

TECHNICAL CATALOGUE

# SACE Emax 2

## Low voltage air circuit-breakers



# SACE Emax 2

## Consultation guide



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# **SACE Emax 2**

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# Main characteristics

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# Overview of the SACE Emax 2 family

## SACE Emax 2, a further leap forward

The world of the electrical power distribution changes fast and major new trends such as energy efficiency, connectivity and smart grids are now crowding onto the stage. These trends lead to new customer and application demands. To meet these demands, ABB has now further improved SACE Emax 2. SACE Emax 2 air circuit breaker is now a multifunctional platform able to manage the next generation of electrical plants such as microgrids, evolving into a true Power Manager.

SACE Emax 2 is the first air circuit breaker that matches all the new grid requirements. It enables

a direct communication to the new energy management cloud-computing platform ABB Ability™ Energy and Asset Manager.

If the smart and plug & play architecture makes SACE Emax 2 easy to use, the cutting-edge connectivity capabilities create a circuit breaker able to evolve during the lifecycle. Thanks to the ABB Ability Marketplace™ offering and the full portfolio of commissioning tools, it is always possible to enhance the device, even when installed.

SACE Emax 2 sets a new circuit breaker benchmark for the needs of today and tomorrow, leveraging also unmatched electrical performances.



# Distinctive features

SACE Emax 2 evolution from circuit breaker to Power Manager continues, embedding more and more functionalities to become the all-in-one solution to manage "low-voltage distribution systems".

## Performance

The SACE Emax 2 range is made up of 4 sizes: E1.2, E2.2, E4.2 and E6.2 up to 6300A, which enable switchgear of compact dimensions and high ratings to be built with busbars of reduced length and cross-section.

The protection trip units, auxiliary connections and main accessories are the same throughout the range to simplify design and installation. Furthermore, the sizes from E2.2 to E6.2 have the same height and depth.

The rating levels are updated and standardized throughout the sizes to meet the demands and needs of today's installations, from 42kA to 150kA, and to standardize switchgear projects. High short-time currents, together with the efficiency of the protection functions, guarantee complete selectivity in all situations.

Accurate design and choice of materials enable optimization of the overall dimensions of the circuit breaker. In this way switchgear of compact dimensions can be built and outstanding savings at the same performance can be obtained.

The SACE Emax 2 range is extended also to the UL market, up to 5000A. Furthermore it can be ordered with a triple marking label, IEC, UL and CCC.

SACE Emax 2 air circuit breakers are certified for Class 1 active energy measurement in compliance with the IEC61557-12 standard. This permits to satisfy highly demanding requirements of energy efficiency and to perfectly fit into SCADA systems thanks to a current detection proximal to 0. Achieving maximum efficiency of an electrical installation requires intelligent management of power supplies and energy use. For this reason, the new technologies used in SACE Emax 2 circuit breakers allow the productivity and reliability of installations to be optimized, and at the same time, power consumption to be reduced while fully respecting the environment.

New advanced functionalities, together with Protection trip units and Communication and system devices contribute to make SACE Emax 2 the circuit breaker that maximizes efficiency in all low-voltage electrical installation.

# Distinctive features

## Control

SACE Emax 2 circuit breaker is the first single device ready to manage all the dynamics of a low-voltage electrical installation.

Managing loads in any condition is now possible thanks to Advanced Functionalities such as:

- **Load shedding:** fast load shedding to guarantee continuity for critical loads during black-outs. Typical scenario is when LV distribution is disconnected from the grid (MV).
- **Power controller:** patented algorithm to reduce the peak of power consumed, allowing savings on electricity bills. Managing different power sources and connecting them to main grid is also crucial, so that service continuity is maximized.
- **Embedded ATS functions:** an automatic transfer switch system used in all application where continuity is essential and where there are multi source supplies.
- **Synchrocheck logics:** Synchronization of voltage and frequency to allow plant reconnection to the Utility. SACE Emax 2 is able to act as a controller of Main grid condition, disconnecting a plant when necessary and also to adapt protection to on-grid or off-grid conditions.
- **Adaptive protection:** Network changes recognition and automatic set of thresholds to guarantee protection and coordination in on-grid and off-grid conditions.

## Connectivity

SACE Emax 2 series circuit breakers can be integrated perfectly into all automation and energy management systems to improve productivity and energy consumption and to carry out remote service.

All circuit breakers can be equipped with communication units for use with Modbus, Profibus, and DeviceNet™ protocols as well as the modern Modbus TCP, Profinet, EtherNet/IP™ and Open ADR. The cartridge-type modules can be easily installed directly on the terminal box, even at a later date. Furthermore, the integrated IEC61850 communication module enables connection to automation systems widely used in medium voltage power distribution to create intelligent networks (Smart Grids).

All circuit breaker settings and functions are also accessible via Bluetooth, using EPiC mobile app. This remote connection allows a safer interaction with the device mitigating the risk of arc flash accidents.

Furthermore with an easy connection thanks to Ekip Com Hub module, SACE Emax 2 can be integrated in ABB Ability™ Energy and Asset Manager, exploiting all the capabilities of a cloud computing platform such as predictive maintenance, analysis and report download.

The power and auxiliary connections are optimized to simplify connection to the switchgear. The power terminals, which can be oriented horizontally or vertically, have been designed for the most common busbars, while the push-in connections of the auxiliaries ensure immediate and safe wiring.





# Distinctive features

## Ease of use

The entire range is available in fixed and withdrawable versions, with double insulation between the front of the switchgear and the live parts to ensure operation in complete safety. The circuit breakers can be powered indifferently from above or below.

All essential information is available in the central area of the front shield and enables immediate identification of the status of the circuit breaker: open, closed, ready to close, charged and discharged springs.

Maintenance is simple and safe. Thanks to the new front shield design, the main accessories can be installed without completely removing it.

The withdrawable circuit breaker is inserted and removed via dedicated guide rails that simplify movement. The correct movement from racked-in, test isolated, to racked-out position is guaranteed by a lock in each position.

As a further guarantee of safety, the shutters of the fixed part can be locked from the front when the circuit breaker is removed.

The shutters of the upper terminals are independent of those of the lower terminals to facilitate checking and maintenance operations.

The Ekip Touch protection trip units are equipped with a large colour touch-screen display which enables safe and intuitive operation. Furthermore the Ekip trip units can be accessed by means of smartphone, tablet or portable PC, thanks to enhanced connectivity capabilities and a full portfolio of commissioning tools. The increased computing power allows to update the circuit breaker maintaining it closed and in service during the operation.

SACE Emax 2 is now able to evolve during the life-cycle thanks to dedicated software packages available on the ABB Ability Marketplace™. Upgrade and customize the circuit breaker has never been so easy. Thanks to the customization simplicity, communication modules installation ease and clear user interface, SACE Emax 2 is making the complex system ready for a new digital experience.



## Key

- 1 Trademark and size of circuit-breaker
- 2 SACE Ekip protection trip unit
- 3 Pushbutton for manual opening
- 4 Pushbutton for manual closing
- 5 Lever to manually charge closing springs
- 6 Electrical rating plate
- 7 Mechanical device to signal circuit breaker open "O" and closed "I"
- 8 Signal for springs charged or discharged
- 9 Mechanical signalling of overcurrent release tripped
- 10 Size and serial number
- 11 QR code



SACE Emax 2 is now equipped with a laser etched QR code located on the front of the circuit breaker allowing easy access to product data via smartphone.

By scanning the QR code directly from your smartphone the user will have access to:

1. Product datasheet including full list of factory installed accessories and relevant documentation
2. ABB Contact information.
3. Link to download ABB EPiC mobile app for monitoring and commissioning.

In addition, ABB's EPiC mobile app has been enhanced with the ability to scan the QR code in order to provide a consistent user experience across the platform.

# Product conformity

SACE Emax 2 circuit breakers and their accessories conform to IEC 60947, EN 60947 international Standard

## Approvals and certifications

SACE Emax 2 circuit breakers and their accessories conform to the international IEC 60947, EN 60947 (harmonized in 30 CENELEC countries), CEI EN 60947 and IEC 61000 Standards and comply with the following EC directives:

- "Low-Voltage Directives" (LVD) no. 2014/35/EU
- "Electromagnetic Compatibility Directive" (EMC) no. 2014/30/EU.

The ABB air circuit breakers include a range that has been certified according to American UL 1066 Standards; it is also certified by the Russian certification body GOST (Russia Certificate of Conformity), has achieved China CCC Certification (China Compulsory Certification) and the UKCA marking (UK Conformity Assessment). Certification of conformity with the above-men-

tioned product Standards is carried out in compliance with the European EN 45011 Standard by the Italian certification body ACAE (Association for the Certification of Electrical Equipment), which is recognized by the European organization LOVAG (Low-Voltage Agreement Group), and by the Swedish Intertek SEMKO certification organization Intertek Semko which is recognized by the international organization IECEE.

## Product Material Compliance

The Emax 2 family complies with the following international regulations:

- RoHS II, Directive 2011/65/EU and Amendment 2015/863 - Restriction of Hazardous Substances;
- REACH, 2006/1907/EC, Registration, Evaluation, Authorization and Restriction of Chemicals;
- WEEE 2012/19/EU -Waste Electrical & Electronic Equipment;
- Conflict Minerals - Dodd-Frank Consumer Protection Act. Section 1502.

**The main versions of the devices are about to be approved by the following shipping registers.**



Registro Italiano Navale (RINA):  
Italian



Lloyd's Register of Shipping (LR):  
English



American Bureau Shipping (ABS):  
American



Germanischer Lloyd (GL):  
Deutsch



Bureau Veritas (BV):  
French



Det Norske Veritas (DNV):  
Norway



Russian Maritime Register of Shipping (RMRS):  
Russian



Nippon Kaiji Kyokai (NKK):  
Japan



Gost - Eac



Low-Voltage Agreement Group



UK Conformity Assessed:  
UK

For the types of certified circuit breakers, certified ratings and corresponding validity, please contact ABB SACE.



Quality and Sustainability: company efficiency and integrated management systems. Quality, Sustainability and Customer Satisfaction have always been ABB SACE's major commitment.

The involvement of all company departments and organization of processes have led the company to develop, implement and certify management systems in compliance with international Standards:

- ISO 9001 for quality management
- IRIS for the quality of supplies in the railway sector (International Railway Industry Standards)
- ISO 14001 for environmental management
- OHSAS 18001 for the management of the health and safety of employees in the workplace
- SA 8000 for the management of social responsibility.

The ABB SACE testing laboratory, accredited by ACCREDIA in compliance with ISO/IEC 17025 Standard, provides both ABB and external customers with a qualified service for performing certification tests on devices and electric equipment of low and medium voltage in accordance with the relevant product Standards.

Thanks to the implementation of systems and their integration (Integrated Management System), ABB SACE, with a view to continuous improvement, has implemented processes with a focus on:

- quality, preventing defects and faults along the entire supply chain
- environment, reviewing production processes in terms of ecology and waste reduction, rationalizing the consumption of raw materials and energy, preventing pollution, containing noise emissions and reducing the quantity of rejects in the production processes
- health and safety of employees, offering a healthy and safe workplace in all of the various stages of work with a "zero accident objective"
- social responsibility, guaranteeing the respect of human rights and the absence of any discrimination throughout the supply chain, and offering a favourable and transparent working atmosphere.

A further commitment aimed at safeguarding the environment has been achieved by assessing products' life cycles (LCA, Life Cycle Assessment): this includes the assessment and improvement of the environmental performance of products from the engineering stage throughout their entire life cycle.

The materials, processes and packaging used are chosen with a view to optimising the actual environmental impact of each product, including its energy efficiency and recyclability.





# ABB EcoSolutions™

## Leading the way to the circular economy

To help preserve the Earth's resources for future generations, ABB takes a company-wide approach to circularity. We aim to innovate towards new circular business models by cutting waste, increasing recyclability and reusability, and making our products more durable. We work closely with customers and suppliers to embed circularity across the value chain.

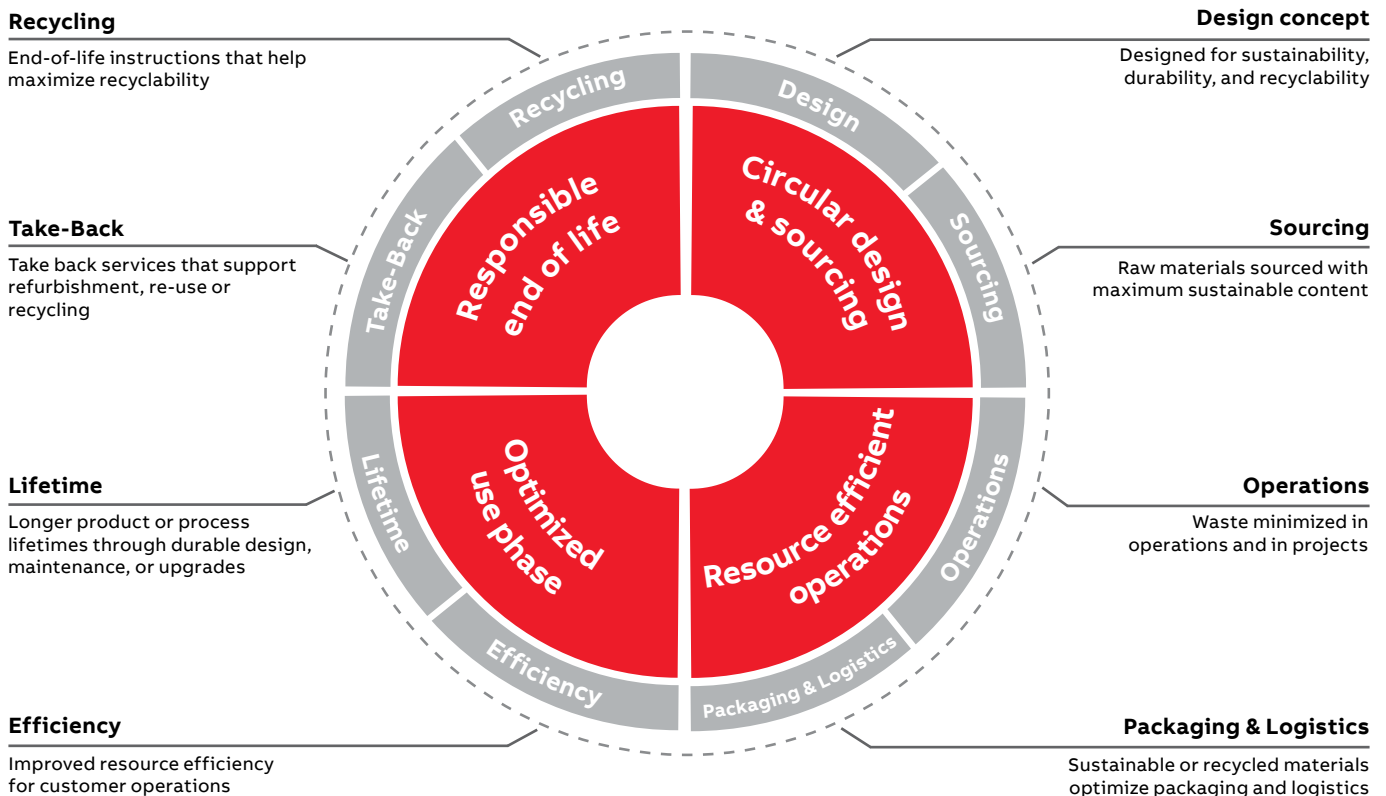
ABB's EcoSolutions™ label provides full transparency on a product's circularity value and environmental impact. ABB products with the EcoSolutions label carry an independently verified environmental product declaration (EPD) (ISO 14025) – and comply with a set of key performance indicators defined in ABB's circularity framework.

### ABB EcoSolutions: transparency for customers

The ABB EcoSolutions™ label is an assurance that the product is:

- designed to last and manufactured with the maximum amount of sustainably sourced raw materials;
- made with processes that are designed to avoid waste and maximize the use of sustainable packaging materials;
- designed to increase resource and process efficiency while in use, be upgradable and optimize the lifetime of equipment and facilities;
- supported by take-back services leading to refurbishment, re-use or recycling of products and components, and is accompanied by instructions for responsible end-of-life treatment.

EcoSolutions products are evaluated against a clear set of 8 key performance indicators (KPIs) based on these four stages of the product life cycle.







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Look for the ABB EcoSolutions™ logo and QR code on packaging to access transparent sustainability information about the product. To receive information for a specific product, please contact ABB.



# ABB Low Voltage Product Service

ABB's technical assistance service offers solutions aimed at supporting the customer in all stages of the lifespan of the circuit breaker in service and covering the entire chain of value; ABB is present from the moment of selection to the end of the life of the product, thereby guaranteeing the investments of its customers.



ABB supplies annual updates regarding the evolution of the circuit breaker ranges (Life Cycle Management) and for each product it provides details of associated services and the level of support available, so that customers can choose the products and spare parts best suited to their needs.

ABB's organisation offers services that include installation and commissioning, technical training on the use and maintenance of products, the supply of original spare parts, corrective and preventive maintenance, equipment diagnostics, modernisation of systems with upgrades and retrofitting kits, consultancy services and personalised maintenance and service contracts.

All this is supported by one of the most extensive global sales and service networks.

## Retrofitting kit

Through continuous research targeted at the needs of the customer, ABB SACE Service has developed innovative retrofitting kits in order to simplify and speed up installation of a new circuit breaker, updating the customer's investment with the latest technology available and with very limited down times.

The retrofitting kit between Emax2 and Emax is a retrofit solution: it is therefore possible to replace the withdrawable version of Emax with an equivalent Emax2 model without changing the switchboard busbars, by simply removing the fixed part of Emax replacing it with a fixed part of Emax2 which has been suitably modified with dedicated terminals.



# The ranges

- 2/2 SACE Emax 2 automatic circuit breakers**
- 2/4 SACE Emax 2 switch disconnectors**
- 2/6 SACE Emax 2/E9 and /E10**  
Range IEC circuit breakers at 800-900V and 1000V
- 2/7 SACE Emax 2/E12**  
Range IEC circuit breakers at 1000-1150-1200V up to 1380V
- 2/8 SACE Emax 2/E9 and /E10**  
Range IEC switch disconnectors at 900V and 1000V
- 2/9 SACE Emax 2/E12**  
Range IEC switch disconnectors at 1200V up to 1380V
- 2/10 SACE Emax 2 derived versions**
- 2/12 SACE Emax 2 MS/DC-E**  
Range IEC Air switch disconnectors at 1500 V DC

# SACE Emax 2 automatic circuit breakers

| Common data                          |      |                      |
|--------------------------------------|------|----------------------|
| Rated service voltage Ue             | [V]  | 690                  |
| Rated insulation voltage Ui          | [V]  | 1000                 |
| Rated impulse withstand voltage Uimp | [kV] | 12                   |
| Frequency                            | [Hz] | 50 - 60              |
| Number of poles                      |      | 3- 4                 |
| Version                              |      | Fixed - Withdrawable |
| Suitable for isolation according to  |      | IEC 60947-2          |



| SACE Emax 2                                           |                                               |        | E1.2      |           |                   |
|-------------------------------------------------------|-----------------------------------------------|--------|-----------|-----------|-------------------|
| Performance levels                                    |                                               |        | B         | C         | N                 |
| Rated uninterrupted current Iu @ 40°C                 |                                               | [A]    | 630       | 630       | 250               |
|                                                       |                                               | [A]    | 800       | 800       | 630               |
|                                                       |                                               | [A]    | 1000      | 1000      | 800               |
|                                                       |                                               | [A]    | 1250      | 1250      | 1000              |
|                                                       |                                               | [A]    | 1600      | 1600      | 1250              |
|                                                       |                                               | [A]    |           |           | 1600              |
|                                                       |                                               | [A]    |           |           |                   |
| Neutral pole current-carrying capacity for 4-pole CBs |                                               | [%Iu]  | 100       | 100       | 100               |
| Rated ultimate short-circuit breaking capacity Icu    | 400-415 V                                     | [kA]   | 42        | 50        | 66                |
|                                                       | 440 V                                         | [kA]   | 42        | 50        | 66                |
|                                                       | 500-525 V                                     | [kA]   | 42        | 42        | 50                |
|                                                       | 690 V                                         | [kA]   | 42        | 42        | 50                |
| Rated service short-circuit breaking capacity Ics     |                                               | [%Icu] | 100       | 100       | 100 <sup>1)</sup> |
| Rated short-time withstand current Icw                | (1s)                                          | [kA]   | 42        | 42        | 50                |
|                                                       | (3s)                                          | [kA]   | 24        | 24        | 30                |
| Rated short-circuit making capacity (peak value) Icm  | 400-415 V                                     | [kA]   | 88        | 105       | 145               |
|                                                       | 440 V                                         | [kA]   | 88        | 105       | 145               |
|                                                       | 500-525 V                                     | [kA]   | 88        | 88        | 105               |
|                                                       | 690 V                                         | [kA]   | 88        | 88        | 105               |
| Utilization category (according to IEC 60947-2)       |                                               |        | B         | B         | B                 |
| Breaking <sup>4)</sup>                                | Maximum breaking time for I < Icw             | [ms]   | 40        | 40        | 40                |
|                                                       | Maximum breaking time for I > Icw             | [ms]   | 25        | 25        | 25                |
| Dimensions                                            | H - Fixed/Withdrawable                        | [mm]   | 296/363.5 | 296/363.5 | 296/363.5         |
|                                                       | D - Fixed/Withdrawable                        | [mm]   | 183/271   | 183/271   | 183/271           |
|                                                       | W - Fixed 3p/4p/4p FS                         | [mm]   | 210/280   |           |                   |
|                                                       | W - Withdrawable 3p/4p/4p FS                  | [mm]   | 278/348   |           |                   |
| Weights (CB with trip unit and current sensor)        | Fixed 3p/4p/4p FS                             | kg     | 14/16     |           |                   |
|                                                       | Withdrawable 3p/4p/4p FS including fixed part | kg     | 38/43     |           |                   |

1) Ics : 50kA for 400V...440V voltage; 2) Ics: 125kA for 400V...440V voltage; 3) E4.2H 3200A: 66 Icw (3s); 4) Total clearing time is the sum of breaking time and trip time

| SACE Emax 2                                                                      |           |                     | E1.2   |      |      |
|----------------------------------------------------------------------------------|-----------|---------------------|--------|------|------|
| Mechanical life with regular ordinary maintenance prescribed by the manufacturer |           | [Iu]                | ≤ 1000 | 1250 | 1600 |
|                                                                                  |           | [No. cycles x 1000] | 20     | 20   | 20   |
|                                                                                  | Frequency | [Oper./Hour]        | 60     | 60   | 60   |
| Electrical life with regular ordinary maintenance prescribed by the manufacturer | 440 V     | [No. cycles x 1000] | 8      | 8    | 8    |
|                                                                                  | 690 V     | [No. cycles x 1000] | 8      | 6,5  | 6,5  |
|                                                                                  | Frequency | [Oper./Hour]        | 30     | 30   | 30   |



| E2.2    |         |         |         | E4.2    |         |                  |                   | E6.2         |         |         |
|---------|---------|---------|---------|---------|---------|------------------|-------------------|--------------|---------|---------|
| B       | N       | S       | H       | N       | S       | H                | V                 | H            | V       | X       |
| 1600    | 800     | 250     | 800     | 3200    | 3200    | 3200             | 2000              | 4000         | 4000    | 4000    |
| 2000    | 1000    | 800     | 1000    | 4000    | 4000    | 4000             | 2500              | 5000         | 5000    | 5000    |
|         | 1250    | 1000    | 1250    |         |         |                  | 3200              | 6300         | 6300    | 6300    |
|         | 1600    | 1250    | 1600    |         |         |                  | 4000              |              |         |         |
|         | 2000    | 1600    | 2000    |         |         |                  |                   |              |         |         |
|         | 2500    | 2000    | 2500    |         |         |                  |                   |              |         |         |
|         |         | 2500    |         |         |         |                  |                   |              |         |         |
| 100     | 100     | 100     | 100     | 100     | 100     | 100              | 100               | 50-100       | 50-100  | 50-100  |
| 42      | 66      | 85      | 100     | 66      | 85      | 100              | 150               | 100          | 150     | 150     |
| 42      | 66      | 85      | 100     | 66      | 85      | 100              | 150               | 100          | 150     | 150     |
| 42      | 66      | 66      | 85      | 66      | 66      | 85               | 100               | 100          | 130     | 130     |
| 42      | 66      | 66      | 85      | 66      | 66      | 85               | 100               | 100          | 100     | 100     |
| 100     | 100     | 100     | 100     | 100     | 100     | 100              | 100 <sup>2)</sup> | 100          | 100     | 100     |
| 42      | 66      | 66      | 85      | 66      | 66      | 85               | 100               | 100          | 100     | 120     |
| 42      | 50      | 50      | 66      | 50      | 66      | 75 <sup>3)</sup> | 75                | 100          | 100     | 100     |
| 88      | 145     | 187     | 220     | 145     | 187     | 220              | 330               | 220          | 330     | 330     |
| 88      | 145     | 187     | 220     | 145     | 187     | 220              | 330               | 220          | 330     | 330     |
| 88      | 145     | 145     | 187     | 145     | 145     | 187              | 220               | 220          | 286     | 286     |
| 88      | 145     | 145     | 187     | 145     | 145     | 187              | 220               | 220          | 220     | 220     |
| B       | B       | B       | B       | B       | B       | B                | B                 | B            | B       | B       |
| 40      | 40      | 40      | 40      | 40      | 40      | 40               | 40                | 40           | 40      | 40      |
| 25      | 25      | 25      | 25      | 25      | 25      | 25               | 25                | 25           | 25      | 25      |
| 371/425 | 371/425 | 371/425 | 371/425 | 371/425 | 371/425 | 371/425          | 371/425           | 371/425      | 371/425 | 371/425 |
| 270/383 | 270/383 | 270/383 | 270/383 | 270/383 | 270/383 | 270/383          | 270/383           | 270/383      | 270/383 | 270/383 |
| 276/366 |         |         |         | 384/510 |         |                  |                   | 762/888/1014 |         |         |
| 317/407 |         |         |         | 425/551 |         |                  |                   | 803/929/1069 |         |         |
| 41/53   |         |         |         | 56/70   |         |                  |                   | 109/125/140  |         |         |
| 84/99   |         |         |         | 110/136 |         |                  |                   | 207/234/260  |         |         |

| E2.2   |      |      |      | E4.2   |      |      |      | E6.2 |      |      |
|--------|------|------|------|--------|------|------|------|------|------|------|
| < 1600 | 1600 | 2000 | 2500 | < 2500 | 2500 | 3200 | 4000 | 4000 | 5000 | 6300 |
| 25     | 25   | 25   | 20   | 20     | 20   | 20   | 15   | 12   | 12   | 12   |
| 60     | 60   | 60   | 60   | 60     | 60   | 60   | 60   | 60   | 60   | 60   |
| 15     | 12   | 10   | 8    | 10     | 8    | 7    | 5    | 4    | 3    | 2    |
| 15     | 10   | 8    | 7    | 10     | 8    | 7    | 4    | 4    | 2    | 2    |
| 30     | 30   | 30   | 30   | 20     | 20   | 20   | 20   | 10   | 10   | 10   |



# SACE Emax 2 switch disconnectors

Switch disconnectors, identified with the abbreviation “/MS”, are devices that satisfy the isolating specifications provided by the IEC 60947-3 Standard. The switch disconnectors are derived from the corresponding automatic circuit breakers, and they have the same dimensions and accessory options.

This version differs from the automatic circuit-breakers only because of the absence of protection trip units.

The device, when in the open position, guarantees an isolating distance between the main contacts of the circuit breaker that is sufficient to ensure that the installation downstream is not live.

Furthermore the switch disconnectors, if used with an external protection relay with maximum delay of 500ms, enable a breaking capacity at a maximum rated operating voltage ( $U_e$ ) equal to the value of rated short-time withstand current ( $I_{cw}$ ) for one second.

| Common data                               |      |                      |
|-------------------------------------------|------|----------------------|
| Rated service voltage $U_e$               | [V]  | 690                  |
| Rated insulation voltage $U_i$            | [V]  | 1000                 |
| Rated impulse withstand voltage $U_{imp}$ | [kV] | 12                   |
| Frequency                                 | [Hz] | 50 - 60              |
| Number of poles                           |      | 3- 4                 |
| Version                                   |      | Fixed - Withdrawable |
| Suitable for isolation according to       |      | IEC 60947-3          |



| SACE Emax 2                                               |                              |            | E1.2        |             |
|-----------------------------------------------------------|------------------------------|------------|-------------|-------------|
| Performance levels                                        |                              |            | B/MS        | N/MS        |
| Rated uninterrupted current $I_u$ @ 40°C                  |                              | [A]        | 630         | 250         |
|                                                           |                              | [A]        | 800         | 630         |
|                                                           |                              | [A]        | 1000        | 800         |
|                                                           |                              | [A]        | 1250        | 1000        |
|                                                           |                              | [A]        | 1600        | 1250        |
|                                                           |                              | [A]        |             | 1600        |
| Neutral pole current-carrying capacity for 4-pole CBs     |                              | [% $I_u$ ] | 100         | 100         |
| Rated short-time withstand current $I_{cw}$               | (1s)                         | [kA]       | 42          | 50          |
|                                                           | (3s)                         | [kA]       | 24          | 30          |
| Rated short-circuit making capacity (peak value) $I_{cm}$ | 400-415 V                    | [kA]       | 88          | 105         |
|                                                           | 440 V                        | [kA]       | 88          | 105         |
|                                                           | 500-525 V                    | [kA]       | 88          | 105         |
|                                                           | 690 V                        | [kA]       | 88          | 105         |
| Utilization category (according to IEC 60947-3)           |                              |            | AC-23A      | AC-23A      |
| Dimensions                                                | H - Fixed / Withdrawable     | [mm]       | 296 / 363.5 | 296 / 363.5 |
|                                                           | D - Fixed / Withdrawable     | [mm]       | 183 / 271   | 183 / 271   |
|                                                           | W - Fixed 3p/4p/4p FS        | [mm]       | 210 / 280   |             |
|                                                           | W - Withdrawable 3p/4p/4p FS | [mm]       | 278 / 348   |             |

1) E4.2H/MS 3200A: 66KA  $I_{cw}$  (3s)

| SACE Emax 2                                                                      |           |                     | E1.2   |      |      |
|----------------------------------------------------------------------------------|-----------|---------------------|--------|------|------|
| Mechanical life with regular ordinary maintenance prescribed by the manufacturer |           | [ $I_u$ ]           | < 1000 | 1000 | 1600 |
|                                                                                  |           | [No. cycles x 1000] | 20     | 20   | 20   |
|                                                                                  | Frequency | [Oper./Hour]        | 60     | 60   | 60   |
| Electrical life with regular ordinary maintenance prescribed by the manufacturer | 440 V     | [No. cycles x 1000] | 8      | 8    | 8    |
|                                                                                  | 690 V     | [No. cycles x 1000] | 8      | 6.5  | 6.5  |
|                                                                                  | Frequency | [Oper./Hour]        | 30     | 30   | 30   |



| E2.2      |           |           | E4.2      |                  |           | E6.2             |           |
|-----------|-----------|-----------|-----------|------------------|-----------|------------------|-----------|
| B/MS      | N/MS      | H/MS      | N/MS      | H/MS             | V/MS      | H/MS             | X/MS      |
| 1600      | 800       | 800       | 3200      | 3200             | 2000      | 4000             | 4000      |
| 2000      | 1000      | 1000      | 4000      | 4000             | 2500      | 5000             | 5000      |
|           | 1250      | 1250      |           |                  | 3200      | 6300             | 6300      |
|           | 1600      | 1600      |           |                  | 4000      |                  |           |
|           | 2000      | 2000      |           |                  |           |                  |           |
|           | 2500      | 2500      |           |                  |           |                  |           |
| 100       | 100       | 100       | 100       | 100              | 100       | 50-100           | 50-100    |
| 42        | 66        | 85        | 66        | 85               | 100       | 100              | 120       |
| 42        | 50        | 66        | 50        | 75 <sup>1)</sup> | 75        | 100              | 100       |
| 88        | 145       | 187       | 145       | 187              | 220       | 220              | 264       |
| 88        | 145       | 187       | 145       | 187              | 220       | 220              | 264       |
| 88        | 145       | 187       | 145       | 187              | 220       | 220              | 264       |
| 88        | 145       | 187       | 145       | 187              | 220       | 220              | 264       |
| AC-23A    | AC-23A    | AC-23A    | AC-23A    | AC-23A           | AC-23A    | AC-23A           | AC-23A    |
| 371 / 425 | 371 / 425 | 371 / 425 | 371 / 425 | 371 / 425        | 371 / 425 | 371 / 425        | 371 / 425 |
| 270 / 383 | 270 / 383 | 270 / 383 | 270 / 383 | 270 / 383        | 270 / 383 | 270 / 383        | 270 / 383 |
| 276 / 366 |           |           | 384 / 510 |                  |           | 762 / 888 / 1014 |           |
| 317 / 407 |           |           | 425 / 551 |                  |           | 803 / 929 / 1069 |           |

| E2.2   |      |      |      | E4.2   |      |      |      | E6.2 |      |      |
|--------|------|------|------|--------|------|------|------|------|------|------|
| < 1600 | 1600 | 2000 | 2500 | < 2500 | 2500 | 3200 | 4000 | 4000 | 5000 | 6300 |
| 25     | 25   | 25   | 20   | 20     | 20   | 20   | 15   | 12   | 12   | 12   |
| 60     | 60   | 60   | 60   | 60     | 60   | 60   | 60   | 60   | 60   | 60   |
| 15     | 12   | 10   | 8    | 10     | 8    | 7    | 5    | 4    | 3    | 2    |
| 15     | 10   | 8    | 7    | 10     | 8    | 7    | 4    | 4    | 2    | 2    |
| 30     | 30   | 30   | 30   | 20     | 20   | 20   | 20   | 10   | 10   | 10   |

# SACE Emax 2/E9 and /E10

## Range IEC circuit breakers at 800-900V and 1000V

| Common data                          |      |                            |
|--------------------------------------|------|----------------------------|
| Rated service voltage Ue             | [V]  | 800-900 (/E9), 1000 (/E10) |
| Rated insulation voltage Ui          | [V]  | 1000                       |
| Rated impulse withstand voltage Uimp | [kV] | 12*                        |
| Frequency                            | [Hz] | 50 - 60                    |
| Version                              |      | Fixed - Withdrawable       |
| Suitable for isolation according to  |      | IEC 60947-2                |

(\*) 15kV for E4.2/E10



| SACE Emax 2/E                                         |       | E1.2   | E2.2 |      | E4.2  |      | E6.2 |                   |      |      |
|-------------------------------------------------------|-------|--------|------|------|-------|------|------|-------------------|------|------|
| Performance levels                                    |       | N/E9   | S/E9 | H/E9 | H/E10 | S/E9 | H/E9 | S/E10             | H/E9 | X/E9 |
| Rated uninterrupted current Iu @ 40°C                 | [A]   | 1250   | 1250 | 1250 | 2500  | 3200 | 3200 | 3200              | 5000 | 5000 |
|                                                       | [A]   |        | 2000 | 2000 |       | 4000 | 4000 | 4000              | 6300 | 6300 |
|                                                       | [A]   |        | 2500 | 2500 |       |      |      |                   |      |      |
| Neutral pole current-carrying capacity for 4-pole CBs |       | [%Iu]  | 100  | 100  | 100   | 100  | 100  |                   | 50   | 50   |
| Rated service voltage Ue                              |       | [V]    | 800  | 900  | 900   | 1000 | 900  | 900               | 1000 | 900  |
| Rated ultimate short-circuit breaking capacity Icu    | 800V  | [kA]   | 35   | 50   | 65    |      | 65   | 90                | 50   | 90   |
|                                                       | 900V  | [kA]   |      | 50   | 65    |      | 65   | 75                |      | 75   |
|                                                       | 1000V | [kA]   |      |      |       | 50   |      |                   | 50   |      |
| Rated service short-circuit breaking capacity Ics     |       | [%Icu] | 100  | 100  | 100   | 100  | 100  | 100               | 100  | 100  |
| Rated short-time withstand current Icw                | (1s)  | [kA]   | 35   | 50   | 65    | 50   | 65   | 75                | 50   | 75   |
|                                                       | (3s)  | [kA]   | 30   | 50   | 65    | 50   | 65   | 75 <sup>(*)</sup> | 50   | 75   |
| Rated short-circuit making capacity (peak value) Icm  | 800V  | [kA]   | 73.5 | 105  | 143   |      | 143  | 200               | 105  | 200  |
|                                                       | 900V  | [kA]   |      | 105  | 143   |      | 143  | 165               |      | 165  |
|                                                       | 1000V | [kA]   |      |      |       | 105  |      |                   | 105  |      |
| Utilization category (according to IEC 60947-2)       |       | [V]    | B    | B    | B     | B    | B    | B                 | B    | B    |
| Suitable for IT network (IEC 60947-2 Annex H)         |       | [V]    |      | 900  | 900   |      |      | 800               |      |      |

(\*) E4.2H/MS 3200A: 66kA Icw (3s)

| SACE Emax 2/E    |           |                     | E1.2 | E2.2  | E4.2  | E6.2 |      |
|------------------|-----------|---------------------|------|-------|-------|------|------|
|                  |           | [Iu]                | 1250 | ≤2500 | ≤3200 | 4000 | 6300 |
| Mechanical life* |           | [No. cycles x 1000] | 20   | 25    | 20    | 15   | 12   |
|                  | Frequency | [Oper./Hour]        | 60   | 60    | 60    | 60   | 60   |
| Electrical life  | 800 V     | [No. cycles x 1000] | 0.5  | 2     | 1.6   | 1    | 1    |
|                  | 900 V     | [No. cycles x 1000] |      | 2     | 1     | 1    | 1    |
|                  | 1000 V    | [No. cycles x 1000] |      | 0.5   | 1     | 1    |      |
|                  | Frequency | [Oper./Hour]        | 30   | 30    | 10    | 10   | 10   |

(\*) with regular maintenance prescribed by the manufacturer.



For further detail, consult  
the Emax 2/E catalogue  
for ACB >690Vac

# SACE Emax 2/E12

Range IEC circuit breakers at 1000-1150-1200V up to 1380V



For further detail, consult the Emax 2/E catalogue for ACB >690Vac

The SACE Emax2/E12 automatic circuit breakers have been certified according to IEC 60947-2. Three levels of performances are offered: "S" with essential performances, "H" with advanced breaking capacities (85kA@1000V, 65kA@1200V), and "V" with extended voltage range up to 1380V.

Devices are available in fixed and withdrawable versions, and can be fitted with a vast assortment of electrical and mechanical accessories already available for the standard SACE Emax 2 range.

## Common data

|                                      |      |                    |
|--------------------------------------|------|--------------------|
| Rated service voltage Ue             | [V]  | 1200               |
| Rated insulation voltage Ui          | [V]  | 1500               |
| Rated impulse withstand voltage Uimp | [kV] | 15                 |
| Frequency                            | [Hz] | 50-60              |
| Number of poles                      |      | 3                  |
| Version                              |      | Fixed-Withdrawable |
| Suitable for isolation according to  |      | IEC 60947-2        |



## SACE Emax 2/E12

|                                                      |            |      | E4.2  |       |       |
|------------------------------------------------------|------------|------|-------|-------|-------|
| Performance levels                                   |            |      | S/E12 | H/E12 | V/E12 |
| Rated uninterrupted current Iu @ 40°C                |            | [A]  | 2500  | 2500  | 2500  |
|                                                      |            | [A]  | 3200  | 3200  | 3200  |
|                                                      |            | [A]  | 4000  | 4000  | 4000  |
| Rated ultimate short-circuit breaking capacity Icu   | 1000V      | [kA] | 65    | 85    | 85    |
|                                                      | 1150V      | [kA] | 50    | 65    | 65    |
|                                                      | 1200V      | [kA] | 50    | 65    | 65    |
| Rated service short-circuit breaking capacity Ics    | 1000V      | [kA] | 65    | 85    | 85    |
|                                                      | 1150V      | [kA] | 50    | 50    | 50    |
|                                                      | 1200V      | [kA] | 50    | 50    | 50    |
| Rated short-time withstand current Icw               | (1s) 1000V | [kA] | 65    | 85    | 85    |
|                                                      | (3s) 1000V | [kA] | 65    | 75    | 75    |
|                                                      | (1s) 1200V | [kA] | 50    | 65    | 65    |
|                                                      | (3s) 1200V | [kA] | 50    | 65    | 65    |
| Rated short-circuit making capacity (peak value) Icm | 1000V      | [kA] | 143   | 187   | 187   |
|                                                      | 1150V      | [kA] | 105   | 143   | 143   |
|                                                      | 1200V      | [kA] | 105   | 143   | 143   |
| Utilization category (according to IEC 60947-2)      |            |      | B     | B     | B     |

## Extended performances

|                           |            |       |
|---------------------------|------------|-------|
| Maximum operating voltage | [V]        | V/E12 |
| Breaking capacity*        | 1380V [kA] | 65    |

(\*) Defined as one single opening operation under short circuit condition.

## SACE Emax 2/E12

|                  |           |                     | E4.2  |      |
|------------------|-----------|---------------------|-------|------|
| Mechanical life* |           | [Iu]                | ≤3200 | 4000 |
|                  |           | [No. cycles x 1000] | 20    | 15   |
| Electrical life  | Frequency | [Oper./Hour]        | 60    | 60   |
|                  | 1000V     | [No. cycles x 1000] | 1     | 1    |
|                  | 1150V     | [No. cycles x 1000] | 1     | 1    |
|                  | 1200V     | [No. cycles x 1000] | 1     | 1    |
|                  | Frequency | [Oper./Hour]        | 10    | 10   |

(\*) with regular maintenance prescribed by the manufacturer.

# SACE Emax 2/E9 and /E10

## Range IEC switch disconnectors at 900V and 1000V

| Common data                          |      |                       |
|--------------------------------------|------|-----------------------|
| Rated service voltage Ue             | [V]  | 900 (/E9), 1000(/E10) |
| Rated insulation voltage Ui          | [V]  | 1000                  |
| Rated impulse withstand voltage Uimp | [kV] | 12                    |
| Frequency                            | [Hz] | 50-60                 |
| Number of poles                      |      | 3                     |
| Version                              |      | F-W (/E9), F (/E10)   |
| Suitable for isolation according to  |      | IEC 60947-3           |



| SACE Emax 2/E MS                                     |            | E2.2     | E4.2    |
|------------------------------------------------------|------------|----------|---------|
| Performance levels                                   |            | H/E10 MS | H/E9 MS |
| Rated uninterrupted current Iu @ 40°C                | [A]        | 2500     | 2500    |
|                                                      | [A]        |          | 3200    |
|                                                      | [A]        |          | 4000    |
| Rated service voltage Ue                             | [V]        | 1000     | 900     |
| Rated short-time withstand current Icw               | (1s) [kA]  | 50       | 75      |
|                                                      | (3s) [kA]  | 50       | 75*     |
| Rated short-circuit making capacity (peak value) Icm | 900V [kA]  |          | 165     |
|                                                      | 1000V [kA] | 105      |         |
| Utilization category (according to IEC 60947-3)      |            | AC-23A   | AC-23A  |

(\*) 66kA Icw(3s) up to 3200A.

| SACE Emax 2/E MS |                            | E2.2 | E4.2  |      |
|------------------|----------------------------|------|-------|------|
|                  | [Iu]                       | 2500 | ≤3200 | 4000 |
| Mechanical life* | [No. cycles x 1000]        | 20   | 20    | 15   |
|                  | Frequency [Oper./Hour]     | 60   | 60    | 60   |
| Electrical life  | 900 V [No. cycles x 1000]  | 2    | 1     | 1    |
|                  | 1000 V [No. cycles x 1000] | 0.5  |       |      |
|                  | Frequency [Oper./Hour]     | 30   | 10    | 10   |

(\*) with regular maintenance prescribed by the manufacturer.

For Variable Frequency versions, see document [1SDC200097B0201](#)



For further detail, consult  
the Emax 2/E catalogue  
for ACB >690Vac



# SACE Emax 2/E12

## Range IEC switch disconnectors at 1200V up to 1380V



For further detail, consult the Emax 2/E catalogue for ACB >690Vac

Switch disconnectors at 1200V are identified with the abbreviation /E12 MS and have been certified according to IEC 60947-3. The switch disconnectors are derived from the corresponding automatic circuit breakers, and they have the same dimensions and accessory options, without protection trip units.

The device, when in the open position, guarantees an isolating distance between the main contacts of the circuit breaker that is sufficient to ensure that the installation downstream is not live.

| Common data                          |      |                    |
|--------------------------------------|------|--------------------|
| Rated service voltage Ue             | [V]  | 1200               |
| Rated insulation voltage Ui          | [V]  | 1500               |
| Rated impulse withstand voltage Uimp | [kV] | 15                 |
| Frequency                            | [Hz] | 50-60              |
| Number of poles                      |      | 3                  |
| Version                              |      | Fixed-Withdrawable |
| Suitable for isolation according to  |      | IEC 60947-3        |



| SACE Emax 2/E12                                      |       |      | E4.2     |
|------------------------------------------------------|-------|------|----------|
| Performance levels                                   |       |      | H/E12 MS |
| Rated uninterrupted current Iu @ 40°C                |       | [A]  | 2500     |
|                                                      |       | [A]  | 3200     |
|                                                      |       | [A]  | 4000     |
| Rated short-time withstand current Icw               | (1s)  | [kA] | 85       |
|                                                      | (3s)  | [kA] | 75       |
| Rated short-circuit making capacity (peak value) Icm | 1000V | [kA] | 187      |
|                                                      | 1200V | [kA] | 143      |
| Utilization category (according to IEC 60947-3)      |       |      | AC-23A   |
| Extended performances                                |       |      |          |
| Maximum operating voltage                            |       | [V]  | 1380     |

| SACE Emax 2/12   |           |                     | E4.2  |      |
|------------------|-----------|---------------------|-------|------|
|                  |           | [Iu]                | ≤3200 | 4000 |
| Mechanical life* |           | [No. cycles x 1000] | 20    | 15   |
|                  | Frequency | [Oper./Hour]        | 60    | 60   |
| Electrical life  | 1000V     | [No. cycles x 1000] | 1     | 1    |
|                  | 1150V     | [No. cycles x 1000] | 1     | 1    |
|                  | 1200V     | [No. cycles x 1000] | 1     | 1    |
|                  | Frequency | [Oper./Hour]        | 10    | 10   |

(\*) with regular maintenance prescribed by the manufacturer.

