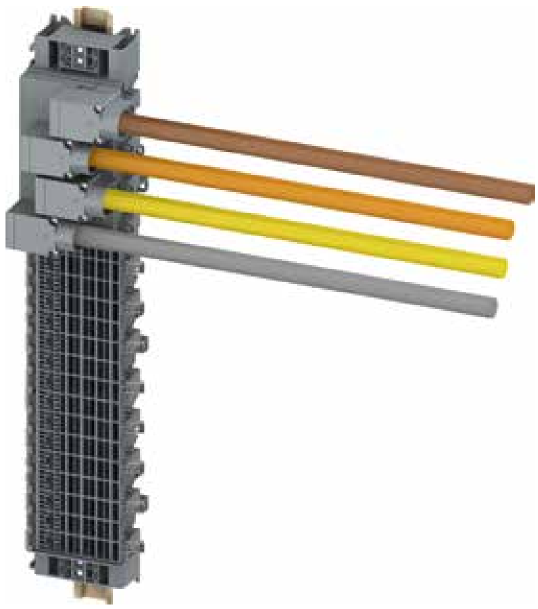
SMISSLINE TP technical details

Power supply SMISSLINE TP Power Bar System 250 A
SMISSLINE TP for UL 508 – Industrial Control Equipment

—
01 Incoming with Incoming solution ZLSP934 bolt on M8 max. 4/0 AWG – 250 kcmil. 250A side feed

—
01





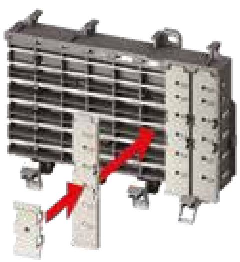
SMISSLINE TP technical details
Busbar system accessories

Socket end piece ZLS920
To prevent displacement of sockets and busbars (particulary when installed vertically) end pieces can be fitted at the start and finish of each row of sockets. These simultaneously ensure electrically protected covering of the busbar end faces and mechanical fixing of the sockets oh the mounting rail.

Intermediate piece ZLS725
The light grey intermediate piece matches the device profile and fills empty module spaces.

Busbar insulator ZLS938
The dark grey busbar insulator electrically isolates the separated busbar ends from each other (e.g. when using several RCD protected groups) and also identifies the isolation point from outside. It conforms with the device profile and its space requirement is 1 module.

Busbar cover ZLS100
If component modules or spare modules are not requiered, the busbar cover ensures electrically protected covering of the main and auxiliary busbars. The cover (4 modules) can be divided anywhere. The openings allow voltage measurements on the busbars without removing the cover.



Extension adapter ZLS101
The extension adapter, single or several side by side, can be plugged into the busbar cover via the built-in holding device. This enables conventional DIN devices with 45 mm cap size to be snapped onto the SMISSLINE socket. By plugging in several extension adapters one on top of the other, heights can be adjusted in multiples of 7 mm

SMISSLINE TP technical details

Combi module: starting solutions in kit form

Direct-On-Line Starters

MS116
+ BEA16-4
+ AF09, AF12, AF16

MS116 up to 16 A
+ BEA26-4
+ AF26, AF30, AF38

MS116 > 16 A
+ BEA38-4
+ AF26, AF30, AF38

MS132
+ BEA16-4
+ AF09, AF12, AF16

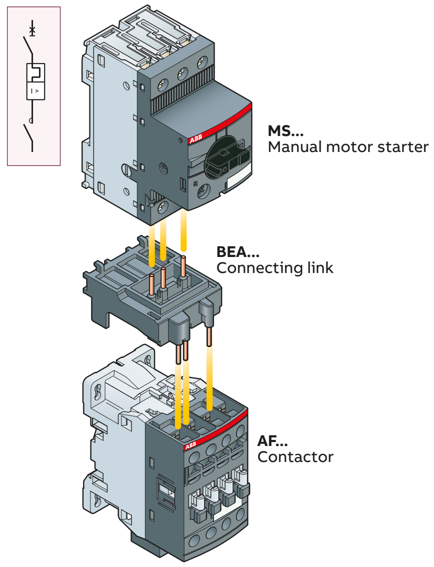
MS132 up to 10 A
+ BEA26-4
+ AF26, AF30, AF38

MS132 > 10 A
+ BEA38-4
+ AF26, AF30, AF38

with control voltage

Mounting possibilities on the combi module:
The following combinations of contactor, motor circuit breaker and connector are possible on the combi module.

+



Reversing Starters

MS116
+ BEA16-4, BER16-4, VEM4
+ AF09, AF12, AF16

MS116 up to 16 A
+ BEA26-4, BER38-4, VEM4
+ AF26, AF30, AF38

MS116 > 16 A
+ BEA38-4, BER38-4, VEM4
+ AF26, AF30, AF38

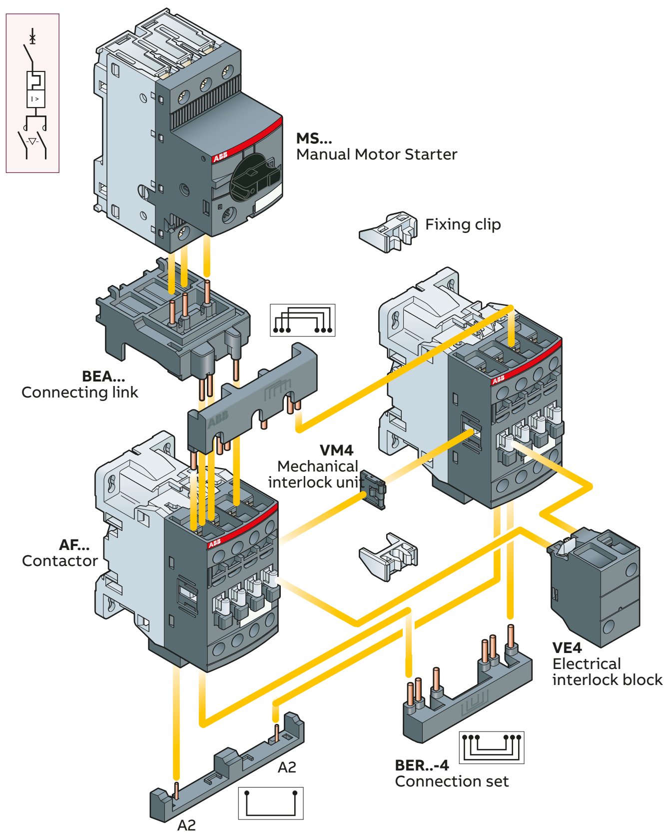
MS132
+ BEA16-4, BER16-4, VEM4
+ AF09, AF12, AF16

MS132 up to 10 A
+ BEA26-4, BER38-4, VEM4
+ AF26, AF30, AF38

MS132 > 10 A
+ BEA38-4, BER38-4, VEM4
+ AF26, AF30, AF38

without control voltage

+



SMISSLINE TP technical details

Definitions

Rated short-circuit breaking capacity I_{cn}
According to EN 60898-1
The maximum current which a switching device can switch off without damage at a rated operational voltage and rated operational frequency. It is specified as an effective value.

Rated ultimate short-circuit breaking capacity I_{cu}
According to EN 60947-2
Ultimate short-circuit breaking capacity that a circuit breaker can switch off without damage at a rated operational voltage and rated operational frequency. It is specified as an effective value.

Rated service short-circuit breaking capacity I_{cs}
According to EN 60947-2
Service short-circuit breaking capacity that a circuit breaker can switch off without damage at a rated operational voltage and rated operational frequency. It is specified as an effective value.

Rated insulation voltage U_i
The rated insulation voltage (U_i) is the voltage to which dielectric checks and creepage distances refer. The maximum rated operational voltage must not exceed its rated insulation voltage.

Rated impulse withstand voltage U_{imp}
Peak of a withstand voltage of a specified form and polarity with which the circuit can be loaded under specified test conditions without a breakdown and to which clearances relate. The rated impulse withstand voltage must be equal to or greater than the values of the withstand over-voltages (transient overvoltages) which occur in the system in which the device is used.

Rated short-time withstand current I_{cw}
The rated short-time withstand current is the effective value of the short-circuit current, as specified by the manufacturer for this circuit, that the circuit can conduct without damage. Unless otherwise specified, a time of 1 s shall apply.

Rated conditional short-circuit current I_{cc}
The rated conditional short-circuit current is the value of the prospective short-circuit current, as specified by the manufacturer, for a switching device combination that the latter can conduct during the total break time. The information about the specified short-circuit device must be given by the manufacturer.

Rated fused short-circuit current I_{cf}
The rated fused short-circuit current is the conditional rated short-circuit current if the short-circuit device is a fuse in accordance with IEC 60269 [IEV 441-17-21, modified].

Rated peak withstand current I_{pk}
The rated peak withstand current is the peak value of the withstand current of the circuit of a combination of switching devices, as specified by the manufacturer.

Back-up protection
Assignment of two overcurrent protective devices in series, where the protective device, generally but not necessarily on the supply side, effects the overcurrent protection with or without the assistance of the other protective device and prevents excessive stress on the latter [IEC 60947-1, definition 2.5.24].

Total selectivity
Overcurrent discrimination where, in the presence of two overcurrent protective devices in series, the protective device on the load side effects the protection without causing the other protective device to operate [IEC 60947-2, definition 2.17.2].

Partial selectivity
Overcurrent discrimination where, in the presence of two overcurrent protective devices in series, the protective device on the load side effects the protection up to a given level of overcurrent, without causing the other protective device to operate [IEC 60947-2, definition 2.17.3].

SMISSLINE TP technical details

Approvals according to IEC/EN 61439-6. Busbar system 125 A

Busbar system touch proof:
Use only for wall mounted application (horizontal or vertical).
When installed correctly the requirements of IEC/EN 61439-2 are met.

Number of poles	max. 6 to 110 3p+N / 2 additional bars PE+N
Rated operational voltage (U_e)	690 VAC, 440 VDC (400 V for LA, LB busbars)
Rated insulation voltage (U_i)	690 VAC, 1000 VDC
IP Code	IP20B
Mounting position	horizontal or vertical, direct mounting or mounting on DIN rail acc. to EN 60715 35 mm
Pollution degree	3 (690 V a.c.) 2 (1000 V d.c.)
Rated impulse voltage (U_{imp})	8 kV Main busbars; 6 KV Auxiliary busbars
Rated current of the assembly (I_nA)	Max. 125 A (side feeding) Max. 200 A (center feeding) Max. 250 A (Double feed side or center)
Auxiliary circuit	max. 40 A
Rated current of a circuit (I_{nc})	Main circuit: Max. 125 A
Rated current of Auxiliary circuit	40 A
Rated short-time withstand current (I_{cw})	10 kA / 300 ms
Auxiliary circuit	4 kA / 50 ms
Rated peak withstand current (I_{pk})	Main circuit: 30 kA
Auxiliary circuit	Auxiliary busbars LA, LB 6 kA
Rated frequency (f)	50/60 Hz, DC
Rated conditional short-circuit current (I_{cc})	100 kA (415V), 50 kA (690 V)
Ambient air temperature	max. 60°C
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	1 cycle with 55 °C/90…96 % and 25 °C/95…100 %
Size of CU bars 3P+N+PE	3 x 10 mm (30 mm²)
Size of CU auxiliary bars La Lb	2 x 5 mm (10 mm²)

	Maximum rated voltage	Maximum rated current	Cross-section of conductors
Incoming terminal block ZLS250–253	690 VAC 1000 VDC	160 A	35 mm²–95 mm² max. 1 wire, 10–25 mm² 1 or 2 wires
Busbar ZLS200	690 VAC 1000 VDC	125 A	
Busbar ZLS202	690 VAC 600 VDC	40 A	
DIN Rail adapters 32 A	690 VAC 600 VDC	32 A Line or neutral	
DIN Rail adapters 63 A	690 VAC 600 VDC	63 A Line or neutral	
Combi module	690 VAC 600 VDC	32 A Line or neutral 6A LA, LB	

The SMISSLINE system and components are tested for vibration according to IEC 60068-2-6 (2–13.2 Hz/1 mm displacement, 13.2–100 Hz/0.7 g) and for Miniature circuit breakers (5 g, 20 frequency cycles 5 …150 … 5 Hz at 0.8 rated current)

Standard: IEC 60068-2-6
Environmental testing – Part 2–6: Test Fc. Vibration (sinusoidal)

Rated Voltage (U_e)	Rated conditional short-circuit current (I_{cc})	Incoming current of main busbars (L1, L2, L3, N)	Short circuit protection device (SCPD)	
			Fuse	**MCCB**
415 V	100 kA	250 A	NH1 gG 690 V/250 A	ABB T_{max} XT Serie up to 250 A
690 V	25 kA	250 A	NH1 gG 690 V/250 A	ABB T_{max} XT Serie up to 250 A
		Inocming current of auxiliary busbars (La, Lb)		
	25 kA	40 A	NH00 gG 415 V/40 A	ABB Type S800 (240/415 VAC)

SMISSLINE TP technical details

Approvals according to UL508. Busbar system 125 A.

SMISSLINE TP system for UL 508 – Industrial Control Equipment, CSA C22.2 No. 14 – Industrial Control Equipment UL File E222110

Technical data UL508 Industrial Control Equipment SMISSLINE TP busbar system	
Rated Voltage	600 V AC
Rated Current	125 A
Rated Current (End Feed, left and right)	125 A left, 125 A right
Rated Current (Center)	250 A max. (double feed)
Rated Current (Center Feed)	250 A max. if used with two feeder blocks
Short Circuit Ratings ABB T_{max} XT2, XT3, XT4	50 kA, max. 480 V AC, 480 Y/277 V and 240 V AC or 35 kA, max. 600 V AC and 600 Y/347 V

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Technical data UL508 Industrial Control Equipment (ZLS906,ZLS908,ZLS920,ZLS926,ZLS928)

	Busbar ZLS200	Feeder ZLS924	Feeder block ZLS95X	Combimodule ZLS840X, 842X	DIN Rail adapter ZLS97X	Terminals ZLS95XUL, 91XUL	Combi modul ZMS132X	Adapter moter strater ZMS93X
Maximum rated voltage	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC
Maximum rated current	125 A	150 A	150 A	30 A	32 A, 63 A	32 A, 100 A, 150 A	32 A	32 A

Terminals for 125 A SMISSLINE TP System

ZLS954UL – Terminal 150 A (Neutral)
ZLS959UL – Terminal (PE)
ZLS913UL – Terminal 63 A (Neutral)
ZLS918UL – Terminal 32 A (Neutral)
ZLS919UL – Terminal (PE)
ZLS929UL – Terminal (PE)

DIN Rail adapters for MCB SU200 and SUP200

	970UL, 971UL, 972UL or 973UL
Maximum nominal current	25 A, 45 A

Incoming devices and terminals

Technical data IEC/EN 61439-6 and UL508

Incoming blocks

	ZLS26X	ZLS924	ZLS25X,95X
General data			
Standards	IEC/EN 61439-6	IEC/EN 61439-6, UL508	IEC/EN 61439-6, UL508
Rated voltage U_e acc. IEC	690 VAC, 1000 VDC	690 VAC, 1000 VDC	690 VAC, 1000 VDC
Rated Voltage acc. UL		600 VAC	600 VAC
Rated current In acc. IEC	63 A	160 A	200 A
Rated current In acc. UL		150 A	
Rated conditional short-circuit current (Icc)	100 kA (415V)	100 kA (415V)	100 kA (415V)
Installation			
Terminal rigid IEC connections (solid/stranded)	2,5 mm² to 25 mm² max. 1 wire	10 mm² up to 50 mm² (3LN) 1.5 mm² up to 10 mm² (LA,LB) Multiple 3LN: – Multiple LA, LB: –	10 mm² to 95 mm²
Terminal flexible IEC connections	2,5 mm² to 25 mm² max. 1 wire flexible wire with ferrules	10 mm² up to 50 mm² single wire 1.5 mm² up to 10 mm² (LA,LB) single wire 2x25 mm² cable withe the same type and size Multiple LA, LB: –	10 mm² to 95 mm² flexible wire with ferrules
Other connections		Flat cable 9x2x0,8 up to 9x9x0,8 mm and 10x3 mm Busbar 10x3 mm combined with 10 mm² up to 25 mm² rigid or flexible IEC connections	10 mm² to 95 mm²
Terminal rigid UL connections		Single: 8 up to 1/0 AWG, Cu only Multiple: –	2 AWG – 1/0 AWG
Torque	2.8 Nm	4.0 Nm (L,N); 1.5 Nm (LA, LB); 1.2 Nm Cover screw	2.0 Nm
Stripping length	13 mm	18 mm (L,N); 11 Nm (LA, LB)	21 mm

Terminals for additional socket

Technical data IEC/EN 61439-6 and UL508

Terminals

	10 mm² IEC ZLS918, ZLS919	10 mm² UL ZLS918UL, ZLS919UL	35 mm² IEC ZLS913, ZLS916, ZLS929	35 mm² UL ZLS913UL, ZLS929UL	95 mm² IEC ZLS954, ZLS959	95 mm² UL ZLS954UL, ZLS959UL
General data						
Standards	IEC/EN 61439-6	UL 508 CSA C22.2 No. 14-13	IEC/EN 61439-6	UL 508 CSA C22.2 No. 14-13	IEC/EN 61439-6	UL 508 CSA C22.2 No. 14-13
Rated voltage Ue acc. IEC	690 VAC, 1000 VDC	–	690 VAC, 1000 VDC	–	690 VAC, 1000 VDC	–
Rated voltage acc. UL	–	600 VAC	–	600 VAC	–	600 VAC
Rated current In acc. IEC	32 A	–	63 A	–	200 A	–
Rated current acc. UL	–	32 A	–	63 A	–	150 A
Installation						
Terminal rigid IEC connections (solid/stranded)	Single: 1 … 10 mm² Multiple: 2 x 1.5 … 2.5 mm², with cables of same type and size	–	–	–	–	–
Terminal flexible IEC connections	Single: 0.7 … 10 mm² Multiple: 2 x 1.5 … 2.5 mm², with cables of same type and size	–	Single: 16 … 35 mm² Multiple: –	–	Single: 10 … 95 mm² Multiple: 2 x 10 … 25 mm², with cables of same type and size	–
Terminal UL connections	–	Single: 14 … 8 AWG Multiple: –	–	Single: 6 … 2 AWG Multiple: –	–	Single: 2 … 1/0 AWG Multiple: –
Torque	1.2 Nm	1.2 Nm	2.5 Nm	2.5 Nm	2.0 Nm	2.0 Nm
Stripping length:	12 mm	12 mm	15 mm	15 mm	21 mm	21 mm

SMISSLINE TP technical details

Combi modules cdapter for manual motor starter and DIN adapters
Technical data IEC/EN 61439-6 and UL508

	ZMS132 Combi Module	ZMS 930 Adapter	ZLS970 DIN Adapter IEC	ZLS970UL DIN Adapter UL489
Standards	IEC/EN 61439-6, UL508	IEC/EN 61439-6, UL508	IEC/EN 61439-6, UL508	UL489 (USL, CNL - Circuit Breaker Accessory)
Rated voltage Ue acc.IEC acc. IEC	690 VAC, 440 V DC	690 VAC, 440 V DC	690 VAC, 440 V DC	
Rated Voltage acc. UL	600 V AC	600 V AC	600 V AC	240 V AC
Rated current In acc.. IEC	32A	32A	32A, 63AMaximum rated current of outgoing circuits (Inc) max. 50 A for S800 with ZLS972X, ZLS973X.	
Rated current In acc. UL	30A	30A	30A, 60A	25A, 45A

SMISSLINE TP technical details

Technical data according to IEC/EN 61439-6
Power Bar System 250 A

Busbar system touch proof:
Use only for wall mounted application (horizontal or vertical).
When installed correctly the requirements of EN/IEC 61439-2 are met.

Number of poles	30 to 110 3p+N / 2 additional bars PE+N
Rated operational voltage (U_e)	690 VAC, 440 VDC (400 V for LA, LB busbars)
Rated insulation voltage (U_i) Main circuit	690 VAC, 440 VDC
Rated insulation voltage (U_i) Auxilary circuit	415 VAC
IP Code	IP20B
Mounting position	horizontal or vertical
Overvoltage category	IV
Pollution degree	3 (690 V a.c.) 2 (1000 V d.c.)
Rated impulse voltage (U_{imp})	8 kV mainbusbars; 6 KV auxillary busbars
Rated current of the assembly (I_nA)	Side feed: 250 A, Middle feed 400 A, Auxiliary busbars: 40 A
Rated current of a circuit (I_{nc})	Main circuit: Max. 100 A
Rated current of Auxiliary circuit	40 A
Rated short-time withstand current (I_{cw})	15 kA/100 ms Main circuit, 4 kA/50 ms Auxiliary circuit
Rated peak withstand current Main circuit (I_{pk})	30 kA
Rated peak withstand current Auxilary circuit (I_{pk})	6 kA
Rated frequency (f)	50/60 Hz
Rated conditional short-circuit current (I_{cc})	see table below
Ambient air temperature	max. 60°C
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	1 cycle with 55 °C/90…96 % and 25 °C/95…100 %
Size of CU bars 3P+N+PE	3 x 25 mm (75 mm²)
Size of CU auxiliary bars La Lb	2 x 5 mm (10 mm²)

Rated Voltage (U_e)	**Rated conditional short-circuit current (I_{cc})**	**Incoming current of main busbars (L1, L2, L3, N)**	**Short circuit protection device (SCPD)**	
			Fuse	**MCCB**
415 V	100 kA	250 A	NH2 gG 690 V/250 A*	ABB T_{max} XT Serie up to 250 A*
690 V	25 kA	250 A	NH2 gG 690V/250A	ABB T_{max} XT Serie up to 250 A*

		Inocming current of auxiliary busbars (La, Lb)		
	25 kA	40 A	NH00 gG 415 V/40 A	ABB Type S800 (240/415 VAC)

* For 400 A Incoming for upstream protection are two fuses or XT breaker necessary or two XT circuit breaker

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SMISSLINE TP technical details

Approvals according to UL508. Busbar system 250 A.

SMISSLINE TP system for UL 508 – Industrial Control Equipment, CSA C22.2 No. 14 – Industrial Control Equipment UL File E222110

Rated Voltage	600 V AC
Rated Current	250 A left or right
Short Circuit Ratings ABB T_{max} XT2, XT3, XT4	50 kA, max. 480 V AC, 480 Y/277 V and 240 V AC or 35 kA, max. 600 V AC and 600 Y/347 V

Technical data UL508 Industrial Control Equipment (ZLSP906, ZLSP908,ZLSP920)

	Busbar ZLSP200	**Feeder ZLSP934**	**Feeder block ZLS95X**	**Combimodule ZLS840X, 842X**	**DIN Rail adapter ZLS97X**	**Terminals ZLS95XUL, 91XUL**	**Combi modul ZMS132X**	**Adapter moter strater ZMS93X**
Maximum rated voltage	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC	600 V AC
Maximum rated current	250 A	250 A	150 A	30 A	32 A, 63 A	32 A, 100 A, 150 A	32 A	32 A

DIN rail adapters for MCB SU200 and SUP200

	970UL, 971UL, 972UL or 973UL
Maximum nominal current	25 A, 45 A

Incoming devices and terminals

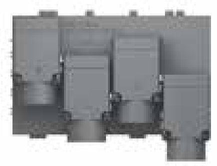
Technical data IEC/EN 61439-6 and UL508

	ZLSP934 and 935	ZLSP25X,ZLSP95X
Standards	IEC/EN 61439-6	IEC/EN 61439-7, UL509
Rated voltage Ue acc. IEC acc. IEC	690 VAC	690 VAC
Rated Voltage acc. UL	600 V AC	-
Rated current In acc.. IEC	250A (center feed or side feed): 400 A max. when used with two feeder blocks	250A
Rated current In acc. UL	250A (short circuit protection 250 A Circuit-Breaker (DIVQ/7) 50 kA (480 V); 35 kA (600 V))	-
Wire size IEC connections	Cable: 50 mm2 up to 150 mm2; no flat cable Ring lug M8	35–120 mm2 one flexible wire with ferrule10–25 mm2 one or two flexible wire with ferrule
Wire size UL connections	4/0AWG – 250 kcmil	-
Torque	8NmCover 1,2 Nm	ZLSP250–253 2,5 NmZLSP954, 959 2,0 NmCover 1,2 Nm
Rated voltage Ue acc. IEC acc. IEC	690 VAC	690 VAC
Stripping length	Ring lug M8; Width: max 22 mm (ring lug like Klauke 9SG8 for 120mm2 or 10SG8 for 150mm2. Connection of two socket rows is possible)	21mm

SMISSLINE TP technical details

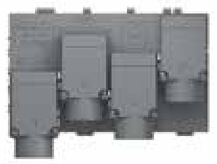
Incoming bolt on 250A

Technical data IEC/EN 61439-6 and UL508

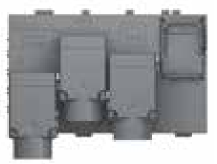


ZLSP934-3LN

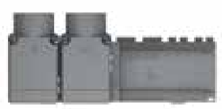
ZLSP934-3L-1



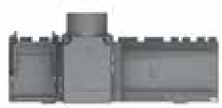
ZLSP934-3LN-R



ZLSP934-3L-R



ZLSP935-8NPE



ZLSP935-8PE_L_PE

ZLSP935-8NPE-R

ZLSP935-8PE-R_PE

	ZLSP934 and 935	**ZLSP25X,ZLSP95X**
Standards	IEC/EN 61439-6	IEC/EN 61439-7, UL508
Rated voltage Ue acc. IEC acc. IEC	690 VAC	690 VAC
Rated Voltage acc. UL	600 V AC	-
Rated current In acc.. IEC	250A (center feed or side feed): 400 A max. when used with two feeder blocks	250A
Rated current In acc. UL	250A (short circuit protection 250 A Circuit-Breaker (DIVQ/7) 50 kA (480 V); 35 kA (600 V))	-
Wire size IEC connections	Cable: 50 mm^2 up to 150 mm2; no flat cable Ring lug M8 (for example Klauke 9SG8 for 120mm2 or 10SG8 for 150mm^2)	35–120 mm2 one flexible wire with ferrule10–25 mm2 one or two flexible wire with ferrule
Wire size UL connections	4/0AWG – 250 kcmil	-
Torque	8NmCover 1,2 Nm	ZLSP250–253 2,5 NmZLSP954, 959 2,0 NmCover 1,2 Nm
Stripping length	Ring lug M8; Width: max 22 mm	21mm

SMISSLINE TP plug-in system

Busbar system 250 A

Direct feed to plug-in circuit-breaker Tmax XT4

The direct feed starter pack solution allows a direct connection from the 250A Power Bar System to the Installation for plug-in circuit-breaker Tmax XT4 Moulded Case Circuit Breaker. Lower part for plug-in for Tmax XT4, 3pole (1SDA068196R1) or 4pole (1SDA068198R1) is needed.
For fixed XT4 version a conversion kit for moving part plug-in is needed additional. 3pole (1SDA066282R1) and 4 pole (SDA066283R1).
The solution is built for a vertical design. The additional heat sink part is helpful to reduce the heat on the system.

Direct Feed 250A

Number of poles	32 to 80 3p+N/2 additional bars PE+N
Rated operational voltage (U_e)	690 VAC, 440 VDC (400 V for LA, LB busbars)
Rated insulation voltage (U_i)	690 VAC, 1000 VDC
IP Code	IP20B
Pollution degree	3 (690 V a.c.) 2 (1000 V d.c.)
Rated impulse voltage (U_{imp})	8 kV (L1L2L3N)
Rated current of the assembly (I_{nA})	250 A
Rated current of a circuit (I_{nc}): main circuit	Max. 250 A
Rated current of Auxiliary circuit	40 A
Rated short-time withstand current (I_{cw})	15 kA/100 ms Main circuit, 4 kA/50 ms Auxiliary circuit
Rated peak withstand current Main circuit (I_{pk})	30 kA
Rated peak withstand current Auxilary circuit (I_{pk})	6 kA
Rated frequency (f)	50/60 Hz
Rated conditional short-circuit current (I_{cc}): see table below	
Ambient air temperature	max. 60 °C
Size of CU bars 3P+N+PE	3 x25 mm (75 mm²)
Size of CU auxiliary bars La Lb	2 x 5 mm (10 mm²)
Environmental conditions (damp heat)	1 cycle with 55 °C/90…96 % and 25 °C/95…100 %

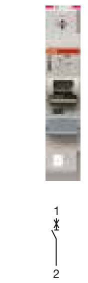
Voltage (VAC)	Rated conditional short-circuit current (I_{cc})	Incoming current of main busbars (L1, L2, L3, N)	Short circuit protection device (SCPD)
415 V	100 kA	250 A	ABB Tmax XT4 250 A
690V	25 kA	250 A	

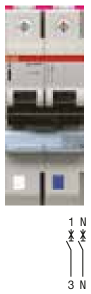
Technical data data UL508; Approvals for US and CA: cULus
Direct Feed 250A

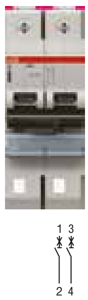
SMISSLINE TP system for UL 508 – Industrial Control Equipment, CSA C22.2 No. 14 – Industrial Control Equipment UL File E222110	Control Equipment UL File E222110
UL Rated Voltage	600 VAC
UL Rated Current (End Feed)	250 A
UL Short Circuit Rating	50 kA (480 V), 35 kA (600 V) with XT4 250 A

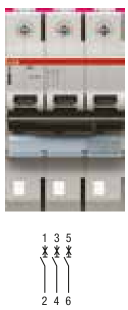
SMISSLINE TP technical details

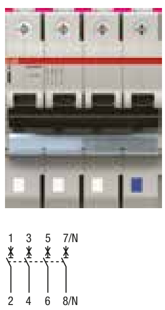
Miniature circuit breaker Properties











General Information

The SMISSLINE miniature circuit-breaker is an energy-restricting circuit-breaker that has high performance values and that is equally suitable for the industrial sector, for commercial use and for installation at home.

If a short-circuit occurs, it guarantees excellent selectivity conditions to upstream overcurrent circuit breakers while the load on equipment that is connected downstream is limited to a minimum amount.

The most important features

- High rated breaking capacity of 6kA and 10kA acc. IEC/EN60989-1 and 25kA, 30kA and 40kA acc. IEC/EN 60947-2
- Optimum ease of installation and connection
- The pole conductors are protected against accidental contact
- Tripping characteristic on B, C, D, K, UCZ/UCC

Miniature circuit-breaker in accordance with standard EN 60898-1

This standard is for electrical installation material for household installations and for similar purposes. It regulates the use of miniature circuit-breakers by the layman up to a maximum of 125 A, a voltage of 440 VAC and up to a maximum of 25 kA.

Miniature circuit-breaker in accordance with standard EN60947-2

This standard is for low-voltage material used for industrial purposes. It regulates the use of circuit-breakers (and not miniature circuit-breakers) by qualified personnel up to a maximum voltage of 1000 VAC or 1500 VDC. This standard does not recognise any maximum values when it comes to current and breaking capacity. In practice, the standard is also applied to miniature circuit-breakers.

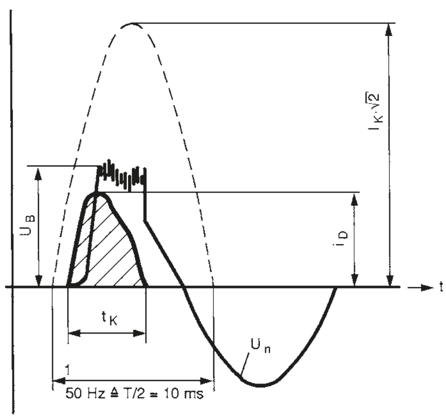
Brief description of tripping

The SMISSLINE miniature circuit breakers have a current-limiting operation.
They have two different releases acting on the mechanism.

1. Thermal release, operating with a time delay, for overload protection
2. Electro-magnetic release plunger operated for short-circuit protection.

They offer:
- high short-circuit breaking capacity
- high selectivity to the back-up fuse
- In the event of short-circuits, low electrodynamic and heating effects on the cable and the point of fault location due to the drastically limited let through energy $\int i^2 dt$.

Oscillogram of a short-circuit current interruption



$I_K \cdot \sqrt{2}$ = peak value of prospective short-circuit current
i_D = Max. peak let through current of circuit breaker S 400
U_n = Supply voltage
U_B = Arc voltage of circuit breaker
t_K = Total interruption time

Miniature circuit breaker (MCB) for IEC

S400E technical features

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When installed correctly the requirements of EN/IEC 61439-2 are met.

	S400E
General data	
Tripping characteristics	B,C
Poles	1P, 1P+NP, 2P, 3P, 3P+NP
Rated current I_n	6 A … 63 A
Rated frequency f	50/60 Hz
Rated insulation voltage U_i acc. to DIN EN 60664-1	440 VAC
Rated impulse withstand voltage $U_{imp.}$ (1.2/50 µs)	4 kV
Overvoltage category	III
Pollution degree	3
Data acc. to IEC/EN 60898-1	
Rated operational voltage U_e	1P: 230/400 V AC; 1P+NP: 230 V AC ; 2...3P: 400 V AC; 3P+NP: 400 V AC; 1P 72 V DC; 2P 125 V DC
Min. operating voltage	12 V AC
Rated short-circuit capacity I_{cn}	6kA
Energy limiting class	3
Reference Ambient Air Temperature for Overload Tripping	B, C: 30 °C
Mechanical Data	
Classification acc. To NF F 126-101, NF F 16-102	Acc. to I2/F3
IP Code	IP20, IP40 in enclosure with cover
Endurance	Electrical endurance: 10 000 ops Mechanical endurance: 10 000 ops
Shock resistance acc. to IEC/EN 61373	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6	2 … 13.2 Hz / 1 mm 13.2 … 100 Hz / 0.7 g, 5 cycles 5 … 150 … 5 Hz / 1 g, 4 waves
Ambient temperature	–25 … +60°C
Storage temperature	–40 … +70°C
Installation	
Terminal type	Failsafe bi-directional cylinder-lift terminal (shock protected)
Terminal rigid IEC connections (solid/stranded)	Single: 0.75 … 35 mm² (front slot), 0.75 … 6 mm² (rear slot) Multiple: 2 x 0.75 … 10 mm² (front slot), 2 x 0.75 … 6 mm² (rear slot), with cables of same type and size
Terminal flexible IEC connections	Single: 0.75 … 25 mm² (front side), 0.75 … 6 mm² (rear slot) Multiple: 2 x 0.75 … 10 mm² (front slot), 2 x 0.75 … 6 mm² (rear slot), with cables of same type and size
Tightening torque	2.8 Nm
Screwdriver	No. 2 Pozidrive
Mounting	Plug in on bus bar system SMISSLINE
Mounting position	Any
Supply	Any
Dimensions and weight	
Pole dimensions (H x D x W)	91 x 18 x 82
Pole weight	110 g

SMISSLINE TP technical details

Miniature circuit breaker S400M

When installed correctly the requirements of EN/IEC 61439-2 are met.

	S400M
General data	
Tripping characteristics	B,C,D,K
Poles	1P, 1P+NP, 2P, 3P, 3P+NP
Rated current I_n	0.5 A … 63 A
Rated frequency f	50/60 Hz
Rated insulation voltage U_i acc. to DIN EN 60664-1	440 VAC
Rated impulse withstand voltage $U_{imp.}$ (1.2/50 µs)	4 kV
Overvoltage category	III
Pollution degree	2
Data acc. to IEC/EN 60898-1	
Rated operational voltage U_e	1P: 230/400 V AC; 1P+NP: 230 V AC ; 2...3P: 400 V AC; 3P+NP: 400 V AC; 1P 72 V DC; 2P 125 V DC
Min. operating voltage	12 V AC
Rated short-circuit capacity I_{cn}	10 kA
Energy limiting class	3
Reference Ambient Air Temperature for Overload Tripping	B, C, D: 30 °C
Data acc. to IEC/EN 60947-2	
Rated operational voltage U_e	1P: 240 V AC; 1P+N: 240 V AC; 2 … 4P: 415 V AC; 3P+N: 415 V AC; 254/440 V 1P: 72 V DC; 2P: 125 V DC (Umax)
Min. operating voltage	12 V AC–12 V DC
Rated ultimate short-circuit capacity I_{cu}	25 kA (0,5 up to 16 A, 240/415 V); 0,5 to 2 A 50 kA on request 15 kA (20 up to 63 A, 240/415 V) 15 kA (0,5 up to 16 A, 254/440 V) 6 kA (20 up to 63 A, 254/440 V)
Rated service short-circuit capacity I_{cs}	15 kA (0,5 up to 16 A, 240/415 V) 7,5 kA (20 up to 63 A, 240/415 V) 6 kA (0,5 up to 16 A, 254/440 V) 3 kA (20 up to 63 A, 254/440 V)
Reference Ambient Air Temperature for Overload Tripping	C: 30 °C K: 40 °C
Mechanical Data	
Classification acc. To NF F 126-101, NF F 16-102	Acc. to I2/F3
IP Code	IP20, IP40 in enclosure with cover
Endurance	Electrical endurance: 10 000 ops Mechanical endurance: 10 000 ops
Shock resistance acc. to IEC/EN 61373	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6	2 … 13.2 Hz / 1 mm 13.2 … 100 Hz / 0.7 g, 5 cycles 5 … 150 … 5 Hz / 1 g, 4 waves
Ambient temperature	–25 … +60 °C
Storage temperature	–40 … +70 °C
Installation	
Terminal type	Failsafe bi-directional cylinder-lift terminal (shock protected)
Terminal rigid IEC connections (solid/stranded)	Single: 0.75 ÷ 35 mm² (front slot), 0.75 ÷ 6 mm² (rear slot) Multiple: 2 x 0.75 ÷ 10 mm² (front slot), 2 x 0.75 ÷ 6 mm² (rear slot), with cables of same type and size
Terminal flexible IEC connections	Single: 0.75 ÷ 25 mm² (front side), 0.75 ÷ 6 mm² (rear slot) Multiple: 2 x 0.75 ÷ 10 mm² (front slot), 2 x 0.75 ÷ 6 mm² (rear slot), with cables of same type and size
Tightening torque	2.8 Nm
Screwdriver	No. 2 Pozidrive
Mounting	Plug in on bus bar system SMISSLINE
Mounting position	Any
Supply	Any
Dimensions and weight	
Pole dimensions (H x D x W)	91 x 18 x 82
Pole weight	110 g

SMISSLINE TP technical details

Miniature circuit breaker S400P

	S400P	
Standards		
IEC/EN 606947-2	x	
General data		
Tripping characteristics	B, C, K	
Poles	1P, 1P+NP, 2P, 3P, 3P+NP	
Rated current I_n	2, 3, 4, 6, 8, 10, 13, 16, 20, 25, 32, 40, 50, 63 A	
Calibration temperature	B,C 30 °C; K 40 °C	
Rated frequency	50/60 Hz	
Rated insulation voltage U_i AC 240/415 V	440 V	
Rated insulation voltage U_i AC 277/480 V	500 V	
Rated impulse withstand voltage U_{imp}	4kV	
Overvoltage category	III	
Pollution degree	AC 240/415 V: 3	AC 277/480 V: 2
Data acc. to IEC/EN 60947-2		
Rated operational voltage U_e	1P 60 V DC; 2P 125 V DC (Umax)	1P, 1P+NP: AC 277 V 2P, 3P, 3P+NP: AC 277/480 V
Minimum operating voltage	AC 12 V	
Rated ultimate short-circuit capacity I_{cu}	40kA (2 up to 16 A, 240/415 VAC) 30 kA (20 up to 40 A, 240/415 VAC) 20 kA (50 up to 63 A, 240/415 VAC)	20 kA (2 up to 16 A, 277/480 VAC) 15 kA (20 up to 40 A, 277/480 VAC) 5 kA (50 up to 63 A, 277/480 VAC)
Rated service short-circuit capacity I_{cs}	20kA (2 up to 16 A, 240/415 VAC) 15kA (20 up to 40 A, 240/415 VAC) 7.5kA (50 up to 63 A, 240/415 VAC)	10 kA (2 up to 16 A, 277/480 VAC) 5 kA (20 up to 40 A, 277/480 VAC) 2.5 kA (50 up to 63 A, 277/480 VAC)
Reference ambient air temperature for overload tripping	B, C: 30 °C, K: 40 °C	
Mechanical Data		
Contact position indication (green OFF/red ON)	x	
L1/L2/L3 position indication	x	
N position indication	x	
Label holder	x	
IP Code	IP20B, IP40 in enclosure with cover	
Endurance	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops	
Shock resistance acc. to IEC/EN 61373	5 g / 30 ms, 3 shocks	
Vibration resistance acc. to IEC/EN 60068-2-6	2...13.2 Hz/1 mm 13.2...100 Hz/0.7 g, 5 cycles 5...150...5 Hz/1 g, 4 sweeps	
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	28 cycles with 55 °C/90…96 % and 25 °C/95…100 %	
Ambient temperature	−25...+55 °C	
Storage temperature	−40...+70 °C	
Installation		
Top terminal type	Failsafe bi-directional cylinder-lift terminal with double slot 35/10 mm^2	
Top terminal rigid IEC connections (solid/stranded)	Single: 0.75 ÷ 35 mm^2 (front slot), 0.75 ÷ 6 mm^2 (rear slot) Multiple: 2x 0.75 ÷ 10 mm^2 (front slot), 2x 0.75 ÷ 6 mm^2 (rear slot), with cables of same type and size	
Top terminal flexible IEC connections	Single: 0.75 ÷ 25 mm^2 (front side), 0.75 ÷ 6 mm^2 (rear slot) Multiple: 2x 0.75 ÷ 10 mm^2 (front slot), 2x 0.75 ÷ 6 mm^2 (rear slot), with cables of same type and size	
Top terminal screwdriver	No. 2 Pozidrive	
Top terminal stripping length	12.5 mm	
Top terminal tightening torque	2.8 Nm	
Bottom terminal type	Movable plug-on terminal L1/L2/L3, fixed plug-on terminal N	
Mounting	SMISSLINE TP socket system only	
Mounting position	Any	
Supply	Any	

SMISSLINE TP technical details

Miniature circuit breaker S400M-UC

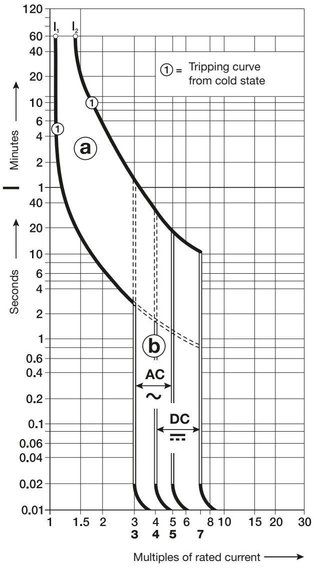
	S400M-UC
General data	
Tripping characteristics	UCC, UCZ
Standards	IEC/EN 60947-2
Poles	1P, 2P
Rated current I_n	0.5 A … 63 A
Rated frequency f	50/60 Hz
Rated insulation voltage U_i acc. to DIN EN 60664-1	440 V AC
Rated impulse withstand voltage $U_{imp.}$ (1.2/50 µs)	4 kV
Overvoltage category	III
Pollution degree	3
Data acc. to IEC/EN 60947-2	
Rated operational voltage U_e	110 VDC (1pole) 220 VDC (poles 1; 2) 440 VDC (2pole) 230/400 VAC (poles 1; 2)
Min. operating voltage	12 VAC–12 VDC
Rated ultimate short-circuit capacity I_{cu}	10 kA (0,5 up to 63 A, 220 VDC 1pole) 20 kA (0,5 up to 63 A, 110 VDC 1pole) 25 kA (0,5 up to 63 A, 220 VDC 2pole) 10 kA (0,5 up to 63 A, 440 VDC 2pole) 10 kA (0,5 up to 63 A, 230/400 VAC)
Rated service short-circuit capacity I_{cs}	10 kA (0,5 up to 63 A, 220 VDC 1pole) 10 kA (0,5 up to 63 A, 110 VDC 1pole) 20 kA (0,5 up to 63 A, 220 VDC 2pole) 10 kA (0,5 up to 63 A, 440 VDC 2pole) 6 kA (0,5 up to 63 A, 230/400 VAC)
Reference Ambient Air Temperature for Overload Tripping	30 °C
Mechanical Data	
IP Code	IP20B, IP40 in enclosure with cover
Mechanical endurance	Electrical endurance: 10 000 ops Mechanical endurance: 10 000 ops
Shock resistance acc. to IEC/EN 61373	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6	2 … 13.2 Hz / 1 mm 13.2 … 100 Hz / 0.7 g, 5 cycles 5 … 150 … 5 Hz / 1 g, 4 waves
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	2 cycles with 55 °C/90–96 % and 25 °C/95–100 %
Ambient temperature	–25 … +60 °C
Storage temperature	–40 … +70 °C
Installation	
Top terminal type	Failsafe bi-directional cylinder-lift terminal with double slot 35/10 mm²
Top terminal rigid IEC connections (solid/stranded)	Single: 0.75 ÷ 35 mm² (front slot), 0.75 ÷ 6 mm² (rear slot) Multiple: 2 x 0.75 ÷ 10 mm² (front slot), 2 x 0.75 ÷ 6 mm² (rear slot), with cables of same type and size
Top terminal flexible IEC connections	Single: 0.75 ÷ 25 mm² (front side), 0.75 ÷ 6 mm² (rear slot) Multiple: 2 x 0.75 ÷ 10 mm² (front slot), 2 x 0.75 ÷ 6 mm² (rear slot), with cables of same type and size
Tightening torque	2.8 Nm
Screwdriver	No. 2 Pozidrive
Mounting	plug in on bus bar system SMISSLINE
Mounting position	any
Supply	any
Dimensions and weight	
Pole dimensions (H x D x W)	91 x 18 x 82
Pole weight	110 g

Notes

SMISSLINE TP technical details

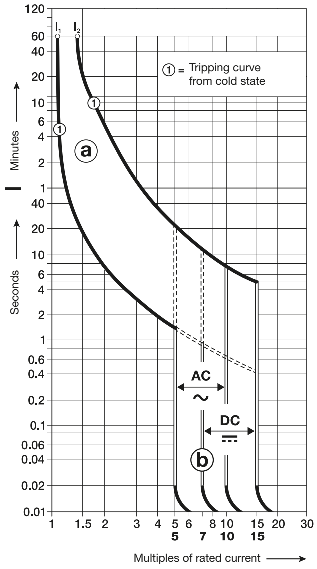
Miniature circuit breaker Trip characteristics

EN60898-1



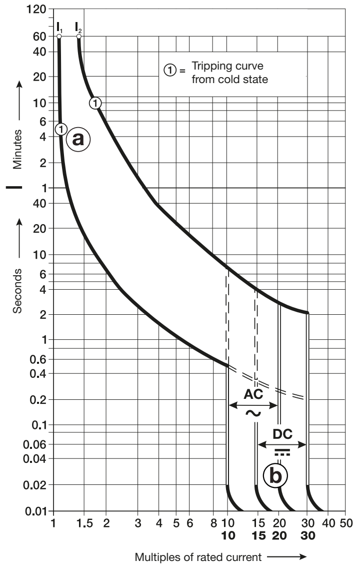
Trip characteristics: B
Thermal trip
1.13...1.45 x I_n
Electromagnetic trip
3...5 x I_n AC
4...7 x I_n DC
Calibration temperature 30°C

EN60898-1



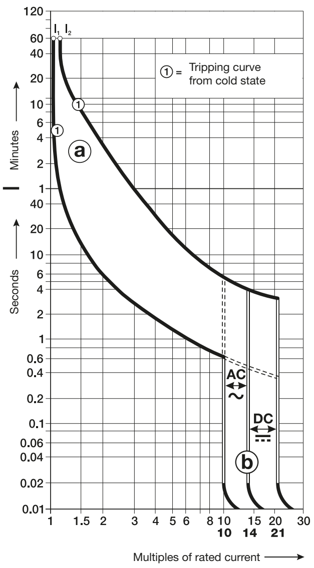
Trip characteristics: C
Thermal trip
1.13...1.45 x I_n acc. to EN60898-1
Thermal trip
1.05...1.3 x I_n acc. to EN60947-2
Electromagnetic trip
5...10 x I_n AC
7...14 x I_n DC
Calibration temperature 30°C

EN60898-1



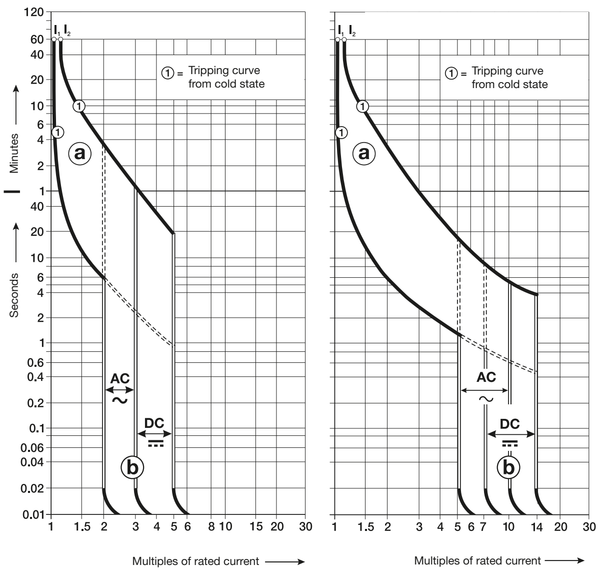
Trip characteristics: D
Thermal trip
1.13...1.45 x I_n
Electromagnetic trip
10...20 x I_n AC
15...30 x I_n DC
Calibration temperature 30°C

EN60947-2



Trip characteristics: K
Thermal trip
1.05...1.3 x I_n
Electromagnetic trip
10...14 x I_n AC
14...20 x I_n DC
Calibration temperature 40°C

EN60947-2



Trip characteristics: UC

Z	C
1.05...1.35 x I_n	1.13...1.45 x I_n
3...5 x I_n DC	7...14 x I_n DC
2...3 x I_n AC	5...10 x I_n AC

Calibration temperature 30°C

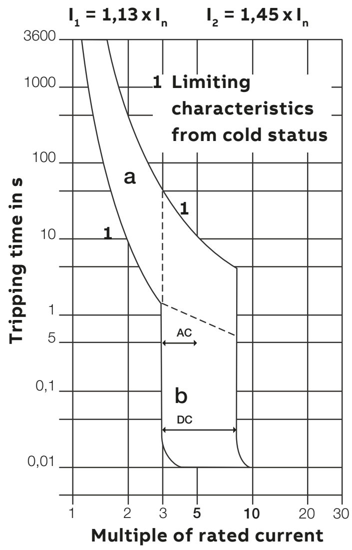
SMISSLINE TP technical details

Miniature circuit breaker Trip characteristics

Trip characteristics example of trip curve interpretation of B-characteristics

a Thermal trip characteristics:
Lower test current I_1 = defined as non-tripping current.
The circuit breaker withstands 1.13 times the rated current for at least 60 minutes.
Upper test current I_2 = defined as trip current.
The circuit breaker trips at 1.45 times the rated current within 60 minutes.

b Electro-magnetic trip characteristics AC:
The circuit breaker withstands 3 times the rated current for more than 0.1 sec. (in this example, up to around 2 sec.).
The circuit breaker trips in less than 0.1 sec. at 5 times the rated current.



Trip behaviour of different trip characteristics

Trip characteristics and current ratings		Thermal release Test currents: lower test current I_1	upper test current I_2	Trip time	Electromagnetic release Test currents: lower test current	upper test current	Trip time
B	4 to 63 A	1.13 x I_n	1.45 x I_n	> 1 h < 1 h	3 x I_n	5 x I_n	> 0.1 s < 0.1 s
C	0.5 to 63 A	1.13 x I_n	1.45 x I_n	> 1 h < 1 h	5 x I_n	10 x I_n	> 0.1 s < 0.1 s
D	6 to 63 A	1.13 x I_n	1.4 x I_n	> 1 h < 1 h	10 x I_n	20 x I_n	> 0.1 s < 0.1 s
K	0.5 to 63 A	1.05 x I_n	1.2 x I_n 1.5 x I_n 6.0 x I_n	> 2 h < 2 h < 2 min > 2 s	8 x I_n	12 x I_n	> 0.2 s < 0.2 s

Application characteristics: B
Miniature circuit breaker for circuits supplying loads generating no or only minor inrush currents (boilers, electric heaters, cookers).

Application characteristics: C
The ‘standard’ miniature circuit breaker for circuits supplying loads producing inrush currents particular to inductive loads (TV sets, fluorescent and discharge lamps) and for socket outlets.

Application characteristics: D
Miniature circuit breaker for circuits supplying loads producing very high inrush currents (transformers, capacitor banks).
Main circuit breaker for the back-up protection of downstream connected circuit breakers.

Application characteristics: K
Circuit breaker for equipment:
The characteristics of these types enable the close protection requirements for equipment to be met.

Application characteristics: UC
Device protection in DC systems of up to 250 V = with a time constant of <15 ms (emergency networks, electroplating, etc.).

SMISSLINE TP technical details

Miniature circuit breaker

Internal resistances at rated voltage and power losses

Internal resistances and power loss per pole (cold resistance at room temperature)

S400E, S400M

B, C tripping characteristics		
I_n [A]	R_i [mΩ]	P_v [W]
0.5	5023	1.3
1	1424	1.4
1.6	677	1.7
2	338	1.4
3	146	1.3
4	109	1.7
6	50	1.8
8	22	1.4
10	17	1.7
13	12	2.0
16	8.4	2.2
20	5.1	2.0
25	3.9	2.4
32	3.1	3.2
40	2.3	3.7
50	1.5	3.8
63	1.4	5.6

S400E, S400M

D, K tripping characteristics		
I_n [A]	R_i [mΩ]	P_v [W]
0.5	4419	1.1
1	1311	1.3
1.6	627	1.6
2	326	1.3
3	135	1.2
4	85	1.4
6	46	1.7
8	20	1.3
10	16	1.6
13	11	1.9
16	7.8	2.0
20	5.0	2.0
25	3.8	2.4
32	3.0	3.1
40	2.3	3.7
50	1.5	3.8
63	1.4	5.6

S400M-UC

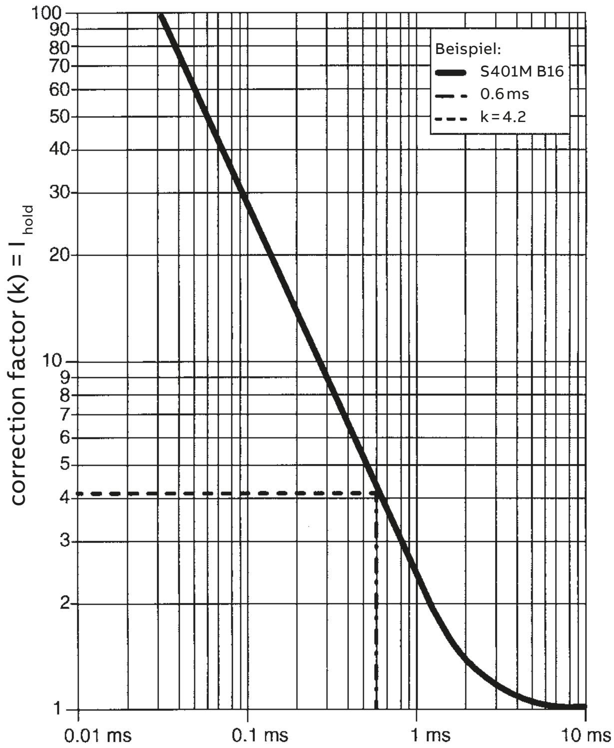
C, Z tripping characteristics		
I_n [A]	R_i [mΩ]	P_v [W]
0.5	8173	2.0
1	2174	2.2
1.6	1039	2.7
2	521	2.1
3	235	2.1
4	132	2.1
6	67	2.4
8	29	1.8
10	20	2.0
13	15	2.5
16	10	2.6
20	5.6	2.2
25	4.3	2.7
32	3.7	3.8
40	2.6	4.2
50	1.7	4.2
63	1.4	5.6

S400P, SUP400M

B, C, K tripping characteristics		
I_n [A]	R_i [mΩ]	P_v [W]
2	333	1.3
3	137	1.2
4	83	1.3
5	45	1.1
6	45	1.6
8	19	1.2
10	13	1.3
13	10	1.7
15	7.6	1.7
16	7.6	1.9
20	5.0	2.0
25	3.7	2.3
30	3.0	2.7
32	2.9	3.0
40	2.3	3.6
50	1.5	3.7
63	1.4	5.5

RCDs technical details

Properties



Example 1:	Non tripping (Electromagnetic tripping)	
S 401-B16	I_{hold} = k x non tripping I_{hold} = 4,2 x 3 x 16 I_{hold} = 201,6 A	B-Characteristic = 3 x I_n C-Characteristic = 5 x I_n K-Characteristic = 10 x I_n Z-Characteristic = 2 x I_n

The MCB S 401-B16 hold is keeping by an Impulse of 0.6 ms up to a current of 201.6 A.

Example 2:

S 401-K25	I_{hold} = k x non tripping I_{hold} = 4,2 x 10 x 25 I_{hold} = 1050 A

The MCB S 401-K25 is keeping by an Impulse of 0.6 ms up to a current of 1050 A.

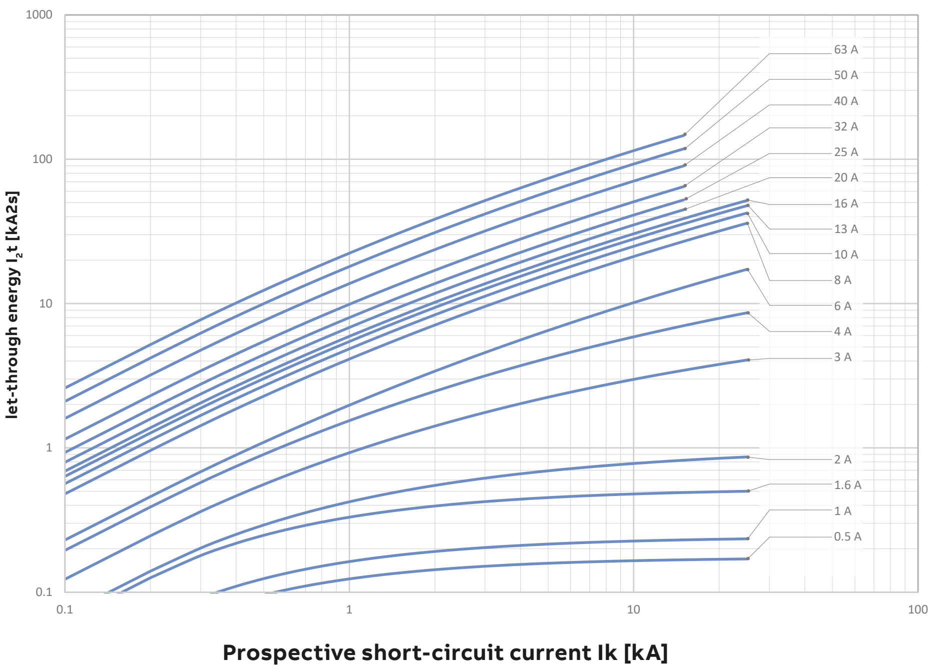
MCBs technical details

Limitation of specific let-through energy I^2t

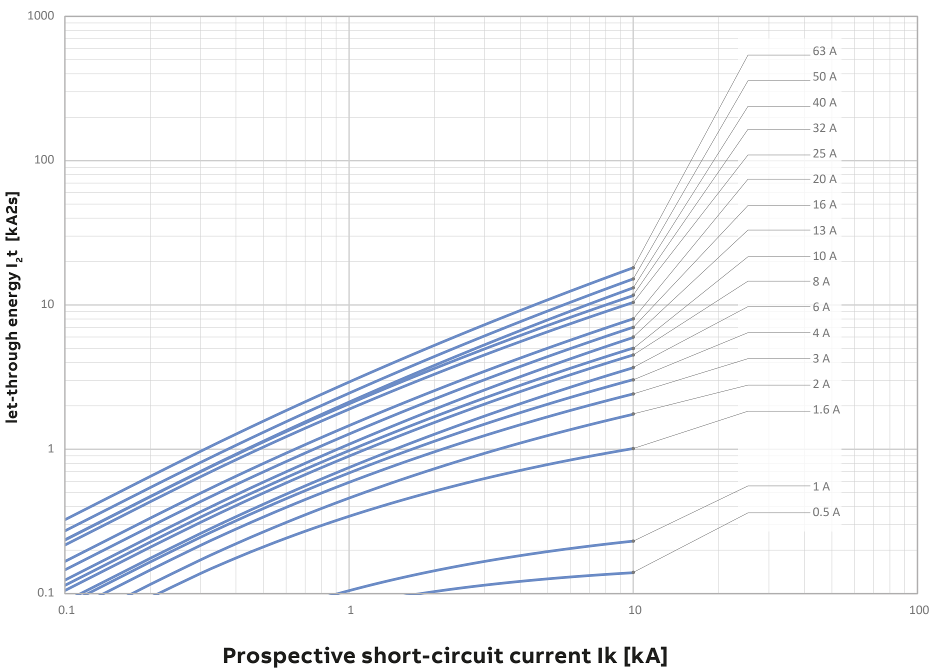
I^2t diagrams - Specific let-through energy value I^2t

The I^2t curves give the values of the specific let-through energy expressed in A^2s (A=amps; s=seconds) in relation to the perspective short-circuit current (I_{rms}) in kA.

S400M; B, C, D, K



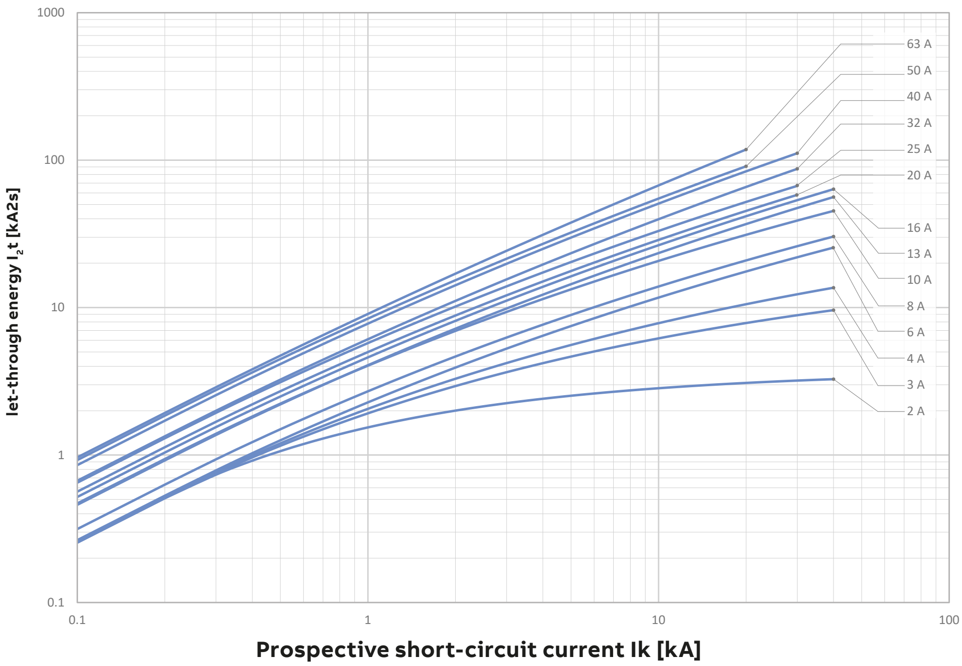
S400UC, S400UCZ



MCBs technical details

Limitation of specific let-through energy I^2t

S400P; B, C, K, SU401 and SUP400



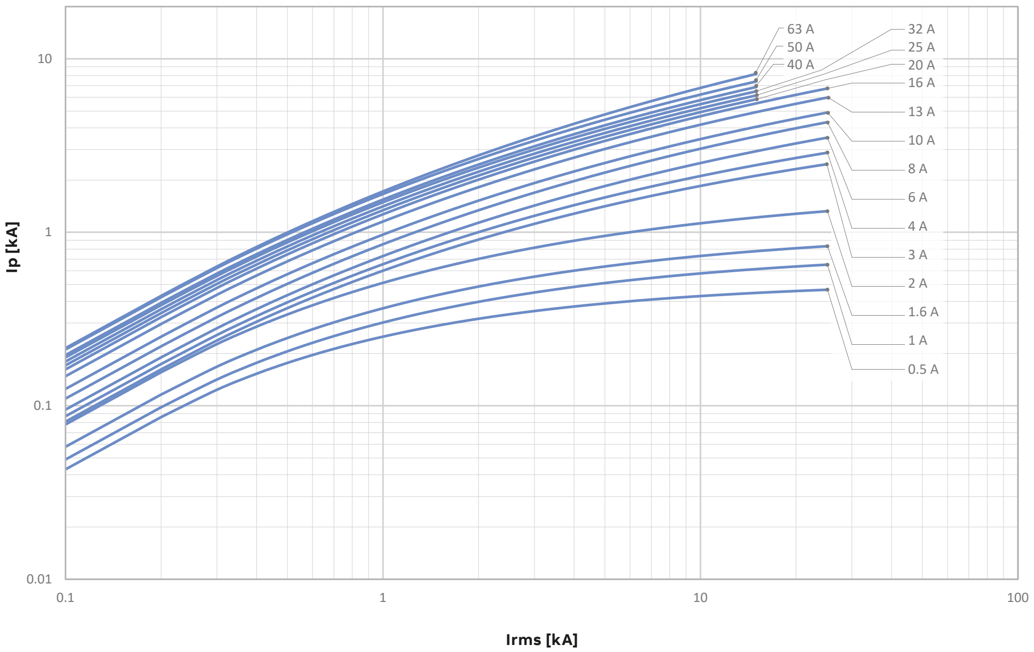
MCBs technical details

Peak current I_p

Limitation curves – Peak current values

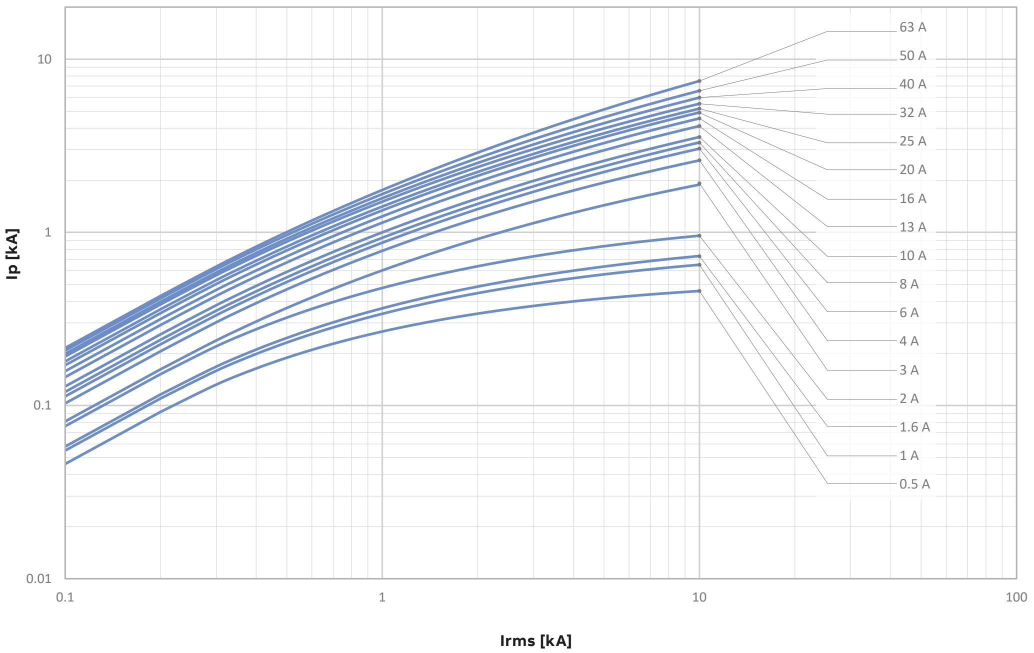
The I_p curves give the values of the peak current, expressed in kA, in relation to the perspective symmetrical short-circuit current (kA).

S400M; B, C, D, K



Prospective short-circuit current Ik [kA]

S400UC, S400UCZ



Prospective short-circuit current Ik [kA]

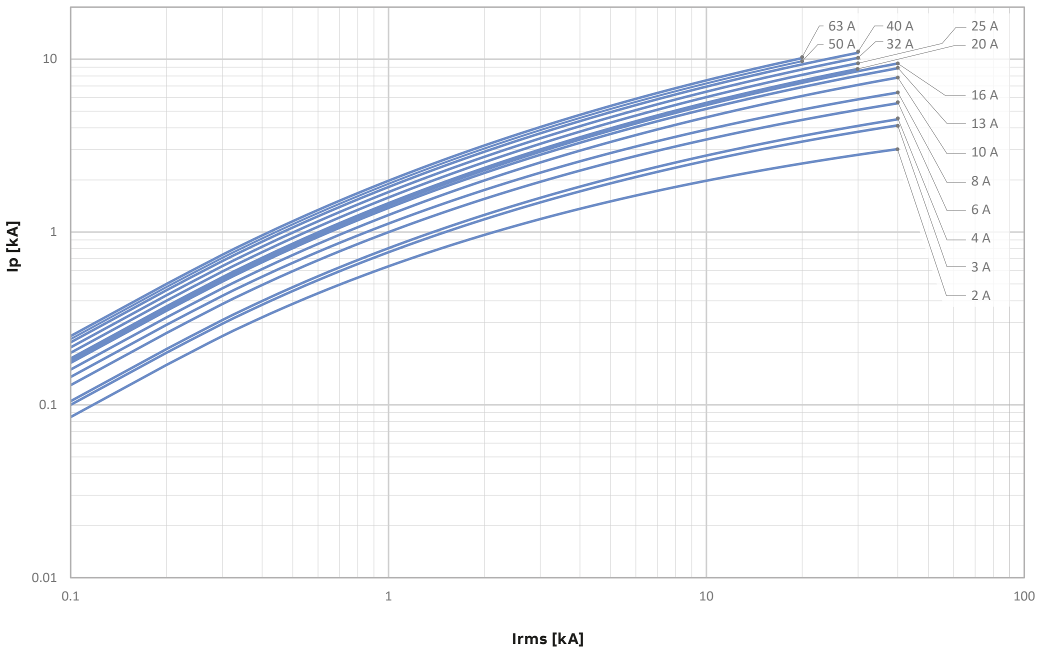
MCBs technical details

Limitation of specific let-through energy I^2t

Limitation curves – Peak current values

The I_p curves give the values of the peak current, expressed in kA, in relation to the perspective symmetrical short-circuit
current (kA).

S400P; B ,C, K, SU401 and SUP400



Prospective short-circuit current Ik [kA]

SMISSLINE TP technical details

Power supply: overload and short-circuit protection

Overload and short-circuit protection of the plug-in socket system

Protection of the busbar system without upstream overcurrent protection

An important factor for the protection of the busbar system (sockets, incoming terminal block, incoming terminal component, adapter, combi module or terminals) is the characteristic of the rated peak withstand current I_{pk}. The rated peak withstand current I_{pk} of the SMISSLINE busbar system is 17 kA.

Protection of the busbar system with up-stream overcurrent protection

The rated short-circuit current Icf of the SMISSLINE busbar system is 50 kA.
If, on the power supply side, a circuit breaker of the type Sace Tmax 200 A, a high performance circuit breaker S800 or a NH fuse is positioned upstream of the busbar system, then due to the short-circuit current limiting effect of this protection device, a larger prospective short-circuit current of up to 50 kA for the plug-in socket system is permissible.

Overload and short-circuit protection of devices on the busbar system

The rated short-circuit breaking capacity (or rated breaking capacity) of the protective devices, together with the maximum short-circuit current at the installation location of the devices on the busbar system, must be taken into consideration.
This is not only relevant for the SMISSLINE busbar system, but is also applicable to the distribution construction.

Miniature circuit breaker

If the prospective short-circuit current at the installation location of a miniature circuit breaker is not greater than its rated breaking capacity, no back-up protection via an upstream overcurrent protection device is necessary.
If the prospective short-circuit current at the installation location of a miniature circuit breaker is greater than its rated short-circuit breaking capacity, the current ratings of the upstream overcurrent protection device must not exceed the table values in the back-up tables (catalogue, page 2/20 onwards).

Residual-current circuit breaker

A back-up fuse with max. 100 A gL/gG or a high performance circuit breaker S800 100 A is required for short-circuit protection upstream or downstream (see Coordination table, page 2/42). A back-up fuse is not required up to the level of the internal short-circuit withstand rating. Thermal protection can be ensured by means of downstream miniature circuit breakers, but only if the rated currents do not exceed the value of the current rating of the residual-current circuit breaker in consideration of a utilisation factor.

Surge arrester OVR

An upstream overcurrent protection device with max. 125 A gL/gG is necessary for short-circuit protection (in the case of non-independent interruptions of the secondary current).

Back-up fuses for devices with a universal adapter

In principle, the same requirements apply as for directly plugged-in devices.

SMISSLINE TP technical details
Back-up and selectivity dates

SOC - Selected Optimized Coordination
See as well ABB on https://applications.it.abb.com/SOC/

SMISSLINE TP technical details

Miniature circuit breaker

Performances at different ambient temperatures

Allowable current of miniature circuit breakers depending on ambient temperature and max. load current for row mounted miniature circuit breakers.

Practical procedure

Conditions often arise which allow for simple consideration of the ambient temperature and thermal influences of row mounted circuit breakers according to EN 60898 and EN 60947-2. The following procedure has proven to be effective:

1. Selection of circuit breaker according to the rated current of the equipment or the current carrying capacity of the cable depending on which of these is the lower value.
2. Consideration of thermal factors
   – for an ambient temperature,
   – for thermal influence of row mounted circuit breakers.
3. This results in the rated current of the circuit breaker to be selected for the relevant current.

This procedure considers all thermal influence factors and results in an optimum choice of the rated current for the circuit breaker.

Basis for the simplified procedure

1. Different ambient temperature

The thermal releases are set to a reference ambient temperature. For trip characteristic K, this is 40 °C, for trip characteristics B, C and D, this is 30 °C. At different ambient temperatures, the specified current values.

2. Influence of row mounted devices at continuous load

If the circuit breakers are lined up close to one another and have equally high load levels, a correction factor must be taken. This influence can be reduced if fillers and/or spacers (9 mm wide) are used.

Influence of adjacent poles
Correction factor Fm

No. of adjacent devices	fm
1	1
2	0.95
3	0.9
4	0.86
5	0.82
6	0.8
7	0.78
8	0.77
9	0.76
>9	0.76

SMISSLINE TP technical details

Miniature circuit breaker

Influence of ambient temperature

Max. operating currents depending on ambient temperature for S400 miniature circuit breakers of tip characteristics B, C, D, UC-C and UC-Z

I_n(A)	Ambient temperature T (°C)										
	0	10	15	20	25	30	35	40	45	50	55	60
0.5*	0.58	0.55	0.53	0.52	0.51	0.50	0.48	0.47	0.46	0.44	0.43	0.42
1.0*	1.15	1.09	1.07	1.04	1.02	1.0	0.97	0.94	0.91	0.89	0.86	0.83
1.6*	1.85	1.75	1.71	1.67	1.63	1.6	1.55	1.50	1.46	1.42	1.38	1.34
2.0*	2.31	2.19	2.13	2.08	2.03	2.0	1.93	1.88	1.83	1.77	1.72	1.67
3.0*	3.5	3.32	3.24	3.16	3.09	3.0	2.93	2.85	2.77	2.69	2.61	2.53
4.0*	4.6	4.37	4.27	4.17	4.07	4.0	3.86	3.76	3.66	3.56	3.45	3.34
6.0	6.9	6.59	6.44	6.29	6.14	6.0	5.83	5.68	5.53	5.37	5.22	5.07
8.0	9.2	8.84	8.63	8.42	8.22	8.0	7.81	7.6	7.39	7.19	6.98	6.77
10.0	11.5	10.9	10.7	10.4	10.2	10.0	9.65	9.39	9.14	8.88	8.63	8.38
13.0	15.0	14.4	14.0	13.7	13.3	13.0	12.7	12.3	12.0	11.6	11.3	11.00
16.0	18.5	17.6	17.2	16.8	16.4	16.0	15.6	15.2	14.7	14.3	13.9	13.50
20.0	23.1	22.1	21.6	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.00
25.0	28.9	27.5	26.9	26.3	25.6	25.0	24.3	23.7	23.0	22.4	21.8	21.20
32.0	37.0	35.3	34.5	33.7	32.8	32.0	31.2	30.4	29.5	28.7	27.9	27.10
40.0	46.2	44.1	43.0	42.0	41.0	40.0	39.0	37.9	36.9	35.9	34.9	33.90
50.0	57.7	55	53.7	52.4	51.1	50.0	48.6	47.3	46.0	44.7	43.4	42.10
63.0	72.7	69.3	67.7	66.1	64.5	63.0	61.3	59.7	58.1	56.4	54.8	53.20

* only applies to C

Max. operating currents depending on ambient temperature for S400M, S400P, SU400M, SUP400M miniature circuit breakers K tripping characteristic

I_n (A)	Ambient temperature T (°C)										
	0	**10**	**15**	**20**	**25**	**30**	**35**	**40***	**45**	**50**	**55**	**60**
0.5	0.56	0.54	0.52	0.51	0.50	0.49	0.47	0.5	0.45	0.43	0.42	0.41
1	1.16	1.14	1.12	1.09	1.07	1.05	1.02	1.0	0.96	0.94	0.91	0.88
1.6	1.89	1.85	1.81	1.77	1.73	1.70	1.65	1.6	1.56	1.52	1.48	1.44
2	2.35	2.29	2.23	2.18	2.13	2.10	2.03	2.0	1.93	1.87	1.82	1.77
3	3.56	3.48	3.40	3.32	3.25	3.20	3.09	3.0	2.93	2.85	2.77	2.69
4	4.68	4.58	4.48	4.38	4.28	4.20	4.07	4.0	3.87	3.77	3.66	3.55
5	6.06	5.91	5.76	5.61	5.46	5.30	5.15	5.0	4.85	4.69	4.54	4.39
6	7.06	6.91	6.76	6.61	6.46	6.30	6.15	6.0	5.85	5.69	5.54	5.39
8	9.45	9.24	9.03	8.82	8.62	8.40	8.21	8.0	7.79	7.59	7.38	7.17
10	11.80	11.50	11.20	11.00	10.70	10.50	10.20	10.0	9.69	9.43	9.18	8.93
13	15.50	15.10	14.70	14.40	14.00	13.70	13.40	13.0	12.70	12.30	12.00	11.70
15	17.80	17.40	17.00	16.60	16.20	15.80	15.40	15.0	14.60	14.20	13.80	13.40
16	18.80	18.40	18.00	17.60	17.20	16.80	16.40	16.0	15.60	15.20	14.80	14.40
20	23.50	23.00	22.50	22.00	21.50	20.90	20.40	20.0	19.40	18.90	18.40	17.90
25	29.50	28.90	28.30	27.60	27.00	26.30	25.70	25.0	24.40	23.80	23.10	22.40
30	35.70	34.90	34.10	33.30	32.40	31.60	30.80	30.0	29.10	28.30	27.50	26.70
32	37.70	36.90	36.10	35.30	34.40	33.60	32.80	32.0	31.10	30.30	29.50	28.70
40	47.30	46.20	45.10	44.10	43.10	42.10	41.10	40.0	39.00	38.00	37.00	36.00
50	59.00	57.70	56.40	55.10	53.80	52.50	51.30	50.0	48.70	47.40	46.10	44.80
63	74.10	72.50	70.90	69.30	67.70	66.10	64.50	63.0	61.30	59.60	58.00	56.40

* Reference ambient air temperature for overload tripping

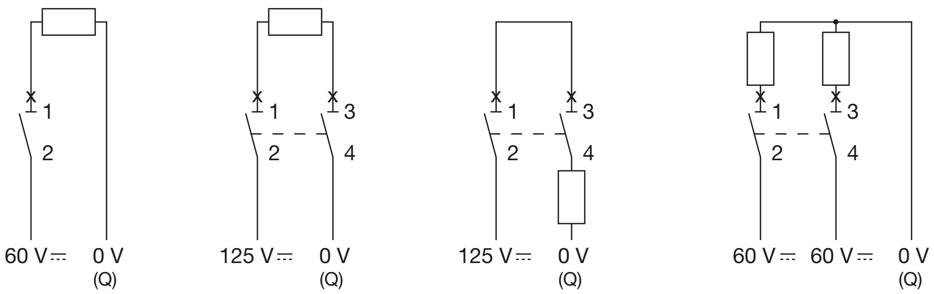
SMISSLINE TP technical details

Miniature circuit breaker

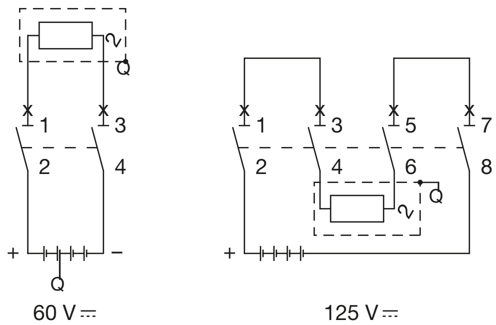
Use for for DC systems

Use of miniature circuit breakers S400 M for DC systems
A standard miniature circuit breaker type S400 M and S400 E can be used in a DC system by observing the following conditions: Single pole miniature circuit breaker max. 72 V DC. 2-pole miniature circuit breaker with 2-poles in series max. 125 V DC. The polarity needs not to be taken into account. Load connection can either be at the top or at the bottom of the MCB.

Example of permissible DC voltages depending on the number of poles and the circuit configeration in earthed DC systems:



Examples for different voltages between a conductor and earth where voltages between conductors are identical:



SMISSLINE TP technical details

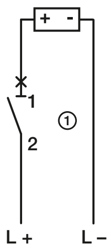
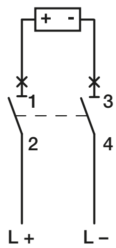
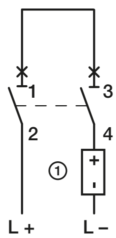
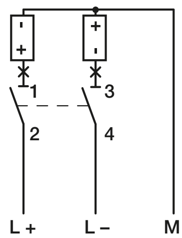
Miniature circuit breaker
S400UC

UC = Universal Current = AC/DC

S400UC MCBs can be used in the one-pole version as 250 V d.c., and in the 2-pole version with series connection of two poles up to 440 V d.c..

For DC incoming supply from above
S400 UC-... MCBs have, in the area of arc chutes, permanent magnets, it is therefore necessary to take into account the polarity during the installation process.
Doing so ensures that in the case of a short circuit the magnetic field of the permanent magnets corresponds with the electromagnetic field of the short-circuit current, therefore safely leading the short circuit into the arc chute. Incorrect polarities may cause damage to the MCB.
This is why – in the case of top-fed devices – terminal 1 must be connected to (–) and terminal 3 (+).

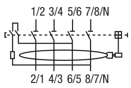
Example for permissible voltages between the conductors depending on the number of poles and circuit layout:

voltage U_N between conductors	250 V d.c.	440 V d.c.	440 V d.c.	440 V d.c.
voltage U_N between conductor and earth	250 V d.c.	250 V d.c.	440 V d.c.	250 V d.c.
supply				

SMISSLINE TP technical details

Residual current operated circuit breaker F402, F404

Properties



General information about residual current operated circuit breakers
The residual current operated circuit breaker prevents personal injury and damage to property caused by electric current. Use of this circuit breaker is required in various national and international standards for electrical installations.
Modern residual current operated circuit breakers respond to small residual currents. Interruption occurs in a fraction of a second even before a hazardous situation for people, animals and property can arise.
The principle of magnetic tripping independable of the supply voltage ensures perfect and safe operation even in the event of undervoltage and neutral interruptions.

The key features
- High short-circuit resistance 10 kA
- Sensitive for alternating and pulsating DC residual currents
- 2- and 4-pole types
- Nominal residual trip currents 10, 30, 100, 300 mA
- Snap-on auxiliary switches and signal contacts
- Nominal currents 25, 40, 63 A
- Double terminals

According to the wave form of the earth leakage currents they are sensitive to, the RCDs may be classed as:
- AC type (for alternating current only) AC are not in the Smissline portfolio
- A type (for alternating and/or pulsating current with DC components)
- B type (for alternating and/or pulsating current with DC components and continuous fault current).

Shape of the fault current			Correct RDC function alternating current Type AC	pulsating current sensitiv Type A
sinusoidal a.c.	rampant	slowly rising		
pulsating d.c.	rampant with or without overlapping DC components from 6 mA	slowly rising		

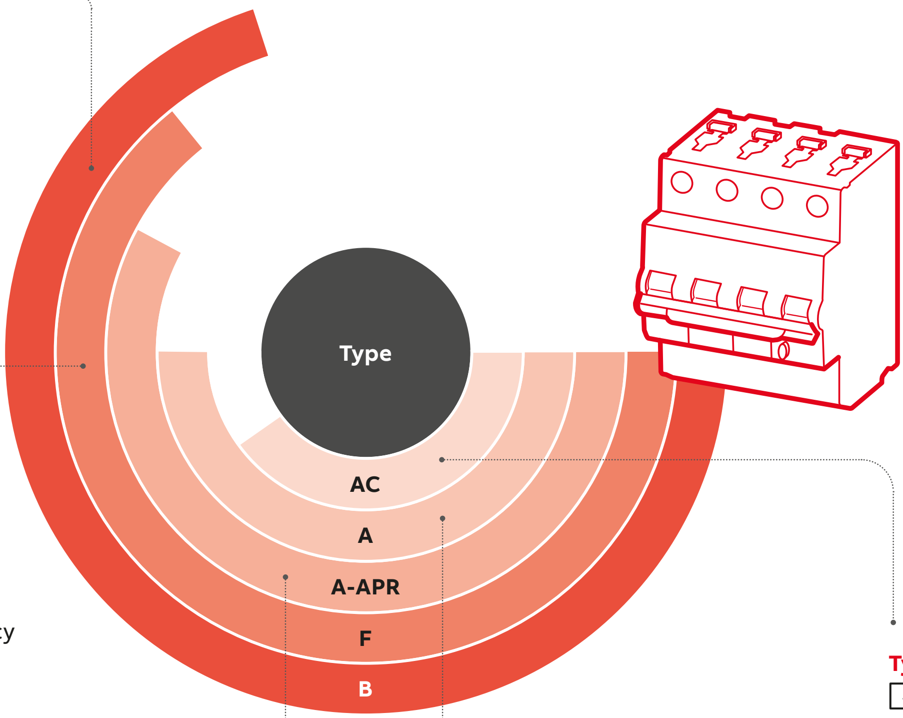
Selectivity
RCDs raise similar issue to those surrounding the installation of MCBs, and in particular the need to reduce to a minimum the parts of the system out of order in the event of a fault.
For RCBOs the problem of selectivity in the case of short-circuit currents may be handled with the same specific criteria as for MCBs.
However, for correct residual current protection, the more important aspects are linked to tripping times. Protection against contact voltages is only effective if the maximum times indicated on the safety curve are not exceeded.

RCDs technical details
Properties

The variety of residual current devices has continuously increased in last decades following the technology evolution and the massive introduction of electronics in all fields of applications. According to the capability to detect different waveforms of residual current and the relative sophisticated type testing, today the spectrum of RCDs types covers from pure AC loads up to high frequency and DC related applications with an increasing level of protection passing from AC types up to F and B types.

Type B

Full type F features.
+ Detection of smooth DC currents.



Type F

Full type A-APR short delay features.
+ Detection of high frequency currents
up to 1 kHz.

Type AC

Alternating current only.

Type A-APR

APR

Full type A features.
+ High immunity to unwanted tripping.

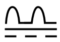
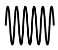
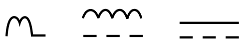
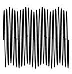
Type A

Full type AC features.
+ Detection of pulsating current with DC components.

RCDs technical details

Properties

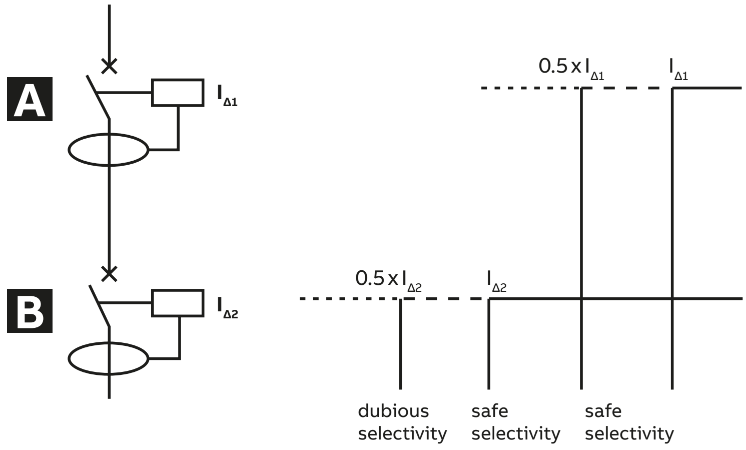
Release current

Proper functionning of residual current protective devices of type		RCD type Type AC	 Type A	 Type F	 Type B
	0,5 … 1 $I_{\Delta n}$	■	■	■	■
	0,35 … 1,4 $I_{\Delta n}$	–	■	■	■
	0,25 … 1,4 $I_{\Delta n}$ 0,11 … 1,4 $I_{\Delta n}$	–	■	■	■
	max. 1,4 $I_{\Delta n}$ + 6 mA	–	■	■	■
	max. 1,4 $I_{\Delta n}$ + 10 mA	–	–	■	■
	0,5 … 1,4 $I_{\Delta n}$	–	–	■	■
	0,5 … 2 $I_{\Delta n}$	–	–	–	■
	0,5 … 2,4 $I_{\Delta n}$ 0,5 … 6 $I_{\Delta n}$ 0,5 … 14 $I_{\Delta n}$	–	–	–	■

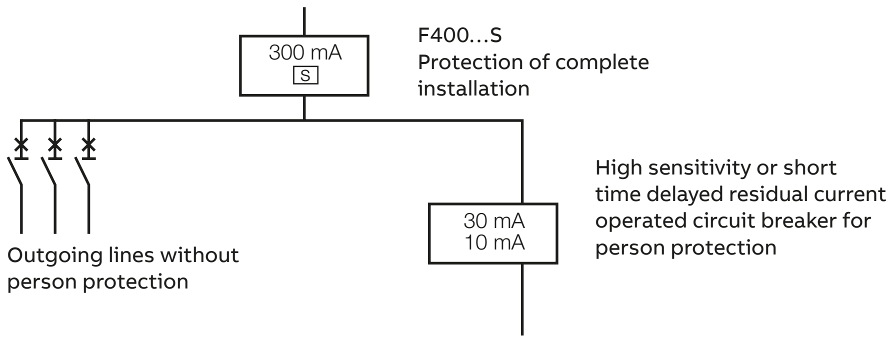
SMISSLINE TP technical details

Residual current operated circuit breaker F402, F404
Properties

Partial selectivity



Total selectivity



Amperometric (partial) selectivity
Selectivity may be created by placing low-sensitivity RCDs upstream and higher-sensitivity RCDs downstream.
An essential condition which must be satisfied in order to achieve selective co-ordination is that the $I_{\Delta 1}$ value of the breaker upstream (main breaker) is more than double the $I_{\Delta 2}$ value of the breaker downstream. The operative rule to obtain an amperometric (partial) selectivity is $I_{\Delta n}$ of the upstream breaker = 3 x $I_{\Delta n}$ of the downstream breaker (e. g.: F404, 300 mA upstream; F402, 100 mA downstream).
In this case, selectivity is partial and only the downstream breaker trips for earth fault currents $I_{\Delta 2} < I_{\Delta m} < 0{,}5 \times I_{\Delta 1}$).

Chronometric (total) selectivity
To achieve total selectivity, delayed or selective RCDs must be installed.
The tripping times of the two devices connected in series must be co-ordinated so that the total interruption time t_2 of the downstream breaker is less than the upstream breaker's no-response limit time t_1, for any current value. In this way, the downstream breaker completes its opening before the upstream one.
To completely guarantee total selectivity, the I_{Δ} value of the upstream device must also be more than double that of the downstream device in accordance with IEC 64-9/563.3, comments. The operative rule to obtain an amperometric (partial) selectivity is $I_{\Delta n}$ of the upstream breaker = 3 x $I_{\Delta n}$ of the downstream breaker (e. g.: F404, S type, 300 mA upstream).
For safety reasons, the delayed tripping times of the upstream breaker must always be below the safety curve.

SMISSLINE TP technical details

Residual current operated circuit breaker F402, F404
Standard, short-time delayed and selective type

The use of multiple electronic reactors for the supply of fluorescent lamps instead generates permanent leakage currents and inrush currents that can provoke nuisance tripping of a standard residual current breaker.
IT system loads and other electronic equipment (e.g. dimmers, computers, inverters) with capacitive input filters connected between the phases and ground can also generate permanent earth leakage currents whose sum may provoke the nuisance tripping of a standard residual current breaker.
For these situations, the SHORT-TIME DELAY breakers allow a greater number of devices to be connected to the installation.
Soft-starters for motors are loads which can generate high-frequency capacitive currents (provoked by the harmonics) toward ground or fed into the network. Also in this case, the use of SHORT-TIME DELAY residual breakers reduces the sensibility to nuisance tripping.

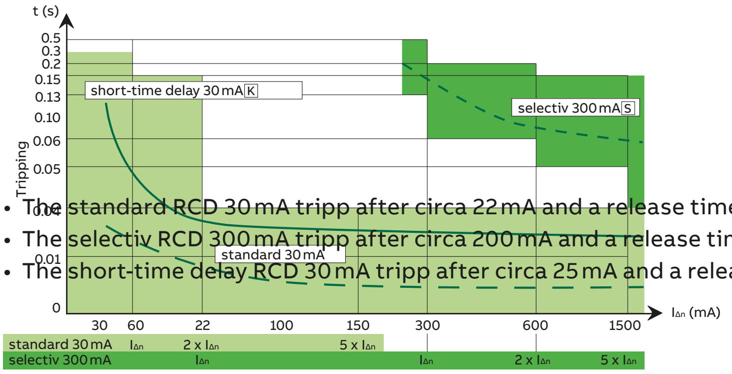
Compared with standard type breakers, SHORT-TIME DELAY residual current breakers are therefore characterised, for any given sensibility, by:

- Higher residual trip current
- Tripping time delay
- Better resistance to overvoltages, harmonics and impulse disturbances.

Regulations
The tests set out in the IEC 61008 and IEC 61009 standards verify the resistance of residual current breakers to unwanted tripping provoked by operation overvoltages, using a ring wave impulse shape of 0.5 µs/100 kHz. All residual current circuit-breakers are required to pass this test with a peak current value of 200 A.
For what concerns atmospheric overvoltages, the IEC 61008 and 61009 standards prescribe the 9/20 µs surge test with a 3000 A peak current, but limit the requirement to residual current devices classified as selective; no test is required for other types.

The ABB range of SHORT-TIME DELAY anti-nuisance tripping breakers and blocks pass the general 0.5 µs/100 kHz ring wave test and also withstand the 9/20 µs impulse test with the same peak current of 3000 A prescribed for selective devices.
The F402 K and F404 K should therefore be used to prevent unwanted tripping.

Three different types of Residual current operated circuit breaker
- standard RCD 30 mA
- selective RCD 300 mA $\boxed{S}$
- short-time delay RCD 30 mA $\boxed{K}$



- The standard RCD 30 mA tripp after circa 22 mA and a release time of ≤ 35 ms.
- The selectiv RCD 300 mA tripp after circa 200 mA and a release time of circa 180 ms.
- The short-time delay RCD 30 mA tripp after circa 25 mA and a release time of 100 … 120 ms.

SMISSLINE TP technical details

Residual current operated circuit breaker F402, F404
Standard, short-time delayed and selective type

Unwanted tripping

In the event of disturbance in the mains, the RCDs normally present in the system are tripped, breaking the circuit even in the absence of a true earth fault.
Disturbances of this kind are most often caused by:

- operation overvoltages caused by inserting or removing loads (opening or closing protection of control devices, starting and stopping motors, switching fluorescent lighting systems on and off, etc.)
- overvoltages of atmospheric origin, caused by direct or indirect discharges on the electrical line.

Under these circumstances, breaker tripping is unwanted, since it does not satisfy the need to avoid the risks due to direct and indirect contacts. On the contrary, the sudden and unjustified interruption of the power supply may result in very serious problems.

SHORT-TIME DELAY RCDs

The ABB range of SHORT-TIME DELAY anti-disturbance residual current circuitbreakers and blocks was designed to overcome the problem of unwanted tripping due to overvoltages of atmospheric or operation origin.
The electronic circuit in these devices can distinguish between temporary leakage caused by disturbances on the mains and permanent leakage due to actual faults, only breaking the circuit in the latter case.
SHORT-TIME DELAY residual current circuit-breakers and blocks have a slight delay into the tripping time, but this does not compromise the safety limits set by the Standards in force (release time at 2 $I_{\Delta n}$ =150 ms).
Guaranteeing conventional residual current protection, their installation in the electrical circuit therefore allows any unwanted tripping to be avoided in domestic and industrial systems in which service continuity is essential.
This delay makes the SHORT-TIME DELAY residual current devices especially suited for installations involving motor starters/variable speed drives, fluorescent lamps or IT/electronic equipment.

Table of RDC selectivity

Downstream $I_{\Delta n}$ [mA]	Upstream $I_{\Delta n}$	10 [mA] inst	30 inst	100 inst	300 inst	300 S	500 inst	500 S
10			▪	▪	▪	■	▪	■
30	inst			▪	▪	■	▪	■
100	inst				▪	■		■
300	inst							
300	S							
500	inst							

inst = instantaneous S = selective ▪ = amperometric (partial) selectivity ■ = chronometric (total) selectivity

Residual current operated circuit breaker RCCBs

F402 technical features, A type and APR-F (K type)

	F402	F402 APR
Standards	IEC/EN 61008-1 IEC/EN 61008-2-1	IEC/EN 61008-1 IEC/EN 61008-2-1 IEC/EN 62423
Electrical features		
Type (wave form of the earth leakage sensed)	A	APR - F
Number of poles	1P + N	1P + N
Rated current I_n	25, 40 A	40 A
Rated sensitivity $I_{\Delta n}$	0.01, 0.03, 0.1 A	0.03 A
Rated voltage U_e	230 V	230/400 V
Rated insulation voltage (U_i)	500 V	500 V
Overvoltage category	III	III
Pollution degree	2	2
Operating voltage of circuit test	110 V (170 for 30 mA) – 254 V	170 – 254 V
Rated frequency	50/60 Hz	50/60 Hz
Rated conditional short-circuit current I_{nc}	10 kA with SCPD - fuse gG 100 A or high performance MCB S800 100 A	
Rated residual breaking capacity $I_{\Delta m}$	1 kA	
Surge current resistance (wave 8/20)	N/A	3000 A
Mechanical features		
Housing	Light grey RAL 7035	Light grey RAL 7035
Toggle	Blue RAL 5015, sealable in ON-OFF positions	Blue RAL 5015, sealable in ON-OFF positions
Contact position indication	Green/Red Window	Green/Red Window
Endurance	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops
IP code	IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover
Shock resistance acc. to IEC/EN 61373	5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6	2 ... 13.2 Hz/1 mm 13.2 ... 100 Hz/0.7 g, 5 cycles 5 ... 150 ... 5 Hz/1 g, 4 waves	2 ... 13.2 Hz/1 mm 13.2 ... 100 Hz/0.7 g, 5 cycles 5 ... 150 ... 5 Hz/1 g, 4 waves
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	28 cycles with 55 °C/90…96 % and 25 °C/95…100 %	
Ambient temperature	–25 ... +55 °C	–25 ... +55 °C
Storage temperature	–40 ... +70 °C	–40 ... +70 °C
Installation		
Terminal type	failsafe bi-directional cylinder-lift terminal (shock protected)	
Top terminal rigid IEC connections (solid/stranded)	Single: 0.75…25 mm2 (front slot), 0.75…10 mm2 (rear slot) Multiple: 2 x 0.75…10 mm² (front slot), 2 x 0.75…6 mm² (rear slot), with cables of same type and size	
Top terminal flexible IEC connections	Single: 0.75…16 mm² (front side), 0.75…6 mm² (rear slot) Multiple: 2 x 0.75…10 mm² (front slot), 2 x 0.75…6 mm² (rear slot), with cables of same type and size	

Residual current operated circuit breaker RCCBs

F404 technical features, A type and APR-F (K type)

	F404 A	F404 A-K	F404 S	F404 LF
Standards	IEC/EN 61008-1 IEC/EN 61008-2-1	IEC/EN 61008-1 IEC/EN 61008-2-1 IEC/EN 62423	IEC/EN 61008-1 IEC/EN 61008-2-1	IEC/EN 61008-1 IEC/EN 61008-2-1
Electrical features				
Type (wave form of the earth leakage sensed)	A	APR - F	A	A
Number of poles	3P + N	3P + N	3P + N	3P + N
Rated current I_n	25, 40, 63 A	40, 63 A	63 A	63 A
Rated sensitivity $I_{\Delta n}$	0.03, 0.1, 0.3 A	0.03–0.1 A	0.1, 0.3 A	0.03, 0.3 A
Rated voltage U_e	230/400 V	230/400 V	230/400 V	230/400 V
Rated insulation voltage (U_i)	500 V	500 V	500 V	500 V
Overvoltage category	III	III	III	III
Pollution degree	2	2	2	2
Operating voltage of circuit test	110 V (170 for 30 mA) – 254 V	110 V (170 for 30 mA) – 254 V	110 – 254 V	110 (170 for 30 mA) – 254 V
Rated frequency Hz	50/60 Hz	50/60 Hz	50/60 Hz	$16^2/_3$ Hz
Rated conditional short-circuit current I_{nc}	10 kA with SCPD – fuse gG 100 A or high performance MCB S800 100 A			
Rated residual breaking capacity $I_{\Delta m}$	1 kA	1 kA	1 kA	1 kA
Surge current resistance (wave 8/20)	N/A	3000 A	5000 A	N/A
Mechanical features				
Housing	Insulation group I, light grey RAL 7035	Insulation group I, light grey RAL 7035	Insulation group I, light grey RAL 7035	Insulation group I, light grey RAL 7035
Toggle	Insulation group II, blue RAL 5015, sealable in ON-OFF positions	Insulation group II, blue RAL 5015, sealable in ON-OFF positions	Insulation group II, blue RAL 5015, sealable in ON-OFF positions	Insulation group II, blue RAL 5015, sealable in ON-OFF positions
Contact position indication	Green/Red Window	Green/Red Window	Green/Red Window	Green/Red Window
Endurance	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops
IP code	IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover
Shock resistance acc. to IEC/EN 61373	5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6	2 ... 13.2 Hz/1 mm, 13.2 ... 100 Hz/0.7 g, 5 cycles, 5 ... 150 ... 5 Hz/1 g, 4 waves			
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	28 cycles with 55 °C/90 … 96 % and 25 °C/95 … 100 %			
Ambient temperature	–25 … +55 °C	–25 … +55 °C	–25 … +55 °C	–25 … +55 °C
Storage temperature	–40 … +70 °C	–40 … +70 °C	–40 … +70 °C	–40 … +70 °C
Installation				
Terminal type	failsafe bi-directional cylinder-lift terminal (shock protected)			
Top terminal rigid IEC connections (solid/stranded)	Single: 0.75…25 mm² (front slot), 0.75…10 mm² (rear slot) Multiple: 2 x 0.75…10 mm² (front slot), 2 x 0.75…6 mm² (rear slot), with cables of same type and size			
Top terminal flexible IEC connections	Single: 0.75…16 mm² (front side), 0.75…6 mm² (rear slot) Multiple: 2 x 0.75…10 mm² (front slot), 2 x 0.75…6 mm² (rear slot), with cables of same type and size			

Tripping time settings type A

Tripping time

Type	Rated sensitivity	Tripping time			
	Alternating current	1 x $I_{\Delta n}$	2 x $I_{\Delta n}$	5 x $I_{\Delta n}$	500 A
	Pulsating current with DC components	1,4 x $I_{\Delta n}$	2 x 1,4 x $I_{\Delta n}$	5 x 1,4 x $I_{\Delta n}$	500 A
	Detection of smooth DC currents	2 x $I_{\Delta n}$	2 x 2 x $I_{\Delta n}$	5 x 2 x $I_{\Delta n}$	500 A
Standard or short time		max. 0,3 s	max. 0,15 s	max. 0,04 s	max. 0,04 s

Residual current operated circuit breaker RCCBs

F404 technical features, B type

	F404 B
Standards	IEC/EN 61008-1 IEC/EN 61008-2-1 IEC/EN 62423"
Electrical features	
Type (wave form of the earth leakage sensed)	B
Number of poles	3P + N
Rated current I_n	25, 40, 63 A
Rated sensitivity $I_{\Delta n}$	0.03, 0.3 A
Rated voltage U_e	230/400 V
Rated insulation voltage (U_i)	500 V
Overvoltage category	III
Pollution degree	2
Operating voltage of circuit test	110 V (170 for 30 mA) – 254 V
Rated frequency	50/60 Hz
Rated conditional short-circuit current I_{nc}	10 kA with SCPD – fuse gG 100 A or high performance MCB S800 100 A
Rated residual breaking capacity $I_{\Delta m}$	1 kA
Surge current resistance (wave 8/20)	3000 A
Operating voltage of circuit test Ut IEC/EN	110 - 253 V AC 170 - 253 V AC (30 mA)
Maximum electronic consumption	1.2W
Mechanical features	
Housing	Light grey RAL 7035
Toggle	Blue RAL 5015, sealable in ON-OFF positions
Contact position indication	Green/Red Window
Electrical life	10000 operations
Mechanical life	10000 operations
IP code	IP20, IP40 in enclosure with cover
Shock resistance acc. to IEC/EN 61373	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6	2 ... 13.2 Hz/1 mm 13.2 ... 100 Hz/0.7 g, 5 cycles 5 ... 150 ... 5 Hz/1 g, 4 waves
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	28 cycles with 55 °C/90 … 96 % and 25 °C/95 … 100 %
Ambient temperature	–25...+70 for system current <= 32 A –25...+65 for system current = 40 A –25...+50 for system current = 63 A
Storage temperature	–40 … +70 °C
Installation	
Terminal type	failsafe bi-directional cylinder-lift terminal (shock protected)
Top terminal rigid IEC connections (solid/stranded)	Single: 0.75…25 mm² (front slot), 0.75…10 mm² (rear slot) Multiple: 2 x 0.75…10 mm² (front slot), 2 x 0.75…6 mm² (rear slot), with cables of same type and size
Top terminal flexible IEC connections	Single: 0.75…16 mm² (front side), 0.75…6 mm² (rear slot) Multiple: 2 x 0.75…10 mm² (front slot), 2 x 0.75…6 mm² (rear slot), with cables of same type and size

SMISSLINE TP technical details
Residual current operated circuit breaker F402, F404
Technical data

Coordination tables between Short Circuit Protection Devices (SCPD) and F404 RCCBs
If you are using an RCCB you must verify that the Short Circuit Protection Device (SCPD) protects it from the effects of high current that arise under short-circuit conditions. The IEC/EN 61008 provides some tests to verify the behaviour of RCCB in short-circuit conditions. The tables below provide the maximum withstanding short-circuit current expressed in eff. kA for which the RCCBs are protected thanks to the coordination with the SCPD with a rated current (thermal protection) less than or eqaul to the rated current of the associated RCCB.

	F404 25 A	F404 40 A	F404 63 A
gG fuse 25 A	100		
gG fuse 40 A	60	60	
gG fuse 63 A	20	20	20
gG fuse 100 A	10	10	10
S403M	10	10	10
S803N	20	20	20
S803S	25	25	25

For RCBO internal resistance and power loss are intended per device (cold resistance at room temperature)

F402

I_n [A]	R_i [mΩ]	P_v [W]
25	6.1	3.8
40	5.8	9.3

F404

I_n [A]	R_i [mΩ]	P_v [W]	F404B
25	6.3	3.9	1.2
40	6.0	9.6	1.2
63	4.5	17.9	1.2

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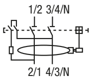
SMISSLINE TP technical details

Residual current operated circuit breaker FS401



Residual current operated circuit breakers with overcurrent protection (RCBO)
The SMISSLINE residual current operated circuit breakers with overcurrent protection (RCBO) are ideal for protecting people and property in all new and existing distribution systems. The combination of standby current and cable protection in one single device greatly simplifies planning and offers cost benefits. Using a RCBO can e.g. satisfy the minimum level of protection required by regulations in an apartment or in a particular distribution system. Should a residual current arise, only the circuit directly affected is switched off while all other circuits remain in operation.

The short time-delayed residual current operated circuit breaker with overcurrent protection FS401 K is a version particularly suited to unfavourable distribution and load situations. Without limiting the personal protection function in any way, the electronic short time delay prevents nuisance tripping which may arise as a result of capacitive discharge currents.

Residual current operated circuit breaker (RCBO)

FS401 technical features

		FS401E	FS401M	FS401MK (APR)
Standards		IEC/EN 61009-1, IEC/EN 61009-2-1	IEC/EN 61009-1, IEC/EN 61009-2-1	IEC/EN 61009-1, IEC/EN 61009-2-1 IEC/EN 62423
Electrical features				
type (wave form of the earth leakage sensed)		A	A	APR - F
Number of poles		1P + N	1P + N	1P + N
Rated current I_n		$6 \le I_n \le 32$ A	$6 \le I_n \le 32$ A	$6 \le I_n \le 32$ A
Rated sensitivity $I_{\Delta n}$		0.03 A	0.03–0.1 A	0.03–0.3 A
Rated voltage U_e		240 V	240 V	240 V
Insulation voltage U_i		500 V	500 V	500 V
Overvoltage category		III	III	III
Pollution degree		2	2	2
Operating voltage of circuit test		110 V (170 for 30 mA) – 264	110 V (170 for 30 mA) – 264	110 V (170 for 30 mA) – 264
Rated frequency		50/60 Hz	50/60 Hz	50/60 Hz
Rated breaking capacity acc. to IEC/EN 61009-1 I_{cn}		6000 A	10000 A	10000 A
Rated ultimate short-circuit capacity I_{cu} acc. to IEC/EN 60947-2 (only referring to short circuit test)	6…16 A 20…32 A		25 kA 15 kA	25 kA 15 kA
Rated service short-circuit capacity I_{cs} acc. to IEC/EN 60947-2 (only referring to short circuit test)	6…16 A 20…32 A		15 kA 7.5 kA	15 kA 7.5 kA
Rated residual breaking capacity acc. to IEC/EN 61009-1 $I_{\Delta m}$		6000 A	10000 A	10000 A
Rated impulse withstand voltage (1.2/50) U_{imp}		4 kV	4 kV	4 kV
Dielectric test voltage at ind. freq. for 1 min.		2.5 kV (50/60 Hz, 1 min.)	2.5 kV (50/60 Hz, 1 min.)	2.5 kV (50/60 Hz, 1 min.)
Thermomagnetic release – characteristic	B: $3 I_n \le I_n \le 5 I_n$	X	X	X
	C: $5 I_n \le I_n \le 10 I_n$	X	X	X
Energy limiting class acc. to EN 61009-1		3	3	3
Mechanical features				
Housing		Insulation group I, light grey RAL 7035	Insulation group I, light grey RAL 7035	Insulation group I, light grey RAL 7035
Toggle		Insulation group II, black RAL 9005, sealable in ON-OFF positions	Insulation group II, black RAL 9005, sealable in ON-OFF positions	Insulation group II, black RAL 9005, sealable in ON-OFF positions
Contact position indication		Green/Red Window	Green/Red Window	Green/Red Window
Endurance		Electrical endurance: 10000 ops Mechanical endurance: 10000 ops		
IP code		IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover
Shock resistance acc. to IEC/EN 61373		5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6		2…13.2 Hz/1 mm 13.2…100 Hz/0.7 g, 5 cycles 5…150 … 5 Hz/1 g, 4 waves	2…13.2 Hz/1 mm 13.2…100 Hz/0.7 g, 5 cycles 5…150 … 5 Hz/1 g, 4 waves	2…13.2 Hz/1 mm 13.2…100 Hz/0.7 g, 5 cycles 5…150 … 5 Hz/1 g, 4 waves
Reference temperature for setting of thermal element		30 °C	30 °C	30 °C
Ambient temperature		–25…+60 °C	–25…+60 °C	–25…+60 °C
Storage temperature		–40…+70 °C	–40…+70 °C	–40…+70 °C
Installation				
Terminal type		failsafe bi-directional cylinder-lift terminal (shock protected)		
Top terminal rigid IEC connections (solid/stranded)		Single: 0.75 … 35 mm² (front slot), 0.75 … 10 mm² (rear slot) Multiple: 2 x 0.75 … 10 mm² (front slot), 2 x 0.75 … 6 mm² (rear slot), with cables of same type and size		
Top terminal flexible IEC connections		Single: 0.75 … 25 mm² (front side), 0.75 … 6 mm² (rear slot) Multiple: 2 x 0.75 … 10 mm² (front slot), 2 x 0.75 … 6 mm² (rear slot), with cables of same type and size		

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RCBO technical details
Internal resistances and power losses, Derating

Internal resistances and power losses
For RCBO internal resistance and power loss are intended per device (cold resistance at room temperature)

FS401E, FS401M
B, C tripping characteristics

I_n [A]	R_i [mΩ]	P_v [W]
6	53	1.9
10	19	1.9
13	14	2.3
16	11	2.7
20	7.6	3.0
25	7.0	4.4
32	5.5	5.6

FS400E, FS400M, FS400MK
B, C tripping characteristics

I_n [A]	Ambient temperature T (°C)										
	0	10	15	20	25	30*	35	40	45	50	55	60
6	7.10	6.70	6.55	6.40	6.20	6.00	5.80	5.60	5.40	5.20	5.00	4.80
10	11.00	10.70	10.50	10.30	10.15	10.00	9.85	9.70	9.55	9.40	9.25	9.10
13	14.40	14.00	13.75	13.50	13.25	13.00	12.75	12.50	12.25	12.00	11.75	11.50
16	17.40	17.00	16.75	16.50	16.25	16.00	15.75	15.50	15.25	15.00	14.75	14.50
20	21.70	21.10	20.85	20.60	20.30	20.00	19.70	19.40	19.10	18.80	18.50	18.20
25	28.20	27.10	26.60	26.10	25.55	25.00	24.45	23.90	23.35	22.80	22.25	21.70
32	36.00	34.70	34.00	33.30	32.65	32.00	31.35	30.70	30.05	29.40	28.75	28.10

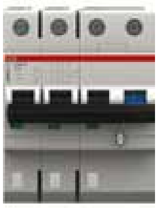
* Reference ambient air temperature for overload tripping

Influence of adjacent poles Correction factor Fm

No. of adjacent poles	correction factor
1 ... 3 poles	1
5 ... 6 poles	0.86
6	0.8
7	0.78
8	0.77
9	0.76
10	0.76

SMISSLINE TP technical details

Residual current operated breaker RCBO FS403



4-pole RCBO from the ABB SMISSLINE protective devices range

The combination of circuit protection and a residual current protection in one device as 4-pole RCBO simplifies both – planning and installation. It enables you to provide perfect protection in one device. This protection consists of:

- Short circuit protection
- Overload protection
- Residual current protection
- Preventive fire protection

High rated short-circuit breaking capacity of 10 kA, conforming to EN 61009-1

The I_{cn} 10 kA short-circuit breaking capacity of the RCBO complies with standard EN 61009-1. This standard specifies testing and usage of RCBO's for household and similar uses. The devices can also be used by non-professionals.

Features and benefits of the new devices:

- Overall width of 72 mm (4 modules)
- Rated sensitivity 30 mA
- Current rating 10 A to 32 A
- B and C tripping characteristics
- Easy Drive double deck terminals on the output side for connecting two conductors in one chamber. The two chambers can accommodate conductors with different cross sections.

Residual current operated circuit breaker (RCBO)
FS403 technical features

		FS403E	FS403M	FS403MK (APR)
Standards		IEC 61009-1, EN 61009-1, EN 61009-2-1	IEC 61009-1, EN 61009-1, EN 61009-2-1	IEC/EN 61009-1, IEC/EN 61009-2-1, IEC/EN 62423
Electrical features				
type (wave form of the earth leakage sensed)		A	A	APR - F
Number of poles		3P + N	3P + N	3P + N
Rated current I_n		$6 \leq I_n \leq 32$ A	$6 \leq I_n \leq 32$ A	$6 \leq I_n \leq 32$ A
Rated sensitivity $I_{\Delta n}$		0.03 A	0.03–0.1 A	0.03–0.3 A
Rated voltage U_e		240/415 V	240/415 V	240/415 V
Insulation voltage U_i		500 V	500 V	500 V
Overvoltage category		III	III	III
Pollution degree		2	2	2
Operating voltage of circuit test		110 V (170 for 30 mA) – 264	110 V (170 for 30 mA) – 264	110 V (170 for 30 mA) – 264
Rated frequency		50/60 Hz	50/60 Hz	50/60 Hz
Rated breaking capacity acc. to IEC/EN 61009-1 I_{cn}		6000 A	10000 A	10000 A
Rated ultimate short-circuit capacity I_{cu} acc. to IEC/EN 60947-2 (only referring to short circuit test)	6…16 A 20…32 A		25 kA 15 kA	25 kA 15 kA
Rated service short-circuit capacity I_{cs} acc. to IEC/EN 60947-2 (only referring to short circuit test)	6…16 A 20…32 A		15 kA 7.5 kA	15 kA 7.5 kA
Rated residual breaking capacity acc. to IEC/EN 61009-1 $I_{\Delta m}$		6000 A	10000 A	10000 A
Rated impulse withstand voltage (1.2/50) U_{imp}		4 kV	4 kV	4 kV
Dielectric test voltage at ind. freq. for 1 min.		2.5 kV (50/60 Hz, 1 min.)	2.5 kV (50/60 Hz, 1 min.)	2.5 kV (50/60 Hz, 1 min.)
Thermomagnetic release – characteristic	B: $3 I_n \leq I_n \leq 5 I_n$		X	X
	C: $5 I_n \leq I_n \leq 10 I_n$	X	X	X
Energy limiting class acc. to EN 61009-1		3	3	3
Mechanical features				
Housing		Insulation group I, light grey RAL 7035	Insulation group I, light grey RAL 7035	Insulation group I, light grey RAL 7036
Toggle		Insulation group II, black RAL 9005, sealable in ON-OFF positions	Insulation group II, black RAL 9005, sealable in ON-OFF positions	Insulation group II, black RAL 9005, sealable in ON-OFF positions
Contact position indication		Green/Red Window	Green/Red Window	Green/Red Window
Endurance		Electrical endurance: 10000 ops Mechanical endurance: 10000 ops	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops	Electrical endurance: 10000 ops Mechanical endurance: 10000 ops
IP code		IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover	IP20, IP40 in enclosure with cover
Shock resistance acc. to IEC/EN 61373		5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks	5 g – 30 ms, 3 shocks
Vibration resistance acc. to IEC/EN 60068-2-6		2…13.2 Hz/1 mm 13.2…100 Hz/0.7 g, 5 cycles 5…150 … 5 Hz/1 g, 4 waves	2…13.2 Hz/1 mm 13.2…100 Hz/0.7 g, 5 cycles 5…150 … 5 Hz/1 g, 4 waves	2…13.2 Hz/1 mm 13.2…100 Hz/0.7 g, 5 cycles 5…150 … 5 Hz/1 g, 4 waves
Reference temperature for setting of thermal element		30 °C	30 °C	30 °C
Ambient temperature		–25…+60 °C	–25…+60 °C	–25…+60 °C
Storage temperature		–40…+70 °C	–40…+70 °C	–40…+70 °C

Installation	
Terminal type	failsafe bi-directional cylinder-lift terminal (shock protected)
Top terminal rigid IEC connections (solid/stranded)	Single: 0.75 … 35 mm² (front slot), 0.75 … 10 mm² (rear slot) Multiple: 2 x 0.75 … 10 mm² (front slot), 2 x 0.75 … 6 mm² (rear slot), with cables of same type and size
Top terminal flexible IEC connections	Single: 0.75 … 25 mm² (front side), 0.75 … 6 mm² (rear slot) Multiple: 2 x 0.75 … 10 mm² (front slot), 2 x 0.75 … 6 mm² (rear slot), with cables of same type and size

RCBO technical details
Internal resistances and power losses, Derating

Internal resistances and power losses
For RCBO internal resistance and power loss are intended per device (cold resistance at room temperature)

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FS403E, FS403M
B, C tripping characteristics

I_n [A]	R_i [mΩ]	P_v [W]
6	146	5.3
10	49	4.9
13	32	5.4
16	26	6.6
20	19	7.5
25	16	10.1
32	12	12.6

NOTE 1. For RCBO internal resistance and power loss are intended per device

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FS400E, FS400M, FS400MK
B, C tripping characteristics

I_n [A]	Ambient temperature T (°C)											
	0	10	15	20	25	30*	35	40	45	50	55	60
6	7.10	6.70	6.55	6.40	6.20	6.00	5.80	5.60	5.40	5.20	5.00	4.80
10	11.00	10.70	10.50	10.30	10.15	10.00	9.85	9.70	9.55	9.40	9.25	9.10
13	14.40	14.00	13.75	13.50	13.25	13.00	12.75	12.50	12.25	12.00	11.75	11.50
16	17.40	17.00	16.75	16.50	16.25	16.00	15.75	15.50	15.25	15.00	14.75	14.50
20	21.70	21.10	20.85	20.60	20.30	20.00	19.70	19.40	19.10	18.80	18.50	18.20
25	28.20	27.10	26.60	26.10	25.55	25.00	24.45	23.90	23.35	22.80	22.25	21.70
32	36.00	34.70	34.00	33.30	32.65	32.00	31.35	30.70	30.05	29.40	28.75	28.10

*Reference ambient air temperature for overload tripping

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Influence of adjacent poles Correction factor Fm

No. of adjacent poles	correction factor
1 ... 3 poles	1
5 ... 6 poles	0.86
6	0.8
7	0.78
8	0.77
9	0.76
10	0.76

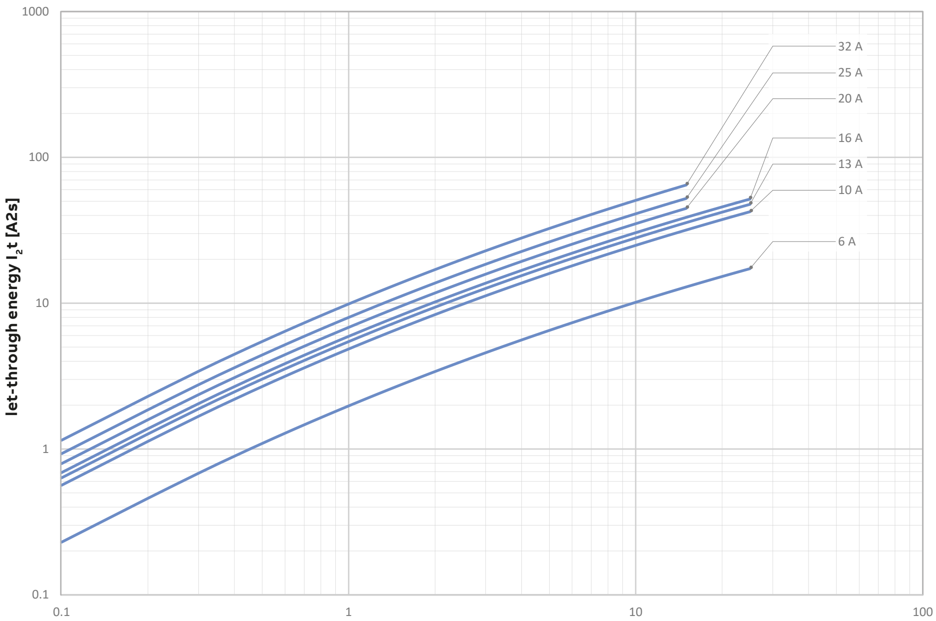
RCBO technical details

Limitation of specific let-through energy I^2t, peak current I_p

I^2t diagrams - Specific let-through energy value I^2t

The I^2t curves give the values of the specific let-through energy expressed in kA^2s (A=amps; s=seconds) in relation to the perspective short-circuit current (I_{rms}) in kA.

FS400M characteristics B–C

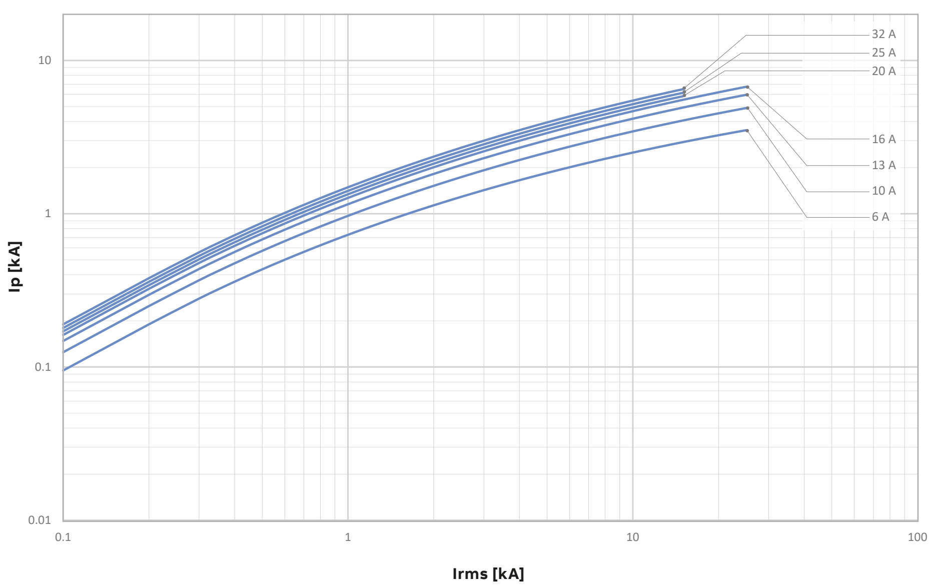


Prospective short-circuit current Ik [kA]

Limitation curves – Peak current values

The I_p curves give the values of the peak current, expressed in kA, in relation to the perspective symmetrical short-circuit current (kA).

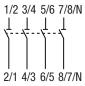
FS400M Characteristics B–C



Prospective short-circuit current Ik [kA]

SMISSLINE TP technical details

Switch disconnector



General switch disconnector
When used in a smissline socket system, the switch disconnector can be used instead of the incoming terminal block for up to 63 A With the smissline IS404 switch disconnector, individual loads, groups of loads or entire system parts can be separated or connected to the input supply.

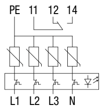
The key features of the switch disconnector
- Input supply switch
- On-Off function
- Clear indication of switching position
- Snap-on auxiliary switch available
- Uniform smissline design

Technical data for switch disconnector IS404

Rated voltage U_n:	230/400 V ~
Rated current I_n:	63 A
Rated frequency f_n:	50 Hz
Number of poles:	4
Rated impulse withstand voltage:	6 kV
Connection cross-sections C_u:	At top, touch finger-proof. Suitable for connecting up single-, multi- and fine-wire conductors of up to 25 mm²
Degree of protection:	IP40
Endurance, mechanical/electrical:	5000 operating cycles
Mounting position:	any
Ambient temperature:	–25 °C ... +40 °C
Specifications:	EN/IEC 60947-3
Weight (approx.):	250 g
Switching duty:	AC-22A

SMISSLINE TP technical details

Surge arrester OVR



Description of product

The ‘OVR’ surge protector is a 4-pole type II surge arrester meeting the requirements of IEC 61643-11.

The OVR is used to protect low voltage distribution systems and devices from overvoltages (DIN VDE 100) caused by remote lightning strikes or switching operations.

Typical sites of use are main and sub-distribution for low voltage systems where the arrester is plugged in directly on to the SMISSLINE busbar system.

Display and maintenance

The protective elements (high-performance varistors) are monitored thermally. In the event of a defect, this monitor automatically disconnects the overloaded high-performance varistors from the power supply and the operating indication changes from green to red. This status is also indicated by the signalling contact. In such cases, the arrester should be replaced immediately because the downstream devices are no longer protected against overvoltages.

If the operating indication is neither green nor red, you should check whether the connections are correct. You must also check whether there is any supply voltage.

If the device is connected correctly, the operating display (LED) lights up green.

The surge arrester requires no maintenance. A regular visual check is recommended.

Warning: When taking insulation resistance measurements on the electrical system, the arrester should be disconnected from the power supply since otherwise the measurement may be affected by the arrester characteristics. The enclosed sticker with the corresponding note should be placed in a clear position on the distribution board.

Assembly

Site of installation and electrical connection

The ‘OVR’ surge arrester installed at the input supply of the system to be protected.

The OVR404 is plugged in directly on to the SMISSLINE busbar system.

Earth conductor rating

The OVR should be linked to ground potential using the shortest route possible.

The earth conductor supplied with the device can be used for this purpose. The connection must be as short as possible. The minimum cross-section is 6 mm².

Running cables

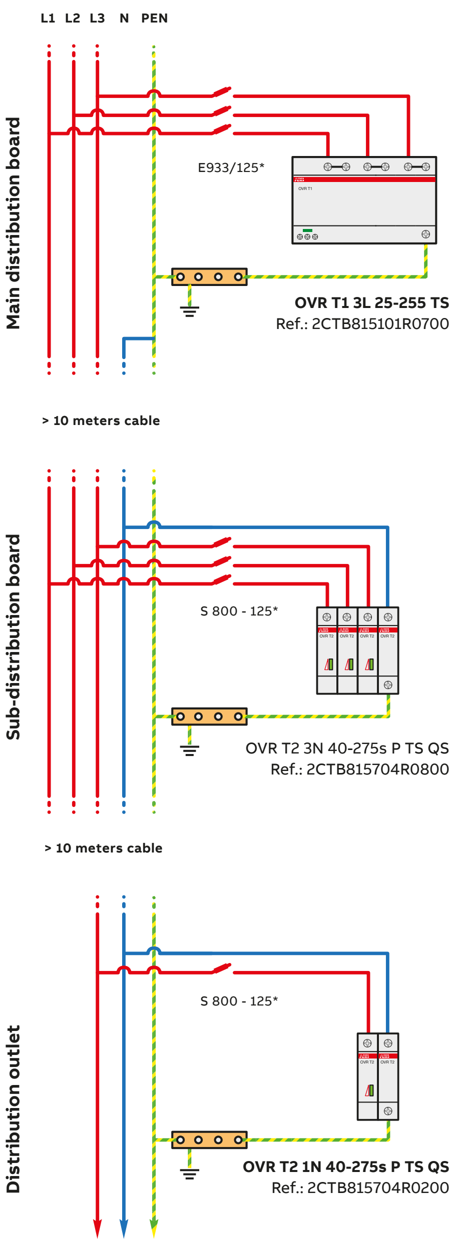
Protected and unprotected cables (also including the earth conductor) must not be routed directly parallel to one another. They should be separated such that surge interference from unprotected to protected cables cannot occur. Cables should cross one another at right angles.

SMISSLINE TP technical details

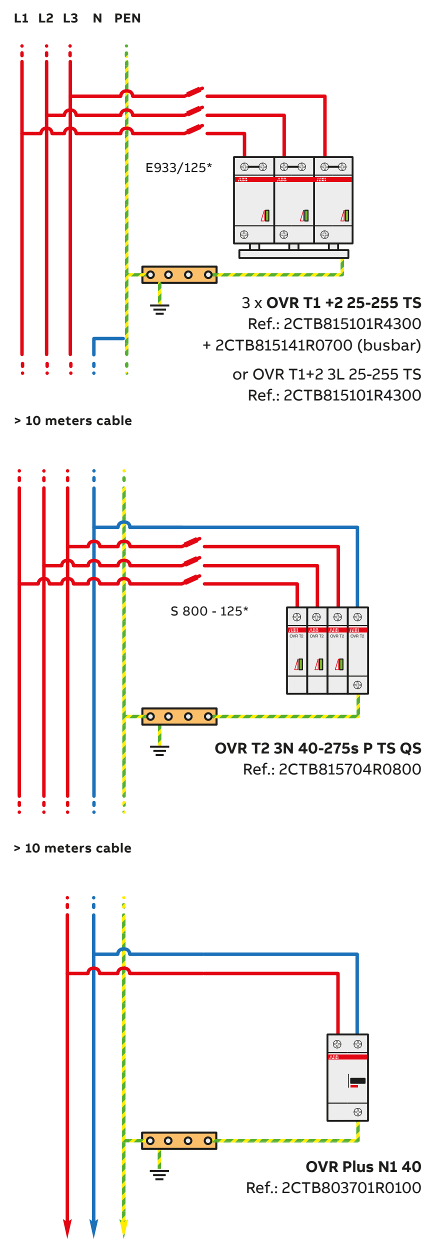
Surge arrester OVR

Coordination between surge arrester
In order to ensure a full and complete protection it is necessary to have coordination between different surge arrester types.

Configuration 1
15 kA ≤ I_p ≤ 50 kA



Configuration 2
7 kA ≤ I_p ≤ 15 kA

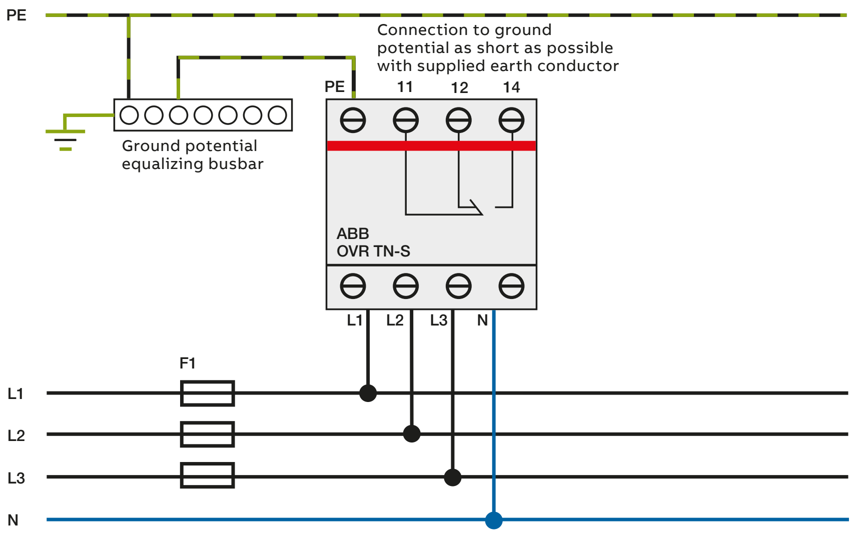


SMISSLINE TP technical details

Surge arrester OVR

Rated voltage U_n:	230/400 V AC
Max. Continuous voltage U_c:	275 V AC
Number of poles:	4 (TN-S system)
Power consumption at U_n:	1.2 W per device
Requirement class according to IEC 61643-1:	Type 2
Rated leakage surge current I_n (9/20 µs):	15 kA
Max. leakage surge current I_{smax} (9/20 µs):	30 kA
Protection level U_p at I_{sn}: U_p at I_s = 5 kV:	≤ 1.5 kV ≤ 1 kV
Max. leakage surge current I_{sg} (9/20 µs):	100 kA 4-pole
Response time t_a:	≤ 25 ms
Connection cross-sections PE / L1/L2/L3/N:	Opposing action stroke clamp on cylinder, touch finger-proof. Suitable for connecting up single-, multi- and fine-wire conductors up to 25 mm²
Max. Back-up fuse:	160 A gL/gG / 25 kA
Short-circuit withstandability with max. Back-up fuse:	25 kA
Signal contact max. operating voltage: max. load current: 1 changeover contact:	250 V AC 2 A 11/12 normally closed contact, 11/14 normally open contact
Temperature range:	–25 ... +60 °C
Degree of protection:	IP 20
Plastic parts: Contacts:	halogen-free cadmium-free

Surge protection TN-S system



SMISSLINE TP technical details

Auxiliary switches and signal contacts

General

The auxiliary switches and signal contacts are snapped on to the left of the protective devices. On the miniature circuit breakers an optional mounting on the right is also possible. For auxiliary switches and signal contacts supplied via SMISSLINE auxiliary busbars LA or LB a version with integrated contacting pieces is available Conventional supply via the terminals of the auxiliary devices is possible.

Function

The auxiliary switch works in the same way as the main contacts. The signal contact only operates when the protective device trips.
This can be simulated with the white test button. Each time the signal contact is tripped, it must be reset to its starting position using the orange-coloured reset button.
Auxiliary switch and signal contacts have special contacts whitch ensure high switching reliability even in systems with low voltages or low currents (PLC, signal systems etc.).

Auxiliary switch contacts operate at the same time as the contacts of the protective device (activated manually or automatically).

Normally open contact	13	
NO (normally open)	14	joint operation with protective device
Normally open contact	21	
NC (normally close)	22	opposing operation with protective device

Signal contacts only operate when the protective device is tripped electrically as a result of a short-circuit, a fault current or overcurrent (undervoltage for MS325).

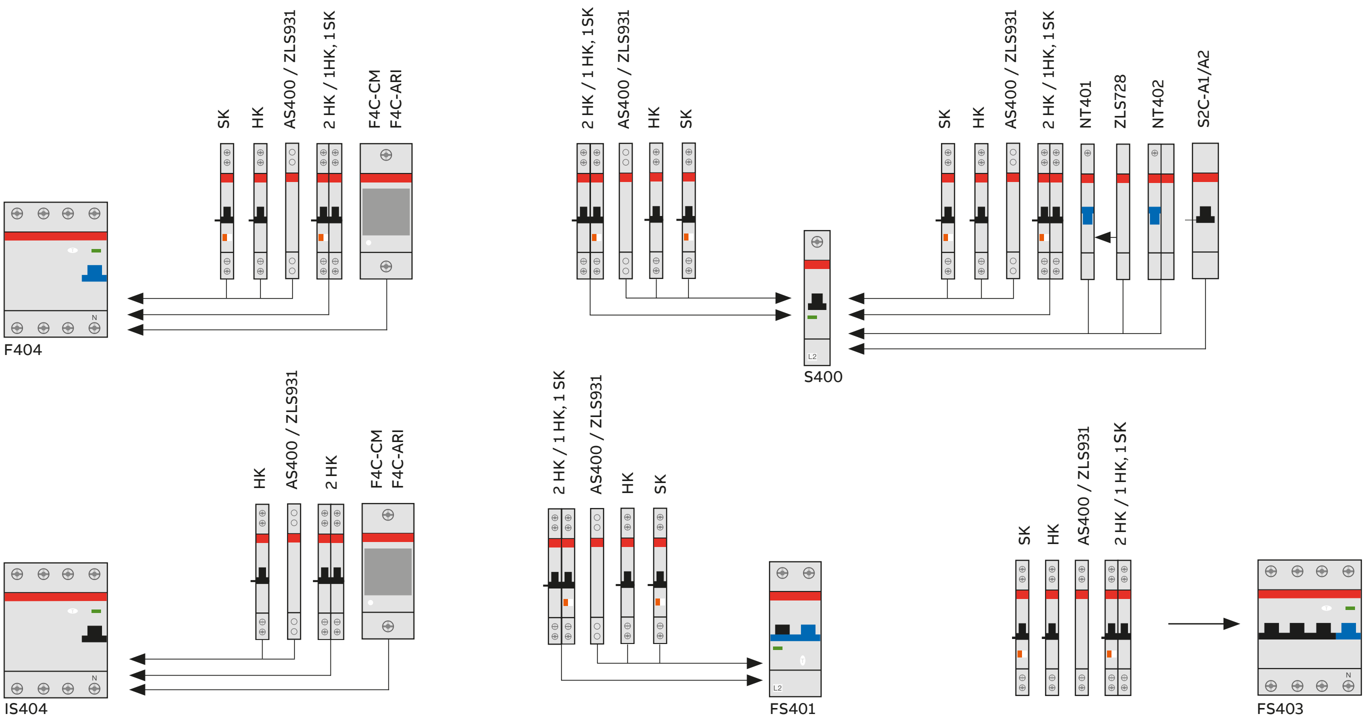
Normally open contact	97	
NO (normally open)	98	closes during automatic trip
Normally closed contact	05	
NC (normally close)	06	opens during automatic trip

Technical data for auxiliary switch and signal contact

	Signal contact SK400	**Auxiliary switch HK400**
Rated voltage U_n:	400 V	400 V
Rated impulse withstand voltage:	4 kV	4 kV
Rated current: – I_{th}: – AC15 – DC13 – DC15	 6 A 2 A/230 V / 1 A/400 V 0.55 A/125 V= 0.27 A/250 V=	 6 A 2 A/230 V / 1 A/400 V 0.55 A/125 V= 0.27 A/250 V=
Minimum current/voltage:	10 mA 12 V=	10 mA 12 V= (to ensure reliable electrical operation)
Connection cross-sections:	Rigid IEC connections (solid/stranded) Single: 0.75…1.5 mm², Multiple: 2 x 0.75…1.5 mm², Flexible IEC connections Single: 0.75…1.5 mm², Multiple: 2 x 0.75…1.5 mm², Stripping length 7.5 mm	
Plastic parts:	Free of halogen und cad-mium	Free of halogen und cadmium
Internal resistance R_i:	0.0065 Ω	0.0065 Ω
Power loss at rated current P_v:	0.24 W	0.24 W
Ambient temperature:	$T_{max.}$ +55 °C T_{min} −25 °C	$T_{max.}$ +55 °C T_{min} −25 °C
Tightening torque:	1 Nm	1 Nm

SMISSLINE TP technical details

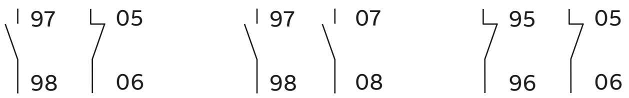
Accessory mounting



On each protective device can be mounted:

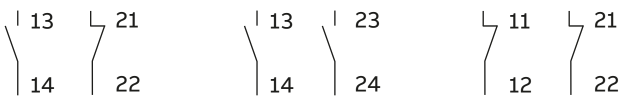
	1 auxiliary switch
or	1 signal contact
or	2 auxiliary contact switches
or	1 auxiliary switch and 1 signal contact

Contact description signal contact



SK40011 SK40020 SK40002

Contact description auxiliary switch

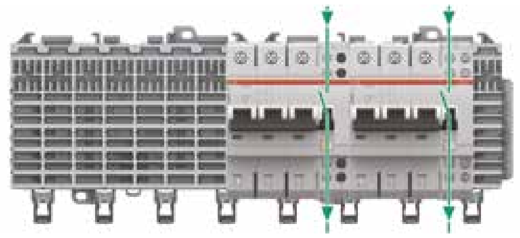


① If you use an auxiliary switch and a signal contact you must connect first the signal contact on the MS325

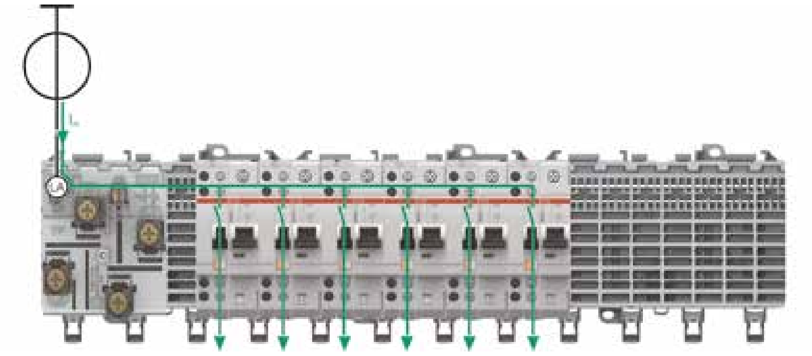
SMISSLINE TP technical details

Auxiliary switches and signal contacts

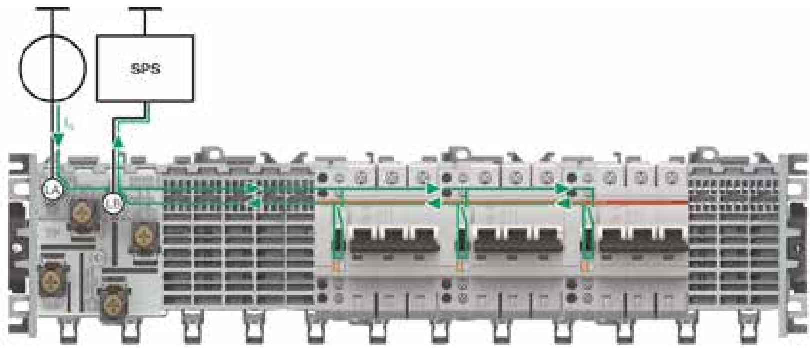
1. Wiring without auxiliary busbars LA, LB
Wiring of auxiliary switch and signal contact blocks without contact to the auxiliary busbars LA and LB.



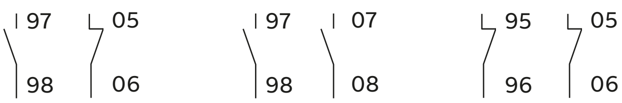
2. Input contacts the auxiliary busbars LA, LB. Standard output wiring.



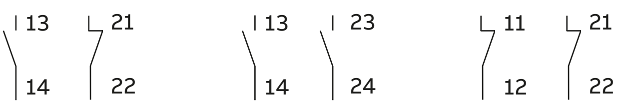
3. Collective alarm, signal contact contacts the auxiliary busbars LA, LB
A cost-effective collective alarm solution can be implemented without additional wiring by using this arrangement.



Contact description signal contact



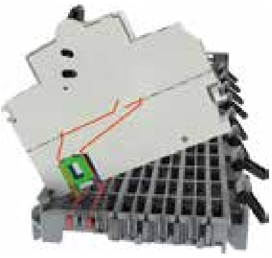
Contact description auxillary contact



SMISSLINE TP technical details

Auxiliary switches and signal contacts

Contact arrangements to auxiliary busbars

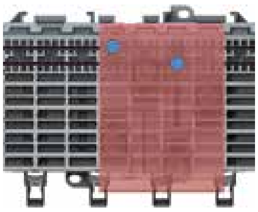


Left/right mounting of auxiliary switch/signal contact for miniature circuit breaker
Space-saving on the socket system
By mounting the auxiliary switches/signal contacts alternately on the left and right, the installation width on the SMISSLINE socket system can be reduced. A dummy housing is therefore not needed when just using auxiliary switches or signal contacts.

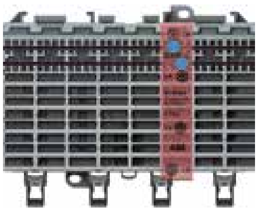
S400 miniature circuit breakers with auxiliary switches mounted on left and right: 25% space saving

S400 miniature circuit breakers with NT40163 9 mm on the right and S400 with auxiliary switch on the left: 20% space saving

Supply options for auxiliary busbars LA and LB



Supply option for auxiliary busbars using incoming terminal block.

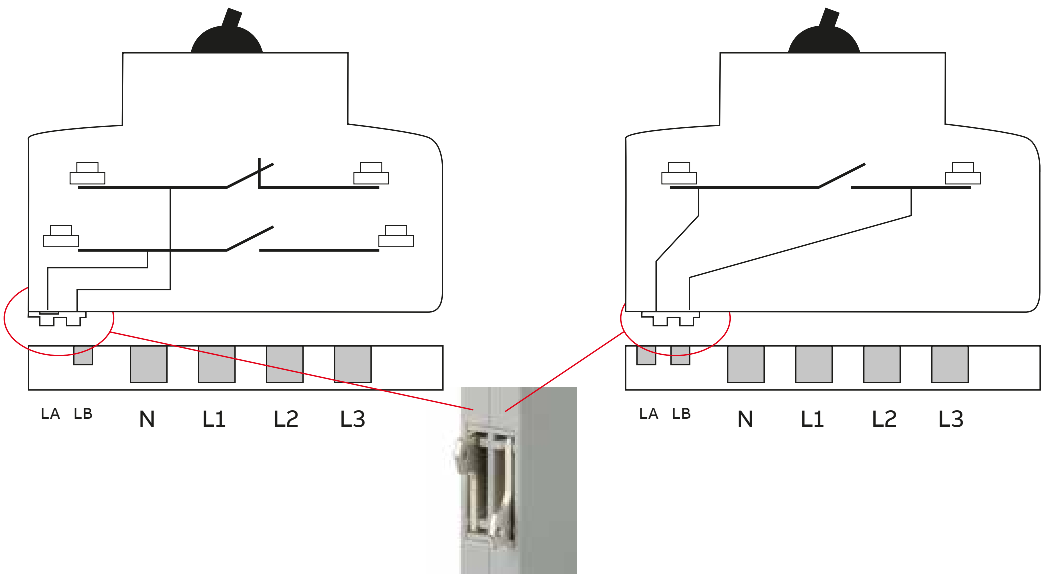


Supply option for auxiliary busbars using incoming terminal block.

Positioning of contacting piece ZLS632 on auxiliary switch and signal contact
The small auxiliary switch/signal contact contacting piece can be simply and quickly changed from the position of the LA to the LB auxiliary busbar by reversing it by 180 degree.

