Technical catalogue

# System pro *M*

## Miniature circuit-breakers

2CSC400001D0201


ABB

# SUMMARY

# ABB SACE
# and its commitment to protecting the environment



ABB SACE is one of the forerunners among the companies in the Group in dedicating considerable resources towards reaching its objectives of sustainable development and environmental protection. This is confirmed by the fact that all the company manufacturing sites have been awarded ISO 9001 quality certification and most of them have also been awarded ISO 14001 environmental management system certification. The plants in Frosinone and Patrica have also been awarded the Quality, Environment and Safety Integrated System certification and are certified in compliance with the BS 8800 Standards for health and safety in the workplace.

ABB SACE is actively involved in continuing the policy of improving environmental management by rationalizing the consumption of raw materials and energy, preventing pollution, respecting water and air, reducing noise levels to a minimum, reducing waste from production processes and carrying out periodic environmental checks at the main suppliers' premises.
By using analysis tools such as LCA (Life Cycle Assessment), from the initial design stages ABB SACE assesses and improves the environmental performance of its products throughout their entire life cycle in order to guarantee maximum efficiency in technical and energy performance during operation, control and reduce environmental impact in the manufacturing stage and define end-of-life procedures.

All these goals and activities are the result of a far-sightedness in adopting ecological policies and methods of reducing environmental impact and, here too, ABB SACE is, as already seen in the quality of its products, a leader on the Italian company scene.

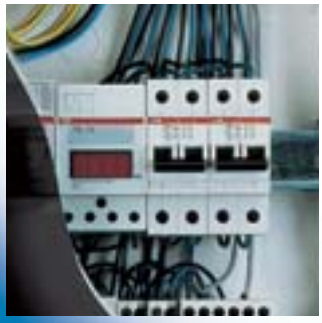

Plant at Pomezia - Rome

# System pro *M* modular devices for low voltage installations

System pro *M* is a modular system developed by ABB which is capable of meeting the requirements of the most modern and up-to-date installations for low voltage applications.

## Project criteria

The system is based on two main criteria: complete functionality and optimum sizing of the devices. The first means there is a wide range of devices which leads to increased safety for the user and greater diversification in command and load management; the second, based on the modular structure, allows the internal space of the switchboard to be used in the best possible way, reduces wiring operations and improves functionality and also the aesthetics of the switchboards.



## Functions

Protection, command, measure and load management: for each of these four basic functions which characterize the low voltage electrical applications, the System pro *M* series proposes the right device.

The protection sector which is the basis of the system consists of MCBs, RCBOs, RCCBs and RCD blocks.

These miniature modular devices are technologically advanced, which speeds up installation and simplifies maintenance.

# System pro *M* modular devices for low voltage installations

## Standards and certification

Each device in the System pro *M* series has been designed in accordance with strict criteria for safety and functionality in compliance with the dictates imposed by international, European and Italian Standards.

For this reason, the devices in the System pro *M* series have obtained standardization issued by the certifying bodies both in Italy and overseas.

## Tropicalization

All the devices in the System pro *M* series, and especially those used for protection, have been carefully designed and constructed to guarantee the maximum operating safety even in difficult environmental conditions. According to the type of device, the metal parts of the switching mechanisms are protected with a suitable galvanic coating or are made of stainless steel to avoid oxidation which may impair operating; even the conductive parts are protected by galvanic coating. The tropicalized devices can withstand the test conditions established in the relevant current Standards (VDE DIN 40046, IEC 68.2, DIN 50016).

## Unifix cabling system: the ideal complement for the System pro *M* range

Unifix is the ABB cabling system which makes the work of installers and switchboard builders easier: with its standard connectors, Unifix effects simple, quick and safe wiring of System pro *M* modular devices and SACE Isomax S1 and S2 and Tmax T1…T3 moulded-case circuit-breakers in ArTu® switchboards and ABB consumer units.

For this reason, it is the ideal solution for using pro *M* modular products to best advantage and exploiting the fact that ABB products for low voltage applications can be perfectly integrated whilst at the same time guaranteeing safety and full compliance with Standards.

The system consists of three **series H**, **L** and **SL**. Each one is suitable for specific applications both for the installation of devices and installation in switchboards. In detail:

- the **H** series, intended for more demanding applications, is used for wiring SACE Isomax S1 and S2 and Tmax T1…T3 moulded-case circuit-breakers and System pro *M* modular devices in ArTu® switchboards (rated currents up to 400A and short-circuit currents up to 50kA);
- the **L** series is the universal solution for wiring System pro *M* modular devices in ArTu® switchboards and polycarbonate consumer units (rated currents up to 100A and short-circuit currents up to 25kA);
- the **SL** series is the ideal easy and cheap solution for wiring bipolar modular devices in consumer units (rated currents up to 40A and short-circuit currents up to 10kA).

### Special features

The main feature of Unifix lies with the possibility of combining different types of circuits (one-phase/three-phase/auxiliary) in a single module. Pre-wiring can be effected at the workbench and installed in the switchboard subsequently, with no limits to the type or combination of devices which can be installed.

Unifix has adjustable pitch which replaces traditional wiring harnesses which means that circuit-breakers with different polarities can be placed in the same row as well as auxiliary modular devices.

The fact that Unifix integrates perfectly with the different ABB low voltage products, both modular and moulded-case devices, switchboards or insulating consumer units, ensures that all devices and accessories can be quickly selected and installed.

N.B. The Unifix cabling system can be used with ABB SACE devices only.


## ONE SYSTEM, MANY ADVANTAGES

Considerable **reduction in wiring times**: by using rigid lock connectors which are standardized for the different types of device, each device does not have to be connected using cable


**Greater standardization of low voltage switchboards:** the rigid connectors enable the results of the type tests (overheating and short-circuit) effected by ABB to be extended also on input wiring of devices.


A more **advanced** and, at the same time, **cheaper technical solution** compared with traditional wiring. This is made possible by cutting down on materials (wires and wire terminals) and space required, thus affecting operating times


**Can be used on all ABB** standard devices, without modifying or adding accessories and without using special equipment


**Adjustable pitch**: Unifix uses adjustable pitch unlike traditional wiring harnesses; in this way, circuit-breakers with different polarity can be placed in the same row as well as auxiliary devices

# MCBs



## Contents

# MCBs
## General information

Designed to protect against overload and short-circuit, MCBs are vitally important devices for reliable and safe operating of installations.

National and international Standards establish the basic requirements of these circuit-breakers, but the task of correctly developing the various characteristics of a circuit-breaker so that it is really reliable depends on the experience of the manufacturer.
For this reason, the reliability and versatility of ABB's MCBs is the result of perfectly harmonizing different parameters which define the technical and installation characteristics including:

- tripping characteristics (B, C, D, K, Z) which are suitable for the different applications;
- limiting the specific let-through energy $\int i^2(t)dt$ downstream of the circuit-breakers in the event of short-circuiting, thereby avoiding damage to cables and equipment;
- limiting the peak current Ip;
- current rated value In;

# MCBs

## General information

- front breaking capacity marking to IEC EN 60898 and side breaking capacity marking to IEC EN 60947-2;
- wide range of auxiliary elements (auxiliary contacts, signal contacts, undervoltage releases, shunt trips, mechanical interlocks, etc.);
- life cycle guaranteed by a large number of electric and mechanical operations;
- adequate resistance to bumps and vibrations;
- suitable protective criteria (tropicalization) for harsh environmental conditions in which the equipment may be used.

# MCBs

## General characteristics and breaking capacities

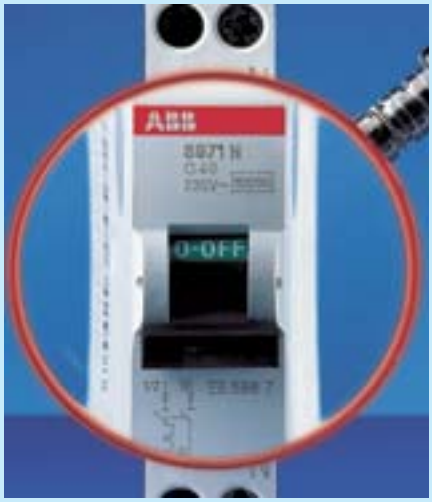
NOTE
All S 2.. range circuit-breakers have twin breaking power markings:
- front Icn according to IEC EN 60898
- side Icu/Ics according to IEC EN 60947-2 depending on the rated current.

The S 2.. curves K, Z breaking capacity on the front refers to VDE 0660.






| Series | | | | S 931 N | S 941 N | S 951 N | S 971 N | S 240 | S 250 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Characteristics | | | | C | B, C | B, C | B, C | C | B, C | K |
| Rated current | | | [A] | 2 ≤In ≤40 | 2 ≤In ≤40 | 2 ≤In ≤40 | 2 ≤In ≤40 | 6 ≤In ≤40 | 0.5 ≤In ≤63 | 0.5 ≤In ≤63 |
| Breaking capacity | | | [kA] | | | | | | | |
| Reference Standards | | n° poles | Ue [V] | | | | | | | |
| IEC 23-3/EN 60898 | $I_{cn}$ | | 230/400 | 3 | 4.5 | 6 | 10 | 4.5 | 6 | 6 a) |
| IEC EN 60947-2 alternating current | $I_{cu}$ | 1 | 127 | | | | | 10 | 30 | 30 |
| | | | 230 | | | | | 6 | 10 | 10 |
| | | 1P+N | 127 | 6 | 10 | 15 | 25 | 10 | 30 | 30 |
| | | | 230 | 4.5 | 6 | 10 | 15 | 6 | 10 | 10 |
| | | 2 | 230 | | | | | 7.5 | 20 | 20 |
| | | | 400 | | | | | 7.5 | 10 | 10 |
| | | 3, 4 | 230 | | | | | 10 | 20 | 20 |
| | | | 400 | | | | | 7.5 | 10 | 10 |
| | | 3 | 500 | | | | | | | |
| | | | 690 | | | | | | | |
| | $I_{cs}$ | 1 | 127 | | | | | 10 | 22.75 | 22.75 |
| | | | 230 | | | | | 6 | 7.5 | 7.5 |
| | | 1P+N | 127 | 4.5 | 6 | 10 | 15 | 10 | 22.75 | 22.75 |
| | | | 230 | 3 | 4.5 | 6 | 10 | 6 | 7.5 | 7.5 |
| | | 2 | 230 | | | | | 7.5 | 15 | 15 |
| | | | 400 | | | | | 5.6 | 7.5 | 7.5 |
| | | 3, 4 | 230 | | | | | 10 | 15 | 15 |
| | | | 400 | | | | | 5.6 | 7.5 | 7.5 |
| | | 3 | 500 | | | | | | | |
| | | | 690 | | | | | | | |
| IEC EN 60947-2 direct current | $I_{cu}$ | 1 | 60 | 6 | 10 | 15 | 15 | 6 | 10 | 10 |
| | | | 125 | | | | | | | |
| | | | 220 | | | | | | | |
| | | 1P+N | 125 | 6 | 10 | 15 | 15 | | | |
| | | 2 | 125 | | | | | 6 | 10 | 10 |
| | | | 250 | | | | | | | |
| | | | 440 | | | | | | | |
| | | 3, 4 | 750 | | | | | | | |
| | $I_{cs}$ | 1 | 60 | 6 | 10 | 15 | 15 | 6 | 10 | 10 |
| | | | 125 | | | | | | | |
| | | | 220 | | | | | | | |
| | | 1P+N | 125 | 6 | 10 | 15 | 15 | | | |
| | | 2 | 125 | | | | | 6 | 10 | 10 |
| | | | 250 | | | | | | | |
| | | | 440 | | | | | | | |
| | | 3, 4 | 750 | | | | | | | |



The S 9.. range of circuit-breakers is the widest range of 1P+N MCBs in one module.
These circuit-breakers are available with rated currents from 2 to 40 A when using the characteristic C and with rated currents from 6 to 40 A when using the characteristic B.
For each current there are also three different breaking capacities available: 4.5 kA (S 941 N series), 6 kA (S 951 N series) and 10 kA (S 971 N series).
These circuit-breakers have been designed so that they ensure, in the last closing section, that the closing speed of the contacts is independent of the rotating speed of the knob.

The trip device (ABB international patent) ensures perfect closure every time thus considerably improving the performance of these devices and extending the average life cycle.

A redesigned red/green toggle makes the ON/OFF status immediately evident.
The terminals have also been designed for safe and easy use and, to this end, new high capacity cage type terminals (16 mm$^2$ on all versions) have been developed.
The S 9.. range circuit-breakers have been designed for wiring with the ABB SACE Unifix rapid system using special connections.
These circuit-breakers are also supported by a complete group of auxiliary elements which effect many functions and configurations such as auxiliary contacts, signal contacts, undervoltage releases and shunt trips.

# S 9.. range



## Contents

# S 9.. range
## Technical characteristics



| | | | S 931 N |
|---|---|---|---|
| **Standards** | | | IEC EN 60898, IEC EN 60947-2 |
| **Rated current In** | | [A] | 2≤In≤40 |
| **Poles** | | | 1P+N |
| **Rated voltage Ue** | | [V] | 230 |
| **Insulation voltage Ui** | | [V] | 500 |
| **Max. operating voltage Ub max.** | a.c. | [V] | 250 |
| | d.c. 1P | [V] | - |
| | d.c. 1P+N | [V] | - |
| **Min. operating voltage Ub min.** | | [V] | 12 V a.c.- 12 V d.c. |
| **Rated frequency** | | [Hz] | 50…60 |
| **Rated breaking capacity IEC EN 60898** | Icn | [A] | 3000 |
| **Rated breaking capacity acc. to IEC EN 60947-2 1P+N - 230 V** | ultimate Icu | [kA] | 4.5 |
| | service Ics | [kA] | 4.5 |
| **Voltage withstanding capacity impulse (1.2/50) Uimp** | | [kV] | 5 |
| **Dielectric test voltage at ind. freq. for 1 min.** | | [kV] | 3 |
| **Thermomagnetic release characteristic** | B: 3 In≤Im≤5 In | | |
| | C: 5 In≤Im≤10 In | | ■ |
| | D: 10 In≤Im≤20 In | | |
| | K: 8 In≤Im≤14 In | | |
| | Z: 2 In≤Im≤3 In | | |
| **Toggle** | | | black sealable in ON-OFF position |
| **Electrical life** | | | 10000 |
| **Mechanical life** | | | 20000 |
| **Protection degree** | housing | | IP4X/IPXXD (except on terminals) |
| | terminals | | IP2X/IPXXB |
| **Mechanical shock resistance** | | | minimum 30 g - 2 shocks - duration 13 ms |
| **Resistance to vibrations acc. to DIN IEC 68-2-6** | | | 6 g - 20 cycles at frequency 5…150…5 Hz with load 0.8 In |
| **Tropicalization acc. to DIN 40046 IEC 68-2** | humid heat | [°C/RH] | 28 cycles with 55/95…100 |
| | const. climatic cond. | [°C/RH] | 23/83-40/93-55/20 |
| | var. climatic cond. | [°C/RH] | 25/95-40/95 |
| **Thermal releaser calibration temperature** | | [°C] | 30 |
| **Ambient temperature (with daily average ≤+35°C)** | | [°C] | -25…+55 |
| **Storage temperature** | | [°C] | -40…+70 |
| **Terminal size upper/lower per cable** | | [mm²] | 16/16 |
| **Tightening torque** | | [N*m] | 1.2 |
| **Mounting** | | | on rail EN 60715 (35 mm) by means of rapid fixing device |
| **Pole dimensions** | HxDxW | [mm] | 83x68x17.8 |
| **Pole weight** | | [g] | 110 |

# S 9.. range
## Technical characteristics





| S 941 N | S 951 N | S 971 N |
|---|---|---|
| | IEC EN 60898, IEC EN 60947-2 | |
| | 2≤In≤40 | |
| | 1P+N | |
| | 230 | |
| | 500 | |
| | 254 | |
| | 60 | |
| | 125 | |
| | 12 V a.c.-12 V d.c. | |
| | 50…60 | |
| 4500 | 6000 | 10000 |
| 4.5\6<br>4.5 | 10<br>6 | 15<br>10 |
| | | |
| 2.5 | 2.5 | 2.5 |
| ■ | ■ | ■ |
| ■ | ■ | ■ |
| | | |
| | | |
| | | |
| | black sealable in ON-OFF position | |
| | 10000 | |
| | 20000 | |
| | IP4X<br>IP2X | |
| | minimum 30 g - 2 shocks - duration 13 ms | |
| | 5 g - 20 cycles at frequency 5…150…5 Hz with load 0.8 In | |
| | 28 cycles with 55/95…100 | |
| | 23/83-40/93-55/20 | |
| | 25/95-40/95 | |
| | 30 | |
| | -25…+55 | |
| | -40…+70 | |
| | 16/16 | |
| | 1.2 | |
| | on rail EN 60715 (35 mm) by means of rapid fixing device | |
| | 83x68x17.8 | |
| | 110 | |

# S 9.. range

## S 931 N series




| Rated currents In [A] | Code Characteristics C |
|---|---|
| **1P+N - S 931 N type** | |
| **2** | 11861114 |
| **4** | 11861115 |
| **6** | 11861116 |
| **10** | 11861117 |
| **16** | 11861118 |
| **20** | 11861119 |
| **25** | 11861120 |
| **32** | 11861121 |
| **40** | 11861122 |

### Tripping characteristics

B (Im=3…5 In)

C (Im=5…10 In)

### Bresking capacity

IEC 898/EN 60898: Icn=3 kA, Icn1=3 kA

IEC 947-2/EN 609472: Icn=4.5 kA, Ics=4.5 kA

### Application: residential or similar

### Connections for UNIFIX available

### RCBO version

DS 941 SERIES

### Breaking capacity

acc. to IEC 898 / EN 60898

| In [A] | poles | voltage [V] | Icn [kA] |
|---|---|---|---|
| **2…40** | 1+N | 230 | 3 |

### IMQ approval

**S 931 N 230 V**
4.5 kA B-C characteristics
In=2…40 A
1P+N

# S 9.. range
## S 941 N series




| Rated currents In [A] | Code Characteristics B | C |
|---|---|---|
| **1P+N - S 941 N type** | | |
| **2** | | EE 550 8 |
| **4** | | EE 551 6 |
| **6** | EE 540 9 | EE 552 4 |
| **10** | EE 541 7 | EE 553 2 |
| **16** | EE 542 5 | EE 554 0 |
| **20** | EE 543 3 | EE 555 7 |
| **25** | EE 544 1 | EE 556 5 |
| **32** | EE 545 8 | EE 557 3 |
| **40** | EE 546 6 | EE 558 1 |

**Tripping characteristics**

B (Im=3…5 In)

C (Im=5…10 In)

**Application: residential and tertiary**

**Connections for UNIFIX available**

**RCBO version**

DS 941 SERIES

### Rated breaking capacity in a.c.

acc. to IEC EN 60898 (IEC 23-3 IV ed.)

| In [A] | poles | voltage [V] | Icn [kA] | Icn1 [kA] |
|---|---|---|---|---|
| **2…40** | 1+N | 230 | 4.5 | 3 |

acc. to IEC EN 60947-2

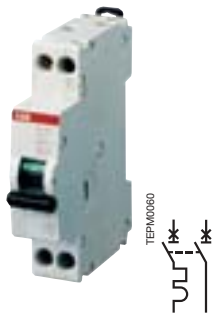
| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **2…40** | 1+N | 230 | 6 | 4.5 |

**IMQ approval**

**S 941 N 230 V**
4.5 kA characteristics B-C
In=2…40 A
1P+N

# S 9.. range
## S 951 N series






| Rated currents In [A] | Code Characteristics B | C |
|---|---|---|
| **1P+N - S 951 N type** | | |
| **2** | | EE 570 6 |
| **4** | | EE 571 4 |
| **6** | EE 560 7 | EE 572 2 |
| **10** | EE 561 5 | EE 573 0 |
| **16** | EE 562 3 | EE 574 8 |
| **20** | EE 563 1 | EE 575 5 |
| **25** | EE 564 9 | EE 576 3 |
| **32** | EE 565 6 | EE 577 1 |
| **40** | EE 566 4 | EE 578 9 |

**Tripping characteristics**

B (Im=3…5 In)

C (Im=5…10 In)

**Application: residential, tertiary and industrial**

**Connections for UNIFIX available**

**RCBO version**

DS 951 SERIES

### Rated breaking capacity in a.c.

acc. to IEC EN 60898 (IEC 23-3 IV ed.)

| In [A] | poles | voltage [V] | Icn [kA] | Icn1 [kA] |
|---|---|---|---|---|
| **2…40** | 1+N | 230 | 6 | 3 |

acc. to IEC EN 60947-2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **2…40** | 1+N | 230 | 10 | 6 |

### IMQ approval

**S 951 N 230 V**
6 kA characteristics B-C
In=2…40 A
1P+N

# S 9.. range
## S 971 N series




| Rated currents In [A] | Code Characteristics B | C |
|---|---|---|
| **1P+N - S 971 N type** | | |
| **2** | | EE 590 4 |
| **4** | | EE 591 2 |
| **6** | EE 580 5 | EE 592 0 |
| **10** | EE 581 3 | EE 593 8 |
| **16** | EE 582 1 | EE 594 6 |
| **20** | EE 583 9 | EE 595 3 |
| **25** | EE 584 7 | EE 596 1 |
| **32** | EE 585 4 | EE 597 9 |
| **40** | EE 586 2 | EE 598 7 |

**Tripping characteristics**

B (Im=3…5 In)

C (Im=5…10 In)

**Application: residential, tertiary and industrial**

**Connections for UNIFIX available**

**RCBO version**

DS 971 SERIES

### Rated breaking capacity in a.c.

acc. to IEC EN 60898 (IEC 23-3 IV ed.)

| In [A] | poles | voltage [V] | Icn [kA] | Icn1 [kA] |
|---|---|---|---|---|
| **2…40** | 1+N | 230 | 10 | 3 |

acc. to IEC EN 60947-2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **2…40** | 1+N | 230 | 10 | 6 |

### IMQ approval

**S 971 N 230 V**
10 kA characteristics B-C
In=2…40 A
1P+N

# S 9.. range
## Auxiliary elements


For the S 9.. circuit-breakers undervoltage releases and contacts (auxiliary and signal) are available.

The accessories are installed in different positions: shunt trips and undervoltage releases are installed to the left of the circuit-breaker whereas the contacts (signal and auxiliary) are installed to the right.

These elements provide additional functions and are all coupled directly to the circuit-breaker without the use of other components such as pins or clips.

The auxiliary contact is equipped with a green indicator which shows the position of the circuit-breaker (when the circuit-breaker is in the “open” position the indicator protrudes). The same indicator also enables a test of the auxiliary circuit.

The signal contact is equipped with a yellow indicator which protrudes out when the circuit-breaker trips. This indicator also resets manually the signal circuit (RESET).

The signal contact is also equipped with a test button (TEST) which tests the signal circuit contact irrespective of the state of the MCB.

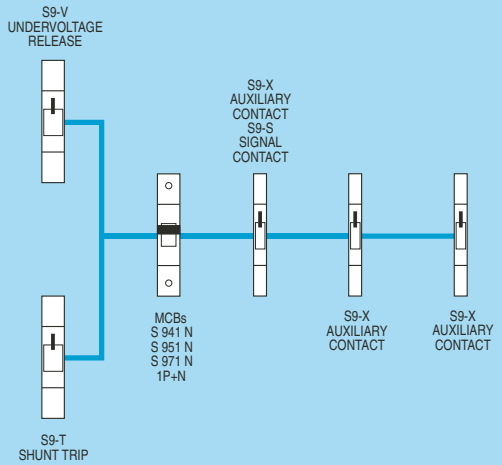
On each circuit-breaker in the S 9.. range, up to a maximum of 3 contacts can be used (the signal contact, if necessary, should be installed directly on the circuit-breaker and only one can be used).

Shunt trips and undervoltage releases are equipped with a protruding red indicator which shows opening of the circuit-breaker (if caused by the release).

There are also two versions of the undervoltage releases equipped with a tripping delay of 100 ms (S 9-V24CA and S 9-V24CC types), which prevents undesirable tripping caused by microinterruption or drop in the network voltage which lasts less than 100 ms.

The procedures for accessorizing are shown in the figure.

Examples of combinations of S 941N, S 951 N and S 971 N circuit-breakers with auxiliary elements (maximum configurations)





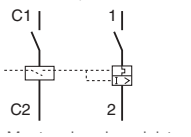
## Shunt trips

They are used to trigger remote opening of the MCBs.

They have an integrated signal contact that indicates the contact position of the breaker they are connected to.

| Code | Type | Description |
|---|---|---|
| **for S 941 N, S 951 N and S 971 N series** | | |
| **EE 619 1** | S9-T24 | 12-24 V a.c./d.c. shunt trip |
| **EE 620 9** | S9-T130 | 48-130 V a.c./48-60 V d.c. shunt trip |
| **EE 621 7** | S9-T415 | 220-415 V a.c./110-250 V d.c. shunt trip |

**S9-T24, S9-T130, S9-T415**

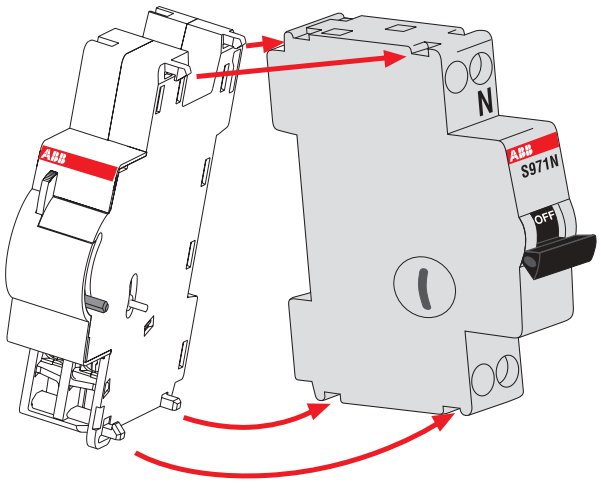



Installation only on left



### Technical characteristics

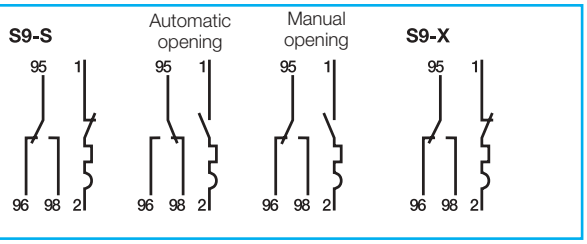
| Type | | S9-T24 | S9-T130 | S9-T415 |
|---|---|---|---|---|
| **Voltage** | [V] a.c. | 12…24 | 48…130 | 220…415 |
| | [V] d.c. | 12…24 | 48…60 | 110…250 |
| **Frequency** | [V] | | 50…60 | |
| **Consumption on release** | [VA] | 20 VA (12 V a.c.)<br>90 VA (24 V a.c.)<br>20 VA (12 V d.c.)<br>90 VA (24 V d.c.) | 22 VA (48 V a.c.)<br>200 VA (130 V a.c.)<br>22 VA (48 V d.c.) | 40 VA (220 V a.c.)<br>130 VA (415 V a.c.)<br>10 VA (110 V d.c.)<br>20 VA (250 V d.c.) |
| **Terminals** | [mm²] | | 2x1.5 | |

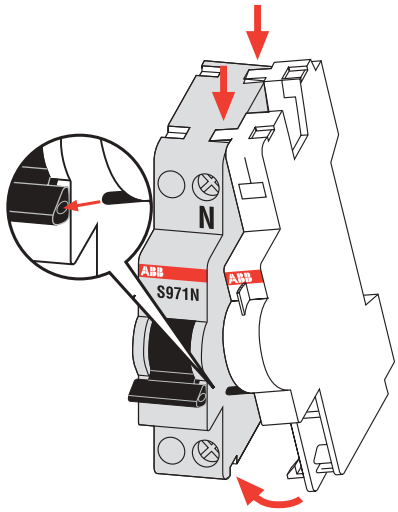



## Auxiliary/signal contacts

The auxiliary contact indicates the position of the circuit-breaker contact. When the position of the contacts change, whether manually or automatically, they indicate their status.
The signal contact indicates the position of the circuit-breaker contacts after automatic release of the circuit-breaker caused by overload or short-circuit. For manual operation, it does not trip. The signal contacts in the S 941 N, S 951 N and S 971 N series breakers are equipped with a test button on the front of the accessory which simulates the functions without acting directly on the circuit-breaker.

| Code | Type | Description |
|---|---|---|
| **For S 941 N, S 951 N ed S 971 N series** | | |
| **EE 610 0** | S9-X | auxiliary contact 1NO + 1NC (1/2 module) |
| **EE 611 8** | S9-S | signal contact 1NO + 1NC (1/2 module) |



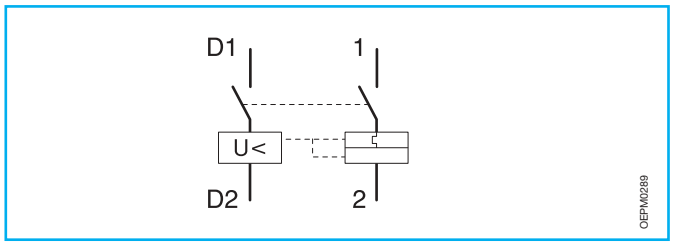



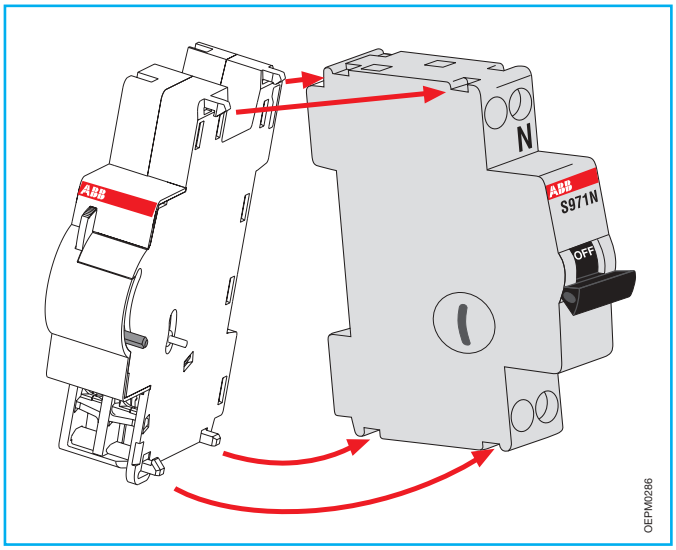
1


## Undervoltage releases

These are used and/or to effect a positive safety emergency stop and/or to protect the load in the event of a voltage drop (threshold between 70% and 35% of its rated value). If used for an emergency stop, they cause undesirable tripping also for temporary microinterruptions of the voltage for a few dozen milliseconds. ABB also makes DDA AE blocks which combine the residual current function and the positive safety emergency stop without the use of an auxiliary energy source (battery) and auxiliary circuits. The DDA AE blocks perform the functions of an undervoltage release but without the disadvantages of an undesirable tripping .

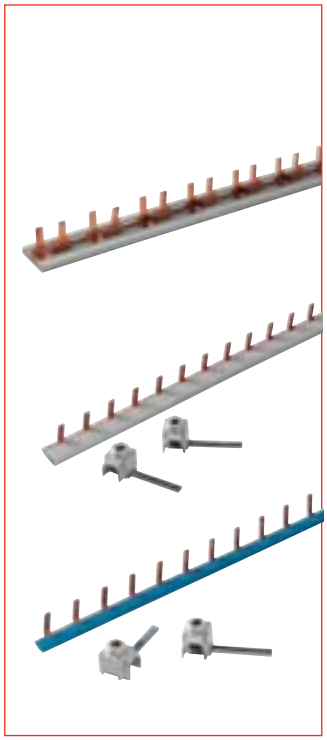
| Code | Type | Description |
|---|---|---|
| **for S 941 N, S 951 N, S 971 N series** | | |
| **EE 612 6** | S9-V24CA | 24 V a.c. undervoltage release |
| **EE 613 4** | S9-V24CC | 24 V d.c. undervoltage release |
| **EE 614 2** | S9-V48CA | 48 V a.c. undervoltage release |
| **EE 615 9** | S9-V48CC | 48 V d.c. undervoltage release |
| **EE 616 7** | S9-V230CA | 230 V a.c. undervoltage release |




### Technical characteristics

| Type | | S9-V24CA | S9-V24CC | S9-V48CA | S9-V48CC | S9-V230CA |
|---|---|---|---|---|---|---|
| **Voltage** | [V] a.c. | 24 | – | 48 | – | 230 |
| | [V] d.c. | – | 24 | – | 48 | – |
| **Frequency** | [Hz] | | | 50…60 | | |
| **Consumption on release** | [VA] | 6 | 2 | 4.3 | 2 | 4.3 |
| **Terminals** | [mm²] | | | 2x1.5 | | |



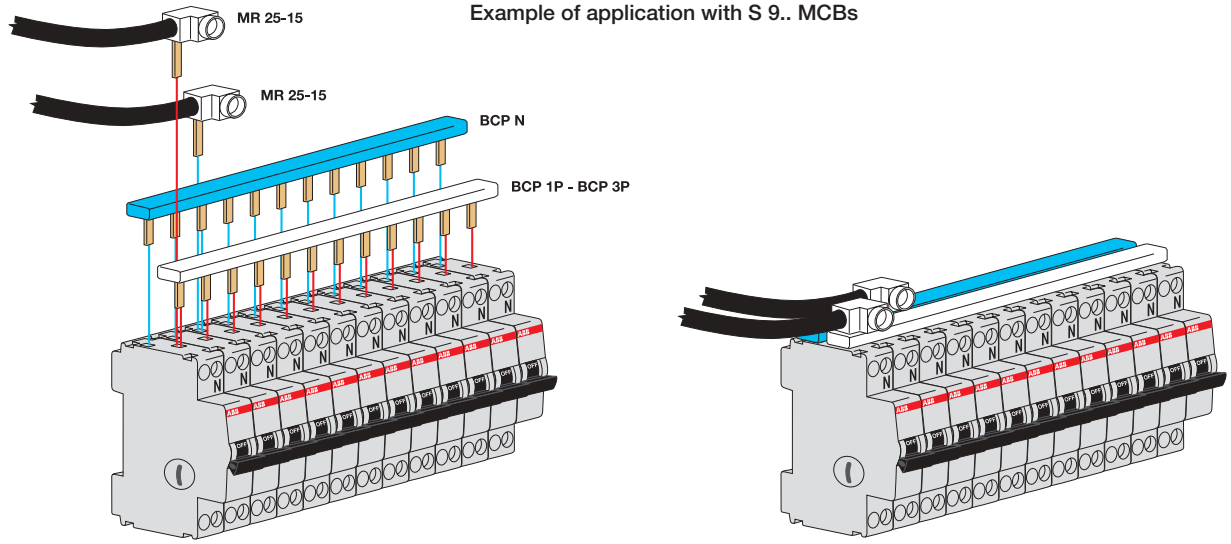
## Busbars

Available in versions with 4 and 12 modules, these are made of a copper conductor and an insulating plastic housing. For all of the different types of busbars, the maximum capacity is 60 A, whilst the copper cross-section is 10 mm$^2$.



| Code | Type | Description |
|---|---|---|
| **Per serie S 9.. e DS 9..** | | |
| **EA 095 8** | BCP 1P - 12 mod. | pin type busbar 1P – 12 modules |
| **EA 096 6** | BCP N - 12 mod. | pin type busbar 1P(N) - 12 modules |
| **EA 097 4** | BCP 1P - 4 mod. | pin type busbar 1P - 4 modules |
| **EA 098 2** | BCP N - 4 mod. | pin type busbar 1P(N) - 4 modules |
| **EA 099 0** | BCP 2P - 12 mod. | pin type busbar 2P - 12 modules |
| **EA 100 6** | BCP 3P - 12 mod. | pin type busbar 3P - 12 modules |
| **EA 101 4** | BCP 4P - 12 mod. | pin type busbar 4P - 12 modules |
| **EA 102 2** | MR 25-15 | pin type terminal 25 mm$^2$ - 15 mm |
| **EA 103 0** | MR 25-30 | pin type terminal 25 mm$^2$ - 30 mm |

Example of application with S 9.. MCBs



The S 2.. range consists of 6 series of circuit-breakers which are capable of meeting all the protection requirements of circuits up to 63 A, from domestic to industrial applications.

The S 240 - S 250 - S 270 - S 280 series are available in 1P-2P-3P-4P versions with thermomagnetic releases in C (S 240 - S 250 - S 270 - S 280), B (S 250 - S 270 - S 280), D (S 270 - S 280), K (S 270 - S 280) and Z characteristic (S 280).

These 4 series have the following breaking capacities according to IEC 898/EN 60898: 4.5 kA for the S 240 series, 6 kA for the S 250 series, 10 kA for the S 270 series and 25 kA for the S 280 (10A≤In≤25A) series.

Recently the S 280 series has been enlarged with the new 80 A and 100 A rated current versions (one pole, one module) available in B and C characteristics, 6 kA breaking capacity according to IEC 898/EN 60898 Standard and 35 $mm^2$ size of the terminals.

The range also includes the S 280 UC series which protects direct current circuits with high voltages, at which standard circuit-breakers cannot operate.

The M 280 series has recently been developed and consists of 1P-2P-3P-4P circuit-breakers with magnetic only releases which are particularly suitable for protecting motors with high start-up currents.

All circuit-breakers in the S 2.. range have self-supporting mechanical parts; in these breakers, there is no specific mechanical constraint between the case and the internal mechanical components which form three independent functional blocks; in this way, any distortion of the case, in the event of thermal shock, does not affect the correct functioning of the circuit-breaker.

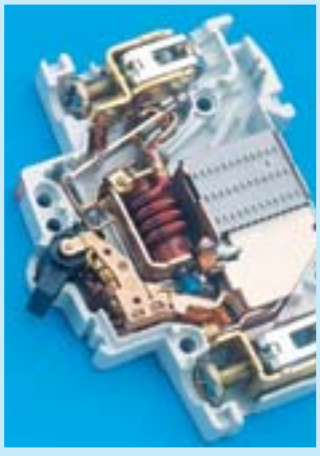
The supply lines of the protected circuits can be connected to either the upper or lower terminals of the circuit-breakers (reversibility of connections).

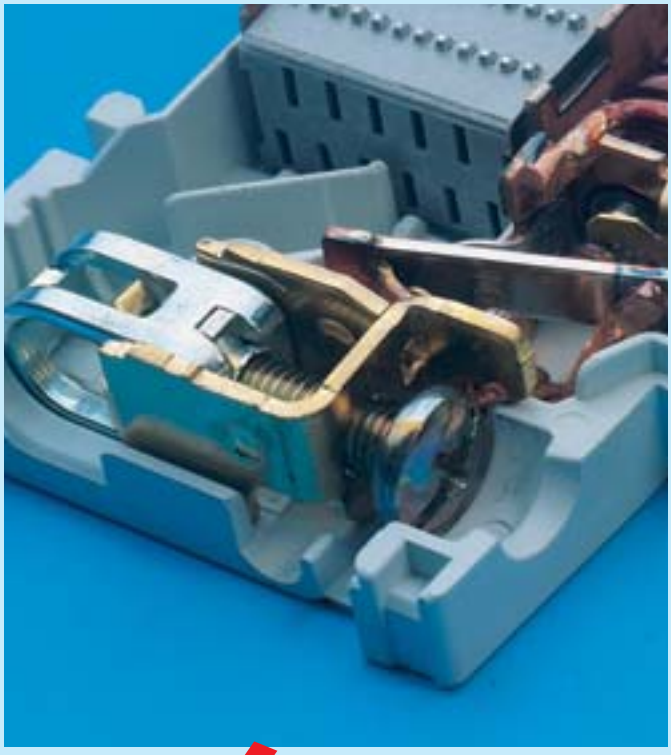
Another feature of the circuit-breakers in this range is the double terminal which enables simultaneous connection of cables and busbars.

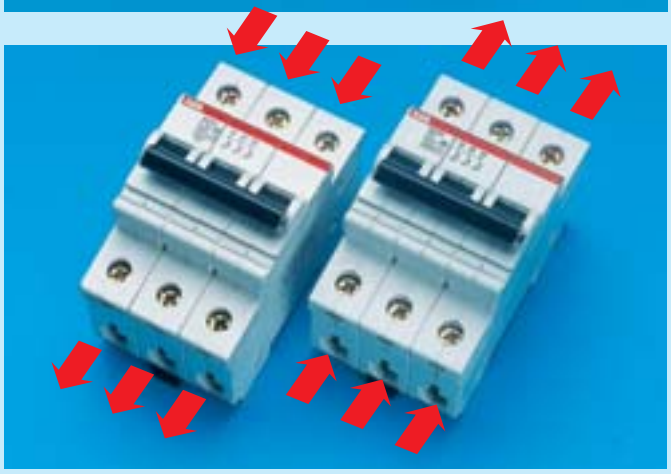
All the circuit-breakers in the S 2.. range with C and B characteristics have IMQ approval which demonstrates the high level of quality achieved.

On some of the series, approval from the Italian Naval Register (R.I.Na.) and the main naval certifying bodies (see detailed indications for each series) is also available.


TEPM0026


TEPM0027


TEPM0028


TEPM0029

# S 2.. range



## Contents

# S 2.. range
## Technical characteristics



| | | | S 240 | S 250 | S 270 |
|---|---|---|---|---|---|
| **Standards** | | | | IEC EN 60898, IEC EN 60947-2 | |
| **Rated current In** | | [A] | 6≤In≤40 | 0.5≤In≤63 | 0.5≤In≤63 |
| **Poles** | | | | 1P, 1P+N, 2P, 3P, 4P | |
| **Rated voltage Ue** | 1P | [V] | | 230 | |
| | 2P, 3P, 4P | [V] | | 230/400 | |
| **Insulation voltage Ui** | | [V] | | 500 | |
| **Max. operating** | a.c. | [V] | | 440 | |
| **voltage Ub max.** | d.c. 1P | [V] | | 60 V d.c. | |
| | d.c. 2P | [V] | | 125 V d.c. | |
| **Min. operating voltage Ub min.** | | [V] | | 12 V a.c.-12 V d.c. | |
| **Rated frequency** | | [Hz] | | 50…60 | |
| **Rated breaking capacity** | Icn | [A] | 4500 | 6000 | 10000 |
| **acc. to IEC EN 60898** | | | | | |
| **Rated breaking capacity** | ultimate Icu | [kA] | 7.5 | 20 | 25 |
| **IEC EN 60947-2 2P - 230 V** | service Ics | [kA] | 7.5 | 15 | 18.7 |
| **Rated breaking capacity** | ultimate Icu | [kA] | 7.5 | 10 | 15 |
| **IEC EN 60947-2 3P, 4P - 400 V** | service Ics | [kA] | 5.6 | 7.5 | 11.2 |
| **Rated breaking capacity** | ultimate Icu | [kA] | | | |
| **IEC EN 60947-2** | service Ics | [kA] | | | |
| **1P - 220 V d.c., 2P - 440 V d.c.** | | | | | |
| **Voltage withstanding capacity** | | | | | |
| **impulse (1.2/50)** | Uimp | [kV] | | 5 | |
| **Dielectric test voltage at ind. freq. for 1 min.** | | [kV] | | 2.5 | |
| **Thermomagnetic release** | B: 3 In≤Im≤5 In | | | ■ | ■ |
| **characteristic** | C: 5 In≤Im≤10 In | | ■ | ■ | ■ |
| | D: 10 In≤Im≤20 In | | | | ■ |
| | K: 8 In≤Im≤14 In | | | ■ | ■ |
| | Z: 2 In≤Im≤3 In | | | | |
| | magnetic only: 12 In≤Im≤14 In | | | | |
| **Toggle** | | | | black sealable in ON-OFF position | |
| **Electrical life** | | | | 10000 | |
| **Mechanical life** | | | | 20000 | |
| **Protection degree** | housing | | | IP4X | |
| | terminals | | | IP2X | |
| **Mechanical shock resistance** | | | | minimum 30 g - 2 shocks - duration 13 ms | |
| **Resistance to vibrations acc. to DIN IEC 68-2-6** | | | | 5 g - 20 cycles at frequency 5…150…5 Hz with load 0.8 In | |
| **Tropicalization** | humid heat | [°C/RH] | | 28 cycles with 55/95…100 | |
| **acc. to DIN 40046 IEC 68-2** | const. climatic cond. | [°C/RH] | | 23/83-40/93-55/20 | |
| | var. climatic cond. | [°C/RH] | | 25/95-40/95 | |
| **Thermal releaser calibration temperature** | | [°C] | | 30 (20 for curves K, Z) | |
| **Ambient temperature (with daily average ≤+35 °C)** | | [°C] | | -25…+55 | |
| **Storage temperature** | | [°C] | | -40…+70 | |
| **Terminal size upper/lower per cable** | | [mm²] | | cage type 25/25 | |
| **Tightening torque** | | [N*m] | | 2 | |
| **Mounting** | | | | on rail EN 60715 (35 mm) by means of rapid fixing device | |
| **Pole dimensions** | HxDxW | [mm] | | 90x68x17.5 | |
| **Pole weight** | | [g] | | 125 | |
| **Possibility of connection to motor operating device** | | | ■ | ■ | ■ |

# S 2.. range
## Technical characteristics





| | S 280 | | | | S 280 UC | | M 280 | | |
|---|---|---|---|---|---|---|---|---|---|
| | IEC EN 60898, IEC EN 60947-2 | | | | IEC EN 60947-2 | | IEC EN 60947-2 | | |
| | 0.5≤In≤2<br>10≤In≤25 | 32≤In≤40 | 3≤In≤8<br>50≤In≤63 | 80≤In≤100 | 0.5≤In≤40 | 50≤In≤63 | 0.5≤In≤1.6<br>10≤In≤25 | 32≤In≤40 | 2.5≤In≤6.3<br>50≤In≤63 |
| | 1P, 2P, 3P, 4P | | | | 1P, 2P | | 1P, 2P, 3P, 4P | | |
| | 230<br>230/400 | | | | 220 V d.c.<br>440 V d.c. | | 230<br>230/400 | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | 60 V d.c.<br>125 V d.c. | | | | 220 V d.c.<br>440 V d.c. | | 60 V d.c.<br>125 V d.c. | | |
| | | | | | | | | | |
| | 50…60 | | | | 50…60 | | 50…60 | | |
| | 25000 | 15000 | 10000 | 6000 | | | | | |
| | 40<br>30 | 30<br>22.5 | 25<br>18.7 | 10<br>10 | | | 40<br>30 | 30<br>22.5 | 25<br>18.75 |
| | 25<br>12.5 | 20<br>10 | 15<br>11.2 | 6<br>6 | | | 25<br>12.5 | 20<br>10 | 15<br>7.5 |
| | | | | | 6<br>6 | 4.5<br>4.5 | | | |
| | | | | | | | | | |
| | 5<br>2.5 | | | | | | | | |
| | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| | ■ | ■ | ■ | | | | | | |
| | ■ | ■ | ■ | | ■ | ■ | | | |
| | ■ | ■ | ■ | | ■ | ■ | | | |
| | | | | | | | ■ | ■ | ■ |
| | black sealable in ON-OFF position | | | | | | | | |
| | 10000<br>20000 | | 4000<br>10000 | | 10000<br>20000 | | 10000<br>20000 | | |
| | IP4X<br>IP2X | | | | IP4X<br>IP2X | | IP4X<br>IP2X | | |
| | minimum 30 g - 2 shocks - duration 13 ms | | | | | | | | |
| | 5 g - 20 cycles at frequency 5…150…5 Hz with load 0.8 In | | | | | | | | |
| | 28 cycles with 55/95…100 | | | | 28 cycles with 55/95…100 | | 28 cycles with 55/95…100 | | |
| | 23/83-40/93-55/20 | | | | 23/83-40/93-55/20 | | 23/83-40/93-55/20 | | |
| | 25/95-40/95 | | | | 25/95-40/95 | | 25/95-40/95 | | |
| | 30 (20 for curves K, Z) | | | | 30 (20 for curves K, Z) | | | | |
| | -25…+55 | | | | -25…+55 | | -25…+55 | | |
| | -40…+70 | | | | -40…+70 | | -40…+70 | | |
| | cage type 25/25 | | cage type 35/35 | | cage type 25/25 | | cage type 25/25 | | |
| | 2 | | 2.5 | | 2 | | 2 | | |
| | on rail EN 60715 (35 mm) by means of rapid fixing device | | | | | | | | |
| | 90x68x17.5 | | – | | 90x68x17.5 | | 90x68x17.5 | | |
| | 140 | | 160 | | 140 | | 140 | | |
| | ■ | | – | | ■ | | ■ | | |