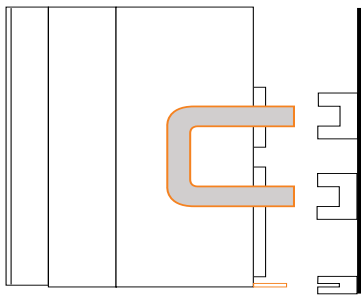
For Variable Frequency versions, see document [1SDC200097B0201](#)



# SACE Emax 2 derived versions

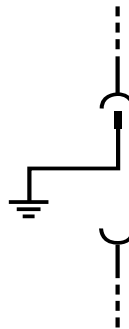
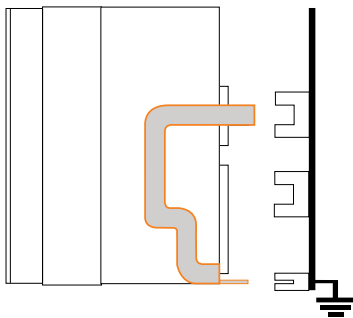
Safety is an indispensable requirement that must always be guaranteed in electrical installations. In this regard, ABB SACE offers devices developed to further increase safety standards during inspection and maintenance activities on electrical installations. In particular, in a withdrawable version, ABB SACE Emax 2 offers:

— The earthing circuit is dimensioned for a short-time current equal to 60% of the maximum Icw of the circuit breaker from which it is derived (IEC 60439-1)

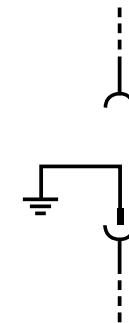
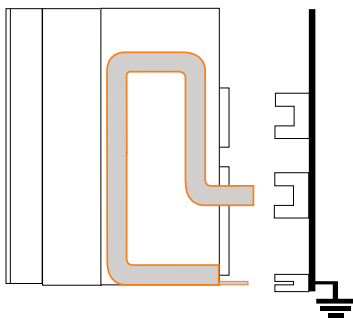


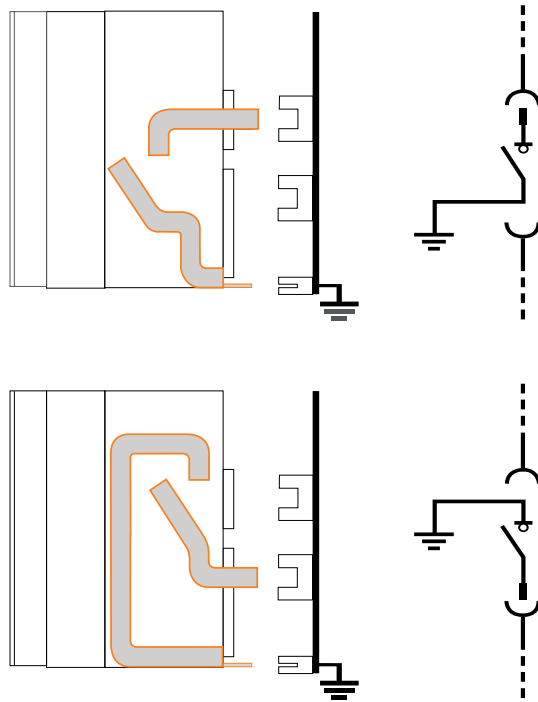
- **Sectionalizing truck CS:** in normal operating conditions of the electrical circuit, this device is inserted in the part. It short-circuits the upper and lower terminals of the power circuit. When maintenance activities need to be carried out, the sectionalizing truck is removed and the part of the system involved is isolated. The device can be accessorized with a keylock and padlocks for locking in the withdrawn position.

— The standard fixed parts can not accept MT/MTP device. In order to allow the utilization of MT/MTP mobile parts is mandatory to install the grounding clamps on fixed parts. Accessorizing only in the factory.



- **Earthing truck MT:** this device enables all phases of the electrical circuit on which maintenance needs to be performed to be earthed <sup>1)</sup>. The earthing truck is available in two versions: for earth connection from the upper or lower terminals.





- **Earthing switch with making capacity MTP:** similar to the MT device, this differs due to the presence of a mechanical stored energy control which allows the circuit to be opened and closed. Two versions of this earthing switch are also available: for earth connection from the upper or lower terminals. It can also be accessorized
  - with a keylock or padlocks for locking in the open position.

#### Common data

|                                      |      |              |
|--------------------------------------|------|--------------|
| Rated service voltage Ue             | [V]  | 690          |
| Rated insulation voltage Ui          | [V]  | 1000         |
| Rated impulse withstand voltage Uimp | [kV] | 12           |
| Frequency                            | [Hz] | 50 - 60      |
| Number of poles                      |      | 3 - 4        |
| Version                              |      | Withdrawable |

| SACE Emax 2                                           | E2.2 |      |      | E4.2 |      |      | E6.2   |        |        |
|-------------------------------------------------------|------|------|------|------|------|------|--------|--------|--------|
| Performance levels                                    | CS   | MT   | MTP  | CS   | MT   | MTP  | CS     | MT     | MTP    |
| Rated uninterrupted current Iu @ 40°C                 | 2500 | 2500 | 2500 | 4000 | 4000 | 4000 | 6300   | 6300   | 6300   |
| Neutral pole current-carrying capacity for 4-pole CBs | 100  | 100  | 100  | 100  | 100  | 100  | 50-100 | 50-100 | 50-100 |
| Rated short-time withstand current Icw (1s) [kA]      | -    | 30   | 30   | -    | 50   | 50   | -      | 50     | 50     |

# SACE Emax 2 MS/DC-E

## Range IEC Air switch disconnectors at 1500 V DC

The SACE Emax 2 MS/DC-E IEC range has been developed for installations up to 1500V DC and 4000 A, with short-time withstand current up to 100 kA.

The SACE Emax 2 MS/DC-E is compliant with DC-PV2, the most demanding Utilization Category according to IEC 60947-3 Annex D, since it requires the ability to connect and disconnect PV circuits where significant overcurrents may occur and where current flow can be in either direction; these are common characteristics of centralized PV systems.

Because of dedicated shorting busbar (jumper) kits, all four poles can be connected in series to isolate a single polarity source, or alternatively for a dual polarity source 2 poles can be configured in series for the positive supply and the other 2 poles in series for the negative supply.

SACE Emax 2 MS/DC-E can be fitted with a vast assortment of electrical and mechanical accessories already available for the standard SACE Emax 2 range. The IEC version has also achieved China CCC certification.

| Common data                          |                         |
|--------------------------------------|-------------------------|
| Rated service voltage Ue             | [V] 1500                |
| Rated insulation voltage Ui          | [V] 1500                |
| Rated impulse withstand voltage Uimp | [kV] 12                 |
| Number of poles                      | 4                       |
| Version                              | Fixed - Withdrawable    |
| Suitable for isolation according to  | IEC 60947-3             |
| Utilization category                 | DC22A, DC-PV2 (Annex D) |



| SACE Emax2 MS/DC-E for IEC                                       |                 |      | E4.2 |      |      |
|------------------------------------------------------------------|-----------------|------|------|------|------|
| Performance levels                                               |                 |      | S    | H    | V    |
| Rated uninterrupted current I <sub>u</sub> @ 40°C                |                 | [A]  | 1600 | 1600 | 1600 |
|                                                                  |                 | [A]  | 2000 | 2000 | 2000 |
|                                                                  |                 | [A]  | 2500 | 2500 | 2500 |
|                                                                  |                 | [A]  | 3200 | 3200 | 3200 |
|                                                                  |                 | [A]  | 4000 | 4000 | 4000 |
| Rated short-time withstand current I <sub>cw</sub>               | (1s)            | [kA] | 65   | 85   | 100  |
| Rated short-circuit making capacity (peak value) I <sub>cm</sub> | 1500 V          | [kA] | 65   | 85   | 100  |
| Dimensions                                                       | H - Fixed       | [mm] | 371  |      |      |
|                                                                  | D - Fixed       |      | 270  |      |      |
|                                                                  | W - Fixed 4p    |      | 510  |      |      |
|                                                                  | H – Draw out    | [mm] | 425  |      |      |
|                                                                  | D – Draw out    | [mm] | 393  |      |      |
|                                                                  | W – Draw out 4p | [mm] | 551  |      |      |



For further detail, please consult the SACE Emax 2 MS/DC-E technical catalogue



Discover more by visiting the SACE Emax 2 MS/DC-E dedicated webpage

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# Protection trip units

|             |                                                            |
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# Introduction

SACE Emax 2 Ekip protection trip units are the new benchmark for the protection, measurement and control of low-voltage electrical systems.

The SACE Emax 2 trip units are designed to be used in a wide range of applications. This complete, flexible protection trip unit can be adapted to the actual level of protection required, independently of the complexity of the system. The range is available for three levels of performances, to meet any requirement, from simple to advanced applications.

- Ekip Dip, standard applications
- Ekip Touch and Ekip Hi-Touch, the smart trip units
- Ekip G Touch and Ekip G Hi-Touch, generator protection

The protection units for power distribution, available in the LI, LSI and LSIG versions, are suited to all distribution systems. These trip units have been designed for a vast range of applications, to be used with transformers, motors and drives. Depending on the complexity of the system, voltage and energy measurements can be also included.

The Ekip G range enables the protection of generators without the use of external devices that require dedicated relays and wiring. These trip units increase efficiency from the design phase to installation, minimizing the time needed for the realization and commissioning of the system. They also ensure high levels of accuracy and reliability of all protection devices required for running generators in applications such as naval, GenSet or cogeneration.



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## Ekip Dip trip units

The first level of electronic trip units for the standard protection of AC system, able to guarantee high reliability and tripping precision. They provide protection against overloads, selective short-circuits, short-circuits and earth faults. The power required for their operation is provided directly from the current sensors.

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## Ekip Touch and Ekip Hi-Touch trip units

These represent the state of the art in terms of technology for AC network protection with advanced protection and system management

functions. Several communication protocols allow to remotely supervise electrical systems and control the circuit breaker. Class 1 active energy measurement in compliance with IEC 61557-12 satisfies high demanding requirements in terms of energy efficiency. The integrated display offers an easy and intuitive experience to the user, while the new embedded Bluetooth technology allows fast interaction through EPiC mobile app.

### **New digital experience**

The new Ekip Touch and Ekip Hi-Touch trip units guarantee maximum flexibility by offering a wide range of software solutions to always upgrade the circuit breaker. These functions can be selected when ordering the circuit-breaker or downloaded directly from the ABB Ability Marketplace™, even from a smart phone or tablet, thus reducing installation time to zero.



# New digital experience

Ekip Touch/Hi-Touch trip units can be now customized with the functions required.

Ekip Touch/Hi-Touch always allow the user to enter in a new product experience thanks to the possibility to build up his own tailor-made trip unit by selecting the set of protections, measurements and logics.

Circuit-breakers' customization has never been so easy.

With the new Ekip Touch and Hi-Touch trip units, the most advanced functionalities can be enabled following two different purchasing processes:

- **ABB Ability Marketplace™**

Users can download digital upgrades via web and enable them directly on the trip unit, without removing the circuit-breaker from the installation point, with zero shipping time and no installation costs. This process allows additional functions to be selected after the trip unit has been already received on site and installed. Moreover, stock can be optimized by keeping in the warehouse few types of trip units and customizing them according to the customer's specific needs. Once purchased, each function can be easily activated by using a smartphone or tablet via EPiC app mobile and embedded Bluetooth connectivity, or a laptop through Ekip Connect 3.

- **Traditional ordering**

This option represents the standard way to order ABB devices. The traditional process allows the users to select and directly install the desired functions when ordering the circuit-breaker. Once received and installed, SACE Emax 2 always offers the possibility to add new functionalities via ABB Ability Marketplace™.

The new Ekip digital offering includes:

- **Packages**

The software packages offer the possibility to customize the circuit-breaker by selecting additional protection functions and measurements. The device can be customized to create tailor-made solutions according to the specific application. Maximum flexibility is guaranteed by offering specific technical features that can be combined in the Ekip Touch/Hi-Touch during the product life cycle.

- **Solutions**

The SACE Emax 2 circuit-breaker is no more intended as a simply stand-alone protection device, but it has become an active player in the electrical system, able to exchange data and trigger actions managing the behavior of other connected devices. Thanks to the new electronic trip units, it is possible to implement transfer logics, load shedding and peak shaving strategies. Such solutions require additional plug and play hardware modules and other smart devices.



SACE Emax 2 allows to easily upgrade and customize the Ekip Touch and Hi-Touch trip units, guaranteeing maximum flexibility for any application, delivering value throughout the entire customer journey.

### 1. Design

Build the circuit-breaker according to specific project requirements.



#### Key drivers

- Ease of doing business
- Technical specifications
- Application and function

#### Benefits

- Flexibility of choice
- Customization by application

### 2. Commissioning

Customize the device thanks to the digital offering. Manage last minute changes through digital upgrades.



#### Key drivers

- Ease of doing business
- Management of components
- Time to market

#### Benefits

- Stock optimization
- Zero lead time and installation effort

### 3. Service

Unlock the full potential of your circuit-breaker at any time, minimizing downtime and installation changes.



#### Key drivers

- Manage installed base
- Simplify diagnostics
- Simplify the hardware re-design

#### Benefits

- Zero lead time and installation effort
- Avoid downtime

# New digital experience

## Packages

Each package includes a set of protection functions or measurements that can be enabled in the trip unit.

Six packages relate to protection functions: Voltage Protections, Frequency Protections, Power Protections, Advanced Voltage Protections, RO-COF Protections and Adaptive Protections.



### Voltage Protections

Set of protections included: UV - Undervoltage, OV - Overvoltage, UV2 - 2nd Undervoltage, OV2 - 2nd Overvoltage, PS - Phase Sequence, VU - Voltage unbalance.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.



### Frequency Protections

Set of protections included: UF - Underfrequency, OF - Overfrequency, UF2 - 2nd Underfrequency, OF2 - 2nd Overfrequency.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.



### Power Protections

Set of protections included: RP - Reverse active power, CosΦ - Power factor, D - Directional overcurrent, RQ - Loss of field or reverse reactive power, OQ - Reactive overpower, OP - Active overpower, UP - Active underpower, RQ - 2nd Loss of field or Reverse reactive power.

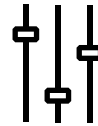
How to order: via ABB Ability Marketplace™ or traditional ordering channels.



### Advanced Voltage Protections

Set of protections included: S(V) - Voltage controlled overcurrent, S(V)2 - 2nd Voltage controlled overcurrent, RV - Residual overvoltage.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.



### ROCOF Protections

Set of protections included: ROCOF - Rate of change of frequency.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.



### Adaptive Protections

Set of protections included: Dual Setting - Set A-B.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.

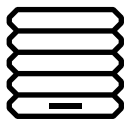
Three packages relate to measurements and diagnostics: Measuring Package, Data Logger and Network Analyzer.



#### Measuring Package

To monitor the plant through several measurements: Phase-to-phase voltage, Phase-to-neutral voltage, Phase sequence, Frequency, Active power, Reactive power, Apparent power, Power factor, Peak factor, Active energy, Reactive energy, Apparent energy.

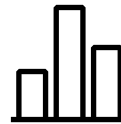
How to order: via ABB Ability Marketplace™ or traditional ordering channels.



#### Data Logger

To record data about events in the plant: Currents, Voltages, Sampling rate, Maximum recording duration, Recording stop delay, Number of registers.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.



#### Network Analyzer

To monitor the power quality of the network through: Harmonic analysis, Hourly average voltage value, Short voltage interruption, Short voltage spikes, Slow-voltage sags and swells, Voltage unbalance.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.

When a package is purchased via ABB Ability Marketplace™, it must be activated through:

- Ekip Connect 3 installed on a PC using Ekip T&P to scan the trip unit
- EPiC app mobile installed on a mobile device, by directly using the embedded Bluetooth connection available in the new Ekip trip units.

Thanks to the maximum flexibility guaranteed by these packages, the new Ekip trip units are now completely customizable. Depending on the specific trip unit version, different packages are available by default, but all of them can be added to the trip unit.

Default functionalities and upgradability of the trip units:

|                 |  |  |  |  |  |  |  |  |  |  |  |
|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                 | Standard Protection                                                                 | Standard Measures                                                                   | Measuring Package                                                                   | Voltage Protections                                                                 | Frequency Protections                                                               | Power Protections                                                                   | Adaptive Protections                                                                 | Data Logger                                                                           | Network Analyzer                                                                      | Advanced Voltage Protections                                                          | ROCOF Protections                                                                     |
| Ekip Touch      | ●                                                                                   | ●                                                                                   | ↑                                                                                   | ↑                                                                                   | ↑                                                                                   | ↑                                                                                   | ↑                                                                                    | ↑                                                                                     | ↑                                                                                     | ↑                                                                                     | ↑                                                                                     |
| Ekip G Touch    | ●                                                                                   | ●                                                                                   | ●                                                                                   | ↑                                                                                   | ↑                                                                                   | ↑                                                                                   | ↑                                                                                    | ●                                                                                     | ↑                                                                                     | ↑                                                                                     | ↑                                                                                     |
| Ekip Hi-Touch   | ●                                                                                   | ●                                                                                   | ●                                                                                   | ●                                                                                   | ●                                                                                   | ↑                                                                                   | ●                                                                                    | ●                                                                                     | ●                                                                                     | ↑                                                                                     | ↑                                                                                     |
| Ekip G Hi-Touch | ●                                                                                   | ●                                                                                   | ●                                                                                   | ●                                                                                   | ●                                                                                   | ●                                                                                   | ●                                                                                    | ●                                                                                     | ●                                                                                     | ●                                                                                     | ●                                                                                     |

● Available by default

↑ Upgradable

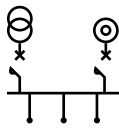
↑ Some elements of the package are already provided by default. It is possible to upgrade the trip unit to achieve the complete package.



# New digital experience

## Solutions

Four solutions are available to fully exploit the potential of the Ekip architecture: Embedded ATS, Adaptive Load Shedding and Power Controller.

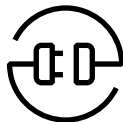


### Embedded ATS

This function enables the activation of auxiliary generation sources (e.g. generators) and transfers the feed of the loads from the distribution network to such auxiliary sources, thus ensuring a secure transfer to maintain service continuity and reliability of the system.

How to order: via ABB Ability Marketplace™.

The hardware accessories must be ordered via traditional ordering channels.



### Adaptive Load Shedding

Thanks to this solution, the circuit-breaker enables islanding transition to avoid blackouts.

It actively controls the power consumption based on the priorities set by the user.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.

The hardware accessories must be ordered via traditional ordering channels.



### Power Controller

This function is the ideal solution for load management and represents an optimum compromise between reliability, simplicity and cost-effectiveness. Based on a patented calculation algorithm, Ekip Power Controller allows a list of loads to be controlled from remote according to the priorities defined by the user.

How to order: via ABB Ability Marketplace™ or traditional ordering channels. The hardware accessories must be ordered via traditional ordering channels.

When a solution is purchased via ABB Ability Marketplace™, it must be activated through Ekip Connect 3 installed on a PC using Ekip T&P to scan the trip unit.

These solutions require the installation of hardware components that have to be ordered through the traditional ordering channels. For further information, please refer to the specific documentation available on ABB Library ([www.abb.com/abblibrary/DownloadCenter/](http://www.abb.com/abblibrary/DownloadCenter/)).

|                              | Functions included                           | Hardware accessories                                  |
|------------------------------|----------------------------------------------|-------------------------------------------------------|
| <b>PACKAGES</b>              |                                              |                                                       |
| Voltage Protections          | UV - Undervoltage                            | -                                                     |
|                              | OV - Overvoltage                             |                                                       |
|                              | UV2 – 2nd Undervoltage                       |                                                       |
|                              | OV2 – 2nd Overvoltage                        |                                                       |
|                              | PS – Phase sequence                          |                                                       |
|                              | VU – Voltage unbalance                       |                                                       |
| Frequency Protections        | UF - Underfrequency                          | -                                                     |
|                              | OF - Overfrequency                           |                                                       |
|                              | UF2 – 2nd Underfrequency                     |                                                       |
|                              | OF2 - 2nd Overfrequency                      |                                                       |
| Power Protections            | RP – Reverse active power                    | -                                                     |
|                              | Cos $\Phi$ - Power factor                    |                                                       |
|                              | D – Directional current                      |                                                       |
|                              | RQ – Loss of field or Reverse reactive power |                                                       |
|                              | OQ – Reactive overpower                      |                                                       |
|                              | OP – Active overpower                        |                                                       |
|                              | UP – Active underpower                       |                                                       |
| Advanced Voltage Protections | S(V) – Voltage controlled overcurrent        | -                                                     |
|                              | S(V)2 – 2nd Voltage controlled overcurrent   |                                                       |
|                              | RV - Residual overvoltage                    |                                                       |
| ROCOF Protections            | ROCOF                                        | -                                                     |
| Adaptive Protections         | Dual setting                                 | Ekip Signalling                                       |
| Measuring Package            | Phase-to-phase voltage                       | -                                                     |
|                              | Phase-to-neutral voltage                     |                                                       |
|                              | Phase sequence                               |                                                       |
|                              | Frequency                                    |                                                       |
|                              | Active power                                 |                                                       |
|                              | Reactive power                               |                                                       |
|                              | Apparent power                               |                                                       |
|                              | Power factor                                 |                                                       |
|                              | Peak factor                                  |                                                       |
|                              | Active energy                                |                                                       |
|                              | Reactive energy                              |                                                       |
|                              | Apparent energy                              |                                                       |
| Data Logger                  | Currents                                     | -                                                     |
|                              | Voltages                                     |                                                       |
|                              | Sampling rate                                |                                                       |
|                              | Maximum recording duration                   |                                                       |
|                              | Recording stop delay                         |                                                       |
|                              | Number of registers                          |                                                       |
| Network Analyzer             | Hourly average voltage value                 | -                                                     |
|                              | Short voltage interruptions                  |                                                       |
|                              | Short voltage spikes                         |                                                       |
|                              | Slow voltage sags and swells                 |                                                       |
|                              | Voltage unbalance                            |                                                       |
|                              | Harmonic analysis                            |                                                       |
| <b>SOLUTIONS</b>             |                                              |                                                       |
| Embedded ATS                 | -                                            | Ekip Link, Ekip Signalling, motor operators and coils |
| Adaptive Load Shedding       | -                                            | Ekip Link, Ekip Signalling, motor operators and coils |
| Power Controller             | -                                            | Ekip Link, Ekip Signalling, motor operators and coils |

# Architecture

All SACE Emax 2 circuit breakers are equipped with protection trip units that are able to evolve during the life cycle.

Ekip trip units are easily interchangeable from the front, with no need to dismantle the circuit breaker or access any internal or sensitive parts. In particular, they consist of:

- **Protection trip unit**, available with different interfaces and versions that range from basic to more complete; it contains a latest generation microprocessor that performs all the functions of protection and control.
- **Measurement Enabler** module, hardware connected internally on all SACE Emax 2 circuit-breakers equipped with Touch and Hi-Touch trip units. The module enables high accuracy voltage, power and energy measurements and advanced protections without requiring any external connection or voltage transformers. The **Measurement Enabler** with voltage sockets module (standard with Ekip Hi-Touch and optional on Ekip Touch) additionally allows to supply the trip unit through direct connection to the busbar system. Depending on the functionality desired, a software package may need to be purchased separately.
- **Interchangeable rating plug** enables all protection thresholds to be adjusted according to the rated current, increasing flexibility for the customer. It is useful in installations that are prepared for future development or in cases in which the power supplied may be limited temporarily.
- **Main board** is the mechanical housing of the trip unit, which includes a micro-controller for measuring currents and the self-protection functions. The separation of trip units ensures excellent reliability and immunity to conducted and radiated emissions. Integrated new generation Rogowski sensors, which are sensitive to the true r.m.s. value of the current, guarantee high accuracy of both measurements and protection.





All protection trip units in the SACE Emax 2 family are self-powered by current that crosses the circuit breaker. They guarantee excellent reliability due to a system of self-control of internal connections.

The setting, testing and downloading of reports can be carried out directly from a Smartphone, Tablet or PC. In addition, the commissioning stage can be further accelerated, minimizing the possibility of errors, by directly configuring the protection trip unit with the DOC design software settings. Cartridge-type modules that are easily installed on-board enable the units to be integrated into the most complex systems. Additional functions can be created, such as:

- **Synchrocheck**, to check the synchronization of the two half-busbars before enabling circuit-breaker closing;
- Communication with all **supervision systems** available in the Modbus, Profibus and DeviceNet™ protocols as well as the modern Modbus TCP, Profinet, EtherNet/IP™;
- **Integration into Smart Grids** thanks to the possibility of communicating without the assistance of any external converter, according to standards (IEC 61850) already in use in the automation systems of high and medium voltage substations;
- Multi-voltage **supply module**, which enables the protection trip unit and modules present to be supplied with any auxiliary voltage available in direct or alternating current;
- Programmable logic management with **Ekip Signalling** modules that provide a high number of electrical input and output contacts;
- Logical interlocks between circuit breakers, which can be made with the **Ekip Link** proprietary communication protocol, avoiding complex wiring thanks to the transmission of all signals via a bus..

# Overview

SACE Emax 2 trip units offer a complete range of solutions for any installation requirements, for both distribution and generator protection. New features are now available with a renewed black look and feel.

## Ekip Dip: The standard trip unit



**Ekip Dip LI**  
**Ekip Dip LSI**  
**Ekip Dip LSIG**

- Overcurrent protection for distribution systems
- Phase and neutral current measurements
- LED Permanent trip cause signalization
- Ekip Multimeter to display data and measurements

## Ekip Touch: The smart trip unit



**Ekip Touch LI**  
**Ekip Touch LSI**  
**Ekip Touch LSIG**

- Advanced set of protections and measurements, always upgradable and customizable
- Intuitive touchscreen interface
- High measurement accuracy of electrical parameters

## Ekip Hi-Touch: The ultimate trip unit



**Ekip Hi-Touch LSI**  
**Ekip Hi-Touch LSIG**

- Complete set of protections and measurements
- Dual settings of protection
- Network Analyzer function



### Ekip G: The generator trip unit



#### Ekip G Touch LSIG Ekip G Hi-Touch LSIG

- Designed for installations with generators such as Genset, cogeneration and marine applications
- Dedicated set of generator protections

### Ekip LCD: The hardened trip unit



#### Ekip LCD LI Ekip LCD LSI Ekip LCD LSIG Ekip Hi-LCD LSI Ekip Hi-LCD LSIG Ekip G LCD LSIG Ekip G Hi-LCD LSIG

- Suitable for installation in aggressive environments and secure applications
- Available for both distribution and generator protection functions

### Protection

SACE Emax 2 trip units offer a great variety of overcurrent protection functions, with thresholds and timing that can be easily set through dip switches or few simple steps directly from the touchscreen display. These units are available in different versions: LI, LSI, LSIG.

All the Ekip trip units also include a thermal memory function. The protection unit is able to record the trips which have occurred in the last few minutes. Since the trip causes overheating, in order to protect the cables and let them cool down, the trip unit imposes a shorter delay tripping time in case of a fault. In this way, the system is protected against damages due to cumulative overheating.

### Watchdog

The Ekip trip units ensure high reliability thanks to an electronic circuit that periodically checks the continuity of internal connections, such as trip coil, rating plug and each current sensor (ANSI 74).

In case of an alarm, a message is shown on the display (Ekip Touch) or through LEDs signalization (Ekip Dip). If a protection function intervenes, the unit always checks that the circuit breaker has been opened through auxiliary contacts that indicate the position of the main contacts. Otherwise, the unit creates an alarm (ANSI BF code - Breaker Failure) that can be used to command the opening of the upstream circuit breaker. Ekip trip units are also provided with self-protection against abnormal temperature (OT) to ensure correct operations.

# Overview

## Test function

All SACE Emax 2 trip units are equipped with a test port on the front that can be used to carry out circuit breaker tests by connecting one of the following devices:

- Ekip TT to perform trip tests, LED tests and checks for the absence of alarms detected by the watchdog function
- Ekip T&P not only for the trip and LED tests, but also for testing the individual protection functions and the saving of the relative report

In addition, the iTest key allows to run a battery test when the circuit breaker is disconnected.

## User interface

Ekip trip units allow to clearly identify the status of the circuit breaker through LEDs activation or an intuitive graphical interface. A password system is used to manage “Read” or “Edit” modes. The default password (00001) can be directly inserted by the user. The protection parameters are settable in “Edit” mode, whereas it is always possible to consult the information in “Read” mode.

## Data & Measurements

SACE Emax 2 trip units are no longer simply protection devices. The Ekip Dip trip unit measures phase and neutral current with great accuracy, while the other advanced units integrate multi-meter and network analyzer functionalities, being also compliant with IEC 61557-12 (Class 1 in energy accuracy).

A complete set of information about the circuit breaker and its operation is available for effective fault analysis and preventive scheduling of maintenance.

## Communication & Connectivity

Ekip Touch and Hi-Touch trip units can be easily integrated into the most modern supervision systems through several communication protocols:

- IEC 61850
- Modbus TCP
- Modbus RS-485
- Profibus
- Profinet
- DeviceNet™
- EtherNet/IP™

Measurements, statuses and alarms can be easily programmed and viewed by remote function, with no need of external interface devices. Moreover, the Ekip Com Actuator module can be installed in the front of the device to remotely control the circuit breaker. Several communication modules with different protocols can be used simultaneously. In addition, up to two modules using the same protocol can be installed to ensure a higher reliability of the installation. The Ekip Com Hub module allows cloud connectivity to ABB Ability™ Energy and Asset Manager platform. The new embedded Bluetooth Low Energy technology makes the circuit breaker easier to be accessed, thus reducing time for commissioning and parameter settings. Ekip Dip and Ekip LCD trip units are not provided with this feature.

**Supply**

SACE Emax 2 protection trip units are self-supplied through the current sensors installed on the circuit breaker and do not require any external supply devices for basic protection and alarm indication functions. A three-phase current of 100A is sufficient for the activation. All protection settings are stored in non-volatile memory that maintains the information without power supply. The Ekip Supply module can be easily connected to both direct and alternating current to activate additional functions such as:

- Using the unit when the circuit breaker is opened
- Using additional modules such as Ekip Signaling and Ekip Com
- Connection to external devices such as Ekip Multimeter
- Recording the number of operations
- G protection with values below 100A or 0.2 In
- Zone selectivity
- Gext and MCR protection functions

SACE Emax 2 trip units are always supplied with an internal battery that enables the cause of a fault to be indicated after a trip, without limit of time. This battery also ensures the update of time and date, thus guaranteeing the chronology of any events. When the unit switched off, the battery test can be run by simply pressing the iTest key on the front.

**Grey platform**

The previous Ekip trip units and their accessories are now available as spare parts only.

# Technical characteristics for protection trip units

## Protection functions

| ABB Code | ANSI/IEEE C37.2 Code | Function                             | Threshold                                                                                                                                                                     |
|----------|----------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L        | 49                   | Overload protection                  | I1 = 0.4 - 0.42 - 0.45 - 0.47 - 0.5 - 0.52 - 0.55 - 0.57 - 0.6 - 0.62 - 0.65 - 0.67 - 0.7 - 0.72 - 0.75 - 0.77 - 0.8 - 0.82 - 0.85 - 0.87 - 0.9 - 0.92 - 0.95 - 0.97 - 1 x In |
|          |                      | Thermal memory                       |                                                                                                                                                                               |
|          |                      | Tolerance                            | trip between 1.05 and 1.2 x I1                                                                                                                                                |
| S        | 50TD                 | Time-delayed overcurrent protection  | I2 = 0.6 - 0.8 - 1 - 1.5 - 2 - 2.5 - 3 - 3.5 - 4 - 5 - 6 - 7 - 8 - 9 - 10 x In                                                                                                |
|          |                      | Tolerance                            | ± 7% If ≤ 6 x In<br>± 10% If > 6 x In                                                                                                                                         |
|          | 51                   | Time-delayed overcurrent protection  | I2 = 0.6 - 0.8 - 1 - 1.5 - 2 - 2.5 - 3 - 3.5 - 4 - 5 - 6 - 7 - 8 - 9 - 10 x In                                                                                                |
|          |                      | Thermal memory                       |                                                                                                                                                                               |
|          |                      | Tolerance                            | ± 7% If ≤ 6 x In<br>± 10% If > 6 x In                                                                                                                                         |
|          |                      |                                      |                                                                                                                                                                               |
| I        | 50                   | Instantaneous overcurrent protection | I3 = 1.5 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 x In                                                                                                   |
|          |                      | Tolerance                            | ± 10%                                                                                                                                                                         |
| G        | 50N TD               | Earth fault protection               | I4 <sup>(1)</sup> = 0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1 x In                                                                                                                |
|          |                      | Tolerance                            | ± 7%                                                                                                                                                                          |
|          | 51N                  | Earth fault protection               | I4 <sup>(1)</sup> = 0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1 x In                                                                                                                |
|          |                      | Tolerance                            | ± 7%                                                                                                                                                                          |

(1) With Vaux all thresholds are available. Without Vaux minimum threshold is limited to: 0.3In (with In = 100A), 0.25In (with In = 400A) or 0.2In (for all other ratings)

(2) The minimum trip time is 1s, regardless of the type of curve set (self-protection)

(3) Total clearing time is the sum of breaking time and trip time

The tolerances above apply to trip units already powered by the main circuit with current flowing in at least two phases or an auxiliary power supply. In all other cases the following tolerance values apply

| ABB Code | Trip threshold                 | Trip time |
|----------|--------------------------------|-----------|
| L        | Trip between 1.05 and 1.2 x I1 | ± 20%     |
| S        | ± 10%                          | ± 20%     |
| I        | ± 15%                          | ≤ 60ms    |
| G        | ± 15%                          | ± 20%     |



| Trip time <sup>(3)</sup>                                                            | Excludibility | Pre Alarm                   | Trip curve    | Ekip Dip |
|-------------------------------------------------------------------------------------|---------------|-----------------------------|---------------|----------|
| with $I_f = 3 I_n$ , $t_1 = 3 - 12 - 24 - 36 - 48 - 72 - 108 - 144s$ <sup>(2)</sup> | no            | 50 ... 90% $I_1$<br>Step 1% | $t = k / I^2$ | ●        |
|                                                                                     | no            |                             |               | ●        |
| ± 10% $I_f \leq 6 \times I_n$<br>± 20% $I_f > 6 \times I_n$                         |               |                             |               |          |
| with $I_f > I_2$ , $t_2 = 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.6 - 0.7 - 0.8s$           | yes           | -                           | $t = k$       | ●        |
| The better of the two data:<br>± 10% $t_2$ or ± 40 ms                               |               |                             |               |          |
| with $I_f = 10 I_n$ , $t_2 = 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.6 - 0.7 - 0.8s$        | yes           | -                           | $t = k / I^2$ | ●        |
|                                                                                     | yes           | -                           |               |          |
| ± 15% $I_f \leq 6 \times I_n$<br>± 20% $I_f > 6 \times I_n$                         |               |                             |               |          |
| Instantaneous                                                                       | yes           | -                           | $t = k$       | ●        |
| ≤ 30 ms                                                                             |               |                             |               |          |
| with $I_f > I_4$ , $t_4 = 0.1 - 0.2 - 0.4 - 0.8s$                                   | yes           | 50 ... 90% $I_4$<br>Step 1% | $t = k$       | ●        |
| The better of the two data:<br>± 10% $t_4$ or ± 40 ms                               |               |                             |               |          |
| with $I_f = 3 I_n$ , $t_4 = 0.1 - 0.2 - 0.4 - 0.8s$                                 | yes           | 50 ... 90% $I_4$<br>Step 1% | $t = k / I^2$ | ●        |
| ± 15%                                                                               |               |                             |               |          |

# Technical characteristics for protection trip units

## Protection functions

| ABB Code | ANSI Code | Function                                          | Threshold                                                    | Threshold step                    | Trip time                                                                                                                                                              | Time Step |
|----------|-----------|---------------------------------------------------|--------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| L        | 49        | Overload Protection                               | $I1 = 0.4...1 \times I_n$                                    | $0.001 \times I_n$                | with $I = 3 I1$ , $t1 = 3...144 \text{ s}$                                                                                                                             | 1s        |
|          |           | Thermal Memory                                    |                                                              |                                   |                                                                                                                                                                        |           |
|          |           | Tolerance                                         | trip between $1.05$ and $1.2 \times I1$                      |                                   | $\pm 10\% I \leq 6 \times I_n / \pm 20\% I > 6 \times I_n$                                                                                                             |           |
|          | 49        | Overload Protection                               | $I1 = 0.4...1 \times I_n$                                    | $0.001 \times I_n$                | with $I = 3 I1$ , $t1 = 3...144 \text{ s}$<br>Standard inverse SI: $k=0.14 \alpha=0.02$<br>Very Inverse VI: $k=13.5 \alpha=1$<br>Extremely Inverse EI: $k=80 \alpha=2$ | 1s        |
| S        | 50TD      | Time-delayed overcurrent protection               | $I2 = 0.6...10 \times I_n$                                   | $0.1 \times I_n$                  | With $I > I2$ , $t2 = 0.05...0.8 \text{ s}$                                                                                                                            | 0.01s     |
|          |           | Zone selectivity                                  |                                                              |                                   | $t2_{sel} = 0.04...0.2 \text{ s}$                                                                                                                                      | 0.01s     |
|          | 68        | Start up                                          | Activation: $0.6...10 \times I_n$                            | $0.1 \times I_n$                  | Range: $0.1...30 \text{ s}$                                                                                                                                            | 0.01s     |
|          |           | Tolerance                                         | $\pm 7\% I \leq 6 \times I_n$<br>$\pm 10\% I > 6 \times I_n$ |                                   | The better of the two data:<br>$\pm 10\%$ or $\pm 40 \text{ ms}$                                                                                                       |           |
|          | 51        | Time-delayed overcurrent protection               | $I2 = 0.6...10 \times I_n$                                   | $0.1 \times I_n$                  | with $I = 10 I_n$ , $t2 = 0.05...0.8 \text{ s}$                                                                                                                        | 0.01s     |
|          |           | Thermal Memory                                    |                                                              |                                   |                                                                                                                                                                        |           |
|          |           | Tolerance                                         | $\pm 7\% I \leq 6 \times I_n$<br>$\pm 10\% I > 6 \times I_n$ |                                   | $\pm 15\% I \leq 6 \times I_n$<br>$\pm 20\% I > 6 \times I_n$                                                                                                          |           |
|          |           |                                                   |                                                              |                                   |                                                                                                                                                                        |           |
| I        | 50        | Instantaneous overcurrent protection              | $I3 = 1.5...15 \times I_n$                                   | $0.1 \times I_n$                  | With $I > I3$ , instantaneous                                                                                                                                          | -         |
|          |           | Start up                                          | Activation: $1.5...15 \times I_n$                            | $0.1 \times I_n$                  | Range: $0.1...30 \text{ s}$                                                                                                                                            | 0.01s     |
|          | 68        | Tolerance                                         | $\pm 10\%$                                                   |                                   | $\leq 30 \text{ ms}$                                                                                                                                                   |           |
|          |           | Zone selectivity                                  |                                                              |                                   | $\leq 30 \text{ ms}$                                                                                                                                                   |           |
| G        | 50N TD    | Earth fault protection                            | $I4^{(1)} = 0.1...1 \times I_n$                              | $0.001 \times I_n$                | with $I > I4$ , $t4 = \text{Instantaneous (with Vaux)} + 0.1...1 \text{ s}$                                                                                            | 0.05s     |
|          |           | Zone selectivity                                  |                                                              |                                   | $t4_{sel} = 0.04...0.2 \text{ s}$                                                                                                                                      | 0.01s     |
|          | 68        | Start up                                          | Activation: $0.2...1 \times I_n$                             | $0.02 \times I_n$                 | range: $0.1...30 \text{ s}$                                                                                                                                            | 0.01s     |
|          |           | Tolerance                                         | $\pm 7\%$                                                    |                                   | The better of the two data: $\pm 10\%$ or $\pm 40 \text{ ms}$ or $50 \text{ ms}$ with $t4 = \text{instantaneous}$                                                      |           |
|          | 51N       | Earth fault protection                            | $I4^{(1)} = 0.1...1 \times I_n$                              | $0.001 \times I_n$                | with $I = 4 I_n$ , $t4 = 0.1...1 \text{ s}$                                                                                                                            | 0.05s     |
|          |           | Tolerance                                         | $\pm 7\%$                                                    |                                   | $\pm 15\%$                                                                                                                                                             |           |
| IU       | 46        | Current unbalance protection                      | $I6 = 2...90\% I_n \text{ unbalance}$                        | $1\% I_n$                         | with unbalance $> I6$ , $t6 = 0.5...60 \text{ s}$                                                                                                                      | 0.5s      |
|          |           | Tolerance                                         | $\pm 10\%$                                                   |                                   | The better of the two data: $\pm 10\%$ or $\pm 40 \text{ ms}$ (for $t < 5 \text{ s}$ ) / $\pm 100 \text{ ms}$ (for $t \geq 5 \text{ s}$ )                              |           |
| 2I       | 50        | Programmable instantaneous overcurrent protection | $I31 = 1.5...15 \times I_n$ (max setting $15 \text{ kA}$ )   | $0.1 \times I_n$                  | with $I > I31$ , instantaneous                                                                                                                                         |           |
|          |           | Tolerance                                         | $\pm 10\%$                                                   |                                   | $\leq 7 \text{ ms}^{(2)}$                                                                                                                                              |           |
| MCR      |           | Closing on short-circuit protection               | $I3 = 1.5...15 \times I_n$                                   | $0.1 \times I_n$                  | With $I > I3$ , instantaneous<br>Monitor time range: $40...500 \text{ ms}$                                                                                             | 0.01s     |
|          |           | Tolerance                                         | $\pm 10\%$                                                   |                                   | $\leq 30 \text{ ms}$                                                                                                                                                   |           |
| Gext     | 50G TD    | Earth fault protection                            | $I41^{(1)} = 0.1...1 \times I_n \text{ Toroid}$              | $0.001 \times I_n \text{ Toroid}$ | with $I > I41$ , $t41 = 0.1...1 \text{ s}$                                                                                                                             | 0.05s     |
|          |           | Zone selectivity                                  |                                                              |                                   | $t41_{sel} = 0.04...0.2 \text{ s}$                                                                                                                                     | 0.01s     |
|          | 68        | Start up                                          | Activation: $0.1...1 \times I_n$                             | $0.02 \times I_n$                 | range: $0.1...30 \text{ s}$                                                                                                                                            | 0.01s     |
|          |           | Tolerance                                         | $\pm 7\%$                                                    |                                   | The better of the two data:<br>$\pm 10\%$ or $\pm 40 \text{ ms}$                                                                                                       |           |
| Rc       | 51G       | Earth fault protection                            | $I41^{(1)} = 0.1...1 \times I_n$                             | $0.001 \times I_n$                | with $I = 4 I_n$ , $t41 = 0.1...1 \text{ s}$                                                                                                                           | 0.05s     |
|          |           | Tolerance                                         | $\pm 7\%$                                                    |                                   | $\pm 15\%$                                                                                                                                                             |           |
|          | 64 50N TD | Residual current protection                       | $I\Delta n = 3 - 5 - 7 - 10 - 20 - 30 \text{ A}$             |                                   | with $I > I\Delta n$ , $t\Delta n = 0.06 - 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.8 \text{ s}$                                                                                |           |
|          |           | Differential ground fault protection              |                                                              |                                   | $140 \text{ ms} @ 0.06 \text{ s}$ (max trip time)<br>$950 \text{ ms} @ 0.80 \text{ s}$ (max trip time)                                                                 |           |
| UV       | 27        | Undervoltage Protection                           | $U8 = 0.5...0.98 \times U_n$                                 | $0.001 \times U_n$                | with $U < U8$ , $t8 = 0.05...120 \text{ s}$                                                                                                                            | 0.01s     |
|          |           | Tolerance                                         | $\pm 2\%$                                                    |                                   | The better of the two data: $\pm 10\%$ or $\pm 40 \text{ ms}$ (for $t < 5 \text{ s}$ ) / $\pm 100 \text{ ms}$ (for $t \geq 5 \text{ s}$ )                              |           |
| MDGF     |           | Modified Differential Ground Fault protection     | $I41 = 0.1...1 \times I_n$                                   |                                   | with $I > I41$ , $t41 = 0.05...1 \text{ s}$ ( $t=k$ )                                                                                                                  | 0.05s     |
|          |           | Tolerance                                         | $\pm 7\%$                                                    |                                   | with $I > I41$ , $t41 = 0.1...1 \text{ s}$ ( $t=k/I^2$ )<br>The highest of $15\%$ or $15 \text{ ms}$                                                                   |           |
| OV       | 59        | Overvoltage protection                            | $U9 = 1.02...1.5 \times U_n$                                 | $0.001 \times U_n$                | with $U > U9$ , $t9 = 0.05...120 \text{ s}$                                                                                                                            | 0.01s     |
|          |           | Tolerance                                         | $\pm 2\%$                                                    |                                   | The better of the two data: $\pm 10\%$ or $\pm 40 \text{ ms}$ (for $t < 5 \text{ s}$ ) / $\pm 100 \text{ ms}$ (for $t \geq 5 \text{ s}$ )                              |           |





| Excludibility                 | Excludibility trip | Pre-alarm            | Trip curve                                                      | Ekip Touch | Ekip Hi-Touch | Ekip G Touch | Ekip G Hi-Touch |
|-------------------------------|--------------------|----------------------|-----------------------------------------------------------------|------------|---------------|--------------|-----------------|
| yes, with rating plug L=off   | no                 | 50...90% I1 step 1%  | $t = k / I^2$                                                   | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes, with rating plug L=off   | no                 | 50...90% I1 step 1%  | $t = \frac{t_1 \cdot (3^\alpha - 1)^{(1)}}{(I/I_1)^\alpha - 1}$ | ●          | ●             | ●            | ●               |
| yes                           | yes                | no                   | $t = k$                                                         | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes                           | yes                | no                   | $t = k / I^2$                                                   | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes <sup>(3)</sup>            | no                 | no                   | $t = k$                                                         | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes                           | yes                | 50...90% I4 step 1%  | $t = k$                                                         | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes                           | yes                | 50...90% I4 step 1%  | $t = k / I^2$                                                   | ●          | ●             | ●            | ●               |
| yes                           | yes                | no                   | $t = k$                                                         | ●          | ●             | ●            | ●               |
| yes                           | no                 | no                   | $t = k$                                                         | ●          | ●             | ●            | ●               |
| yes                           | no                 | no                   | $t = k$                                                         | ●          | ●             | ●            | ●               |
| yes                           | yes                | 50...90% I41 step 1% | $t = k$                                                         | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes                           |                    |                      |                                                                 | ●          | ●             | ●            | ●               |
| yes                           | yes                | 50...90% I41 step 1% | $t = k / I^2$                                                   | ●          | ●             | ●            | ●               |
| Available with rating plug Rc | no                 | no                   | $t = k$                                                         | ○          | ●             | ●            | ●               |
| yes                           | yes                | no                   | $t = k$                                                         | ○          | ●             | ●            | ●               |
| yes                           | yes                | 50...90% I41 step 1% | $t = k$<br>$t = k / I^2$                                        | ●          | ●             | ●            | ●               |
| yes                           | yes                | no                   | $t = k$                                                         | ○          | ●             | ●            | ●               |