HK/SK 1NO, 1NC

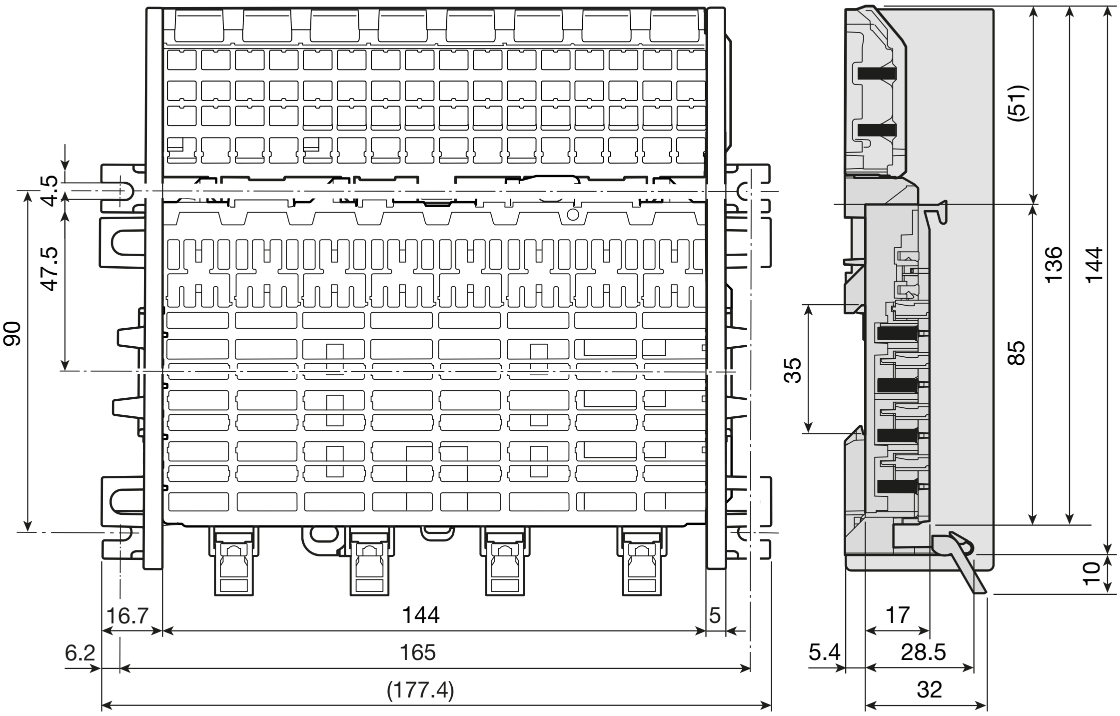
Signal or auxilary contact
Collective alarm



SMISSLINE dimension drawings

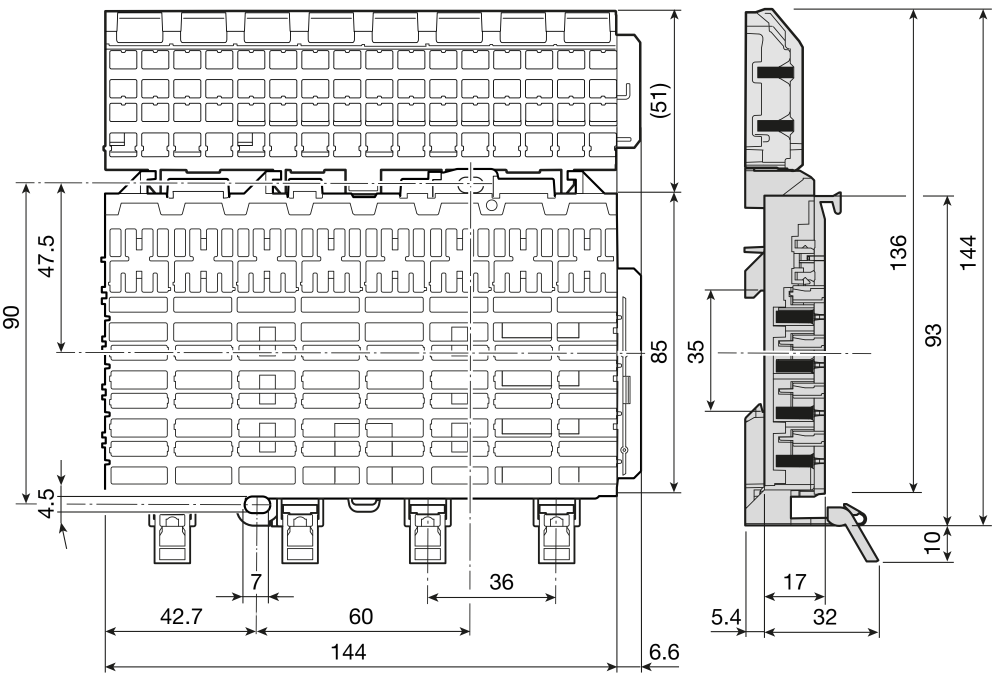
8-module socket ZLS908 and additional socket ZLS928 including end piece

2CCC451271Z0001



8-module socket ZLS908 and additional socket ZLS928

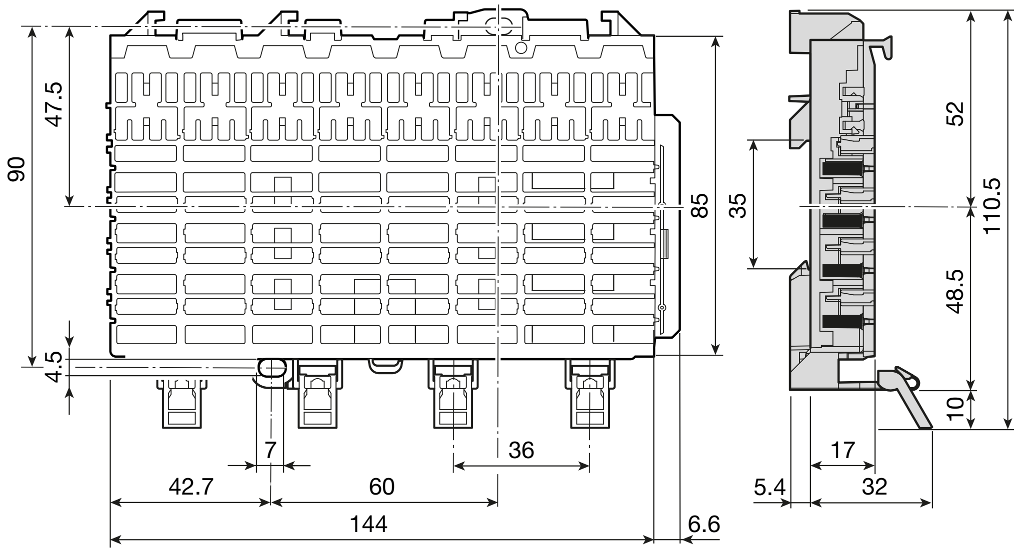
2CCC451272Z0001



SMISSLINE dimension drawings

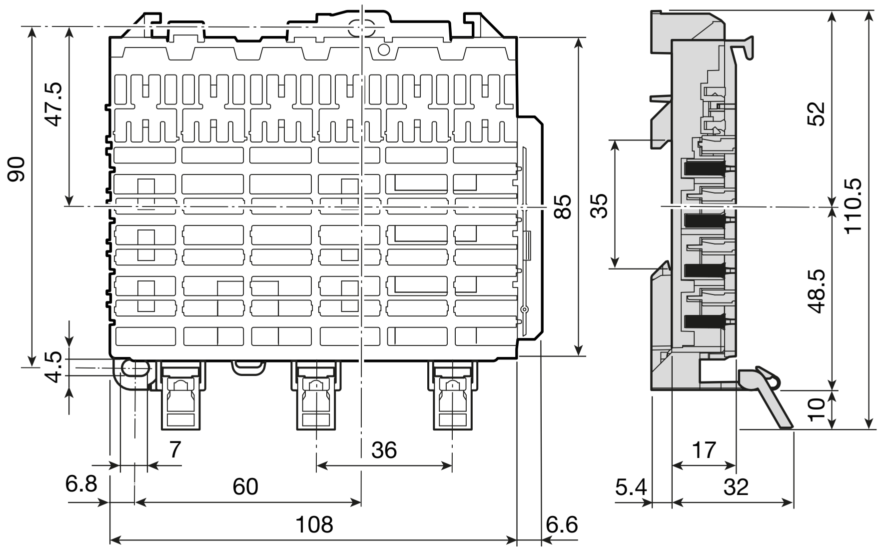
8-module socket ZLS908

2CCC451273Z0001



6-module socket ZLS906

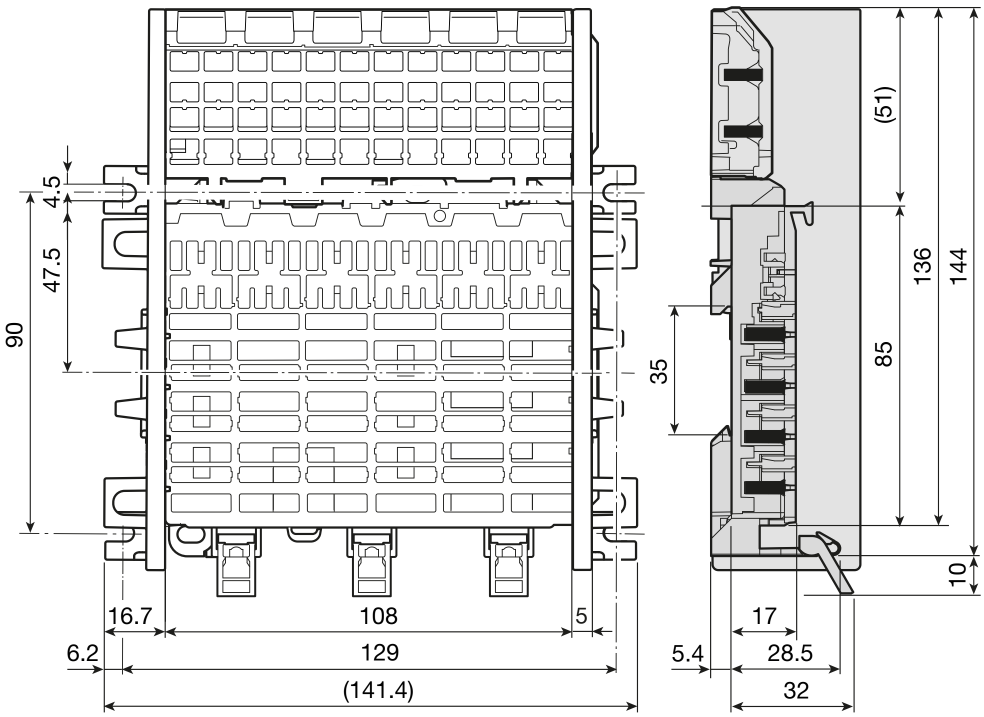
2CCC451279Z0001



SMISSLINE dimension drawings

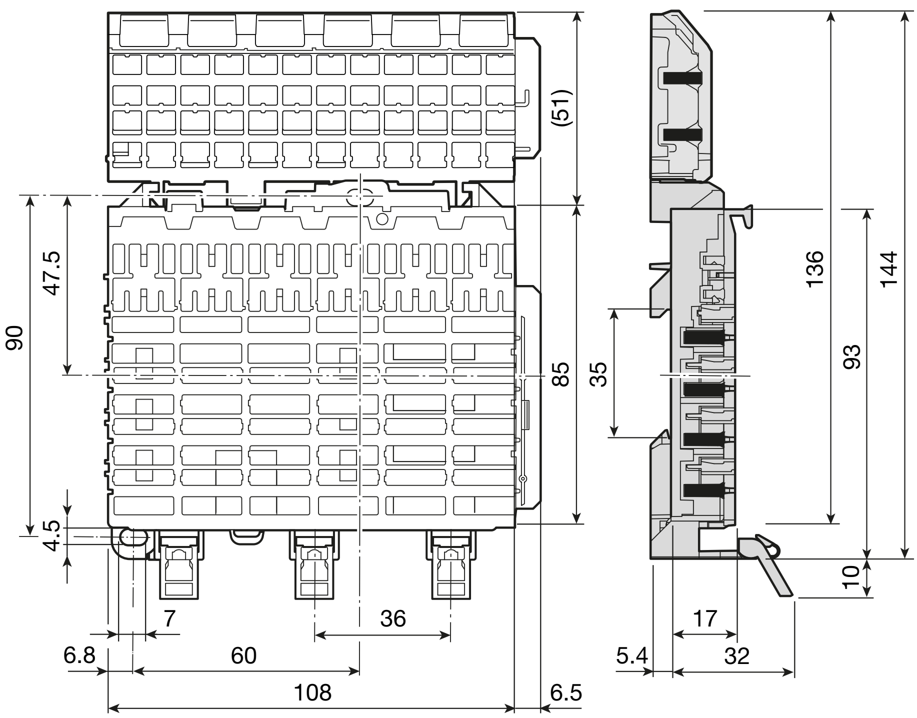
6-module socket ZLS906 and additional socket ZLS926 including end piece

2CCC451277Z0001



6-module socket ZLS906 and additional socket ZLS926

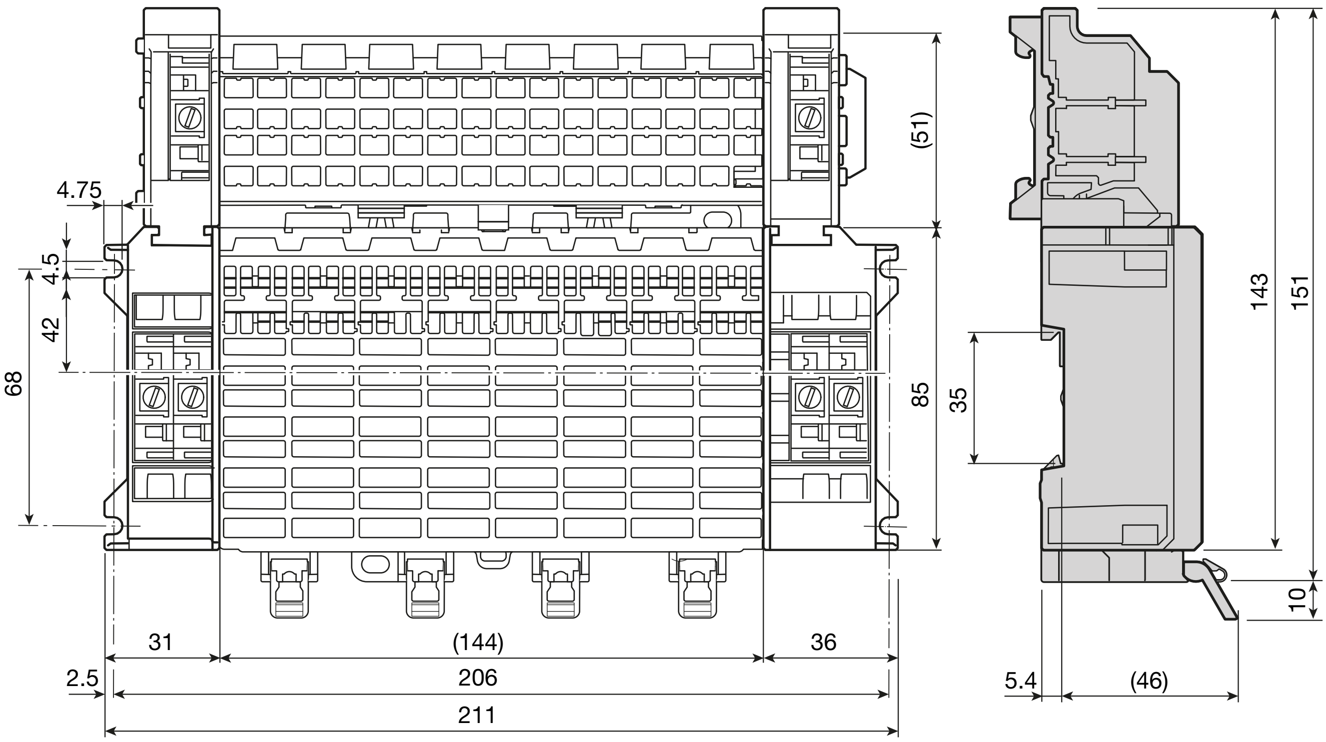
2CCC451278Z0001



SMISSLINE dimension drawings

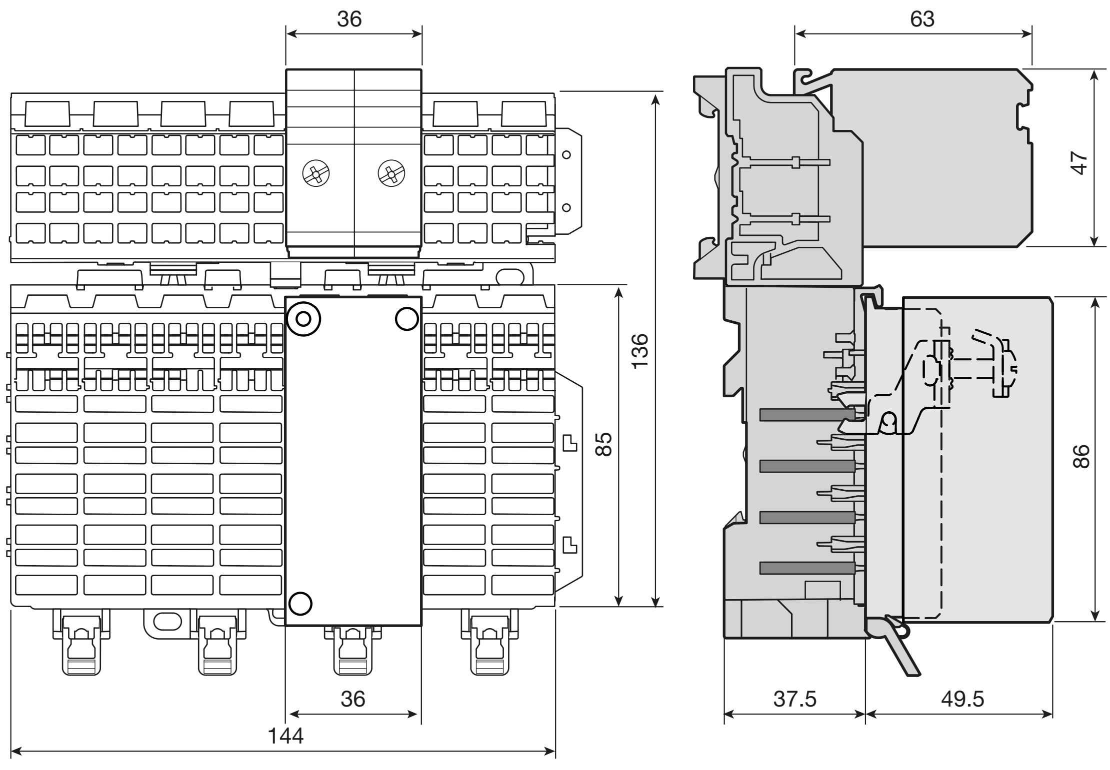
8-module socket ZLSP908 and additional socket ZLSP928 including end piece

2CCC451274Z0001



8-module socket ZLSP908 and additional socket ZLSP928

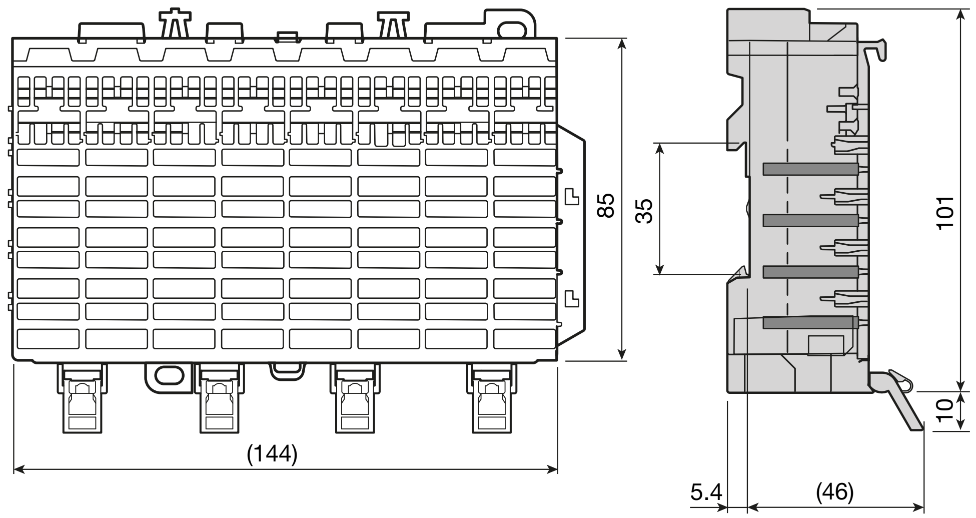
2CCC451275Z0001



SMISSLINE dimension drawings

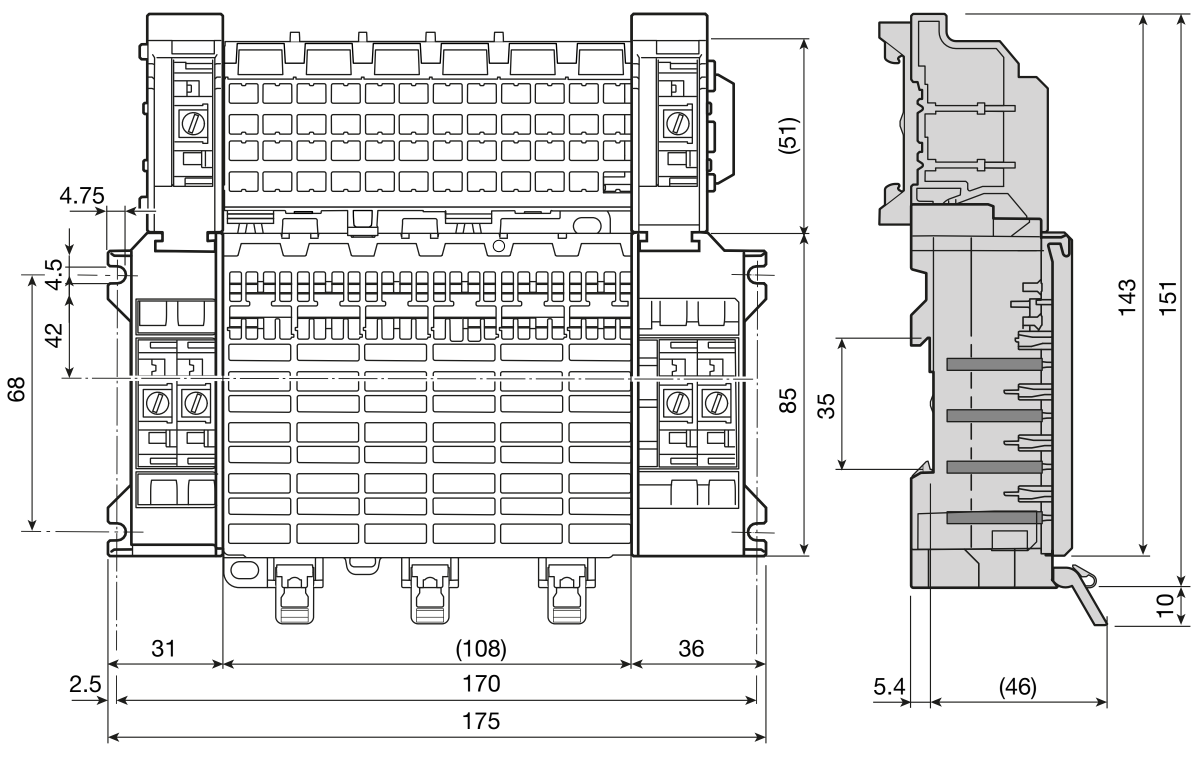
6-module socket ZLSP906

2CCC451276Z0001



6-module socket ZLSP906 and additional socket ZLSP926 including end piece

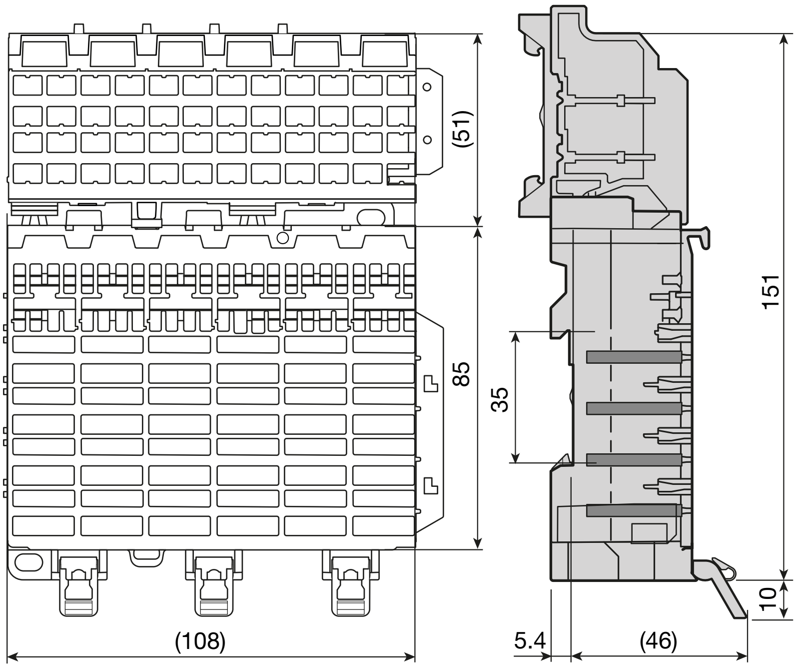
2CCC451280Z0001



SMISSLINE dimension drawings

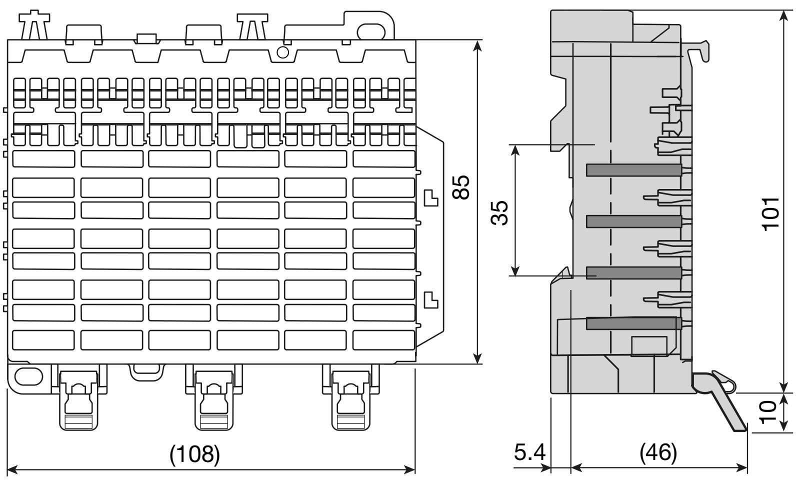
6-module socket ZLSP906 and additional socket ZLSP926

2CCC451281Z0001



6-module socket ZLSP906

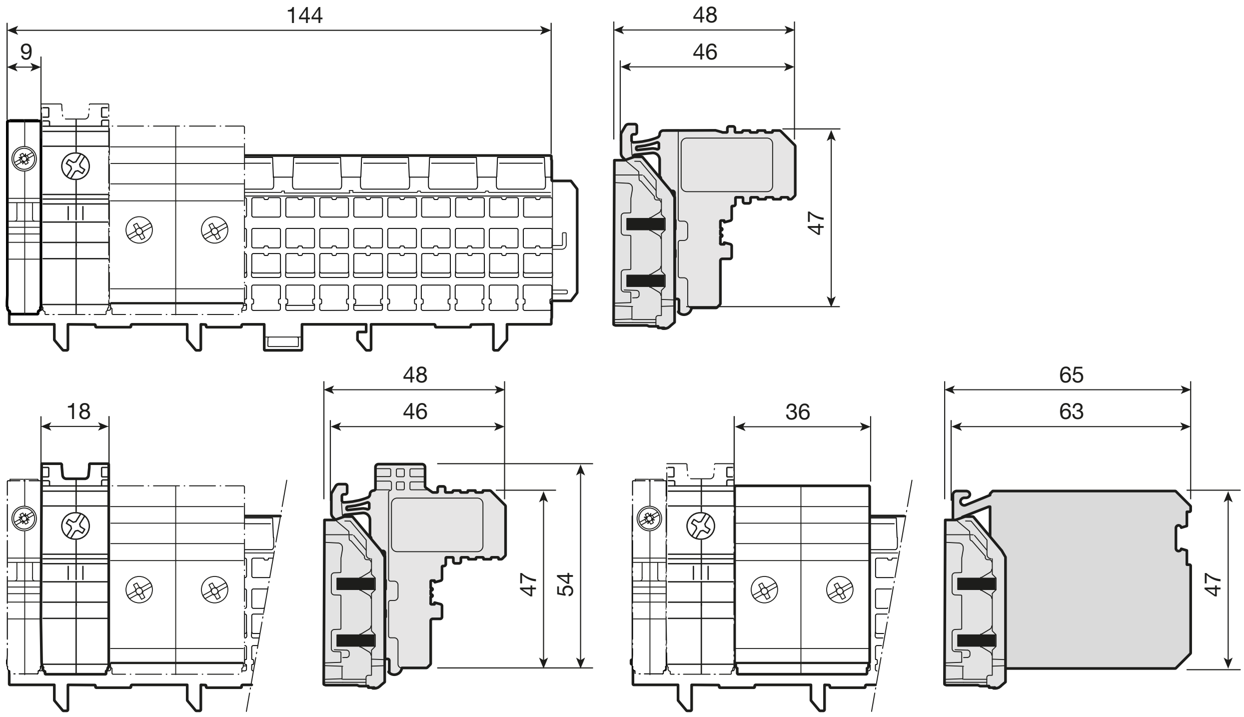
2CCC451282Z0001



SMISSLINE dimension drawings

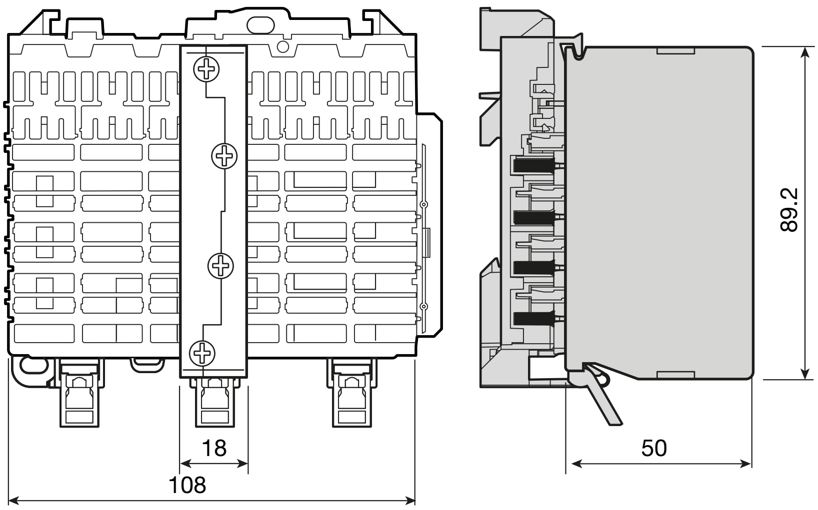
Terminal for additional socket

2CCC451289Z0001



Incoming terminal block 63A ZLS260-261

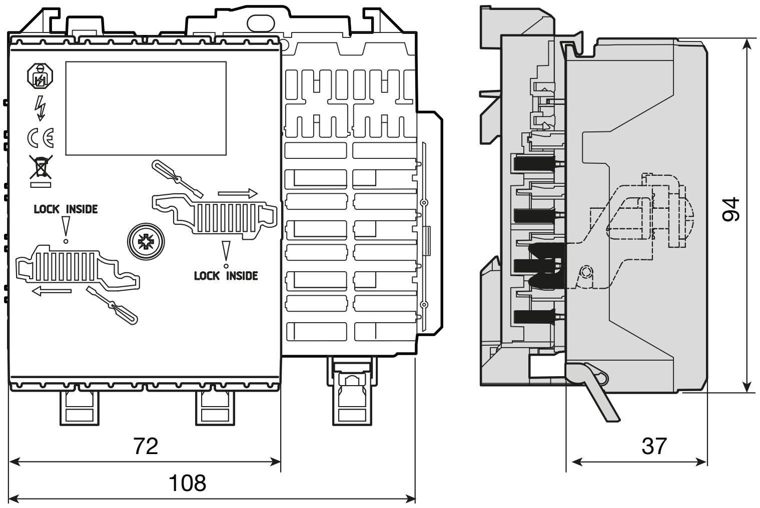
2CCC451283Z0001



SMISSLINE dimension drawings

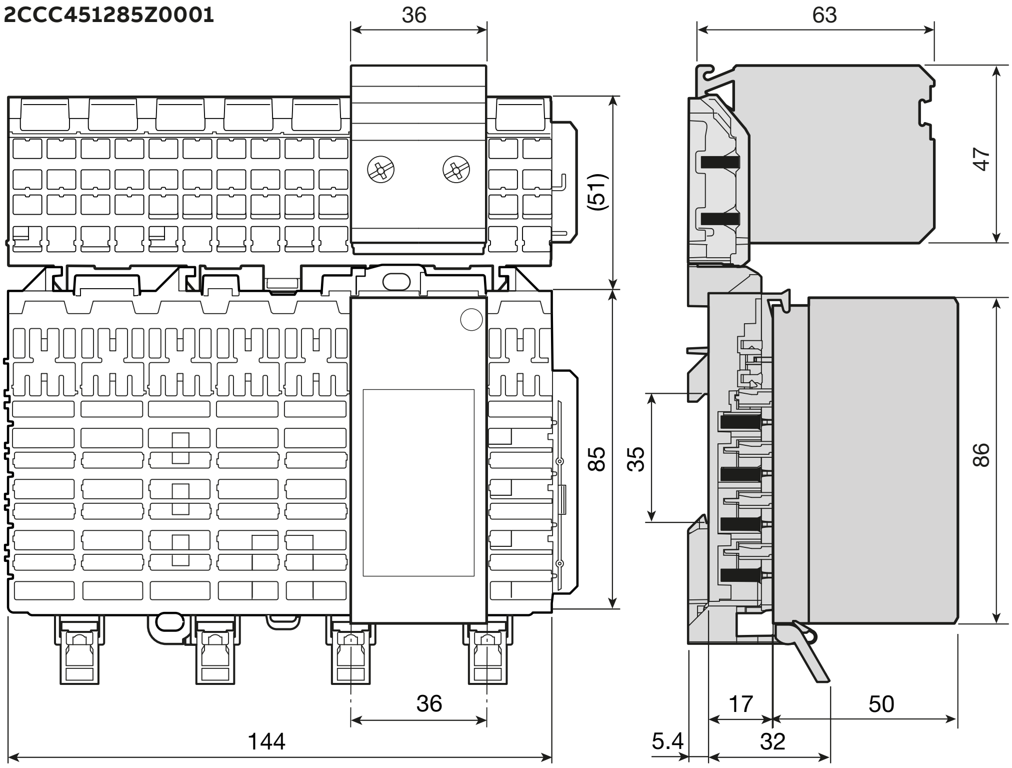
Incoming terminal block 160A ZLS924

2CCC451284Z0001



Incoming components 200A

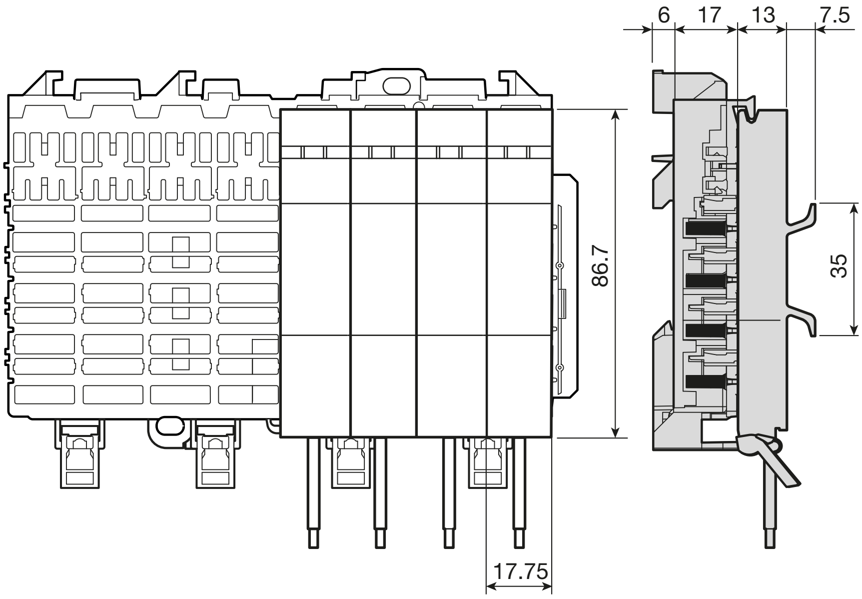
2CCC451285Z0001



SMISSLINE dimension drawings

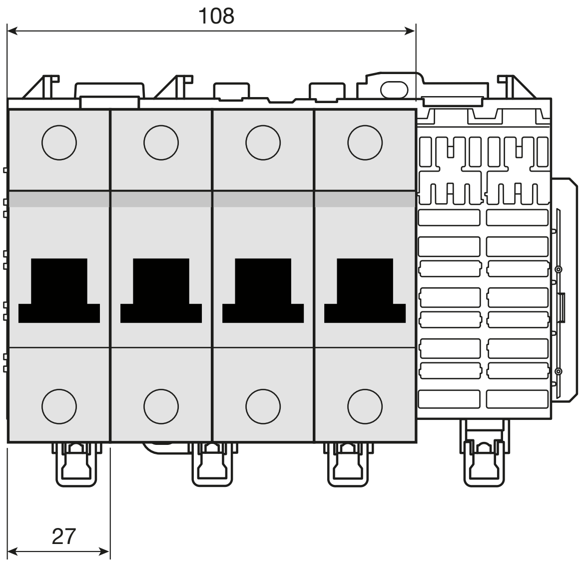
DIN rail adapters

2CCC451286Z0001



DIN rail adapters for S800

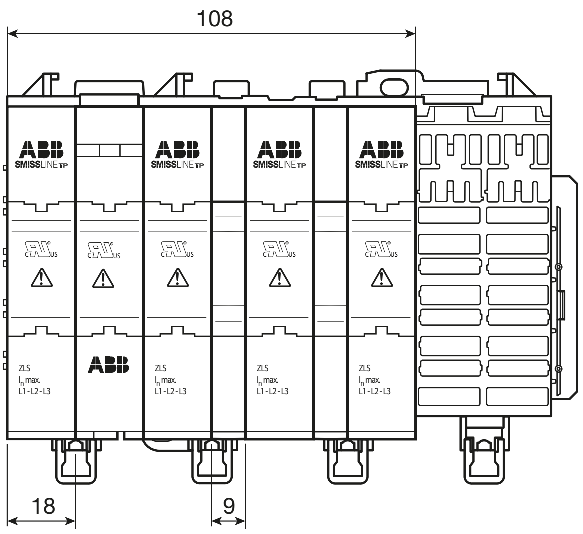
2CCC451287Z0001



SMISSLINE dimension drawings

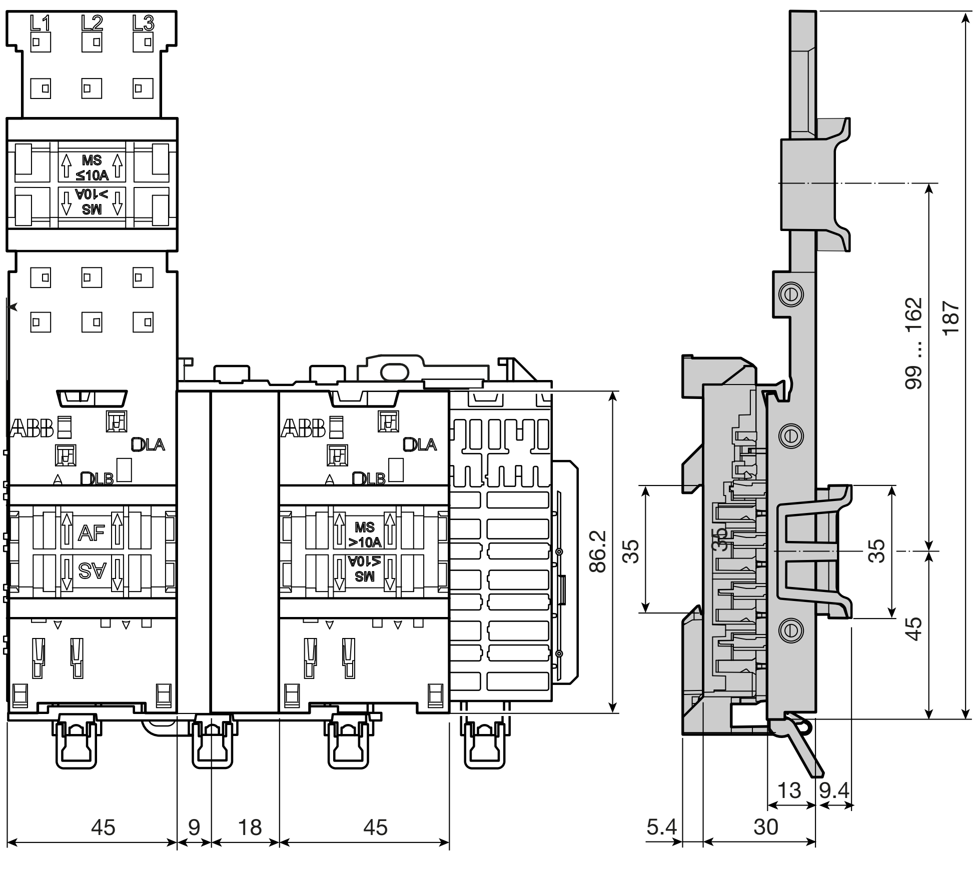
DIN rail adapters for S800

2CCC451288Z0001



Combi module and adapter for manual motor starter MS116 and MS132

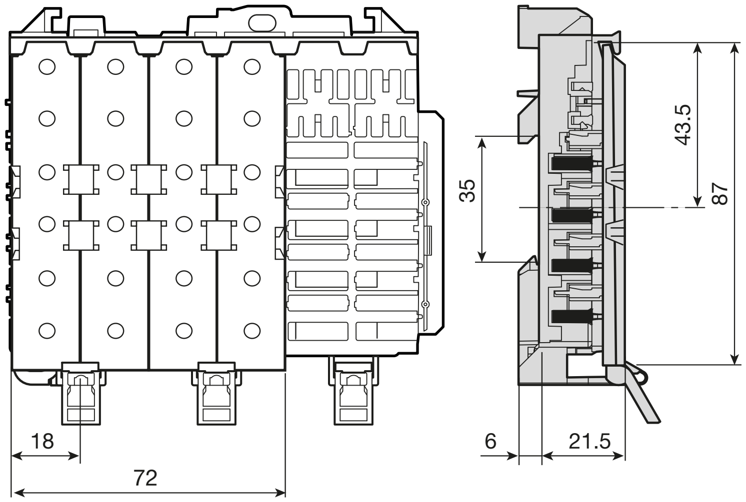
2CCC451290Z0001



SMISSLINE dimension drawings

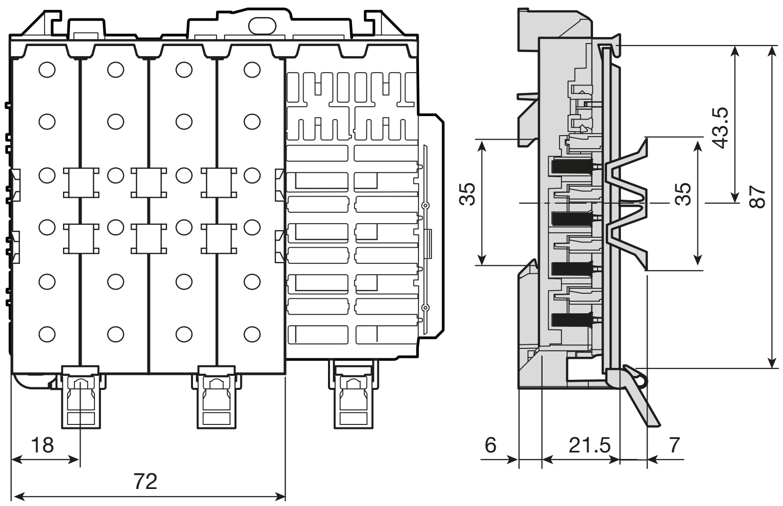
Covering of main and auxiliary busbars ZLS100

2CCC451291Z0001



Covering of main and auxiliary busbars ZLS100 with DIN adapter ZLS101

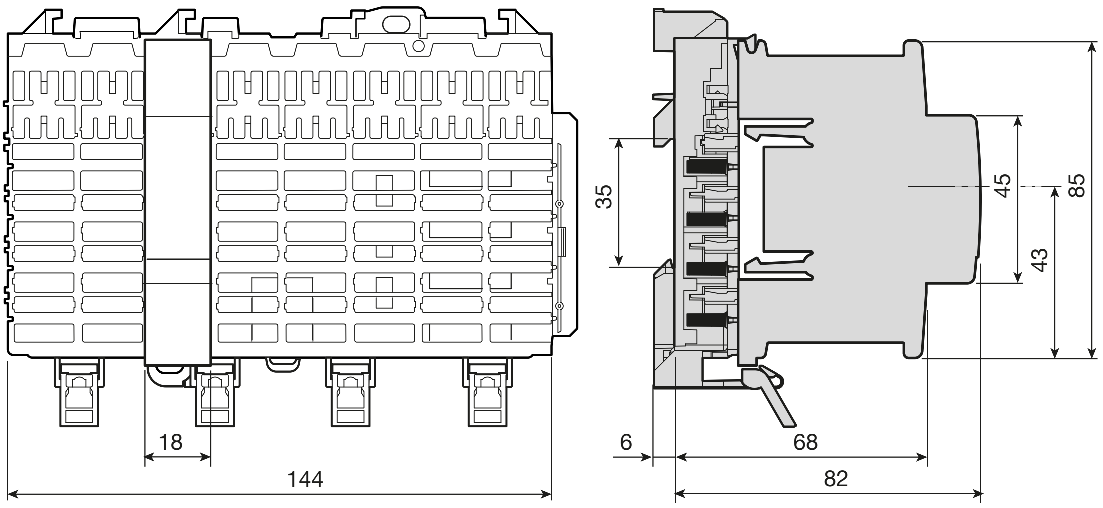
2CCC451292Z0001



SMISSLINE dimension drawings

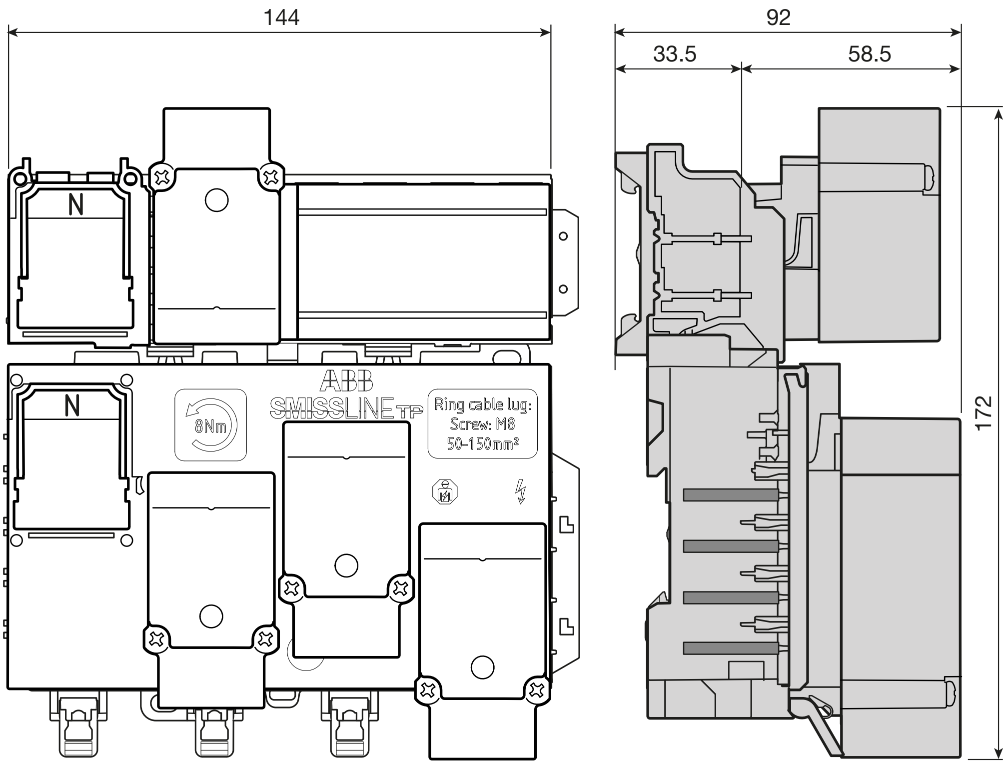
Intermediate piece ZLS725

2CCC451293Z0001



Incoming terminal block 250A ZLSP934 left version

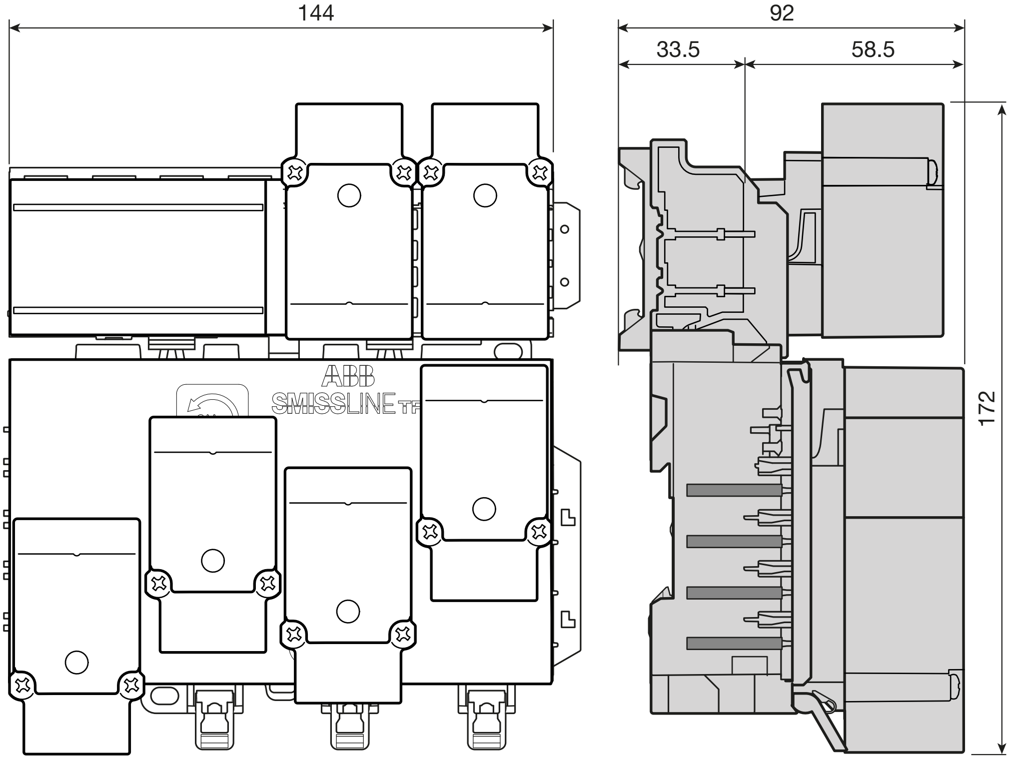
2CCC451295Z0001



SMISSLINE dimension drawings

Incoming terminal block 250A ZLSP934 right version

2CCC451296Z0001

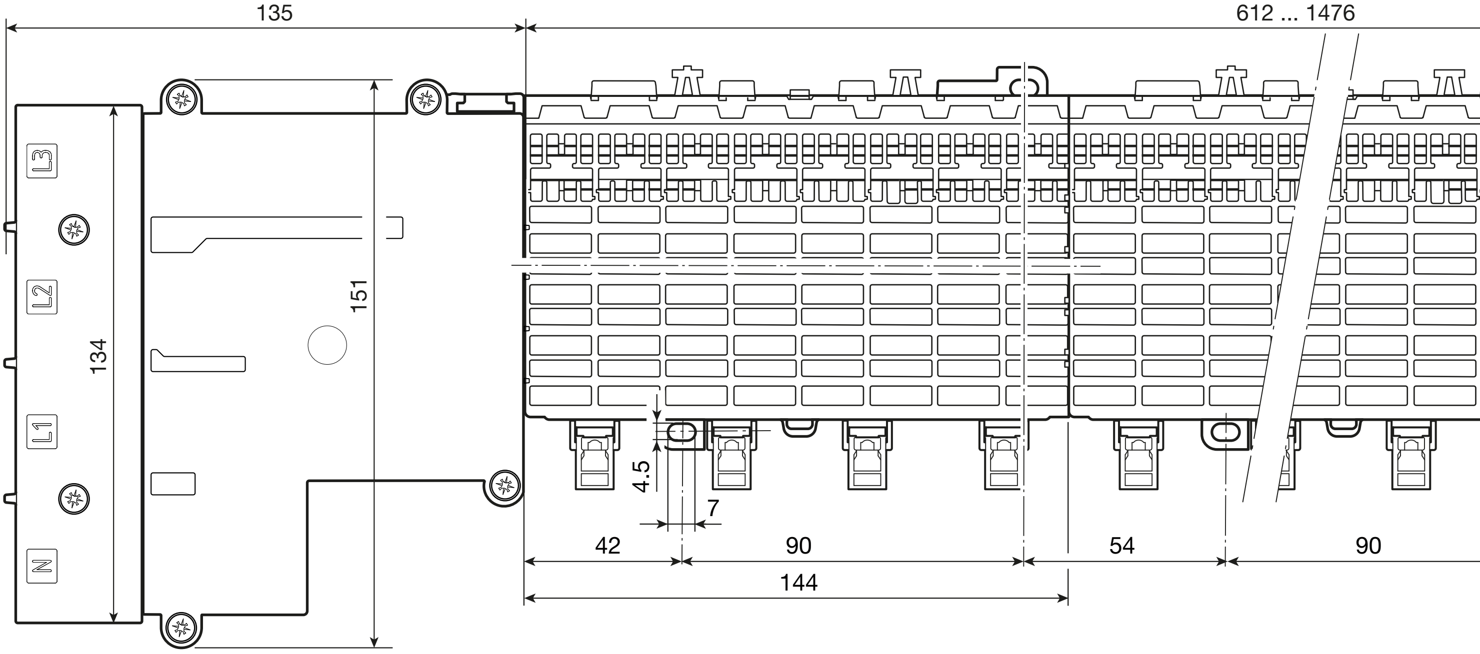


6

SMISSLINE dimension drawings

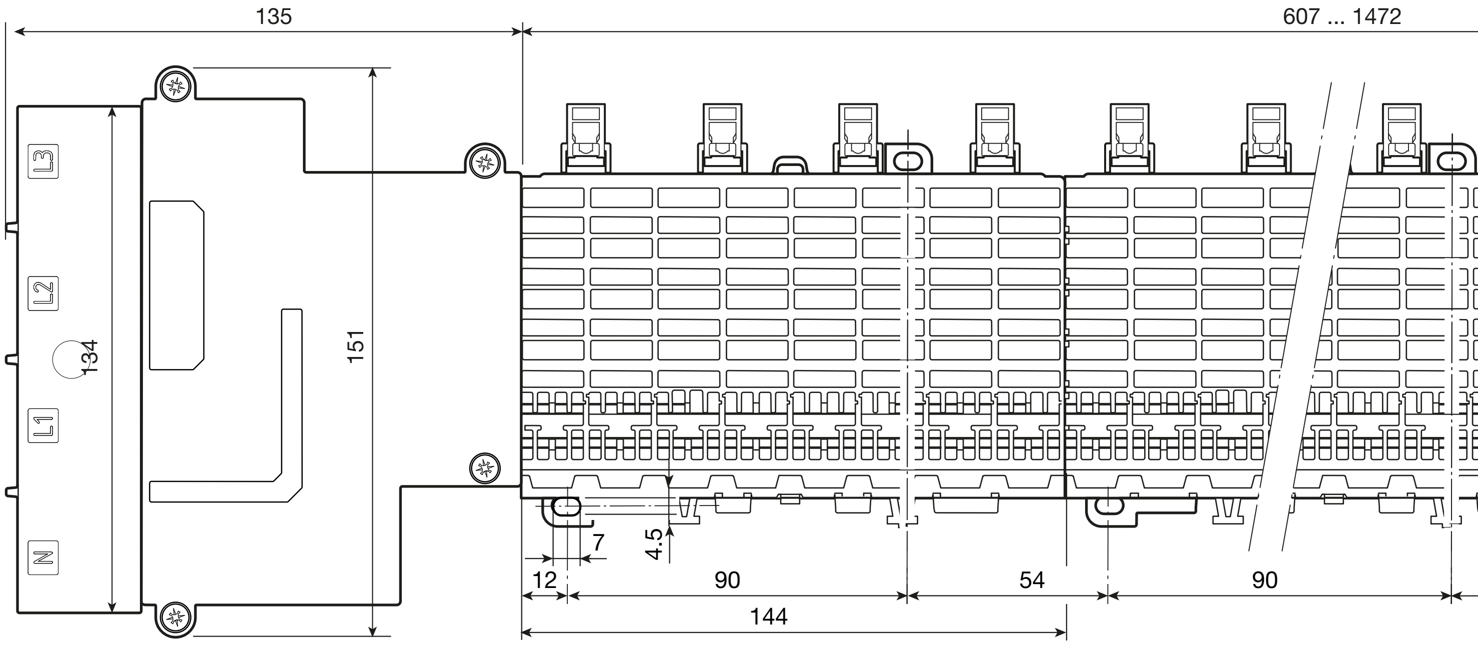
Busbar system 250 A Direct feed ZLSP960 left version

2CCC451297Z0001

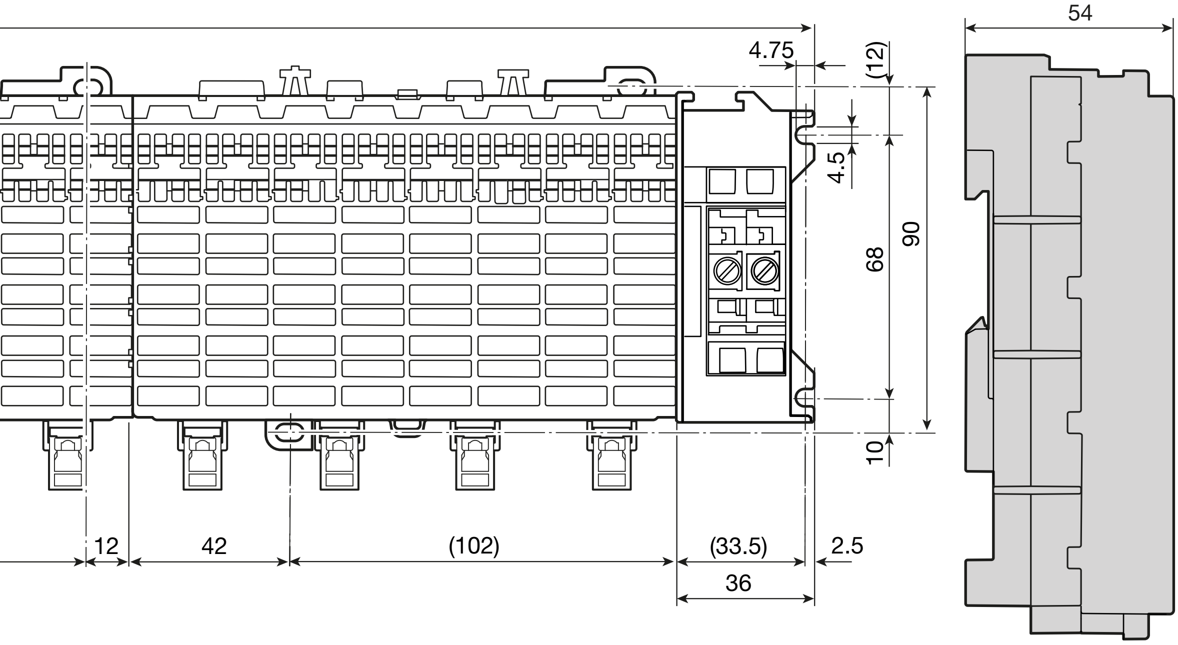


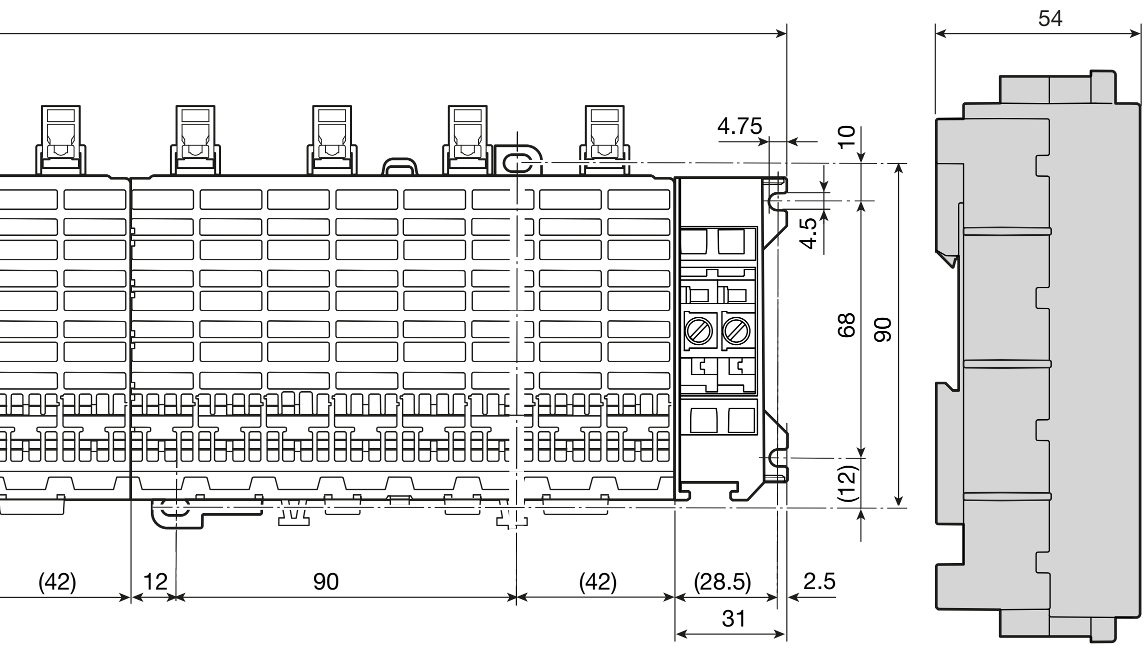
Busbar system 250 A Direct feed ZLSP960 right version

2CCC451298Z0001



SMISSLINE dimension drawings

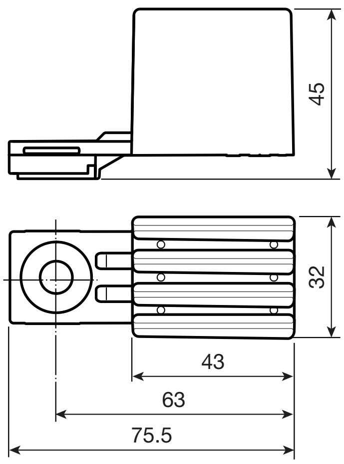




SMISSLINE dimension drawings

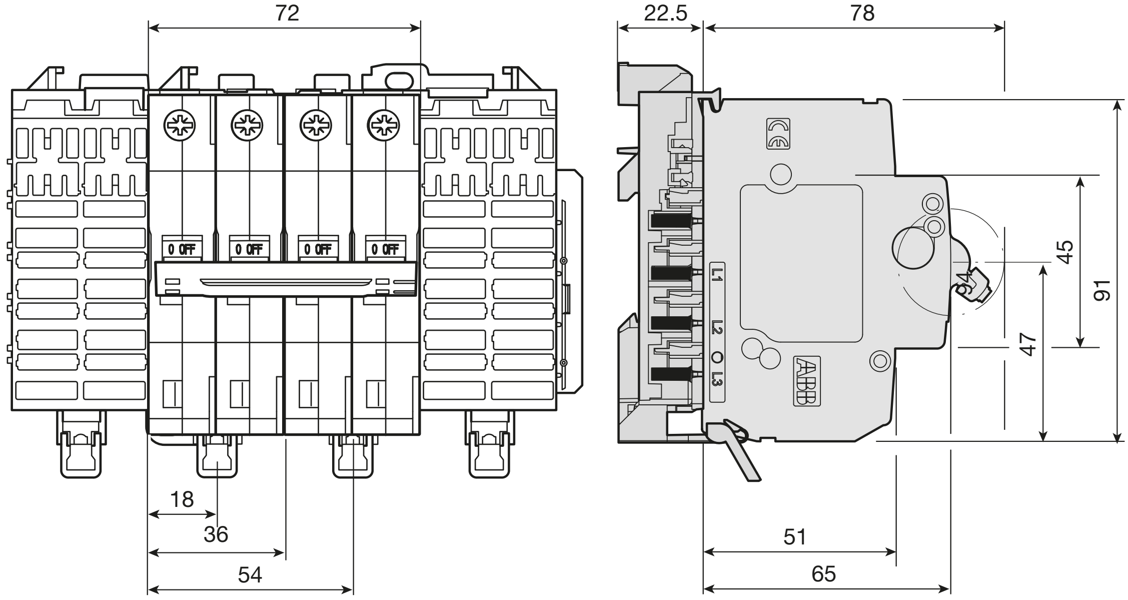
Direct feed heat sink

2CCC451299Z0001



Miniature circuit breaker S400

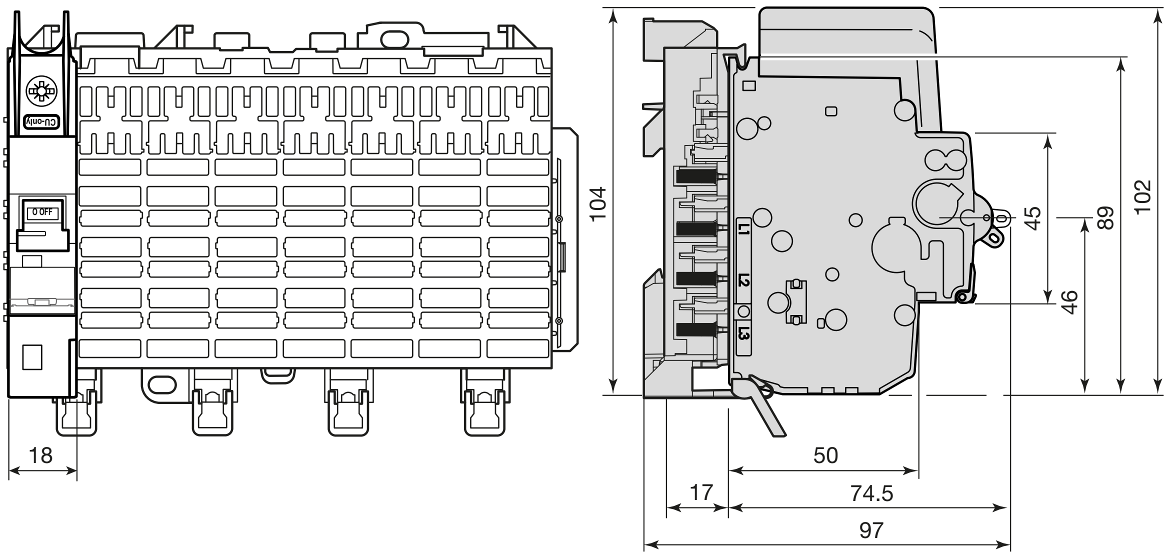
2CCC451300Z0001



SMISSLINE dimension drawings

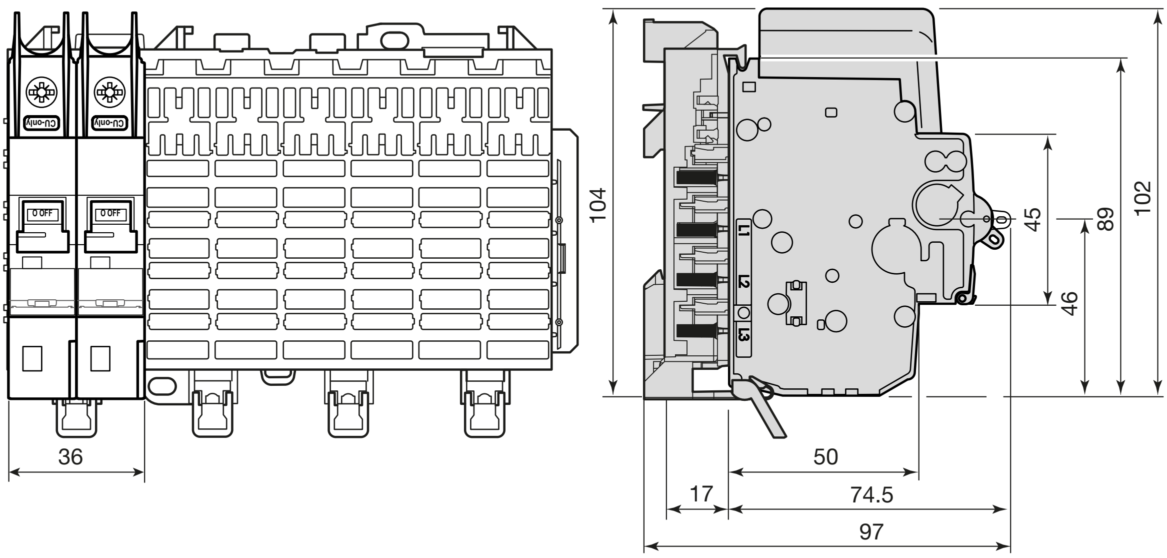
Miniature circuit breaker SUP401

2CCC451301Z0001



Miniature circuit breaker SUP402

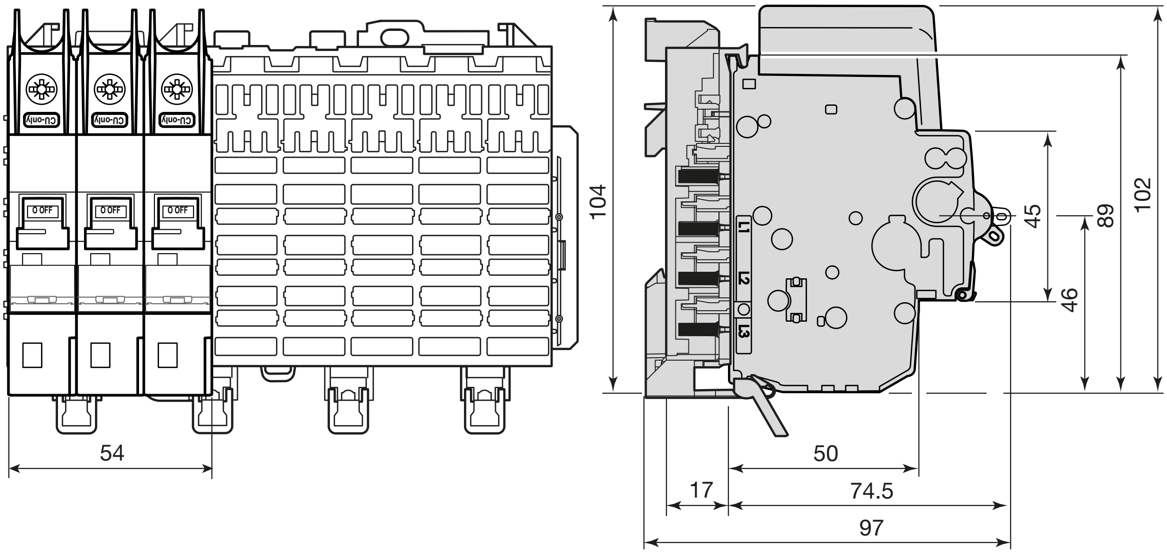
2CCC451302Z0001



SMISSLINE dimension drawings

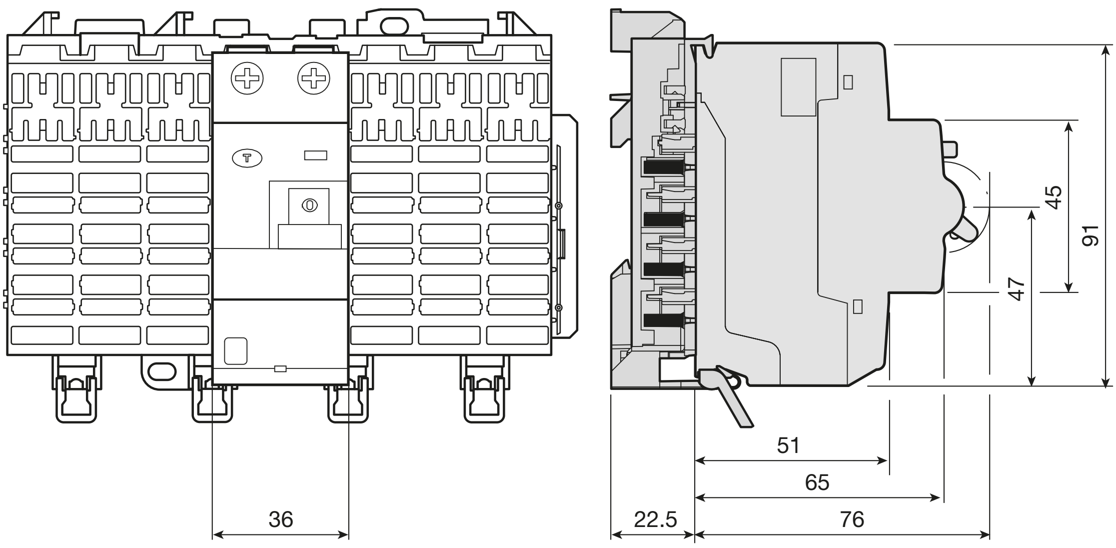
Miniature circuit breaker SUP403

2CCC451303Z0001



Residual current operated circuit breaker F402

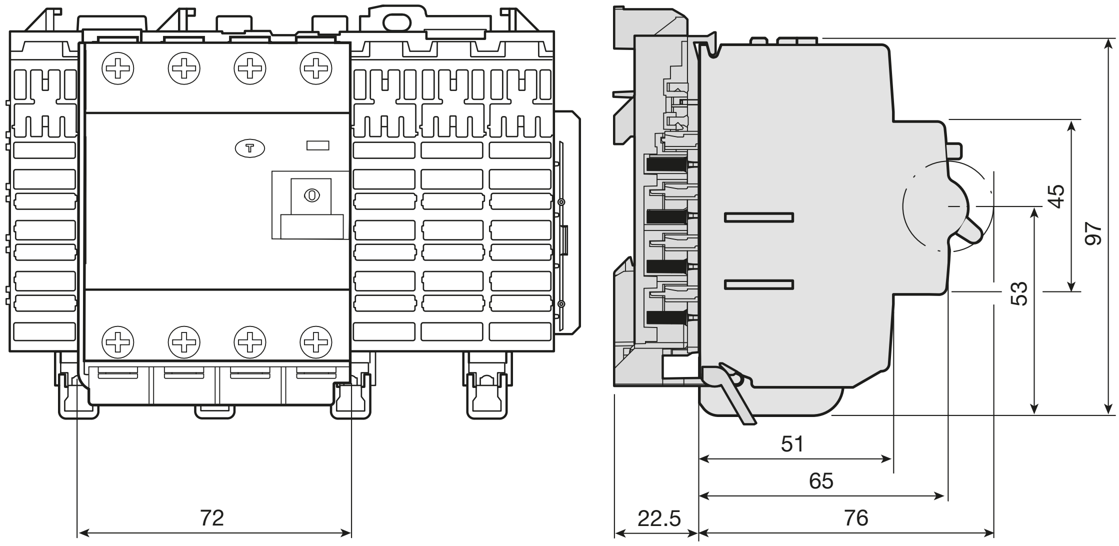
2CCC451304Z0001



SMISSLINE dimension drawings

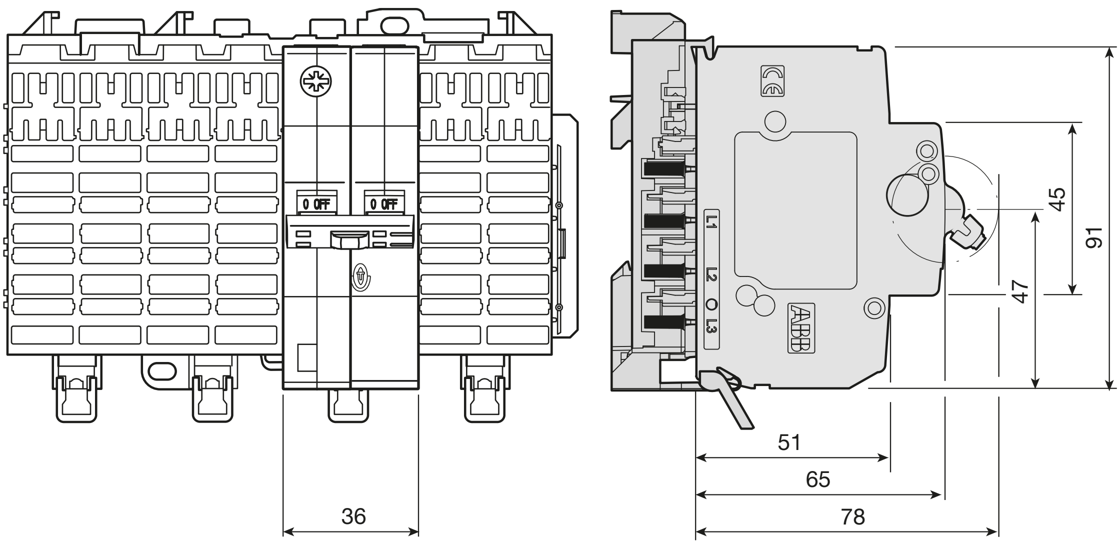
Residual current operated circuit breaker F404 type A

2CCC451305Z0001



Residual current operated circuit breaker (RCBO) FS401

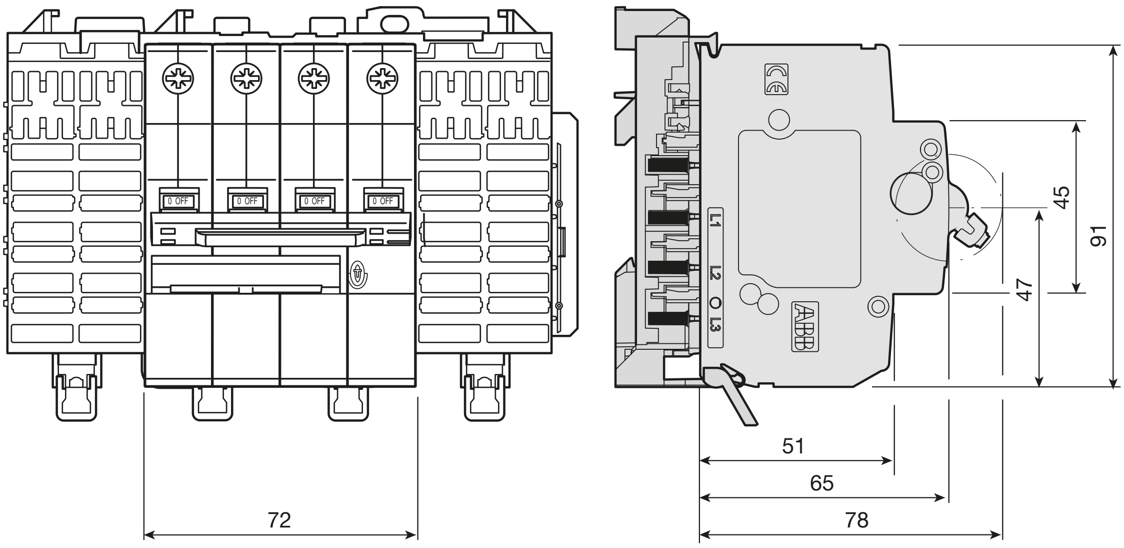
2CCC451306Z0001



SMISSLINE dimension drawings

Residual current operated circuit breaker (RCBO) FS403

2CCC451307Z0001



Residual current operated circuit breaker (RCBO) FS402

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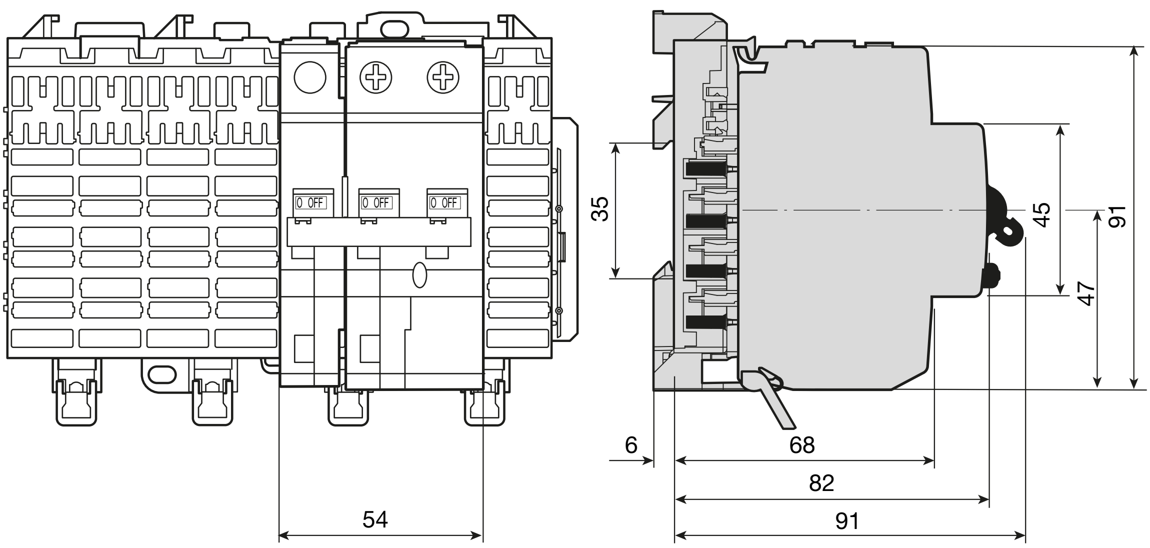

SMISSLINE dimension drawings

Surge arrester (SPD) OVR404

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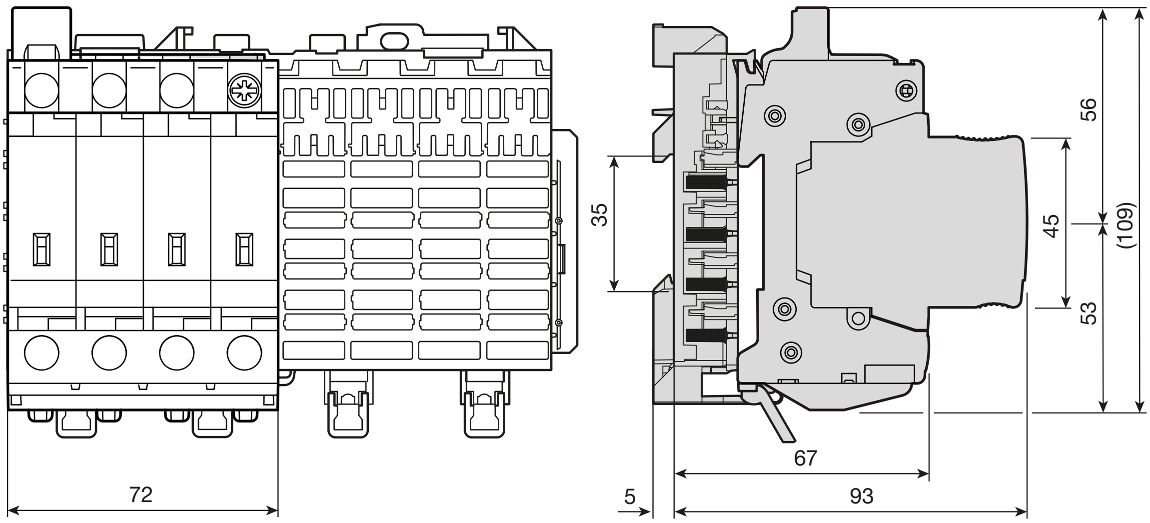
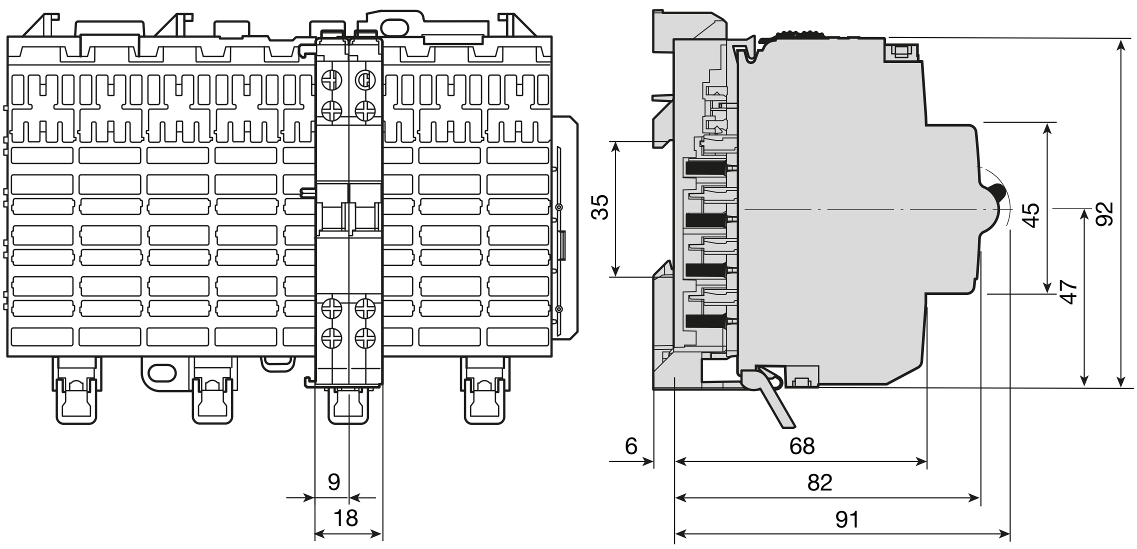


Auxiliary switch and signal contacts

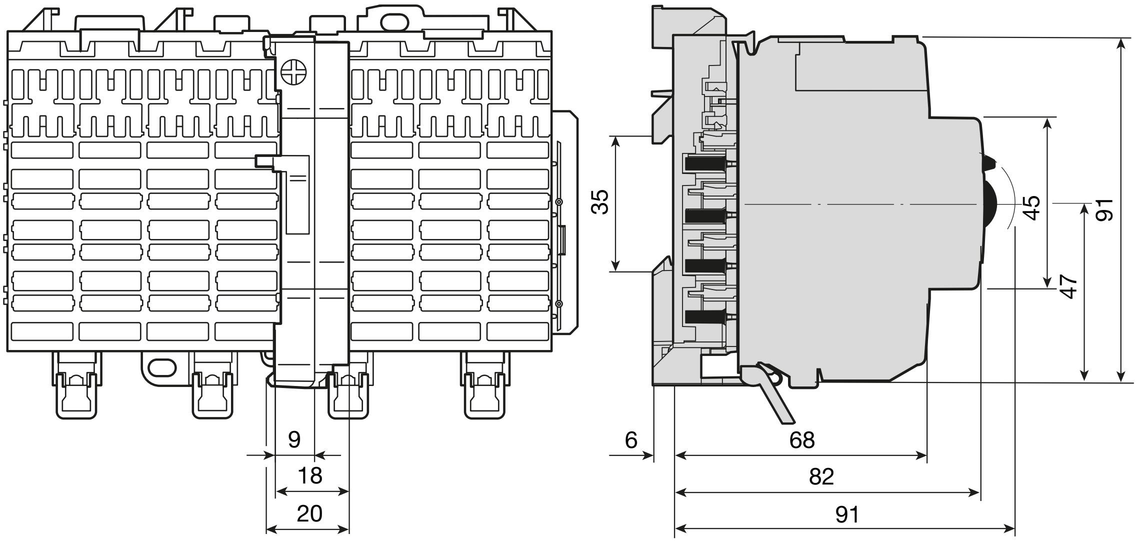
2CCC451310Z0001



SMISSLINE dimension drawings

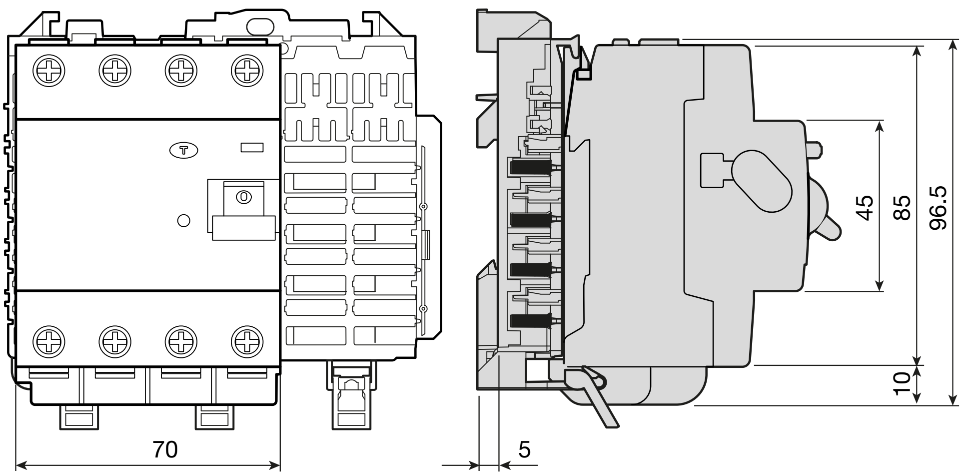
Neutral disconnector NT400

2CCC451311Z0001



Residual current operated circuit breaker F404 type B

2CCC451312Z0001



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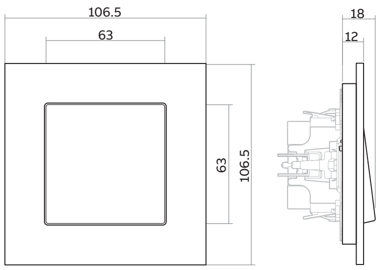
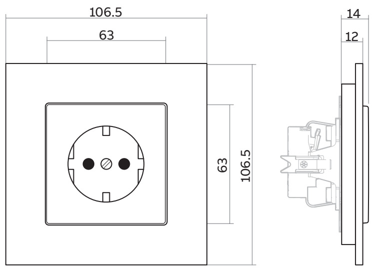
carat®

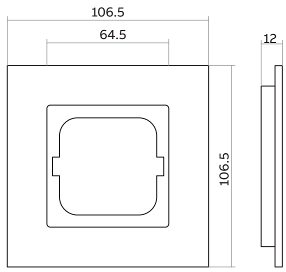
Frame dimensions



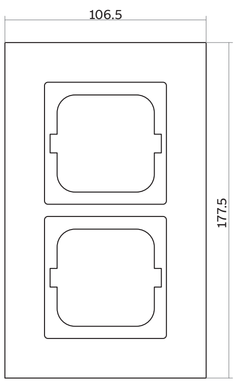
Rocker switch 1gang



Socket outlet 1gang



Cover frame 1gang



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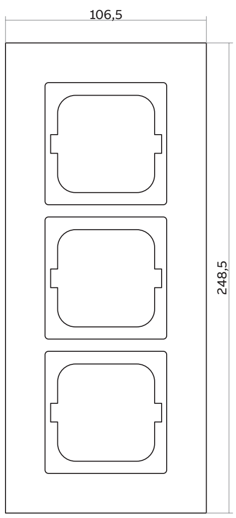

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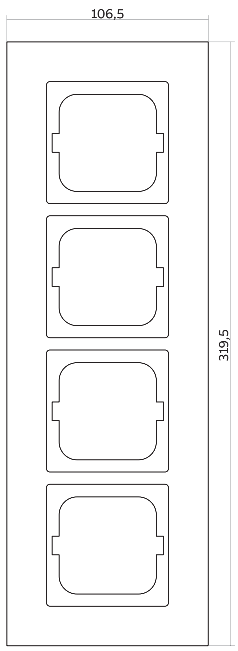
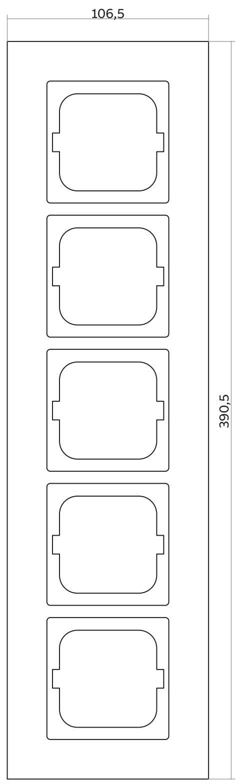


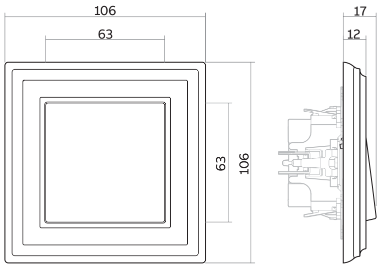
Cover frame 4gang



Cover frame 5gang

Technical details

Busch-dynasty®



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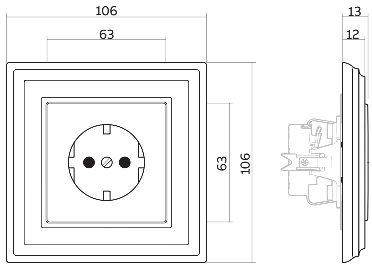
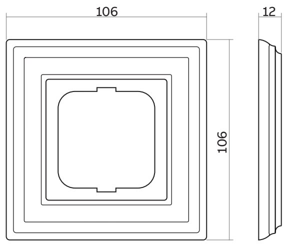
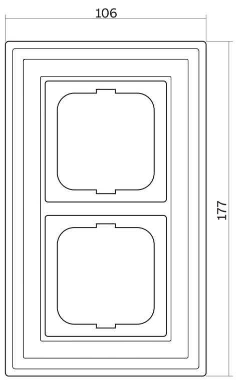


Socket outlet 1gang



Cover frame 1gang



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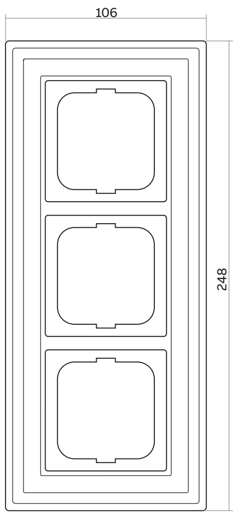

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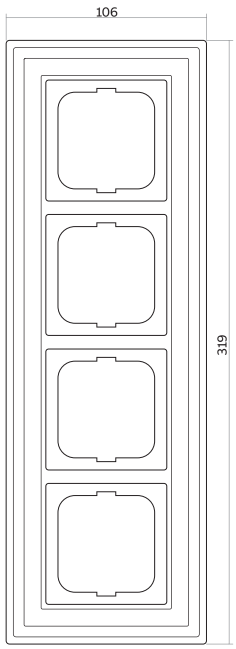

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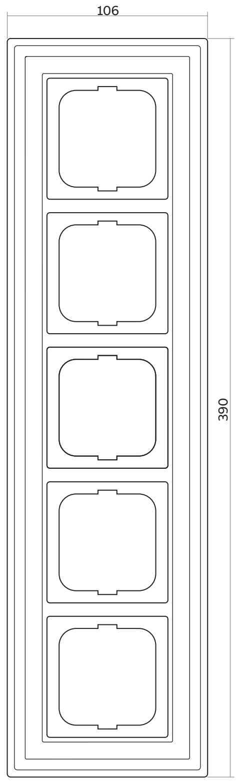
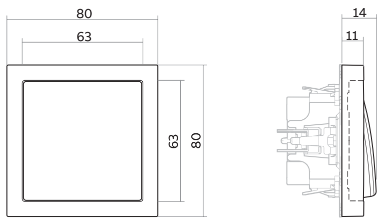


Cover frame 5gang

Technical details
pure stainless steel

Frame dimensions



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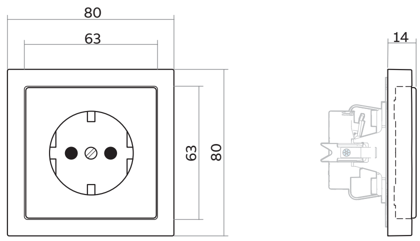
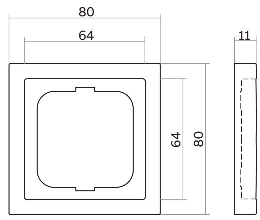
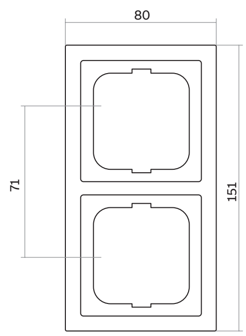


Socket outlet 1gang



Cover frame 1gang



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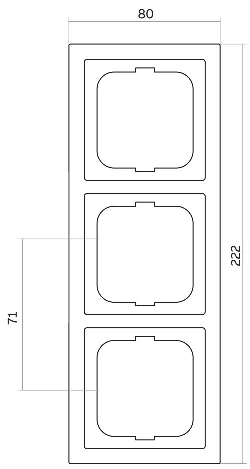

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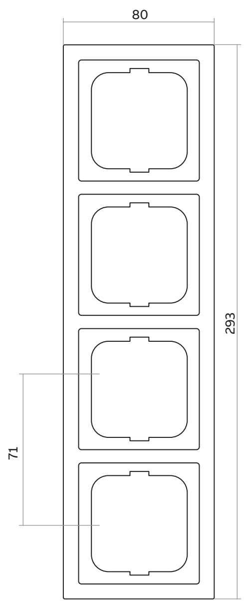

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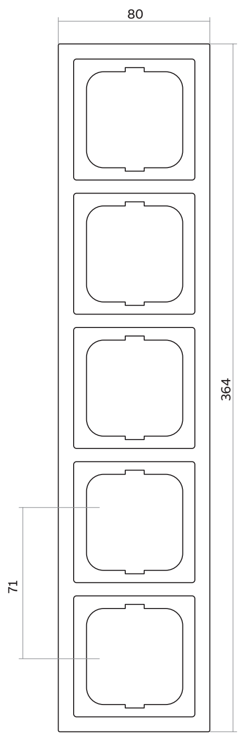
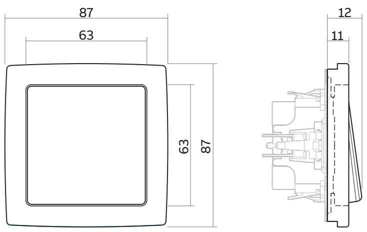


Cover frame 5gang

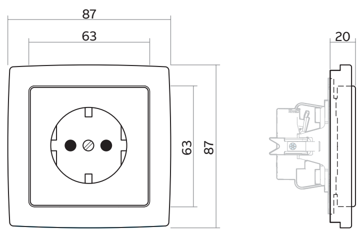
Technical details

solo®

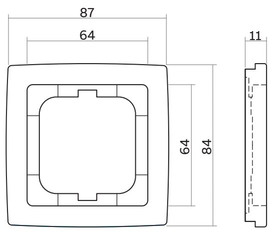
Frame dimensions



Rocker switch 1gang



Socket outlet 1gang



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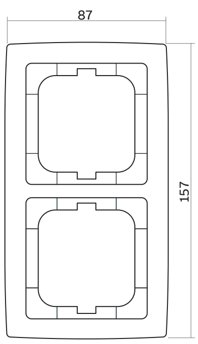

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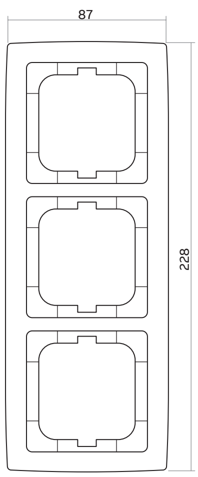

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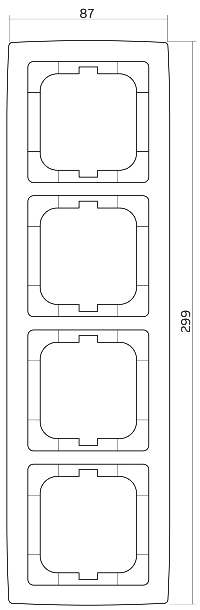

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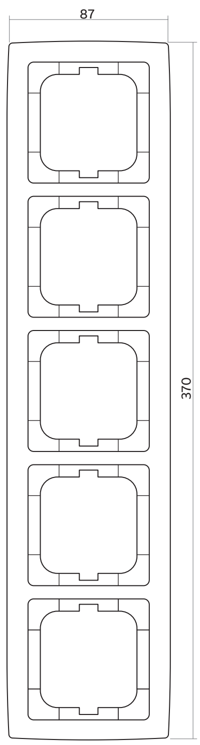
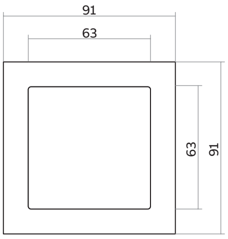


Cover frame 5gang

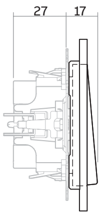
Technical details

Busch-axcent® / Busch-axcent® flat

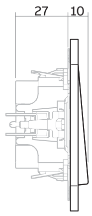
Frame dimensions



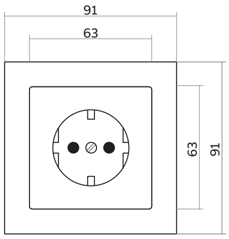
Rocker switch 1gang



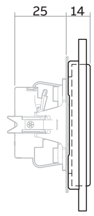
axcent



flat



Socket outlet 1gang



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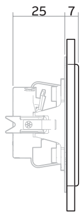
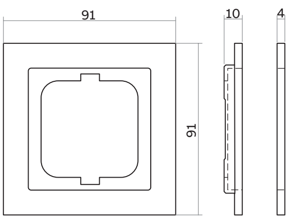
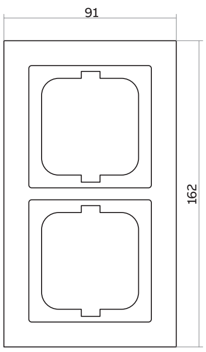


flat



Cover frame 1gang



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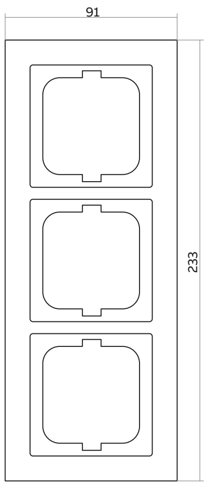

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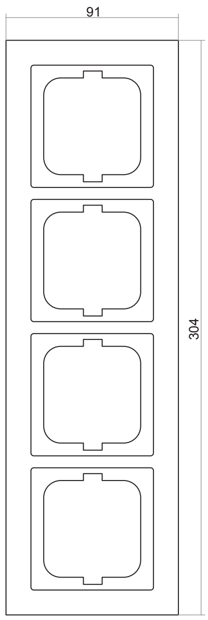

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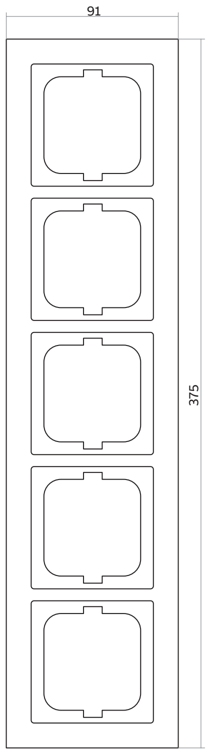
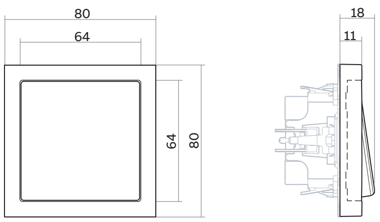


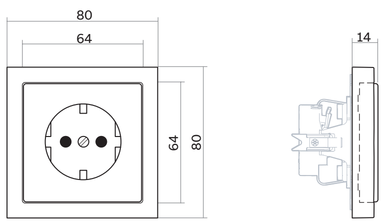
Cover frame 5gang

Technical details
future® linear

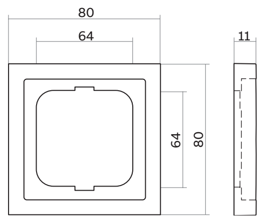
Frame dimensions



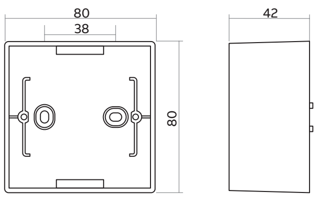
Rocker switch 1gang



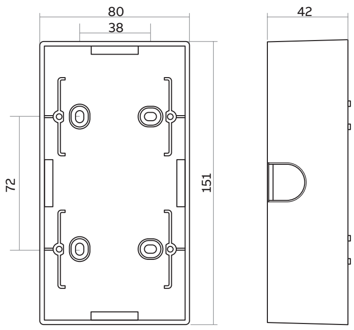
Socket outlet 1gang



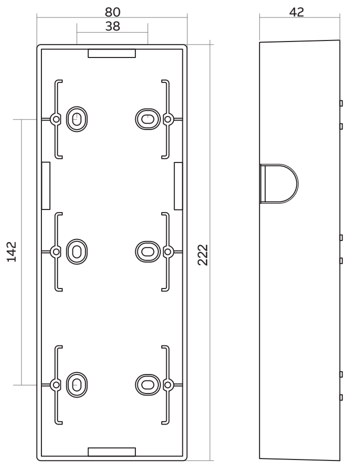
Cover frame 1gang



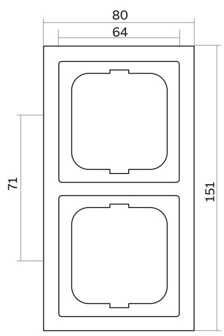
Surface mounting box 1gang

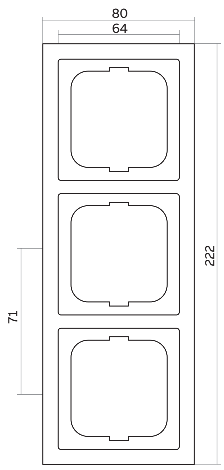


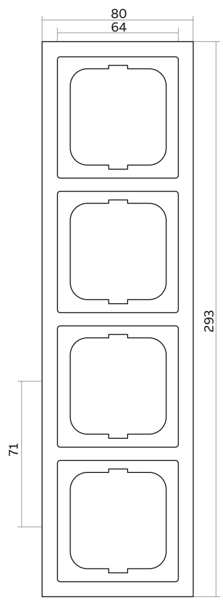
Surface mounting box 2gang

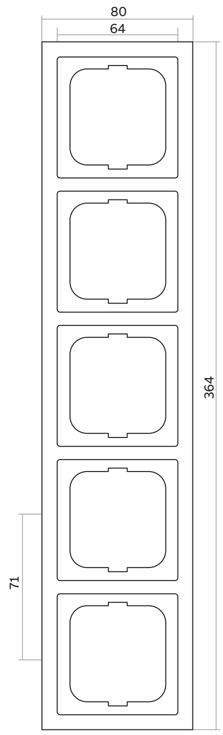


Surface mounting box 3gang







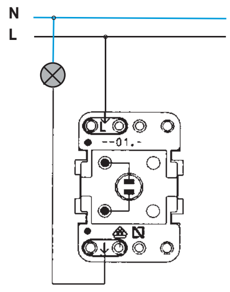


Technical details

Sky Niessen

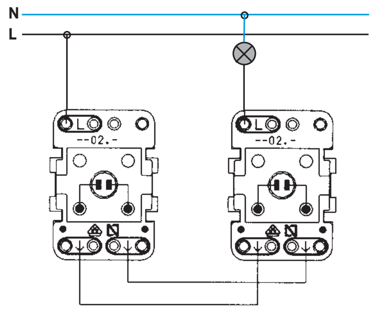
Luxury insert

Switch with night guide light



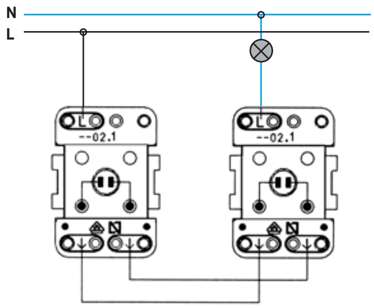
8101 & 8148

Switches with night guide light



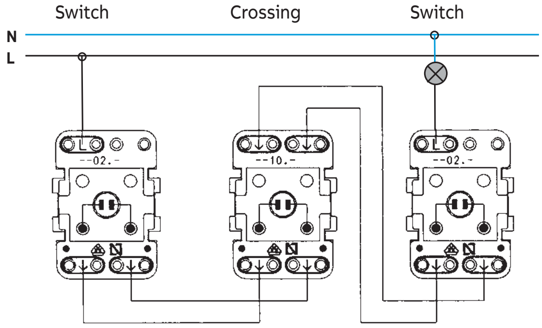
8102

Switch 16A with night guide light



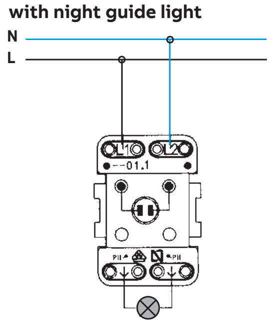
8102 8102

With night guide light



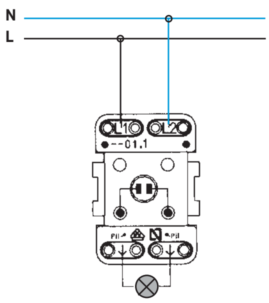
8102 8110 8102

Two-pole switch 16 A with night guide light



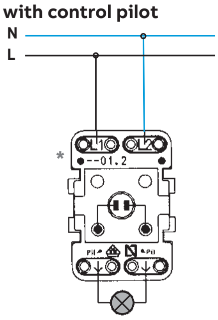
8101.1

Two-pole switch 16 A with control pilot



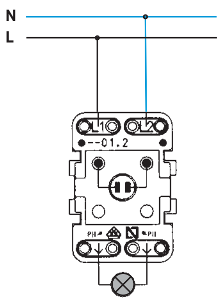
8101.1

Two-pole switch with control pilot



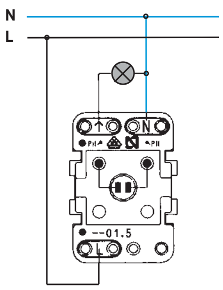
8101.2

Two-pole switch with night guide light



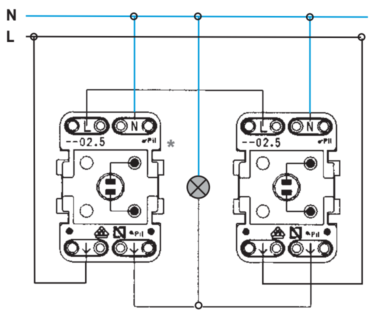
8101.2

Switch with control pilot



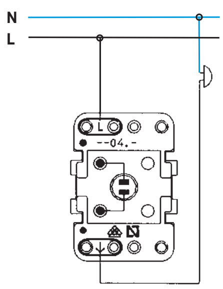
8101.5

Switches with control pilot



8102.5

Button with night guide light



8104

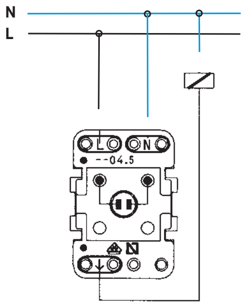
* The • indicates where the night guide lamp must be connected.
* The "pil" indicates where the control pilot lamp must be connected.

Technical details

Sky Niessen

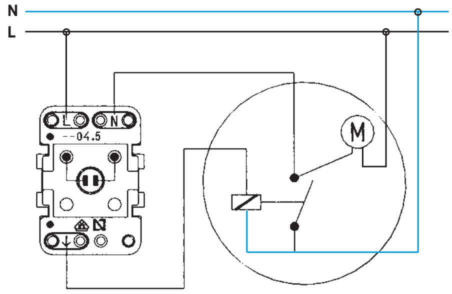
Luxury insert

Button with control pilot functioning as night guide light



8104.5

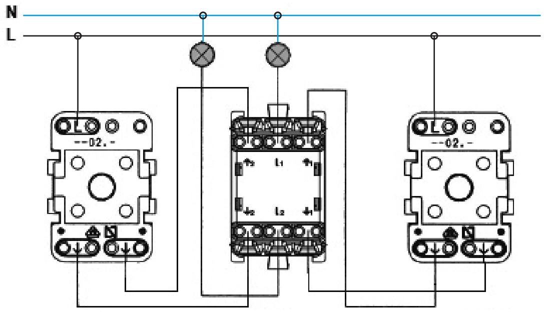
Button with control pilot
Motor with time-delayed relay



8104.5

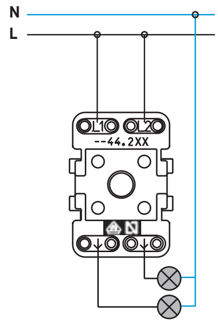
Double switch

Switch Double switch Switch



8102 8122 8102

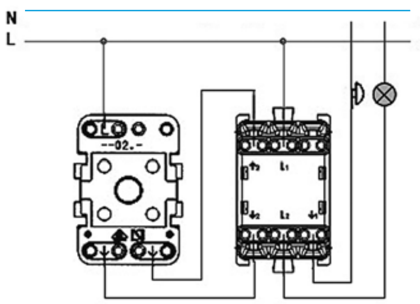
Double button



8144.2

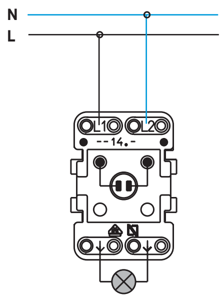
Combination of button and switch

Switch Button + switch



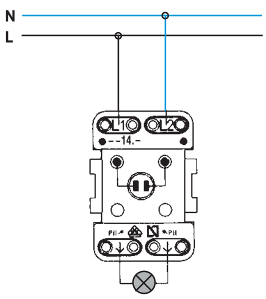
8102 8142

Two-pole card switch 10 A



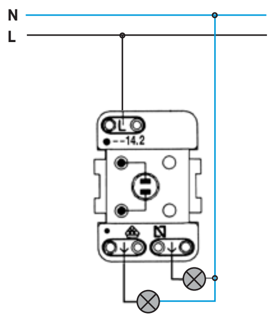
8114

Two-pole card switch 16 A



8114.1

Card switch



8114.2

Technical details

Sky Niessen

Luxury insert

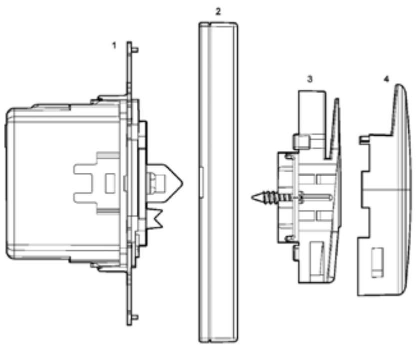
Time-delayed connection card switch. 8114.5

Technical characteristics:
- Power supply: 127 V~ / 60 Hz
230 V~ / 50 Hz

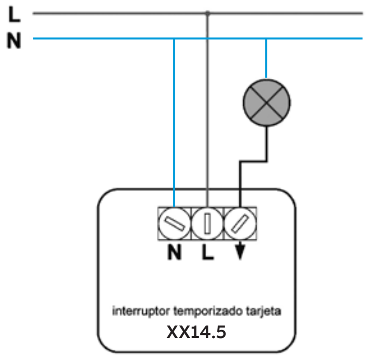
Valid for the following types of loads:
(a) Conventional incandescent lamps, halogen incandescent lamps at 230 V~ or 127 V~, low voltage halogen lamps with conventional transformer or electronic transformer and motors:
At 230 V~, 50 Hz, maximum power 3,000 W
At 127 V~, 60 Hz, maximum power 1,600 W
(b) Fluorescent lamps:
At 230 V~, 50 Hz, maximum power 1,300 W
At 127 V~, 60 Hz, maximum power 700 W

Operation
This appliance detects whether a card is present in the card slot.
(a) Whenever it detects the presence of a card, it connects the load. It will maintain the load connected for the time the card remains present.
(b) When, after having inserted a card, this is removed, the device will delay the cut-out of the load, according to the programmed time.

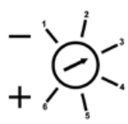
Assembly
1.- Secure the mechanism (1) in the recessed box with the screws of the box.
2.- Fit the frame (2) onto the mechanism.
3.- Secure the support (3) with the screws to the mechanism.
4.- Position the cover (4) onto the support.



Connection diagram:



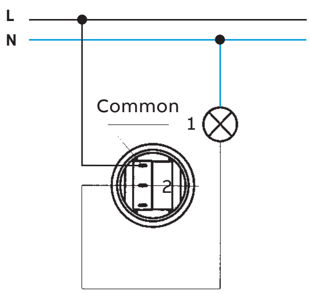
Programming the load disconnection times when the card is removed.
It is possible to select the disconnection times after the card is removed, through the rotating potentiometer for programming on the cover.

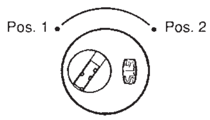


Step	Waiting time for disconnection
1.-	5 s.
2.-	10 s.
3.-	20 s.
4.-	30 s.
5.-	60 s.
6.-	90 s.

Switch-switch (code: 8153) / Push-button (8153.2) Two-position key

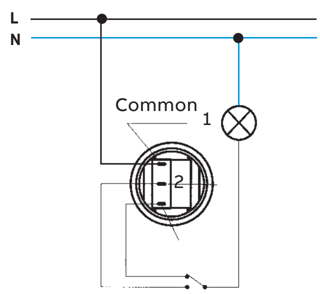
Diagram as switch/button 8153 / 8153.2





Position of the key	Active contacts
1	Common and 1
2	Common and 2

Diagram as switch

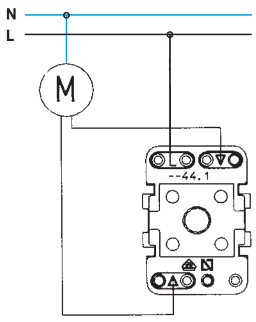


Technical details

Sky Niessen

Luxury insert

Button for blinds



8144 & 8144.1

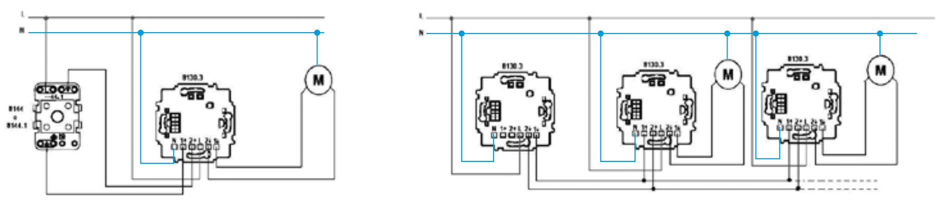
Switch for blinds

8130.3

230 V~ / 50 Hz; ±10%
Nominal power: 2 x 700 W/VA

- Allows two operating modes:
- (BLINDS): Switch for blinds.
- (SLATS): Switch for Venetian blinds with slats.
  Time to raise/lower switchable blinds (30-300 s).
- (C): Centre of an installation of a blind switch.
- Range of ambient temperature: from 0 to +35°C.
- To adapt to the Wireless system, use the buttons with the connector.
  Ref.: 8432.X (Fig. 2)
- For manual operation exclusively, use the buttons Ref.: 8430, 8230,
  5530. (Fig.2)

Fig. 1



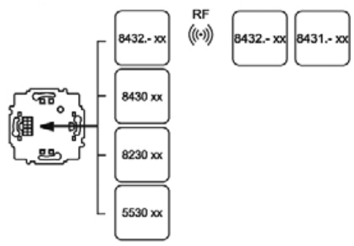
8130.3 with auxiliary buttons for blinds 8144.
Centralization of blinds for buttons 8430, 8230,
5530.

Centre

Switch for blinds 1

Switch for blinds 2

Fig. 2



Technical details

Sky Niessen

USB charger

8185

1.- Technical data:

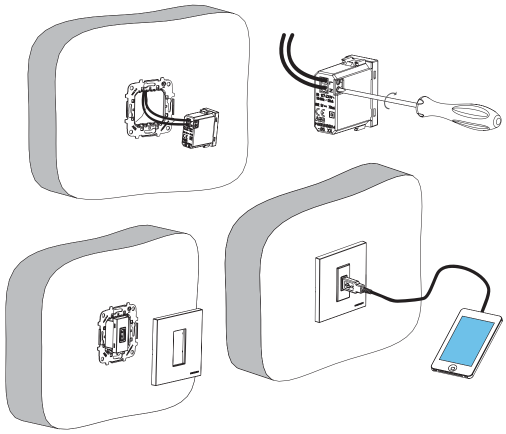
Nom. input voltage: 100 - 240 V AC ± 10 %
Nom. input frequency: 50 - 60 Hz
Nom. input current:
8185 and N2285: 0,20Aca at max load
N2185: 0,12Aca at max load
Stand-by current: 230 V AC : <= 0,3 W
Nom. output voltage: 5 V DC +5 / -5 %
Output current:
8185 and N2285: 1500 mA at 5 V DC
N2185: 750 mA at 5 V DC
Operating temp.:
8185 and N2285: 0 °C + 35 °C
N2185: 0 °C + 45 °C
Energy efficiency:
8185 and N2285: >= 71%
N2185: >= 66%

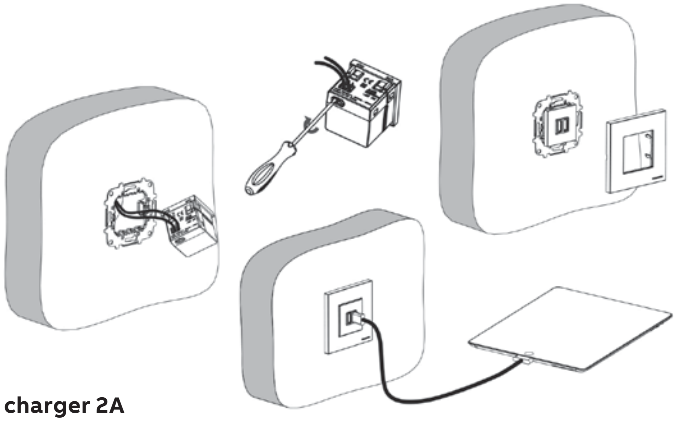
2.- Electric safety data

Safety standard: EN60950-I
Safety standard: II - Low voltage
Separation (prim. sec.):
Converter with galvanic insulation

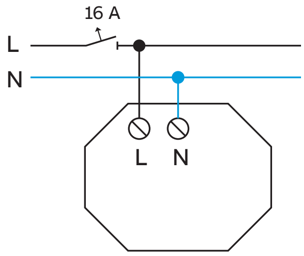
3.- Mean charge times for devices with lithium ion polymer compound batteries (for 8185 or N2285):
- 80% of the charge <1 h 15
- 100% of the charge <2 h 05

4.- Example of application: 8185





5.- Connection diagrams



USB charger 2A

8185.2 & 8185.3

1.- Technical data:
Nom. input voltage: 100 - 230 V AC ± 10 %
Nom. input frequency: 50 - 60 Hz
Nom. input current: <0,2A AC at max load
Stand-by current: <10 MW at 230 V AC, no load
Nom. output voltage: 5 V DC +5 / -5 %
Output current per outlet: 2000mA at 5V DC
Operating temp.:
0 °C to 45 °C, installing one USB charger N2185.2 or 8185.2.
0 °C to 30 °C, installing one charger 8185.3 or two N2185.2 together.
Energy efficiency: >= 79%

2.- Electrical connection diagram:

Fig. 1. Diagram 8185.2

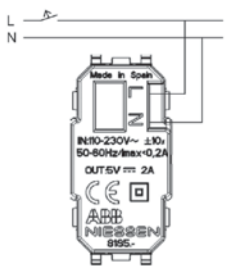
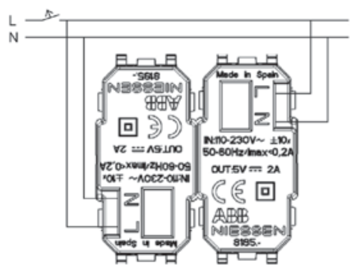
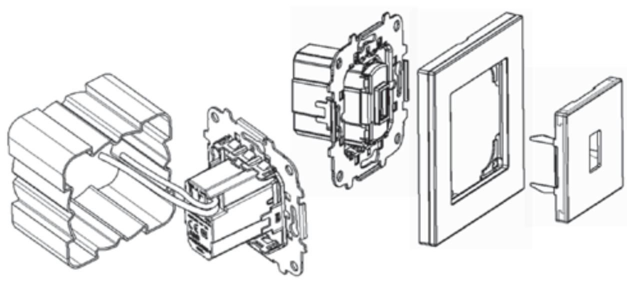


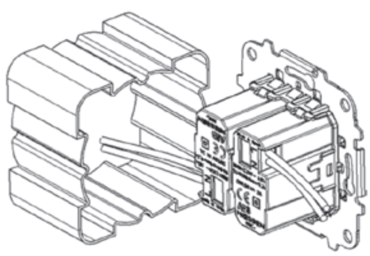
Fig. 2. Diagram 8185.3



3.- Installation:
3.2.- Installation of USB charger with one outlet 8185.2



3.3.- Fig. 5. -Installation of USB charger with two outlets 8185.3



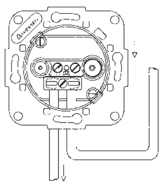
Technical details

Sky Niessen

TV / R outlets

Technical data

- Connection: Screw terminal and clamp. Coaxial cable 75 ohm.
- Shielded zamak and metal plate chassis.
- In conformity with EN 50083-1:1993, EN 50083-2:2001, EN 61000-6-1:2001, EN 61000-4-2:1995 ESD 15KV AD, 8KV CD, EN50083-4:1998
- Fits in a Ø60 mm box.

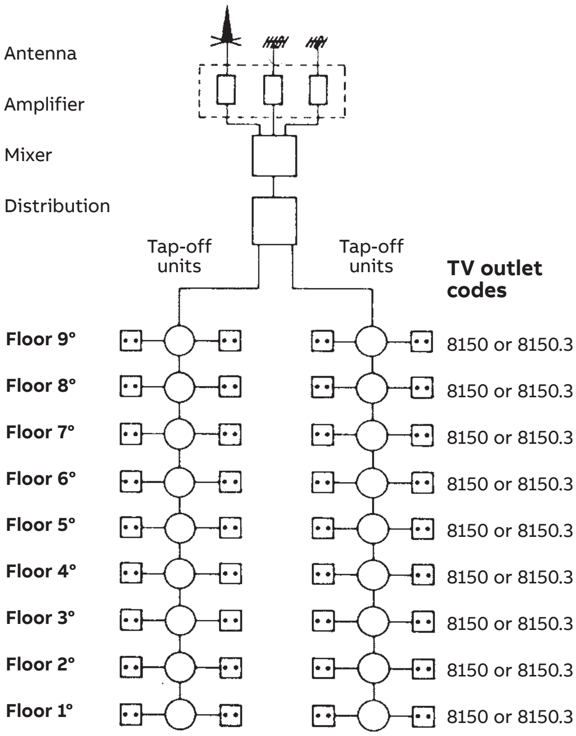


Important: the connection of the TV outlets in serial distribution must be carried out according to the figure on the left. The cable coming from the previous outlet is connected in the right terminal and the cable going to the next outlet in the left terminal.

Code			8150	8150.3	8150.7	8150.8
Installation			Final		Intermediate	
Connection			Screw terminal and clamp			
Output connectors		C1	IEC male Ø 9.52 mm			
		C2	IEC female Ø 9.52 mm			
Frequency range	MHz	I/O	5 - 862		13 - 862	5 - 862
		C1	5 - 862	5-68 / 118-862	13 - 862	5 - 862
		C2	5 - 862	87.5 - 108	13 - 862	5 - 862
Basic loss	dB ±TOL	FM	10,0 ±0,7	1,1 ±0,3	25,0 ±1,5	30,0 ±0,2
		DAB	10,0 ±1,5	R: 0,3 ±0,1	25,0 ±1,5	30,0 ±0,2
		VHF	4,0 ±1,5	TV: 0,9 ±0,3	8,0 ±0,7	11,0 ±1,0
		UHF	3,0 ±0,5		8,0 ±0,7	10,5 ±1,0
Through loss	dB ±TOL	FM	-		2,0 ±0,3	1,0 ±0,2
		VHF	-		2,0 ±0,5	1,1 ±0,3
		UHF	-		2,0 ±0,5	1,3 ±0,4
Directivity	dB	FM	-		>12	>25
		TV	-		>9	>13
Isolation	dB	FM	>14	>18	>16	>20
		TV	>14	>16	>15	>18
Return loss	dB	FM	>18	>16	>12	>18
		TV	>10	>18	>12	>15

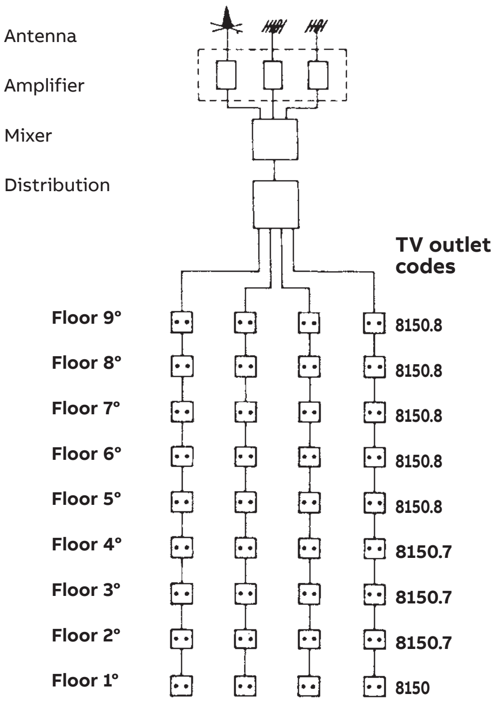
Note: reference 8150.3 compatible with CATV

MATV connection diagram
Distribution with tap-off units

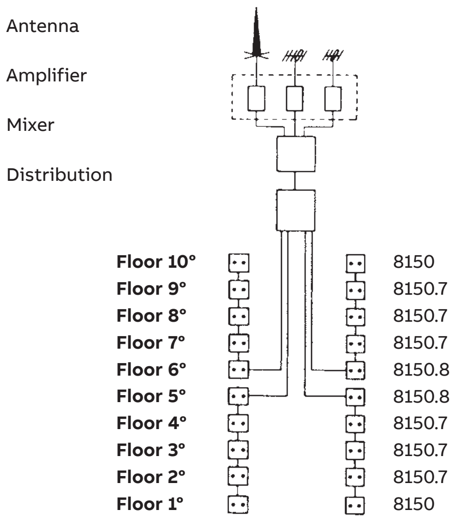


In this diagram all final outlets are the same. References 8150 or 8150.3 can be used equally.

MATV connection diagram
Serial distribution up to 9 floors



MATV connection diagram
Serial distribution for more than 9 floors

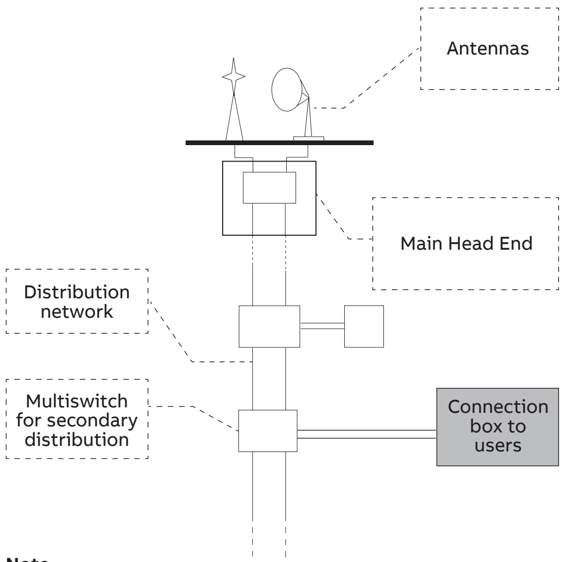


Example: 10 floors. The floors are divided in 2 groups of 5 floors each. The outlets are distributed according to the criteria shown in the MATV connection diagram for serial distribution up to 9 floors. The diagram above can be used in buildings up to 18 floors. For buildings with more than 18 floors and up to 27 floors, 3 groups have to be created and so on.

Technical details
Sky Niessen

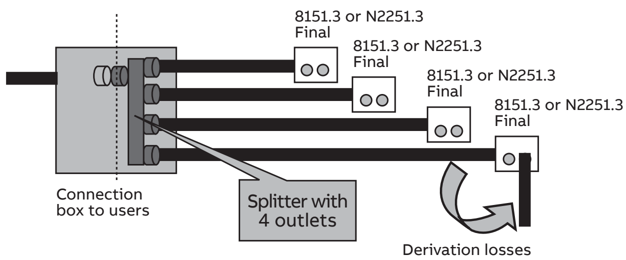
TV-R / SAT outlets

SMATV connection diagram

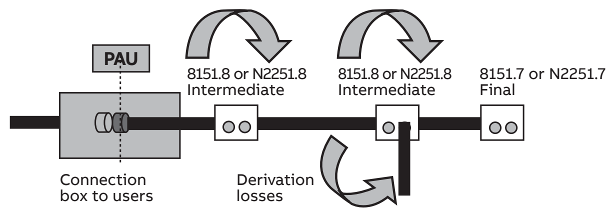


Note:
End of line impedance. If the distribution equipment requires outlets with end of line resistors, 8151.7/N2251.7 outlets must be used or add to 8151.3/N2251.3 outlets a termination resistor to close the line.

a) SMATV star connection diagram



a) SMATV star connection diagram



Note:
It is recommended to avoid installing more than 2 intermediate outlets per line.

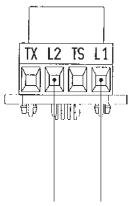
Code			8151.3 N2251.3	8151.7 N2251.7	8151.8 N2251.8	8152.7
Installation			Final		Intermediate	Final
Connection			Screw terminal and clamp			
Output connectors		C1	IEC male Ø 9.52 mm			
		C2	IEC female Ø 9.52 mm			
		C3	-			F female
Frequency range	MHz	E/S	5 - 2400	5 - 2400		5 - 2500
		C1	5 - 862	5 - 2400		5 - 68 / 125 - 862
		C2	930 - 2400	5 - 2400		87,5 - 108
		C3	-			950 - 2500
Basic loss	dB ±TOL	FM	0,2 ±0,1	3,7 ±0,3	10,0 ±1,0	2,0
		TV	1,0 ±0,5	4,0 ±0,5	10,0 ±1,0	2,7
		SAT	1,2 ±0,6	5,0 ±1,2	12,0 ±2,0	2,3
Through loss	dB ±0,5	FM	-		2,5 ±0,5	-
		TV	-		2,5 ±0,7	-
		SAT	-		3,0 ±1,0	-
Directivity	dB	FM	-		>20.0	-
		TV	-		>12.0	-
		SAT	-		>5.0	-
Isolation	dB	FM	>45	>20	>45	>24,3
		TV	>14	>20	>30	>15
		SAT	>14	>14	>28	>15
Selectivity	dB	FM	-	-		>15
		TV-R	>15	-		>15
		SAT	>15	-		>15
Return loss	dB	VR	>25	>16	>13	>7,6
		FM	>25	>16	>13	>10
		TV	>14	>16	>12	>7,6
		SAT	>10	>9	>12	>8,2
DC path	V⎓		24 max			24 max
	mA		500 max			500 max
	Tono		22 KHz/DiSEqC			22 KHz/DiSEqC

Technical details

Sky Niessen

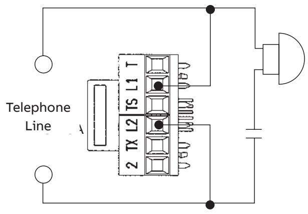
Telephone outlets

4 contacts



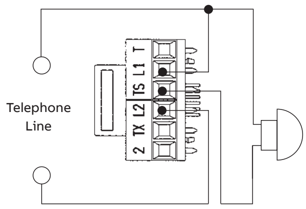
6 contacts

Supplementary bell
with capacitor

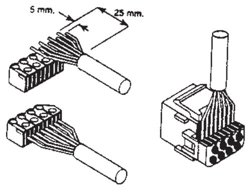


6 contacts

Supplementary bell
without capacitor



8 contacts



Connections for special services:

Special services are understood to be those which need the installation of a subscriber other than the normal one, either in terms of number of wires or connections in the telephone outlet, or in both cases at the same time.

These services may be:

Reversed Call (between a main telephone and another extension), Shared Line (two subscribers per terminal), Blocked Dialing by Fee Indicator, Supplementary bell (with and without capacitor). Call transfers, Connection for Fax., Connection for Modem, etc.

Connections:

The connection of each of the appliances to the telephone outlet (either to the PRC or private outlet) must be specified by the manufacturer of the appliance in question. However, Electromechanical supplementary bell are connected according to the following diagrams.

The references Niessen 8117.3, 2117.8 XX, 2117.8 XX, 2217.8 XX, 2217.8 XX, 2017.3 (terminal access bases, TAB) are supplied with an 8-contact connector that complies with the Standard ISO 8877, without terminating resistor.
Primary ISDN access: Used as elements, cable (in point-to-point configuration), the network termination equipment at primary speed (TR1p, component supplied and owned by the ISDN service provider). If using shielded cables, the connection to the termination equipment shall be fixed with a terminal block with connection to the shield of each pair. Both shield connections can be joined. Optionally an 8-contact connector can be used.

Technical details
Sky Niessen

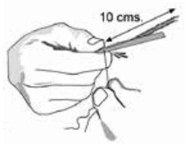
Female RJ45 Connector Device
2018.6 & AM33322-AN

1.- Preparing the Cable

1.1.- Put the cable into the hole of cap.

1.2.- Cut approximately 5 cm. off the jacket

1.3.- Open approx. 10 cm of the jacket with a cutter cord or another tool.

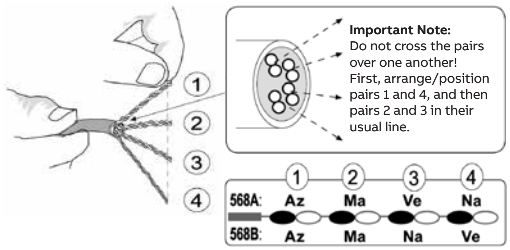


1.4.- Cut the jacket

1.5.- Cut the mesh (if it has one) and the cord at the same level of the jacket.

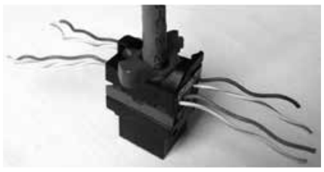
2.- Preparing the Conductors

2.1.- Select the adequate wiring scheme (568A or 568B) and place the pairs in a straight line.

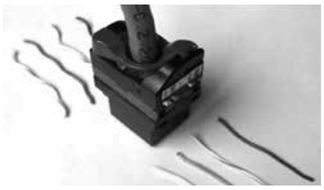


2.2.- Position each of the four pairs in the holes of the end piece.

2.3.- Set the cover to the module.



2.4.- Cut the excrescent wires.

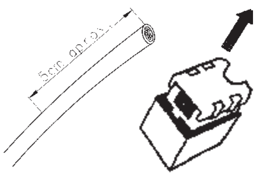


3.- Technical specifications

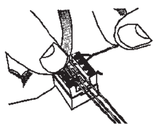
- Wiring sticker: T568A &T568B
- WInsertion force: 20N max. (IEC 60603-7-4)
- Retention strength: 7.7kg.
- Operating temperature: -10Cº — 60Cº
- In compliance with ANA/TIA/EIS 568 B-2 standard

RJ45 Cat. 5E female connector
2018.5

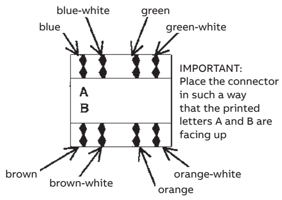
1.- Remove the back cap from the connector. Strip approx. 5cm off the jacket and discard the cable cutter cord.



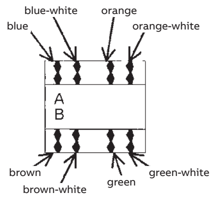
2.- Remove the back cap from the connector. Strip approx. 5cm off the jacket and discard the cable cutter cord.



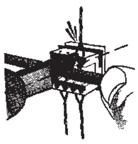
2a.- Wiring according to T568A:



2b.- Wiring according to T568B:



3.- Push the cables against the end of the slot and cut them flush to the connector.
Use an IBDN 110, BIX, KRONE wiring tool, or a similar type 110 tool.

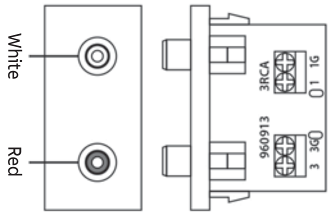


4.- Mount the connector cap.

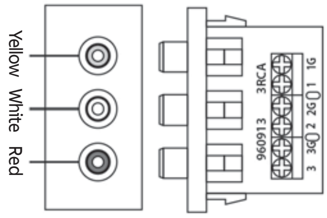
Technical details

Sky Niessen

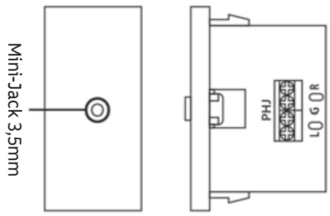
VDI connectors



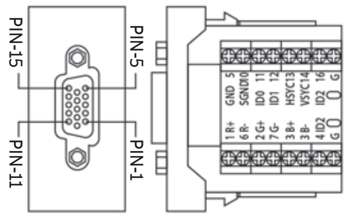
8155.2
Pin Out:
1G — W/GND ⎤ Left Audio
1B — White ⎦
3G — R/GNB ⎤ Right Audio
3R — red ⎦



8155.3
Pin Out:
1G — Y/GND ⎤ Composite Video
1A — Yellow ⎦
2G — W/GND ⎤ Left Audio
2B — White ⎦
3G — R/GND ⎤ Right Audio
3R — Red ⎦



8155.4
Pin Out:
R — Red ⎤ Left Audio
G — Ground ⎦ Right Audio
L — White

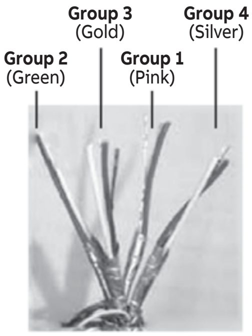


8155.5

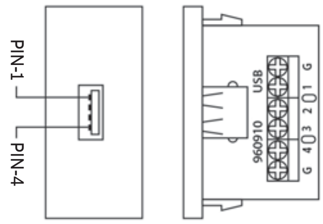
PIN		PIN	
1	1 R+	5	GND 5
6	6 R-	10	SGND 10
2	2 G+	11	ID0 11
7	7 G-	12	ID1 12
3	3 B+	13	HSYC 13
8	8 B-	14	VSYC 14
4	4 ID2	15	ID2 15
G	GND	G	GND

8155.6

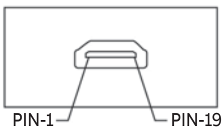
G-1	1	TMDS Data2+
G-1	2	TMDS Data2 Shield
G-1	3	TMDS Data2-
G-2	4	TMDS Data1+
G-2	5	TMDS Data1 Shield
G-2	6	TMDS Data1-
G-3	7	TMDS Data0+
G-3	8	TMDS Data0 Shield
G-3	9	TMDS Data0-
G-4	10	TMDS Clock+
G-4	11	TMDS Clock Shield
G-4	12	TMDS Clock-
	13	CEC
	14	RESERVED (N.C. on device)
	15	SCL
	16	SDA
	17	DDC/CEC Ground
	18	+5V Power
	19	Hot Plug Detect
	GND	Ground

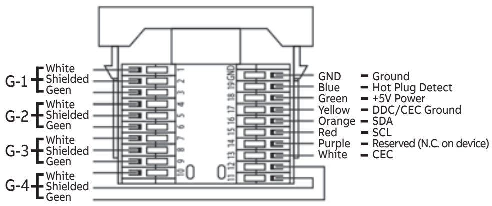


On Group included 3 wires



8155.8
Pin Out:
1 — V_{BUS}
2 — D-
3 — D+
4 — Ground
G — Shielded





Note:
Using a strap for fixing the cable to the board it is recommended to avoid disconnections. For this the plates have two through-holes at its rear end.

Technical details

Sky Niessen

Rotatory dimmer

Reference	Types of lamps					Power	Switchable
	incandescent	halogen transformer-electromechanical	halogen transformer-electronic	fluorescent lamp	LED		
2260.2	☻	☹	☹	☹	☹	60-400 W	☹
8160*	☻	☻	☹	☹	☹	20-500 W / VA	☻
8160.2	☻	☻	☻	☹	☻	2-100 W / VA LEDi 10-250 W / VA	☻
8160.3	☻	☻	☹	☹	☹	200-1000 W / VA	☻
8160.5	☻	☻	☹	☹	☹	60-400 W / VA	☻
8160.7	☻	☹	☻	☹	☹	40-420 W / VA	☻
8160.9	☹	☹	☹	☻	☹	700 W / VA	☹
8160.8	☻	☻	☻	☹	☹	60-420 W / VA	☻ Regulated with ref. 8161.8
8161.8	Auxiliary component, does not bear load. Up to 5 units connected.						☻

* Valid for small motors of 300 VA

Rotatory dimmer, RL, 20-500 W

8160

230 V~ / 50 Hz.
20-500W
20-500VA
Motors up to 300 VA

- Mechanism valid for cover and button Ref: 5560, 8260.2, 8460.2 and 8560.2
- Protection against short circuit: T3, 15H
- Protection against overload: electronic
- Range of ambient temperature: from 0 to +35°C
- Triac regulator

Fig. 1

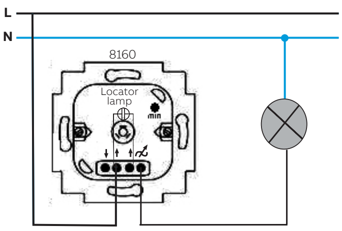
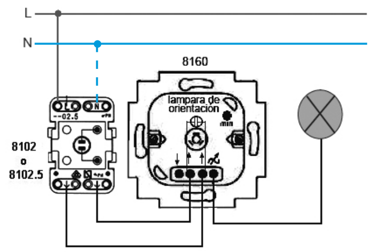


Fig. 2



* If you wish to fit a night guide light use the 8102.5

Note:
The nominal power depends on the ambient temperature. In addition, when calculating the nominal power note the transformer losses (20%).

Rotatory dimmer, LED, 2-100 W

8160.2

Fig. 1

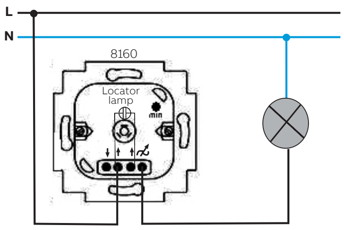
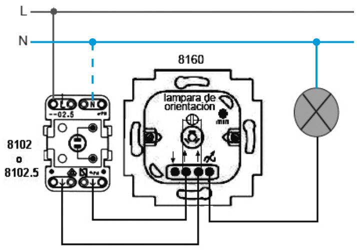
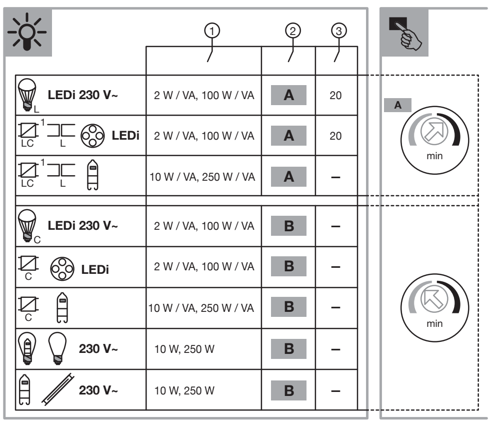


Fig. 2





- Mechanism valid for cover and button Ref: 5560, 8260.2, 8460.2 and 8560.2
- Protection against overload: Electronic
- Range of ambient temperature: from 0 to +35°C

Note:
The nominal power depends on the ambient temperature. In addition, when calculating the nominal power note the transformer losses (20%).

Technical details

Sky Niessen

Rotatory dimmer, RL, 200-700 W

(Incan. + halog. electromagnetic transformer). 8160.3

230 V~ / 50 Hz.
200-1000W
200-1000VA

- Mechanism valid for cover and button Ref: 5560, 8260.2, 8460.2 and 8560.2
- Calibrated fuse T-6.3H Time-delayed
- Protection against short circuit: T 6.3 H
- Range of ambient temperature: 0 - +35°C

Fig. 1

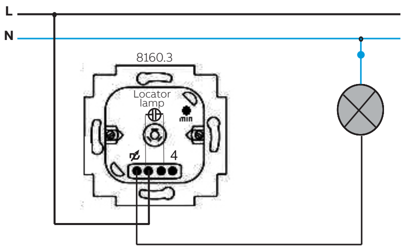
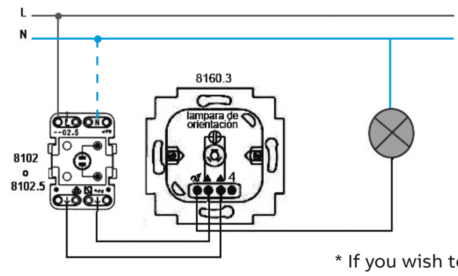


Fig. 2



Note:
The nominal power depends on the ambient temperature. In addition, when calculating the nominal power note the transformer losses (20%).

* If you wish to fit a night guide light use the 8102.5

Rotatory dimmer, RL, 60-400 W

8160.5

230 V~ / 50 Hz.
60-400 W
60-400 VA

- 6A complementary circuit switch.
- Mechanism valid for cover and button of ref. 5560, 8260.2, 8460.2 and 8560.2
- Nominal current - switch: 6 A
- Stray current protection: EN 55014

- Minimum load: 60 VA
- Protection against short circuit: T3, 15H
- Maximum protection against short circuit: 10 A
- Range of ambient temperature: from 0 to +35°C

Fig. 1

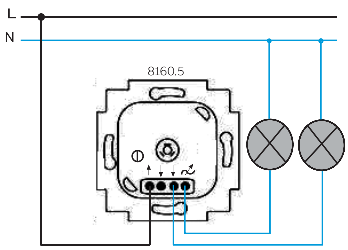
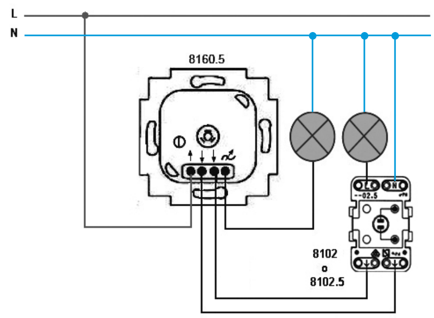


Fig. 2



Note:
The nominal power depends on the ambient temperature. In addition, when calculating the nominal power note the transformer losses (20%).

Rotatory dimmer, RC, 40-420 W

8160.7

230 V~ / 50 Hz.
40-420 W
40-420 VA

- Mechanism valid for cover and button of ref. 5560, 8260.2, 8460.2 and 8560.2
- Types of loads: incandescent and/or halogen lamps at 230V and/or halogen with electronic transformer.

- Protection against short circuit: electronic
- Protection against overload: electronic
- Range of ambient temperature: 0 - +35°C

Fig. 1

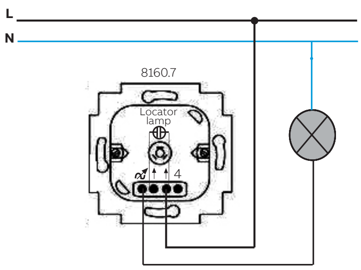
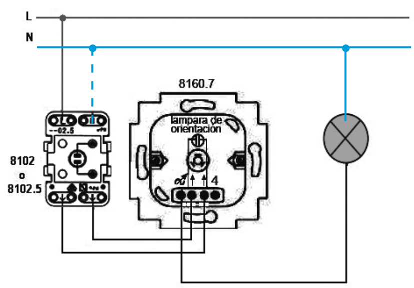


Fig. 2



Note:
The nominal power depends on the ambient temperature. In addition, when calculating the nominal power note the transformer losses.

* If you wish to fit a night guide light use the 8102.5

Technical details

Sky Niessen

Rotatory dimmer, RLC, 60-420 W & Rotatory dimmer remote control

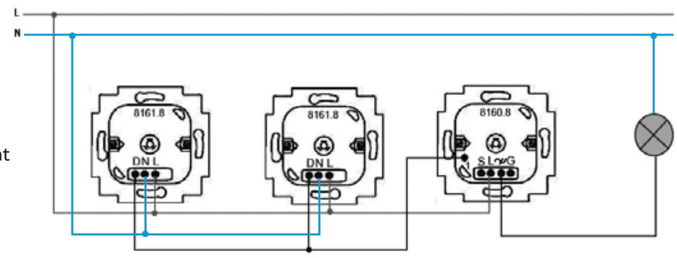
8160.8 & 8161.8

230 V~ / 50 Hz
60-420 W
60-420 VA
60-420 VA

- Mechanism valid for cover and button Ref: 5560, 8260.2, 8460.2 and 8560.2
- The principal mechanism (8160.8) may be connected to up to 5 auxiliary elements (8161.8) which also regulate the load.
- Range of ambient temperature: 0 to +35°C

- Maximum number of auxiliary elements with an 8160.8: 5 units
- Maximum length of cable 100 m.
- Range of ambient temperature: 0 to +35°C
- Mechanism valid for cover and button Ref: 5560, 8260.2, 8460.2

* The connection N is only necessary if a night guide light is used in the regulator.



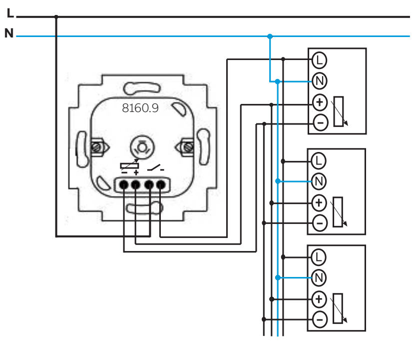
Note:
The nominal power depends on the ambient temperature.
In addition, when calculating the nominal power note the losses of the conventional (20%) and electronic (5%) transformers.

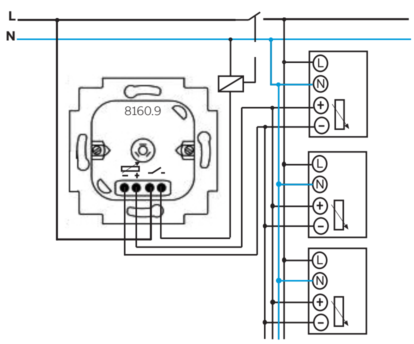
Rotatory dimmer, 1-10Vdc

8160.9

230 V~ / 50 Hz.
700 VA

- Mechanism valid for cover and button of ref. 5560, 8260.2, 8460.2 and 8560.2
- Valid for fluorescent lights with dimmable electronic ballast.
- Power: 700 VA
- Control voltage: 0/1 - 10 V DC
- Ballast control max. current: 50 m A DC.
- The night guide light must not be installed with this regulator.





Technical details

Sky Niessen

Rotatory dimmer remote control

8130

230 V~ / 50 Hz; ±10%
60-450 W
60-450 VA
60-450 VA

- Two-wire connection.
- Enables two operating modes selected with the front potentiometer: Regulator and Switch Modes.

- Range of ambient temperature: from 0 to +35°C.
- For manual operation exclusively, use the buttons Ref.: 8530, 8430, 8230 and 5530. (Fig. 2).

Fig. 1

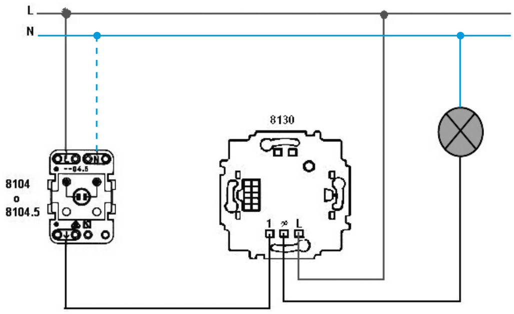
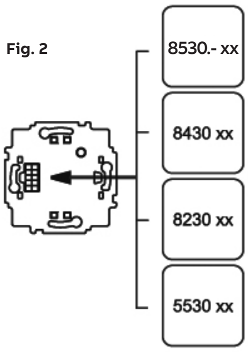


Fig. 2



* If you wish to fit a night guide light, use the 8104.5

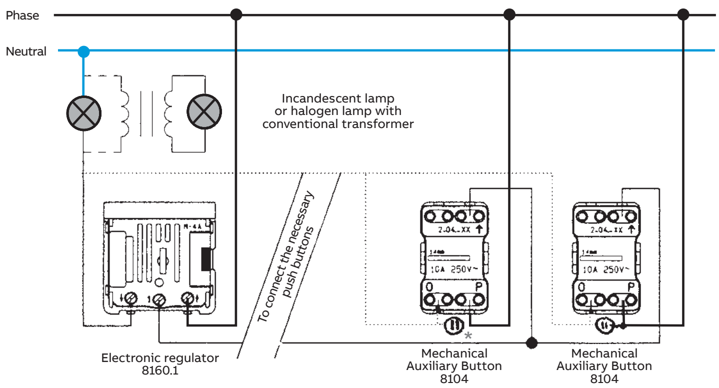
Note:

The nominal power depends on the ambient temperature. In addition, when calculating the nominal power note the losses of the conventional (20%)and electronic (5%) transformer.

Universal push dimmer 40-450W

8160.1

Mains voltage: 127 V~ / 60 Hz
220 V~ / 50 Hz
Power: - at 220 V~ / 50 Hz: 40 - 450 W
40 - 400 VA



Its special characteristics enable convenient remote control using conventional buttons, deriving one conductor only, and thus simplifying the electrical installations as the traditional switched installations can be replaced.

Short press:
If the regulator was switched off, with a short press the maximum lighting is always connected. If the regulator is switched on, with a short press it is disconnected. A short press is understood to be between 50 ms and 400 ms.

Long press:

If the regulator was switched off, with a long press, it is connected from minimum lighting and continues the regulation until the button is released. If the regulator was switched off, with a long press, the regulation process starts from the point it was at and until the button is released. A long press is understood to be greater than 400 ms.
Protection against overcurrents: With calibrated fuse Code T-2A. It is supplied with a spare.
Protection against erroneous connections: With electronic device. From min. to max. 3.8 seconds.
Night guide display: With red LED. Operating temperature: 0 °C to 30 °C.
Suppression of interference according to Standards: UNE-20507 and UNE-21806, EN 55014 and EN 60555.

*** If you want a night guide light, use the 8104.5**

Rotatory DALI dimmer & Rotatory DALI dimmer with power supply

8161.4 & 8161.5

8161.5	
Nominal voltage (through the DALI external power supply)	9,5 – 22,5 V ⎓
Power consumption (depending on the color of the guide light)	7 – 15 mA
Connection for electronic	protection
Maximum number of DALI service units that can be connected (depending on the external power supply)	64
Service temperature	0 °C – +35 °C
Protection class	IP20
Maximum cable length in the system	300 m
Number of color of the guide light	18 + disconnected

8161.4	
Nominal voltage	230 V~ ±10 % ; 50/60 Hz
Power consumption	7 – 15 mA
Gap voltage. Output voltage	15,5 V ⎓
Maximum usable current	75 mA
Connection for electronic	protection
Maximum number of DALI service units that can be connected	37
Service temperature	0 °C – +35 °C
Protection class	IP20
Maximum cable length in the system	300 m
Number of color of the guide light	18 + disconnected

Technical details

Sky Niessen

Rotatory DALI dimmer & Rotatory DALI dimmer with power supply

8161.4 & 8161.5

Operation

1- Attenuation speed:

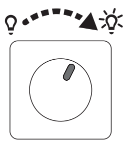


Fig. 1:

Slow rotation of the control element:
– Precision setting with up to 254 levels of luminosity.

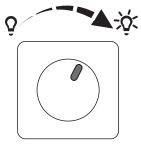


Fig. 2:

Quick rotation of the control element:
– Large changes in luminosity to reach the desired setting rapidly.

2- Adjusting the basic luminosity:

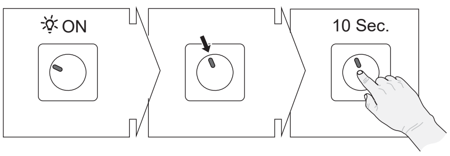


Fig. 3:

To set the basic luminosity, turn the control element slowly.

1. Switch on the lighting.
2. Adjust the lighting.
3. Press the control element for 10 seconds.
   – Once the configuration has been carried out, the load will blink once.

3- Deleting the basic luminosity:

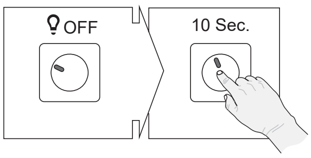


Fig. 4:

To delete the basic luminosity, turn the control element slowly.

1. Turn off the lighting.
   Press the control element for 10 seconds.
   – Once the configuration has been carried out, the load will blink once.

4- Switching on with the memory function:

The DALI potentiometers always switch on the lighting with the last value of luminosity set (memory function). This function overwrites the manual setting of the luminosity connection.

5- Modifying the connection luminosity:

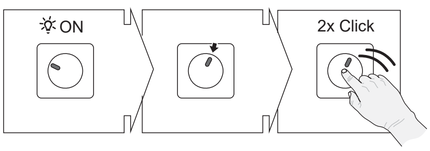


Fig. 5:

To adjust an established luminosity connection the following points must be executed:

1. Switch on the lighting.
2. Adjust the lighting.
3. Double click quickly on the control element.
   – Once the configuration has been carried out, the load will blink twice.

The memory function overwrites the luminosity connection established (connection with the last luminosity value it had before the disconnection).

Note:
If the lighting is disconnected after pressing twice is because the interval between the first and second time the button was pressed too long.

6- Deleting the connection luminosity:

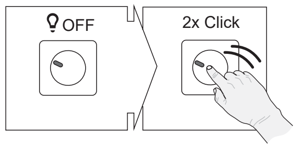


Fig. 6:

To delete an established luminosity connection the following points must be executed:

1. Switch on the lighting.
2. Double click quickly on the control element.
   – Once the configuration has been carried out, the load will blink twice.

The memory function works again after deleting the luminosity connection established (connection with the last luminosity value it had before the disconnection).

7- Adjusting the colour of the guide light:

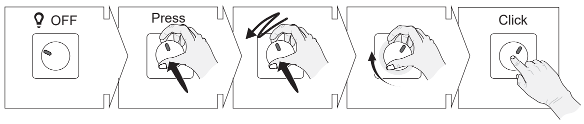


Fig. 7:

To change the color of the connection light, do the following:

1. Turn off the lighting (load).
2. Press the control element, hold it down and rotate it quickly three times from one side to the other.
3. Release the control element.
   – The guide light blinks 3 times.
4. Turn the control element to choose the color of the LED.
5. Confirm the color selected by pressing the control element briefly.
   – Once the configuration has been carried out, the guide light will blink 3 times.

8- Changing the Power On level (optional setting)

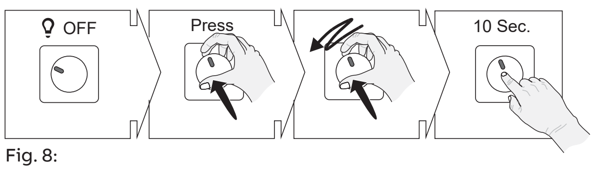


Fig. 8:

The modification of the Power On level (luminosity connection after a grid failure) achieves a standard luminosity or disconnects all the service equipment connected with the luminosity value it had before the power cut.
To modify the Power On level, do the following:

1. Turn off the lighting (load).
2. Press the control element, hold it down and rotate it quickly three times from one side to the other.
3. Release the control element.
   – The guide light blinks 3 times.
4. Press the control element for 10 seconds.
   – After the configuration has been carried out, the lighting (load) will blink once and the guide light will blink 3 times.

The DALI service units will now be connected now with the return of the grid voltage with the last luminosity value set.

9- Operation in various control stations

The DALI service units can be operated from various control stations. The luminosity is always taken from the last potentiometer used. This is valid for the rest of the configuration, such as the basic luminosity and the memory function.
The color of the guide light has to be selected individually for each DALI potentiometer in an installation.

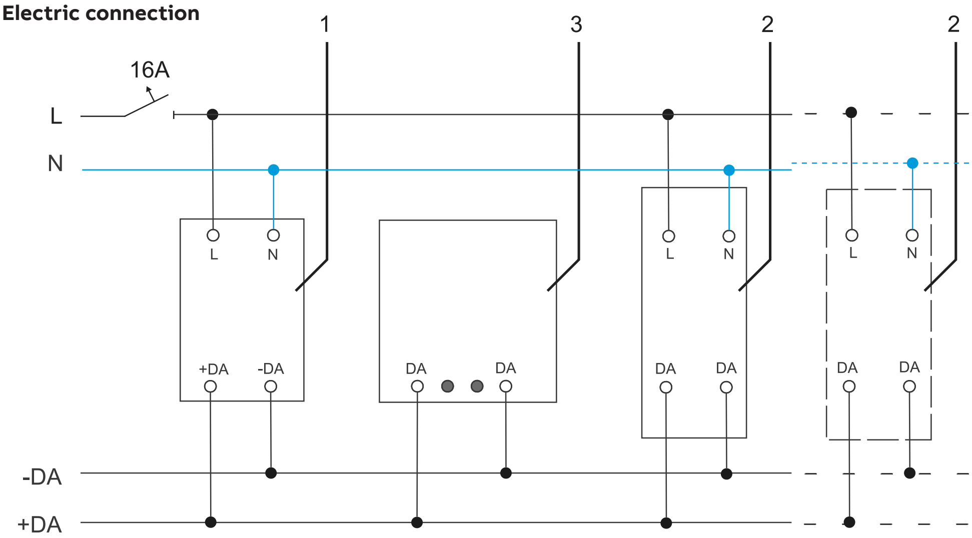
Technical details

Sky Niessen

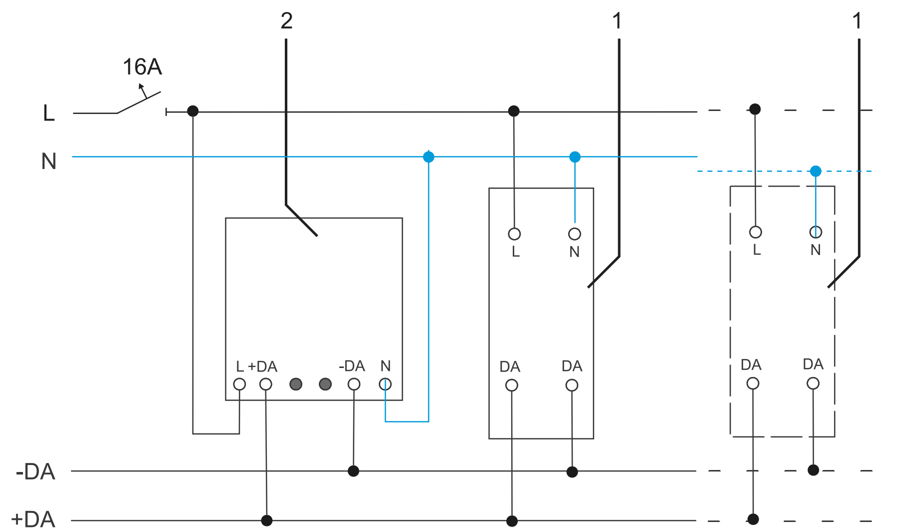
Rotatory DALI dimmer & Rotatory DALI dimmer with power supply

8161.4 & 8161.5

Electric connection



No.	Function
1	DALI power supply
2	DALI service unit
3	8161.4



No.	Function
1	DALI service unit
2	8161.5

Note:

- If the potentiometer DALI 8161.4 is used in installations with a DALI power supply, terminals L and N cannot be occupied. The device is supplied directly with current from the bus.
- Up to 3 DALI 8161.4 and 5 DALI 8161.5 potentiometers can be operated in parallel. For this purpose, observe the power consumption permitted.
- When the DALI service units e.g., EVG are connected, observe the indications of the corresponding manufacturer.
- The DALI control line and the power supply line can be found in a shared NYM cable.
- Multi-phase service is permitted.