# S 2.. range
## S 240 series






| Rated currents In [A] | Code Characteristics C |
|---|---|
| **1P - S 241 type** | |
| **6** | EF 010 2 |
| **8** | EF 016 9 |
| **10** | EF 011 0 |
| **13** | EF 017 7 |
| **16** | EF 012 8 |
| **20** | EF 013 6 |
| **25** | EF 014 4 |
| **32** | EF 015 1 |
| **40** | EF 018 5 |
| **1P+N - S 241 Na type** | |
| **6** | EF 020 1 |
| **8** | EF 026 8 |
| **10** | EF 021 9 |
| **13** | EF 027 6 |
| **16** | EF 022 7 |
| **20** | EF 023 5 |
| **25** | EF 024 3 |
| **32** | EF 025 0 |
| **40** | EF 028 4 |
| **2P - S 242 type** | |
| **6** | EF 030 0 |
| **8** | EF 036 7 |
| **10** | EF 031 8 |
| **13** | EF 037 5 |
| **16** | EF 032 6 |
| **20** | EF 033 4 |
| **25** | EF 034 2 |
| **32** | EF 035 9 |
| **40** | EF 038 3 |

**Tripping characteristics**

C (Im=5…10 In)

**Application: residential and similar**

**Connections for UNIFIX available**

**RCBO version**

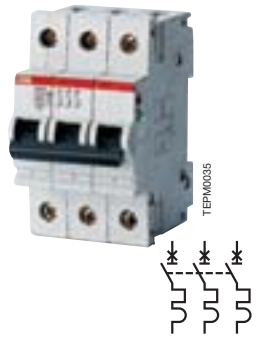
DS 640 SERIES

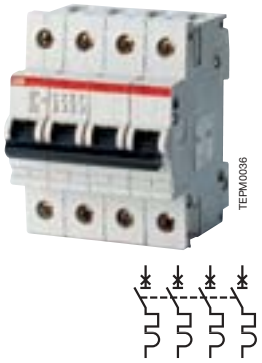
**RCD blocks**

DDA 25/40/63 A

# S 2.. range
## S 240 series






| Rated currents In [A] | Code Characteristics C |
|---|---|
| **3P - S 243 type** | |
| **6** | EF 040 9 |
| **8** | EF 046 6 |
| **10** | EF 041 7 |
| **13** | EF 047 4 |
| **16** | EF 042 5 |
| **20** | EF 043 3 |
| **25** | EF 044 1 |
| **32** | EF 045 8 |
| **40** | EF 048 2 |
| **4P - S 244 type** | |
| **6** | EE 380 0 |
| **8** | EE 381 8 |
| **10** | EE 382 6 |
| **13** | EE 383 4 |
| **16** | EE 384 2 |
| **20** | EE 385 9 |
| **25** | EE 386 7 |
| **32** | EE 387 5 |
| **40** | EE 388 3 |

### Rated breaking capacity in a.c.

acc. to IEC EN 60898 (IEC 23-3 IV ed.)

| In [A] | poles | voltage [V] | Icn [kA] |
|---|---|---|---|
| **6…40** | All | 230/400 | 4.5 |

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **6…40** | 1, 1+N | 127 | 10 | 10 |
| | | 230 | 6 | 6 |
| | | 400 | 3 | - |
| | 2 | 230 | 7.5 | 7.5 |
| | | 400 | 7.5 | 5.6 |
| | 3, 4 | 230 | 10 | 10 |
| | | 400 | 7.5 | 5.6 |

### Rated breaking capacity in d.c.

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **6…40** | 1 | 60 | 6 | 6 |
| | 2 | 125 | 6 | 6 |

**IMQ approval**

**S 240 230-400 V**
4.5 kA characteristic C
In=6 ... 40 A
1P, 1P+N, 2P, 3P

# S 2.. range
## S 250 series


| Rated currents In [A] | Code Characteristics B | C | D | K |
|---|---|---|---|---|
| **1P - S 251 type** | | | | |
| **0.5** | | EF 536 6 | 11178108 | EF 160 5 |
| **1** | | EF 537 4 | 11178109 | EF 161 3 |
| **1.6** | | EF 538 2 | 11178110 | EF 162 1 |
| **2** | | EF 539 0 | 11178111 | EF 163 9 |
| **3** | | EF 540 8 | 11178112 | EF 164 7 |
| **4** | | EF 541 6 | 11178113 | EF 165 4 |
| **6** | EF 110 0 | EF 060 7 | 11178114 | EF 166 2 |
| **8** | EF 111 8 | EF 061 5 | | EF 167 0 |
| **10** | EF 112 6 | EF 062 3 | 11178115 | EF 168 8 |
| **13** | EF 176 1 | EF 177 9 | | |
| **16** | EF 113 4 | EF 063 1 | 11178116 | EF 169 6 |
| **20** | EF 114 2 | EF 064 9 | 11178117 | EF 170 4 |
| **25** | EF 115 9 | EF 065 6 | 11178118 | EF 171 2 |
| **32** | EF 116 7 | EF 066 4 | 11178119 | EF 172 0 |
| **40** | EF 117 5 | EF 067 2 | 11178120 | EF 173 8 |
| **50** | EF 118 3 | EF 068 0 | 11178121 | EF 174 6 |
| **63** | EF 119 1 | EF 069 8 | 11178122 | EF 175 3 |

**Tripping characteristics**

B (Im=3…5 In); C (Im=5…10 In)

K (Im=8…14 In)

**Application: residential, tertiary and industrial**

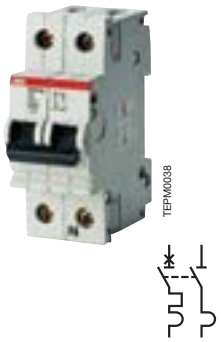
**Connections for UNIFIX available**

**RCBO version**

DS 650 SERIES

**RCD blocks**

DDA 25/40/63 A




| Rated currents In [A] | Code Characteristics B | C | K |
|---|---|---|---|
| **1P+N - S 251 Na type** | | | |
| **0.5** | | EF 542 4 | EF 180 3 |
| **1** | | EF 543 2 | EF 181 1 |
| **1.6** | | EF 544 0 | EF 182 9 |
| **2** | | EF 545 7 | EF 183 7 |
| **3** | | EF 546 5 | EF 184 5 |
| **4** | | EF 547 3 | EF 185 2 |
| **6** | EF 120 9 | EF 070 6 | EF 186 0 |
| **8** | EF 121 7 | EF 071 4 | EF 187 8 |
| **10** | EF 122 5 | EF 072 2 | EF 188 6 |
| **13** | EF 196 9 | EF 197 7 | |
| **16** | EF 123 3 | EF 073 0 | EF 189 4 |
| **20** | EF 124 1 | EF 074 8 | EF 190 2 |
| **25** | EF 125 8 | EF 075 5 | EF 191 0 |
| **32** | EF 126 6 | EF 076 3 | EF 192 8 |
| **40** | EF 127 4 | EF 077 1 | EF 193 6 |
| **50** | EF 128 2 | EF 078 9 | EF 194 4 |
| **63** | EF 129 0 | EF 079 7 | EF 195 1 |

## Rated breaking capacity in a.c.

acc. to IEC EN 60898 (IEC 23-3 IV ed.)

| In [A] | poles | voltage [V] | Icn [kA] |
|---|---|---|---|
| **0.5…63** | All | 230/400 | 6 |

acc. to IEC EN 60947.2

| In [A] [kA] | poles | voltage [V] | Icu [kA] | Ics |
|---|---|---|---|---|
| **0.5…63** | 1, 1+N | 127 | 30 | 22.75 |
| | | 230 | 10 | 7.5 |
| | | 400 | 3 | - |
| | 2 | 230 | 20 | 15 |
| | | 400 | 10 | 7.5 |
| | 3, 4 | 230 | 20 | 15 |
| | | 400 | 10 | 7.5 |

## Rated breaking capacity in d.c.

acc. to IEC EN 60947.2

| In [A] [kA] | poles | voltage [V] | Icu [kA] | Ics |
|---|---|---|---|---|
| **0.5…63** | 1 | 60 | 10 | 10 |
| | 2 | 125 | 10 | 10 |

### IMQ approval

**S 250 230-400V**
6 kA characteristics B-C
In=6 ... 63 A
1P, 1P+N, 2P, 3P, 4P

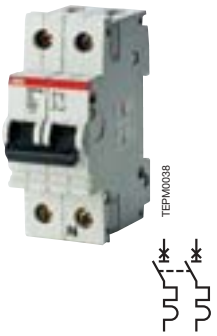
### R.I.Na. approval

The S 252, S 253, S 254 types (B-C-K characteristics) have obtained R.I.Na. approval for naval application at voltages of 230, 400, 440 V a.c.

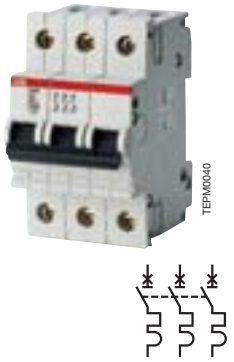
UL-CSA approvals available on request

# S 2.. range

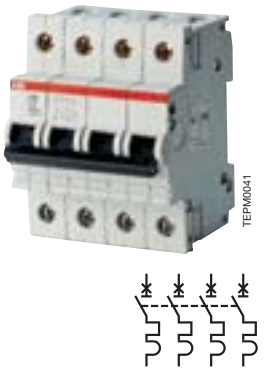
## S 250 series




| Rated currents In [A] | Code Characteristics B | C | K |
|---|---|---|---|
| **2P - S 252 type** | | | |
| **0.5** | | EF 548 1 | EF 200 9 |
| **1** | | EF 549 9 | EF 201 7 |
| **1.6** | | EF 550 7 | EF 202 5 |
| **2** | | EF 551 5 | EF 203 3 |
| **3** | | EF 552 3 | EF 204 1 |
| **4** | | EF 553 1 | EF 205 8 |
| **6** | EF 130 8 | EF 080 5 | EF 206 6 |
| **8** | EF 131 6 | EF 081 3 | EF 207 4 |
| **10** | EF 132 4 | EF 082 1 | EF 208 2 |
| **13** | EF 216 5 | EF 217 3 | |
| **16** | EF 133 2 | EF 083 9 | EF 209 0 |
| **20** | EF 134 0 | EF 084 7 | EF 210 8 |
| **25** | EF 135 7 | EF 085 4 | EF 211 6 |
| **32** | EF 136 5 | EF 086 2 | EF 212 4 |
| **40** | EF 137 3 | EF 087 0 | EF 213 2 |
| **50** | EF 138 1 | EF 088 8 | EF 214 0 |
| **63** | EF 139 9 | EF 089 6 | EF 215 7 |




| | | | |
|---|---|---|---|
| **3P - S 253 type** | | | |
| **0.5** | | EF 554 9 | EF 220 7 |
| **1** | | EF 555 6 | EF 221 5 |
| **1.6** | | EF 556 4 | EF 222 3 |
| **2** | | EF 557 2 | EF 223 1 |
| **3** | | EF 558 0 | EF 224 9 |
| **4** | | EF 559 8 | EF 225 6 |
| **6** | EF 140 7 | EF 090 4 | EF 226 4 |
| **8** | EF 141 5 | EF 091 2 | EF 227 2 |
| **10** | EF 142 3 | EF 092 0 | EF 228 0 |
| **13** | EF 236 3 | EF 237 1 | |
| **16** | EF 143 1 | EF 093 8 | EF 229 8 |
| **20** | EF 144 9 | EF 094 6 | EF 230 6 |
| **25** | EF 145 6 | EF 095 3 | EF 231 4 |
| **32** | EF 146 4 | EF 096 1 | EF 232 2 |
| **40** | EF 147 2 | EF 097 9 | EF 233 0 |
| **50** | EF 148 0 | EF 098 7 | EF 234 8 |
| **63** | EF 149 8 | EF 099 5 | EF 235 5 |




| | | | |
|---|---|---|---|
| **4P - S 254 type** | | | |
| **0.5** | | EF 840 2 | EE 390 9 |
| **1** | | EF 841 0 | EE 391 7 |
| **1.6** | | EF 842 8 | EE 392 5 |
| **2** | | EF 843 6 | EE 393 3 |
| **3** | | EF 844 4 | EE 394 1 |
| **4** | | EF 845 1 | EE 395 8 |
| **6** | EF 883 2 | EF 846 9 | EE 396 6 |
| **8** | EF 884 0 | EF 847 7 | EE 397 4 |
| **10** | EF 885 7 | EF 848 5 | EE 398 2 |
| **13** | EF 886 5 | EF 849 3 | |
| **16** | EF 887 3 | EF 850 1 | EE 399 0 |
| **20** | EF 888 1 | EF 851 9 | EE 400 6 |
| **25** | EF 889 9 | EF 852 7 | EE 401 4 |
| **32** | EF 890 7 | EF 853 5 | EE 402 2 |
| **40** | EF 891 5 | EF 854 3 | EE 403 0 |
| **50** | EF 892 3 | EF 855 0 | EE 404 8 |
| **63** | EF 893 1 | EF 856 8 | EE 405 5 |

# S 2.. range
## S 270 series




| Rated currents In [A] | Code Characteristics B | C | K | D |
|---|---|---|---|---|
| **1P - S 271 type** | | | | |
| **0.5** | | EF 566 3 | EF 360 1 | EF 600 0 |
| **1** | | EF 567 1 | EF 361 9 | EF 601 8 |
| **1.6** | | EF 568 9 | EF 362 7 | EF 602 6 |
| **2** | | EF 569 7 | EF 363 5 | EF 603 4 |
| **3** | | EF 570 5 | EF 364 3 | EF 604 2 |
| **4** | | EF 571 3 | EF 365 0 | EF 605 9 |
| **6** | EF 310 6 | EF 260 3 | EF 366 8 | EF 606 7 |
| **8** | EF 311 4 | EF 261 1 | EF 367 6 | EF 607 5 |
| **10** | EF 312 2 | EF 262 9 | EF 368 4 | EF 608 3 |
| **13** | EF 830 3 | EF 835 2 | | |
| **16** | EF 313 0 | EF 263 7 | EF 369 2 | EF 609 1 |
| **20** | EF 314 8 | EF 264 5 | EF 370 0 | EF 610 9 |
| **25** | EF 315 5 | EF 265 2 | EF 371 8 | EF 611 7 |
| **32** | EF 316 3 | EF 266 0 | EF 372 6 | EF 612 5 |
| **40** | EF 317 1 | EF 267 8 | EF 373 4 | EF 613 3 |
| **50** | EF 318 9 | EF 268 6 | EF 374 2 | EF 614 1 |
| **63** | EF 319 7 | EF 269 4 | EF 375 9 | EF 615 8 |

**Tripping characteristics**

B (Im=3…5 In); C (Im=5…10 In)

D (Im=10…20 In); K (Im=8…14 In)

**Application: tertiary and industrial**

**Connections for UNIFIX available**

**RCBO version**

DS 670 SERIES

**RCD blocks**

DDA 25/40/63 A

### Rated breaking capacity in a.c.

acc. to IEC EN 60898 (IEC 23-3 IV ed.)

| In [A] | poles | voltage [V] | Icn [kA] |
|---|---|---|---|
| **0.5…63** | All | 230/400 | 10 |

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5…63** | 1, 1+N | 127 | 35 | 26.2 |
| | | 230 | 15 | 11.2 |
| | | 400 | 4 | - |
| | 2 | 230 | 25 | 18.7 |
| | | 400 | 15 | 11.2 |
| | 3, 4 | 230 | 20 | 15 |
| | | 400 | 15 | 11.2 |

### Rated breaking capacity in d.c.

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5…63** | 1 | 60 | 10 | 10 |
| | 2 | 125 | 10 | 10 |

**R.I.Na. approval**

The S 272, S 273 types (B-C-K characteristics) and S 274 (B-C characteristics) have obtained R.I.Na. approval for naval application at voltages 230, 400, 440 V a.c.

**IMQ approval**

**S 270 230-400 V**
10 kA characteristics B-C
In=0.5...63 A (C); In=6...63 A (B)
1P, 1P+N, 2P, 3P, 4P

# S 2.. range

## S 270 series

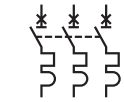

| Rated currents In [A] | Code Characteristics B | C | K | D |
|---|---|---|---|---|
| **1P+N - S 271 Na type** | | | | |
| **0.5** | | EF 572 1 | EF 380 9 | EF 616 6 |
| **1** | | EF 573 9 | EF 381 7 | EF 617 4 |
| **1.6** | | EF 574 7 | EF 382 5 | EF 618 2 |
| **2** | | EF 575 4 | EF 383 3 | EF 619 0 |
| **3** | | EF 576 2 | EF 384 1 | EF 620 8 |
| **4** | | EF 577 0 | EF 385 8 | EF 621 6 |
| **6** | EF 320 5 | EF 270 2 | EF 386 6 | EF 622 4 |
| **8** | EF 321 3 | EF 271 0 | EF 387 4 | EF 623 2 |
| **10** | EF 322 1 | EF 272 8 | EF 388 2 | EF 624 0 |
| **13** | EF 831 1 | EF 836 0 | | |
| **16** | EF 323 9 | EF 273 6 | EF 389 0 | EF 625 7 |
| **20** | EF 324 7 | EF 274 4 | EF 390 8 | EF 626 5 |
| **25** | EF 325 4 | EF 275 1 | EF 391 6 | EF 627 3 |
| **32** | EF 326 2 | EF 276 9 | EF 392 4 | EF 628 1 |
| **40** | EF 327 0 | EF 277 7 | EF 393 2 | EF 629 9 |
| **50** | EF 328 8 | EF 278 5 | EF 394 0 | EF 630 7 |
| **63** | EF 329 6 | EF 279 3 | EF 395 7 | EF 631 5 |


| | | | | |
|---|---|---|---|---|
| **2P - S 272 type** | | | | |
| **0.5** | | EF 578 8 | EF 400 5 | EF 632 3 |
| **1** | | EF 579 6 | EF 401 3 | EF 633 1 |
| **1.6** | | EF 580 4 | EF 402 1 | EF 634 9 |
| **2** | | EF 581 2 | EF 403 9 | EF 635 6 |
| **3** | | EF 582 0 | EF 404 7 | EF 636 4 |
| **4** | | EF 583 8 | EF 405 4 | EF 637 2 |
| **6** | EF 330 4 | EF 280 1 | EF 406 2 | EF 638 0 |
| **8** | EF 331 2 | EF 281 9 | EF 407 0 | EF 639 8 |
| **10** | EF 332 0 | EF 282 7 | EF 408 8 | EF 640 6 |
| **13** | EF 832 9 | EF 837 8 | | |
| **16** | EF 333 8 | EF 283 5 | EF 409 6 | EF 641 4 |
| **20** | EF 334 6 | EF 284 3 | EF 410 4 | EF 642 2 |
| **25** | EF 335 3 | EF 285 0 | EF 411 2 | EF 643 0 |
| **32** | EF 336 1 | EF 286 8 | EF 412 0 | EF 644 8 |
| **40** | EF 337 9 | EF 287 6 | EF 413 2 | EF 645 5 |
| **50** | EF 338 7 | EF 288 4 | EF 414 6 | EF 646 3 |
| **63** | EF 339 5 | EF 289 2 | EF 415 3 | EF 647 1 |

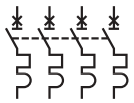
# S 2.. range

## S 270 series



| Rated currents In [A] | Code Characteristics B | C | K | D |
|---|---|---|---|---|
| **3P - S 273 type** | | | | |
| **0.5** | | EF 584 6 | EF 420 3 | EF 648 9 |
| **1** | | EF 585 3 | EF 421 1 | EF 649 7 |
| **1.6** | | EF 586 1 | EF 422 9 | EF 650 5 |
| **2** | | EF 587 9 | EF 423 7 | EF 651 3 |
| **3** | | EF 588 7 | EF 424 5 | EF 652 1 |
| **4** | | EF 589 5 | EF 425 2 | EF 653 9 |
| **6** | EF 340 3 | EF 290 0 | EF 426 0 | EF 654 7 |
| **8** | EF 341 1 | EF 291 8 | EF 427 8 | EF 655 4 |
| **10** | EF 342 9 | EF 292 6 | EF 428 6 | EF 656 2 |
| **13** | EF 833 7 | EF 838 6 | | |
| **16** | EF 343 7 | EF 293 4 | EF 429 4 | EF 657 0 |
| **20** | EF 344 5 | EF 294 2 | EF 430 2 | EF 658 8 |
| **25** | EF 345 2 | EF 295 9 | EF 431 0 | EF 659 6 |
| **32** | EF 346 0 | EF 296 7 | EF 432 8 | EF 660 4 |
| **40** | EF 347 8 | EF 297 5 | EF 433 6 | EF 661 2 |
| **50** | EF 348 6 | EF 298 3 | EF 434 4 | EF 662 0 |
| **63** | EF 349 4 | EF 299 1 | EF 435 1 | EF 663 8 |

| | | | | |
|---|---|---|---|---|
| **4P - S 274 type** | | | | |
| **0.5** | | EF 700 8 | EE 410 5 | EE 430 3 |
| **1** | | EF 701 6 | EE 411 3 | EE 431 1 |
| **1.6** | | EF 702 4 | EE 412 1 | EE 432 9 |
| **2** | | EF 703 2 | EE 413 9 | EE 433 7 |
| **3** | | EF 704 0 | EE 414 7 | EE 434 5 |
| **4** | | EF 706 5 | EE 415 4 | EE 435 2 |
| **6** | EF 945 9 | EF 707 3 | EE 416 2 | EE 436 0 |
| **8** | EF 946 7 | EF 708 1 | EE 417 0 | EE 437 8 |
| **10** | EF 947 5 | EF 709 9 | EE 418 8 | EE 438 6 |
| **13** | EF 948 3 | EF 800 6 | | |
| **16** | EF 949 1 | EF 801 4 | EE 419 6 | EE 439 4 |
| **20** | EF 963 2 | EF 804 8 | EE 420 4 | EE 440 2 |
| **25** | EF 964 0 | EF 805 5 | EE 421 2 | EE 441 0 |
| **32** | EF 965 7 | EF 806 3 | EE 422 0 | EE 442 8 |
| **40** | EF 966 5 | EF 807 1 | EE 423 8 | EE 443 6 |
| **50** | EF 967 3 | EF 808 9 | EE 424 6 | EE 444 4 |
| **63** | EF 968 1 | EF 809 7 | EE 425 3 | EE 445 1 |

# S 2.. range
## S 280 B-C-D series



| Rated currents In [A] | Code Characteristics B | C | D |
|---|---|---|---|
| **1P - S 281 type** | | | |
| **6** | KU 647 0 | KU 657 9 | KU 674 4 |
| **10** | KU 648 8 | KU 658 7 | KU 810 4 |
| **13** | KU 654 6 | KU 664 5 | |
| **16** | KU 649 6 | KU 659 5 | KU 811 2 |
| **20** | KU 650 4 | KU 660 3 | KU 812 0 |
| **25** | KU 651 2 | KU 661 1 | KU 813 8 |
| **32** | KU 652 0 | KU 662 9 | KU 814 6 |
| **40** | KU 653 8 | KU 663 7 | KU 815 3 |
| **50** | KU 655 3 | KU 665 2 | KU 817 9 |
| **63** | KU 656 1 | KU 666 0 | KU 818 7 |
| **80** | 111 78645 | 111 78643 | |
| **100** | 111 78646 | 111 78644 | |
| **2P - S 282 type** | | | |
| **0.5** | | 118 65333 | |
| **1** | | 118 65334 | |
| **1.6** | | 118 65335 | |
| **2** | | 118 65336 | |
| **3** | | 118 65337 | |
| **4** | | 118 65338 | |
| **6** | KU 687 6 | KU 697 5 | KU 819 5 |
| **8** | 118 65324 | 118 65340 | |
| **10** | KU 688 4 | KU 698 3 | KU 820 3 |
| **13** | KU 694 2 | KU 704 9 | |
| **16** | KU 689 2 | KU 699 1 | KU 821 1 |
| **20** | KU 680 0 | KU 700 7 | KU 822 9 |
| **25** | KU 681 8 | KU 701 5 | KU 823 7 |
| **32** | KU 682 6 | KU 702 3 | KU 824 5 |
| **40** | KU 683 4 | KU 703 1 | KU 825 2 |
| **50** | KU 695 9 | KU 705 6 | KU 827 8 |
| **63** | KU 696 7 | KU 706 4 | KU 828 6 |
| **80** | 111 78651 | 111 78649 | |
| **100** | 111 78652 | 111 78650 | |

**Tripping characteristics**

B (Im=3…5 In); C (Im=5…10 In)

D (Im=10…20 In)

**Application: tertiary and industrial**

**Connections for UNIFIX available**

**RCD blocks**

DDA 25/40/63 A

**IMQ approval**

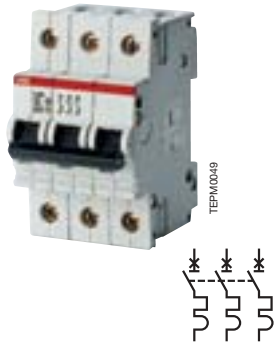
**S 280 230-400 V**
characteristics B-C
25 kA In=10...25 A
15 kA In=32...40 A
1P, 2P, 3P, 4P

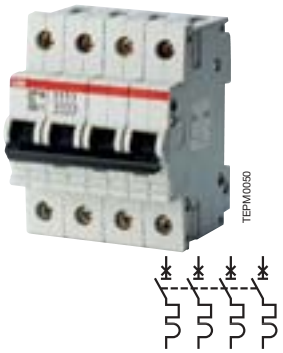
**R.I.Na. approval**

The S 282 and S 283 types with B-C characteristics with rated currents from 0.5 to 63 A have obtained R.I.Na, Lloyd's Register, Det Norske Veritas, Bureau Veritas approval for naval application at voltages:
- S 282 (60 V d.c./230 V a.c.)
- S 283 (230-440 V a.c.)

# S 2.. range

## S 280 B-C-D series




| Rated currents In [A] | Code Characteristics B | C | D |
|---|---|---|---|
| **3P - S 283 type** | | | |
| **0.5** | | 118 66313 | |
| **1** | | 118 66314 | |
| **1.6** | | 118 66315 | |
| **2** | | 118 66316 | |
| **3** | | 118 66317 | |
| **4** | | 118 66318 | |
| **6** | KU 707 2 | KU 717 1 | KU 829 4 |
| **8** | 118 66349 | 118 66320 | |
| **10** | KU 708 0 | KU 718 9 | KU 830 2 |
| **13** | KU 714 8 | KU 724 7 | |
| **16** | KU 709 8 | KU 719 7 | KU 831 0 |
| **20** | KU 710 6 | KU 720 5 | KU 832 8 |
| **25** | KU 711 4 | KU 721 3 | KU 833 6 |
| **32** | KU 712 2 | KU 722 1 | KU 834 4 |
| **40** | KU 713 0 | KU 723 9 | KU 835 1 |
| **50** | KU 715 5 | KU 725 4 | KU 837 7 |
| **63** | KU 716 3 | KU 726 2 | KU 838 5 |
| **80** | 111 78657 | 111 78655 | |
| **100** | 111 78658 | 111 78656 | |
| **4P - S 284 type** | | | |
| **6** | KU 727 0 | KU 737 9 | KU 839 3 |
| **10** | KU 728 8 | KU 738 7 | KU 840 1 |
| **13** | KU 734 6 | KU 744 5 | |
| **16** | KU 729 6 | KU 739 5 | KU 841 9 |
| **20** | KU 730 4 | KU 740 3 | KU 842 7 |
| **25** | KU 731 2 | KU 741 1 | KU 843 5 |
| **32** | KU 732 0 | KU 742 9 | KU 844 3 |
| **40** | KU 733 8 | KU 743 7 | KU 845 0 |
| **50** | KU 735 3 | KU 745 2 | KU 677 7 |
| **63** | KU 736 1 | KU 676 9 | KU 678 5 |
| **80** | 160 64740 | 160 64724 | |
| **100** | 160 64757 | 160 64732 | |

## Rated breaking capacity in a.c.

acc. to IEC EN 60898

| In [A] | poles | voltage [V] | Icn [kA] |
|---|---|---|---|
| **10…25** | All | 230/400 | 25 |
| **32 – 40** | All | 230/400 | 15 |
| **6 – 50 – 63** | All | 230/400 | 10 |
| **80 - 100** | All | 230/400 | 6 |

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5…2** | 1 | 127 | 50 | 37.5 |
| **10…25** | | 230 | 25 | 25 |
| | | 400 | 5 | - |
| | 2 | 230 | 40 | 30 |
| | | 400 | 25 | 18.75 |
| | 3, 4 | 230 | 40 | 30 |
| | | 400 | 25 | 12.5 |
| **32…40** | 1 | 127 | 40 | 30 |
| | | 230 | 20 | 20 |
| | | 400 | 4.5 | - |
| | 2 | 230 | 30 | 22.5 |
| | | 400 | 20 | 15 |
| | 3, 4 | 230 | 30 | 22.5 |
| | | 400 | 20 | 10 |
| **3-4-6-8-50-63** | 1 | 127 | 35 | 26.2 |
| | | 230 | 15 | 11.2 |
| | | 400 | 4 | - |
| | 2 | 230 | 25 | 18.7 |
| | | 400 | 15 | 11.2 |
| | 3, 4 | 230 | 20 | 15 |
| | | 400 | 15 | 11.2 |
| **80-100** | 1 | 230 | 6 | 100% |
| | | 400 | - | - |
| | 2 | 230 | 10 | 100% |
| | | 400 | 6 | 100% |
| | 3 | 230 | 10 | 100% |
| | | 400 | 6 | 100% |

## Rated breaking capacity in d.c.

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5…2** | 1 | 60 | 15 | 15 |
| **10…40** | 2 | 125 | 15 | 15 |
| **In [A]** | poles | voltage [V] | Icu [kA] | Ics [kA] |
| **3-4-6-8-50-63-80-100** | 1 | 60 | 10 | 10 |
| | 2 | 125 | 10 | 10 |

# S 2.. range
## S 280 K-Z series



| Rated currents In [A] | Code Characteristics K | Z |
|---|---|---|
| **1P - S 281 type** | | |
| **0.5** | KU 520 9 | KU 750 2 |
| **1** | KU 521 7 | KU 751 0 |
| **1.6** | KU 522 5 | KU 752 8 |
| **2** | KU 523 3 | KU 753 6 |
| **3** | KU 524 1 | KU 754 4 |
| **4** | KU 525 8 | KU 755 1 |
| **6** | KU 866 6 | KU 756 9 |
| **10** | KU 867 4 | KU 757 7 |
| **13** | KU 873 2 | KU 886 4 |
| **16** | KU 868 2 | KU 758 5 |
| **20** | KU 869 0 | KU 759 3 |
| **25** | KU 870 8 | KU 760 1 |
| **32** | KU 871 6 | KU 761 9 |
| **40** | KU 872 4 | KU 762 7 |
| **50** | KU 874 0 | KU 763 5 |
| **63** | KU 875 7 | KU 764 3 |
| **2P - S 282 type** | | |
| **0.5** | 118 65375 | KU 765 0 |
| **1** | 118 65376 | KU 766 8 |
| **1.6** | 118 65377 | KU 767 6 |
| **2** | 118 65378 | KU 768 4 |
| **3** | 118 65379 | KU 769 2 |
| **4** | 118 65380 | KU 770 0 |
| **6** | KU 856 7 | KU 771 8 |
| **8** | 118 65382 | |
| **10** | KU 857 5 | KU 772 6 |
| **13** | KU 863 3 | KU 887 2 |
| **16** | KU 858 3 | KU 773 4 |
| **20** | KU 859 1 | KU 774 2 |
| **25** | KU 860 9 | KU 775 9 |
| **32** | KU 861 7 | KU 776 7 |
| **40** | KU 862 5 | KU 777 5 |
| **50** | KU 864 1 | KU 778 3 |
| **63** | KU 865 8 | KU 779 1 |

**Tripping characteristics**

K (Im=8…14 In)

Z (Im=2…3 In)

**Application: industrial**

**Connections for UNIFIX available**

**RCD blocks**

DDA 25/40/63 A

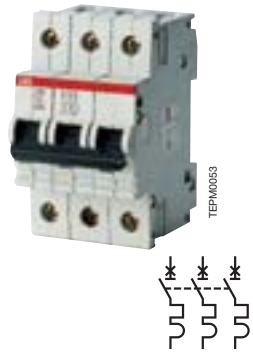
## Rated breaking capacity in a.c.

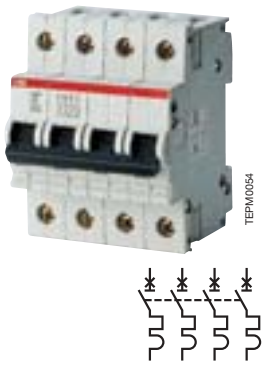
acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5…2** | 1 | 127 | 50 | 37.5 |
| **16…25** | | 230 | 25 | 25 |
| | 2 | 230 | 40 | 30 |
| | | 400 | 25 | 18.75 |
| | 3, 4 | 230 | 40 | 30 |
| | | 400 | 25 | 12.5 |
| **32…40** | 1 | 127 | 40 | 30 |
| | | 230 | 20 | 20 |
| | 2 | 230 | 30 | 22.5 |
| | | 400 | 20 | 15 |
| | 3, 4 | 230 | 30 | 22.5 |
| | | 400 | 20 | 10 |
| **3-4-6-8-10-50-63** | 1 | 127 | 35 | 26.2 |
| | | 230 | 15 | 11.2 |
| | 2 | 230 | 25 | 18.7 |
| | | 400 | 15 | 11.2 |
| | 3, 4 | 230 | 20 | 15 |
| | | 400 | 15 | 11.2 |

# S 2.. range

## S 280 K-Z series




| Rated currents In [A] | Code Characteristics K | Z |
|---|---|---|
| **3P - S 283 type** | | |
| **0.5** | 118 66329 | KU 780 9 |
| **1** | 118 66330 | KU 781 7 |
| **1.6** | 118 66331 | KU 782 5 |
| **2** | 118 66332 | KU 783 3 |
| **3** | 118 66333 | KU 784 1 |
| **4** | 118 66334 | KU 785 8 |
| **6** | KU 675 1 | KU 786 6 |
| **8** | 118 66336 | |
| **10** | KU 847 6 | KU 787 4 |
| **13** | | KU 888 0 |
| **16** | KU 848 4 | KU 788 2 |
| **20** | KU 849 2 | KU 789 0 |
| **25** | KU 850 0 | KU 790 8 |
| **32** | KU 851 8 | KU 791 6 |
| **40** | KU 852 6 | KU 792 4 |
| **50** | KU 854 2 | KU 793 2 |
| **63** | KU 855 9 | KU 794 0 |
| **4P - S 284 type** | | |
| **0.5** | KU 540 7 | KU 795 7 |
| **1** | KU 541 5 | KU 796 5 |
| **1.6** | KU 542 3 | KU 797 3 |
| **2** | KU 543 1 | KU 798 1 |
| **3** | KU 544 9 | KU 799 9 |
| **4** | KU 545 6 | KU 800 5 |
| **6** | KU 876 5 | KU 801 3 |
| **10** | KU 877 3 | KU 802 1 |
| **13** | KU 883 1 | KU 889 8 |
| **16** | KU 878 1 | KU 803 9 |
| **20** | KU 879 9 | KU 804 7 |
| **25** | KU 880 7 | KU 805 4 |
| **32** | KU 881 5 | KU 806 2 |
| **40** | KU 882 3 | KU 807 0 |
| **50** | KU 884 9 | KU 808 8 |
| **63** | KU 885 6 | KU 809 6 |

## Rated breaking capacity in d.c.

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5…2** | 1 | 60 | 15 | 15 |
| **16…40** | 2 | 125 | 15 | 15 |

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **3-4-6-8-10-50-63** | 1 | 60 | 10 | 10 |
| | 2 | 125 | 10 | 10 |

## R.I.Na. approval

S 282 and S 283 types with K characteristic with rated currents from 0.5 to 63 A have obtained R.I.Na, Lloyd's Register, Det Norske Veritas, Bureau Veritas approval for use at the following voltages:
- S 282 (60 V d.c./230-440 V a.c.)
- S 283 (230-440 V a.c.)

# S 2.. range
## S 280 UC series


| Rated currents | Code | | | |
|---|---|---|---|---|
| In [A] | Characteristics B | C | K | Z |
| **1P - S 281 UC type** | | | | |
| **0.5** | | EF 720 6 | EF 752 9 | EF 784 2 |
| **1** | | EF 721 4 | EF 753 7 | EF 785 9 |
| **1.6** | | EF 722 2 | EF 754 5 | EF 786 7 |
| **2** | | EF 723 0 | EF 755 2 | EF 787 5 |
| **3** | | EF 724 8 | EF 756 0 | EF 788 3 |
| **4** | | EF 725 5 | EF 757 8 | EF 789 1 |
| **6** | EF 690 1 | EF 726 3 | EF 758 6 | EF 790 9 |
| **8** | EF 691 9 | EF 727 1 | EF 759 4 | EF 791 7 |
| **10** | EF 692 7 | EF 728 9 | EF 760 2 | EF 792 5 |
| **16** | EF 693 5 | EF 729 7 | EF 761 0 | EF 793 3 |
| **20** | EF 694 3 | EF 730 5 | EF 762 8 | EF 794 1 |
| **25** | EF 695 0 | EF 731 3 | EF 763 6 | EF 795 8 |
| **32** | EF 696 8 | EF 732 1 | EF 764 4 | EF 796 6 |
| **40** | EF 697 6 | EF 733 9 | EF 765 1 | EF 797 4 |
| **50** | EF 698 4 | EF 734 7 | EF 766 9 | EF 798 2 |
| **63** | EF 699 2 | EF 735 4 | EF 767 7 | EF 799 0 |

**Tripping characteristics (defined in a.c.*)**

B (Im=3…5 In); C (Im=5…10 In)

K (Im=8…14 In); Z (Im=2…3 In)

**Application: industrial**

**Connections for UNIFIX available**

### Rated breaking capacity in a.c.

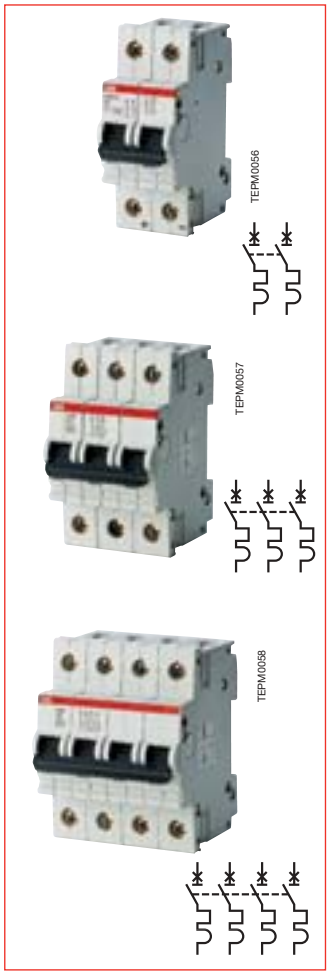
acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5…40** | 1 | 127 | 50 | 50 |
| | | 230 | 12.5 | 12.5 |
| | 2 | 230 | 25 | 25 |
| | | 400 | 12.5 | 12.5 |
| **50…63** | 1 | 127 | 20 | 20 |
| | | 230 | 12.5 | 12.5 |
| | 2 | 230 | 10 | 10 |
| | | 400 | 4.5 | 4.5 |

* For time/current curve in d.c. see chap. 2

# S 2.. range
## Serie S 280 UC






| Rated currents In [A] | Code Characteristics B | C | K | Z |
|---|---|---|---|---|
| **2P - S 282 UC type** | | | | |
| **0.5** | | EF 736 2 | EF 768 5 | EF 810 5 |
| **1** | | EF 737 0 | EF 769 3 | EF 811 3 |
| **1.6** | | EF 738 8 | EF 770 1 | EF 812 1 |
| **2** | | EF 739 6 | EF 771 9 | EF 813 9 |
| **3** | | EF 740 4 | EF 772 7 | EF 814 7 |
| **4** | | EF 741 2 | EF 773 5 | EF 815 4 |
| **6** | EF 710 7 | EF 742 0 | EF 774 3 | EF 816 2 |
| **8** | EF 711 5 | EF 743 8 | EF 775 0 | EF 817 0 |
| **10** | EF 712 3 | EF 744 6 | EF 776 8 | EF 818 8 |
| **16** | EF 713 1 | EF 745 3 | EF 777 6 | EF 819 6 |
| **20** | EF 714 9 | EF 746 1 | EF 778 4 | EF 820 4 |
| **25** | EF 715 6 | EF 747 9 | EF 779 2 | EF 821 2 |
| **32** | EF 716 4 | EF 748 7 | EF 780 0 | EF 822 0 |
| **40** | EF 717 2 | EF 749 5 | EF 781 8 | EF 823 8 |
| **50** | EF 718 0 | EF 750 3 | EF 782 6 | EF 824 6 |
| **63** | EF 719 8 | EF 751 1 | EF 783 4 | EF 825 3 |
| **3P - S 283 UC type** | | | | |
| **0.5...4** | | on request | on request | on request |
| **6...63** | on request | on request | on request | on request |
| **4P - S 284 UC type** | | | | |
| **0.5...4** | | on request | on request | on request |
| **6...63** | on request | on request | on request | on request |

### Rated breaking capacity in d.c.

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.5...40** | 1 | 60 | 10 | 10 |
| | | 110 | 10 | 10 |
| | | 220 | 6 | 6 |
| | 2 | 60 | 10 | 10 |
| | | 110 | 10 | 10 |
| | | 220 | 10 | 10 |
| | | 440 | 6 | 6 |
| **50...63** | 1 | 60 | 6 | 6 |
| | | 110 | 6 | 6 |
| | | 220 | 4.5 | 4.5 |
| | 2 | 60 | 10 | 10 |
| | | 110 | 6 | 6 |
| | | 220 | 6 | 6 |
| | | 440 | 4.5 | 4.5 |

### R.I.Na. approval

S 282 UC type with B-C-K-Z characteristics has obtained R.I.Na, Lloyd's Register, Det Norske Veritas and Bureau Veritas approval for naval application at voltages 230 V d.c./230 V a.c.
S 282 UC type with Z characteristic with currents from 4 to 40 A has obtained R.I.Na approval for naval application at voltages 60 and 250 V d.c.

# S 2.. range

## M 280 magnetic only series



| Rated currents In [A] | I magn [A] | Code |
|---|---|---|
| **1P - M 281 type** | | |
| 0.5 | 7 | KU 470 7 |
| 1 | 14 | KU 471 5 |
| 1.6 | 23 | KU 472 3 |
| 2.5 | 32 | KU 473 1 |
| 4 | 56 | KU 474 9 |
| 6.3 | 88 | KU 475 6 |
| 10 | 140 | KU 476 4 |
| 12.5 | 175 | KU 477 2 |
| 16 | 192 | KU 478 0 |
| 20 | 240 | KU 479 8 |
| 25 | 300 | KU 480 6 |
| 32 | 384 | KU 481 4 |
| 40 | 480 | KU 482 2 |
| 50 | 600 | KU 483 0 |
| 63 | 700 | KU 484 8 |


| | | |
|---|---|---|
| **2P - M 282 type** | | |
| 0.5 | 7 | KU 602 5 |
| 1 | 14 | KU 603 3 |
| 1.6 | 23 | KU 604 1 |
| 2.5 | 32 | KU 605 8 |
| 4 | 56 | KU 606 6 |
| 6.3 | 88 | KU 607 4 |
| 10 | 140 | KU 608 2 |
| 12.5 | 175 | KU 609 0 |
| 16 | 192 | KU 610 8 |
| 20 | 240 | KU 611 6 |
| 25 | 300 | KU 612 4 |
| 32 | 384 | KU 613 2 |
| 40 | 480 | KU 614 0 |
| 50 | 600 | KU 615 7 |
| 63 | 700 | KU 616 5 |

### Application

Protection against short-circuit overcurrents in the supply circuits of motors. For protection against overload currents, additional thermal protection is necessary.

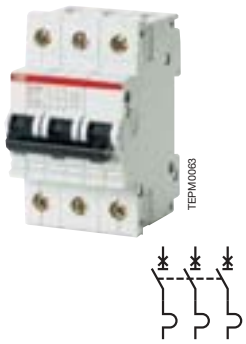
### Connections for UNIFIX available

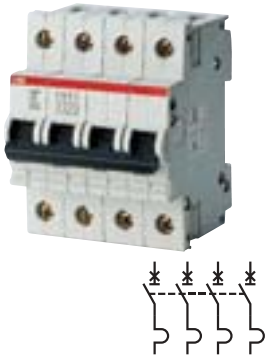
### RCD blocks

DDA 63 A

# S 2.. range

## M 280 magnetic only series



| Rated currents In [A] | I magn [A] | Code |
|---|---|---|
| **3P - M 283 type** | | |
| **0.5** | **7** | KU 617 3 |
| **1** | **14** | KU 618 1 |
| **1.6** | **23** | KU 619 9 |
| **2.5** | **32** | KU 620 7 |
| **4** | **56** | KU 621 5 |
| **6.3** | **88** | KU 622 3 |
| **10** | **140** | KU 623 1 |
| **12.5** | **175** | KU 624 9 |
| **16** | **192** | KU 625 6 |
| **20** | **240** | KU 626 4 |
| **25** | **300** | KU 627 2 |
| **32** | **384** | KU 628 0 |
| **40** | **480** | KU 629 8 |
| **50** | **600** | KU 630 6 |
| **63** | **700** | KU 631 4 |
| **4P - M 284 type** | | |
| **0.5** | **7** | KU 632 2 |
| **1** | **14** | KU 633 0 |
| **1.6** | **23** | KU 634 8 |
| **2.5** | **32** | KU 635 5 |
| **4** | **56** | KU 636 3 |
| **6.3** | **88** | KU 637 1 |
| **10** | **140** | KU 638 9 |
| **12.5** | **175** | KU 639 7 |
| **16** | **192** | KU 640 5 |
| **20** | **240** | KU 641 3 |
| **25** | **300** | KU 642 1 |
| **32** | **384** | KU 643 9 |
| **40** | **480** | KU 644 7 |
| **50** | **600** | KU 645 4 |
| **63** | **700** | KU 646 2 |

### Rated breaking capacity in a.c.

acc. to IEC EN 60947.2

| In [A] | poles | [V] | Icu [kA] | Ics [%] |
|---|---|---|---|---|
| **0.5…1.6 - 10…25** | 3, 4 | 230 | 40 | 75 |
| **2.5…6.3 - 50…63** | 3, 4 | 230 | 25 | 75 |
| **32…40** | 3, 4 | 230 | 30 | 75 |
| **0.5…1.6 - 10…25** | 3, 4 | 400 | 25 | 50 |
| **2.5…6.3 - 50…63** | 3, 4 | 400 | 15 | 50 |
| **32…40** | 3, 4 | 400 | 20 | 50 |

# S 2.. range
## Auxiliary elements

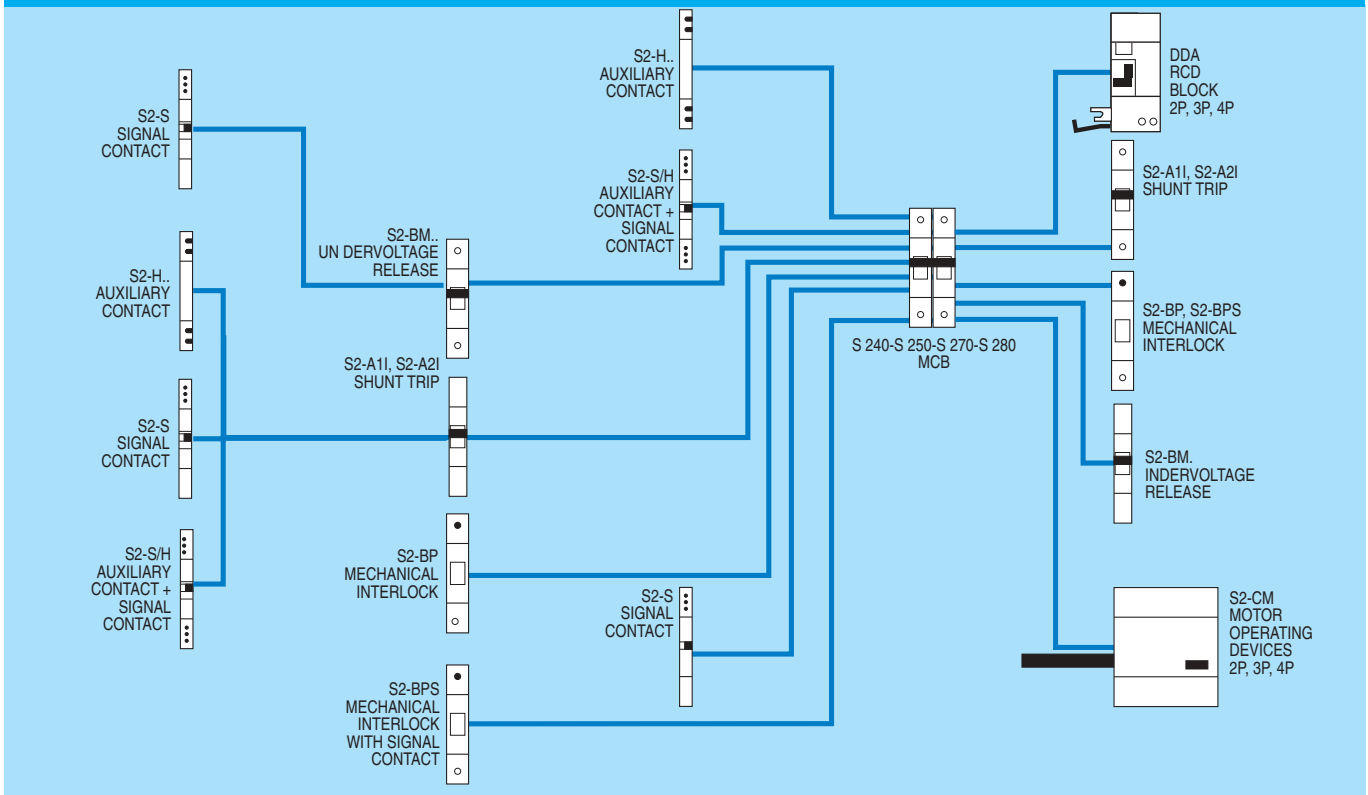

The S 2.. range circuit-breakers are supported by a whole group of auxiliary elements with many functions and configurations.