(1) The formula is derived by the follow general equation from IEC 60255-151:  $b \cdot k / (I/I_1)^\alpha - 1$ , Where  $b = (3^\alpha - 1)/K$  when  $I_1 = 3 \cdot I_1$  and  $t = t_1$

# Technical characteristics for protection trip units

## Protection functions

| ABB Code                       | ANSI Code | Function                                                                                       | Threshold                                                                                                                                                                                                      | Threshold step                                 | Trip time                                                                                                                                             | Time Step |
|--------------------------------|-----------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>VU</b>                      | 47        | Voltage unbalance protection<br>Tolerance                                                      | $U14 = 2...90\% U_n$ unbalance<br>$\pm 5\%$                                                                                                                                                                    | $1\% U_n$                                      | with unbalance $> U14$ , $t14 = 0.5...60s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ ) | 0.5s      |
| <b>UF</b>                      | 81L       | Underfrequency protection<br>Tolerance                                                         | $f12 = 0.9...0.999 \times f_n$<br>$\pm 1\%$ (with $f_n \pm 2\%$ )                                                                                                                                              | $0.001 \times f_n$                             | with $f < f12$ , $t12 = 0.06...300s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )       | 0.01s     |
| <b>OF</b>                      | 81H       | Overfrequency protection<br>Tolerance                                                          | $f13 = 1.001...1.1 \times f_n$<br>$\pm 1\%$ (with $f_n \pm 2\%$ )                                                                                                                                              | $0.001 \times f_n$                             | with $f > f13$ , $t13 = 0.06...300s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )       | 0.01s     |
| <b>RP</b>                      | 32R       | Reverse active power protection<br>Tolerance                                                   | $P11 = -1...-0.05 S_n$<br>$\pm 10\%$                                                                                                                                                                           | $0.001 S_n$                                    | with $P > P11$ , $t11 = 0.5...100s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )        | 0.1s      |
| <b>ABB: Cyclical direction</b> | 47        | Cyclical direction of the phases                                                               | 1-2-3 or 3-2-1                                                                                                                                                                                                 |                                                |                                                                                                                                                       |           |
| <b>ABB: Power factor</b>       | 78        | 3phase Power factor                                                                            | $PF3 = 0.5...0.95$                                                                                                                                                                                             | 0.01                                           |                                                                                                                                                       |           |
| <b>LC1/2</b>                   |           | Current threshold                                                                              | $LC1 = 50\%...100\% I_l$<br>$LC2 = 50\%...100\% I_l$<br>$Iw1 = 0.1...10 I_n$<br>$Iw2 = 0.1...10 I_n$<br>Activation: up/down                                                                                    | 1%<br>1%<br>$0.01 \times I_n$                  |                                                                                                                                                       |           |
| <b>Iw1/2</b>                   |           | Tolerance                                                                                      | $\pm 10\%$                                                                                                                                                                                                     |                                                |                                                                                                                                                       |           |
| <b>S2</b>                      | 50TD      | Time-delayed overcurrent protection                                                            | $I5 = 0.6...10 \times I_n$                                                                                                                                                                                     | $0.1 \times I_n$                               | With $I > I5$ , $t5 = 0.05...0.8s$                                                                                                                    | 0.01s     |
|                                | 68        | Zone selectivity                                                                               |                                                                                                                                                                                                                |                                                | $t5sel = 0.04...0.2s$                                                                                                                                 | 0.01s     |
|                                |           | Start up<br>Tolerance                                                                          | Activation: $0.6...10 \times I_n$<br>$\pm 7\% I \leq 6 \times I_n$<br>$\pm 10\% I > 6 \times I_n$                                                                                                              | $0.1 \times I_n$                               | Range: $0.1...30s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$                                                                           | 0.01s     |
| <b>D</b>                       | 67        | Directional overcurrent protection (forward &/or backward)                                     | $I7 = 0.6...10 \times I_n$                                                                                                                                                                                     | $0.1 \times I_n$                               | with $I > I7$ , $t7 = 0.1...0.8s$                                                                                                                     | 0.01s     |
|                                | 68        | Zone selectivity                                                                               |                                                                                                                                                                                                                |                                                | $t7sel = 0.1...0.8s$                                                                                                                                  | 0.01s     |
|                                |           | Start up (forward &/or backward)<br>Trip direction<br>Minimum angle direction (°)<br>Tolerance | Activation: $0.6...10 \times I_n$<br>forward &/or backward<br>3.6, 7.2, 10.8, 14.5, 18.2, 22, 25.9, 30, 34.2, 38.7, 43.4, 48.6, 54.3, 61, 69.6<br>$\pm 7\% I \leq 6 \times I_n$<br>$\pm 10\% I > 6 \times I_n$ | $0.1 \times I_n$                               | Range: $0.1...30s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$                                                                           | 0.01s     |
| <b>UV2</b>                     | 27        | Undervoltage Protection<br>Tolerance                                                           | $U15 = 0.5...0.98 \times U_n$<br>$\pm 2\%$                                                                                                                                                                     | $0.001 \times U_n$                             | with $U < U15$ , $t15 = 0.05...120s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )       | 0.01s     |
| <b>OV2</b>                     | 59        | Overvoltage protection<br>Tolerance                                                            | $U16 = 1.02...1.5 \times U_n$<br>$\pm 2\%$                                                                                                                                                                     | $0.001 \times U_n$                             | with $U > U16$ , $t16 = 0.05...120s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )       | 0.01s     |
| <b>UF2</b>                     | 81L       | Underfrequency protection<br>Tolerance                                                         | $f17 = 0.9...0.999 \times f_n$<br>$\pm 1\%$ (with $f_n \pm 2\%$ )                                                                                                                                              | $0.001 \times f_n$                             | with $f < f17$ , $t17 = 0.15...300s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )       | 0.01s     |
| <b>OF2</b>                     | 81H       | Overfrequency protection<br>Tolerance                                                          | $f18 = 1.001...1.1 \times f_n$<br>$\pm 1\%$ (with $f_n \pm 2\%$ )                                                                                                                                              | $0.001 \times f_n$                             | with $f > f18$ , $t18 = 0.15...300s$<br>The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )       | 0.01s     |
| <b>S(V)</b>                    | 51V       | Voltage controlled overcurrent protection                                                      | $I20 = 0.6...10 \times I_n$                                                                                                                                                                                    | $0.1 \times I_n$                               | With $I > I20$ , $t20 = 0.05...30s$                                                                                                                   | 0.01s     |
|                                |           | Step mode                                                                                      | $U_l = 0.2...1 \times U_n$<br>$K_s = 0.1...1$                                                                                                                                                                  | $0.01 \times U_n$<br>0.01                      |                                                                                                                                                       |           |
|                                |           | Linear mode                                                                                    | $U_l = 0.2...1 \times U_n$<br>$U_h = 0.2...1 \times U_n$<br>$K_s = 0.1...1$                                                                                                                                    | $0.01 \times U_n$<br>$0.01 \times U_n$<br>0.01 |                                                                                                                                                       |           |
|                                |           | Tolerance                                                                                      | $\pm 10\%$                                                                                                                                                                                                     |                                                | The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ )                                               |           |



| Excludibility | Excludibility trip | Pre-alarm | Trip curve | Ekip Touch | Ekip Hi-Touch | Ekip G Touch | Ekip G Hi-Touch |
|---------------|--------------------|-----------|------------|------------|---------------|--------------|-----------------|
| yes           | yes                | no        | t = k      | ○          | ●             | ●            | ●               |
| yes           | yes                | no        | t = k      | ○          | ●             | ●            | ●               |
| yes           | yes                | no        | t = k      | ○          | ●             | ●            | ●               |
| yes           | yes                | no        | t = k      | ○          | ●             | ●            | ●               |
| yes           | only signalling    | no        | -          | ○          | ●             | ●            | ●               |
| yes           | only signalling    | no        | -          | ○          | ●             | ●            | ●               |
| yes           | only signalling    | no        | -          | ●          | ●             | ●            | ●               |
| yes           | yes                | no        | t = k      | ●          | ●             | ●            | ●               |
| yes           | yes                |           |            | ●          | ●             | ●            | ●               |
| yes           |                    |           |            | ●          | ●             | ●            | ●               |
| yes           | yes                | no        | t = k      | ○          | ●             | ○            | ●               |
| yes           |                    |           |            | ○          | ●             | ○            | ●               |
| yes           |                    |           |            | ○          | ●             | ○            | ●               |
| yes           | yes                | no        | t = k      | ○          | ●             | ○            | ●               |
| yes           | yes                | no        | t = k      | ○          | ●             | ○            | ●               |
| yes           | yes                | no        | t = k      | ○          | ●             | ○            | ●               |
| yes           | yes                | no        | t = k      | ○          | ○             | ○            | ●               |
|               |                    |           |            | ○          | ○             | ○            | ●               |
|               |                    |           |            | ○          | ○             | ○            | ●               |
|               |                    |           |            |            |               |              |                 |
|               |                    |           |            |            |               |              |                 |
|               |                    |           |            |            |               |              |                 |

Table continued on next page

# Technical characteristics for protection trip units

## Protection functions

| ABB Code                | ANSI Code | Function                                           | Threshold                                | Threshold step                                                                                                           | Tripping time                                                                                           | Time Step |
|-------------------------|-----------|----------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------|
| <b>RV</b>               | 59N       | Residual overvoltage protection                    | $U_{22} = 0.05...0.5 \times U_n$         | $0.001 \times U_n$                                                                                                       | with $U > U_{22}$ , $t_{22} = 0.5...120s$                                                               | 0.01s     |
|                         |           | Tolerance                                          | $\pm 5\%$                                |                                                                                                                          | The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ ) |           |
| <b>OP</b>               | 32OF      | Active overpower protection                        | $P_{26} = 0.4...2 S_n$                   | $0.001 S_n$                                                                                                              | with $P > P_{26}$ , $t_{26} = 0.5...100s$                                                               | 0.5s      |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          | The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ ) |           |
| <b>OQ</b>               | 32OF      | Reactive overpower protection                      | $Q_{27} = 0.4...2 S_n$                   | $0.001 S_n$                                                                                                              | with $Q > Q_{27}$ , $t_{27} = 0.5...100s$                                                               | 0.5s      |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          | The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ ) |           |
| <b>UP</b>               | 32LF      | Active underpower protection                       | $P_{23} = 0.1...1 \times S_n$            | $0.001 \times S_n$                                                                                                       | with $P < P_{23}$ , $t_{23} = 0.5...100s$                                                               | 0.5s      |
|                         |           | Start up                                           |                                          |                                                                                                                          | range: $0.1...30s$                                                                                      | 0.01s     |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          | The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ ) |           |
| <b>RQ</b>               | 40/32R    | Loss of field or reverse reactive power protection | $Q_{24} = -1...-0.1 S_n$                 | $0.001 S_n$                                                                                                              | with $Q > Q_{24}$ , $t_{24} = 0.5...100s$                                                               | 0.1s      |
|                         |           |                                                    | $K_q = -2...2$                           | 0.01                                                                                                                     |                                                                                                         |           |
|                         |           | Loss of field or reverse reactive power protection | $Q_{25} = -1...-0.1 S_n$                 | $0.001 S_n$                                                                                                              | with $Q > Q_{25}$ , $t_{25} = 0.5...100s$                                                               | 0.5s      |
|                         |           |                                                    | $K_{q2} = -2...2$                        | 0.01                                                                                                                     |                                                                                                         |           |
|                         |           | Voltage minimum threshold                          | $V_{min.} = 0.5...1.2$                   | 0.01                                                                                                                     |                                                                                                         |           |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          | The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ ) |           |
| <b>S2(V)</b>            | 51V       | Voltage controlled overcurrent protection          | $I_{21} = 0.6...10 \times I_n$           | $0.1 \times I_n$                                                                                                         | With $I > I_{21}$ , $t_{21} = 0.05...30s$                                                               | 0.01s     |
|                         |           | Step mode                                          | $U_{I2} = 0.2...1 \times U_n$            | $0.01 \times U_n$                                                                                                        |                                                                                                         |           |
|                         |           |                                                    | $K_{s2} = 0.1...1$                       | 0.01                                                                                                                     |                                                                                                         |           |
|                         |           | Linear mode                                        | $U_{I2} = 0.2...1 \times U_n$            | $0.01 \times U_n$                                                                                                        |                                                                                                         |           |
|                         |           |                                                    | $U_{h2} = 0.2...1 \times U_n$            | $0.01 \times U_n$                                                                                                        |                                                                                                         |           |
|                         |           |                                                    | $K_{s2} = 0.1...1$                       | 0.01                                                                                                                     |                                                                                                         |           |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          | The better of the two data: $\pm 10\%$ or $\pm 40 ms$ (for $t < 5s$ ) / $\pm 100 ms$ (for $t \geq 5s$ ) |           |
| <b>ROCOF</b>            | 81R       | Rate of change of frequency protection             | $f_{28} = 0.4...10 Hz/s$                 | $0.2 Hz/s$                                                                                                               | with $f > f_{28}$ , $t_{28} = 0.5...10s$                                                                | 0.01s     |
|                         |           | Trip direction                                     | up &/or down                             |                                                                                                                          |                                                                                                         |           |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          | The better of the two data: $\pm 20\%$ or $\pm 200 ms$                                                  |           |
| <b>Synchro-check SC</b> | 25        | Synchrocheck (Live busbars)                        | $U_{live} = 0.5...1.1 U_n$               | $0.001 U_n$                                                                                                              | Stability voltage time for live state = $100...30000ms$                                                 | 0.001s    |
|                         |           |                                                    | $\Delta U = 0.02...0.12 U_n$             | $0.001 U_n$                                                                                                              | Minimum matching Time = $100...3000ms$                                                                  | 0.01 s    |
|                         |           |                                                    | $\Delta f = 0.1...1Hz$                   | 0.1Hz                                                                                                                    |                                                                                                         |           |
|                         |           |                                                    | $\Delta \Phi = 5...50^\circ \text{ elt}$ | $5^\circ \text{ elt}$                                                                                                    |                                                                                                         |           |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          |                                                                                                         |           |
|                         |           | Synchrocheck (Live,Dead busbars)                   | $U_{live} = 0.5...1.1 U_n$               | $0.001 U_n$                                                                                                              | $t_{ref} = 0.1...30s$                                                                                   | 0.1s      |
|                         |           |                                                    | $U_{dead} = 0.02...0.2 U_n$              | $0.001 U_n$                                                                                                              |                                                                                                         |           |
|                         |           | Frequency check off                                |                                          |                                                                                                                          |                                                                                                         |           |
|                         |           | Phase check off                                    |                                          |                                                                                                                          |                                                                                                         |           |
|                         |           | Dead bar configuration                             | Reverse/standard                         |                                                                                                                          |                                                                                                         |           |
|                         |           | Primary voltage                                    | 100...1150                               | 100, 115, 120, 190, 208, 220, 230, 240, 277, 347, 380, 400, 415, 440, 480, 500, 550, 600, 660, 690, 910, 950, 1000, 1150 |                                                                                                         |           |
|                         |           | Secondary voltage                                  | 100...120                                | 100, 110, 115, 120                                                                                                       |                                                                                                         |           |
|                         |           | Tolerance                                          | $\pm 10\%$                               |                                                                                                                          |                                                                                                         |           |

(1) With Vaux all thresholds are available. Without Vaux minimum threshold is limited to:  $0.3I_n$  (with  $I_n = 100A$ ),  $0.25I_n$  (with  $I_n = 400A$ ) or  $0.2I_n$  (for all other ratings). The tolerances above apply to trip units already powered by the main circuit with current flowing in at least two-phases or an auxiliary power supply.

In all other cases the following tolerance values apply:

| ABB Code                | Trip threshold                           | Trip time   |
|-------------------------|------------------------------------------|-------------|
| <b>L</b>                | Trip between $1.05$ and $1.2 \times I_1$ | $\pm 20\%$  |
| <b>S</b>                | $\pm 10\%$                               | $\pm 20\%$  |
| <b>I</b>                | $\pm 15\%$                               | $\leq 60ms$ |
| <b>G</b>                | $\pm 15\%$                               | $\pm 20\%$  |
| <b>Other protection</b> | $\pm 15\%$                               | $\pm 20\%$  |



(2) 2I Trip time:

- < 3ms when the fault current is above 18kA
- 7ms (three-phase) or 9ms (single-phase) when the fault current is greater than three times the 2I setting (I31)
- ≤ 15ms when the fault current is lower than three times the 2I setting (I31)

(3) Instantaneous protection can be permanently non-defeatable through the dedicated extracode

available with Ekip Synchrocheck

# Technical characteristics for protection trip units

## Measurement functions

| Instantaneous measurements                                                           |      | Displayed with Ekip Multimeter | Parameters                                                   |
|--------------------------------------------------------------------------------------|------|--------------------------------|--------------------------------------------------------------|
| Currents (RMS)                                                                       | [A]  | •                              | L1, L2, L3, Ne                                               |
| Earth fault current (RMS)                                                            | [A]  | •                              | Ig                                                           |
| Record of values: of the parameter for each interval with time-stamping              |      |                                | Parameters                                                   |
| Current: minimum and maximum                                                         | [A]  | •                              | I Min, I Max                                                 |
| Information on trip and opening data: after a fault with or without auxiliary supply |      |                                | Parameters                                                   |
| Type of protection tripped                                                           |      | •                              | eg. L, S, I, G                                               |
| Fault values per phase                                                               | [A]  | •                              | eg. I1, I2, I3, neutral for S protection                     |
| Time-stamping                                                                        |      | •                              | Date, time and progressive number                            |
| Maintenance indicators                                                               |      |                                | Parameters                                                   |
| Information on last 30 trips                                                         |      | •                              | Type of protection, fault values and time-stamping           |
| Information on last 200 events                                                       |      | •                              | Type of event, time-stamping                                 |
| Number of mechanical operations <sup>(1)</sup>                                       | [no] | •                              | Can be associated to alarm                                   |
| Total number of trips                                                                | [no] | •                              |                                                              |
| Total operating time                                                                 | [h]  | •                              |                                                              |
| Wear of contacts                                                                     | [%]  | •                              | Prealarm >80%, Alarm = 100%                                  |
| Date of maintenance operations performed                                             |      | •                              | Last                                                         |
| Indication of maintenance operation needed                                           |      | •                              |                                                              |
| Circuit-breaker I.D.                                                                 |      | •                              | Type of circuit breaker, assigned device name, serial number |
| Self-diagnosis                                                                       |      |                                | Parameters                                                   |
| Check of continuity of internal connections                                          |      | •                              | Alarm due to disconnection: rating plug, sensors, trip coil  |
| Failure of circuit breaker to open (ANSI 50BF)                                       |      | •                              | Alarm following non-tripping of protection functions         |
| Temperature (T)                                                                      |      | •                              | Pre-alarm and alarm for abnormal temperature                 |

(1) with auxiliary supply present





| Precision                                                   | Standard                                        | Ekip Dip |
|-------------------------------------------------------------|-------------------------------------------------|----------|
| 1%                                                          | IEC 61557-12                                    | ●        |
| 2%                                                          |                                                 | ●        |
|                                                             |                                                 |          |
| Window                                                      | Intervals                                       |          |
| Fixed, synchronizable by remote                             | Duration: 5...120min<br>Number of intervals: 24 | ●        |
|                                                             |                                                 |          |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 |          |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 |          |
|                                                             |                                                 | ●        |
|                                                             |                                                 | ●        |
|                                                             |                                                 |          |
| Note:                                                       |                                                 | ●        |
| Opening of circuit breaker can be set in the event of alarm |                                                 | ●        |
|                                                             |                                                 | ●        |

# Technical characteristics for protection trip units

## Measurement functions

| Instantaneous measurements                                 |             | Parameters                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Currents (RMS)                                             | [A]         | L1, L2, L3, Ne                                                                                                                                                                                                                                                                                                                                                                             |
| Earth fault current (RMS)                                  | [A]         | I <sub>g</sub>                                                                                                                                                                                                                                                                                                                                                                             |
| Phase-phase voltage (RMS)                                  | [V]         | U <sub>12</sub> , U <sub>23</sub> , U <sub>31</sub>                                                                                                                                                                                                                                                                                                                                        |
| Phase-neutral voltage (RMS)                                | [V]         | U <sub>1</sub> , U <sub>2</sub> , U <sub>3</sub>                                                                                                                                                                                                                                                                                                                                           |
| Phase sequence                                             |             |                                                                                                                                                                                                                                                                                                                                                                                            |
| Frequency                                                  | [Hz]        | f                                                                                                                                                                                                                                                                                                                                                                                          |
| Active power                                               | [kW]        | P <sub>1</sub> , P <sub>2</sub> , P <sub>3</sub> , P <sub>tot</sub>                                                                                                                                                                                                                                                                                                                        |
| Reactive power                                             | [kVAR]      | Q <sub>1</sub> , Q <sub>2</sub> , Q <sub>3</sub> , Q <sub>tot</sub>                                                                                                                                                                                                                                                                                                                        |
| Apparent power                                             | [KVA]       | S <sub>1</sub> , S <sub>2</sub> , S <sub>3</sub> , S <sub>tot</sub>                                                                                                                                                                                                                                                                                                                        |
| Power factor                                               |             | total                                                                                                                                                                                                                                                                                                                                                                                      |
| Peak factor                                                |             | L1, L2, L3, Ne                                                                                                                                                                                                                                                                                                                                                                             |
| Counters recorded from installation or from the last reset |             | Parameters                                                                                                                                                                                                                                                                                                                                                                                 |
| Active energy                                              | [kWh]       | Ep total, Ep positive, Ep negative                                                                                                                                                                                                                                                                                                                                                         |
| Reactive energy                                            | [kVARh]     | Eq total, Ep positive, Ep negative                                                                                                                                                                                                                                                                                                                                                         |
| Apparent energy                                            | [KVAh]      | Es total                                                                                                                                                                                                                                                                                                                                                                                   |
| Network Analyzer                                           |             | Parameters                                                                                                                                                                                                                                                                                                                                                                                 |
| Hourly average voltage value                               | [V]<br>[no] | - U <sub>min</sub> = 0.75...0.95 x U <sub>n</sub><br>- U <sub>max</sub> = 1.05...1.25 x U <sub>n</sub><br>- Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime)                                                                                                                                                                     |
| Short voltage interruptions                                | [no]        | - U <sub>min</sub> = 0.75...0.95 x U <sub>n</sub><br>- Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime)                                                                                                                                                                                                                          |
| Short voltage spikes                                       | [no]        | - U <sub>max</sub> = 1.05...1.25 x U <sub>n</sub><br>- Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime)                                                                                                                                                                                                                          |
| Slow-voltage sags and swells                               | [no]        | - U <sub>min1</sub> = 0.75...0.95 x U <sub>n</sub><br>- U <sub>min2</sub> = 0.75...0.95 x U <sub>n</sub><br>- U <sub>min3</sub> = 0.75...0.95 x U <sub>n</sub><br>- U <sub>max1</sub> = 1.05...1.25 x U <sub>n</sub><br>- U <sub>max2</sub> = 1.05...1.25 x U <sub>n</sub><br>- Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime) |
| Voltage unbalance                                          | [V]<br>[no] | - U neg. seq.= 0.02...0.10 x U <sub>n</sub><br>- Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime)                                                                                                                                                                                                                                |
| Harmonic analysis                                          |             | Current and Voltage<br>- up to 50°<br>- Alarm THD: 5...20%<br>- Single harmonic alarm:<br>3...10% plus a count of minutes the harmonic has been exceeded                                                                                                                                                                                                                                   |



| Precision (Class 1) | Ekip Touch (*) | Ekip Hi-Touch | Ekip G Touch (*) | Ekip G Hi-Touch |
|---------------------|----------------|---------------|------------------|-----------------|
| 0.5%                | ●              | ●             | ●                | ●               |
| 2%                  | ●              | ●             | ●                | ●               |
| 0.5%                | ○              | ●             | ●                | ●               |
| 0.5%                | ○              | ●             | ●                | ●               |
| 0.1%                | ○              | ●             | ●                | ●               |
| 1%                  | ○              | ●             | ●                | ●               |
| 2%                  | ○              | ●             | ●                | ●               |
| 1%                  | ○              | ●             | ●                | ●               |
| 2%                  | ○              | ●             | ●                | ●               |
|                     | ○              | ●             | ●                | ●               |
| Precision (Class 1) |                |               |                  |                 |
| 1%                  | ○              | ●             | ●                | ●               |
| 2%                  | ○              | ●             | ●                | ●               |
| 1%                  | ○              | ●             | ●                | ●               |
| Intervals           |                |               |                  |                 |
| t = 5...120min      | ○              | ●             | ○                | ●               |
| t <40ms             | ○              | ●             | ○                | ●               |
| t <40ms             | ○              | ●             | ○                | ●               |
| t = 0.02s...60s     | ○              | ●             | ○                | ●               |
| t = 5...120min      | ○              | ●             | ○                | ●               |
|                     | ○              | ●             | ○                | ●               |

(\*) Precision (Class 1) available with dedicated extracode  
 With no Class 1, please refer to the precision values below:

|                             |      |
|-----------------------------|------|
| Current (RMS)               | 1%   |
| Earth fault current (RMS)   | 2%   |
| Phase-phase voltage (RMS)   | 0.5% |
| Phase-neutral voltage (RMS) | 0.5% |

|                |      |
|----------------|------|
| Frequency      | 0.2% |
| Active power   | 2%   |
| Reactive power | 2%   |
| Apparent power | 2%   |

|                 |    |
|-----------------|----|
| Power factor    | 2% |
| Active energy   | 2% |
| Reactive energy | 2% |
| Apparent energy | 2% |

# Technical characteristics for protection trip units

## Measurement functions

| Record of values: of the parameter for each interval with time-stamping      |                | Parameters                                                                  |
|------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------|
| Current: minimum and maximum                                                 | [A]            | I Min, I Max                                                                |
| Phase-phase voltage: minimum and maximum                                     | [V]            | U Min, U max                                                                |
| Active power: average and maximum                                            | [kW]           | P Avg, P Max                                                                |
| Reactive power: average and maximum                                          | [kVAR]         | Q Avg, Q Max                                                                |
| Apparent power: average and maximum                                          | [KVA]          | S Avg, S Max                                                                |
| Data logger: record of high sampling rate parameters                         |                | Parameters                                                                  |
| Currents                                                                     | [A]            | L1, L2, L3, Ne, Ig                                                          |
| Voltages                                                                     | [V]            | U12, U23, U31                                                               |
| Sampling rate                                                                | [Hz]           | 1200-2400-4800-9600                                                         |
| Maximum recording duration                                                   | [s]            | 13.6                                                                        |
| Recording stop delay                                                         | [s]            | 0-10s                                                                       |
| Number of registers                                                          | [no]           | 2 independent                                                               |
| Information on trip and opening data: after a fault without auxiliary supply |                | Parameters                                                                  |
| Type of protection tripped                                                   |                | eg. L, S, I, G, UV, OV                                                      |
| Fault values per phase                                                       | [A/V/Hz W/var] | eg. I1, I2, I3, neutral for S protection<br>V12, V23, V32 for UV protection |
| Time-stamping                                                                |                | Date, time and progressive number                                           |
| Maintenance indicators                                                       |                | Parameters                                                                  |
| Information on last 30 trips                                                 |                | Type of protection, fault values and time-stamping                          |
| Information on last 200 events                                               |                | Type of event, time-stamping                                                |
| Number of mechanical operations <sup>(1)</sup>                               | [no]           | Can be associated to alarm                                                  |
| Total number of trips                                                        | [no]           |                                                                             |
| Total operating time                                                         | [h]            |                                                                             |
| Wear of contacts                                                             | [%]            | Prealarm >80%<br>Alarm = 100%                                               |
| Date of maintenance operations performed                                     |                | Last                                                                        |
| Indication of maintenance operation needed                                   |                |                                                                             |
| Circuit-breaker I.D.                                                         |                | Type of circuit breaker, assigned device name, serial number                |
| Self-diagnosis                                                               |                | Parameters                                                                  |
| Check of continuity of internal connections                                  |                | Alarm due to disconnection: rating plug, sensors, trip coil                 |
| Failure of circuit breaker to open (ANSI 50BF)                               |                | Alarm following non-tripping of protection functions                        |
| Temperature (OT)                                                             |                | Prealarm and alarm for abnormal temperature                                 |

(1) with auxiliary supply present

Note: In case of Black trip units, 0.4% In is the lowest current value detected by Emax 2

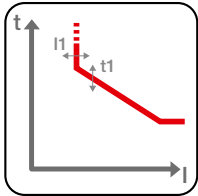


| Window                                                            | Intervals                                       | Ekip Touch | Ekip Hi-Touch | Ekip G Touch | Ekip G Hi-Touch |
|-------------------------------------------------------------------|-------------------------------------------------|------------|---------------|--------------|-----------------|
| Fixed synchronizable by remote                                    | Duration: 5...120min<br>Number of intervals: 24 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ○          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
| Note: Opening of circuit breaker can be set in the event of alarm |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |
|                                                                   |                                                 | ●          | ●             | ●            | ●               |

## Key:

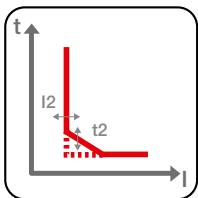
- not available
- available
- available with the dedicated software package

# Description of protection functions

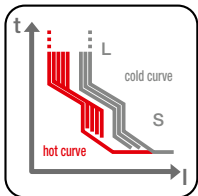


**Overload (L - ANSI 49):** available with three different types of trip curve:

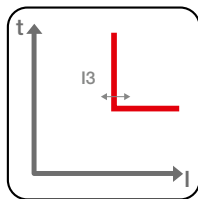
1.  $t = k/I^2$  with inverse long time;
  2. IDMT in accordance with 60255-151 for coordination with medium voltage protections, that are available according to the Standard Inverse (SI), Very Inverse (VI) and Extremely Inverse (EI) curves;
  3. with  $t = k/I^4$  curve for better coordination with upstream circuit-breakers or with fuses.
- The thresholds can be fine tuned (for example 1A for circuit-breaker E1.2 1000A) and the timings to the second can be set directly from the display. The settable pre-alarm indicates the set threshold is reached before the protection is tripped. The protection can be disabled by rating plug L=off.



**Time-delayed overcurrent (S - ANSI 51 & 50TD):** with constant tripping time ( $t = k$ ), or with constant specific let-through energy ( $t = k/I^2$ ), this provides 15 current thresholds and 8 curves, for fine adjustment. The function can be excluded by setting the dip switch combination to "OFF".

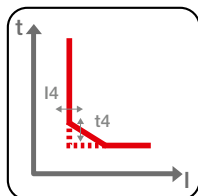


**Thermal memory:** for L and S protection functions, this is used to protect components, such as transformers, from overheating following an overload. The function, which can be enabled by the Ekip Connect software, adjusts the protection tripping time according to the length of time that has elapsed since the first overload, taking into account the amount of heat generated.

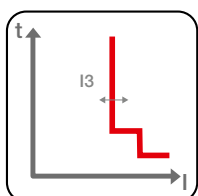


**Instantaneous overcurrent (I - ANSI 50):** with tripping curve without intentional delay, it offers 15 tripping thresholds and can be excluded by setting the dip switch combination to "OFF".

**Closing on short-circuit (MCR):** the protection uses the same algorithm of the protection I, limiting operation to a settable time window from the closing of the circuit-breaker. The protection can be disabled, also alternatively to protection I. The function is active with an auxiliary supply.

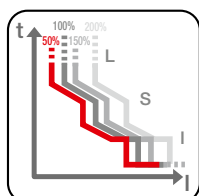


**Earth fault (G - ANSI 51N & 50NTD):** with tripping time independent of current ( $t = k$ ) or constant specific let-through energy ( $t = k/I^2$ ). The function can be excluded by setting the dip switch combination to "OFF".

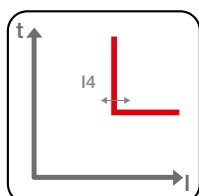


**Programmable instantaneous overcurrent (2I - ANSI 50):** Second instantaneous tripping curve designed to mitigate against arc flashes (also referred to as RELT - Reduced Energy Let-Through). This protection can be adjusted from 1.5 to 15 x  $I_n$ , with a maximum setting of 18kA. The clearing time of the 2I protection is between 25 and 42ms at 60Hz (+5ms for 50Hz). Note: Easy activation and I/O assignment, including positive feedback, can be implemented using the RELT Ekip Signalling 2K-3 module.

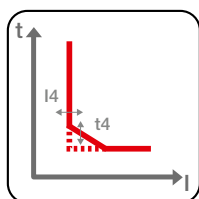




**Neutral protection:** available at 50%, 100% or 200% of the phase currents, or disabled, it is applied to the overcurrent protections L, S and I.

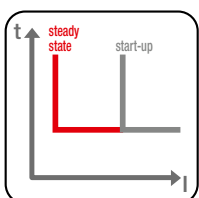


**Instantaneous Earth Fault (G-ANSI 50N):** with trip curve without instantaneous delay.



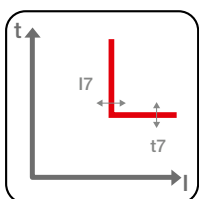
**Earth fault on toroid (G ext - ANSI 51G & 50GTD):** with trip time independent of the current ( $t = k$ ) or with constant specific let-through energy ( $t = k/I^2$ ). Pre-alarm that 90% threshold has been reached permits the fault to be reported to supervision systems without interruption of continuity. The protection uses the external toroid installed, for example, on the star centre of the transformer, and is an alternative to the G and Rc functions. The function is active with an auxiliary supply.

**Modified Differential Ground Fault (MDGF):** Available with the trip time independent of the current ( $t = k$ ) or constant specific let-through energy ( $t = k/I^2$ ). This protection function is designed for systems with solidly grounded multi-source ground fault schemes (refer to instruction manual 1SDH001330R005). The complete equipment level solution includes third-party phase current transformers, summing current transformers, and a dedicated terminal (please refer to 1SDA114800R1 or 1SDA114798R1).



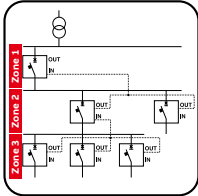
**Start-up function:** enables protections S, I and G to operate with higher trip thresholds during the starting phase, avoiding untimely trips due to high inrush currents of certain loads (motors, transformers, lamps). The starting phase lasts 100 ms to 30 s and is recognized automatically by the trip unit:

- at the closing of the circuit breaker with a self-supplied trip unit;
- when the peak value of the maximum current exceeds the set threshold ( $0.1...10 \times I_n$ ) with an externally supplied trip unit; a new start-up is possible after the current falls below the threshold.



**Current unbalance (IU - ANSI 46):** with constant trip time ( $t = k$ ), protects from an unbalance between the currents of the single phases protected by the circuit breaker.

# Description of protection functions



**Zone selectivity for S, I and G protections (ANSI 68):** can be used to minimize circuit-breaker trip times closer to the fault. The protection is provided by connecting all the zone selectivity outputs of the trip units belonging to the same zone and taking this signal to the trip unit input that is immediately upstream. Each circuit breaker that detects a fault reports it to the circuit breaker upstream; the circuit-breaker thus detects the fault but does not receive any communication from those downstream and opens without waiting for the set delay to elapse. It is possible to enable zone selectivity if the fixed-time curve has been selected and the auxiliary supply is present.

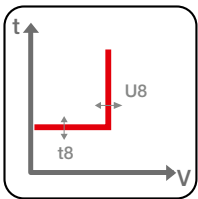
**Current thresholds:** this function enables four independent thresholds to be indicated in order to enable corrective action implementation before the overload L protection trips the circuit breaker. For example, by disconnecting loads located downstream of the circuit breaker that are controlled by Ekip Signalling.

## Advanced protection functions

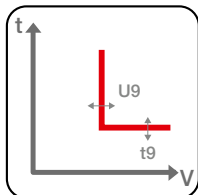
A different operating mode can be chosen for the following protection function:

1. Active: protection enabled by opening of the circuit-breaker when the threshold is reached;
2. Only alarm: protection active, with only alarm indication when the threshold is reached;
3. Deactivated: protection disabled.

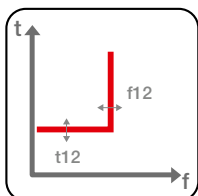
Furthermore, when the voltage and frequency protections are activated, they indicate an alarm status even when the circuit breaker is open so that a fault can be identified before the circuit breaker closes.



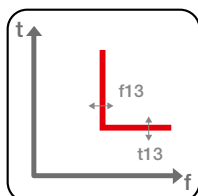
**Undervoltage (UV - ANSI 27):** with constant trip time ( $t = k$ ), function is tripped when phase voltage falls below set threshold.



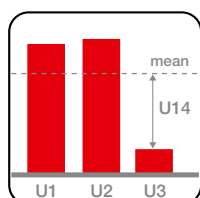
**Overvoltage (OV - ANSI 59):** with constant trip time ( $t = k$ ), function is tripped when phase voltage exceeds the set threshold.



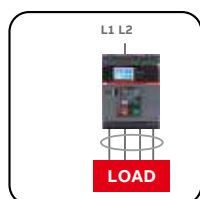
**Underfrequency (UF - ANSI 81L):** with constant trip time ( $t = k$ ), function is tripped when network frequency falls below set threshold.



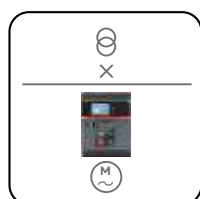
**Overfrequency (OF - ANSI 81H):** with constant trip time ( $t = k$ ), function is tripped when network frequency exceeds the set threshold.



**Voltage unbalance (VU - ANSI 47):** with constant trip time ( $t = k$ ), protects against an unbalance between the voltages of the individual phases that are protected by the circuit-breaker.



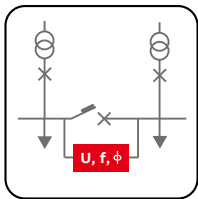
**Residual current (Rc - ANSI 64 & 50NDT):** with constant temperature ( $t=k$ ) protects against indirect contacts and is integrated into Ekip Touch LSIG with Measurement Enabler with voltage sockets by a dedicated residual current rating plug and external toroid. The protection is an alternative to the functions G and Gext.



**Reverse active power (RP - ANSI 32R):** with constant trip time ( $t = k$ ), function is tripped when total active power – in the opposite direction of the current - exceeds the set threshold.

# Description of protection functions

In addition to the protection functions, the following indication and control functions are available to warn the user that a given condition has been reached. The active indications are always shown on the display and are also available by communication on the system bus (with Ekip Com modules) or electrical indication (with Ekip Signalling modules).



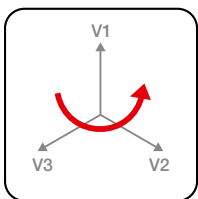
**Synchrocheck (SC - ANSI 25):** the synchronism control function compares the voltages in the modules as well as the frequencies and phases of two circuit breakers to which the circuit breaker is connected. Ekip Touch indicates that conditions have been reached that enable the two lines to be made parallel.

The function is available with two work modes:

- In systems with both busbars supplied, where synchronism is determined by:
  1. voltage of the two half-busbars above the  $U_{live}$  threshold for the set time
  2. difference of the module of the two voltages below the threshold  $\Delta U$
  3. difference in the frequency of the two voltages below the threshold  $\Delta f$
  4. difference in the phase of the two voltages below the threshold  $\Delta$
  5. desirable time for synchronism condition  $t_{syn}$
  6. circuit breaker open
- In systems with an out-of-service line (dead busbar), where the synchronism condition is determined by the concurrence of the following conditions for the  $t_{ref}$  set time:
  1. voltage of the active half-busbar above threshold  $U_{live}$
  2. voltage of the dead half-busbar below threshold  $U_{dead}$
  3. circuit breaker open

In both cases, synchronism consent is withdrawn when one of the above conditions is missing and it has not been less than 200ms from the change of the circuit-breaker condition (when the relationship has been set).

The indication of reached synchronism is available directly as an electrical indication via a contact that is always supplied with the module. The function can be activated simply by connecting the Ekip Synchrocheck module.

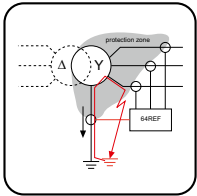


**Cyclical direction of the phases (ANSI 47):** indicates an alarm through inversion of the phases sequence.

**Power factor (ANSI 78):** available with a three-phase threshold, warns when the system operates with a power factor that is less than the set power factor.

The following protections are also available:

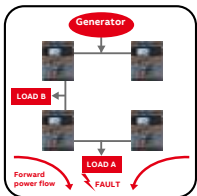
**Second time-delayed overcurrent protection (S2 – ANSI 50TD):** in addition to the standard protection S, a second (excludable) time-constant protection is available that enables two independent thresholds to be set in order to ensure precise selectivity, especially in highly critical conditions.



**Second protection against earth fault (ANSI 50GTD/51G & 64REF):** whereas with Ekip Touch the user has to choose between implementation of the protection G by internal current sensors (calculating the vector sum of the currents) or G ext external toroids (direct measurement of the earth fault current), Ekip Hi-Touch offers the exclusive feature of simultaneous management of both configurations by two independent earth fault protection curves. Owing to this characteristic, the trip unit is able to distinguish a non-restricted earth fault and then activate the opening of Emax 2, from a restricted earth fault, and to thus command the opening of the medium voltage circuit breaker.

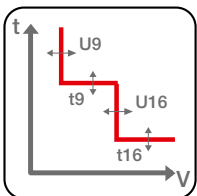
Another possible configuration is with the residual current protection replacing the Gext protection, whilst the G protection remains active. The residual current protection is activated in the presence of the residual current rating-plug and of the toroid.

**Directional overcurrent (D – ANSI 67):** the protection is able to recognize the direction of the current during the fault period and thus detect if the fault is upstream or downstream of the circuit-breaker. The protection, with fixed time trip curve ( $t=k$ ), intervenes with two different time delays ( $t_{7bw}$  and  $t_{7fw}$ ), according to the current direction. In ring distribution systems, this enables the distribution portion to be identified in which the fault occurred and to disconnect it while maintaining the operation of the rest of the installation.

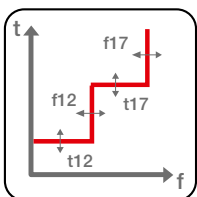


**Zone selectivity for protection D (ANSI 68):** enables the possibility to interconnect circuit breakers so that, in the event of a fault, the fault area can be rapidly isolated. Disconnection only occurs at the level close to the fault and operation to the rest of the operation continues uninterrupted. The function is particularly useful in ring and grid installations where, in addition to the zone, it is also essential to define the flow direction of the power that supplies the fault. It is possible to enable directional zone selectivity alternatively to the zone selectivity of the protections S and G, and in the presence of an auxiliary supply.

**Start-up function** for protection D: enables higher trip thresholds to be set at the outgoing point, as available for protections S, I and G.



**Second protection against undervoltage and overvoltage (UV2 and OV2 – ANSI 27 and 59):** enables two minimum and maximum voltage thresholds to be set with different delays in order to be able to discriminate, for example, between voltage dip transients due to the start-up of a motor and an actual fault.

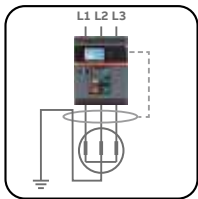


**Second protection against underfrequency and overfrequency (UF2 and OF2 – ANSI 81L and 87H):** enables two minimum and maximum frequency thresholds to be set simultaneously. For example, only an alarm can be set to be tripped when the first threshold is reached, and the circuit breaker can be set to be opened when the second threshold is reached.

# Description of protection functions

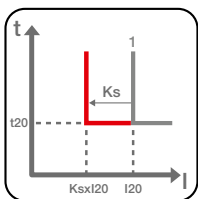
**Dual setting of protections:** Ekip Hi-Touch can store a set of alternative parameters for all protections. This second series (set B) can replace, if necessary, the default series (set A) by an external command. The command can be given when the network configuration is edited, for example when an emergency source is activated in the system, changing the load capacity and the short-circuit levels. Another typical application is protecting the operator opposite the switchgear against the electric arc. In this case, protection delays are minimized to safeguard the operator (Set A), whereas in the absence of an operator the protections are set to ensure selectivity with the circuit breakers downstream (Set B). It is possible to activate series B by:

- Digital input available with an Ekip Signalling module;
- Communication network, by means of one of the Ekip Com communication modules;
- Directly from the Ekip Hi-Touch display;
- By a settable internal time, after the circuit-breaker has closed.

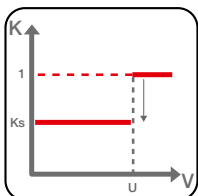


**Differential ground fault (Rc - ANSI 87N):** protects against internal earth fault on generator winding. It is required that the toroid hugs the active conductors and the ground conductor. Rc protection is integrated by a dedicated residual current rating plug and the external toroid.

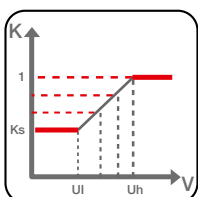
The specific functions for generator protections are described below. For each of these it is possible to choose the operating mode: active, only alarm or deactivated. All the voltage and frequency protections also operate when the circuit-breaker is open, enabling the fault to be identified before the closing of the circuit breaker.