Technical details

Sky Niessen

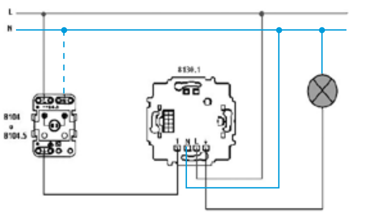
Universal single relay time delayed switch

8130.1

230 V~ / 50 Hz; ±10%
2300 W
2300 VA
2300 VA
2300 VA

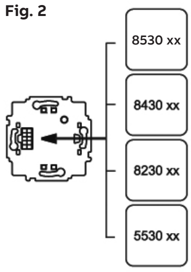
- Enables two operating modes selected with the front potentiometer: Switch Mode and Time-delayed Mode (30-300 s).
- For all types of loads.
- Range of ambient temperature: from 0 to +35°C.
- For manual operation exclusively, use the buttons Ref.: 8530, 8430, 8230 and 5530. (Fig. 2).

Fig. 1



8130.1 with auxiliary button 8104.5

Fig. 2



* If you want to fit a night guide light, use the 8104.5.

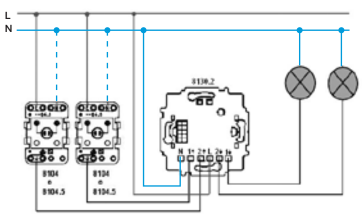
Universal double relay time delayed switch

8130.2

230 V~ / 50 Hz; ±10%
2 x 700 W
2 x 700 VA
2 x 700 VA
2 x 700 VA
M 2 x 700 VA

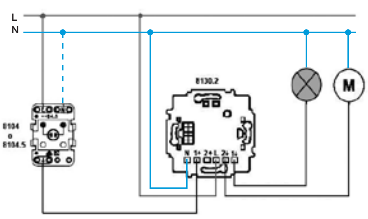
- Enables two operating modes selected with the front potentiometer: Double switch mode and time-delayed disconnection mode of load 2, after the disconnection of load 1 (30-300 s).
- For all types of loads.
- Range of ambient temperature: from 0 to +35°C.
- For manual operation exclusively, use the buttons Ref.: 8530, 8430, 8230 and 5530. (Fig. 2) for time-delayed mode only.

Fig. 1



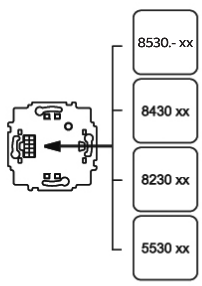
8130.2 with auxiliary buttons (8144.2, 8104.5) and two lamps.

Fig. 2



8130.2 with an auxiliary button (8104.5), a lamp and a motor. To control combinations of light and fans in bathrooms.

Fig. 3



* If you want to fit a night guide light, use the 8104.5

Technical details

Sky Niessen

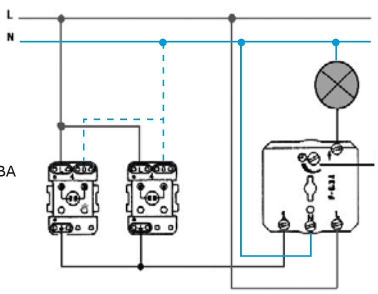
Time delayed switch with relay

8162

- Power supply: 230 V~ / 50 Hz
- Maximum power:
1.000 W
1.000 VA for cos φ = 0,6
650 VA

The time-delayed switch is an electronic mechanism that automatically disconnects the component controlled, within an adjustable time interval. It is activated manually by pressing the button directly. Activation by remote control is with conventional auxiliary buttons.

CONVENTIONAL BUTTONS
8104 or 2104 BM/BA or 2204 BM/BA or N2204 BL/AN/PL



* If you want to fit a night guide light, use the 8104.5.

- Protection against overcurrents:
  With calibrated fuse Code T5A.
  It is supplied with a spare.
- Protection against erroneous connections:
  With electronic device.
- Regulation time: From 10 s to 10 min.
- Night guide display: With red LED.
- Operating temperature: 0º to 40 °C.
- Suppression of interference according to Standards:
  UNE-20507 and UNE-21806, EN 55014 and EN 60555.

Time delayed switch with triac

8162.1

Technical data:
Power supply: 230V~ ±10% / 50Hz
Maximum power:
40-500W for
40-400VA for
40-100VA for
Protection against overcurrents: With calibrated fuse F-3, 15H.
It is supplied with a spare.

Protection against erroneous connections: with electronic device.
Regulation time: From 10 s to 10 min. (±10%).
Night guide display: With red LED.
Operating temperature: 0 to 40 °C.

Manufactured in accordance with the standards:
UNE-EN-60669-1 • UNE-EN-60669-2-1 • UNE-EN-60699-2-3

Operation:
The time-delayed switch is an electronic mechanism that automatically disconnects the component controlled, within an adjustable time interval. It is activated by pressing the button directly.
The desired margin of time for the disconnection of the device is regulated using the adjusting screw, indicated in Figure 1. The margin of time that can be set ranges between 10 seconds and 10 minutes (±10%).

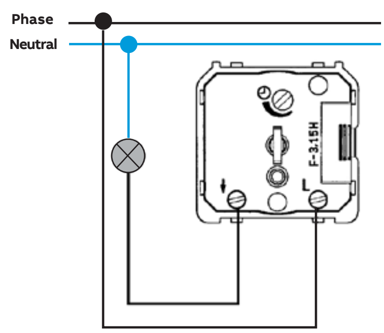


fig.1

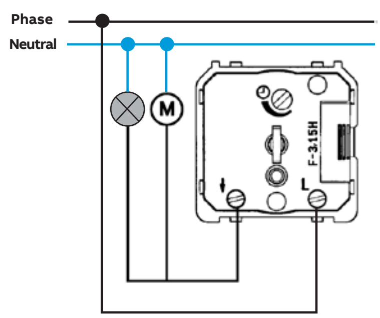


fig.2

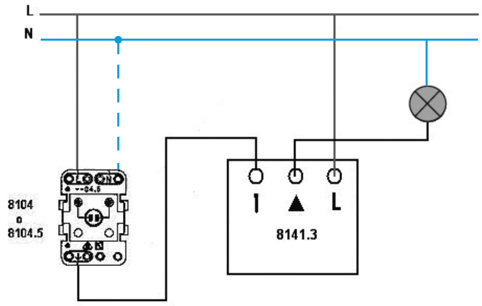
Technical details
Sky Niessen

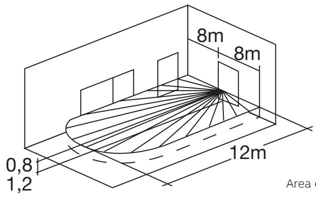
MOS-Fet switch for motion sensor
Switch 8141.3

Switch 8141.3
Nominal voltage: 230 V~ 50 Hz.
Minimum nominal power: 60 W/VA
Maximum nominal power: 420 W/VA
Permitted load: incandescent lamps, halogen lamps at 230 V and halogen lamps with conventional and electronic transformers. Protected against overloads and short circuit.
Operating temperature: From 0°C to 35°C.
Protection against short circuits with fuse Code M-4 A.

Note:
Do not use the mechanism 8141.3 with contactors; in these cases use the 8141.4.
An auxiliary button (8104) can be connected, if you wish to operate the load manually.

Switch 8141.3



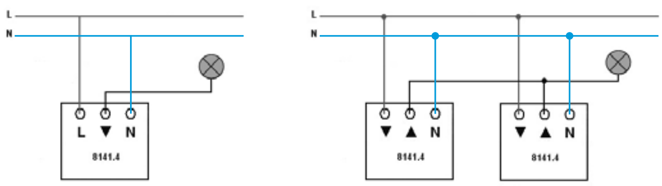


Area of detection

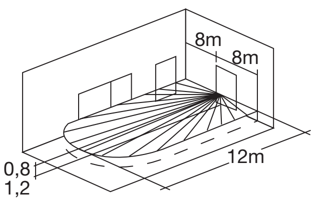
Note: To use the 8141.3 in parallel, make sure the minimum load is increased by: no. of devices x 60 W
In these applications, the light sources must be outside the detection area to prevent the disconnection due to a Sensor Switch being interpreted as a thermal variation by the other Sensor Switch, causing an unwanted connection.
* If you want to fit a night guide light, use the 8104.5.

Relay switch for motion sensor
Switch 8141.4

Nominal voltage: 230 V~ / 50 Hz.
Maximum power: 700 W / VA
3 A cos φ = 0,5
Permitted load: All types of loads.
Operating temperature: From 0°C to 35°C



Area of detection

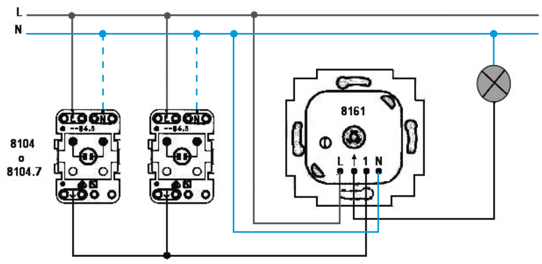


In these applications, the light sources must be outside the detection area to prevent the disconnection due to a Sensor Switch being interpreted as a thermal variation by the other Sensor Switch, causing an unwanted connection.

Technical details
Sky Niessen

Relay switch
8161

230 V~ / 50 Hz
For all types of loads
Power 2300 W/VA



Installation with auxiliary buttons
Device 8161 can be operated with auxiliary buttons. In these cases, the following aspects have to be taken into account:
- To avoid switching faults, the power supply lines of the motor and the auxiliary elements must not be in the same cable or next to each other (the minimum distance must be 5 cm).
The following auxiliary elements can be used:
- Conventional mechanical buttons with or without potential-free terminals.

*** Attention:**
If you want to fit a night guide light, use the 8104.5

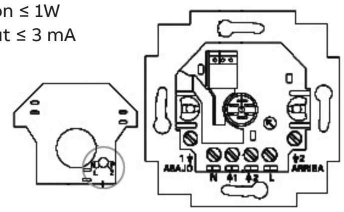
To ensure proper operation, **separate the switching lines from the auxiliary activation lines (in different conduits).**

Can be combined with the IR button, with the programmer 8165.3 and with the presence sensor 9511.

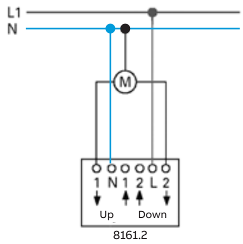
Relay switch for blinds
8161.2

Power 700W/VA
I nominal - 3A cos φ 0.5
Power consumption ≤ 1W
Max I per aux. input ≤ 3 mA

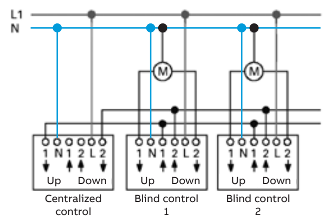
View of the whole unit



Individual control



Centralized control



The IR button 8439.XX and the programmer 8165.3 can control a group of blind motors by operating the auxiliary inputs (“1” and “2”) of the blind control device. Using a two-pole switch for blinds, the group of blinds can be moved manually or the sensor can be activated for periods of absence.
The recessed device 8161.2 is used to control:
• Blinds with mobile slats.
• Rolling blinds.
• Awnings.
• Closures with motorised domes or vaults, etc.
In this instruction manual the term “blind” or “blinds” as synonyms of the applications mentioned in the above paragraph.
Mechanism that can be combined with the programmer 8165.3

Service modes

Normal service (N) = factory setting
Example of use: “normal” activation of the blind.
One short press activates the order of actuation that activates the blind to its final position (up or down). A long press (holding it down) activates a regulation command. The output will remain permanently connected throughout the setting using the control element/extension.
If the regulation lasts more than three minutes, the recessed application will be disconnected.

Regulation of slats (L)
Example of use: “normal” activation of the blind and regulation of slats in small stages. The short press is identical to that of normal service. The output is regulated in steps during adjustment using the control element/extension. After the eighth step or 2 seconds the adjustment ends.

“Central” (Z)
Example of use: a recessed control blind application is used as a central unit for other blinds. Each press (short or long) of this central unit is interpreted and converted into a 3-minute activation command. This ensures that all the subordinate blinds reach the final position.

Programming (P)
Example of use:
in the event of a command to lower, the blind must automatically be lowered and the slats regulated.

Technical details
Sky Niessen

Timer control element + Cover plate for timer control element
8165.31 + 8565.3

Loads that are usually automated/programmed:
• Porch lights
• Garden lights
• Lights in corridors in schools, universities, shops, etc.
• Blinds in a house
• Shop awnings
• Alarm activation
• Heating or air conditioning
• A small wake-up alarm (next to the bell)

For all these applications there are two construction types for the function:
- 8161+8165.31+8565.3: To function as a relay switch.
- 8161.2+8165.31+8565.3:
To function as a relay switch for blinds, awnings, etc. Enables slats to be regulated, all the blinds to be centralized from one point and awnings to be operated.

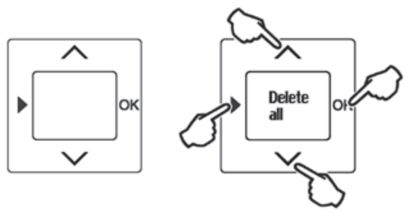
See diagrams of relay switches.

Service modes
The control element has three service modes that you can select freely.
- “**MANUAL**” (symbol)= The automatic connection intervals, and the luminosity and twilight functions (with the blinds) are not executed. Exclusive control with the buttons ▼ or ▲.
  RAISE blind ▲
  Short press:
  - The blind moves toward the final upper position.
  - When pressed again, the blind stops.
  Long press:
  - The blind is raised while the button is being pressed.
  LOWER blind ▼
  Short press:
  - The blind moves toward the final lower position.
  - When pressed again, the blind stops.
  Long press:
  - The blind is lowered while the button is being pressed.
- “**AUTOMATIC**” (symbol **AUTO**) = Automatic control according to the selected program: Astro, day-week, connection times.
Manual control with the buttons ▼ or ▲ is also possible.

- “**HOLIDAYS**” (symbol)= control as in automatic service. A random number generator moves the connection intervals up to 30 minutes each day to simulate the presence of a person in the home. Manual control with the buttons ▼ or ▲ is also possible.

Types of connection
The control element can work with three different types of connection: **“daily clock newspaper”**, **“weekly clock”** or **“weekly clock with Astro device”**.
- **Daily clock:** When programming the connection times, the day of the week cannot be selected. Thus, the times you program are repeated every day.
- **Weekly clock:** When programming the connection times, the days of the week are available (1 for Monday up to 7 for Sunday.) Thus it can be programmed differently for each day of the week.
- **Weekly clock with Astro:** Together with the programming of the days of the week, it is possible to activate the Astro function with each connection time.

Indications on the display
1 Current weekday / info line.
2 Info line / date.
3 Operating mode.
4 Time / switching time.
5 Display on the blind insert: Arrows up down during movement time;
Display on the light insert:
OFF / light value in %;
Display on the relay insert: ON / OFF.

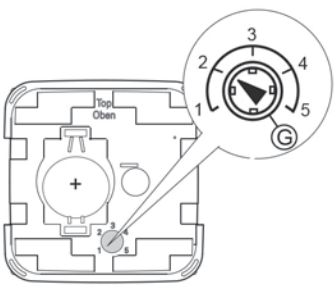


Button	Function	In setting mode	Adjusting values	Reset to factory setting
▶	Calling up menu level and switching to setting mode	Return to operating mode		
^	Blind UP/ Light ON (brighter)/ Electric load ON	Select menu item	Adjust values	In operating mode press all buttons of the rocker switch simultaneously for approx. 5 seconds.
v	Blind DOWN/ Light OFF (darker)/ Electric load OFF			
OK	Switching operating modes, Switching times today, Displaying sensor values, Confirmation.	Select menu	Accept value	

Link for button with battery and wireless switch actuator
8531.X & 8130.4

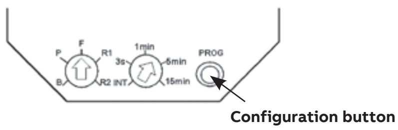
1- Selecting the functioning of the button with battery

The battery transmitter must have Switch operation mode (mode 2) selected.



2- Configuring the wireless receiver actuator

The wireless receiver actuator basically offers two operating modes:
a) Switch mode: Potentiometer position “INT”
b) Time-delayed switch mode: We can time the disconnection of the actuator to the desired time, 3 s, 1 min, 5 min, 15 min.
To select the actuator operating mode, turn the potentiometer so that it points to the corresponding position.



Technical details

Sky Niessen

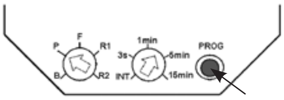
Link for button with battery and wireless switch actuator

8531.X & 8130.4

2.1.- Configuring a link between transmitter and receiver channel of the wireless actuator.

Details are provided below on the association between a transmitter (wireless button, wireless touch control, wireless motion sensor, etc.), and the receiver channel of the wireless actuator.

Turn the potentiometer of the wireless actuator to the position “P”. The LED of the configuration button will blink slowly in red.



Blinks slowly in red

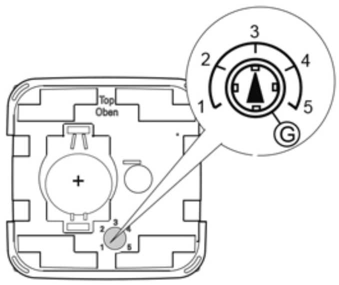
2.2.- Press the configuration button; the LED of the configuration button will blink quickly in red.

Blinks quickly in red

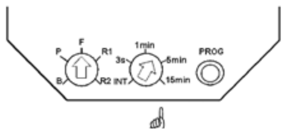
At this moment the wireless actuator is waiting to accept a link with a transmitter channel. (wireless button, wireless touch control, wireless motion sensor, etc.).

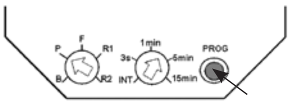
2.3.- Linking with the transmitter channel:
- to link with the button with battery, press the lower part of the button briefly. The LED of the button will remain red for a few seconds and go off.
- to link with a touch control.
- wireless motion sensor.

2.4.- Place the transmitter and receiver in operation mode:
- Turn the potentiometer of the battery to position “3”

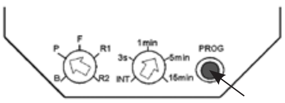


- Turn the potentiometer of the chip to position “F”





3 blinks in green



3 blinks in red

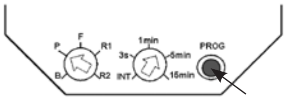
2.5.- To act on the load: Short and long presses turn on/off.

3- Deleting a link from the receiver channel of the wireless actuator

3.1.- Turn the potentiometer of the wireless actuator to the position “Rst 1”, link erase mode.

LED in red

3.2.- Press the configuration button for approximately 8-10 seconds; The LED of the configuration button will blink quickly in red.

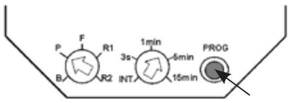


Blinks quickly in red

3.3.- Turn the potentiometer of the wireless actuator to the position “Rst 2”, link erase mode. If the link has been deleted successfully, the wireless actuator will leave configuration mode and the configuration button will blink in green 3 times.

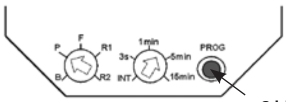
3.4.- Press the configuration button for 4 seconds; The LED of the configuration button will blink quickly in red.

3.5.- If the link has been deleted successfully, the wireless actuator will leave configuration mode and the configuration button will blink in green 3 times.



3 blinks in green

If the link has not been deleted successfully, the wireless actuator will leave configuration mode and the configuration button will blink in red 3 times.



3 blinks in red

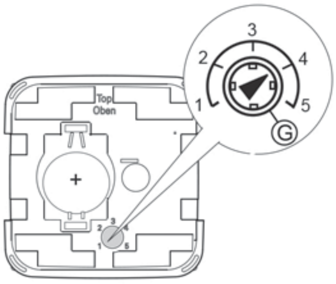
Similarly if after one minute there is no attempt to establish an association for the deleted link, the wireless actuator will leave configuration mode automatically.

Technical details
Sky Niessen

Link for button with battery and wireless dimming actuator
8531.X & 8130.5

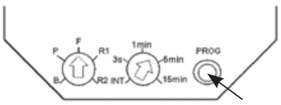
1- Selecting the functioning of the button with battery

The battery transmitter must have regulation operation mode (mode 4) selected.



2- Configuring the wireless receiver actuator

The wireless receiver actuator basically offers two operating modes:
a) Switch mode: Potentiometer position "INT"
b) Time-delayed switch mode: We can time the disconnection of the actuator to the desired time, 3 s, 1 min, 5 min, 15 min.
To select the actuator operating mode, turn the potentiometer so that it points to the corresponding position.

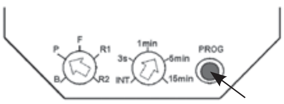


Configuration button

2.1.- Configuring a link between transmitter and receiver channel of the wireless actuator.

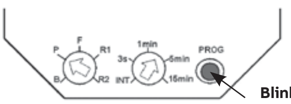
Details are provided below on the association between a transmitter (wireless button, wireless touch control, wireless motion sensor, etc.), and the receiver channel of the wireless actuator.

Turn the potentiometer of the wireless actuator to the position "P". The LED of the configuration button will blink slowly in red.



Blinks slowly in red

2.2.- Press the configuration button; the LED of the configuration button will blink quickly in red.



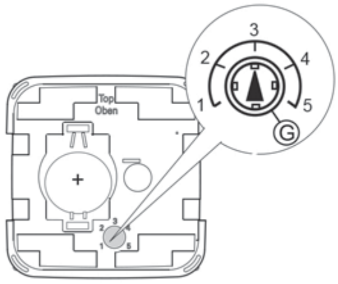
Blinks quickly in red

At this moment the wireless actuator is waiting to accept a link with an transmitter channel. (wireless button, wireless touch control, wireless motion sensor, etc.).

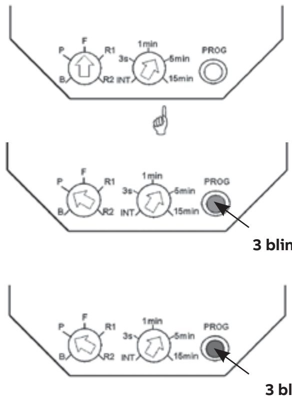
2.3.- Linking with the transmitter channel:
-to link with the button with battery, press the lower part of the button briefly. The LED of the button will remain red for a few seconds and go off.
- to link with a touch control.
- wireless motion sensor.

2.4.- Place the transmitter and receiver in operation mode:

- Turn the potentiometer of the battery to position "3"



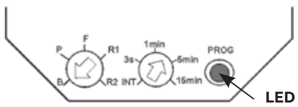
- Turn the potentiometer of the chip to position "F"



2.5.- To act on the load:
- Short press up, turn on
- Short press down, turn off
- Long press up, regulate upward
- Long press down, regulate upward

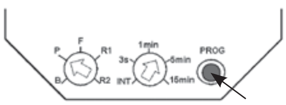
3- Deleting a link from the receiver channel of the wireless actuator

3.1.- Turn the potentiometer of the wireless actuator to the position "Rst 1", link erase mode.



LED in red

3.2.- Press the configuration button for approximately 8-10 seconds; The LED of the configuration button will blink quickly in red.



Blinks quickly in red

3.3.- Press the configuration button for 4 seconds; The LED of the configuration button will blink quickly in red.

11

Technical details

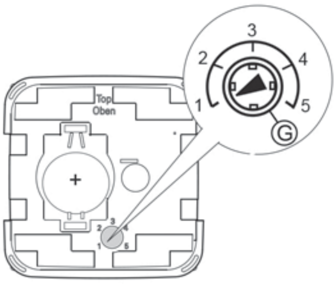
Sky Niessen

Link for button with battery and wireless blind actuator

8531.X & 8130.7

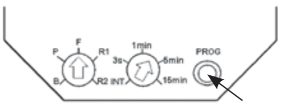
1- Selecting the functioning of the button with battery

The battery transmitter must have blinds operation mode (mode 1) selected.



2- Configuring the wireless receiver actuator

The wireless receiver actuator basically offers two operating modes:
a) Switch mode: Potentiometer position “INT”
b) Time-delayed switch mode: We can time the disconnection of the actuator to the desired time, 3 s, 1 min, 5 min, 15 min.
To select the actuator operating mode, turn the potentiometer so that it points to the corresponding position.

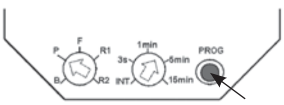


Configuration button

2.1.- Configuration of a link between transmitter and receiver channel of the wireless actuator.

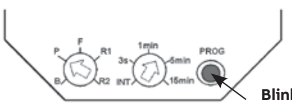
Details are provided below on the association between a transmitter (wireless button, wireless touch control, wireless motion sensor, etc.), and the receiver channel of the wireless actuator.

Turn the potentiometer of the wireless actuator to the position “P1”.
The LED of the configuration button will blink slowly in red.



Blinks slowly in red

2.2.- To link with the button with battery, press the upper part of the button briefly. The LED of the button will remain green for a few seconds and go off.

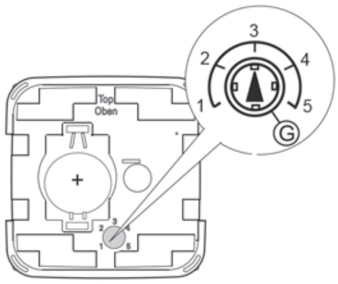


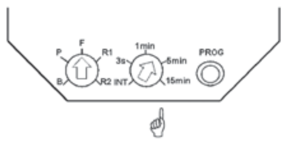
Blinks quickly in red

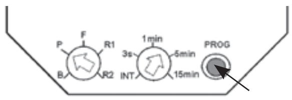
At this moment the wireless actuator is waiting to accept a link with an transmitter channel. (wireless button, wireless touch control, wireless motion sensor, etc.).

2.3.- Turn the potentiometer of the wireless actuator to the position “P2”. The LED of the configuration button will blink slowly in red.

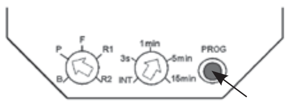
2.4.- To link with the button with battery, press the lower part of the button briefly. The LED of the button will remain green for a few seconds and go off.







3 blinks in green



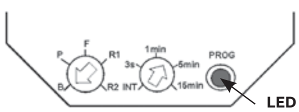
3 blinks in red

2.5.- Place the transmitter and receiver in operation mode:

- Turn the potentiometer of the battery to position “3”
(image of dial instructions)
- Turn the potentiometer of the chip to position “F”
(image of chip) 2.5-To act on the load:
Short press: If the blind is moving, it will stop. And if the blind is stopped, it will be raised/lowered one step or the slats rotated.
Long press: Raises/lowers the blind for the programmed time, with the selector with the electronic mechanism.

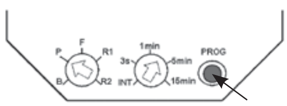
3- Deleting a link from the receiver channel of the wireless actuator

3.1.- Turn the potentiometer of the wireless actuator to the position “Rst 1”, link erase mode.



LED in red

3.2.- Press the configuration button for approximately 8-10 seconds; The LED of the configuration button will blink quickly in red.



Blinks quickly in red

3.4.- Press the configuration button for 4 seconds; The LED of the configuration button will blink quickly in red.

Technical details

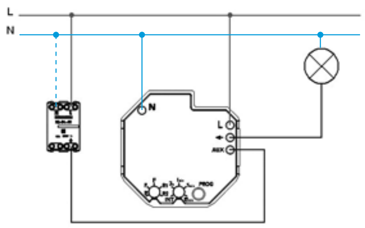
Sky Niessen

Wireless switch actuator

8130.4

230 V~ / 50 Hz
2300 W / VA
2300 W / VA
2300 W / VA
1000 VA

- Transmission frequency: 868 MHz.
- Allows two operating modes:
  - Switch and time-delayed from 3 s to 15 min.
- One auxiliary input and one relay output.
- It has a potentiometer to select the operating modes and for configuration.
- Dimensions: 47 mm. x 48 mm. x 22 mm.

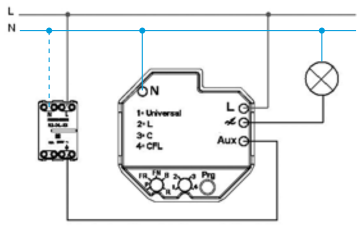


Wireless dimming actuator

8130.5

230 V~ / 50 Hz ±10%
25-350 W / VA
25-350 W / VA
25-350 W / VA

- Transmission frequency: 868 MHz.
- Allows 4 operating modes:
  - Universal, type C loads, L loads and ESL loads.
- An auxiliary input and adjustable output.
- It has a potentiometer to select the operating modes and for configuration.
- Dimensions: 47 mm x 48 mm x 30 mm
- Suitable for most low consumption LED lamps with phase-cut dimmers.



Wireless blind actuator

8130.7

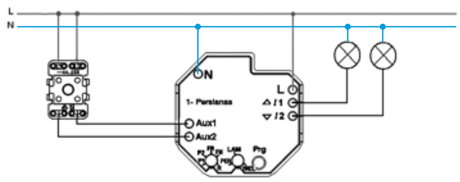
230 V~ / 50 Hz ±10%

- Allows two operating modes:
  - 2 independent relays:
    - 2 x 700 W/VA.
    - Nominal current 3AX.

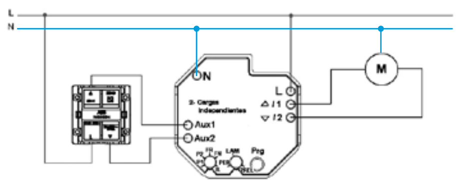
Use of contactors in installations with fluorescents is recommended.

- Blinds: - 700 W/VA
  - 3AX

Installation of 2 Loads



Installation of Blinds

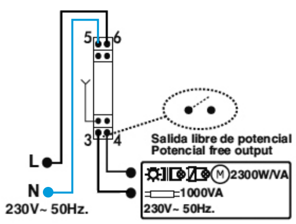


Wireless DIN-rail actuator

8130.6

230 V~ / 50 Hz
2300 W / VA
2300 W / VA
2300 W / VA
1000 VA

- Transmission frequency: 868 MHz.
- Allows two operating modes:
  - Switch and time-delayed from 3 s to 30 min.
- It has a potentiometer to select the operating modes and for configuration.

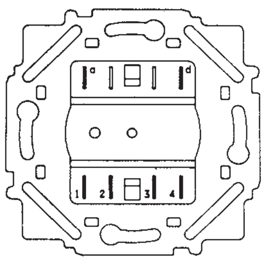


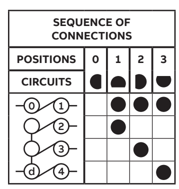
4 position rotatory switch

8154

4 positions and 4 circuits.

The connection must be made with "Faston" type terminals.

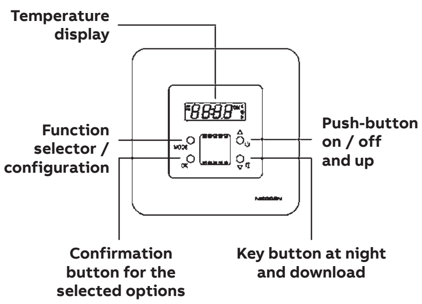




Technical details
Sky Niessen

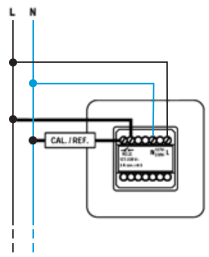
Digital room thermostat
8140.5

Technical data:
Power supply: 230 V~ ± 10%, 50 Hz for ref. 8140.5
127 V~ ± 10%, 60 Hz for ref. 8840.5
Consumption: < 1 W
Usage temperature: From 0 °C to 50 °C.
• Accuracy of the measurement: ± 2 °C (± 1 °C with calibration)
• Resolution: 0.1 °C.
Control output: Voltage-free relay contacts (NO)
• Maximum load: 3 A cos φ = 0.5
Operating mode of the output relay:
• Hysteresis: 0.5 °C.
• Pulse width modulation: With a difference of ± 4 °C compared to the setpoint temperature, variable from 100% to 0% modulation.
This control makes it possible to control heating and cooling devices (not simultaneously) using its internal electronic thermostat.
The thermostat can be calibrated in situ.
• **Nocturnal operating mode “ ☾ “:**
Based on establishing a difference between day and night temperatures (from 0 °C to 5 °C) with the purpose of saving energy.

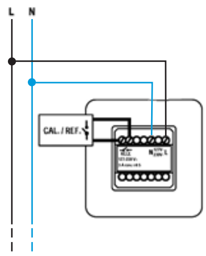


Connection diagram:

For heating and cooling installations with non-potential-free input.



For heating and cooling installations WITH potential-free input.



• **Winter mode** “ ”:
Selected when the unit controlled is a heating unit.
• **Summer mode** “ ”:
Selected when the unit controlled is an air conditioning unit.
• **Temperature regulation by hysteresis:**
In this operating mode of the output, the unit to be controlled is working constantly until it reaches the setpoint temperature, at which point it is disconnected and will not be re-activated until the ambient temperature is more than 0.5 °C from the setpoint.
• **Temperature regulation by pulse width:**
With this configuration of the output type, the unit to be controlled is working constantly up to ± 4 °C of the setpoint temperature. From this moment, a cyclical series of switching the unit on/off (varying the ratio of time ON-OFF) until the setpoint temperature is reached. The use of pulse width regulation is especially recommended for electrical heating, heat pumps and electrothermic actuators.
Attention: To regulate between hysteresis and pulse width, the thermostat must not be on, in other words the “**ON**” must not be shown on the display.

In cases in which it is important to avoid a frequent change between switching on and off, for example in gas boilers, temperature regulation by hysteresis should be used, which is selected by default in the thermostat.

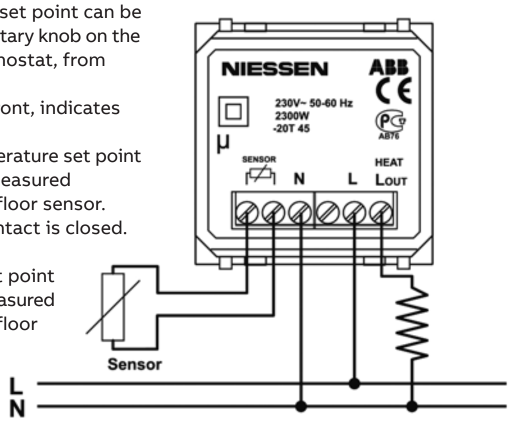
Floor thermostat
8140.9

1. Technical data
Voltage: 230V~ +/-10% 50-60Hz
Load power: 2 300 W
Load type: floor heating resistor.
Control temperature: +5 °C to +45 °C (Set point).
OFF state: at OFF position, the thermostat is off, so that it does not address the temperature measured by the floor temperature probe.
The relay output contact is open.
Temperature accuracy: 0,5 °C.
Hysteresis: 0,5 °C.
Floor temperature sensor: NTC, 10KΩ at 25 °C, -40°C to 80 °C.
Double isolated cable, 4m length.
LED light indication: red and green
Ambient temperature: -20 °C to 45 °C

2. Installation
In order to get the better temperature measurement performance possible at the floor thermostat installation, it is recommended:
- Install the thermostat higher than 1m height from the floor.
- Do not install the thermostat near other heat or cold sources.
- Keep the floor temperature sensor away from interference sources or power circuits.
- Check the floor temperature sensor is correctly connected.

3. Connection
Important: Disconnect the mains voltage power when installing.
Work on the 230 V supply system may only be performed by specialist staff! Disconnect main power supply prior to installation and/or disassembly!

4. Operation
The temperature set point can be adjusted by the rotary knob on the front of the thermostat, from +5 °C to +45 °C.
LED light in the front, indicates the following:
- Red color: Temperature set point is higher than measured temperature at floor sensor. Relay output contact is closed.
- Green color: Temperature set point is lower than measured temperature at floor sensor. Relay output contact is open.
- LED off: Thermostat is OFF state (disconnected).
- Blinking red color: (a) The floor temperature sensor would not be connected or (b) the temperature read by the floor temperature sensor is below.
- 40°C. Relay output contact is closed.



5. Guarantee
This product is subject to the guarantee offered in the selling general terms of ABB in each country.

Technical details
Sky Niessen

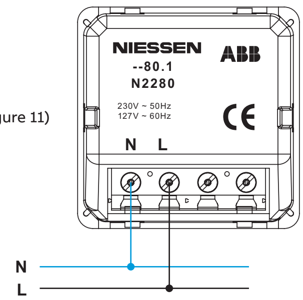
LED signaling light
8180.1

230 V~ / 50 Hz.
• Suppression of interference according to standards UNE-21806 and EN-55014
• At a distance of 1 meter, it provides a light flux greater than 2 lumen.
The indicators will light up provided they are connected to the grid voltage and this maintains its nominal voltage value. These electronic mechanisms do not have rechargeable batteries or auxiliary energy sources, for cases in which the grid voltage falls below the nominal value or 0 V.

The device is installed with a universal box for recessed mounting, with the same electrical connections shown in the figure.
Disconnect the grid voltage while installing the device.

Connection of the Indicator light.

(Figure 11)



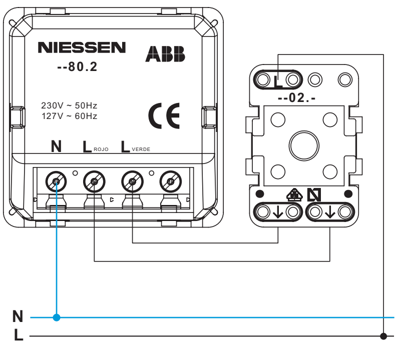
Connection of the device

LED DND/MUR signaling light
8180.2

230 V~ / 50 Hz.
• Suppression of interference according to standards UNE-21806 and EN-55014
• At a distance of 1 metre, it provides a light flux greater than 2 lumen.
The pass/wait indicator is a device that is connected to the grid voltage and is able to indicate with a green or red LED light, the wait or pass where it is located. Installed in conjunction with a conventional switch, it makes it possible to have an indicator to indicate free or restricted passage, as relevant at any time (Figure 1).
In addition it can be installed with a switch that has three possibilities, thus allowing standby status, signaling free passage, and restricted passage (Figure 2).

Connection of pass/wait indicator.

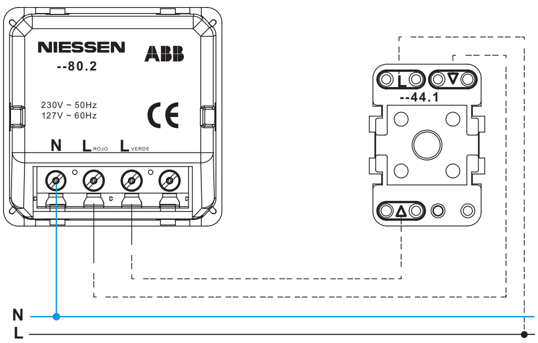
(Figure 1)



Connection of the device

Connection of pass/wait indicator.

(Figure 2)



Connection of the device

Beacon LED light
8181.2

1.- Introduction
The standard marker light is an autonomous indication device, with a battery for accumulating electrical energy, which guarantees the correct indication lighting of the communication routes of buildings in the event there is a power cut or when this falls below 70% of its nominal value (230 V).

2.- Technical Specifications 230 V~ / 50 Hz.
• Alert indication: This can be selected with the selector.
  a) lighting in blue or
  b) lighting in white
• Emergency lighting: high luminosity white.
• Nickel-Metal Hydride (NI-MH) battery, which currently have the lowest environmental impact.
• Autonomy: 3 hours, of which 1 h at maximum lighting. 2 h at lower lighting.

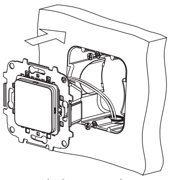
Remote control: Allows any type of component standardized regarding voltages.
• Compliant with the following regulations:
  RD 2816/1982 (BOE 6-11-92): General regulation of the police. Art. 15.2
  RD 314/2006 (BOE 28-03-06) Technical Building Code Section SU4.
  Sec. 2.2 Position and characteristics of lights.
  Sec. 2.3 Installation characteristics.
  REBT 2002, ITC-BT-28, section 5-g.
  UNE-EN60598-2-22
• Suppression of interference according to standards UNE-21806 and EN-55014.
• At a distance of 1 meter, it provides a light flux greater than 2 lumen.

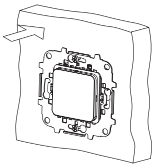
Technical details
Sky Niessen

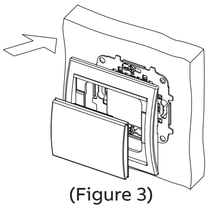
Beacon LED light
Autonomous LED marker light. 8181.2

3.- Installation
- Connect, fit and secure the marker lights to the box (square or circular with 60 mm between screws).
- For greater protection in public premises, the external part of the unit can be affixed with two screws, thus the external parts of the unit are secured more firmly, thus protecting against vandalism.

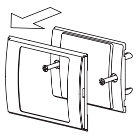
See assembly in Figures 1, 2 and 3:


(Figure 1)

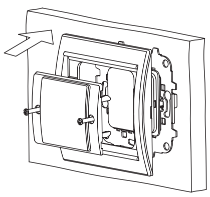

(Figure 2)


(Figure 3)

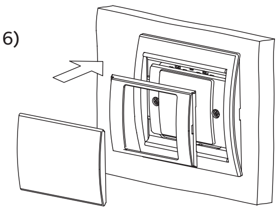
- Separate the diffuser support from the cover to be able to secure it to the marker light with the screws.

(Figure 4)


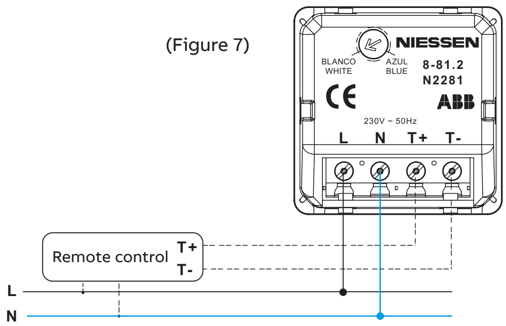
- Once the beacon has been secured to the box, position the frame and secure the diffuser support to the marker light.

(Figure 5)


- Fit the cover and the trim onto the diffuser support.

(Figure 6)


4.- Connection
The device is installed with its universal box for recessed mounting, with the same electrical connections shown in the figure.
Disconnect the grid voltage while installing the device.

(Figure 7)


Connection of the device

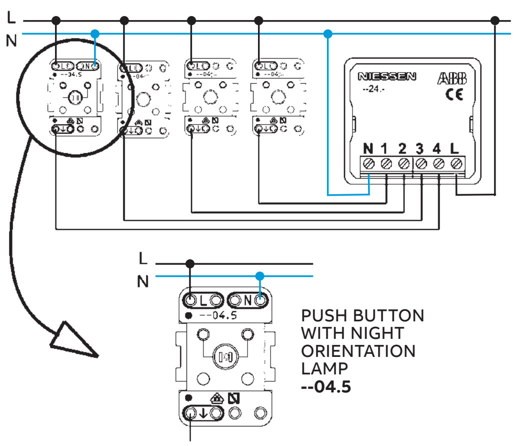
* The voltage of the remote controls may be 9, 13 or 24 Vdc.

Electronic bell
N2224.-XX

1. Technical data
Power Supply
- N2224.1: 127V~ ; 60Hz
- N2224: 230 V~ ; 50-60 Hz

2. Mounting and connection scheme
2.1. Connection
Important: Disconnect the mains when installing.

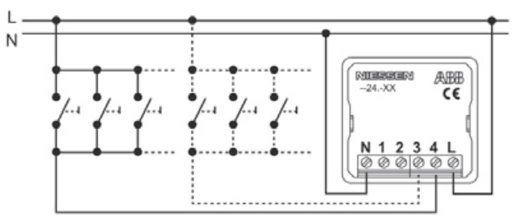
Connection with Niessen push buttons

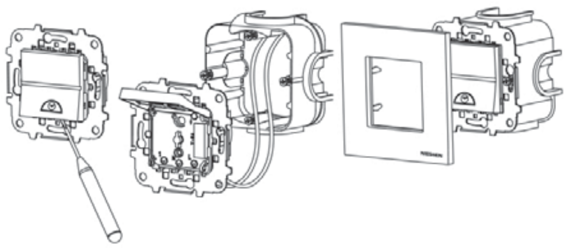


3. Operation
The bell can be connected to 4 push buttons maximum, with a different melody for each one of them.

4. Warranty
This product is subject to the warranty offered in the general conditions of sale of ABB in each country.

Connection with conventional push buttons





Technical details
Sky Niessen

FM stereo receiver with alarm module
9368 & 9368.7

1. Technical data

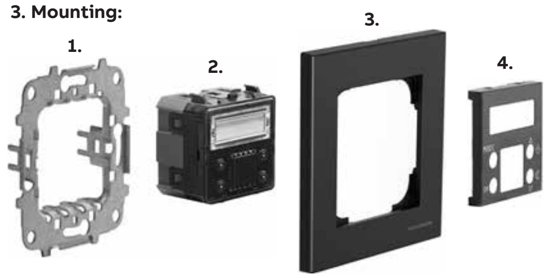
Rated voltage:
- 9368: 230 V~; ±15%; 50-60 Hz
- 9368.7: 127 V~; ±15%; 50-60 Hz

Max. consumption: 100 mA
Stand-by consumption ref. 9368 and 9368.7 (*): 0,2 W.
Stand-by consumption ref. (9368 or 9368.7) + 9368.3 (*): 0,5 W.
(*) With the display illumination at minimum.
Maximum output power: 2+2 W; <1% distortion (16 W)
Speaker impedance: 16 W (2+2 W audio)

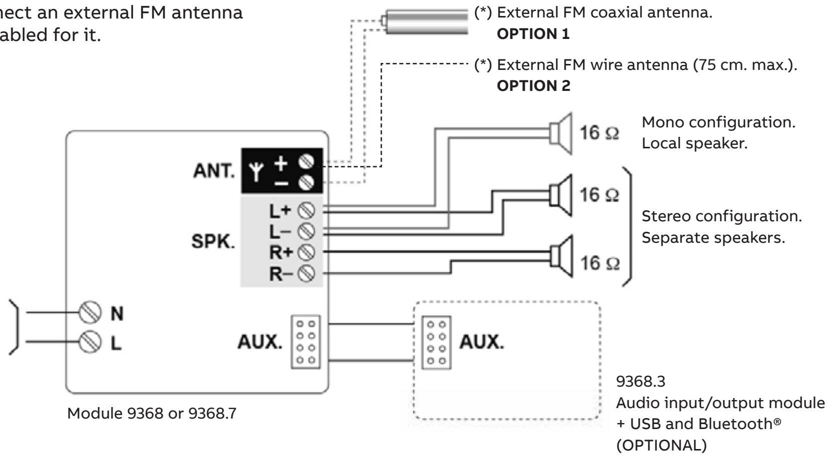
2. Wiring diagram:

(*) FM RECEPTION
The FM indoor antenna that incorporates the module 9368 or 9368.7, uses the electrical network to improve reception.
If the reception is not quite right, you can connect an external FM antenna (thin wire or coaxial wire) in the connectors enabled for it.

3. Mounting:



1.- Mounting plate
2.- Insert 9368/9368.7
3.- Frame
4.- Cover plate - 8586



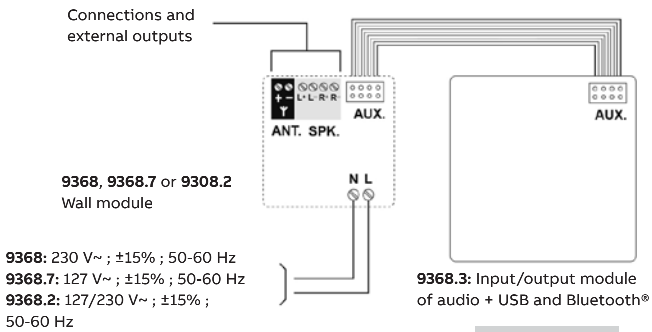
Module 9368 or 9368.7

Auxiliary module
9368.3

1. Technical data

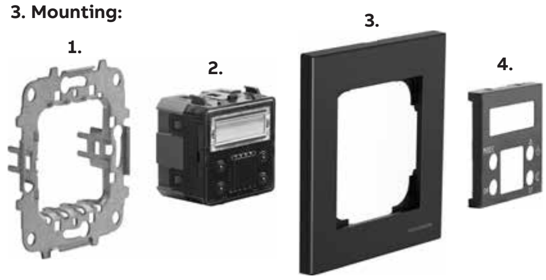
Power supply through AUX.: 9 V
Maximum consumption: 175 ~ 200 mA
Consumption stand-by: 0.4 W
Headphones impedance: 16 ~ 600 Ω (25 + 25 mW audio phones)
Bluetooth®: Bluetooth® v2.1 2.4GHz IEEE 802.15.1
Maximum reach from the module 9368.3 to user's Bluetooth® device: 10 m.

2. Wiring diagram:

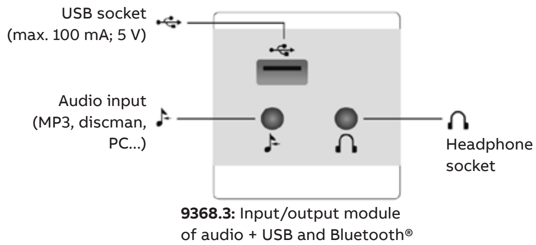


REAR VIEW

3. Mounting:



1.- Mounting plate
2.- Insert 9368.3
3.- Frame
4.- Cover plate - 8586.3



FRONT VIEW

Technical details
Sky Niessen

Radio & Bluetooth multiroom module + Remote control module
9368.1 & 9368.2

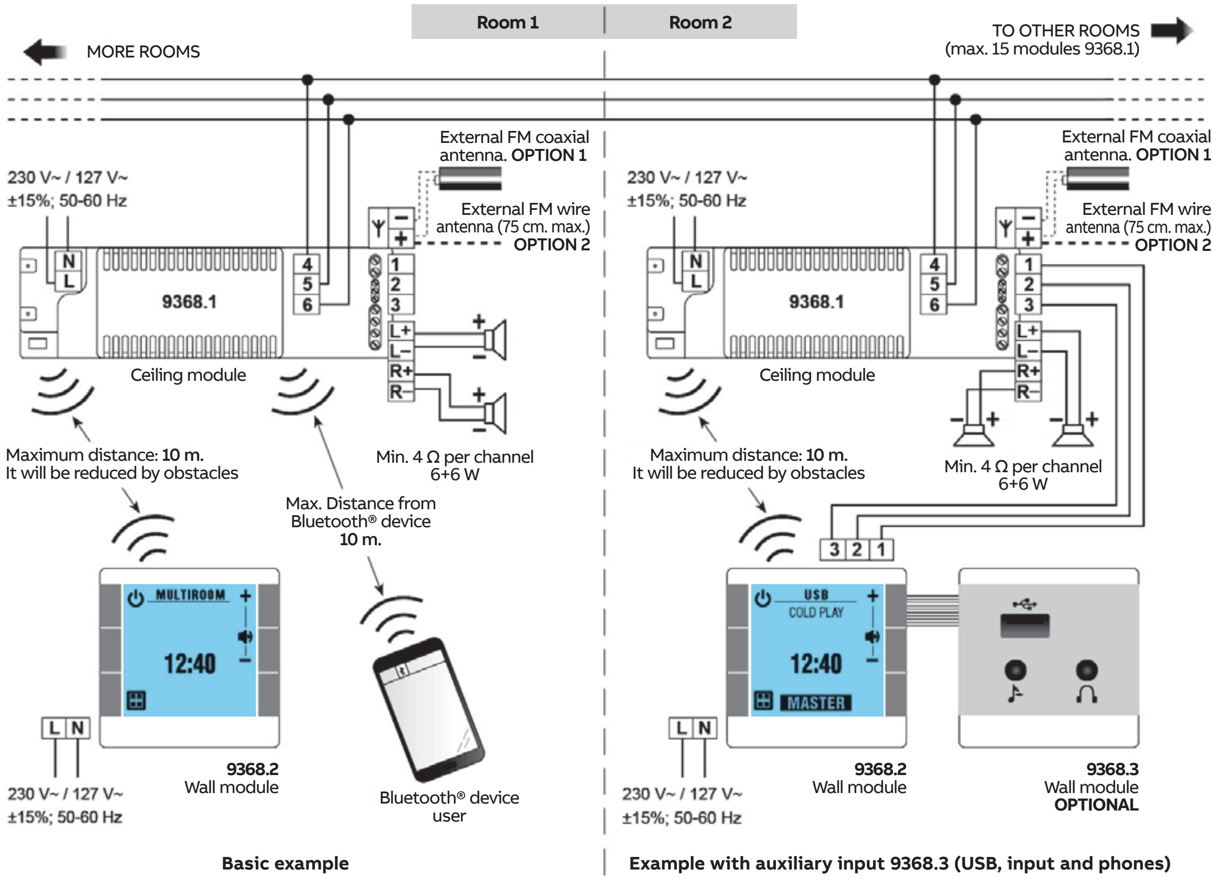
1. Technical Data
Power supply:
230 V~ / 127 V~; ±15%; 50-60 Hz
Bluetooth®:
Bluetooth® v2.1 2.4GHz IEEE 802.15.1
Maximum reach from the ceiling module 9368.1 to user's Bluetooth® device: 10 m.

Maximum power consumption:
200 mA
Consumption stand-by:
0.3 W
Communication data:
ZigBee 2.4GHz IEEE 802.15.4

Antenna impedance:
75 Ω
Maximum power headphone output
6+6 W; <1% distortion (4 Ω)
Minimum impedance of headphones:
4 Ω (6+6 W audio)

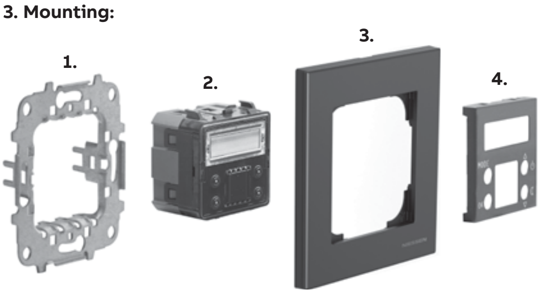
2. Wiring diagram:

BUS MULTIROOM is only necessary if there is more than one room in the house and/or you want to connect the rooms in the house.



NOTE: Because these devices are radio frequency and to avoid interference, you should not install modules of the same reference or any other RF equipment that could interfere less than 1 m. away. It should be noted that any obstacle between the devices, can significantly reduce the distance range between them.

3. Mounting:



1. Mounting plate
2. Insert - 9368 / 9368.7
3. Frame
4. Cover plate - 8586

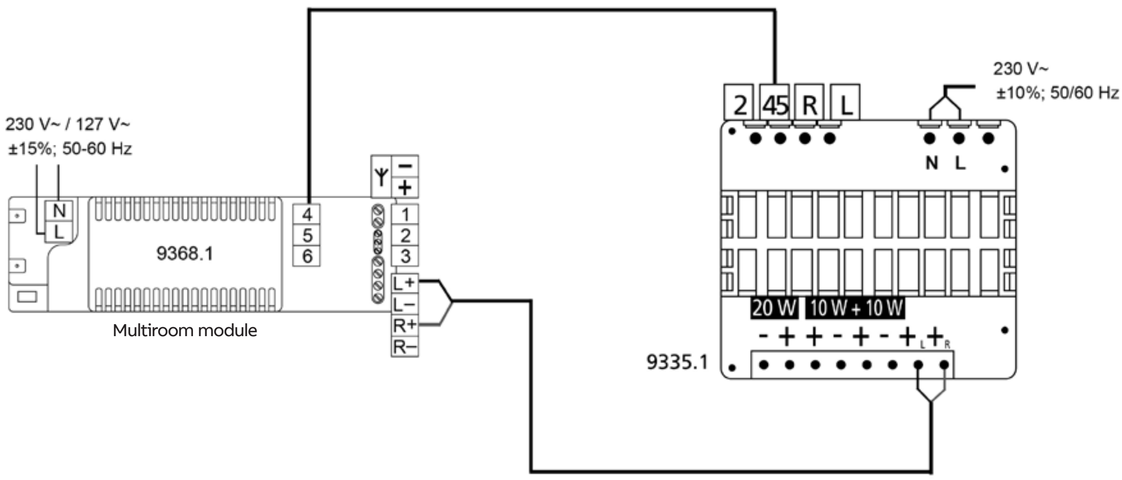
Technical details

Sky Niessen

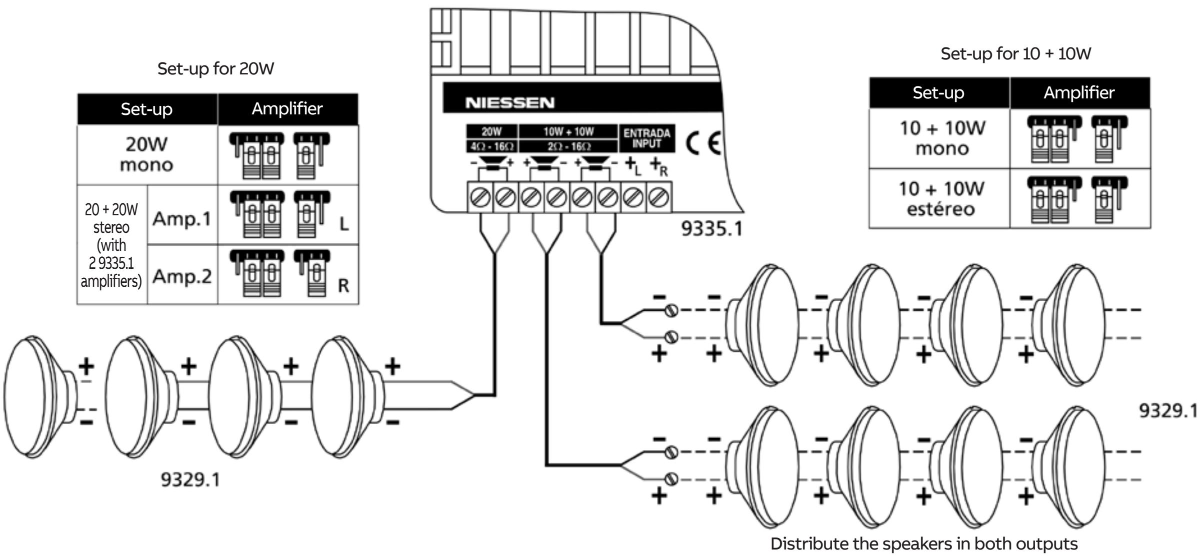
Sound amplifier - Connection to multiroom module

9335.1 - 9368.1

Wiring diagram of 9368.1 module to 9335.1 sound amplifier



Wiring diagram for 9329.1 loudspeakers to 9335.1 sound amplifier

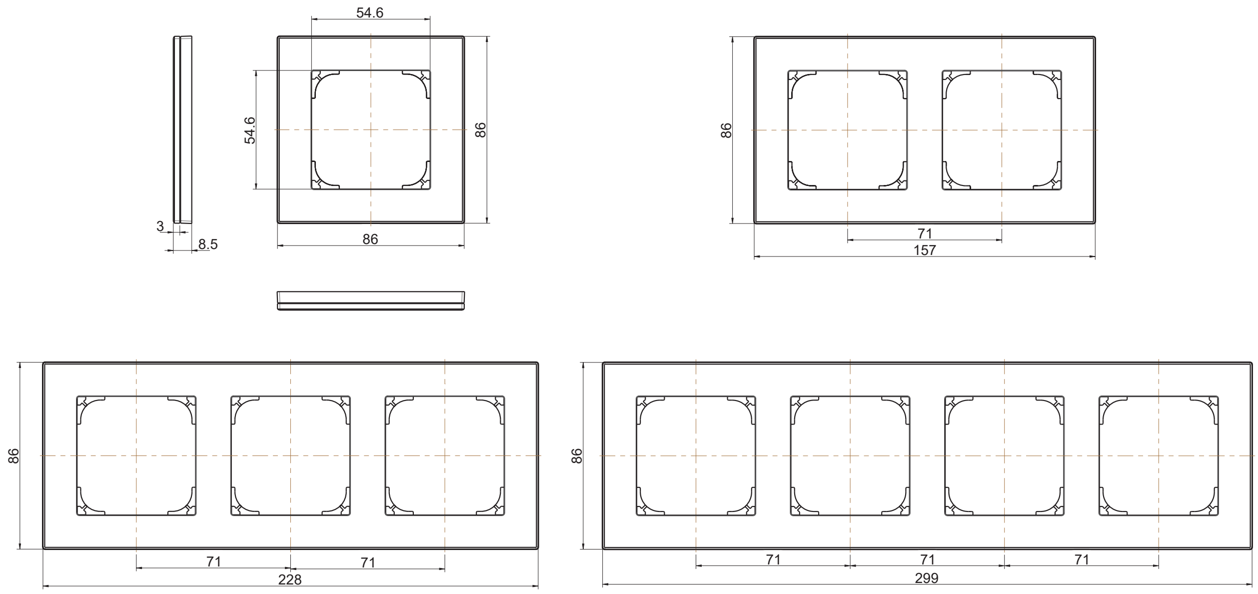


Power per speaker	
No. of speakers	9329.1 16Ω
3	5.5W
4	5W

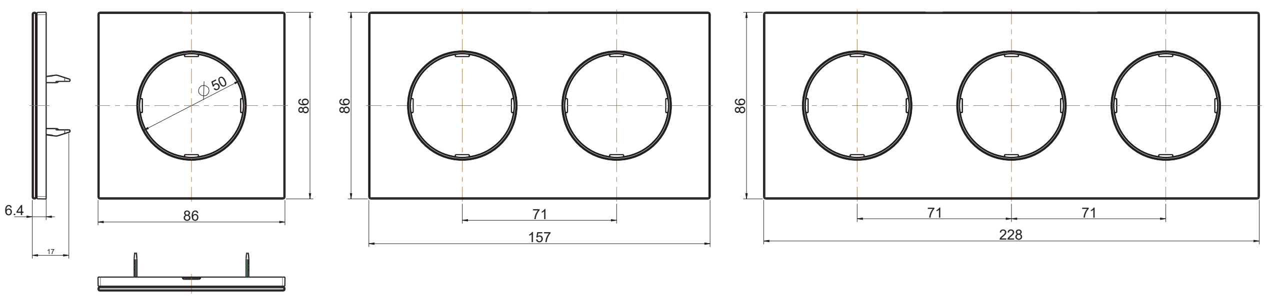
Power per speaker			
No. of speakers	Power per speaker 4Ω	8Ω	9329.1 16Ω
2	7W	4W	2W
4	5W	3.5W	2W
6 / 8	Þ	2.5W	1.7W

Technical details
Sky Niessen

Dimensions
Sky Niessen

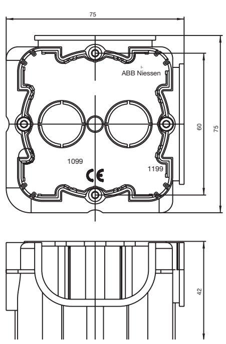


Dimensions
Skymoon

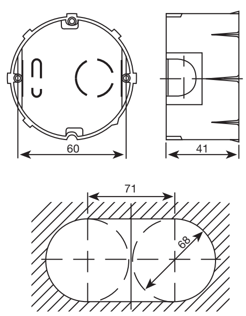


Boxes for flush mounting

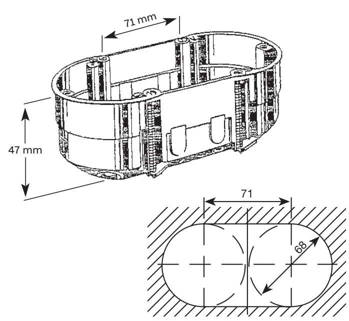
1099/1199



999



999.2

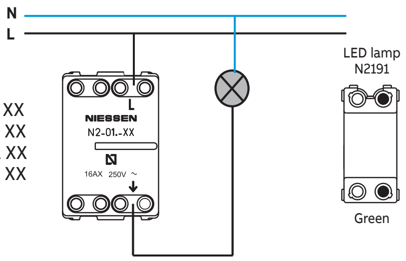


Technical details
Zenit

Switches
Optional: locator light

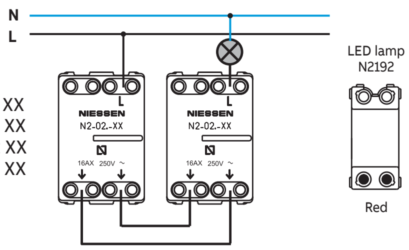
1-way switch

N2101 XX
N2201 XX
N2801 XX
N2301 XX

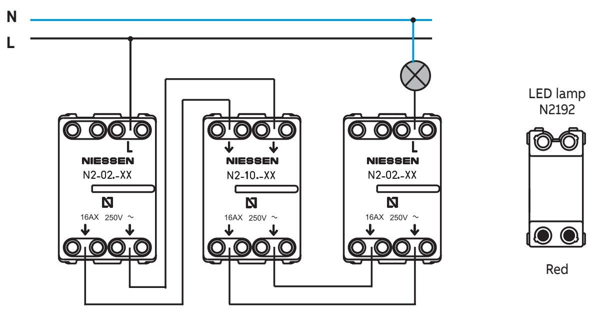


2-way switch

N2102 XX
N2202 XX
N2802 XX
N2302 XX



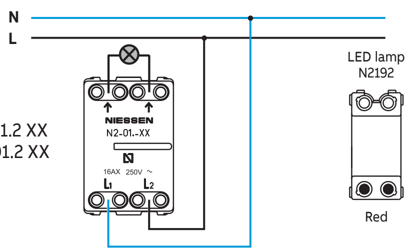
2-way switch - Intermidiate switch - 2-way switch



N2102 XX	N2110 XX	N2102 XX
N2202 XX	N2210 XX	N2202 XX
N2802 XX	N2810 XX	N2802 XX
N2302 XX	N2310 XX	N2302 XX

1-way double pole switch

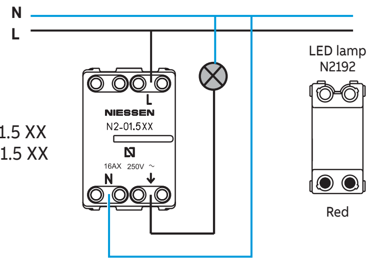
N2101.2 XX
N2201.2 XX



Switches
With indicator light

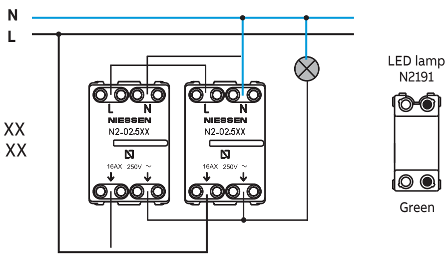
1-way switch with indicator light

N2101.5 XX
N2201.5 XX



2-way switch with indicator lamp

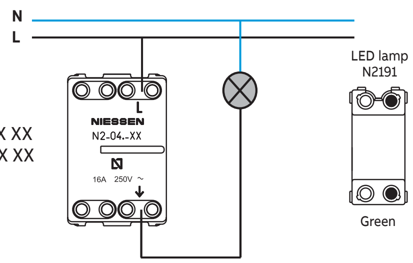
N2102.5 XX
N2202.5 XX



Push-buttons
Optional: locator light

Push-buttons

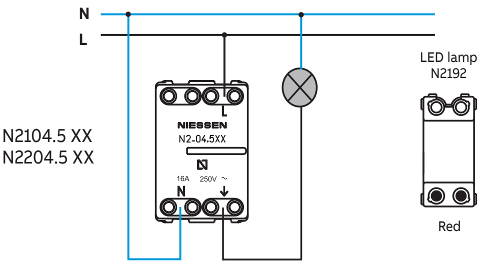
N2104.X XX
N2204.X XX



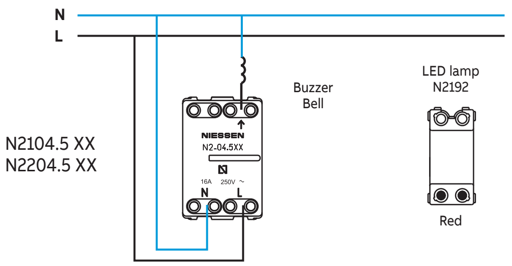
Technical details
Zenit

Push-buttons
With locator or indicator light

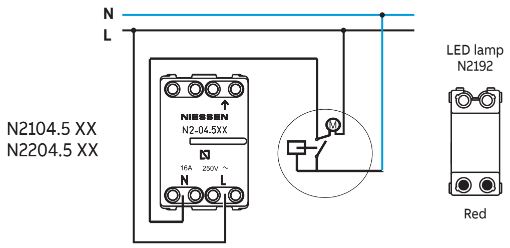
Push-button with indicator lamp



Push-button for buzzer / bell with locator lamp

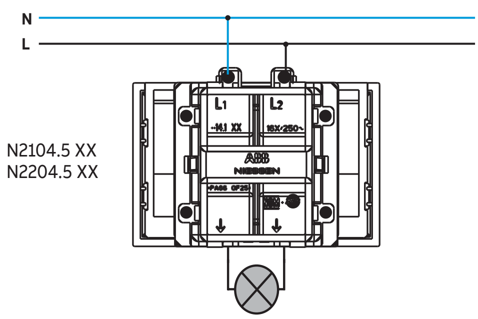


Push-button for relay with locator lamp



Card switch
With locator light

Card switch



Card timer switch
With locator light

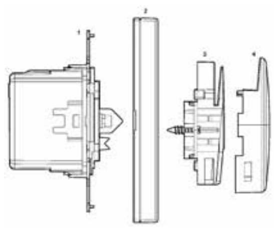
1- Technical Data

Power Supply: 127 V~ / 60 Hz
230 V~ / 50 Hz

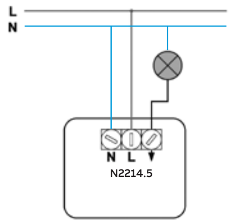
Night orientation: By a red LED
Operating T°: 0° C +40° C

Maximum power:
127 V~ / 60 Hz:
1600 W, 1600 W, 1600 W, Ⓜ1600 W, 700 W
230 V~ / 50 Hz:
3000 W, 3000 W, 3000 W, Ⓜ1600 W, 1300 W

2.- Mounting and connection scheme
2.1.- Mounting

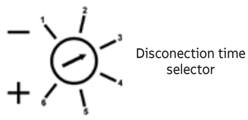


2.2.- Connection



Important: Disconnect the electrical power when installing.

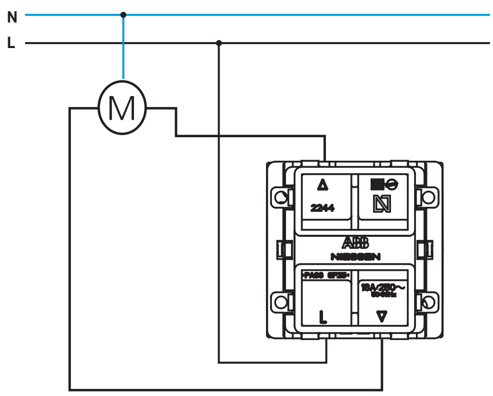
3.- Operation
Time selector for disconnection: The load time disconnection, after removing the card, can be programmed by the user through the rotary programme selector on the device cover.



Option	Time until disconnection 50Hz	60Hz	Previous status	Current Status	Action
1.-	5 s.	4 s.	No card	Card detected	Connects load
2.-	10 s.	8 s.			
3.-	20 s.	16 s.			
4.-	30 s.	25 s.	Card detected	No card	Disconnects the load at preset time
5.-	60 s.	50 s.			
6.-	90 s.	75 s.			

Blind switch & push-button

Blind switch & push-button



Technical details

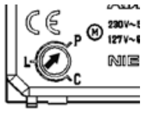
Zenit

Electronic blind switch

N2261.2

Technical data:

- Power Supply: 230V~ 50Hz / 127V~ 60Hz
- Maximum power:
  - 230V~ 50Hz blind motors: 2x 700VA persianas (cos φ = 0,5)
  - 127V~ 60Hz blind motors: 2x 350VA persianas (cos φ = 0,5)
- Room temperature for operation: 0°C to 40°C
- According to: UNE-21806 y EN-55014



Functional features:

The electronic blind switch includes 3 modes of operation
(to be selected in the rotatory switch):
- P: standard blinds control. Optionally other N2244 inserts can be connected to the N2261.2 to control the blind from other locations.
- V: venetian type blinds control. Optionally other N2244 inserts can be connected to the N2261.2 to control the blind from other locations.
- C: centralization. One N2261.2 can control all the N2261.2 centrally.

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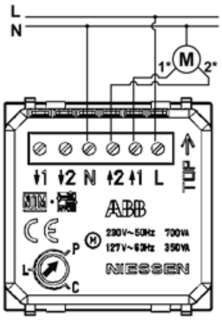
Wiring diagram:

- Direct blind control with a N2261.2 (Fig. 1).
- Remote control of the N2261.2 lectronic blind control by using a blind push-button N2244 (Fig. 2).
- Centralized control of all the blind from one point by using a electronic blind switch N2261.2 as master of the rest electronic blind switches N2261.2 (Fig. 3).

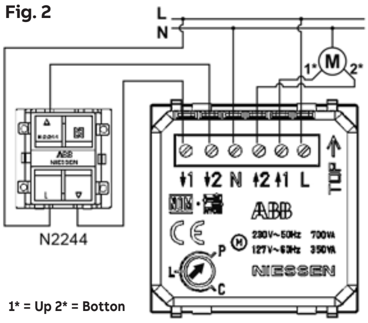
Fig. 1



1* = Up 2* = Botton

N2261.2

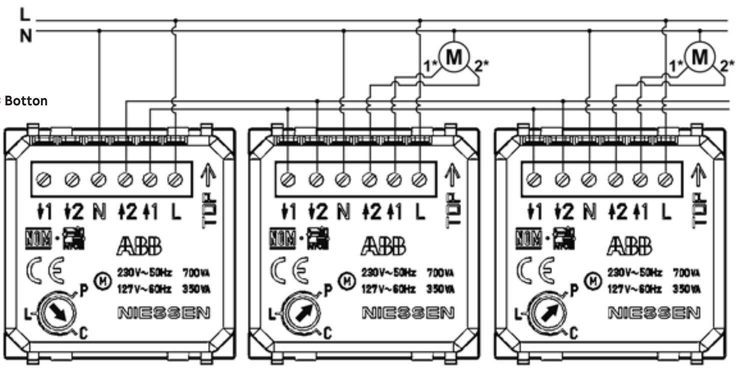
Fig. 2



1* = Up 2* = Botton

N2261.2

Fig. 3

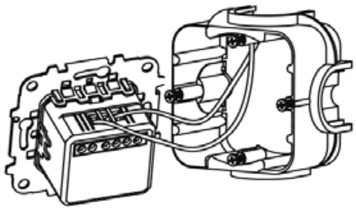


1* = Up 2* = Botton

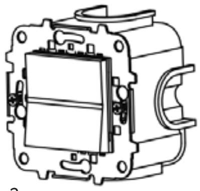
N2261.2 N2261.2 N2261.2

Mounting:

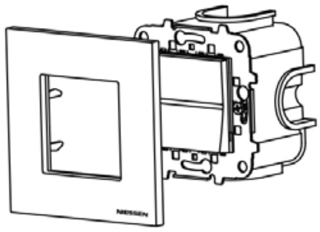
Follow the steps below to install the mechanism:
1. Connect the device according to the connection schemes. Figure 1, 2 or 3.
2. Assemble the device on the flush mounting box.
3. Then, place the plate.



1.



2.



3.

Operation: Blind operating mode. Slats or Venetian blinds operating mode. Centralized operating mode.

Pulsation	Action	Action	Action
Short pulsation ▲ < 300ms	It raises the blind (3 min.), which was previously stationary. It stops the blind, which was previously moving.	It raises the blind (3 min.) which was previously stationary. It stops the blind, which was previously moving.	It raises the blinds (of those inserts connected), which were previously stationary. It stops the blinds, which were previously moving.
Short pulsation ▼ > 300ms	It lowers the blind (3 min.), which was previously stationary. It stops the blind, which was previously moving.	It lowers the blind (3 min.), which was previously stationary. It stops the blind, which was previously moving.	It lowers the blinds (of those inserts connected), which were previously stationary. It stops the blinds, which were previously moving.
Long pulsation ▲ < 300ms	Raises the blind while the pulsation lasts, which was previously stationary . It stops the blind, which was previously moving.	The slats rotates upwards in a pulsed way while the pulsation lasts, if the blind was previously stationary. If the pulsation lasts longer, the blind will raise for as long as the pulsation lasts. It stops the blind, which was previously moving.	It raises the blinds (of those connected mechanisms), which were previously stationary. It stops the blinds, which were previously moving.
Long pulsation ▼ > 300ms	It lowers the blind while the pulsation lasts, if it was previously stationary. It stops the blind, which was previously moving.	The slats rotates downwards in a pulsed way while the pulsation lasts, if the blind was previously stationary. If the pulsation lasts longer, the blind will raise for as long as the pulsation lasts. It stops the blind, which was previously moving.	It lowers the blinds (of those connected mechanisms), which were previously stationary. It stops the blinds, which were previously moving.

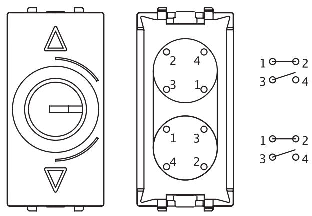
Technical details

Zenit

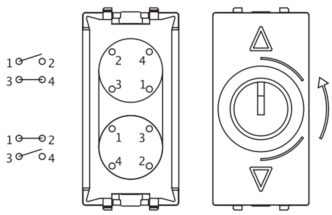
Key switches

2-way / 3 positions

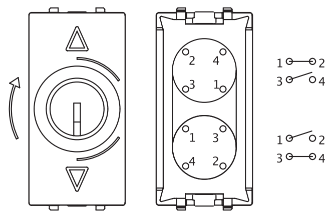
Position 0



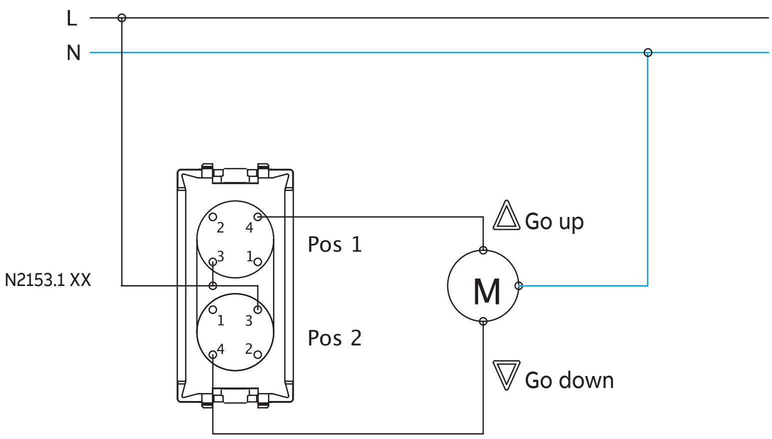
Position 1

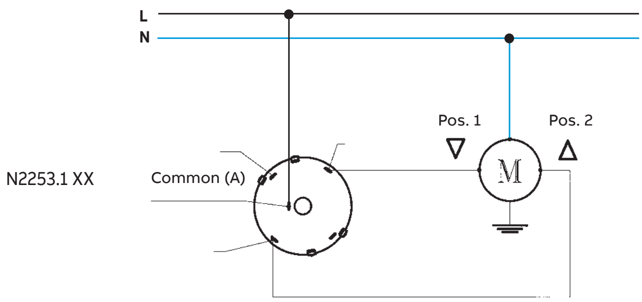


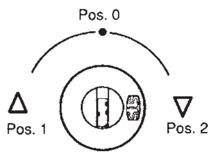
Position 2



Example for a blind control:





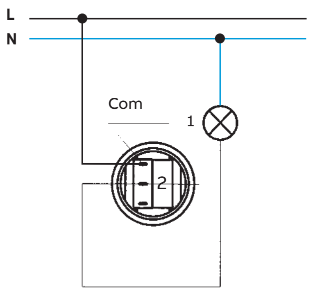


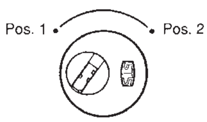
Position of the key	Active contacts
0	Common and 1
1	Common and 10
2	Common and 4

Key switches & push-buttons

1 or 2-way / 2 positions

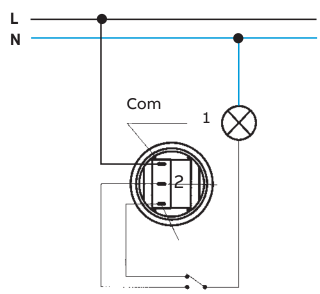
Diagram as switch / push button
8153, N2253 / 8153.2, N2253.2





Position of the key	Active contacts
1	Common and 1
2	Common and 2

Scheme as a switch



Technical details
Zenit

USB chargers
N2185, N2285, N2185.2, N2285.1 & N2285

1. Technical data:

Rated input voltage:
N2185 / N2185.2 / N2285: 100 - 240 Vac ± 10 %.
N2285.1: 230 Vac ± 10 %.
N2285.7: 127 Vac ± 10 %.

Rated input frequency: 50 - 60 Hz

Rated input current:
N2185.2: 0,20Aac@max load
N2285: 0,20Aac@max load
N2185: 0,12Aac@max load
N2285.1: 0,275Aac@max load
N2285.7: 0,40Aac@max load

Consumption in standby:
N2185.2: <10 mW@230 Vac.
N2185 / N2285: <= 0,3W@230 Vac.
N2285.1 / N2285.7: < 0,075 W.

Rated output voltage:
N2185 / N2185.2 / N2285: 5 Vdc ± 5 %.
N2285.1 / N2285.7: 5 / 9 / 12 Vdc ± 5 %.

Rated output current:
N2185.2: 2 A (5 Vdc).
N2285: 1,5 A (5 Vdc).
N2185: 0,75 A (5 Vdc).
N2285.1 / N2285.7:
- USB-A: 2,4 A (5 Vdc).
- USB-C: 3 A (5 Vdc) / 2 A (9 Vdc) / 1,5A (12 Vdc).
- USB-A+C: 1,5 A + 1,5 A (5 Vdc).

Energy efficiency:
N2185.2: > 79%
N2285: >= 71%
N2185: >= 66%
N2285.1 / N2285.7: 85%

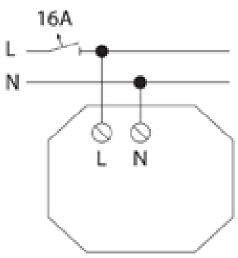
2. Electrical safety data:

Safety standard:
EN60950-I - Low Voltage Directive

Protection class:
II - Low voltage

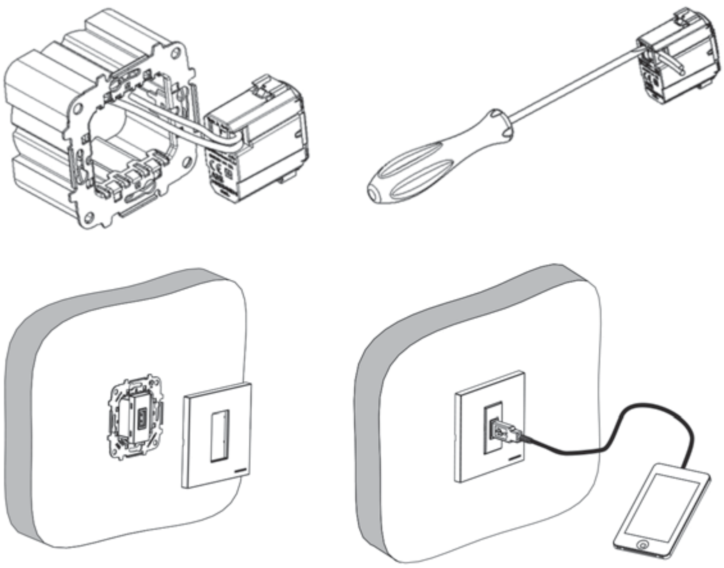
Isolation (primary-secondary):
transformer with galvanized isolation
EMC Directive: EN 55022, EN 55024

3. Wiring diagram:

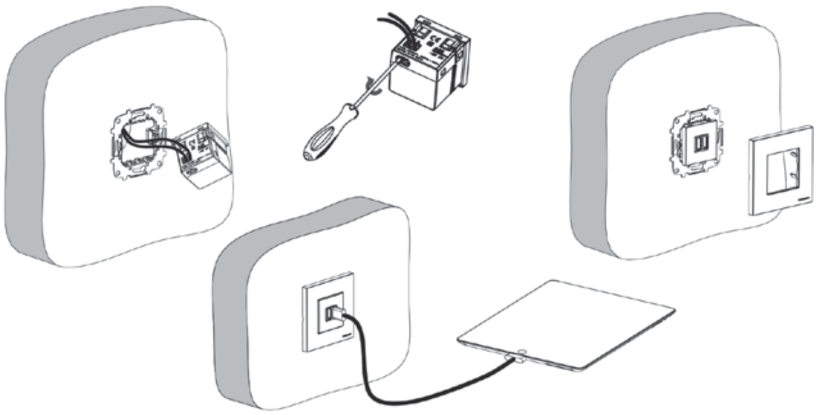


4. Installation

N2185.2 & N2185



N2285, N2285.1 & N2285.7



Technical details

Zenit

Circuit breaker 6/10/16A & RCD

N2234.1, N2234.2 & N2234.3

1.- Technical data:

Rated voltage:
120 - 230 Vac

Rated frequency:
50 - 60 Hz

Rated current (In):
N2234.1: 6 Aac
N2234.2: 10 Aac
N2234.3: 16 Aac

Breaking capacity:
N2234.1: 1,5 kA
N2234.2 & N2234.3: 3 kA

Residual current (sensitivity) - IΔn:
10 mA

Magneto-thermic action:
C type (see diagram)

Number of poles:
Two-pole (1P + N) with 1 protected pole

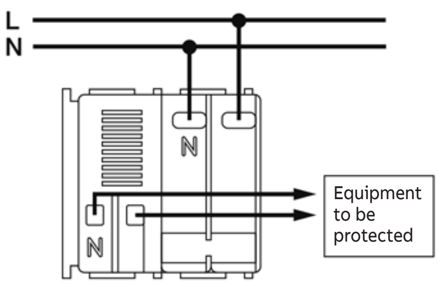
2.- Standards:

EN 61009 / 1 / 1994
EN 61009 / 2 / 1 / 1994
IEC 1009 / 2 / 2 / 1991
IEC 1009 / 1 Amd 1 1995

Low Voltage Directive:
CEE 73/23 & 93/66 CEE

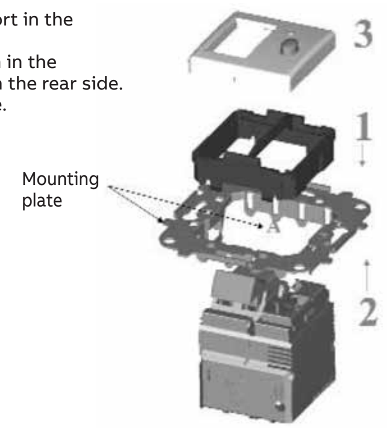
EMC Directive:
CEE89/336, 92/31 CEE & 93/68 EEC

3.- Wiring diagram:

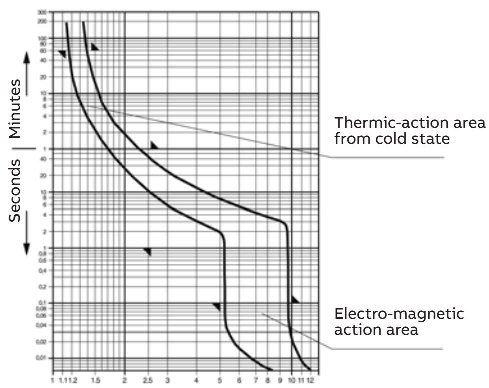


4.- Installation

1. Fix the plastic support in the mounting plate.
2. Insert the mecanism in the mounting plate from the rear side.
3. Place the cover plate.



4.- Current-Time tripping diagram

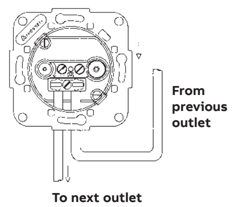


Technical details
Zenit

TV / R outlets

Technical data

- Connection: Screw terminal and clamp. Coaxial cable 75 ohm.
- Shielded zamak and metal plate chassis.
- In confirmity with EN 50083-1:1993, EN 50083-2:2001, EN 61000-6-1:2001, EN 61000-4-2:1995 ESD 15KV AD, 8KV CD, EN50083-4:1998
- Fits in a Ø60 mm box.

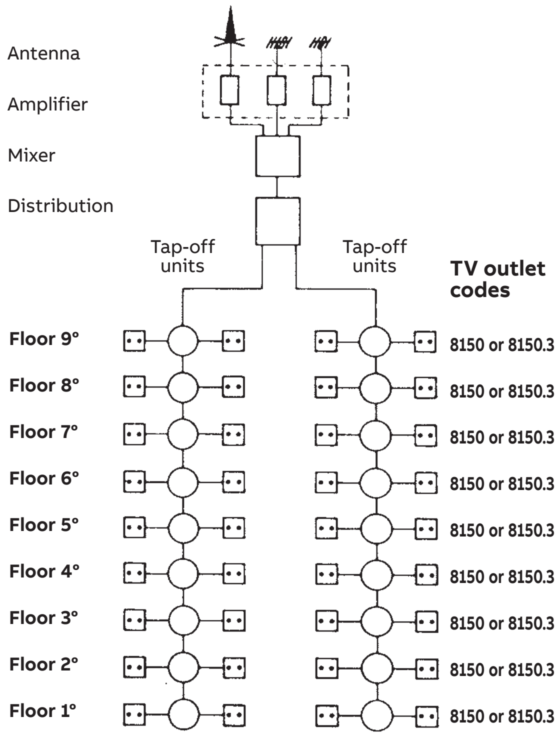


Important: the connection of the TV outlets in serial distribution must be carried out according to the figure on the left. The cable comming from the previous outlet is connected in the right terminal and the cable going to the next outlet in the left terminal.

Code			8150	8150.3	8150.7	8150.8
Installation			Final		Intermediate	
Connection			Screw terminal and clamp			
Output connectors		C1	IEC male Ø 9.52 mm			
		C2	IEC female Ø 9.52 mm			
Frequency range	MHz	I/O	5 - 862		13 - 862	5 - 862
		C1	5 - 862	5 - 68 / 118 - 862	13 - 862	5 - 862
		C2	5 - 862	87.5 - 108	13 - 862	5 - 862
Basic loss	dB ±TOL	FM	10,0 ±0,7	1,1 ±0,3	25,0 ±1,5	30,0 ±0,2
		DAB	10,0 ±1,5	R: 0,3 ±0,1	25,0 ±1,5	30,0 ±0,2
		VHF	4,0 ±1,5	TV: 0,9 ±0,3	8,0 ±0,7	11,0 ±1,0
		UHF	3,0 ±0,5		8,0 ±0,7	10,5 ±1,0
Through loss	dB ±TOL	FM	-		2,0 ±0,3	1,0 ±0,2
		VHF	-		2,0 ±0,5	1,1 ±0,3
		UHF	-		2,0 ±0,5	1,3 ±0,4
Directivity	dB	FM	-		>12	>25
		TV	-		>9	>13
Isolation	dB	FM	>14	>18	>16	>20
		TV	>14	>16	>15	>18
Return loss	dB	FM	>18	>16	>12	>18
		TV	>10	>18	>12	>15

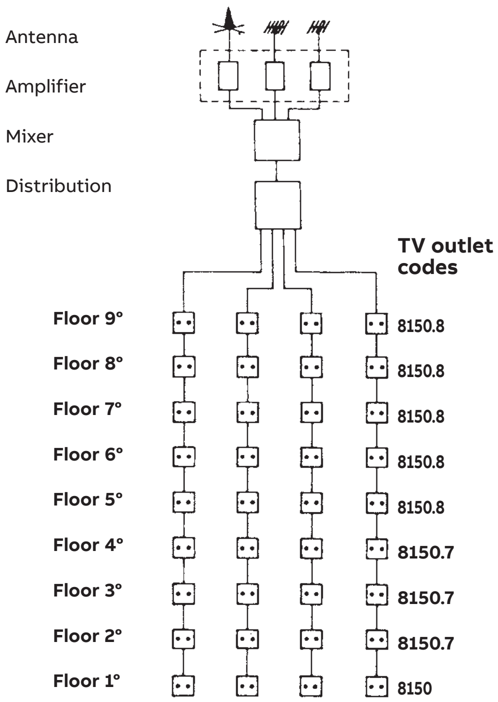
Note: reference 8150.3 compatible with CATV

MATV connection diagram
Distribution with tap-off units

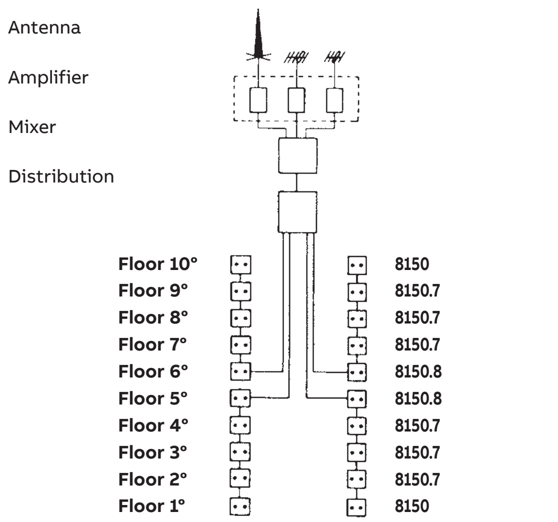


In this diagram all final outlets are the same.
References 8150 or 8150.3 can be used equally.

MATV connection diagram
Serial distribution up to 9 floors



MATV connection diagram
Serial distribution for more than 9 floors



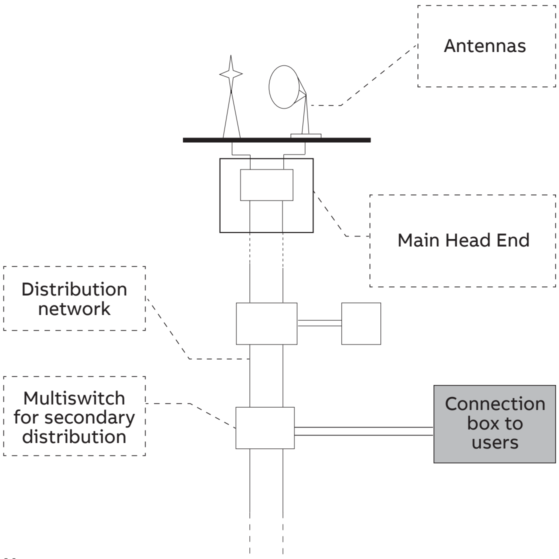
Example: 10 floors. The floors are divided in 2 groups of 5 floors each. The outlets are distributed according to the criteria shown in the MATV connection diagram for serial distribution up to 9 floors. The diagram above can be used in buildings up to 18 floors. For buildings with more than 18 floors and up to 27 floors, 3 groups have to be created and so on.

Technical details

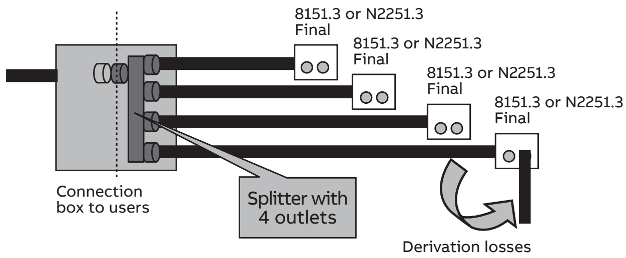
Zenit

Tomas de TV-R / SAT

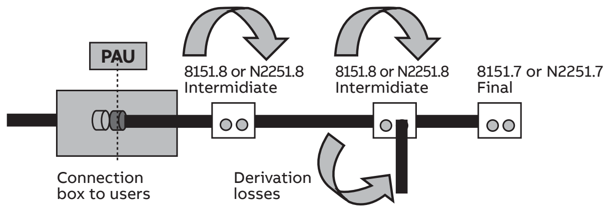
SMATV connection diagram



a) SMATV star connection diagram



a) SMATV star connection diagram



Note:

End of line impedance. If the distribution equipment requires outlets with end of line resistors, 8151.7/N2251.7 outlets must be used or add to 8151.3/N2251.3 outlets a termination resistor to close the line.

Note:

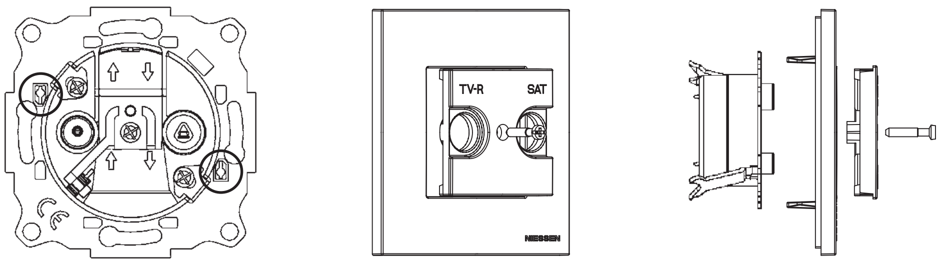
It is recommended to avoid installing more than 2 intermidiate outlets per line.

Code			**8151.3 N2251.3**	**8151.7 N2251.7**	**8151.8 N2251.8**	**8152.7**
Installation			Final		Intermediate	Final
Connection			Screw terminal and clamp			
Output connectors		C1	IEC male Ø 9.52 mm			
		C2	IEC female Ø 9.52 mm			
		C3	-			F female
Frequency range	MHz	E/S	5 - 2400	5 - 2400		5 - 2500
		C1	5 - 862	5 - 2400		5 - 68 / 125 - 862
		C2	930 - 2400	5 - 2400		87,5 - 108
		C3	-			950 - 2500
Basic loss	dB ±TOL	FM	0,2 ±0,1	3,7 ±0,3	10,0 ±1,0	2,0
		TV	1,0 ±0,5	4,0 ±0,5	10,0 ±1,0	2,7
		SAT	1,2 ±0,6	5,0 ±1,2	12,0 ±2,0	2,3
Through loss	dB ±0,5	FM	-		2,5 ±0,5	-
		TV	-		2,5 ±0,7	-
		SAT	-		3,0 ±1,0	-
Directivity	dB	FM	-		>20.0	-
		TV	-		>12.0	-
		SAT	-		>5.0	-
Isolation	dB	FM	>45	>20	>45	>24,3
		TV	>14	>20	>30	>15
		SAT	>14	>14	>28	>15
Selectivity	dB	FM	-	-		>15
		TV-R	>15	-		>15
		SAT	>15	-		>15
Return loss	dB	VR	>25	>16	>13	>7,6
		FM	>25	>16	>13	>10
		TV	>14	>16	>12	>7,6
		SAT	>10	>9	>12	>8,2
DC path	V⎓		24 max			24 max
	mA		500 max			500 max
	Tono		22 KHz/DiSEqC			22 KHz/DiSEqC

Technical details
Zenit

N2250.X & N2252 covers for TV outlets

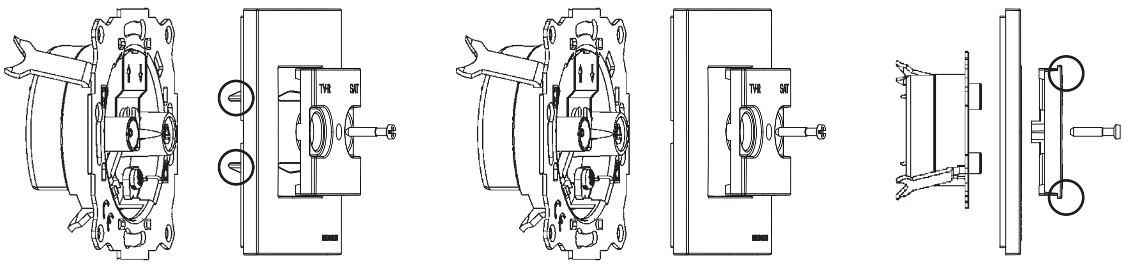
1. In some cases the TV outlets have too small holes for frame's clamps.



2. There are two options of mounting the cover plates: a) cut the clamps that are facing the small holes.

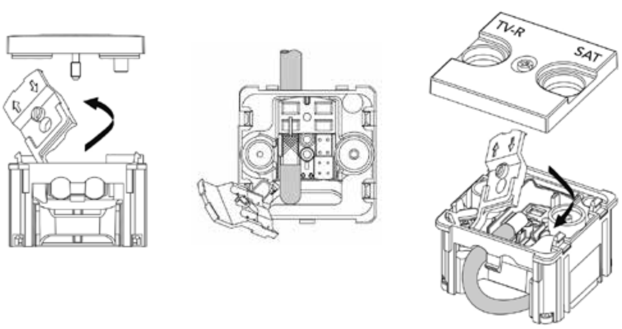
b) Cut all the clamps of the frame.

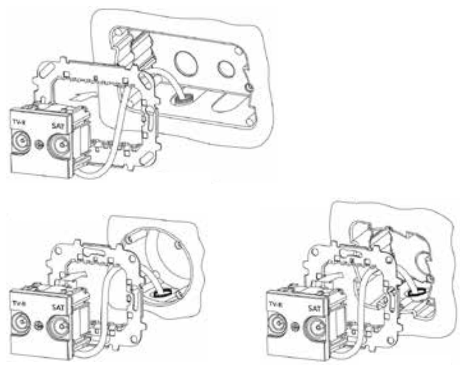
3. When the cover plate is screwed to the insert, the 4 parts that stick out from the cover, will fix the frame to the wall.



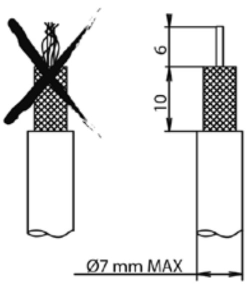
N2251.3 TV-R/SAT outlet single, N2251.7 TV-R/SAT outlet dead-end and N2251.8 TV-R/SAT outlet loop through

Mounting diagram



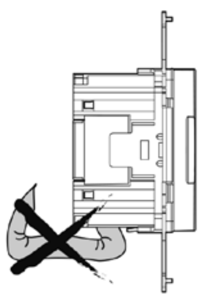


Cable to use



- Use coaxial cable with 75Ω impedance.

Cable to use



- Avoid small bending radius.

Technical details
Zenit

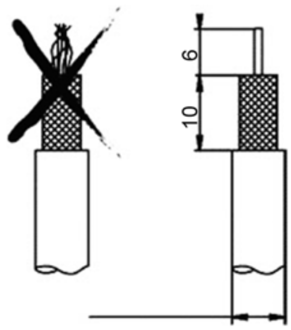
N2150.7 & N2250.7 - TV outlet dead-end

Connector characteristics

N2150.7 N2250.7

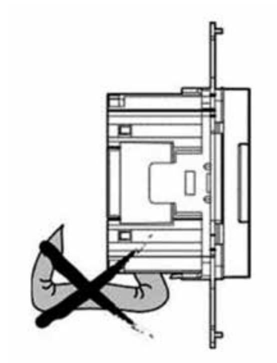
- TV output: 9,52 mm male.

Cable to use



- Use coaxial cable with 75Ω impedance.

Warning



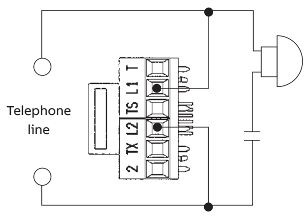
- Avoid small bending radius.

Name			TV outlet dead-end
Frequency range	MHz	TV	5 - 2400
Connection loss	dB	TV	1
Isolation	dB	TV	>16
Return loss	dB	TV	>7,6
Bypass DC current	V mA		34 (max.) 500 (max.) 22Khz / DiSEqC

Telephone outlets

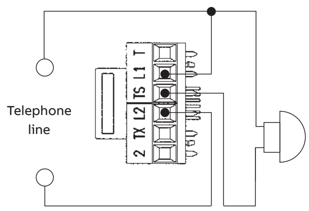
6 contacts
N2117.6 / N2217.6

Additional bell
with capacitor

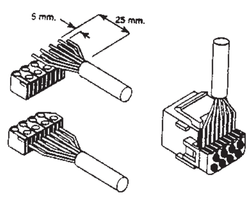


6 contacts
N2117.6 / N2217.6

Additional bell
without capacitor



8 contacts
2017.3



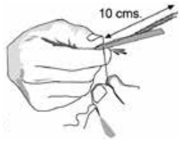
Technical details
Zenit

RJ45 Cat. 6 female connector
2018.6

1 Preparing the Cable

1.1 Cut approximately 5 cm. off the jacket.

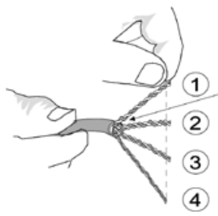
1.2 Open approx. 10 cm. of the jacket with a cutter cord or another tool.



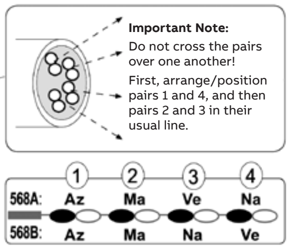
1.3 Cut the jacket.

1.4 Cut the mesh (if it has one and the cord at the same level of the jacket).

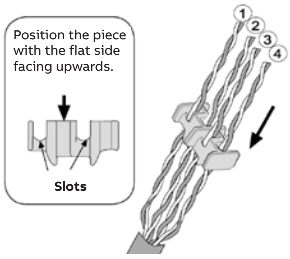
2 Preparing the Conductors



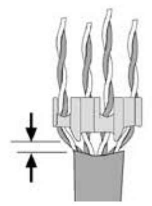
2.1 Select the adequate wiring scheme (568A or 568B) and place the pairs in a straight line.



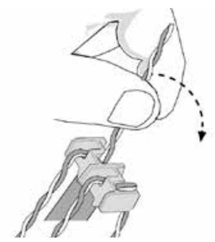
2.2 Position each of the four pairs in the holes of the end piece.



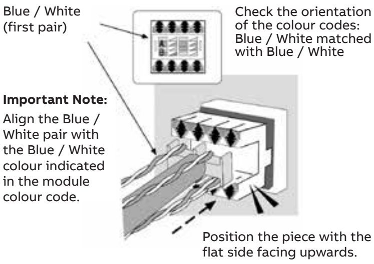
2.3 Ensure the end piece is located as close as possible to the edge of the jacket.



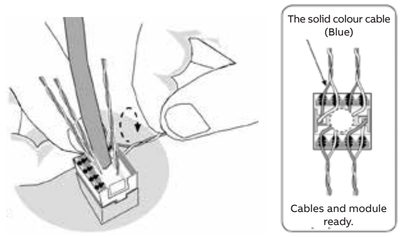
2.4 Place the pairs in the direction of the end piece slots.



2.5 Insert the end piece into the module.

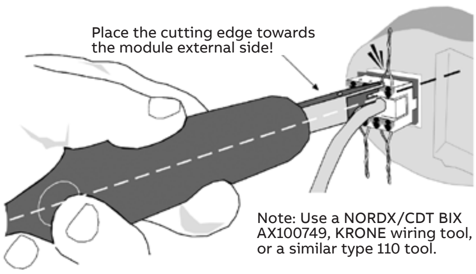


2.6 Unbraid the pairs, position and insert the cable in the module slots. Place the **solid colour cable in the first slot of the pair.**



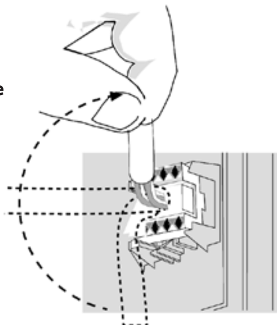
3 Conductor Terminations

3.1 Place the tool perpendicular to the module and finish cutting the cables.



4 Placing the Cable

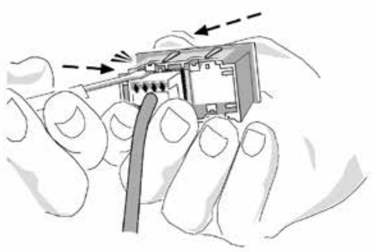
4.1 Place the cable in **the upper, perpendicular, or lower position** so that it is easy to insert the module in the box for attachment.



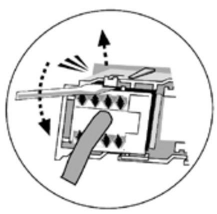
5 Disassembling the module from the supporting piece

Use a...

5.1 Push the front of the module in with your thumb releasing the hooks.



5.2 Pry upwards to release **the upper hook.**



5.3 Pry downwards to release **the lower hook.**

11

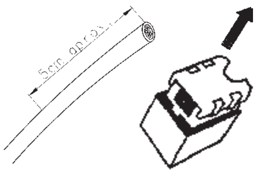
Technical details

Zenit

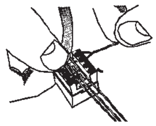
RJ45 Cat. 5E female connector

2018.5

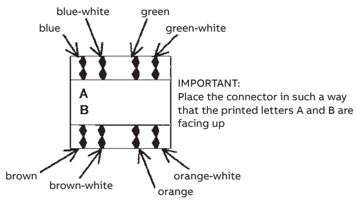
1 Remove the back cap from the connector.
Strip approx. 5cm off the jacket and discard the cable cutter cord.



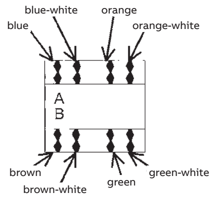
2 Bring the cable close to the connector, with the jacket at approx. 6 mm from the connector. Insert the cables into the corresponding slots as indicated by the cable colour-wiring configuration for T568A or T568 B (as shown in Figures 2A and 2B).



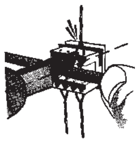
2a Wiring according to T568A:



2b Wiring according to T568B:



3 Push the cables against the end of the slot and cut them flush to the connector.
Use an IBDN 110, BIX, KRONE wiring tool, or a similar type 110 tool.

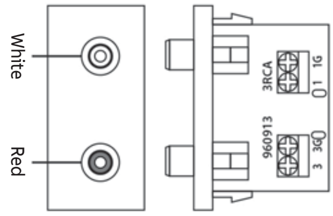


4 Mount the connector cap.

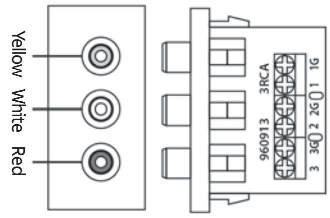
Technical details

Zenit

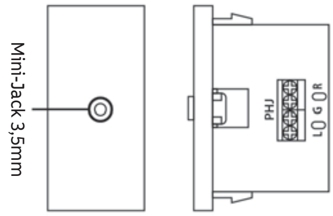
VDI connectors



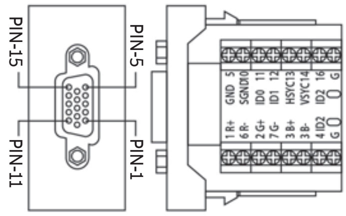
N2155.2
Pin Out:
1G — W/GND ┐ Left Audio
1B — White ┘
3G — R/GNB ┐ Right Audio
3R — red ┘



N2155.3
Pin Out:
1G — Y/GND ┐ Composite Video
1A — Yellow ┘
2G — W/GND ┐ Left Audio
2B — White ┘
3G — R/GND ┐ Right Audio
3R — Red ┘



N2155.4
Pin Out:
R — Red ┐ Left Audio
G — Ground ┤ Right Audio
L — White ┘

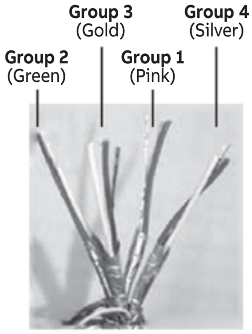


N2155.5

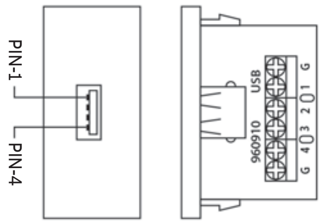
PIN		PIN	
1	1 R+	5	GND 5
6	6 R-	10	SGND 10
2	2 G+	11	ID0 11
7	7 G-	12	ID1 12
3	3 B+	13	HSYC 13
8	8 B-	14	VSYC 14
4	4 ID2	15	ID2 15
G	GND	G	GND

N2155.6

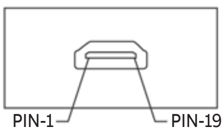
- G-1: 1 — TMDS Data2+; 2 — TMDS Data2 Shield; 3 — TMDS Data2-
- G-2: 4 — TMDS Data1+; 5 — TMDS Data1 Shield; 6 — TMDS Data1-
- G-3: 7 — TMDS Data0+; 8 — TMDS Data0 Shield; 9 — TMDS Data0-
- G-4: 10 — TMDS Clock+; 11 — TMDS Clock Shield; 12 — TMDS Clock-
- 13 — CEC
- 14 — RESERVED (N.C. on device)
- 15 — SCL
- 16 — SDA
- 17 — DDC/CEC Ground
- 18 — +5V Power
- 19 — Hot Plug Detect
- GND — Ground

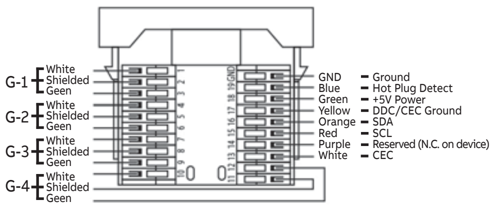


On Group included 3 wires



N2155.8
Pin Out:
1 — VBUS
2 — D-
3 — D+
4 — Ground
G — Shielded





Note:
Using a strap for fixing the cable to the board it is recommended to avoid disconnections. For this the plates have two through-holes at its rear end.

Technical details
Zenit

LED rotatory/push dimmer - 2M
N2260.3

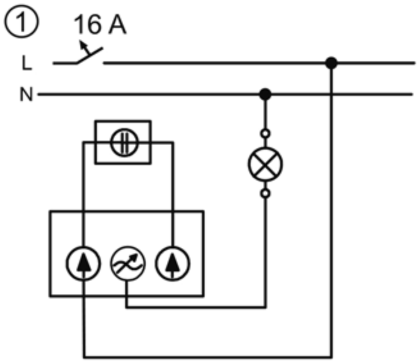
1. Technical data

Rated voltage / max. power:
- 230 V~ ±10%, 50 Hz / 250 W/VA
  230 V~ ±10%, 60 Hz / 200 W/VA
- Room temperature for operation: 0 to 35 °C.

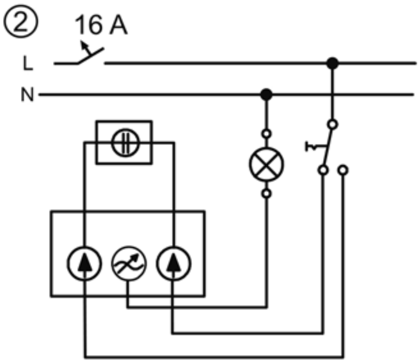
Protection:
- Back-up fuse: Electronic
- Overload protection: Electronic

Rated min./max. power (230 V~):
- LEDi: 2 W/VA / 100W/VA (max. 10 lamps).
- Dimmable energy saving lamps: 2 W/VA / 100W/VA (máx. 10 lamps).
- LV LEDi with transformer: 4 W/VA / 100W/VA (max. 10 lamps).
- Incandescent lamps: 10 W/VA / 250W/VA.
- Halogen lamps: 10 W/VA / 250W/VA.
- LV halogen lamps with transformer: 10 W/VA / 250W/VA.

2. Wiring diagram



Standard operation

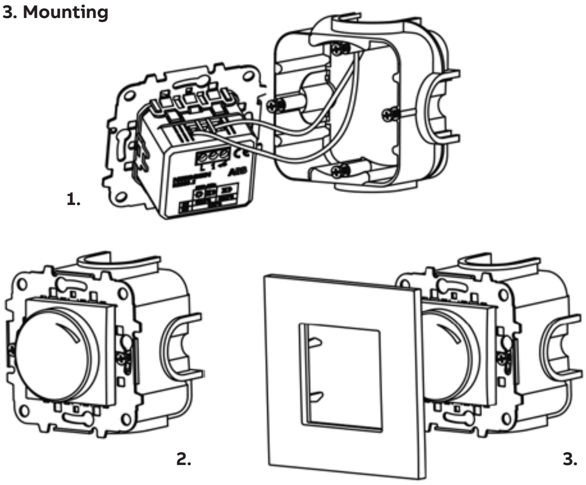


Operation in a two-way circuit

Warning:

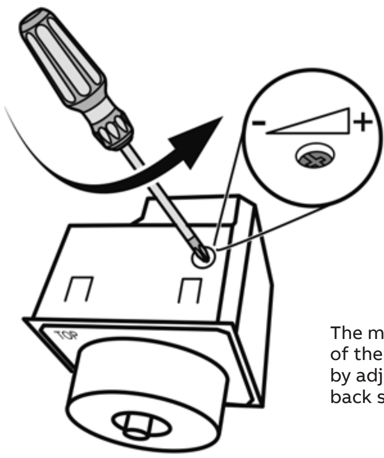
Disconnect the mains power supply prior to installation and/or disassembly! Permit work on the 230V/127V supply system to be performed only by specialist staff.

3. Mounting



Turn the device in the correct installation position. The marks on the back side of the device, orients the correct top position.

4. Set-up



The minimum brightness of the dimmer can be set by adjusting the on the back side of the device.

5. Operation

The LED dimmer is a phase-angle dimmer and is used to switch and dim all lamps listed in “Types of load”, especially LEDi loads (LED lamps with an integrated ballast). The LED dimmer serves as light controller in connection with rotary dimmer control elements.

Notes:
1) Use only L or LC transformers. Pure C transformers are not permitted. If transformers are used, the specifications of the respective manufacturers must be observed. In particular, observe the information regarding the minimum load.

Connection load for LEDi
2) Above a connection load of 25 W/VA, suitable measures must be taken to increase the connection load to a maximum of 100 W/VA (230 V supply) when connecting LEDi according to IEC 61000-3-2, for example, through the use of harmonic wave filters.

3) Maximum number of LEDi lamps is 10.

Technical details
Zenit

LED/Universal rotatory dimmer - 1M
N2160.3 & N2160.8

1. Technical data

1

			max	N1160.3 N2160.3 AMD60322 max W. 230V~50/60Hz	N1160.8 N2160.8 max W. 127V~60Hz	Mode
Leading-Edge	I.	LEDi	10	4 - 60 W	4 - 30 W	T L
	II.	LED	10	4 - 60 W	4 - 30 W	
	III.	HALOGEN. 12V	-	4 - 60 W	4 - 30 W	
Trailing-Edge	IV.	LEDi	-	4 - 250 W	4 - 125 W	T L
	V.	LED	-	4 - 250 W	4 - 125 W	
	VI.	HALOGEN. 12V	-	4 - 250 W	4 - 125 W	
	VII.	INCANDESDEN.	-	4 - 250 W	4 - 125 W	

Types of load supported (see table 1)
Leading-edge dimmable loads:
- I. LED lamps at 230V/127V type L
- II. LED lamps at 12V with electronic transformer
- III. Halogen lamps at 12V with electronic transformer

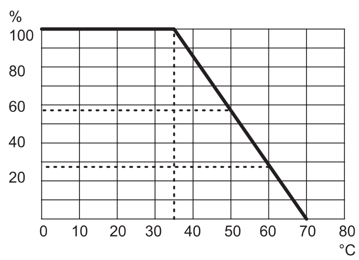
Trailing-edge dimmable loads (recommended):
- IV. LED lamps at 230V/127V type C
- V. LED lamps at 12V with electronic transformer
- VI. Halogen lamps at 12V with electronic transformer

Traditional loads:
- VII. Incandescent and halogen lamps.

Technical data

Nominal input voltage	(see tables 1)
Nominal input frequency	50 / 60Hz
Operating temperature	-5ºC… +35ºc
Maximum power supported:	(see tables 1 and 2)
Load type selector	Yes
Off position	Yes
Possible extension for ON/OFF	No
Connection wires	2 o 3
Short-circuit & overload protection	Yes
Temperature protection	Yes
IP protection	IP20
Safety standard	IEC 60669-2-1

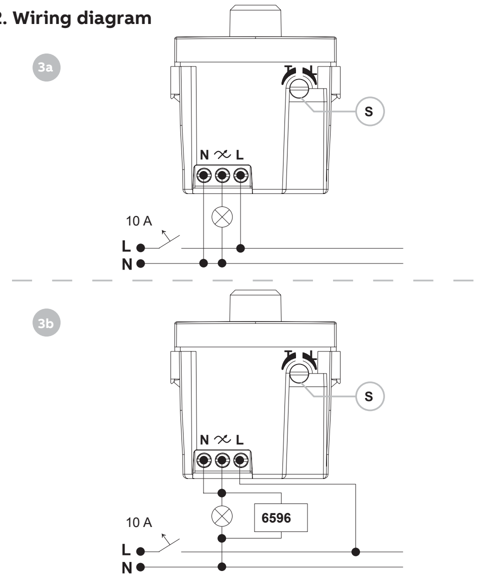
i 2



Performance

The dimmer's nominal power will decrease according to ambient temperature in line with the graph.
If 2 regulators are installed adjacent, reduce max. power to 50%. If 3 adjacent regulators are installed, reduce max. power to 25%.

2. Wiring diagram



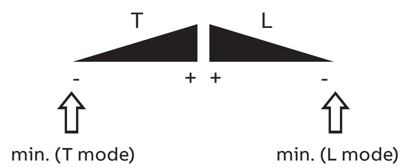
3. Connection

3 WIRES (recommended):
Figure '3a' shows an example of a 3-wire connection.

2 WIRES:
Figure '3b' shows an example of a 2-wire connection. This connection is subject to load compatibility, and correct functioning in all cases cannot be guaranteed (see note above). The minimum load installed must exceed 14W and it must be complemented with a 6596 compensation filter in parallel.

4. Set-up

1. Check the voltage is disconnected.
2. Configure the dimmer functioning mode using the adjust-ment dial, according to the type of load (see table 1)
3. Place the arrow at the bottom end (-) of the selector dial 'S'
4. Connect all wires through the rear terminals.
5. Make sure that the wires are correctly installed and free of potential short-circuits.
6. Restore the general power supply.
7. Switch on the lamps by turning the dimmer switch.
8. Adjust the minimum threshold by placing the arrow of the selector dial 'S' at the lowest point at which the lamps emit light without flashing.
9. Insert the mechanism in the recess box.



⚠ Make sure that the proper functioning mode has been configured (L or T) according to the type of load. Otherwise, the dimmer and the lamp could be damaged.

Note

Given the heterogeneity of the lamps and manufacturers in the market, some LED lamps may not be compatible with the dimmer resulting in persistent flashing problems. To avoid these problems, we recommend using the lamps of recognised manufacturers, avoiding the mixture of models and types whenever this is possible.

Technical details

Zenit

Rotary dimmer 1-10 Vdc for fluorescent or LED drivers - N2260.9

1. Technical data

- **Power supply:**
  230V 50-60Hz 700VA
  127V 50-60Hz 350VA
- **Load type:** Dimmable electronic ballast with 1-10V control input.

2. Assembly/Connection

2.1. Connection

Follow the steps below to install the mechanism:

1. Connect the device according to the connection schemes. Figure 2 and Figure 3.
2. Assemble the device on the flush mounting box.
3. Then, place the plate.

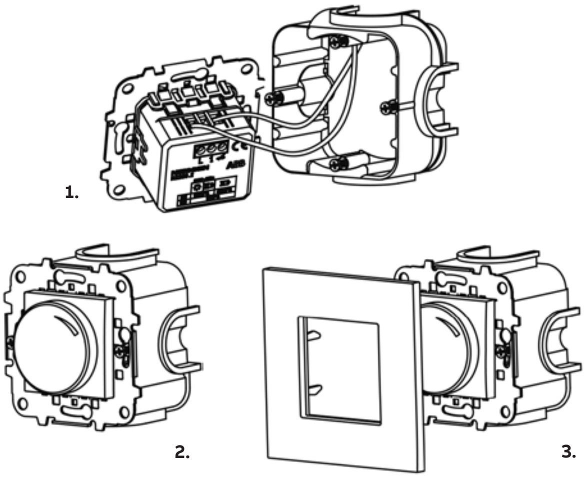


Figure 1: Installation

Important: Disconnect the power supply when installing.

2. Connection

The fluorescent lighting dimmer N2260.9 may be connected to dimmable electronic ballasts with a control input of 1-10 V as shown in Figure 2:

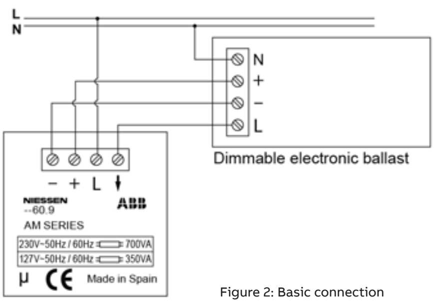


Figure 2: Basic connection

The maximum charge to be connected to the control terminals +/– should not exceed 50 mA.

See technical specifications of the dimmable electronic ballast to be installed.

Electronic ballasts generate a very high instantaneous peak current at connection, therefore it is recommended not to connect more than 6 ballasts to the N2260.9 fluorescence regulator.

In installations where it is required to connect more than 6 electronic ballasts to the same regulator mechanism, it is recommended to use a contactor to protect the mechanism contacts. See Figure 3.

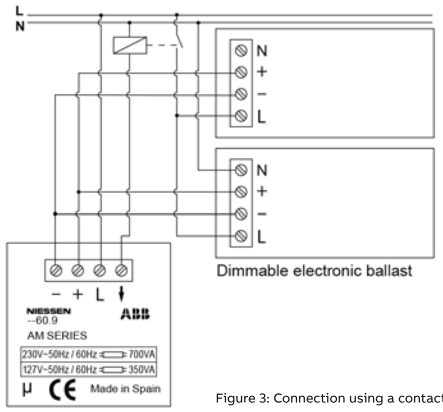


Figure 3: Connection using a contactor

3. Operation button turns in the clockwise direction

If the charge is disconnected, i.e. the rotatory button is completely turned counter-clockwise, when turning right the charge will turn on (a "click" will be heard) and the intensity level will increase as we turn the button in the clockwise direction.

If the charge is at a given point of regulation, the charge intensity will increase as we turn the button in that direction.

If we turn the button completely in the clockwise direction, this will stop in a limit, which will coincide with the maximum regulation intensity level.

Operation button turns in the counter-clockwise direction

Intensity level will reduce as we turn the button in the counter-clockwise direction.

If we turn the button completely in the counter-clockwise direction, a "click" will be heard and the button will stop in a limit, the charge will be disconnected.

WARNING: This product should only be used with the compatible loads defined in the compatibility table above.

Any installation outside the declared power range could cause damage to the product that could result in malfunction or even accidents.

Technical details
Zenit

1 Module dimmer - N2160.E

1. Technical Data

Voltage:
N2160: 127 V~ ; 60 Hz
N2160.1: 230 V~ ; 50-60 Hz

Power:
N2160: 50-500 W ☼
N2160.1: 50-700 W ☼

Operating temperature:
0 – 30° C

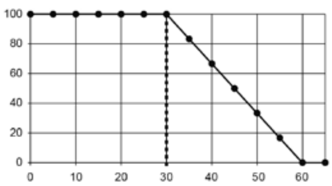
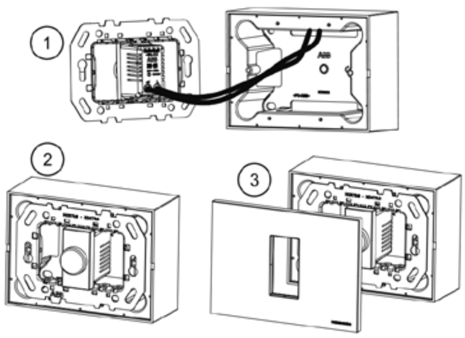


Table 1:
Power reduction (%) as a function of temperature (°C)

2. Assembly/Connection

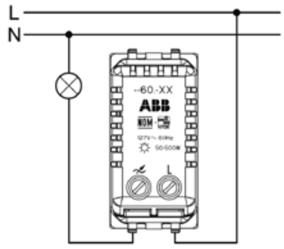
2.1. Assembly

Important:
If the dimmer is installed next to another electronic device that can produce heat, the maximum power must be reduced in half.
If it is installed between two electronic devices that can produce heat, the maximum power must be reduced to the fourth.



2.2. Connection

Important:
Disconnect the power supply when installing.



3. Operation

Do not exceed the maximum shown in Table 1, since the dimmer has a NON-resettable thermal fuse. If the fuse is triggered, the electronic dimmer is useless for further use. In case of exceeding the maximum load, the fuse could not trig but it may happen that the load will not turn off.

Electronic switch cookie - 8132.1 & 8132.2

1.- Description
Electronic switch pill (127V~ 60Hz), code 8132.1 and electronic switch pill (230V~50Hz), code 8132.2.

The electronic switch incorporates a remote control switch with a NO (Normally open) output contact, potential-free.

The output contact changes state every time the auxiliary input (A1, A2) of the electronic switch is phase-supplied (L) from one or many push switches connected to A1 and A2 inputs. One push to the switch closes the output contact of the electronic switch and the next push opens the contact.

Unlike a contactor, the coil of the electronic switch does not remain live and, therefore, there is no permanent energy consumption when it is not pressed.

Assembly by embedding in distribution box or false ceiling.
If necessary, the screw tabs can be manually removed by bending by the corner until they come off.

2.- Technical details:
Rated voltage:
- 8132.1: 127 V~ 60 Hz
- 8132.2: 230V~ 50 Hz

Rated power: 10 A

Suitable for (230 / 127 V~):
LED lamps (up to): 400 / 200 W.

Incandescent/Halogen lamps (230V): 2.000 / 1.000 W.

Low-voltage halogen lamps with transformers (12 V): 1.000 / 500 W.

Fluorescent lamps: 600 / 300 W (60µF).
Switch type: single pole NO

Standard: EN60669-2-2

Standby power consumption: 0 VA

Operation power consumption: 0 mW

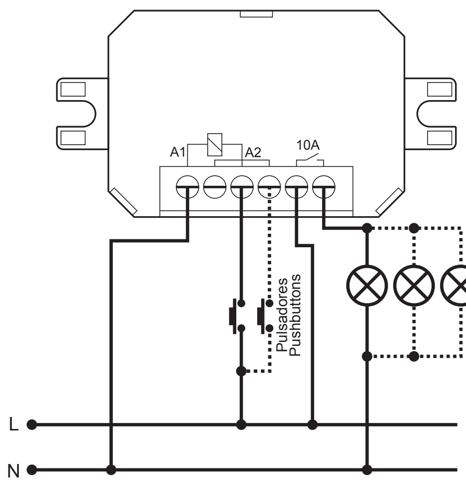
Min. time span of push button: 0,05 s

Min. interval of push button:
0,1 seg (maximum 20 per minute)

Dimensions: 61 (46) x 32 x 19 mm (without flaps)

Temperature range: -20ºC ~ +45ºC

3.- Electrical diagram



Technical details

Zenit

Movement detector - N2141

Technical features

Power supply:	230 V AC (-10% ÷ +10%) 50/60 Hz
Absorption:	2,5 VA (0,1 W)
Backup batteries:	1 rechargeable NiMH battery (not replaceable) - 3.6 V & 140 mAh full recharge time: 48 hours
Autonomy in event of power failure:	2 hours approx
Light source:	1 white LED Light intensity: 2400 med Beam angle: 120°
Red LED:	for low battery indication
Installation:	on 45mm height flush-mounted box (footprint: 1 module)
Terminal block:	for 1.5 mm^2 cables
Operating temperature:	0·c ÷ +40°c
Storage temperature:	-20°c ÷ +40°c
Operating humidity:	20÷90% non-condensing
Protection:	IP40
Insulation:	reinforced between accessible parts (front) and all other terminals

Installation

The emergency lamp requires 1 module footprint to be installed in the flush-mounted box.

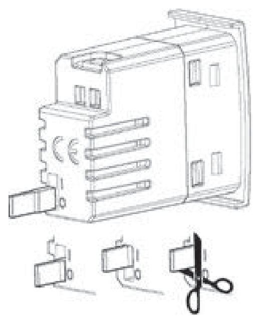
The emergency lamp is supplied with the battery installed (not removable) and charged. To prevent the battery from discharging during storage, a jumper on the back insulates the battery from the circuit.

Before installing the lamp, move the jumper from "**O**" to "**I**" position.

Note: if the jumper interferes with the back of the flush-mounted box when plugging the lamp, cut the protruding part (as indicated).

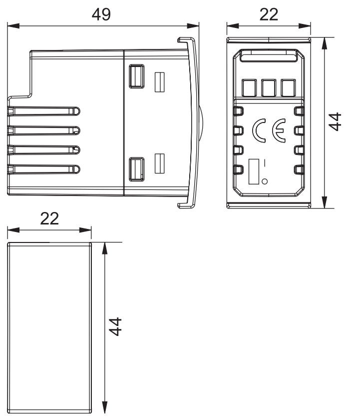
Respect the connection diagram.

If the red LED on the front of the emergency light is on, the battery is low.

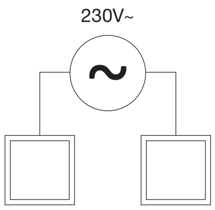


Compliance with the following EU Directives:
2014/35/U E (Low Voltage)
2014/30/UE (EMC)
2011/65/EU (RoHS)

Dimensions



Schema di collegamento



Technical details

Zenit

Time delay switch

N2262.1

1. Technical data

- Rated Voltage: 230 V~ ; 50 Hz
- Maximum power:

40 - 500 W for incandescent lamps.

40 - 400 VA for halogens with conventional transformers.

(M) 40 - 100 VA for motors.

Protection against overcurrents:
Through calibrated fuse F-3,15H. It is supplied with a replacement.

Protection against faulty connections:
Through electronic device.

Time delay: from 10 sec. to 10 min. (±10%).

Night vision device: red LED.

Operating temperature: from 0 to 40 °C.

2. Wiring diagram:

The electric connection of these articles is carried out in conformity with the presentation of the following Figures. The «L» terminal indicates the connection with the installation phase wire, and the arrow exiting the device indicates the connection to the receptor.

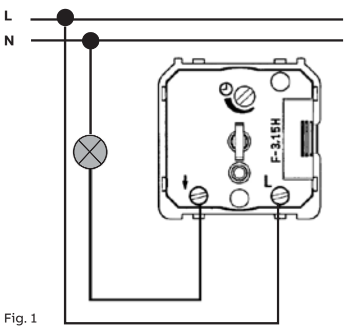


Fig. 1

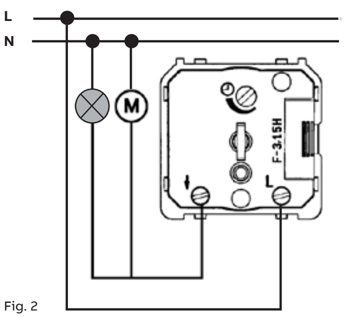


Fig. 2

NOTE:
Pay particular attention to the connection of exit/entry device conductors, as shown in the diagrams.
When manipulating the device, make sure it is disconnected from the power grid.

For the applications requiring the timing of an engine of less than 40VA power, for example a small air-extractor engine with 13VA in a bathroom, the connection will be possible if you connect another load to the latter, so as to make sure the addition of both power loads results in a power output which is greater than 40VA, the minimum load required for the correct operation of the device.
If an engine is connected to another load (a halogen or incandescent lamp), the maximum power load of the latter has to equal the maximum power output value of the engine.

3. Mounting:

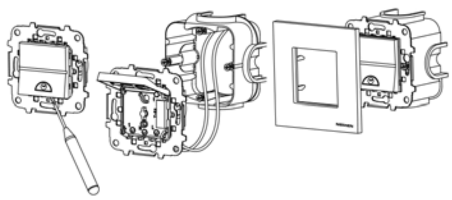


Fig. 3

1. Connect the device according to the instructions cited in the subsection on connection systems. **Do not manipulate the device when connected to the power grid.**
2. Introduce the mechanism in the flush-mounting box holding it with the screws of the box (or with fixation claws, if the box is equipped with them).
3. Set the time delay.
4. Mount the frame.
5. When mounting the other series, insert the frame between the support and the body and screw the support to the body. Mount the key on the support.
6. The time deleyed switch is ready to use.

4. Operation:

The time deleyed switch is an electronic operation mechanism mak-ing the automatic disconnection of the controlled element, within an adjustable time interval.
The manual operation is carried out by pressing the key.
Setting the desired time margin for disconnecting the device, is carried out by using an adjusting screw, as indicated on Figure 4. The time range is adjustable from 10 seconds to 10 minutes (±10%).

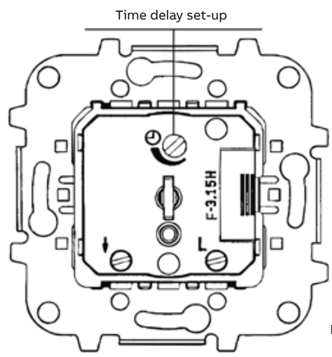


Fig. 4

Technical details

Zenit

Rotatory thermostat with remote sensor

N2240.3

1. Technical data

Voltage: 230V~ +/-10% 50-60Hz

Load power: 2.300W.

Load type: floor heating resistor.

Control temperature: +5°C to +45°C (Set point).

OFF state: at OFF position, the thermostat is off, so that it does not address the temperature measured by the floor temperature probe. The relay output contact is open.

Temperature accuracy: 0,5°C.

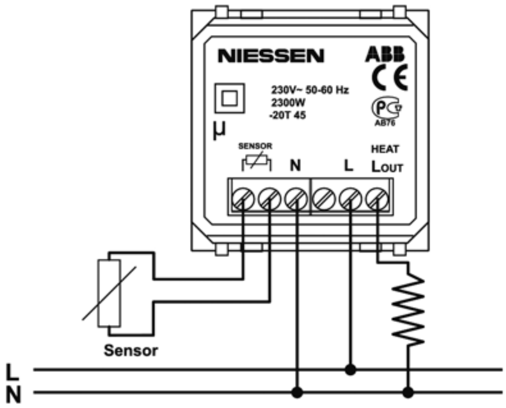
Hysteresis: 0,5°C.

Floor temperature sensor: NTC, 10KΩ at 25°C, -40°C to 80°C. Double isolated cable, 4m length.

LED light indication: red and green

Ambient temperature: -20°C to 45°C

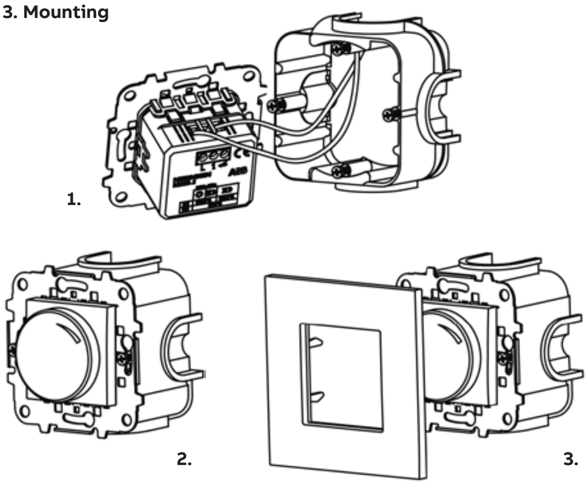
2. Wiring diagram:



In order to get the better temperature measurement performance possible at the floor thermostat installation, it is recommended:
- Install the thermostat higher than 1m height from the floor.
- Do not install the thermostat near other heat or cold sources.
- Keep the floor temperature sensor away from interference sources or power circuits.
- Check the floor temperature sensor is correctly connected.

Important: Disconnect the mains voltage power when installing.
Work on the 230 V supply system may only be performad by specialist staff!
Disconnect main power supply prior to installation and/or disassembly!

3. Mounting



4. Operation:

The temperature set point can be adjusted by the rotary knob on the front of the thermostat, from +5°C to +45°C.
LED light in the front, indicates the following:
- Red color: Temperature set point is higher than measured temperature at floor sensor. Relay output contact is closed.
- Green color: Temperature set point is lower than measured temperature at floor sensor. Relay output contact is open.
- LED off: Thermostat is OFF state (disconnected).
- Blinking red color: (a) The floor temperature sensor woul not be connected or (b) the temperature read by the floor temperature sensor is below.
- 40°C. Relay output contact is closed.

11

Technical details

Zenit

Digital thermostat

8140.5 + N2240.5

1. Technical data

Voltage: 230 V~ ; 50 - 60 Hz

Power consuption: < 1W

Control temperature: +0°C to +50°C

Temperature accuracy: ±2°C (±1°C with calibration)

Resolution: 0,1°C

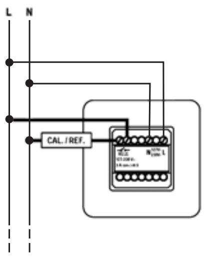
Control output: potential-fre relay contacts (NA).

Maximum load: 3A cos φ = 0,5.

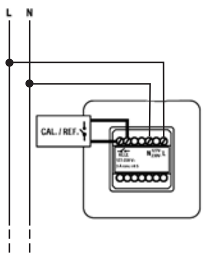
Hysteresis: 0,5°C

Pulse-width modulation: ±4°C difference with the set-point temperature, variable from 100% to 0% modulation.

2. Wiring diagram:



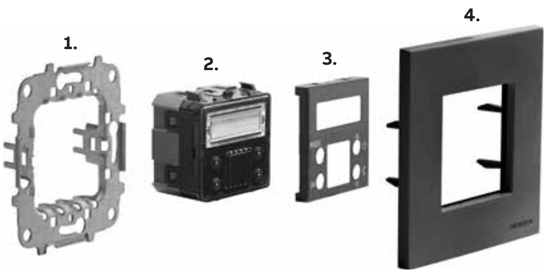
For hating or cooling installations
WITHOUT potential free input



For heating or cooling installations
WITH potential free input

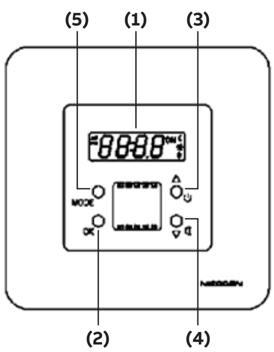
Important: Disconnect the mains voltage power when installing.
Work on the 230 V supply system may only be performad by specialist staff!
Disconnect main power supply prior to installation and/or disassembly!

3. Mounting



1. Mounting plate
2. Insert - 8140.5
3. Cover plate - N2240.5
4. Frame

4. Operation:



This command allows you to control heating and cooling devices (not simultaneously) from its internal electronic thermostat. Also, thanks to the night mode, allows to maintain a temperature differential (from 0°C to 5°C, also programmable) to save energy with just one keystroke.

Night operating mode ☾ :
It is based on setting a temperature differ-ence (in °C) between day and night, in order to save energy.

Winter mode ❄ :
To be selected when the equipment under control is a heating equipment.

Summer mode ☼ :
To be selected when the equipment under control is an air-conditioning equipment.

Temperature control by hysteresis:
Thermostat's default type of control. The use of hysteresis control is particularly suitable for gas boilers.

Pulse-width temperature control:
The use of pulse-width control is particularly recommended for electric heaters, heat pumps or electrothermal actuators.

ATTENTION:
To select between hysteresis and pulse-width, it is necessary that the thermostat is off mode, i.e. the **"ON"** is not displayed on the screen.

(1) TEMPERATURE DISPLAY
Displays the set-point temperature.

(2) PUSH BUTTON FOR CONFIRMATION OF SELECTED OPTIONS
Confirms the selected values.

(3) ON/OFF AND UP PUSH BUTTON
Turns the control on and off. The display will show "**ON**" if it is turned on and will turn off when it is off. It serves to increase the temperature displayed on screen.

(4) NIGHT AND DOWN KEY PUSH BUTTON
Selects between day and night modes. The display will show ☾ in night mode and in day mode it will disappear. It serves to decrease the temperature displayed on screen.

(5) FUNCTIONS/CONFIGURATION SELECTOR
By pressing "we will adjust the set-point temperature" and, if we press successively, we will choose "winter/summer", "night temperature", "thermometer calibration" and "output relay action mode".

- **1 press** on "**MODE**" to adjust the set-point temperature.

While the set-point temperature and the symbol "**°C**" flash on the display, set the desired value with "▲ and ▼ " and press "**OK**".

- **2 presses** on "**MODE**" to choose between winter and summer.

While the symbols ❄ / ☼ flash on the display, set the desired value with "▲ and ▼ " and press "**OK**".

- **3 presses** on "**MODE**" to choose the night temperature differential.

While the night temperature differential and the symbol ☾ flash on the display, set the de-sired value with "▲ and ▼ " and press "**OK**".

- **4 presses** on "**MODE**" to calibrate the thermometer.

The temperature indicator flashes and with "▲ y ▼ " we select the appropriate ambient temperature. It will be set by pressing "**OK**".

- **5 presses** on "**MODE**" to choose the "output relay action mode". The "**STD**" or "**INC**" will be illuminated on the display when pressing "▲ or ▼". We select the right one and we press "**OK**".

"**STD**" indicates the operating mode by hysteresis.

"**INC**" indicates the operating mode by pulse-width modulation.

In all the cases the setting is validated pressing "**OK**". Failure to do so, the control returns to the previous settings in 5 seconds without saving the new ones.
With the control turned off, it behaves as a thermometer, showing the current temperature.

ATTENTION:
In the first implementation it is advised to wait **8 hours** before calibration. After an off voltage, the control requires **30 minutes** before showing an accurate temperature.

Technical details

Zenit

Rotatory fan control

N2254.1

1. Technical data

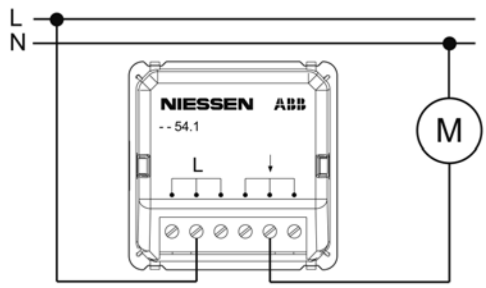
Voltage: 127 V~ ; 60 Hz

Load power: 190 W

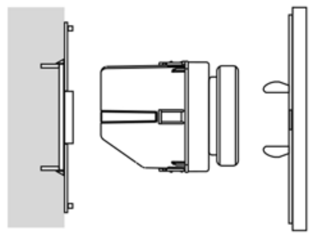
Load type: ceiling fan.

Operating temperature: +0°C to +40°C

2. Wiring diagram:



3. Mounting:



4. Operation:

Speed / Button position: 0 Disconnected.
I Maximum speed.
II Medium speed.
III Minimum speed.

Important: Disconnect the mains voltage power when installing.
Work on the power supply system may only be performad by specialist staff!
Disconnect main power supply prior to installation and/or disassembly!

Electronic doorbell

N2224 & N2224.1

1. Technical data

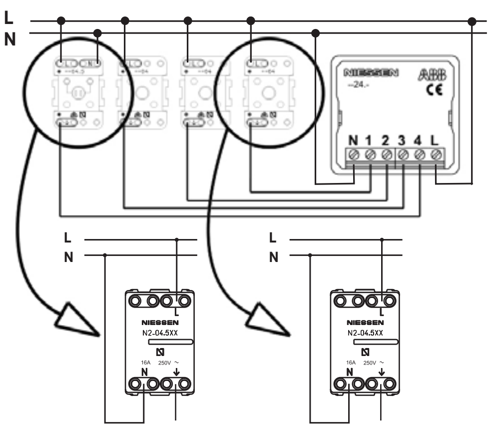
Voltage:

- N2224: 230 V~ ; 50-60 Hz
- N2224.1: 127V~ 60Hz

4 melodies available.

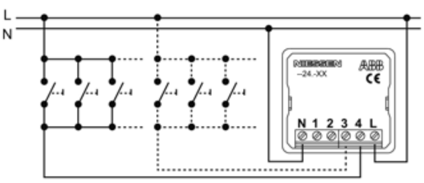
Acoustic power at 1 meter with cover plate: 72 dB.

2. Wiring diagram:



PUSH BUTTON WITH NIGHT ORIENTATION LAMP
N2104.5 or N2204.5 **N2104.X or N2204.X**

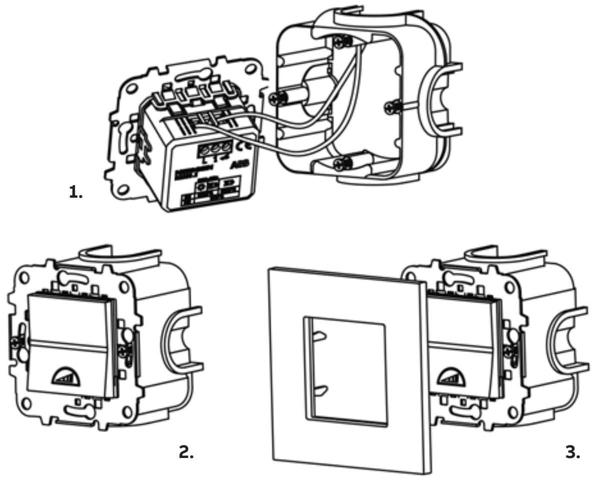
Connection with more than one push-button per melody.



3. Mounting

To install the device follow these steps:

1. Connect the device based on the corresponding wiring scheme.
2. Mount the device on the wall box.
3. Then, position the plate.



4. Operation:

The bell can be connected to 4 push buttons maximum, with a different melody for each one of them.

Important: Disconnect the mains voltage power when installing.
Work on the power supply system may only be performad by specialist staff!
Disconnect main power supply prior to installation and/or disassembly!

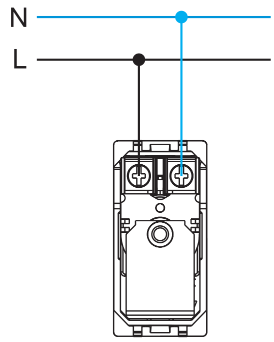
Technical details
Zenit

Buzzer
N2119 & N2219

1. Technical data
Rated voltage: 127-230 Vac / 50-60 Hz.
Rated power: 8 VA.
Adjustable tone.
Acoustic power at 1 meter with cover
plate: 75 dB.

Note: the buzzer is set for 230Vac operation. For other voltages, the tone must be adjusted by means of the screw regulator on the back.

2. Wiring diagram:



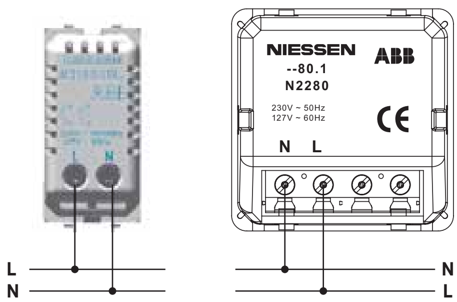
LED signaling light
N2180 BL/RJ/VD, N2180.1 BL, N2280 BL & N2280.2 RJ/VD

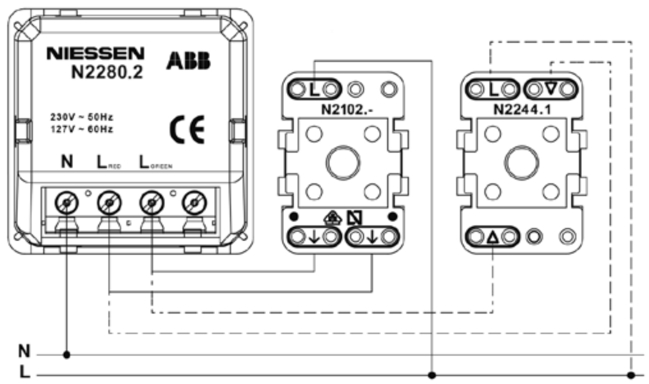
1. Technical data
Rated voltage: 127-230 Vac / 50-60 Hz.
Lamp:
- N2180 BL/RJ/VD / N2180.1 BL / N2280 BL: white LED.
- N2280.2 RJ/VD: red and green LED.

Luminous flux:
- N2180 BL/RJ/VD / N2280 BL / N2280.2 RJ/VD: > 2 lumen at 1 meter.
- N2180.1: < 0,5 lumen at 0,3 meter.

Diffuser:
- N2180 BL / N2180.1 BL / N2280 BL / N2280.2 RJ/VD: white.
- N2180 RJ: red.
- N2180 VD: green.

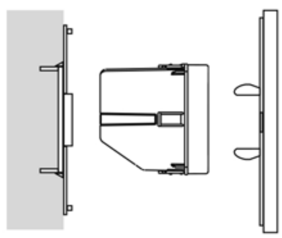
2. Wiring diagram:





Important: Disconnect the mains voltage power when installing.
Work on the power supply system may only be performad by specialist staff!
Disconnect main power supply prior to installation and/or disassembly!

3. Mounting:



Technical details
Zenit

Beacon light
N2181.1

Technical features

Power supply:	230 V AC (-10% ÷ +10%) 50/60 Hz
Absorption:	2,5 VA (0,1 W)
Backup batteries:	1 rechargeable NiMH battery (not replaceable) - 3.6 V & 140 mAh full recharge time: 48 hours
Autonomy in event of power failure:	2 hours approx
Light source:	1 white LED Light intensity: 2400 med Beam angle: 120°
Red LED:	for low battery indication
Installation:	on 45mm height flush-mounted box (footprint: 1 module)
Terminal block:	for 1.5 mm^2 cables
Operating temperature:	0·c ÷ +40°c
Storage temperature:	-20°c ÷ +40°c
Operating humidity:	20÷90% non-condensing
Protection:	IP40
Insulation:	reinforced between accessible parts (front) and all other terminals

Installation

The emergency lamp requires 1 module footprint to be installed in the flush-mounted box.

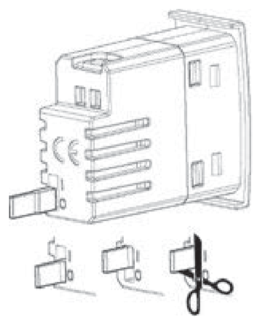
The emergency lamp is supplied with the battery installed (not removable) and charged. To prevent the battery from discharging during storage, a jumper on the back insulates the battery from the circuit.

Before installing the lamp, move the jumper from "**O**" to "**I**" position.

Note: if the jumper interferes with the back of the flush-mounted box when plugging the lamp, cut the protruding part (as indicated).

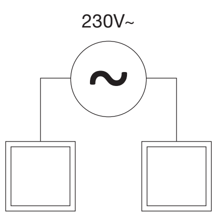
Respect the connection diagram.

If the red LED on the front of the emergency light is on, the battery is low.

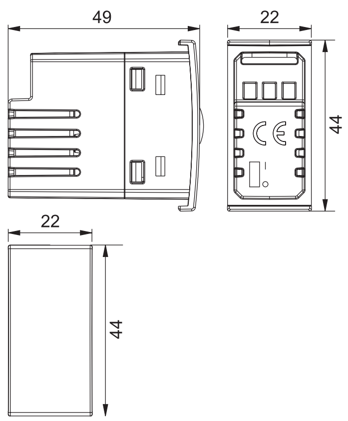


Compliance with the following EU Directives:
2014/35/U E (Low Voltage)
2014/30/UE (EMC)
2011/65/EU (RoHS)

Schema di collegamento



Dimensions



Technical details
Zenit

Beacon light
N2281.2

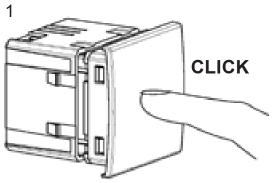
Technical features

Power supply:	230 V AC (-10% ÷ +10%) 50/60 Hz
Absorption:	3 VA (0,2 W)
Backup batteries:	1 rechargeable NiMH battery (not replaceable) - 3.6 V & 140 mAh full recharge time: 48 hours
Autonomy in event of power failure:	2 hours approx
Light source:	Light intensity: 20 lumens Beam angle: 120°
Red LED:	for low battery or fault indication
Installation:	on 45mm height flush-mounted box (footprint: 2 module)
Terminal block:	for 1.5 mm² cables
Operating temperature:	0·c ÷ +50°c
Storage temperature:	-20°c ÷ +50°c
Operating humidity:	20÷90% non-condensing
Protection:	IP40
Insulation:	reinforced between accessible parts (front) and all other terminals

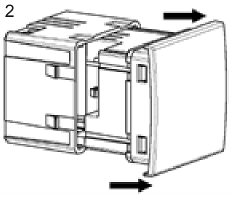
Lamp extraction

1. Press the lamp: an audible click will be heard to indicate that the sealing mechanism has released the lamp.
2. Pull the lamp out of the back shell

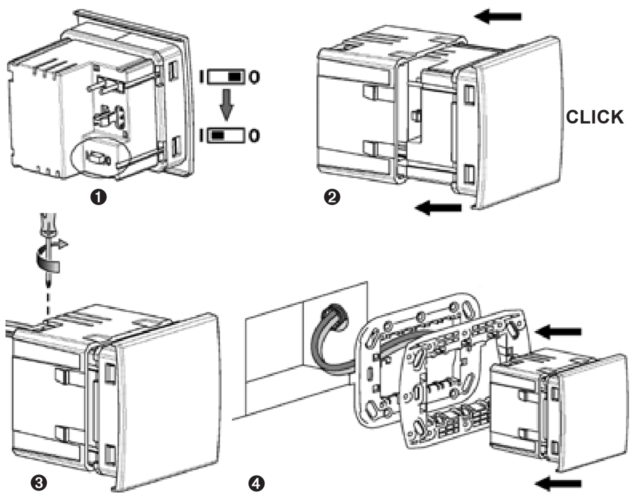
1



2

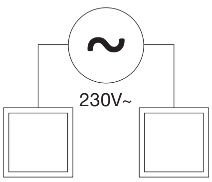


Assembly drawing in Zenit Niessen, Mylos and Chiara frame

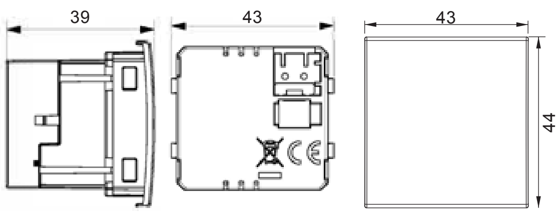


1. Move the selector from the storage position (O) to the operating position (I)
2. Plug the lamp into the back shell
3. Connect the power supply wires to the terminals
4. Plug the lamp+ back shell

Wiring diagram



Dimensions



Compliance with the following EU Directives:
2014/35/U E (Low Voltage)
2014/30/UE (EMC)
2011/65/EU (RoHS)

Technical details
Zenit

LED beacon light
N2281

1. Technical data

Rated voltage: 230V~, 50-60Hz (optional 127 Vac version available)

Alert signals: it can be selected by the selector:
(a) - blue color light or
(b) - high brightness white light

Autonomy: 2 hours; 1h at maximum illumination and 1h at lower illumination.

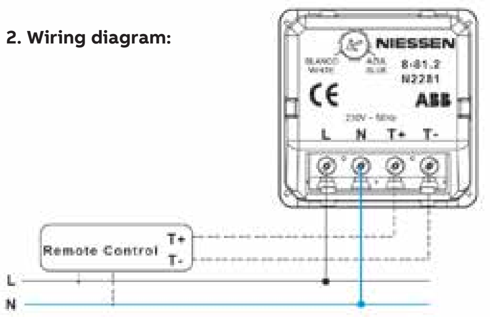
Remote control: supports any standard remote control over voltages.