Shunt trips, undervoltage releases, auxiliary contacts, signal contacts, mechanical interlocks and motor operating devices are available.

Each auxiliary element has been studied so that it can be installed on the highest possible number of circuit-breakers thus simplifying selection for the sector operators.

A wide range of auxiliary elements considerably improves the performance of the circuit-breakers and enables innovative and integrated solutions to be used in every installation.

**Examples of combinations of S 240, S 250, S 270 and S 280 series circuit-breakers with auxiliary elements (maximum configurations)**



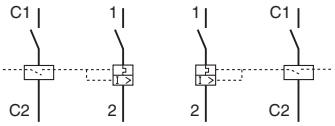

## Shunt trips

These are used for remote tripping of the circuit-breakers. If an auxiliary contact or signal contact is also required, they must be installed to the left of the shunt trips.

A TM30 transformer can be used to supply five 12 V a.c. S2-A1 shunt trips (TM30/12) and three 24 V a.c. S2-A1 shunt trips (TM30/24).

| Code | Type | Description |
|---|---|---|
| **For use with S 240, S 250, S 270, S 280, S 280 UC, DS 640, DS 650, DS 670, DS 850 series** | | |
| **KU 918 5** | S2-A1 I | 12-60 V a.c./d.c. shunt trip |
| **KU 919 3** | S2-A2 I | 110-415 V a.c. and 110-250 V d.c. shunt trip |

**S2-A1 I,**
**S2-A2 I**

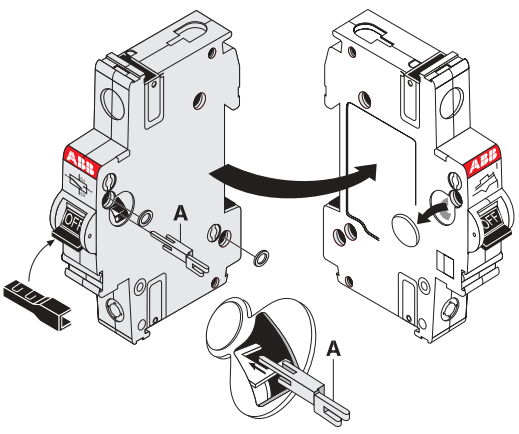


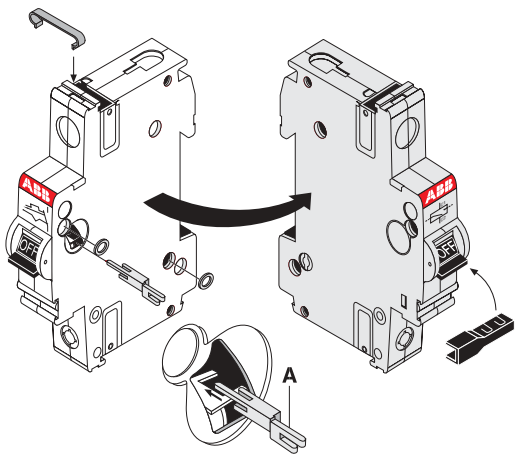

Installation on left or right side

OEPM0015

### Technical characteristics

| Type | | S2-A1 I | S2-A2 I |
|---|---|---|---|
| **Rated voltage** | [V] | | |
| | a.c. | 12 - 60 | 110 - 415 |
| | d.c. | 12 - 60 | 110 - 250 |
| **Max. release duration** | [ms] | <10 | <10 |
| **Min. release voltage** | [V] | | |
| | a.c. | 7 | 55 |
| | d.c. | 10 | 80 |
| **Consumption on release** | [VA] | | |
| | 12 V a.c. | 35 | |
| | 12 V d.c. | 30 | |
| | 24 V a.c. | 140 | |
| | 24 V d.c. | 100 | |
| | 48 V a.c. | 600 | |
| | 48 V d.c. | 330 | |
| | 110 V a.c. | | 40 |
| | 110 V d.c. | | 40 |
| | 220 V a.c. | | 180 |
| | 220 V d.c. | | 170 |
| **Coil resistance** | [Ω] | 3.7 | 225 |
| **Terminals** | [mm²] | 25 | 25 |
| **Tightening torque** | [Nm] | 2 | 2 |
| **Dimens.(WxDxH)** | [mm] | 17.5x68x90 | 17.5x68x90 |




OEPM0290

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## Auxiliary/signal contacts

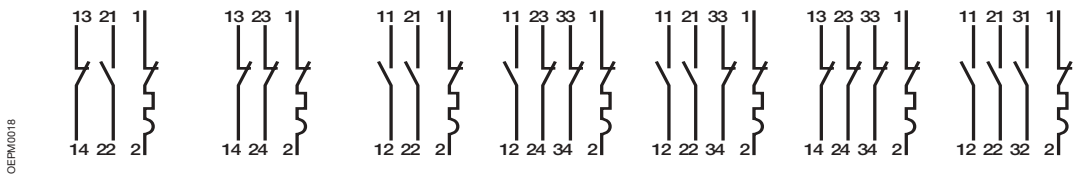
The auxiliary contact indicates the position of the circuit-breaker contacts. When the position of the contacts changes, whether manually or automatically, it indicates their status.
The signal contact indicates the position of the circuit-breaker after automatic release of the circuit-breaker caused by overload or short-circuit. For manual operation, it does not trip.

**Legend**

S2-H = auxiliary contact
S2-S = signal contact
S2-SH = auxiliary + signal contact
❶ = signal contact (1 change over contact)
❷ = auxiliary + signal contact (2 change over contacts)

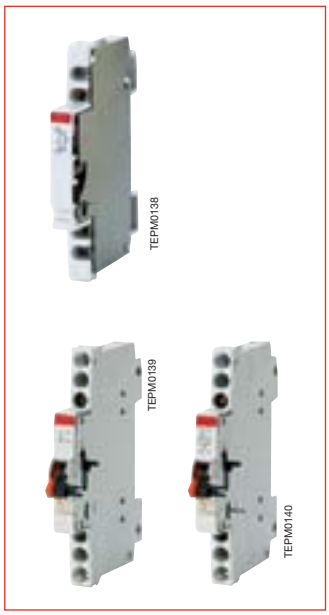
### Technical characteristics

| Type | | S2-H11 I<br>S2-H11 X | S2-H20 I<br>S2-H20 X | S2-H02 I<br>S2-H02 X | S2-H21 | S2-H12 | S2-H30 | S2-H03 |
|---|---|---|---|---|---|---|---|---|
| **Description** | | 1NO+1NC | 2NO | 2NC | 2NO+1NC | 1NO+2NC | 3NO | 3NC |
| **Alternating** | Ue [V] | | | | 240 415 | | | |
| **current** | Ie [A] | | | | 6 2 | | | |
| **Direct** | Ue [V] | | | 24 | 60 110 | 250 | | |
| **current** | Ie [A] | | | 4 | 2 1.5 | 1 | | |
| **Min.operating voltage** | [V] | 12 a.c.-12 d.c. | | | | | | |
| **Min. operating current** | [mA] | 12 | | | | | | |
| **Terminals** | [mm²] | up to 2x1.5 | | | | | | |
| **Dielectric strength** | [kV] | 3 | | | | | | |
| **Resistance to short-circuit at 240 V a.c.** | [A] | 1000 (protected with S 2 breaker characteristic K - 6 A) | | | | | | |
| **Impulse voltage withstand capacity** | [kV] | 4 | | | | | | |
| **Tightening torque** | [Nm] | 0.7 | | | | | | |
| **Dimensions (WxDxH)** | [mm] | 8.75x68x90 | | | | | | |



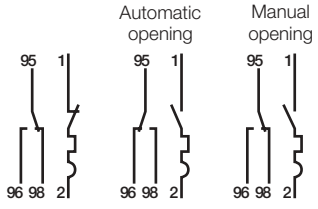

OEPM0018

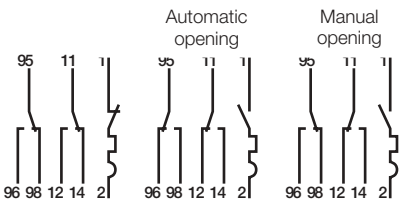
**NB:** the auxiliary contacts S2-H11 X, S2-H20 X, S2-H02 X differ from the contacts S2-H11, S2-H20, S2-H02 in that they do not have a terminal to tighten the cable which is replaced by a bayonet for the Faston connection.




| Code | Type | Description |
|---|---|---|
| **For use with S 240, S 250, S 270, S 280, S 280 UC, DS 640, DS 650, DS 670, DS 850 series** | | |
| **KU 925 0** | S2-H11 I | auxiliary contact 1NO+1NC (1/2 module) |
| **KU 926 8** | S2-H02 I | auxiliary contact 2NC (1/2 module) |
| **KU 927 6** | S2-H 20 I | auxiliary contact 2NO (1/2 module) |
| **KU 897 1** | S2-H11X | auxiliary contact 1NO+ 1NC (1/2 module) with Faston connections |
| **KU 899 7** | S2-H20X | auxiliary contact 2NO (1/2 module) with Faston connections |
| **KU 898 9** | S2-H02X | auxiliary contact 2NC (1/2 module) with Faston connections |
| **KU 891 4** | S2-H21 | auxiliary contact 2NO+1NC (1/2 module) |
| **KU 890 6** | S2-H12 | auxiliary contact 1NO+2NC (1/2 module) |
| **KU 893 0** | S2-H30 | auxiliary contact 3NO (1/2 module) |
| **KU 892 2** | S2-H03 | auxiliary contact 3NC (1/2 module) |
| **KU 903 7** | S2-S | signal contact (1/2 module) |
| **KU 902 9** | S2-S/H | signal contact + auxiliary contacts (1/2 module) |

| S2-S | | | | S2-SH |
|---|---|---|---|---|
| ❶ | | | | ❷ |
| | | 240 | 415 | |
| | | 6 | 2 | |
| | 250 | 110 | 60 | 24 |
| | 0.5 | 1 | 1 | 4 |
| 12 a.c.-12 d.c. | | | | |
| 12 | | | | |
| up to 2x1.5 | | | | |
| 3 | | | | |
| 1000 (protected with S 2 breaker characteristic K - 6 A) | | | | |
| 4 | | | | |
| 0.7 | | | | |
| 8.75x68x90 | | | | |

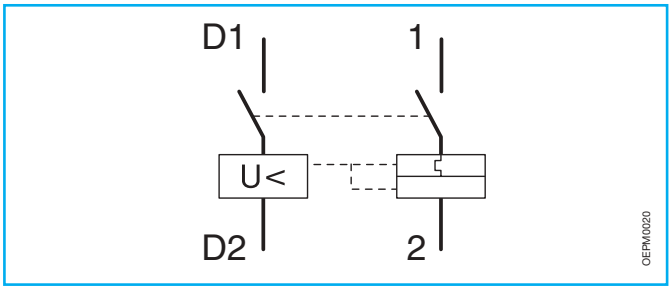



## Undervoltage releases

These are used to protect the load in the event of a voltage drop (between 70% and 35% of its rated value) and/or to effect a positive safety emergency stop. If used for an emergency stop, they cause undesirable tripping also for temporary microinterruptions of the voltage for a few dozen milliseconds. ABB has also developed DDA AE blocks which perform the residual current function and the positive safety emergency stop without use of an auxiliary energy source (battery) and auxiliary circuits. The DDA AE blocks perform the functions of a shunt trip but without the disadvantages of an undesirable release.

| Code | Type | Description |
|---|---|---|
| **For use with S 240, S 250, S 270, S 280, S 280 UC, DS 640, DS 650, DS 670, DS 850 series** | | |
| **KU 912 8** | S2-BM1 | 12 V d.c. undervoltage release (1 module) |
| **KU 913 6** | S2-BM2 | 24 V a.c. and d.c. undervoltage release (1 module) |
| **KU 914 4** | S2-BM3 | 48 V a.c. and d.c. undervoltage release (1 module) |
| **KU 915 1** | S2-BM4 | 110 V a.c. and d.c. undervoltage release (1 module) |
| **KU 916 9** | S2-BM5 | 220 V a.c. and d.c. undervoltage release (1 module) |
| **KU 917 7** | S2-BM6 | 380 V a.c. undervoltage release (1 module) |




### Technical characteristics

| Type | | S2-BM1 | S2-BM2 | S2-BM3 | S2-BM4 | S2-BM5 | S2-BM6 |
|---|---|---|---|---|---|---|---|
| **Standards** | | VDE0660 part I - IEC EN 60947.1 | | | | | |
| **Rated** | [V] a.c. | - | 24 | 48 | 110 | 220-240 | 380 |
| **voltage** | [V] d.c. | 12 | 24 | 48 | 110 | 220 | - |
| **Frequency** | [Hz] | 50...60 | | | | | |
| **Release trip** | [V] | 0.35 Un≤V≤0.7 Un | | | | | |
| **Terminals** | [mm²] | 2 x 1.5 | | | | | |
| **Consumption** | [mA] | 10 | | | | | |
| **Resistance to corrosion** | [°C/RH] | const. climatic cond.: 23/83-40/93-55/20; var. climatic cond.: 25/95-40/93 | | | | | |
| **Protection degree** | | IPXXB/IP2X | | | | | |
| **Tightening torque** | [Nm] | 0.4 | | | | | |
| **Dimensions (WxDxH)** | [mm] | 17.5x68x90 | | | | | |



## Mechanical interlocks

Auxiliary element for MCBs and RCBOs. It automatically releases the relative circuit-breaker when the panel of the electric switchboard is opened or removed. The release is only mechanical and acts on the release elements of the circuit-breakers.

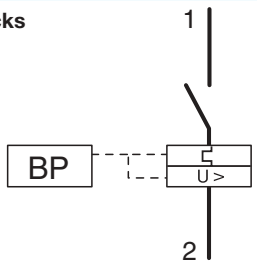
| Code | Type | Description |
|---|---|---|
| **For use with S 240, S 250, S 270, S 280, S 280 UC, DS 640, DS 650, DS 670, DS 850 series** | | |
| **EF 998 8** | S2-BP | mechanical interlock |

## Mechanical interlocks with signal contact

It automatically releases the relative circuit-breaker when the panel or the door of the electric switchboard is opened or removed and indicates that this has occurred by way of a contact.

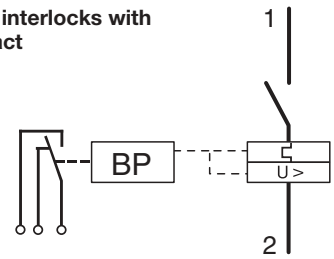
| Code | Type | Description |
|---|---|---|
| **For use with S 240, S 250, S 270, S 280, S 280 UC, DS 640, DS 650, DS 670, DS 850 series** | | |
| **EF 999 6** | S2-BPS | mechanical interlock with signal contact |

**Mechanical interlocks**




OEPM0021

**Mechanical interlocks with signal contact**




### Technical characteristics of mechanical interlock

| | | |
|---|---|---|
| **Dimensions (WxDxH)** | [mm] | 17.5x68x90 |

### Technical characteristics of mechanical interlock with signal contact

| | | |
|---|---|---|
| **Max. contact capacity at 250 V a.c.** | [In] | 8A ohmic<br>2A inductive |
| **Max. contact capacity at 24 V d.c.** | [In] | 4A ohmic<br>2A inductive |
| **Mechanical endurance** | | 4000 |
| **Operating temperature** | [°C] | -25...+80 |
| **Contact material** | | silver alloy, gold-plated |
| **Insulation voltage** | [V]<br>[V] | terminal/terminal:<br>1000<br>terminal/earth:<br>1500 |

1

## Motor operating devices

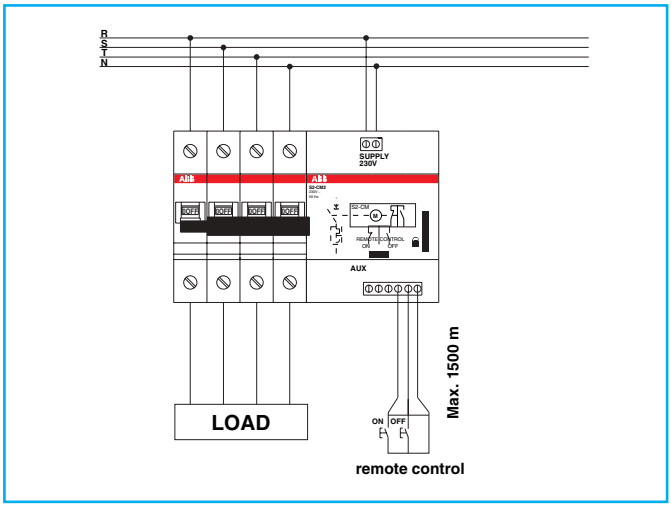
The S2-CM motor operating device allows remote activation of the opening and closing of all S 240, S 250, S 270 and S 280 series circuit-breakers with rated currents up to 63 A.

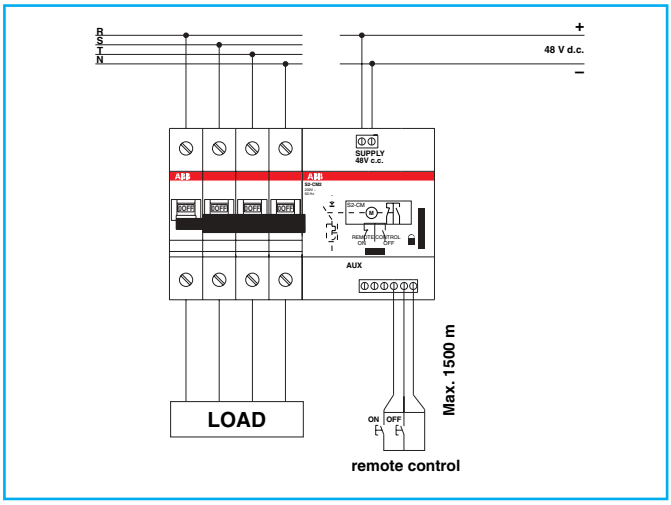
The motor operating device is activated by a pulsing or maintained electrical command. It can be activated locally (manually) using the toggle on the breaker. On the front of the device is the selector which can be used to switch off remote control, and the device for padlocking the toggle in the OFF position (with remote control ON/OFF selector in the OFF position).

The device also has an internal load reserve, which guarantees completion of the opening and closing cycle even in the absence of voltage in the supply circuit.

### Technical characteristics

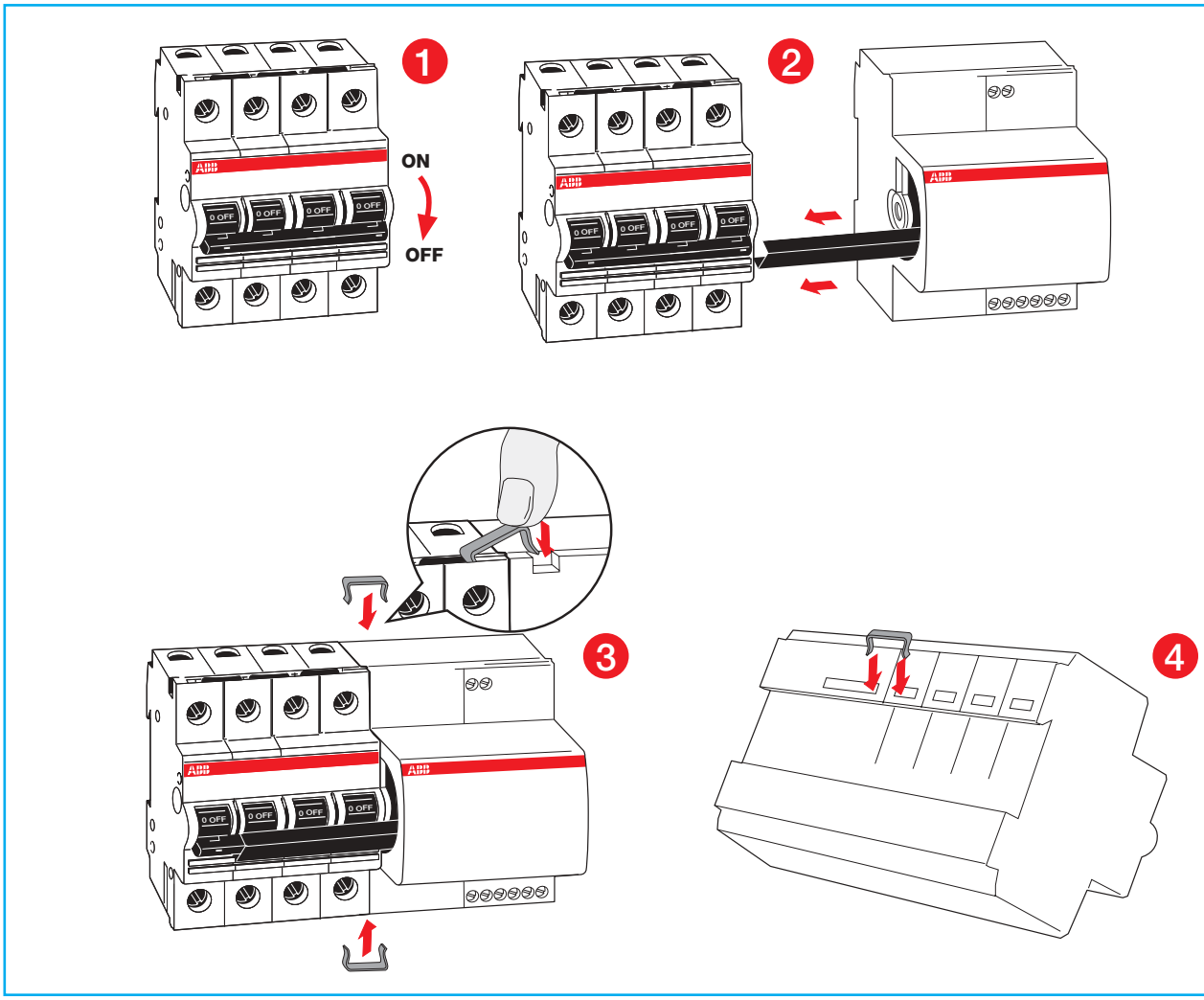
| | | |
|---|---|---|
| **Power supply** | [V] | |
| S2-CM | | a.c. 230 +10% –15% (50-60 Hz) |
| S2-CM 48 | | d.c. 48 +20% –20% |
| **Absorbed power** | [W] | |
| S2-CM | | ≤ 4 |
| S2-CM 48 | | ≤ 9 |
| **Operating frequency** | | ≤ 120 operations/h |
| **Number of mechanical operations** | | 10.000 |
| **Remote control** | | using voltage-free contacts |
| **Operating temperature** | [°C] | –20…+55 |
| **Opening time at ambient temperature** | [sec.] | 0.5 |
| **Closing time at ambient temperature** | [sec.] | ≤ 1 |
| **Control circuit cable length** | [m] | ≤ 1.500 |
| **Cable cross-section** | [mm²] | ≤ 2.5 |
| **Protection degree** | | IP2X - IP4X excluding terminals zone |
| **Auxiliary contact (terminals 1-2-3)** | | 1 NO + 1 NC (change over) |
| **Rated current** | | 5 A (250 V a.c.) inductive ohmic load<br>0.5 A (250 V a.c.) Incandescent bulb load |
| **Control terminals** | | terminal 4 = closing contact<br>terminal 5 = opening contact<br>terminal 6 = shared for control contacts |



| Code | Type | Description |
|---|---|---|
| **230 V a.c. motor operating device** | | |
| **KU 936 7** | S2-CM2 | for two-pole circuit-breaker |
| **KU 937 5** | S2-CM3 | for three-pole circuit-breaker |
| **KU 938 3** | S2-CM4 | for four-pole circuit-breaker |
| **48 V d.c. motor operating device** | | |
| **on request** | S2-CM2 48 V d.c. | for two-pole circuit-breaker |
| **on request** | S2-CM3 48 V d.c. | for three-pole circuit-breaker |
| **on request** | S2-CM4 48 V d.c. | for four-pole circuit-breaker |





# S 2.. range
## Accessories


The S 2.. range has a varied and comprehensive group of accessories which can quickly and easily resolve even the smallest of installation problems and effect functional and safe installations in the best possible way.

**Terminal cover:** enables wall mounting of MCBs and RCDs (wall-mounting consumer units with 2/4/6/8 module capacity for installation of single circuit-breakers).

**Spacer - false pole:** completes a line of modular circuit-breakers in switchboards and consumer units, with projecting elements with the same profile as the S 2.. range circuit-breakers (making the front of the circuit-breakers uniform).

**Mechanical lock:** blocks the circuit-breaker knob.

**END clamp:** laterally blocks the circuit-breakers on the DIN rail.

**Flange for rear board mounting:** mounts the circuit-breaker on the door or front panel of switchboards.

**One-pole withdrawable kit:** makes the circuit-breaker extractable. It is installed horizontally or vertically onto the DIN rail.

**Screw protection cover:** insulates and seals the terminal screws so that they are inaccessible and raises the protection degree to IP40.

**Block for rotary operation:** transforms operating of the circuit-breaker knob into rotary operation.

**Motor operating device:** activates the opening/closing command of S 2.. two-pole, three-pole and four-pole MCBs.

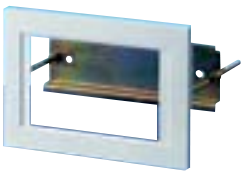
**Connection busbars:** enable parallel power supply of several circuit-breakers with the same number of poles.

**FP2 spacer – false pole + SFP support**

**Support for SFP spacer - false pole**

**Mechanical block BSA1**

**Padlock BSA2**



**Flange for rear board fixing ME4**

**Terminal S2-MP2**

| Code | Type | Description |
|---|---|---|
| **For use with S 240, S 250, S 270, S 280, DS 640, DS 650, DS 670, DS 850 series** | | |
| **EB 176 5** | FP1 | spacer - false pole - 1 module |
| **EB 177 3** | FP2 | spacer - false pole - 2 modules |
| **EB 178 1** | FP4 | spacer - false pole - 4 modules |
| **EB 179 9** | FP6 | spacer - false pole - 6 modules |
| **EB 183 1** | SFP | support for FP spacer - false pole |
| The SFP support is necessary for spacer-false pole installation on DIN rail | | |
| **EA 214 5** | BSA1 | mechanical block |
| **EA 213 7** | BSA2 | padlock for BSA1 |
| **EA 215 2** | END CLAMP | clamp for DIN rail |
| **KU 930 0** | ME1 | flange for rear board fixing 1 module - IP40 |
| **KU 931 8** | ME2 | flange for rear board fixing 2 modules - IP40 |
| **KU 932 6** | ME3 | flange for rear board fixing 3 modules - IP40 |
| **KU 933 4** | ME4 | flange for rear board fixing 4 modules - IP40 |
| **KU 934 2** | ME6 | flange for rear board fixing 6 modules - IP40 |
| **KU 935 9** | ME8 | flange for rear board fixing 8 modules - IP40 |
| **KU 939 1** | S2-MP2 | rear terminal for rear board fixing 25mm$^2$ for S 2 |

# S 2.. range
## Accessories

CPV2

S2-EST

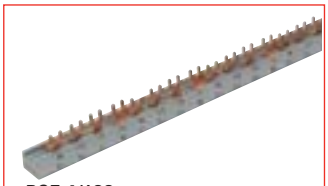
ST label carrier

OHY 2AJ

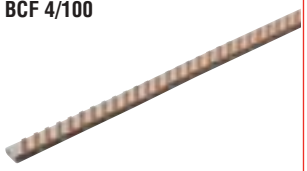
OSX 5X

S2-DH

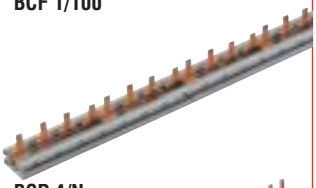
| Code | Type | Description |
|---|---|---|
| **KU 943 3** | CPV2 | sealable screw protection cover for S 2.. circuit-breakers |
| **KU 922 7** | S2-EST | withdrawable kit for S 2.. circuit-breakers up to 32 A |
| **EP 742 9** | ST | label carrier |
| **EP 743 7** | ST-E | neutral labels |
| **KU 894 8** | S2-DH | block for rotary operation for S 2.. circuit-breakers |
| **EO 010 2** | OHB 2AJ | OHB 2AJ handle for rotary operation block, black, padlockable IP65 |
| **EO 011 0** | OHY 2AJ | handle for rotary operation block, red/yellow, padlock possible, IP65 |
| **EO 071 4** | OXS 5X 85 | shaft for rotary operation 85 mm long |
| **EO 066 4** | OXS 5X 105 | shaft for rotary operation 105 mm long |
| **EO 067 2** | OXS 5X 120 | shaft for rotary operation 120 mm long |
| **EO 068 0** | OXS 5X 130 | shaft for rotary operation 130 mm long |
| **EO 109 2** | OXS 5X 160 | shaft for rotary operation 160 mm long |
| **EO 069 8** | OXS 5X 180 | shaft for rotary operation 180 mm long |
| **EO 110 0** | OXS 5X 250 | shaft for rotary operation 250 mm long |
| **EO 070 6** | OXS 5X 330 | shaft for rotary operation block 330 mm long |



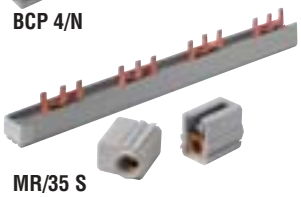
BCF 4/100



BCF 1/100



BCP 4/N



MR/35 S

| Code | Type | Description |
|---|---|---|
| **Insulated busbars (1 m long- max. 56 poles) - fork type** | | |
| **EA 643 5** | BCF 1/100 | for one-pole circuit-breaker |
| **EA 644 3** | BCF 1H/100 | for one-pole circuit-breaker with auxiliary contact |
| **EA 645 0** | BCF 2/100 | for two-pole circuit-breaker |
| **EA 646 8** | BCF 3/100 | for three-pole circuit-breaker |
| **EA 647 6** | BCF 4/100 | for four-pole circuit-breaker |
| **EA 648 4** | EK-C-2+3 | lateral end cover for busbars BCF 2/100 and BCF 3/100 |
| **EA 649 2** | EK-C-4 | lateral end cover for busbars BCF 4/100 |
| **Insulated busbars (1 m long - max. 56 poles) - pin type** | | |
| **EA 650 0** | BCP 1/100 | for one-pole circuit-breaker |
| **EA 524 7** | BCP 2/N | for two-pole circuit-breaker |
| **EA 525 4** | BCP 3/N | for three-pole circuit-breaker |
| **EA 526 2** | BCP 4/N | for four-pole circuit-breaker |
| **EA 549 4** | EK-SBS 2 | lateral end cover for busbars BCP 2/N |
| **EA 550 2** | EK-SBS 4 | lateral end cover for busbars BCP 3/N-4/N |
| **EA 546 0** | MR/35 S | terminal for supply cable for busbars BCF/N and BCP/N |
| **Depth adapters** | | |
| **EA 450 5** | S2-AD160 | adapter for aligning S2 range circuit-breakers with S 500 range circuit-breakers |

The S 290 range of circuit-breakers enables the use in switchboards and consumer units for modular devices with 45 mm slotting and rated currents up to 125 A.

They can be mounted alongside standard modular circuit-breakers because of their modular design and ability to be installed on 35 mm DIN EN 50022 rails.

The S 290 range circuit-breakers are available in 1-2-3-4 pole versions with a width equal to 1 1/2 modules per pole (27 mm).

The time-current characteristics available are C and D, as normally required for circuit-breakers which are used for main switchboard functions or are however installed upstream of other MCBs.

The fact that these devices fully comply with the IEC 898/EN 60898 Standards means that they can be used by untrained staff, as sometimes required for circuit-breakers with these rated currents.

The S 290 circuit-breakers have a series of special auxiliary elements which effect the normal functions required in modern installations (indication of tripping, remote release, etc).

TEPM01430


TEPM01428


TEPM01429

# S 290 range



## Contents

# S 290 range
## Technical characteristics

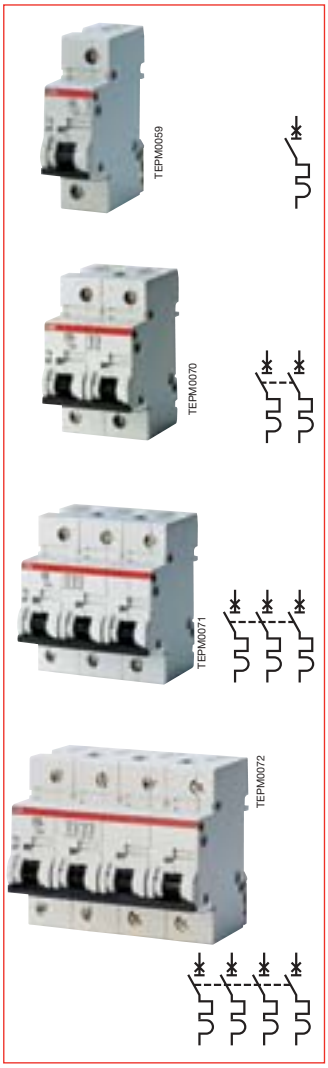


| | | | S 290 |
|---|---|---|---|
| **Standards** | | | IEC EN 60898, IEC EN 60947-2 |
| **Rated current In** | | [A] | 80≤In≤125 |
| **Poles** | | | 1P, 2P, 3P, 4P |
| **Rated voltage Ue** | 1P | [V] | 230 |
| | 2P, 3P, 4P | [V] | 230/400 |
| **Insulation voltage Ui** | | [V] | 500 |
| **Max. operating voltage** | a.c. | [V] | 440 |
| **Ub max.** | d.c. 1P | | 60 |
| | d.c. 2P | | 125 |
| **Min. operating voltage Ub min.** | | [V] | 12 V a.c.-12 V d.c. |
| **Rated frequency** | | [Hz] | 50…60 |
| **Rated breaking capacity IEC EN 60898** | Icn | [A] | 10000 |
| **Rated breaking capacity** | ultimate Icu | [kA] | 25 |
| **IEC EN 60947-2 2 poles - 230 V** | service Ics | [kA] | 20 |
| **Rated breaking capacity** | ultimate Icu | [kA] | 15 |
| **IEC EN 60947-2 3, 4 poles - 400 V** | service Ics | [kA] | 10 |
| **Voltage withstanding capacity impulse (1,2/50) Uimp** | | [kV] | 5 |
| **Dielectric test voltage at ind. freq. for 1 min** | | [kV] | 2.5 |
| **Thermomagnetic release characteristic** | B: 3 In≤Im≤5 In | | |
| | C: 5 In≤Im≤10 In | | n |
| | D: 10 In≤Im≤20 In | | n |
| | K: 8 In≤Im≤14 In | | |
| | Z: 2 In≤Im≤3 In | | |
| **Toggle** | | | black sealable in ON-OFF position |
| **Electrical life** | | | 10000 |
| **Mechanical life** | | | 20000 |
| **Protection degree** | housing | | IP4X |
| | terminals | | IP2X |
| **Mechanical shock resistance** | | | minimum 30 g - 2 shocks - duration 13 ms |
| **Resistance to vibrations acc. to DIN IEC 68-2-6** | | | 5 g - 20 cycles at frequency 5…150…5 Hz with load 0.8 In |
| **Tropicalization** | humid heat | [°C/RH] | 28 cycles with 55/95…100 |
| **acc. to DIN 40046 IEC 68-2** | const. climatic cond. | [°C/RH] | 23/83-40/93-55/20 |
| | var. climatic cond. | [°C/RH] | 25/95-40/95 |
| **Thermal releaser calibration temperature** | | [°C] | 30 |
| **Ambient temperature (with daily average ≤ +35°C)** | | [°C] | -25…+55 |
| **Storage temperature** | | [°C] | -40…+70 |
| **Terminal size upper/lower per cable** | | [mm²] | cage type 50/50 |
| **Tightening torque** | | [N*m] | 3.5 |
| **Mounting** | | | on rail EN 60715 (35 mm) by means of rapid fixing device |
| **Pole dimensions** | HxDxW | [mm] | 90x70x26.25 |
| **Pole weight** | | [g] | 200 |

# S 290 range

## S 291, S 292, S 293, S 294 series






| Rated currents In [A] | Code Characteristic C | D |
|---|---|---|
| **1P - S 291 type** | | |
| **80** | KU 950 8 | KU 974 8 |
| **100** | KU 951 6 | KU 975 5 |
| **125** | KU 952 4 | |
| **2P - S 292 type** | | |
| **80** | KU 953 2 | KU 977 1 |
| **100** | KU 954 0 | KU 978 9 |
| **125** | KU 955 7 | |
| **3P - S 293 type** | | |
| **80** | KU 956 5 | KU 980 5 |
| **100** | KU 957 3 | KU 981 3 |
| **125** | KU 958 1 | |
| **4P - S 294 type** | | |
| **80** | KU 959 9 | KU 983 9 |
| **100** | KU 960 7 | KU 984 7 |
| **125** | KU 961 5 | |

**Tripping characteristics**

C (Im=5…10 In); D (Im=10…20 In)

**Application: industrial**

**RCD blocks**

DDA 100 A only on C curve circuit-breakers

### Breaking capacity in a.c.

acc. to IEC EN 60898

| In [A] | poles | voltage [V] | Icn [kA] |
|---|---|---|---|
| **80…125** | All | 230/400 | 10 |

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icn [kA] | Ics [kA] |
|---|---|---|---|---|
| **80…125** | 1 | 230 | 15 | 10 |
| | 2 | 127 | 50 | 25 |
| | | 230 | 25 | 20 |
| | | 400 | 15 | 10 |
| | 3, 4 | 230 | 25 | 20 |
| | | 400 | 15 | 10 |

### Breaking capacity in d.c.

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icn [kA] | Ics [kA] |
|---|---|---|---|---|
| **80…125** | 1 | 60 | 15 | 15 |
| | 2 | 110 | 15 | 15 |

Note: the 100A DDA RCD blocks are suitable for assembly with the S 290 series MCBs with C characteristic and In≤100 A

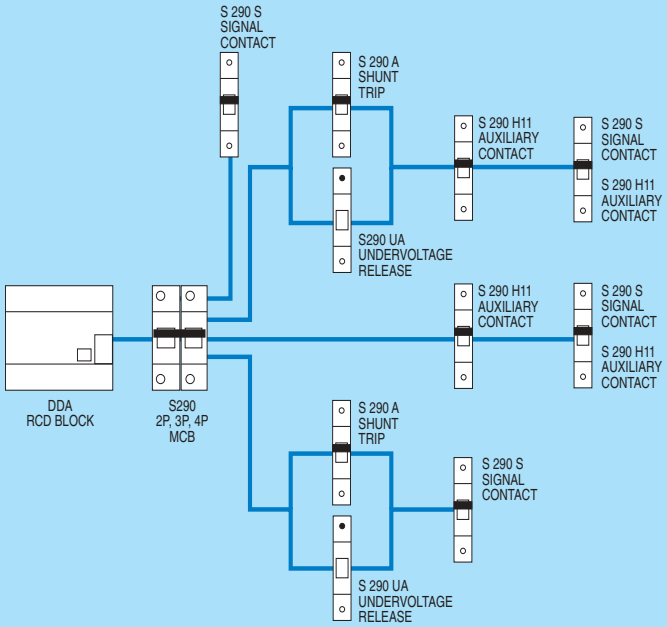
# S 290 range
## Auxiliary elements


The S 290 circuit-breakers are supplied with special shunt trips, undervoltage releases and contacts (auxiliary and signal).

All the accessories are installed to the right of the circuit-breaker. The left part is used for installing RCD blocks.

The procedures for accessorizing are shown in the figure.

**Examples of combinations of S 290 series circuit-breakers with auxiliary elements (maximum configurations)**



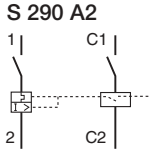


## Shunt trips

These are used for remote tripping of the circuit-breakers.

| Code | Type | Description |
|---|---|---|
| **For S 290 series** | | |
| **KU 989 6** | S290 A1 | 110-415 V a.c. and 110 V d.c. shunt trip |
| **KU 991 2** | S290 A2 | 24-48 V a.c./d.c. shunt trip |

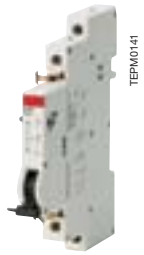
S 290 A1
S 290 A2




Installation only on right

## Technical characteristics

| Type | | S 290 A1 | S 290 A2 |
|---|---|---|---|
| **Rated voltage** | [V] a.c. | 110...415 | 24...48 |
| | d.c. | 110...250 | 24...48 |
| **Max. release duration** | [ms] | <10 | <10 |
| **Consumption on release** | [VA] a.c. | 20÷180 | 40÷200 |
| | d.c. | 20÷180 | 40÷200 |
| **Terminals** | [mm$^2$] | 25 | 25 |
| **Tightening torque** | [Nm] | 2 | 2 |
| **Dimensions (WxDxH)** | [mm] | 17.5x68x90 | 17.5x68x90 |

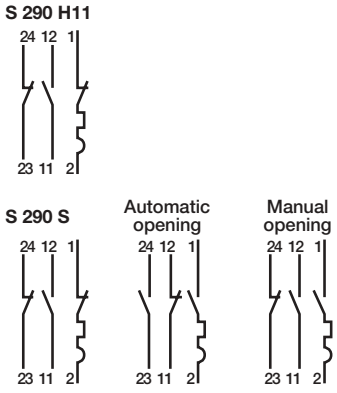




## Auxiliary/signal contacts

The auxiliary contact indicates the position of the circuit-breaker contacts. When the position of the contacts changes, whether manually or automatically, it indicates their status.
The signal contact indicates the position of the contact of the circuit-breaker after automatic release of the circuit-breaker caused by overload or short-circuit. For manual operation, it does not trip.
An auxiliary contact and a signal contact can be installed side by side on the same circuit-breaker.

| Code | Type | Description |
|---|---|---|
| **For S 290 series** | | |
| **KU 987 0** | S 290 H11 | auxiliary contact 1NO+1NC (1/2 module) |
| **KU 988 8** | S 290 S | signal contact (1/2 module) |



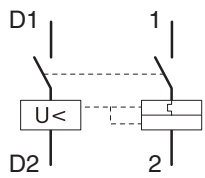

## Technical characteristics

| Type | | S290 H11<br>S290 S |
|---|---|---|
| **Description** | | 1NO+1NC |
| **Alternating** | Ue [V] | 230/400 |
| **current** | Ie [A] | 62 |
| **Direct** | Ue [V] | 24/60/110/220 |
| **current** | Ie [A] | 3/3/3/1 |
| **Min. operating voltage** | [V] | 12 a.c.-12 d.c. |
| **Min. operating current** | [mA] | 5 |
| **Terminals** | [mm$^2$] | 0.5x2.5 |
| **Dielectric strength** | [kV] | 3 |
| **Resistance to short-circuit at 240 V a.c.** | [A] | 1000 (protected with breaker char. K 6 A) |
| **Impulse voltage withstand capacity** | [kV] | 4 |
| **Tightening torque** | [Nm] | 1 |
| **Dimensions (WxDxH)** | [mm] | 8.75x68x90 |


## Undervoltage releases

These are used to protect the load in the event of a voltage drop (between 70% and 35% of its rated value) and/or to effect an emergency stop in positive safety.

| Code | Type | Description |
|---|---|---|
| **For S 290 series** | | |
| **KU 990 4** | S 290 UA 230 | 230 V a.c. undervoltage release (1 module) |





## Technical characteristics

| Type | | S 290-UA 230 |
|---|---|---|
| **Standards** | | VDE0660 part I - IEC EN 60947.1 |
| **Rated** | [V] a.c. | 230 |
| **voltage** | [V] d.c. | - |
| **Frequency** | [Hz] | 50...60 |
| **Release trip threshold** | [V] | 0.35 Un≤V≤0.7 Un |
| **Terminals** | [mm²] | 2x1.5 |
| **Consumption** | [mA] | 10 |
| **Resistance to corrosion** | [°C/RH] | constant atmosphere: 23/83-40/93-55/20; variable atmosphere: 25/95-40/93 |
| **Protection degree** | | IPXXB/IP2X |
| **Tightening torque** | [Nm] | 0.4 |
| **Dimensions (WxDxH)** | [mm] | 17.5x68x90 |

The S 500 circuit-breakers have a high breaking capacity which is obtained using the “double interruption” technique.

These circuit-breakers have a special movable fork contact which operates with two separate breaking chambers for each pole in the device.

This structure leads to a high energy limitation capacity and, consequently, a high breaking capacity.

Because of the tripping speed (less than 3 ms up to 50 kA), the S 500 breakers offer considerable protection to the standard modular circuit-breakers installed downstream.

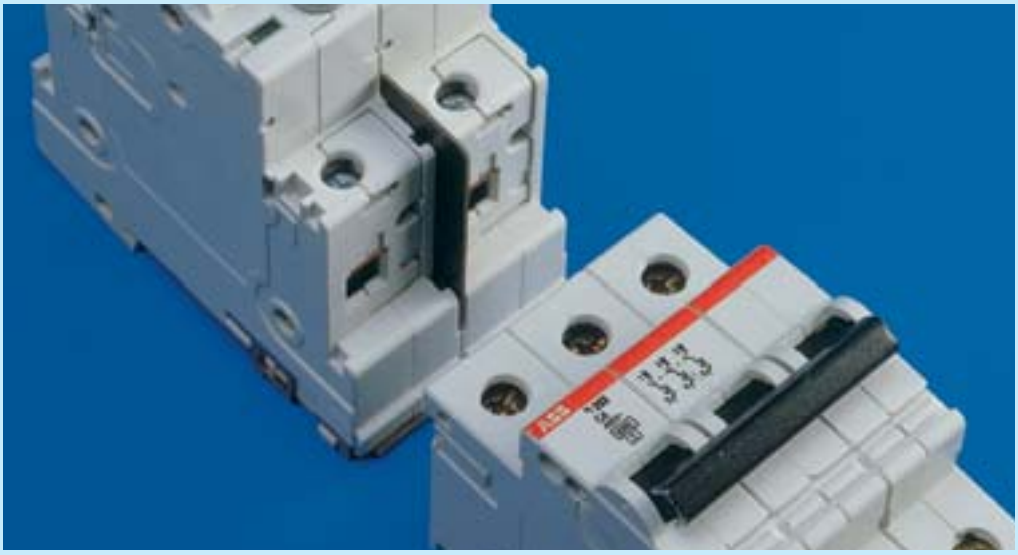
If they are installed downstream of moulded-case circuit-breakers, on the other hand, they easily carry out selective coordination with the upstream protection devices.

The S 500 circuit-breakers are available in 1-2-3-4 pole versions with width equal to 1 1/2 modules per pole (27 mm), up to a rated current of 63 A.

The time-current characteristics available are C and B for protecting circuits in alternating current and B for protecting circuits in direct current (S 500 UC series).

S 500-K versions with adjustable thermal and S 500-KM versions with magnetic only releasers are also available.