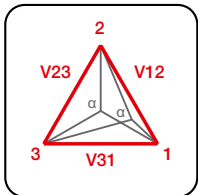
**Voltage controlled overcurrent protection (S(V) - ANSI 51V):** protection from maximum current with a constant trip time ( $t = k$ ) that is sensitive to the voltage value. The set current threshold, following a voltage drop, decreases by steps or linearly.



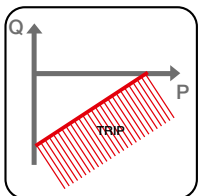
In step mode (controlled mode) the protection is tripped at the set threshold ( $I_{20}$ ) if the voltage is above  $U$ , whereas it is tripped at the lower threshold of the factor  $K_s$  ( $I_{20} * K_s$ ) if the voltage is below  $U$ .



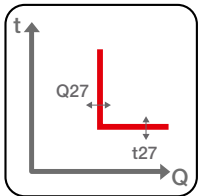
On the other hand, in linear mode (restrained mode) two voltage limits are selected within which the protection is tripped at the set threshold ( $I_{20}$ ) reduced by the factor  $K$  corresponding to the measured voltage. The variation of the factor  $K$  is proportional to the voltage, and for voltages greater than the upper threshold ( $U_h$ ) the threshold  $I_{20}$  works, whereas for voltages below the lower threshold ( $U_l$ ) the minimum threshold ( $I_{20} * K_s$ ) applies.



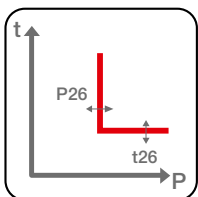
**Residual overvoltage (RV – ANSI 59N):** with constant trip time ( $t = k$ ), protects against insulation loss in systems with insulated neutral or with neutral earthed with impedance.



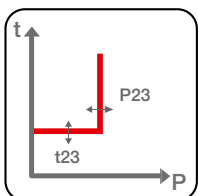
**Loss of field or reverse reactive power (RQ – ANSI 40 or 32RQ):** with constant trip time ( $t = k$ ), the circuit breaker tripped when the total reactive power absorbed by the generator exceeds the set threshold. It is possible to select the constant threshold ( $k=0$ ) or a function of the delivered active power of the generator ( $k \neq 0$ ).



**Reactive overpower (OQ – ANSI 32OF):** with constant trip time ( $t = k$ ), the function is tripped when reactive power exceeds the set threshold in the generator to network direction.



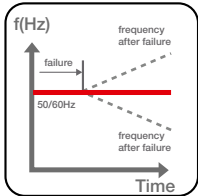
**Active overpower (OP – ANSI 32OF):** with constant trip time ( $t = k$ ), the function is tripped when the active power exceeds the threshold set in the delivering direction of the generator.



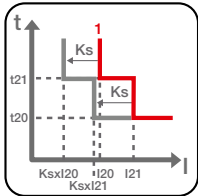
**Active underpower (UP – ANSI 32LF):** with constant trip time ( $t = k$ ), the function is tripped when the active power delivered by the generator is lower than the set threshold. It is possible to disable the protection temporarily, to manage the start-up phase, by setting a time window from the closing of the circuit breaker, by using an electrical signal or via incoming communication to a relay.



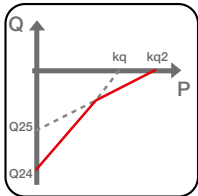
# Description of protection functions



**Rate of change of frequency (ROCOF – ANSI 81R):** enables both positive and negative frequency variations to be rapidly detected. The protection is constant and is tripped when the frequency variation in Hz/s is greater than the set threshold.



**Second protection against voltage controlled overcurrent protection (S2(V) - ANSI 51V):** available in addition to the protection S(V), enables total selectivity to be achieved in all installations.



**Second protection against loss of field or reverse reactive power (RQ – ANSI 40 or 32R):** enables the generator's de-energization curve to be followed very accurately, thereby avoiding any unnecessary disconnection.

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# Software functions

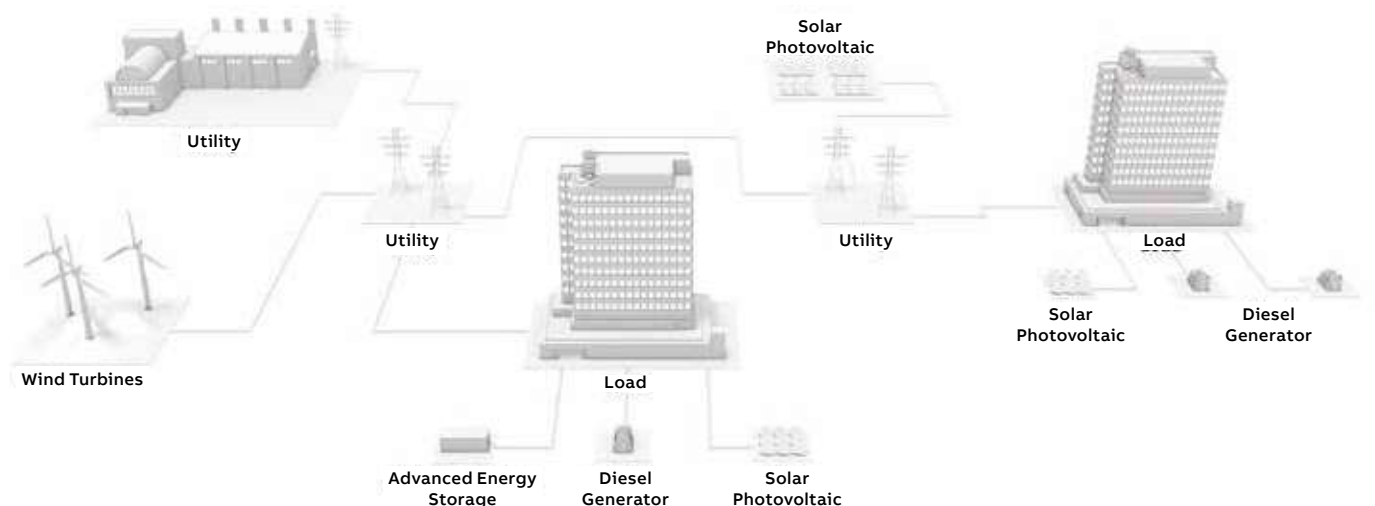
- 4/2**      **Introduction**
- 4/4**      **Adaptive Protections**
- 4/6**      **Load Shedding**
- 4/8**      **Automatic Transfer Switch**
- 4/10**     **Power Controller**

# Introduction

Renewables have been growing during the last 10 years reducing the polluting emission for a greenest world. Due to environmental changes, people has started to think about ecology and sustainability, increasing their awareness of energy self-consumption in a perspective of energy efficiency.

Emax 2 is the first smart circuit breaker enabling all-in-one solutions that combine advanced protection, programmable logic, full connectivity, easy integration and comprehensive energy management in a single revolutionary device or at the local generation side.

Emax 2 and its **Adaptive Protections** recognize the network change and automatically set new thresholds to guarantee protection and coordination in on-grid and off-grid conditions.



In order to maximize the service continuity, local generation starts to supply the islanded User's plant. Emax 2 is the first circuit breaker able to integrate in one device protection features and **Automatic Transfer Switching (ATS)** programmable logics. This unique integrated solution avoids the usage of other external control unit, guaranteeing switchgear footprint and commissioning time saving.

Strong reduction of wiring connection simplify the installation and commissioning phase.

The **Load Shedding** embedded algorithm is able to manage power system for the comprehensive microgrid energy management.

Before the transfer from the main grid to local line, selected loads are shed to support power balance. Emax 2 using slope of frequency disconnects loads only in case of emergency unbalance condition.

in grid-connected operation, Emax 2 manages the **Power Controller** algorithm to shave peaks and shift loads in order to optimize system performance and productivity.

Emax 2 advanced features are easily customized thanks to commissioning software tools which do not require high level engineering competencies. Ready to use templates enable the download of all the logics directly into the trip unit. The solutions become plug & play, increasing modularization and standardization for design and installation.

Here following the description of the several Advanced functionalities wich have been developed and integrated in Emax 2 follows the below compatibility table.

|                           | Adaptive Load Shedding | Automatic Transfer Switch | Power Controller |
|---------------------------|------------------------|---------------------------|------------------|
| Adaptive Load Shedding    | ●                      |                           | ●                |
| Automatic Transfer Switch |                        | ●                         | ●                |
| Power Controller          | ●                      | ●                         | ●                |

# Adaptive Protections

Emax 2 adds dual setting capability to switching device to ensure continuous coordination

## Purpose

User's plants can work as a LV Microgrid thanks to the energy produced by renewable and local power sources, in particular as a consequence of lacking of the Utility power supply, e.g. due to a fault on the MV voltage side. In order to still guarantee a high level of selectivity and continuity of service, it is important to take into account the variation of the short circuit power when moving from. Indeed, during grid connected condition the fault current on a microgrid feeder is supplied by the Utility, so it is higher than the one supplied only by the local generation during islanded condition.

As a result, it is desirable that the several protection thresholds of the units can be automatically changed during the transition to the islanding condition.

## Application example

We have a plant connected to the MV Utility by means of a MV/LV transformer. If the Utility shuts down, the plant will become a Microgrid supplied by the local generator G, which will feed the priority loads by using the loads shedding feature of Emax 2.

In grid-connected condition, the generator G is disconnected. With reference to fig.1:

- Circuit breaker A is closed
- Circuit breaker B is open
- Circuit breakers C are closed. The protections of the one that supplies loads D are upgraded using "Set A" of Emax 2 unit.
- Circuit breakers D are closed
- Circuit breaker E is closed
- Circuit breaker QS1 is closed
- All loads supplied.

The circuit breakers C are selectively coordinated with the upstream main circuit breaker A, supplied by the Utility, and the downstream load circuit breakers D (fig. 2).

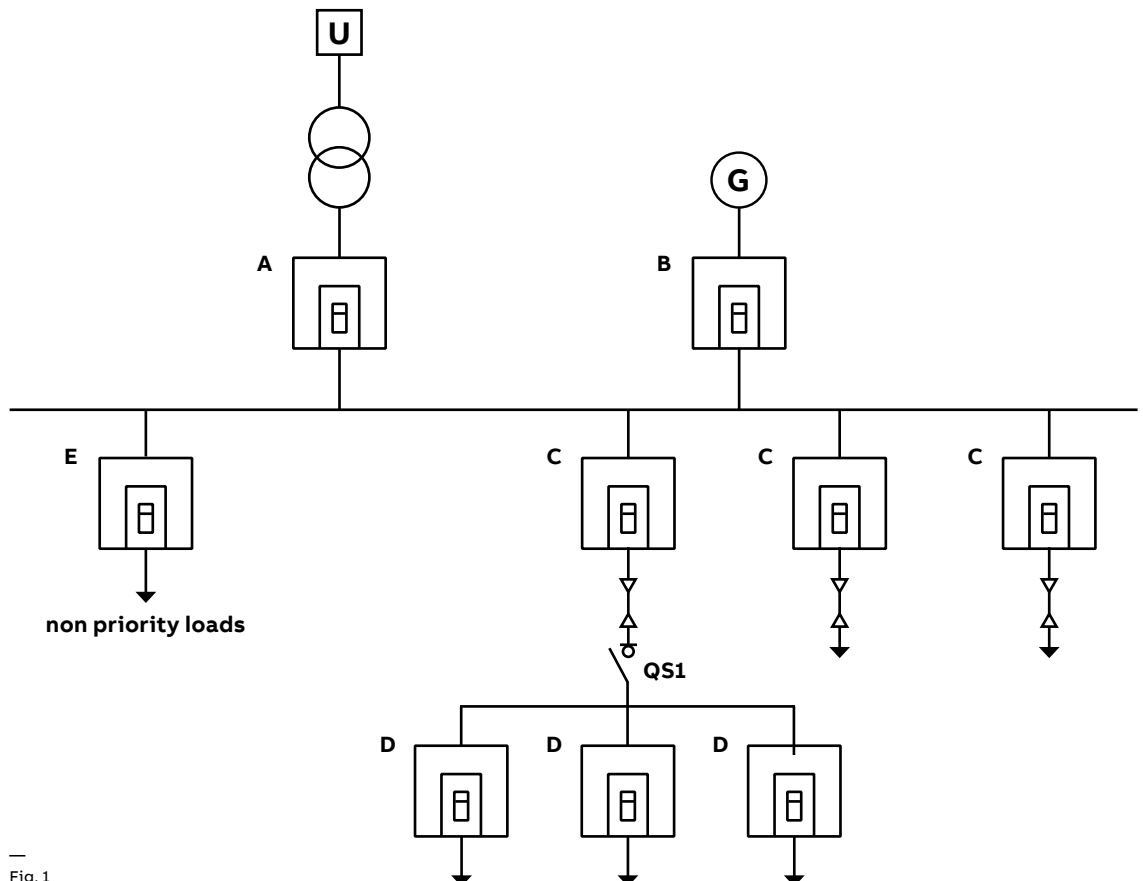


Fig. 1

With Adaptive protections when there is a Utility outage, circuit breaker A opens and B closes in order to have operation in islanded condition. In order to still guarantee selectivity, an alternate set of protection settings is required. Adding Emax 2 adaptive protections to circuit breaker C ensure this behaviour. The second protection setting is optimized for the characteristics of the local generator ensuring the incoming supply and load side switching devices will remain selectively coordinated.

With reference to Figure 1:

- Circuit breaker A is open
- Circuit breaker B is closed
- Circuit breakers C are closed and the protection thresholds move automatically to “Set B”
- Circuit breakers D are closed
- Circuit breaker E is open
- Circuit breaker QS1 is closed
- No priority loads can be disconnected using another functionality of Emax 2 units (see next paragraph).

The following Figure shows how it is possible to switch to a set of parameters which guarantees selective coordination between circuit breakers C and B by means of the “Adaptive protections” function embedded in the trip unit of the circuit-breaker C.

### Benefits

Thanks to Emax 2 it is possible to have two sets of settings implemented in a single device. As a result, the following benefits are guaranteed:

- Overcurrent protection and selectivity 100% guaranteed both in grid-connected and islanded condition
- The service continuity is granted just adding a single unit in the switchboard in every plant condition
- Ease of use, thanks to the Ekip Connect software which allows an immediate and intuitive commissioning phase.

For further information, please refer to the White Paper “Emax 2, all-in-one innovation – Adaptive protections” (1SDC007116G0201).

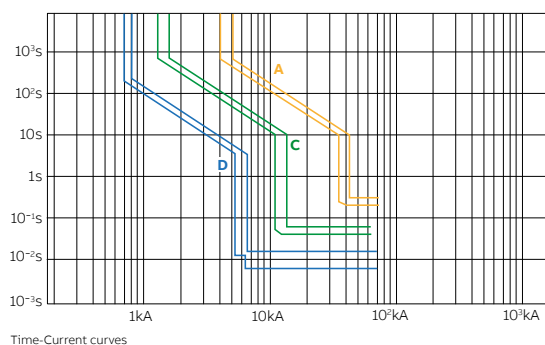


Fig. 2

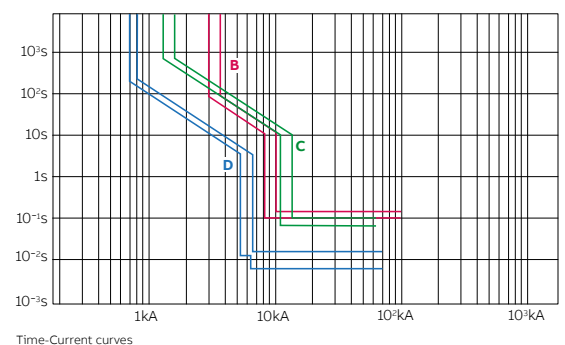


Fig. 3

# Load Shedding

Emax 2 has built-in load shedding algorithms to avoid power unbalance in the low voltage plant and stress for all the components.

## Purpose

ABB Emax 2 embeds patented functions based on load shedding which reduces the Microgrid stress in all situations. Typically it is the main protection relay of the low voltage Microgrid located at the interface point with the medium voltage grid, able to control the plant in every circumstances.

## Microgrid in islanding operation

After the Emax 2 circuit breaker opens, because of interface protection systems intervention or external command, the Microgrid should transit from on-grid to off-grid state with bumpless transition. When it is standalone, the power absorption from the main grid ceases, so that the Microgrid loads remains supplied by the local generation, like diesel GenSet or energy storage systems. This Microgrid generation can be always active or started up by an automatic transfer switching (ATS) logic after the disconnection from the main grid, depending on the plant configuration. During the islanding transition, it is very important to avoid the frequency drop, otherwise the generation protections could trip jeopardizing the Microgrid stability with consequently a long downtime. Emax 2, employing the current and voltage measurements, integrates two different fast load shedding logics to reduce this blackout risk, protecting the Microgrid during the intentional or unintentional islanding operation:

- Basic Load Shedding, simple logic able to recognize the Microgrid disconnection event and shed a group of not priority loads thus ensuring a fast time response and power balance.
- Adaptive Load Shedding, the advanced algorithm available with Emax 2 as an enhancement of the basic version. The intelligent software embedded in the unit sheds very quickly the not priority loads according to the Microgrid power consumption and frequency measurements. Moreover, such software has a dedicated configuration for backup generation related to ATS and the software itself is even able to estimate the energy produced by a solar plant based on plant geography settings.

All the versions are available on Emax 2 platform for both the Microgrid situations, sharing some information about the loads under control in the plant.

## Application examples

- **Grid-connected plants with running GenSets**, which contribute to the self-consumption together with potential renewable sources and support the load power supply in emergency conditions. It is the case of hybrid PV-diesel remote communities connected to weak distribution-grids where there are a lot of daily faults, or of facilities located in geographical areas where there are frequent environmental events, for example hurricanes or earthquakes.
- **Grid-connected plants with back-up GenSets** started up after main - gen transfer switching logics that require high reliability. For example, hospitals, banks or data centers.

## Benefits

Thanks to Emax 2 with embedded Load Shedding innovation, the following benefits are guaranteed:

### Service continuity

- When a plant remain disconnected from the main grid, even if local production is present, there is a significant stress that turns off all the generators with consequent blackout. Load Shedding logics embedded in Emax 2 reduce the frequency drop that usually makes the local generation protection trip, maintaining the plant live.



### Space saving

- No other Programmable Logic Controllers (PLC) are needed as Emax 2 has embedded the intelligence to realize the load shedding logics, taking advantage of the current and voltage sensors for electrical parameter measurements.
- In addition, static converters for low voltage photovoltaic production have typically anti-islanding protections: this implies another power deficit to be added to the main grid contribution during the Microgrid islanding. Emax 2 is the first circuit breaker that estimates solar production without additional sensors.
- Load Shedding is suitable with ATS architectures like Main-BusTie-Gen used to distinguish priority/not priority loads.

Where feasible, BusTie switching device is not required anymore and this means:

- Significant space and material saving up to 50% in the power distribution switchgear for panel builders.
- Load Shedding is self-tuned with the specific power unbalance identification and dynamically choses the controllable loads to be shed, reducing constraints for consultants during plant design.

- ATS unit manages only two sources, without interlock, logic programming and wiring connections for the third circuitbreaker with less time required for installation.

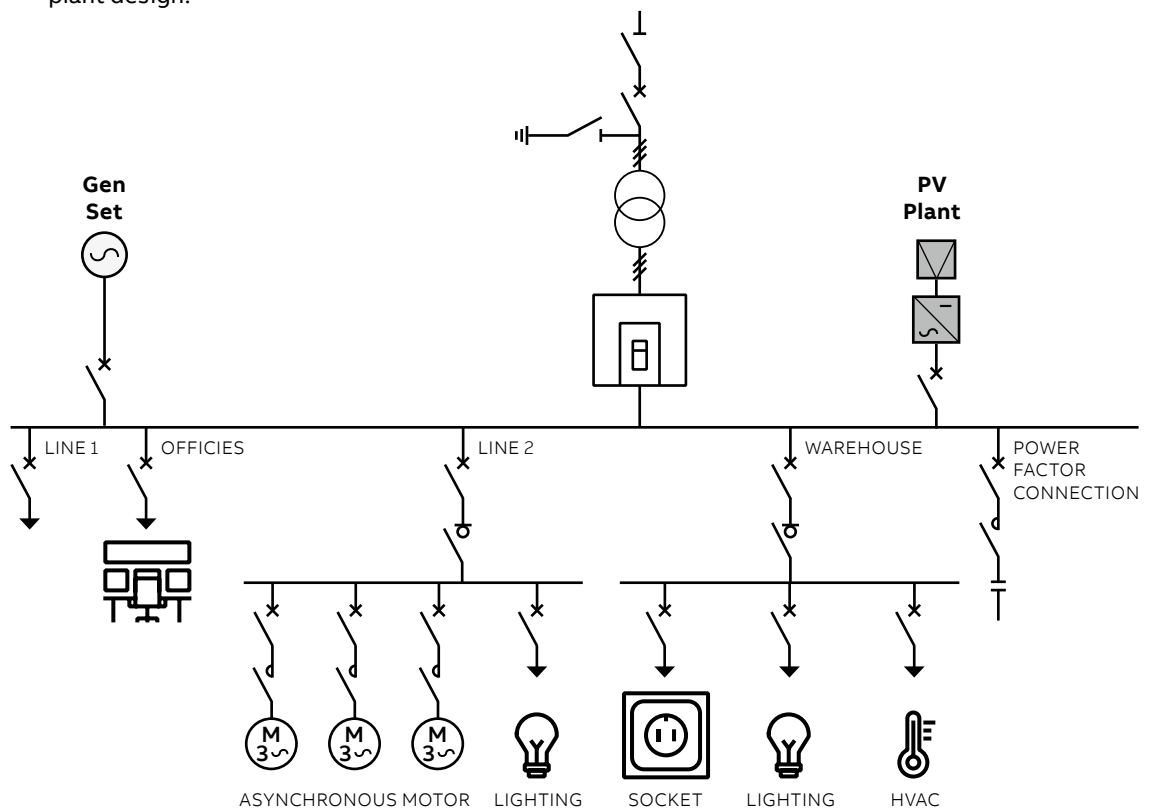
### Ease of use

- Load shedding logics are generally set with high engineering skills and customization effort with devices as programmable logic controllers.
- Emax 2 guarantees easy installation thanks to predefined templates and the user-friendly graphic interface in the SW commissioning tool.

For further information, please refer to the White Paper “Emax 2, all-in-one innovation – Load Shedding” (1SDC007119G0201).



Typical load shedding application



# Automatic Transfer Switch

Emax 2 is ready for transfer switching applications reducing time for logics programming and commissioning.

## The ATS solution

ABB's Automatic Switching (ATS) system takes advantage of the new capabilities provided by the new Ekip Connect 3 Software and the intelligent digital unit such as Emax 2 to deliver versatile and reliable solution.

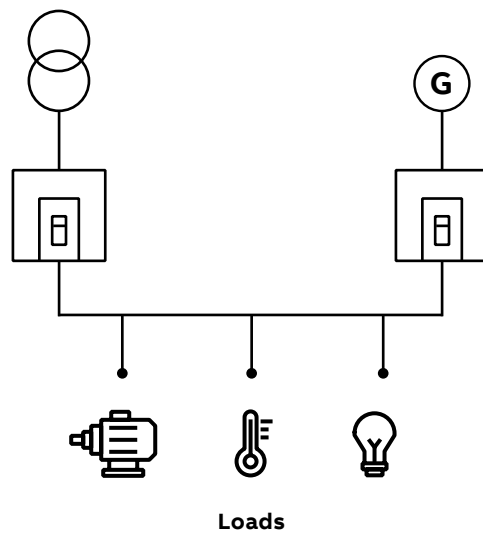
## Application example

Automatic Transfer Switch systems is common in all application where service continuity is essential and where there are multi source supplies.

The main applications are:

- Power supplies of UPS groups in general
- Oil & Gas
- Operating theatres and primary hospital services
- Emergency power supplies for civil building, hotels and airports
- Data banks and telecommunication systems
- Power supply of industrial line for continuous processes.

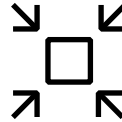
Another case of use of ATS is in all cases where a portion of grid with local generation, called microgrid, can be disconnected from main grid.



The ATS is a high-performances energy automation system, easy to install and program.

**Benefits****Ready-to-go Programming**

Estimated time and cost savings on the ATS Engineering on the low voltage project 95%.

**Emax 2 compactness**

Space saving on the power switchboard: up to 30%.

**Simplify the connections**

Estimated time and cost savings on cabling and commissioning of the power switchboard: 50%.

**Top rate reliability**

With watchdog functions and fewer installed components.



For more info check out the white paper "Emax 2, all in one innovation: Embedded ATS system" ([1SDC007115G0202](#)).

# Power Controller

Emax 2 is able to control loads and generator to ensure bill savings and enable demand response applications according to power management strategies.

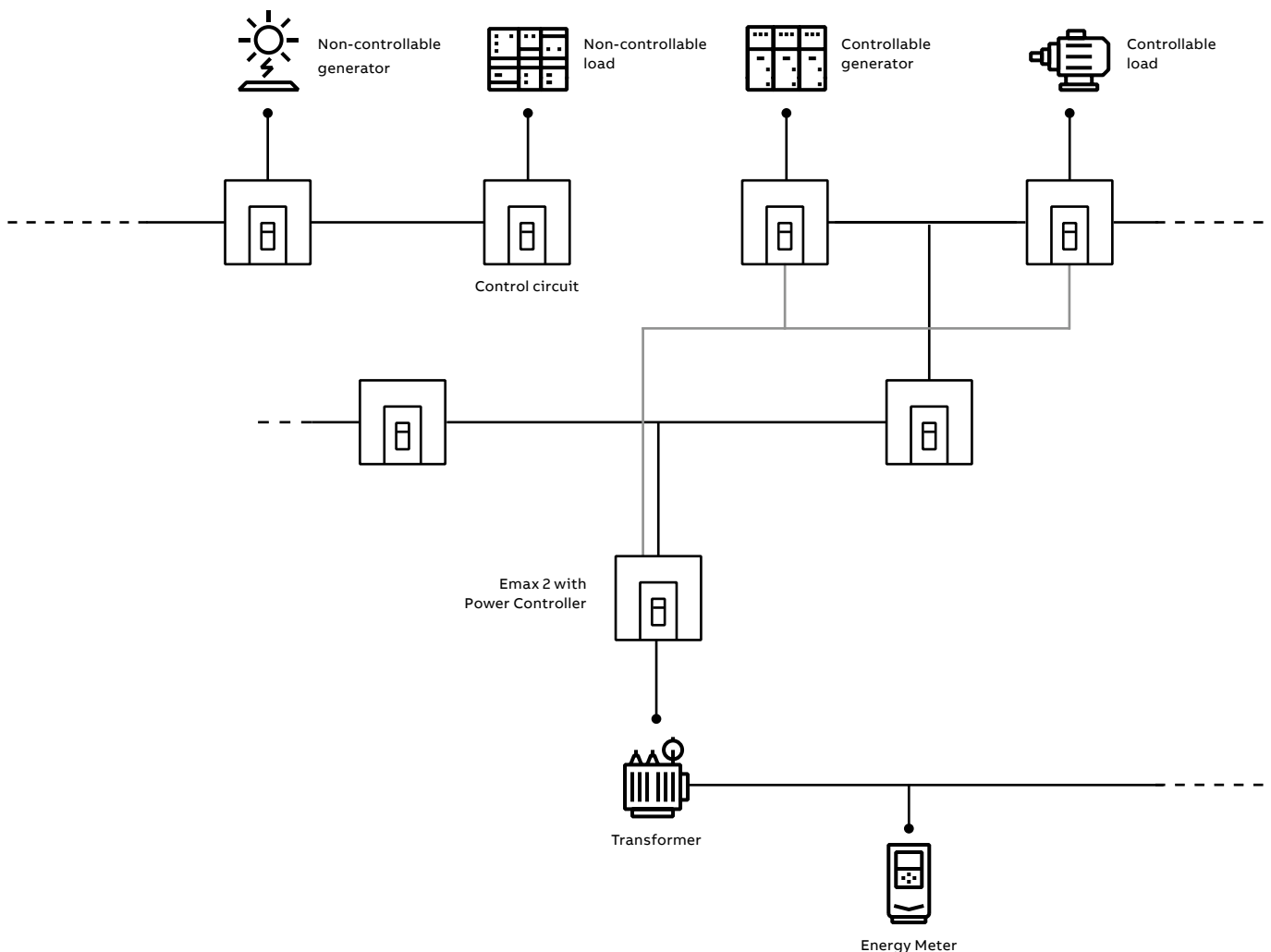
## Purpose

Thanks to Power Controller software, Emax 2 manages the power to shave the peaks and shift the loads. In this way, it is possible to cut electricity bills, increase energy efficiency up to 20% and be ready for demand response programs. Power Controller function is based on a patented calculation algorithm that allows a load list to be controlled through the remote command of relevant switching device (like switching device, switching device, contactor, drive) or control circuit according to a priority defined locally by the user or remotely by a load aggregator or utility, based on his own requirements and types of load.

The algorithm is designed on a foreseen average power absorption which can be set by the user over a determined time interval. Whenever this value exceeds the fixed power, Power Controller function intervenes to bring it back within the limits.

This system can be realized with a single Emax 2 Control or Emax 2 Control+ standard equipped with this function and installed as the low voltage plant controller.

Furthermore, the control unit, shall not only command the passive loads, but it can also manage a reserve generator.



Ekip Power Controller, which can be used with all Ekip Touch trip units of the Emax 2 series, effectively helps to improve energy efficiency by managing the entire low-voltage electrical system. It is, in fact, able to adapt the demand for power according to the availability of the energy source, the time of day and the costs indicated in the current pricing plan.

In this way Ekip Power Controller is able to maintain power consumption within the limits defined, thereby optimizing the costs of managing the installation and reducing emissions.

The command sent to the downstream devices can be performed in two different ways:

- through the wired solution, by commanding the shunt opening/closing releases or acting on the motor operators of the loads to be managed;
- through a dedicated communication system.

The ability to control the loads according to a list of priorities already defined provides significant advantages from both economic as well as technical points of view:

- **economical:** energy consumption optimization is focused on the control of the costs linked in particular to the penalties that are levied when the contractual power is exceeded or when the contractual power is increased by the Distribution System Operator (DSO) as a consequence of exceeding the limit repeatedly.
- **technical:** the possibility of power absorption over the contractual limits for shorter periods and, as well as, the management and the control of the power consumption over long periods of time. Thus it is possible to reduce the likelihood of malfunctioning due to overloads, or worse, complete inefficiency of the entire plant due to tripping of the LV main switching device.

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The exclusive Power Controller function available on the new Emax 2 units monitors the power, keeping it below the limit set by the user. As a result of this more effective use, the peak of power consumed can be limited allowing savings on electricity bills.

The Power Controller, patented by ABB, disconnects non-priority utilities, such as electric car charging stations, lighting or refrigeration units, during the times when consumption limits need to be respected, and connects them again as soon as it is appropriate. When required, it automatically activates auxiliary power supplies such as generator sets. No other supervision and control system is required: it is sufficient to set the required load limit on Emax 2, which can control any switching device located downstream, even if it is not equipped with a measurement function.

#### **Application examples**

Electricity bill savings, demand response, avoiding power overload are the typical scenarios where Power Controller is adopted.

As it operates on not critical loads, it is common of office building, shopping malls, hotels, campuses, waste and water industries or every plant that works like a low voltage microgrid.

# Power Controller

## Benefits

Thanks to Emax 2 with embedded Power Controller, the following benefits are guaranteed:

- **Reduction of energy costs with minimum impact.**

The loads are disconnected from the power supply for short periods, in the minimum number necessary and in a fixed order of priority, enabling power consumption peaks to be limited. This allows the contract drawn up with the energy provider to be renegotiated, reducing the power allocated, with a consequent reduction in total energy costs.

- **Power limited only when necessary.**

Power Controller function manages up to four different time bands, it is therefore possible to respect a particular power limit according to whether it is during the day (peak) or night (off peak). In this way, consumption during the day when rates are at their highest can be limited.

- **Easy of use**

Power Controller function allows the installation to be managed efficiently with a simple architecture. Thanks to a patented design, it is sufficient to measure the total power of the installation without having to measure the power consumed by each load. Installation costs and times are thereby reduced to a minimum.

Power Controller function does not require the writing, implementation and testing of complicated programmes for PLC or computer because the logic has already been implemented in the protection unit and is ready to use; it is sufficient to set the installation parameters from a smartphone or directly from the switching device display.

Power Controller significantly helps to flatten the load curve, limiting the use of peaking power plants in favour of base load power plants with greater efficiency.

- Thanks to integrated communication modules, Power Controller can receive the maximum absorbable power directly from the medium voltage control system, determining consumption for the next 15 minutes. Ekip Power Controller, according to the information received, manages the switching off of non-priority loads or the switching on of reserve generators. The software gives maximum priority to non-programmable preferred energy sources, such as wind and solar, and they are therefore considered uninterruptable. In the event the production of internal power to the controlled network is reduced, due, for example, to decreased production of solar power, Power Controller will disconnect the necessary loads to respect the consumption limit set.
- This benefit is used, for example, in installations with a system of cogeneration. Indeed Power Controller controls the total consumption drawn from the electrical network, interrupting non-indispensable loads when production is reduced and reconnecting them when generator power is sufficient to not exceed limits. There are multiple advantages: reduction in energy costs, maximum use of local production and greater overall energy efficiency.

For further information, please refer to the White Paper "Load management with Ekip Power Controller for SACE Emax 2" (1SDC007410G0202).

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# Supervision and connectivity

## **5/2 Introduction**

## **5/4 Supervision and control**

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## **5/8 Software and web applications**

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# Introduction

SACE Emax 2 circuit breakers provide a complete and flexible offering that can be adapted to the actual level of supervision and control required.

According to their complexity, the supervision of low-voltage systems may involve different levels:

- **switchgear compartment:** for control of the main electrical values of the circuit breaker, thanks to Ekip Touch trip units with high resolution display and the Ekip Multimeter display.
- **electrical switchgear:** to display the data of all circuit breakers installed in the switchgear from a single point: in local mode via control panel on the front of the switchgear, or remotely via several communication protocol.
- **electrical system:** the integration of low-voltage devices in communication networks is required in particular for: automated industrial processes, industrial and petrochemical sites, modern data centres and intelligent electricity networks, better known as smart grids. The system can be supervised via Internet with the ABB Ability™ Energy and Asset Manager webapp.







# Supervision and control

## Switchgear compartment

For the list of information available for each trip unit, consult chapter 3.

The SACE Emax 2 circuit breakers equipped with Ekip electronic trip units enable electrical measurements and diagnostic data to be displayed on the front of the switchgear.

### **Solution with Ekip Touch trip units**

The Ekip Touch electronic trip units are the ideal solution for supervision and control of the compartments in switchgear. In particular:

- their use is simple and intuitive thanks to a large, high resolution, colour touch screen;
- they do not require an auxiliary power supply for safety; the Ekip Touch trip units are directly supplied by the current sensors integrated in the circuit breaker, thereby avoiding the use of external power supplies.

The Ekip Multimeter is a display unit to be installed on the front of the switchgear for SACE Emax 2 air circuit breakers equipped with Ekip electronic trip units.

### **Solution with Ekip Multimeter Display on the front of the switchgear**

This device remotely displays the information about the system that is available in the trip unit to which it is connected.

The main characteristics of the Ekip Multimeter unit are:

- **Graphical and functional uniformity with the Ekip Touch trip units;** Ekip Multimeter uses the same display as the trip unit to which it is connected, ensuring perfect continuity between the graphic display and the menu items.
- **Reduced dimensions;** the Ekip Multimeter guarantees the precision of the trip unit to which it is connected and performs the function of a measuring instrument without requiring the installation of external current and voltage transformers.
- **Flexible installation;** the Ekip Multimeter can be installed at a distance from the trip unit, enabling access to information from the most convenient point.
- **Simultaneous reading of the various electrical values;** the advanced connection system used allows several Ekip Multimeter devices to be connected to the same protection trip unit.

Furthermore, if connected to trip units equipped with display, the Ekip Multimeter enables adjustment of the parameters and protection thresholds.



01 Ekip Touch



02 Ekip Multimeter



03 Lite Panel

| Electronic trip unit                                | Ekip Dip                          | Ekip Touch | Ekip G Touch | Ekip Hi Touch<br>Ekip Hi-G Touch |
|-----------------------------------------------------|-----------------------------------|------------|--------------|----------------------------------|
| <b>Solution</b>                                     | Ekip trip units + Ekip Multimeter |            |              |                                  |
| Type of trip units connectable to Ekip Multimeter   | Ekip trip units                   |            |              |                                  |
| Number of trip units connectable to Ekip Multimeter | 1                                 |            |              |                                  |
| <b>Measurement functions</b>                        |                                   |            |              |                                  |
| Currents                                            | ●                                 | ●          | ●            | ●                                |
| Voltages                                            | -                                 | ○          | ●            | ●                                |
| Powers                                              | -                                 | ○          | ●            | ●                                |
| Energies                                            | -                                 | ○          | ●            | ●                                |
| Harmonics                                           | -                                 | ○          | ○            | ●                                |
| Network analyzer                                    | -                                 | ○          | ○            | ●                                |
| <b>Adjustment functions</b>                         |                                   |            |              |                                  |
| Setting of thresholds                               | -                                 | ●          | ●            | ●                                |
| Setting of thresholds second set                    | -                                 | ○          | ○            | ●                                |
| Resetting of alarms                                 | ●                                 | ●          | ●            | ●                                |
| <b>Diagnostics</b>                                  |                                   |            |              |                                  |
| Protection function alarms                          | ●                                 | ●          | ●            | ●                                |
| Device alarms                                       | ●                                 | ●          | ●            | ●                                |
| Protection unit tripping details                    | ●                                 | ●          | ●            | ●                                |
| Events log                                          | ●                                 | ●          | ●            | ●                                |
| Protection unit tripping log                        | ●                                 | ●          | ●            | ●                                |
| <b>Maintenance</b>                                  |                                   |            |              |                                  |
| Number of operations                                | ●                                 | ●          | ●            | ●                                |
| Number of trips                                     | ●                                 | ●          | ●            | ●                                |
| Wear of contacts                                    | ●                                 | ●          | ●            | ●                                |
| <b>Other data</b>                                   |                                   |            |              |                                  |
| Status of circuit breaker                           | ●                                 | ●          | ●            | ●                                |
| Circuit-breaker position <sup>1)</sup>              | ●                                 | ●          | ●            | ●                                |
| Local/remote mode                                   | ●                                 | ●          | ●            | ●                                |

1) Circuit-breakers equipped with auxiliary contacts to indicate position

- not available

● available

○ available with the dedicated software package



# Supervision and control

## Electrical system

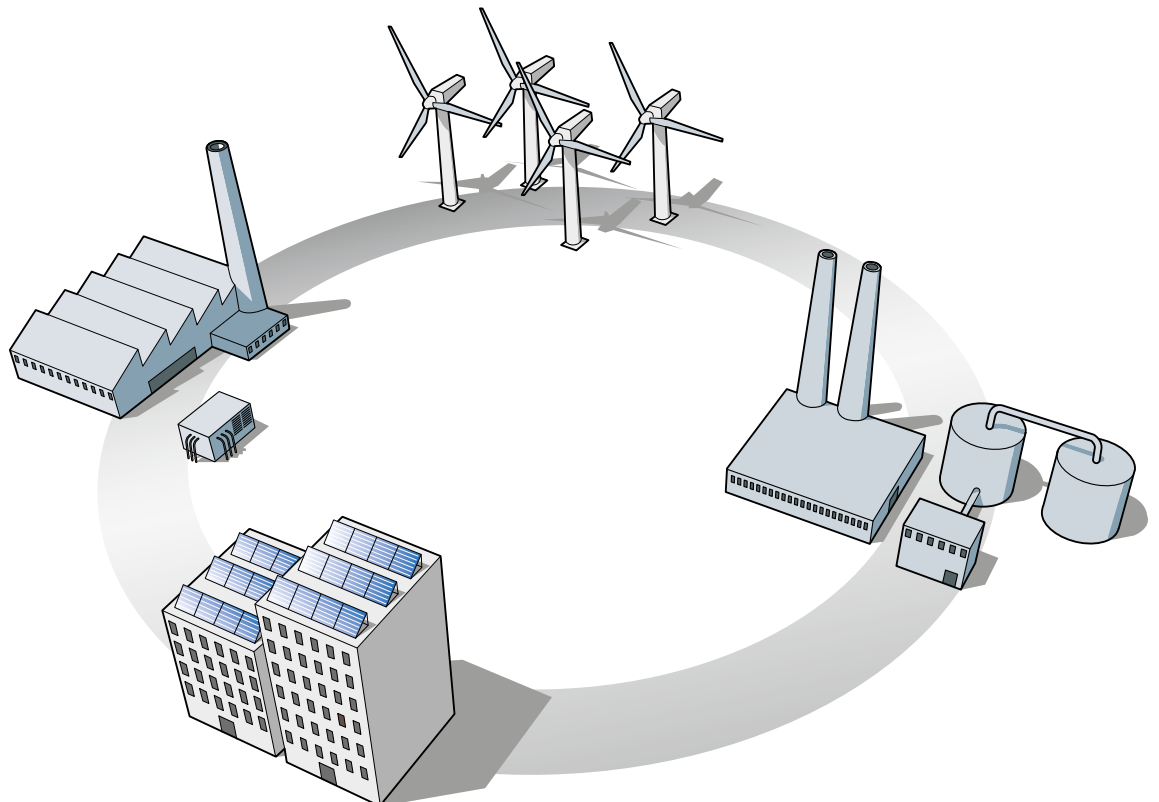
The integration of low-voltage devices in communication networks is required in particular for: automated industrial processes, industrial and petrochemical sites, modern data centres and intelligent electricity networks, better known as smart grids.

### Ekip Com Modules

Thanks to the wide range of communication protocols supported, SACE Emax 2 circuit breakers equipped with Ekip Touch electronic trip units can be integrated into communication networks without the need for external interface devices. The distinctive characteristics of the SACE Emax 2 circuit breakers offering for industrial communication are:

- **Wide range of protocols supported;** the Ekip Com communication modules enable integration with the most common communication protocols based on RS485 serial lines and the most modern communication systems based on EtherNet™ infrastructures, which guarantee an exchange of data in the order of 100 Mbit/s.

- **Installation times reduced to a minimum** due to the plug & play technology of the communication modules, which are connected directly to the circuit breaker terminal box without having to remove the electronic trip unit.
- **Repetition of communication for greater reliability of the system;** the circuit breaker can be equipped with two communication modules at the same time, allowing the information on two buses to be exchanged simultaneously.
- **Ready to smart grid;** the Ekip Com 61850 module is the solution for integrating SACE Emax 2 circuit breakers into the automated systems of electrical substations based on the IEC 61850 standard without the need for complex external devices.



| Electronic trip unit                               | Ekip Touch                               | Ekip G Touch | Ekip Hi Touch<br>Ekip Hi-G Touch |
|----------------------------------------------------|------------------------------------------|--------------|----------------------------------|
| Solution                                           | Ekip Touch trip units + Ekip com modules |              |                                  |
| Protocols supported:                               |                                          |              |                                  |
| Modbus RTU                                         | Ekip com Modbus RTU                      |              |                                  |
| Profibus-DP                                        | Ekip com Profibus                        |              |                                  |
| DeviceNet™                                         | Ekip com DeviceNet™                      |              |                                  |
| Modbus TCP/IP                                      | Ekip com Modbus TCP                      |              |                                  |
| Profinet                                           | Ekip com Profinet                        |              |                                  |
| EtherNet/IP™                                       | Ekip com EtherNet™                       |              |                                  |
| IEC61850                                           | Ekip com IEC61850                        |              |                                  |
| Hub                                                | Ekip com Hub                             |              |                                  |
| Control functions                                  |                                          |              |                                  |
| Circuit-breakers opening and closing <sup>1)</sup> | ●                                        | ●            | ●                                |
| Measurement functions                              |                                          |              |                                  |
| Currents                                           | ●                                        | ●            | ●                                |
| Voltages                                           | ○                                        | ●            | ●                                |
| Powers                                             | ○                                        | ●            | ●                                |
| Energies                                           | ○                                        | ●            | ●                                |
| Harmonics                                          | ○                                        | ○            | ●                                |
| Network analyzer                                   | ○                                        | ○            | ●                                |
| Data logger                                        | ○                                        | ●            | ●                                |
| Adjustment functions                               |                                          |              |                                  |
| Setting of thresholds                              | ●                                        | ●            | ●                                |
| Resetting of alarms                                | ●                                        | ●            | ●                                |
| Diagnostic                                         |                                          |              |                                  |
| Protection function alarms                         | ●                                        | ●            | ●                                |
| Device alarms                                      | ●                                        | ●            | ●                                |
| Protection unit tripping details                   | ●                                        | ●            | ●                                |
| Events log                                         | ●                                        | ●            | ●                                |
| Protection unit tripping log                       | ●                                        | ●            | ●                                |
| Maintenance                                        |                                          |              |                                  |
| Number of operations                               | ●                                        | ●            | ●                                |
| Number of trips                                    | ●                                        | ●            | ●                                |
| Wear of contacts                                   | ●                                        | ●            | ●                                |
| Other data                                         |                                          |              |                                  |
| Status of circuit breaker                          | ●                                        | ●            | ●                                |
| Circuit-breaker position <sup>2)</sup>             | ●                                        | ●            | ●                                |
| Local/remote mode                                  | ●                                        | ●            | ●                                |

1) Circuit-breakers equipped with Ekip Com Actuator module, electrical accessories, opening and closing releases and spring charging motor

2) Circuit-breakers equipped with auxiliary contacts to indicate position

- not available, ● available, ○ available with the dedicated software package

### ABB Ability™ Edge Industrial gateway

This is a DIN-rail mounted communication module for cloud-connectivity. ABB Ability™ Edge Industrial gateway can collect data throughout the system from ACBs to MCCBs, multimeter, minia-

ture CBs. Moreover, it is possible to connect sensors for environmental parameters (temperature, water, gas) via both analog and digital I/O. Modules for Wi-Fi or GPRS connection are provided as optional features.