Standard: UNE-EN60598-2-22 Interference suppression according to norms UNE-21806 y EN-55014.

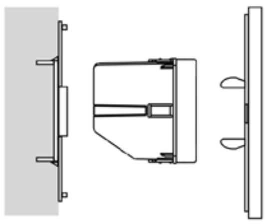
Brightness: more than 2 lumens (lm) at 1 meter distance.
Battery Nickes-Metal Hydride (Ni-MH), with less environmental impact.

Note: Ni-MH batteries have an estimated life of 4 years. Beacon Pilots correct operation should be verified periodically. In the absence of voltage and previously to have been connected to voltage for more than 24 hours, the mechanism should provide a minimum of one hour beacon lighting, if not, replace the mechanism.

2. Wiring diagram:



3. Mounting:



4. Operation:

The stairs beacon pilot is an autonomous signaling device, equipped with an electric energy storage battery, which ensures the correct building pathways signaling lighting in the event of a power outage or when it drops below 70% of its nominal value (230V~).
Once connected to mains voltage the device can remain in the following operation situations:
(1) Alert (signaling)
(2) Operation (beacon)
(3) Standby (remote control)

Alert (signaling)
The device remains on alert (signaling), provided that the value of the power supply exceeds 70% of the power supply nominal voltage (230V~ 50-60Hz).

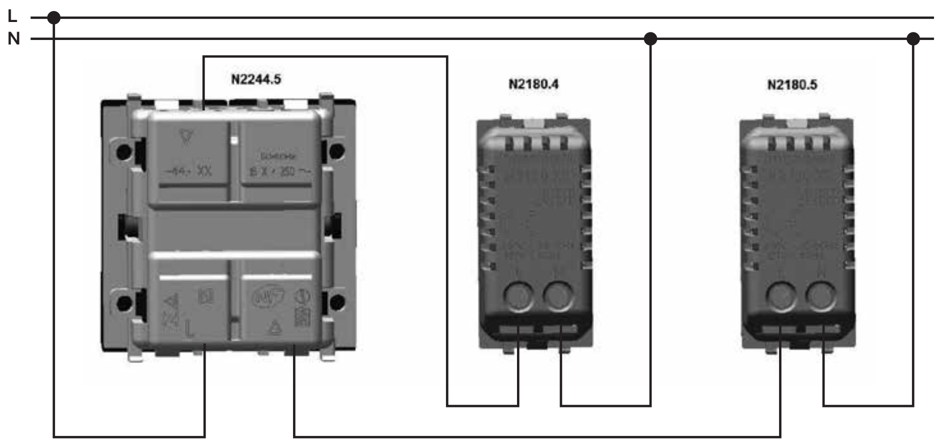
Emergency operation
It comes into an emergency operating condition when the power supply voltage is less than 70% of rated voltage (230V~ +/-10%). The device is illuminated with high brightness white color.
Note: The time necessary to recharge the device batteries is 24 hours.

Standby (remote control)
Situation in which the device remains off, even when the power supply voltage is interrupted. This action is achieved by using a remote control connected to the equipment, as shown in figure “Device connection”.
This way you can select certain number of appliances, from the total installed drivers, to remain off in a power failure, thereby reserving the batteries charge in case of a possible need for further use if the power outage is prolonged.
This is achieved by acting on the remote control that generates a continuous control signal or low voltage pulses, which acts on the pilot/s by placing it/them at standby or running again (beacon), as desired.
When achieving this type of installation, make sure of the correct connection of the different drivers.

Select the color of the device signaling light in alert situation (signaling).
No need to disconnect the supply voltage of the device to select the alert light through the potentiometer. Although the remote control inputs were connected, these should not be active at the time of selecting the alert light through the potentiometer.

Important: Disconnect the mains voltage power when installing. Work on the power supply system may only be performad by specialist staff! Disconnect main power supply prior to installation and/or disassembly!

Make Up Room / Do Not Disturb system
N2180.4, N2180.5 & N2244.5



Technical details

Zenit

Make Up Room / Do not Disturb system

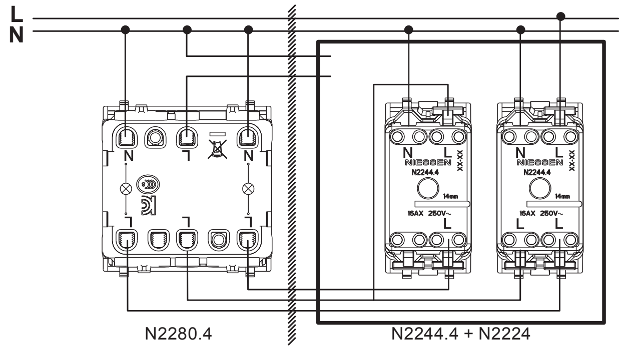
N2280.4 & N2244.4

1.- Introduction

Push switch with bell symbol, “DND” & “Please clean room” indicator
This product is always used for hotel guest room, office, meeting room and so on. It is installed outside. N2280.4 is installed outside the room, allowing the activation of the door bell inside the room, while in the front side of the push-buttom is shown the preference (Make Up Room / Do Not Disturb) selected in the N2244.4 switch placed inside the room.

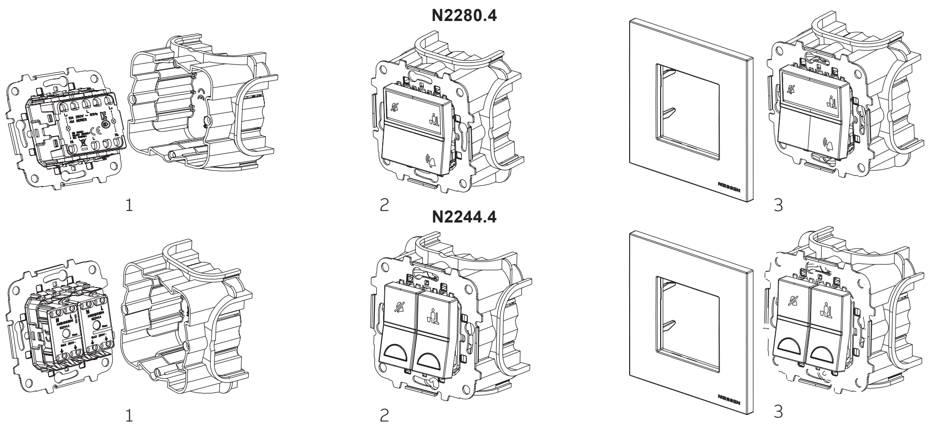
3.- Wiring diagram

The terminals marked•L are connected to the L of the pushbutton mechanism



4.- Mounting

To install the device follow these steps:
1. Connect the device following the wiring diagram.
2. Mount the device on the wall box.
3. Then, position the frame .

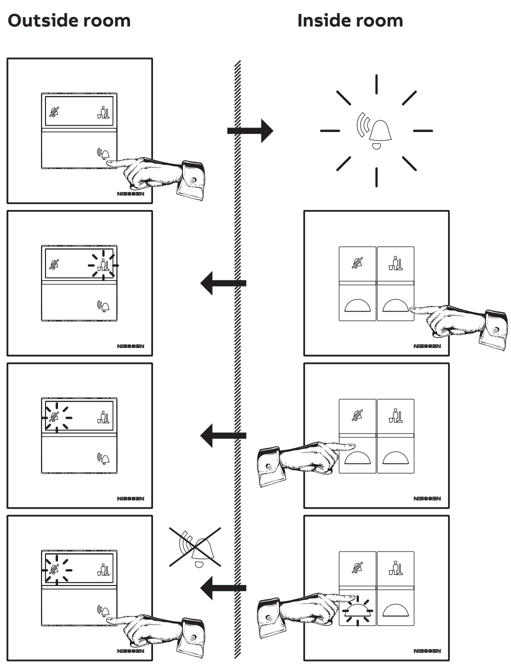


Danger
Dangerous currents flow through the body when coming into direct or indirect contact with live components. This can result in electric shock, burns or even death. Work improperly carried out on current-carrying parts can cause fires.
- Disconnect the mains power supply prior to installation and/or disassembly!
- Permit work on the 230 V supply system to be performed only by specialist staff.

2.- Technical data

Rated current:
10A / 250V~
N2244.4: not interlock
Compliant with:
IEC 60669-1 &
BS-EN60669-1.
Operating temperature:
≥+5ºC ≤+35ºC
Storage temperature:
≥-5ºC ≤+45ºC
Relative humidity:
≥0% ≤90% (noncondensing)

5.- Operation



Technical details
Zenit

Zenit elastic claws

Mounting the claws on the metal mounting plate

The elastic claws are inserted into the metal support of the mechanisms. For this, there is a guide where at the end of the path the claws are clipped and are perfectly secured, making a block with the mounting plate.

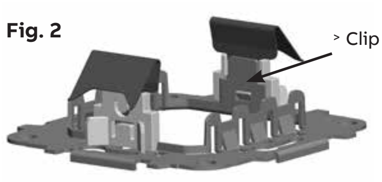
Fig. 1

> Guide for clamping the claws.

> Metallic mounting plate.

Once the claws are assembled, place the screwdriver in the mounting plate to level it and mount it correctly in the box.

Fig. 2



> Clip of the claws.

Fig. 3

The assembly is pressed into the housing.

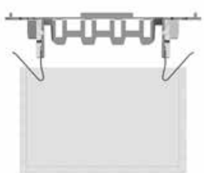


Fig. 4

The claws, when interconnected with the inner part of the box, flex by introducing the whole set into the box.

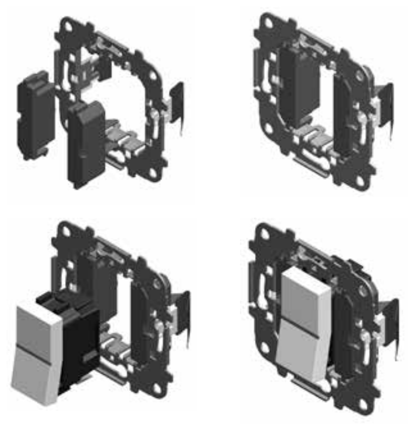
Fig. 5

Once the support is carried to the top of the box, the claws press against the inner walls of the box holding the support so that it is fixed to be able to mount the mechanisms.

The system is effectively fixed without the need for any additional elements. It supports the stresses to which the elements inserted in the ring can be subjected, in their habitual use.
(insertion of plugs, rocker pressing, etc.)

Insertion of a 1-module mechanism in a mountin plate with elastic claws.
1- Insert the additional parts (elastic claw insert ref. N2071.8).
2- Insert the 1-module mechanism into the metal bracket.

Fig. 6



Removing the mounting plate and claws from the box

In order to be able to disassemble the entire set, simply insert a tool (screwdriver) and press on each of the claws until they are released from the mechanism support, they fall into the inside of the box and it is now possible to remove all the system. To reassemble it you have to restart the whole process explained before.

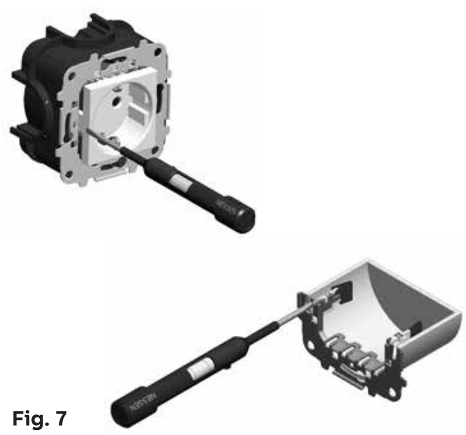


Fig. 7

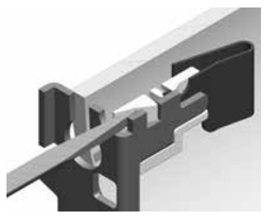


Fig. 8

Technical details
Zenit

FM stereo receiver with alarm module - 9368

1. Technical data

Rated voltage:
- 9368: 230 V~; ±15%; 50-60 Hz
- 9368.7: 127 V~; ±15%; 50-60 Hz

Max. consumption: 100 mA

Stand-by consumption ref. 9368 and 9368.7 (*): 0,2 W.

Stand-by consumption ref. (9368 or 9368.7) + 9368.3 (*): 0,5 W.
(*) With the display illumination at minimum.

Maximum output power: 2+2 W; <1% distorsion (16 W)

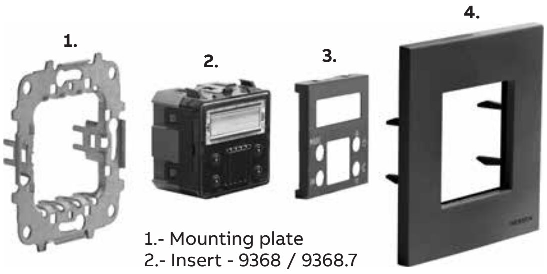
Speaker impedance: 16 W (2+2 W audio)

2. Wiring diagram:

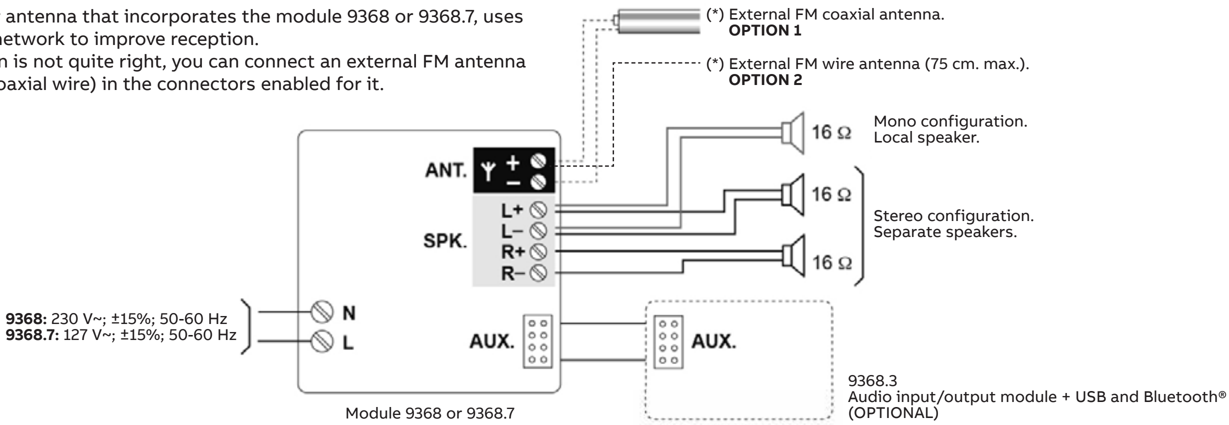
(*) FM RECEPTION

The FM indoor antenna that incorporates the module 9368 or 9368.7, uses the electrical network to improve reception.
If the reception is not quite right, you can connect an external FM antenna (thin wire or coaxial wire) in the connectors enabled for it.

3. Mounting:



1.- Mounting plate
2.- Insert - 9368 / 9368.7
3.- Cover plate - N2268
4.- Frame



Auxiliary module – 9368.3

1. Technical data

Power supply through AUX.: 9 V

Maximum consumption: 175 ~ 200 mA

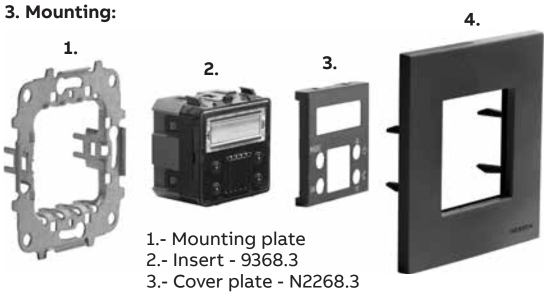
Consumption stand-by: 0.4 W

Headphones impedance: 16 ~ 600 Ω (25 + 25 mW audio phones)

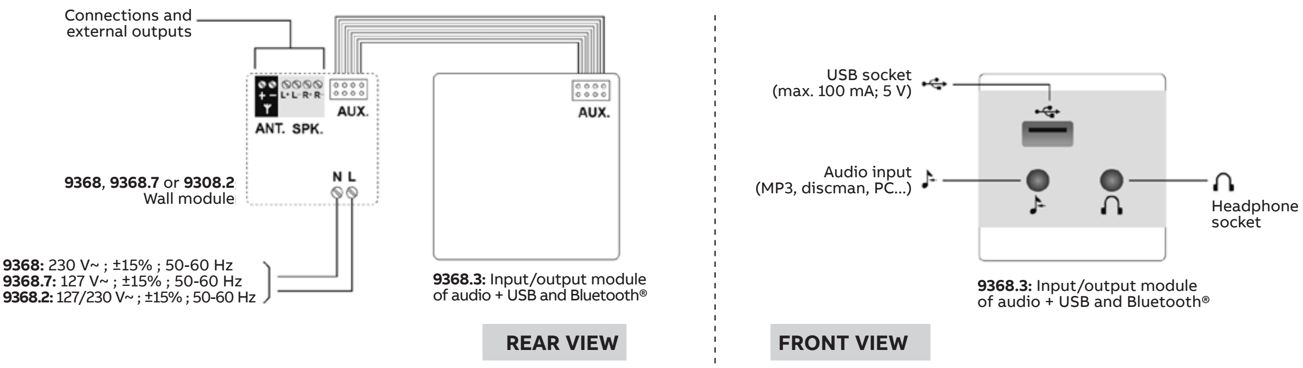
Bluetooth®: Bluetooth® v2.1 2.4GHz IEEE 802.15.1
Maximum reach from the module 9368.3 to user's Bluetooth® device: 10 m.

2. Wiring diagram:

3. Mounting:



1.- Mounting plate
2.- Insert - 9368.3
3.- Cover plate - N2268.3
4.- Frame



Technical details
Zenit

Radio & Bluetooth multiroom module + Remote control module
9368.1 & 9368.2

1. Technical Data

Power supply:
230 V~ / 127 V~; ±15%; 50-60 Hz

Bluetooth®:
Bluetooth® v2.1 2.4GHz IEEE 802.15.1
Maximum reach from the ceiling module 9368.1 to user's Bluetooth® device: 10 m.

Maximum power consumption:
200 mA

Consumption stand-by:
0.3 W

Communication data:
ZigBee 2.4GHz IEEE 802.15.4

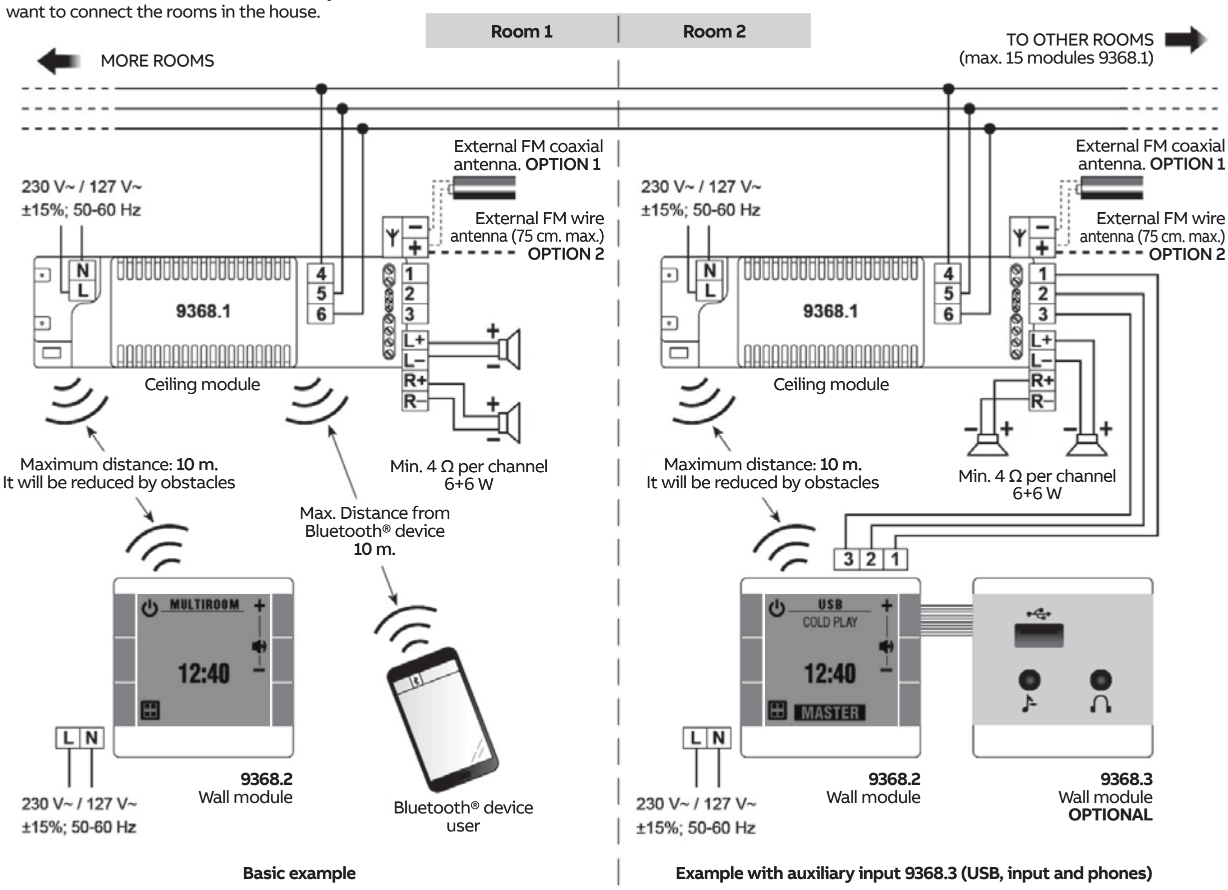
Antenna impedance:
75 Ω

Maximum power headphone output
6+6 W; <1% distortion (4 Ω)

Minimum impedance of headphones:
4 Ω (6+6 W audio)

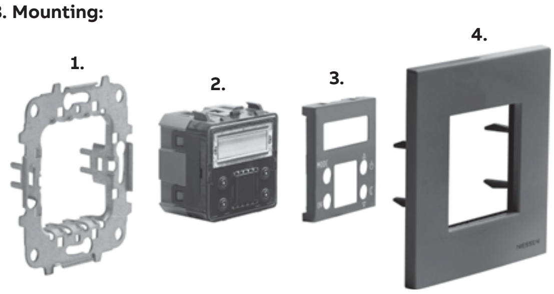
2. Wiring diagram:

BUS MULTIROOM is only necessary if there is more than one room in the house and/or you want to connect the rooms in the house.



NOTE: Because these devices are radio frequency and to avoid interference, you should not install modules of the same reference or any other RF equipment that could interfere less than 1 m. away. It should be noted that any obstacle between the devices, can significantly reduce the distance range between them.

3. Mounting:



1. Mounting plate
2. Insert - 9368 / 9368.7
3. Cover plate - N2268
4. Frame

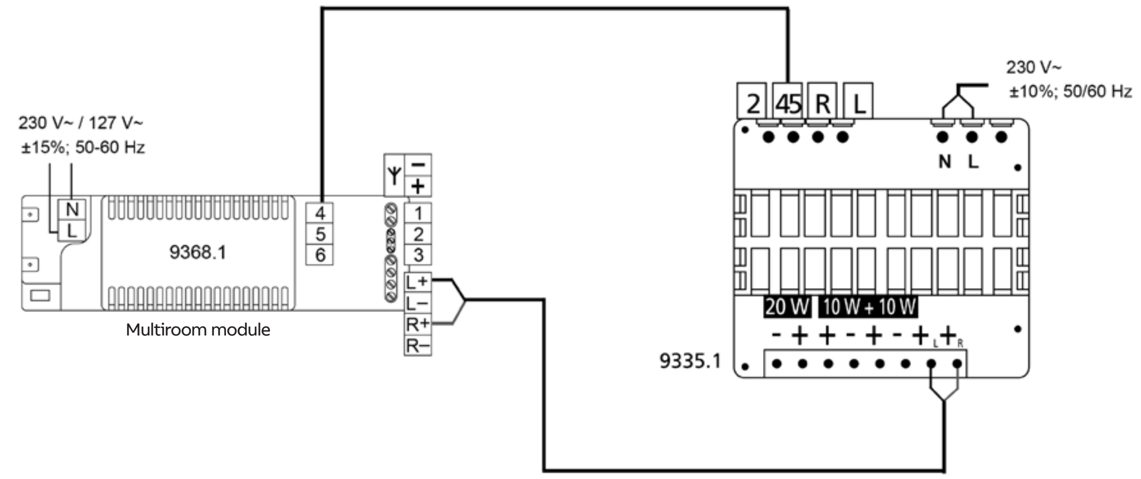
Technical details

Zenit

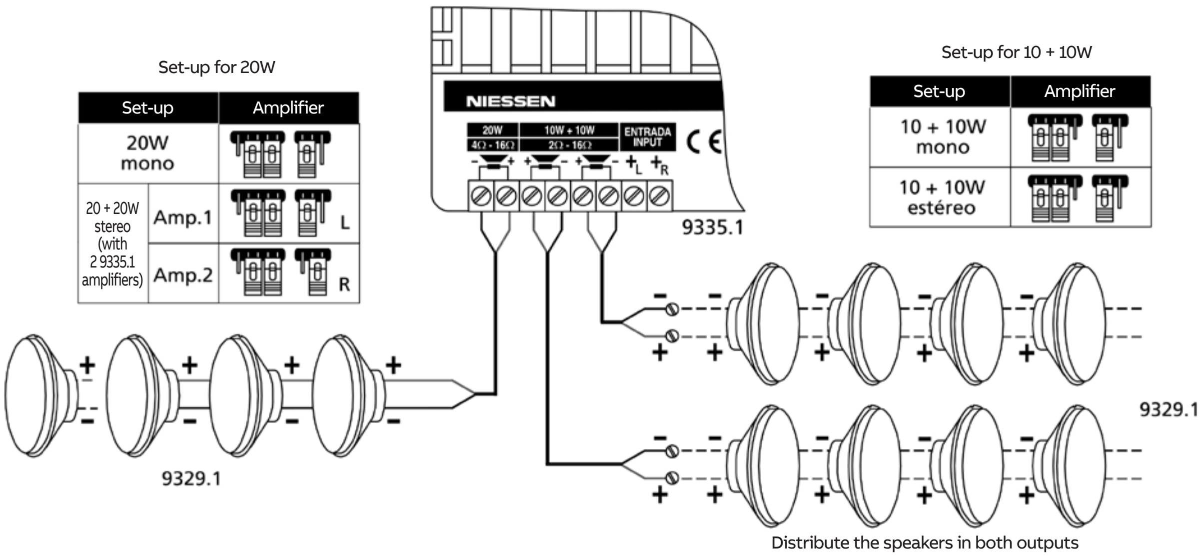
Sound amplifier - Connection to multiroom module

9335.1 - 9368.1

Wiring diagram of 9368.1 module to 9335.1 sound amplifier



Wiring diagram for 9329.1 loudspeakers to 9335.1 sound amplifier



Power per speaker	
No. of speakers	9329.1 16Ω
3	5.5W
4	5W

Power per speaker			
No. of speakers	Power per speaker 4Ω	8Ω	9329.1 16Ω
2	7W	4W	2W
4	5W	3.5W	2W
6 / 8	Þ	2.5W	1.7W

Technical details
Zenit

Bluetooth sound module with amplifier
9368.4

1. Technical Data

Power supply:
230 V~ / 127 V~; ±15%; 50-60 Hz

Bluetooth®:
Bluetooth® v2.1 2.4GHz IEEE 802.15.1
Maximum reach from the ceiling module 9368.1 to user's Bluetooth® device: 10 m.

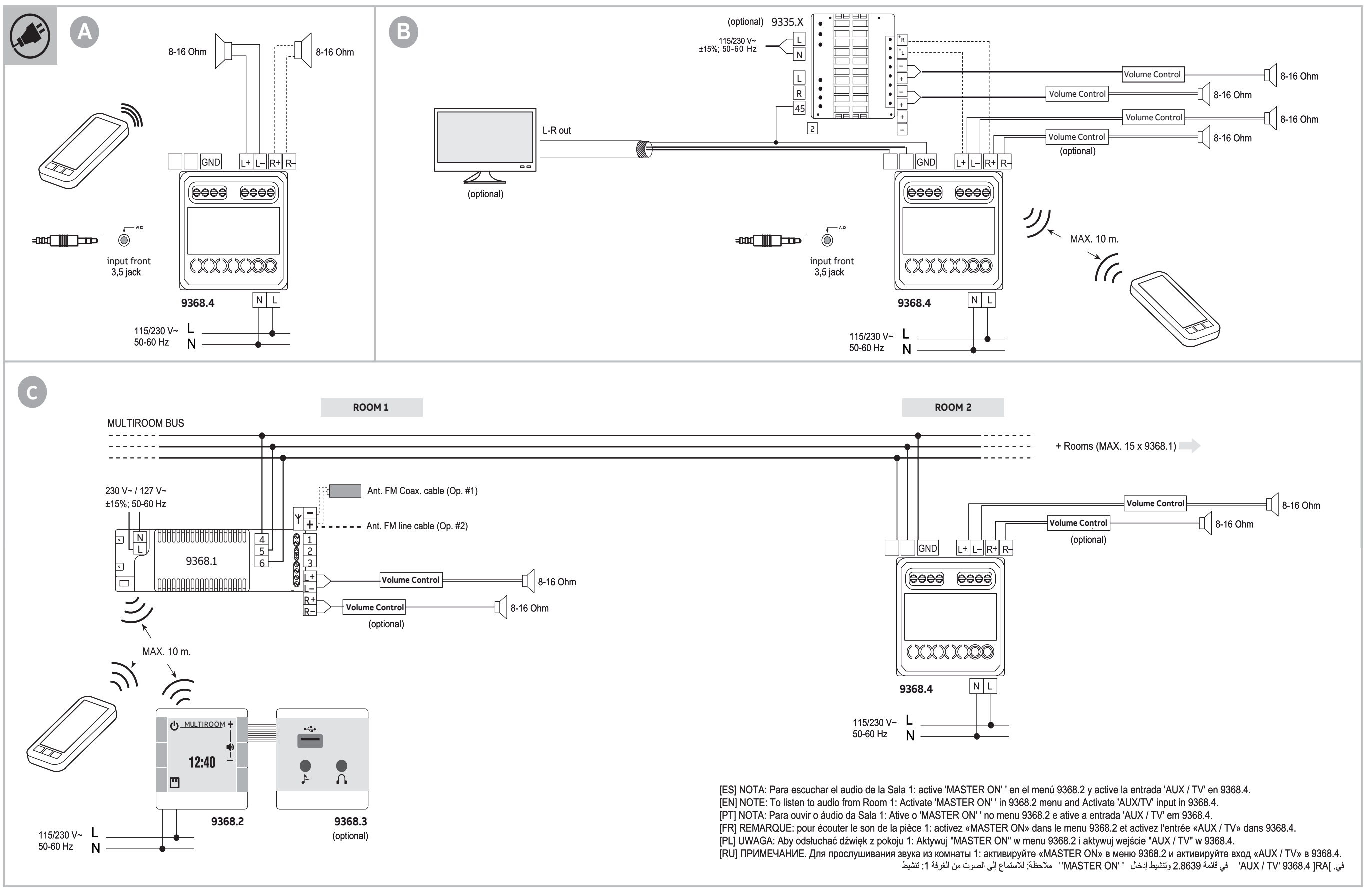
3 audio inputs:
Bluetooth, AUX (front), TV (rear)

Maximum power consumption: 7W
Consumption stand-by: 0.2 W
Min input signal level AUX / TV: 500 mV RMS
Input impedance: 10 kOhm

Amplifier power:
2 + 2 W <1% distorsion (16 Ω)

Speaker impedance:
8 - 16 Ohm

2. Connection
[A] Basic: input from jack connector (front) or via Bluetooth®.
Output: amplified signal via R-L terminals (rear).
[B] Complete: input from jack connector (front), via Bluetooth® or rear terminals (LIN-RIN) to
connect TV audio.
Output: amplified signal via R-L terminals (rear) to fed speakers
(min. impedance: 8 - 16 Ohm) or external amplifier (ref. 9335.X) for higher power output.



Technical details
Zenit

Bluetooth sound module with amplifier
9368.4

3. Set-up
Make sure power supply is disconnected during setup. Connect all wires to rear terminals according to diagrams. Secure mechanism into flush-mounted box using the screws. Connect main power supply.

Note:
Avoid installing the module into encapsulated metal boxes to prevent Bluetooth® connectivity issues.

4. Control Elements
[1] ON / OFF
[2] Bluetooth® mode selection
[3] Add a new Bluetooth® device
[4] Volume +/-
[5] Analog audio mode: rear terminals (TV) or front jack (AUX)

5. Status LED

Bluetooth®

Blue (still)	Connected to Bluetooth® device
Blue (flashing quickly)	• No stored devices • Ready to sync to new devices
Blue (flashing slowly)	Trying to sync with stored device
AUX / TV	
Yellow	Connected to jack input (front)
Green	Connected to TV input (rear)

6. Bluetooth® mode

Note:
Activate the Bluetooth® connection in your mobile device to enable BT mode.

I. First time sync (new installation/reset)

1. Press [1] to switch ON the BT module
   – The quickly flashing blue LED will indicate that the BT module is ready to sync with new device. If blue LED is notflashing, press [2] to activate BT mode.

2. Connect your mobile device to the BT module
– Browse your mobile device to the Bluetooth settings.
  – Depending on the device, a list of BT devices will be displayed automatically. Alternatively select „search for BT devices" function.
  – Select „ABB-BTR-XXXX" to sync devices.

– This sync process must be initiated from the mobile device / computer after the blue LED is flashing quickly.

3. Once the blue LED remains permanently ON, you may play music.
   – The BT module will play the audio stream from your mobile.

II. Selecting previously stored devices
1. Press [1] to switch ON the BT module
   – The BT module will try to connect to previously stored devices (LED flashing slowly). If the last used device cannot be found, the module will skip to the previous device in the history list.
   – When a device is found, the devices will connect automatically and the LED will remain still.
2. Once the blue LED remains permanently ON, you may play music.
   – The BT module will play the audio stream from your mobile.

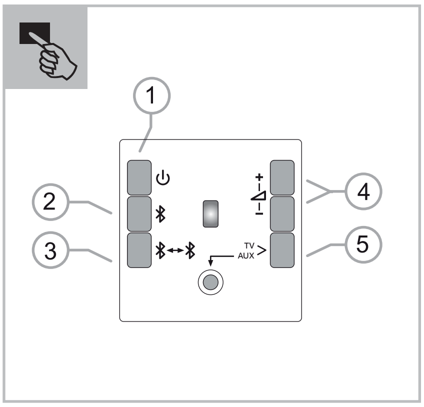
III. Adding new devices
1. Press button [3] for at least 1 second
   – The blue LED will turn to quick flashing
2. Connect to the new device following chapter „I. First time sync (new installation/reset)"
   – The BT module can store up to 8 devices. Once the list is full any new device will overwrite the device from the list which has been used the least.

Note:
To empty the device list you may push button [3] for at least 6 seconds.

Bluetooth® mode remarks

- Depending on the model, the loudspeakers on the multimedia device for playing music have been deactivated while it is connected to the BT module.
- BT module volume is independent to that from the mobile /computer.
  – It is recommended to keep the volume high in the mobile / computer to improve the usability of the BT module.
- Automatic connection
  – Only previously connected devices can connect to the BT module automatically.

7. TV/AUX mode
1. Press [5] to siwtch to TV/AUX mode.
2. Press [5] again to toggle between front and rear audio signals
– Front input (jack), yellow LED
– Rear input (TV LIN-RIN), green LED

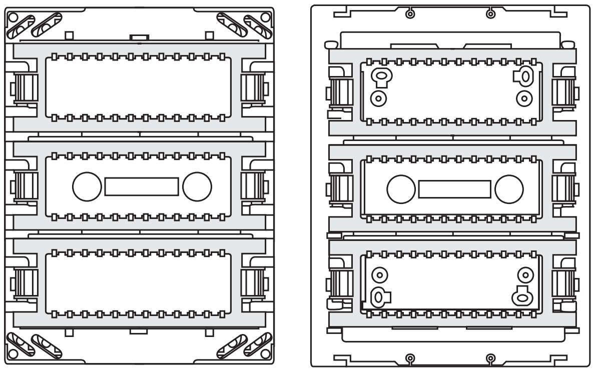


8. Troubleshooting
- The sound unit does not turn on.
  – Check if the sound unit is powered. A voltage between 115 and 230 V~ 50/60Hz must be applied to L and N terminals.
- The sound unit turns on, but there is no sound.
  – Check that the speakers are properly connected to L+ / L and R+ / R outputs. Verify the absence of shortcircuits and check that line impedance is above 11 Ohms. Make sure that a Bluetooth® device is connected, or a signal is present at TV or AUX inputs. Set volume level to maximum.
- The blue LED flashes slowly, but the unit does not connect to a previously paired device.
  – Check that your device has Bluetooth connectivity enabled. Press twice the ON/OFF key [1] to force a new search through the paired device list [2]. To force a pairing process, press [3] key.
- The unit is at TV or AUX mode, and there is no sound.
  – Verify that an analog signal with a level around 250-500mV is present at TV (rear terminals) or AUX (front 3.5 mm jack) inputs.

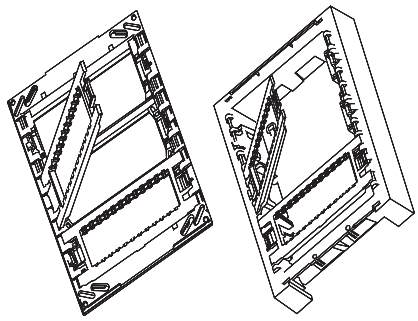
Technical details
Zenit

Surface and flush-mounted Centralizations

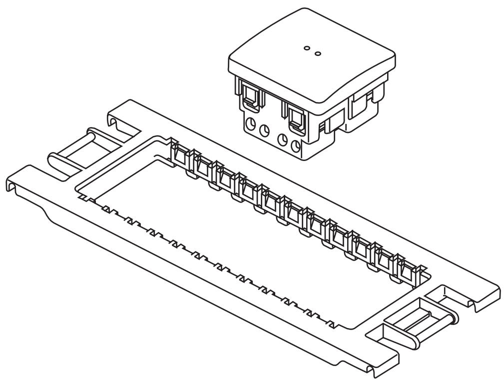
1. For the mounting of the surface and flush mounting boxes, please check the diagrams for the Workstations in the next page.

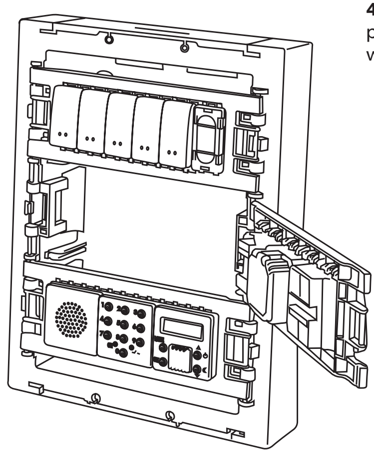


2. Both in the surface solution and in the flush solution, there are metal mounting plates where the mechanisms are inserted.



3. The mechanisms are inserted in the mounting plate by pressure.

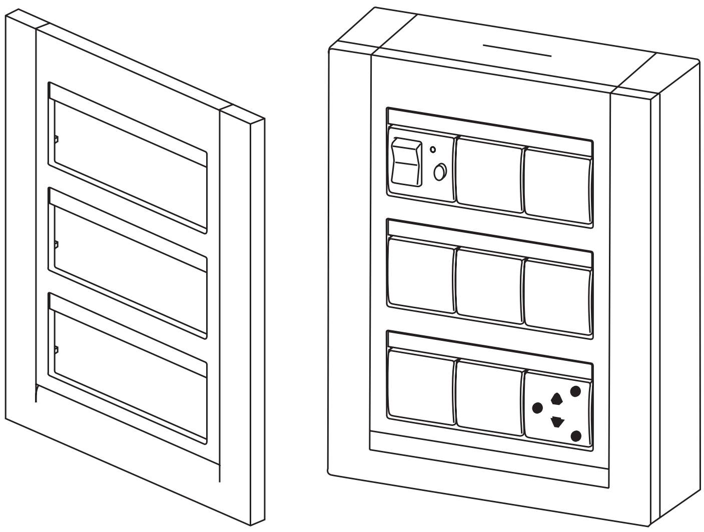




4. Once inserted, proceed with the wiring.

5. The mounting plate is closed by clipping.

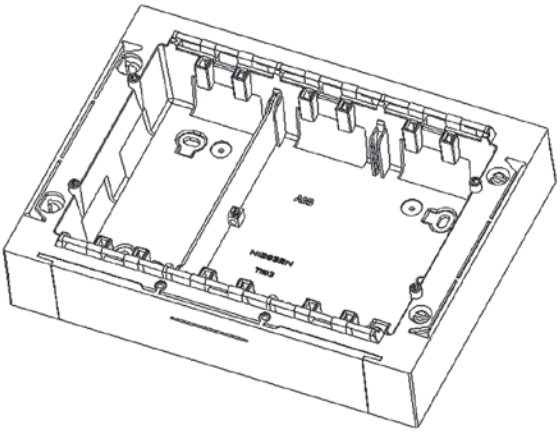
6. Once all the devices are wired and the mounting plates correctly placed, the frame is mounted by clipping it to the box.

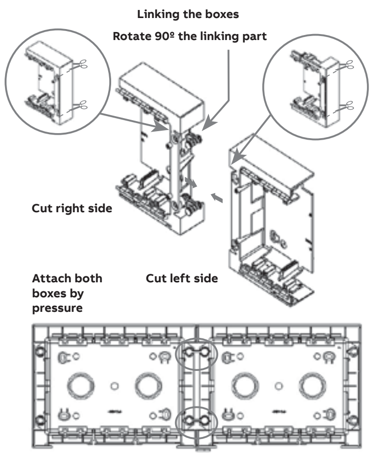


Technical details
Zenit

Installation of the surface mounting boxes for Workstations – T1193, T1194, T1195

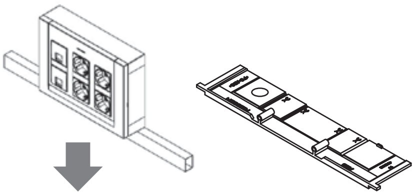
Installation of the box





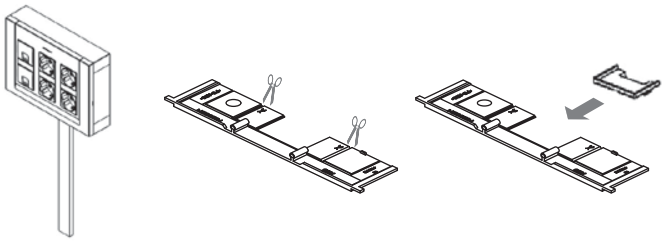
11

1

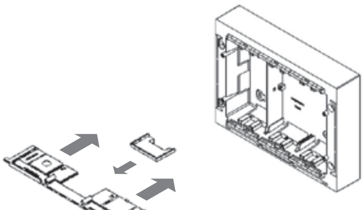


Thanks to the pre-cuts, no adapter required for trunking systems

2

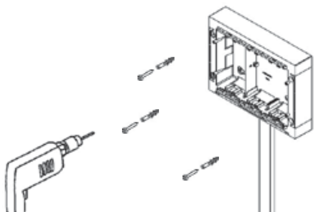


3



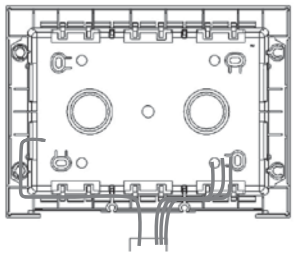
Mount the adapter to the cable trunking

4



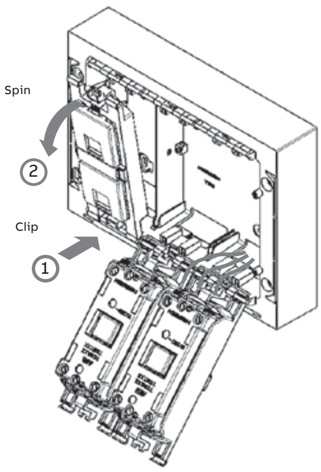
Tie to the wall

5

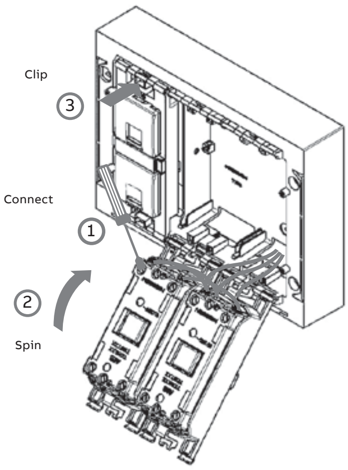


Installation of mechanisms

6



7



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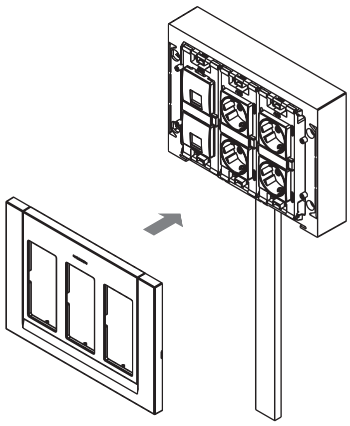


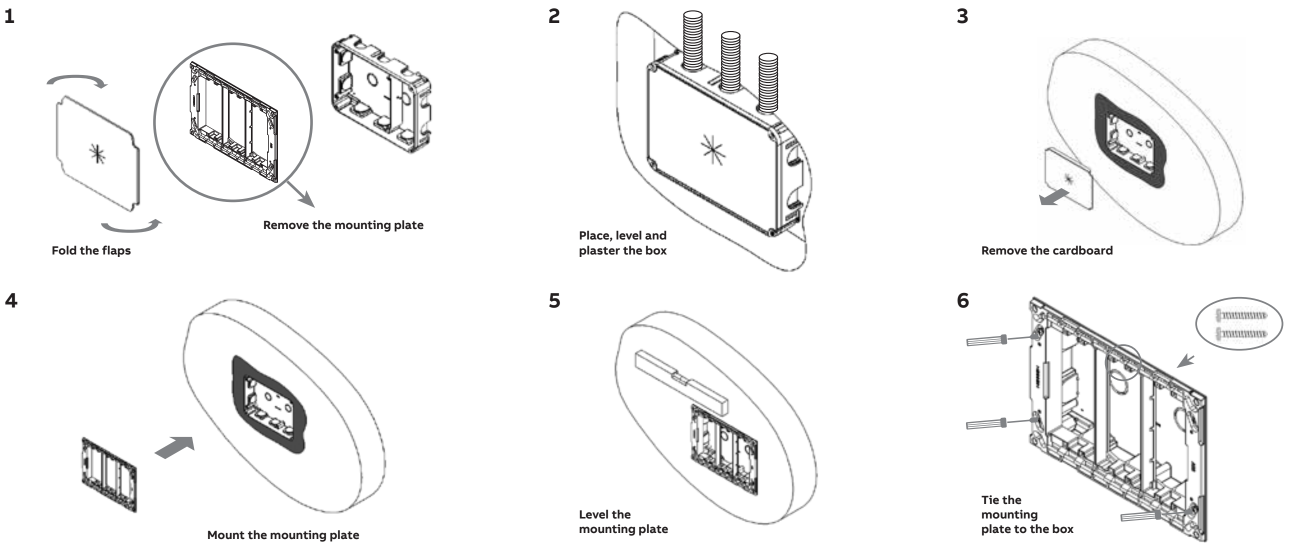
Mount the frame

Technical details

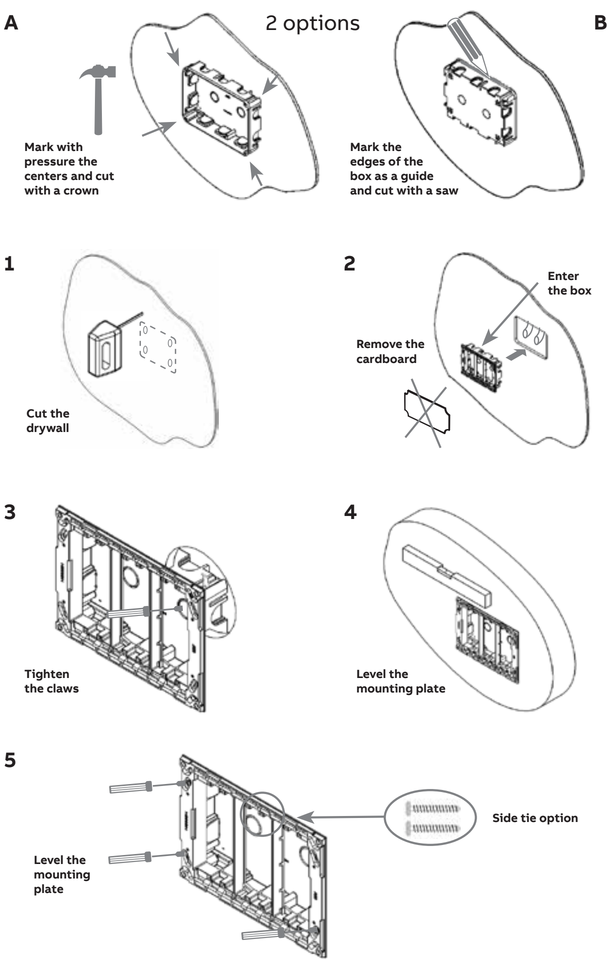
Zenit

Installation of the flush mounting boxes for Workstations - T1093, T1094

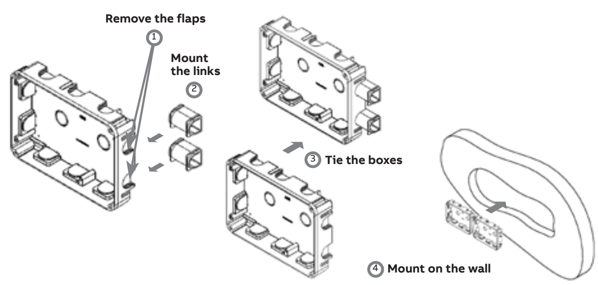
Installation in cement and brick walls



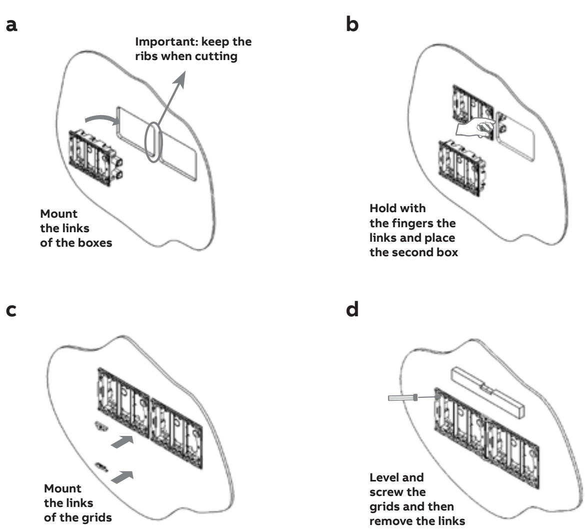
Installation in drywall / hollow partition



Linking the boxes in cement / brick walls



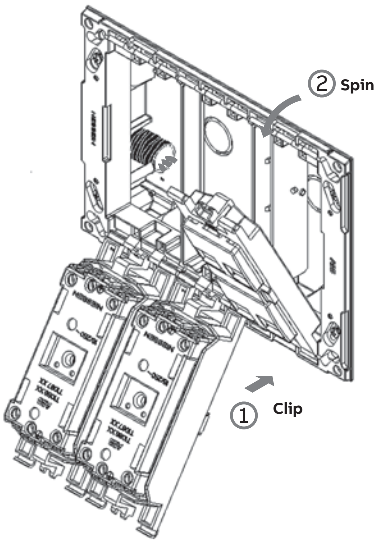
Linking the boxes in drywall / hollow partition



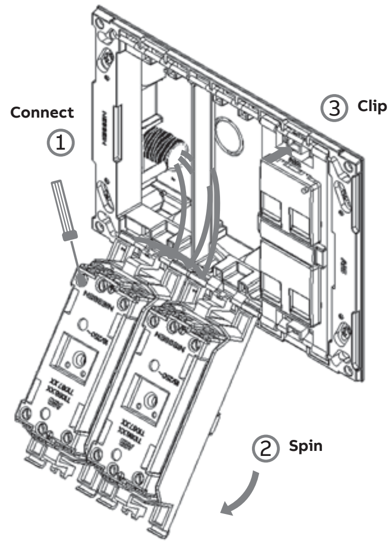
Technical details
Zenit

Installation of inserts in flush mounting Workstations

1

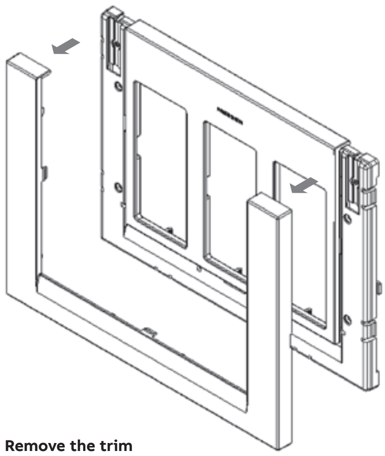


2



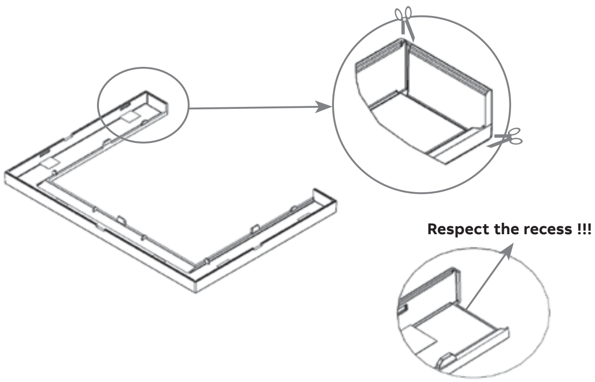
Installation of the foldable lid in the Workstations

1



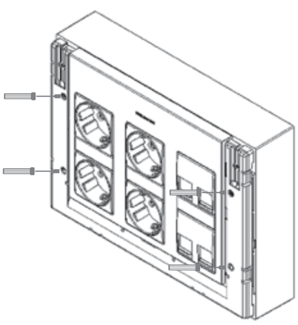
Remove the trim

2



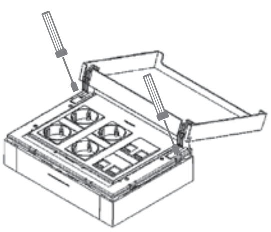
Cut the ends of the trim

3



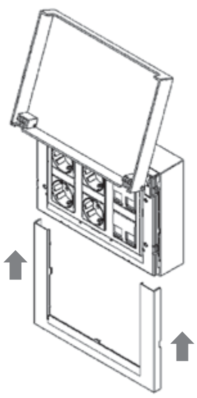
Tie the structural plate

4



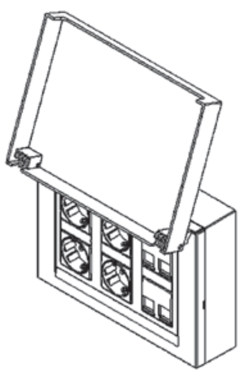
Tie the hinges

5



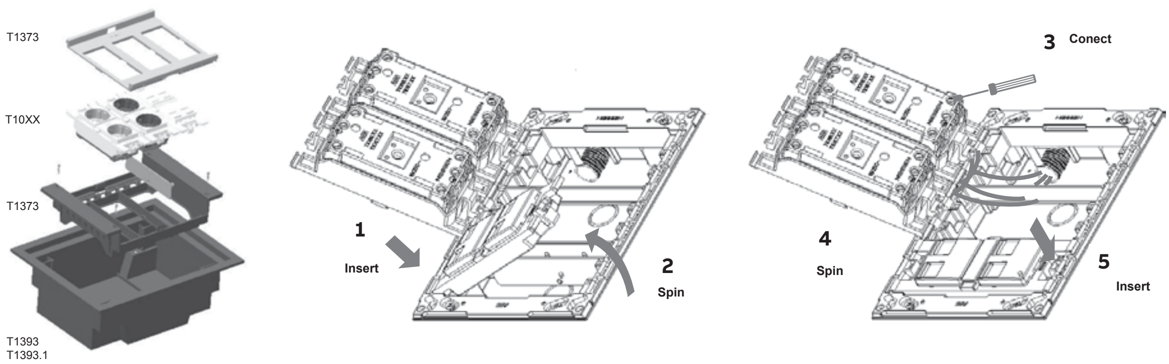
Mount the trim

6



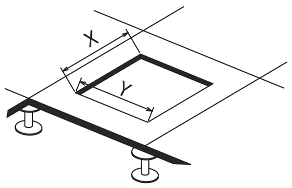
Technical details
Zenit

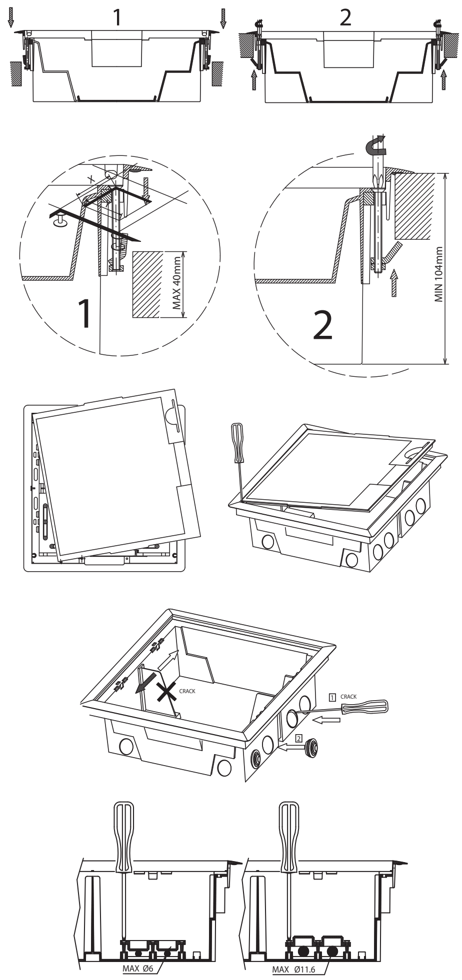
Installation of the floor box
Installation of the frame T1373 and inserts T10XX



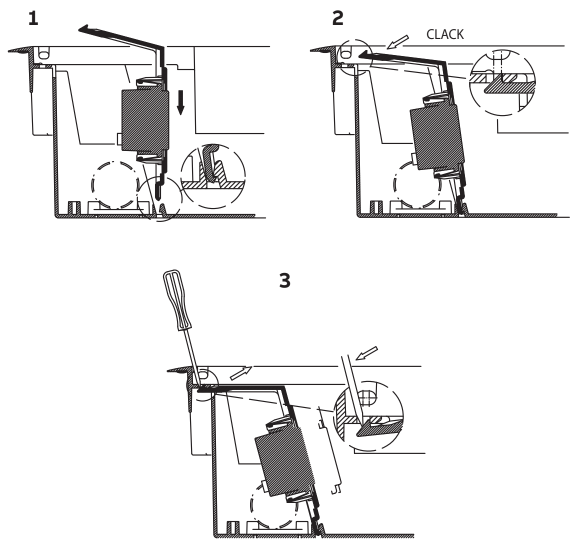
Installation in flush floor

X	273
Y	209

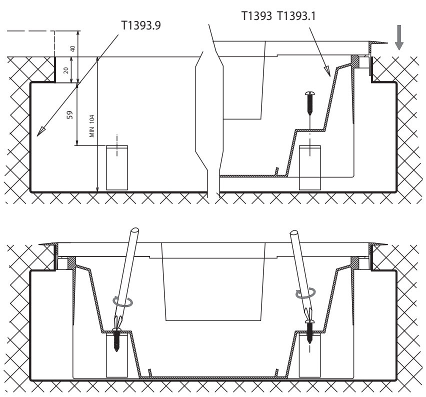




Installation of frame bracket T1393.4



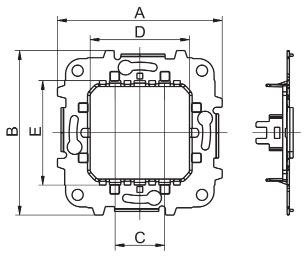
Installation in concrete floor T1393.9

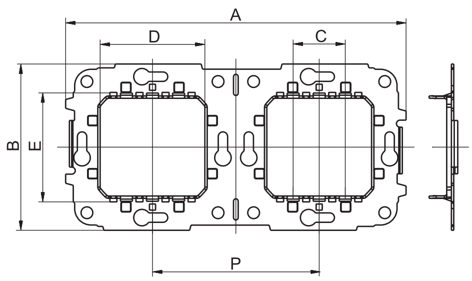


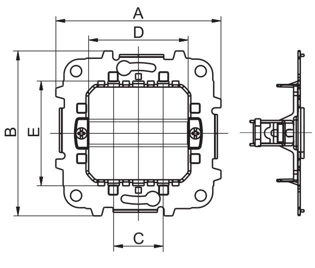
Technical details

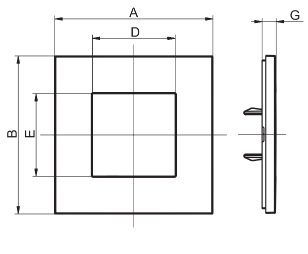
Zenit

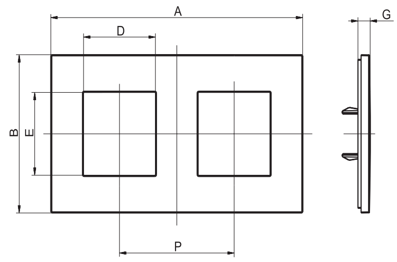
Frames

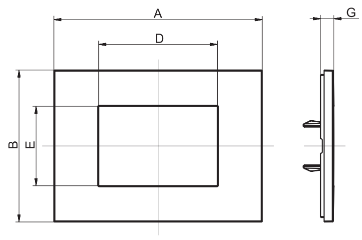


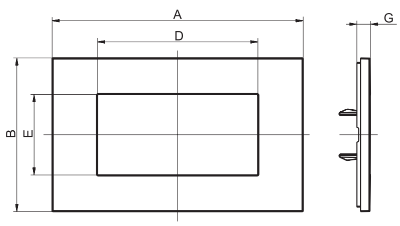


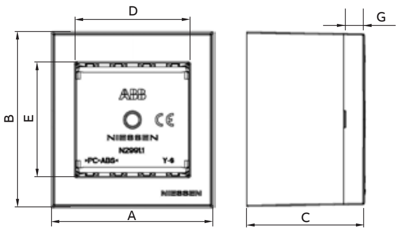


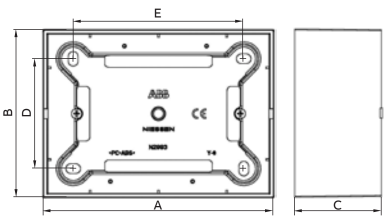


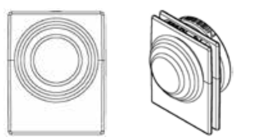


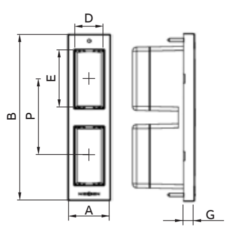


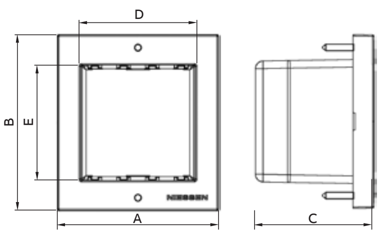


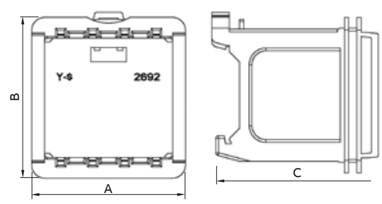












Technical details
Zenit

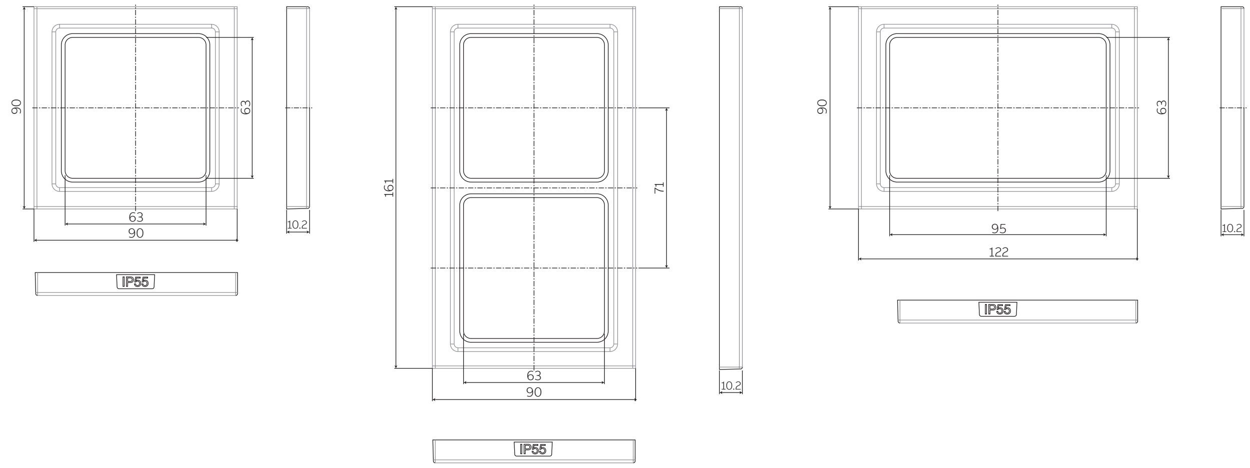
Frames

Type	Article No.	A	B	C	D	E	G	P
Frames for square boxes (60mm screw distance)	N2171 / N2171.1 / N2271 / N2271.1	85	85	-	22,4	44,6	7,5	-
	*N2271	90	90	-	22,4	44,6	8	-
	Z2271.1	86	86	-	44,6	44,6	4,2	-
	*Z2271.1	86	86	-	44,6	44,6	4,4	-
	N2272 / N2272.1	156	85	-	44,6	44,6	7,5	71
	*N2272	161	90	-	44,6	44,6	8	71
	N2273 / N2273.1	227	85	-	44,6	44,6	7,5	71
	*N2273	232	90	-	44,6	44,6	8	71
	N2274 / N2274.1	298	85	-	44,6	44,6	7,5	71
	*N2274	303	90	-	44,6	44,6	8	71
	N2275	369	85	-	44,6	44,6	7,5	71
Frames for 3 module boxes (83,5mm screw distance)	N2370.1	122	90	-	-	-	7,5	-
	N2371.1 / N2372.2	122	90	-	22,4	44,6	7,5	-
	N2371.1V	122	90	-	44,6	22,4	7,5	-
	N2372.1	122	90	-	44,6	44,6	7,5	-
	*N2372.1 / *N2472	122	90	-	44,6	44,6	8	-
	N2373.1	122	90	-	66,8	44,6	7,5	-
	*N2373.1 / *N2473	122	90	-	66,8	44,6	8	-
	N2471 / N2472.2 /N2471.1 / N2472.3	117	85	-	22,4	44,6	7,5	-
	N2472 / N2472.1	117	85	-	44,6	44,6	7,5	-
	N2473 / N2473.1	117	85	-	66,8	44,6	7,5	-
	Z2373.1	118	86	-	66,8	44,6	3,9	-
	*Z2373.1	118	86	-	66,8	44,6	4,1	-
Frames for 4 module boxes (107mm screw distance)	N2374.1 / N2474	139	85	-	89	44,6	7,5	-
	*N2374.1 / *N2474	142	90	-	89	44,6	8	-
	Z2474.1	140	86	-	89	44,6	3,9	-
	*Z2474.1	140	86	-	89	44,6	4,1	-
Frames for 7 modules boxes (100mm screw distance)	N2777.1 / N2777	196	85	-	155,6	44,6	7,5	-
	*N2777	210	90	-	155,6	44,6	8	-
	Z2777.1	207	86	-	155,6	44,6	3,9	-
	*Z2777.1	207	86	-	155,6	44,6	4,1	-
Mounting grids	N2271.9 / N2271.9G	74	74	22,2	44,6	47	-	-
	Z2271.91	74	74	22,2	44,6	44,6	-	-
	N2272.9	145	70,8	22,2	44,6	47	-	71
	N2273.9	216	70,8	22,2	44,6	44,6	-	71
	N2371.9V	102	74	22,2	44,6	44,6	-	-
	N2473.9	102	74	22,2	66,8	44,6	-	-
	Z2373.91	102	70,8	22,2	66,8	44,6	-	-
	N2474.9	124	74	22,2	92	44,6	-	-
	Z2474.91	102	70,8	22,2	92	44,6	-	-
	N2777.9 / Z2777.91	194	79	22,2	158	44,6	-	-
Surface mounting boxes	N2991.1 BL	62	68	47	44,6	44,6	8,5	-
	8591 BL	86	86	44,2	58	58	-	-
	8592 BL	157	86	44,2	58	129	-	-
	8593 BL	228	86	44,2	58	200	-	-
	N2993 BL	117	85	44,2	56	87	-	-
	N2994 BL	139,2	85	44,2	56	110,2	-	-
Frames for profiles	N2671	32	68	46,5	22,4	44,6	8,5	-
	N2671.2	32	126	46,5	22,4	44,6	8,5	-
	N2672	62	68	46,5	44,6	44,6	8,5	-
DIN-rail mounting plate	2692 BL	53,5	56	58,5	-	-	-	-

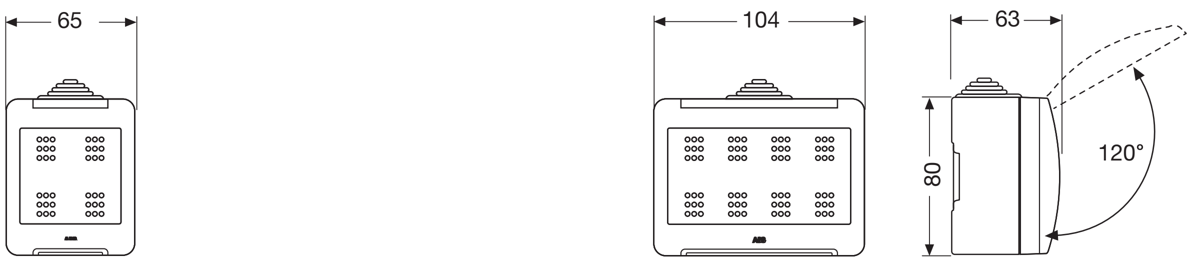
* Noble materials

Technical details
Zenit

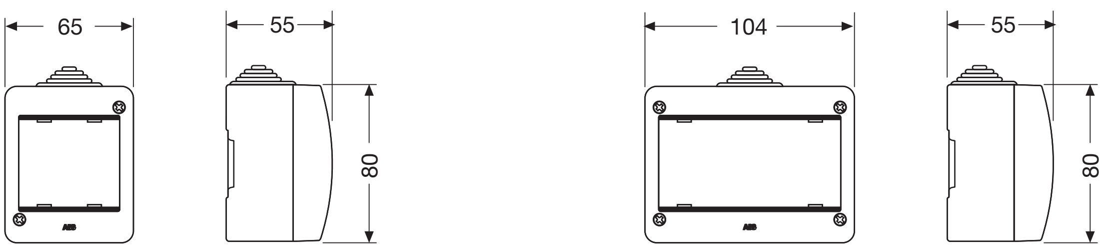
IP55 flush-mounting boxes



IP55 surface mounting boxes



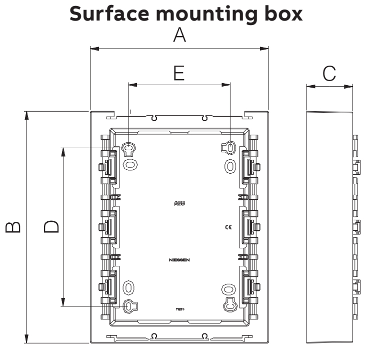
IP40 surface mounting boxes



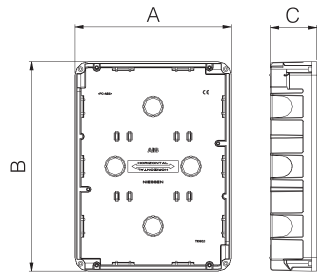
Technical details
Zenit

Centralizations

Surface mounting box



Flush-mounting box

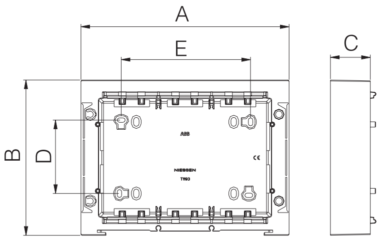


Ref.	A	B	C	D	E
T1292	212	204	55	117	121
T1293	212	275	55	188	121
T1294	212	346	55	259	121

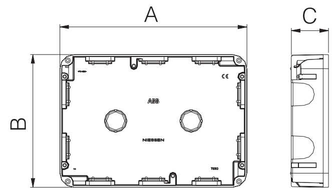
Ref.	A	B	C	D	E
T1092.1	186	178	55	-	-
T1093.1	186	249	55	-	-
T1094.1	186	320	55	-	-

Workstations

Surface mounting box



Flush-mounting box

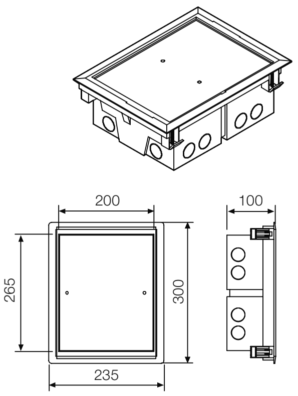


Ref.	A	B	C	D	E
T1193	235	176	45	83	146
T1194	295	176	45	83	206
T1195	355	176	45	83	266

Ref.	A	B	C	D	E
T1093	211	150	42	-	-
T1094	271	150	42	-	-

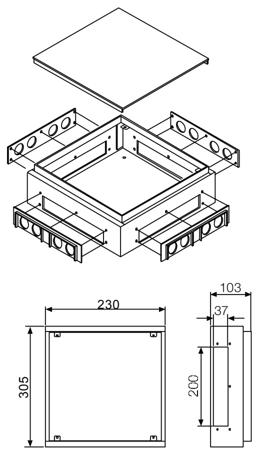
Floor boxes T1393 and T1393.1

Floor box

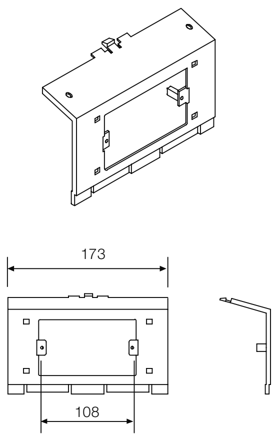


Hollow to be done: 273 x 209

Metallic housing T1393.9



Adapter frame T1371.4

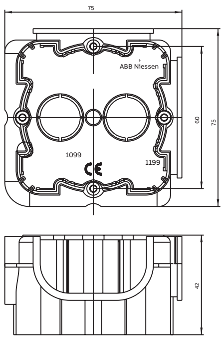


Note: all dimensions in mm.

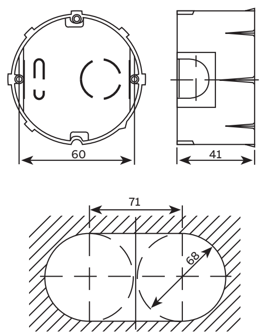
Technical details
Zenit

Mounting boxes

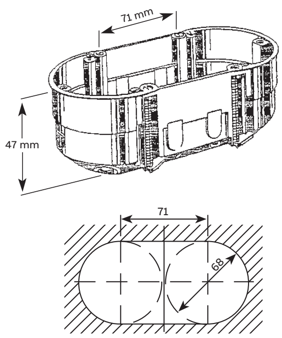
1099/1199



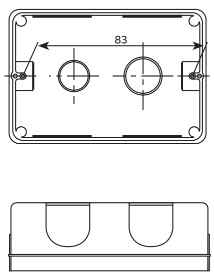
999



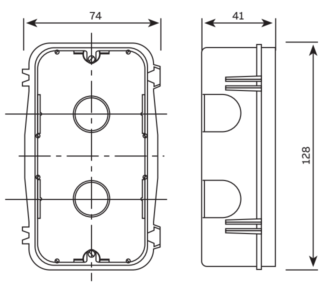
999.2



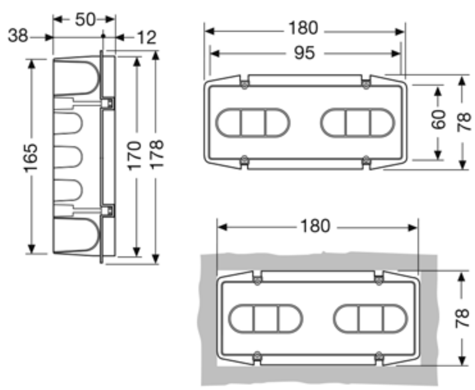
499.3



1499.4



1499.7



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Notes

Technical details

Chiara – General information

Main technical data and reference standards for the devices in the range

Component	Reference standards	Basic electrical data*			Prolonged operation	Resistance to abnormal heat and fire	
		Test voltage withstand (V)	Insulation resistance (MW)	Breaking capacity or utilization category	No. changes of position	Termopres-sione con biglia (°C)	Glow wire tests (°C)
Operating mechanisms	CEI 23-9 (EN 60669-1)	2000 at 50Hz for 1 minute	> 5	1.25 In (200 changes of position)	40000 at In 250V~ cosφ = 0.6)	125	850
Socket outlets	CEI 23-5/CEI 23-50/ CEI 23-16 (EN 60884-1)	2000 at 50Hz for 1 minute	> 5	1.25 In (100 changes of position)	10000 at In 250V~ cosφ = 0,8)	125	850
Latching relay	CEI 23-9/CEI 23-62 (EN 60669-1/ EN 60669-2-2)	2000 at 50Hz for 1 minute	> 5	-	50000 a In 250V~ cosφ = 0,6)	125	850
Monostable relays	CEI 94-4/CEI-EN 61810-1 (EN 60669-1/ EN 60669-2-2)	2000 at 50Hz for 1 minute	> 5	1.25 In (200 changes of position)	50000 at In 250V~ cosφ = 0,6)	125	850
Automatic MCBs	CEI 23-3 (EN 60898)	2000 at 50Hz for 1 minute	-	1.5...3kA	8000	125	850
Automatic RCDs	CEI 23-95	2000 at 50Hz for 1 minute	-	1.5...3kA	4000	125	850
Supports and frames	CEI 23-9 (EN 60669-1)	-	-	-	-	75	650

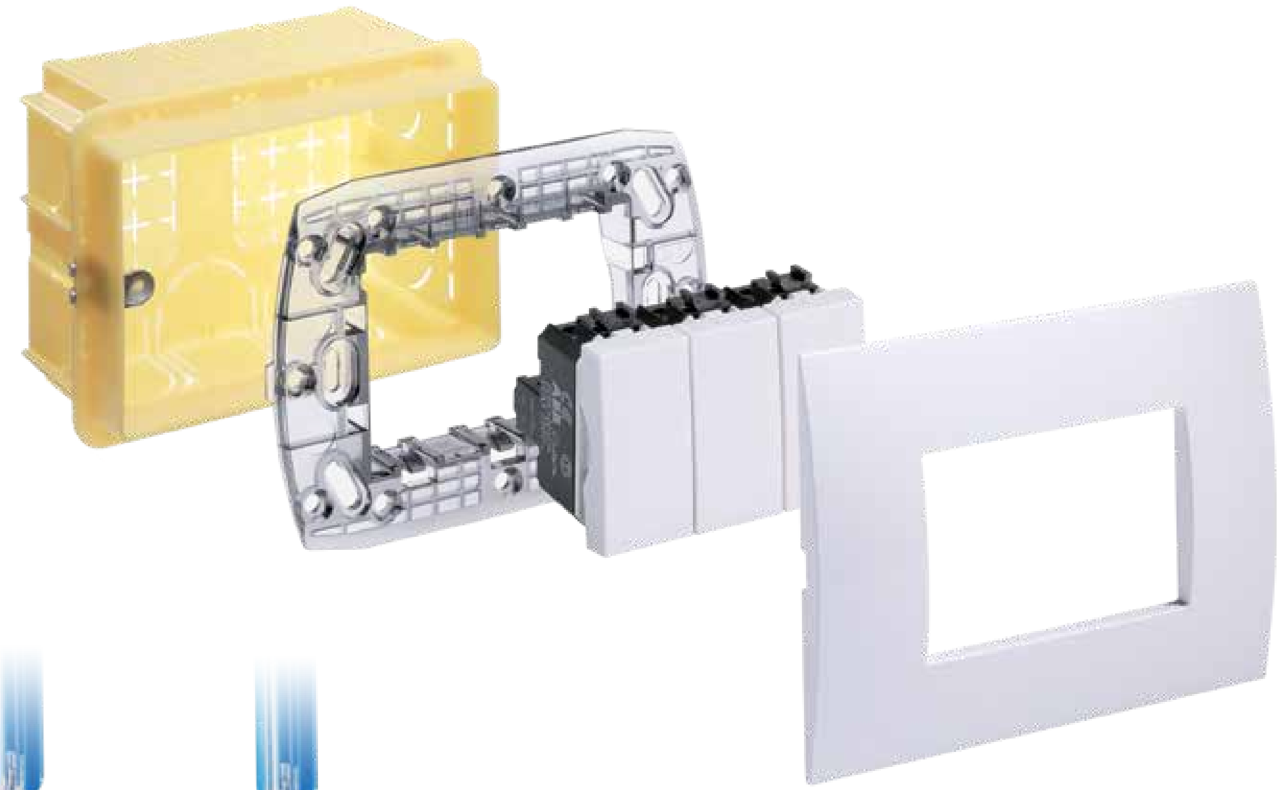
*For the rated voltages and currents see the specifications for the individual part codes.

Clamping capacity of the terminals			
Flexible wires		**Rigid wires**	
Min. 0.75 mm²	Max. 2x4 mm²	Min. 0.5 mm²	Max. 2x2.5 mm²

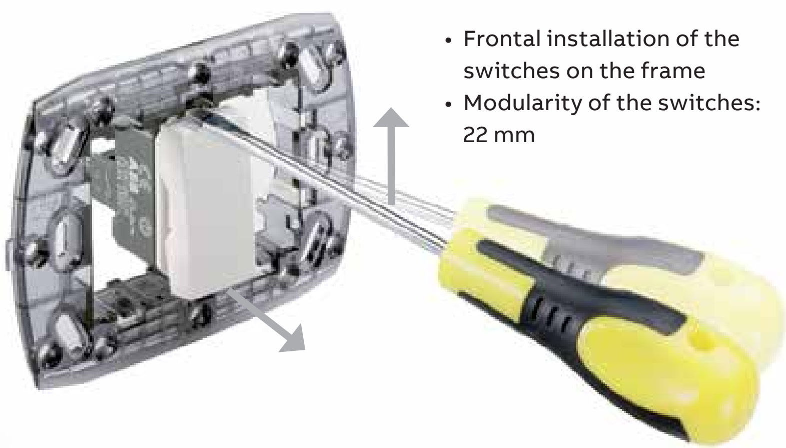
Cable traction resistance of terminals: > 50N
Adhesion of switches and device to the support: > 0.6J

Technical details
Chiara – General information

Composition method for devices and supports



Installing and removing switches from the support



- Frontal installation of the switches on the frame
- Modularity of the switches: 22 mm

Specifications of screws and terminals
- Captive screws with open position captive screws with cross and slot head and clamping plate.
- Double input protected terminals for one or two conductors (rigid or flexible).

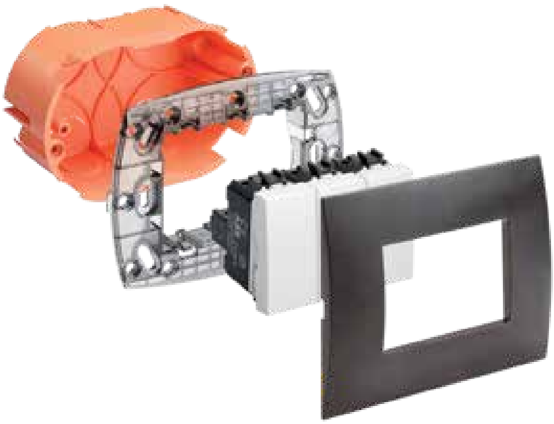
Technical details
Chiara – Installation solutions

Installation on concrete walls

No. modules	Screw distance	Recommended box
2 (with claws)	-	00 050
2 (with screws)	60 mm	00 050
3	83.5 mm	1SL006A00
4	108 mm	00 053
7	100 mm	1SL0064A00

Note: For further information on ABB boxes for concrete walls please refer to the catalog 1SLC001001D0905 - Insulating Enclosures and Installation Materials.

Installation of plasterboard walls



No. modules	Screw distance	Recommended box
2 (with screws)	-	10801/10802/10807
2 (with claws)	60 mm	10801/10802/10807
3	83.5 mm	10804
4	108 mm	Ave 254CG, BTicino PS564N, Gewiss GW24245 Vimar V71604
7	100 mm	Bticino PS567N Gewiss 24246 Vimar V71606

Note: For further information on ABB boxes for plasterboard walls please refer to the catalog 1SLC001001D0905 - Insulating Enclosures and Installation Materials.

Technical details
Chiara – Installation solutions

Protected installation with IP40/55 wall-mounted enclosures

IP40 wall-mounted enclosure

IP55 wall-mounted enclosure

No. Modules	IP40 enclosure	IP55 enclosure
1 (on 2-module enclosure)	2CSK2140CH	2CSK2155CH
2	2CSK2240CH	2CSK2255CH
3	2CSK2340CH	2CSK2355CH
4	2CSK2440CH	2CSK2455CH

The watertight enclosures allow the direct assembly of devices without the aid of supports.
The devices are inserted from the rear. See technical details.
For further information on IP40/IP55 wall-mounted enclosures, please refer to the catalog 1SLC001001D0905 - Insulating Enclosures and Installation Materials.

Protected installation with watertight escutcheon plate

IP55 wall-mounted escutcheon plate

No. Modules	IP55 escutcheon plate
2 (on a square or round box with screws, center distance 60mm)	2CSK3255CH
3	2CSK3355CH

Note: The watertight escutcheon plates provide a self-supporting solution that allows direct assembly of devices without the aid of supports. The devices are inserted from the rear.

Technical details
Chiara – Installation solutions

Installation on raised floors with Undernet under-floor turrets

No. Modules	Dedicated adapter	Undernet tower
5 (max 20 contact blocks)	2CSK1625CH	10900 e 10901
6 (max 12 contact blocks)	2CSK1626CH	10902 e 10903

Note: The dedicated adapter provides a self-supporting solution that allows direct assembly of devices without the aid of supports. The devices are inserted from the rear. The use of finishing plates is not required.
For further information on Undernet under-floor turrets, please refer to the catalog 1SLC006001D0903 - Under-floor Distribution Systems.

Installation on surface mounted boxes

No. Modules	Wall box	Frame
2	42 096	Use a 2M self-supporting frame
3	41 823	Use a 3M self-supporting frame
3	41 822	Use a 3M self-supporting frame
4	41 830	Use a 4M self-supporting frame

Note: The self-supporting frames allow the direct assembly of devices without the aid of supports. The devices are inserted from the rear.
For further information on the wall boxes and duct systems, please refer to the catalog 1SLC800001D0905 - Plastic and Metal Duct Systems.

Technical details

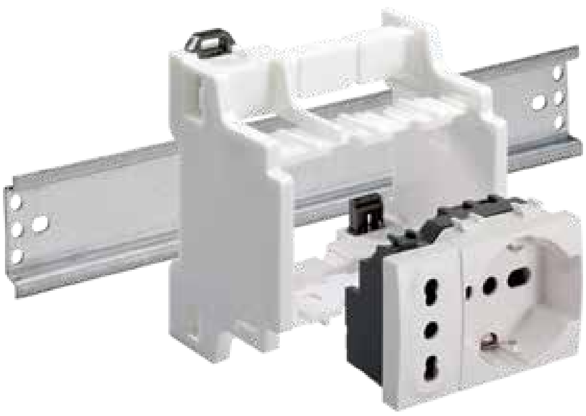
Chiara – Installation solutions

Installation on Lusy table towers

No. Modules	Lusy tower	Frame
4	10 507	Use a 4M self-supporting frame

Note: The self-supporting frames allow the direct assembly of devices without the aid of supports. The devices are inserted from the rear.
For further information on the Lusy table towers, please refer to the catalog 1SLC006001D0903 - Under-floor Distribution Systems.

Installation on DIN rail adapter



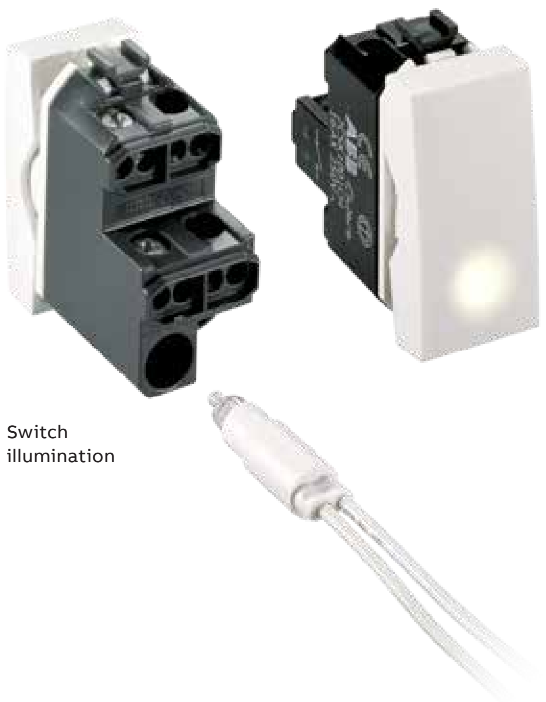
No. Modules	Dedicated adapter
1	2CSK1608CH
2	2CSK1608CH
3	2CSK1608CH

Note: The DIN rail adapter allows devices to be assembled without the aid of supports. The devices are inserted from the front. See technical details.

Technical details
Chiara – Selection of lights

Control devices		Lamps
2CSK1001CH	Single-pole switch, 16A - 250V~	LED lamp 2CSK1616CH White 230V 0.4W
2CSK1002CH	Double-pole switch, 16A - 250V~	
2CSK1004CH	Single-pole switch, 16A - 250V~, 2 modules	
2CSK1003CH	Single-pole two-way switch, 16A - 250V~	
2CSK1007CH	Single-pole two-way switch, 16A - 250V~, 2 modules	
2CSK1010CH	Intermediate switch, 16A - 250V~	
2CSK1008CH	Intermediate switch, 16A - 250V~, 2 modules	
2CSK1005CH	Single-pole push switch NO, 16A	
2CSK1016CH	Single-pole push switch NC, 16A	
2CSK1020CH	Single-pole push switch NO with cord pull, 16A with 2.25 m cord	
2CSK1021CH	Single-pole push switch NC with cord pull, 16A with 2.25 m cord	
2CSK1022CH	Single-pole push switch 1 NO and 1 NC, 16A, with ON	
2CSK1023CH	Single-pole push switch 1 NO and 1 NC, 16A, with OFF symbol	
2CSK1024CH	Single-pole push switch NO, 16A, with red diffuser	
2CSK1025CH	Single-pole push switch NO, 16A, with green diffuser	
2CSK1026CH	Single-pole push switch NO, 16A, with orange diffuser	
2CSK1027CH	Single-pole push switch NO, 16A, with white diffuser	
2CSK1028CH	Single-pole push switch NO, 16A, with BELL	
2CSK1029CH	Single-pole push switch NO, 16A, with KEY	
2CSK1030CH	Single-pole push switch NO, 16A, with STAIR LIGHT	
2CSK1031CH	Single-pole push switch NO, 16A, with backlit label holder plate	
2CSK1032CH	Single-pole push switch NO, 16A, with backlit label holder plate, 3 modules	

Signalling devices		Lamps
2CSK1310CH	Warning light, ORANGE colour	LED lamp 2CSK1616CH White 230V 0.4W
2CSK1311CH	Warning light, WHITE colour	
2CSK1312CH	Warning light, RED colour	
2CSK1313CH	Warning light, GREEN colour	


Switch illumination

11

Technical details
Chiara – Control devices

Switches, two-way switches, intermediate switches and pushbuttons

Area of application
Control (on and off) of ohmic-inductive loads:

- with filament and fluorescent lamps (corrected and uncorrected);
- dedicated circuits for powered equipment (aspirators, range hoods, shutters, blinds, fans, etc..) and controllable outlets.

To eliminate architectural barriers in creating installations, we recommend the use of luminous controls (Article 4 of Italian Ministerial Decree no. 236 del 14.06.1989).

Technical specifications	
Rated voltage	250V~
Rated current	10A (16A for pushbuttons)
Opening distance of the contacts	> 3 mm
Dielectric strength	> 2000V~

Reference standards
LV Directive EN 60669-1.

Customization of the control device keys
The illuminable keys of the Chiara wiring accessories' range are supplied with all most widely used functional symbols.

Wiring diagrams
The diagrams provided below are the most widely applied installation solutions in creating lighting points.

Backlighting of the control devices

Night-time location

Characteristics
- It allows the command key to be identified in the dark.
- We recommend the use of white, blue, green or red Chiara lamps.

Applications
- Bedrooms
- Corridors

Functional signalling

Characteristics
- This allows the command key to be identified and the ON/OFF status of a circuit to be signalled in the dark.

Applications
- General services of a building complex (entrance halls, stair lights, landings etc.)
- Public environments (cinemas, theatres etc.)

Signalling with symbols

Characteristics
- This allows the command key and its specific function to be identified in the dark.

Applications
- Warehouses, shops, offices
- Hotels
- Nursing homes, hospitals

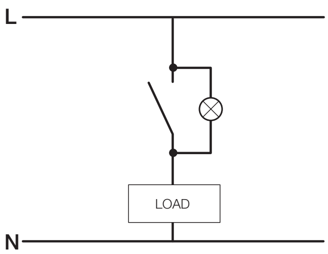
With warning light

Characteristics
- Allows the ON/OFF status of an appliance or a lighting circuit, even at a distance.
- Visible from both a front and side position.

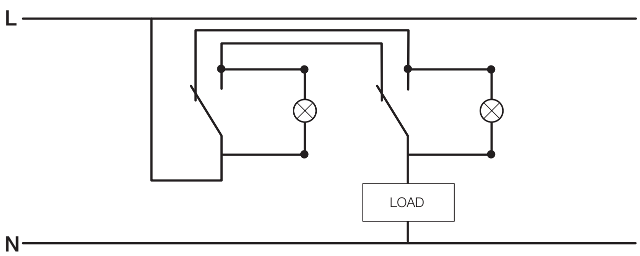
Applications
- Signalling the switching on of lighting points outside the environment in which the control device is installed

Technical details
Chiara – Control devices

Example of functional signalling

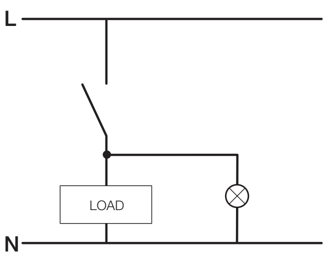


Warning light on when the switch is OFF (if the switch is in the ON state, the warning light is off while the load is ON).

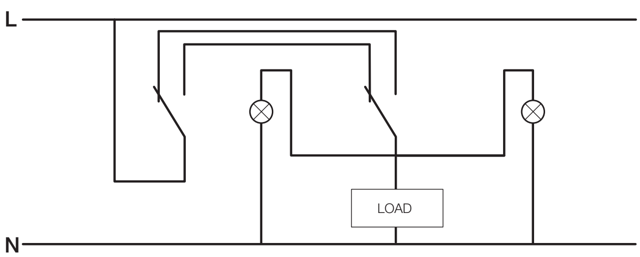


The two warning lights switch on and off respectively when the load is in the OFF and ON state.

Example of remote signalling



Warning light placed in parallel to the load, of which indicates the ON/OFF state (it is on when the switch is ON).



Two warning lights placed in parallel with the load (they switch on and off with it).

Instructions for installation in systems with relays and illuminable push switches

The lamps must be connected in parallel.
Using single-pole latching relays 2CSK1012CH, it is possible to connect up to four fluorescent lamps: by adding a 0.94μF capacitor to the heads of the relay, up to twelve fluorescent lamps can be connected.

Using double-pole latching relays 2CSK1014CH, it is possible to connect two fluorescent lamps: by adding a 1.41μF capacitor to the heads of the relay, up to twelve fluorescent lamps can be connected.

Technical details
Chiara – Control devices

Relays

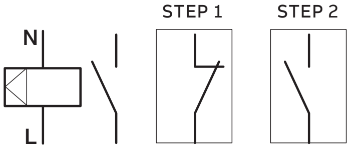
Relay with latching operation for control and adjustment from multiple lamp points by means of single-pole push switches with NO (normally open) contact.

Technical specifications	
Power supply voltage (coil)	230V - 50/60Hz
Output contact	2CSK1012CH 1NO / 2CSK1014CH 2NO; 10A (AC1) / 7A (AC15) - 250V~

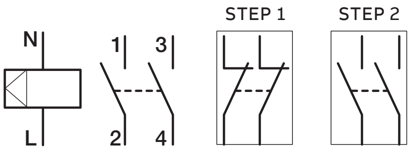
Reference standards
EN 60669-1, EN 60669-2-2.

Wiring diagrams

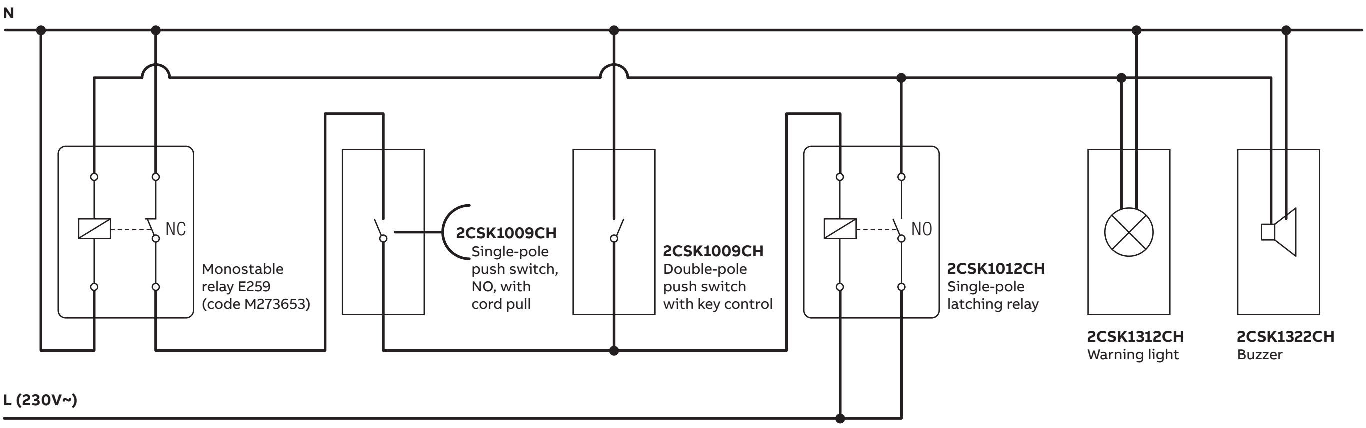
2CSK1012CH



2CSK1014CH



Examples of application
The flush-mounted relays of the Chiara wiring accessories' range can be used to implement numerous functions. The example illustrates a disabled bathroom calling system with cancellation via a key operated push switch:



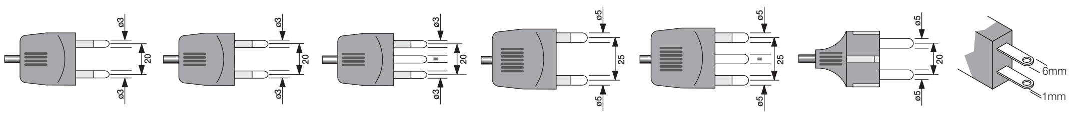
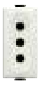
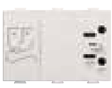
Technical details

Chiara – Socket outlets

Plug sockets

Area of application
Powering of household appliances, lighting equipment etc.

Main features Italian and German standard sockets.
The cells of the sockets are segregated and protected when the plug is disconnected: the live parts are accessible only with the corresponding plug fully inserted.

Possibility of coupling Chiara sockets with the various types of plugs on the market		2P, 10A	2P, 2,5A	2P+T, 10A	2P, 16A	2P+T, 16A	Schuko 2P+T, 16A	American 2P, 15A
								
Plug sockets, 250V~, Italian standard with safety shutters								
	P 11 2CSK1101CH	■	■	■				
	P 17 2CSK1102CH				■	■		
	P 17/11 2CSK1103CH	■	■	■	■	■		
Plug sockets, 250V~, Italian/German standard with safety shutters and side/central earth								
	P 30 2CSK1108CH	■	■	■			■	
	P 30/17 2CSK1109CH	■	■	■	■	■	■	
Interlocked socket outlets with automatic MCB								
	P 17/11 2CSK1324CH	■	■	■	■	■		
	P 30 2CSK1325CH	■	■	■			■	
Special sockets								
	Shaver socket(1) 2CSK1113CH	■	■					■

(1) Shaver socket, European/American standard with insulating transformer 230V~ - 50/60 Hz

Technical specifications	
Rated voltage	250V~
Rated current	10A o 16A
Shuttered and elastic live cells	

Reference standards
CEI 23-5, CEI 23-50, CEI 23-16 (IEC 60884-1).

Note: In general terms, no plug sockets of any standard for domestic use fall under the European low voltage directive, because there is no harmonized European standard for these types of sockets: in fact, each country has its own standard and therefore a single standard is impossible. For this reason the plug sockets do not bear the CE mark. All the sockets of the Chiara wiring accessories' range conforming to CEI 23-50 are however are certified by IMQ as a further guarantee of their quality and compliance with standards.

Technical details

Chiara – Socket outlets

Plug sockets for dedicated lines

Plug sockets for dedicated lines allow outlet points to be differentiated according to their particular application, avoiding incorrect connection of unsupported appliances. Different coloured enclosures (red, orange, green) distinguish them from common power sockets.
There are as yet no standard regulations on the correspondence between the colour of the socket and the type of power supply. In order to distinguish the area of application, the following usage customs are adopted.

Red:
continuous power supply with UPS (uninterruptible power supply) through an insulating transformer.

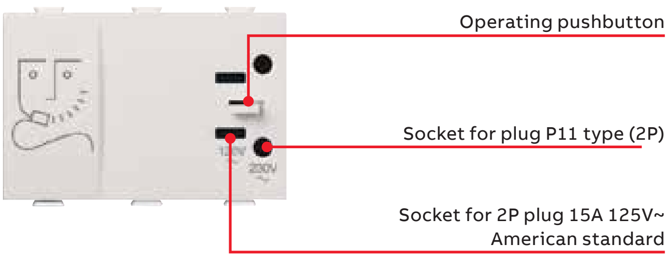
Orange:
power supply protected by network-generator unit through an insulating transformer.

Green:
safety power supply with network/generator unit.

Special sockets

Description	Code
2P shaver socket with insulating transformer. Power supply 230V~ - 50/60Hz. Output voltage 125V~ (American standard 2P socket) or 230V~ (2P socket P11 type)	2CSK1113CH

Components



The shaver socket incorporates an insulating transformer with a power rating of 20 VA, protected against overload and resistant to short-circuits.
Power supply is guaranteed by a pushbutton that is operated automatically whenever the plug is inserted in the socket.
The secondary circuit, to which the cells of the socket are connected, is isolated from the primary power supply circuit by double insulation:
additional protections (shutter devices) on the cells of the socket are therefore superfluous.

The socket is suitable for the insertion Italian standard plugs of the P11 type (2P) and American standard plugs (2P).
The shaver socket is protected against overload with a thermal interruption device without auto-reclosing.
After the protection is tripped, the cells of the socket are not energized. To reclose the circuit, the plug of the device that caused the overload must be disconnected, waiting a few minutes in order to allow the transformer to cool down.

Technical specifications	
Power supply	230 V~ 50-60 Hz
Output voltage	230 V~ for plugs P11(2P) 2,5 A 120 V~ for plugs 2P 15 A 125 V~ American standard with non-polarized flat pins
Available power	20VA
Operation with auto-protected	temperature

Reference standards

EN 61558-2-5, EN 61000-3-2, EN 55014-1, EN 55014-2.

Technical details

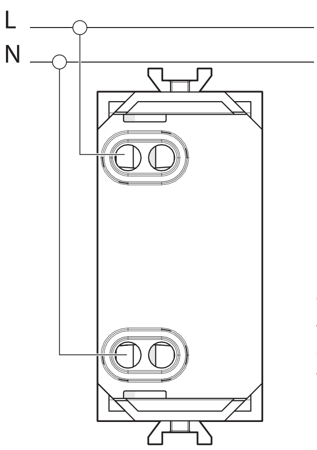
Chiara – Socket outlets

Description	Code
Flush-mounted USB charger 500-650mA, with male type A connector, power supply 230~ 50/60Hz, output voltage 5V DC	2CSK1160CH

Components

The flush-mounted USB charger allows you supply and recharge the most common portable electronic devices. Using only a USB cable with Type A male connector it is possible to power mobile phones, smartphones, tablets and cameras that support standard USB power supply (up to 650mA), independently of the manufacturer.

Wiring diagrams



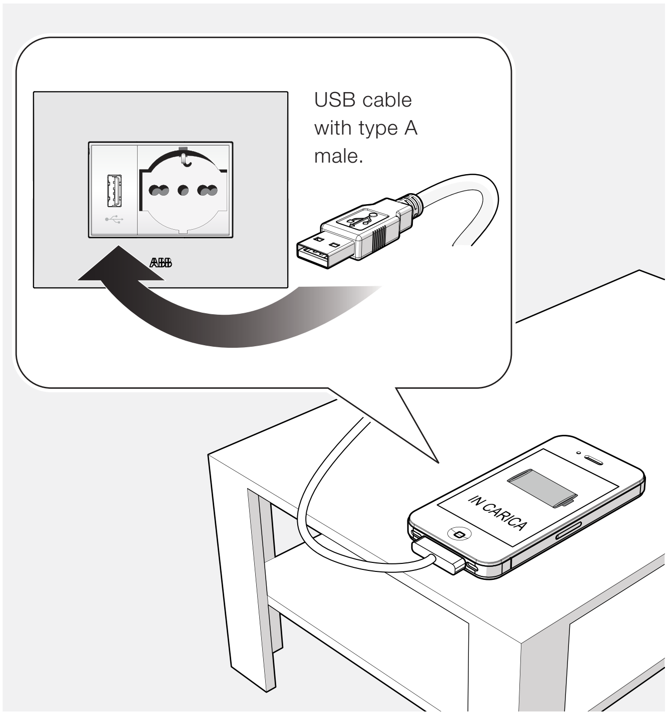
Caution!
The device absorbs up to 60mW in the absence of connected electronic devices. To exclude this absorption, it is recommended to use a double-pole switch.

Operating method

Connect the USB cable with the type A male connector to the charger and the opposite end to the device to be powered. Type A, B, miniUSB and microUSB USB connectors can be used indifferently. The device is now being charged.

Caution: the device supplies power according to the USB data transmission protocol, with a maximum current of 650mA at 5V ⎓. Some devices may require a higher power supply current. Look up the manual of the connected device to check its absorption specifications.
The charging time depends on the connected device and may vary compared with the original charger.

Examples of application



Technical specifications	
Power supply	125-250V - 50/60 Hz
Input current	5A 230V
Output current	500-650mA at 5V DC
Max absorption in standby	60mW
Operating temperature	-20 +50°C
Storage temperature	-20 +80°C
Protection class	IP20
Place of use	indoors, dry
The device is protected against short-circuits by an internal fuse (not replaceable).	

Technical details
Chiara – Socket outlets

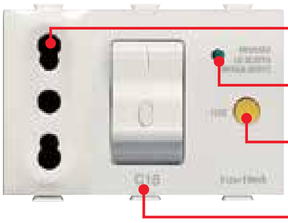
Interlocked socket outlets

Description	Code
2P+E socket outlet, 16A - 250V~, interlocked with MCB, P17/11	2CSK1324CH
2P+E socket outlet, 16A - 250V~, interlocked with MCB, P30	2CSK1325CH
2P+E socket outlet, 16A - 250V~, with RCD 10mA, P17/11	2CSK1326CH

Components

Interlocked socket outlets with automatic MCB (PIA)

Interlocked socket outlets with automatic MCD (PID)



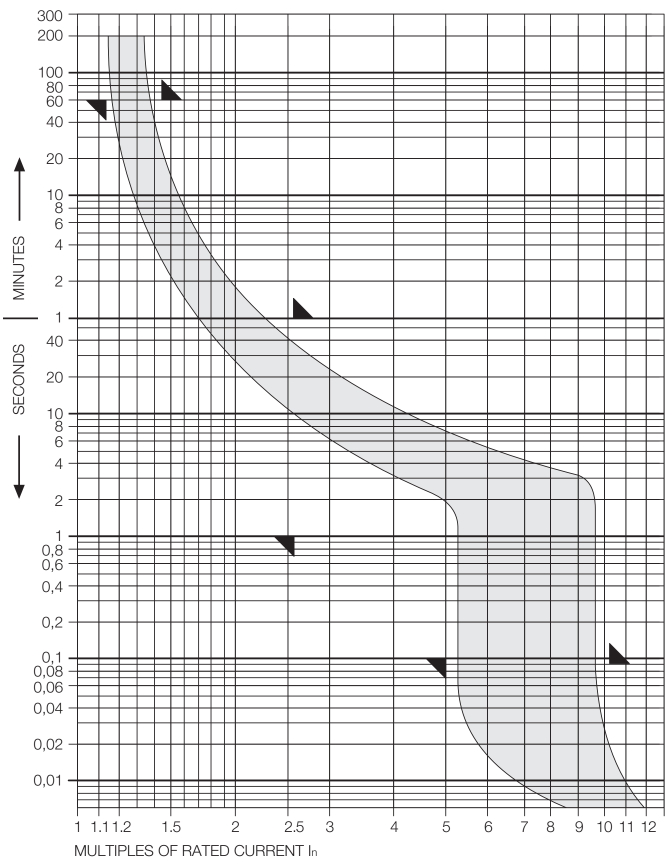
Interlocked socket outlets with automatic MCB (PIA)
These sockets are suitable for installation in the system terminations for protection of the load supplied from the outlet against dangers of short circuits and overloads..

Interlocked socket outlets with automatic RCD (PID).
These sockets are suitable for installation in the system terminations for protection of the load supplied from the outlet against dangers of short circuits and overloads, as well as protection of the user against contact voltages.
The residual current function with sensitivity of 10 mA also acts in the presence of non-sinusoidal fault currents (alternating currents mixed with unidirectional pulsating currents).

In compliance with installation standards, they are particularly suitable for the protection of:
- terminal user devices in rooms where there is a greater risk of electrocution (bathrooms, showers, etc.)
- sockets that power class 1 users with electronic circuits
- sockets for portable user devices in domestic or similar environments (irons, drills, etc.).

Operation
The MCB or RCD interlocked with the socket energises the cells of the socket only after the plug has been inserted and automatically cuts off voltage to the socket before the plug is fully extracted.
Therefore the plug is always inserted and extracted without an electrical arc.
The lever of the circuit-breaker can be closed only after the plug is inserted; without the plug, the lever operates without effect and does not close the switch.

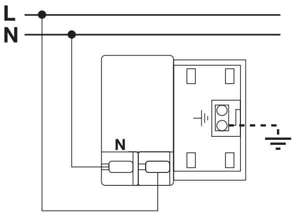
Current-time tripping diagrams for circuit-breakers of the Chiara range



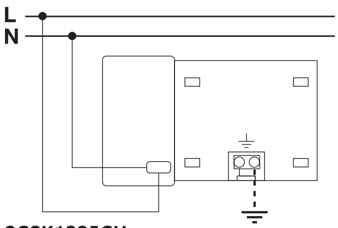
Technical details

Chiara – Socket outlets

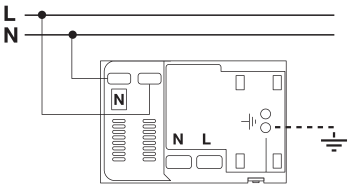
Wiring diagrams



2CSK1324CH



2CSK1325CH



2CSK1326CH

Technical specifications	
Power supply voltage	230 V~ - 50 Hz
Residual current (sensitivity)	IΔn 10 mA
Operation dependent on the line voltage	they must be installed downstream of a general residual current circuit-breaker
Thermomagnetic tripping	with characteristic C
Double-pole isolation	with 1 protected pole
Breaking capacity	3000 A
Rated current corresponding to the standard of the socket	
Type A RCBO for alternating and unidirectional pulsating currents	
Front LED with green light indicates normal operation with the presence of network power supply and contact closed	

Reference standards:
Interlocked socket outlets with MCB:
LV Directive, Standard CEI 23-97.
Interlocked socket outlets with RCD:
LV Directive, Standard CEI 23-96.

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Technical details

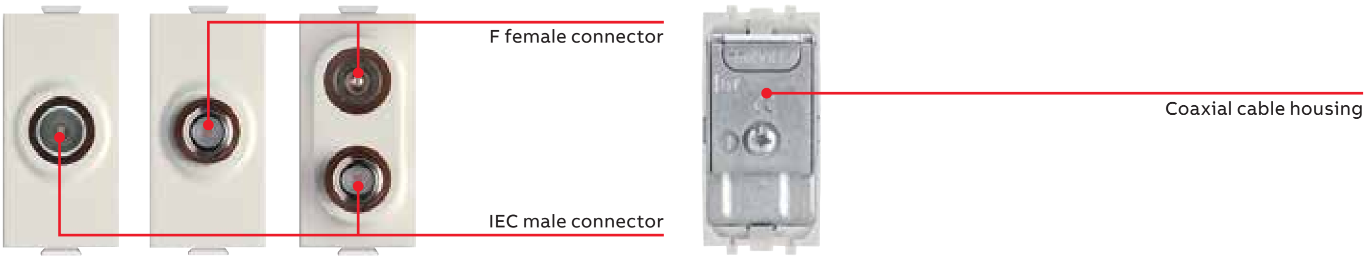
Chiara – Socket outlets

TV/SAT sockets

The TV/SAT coaxial sockets for the Chiara series offer a complete range of products for implementing the terminal part of modern antenna systems. Manufactured fully from die cast Zama, they include a pressure terminal with safety screw in order to guarantee proper grip of the cable.

Individual sockets are available with male IEC or female F bushing, and double demixed sockets with both connection possibilities. Various levels of attenuation are available, ensuring that solutions are available for every type of installation.

Components



TV/SAT coaxial sockets

Double demixed TV/SAT coaxial sockets

Attenuation values of the TV/SAT coaxial sockets

Code	Bushing	Passing attenuation [dB]			Bridging attenuation [dB]			Inverse attenuation	Direct current transit
		5÷40 MHz	47÷862 MHz	950÷2402 MHz	5÷40 MHz	47÷862 MHz	950÷2400 MHz	[dB]	
2CSK1117CH	Male IEC Terr.	-	-	-	0,5	0,5	0,5	-	NO
2CSK1118CH	Male IEC Terr.	-	-	-	0,5	0,5	0,5	-	YES
2CSK1132CH	Male IEC Terr.	≤2	≤2	≤3	≤7	≤7	≤8	≥35	NO
2CSK1136CH	Male IEC Terr.	≤2	≤2	≤2,5	≤10,5	≤10	≤11	≥35	NO
2CSK1137CH	Male IEC Terr.	≤1,5	≤1,5	≤2,5	≤14,5	≤14	≤14,5	≥35	NO
2CSK1138CH	Male IEC Terr.	≤1,5	≤1,5	≤2,5	≤18,5	≤18	≤18,5	≥35	NO
2CSK1119CH	Female SAT	-	-	-	≤0,5	≤0,5	0,5	-	YES

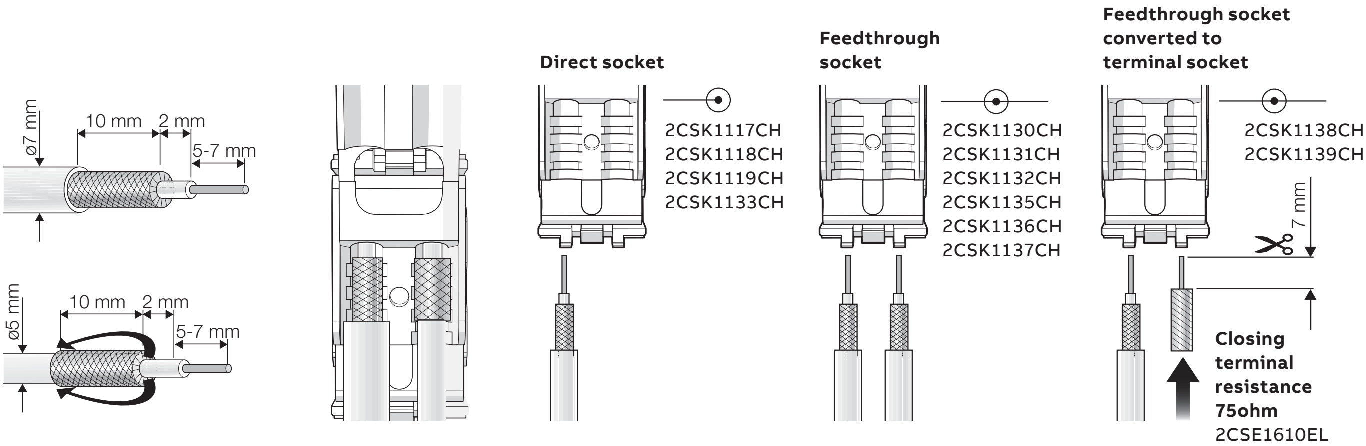
Attenuation values of double demixed TV/SAT coaxial sockets

Code	Bushing	Passing attenuation [dB]		Bridging attenuation [dB]		Inverse attenuation [dB]	Direct current transit
		TV	SAT	TV	SAT		
2CSK1133CH	Male IEC Terr. Female SAT	-	-	≤2	≤2	-	YES
2CSK1120CH	Male IEC Terr. Female SAT	≤4	≤5	≤6,5	≤7	≥35	YES
2CSK1132CH	Male IEC Terr. Female SAT	≤3	≤4,5	≤10	≤11	≥35	YES
2CSK1131CH	Male IEC Terr. Female SAT	≤2	≤3	≤14	≤15	≥35	YES
2CSK1139CH	Male IEC Terr. Female SAT	≤1	≤2	≤18	≤19	≥35	YES

Technical details

Chiara – Socket outlets

Instructions for installation



Technical specifications
Manufactured from die cast Zama. Pressure terminal. Available with bushing of type: male CEI, female F.

Reference standards

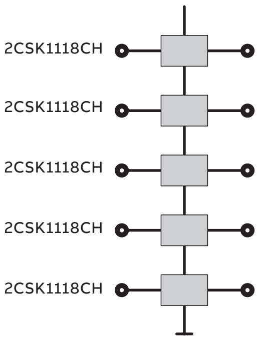
EN 50083-1, EN 50083-2, EN 50083-4

Technical details
Chiara – Socket outlets

Wiring diagrams

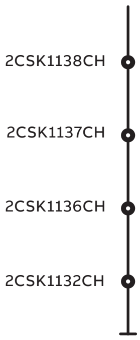
TV

TV system with branched sockets from the central unit



Closing resistance 75ohm

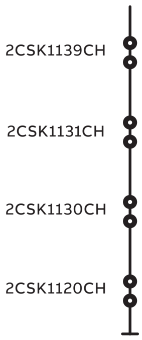
TV system with feedthrough sockets from the central unit



Closing resistance 75ohm

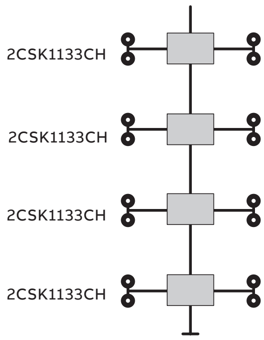
TV/SAT

TV/SAT system with feedthrough demixed sockets from the central unit



Closing resistance 75ohm

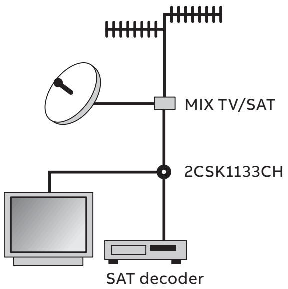
TV/SAT system with branched demixed sockets from the central unit



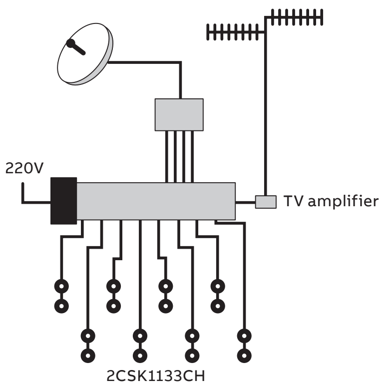
Closing resistance 75ohm

TV/SAT

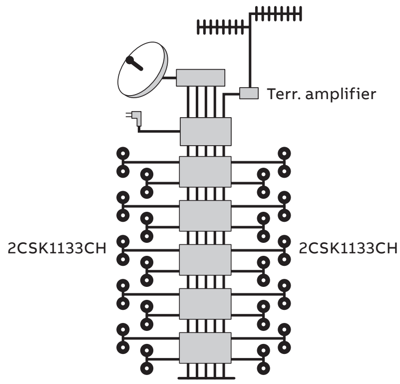
Mixed TV/SAT system, single consumer



Multiswitch radial TV/SAT system

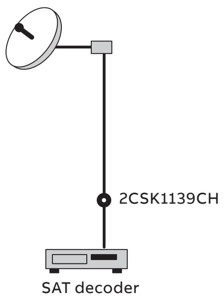


SAT system, single consumer

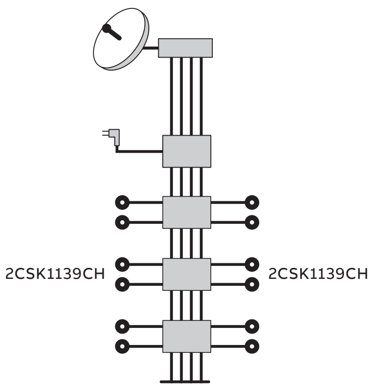


SAT

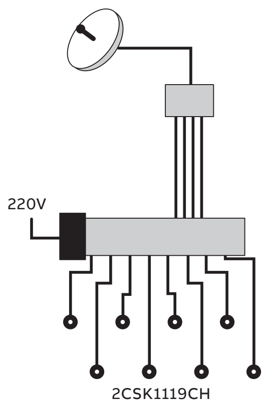
SAT system, single consumer



SAT and feedthrough Multiswitch system

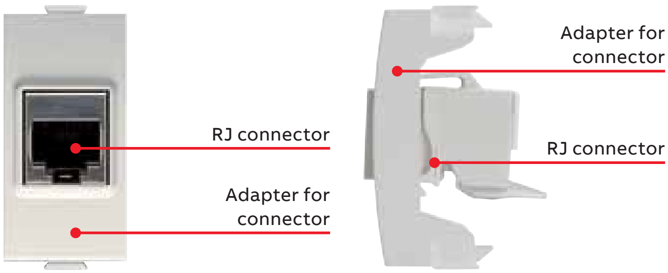


SAT and radial Multiswitch system



Technical details
Chiara – Socket outlets

Network and telephone sockets
The range includes devices for the implementation of telephone and computer networks, RJ11 4-contact telephone connectors for telephones, telefax, modems and RJ12 6-contact telephone connectors for intercommunicating telephone installations.
RJ45 category 5e and 6 connectors are also available. These devices allow computer equipment (computers, modems, printers, etc) to be connected in a network and connection of multimedia devices.

Components


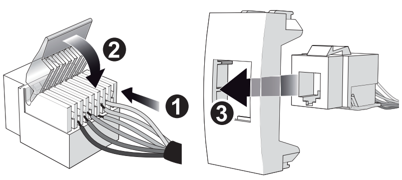
Code	Connector type	No. contacts	Cable type	Shielded	Category	Speed
2CSK1121CH	RJ11	4	twin core	NO	3	up to 16 Mb/s
2CSK1122CH	RJ12	6	twin core	NO	3	up to 16 Mb/s
2CSK1124CH	RJ45	8	UTP	NO	5e	up to 100 Mb/s
2CSK1125CH	RJ45	8	FTP	YES	5e	up to 100 Mb/s
2CSK1127CH	RJ45	8	UTP	NO	6	up to 10 Mb/s
2CSK1128CH	RJ45	8	FTP	YES	6	up to 10 Mb/s

FTP = cable shielded with aluminium tape
UTP = unshielded cable

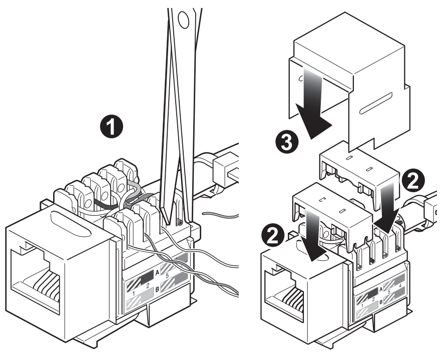
Instructions for installation
Unshielded connectors:
1. wire the connector making sure that the connection terminals match;
2. operate the lever wiring device on the connector;
3. latch the connector on the adapter and proceed with the installation on the frame.

Shielded connectors:
1. wire the connector making sure that the connection terminals match;
2. position the cover of the connector and squeeze with pliers to make sure the contacts are tight;
3. apply the shielding, ensuring insulation of the connector;
4. latch the connector on the adapter and proceed with the installation on the support.

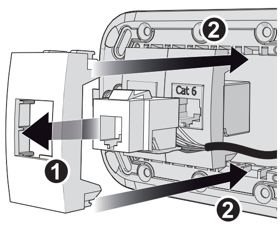
Keystone adapter 2CSK1135CH:
the structured wiring systems for data transmission are distinguished by their flexibility of use, installation independent of location and the use of the terminal outputs. The suppliers of components for wiring, when dealing with installations of a certain complexity and size, must be in able to show certification of conformity of the installation, directly or through accredited installations.
ABB meets this requirement with the adapter of the Chiara wiring accessories' range, which is compatible with various Keystone coupling connectors available on the market and enables integration between the Chiara wiring accessories' range and data transmission components of systems with structured wiring.
1. latch the connector on the adapter and proceed with the installation on the frame.



Unshielded connectors



Shielded connectors

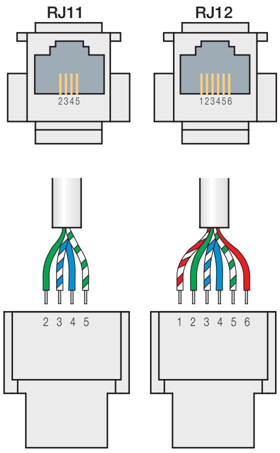


Keystone adapter 2CSK1135CH

Technical details

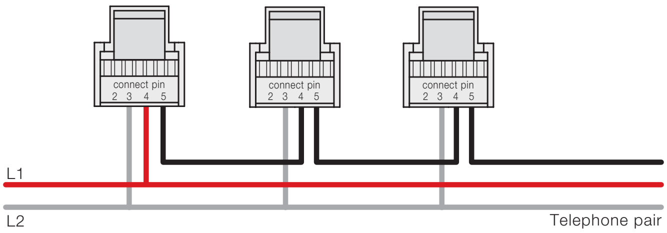
Chiara – Socket outlets

Wiring diagrams for RJ11 and RJ12 telephone connectors



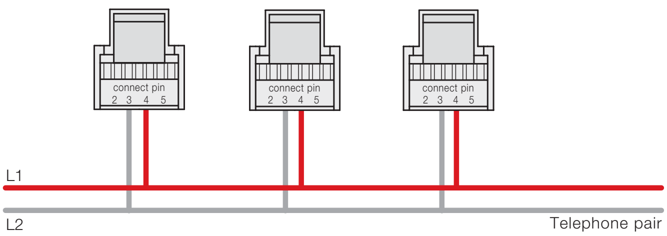
For telephone use, 2 wires of the RJ11 and RJ12 connectors, use the central contacts 3-4

Connection in series

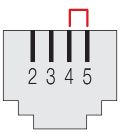


Terminals 3 and 4 are connected via the internal contact to the telephone (closed with the receiver hung up). Lifting the receiver causes interruption of the downstream line (L1), guaranteeing secrecy of the conversation.

Connection in parallel



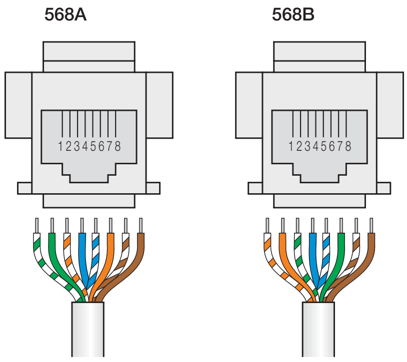
Each socket captures the line signal (there is no secrecy of conversation).

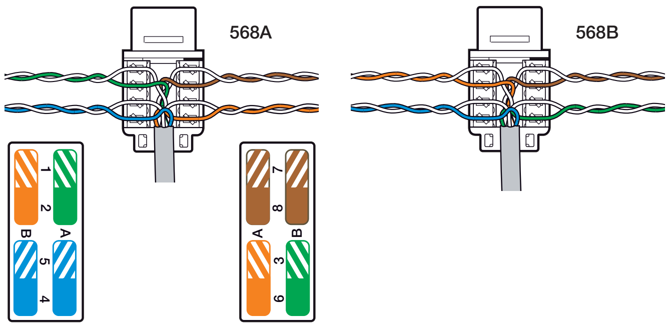


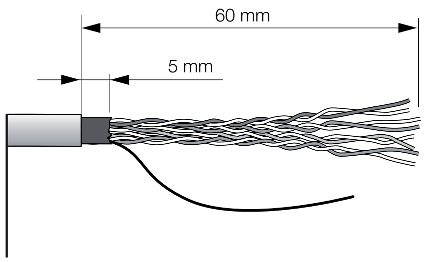
Note: extracting one of the plugs causes disconnection of sockets located downstream. In order to prevent this, you just need to insert a plug in the socket from which the telephone device was removed with a jumper between terminal 4 and 5.

Wiring diagrams for RJ45 data connectors

To obtain the EIA/TIA 568A or 568B configuration included below, follow the colour code shown on the terminal box.







Technical specifications	
Connections	With perforated insulation
Conductors	non-butted, inserted in the appropriate blade slots

Reference standards

EN 50083-1, EN 50083-2, EN 50083-4, ISO 11801.

Technical details

Chiara – Protection devices

Fuse holder

Description	Code
Fuse holder, Ø5x20 / Ø6.3x32, 16A	2CSK1301CH

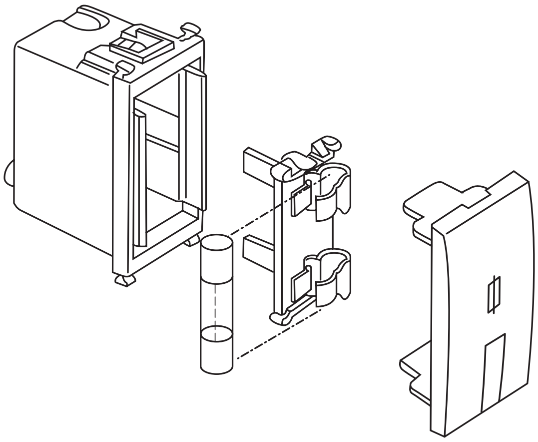
Components

Replacement fuses

Fuses with dimension Ø5x20mm or Ø6.3x32 mm can be installed.

Replacement of the fuse

After removing the removable cover with a screwdriver, proceed with replacement as in the drawing:

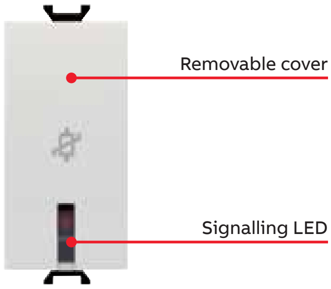


Technical details

Chiara – Protection devices

Description	Code
Overvoltage limiter, 75J, 230V~	2CSK1315CH

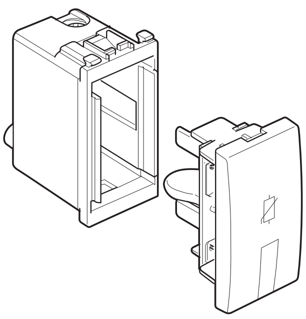
Components

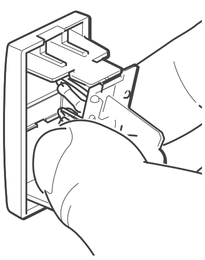


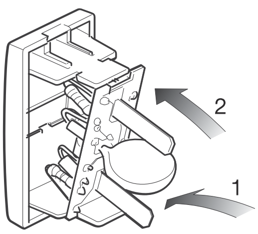
This device provides protection for power supply sockets for all types of household appliances and in particular for those containing electronic components (Hi-Fi, TV, computers, video recorders, programming mechanisms, cash registers etc.) from damage caused by over-voltages present in power supply networks.

Instructions for installation and operation

The protection device is housed in the removable front cover. To replace it, after disconnecting the voltage from the installation, extract the cover from the limiter and separate the SPD block from the plastic cover, levering it with a screwdriver. Replace it with spare part 2CSY1302MY.





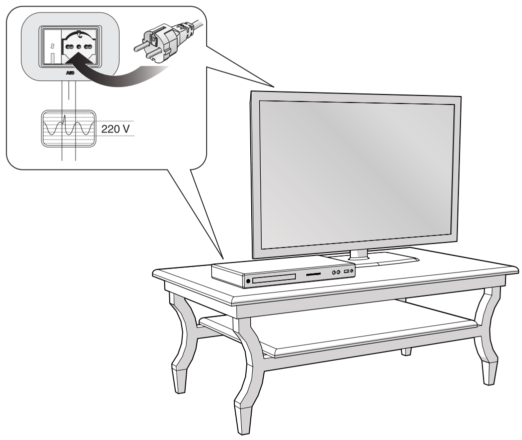


Functions

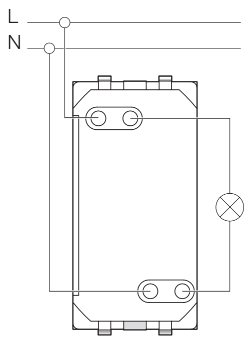
When the red warning light is on, it indicates that the protection has tripped and needs to be replaced (the load remains energised but it is not protected).

Examples of application

Over-voltages in domestic networks can be caused both by atmospheric interference and by control, operation or programming of connected inductive loads (air conditioners, burner motors, water pumps, reactors of fluorescent or discharge lamps, washing machines, etc.).



Wiring diagram



Technical specifications	
Residual current limiting	protection (line-to-neutral)
Rated voltage (U_n)	120-230 V~ 50/60 Hz
Number of ports	1
Rated load current I_L	16 A
Max steady current (U_c)	250 V~
Test class	III
Protection level (U_p)	< 1.2 kV
Test voltage of combined wave generator U_{oc}	2.5 kV
Rated flashover current (I_n)	1 kA (8/20 ns) 20 times
Max flashover current (I_{max})	2 kA (8/20 ns) once
Temperature range	-5 °C - +40 °C
Internal integrated protection	fuse

Reference standards

LV Directive, Standard EN 61643-11

Technical details

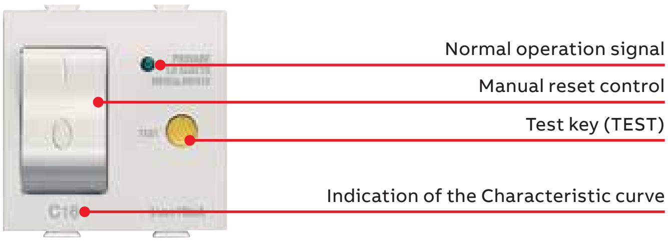
Chiara – Protection devices

Miniature circuit-breakers and Residual current circuit-breakers

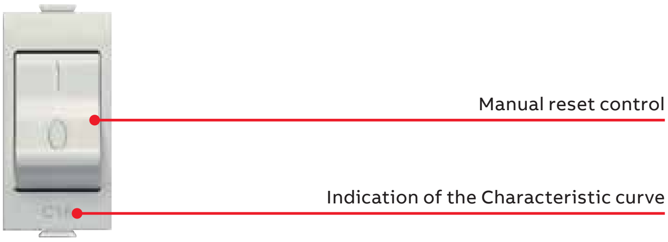
Description	Code
Automatic MCB, 1P+N, C6, breaking capacity 1.5kA	2CSK1304CH
Automatic MCB, 1P+N, C10, breaking capacity 3kA	2CSK1305CH
Automatic MCB, 1P+N, C16, breaking capacity 3kA	2CSK1306CH
Automatic RCD, 1P+N, C6 - 10 mA, breaking capacity 1.5kA	2CSK1307CH
Automatic RCD, 1P+N, C10 - 10 mA, breaking capacity 3kA	2CSK1308CH
Automatic RCD, 1P+N, C16 - 10 mA, breaking capacity 3kA	2CSK1309CH
Automatic RCD, 1P+N, C6 - 30 mA, breaking capacity 1.5kA	2CSK1328CH
Automatic RCD, 1P+N, C10 - 30 mA, breaking capacity 3kA	2CSK1329CH
Automatic RCD, 1P+N, C16 - 30 mA, breaking capacity 3kA	2CSK1330CH

Components

Automatic RCD



Automatic MCB



Automatic MCBs and automatic RCDs provide protection against over-currents and earth fault currents of terminal circuits. Protection class with the device embedded in smooth vertical walls with the associated support, frame and blank covers, if required: IP41.

Instructions for installation and operation

Use in dry and dust-free locations.
- Temperature between -5 °C and +40 °C..
- Suitability for installation on the supply side of a socket or device for the protection against overloads and short circuits of the equipment and, at the same time, for protection of the users against contact voltages.
- The sensitivity (operating residual current) of 10mA and the suitability for operation also in the presence of non-sinusoidal fault currents (alternating currents mixed with unidirectional pulsating currents) allow the protection devices of the Chiara range to be classified as "type A RCBOs" (identified by the symbol), particularly suitable for the protection of:
  - terminal uses in rooms where there is a greater risk of electrocution (bathrooms, showers, kitchens etc.), as prescribed by the CEI standards;
  - class I consumer power sockets with electronic circuits (computers and accessories, electronic scales, electronic typewriters, cash registers etc.). In domestic and service industry networks non-sinusoidal fault currents are often present because of the use of electronic boards in domestic appliances.
- The electromagnetic part of the circuit breakers guarantees protection against overloads and short circuits; the residual current part of the devices, for current values of 10mA, guarantees protection of persons against the contact voltages.
- Closing the circuit: manually press the lever of the circuit breaker at the "I" symbol.
- Opening the circuit:
  - manually, by pressing the lever of the circuit breaker at the "0" symbol or the yellow test button (test);
  - automatically, due to thermal (overload), magnetic (short-circuit) or residual current (earth fault current) tripping.
- The device must not be used as a control breaker.
- To check that the circuit breaker is installed and behaving correctly, the yellow test button (test) must be pressed every month. If the device is correctly installed and powered, the circuit breaker trips; if it does not, you must immediately inform the installation technician because safety will be compromised. After the test, you need to press the main key near the "I" symbol in order to reset the circuit breaker.
- Thermomagnetic tripping with characteristic "C" (see the current-time tripping diagram provided below).
- Double-pole operation with one protected pole + N, type A for alternated fault currents and unidirectional pushbuttons.
- Operating residual current (sensitivity) IΔn 10mA; the circuit breaker must be connected according to the electrical diagram provided below.

Technical details

Chiara – Protection devices

Functions

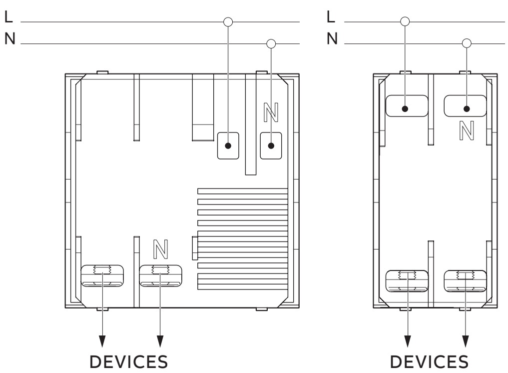
- Green front LED for signalling normal operation: presence of line voltage and closed circuit.
- Internal temperature checking: the circuit breaker automatically operates the opening of the circuit as soon as the safety threshold is exceeded.
- Self-test function to check the electrical continuity of the internal residual current circuit (in the absence of continuity, the circuit breaker will open).
- Opening the circuit if voltages occur higher than the predefined threshold at the circuit breaker input(for example, in 380V~ three-phase systems the circuit breaker prevents an erroneous “line-to line ” connections, instead of “line-to-neutral”).

Characteristics

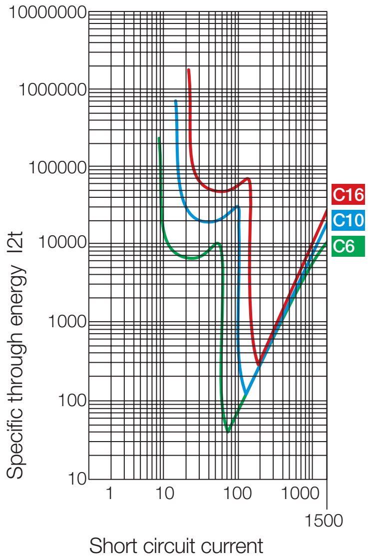
- Main lever operated control part: “I” symbol (closed circuit); “0” symbol (open circuit).
- Front LED for signalling the presence of line voltage and closed circuit.
- Yellow test button (test) for checking that the device is functioning properly.
- Terminals protected with captive screws for clamping two conductors up to 4 mm² each
- Construction of the thermo magnetic part as prescribed by Standards EN 60898 and IEC 60898.
- Construction of the residual current part according to Standards EN 61009 and IEC 61009.
- Power supply voltage: 120-230V~ ±10% 50-60Hz.

The supply line can be connected to either the upper or the lower terminals of the circuit breaker, which must be installed downstream of a general residual current circuit breaker (Standard CEI 64-8/5, paragraph 532.2.2.2).
The line voltage determines operation (Standard IEC 1009-1, paragraph 4.1.2).

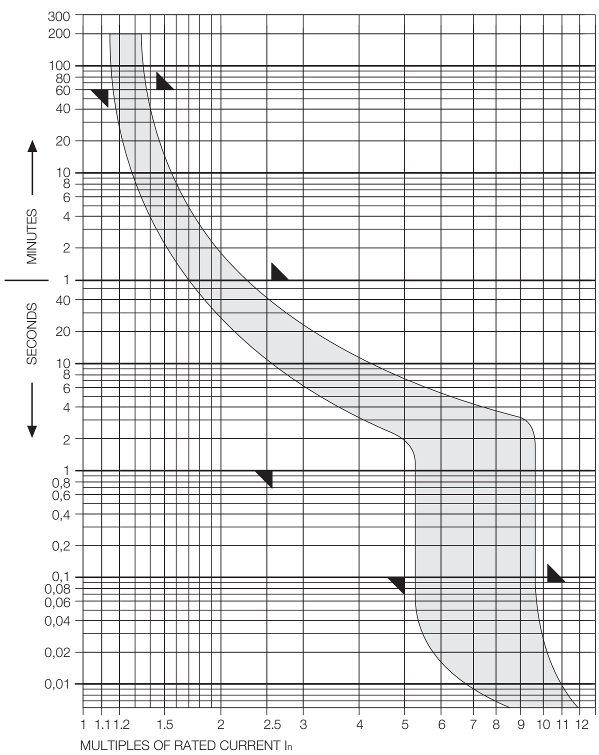
Wiring diagram



Characteristic curves



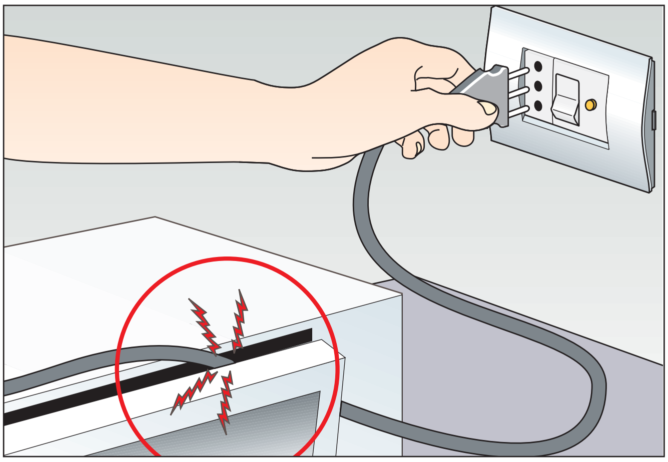
Current-time tripping diagrams for circuit-breakers of the Chiara range

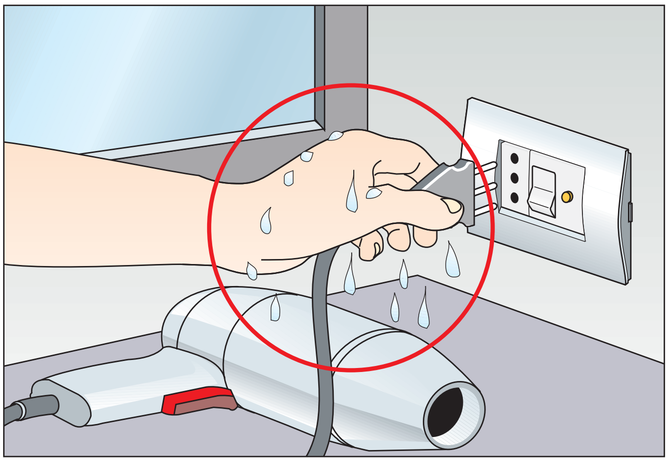


Technical details

Chiara – Protection devices

Examples of application





Technical specifications		
Type of circuit breaker	MCB	RCD
Rated voltage	230V	230V
Rated frequency	50 ÷ 60Hz	50 ÷ 60Hz
Rated residual current	-	10mA or 30mA
Short-circuit breaking capacity	6A 1500A 10A 3000A 16A 3000A	6A 1500A 10A 3000A 16A 3000A
Correnti nominali	6 -10 -16A	6 -10 -16A
Number of poles	1P + N	1P + N
Tripping characteristic		
Overcurrent protection	Type C	Type C
Limitation class	3	3
Residual current protection	-	Class A

Reference standards

Thermomagnetic: EN 60898-1 - Differential: IEC 61009-1

Technical details
Chiara – Safety and comfort devices

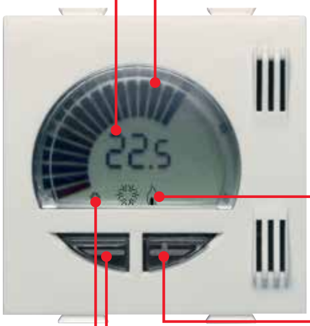
Thermostats and time-programmed thermostats

Description	Code
Summer/winter electronic thermostat, relay output, 1 contact NO 8A (AC1)/2A (AC15) - Power supply 230V~ 50/60Hz	2CSK1202CH

Components

Current value of the AMBIENT TEMPERATURE in °C. While adjusting the value of the DESIRED TEMPERATURE, it value is displayed (flashing). About 5 seconds after the last time the keys were pressed, it returns to displaying the AMBIENT TEMPERATURE.

Display indicating the value of the DESIRED TEMPERATURE



RELAY ENERGISED icon. This icon is displayed when power is requested from the system controlled by the thermostat. The type of icon displayed (🔥 or ❄) depends on the operating mode of the thermostat (heating or air conditioning).

Key to INCREASE the DESIRED TEMPERATURE (in steps of 0.5°C). The maximum value that can be set is 30 °C.

Key to DECREASE the DESIRED TEMPERATURE (in steps of 0.5 °C) The minimum value that can be set is 5.0 °C (anti-freeze temperature)

ANTI-FREEZE icon. This is displayed when the DESIRED TEMPERATURE is set to the minimum value (5.0 °C)

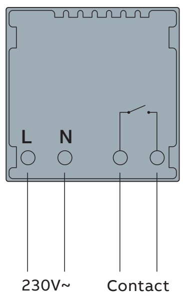
The electronic thermostats of the Chiara series are equipped with a summer/winter switch for heating and air conditioning systems.

Characteristics
- Display of the current ambient temperature
- Display of the comfort temperature
- Display of the night-time temperature set
- Possibility to increase or decrease of temperature in steps of 0.5°C
- Minimum configurable value that can be set 5°C (anti-freeze temperature) and maximum configurable value 30°C
- Display of the operating status of the thermostat by means of symbols
- Anti-freeze function set to 5°C

Instructions for installation and operation
For correct operation, the thermostat must be installed at a height of approximately 1.5 metres from the floor, on internal walls, protected from direct sunlight and from any thermal interference such as heaters, lamps, televisions or any object that generates heat.
This device for controlling heating or air conditioning systems, uses a special technique that allows greater stability of the ambient temperature to be achieved while guaranteeing better comfort.

Areas of application
The environmental thermostats can be used for both heating and conditioning systems to control burners, pumps, valves, and refrigeration compressors.

Wiring diagrams



Technical specifications	
Power supply	230V~ ±15% - 50Hz
Consumption	< 0.5 W
Output	Clean contact of 8A resistive relay
Operating temperature	from 0°C to +50°C
Adjustment range	from +5°C to +30°C
Precision	±1°C
Area of use	heating and air conditioning
Type of adjustment	PI
Proportional band	2.5°C

Reference standards
EN60730-1, EN60730-2-9, EN61000-3-2, EN61000-3-3, EN55014-1,EN55014-2

Technical details

Chiara – Safety and comfort devices

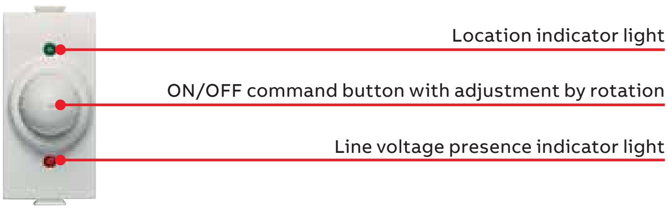
Dimmer

Loads that can be controlled with the dimmer

Dimmer type		Loads						
		Fluorescent or halogen lamps 230V	Fluorescent lamps	Toroidal transformers	Electronic transformers	Electro-mechanical transformers	Drills	Air agitators
Dimmer code	**Description**							
2CSK1205CH	Electronic dimmer with rotary control	YES	NO	NO	NO	NO	NO	NO
2CSK1207CH	Electronic dimmer with button control	YES	NO	YES	NO	YES	NO	NO
2CSK1204CH	Electronic dimmer with rotary control and two-way switch	YES	NO	NO	NO	NO	NO	NO

Description	Code
Electronic dimmer with rotary control for resistive loads 100-500W, 230V~ - 50/60Hz	2CSK1205CH

Components



Electronic dimmer with rotary control for resistive loads 100-500W 230V~ 50/60Hz (visible in the dark).

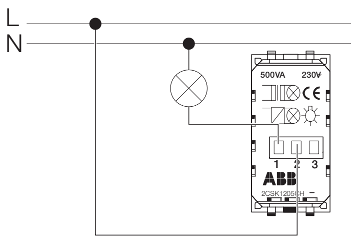
Operation

The load can be controlled and adjusted by rotating the knob.
The light intensity of the location LED is attenuated as the brightness of the controlled lamps increases.

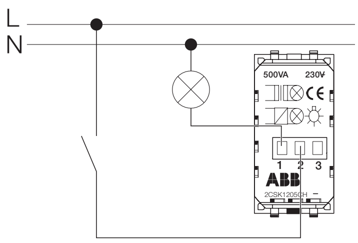
Wiring diagram

The connection can be made between phase and neutral or between phase and phase, always in series with the load.

Control with dimmer



Control with a switch and adjustment with a dimmer



Technical specifications		
Rated voltage	230V - 50/60Hz	110V - 50/60Hz
Resistive load power	100 - 500W	50 – 250W
Inductive load power	100 – 500VA	50 – 250VA
Technology	TRIAC	TRIAC
Operating temperature	-5 °C ÷ +35 °C.	
Adjustable load	Filament and halogen lamps	

Reference standards

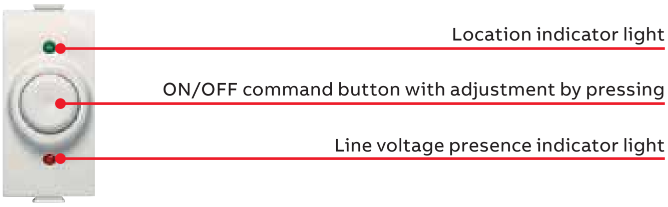
CEI 23-9 (EN 60669-1)

Technical details

Chiara – Safety and comfort devices

Description	Code
Electronic dimmer with pushbutton control for resistive and inductive loads 60-500W, (60-500VA) 230V~ - 50/60Hz	2CSK1207CH

Components



Electronic dimmer with pushbutton control for resistive and inductive loads 60-500W 60-500VA 230V~ -50/60Hz (visible in the dark).

Operation

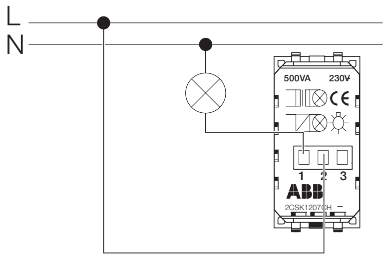
The load can be controlled and adjusted using a pushbutton. The light intensity of the location LED is attenuated as the brightness of the controlled lamps increases.
The load can be turned on, adjusted and turned off using the pushbutton present on the dimmer or with normal non-luminous NO pushbuttons connected to the dimmer.

- Storage of the adjustment set when the load was switched off (apart from network outages).
- Switch-on and switch-off of the load is gradual.
- Pressing the pushbutton quickly causes the load to be switched on or off. Adjustment is obtained by keeping it pressed. To reverse the direction of adjustment, interrupt and then resume pressing the pushbutton.
- If the pushbutton is pressed approximately between 0.3 s and 1 s, the dimmer will light up the controlled lamps, automatically and gradually, to their maximum brightness.

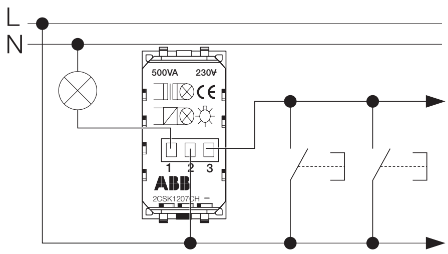
Wiring diagram

The connection can be made between phase and neutral or between phase and phase, always in series with the load.

Control and adjustment with a dimmer pushbutton



Control and adjustment with a dimmer pushbutton and NO button connected in parallel



Technical specifications		
Rated voltage	230V - 50/60Hz	110V - 50/60Hz
Resistive load power	60 - 500W	30 – 250W
Inductive load power	60 – 500VA	30 – 250VA
Technology	TRIAC	TRIAC
Operating temperature	-5 °C ÷ +35 °C.	
Adjustable load	Filament and halogen lamps, ferromagnetic transformers for halogen lamps	

Reference standards

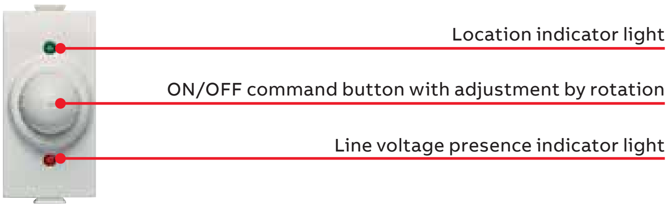
CEI 23-9 (EN 60669-1)

Technical details

Chiara – Safety and comfort devices

Description	Code
Electronic dimmer with rotary control and with two-way switch for resistive loads 100-500W, 230V~ - 50/60Hz	2CSK1204CH

Components



Electronic dimmer with rotary control and two-way switch for resistive loads 100-500W 230V~ -50/60Hz (visible in the dark).

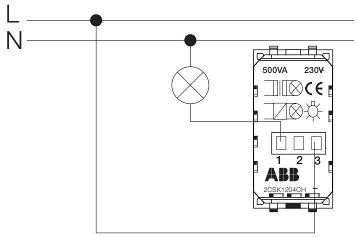
Operation

The load is controlled directly by means of a pressed two-way switch. Adjustment is performed by rotating the knob. The light intensity of the location LED is attenuated as the brightness of the controlled lamps increases.
Once the desired lighting level has been set, pressing the knob will switch the light source off, while pressing it again will switch it back on at the set lighting level.

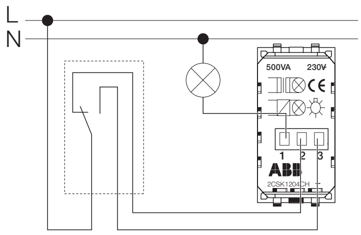
Wiring diagram

The connection can be made between phase and neutral or between phase and phase, always in series with the load.