TEPM01434



TEPM01433

# S 500 range



## Contents

# S 500 range
## Technical characteristics

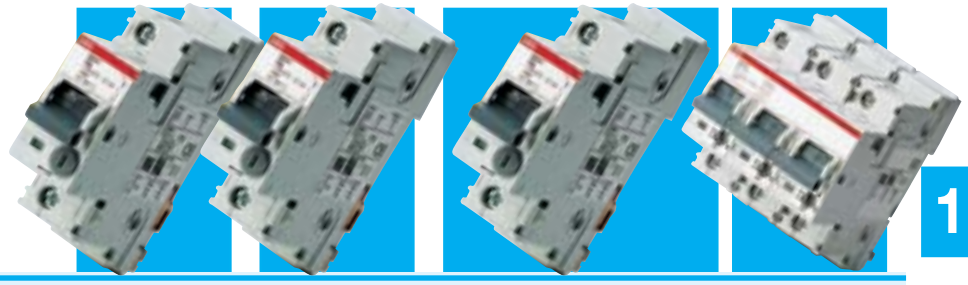


| | | | S 500 |
|---|---|---|---|
| **Standards** | | | IEC EN 60898, IEC EN 60947-2, UL 1077, CE conformity, CAN/CSA-C22.2 N235-M89 * |
| **Rated current In** | | [A] | 6≤In≤63 |
| **Poles** | | | 1P, 2P, 3P, 4P |
| **Rated current Ue** | 1P | [V] | 230 |
| | 2P, 3P, 4P | [V] | 230/400 |
| **Insulation voltage Ui** | | [V] | 690 |
| **Max. operating** | a.c. | [V] | 690 |
| **voltage Ub max.** | d.c. 1P | [V] | 125 |
| | d.c. 2P | [V] | 250 |
| **Min. operating voltage Ub min.** | | [V] | 12 V a.c.-12 V d.c. |
| **Rated frequency** | | [Hz] | 16 2/3…60 Hz (S 500-X: >60…400 Hz) |
| **Rated breaking capacity** | Icn | [kA] | 25 |
| **acc. to IEC EN 60898** | service Ics | [kA] | 12.5 |
| **Rated breaking capacity** | ultimate Icu | [kA] | 50 |
| **acc. to IEC EN 60947-2 - 230/400 V** | service Ics | [kA] | 25 |
| **Rated breaking capacity** | ultimate Icu | [kA] | 30 |
| **acc. to IEC EN 60947-2 - 440 V** | service Ics | [kA] | 22 |
| **Rated breaking capacity** | ultimate Icu | [kA] | 15 |
| **acc. to IEC EN 60947-2 - 500 V** | service Ics | [kA] | 11 |
| **Rated breaking capacity** | ultimate Icu | [kA] | 6 |
| **acc. to IEC EN 60947-2 - 690 V** | service Ics | [kA] | 3 |
| **Rated breaking capacity acc. to UL 1077 and CSA - 240 V** | Icc | [kA] | 30 (In≤25 A); 18 (25≤In≤63 A) |
| **Rated breaking capacity acc. to UL 1077 and CSA - 277/480 V** | Icc | [kA] | 14 |
| **Rated breaking capacity acc. to UL 1077 and CSA - 600 V** | Icc | [kA] | 6 |
| **Voltage withstanding capacity impulse (1,2/50) Uimp** | | [kV] | 6 |
| **Dielectric test voltage at ind. freq. for 1 min.** | | [kV] | 3 |
| **Thermomagnetic release** | B: 3 In≤Im≤5 In | | ■ |
| **characteristic** | C: 5 In≤Im≤10 In | | ■ |
| | D: 10 In≤Im≤20 In | | ■ |
| | K: 8 In≤Im≤14 In | | |
| | Z: 2 In≤Im≤3 In | | |
| **Toggle** | | | grey sealable in ON-OFF position |
| **Electrical life** | | | 10000 |
| **Mechanical life** | | | 20000 |
| **Equipment protection degree** | | | IP2X |
| **Tropicalization** | | | DIN 50016 |
| **Current limitation at Icc 30 kA** | | | I<8000 A |
| **Total short-circuit breaking time** | | | max. 2.5 ms per Icc 30 kA |
| **Thermal releaser calibration temperature** | | [°C] | 30 |
| **Ambient temperature (with daily average ≤+35 °C)** | | [°C] | -25…+55 |
| **Storage temperature** | | [°C] | -40…+70 |
| **Terminal size upper/lower per cable** | | [mm²] | 25/25 |
| **Tightening torque** | | [N*m] | 2.5 |
| **Mounting** | | | on rail EN 60715 (35 mm) by means of rapid fixing device |
| **Pole dimensions** | HxDxW | [mm] | 91x92x25 |
| **Pole weight** | | [g] | 250 |

* S 500 range circuit-breakers do not have UL/CA approval for use in d.c.

# S 500 range
## Technical characteristics





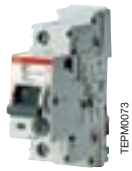
| | | | S 500 UC-B | S 500 UC-K | S 500-K | | S 500-KM |
|---|---|---|---|---|---|---|---|
| **Standards** | | | IEC EN 60898, IEC EN 60947-2, UL 1077, CE conformity, CAN/CSA-C22.2 N235-M89 * | | | | |
| **Rated current In** | fixed | [A] | 6≤In≤63 | – | – | – | 1.6≤In≤75 |
| | adjustable | [A] | – | 0.1≤In≤45 | 0.1≤In≤11 | 11 ≤In≤45 | – |
| **Poles** | | | 1P, 2P, 3P, 4P | 1P, 2P, 3P, 4P | 1P, 2P, 3P | | 3P |
| **Rated current Ue** | 1P | [V] | 250 V d.c. | | 230 | | 230 |
| | 2P | [V] | 500 V d.c. | | 230/400 | | 230/400 |
| | 3P, 4P | [V] | 750 V d.c. | | 230/400 | | 230/400 |
| **Insulation voltage Ui** | | [V] | 690 | | 690 | | 690 |
| **Max. operating voltage Ub max.** | a.c. | [V] | 690 | | 690 | | 690 |
| | d.c. 1P | [V] | 250 V d.c. | | 125 V d.c. | | 125 V d.c. |
| | d.c. 2P | [V] | 500 V d.c. | | 250 V d.c. | | 250 V d.c. |
| | d.c. 3P, 4P | [V] | 750 V d.c. | | 250 V d.c. | | 250 V d.c. |
| **Min. operating voltage Ub min.** | [V] | | 12 V a.c. - 12 V d.c. | | 12 V a.c. - 12 V d.c. | | 12 V a.c. - 12 V d.c. |
| **Rated frequency** | | [Hz] | | | 16 2/3 …60 Hz (S 500-X:> 60 … 400 Hz) | | |
| **Rated breaking capacity IEC EN 60947-2 - 230 /400 V** | ultimate Icu | [kA] | – | – | 50 | 30 | 25 |
| | service Ics | [kA] | – | – | 30 | 25 | – |
| **Rated breaking capacity IEC EN 60947-2 - 440 V** | ultimate Icu | [kA] | – | – | 30 | 25 | – |
| | service Ics | [kA] | – | – | 22 | 22 | – |
| **Rated breaking capacity IEC EN 60947-2 - 500 V** | ultimate Icu | [kA] | – | – | 20 | 15 | – |
| | service Ics | [kA] | – | – | 15 | 11 | – |
| **Rated breaking capacity IEC EN 60947-2 - 690 V** | ultimate Icu | [kA] | – | – | 6 | 6 | – |
| | service Ics | [kA] | – | – | 3 | 3 | – |
| **Rated breaking capacity acc. to UL 1077 and CSA - 240 V** | Icc | [kA] | – | – | 30 | 18 | – |
| **Rated breaking capacity acc. to UL 1077 and CSA - 277/480 V** | Icc | [kA] | – | – | 14 | 14 | – |
| **Rated breaking capacity acc. to UL 1077 and CSA - 600 V** | Icc | [kA] | – | – | 6 | 6 | – |
| **Rated breaking capacity acc. to UL 1077, CSA and IEC EN 60947-2 - 250 V d.c. (1P), 500 V d.c.(2P), 750 V d.c. (3P), L/R 15 ms** | | [kA] | 30 | 30 | – | – | – |
| **Thermomagnetic release characteristic** | B: 3 In≤Im≤5 In | | ■ | – | – | – | – |
| | K: 8 In≤Im≤14 In ** | | – | ■ | ■ | ■ | – |
| | magnetic only KM: 8 In≤Im≤14 In ** | | – | – | – | – | ■ |
| **Toggle** | | | grey sealable in ON-OFF position | | | | |
| **Electrical life** | | | 10000 | | | | |
| **Mechanical life** | | | 20000 | | | | |
| **Equipment protection degree** | | | IP2X | | | | |
| **Tropicalization** | | | DIN 50016 | | | | |
| **Current limitation at Icc 30 kA** | | | I<3000 A | | I< 8000 A | | |
| **Total short-circuit breaking time** | | | max. 2.5 ms per Icc 30 kA | | | | |
| **Thermal releaser calibration temperature** | | [°C] | 30 | 40 – | 40 | – | – |
| **Ambient temperature (with daily average ≤ +35°C)** | | [°C] | -25…+55 | | | | |
| **Storage temperature** | | [°C] | -40…+70 | | | | |
| **Terminal size upper/lower per cable** | | [mm²] | 25/25 | | | | |
| **Tightening torque** | | [N*m] | 2.5 | | | | |
| **Mounting** | | | on rail EN 60715 (35 mm) by means of rapid fixing device | | | | |
| **Pole dimensions** | HxDxW | [mm] | 91x92x25 | | | | |
| **Pole weight** | | [g] | 250 | | | | |

* S 500 range circuit-breakers do not have UL/CA approval for use in d.c.

** K and KM curves magnetic tripping range: 8 In<Im<10 In (d.c./a.c., In<0.21); 10 In<Im<12 In (d.c./a.c., 0.2<In<0.42); 12 In<Im<14 In (d.c./a.c., In>0.38)

# S 500 range

## S 500 B-C-D series





| Rated currents In [A] | Code Characteristic B | C | D |
|---|---|---|---|
| **1P - S 501 type** | | | |
| **6** | EI 060 4 | EI 100 8 | - |
| **10** | EI 061 2 | EI 101 6 | EI 366 5 |
| **13** | EI 062 0 | EI 102 4 | EI 027 3 |
| **16** | EI 063 8 | EI 103 2 | EI 028 1 |
| **20** | EI 064 6 | EI 104 0 | EI 029 9 |
| **25** | EI 065 3 | EI 105 7 | EI 030 7 |
| **32** | EI 066 1 | EI 106 5 | EI 031 5 |
| **40** | EI 067 9 | EI 107 3 | EI 032 3 |
| **50** | EI 068 7 | EI 108 1 | EI 033 1 |
| **63** | EI 069 5 | EI 109 9 | EI 034 9 |
| **2P - S 502 type** | | | |
| **6** | EI 070 3 | EI 110 7 | - |
| **10** | EI 071 1 | EI 111 5 | EI 367 3 |
| **13** | EI 072 9 | EI 112 3 | EI 035 6 |
| **16** | EI 073 7 | EI 113 1 | EI 036 4 |
| **20** | EI 074 5 | EI 114 9 | EI 037 2 |
| **25** | EI 075 2 | EI 115 6 | EI 038 0 |
| **32** | EI 076 0 | EI 116 4 | EI 039 8 |
| **40** | EI 077 8 | EI 117 2 | EI 040 6 |
| **50** | EI 078 6 | EI 118 0 | EI 041 4 |
| **63** | EI 079 4 | EI 119 8 | EI 042 2 |

**Tripping characteristics**

B (Im=3…5 In); C (Im=5…10 In)

D (Im=10…20 In)

**Application: tertiary and industrial**

**RCBO version**

F 500

**RCD blocks**

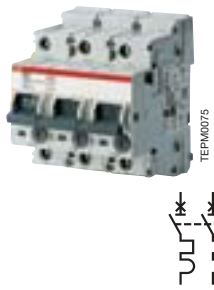
DDA 500 63 A

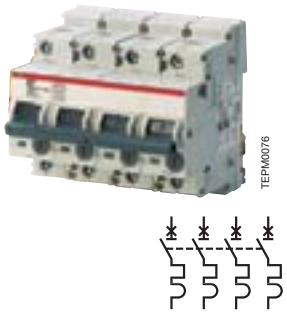
The DDA 500 RCD blocks cannot be connected to S 500 B-C-D In=6 A circuit-breakers

# S 500 range

## S 500 B-C-D series






| Rated currents In [A] | Code Characteristic B | C | D |
|---|---|---|---|
| **3P - S 503 type** | | | |
| **6** | EI 080 2 | EI 120 6 | - |
| **10** | EI 081 0 | EI 121 4 | EI 368 1 |
| **13** | EI 082 8 | EI 122 2 | EI 043 0 |
| **16** | EI 083 6 | EI 123 0 | EI 044 8 |
| **20** | EI 084 4 | EI 124 8 | EI 045 5 |
| **25** | EI 085 1 | EI 125 5 | EI 046 3 |
| **32** | EI 086 9 | EI 126 3 | EI 047 1 |
| **40** | EI 087 7 | EI 127 1 | EI 048 9 |
| **50** | EI 088 5 | EI 128 9 | EI 049 7 |
| **63** | EI 089 3 | EI 129 7 | EI 050 5 |
| **4P - S 504 type** | | | |
| **6** | EI 090 1 | EI 130 5 | - |
| **10** | EI 091 9 | EI 131 3 | EI 369 9 |
| **13** | EI 092 7 | EI 132 1 | EI 051 3 |
| **16** | EI 093 5 | EI 133 9 | EI 052 1 |
| **20** | EI 094 3 | EI 134 7 | EI 053 9 |
| **25** | EI 095 0 | EI 135 4 | EI 054 7 |
| **32** | EI 096 8 | EI 136 2 | EI 055 4 |
| **40** | EI 097 6 | EI 137 0 | EI 056 2 |
| **50** | EI 098 4 | EI 138 8 | EI 057 0 |
| **63** | EI 099 2 | EI 139 6 | EI 058 8 |

### Breaking capacity in a.c.

acc. to IEC EN 60898

| In [A] | poles | voltage [V] | Icn [kA] |
|---|---|---|---|
| **6…63** | All | 230/400 | 25 |

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **6…63** | All | 230/400 | 50 | 25 |
| | | 440 | 30 | 22 |
| | | 500 | 15 | 11 |
| | | 690 | 6 | 3 |

### Breaking capacity in d.c.

acc. to IEC EN 60947.2

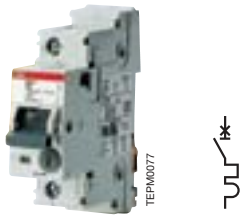
| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **6…63** | 1 | 125 | 30 | 30 |
| | 2 | 250 | 30 | 30 |

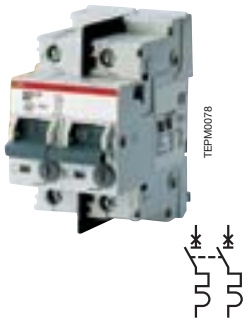
### R.I.Na. approval

The MCBs S 502, S 503, S 504 (B, C, D) 10…63A have obtained R.I.Na. approval for naval application at voltages 400, 440, 500, 690 V a.c.

# S 500 range

## S 500 UC series (especially for direct current)




| Rated currents In [A] | Code Characteristic B | K |
|---|---|---|
| **1P - S 501 UC type** | | |
| **6** | EI 315 2 | |
| **10** | EI 316 0 | |
| **13** | EI 317 8 | |
| **16** | EI 318 6 | |
| **20** | EI 319 4 | |
| **25** | EI 320 2 | |
| **32** | EI 321 0 | |
| **40** | EI 322 4 | |
| **50** | EI 323 6 | |
| **63** | EI 324 6 | |
| **2P - S 502 UC type** | | |
| **6** | EI 325 1 | |
| **10** | EI 326 9 | |
| **13** | EI 327 7 | |
| **16** | EI 328 5 | |
| **20** | EI 329 3 | |
| **25** | EI 330 1 | |
| **32** | EI 331 9 | |
| **40** | EI 332 7 | |
| **50** | EI 333 5 | |
| **63** | EI 334 3 | |

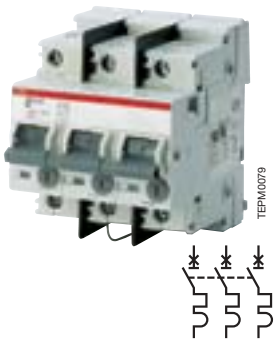
**Tripping characteristics**

B (Im=3…5 In); K (Im=8…14 In)

**Application: protection of circuits in d.c.**

# S 500 range

## S 500 UC series (especially for direct current)




| Rated currents In [A] | Code Characteristic B | K |
|---|---|---|
| **3P - S 503UC type** | | |
| **6** | EI 335 0 | |
| **10** | EI 336 8 | |
| **13** | EI 337 6 | |
| **16** | EI 338 4 | |
| **20** | EI 339 2 | |
| **25** | EI 340 0 | |
| **32** | EI 341 8 | |
| **40** | EI 342 6 | |
| **50** | EI 343 4 | |
| **63** | EI 344 2 | |

**1P, 2P, 3P, 4P S 501 UC-K, S 502 UC-K, S 503 UC-K and S 504 UC-K motor protection with adjustable thermal types***

| | |
|---|---|
| **0.1 - 0.16** | on request |
| **…** | on request |
| **38 - 45** | on request |

* The adjustment ranges are the same as those for the S 500-K circuit-breakers

### Breaking capacity in d.c.

acc. to IEC EN 60947.2/UL077/CAN CSA-C22.2 N235-M89

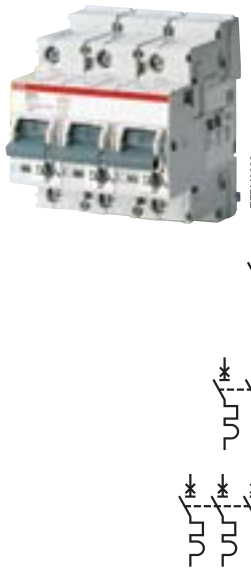
| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.1…63** | 1P | 250 | 30 | 30 |
| | 2P | 500 | 30 | 30 |
| | 3P | 750 | 30 | 30 |

In alternating current they maintain the same performance as S 500 B, K

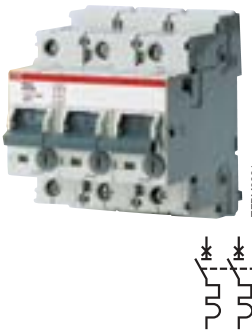
# S 500 range

## S 500-K motor protection series with adjustable thermal release, S 500-KM magnetic only






| Rated currents In [A] | Code Characteristic K 1P | 2P | 3P |
|---|---|---|---|
| **S 500 K type** | | | |
| **0.1 - 0.15** | EI 450 7 | EI 475 4 | EI 345 9 |
| **0.14 - 0.21** | EI 451 5 | EI 476 2 | EI 346 7 |
| **0.2 - 0.3** | EI 452 3 | EI 477 0 | EI 347 5 |
| **0.28 - 0.42** | EI 453 1 | EI 478 8 | EI 348 3 |
| **0.38 - 0.58** | EI 454 9 | EI 479 6 | EI 349 1 |
| **0.53 - 0.8** | EI 454 6 | EI 480 4 | EI 350 9 |
| **0.73 - 1.1** | EI 456 4 | EI 481 2 | EI 351 7 |
| **1 - 1.5** | EI 457 2 | EI 482 0 | EI 352 5 |
| **1.4 - 2.1** | EI 458 0 | EI 483 8 | EI 353 3 |
| **2 - 3** | EI 459 8 | EI 484 6 | EI 354 1 |
| **2.8 - 4.2** | EI 460 6 | EI 485 3 | EI 355 8 |
| **3.8 - 5.8** | EI 461 4 | EI 486 1 | EI 356 6 |
| **5.3 - 8** | EI 462 2 | EI 487 9 | EI 357 4 |
| **7.3 - 11** | EI 463 0 | EI 488 7 | EI 358 2 |
| **10 - 15** | EI 464 8 | EI 489 5 | EI 359 0 |
| **14 - 20** | EI 465 5 | EI 490 3 | EI 360 8 |
| **18 - 26** | EI 466 3 | EI 491 1 | EI 361 6 |
| **23 - 32** | EI 467 1 | EI 492 9 | EI 362 4 |
| **29 - 37** | EI 468 9 | EI 493 7 | EI 363 2 |
| **34 - 41** | EI 469 7 | EI 494 5 | EI 364 0 |
| **38 - 45** | EI 470 5 | EI 495 2 | EI 365 7 |




| Rated currents In [A] | Code Characteristic KM 3P |
|---|---|
| **3P - S 503 KM magnetic only type*** | |
| **1.6** | EI 417 6 |
| **2.5** | EI 418 4 |
| **4** | EI 419 2 |
| **6** | EI 420 0 |
| **9** | EI 421 8 |
| **20** | EI 422 6 |
| **32** | EI 423 4 |
| **52** | EI 424 2 |
| **63** | EI 425 9 |
| **75** | EI 428 3 |

* 1P, 2P, 4P versions also on request

### Tripping characteristics

K (Im=8…14 In); KM (Im=8…14 In)

### Application

Specific for protection of motors
(with adjustable thermal=K; magnetic only=KM)

### Breaking capacity in a.c.

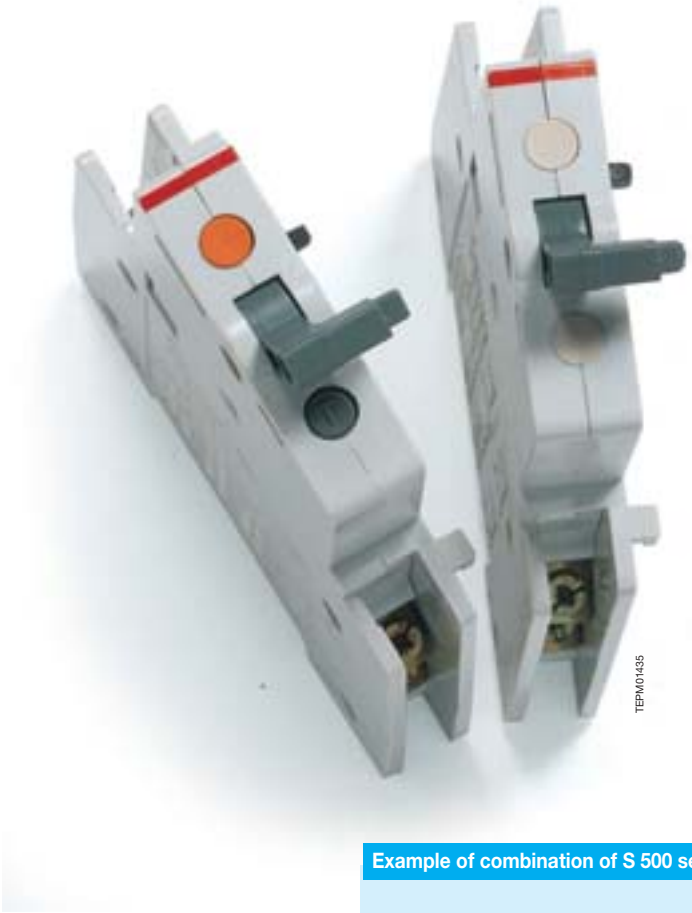
infinite up to 2 A

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **0.1…11** | 1, 2, 3 | 230/400 | 50 | 30 |
| | | 440 | 30 | 22 |
| | | 500 | 20 | 15 |
| | | 690 | 6 | 3 |
| **10…45** | 1, 2, 3 | 230/400 | 30 | 25 |
| | | 440 | 25 | 22 |
| | | 500 | 15 | 11 |
| | | 690 | 6 | 3 |

# S 500 range
## Auxiliary elements






For the S 500 range of circuit-breakers, shunt trips, undervoltage releases and contacts (auxiliary and signal) are available.

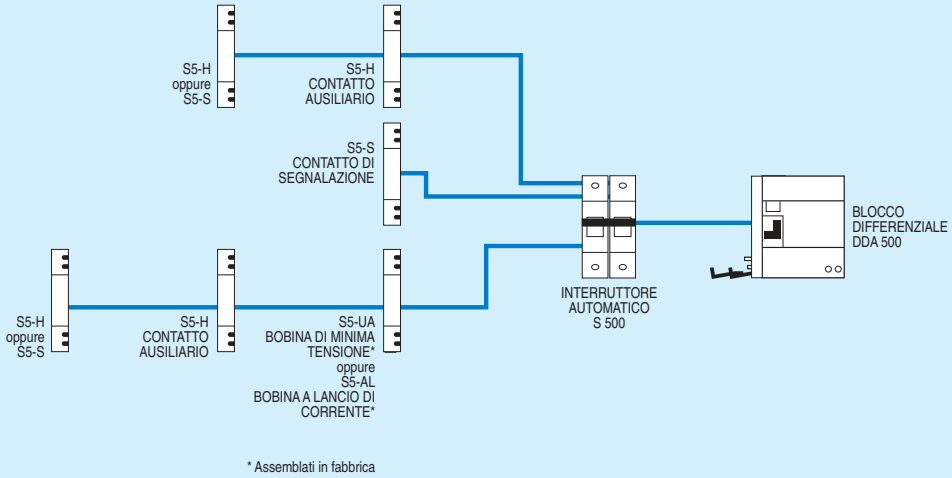
Only the auxiliary contacts can be mounted by the installer; the undervoltage releases and shunt trips are installed directly at the factory and, for this reason, cannot be ordered separately.

Four shunt trips for voltages of 24 V a.c./d.c, 110 V a.c./d.c, 220 V a.c./d.c, and 400 V a.c./d.c, and eight undervoltage releases for voltages equal to 24 V a.c., 110 V a.c., 230 V a.c., 400 V a.c., 24 V d.c., 110 V d.c., 230 V d.c., 400 V d.c. are available.

These auxiliary elements can also be mounted on the corresponding RCBO version (F 500 series).

The S 500 circuit-breakers are also equipped with a rotary drive with the possibility of selection from different rotary handle.

**Example of combination of S 500 series circuit-breakers with auxiliary elements (maximum configuration)**



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## Auxiliary/signal contacts

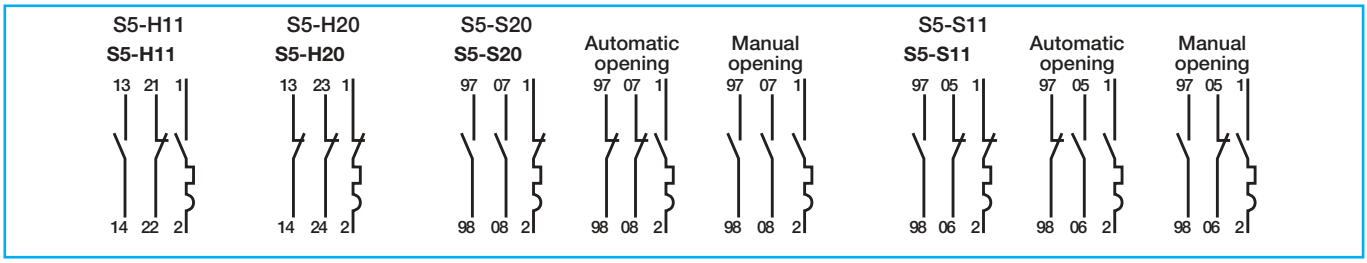
The auxiliary contact indicates the position of the circuit-breaker contacts. When the position of the contacts changes, whether manually or automatically, it indicates their status.
The signal contact indicates the position of the contact after automatic release of the circuit-breaker caused by overload or short-circuit. For manual operation, it does not trip.

**For S 500, F 500 series**

| | | |
|---|---|---|
| **EI 410 1** | S5-H11 | auxiliary contact 1NO+1NC (12.5 mm) |
| **EI 411 9** | S5-H20 | auxiliary contact 2NO (12.5 mm) |
| **EI 412 7** | S5-S11 | signal contacts 1NO+1NC (12.5 mm) |
| **EI 413 5** | S5-S20 | signal contacts 2NO (12.5 mm) |

## Technical characteristics

| **Type** | | **S5-H11** | **S5-H20** | **S5-S11** | **S5-S20** |
|---|---|---|---|---|---|
| **Description** | | 1NO + 1NC | 2NO | 1NO + 1NC | 2NO |
| **Alternating** | Ue [V] | | 230 | 400 | |
| **current** | Ie [A] | | 2 | 1 | |
| **Direct** | Ue [V] | | 220 | | |
| **current** | Ie [A] | | 0.5 | | |
| **Min. operating voltage** | [V] | | 12 a.c.-12 d.c. | | |
| **Min. operating current** | [mA] | | 10 | | |
| **Terminals** | [mm²] | | 0.5x2.5 | | |
| **Dielectric strength** | [kV] | | 3 | | |
| **Resistance to short-circuit at 240 V a.c.** | [A] | | 1000 (protected with S 2 breaker characteristic K 6 A) | | |
| **Impulse voltage withstand capacity** | [kV] | | 4 | | |
| **Tightening torque** | [Nm] | | 1 | | |
| **Dimensions (WxDxH)** | [mm] | | 12.5x92x92.5 | | |

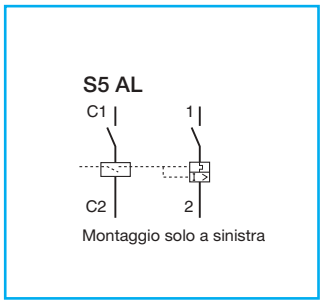


## Shunt trips

Consumption on release 130 VA-120 W.

| Code | Type | Description |
|---|---|---|
| **For S 500 series** | | |
| * | S5 AL 24V | shunt trip<br>24 V a.c./d.c. |
| * | S5 AL 110V | shunt trip<br>110 V a.c./d.c. |
| * | S5 AL 220V | shunt trip<br>220 V a.c./d.c. |
| * | S5 AL 400V | shunt trip<br>400 V a.c./d.c. |

* The S5 AL type shunt trips must be ordered with the S 500 circuit-breaker, since they are installed directly in the factory (they cannot be installed by the customer).



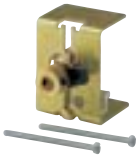

## Undervoltage releases

Consumption max. 3.5 VA - 3.5 W.

| Code | Type | Description |
|---|---|---|
| **For S 500 series** | | |
| * | S5-UA 24V ca | 24 V c.a. undervoltage release<br>(1 module) |
| * | S5-UA 110V ca | 110 V a.c. undervoltage release<br>(1 module) |
| * | S5-UA 230V ca | 230 V a.c. undervoltage release<br>(1 module) |
| * | S5-UA 400V ca | 400 V a.c. undervoltage release<br>(1 module) |
| * | S5-UA 24V cc | 24 V d.c. undervoltage release<br>(1 module) |
| * | S5-UA 110V cc | 110 V d.c. undervoltage release<br>(1 module) |
| * | S5-UA 230V cc | 230 V d.c. undervoltage release<br>(1 module) |
| * | S5-UA 400V cc | 400 V d.c. undervoltage release<br>(1 module) |

* The S5 UA undervoltage releases must be ordered with the S 500 circuit-breaker since they are installed directly in the factory (they cannot be installed by the customer).

# S 500 range
## Accessories



S500 RD3

S500 H2B1
S500 H2B2

S500 H8B

S500 H8Y

S500 S51
S500 S52
S500 S56

**For S 500 and F 500 series**

| | | |
|---|---|---|
| **EI 409 3** | S500 RD3 | rotary control knob for 1P, 2P, 3P S 500 circuit-breakers* |
| **EI 426 7** | S500 RD4 | rotary control knob for 4P S 500 circuit-breakers* |

* When using S 503 three-pole circuit-breakers with undervoltage releases or shunt trips, the rotary control knob to order is S 500 RD4

| | | |
|---|---|---|
| **EI 427 5** | S500 H2B1 | rotary control knob; black IP65 with interlock ON, padlock possible in OFF position |
| **EI 437 4** | S500 H2Y1 | rotary control knob; red/yellow IP65 with interlock ON, padlock possible in OFF position |
| **EI 438 2** | S500 H2B2 | rotary control knob; black IP65 with interlock ON, padlock possible in OFF position with manual release |
| **EI 439 0** | S500 H2Y2 | rotary control knob; red/yellow IP65 with interlock ON, padlock possible in OFF position with manual release |

| | | |
|---|---|---|
| **EI 442 4** | S500 HP2B | emergency plate - black |
| **EI 443 2** | S500 HP2Y | emergency plate - red/yellow |

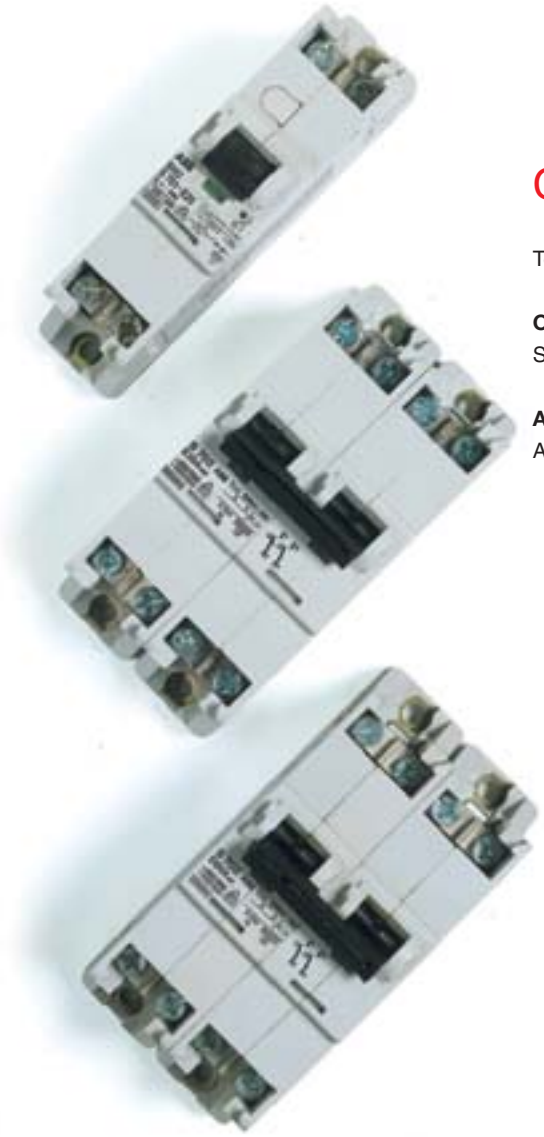
| | | |
|---|---|---|
| **EI 440 8** | S500 H8B | rotary control knob; black IP65 with interlock ON, padlock possible in OFF position with manual release |
| **EI 441 6** | S500 H8Y | rotary control knob for circuit-breakers; red/yellow IP65 with interlock ON, padlock possible in OFF position with manual release |

| | | |
|---|---|---|
| **EI 416 8** | S500 S51 | drive shaft L=85 mm |
| **EI 415 0** | S500 S52 | drive shaft L=180 mm |
| **EI 444 0** | S500 S56 | drive shaft L=265 mm* |

* Only suitable for EI 440 8 and EI 441 6 knobs

# S 700 range





## Contents

# S 700 range
## Technical characteristics



| | | | | | |
|---|---|---|---|---|---|
| **Rated current In** | [A] | 25...100 | | | |
| **Rated current a.c.** | [V] | 400 | | | |
| **Min. operating voltage** | [V] | 125 | | | |
| **Electrical life** | [n°] | 4000 | | | |
| **Mechanical life** | [n°] | 10000 | | | |
| **Tropicalization at 55°C acc. to DIN 40046** | | 95% UR | | | |
| **Terminals for cable** | | cage type up to 70 mm² | | | |
| **Self-extinguishing degree** | | V0 thickness 3.2 mm | | | |
| **Poles** | | 1P | 2P | 3P | 4P |
| **Weight** | [g] | 550 | 1100 | 1650 | 2200 |

**Tripping characteristics**

E sel. (Im=5…6,25 In)

**Application: industrial, naval**

### Breaking capacity in a.c.

acc. to IEC EN 60947.2

| In [A] | poles | voltage [V] | Icu [kA] | Ics [kA] |
|---|---|---|---|---|
| **25…100** | 1 | 230 | 50 | 25 |
| | 2 | 230<br>400 | 50<br>30 | 25<br>15 |
| | 3, 4 | 230<br>400 | 50<br>30 | 25<br>15 |
| | 4 | 500<br>690 | 15<br>10 | 7,5<br>5 |

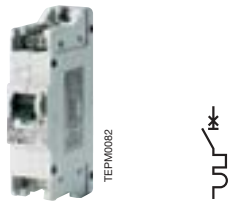
### R.I.Na. approval

The S 702, S 703 MCBs for naval application have obtained R.I.Na. approval

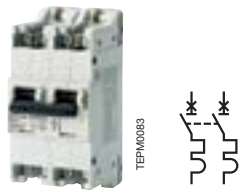
# S 700 range

## S 701, S 702, S 703, S 704 series and accessories

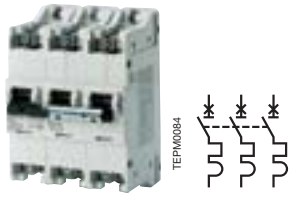




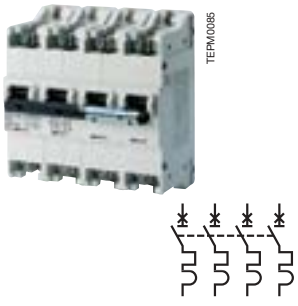

| Rated currents In [A] | Code Characteristic E sel. |
|---|---|
| **1P - S 701 type** | |
| **25** | EG 700 7 |
| **35** | EG 701 5 |
| **50** | EG 702 3 |
| **63** | EG 703 1 |
| **80** | EG 704 9 |
| **100** | EG 705 6 |




| 2P - S 702 type | | Naval application |
|---|---|---|
| **25** | EG 706 4 | EG 730 4 |
| **35** | EG 707 2 | EG 731 2 |
| **50** | EG 708 0 | EG 732 0 |
| **63** | EG 709 8 | EG 733 8 |
| **80** | EG 710 6 | EG 734 6 |
| **100** | EG 711 4 | EG 735 3 |




| 3P - S 703 type | | Naval application |
|---|---|---|
| **25** | EG 712 2 | EG 736 1 |
| **35** | EG 713 0 | EG 737 9 |
| **50** | EG 714 8 | EG 738 7 |
| **63** | EG 715 5 | EG 739 5 |
| **80** | EG 716 3 | EG 740 3 |
| **100** | EG 717 1 | EG 741 1 |




| 4P - S 704 type | |
|---|---|
| **25** | EG 718 9 |
| **35** | EG 719 7 |
| **50** | EG 720 5 |
| **63** | EG 721 3 |
| **80** | EG 722 1 |
| **100** | EG 723 9 |

| Accessories for S 700 series | | |
|---|---|---|
| **EG 035 8** | BT3 | plate for assembly on EN50022 rail (1 piece for 1P, 2 pieces for 2P, 3P, 4P) |
| **EG 037 4** | KA1 | pair of terminal covers (2 pieces per pole) |
| **EG 040 8** | SA | connection flange and fixing on busbars |
| **EG 041 6** | SPA | plate for blocking manual opening |
| **EG 042 4** | SPB1 | transparent plate for blocking operation, for lever position inspection |
| **EG 044 0** | SPE | toggle locking device, padlock possible |
| **EL 175 6** | BA50 | transparent label carrier; covers and assorted labels |
| **EG 046 5** | EST1 | withdrawable kit on NH base (2 pieces per pole) |
| **EG 047 3** | EST2 | terminal protection for withdrawable version NH base (2 pieces per pole) |

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# Technical details and guide to applications

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## Contents

## Tripping characteristics

According to the specific uses of the different types of circuit-breakers, the respective thermal and electromagnetic relays are designed and regulated to effect the most widely requested current/time tripping characteristics.

The following table shows the main general and specific tripping characteristics, with reference to the circuit-breakers supplied by ABB, as indicated in the table.

| Series | Characteristics | | | | | |
|---|---|---|---|---|---|---|
| | B | C | D | K | Z | E sel. |
| **S 941 N** | In=6…40 A | In=2...40 A | - | - | - | - |
| **S 951 N** | In=6…40 A | In=2...40 A | - | - | - | - |
| **S 971 N** | In=6…40 A | In=2...40 A | - | - | - | - |
| **S 240** | - | In=6...40 A | - | - | - | - |
| **S 250** | In=6...63 A | In=0.5...63 A | - | In=0.5...63 A | - | - |
| **S 270** | In=6...63 A | In=0.5...63 A | In=0.5...63 A | In=0.5...63 A | - | - |
| **S 280** | In=6...63 A | In=6...63 A | In=6...63 A | In=6...63 A | In=0.5...63 A | - |
| **S 280 UC** | In=6...63 A | In=0.5...63 A | - | In=0.5...63 A | In=0.5...63 A | - |
| **S 290** | - | In=80...125 A | In=80…100 A | - | - | - |
| **S 500** | In=6...63 A | In=6...63 A | In=6...63 A | In=0.1...45 A | - | - |
| **S 500 UC** | In=6...63 A | - | - | In=0.1...45 A | - | - |
| **S 700** | - | - | - | - | - | In=25...100 A |

Thermal version on request

### Characteristics B-C-D

Tripping characteristics according to IEC 23-3 IV Ed. (EN60898 – IEC60898). Rated currents from 6 to 63A in 10 different values (char. B) and from 0.5 to 63A in 16 different values (char. C, D).

These characteristics enable direct coordination of the circuit-breaker in relation to the capacity of the cables Iz, according to IEC 64-8 III Ed.

The following coordination conditions apply:

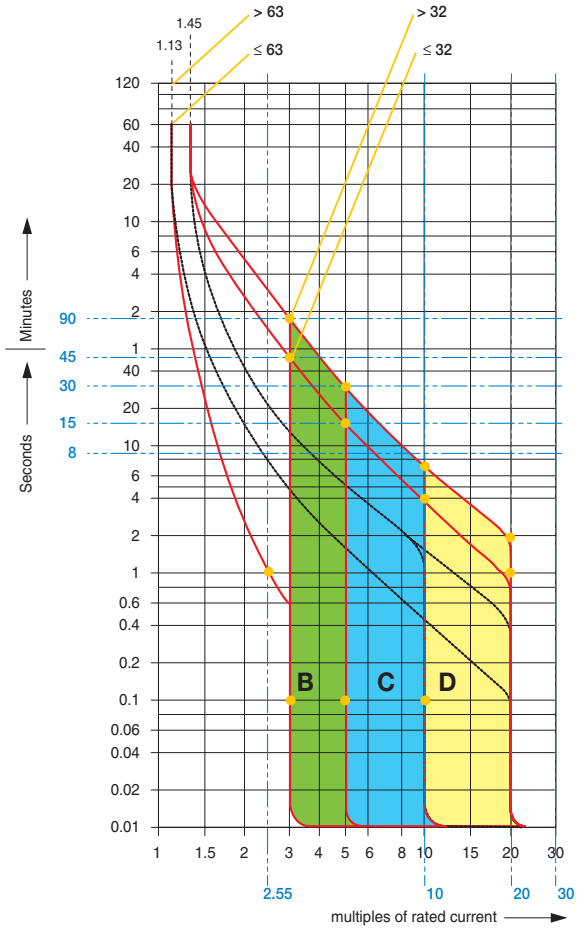
Ib<In<Iz; If<1.45 Iz, where
Ib=circuit operating current
In=circuit-breaker rated current
Iz=capacity of cables
If=circuit-breaker operating current within conventional time.

MCBs with characteristic B are supplied for protecting resistive loads and long lines; MCBs with characteristic C are used to protect circuits with resistive loads and small inductive loads; MCBs with characteristic D are used for highly inductive loads or loads with high start currents.

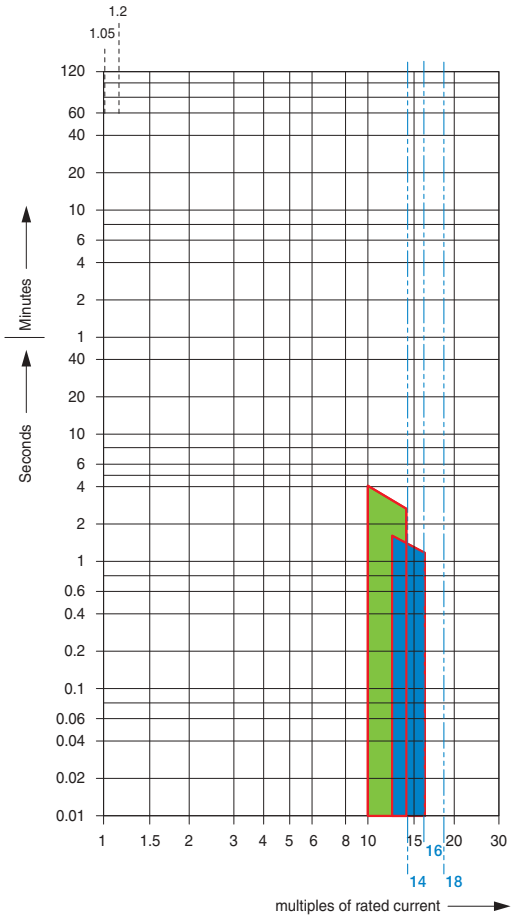
| Tripping characteristic | B | C | D |
|---|---|---|---|
| Standard | IEC 23-3 IV ed. | IEC 23-3 IV ed. | IEC 23-3 IV ed. |
| Rated current In | 6…63 A | 0.5…63 A | 0.5…63 A |
| **Thermal trip** | | | |
| Test currents | | | |
| non-tripping current Inf | 1.13 In | 1.13 In | 1.13 In |
| tripping time | >1 h | >1 h | >1 h |
| tripping current If | 1.45 In | 1.45 In | 1.45 In |
| tripping time | <1 h | <1 h | <1 h |
| **Electro-magnetic trip** | | | |
| Test currents | | | |
| non-tripping current Im1 | 3 In | 5 In | 10 In |
| tripping time | >0.1 s | >0.1 s | >0.1 s |
| tripping current Im2 | 5 In | 10 In | 20 In |
| tripping time | <0.1 s | <0.1 s | <0.1 s |



## Characteristics B, C, D




## Characteristics, magnetic only



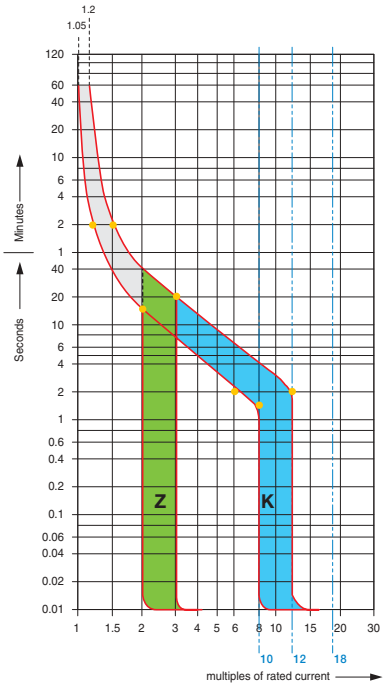
## Characteristics K-Z-E selective

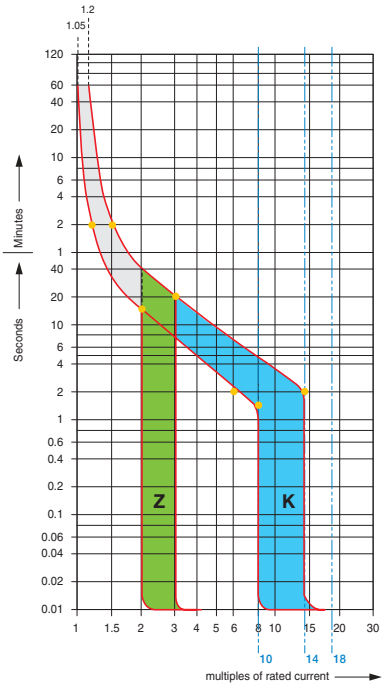
Tripping characteristics according to DINVDE 0660. Rated currents from 0.5 to 63 A, in 16 different values.

They are used to control and protect inductive circuits, power suppliers for semi-conductor electronic circuits and secondary measurement circuits, in the commercial and industrial sectors.