# Software and web applications

## Ekip Connect

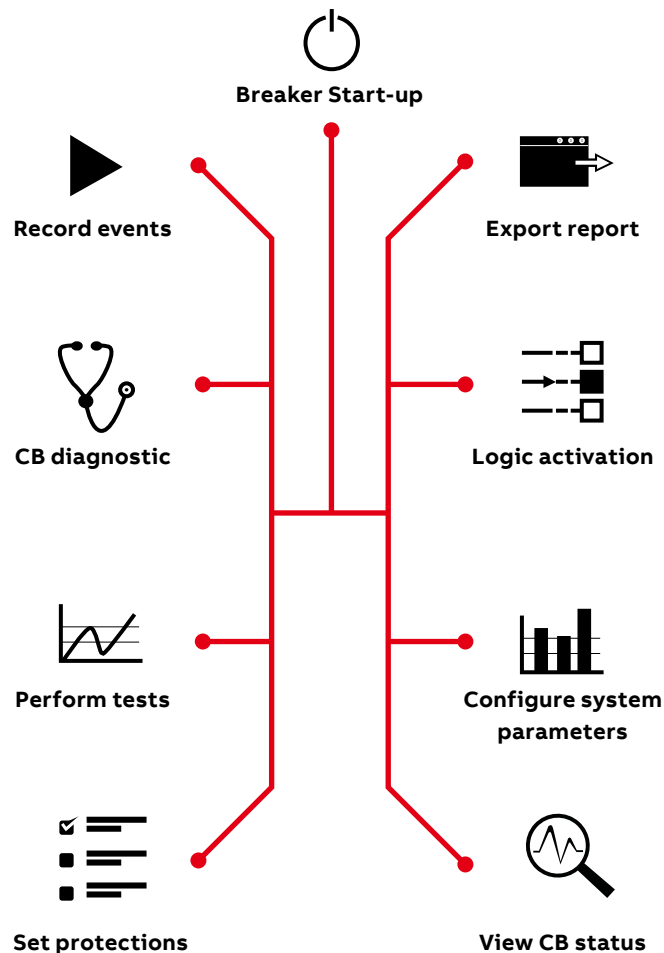
ABB SACE offers software applications that allow to exploit the full potential of Ekip trip units in terms of power management, acquisition and analysis of electrical data, protection testing, maintenance and diagnostic functions.

Ekip Connect is the ABB commissioning and programming software tool that allows the user to unlock the full potential of circuit breakers, improving the efficiency of the electrical plant. A circuit breaker is an essential part of any electrical system that guarantees that the day-by-day

processes can be performed safely and continuously. For this reason, it is vital that the installation and use of the circuit breaker is made as error-free and simple as possible.

From commissioning to implementation, through monitoring, testing and analysis, Ekip Connect is the perfect tool for guiding the user in the management of ABB circuit breakers throughout the whole product life cycle.

Using Ekip Connect, the user can manage power, acquire and analyze electrical values, and test protection, maintenance and diagnostic functions. Just as Emax 2 has evolved into a true power manager that has simplified the electrical plant, so too has Ekip Connect software become the user's key to access the full capability of the breaker.



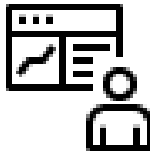
—  
Panel builders  
- 50% commissioning time



#### Ease of use

Imagine you are a panel builder. You have to commission a circuit breaker and you need to save time. Using Ekip Connect – instead of managing it manually – you can cut commissioning time up to 50%. Providing a stress-free relationship with the device complexity, Ekip Connect is an easy-to-use software that has all the answers you need. Ekip Connect simple and intuitive interface guarantees, from the very start, easy navigation throughout the tool and quick access to every circuit breaker operation. At a glance, the user can see all the information he needs, thus being able to quickly and effectively assess any situation.

—  
Facility manager  
100% full exploitation  
of your device



#### Full exploitation

Imagine you are a facility manager. You need to perform fast and precise diagnosis to have everything under control and avoid failures. Using Ekip Connect you can exploit the full capabilities of your device and, thanks to the customizable dashboard, you can organize your windows to manage any function of the device just the way you want it. It is possible to manage all the circuit breaker settings and specifications directly with Ekip Connect, the perfect instrument for exploring and using the breaker. Diagnostics are easy too: it is possible to consult and download event log, alarms and trips, thereby facilitating identification and understanding of any anomalies. One single software to manage all ABB low-voltage circuit breakers equipped with an electronic trip unit, granting full integration between air and molded case circuit breakers.

—  
Consultant/system  
integrator  
Complex logic at your  
fingertips



#### Product enhancement

Imagine you are a consultant or a system integrator and you want to implement advanced features while avoiding any risk of mistakes. Using Ekip Connect you can implement complex logics with just a few clicks. To add, set and manage advanced functions has never been so easy. Cloud platform, automatic transfer switch logic, load shedding, advanced protection and demand management can be managed and easily set through the Ekip Connect software. Expand your software features by purchasing and downloading software packages for advanced functions directly using Ekip Connect.

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# Software and web applications

## Ekip Connect

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Accessing the full potential of the circuit breaker is finally possible. Thanks to Ekip Connect software, you can achieve complete utilization of the breaker and more with a few clicks.



### Configuration

- Set protections
- Configure system and communication parameters
- Breaker start-up



### Monitoring & analysis

- View CB status and measure
- Read events list
- CB diagnostic



### Product implementation

- Set advanced protections
- Logic activation
- Enable advanced functions

### Test

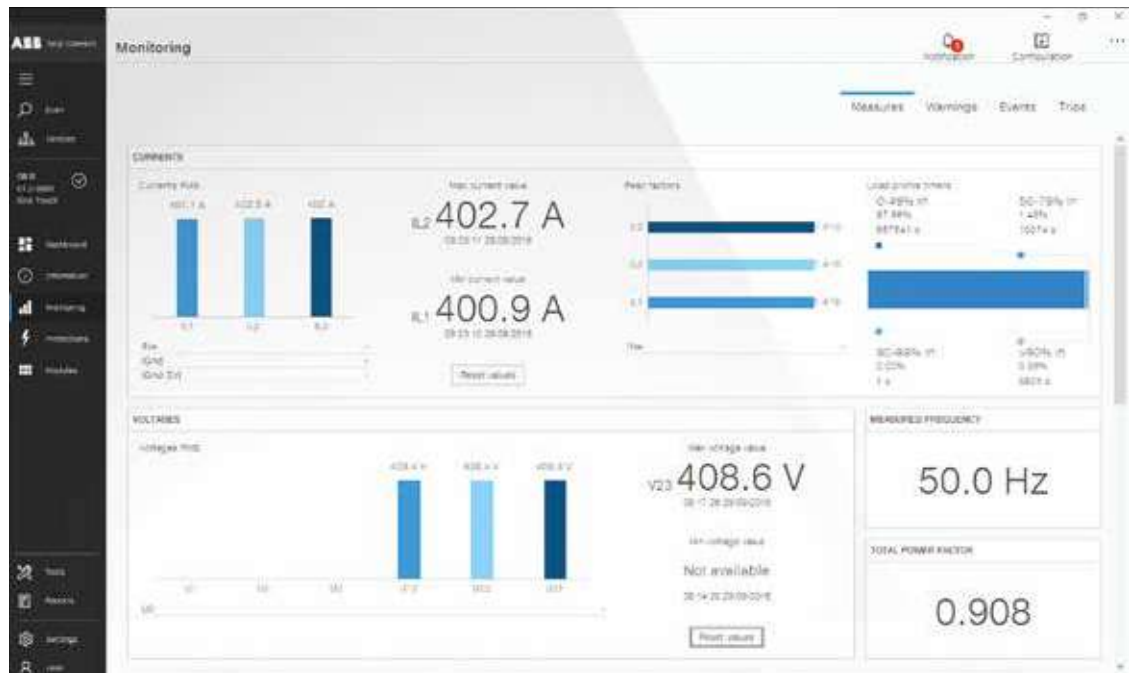


### Testing & reporting

- Check correct functionality
- Perform tests
- Export report



Ekip Connect is available for free download at <https://library.abb.com/d/15-DC20011X3000>



### EPiC mobile app

With Bluetooth embedded into the trip units it possible to connect rapidly to the EPiC mobile app. Buy additional protection functions or measures, register the product and configure your

device. EPiC helps the customer during the commissioning of the system; all system parameters and protection thresholds can be set rapidly in the Ekip Touch trip units thanks to the easy and intuitive navigation pages of the app.

# Software and web applications

## ABB Ability™ Energy and Asset Manager

ABB Ability™ Energy and Asset Manager is the state-of-the-art cloud-solution for monitoring, supervising and analyzing site equipment as well as the site's electrical distribution system, resulting in improved overall performance, efficiency and safety.

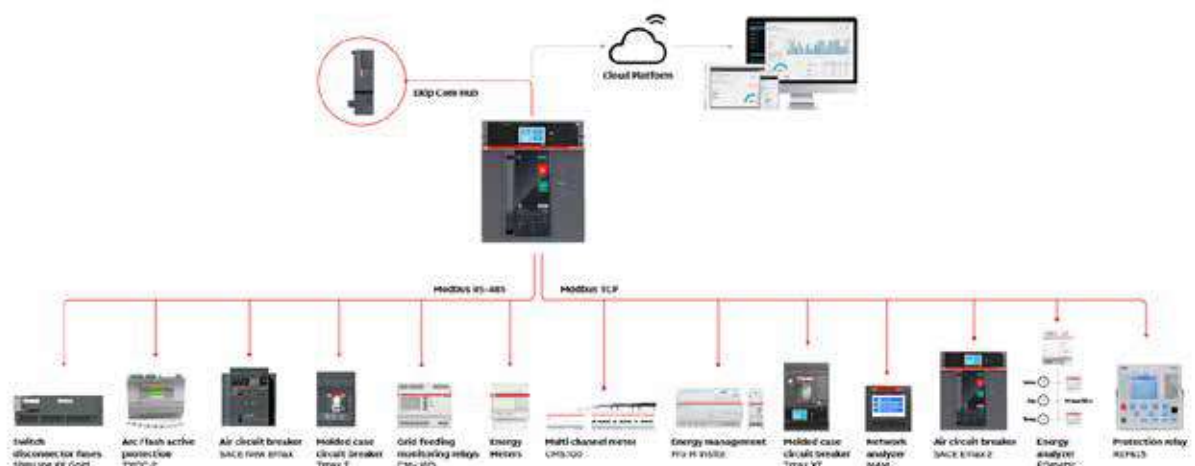
Through its scalable and flexible approach, ABB Ability™ Energy and Asset Manager ensures full-range integration of main electrical LV and MV equipment installed in the distribution and sub-distribution switchboards. It also enables upgrades at any time via the ABB Ability Marketplace™ in just a click. With a single easy-to-use interface, ABB Ability™ Energy and Asset Manager assists the user by means of a cloud computing or hybrid platform, enabling analysis of relevant data and optimization of installation anytime, anywhere.

### Value proposition

#### • Flexible and scalable platform

- Ease of use: the power of understanding at your fingertips

- Remote visibility: Discovery of facility performance anytime, anywhere
- Faster payback
- Scalable, from monitoring of a production line to the supervision of multiple sites.
- **Improved site efficiency**
  - Reduce cabling, connectivity components and commissioning time with embedded WiFi and 3G/4G
  - Save up to 20% on energy bills
  - Remove energy inefficiency by up to 10%
  - Identify unexpected consumptions and eliminate unwanted energy usage
  - 100% avoidance of penalties for low power factor.
- **Maximized performance**
  - 100% elimination of costly unplanned labor
  - Up to 40% maintenance-cost reduction: avoid unnecessary inspection and maintenance
  - Up to 15% extended asset lifetime
  - Up to 30% reduction in operational costs
  - Minimized risk of unplanned downtime
  - Monitoring up to 70% of potential asset-failure causes.
- **Enhanced personnel safety**
  - Improve safety: Healthy assets mean healthy people mean healthy business
  - Keep operators safe with remote monitoring
  - Supervise and schedule maintenance remotely.





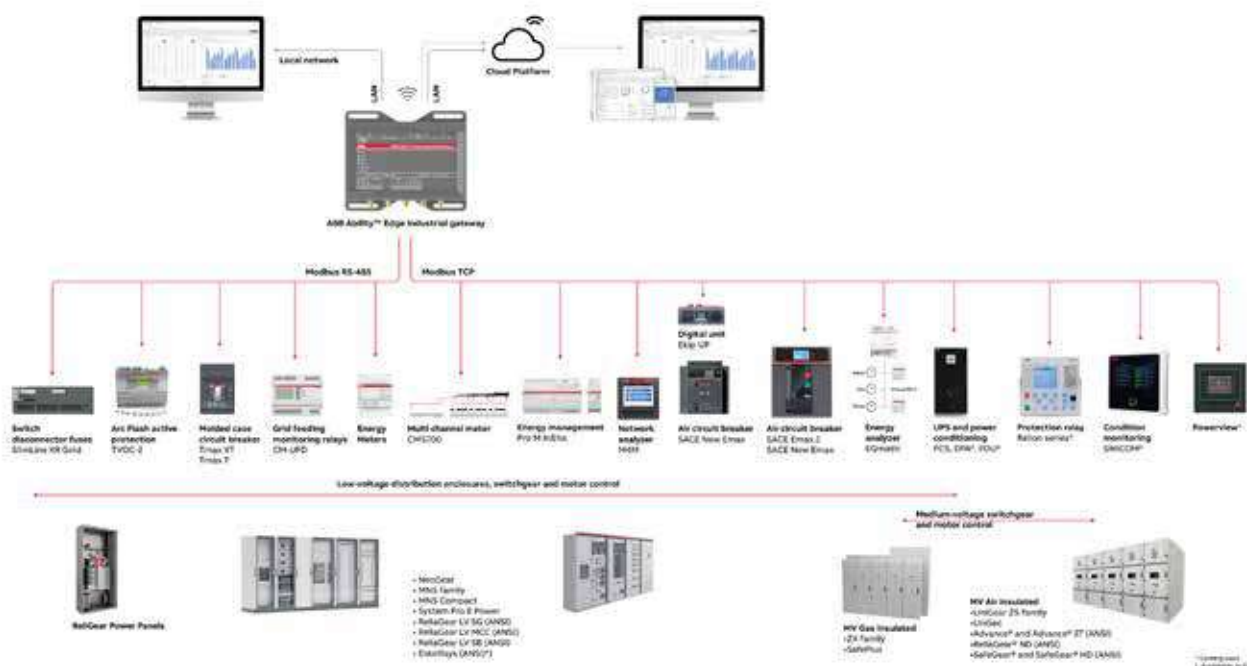
### External solution with ABB Ability™ Edge Industrial gateway

The ABB Ability™ Edge Industrial gateway module can be mounted on DIN rail to collect data throughout the system.

Moreover, it is possible to connect sensors for environmental parameters (temperature, water, gas) via both analog and digital I/O.

Modules for Wi-Fi or GPRS connection are provided as optional features.

For any further information please visit our website: <https://new.abb.com/about/our-businesses/electrification/abb-ability/energy-and-asset-manager>.



# Energy Measurements

## Introduction

The Emax 2 circuit-breakers have been designed to manage all low voltage electrical installations with maximum efficiency: from industrial plants, naval applications, traditional and renewable power generation installations to buildings, shopping centers, data centers and communication networks.

Achieving maximum efficiency of an electrical installation in order to reduce consumption and waste requires intelligent management of power supplies and energy. For this reason, the new technologies used in the Emax 2 circuit-breakers

with Ekip Touch trip units allow the productivity and reliability of any installation to be optimized, and at the same time, power consumption to be reduced while fully respecting the environment.





**Class 1 in power and energy measurements**

Before starting to take any action on electrical systems and to analyze the available data, top accuracy on measurements must be guaranteed. Thanks to the Ekip Touch trip units, the SACE Emax 2 range of circuit-breakers guarantees extremely accurate measures, in compliance with the relevant IEC 61557-12 Standard.

**Network Analyzer**

The quality of the power supply is an important factor to consider in order to preserve the loads, to avoid equipment malfunctions, and to optimize energy consumption. The power quality of a power system is never a perfect sinusoidal waveform, distortions and harmonics are always present. Several parameters that cause reductions in power quality can be monitored and controlled thanks to the Network Analyzer embedded function. In this way, the use of expensive external devices can be avoided.

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# Energy Measurements

## Class 1 accuracy

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With the Ekip Touch trip units the embedded measurement functionalities allow the measurement of power and energy to a Class 1 degree of accuracy, as specified by the IEC 61557-12 Standard, avoiding the need of additional device saving costs, space and installation time.

With the Ekip Touch trip units, measurements of power and energy to a IEC 61557-12 Standard compliant, Class 1 level of accuracy, are guaranteed by the embedded measurement functionalities. Thus, there is no need for additional devices, with consequent advantages in terms of cost savings, space reduction and installation time optimization.

When energy needs monitoring, even a minimal percentage of errors would result in a waste of money. Accuracy is everything and depends on the design and manufacturing quality of solution used. SACE Emax 2 with Ekip Touch trip units guarantee 1% accuracy for power and energy monitoring.



Thanks to the extremely accurate Rogowsky coil, ABB Ekip Touch trip units are able to guarantee Class 0.5 for voltage and current measurements and Class 1 for active power and energy measurements, complying with and certified by the IEC 61557-12 Standard.

IEC 61557-12 can be applied to both AC and DC electrical networks up to 1000 V AC or 1500V DC. Moreover, an upgrade of the device is always guaranteed to be quick and easy: the measurement functions not included in an installed trip unit can be downloaded directly from the Market-Place via EPiC mobile app, thus allowing new system

requirements to be met with ease.

Measurement data can be displayed in several ways:

- On the embedded display on the trip unit
- On a smartphone via Bluetooth (EPiC mobile app)
- Using the Ekip Connect software on a PC
- On an Ekip Multimeter external display
- On a cloud-platform thanks to ABB Ability™ Energy and Asset Manager
- In the supervision system (ex SCADA) thanks to several communication protocols
- On the control panel display.

# Energy Measurements

## Network Analyzer

Thanks to the Network Analyzer function available in all Ekip Touch trip units, the quality of energy based on harmonics, micro-interruptions or voltage dips is monitored without the need for dedicated instrumentation.

Thanks to Network Analyzer, effective preventive and corrective action can be implemented through accurate analysis of faults, thereby improving the efficiency of the system.

### Applications

Electrical equipment is designed for optimum operation under constant and uniform voltage level, as close as possible to the rated value. In addition, industrial equipment, working on a three phase supply, requires the three phase voltage levels to be balanced. Power quality is a description of how well a power system complies with the above ideal conditions. Power quality issues can have negative consequences on the components and on the energy efficiency of the network. Thus, power quality monitoring is becoming more important in modern power systems, and will be a key part of the smart grid of the future. In particular, power quality evaluation includes the following aspects:

- Deviations of voltage average value from the rated value
- Short decreases (sags) or increases (swells) of voltage value
- Voltage unbalance, i.e., difference in voltage values between different phases
- The presence of current and voltage harmonics.

Distortions of the voltage value (sags, swells) and/or frequency can have fatal consequences, especially for process industries, leading to possible production stoppages with consequently expensive downtime, damage to motor drives and damage to PLCs. Examples of process industries that can be badly hit by voltage instabilities include the plastics, petrochemicals, textiles, paper, semiconductor, and glass industries.

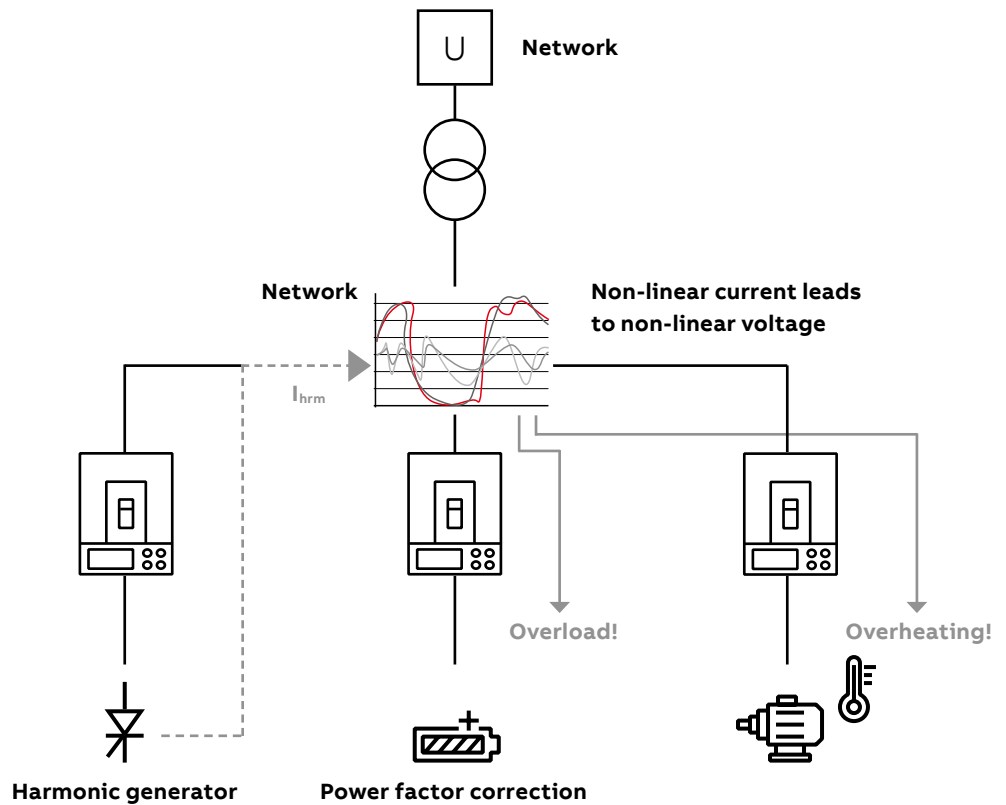
Voltage sag is defined as when the value of the voltage is reduced below the rated one for a certain amount of time. Similarly, voltage swell is defined as when the voltage is increased above the rated value for a certain amount of time.

RMS voltage values and frequency are two fundamental features of a voltage signal, but the “purity” of the voltage waveform is also an important point. An ideal voltage waveform should be a perfect sinusoid, but this is not something that is normally seen in the real world. Frequencies other than the fundamental are always present.

These frequencies are called harmonics: a harmonic of a signal is a component frequency of the wave spectrum that is a multiple of the fundamental frequency. Harmonic content is an issue that is becoming increasingly debated: technological developments in the industrial and household field have led to the spread of electronic equipment which, due to their operating principles, absorb a non-sinusoidal current (non-linear load). Such current causes a non-sinusoidal voltage drop on the supply side of the network with the consequence that the linear loads are also supplied with a distorted voltage.

# Energy Measurements

## Network Analyzer



Power electronics produce harmonic content that can affect other loads in the plant: the result can be an overheating of the asynchronous motor and an overload on the power factor correction capacitors. To get information about the harmonic con-

tent of voltage and current waveforms and to take measures if such values are high, a dedicated index has been defined. The total harmonic distortion (THD) of a signal is a measurement of the harmonic distortion present.



## The first step towards better Power Quality: measurement

A Power Quality monitor is the most commonly used tool for detecting voltage sags and power quality issues. Measurement is the first step for checking the status of the installation and starting the root cause analysis. Power Quality measurements and related instrumentation are described in specific industrial Standards such as IEC61000-4-30 and IEEE 1250. For the first time, thanks to the Ekip Touch trip units for the Emax 2, the power quality monitor is embedded in a low voltage molded case circuit-breaker. The Network Analyzer function complies with the prescriptions of IEC 61000-4-30 and IEEE 1250.

The Network Analyzer function allows the user to set controls on the voltage in order to analyze the operation of the system: any time a control parameter exceeds a preset threshold, an alarm is generated. The accuracy of voltage measurements by the Emax 2 is excellent at 0.5%. The Emax 2 Network Analyzer complies with IEEE 1250-2011, Section 3 for the monitoring of the voltage value, unbalance and harmonic content, which is the equivalent of IEC61000-4-30 Class S for voltage values and unbalance and Class B for the harmonic content.

| Network Analyzer             |
|------------------------------|
| Hourly average voltage value |
| Short voltage interruption   |
| Short voltage spikes         |
| Slow voltage sags and swells |
| Voltage unbalance            |
| Harmonic analysis            |

Referring to the voltage sag ambit, as an example, the Network Analyzer function has the ability to control three kinds of sag classes, defined by the user:

| Parameter                    | Description                                                                                                                   |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Sag Threshold (First Class)  | This defines the first alarm threshold. It is expressed as % Un.                                                              |
| Sag Times (First Class)      | In the event of dropping under the first alarm threshold, this defines the time beyond which the alarm counter is increased.  |
| Sag Threshold (Second Class) | This defines the second alarm threshold. It is expressed as % Un.                                                             |
| Sag Times (Second Class)     | In the event of dropping under the second alarm threshold, this defines the time beyond which the alarm counter is increased. |
| Sag Threshold (Third Class)  | This defines the third alarm threshold. It is expressed as % Un.                                                              |
| Sag Times (Third Class)      | In the event of dropping under the third alarm threshold, this defines the time beyond which the alarm counter is increased.  |

Two different types of counters for each power quality monitoring function are made available directly on the trip unit touch screen: one is a cumulative counter, which stores all the alarms (for example, all the voltage sags) from the beginning, and one is a 24h counter, that shows the alarms in the last 24 hours.

With the optional communication module (Modbus, Profibus, Profinet, etc.) eight counters for each power quality monitoring function are available: one is the cumulative and the other seven are the daily counters of the last seven days of activity.

# Energy Measurements

## Network Analyzer

### Operating Principle

The Network Analyzer function performs continuous monitoring of the quality of energy, and shows all results through a display or communication module. In particular:

- **Hourly average voltage value:** in accordance with international Standards, this must remain within 10% of the rated value, but different limits can be defined according to the needs of the installation. The positive sequence voltage is compared with the limits. If the limits are exceeded, the Ekip Touch trip units generates a signaling event. The number of these events is stored in a suitable counter. The counter values are available for each of last 7 days, as well as the total. The measures available are the positive and negative sequence voltages and positive and negative sequence currents of the last interval monitored. The time of the calculation of the average values can be set between 5 minutes and 2 hours.
- **Interruptions / short dips in voltage:** if the voltage remains below a threshold for more than 40ms, the Ekip Touch trip units generates an event that is counted in a dedicated log. The voltage is monitored on all lines.
- **Short voltage spikes** (voltage transients, spikes): if the voltage exceeds a threshold for 40ms, set for a pre-determined time, the Ekip Hi-Touch generates an event that is counted.
- **Slow voltage sags and swells:** when the voltage strays outside a range of acceptable limit values for a time greater than the one set, the Ekip Hi-Touch generates an event that is counted. Three values can be configured for voltage sags and two for voltage swells, each associated with a time limit: this enables verification of whether the voltage remains within a curve of values that are acceptable by equipment such as computers. The voltage is monitored on all lines.
- **Voltage unbalances:** if the voltage values are not equal or the phase displacements between them are not exactly 120°, an unbalance occurs, which is manifested with a negative sequence voltage value. If this limit exceeds the threshold value set, an event is stored which is counted.
- **Harmonic analysis:** the harmonic content of voltages and currents, measured to the 50th harmonic, as well as the value of the total harmonic distortion (THD), are available in real time on the display or through the communication modules. The Ekip Touch trip units also generates an alarm if the THD value or a magnitude of at least one of the harmonics exceeds the values set. The voltage and current values are monitored on all phases.

All information can be displayed directly on the screen or on a smartphone, a PC or in a network system with any of the communication modules. This is an embedded function of Ekip Touch trip units and analyzes important parameters of the distribution network including:

- The average Voltage value
- Short Voltage interruptions and spikes
- Slow Voltage sags and swells
- Voltage unbalance
- Harmonic analysis

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# Accessories

|             |                                         |
|-------------|-----------------------------------------|
| <b>6/2</b>  | <b>Functional areas</b>                 |
| <b>6/3</b>  | <b>Standard supply</b>                  |
| <b>6/4</b>  | <b>Accessories for circuit-breakers</b> |
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| <b>6/8</b>  | Control                                 |
| <b>6/11</b> | Safety                                  |
| <b>6/12</b> | Protection devices                      |
| <b>6/14</b> | Connections                             |
| <b>6/16</b> | Interlocks and switching devices        |
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| <b>6/21</b> | Power supply                            |
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| <b>6/30</b> | <b>Service</b>                          |

# Functional areas

The new SACE Emax 2 circuit-breakers have been designed to optimize the installation and commissioning of accessories.

The front of the circuit-breaker features two functional areas, which are protected by separate covers:

- **Accessories area** for the installation of accessories inside the circuit-breaker and Ekip trip unit. The areas dedicated to accessories can be accessed by removing the flange and the accessories covers. On removal, the operating mechanism area remains segregated and protected, providing safety for operators.
- **Safety area**, which delimits the housing of the stored energy operating mechanism of the circuit-breaker. To carry out maintenance on the operating mechanism, the covers of the accessories and safety area must be removed.

The auxiliary connection terminal box also features two areas:

- **Terminal area** for housing and inserting the terminals for wiring the auxiliary connections. The terminals can be wired first and then installed on the circuit-breaker terminal box, thereby facilitating cable connection for the operator.
- **Cartridge module area**, housing for the Ekip modules. These are installed directly on the upper part of the circuit-breaker or of the fixed part without having to remove the Ekip electronic trip unit, thereby minimizing the time required for the installation and commissioning of accessories.



# Standard supply

The fixed versions of SACE Emax 2 automatic circuit-breakers and switch-disconnectors are always supplied as standard with the following accessories:

- IP30 protection for switchgear door
- front terminals for E1.2 circuit-breaker
- adjustable rear terminals for E2.2 ... E6.2 circuit-breaker, mounted in HR – HR configuration.

In addition, for **fixed automatic circuit-breakers** only:

- four standard open/closed auxiliary contacts - AUX 4Q 400V
- four terminals for auxiliary connections
- mechanical signalling of the tripping of the protection trip unit - TU Reset
- contact signalling tripping of Ekip protection trip unit S51 250V.

The withdrawable versions of automatic circuit-breakers and switch-disconnectors are always supplied as standard with the following accessories:

- closed circuit-breaker racked-out mechanism lock
- lever for racking in and racking out
- anti-insertion lock.

In addition, for **withdrawable automatic circuit-breakers** only:

- four standard open/closed auxiliary contacts - AUX 4Q 400V
- four terminals for auxiliary connections
- mechanical signalling of the tripping of the protection trip unit - TU Reset
- contact signalling tripping of Ekip protection trip unit S51 250V.

The fixed parts feature:

- IP30 protection for switchgear door
- anti-insertion lock
- standard shutter lock – SL
- adjustable rear terminals, mounted in HR – HR configuration.



# Accessories for circuit-breakers

SACE Emax 2 circuit-breakers offer a wide range of accessories developed to satisfy the applica-

tion and installation requirements of every customer.

|                                                                                         | Automatic<br>circuit-breaker |                          | Switch-<br>disconnector |                          | Derived versions   |    |      |
|-----------------------------------------------------------------------------------------|------------------------------|--------------------------|-------------------------|--------------------------|--------------------|----|------|
|                                                                                         | E1.2                         | E2.2 -<br>E4.2 -<br>E6.2 | E1.2                    | E2.2 -<br>E4.2 -<br>E6.2 | CS                 | MT | MTP  |
|                                                                                         |                              |                          |                         |                          | E2.2 - E4.2 - E6.2 |    |      |
| Signalling                                                                              |                              |                          |                         |                          |                    |    |      |
| Standard open/closed auxiliary contacts - AUX 4Q                                        | ● / ●●                       | ● / ●●                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | -    |
| Open/closed auxiliary contacts - AUX 6Q                                                 | -                            | ○ / ○○                   | -                       | ○ / ○○                   | -                  | -  | ○○   |
| Open/closed auxiliary contacts- AUX 15Q                                                 | ○ / △                        | ○ / △                    | ○ / △                   | ○ / △                    | -                  | -  | ○○   |
| Auxiliary position contacts - AUP                                                       | △                            | △                        | △                       | △                        | △                  | △  | △    |
| Ready to close signalling contact - RTC                                                 | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | -    |
| TU Reset mechanical signalling of the tripping of protection trip unit - TU Reset       | ● / ●●                       | ● / ●●                   | -                       | -                        | -                  | -  | -    |
| Contact signalling tripping of Ekip protection trip unit - S51                          | ● / ●●                       | ● / ●●                   | -                       | -                        | -                  | -  | -    |
| Second contact signalling tripping of Ekip protection trip unit - S51/2                 | -                            | ○ / ○○                   | -                       | -                        | -                  | -  | -    |
| Contact signalling loaded springs – S33 M/2 (supplied with Motor)                       | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | ○○   |
| Control                                                                                 |                              |                          |                         |                          |                    |    |      |
| Opening and closing release - YO/YC                                                     | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | ○○ * |
| Second opening and closing release - YO2/YC2                                            | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | -    |
| Undervoltage release - YU                                                               | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | -    |
| Electronic time-delay device for undervoltage release - UVD                             | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | -    |
| Motor - M                                                                               | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | ○○   |
| Remote reset - YR                                                                       | ○ / ○○                       | ○ / ○○                   | -                       | -                        | -                  | -  | -    |
| Opening and closing release test unit - YO/YC Test Unit                                 | ○ / △                        | ○ / △                    | ○ / △                   | ○ / △                    | -                  | -  | △ *  |
| Safety                                                                                  |                              |                          |                         |                          |                    |    |      |
| Key lock and padlock in open position - KLC and PLC                                     | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | ○○   |
| Key lock and padlock in racked-in / test / racked-out position - KLP and PLP            | △                            | ○○                       | △                       | ○○                       | ○○                 | ○○ | ○○   |
| Shutter lock - SL                                                                       | ▲                            | ▲                        | ▲                       | ▲                        | ▲                  | ▲  | ▲    |
| Lock for racking-out mechanism with circuit-breaker in closed position                  | ▲                            | ●●                       | ▲                       | ●●                       | ●●                 | ●● | ●●   |
| Lock for racking in / racking out the mobile part when the door is open - DLR           | -                            | △                        | -                       | △                        | -                  | -  | ○○   |
| Lock to prevent door opening when circuit-breaker is in racked-in / test position - DLP | -                            | △                        | -                       | △                        | △                  | △  | △    |
| Lock to prevent door opening when circuit-breaker is in closed position - DLC           | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | ○○   |
| Anti-insertion lock                                                                     | ● / ●●                       | ● / ●●                   | ● / ●●                  | ● / ●●                   | ●●                 | ●● | ●●   |
| Mechanical operation counter - MOC                                                      | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | ○○   |
| Protection devices                                                                      |                              |                          |                         |                          |                    |    |      |
| Protection device for opening and closing pushbuttons - PBC                             | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | ○○   |
| IP30 Protection                                                                         | ● / ▲                        | ● / ▲                    | ● / ▲                   | ● / ▲                    | -                  | -  | ▲    |
| IP54 Protection                                                                         | ○ / △                        | ○ / △                    | ○ / △                   | ○ / △                    | -                  | -  | △    |
| Terminal covers - HTC / LTC                                                             | ○ / ○○                       | -                        | -                       | -                        | -                  | -  | -    |
| Separators - PB                                                                         | ○ / △                        | ○ / △                    | ○ / △                   | ○ / △                    | -                  | -  | -    |
| Connections                                                                             |                              |                          |                         |                          |                    |    |      |
| Orientable rear terminal - HR/VR                                                        | ○ / ▲                        | ● / ▲                    | ○ / ▲                   | ● / ▲                    | -                  | -  | ●    |
| Front terminal - F                                                                      | ●                            | ○ / △                    | ●                       | ○ / △                    | -                  | -  | △    |
| Other configurations                                                                    | ○ / △                        | ○ / △                    | ○ / △                   | ○ / △                    | -                  | -  | △    |
| Interlocks and switching devices                                                        |                              |                          |                         |                          |                    |    |      |
| Mechanical interlock - MI                                                               | ○ / ○○ / △                   | ○ / ○○ / △               | ○ / ○○ / △              | ○ / ○○ / △               | -                  | -  | -    |
| Automatic transfer switches - ATS                                                       | ○ / ○○                       | ○ / ○○                   | ○ / ○○                  | ○ / ○○                   | -                  | -  | -    |

- Standard accessory for fixed circuit-breaker
- Accessory on request for fixed circuit-breaker
- Standard accessory for mobile part
- Accessory on request for mobile part

- ▲ Standard accessory for fixed part
- △ Accessory on request for fixed part
- \* Only closing release YC



Fig. 01-A



Fig. 01-B



Fig. 01-C

## Signalling

### Open / closed auxiliary contacts - AUX (Fig. 01A/B/C)

SACE Emax 2 circuit-breakers can be equipped with auxiliary contacts that signal the open or closed status of the circuit-breaker. The first block of four standard contacts is always provided with the automatic circuit-breakers. The switching contacts are available in the following configurations:

| Open / closed auxiliary contacts (AUX 4Q)                                |                 | E1.2                | E2.2 ... E6.2               |
|--------------------------------------------------------------------------|-----------------|---------------------|-----------------------------|
| 4 auxiliary contacts                                                     | standard        | ●                   | ●                           |
|                                                                          | digital signals | ●                   | ●                           |
|                                                                          | mixed           | ●                   | ●                           |
| Open / closed supplementary auxiliary contacts (AUX 6Q)                  |                 |                     |                             |
| 6 auxiliary contacts                                                     | standard        | -                   | ●                           |
|                                                                          | digital signals | -                   | ●                           |
|                                                                          | mixed           | -                   | ●                           |
| Open / closed external supplementary auxiliary contacts (AUX 15Q)        |                 |                     |                             |
| 15 auxiliary contacts                                                    | standard        | ●                   | ●                           |
|                                                                          | digital signals | ●                   | ●                           |
| Maximum number of open / closed auxiliary contacts that can be installed |                 | 19                  | 25                          |
|                                                                          |                 | Standard contact    | Contact for digital signals |
| Type                                                                     |                 | changeover contacts | changeover contacts         |
| Minimum load                                                             |                 | 100mA @ 24V         | 1mA @ 5V                    |
| Breaking capacity                                                        |                 |                     |                             |
| DC                                                                       | 24V             | ~0                  | 0.1A                        |
|                                                                          | 125V            | 0.3A @ 10ms         | -                           |
|                                                                          | 250V            | 0.15A @ 10ms        | -                           |
| AC                                                                       | 250V            | 5A @ cosφ 1         | -                           |
|                                                                          |                 | 5A @ cosφ 0.7       | -                           |
|                                                                          |                 | 5A @ cosφ 0.3       | -                           |
|                                                                          | 400V            | 3A @ cosφ 1         | -                           |
|                                                                          |                 | 2A @ cosφ 0.7       | -                           |
|                                                                          |                 | 1A @ cosφ 0.3       | -                           |
|                                                                          |                 |                     |                             |

Electrical diagram reference: figures 1, 81, 91

Aux 6Q is an alternative to the Ekip Signalling 4K module. AUX 15Q is an alternative to the mechanical interlock (MI), the DLC for E1.2 lock or the DLP lock if mounted on the right side.



# Accessories for circuit-breakers



Fig. 02-A



Fig. 02-B

## Auxiliary position contacts - AUP (Fig. 02A/B)

When the circuit-breaker is a withdrawable version, the position of the mobile part can be signalled electrically by accessorizing the fixed part with one of the following signalling contact units:

| Auxiliary position contacts (AUP)                                   |                 | E1.2 | E2.2 ... E6.2 |
|---------------------------------------------------------------------|-----------------|------|---------------|
| 6 auxiliary contacts                                                | standard        | ●    | -             |
|                                                                     | digital signals | ●    | -             |
| 5 auxiliary contacts                                                | standard        | -    | ●             |
|                                                                     | digital signals | -    | ●             |
| 5 supplementary auxiliary contacts                                  | standard        | -    | ●             |
|                                                                     | digital signals | -    | -             |
| Maximum number of auxiliary position contacts that can be installed |                 | 6    | 10            |

|                          |      | Standard contact    | Contact for digital signals |
|--------------------------|------|---------------------|-----------------------------|
| Type                     |      | changeover contacts | changeover contacts         |
| Minimum load             |      | 100mA @ 24V         | 1mA @ 5V                    |
| <b>Breaking capacity</b> |      |                     |                             |
| DC                       | 24V  | -                   | 0.1A                        |
|                          | 125V | 0.3A @ 0ms          | -                           |
|                          | 250V | 0.15A @ 0ms         | -                           |
| AC                       | 250V | 5A @ cosφ 1         | -                           |
|                          |      | 5A @ cosφ 0.7       | -                           |
|                          |      | 5A @ cosφ 0.3       | -                           |
|                          | 400V | 3A @ cosφ 1         | -                           |
|                          |      | 2A @ cosφ 0.7       | -                           |
|                          |      | 1A @ cosφ 0.3       | -                           |

Electrical diagram reference: figures 95, 96, 97



Fig. 03

## Ready to close signalling contact - RTC (Fig. 03)

The ready to close signalling contact – RTC – indicates that the circuit-breaker is ready to receive the closing command. The circuit-breaker is ready to close when the following conditions have been met:

- circuit-breaker open
- springs loaded
- no opening command or locks on the opening command
- circuit-breaker reset following tripping of Ekip protection trip unit
- YU energized.

|                          |      | Standard contact       | Contact for digital signals |
|--------------------------|------|------------------------|-----------------------------|
| Type                     |      | Switching              |                             |
| Minimum load             |      | 100mA @ 24V            | 1mA @ 5V                    |
| <b>Breaking capacity</b> |      |                        |                             |
| DC                       | 24V  | -                      | 0.1                         |
|                          | 250V | 0.5A @ 0ms / 0.2A 10ms | -                           |
| AC                       | 250V | 3A @ cosφ 0.7          | -                           |

Electrical diagram reference: figure 71



Fig. 04

#### Mechanical signalling of the tripping of protection trip unit - TU Reset (Fig. 04)

The automatic circuit-breakers are always equipped with a mechanical device that signals the tripping status of the protection trip units. After the Ekip trip unit has tripped due to an electrical fault, the signalling device clearly indicates the tripping status on the front of the circuit-breaker. The circuit-breaker can be reset only after the signalling pushbutton has been restored to its normal operating position. The device conforms to the Ansi 86T standard.

Emax 2 is fitted with the anti-pumping function. With the anti-pumping function the opening order always takes priority over a closing order. Moreover, when the Circuit Breaker is in open position due to a trip, the anti-pumping function allows the reclosing of the operating mechanism only after a reset of the trip, avoiding improper or accidental closing.



Fig. 05

#### Contact signalling tripping of protection trip unit Ekip – S51 (Fig. 05)

The contact signals the opening of the circuit-breaker after the Ekip protection trip unit has tripped. The circuit-breaker can only be closed after the “TU Reset” tripped trip unit mechanical signalling pushbutton has been restored to its normal operating position.

The switching contact, which is always supplied with the standard version of the automatic circuit-breakers, is also available on request in a version for digital signals (for electrical characteristics, please refer to the RTC contact). It can also be associated with an optional accessory for resetting by remote control - YR. For electromechanical characteristics, please refer to the RTC contact.

For E2.2, E4.2 and E6.2 it is possible to double the signal for the tripping of the Ekip Trip Unit specifying the dedicated code for the S51/2. The S51/2 is an alternative of the YR contact.

Electrical diagram reference: figure 11

#### Contact signalling loaded springs – S33 M/2

This contact is always supplied with a geared motor; it remotely signals the spring status of the circuit-breaker operating mechanism. It is available in both standard version and version for digital signals.

|                          |      | Standard contact    | Contact for digital signals |
|--------------------------|------|---------------------|-----------------------------|
| Type                     |      | changeover contacts | changeover contacts         |
| Minimum load             |      | 100mA @ 24V         | 1mA @ 5V                    |
| <b>Breaking capacity</b> |      |                     |                             |
| DC                       | 24V  | -                   | 0.1A                        |
|                          | 125V | 0.3A @ 0ms          | -                           |
|                          | 250V | 0.15A @ 0ms         | -                           |
| AC                       | 250V | 5A @ cosφ 1         | -                           |
|                          |      | 5A @ cosφ 0.7       | -                           |
|                          |      | 5A @ cosφ 0.3       | -                           |
|                          | 400V | 3A @ cosφ 1         | -                           |
|                          |      | 2A @ cosφ 0.7       | -                           |
|                          |      | 1A @ cosφ 0.3       | -                           |

Electrical diagram reference: figure 12

# Accessories for circuit-breakers



Fig. 06

## Control

### Opening and closing release- YO/YC (Fig. 06)

The opening and closing releases enable the circuit-breaker to be controlled remotely. Opening is always possible, while closing is available only when the closing springs of the operating mechanism are loaded and the circuit-breakers is ready to close. The releases operate by means of minimum impulse current duration time of 100 ms.

Furthermore, they can operate in permanent service. In this case, if opening command is given by means of the opening release, the circuit-breaker can be closed by de-energizing the opening release and, after a time of at least 30 ms, by controlling the closing.

The circuit breaker operating mechanism has an anti-pumping function that ensures safety and reliability.

Electrical diagram reference: figures 75, 77



### Second opening and closing release - YO2/YC2

For certain installations the redundancy of mechanisms and circuit-breaker operating circuits is often requested. To answer these needs, the SACE Emax 2 circuit-breakers can be equipped with double opening release and double closing release. The technical characteristics of the second opening release remain the same as those of the first opening and closing release. A double closing release can be used for E2.2, E4.2 and E6.2 circuit-breakers; a second open release in an alternative to undervoltage release.

Electrical diagram reference: figures 72, 79

| General characteristics                 |                                                |      |
|-----------------------------------------|------------------------------------------------|------|
| Power supply (Un)                       | AC                                             | DC   |
| 24V                                     | ●                                              | ●    |
| 30V                                     | ●                                              | ●    |
| 48V                                     | ●                                              | ●    |
| 60V                                     | ●                                              | ●    |
| 110V...120V                             | ●                                              | ●    |
| 120V...127V                             | ●                                              | ●    |
| 220V...240V                             | ●                                              | ●    |
| 240V...250V                             | ●                                              | ●    |
| 380V...400V                             | ●                                              | -    |
| 415V...440V                             | ●                                              | -    |
| 480V...500V                             | ●                                              | -    |
| Operating limits (IEC60947-2 standards) | YO/YO2: 70%...110% Un<br>YC/YC2: 85%...110% Un |      |
| Inrush power (Ps)                       | 300VA                                          | 300W |
| Continuous power (Pc)                   | 3.5VA                                          | 3.5W |
| Opening time (YO/YO2)                   |                                                |      |
| E1.2                                    | 35 ms                                          |      |
| E2.2 ... E6.2                           | 55 ms                                          |      |
| Closing time (YC/YC2)                   |                                                |      |
| E1.2                                    | 50 ms                                          |      |
| E2.2 ... E6.2                           | 70 ms                                          |      |

### Opening and closing release test unit - YO/YC Test Unit

The opening and closing releases test unit helps ensure that the various version of releases are running smoothly, to guarantee a high level of reliability in controlling circuit-breaker opening.