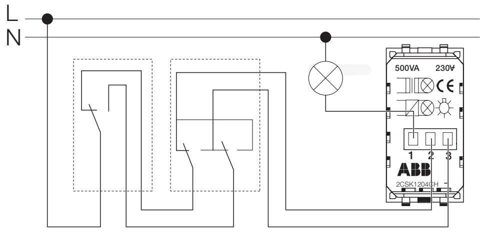
Control and adjustment with a dimmer



Control with two-way switch and dimmer, adjustment with dimmer



Control with two-way switch, intermediate switch and dimmer, adjustment with dimmer



Technical specifications		
Rated voltage	230V - 50/60Hz	110V - 50/60Hz
Resistive load power	100 - 500W	50 – 250W
Inductive load power	100 – 500VA	50 – 250VA
Technology	TRIAC	TRIAC
Operating temperature	-5 °C ÷ +35 °C.	
Adjustable load	Filament and halogen lamps	

Reference standards

CEI 23-9 (EN 60669-1)

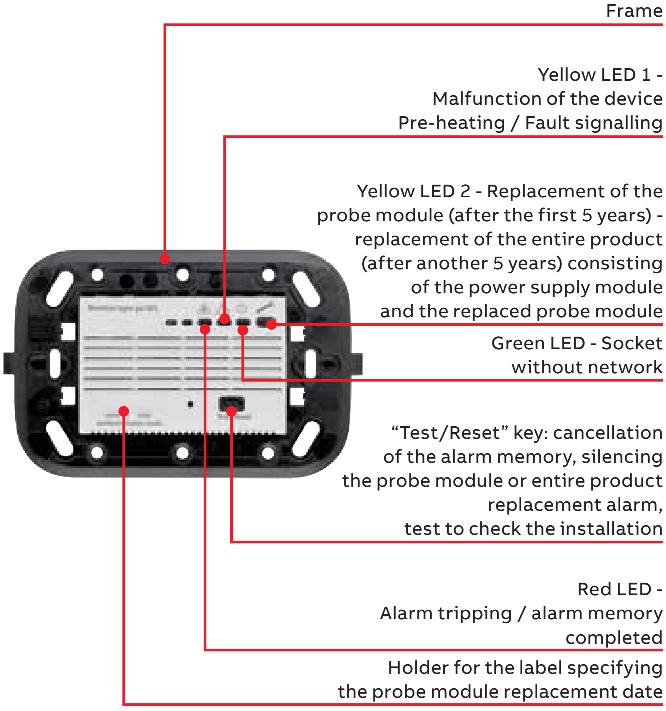
Technical details

Chiara – Safety and comfort devices

Gas detectors

Description	Code
Electronic natural gas detector with acoustic and indicator signal, relay output, 1 NO/NC change-over contact 6A (AC1)/2A (AC15) - 250V~. Power supply 230V~ - 50Hz. Equipped with dedicated frame for installation on type 503 box	2CSK1210CH
Electronic LPG gas detector with acoustic and indicator signal, relay output, 1 NO/NC change-over contact 6A (AC1)/2A (AC15) - 250V~. Power supply 230V~ - 50Hz. Equipped with dedicated frame for installation on type 503 box	2CSK1211CH

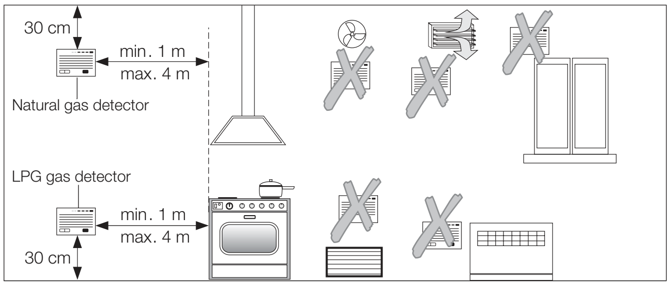
Components



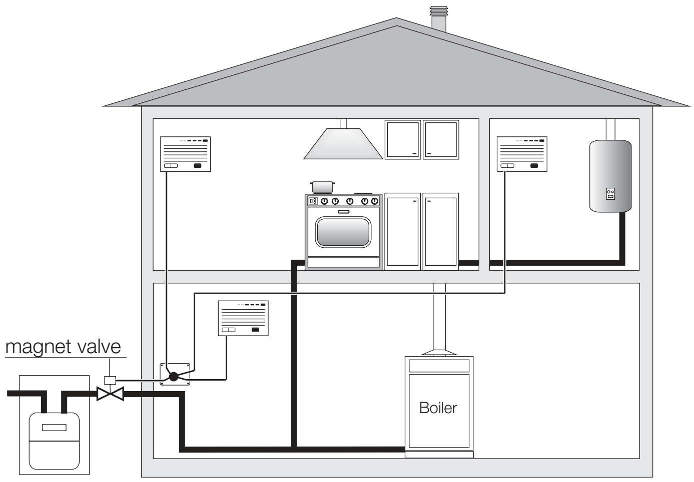
The wiring accessories natural gas (CH_4) or LPG gas detectors, flush-mounted with 3 modules (503 box embedded in the wall) contribute to guarantee the safety of civil environments where gas operated domestic appliances are installed, such as: boilers, cookers.
The equipment consists of a fixed power supply module and removable sensor module, which must be replaced after 5 years of continuous use. This allows a saving on the purchase and installation costs, with a lower impact on the environment due to the extension of the life time of the power supply/relay module for a further 5 years.

Positioning of the detector

The installation of the gas detector does not exonerate users from observance of all current laws and standards in the country of installation regarding the specifications, installation and use gas powered equipment, the ventilation of rooms and the release of combustion products.



- Install the natural gas detector at a maximum of 30 cm from the ceiling
- Install the LPG detector at a maximum of 30 cm from the floor surface.
- Install the detectors between 1 m and 4 m from the gas appliances.
- Do not install the detectors outdoors or in places exposed to atmospheric agents
- Do not install the detectors close to: sinks, air intakes, heating and air conditioning devices, windows and ventilation devices; in addition, the detectors must not be installed in closed spaces, such as behind a curtain or inside a cabinet.



Illustrative example: installation with 3 gas detectors (natural gas) that command the solenoid valve for shutting off the gassupply.

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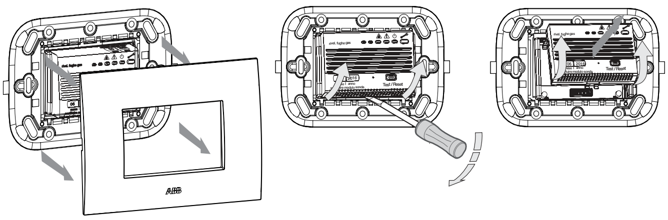
Technical details

Chiara – Safety and comfort devices

Extraction of the probe module (for example: to replace it)
CAUTION: always deactivate the line voltage 230V~

1. Remove the frame.
2. Delicately insert the flat blade of a small screwdriver and use it as a lever to uncouple the sensor module.
3. Rotate the sensor module upwards in order to uncouple it completely.

Replacement probe modules:
2CSY1220MC: Natural Gas replacement probe module
2CSY1223MC: LPG Gas replacement probe module



Characteristics

- Devices equipped with a control circuit with microprocessor that performs self-diagnosis tasks to ensure the perfect efficiency of the sensor over time.
- Sensor equipped with a special selective filter in order to avoid alarms in response to the presence of gas vapours that are not meant to be detected, such as steam from cooking, vapours from cleaning fluids etc.
- Devices equipped with an operating time meter, in order to signal the necessary replacement of the sensor module after the firsts 5 years of use.
- Luminous (red LED) and acoustic alarm signal.
- TEST (to verify that the device is operating properly) and Reset system with a single pushbutton.
- The gas detectors are equipped with an output relay that can command a valve to shut off the distribution of gas.

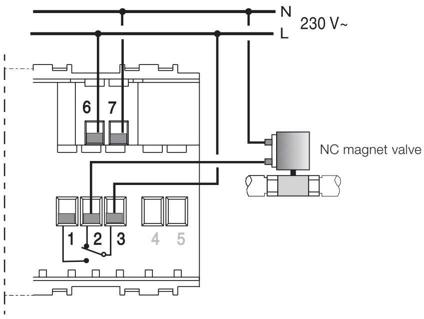
Key to signals			
Luminous LED		**Acoustic BUZZER**	
	off		off
	flashing		intermittent
	on, fixed	-	

Reference standards
LVD CEI 216-8 - EMC EN 50270

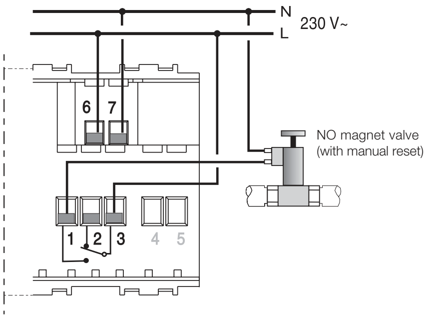
Wiring diagrams
CAUTION: the power supply network must incorporate a device to guarantee omnipolar disconnection.
The detector must be powered by a voltage of 230V~ 50Hz with continuity in order to guarantee maximum safety and correct signalling of replacement within the declared time limits.
For the electrical connections, bring cables with a maximum cross-section of 2.5 mm² to the terminals of the detector.

The diagrams (illustrative examples) show the position of the relay contacts at rest (no alarm).

Connection with solenoid valve normally closed



Connection with solenoid valve normally open



Technical specifications	
Power supply voltage	230 V~ +/- 10% 50 Hz
Solenoid valve command relay	1 potential-free change-over contact
Capacity of relay contacts (max)	6 (2) A 250 V ~
Protection class	IP40
Type of insulation	Class II ⧈
Area of application	Domestic - type A
Semiconductor sensor	Installed inside the probe module
Operating temperature limits	- 10 °C ÷ + 40 °C
Operating humidity	90% UR (maximum)
Types of gas detected	Natural Gas - with model for natural gas LPG - with model for LPG gas
Alarm tripping	10% LIE (Lower Explosiveness Limit) For both models
Acoustic alarm	85 dB at 1 m
Sensor warm-up time at switch-on	1 minute
Storage temperature limits	- 15 °C ÷ + 50 °C

Technical details

Chiara – Safety and comfort devices
Flush-mounted emergency light

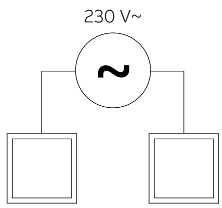
2CSk218932R1235
Supplied with their supports

Compliance with the following EU Directives:
2014/35/UE (Low Voltage)
2014/30/UE (EMC)
2011/65/EU (RoHS)

User manual
Read all instructions carefully
The 1-module anti-blackout lamp is a non-pluggable electronic emergency lamp for flush-mounted boxes installation. It turns on to enlightening areas where it is installed if a blackout occurs and guarantees a constant output for more than two hours thanks to its rechargeable battery.

Safety warnings
During installation and operation the following indications must be respected:
1. The product must be installed by qualified personnel in strict compliance with the connection diagrams.
2. Do not power the product if any part is damaged.
3. The product must be installed and commissioned in compliance with the regulations concerning electrical systems.
4. Do not use the product for purposes other than those indicated.
5. In case of fault do not repair the product.
6. The product can be used in overvoltage category III and pollution degree 2 environments.
7. An overcurrent protection device must be installed in the electrical system upstream of the product.
8. After installation, the inaccessibility to the connection terminals without special tools must be guaranteed.
9. Check that conductors are not live before accessing the connection terminals.

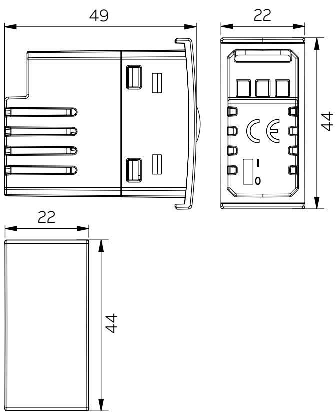
Connection scheme



Technical features

Power supply:	230 V AC (-10% ÷ +10%) 50/60 Hz
Absorption:	2,5 VA (0,1 W)
Backup batteries:	1 rechargeable NiMH battery (not replaceable) - 3.6 V & 140 mAh full recharge time: 48 hours
Autonomy in event of power failure:	2 hours approx
Light source:	1 white LED Light intensity: 2400 mcd Beam angle: 120°
Red LED:	for low battery indication
Installation:	on 45mm height flush-mounted box (footprint: 1 module)
Terminal block:	for 1.5 mm^2 cables
Operating temperature:	0°C ÷ +40°C
Storage temperature:	-20°C ÷ +40°C
Operating humidity:	20÷90% non-condensing
Protection:	IP40
Insulation:	reinforced between accessible parts (front) and all other terminals

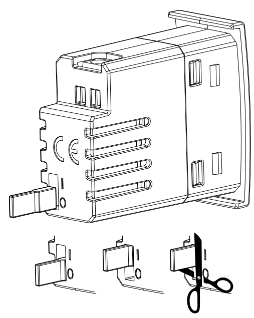
Dimensions



Installation
The emergency lamp requires 1 module footprint to be installed in the flush-mounted box.
The emergency lamp is supplied with the battery installed (not removable) and charged. To prevent the battery from discharging during storage, a jumper on the back insulates the battery from the circuit.
Before installing the lamp, move the jumper from “0” to “I” position.

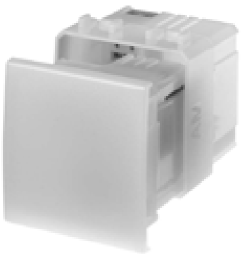
Note: if the jumper interferes with the back of the flush-mounted box when plugging the lamp, cut the protruding part (as indicated).

Respect the connection diagram.
If the red LED on the front of the emergency light is on, the battery is low.



Technical details

Chiara – Safety and comfort devices
Flush-mounted pluggable emergency light



2CSK218782R1236
Supplied with their supports

Compliance with
the following
EU Directives:
2014/35/UE (Low Voltage)
2014/30/UE (EMC)
2011/65/EU (RoHS)

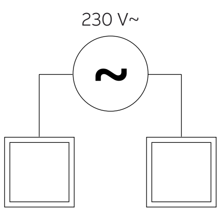
User manual

Read all instructions carefully
The 2-module pluggable blackout lamp is an electronic emergency lamp for flush-mounted boxes installation. It turns on to enlightening areas where it is installed if a blackout occurs. The lamp can be unplugged and used as a portable torch; once unplugged it turns on automatically until is plugged again into its back shell.

Safety warnings

During installation and operation the following indications must be respected:
1. The product must be installed by qualified personnel in strict compliance with the connection diagrams.
2. Do not power the product if any part is damaged.
3. The product must be installed and commissioned in compliance with the regulations concerning electrical systems.
4. Do not use the product for purposes other than those indicated.
5. In case of fault do not repair the product.
6. The product can be used in overvoltage category III and pollution degree 2 environments.
7. An overcurrent protection device must be installed in the electrical system upstream of the product.
8. After installation, the inaccessibility to the connection terminals without special tools must be guaranteed.
9. Check that conductors are not live before accessing the connection terminals.

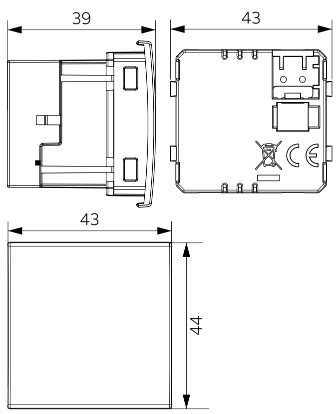
Connection scheme



Technical features

Power supply:	230 V AC (-10% ÷ +10%) 50/60 Hz
Absorption:	3 VA (0,2 W)
Backup batteries:	1 rechargeable NiMH battery (not replaceable) - 3.6V & 140mAh full recharge time: 48 hours
Autonomy in event of power failure:	2 hours approx
Light source:	Light intensity: 20 lumens Beam angle: 120°
Red LED:	for low battery or fault indication
Installation:	on 45mm height flush-mounted box (footprint: 2 modules)
Terminal block:	for 1.5 mm² cables
Operating temperature:	0°C ÷ +50°C
Storage temperature:	-20°C ÷ +50°C
Operating humidity:	20÷90% non-condensing
Protection:	IP40
Insulation:	reinforced between accessible parts (front) and all other terminals

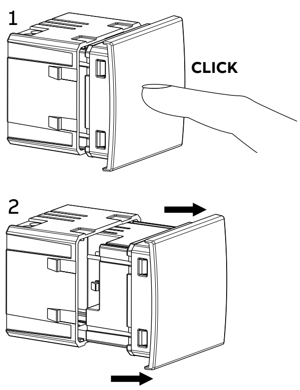
Dimensions



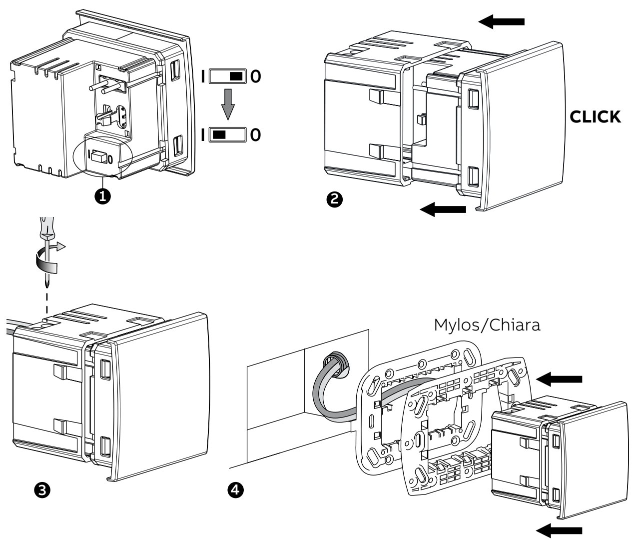
1. Move the selector from the storage position (**0**) to the operating position (**I**)
2. Plug the lamp into the back shell
3. Connect the power supply wires to the terminals
4. Plug the lamp + back shell

Lamp extraction

1. Press the lamp: an audible click will be heard to indicate that the sealing mechanism has released the lamp.
2. Pull the lamp out of the back shell



Assembly drawing in Mylos frame

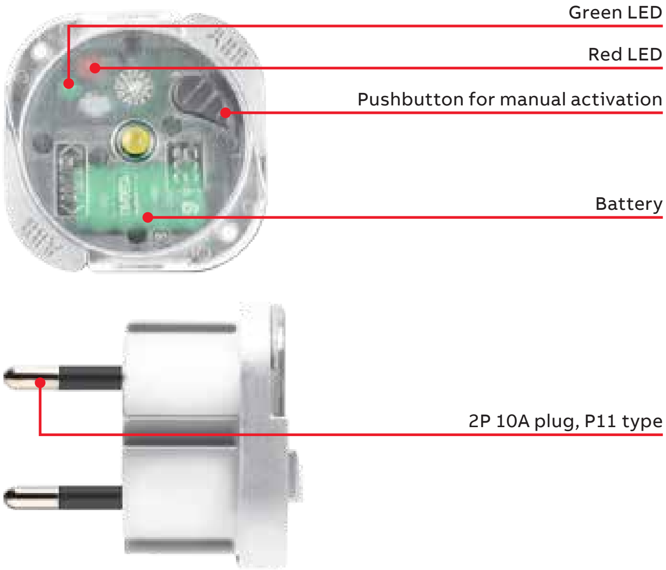


Technical details

Chiara – Safety and comfort devices

Description	Code
Removable anti-blackout light, 230V~. Charge reserve 4.5 h and recharge time 10-20h. To be combined with 230V~ plug sockets; particularly recommended for codes 2CSK1108CH and 2CSK1109CH.	2CSK1214CH

Components



The anti-blackout light is an automatic removable, rechargeable electronic lamp that can be inserted in any Schuko socket or Italian P11 standard 10A bivalent socket. Socket outlets particularly recommended for holding the lamp are the sockets of the Chiara wiring accessories' range 2CSK1108CH and 2CSK1109CH, that allow the body of the lamp to be embedded in the socket outlet, thus minimizing the external dimensions.
The device was designed to light up automatically in the event of a blackout (no voltage warning), or to be used as a portable lighting device, useful in order to guarantee visibility and facilitate maintenance operations and/or searching for faults in unlit environments.

Functions

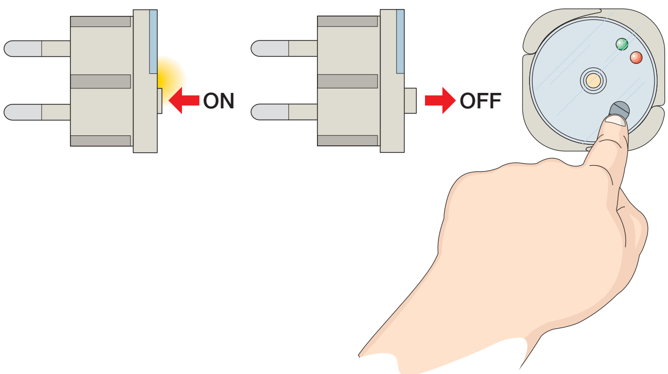
A light source is activated automatically whenever the line voltage is missing (blackout) thanks to rechargeable backup batteries.

- Possibility to extract it from the socket and use it as a normal pocket torch with an on/off button on the front.
- Long autonomy, 4.5 hours of continuous operation.
- Small dimensions - protrusion from the Schuko profile (only 8 mm).

On the front part there are two LEDs (one red and one green) that indicate the state of the lamp when it is powered:

- Red LED on, recharging in progress. In the event of a blackout the lamp will remain off (battery saving condition, used in the case of prolonged absence).
- Green LED on, recharging in progress. In the event of a blackout the lamp will light up and will switch off automatically when the network is restored.

The pushbutton on the front part allows you to switch from one condition to another.



Technical specifications	
Plug	2P 10A
Center distance of the pins	19 mm
Ø of the pins	4 mm
Power supply	230V~50-60 Hz
Recharge time	10-20 hours
Useful battery life	4.5 hours

Reference standards

EN 60598-1, EN 60598-2

Technical details

Chiara – Safety and comfort devices

Other devices

2CSK235321R1226
Supplied with their supports

Compliance with the following EU Directives:
2014/35/UE (Low Voltage)
2014/30/UE (EMC)
2011/65/EU (RoHS)

User manual

Read all instructions carefully

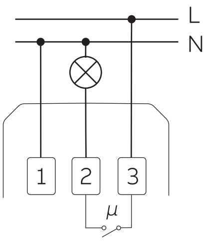
The ABB's motion detector is a flush-mounted twilight motion detector that senses all the movements in its active field and triggers the lighting system for a predetermined period only if the brightness level is lower than a pre-set threshold. It performs type 1B actions and is intended for use in environments with overvoltage category III and pollution degree 2, according to EN 60669.

Safety warnings

During installation and operation the following indications must be respected:

1. The product must be installed by qualified personnel in strict compliance with the connection diagrams.
2. Do not power the product if any part is damaged.
3. The product must be installed and commissioned in compliance with the regulations concerning electrical systems.
4. In case of fault do not repair the product.
5. An overcurrent protection device must be installed in the electrical system upstream of the product.
6. After installation, the inaccessibility to the connection terminals without special tools must be guaranteed.
7. Check that conductors are not live before accessing the connection terminals.

Connection scheme



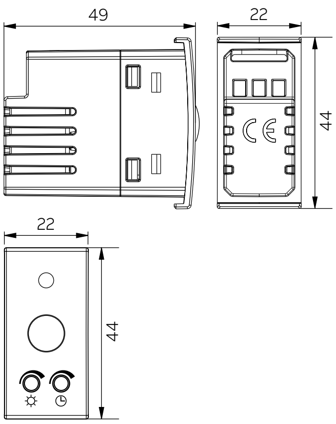
5A / 250V

Connectable loads
- Incandescent 800 W
- Fluorescent (neon) 200 VA
- Low voltage halogen 500 VA
- Halogen 230 V~ 800 W
- Low consumption (CFL) 200 VA
- Led 200 VA

Technical features

Power supply:	230 V AC (-10% ÷ +10%) 50/60 Hz
Maximum absorption:	5 VA (1 W)
Output:	NO relay with breaking capacity of 5A/250V (on resistive load) with "zero crossing" technology
Tripping time:	5 seconds (test), 30 seconds ÷ 15 minutes
Tripping brightness:	5 ÷ 100 lux
Detection angle:	110° at 20°C
Detection field:	7 meters at 20°C
Installation:	on flush-mounted box with 45 mm height (dimensions: 1 module)
Terminal block:	for 1.5 mm² cables
Operating temperature:	0°C ÷ +35°C
Storage temperature:	-10°C ÷ +60°C
Operating humidity:	20÷90% non-condensing
Protection:	IP40 (on accessible parts)
Insulation:	reinforced between accessible parts (front) and all other terminals

Dimensions



Installation

To be installed in the flush-mounted box the motion detector requires 1 module footprint. High temperatures reduce the sensitivity of the sensor: avoid installation close to heat sources, air vents or devices that can rapidly change their temperature. For installation, consider that the detector is more sensitive to movements cross the detection field than movements in the direction of the detector itself.

Operations

Detector test

The test verifies the correct operations of the IR sensor and relay. Turn the brightness control (☼) clockwise to the maximum range (100 lux) and the timing regulator (◷) anticlockwise to the minimum range (5 seconds). Check that the relay triggers when a movement is spotted inside the detection field.

Brightness adjustment

This regulation (☼) sets the lower brightness threshold for the relay to trigger if a movement is detected. Turn the brightness control (☼) anticlockwise to the minimum range: in this position the relay will remain inactive with daylight. Toward dusk, when the brightness threshold for relay activation is reached, turn the brightness control dimmer (☼) clockwise until the relay triggers.

Timing adjustment

This regulation (◷) determines how long the relay must remain active if a movement is detected. Turn the timing regulator (◷) clockwise to increase the timing, counterclockwise to decrease the timing. The timing is restarted every time a movement is detected.

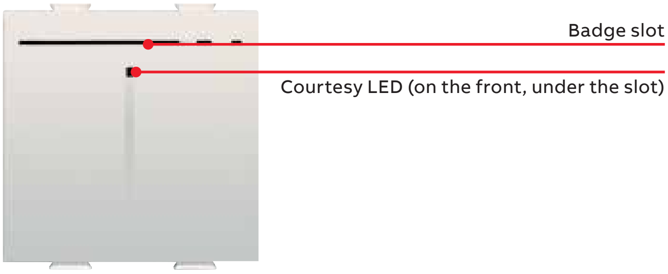
Note. The timing can be 5 seconds or between 30 seconds and 15 minutes. The minimum setting value of the regulator (◷) corresponds to 5 seconds; a minimum clockwise rotation brings the timing to 30 seconds. Continue to rotate the regulator clockwise to increase timing values up to a maximum of 15 minutes.

Technical details
Chiara – Safety and comfort devices

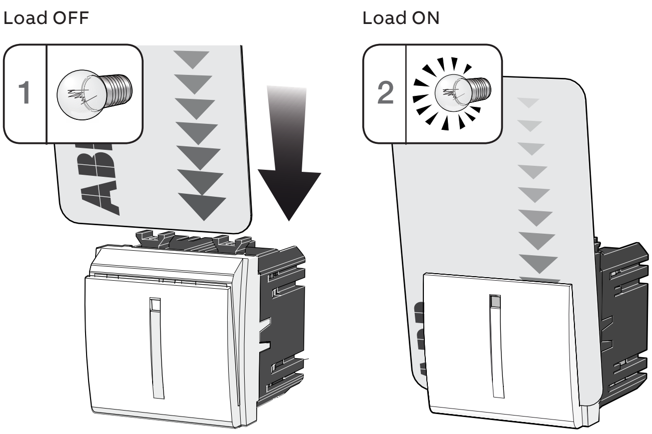
Description	Code
Universal badge switch with location light Relay output with NO contact 10A (AC1). Power supply 230V~ 50/60Hz	2CSK1426CH

Vertical badge electronic switch, relay output 16 A 250 V~, power supply 230 V~ 50-60 Hz, modules.
Supplied without ISO card (badge). The device is equipped with a courtesy LED for night-time location.

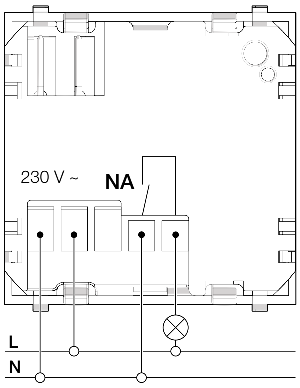
Components



Operation



Wiring diagram



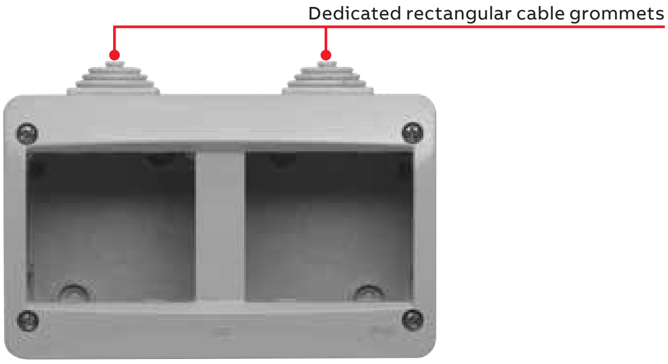
Technical specifications	
Power supply	230 V~ ±10% 50-60 Hz
Output	relay with clean contact 10 A 250 V~ cos ø 1
Typical absorption	230 V~ 50-60 Hz: 30 mA, with relay active
Operating temperature	-5 °C +45 °C

Reference standards
LV Directive; EMC Directive; Standard EN 60669-2-1

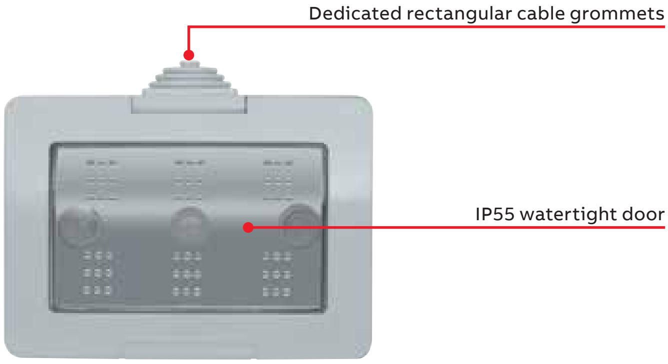
Technical details

Chiara – Wall-mounted enclosures

IP40 and IP55 wall-mounted enclosures



IP40 enclosure



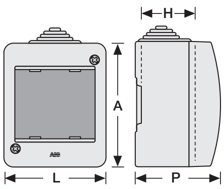
IP55 enclosure

Area of application

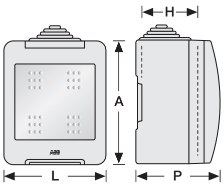
The IP40 wall-mounted enclosures, pursuant to Standard CEI 64-8, extend the area of application of the devices of the Chiara series to environments such as boiler rooms, warehouses, mechanical workshop, basements etc., where protection class IP40 is prescribed, defined by Standard EN 60529 (CEI 70-1).
This is guaranteed through devices installed in the enclosures, if the installation is carried out according to the supported procedures, through the use of connections, cable grommets and pipe ducts.
For devices with an open front (e.g. socket outlets) the protection class is less than IP40 but never less than IP20.

IP55 watertight wall-mounted enclosures, on the other hand, allow the application of the equipment of the Chiara series in environments such as building sites, sports installations, marinas, industrial and agricultural establishments, gardens, camp sites etc. The protection class IP55, defined by the Standard EN 60529 (CEI 70-1), is guaranteed by devices installed in the enclosures, if the installation is carried out according to the supported procedures, through the use of the suitable accessories and with the cover closed.

Dimensions of IP40 and IP55 enclosures



IP40 enclosure	no. modules	H	A	L	P
2CSK2140CH	1	38	80	65	55
2CSK2240CH	2	38	80	65	55
2CSK2340CH	3	38	80	104	55
2CSK2440CH	4	38	80	130	55



IP55 enclosure	no. modules	H	A	L	P
2CSK2155CH	1	40,5	80	65	63
2CSK2255CH	2	40,5	80	65	63
2CSK2355CH	3	40,5	80	104	63
2CSK2455CH	4	40,5	80	130	63

Technical details

Chiara – Wall-mounted enclosures

Because of the maximum depth dimension H, the IP40 and IP55 wall-mounted enclosures of the Chiara series cannot house the following contact blocks:

Code	Description
2CSK1204CH	Electronic dimmer with rotary control and two-way switch for resistive loads 100-500W
2CSK1205CH	Electronic dimmer with rotary control for resistive loads 100-500W
2CSK1207CH	Electronic dimmer with pushbutton control for resistive and inductive loads
2CSK1317CH	Electro-mechanical bell, 12V, 5VA, sound intensity 80 dB
2CSK1318CH	Electro-mechanical bell, 230V, 8VA, sound intensity 80 dB
2CSK1321CH	Electro-mechanical buzzer, 12V, 5VA, sound intensity 70 dB
2CSK1322CH	Electro-mechanical buzzer, 230V, 8VA, sound intensity 70 dB
2CSK1304CH	Automatic MCB 1P+N, C6
2CSK1305CH	Automatic MCB 1P+N, C10
2CSK1306CH	Automatic MCB 1P+N, C16

Code	Description
2CSK1307CH	Automatic RCD 1P+N, C6 – 10 mA
2CSK1308CH	Automatic RCD 1P+N, C10 – 10 mA
2CSK1309CH	Automatic RCD 1P+N, C16 – 10 mA
2CSK1328CH	Automatic RCD 1P+N, C6 – 30 mA
2CSK1329CH	Automatic RCD 1P+N, C10 – 30 mA
2CSK1330CH	Automatic RCD 1P+N, C16 – 30 mA
2CSK1324CH	Interlocked socket with MCB (2P+E 16A 230V P17/11)
2CSK1325CH	Interlocked socket with MCB (2P+E 16A 230V)
2CSK1326CH	Interlocked socket with automatic RCD 10mA (2P+E 16A 230V P17/11)
2CSK1012CH	Single pole latching relay, 230V, 1 10A output contact
2CSK1014CH	4 sequence switch relay, 230V, 2 10A output contacts

The installation of similar devices in the form of a DIN rail in the distribution board is recommended where possible.

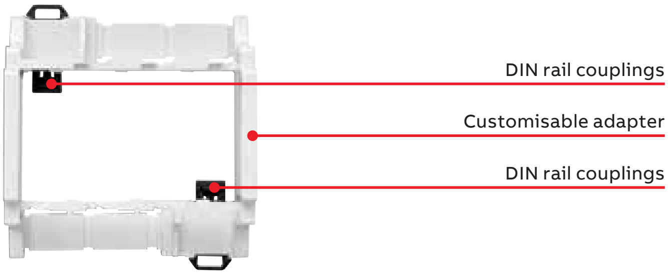
Technical details

Chiara – Other installation solutions

Support for DIN bar 1-2-3 modules

Description	Code
Support for DIN bar for 1-2-3 modules, customisable	2CSK1608CH

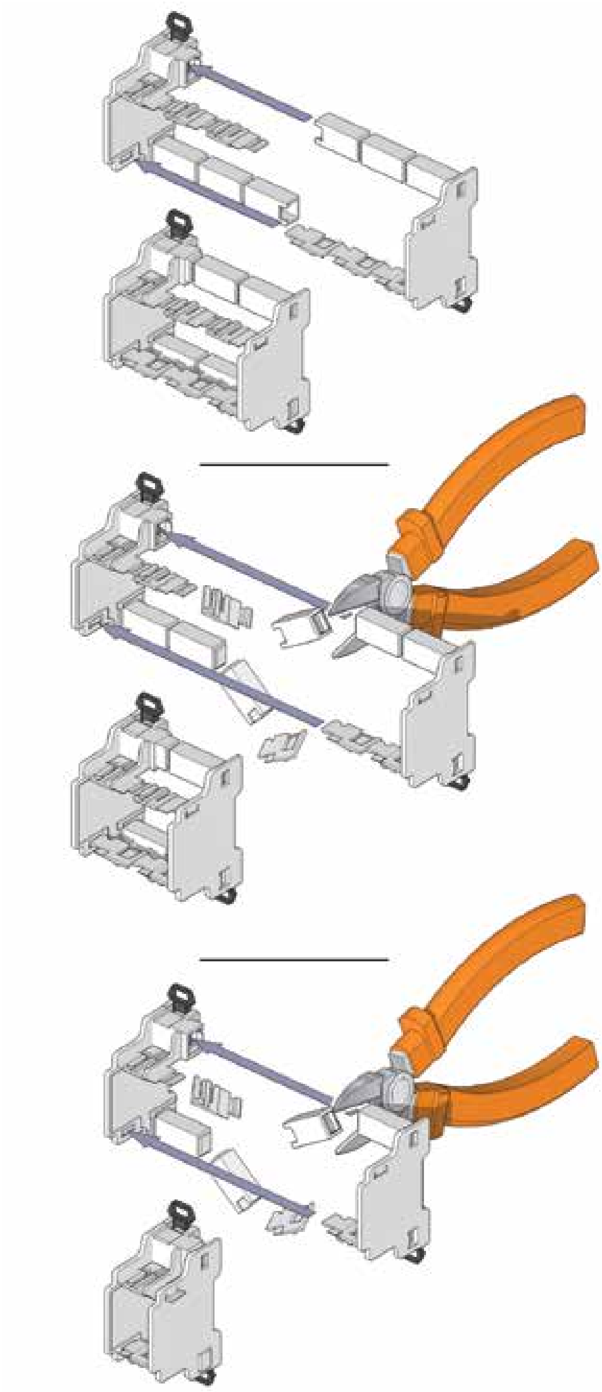
Components



Reference dimensions:
1 module version: 1,9 DIN modules
2 modules version: 3,4 DIN modules
3 modules version: 4,4 DIN modules

Instruction for installation

3 modules: snap assemble the two halves.
1 or 2 modules: using a cutter, cut along lines 1 or 2 respectively and assemble the two halves.



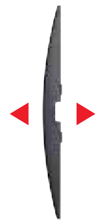
Technical details

Chiara – Frames

The frames of the Chiara series are made from technopolymer with natural/pastel colour shades or surface galvanic painting, and are characterised by their minimal protrusion from the wall, since they are not fitted with an under-plate.

Reference standards
CEI 23-9 (EN 60669-1).

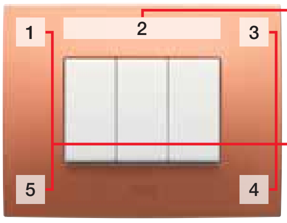
Frame that adheres to all surfaces



2 ÷ 8 mm

Customization

Frames customized with a logo/text string can be supplied on request. They are produced by means of monochromatic pad printing on the areas highlighted below.



Position 2
Logo inside a rectangle
10 mm in height and 45mm in length

Positions 1-3-4-5
Logo in square with 13 mm sides.

Customization is possible with standard colours (black, Pantone cool gray 3C, Pantone 5425 C) or with a colour specified by the customer.
Minimum order batch: 36 pieces including various modularities.
For quotes and delivery times contact an ABB sales executive.

Technical details

Chiara – Coding, Order information

Coding criteria of the devices

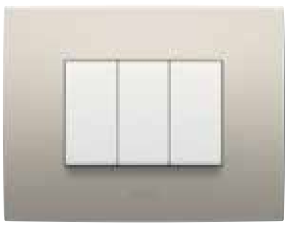
2	C	S	K	1				C	H
Fixed part of the code					Product family	Product progressive number		Fixed part of the code	

0 Control devices
1 Socket outlets
2 Comfort devices
3 Protection devices and signalling devices
6 Components for installation, accessories and spare parts

Example: single-pole switch

2	C	S	K	0	**0**	**0**	**1**	C	H

Coding criteria of the frames



2	C	S	K	0				C	H
Fixed part of the code					Number of modules	Colour code		Fixed part of the code	

2 2-module frame
3 3-module frame
4 4-module frame
7 7-module frame

01 white
02 sand
03 stone
04 volcano
11 pastel yellow
12 pastel orange
13 pastel green
14 pastel blue
15 glossy chromium
16 satin chromium
17 glossy metal
18 satin metal black
51 glossy bronze
52 satin bronze
53 glossy gold
54 satin gold

Example: technopolymer frame, 3 modules, sand colour

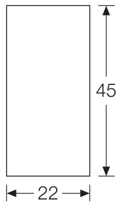
2	C	S	K	0	**3**	**0**	**2**	C	H

Packaging
To enable automatic warehouse management using optical readers, the devices and frames of the Chiara wiring accessories' range are packaged in boxes that bear the EAN bar code and that protect the contents adequately against dust and shocks. For a better explanations of the installation methods, a specific instruction sheet is supplied. Individual packages are available for only for the codes with the lowest turnover.

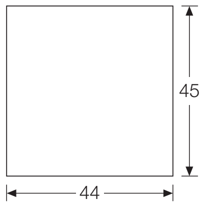
Technical details
Chiara – Overall dimensions

Chiara code	Description	No. Modules	Depth mm
2CSK1001CH	Single-pole switch, 16A - 250V~	1	30
2CSK1002CH	Double-pole switch, 16A - 250V~	1	30
2CSK1003CH	Single-pole two-way switch, 16A - 250V~	1	30
2CSK1004CH	Single-pole switch, 16A - 250V~, 2 modules	2	30
2CSK1005CH	Single-pole push switch NO, 16A	1	30
2CSK1006CH	Double-pole switch, 16A - 250V~, with key control	1	25
2CSK1006CHU	Double-pole switch, 16A - 250V~, with universal key control	1	25
2CSK1007CH	Single-pole two-way switch, 16A - 250V~, 2 modules	2	30
2CSK1008CH	Intermediate switch, 16A - 250V~, 2 modules	2	30
2CSK1009CH	Double-pole push switch, NO, 16A - 250V~, with key control	1	25
2CSK1009CHU	Double-pole push switch, NO, 16A - 250V~, with universal key control	1	25
2CSK1010CH	Intermediate switch, 16A - 250V~	1	30
2CSK1011CH	Change-over switch, 10A - 250V~, 3 positions	1	31
2CSK1012CH	Single pole latching relay, 230V	1	31
2CSK1014CH	4 sequence switch relay, 230V, 2 10A output contacts	1	31
2CSK1016CH	Single-pole push switch NC, 16A	1	30
2CSK1017CH	Double single-pole push switch, NO+NO, 16A - 250V~	1	30
2CSK1018CH	Double single-pole push switch, NO+NO, 16A - 250V~, with interlock	1	30
2CSK1022CH	Single-pole push switch 1 NO and 1 NC, 16A, with ON	1	30
2CSK1023CH	Single-pole push switch 1 NO and 1 NC, 16A, with OFF symbol	1	30
2CSK1020CH	Single-pole push switch NC with cord pull, 16A	1	30
2CSK1021CH	Single-pole push switch NC with cord pull, 16A	1	30
2CSK1028CH	Single-pole push switch NO, 16A, with BELL	1	30
2CSK1029CH	Single-pole push switch NO, 16A, with KEY	1	30
2CSK1030CH	Single-pole push switch NO, 16A, with STAIR LIGHT	1	30
2CSK1024CH	Single-pole push switch NO, 16A, with red diffuser	1	30
2CSK1025CH	Single-pole push switch NO, 16A, with green diffuser	1	30
2CSK1026CH	Single-pole push switch NO, 16A, with orange diffuser	1	30
2CSK1027CH	Single-pole push switch NO, 16A, with white diffuser	1	30
2CSK1031CH	Single-pole pushbutton NO, 16A, with backlit label holder plate push switch	2	30
2CSK1032CH	Single-pole push switch NO, 16A, with backlit label holder plate, 3 modules	3	30
2CSK1101CH	2P+E socket outlet, 10A - 250V~, P11 type	1	22
2CSK1102CH	2P+E socket outlet, 16A - 250V~, P17 type	1	22
2CSK1103CH	2P+E socket outlet, 10/16A - 250V~, P17/P11 type	1	22
2CSK1104CH	2P+E socket outlets, 10/16A, red	1	22
2CSK1105CH	2P+E socket outlets, 10/16A, green	1	22
2CSK1106CH	2P+E socket outlets, 10/16A, orange	1	22
2CSK1108CH	2P+E socket outlet, 16A - 250V~, P30 type	2	31
2CSK1114CH	2P+E socket outlets, 16A - 250V~, P30 type, red	2	31
2CSK1115CH	2P+E socket outlets, 16A - 250V~, P30 type, green	2	31
2CSK1116CH	2P+E socket outlets, 16A - 250V~, P30 type, orange	2	31
2CSK1109CH	2P+E socket outlet, 16A - 250V~, P30/17 type	2	35
2CSK1110CH	2P+E socket outlets, 16A - 250V~, P30/17 type, red	2	35
2CSK1111CH	2P+E socket outlets, 16A - 250V~, P30/17 type, green	2	35
2CSK1112CH	2P+E socket outlets, 16A - 250V~, P30/17 type, orange	2	35
2CSK1113CH	2P shaver socket with insulating transformer	3	37.5

1 module



2 modules



3 modules

Technical details

Chiara – Overall dimensions

Chiara code	Description	No. Modules	Depth mm
2CSK1324CH	2P+E socket outlet, 16A - 250V~, interlocked with MCB, P17/11	2	37.5
2CSK1325CH	2P+E socket outlet, 16A - 250V~, interlocked with MCB, P30	3	37.5
2CSK1326CH	2P+E socket outlet, 16A - 250V~, with RCD 10mA, P17/11	3	37.5
2CSK1117CH	TV coaxial socket, direct, male IEC connector ø 9.5 mm, insulated type	1	21
2CSK1118CH	TV/SAT coaxial socket, direct, male IEC connector ø 9.5 mm, with feedthrough of direct current	1	21
2CSK1132CH	TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm, attenuation 7dB	1	21
2CSK1136CH	TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm, attenuation 10dB	1	21
2CSK1137CH	TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm, attenuation 14dB	1	21
2CSK1138CH	TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm, attenuation 18dB	1	21
2CSK1119CH	TV/SAT coaxial socket, direct, female F connector, with feedthrough of direct current	1	21
2CSK1133CH	Double demixed TV/SAT coaxial socket, direct, male IEC connector ø 9.5 mm and female F connector	1	21
2CSK1120CH	Double demixed TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm and female F connector, attenuation 7dB	1	21
2CSK1130CH	Double demixed TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm and female F connector, attenuation 10dB	1	21
2CSK1131CH	Double demixed TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm and female F connector, attenuation 14dB	1	21
2CSK1139CH	Double demixed TV/SAT coaxial socket, feedthrough, male IEC connector ø 9.5 mm and female F connector, attenuation 18dB	1	21
2CSK1121CH	RJ11 telephone connector	1	21
2CSK1122CH	RJ12 telephone connector	1	21
2CSK1124CH	RJ45 connector, Cat. 5e, UTP (unshielded)	1	21
2CSK1125CH	RJ45 connector, Cat. 5e, FTP (shielded)	1	21
2CSK1127CH	RJ45 connector, Cat. 6, UTP (unshielded)	1	21
2CSK1128CH	RJ45 connector, Cat. 6, FTP (shielded)	1	21
2CSK1160CH	Flush-mounted USB charger 500-650mA	1	35
2CSK1210CH	Electronic natural gas detector	3	39
2CSK1211CH	Electronic LPG gas detector with acoustic and indicator signal	3	39
2CSK1301CH	Fuse holder, for fuses Ø5x20 / Ø6.3x32 mm, max. 16A	1	26
2CSK1303CH	LED light for emergency lighting or steplight	3	50
2CSK1304CH	Automatic MCB, 1P+N, C6, breaking capacity 1.5kA	1	36
2CSK1305CH	Automatic MCB, 1P+N, C10, breaking capacity 3kA	1	36
2CSK1306CH	Automatic MCB, 1P+N, C16, breaking capacity 3kA	1	36
2CSK1307CH	Automatic RCD, 1P+N, C6 - 10 mA, breaking capacity 1.5kA	2	36
2CSK1308CH	Automatic RCD, 1P+N, C10 - 10 mA, breaking capacity 3kA	2	36

Technical details

Chiara – Overall dimensions

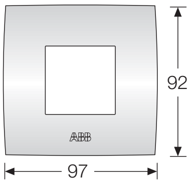
Chiara code	Description	No. Modules	Depth mm
2CSK1309CH	Automatic RCD, 1P+N, C16 - 10 mA, breaking capacity 3kA	2	36
2CSK1315CH	Overvoltage limiter, 75J, 230V~	1	26
2CSK1328CH	Automatic RCD, 1P+N, C6 - 30 mA, breaking capacity 1.5kA	2	36
2CSK1329CH	Automatic RCD, 1P+N, C10 - 30 mA, breaking capacity 3kA	2	36
2CSK1330CH	Automatic RCD, 1P+N, C16 - 30 mA, breaking capacity 3kA	2	36
2CSK1310CH	Warning light, ORANGE colour	1	20
2CSK1311CH	Warning light, WHITE colour	1	20
2CSK1312CH	Warning light, RED colour	1	20
2CSK1313CH	Warning light, GREEN colour	1	20
2CSK1317CH	Electro-mechanical bell, 12V	1	37
2CSK1318CH	Electro-mechanical bell, 230V,	1	37
2CSK1321CH	Electro-mechanical buzzer, 12V	1	37
2CSK1322CH	Electro-mechanical buzzer, 230V	1	37
2CSK1201CH	Summer/winter electronic time-programmed thermostat	3	38
2CSK1202CH	Summer/winter electronic thermostat	2	29.5
2CSK1205CH	Electronic dimmer with rotary control for resistive loads 100-500W	1	39
2CSK1204CH	Electronic dimmer with rotary control and two-way switch for resistive loads 100-500W	1	39
2CSK1207CH	Electronic dimmer with pushbutton control for resistive and inductive loads 60-500W	1	39
2CSK1426CH	Universal badge switch with location light	2	32

Technical details

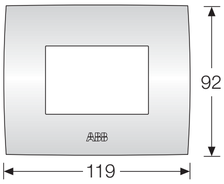
Chiara – Overall dimensions

Frames

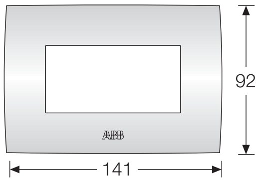
2 modules



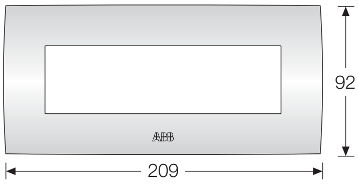
3 modules



4 modules

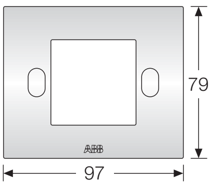


7 modules



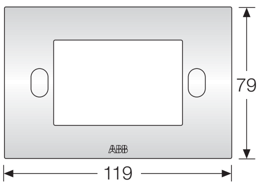
Self-supporting frames

2 modules



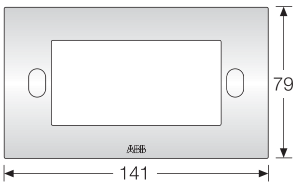
Screw distance: 60 mm

3 modules



Screw distance: 83.5 mm

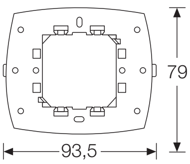
4 modules



Screwr distance: 108 mm

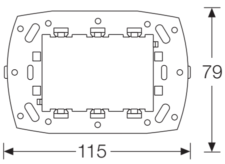
Supports

2 modules



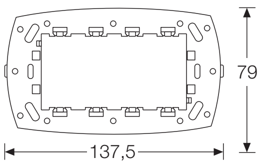
Screw distance of the box: 60 mm

3 modules



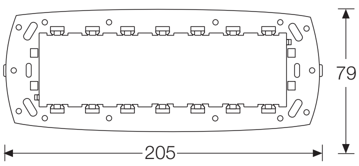
Screw distance of the box: 83.5 mm

4 modules



Screw distance of the box: 108 mm

7 moduli



Screw distance of the box: 100 mm

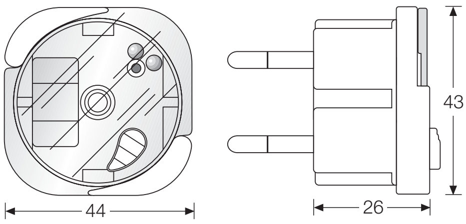
All measurements are in millimetres.

Technical details

Chiara – Overall dimensions

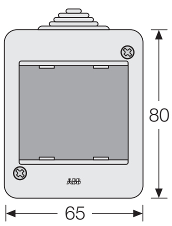
Safety and comfort devices

Anti-blackout light

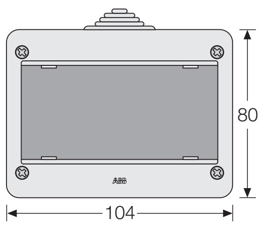


IP40 wall-mounted enclosures

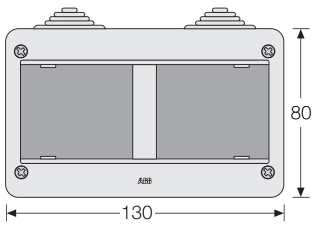
2 modules

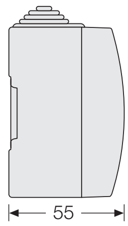


3 modules



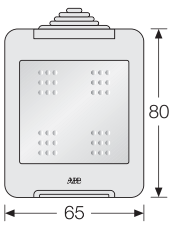
4 modules



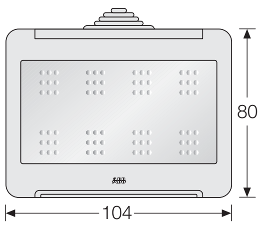


IP55 wall-mounted enclosures

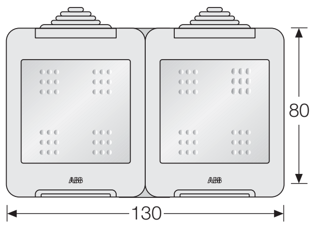
2 modules

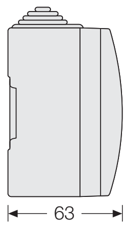


3 modules

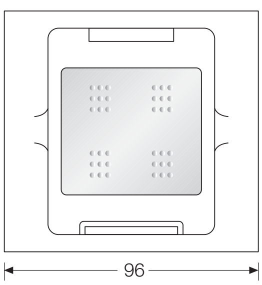


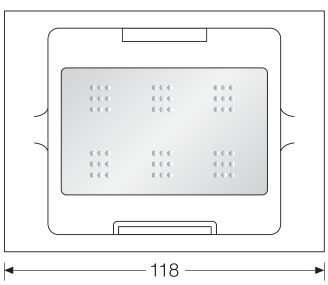
4 modules

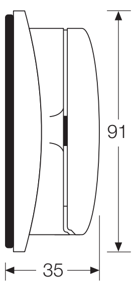




IP55 flush-mounted escutcheon plate







All measurements are in millimetres.

Technical details

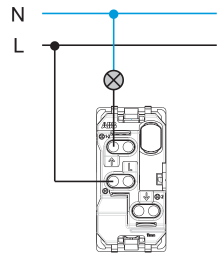
Unno

Switches

Optional: locator light

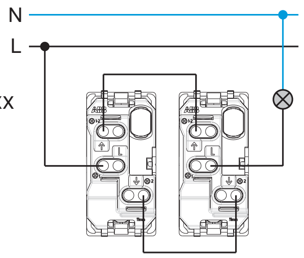
1-way switch

N1101 XX

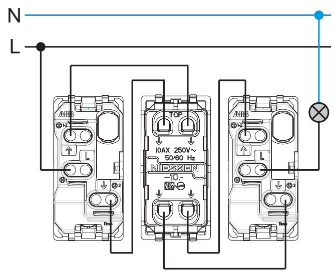


2-way switch

N1102 XX



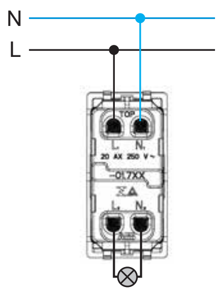
2-way switch - Intermediate switch - 2-way switch



N1102 XX N1110 XX N1102 XX

1-way double pole switch

N1101.7 XX

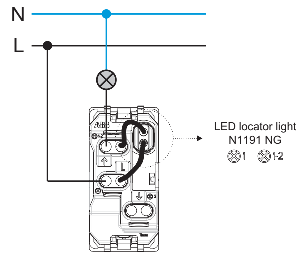


Switches

With locator light

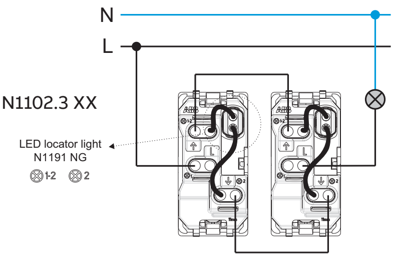
1-way switch with indicator light

N1101.3 XX



2-way switch with indicator lamp

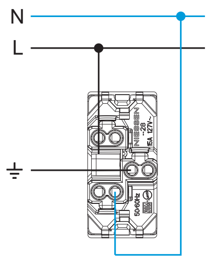
N1102.3 XX



Socket outlets

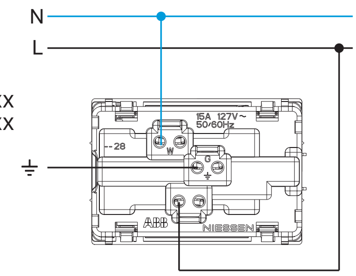
1-module socket outlets

N1128 XX
N1135 XX
(without earth)
N1136 XX
N1136.2 XX
N1138 XX



3-module duplex socket outlets

N1328 XX
N1338 XX



Technical details

Unno

USB chargers

N1185 & N1185.2

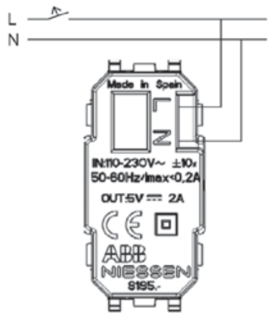
1. Technical data:

Rated input voltage:
100 - 240 V AC ± 10 %
Rated input frequency:
50 - 60 Hz
Rated input current:
N1185.2: 0,20Aac@max load
N1185: 0,12Aac@max load
Consumption in standby:
N1185.2: <10 mW@230 VAC
N1185: <= 0,3W@230 VAC
Rated output voltage:
5 V DC +5 / -5 %
Rated output current:
N1185.2: 2000 mA a 5 V DC
N1185: 750 mA a 5 V DC
Operating temperature:
N1185.2: 0°C to 45°C, when installing a N1185.2. 0°C to 30°C, when two N1185.2 chargers together
N1185: 0° C + 45° C
Energy efficiency:
N1185.2: > 79%
N1185: >= 66%

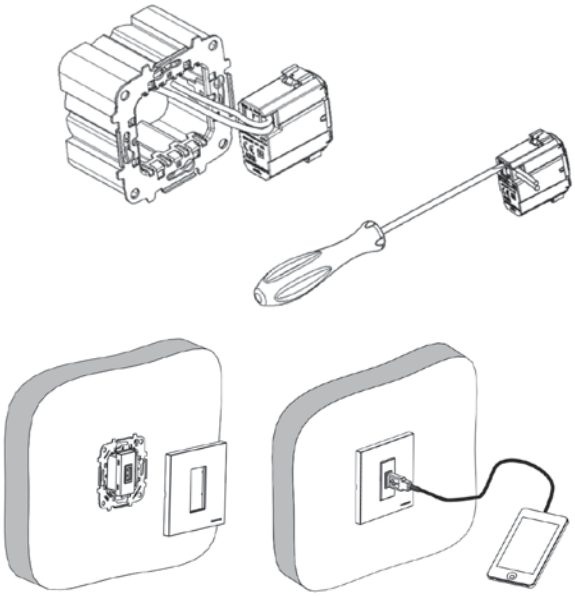
2. Electrical safety data:

Safety standard:
EN60950-I - Low Voltage Directive
Protection class:
II - Low voltage
Isolation (primary-secondary):
Transformer with galvanized isolation
EMC Directive:
EN 55022, EN 55024

3. Wiring diagram

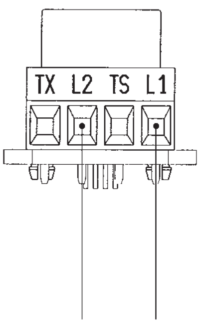


4. Installation



Telephone outlets

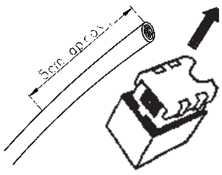
N1117



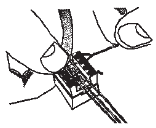
Data outlets - RJ45 Cat. 5e UTP female connector

N1118.5

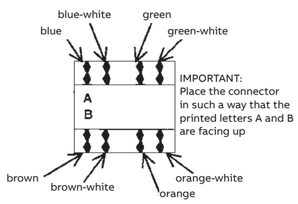
1 Remove the back cap from the connector. Strip approx. 5 cm off the jacket and discard the cable cutter cord.



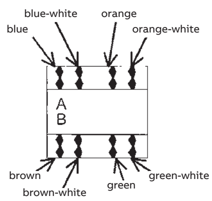
2 Bring the cable close to the connector, with the jacket at approx. 6 mm from the connector. Insert the cables into the corresponding slots as indicated by the cable color-wiring configuration for T568A or T568 B (as shown in Figures 2A and 2B).



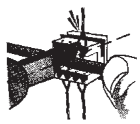
2a Wiring according to T568A:



2b Wiring according to T568B:



3 Push the cables against the end of the slot and cut them flush to the connector.
Use an IBDN 110, BIX, KRONE wiring tool, or a similar type 110 tool.



4 Mount the connector cap.

Technical details

Unno

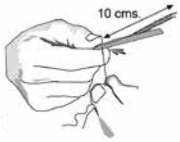
Data outlets - RJ45 Cat. 6 UTP female connector

N1118.6

1 Preparing the Cable

1.1 Cut approximately 5 cm. off the jacket.

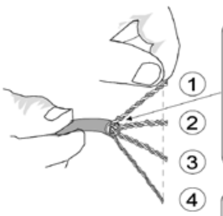
1.2 Open approx. 10 cm. of the jacket with a cutter cord or another tool.



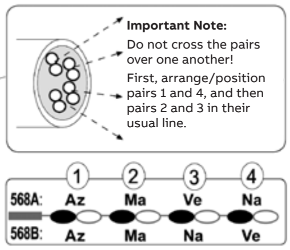
1.3 Cut the jacket.

1.4 Cut the mesh (if it has one and the cord at the same level of the jacket).

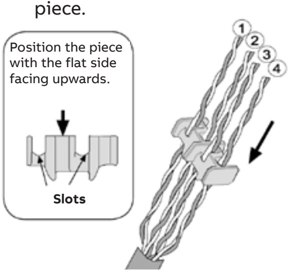
2 Preparing the Conductors



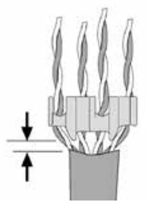
2.1 Select the adequate wiring scheme (568A or 568B) and place the pairs in a straight line.



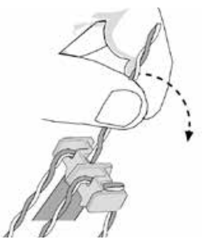
1.2 Position each of the four pairs in the holes of the end piece.



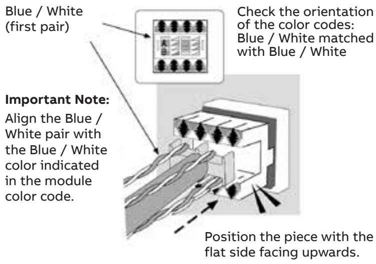
2.3 Ensure the end piece is located as close as possible to the edge of the jacket.



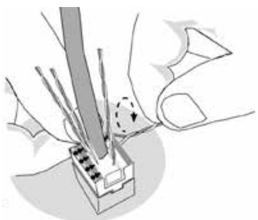
2.4 Place the pairs in the direction of the end piece slots.



2.5 Insert the end piece into the module.

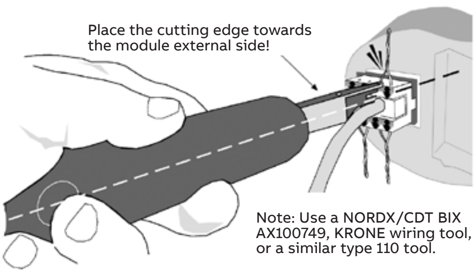


2.6 Unbraid the pairs, position and insert the cable in the module slots. Place the **solid color cable in the first slot of the pair.**



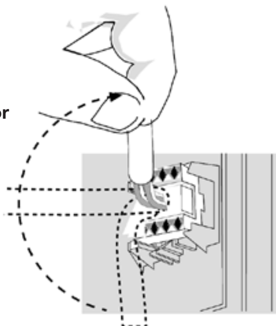
3 Conductor Terminations

3.1 Place the tool perpendicular to the module and finish cutting the cables.



4 Placing the Cable

4.1 Place the cable in **the upper, perpendicular, or lower position** so that it is easy to insert the module in the box for attachment.

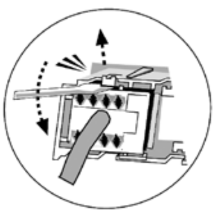


5 Disassembling the module from the supporting piece

Use a...

5.1 Push the front of the module in with your thumb releasing the hooks.

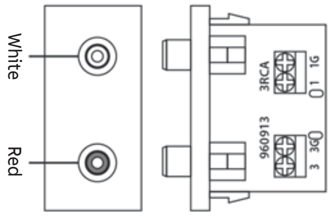
5.2 Pry upwards to release **the upper hook.**



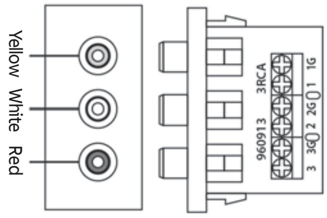
5.3 Pry downwards to release **the lower hook.**

Technical details
Unno

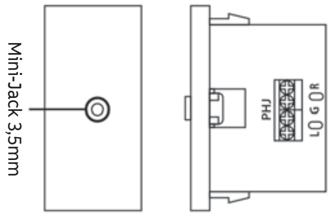
VDI connectors



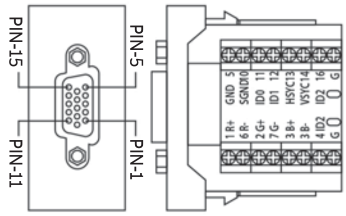
N2155.2
Pin Out:
1G — W/GND ⎤ Left Audio
1B — White ⎦
3G — R/GNB ⎤ Right Audio
3R — red ⎦



N2155.3
Pin Out:
1G — Y/GND ⎤ Composite Video
1A — Yellow ⎦
2G — W/GND ⎤ Left Audio
2B — White ⎦
3G — R/GND ⎤ Right Audio
3R — Red ⎦



N2155.4
Pin Out:
R — Red ⎤ Left Audio
G — Ground ⎥
L — White ⎦ Right Audio

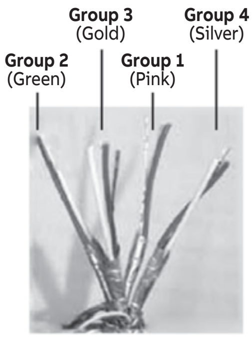


N2155.5

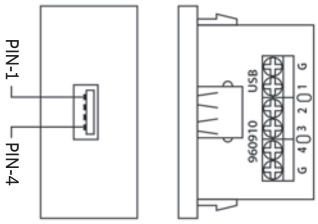
PIN		PIN	
1	1 R+	5	GND 5
6	6 R-	10	SGND 10
2	2 G+	11	ID0 11
7	7 G-	12	ID1 12
3	3 B+	13	HSYC 13
8	8 B-	14	VSYC 14
4	4 ID2	15	ID2 15
G	GND	G	GND

N2155.6

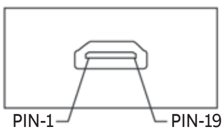
G-1	1	TMDS Data2+
G-1	2	TMDS Data2 Shield
G-1	3	TMDS Data2-
G-2	4	TMDS Data1+
G-2	5	TMDS Data1 Shield
G-2	6	TMDS Data1-
G-3	7	TMDS Data0+
G-3	8	TMDS Data0 Shield
G-3	9	TMDS Data0-
G-4	10	TMDS Clock+
G-4	11	TMDS Clock Shield
G-4	12	TMDS Clock-
	13	CEC
	14	RESERVED (N.C. on device)
	15	SCL
	16	SDA
	17	DDC/CEC Ground
	18	+5V Power
	19	Hot Plug Detect
	GND	Ground

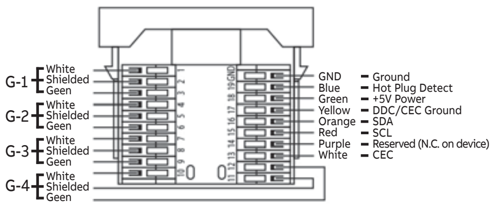


On Group included 3 wires



N2155.8
Pin Out:
1 — VBUS
2 — D-
3 — D+
4 — Ground
G — Shielded





Note:
Using a strap for fixing the cable to the board it is recommended to avoid disconnections. For this the plates have two through-holes at its rear end.

Technical details
Unno

LED/Universal rotatory dimmer - 1M
N1160.3 & N1160.8

1. Technical data

1

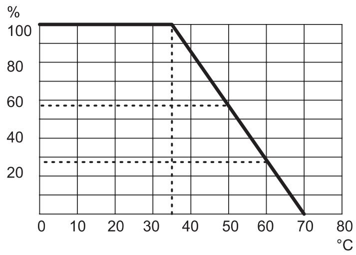
			max	N1160.3 N2160.3 AMD60322 max W. 230V~50/60Hz	N1160.8 N2160.8 max W. 127V~60Hz	Mode
Leading-Edge	I.	LEDi	10	4 - 60 W	4 - 30 W	T L
	II.	LED	10	4 - 60 W	4 - 30 W	
	III.	HALOGEN. 12V	-	4 - 60 W	4 - 30 W	
Trailing-Edge	IV.	LEDi	-	4 - 250 W	4 - 125 W	T L
	V.	LED	-	4 - 250 W	4 - 125 W	
	VI.	HALOGEN. 12V	-	4 - 250 W	4 - 125 W	
	VII.	INCANDESDEN.	-	4 - 250 W	4 - 125 W	

Types of load supported (see table 1)
Leading-edge dimmable loads:
I. LED lamps at 230V/127V type L
II. LED lamps at 12V with electronic transformer
III. Halogen lamps at 12V with electronic transformer
Trailing-edge dimmable loads (recommended):
IV. LED lamps at 230V/127V type C
V. LED lamps at 12V with electronic transformer
VI. Halogen lamps at 12V with electronic transformer
Traditional loads:
VII. Incandescent and halogen lamps.

Technical data

Nominal input voltage	(see tables 1)
Nominal input frequency	50 / 60Hz
Operating temperature	-5ºC… +35ºc
Maximum power supported:	(see tables 1 and 2)
Load type selector	Yes
Off position	Yes
Possible extension for ON/OFF	No
Connection wires	2 o 3
Short-circuit & overload protection	Yes
Temperature protection	Yes
IP protection	IP20
Safety standard	IEC 60669-2-1

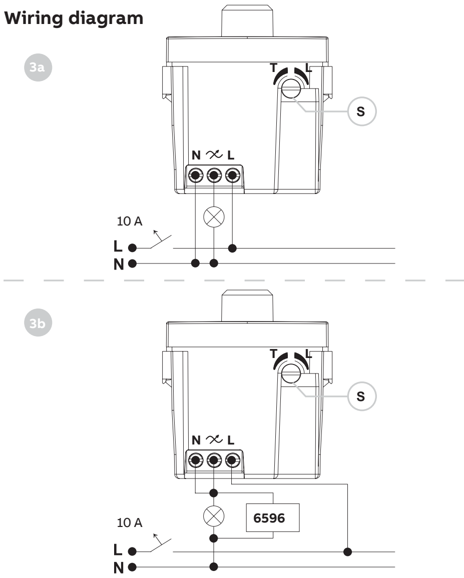
i 2



Performance

The dimmer's nominal power will decrease according to ambient temperature in line with the graph.
If 2 regulators are installed adjacent, reduce max. power to 50%. If 3 adjacent regulators are installed, reduce max. power to 25%.

2. Wiring diagram



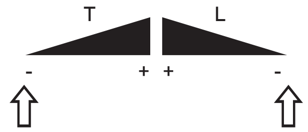
3. Connection

3 WIRES (recommended):
Figure '3a' shows an example of a 3-wire connection.

2 WIRES:
Figure '3b' shows an example of a 2-wire connection. This connection is subject to load compatibility, and correct functioning in all cases cannot be guaranteed (see note above). The minimum load installed must exceed 14W and it must be complemented with a 6596 compensation filter in parallel.

4. Set-up

1. Check the voltage is disconnected.
2. Configure the dimmer functioning mode using the adjust-ment dial, according to the type of load (see table 1)
3. Place the arrow at the bottom end (-) of the selector dial 'S'
4. Connect all wires through the rear terminals.
5. Make sure that the wires are correctly installed and free of potential short-circuits.
6. Restore the general power supply.
7. Switch on the lamps by turning the dimmer switch.
8. Adjust the minimum threshold by placing the arrow of the selector dial 'S' at the lowest point at which the lamps emit light without flashing.
9. Insert the mechanism in the recess box.



min. (T mode) min. (L mode)

Make sure that the proper functioning mode has been configured (L or T) according to the type of load. Otherwise, the dimmer and the lamp could be damaged.

Note

Given the heterogeneity of the lamps and manufacturers in the market, some LED lamps may not be compatible with the dimmer resulting in persistent flashing problems. To avoid these problems, we recommend using the lamps of recognised manufacturers, avoiding the mixture of models and types whenever this is possible.

Technical details
Unno

1 Module dimmer
N1160 & N1160.1

1. Technical Data

Voltage:
N1160: 127 V~ ; 60 Hz
N1160.1: 230 V~ ; 50-60 Hz

Power:
N1160: 50-500 W
N1160.1: 50-700 W

Operating temperature:
0 – 30° C

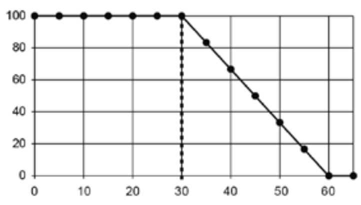
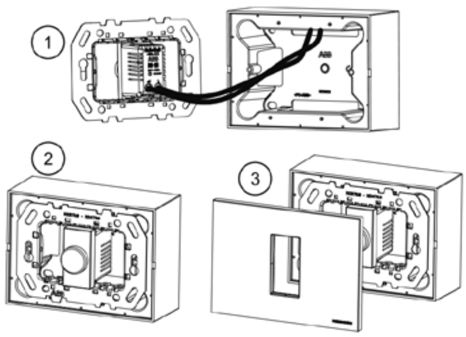


Table 1:
Power reduction (%) as a function of temperature (°C)

2. Assembly/Connection

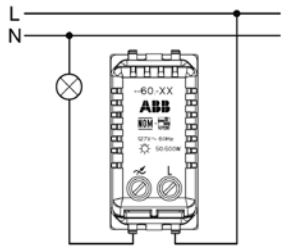
2.1. Assembly

Important:
If the dimmer is installed next to another electronic device that can produce heat, the maximum power must be reduced in half.
If it is installed between two electronic devices that can produce heat, the maximum power must be reduced to the fourth.



2.2. Connection

Important:
Disconnect the power supply when installing.



3. Operation

Do not exceed the maximum shown in Table 1, since the dimmer has a NON-resettable thermal fuse. If the fuse is triggered, the electronic dimmer is useless for further use. In case of exceeding the maximum load, the fuse could not trig but it may happen that the load will not turn off.

Buzzer
N1119

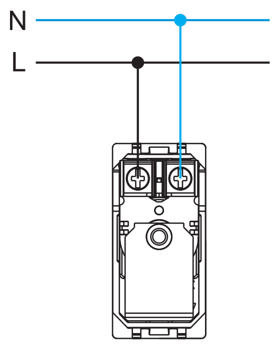
1. Technical data

Rated voltage: 127-230 Vac / 50-60 Hz.

Rated power: 8 VA.
Adjustable tone.

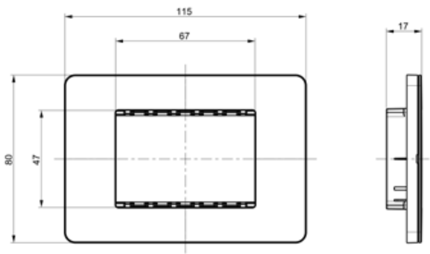
Acoustic power at 1 meter with cover plate: 75 dB.

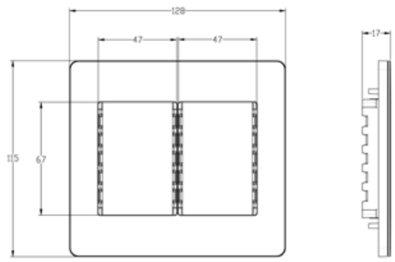
2. Wiring diagram:



Technical details
Unno

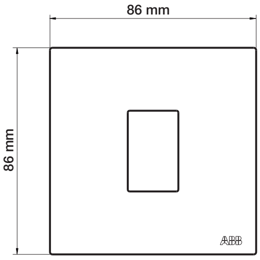
Frames



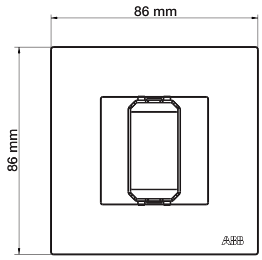


Technical details
Millenium

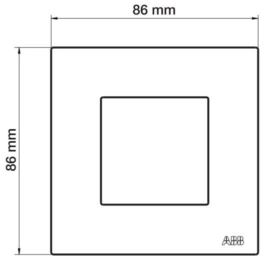
Frame dimensions



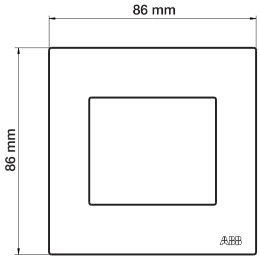
Rocker switch frame 1 gang



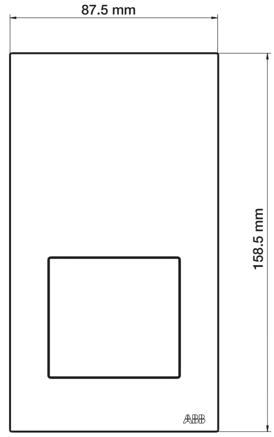
Premium rocker frame 1 gang



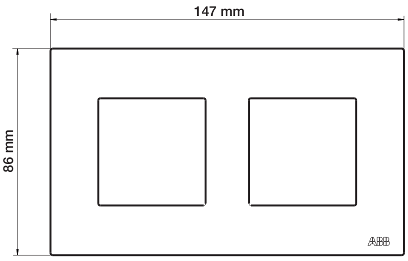
Half/Double rocker & other functions frame 1 gang



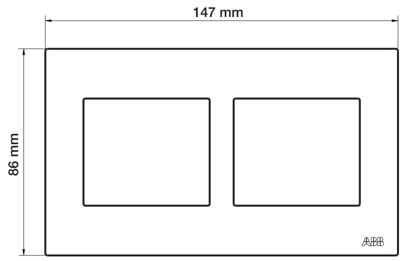
Triple rocker & KNX sensor frame 1 gang



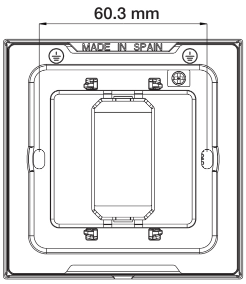
Shaver socket outlet frame



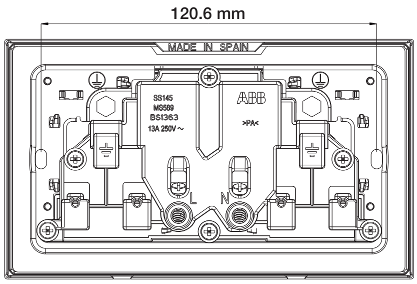
Triple rocker & KNX sensor frame 2 gang



Half/Double rocker & other functions frame 2 gang



Distance between fixing screws for 1 gang frames



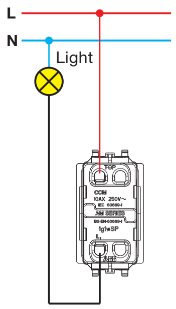
Distance between fixing screws for 2 gang frames

Suitable for flush wall boxes of 35 mm minimum except shaver socket. Cooker unit and 45 DP switch.

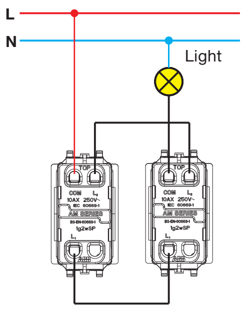
Technical details

Millenium

Circuit connection diagrams

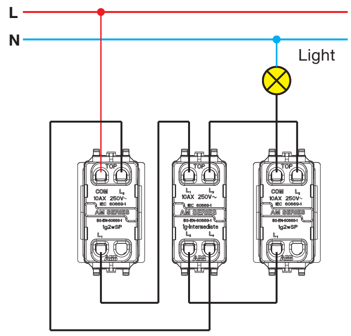


1 Gang
1 way switch



1 Gang
2 way switch

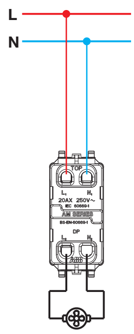
1 Gang
2 Way switch



1 Gang
2 way switch

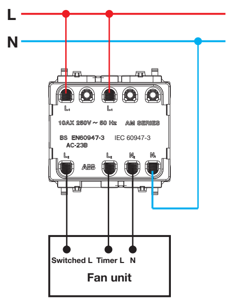
Intermediate
Switch

1 Gang
2 way switch

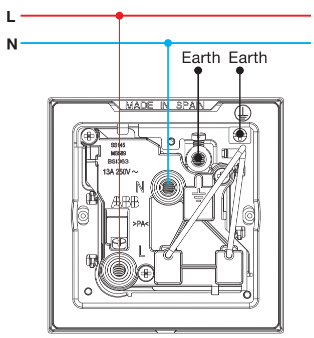


1 Gang
1 way double pole switch

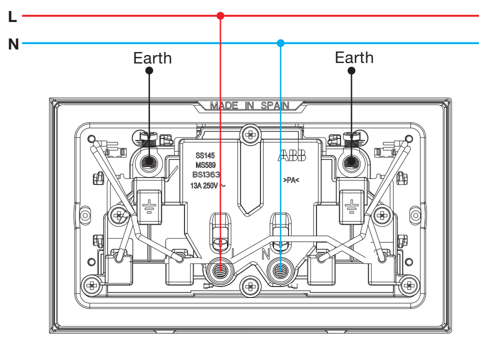
11



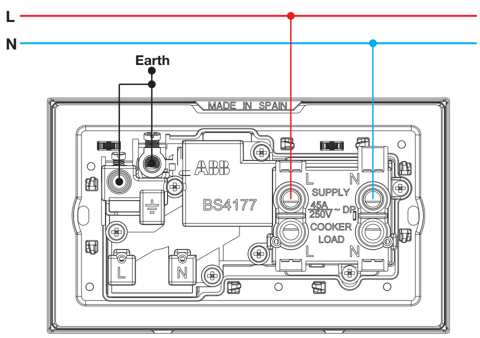
Fan isolator switch



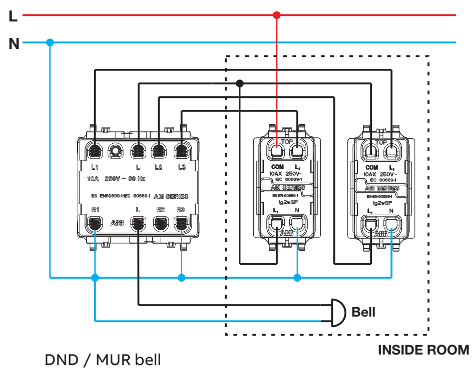
1 Gang BS socket outlet



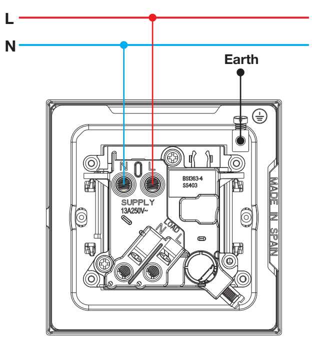
2 Gangs BS socket outlet



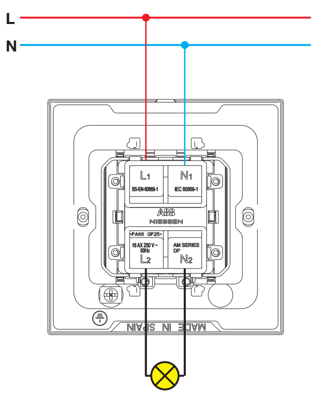
Cooker control unit



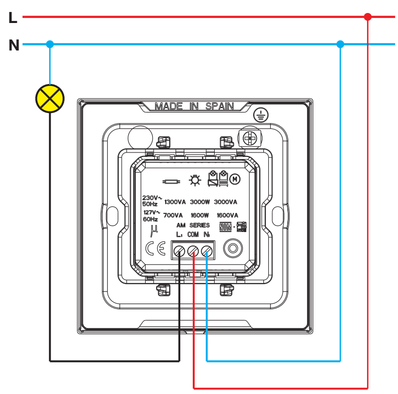
DND / MUR bell



Fuse holder



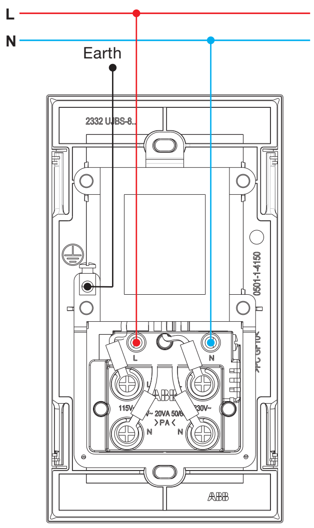
Card switch



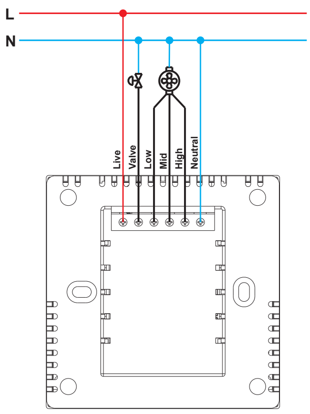
Electronic card switch

Technical details
Millenium

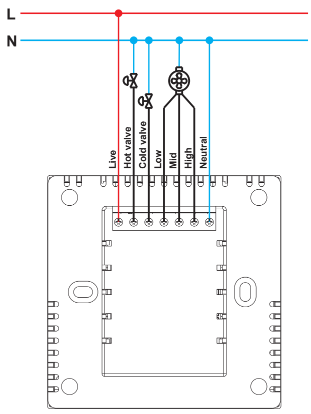
Circuit connection diagrams



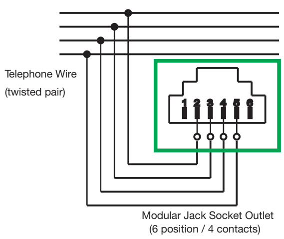
Shaver socket outlet



Thermostat 2 pipes

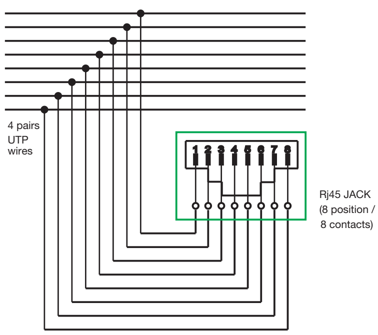


Thermostat 4 pipes



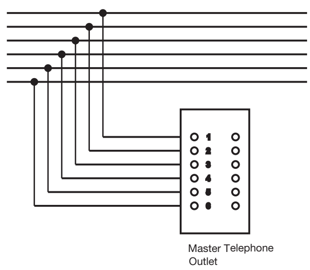
Wiring Colour Code		
Pin Number	Base Colour	Indication
1	-	-
2	Black	Earth
3	Red	L2
4	Green	L1
5	Yellow	Spare
6	-	-

Telephone outlet - RJ11



Wiring Colour Code		
Pin Number	EIA-T568AWire Colour	EIA-T568B Wire Colou
1	White / Green	White / Orange
2	Green	Orange
3	White / Orange	White / Green
4	Blue	Blue
5	White / Blue	White / Blue
6	Orange	Green
7	White / Brown	White / Brown
8	Brown	Brown

Computer outlet - RJ45



Wiring Colour Code	
Pin Number	Base Colour / Stripe
1	Green / White
2	Blue / White
3	Orange / White
4	White / Orange
5	White / Blue
6	White / Green

Telephone outlet - BT R11 / RJ12

TV & SAT technical specifications

TV

Frecuency (Mhz)	Insertion Loss (dB)	Output return loss (dB)	Voltage resistance
5 ~ 550	< 2.5	> 16	
550 ~ 750	< 2.5	> 14	2 KV
750 ~ 1000	< 2.5	> 14	

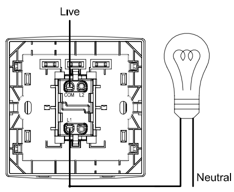
SAT OUTLET

Frecuency (Mhz)	Insertion Loss (dB)	Output return loss (dB)	Voltage resistance
5 ~ 550	< 0.5	> 18	
550 ~ 750	< 0.8	> 18	2 KV
750 ~ 1000	< 0.8	> 16	

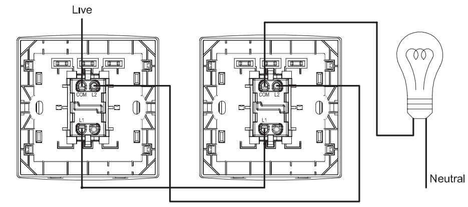
Technical details

Concept bs

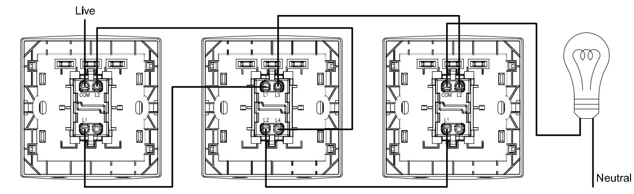
Circuit connection diagrams



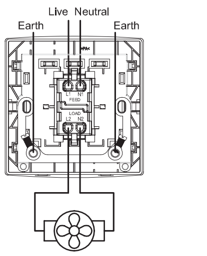
1 gang 1 way switch



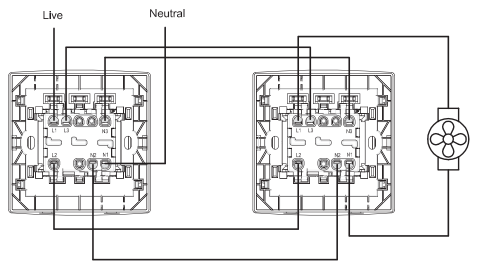
1 gang 2 way switch 1 gang 2 way switch



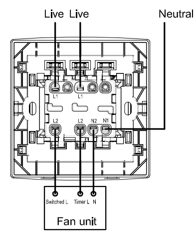
1 gang 2 way switch intermediate switch 1 gang 2 way switch



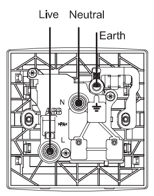
Double pole 1 way switch



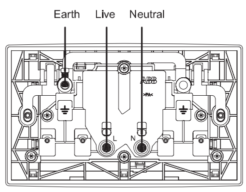
1 gang 2 way double pole switch 1 gang 2 way double pole switch



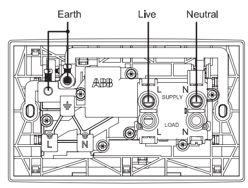
Fan isolator switch



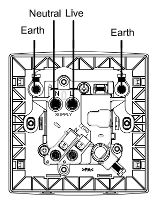
1 gang BS socket outlet



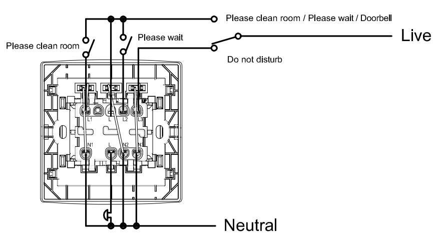
2 gang BS socket outlet



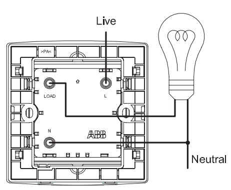
45A DP Switch and 13A Switched Socket Outlet with Neon



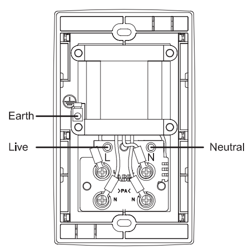
Fused Connection Unit



Bell push-switch with marking and indicator



Card Switch

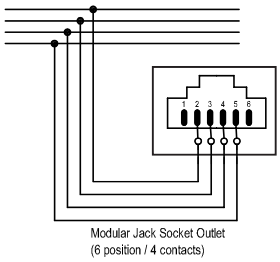


Shaver Socket Outlet

Technical details

Concept bs

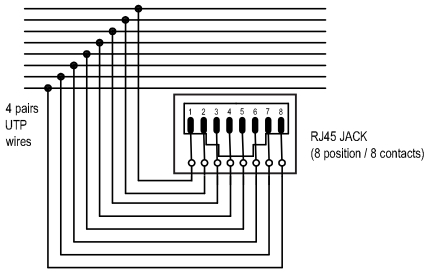
Circuit connection diagrams



Wiring Colour Code

Pin Number	Base Colour	Indication
1	-	-
2	Black	Earth
3	Red	L2
4	Green	L1
5	Yellow	Spare
6	-	-

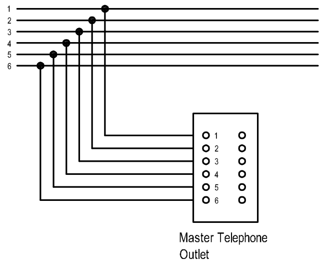
Telephone Outlet - RJ11



Wiring Colour Code

Pin Number	EIA-T568A Wire Colour	EIA-T568B Wire Colour
1	White / Green	White / Orange
2	Green	Orange
3	White / Orange	White / Green
4	Blue	Blue
5	White / Blue	White / Blue
6	Orange	Green
7	White / Brown	White / Brown
8	Brown	Brown

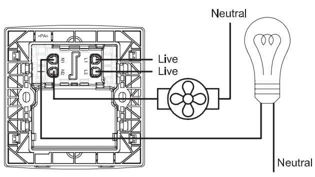
Computer outlet - RJ45



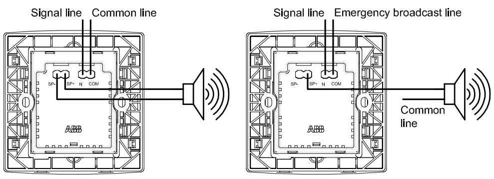
Wiring Colour Code

Pin Number	Base Colour / Stripe
1	Green / White
2	Blue / White
3	Orange / White
4	White / Orange
5	White / Blue
6	White / Green

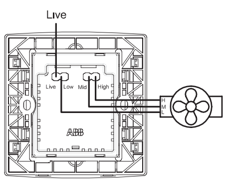
Telephone Outlet - BT



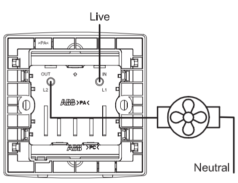
Countdown time switch, 1 gang 1 way



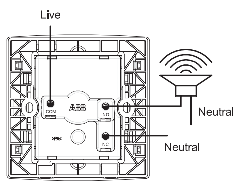
Volume control switch



4 step rotary switch



Fan Controller

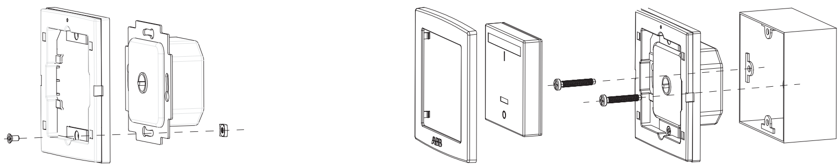


Emergency switch

Technical details

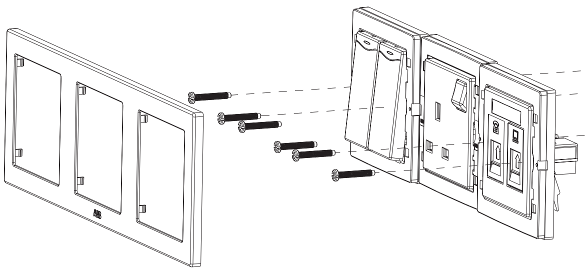
Concept bs

The usage of AC503 (adapter plate)



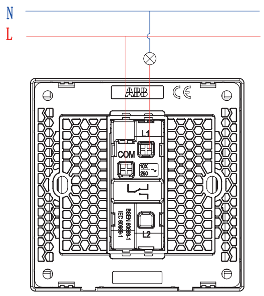
step 1 step 2

The usage of the multi-gang frame

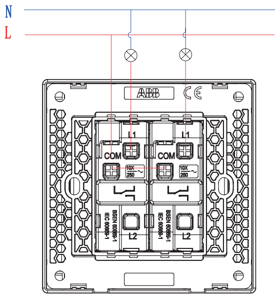


Technical details

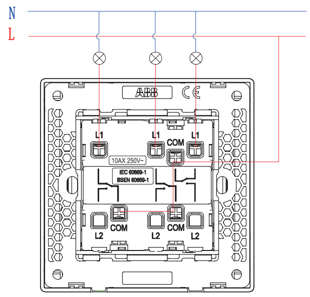
Inora - Wiring Diagrams



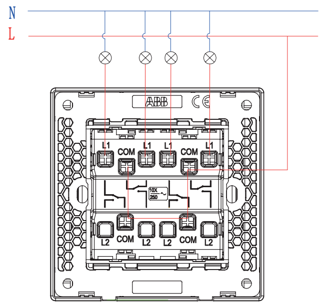
1G 1W switch



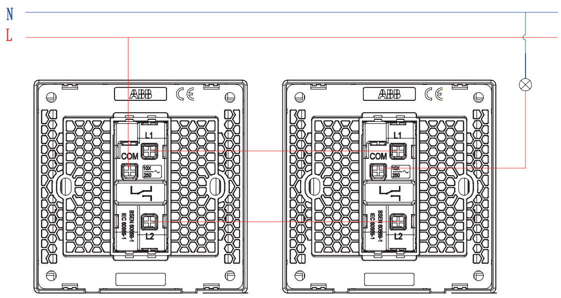
2G 1W switch



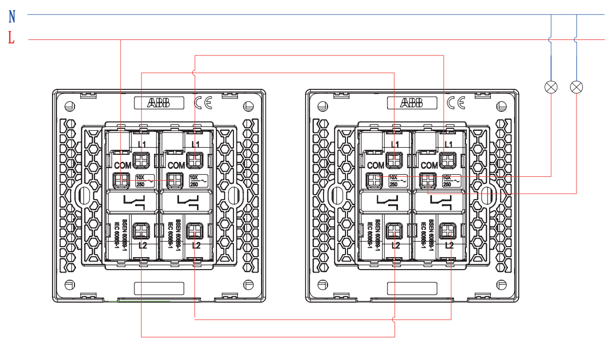
3G 1W switch



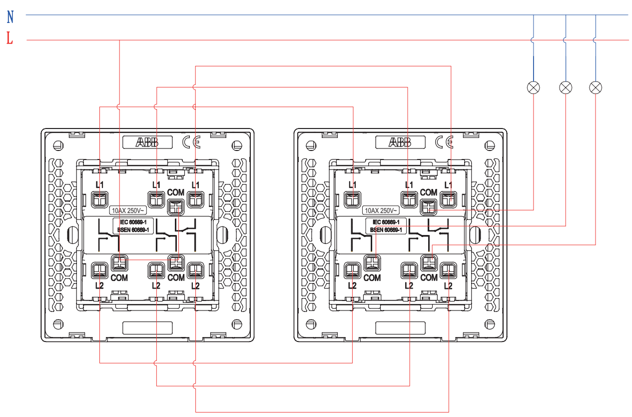
4G 1W switch



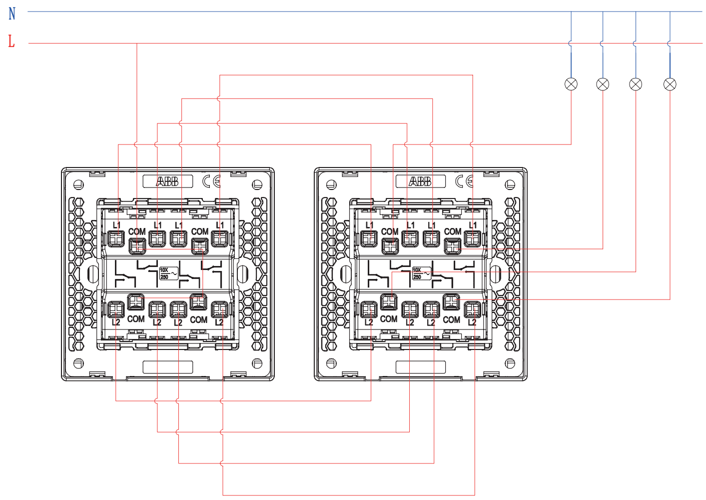
1G 2W switch



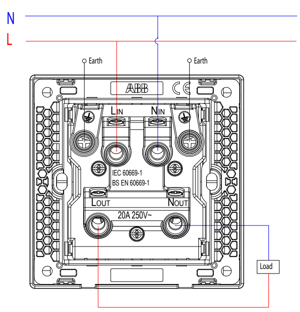
2G 2W switch



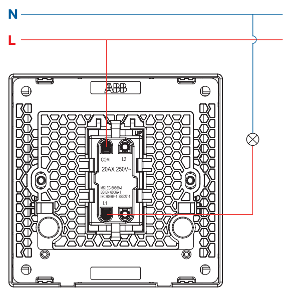
3G 2W switch



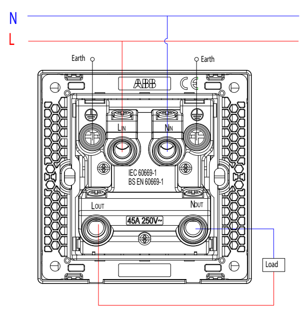
4G 2W switch



1G 1W switch 20 A DP

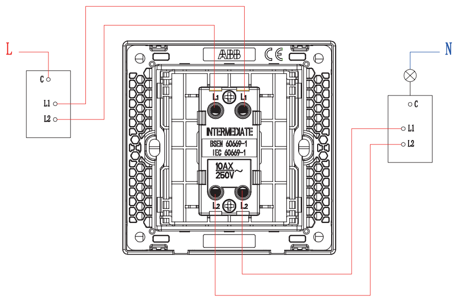


1G 1W switch 20AX DP



1G 1W 32/45 A switch DP

Technical details
Inora - Wiring Diagrams



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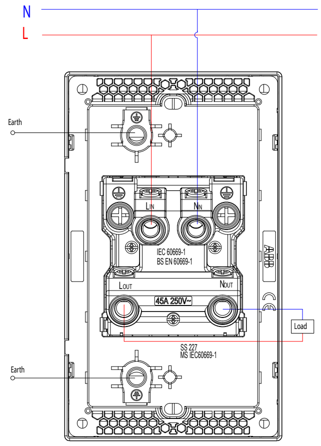
1G intermediate switch



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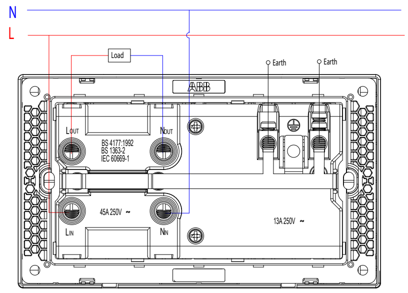
1G 1W 45A switch DP



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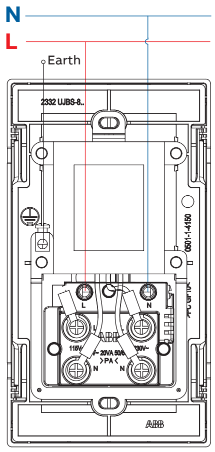
Cooker control unit



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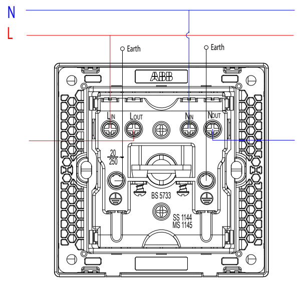
Shaver socket



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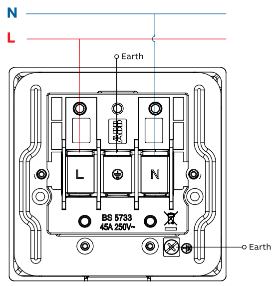
Flex outlet 20 A



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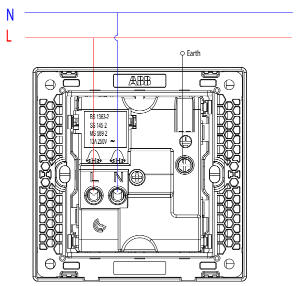
Flex outlet 45 A



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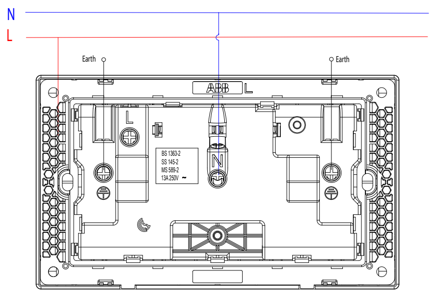
1G 13 A switched socket outlet



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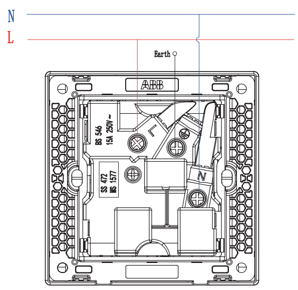
2G 13 A switched socket outlet



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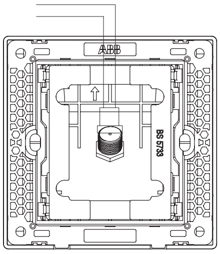
1G 15 A switched socket outlet

Technical details

Inora - Wiring Diagrams



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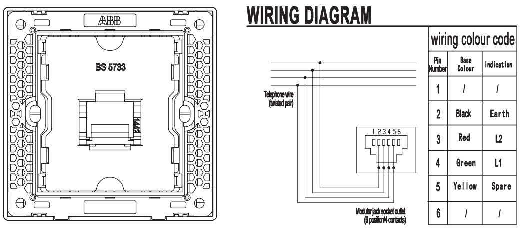
1G TV outlet



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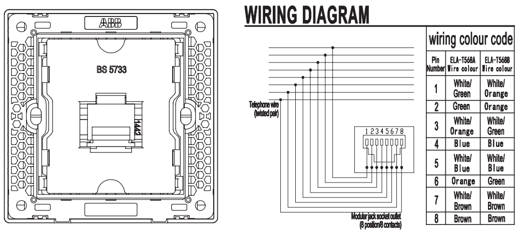
1G telephone outlet



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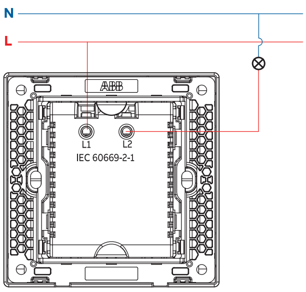
1G/2G data outlet



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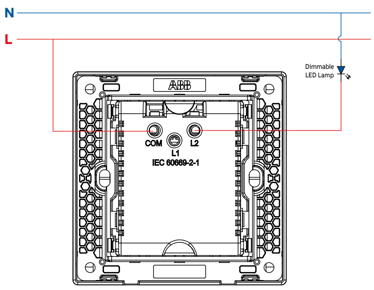
Rotary dimmer



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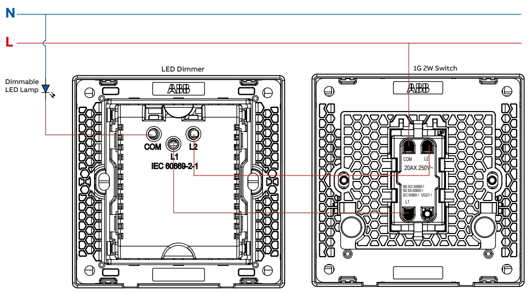
LED dimmer - 1 Way operation



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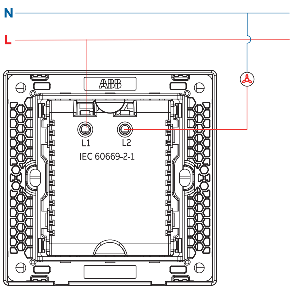
LED dimmer - 2 Way operation



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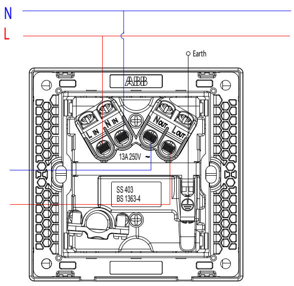
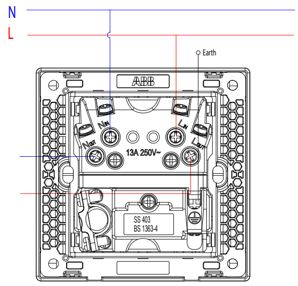
Fan regulator



—
Fused connection unit



—
Fused switched connection unit

Product description	Standard	Description
Switches	IEC60669-1 / BSEN60669-1 / SS 227 / MSIEC60669-1	Switches for household and similar fixed electrical installations
Cooker control unit	BS4177 IEC60669-1 BS1363-2 SASO 2203	Specification for Cooker control units Switches for household and similar fixed electrical installations Specification for 13 A switched and unswitched socket outlets Standard for Cooker control units
13 A sockets	BS1363-2 / SS 145-2 / SASO 2203 / MS 589-2	Specification for 13 A switched and unswitched socket outlets
15 A sockets	BS546 / SS472 / MS1577	Two-pole and earthing-pin plugs, socket outlets and socket outlet adaptors
Shaver socket	IEC60558-1 IEC60558-2-5	Safty of power transformers, power supply units and similar-Part 2-5: particular requirement for shaver transformers and shaver supply units
Dimmer/Fan regulator	IEC60669-2-1	Switches for household and similar fixed electrical installations-Part 2-1: Particular requirements-Electronic switches
Telecommunication	BS5733	General requirements for electrical accessories
Fused Connection Unit	BS 1363-4 / SS403	Specification for 13 A fused connection units switched and unswitched
Flex outlet 20 A/45 A	BS 5733 / MS1144 / MS1145	General requirements for electrical accessories
Plates	BS5733	General requirements for electrical accessories

Notes

Electrical installation solutions for buildings – Technical details

ABB i-bus® KNX

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ABB i-bus® KNX

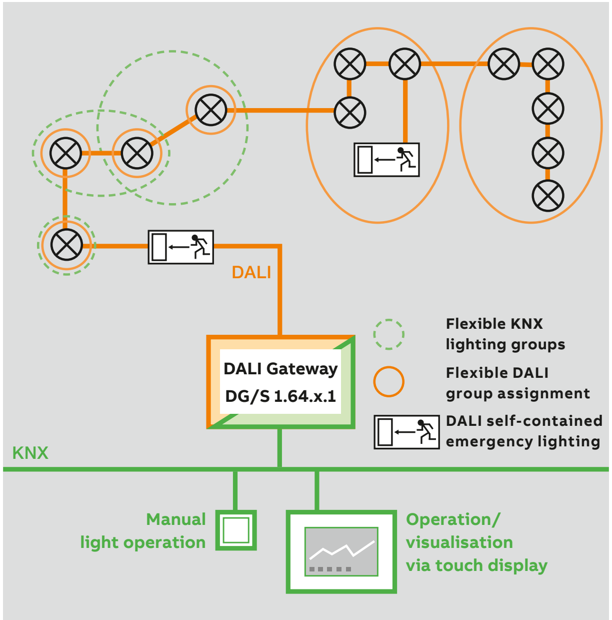
Illumination and Light Sensors – DALI

The ABB DALI Gateways are used to interface between DALI (Digital Addressable Lighting Interface) and KNX installations. Four Gateways are available:
The DALI Gateway Basic DG/S 1.64.1.1 (1-fold) and DG/S 2.64.1.1 (2-fold) and on the other hand the DALI Gateway Premium DG/S 1.64.5.1 (1-fold) and DG/S 2.64.5.1 (2-fold).
All incorporate the DALI power supply.

Both basic Gateways are equipped with emergency lighting function, support the DALI standard EN 62386-202 that specifies DALI emergency lighting (self-contained).
The two DALI Gateways Premium are additionally equipped with colour temperature Tc (tunable white) function and supports the DALI standard EN 62386-209.

DALI Gateways DG/S 1.64.x.1
Flexibility by controlling light individually per device or in groups

The DALI Gateway (1-fold) Basic and Premium can install up to 64 DALI devices both via 16 flexible DALI (orange lined group) and KNX lighting groups (green dotted lined group), each with one or more DALI participants. Control and Monitoring via KNX. Control and status feedback can also be carried out via Broadcast. 16 independent Lighting scenes are available.



DALI Gateways DG/S 2.64.x.1
Maximum flexibility combined with highest amount of DALI participants and groups, to meet all customer needs

The DALI Gateway (2-fold) Basic and Premium can install up to 2 x 64 DALI devices both via 2 x 16 flexible DALI (orange lined group) and KNX lighting groups (green dotted lined group), each with one or more DALI participants. Control and Monitoring via KNX. Control and status feedback can also be carried out via Broadcast. 2 x 16 independent Lighting scenes are available.

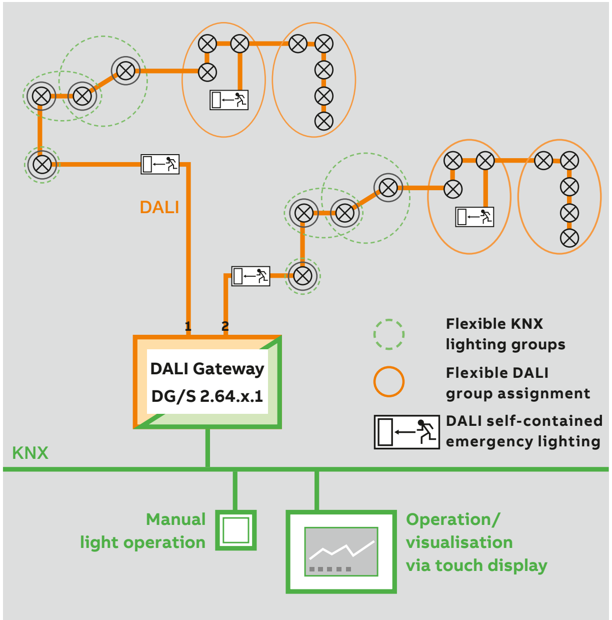


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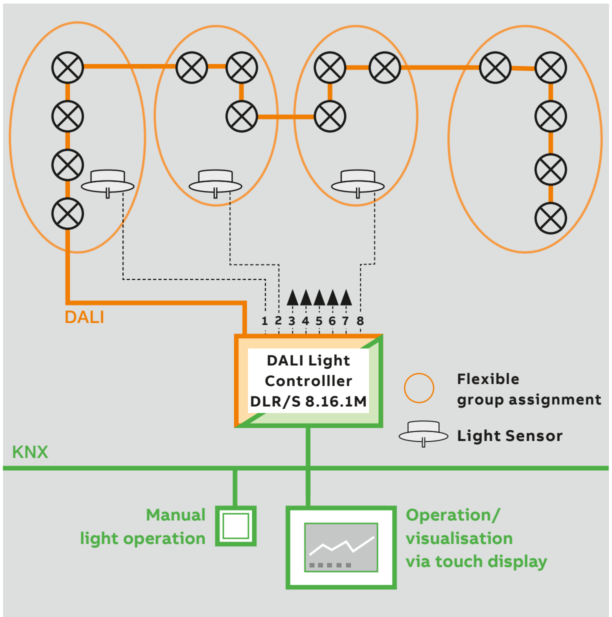
ABB i-bus® KNX

Illumination and Light Sensors – DALI

DALI Light Controller DLR/S 8.16.1M
Energy through constant lighting control

Control via 16 lighting groups. Up to 8 lighting groups can be controlled with 8 light sensors. Master-slave, staircase light and Scene mode round off the functions.



DALI Light Controller DLR/A 4.8.1.1
Decentralized Constant Lighting Control

The new DALI Light Controller DLR/A 4.8.1.1 is a surface mounting device for switching and dimming of 8 independent lighting groups. A maximum of 64 DALI devices can be connected. The device can be used for 4-fold constant lighting control in connection with 4 Light Sensors LF/U 2.1. Furthermore staircase lighting and master / slave functions are provided. Fault feedback messages, e.g. concerning ballast or lamp failures, can be programmed and activated via KNX. The compact surface-mounted housing allows the decentralized installation in the underfloor or in false ceilings – optimal for the use with Room Controller RC/A.

ABB i-bus® KNX
Illumination and Light Sensors – DALI

DALI Gateway DG/S 8.1
The proven technology

Lighting groups are formed via "rigid" hardware wiring.
Fast commissioning as no addressing is necessary.
No readdressing when a ballast is exchanged. 8 x 16 DALI devices.

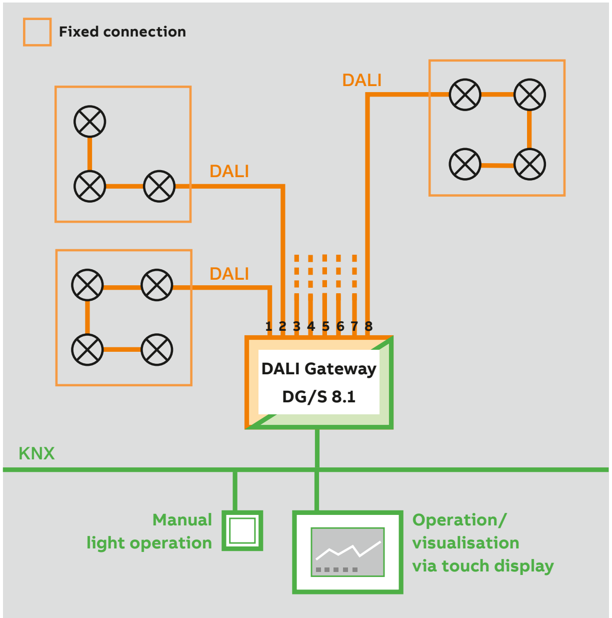


ABB i-bus® KNX
Heating and Cooling

Influencing Variables on Room Climate

Influencing Variables on Room Temperature

Internal and external factors have an effect on the thermal conditions in a room or a building. As an external factor the solar radiation is important for the indoor temperature – particularly with regard to modern architecture with glass fronts. Besides this, the room temperature is strongly affected by the exchange of thermal energy through windows and walls as well as the loss of thermal energy through open doors and windows.

Depending on the intensity, all this interactions influence also the energy efficiency of a building and have therefore to be optimised.
Internal thermal inputs from lighting, devices or persons have also an influence on the room climate. By planning a heating, ventilation or air conditioning system all this internal and external factors have to be considered.

Influencing Variables on Air Quality

The indoor climate in living and working areas has a scientifically proven impact on health, job performance and well-being of people. A suitable indicator for determination of the room air quality is the CO_2 concentration. In addition the values for room temperature and air humidity must be controlled to meet the requirements for a comfortable room climate.

Studies have shown, that high CO_2 concentration in the air influences the well-being as well as the performance and learning ability of people. Besides the normal CO_2 concentration in the air, human respiration is an important factor increasing the CO_2 concentration in a room. Therefore it is important to measure the CO_2 concentration in rooms where many persons are present (schools, conference rooms, open-plan offices). Monitoring of thresholds enables fans to be switched via ABB i-bus KNX allowing automatic control of the CO_2 concentration and sufficient supply of fresh air.

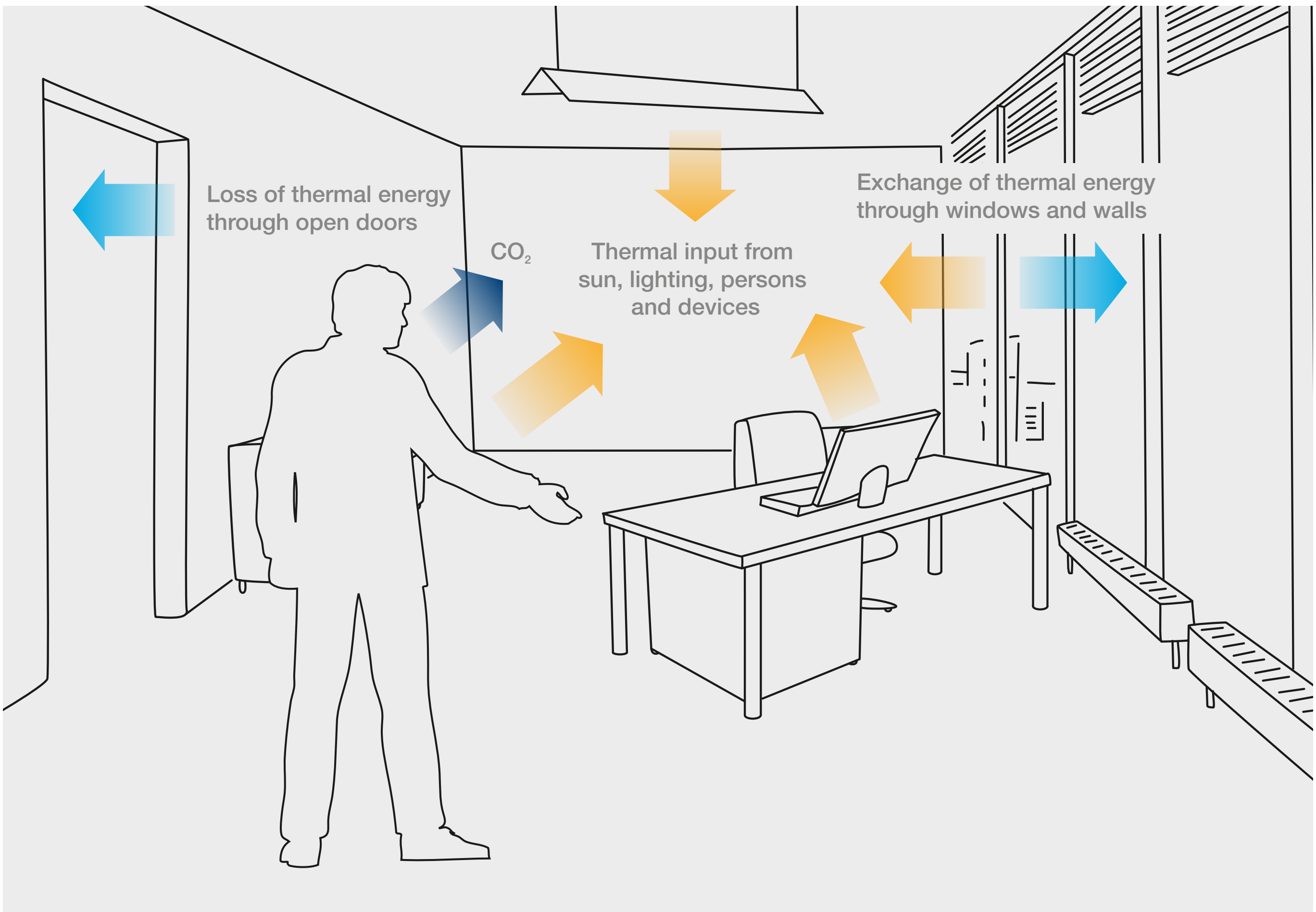


ABB i-bus® KNX

Busch-priOn®

Operation – Planning aid for Busch-priOn®

End strips without function

studio white,
Article-No. 6348-24G-101-500

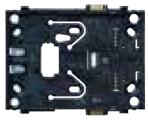

glass black,
Article-No. 6348-825-101-500

white glass,
Article-No. 6348-811-101-500


stainless steel,
Article-No. 6348-860-101-500

Support frame, bus coupler

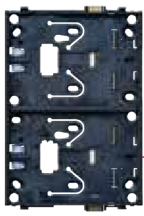

Bus coupler Busch-priOn®,
Article-No. 6120/12-101


1gang,
Article-No.
6346/10-101-500

Note:
This power adaptor can supply up to 15 power bus couplers with current.


Power adaptor REG,
Article-No.
CP-D 24/2.5


Bus coupler Busch-priOn®,
Article-No. 6120/13-500


2gang,
Article-No.
6346/11-101-500


3gang,
Article-No.
6346/12-101-500

FM actuators

End strip


Commissioning adaptor,
Article-No. 6149/21-500

End strips without function

studio white,
Article-No. 6349-24G-101-500

white glass,
Article-No. 6349-811-101-500

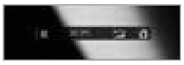

glass black,
Article-No. 6349-825-101-500


stainless steel,
Article-No. 6349-860-101-500

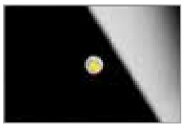
ABB i-bus® KNX
Busch-priOn®

End strip with IR proximity function

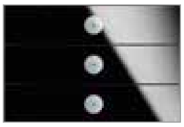
glass black,
Article-No.
6350-825-101-500



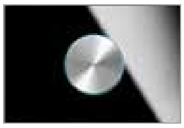
Single-line display and room thermostat,
Article-No.
6351/08-825



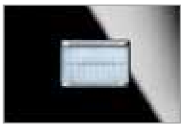
Control element, 1gang,
Article-No.
6340-825-101-500



Control element, 3gang, Article-No.
6342-825-101-500



Rotary control element, 1gang,
Article-No.
6341-825-101-500



Busch-Watchdog, 180 FM,
Article-No.
6345-825-101-500

End strips with temperature sensor.

studio white,
Article-No. 6352-24G-101-500

white glass,
Article-No. 6352-811-101-500

glass black,
Article-No. 6352-825-101-500

stainless steel,
Article-No. 6352-860-101-500

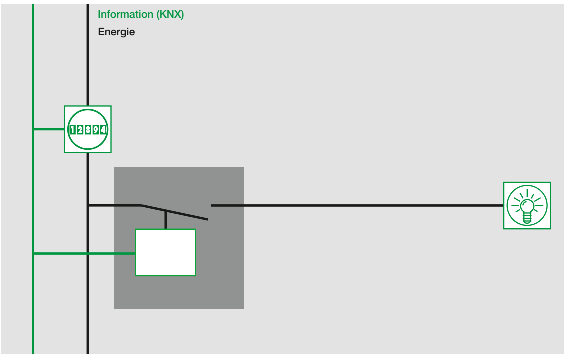
Labelling symbols

Labelling inserts for blinds, lighting, RTC and scene. The colours are repeated in the Busch-Jaeger colour concept.

ABB i-bus® KNX
Energy measurement

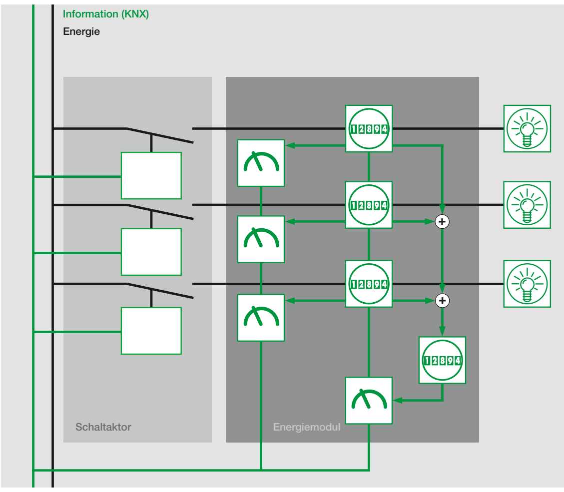
ABB offers various solutions for decentral energy measurement on the basis of the KNX standard.

Version 1



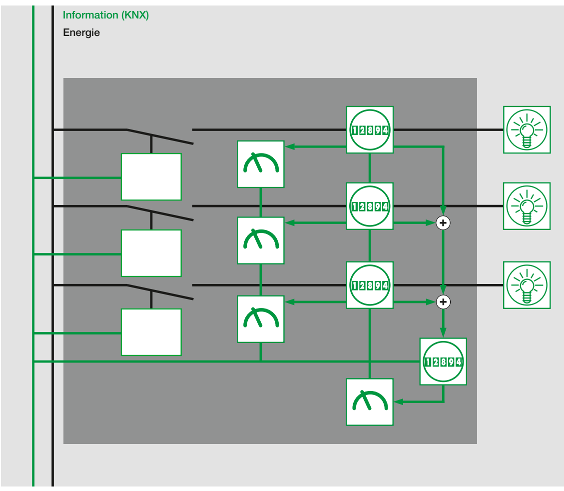
Electronic energy meters make the current energy values available on the KNX bus system in conjunction with a KNX interface. The measured data can be intermediately stored, evaluated and visualized from here.

Version 2



The Energy Module can record the energy consumption for the individual devices. It is used particularly when upgrading existing KNX systems and wherever energy measurement is required without switch functions. It facilitates a detailed and transparent insight into the energy consumption of a building. The current meter values can be sent and evaluated.

Version 3

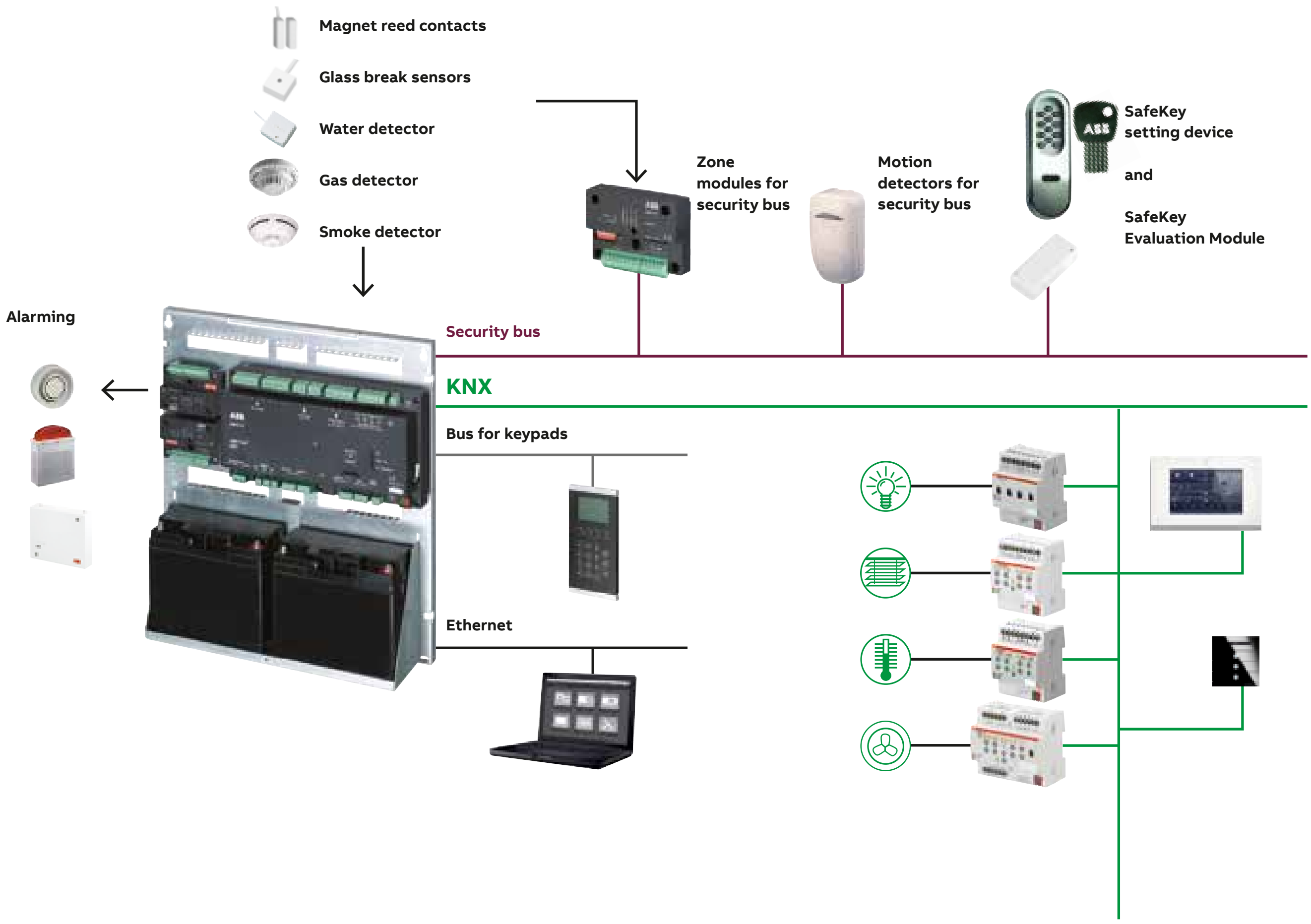


The Energy Actuator facilitates control of the connected consumer loads via the ABB i-bus® KNX. For each of the three switch channels, the individual consumption can be measured in the same way as for the Energy Module. For every channel, the proven functionality of the ABB i-bus® KNX Switch Actuators are available.

Intermediate meter for electrical energy **Electrical consumer (load)** **Energy meter**

ABB i-bus® KNX

Security and Surveillance – The new KNX Security Panel



A complete product product portfolio: One system – all interfaces
To fulfill the project requirements ABB provides the user besides the new panel and keypad a complete product portfolio for professional alarm technology as well as known solutions for all trades of KNX building automation.

The KNX Security Panel is for universal usage for all kinds of hazardous situations in buildings like intrusion, personal attack, smoke, gas- and water leakage.

ABB i-bus® KNX

Security and Surveillance – The new KNX Security Panel

Ethernet connection for programming, diagnostics and operation via a standard webbrowser

Direct inputs for security sensors

Keypads

Internal, external or remote alarming

Security bus for security sensors, zone modules and setting devices

KNX interface to display alarm states via displays of building automation and to control automatic building functions with support of security sensors.

KNX Security Panel without cover, integrated zone modules and batteries

The KNX Security Panel provides all needed system interfaces: An ethernet connection is used for programming, diagnostics and operation via a standard webbrowser as well as integration into the building network. The security sensors will be connected directly to the panel inputs or via the security bus, where the setting device for the system is also connected. Furthermore the panel provides interfaces for the also newly developed keypads and for internal, external or remote alarming. Finally the integrated KNX interface allows on the one hand to display alarm states via displays of building automation and on the other to control automatic building functions with support of security sensors.

Electrical installation solutions for buildings
Legislation & requirements

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Legislation & requirements

—
01 Emergency lighting technical reference

The requirement for emergency lighting originates from the Fire Precautions Act 1971 and was further enforced by the Fire Precautions (Workplace) Regulations 1997 (Amended 1999).

The Regulatory Reform (Fire Safety) Order, FSO came into force in October 2006 and now replaces all previous fire safety legislation.

The key considerations from the Fire Safety Order are:
- The FSO creates one simple fire safety legislative control for all workplaces/non-domestic premises
- Control is fire risk assessment based, with the responsibility for fire safety resting with the 'responsible person' for the premises
- All persons inside the building/in the vicinity who might be affected by a fire must be protected
- Employees will be required to act upon the fire risk assessment, make remedial arrangements accordingly and maintain the fire precautions
- Failure to comply with the rules would be a breach of law, with the consequence of enforcement or prohibition notices being served

The fire safety risk assessment is a legal requirement, and where a site has 5 or more employees the risk assessment must be documented.

Fire certificates under the Fire Precautions Act 1971 are now no longer valid. Guidance documents on the new Fire Safety legislation have been published and the appropriate ones must be consulted as part of the overall fire risk assessment.

Other important legislation and regulations, such as The Buildings Regulations and The Health and Safety "Safety Signs and Signals" Regulations 1996, also have a requirement for emergency lighting and must be considered as part of the design and specification.

—
01

02 Figure A.
Exit sign boards have a maximum viewing distance defined as 100 x the height of the sign (h), in metres

03 Figure B.
For illuminated exit signs, the maximum viewing distance is defined as 200 x the height of the sign (h), in metres

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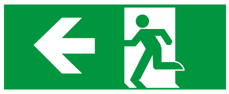
Other important legislation and regulations, such as The Buildings Regulations and The Health and Safety "Safety Signs and Signals" Regulations 1996, also have a requirement for emergency lighting and must be considered as part of the design and specification. A number of standards have been devised to provide guidance on application of emergency lighting in line with legislative requirements, and to determine the quality of product to be specified.

The major standards to be considered when designing a high-level emergency lighting system are:
- **BS 5266-1, BS EN 1838:2013, BS 5266-8**
  These sections of the standards set the guidelines for installation of emergency lighting, where to locate emergency luminaires and exit signs and the minimum lighting levels required. Note that BS 5266-7 has been superseded by BS EN 1838:2013.
- **BS EN 60598.2.22**
  This is the product standard which establishes the performance requirements of emergency lighting luminaires and internally illuminated exit signs
- **IEC 62034**
  This standard defines the requirement for automated testing systems for emergency lighting
- **Lighting Industry Association & ICEL**
  Guides and registration schemes provided by the Industry Committee for Emergency Lighting which define enhanced performance requirements for the differing types of emergency lighting, backed by independent testing

Exit signs

Designated legend formats

European pictogram format SI341 signs are acceptable, as are ISO 7010 format signs, although there should not be a mixture of both within an installation.



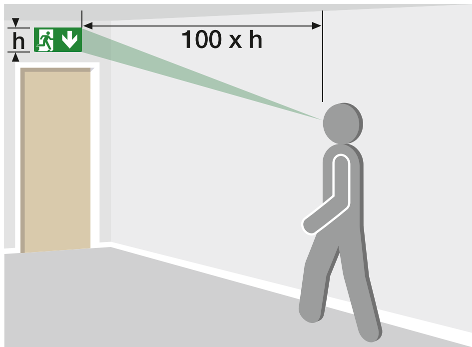
ISO 7010

EU-format, SI-341

Text only signs are no longer acceptable and should have been withdrawn.

SI-341: UK legislation, Statutory Instrument 341

Maximum viewing distances



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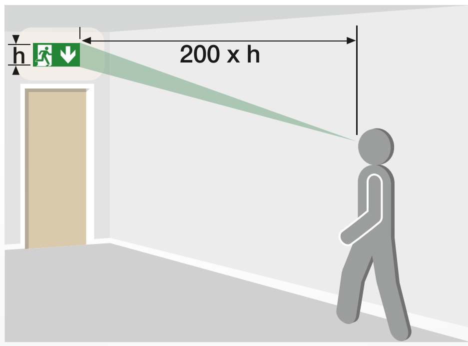

03

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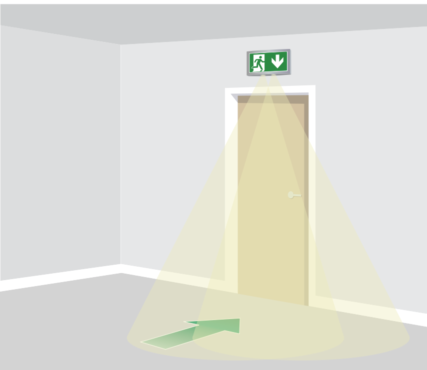
—
01 Near an exit door
—
02 New stairs and changes of level
—
03 Near each piece of fire-fighting equipment or manual call point
—
04 Near changes in direction
—
05 Near each piece of fire-fighting equipment or manual call point
—
06 Near each First Aid point

General requirements for emergency lighting (BS 5266-1, BS EN 1838:2013, BS 5266-8)
If emergency lighting is required it should:
- Indicate the escape routes clearly with exit signs so there is no doubt which is the way out
- Ensure fire safety equipment such as fire alarm call-points, fire extinguishers etc can be located
- Illuminate escape routes, and open areas used in escape routes so that obstacles can be avoided
- Provide illumination for high risk task areas to allow the processes to be shut down safely

Any point on an escape route or leading to it must have an exit sign so that direction of travel is never in doubt. Internally illuminated exit signs offer the most effective method of achieving the requirement, and have a viewing distance twice that of exit signboards - see below.

Note: where exit sign boards are installed, these must now have 5 lux illuminance on the sign to meet the requirements on BS 5266 / EN 1838 - for practical purposes unachievable through use of converted mains luminaires.

Points of emphasis
An escape route luminaire shall be positioned to give emphasis on potential danger points, as well as for safety and fire equipment.
- Near all emergency exit doors
- At changes of direction along the escape route, to illuminate in both directions
- At intersection of corridors, to illuminate in both directions
- At changes in level to avoid tripping
- Near stairs, so stair flights are directly lit
- Near each piece of firefighting equipment or manual call point, to a level of 5 lux in the vertical.
- Near first aid points, to a level of 5 lux in the vertical
- At externally illuminated exit signs and other safety signs, which identify a hazard
- Near escape route equipment in place for disabled people
- Near refuges and two-way telephone positions for the disabled
- Near 'disabled toilet' alarm call positions
- Near to each final exit on the inside
- Near to the final exit externally, to a place of safety
- Near is defined as 'within 2 m' in the horizontal.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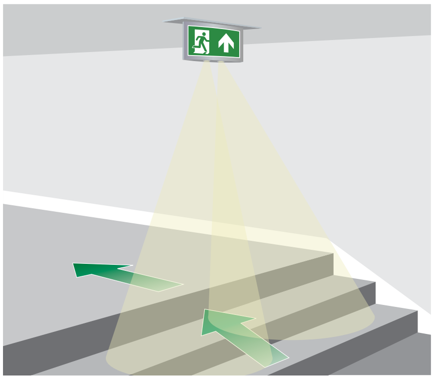
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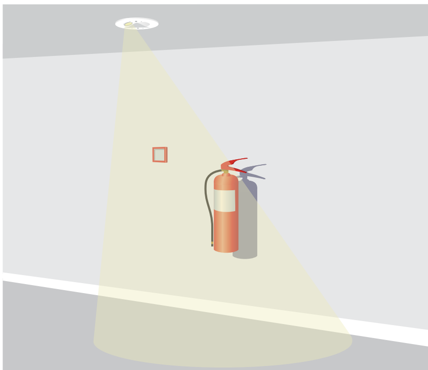
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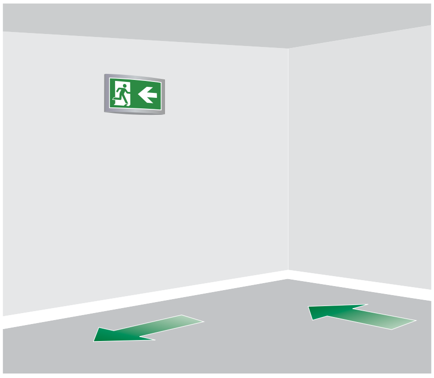
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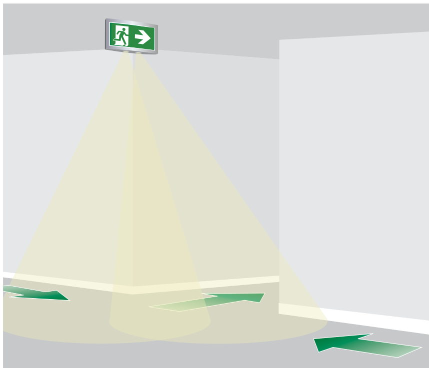
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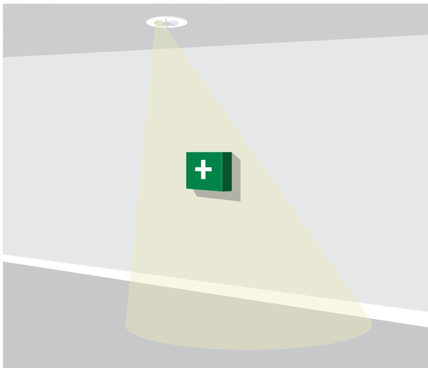
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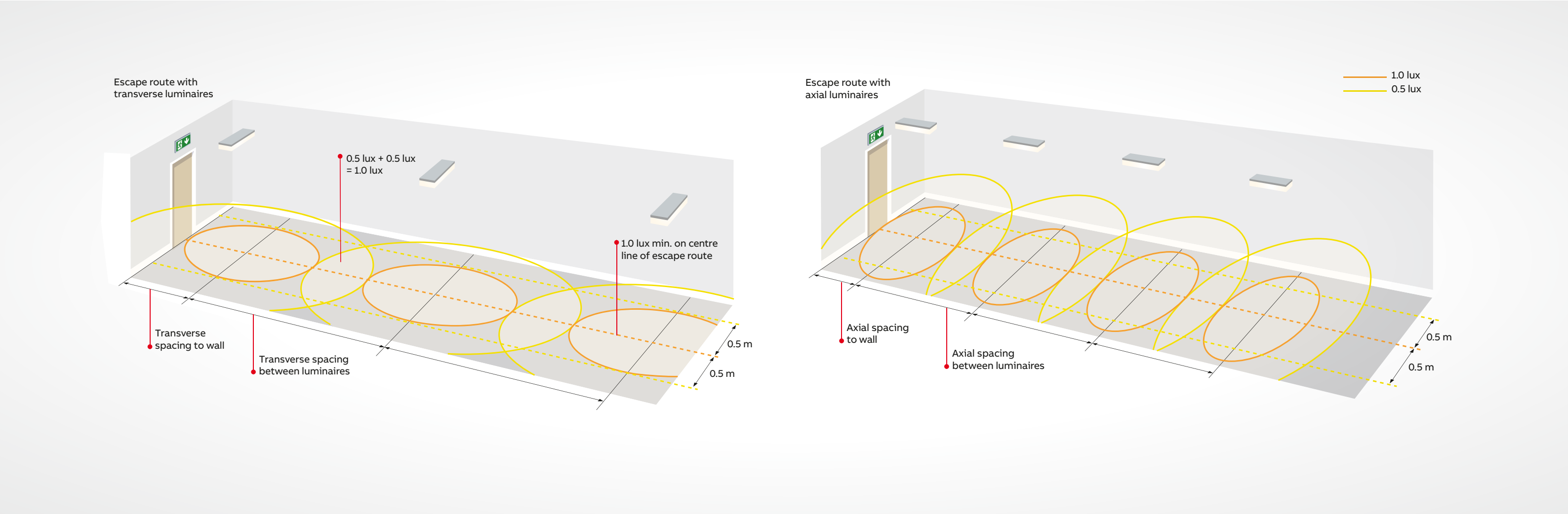

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07

—
07 Escape routes with transverse and axial luminaires
—
08 Core areas

In addition to these points of emphasis, the following need to be considered when planning emergency lighting.

Escape routes
A defined escape route of 2 m width must be illuminated to a minimum of 1 lux along the centre line (see below).

Open areas (anti panic)
Open areas must be illuminated to 0.5 lux minimum in the core area (see below right). This also applies to areas with undefined escape routes, in halls or areas greater than 60 m².

High risk task areas
This refers to areas normally associated with moving machinery, dangerous materials or processes, and other areas of high risk where hazards may continue after mains lighting failure.

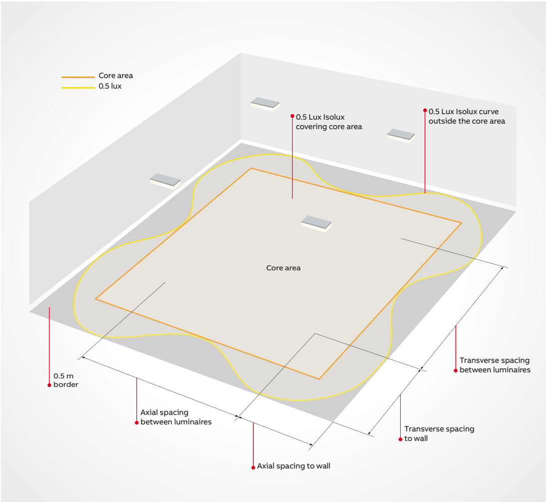
Illuminance levels should be maintained at 10% (or over) of the normal lighting level or 15 lux, provided within 0.5 seconds, to allow for safe egress and/or termination of processes. For high risk task areas, the lux requirement is calculated at the plane of the task rather than floor level.

Additional areas
Additional areas not part of the escape route still require illumination as people may be located there and/or measures may be required to ensure the safety of persons or processes. These areas include kitchens, first aid/operating rooms, lifts, refuge areas, escalators and moving walkways, toilets larger than 8 m² (or smaller without borrowed light), disabled toilets, small lobbies and pedestrian routes within covered car parks.

System integrity
All compartments should include two or more emergency luminaires to counter the risk of emergency luminaire failure.

Luminaire mounting height
Emergency luminaires should be mounted at least 2 m above the floor. There is no upper limit but luminaires should be fitted below smoke level if there is a significant risk of floor illumination being affected.

Stand-by lighting
If stand-by lighting is used as emergency lighting it should conform to all the requirements of emergency lighting.



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08

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Technical reference

Legislation & requirements

Specific location requirements
BS 5266 stipulates light levels, response and duration times for specific locations within premises, and for specific activities, including:
- Kitchens
- First aid rooms
- Examination and treatment rooms
- Refuge areas for the mobility impaired
- Plant rooms, switch rooms and emergency winding facilities for lifts
- Reception areas
- Crash bars or security devices at exit doors
- Inspection of the condition of fire control and indicating equipment

A table showing the illuminance recommendation for these specific locations and requirements can be found in BS 5266-1.

Emergency lighting systems
There is a varied range of emergency lighting available to suit different budgets, decors, building requirements, colours and specifications. The types and categories available for specification are:

Types of emergency lighting
- **Self-contained**
  Each luminaire contains a battery and electronic circuitry to charge batteries and operate the lamp
- **Slave**
  Luminaires are powered from a central system
- **Conversions**
  Almost any mains fluorescent luminaire can be converted for emergency use. Emergi-Lite is registered to ICEL to undertake emergency lighting conversions at our head office facility in Leeds, UK

Categories of emergency lighting
- **Non-maintained (NM)**
  Luminaires operate when the mains fail
- **Maintained (M)**
  Luminaires operate when the mains fail, but can also be operated if required using a switch when the mains supply is healthy
- **Combined Non-maintained (CNM)**
  The luminaire contains more than one lamp, one of which is mains operated, the other is for emergency use only. When the mains is healthy one or more lamps operate, but should the mains fail the emergency lamp operates
- **Combined Maintained**
  Similar to combined non-maintained, but when the mains supply is healthy both lamps operate, whereas on mains failure only one lamp operates

CE marking alone on an emergency lamp does not necessarily imply that the product will work in an emergency situation. All emergency lighting must be designed and manufactured to meet the requirements of BS EN 60598.2.22, the established product standard.

Emergency lighting products may be independently certified and approved as a means of proving quality in the product, thereby giving an enhanced level of assurance to the installer, and greater confidence and less risk in the work he performs. Emergency lighting independently tested and carrying the approval of a recognised national standards body, such as the BSI Kitemark or European ENEC mark, serves this purpose.

Testing and maintenance of emergency lighting
Fire legislation requires the safety systems within a building to be tested and maintained to ensure correct working order.

The major standards for emergency lighting establish the testing requirement, and that testing and maintenance should be done by a “competent person” (trained, with appropriate skills and experience).

Automated testing solutions are available to assist with the testing requirement, such as the Self-Test, IR2 infra-red and Naveo®Pro addressable testing solutions available from Emergi- Lite (see pages 72-77 of this catalogue for

more details on these solutions).
For automated testing solutions, IEC 62034 provides specific guidance for luminaire testing, including:

- Testing should be undertaken during periods of low risk
- Tests should be performed at the appropriate times for the correct duration
- Testing should prove the emergency circuit operates correctly, and that the battery powers the luminaire for the duration of the test
- Results of the test should be reliably indicated

Within the IEC 62034 Standard, test systems for both self-contained and centrally powered emergency lighting systems are covered.

Technical reference

Checklist for emergency lighting system design

Checklist for emergency lighting system design

Point	Establish	Action
1	Establish position of fire equipment, position of hazards such as steps, each of changes of direction, stairs, first aid points etc.	Provide an emergency luminaire near (within 2 m horizontally) of these points of emphasis.
2	Establish designated exit doors, points on escape routes or where a sign is required to make the exit obvious.	Provide exit signs with arrows if necessary, observing the maximum viewing distances of the exit sign type.
3	Establish the need for external escape lighting.	Provide emergency luminaires so that people can proceed outside to a place of safety.
4	Establish the escape routes and establish mounting heights of luminaires and exit signs.	Position luminaires along parts of the escape route not already illuminated near the above points to provide 1 lux minimum along the centre line and 0.5 lux minimum in the 1 m central band. Use published data in the form of spacing tables for the luminaires to determine the positions taking into account the mounting height.
5	Establish the open areas used as escape routes and other open areas larger than 60 m^2 and establish mounting heights of luminaires above the floor.	Provide 0.5 lux minimum in the core area. Use published data (as above) to determine the positions.
6	Establish the position of lifts, escalators, toilets, control/plant rooms, pedestrian walkways in covered car parks.	Provide emergency luminaires in all of these areas.
7	Establish the location of any first aid point or fire equipment not on an escape route or open area.	Provide 5 lux emergency illuminance on the floor in the vicinity of the point. This also applies for a first aid room.
8	Establish the toilet areas.	Provide emergency lighting for toilets larger than 8 m^2, as if they were open areas. For toilets smaller than 8 m^2, unless illuminated by borrowed emergency light from another area, provide at least one emergency luminaire. Provide emergency lighting to all disabled toilets.
9	Establish any small lobbies with no borrowed light.	Provide emergency lighting.
10	Establish any central power supply (if used) is in an area of low risk away from other switchgear or plant.	Position the central power supply in its own room in fire-proof construction.
If the building use is known:		
11	Establish any need for stand-by lighting.	Provide generators as required. If the response time is longer than 5 seconds, then transitional, alternative or additional emergency lighting must be provided.
12	Establish any special needs for the occupants such as impaired mobility or impaired sight.	Provide additional emergency lighting to reduce the risk to those people to help them evacuate the premises. This applies to designated refuge areas (which may require the provision of emergency voice communication).
13	Establish the location of any high risk task areas and the normal lighting illuminance (lux) in these areas.	Provide 10% of the normal illuminance (lux) or 15 lux minimum.
14	Establish if there are any dust or dirt problems.	Allow a service factor as appropriate. 0.8 is allowed for normal areas, but for dusty environments 0.5 may be required, or alternatively instigate a regular cleaning procedure.
15	Establish any local regulations.	Provide emergency lighting to comply with the regulations.
16	Establish if there is any dimmable lighting and shopping malls.	Provide maintained emergency lighting.
17	Establish whether people would be “unfamiliar” with the escape routes.	Provide maintained exit signs.
18	Establish the use of the premises: • entertainment (including temporary such as licensed evening dance at a school) • sleeping risk • residential special care • non-residential care • public access non-residential • industrial • multi-storey dwelling over 10 storeys Note : because the duration times are varied, it is customary in the UK to use	Recommended Minimum Duration: 3 hr 3 hr 3 hr 1 hr 1 hr 1 hr 3 hr 3 hr

Note: for points 5 and 6 the luminaires positioned near points of emphasis can be moved slightly within the 2 m horizontal tolerance to fit in with the spacing or array of emergency luminaires in the escape route or open area. This checklist is for guidance purposes only and does not form an exhaustive list of all requirements to standards and legislation, which should be reviewed when undertaking emergency lighting system design. ‘60Hz’ option available on request, please contact Emergi-Lite . Please refer to ICEL (Industry Committee for Emergency Lighting) for updates and/or additional information [www.ICEL.co.uk]

Technical reference
Spacing data

In the UK, Building Regulation 2000 : B1 covers the provision of safe and effective means of escape from a building.

Approved Document B (2000) (ADB) is a published guide to the Building Regulations, which specifies that standards for the installation of escape lighting should be according to BS 5266 Part 1.

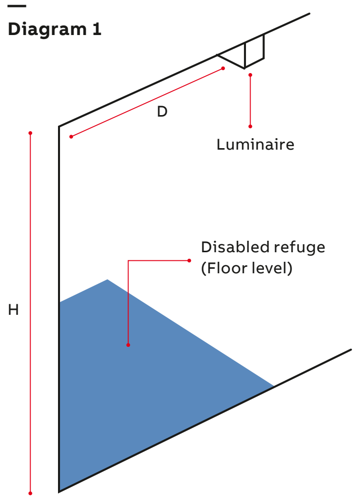
BS 5266 Part 1 is the umbrella standard which refers to EN 1838 (BS 5266 Part 7), defining emergency lighting levels of minimum 1.0 lux on the centre line of an escape route, and 0.5 lux minimum for open areas larger than $60m^2$.

British Standards are recognised worldwide, or are commonly used as the basis of local standards. NFPA 101 Life Safety Code standards require an average of 10.8 lux with not less that 1.1 lux at any point for escape routes.

We recommend that a copy of relevant local standards are obtained prior to any design work. We are pleased to supply data for any of our luminaires in LUMDAT format, for use with Relux or similar lighting packages.

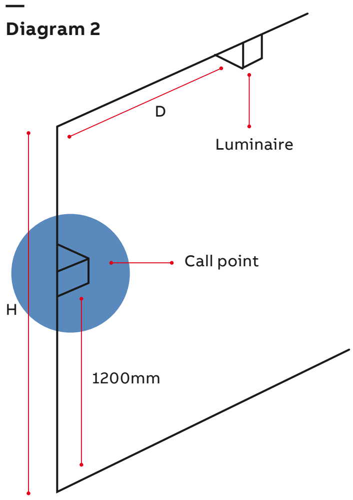
We offer the following data for guidance to assist with design work to BS 5266 requirements. Data is shown for a selection of luminaires, for a typical 2.5 metre ceiling height.