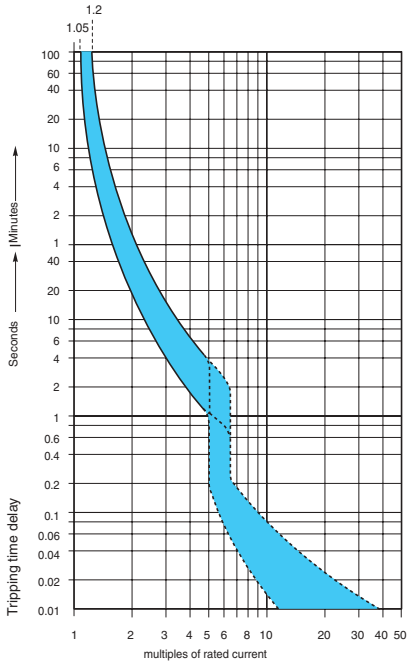
| **Tripping characteristic** | **K** | **Z** | **E selective** |
|---|---|---|---|
| Standard | DIN VDE 0660 9.82 part 1 | DIN VDE 0660 9.82 part 1 | DIN VDE 0660 |
| Rated current In | 0.5…63 A | 0.5…63 A | 25…100 A |
| **Thermal trip** | | | |
| Test currents | | | |
| non-tripping current Inf | 1.05 In | 1.05 In | 1.05 In |
| tripping time | >2 h | >2 h | >2 h |
| tripping current If | 1.2 In | 1.2 In | 1.2 In |
| tripping time | <2 h | <2 h | <2 h |
| **Electro-magnetic trip** | | | |
| non-tripping current Im1 | 8 In | 2 In | 5 In |
| tripping time | >0.2 s | >0.2 s | >0.3 s |
| tripping current Im2 | 14 In | 3 In | 6.25 In |
| tripping time | <0.2 s | <0.2 s | <0.3 s |

### Characteristics K, Z




### Characteristics S selective



## Limitation of specific let-through energy

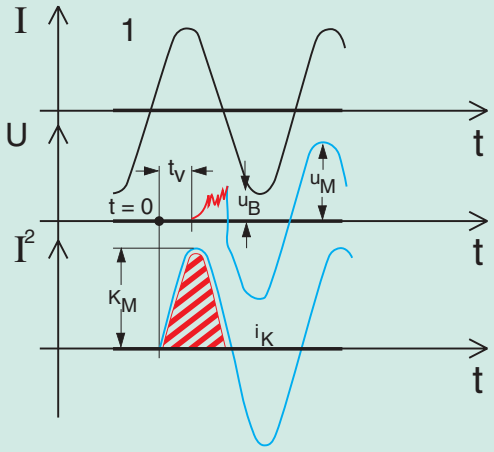
Tripping of an installation circuit by circuit-breaker when there is a short-circuit requires a certain amount of time depending on the characteristics of the circuit-breaker and the entity of the short-circuit current. During this period of time, some or all of the short-circuit current flows into the 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.

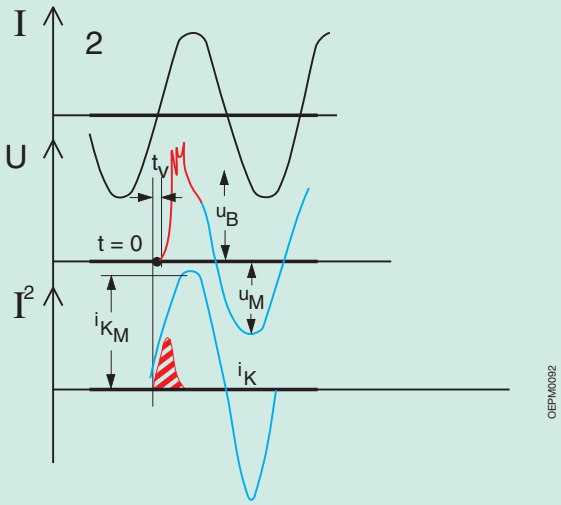
This can be achieved using mechanisms which open very rapidly and have the following advantages:

- 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.






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

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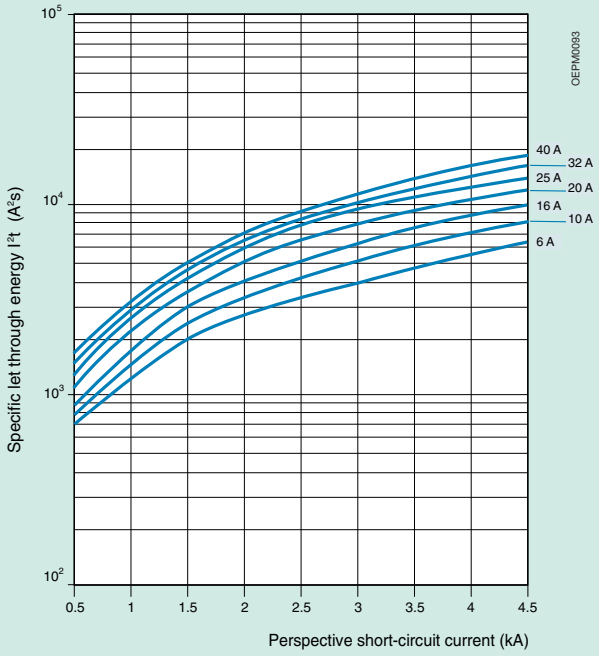
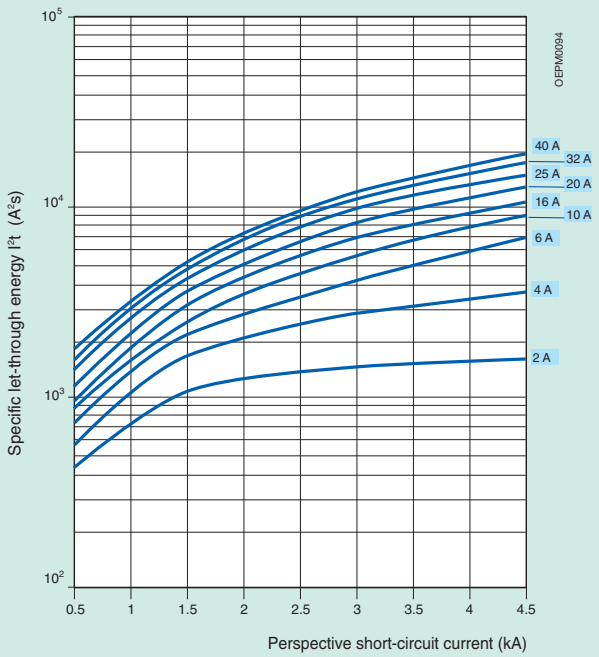
## $I^2t$ diagrams - Specific let-through energy value $I^2t$

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 estimated short-circuit current (amp).

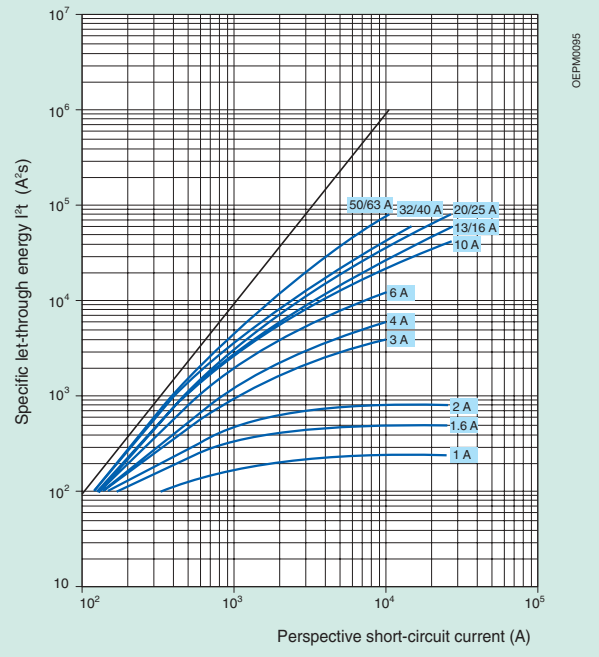
### S 941 N characteristic B



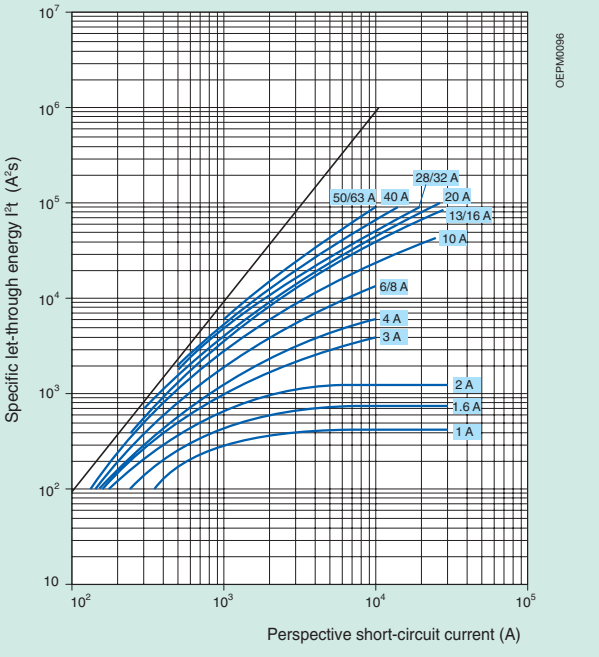

### S 941 N characteristic C



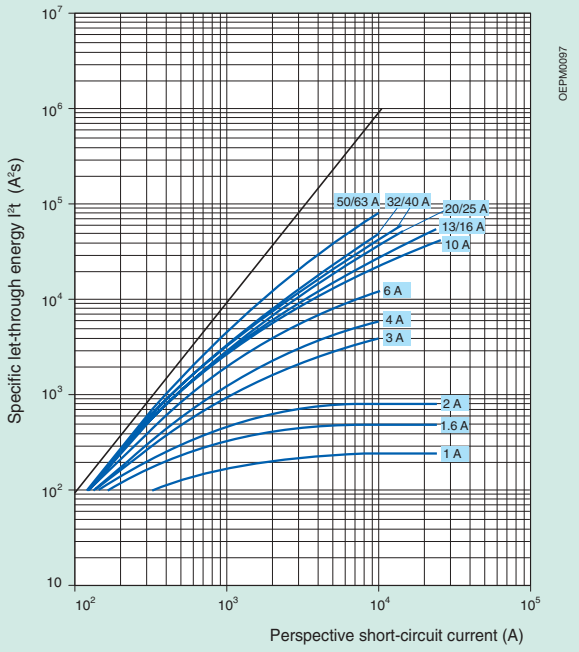

### S 240…S 280 characteristics B and C



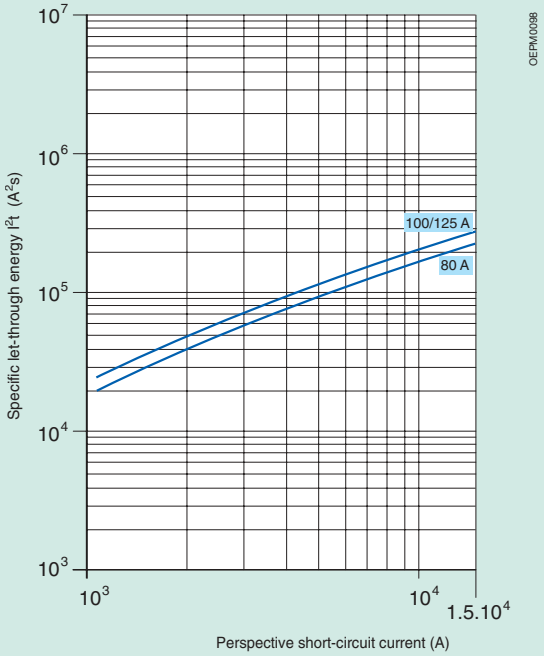

### S 240…S 280 characteristics K and D



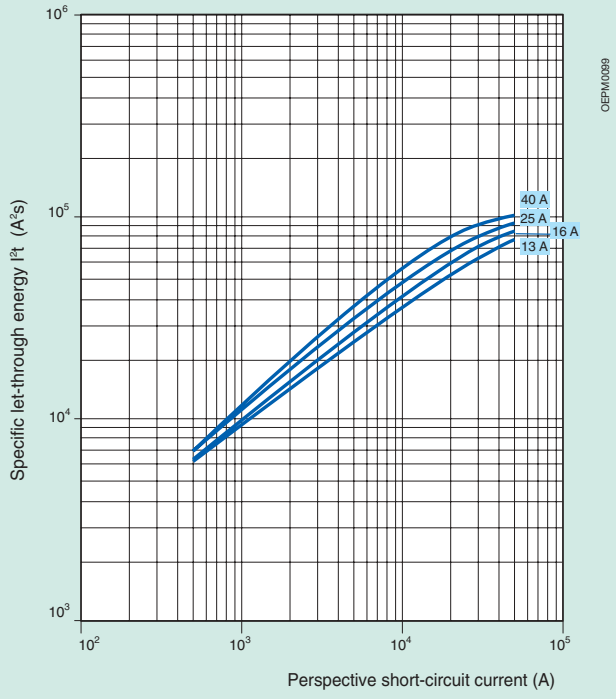
## S 280 characteristic Z

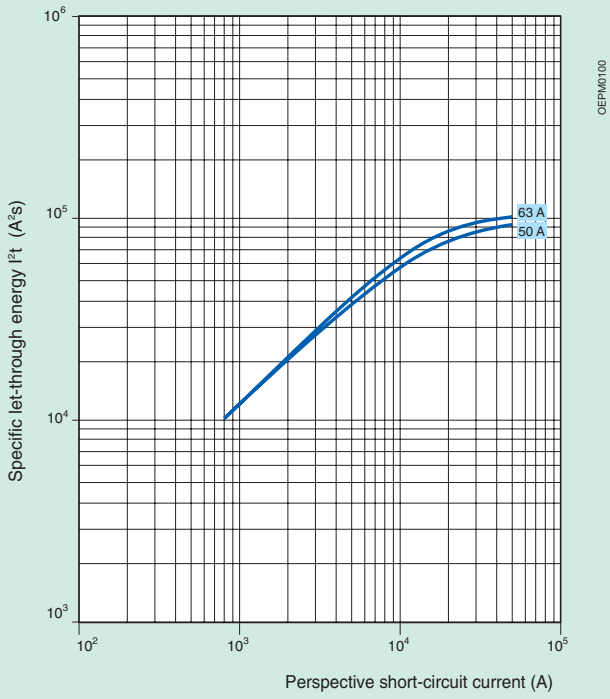



## S 290 characteristic C, D



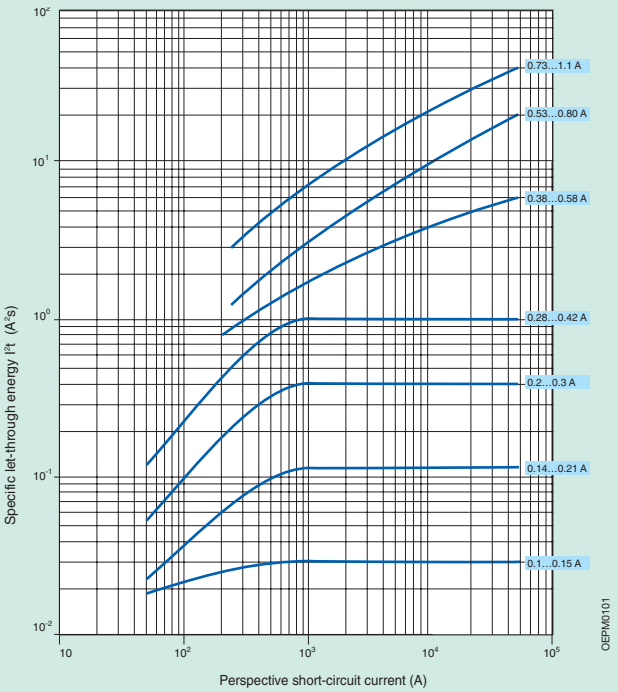

## S 500 characteristics B, C and D

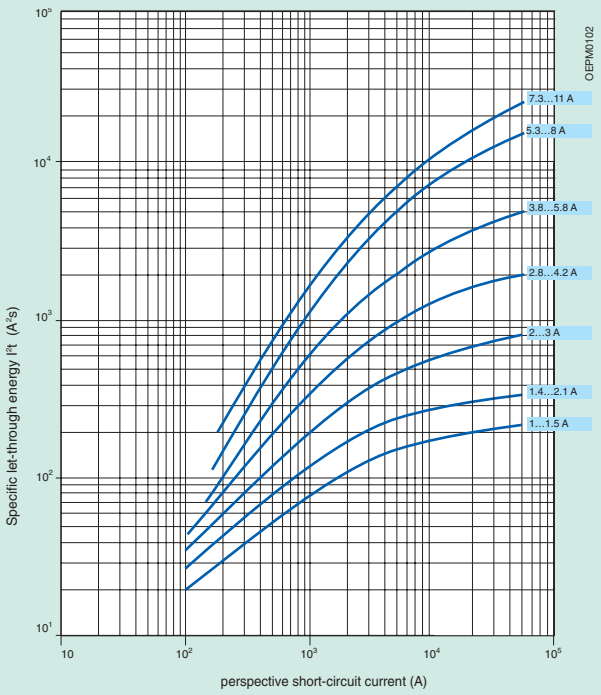


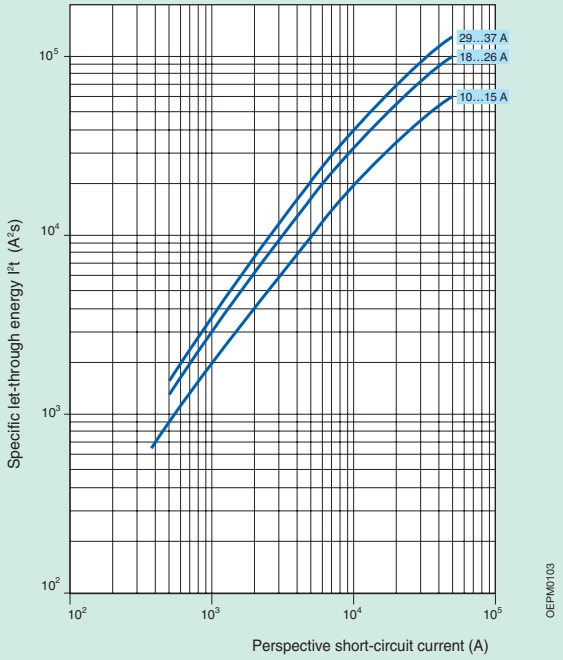
2

## S 500 K - S 500 KM

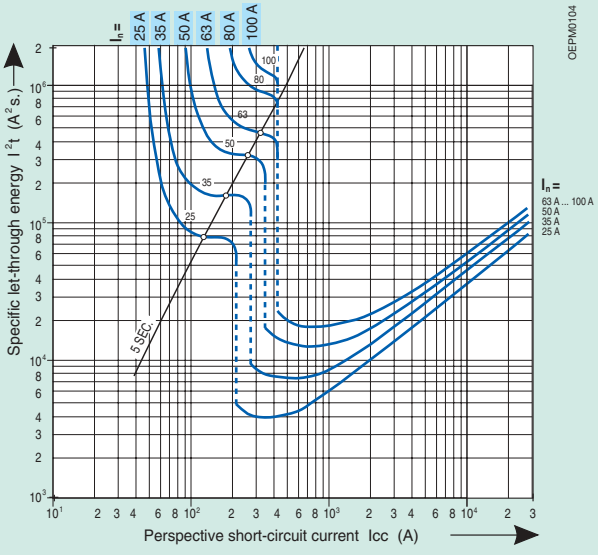



## S 500 K - S 500 KM



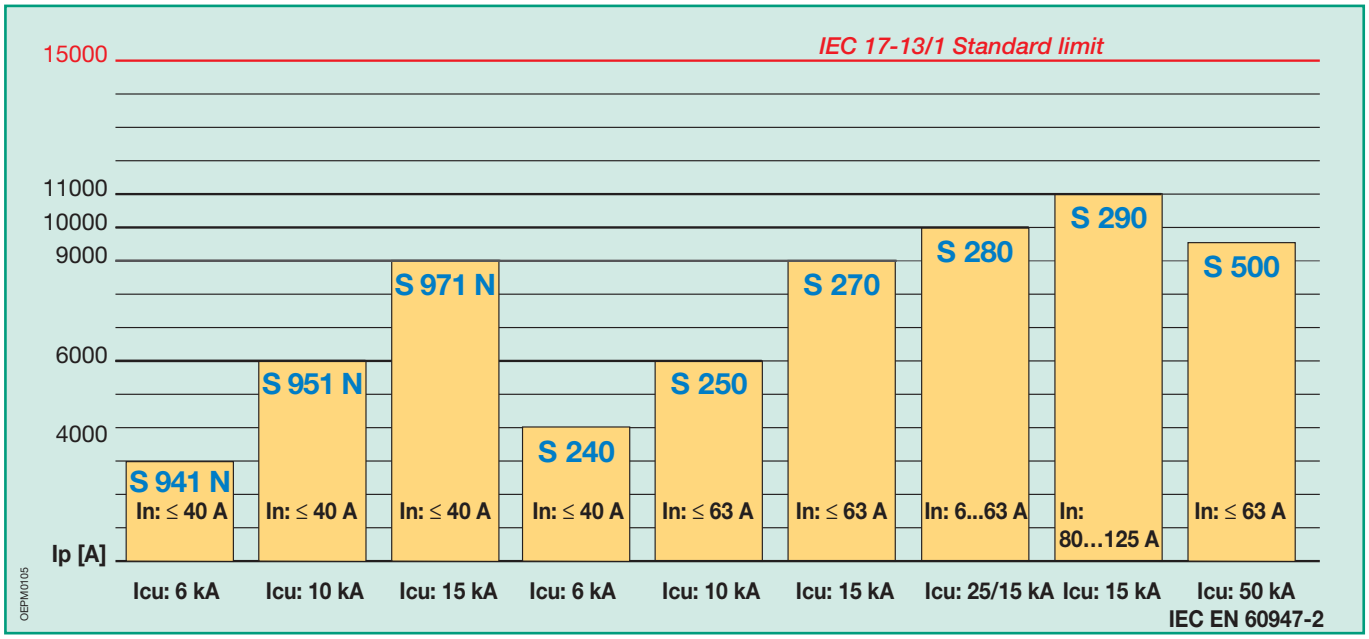

## S 700 characteristic E selective



## Ip peak current

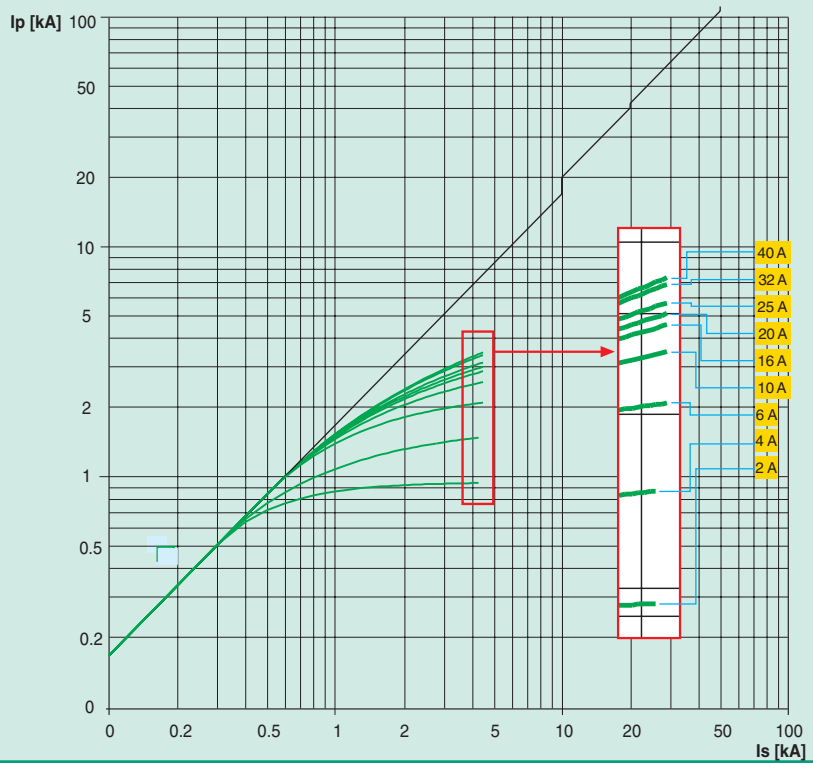
With reference to IEC 17-13/1 and 23-51 relative to the short-circuit withstand test, the limited peak current values corresponding to the ultimate breaking capacity Icu (EN 60947-2) are shown below.

| Series | In [A] | Icu [kA] | Ip [kA] |
|---|---|---|---|
| **S 941 N** | 2...40 | 6 | 3.5 |
| **S 951 N** | 2...40 | 10 | 6 |
| **S 971 N** | 2...40 | 15 | 9 |
| **S 240** | 6...40 | 6 | 4 |
| **S 250** | 0.5...63 | 10 | 6 |
| **S 270** | 0.5...63 | 15 | 9 |
| **S 280** | 6...63 | 25/15 | 10 |
| **S 290** | 80...125 | 15 | 11 |
| **S 500** | 6...63 | 50 | 9.5 |

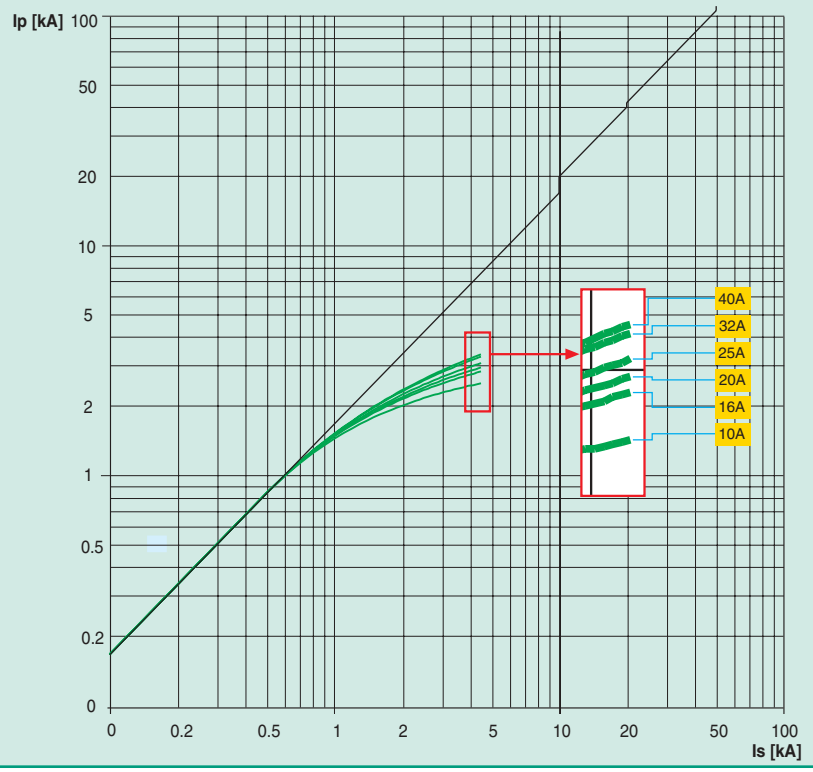


## Limitation curves

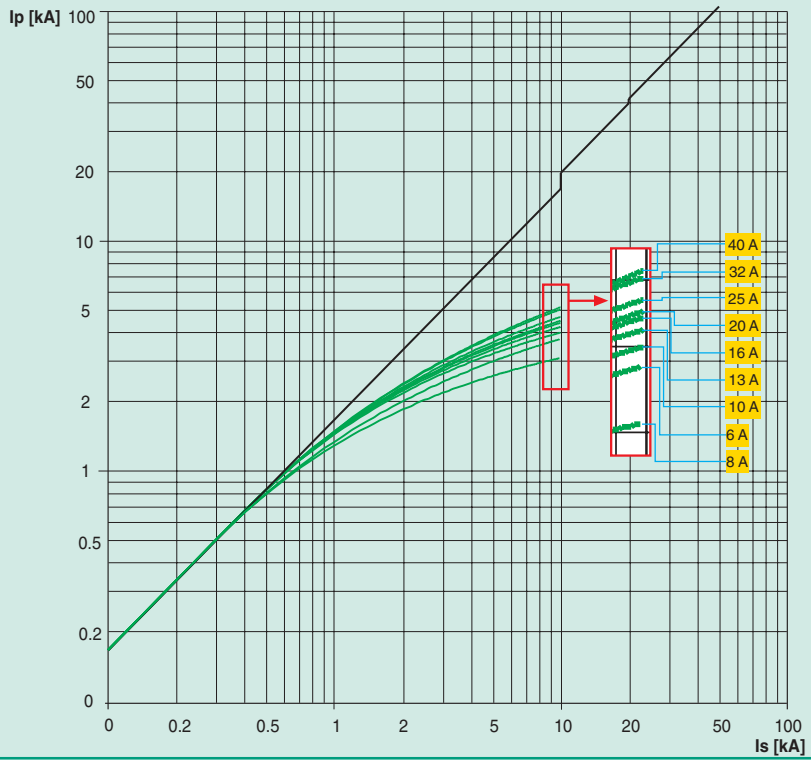
### S 941 N characteristic C - 230 V



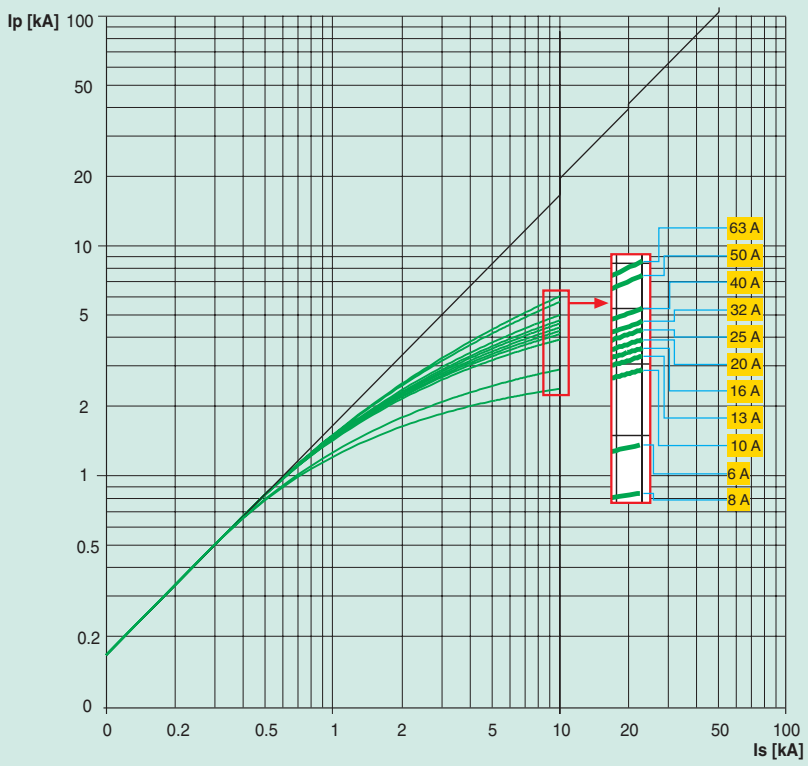

### S 941 N characteristic B - 230 V



## S 240 characteristic C - 3P, 4P 400 V

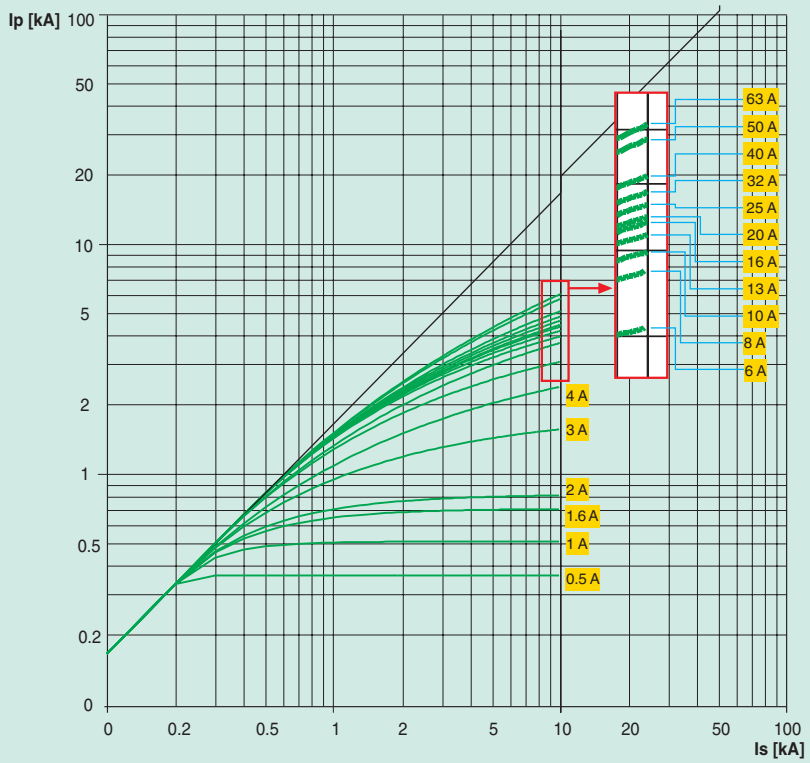



## S 250 characteristic B - 3P, 4P 400 V

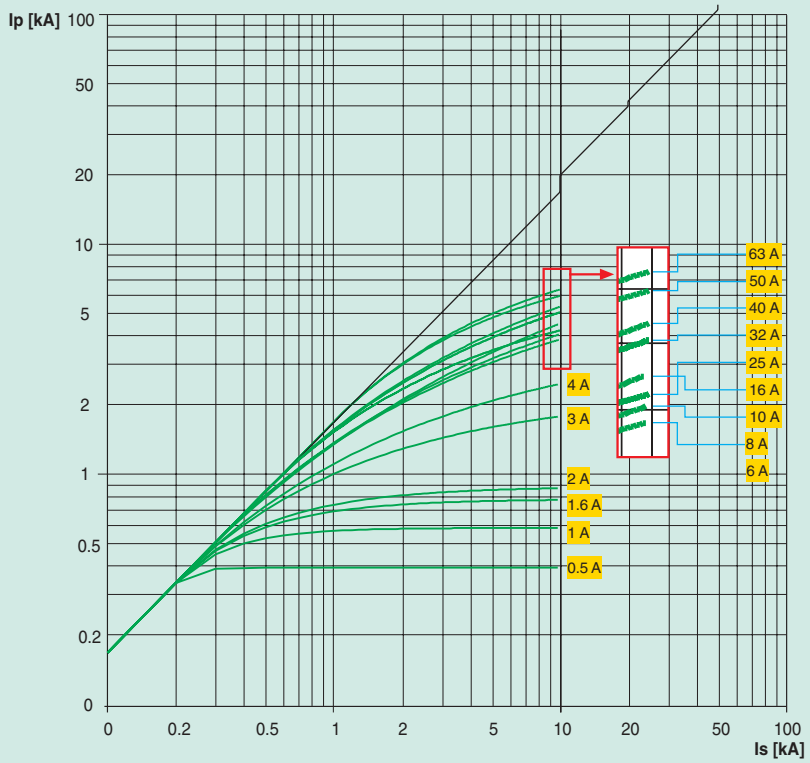


2

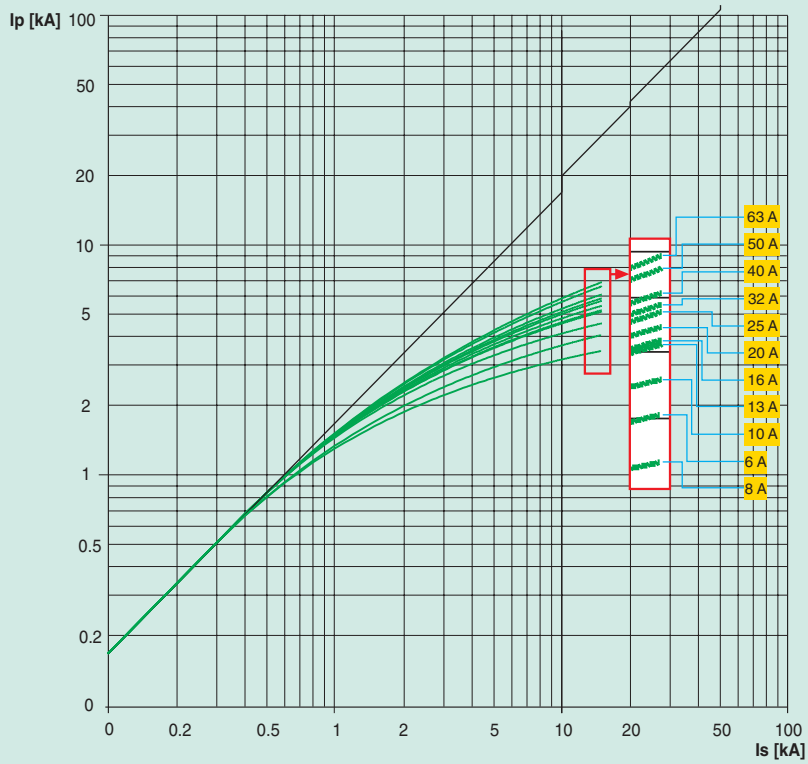
## S 250 characteristic C - 3P, 4P 400 V



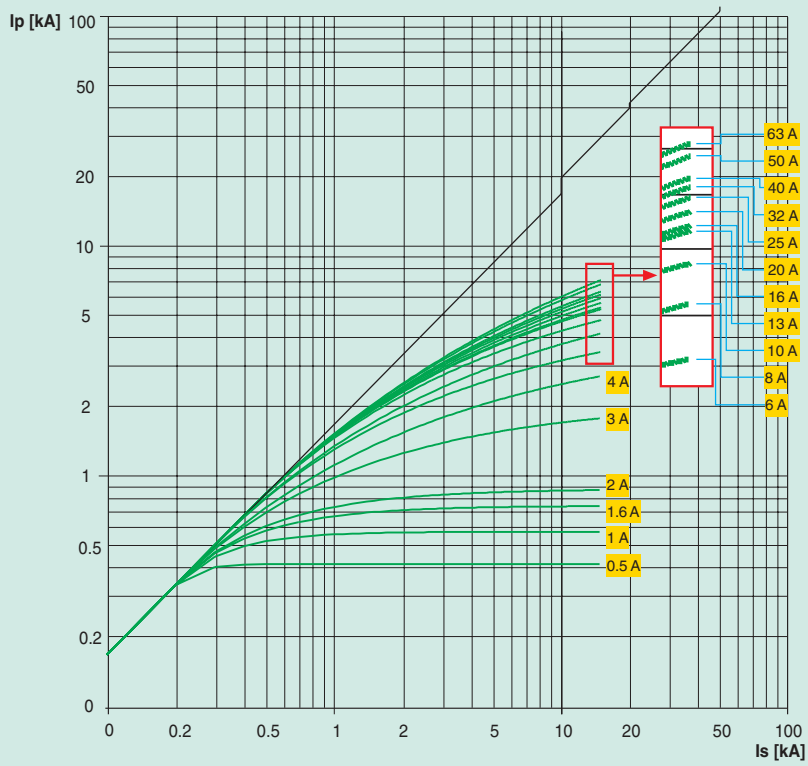

## S 250 characteristic K - 3P, 4P 400 V



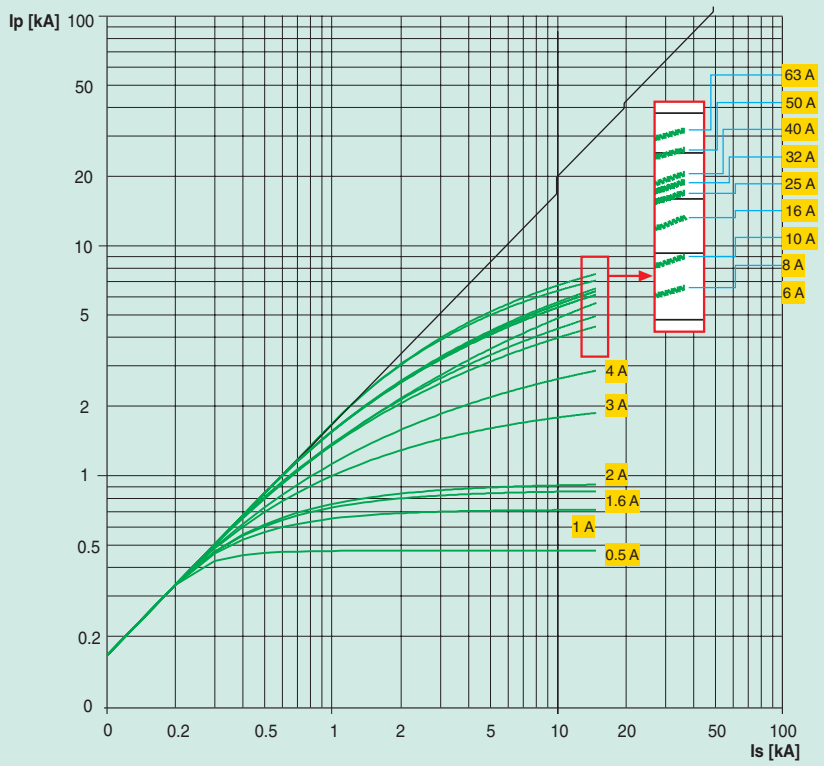
## S 270 characteristic B - 3P, 4P 400 V



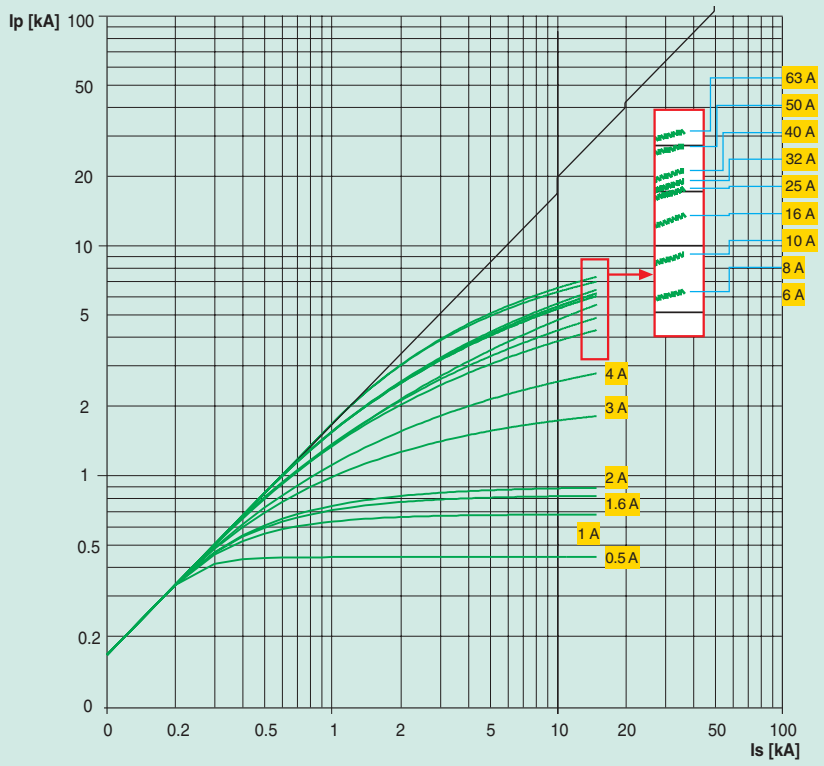

## S 270 characteristic C - 3P, 4P 400 V



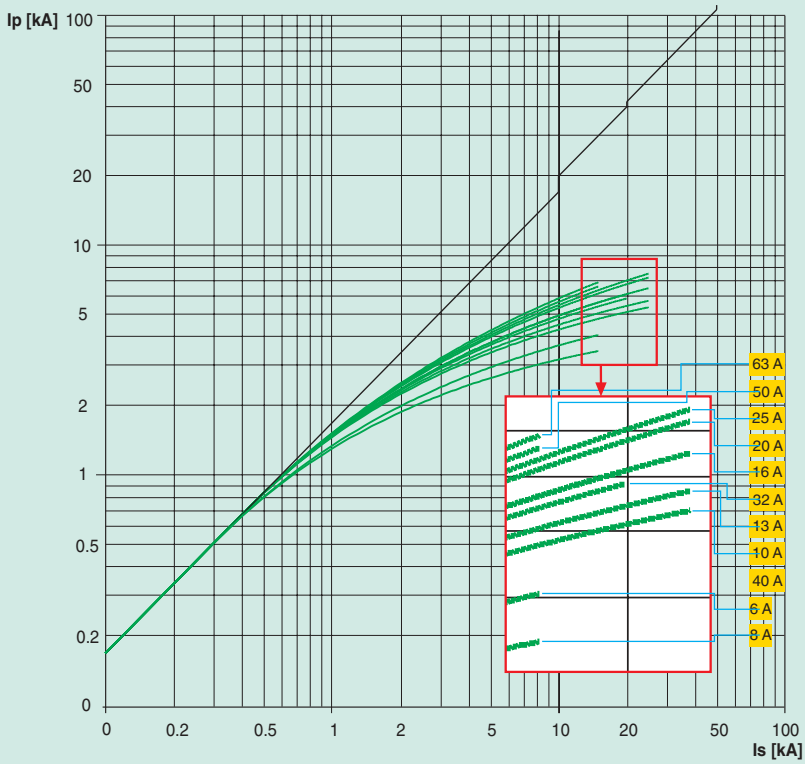
## S 270 characteristic D - 3P, 4P 400 V



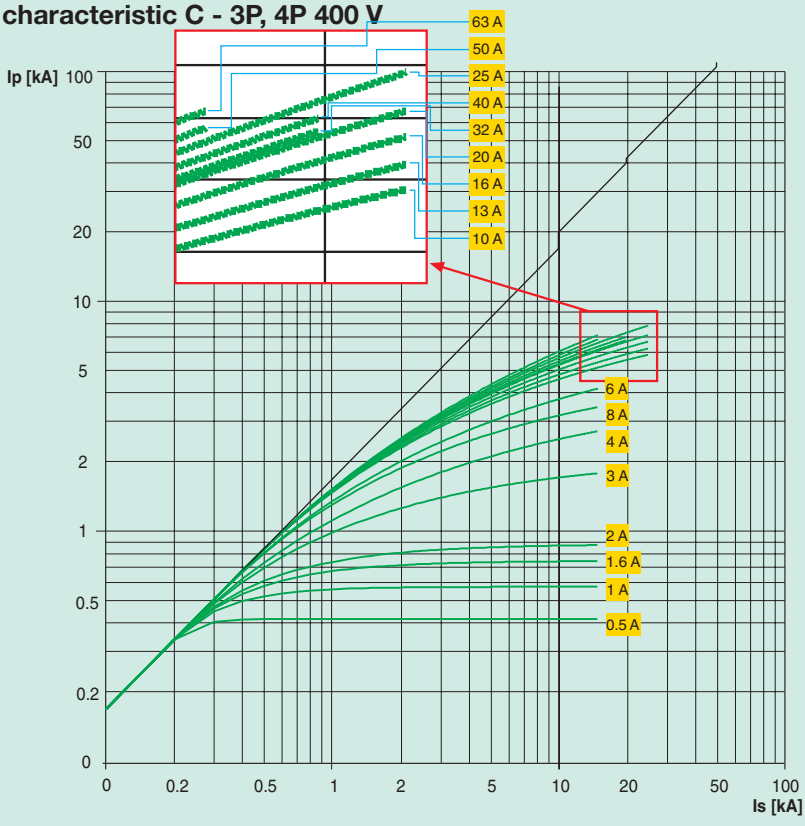

## S 270 characteristic K - 3P, 4P 400 V



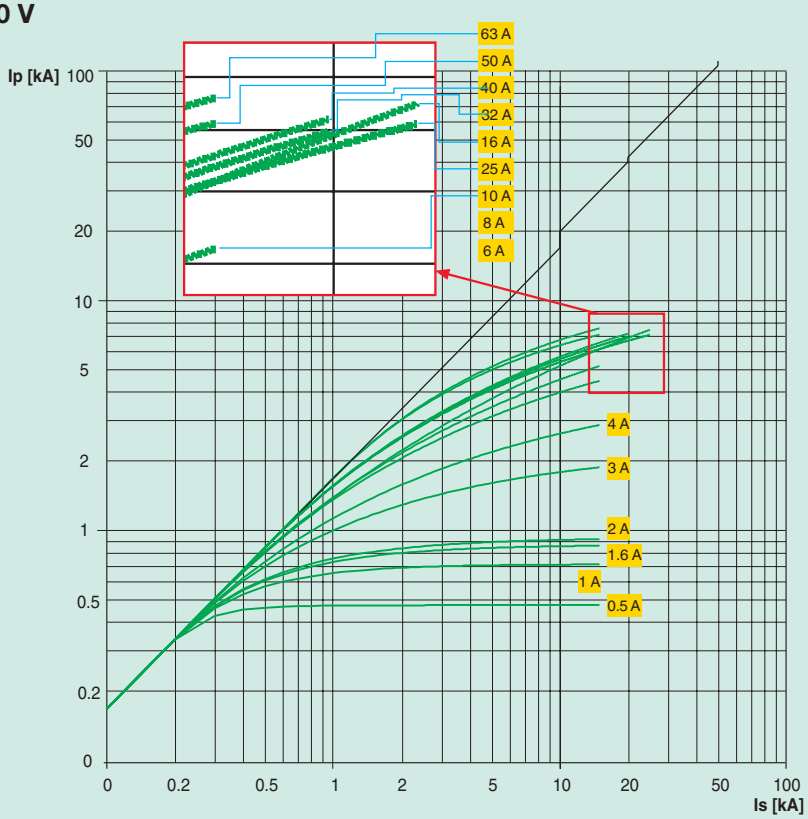
## S 280 characteristic B - 3P, 4P 400 V



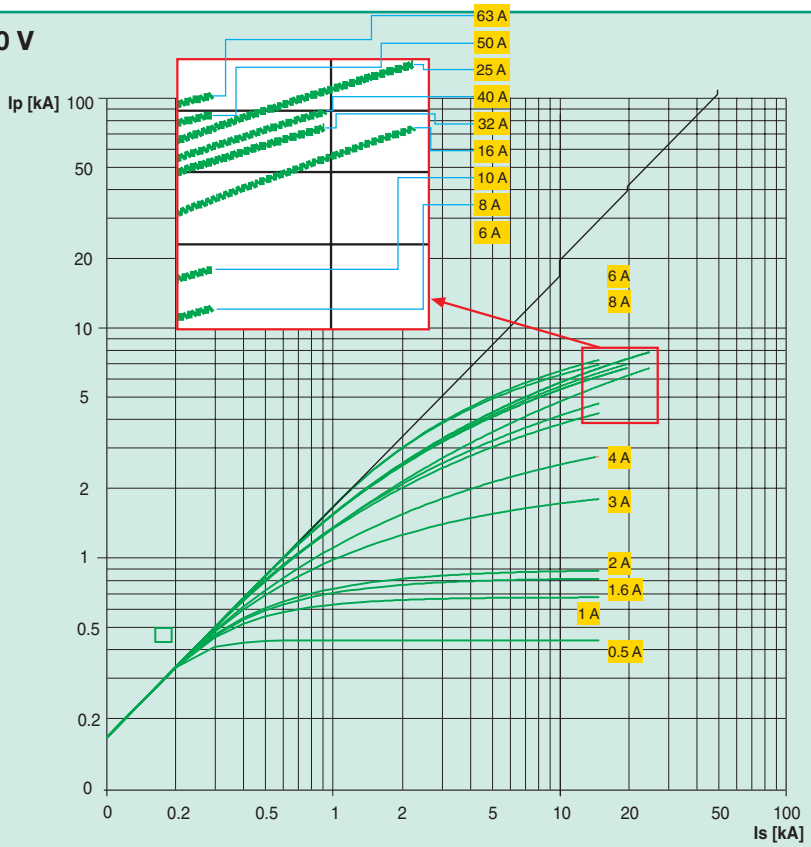

## S 280 characteristic C - 3P, 4P 400 V



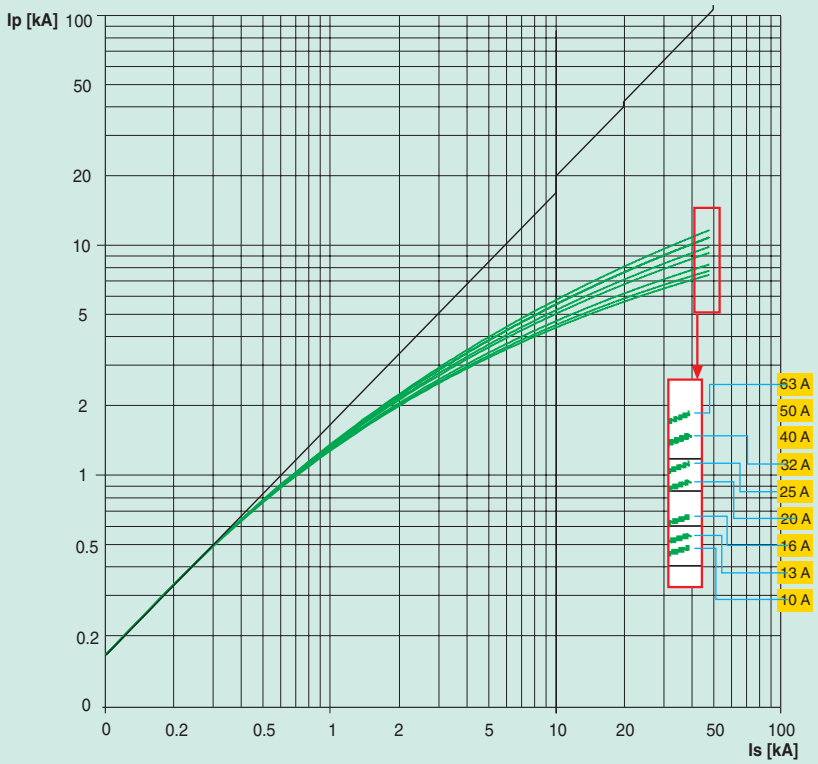
## S 280 characteristic D - 3P, 4P 400 V




## S 280 characteristic K - 3P, 4P 400 V



## S 500 characteristics B-C-D - 3P, 4P 400 V



## Coordination tables

### Back up protection

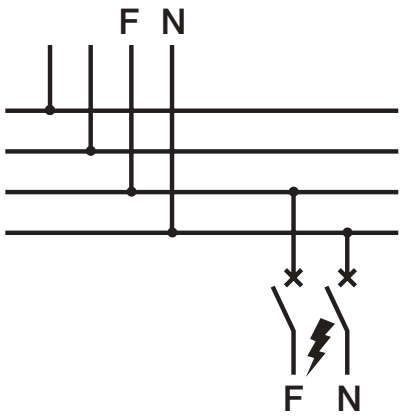
The back up protection tables below indicate the value (in kA, relative to breaking capacity according to IEC 60947-2) for which back up protection was in place between the preselected combination of ABB circuit-breakers and in particular between all of the series of modular breakers and the moulded-case circuit-breakers Tmax. The values in the tables refer to a voltage Vn of 400 V a.c.