The test unit ensures the continuity of the opening and closing releases with a rated operating voltage between 24V and 250V (AC and DC), as well as verifies the functions of the opening and closing coil electronic circuit. Continuity is checked cyclically with an interval of 30s between tests. The unit has optic signals via LEDs on the front, which provide the following information:

**POWER ON:** correct power supply of the YO/YC Test Unit

**OPEN ON:** coil switch absent, power supply absent or insufficient, interrupted cables

**SHORT ON:** coil switch failure, short-circuited cables

**OPEN and SHORT FLASHING:** faulty coil switch or incorrect supply

**OPEN and SHORT OFF:** correct operation of the coil switch.

Two relays with one change-over area also available on board the unit, to allow remote signalling of the following events:

**Failure of a test** - resetting takes place automatically when the alarm stops

**Failure of three tests** - resetting occurs only by pressing the manual RESET on the unit.

| Characteristics of device              |                  |
|----------------------------------------|------------------|
| Auxiliary power supply                 | 24V...250V AC/DC |
| Specification of the signalling relays |                  |
| Maximum interrupted current            | 6A               |
| Maximum interrupted voltage            | 250V AC          |



Fig. 07

### Undervoltage release – YU (Fig. 07)

The undervoltage release opens the circuit- breaker when there is a significant voltage drop or power failure. It can be used for safe remote tripping, for blocking closing or to control the voltage in the primary and secondary circuits. The power supply for the release is therefore obtained on the supply side of the circuit-breaker or from an independent source. Circuit-breaker closing is permitted only when the release is powered. The undervoltage release is an alternative to as second shunt trip or the anti-racking out device. The circuit-breaker is opened with trip unit power supply voltages of 35-70%  $U_n$ . The circuit-breaker can be closed with a trip unit power supply voltage of 85-110%  $U_n$ .

| General characteristics |       |      |
|-------------------------|-------|------|
| Power supply ( $U_n$ )  | AC    | DC   |
| 24V                     | ●     | ●    |
| 30V                     | ●     | ●    |
| 48V                     | ●     | ●    |
| 60V                     | ●     | ●    |
| 110V...120V             | ●     | ●    |
| 120V...127V             | ●     | ●    |
| 220V...240V             | ●     | ●    |
| 240V...250V             | ●     | -    |
| 380V...400V             | ●     | -    |
| 415V...440V             | ●     | -    |
| 480V...500V             | ●     | -    |
| Inrush power (Ps)       | 300VA | 300W |
| Continuous power (Pc)   | 3.5VA | 3.5W |
| Opening time (YU)       |       |      |
| E1.2                    | 30 ms |      |
| E2.2 ... E6.2           | 50 ms |      |

Electrical diagram reference: figure 73

# Accessories for circuit-breakers



Fig. 08

## Time-delay device for undervoltage release (UVD) (Fig. 08)

The undervoltage release can be combined with an electronic time-delay device for the circuitbreaker, allowing for delayed external tripping with adjustable preset times. Use of the delayed undervoltage trip unit is recommended to prevent tripping when the power supply network for the trip unit is subject to brief voltage drops or power supply failures. Circuit-breaker closing is inhibited when it is not powered. The time-delay device must be used with an undervoltage release with the same voltage.

| General characteristics           |                 |    |
|-----------------------------------|-----------------|----|
| Power supply (UVD)                | AC              | DC |
| 24-30V                            | -               | ●  |
| 48V                               | ●               | ●  |
| 60V                               | ●               | ●  |
| 110-127V                          | ●               | ●  |
| 220-250V                          | ●               | ●  |
| Adjustable opening time (YU + D): | 0.5-1-1.5-2-3 s |    |



## Resetting remotely- YR

The reset coil YR permits remote resetting of the circuit-breaker after a release has tripped due to an overcurrent condition. It is available for all automatic circuit-breakers, in different voltage supply:

| General characteristics |               |    |
|-------------------------|---------------|----|
| Power supply (Un)       | AC            | DC |
| 24V                     | ●             | ●  |
| 110V                    | ●             | ●  |
| 220V                    | ●             | ●  |
| Operating limits        | 90%...110% Un |    |

Electrical diagram reference: figure 4



## Motor – M (Fig. 09A/B)

The motor automatically loads the closing springs of the circuit-breaker. The device, which can be installed from the front, automatically reloads the springs of the operating device when they are unloaded and power is present. In the event no power is present, the springs can be manually loaded by a dedicated lever on the operating device. The motor is always supplied with the limit switch contact S33 M/2 which signals the status of the springs.

| General characteristics                 |                                   |                                 |
|-----------------------------------------|-----------------------------------|---------------------------------|
| Power supply (Un)                       | AC                                | DC                              |
| 24V-30V                                 | ●                                 | ●                               |
| 48V-60V                                 | ●                                 | ●                               |
| 100V...130V                             | ●                                 | ●                               |
| 220V...250V                             | ●                                 | ●                               |
| Operating limits (IEC60947-2 standards) | 85%...110% Un                     |                                 |
| Inrush power (Ps)                       | 300VA E1.2<br>500VA E2.2 ... E6.2 | 300W E1.2<br>500W E2.2 ... E6.2 |
| Inrush time                             | 200ms                             |                                 |
| Continuous power (Pc)                   | 100VA E1.2<br>150VA E2.2 ... E6.2 | 100W E1.2<br>150W E2.2 ... E6.2 |
| Charging time                           |                                   |                                 |
| E1.2                                    | 8 sec                             |                                 |
| E2.2 ... E6.2                           | 7 sec                             |                                 |

Note: charging time is referring to standard condition (Vn; Tamb)



Fig. 09A



Fig. 09B

Electrical diagram reference: figure 13



Fig. 10

## Safety

### Key lock in open position - KLC (Fig. 10)

Due to these safety devices, the SACE Emax 2 circuit-breaker can be locked in the open position. The lock can also be used during maintenance activities when the shield of the accessories area is removed. The device is available with lock with different keys – KLC-D (for only one circuit-breaker) or with the same keys – KLC-S (for several circuit-breakers). Four different key numbers are available for the KLC-S. SACE Emax 2 also allows alternative key lock to be installed. The following key lock set-ups are also available:

- Ronis
- STI
- Kirk
- Castell

In this case, the key locks must be supplied by the customer.



Fig. 11

### Padlocks - PLC (Fig. 11)

These padlock options allow the circuit-breaker to be kept open by acting directly on the mechanical operating device (opening pushbutton). Three different padlock versions are available:

- Locking device with plastic structure for up to a maximum of three padlocks of 4 mm
- Locking device with metal structure for up to a maximum of two padlocks of 8 mm
- Locking device with metal structure for one padlock of 7 mm or for padlock holders

The padlocks must be supplied by the customer. This device is an alternative to the PBC.

### Key lock in racked-in / test / racked-out position - KLP (Fig. 12)

This device enables the mobile part to be locked in one of the three positions: racked-in, test and racked-out. This device can be supplied with locks with different keys – KLP-D or with the same keys – KLP-S.

A second key lock option can be added for a maximum of two key locks per breaker. Locking in the racked-in, test and racked-out positions can be achieved by using other key locks – KLP-A. Adapters are offered for acceptance of Ronis, STI, Kirk and Castell locks, which are to be provided by the customer. With the exception of the Castell version, every circuit-breaker can accept up to two key locks. Moreover, it is possible to allow locking only when in the racked-out position with a supplementary accessory.



Fig. 12

### Padlock in racked-in / test / racked-out position - PLP (Fig. 13)

This device can hold up to three padlocks of 8 mm in diameter. The structure housing the padlocks can also be used in combination with the 2 lock KLP keylock option. Furthermore, it enables the lock of the moving part in the racked-out position only by means of the supplementary lock in racked-out position.

### Shutter lock – SL

When the mobile part is in the test position, the shutters of the fixed part close, maintaining the insulation distance and physically segregating the live parts of the of the cradle from the internal breaker compartment of the cradle. Using two dedicated mechanisms, the upper and lower shutters can be locked independently of one another. The shutter lock is always supplied with the fixed part of the SACE Emax 2 circuit-breakers and locks the shutters, using a maximum of three padlocks of 4 mm, 6 mm or 8 mm.



Fig. 13

# Accessories for circuit-breakers



Fig. 14

## Protection devices

### Lock for racking-out mechanism with circuit-breaker in closed position (Fig. 14)

All SACE Emax 2 withdrawable circuit-breakers are always supplied with a lock that prevents the mobile part from being racked in and racked out when the circuit-breaker is in the closed position. To rack in the mobile part, the circuit-breaker must be in the open position.

### Lock for racking in / racking out the mobile part when the door is open - DLR

This accessory, which is mounted on the fixed part, prevents the mobile part from being racked in or out when the switchgear door is open.



Fig. 15

### Lock to prevent door opening when the circuit-breaker is in racked-in / test position - DLP (Fig. 15)

This safety device prevents the switchgear door from being opened when the mobile part of the withdrawable version of the circuit-breaker is in the racked-in or test position. This accessory can be installed on either the right-hand or left-hand side of the fixed part. It is available for circuit-breakers E2.2, E4.2 and E6.2. If mounted on the right side, it is an alternative to the mechanical interlock, the AUX 15Q or the DLC.



Fig. 16

### Lock to prevent door opening when the circuit-breaker is in the closed position - DLC (Fig. 16)

This prevents the compartment door from being opened when the circuit-breaker is in the closed position (and with the circuit-breaker racked in for withdrawable circuit-breakers). It also blocks the circuit breaker from closing when the compartment door is open. DLC for E1.2 is an alternative to the mechanical interlock and the AUX 15Q. DLC direct door for E2.2...E6.2 is compatible with mechanical interlocks type A-B-D and the AUX 15Q. DLC cable door for E2.2...E6.2 is not compatible with mechanical interlock. DLC cable door for E2.2...E6.2 is compatible with the AUX 15Q.

### Anti-insertion lock

The withdrawable circuit-breakers are equipped with special locks that allow the mobile part to be inserted only into the corresponding fixed part.



### Mechanical operation counter - MOC (Fig. 17)

The number of mechanical operations is often one of the elements that determines the frequency of ordinary maintenance operations on circuit-breakers. With this mechanical operation counter, which is always visible on the front of the circuit-breaker, the user knows how many mechanical operations the device has performed.



Fig. 17





### Protection device for opening and closing pushbuttons - PBC (Fig. 18)

This accessory is applied to the safety cover of the circuit-breaker and is available in two versions:

- Pushbutton protection device, which blocks operations on both the opening and closing pushbuttons unless the special key is used.
- Padlockable pushbutton protection device, which makes it possible to block either or both pushbuttons and lock the covers in place. It does not trip the breaker as a standard "Padlock device" would.
- PBC is an alternative to PLC padlocks.



Fig. 18

### IP30 Protection (Fig. 19)

Supplied with every circuit-breaker, the cover frame is installed on the door of the switchgear to achieve IP30 degree of protection on the front part of the circuit-breaker.



Fig. 19

### IP54 Protection (Fig. 20)

This transparent cover completely protects the front of the circuit-breaker, enabling an IP54 degree of protection to be achieved. This accessory is provided with double key lock (same or different keys).



Fig. 20

### Terminal covers – HTC / LTC (Fig. 21)

These accessories are installed over in the terminal area, thereby reducing the risk of direct contact with the live parts of the circuit-breaker. Two versions are available for E1.2: HTC high terminal covers and LTC low terminal covers.



Fig. 21

### Separators - PB (Fig. 22)

These protection devices increase the insulation distance between adjacent phases. They are available for all the frames.



Fig. 22

### 0-ARC Distance top cover

This accessory allows the circuit-breakers to reach the 0-arc distance performance. Installable on the fixed part of E2.2, E4.2 and E6.2 gives the possibility to dimension the cubicle at the same height of the fixed part. The 0-arc distance top cover is not compatible with the AUP auxiliary contacts IEC version, but alternatively it is possible to install the AUP auxiliary contacts UL version.

### Remote Racking Device - RRD

The Remote Racking Device (RRD) operates Emax 2 circuit breakers without being in front of the gear. The remote control is connected to the main device through 10mt cable that allows the Racking-in/out command from a remote location. The cable length guarantees enough distance from the arc flash boundary of traditional low voltage switchgears. The RRD can only operate with the circuit breaker in open position and discharged springs. The RRD for switchgear and controlgear has been investigated by UL in accordance with the Standards UL 2876 and CSA-C22.2 (n.14).

### General characteristics

|                                         |                  |
|-----------------------------------------|------------------|
| Rated service voltage                   | 100...127V AC    |
|                                         | 200...240V AC/DC |
| Frequency                               | 50-60Hz          |
| Rated power                             | 150 W, 120VA     |
| Working and storage temperature range   | -5°C...+70°C     |
| Minimum time interval between operation | 3 minutes        |
| Maximum operating distance              | 100m             |
| Weight                                  | 11Kg             |

# Accessories for circuit-breakers

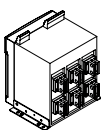
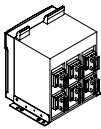
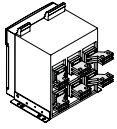
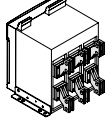
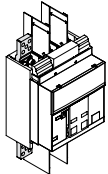
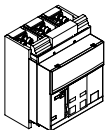
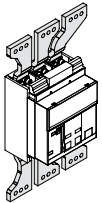
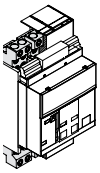
## Connections

The SACE Emax 2 circuit-breakers offer a wide variety of terminals, thereby always guaranteeing an optimal solution for connection to the power circuit.

Emax 2 product family is tested according to IEC standard 60947.2 and 60947.3.

Customer applications need to be validated applying the type tests of the related standards.

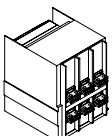
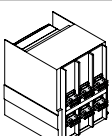
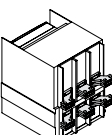
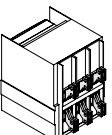
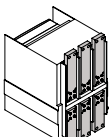
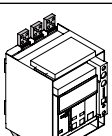
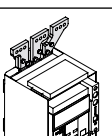
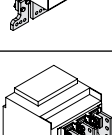
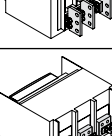
### Solution for fixed circuit-breakers

| Type                                              | Abbreviation |                                                                                     | E1.2                 | E2.2         | E4.2         | E6.2         |
|---------------------------------------------------|--------------|-------------------------------------------------------------------------------------|----------------------|--------------|--------------|--------------|
| Rear adjustable terminal *                        | HR<br>VR     |    | Single stab design   |              |              |              |
|                                                   |              |                                                                                     | ○                    | ● Iu = 2000A | ● Iu = 3200A | ● Iu = 5000A |
|                                                   |              |                                                                                     | Multiple stab design |              |              |              |
|                                                   |              |                                                                                     |                      | ● Iu = 2500A | ● Iu = 4000A | ● Iu = 6300A |
| Long Rear adjustable terminal                     | LHR<br>LVR   |    | Multiple stab design |              |              |              |
|                                                   |              |                                                                                     |                      | ○ Iu = 2500A | ○ Iu = 4000A | ○ Iu = 6300A |
| Horizontal rear spread terminal                   | SHR          |   | Single stab design   |              |              |              |
|                                                   |              |                                                                                     |                      | ○ Iu = 2000A | ○ Iu = 3200A |              |
|                                                   |              |                                                                                     | Multiple stab design |              |              |              |
|                                                   |              |                                                                                     |                      | ○ Iu = 2500A | ○ Iu = 4000A |              |
| Vertical rear spread terminal                     | SVR          |  | Single stab design   |              |              |              |
|                                                   |              |                                                                                     |                      | ○ Iu = 2000A | ○ Iu = 3200A |              |
|                                                   |              |                                                                                     | Multiple stab design |              |              |              |
|                                                   |              |                                                                                     |                      | ○ Iu = 2500A | ○ Iu = 4000A |              |
| Extended front terminal                           | EF           |  | ○                    |              |              |              |
| Front terminal                                    | F            |  | ●                    | ○            | ○            | ○            |
| Front spread terminal                             | ES           |  | ○                    |              |              |              |
| Terminal for cable<br>FcCuAl 4x240mm <sup>2</sup> | FcCuAl       |  | ○                    |              |              |              |

- Standard configuration
- Configuration on request

(\*) The adjustable terminals are supplied as standard in the HR – HR configuration.

## Solutions for fixed parts, withdrawable circuit-breakers

| Type                                              | Abbreviation |                                                                                     | E1.2                 | E2.2         | E4.2                           | E6.2                                               |
|---------------------------------------------------|--------------|-------------------------------------------------------------------------------------|----------------------|--------------|--------------------------------|----------------------------------------------------|
| Rear adjustable terminal *                        | HR<br>VR     |    | Single stab design   |              |                                |                                                    |
|                                                   |              |                                                                                     | ●                    | ● Iu = 2000A | ● Iu = 3200A                   | ● Iu = 5000A                                       |
|                                                   |              |                                                                                     | Multiple stab design |              |                                |                                                    |
|                                                   |              |                                                                                     |                      | ● Iu = 2500A | ● Iu = 4000A<br>○ Iu = 3200A** | ● Iu = 6300A<br>○ Iu = 5000A**<br>or X performance |
| Long Rear adjustable terminal                     | LHR<br>LVR   |    | Multiple stab design |              |                                |                                                    |
|                                                   |              |                                                                                     |                      | ○ Iu = 2500A | ○ Iu = 4000A                   | ○ Iu = 6300A<br>or X performance                   |
| Horizontal rear terminal                          | SHR          |    | Single stab design   |              |                                |                                                    |
|                                                   |              |                                                                                     |                      | ○ Iu = 2000A | ○ Iu = 3200A                   |                                                    |
|                                                   |              |                                                                                     | Multiple stab design |              |                                |                                                    |
|                                                   |              |                                                                                     |                      | ○ Iu = 2500A | ○ Iu = 4000A                   |                                                    |
| Vertical rear spread terminal                     | SVR          |   | Single stab design   |              |                                |                                                    |
|                                                   |              |                                                                                     |                      | ○ Iu = 2000A | ○ Iu = 3200A                   |                                                    |
|                                                   |              |                                                                                     | Multiple stab design |              |                                |                                                    |
|                                                   |              |                                                                                     |                      | ○ Iu = 2500A | ○ Iu = 4000A                   |                                                    |
| Front terminal                                    | F            |  |                      | ○            | ○                              | ○                                                  |
| Extended front terminal                           | EF           |  | ○                    |              |                                |                                                    |
| Front spread terminal                             | ES           |  | ○                    |              |                                |                                                    |
| Terminal for cable<br>FcCuAl 4x240mm <sup>2</sup> | Fc CuAl      |  | ○                    |              |                                |                                                    |
| Flat terminal                                     | FL           |  |                      | ○            | ○                              | ○                                                  |

- Standard configuration  
○ Configuration on request

(\*) The adjustable terminals are supplied as standard in the HR – HR configuration.

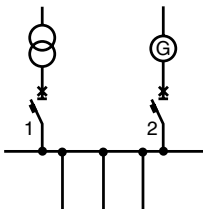
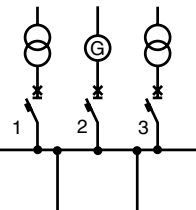
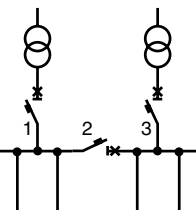
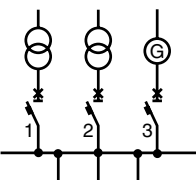
(\*\*) Fixed parts accessorized with rear orientable terminals with multiple stabs guarantee higher performances in switchboard installations.

# Accessories for circuit-breakers

## Interlocks and switching devices

### Mechanical interlocks

These interlock systems enable various opening and closing configurations to be obtained between two or three circuit-breakers. Four types of interlock configuration are available:

| Types of interlock                                                                                                         | Possible application                                                                                                                                                                                        | Logic                                                                                                                                                                                                                                                                                                                                   | Circuit-breakers |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|---|---|---|---|---|---|-------------------------------------------------------------------------------------------------|---|---|---|---|---|---|--------------------------------------------------------------------------------------------------|---|---|--------------------------------------------------------------------------------------------------|---|---|---|---|---|--------------------------------------------------------------------------------------------------|
| Type A                                                                                                                     |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| Excludes the possibility of having two circuit-breakers in the closed position at the same time.                           | Main line power supply and emergency power supply.<br>                                                                     | <table><tr><th>1</th><th>2</th></tr><tr><td>O</td><td>O</td></tr><tr><td>I</td><td>O</td></tr><tr><td>O</td><td>I</td></tr></table>                                                                                                                                                                                                     | 1                | 2 | O | O | I | O | O | I | Available between circuit-breakers of different sizes and with any fixed / withdrawable version |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| 1                                                                                                                          | 2                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | O                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| I                                                                                                                          | O                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | I                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| Type B                                                                                                                     |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| Permits a pair of circuit-breakers to be closed if the third is open. The latter can only be closed when the pair is open. | Two power supplies from transformers and one emergency power supply.<br>                                                 | <table><tr><th>1</th><th>2</th><th>3</th></tr><tr><td>O</td><td>O</td><td>O</td></tr><tr><td>I</td><td>O</td><td>O</td></tr><tr><td>O</td><td>O</td><td>I</td></tr><tr><td>I</td><td>O</td><td>I</td></tr><tr><td>O</td><td>I</td><td>O</td></tr></table>                                                                               | 1                | 2 | 3 | O | O | O | I | O | O                                                                                               | O | O | I | I | O | I | O                                                                                                | I | O | Available between E2.2, E4.2 and E6.2 circuit-breakers and with any fixed / withdrawable version |   |   |   |   |   |                                                                                                  |
| 1                                                                                                                          | 2                                                                                                                                                                                                           | 3                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | O                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| I                                                                                                                          | O                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | O                                                                                                                                                                                                           | I                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| I                                                                                                                          | O                                                                                                                                                                                                           | I                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | I                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| Type C                                                                                                                     |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| Permits two out of three circuit-breakers to be closed at the same time.                                                   | Two half-busbars can be powered by a single transformer (bus-tie closed) or by both at the same time (bus-tie open).<br> | <table><tr><th>1</th><th>2</th><th>3</th></tr><tr><td>O</td><td>O</td><td>O</td></tr><tr><td>I</td><td>O</td><td>O</td></tr><tr><td>O</td><td>I</td><td>O</td></tr><tr><td>O</td><td>O</td><td>I</td></tr><tr><td>O</td><td>I</td><td>I</td></tr><tr><td>I</td><td>I</td><td>O</td></tr><tr><td>I</td><td>O</td><td>I</td></tr></table> | 1                | 2 | 3 | O | O | O | I | O | O                                                                                               | O | I | O | O | O | I | O                                                                                                | I | I | I                                                                                                | I | O | I | O | I | Available between E2.2, E4.2 and E6.2 circuit-breakers and with any fixed / withdrawable version |
| 1                                                                                                                          | 2                                                                                                                                                                                                           | 3                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | O                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| I                                                                                                                          | O                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | I                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | O                                                                                                                                                                                                           | I                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | I                                                                                                                                                                                                           | I                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| I                                                                                                                          | I                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| I                                                                                                                          | O                                                                                                                                                                                                           | I                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| Type D                                                                                                                     |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                         |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| Permits one out of three interlocked circuit-breakers to be closed.                                                        | Three power supplies on the same busbar that must not operate in parallel.<br>                                           | <table><tr><th>1</th><th>2</th><th>3</th></tr><tr><td>O</td><td>O</td><td>O</td></tr><tr><td>I</td><td>O</td><td>O</td></tr><tr><td>O</td><td>I</td><td>O</td></tr><tr><td>O</td><td>O</td><td>I</td></tr></table>                                                                                                                      | 1                | 2 | 3 | O | O | O | I | O | O                                                                                               | O | I | O | O | O | I | Available between E2.2, E4.2 and E6.2 circuit-breakers and with any fixed / withdrawable version |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| 1                                                                                                                          | 2                                                                                                                                                                                                           | 3                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | O                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| I                                                                                                                          | O                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | I                                                                                                                                                                                                           | O                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |
| O                                                                                                                          | O                                                                                                                                                                                                           | I                                                                                                                                                                                                                                                                                                                                       |                  |   |   |   |   |   |   |   |                                                                                                 |   |   |   |   |   |   |                                                                                                  |   |   |                                                                                                  |   |   |   |   |   |                                                                                                  |

The mechanical interlocks offer multiple solutions for installation that simplify their integration into the switchgear. The interlocks can be mounted:

- vertically VR
- horizontally HR
- mixed L

Different types of interlocks can be supplied according to the maximum distance between two interlocked breakers:

| Configuration |      | Type A | Type B, C, D |
|---------------|------|--------|--------------|
| Horizontal    |      | 2750mm | 1600mm       |
| Vertical      |      | 1000mm | 1000mm       |
| Breakers      | E1.2 | ●      | -            |
|               | E2.2 | ●      | ●            |
|               | E4.2 | ●      | ●            |
|               | E6.2 | ●      | ●            |

For B, C and D types, the maximum distance between the two furthest breakers is 3200mm for horizontal configurations and 2000mm for vertical configurations. It is possible to make the mechanical interlock among three circuit-breakers disposed in 'L position' by using the cables of three horizontal circuit-breakers interlock. Make sure the distance between the horizontal and vertical circuit-breakers respects the minimum and maximum distance. All cables can be cut to guarantee easy installation in switchboards. Mechanical interlocks are not compatible with AUX 15Q, the lock for preventing door opening when the circuit breaker is in the closed position (DLC) or when the circuit breaker is in the racked in or test position (DLP), if mounted on the right side.

#### External Automatic Transfer Switches ATS

The ATS (Automatic Transfer Switch) is a network-unit transfer device used in installations where switching from the main power line to an emergency line is required in order to ensure that power is supplied to the loads in the case of power loss or abnormalities from the main line. These devices are able to control the entire transfer procedure automatically, but also offer commands for performing the procedure manually. The new generation of ATSs (ATS021 and ATS022) offers the most advanced and complete solution for ensuring service continuity. The ATS021 and ATS022 devices can also be used with all automatic circuit-breakers and switch-disconnectors of the Tmax XT family. The ATS021 and ATS022 devices have been designed to be self-powered.

ATS022 is also designed for the connection of an auxiliary supply, which enables the use of further functions.

The ATS021 and ATS022 devices carry out control of both power supply lines and also analyze:

- phase imbalance;
- frequency imbalance;
- phase loss.

In addition to the standard control functions, the ATS022 unit also permits:

- the priority line to be selected;
- a third circuit-breaker to be controlled;
- the device to be integrated into a supervision system with Modbus communication (auxiliary supply needed);
- parameters to be read and set, and measurements and alarms to be displayed by means of a graphical display.

Typical applications are: supply of UPS (Uninterrupted Power Supply) units, operating rooms and primary hospital services, emergency power for civil buildings, airports, hotels, databases and telecommunication systems and power supply of industrial lines in continuous processes.

For correct configuration, each circuit-breaker connected to the ATS021 or ATS022 device must be fitted with the following accessories:

- mechanical interlock;
- motorized control of opening and closing;
- contact for signalling status (open / closed) and contact for signalling tripping;
- contact for signalling circuit-breaker racked in (for withdrawable circuit-breaker).

# Accessories for circuit-breakers



## Technical characteristics

|                          |                                                                                              | ATS021                                                          | ATS022                                                                                          |     |
|--------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----|
| General                  | Auxiliary supply voltage                                                                     | Not required                                                    | Not required<br>(24-110V DC is required only for Modbus communication and systems of 16 2/3 Hz) |     |
|                          | Supply voltage, Un                                                                           | Max 480V AC                                                     | Max 480V AC                                                                                     |     |
|                          | Frequency, fn                                                                                | 50, 60 Hz                                                       | 16 2/3, 50, 60, 400 Hz                                                                          |     |
|                          | <div></div> | H mm                                                            | 96                                                                                              | 96  |
|                          |                                                                                              | W mm                                                            | 144                                                                                             | 144 |
|                          |                                                                                              | D mm                                                            | 170                                                                                             | 170 |
|                          | Type of installation                                                                         | Installation on front of switchgear<br>Installation on DIN rail | Installation on front of switchgear<br>Installation on DIN rail                                 |     |
| Operating mode           | Automatic/Manual                                                                             | Automatic/Manual                                                |                                                                                                 |     |
| Characteristics          | Monitoring of normal and emergency line                                                      | ●                                                               | ●                                                                                               |     |
|                          | Control of circuit-breakers on normal and emergency line                                     | ●                                                               | ●                                                                                               |     |
|                          | Setting start-up of generator                                                                | ●                                                               | ●                                                                                               |     |
|                          | Setting switch-off of generator with settable time delay                                     | ●                                                               | ●                                                                                               |     |
|                          | Third circuit-breaker                                                                        | -                                                               | ●                                                                                               |     |
|                          | Selection priority line                                                                      | -                                                               | ●                                                                                               |     |
|                          | Modbus Rs485 communication                                                                   | -                                                               | ●                                                                                               |     |
|                          | Display                                                                                      | -                                                               | ●                                                                                               |     |
| Environmental conditions | Protection degree                                                                            | IP20*                                                           | IP20*                                                                                           |     |
|                          | Operating temperature                                                                        | -20 ... +60 °C                                                  | -20 ... +60 °C                                                                                  |     |
|                          | Humidity                                                                                     | 5% - 90% without condensation                                   | 5% - 90% without condensation                                                                   |     |
| Operating thresholds     | Undervoltage                                                                                 | -30% ... -5% Un                                                 | -30% ... -5% Un                                                                                 |     |
|                          | Overvoltage                                                                                  | +5% ...+30% Un                                                  | +5% ...+30% Un                                                                                  |     |
|                          | Frequency thresholds                                                                         | -10% / +10% fn                                                  | -10% ... +10% fn                                                                                |     |
| Tests                    | Test Mode                                                                                    | ●                                                               | ●                                                                                               |     |
|                          | Mode Test Gen set                                                                            | ●                                                               | ●                                                                                               |     |
| Standards                | Electronic devices for use in electrical installations                                       | EN-IEC 50178                                                    | EN-IEC 50178                                                                                    |     |
|                          | Electromagnetic compatibility                                                                | EN 50081-2                                                      | EN 50081-2                                                                                      |     |
|                          |                                                                                              | EN 50082-2                                                      | EN 50082-2                                                                                      |     |
|                          | Environmental conditions                                                                     | IEC 68-2-1                                                      | IEC 68-2-1                                                                                      |     |
|                          |                                                                                              | IEC 68-2-2                                                      | IEC 68-2-2                                                                                      |     |
|                          |                                                                                              | IEC 68-2-3                                                      | IEC 68-2-3                                                                                      |     |

Electrical diagram reference: figures 100,101 and 102.

\* IP54 available with 1SCA101001R1001 accessory

# Accessories for Ekip trip units

The electronic trip unit accessories enable utilization of all the potential of Ekip protection trip units in terms of signalling, connectivity, protection functions and testing.

|                                                                  | Electronic trip unit |                  |               |              |                 |
|------------------------------------------------------------------|----------------------|------------------|---------------|--------------|-----------------|
|                                                                  | Ekip DIP             | Ekip Touch       | Ekip Hi-Touch | Ekip G Touch | Ekip G Hi-Touch |
| <b>Power supply</b>                                              |                      |                  |               |              |                 |
| Ekip Supply                                                      | ○                    | ○                | ○             | ○            | ○               |
| Battery for Ekip trip units                                      | ○                    | ○                | ○             | ○            | ○               |
| <b>Connectivity</b>                                              |                      |                  |               |              |                 |
| Ekip Com                                                         |                      | ○                | ○             | ○            | ○               |
| Ekip Com Redundant                                               |                      | ○                | ○             | ○            | ○               |
| Ekip Com Actuator                                                | ○                    | ○                | ○             | ○            | ○               |
| Ekip Link                                                        | ○                    | ○                | ○             | ○            | ○               |
| <b>Signalling</b>                                                |                      |                  |               |              |                 |
| Ekip Signalling 2K                                               |                      | ○                | ○             | ○            | ○               |
| Ekip Signalling 3T                                               |                      | ○                | ○             | ○            | ○               |
| Ekip Signalling 4K <sup>(1)</sup>                                |                      | ○                | ○             | ○            | ○               |
| Ekip Signalling 10K                                              | ○                    | ○                | ○             | ○            | ○               |
| Ekip Signalling Modbus TCP                                       | ○                    | ○                | ○             | ○            | ○               |
| Ekip AUP                                                         | ○                    | ○                | ○             | ○            | ○               |
| Ekip RTC                                                         | ○                    | ○                | ○             | ○            | ○               |
| <b>Measurement and Protection</b>                                |                      |                  |               |              |                 |
| Measurement Enabler with voltage sockets                         |                      | ○                | ●             | ●            | ●               |
| Measurement Enabler                                              |                      | ● <sup>(2)</sup> |               |              |                 |
| Ekip Synchrocheck                                                |                      | ○                | ○             | ○            | ○               |
| Ekip LCD                                                         |                      | ○                | ○             | ○            | ○               |
| Rating Plug                                                      | ○                    | ○                | ○             | ○            | ○               |
| Homopolar toroid                                                 |                      | ○                | ○             | ○            | ○               |
| Toroid for differential protection                               |                      | ○                | ○             | ○            | ○               |
| Current sensor for neutral conductor outside the circuit-breaker | ○                    | ○                | ○             | ○            | ○               |
| <b>Displaying and Supervision</b>                                |                      |                  |               |              |                 |
| Ekip Multimeter                                                  | ○                    | ○                | ○             | ○            | ○               |
| Ekip Control Panel <sup>(3)</sup>                                | ○                    | ○                | ○             | ○            | ○               |
| <b>Testing and Programming</b>                                   |                      |                  |               |              |                 |
| Ekip TT                                                          | ○                    | ○                | ○             | ○            | ○               |
| Ekip T&P                                                         | ○                    | ○                | ○             | ○            | ○               |
| Ekip T&P: Ekip Programming                                       | ○                    | ○                | ○             | ○            | ○               |

● Standard accessory

○ Accessory on request

<sup>(1)</sup> Not available for E1.2

<sup>(2)</sup> Measurements to be activated with the dedicated software package

<sup>(3)</sup> Available for Ekip trip units, Grey Platform only



# Accessories for Ekip trip units

All accessories are automatically recognized by the Ekip units without the need for any specific configuration. Based on the installation method and connection of the trip units, the electronic accessories can be divided into:

| Installation             | Modules                                                                                                                                                          | Highlights                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Terminal box             | Cartridge modules:<br>- Ekip Com<br>- Ekip Link<br>- Ekip Signalling 2K<br>- Ekip Signalling 3T<br>- Ekip Supply<br>- Ekip Synchrocheck                          | <ul style="list-style-type: none"> <li>- The Ekip Supply module enables the trip units to be supplied with a wide range of control voltages</li> <li>- The Ekip supply module must be present for the other modules to be used</li> <li>- The Ekip Supply module has a dedicated position in the installation area in the terminal box; the other modules can be installed as desired in the positions available</li> <li>- When fitted with the Ekip Supply module, up to 2 additional modules can be installed on E1.2, and up to 3 on E2.2, E4.2 and E6.2</li> </ul>                                                                                                                                                                                                                                                               |
| Accessorizing area       | Ekip LCD<br>Ekip Com Actuator<br>Ekip RTC<br>Ekip AUP<br>Ekip Signalling 4K<br>Rating Plug<br>Battery for Ekip                                                   | <ul style="list-style-type: none"> <li>- These are installed in specific housings from the front of the circuit-breaker</li> <li>- For all the trip units with a touch screen interface, an LCD version is available with any adjustment in the protection and measurements functions</li> <li>- Thanks to the optional modules Ekip RTC and Ekip AUP, all the Ekip trip units can acquire and monitor the ready to close state and the racked-in/test isolated/racked-out position of the circuit-breaker. The module to acquire the open/closed position is supplied as standard for all Ekip trip units.</li> <li>- The Ekip Signalling 4k module increases the remote signalling possibilities for E2.2, E4.2 and E6.2 and can be installed if the Ekip Supply module or another 24V auxiliary power supply is present</li> </ul> |
| Ekip trip unit test port | Ekip T&P<br>Ekip TT                                                                                                                                              | <ul style="list-style-type: none"> <li>- These can be connected to the front test port of the trip units even with the device in operation</li> <li>- Compatible also with the SACE Tmax XT range</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| External                 | Ekip Multimeter<br>Ekip Control Panel<br>Ekip Signalling 10K<br>Ekip Signalling Modbus TCP<br>External neutral sensor<br>Homopolar toroid<br>Differential toroid | <ul style="list-style-type: none"> <li>- Ekip Multimeter can supply a 24V DC output to the trip unit it is connected to</li> <li>- Several Ekip units and / or Ekip Signalling 10K can be connected at the same time to the same Ekip trip unit</li> <li>- These are connected to the trip unit by the terminal box of the circuit-breaker</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



Fig. 23

## Power supply

### Ekip Supply module (Fig. 23)

The Ekip Supply module supplies all Ekip trip units and modules present on the terminal box and of the circuit-breaker with several auxiliary power (in AC or DC) available in the switchgear. The module is mounted in the terminal box and permits the installation of the other advanced modules. It can be field installed at any time.

Two versions are available according to the control voltage available:

- Ekip Supply 110-240V AC/DC
- Ekip Supply 24-48V DC

|                                 | Supply                                 | Ekip Supply  |                |
|---------------------------------|----------------------------------------|--------------|----------------|
| <b>Ekip Dip</b>                 | <b>Nominal voltage</b>                 | 24-48V DC    | 110-240V AC/DC |
|                                 | <b>Voltage range</b>                   | 21,5-53V DC  | 105-265V AC/DC |
|                                 | <b>Rated power (including modules)</b> | 10W max.     | 10W max.       |
|                                 | <b>Inrush current</b>                  | ~2A for 20ms | ~2A for 20ms   |
| <b>Ekip Touch/<br/>Hi-Touch</b> | <b>Nominal voltage</b>                 | 24-48V DC    | 110-240V AC/DC |
|                                 | <b>Voltage range</b>                   | 21,5-53V DC  | 105-265V AC/DC |
|                                 | <b>Rated power (including modules)</b> | 10W max.     | 10W max.       |
|                                 | <b>Inrush current</b>                  | ~2A for 20ms | ~2A for 20ms   |



Fig. 24

## Connectivity

### Ekip Com modules (Fig. 24)

The Ekip communication modules enable SACE Emax 2 circuit-breakers to be integrated in an industrial communication network for remote supervision and control of the circuit-breaker. They are suitable for all distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units. Since they are mounted in the terminal box, communication can be maintained with withdrawable circuit-breakers, even while in the racked-out position. Several Ekip Com modules can be installed at the same time, thereby enabling connection to communication systems that use different protocols.

The Ekip Com modules for Modbus RTU, Profibus-DP and DeviceNet™ contain a terminating resistor and dip switch for optional activation to terminate the serial network or bus.

The Profibus-DP module also contains a polarization resistor and dip switch for its activation.

The Ekip Com modules are supplied with auxiliary position contacts Ekip AUP and ready to close circuit-breaker contacts Ekip RTC.

For industrial applications in which a higher reliability of the communication network is required, the Ekip Com Redundant modules can be installed together with the corresponding Ekip Com modules in order to guarantee a back-up connection to the network.

The following communication protocols are available for Ekip trip units:

| Protocol           | Ekip Com Module        | Ekip Com Redundant Module |
|--------------------|------------------------|---------------------------|
| Modbus RTU         | Ekip Com Modbus RS-485 | Ekip Com R Modbus RS-485  |
| Modbus TCP         | Ekip Com Modbus TCP    | Ekip com R Modbus TCP     |
| Profibus-DP        | Ekip Com Profibus      | Ekip Com R Profibus       |
| Profinet           | Ekip Com Profinet      | Ekip Com R Profinet       |
| EtherNet/IP™       | Ekip Com EtherNet/IP™  | Ekip Com R EtherNet/IP™   |
| DeviceNet™         | Ekip Com DeviceNet™    | Ekip Com R DeviceNet™     |
| IEC61850           | Ekip Com IEC61850      | Ekip Com R IEC61850       |
| Cloud connectivity | Ekip Com Hub           | –                         |

Electrical diagram reference: figures from 51 to 57. Redundant version from 61 to 66.

# Accessories for Ekip trip units



Fig. 25



Fig. 26



Fig. 27

## Ekip Link Module (Fig. 25)

The Ekip Link module enables the SACE Emax 2 circuit-breaker to be connected to ABB communication system for locally supervising switchgear by means of the Ekip Control Panel and to act as Power Controller. It is suitable for all Ekip trip units and can be factory or field installed in time to the circuit-breaker terminal box, even when Ekip Com communication modules are present. In this way, it is possible to have both local supervision of the control panel by means of the Ekip Control Panel and supervision of the system by means of the Ekip Com modules connected to the communication network. The Ekip Link modules are supplied complete with auxiliary position contacts Ekip AUP and ready to close circuit-breaker contacts Ekip RTC.

—  
Electrical diagram reference: figure 58

## Ekip Com Hub (Fig. 26)

Ekip Com Hub is the new communication module for Emax 2 cloud-connectivity.

Emax 2 equipped with Ekip Com Hub can establish the connection to ABB Ability™ Energy and Asset Manager for the whole low-voltage power distribution panel. This dedicated cartridge-type communication module just needs to be inserted into the terminal box and connected to the internet.

For further information related to ABB Ability™ Energy and Asset Manager, please visit the dedicated website <https://new.abb.com/about/our-businesses/electrification/abb-ability/energy-and-asset-manager>.

—  
Ekip Com Hub has to be connected to the external network in order to refresh the Cybersecurity Certificate and have it always up to date. In case of long-term disconnections from the network for more than 6 months (e.g. module in stock or physically disconnected), the correct functioning of Ekip Com Hub can be inhibited from the cybersecurity measures in place. It is recommended to keep the module connected or periodically connect it (e.g. in stock or physically disconnected) to the external network.

## Ekip Com Actuator module (Fig. 27)

The Ekip Com Actuator module enables the SACE Emax 2 circuit-breakers to be opened and closed remotely. The Ekip com Actuator is optional and can be ordered for all Ekip trip units equipped with Ekip Com or Ekip Link modules; it is installed on the front of the circuit-breaker in the right-hand accessories area.

—  
Electrical diagram reference: figures 76, 78



Fig. 28

## Signalling

### Ekip 2K Signalling modules (Fig. 28)

The Ekip 2K Signalling modules supply two input and two output contacts for control and remote signalling of alarms and circuit-breaker trips. They can be programmed from the trip unit's display or through the Ekip Connect software. Furthermore, when using Ekip Connect, combinations of events can be freely configured. They are suitable for all distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units. Three versions of the Ekip 2K Signalling modules are available: Ekip 2K-1, Ekip 2K-2, RELT Ekip 2K-3. In this way, a maximum of three modules for E2.2, E4.2, E6.2, and two for E1.2 can be installed at the same time. The RELT Ekip Signalling 2K-3 module enables the wizard for easy configuration of the arc flash mitigating 2I protection. This automatically assigns the I/O for remote activation and positive feedback.

Electrical diagram reference: figures 41, 42, 43



Fig. 29

### Ekip 3T Signalling modules (Fig. 29)

The Ekip 3T Signalling modules provide three analog inputs for PT100/PT1000 thermo-resistances and one analog input 4-20mA for external sensors. Through the Ekip Connect commissioning tool, it is possible to set different control thresholds and associate them to digital signals. The Ekip 3T Signalling modules are suitable for all the versions of Ekip Touch and Hi-Touch trip units. However, PT100 sensors are compatible with the Ekip black platform only. Up to two modules can be installed simultaneously on SACE Emax 2: one Ekip Signalling 3T-1 and one Ekip Signalling 3T-2. ABB external probes PT1000 are available for busbar applications.



Fig. 30

### Ekip 4K Signalling module (Fig. 30)

The Ekip 4K Signalling module is available for E2.2, E4.2, E6.2. This module provides four input contacts and four output contacts for control and remote signalling. It can be programmed from the trip unit's display or through the Ekip Connect software. Furthermore, when using Ekip Connect, combinations of events can be freely configured.

It is installed in the housing provided in the front left of distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units, without having to remove the trip unit itself and is an alternative to the AUX 6Q auxiliary contacts unit.

Electrical diagram reference: figure 2



Fig. 31

### Ekip 10K Signalling modules (Fig. 31)

Ekip 10K Signalling is an external signalling unit designed for DIN rail installation for SACE Emax 2 automatic circuit-breakers. The unit provides ten contacts for electrical signalling of timing and tripping of protection devices.

If connected via the Ekip Connect software, the contacts can be freely configured in association with any event and alarm or combination of both.

Several Ekip 10K Signalling modules (up to 3) can be installed at the same time on the same Ekip trip unit. The Ekip 10K Signalling module can be powered either by direct or alternating current and can be connected to all the trip units via internal bus or Ekip Link modules.

# Accessories for Ekip trip units



## Ekip Signalling Modbus TCP (Fig. 32)

It is an external signalling unit designed for DIN rail installation. Function of the signalling module is to share, via an Ethernet network with Modbus TCP communication protocol, information about the state of circuit-breakers that might not have the ability to provide such information via Ethernet, and also to allow these circuit-breakers to be operated via remote control.



Fig. 32

| Characteristics of output contacts |                        | Number of contacts |         |          |
|------------------------------------|------------------------|--------------------|---------|----------|
| Type                               | Monostable             | Ekip 2K            | Ekip 4K | Ekip 10K |
| Maximum switching voltage          | 150V DC / 250V AC      |                    |         |          |
| Maximum switching current          |                        |                    |         |          |
| 30V DC                             | 2A                     | 2                  | 4       | 10       |
| 50V DC                             | 0.8A                   | output             | output  | output   |
| 150V DC                            | 0.2A                   | + 2                | + 4     | + 11     |
| 250V AC                            | 4A                     | input              | input   | input    |
| Contact/coil insulation            | 1000 Vrms (1min @50Hz) |                    |         |          |

## Ekip 10K/Ekip Signalling Modbus TCP power supply

|                  |                             |
|------------------|-----------------------------|
| Auxiliary supply | 24-48V DC, 110-240V AC/DC   |
| Voltage range    | 21.5-53V DC, 105-265V AC/DC |
| Rated power      | 10VA/W                      |
| Inrush current   | 1A for 10ms                 |



Fig. 33

## Ekip RTC and Ekip AUP Signalling contacts (Fig. 33)

The signalling contacts allow the Ekip trip units to acquire the ready-to-close status of the circuit-breaker, as well as its racked-in, test or racked-out position. These contacts can be optionally installed in the accessories area of SACE Emax 2 equipped with Ekip Dip, Ekip Touch and Ekip Hi-Touch trip units. Ekip Link and Ekip Com modules are always supplied with Ekip RTC and Ekip AUP.