Diagram 1



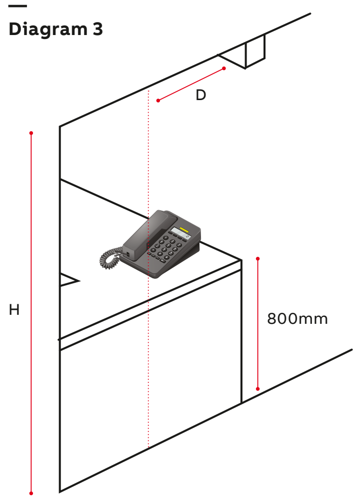
D - Distance to wall (m)
H - Ceiling height (m)

Diagram 2



D - Distance to wall (m)
H - Ceiling height (m)

Diagram 3



D - Distance to (imaginary) vertical intercept (m)
H - Ceiling height (m)

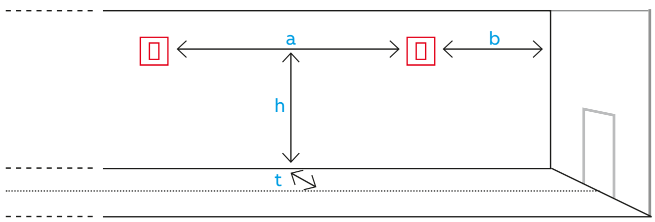
Technical reference
Spacing data

Serenga SR2, emergency spot light		
Point of emphasis - Disabled refuge see diagram 1		
h (m)		**Minimum lux**
Self-contained		
2.5	1.6	7.2
2.8	1.8	7.2
3.2	1.9	6.3
3.7	2.1	5.5
4.0	2.3	5.05
Slave 230V		
2.5	1.5	8.2
2.8	1.7	7.1
3.2	2	6.6
3.7	2.3	5.9
4.0	2.4	5.7

Serenga SR2, emergency spot light		
Point of emphasis - Call point see diagram 2		
h (m)		**Minimum lux**
Self-contained		
2.5	1.5	15.5
2.8	1.7	12.7
3.2	1.9	8.15
3.7	2.1	5.56
4.0	-	-
Slave 230V		
2.5	1.5	17.8
2.8	1.75	13.3
3.2	2	9.5
3.7	2.4	6.64
4.0	2.4	5.7

Serenga SR2, emergency spot light		
Point of emphasis - Telephone see diagram 3		
h (m)		**Minimum lux**
Self-contained		
2.5	1	24.6
2.8	1.1	20.4
3.2	1.2	14.1
3.7	1.5	9.7
4.0	1.9	7.58
Slave 230V		
2.5	1	28.3
2.8	1.15	21.4
3.2	1.4	15.2
3.7	1.5	11.2
4.0	1.75	9.06

Serenga SR2, wall mount Lens G				
Self contained and Slave (1.0 lux) Slave (1.0 lux)				
h (m)				
Distance to escape route centre (t)				
		1m		**1.5m**
0.5	1.5	3.7	1.7	5.0
1.0	1.6	4.0	1.6	5.7
1.5	1.5	3.6	2.5	5.8
2.0	1.2	3.5	2.5	5.6
2.5	0.0	1.8	2.3	5.3
3.0	0.0	0.0	2.0	5.0
3.5	0.0	0.0	1.1	3.3



Technical reference
Spacing data

Serenga 2, escape route lighting - lens A

h (m)				
Self Contained (1.0 lux)				
2.0	1.8	4.9	6.4	18.8
2.5	1.3	5.3	6.4	19.4
3.0	1.0	5.0	3.9	18.3
3.5	0.9	3.9	3.6	16.6
4.0	0.9	3.1	2.5	15.6
Slave (1.0 lux)				
2.0	2.0	5.2	7.0	19.7
2.5	1.6	5.6	6.9	20.8
3.0	1.2	5.5	4.8	20.0
3.5	1.1	4.8	4.0	19.7
4.0	1.0	3.7	3.2	16.8

Serenga 2, escape route lighting - lens B

h (m)				
Self Contained (1.0 lux)				
4.5	1.6	4.2	6.9	17.4
5.0	1.6	4.4	7.1	18.3
5.5	1.6	4.5	7.3	19.1
6.0	1.6	4.6	7.1	19.8
6.5	1.5	4.7	7.2	20.3
7.0	1.4	4.7	7.0	20.5
7.5	1.3	4.7	7.0	20.7
8.0	1.1	4.6	6.7	20.7
Slave (1.0 lux)				
4.5	1.7	4.4	7.4	17.8
5.0	1.7	4.6	7.7	19.0
5.5	1.8	4.7	7.8	19.9
6.0	1.7	4.9	7.6	20.7
6.5	1.6	5.0	7.7	21.3
7.0	1.6	5.0	7.7	21.8
7.5	1.5	5.0	7.5	22.0
8.0	1.4	5.0	7.4	22.1

Serenga 2, escape route lighting - lens C

h (m)				
Self Contained (1.0 lux)				
8.5	2.0	5.8	7.1	17.0
9.0	1.9	5.8	7.3	17.7
9.5	1.7	5.9	7.4	18.3
10.0	1.2	5.9	7.5	18.9
10.5	0.0	6.0	0.0	14.1
11.0	0.0	5.2	0.0	12.6
11.5	0.0	4.5	0.0	12.2
12.0	0.0	4.0	0.0	12.0
Slave (1.0 lux)				
8.5	2.1	6.1	7.6	17.4
9.0	2.1	6.2	7.8	18.1
9.5	2.0	6.2	7.9	18.8
10.0	1.9	6.2	8.1	19.4
10.5	1.5	6.3	7.9	20.0
11.0	0.4	6.4	8.0	20.6
11.5	0.0	6.4	0.0	14.0
12.0	0.0	5.2	0.0	13.3

Serenga 2, open area- lens D

h (m)				
Self Contained (0.5 lux)				
2.0	3.9	8.1	3.9	8.1
2.5	4.6	10.0	4.6	10.0
3.0	5.4	11.6	5.4	11.6
3.5	6.0	13.2	6.0	13.2
4.0	6.6	14.8	6.6	14.8
Slave (0.5 lux)				
2.0	3.9	8.2	3.9	8.2
2.5	4.6	10.0	4.6	10.0
3.0	5.4	11.8	5.4	11.8
3.5	6.3	13.4	6.3	13.4
4.0	6.9	15.0	6.9	15.0

Serenga 2, open area - lens E

h (m)				
Self Contained (0.5 lux)				
4.5	5.0	11.0	5.0	11.0
5.0	5.3	12.0	5.3	12.0
5.5	5.5	12.9	5.5	12.9
6.0	5.8	13.7	5.8	13.7
6.5	5.6	14.4	5.6	14.4
7.0	4.2	14.3	4.2	14.3
7.5	3.6	14.1	3.6	14.1
8.0	3.2	14.1	3.2	14.1
Slave (0.5 lux)				
4.5	5.0	11.2	5.0	11.2
5.0	5.3	12.2	5.3	12.2
5.5	5.7	13.1	5.7	13.1
6.0	6.0	14.0	6.0	14.0
6.5	6.0	14.7	6.0	14.7
7.0	8.8	15.5	8.8	15.5
7.5	4.5	15.3	4.5	15.3
8.0	4.1	15.2	4.1	15.2

Serenga 2, open area - lens F

h (m)				
Self Contained (0.5 lux)				
8.5	4.7	11.4	4.7	11.4
9.0	4.8	11.7	4.8	11.7
9.5	4.8	12.0	4.8	12.0
10.0	5.1	12.4	5.1	12.4
10.5	5.1	12.7	5.1	12.7
11.0	5.1	12.9	5.1	12.9
11.5	5.1	13.2	5.1	13.2
12.0	5.3	13.5	5.3	13.5
Slave (0.5 lux)				
8.5	4.9	11.8	4.9	11.8
9.0	5.0	12.1	5.0	12.1
9.5	5.0	12.5	5.0	12.5
10.0	5.3	12.8	5.3	12.8
10.5	5.3	13.1	5.3	13.1
11.0	5.4	13.5	5.4	13.5
11.5	5.6	13.7	5.6	13.7
12.0	5.6	14.0	5.6	14.0

Technical reference
Spacing data

Daylite Prismatic LED 251 Lm

h (m)				
Escape				
2.0	3.5	7.3	1.6	5.5
2.5	4.2	8.8	1.5	4.6
3.0	5.0	10.3	1.1	4.6
4.0	-	13.4	-	3.6
Open				
2.0	3.7	7.6	2.7	6.9
2.5	4.4	9.3	2.3	7.5
3.0	5.2	10.9	2.3	7.8
4.0	6.7	13.8	1.8	6.6

Daylite Opal LED 214 Lm

h (m)				
Escape				
2.0	3.1	7.8	2.8	7.0
2.5	3.3	8.4	2.9	7.6
3.0	3.3	8.9	3.0	8.0
4.0	3.2	9.4	2.8	8.3
Open				
2.0	3.9	9.6	3.5	8.7
2.5	4.2	10.5	3.8	9.5
3.0	4.4	11.3	4.0	10.2
4.0	4.7	12.4	4.2	11.1

Daylite Silverscape Prismatic LED 241 Lm

h (m)				
Escape				
2.0	3.6	7.6	2.6	6.5
2.5	3.9	9.2	2.9	7.1
3.0	4.4	10.7	1.5	7.7
4.0	-	12.0	-	4.6
Open				
2.0	3.8	8.0	3.3	7.5
2.5	4.6	9.6	3.6	8.5
3.0	5.3	11.3	3.8	9.5
4.0	6.0	14.4	2.3	10.6

Cordona Prismatic LED 207 Lm S/C EM

h (m)				
Escape				
2.0	2.9	7.3	2.9	7.3
2.5	3.1	7.9	3.1	7.9
3.0	3.1	8.3	3.1	8.3
4.0	3.1	8.8	3.1	8.8
Open				
2.0	3.7	9.1	3.7	9.1
2.5	3.9	9.9	3.9	9.9
3.0	4.2	10.6	4.2	10.6
4.0	4.4	11.6	4.4	11.6

Cordona & Camarque Opal LED 1830 Lm Slave

h (m)				
Escape				
2.0	5.7	13.8	5.7	13.8
2.5	6.3	15.3	6.3	15.3
3.0	6.8	16.5	6.8	16.4
4.0	7.6	18.8	7.6	18.7
Open				
2.0	6.9	16.7	6.9	16.6
2.5	7.6	18.3	7.6	18.3
3.0	8.2	20.1	8.2	20.0
4.0	9.4	22.8	9.4	22.8

Cordona Prismatic LED 2355 Lm Slave

h (m)				
Escape				
2.0	5.8	14.3	5.8	14.1
2.5	6.5	15.7	6.6	15.5
3.0	7.1	16.8	7.1	16.9
4.0	8.0	19.7	7.9	19.7
Open				
2.0	7.2	17.0	7.1	16.9
2.5	7.8	18.9	7.7	18.7
3.0	8.4	20.8	8.5	20.4
4.0	9.9	23.4	9.9	23.3

Cordona & Camarque Opal LED 207 Lm S/C EM

h (m)				
Escape				
2.0	2.9	7.3	2.9	7.3
2.5	3.1	7.9	3.1	7.9
3.0	3.1	8.3	3.1	8.3
4.0	3.1	8.8	3.1	8.8
Open				
2.0	3.7	9.1	3.7	9.1
2.5	3.9	9.9	3.9	9.9
3.0	4.2	10.6	4.2	10.6
4.0	4.4	11.6	4.4	11.6

Weather force opal LED 207 Lm

h (m)				
Escape				
2.0	2.9	7.5	2.7	6.9
2.5	3.0	8.0	2.9	7.5
3.0	3.0	8.3	2.9	7.8
4.0	2.8	8.6	2.7	8.2
Open				
2.0	3.7	9.4	3.5	8.7
2.5	4.0	10.2	3.8	9.4
3.0	4.2	10.8	3.9	10.0
4.0	4.3	11.6	4.1	10.9

Technical reference
Spacing data

PrimEvo XT100E & XT100ST

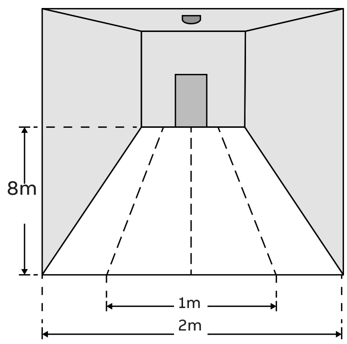
h (m)					
2.00	2.49	6.57	6.92	7.19	2.57
2.50	2.50	6.93	7.17	7.34	2.56
3.00	2.39	7.11	7.28	7.40	2.43
3.50	2.14	7.12	7.22	7.32	2.17
4.00	1.68	6.96	6.99	7.07	1.72

PrimEvo RS100E/RS100ST and SM100E/SM100ST

h (m)					
2.00	1.34	3.41	6.14	9.41	4.10
2.50	1.40	3.69	6.87	10.66	4.44
3.00	1.50	3.81	7.44	11.53	4.69
3.50	1.55	3.91	7.85	12.28	4.90
4.00	1.53	4.10	8.15	12.86	5.17

PrimEvo TW220E

h (m)					
2.50	5.39	11.75	6.85	2.03	0.86
3.00	6.47	14.11	8.22	2.44	1.04
3.50	7.15	16.04	9.26	2.66	1.18
4.00	7.57	17.69	9.89	2.87	1.28
4.50	7.94	19.15	10.44	3.14	1.36
5.00	7.93	20.15	10.87	3.39	1.42



Indulux Double Sided LED
IND3LS5DS & CTIND3LS5DS

h (m)				
Self contained 1hr (MF 0.8 - 1.0 lux)				
2.5	3.89	10.70	2.39	6.31
3.0	3.81	10.91	2.36	6.60
3.5	3.62	10.94	2.23	6.74
4.0	3.25	10.82	1.96	6.74
4.5	2.50	10.54	1.49	6.59
5.0	0.19	10.09	0.32	6.28
5.5	-	8.54	-	5.78
6.0	-	6.80	-	4.22
6.5	-	3.74	-	2.98
7.0	-	0.94	-	1.20

Indulux Single Sided LED
IND3LS5 & CTIND3LS5

h (m)				
Self contained 1hr (MF 0.8 - 1.0 lux)				
2.5	3.50	9.24	3.01	7.70
3.0	3.56	9.65	3.11	8.19
3.5	3.54	9.92	3.13	8.54
4.0	3.43	10.06	3.07	8.76
4.5	3.25	10.09	2.94	8.89
5.0	2.96	10.02	2.71	8.90
5.5	2.56	9.82	2.37	8.80
6.0	1.94	9.50	1.84	8.60
6.5	0.77	9.08	0.84	8.27
7.0	-	8.51	-	7.81

Indulux Double sided LED
IND1LS5DS & IND1LS5DSLTC

h (m)				
Slave 1hr (MF 0.8 - 1.0 lux)				
2.5	5.37	14.17	3.16	7.89
3.0	5.49	14.73	3.30	8.46
3.5	5.51	15.11	3.38	8.90
4.0	5.45	15.36	3.37	9.22
4.5	5.31	15.48	3.29	9.44
5.0	5.10	15.47	3.14	9.55
5.5	4.74	15.35	2.88	9.55
6.0	4.21	15.14	2.50	9.46
6.5	2.14	14.80	1.93	9.25

Indulux Single sided LED
IND1LS5 & IND1LSLTC

h (m)				
Slave 1hr (MF 0.8 - 1.0 lux)				
2.5	4.62	11.80	3.83	9.46
3.0	4.82	12.50	4.07	10.22
3.5	4.95	13.04	4.25	10.85
4.0	5.03	13.48	4.36	11.37
4.5	5.04	13.82	4.42	11.79
5.0	5.00	14.05	4.43	12.10
5.5	4.90	14.20	4.38	12.33
6.0	4.74	14.28	4.28	12.50

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Technical reference
Spacing data

Hyled, escape route lighting

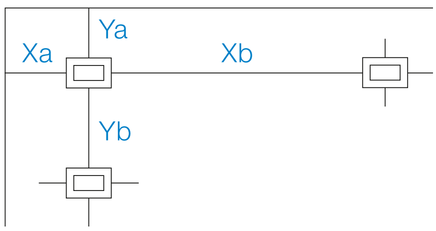
h (m)				
Self Contained (1.0 lux) 3hr				
2.0	1.8	5.3	3.7	8.2
2.5	1.7	5.2	4.5	8.9
3.0	1.7	5.0	5.2	11.3
3.5	1.8	4.9	5.9	12.9
4.0	2.0	4.9	6.5	14.4
5.0	2.3	5.3	8.2	17.3
6.0	2.5	5.9	9.4	20.2
7.0	2.6	6.5	10.6	23.0
8.0	2.7	7.0	11.7	25.8
9.0	2.7	7.5	12.7	28.3
10.0	2.5	7.8	13.6	30.7
11.0	1.7	8.0	14.0	33.0
Slave (1.0 lux)				
2.0	1.9	5.4	3.9	8.2
2.5	2.4	6.8	4.9	10.4
3.0	2.8	8.3	5.7	12.5
3.5	2.8	8.3	6.4	14.2
4.0	2.7	8.2	7.0	15.8
5.0	2.7	7.8	8.5	18.8
6.0	3.0	7.8	9.8	22.0
7.0	3.4	7.9	11.5	24.9
8.0	3.5	8.5	12.6	27.7
9.0	3.8	9.1	14.2	30.6
10.0	4.0	9.7	15.2	33.6
11.0	4.2	10.3	16.8	36.4
12.0	4.3	10.8	17.6	39.2
13.0	4.4	11.3	19.1	41.8
14.0	4.2	11.8	19.9	44.4
15.0	4.0	12.1	20.5	46.8
16.0	3.7	12.4	21.1	49.2
17.0	3.0	12.6	21.6	51.5
18.0	1.6	12.5	21.3	53.7

Hyled, open area

h (m)				
Self Contained (0.5 lux) 3hr				
2.0	3.4	7.6	3.4	9.6
2.5	4.2	9.1	4.2	9.1
3.0	4.8	10.7	4.8	10.7
3.5	5.2	12.0	5.2	12.0
4.0	5.6	13.3	5.6	13.3
5.0	6.3	15.3	6.3	15.3
6.0	6.8	16.8	6.8	16.8
7.0	7.1	18.1	7.1	18.1
8.0	7.4	19.2	7.4	19.2
9.0	7.5	20.1	7.5	20.1
10.0	7.2	20.9	7.2	20.9
11.0	6.3	21.5	6.3	21.5
Slave (0.5 lux)				
2.0	3.6	7.7	3.6	7.7
2.5	4.5	9.7	4.5	9.7
3.0	5.2	11.7	5.2	11.7
3.5	6.1	13.3	6.1	13.3
4.0	6.8	14.5	6.8	14.8
5.0	7.8	17.7	7.8	17.7
6.0	8.7	20.4	8.7	20.4
7.0	9.5	22.5	9.5	22.5
8.0	10.1	24.4	10.1	24.4
9.0	10.6	25.9	10.6	25.9
10.0	11.0	27.3	11.0	27.3
11.0	11.3	28.5	11.3	28.5
12.0	11.9	29.7	11.9	29.7
13.0	12.0	30.7	12.0	30.7
14.0	12.1	31.7	12.1	31.7
15.0	11.6	32.6	11.6	32.6
16.0	11.1	33.2	11.1	33.2
17.0	10.6	33.8	10.6	33.8
18.0	7.6	34.2	7.6	34.2

Ovano, XT200M3H & XT201M3H

h (m)				
XT200M3H				
2.0	3.11	7.53	3.29	7.50
2.5	3.35	8.34	3.49	8.37
3.0	3.48	8.98	3.62	8.93
3.5	3.51	9.47	3.68	9.37
4.0	3.47	9.79	3.65	9.70
XT201M3H				
2.0	3.24	7.98	2.05	5.04
2.5	3.56	8.71	2.34	5.38
3.0	3.77	9.35	2.60	5.87
3.5	3.90	9.98	2.80	6.48
4.0	3.99	10.43	2.94	7.02



Technical reference
Spacing data

Lutia ceiling mount Open area

h (m) Self Contained 3 hrs (0.5 lux)	Ya	Yb	Xa	Xb
2.0	1.50	3.40	3.00	6.40
2.5	1.40	3.60	4.00	8.00
3.0	1.60	4.00	4.10	10.00
3.5	1.60	4.40	5.00	11.00
4.0	1.50	4.40	5.50	12.00
5.0	1.50	4.40	6.00	15.00
6.0	1.50	4.40	6.50	16.00
Slave (0.5 lux)				
2.0	1.70	4.00	3.00	7.00
2.5	2.00	4.60	3.50	8.00
3.0	2.00	5.00	5.00	10.00
3.5	2.20	5.20	5.00	10.00
4.0	2.30	5.40	6.00	13.00
5.0	2.30	6.20	7.50	15.00
6.0	2.20	6.20	8.00	18.00
7.0	2.20	6.60	8.00	18.00

Lutia ceiling mount escape route

h (m) Self Contained 3 hrs (1.0 lux)	Ya	Yb	Xa	Xb
2.0	1.1	3.2	3.8	8.5
2.5	1.0	3.0	4.5	9.9
3.0	1.0	3.0	5.0	11.3
3.5	1.1	2.9	5.5	12.6
4.0	1.1	2.9	5.8	13.8
5.0	1.0	3.0	5.7	15.6
6.0	0.7	3.0	5.2	16.3
Slave (1.0 lux)				
2.0	1.7	4.5	4.3	9.7
2.5	1.6	4.7	5.0	11.2
3.0	1.6	4.3	5.7	12.6
3.5	1.5	4.4	6.3	14.1
4.0	1.5	4.4	7.0	15.4
5.0	1.5	4.2	7.9	18.1
6.0	1.5	4.3	8.4	20.4
7.0	1.4	4.4	8.3	22.3

MirEvo Twinspot, escape route lighting

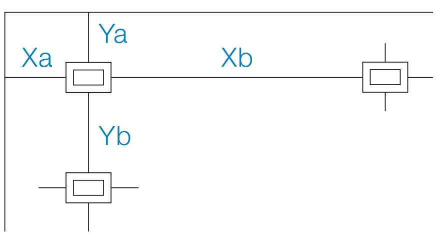
h (m) Self Contained 3 hrs (1.0 lux)	Ya	Yb	Xa	Xb
2.0	2.98	6.71	3.23	7.29
2.5	3.56	8.08	3.78	8.58
3.0	4.06	9.02	4.01	9.29
3.5	4.51	9.90	4.19	9.87
4.0	4.90	10.90	4.35	10.38
Slave (1.0 lux)				
2.0	3.02	6.75	3.26	7.34
2.5	3.69	8.28	3.94	8.91
3.0	4.16	9.25	4.19	9.62
3.5	4.63	10.08	4.40	10.22
4.0	5.05	11.03	4.57	10.75

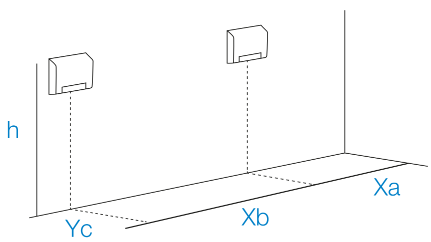
Lutia wall mount Open area

h (m) Self Contained 3 hrs (0.5 lux)	Yb	Xa	Xb
2.0	1.70	2.50	6.00
2.5	1.70	3.50	8.00
3.0	2.00	4.00	9.00
3.5	2.10	5.30	10.00
4.0	2.10	6.00	14.00
5.0	2.40	6.70	15.00
Slave (0.5 lux)			
2.0	1.90	3.00	7.00
2.5	2.20	4.00	10.00
3.0	2.40	5.00	10.00
3.5	2.60	5.00	10.00
4.0	2.70	6.50	14.00
5.0	2.90	8.00	16.00
6.0	3.10	9.00	18.00
7.0	3.30	9.00	18.00

Lutia wall mount escape route

h (m) Self Contained 3 hrs (1.0 lux) Yc = 1m	Xa	Xb
2.0	3.50	7.80
2.5	4.10	9.40
3.0	4.60	10.00
3.5	5.00	12.00
4.0	5.20	12.80
5.0	5.30	14.20
6.0	4.60	14.40
Slave (1.0 lux)		
2.0	4.0	8.8
2.5	4.7	10.4
3.0	5.4	12.0
3.5	5.9	13.4
4.0	6.5	14.6
5.0	7.2	17.0
6.0	7.4	19.0
7.0	7.4	20.4





Legends guide
Euro pictogram format

—
Single sided & safety equipment signs

Model	Serenga SER		Horizon OH		Aqualux OW / STF	
Format	Screen printed (curved)	Screen printed (normal)	Screen printed	Perspex screen printed	Screen printed (back-lit)	Self-adhesive (edge-lit)
	–	–	–	–	–	–
	SER-SC012	SER-SN012	XE02H	XE20HS	XE02W	RSE2W
	SER-SC010	SER-SN010	XE03H	XE30HS	XE03W	RSE3W
	SER-SC011	SER-SN011	XE06H	XE60HS	XE06W	RSE6W
	SER-SC013	SER-SN013	XE05H	XE50HS	XE05W	RSE5W
	SER-SC802	SER-SN802	XLF-SN802	XLF802HS	XLF802W	-
	SER-SC803	SER-SN803	XLF-SN803	XLF803HS	XLF803W	-

Model	Navigator Compact VE / DVE
Format	Screen printed
	–
	XE02V31
	XE03V31
	XE06V31
	XE05V31

Model	Silver-Scape RB	Weatherforce DV	Weatherforce B / WA	Day-Lite Ex-cel XXW	Guideway 22	Guideway 32m
Format	Screen printed	Double sided fitted	Self-adhesive sticker	Self-adhesive sticker	Screen printed	Screen printed
	–	–	RSE120	RSE23560X	-	-
	XE02A31	–	RSE2120	RSE2X	XE02EG22	XE02EG32
	XE03A31	–	RSE3120	RSE3X	XE03EG22	XE03EG32
	XE06A31	–	RSE6120	RSE6X	XE06EG22	XE06EG32
	XE05A31	–	RSE5120	RSE5X	XE05EG22	XE05EG32

The standard 'Signs Directive' format is shown above. Other legend formats with different arrow directions, HTM65 format (below), BS 5499 mixed 'image/word' and foreign language variants are available by special request.

Legends guide
Euro pictogram format

—
Double sided signs

Model	Horizon OH
Format	**Panel screen printed**
	–
	XE36HD
	XE55HD

Model	Silver-Scape RB	Weatherforce DV
Format	**Screen printed**	**Double sided fitted**
	XE02/2A32	(Suffix) XE22
	XE03/6A32	(Suffix) XE36
	XE05/5A32	(Suffix) XE55

Legends Guide
ISO 7010 format

—
Single sided

Model	Serenga SER		Horizon OH		Aqualux OW / STF	
Format	Screen printed (curved)	Screen printed (normal)	Screen printed	Panel screen printed	Screen printed (back-lit)	Self-adhesive (edge-lit)
	–	–	–	–	–	–
	SER-SCN12	SER-SNN12	XEN2H	XEN20HS	XEN2W	RSEN2W
	SER-SCN10	SER-SNN10	XEN3H	XEN30HS	XEN3W	RSEN3W
	SER-SCN11	SER-SNN11	XEN6H	XEN60HS	XEN6W	RSEN6W
	SER-SCN13	SER-SNN13	XEN5H	XEN50HS	XEN5W	RSEN5W
Arabic legend format						
	SER-SCB01	SER-SNB01	XB01H	XB01HS	On request	XB01HS

Model	Navigator Compact VE / DVE	Silver-Scape RB
Format	Screen printed	Screen printed
	–	–
	XEN2V31	XEN2A31
	XEN3V31	XEN3A31
	XEN6V31	XEN6A31
	XEN5V31	XEN5A31
Arabic legend format		
	XB01V31	XB01A31

Model	Weatherforce DV	Weatherforce B /WA	Day-Lite Ex-cel XXW	Guideway 22m	Guideway 32
Format	Double sided fitted	Self-adhesive sticker	Self-adhesive sticker	Screen printed	Screen printed
	–	–	RSEN23560X	–	–
	–	RSEN2120	RSEN2X	XEN2EG22	XEN2EG32
	–	RSEN3120	RSEN3X	XEN3EG22	XEN3EG32
	–	RSEN6120	RSEN6X	XEN6EG22	XEN6EG32
	–	RSEN5120	RSEN5X	XEN5EG22	XEN5EG32
Arabic legend format					
	XB10DV32	RSB1X	RSB1X	XBN1EG22	XBN1EG32

Legends guide
ISO 7010 format

Single sided (Flag mounted)

Model	Guideway 22m
Format	**Screen printed**
	XEN602EG22
	XEN603EG22
	XEN606EG22
	XEN605EG22

Double sided signs

Model	Silver-Scape RB	Weatherforce DV
Format	**Screen printed**	**Double sided fitted**
	XEN2/2A32	XEN2/2DV32
	XEN3/6A32	XEN3/6DV32
	XEN5/5A32	XEN5/5DV32

Notes

Electrical installation solutions for buildings – Technical details

Intrusion Alarm Systems

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Intrusion Alarm Systems

ABB-secure@home

END OF LIFE

ABB-secure@home central units

Description	GSM	ABB-free@home®	Color	Type	Order number	Pack unit
Central unit	•	•	Glass white	SAS-W1.1E	2CSY233921R0003	1
Central unit		•	Glass white	SAS-W2.1E	2CSY245181R0004	1
Central unit	•	•	Glass black	SAS-W1.1F	2CSY233541R0003	1
Central unit		•	Glass black	SAS-W2.1F	2CSY255461R0004	1
Central unit	•		White	SAS-W3.1E	2CSY234925R0005	1
Spare batteries						
Rechargeable battery pack, Ni-Mh, 6 V, 1.6 Ah				SBA-W1.1	2CSY255111R0801	1

System capability

Device type		Max. no. of devices	Max. no. of zones
Anti-intrusion	Indoor and outdoor volumetric passive infrared detectors Magnet reed contacts	64	7
Home safety	Flood detectors, optical smoke detectors, heat detectors		1 active 24 h
Signaling	Outdoor sirens	4	-
Control	Remote controls, security keypads	16	-
Others	Wireless repeaters, wired interface	4	-

Bidirectional

Indoor

Rechargeable battery backup up to 30 h

Direct 230 V power supply

Up to 7 zones

Integrated indoor siren up to 95 db at 1 m

Capacitive touch keypad

Communication between central unit and devices is wireless based on a radio frequency signal that ensures the reliability and the security of the communication itself.

Reliability

ABB-secure@home wireless communication operates at 868.3MHz. It is a frequency band regulated by European norms (ERCREC-70-3E) much less crowded than the traditional one of 434MHz, with a power of 25mW and considered as privileged. In addition the components are ETSI-RED (Radio Equipment Directive) 2014/53/EU compliant. The alarm system uses an ABB owner communication protocol, optimized to the best ratio distance over energy consumption and it is classified as long range wireless communication, since it supports an alarm system up to 300m in free field. The bidirectional transmission let know the status of each single component, because the sensor receives instructions from the central unit and sends back messages when the action is accomplished.

Security

ABB-secure@home counts on a digital encrypted communication with 128 bits and it is supplied with a 65k rolling code remote control which creates unique code each time a command is sent to prevent it from being maliciously copied and replicated. Moreover the bidirectional communication let the central unit know the state of each controlled device, as battery charge state, state of functioning and if any infringement has been done. The multiple access (CSMA) transmission system, avoid interferences, disturbances and signal collisions.

Intrusion Alarm Systems

ABB-secure@home

END OF LIFE

The central unit is able to manage up to seven security zones, set as anti-burglar type (armed/disarmed), one safety zone, set as technical alarm always-on, and one zone dedicated to system devices. Each zone of the anti-theft system can be activated in three different modes:

	User	System activation after a detection
Notification mode	Located inside the apartment, office, shop	Notification only (e.g., SMS)
Home mode		Internal warning only (e.g., indoor siren)
Away mode	Located outside	All possible notifications (external and indoor siren, SMS, actuations)

USB connection

PC connection

The central unit provides two USB ports:
- 1 USB type A for updating the central unit firmware via USB stick
- 1 USB type B port for connection via USB type B cable to a computer with maintenance software

Electrical specifications:
- Power supply:
  230 VAC ± 10%, 50/60 Hz
- Max. current: 45 mA
- Backup battery: Ni-Mh rechargeable, 6 V, 1.600 mAh

Dimensions (LxHxD):
- Square shaped: 273 x 188 x 48 mm

Conditions of use:
- Environmental class: I (indoor)
- Operating temperature:
  -5 °C to +45 °C
- Relative humidity: 75% average, non-condensing, 90% peak
- Installation: wall-mounted

Communication technologies:
- Safety devices: bidirectional FM transmission at 868.3 MHz
- Range in free field: 300 m
- For GSM models only:
  - GSM/LTE Cat 1
    (only voice call and SMS services)
  - Internal antenna
- ABB-free@home® 2-wire bus

Other features:
- Backlit LCD display,
  128 x 64 pixels
- Indoor siren: built-in piezo siren,
  95 dB at 1 m
- Protection:
  anti-tamper, anti-removal

END OF LIFE

Intrusion Alarm Systems

ABB-secure@home

Preconfigured remote control

Description	Color	Type	Order number	Pack unit
Preconfigured remote control	Glass black	SAD-W1.1F	2CSY202821R0305	1
Preconfigured remote control	Black	SAD-W3.1F	2CSY295161R1058	1
Spare lithium button battery, 3 V (CR2032), normally available on the market				

Bidirectional

Battery up to 5 years

- Power supply: 1 lithium battery type CR2032, 3 V, 220 mAh
- Battery life: 5 years
- Protection: IP32
- Operating temperature: -5 °C to +55 °C
- Relative humidity: max. 93 % (non-condensing)
- Environment: indoors, outdoors
- Range in free field: 200 m
- Local signals: 5 LEDs red/green/orange
- Dimensions (LxHxD): 40 x 78 x 10 mm

Remote control

Description	Color	Type	Order number	Pack unit
Remote control	Glass black	SAD-W2.1F	2CSY251641R0306	1
Remote control	Black	SAD-W4.1F	2CSY251195R0308	1
Spare lithium button battery, 3 V (CR2032), normally available on the market				

Bidirectional

Battery up to 5 years

- Power supply: 1 lithium battery type CR2032, 3 V, 220 mAh
- Battery life: 5 years
- Protection: IP32
- Operating temperature: -5 °C to +55 °C
- Relative humidity: max. 93 % (non-condensing)
- Environment: indoors, outdoors
- Range in free field: 200 m
- Local signals: 5 LEDs red/green/orange
- Dimensions (LxHxD): 40 x 78 x 10 mm

Intrusion Alarm Systems

ABB-secure@home

END OF LIFE

Bidirectional

Indoor

Battery
up to 5 years

Perimeter magnet reed contact detector

Description	Color	Type	Order number	Pack unit
Universal perimeter detector	White	SMC-W1.1A	2CSY255791R0104	1
Universal perimeter detector	Brown	SMC-W1.1D	2CSY255731R0104	1
Spare lithium battery 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

- Power supply: lithium battery 3 V, 1.4 Ah
- 30-day guaranteed operation from low battery signal
- Battery life: 5 years with average use of 10 opening/closing operations daily
- Protection degree: IP30
- Dimensions (LxHxD): detector 31 x 106 x 35 mm, magnet 8 x 56 x 10 mm
- Color: white or brown
- Operating temperature: -5 °C to +45 °C
- Relative humidity: max. 93 % (non-condensing)
- Usage environment: indoors (dry and sheltered places)
- Range in free field: 300 m
- Local signals: 1 calibration LED
- Installation: free
- Protection degree: dual tamper
- Performance level: complies with EN 50131-1 and EN 50131-2-6 Class I standards

Rolling door magnet reed contact

Description	Color	Type	Order number	Pack unit
Magnetic contact for overhead doors	-	SMC-W2.1	2CSY255341R0602	1

This device signals the opening of overhead or sliding doors. It needs to be connected to a perimeter magnet reed contact detector (type codes: SMC-W1.1A or SMC-W1.1D) or to a dual passive IR perimeter motion detector (type codes: SMD-W2.1A or SMD-W2.1D), and is equipped with a 1.2-meter connection cable for this purpose. It is made of aluminum with high resistance to the transit of heavy vehicles. The minimum fixing distance is 20 mm from ferrous materials and 25 mm from non-ferrous materials.

- Protection degree: IP66
- Dimensions (LxHxD): 140 x 15.5 x 42 mm (fixed part) 86 x 25 x 32 mm (moving part)
- Operating temperature: -25 °C to +70 °C

Intrusion Alarm Systems
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END OF LIFE

Roller shutter sensor

Description	Color	Type	Order number	Pack unit
Rope-operated contact for shutters, monitors the opening of windows and doors, complete, for screw-on or drilling	White	SLM-W1.1	2CSY255001R0603	1

The device detects the lifting of shutters through the movement of the retractable rope. It is made of thermoplastic material; the rope is 3.5 m long. It needs to be connected to a perimeter magnet reed contact detector (type codes: SMC-W1.1A or SMC-W1.1D).

- Protection degree: IP40
- Dimensions (LxHxD): 100 x 77 x 15 mm
- Weight: 280 g
- Operating temperature: -25 °C to +70 °C

Magnet reed contact for surface/flush mounting

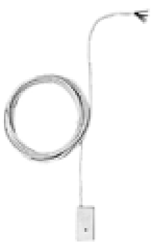
Description	Color	Type	Order number	Pack unit
Projecting or flush-mounted magnetic contact	White	SMC-W3.1A	2CSY295241R0606	1
Projecting or flush-mounted magnetic contact	Brown	SMC-W3.1D	2CSY295201R0606	1

The device monitors the opening of windows and doors. Installation options:

- Wall-mounted, inserting with pressure the cylindrical parts into 8 mm diameter holes
- Flush-mounted, with the use of the plastic adapters included in the packaging

It needs to be connected to a perimeter magnet reed contact detector (type codes: SMC-W1.1A or SMC-W1.1D) or to a dual passive IR perimeter motion detector (type codes: SMD-W2.1A or SMD-W2.1D) and is equipped with a 1.2-meter connection cable for this purpose. It is made of aluminum with high resistance to the transit of heavy vehicles. The minimum fixing distance is 20 mm from ferrous materials and 25 mm from non-ferrous materials.

- Protection degree: IP66
- Dimensions (LxHxD): 45 x 16.5 x 15 mm
- Weight: 50 g
- Operating temperature: -25 °C to +70 °C



Shock inertial sensor

Description	Color	Type	Order number	Pack unit
Shock inertial sensor	White	SGB-W1.1A	2CSY255871R0604	1

This device detects a possible shock occurring on a door, window, or the surface on which it is installed. Equipped with a 2-meter connection cable, it must be connected to a perimeter magnet reed contact detector (type codes: SMC-W1.1A or SMC-W1.1D). Assembly: projecting on door/window/generic surfaces using screws or double-sided adhesive tape.

- Protection degree: IP54
- Dimensions (LxHxD): 33 x 32.7 x 23.7 mm
- Weight: 40 g
- Operating temperature: -25 °C to +70 °C

Intrusion Alarm Systems

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END OF LIFE

Bidirectional

Indoor

Battery up to 4 years

Dual passive IR perimeter motion detector

Description	Color	Type	Order number	Pack unit
Perimeter detector	White	SMD-W2.1A	2CSY235871R0103	1
Perimeter detector	Brown	SMD-W2.1D	2CSY200091R0103	1
Spare lithium battery 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

- Power supply: lithium battery 3 V, 1.4 Ah (included in the package)
- 30-day guaranteed operation from low battery signal
- Battery life: 4 years with average use of 10 daily operations
- Protection degree: IP34
- Dimensions (LxHxD): 220 x 38 x 32 mm
- Operating temperature: -20 °C to +55 °C
- Relative humidity: max. 93 % (non-condensing)
- Usage environment: indoors (dry and sheltered places)
- Range in free field: 300 m
- Local signals: 1 red LED
- Detecting element: 2 IR sensors with linear Fresnel lens; 1 external contact with anti-tamper (can be excluded), anti-masking (can be excluded)
- Installation: free
- Anti-tamper protection: anti-opening, anti-tear (optional)

Diagram of side coverage

Typical installation between window and blind.

2 m

0 m

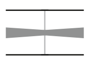
0 m 2 m

Maximum cone width 50 cm

Side installation for large openings with two opposing devices.

2 m

0 m



0 m 1,5 m 0 m

Maximum width of opening 3 m

Diagram of top coverage

2 m

0 m

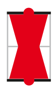
1 m 1 m

Beam angel 34° (maximum cone width 120 cm)

0 m

1,5 m

0 m



1 m 1 m

Maximum width of opening 3 m

Intrusion Alarm Systems

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END OF LIFE

Indoor passive IR motion detector

Description	Color	Type	Order number	Pack unit
Indoor passive infrared detector	White	SMD-W1.1A	2CSY255701R0105	1
Spare lithium battery 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1
Joint for mounting the IR wall detector	White	SIM-W2.1A	2CSY255101R0607	1

Bidirectional

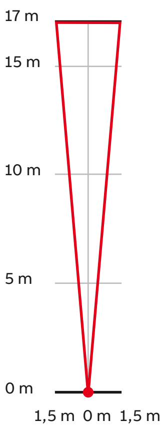
Indoor

Battery up to 4 years

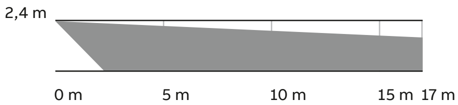
- Power supply: lithium battery 3 V, 1.4 Ah (included in the package)
- Battery life: 4 years (operation guaranteed 30 days from low battery signal)
- Protection degree: IP30
- Operating temperature: -5 °C to +45 °C
- Relative humidity: max. 95% (non-condensing)
- Environment: indoors
- Range in free field: 300 m
- Detecting elements: 1 IR sensor with Fresnel lens
- Programming elements: 2 jumpers, one for testing, one for pulse counting
- Local signals: 1 LED
- Anti-tamper protection: lid opening tamper
- Dimensions (LxHxD): 70 x 114 x 128 mm

Long distance coverage

Top view

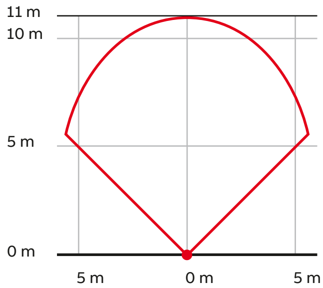


Side view

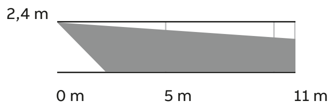


Wide coverage angle

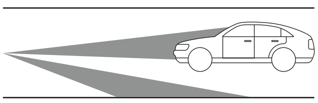
Top view



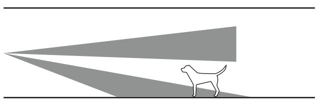
Side view



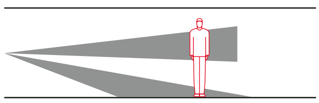
No reaction
Only upper IR beam is crossed



No reaction
Only lower IR beam is crossed



Alarm
Both IR beams are crossed



Intrusion Alarm Systems

ABB-secure@home

END OF LIFE

Bidirectional

Outdoor

Battery
up to 3 years

Perimeter bidirectional dual passive IR motion detector

Description	Color	Type	Order number	Pack unit
Perimeter bidirectional dual passive IR motion detector	White	SMD-W4.1A	2CSY254971R0202	1
Lithium battery, 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

- Power supply: lithium battery 3 V, 1.4 Ah (included in the package)
- Battery life: 4 years (operation guaranteed 30 days from low battery signal)
- Protection degree: IP55
- Environment: outdoors
- Range in free field: 300 m
- Detecting elements: no. 4 sensors
- Programming elements: a 3-way DIP switch
- 1 sensitivity switch
- Local signals: 2 LEDs
- Anti-tamper protection: cover opening
- Dimensions (LxHxD): 56 x 235 x 128 mm
- Operating temperature: -15 °C to +55 °C
- Relative humidity: max. 93 % (non-condensing)

Diagram of side coverage

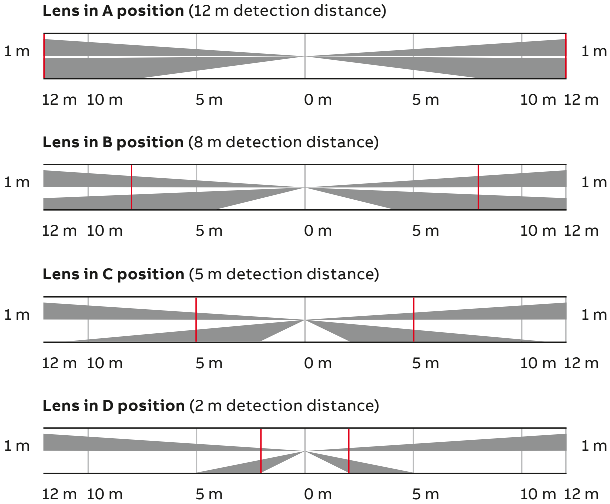
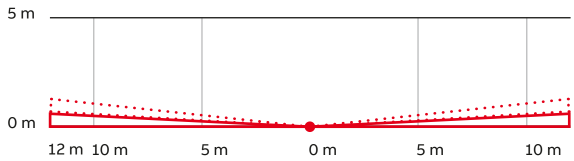
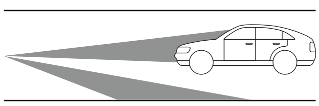


Diagram of top coverage

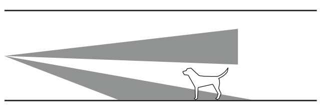


Can be adjusted horizontally to 0° or 3°

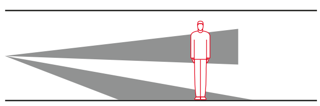
No reaction
Only upper IR beam is crossed



No reaction
Only lower IR beam is crossed



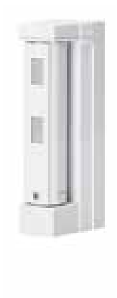
Alarm
Both IR beams are crossed



Intrusion Alarm Systems

ABB-secure@home

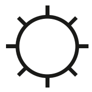
END OF LIFE



Compact dual passive IR perimeter motion detector

Description	Color	Type	Order number	Pack unit
Compact dual passive IR perimeter motion detector	White	SMD-W5.1A	2CSY254981R0203	1
Lithium battery, 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

Bidirectional



Outdoor

Battery up to 3 years

- Power supply: lithium battery 3 V, 1.4 Ah (included in the package)
- Battery life: 4 years (operation guaranteed 30 days from low battery signal)
- Protection degree: IP55
- Dimensions (LxHxD): 35 x 155 x 85 mm
- Operating temperature: -15 °C to +55 °C
- Relative humidity: max. 93 % (non-condensing)
- Range in free field: 300 m
- Detecting element: 2 IR sensors
- Programming elements: 1 DIP switch (with 6 switches)
- Local signals: no. 1 LED
- Anti-tamper protection: cover opening

Diagram of side coverage

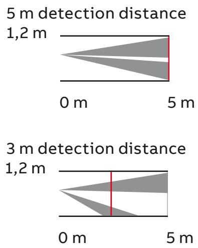
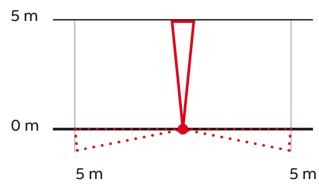
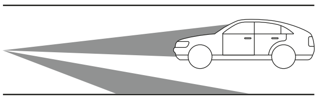


Diagram of top coverage

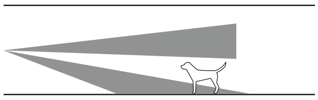


Can be rotated 95° to either side (5° steps)

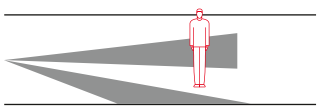
No reaction
Only upper IR beam is crossed



No reaction
Only lower IR beam is crossed



Alarm
Both IR beams are crossed



Intrusion Alarm Systems

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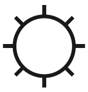
END OF LIFE

Bidirectional



Outdoor

Battery up to 3 years

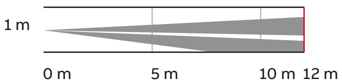
Outdoor dual passive IR motion detector

Description	Color	Type	Order number	Pack unit
Outdoor dual passive IR motion detector	White	SMD-W3.1A	2CSY255211R0201	1
Lithium battery, 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

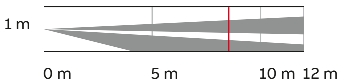
- Power supply: lithium battery 3 V, 1.4 Ah (included in the package)
- Battery life: 3 years (operation guaranteed 30 days from low battery signal)
- Protection degree: IP55
- Operating temperature: -15 °C to +55 °C
- Relative humidity: max. 93 % (non-condensing)
- Environment: outdoors
- Range in free field: 300 m
- Detecting element: no. 2 IR sensors
- Programming elements: no. 2 DIP switches (with 3 and 6 switches)
- Local signals: no. 1 LED
- Anti-tamper protection: cover opening
- Dimensions (LxHxD): 71 x 186 x 105 mm

Diagram of side coverage

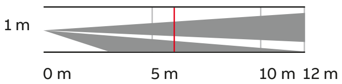
Detector position 1 (12 m average coverage area)



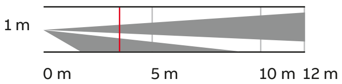
Detector position 2 (8.5 m average coverage area)



Detector position 3 (6 m average coverage area)



Detector position 4 (3.5 m average coverage area)



Detector position 5 (2.5 m average coverage area)

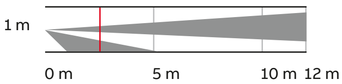
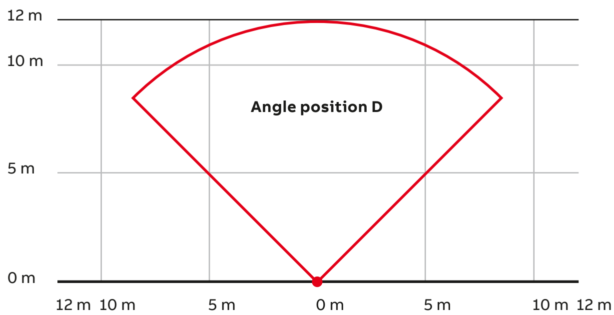
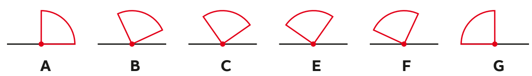
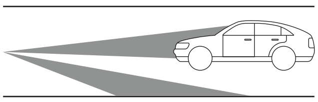


Diagram of top coverage

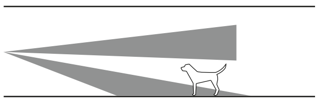




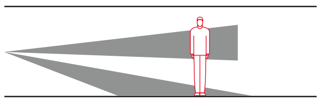
No reaction
Only upper IR beam is crossed



No reaction
Only lower IR beam is crossed



Alarm
Both IR beams are crossed



Intrusion Alarm Systems

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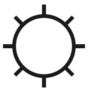
END OF LIFE

Bidirectional



Outdoor

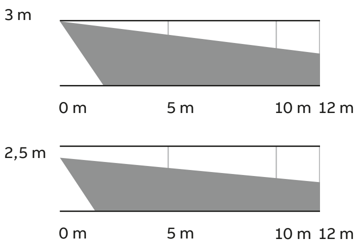
Battery up to 3 years

Outdoor dual passive IR motion detector for height

Description	Color	Type	Order number	Pack unit
Outdoor dual passive IR motion detector for height	White	SMD-W6.1A	2CSY255311R0204	1
Lithium battery, 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

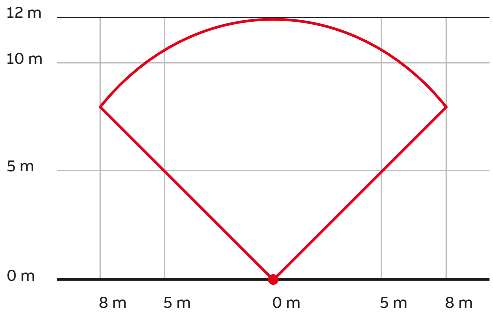
- Power supply: lithium battery 3 V, 1.4 Ah (included in the package)
- Battery life: 4 years (with 120 s active interdiction)
- Operation guaranteed 30 days from low battery signal
- Protection degree: IP55
- Operating temperature: -20 °C to +60 °C
- Relative humidity: max. 95% (non-condensing)
- Range in free field: 300 m
- Detecting element: 2 IR sensors
- Programming elements: 1 DIP switch (with 6 switches) – 2 sensitivity selectors
- Local signals: no. 1 LED
- Tamper protection
- Dimensions (LxHxD): detector with joint 99 x 205 x 266 mm coverage, detector without joint 92 x 198 x 148 mm

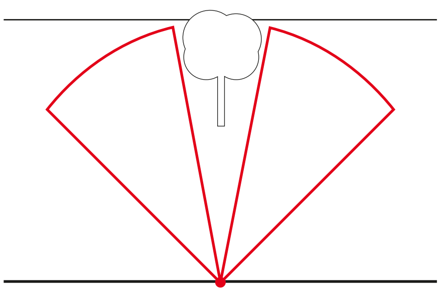
Diagram of side coverage



Requires change in detector tilt

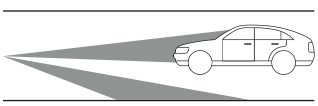
Diagram of top coverage



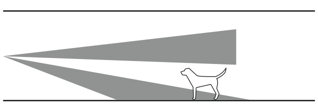


Possibility to partially mask the sensor with supplied full height adhesive seals to avoid false alarms

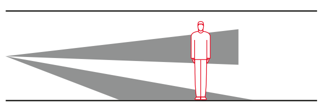
No reaction
Only upper IR beam is crossed



No reaction
Only lower IR beam is crossed



Alarm
Both IR beams are crossed



Intrusion Alarm Systems

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END OF LIFE

Bidirectional

Indoor

Battery 10 years

ABB-Secure@home wireless interface module for Busch-Smoke alarm detector

Description	Color	Type	Order number	Pack unit
Smoke/heat detector interface module	-	STD-W1.1	2CSY254961R0701	1

The device is required for interfacing the smoke detectors (order number: 2CKA006800A2721) or heat detectors (order number: 2CKA006800A2723) with the central unit.

The module is equipped with an integrated lithium battery with a minimum life of ten years. The device features bidirectional communication with the central unit that supervises it with a programmable supervision interval (typically every 15 minutes). During installation/programming it is possible to change the supervision interval through the specific functions available on the central unit.

- Power supply: lithium battery 3 V, not replaceable
- Battery life: 10 years
- Installation: inside a smoke detector, heat detector
- Communication technology: FM 868.3 MHz transmission
- Range in free field: 300 m

Intrusion Alarm Systems

END OF LIFE

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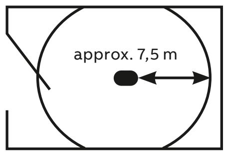
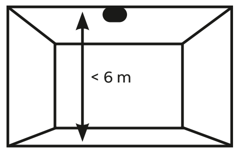
Smoke detector

Description	Color	Type	Order number	Pack unit
Optical smoke detector	White	6833/01-84-500	2CKA006800A2721	1



Coverage area (radius 7,5 m)



Maximum height (6 m)

Bidirectional

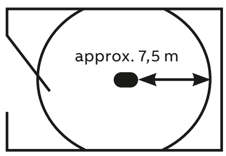
Indoor

Battery 10 years

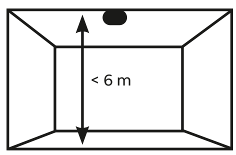
- Power supply: lithium battery 3 V, not replaceable
- Battery life: 10 years
- Dimensions (diameter x D): 120 mm x 47.5 mm
- Local signals: alarm (LED and buzzer), low battery (LED)
- Installation: ceiling

Heat detector

Description	Color	Type	Order number	Pack unit
Heat detector	White	6835/01-84-500	2CKA006800A2723	1



Coverage area (radius 7,5 m)



Maximum height (6 m)

Bidirectional

Indoor

Battery 10 years

- Power supply: lithium battery 3 V, not replaceable
- Battery life: 10 years
- Dimensions (diameter x D): 120 x 55 mm
- Color: white
- Usage environment: indoors
- Local signals: acoustic horn, sound pressure 85 dB at 3 m
- 1 alarm LED – low battery
- Installation: ceiling

Intrusion Alarm Systems

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END OF LIFE

Water detector

Description	Color	Type	Order number	Pack unit
Flood detector	White	STD-W5.1A	2CSY255191R0705	1
Lithium battery, 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

Bidirectional

Indoor

Battery up to 3 years

- Power supply: lithium battery 3 V, 1.4 Ah (included in the package)
- Battery life: 3 years, operation guaranteed 30 days from low battery signal
- Color: white
- Operating temperature: 0 °C to +55 °C
- Range in free field: 300 m
- Local signals: 1 alarm LED
- Dimensions: interface module: 30 x 36 x 103 mm flood probe: 40 x 44 x 23 mm
- Connection cable length: 5 m
- Installation: wall

Intrusion Alarm Systems

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END OF LIFE

Outdoor alarm sirens

Description	Color	Type	Order number	Pack unit
Outdoor siren	White	SSD-W1.1A	2CSY277631R0502	1
Outdoor siren	Anthracite	SSD-W1.1B	2CSY229751R0502	1
Outdoor siren	Silver	SSD-W1.1C	2CSY296961R0502	1
Outdoor siren	Silver	SSD-W2.1C	2CSY258212R0501	1
Battery pack, LR20, 7.5 V, 12 Ah	-	SBA-W3.1	2CSY254991R0803	1

- Power supply: no. 1 battery pack LR20 7.5 V (5 type “D”x 1.5 V batteries), 12 Ah
- Operation guaranteed 30 days from low battery signal
- Battery life: 3 years under normal use
- Protection degree: IP55
- Color: silver, flashing orange
- Operating temperature: -20 °C to +55 °C
- Relative humidity: max. 93 % (non-condensing)
- Range in free field: 300 m
- Local signals: 1 trumpet, 100 dBA sound pressure at 3 m, 1x 8-LED flash
- Installation: free
- Anti-tamper protection: anti-opening and anti-removal
- Performance level: complies with EN 50131-1 and EN 50131-4 standards
- Environmental class: III, safety degree: 2
- Dimensions (LxHxD): 210 x 330 x 155 mm

Bidirectional

Outdoor

Battery up to 3 years

Intrusion Alarm Systems

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END OF LIFE

Bidirectional

Indoor

Battery
up to 3 years

Wireless repeater

Description	Color	Type	Order number	Pack unit
Wireless repeater	-	SIM-W1.1	2CSY255201R0601	1
Lithium battery, 3 V, 1.4 Ah	-	SBA-W2.1	2CSY255331R0802	1

- Power supply: 4 3 V DC batteries (included) or external 5 V DC plug-in power supply (optional, not included)
- Battery life: 3 years without 220 V power supply with 4 batteries installed (capacity 1.4 Ah x 4 = 5,6 Ah)
- Protection: IP20
- Dimensions (LxHxD): 97 x 97 x 35 mm
- Color: white
- Operating temperature: –5 °C to +45 °C
- Relative humidity: 93 % max. (non-condensing)
- Usage environment: indoors, in a dry, sheltered place
- Communication technology: FM 868,3 MHz transmission
- Range in free field: 300 m
- Programming elements: no. 1 button
- Signaling elements: none
- Installation: wall
- Tamper protection: anti-tamper and anti-burglary

Notes

Electrical installation solutions for buildings – Technical details

Consumer units

Index

Consumer units technical details

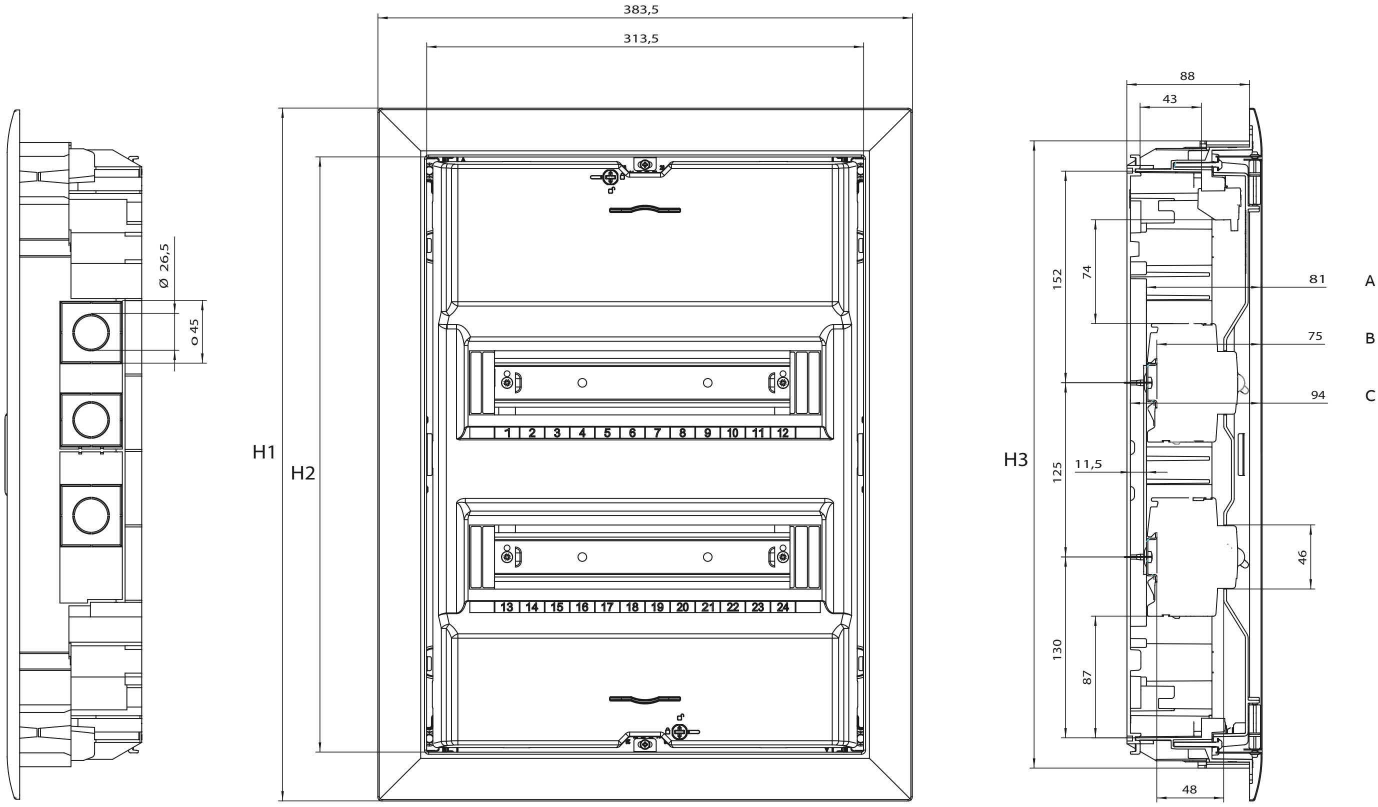
UK600 Series

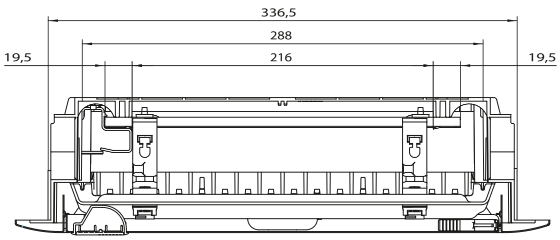
UK600 IP30 Flush & hollw wall mounting consumer units

Codes	UK61...	UK62...	UK63...	UK64...	UK66...
Number of Modules	12	24	36	48	60
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Without door	YES	YES	YES	YES	YES
With opaque door	YES	YES	YES	YES	YES
With transparent door	NO	NO	NO	NO	NO
Double Insulation	YES	YES	YES	YES	YES
Resistance to Heat	GWT 850 °C	GWT 850 °C	GWT 850 °C	GWT 850 °C	GWT 850 °C
Type of Material	Thermo-plastic, Sheet steel	Thermo-plastic, Sheet steel	Thermo-plastic, Sheet steel	Thermo-plastic, Sheet steel	Thermo-plastic, Sheet steel
Shock Resistance	2 Joule (IK 07)	2 Joule (IK 07)	2 Joule (IK 07)	2 Joule (IK 07)	2 Joule (IK 07)
Installation Temperature	-5 °C ÷ +40 °C	-5 °C ÷ +40 °C	-5 °C ÷ +40 °C	-5 °C ÷ +40 °C	-5 °C ÷ +40 °C
Protection degree	IP 30	IP 30	IP 30	IP 30	IP 30
Maximum current	63 A	63 A	63 A	63 A	63 A
Max Dissipation Power	31 W	45 W	54 W	62 W	69 W
Cable Holding System by hollow wall mounting	YES	YES	YES	YES	YES
Designed for Input	push and stay design	push and stay design	push and stay design	push and stay design	push and stay design
Extractable Frame	YES	YES	YES	YES	YES
Media Enclosures	NO	YES	YES	YES	YES

Consumer units technical details

UK600 Series





A) between mounting plate and door inside

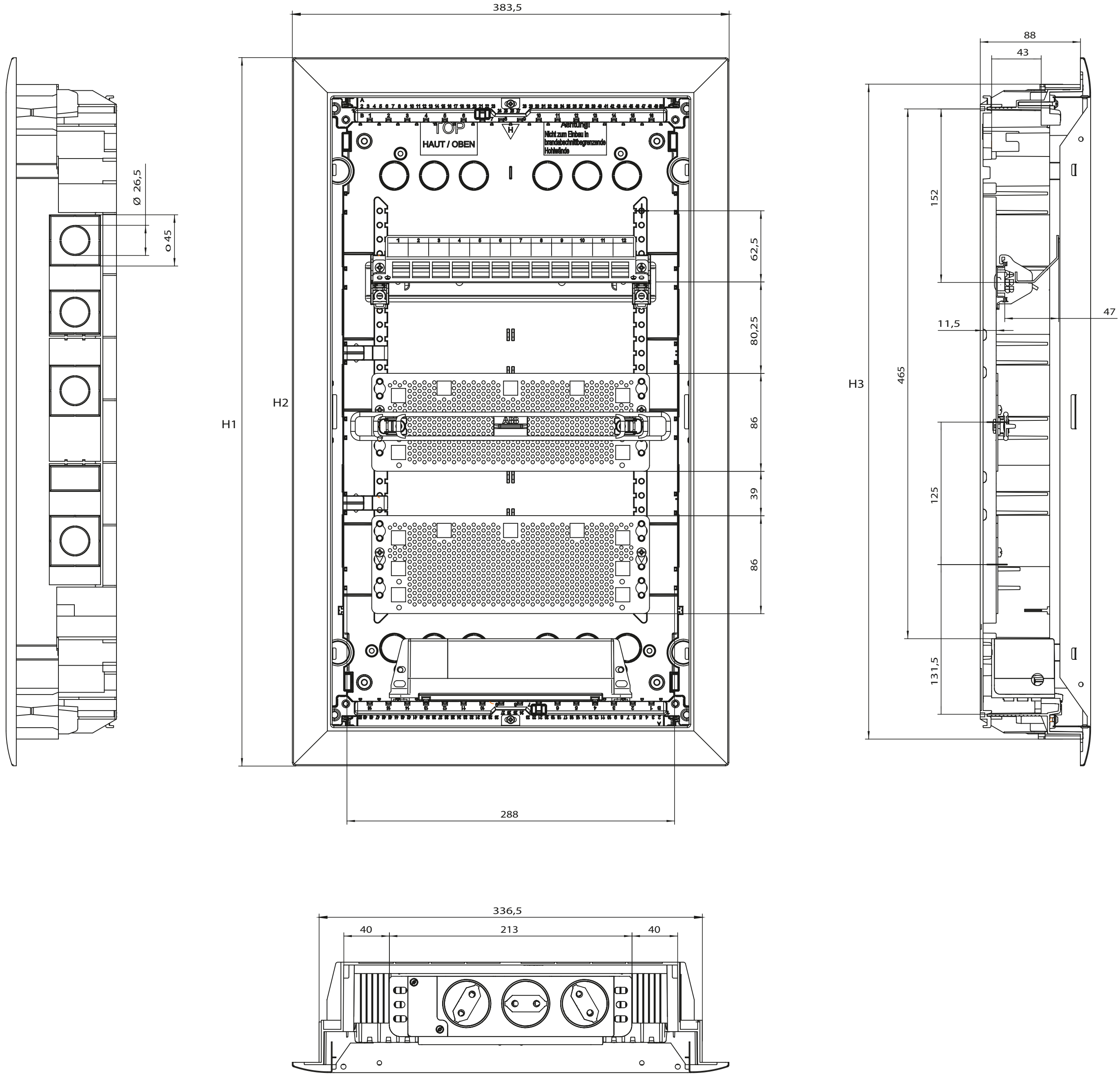
B) between DIN rail and door inside

C) between rear wall and door inside

Type	Allowed power loss Pzul according to DIN 43671 (W)			Max. output capacity P de in accordance with DIN VDE 60670-24 (W)	Dimensions in mm		
	20KΔT	25KΔT	30KΔT	30KΔT	H1	H2	H3
UK61..	10.0	13.0	16.0	31.0	372	302	325
UK62..	11.5	15.0	19.0	45.0	497	427	450
UK63..	14.5	19.0	24.0	54.0	622	552	575
UK64..	16.5	21.5	27.0	62.0	747	677	700
UK66..				69.0	872	802	825

Consumer units technical details

UK600 Series – Media enclosure

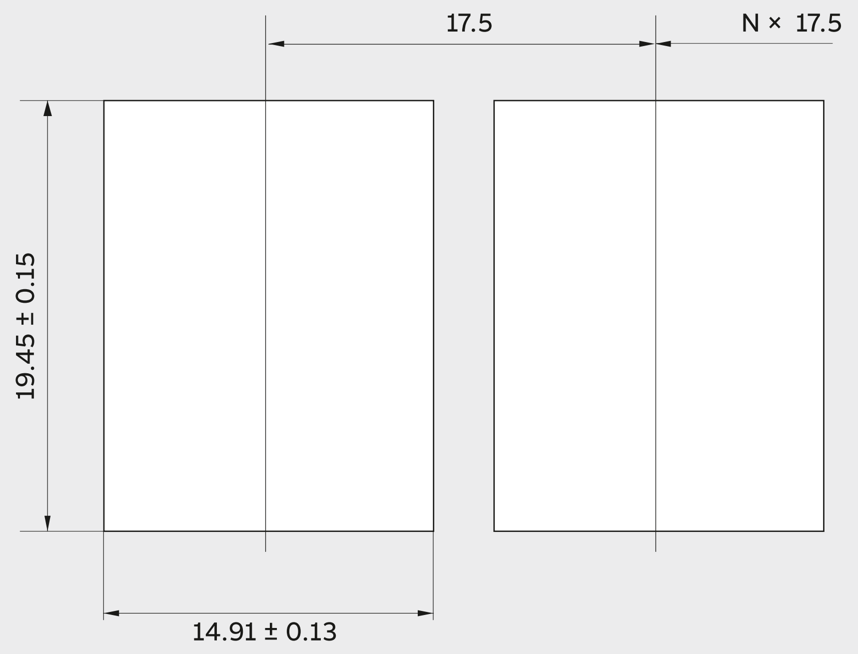


Type	Allowed power loss Pzul according to DIN 43671 (W)			Max. output capacity P de in accordance with DIN VDE 60670-24 (W)	Dimensions in mm		
	20KΔT	25KΔT	30KΔT	30KΔT	H1	H2	H3
UK62..	11.5	15.0	19.0	100.0	497	427	450
UK63..	14.5	19.0	24.0	114.0	622	552	575
UK64..	16.5	21.5	27.0	133.0	747	677	700
UK65.. UK66..				155.0	872	802	825

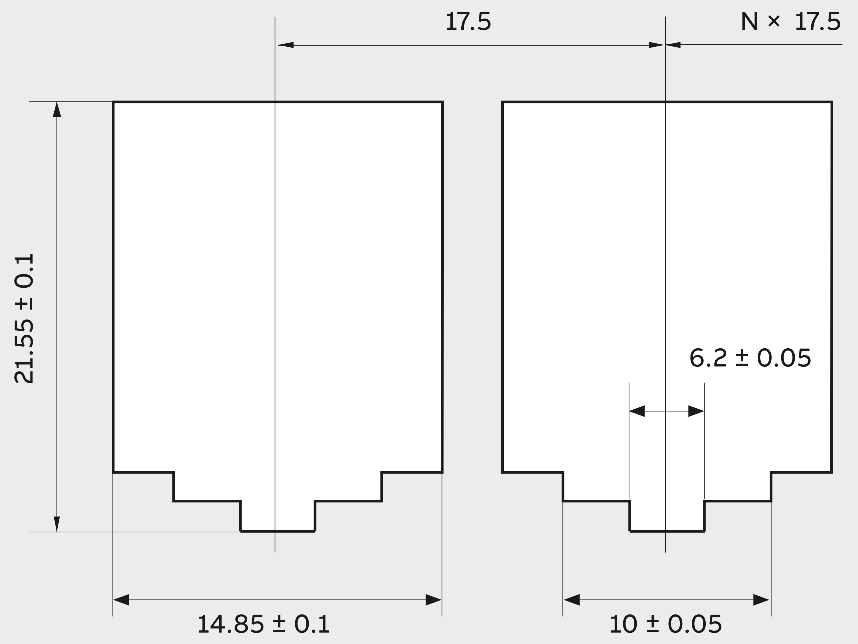
Consumer units technical details

Dimensions of the knockouts for the Keystone- and E-Dat-modules

Patch panel Key stone



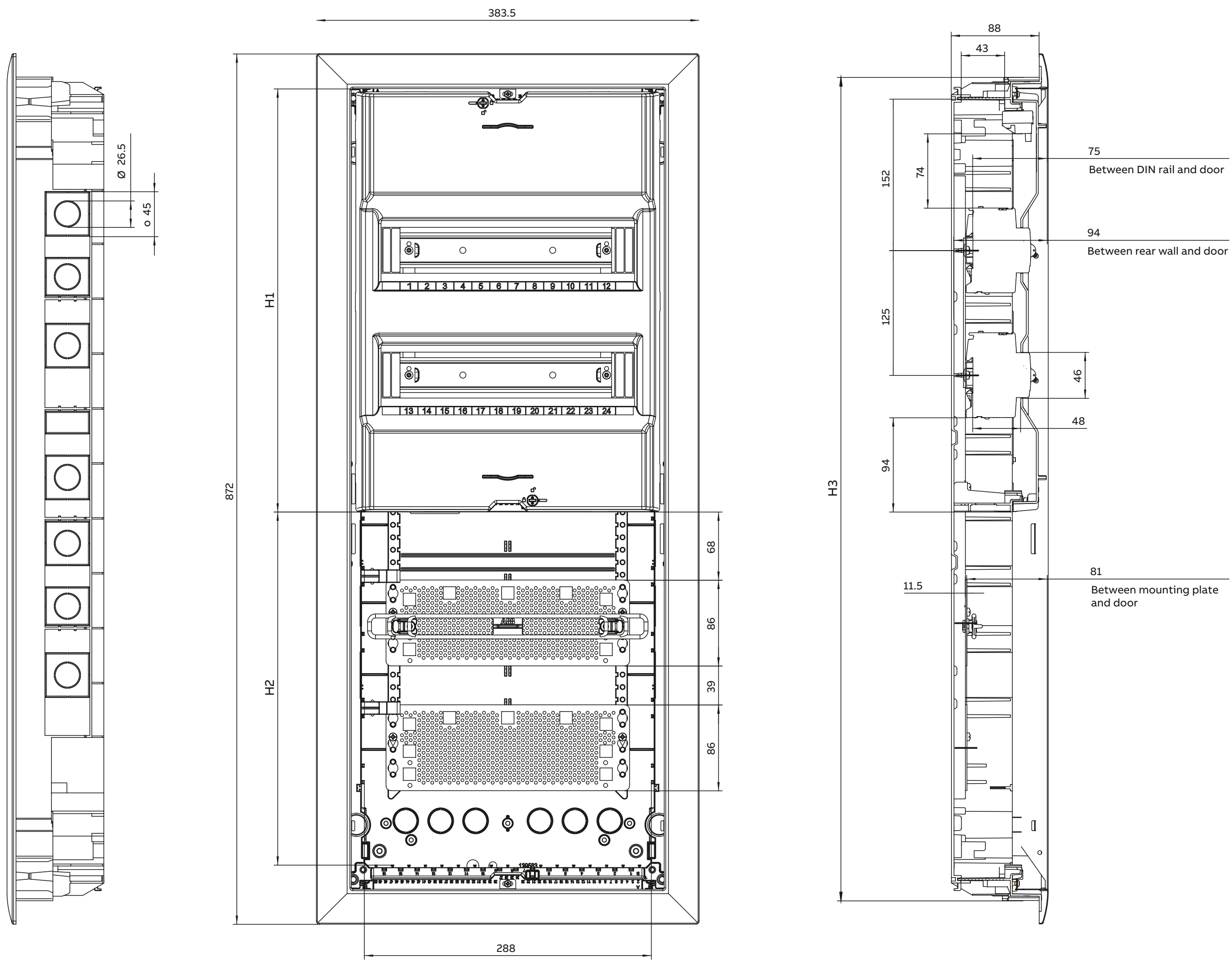
Patch panel E-Dat



> Dimensions in mm

Consumer units technical details

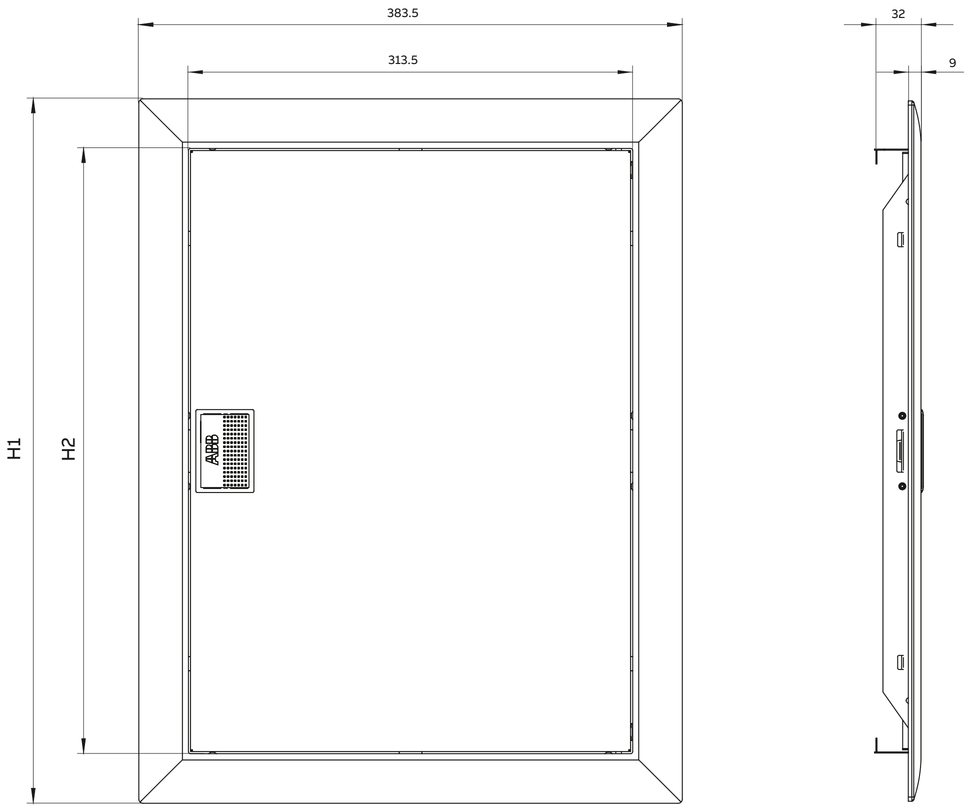
UK600 Series – Combi enclosure



Type	Allowed power loss Pzul according to DIN 43671 (W)			Max. output capacity P de in accordance with DIN VDE 60670-24 (W)	Dimensions in mm		
	20KΔT	25KΔT	30KΔT	30KΔT	H1	H2	H3
UK662CV				78.0	424	353	825
UK665CV				73.0	549	228	825
UK662CW				75.0	424	353	825
UK665CW				71.0	549	228	825

Consumer units technical details

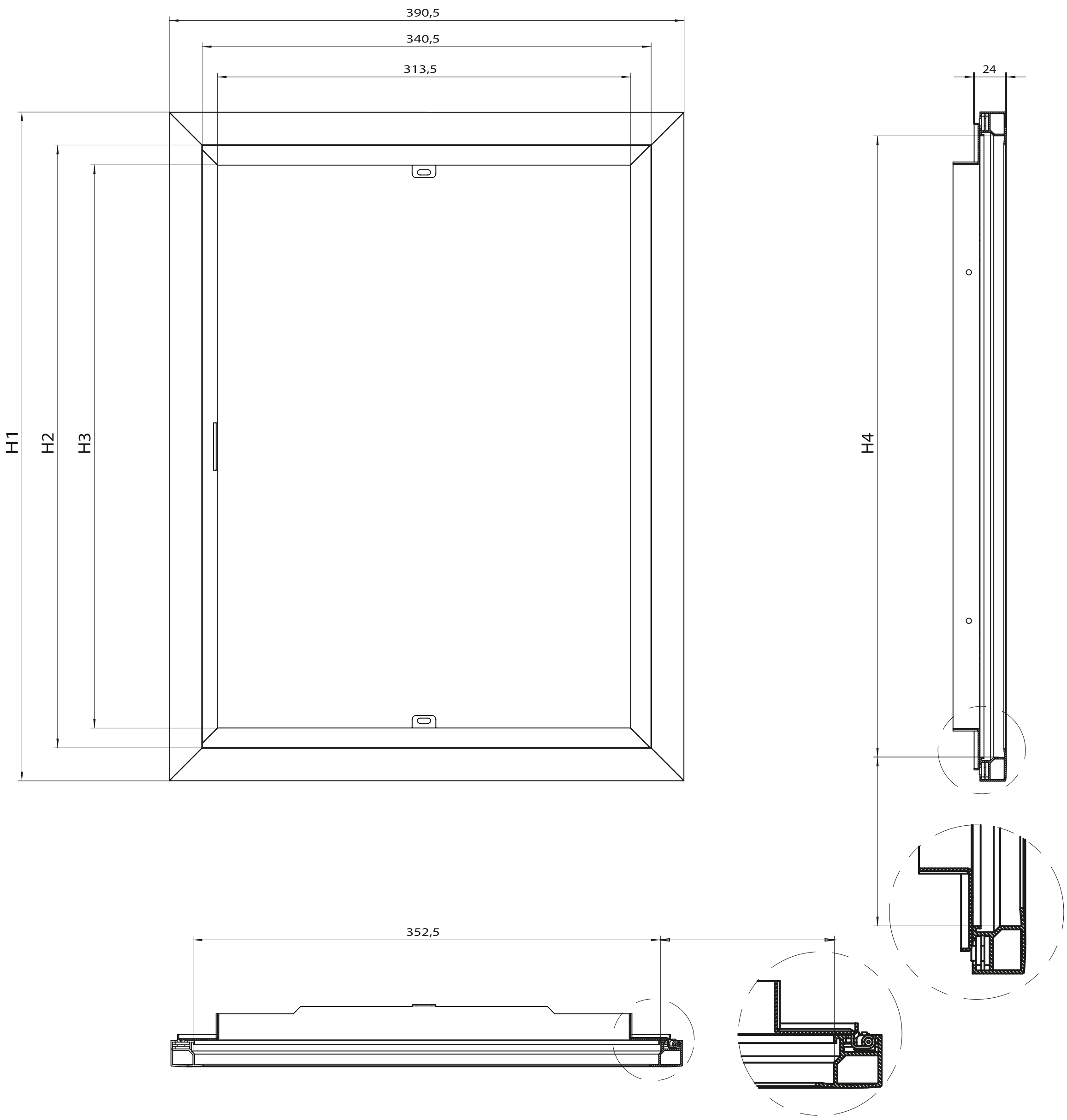
UK600 Series – Trim frame and door



	Dimensions in mm	
Type	**H1**	**H2**
BL610	302	372
BL620	497	427
BL630	622	552
BL640	747	677
BL650	872	802

Consumer units technical details

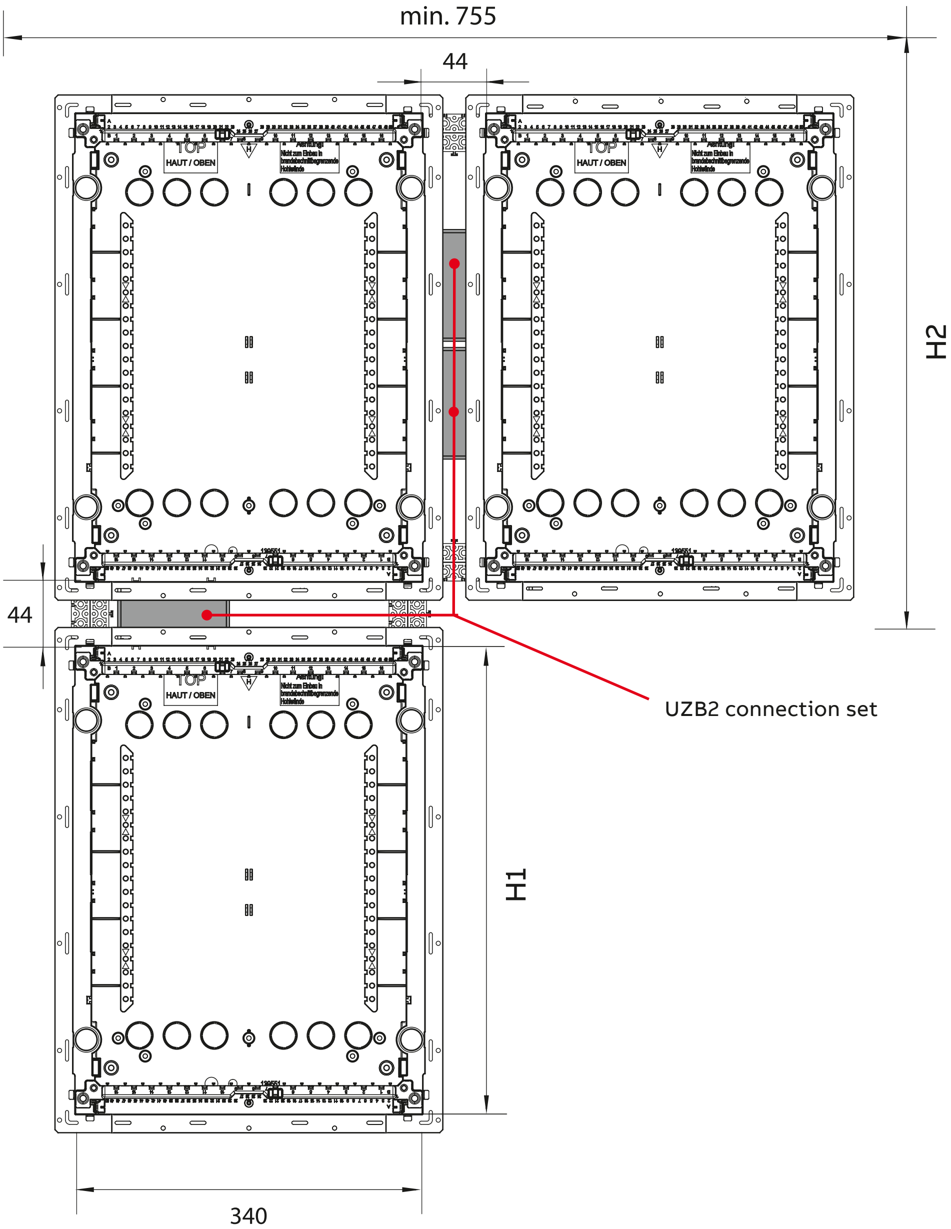
UK600 Series – Interchangeable design frame



	Dimensions in mm				Technical specifications LED panel			
Type	H1	H2	H3	H4	Type	U	P	Colour temperature
BL520D	507	457	427	469	UZD624	12V DC	9.60 W	4200 K
BL630D	632	582	552	594	UZD634	12V DC	13.20 W	4200 K
BL640D	757	707	677	719	UZD644	12V DC	15.60 W	4200 K
BL650D	882	832	802	844	UZD654	12V DC	19.60 W	4200 K

Consumer units technical details

UK600 Series



Type	Dimensions in mm	
	Niche dimensions brick wall H1	Wall cut out hollow wal H2
UK61...	355	328
UK62...	480	453
UK63...	605	578
UK64...	730	703
UK65... UK66...	855	828

Consumer units technical details

MISTRAL41F/41W

Table of resistance to chemical agents

	Cold water	Hot water	Sulphuric acid	Hydrochloric acid	Acetic acid	Petroleum	Benzine	Acetone	Ethyl alcohol	Ammonia	Dichloromethane	Diesel oil - Naptha	Mineral oil	Food oils	Tetrachloroethylene	Trichloroethylene	Ether	Ozone	Toluene	Methyl alcohol	Alcohol	Milk	Fruit juices	Fluorocarbons	Detersives	Detergents	Potassium nitrate	Hydrogen peroxide
MISTRAL41F – Flush-mounted	■	■	□	●	■	●	●	●	□	■	●	□	■	■	●	●	●	■	●	□	■	■	■	●	■	■	□	■
MISTRAL41W – Wall-mounted	■	■	□	●	■	●	●	●	□	■	●	□	■	■	●	●	●	■	●	□	■	■	■	●	■	■	□	■

■ resistant □ partially resistant ● non resistant

Consumer units technical details

MISTRAL41F/41W

MISTRAL41F – Technical details

Codes			1SLM004101A1202	1SLM004101A1203	1SLM004101A1204	1SLM004101A1205
	1SLM004100A1100	1SLM004100A1101	1SLM004100A1102	1SLM004100A1103	1SLM004100A1104	1SLM004100A1105
	1SLM004100A1200	1SLM004100A1201	1SLM004100A1202	1SLM004100A1203	1SLM004100A1204	1SLM004100A1205
Number of modules	4	6	8	12	18	24
Dimensions (W x H x D) in mm	152 x 202 x 105	192 x 202 x 105	232 x 250 x 108	320 x 250 x 108	430 x 250 x 108	320 x 435 x 108
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	15°C / + 60 °C
Resistance to heat	BPT 70°C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	11 W	14 W	18 W	22 W	27 W	41 W
Extractable frame	Yes	Yes	Yes	Yes	Yes	Yes
Maximum current	63A	63 A	63 A	63 A	125 A	63 A
DIN rail centre distance	–	–	–	–	–	150 mm
Halogen free	Yes	Yes	Yes	Yes	Yes	Yes
Cable entry	Knockout	Knockout	Flange multi pre-cuts	Flange multi pre-cuts	Flange multi pre-cuts	Flange multi pre-cuts

Codes	1SLM004101A1206	1SLM004101A1207	1SLM004101A1208	1SLM004101A1209	1SLM004101A1210
	1SLM004100A1106	1SLM004100A1107	1SLM004100A1108	1SLM004100A1109	1SLM004100A1110
	1SLM004100A1206	1SLM004100A1207	1SLM004100A1208	1SLM004100A1209	1SLM004100A1210
Number of modules	36 (2 x 18)	36 (3 x 12)	48	54	72
Dimensions (W x H x D) in mm	430 x 435 x 108	320 x 600 x 108	320 x 735 x 108	430 x 600 x 128	430 x 735 x 128
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15°C / + 60 °C	15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	47 W	50 W	59 W	59 W	82 W
Extractable frame	Yes	Yes	Yes	Yes	Yes
Maximum current	125 A	100 A	100 A	125 A	125 A
DIN rail centre distance	150 mm	150 mm	150 mm	150 mm	150 mm
Halogen free	Yes	Yes	Yes	Yes	Yes
Cable entry	Flange multi pre-cuts	Flange multi pre-cuts	Flange multi pre-cuts	Flange multi pre-cuts	Flange multi pre-cuts

Note: the versions with box and frontal splitted have the same characteristics of standard product

Consumer units technical details

MISTRAL41F/41W

MISTRAL41F & Multimedia – Technical details

Codes	1SLM004100A1300	1SLM004100A1301	1SLM004100A1302	1SLM004100A1303	1SLM004100A1304	1SLM004100A1305
	1SLM004100A1400	1SLM004100A1401	1SLM004100A1402	1SLM004100A1403	1SLM004100A1404	1SLM004100A1405
						1SLM004100A6305
Number of modules	4	6	8	12	18	24
Dimensions (W x H x D) in mm	152 x 202 x 105	192 x 202 x 105	232 x 250 x 108	320 x 250 x 108	430 x 250 x 108	320 x 435 x 108
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque
Protection class	II ▣	II ▣	II ▣	II ▣	II ▣	II ▣
Fire resistance	GWT 850 °C	GWT 850 °C	GWT 850 °C	GWT 850 °C	GWT 850 °C	GWT 850 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	15°C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	11 W	14 W	18 W	22 W	27 W	41 W (Multimedia 61 W)
Extractable frame	Yes	Yes	Yes	Yes	Yes	Yes
Maximum current	63 A	63 A	63 A	63 A	125 A	63 A
DIN rail centre distance	–	–	–	–	–	150 mm
Halogen free	Yes	Yes	Yes	Yes	Yes	Yes
Cable entry	Flange with knockouts	Flange with knockouts	Flange with knockouts	Flange with knockouts	Flange with knockouts	Flange with knockouts

Codes	1SLM004100A1306	1SLM004100A1307	1SLM004100A1308	1SLM004100A1309	1SLM004100A1310
	1SLM004100A1406	1SLM004100A1407	1SLM004100A1408	1SLM004100A1409	1SLM004100A1410
		1SLM004100A6307		1SLM004100A6309	
Number of modules	36 (2 x 18)	36 (3 x 12)	48	54	72
Dimensions (W x H x D) in mm	430 x 435 x 108	320 x 600 x 108	320 x 735 x 108	430 x 600 x 128	430 x 735 x 128
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque	Transparent / opaque
Protection class	II ▣	II ▣	II ▣	II ▣	II ▣
Fire resistance	GWT 850 °C	GWT 850 °C	GWT 850 °C	GWT 850 °C	GWT 850 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15°C / + 60 °C	15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C	-15°C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	47 W	50 W (Multimedia 63 W)	59 W	59 W (Multimedia 74 W)	82 W
Extractable frame	Yes	Yes	Yes	Yes	Yes
Maximum current	125 A	100 A	100 A	125 A	125 A
DIN rail centre distance	150 mm	150 mm	150 mm	150 mm	150 mm
Halogen free	Yes	Yes	Yes	Yes	Yes
Cable entry	Flange with knockouts	Flange with knockouts	Flange with knockouts	Flange with knockouts	Flange with knockouts

Note: the versions with box and frontal splitted have the same characteristics of standard product

Consumer units technical details

MISTRAL41F/41W

MISTRAL41W & Multimedia – Technical details

Codes						
		1SPE007717F0200	1SPE007717F0300	1SPE007717F0400	1SPE007717F0800	1SPE007717F0500
		1SPE007717F0210	1SPE007717F0310	1SPE007717F0410	1SPE007717F0810	1SPE007717F0510
	1SPE007717F0100	1SPE007717F0220	1SPE007717F0320	1SPE007717F0420	1SPE007717F0820	1SPE007717F0520
						1SLM004100A7105
Number of modules	2	4	8	12	18	24
Dimensions (W x H x D) in mm	68 x 210 x 93	96 x 210 x 93	202 x 257 x 120	292 x 257 x 120	382 x 257 x 120	292 x 382 x 120
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	No door	No door / transparent / opaque	No door / transparent / opaque	No door / transparent / opaque	No door / transparent / opaque	No door / transparent / opaque
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 650°C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	15 °C / + 60 °C
Resistance to heat	BPT 70°C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	9,2W	9,3 W	17,7 W	23,8 W	29,8 W	30,2 W (Multimedia 41 W)
Maximum current	63A	63 A	63 A	63 A	63 A	63 A
DIN rail centre distance	–	–	–	–	–	125 mm
Halogen free	Yes	Yes	Yes	Yes	Yes	Yes
Cable entry	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth

Codes					
	1SPE007717F0900	1SPE007717F0600	1SPE007717F0700	1SPE007717F1000	1SPE007717F1100
	1SPE007717F0910	1SPE007717F0610	1SPE007717F0710	1SPE007717F1010	1SPE007717F1110
	1SPE007717F0920	1SPE007717F0620	1SPE007717F0720	1SPE007717F1020	1SPE007717F1120
		1SLM004100A7107		1SLM004100A7109	
Number of modules	36 (2 x 18)	36 (3 x 12)	48	54	72
Dimensions (W x H x D) in mm	382 x 382 x 120	292 x 507 x 120	292 x 656 x 120	382 x 507 x 120	382 x 656 x 120
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	No door / transparent / opaque	No door / transparent / opaque	No door / transparent / opaque	No door / transparent / opaque	No door / transparent / opaque
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15 °C / + 60 °C	15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	37,5 W	36,8 W (Multimedia 48 W)	44,8 W	45,2 W (Multimedia 52 W)	54,4 W
Maximum current	63 A	63 A	63 A	63 A	63 A
DIN rail centre distance	125 mm	125 mm	125 mm	125 mm	125 mm
Halogen free	Yes	Yes	Yes	Yes	Yes
Cable entry	Smooth	Smooth	Smooth	Smooth	Smooth

Note: the versions with box and frontal splitted have the same characteristics of standard product

Consumer units technical details

MISTRAL41F/41W

MISTRAL41W – Technical details

Codes	1SPE007717F1500	1SPE007717F1600	1SPE007717F1700	1SPE007717F1800	1SPE007717F2200	1SPE007717F1900
Number of modules	2	4	8	12	18	24
Dimensions (W x H x D) in mm	68 x 210 x 93	96 x 210 x 93	202 x 257 x 120	292 x 257 x 120	382 x 257 x 120	292 x 382 x 120
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	No door	No door	No door	No door	No door	No door
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	15 °C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	9,2 W	9,3 W	17,7 W	23,8 W	29,8 W	30,2 W
Maximum current	63 A	63 A	63 A	63 A	63 A	63 A
DIN rail centre distance	–	–	–	–	–	125 mm
Halogen free	No	No	No	No	No	No
Cable entry	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth

Codes	1SPE007717F2300	1SPE007717F2000	1SPE007717F2100	1SPE007717F2400	1SPE007717F2500
Number of modules	36 (2 x 18)	36 (3 x 12)	48	54	72
Dimensions (W x H x D) in mm	382 x 382 x 120	292 x 507 x 120	292 x 656 x 120	382 x 507 x 120	382 x 656 x 120
Colour	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white	RAL 9016 white
Door type	No door	No door	No door	No door	No door
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08
Reference standard	IEC 60670	IEC 60670	IEC 60670	IEC 60670	IEC 60670
Installation temperature	-15 °C / + 60 °C	15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C	-15 °C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP41	IP41	IP41	IP41	IP41
Max. dissipation power	37,5 W	36,8 W	44,8 W	45,2 W	54,4 W
Maximum current	63 A	63 A	63 A	63 A	63 A
DIN rail centre distance	125 mm	125 mm	125 mm	125 mm	125 mm
Halogen free	No	No	No	No	No
Cable entry	Smooth	Smooth	Smooth	Smooth	Smooth

Note: the versions with box and frontal splitted have the same characteristics of standard product

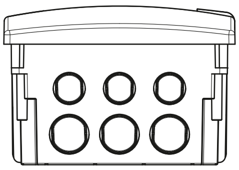
Consumer units technical details

MISTRAL41F/41W

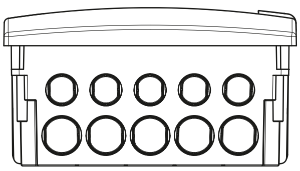
Upper and lower knockouts and precuts

Cable entry

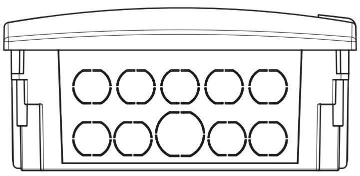
Modules (mm)	diam. 40	diam. 32	diam. 25	diam. 20	Flange
4	–	–	3	3	/ / /
6	–	–	5	5	/ / /
8	–	1	9	–	150 x 55
12	1	8	4	–	240 x 55
18	1	12	2	–	330 x 55



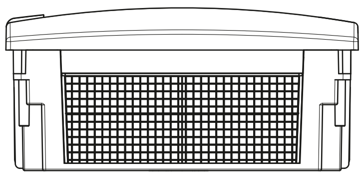
4 modules - top and bottom - concrete and hollow wall



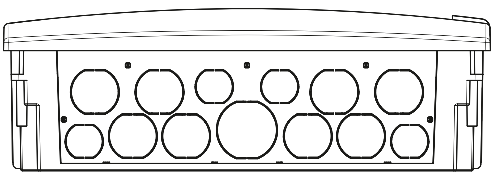
6 modules - top and bottom - concrete and hollow wall



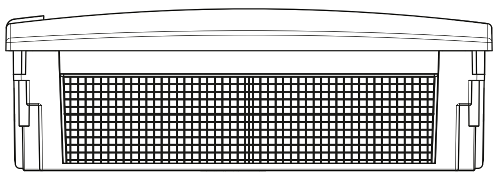
8 modules - top and bottom - hollow wall



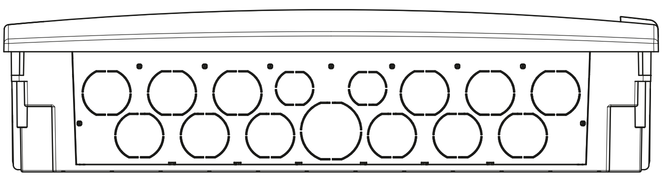
8 modules - top and bottom - concrete wall



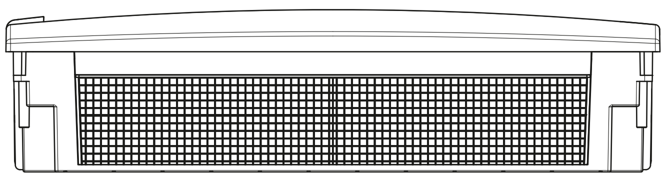
12 modules - top and bottom - hollow wall



12 modules - top and bottom - concrete wall



18 modules - top and bottom - hollow wall



18 modules - top and bottom - concrete wall

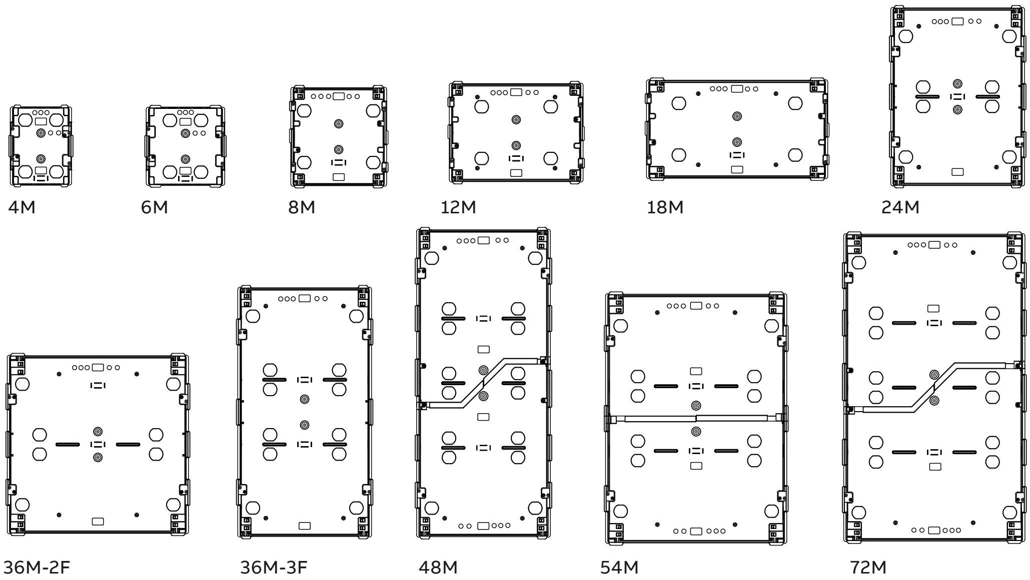
Consumer units technical details

MISTRAL41F/41W

Upper and lower knockouts

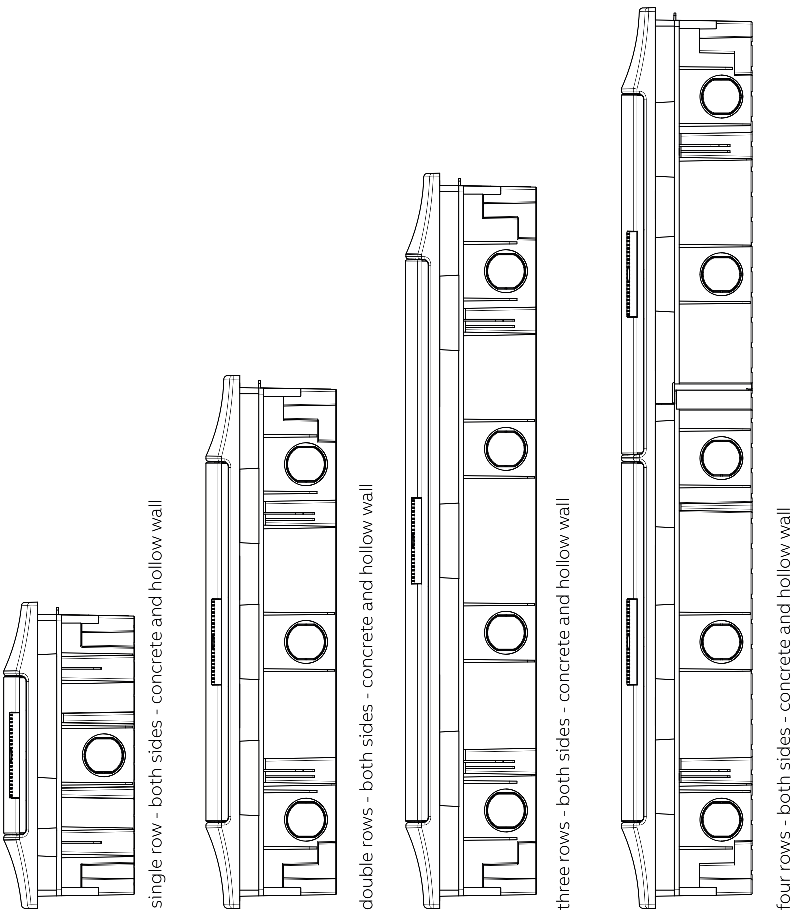
Box

Modules	diam. 32
4 M	4
6 M	4
8 M	4
12 M	4
18 M	4
24 M	8
36 M – 2F	8
36 M – 3F	12
48 M	16
54 M	12
72 M	16



Side

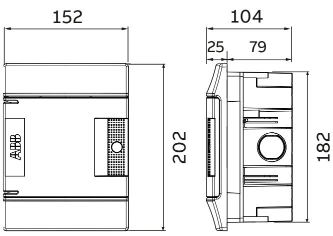
Modules	diam. 32
4 M	1
6 M	1
8 M	1
12 M	1
18 M	1
24 M	3
36 M – 2F	3
36 M – 3F	4
48 M	5
54 M	4
72 M	5



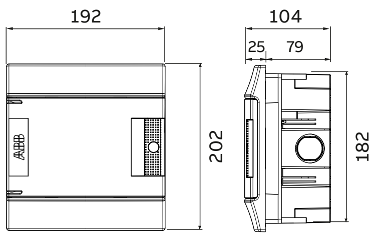
Consumer units technical details

MISTRAL41F/41W

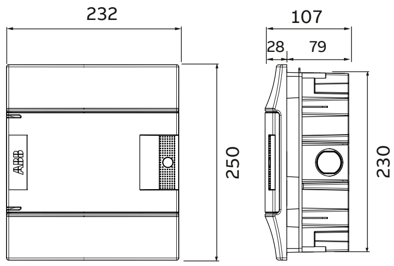
Overall dimensions



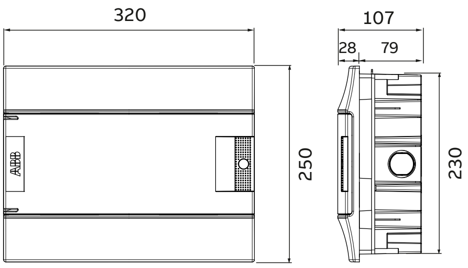
4 modules



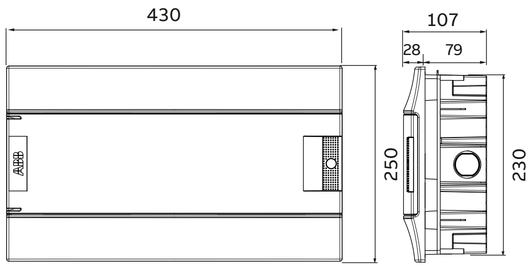
6 modules



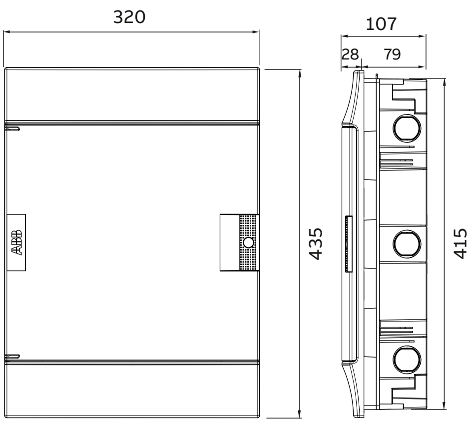
8 modules



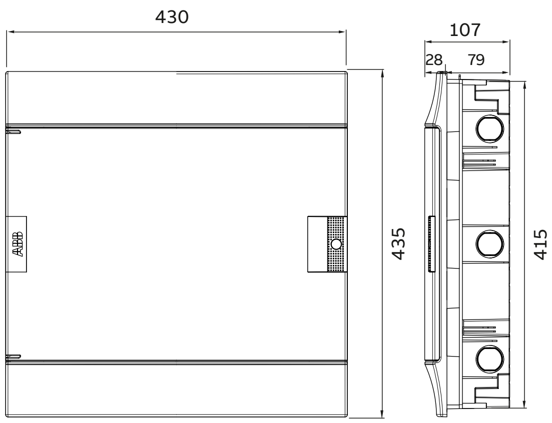
12 modules



18 modules



24 modules



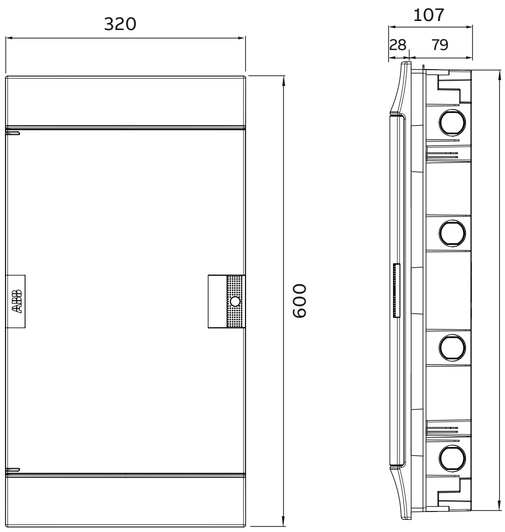
36 modules

Dimensions in mm

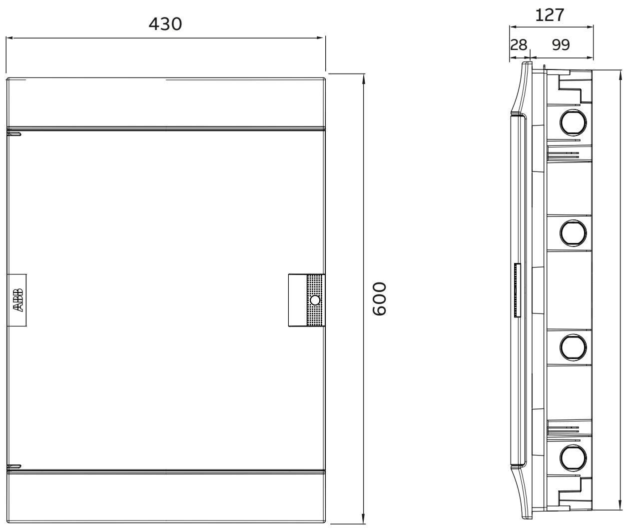
Consumer units technical details

MISTRAL41F/41W

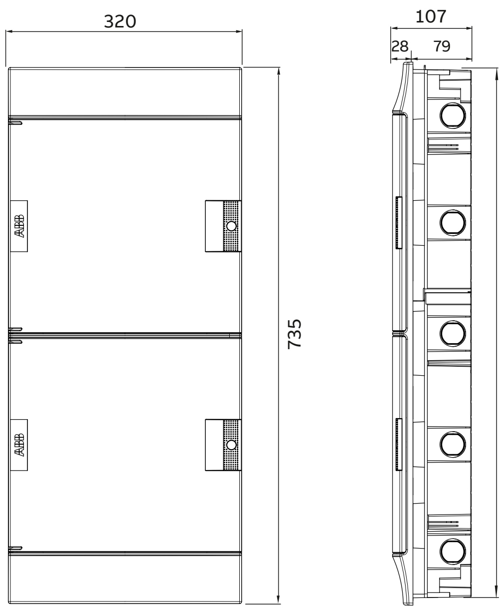
Overall dimensions



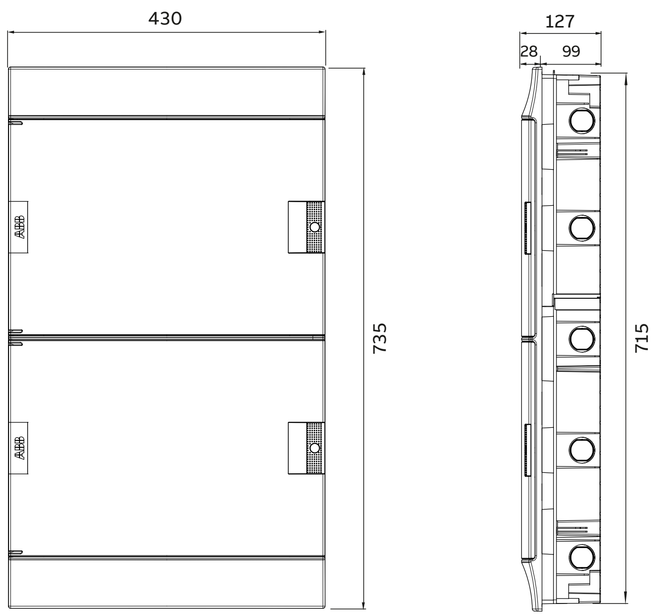
36 modules



54 modules



48 modules



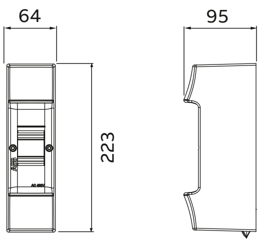
72 modules

Dimensions in mm

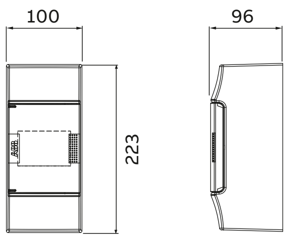
Consumer units technical details

MISTRAL41F/41W

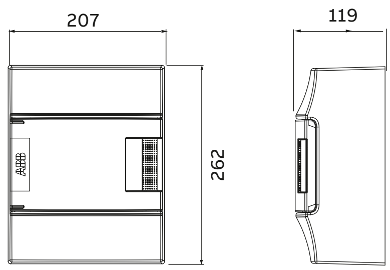
Overall dimensions



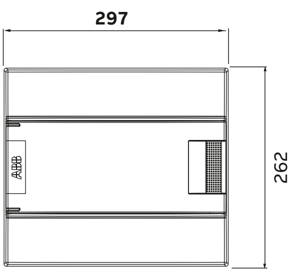
2 modules



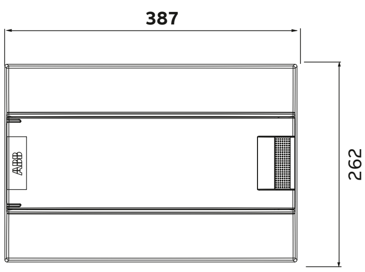
4 modules



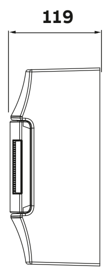
8 modules

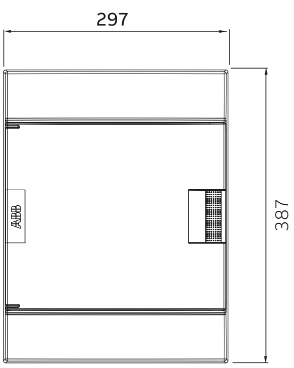


12 modules

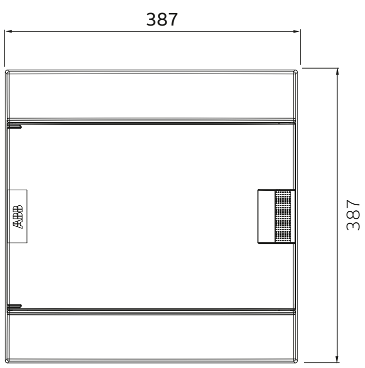


18 modules

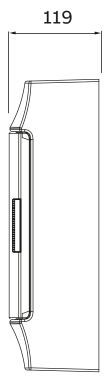




24 modules



36 modules

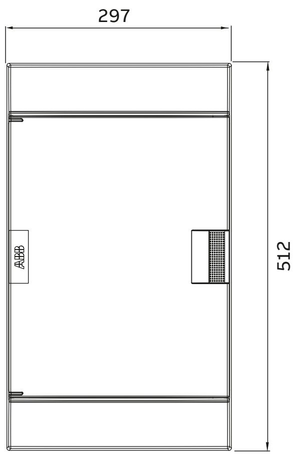


Dimensions in mm

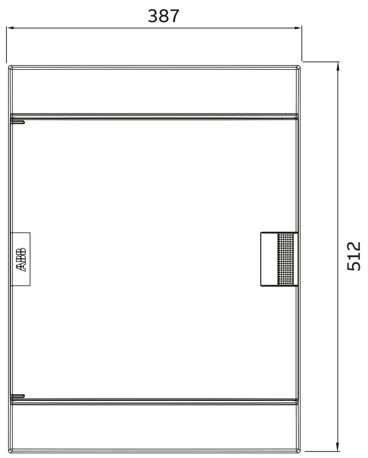
Consumer units technical details

MISTRAL41F/41W

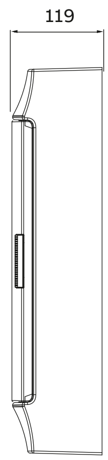
Overall dimensions

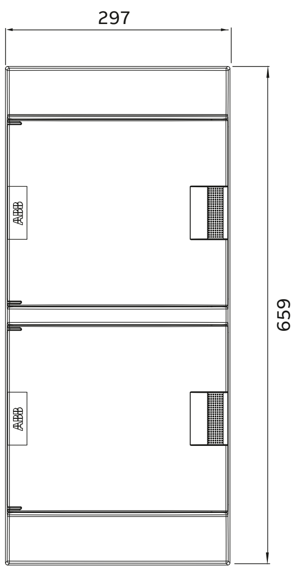


36 modules

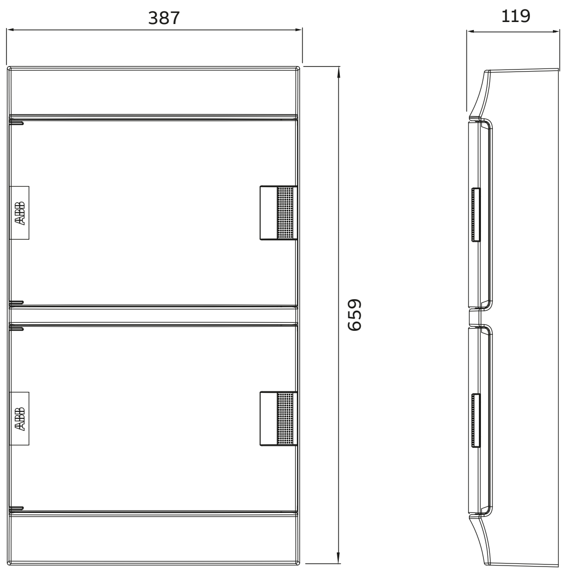


54 modules





48 modules



72 modules

Dimensions in mm

Consumer units technical details
MISTRAL65 / 65H

Table of resistance to chemical agents

	Cold water	Hot water	Sulphuric acid	Hydrochloric acid	Acetic acid	Petroleum	Benzine	Acetone	Ethyl alcohol	Ammonia	Dichloromethane	Diesel oil - Naptha	Mineral oil	Food oils	Tetrachloroethylene	Trichloroethylene	Ether	Ozone	Toluene	Methyl alcohol	Alcohol	Milk	Fruit juices	Fluorocarbons	Detersives	Detergents	Potassium nitrate	Hydrogen peroxide
MISTRAL65	■	■	▲	●	■	●	●	●	▲	■	●	▲	■	■	●	●	●	■	●	▲	■	■	■	●	■	■	▲	■
MISTRAL65H MISTRAL65H switchboards	■	■	▲	●	■	●	●	●	▲	■	●	▲	■	■	●	●	●	■	●	▲	■	■	■	●	■	■	▲	■

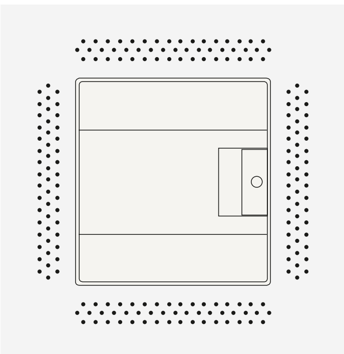
■ resistant ▲ partially resistant ● non resistant

Ingress protection rating IP65

6

First number:
Protection against the penetration of solid bodies

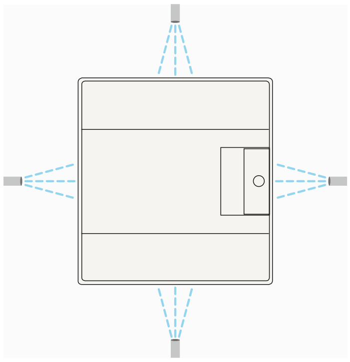
No dust can penetrate



5

Second number:
Protection against the penetration of water

Water projected with a nozzle from all directions must not cause damage



Shock resistance (IK) – MISTRAL65: IK09 and MISTRAL65H: IK10

Code IK	00	01	02	03	04	05	06	07	08	09	10
Shock energy (Joule)	not protected	0.15	0.2	0.35	0.5	0.7	1	2	5	10	20

Consumer units technical details

MISTRAL65 / 65H

MISTRAL65 – Technical details

Codes	1SL1100A00 1SL1200A00	1SL1101A00 1SL1201A00 1SLM006501A1101 1SLM006501A1201	1SL1102A00 1SL1202A00 1SLM006501A1102 1SLM006501A1202	1SL1103A00 1SL1203A00 1SLM006501A1103 1SLM006501A1203 1SLM006502A1103 1SLM006502A1203	1SL1104A00 1SL1204A00 1SLM006501A1104 1SLM006501A1204 1SLM006502A1104 1SLM006502A1204
Number of modules	4	8	12	18	24
Dimensions (W x H x D) in mm	152 x 202 x 117	232 x 250 x 154	320 x 250 x 155	430 x 250 x 155	320 x 435 x 155
Color	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey
Door type	Opaque / Transparent	Opaque / Transparent	Opaque / Transparent	Opaque / Transparent	Opaque / Transparent
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Reference standard	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3
Resistance to mechanical impacts	IK09	IK09	IK09	IK09	IK09
Installation temperature	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP65	IP65	IP65	IP65	IP65
Max. dissipation power	12W	20W	27W	32W	34W
Maximum current	63A	63A	63A	125A	125A
Exctractable frame	no	no	no	no	yes
Additional module	no	no	yes	yes	yes
Installation of MCCBs	no	yes	yes	yes	yes
DIN rail centre distance	–	–	–	–	150 – 125 mm
Halogen free	yes	yes	yes	yes	yes
Cable entry finish	Smooth	Smooth	Smooth	Smooth	Smooth

Codes	1SL1105A00 1SL1205A00 1SLM006501A1105 1SLM006501A1205	1SL1106A00 1SL1206A00 1SLM006501A1106 1SLM006501A1206	1SL1107A00 1SL1207A00 1SLM006501A1107 1SLM006501A1207	1SL1108A00 1SL1208A00 1SLM006501A1108 1SLM006501A1208	1SL1109A00 1SL1209A00 1SLM006501A1109 1SLM006501A1209
Number of modules	36	36	48	54	72
Dimensions (W x H x D) in mm	430 x 435 x 155	320 x 600 x 155	320 x 735 x 155	430 x 600 x 155	430 x 735 x 155
Color	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey
Door type	Opaque / Transparent	Opaque / Transparent	Opaque / Transparent	Opaque / Transparent	Opaque / Transparent
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C	GWT 650 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts	IK09	IK09	IK09	IK09	IK09
Reference standard	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3	IEC 60670 & IEC 61439-3
Installation temperature	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP65	IP65	IP65	IP65	IP65
Max. dissipation power	43 W	51 W	64 W	63 W	81 W
Maximum current	125 A	125 A	125 A	125 A	125 A
Exctractable frame	yes	yes	yes	yes	yes
Additional module	yes	yes	yes	yes	yes
Installation of MCCBs	yes	yes	yes	yes	yes
DIN rail centre distance	150 – 125 mm	150 – 125 mm	150 – 125 mm	150 – 125 mm	150 – 125 mm
Halogen free	yes	yes	yes	yes	yes
Cable entry finish	Smooth	Smooth	Smooth	Smooth	Smooth

Consumer units technical details

MISTRAL65 / 65H

MISTRAL65H – Technical details

Codes	1SLM006500A2110 1SLM006500A2210	1SLM006500A2111 1SLM006500A2211	1SLM006500A2112 1SLM006500A2212	1SLM006500A2113 1SLM006500A2213	1SLM006500A2114 1SLM006500A2214 1SLM006500A3114*
Number of modules	4	8	12	18	24
Dimensions (W x H x D) in mm	152 x 202 x 117	232 x 250 x 154	320 x 250 x 155	430 x 250 x 155	320 x 435 x 155
Color	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey
Door type	Opaque/Trasparent	Opaque/Trasparent	Opaque/Trasparent	Opaque/Trasparent	Opaque/Trasparent
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts			IK10**		
Reference standards	IEC 62208	IEC 62208	IEC 62208	IEC 62208	IEC 62208
Installation temperature	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP65	IP65	IP65	IP65	IP65
Max. dissipation power	12W	20W	27W	32W	34W
Maximum current	63A	63A	63A	125A	125A
Exctractable frame	no	no	no	no	yes
Additional module	no	no	yes	yes	yes
Installation of MCCBs	no	yes	yes	yes	yes
DIN rail centre distance	–	–	–	–	150 – 125 mm
Halogen free	no	no	no	no	no
Cable entry finish	Smooth/Precut	Smooth/Precut	Smooth/Precut	Smooth/Precut	Smooth/Precut

Codes	1SLM006500A2115 1SLM006500A2215 1SLM006500A3115*	1SLM006500A2116 1SLM006500A2216 1SLM006500A3116*	1SLM006500A2117 1SLM006500A2217	1SLM006500A2118 1SLM006500A2218 1SLM006500A3118*	1SLM006500A2119 1SLM006500A2219
Number of modules	36	36	48	54	72
Dimensions (W x H x D) in mm	430 x 435 x 155	320 x 600 x 155	320 x 735 x 155	430 x 600 x 155	430 x 735 x 155
Color	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey
Door type	Opaque/Trasparent	Opaque/Trasparent	Opaque/Trasparent	Opaque/Trasparent	Opaque/Trasparent
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Fire resistance	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C	GWT 750 °C
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Resistance to mechanical impacts			IK10**		
Reference standards	IEC 62208	IEC 62208	IEC 62208	IEC 62208	IEC 62208
Installation temperature	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C	-25 °C / + 60 °C
Resistance to heat	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C	BPT 70 °C
IP rating	IP65	IP65	IP65	IP65	IP65
Max. dissipation power	43 W	51 W	64 W	63 W	81 W
Maximum current	125 A	125 A	125 A	125 A	125 A
Exctractable frame	yes	yes	yes	yes	yes
Additional module	yes	yes	yes	yes	yes
Installation of MCCBs	yes	yes	yes	yes	yes
DIN rail centre distance	150 – 125 mm	150 – 125 mm	150 – 125 mm	150 – 125 mm	150 – 125 mm
Halogen free	no	no	no	no	no
Cable entry finish	Smooth/Precut	Smooth/Precut	Smooth/Precut	Smooth/Precut	Smooth/Precut

* For the switchboards, modules indicate size
** IK08 in the area of knockouts

Consumer units technical details

MISTRAL65 / 65H

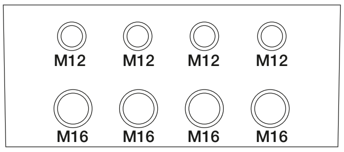
Upper and lower knockouts

Cable glands

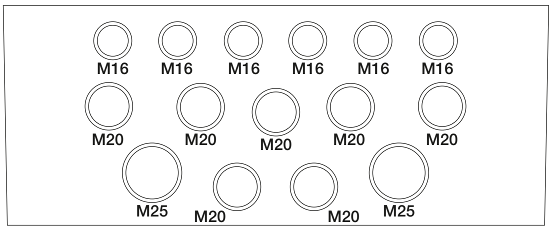
Modules		diam. 16	diam. 20	diam. 25
4	04 x 1	2	–	–
8	08 x 1	3	3	–
12	12 x 1	2	2	2
24	12 x 2	5	5	2
36	12 x 3	5	5	2
48	12 x 4	5	5	2
18	18 x 1	2	2	2
36	18 x 2	5	5	2
54	18 x 3	5	5	2
72	18 x 4	5	5	2

Holes

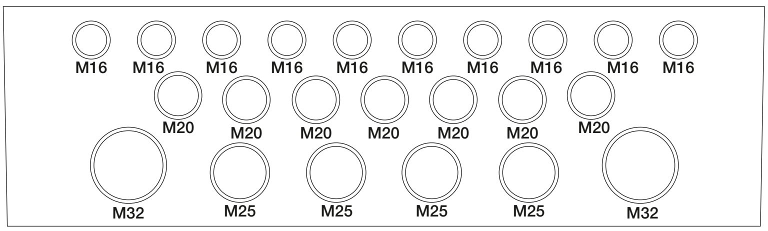
Modules		diam. 12	diam. 16	diam. 20	diam. 25	diam. 32
4	04 x 1	4	4	–	–	–
8	08 x 1	–	6	7	2	–
12	12 x 1	–	10	7	4	2
24	12 x 2	–	10	7	4	2
36	12 x 3	–	10	7	4	2
48	12 x 4	–	10	7	4	2
18	18 x 1	–	14	9	4	2
36	18 x 2	–	14	9	4	2
54	18 x 3	–	14	9	4	2
72	18 x 4	–	14	9	4	2



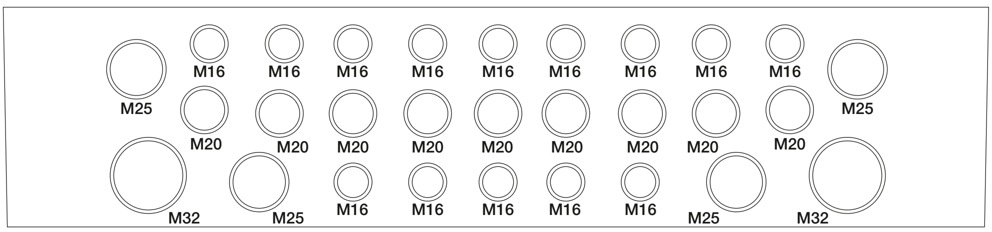
4 modules – top and bottom



8 modules – top and bottom



12 modules – top and bottom

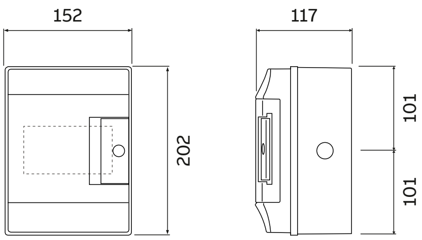


18 modules – top and bottom

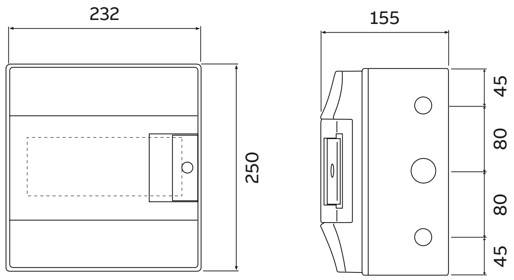
Consumer units technical details

MISTRAL65 / 65H

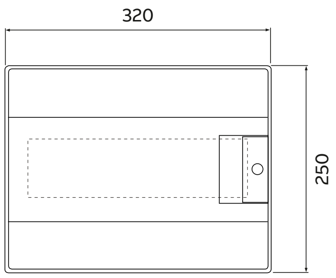
Overall dimensions



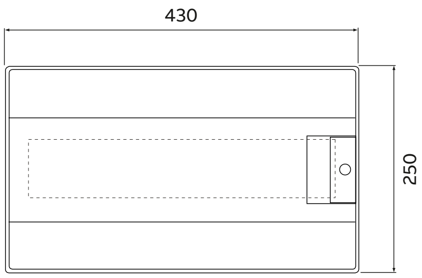
4 modules



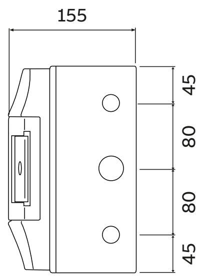
8 modules

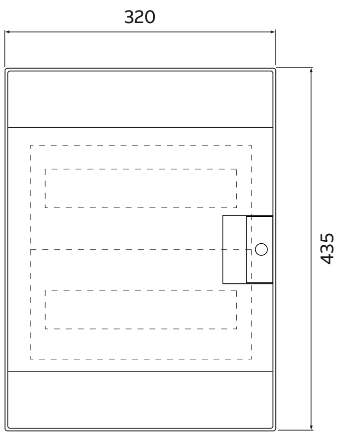


12 modules

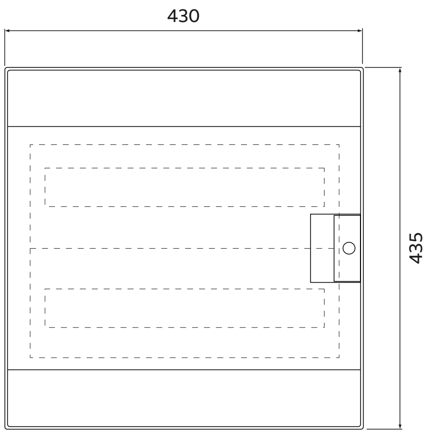


18 modules

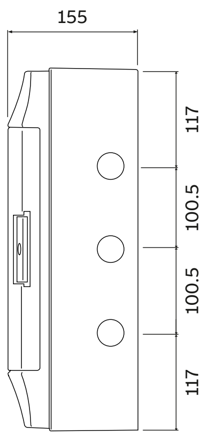




24 modules



36 modules

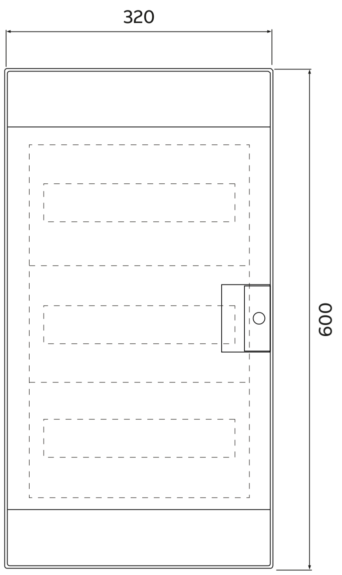


Dimensions in mm

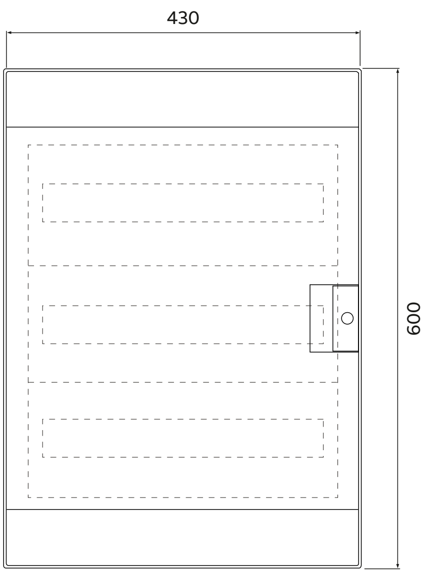
Consumer units technical details

MISTRAL65 / 65H

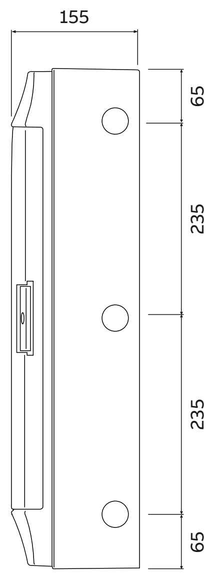
Overall dimensions

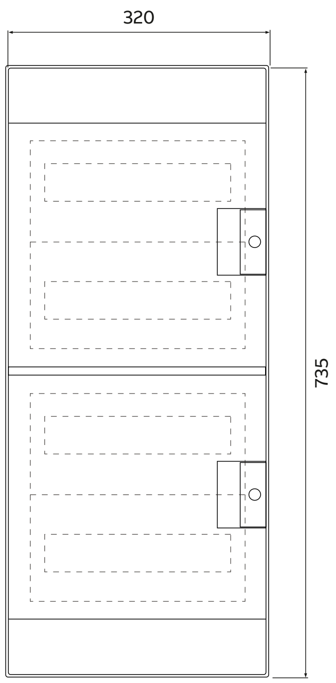


36 modules

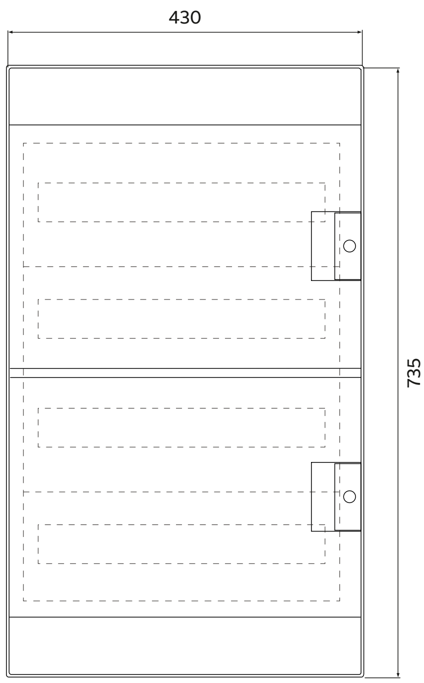


54 modules

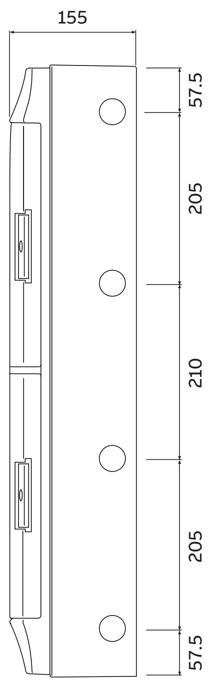




48 modules



72 modules

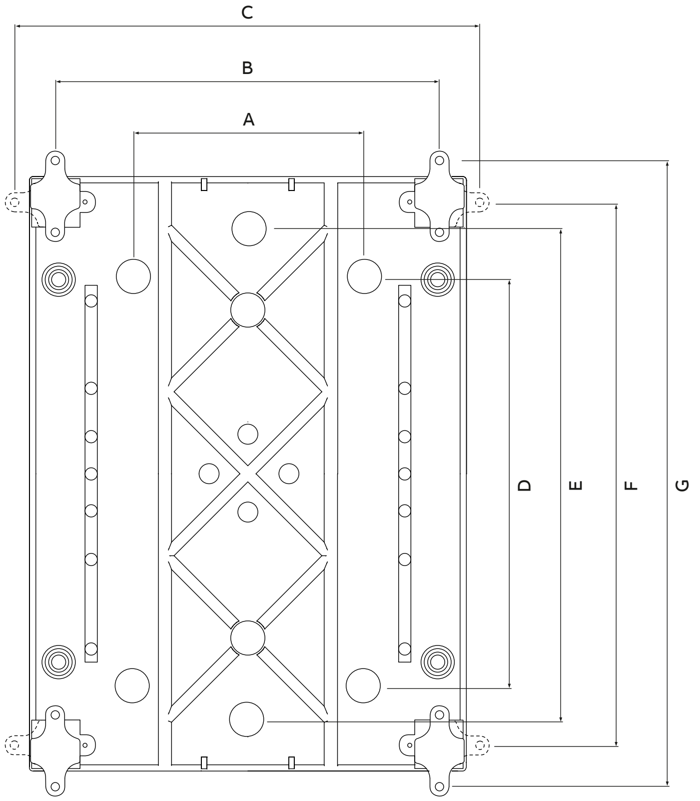


Dimensions in mm

Consumer units technical details

MISTRAL65 / 65H

Fixing template



	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]
4 PLE	–	113	173	–	140	163	223.5
8 PLE	90	194	254.5	180	–	212	272.5
12 PLE	170	282.5	343	180	–	212	272.5
18 PLE	280	392	452.5	125	175	212	272.5
24 PLE	170	282.5	343	310	360	397	457.5
36 PLE – 2 F	280	392	452.5	310	360	397	457.5
36 PLE – 3 F	170	282.5	343	475	525	562	622.5
48 PLE	170	282.5	343	610	660	697	757.5
54 PLE	280	392	452.5	475	525	562	622.5
72 PLE	280	392	452.5	610	660	697	757.5

Consumer units technical details

basic E – Flush-mounted

Technical details

basic E – Flush-mounted								
Number of modules	2	4	6	8	12	16	24	36
Dimensions (WxHxD) in mm	120x180x102	155x180x102	190x180x102	230x180x102	300x220x102	230x315x102	300x335x102	300x450x102
Body / Cover Colour	White / White	White / White	White / White	White / White	White / White	White / White	White / White	White / White
Body / Cover Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Door Colour	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey
Door Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Fire Resistance Cover-Body, Terminal-Holder	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C
Installation Temperature	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60
Resistance to Heat Cover-Body, Terminal-Holder	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C
IP rating	IP40	IP40	IP40	IP40	IP40	IP40	IP40	IP40
Max. dissipation power	10 W	14 W	16 W	20 W	27 W	31 W	33 W	40 W
Extractable DIN rail	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Halogen Free	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cable entry	Knockout	Knockout	Knockout	Knockout	Knockout	Knockout	Knockout	Knockout
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08	IK08	IK08	IK08
Maximum current	63 A	63 A	63 A	63 A	63 A	63 A	63 A	63 A
Resistance to heat	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C
Terminal bars (Number of holes)	–	1 x 5	1 x 5	2 x 5	2 x 13	2 x 13	2 x 13	2 x 21

Number of cable entries for Flush-mounted

basic E Flush-mounted	Module	Top Number of Entries	Bottom Number of Entries	Right Number of Entries	Left Number of Entries	Hole diameter (mm)
	2	2	2	**3**	**3**	28
	4	2	2	**3**	**3**	28
	6	4	4	**2**	**2**	28
	8	4	4	**2**	**2**	28
	12	6	6	**2**	**2**	28
	16	4	4	**2**	**2**	28
	24	6	6	**2**	**2**	28
	36	6	6	**6**	**6**	28

Consumer units technical details

basic E – Wall-mounted

Technical details

basic E – Wall-mounted								
Number of modules	2	4	6	8	12	16	24	36
Dimensions (WxHxD) in mm	120x180x102	155x180x102	190x180x102	230x180x102	300x220x102	230x315x102	300x335x102	300x450x102
Body / Cover Colour	White / White	White / White	White / White	White / White	White / White	White / White	White / White	White / White
Body / Cover Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Door Colour	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey	Opaque white Transparent grey
Door Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Fire Resistance Cover-Body, Terminal-Holder	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C	650° C / 850° C
Installation Temperature	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60	–25 / +60
Resistance to Heat Cover-Body, Terminal-Holder	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C	650–70° C
IP rating	IP40	IP40	IP40	IP40	IP40	IP40	IP40	IP40
Max. dissipation power	10 W	14 W	16 W	20 W	27 W	31 W	33 W	40 W
Extractable DIN rail	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Halogen Free	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cable entry	Knockout	Knockout	Knockout	Knockout	Knockout	Knockout	Knockout	Knockout
Protection class	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈	II ⧈
Resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08	IK08	IK08	IK08
Maximum current	63 A	63 A	63 A	63 A	63 A	63 A	63 A	63 A
Resistance to heat	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C	BPT 70° C
Terminal bars (Number of holes)	–	–	–	2x5	2x13	2x13	2x13	2x21

Number of cable entries for Wall-mounted

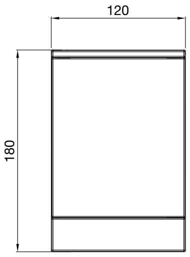
basic E Wall-mounted	Module	Top Number of Entries	Bottom Number of Entries	Hole diameter (mm)
	2	1	1	24
	4	1	1	24
	6	2	2	24
	8	2	2	24
	12	3	3	24
	16	3	3	24
	24	3	3	24
	36	3	3	24

Consumer units technical details

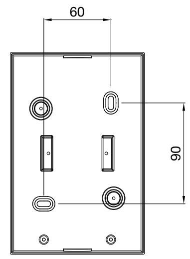
basic E

Overall dimensions

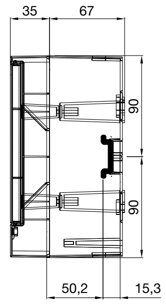
2M Enclosure, dimensions (mm)



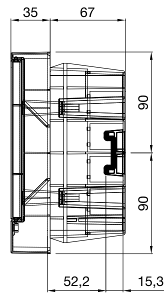
Front cover + door



Surface mounted

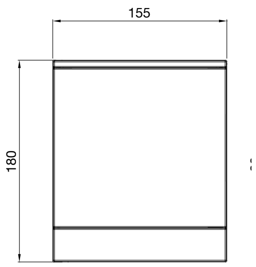


Surface mounted

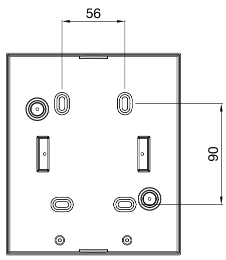


Flush mounted

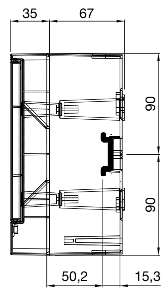
4M Enclosure, dimensions (mm)



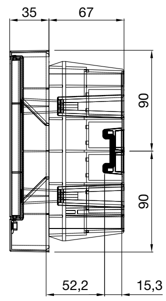
Front cover + door



Surface mounted

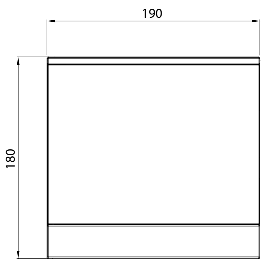


Surface mounted

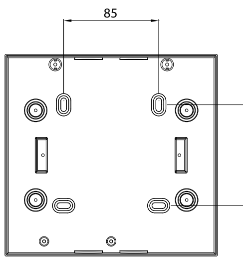


Flush mounted

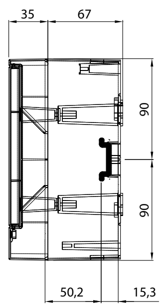
6M Enclosure, dimensions (mm)



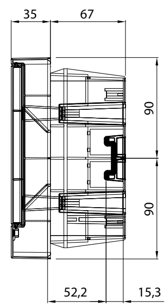
Front cover + door



Surface mounted



Surface mounted

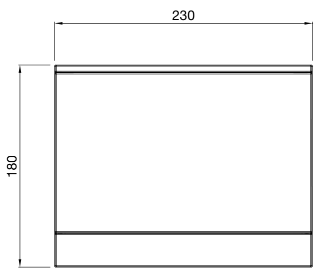


Flush mounted

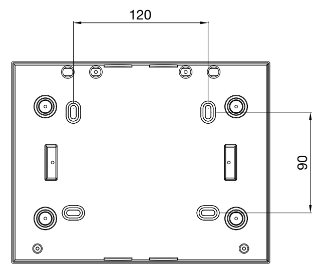
Consumer units technical details
basic E

Overall dimensions

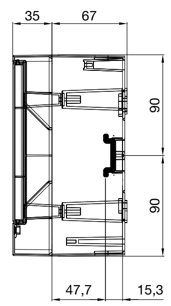
8M Enclosure, dimensions (mm)



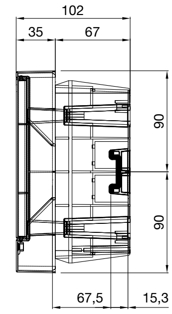
Front cover + door



Surface mounted

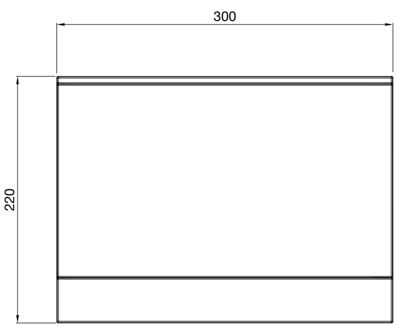


Surface mounted

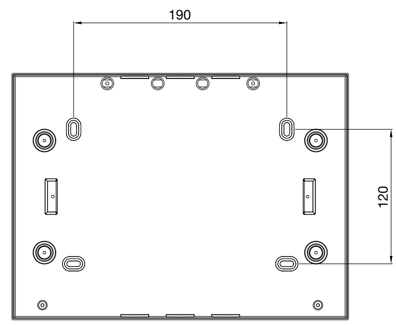


Flush mounted

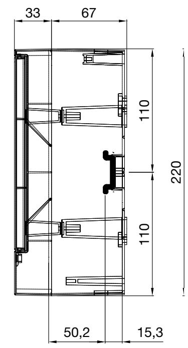
12M Enclosure, dimensions (mm)



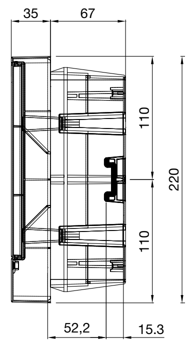
Front cover + door



Surface mounted

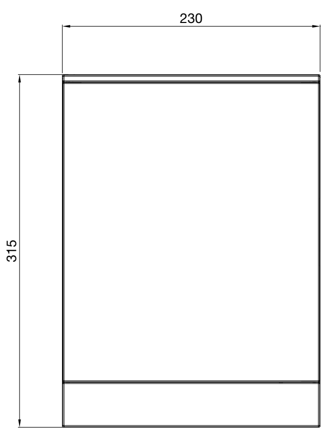


Surface mounted

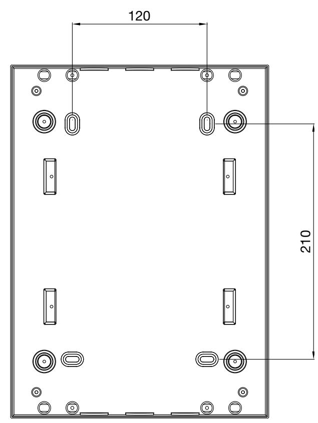


Flush mounted

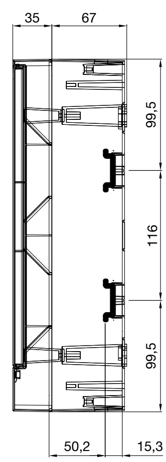
16M Enclosure, dimensions (mm)



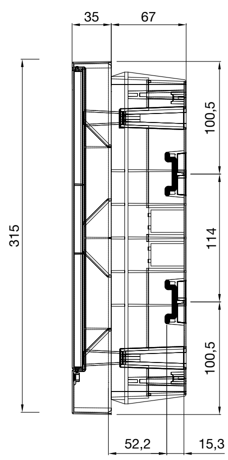
Front cover + door



Surface mounted



Surface mounted



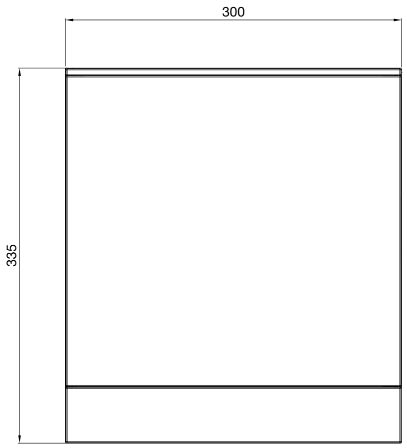
Flush mounted

23

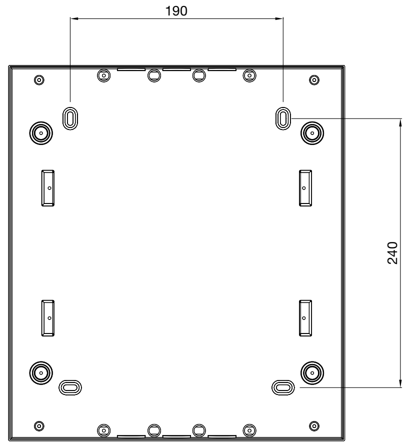
Consumer units technical details
basic E

Overall dimensions

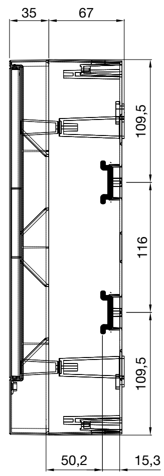
24M Enclosure, dimensions (mm)



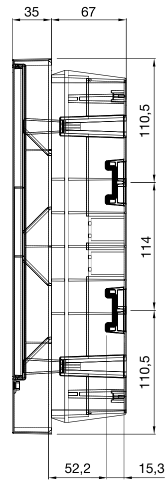
Front cover + door



Surface mounted

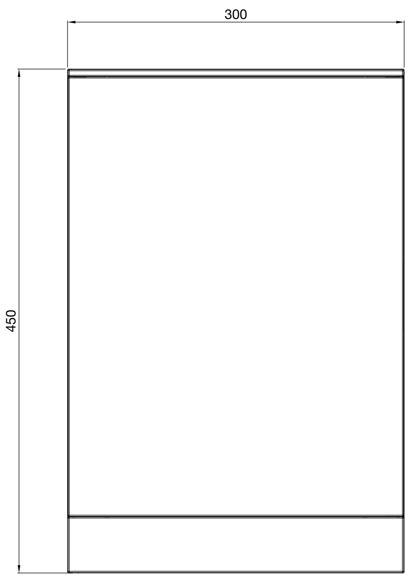


Surface mounted

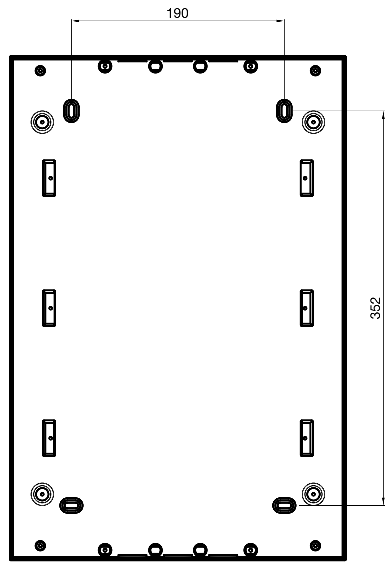


Flush mounted

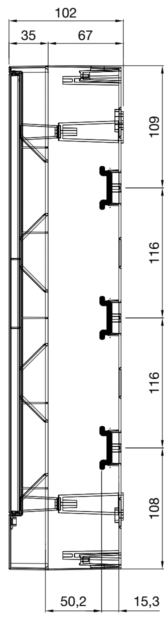
36M Enclosure, dimensions (mm)



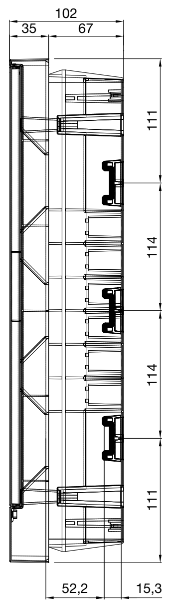
Front cover + door



Surface mounted



Surface mounted

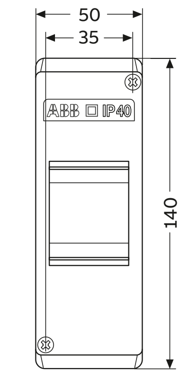


Flush mounted

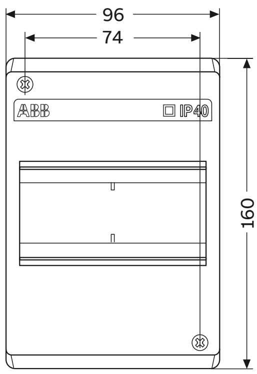
Consumer units technical details

Mini Europa40

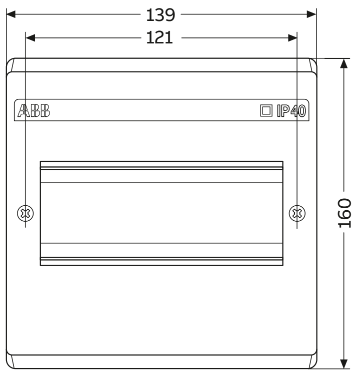
Front view



2 modules

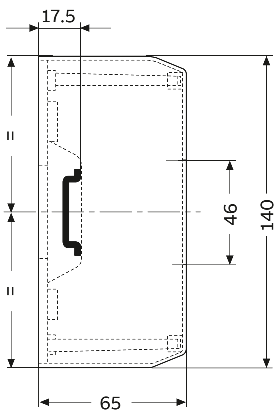


4 modules

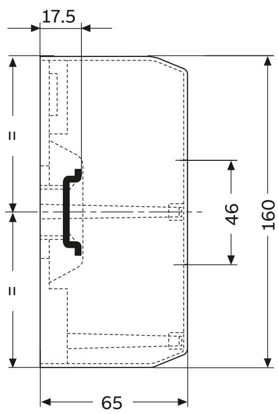


6 modules

Side view



2 modules

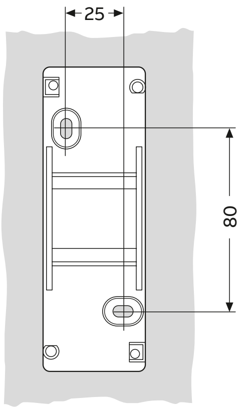


4-6 modules

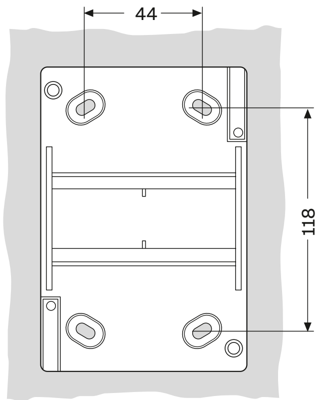
Consumer units technical details

Mini Europa40

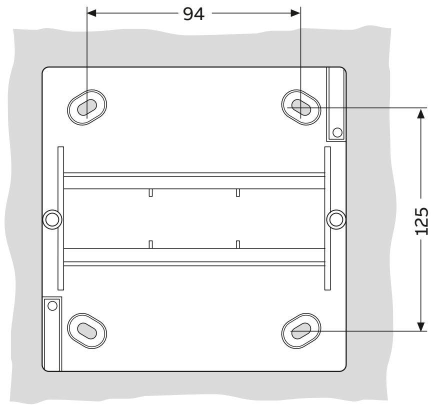
Drilling sheets



2 modules



4 modules



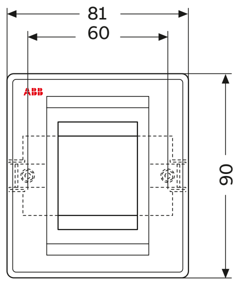
6 modules

Modules	code
2 modules	1SL2402A00 – 12 422
4 modules	1SL2404A00 – 12 424
6 modules	1SL2406A00 – 12 426

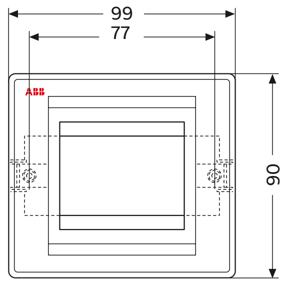
Consumer units technical details

IP 40 panel fronts

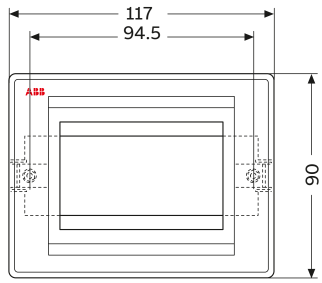
Front view



2 modules

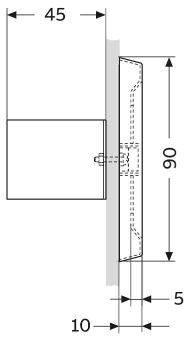


3 modules

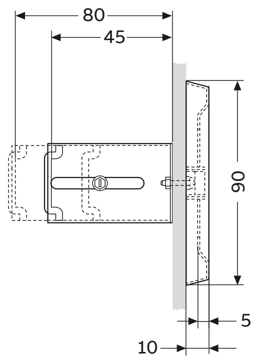


4 modules

Side view

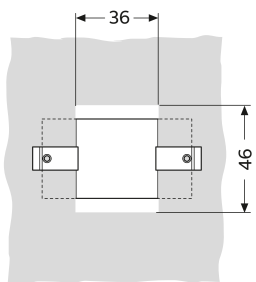


2-3 modules

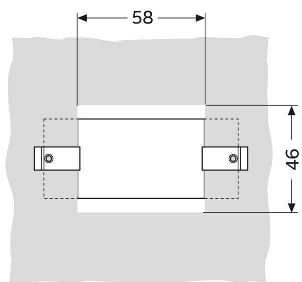


4 modules

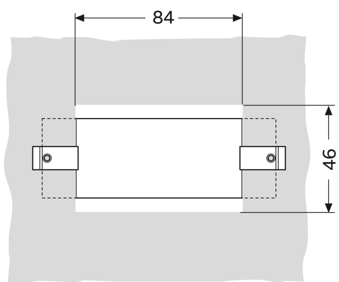
Drilling sheets



2 modules



3 modules



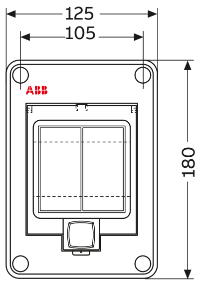
4 modules

Modules	code
2 modules	12 362
3 modules	12 363
4 modules	12 364

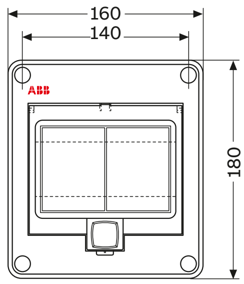
Consumer units technical details

IP 55 panel fronts

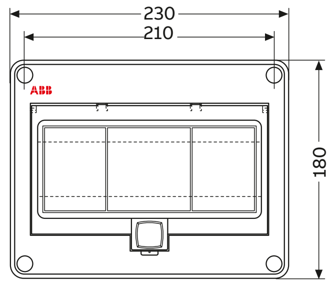
Front view



4 modules

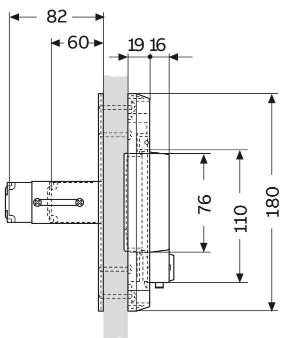


6 modules



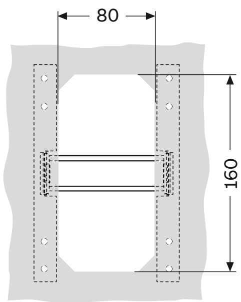
10 modules

Side view

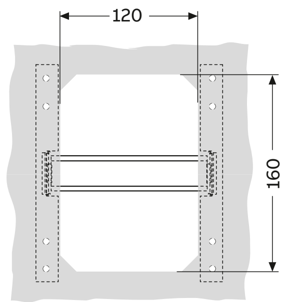


4-6-10 modules

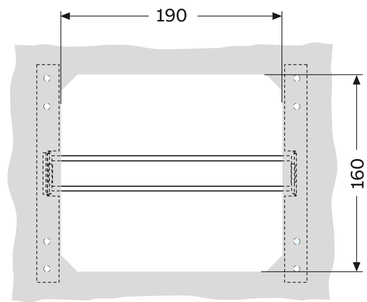
Drilling sheets



4 modules



6 modules



10 modules

Modules	code
4 modules	12 658
6 modules	12 659
10 modules	12 660

Electrical installation solutions for buildings – Technical details

General purpose enclosures

Index

General purpose enclosures technical details

Power dissipation values

According to EN 62208, IEC 62208 and IEC 60890

For each enclosures range
- The 4 or 5 different matrix tables contain all the enclosure **dimensions**.
- The tables are created according to the **positioning** of the enclosure.
- **Two different values** of temperature rise are given depending on the measuring point in the cabinet: **half way or on top.**

What is acceptable according to EN 62208, IEC 62208 and IEC 60890
- For common electrical applications, a **temperature rise of 50 K** is generally accepted. If the rise is above 50 K, a larger enclosure should be chosen. More volume results in a decrease of the temperature rise.
- The **absolute** temperature in °C in the enclosure is **the sum** of the **ambient** temperature in °C and the **temperature rise** in K. According to the standards, the absolute temperature is **max. 70 °C**

How to use a matrix?
First choose the right matrix according to the position and the size of the enclosure.
Second calculate the effective power loss in Watt (left column). Add 10-20% to the total effective power loss of the components in order to compensate the small wiring and connections.
Third read in the matrix the temperature rise in the cabinet due to the thermal power dissipation.