### Selective protection

The selective protection tables indicate the value (in kA, relative to breaking capacity according to IEC 60947-2) for which selective protection was in place between the preselected combination of ABB circuit-breakers and in particular between all of the series of modular breakers and the moulded-case circuit-breakers Tmax. The values in the tables represent the maximum selectivity which can be obtained between the breaker upstream and downstream, for a voltage Vn of 400 V a.c.

### 230V mains supply downstream of a 400V mains supply

To discover whether or not filtration is possible between devices downstream and upstream in a TT or TNS system with a 400 V mains supply in which 1P+N breakers are installed, consult the filtration table for 230  V supply networks.



## Back up protection

Upstream breaker: modular
Downstream breaker: modular

| 230/240 V | Upstream breaker | | | S 240 | S 250 | S 270 | S 280 | S 280 | S 280 | S 280 | S 290 | S 500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downstream | In [A] | | | (6...40) | (0.5...63) | (0.5...63) | (10...25) | (32...40) | (50...63) | (80...100) | (80...125) | (6...63) |
| breaker | | | Icu (kA) | 10 | 20 | 25 | 40 | 30 | 25 | 20 | 25 | 100 |
| | | | Im | C | B-C | B-C | B-C | B-C | B-C | B-C | C | B-C |
| **S 931 N** | (2...40) | 3 | C | 10 | 20 | 25 | 40 | 30 | 25 | 15 | 15 | 100 |
| **S 941 N** | (2...40) | 6 | B-C | 10 | 20 | 25 | 40 | 30 | 25 | 15 | 15 | 100 |
| **S 951 N** | (2...40) | 10 | B-C | 10 | 20 | 25 | 40 | 30 | 25 | 15 | 15 | 100 |
| **S 971 N** | (2...40) | 10 | B-C | 10 | 20 | 25 | 40 | 30 | 25 | 15 | 15 | 100 |
| **S 240** | (6...40) | 10 | C | - | 20 | 25 | 40 | 30 | 25 | 15 | 15 | 100 |
| **S 250** | (0.5...63) | 20 | B-C-K-D | - | - | 25 | 40 | 30 | 25 | - | - | 100 |
| **S 260** | (0.5...63) | 10 | B-C | - | - | 25 | 40 | 30 | 25 | - | - | 100 |
| **S 270** | (0.5...63) | 20 | Z | - | - | 25 | 40 | 30 | 25 | - | - | 100 |
| **S 270** | (0.5...63) | 25 | B-C-K-D | - | - | - | 40 | 30 | - | - | - | 100 |
| **S 280** | (3...8) | 40 | B-C-D-K-Z | - | - | - | 40 | 30 | - | - | - | 100 |
| **S 280** | (10...25) | 30 | B-C-D-K-Z | - | - | - | - | - | - | - | - | 100 |
| **S 280** | (32...40) | 25 | B-C-D-K-Z | - | - | - | - | - | - | - | - | 100 |
| **S 280** | (50...63) | 20 | B-C-D-K-Z | - | - | - | - | - | - | - | - | - |
| **S 280** | (80...100) | 20 | B-C | - | - | - | - | - | - | - | - | - |
| **S 290** | (80...125) | 25 | C-D | - | - | - | - | - | - | - | - | - |
| **S 500** | (6...63) | 100 | B-C-D | - | - | - | - | - | - | - | - | - |

| 400/415 V | Upstream breaker | | | S 240 | S 250 | S 270 | S 280 | S 280 | S 280 | S 280 | S 290 | S 500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downstream | In [A] | | | (6...40) | (0.5...63) | (0.5...63) | (10...25) | (32...40) | (50...63) | (80...100) | (80...125) | (6...63) |
| breaker | | Icu (kA) | | 7.5 | 10 | 15 | 25 | 20 | 15 | 6 | 15 | 50 |
| | | | Im | B-C | B-C | B-C | B-C | C | C | B-C | B-C | B-C |
| **S 240** | (6...40) | 7.5 | C | - | 10 | 15 | 25 | 20 | 15 | - | 15 | 50 |
| **S 250** | (0.5...63) | 10 | B-C-K-D | - | - | 15 | 25 | 20 | 15 | - | 15 | 50 |
| **S 260** | (0.5...63) | 10 | B-C | - | - | 15 | 25 | 20 | 15 | - | 15 | 50 |
| **S 270** | (0.5...63) | 10 | Z | - | - | 15 | 25 | 20 | 15 | - | 15 | 50 |
| **S 270** | (0.5...63) | 15 | B-C-K-D | - | - | - | 25 | 20 | - | - | 15 | 50 |
| **S 280** | (3...8) | 25 | B-C-D-K-Z | - | - | - | 25 | 20 | - | - | - | 50 |
| **S 280** | (10...25) | 20 | B-C-D-K-Z | - | - | - | - | - | - | - | - | 50 |
| **S 280** | (32...40) | 15 | B-C-D-K-Z | - | - | - | - | - | - | - | - | 50 |
| **S 280** | (50...63) | 10 | B-C-D-K-Z | - | - | - | - | - | - | - | - | - |
| **S 280** | (80...100) | 6 | B-C | - | - | - | - | - | - | - | - | - |
| **S 290** | (80...125) | 15 | C-D | - | - | - | - | - | - | - | - | - |
| **S 500** | (6...63) | 50 | B-C-D | - | - | - | - | - | - | - | - | - |

## Upstream breaker: moulded-case Tmax
## Downstream breaker: modular

| 400 V | Upstream breaker | | | T1 | T1 | T1 | T2 | T3 | T2 | T3 | T2 | T2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downstream | Version | | | B | C | | N | | S | | H | L |
| breaker | Ch. | $I_n$ [A] | $I_{cu}$ [kA] | 16 | 25 | | 36 | | 50 | | 70 | 85 |
| **S 240** | C | 6...10 | 7.5 | 16 | 25 | 30 | 36 | 36 | 36 | 40 | 40 | 40 |
| | | 13...40 | | | | | | 16 | | 16 | | |
| **S 250** | B-C-K | 3...10 | 10 | 16 | 25 | 30 | 36 | 36 | 36 | 40 | 40 | 40 |
| | | 13...63 | | | | | | 16 | | 16 | | |
| **S 260** | B-C | 3...10 | 10 | 16 | 25 | 30 | 36 | 36 | 36 | 40 | 40 | 40 |
| | | 13...63 | | | | | | 16 | | 16 | | |
| **S 270** | B-C-D | 3...10 | 15 | 16 | 25 | 30 | 36 | 36 | 50 | 40 | 70 | 85 |
| | | 13...63 | | | | | | 25 | | 25 | 60 | 60 |
| **S 270** | Z | 3...10 | 10 | 16 | 25 | 30 | 36 | 36 | 36 | 40 | 40 | 40 |
| | | 13...63 | | | | | | 16 | | 16 | | |
| **S 280** | B-C-D-K-Z | 3...10 | | | | | | 36 | | 40 | 70 | 85 |
| | | 13...25 | 25 | | | 30 | | 30 | 50 | 30 | | |
| | | 32...40 | 20 | | 25 | | 36 | 25 | | 25 | 60 | 60 |
| | | 50...63 | 15 | 16 | | | | 25 | | 25 | | |
| | | 80/100 | 6 | 16 | 16 | 16 | | 16 | 36 | 16 | 36 | 36 |
| **S 290** | C-D-K | 80...125 | 15 | 16 | 25 | 30 | 36 | 30 | 50 | 30 | 70 | 85 |

## Selective protection

### Selectivity between S 9.. and S 2.. upstream and downstream modular circuit-breakers

In this case, selectivity is amperometric and so the selectivity limit is given simply by the magnetic threshold of the upstream breaker, which is fixed. This selectivity value is obtained if a minimum ratio of 1.6 (In upstream/In downstream > 1.6) is observed between the rated currents of the two breakers.



Example 1

| | |
|---|---|
| Upstream circuit-breaker | S 270, curve D 63 A |
| downstream circuit-breaker | S 240, curve C 32 A |
| Selectivity limit | 10 In=630 A |

Example 2

| | |
|---|---|
| Upstream circuit-breaker | S 280, curve D 50 A |
| downstream circuit-breaker | S 941 N, curve B 10 A |
| Selectivity limit | 10 In=500 A |

Upstream breaker: S 290
Downstream breaker: modular

| | Upstream breaker S 290 | | | | | |
|---|---|---|---|---|---|---|
| | Im | | | C | C | C |
| | | Icu [kA] | | 15 | 15 | 15 |
| | | | In [A] | 80 | 100 | 125 |
| **Downstream breaker** | C | 4.5 | 2 | T | T | T |
| | C | 4.5 | 4 | T | T | T |
| | C | 4.5 | 6 | T | T | T |
| | C | 4.5 | 10 | 4 | T | T |
| **S 931 N** | C | 4.5 | 16 | 2.5 | 3.5 | 3.5 |
| | C | 4.5 | 20 | 1.5 | 2.5 | 2.5 |
| | C | 4.5 | 25 | 0.5 | 0.5 | 1.5 |
| | C | 4.5 | 32 | 0.5 | 0.5 | 0.5 |
| | C | 4.5 | 40 | 0.5 | 0.5 | 0.5 |

| | Upstream breaker S 290 | | | | | |
|---|---|---|---|---|---|---|
| | Im | | | C | C | C |
| | | Icu [kA] | | 15 | 15 | 15 |
| | | | In [A] | 80 | 100 | 125 |
| **Downstream breaker** | B-C | 6 | 2 | T | T | T |
| | B-C | 6 | 4 | 5 | T | T |
| | B-C | 6 | 6 | 4.5 | 5 | T |
| | B-C | 6 | 10 | 4 | 4.5 | 5 |
| **S 941 N** | B-C | 6 | 16 | 2.5 | 3.5 | 3.5 |
| | B-C | 6 | 20 | 1.5 | 2.5 | 2.5 |
| | B-C | 6 | 25 | 0.5 | 0.5 | 1.5 |
| | B-C | 6 | 32 | 0.5 | 0.5 | 0.5 |
| | B-C | 6 | 40 | 0.5 | 0.5 | 0.5 |

| | Upstream breaker S 290 | | | | | |
|---|---|---|---|---|---|---|
| | Im | | | C | C | C |
| | | Icu [kA] | | 15 | 15 | 15 |
| | | | In [A] | 80 | 100 | 125 |
| **Downstream breaker** | B-C | 10 | 2 | 6 | 8 | 9 |
| | B-C | 10 | 4 | 5 | 6 | 7.5 |
| | B-C | 10 | 6 | 4.5 | 5 | 6 |
| | B-C | 10 | 10 | 4 | 4.5 | 5 |
| **S 951 N** | B-C | 10 | 16 | 2.5 | 3.5 | 3.5 |
| | B-C | 10 | 20 | 1.5 | 2.5 | 2.5 |
| | B-C | 10 | 25 | 0.5 | 0.5 | 1.5 |
| | B-C | 10 | 32 | 0.5 | 0.5 | 0.5 |
| | B-C | 10 | 40 | 0.5 | 0.5 | 0.5 |

| | Upstream breaker S 290 | | | | | |
|---|---|---|---|---|---|---|
| | Im | | | C | C | C |
| | | Icu [kA] | | 15 | 15 | 15 |
| | | | In [A] | 80 | 100 | 125 |
| **Downstream breaker** | B-C | 10 | 2 | 6 | 8 | 9 |
| | B-C | 10 | 4 | 5 | 6 | 7.5 |
| | B-C | 10 | 6 | 4.5 | 5 | 6 |
| | B-C | 10 | 10 | 4 | 4.5 | 5 |
| **S 971 N** | B-C | 10 | 16 | 2.5 | 3.5 | 3.5 |
| | B-C | 10 | 20 | 1.5 | 2.5 | 2.5 |
| | B-C | 10 | 25 | 0.5 | 0.5 | 1.5 |
| | B-C | 10 | 32 | 0.5 | 0.5 | 0.5 |
| | B-C | 10 | 40 | 0.5 | 0.5 | 0.5 |

**Upstream breaker S 290**

| | Im | | | D | D |
|---|---|---|---|---|---|
| | | Icu [kA] | | 15 | 15 |
| | | | In [A] | 80 | 100 |
| **Downstream breaker S 931 N** | C | 4.5 | 2 | T | T |
| | C | 4.5 | 4 | T | T |
| | C | 4.5 | 6 | T | T |
| | C | 4.5 | 10 | T | T |
| | C | 4.5 | 16 | 4 | T |
| | C | 4.5 | 20 | 3 | T |
| | C | 4.5 | 25 | 2 | 4 |
| | C | 4.5 | 32 | 1.5 | 3.5 |
| | C | 4.5 | 40 | 1.5 | 3.5 |

**Upstream breaker S 290**

| | Im | | | D | D |
|---|---|---|---|---|---|
| | | Icu [kA] | | 15 | 15 |
| | | | In [A] | 80 | 100 |
| **Downstream breaker S 941 N** | B-C | 6 | 2 | T | T |
| | B-C | 6 | 4 | T | T |
| | B-C | 6 | 6 | 5.5 | T |
| | B-C | 6 | 10 | 5 | 5 |
| | B-C | 6 | 16 | 4 | 4.5 |
| | B-C | 6 | 20 | 3 | 4.5 |
| | B-C | 6 | 25 | 2 | 4 |
| | B-C | 6 | 32 | 1.5 | 3.5 |
| | B-C | 6 | 40 | 1.5 | 3.5 |

**Upstream breaker S 290**

| | Im | | | D | D |
|---|---|---|---|---|---|
| | | Icu [kA] | | 15 | 15 |
| | | | In [A] | 80 | 100 |
| **Downstream breaker S 951 N** | B-C | 10 | 2 | 7 | 8 |
| | B-C | 10 | 4 | 6 | 7 |
| | B-C | 10 | 6 | 5.5 | 6 |
| | B-C | 10 | 10 | 5 | 5 |
| | B-C | 10 | 16 | 4 | 4.5 |
| | B-C | 10 | 20 | 3 | 4.5 |
| | B-C | 10 | 25 | 2 | 4 |
| | B-C | 10 | 32 | 1.5 | 3.5 |
| | B-C | 10 | 40 | 1.5 | 3.5 |

**Upstream breaker S 290**

| | Im | | | D | D |
|---|---|---|---|---|---|
| | | Icu [kA] | | 15 | 15 |
| | | | In [A] | 80 | 100 |
| **Downstream breaker S 971 N** | B-C | 10 | 2 | 7 | 8 |
| | B-C | 10 | 4 | 6 | 7 |
| | B-C | 10 | 6 | 5.5 | 6 |
| | B-C | 10 | 10 | 5 | 5 |
| | B-C | 10 | 16 | 4 | 4.5 |
| | B-C | 10 | 20 | 3 | 4.5 |
| | B-C | 10 | 25 | 2 | 4 |
| | B-C | 10 | 32 | 1.5 | 3.5 |
| | B-C | 10 | 40 | 1.5 | 3.5 |

Upstream breaker: S 500
Downstream breaker: modular



**Upstream breaker S 500**

| | Im | | | B | B | B | B | B | B | B | B | B | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [ A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | C | 4.5 | 2 | - | - | - | 0.1 | 0.15 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 |
| **breaker** | C | 4.5 | 4 | - | - | - | - | 0.06 | 0.15 | 0.25 | 0.3 | 0.4 | 0.5 |
| | C | 4.5 | 6 | - | - | - | - | - | 0.075 | 0.2 | 0.25 | 0.3 | 0.4 |
| | C | 4.5 | 10 | - | - | - | - | - | - | 0.15 | 0.2 | 0.25 | 0.3 |
| **S 931 N** | C | 4.5 | 16 | - | - | - | - | - | - | - | - | - | 0.3 |
| | C | 4.5 | 20 | - | - | - | - | - | - | - | - | - | 0.3 |
| | C | 4.5 | 25 | - | - | - | - | - | - | - | - | - | 0.3 |
| | C | 4.5 | 32 | - | - | - | - | - | - | - | - | - | - |
| | C | 4.5 | 40 | - | - | - | - | - | - | - | - | - | - |

**Upstream breaker S 500**

| | Im | | | B | B | B | B | B | B | B | B | B | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [ A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 6 | 2 | - | - | - | 0.1 | 0.15 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 |
| **breaker** | B-C | 6 | 4 | - | - | - | - | - | 0.15 | 0.25 | 0.3 | 0.4 | 0.5 |
| | B-C | 6 | 6 | - | - | - | - | - | - | 0.2 | 0.25 | 0.3 | 0.4 |
| | B-C | 6 | 10 | - | - | - | - | - | - | 0.15 | 0.2 | 0.25 | 0.3 |
| **S 941 N** | B-C | 6 | 16 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 6 | 20 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 6 | 25 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 6 | 32 | - | - | - | - | - | - | - | - | - | - |
| | B-C | 6 | 40 | - | - | - | - | - | - | - | - | - | - |

**Upstream breaker S 500**

| | Im | | | B | B | B | B | B | B | B | B | B | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [ A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 10 | 2 | - | - | - | 0.1 | 0.15 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 |
| **breaker** | B-C | 10 | 4 | - | - | - | - | - | 0.15 | 0.25 | 0.3 | 0.4 | 0.5 |
| | B-C | 10 | 6 | - | - | - | - | - | - | 0.2 | 0.25 | 0.3 | 0.4 |
| | B-C | 10 | 10 | - | - | - | - | - | - | 0.15 | 0.2 | 0.25 | 0.3 |
| **S 951 N** | B-C | 10 | 16 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 10 | 20 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 10 | 25 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 10 | 32 | - | - | - | - | - | - | - | - | - | - |
| | B-C | 10 | 40 | - | - | - | - | - | - | - | - | - | - |

**Upstream breaker S 500**

| | Im | | | B | B | B | B | B | B | B | B | B | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [ A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 10 | 2 | - | - | - | 0.1 | 0.15 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 |
| **breaker** | B-C | 10 | 4 | - | - | - | - | - | 0.15 | 0.25 | 0.3 | 0.4 | 0.5 |
| | B-C | 10 | 6 | - | - | - | - | - | - | 0.2 | 0.25 | 0.3 | 0.4 |
| | B-C | 10 | 10 | - | - | - | - | - | - | 0.15 | 0.2 | 0.25 | 0.3 |
| **S 971 N** | B-C | 10 | 16 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 10 | 20 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 10 | 25 | - | - | - | - | - | - | - | - | - | 0.3 |
| | B-C | 10 | 32 | - | - | - | - | - | - | - | - | - | - |
| | B-C | 10 | 40 | - | - | - | - | - | - | - | - | - | - |

**Upstream breaker S 500**

| | Im | | | C | C | C | C | C | C | C | C | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | C | 4.5 | 2 | - | 0.1 | 0.2 | 0.34 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 | 1 |
| **breaker** | C | 4.5 | 4 | - | - | 0.15 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 |
| | C | 4.5 | 6 | - | - | 0.1 | 0.2 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 |
| | C | 4.5 | 10 | - | - | - | 0.15 | 0.2 | 0.34 | 0.48 | 0.53 | 0.58 | 0.62 |
| **S 931 N** | C | 4.5 | 16 | - | - | - | - | 0.15 | 0.26 | 0.4 | 0.48 | 0.53 | 0.58 |
| | C | 4.5 | 20 | - | - | - | - | - | 0.2 | 0.34 | 0.4 | 0.48 | 0.53 |
| | C | 4.5 | 25 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | C | 4.5 | 32 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | C | 4.5 | 40 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |

**Upstream breaker S 500**

| | Im | | | C | C | C | C | C | C | C | C | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 6 | 2 | - | 0.1 | 0.2 | 0.34 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 | 1 |
| **breaker** | B-C | 6 | 4 | - | - | 0.15 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 |
| | B-C | 6 | 6 | - | - | 0.1 | 0.2 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 |
| | B-C | 6 | 10 | - | - | - | 0.15 | 0.2 | 0.34 | 0.48 | 0.53 | 0.58 | 0.62 |
| **S 941 N** | B-C | 6 | 16 | - | - | - | - | 0.15 | 0.26 | 0.4 | 0.48 | 0.53 | 0.58 |
| | B-C | 6 | 20 | - | - | - | - | - | 0.2 | 0.34 | 0.4 | 0.48 | 0.53 |
| | B-C | 6 | 25 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | B-C | 6 | 32 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | B-C | 6 | 40 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |

**Upstream breaker S 500**

| | Im | | | C | C | C | C | C | C | C | C | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 10 | 2 | - | 0.1 | 0.2 | 0.34 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 | 1 |
| **breaker** | B-C | 10 | 4 | - | - | 0.15 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 |
| | B-C | 10 | 6 | - | - | 0.1 | 0.2 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 |
| | B-C | 10 | 10 | - | - | - | 0.15 | 0.2 | 0.34 | 0.48 | 0.53 | 0.58 | 0.62 |
| **S 951 N** | B-C | 10 | 16 | - | - | - | - | 0.15 | 0.26 | 0.4 | 0.48 | 0.53 | 0.58 |
| | B-C | 10 | 20 | - | - | - | - | - | 0.2 | 0.34 | 0.4 | 0.48 | 0.53 |
| | B-C | 10 | 25 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | B-C | 10 | 32 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | B-C | 10 | 40 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |

**Upstream breaker S 500**

| | Im | | | C | C | C | C | C | C | C | C | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 10 | 2 | - | 0.1 | 0.2 | 0.34 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 | 1 |
| **breaker** | B-C | 10 | 4 | - | - | 0.15 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 | 0.85 |
| | B-C | 10 | 6 | - | - | 0.1 | 0.2 | 0.26 | 0.4 | 0.53 | 0.58 | 0.62 | 0.7 |
| | B-C | 10 | 10 | - | - | - | 0.15 | 0.2 | 0.34 | 0.48 | 0.53 | 0.58 | 0.62 |
| **S 971 N** | B-C | 10 | 16 | - | - | - | - | 0.15 | 0.26 | 0.4 | 0.48 | 0.53 | 0.58 |
| | B-C | 10 | 20 | - | - | - | - | - | 0.2 | 0.34 | 0.4 | 0.48 | 0.53 |
| | B-C | 10 | 25 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | B-C | 10 | 32 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |
| | B-C | 10 | 40 | - | - | - | - | - | - | 0.26 | 0.34 | 0.4 | 0.48 |

**Upstream breaker S 500**

| | Im | | | D | D | D | D | D | D | D | D | D | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | C | 4.5 | 2 | - | 0.24 | 0.5 | 1 | 2 | 3 | T | T | T | T |
| **breaker** | C | 4.5 | 4 | - | 0.2 | 0.32 | 0.5 | 1 | 2 | 3.5 | T | T | T |
| | C | 4.5 | 6 | - | 0.15 | 0.24 | 0.35 | 0.5 | 1 | 2 | 4 | T | T |
| | C | 4.5 | 10 | - | - | 0.2 | 0.32 | 0.35 | 0.5 | 0.5 | 2 | T | T |
| **S 931 N** | C | 4.5 | 16 | - | - | - | 0.24 | 0.3 | 0.5 | 0.5 | 1.5 | 3.5 | T |
| | C | 4.5 | 20 | - | - | - | - | - | 0.35 | 0.5 | 1 | 2.5 | 3.5 |
| | C | 4.5 | 25 | - | - | - | - | - | - | 0.5 | 0.5 | 1.5 | 2 |
| | C | 4.5 | 32 | - | - | - | - | - | - | - | - | 0.51 | 1.5 |
| | C | 4.5 | 40 | - | - | - | - | - | - | - | - | - | 0.51 |

**Upstream breaker S 500**

| | Im | | | D | D | D | D | D | D | D | D | D | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 6 | 2 | - | 0.24 | 0.5 | 1 | 2 | 3 | T | T | T | T |
| **breaker** | B-C | 6 | 4 | - | 0.2 | 0.32 | 0.5 | 1 | 2 | 3.5 | T | T | T |
| | B-C | 6 | 6 | - | 0.15 | 0.24 | 0.35 | 0.5 | 1 | 2 | 4 | T | T |
| | B-C | 6 | 10 | - | - | 0.2 | 0.32 | 0.35 | 0.5 | 0.5 | 2 | T | T |
| **S 941 N** | B-C | 6 | 16 | - | - | - | 0.24 | 0.3 | 0.5 | 0.5 | 1.5 | 3.5 | T |
| | B-C | 6 | 20 | - | - | - | - | - | 0.35 | 0.5 | 1 | 2.5 | 3.5 |
| | B-C | 6 | 25 | - | - | - | - | - | - | 0.5 | 0.5 | 1.5 | 2 |
| | B-C | 6 | 32 | - | - | - | - | - | - | - | - | 0.51 | 1.5 |
| | B-C | 6 | 40 | - | - | - | - | - | - | - | - | - | 0.51 |

**Upstream breaker S 500**

| | Im | | | D | D | D | D | D | D | D | D | D | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 10 | 2 | - | 0.24 | 0.5 | 1 | 2 | 3 | T | T | T | T |
| **breaker** | B-C | 10 | 4 | - | 0.2 | 0.32 | 0.5 | 1 | 2 | 3.5 | T | T | T |
| | B-C | 10 | 6 | - | 0.15 | 0.24 | 0.35 | 0.5 | 1 | 2 | 4 | T | T |
| | B-C | 10 | 10 | - | - | 0.2 | 0.32 | 0.35 | 0.5 | 0.5 | 2 | T | T |
| **S 951 N** | B-C | 10 | 16 | - | - | - | 0.24 | 0.3 | 0.5 | 0.5 | 1.5 | 3.5 | T |
| | B-C | 10 | 20 | - | - | - | - | - | 0.35 | 0.5 | 1 | 2.5 | 3.5 |
| | B-C | 10 | 25 | - | - | - | - | - | - | 0.5 | 0.5 | 1.5 | 2 |
| | B-C | 10 | 32 | - | - | - | - | - | - | - | - | 0.51 | 1.5 |
| | B-C | 10 | 40 | - | - | - | - | - | - | - | - | - | 0.51 |

**Upstream breaker S 500**

| | Im | | | D | D | D | D | D | D | D | D | D | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Icu [kA] | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | | | In [A] | 6 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| **Downstream** | B-C | 10 | 2 | - | 0.24 | 0.5 | 1 | 2 | 3 | T | T | T | T |
| **breaker** | B-C | 10 | 4 | - | 0.2 | 0.32 | 0.5 | 1 | 2 | 3.5 | T | T | T |
| | B-C | 10 | 6 | - | 0.15 | 0.24 | 0.35 | 0.5 | 1 | 2 | 4 | T | T |
| | B-C | 10 | 10 | - | - | 0.2 | 0.32 | 0.35 | 0.5 | 0.5 | 2 | T | T |
| **S 971 N** | B-C | 10 | 16 | - | - | - | 0.24 | 0.3 | 0.5 | 0.5 | 1.5 | 3.5 | T |
| | B-C | 10 | 20 | - | - | - | - | - | 0.35 | 0.5 | 1 | 2.5 | 3.5 |
| | B-C | 10 | 25 | - | - | - | - | - | - | 0.5 | 0.5 | 1.5 | 2 |
| | B-C | 10 | 32 | - | - | - | - | - | - | - | - | 0.51 | 1.5 |
| | B-C | 10 | 40 | - | - | - | - | - | - | - | - | - | 0.51 |

Upstream breaker: S 700
Downstream breaker: modular



| | Upstream breaker S 700 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Im | | | E | E | E | E | E | E | E | E |
| | | Icu [kA] | | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | In [A] | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| **Downstream** | C | 4.5 | 2 | T | T | T | T | T | T | T | T |
| **breaker** | C | 4.5 | 4 | T | T | T | T | T | T | T | T |
| | C | 4.5 | 6 | T | T | T | T | T | T | T | T |
| | C | 4.5 | 10 | T | T | T | T | T | T | T | T |
| **S 931 N** | C | 4.5 | 16 | - | T | T | T | T | T | T | T |
| | C | 4.5 | 20 | - | - | T | T | T | T | T | T |
| | C | 4.5 | 25 | - | - | T | T | T | T | T | T |
| | C | 4.5 | 32 | - | - | - | - | T | T | T | T |
| | C | 4.5 | 40 | - | - | - | - | - | T | T | T |

| | Upstream breaker S 700 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Im | | | E | E | E | E | E | E | E | E |
| | | Icu [kA] | | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | In [A] | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| **Downstream** | B-C | 6 | 2 | T | T | T | T | T | T | T | T |
| **breaker** | B-C | 6 | 4 | T | T | T | T | T | T | T | T |
| | B-C | 6 | 6 | T | T | T | T | T | T | T | T |
| | B-C | 6 | 10 | T | T | T | T | T | T | T | T |
| **S 941 N** | B-C | 6 | 16 | - | T | T | T | T | T | T | T |
| | B-C | 6 | 20 | - | - | T | T | T | T | T | T |
| | B-C | 6 | 25 | - | - | T | T | T | T | T | T |
| | B-C | 6 | 32 | - | - | - | - | T | T | T | T |
| | B-C | 6 | 40 | - | - | - | - | - | T | T | T |

| | Upstream breaker S 700 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Im | | | E | E | E | E | E | E | E | E |
| | | Icu [kA] | | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | In [A] | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| **Downstream** | B-C | 10 | 2 | T | T | T | T | T | T | T | T |
| **breaker** | B-C | 10 | 4 | T | T | T | T | T | T | T | T |
| | B-C | 10 | 6 | T | T | T | T | T | T | T | T |
| | B-C | 10 | 10 | T | T | T | T | T | T | T | T |
| **S 951 N** | B-C | 10 | 16 | - | T | T | T | T | T | T | T |
| | B-C | 10 | 20 | - | - | T | T | T | T | T | T |
| | B-C | 10 | 25 | - | - | T | T | T | T | T | T |
| | B-C | 10 | 32 | - | - | - | - | T | T | T | T |
| | B-C | 10 | 40 | - | - | - | - | - | T | T | T |

| | Upstream breaker S 700 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Im | | | E | E | E | E | E | E | E | E |
| | | Icu [kA] | | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | In [A] | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| **Downstream** | B-C | 10 | 2 | T | T | T | T | T | T | T | T |
| **breaker** | B-C | 10 | 4 | T | T | T | T | T | T | T | T |
| | B-C | 10 | 6 | T | T | T | T | T | T | T | T |
| | B-C | 10 | 10 | T | T | T | T | T | T | T | T |
| **S 971 N** | B-C | 10 | 16 | - | T | T | T | T | T | T | T |
| | B-C | 10 | 20 | - | - | T | T | T | T | T | T |
| | B-C | 10 | 25 | - | - | T | T | T | T | T | T |
| | B-C | 10 | 32 | - | - | - | - | T | T | T | T |
| | B-C | 10 | 40 | - | - | - | - | - | T | T | T |

Upstream: fuse
Downstream breaker: modular



**Upstream fuse gI, gG**

| | Im | Icu [kA] | | 100 | 100 | 100 | 100 | 100 | 100 | 120 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | In [A] | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
| **Downstream** | C | 4.5 | 2 | 1.5 | 2.5 | T | T | T | T | T | T |
| **breaker** | C | 4.5 | 4 | 1 | 2 | T | T | T | T | T | T |
| | C | 4.5 | 6 | 1 | 1.5 | 4 | T | T | T | T | T |
| | C | 4.5 | 10 | - | 1.2 | 3.5 | 4 | T | T | T | T |
| **S 931 N** | C | 4.5 | 16 | - | 1 | 3 | 3.5 | T | T | T | T |
| | C | 4.5 | 20 | - | 1 | 3 | 3.5 | T | T | T | T |
| | C | 4.5 | 25 | - | 1 | 2 | 3 | T | T | T | T |
| | C | 4.5 | 32 | - | 1 | 2 | 3 | T | T | T | T |
| | C | 4.5 | 40 | - | - | 1.5 | 2.5 | 4 | T | T | T |

**Upstream fuse gI, gG**

| | Im | Icu [kA] | | 100 | 100 | 100 | 100 | 100 | 100 | 120 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | In [A] | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
| **Downstream** | B-C | 6 | 2 | 1.5 | 2.5 | T | T | T | T | T | T |
| **breaker** | B-C | 6 | 4 | 1 | 2 | T | T | T | T | T | T |
| | B-C | 6 | 6 | 1 | 1.5 | 4 | T | T | T | T | T |
| | B-C | 6 | 10 | - | 1.2 | 3.5 | 4 | T | T | T | T |
| **S 941 N** | B-C | 6 | 16 | - | 1 | 3 | 3.5 | T | T | T | T |
| | B-C | 6 | 20 | - | 1 | 3 | 3.5 | T | T | T | T |
| | B-C | 6 | 25 | - | 1 | 2 | 3 | T | T | T | T |
| | B-C | 6 | 32 | - | 1 | 2 | 3 | T | T | T | T |
| | B-C | 6 | 40 | - | - | 1.5 | 2.5 | 4 | T | T | T |

**Upstream fuse gI, gG**

| | Im | Icu [kA] | | 100 | 100 | 100 | 100 | 100 | 100 | 120 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | In [A] | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
| **Downstream** | B-C | 10 | 2 | 1.5 | 2.5 | T | T | T | T | T | T |
| **breaker** | B-C | 10 | 4 | 1 | 2 | T | T | T | T | T | T |
| | B-C | 10 | 6 | 1 | 1.5 | 4 | T | T | T | T | T |
| | B-C | 10 | 10 | - | 1.2 | 3.5 | 4 | T | T | T | T |
| **S 951 N** | B-C | 10 | 16 | - | 1 | 3 | 3.5 | T | T | T | T |
| | B-C | 10 | 20 | - | 1 | 3 | 3.5 | T | T | T | T |
| | B-C | 10 | 25 | - | 1 | 2 | 3 | T | T | T | T |
| | B-C | 10 | 32 | - | 1 | 2 | 3 | T | T | T | T |
| | B-C | 10 | 40 | - | - | 1.5 | 2.5 | 4 | T | T | T |

**Upstream fuse gI, gG**

| | Im | Icu [kA] | | 100 | 100 | 100 | 100 | 100 | 100 | 120 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | In [A] | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
| **Downstream** | B-C | 10 | 2 | 1.5 | 2.5 | T | T | T | T | T | T |
| **breaker** | B-C | 10 | 4 | 1 | 2 | T | T | T | T | T | T |
| | B-C | 10 | 6 | 1 | 1.5 | 4 | T | T | T | T | T |
| | B-C | 10 | 10 | - | 1.2 | 3.5 | 4 | T | T | T | T |
| **S 971 N** | B-C | 10 | 16 | - | 1 | 3 | 3.5 | T | T | T | T |
| | B-C | 10 | 20 | - | 1 | 3 | 3.5 | T | T | T | T |
| | B-C | 10 | 25 | - | 1 | 2 | 3 | T | T | T | T |
| | B-C | 10 | 32 | - | 1 | 2 | 3 | T | T | T | T |
| | B-C | 10 | 40 | - | - | 1.5 | 2.5 | 4 | T | T | T |

Upstream breaker: modular
Downstream breaker: modular



### S 290 D - S 240 C

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 240 | 7.5 | 6 | C | T | T |
| | | 8 | C | T | T |
| | | 10 | C | 5 | T |
| | | 13 | C | 4.5 | 7 |
| | | 16 | C | 4.5 | 7 |
| | | 20 | C | 3.5 | 5 |
| | | 25 | C | 3.5 | 5 |
| | | 32 | C | | 4.5 |
| | | 40 | C | | |

### S 290 D - S 250 B-C

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 250 | 10 | ≤2 | C | T | T |
| | | 3 | C | T | T |
| | | 4 | C | T | T |
| | | 6 | B-C | T | T |
| | | 8 | B-C | T | T |
| | | 10 | B-C | 5 | 8 |
| | | 13 | B-C | 4.5 | 7 |
| | | 16 | B-C | 4.5 | 7 |
| | | 20 | B-C | 3.5 | 5 |
| | | 25 | B-C | 3.5 | 5 |
| | | 32 | B-C | | 4.5 |
| | | 40 | B-C | | |
| | | 50 | B-C | | |
| | | 63 | B-C | | |

### S 290 D - S 250 K

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 250 | 10 | ≤2 | K | T | T |
| | | 3 | K | T | T |
| | | 4 | K | T | T |
| | | 6 | K | T | T |
| | | 8 | K | T | T |
| | | 10 | K | 5 | 8 |
| | | 16 | K | 3 | 5 |
| | | 20 | K | 3 | 7 |
| | | 25 | K | | 4 |
| | | 32 | K | | |
| | | 40 | K | | |
| | | 50 | K | | |
| | | 63 | K | | |

### S 290 D - S 260 B-C

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 260 | 10 | ≤2 | C | T | T |
| | | 3 | C | T | T |
| | | 4 | C | T | T |
| | | 6 | B-C | T | T |
| | | 8 | B-C | T | T |
| | | 10 | B-C | 5 | 8 |
| | | 13 | B-C | 4.5 | 7 |
| | | 16 | B-C | 4.5 | 7 |
| | | 20 | B-C | 3.5 | 5 |
| | | 25 | B-C | 3.5 | 5 |
| | | 32 | B-C | | 4.5 |
| | | 40 | B-C | | |
| | | 50 | B-C | | |
| | | 63 | B-C | | |

## S 290 D - S 270 B-C

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 270 | 15 | ≤2 | C | T | T |
| | | 3 | C | T | T |
| | | 4 | C | T | T |
| | | 6 | B-C | 10.5 | T |
| | | 8 | B-C | 10.5 | T |
| | | 10 | B-C | 5 | 8 |
| | | 13 | B-C | 4.5 | 7 |
| | | 16 | B-C | 4.5 | 7 |
| | | 20 | B-C | 3.5 | 5 |
| | | 25 | B-C | 3.5 | 5 |
| | | 32 | B-C | | 4.5 |
| | | 40 | B-C | | |
| | | 50 | B-C | | |
| | | 63 | B-C | | |

## S 290 D - S 270 D

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 270 | 15 | ≤2 | D | T | T |
| | | 3 | D | T | T |
| | | 4 | D | T | T |
| | | 6 | D | 10.5 | T |
| | | 8 | D | 10.5 | T |
| | | 10 | D | 5 | 8 |
| | | 16 | D | 3 | 5 |
| | | 20 | D | 3 | 5 |
| | | 25 | D | 2.5 | 4 |
| | | 32 | D | | 4 |
| | | 40 | D | | |
| | | 50 | D | | |
| | | 63 | D | | |

## S 290 D - S 270 Z

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 270 | 10 | ≤2 | Z | T | T |
| | | 3 | Z | T | T |
| | | 4 | Z | T | T |
| | | 6 | Z | T | T |
| | | 8 | Z | T | T |
| | | 10 | Z | 5 | 8 |
| | | 16 | Z | 4.5 | 7 |
| | | 20 | Z | 3.5 | 5 |
| | | 25 | Z | 3.5 | 5 |
| | | 32 | Z | 3 | 4.5 |
| | | 40 | Z | 3 | 4.5 |
| | | 50 | Z | | 3 |
| | | 63 | Z | | |

## S 290 D - S 280 B-C

| 400 V | Upstream breaker | S 290 | | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | 15 | | | |
| Downstream breaker | $I_n$ [A] | | 80 | 100 | |
| | | Char. | D | D | |
| S 280 | 15 | 6 | B-C | 10.5 | T |
| | 25 | 10 | B-C | 5 | 8 |
| | | 13 | B-C | 4.5 | 7 |
| | | 16 | B-C | 4.5 | 7 |
| | | 20 | B-C | 3.5 | 5 |
| | | 25 | B-C | 3.5 | 5 |
| | 20 | 32 | B-C | | 4.5 |
| | | 40 | B-C | | |
| | 15 | 50 | B-C | | |
| | | 63 | B-C | | |

## S 290 D - S 280 D

| 400 V | Upstream breaker | | S 290 | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 15 | | |
| Downstream breaker | | $I_n$ [A] | | 80 | 100 |
| | | | Char. | D | D |
| S 280 | 15 | 6 | D | 10.5 | T |
| | 25 | 10 | D | 5 | 8 |
| | | 16 | D | 3 | 5 |
| | | 20 | D | 3 | 5 |
| | | 25 | D | 2.5 | 4 |
| | 20 | 32 | D | | 4 |
| | | 40 | D | | |
| | 15 | 50 | D | | |
| | | 63 | D | | |

## S 290 D - S 280 K

| 400 V | Upstream breaker | | S 290 | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 15 | | |
| Downstream breaker | | $I_n$ [A] | | 80 | 100 |
| | | | Char. | D | D |
| S 280 | 15 | 6 | K | 10.5 | T |
| | 25 | 10 | K | 5 | 8 |
| | | 13 | K | 3 | 5 |
| | | 16 | K | 3 | 5 |
| | | 20 | K | 3 | 5 |
| | | 25 | K | | 4 |
| | 20 | 32 | K | | |
| | | 40 | K | | |
| | 15 | 50 | K | | |
| | | 63 | K | | |

## S 290 D - S 280 Z

| 400 V | Upstream breaker | | S 290 | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 15 | | |
| Downstream breaker | | $I_n$ [A] | | 80 | 100 |
| | | | Char. | D | D |
| S 280 | Inf. | ≤2 | Z | T | T |
| | 15 | 3 | Z | T | T |
| | | 4 | Z | T | T |
| | | 6 | Z | 10.5 | T |
| | 25 | 10 | Z | 5 | 8 |
| | | 13 | Z | 4.5 | 7 |
| | | 16 | Z | 4.5 | 7 |
| | | 20 | Z | 3.5 | 5 |
| | | 25 | Z | 3.5 | 5 |
| | 20 | 32 | Z | 3 | 4.5 |
| | | 40 | Z | 3 | 4.5 |
| | 15 | 50 | Z | | 3 |
| | | 63 | Z | | |

## S 290 D - S 500 B-C-D

| 400 V | Upstream breaker | | S 290 | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 15 | | |
| Downstream breaker | | $I_n$ [A] | | 80 | 100 |
| | | | Char. | D | D |
| S 500 | 50 | 6 | B-C-D | 6 | 10 |
| | | 10 | B-C-D | 6 | 10 |
| | | 13 | B-C-D | 6 | 10 |
| | | 16 | B-C-D | 6 | 10 |
| | | 20 | B-C-D | 6 | 7.5 |
| | | 25 | B-C-D | 4.5 | 6 |
| | | 32 | B-C-D | | 6 |
| | | 40 | B-C-D | | |
| | | 50 | B-C-D | | |
| | | 63 | B-C-D | | |

## S290 D - S 500 K

| | Upstream breaker | | S 290 | | |
|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 15 | | |
| Downstream breaker | | $I_n$ [A] | | 80 | 100 |
| | | | Char. | D | D |
| S 500 | 50 | ≤5.8 | K | T | T |
| | | 5.3...8 | K | 10 | T |
| | | 7.3...11 | K | 7.5 | T |
| | 30 | 10...15 | K | 4.5 | 10 |
| | | 14...20 | K | 4.5 | 6 |
| | | 18...26 | K | | 4.5 |
| | | 23...32 | K | | |
| | | 29...37 | K | | |
| | | 34...41 | K | | |
| | | 38...45 | K | | |

## S 500 D - S 240 C

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$[A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 240 | 7.5 | 6 | C | 1.5 | 2 | 3 | 5.5 |
| | | 8 | C | 1.5 | 2 | 3 | 5.5 |
| | | 10 | C | 1 | 1.5 | 2 | 3 |
| | | 13 | C | | 1.5 | 2 | 3 |
| | | 16 | C | | | 2 | 3 |
| | | 20 | C | | | | 2.5 |
| | | 25 | C | | | | |
| | | 32 | C | | | | |
| | | 40 | C | | | | |

## S 500 D - S 250 B-C

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$[A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 250 | 10 | ≤2 | C | T | T | T | T |
| | | 3 | C | 3 | 6 | T | T |
| | | 4 | C | 2 | 3 | 6 | T |
| | | 6 | B-C | 1.5 | 2 | 3 | 5.5 |
| | | 8 | B-C | 1.5 | 2 | 3 | 5.5 |
| | | 10 | B-C | 1 | 1.5 | 2 | 3 |
| | | 13 | B-C | | 1.5 | 2 | 3 |
| | | 16 | B-C | | | 2 | 3 |
| | | 20 | B-C | | | | 2.5 |
| | | 25 | B-C | | | | |
| | | 32 | B-C | | | | |
| | | 40 | B-C | | | | |
| | | 50 | B-C | | | | |
| | | 63 | B-C | | | | |