## Measurement and protection

### Measurement Enabler module (Fig. 34)

The Measurement Enabler module is supplied with Ekip Touch trip units by default and is installed to the right of the trip unit. This module enables the trip unit to internally measure phase and neutral voltages, as well as power and energy. In particular, the Measurement Enabler module makes the platform always customizable through the activation of dedicated software packages available in the ABB Ability Marketplace™. Depending on the functionality desired, a software package may need to be purchased separately. The voltage outlets are installed on the lower terminals by default and can be moved to the upper terminals upon request. No external connection is required, except for rated voltages higher than 690V. In this case, the voltage connection is moved outside the circuit-breaker by using voltage transformers connected to the terminal box. The installation of external outlets does not guarantee Class 1 accuracy.



Fig. 34



Fig. 35

Measurement Enabler with voltage sockets (Fig. 35)

This module has the same features as the Measurement Enabler module, but additionally includes voltage sockets that allow direct connection of line voltages higher than 85V. This module is mandatory for Rc protection and is always supplied with Ekip Hi-Touch and Ekip G trip units. On request, it can be also installed with the Ekip Touch version.



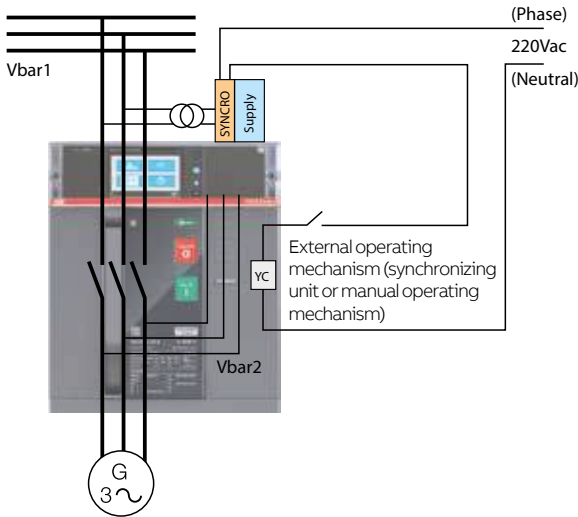
Fig. 36

Ekip Synchrocheck (Fig. 36)

This module enables the control of the synchronism condition when placing two lines in parallel. The module can be used with distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units with the measurement function enabled. Ekip Synchrocheck measures the voltages from two phases of one line through an external transformer and compares them to the measured voltages at the breaker. An output contact is available, which is activated upon reaching synchronism, and enables the circuit-breaker to be closed by means of wiring with the closing coil.

| Characteristics of output contacts |                        | Number of contacts |
|------------------------------------|------------------------|--------------------|
| Type                               | Monostable             | Ekip Synchrocheck  |
| Maximum switching voltage          | 150V DC / 250V AC      |                    |
| Maximum switching current          |                        |                    |
| 30V DC                             | 2A                     | 1 output           |
| 50V DC                             | 0.8A                   |                    |
| 150V DC                            | 0.2A                   |                    |
| 250V AC                            | 4A                     |                    |
| Contact/coil insulation            | 1000 Vrms (1min @50Hz) |                    |

Electrical diagram reference: figure 48



# Accessories for Ekip trip units



Fig. 37

## Ekip LCD interface (Fig. 37)

The Ekip trip units can be supplied with LCD black and white display, equipped with dedicated push-buttons to easily interact with the circuit-breaker. This option is well suited for aggressive environments characterized by low temperatures, high humidity or the presence of dust and chemical agents. The Ekip LCD trip units share the same advanced features with the touchscreen trip units in terms of protections, measurements and accuracy levels. However, the LCD version is not equipped with the embedded Bluetooth antenna.



Fig. 38

## Rating Plug (Fig. 38)

The rating plugs are field interchangeable from the front on all trip units and enable the protection thresholds to be adjusted according to the actual rated current of the system.

This function is particularly advantageous in installations that may require future expansion or in cases in which the power supplied needs to be limited temporarily (e.g. mobile Gen Set). The Overload (L) protection function can be disabled at any time by using an L OFF version of the rating plug. There is a matching L OFF version for each standard version of rating plug.

| Circuit-breaker | Rating plugs available (both in standard and L OFF versions) |
|-----------------|--------------------------------------------------------------|
| E1.2            | 400-630-800-1000-1250-1600                                   |
| E1.2 250        | 100-200-250                                                  |
| E2.2            | 400-630-800-1000-1250-1600-2000-2500                         |
| E2.2 250        | 100-200-250                                                  |
| E4.2            | 400-630-800-1000-1250-1600-2000-2500-3200-4000               |
| E6.2            | 400-630-800-1000-1250-1600-2000-2500-3200-4000-5000-6300     |

Special rating plugs are also available for differential protection against earthing faults in combination with a suitable toroid to be installed externally.

| Circuit-breaker | Rating plug available for Rc protection |
|-----------------|-----------------------------------------|
| E1.2            | 400-630-800-1250                        |
| E1.2 250        | 100-200-250                             |
| E2.2            | 400-630-800-1250-2000                   |
| E2.2 250        | 100-200-250                             |
| E4.2 / E6.2     | 400-630-800-1250-2000-3200-3600-4000    |



Fig. 39

#### Current sensor for neutral conductor outside the circuit-breaker (Fig. 39)

This is only for three-pole circuit-breakers; it enables protection of the neutral conductor to be achieved through connection to the Ekip trip unit. It is supplied on request.

Electrical diagram reference: figure 27



Fig. 40

#### Homopolar toroid for the earthing conductor of main power supply (Fig. 40)

The distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units can be used with an external toroid positioned, for example, on the conductor that connects the star centre of the MV/LV transformer to earth (homopolar transformer): in this case, the earth protection is called Source Ground Return. There are four sizes of the toroid: 100A, 250A, 400A, 800A. The homopolar toroid is an alternative to the toroid for differential protection.

Electrical diagram reference: figure 25



Fig. 41

#### Toroid for differential protection (Fig. 41)

Connected to the Ekip Touch and Hi-Touch LSIG trip units equipped with a rating plug for differential protection, this toroid enables earth fault currents of 3...30A to be monitored. To be installed on the busbar system, it is an alternative to the homopolar toroid.

Electrical diagram reference: figure 24



Fig. 42

#### Dedicated terminal for Modified Differential Ground Fault (MDGF) protection (Fig. 42)

This terminal is needed to realize the MDGF scheme with SACE Emax 2 circuit-breakers. Two types of terminal are available: one for the fixed circuit-breakers and one for the withdrawable ones. The application needs the mounting of external phase current transformers and summing current transformers. SACE Emax 2 MDGF scheme is compatible only with current transformer from Amram that must be purchased separately. External current transformers must have the same rating of the circuit-breaker rating plug.

For the complete application wiring diagram, please refer to 1SDM000019A1001. Listed below the commercial codes of Phase CTs and Summing CTs compatible with SACE Emax 2 MDGF scheme.

| Current rating (A) | Phase current transformer | Summing current transformer |
|--------------------|---------------------------|-----------------------------|
| 800                | CT409-801-01              | CT550-5X4-01000             |
| 1600               | CT409-162-01              | CT550-5X4-02000             |
| 2000               | CT421-202-01              | CT550-5X4-02500             |
| 2500               | CT421-252-01              | CT550-5X4-03125             |
| 3200               | CT421-322-01              | CT550-5X4-04167             |
| 4000               | CT421-402-01              | CT550-5X4-05000             |
| 5000               | CT421-502-01              | CT550-5X4-06250             |



# Accessories for Ekip trip units



Fig. 43

## Displaying and supervision

### Ekip Multimeter (Fig. 43)

Ekip Multimeter is a display unit to be installed on the front of the switchgear for SACE Emax 2 circuit-breakers equipped with Ekip electronic trip units. The device is equipped with a large touch screen display and enables measurements to be displayed with the same levels of precision. If connected to trip units with a display, Ekip Multimeter enables the adjustment of parameters and protection thresholds. Up to 4 Ekip Multimeter devices can be connected at the same time to the same Ekip protection trip unit to display currents, voltage, powers and energy.

Ekip Multimeter can be powered either in direct current or in alternating current. It is equipped with a 24V DC output that supplies the trip unit to which it is connected.

|                |                             |
|----------------|-----------------------------|
| Power supply   | 24-48V DC, 110-240V AC/DC   |
| Tolerance      | 21.5-53V DC, 105-265V AC/DC |
| Rated Power    | 10VA/W                      |
| Inrush current | 2A for 20ms                 |

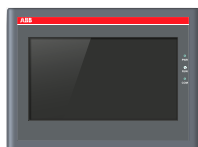


Fig. 44

### Lite panel (Fig. 44)

The Lite Panel is a 7 inches local control panel that can monitor and control max 15 devices connected via Modbus TCP/IP or Modbus RTU.

The most important functionalities of this device:

- User administration: 5 level of user present inside the Lite Panel
- Automatic Scan via Modbus RTU and via Modbus TCP connection of various devices already mapped inside the Lite panel: Emax 2, Tmax XT, ITS2, M4M, CMS700 etc... (see detailed list in the user installation manual)
- Local monitoring directly on the front of the panel for all the devices
- Local control of devices: open, closing, reset
- Alarm list and event log directly visible from one access point



Fig. 45

## Testing and programming

### **Ekip TT testing and power supply unit (Fig. 45)**

Ekip TT allows to supply the Ekip trip unit with no need of auxiliary power supply. In this way, the last protection device tripped can be displayed directly on the screen or by the lighting up of corresponding LEDs. Moreover, the unit permits to verify that the circuit-breaker trip mechanism properly works (trip test). Ekip TT can be directly connected through the front test connector of any Ekip trip units of SACE Emax 2 and allows to set all protection functions.



Fig. 46

### **Ekip T&P testing kit (Fig. 46)**

Ekip T&P is a kit that includes different components for programming and testing the electronic protection trip units.

The kit includes:

- Ekip T&P unit;
- Ekip TT unit;
- adaptors for Emax and Tmax trip units;
- USB cable to connect the T&P unit to the Ekip trip units;
- installation CD for Ekip Connect and Ekip T&P interface software.

The Ekip T&P unit is easily connects from your PC (via USB) to the trip unit (via mini USB) with the cable provided.

The Ekip T&P unit can perform simple manual or automatic tests on the trip unit functions. The Ekip T&P will also provide the ability to conduct more advanced function testing that allows the addition of harmonics and the shifting of phases to more accurately represent the real conditions of an application. Thus, leading to more concise protection function parameters that may be required for critical applications. It can also generate a test report as well as help you to monitor maintenance schedules.



Fig. 47

### **Ekip Programming Module (Fig. 47)**

The Ekip Programming module is used for programming Ekip trip units via USB to a PC using the Ekip Connect software that can be downloaded on-line. This can be useful for uploading/downloading entire sets of parameters for multiple breakers both for set-up as well as for maintenance (for periodic cataloging breaker parameters in case of a catastrophic situation).

# Service



## Extended warranty

For ABB Low Voltage circuit breakers, extending the 1-year standard factory warranty to up to 5 years has never been so simple.

Extended warranty activation can be requested after the online registration in the Extended Warranty tool. This web-tool verifies that the application of the circuit breaker is within the recommended guidelines, and grant the registration of the circuit breaker.

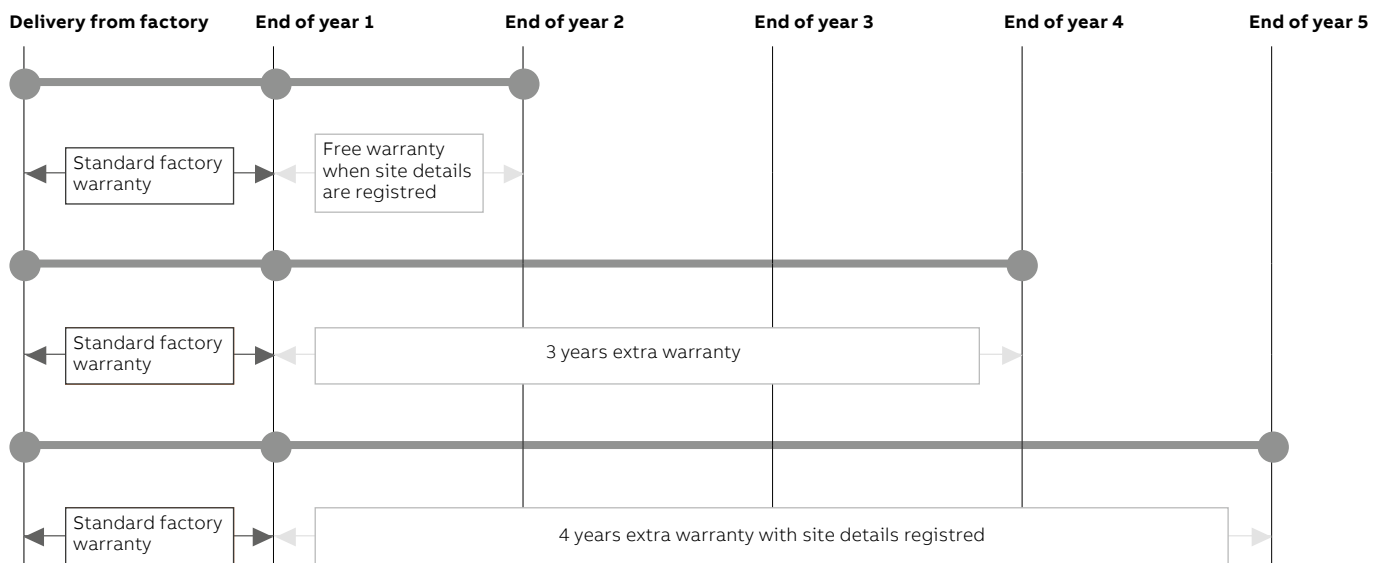
When end users details are registered, one year of extra warranty is offered free-of-charge.

Extended Warranty can be ordered by following the steps:

- 1) Registration in the online tool (Extended Warranty Tool) to verify the application.
- 2) Extended Warranty part number(s) and registration code received by email
- 3) Place the order of the circuit breaker(s) together with:
  - Extended warranty part number(s)
  - Unique registration code

### Warranty coverage:

- Any possible issues related to circuit breaker quality for the complete extra warranty time
- Accessories mounted by the factory only.



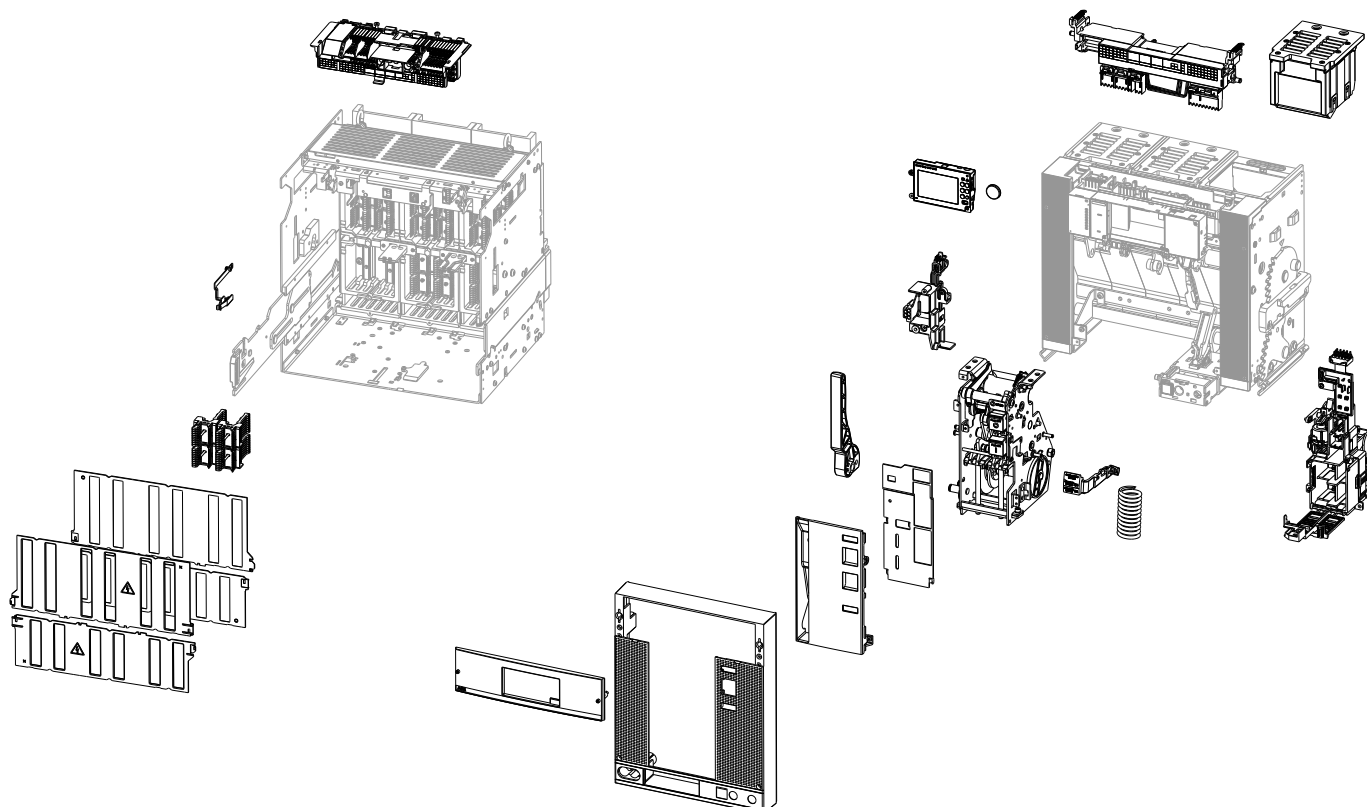


## Spare parts

The following original and guaranteed spare parts are available:

- Accessories and Safety Covers
- Closed Door lock lever
- Closing Spring
- Conversion kit from Fixed to Moving part
- Conversion kit from Moving Part into Fixed version
- Conversion kit into Switch Disconnecter MS
- Earth sliding contacts
- Fixing screws kit
- Arching chambers
- Jaw contacts
- Moving part Terminals
- Poles
- Kit front cover plugs
- Lateral guides for Fixed and Moving part
- Left and Right plates for accessories (Left MID, Right MID)
- Main board
- Lifting plates
- Main board + Sensors + cables
- Operating mechanism
- Racked in and out device
- Racking in and out lever
- Safety shutters for fixed part
- Side walls
- Sliding contacts/ Terminal Box
- Transparent cover
- Trip coil
- Trip Unit Battery
- Tripping mechanism
- Spring charging device
- Spring Charging lever
- Grey platform spare parts (trip units, Ekip Measuring modules, rating plugs).

For further details, please refer pag 296-301 or to ABB SACE Spare Parts Catalogue (1SDC001007D0203).





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# Installation

## **7/2      Circuit-breaker**

**7/3**      Sizes

**7/4**      Versions

**7/5**      Poles

**7/6**      Terminals

**7/7**      Degree of protection

**7/7**      Power losses

**7/8**      Temperature derating

## **7/9      Installation environment**

**7/9**      Temperature

**7/9**      Environmental conditions

**7/10**      Vibration

**7/10**      Electromagnetic compatibility

## **7/13      Installation in switchgear**

**7/13**      Position

**7/13**      Power supply

**7/13**      Insulation distances and connection

**7/14**      Earthing connection

**7/15**      Busbar types

**7/15**      Accessories

## **7/16      Performance in switchgear**

# Circuit-breaker

The new SACE Emax 2 family maintains the characteristics of strength and reliability that have always distinguished the tradition of ABB SACE air circuit breakers.

The new SACE Emax 2 circuit breakers, available in four sizes, are extremely compact due to their new dimensions: with reduced depths and heights, combined with standardized widths, they provide the answer to the most stringent installation requirements.

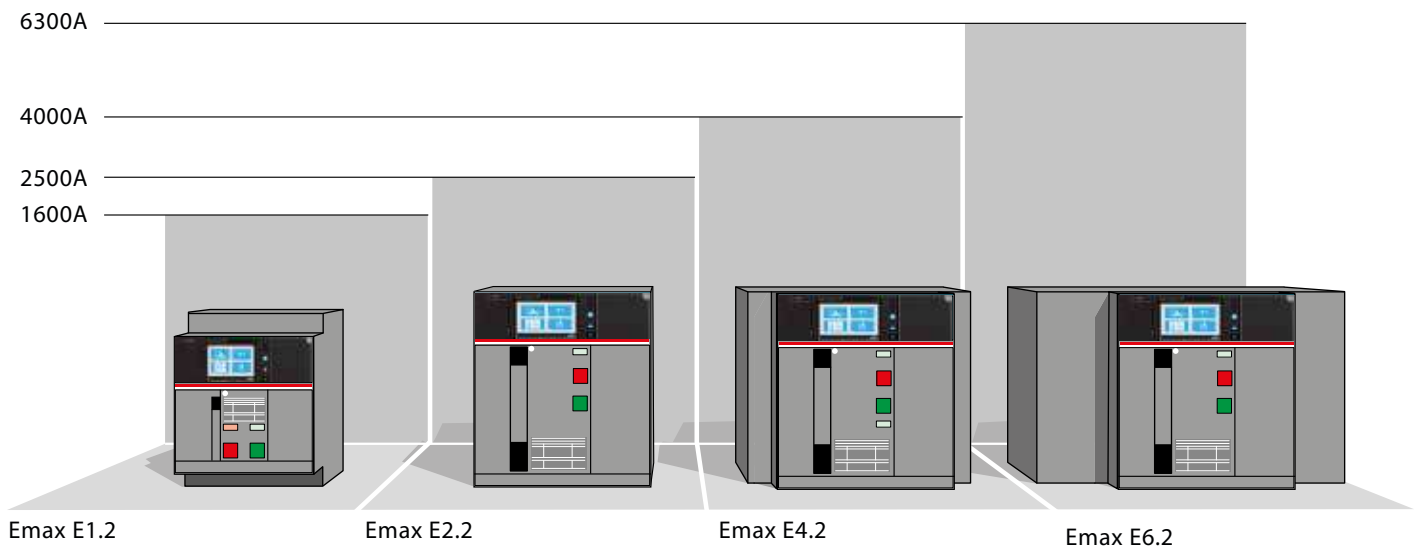
Safety is guaranteed thanks to the double insulation of the live parts and total segregation of the phases. Furthermore, the new functional design of the SACE Emax 2 circuit breakers has been developed with the purpose of improving installation operations and use of the devices and accessories; making them simple, intuitive and safe.

| Distinctive characteristics  |                                                                                                                        | Benefits                            |
|------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Simplicity of use and safety | - Ekip protection trip units are interchangeable from front of circuit breaker                                         | Reduced times during the stages of: |
|                              | - Rapid configuration of the Ekip trip units                                                                           | - installation                      |
|                              | - Electronic modules can be installed on terminal box without removing the electronic trip units and protection shield | - wiring                            |
|                              | - Electrical plug-in accessories can be installed from the front of circuit breaker                                    | - configuration                     |
|                              | - New push-in terminal box allows rapid auxiliary connections                                                          | - commissioning                     |
|                              | - Horizontal or vertical rear connections can be modified on-site by turning 90°                                       | - maintenance                       |
|                              | - Accessorizing logic common to the entire family of circuit breakers                                                  | Increased level of safety           |
|                              | - Accessory cabinet and terminal box are stamped with accessory codes for easy identification                          |                                     |
|                              | - Accessories area is separated functionally from the safety area                                                      |                                     |
|                              | - Mechanical safety locks in open position are active when the shield is removed                                       |                                     |
|                              | - Guided racking in and out of the mobile part                                                                         |                                     |

## Sizes

The SACE Emax 2 circuit breakers, available in 4 sizes up to 6300A, provide:

- **Versatility**, where installation space is a critical and influential factor, such as naval applications, wind turbine towers or switchgear
- **Opportunities**, optimization of the dimensions of the electrical switchgear results in a potential reduction in the consumption of the materials used.





# Circuit-breaker

## Versions

The SACE Emax 2 circuit breakers are available in both fixed and withdrawable versions. The withdrawable version is recommended in applications in which service continuity is a fundamental requirement.

Replacement of the moving part with a new device does not require any intervention on power connections or on auxiliary connections, thus permitting reset in the shortest time possible.

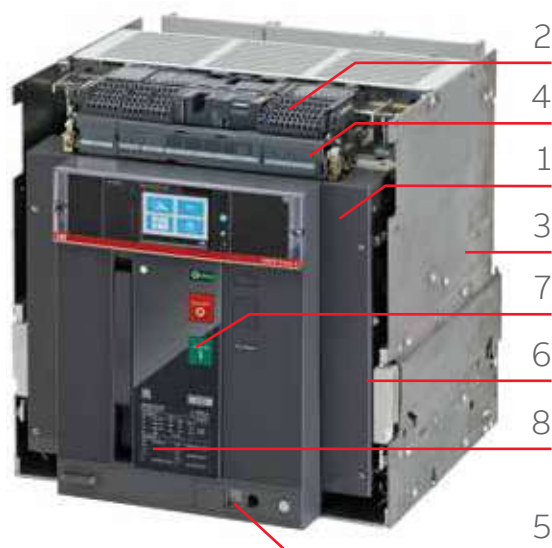
The fixed version, which is connected directly to power system through the circuit breaker terminals, is recommended in applications in which the need for space means that compact products are required without compromising the performance and possibility of fitting accessories.

1. Moving part
2. Sliding contacts
3. Fixed part
4. Terminal box
5. Racking-out mechanism
6. Racking-out guide rails
7. Pushbuttons
8. Data label and accessories

**Fixed**



**Withdrawable**



Poles

SACE Emax 2 circuit breakers are available in three-pole and four-pole versions and can be used in all types of distribution systems. Furthermore, with the possibility of connecting the external current sensor, three-pole circuit breakers can be used efficiently even in systems in which the neutral conductor cannot be isolated.

The four-pole circuit breakers E1.2, E2.2 and E4.2 are always provided with full-size neutral pole with rated uninterrupted current-carrying capacity identical to the phase poles. The E6.2 circuit-breakers, thanks to their construction modularity,

are available with neutral set at 50 percent of normal supply and with full-sized neutral, so that the customer does not need to oversize the neutral unless strictly necessary.

The standard supplied circuit breakers are suitable for connection of phases in the sequence L1, L2, L3 for three-pole circuitbreakers, or N, L1, L2 and L3 for four-pole circuit breakers with neutral on the left; a special optional kit enables the position of the circuit breaker neutral to be changed to the right, making the sequence L1, L2, L3, N available (refer to page 9/53 for the commercial codes).

| Circuit-breaker | Standard version |    |    |            | Optional version with neutral on the right |    |    |   |
|-----------------|------------------|----|----|------------|--------------------------------------------|----|----|---|
|                 | Three-pole       |    |    | Four-pole  | Four-pole                                  |    |    |   |
| Emax E1.2       | L1               | L2 | L3 | N L1 L2 L3 | L1                                         | L2 | L3 | N |
| Emax E2.2       |                  |    |    |            |                                            |    |    |   |
| Emax E4.2       |                  |    |    |            |                                            |    |    |   |
| Emax E6.2       |                  |    |    |            |                                            |    |    |   |

# Circuit-breaker

## Terminals

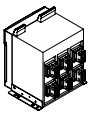
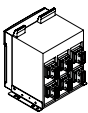
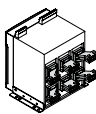
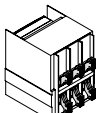
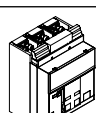
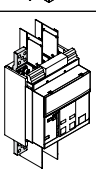
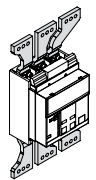
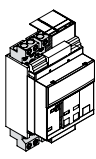
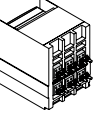
The integration of the circuit breaker in the electrical system is simplified because of the connection terminals of the circuit breakers.

The silver-plated copper terminals are designed to assist installation CB of connecting bars according to the change in the rated capacity of the circuit-breaker. Each terminal has been created to the standard width of busbar for that amperage and is equipped with one, two or three terminal

stabs for easy connection to multiple bus runs that may be required for the application. For particular installation CB requirements, the circuit breakers can be equipped with different combinations of terminals for the upper and lower part.

Emax 2 product family is tested according to IEC standard 60947.2 and 60947.3

Customer applications need to be validated applying the type tests of the related standards.

| Type                                              | Abbreviation |                                                                                     | E1.2 | E2.2 | E4.2 | E6.2 |
|---------------------------------------------------|--------------|-------------------------------------------------------------------------------------|------|------|------|------|
| Rear adjustable terminal <sup>(1)</sup>           | HR<br>VR     |    | F, W | F, W | F, W | F, W |
| Long Rear adjustable terminal                     | LHR<br>LVR   |   | F, W | F, W | F, W | F, W |
| Horizontal rear spread terminal                   | SHR          |  | W    | F, W | F, W |      |
| Vertical rear spread terminal                     | SVR          |  |      | F, W | F, W |      |
| Front terminal                                    | F            |  | F    | F, W | F, W | F, W |
| Extended front terminal                           | EF           |  | F, W |      |      |      |
| Front spread terminal                             | ES           |  | F, W |      |      |      |
| Terminal for cable<br>FcCuAl 4x240mm <sup>2</sup> | Fc CuAl      |  | F, W |      |      |      |
| Flat terminal                                     | FL           |  |      | W    | W    | W    |

(1) The rear adjustable terminals are supplied as standard in the HR-HR configuration.

## Degree of protection

The SACE Emax 2 circuit breakers guarantee the following degrees of protection:

- IP20 for circuit breakers in fixed or withdrawable versions, excluding the terminals.
- IP30 for the front parts of the circuit breaker when installed in switchgear with IP30 flange mounted on the door.
- IP54 for circuit breakers equipped with optional IP54 transparent flange fixed on the door in front of the switchgear.

## Power losses

To guarantee the performance of the electrical switchgear in terms of rated uninterrupted current-carrying capacity, the design of the electrical switchgear must take into consideration the power losses of the apparatus and by live parts installed.

These power losses are measured according to IEC60947 product standard. The values given in the table below refer to total power for three and four pole circuit breakers with balanced loads with a current flow equal to rated uninterrupted current "I<sub>u</sub>" at 50/60Hz.

| Circuit-breaker type |              | I <sub>u</sub> | 630A | 800A | 1000A | 1250A | 1600A | 2000A | 2500A | 3200A | 4000A | 5000A | 6300A |
|----------------------|--------------|----------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Fixed                | E1.2 B/C/N   | [W]            | 31   | 50   | 78    | 122   | 201   | -     | -     | -     | -     | -     | -     |
|                      | E2.2 B/N/S/H | [W]            | -    | 34   | 53    | 83    | 136   | 212   | 267   | -     | -     | -     | -     |
|                      | E4.2 N/S/H/V | [W]            | -    | -    | -     | -     | -     | -     | -     | 425   | 465   | -     | -     |
|                      | E6.2 H/V/X   | [W]            | -    | -    | -     | -     | -     | -     | -     | -     | 309   | 483   | 767   |
| Withdrawable         | E1.2 B/C/N   | [W]            | 62   | 100  | 156   | 244   | 400   | -     | -     | -     | -     | -     | -     |
|                      | E2.2 B/N/S/H | [W]            | -    | 72   | 113   | 176   | 288   | 450   | 550   | -     | -     | -     | -     |
|                      | E4.2 N/S/H/V | [W]            | -    | -    | -     | -     | -     | -     | -     | 743   | 900   | -     | -     |
|                      | E6.2 H/V/X   | [W]            | -    | -    | -     | -     | -     | -     | -     | -     | 544   | 850   | 1550  |

# Circuit-breaker

## Temperature derating

Under certain installation conditions, the circuit-breakers can operate at higher temperatures than the reference temperature of 40 °C. In this case the current-carrying capacity of the circuit-breaker may be lower than the rated current-

carrying capacity at the reference temperature: therefore the derating coefficients shown in the table must be applied. Percentage values refer to withdrawable and fixed circuit breaker. If not specified, all data refer to a copper according to IEC60947.

| Emax 2 E1.2 |      | Cross section | Temperature [°C] |      |      |      |      |      |      |
|-------------|------|---------------|------------------|------|------|------|------|------|------|
|             |      |               | <40              | 45   | 50   | 55   | 60   | 65   | 70   |
| E1.2        | 250  |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E1.2        | 630  |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E1.2        | 800  |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E1.2        | 1000 |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E1.2        | 1250 |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E1.2        | 1600 |               | 100%             | 100% | 100% | 98%  | 95%  | 93%  | 90%  |
| E1.2        | 1600 | 1200 mm²      | 100%             | 100% | 100% | 100% | 97%  | 95%  | 92%  |

| Emax 2 E2.2 |      | Cross section | Temperature [°C] |      |      |      |      |      |      |
|-------------|------|---------------|------------------|------|------|------|------|------|------|
|             |      |               | <40              | 45   | 50   | 55   | 60   | 65   | 70   |
| E2.2        | 250  |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E2.2        | 800  |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E2.2        | 1000 |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E2.2        | 1250 |               | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E2.2        | 1600 |               | 100%             | 100% | 100% | 100% | 100% | 100% | 98%  |
| E2.2        | 2000 |               | 100%             | 100% | 100% | 100% | 95%  | 91%  | 87%  |
| E2.2        | 2500 |               | 100%             | 100% | 100% | 100% | 98%  | 94%  | 90%  |

| E <sub>max</sub> 2 E4.2 |      | Cross section        | Temperature [°C] |      |      |      |      |      |      |
|-------------------------|------|----------------------|------------------|------|------|------|------|------|------|
|                         |      |                      | <40              | 45   | 50   | 55   | 60   | 65   | 70   |
| E4.2                    | 2000 |                      | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E4.2                    | 2500 |                      | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E4.2                    | 3200 | 3000 mm <sup>2</sup> | 100%             | 100% | 97%  | 93%  | 89%  | 86%  | 82%  |
| E4.2 <sup>(*)</sup>     | 3200 | 3000 mm <sup>2</sup> | 100%             | 100% | 100% | 100% | 95%  | 93%  | 89%  |
| E4.2                    | 4000 | 4000 mm <sup>2</sup> | 100%             | 100% | 97%  | 93%  | 89%  | 86%  | 83%  |

(\*) Three stabs terminal kit only for withdrawable version

| Emax 2 E6.2 |      | Cross section | Temperature [°C] |      |      |      |      |      |      |
|-------------|------|---------------|------------------|------|------|------|------|------|------|
|             |      |               | <40              | 45   | 50   | 55   | 60   | 65   | 70   |
| E6.2        | 4000 | 4000 mm²      | 100%             | 100% | 100% | 100% | 100% | 100% | 100% |
| E6.2        | 5000 | 5000 mm²      | 100%             | 100% | 100% | 100% | 100% | 98%  | 95%  |
| E6.2        | 6300 | 6000 mm²      | 100%             | 100% | 95%  | 91%  | 87%  | 84%  | 81%  |

# Installation environment

SACE Emax 2 circuit breakers have been designed and tested in accordance with major international Standards to manage the electrical plant.

The installation requirements prescribed by the international Standards are listed below.

In addition, ABB provides instructions for the use of circuit breakers in nonstandard environments, as for example personalized maintenance program or installation solutions aimed at increasing performances and extending the lifecycle of the circuit breaker.

## Temperature

SACE Emax 2 circuit breakers can operate in the following environmental conditions:

|                             | Temperature (°C) |                 |                 |
|-----------------------------|------------------|-----------------|-----------------|
|                             | Operating        | Active Display  | Storage         |
| Emax 2 with Ekip DIP        | -25°C ... +70°C  | -               | -40°C ... +70°C |
| Emax 2 with Ekip Touch      | -25°C ... +70°C  | -20°C ... +70°C | -30°C ... +70°C |
| Emax 2 with LCD             | -25°C ... +70°C  | -25°C ... +70°C | -40°C ... +70°C |
| Emax 2 switch-disconnectors | -25°C ... +70°C  | -               | -40°C ... +70°C |

## Environmental conditions

The devices can be installed in industrial environments with pollution level 3, IEC60947. SACE Emax 2 circuit breakers also comply with:

- IEC60721-3-6 class 6C3
- IEC60721-3-3 class 3C2

## Altitude

SACE Emax 2 air circuit breakers do not undergo changes in rated performance up to 2000 metres. Beyond this altitude, the properties of the atmosphere in terms of composition, dielectric capacitance, cooling power and pressure can vary and, therefore, the performance of the circuit breakers is subject to derating, which can be measured by means of the variation in maximum rated service voltage and rated uninterrupted current.

| Altitude                               |               | [m]                 | 2000 | 3000 | 4000 | 5000 |
|----------------------------------------|---------------|---------------------|------|------|------|------|
| Rated service voltage - U <sub>e</sub> | Versions 690V | [V]                 | 690  | 624  | 544  | 477  |
|                                        | Versions 900V | [V]                 | 900  | 813  | 710  | 623  |
| Rated current                          |               | [% I <sub>n</sub> ] | 100  | 98   | 93   | 90   |

# Installation environment

An installation at 3000 m of a 690V AC rated service voltage can be an explicative example. The altitude, as shown in the table, may cause a derating which precludes the use of a standard automatic circuit breaker. To use a circuit breaker at a 690 V AC service voltage, a 900 V AC version has to be used. This version, even after derating, fulfils the service voltage required. In addition, the selection of the circuit breakers has to be based on the short-circuit performance required by the application.

## Electromagnetic compatibility

The use of specific devices in industrial installations may cause electromagnetic interference in the electrical system. SACE Emax 2 circuit breakers have been developed and tested for electromagnetic compatibility in accordance with IEC 60947-2, Appendices J and F.

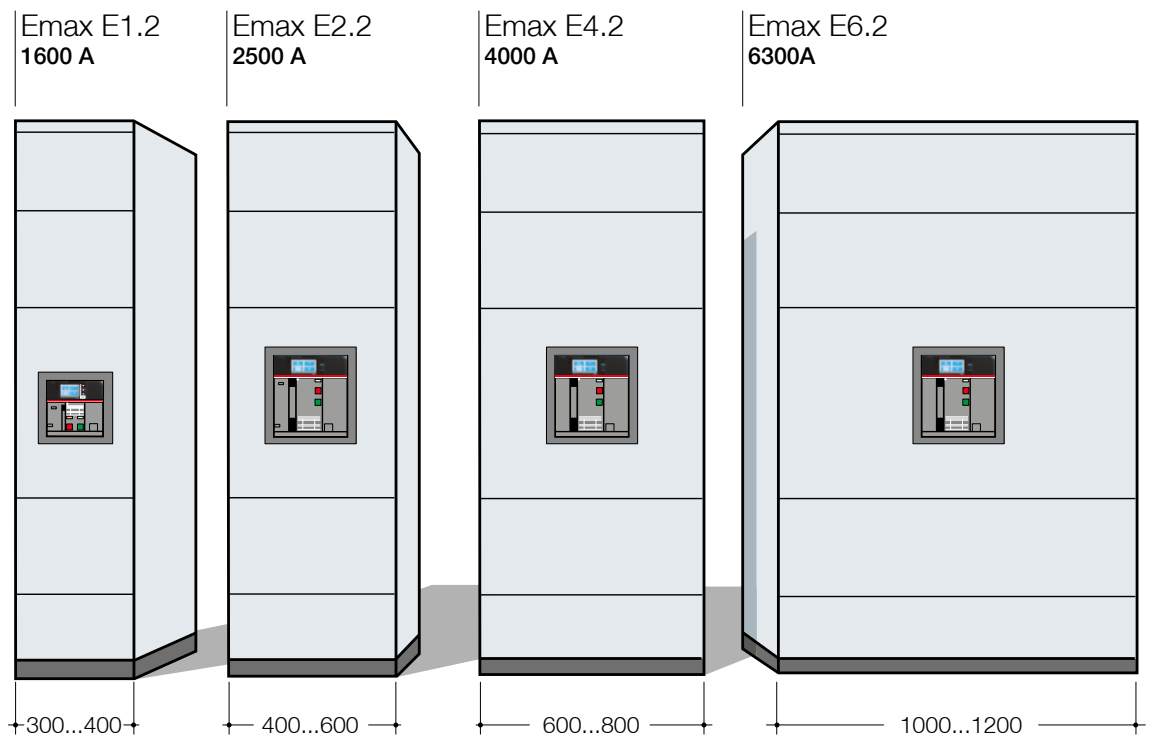
## Vibration

The circuit breakers have been tested according to:

- IEC60068-2-6
- From 1 to 13 Hz with amplitude 1mm
- From 13 to 100 Hz with constant acceleration 0.7g
- IEC60721-3-1
- Storage: 1M3
- IEC60721-3-2
- Transport: 2M2
- IEC60721-3-3
- Operational conditions: 3M2
- Shipping registers or certifications

Due to the four construction sizes and the reduced insulation distances required, SACE Emax 2 circuit breakers optimize the installation spaces

of the compartments of electrical switchgear, thereby providing a rational solution to the customers' application needs.



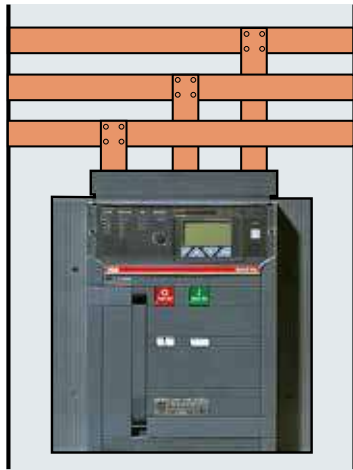


# Installation environment

SACE Emax 2 circuit breakers enable the design of electrical switchgear to be improved, optimization in terms of performance and also in the use of the main materials:

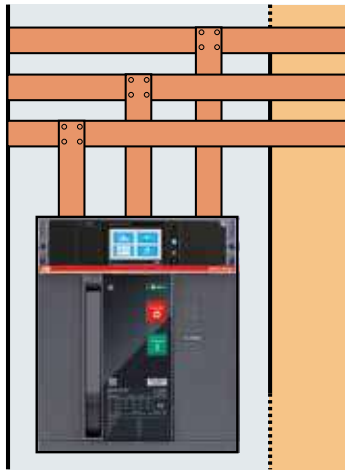
- **Copper:** thanks to the possibility of developing compact units, the length of the distribution system / busbar can be minimized.
- **Metal frame and structure:** reduced volumes also mean less surface space is used for panels and internal structures.
- **Space:** the optimization of the individual units benefits the entire switchgear, which is more compact and can therefore be installed taking up less surface space.

**Traditional circuit breaker**  
3p lu 2500A



600

**Emax E2.2 3p lu 2500A**



400 200

Efficiencies with Emax 2:

- ▶ Possibility of saving in copper
- ▶ Possibility of saving in metal frame, segregation and plates
- ▶ Possibility of saving in the installation surface

Installation in switchgear

**Position**

All SACE Emax 2 circuit breakers can be floor mounted in a vertical position inside the switch-gear compartment.

The E1.2 circuit breaker can also be installed in a horizontal position and wall mounted. Conve-niently, the screens of the Ekip Touch and Hi-Touch versions rotate to a horizontal view for key data when the E1.2 is installed horizontally.

**Power supply**

The Emax 2 circuit breakers can be supplied, from either the upper or lower terminals. In the event a measurement module is present, in order to make use of all information when the circuit breaker is in the open position, the voltage sockets must be installed on the power supply side.

**Insulation distances and connection**

The circuit breakers can be connected to the main power system using the most common configura-tions and dimensions of copper bars.

Installation of live parts must ensure:

- **Minimum insulation distances between the phases**

| Rated insulation voltage Ui | Minimum distance [mm]                                                             |
|-----------------------------|-----------------------------------------------------------------------------------|
| 1000V                       | for voltages upper to 440V in fixed circuit breakers, please use phase separators |

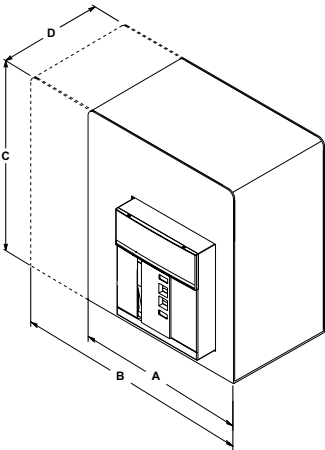
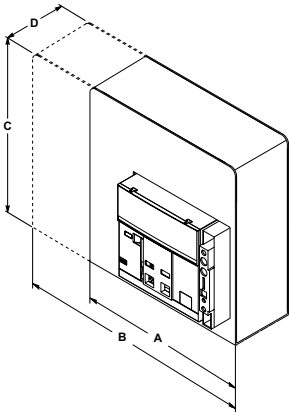
• Insulation distance of installation cubicle

| Fixed circuit breakers |     |      |        |     |
|------------------------|-----|------|--------|-----|
|                        | A   | B    | C      | D   |
| [mm]                   | 3p  | 4P   |        |     |
| E1.2                   | 250 | 322  | 382.5* | 130 |
| E2.2                   | 400 | 490  | 500    | 221 |
| E4.2                   | 500 | 600  | 500    | 221 |
| E6.2                   | 900 | 1000 | 500    | 221 |
| E6.2/f                 | -   | 1200 | 500    | 221 |

\* 332.5mm for voltage less ≤ 440V AC

| Withdrawable circuit breakers |     |      |      |     |
|-------------------------------|-----|------|------|-----|
|                               | A   | B    | C    | D   |
| [mm]                          | 3p  | 4P   |      |     |
| E1.2                          | 280 | 350  | 440* | 252 |
| E2.2                          | 400 | 490  | 500  | 355 |
| E4.2                          | 500 | 600  | 500  | 355 |
| E6.2                          | 900 | 1000 | 500  | 355 |
| E6.2/f                        | -   | 1200 | 500  | 355 |

\* 390mm for voltage less ≤ 440V AC



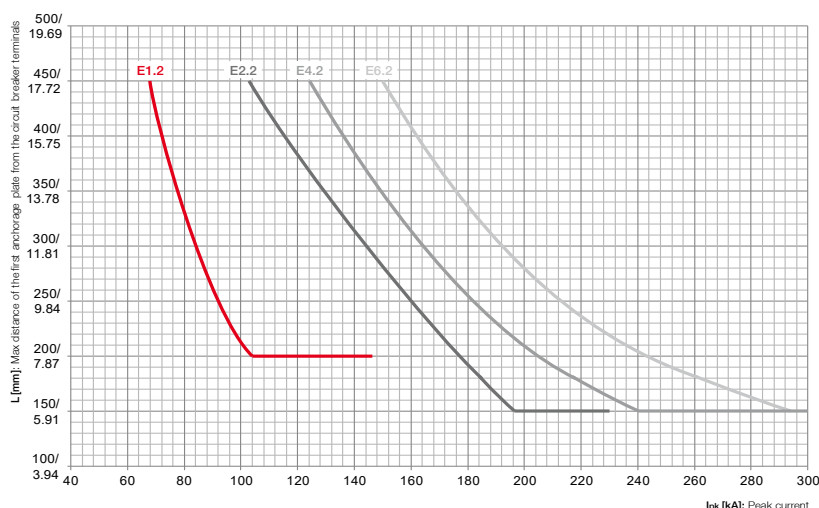
Order the 0-Arc accessory (1SDA085710R1) in order to eliminate the minimum height requirement for drawout type devices for installation up to 690V AC (dimension C above).