Example of an individual enclosure PolySafe 452
Enclosure: height = 1000 mm, width = 1250 mm, depth = 320 mm.
Placed against the wall.
The calculated effective power loss of the components: 600W
Components are placed in the centre of the cabinet.
In the table 'Rear against wall' (see below) read for **600W** and column **'Half': 40K** temperature rise.
With an ambient temperature of 20 °C, the absolute temperature around the components will be approximately 20 + 40 = 60 °C
If the temperature is too high for the components, then choose a larger cabinet to allow air ventilation.

Example of coupled enclosures PolySafe 452
Enclosure on the **left side**: height 1000, width 1250 mm, depth 320 mm. Enclosure **in the middle**: height 1000, width 1250 mm, depth 320 mm. Enclosure on the **right side**: height 1000, width 1250 mm, depth 320 mm. Placed against the wall
Do the same calculation as above for each individual enclosure.
Find the temperature rise for the **left and right side** enclosure in the table '**Front, left and upperside free**', see page 24/10 and find **'Half': 42K**
Find the temperature rise for the **middle** enclosure in the table '**Frontside and upperside free**', see page 24/11 and find **'Half': 44K**

Rear against wall (wall mounting)

Temperature rise [Kelvin]

Dissipa-tion	PSS 220		PSS 230		PSS 320		PSS 330		PSS 340		PSS 352		PSS 420		PSS 430		PSS 440/442		PSS 452		PSS 530		PSS 542/546	
	500×500		500×750		750×500		750×750		750×1.000		750×1.250		1.000×500		1.000×750		1.000×1.000		1.000×1.250		1.250×750		1.250×1.000	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	4	5	4	4	4	5																		
20	8	9	7	7	6	8	5	6	4	5			5	7										
30	11	13																						
40	13	16	11	13	11	14	9	11	7	9	6	7	9	13	7	9	5	7	5	6	5	8		
50	16	19																						
60	19	22	16	18	16	19	12	16	10	12	8	10	12	18	10	13	7	10	6	8	8	11	6	8
70	21	25																						
80	23	28	20	23	20	24	15	20	12	16	10	12	16	22	12	16								
90	26	31																						
100	28	33	24	27	23	29	18	23	15	19	12	14	19	27	14	19	11	14	9	12	11	16	9	13
120	32	38	28	31	27	33	21	27					22	31	17	23								
140	37	44	31	35	31	38	24	31	19	24	15	19	25	35	19	26	15	19	12	16	15	21	12	16
160	41	48	35	39	34	42	27	34					27	39	21	28								
180	45	53	38	43	38	46	29	38	24	30	19	23	30	43	23	31	18	23	15	19	18	25	15	20
200	49	58	42	47	41	51	32	41					33	47	25	34								
220	53	63	45	51	44	55	34	44	28	35	22	27	35	50	27	37	21	27	18	23	21	30	18	24
240			48	55	47	58	37	47					38	54	29	39								
260			52	58	51	62	39	51	32	40	25	31	40	58	31	42	24	31	20	26	24	34	20	27
280							42	54					43	61	33	45								
300							44	57	36	45	28	35	45	65	35	47	27	35	23	29	27	38	23	30
350							50	64	40	51	32	40	51	73	40	53	30	39	26	33	31	43	25	34
400									45	57	36	44			44	59	34	44	29	37	34	48	28	38
450									49	62	39	48			48	65	37	48	32	40	38	53	31	42
500											43	53			53	71	40	53	34	44	41	58	34	46
550											46	57					44	57	37	47	45	63	37	49
600											49	61					47	61	40	51	48	67	39	53
650											53	65					50	65	42	54	51	72	42	57
700																			45	57			45	60
750																			48	61			47	63
800																			50	64			50	67

General purpose enclosures technical details

Power dissipation values – MultiBox

Rear against wall — Temperature rise [Kelvin]

	MB11	MB11	MB21	MB21	MB22	MB22	MB33	MB33	MB42	MB42	MB44	MB44
H×W (mm)	65×65	65×65	94×65	94×65	94×94	94×94	110×110	110×110	130×94	130×94	130×130	130×130
Depth (mm)	57	81	57	81	57	81	66	90	57	81	75	99
DISSIPATION												
Watt	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**
1												
2												
3												
4	45											
5	55	45	45									
6				45								
7	65	55	55		45							
8	75	65	65	55		45			45			
9					55		45					
10		75	75	65	65	55			55	45		
11							55	45				
12				75						55	45	
13					75	65		55	65			
14							65				55	45
15						75		65	75	65	65	55
20							75	75		75	75	65
25												75

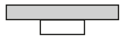
Rear against wall — Temperature rise [Kelvin]

	MB52	MB52	MB53	MB53	MB53	MB65	MB65	MB65	MB75	MB75	MB75	MB87	MB87
H×W (mm)	180×94	180×94	180×110	180×110	180×110	182×180	182×180	182×180	254×180	254×180	254×180	361×254	361×254
Depth (mm)	57	81	90	111	165	90	111	165	90	111	165	111	165
DISSIPATION													
Watt	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**	**Top**
10	45	45											
15	55	55	45										
16	65			45									
17													
18			55										
19	75	65											
20			65	55	45	45							
25		75	75	65	55	55	45		45				
30				75	65	65	55	45	55	45			
35							65	55		55			
40					75	75	75		65		45		
45								65	75	65		45	
50								75		75	55		
55													
60											65	55	45
65													
70											75	65	55
75													
80													
85												75	65
90													
95													
100													75
105													
110													

General purpose enclosures technical details

Power dissipation values – APO

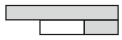
Rear against wall



Temperature rise [Kelvin]

Dissipa-	APO 1		APO 31		APO 41		APO 71		APO 51		APO 81		APO 61		APO 11		APO 12	
tion	185×150×130		300×185×175		300×300×175		370×300×175		485×300×175		555×300×175		600×300×175		600×370×175		600×600×175	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
5	12	14	7	9	6	7	5	6	4	5	4	5	4	5	3	4	3	3
10	20	25	12	15	10	12	9	11	8	9	7	9	7	8	6	7	4	5
15	28	34	17	21	14	16	12	15	10	13	10	12	9	11	8	10	6	7
20	36	43	22	27	17	20	15	19	13	16	12	15	11	14	10	13	8	9
25	43	52	26	32	21	24	18	22	16	19	14	18	14	17	12	15	9	11
30			30	37	24	28	21	26	18	22	17	21	16	20	14	17	11	13
40			38	47	30	36	27	32	23	28	21	26	20	25	18	22	14	16
50			45	56	36	43	32	39	27	34	25	31	24	30	21	26	16	19
60					42	49	37	45	32	39	29	36	28	34	25	30	19	22
70							42	51	36	44	33	41	31	39	28	34	21	25
80									40	49	37	46	35	43	31	38	24	28
90											40	50	38	48	34	42	26	31
100													42	52	37	46	28	34
110															40	50	31	36
120															43	53	33	39
130																	35	42
140																	37	44
150																	39	47
160																	41	49
170																	45	53

Front, left and upperside free



Temperature rise [Kelvin]

Dissipa-	APO 1		APO 31		APO 41		APO 71		APO 51		APO 81		APO 61		APO 11		APO 12	
tion	185×150×130		300×185×175		300×300×175		370×300×175		485×300×175		555×300×175		600×300×175		600×370×175		600×600×175	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
5	13	15	8	9	6	7	5	6	5	6	4	5	4	5	4	4	3	3
10	22	27	13	16	11	13	9	11	8	10	7	9	7	9	6	8	5	5
15	30	37	18	23	15	18	13	15	11	14	10	13	10	12	9	11	6	8
20	38	46	23	28	19	22	16	19	14	17	13	16	12	15	11	13	8	10
25	46	56	28	34	22	27	19	23	17	21	15	19	15	18	13	16	10	11
30			32	39	26	31	22	27	19	24	18	22	17	21	15	19	11	13
40			40	50	33	39	28	34	24	30	22	28	19	24	19	23	14	17
50					39	46	33	41	29	36	27	33	25	32	23	28	17	20
60					45	54	39	47	34	42	31	39	29	37	26	32	19	23
70							44	53	38	47	35	44	33	42	30	37	22	26
80									42	52	39	49	37	46	33	41	25	29
90											43	53	41	51	36	45	27	32
100															39	49	29	35
110															43	53	32	38
120																	34	40
130																	36	43
140																	39	46
150																	41	48
160																	43	51
170																		

General purpose enclosures technical details

Power dissipation values – APO

Frontside and upperside free

Temperature rise [Kelvin]

Dissipa-	APO 1		APO 31		APO 41		APO 71		APO 51		APO 81		APO 61		APO 11		APO 12	
tion	185×150×130		300×185×175		300×300×175		370×300×175		485×300×175		555×300×175		600×300×175		600×370×175		600×600×175	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
5	13	16	8	10	7	8	6	7	5	6	5	6	4	5	4	5	3	3
10	24	29	14	18	11	14	10	12	8	10	8	10	7	9	7	8	5	6
15	33	40	20	24	16	19	14	17	12	15	11	14	10	13	9	11	7	8
20	41	50	25	31	20	24	17	21	15	18	14	17	13	16	12	14	8	10
25			30	37	24	28	21	25	18	22	16	20	16	20	14	17	10	12
30			34	42	28	33	24	29	20	25	19	24	18	23	16	20	12	14
40			43	54	35	41	30	37	26	32	24	30	23	29	20	25	15	17
50					42	49	36	44	31	38	29	36	27	34	24	30	17	21
60					48	57	42	51	36	44	33	41	32	39	28	35	20	24
70									40	50	38	47	36	45	32	39	23	27
80											42	52	40	50	35	44	26	30
90															39	48	28	33
100															42	52	31	36
110																	33	39
120																	35	42
130																	38	45
140																	40	48
150																	42	50
160																		
170																		

Frontside free, upper side not free

Temperature rise [Kelvin]

Dissipa-	APO 1		APO 31		APO 41		APO 71		APO 51		APO 81		APO 61		APO 11		APO 12	
tion	185×150×130		300×185×175		300×300×175		370×300×175		485×300×175		555×300×175		600×300×175		600×370×175		600×600×175	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
5	15	18	9	11	7	8	6	8	5	6	5	6	5	6	4	5	3	4
10	25	31	16	19	12	15	11	14	9	11	8	10	8	10	7	9	5	6
15	35	43	22	27	17	21	16	19	13	16	12	14	11	14	10	12	7	9
20	44	54	27	34	22	26	20	24	16	20	15	18	14	17	12	15	9	11
25			33	41	26	31	23	29	19	23	18	22	17	21	15	18	11	13
30			38	47	30	36	27	33	22	27	20	25	19	24	17	21	13	15
40			48	59	38	45	34	42	28	34	26	32	24	30	22	27	16	19
50					46	54	41	50	33	41	31	38	29	36	26	32	19	22
60									38	47	35	44	34	42	30	37	22	26
70									43	54	40	50	38	48	34	42	25	29
80													43	53	38	47	28	33
90															42	51	30	36
100																	33	39
110																	36	42
120																	38	45
130																	41	48
140																	43	51
150																		
160																		
170																		

General purpose enclosures technical details

Power dissipation values – VMS

Rear against wall (wall mounting)

Temperature rise [Kelvin]

Dissipa-tion	VMS 32		VMS 32		VMS 33		VMS 33		VMS 43		VMS 43		VMS 63		VMS 63		VMS 64		VMS 64	
	320×220×180		320×220×255		320×320×180		320×320×255		440×320×180		440×320×255		640×320×180		640×320×255		640×440×180		640×440×255	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	11	14	9	11	9	11	8	9	8	9	7	8	6	7	5	6	5	6	4	5
20	20	24	16	20	16	19	14	16	13	16	11	14	10	13	9	11	9	11	8	10
30	27	33	22	27	22	26	19	23	18	23	16	19	14	18	12	15	12	15	11	13
40	34	42	28	34	28	33	24	28	23	28	20	24	18	23	16	19	15	19	14	17
50	41	50	33	41	33	39	29	34	28	34	24	29	22	27	19	23	18	22	16	20
60	47		38	47	38	45	33	39	32	39	28	34	25	31	22	27	21	26	19	23
70	54		43	53	43	51	38	45	36	45	31	38	28	36	24	30	24	29	21	26
80			48		48		42	50	41	50	35	43	32	40	27	34	27	33	24	29
90			53		53		46	55	45	55	38	47	35	43	30	37	29	36	26	32
100							50		49		42	51	38	47	33	41	32	39	28	35
120									56		48		44	55	38	47	37	45	33	40
140											55		50		43	53	42	51	37	46
160													55		47		47		41	51
180															52		51		45	56
200															57		56		49	
220																			53	

Front, right and upperside free

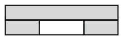
Temperature rise [Kelvin]

Dissipa-tion	VMS 32		VMS 32		VMS 33		VMS 33		VMS 43		VMS 43		VMS 63		VMS 63		VMS 64		VMS 64	
	320×220×180		320×220×255		320×320×180		320×320×255		440×320×180		440×320×255		640×320×180		640×320×255		640×440×180		640×440×255	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	12	15	10	12	9	11	8	10	8	10	7	9	6	8	6	7	5	6	5	6
20	21	26	17	21	16	20	15	17	14	17	12	15	11	14	10	12	9	11	8	10
30	29	35	24	30	23	27	20	24	20	24	17	21	15	19	13	17	13	16	11	14
40	36	45	30	37	29	34	25	30	25	30	21	26	19	24	17	21	16	20	14	18
50	43	53	36	45	34	41	30	36	29	36	26	31	23	29	20	25	19	24	17	21
60	50		42	52	40	47	35	42	34	42	30	36	27	34	23	29	22	27	20	24
70	57		48		45	54	40	47	39	47	34	41	31	38	26	33	25	31	22	28
80			53		50		44	53	43	53	37	46	34	42	29	37	28	35	25	31
90					55		49		47		41	50	37	47	32	40	31	38	27	34
100							53		51		45	55	41	51	35	44	34	41	30	37
120											52		47		41	51	39	48	35	43
140													53		46		44	54	39	48
160															51		49		44	54
180															57		54		48	
200																			52	
220																			56	

General purpose enclosures technical details

Power dissipation values – VMS

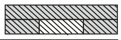
Frontside and upperside free



Temperature rise [Kelvin]

Dissipa-tion	VMS 32 320×220×180		VMS 32 320×220×255		VMS 33 320×320×180		VMS 33 320×320×255		VMS 43 440×320×180		VMS 43 440×320×255		VMS 63 640×320×180		VMS 63 640×320×255		VMS 64 640×440×180		VMS 64 640×440×255	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	13	16	11	14	10	12	9	10	9	10	8	9	7	9	6	8	6	7	5	6
20	22	27	20	24	18	22	15	18	15	18	13	16	12	15	11	13	10	12	9	11
30	31	37	27	33	25	30	21	25	21	25	18	22	17	21	15	18	14	17	12	15
40	38	47	34	42	32	38	27	32	26	32	23	28	21	26	18	23	17	21	15	19
50	46	57	41	50	38	45	32	38	31	38	28	34	25	31	22	28	20	25	18	22
60	53		47		44	52	37	44	36	44	32	39	29	36	26	32	24	29	21	26
70			53		50		42	50	41	50	36	44	33	41	29	36	27	33	24	29
80					55		47	56	46	56	40	49	37	46	32	40	30	37	27	33
90							52		50		44	54	40	50	35	44	33	40	29	36
100							56		54		48		44	55	39	48	36	44	32	39
120											56		51		45	56	41	51	37	45
140															51		47		42	51
160															56		52		46	
180																			51	

Frontside free, upperside not free



Temperature rise [Kelvin]

Dissipa-tion	VMS 32 320×220×180		VMS 32 320×220×255		VMS 33 320×320×180		VMS 33 320×320×255		VMS 43 440×320×180		VMS 43 440×320×255		VMS 63 640×320×180		VMS 63 640×320×255		VMS 64 640×440×180		VMS 64 640×440×255	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	14	17	12	15	12	14	10	12	9	11	8	10	7	9	7	8	6	7	5	7
20	24	30	22	27	20	24	18	22	16	20	15	18	13	16	12	14	11	13	10	12
30	33	41	30	37	28	34	25	30	22	27	20	25	18	22	16	20	15	18	13	16
40	42	52	38	46	36	42	32	38	28	34	26	31	22	28	20	25	18	23	17	21
50	50		45	55	43	51	38	45	34	41	31	38	27	33	24	30	22	27	20	25
60			52		49		44	52	39	48	35	43	31	39	28	35	26	31	23	28
70					56		50		44	54	40	49	35	44	32	39	29	36	26	32
80							55		49		45	55	39	49	35	44	32	40	29	36
90									54		49		43	54	39	48	35	43	32	39
100											54		47		42	52	39	47	35	43
120													54		49		45	55	40	50
140															55		50		46	56
160																	56		51	
180																			56	

General purpose enclosures technical details

Power dissipation values – ARIA

Rear against wall

Temperature rise [Kelvin]

Dissipa-tion	ARIA 32		ARIA 43		ARIA 54		ARIA 64		ARIA 75		ARIA 86		ARIA 108	
	300×200×170		400×300×170		500×400×230		600×400×230		700×500×270		800×600×300		1.000×800×300	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	12	15	8	10	6	7	5	6	4	5	3	4	2	3
20	21	26	15	18	10	12	9	11	7	9	6	7	4	5
30	30	36	20	25	14	17	12	15	10	12	8	10	5	7
40	37	46	26	32	17	21	15	19	12	15	10	13	7	9
50	45	55	31	38	21	25	18	22	15	18	12	15	8	11
60			36	44	24	29	21	26	17	21	13	18	9	13
70			41	49	27	33	24	29	19	24	15	20	11	14
80			45	55	30	36	27	33	21	26	17	23	12	16
90					33	40	29	36	23	29	18	25	13	18
100					36	44	32	39	26	31	20	27	14	19
110					39	47	34	42	28	34	22	29	15	21
120					42	50	37	45	30	36	23	31	16	22
130							39	49	32	39	25	33	17	24
140							42	51	33	41	26	35	19	25
150									35	43	28	37	20	26
160									37	46	29	39	21	28
170									39	48	31	41	22	29
180									41	50	32	43	23	31
190											34	45	24	32
200											35	47	25	33
210											37	49	26	35
220											38	51	27	36
230													28	37
240													29	39
250													30	40
260													31	41
270													31	42
280													32	44
290													33	45
300													34	46
310													35	47
320													36	49
330													37	50
340														

Front, left and upperside free

Temperature rise [Kelvin]

Dissipa-tion	ARIA 32		ARIA 43		ARIA 54		ARIA 64		ARIA 75		ARIA 86		ARIA 108	
	300×200×170		400×300×170		500×400×230		600×400×230		700×500×270		800×600×300		1.000×800×300	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	13	16	9	11	6	7	5	7	4	5	3	4	2	3
20	23	28	16	19	10	13	9	11	7	9	6	8	4	6
30	31	38	22	26	15	18	13	16	10	12	8	11	6	8
40	39	49	27	33	18	22	16	20	13	16	10	13	7	10
50	47	58	32	40	22	27	19	24	15	19	12	16	9	12
60			38	46	25	31	23	28	18	22	14	19	10	13
70			43	52	29	35	26	31	20	24	16	21	11	15
80					32	39	28	35	22	27	18	23	13	17
90					35	43	31	38	24	30	19	26	14	19
100					38	46	34	42	27	33	21	28	15	20
110					41	50	37	45	29	35	23	30	16	22
120							39	48	31	38	24	32	18	23
130							42	52	33	40	26	35	19	25
140									35	43	28	37	20	26
150									37	45	29	39	21	28
160									39	48	31	41	22	29
170									41	50	32	43	23	31
180									43	52	34	45	24	32
190											35	47	26	34
200											37	49	27	35
210											38	51	28	37
220													29	38
230													30	39
240													31	41
250													32	42
260													33	44
270													34	45
280													35	46
290													36	48
300													37	49
310													38	50
320														
330														
340														

General purpose enclosures technical details

Power dissipation values – ARIA

Frontside and upperside free

Temperature rise [Kelvin]

Dissipa-	ARIA 32		ARIA 43		ARIA 54		ARIA 64		ARIA 75		ARIA 86		ARIA 108	
tion	300×200×170		400×300×170		500×400×230		600×400×230		700×500×270		800×600×300		1.000×800×300	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	14	17	9	11	6	8	6	7	4	5	4	5	3	3
20	24	30	16	20	11	14	10	12	8	9	7	8	4	6
30	33	41	23	28	16	19	14	17	11	13	9	11	6	8
40	42	52	29	35	20	24	17	22	13	16	11	14	8	10
50			34	42	23	29	21	26	16	20	14	17	9	12
60			40	48	27	33	24	30	18	23	16	19	11	14
70			45	55	31	37	27	34	21	26	18	22	12	16
80					34	42	31	38	23	29	20	24	14	18
90					38	46	34	41	26	31	22	27	15	19
100					41	50	36	45	28	34	24	29	16	21
110							39	49	30	37	26	31	18	23
120							42	52	32	40	27	34	19	24
130									34	42	29	36	20	26
140									37	45	31	38	21	27
150									39	47	33	40	23	29
160									41	50	35	42	24	31
170											36	44	25	32
180											38	47	26	34
190											40	49	27	35
200											41	51	29	37
210													30	38
220													31	40
230													32	41
240													33	42
250													34	44
260													35	45
270													36	47
280													37	48
290													39	49
300													40	51
310														
320														
330														
340														

Frontside free, upper side not free

Temperature rise [Kelvin]

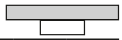
Dissipa-	ARIA 32		ARIA 43		ARIA 54		ARIA 64		ARIA 75		ARIA 86		ARIA 108	
tion	300×200×170		400×300×170		500×400×230		600×400×230		700×500×270		800×600×300		1.000×800×300	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
20	27	33	19	23	12	15	11	14	8	10	7	8	5	6
30	37	46	26	32	17	21	15	19	11	14	10	12	7	9
40	47	57	33	40	22	26	19	24	14	18	12	15	9	11
50			39	48	26	32	23	28	17	21	14	18	10	14
60			45	56	30	37	27	33	20	24	17	21	12	16
70					34	41	30	37	23	28	19	23	13	18
80					38	46	33	41	25	31	21	26	15	20
90					42	51	37	45	28	34	23	28	16	22
100							40	49	30	37	25	31	18	24
110									32	40	27	33	19	26
120									35	43	29	36	21	27
130									37	45	31	38	22	29
140									39	48	33	41	23	31
150									42	51	35	43	25	33
160											37	45	26	35
170											39	47	27	36
180											41	50	29	38
190													30	40
200													31	41
210													32	43
220													34	45
230													35	46
240													36	48
250													37	49
260													39	51
270														
280														
290														
300														
310														
320														
330														
340														

General purpose enclosures technical details

Power dissipation values – PolySafe

Rear against wall (wall mounting)

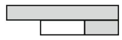
Temperature rise [Kelvin]



Dissipation Watt	PS 220 500×500		PS 230 500×750		PS 320 750×500		PS 330 750×750		PS 340 750×1.000		PS 352 750×1.250		PS 420 1.000×500		PS 430 1.000×750		PS 440/442 1.000×1.000		PS 452 1.000×1.250		PS 530 1.250×750		PS 542/546 1.250×1.000	
	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	4	5	4	4	4	5																		
20	8	9	7	7	6	8	5	6	4	5			5	7										
30	11	13																						
40	13	16	11	13	11	14	9	11	7	9	6	7	9	13	7	9	5	7	5	6	5	8		
50	16	19																						
60	19	22	16	18	16	19	12	16	10	12	8	10	12	18	10	13	7	10	6	8	8	11	6	8
70	21	25																						
80	23	28	20	23	20	24	15	20	12	16	10	12	16	22	12	16								
90	26	31																						
100	28	33	24	27	23	29	18	23	15	19	12	14	19	27	14	19	11	14	9	12	11	16	9	13
120	32	38	28	31	27	33	21	27					22	31	17	23								
140	37	44	31	35	31	38	24	31	19	24	15	19	25	35	19	26	15	19	12	16	15	21	12	16
160	41	48	35	39	34	42	27	34					27	39	21	28								
180	45	53	38	43	38	46	29	38	24	30	19	23	30	43	23	31	18	23	15	19	18	25	15	20
200	49	58	42	47	41	51	32	41					33	47	25	34								
220	53	63	45	51	44	55	34	44	28	35	22	27	35	50	27	37	21	27	18	23	21	30	18	24
240			48	55	47	58	37	47					38	54	29	39								
260			52	58	51	62	39	51	32	40	25	31	40	58	31	42	24	31	20	26	24	34	20	27
280							42	54					43	61	33	45								
300							44	57	36	45	28	35	45	65	35	47	27	35	23	29	27	38	23	30
350							50	64	40	51	32	40	51	73	40	53	30	39	26	33	31	43	25	34
400									45	57	36	44			44	59	34	44	29	37	34	48	28	38
450									49	62	39	48			48	65	37	48	32	40	38	53	31	42
500											43	53			53	71	40	53	34	44	41	58	34	46
550											46	57					44	57	37	47	45	63	37	49
600											49	61					47	61	40	51	48	67	39	53
650											53	65					50	65	42	54	51	72	42	57
700																			45	57			45	60
750																			48	61			47	63
800																			50	64			50	67

Front, left and upperside free

Temperature rise [Kelvin]

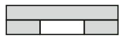


Dissipation Watt	PS 220 500×500		PS 230 500×750		PS 320 750×500		PS 330 750×750		PS 340 750×1.000		PS 352 750×1.250		PS 420 1.000×500		PS 430 1.000×750		PS 440/442 1.000×1.000		PS 452 1.000×1.250		PS 530 1.250×750		PS 542/546 1.250×1.000	
	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	4	5	4	4	4	5																		
20	8	10	7	8	7	8	5	7	4	5			5	8	4	6								
30	11	13	9	11	9	12																		
40	14	17	12	13	12	15	9	12	7	9	6	7	10	13	7	10	6	7	5	6	6	8	5	6
50	17	20	14	16	14	17																		
60	19	23	16	19	16	20	13	16	10	13	8	10	13	19	10	14	8	10	7	8	8	11	7	9
70	22	26	19	21	19	23																		
80	25	29	21	23	21	25	16	20	13	16	10	13	17	23	13	17	10	13	8	10	10	14	8	11
90	27	32	23	26	23	28																		
100	29	35	25	28	25	30	19	24	16	19	12	15	20	28	16	21	12	15	10	12	12	17	10	13
120	34	40	29	32	29	35	22	28	18	22			23	32	18	24								
140	39	46	32	37	32	40	25	32	20	25	16	20	26	37	20	27	15	20	13	16	16	22	13	17
160	43	51	36	41	36	44	28	35	23	28			29	41	23	30								
180	47	56	40	45	40	49	31	39	25	31	20	24	32	45	25	33	19	24	16	20	20	27	16	21
200	51	61	43	49	43	53	33	42	27	34			35	49	27	36								
220			47	53	47	57	36	46	29	36	23	28	38	53	29	39	22	28	19	23	23	32	19	25
240			50	56	50	62	39	49	32	39			40	57	32	42								
260							41	52	34	42	27	32	43	60	34	45	25	32	21	27	27	37	21	28
280							44	55	36	44			46	64	36	47								
300							46	58	38	47	30	36	48	68	38	50	28	36	24	30	30	41	24	32
350							52	66	43	53	34	41	55	77	43	57	32	41	27	34	34	47	27	36
400									48	59	38	46			48	63	36	46	30	38	38	52	30	40
450									52	65	41	50			52	69	39	50	33	41	41	57	33	44
500											45	55					43	55	36	45	45	62	36	48
550											49	59					46	59	39	49	49	67	39	52
600											52	63					50	63	42	52	52	72	42	55
650																			45	56			45	59
700																			47	59			47	63
750																			50	62			50	66

General purpose enclosures technical details

Power dissipation values – PolySafe

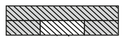
Frontside and upperside free



Temperature rise [Kelvin]

Dissipa-tion	PS 220		PS 230		PS 320		PS 330		PS 340		PS 352		PS 420		PS 430		PS 440/442		PS 452		PS 530		PS 542/546	
	500×500		500×750		750×500		750×750		750×1.000		750×1.250		1.000×500		1.000×750		1.000×1.000		1.000×1.250		1.250×750		1.250×1.000	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	5	6	4	5	4	5																		
20	9	10	7	8	7	9	5	7	5	5			6	8	5	6								
30	12	14	10	11	10	12																		
40	15	18	12	14	12	15	10	12	8	9	6	7	11	13	8	10	6	7	5	6	7	9	5	6
50	18	21	15	17	15	18																		
60	21	25	17	19	17	21	13	16	11	13	9	10	15	19	11	14	8	10	7	8	9	12	7	9
70	23	28	19	22	19	24																		
80	26	31	21	24	22	27	17	20	14	16	11	13	19	23	14	18	11	13	9	11	11	15	9	11
90	29	34	23	26	24	29																		
100	31	37	26	29	26	32	20	25	17	20	13	15	23	28	17	22	13	16	10	13	14	18	11	14
120	36	43	30	33	30	37	23	28	19	23			26	33	19	25	15	18						
140	41	49	33	38	34	42	26	32	22	26	17	20	30	37	22	28	17	21	14	16	18	24	14	18
160	46	54	37	42	38	47	29	36	24	29			33	41	25	31	18	23						
180	50	59	41	46	42	51	32	39	27	32	21	25	36	45	27	35	20	25	17	20	22	29	17	22
200			45	50	45	56	35	43	29	34			39	49	29	38	22	27						
220			48	54	49	60	38	46	31	37	25	29	42	53	32	41	24	29	20	24	26	35	20	26
240			52	58	52	65	41	50	33	40			46	57										
260							43	53	36	42	28	33	49	61	36	46	27	34	22	27	29	40	23	29
280							46	56	38	45			52	64										
300							48	59	40	48	32	37			41	52	31	38	25	30	33	44	24	33
350							55	67	45	54	36	42			46	59	35	43	28	34	37	50	26	37
400									50	60	40	47			51	66	39	48	32	38	42	56	29	41
450											44	52					42	52	35	42	46	61	32	45
500											48	56					46	57	38	46	50	67	38	49
550											52	61					50	62	41	50			42	53
600																			44	53			45	57
650																			47	57			47	61
700																			50	60			50	65

Frontside free, upperside not free



Temperature rise [Kelvin]

Dissipa-tion	PS 220		PS 230		PS 320		PS 330		PS 340		PS 352		PS 420		PS 430		PS 440/442		PS 452		PS 530		PS 542/546	
	500×500		500×750		750×500		750×750		750×1.000		750×1.250		1.000×500		1.000×750		1.000×1.000		1.000×1.250		1.250×750		1.250×1.000	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10	6	7	4	5	4	5							4	5										
20	10	12	8	9	8	9	6	8	5	6	4	5	7	8	5	7					4	6		
30	14	16	11	12	11	13							9	11										
40	17	20	13	15	13	16	11	13	9	11	7	9	12	14	9	12	7	9	5	7	7	10	5	7
50	20	24	16	18	16	20							14	17										
60	24	28	19	21	18	23	15	18	12	15	10	13	16	20	12	16	10	12	8	9	10	14	7	10
70	27	32	21	24	21	26																		
80	30	35	24	27	23	28	19	23	16	19	13	16	20	25	15	20	12	16	10	12	13	18	9	13
90	33	39	26	29	25	31																		
100	36	42	28	32	28	34	23	28	19	23	16	19	24	30	18	24	15	19	11	14	15	21	11	15
120	41	49	33	37	32	39	27	32	22	27	18	22	28	35	21	28					18	24		
140	47	55	37	42	36	45	31	36	24	30	21	25	32	39	24	32	19	25	15	19	20	28	15	20
160	52	62	41	46	40	50	34	40	27	33	23	28	35	44	27	35					22	31		
180			45	51	44	55	37	44	30	37	25	30	39	48	29	39	23	30	18	23	24	34	18	24
200			49	55	48	60	41	48	32	40	27	33	42	53	32	42								
220			53	60	52	64	44	52	35	43	30	36	46	57	35	46	28	35	22	27	29	40	21	28
240							47	56	38	46	32	38	49	61	37	49								
260							50	60	40	49	34	41	52	65	40	52	32	40	25	31	33	45	24	32
280									43	52	36	43			42	56								
300									45	55	38	46			44	59	35	45	28	34	37	51	27	36
350									51	63	43	52			50	66	40	51	31	39	42	58	31	41
400											48	58					45	57	35	43	46	64	34	46
450											52	64					49	63	38	48	51	70	38	50
500																	53	68	42	52			41	55
550																			45	56			44	59
600																			48	60			48	63
650																			51	64			51	67

General purpose enclosures technical details

Power dissipation values – PolySafe

Stand alone — **Temperature rise [Kelvin]**

Dissipa-tion	PS 220		PS 230		PS 320		PS 330		PS 340		PS 352		PS 420		PS 430		PS 440/442		PS 452		PS 530		PS 542/546	
	500×500		500×750		750×500		750×750		750×1.000		750×1.250		1.000×500		1.000×750		1.000×1.000		1.000×1.250		1.250×750		1.250×1.000	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
20	7	9	6	7	6	8	4	6					5	7										
40	13	15	10	13	10	13	8	10	6	8	5	6	8	12	6	8	5	6	4	5	5	7		
60	17	21	14	17	14	19	11	14					11	16	8	11								
80	22	26	17	22	17	23	13	18	10	13	9	11	14	21	10	14	8	11	7	9	8	12	7	9
100	26	31	21	26	20	28	16	21					17	25	12	16								
120	30	36	24	30	24	33	19	25	14	18	12	15	20	28	14	19	11	15	9	12	12	17	9	13
140	34	41	27	34	27	37	21	28					22	32	16	22								
160	38	46	30	38	30	41	24	31	18	23	15	19	25	36	17	24	14	19	12	15	15	21	12	16
180	42	50	33	42	33	45	26	34					27	39	19	26								
200	46	55	36	46	36	49	28	37	21	27	18	23	29	43	21	29	17	22	14	18	17	25	14	19
220	50	59	39	50	38	53	30	40					32	46	23	31								
250			43	55	43	59	34	45	25	33	21	27	35	51	25	34	20	27	17	22	21	30	17	23
300			50	64	49	68	39	52	29	38	25	31	41	59	29	40	23	31	19	25	24	34	19	27
350							44	58	33	43	28	36	46	67	33	45	26	35	22	29	27	39	22	30
400							49	65	37	48	31	40	51	75	36	50	29	39	24	32	30	43	24	34
450							54	71	41	53	34	43			40	55	32	43	27	35	33	48	27	37
500									44	57	37	47			44	60	35	47	29	38	36	52	29	40
550									48	62	40	51			47	65	38	51	32	41	39	56	31	43
600									51	66	43	55			50	69	41	54	34	44	42	60	34	46
700											49	62					46	61	38	50	48	68	38	53
800											54	69					51	68	43	56	53	76	42	58
900																			47	61			47	64
1.000																			51	67			51	70

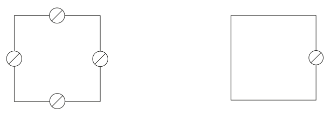
General purpose enclosures technical details

MultiBox – dimensions

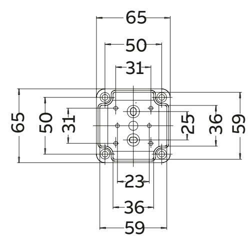
MB11 - MB42

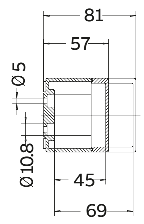
Polystyrene/ Polycarbonate | **Polycarbonate***

MB11

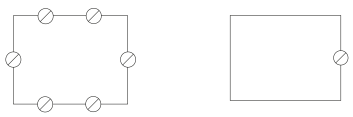


Metric knockouts
⊘ = M16/20

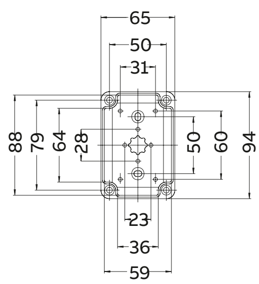


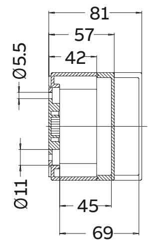


MB21

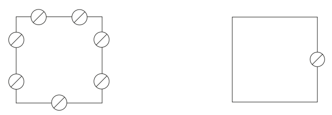


Metric knockouts
⊘ = M16/20

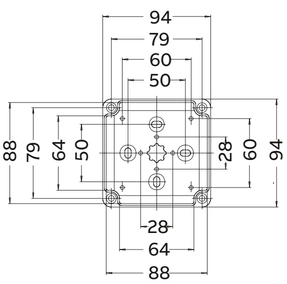


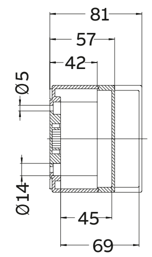


MB22

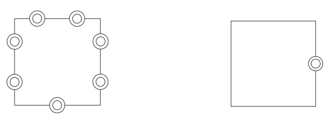


Metric knockouts
⊘ = M16/20

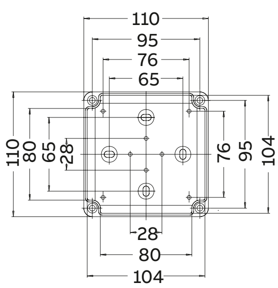


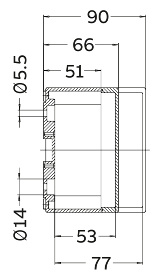


MB33



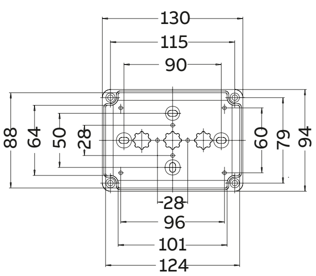
Metric knockouts
◎ = M20/25

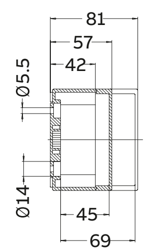




MB42

Metric knockouts
⊘ = M16/20





(*) Smooth = one metric knock-out on short side for power supply cord

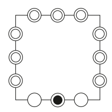
General purpose enclosures technical details

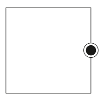
MultiBox – dimensions

MB44-MB75

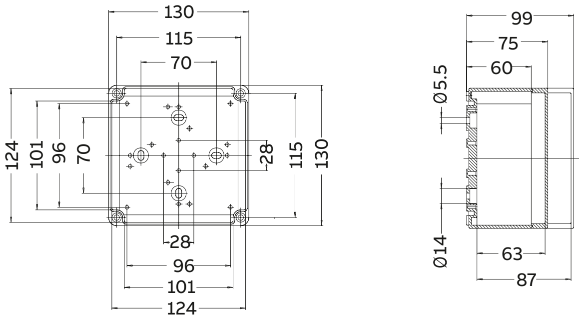
Polystyrene/ Polycarbonate	**Polycarbonate***

MB44

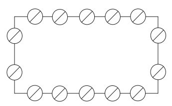


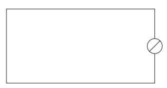


Metric knockouts
○ = M20
◎ = M20/25
● = M25/32

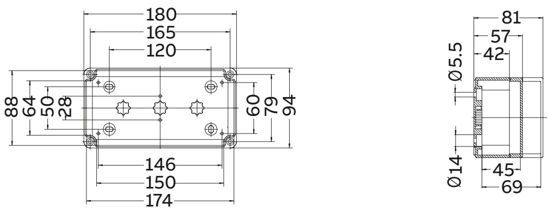


MB52

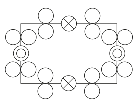




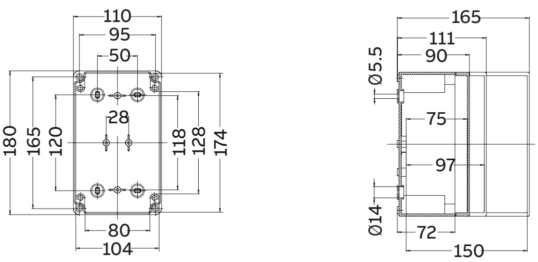
Metric knockouts
⊘ = M16/20



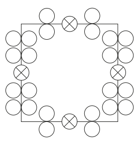
MB53

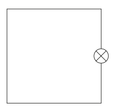


Metric knockouts
○ = M20
◎ = M20/25
● = M25/32
⊗ = M32/40

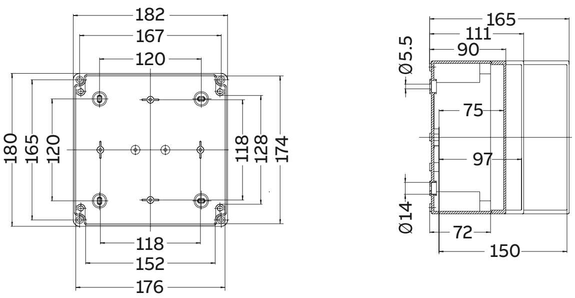


MB65

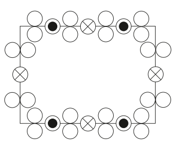


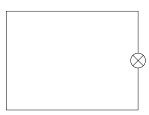


Metric knockouts
○ = M20
⊗ = M32/40

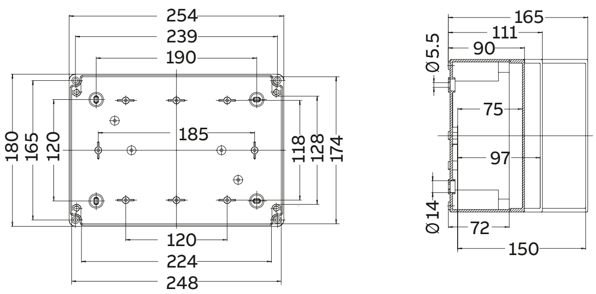


MB75





Metric knockouts
○ = M20
● = M25/32
⊗ = M32/40



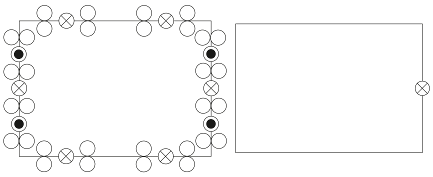
(*) Smooth = one metric knock-out on short side for power supply cord

General purpose enclosures technical details
MultiBox – dimensions

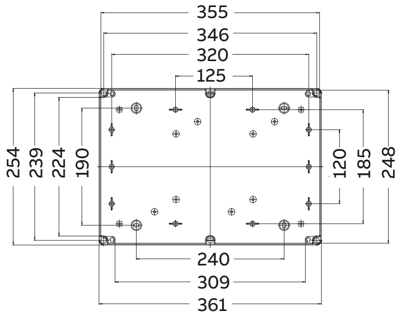
MB87

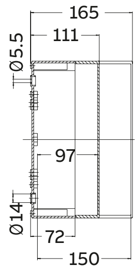
Polystyrene/ Polycarbonate | **Polycarbonate***

MB87



Metric knockouts
○ = M20
◉ = M25/32
⊗ = M32/40





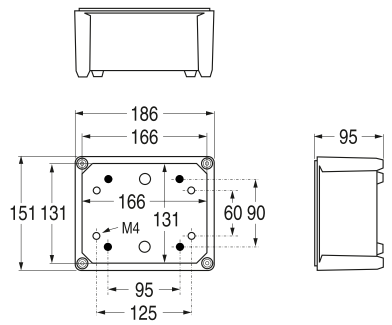
(*) Smooth = one metric knock-out on short side for power supply cord

General purpose enclosures technical details

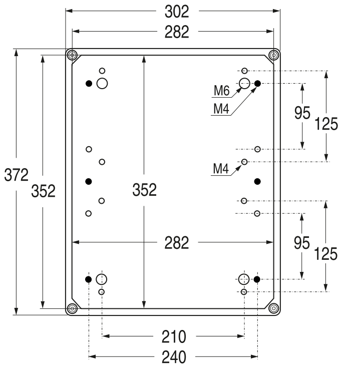
APO – dimensions

Bases

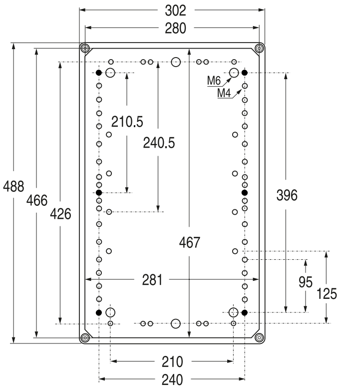
APO 1



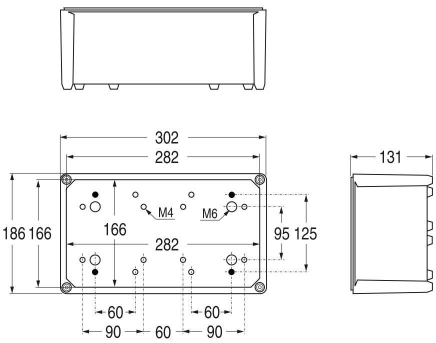
APO 71



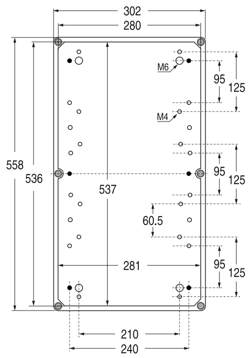
APO 51



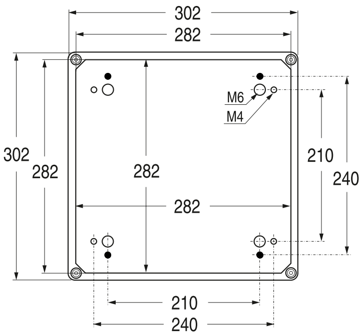
APO 31



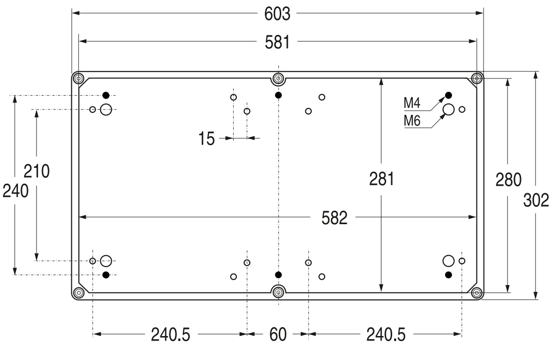
APO 81



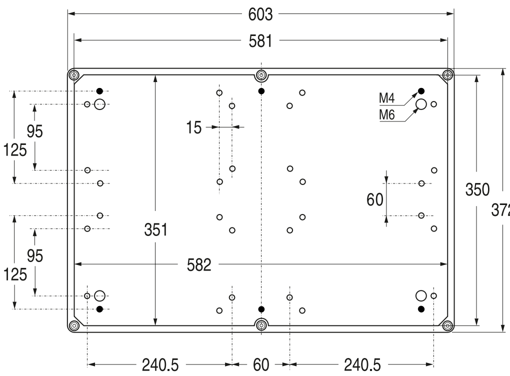
APO 41



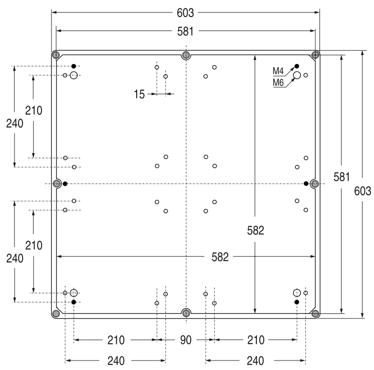
APO 61



APO 11



APO 12



● = insert standard delivered in APO boxes (base + cover) ○ = with insert M4 or M6

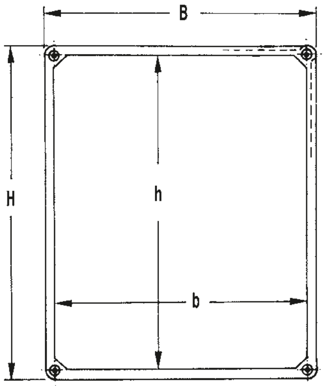
24

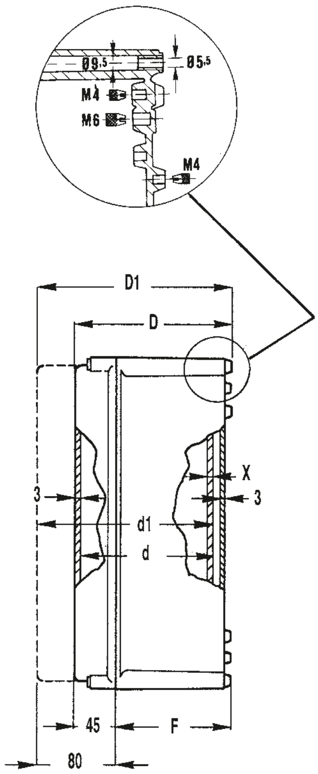
General purpose enclosures technical details

APO - dimensions

For mounting

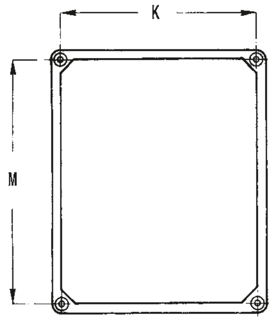
Boxes



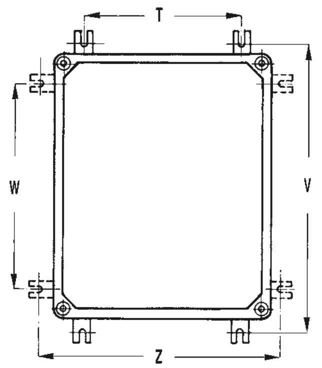


Wall mounting

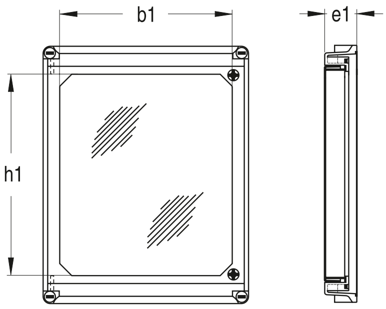
Direct to the wall



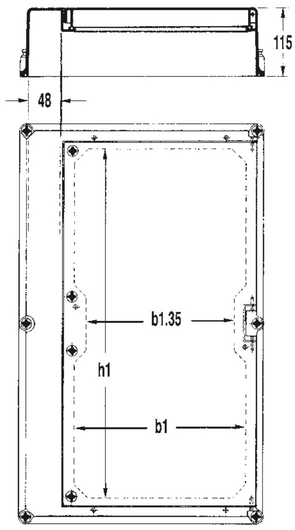
With stainless steel mounting brackets



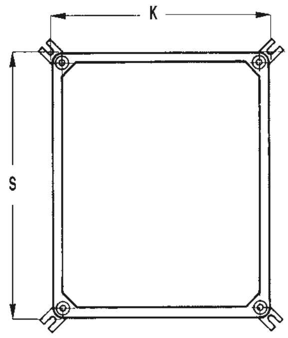
Transparant hinged cover



APO 11
Hinged cover with side flange



With polyamide mounting brackets



Dimensions

H	B	D	D1	h	b	d	d1	F	h1	b1	e1	Type	K	M	R	S	T	V	W	Z
186	151	140	-	166	131	118-X	-	95	-	-	-	**APO 1**	131	166	155	190	-	-	-	-
302	186	175	-	282	166	150-X	-	130	110	260	45	**APO 31**	282	166	190	306	125	312	241	197
302	302	175	-	282	282	150-X	-	130	225	260	45	**APO 41**	282	282	306	306	241	313	241	313
372	302	175	-	352	282	150-X	-	130	295	260	45	**APO 71**	282	352	376	306	241	383	311	313
488	302	175	210	467	281	150-X	185-X	130	410	260	45	**APO 51**	280	466	490	304	241	499	427	313
558	302	175	210	537	281	150-X	185-X	130	-	-	-	**APO 81**	280	536	561	305	241	569	497	313
603	302	175	210	582	281	150-X	185-X	130	525	260	45	**APO 61**	280	581	606	305	241	614	542	313
603	372	175	210	582	351	150-X	185-X	130	525	260	115	**APO 11**	350	581	606	374	311	614	542	383
603	603	175	210	582	582	150-X	185-X	130	-	-	-	**APO 12**	581	581	605	605	542	614	542	614

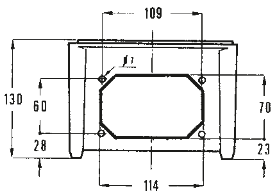
X = thickness of mounting plate

General purpose enclosures technical details

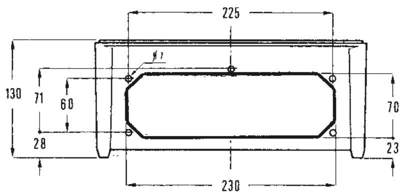
APO – dimensions

Cut-outs in side panels

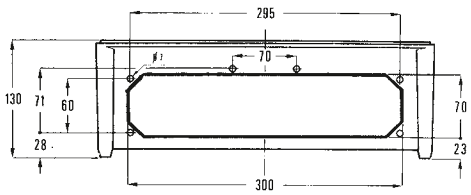
Side 185



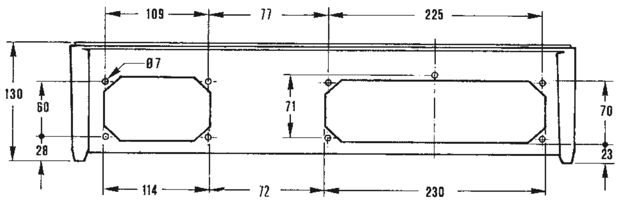
Side 300



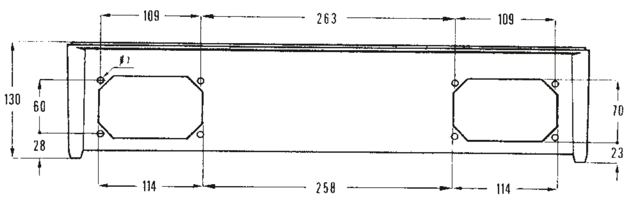
Side 370



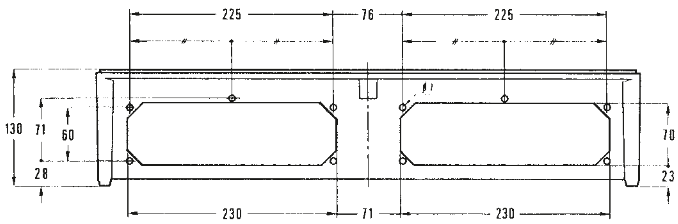
Side 485



Side 555



Side 600

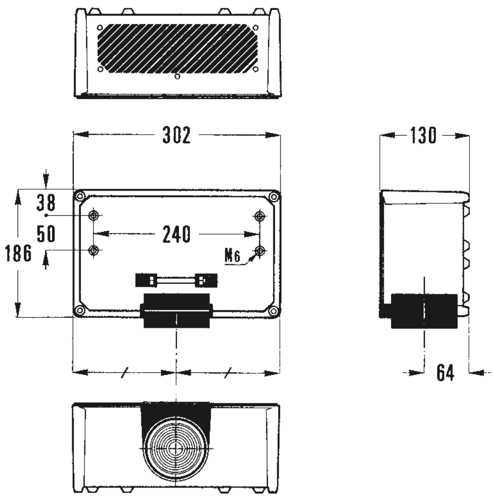


General purpose enclosures technical details

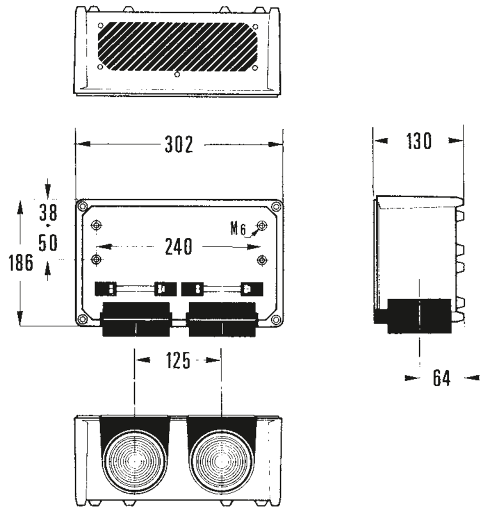
APO – dimensions
Cable-end boxes

APO 31

1 entry

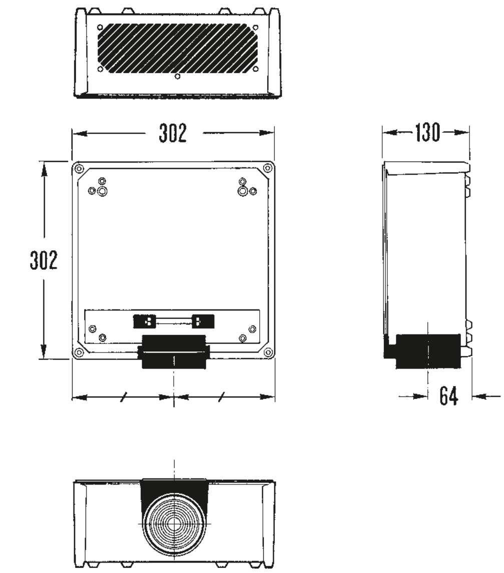


2 entries



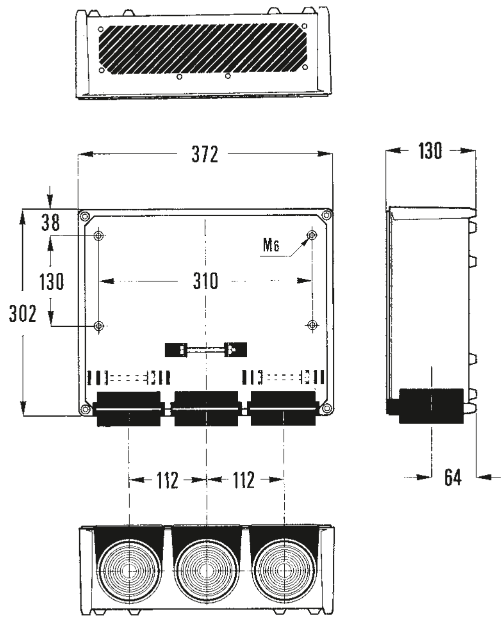
APO 41

1 entry



APO 71

3 entries

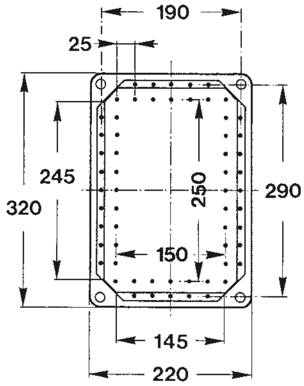


General purpose enclosures technical details

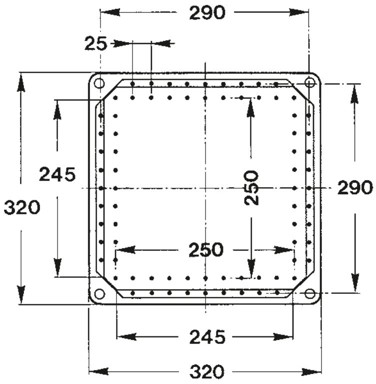
VMS – dimensions

Bases

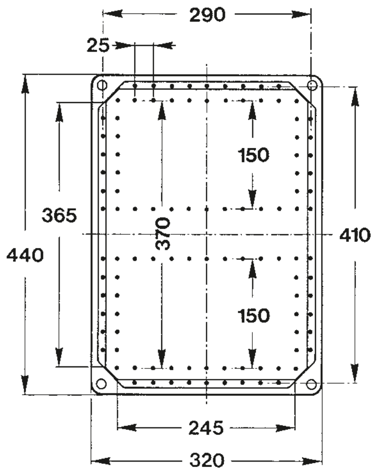
VMS 32



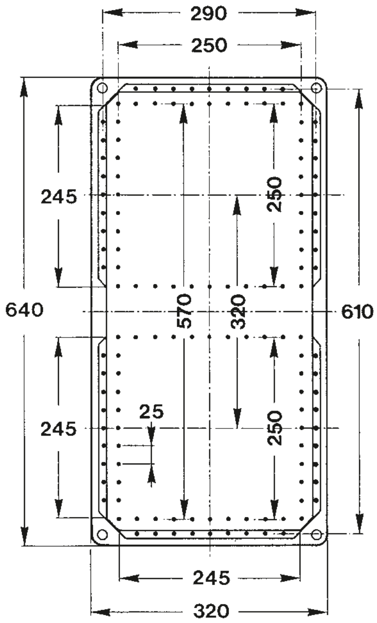
VMS 33



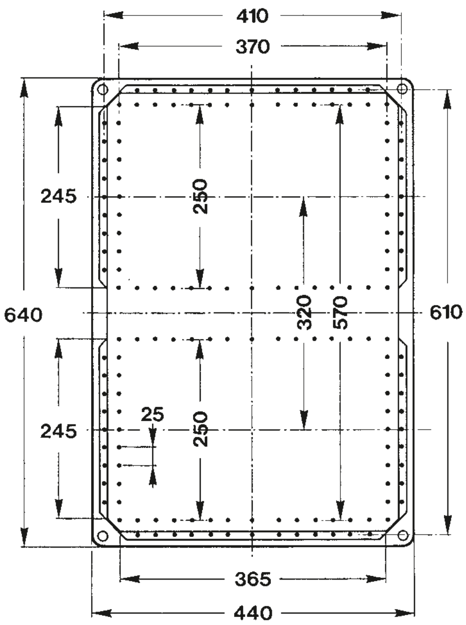
VMS 43



VMS 63



VMS 64



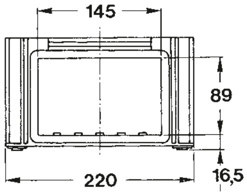
General purpose enclosures technical details

VMS – dimensions

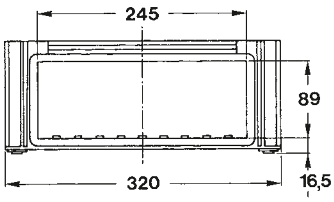
Bases

Openings in the base side walls

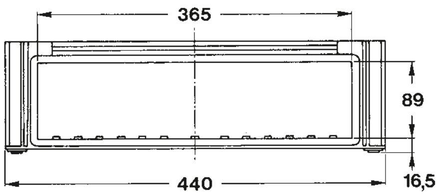
Side 220



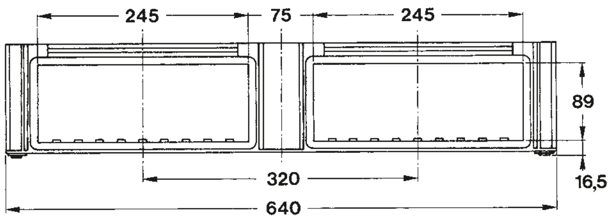
Side 320



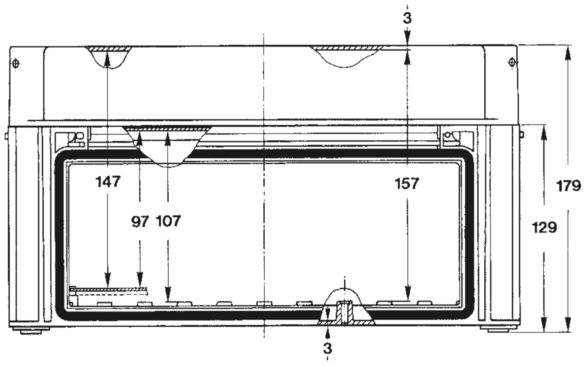
Side 440



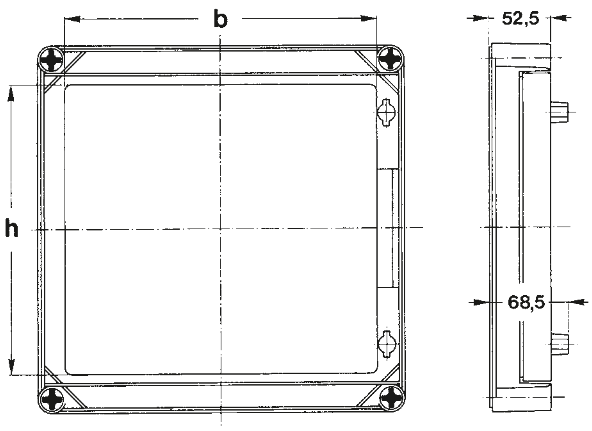
Side 640



Built-in heights



Pivoting covers



Type	Dimensions	b	h
VMS 33	320×320mm	260	241
VMS 43	440×320mm	260	361

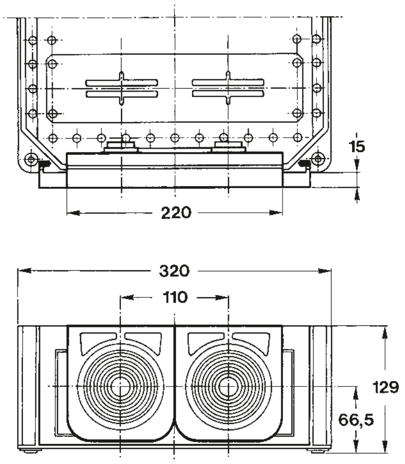
General purpose enclosures technical details

VMS – dimensions

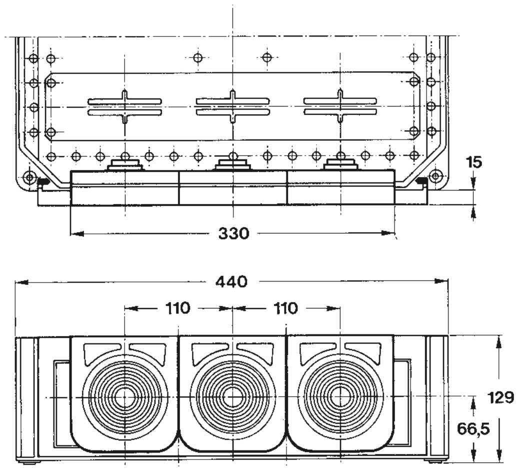
Bases

Cable end plates and universal cable stress releases

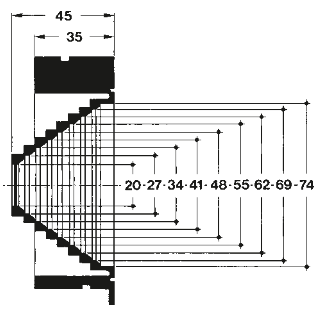
Side 320



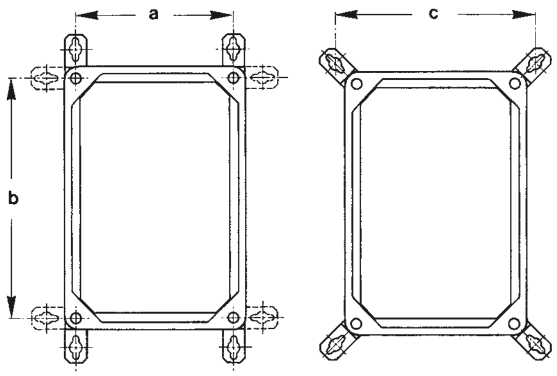
Side 440



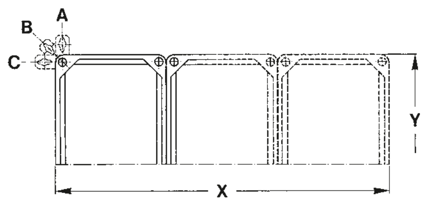
Side view



Mounting brackets



Type	Dimensions	a	b	c
VMS 32	320×220 mm	193	293	254
VMS 33	320×320 mm	293	293	354
VMS 43	440×320 mm	293	413	354
VMS 63	640×320 mm	293	613	354
VMS 64	640×440 mm	413	613	474



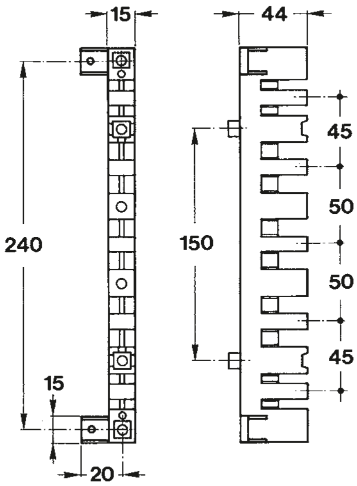
	Centre dimensions	
A	X - 27	Y + 40
B	X + 34	Y + 34
C	X + 40	Y - 27

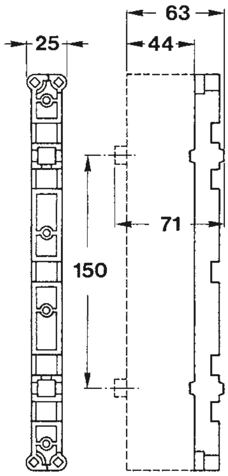
General purpose enclosures technical details

VMS – dimensions

Busbar supports

630 A–1 250 A - parallel

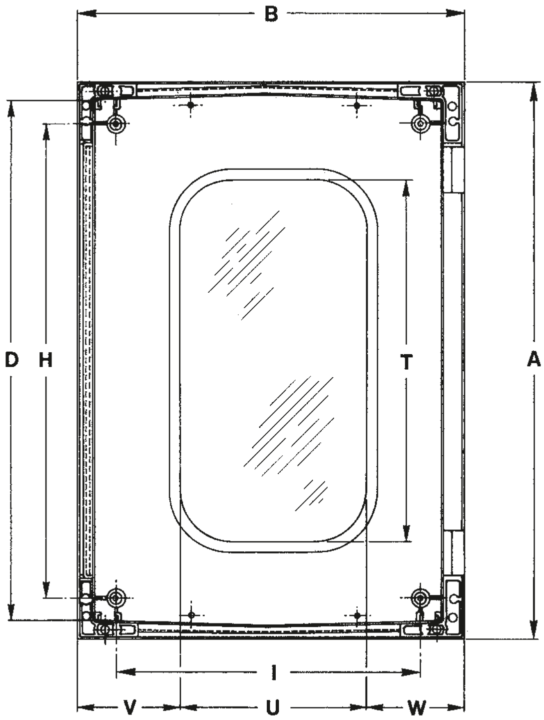


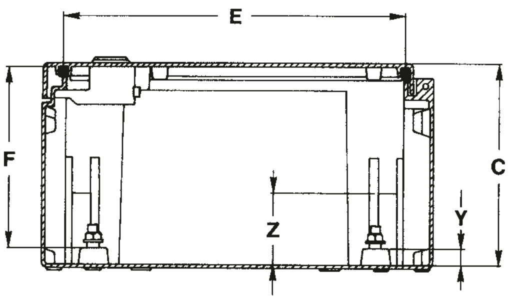


General purpose enclosures technical details

ARIA – dimensions

Cabinets

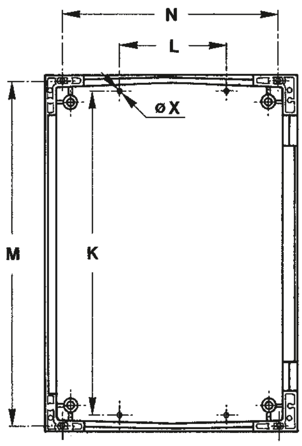




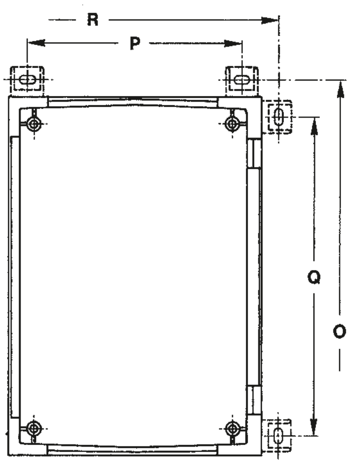
Dimensions							
ARIA	**32**	**43**	**54**	**64**	**75**	**86**	**108**
A	315	415	515	615	735	835	1035
B	215	315	415	415	535	635	835
C	170	170	230	230	270	300	300
D	275	375	475	575	675	775	975
E	170	270	370	370	470	570	770
F	148	148	208	208	248	278	277
H	225	325	425	525	625	725	925
I	125	225	325	325	425	525	725
K	275	375	475	575	675	775	975
L	70	150	200	200	300	400	600
M	295	395	495	595	-	-	-
N	155	255	355	355	-	-	-
O	362	462	562	662	782	882	1082
P	162	262	362	362	482	582	782
Q	262	362	462	562	682	782	982
R	262	362	462	462	582	682	882
T	-	280	380	480	580	680	880
U	-	130	230	230	330	430	630
V	-	70	70	70	80	80	80
W	-	115	115	115	125	125	125
X	6	6	6	6	8	8	8
Y	14	14	15,5	15,5	15,5	15,5	15,5
Z	28	25	88	88	118	148	148

Wall mounting

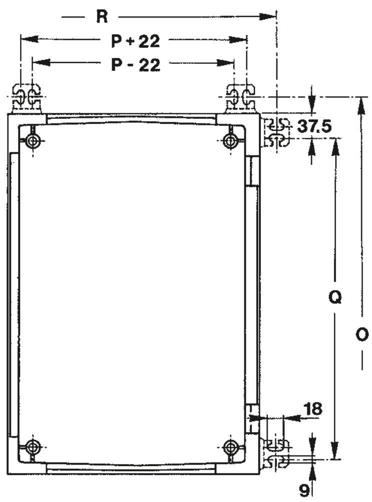
Direct to the wall



By fixing lugs in polyamide



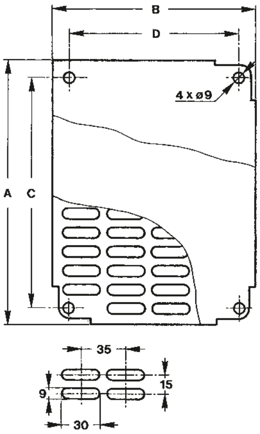
By fixing lugs in stainless steel



General purpose enclosures technical details

ARIA – dimensions

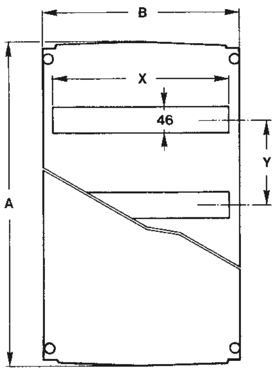
Mounting plates



Dimensions				
ARIA	**A**	**B**	**C**	**D**
32	250	150	225	125
43	350	250	325	225
54	450	350	425	325
64	550	350	525	325
75	650	450	625	425
86	750	550	725	525
108	950	750	925	725

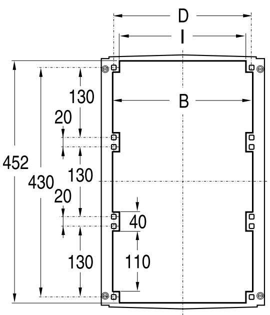
Cover plates

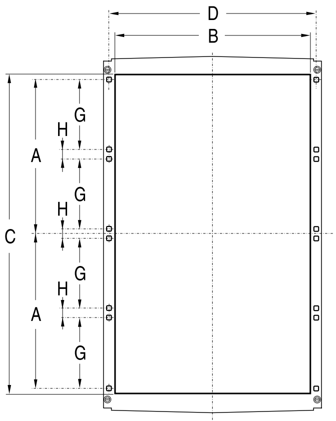
Plain and with openings for DIN-rail equipment

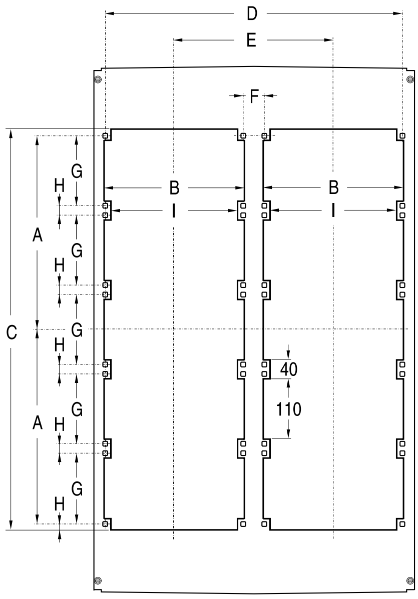


Dimensions				
ARIA	**A**	**B**	**X**	**Y**
32	2 rows 279	162	108	125
43	2 rows 379	262	216	150
54	3 rows 479	362	324	150
64	3 rows 579	362	324	150
75	4 rows 690	462	396	150
86	4 rows 790	562	2 x 216	150
108	5 rows 990	762	2 x 324	150

Cover plates with cut-out for individual modular cover plates

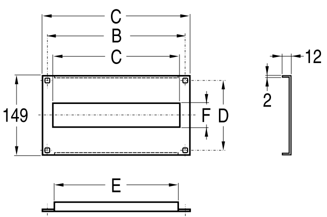






Dimensions									
Type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**Mod.**
ARIA 43	140	216	302	236	-	-	130	20	-	24
ARIA 54	-	308	-	303	-	-	-	-	283	51
ARIA 64	-	326	-	336	-	-	-	-	316	54
ARIA 75	290	400	602	428	-	-	130	20	-	88
ARIA 86	290	216	602	524	288	52	130	20	-	96
ARIA 108	365	326	752	732	396	60	130	20	316	180

Individual modular cover plate

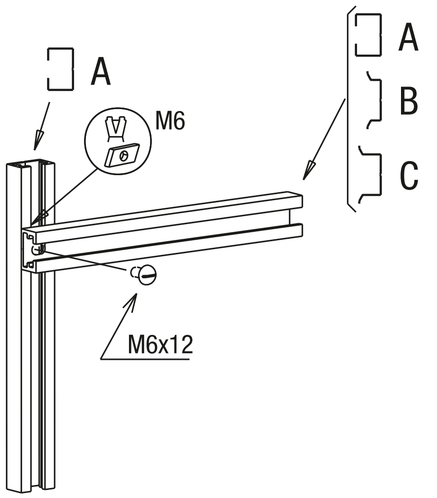


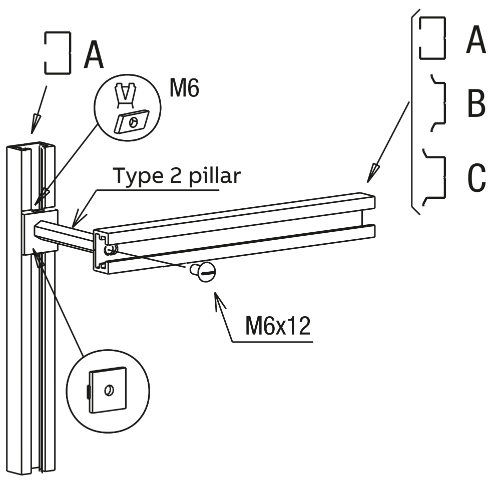
Dimensions						
Type	**A**	**B**	**C**	**D**	**E**	**F**
831796	255	236	216	130	210	46
831797	255	236	0	130	210	0
831798	322	303	306	130	280	46
831799	322	303	0	130	280	0
831800	355	336	324	130	312	46
831801	355	336	0	130	312	0
831802	455	428	396	130	396	46
831803	455	428	0	130	396	0

General purpose enclosures technical details

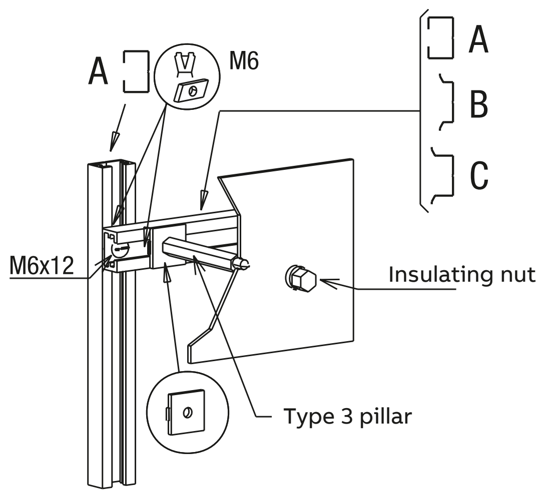
PolySafe – Alu frame mounting applications

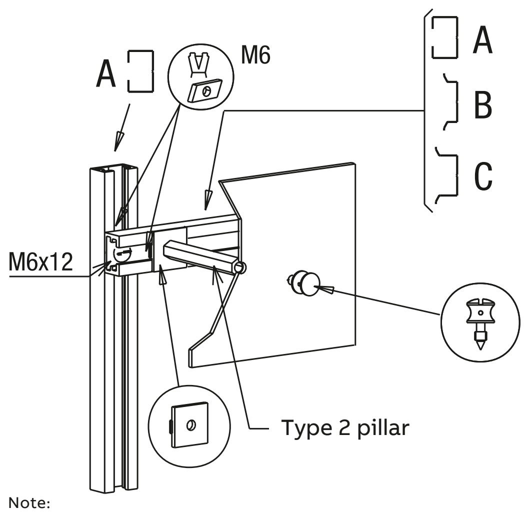
Alu frame with progressive adjustment





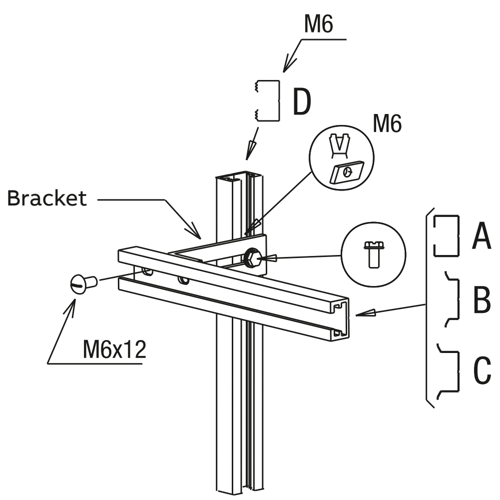
Installation of the cover plate





Note:
Same installation technique as for the cover plate on the mounting plate.

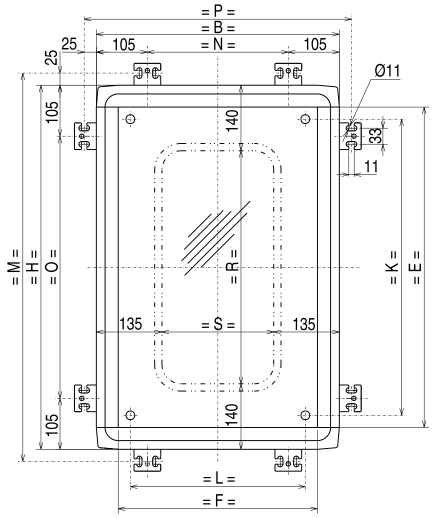
Alu frame with adjustment in 12.5 mm increments

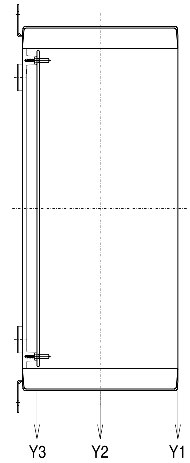


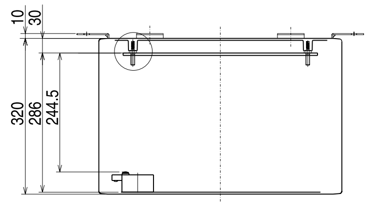
General purpose enclosures technical details

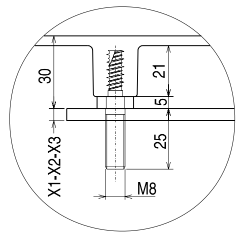
PolySafe – dimensions

Enclosures

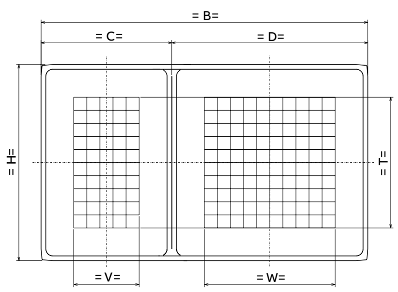


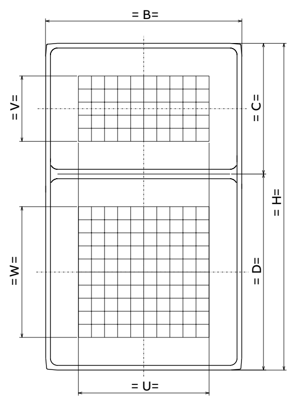






Usable mounting space on the doors





Dimensions

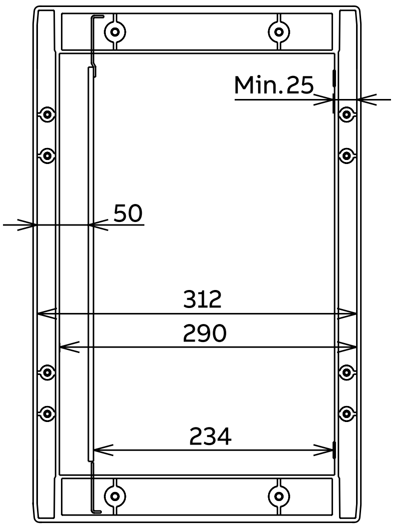
Type	H	B	C	D	E	F	K	L	M	N	O	P	R	S	T	U	V	W	X1	X2	X3	Y1	Y2	Y3
220	500	500			410	410	360	360	550	290	290	550	220	230	250	250			5	2	-	8	80	110
230	500	750			410	660	360	610	550	540	290	800	220	480	250	500			5	2	-	8	80	110
320	750	500			660	410	610	360	800	290	540	550	470	230	500	250			5	2	-	8	80	110
330	750	750			660	660	610	610	800	540	540	800	470	480	500	500			5	2	-	8	80	110
340	750	1.000			660	910	610	860	800	790	540	1050	470	730	500	750			5	2	-	6	80	110
352	750	1.250	500	750	660		610	1.110	800	1.040	540	1.300			500		250	500	5	2	10	5	80	110
420	1.000	500			910	410	860	360	1.050	290	790	550	720	230	750	250			5	2	-	8	80	110
430	1.000	750			910	660	860	610	1.050	540	790	800	720	480	750	500			5	2	-	8	80	110
440	1.000	1.000			910	910	860	860	1.050	790	790	1.050	720	730	750	750			5	2	10	6	80	110
442	1.000	1.000	500	500	910		860	860	1.050	790	790	1.050			750		250	250	5	2	10	6	80	110
452	1.000	1.250	500	750	910		860	1.110	1.050	1.040	790	1.300			750		250	500	5	2	10	5	80	110
530	1.250	750			1.160	660	1.110	610	1.300	540	1.040	800	970	480	1.000	500			5	2	10	8	80	110
542	1.250	1.000	500	750		910	1.110	860	1.300	790	1.040	1.050				750	250	500	5	2	10	6	80	110
546	1.250	1.000	500	750		910	1.110	860	1.300	790	1.040	1.050				750	250	500	5	2	10	6	80	110
	Enclosure external dimensions		Door dimensions		Enclosure let-through		Centres of the mounting plate		Centres for wall mounting				Window surface		Usable mounting space on the doors				Thickness of the mounting plate			Admissible charge in kg		

X1 = pertinax 5 mm
X2 = metal perforated 2 mm
X3 = pertinax 10 mm

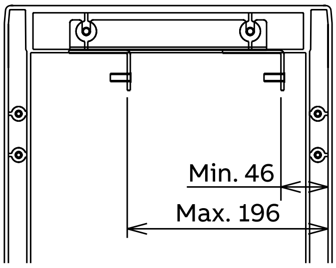
General purpose enclosures technical details

PolySafe – dimensions

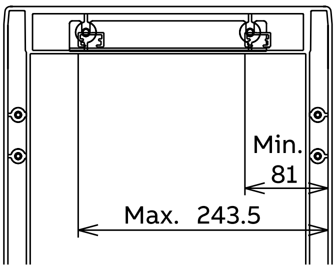
Inner door



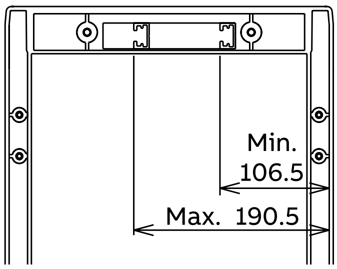
Adjustable mounting plate



Adjustable mounting frame in steps of 12.5 mm



Continuously adjustable mounting frame



General purpose enclosures technical details
Compliance with standards and technical characteristics – Gemini

Reference Standards

Standard IEC 62208 (“Empty enclosures for low voltage switch-gear and control gear assemblies. General requirements”), that has implemented at an international level the Standard EN 50298, presently EN 62208, is the prescriptive reference for Gemini switchboards.
The object of Standard CEI EN 50298 is to formulate definitions, classifications, characteristics and test prescriptions for cases designed to be used as part of protection and operating equipment (switchboards) in compliance with the Standards of the EN 61439 series, that have a maximum rated voltage of 1000 V in alternating current for maximum frequencies of 1000 Hz or 1500 V in direct current and are suitable for general use in both internal and external applications.

The Standard applies to empty enclosures, before the user has installed protection and operating devices inside them. The Standard does not apply to enclosures with structural and functional characteristics that make them subject to other prescriptions (e.g. cases for domestic installations and the like). In this case Standards IEC 60670 – CEI 23-48 (“General requirements for enclosures for accessories for household and similar fixed electrical installations”) and CEI 23-49 (“Enclosures for accessories for household and similar fixed electrical installations. Part 2: particular requirements for enclosures for protection devices and accessories dissipating a considerable power in normal use”) apply. On the basis of the indications of the ABB SACE technical characteristics’ table, the installer may have to certify compliance with Standards CEI 23-51 – EN 61439 – CEI 17-13-1
(“Part 1: standard equipment subject)

General purpose enclosures technical details
Compliance with standards and technical characteristics – Gemini

Gemini switchboards features table

Size	1	2	3	4	5	6
Gemini with transparent door	1SL0211A00	1SL0212A00	1SL0213A00	1SL0214A00	1SL0215A00	1SL0216A00
Gemini with opaque door	1SL0201A00	1SL0202A00	1SL0203A00	1SL0204A00	1SL0205A00	1SL0206A00
External dimensions WxHxD (mm)	335x400x210	460x550x260	460x700x260	590x700x260	590x855x360	840x1005x360
Internal dimensions WxHxD (mm)	250x300x180	375x450x230	375x600x230	500x600x230	500x750x330	750x900x330
IP degree	IP66	IP66	IP66	IP66	IP66	IP66
Double isolation	Sì	Sì	Sì	Sì	Sì	Sì
IK degree	10	10	10	10	10	10
GWT (°C)	750	750	750	750	750	750
Operating temperature	-25 °C … +100 °C	-25 °C … +100 °C	-25 °C … +100 °C	-25 °C … +100 °C	-25 °C … +100 °C	-25 °C … +100 °C
No. of DIN modules	24 (12x2)	54 (18x3)	72 (18x4)	96 (24x4)	120 (24x5)	216 (36x6)
No. of vertical modules (H=150 mm)	2	3	4	4	5	6
Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Color	Gray RAL7035	Gray RAL7035	Gray RAL7035	Gray RAL7035	Gray RAL7035	Gray RAL7035
Fast wiring system	Unifix L	Unifix L	Unifix L	Unifix L	Unifix L	Unifix L
No. of locks	2	2	2	2	3	3
Rated frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
STANDARD CEI 23-51(1)						
- Max. dispersible power(2)	45 W	72 W	85 W	102 W	156 W	248 W
STANDARD CEI EN 61439 Over-temperature (par. 8.2.1)(3)						
- Max. dispersible power with over-temperature of 25 °C	40 W	65 W	77 W	91 W	133 W	205 W
- Max. dispersible power with over-temperature of 30 °C	45 W	72 W	85 W	102 W	156 W	248 W
- Max. dispersible power with over-temperature of 35 °C	52 W	85 W	100 W	121 W	187 W	299 W
- Max. dispersible power with over-temperature of 40 °C	62 W	100 W	118 W	143 W	221 W	355 W
Impulse withstand (par. 8.2.2)						
- Rated service voltage(4)	≤ 800 V	≤ 800 V	≤ 800 V	≤ 800 V	≤ 800 V	≤ 800 V
- Rated impulse withstand voltage	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV

(1) Limits of applicability of the standard CEI 23-51
The standard may be applied only when the wired switchboard meets all the following conditions:
- fixed installation with average ambient temperature up to 25 °C, occasionally up to 35 °C;
- alternate current with rated voltage up to 440 V;
- input rated current up to 125 A;
- assumed short circuit rated current up to 10 kA or liming current devices protection with limited current up to 15 kA at their rated breaking capacity.

(2) Maximum dissipation power data was obtained following the indications of Standard CEI 23-49, with a temperature difference of Dt=30 °C.

(3) Note to paragraph 8.2.1 of Standard CEI EN 61439-1
The table gives the thermal dissipation values of Gemini switchboards when they are wall-mounted. The dispersible power figures (in Watts) vary according to the overtemperature allowed in the accessible parts of the switchboard and must be compared with the total amount of power dissipated by all the components installed inside the switchboard taking into due account the factor of contemporaneity.

(4) Rated service voltage according to CEI EN 61439-1 1000V AC and 1500V DC

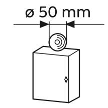
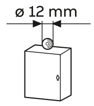
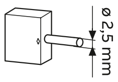
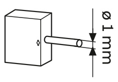
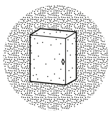
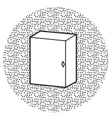
General purpose enclosures technical details

IP degree of protection – Gemini

As indicated in the following table, the IP degree of protection is expressed by two characteristic numbers depending on the behavior of the product to which it refers according to the prescriptions of CEI 70-1 and IEC 529 Standards.

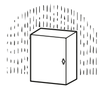
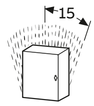
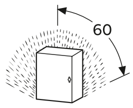
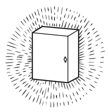
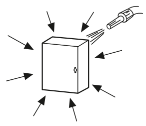
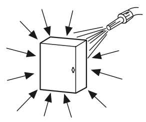
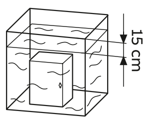
With IP66 degree of protection, Gemini switchboards are totally protected against the penetration of dusts and sprays of seawater.

First number:
protection against the penetration of solid bodies

IP		
0		No protection
1		Protection against the penetration of solid bodies with a diameter of over 50 mm
2		Protection against the penetration of solid bodies with a diameter of over 12 mm or a length of over 80 mm
3		Protection against the penetrationof solid bodies with a diameter or thickness of over 2,5 mm
4		Protection against the penetration of solid bodies with a diameter or thickness of over 1,0 mm
5		Protection against the penetration of dusts
6		Total protection against the penetration of dusts

1st number defined by Standards CEI 70-1 – IEC 60529

Second number:
protection against the penetration of water

IP		
0		No protection
1		Protection against the penetration of drops of water falling vertically
2		Protection against the penetration of drops of water falling at an angle of up to 15° from vertical
3		Protection against the penetration of drops of water falling at an angle of up to 60° from vertical
4		Protection against the penetration of splashes of water from all directions
5		Protection against the penetration of water sprayed by a hose from all directions
6		Protection against the penetration of sea water
7		Protection against the penetration of water during temporary immersion
8		Protection against the penetration of water during continual immersion

2nd number defined by Standards CEI 70-1 - IEC 60529.

General purpose enclosures technical details

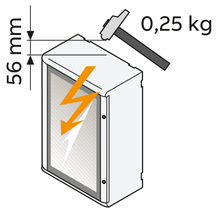
IK degree of resistance to impacts – Gemini

The IK degree is expressed in Joules in compliance with Standard CEI EN 50102.

IK 0

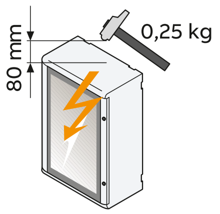
No protection against impacts

IK 01



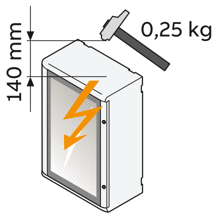
Resistance to impacts with impact energy up to 0,150 J

IK 02



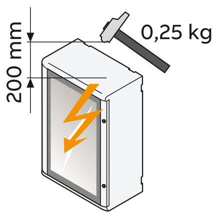
Resistance to impacts with impact energy up to 0,200 J

IK 03



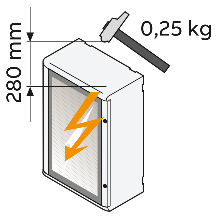
Resistance to impacts with impact energy up to 0,350 J

IK 04



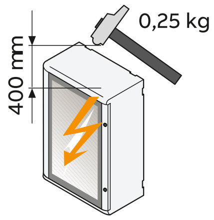
Resistance to impacts with impact energy up to 0,500 J

IK 05



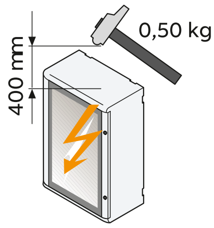
Resistance to impacts with impact energy up to 0,700 J

IK 06



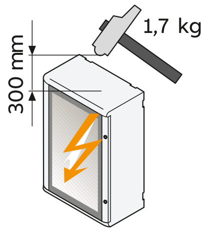
Resistance to impacts with impact energy up to 1,00 J

IK 07



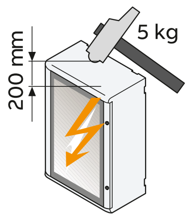
Resistance to impacts with impact energy up to 2,00 J

IK 08



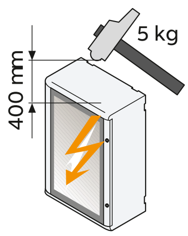
Resistance to impacts with impact energy up to 5,00 J

IK 09



Resistance to impacts with impact energy up to 10,00 J

IK 10



Resistance to impacts with impact energy up to 20,00 J

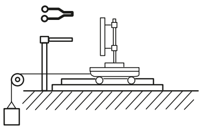
General purpose enclosures technical details

Double insulation and self-extinguishing tests – Gemini

Double insulation

Double insulation guarantees that Gemini is protected against indirect contacts on condition that the manufacturer's instructions are observed when carrying out mounting and wiring operations on the switchboard and that the appropriate accessories are used (e.g. screw-cover caps). Double insulation is indicated by the graphic symbol ⧈

Self-extinguishing tests

Test text	Equipment required	Compliance with Standards	Purpose	Test results of the test	Test conditions		
					Heat source	Test period	Characteristic elements
Glow-wire test		IEC 695-2-1 CEI 50-11	To assess the danger of fire by simulating thermal stresses produced by heat sources or by ignition (e.g. glowing elements, resistances overloaded for short intervals)	If a flame is generated, it must go out within 30 seconds of removing the glow wire. The test is conducted at temperatures of: - 650 °C - 750 °C - 850 °C - 960 °C	Glow wire ø 4 mm	30 sec.	Assessment of the time it takes for the flame to go out

General purpose enclosures technical details
Resistance to chemical agents – Gemini

Resistance to chemical agents

The behavior of Gemini switchboards in the presence of chemical agents is indicated in the table with the symbols:

Cold water	■
Hot water	■
Sulfuric acid 50%	■
Hydrochloric acid 36%	■
Acetic acid 60%	■
Benzol	▲
Gasoline	▲
Acetone	■
Ethyl alcohol	■
Ammonia	■
Dichloromethane	▲
Diesel oil - naphtha	▲
Mineral oils and greases	■
Food oils and greases	■
Perchloroethylene	▲
Trichlorethene	▲
Ethylether	■
Toluene	▲
Methanol	■
Wine	■
Fruit juices	■
Laundry lye	■
Detergents	■

Caption:
■ high resistance
▲ limited resistance

General purpose enclosures technical details
Integration with ABB products – Gemini

Installation of Tmax XT moulded-case circuit breakers

The table indicates the type of installation required for the different versions of Tmax XT moulded-case circuit breakers in Gemini switchboards.

Before carrying out wiring operations check compliance with Standards on the basis of the technical characteristics of the switchboard and circuit breaker (CEI EN 60439-1).

		XT1				XT2				XT3				XT4			
Size	**Installation**	**3p**	**4p**	**3p D**	**4p D**	**3p**	**4p**	**3p D**	**4p D**	**3p**	**4p**	**3p D**	**4p D**	**3p**	**4p**	**3p D**	**4p D**
1	D	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	O1	■	■	■	■	■	■	■	■	■	■			■	■		
	T	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2	D	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	K1	■	■	■													
	K2		■	■	■					■	■	■	■				
	O1	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■
	O2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	T	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3	D	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	K1	■	■	■													
	K2		■	■	■					■	■	■	■				
	O1	■	■	■	■	■	■	■	■	■	■	■		■	■	■	
	O2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	T	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
4	D	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	K1	■	■	■													
	K2		■	■	■					■	■	■	■				
	O1	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■
	O2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	T	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
5	D	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	K1	■	■	■													
	K2		■	■	■					■	■	■	■				
	O1	■	■	■	■	■	■	■	■	■	■	■		■	■	■	
	O2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	T	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6	D	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	K1	■	■	■													
	K2		■	■	■					■	■	■	■				
	O1	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■
	O2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	T	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Caption
- D, installation on DIN rail
- K1, installation with Tmax kit H = 150 (holes made)
- K2, installation with Tmax kit H = 300 (holes made)
- O1, installation on modular plate (1 module, H = 150 mm)
- O2, installation on modular plate (2 modules, H = 300 mm)
- T, installation on total base plate

General purpose enclosures technical details

Disposal instructions

Information about how to dispose of Gemini switchboards when they reach the end of their life

Instructions are given below about the procedures to adopt when disposing of Gemini switchboards at the end of their life cycle.

The text is drafted in the form of a table referring to Standard CEI 308-1 “Information table concerning the end of life of electric and electronic products and a compilation guide”, 2002 -04, ed. 1, pamphlet number 308-1 6454.

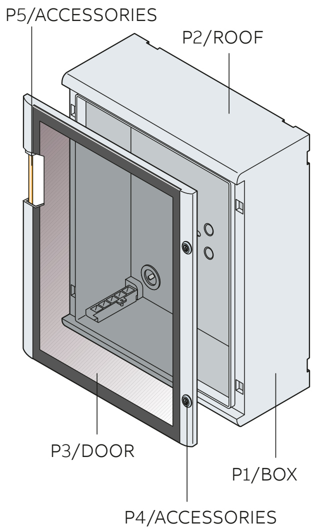
Section I – Global product specification

Name	Type of product			
Size	**With transparent door**	**With opaque door**	**Rated weight (kg)**	**External dimensions WxHxD (mm)**
1	1SL0211A00	1SL0201A00	4,3	335x400x210
2	1SL0212A00	1SL0202A00	7,9	460x550x260
3	1SL0213A00	1SL0203A00	9,5	460x700x260
4	1SL0214A00	1SL0204A00	12,0	590x700x260
5	1SL0215A00	1SL0205A00	17,8	590x855x360
6	1SL0216A00	1SL0206A00	21,1	840x1005x360

Section II – Global product table

General code: CER 17 02 03 plastic (more than 95% of the product’s weight)

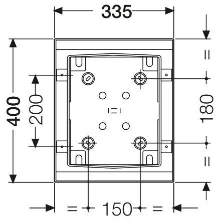
Part (P1, P2 ecc.)/ Component number	Diagram	Quantity % over total weight	Material description	Symbol	Dangerousness (Yes/No)	CER code
P1/BOX		~ 80%	Polypropylene	>PP<	No	17 02 03
P2/ROOF			Polycarbonate	>PP<	No	17 02 03
P3/DOOR		~ 20%	Steel	>PC<	No	17 04 05
P4/ACCESSORIES		< 5%	Brass	-	No	17 04 01
P5/ACCESSORIES		< 5%	Polypropylene	-	No	17 02 03



General purpose enclosures technical details

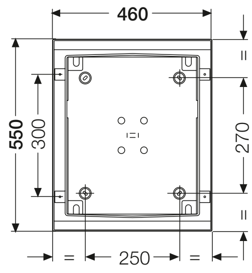
Overall dimensions – Basic configuration

Front view



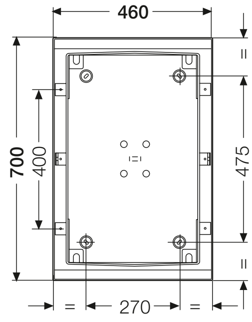
Size 1

1SL0201A00 - 1SL0211A00 - 1SL0221A00



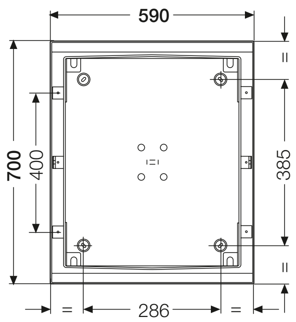
Size 2

1SL0202A00 - 1SL0212A00 - 1SL0222A00



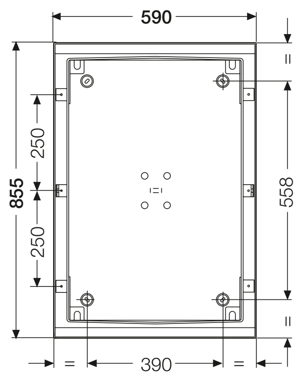
Size 3

1SL0203A00 - 1SL0213A00 - 1SL0223A00



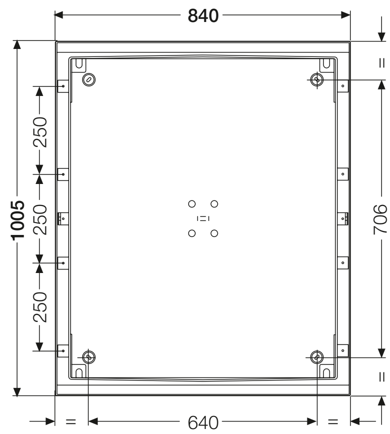
Size 4

1SL0204A00 - 1SL0214A00 - 1SL0224A00



Size 5

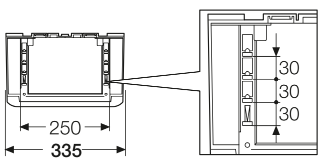
1SL0205A00 - 1SL0215A00 - 1SL0225A00



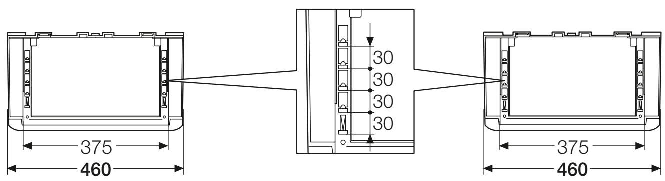
Size 6

1SL0206A00 - 1SL0216A00 - 1SL0226A00

Top view

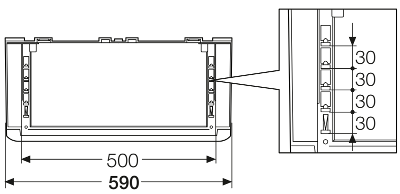


Size 1

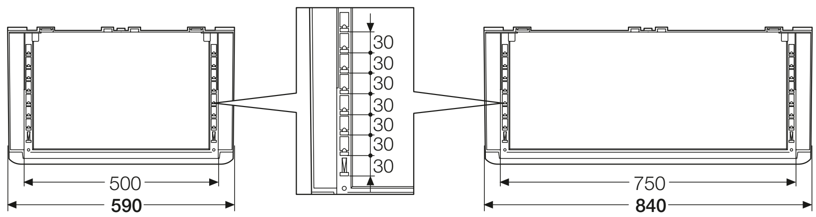


Size 2

Size 3



Size 4



Size 5

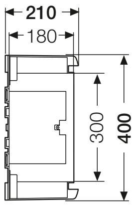
Size 6

Measurements are expressed in millimeters.

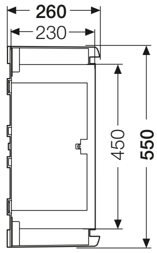
General purpose enclosures technical details

Overall dimensions – Basic configuration

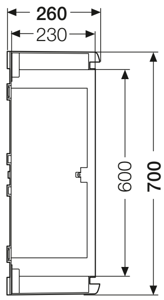
Side view



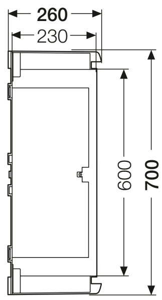
Size 1



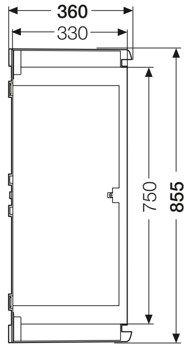
Size 2



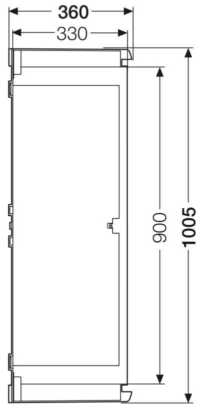
Size 3



Size 4

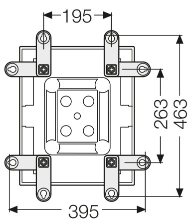


Size 5

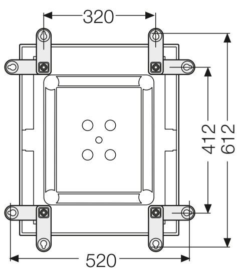


Size 6

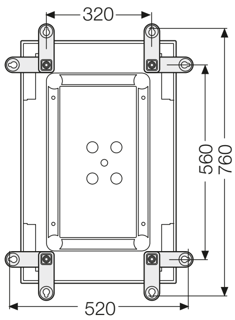
Installation with plastic brackets



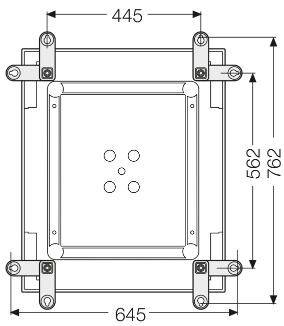
Size 1



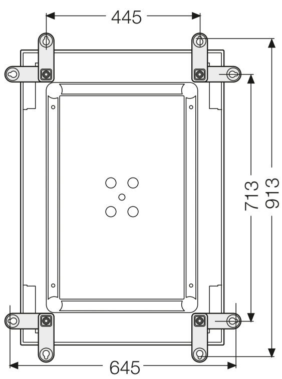
Size 2



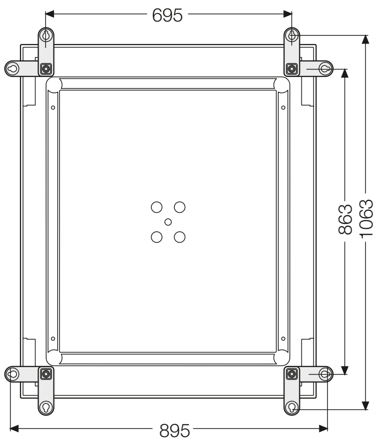
Size 3



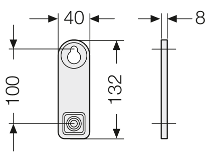
Size 4



Size 5



Size 6



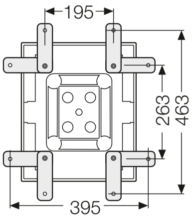
Bracket

Measurements are expressed in millimeters.

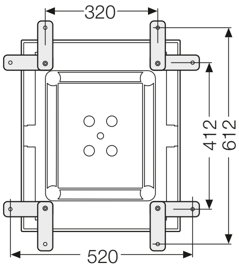
General purpose enclosures technical details

Overall dimensions – Basic configuration

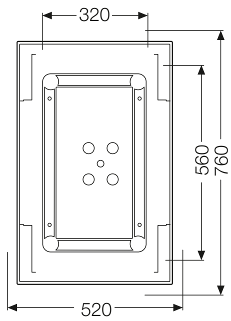
Installation with stainless steel brackets



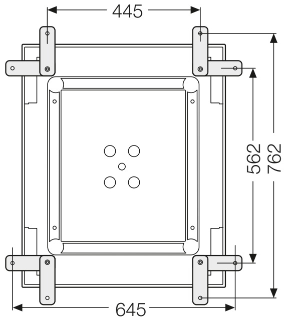
Size 1



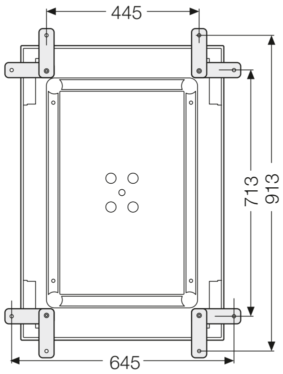
Size 2



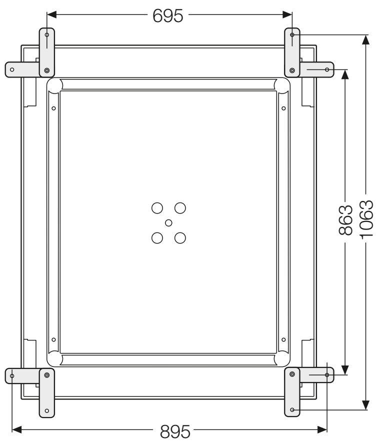
Size 3



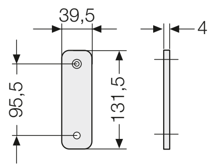
Size 4



Size 5

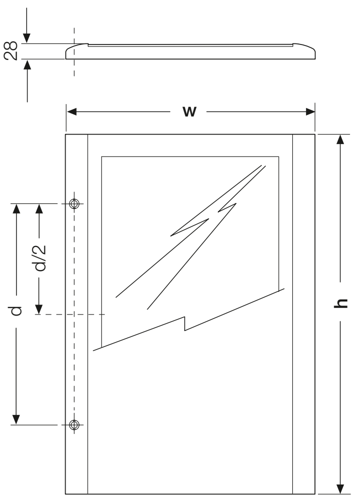


Size 6

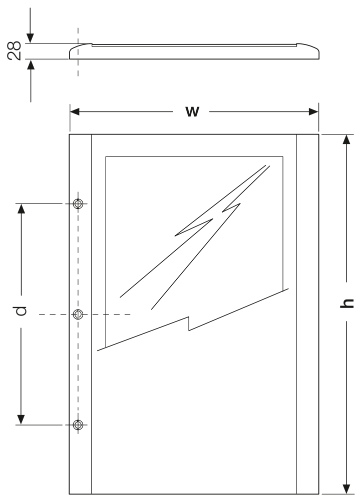


Bracket

External opaque and transparent doors



Size 1, 2, 3, 4



Size 5, 6

Size	w	h	Locks	d = lock distance
1	325	349	2	200
2	450	499	2	300
3	450	649	2	400
4	575	649	2	400
5	575	799	3	500
6	825	949	3	750

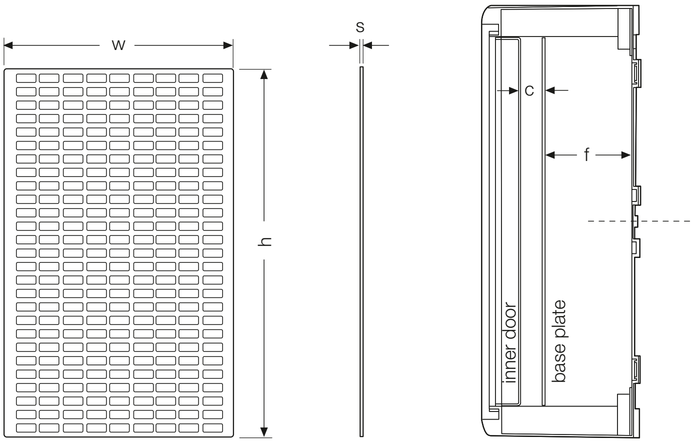
Measurements are expressed in millimeters.

General purpose enclosures technical details

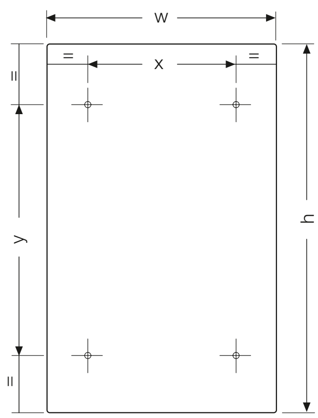
Overall dimensions – Components for automation applications

Base plate

Metal, drilled



Metal, blank and insulating



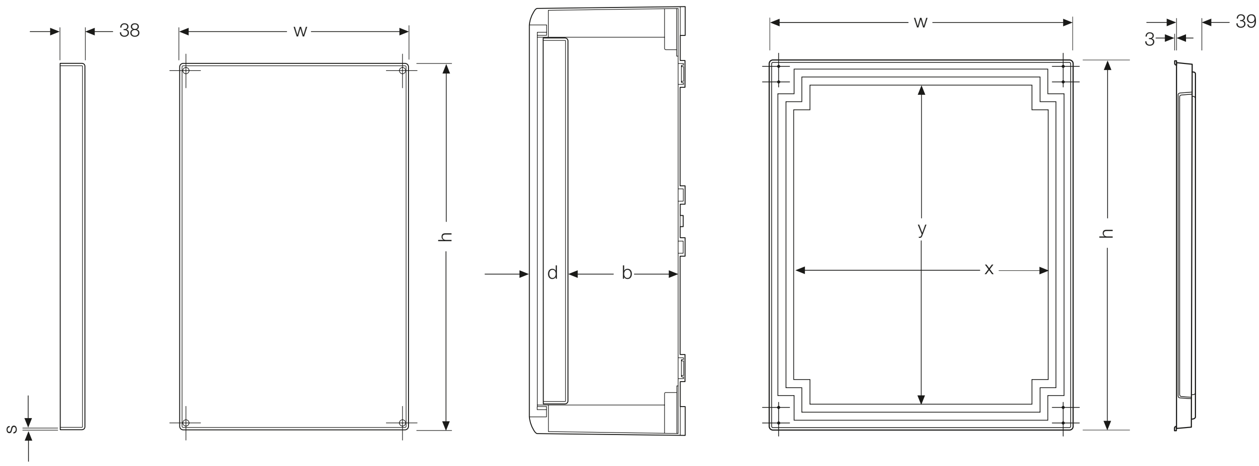
Size	w	h	Metal, blank and drilled	Insulating	f = base distance		c = distance inner door		Distance of the plate from the inner door
			s	s	MIN.	MAX.	MIN.	MAX.	
1	235	285	2	5	16,3	91	33,5	110	-
2	360	435	2	5	36,4	140	33,5	139	152,4
3	360	585	2	5	36,4	140	33,5	139	152,4
4	485	585	2	5	36,4	140	33,5	139	152,4
5	485	735	2	5	47	244	33,5	228	252,0
6	735	885	2	5	47	244	33,5	228	252,0

The distance of the plate from the base and inner door depends on the installation point selected for mounting the plate on the box.

Drilling for base mounting with code 1SL0383A00

Size	x	y
1	–	–
2	337	248
3	337	398
4	462	398
5	462	548
6	711	698

Inner doors



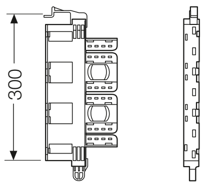
Size	w	h	s	Inner door distance		x	y
				d = door	b = base		
1	250	300	3	63	128	245	295
2	375	450	4	63	177	365	435
3	375	600	4	63	177	215	435
4	500	600	4	63	177	340	440
5	500	750	4	63	277	340	590
6	750	900	4	63	277	585	735

Measurements are expressed in millimeters.

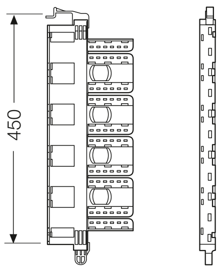
General purpose enclosures technical details

Overall dimensions – Components for distribution and mixed applications

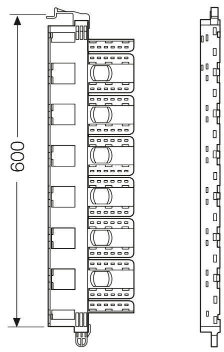
Uprights



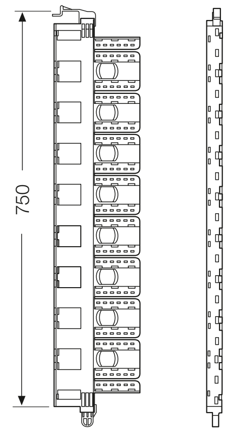
Size 1



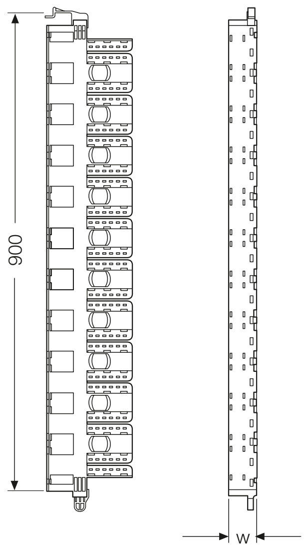
Size 2



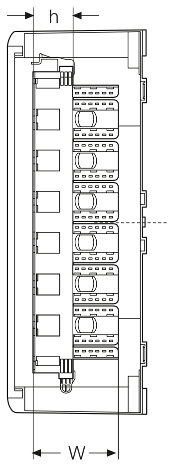
Size 3, 4



Size 5



Size 6



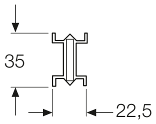
Upright		Duct	
Size	**W**	**w**	**h**
1	132	18	46
2	152	27	46
3	152	27	46
4	152	27	46
5	152	36	46
6	152	55	46

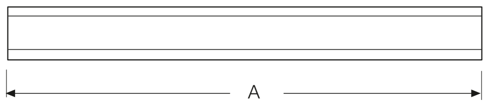
Measurements are expressed in millimeters.

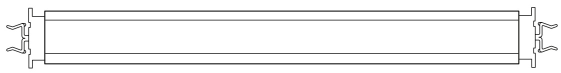
General purpose enclosures technical details

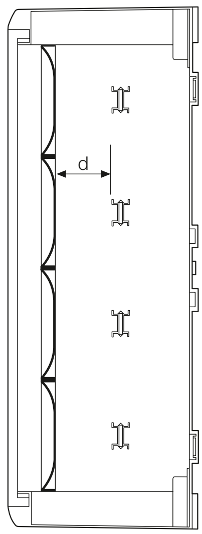
Overall dimensions – Components for distribution and mixed applications

DIN rails







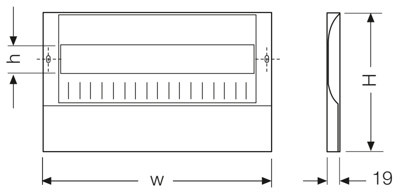


Size	A	d = distance between panel with holes/DIN rail					
		pos. 1	pos. 2	pos. 3	pos. 4	pos. 5	pos. 6
1	210	51	63,5	76	88,5	-	-
2	318	51	63,5	76	88,5	101	113,5
3	318	51	63,5	76	88,5	101	113,5
4	443	51	63,5	76	88,5	101	113,5
5	443	51	63,5	76	88,5	101	113,5
6	663	51	63,5	76	88,5	101	113,5

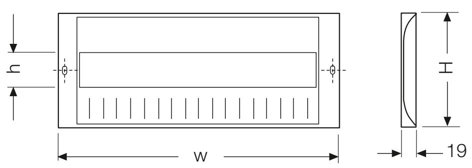
The distances of the DIN rail from the Panel depend on depth adjustment made through rail mountings.

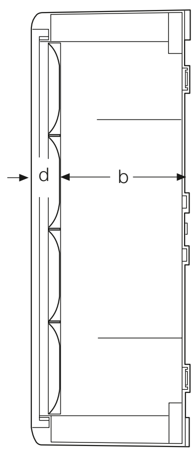
Drilled panels

1 + 1/2 module



1 module





Drilled panel	1 mod.		1+1/2 mod.		Window		Panel distance	
Size	w	H	w	H	h	module	d = door	b = base
1	250	150	-	-	46	12	44	145
2	375	150	375	225	46	18	44	197
3	375	150	375	225	46	18	44	197
4	500	150	500	225	46	24	44	197
5	500	150	500	225	46	24	44	297
6	750	150	750	225	46	36	44	297

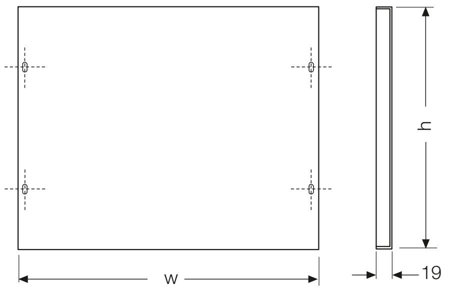
Measurements are expressed in millimeters.

General purpose enclosures technical details

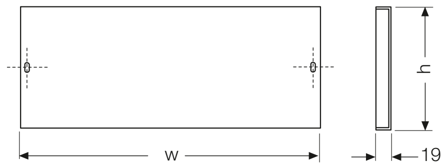
Overall dimensions – Components for distribution and mixed applications

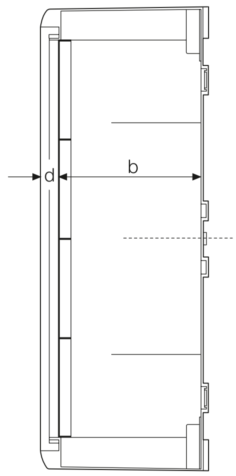
Blank panels

Blank panel 2 modules

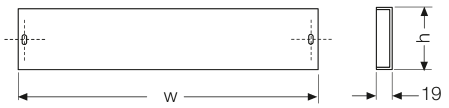


Blank panel 1 module





Blank panel 1/2 module



Size	1/2 mod.		1 mod.		2 mod.		Panel distance	
	w	h	w	h	w	h	d = door	b = base
1	250	75	250	150	250	300	26,5	162
2	375	75	375	150	375	300	26,5	214
3	375	75	375	150	375	300	26,5	214
4	500	75	500	150	500	300	26,5	214
5	500	75	500	150	500	300	26,5	314
6	750	75	750	150	750	300	26,5	314

Measurements are expressed in millimeters.

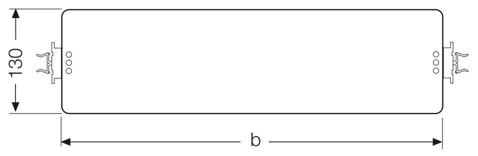
General purpose enclosures technical details

Overall dimensions – Components for distribution and mixed applications

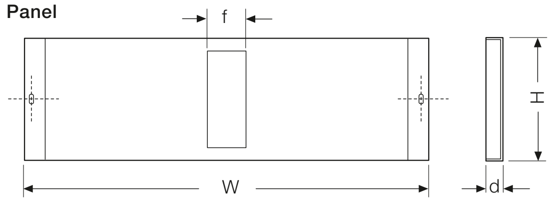
Kit for Tmax

Kit H 150

Plate

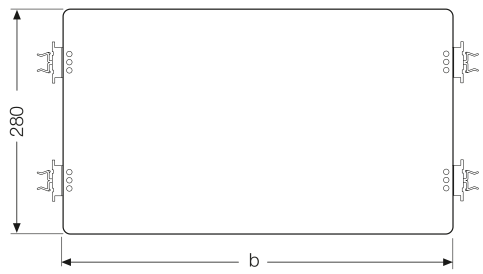


Panel

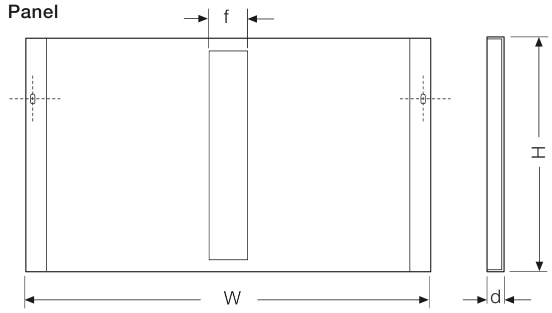


Kit H 300

Plate



Panel



kit for Tmax H 150 (available for sizes 2-6)

Size	W	H	d	f	b
2	375	150	19	46	318
3	375	150	19	46	318
4	500	150	19	46	443
5	500	150	19	46	443
6	750	150	19	46	663

kit for Tmax H 300 (available for sizes 2-6)

Size	W	H	d	f	b
2	375	300	19	46	318
3	375	300	19	46	318
4	500	300	19	46	443
5	500	300	19	46	443
6	750	300	19	46	663

Measurements are expressed in millimeters.

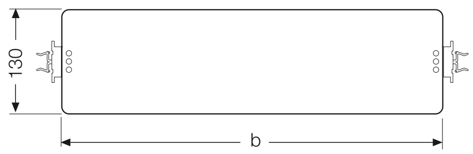
General purpose enclosures technical details

Overall dimensions – Components for distribution and mixed applications

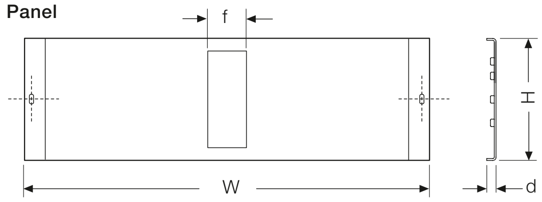
Kit for Tmax XT

Kit H 150

Plate

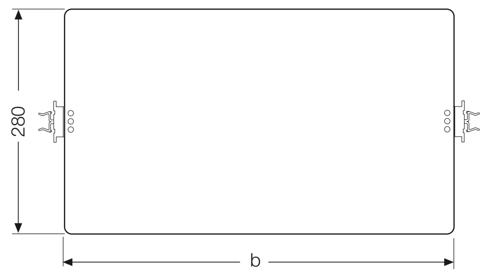


Panel

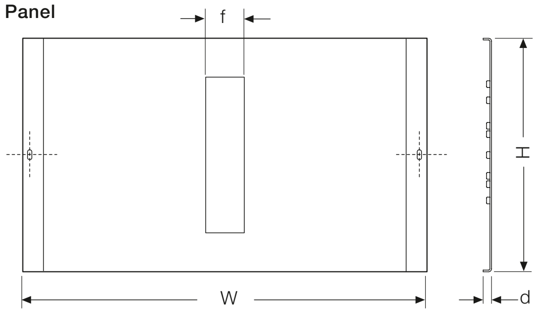


Kit H 300

Plate



Panel



kit for Tmax XT H 150 (available for sizes 2-6)

Size	W	H	d	f	b
2	375	150	10	46	318
3	375	150	10	46	318
4	500	150	10	46	443
5	500	150	10	46	443
6	750	150	10	46	663

kit for Tmax XT H 300 (available for sizes 2-6)

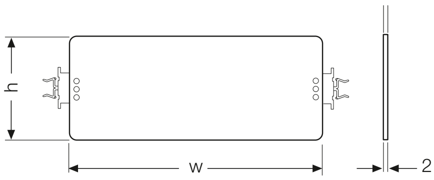
Size	W	H	d	f	b
2	375	300	10	46	318
3	375	300	10	46	318
4	500	300	10	46	443
5	500	300	10	46	443
6	750	300	10	46	663

Measurements are expressed in millimeters.

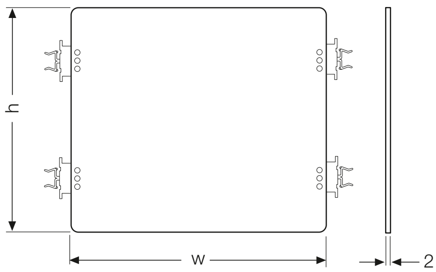
General purpose enclosures technical details

Overall dimensions – Components for distribution and mixed applications

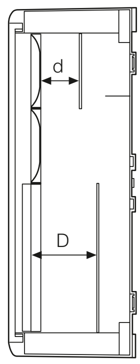
Modular plates

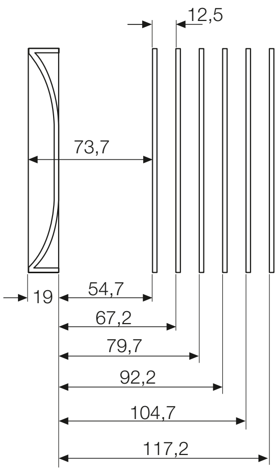


1 module

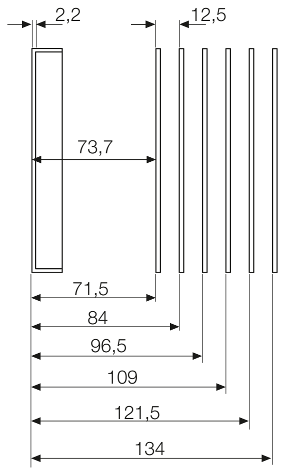


2 modules





Drilled panel



Blank panel

Size	1 module		2 modules	
	w	h	w	h
1	210	130	-	-
2	318	130	318	280
3	318	130	318	280
4	443	130	443	280
5	443	130	443	280
6	663	130	663	280

D = distance blank panel/plate					
pos. 1	pos. 2	pos. 3	pos. 4	pos. 5	pos. 6
71,5	84	96,5	109	-	-
71,5	84	96,5	109	121,5	134
71,5	84	96,5	109	121,5	134
71,5	84	96,5	109	121,5	134
71,5	84	96,5	109	121,5	134
71,5	84	96,5	109	121,5	134

d = distance drilled panel/plate					
pos. 1	pos. 2	pos. 3	pos. 4	pos. 5	pos. 6
54,7	67,2	79,7	92,2	-	-
54,7	67,2	79,7	92,2	104,7	117,2
54,7	67,2	79,7	92,2	104,7	117,2
54,7	67,2	79,7	92,2	104,7	117,2
54,7	67,2	79,7	92,2	104,7	117,2
54,7	67,2	79,7	92,2	104,7	117,2

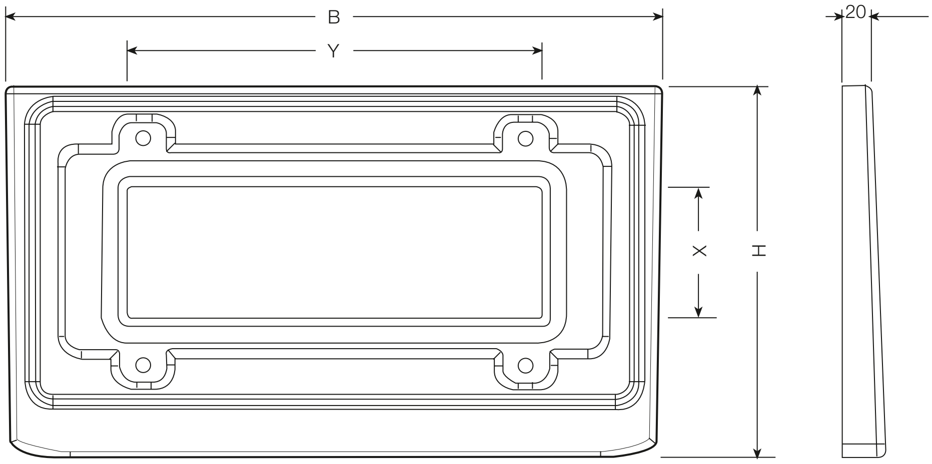
The distance of the panels from the modular plates depends on the depth at which the DIN rail is regulated by using fixing devices.

Measurements are expressed in millimeters.

General purpose enclosures technical details

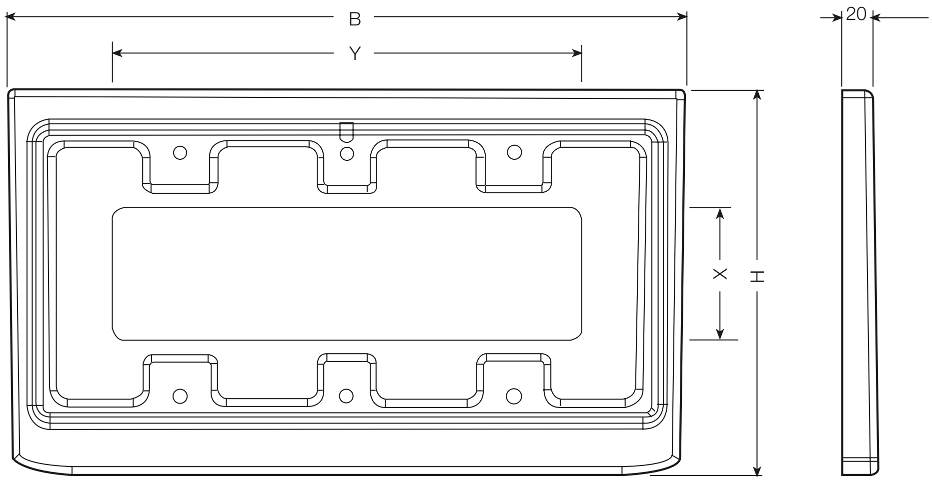
Overall dimensions – Components for distribution and mixed applications

Coupling kit



Size	B	H	X	Y
1	-	-	-	-
2	455	258	90	286
3	455	258	90	286
4	583	260	90	412
5	583	360	190	412
6	834	360	190	662

Bottom base H 30



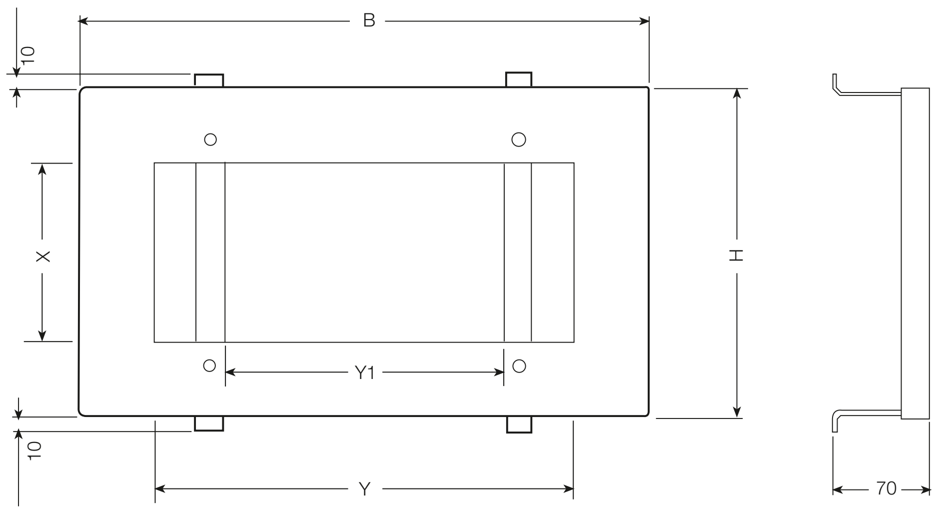
Size	B	H	X	Y
1	-	-	-	-
2	458	260	91	316
3	458	260	91	316
4	583	260	91	440
5	590	366	164	400
6	840	366	164	640

Measurements are expressed in millimeters.

General purpose enclosures technical details

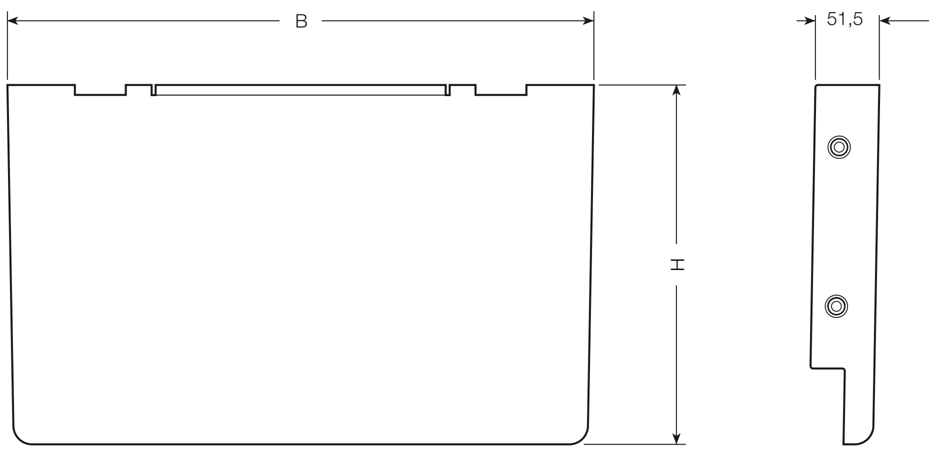
Overall dimensions – Components for distribution and mixed applications

Fixed frame



Size	B	H	X	Y	Y1
1	-	-	-	-	-
2	415	240	130	305	205
3	415	240	130	305	205
4	540	240	130	430	330
5	584	330	210	480	280
6	834	330	210	730	530

Integral cover



Size	B	H
1	347	238
2	472	289
3	472	289
4	600	289
5	604	390
6	854	390

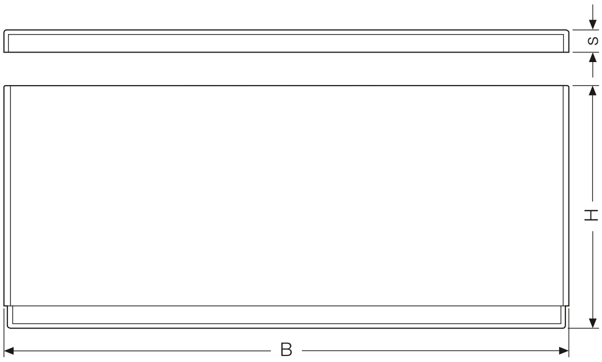
Measurements are expressed in millimeters.

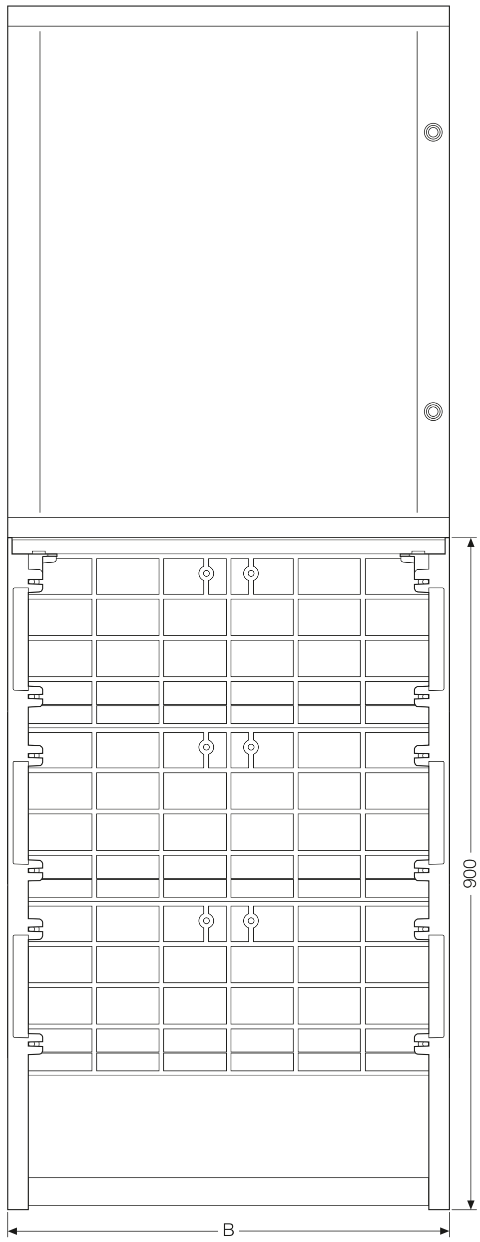
General purpose enclosures technical details

Overall dimensions – Components for distribution and mixed applications

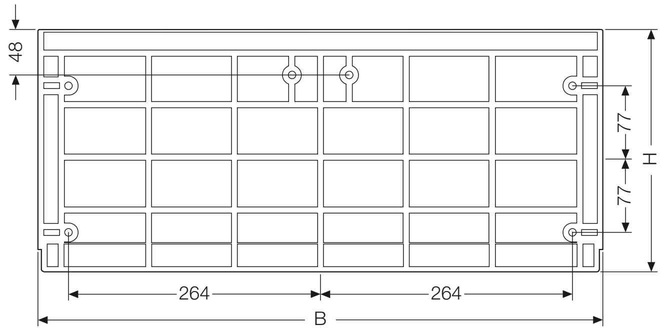
Pedestal

Front view

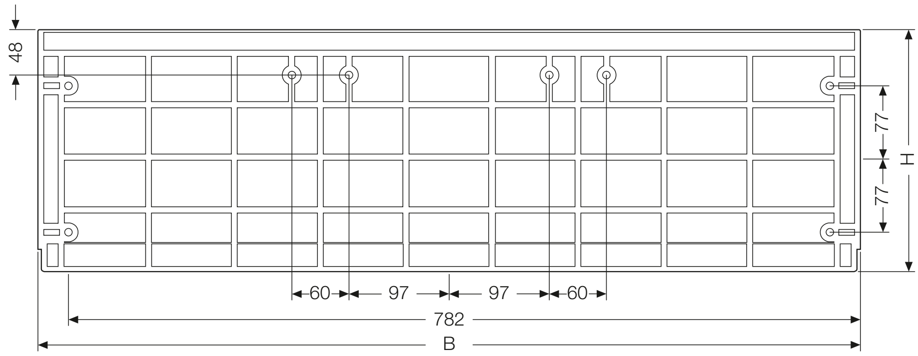




Size 4, 5



Size 6



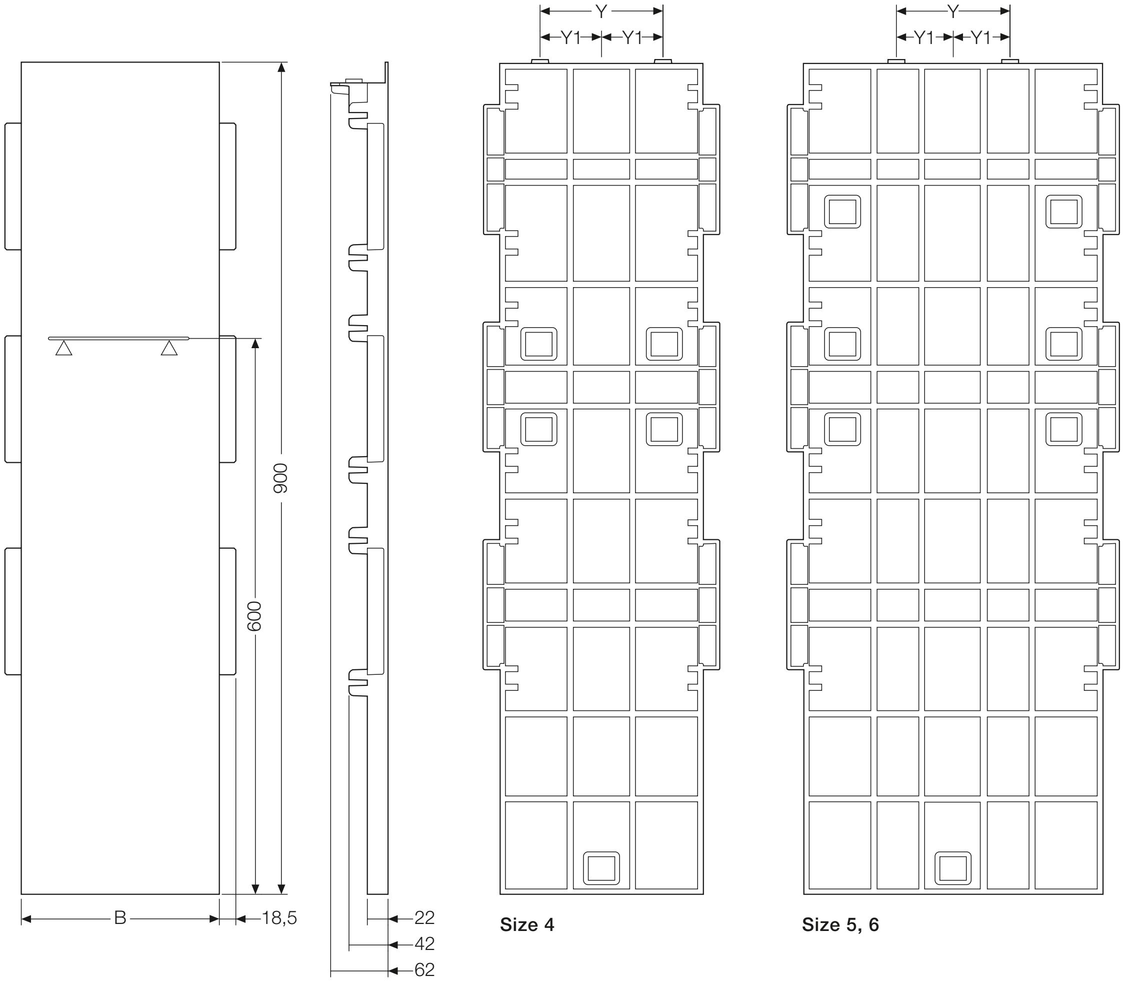
Size	B	H	s
4	592	254	28
5	592	254	28
6	846	254	28

Measurements are expressed in millimeters.

General purpose enclosures technical details

Overall dimensions – Components for distribution and mixed applications

Side view



Size 4

Size 5, 6

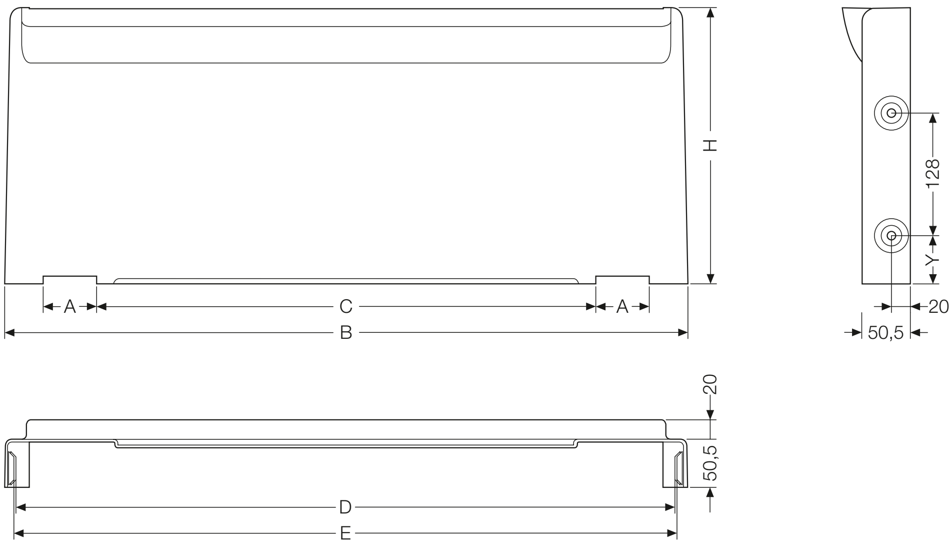
Size	B	Y	Y1
4	213	130	65
5	313	120	60
6	313	120	60

Measurements are expressed in millimeters.

General purpose enclosures technical details

Overall dimensions – Components for distribution and mixed applications

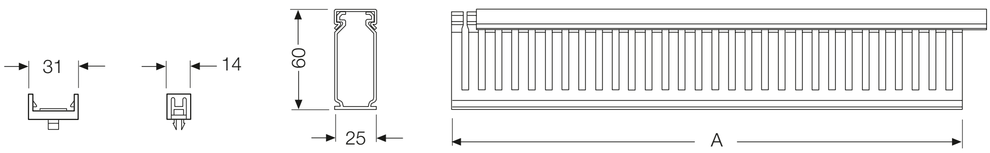
Horizonal Gemini kit



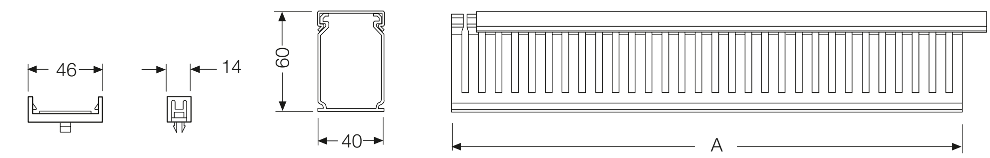
Size	A	B	C	H	Y	D	E
3	56	715,6	523	288	51	692	696
4	56	715,6	523	288	51	692	696
5	60	870	660	388	151	844	848
6	60	1021	810	388	153	994	998

Wiring kit

Duct 25x60 mm



Duct 40x60 mm



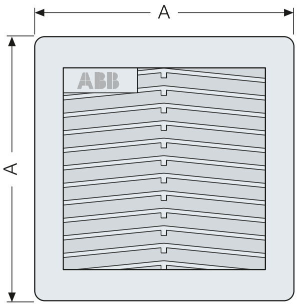
Size	A
1	210
2	318
3	318
4	443
5	443
6	663

Measurements are expressed in millimeters.

General purpose enclosures technical details

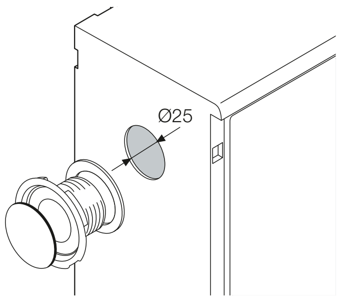
Overall dimensions – Components for distribution and mixed applications

Ventilation kit

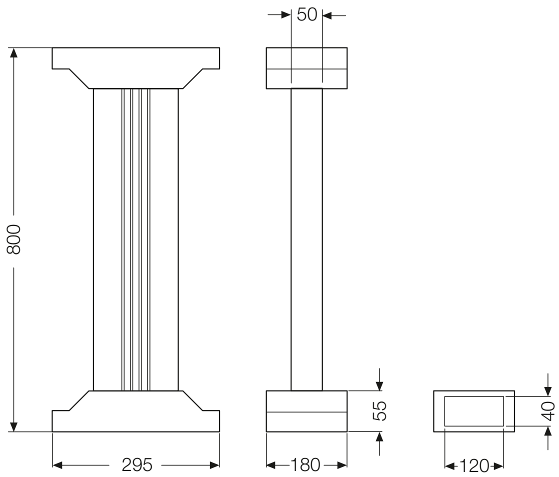


Code	A
EN0105K	105
EN0150K	150
EN0204K	204

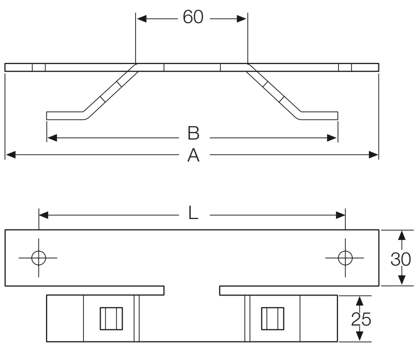
Anti-condensation kit



Floor pedesta



Pole installation kit



Size	A	B	L
1	232	206	196
2	358	332	320
3	358	332	320
4	483	457	447
5	483	457	447
6	733	707	697

Note: minimum pole section = 150 mm

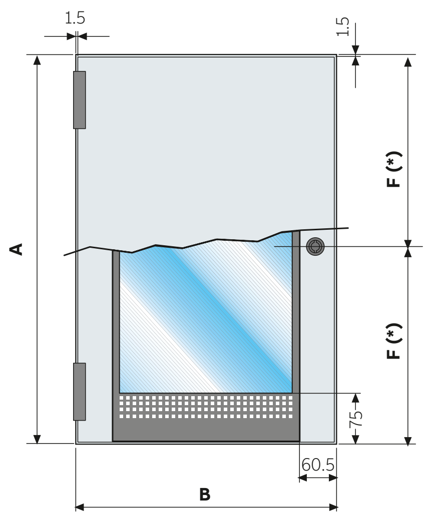
Measurements are expressed in millimeters.