## S 500 D - S 250 K

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 250 | 10 | ≤2 | K | T | T | T | T |
| | | 3 | K | 3 | 6 | T | T |
| | | 4 | K | 2 | 3 | 6 | T |
| | | 6 | K | 1.5 | 2 | 3 | 5.5 |
| | | 8 | K | 1.5 | 2 | 3 | 5.5 |
| | | 10 | K | | 1.5 | 2 | 3 |
| | | 16 | K | | | | 2 |
| | | 20 | K | | | | |
| | | 25 | K | | | | |
| | | 32 | K | | | | |
| | | 40 | K | | | | |
| | | 50 | K | | | | |
| | | 63 | K | | | | |

## S 500 D - S 260 B-C

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$[A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 260 | 10 | ≤2 | C | T | T | T | T |
| | | 3 | C | 3 | 6 | T | T |
| | | 4 | C | 2 | 3 | 6 | T |
| | | 6 | B-C | 1.5 | 2 | 3 | 5.5 |
| | | 8 | B-C | 1.5 | 2 | 3 | 5.5 |
| | | 10 | B-C | 1 | 1.5 | 2 | 3 |
| | | 13 | B-C | | 1.5 | 2 | 3 |
| | | 16 | B-C | | | 2 | 3 |
| | | 20 | B-C | | | | 2.5 |
| | | 25 | B-C | | | | |
| | | 32 | B-C | | | | |
| | | 40 | B-C | | | | |
| | | 50 | B-C | | | | |
| | | 63 | B-C | | | | |

## S 500 D - S 270 B-C

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 270 | 15 | ≤2 | C | T | T | T | T |
| | | 3 | C | 3 | 6 | T | T |
| | | 4 | C | 2 | 3 | 6 | T |
| | | 6 | B-C | 1.5 | 2 | 3 | 5.5 |
| | | 8 | B-C | 1.5 | 2 | 3 | 5.5 |
| | | 10 | B-C | 1 | 1.5 | 2 | 3 |
| | | 13 | B-C | | 1.5 | 2 | 3 |
| | | 16 | B-C | | | 2 | 3 |
| | | 20 | B-C | | | | 2.5 |
| | | 25 | B-C | | | | |
| | | 32 | B-C | | | | |
| | | 40 | B-C | | | | |
| | | 50 | B-C | | | | |
| | | 63 | B-C | | | | |

## S 500 D - S 270 D

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 270 | 15 | ≤2 | D | T | T | T | T |
| | | 3 | D | 3 | 6 | T | T |
| | | 4 | D | 2 | 3 | 6 | T |
| | | 6 | D | 1.5 | 2 | 3 | 5.5 |
| | | 8 | D | 1.5 | 2 | 3 | 5.5 |
| | | 10 | D | 1 | 1.5 | 2 | 3 |
| | | 16 | D | | | 1.5 | 2 |
| | | 20 | D | | | | 2 |
| | | 25 | D | | | | |
| | | 32 | D | | | | |
| | | 40 | D | | | | |
| | | 50 | D | | | | |
| | | 63 | D | | | | |

## S 500 D - S 270 Z

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 270 | 10 | ≤2 | Z | T | T | T | T |
| | | 3 | Z | 3 | 6 | T | T |
| | | 4 | Z | 2 | 3 | 6 | T |
| | | 6 | Z | 1.5 | 2 | 3 | 5.5 |
| | | 8 | Z | 1.5 | 2 | 3 | 5.5 |
| | | 10 | Z | 1 | 1.5 | 2 | 3 |
| | | 16 | Z | 1 | 1.5 | 2 | 3 |
| | | 20 | Z | | 1.5 | 2 | 2.5 |
| | | 25 | Z | | | 2 | 2.5 |
| | | 32 | Z | | | | 2 |
| | | 40 | Z | | | | |
| | | 50 | Z | | | | |
| | | 63 | Z | | | | |

## S 500 D - S 280 B-C

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | 32 | 40 | 50 | 63 | |
| | | Char. | D | D | D | D | |
| S 280 | 15 | 6 | B-C | 1.5 | 2 | 3 | 5 |
| | 25 | 10 | B-C | 1 | 1.5 | 2 | 3 |
| | | 13 | B-C | | 1.5 | 2 | 3 |
| | | 16 | B-C | | | 2 | 3 |
| | | 20 | B-C | | | | 2.5 |
| | | 25 | B-C | | | | |
| | 20 | 32 | B-C | | | | |
| | | 40 | B-C | | | | |
| | 15 | 50 | B-C | | | | |
| | | 63 | B-C | | | | |

## S 500 D - S 280 D

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | | 32 | 40 | 50 | 63 |
| | | | Char. | D | D | D | D |
| S 280 | 15 | 6 | D | 1.5 | 2 | 3 | 5 |
| | 25 | 10 | D | 1 | 1.5 | 2 | 3 |
| | | 16 | D | | | 1.5 | 2 |
| | | 20 | D | | | | 2 |
| | | 25 | D | | | | |
| | 20 | 32 | D | | | | |
| | | 40 | D | | | | |
| | 15 | 50 | D | | | | |
| | | 63 | D | | | | |

## S 500 D - S 280 K

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | | 32 | 40 | 50 | 63 |
| | | | Char. | D | D | D | D |
| S 280 | 15 | 6 | K | 1.5 | 2 | 3 | 5 |
| | 25 | 10 | K | | 1.5 | 2 | 3 |
| | | 13 | K | | | 1.5 | 2 |
| | | 16 | K | | | | 2 |
| | | 20 | K | | | | |
| | | 25 | K | | | | |
| | 20 | 32 | K | | | | |
| | | 40 | K | | | | |
| | 15 | 50 | K | | | | |
| | | 63 | K | | | | |

## S 500 D - S 280 Z

| 400 V | Upstream breaker | | S 500 | | | | |
|---|---|---|---|---|---|---|---|
| | $I_{cu}$ [kA] | | 50 | | | | |
| Downstream breaker | | $I_n$ [A] | | 32 | 40 | 50 | 63 |
| | | | Char. | D | D | D | D |
| S 280 | Inf. | ≤2 | Z | T | T | T | T |
| | 15 | 3 | Z | 3 | 6 | T | T |
| | | 4 | Z | 2 | 3 | 6 | T |
| | | 6 | Z | 1.5 | 2 | 3 | 5.5 |
| | 25 | 10 | Z | 1 | 1.5 | 2 | 3 |
| | | 13 | Z | 1 | 1.5 | 2 | 3 |
| | | 16 | Z | 1 | 1.5 | 2 | 3 |
| | | 20 | Z | | 1.5 | 2 | 2.5 |
| | | 25 | Z | | | 2 | 2.5 |
| | 20 | 32 | Z | | | | 2 |
| | | 40 | Z | | | | |
| | 15 | 50 | Z | | | | |
| | | 63 | Z | | | | |

Upstream breaker: moulded-case Tmax
Downstream breaker: modular



## Tmax T1 - S 240

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 240 | 7.5 | C | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | C | 8 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | C | 10 | | | 3 | 3 | 3 | 4.5 | T | T | T | T | T |
| | | C | 13 | | | | 3 | 3 | 4.5 | T | T | T | T | T |
| | | C | 16 | | | | | 3 | 4.5 | 5 | T | T | T | T |
| | | C | 20 | | | | | | 3 | 5 | 6 | T | T | T |
| | | C | 25 | | | | | | | 5 | 6 | T | T | T |
| | | C | 32 | | | | | | | | 6 | T | T | T |
| | | C | 40 | | | | | | | | | T | T | T |

## Tmax T1 - S 250

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 250 | 10 | C | ≤2 | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T | T | T | T | T |
| | | B-C | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | B-C | 8 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | B-C | 10 | | | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | T | T | T |
| | | B-C | 13 | | | | 3 | 3 | 4.5 | 7.5 | 7.5 | T | T | T |
| | | B-C | 16 | | | | | 3 | 4.5 | 5 | 7.5 | T | T | T |
| | | B-C | 20 | | | | | | 3 | 5 | 6 | T | T | T |
| | | B-C | 25 | | | | | | | 5 | 6 | T | T | T |
| | | B-C | 32 | | | | | | | | 6 | 7.5 | T | T |
| | | B-C | 40 | | | | | | | | | 7.5 | T | T |
| | | B-C | 50 | | | | | | | | | | 7.5 | T |
| | | B-C | 63 | | | | | | | | | | | T |

## Tmax T1 - S 250

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 250 | 10 | K | ≤2 | T | T | T | T | T | T | T | T | T | T | T |
| | | K | 3 | T | T | T | T | T | T | T | T | T | T | T |
| | | K | 4 | T | T | T | T | T | T | T | T | T | T | T |
| | | K | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | K | 8 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | K | 10 | | | 3 | 3 | 3 | 3 | 6 | 8.5 | T | T | T |
| | | K | 16 | | | | | 3 | 3 | 4.5 | 7.5 | T | T | T |
| | | K | 20 | | | | | | 3 | 3.5 | 5.5 | 6.5 | T | T |
| | | K | 25 | | | | | | | 3.5 | 5.5 | 6 | 9.5 | T |
| | | K | 32 | | | | | | | | 4.5 | 6 | 9.5 | T |
| | | K | 40 | | | | | | | | | 5 | 8 | T |
| | | K | 50 | | | | | | | | | | 6 | 9.5 |
| | | K | 63 | | | | | | | | | | | 9.5 |

## Tmax T1 - S 260

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 260 | 10 | C | ≤2 | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T | T | T | T | T |
| | | B-C | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | B-C | 8 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | B-C | 10 | | | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | T | T | T |
| | | B-C | 13 | | | | 3 | 3 | 4.5 | 7.5 | 7.5 | T | T | T |
| | | B-C | 16 | | | | | 3 | 4.5 | 5 | 7.5 | T | T | T |
| | | B-C | 20 | | | | | | 3 | 5 | 6 | T | T | T |
| | | B-C | 25 | | | | | | | 5 | 6 | T | T | T |
| | | B-C | 32 | | | | | | | | 6 | 7.5 | T | T |
| | | B-C | 40 | | | | | | | | | 7.5 | T | T |
| | | B-C | 50 | | | | | | | | | | 7.5 | T |
| | | B-C | 63 | | | | | | | | | | | T |

## Tmax T1 - S 270

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 270 | 15 | C | ≤2 | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T | T | T | T | T |
| | | B-C | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | | B-C | 8 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | | B-C | 10 | | | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | T | T | T |
| | | B-C | 13 | | | | 3 | 3 | 4.5 | 7.5 | 7.5 | 12 | T | T |
| | | B-C | 16 | | | | | 3 | 4.5 | 5 | 7.5 | 12 | T | T |
| | | B-C | 20 | | | | | | 3 | 5 | 6 | 10 | T | T |
| | | B-C | 25 | | | | | | | 5 | 6 | 10 | T | T |
| | | B-C | 32 | | | | | | | | 6 | 7.5 | 12 | T |
| | | B-C | 40 | | | | | | | | | 7.5 | 12 | T |
| | | B-C | 50 | | | | | | | | | | 7.5 | 10.5 |
| | | B-C | 63 | | | | | | | | | | | 10.5 |

## Tmax T1 - S 270

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 270 | 15 | D | ≤2 | T | T | T | T | T | T | T | T | T | T | T |
| | | D | 3 | T | T | T | T | T | T | T | T | T | T | T |
| | | D | 4 | T | T | T | T | T | T | T | T | T | T | T |
| | | D | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | | D | 8 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | 12 | T | T | T |
| | | D | 10 | | | 3 | 3 | 3 | 3 | 5 | 8.5 | T | T | T |
| | | D | 16 | | | | | 2 | 2 | 3 | 5 | 8 | 13.5 | T |
| | | D | 20 | | | | | | 2 | 3 | 4.5 | 6.5 | 11 | T |
| | | D | 25 | | | | | | | 2.5 | 4 | 6 | 9.5 | T |
| | | D | 32 | | | | | | | | 4 | 6 | 9.5 | T |
| | | D | 40 | | | | | | | | | 5 | 8 | T |
| | | D | 50 | | | | | | | | | | 5 | 9.5 |
| | | D | 63 | | | | | | | | | | | 9.5 |

## Tmax T1 - S 270

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | | |
| Downstream | | | Iu [A] | 160 | | | | | | | | | | | |
| breaker | Icu [kA] | Char. | In [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 270 | 10 | Z | ≤2 | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 3 | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 4 | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | Z | 8 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T |
| | | Z | 10 | | | 3 | 3 | 3 | 4.5 | 8 | 8.5 | T | T | T |
| | | Z | 16 | | | | | 3 | 4.5 | 5 | 7.5 | T | T | T |
| | | Z | 20 | | | | | | 3 | 5 | 6 | T | T | T |
| | | Z | 25 | | | | | | | 5 | 6 | T | T | T |
| | | Z | 32 | | | | | | | | 6 | 7.5 | T | T |
| | | Z | 40 | | | | | | | | | 7.5 | T | T |
| | | Z | 50 | | | | | | | | | | 7.5 | T |
| | | Z | 63 | | | | | | | | | | | T |

## Tmax T1 - S 280

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | |
| Downstream | | | Iu [A] | 160 | | | | | | | | | | |
| breaker | Icu [kA] | Char. | In [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 280 | 15 | B-C | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | 25 | B-C | 10 | | | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | 17* | T | T |
| | | B-C | 13 | | | | 3 | 3 | 4.5 | 7.5 | 7.5 | 12 | 20* | T |
| | | B-C | 16 | | | | | 3 | 4.5 | 5 | 7.5 | 12 | 20* | T |
| | | B-C | 20 | | | | | | 3 | 5 | 6 | 10 | 15 | T |
| | | B-C | 25 | | | | | | | 5 | 6 | 10 | 15 | T |
| | 20 | B-C | 32 | | | | | | | | 6 | 7.5 | 12 | T |
| | | B-C | 40 | | | | | | | | | 7.5 | 12 | T |
| | 15 | B-C | 50 | | | | | | | | | | 7.5 | 10.5 |
| | | B-C | 63 | | | | | | | | | | | 10.5 |

* Consider the lower value between the breaking capacity of the upstream circuit-breaker and the value indicated.

## Tmax T1 - S 280

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 280 | 15 | D | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | 25 | D | 10 | | | 3 | 3 | 3 | 3 | 5 | 8.5 | 17* | T | T |
| | | D | 16 | | | | | 2 | 2 | 3 | 5 | 8 | 13.5 | T |
| | | D | 20 | | | | | | 2 | 3 | 4.5 | 6.5 | 11 | T |
| | | D | 25 | | | | | | | 2.5 | 4 | 6 | 9.5 | T |
| | 20 | D | 32 | | | | | | | | 4 | 6 | 9.5 | T |
| | | D | 40 | | | | | | | | | 5 | 8 | T |
| | 15 | D | 50 | | | | | | | | | | 5 | 9.5 |
| | | D | 63 | | | | | | | | | | | 9.5 |

## Tmax T1 - S 280

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 280 | 15 | K | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | 25 | K | 10 | | | 3 | 3 | 3 | 3 | 6 | 8.5 | 17* | T | T |
| | | K | 13 | | | | | 3 | 3 | 5 | 7.5 | 10 | 13.5 | T |
| | | K | 16 | | | | | 3 | 3 | 4.5 | 7.5 | 10 | 13.5 | T |
| | | K | 20 | | | | | | 3 | 3.5 | 5.5 | 6.5 | 11 | T |
| | | K | 25 | | | | | | | 3.5 | 5.5 | 6 | 9.5 | T |
| | 20 | K | 32 | | | | | | | | 4.5 | 6 | 9.5 | T |
| | | K | 40 | | | | | | | | | 5 | 8 | T |
| | 15 | K | 50 | | | | | | | | | | 6 | 9.5 |
| | | K | 63 | | | | | | | | | | | 9.5 |

* Consider the lower value between the breaking capacity of the upstream circuit-breaker and the value indicated.

## Tmax T1 - S 280

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | |
| Downstream | | | Iu [A] | 160 | | | | | | | | | | |
| breaker | Icu [kA] | Char. | In [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 280 | Inf. | Z | ≤2 | T | T | T | T | T | T | T | T | T | T | T |
| | 15 | Z | 3 | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 4 | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | 25 | Z | 10 | | | 3 | 3 | 3 | 4.5 | 8 | 8.5 | 17* | T | T |
| | | Z | 13 | | | | | 3 | 4.5 | 7.5 | 7.5 | 12 | 20* | T |
| | | Z | 16 | | | | | 3 | 4.5 | 5 | 7.5 | 12 | 20* | T |
| | | Z | 20 | | | | | | 3 | 5 | 6 | 10 | 15 | T |
| | | Z | 25 | | | | | | | 5 | 6 | 10 | 15 | T |
| | 20 | Z | 32 | | | | | | | | 6 | 7.5 | 12 | T |
| | | Z | 40 | | | | | | | | | 7.5 | 12 | T |
| | 15 | Z | 50 | | | | | | | | | | 7.5 | 10.5 |
| | | Z | 63 | | | | | | | | | | | 10.5 |

## Tmax T1 - S 500

| 400 V | | Upstream breaker | | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | | |
| Downstream | | | Iu [A] | 160 | | | | | | | | | | |
| breaker | Icu [kA] | Char. | In [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 500 | 50 | B-C-D | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | 15 | 20* | 25* | T |
| | | B-C-D | 10 | | | 4.5 | 4.5 | 4.5 | 4.5 | 8 | 10 | 20* | 25* | T |
| | | B-C-D | 13 | | | | 4.5 | 4.5 | 4.5 | 7.5 | 10 | 15 | 25* | T |
| | | B-C-D | 16 | | | | | 4.5 | 4.5 | 7.5 | 10 | 15 | 25* | T |
| | | B-C-D | 20 | | | | | | 4.5 | 7.5 | 10 | 15 | 25* | T |
| | | B-C-D | 25 | | | | | | | 6 | 10 | 15 | 20* | T |
| | | B-C-D | 32 | | | | | | | | 7.5 | 10 | 20* | T |
| | | B-C-D | 40 | | | | | | | | | 10 | 20* | T |
| | | B-C-D | 50 | | | | | | | | | | 15 | T |
| | | B-C-D | 63 | | | | | | | | | | | T |

## Tmax T1 - S 500

| 400 V | | Upstream breaker | T1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | B, C, N | | | | | | | | | |
| | | | Relay | TM | | | | | | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| S 500 | 50 | K | ≤5.8 | 36 | 36 | T | T | T | T | T | T | T | T | T |
| | | K | 5.3...8 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T |
| | | K | 7.3...11 | | | 4.5 | 4.5 | 4.5 | 4.5 | 8 | T | T | T | T |
| | 30 | K | 10...15 | | | | 4.5 | 4.5 | 4.5 | 7.5 | 10 | 15 | T | T |
| | | K | 14...20 | | | | | 4.5 | 4.5 | 7.5 | 10 | 15 | T | T |
| | | K | 18...26 | | | | | | 4.5 | 7.5 | 10 | 15 | T | T |
| | | K | 23...32 | | | | | | | 6 | 10 | 15 | 20* | T |
| | | K | 29...37 | | | | | | | | 7.5 | 10 | 20* | T |
| | | K | 34...41 | | | | | | | | | 10 | 20* | T |
| | | K | 38...45 | | | | | | | | | | 15 | T |

* Consider the lower value between the breaking capacity of the upstream circuit-breaker and the value indicated.

## Tmax T2 - S 240

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 240 | 7.5 | C | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | C | 8 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | C | 10 | | | 3* | 3 | 3 | 3 | 4.5 | T | T | T | T | T | | T | T | T | T |
| | | C | 13 | | | 3* | | 3 | 3 | 4.5 | T | T | T | T | T | | T | T | T | T |
| | | C | 16 | | | | | 3* | 3 | 4.5 | 5 | T | T | T | T | | | T | T | T |
| | | C | 20 | | | | | 3* | | 3 | 5 | 6 | T | T | T | | | T | T | T |
| | | C | 25 | | | | | | | 3* | 5 | 6 | T | T | T | | | T | T | T |
| | | C | 32 | | | | | | | 3* | | 6 | T | T | T | | | T | T | T |
| | | C | 40 | | | | | | | | | 5.5* | T | T | T | | | | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 250

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 250 | 10 | C | ≤2 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | B-C | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | B-C | 8 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | B-C | 10 | | | 3* | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | T | T | T | | T | T | T | T |
| | | B-C | 13 | | | 3* | | 3 | 3 | 4.5 | 7.5 | 7.5 | T | T | T | | T | T | T | T |
| | | B-C | 16 | | | | | 3* | 3 | 4.5 | 5 | 7.5 | T | T | T | | | T | T | T |
| | | B-C | 20 | | | | | 3* | | 3 | 5 | 6 | T | T | T | | | T | T | T |
| | | B-C | 25 | | | | | | | 3* | 5 | 6 | T | T | T | | | T | T | T |
| | | B-C | 32 | | | | | | | 3* | | 6 | 7.5 | T | T | | | T | T | T |
| | | B-C | 40 | | | | | | | | | 5.5* | 7.5 | T | T | | | | T | T |
| | | B-C | 50 | | | | | | | | | 3* | 5* | 7.5 | T | | | | T | T |
| | | B-C | 63 | | | | | | | | | | 5* | | T | | | | | T |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 250

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 250 | 10 | K | ≤2 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | K | 3 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | K | 4 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | K | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | K | 8 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | K | 10 | | | 3* | 3 | 3 | 3 | 3 | 6 | 8.5 | T | T | T | | T | T | T | T |
| | | K | 16 | | | | | 2* | 3 | 3 | 4.5 | 7.5 | T | T | T | | | T | T | T |
| | | K | 20 | | | | | 2* | | 3 | 3.5 | 5.5 | 6.5 | T | T | | | T | T | T |
| | | K | 25 | | | | | | | 2* | 3.5 | 5.5 | 6 | 9.5 | T | | | T | T | T |
| | | K | 32 | | | | | | | | | 4.5 | 6 | 9.5 | T | | | T | T | T |
| | | K | 40 | | | | | | | | | 3* | 5 | 8 | T | | | | T | T |
| | | K | 50 | | | | | | | | | 2* | 3* | 6 | 9.5 | | | | 9.5 | 9.5 |
| | | K | 63 | | | | | | | | | | 3* | | 9.5 | | | | | 9.5 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 260

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 260 | 10 | C | ≤2 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | B-C | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | B-C | 8 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | B-C | 10 | | | 3* | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | T | T | T | | T | T | T | T |
| | | B-C | 13 | | | 3* | | 3 | 3 | 4.5 | 7.5 | 7.5 | T | T | T | | T | T | T | T |
| | | B-C | 16 | | | | | 3* | 3 | 4.5 | 5 | 7.5 | T | T | T | | | T | T | T |
| | | B-C | 20 | | | | | 3* | | 3 | 5 | 6 | T | T | T | | | T | T | T |
| | | B-C | 25 | | | | | | | 3* | 5 | 6 | T | T | T | | | T | T | T |
| | | B-C | 32 | | | | | | | 3* | | 6 | 7.5 | T | T | | | T | T | T |
| | | B-C | 40 | | | | | | | | | 5.5* | 7.5 | T | T | | | | T | T |
| | | B-C | 50 | | | | | | | | | 3* | 5* | 7.5 | T | | | | T | T |
| | | B-C | 63 | | | | | | | | | | 5* | | T | | | | | T |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 270

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 270 | 15 | C | ≤2 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | B-C | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T | | T | T | T | T |
| | | B-C | 8 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T | | T | T | T | T |
| | | B-C | 10 | | | 3* | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | T | T | T | | T | T | T | T |
| | | B-C | 13 | | | 3* | | 3 | 3 | 4.5 | 7.5 | 7.5 | 12 | T | T | | T | T | T | T |
| | | B-C | 16 | | | | | 3* | 3 | 4.5 | 5 | 7.5 | 12 | T | T | | | T | T | T |
| | | B-C | 20 | | | | | 3* | | 3 | 5 | 6 | 10 | T | T | | | T | T | T |
| | | B-C | 25 | | | | | | | 3* | 5 | 6 | 10 | T | T | | | T | T | T |
| | | B-C | 32 | | | | | | | 3* | | 6 | 7.5 | 12 | T | | | T | T | T |
| | | B-C | 40 | | | | | | | | | 5.5* | 7.5 | 12 | T | | | | T | T |
| | | B-C | 50 | | | | | | | | | 3* | 5* | 7.5 | 10.5 | | | | 10.5 | 10.5 |
| | | B-C | 63 | | | | | | | | | | 5* | | 10.5 | | | | | 10.5 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 270

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 270 | 15 | D | ≤2 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | D | 3 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | D | 4 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | D | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T | | T | T | T | T |
| | | D | 8 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | 12 | T | T | T | | T | T | T | T |
| | | D | 10 | | | 3* | 3 | 3 | 3 | 3 | 5 | 8.5 | T | T | T | | T | T | T | T |
| | | D | 16 | | | | | 2* | 2 | 2 | 3 | 5 | 8 | 13.5 | T | | | T | T | T |
| | | D | 20 | | | | | 2* | | 2 | 3 | 4.5 | 6.5 | 11 | T | | | T | T | T |
| | | D | 25 | | | | | | | 2* | 2.5 | 4 | 6 | 9.5 | T | | | T | T | T |
| | | D | 32 | | | | | | | | | 4 | 6 | 9.5 | T | | | T | T | T |
| | | D | 40 | | | | | | | | | 3* | 5 | 8 | T | | | | T | T |
| | | D | 50 | | | | | | | | | 2* | 3* | 5 | 9.5 | | | | 9.5 | 9.5 |
| | | D | 63 | | | | | | | | | | 3* | | 9.5 | | | | | 9.5 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 270

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 270 | 10 | Z | ≤2 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 3 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 4 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | Z | 8 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | T | T | T | T | T | | T | T | T | T |
| | | Z | 10 | | | 3* | 3 | 3 | 3 | 4.5 | 8 | 8.5 | T | T | T | | T | T | T | T |
| | | Z | 16 | | | | | 3* | 3 | 4.5 | 5 | 7.5 | T | T | T | | | T | T | T |
| | | Z | 20 | | | | | 3* | | 3 | 5 | 6 | T | T | T | | | T | T | T |
| | | Z | 25 | | | | | | | 3* | 5 | 6 | T | T | T | | | T | T | T |
| | | Z | 32 | | | | | | | 3* | | 6 | 7.5 | T | T | | | T | T | T |
| | | Z | 40 | | | | | | | | | 5.5* | 7.5 | T | T | | | | T | T |
| | | Z | 50 | | | | | | | | | 4* | 5* | 7.5 | T | | | | T | T |
| | | Z | 63 | | | | | | | | | | 5* | | T | | | | | T |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 280

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 280 | 15 | B-C | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T | | T | T | T | T |
| | 25 | B-C | 10 | | | 3* | 3 | 3 | 3 | 4.5 | 7.5 | 8.5 | 17 | T | T | | T | T | T | T |
| | | B-C | 13 | | | 3* | | 3 | 3 | 4.5 | 7.5 | 7.5 | 12 | 20 | T | | T | T | T | T |
| | | B-C | 16 | | | | | 3* | 3 | 4.5 | 5 | 7.5 | 12 | 20 | T | | | T | T | T |
| | | B-C | 20 | | | | | 3* | | 3 | 5 | 6 | 10 | 15 | T | | | T | T | T |
| | | B-C | 25 | | | | | | | 3* | 5 | 6 | 10 | 15 | T | | | T | T | T |
| | 20 | B-C | 32 | | | | | | | 3* | | 6 | 7.5 | 12 | T | | | T | T | T |
| | | B-C | 40 | | | | | | | | | 5.5* | 7.5 | 12 | T | | | | T | T |
| | 15 | B-C | 50 | | | | | | | | | 3* | 5* | 7.5 | 10.5 | | | | 10.5 | 10.5 |
| | | B-C | 63 | | | | | | | | | | 5* | | 10.5 | | | | | 10.5 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 280

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 280 | 15 | D | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T | | T | T | T | T |
| | 25 | D | 10 | | | 3* | 3 | 3 | 3 | 3 | 5 | 8.5 | 17 | T | T | | T | T | T | T |
| | | D | 16 | | | | | 2* | 2 | 2 | 3 | 5 | 8 | 13.5 | T | | | T | T | T |
| | | D | 20 | | | | | 2* | | 2 | 3 | 4.5 | 6.5 | 11 | T | | | T | T | T |
| | | D | 25 | | | | | | | 2* | 2.5 | 4 | 6 | 9.5 | T | | | T | T | T |
| | 20 | D | 32 | | | | | | | | | 4 | 6 | 9.5 | T | | | T | T | T |
| | | D | 40 | | | | | | | | | 3* | 5 | 8 | T | | | | T | T |
| | 15 | D | 50 | | | | | | | | | 2* | 3* | 5 | 9.5 | | | | 9.5 | 9.5 |
| | | D | 63 | | | | | | | | | | 3* | | 9.5 | | | | | 9.5 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 280

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 280 | 15 | K | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T | | T | T | T | T |
| | 25 | K | 10 | | | 3* | 3 | 3 | 3 | 3 | 6 | 8.5 | 17 | T | T | | T | T | T | T |
| | | K | 13 | | | | | 2* | 3 | 3 | 5 | 7.5 | 10 | 13.5 | T | | T | T | T | T |
| | | K | 16 | | | | | 2* | 3 | 3 | 4.5 | 7.5 | 10 | 13.5 | T | | | T | T | T |
| | | K | 20 | | | | | 2* | | 3 | 3.5 | 5.5 | 6.5 | 11 | T | | | T | T | T |
| | | K | 25 | | | | | | | 2* | 3.5 | 5.5 | 6 | 9.5 | T | | | T | T | T |
| | 20 | K | 32 | | | | | | | | | 4.5 | 6 | 9.5 | T | | | T | T | T |
| | | K | 40 | | | | | | | | | 3* | 5 | 8 | T | | | | T | T |
| | 15 | K | 50 | | | | | | | | | 2* | 3* | 6 | 9.5 | | | | 9.5 | 9.5 |
| | | K | 63 | | | | | | | | | | 3* | | 9.5 | | | | | 9.5 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 280

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 280 | Inf. | Z | ≤2 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | 15 | Z | 3 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 4 | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | Z | 6 | 5.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | T | T | T | T | | T | T | T | T |
| | 25 | Z | 10 | | | 3* | 3 | 3 | 3 | 4.5 | 8 | 8.5 | 17 | T | T | | T | T | T | T |
| | | Z | 13 | | | 3* | | 3 | 3 | 4.5 | 7.5 | 7.5 | 12 | 20 | T | | T | T | T | T |
| | | Z | 16 | | | | | 3* | 3 | 4.5 | 5 | 7.5 | 12 | 20 | T | | | T | T | T |
| | | Z | 20 | | | | | 3* | | 3 | 5 | 6 | 10 | 15 | T | | | T | T | T |
| | | Z | 25 | | | | | | | 3* | 5 | 6 | 10 | 15 | T | | | T | T | T |
| | 20 | Z | 32 | | | | | | | 3* | | 6 | 7.5 | 12 | T | | | T | T | T |
| | | Z | 40 | | | | | | | | | 5.5* | 7.5 | 12 | T | | | | T | T |
| | 15 | Z | 50 | | | | | | | | | 4* | 5* | 7.5 | 10.5 | | | | 10.5 | 10.5 |
| | | Z | 63 | | | | | | | | | | 5* | | 10.5 | | | | | 10.5 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 290

| 400 V | | | Upstream breaker | T2 | | |
|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | |
| | | | Relay | TM, M | | EL |
| Downstream | | | $I_u$ [A] | 160 | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 160 | | 160 |
| S 290 | 15 | C-D-K | 80 | | | 4 |
| | | C-D-K | 100 | | | 4 |
| | | C | 125 | | | 4 |

## Tmax T2 - S 500

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 500 | 50 | B-C-D | 6 | 4.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | 15 | 20 | 25 | 36 | | 36 | 36 | 36 | 36 |
| | | B-C-D | 10 | | | 4.5* | 4.5 | 4.5 | 4.5 | 4.5 | 8 | 10 | 20 | 25 | 36 | | 36 | 36 | 36 | 36 |
| | | B-C-D | 13 | | | 4.5* | | 4.5 | 4.5 | 4.5 | 7.5 | 10 | 15 | 25 | 36 | | 36 | 36 | 36 | 36 |
| | | B-C-D | 16 | | | | | 4.5* | 4.5 | 4.5 | 7.5 | 10 | 15 | 25 | 36 | | | 36 | 36 | 36 |
| | | B-C-D | 20 | | | | | 4.5* | | 4.5 | 7.5 | 10 | 15 | 25 | 36 | | | 36 | 36 | 36 |
| | | B-C-D | 25 | | | | | | | 4.5* | 6 | 10 | 15 | 20 | 36 | | | 36 | 36 | 36 |
| | | B-C-D | 32 | | | | | | | 4.5* | | 7.5 | 10 | 20 | 36 | | | 36 | 36 | 36 |
| | | B-C-D | 40 | | | | | | | | | 5* | 10 | 20 | 36 | | | | 36 | 36 |
| | | B-C-D | 50 | | | | | | | | | 5* | 7.5* | 15 | 36 | | | | 36 | 36 |
| | | B-C-D | 63 | | | | | | | | | | 5* | | 36 | | | | | 36 |

* Value valid with magnetic only breaker upstream.

## Tmax T2 - S 500

| 400 V | | Upstream breaker | | T2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S, H, L | | | | | | | | | | | | | | | | |
| | | | Relay | TM, M | | | | | | | | | | | | EL | | | | |
| Downstream | | | $I_u$ [A] | 160 | | | | | | | | | | | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 10 | 25 | 63 | 100 | 160 |
| S 500 | 50 | K | ≤5.8 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 50** | 50** | 50** | 50** | 50** | 50** |
| | | K | 5.3...8 | 4.5* | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 10.5 | 36 | 36 | 36 | 50** | | 50** | 50** | 50** | 50** |
| | | K | 7.3...11 | | | 4.5* | 4.5 | 4.5 | 4.5 | 4.5 | 8 | 36 | 36 | 36 | 50** | | 50** | 50** | 50** | 50** |
| | 30 | K | 10...15 | | | 4.5* | | 4.5 | 4.5 | 4.5 | 7.5 | 10 | 15 | T | T | | T | T | T | T |
| | | K | 14...20 | | | | | 4.5* | 4.5 | 4.5 | 7.5 | 10 | 15 | T | T | | | T | T | T |
| | | K | 18...26 | | | | | 4.5* | | 4.5 | 7.5 | 10 | 15 | T | T | | | T | T | T |
| | | K | 23...32 | | | | | | | 4.5* | 6 | 10 | 15 | 20 | T | | | T | T | T |
| | | K | 29...37 | | | | | | | 4.5* | | 7.5 | 10 | 20 | T | | | | T | T |
| | | K | 34...41 | | | | | | | | | 5* | 10 | 20 | T | | | | T | T |
| | | K | 38...45 | | | | | | | | | 5* | 7.5* | 15 | T | | | | T | T |

* Value valid with magnetic only breaker upstream.
** Consider the lower value between the breaking capacity of the upstream circuit-breaker and the value indicated.

## Tmax T3 - S 240

| 400 V | | Upstream breaker | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Version | N, S | | | | | | |
| | | Relay | TM, M | | | | | | |
| Downstream | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 240 | 7.5 | C | 6 | T | T | T | T | T | T | T |
| | | C | 8 | T | T | T | T | T | T | T |
| | | C | 10 | T | T | T | T | T | T | T |
| | | C | 13 | T | T | T | T | T | T | T |
| | | C | 16 | 5 | T | T | T | T | T | T |
| | | C | 20 | 5 | 6 | T | T | T | T | T |
| | | C | 25 | 5 | 6 | T | T | T | T | T |
| | | C | 32 | | 6 | T | T | T | T | T |
| | | C | 40 | | 4 | T | T | T | T | T |

## Tmax T3 - S 250

| 400 V | | Upstream breaker | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Version | N, S | | | | | | |
| | | Relay | TM, M | | | | | | |
| Downstream | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 250 | 10 | C | ≤2 | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T |
| | | B-C | 6 | T | T | T | T | T | T | T |
| | | B-C | 8 | T | T | T | T | T | T | T |
| | | B-C | 10 | 7.5 | 8.5 | T | T | T | T | T |
| | | B-C | 13 | 7.5 | 7.5 | T | T | T | T | T |
| | | B-C | 16 | 5 | 7.5 | T | T | T | T | T |
| | | B-C | 20 | 5 | 6 | T | T | T | T | T |
| | | B-C | 25 | 5 | 6 | T | T | T | T | T |
| | | B-C | 32 | | 6 | 7.5 | T | T | T | T |
| | | B-C | 40 | | | 7.5 | T | T | T | T |
| | | B-C | 50 | | | 5* | 7.5 | T | T | T |
| | | B-C | 63 | | | 5* | 6* | T | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 250

| 400 V | | Upstream breaker | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Version | N, S | | | | | | |
| | | Relay | TM, M | | | | | | |
| Downstream | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 250 | 10 | K | ≤2 | T | T | T | T | T | T | T |
| | | K | 3 | T | T | T | T | T | T | T |
| | | K | 4 | T | T | T | T | T | T | T |
| | | K | 6 | T | T | T | T | T | T | T |
| | | K | 8 | T | T | T | T | T | T | T |
| | | K | 10 | 6 | 8.5 | T | T | T | T | T |
| | | K | 16 | 4.5 | 7.5 | T | T | T | T | T |
| | | K | 20 | 3.5 | 5.5 | 6.5 | T | T | T | T |
| | | K | 25 | 3.5 | 5.5 | 6 | 9.5 | T | T | T |
| | | K | 32 | | 4.5 | 6 | 9.5 | T | T | T |
| | | K | 40 | | | 5 | 8 | T | T | T |
| | | K | 50 | | | 3* | 6 | 9.5 | T | T |
| | | K | 63 | | | 3* | 5.5* | 9.5 | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 260

| 400 V | | Upstream breaker | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Version | N, S | | | | | | |
| | | Relay | TM, M | | | | | | |
| Downstream | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 260 | 10 | C | ≤2 | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T |
| | | B-C | 6 | T | T | T | T | T | T | T |
| | | B-C | 8 | T | T | T | T | T | T | T |
| | | B-C | 10 | 7.5 | 8.5 | T | T | T | T | T |
| | | B-C | 13 | 7.5 | 7.5 | T | T | T | T | T |
| | | B-C | 16 | 5 | 7.5 | T | T | T | T | T |
| | | B-C | 20 | 5 | 6 | T | T | T | T | T |
| | | B-C | 25 | 5 | 6 | T | T | T | T | T |
| | | B-C | 32 | | 6 | 7.5 | T | T | T | T |
| | | B-C | 40 | | | 7.5 | T | T | T | T |
| | | B-C | 50 | | | 5* | 7.5 | T | T | T |
| | | B-C | 63 | | | 5* | 6* | T | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 270

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 270 | 15 | C | ≤2 | T | T | T | T | T | T | T |
| | | C | 3 | T | T | T | T | T | T | T |
| | | C | 4 | T | T | T | T | T | T | T |
| | | B-C | 6 | 10.5 | T | T | T | T | T | T |
| | | B-C | 8 | 10.5 | T | T | T | T | T | T |
| | | B-C | 10 | 7.5 | 8.5 | T | T | T | T | T |
| | | B-C | 13 | 7.5 | 7.5 | 12 | T | T | T | T |
| | | B-C | 16 | 5 | 7.5 | 12 | T | T | T | T |
| | | B-C | 20 | 5 | 6 | 10 | T | T | T | T |
| | | B-C | 25 | 5 | 6 | 10 | T | T | T | T |
| | | B-C | 32 | | 6 | 7.5 | 12 | T | T | T |
| | | B-C | 40 | | | 7.5 | 12 | T | T | T |
| | | B-C | 50 | | | 5* | 7.5 | 10.5 | T | T |
| | | B-C | 63 | | | 5* | 6* | 10.5 | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 270

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 270 | 15 | D | ≤2 | T | T | T | T | T | T | T |
| | | D | 3 | T | T | T | T | T | T | T |
| | | D | 4 | T | T | T | T | T | T | T |
| | | D | 6 | 10.5 | T | T | T | T | T | T |
| | | D | 8 | 10.5 | 12 | T | T | T | T | T |
| | | D | 10 | 5 | 8.5 | T | T | T | T | T |
| | | D | 16 | 3 | 5 | 8 | 13.5 | T | T | T |
| | | D | 20 | 3 | 4.5 | 6.5 | 11 | T | T | T |
| | | D | 25 | 2.5 | 4 | 6 | 9.5 | T | T | T |
| | | D | 32 | | 4 | 6 | 9.5 | T | T | T |
| | | D | 40 | | | 5 | 8 | T | T | T |
| | | D | 50 | | | 3* | 5 | 9.5 | T | T |
| | | D | 63 | | | 3* | 5* | 9.5 | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 270

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 270 | 10 | Z | ≤2 | T | T | T | T | T | T | T |
| | | Z | 3 | T | T | T | T | T | T | T |
| | | Z | 4 | T | T | T | T | T | T | T |
| | | Z | 6 | T | T | T | T | T | T | T |
| | | Z | 8 | T | T | T | T | T | T | T |
| | | Z | 10 | 8 | 8.5 | T | T | T | T | T |
| | | Z | 16 | 5 | 7.5 | T | T | T | T | T |
| | | Z | 20 | 5 | 6 | T | T | T | T | T |
| | | Z | 25 | 5 | 6 | T | T | T | T | T |
| | | Z | 32 | | 6 | 7.5 | T | T | T | T |
| | | Z | 40 | | | 7.5 | T | T | T | T |
| | | Z | 50 | | | 5* | 7.5 | T | T | T |
| | | Z | 63 | | | 5* | 6* | T | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 280

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 280 | 15 | B-C | 6 | 10.5 | T | T | T | T | T | T |
| | 25 | B-C | 10 | 7.5 | 8.5 | 17 | T | T | T | T |
| | | B-C | 13 | 7.5 | 7.5 | 12 | 20 | T | T | T |
| | | B-C | 16 | 5 | 7.5 | 12 | 20 | T | T | T |
| | | B-C | 20 | 5 | 6 | 8 | 13.5 | T | T | T |
| | | B-C | 25 | 5 | 6 | 8 | 13.5 | T | T | T |
| | 20 | B-C | 32 | | 6 | 7.5 | 12 | T | T | T |
| | | B-C | 40 | | | 7.5 | 12 | T | T | T |
| | 15 | B-C | 50 | | | 5* | 7.5 | 10.5 | T | T |
| | | B-C | 63 | | | 5* | 6* | 10.5 | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 280

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 280 | 15 | D | 6 | 10.5 | T | T | T | T | T | T |
| | 25 | D | 10 | 5 | 8.5 | 17 | T | T | T | T |
| | | D | 16 | 3 | 5 | 8 | 13.5 | T | T | T |
| | | D | 20 | 3 | 4.5 | 6.5 | 11 | T | T | T |
| | | D | 25 | 2.5 | 4 | 6 | 9.5 | T | T | T |
| | 20 | D | 32 | | 4 | 6 | 9.5 | T | T | T |
| | | D | 40 | | | 5 | 8 | T | T | T |
| | 15 | D | 50 | | | 3* | 5 | 9.5 | T | T |
| | | D | 63 | | | 3* | 5* | 9.5 | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 280

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 280 | 15 | K | 6 | 10.5 | T | T | T | T | T | T |
| | 25 | K | 10 | 6 | 8.5 | 17 | T | T | T | T |
| | | K | 13 | 5 | 7.5 | 10 | 13.5 | T | T | T |
| | | K | 16 | 4.5 | 7.5 | 10 | 13.5 | T | T | T |
| | | K | 20 | 3.5 | 5.5 | 6.5 | 11 | T | T | T |
| | | K | 25 | 3.5 | 5.5 | 6 | 9.5 | T | T | T |
| | 20 | K | 32 | | 4.5 | 6 | 9.5 | T | T | T |
| | | K | 40 | | | 5 | 8 | T | T | T |
| | 15 | K | 50 | | | 3* | 6 | 9.5 | T | T |
| | | K | 63 | | | 3* | 5.5* | 9.5 | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 280

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 280 | Inf. | Z | ≤2 | T | T | T | T | T | T | T |
| | 15 | Z | 3 | T | T | T | T | T | T | T |
| | | Z | 4 | T | T | T | T | T | T | T |
| | | Z | 6 | 10.5 | T | T | T | T | T | T |
| | 25 | Z | 10 | 8 | 8.5 | 17 | T | T | T | T |
| | | Z | 13 | 7.5 | 7.5 | 12 | 20 | T | T | T |
| | | Z | 16 | 5 | 7.5 | 12 | 20 | T | T | T |
| | | Z | 20 | 5 | 6 | 10 | 15 | T | T | T |
| | | Z | 25 | 5 | 6 | 10 | 15 | T | T | T |
| | 20 | Z | 32 | | 6 | 7.5 | 12 | T | T | T |
| | | Z | 40 | | | 7.5 | 12 | T | T | T |
| | 15 | Z | 50 | | | 5* | 7.5 | 10.5 | T | T |
| | | Z | 63 | | | 5* | 6* | 10.5 | T | T |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 290

| 400 V | | Upstream breaker | | T3 | | |
|---|---|---|---|---|---|---|
| | | | Version | N, S | | |
| | | | Relay | TM, M | | |
| Downstream | | | $I_u$ [A] | 250 | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 160 | 200 | 250 |
| S 290 | 15 | C-D-K | 80 | 4* | 10 | 15 |
| | | C-D-K | 100 | 4* | 7.5* | 15 |
| | | C | 125 | | 7.5* | |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 500

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 500 | 50 | B-C-D | 6 | 10.5 | 15 | 20 | 25 | 36 | 36 | 36 |
| | | B-C-D | 10 | 8 | 10 | 20 | 25 | 36 | 36 | 36 |
| | | B-C-D | 13 | 7.5 | 10 | 15 | 25 | 36 | 36 | 36 |
| | | B-C-D | 16 | 7.5 | 10 | 15 | 25 | 36 | 36 | 36 |
| | | B-C-D | 20 | 7.5 | 10 | 15 | 25 | 36 | 36 | 36 |
| | | B-C-D | 25 | 6 | 10 | 15 | 20 | 36 | 36 | 36 |
| | | B-C-D | 32 | | 7.5 | 10 | 20 | 36 | 36 | 36 |
| | | B-C-D | 40 | | | 10 | 20 | 36 | 36 | 36 |
| | | B-C-D | 50 | | | 7.5* | 15 | 36 | 36 | 36 |
| | | B-C-D | 63 | | | 5* | 6* | 36 | 36 | 36 |

* Value valid with magnetic only breaker upstream.

## Tmax T3 - S 500

| 400 V | | Upstream breaker | | T3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Version | N, S | | | | | | |
| | | | Relay | TM, M | | | | | | |
| Downstream | | | $I_u$ [A] | 250 | | | | | | |
| breaker | $I_{cu}$ [kA] | Char. | $I_n$ [A] | 63 | 80 | 100 | 125 | 160 | 200 | 250 |
| S 500 | 50 | K | ≤5.8 | 36 | 36 | 36 | 36 | T | T | T |
| | | K | 5.3...8 | 10.5 | 36 | 36 | 36 | T | T | T |
| | | K | 7.3...11 | 8 | 36 | 36 | 36 | T | T | T |
| | 30 | K | 10...15 | 7.5 | 10 | 15 | T | T | T | T |
| | | K | 14...20 | 7.5 | 10 | 15 | T | T | T | T |
| | | K | 18...26 | 7.5 | 10 | 15 | T | T | T | T |
| | | K | 23...32 | 6 | 10 | 15 | 20 | T | T | T |
| | | K | 29...37 | | 7.5 | 10 | 20 | T | T | T |
| | | K | 34...41 | | | 10 | 20 | T | T | T |
| | | K | 38...45 | | | 7.5* | 15 | T | T | T |

* Value valid with magnetic only breaker upstream.

## 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 a.c. 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 V a.c. 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 cosφ=0.6
  lamp with capacitors cosφ=0.86

Method of calculation

- IB = (PL * n°L * KST * KC) / (Un * cosφ) where:
  - Un = rated voltage 230 V
  - cosφ = 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 |
| In [A] - 2P and 4P circuit-breakers | | 1 | 2 | 3 | 6 | 10 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |

Fluorescent lamps. 230V a.c. 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.