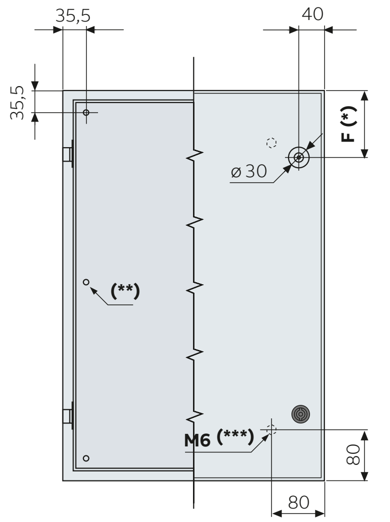
General purpose enclosures technical details

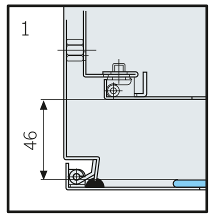
Overall dimensions – Casse SR2

Basic version

Front







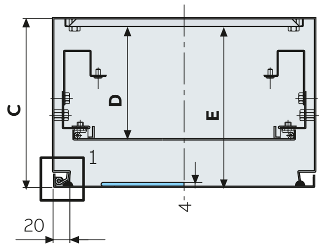
(*) Locks (F)
n°1 central for enclosures from h = 303 to 503 mm
n°2 for enclosures from h = 603 to 703 mm (F = 100 mm)
n°2 for enclosures from h = 803 to 1 203 mm (F = 150 mm)

(**) Copper plated nut on the rear only for enclosures from h = 1 003 to 1 203 mm

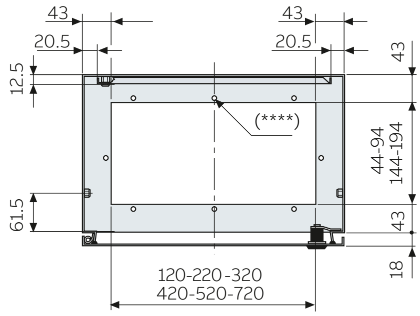
(***) Copper plated nut on door
n° 1 for enclosures from h = 303 to 503 mm
n° 4 for enclosures from h = 603 to 803 mm
n° 6 for enclosures from h = 1 003 to 1 203 mm

(****) Flange fixing holes
n° 4 for enclosures from l = 203mm
n° 6 for enclosures from l = 303 to 403 mm
n° 8 for enclosures from l = 503 to 1 203 mm

Modular panels and inner door



Fairlead flange



Code	A	B	C	D	E	F (*)	G	H	I	L
SRN3215K	303	203	147	82	133,5	151,5	163	337	237	263
SRN3315K	303	303	147	82	133,5	151,5	263	337	337	263
SRN3415K	303	403	147	82	133,5	151,5	363	337	437	263
SRN4315K	403	303	147	82	133,5	201,5	263	437	337	363
SRN4320K	403	303	197	132	183,5	201,5	263	437	337	363
SRN4420K	403	403	197	132	183,5	201,5	363	437	437	363
SRN4620K	403	603	197	132	183,5	201,5	563	437	637	363
SRN5320K	503	303	197	132	183,5	251,5	263	537	337	463
SRN5420K	503	403	197	132	183,5	251,5	363	537	437	463
SRN5425K	503	403	247	182	233,5	251,5	363	537	437	463
SRN6420K	603	403	197	132	183,5	100	363	637	437	563
SRN6425K	603	403	247	182	233,5	100	363	637	437	563
SRN6625K	603	603	247	182	233,5	100	563	637	637	563
SRN7520K	703	503	197	132	183,5	100	463	737	537	663
SRN7525K	703	503	247	182	233,5	100	463	737	537	663
SRN8625K	803	603	247	182	233,5	150	563	837	637	763
SRN8630K	803	603	297	232	283,5	150	563	837	637	763
SRN8830K	803	803	297	232	283,5	150	763	837	837	763

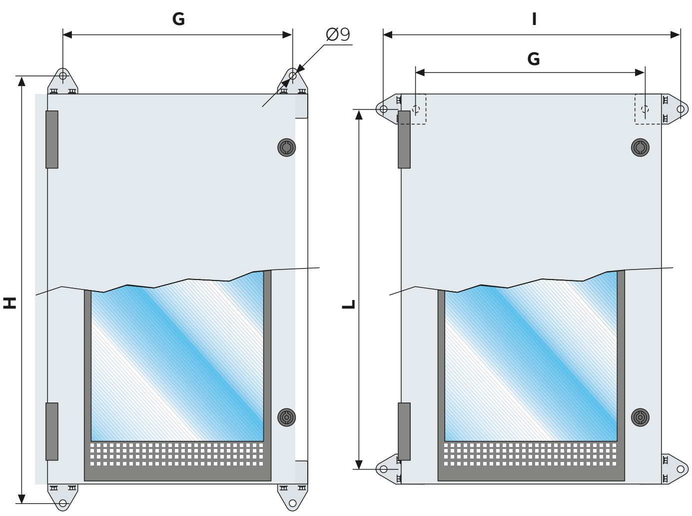
Code	A	B	C	D	E	F (*)	G	H	I	L
SRN10625K	1003	603	247	182	233,5	150	563	1037	637	963
SRN10630K	1003	603	297	232	283,5	150	563	1037	637	963
SRN10830K	1003	803	297	232	283,5	150	763	1037	837	963
SRN12630K	1203	603	297	232	283,5	150	563	1237	637	1163
SRN12830K	1203	803	297	232	283,5	150	763	1237	837	1163
SRN5420VK	503	403	197	132	183,5	150	363	537	437	463
SRN5425VK	503	403	247	182	233,5	150	363	537	437	463
SRN6420VK	603	403	197	132	183,5	150	363	637	437	563
SRN6425VK	603	403	247	182	233,5	150	363	637	437	563
SRN7520VK	703	503	197	132	183,5	150	463	737	537	663
SRN7525VK	703	503	247	182	233,5	150	463	737	537	663
SRN8625VK	803	603	247	182	233,5	150	563	837	637	763
SRN8630VK	803	603	297	232	283,5	150	563	837	637	763
SRN10625VK	1003	603	247	182	233,5	150	563	1037	637	963
SRN10630VK	1003	603	297	232	283,5	150	563	1037	637	963
SRN10830VK	1003	803	297	232	283,5	150	763	1037	837	963
SRN12630VK	1203	603	297	232	283,5	150	563	1237	637	1163
SRN12830VK	1203	803	297	232	283,5	150	763	1237	837	1163

Measurements are expressed in millimeters.

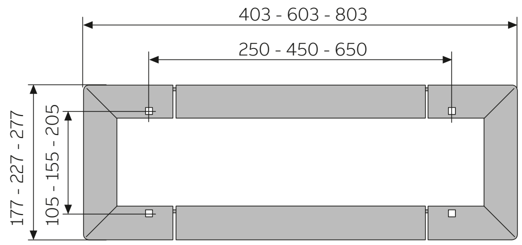
General purpose enclosures technical details

Overall dimensions – Casse SR2

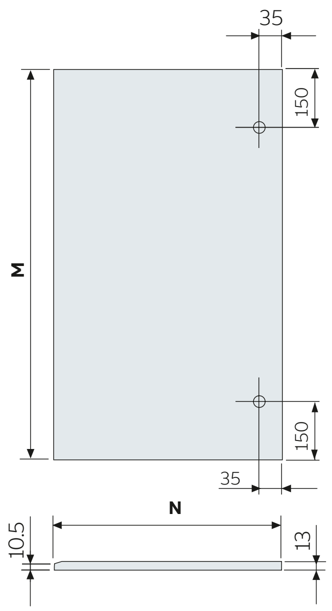
Centre distances for wall fixing



Centre distances for plinth fixing



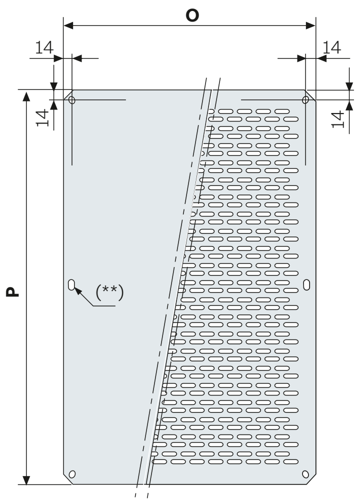
Internal counterdoors



Code	M	N
KC5040K *	456	360
KC6040K *	556	360
KC7050K *	656	460
KC8060K	756	560
KC1060K	956	560
KC1080K	956	760
KC1260K	1156	560
KC1280K	1156	760

* The counterdoors with H 500 mm, 600 mm and 700 mm, only have one hole in the centre for the lock

Internal plates



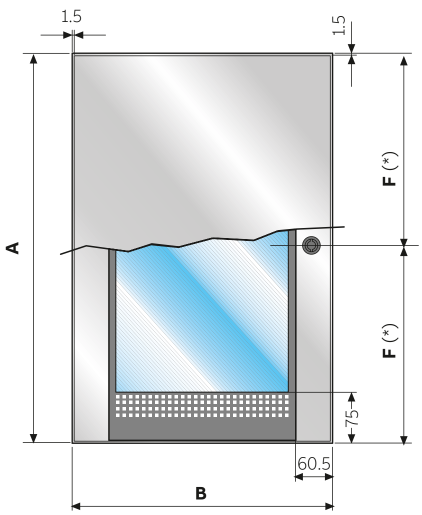
Code	O	P
PF3020	160	260
PF3030	260	260
PF3040 - PF4030	360	260
PF4040	360	360
PF5030	260	460
PF5040	360	460
PF6040 - PF4060	360	560
PF6060	560	560
PF7050	460	660
PF8060	560	760
PF8080	760	760
PF1060	560	960
PF1080	760	960
PF1260	560	1160
PF1280	760	1160

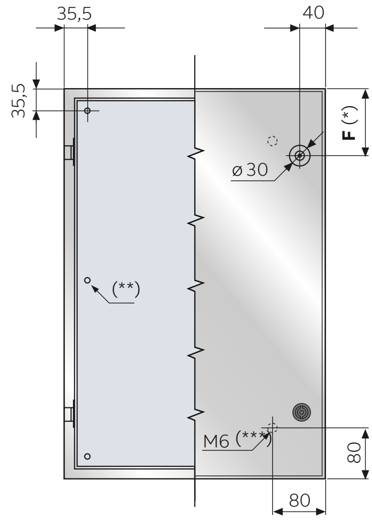
Measurements are expressed in millimeters.

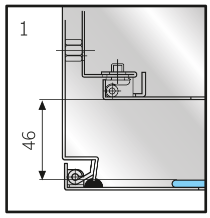
General purpose enclosures technical details

Overall dimensions – SRX enclosures

Basic version





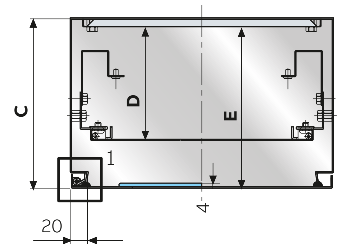


(*) Locks (F)
1 central for enclosures from h=303 to 503 mm
2 for enclosures from h=603 to 703 mm (F=100mm)
2 for enclosures from h=803 to 1203 mm (F=150mm)

(**) Copper plated nut on the rear only for enclosures from h=1003 to 1203 mm

(***) Copper plated nut on door
1 for enclosures from h=303 to 503 mm
4 for enclosures from h=603 to 803 mm
6 for enclosures from h=1003 to 1203 mm

Modular panels and inner door



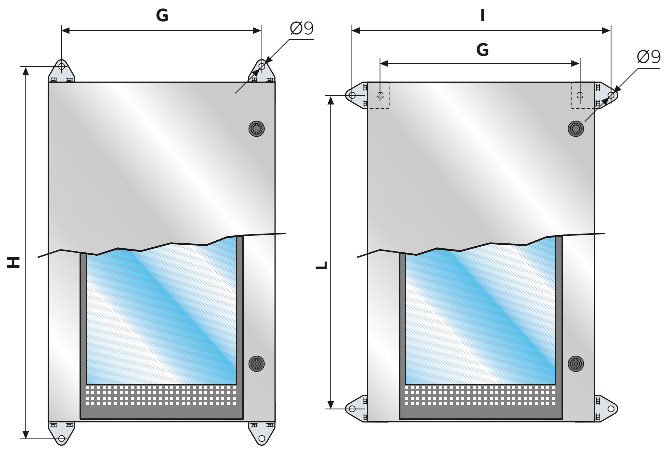
Code	A	B	C	D	E	F (*)	G	H	I	L
SRN3215X	303	203	147	82	133,5	151,5	163	337	237	263
SRN3415X	303	403	147	82	133,5	151,5	363	337	437	263
SRN4315X	403	303	147	82	133,5	201,5	263	437	337	363
SRN4320X	403	303	197	132	183,5	201,5	263	437	337	363
SRN4420X	403	403	197	132	183,5	201,5	363	437	437	363
SRN4620X	403	603	197	132	183,5	201,5	563	437	637	363
SRN5420X - SRN5420VX	503	403	197	132	183,5	251,5	363	537	437	463
SRN5520X	503	503	197	132	183,5	251,5	363	537	437	463
SRN6420X - SRN6420VX	603	403	197	132	183,5	100	363	637	437	563
SRN6620X	603	603	197	132	183,5	100	363	637	437	563
SRN6630X	603	603	297	232	283,5	100	363	637	437	563
SRN7525X - SRN7525VX	703	503	247	182	233,5	100	463	737	537	663
SRN8620X	803	603	197	132	183,5	150	363	637	437	563
SRN8625VX	803	603	247	182	233,5	150	563	837	637	763
SRN8630X	803	603	297	232	283,5	150	563	837	637	763
SRN8830X	803	803	297	232	283,5	150	763	837	837	763
SRN10830X - SRN10830VX	1003	803	297	232	283,5	150	763	1037	837	963
SRN12630X	1203	603	297	232	283,5	150	563	1237	637	1163
SRN12830X	1203	803	297	232	283,5	150	763	1237	837	1163

Measurements are expressed in millimeters.

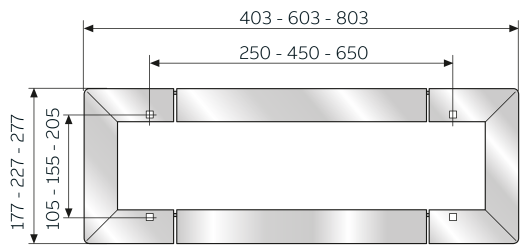
General purpose enclosures technical details

Overall dimensions – SRX enclosures

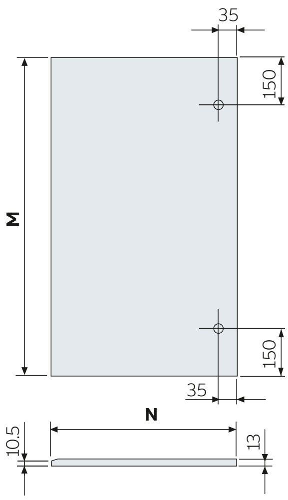
Centre distances for wall-mounting



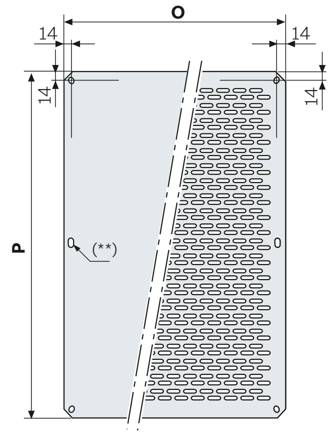
Centre distances for plinth fixing



Inner doors



Internal plates



Code	M	N
KC5040X*	456	360
KC6040X*	556	360
KC7050X*	656	460
KC8060X	756	560
KC1080X	956	760

* Inner doors with H 500mm, 600mm, 700mm only have one hole in the centre for the lock

Code	O	P
PF3020	160	260
PF3030	260	260
PF3040 - PF4030	360	260
PF4040	360	360
PF5030	260	460
PF5040	360	460
PF5050	460	460
PF6040 - PF4060	360	560
PF6060	560	560
PF7050	460	660
PF8060	560	760
PF8080	760	760
PF1060	560	960
PF1080	760	960
PF1260	560	1160
PF1280	760	1160

Measurements are expressed in millimeters.

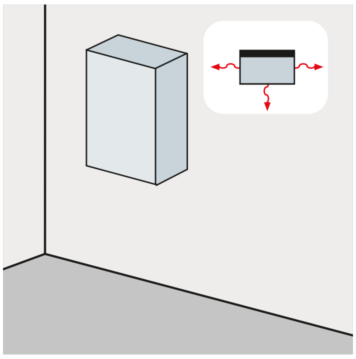
General purpose enclosures technical details

SR2 enclosures

Dissipating power

SR enclosures
Dissipating power inside the SR enclosures according to the permissible overtemperature (external temperature plus overtemperature = 60 °C max).

Maximum dissipating power (W)



Wall-mounted single enclosure

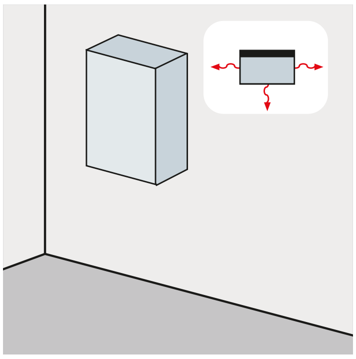
Code	Dimensions H (mm)	W (mm)	D (mm)	Overtemperature values ΔT 25 °C	30 °C	35 °C	40 °C
SRN3215K	300	200	150	18	22	26	31
SRN3315K	300	300	150	23	29	35	42
SRN3415K	300	400	150	34	42	51	60
SRN4315K	400	300	150	30	37	45	53
SRN4320K	400	300	200	33	42	51	60
SRN4420K	400	400	200	42	52	63	74
SRN4620K	400	600	200	59	74	89	105
SRN5320K	500	300	200	39	49	59	69
SRN5420K	500	400	200	47	59	72	85
SRN5420VK	500	400	200	47	59	72	85
SRN5425K	500	400	250	52	66	79	94
SRN5425VK	500	400	250	52	66	79	94
SRN6420K	600	400	200	54	67	82	96
SRN6420VK	600	400	200	54	67	82	96
SRN6425K	600	400	250	59	74	89	105
SRN6425VK	600	400	250	59	74	89	105
SRN6625K	600	600	250	79	99	120	141
SRN7520K	700	500	200	68	86	104	122
SRN7520VK	700	500	200	68	86	104	122
SRN7525K	700	500	250	74	93	113	133
SRN7525VK	700	500	250	74	93	113	133
SRN8625K	800	600	250	94	118	143	169
SRN8625VK	800	600	250	94	118	143	169
SRN8630K	800	600	300	107	134	162	191
SRN8630VK	800	600	300	107	134	162	191
SRN8830K	800	800	300	114	142	173	204
SRN10625K	1000	600	250	95	118	143	169
SRN10625VK	1000	600	250	95	118	143	169
SRN10630K	1000	600	300	103	130	156	185
SRN10630VK	1000	600	300	103	130	156	185
SRN10830K	1000	800	300	142	178	215	254
SRN10830VK	1000	800	300	142	178	215	254
SRN12630K	1200	600	300	123	155	187	220
SRN12630VK	1200	600	300	123	155	187	220
SRN12830K	1200	800	300	168	210	255	300
SRN12830VK	1200	800	300	168	210	255	300

Values also valid for the versions with glazed door.

General purpose enclosures technical details
SRX enclosures

Dissipating power
SRX enclosures
Dissipating power inside the SRX enclosures according to the permissible overtemperature (external temperature plus overtemperature = 60 °C max).

Maximum dissipating power (W)



Wall-mounted single enclosure

	Dimensions			Overtemperature values ΔT			
Code	H (mm)	W (mm)	D (mm)	25 °C	30 °C	35 °C	40 °C
SRN3215X	300	200	150	29	35	42	50
SRN3415X	300	400	150	55	68	82	97
SRN4315X	400	300	150	48	60	72	85
SRN4320X	400	300	200	53	68	82	97
SRN4420X	400	400	200	68	84	101	119
SRN4620X	400	600	200	95	119	143	169
SRN5420X	500	400	200	76	95	116	137
SRN5420VX	500	400	200	76	95	116	137
SRN5520X	500	500	200	-	-	-	-
SRN6420X	600	400	200	87	108	132	154
SRN6420VX	600	400	200	87	108	132	154
SRN6620X	600	600	200	-	-	-	-
SRN6630X	600	600	300	-	-	-	-
SRN7525X	700	500	250	119	150	182	214
SRN7525VX	700	500	250	119	150	182	214
SRN8620X	800	600	200	-	-	-	-
SRN8625VX	800	600	250	151	190	230	272
SRN8630X	800	600	300	172	216	261	307
SRN8830X	800	800	300	183	228	278	328
SRN10830X	1000	800	300	228	286	346	409
SRN10830VX	1000	800	300	228	286	346	409
SRN12630X	1200	600	300	198	249	301	354
SRN12830X	1200	800	300	270	338	410	483

Electrical installation solutions for buildings – Technical details

Pedestals

Index

Pedestals technical details

Power dissipation values – EH Pedestals

EH1 - EH2 Stand alone — **Temperature rise [Kelvin]**

Dissipation	EH1 752×385×270		EH2-NA 256×433×240		EH2-NB 516×433×240		EH2-NC 791×433×240		EH2-ND 1066×433×240	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10		5	7	8	5	6		5		5
20	7	9	13	14	8	10	7	8	5	8
30	10	12	17	19	11	14	9	12	7	11
40	12	15	22	24	14	17	12	15	9	14
50	18	26	29	17	21	14	17	11	17	
60	21	30	34	20	24	16	20	13	20	
70	24	34	38	23	27	18	23	14	23	
80	26	38	43	25	30	20	25	16	25	
90	29	42	47	28	33	23	28	18	28	
100	32	46	51	30	36	25	30	19	30	
120	37	53		35	42	28	35	22	35	
140	41			39	48	32	40	25	40	
160	46			44	53	36	44	28	44	
180	51			48		39	49	31	49	
200	55			53		43	53	34	53	
220				57		46		36	57	
240						50		39		
260						53		42		
280						56		44		
300								47		
350								53		

Pedestals technical details

Power dissipation values – EH Pedestals

EH4 Stand alone

Temperature rise [Kelvin]

Dissipation Watt	EH4-00 1.004×395×224 Half	EH4-00 Top	EH4-0 1.004×495×224 Half	EH4-0 Top	EH4-1 1.004×745×224 Half	EH4-1 Top	EH4-S1 820×320×234 Half	EH4-S1 Top
10		4		5			4	5
20	6	8	5	8		6	7	9
30	9	11	7	11	5	8	10	13
40	11	14	9	14	7	10	13	16
50	13	16	11	17	8	12	15	19
60	15	19	13	20	9	14	18	22
70	17	21	14	22	11	15	20	25
80	19	24	16	25	12	17	22	28
90	21	26	18	27	13	19	25	31
100	23	28	19	29	14	21	27	34
120	26	33	22	34	16	24	31	39
140	30	37	25	39	19	27	35	44
160	33	41	28	43	21	30	39	49
180	36	45	31	47	23	33	43	54
200	39	49	33	51	25	36	47	59
220	42	53	36	55	27	39	51	64
240	46	57	39	59	29	42	54	68
260	49	61	41	63	31	44	58	73
280	52	65	44	67	33	47	62	77
300	55	68	46	71	34	50	65	
350	62	77	52		39	56	74	
400	69		58		43	63		
450	76		64		48	69		
500			70		52	75		
550			75		56			
600					60			
650					64			
700					68			
750					72			
800					76			
850					80			

Pedestals technical details

Power dissipation values – EH Pedestals

EH3 Stand alone — Temperature rise [Kelvin]

Dissipation	EH3/F-0 EH3/AP-0 875×590×320		EH3/F-1 EH3/AP-1 875×785×320		EH3/F-2 EH3/AP-2 875×1.115×320		EH3/F-3 EH3/AP-3 875×1.445×320		EH3/AP-20 1.125×590×320		EH3/AP-21 1.125×785×320		EH3/AP-22 1.125×1.115×320		EH3/AP-23 1.125×1.445×320	
Watt	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top	Half	Top
10																
20	5	6		5						5		4				
30	6	9	5	7		5			5	7	4	6		4		
40	8	11	6	9	5	6		5	6	9	5	7		5		4
50	10	13	8	10	6	7	5	6	8	11	6	8	5	6	4	5
60	11	16	9	12	7	9	5	7	9	13	7	10	5	7	5	6
70	13	18	10	13	7	10	6	8	10	14	8	11	6	8	5	7
80	14	20	11	15	8	11	7	8	11	16	9	12	7	9	6	8
90	16	22	12	16	9	12	7	9	12	18	10	14	7	10	7	9
100	17	23	13	18	10	13	8	10	13	19	11	15	8	11	7	9
120	20	27	15	21	11	15	9	12	15	22	12	17	9	12	8	11
140	22	31	17	23	13	17	10	13	17	25	14	19	10	14	9	12
160	25	34	19	26	14	19	12	15	19	28	15	22	12	16	10	14
180	27	38	21	29	16	21	13	16	21	31	17	24	13	17	11	15
200	29	41	23	31	17	22	14	18	23	33	18	26	14	19	13	16
220	32	44	25	34	19	24	15	19	25	36	20	28	15	20	14	18
240	34	47	27	36	20	26	16	21	27	39	21	30	16	22	14	19
260	36	51	29	38	21	28	17	22	28	41	23	32	17	23	15	20
280	39	54	30	41	23	29	18	23	30	44	24	34	18	25	16	21
300	41	57	32	43	24	31	19	25	32	46	26	36	19	26	17	23
350	46		36	49	27	35	22	28	36	52	29	40	22	29	20	26
400	51		41	54	30	39	24	31	40		32	45	24	33	22	29
450	57		45		33	43	27	34	44		35	50	27	36	24	31
500			48		36	47	29	37	48		39	54	29	39	26	34
550			52		39	51	31	40	52		42		31	42	28	37
600			56		42	54	34	43	56		45		34	45	30	40
650					45		36	46			48		36	48	32	42
700					47		38	49			51		38	51	34	45
750					50		40	51			53		40	54	36	47
800					53		42	54			56		43		38	50
850					55		44	57					45		40	52
900							47						47		42	55
950							49						49		44	
1.000							51						51		46	
1.100							55						55		49	
1.200															53	
1.300															56	

Pedestals technical details

Power dissipation values – EH Pedestals

EH3 Stand alone — **Temperature rise [Kelvin]**

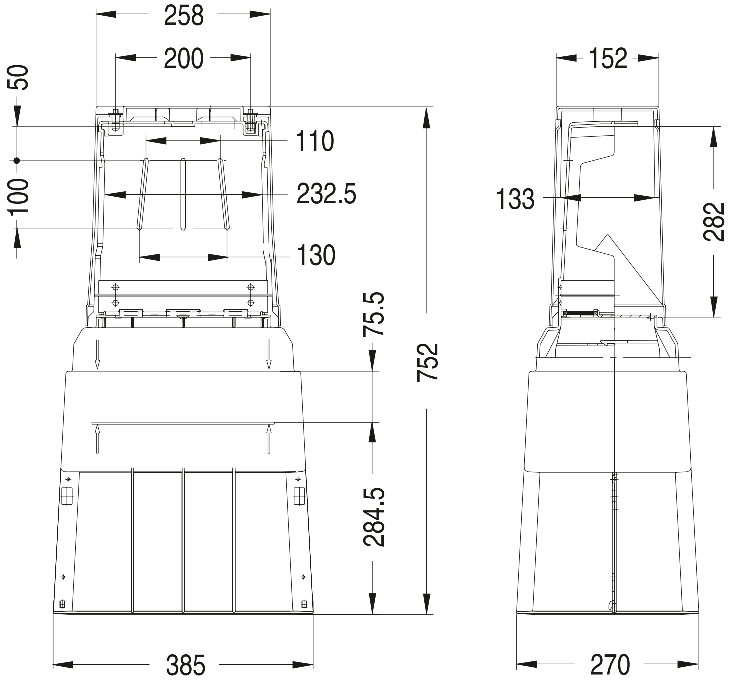
Dissipation Watt	EH3/DC-1 875×785×320 Half	Top	EH3/DC-2 875×1115×320 Half	Top	EH3/GD-AP - 031 875×676×541 Half	Top	EH3/GD-AP - 041 875×871×541 Half	Top	EH3/GD-AP - 051 875×1.200×541 Half	Top	EH3/GD-AP - 233 1.125×676×676 Half	Top	EH3/GD-AP - 243 1.125×871×676 Half	Top	EH3/GD-AP - 253 1.125×1.200×676 Half	Top
10																
20		5				5										
30	5	7		5	5	7	4	5				4				
40	6	9	5	6	6	8	5	7		5		5		5		
50	8	10	6	7	7	10	6	8	5	6	5	6	4	5		5
60	9	12	7	9	9	11	7	9	5	7	5	7	5	6	4	5
70	10	13	7	10	10	13	8	10	6	8	6	8	6	7	5	6
80	11	15	8	11	11	14	9	12	7	9	7	9	6	8	5	7
90	12	16	9	12	12	16	10	13	8	10	7	10	7	9	6	7
100	13	18	10	13	13	17	11	14	8	11	8	11	7	10	6	8
120	15	21	11	15	15	20	12	16	10	12	9	12	9	11	7	9
140	17	23	13	17	17	22	14	18	11	14	11	14	10	13	8	11
160	19	26	14	19	19	25	16	20	12	15	12	15	11	14	9	12
180	21	29	16	21	21	27	17	22	13	17	13	17	12	15	10	13
200	23	31	17	22	23	30	19	24	14	18	14	18	13	17	11	14
220	25	34	19	24	24	32	20	26	16	20	15	20	14	18	12	15
240	27	36	20	26	26	32	22	28	17	21	16	21	15	19	13	16
260	29	38	21	28	28	37	3	30	18	23	17	23	16	21	14	18
280	30	41	23	29	30	39	25	32	19	24	18	24	17	22	15	19
300	32	43	24	31	31	41	26	34	20	25	19	26	18	23	16	20
350	36	49	27	35	35	47	29	38	23	29	22	29	20	26	18	22
400	41	54	30	39	39	52	33	42	25	32	25	32	23	29	20	25
450	45		33	43	43		36	47	28	35	27	35	25	32	22	27
500	48		36	47	47		39	51	30	38	29	38	27	35	24	30
550	52		39	51	51		42	55	33	41	32	42	29	38	25	32
600	56		42	54	55		45		35	44	34	45	31	40	27	34
650			45				48		37	47	36	47	34	43	29	37
700			47				51		40	50	38	50	36	46	31	39
750			50				54		42	53	41	53	38	48	33	41
800			53						44	56	43	56	40	51	34	43
850			55						46		45		42	54	36	46
900									49		47		44	56	38	48
950									51		49		46		40	50
1.000									53		51		47		41	52
1.100											55		51		44	56
1.200													55		48	
1.300															51	
1.400															54	

Notes

Pedestals

EH1 - Small pedestal - Dimensional drawings

EH1 - Small pedestal

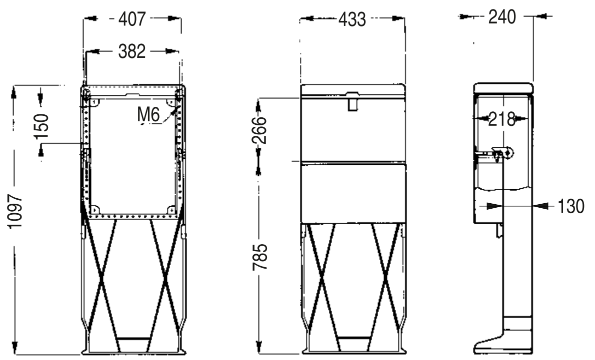


Pedestals

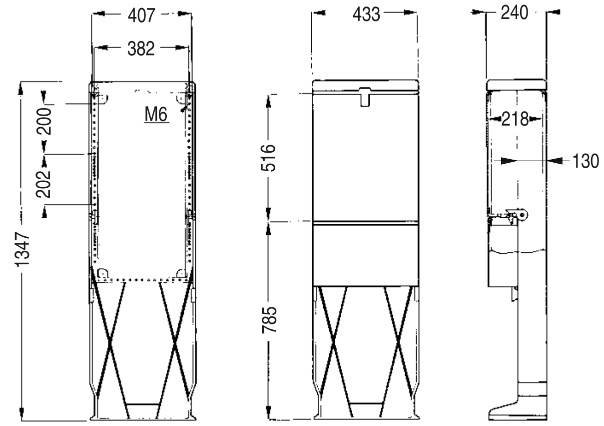
EH2 - Dimensional drawings

EH2 - Column cabinets

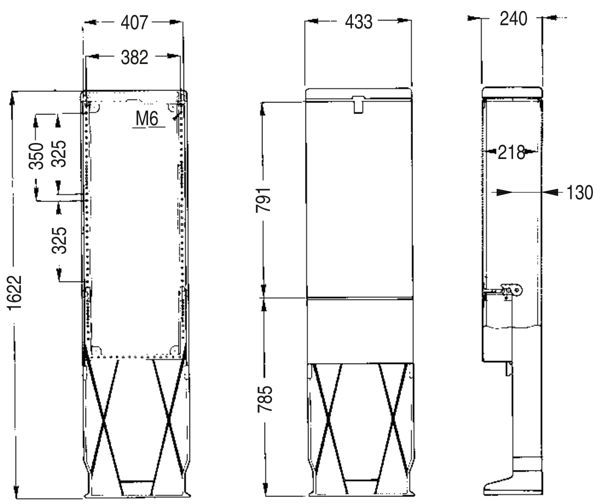
EH2-NA



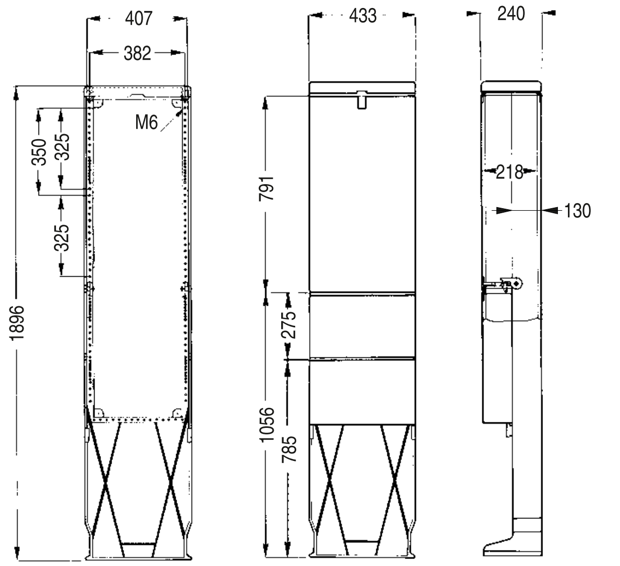
EH2-NB



EH2-NC

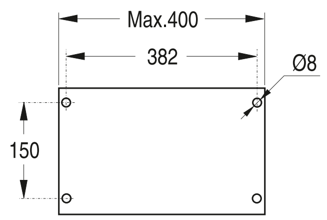


EH2-ND

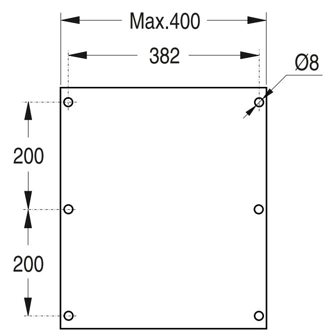


EH2 - Mounting plates

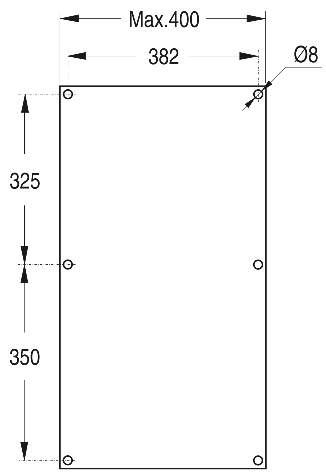
EH2-NA



EH2-NB



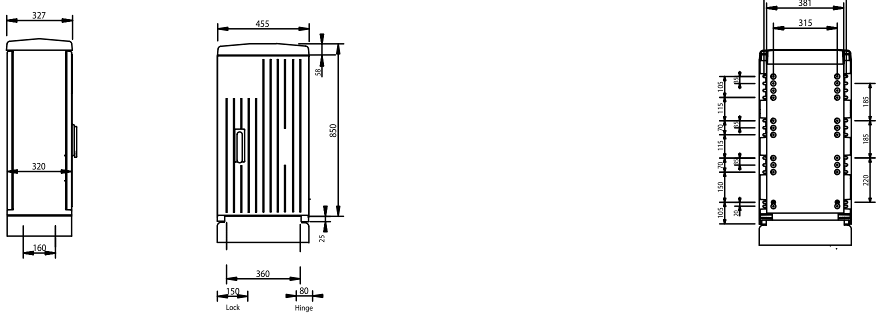
EH2-NC/ND



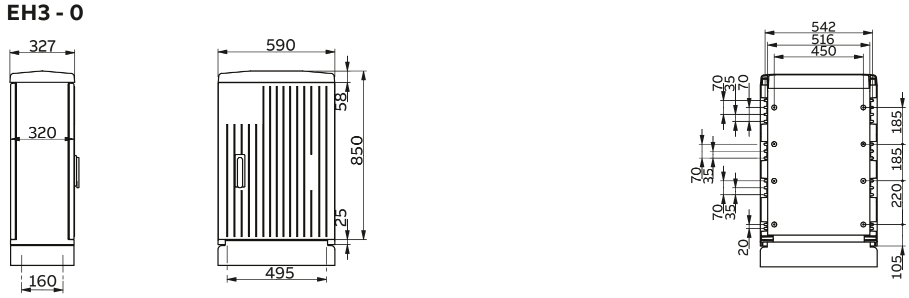
Pedestals

EH3 - Dimensional drawings

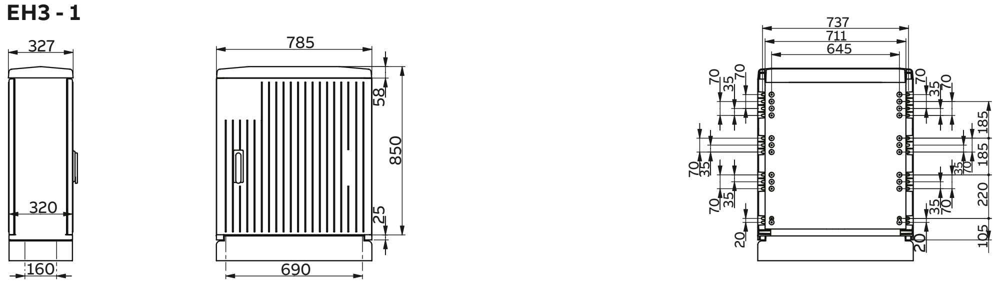
EH3 - 00



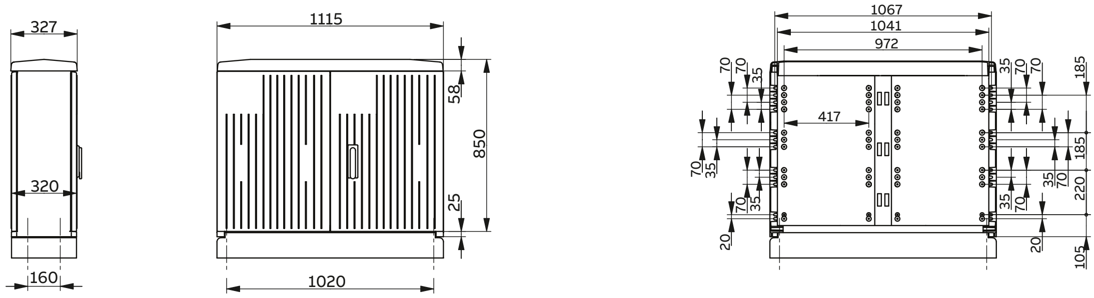
EH3 - 0



EH3 - 1



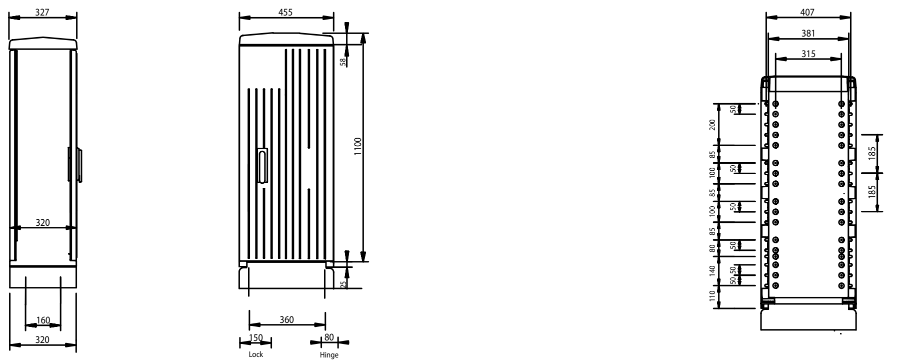
EH3 - 2



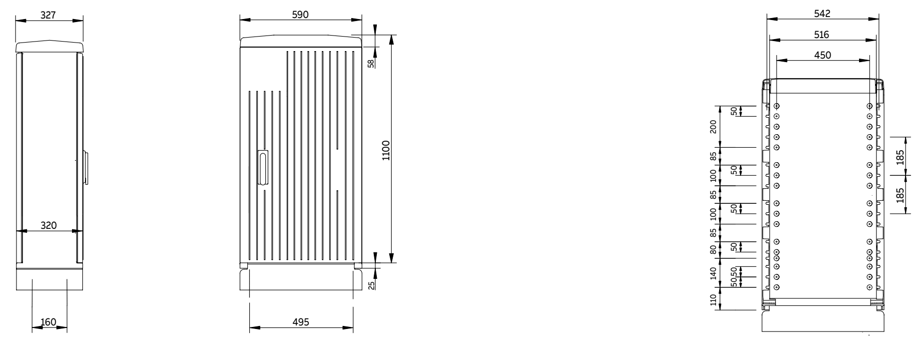
Pedestals

EH3 - Dimensional drawings

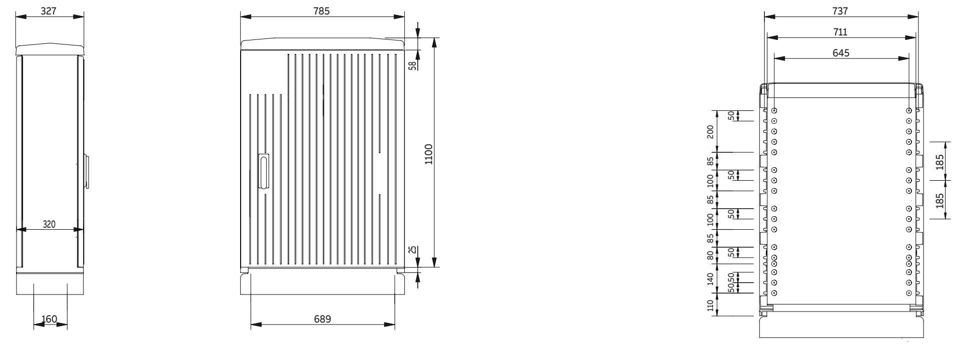
EH3/AP - 200



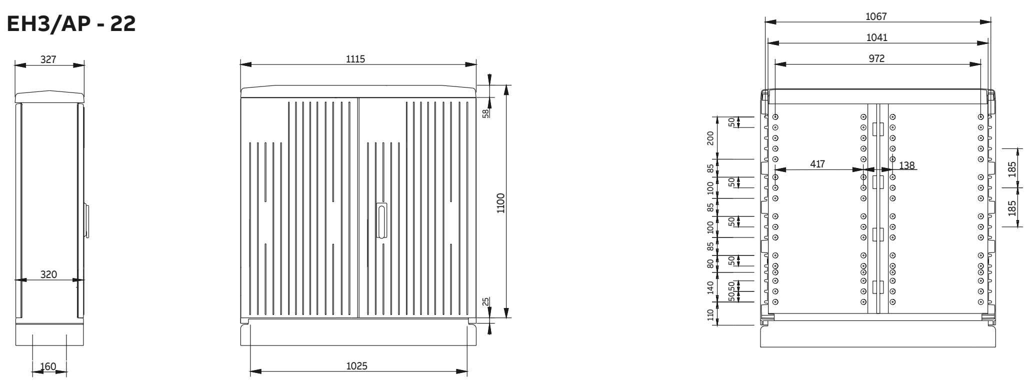
EH3/AP - 20



EH3/AP - 21



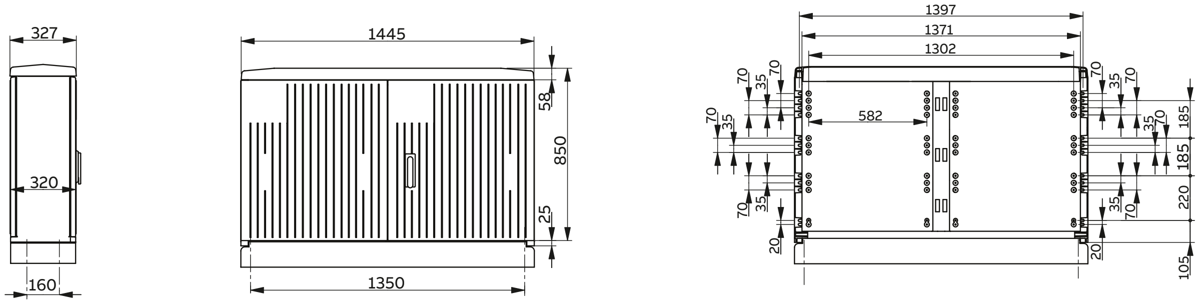
EH3/AP - 22



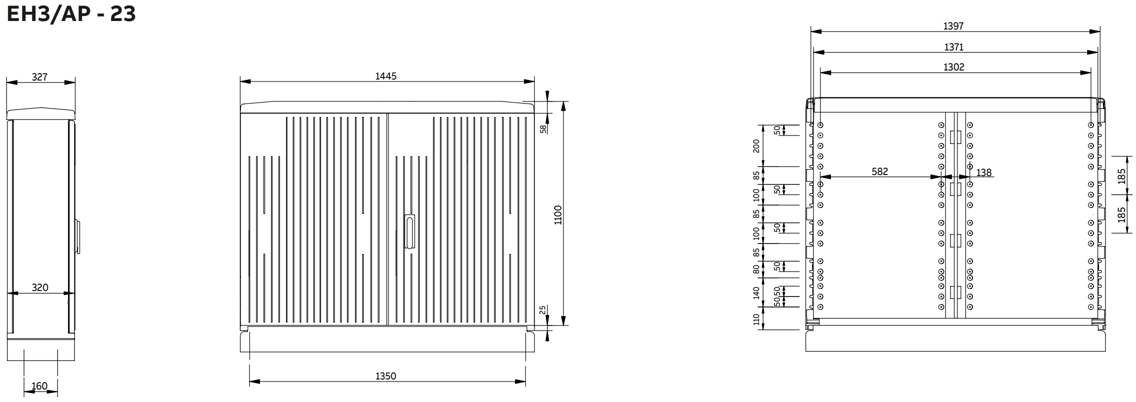
Pedestals

EH3 - Dimensional drawings

EH3 - 3

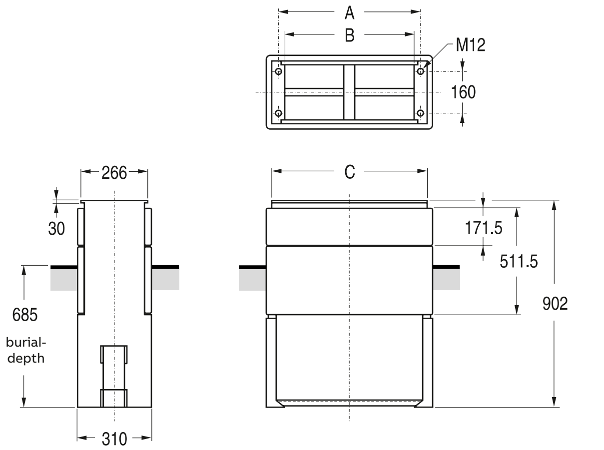


EH3/AP - 23



Pedestals
EH3 - Dimensional drawings

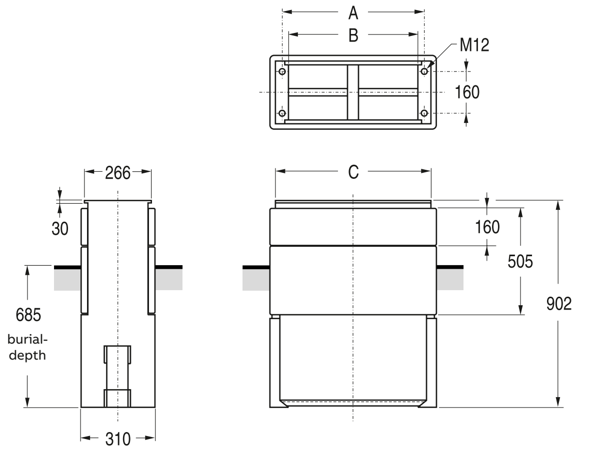
Polyester bases DIN 00-0-1-2



The dimensions of the base fixation points are in accordance with DIN 43629.

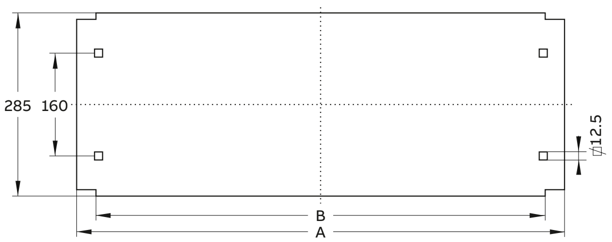
Dimensions				
DIN	**00**	**0**	**1**	**2**
A	360	495	690	1.020
B	322	457	652	982
C	408	543	738	1.068

Polyester bases DIN 3



Dimensions	
DIN	**3**
A	1.35
B	1.315
C	1.400

Bottom plate



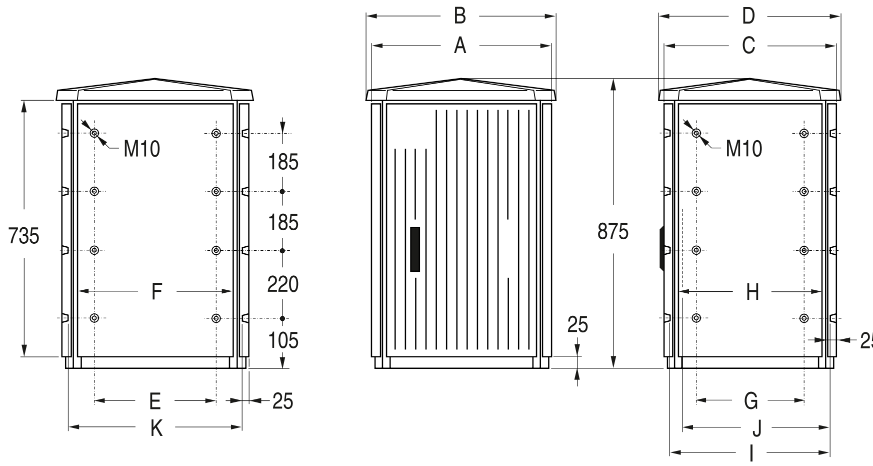
To be mounted between pedestal and DIN-base or as bottom plate of the enclosure.

Dimensions					
DIN	**00**	**0**	**1**	**2**	**3**
A	427	562	757	1.086	1.416
B	360	495	630	1.020	1.350

Pedestals

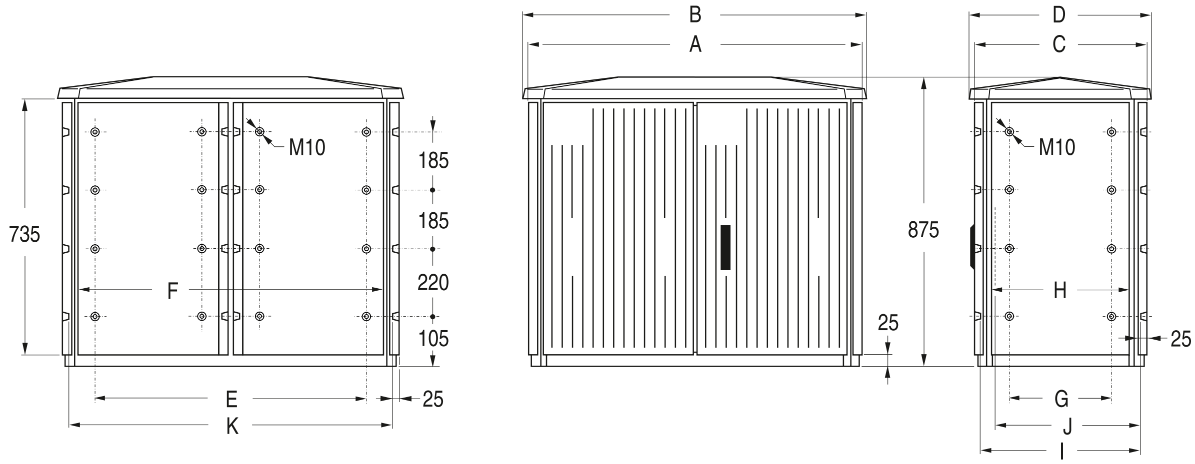
EH3 / GD - Dimensional drawings

EH3/GD-AP 031 - EH3/GD-AP 041



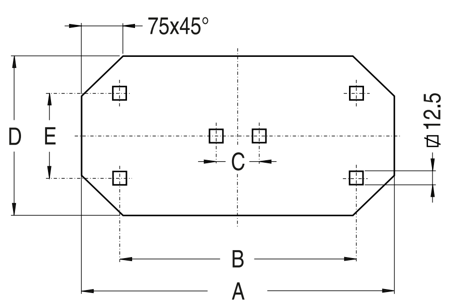
Dimensions		
DIN	**31**	**41**
A	676	871
B	716	911
C	541	541
D	581	581
E	450	645
F	500	695
G	317	317
H	250	250
I	493	493
J	459	459
K	628	823

EH3/GD-AP 051



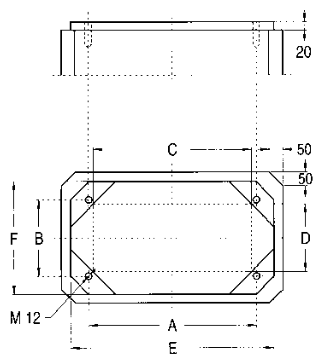
Dimensions											
DIN	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
51	1200	1240	541	581	972	1025	317	250	493	459	1.152

Bottom plate



Dimensions						
DIN	**31**	**233**	**41**	**243**	**51**	**253**
A	635	635	830	830	1158	1158
B	495.5	496.5	691.5	691.5	1021	1021
C	-	-	-	-	50	50
D	380	632	388	632	380	632
E	245	498	246	498	245	498
No of holes	4	4	4	4	6	6

Polyester base

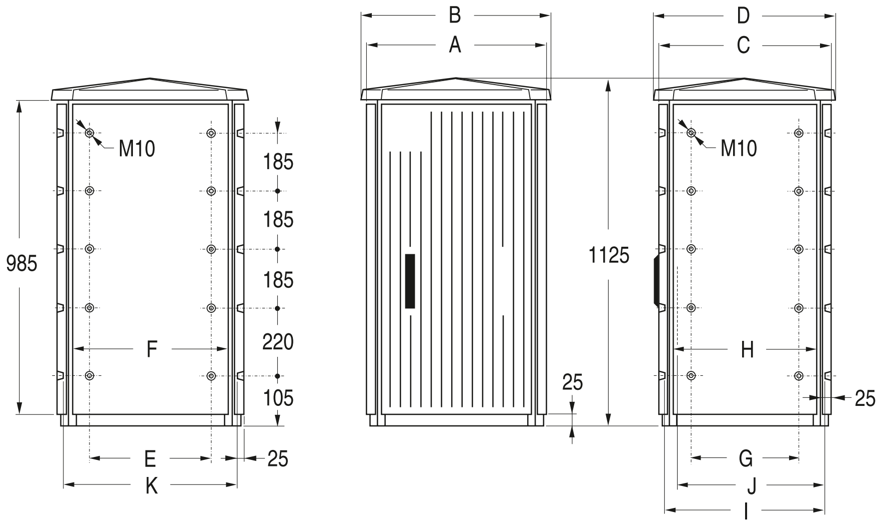


Dimensions						
DIN	**31**	**233**	**41**	**243**	**51**	**253**
A	498	498	693	693	1022	1022
B	246	498	246	498	246	498
C	456	456	651	651	980	980
D	205	456	204	456	204	456
E	626	626	821	821	1150	1150
F	374	626	374	626	374	626

Pedestals

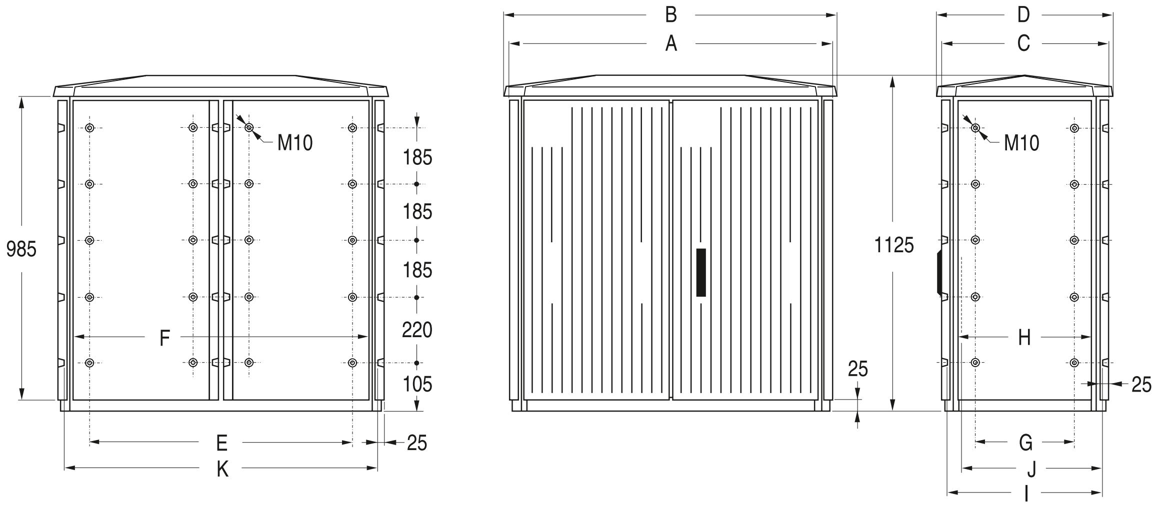
EH3 / GD - Dimensional drawings

EH3/GD-AP 233 - EH3/GD-AP 243



Dimensions		
DIN	**233**	**243**
A	676	871
B	716	911
C	676	676
D	716	716
E	450	645
F	500	695
G	450	450
H	500	500
I	628	628
J	594	594
K	628	823

EH3/GD-AP 253

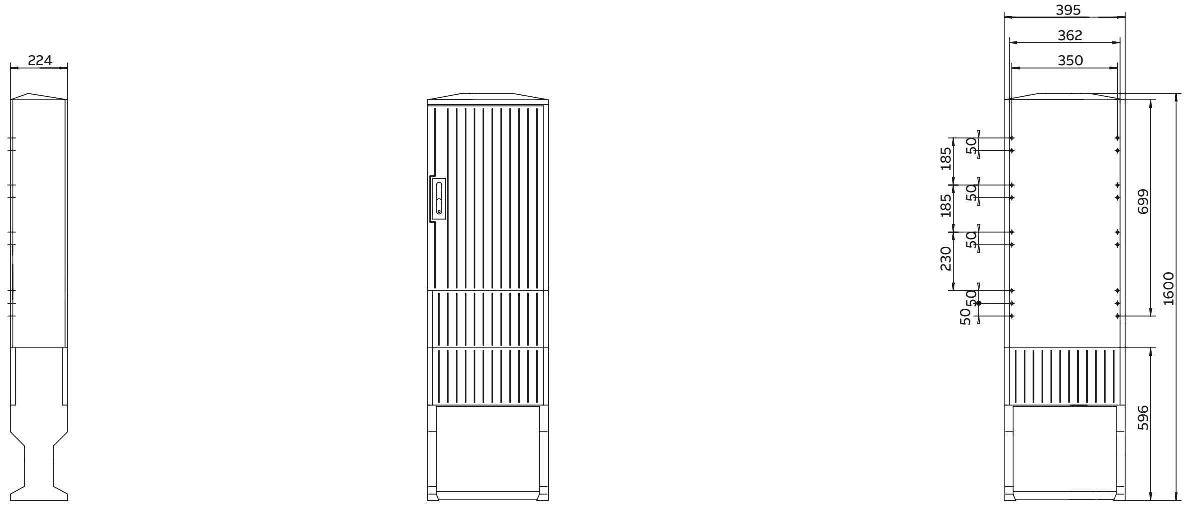


Dimensions											
DIN	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
253	1.200	1.240	676	716	972	1.025	450	500	628	594	1.152

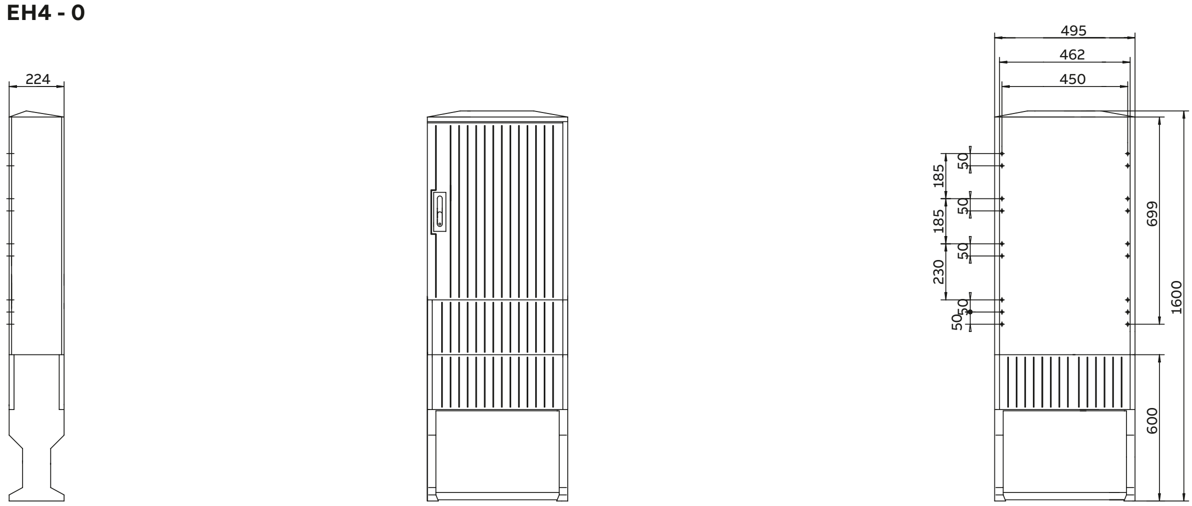
Pedestals

EH4 - Dimensional drawings

EH4 - 00



EH4 - 0



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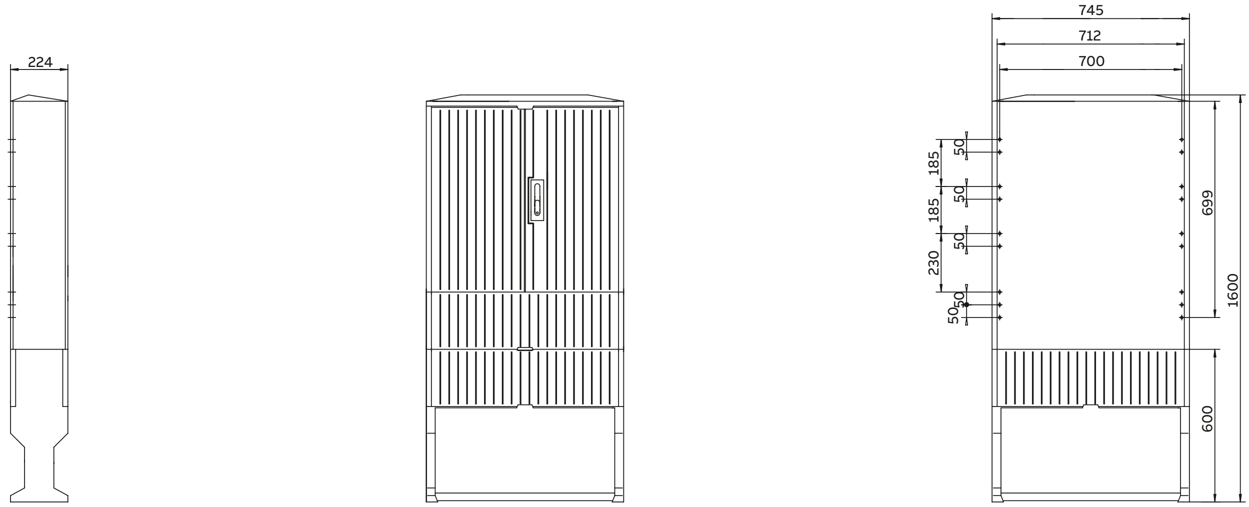
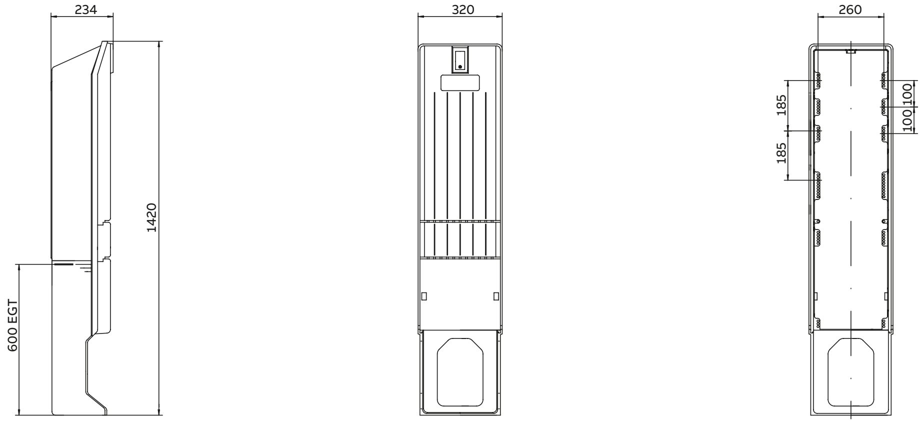


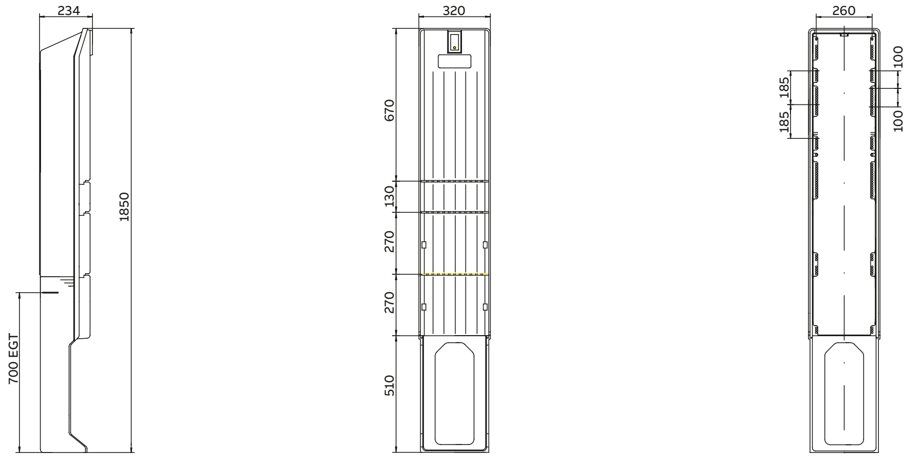
Pedestals

EH4 - Dimensional drawings

EH4 - S1



EH4 - S2



Electrical installation solutions for buildings – Technical details

Low Voltage Dry Type Transformers

Index

General purpose ventilated DOE 2016

Overview single phase and three phase

Introduction

Type QL are ABB's large power transformers ranging from 15 kVA to 1000 kVA. The QL transformers come in standard NEMA 2 enclosures with rain shield kits available for NEMA 3R installations. Stainless steel enclosures are available as options as well. QL transformers are available in single or three phase configurations with either aluminum or copper windings. Type QL's are DOE 2016 compliant with models available for Canadian NRCan efficiency standards.

All of the LVDTTs through 1,000 kVA are UL listed under the requirements of Standard 5085 and/or 1561. In addition, each transformer meets the requirements of NEMA ST-20-2014.

General purpose transformers are rated 600 Volts and below for supplying appliances, lighting, and power loads from electrical distribution systems. Standard distribution voltages are 600, 480, and 240 Volts; standard load voltages are 480, 277, 240, 208, and 120 Volts. The transformer is used to obtain the load voltage from the distribution voltage while providing galvanic isolation. Since no vaults are required for installation, these transformers can be located right at the load to provide the correct voltage for the application. This eliminates the need for long, costly, low voltage feeders.

Construction – Type QL

Large power transformers

QL units come standard enclosed in a NEMA 2 drip-proof painted metal enclosure with natural draft ventilation. The core-and-coil assembly is mounted on rubber isolation pads to reduce noise generated by transformer vibration. Rain shield kits are available for conversion to a NEMA 3R enclosure suitable for outdoor service. Type QL transformers are UL Listed: XQNX:E79145; XQNX7:E79145; XQNX2:E79145 or XQNX8:E79145.

Coil construction, 3 phase general purpose, all 100% production tested

Coil material	kVA range	Coil temperature	Terminal connections	Windings[1]
AL	15 to 150	150	Bolted	Continuous
	225 to 500	150	Welded	
	15 to 112.5	115	Bolted	
	150 to 500	115	Welded	
	15 to 112.5	80	Bolted	
	150 to 300	80	Welded	
CU	15 to 150	150	Bolted	Continuous
	225 to 500	150	Welded	
	15 to 150	115	Bolted	
	225 to 500	115	Welded	
	15 to 112.5	80	Bolted	
	150 to 300	80	Welded	

[1]Rarely a coil may have a welded internal connection. All transformers are 100% tested, assuring internal resistance and losses are within established standards, UL and NEMA requirements.

NEMA enclosure ratings

Type QL transformers are standard as NEMA 2 painted steel enclosures. NEMA 3R or NEMA 3R stainless steel (316) enclosures are available up to 150 kVA. NEMA 3R includes the rain shield kit (also 316 SS).

To specify a stainless steel enclosure for an aluminum wound transformer, substitute the letter "S" in the fifth character of the ABB product number. For example, 9T10A1004 changes to 9T10S1004. For copper wound transformers substitute the letter "Z" in the fifth character of the ABB product number. For example, 9T10C1004 changes to 9T10Z1004. All QL model product numbers begin with 9T1, 9T7 and 9T8.

NEMA enclosure rating	Standard or optional	Installation location	Optional rain shield
NEMA 2 (ANSI 61 Painted)	Standard	Indoor	Not required
NEMA 2 (316 Stainless Steel)[2]	Optional	Indoor	Not required
NEMA 3R (ANSI 61 painted)	Optional	Indoor or Outdoor	Required & painted
NEMA 3R (316 Stainless Steel)[2]	Optional	Indoor or Outdoor	Required & 316 SS
NEMA 4X (316 Stainless Steel)[3]	Optional	Indoor or Outdoor	Required & 316 SS

[2] Up to 150 kVA
[3] Special order only, must be quoted and not available for all transformers

Transformer taps

Transformer taps compensate for high or low line (supply) voltages. FCAN (full capacity above nominal) and FCBN (full capacity below nominal) are standard on Type QL transformers rated 15 kVA through 300 kVA and with a primary voltage of 240 V or higher. These have a total of six available voltage taps – four 2.5% taps (FCBN) below the nominal tap and two 2.5% taps above (FCAN) the nominal tap. This arrangement provides a 15% range of tap voltage adjustment. Transformers rated 500 kVA and higher have four available voltage taps – two 2.5% taps above (FCAN) the nominal tap and two 2.5% taps below (FCBN) the nominal tap.

Insulation systems

Insulation systems

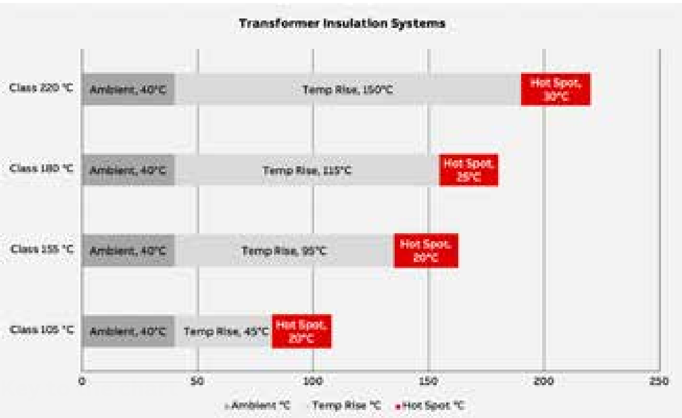
Industry standards classify insulation systems in accordance with the rating system shown below:

Transformer insulation systems

Insulation Rating	Insulation Letter Class (NEMA/UL)	Ambient	+ Avg Coil Temp Rise	+ Hot Spot Temp Rise	= Max. Coil Temp
Class 105	A	40 °C	45 °C	20 °C	105 °C
Class 155	F	40 °C	95 °C	20 °C	155 °C
Class 180	H	40 °C	115 °C	25 °C	180 °C
Class 220	R	40 °C	150 °C	30 °C	220 °C

All ABB Type QL (80 °C, 115 °C and 150 °C) DOE and NRCan compliant transformers use 220 °C insulation systems and meet all applicable NEMA, ANSI, UL, and IEEE dry type transformer standards.

The design life of transformers having different insulation systems is the same, since the allowable temperature rise of an insulation material system is predicated on a specified life for all insulation. The lower temperature systems are designed for the same life as higher temperature systems.



- All assume 40 °C ambient temperature.
- Coil temperature rating (Temp Rise) is a typical specification when choosing a transformer
- The Hot Spot is the buffer added for internal hot spots
- For large power transformers, an 80 °C temp rise will cost more than a 150 °C, and will likely last longer
- Designing for other ambient temperatures like 50 °C for use in desert regions will increase the cost
- Lower coil temp rise = higher price
- Higher ambient temp requirement = higher price

Type QL insulation system

- Insulation Class: 220 °C, UL recognized insulation system with a maximum of 150, 115 or 80 °C rise above 40 °C ambient temperature
- Temperature rise ratings are in accordance with UL 1561
- All ABB Type QL dry type transformers use a 220 °C insulation rating class

Single phase transformer data

Typical data based upon single phase 240X480 V primary and 120X240 V secondary
DOE 2016 efficient dry type transformers for two wire secondary applications

Conductor	Temp. Rise	kVA	Frame	Weight (lb)	Losses in Watts: No Load	Losses in Watts: Impedance Loss	Losses in Watts: Total at Rise +20 °C	Efficiency (T Rise +20): 25%	35%	50%	75%	Full Load
Aluminum Wound	150 °C Rise	15	XV171	320	62.5	669.2	731.7	97.6	97.7	97.64	97.15	96.54
		25	YF171	320	101.7	833.8	935.5	97.82	98	98.03	97.72	97.28
		37.5	YF171	320	109.3	1404.1	1513.4	98.2	98.2	98.12	97.66	97.12
		50	YF172	400	142.5	1719.3	1861.8	98.27	98.3	98.23	97.82	97.32
		75	YF174	510	206.4	2014.5	2220.9	98.42	98.5	98.47	98.17	97.78
		100	YF175	900	253.7	2385	2638.7	98.56	98.6	98.62	98.36	98.01
		167	YF176	1420	396.6	3473.8	3870.4	98.69	98.7	98.78	98.57	98.28
		250	YF177	1700	544.3	5088.1	5632.4	98.76	98.8	98.82	98.59	98.29
	115 °C Rise	15	XV171	320	90.2	279.6	369.8	97.3	97.7	98.1	98.13	97.96
		25	YF171	320	109.3	592.3	701.6	97.83	98	98.22	98.05	97.74
		37.5	YF172	400	142.5	900.8	1043.3	98.04	98.2	98.32	98.1	97.76
		50	XV173	490	150.8	1494.8	1645.6	98.23	98.3	98.23	97.85	97.38
		75	YF174	510	206.4	1784.4	1990.8	98.44	98.5	98.5	98.2	97.82
		100	YF175	900	253.7	2097.4	2351.1	98.58	98.6	98.65	98.4	98.06
	80 °C Rise	15	YF171	320	109.3	200	309.3	96.89	97.7	97.99	98.18	98.13
		25	YF171	320	109.3	553.5	662.8	97.71	98	98.18	97.99	97.66
		37.5	YF172	400	142.2	807.1	949.3	98.03	98.2	98.3	98.07	97.72
		50	YF174	510	206.4	754.2	960.6	98.04	98.3	98.2	97.8	97.3
		100	YF176	1420	260	1872.2	2132.2	98.55	98.6	98.64	98.39	98.06
Copper Wound	150 °C Rise	15	YF171	350	90.2	301.1	391.3	97.31	97.7	98.11	98.15	97.99
		25	YF171	350	109.3	766	875.3	97.75	98	98.06	97.81	97.42
		37.5	YF172	460	126.4	1119.9	1246.3	98.15	98.2	98.27	97.97	97.56
		50	XV173	500	150.8	1251.1	1401.9	98.3	98.3	98.37	98.06	97.66
		75	YF174	625	225.3	1687.3	1912.6	98.39	98.5	98.56	98.34	98.02
		100	YF175	900	253.7	2326.8	2580.5	98.56	98.6	98.62	98.35	98
		167	YF176	1675	396.6	3265.1	3661.7	98.7	98.7	98.8	98.59	98.31
		250	YF177	1960	474.2	5094.7	5568.9	98.82	98.8	98.76	98.45	98.09
	115 °C Rise	15	YF171	350	90.2	277.9	368.1	97.3	97.7	98.1	98.13	97.96
		25	YF171	350	103.8	693.7	797.5	97.83	98	98.1	97.84	97.44
		37.5	YF172	460	126.4	1021.9	1148.3	98.14	98.2	98.27	97.96	97.54
		50	XV173	500	150.8	1149.1	1299.9	98.35	98.3	98.48	98.23	97.87
		75	YF174	625	225.3	1542.7	1768	98.39	98.5	98.56	98.34	98.02
		100	YF175	900	253.7	2148	2401.7	98.56	98.6	98.61	98.34	97.98
		167	YF176	1675	396.6	3220.5	3617.1	98.65	98.7	98.7	98.44	98.11
	80 °C Rise	15	YF171	350	90.2	250.3	340.5	97.3	97.7	98.09	98.12	97.96
		25	YF171	350	103.8	693.7	797.5	97.83	98	98.1	97.84	97.44
		37.5	YF172	460	126.4	946.8	1073.2	98.13	98.2	98.23	97.91	97.48
		50	YF174	625	225.3	636.5	861.8	97.95	98.3	98.53	98.54	98.4
		75	YF175	900	253.7	1118.4	1372.1	98.33	98.5	98.65	98.54	98.31
		100	YF176	1675	396.6	950.8	1347.4	98.23	98.6	98.79	98.83	98.75

Table continued on next page

Single phase transformer data

Typical data based upon single phase 240X480 V primary and 120X240 V secondary DOE 2016 efficient dry type transformers for two wire secondary applications (continued)

Conductor	Temp. Rise	kVA	% Regulation 100% PF	% Regulation 80% PF	% Imp. T rise +20 °C	% X T rise +20 °C	R T rise +20 °C	X/R atio	Sound Level dB (per NEMA ST-20)	Inrush Max (RMS) t=8.33 ms
Aluminum Wound	150 °C Rise	15	4.5	5.7	5.6	3.5	4.4	0.8	45	765.77
		25	3.4	5.1	5.1	3.9	3.3	1.2	45	902
		37.5	4	7.1	7.7	6.7	3.7	1.8	45	1207.18
		50	3.6	6.3	6.7	5.8	3.4	1.7	45	390.63
		75	2.9	6	6.2	5.6	2.7	2.1	50	781.25
		100	2.6	6.3	6.6	6.1	2.4	2.5	50	1041.67
		167	2.2	4.1	4.6	4.1	2.1	2.0	50	6793.65
		250	2.3	5.7	7	6.7	2	3.4	55	7204.63
	115 °C Rise	15	1.9	3.5	3.8	3.3	1.9	1.7	45	919.55
		25	2.5	4.6	5	4.4	2.4	1.8	45	1205.23
		37.5	2.5	4.6	5	4.4	2.4	1.8	45	390.62
		50	3.1	5	5.2	4.3	3	1.4	45	521
		75	2.5	5.2	6	5.5	2.4	2.3	50	781
		100	2.3	5.4	6.5	6.1	2.1	2.9	50	1042
	80 °C Rise	15	1.4	2.6	2.9	2.6	1.3	2.0	45	902
		25	2.3	4.4	4.9	4.4	2.2	2.0	45	902
		37.5	2.2	4.4	4.9	4.4	2.2	2.0	45	391
		50	1.6	3.5	4.1	3.8	1.5	2.5	45	781.25
		100	1.9	3.8	4.2	3.8	1.9	2.0	50	1740
Copper Wound	150 °C Rise	15	2	3.2	3.3	2.6	2	1.3	45	1103.9
		25	3.2	5.2	5.6	4.7	3.1	1.5	45	260.42
		37.5	3.1	5.2	5.1	4.1	3	1.4	45	390.63
		50	2.7	4.7	4.7	3.8	2.7	1.4	45	520.83
		75	2.4	4.8	5.5	5	2.2	2.3	50	3246.42
		100	2.5	5	5.6	5.1	2.3	2.2	50	2148.65
		167	2	4	4.0	3.5	2	1.8	50	6936.83
		250	2.2	5.5	6.7	6.4	2	3.2	55	2605
	115 °C Rise	15	1.9	3.1	3.3	2.7	1.9	1.4	45	587
		25	2.9	5.2	5.7	5	2.8	1.8	45	870
		37.5	2.8	4.7	5	4.2	2.7	1.6	45	1753.29
		50	2.6	4.8	4.6	4	2.3	1.7	45	520.83
		75	2.2	4.6	5.3	4.9	2.1	2.3	50	3303.98
		100	2.3	4.8	5.5	5.1	2.1	2.4	50	2148.65
		167	2	4	4.4	4	1.9	2.1	50	6782.85
	80 °C Rise	15	1.6	2.9	3.2	2.7	1.7	1.6	45	1100.44
		25	2.9	5.2	5.6	4.9	2.8	1.8	45	870
		37.5	2.6	5	5.6	5	2.5	2.0	45	1576.69
		50	1.3	3	3.5	3.3	1.3	2.5	45	2853
		75	1.6	3.5	4.1	3.8	1.5	2.5	50	782
		100	1	2	2.3	2.1	1	2.1	50	1042

Three phase transformer data

Typical Data based upon 480 V delta primary and 208Y/120 secondary
DOE 2016 efficient dry type transformers K-Factor 1

				Weight		Losses in Watts			Efficiency (T Rise +20)				
Conductor	Temp. Rise	kVA	Frame	Painted	Stainless Steel	No Load	Impedance Loss	Total at Rise +20 °C	25%	35%	50%	75%	Full Load
Aluminum Wound	150 °C Rise	15	UX71A	231	251	63.0	471.3	534.3	97.81	97.89	98.09	97.82	97.42
		30	UY72A	297	217	78.7	1191.3	1270	98.28	98.23	98.11	97.6	97.02
		45	UX73A	363	383	120.8	1395.2	1516	98.4	98.4	98.38	98.01	97.57
		75	UY04A	555	575	168.8	2275.1	2443.9	98.58	98.6	98.49	98.12	97.67
		112.5	DY75A	680	760	245.5	2815.3	3060.8	98.69	98.74	98.67	98.37	98.01
		150	DY76A	1030	1050	322	2931.9	3253.9	98.79	98.83	98.85	98.63	98.34
		225	DY77A	1450	NA	377.2	5080.9	5458.1	98.92	98.94	98.83	98.52	98.17
		300	DY08A	1666	NA	465	6348.5	6813.5	99.01	99.02	98.93	98.66	98.34
		500	DY79A	2713	NA	698.5	8454.7	9153.2	99.13	99.14	99.09	98.87	98.6
	115 °C Rise	15	UX71A	231	251	63	434.3	497.3	97.8	97.89	98.06	97.79	97.38
		30	UX72A	330	350	77.7	1100.2	1177.9	98.27	98.23	98.07	97.55	96.95
		45	UX73A	444	464	143.2	1029.3	1172.5	98.3	98.4	98.48	98.25	97.92
		75	UX74A	603	623	168.8	1920.5	2089.3	98.61	98.6	98.54	98.19	97.77
		112.5	DX75A	830	850	230.8	2705.7	2936.5	98.71	98.74	98.65	98.31	97.91
		150	DX76A	1250	NA	318.4	2835.7	3154.1	98.79	98.83	98.84	98.61	98.32
		225	DX77A	1670	NA	425	4087.1	4512.1	98.88	98.94	98.88	98.64	98.33
		300	DX78A	1985	NA	480.3	5265.3	5745.6	99.01	99.02	98.97	98.73	98.43
		500	DX79A	2900	NA	719	7032.9	7751.9	99.14	99.14	99.13	98.94	98.7
	80 °C Rise	15	UY72A	297	317	78.7	247.3	326	97.6	97.89	98.26	98.25	98.07
		30	UY73A	363	383	120.6	531.7	652.3	98.04	98.23	98.44	98.32	98.07
		45	UY04A	555	575	168.8	666.3	835.1	98.2	98.4	98.61	98.54	98.34
		75	DY75A	680	760	245.5	1042.4	1287.9	98.41	98.6	98.74	98.65	98.46
		112.5	DY76A	1030	1050	304.3	1346.1	1650.4	98.67	98.74	98.93	98.85	98.67
		150	DY77A	1450	NA	366.2	1855.7	2221.9	98.76	98.83	98.97	98.85	98.66
		225	DX78A	1985	NA	480.3	2718.7	3199	98.89	98.94	99.04	98.91	98.71
		300	DY79A	2713	NA	698.5	2550.6	3249.1	98.89	99.02	99.15	99.12	99
Copper Wound	150 °C Rise	15	UX71C	230	250	55.1	572.2	627.3	97.89	97.89	97.95	97.53	97
		30	UX72C	353	373	92	986.5	1078.5	98.22	98.23	98.24	97.87	97.41
		45	UX73C	480	500	139.6	1109.3	1248.9	98.34	98.4	98.51	98.28	97.94
		75	UY04C	503	523	200.9	791.4	992.3	98.52	98.6	98.62	98.38	98.05
		112.5	DY75C	790	870	245.9	2805.1	3051	98.69	98.74	98.67	98.37	98
		150	DY76C	1085	1105	304.1	3373.8	3677.9	98.79	98.83	98.77	98.5	98.16
		225	DY77C	1610	NA	449.7	4340.5	4790.2	98.86	98.94	98.9	98.68	98.39
		300	DY78C	1970	NA	478.2	5844.3	6322.5	99.01	99.02	98.97	98.72	98.42
		500	DX79C	3720	NA	758	7647.2	8405.2	99.1	99.14	99.09	98.89	98.64
	115 °C Rise	15	UX71C	230	250	55.1	528.6	583.7	97.88	97.89	97.92	97.49	96.95
		30	UX72C	353	373	92	899	991	98.21	98.23	98.23	97.86	97.39
		45	UX73C	480	500	134.5	1101.6	1236.1	98.35	98.4	98.45	98.18	97.81
		75	UX74C	748	768	213	1352	1565	98.52	98.6	98.72	98.55	98.29
		112.5	DX75C	900	980	280.8	1982.9	2263.7	98.67	98.74	98.81	98.63	98.37
		150	DX76C	1240	1260	293.6	3309	3602.6	98.78	98.83	98.73	98.42	98.04
		225	DX77C	1847	NA	513.5	3073.3	3586.8	98.8	98.94	98.96	98.82	98.60
		300	DX78C	2150	NA	544.9	4571.1	5116	98.97	99.02	99.03	98.84	98.6
		500	DX79C	3720	NA	758	6996.6	7754.6	99.1	99.14	99.1	98.9	98.65
	80 °C Rise	15	UX72C	353	373	92	189	281	97.34	97.89	98.25	98.37	98.3
		30	UX73C	480	500	134.5	442.4	576.9	97.92	98.23	98.47	98.45	98.28
		45	UY74C	661	681	196.9	518.9	715.8	98.03	98.4	98.63	98.66	98.55
		75	DY75C	790	870	245.9	1042.2	1288.1	98.4	98.6	98.74	98.65	98.46
		112.5	DY76C	1085	1105	304.1	1594.3	1898.4	98.61	98.74	98.83	98.7	98.47
		150	DY77C	1610	NA	442.1	1623.1	2065.2	98.6	98.83	98.93	98.89	98.74
		225	DX78C	2150	NA	544.9	2314.3	2859.2	98.81	98.94	99.06	98.99	98.84
		300	DX79C	3720	NA	758	2404	3162	98.81	99.02	99.12	99.1	98.99

Table continued on next page

Three phase transformer data

Typical Data based upon 480 V delta primary and 208Y/120 secondary DOE 2016 efficient dry type transformers K-Factor 1 (continued)

Conductor	Temp. Rise	kVA	% Regulation 100% PF	% Regulation 80% PF	% Imp. T rise +20 °C	% X T rise +20 °C	R T rise +20 °C	X/R Ratio	Sound Level dB (per NEMA ST-20)	Inrush Max (RMS) t=8.33 ms
Aluminum Wound	150 °C Rise	15	3.2	3.7	3.7	1.9	3.1	0.6	45	556.83
		30	4	4.6	4.6	2.4	4	0.6	45	521
		45	3.2	4.2	4.3	3	3.1	1.0	45	943.1
		75	3.1	4.5	4.6	3.5	3	1.2	50	1298
		112.5	2.6	4	4.1	3.3	2.5	1.3	50	2694.81
		150	2	3.9	4.4	3.9	2	2.0	50	3257.73
		225	2.4	5.1	5.2	4.7	2.3	2.0	55	1850.52
		300	2.2	4	4.3	3.8	2.1	1.8	55	4369
		500	1.5	3.8	5.1	4.7	1.9	2.5	60	7975.81
	115 °C Rise	15	2.9	3.5	3.4	1.8	2.9	0.6	45	559.29
		30	3.7	4.9	4.9	3.3	3.7	0.9	45	180.42
		45	2.3	3	3	2	2.3	0.9	45	1263.55
		75	2.7	5.4	5.4	4.7	2.6	1.8	50	1122.96
		112.5	2.6	5.3	5.2	4.6	2.4	1.9	50	1754.1
		150	1.9	3.4	3.6	3.1	1.9	1.6	50	3763
		225	1.9	4.5	4.7	4.3	1.8	2.4	55	4110.48
		300	1.9	4.4	5.1	4.8	1.8	2.7	55	4758.19
		500	1.5	3.8	5.4	5.2	1.4	3.7	60	4259.7
	80 °C Rise	15	4	4.6	2	1.2	1.6	0.8	45	652.14
		30	1.8	2.6	2.6	1.9	1.8	1.1	45	888.91
		45	3.1	4.5	2.6	2.1	1.5	1.4	45	1460.36
		75	1.4	2.4	2.6	2.2	1.4	1.6	50	2238.52
		112.5	1.3	2.7	3.2	2.9	1.2	2.4	50	2766.16
		150	2.4	5.1	3.8	3.6	1.2	3.0	50	2524
		225	1.9	4.4	3.8	3.6	1.2	3.0	55	3199
		300	1.5	3.8	3	2.9	0.9	3.2	55	8421.92
Copper Wound	150 °C Rise	15	3.8	4	4.1	1.6	3.8	0.4	45	598.95
		30	3.3	3.9	3.9	2.1	3.3	0.6	45	1033.74
		45	2.5	3	3	1.7	2.5	0.7	45	958
		75	2.4	3.9	3	2.4	2.4	1.0	50	1931
		112.5	2.6	5	5	4.3	2.5	1.7	50	2277.36
		150	2.3	4.1	4.2	3.6	2.2	1.6	50	3394.56
		225	2	3.6	4.1	3.6	1.9	1.9	55	5732.46
		300	2.1	4.6	4.9	4.5	1.9	2.4	55	1804.22
		500	1.6	3.6	5.6	5.4	1.5	3.6	60	3090.1
	115 °C Rise	15	3.5	3.8	3.8	1.5	3.5	0.4	45	463.58
		30	3	3.7	3.6	2	3	0.7	45	832.12
		45	2.5	3.3	3.4	2.3	2.4	1.0	45	1187
		75	1.8	3.3	3.5	3	1.8	1.7	50	1951.47
		112.5	1.8	3.1	3.2	2.7	1.8	1.5	50	3320.13
		150	2.3	4.9	5	4.5	2.2	2.0	50	1410.66
		225	1.4	3.4	4	3.8	1.4	2.7	55	6137.43
		300	1.7	4	4.5	4.2	1.6	2.6	55	6212.11
		500	1.6	3.6	5	4.8	1.4	3.4	60	3227.97
	80 °C Rise	15	3	3.7	1.8	1.2	1.4	0.9	45	821.59
		30	1.5	2.1	2.2	1.6	1.5	1.1	45	1191.04
		45	1.2	2.2	2.5	2.2	1.2	1.8	50	1748.67
		75	2.6	5	3.2	2.9	1.4	2.1	50	2277.36
		112.5	2.3	4.1	3.1	2.8	1.4	2.0	50	3394.56
		150	1.1	2.3	2.4	2.1	1.1	1.9	55	5732.46
		225	1.7	4	3.2	3	1	2.9	55	6498.7
		300	1.6	3.6	3.4	3.3	0.8	4.1	55	2991.18

Three phase transformer data

Sound levels

All general purpose transformers are as quiet, or quieter than required by NEMA ST-20. Average sound levels are warranted not to exceed the values listed for each load rating shown in the below table. Sound characteristics vary between transformers of identical voltage and kVA rating. The range of variation may be 4 to 8 decibels.

These values apply only to specified test conditions because the characteristic of the installation can cause them to be higher under operating conditions. Where acoustical noise is deemed to be of concern, proper steps should be taken during installation to minimize audible noise transmission. Please refer to the installation manual for installation and operation recommended practices to minimize the audible sound of the transformer.

If lower sound levels are needed or desired, -3 dB and -5 dB options are available for most models.

	Average Sound Level, Decibels	
	Self cooled ventilated	
	A	**B**
Equivalent Winding kVA Range	**K-factor = 1 K-factor = 4**	**K-factor = 13 K-factor = 20**
9.01 to 15.00	45	45
15.01 to 30.00	45	45
30.01 to 50.00	45	48
50.01 to 75.00	50	53
75.01 to 112.50	50	53
112.51 to 150.00	50	53
150.01 to 225.00	55	58
225.01 to 300.00	55	58
300.01 to 500.00	60	63
500.01 to 700.00	62	65
700.01 to 1000.00	64	67

Note 1: Consult factory for non-linear requirements exceeding a K-factor rating of 20.
Note 2: Sound levels are measured using the A-weighted scale (dB [A])

Electrostatic shielding

An electrostatic shield is a grounded insulated metallic foil inserted between the primary and secondary. The foil creates a shield effect which reduces the capacitive coupling between the windings, reducing the transmission of electrical noise between windings. All K-factor transformers (K4, K13, K20) and harmonic mitigating transformers come with electrostatic shielding. Electrostatic shielding can be ordered as an option for general purpose (K1) and is known as a Guard I transformer. See the suffix code table below for addition information on electrostatic shielding and noise reduction. All Type QL transformers that have electrostatic shielding use copper material for the shield.

Nomenclature

The nomenclature table is a guide to understanding our catalog numbers.

Please Note: This catalog number nomenclature is for illustrative purposes only. Not all catalog number combinations are available for production. Please reference the BuyLog Section 10 ordering tables beginning on page 10-10 for Three-phase DOE 2016 Efficiency transformers currently available for ordering. For additional assistance, please contact Customer Service at 1-800-431-7867.

DOE 2016 catalog number nomenclature

9T | 1 | 0 | A | 100 | 1 | G31

ABB Standard (9T)

1 = QL DOE 2016 Design

Transformer Type
- 0 = Standard, K1
- 1 = K13
- 2 = K20
- 4 = K4
- 7 = Guard II/Servicenter
- 8 = Spare Parts

Options
- A = Aluminum Coil
- B[1] = Aluminum C&C (no enclosure)
- C = Copper Coil
- S = AL Stainless Steel Enclosure
- V[1] = Copper C&C (no enclosure)
- Z = CU Stainless Steel Enclosure
- Y = Accessories

[1]These options are UL recognized components.

Voltage Series
See Voltage Chart below

kVA Rating
- 1 = 15 kVA
- 2 = 30 kVA
- 3 = 45 kVA
- 4 = 75 kVA
- 5 = 112.5 kVA
- 6 = 150 kVA
- 7 = 225 kVA
- 8 = 300 kVA
- 9 = 500 kVA

		Catalog No. Suffix Codes		
		Core & Coil Temp Rise		
		150 °C	**115 °C**	**80 °C**
Core & Coil Characteristics	**Temp Rise Rating Only**	G01 or blank	G31	G61
	-3 dB noise reduction	G02	G32	G62
	Electrostatic Shield*	G03	G33	G63
	-3 dB noise reduction + Electrostatic Shield	G04	G34	G64
	-5 dB noise reduction	G05	G35	G65
	-5 dB noise reduction + Electrostatic Shield	G06	G36	G66

* An Electrostatic Shield (a Guard I transformer) is bonded to the ground terminal and is a copper barrier between the primary and secondary windings to reduce electrical noise. All K-factor transformers come standard with an Electrostatic Shield (K4, K13, K20).

Three phase transformer data

3-phase common voltages

Series	Primary Voltage	Secondary Voltage
100	480	208Y/120
101	480	220
102	480	220Y/127
103	480	208
104	480	230Y/133
105	480	240Y/139
106	480	380
107	480	380Y/219
108	480	400Y/231
109	480	415Y/240
110	480	480
111	480	575
112	480	600
113	480	440Y/254
114	480	600Y/346
115	480	440
116	480	230/115
117	480	480Y/277
118	480	240/120
119	480	240
121	480	220/110
123	480	400
124	480	460
125	480	420
126	480	230
127	480	575Y/332
129	480	460Y/266
131	208	240
132	208	240/120
133	208	480
134	208	480Y/277
135	208	380Y/219
136	208	230
137	208	575
138	208	460
139	208	400Y/231
140	208	208
141	208	230Y/133
142	208	380
143	208	220/110
144	208	220Y/127
145	208	208Y/120
146	208	400
147	208	315
148	208	600
149	208	460Y/266
150	208	220
151	208	230/115
152	208	415Y/240
153	240	480Y/277
154	240	480
155	240	400Y/231

3-phase common voltages

Series	Primary Voltage	Secondary Voltage
157	240	575
158	240	460Y/266
159	240	240Y/139
160	240	600
161	240	208Y/120
162	240	380
163	240	440
164	240	240/120
165	240	380Y/219
166	220	380Y/219
167	220	400Y/231
168	220	240Y/139
169	220	220
170	220	208Y/120
171	220	480Y/277
172	220	440Y/254
173	220	480/240
174	220	480
175	220	415Y/240
176	380	220Y/127
177	380	480
178	380	220
179	380	208Y/120
180	380	415Y/240
181	380	240/120
184	380	480Y/277
185	380	380Y/219
186	380	230Y/133
187	380	240
188	440	220Y/127
189	440	480
190	440	208Y/120
191	440	380
192	440	380Y/219
193	440	400Y/231
194	440	575Y/332
195	440	240/120
196	440	480Y/277
197	440	240
198	230	460
199	230	400Y/231
200	230	400
201	230	480Y/277
202	230	208Y/120
203	230	480
204	400	230Y/133
205	400	380Y/219
206	400	480
207	400	220Y/127
209	400	400Y/231
210	400	208Y/120
211	400	208Y/120

3-phase common voltages

Series	Primary Voltage	Secondary Voltage
212	400	480Y/277
213	415	208Y/120
214	415	460
215	415	220Y/127
216	416	208Y/120
217	416	480Y/277
218	460	208Y/120
219	460	220
221	460	400Y/231
222	460	220Y/127
223	460	230
224	460	575Y/332
225	460	230Y/133
226	460	460Y/266
227	550	208Y/120
228	550	480Y/277
229	575	208Y/120
230	575	480Y/277
231	575	240Y/139
232	575	460
233	575	480
234	575	230Y/133
235	575	230
236	600	240/120
237	600	480
238	600	480Y/277
239	600	240
240	600	208Y/120
241	600	230Y/133
242	600	240Y/139
243	600	208
244	600	600Y/346
245	690	400Y/231
246	690	208Y/120
247	277	415Y/240
248	315	208Y/120
249	320	480Y/277
250	420	480Y/277
251	490	480Y/277
252	500	480Y/277

Three phase transformer data

Mounting and placement
The only foundation necessary is a non-combustible flat surface strong enough to support the weight of the unit. Note that permanent and effective grounding of the metal case in accordance with NEC/CEC is recommended as a safety precaution.

Free circulation of ambient air is essential for the proper operation of all ventilated dry-type transformers. The top and sides of the transformer with ventilation openings require a minimum distance of six inches to adjacent noncombustible structures or equipment to ensure proper circulation of air. A minimum of six inches from the top of the enclosure is required for ventilation purposes, but 12 to 18 inches minimum is recommended for removal of top cover for servicing.

Larger kVA size transformers may require both front and rear access for installation and maintenance. Please refer to associated outline drawings that indicate terminal locations to determine if both front and rear access are needed.

Ventilation
Dry type general purpose transformers are cooled by free circulation of surrounding air. They depend on air to enter at the bottom, flow upward over the core and coil surfaces and exit through the openings near the top. These transformers will carry full-rated loads continuously when the surrounding air does not exceed 30 °C/86 °F average, 40 °C/104 °F maximum and adjacent structures permit free movement of cooling air.

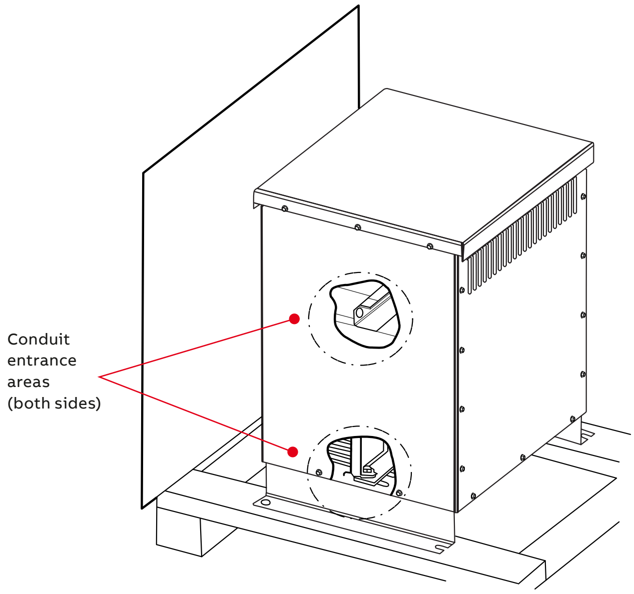
The room in which dry type transformers are located should be sized to permit locating transformers with sufficient spacing between units and sufficient clearances to walls and other obstructions to permit the free circulation of air around each unit and to minimize noise amplification. Sufficient space should also be maintained to permit routine inspection and maintenance. Adequate ventilation is essential for the proper cooling of transformers. Clean dry air is desirable. Filtered air at or above atmospheric pressure may reduce maintenance if dust or other contaminants present a problem. When transformers are located in rooms or other restricted spaces, sufficient ventilation should be provided to hold the air temperature within established limits (30 ¬°C/86 °F average over 24 hours with a 40 °C/104 °F maximum) when measured near the transformer inlets.

Cable conduit entrance / lugs
All cable connections to the transformer should be brought into the enclosure as low as possible to allow for the required cable bending radius. Side entry of cables is recommended as it leaves the ventilation areas unobstructed. When making cable connection or changing taps, always use two wrenches for tightening or loosening bolted connections to prevent distortion or damage.

Note: terminals must be cleaned if it is necessary to change taps. Gently scrape the insulation/coating from the new connection and apply an electrical joint compound.

All general purpose transformers are designed for easy accommodation of cables and cable connectors. Lug connector kits are readily available and can be ordered through the sales office, through the distributor, or can be purchased commercially. Lug kit and ground bar kits are included up through 150 kVA. The assembly of connectors to the line terminals is important. Follow established installation procedures recommended by the connector manufacturer. Do not install washers between the lug and the terminal as this will cause heating and arcing, resulting in failure of the connector. Refer to the NEC/CEC guide for sizing. Follow the torque recommendations of the connector manufacturer or use the guide below.

Bolt Size	Torque (In Lbs.)
1/4”	60
5/16”	120
3/8”	220
1/2”	460



Three phase transformer data

Cleaning and maintenance
Under normal environments and operating conditions, dry type transformers are virtually maintenance-free. However, they do require occasional internal cleaning, care, and inspection. The frequency of inspection, cleaning and care will depend on the atmospheric and/or environmental conditions where the transformer is installed.

A continuously energized transformer needs periodic cleaning and maintenance to remove accumulations of dust or dirt from cooling ducts and other surfaces. Large accumulations may reduce cooling efficiency and lead to overheating.
Maintenance and cleaning are recommended at least once a year in relatively clean installations and at more frequent intervals in more heavily contaminated atmospheres. Transformers that are de-energized for long periods of time generally require more frequent maintenance and cleaning to ensure the removal of contamination.

CAUTION: Any internal inspection, adjustment, cleaning, or maintenance must be done with the transformer de-energized and the windings grounded. Technicians must follow NFPA 70E guidelines.

Cleaning
Accumulation of dirt on insulating surfaces becomes a hazard when a considerable amount of moisture is absorbed. Vacuuming is the recommended method for cleaning. Special attention should be given to cooling ducts within the winding. Low pressure dry air can be used if care is taken to avoid driving the contamination into the insulation.

Moisture is detrimental to most insulation systems. It is advisable to dry out any transformer that has been exposed for long periods of time to high humidity. Whenever moisture is visible on insulation surfaces, the unit must be dried before being energized. If moisture is evident, the unit should be dried out by placing it in an oven, by blowing heated air over it, or by placing strip heaters under the coil windings. The temperature of the heated air should not exceed 110 °C/230 °F. If strip heaters are used, the elements should not be allowed to come in contact with the transformer. Heat should be applied to both the front and rear of the transformer. Normal drying techniques may not be adequate for transformers subjected to flooding, direct rain or similar applications of water. The factory should be consulted as the transformer will most likely need to be replaced.

Maintenance
Maintenance would include dust removal and/or drying (if applicable), tap changing, tightening of bolted connections, general servicing and inspection of auxiliary devices. Additional information related to the installation and maintenance of general purpose transformers can be found in ANSI publication C57.94, “Guide for Installation and Maintenance of Dry Type Transformers.”

Applicable design, performance and safety standards
ABB Dry Type Transformers conform to the standards as shown above and are in compliance with these standards below:

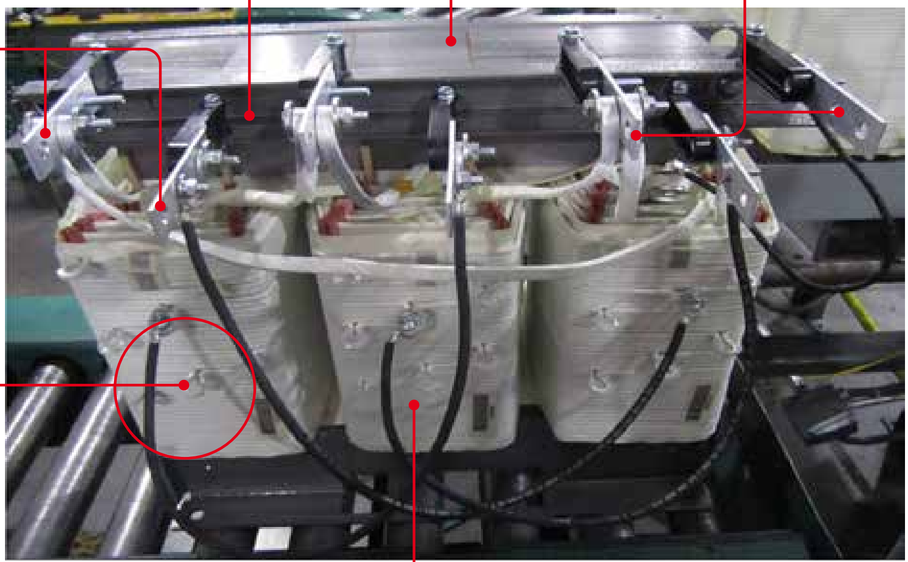
- ANSI/NFPA 70: National Electrical Code
- ANSI/IEEE C57.96, Distribution Transformers, Guide for Loading Dry Type appendix to ANSI C57.12 standards
- IEEE C57.12.01: General Requirements for Dry Type Distribution Transformers
- IEEE C57.12.91, Test Code for Dry Type Distribution Transformers
- NEMA ST-20: Dry Type Transformers for General Applications
- UL 1561, Dry Type General Purpose Power Transformer, UL Category code XQNX
- 10 CFR 431 (DOE2016) USA Efficiency Level compliance, UL category code ZXPC
- CSA 802.2 (Natural Resources Canada - NRCan) energy efficiency compliance (UL category code ZZED)
- ANSI/UL 5085 Low Voltage Transformers, UL category code XPTQ
- UL Energy Verification – for US and Canada (ZXPC: EV519886) (ZZED: EV23760)
- ABB’s dry type transformers are manufactured in an ISO 9001 certified plant.

ISO 9001:2015
BUREAU VERITAS
Certification

Energy Verified

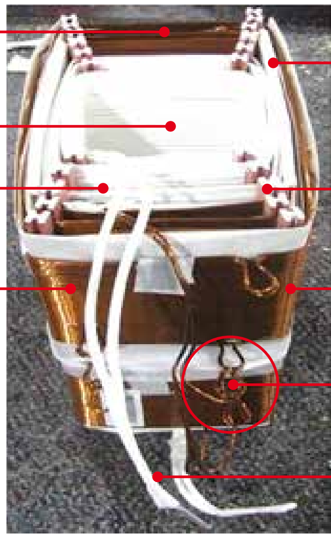
Energy Verified

Transformer's main components



Transformer winding (also known as coil)

- Windings are coils of conductors
- Windings are made of insulated aluminum or copper
- Wrapped with Nomex paper or painted with varnish
- Cooling ducts are added to increase convection area
- Ducts are built by inserting spacers between conductor layers
- Taps allows the modification of voltage ratio by adding or subtracting turns of the primary winding



Seismic testing
The testing was performed according to both the requirements of ICC-ES AC156 and IEEE-693-2005 and meets the requirements for special seismic certification as detailed in section 1705A.13.3 of the CBC 2019 and the 2015-ICC-ES AC156 standard. In accordance with ASCE 7-16, which contains the seismic provisions of the 2018 International Building Code [IBC], AC156 is an acceptable test procedure for determining the seismic certification of equipment. ASCE 7-16, Section 13.2.1.2.b allows for testing alone to be used to satisfy all IBC seismic design requirements for electrical equipment.

Using AC156 procedures, third party engineering evaluation determined that the test results demonstrate the ability of the ABB low voltage transformers up to the peak ground seismicity (Sds) in the table below. Therefore, third party engineering evaluation concludes that the test data demonstrates that the ABB low voltage transformers are certified for installation in accordance with the seismic provisions of the 2018 IBC for any site with a site-specific Sds equal or less than the below Sds table and at any location within a building.

Enclosure Type & Product Names	Mounting	NEMA Rating	kVA	Width	Depth	Height	Weight	Sds (g)	IEEE-693 Seismic Level
Vented/Non-Vented QL Transformer	Floor	1,2	11-1000	18” -47”	16”- 40”	27” - 57”	50-4,290 lbs.	1.18[1] & 2.42[2]	High
	Wall Bracket	1,2	11-112.5	19”- 32”	17”- 28”	27” - 39.9”	50- 1,018 lbs.	1.16[1] & 2.50[2]	High

[1] For QL, QF, FC
[2] For encapsulated and enclosed Servicenter™ product line

Tests
Below are the production line tests we perform on each type QL transformer.

- HiPot test (Dielectric test)
- Induced volts test
- OCV (Open Circuit Volts, this is Volts ratio test)
- No load losses
- Load losses
- Impedance volts
- Excitation current
- Polarity test

These tests are pass/fail only.

HiPot (dielectric) testing is more strenuous than insulation resistance as it applies a higher voltage looking for insulation breakdown – it is a pass/fail test.

We do not run the less stringent insulation resistance test and take or calculate readings.

In fact the IEEE Std C57.12.91-2011 standard warns against using such test results to determine suitability.

Insulation resistance tests
Insulation resistance tests determine the insulation resistance from individual windings to ground or between individual windings. The insulation resistance is commonly measured in megohms but may be calculated from measurements of applied voltage and leakage current. The insulation resistance of electrical apparatus is of doubtful significance as compared with the dielectric strength. It is subject to wide variation with design, temperature, dryness, and cleanliness of the parts. When the insulation resistance falls below prescribed values, it can, in most cases, be brought up to the prescribed value by cleaning and drying the transformer. The insulation resistance, therefore, may afford a useful indication as to whether the transformer is in suitable condition for application of the more meaningful dielectric test.

NOTE 1: The significance of values of insulation resistance tests generally requires some interpretation, depending on the design, dryness, and cleanliness of the insulation involved. If a user decides to make insulation resistance tests, it is recommended that insulation resistance values be measured periodically (during maintenance shutdown) and that these periodic values be plotted. Substantial variation in the plotted values of insulation resistance should be investigated for cause.

NOTE 2: Insulation resistances may vary with applied voltage, and any comparison should be made with measurements at the same voltage.

Here is an example of our typical test data.
Many of these are available on our web page.

ABB Inc.
305 Gregson Drive
Cary, NC 27511
electrification.us.abb.com

TYPICAL TEST DATA

LV Dry Type Transformer

Industrial Solutions

MODEL #: 9T10A1004 Underwriters' Laboratories Inc. Listed

RATINGS

KVA	75	Conductor	AL
Frequency (Hz)	60	Phase	3
Primary Voltage	480D +2, -4 (2.5% taps)	Secondary Voltage	208Y/120
Current Line Primary (A)	90.21	Current Line Secondary (A)	208.18
Frame	UY04A	Insulation System (°C)	220C
K Factor	1	Efficiency level	DoE 2016 (10CFR 431)
Temp. Rise (°C)	150	Average Sound Level (dB)	50

LOSS DATA @ 100% LOAD

Core Loss or No Load Loss @ 100% voltage (Watts)	168.8
Impedance Loss or Coil Loss @ Rise + 20 °C reference (Watts)	2,275.1
Total Loss @ Rise + 20 °C reference (Watts)	2,443.9

DIELECTRIC AND PRODUCTION TESTING

Induce Test @ Twice rated voltage 400 Hz per UL1561 and NEMA ST-20
Hipot Test for High Voltage winding to Low Voltage and Ground @ 4000 volts 60 Hz, 60 Sec
Hipot Test for Low Voltage winding to High Voltage and Ground @ 2500 volts 60 Hz, 60 Sec
Polarity additive in accordance with UL1561 and NEMA ST-20

EFFICIENCY:

DoE 2016 (10CFR 431) Efficiency Level

Load (%)	Efficiency (%)
16	98.28
25	98.58
35	98.60
50	98.49
75	98.12
100	97.67

IMPEDANCE:

Impedance at reference temperature of Rise + 20 °C (Calculated)

%R	3.0
%X	3.5
%Z	4.6
X/R Ratio	1.2

REGULATION:

Regulation at reference temperature of Rise + 20 °C (Calculated)

Power Factor	Regulation (%)
1.0	3.1
0.9	4.3
0.8	4.5

REFERENCE VALUES:

Inrush Current (Calculated)	t= 8.33ms
Imax (RMS)	≈1298.00 A

by ABB

Accessories and lug kits

Single-phase and three-phase

Wall mount bracket

Frame Size	Catalog Number
UX71A	9T18Y1071G07
UX71C	9T18Y1071G07
UX72A	9T18Y1071G07
UX72C	9T18Y1071G07
UX73A	9T18Y1071G07
UX73C	9T18Y1071G07
UX74A	9T18Y1074G07
UX74C	9T18Y1074G07
UY04A	9T18Y1074G07
UY74A	9T18Y1074G07
UY74C	9T18Y1074G07
DX75C	9T18Y1074G07
DY75A	9T18Y1074G07
DY75C	9T18Y1074G07
YF171	9T18Y5042
YF172	9T18Y5043
YF174	9T18Y5043
YF175	Not available
YF176	Not available
YF177	Not available

Bottom pan

Frame Size	Catalog Number
DY08A	9T18Y1078G09
DX76A	9T18Y1077G09
DX77A	9T18Y1077G09
DX77C	9T18Y1077G09
DY77A	9T18Y1077G09
DY77C	9T18Y1077G09
DX78A	9T18Y1078G09
DX78C	9T18Y1078G09
DY78A	9T18Y1078G09
DY78C	9T18Y1078G09
DX79A	9T18Y1079G09
DY79A	9T18Y1079G09
DY79C	9T18Y1079G09
DX79C	9T18Y1079G09
YF175	9T18Y4504G77
YF176	9T18Y4504G79
YF177	9T18Y4504G79

316 stainless steel rain shield kit

Frame Size	Catalog Number
UX71A	9T18Y1171G06
UX71C	9T18Y1171G06
UX72A	9T18Y1172G06
UX73A	9T18Y1172G06
UX72C	9T18Y1172G06
UX73C	9T18Y1172G06
UY74A	9T18Y1174G06
UX74A	9T18Y1174G06
UY74C	9T18Y1174G06
UX74C	9T18Y1174G06
DY75A	9T18Y1174G06
DY75C	9T18Y1174G06
DX75C	9T18Y1174G06
DY76A	9T18Y1176G06
DY76C	9T18Y1176G06
DX75A	9T18Y1176G06
DX76C	9T18Y1176G06

Ground bar kit

Frame Size	Catalog Number
UY04A	9T18Y1074G11
UX71A	9T18Y1071G11
UX71C	9T18Y1071G11
UX72A	9T18Y1071G11
UX73A	9T18Y1071G11
UX72C	9T18Y1071G11
UX73C	9T18Y1071G11
UY74A	9T18Y1074G11
UX74A	9T18Y1074G11
UY74C	9T18Y1074G11
UX74C	9T18Y1074G11
DY75A	9T18Y1074G11
DY76A	9T18Y1074G11
DY75C	9T18Y1074G11
DY76C	9T18Y1074G11
DX75A	9T18Y1074G11
DX75C	9T18Y1074G11
DX76C	9T18Y1074G11

Rain shield kit

Frame Size	Catalog Number
UY04A	9T18Y1074G06
UX71A	9T18Y1071G06
UX71C	9T18Y1071G06
UX72A	9T18Y1072G06
UX72C	9T18Y1072G06
UX73A	9T18Y1072G06
UX73C	9T18Y1072G06
UY74A	9T18Y1074G06
UX74A	9T18Y1074G06
UY74C	9T18Y1074G06
UX74C	9T18Y1074G06
DY08A	9T18Y1077G06
DY75A	9T18Y1074G06
DY75C	9T18Y1074G06
DX75A	9T18Y1076G06
DX75C	9T18Y1074G06
DY76A	9T18Y1076G06
DY76C	9T18Y1076G06
DX76A	9T18Y1077G06
DX76C	9T18Y1076G06
DX77A	9T18Y1077G06
DX77C	9T18Y1077G06
DY77A	9T18Y1077G06
DY77C	9T18Y1077G06
DY78C	9T18Y1077G06
DY78A	9T18Y1077G06
DX78A	9T18Y1077G06
DX78C	9T18Y1077G06
DX79A	9T18Y1079G06
DX79C	9T18Y1079G06
DY79A	9T18Y1079G06
DY79C	9T18Y1079G06
YF171	9T18Y4317G05
YF172	9T18Y4317G06
YF173	9T18Y4317G06
YF174	9T18Y1074G06
YF175	9Y18Y4322G77
YF176	9T18Y4322G88
YF177	9T18Y4322G88

Lug kits for QL transformers

Frame Size	Catalog Number
UY04A	9T18Y1074G10
UX71A	9T18Y1071G10
UX71C	9T18Y1071G10
UX72A	9T18Y1072G10
UX73A	9T18Y1072G10
UX72C	9T18Y1072G10
UX73C	9T18Y1072G10
UY74A	9T18Y1074G10
UX74A	9T18Y1074G10
UY74C	9T18Y1074G10
UX74C	9T18Y1074G10
DY08A	9T18Y1078G10
DY75A	9T18Y1075G10
DY75C	9T18Y1075G10
DX75C	9T18Y1075G10
DY76A	9T18Y1076G10
DY76C	9T18Y1076G10
DX75A	9T18Y1076G10
DX76C	9T18Y1076G10
DY77A	9T18Y1077G10
DY77C	9T18Y1077G10
DX76A	9T18Y1077G10
DX77A	9T18Y1077G10
DX77C	9T18Y1077G10
DY78A	9T18Y1078G10
DY78C	9T18Y1078G10
DX78A	9T18Y1078G10
DX78C	9T18Y1078G10
DX79A	9T18Y1079G10
DX79C	9T18Y1079G10
DY79A	9T18Y1079G10
DY79C	9T18Y1079G10
YF171	9T18Y7240G02
YF172	9T18Y7241G03
YF174	9T18Y7240G03
YF175	9T18Y7242G07
YF176	9T18Y7242G05
YF177	9T18Y7242G05

Accessories and lug kits

Single-phase and three-phase

Single phase lug kits

Coil Material	Temp Rise	kVA	Frame Size	Primary Bus Bar Holes (Qty/Size)	Secondary Bus Bar Holes (Qty/Size)	Lug Kit	Cable Size	Stud Diameter	Lug	Qty
Alumninum/ Copper	115 or 150	15 or 25 37.5	YF171	(2) .406 dia	(2) .406 dia	9T18Y7240G02	250MCM-6	(1) 21/64	P250	8
		50	YF172	(2) .406 dia	(2) .406 dia	9T18Y7241G03	250MCM-6	(1) 21/64	P250	4
							350MCM-6	(1) 13/32	P350	4
		75	YF174	(2) .406 dia	(2) .406 dia	9T18Y7240G03	250MCM-6	(1) 21/64	P250	12
		100	YF175	(2) .406 dia	(2) .406 dia	9T18Y7242G07	350MCM-6	(1) 13/32	P350	12
	150	167	YF176	(2) .406 dia	(2) .406 dia	9T18Y7242G05	350MCM-6	(1) 13/32	P350	8
							500MCM-4	(1) 13/32	P500	12

Three phase lug kits

Coil Material	Temp Rise	kVA	Frame Size	Primary Bus Bar Holes (Qty/Size)	Secondary Bus Bar Holes (Qty/Size)	Lug Kit	Cable Size	Stud Diameter	Lug	Qty
Aluminum	115 or 150	15	UX71A	(2) .406 dia	(2) .406 dia	9T18Y1071G10	1/0-14	(1) 17/64	P125	7
		30	UX72A	(2) .406 dia	(2) .406 dia	9T18Y1072G10	250MCM-6	(1) 21/64	P250	7
		45	UX73A	(2) .406 dia	(2) .406 dia	9T18Y1072G10	250MCM-6	(1) 21/64	P250	7
		500	DX79A	(4) .563 dia	(6) .563 dia	9T18Y1079G10	350MCM-6	(1) 13/32	P350	9
							500MCM-4	(1) 13/32	P500	24
	150	75	UY74A UY04A	(2) .406 dia	(2) .406 dia	9T18Y1074G10	250MCM-6	(1) 21/64	P250	3
							350MCM-6	(1) 13/32	P350	4
	115	75	UX74A	(2) .406 dia	(2) .406 dia	9T18Y1074G10	250MCM-6	(1) 21/64	P250	3
							350MCM-6	(1) 13/32	P350	4
	150	112.5	DY75A	(1) .563 dia	(2) .563 dia	9T18Y1075G10	350MCM-6	(1) 13/32	P350	7
		150	DY76A	(1) .563 dia	(2) .563 dia	9T18Y1076G10	350MCM-6	(1) 13/32	P350	3
							500MCM-4	(1) 13/32	P500	4
		225	DY77A	(2) .563 dia	(4) .563 dia	9T18Y1077G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	8
		300	DY78A DY08A	(4) .563 dia	(6) .563 dia	9T18Y1078G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	2
							600MCM-2	(1) 13/32	P600	6
		500	DY79A	(4) .563 dia	(6) .563 dia	9T18Y1079G10	350MCM-6	(1) 13/32	P350	9
							500MCM-4	(1) 13/32	P500	24
	115	112.5	DX75A	(1) .563 dia	(2) .563 dia	9T18Y1076G10	350MCM-6	(1) 13/32	P350	3
							500MCM-4	(1) 13/32	P500	4
		150	DX76A	(2) .563 dia	(4) .563 dia	9T18Y1077G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	8
		225	DX77A	(2) .563 dia	(4) .563 dia	9T18Y1077G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	8
		300	DX78A	(2) .563 dia	(4) .563 dia	9T18Y1078G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	2
							600MCM-2	(1) 13/32	P600	6
Copper	150 or 115	15	UX71C	(2) .406 dia	(2) .406 dia	9T18Y1071G10	1/0-14	(1) 17/64	P125	7
		30	UX72C	(2) .406 dia	(2) .406 dia	9T18Y1072G10	250MCM-6	(1) 21/64	P250	7
		45	UX73C	(2) .406 dia	(2) .406 dia	9T18Y1072G10	250MCM-6	(1) 21/64	P250	7
	150	75	UY74C	(2) .406 dia	(2) .406 dia	9T18Y1074G10	250MCM-6	(1) 21/64	P250	3
							350MCM-6	(1) 13/32	P350	4
	115	75	UX74C	(2) .406 dia	(2) .406 dia	9T18Y1074G10	250MCM-6	(1) 21/64	P250	3
							350MCM-6	(1) 13/32	P350	4
	150	112.5	DY75C	(1) .563 dia	(2) .563 dia	9T18Y1075G10	350MCM-6	(1) 13/32	P350	7
		150	DY76C	(1) .563 dia	(2) .563 dia	9T18Y1076G10	350MCM-6	(1) 13/32	P350	3
							500MCM-4	(1) 13/32	P500	4
		225	DY77C	(2) .563 dia	(4) .563 dia	9T18Y1077G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	8
		300	DY78C	(4) .563 dia	(6) .563 dia	9T18Y1078G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	2
							600MCM-2	(1) 13/32	P600	6
		500	DY79C	(4) .563 dia	(6) .563 dia	9T18Y1079G10	350MCM-6	(1) 13/32	P350	9
							500MCM-4	(1) 13/32	P500	24
	115	112.5	DX75C	(1) .563 dia	(2) .563 dia	9T18Y1075G10	350MCM-6	(1) 13/32	P350	7
		150	DX76C	(1) .563 dia	(2) .563 dia	9T18Y1076G10	350MCM-6	(1) 13/32	P350	3
							500MCM-4	(1) 13/32	P500	4
		225	DX77C	(2) .563 dia	(4) .563 dia	9T18Y1077G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	8
		300	DX78C	(2) .563 dia	(4) .563 dia	9T18Y1078G10	350MCM-6	(1) 13/32	P350	6
							500MCM-4	(1) 13/32	P500	2
							600MCM-2	(1) 13/32	P600	6

Enclosure parts

Enclosure kits

Frame Size	Catalog Number
UY04A	9T18Y1074G01
UX71A	9T18Y1071
UX71C	9T18Y1071
UX72A	9T18Y1072
UX73A	9T18Y1072
UX72C	9T18Y1072
UX73C	9T18Y1072
UY74A	9T18Y1074
UX74A	9T18Y1074
UY74C	9T18Y1074
UX74C	9T18Y1074
DY08A	9T18Y1078G01
DY75A	9T18Y1075
DY75C	9T18Y1075
DX75C	9T18Y1075
DY76A	9T18Y1076
DY76C	9T18Y1076
DX75A	9T18Y1076
DX76C	9T18Y1076
DY77A	9T18Y1077
DY77C	9T18Y1077
DX76A	9T18Y1077
DX77A	9T18Y1077
DX77C	9T18Y1077
DY78A	9T18Y1078
DY78C	9T18Y1078
DX78A	9T18Y1078
DX78C	9T18Y1078
DX79A	9T18Y1079
DY79A	9T18Y1009G01
DY79C	9T18Y1079

Front/back panel

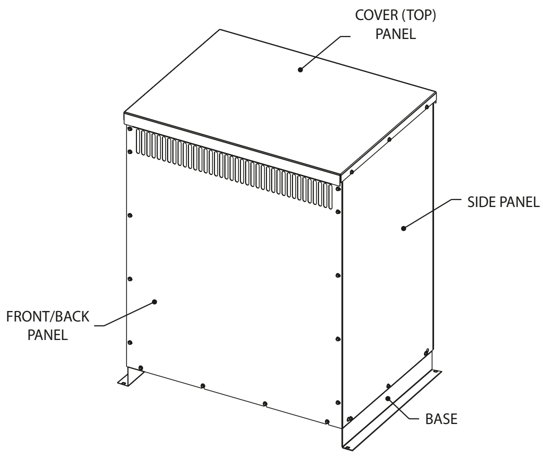
Frame Size	Catalog Number
UY04A	9T18Y1074G03
UX71A	9T18Y1071G03
UX71C	9T18Y1071G03
UX72A	9T18Y1072G03
UX73A	9T18Y1072G03
UX72C	9T18Y1072G03
UX73C	9T18Y1072G03
UY74A	9T18Y1074G03
UX74A	9T18Y1074G03
UY74C	9T18Y1074G03
UX74C	9T18Y1074G03
DY08A	9T18Y1078G03
DY75A	9T18Y1075G03
DY75C	9T18Y1075G03
DX75C	9T18Y1075G03
DY76A	9T18Y1076G03
DY76C	9T18Y1076G03
DX75A	9T18Y1076G03
DX76C	9T18Y1076G03
DY77A	9T18Y1077G03
DY77C	9T18Y1077G03
DX76A	9T18Y1077G03
DX77A	9T18Y1077G03
DX77C	9T18Y1077G03
DY78A	9T18Y1078G03
DY78C	9T18Y1078G03
DX78A	9T18Y1078G03
DX78C	9T18Y1078G03
DX79A	9T18Y1079G03
DY79A	9T18Y1079G03
DY79C	9T18Y1079G03

Side panel

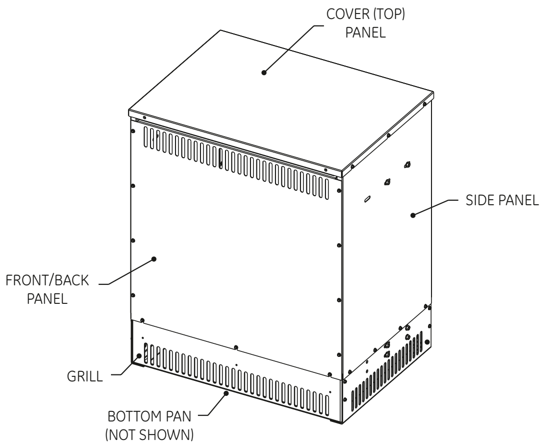
Frame Size	Catalog Number
UY04A	9T18Y1074G04
UX71A	9T18Y1071G04
UX71C	9T18Y1071G04
UX72A	9T18Y1072G04
UX73A	9T18Y1072G04
UX72C	9T18Y1072G04
UX73C	9T18Y1072G04
UY74A	9T18Y1074G04
UX74A	9T18Y1074G04
UY74C	9T18Y1074G04
UX74C	9T18Y1074G04
DY08A	9T18Y1078G04
DY75A	9T18Y1075G04
DY75C	9T18Y1075G04
DX75C	9T18Y1075G04
DY76A	9T18Y1076G04
DY76C	9T18Y1076G04
DX75A	9T18Y1076G04
DX76C	9T18Y1076G04
DY77A	9T18Y1077G04
DY77C	9T18Y1077G04
DX76A	9T18Y1077G04
DX77A	9T18Y1077G04
DX77C	9T18Y1077G04
DY78A	9T18Y1078G04
DY78C	9T18Y1078G04
DX78A	9T18Y1078G04
DX78C	9T18Y1078G04
DX79A	9T18Y1079G04
DY79A	9T18Y1009G04
DY79C	9T18Y1079G04

Cover (top) panel

Frame Size	Catalog Number
UY04A	9T18Y1074G05
UX71A	9T18Y1071G05
UX71C	9T18Y1071G05
UX72A	9T18Y1072G05
UX73A	9T18Y1072G05
UX72C	9T18Y1072G05
UX73C	9T18Y1072G05
UY74A	9T18Y1074G05
UX74A	9T18Y1074G05
UY74C	9T18Y1074G05
UX74C	9T18Y1074G05
DY08A	9T18Y1078G05
DY75A	9T18Y1074G05
DY75C	9T18Y1074G05
DX75C	9T18Y1074G05
DY76A	9T18Y1076G05
DY76C	9T18Y1076G05
DX75A	9T18Y1076G05
DX76C	9T18Y1076G05
DY77A	9T18Y1077G05
DY77C	9T18Y1077G05
DX76A	9T18Y1077G05
DX77A	9T18Y1077G05
DX77C	9T18Y1077G05
DY78A	9T18Y1078G05
DY78C	9T18Y1078G05
DX78A	9T18Y1078G05
DX78C	9T18Y1078G05
DX79A	9T18Y1079G05
DY79A	9T18Y1079G05
DY79C	9T18Y1079G05



ENCLOSURE KIT: 1 COVER + 2 SIDES + 2 FRONTS



ENCLOSURE KIT: 1 COVER + 2 SIDES + 2 FRONTS

This style enclosure is used with the following frames:

Frame Size	Frame Size
UX71A	UY74C
UX71C	UX74C
UX72A	DY75A
UX72C	DY75C
UX73A	DX75A
UX73C	DX75C
UY74A	DY76A
UX74A	DY76C

This style enclosure is used with the following frames:

Frame Size	Frame Size
DX76A	DX79A
DX76C	DX79C
DX77A	YF171
DX77C	YF172
DY77A	YF173
DY77C	YF174
DY78C	YF175
DY78A	YF176
DX78A	YF177
DX78C	-

Dimensions

Single phase vented QL transformers

Product Weights and Dimensions		Weight (Lb)		Dimensions (In)		
Frame Size	Outline Drawing No.	AL	CU	Height (In.)	Width (In.)	Depth (In.)
YF171	303B406AAP071	320	350	32.1	23.8	18.4
YF172	303B406AAP072	400	500	35.7	31.8	24
XV173	303B406AAP073	500	520	35.7	31.8	24
YF174	303B406AAP074	510	625	39.9	31.8	24
YF175	303B932AAP075	900	1050	37.4	29.5	28.5
YF176	303B932AAP076	1360	1675	45.5	38.5	33
YF177	303B932AAP077	1700	1960	45.5	38.5	33

QL Transformer
(Front Panel Removed)

Three phase, vented QL transformers

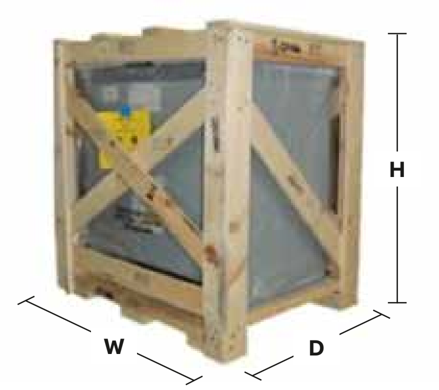
Includes General Purpose, K-factor, K-factor Low Noise, Low Noise, Guard I™, Midtapped, Drive Isolation

Product Weights and Dimensions		Enclosure Dimensions			Mounting Feet Dimensions		Weight	
Frame Size	Outline Drawing No.	Width (in.)	Depth (in.)	Height (in.)	Width (in.)	Depth (in.)	Painted (lbs.)	316 Stainless Steel (lbs.)
UX71A	303B111GEUXP71A	18.7	16.9	29.3	21.2	15.1	231	251
UX71C	303B111GEUXP71C	18.7	16.9	29.3	21.2	15.1	230	250
UX72A	303B111GEUXP72A	23.8	18.4	34.7	26.2	16.6	330	350
UX72C	303B111GEUXP72C	23.8	18.4	34.7	26.2	16.6	353	373
UX73A	303B111GEUXP73A	23.8	18.4	34.7	26.2	16.6	444	464
UY72A	303B111GEUYP72A	23.8	18.4	34.7	26.2	16.6	297	317
UY73A	303B111GEUYP73A	23.8	18.4	34.7	26.2	16.6	363	383
UX73C	303B111GEUXP73C	23.8	18.4	34.7	26.2	16.6	480	500
UY74A	303B111GEUYP74A	31.8	24	35.7	34.3	22.3	561	581
UY04C	303B111GEUYP04C	31.8	24	35.7	22.3	34.3	503	523
UY74C	303B111GEUYP74C	31.8	24	35.7	34.3	22.3	661	681
UX74A	303B111GEUXP74A	31.8	24	35.7	34.3	22.3	603	623
UX74C	303B111GEUXP74C	31.8	24	35.7	34.3	22.3	748	768
DY75A	303B111GEDYP75A	31.8	24	42.2	34.3	22.3	680	760
DY75C	303B111GEDYP75C	31.8	24	42.2	34.3	22.3	790	870
DX75A	303B111GEDXP75A	34.8	24	45.8	37.3	22.3	830	850
DX75C	303B111GEDXP75C	31.8	24	42.2	34.3	22.3	900	980
DY76A	303B111GEDYP76A	34.8	24	45.8	37.3	22.3	1030	1050
DY76C	303B111GEDYP76C	34.8	24	45.8	37.3	22.3	1085	1105
DX76A	303B112GEDXP76A	38.4	33	47.4	41.1	32	1250	NA
DX76C	303B111GEDXP76C	34.8	24	45.8	37.3	22.3	1240	1260
DY77A	303B112GEDYP77A	38.4	33	47.4	41.4	32	1450	NA
DY77C	303B112GEDYP77C	38.4	33	47.4	41.4	32	1610	NA
DX77A	303B112GEDXP77A	38.4	33	47.4	41.4	32	1670	NA
DY78A	303B112GEDYP78A	38.4	33	57.1	41.4	32	1670	NA
DX77C	303B112GEDXP77C	38.4	33	47.4	41.4	32	1847	NA
DY78C	303B112GEDYP78C	38.4	33	57.1	41.4	32	1970	NA
DX78A	303B112GEDXP78A	38.4	33	57.1	41.4	32	1985	NA
DX78C	303B112GEDXP78C	38.4	33	57.1	41.4	32	2150	NA
DX79A	303B112GEDXP79A	46.5	37.8	65.7	50.1	37	2900	NA
DX79C	303B112GEDXP79C	46.5	37.8	65.7	50.1	37	3720	NA
DY79A	303B112GEDYP79A	46.8	38.0	65.7	50.1	37.0	2713	NA

Dimensions

Single phase vented QL transformers

Package Weights and Dimensions		Weight (Lb)		Dimensions (In)		
Frame Size	Outline Drawing No.	AL	CU	Height (in)	Width (in.)	Depth (in.)
YF171	303B406AAP071	362	392	38.13	27	30.25
YF172	303B406AAP072	448	548	41.63	30.25	34.75
XV173	303B406AAP073	548	568	41.63	30.25	34.75
YF174	303B406AAP074	741	673	46	30.25	34.75
YF175	303B932AAP075	925	1075	43.78	30	32
YF176	303B932AAP076	1415	1730	52.88	41.5	47.75
YF177	303B932AAP077	1755	2015	52.88	41.5	47.75



Three phase vented QL transformers

Package Weights and Dimensions		Weight (Lb)				Dimensions (In)		
Frame Size	Outline Drawing No.	AL	AL-SS	CU	CU-SS	Height (in)	Width (in.)	Depth (in.)
UX71A	303B111GEUXP71A	268	288	NA	NA	35.00	25.50	30.50
UX71C	303B111GEUXP71C	NA	NA	267	287	35.00	25.50	30.50
UX72A	303B111GEUXP72A	377	397	NA	NA	40.73	30.25	30.50
UX72C	303B111GEUXP72C	NA	NA	400	420	40.73	30.25	30.50
UX73A	303B111GEUXP73A	491	511	NA	NA	40.73	30.25	30.50
UY72A	303B111GEUYP72A	344	364	NA	NA	40.73	30.25	30.50
UY73A	303B111GEUYP73A	410	430	NA	NA	40.73	30.25	30.5
UX73C	303B111GEUXP73C	NA	NA	527	547	40.73	30.25	30.50
UY74A	303B111GEUYP74A	598	618	NA	NA	35.00	25.50	30.50
UY04C	303B111GEUYP04C	NA	NA	554	574	41.63	30.25	38.25
UY74C	303B111GEUYP74C	NA	NA	712	732	41.63	30.25	38.25
UX74A	303B111GEUXP74A	654	674	NA	NA	41.63	30.25	38.25
UX74C	303B111GEUXP74C	NA	NA	799	819	41.63	30.25	38.25
DY75A	303B111GEDYP75A	730	810	NA	NA	48.38	30.25	38.25
DY75C	303B111GEDYP75C	NA	NA	840	920	48.38	30.25	38.25
DX75A	303B111GEDXP75A	888	NA	NA	908	51.88	30.00	41.00
DX75C	303B111GEDXP75C	NA	NA	950	1030	48.38	30.25	38.25
DY76A	303B111GEDYP76A	1088	1108	NA	NA	51.88	30.00	41.00
DY76C	303B111GEDYP76C	NA	NA	1143	1163	51.88	30.00	41.00
DX76A	303B112GEDXP76A	1305	NA	NA	NA	52.78	41.50	47.75
DX76C	303B111GEDXP76C	NA	NA	1298	1318	51.88	30.00	41.00
DX77A	303B112GEDXP77A	1725	NA	NA	NA	52.78	41.50	47.75
DY77C	303B112GEDYP77C	NA	NA	1665	NA	52.78	41.50	47.75
DX77A	303B112GEDXP77A	1655	NA	NA	NA	40.28	41.50	47.75
DY78A	303B112GEDYP78A	1725	NA	NA	NA	62.48	41.50	47.75
DX77C	303B112GEDXP77C	NA	NA	1902	NA	52.78	41.5	47.7
DY78C	303B112GEDYP78C	NA	NA	2025	NA	62.48	41.50	47.75
DX78A	303B112GEDXP78A	2040	NA	NA	NA	62.48	41.50	47.75
DX78C	303B112GEDXP78C	NA	NA	2205	NA	62.48	41.50	47.75
DX79A	303B112GEDXP79A	2964	NA	NA	NA	72.20	43.00	56.00
DX79C	303B112GEDXP79C	NA	NA	3784	NA	72.20	43.00	56.00
DY79A	303B112GEDYP79A	2777	NA	NA	NA	72.20	43.00	56.00

Information annex

Differences between Cu and Al transformer
It is a common belief that copper coil transformers have greater efficiency than an aluminum coil transformer, since the electrical conductivity of copper is greater than aluminum. This common belief is not totally true. While copper does have better conductivity characteristics than aluminum, transformer designs must meet minimum efficiency ratings regardless of the metal used in its coils. However, there are some factors to consider regarding the coil winding materials beyond efficiency ratings.

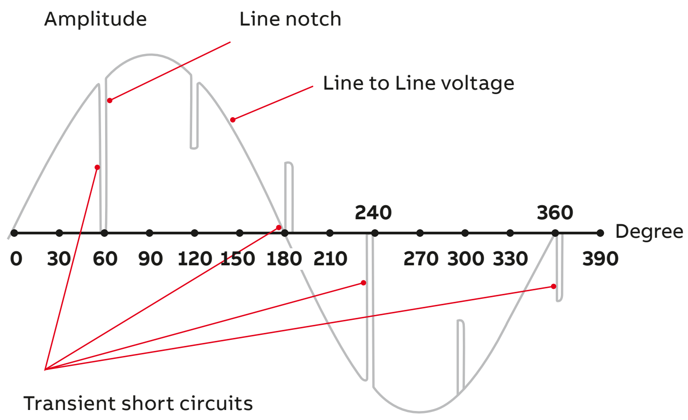
Copper coil transformers are heavier, and copper is significantly a more expensive metal than aluminum. On the other hand, copper coil windings exhibit better withstand capabilities with short circuit events and vibration. This short circuit withstand capability can be an appreciable characteristic for applications where temporary short circuit loads can occur such as supplying power to numerous switchmode power supplies.

Switch-mode power supplies in their normal operation generate transient short circuits during commutation (switching). These are not solid or “bolted” short circuits rather they are known as “high resistance” short circuits. These same transient short circuits induce electromechanical forces and vibrations within the winding which are better supported using copper conductors for the transformer coils.

As an example, any current induces an electromagnetic force on the windings. The electromagnetic force is increased with the square of the current. This means that in a short circuit event, the current is about 15 times the rated current, the forces induced at the windings are 237 times the force induced at full load conditions.

Therefore, specifying copper conductors for a transformer coil construction has its benefits for specific applications like switch-mode power supply (non-linear) loads. However, the additional costs and weight for such a transformer must be carefully considered. Aluminum coil transformers are an excellent choice for general purpose applications providing consistent performance over time with a long operational life. Both Aluminum and Copper coil transformers will provide the same efficiency ratings required by standards and law.

Typical 6-pulse SMPS sine wave signature



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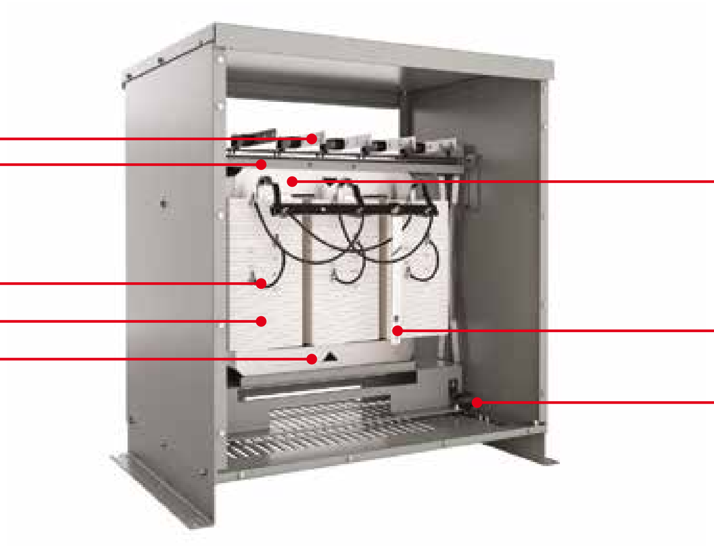
Structural Integrity



White paper: Reverse feeding low voltage dry type transformers

Abstract

Reverse feeding transformers has been a practice in the electrical industry for many years. While possible and to a point, successful, reverse feeding a transformer presents technical issues that should not be overlooked. Several key transformer attributes are compromised when reverse-feeding a dry type transformer. Therefore, the most reliable installation is to install a transformer designed for its application. Nevertheless, the quick restoration of interrupted power may lead toward the installation of a transformer by reverse feeding. This paper presents some technical issues that must be considered with reverse feeding a low voltage dry type transformer.

Introduction

General purpose dry type transformers rated 600 volts and below are used for supplying appliance, lighting, and various linear and/or non-linear loads within an electrical distribution system. These transformers are used to convert the facility distribution voltage to the load's utilization voltage. Most general purpose transformers are used in stepdown applications. The most used polyphase transformer in the United States has a 480 volt threephase delta primary and a 208/120 volt three-phase, four-wire, wye secondary. This is known as a Delta-Wye transformer. Step-up transformers are available, but because step-up applications are rare these transformers are not typically stocked. So, step-up transformers are mostly built-to-order and construction can take six weeks or longer.

When there is an immediate need for a non-stock step-up transformer, it has been a common practice to use an in-stock step-down transformer and install it in reverse fashion (reverse feed). If permitted by local codes and allowed by the authority having jurisdiction, it is generally acceptable to reverse feed (or back-feed) a transformer. Considering the complexities of a reverse-feed transformer installation, the electrical contractor owns the complete installation.

Nevertheless, there are several issues that must be considered before reverse feeding a step-down transformer. This paper discusses a reverse-feed application and presents the technical challenges from reverse feeding a low voltage dry type transformer.

Structural integrity

As an electromagnetic machine, the transformer "machine" has no moving parts to transfer energy, this energy transfer is accomplished through electromagnetism using the magnetic flux that is inherent in the transformer core. The magnetic flux has a limit or saturation point of its flux density. When the flux density exceeds or "saturates", the magnetic properties of the transformer core degrade exponentially causing excessive energy loss, higher core vibrations that presents greater stress on the insulation system which could cause premature failure, appreciable audible noise from those vibrations will be easily heard and the entire core & coil of the transformer will experience higher than designed operating temperatures. All these factors alone should be a concern as the expected transformer life of 20-30 years of operation could be dramatically reduced.

Voltage taps

A standard step-down transformer usually contains taps on the input (primary) side, placing the taps on the primary side is called out in the NEMA ST-20 (sec. 2.1) transformer

Information annex (cont.)

standard. Lowering the primary side taps will increase secondary voltage and raising the primary taps will lower the secondary voltage. When a transformer is reverse fed, the taps move to the output side and so their operation is reversed. For reverse fed applications, raising the taps will increase output voltage and lowering the taps will lower output voltage.

The primary purpose of these taps is to match the input rating of the transformer to the actual voltage applied to the primary terminals to provide the output (secondary) voltage that most closely matches the load requirement. The taps must be used with care since no-load or low-load conditions combined with variance in the utility service voltage can cause an overexcitation of the winding, resulting in higher than rated core loss and excitation current. This is generally not a serious concern unless the over-voltage exceeds 5%. For reverse feed applications, the taps are positioned at the output side and so cannot be used to correct for over-excitation.

There is a fine line with the voltage taps and reverse feeding which should arise a concern as misapplication could cause premature transformer failure or other adverse effects such as over-heating and excessive vibration that causes noise and excessive wear on the insulation system

Compensated windings
Voltage drop across transformers increases with load. At noload a transformer's primary: secondary voltage ratio may exactly match the winding turns ratio. At full-load the same transformer's secondary voltage could be 3- 4% less than the turns ratio would dictate. The transformer winding turns ratio can be compensated to correct for this phenomenon. Smaller (less than 3 kVA) transformers commonly have compensated windings. Winding turns ratios are compensated so that a 3-4% over-voltage exists at no-load, but nominal secondary voltage is available at full load. Some manufacturers build larger transformers (>10 kVA) with compensated windings, although this is not a common practice due to the extra costs involved in manufacturing such a transformer.

When transformers with compensated windings are reverse fed, the compensation is reversed. As a result, the transformer voltage drop will be 3- 4% at no-load and 6-8% at full load. The transformer's taps may be able to correct for this additional voltage drop, but extra caution is required to have a transformer installation that provides the correct voltages.

Inrush currents Upon energization, transformers will draw a high inrush current for a brief period (typically 0.1 seconds or less). The inrush current can be on the order of eight to twelve times the rated full load current of the transformer. For a specified input voltage and VA rating, the inrush current for a reverse fed step-down transformer will be greater than the inrush current for a transformer specifically designed and installed as a step-up transformer.

To illustrate, assume that a standard ABB 9T10A1004 stepdown transformer will be used in a step-up application. This transformer is rated 75 kVA, 60 Hz, 480 volt three-phase delta primary and 208/120 volt three-phase, four-wire, wye secondary. This transformer also contains six (6) 2.5% voltage taps on the primary (480 volt) side, 2 taps above nominal and 4 taps below nominal. For reverse feeding application, the secondary is to be operated step-up (208 VAC input to 480 VAC output).

The installer may discover that the primary side overcurrent protection, having been properly selected and applied per Article 450 (Table 450.3) of the National Electrical Code, nevertheless operates (trips) when attempting to energize the reverse operated transformer.

This tripping phenomenon can occur because the low impedance winding (the 208Y/120 VAC winding) that was intended by design to be the secondary winding, now serves as the primary and the value of the magnetizing inrush current (Mag-I) is much greater than expected.

The Mag-I experienced when energizing transformers is like the inrush current associated with motor starting. The primary and secondary full load amps of the above referenced transformer are 90 amps @ 480 VAC and 208 amps @ 208 VAC. When connected as the intended design as a step-down transformer and energized at 480 VAC, the maximum peak inrush current is approximately 990 amps or 11 times the rated 90 amp primary winding full load current. But when connected in reverse and energized at 208 VAC, the maximum peak inrush current can reach 7700 amps or 37 times the rated 208 amp secondary winding full load current (7700/208 ≈ 37). To accommodate this high inrush current without the nuisance tripping of the overcurrent protective device, the input (208 VAC side) overcurrent protective device must be sized at a higher value than the allowed National Electric Code Article 450. Clearly, in this case, a National Electric Code violation (adopted by most state electrical codes), would occur creating a potential fire hazard at best and safety concern at worst.

Grounding
When the secondary (wye) of a delta- wye transformer is energized instead of the primary (delta), then the wye side of the transformer is not a separately derived service according the National Electric Code Article 250. As such, the neutral Information annex (cont.)

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should not be connected to building ground nor should it be bonded to the transformer enclosure. The delta side of the transformer becomes the output, which is the separately derived system. The output delta “B” phase should be tied to ground unless the facility distribution system utilizes a different grounding scheme. As with compensation taps, extra caution is required as a wrong installation could prove to become a safety hazard.

Corner grounding a delta transformer presents different overcurrent protection device challenges. The IEEE 3004.5 standard Sec. 5.4.2 (Fig 13) should be referenced along with the National Electric Code Art. 450 to understand the overcurrent protection challenges and requirements.

CONCLUSION Standard step-down transformers may be reverse fed for step-up applications but there are several significant precautions that must be considered (not all inclusive):

Structural integrity – by reverse feeding the step down transformer, extra stresses will be applied to the transformer for which it was not designed to handle. Great care is needed to assure that these thermal and mechanical compromises are worth the reverse feed installation.

Voltage taps – the over-excitation with its extra core loss (lower efficiency rating) must be considered if a reverse feed application is required. Lower installed efficiency values could violate the US Federal Regulation 10 CFR 431 (DOE) or the CSA 802.2 (NRCan) laws. The function of the taps becomes a greater challenge as the taps no longer match the primary voltage to the secondary, rather it does this voltage matching in reverse. (the nameplate does not provide guidance to this usage).

Higher inrush current – the higher inrush currents that will occur in reverse feeding, will likely violate the overcurrent protection device requirements of the National Electric Code Article 450. Proper overcurrent protection is a requirement in most municipalities, a properly sized overcurrent protective device will likely trip each time the transformer is energized.

Compensated windings - Transformers with compensated windings (most do not have compensated windings) will have output voltage 3-4% below nominal at no-load and 6-8% below nominal at full load. The transformer’s taps may be able to correct for this under-voltage condition, but extra caution is required to have a transformer installation that provides the correct voltages.

Grounding – an essential installation requirement. The reverse feed of a Delta-Wye transformer no longer allows the neutral of the Wye portion of the transformer to be used as a grounding means as a separately derived source. The separately derived source becomes the Delta side and extra caution needs to be considered when grounding a delta transformer to prevent imbalances and short circuit currents issues.

Local codes – always review applicable codes and standards along with consulting the local authority having jurisdiction (AHJ) before reverse feeding transformers.

Considering the explanation and for permanent installations, ABB recommends that transformers be specified and installed to match the installation requirements. However, in temporary installations to resolve immediate power issues, a step-down transformer can be successfully installed in reverse. The specifier, installer and inspector must understand the technical challenges and compromises presented, the potential code related issues, and the potential safety concerns of the installation. ABB manufactures step-up transformers and these are available from ABB as made-toorder items. Critical factors (but not all possible) to consider when specifying a low voltage dry type transformer are:

- Primary (supply) voltage and system (Delta or Wye) – most common is Delta 480 V.
- Secondary (Load) voltage and system (Wye or Delta) – most common is Wye 208/120
- Load profile – linear and/or non-linear loads (50% or more of non-linear loads, consider a K-Factor transformer)
- Amount of energy required for the loads – (kVA) – also known as the transformer’s capacity
- The acceptable temperature rise – 150 °C being the most common, lower temperatures are available
- The maximum ambient temperature – 40 °C being the most common, equatorial, or desert areas may require a higher ambient temperature, usually 50 °C.
- Coil Material – Copper or Aluminum
- Special Requirements, such as installation location, impedance, presence of harmonics, electrostatic shielding, lower audible noise required, special approvals, etc.

Reference materials

IEEE C57.96: IEEE Guide for Loading Dry Type Distribution and Power Transformers

NEMA ST-20: Dry Type Transformers for General Applications

IEEE C57.12.01: IEEE Standard for General Requirements for Dry Type Distribution and Power Transformers

IEEE C57.105: IEEE Guide for Application of Transformer Connections in Three-Phase Electrical Systems

NFPA 70 – National Electric Code

IEEE 3004.5: IEEE Recommended Practice for the Application of Low Voltage Circuit Breakers in Industrial and Commercial Power Systems

Glossary

Selecting a transformer?

Key questions to ask

What is the kVA?
The maximum apparent power capacity of the transformer to deliver to its electrical loads, expressed as a number such as, 2, 15, 50 or 500 as examples.

What is the primary voltage?
The input voltage feeding the transformer, typically expressed as a number such as 480 followed by a V (480 V).

What is the secondary voltage?
The voltage(s) of the transformer that supply power to the electrical loads. Often shown as a power system such as a WYE (Y). 208Y/120 is common meaning both 208 volts and 120 volts can be delivered to electrical loads.

What is the frequency?
The periodic sinusoidal current delivered to the electrical loads and supplied to the primary of the transformer. In the United States 60 Hz is common according to ANSI C84.1 standard.

Are Taps required?
For example: +2, -4: 2.5%

What type of winding?
Aluminum or Copper

What is the required temperature rise?
80 °C, 115 °C, 150 °C

Are there non-linear loads?
If yes, use K-factor transformer. As a general rule, if 50% of the loads are expected to be non-linear, choose a K4 transformer. If the expected loads are beyond 50%, recommend a K13 transformer.

Are lower audible noise transformers required?
If yes, use Low Noise

What is the environment where the unit will be operating?
Indoor, Outdoor, Dusty, etc.

Glossary

BIL Rating - Basic Impulse Level; Indicates ability to withstand lightning strikes or high surge voltage exposure

Core - Laminated iron or steel-alloy ring which windings are wound around; Windings may be AL or CU

Coil - The windings of the transformer made of insulated copper or aluminum conductors

Frequency - The AC power cycles per second that the coil is designed to operate expressed in Hz – all 50 Hz can operate at 60 Hz but not the other way around!

xx% Imp - The amount of internal impedance at the frequency rating of the transformer, will determine available short circuit current and determine the voltage drop at full load. It is used to help size the circuit interrupting devices

Insulation Class (rating) - The maximum allowable temperature at any one point within the transformer (hot spot) that will give adequate life (≈20 years) before degradation starts.

kVA - (kilo-volt-ampere) Capacity of the transformer; defined as Output Voltage x Full-Load Output Current – how much power can it provide

Taps - Selectable, during installation, primary coil lead connections to accommodate supply voltages higher or lower than nominal that will provide the nameplate output or secondary voltage. Available in 2 1/2% increments of primary's normal voltage rating

Noise - Audible rating is given in decibels (abbreviated dB); Typical noise ranges are from 45 to 95 dB

Winding Temperature - The average temperature above ambient (40 °C) over time of that the coil (windings) will produce while operating at full load

Notes

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