### Single-phase transformer (primary voltage 230 V)

| Pn [kVA] | In [A] | ucc (%) | 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 |
| 8 | 34 | 5 | S 290 D80 |
| 10 | 42 | 5.5 | S 290 D100 |
| 12.5 | 53 | 5.5 | S 290 D100 |

### Single-phase transformer (primary voltage 400 V)

| Pn [kVA] | In [A] | ucc (%) | 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 |
| 16 | 39 | 5 | S 290 D80 |
| 20 | 49 | 5 | S 290 D100 |

### Three-phase transformer (primary voltage 400 V)

| Pn [kVA] | In [A] | ucc (%) | 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 |
| 25 | 35 | 5.5 | S 290 D80 |
| 31.5 | 44 | 5 | S 290 D80 |
| 40 | 56 | 5 | S 290 D80 |
| 50 | 70 | 4.5 | S 290 D100 |

S 2*.. = S 250, S 270 or S 280

(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.

## Internal resistances and dissipated power tables

### S 240 series

| | Characteristics C | |
|---|---|---|
| In | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] |
| **6** | 48 | 1.7 |
| **8** | 15 | 1 |
| **10** | 13.3 | 1.3 |
| **13** | 13.3 | 2.3 |
| **16** | 9 | 2.3 |
| **20** | 6.25 | 2.5 |
| **25** | 5 | 3.2 |
| **32** | 3.6 | 3.7 |
| **40** | 2.5 | 4 |

* Internal resistance and dissipated power per pole

### S 941 N - S 951 N - S 971 N series

| | Characteristics B-C | |
|---|---|---|
| In | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] |
| **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 |

* Total dissipated power of device

### S 250 series

| | Characteristics B, C ** | | Characteristics K | |
|---|---|---|---|---|
| In | Resistance* | Diss. pwr.* | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] | [mΩ] | [W] |
| **0.5** | 5500 | 1.4 | 5020 | 1.26 |
| **1** | 1440 | 1.4 | 1390 | 1.39 |
| **1.6** | 630 | 1.6 | 612 | 1.56 |
| **2** | 460 | 1.8 | 450 | 1.79 |
| **3** | 150 | 1.3 | 147 | 1.32 |
| **4** | 110 | 1.8 | 112 | 1.79 |
| **6** | 48 | 1.7 | 54.1 | 1.95 |
| **8** | 15 | 1 | 33.8 | 2.16 |
| **10** | 13.5 | 1.35 | 15.1 | 1.51 |
| **13** | 13.3 | 2.3 | 12.6 | 1.26 |
| **16** | 9 | 2.3 | 8.1 | 2.07 |
| **20** | 4.5 | 2.5 | 5.27 | 2.11 |
| **25** | 3.8 | 2.4 | 3.97 | 2.48 |
| **32** | 3.2 | 3.3 | 2.65 | 2.71 |
| **40** | 2.5 | 4 | 2.44 | 3.9 |
| **50** | 1.2 | 3 | 1.15 | 2.9 |
| **63** | 1.4 | 5.6 | 0.7 | 5.2 |

* Internal resistance and dissipated power per pole

**The rated currents 0.5...4 A only apply to characteristic C

### S 270 series

| | Characteristics B, C ** | | Characteristics K | |
|---|---|---|---|---|
| In | Resistance* | Diss. pwr.* | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] | [mΩ] | [W] |
| **0.5** | 5500 | 1.4 | 5020 | 1.26 |
| **1** | 1440 | 1.4 | 1390 | 1.39 |
| **1.6** | 630 | 1.6 | 612 | 1.56 |
| **2** | 460 | 1.8 | 450 | 1.79 |
| **3** | 150 | 1.3 | 147 | 1.32 |
| **4** | 110 | 1.8 | 112 | 1.79 |
| **6** | 48 | 1.7 | 54.1 | 1.95 |
| **8** | 15 | 1 | 33.8 | 2.16 |
| **10** | 13.5 | 1.35 | 15.1 | 1.51 |
| **13** | 13.3 | 2.3 | 13.3 | 2.3 |
| **16** | 9 | 2.3 | 8.1 | 2.07 |
| **20** | 6.25 | 2.5 | 5.27 | 2.11 |
| **25** | 3 | 1.9 | 3.97 | 2.48 |
| **32** | 2.9 | 3.7 | 2.65 | 2.71 |
| **40** | 2 | 4.8 | 2.44 | 3.9 |
| **50** | 1.2 | 3 | 1.15 | 2.9 |
| **63** | 1.4 | 5.6 | 0.7 | 5.2 |

* Internal resistance and dissipated power per pole

**The rated currents 0.5...4 A only apply to characteristic C

## S 280 - S 280 UC series

| | Characteristics B, C** | | Characteristics Z** | | Characteristics K**, D | |
|---|---|---|---|---|---|---|
| In | Resistance* | Diss. pwr.* | Resistance* | Diss. pwr.* | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] | [mΩ] | [W] | [mΩ] | [W] |
| **0.5** | 5500 | 1.37 | 10100 | 2.52 | 5020 | 1.26 |
| **1** | 1440 | 1.44 | 2270 | 2.27 | 1390 | 1.39 |
| **1.6** | 630 | 1.61 | 1100 | 2.81 | 612 | 1.56 |
| **2** | 460 | 1.84 | 619 | 2.47 | 450 | 1.79 |
| **3** | 150 | 1.35 | 202 | 1.82 | 147 | 1.32 |
| **4** | 110 | 1.76 | 149 | 2.38 | 112 | 1.79 |
| **6** | 48 | 1.73 | 104 | 3.74 | 54.1 | 1.95 |
| **8** | 15 | 1 | 53.9 | 3.45 | 33.8 | 2.16 |
| **10** | 13.5 | 1.35 | 17.5 | 1.75 | 15.1 | 1.51 |
| **13** | 13.3 | 2.3 | - | - | 13.3 | 2.3 |
| **16** | 9 | 2.3 | 10.9 | 2.8 | 8.1 | 2.07 |
| **20** | 6.25 | 2.5 | 6 | 2.4 | 5.27 | 2.11 |
| **25** | 3 | 1.9 | 4.1 | 2.56 | 3.97 | 2.48 |
| **32** | 2.9 | 3.7 | 2.81 | 2.88 | 2.65 | 2.71 |
| **40** | 2 | 4.8 | 2.55 | 4.09 | 2.44 | 3.9 |
| **50** | 1.2 | 3 | 1.77 | 4.43 | 1.15 | 2.9 |
| **63** | 1.4 | 5.6 | 1.31 | 5.2 | 0.7 | 5.2 |

* Internal resistance and dissipated power per pole ** Values also apply to UC version

## S 290 series

| | Characteristics C, D | |
|---|---|---|
| In | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] |
| **80** | 1.0 | 6.4 |
| **100** | 0.8 | 8.0 |
| **125** | 0.7 | 10.9 |

* Internal resistance and dissipated power per pole

## S 500 series

| | Characteristics B, C, UCB | | Characteristics D | |
|---|---|---|---|---|
| In | Resistance* | Diss. pwr.* | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] | [mΩ] | [W] |
| **6** | 55 | 1.98 | - | - |
| **10** | 15.2 | 1.52 | - | - |
| **13** | 12.0 | 2.03 | 10.0 | 1.69 |
| **16** | 8.4 | 2.15 | 7.1 | 1.82 |
| **20** | 6.5 | 2.60 | 5.0 | 2.00 |
| **25** | 4.5 | 2.81 | 3.5 | 2.19 |
| **32** | 3.5 | 3.58 | 3.0 | 3.07 |
| **40** | 2.1 | 3.36 | 1.9 | 3.04 |
| **50** | 1.7 | 4.25 | 1.7 | 4.25 |
| **63** | 1.7 | 6.75 | 1.7 | 6.75 |

* Internal resistance and dissipated power per pole

## S 500 series

| | Characteristics K adjustable, UC-K, KM | |
|---|---|---|
| In | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] |
| **0.1…0.15** | 84000 | 1.89 |
| **0.14…0.21** | 51000 | 2.25 |
| **0.2…0.3** | 25500 | 2.30 |
| **0.28…0.42** | 12800 | 2.26 |
| **0.28…0.58** | 7000 | 2.35 |
| **0.53…0.8** | 3600 | 2.30 |
| **0.73…1.1** | 2000 | 2.42 |
| **1…1.5** | 1050 | 2.36 |
| **1.4…2.1** | 680 | 3.00 |
| **2…3.0** | 350 | 3.15 |
| **2.8…4.2** | 175 | 3.09 |
| **3.8…5.8** | 95 | 3.20 |
| **5.3…8.0** | 55 | 3.52 |
| **7.3…11.0** | 35 | 4.24 |
| **10…15.0** | 23 | 5.18 |
| **14…20.0** | 12 | 4.80 |
| **18…26.0** | 8 | 5.41 |
| **23…32.0** | 5 | 5.12 |
| **29…37.0** | 3.5 | 4.79 |
| **34…41.0** | 2.5 | 4.20 |
| **38…45.0** | 1.7 | 3.44 |

* Internal resistance and dissipated power per pole

## S 700 series

| | Characteristics E sel | | | | |
|---|---|---|---|---|---|
| In | Resistance* | Diss. pwr.* | In | Resistance* | Diss. pwr.* |
| [A] | [mΩ] | [W] | [A] | [mΩ] | [W] |
| **25** | 4.1 | 2.6 | **63** | 1.3 | 5.2 |
| **35** | 2.85 | 3.5 | **80** | 1.1 | 7.0 |
| **50** | 1.65 | 4.1 | **100** | 1 | 10 |

* Internal resistance and dissipated power per pole

## Influence of ambient temperature on effective capacity and rated current

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.

For other temperatures, consider a factor (Fc) multiplied by the rated current of the device to obtain the non-tripping current (Inf) for the new temperature.

The change in the Fc factor depending on ambient temparature, rated current of the circuit-breaker and the characteristic type is shown in the two graphs below. The rated current (equivalent) for the new temperature is obtained by dividing the non-tripping current by the factor of 1.13 for circuit-breakers with characteristics B, C or D and by the factor of 1.05 for circuit-breakers with characteristics K or Z.

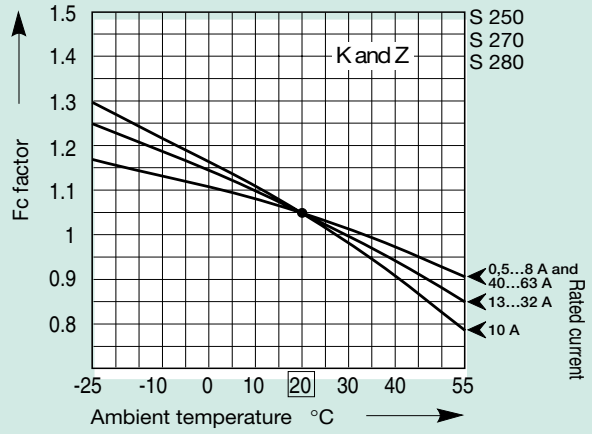
The following page contains two tables in which this calculation has been effected for temperatures from -25 °C to +55 °C for the curves B, C, D, K and Z.

This derating is sufficient for loads which last for less than an hour; for loads which last for more than an hour, multiply the rated current (equivalent) referring to the new temperature by another factor of 0.9.

A variation in the tripping current is also caused by the presence of several devices installed alongside each other; in this case, consider the factor Fm according to the number of adjacent devices (see table).

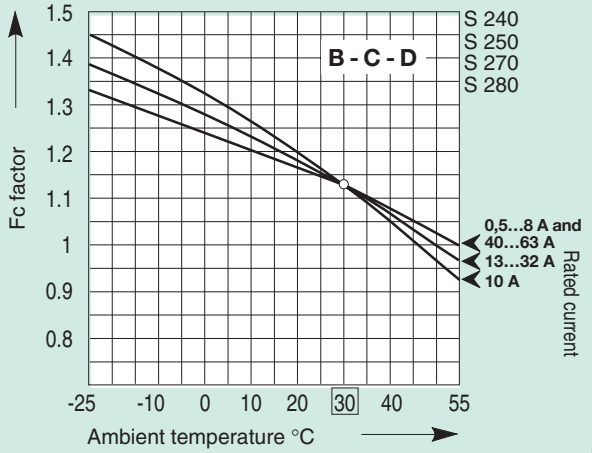


### Influence of ambient temperature



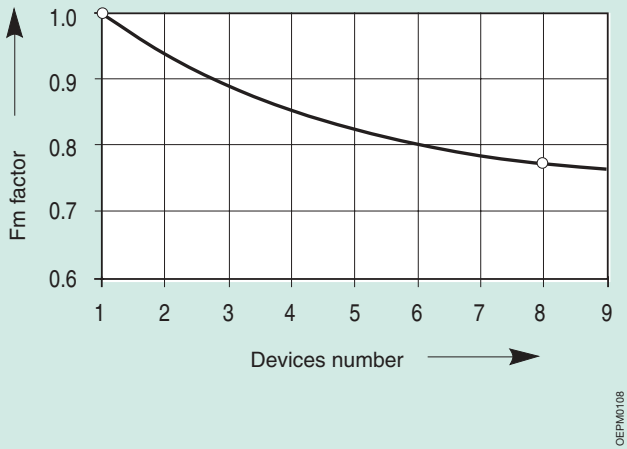

Inf= In • Fc (NON-tripping current)

### Influence of ambient temperature




Inf= In • Fc (NON-tripping current)

### Influence of adjacent devices




**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 | 0.795 |
| 7 | 0.78 |
| 8 | 0.77 |
| 9 | 0.76 |
| >9 | 0.76 |

## Example: S 252 C 16 with T=35 °C

| Type of use | Values to use | Formula | Calculation | Result |
|---|---|---|---|---|
| **Load less than an hour** | In (amb. t°) -see tables- | | | In=15.43 A |
| **Load more than an hour** | In (amb. t°) -see tables-, 0.9 | In (amb. t°)x0.9 | 15.43x0.9 | In=13.9 A |
| **Load over an hour with 8 adj.devices** | In (amb. t°) -see tables-, 0.9, Fm (0.77) | In (amb. t°)x0.9x0.77 | 15.43x0.9x0.77 | In=10.7 A |

2

## Equivalent rated current according to ambient temperature

### MINIATURE CIRCUIT-BREAKERS S 240 - S 250 - S 270 - S 280 SERIES - CHARACTERISTICS B-C-D

| | | | | | | | | | | | | In | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In | temp | -25 °C | -20 °C | -15 °C | -10 °C | -5 °C | 0 °C | 5 °C | 10 °C | 15 °C | 20 °C | 25 °C | 30 °C | 35 °C | 40 °C | 45 °C | 50 °C | 55 °C |
| 0.5 | | 0.64 | 0.63 | 0.62 | 0.60 | 0.59 | 0.58 | 0.57 | 0.55 | 0.54 | 0.53 | 0.51 | 0.5 | 0.48 | 0.46 | 0.45 | 0.43 | 0.41 |
| 1 | | 1.28 | 1.26 | 1.23 | 1.20 | 1.18 | 1.15 | 1.13 | 1.10 | 1.08 | 1.05 | 1.03 | 1 | 0.96 | 0.93 | 0.89 | 0.86 | 0.82 |
| 1.6 | | 2.05 | 2.01 | 1.97 | 1.93 | 1.88 | 1.84 | 1.81 | 1.77 | 1.73 | 1.68 | 1.64 | 1.6 | 1.54 | 1.49 | 1.43 | 1.37 | 1.32 |
| 2 | | 2.57 | 2.51 | 2.46 | 2.41 | 2.35 | 2.30 | 2.27 | 2.21 | 2.16 | 2.11 | 2.05 | 2 | 1.93 | 1.86 | 1.79 | 1.72 | 1.65 |
| 3 | | 3.85 | 3.77 | 3.69 | 3.61 | 3.53 | 3.45 | 3.40 | 3.31 | 3.24 | 3.16 | 3.08 | 3 | 2.89 | 2.79 | 2.68 | 2.58 | 2.47 |
| 4 | | 5.13 | 5.03 | 4.92 | 4.81 | 4.71 | 4.60 | 4.53 | 4.42 | 4.32 | 4.21 | 4.11 | 4 | 3.86 | 3.72 | 3.58 | 3.43 | 3.29 |
| 6 | | 7.06 | 6.98 | 6.88 | 6.77 | 6.72 | 6.64 | 6.53 | 6.42 | 6.37 | 6.27 | 6.11 | 6 | 5.79 | 5.68 | 5.58 | 5.47 | 5.31 |
| 8 | | 9.42 | 9.31 | 9.17 | 9.03 | 8.96 | 8.85 | 8.71 | 8.57 | 8.50 | 8.35 | 8.14 | 8 | 7.72 | 7.58 | 7.43 | 7.29 | 7.08 |
| 10 | | 12.83 | 12.57 | 12.30 | 12.04 | 11.77 | 11.50 | 11.33 | 11.04 | 10.80 | 10.53 | 10.27 | 10 | 9.65 | 9.29 | 8.94 | 8.58 | 8.23 |
| 13 | | 16.11 | 15.82 | 15.53 | 15.19 | 14.96 | 14.61 | 14.38 | 14.15 | 13.81 | 13.58 | 13.23 | 13 | 12.54 | 12.37 | 11.96 | 11.50 | 11.16 |
| 16 | | 19.82 | 19.47 | 19.12 | 18.69 | 18.41 | 17.98 | 17.70 | 17.42 | 16.99 | 16.71 | 16.28 | 16 | 15.43 | 15.22 | 14.73 | 14.16 | 13.73 |
| 20 | | 24.78 | 24.34 | 23.89 | 23.36 | 23.01 | 22.48 | 22.12 | 21.77 | 21.24 | 20.88 | 20.35 | 20 | 19.29 | 19.03 | 18.41 | 17.70 | 17.17 |
| 25 | | 30.97 | 30.42 | 29.87 | 29.20 | 28.76 | 28.10 | 27.65 | 27.21 | 26.55 | 26.11 | 25.44 | 25 | 24.12 | 23.78 | 23.01 | 22.12 | 21.46 |
| 32 | | 39.65 | 38.94 | 38.23 | 37.38 | 36.81 | 35.96 | 35.40 | 34.83 | 33.98 | 33.42 | 32.57 | 32 | 30.87 | 30.44 | 29.45 | 28.32 | 27.47 |
| 40 | | 47.08 | 46.55 | 45.84 | 45.13 | 44.78 | 44.25 | 43.54 | 42.83 | 42.48 | 41.77 | 40.71 | 40 | 38.58 | 37.88 | 37.17 | 36.46 | 35.40 |
| 50 | | 58.85 | 58.19 | 57.30 | 56.42 | 55.97 | 55.31 | 54.42 | 53.54 | 53.10 | 52.21 | 50.88 | 50 | 48.23 | 47.35 | 46.46 | 45.58 | 44.25 |
| 63 | | 74.15 | 73.31 | 72.20 | 71.08 | 70.53 | 69.69 | 68.58 | 67.46 | 66.90 | 65.79 | 64.12 | 63 | 60.77 | 59.65 | 58.54 | 57.42 | 55.75 |
| 80 | | 95.57 | 94.04 | 92.50 | 90.97 | 89.73 | 88.49 | 87.08 | 85.66 | 84.25 | 82.83 | 82.12 | 80 | 79.29 | 78.41 | 76.11 | 73.98 | 72.92 |
| 100 | | 119.47 | 117.55 | 115.64 | 113.72 | 112.17 | 110.62 | 108.85 | 107.08 | 105.31 | 103.54 | 102.65 | 100 | 99.11 | 98.05 | 95.13 | 92.48 | 91.15 |

### MINIATURE CIRCUIT-BREAKERS S 240 - S 250 - S 270 - S 280 SERIES - CHARACTERISTICS K-Z

| | | | | | | | | | | | In | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In | temp | -25 °C | -20 °C | -15 °C | -10 °C | -5 °C | 0 °C | 5 °C | 10 °C | 15 °C | 20 °C | 25 °C | 30 °C | 35 °C | 40 °C | 45 °C | 50 °C | 55 °C |
| 0.5 | | 0.55 | 0.55 | 0.54 | 0.54 | 0.53 | 0.52 | 0.52 | 0.51 | 0.51 | 0.5 | 0.49 | 0.49 | 0.48 | 0.47 | 0.45 | 0.44 | 0.43 |
| 1 | | 1.10 | 1.10 | 1.09 | 1.08 | 1.07 | 1.05 | 1.04 | 1.02 | 1.01 | 1 | 0.98 | 0.97 | 0.95 | 0.93 | 0.90 | 0.89 | 0.87 |
| 1.6 | | 1.77 | 1.75 | 1.74 | 1.72 | 1.71 | 1.68 | 1.66 | 1.64 | 1.62 | 1.6 | 1.57 | 1.55 | 1.52 | 1.49 | 1.45 | 1.42 | 1.39 |
| 2 | | 2.21 | 2.19 | 2.17 | 2.15 | 2.13 | 2.10 | 2.08 | 2.05 | 2.03 | 2 | 1.96 | 1.94 | 1.90 | 1.87 | 1.81 | 1.77 | 1.73 |
| 3 | | 3.31 | 3.29 | 3.26 | 3.23 | 3.20 | 3.14 | 3.11 | 3.07 | 3.04 | 3 | 2.94 | 2.91 | 2.86 | 2.80 | 2.71 | 2.66 | 2.60 |
| 4 | | 4.42 | 4.38 | 4.34 | 4.30 | 4.27 | 4.19 | 4.15 | 4.10 | 4.06 | 4 | 3.92 | 3.89 | 3.81 | 3.73 | 3.62 | 3.54 | 3.47 |
| 6 | | 6.63 | 6.57 | 6.51 | 6.46 | 6.40 | 6.29 | 6.23 | 6.14 | 6.09 | 6 | 5.89 | 5.83 | 5.71 | 5.60 | 5.43 | 5.31 | 5.20 |
| 8 | | 8.84 | 8.76 | 8.69 | 8.61 | 8.53 | 8.38 | 8.30 | 8.19 | 8.11 | 8 | 7.85 | 7.77 | 7.62 | 7.47 | 7.24 | 7.09 | 6.93 |
| 10 | | 12.38 | 12.19 | 11.90 | 11.52 | 11.33 | 11.05 | 10.76 | 10.48 | 10.29 | 10 | 9.81 | 9.33 | 9.05 | 8.57 | 8.29 | 7.81 | 7.52 |
| 13 | | 15.35 | 15.17 | 14.98 | 14.73 | 14.49 | 14.11 | 13.87 | 13.62 | 13.25 | 13 | 12.75 | 12.38 | 12.13 | 11.76 | 11.39 | 10.77 | 10.52 |
| 16 | | 18.90 | 18.67 | 18.44 | 18.13 | 17.83 | 17.37 | 17.07 | 16.76 | 16.30 | 16 | 15.70 | 15.24 | 14.93 | 14.48 | 14.02 | 13.26 | 12.95 |
| 20 | | 23.62 | 23.33 | 23.05 | 22.67 | 22.29 | 21.71 | 21.33 | 20.95 | 20.38 | 20 | 19.62 | 19.05 | 18.67 | 18.10 | 17.52 | 16.57 | 16.19 |
| 25 | | 29.52 | 29.17 | 28.81 | 28.33 | 27.86 | 27.14 | 26.67 | 26.19 | 25.48 | 25 | 24.52 | 23.81 | 23.33 | 22.62 | 21.90 | 20.71 | 20.24 |
| 32 | | 37.79 | 37.33 | 36.88 | 36.27 | 35.66 | 34.74 | 34.13 | 33.52 | 32.61 | 32 | 31.39 | 30.48 | 29.87 | 28.95 | 28.04 | 26.51 | 25.90 |
| 40 | | 44.19 | 43.81 | 43.43 | 43.05 | 42.67 | 41.90 | 41.52 | 40.95 | 40.57 | 40 | 39.24 | 38.86 | 38.10 | 37.33 | 36.19 | 35.43 | 34.67 |
| 50 | | 55.24 | 54.76 | 54.29 | 53.81 | 53.33 | 52.38 | 51.90 | 51.19 | 50.71 | 50 | 49.05 | 48.57 | 47.62 | 46.67 | 45.24 | 44.29 | 43.33 |
| 63 | | 69.60 | 69.00 | 68.40 | 67.80 | 67.20 | 66.00 | 65.40 | 64.50 | 63.90 | 63 | 61.80 | 61.20 | 60.00 | 58.80 | 57.00 | 55.80 | 54.60 |

## Variation in alarm thresholds according to network frequency

The circuit-breakers are calibrated for a current with a frequency range between 50 and 60 Hz.

For other frequency values, the electro-magnetic tripping current varies according to the multiplication factor H.

| | 100 Hz | 200 Hz | 400 Hz | d.c. |
|---|---|---|---|---|
| H | 1.1 | 1.2 | 1.5 | 1.5 |

For the thermal trip, on the other hand, there is no variation because it is independent of the network frequency.



## Applications in d.c. of standard circuit-breakers

Direct current is used because of the need for a source of energy which is able to power essential services such as protection systems, emergency lighting, alarm systems, uninterruptible power supplies with extreme reliability even in the absence of normal energy sources.

Storage batteries, buffer-powered from the network and installed near the users, are the safest source of energy for powering these services.

In most cases, the rated voltage of these installations lies between 24 and 220 V; higher voltages are not, however, excluded (even up to 1000 V).

When selecting circuit-breakers, it is important to bear in mind that leakage currents are very high near power sources due to the low internal resistance of the batteries.

The main applications of circuit-breakers used in circuits in d.c. include:

- electric traction
- industrial plants with electrolithic processes
- units for rapid drop-out of synchronous machines.

For use in d.c., most standard circuit-breakers can be used, as long as the relevant voltage limits are respected, as well as the special versions.

It is important to remember that the electro-magnetic trip value in d.c. is approx. 1.5-1.6 times the corresponding value in a.c.

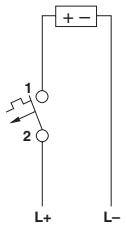
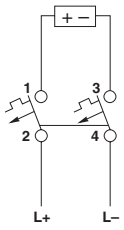
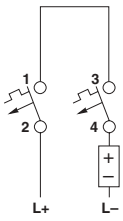
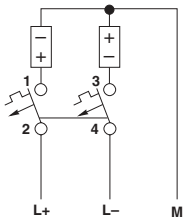
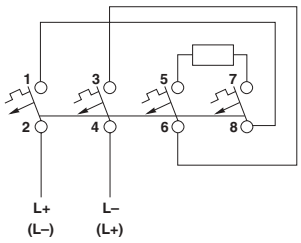
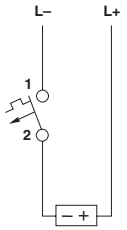
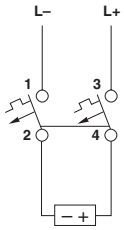
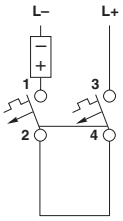
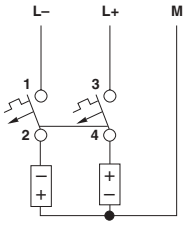
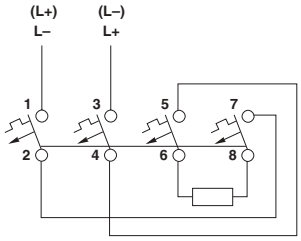
### Standard circuit-breakers

| Series | Max. permitted voltage |
|---|---|
| **S 240, S 250, S 270, S 280** | 60 V d.c. for one-pole circuit-breakers |
| | 125 V d.c. for two-pole circuit-breakers |
| **S 290** | 60 V d.c. for one-pole circuit-breakers |
| | 125 V d.c. for two-pole circuit-breakers |
| **S 500** | 250 V d.c. for two-pole circuit-breakers |

### Special UC (Universal Current) circuit-breakers

| Series | Max. permitted voltage |
|---|---|
| **S 280 UC** | 440 V d.c. for two-pole circuit-breakers |
| **S 500 UC** | 750 V d.c. for three-pole circuit-breakers |

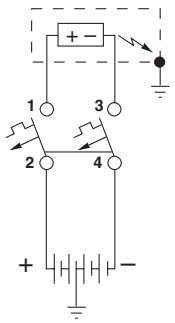
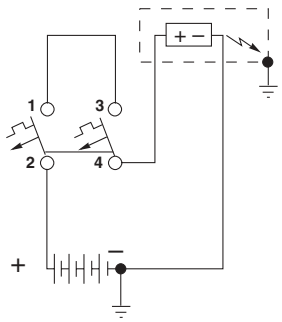
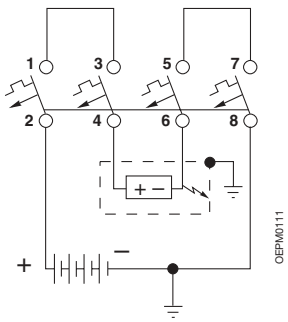
## Examples of maximum voltages allowed between terminals according to number of poles and wiring

| | | | | | |
|---|---|---|---|---|---|
| **Max. voltage between terminals** | 250 V .... | 440 V .... | 440 V .... | 440 V .... | 440 V .... voltage reversal |
| **Max. voltage between terminals and earth** | 250 V .... | 250 V .... | 440 V .... (1) | 250 V .... | 250 V .... |
| **Modular circuit-breaker** | One-pole S 281 UC | Two-pole S 282 UC | Two-pole S 282 UC | Two-pole S 282 UC | Four-pole (2) S 284 UC |
| **Power supply from bottom** |  |  |  |  |  |
| **Power supply from top** |  |  |  |  |  |



(1) In the interruption example, the negative pole is earthed

## Examples of high voltages between terminals and earth with equal voltage between terminals

| | | | |
|---|---|---|---|
| **Max. voltage between terminals** | 440 V .... interruption of both poles | 440 V .... interruption of 1 pole | 440 V .... interruption of both poles |
| **Max. voltage between terminals and earth** | 250 V power supply with symmetrical earthing | 440 V unearthed network or with asymmetrical earthing | 440 V unearthed network or with asymmetrical earthing |
| **Modular circuit-breaker** | Two-pole S 282 UC | Two-pole S 282 UC | Four-pole (2) S 284 UC |
| |  |  |  |



(1) Version with 4 protected poles available on request

# Overall dimensions

## Contents



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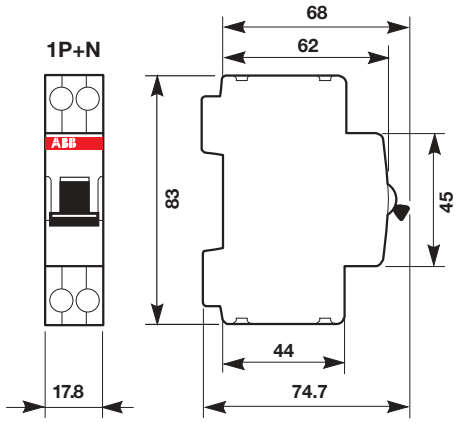
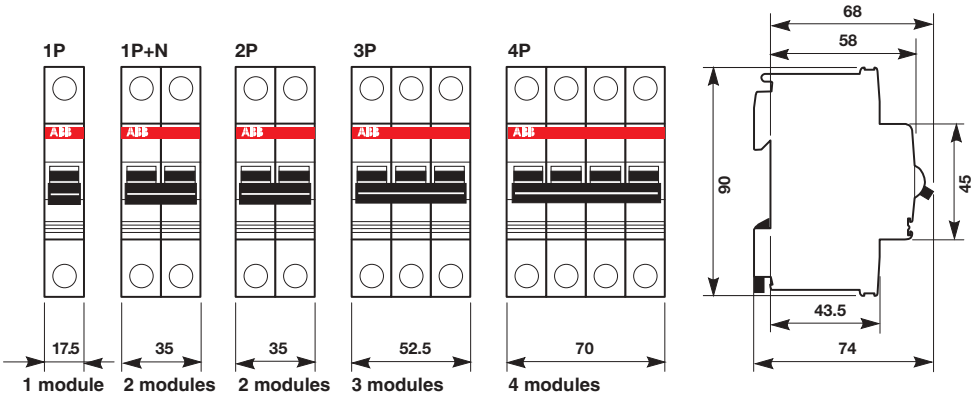
# Overall dimensions

## MCBs

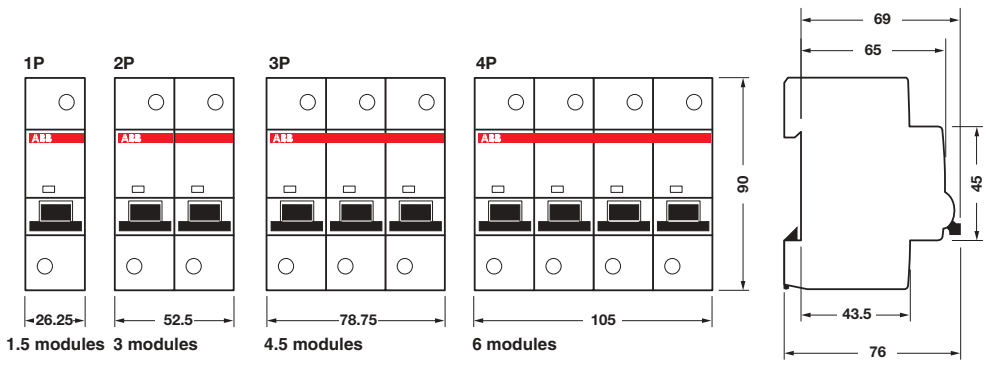
### S 931 N - S 941 N - S 951 N - S 971 N




### S 240 - S 250 - S 270 - S 280 - M 280




### S 290

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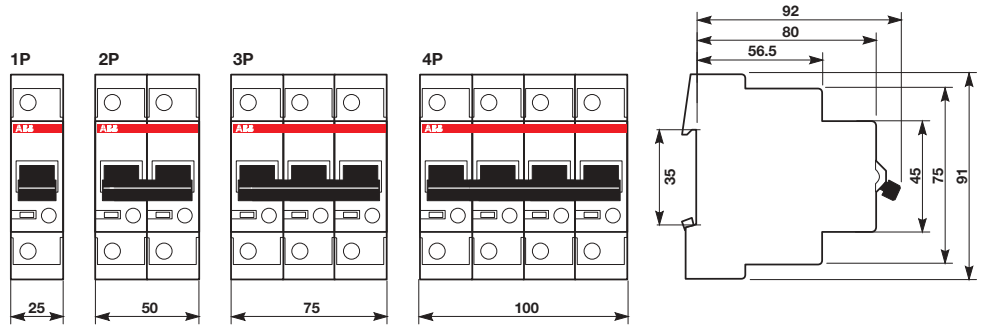
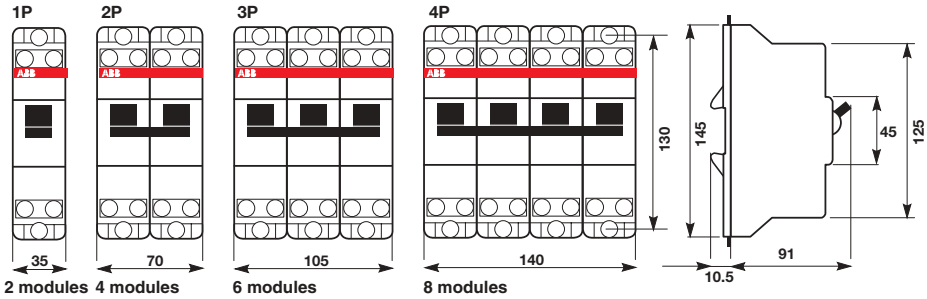
# Overall dimensions

## MCBs

### S 500




### S 700

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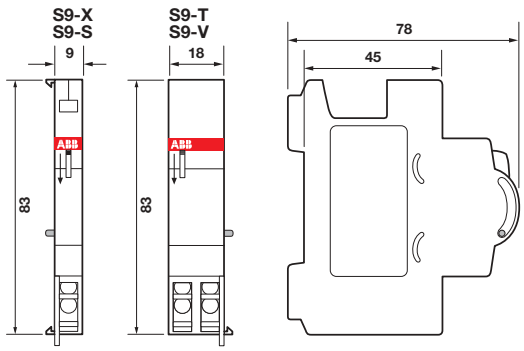
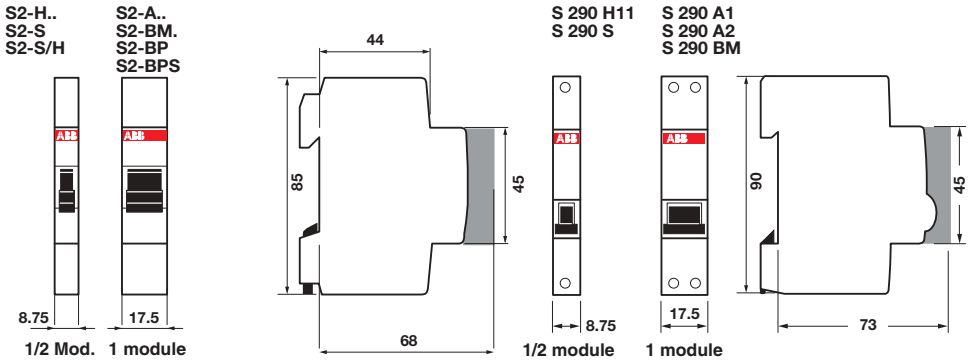
# Overall dimensions

## Auxiliary elements

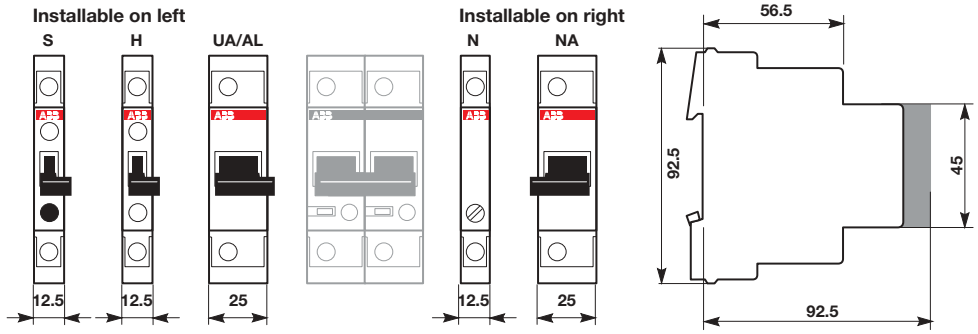
### Auxiliary elements for range S 9..



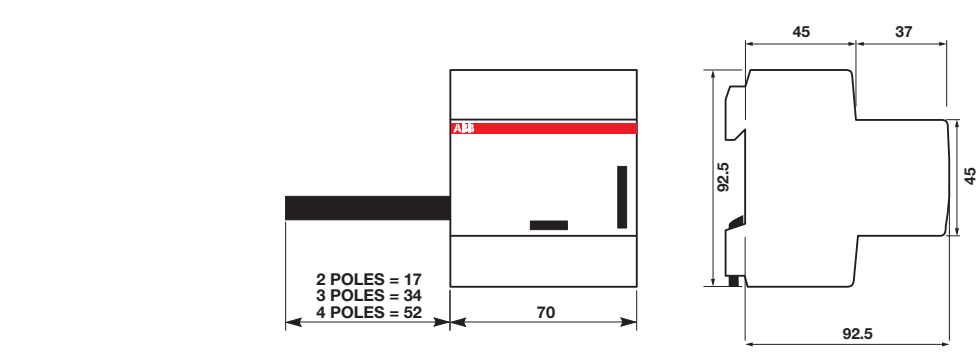

### Auxiliary elements for range S 2..




### Auxiliary elements for S 500 - F 500




### Motor operating device for S 2..

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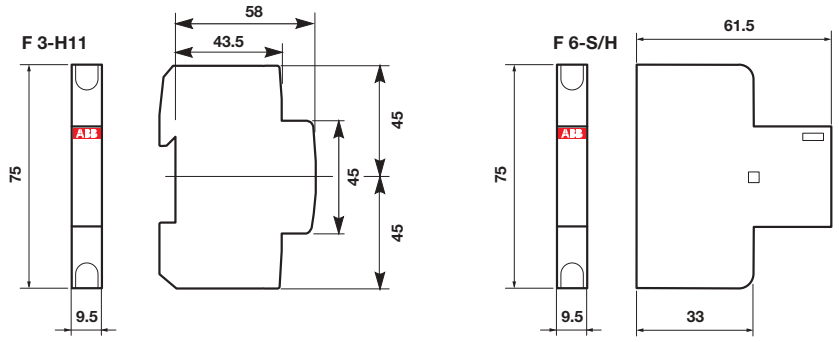
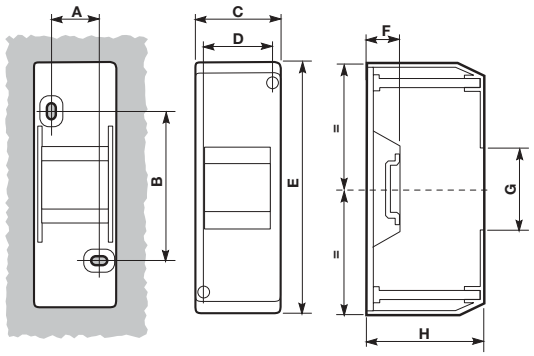
# Overall dimensions

## Auxiliary elements

### Auxiliary elements for F 3.. - F 6..




### PCD terminal covers



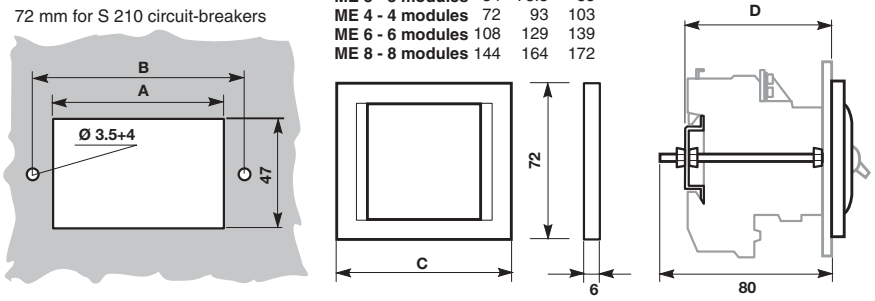

| TYPE | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| PCD/2 | 25 | 80 | 50 | 35 | 140 | 17.5 | 46 | 65 |
| PCD/4 | 44 | 118 | 96 | 74 | 160 | 17.5 | 46 | 65 |
| PCD/6 | 94 | 125 | 139 | 121 | 160 | 17.5 | 46 | 65 |
| PCD/8 | 183 | 94 | 230 | 178 | 200 | 20.5 | 100 | 95 |

### ME flange for rear board mounting

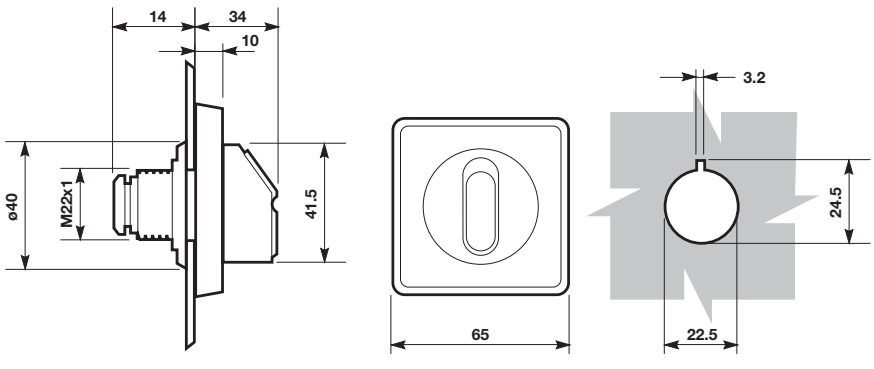
**DEPHT D**
57 mm for S 240-S 250-
S 270-S 280 circuit-breakers

72 mm for S 210 circuit-breakers

| TYPE | A | B | C |
|---|---|---|---|
| ME 1 - 1 module | 18 | 40 | 50 |
| ME 2 - 2 modules | 36 | 57.5 | 67 |
| ME 3 - 3 modules | 54 | 75.5 | 85 |
| ME 4 - 4 modules | 72 | 93 | 103 |
| ME 6 - 6 modules | 108 | 129 | 139 |
| ME 8 - 8 modules | 144 | 164 | 172 |




### OH_2A_

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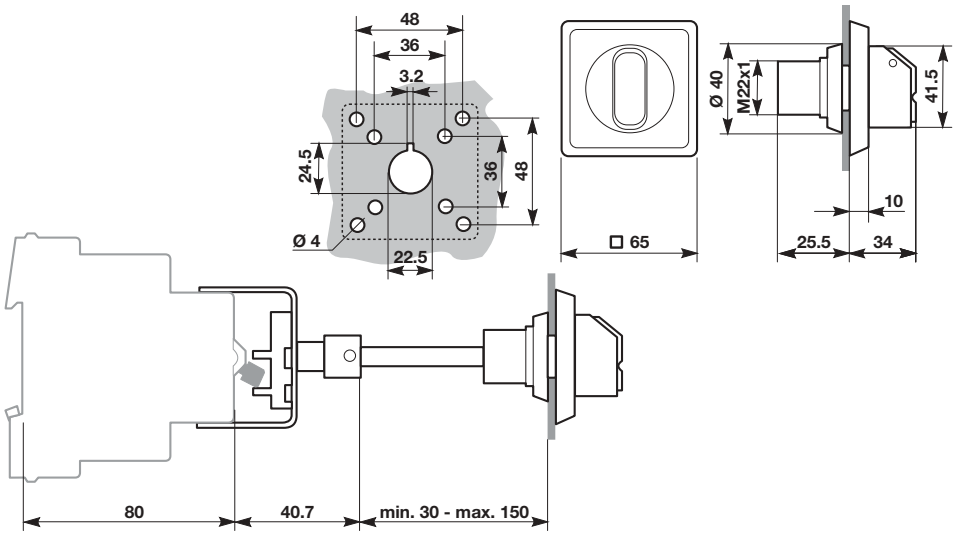
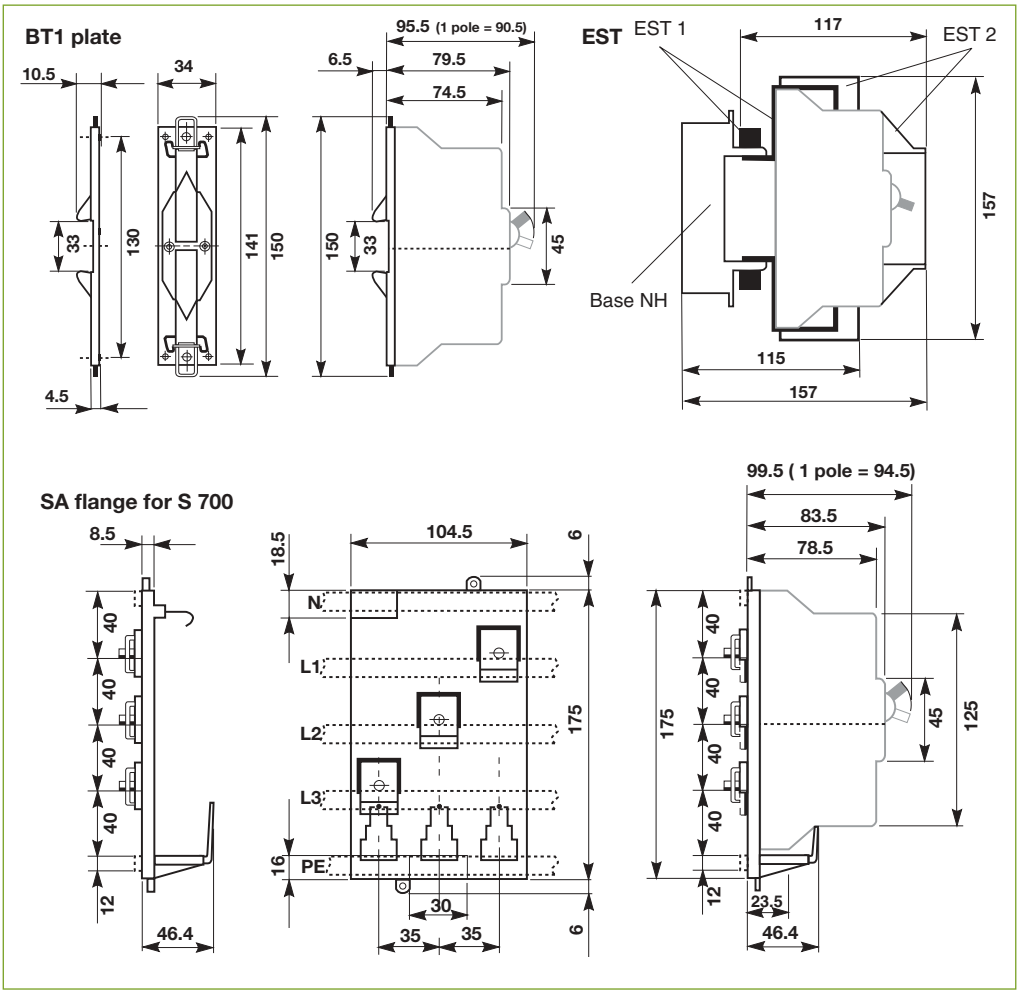
## Rotary handle for S 500 - F 500




## Accessories for S 700





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In consideration of modifications to Standards and materials, the characteristics and overall dimensions indicated in this catalogue may be considered binding only following confirmation by ABB SACE

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