# Installation in switchgear

## • Anchorage plates

The electrodynamic force released during a short-circuit can cause high levels of mechanical stress on the devices and structures of the

switchgear. To minimize this, fastening plates must be positioned near the circuit breaker terminals.



In case of flat terminals, please refer to the Instruction Manual 1SDH001000R0809

## • Tightening torques

The following table indicates the values required for connecting the circuit breaker terminal and the connecting bars.

| Terminals             | E1.2  | E2.2 / E4.2 / E6.2 |
|-----------------------|-------|--------------------|
| Modifiable HR/VR rear | 45 Nm | 70 Nm              |
| Spread rear           | 45 Nm | 70 Nm              |
| Front                 | 45 Nm | 70 Nm              |
| Extended front        | 45 Nm | 70 Nm              |
| Spread front          | 70 Nm | 70 Nm              |
| Front for cables      | 43 Nm | 70 Nm              |

## • Segregation plates and separator plates

The rear part of the circuit breaker has been designed with specific slots in which insulating walls can be housed to facilitate segregation of live parts. In addition, phase separators are available as optional accessories.

## Earthing connection

To achieve continuity and equal potential of earthing between the Emax 2 circuitbreaker and the protection circuit of the switchboard, customers can do either of the options below:

- Connect the Emax 2 fixed circuit breaker or the fixed part of the withdrawable circuit breaker to the protective circuit by means of a cable with suitable crosssectional area to fulfil the requirements of clause 10.5.2 of the Standard IEC 61439-1.

- If the continuity of the circuit breaker frame with the switchboard earthing is guaranteed by the metal contact (support) between the circuit breaker and the metal structure of the switchboard (which is a part of the protective circuit) no connection is necessary (provided that no panels of insulating material are interposed between the circuit breaker and the metal frame of the switchboard).

Emax E1.2, fixed version, does not require any earthing connection.

## Busbar types

The circuit breakers, via the terminals, can be connected to the main distribution system by busbars of different types: copper, silver-plated copper and tinned aluminium when the main distribution system is made of aluminium.

The circuit breakers can be connected directly with copper or aluminium cables in the case of E1.2 circuit breakers, or indirectly by cable-carrying bars in the case of E2.2, E4.2 and E6.2.

## Accessories

The SACE Emax 2 circuit breakers offer a wide range of accessories that improve safety levels for technicians working on the switchgear and circuit breakers. Furthermore, thanks to the different types of mechanical interlock available, pre-determined coordination strategies can be achieved between the circuit breakers. In detail:

- Horizontal and vertical interlocks between circuit breakers
- Door lock with circuit breaker in closed position
- Switchgear door lock in racked-in/out position
- Lock of racked-out mechanism with door open
- External lock of shutters
- Flange for switchgear door IP30 and IP54

For further information of the operation of accessories, see chapter 5.



# Performance in switchgear

The many types of switchgear that can be created and the installation and environmental conditions can considerably influence the performance of the circuit breaker. In this regard, SACE Emax 2 circuit breakers offer the best solution for improving the capacity in switchgear.

The following application situations have been assessed by taking into consideration the main factors that can influence the performance of the circuit breaker in switchgear:

- Type of switchgear
- Switchgear degree of protection
- Segregation form 3
- Size of circuit breaker
- Number of devices connected at the same time in the unit
- Type of terminal and connection
- Ambient temperature Ta (IEC61439-1 )
- Withdrawable circuit breakers
- Maximum withstand temperature for the terminal 120° C

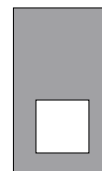
The following tables provide an indication of the performance of the apparatus inside the switchgear. The data shown are a summary of software model simulations and real tests.

Emax 2 product family is tested according to IEC standard 60947.2 and 60947.3

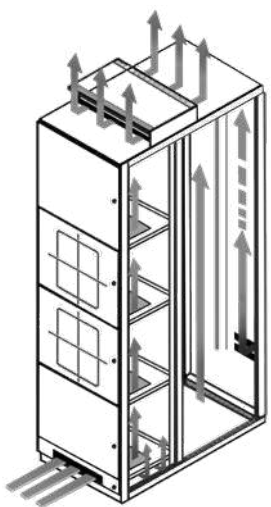
Customer applications need to be validated applying the type tests of the related standards.

## SACE Emax 2 E1.2 B C N Circuit-breaker - Switchgear dimensions 2200x400x600 (HxWxD)

HR Terminal  
One circuit breaker in the column



Environment temperature

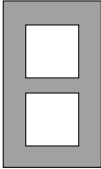
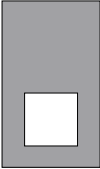
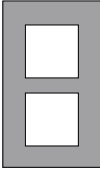
| IP                                                                                  | Iu   | Connection [mm] | Compartment | 35 °C | 45 °C | 55 °C |
|-------------------------------------------------------------------------------------|------|-----------------|-------------|-------|-------|-------|
|  | 630  | 2x40x5          | 2           |       |       |       |
|                                                                                     |      |                 | 1           | 630   | 630   | 630   |
|                                                                                     | 800  | 2x50x5          | 2           |       |       |       |
|                                                                                     |      |                 | 1           | 800   | 800   | 800   |
|                                                                                     | 1000 | 2x50x10         | 2           |       |       |       |
|                                                                                     |      |                 | 1           | 1000  | 1000  | 1000  |
|                                                                                     |      | 2x50x8          | 2           |       |       |       |
|                                                                                     |      |                 | 1           |       |       |       |
|                                                                                     | 1250 | 2x50x10         | 2           |       |       |       |
|                                                                                     |      |                 | 1           | 1250  | 1250  | 1200  |
|                                                                                     |      | 2x50x8          | 2           |       |       |       |
|                                                                                     |      |                 | 1           |       |       |       |
|                                                                                     | 1600 | 3x50x8          | 2           |       |       |       |
|                                                                                     |      |                 | 1           | 1440  | 1360  | 1290  |
|                                                                                     |      | 2x50x10         | 2           |       |       |       |
|                                                                                     |      |                 | 1           |       |       |       |

Performances with EF, SHR and F terminals can be compared, with the same connection sections, to the performances of circuit breaker with HR terminal.

Performances with ES terminals can be compared to the VR terminals.

Performances with FC CuAl terminals, with cables in the prescribed sections, can be compared to HR performances.

Performances depend on switchboard design and testing condition. ABB is not responsible for the overall performances result.

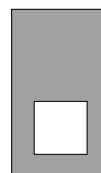
| HR Terminal<br>Two circuit breakers in the column                                   |       |       | VR Terminal<br>One circuit breaker in the column                                    |       |       | VR Terminal<br>Two circuit breakers in the column                                     |       |       |
|-------------------------------------------------------------------------------------|-------|-------|-------------------------------------------------------------------------------------|-------|-------|---------------------------------------------------------------------------------------|-------|-------|
|  |       |       |  |       |       |  |       |       |
| Environment temperature                                                             |       |       | Environment temperature                                                             |       |       | Environment temperature                                                               |       |       |
| 35 °C                                                                               | 45 °C | 55 °C | 35 °C                                                                               | 45 °C | 55 °C | 35 °C                                                                                 | 45 °C | 55 °C |
| 630                                                                                 | 630   | 630   |                                                                                     |       |       | 630                                                                                   | 630   | 630   |
| 630                                                                                 | 630   | 630   | 630                                                                                 | 630   | 630   | 630                                                                                   | 630   | 630   |
| 800                                                                                 | 800   | 800   |                                                                                     |       |       | 800                                                                                   | 800   | 800   |
| 800                                                                                 | 800   | 800   | 800                                                                                 | 800   | 800   | 800                                                                                   | 800   | 800   |
| 970                                                                                 | 930   | 900   |                                                                                     |       |       |                                                                                       |       |       |
| 1000                                                                                | 960   | 920   |                                                                                     |       |       |                                                                                       |       |       |
|                                                                                     |       |       |                                                                                     |       |       | 1000                                                                                  | 1000  | 950   |
|                                                                                     |       |       | 1000                                                                                | 1000  | 1000  | 1000                                                                                  | 1000  | 970   |
| 1200                                                                                | 1150  | 1100  |                                                                                     |       |       |                                                                                       |       |       |
| 1250                                                                                | 1200  | 1140  |                                                                                     |       |       |                                                                                       |       |       |
|                                                                                     |       |       |                                                                                     |       |       | 1250                                                                                  | 1250  | 1150  |
|                                                                                     |       |       | 1250                                                                                | 1250  | 1250  | 1250                                                                                  | 1250  | 1200  |
| 1330                                                                                | 1260  | 1220  |                                                                                     |       |       |                                                                                       |       |       |
| 1370                                                                                | 1315  | 1262  |                                                                                     |       |       |                                                                                       |       |       |
|                                                                                     |       |       |                                                                                     |       |       | 1430                                                                                  | 1355  | 1265  |
|                                                                                     |       |       | 1520                                                                                | 1440  | 1330  | 1475                                                                                  | 1415  | 1310  |

# Performance in switchgear

The following tables provide an indication of the performance of the apparatus inside the switchgear. The data shown are a summary of software model simulations and real tests.

**SACE Emax 2 E2.2 B N S H Circuit-breaker**  
Switchgear dimensions 2200x600x900 (HxWxD)

**HR Terminal**  
One circuit breaker in the column



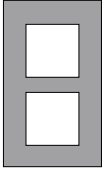
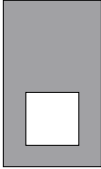
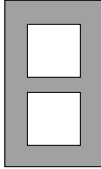
**Environment temperature**

| IP   | Iu   | Connection [mm] | Compartment | 35 °C | 45 °C | 55 °C |
|------|------|-----------------|-------------|-------|-------|-------|
| IP31 | 800  | 1x60x10         | 2           |       |       |       |
|      |      |                 | 1           | 800   | 800   | 800   |
|      | 1000 | 1x60x10         | 2           |       |       |       |
|      |      |                 | 1           | 1000  | 1000  | 1000  |
|      | 1250 | 2x60x10         | 2           |       |       |       |
|      |      |                 | 1           | 1250  | 1250  | 1250  |
|      | 1600 | 2x60x10         | 2           |       |       |       |
|      |      |                 | 1           | 1600  | 1540  | 1480  |
|      |      | 1x100x10        | 2           |       |       |       |
|      |      |                 | 1           |       |       |       |
|      | 2000 | 3x60x10         | 2           |       |       |       |
|      |      |                 | 1           | 2000  | 1940  | 1850  |
|      |      | 2x80x10         | 2           |       |       |       |
|      |      |                 | 1           |       |       |       |
|      |      | 3x60x10 *       | 2           |       |       |       |
|      |      |                 | 1           | 2000  | 2000  | 1940  |
|      | 2500 | 2x80x10 *       | 2           |       |       |       |
|      |      |                 | 1           |       |       |       |
|      |      | 3x60x10         | 2           |       |       |       |
|      |      |                 | 1           | 2400  | 2320  | 2200  |
|      |      | 4x100x5         | 2           |       |       |       |
|      |      |                 | 1           |       |       |       |
|      |      | 3x60x10 *       | 2           |       |       |       |
|      |      |                 | 1           | 2500  | 2460  | 2320  |
|      |      | 4x100x5 *       | 2           |       |       |       |
|      |      |                 | 1           |       |       |       |

\* Performances refer to SHR and SVR terminals.

Performances with F and FL terminals can be compared to the performance of circuit breakers with HR terminals.

Performances depend on switchboard design and testing condition. ABB is not responsible for the overall performances result.

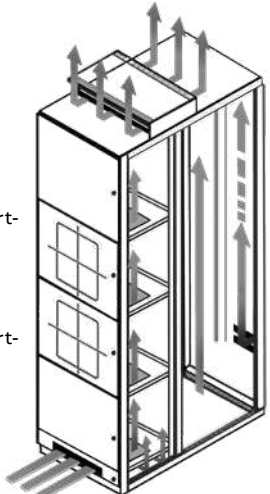
| HR Terminal<br>Two circuit breakers in the column                                  |       |       | VR Terminal<br>One circuit breaker in the column                                   |       |       | VR Terminal<br>Two circuit breakers in the column                                    |       |       |
|------------------------------------------------------------------------------------|-------|-------|------------------------------------------------------------------------------------|-------|-------|--------------------------------------------------------------------------------------|-------|-------|
|  |       |       |  |       |       |  |       |       |
| Environment temperature                                                            |       |       | Environment temperature                                                            |       |       | Environment temperature                                                              |       |       |
| 35 °C                                                                              | 45 °C | 55 °C | 35 °C                                                                              | 45 °C | 55 °C | 35 °C                                                                                | 45 °C | 55 °C |
| 800                                                                                | 800   | 800   |                                                                                    |       |       | 800                                                                                  | 800   | 800   |
| 800                                                                                | 800   | 800   | 800                                                                                | 800   | 800   | 800                                                                                  | 800   | 800   |
| 1000                                                                               | 1000  | 1000  |                                                                                    |       |       | 1000                                                                                 | 1000  | 1000  |
| 1000                                                                               | 1000  | 1000  | 1000                                                                               | 1000  | 1000  | 1000                                                                                 | 1000  | 1000  |
| 1250                                                                               | 1250  | 1250  |                                                                                    |       |       | 1250                                                                                 | 1250  | 1250  |
| 1250                                                                               | 1250  | 1250  | 1250                                                                               | 1250  | 1250  | 1250                                                                                 | 1250  | 1250  |
| 1470                                                                               | 1410  | 1360  |                                                                                    |       |       |                                                                                      |       |       |
| 1550                                                                               | 1490  | 1430  |                                                                                    |       |       |                                                                                      |       |       |
|                                                                                    |       |       |                                                                                    |       |       | 1500                                                                                 | 1470  | 1400  |
|                                                                                    |       |       | 1600                                                                               | 1600  | 1520  | 1580                                                                                 | 1550  | 1475  |
| 1920                                                                               | 1810  | 1720  |                                                                                    |       |       |                                                                                      |       |       |
| 1950                                                                               | 1850  | 1760  |                                                                                    |       |       |                                                                                      |       |       |
|                                                                                    |       |       |                                                                                    |       |       | 1950                                                                                 | 1860  | 1760  |
|                                                                                    |       |       | 2000                                                                               | 2000  | 1920  | 2000                                                                                 | 1920  | 1810  |
| 2000                                                                               | 1900  | 1810  |                                                                                    |       |       |                                                                                      |       |       |
| 2000                                                                               | 1945  | 1850  |                                                                                    |       |       |                                                                                      |       |       |
|                                                                                    |       |       |                                                                                    |       |       | 2000                                                                                 | 1950  | 1850  |
|                                                                                    |       |       | 2000                                                                               | 2000  | 2000  | 2000                                                                                 | 2000  | 1900  |
| 2280                                                                               | 2200  | 2100  |                                                                                    |       |       |                                                                                      |       |       |
| 2400                                                                               | 2310  | 2170  |                                                                                    |       |       |                                                                                      |       |       |
|                                                                                    |       |       |                                                                                    |       |       | 2400                                                                                 | 2270  | 2160  |
|                                                                                    |       |       | 2500                                                                               | 2450  | 2350  | 2500                                                                                 | 2380  | 2270  |
| 2394                                                                               | 2310  | 2205  |                                                                                    |       |       |                                                                                      |       |       |
| 2500                                                                               | 2430  | 2280  |                                                                                    |       |       |                                                                                      |       |       |
|                                                                                    |       |       |                                                                                    |       |       | 2500                                                                                 | 2390  | 2270  |
|                                                                                    |       |       | 2500                                                                               | 2500  | 2460  | 2500                                                                                 | 2500  | 2380  |



# Performance in switchgear

The following tables provide an indication of the performance of the apparatus inside the switchgear. The data shown are a summary of software model simulations and real tests.

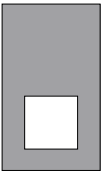
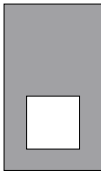
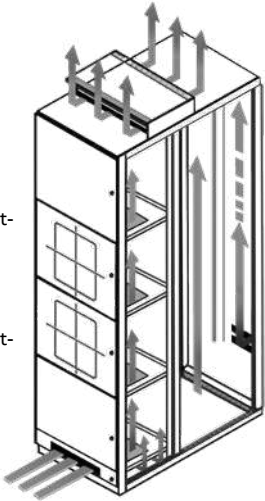
## SACE Emax 2 E4.2 N S H V Circuit-breaker Switchgear dimensions 2200x800x900 (HxWxD)

|                                                                                     |      |                    |             | HR Terminal<br>One circuit breaker in the column |       |       | VR Terminal<br>One circuit breaker in the column |       |       |
|-------------------------------------------------------------------------------------|------|--------------------|-------------|--------------------------------------------------|-------|-------|--------------------------------------------------|-------|-------|
|                                                                                     |      |                    |             | Environment temperature                          |       |       | Environment temperature                          |       |       |
| IP                                                                                  | Iu   | Connection<br>[mm] | Compartment | 35 °C                                            | 45 °C | 55 °C | 35 °C                                            | 45 °C | 55 °C |
|  | 2000 | 2x80x10            | 1           | 2000                                             | 2000  | 2000  | 2000                                             | 2000  | 2000  |
|                                                                                     | 2500 | 2x100x10           | 1           | 2500                                             | 2450  | 2400  | 2500                                             | 2500  | 2500  |
|                                                                                     | 3200 | 3x100x10           | 1           | 3050                                             | 2900  | 2755  | 3200                                             | 3080  | 2920  |
|                                                                                     | 3200 | 3x100x10*          | 1           | 3200                                             | 3050  | 2850  | 3200                                             | 3200  | 3020  |
|                                                                                     | 4000 | 4x100x10           | 1           | 3450                                             | 3200  | 2970  | 3650                                             | 3400  | 3200  |

\* Performances refer to withdrawable circuit breakers with a fixed part accessorized with three stab rear terminals for 4000A (Example: 1SDA074021R1 - KIT VR 4000A)  
Performances with F and FL terminals can be compared to the performances of circuit breaker with HR terminal.  
Performances depend on switchboard design and testing condition. ABB is not responsible for the overall performances result.

The following tables provide an indication of the performance of the apparatus inside the switch-gear. The data shown are a summary of software model simulations and real tests.

**SACE Emax 2 E6.2 H V X Circuit-breaker**  
Switchgear dimensions 2200x1200x900 (HxLxD)

|                                                                                     |      |                    |             | HR Terminal<br>One circuit breaker in the column                                    |       |       | VR Terminal<br>One circuit breaker in the column                                     |       |       |
|-------------------------------------------------------------------------------------|------|--------------------|-------------|-------------------------------------------------------------------------------------|-------|-------|--------------------------------------------------------------------------------------|-------|-------|
|                                                                                     |      |                    |             |  |       |       |  |       |       |
|                                                                                     |      |                    |             | Environment temperature                                                             |       |       | Environment temperature                                                              |       |       |
| IP                                                                                  | Iu   | Connection<br>[mm] | Compartment | 35 °C                                                                               | 45 °C | 55 °C | 35 °C                                                                                | 45 °C | 55 °C |
|  | IP31 |                    |             |                                                                                     |       |       |                                                                                      |       |       |
|                                                                                     | 4000 | 4x100x10           | 1           | 4000                                                                                | 4000  | 4000  | 4000                                                                                 | 4000  | 4000  |
|                                                                                     | 5000 | 5x100x10           | 1           | 5000                                                                                | 5000  | 4900  | 5000                                                                                 | 5000  | 5000  |
|                                                                                     | 6300 | 6x100x10           | 1           | 5650                                                                                | 5350  | 5100  | 6000                                                                                 | 5700  | 5250  |

Performances with F and FL terminals can be compared to the performances of circuit breaker with HR terminal.





# Dimensions

## **8/2**      **Fixed circuit-breaker**

**8/4**      E1.2

**8/8**      E2.2

**8/12**      E4.2

**8/16**      E6.2

## **8/20**      **Withdrawable circuit-breaker**

**8/22**      E1.2

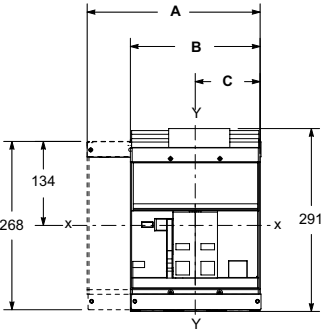
**8/26**      E2.2

**8/32**      E4.2

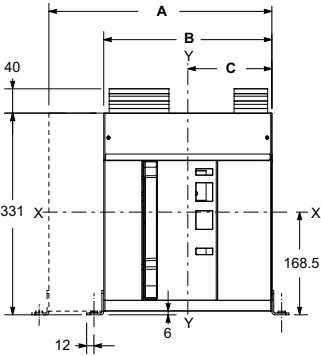
**8/38**      E6.2

# Fixed circuit-breaker

E1.2



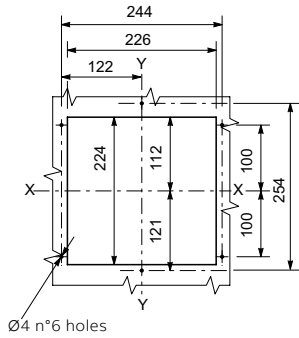
E2.2 - E4.2 - E6.2



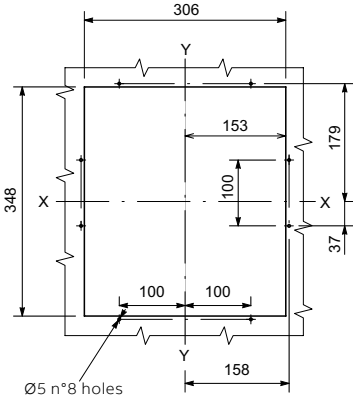
|        | A    | B   | C   |     |
|--------|------|-----|-----|-----|
| [mm]   | 4p   | 3p  | 3p  | 4p  |
| E1.2   | 214  | 284 | 107 | 107 |
| E2.2   | 366  | 276 | 138 | 138 |
| E4.2   | 510  | 384 | 192 | 192 |
| E6.2   | 888  | 762 | 318 | 444 |
| E6.2/f | 1014 | -   | -   | 444 |

## Compartment door drilling

E1.2

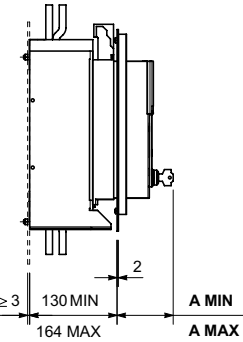


E2.2 - E4.2 - E6.2

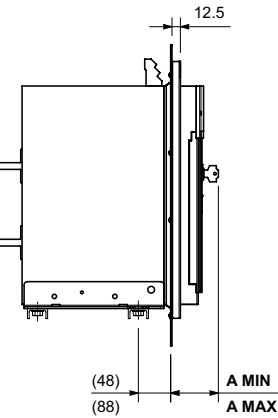


| E1.2  | Standard  | Ronis/STI | Kirk | Castell |
|-------|-----------|-----------|------|---------|
| A MIN | [mm] 49.5 | 63.5      | 63.5 | 83.5    |
| A MAX | [mm] 83.5 | 97.5      | 97.5 | 117.5   |

E1.2

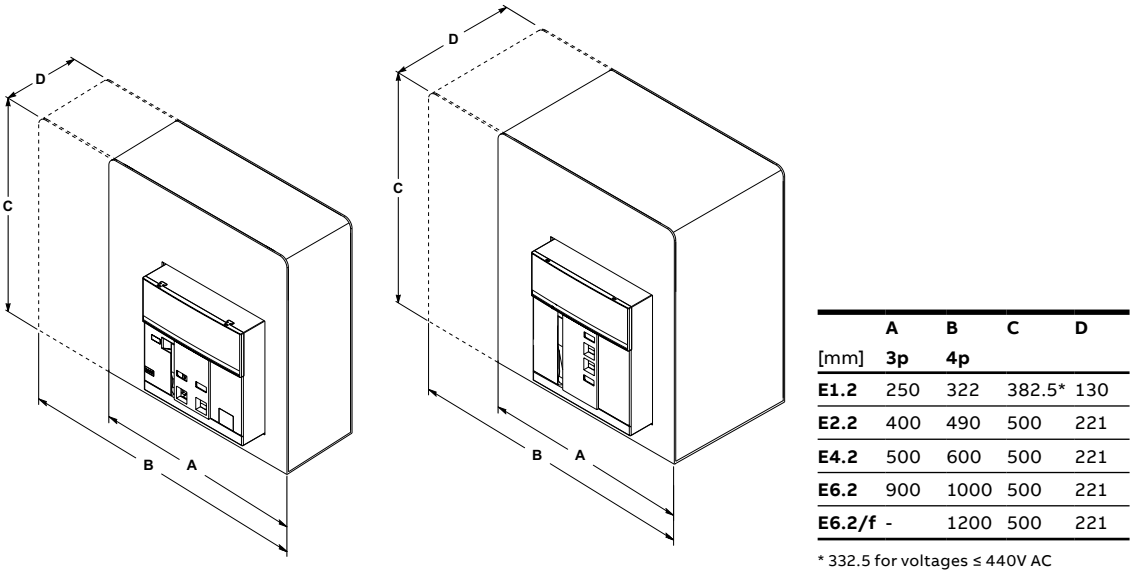


E2.2 - E4.2 - E6.2

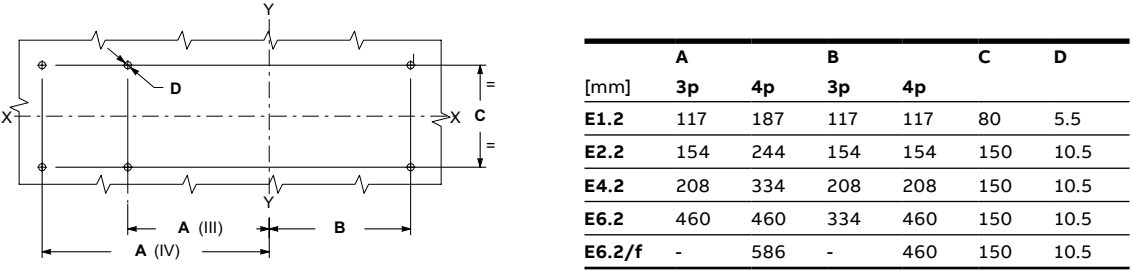


| E2.2-E4.2-E6.2 | Standard  | Ronis/STI | Kirk | Castell |
|----------------|-----------|-----------|------|---------|
| A MIN          | [mm] 29.5 | 41.5      | 46.5 | 65      |
| A MAX          | [mm] 69.5 | 81.5      | 86.5 | 105     |

Dimensions of the compartment

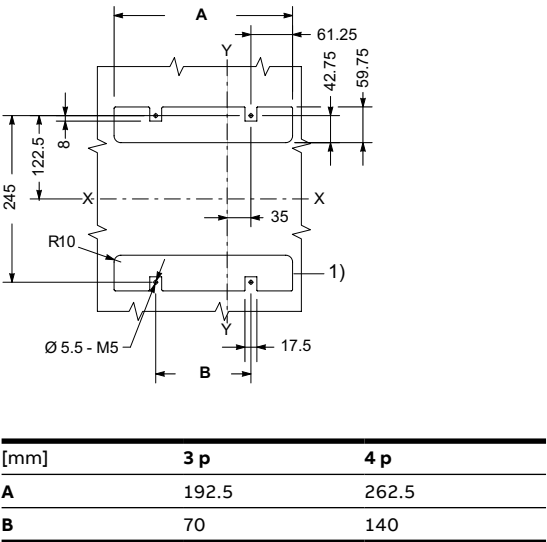


Floor fixing

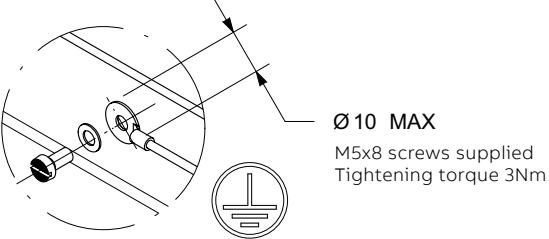


Wall fixing (only for E1.2)

1) for fixing with rear terminals

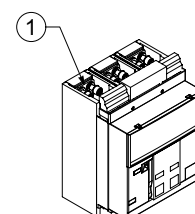
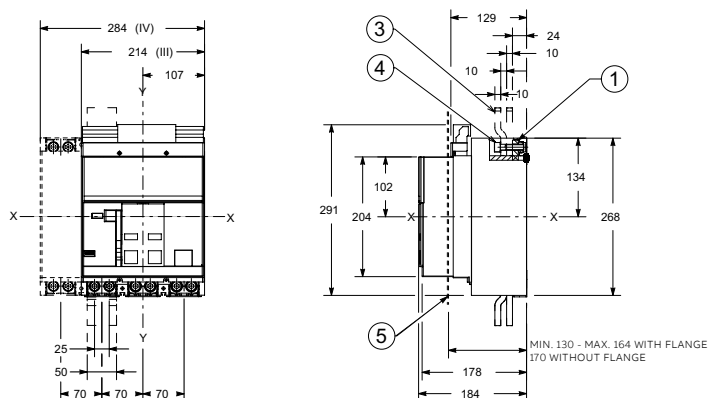


Earthing device E2.2 - E4.2 - E6.2

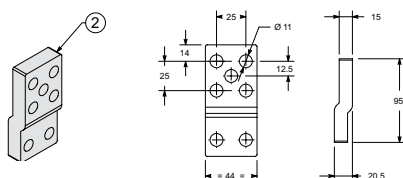
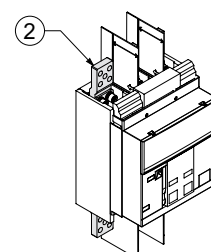
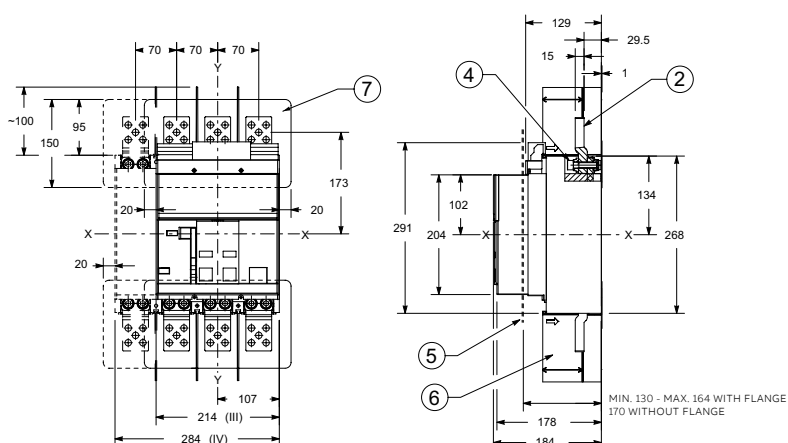


# Fixed circuit-breaker - E1.2

## Front terminals – F



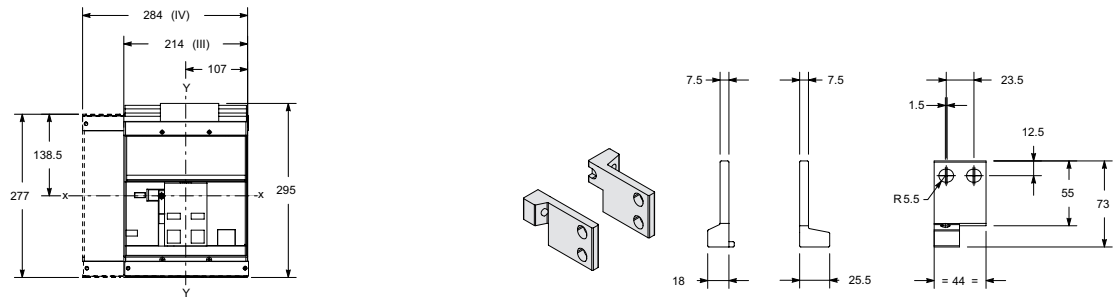
## Extended front terminals – EF



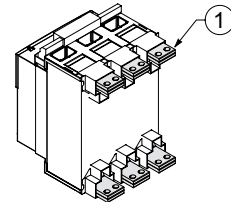
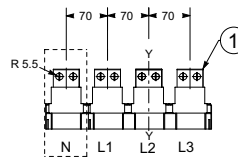
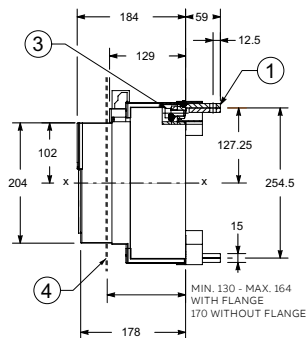
### Key

- 1 Front terminals for flat connection
- 2 Extended front terminals
- 3 To be supplied by the customer
- 4 Tightening torque 18Nm
- 5 Door position - Ref. page 7/2
- 6 Obligatory phase separators 100mm
- 7 Obligatory insulating plate to be supplied by the customer

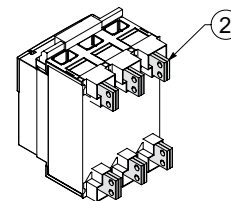
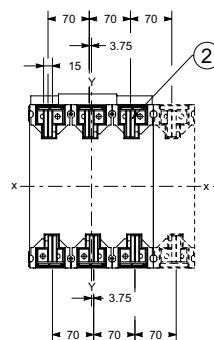
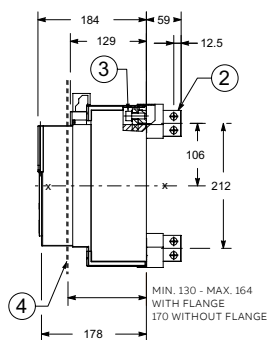
## Orientable rear terminals - HR/VR



### Terminals HR



### Terminals VR



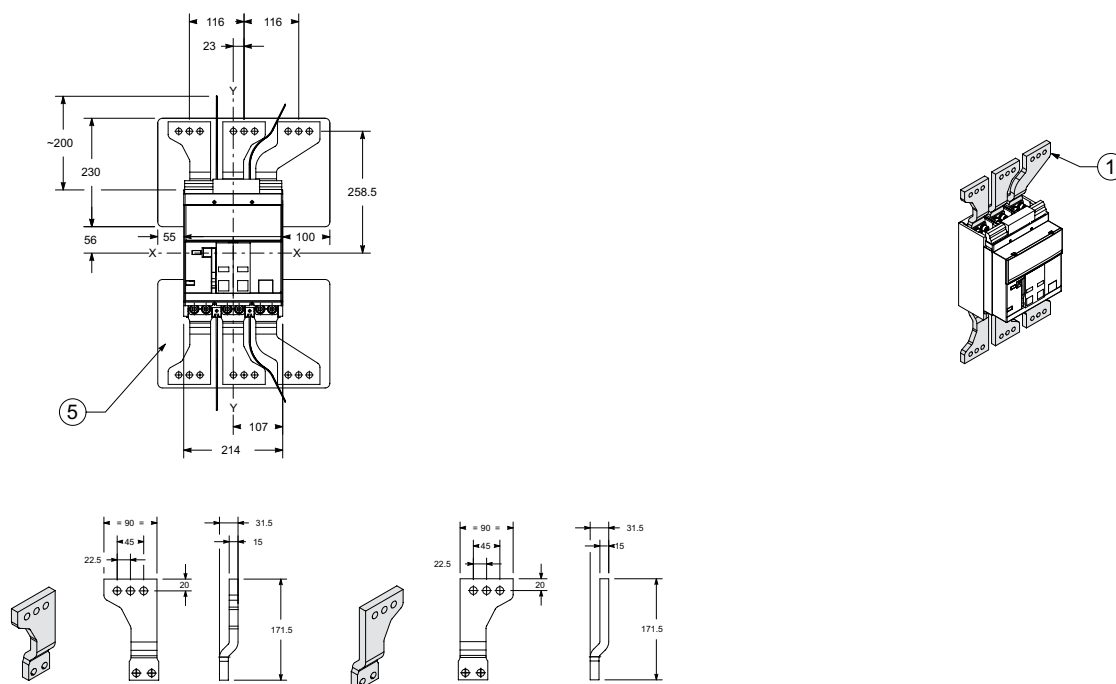
- Key
- 1 Horizontal orientable terminals HR
  - 2 Vertical orientable terminals VR
  - 3 Tightening torque 20Nm
  - 4 Door position - Ref. page 7/2



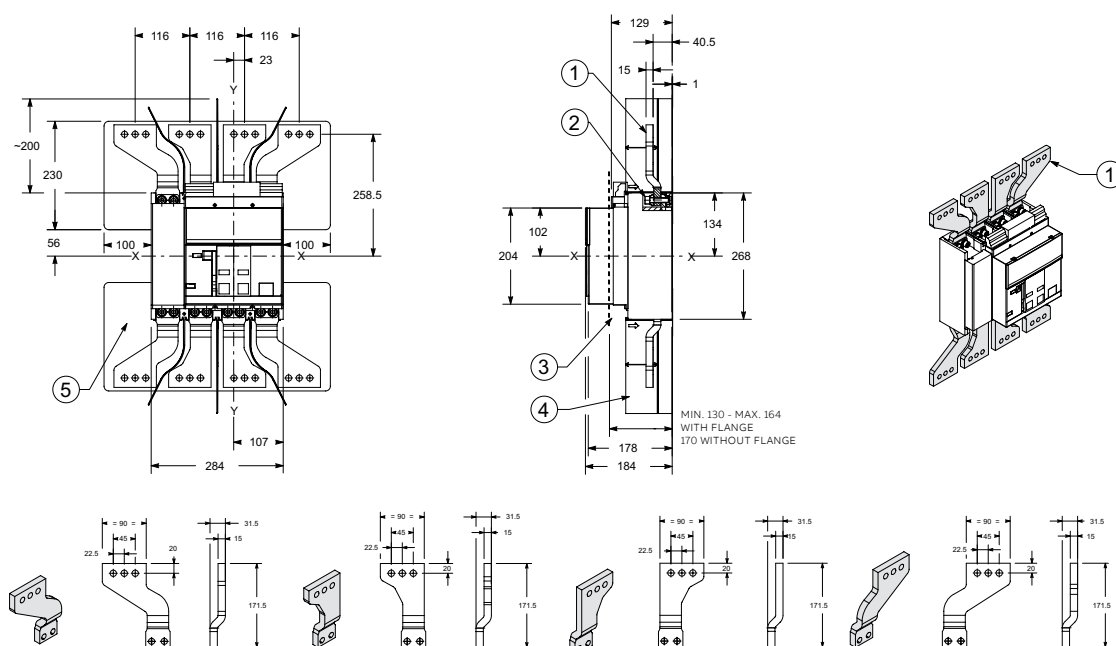
# Fixed circuit-breaker - E1.2

Splayed extended front terminals - ES

3-pole version



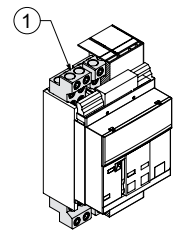
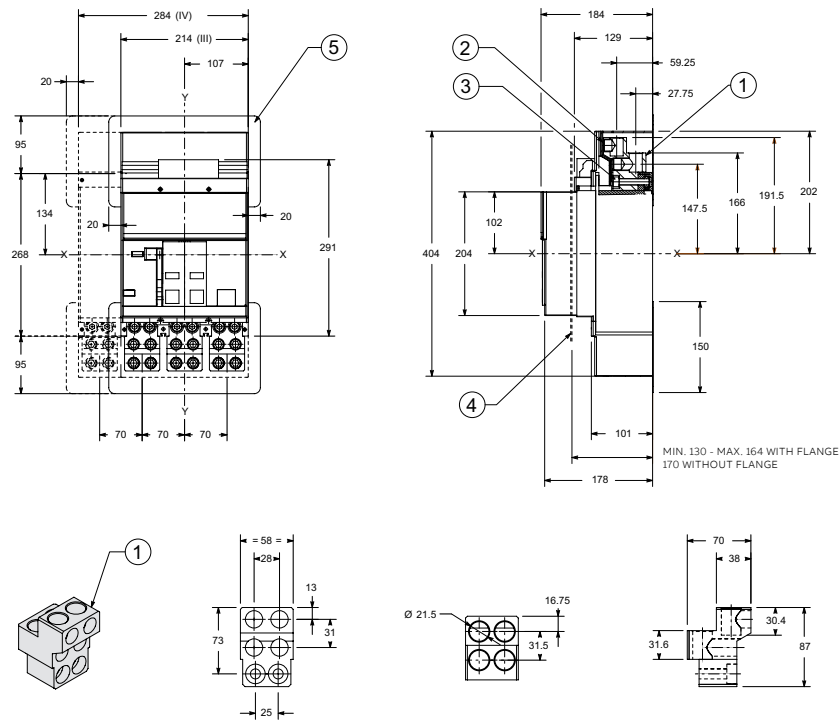
4-pole version



## Key

- 1 Splayed extended front terminals
- 2 Tightening torque 18Nm
- 3 Door position - Ref. page 7/2
- 4 Obligatory phase separators 200mm
- 5 Obligatory insulating plate to be supplied by the customer

## Front terminals for cables – FcCuAl



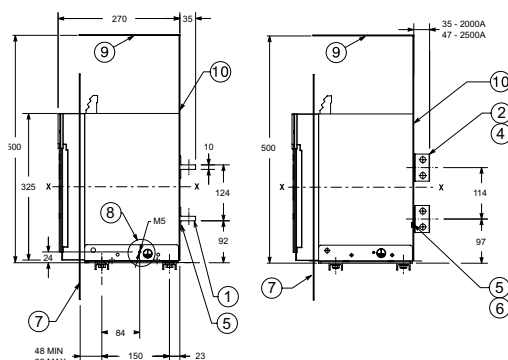
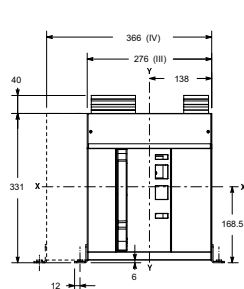
## Key

- 1 Front terminals for cables FC CU AL
- 2 Tightening torque 43Nm
- 3 Tightening torque 18Nm
- 4 Door position - Ref. page 7/2
- 5 Obligatory insulating plate to be supplied by the customer

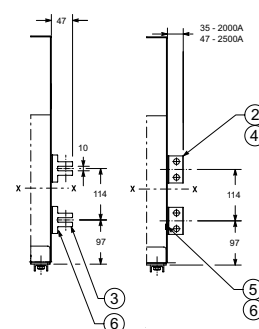
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## Orientable rear terminals

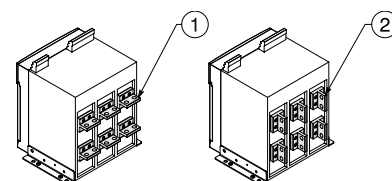
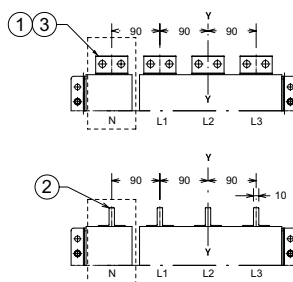
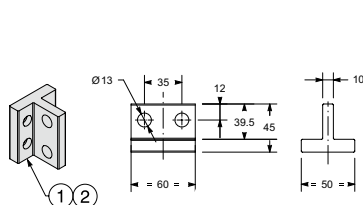
## E2.2 B/N/S/H 2000A



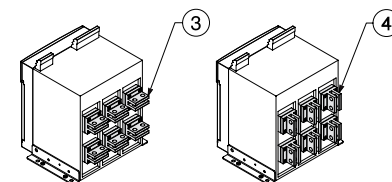
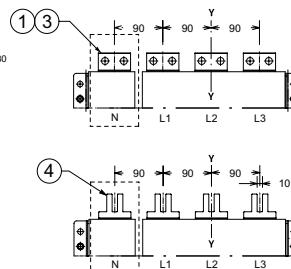
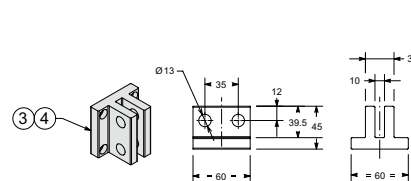
## E2.2 N/S/H 2500A



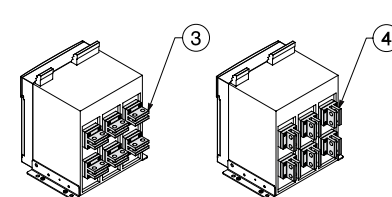
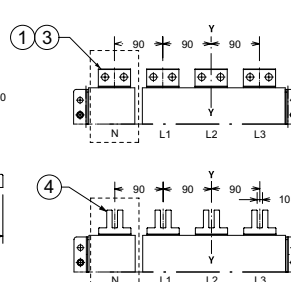
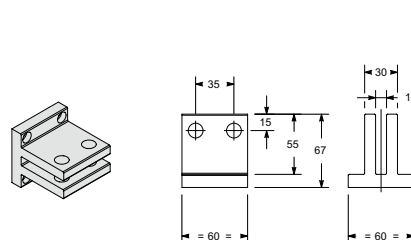
## E2.2 B/N/S/H 2000A HR/VR



## E2.2 N/S/H 2500A HR/VR



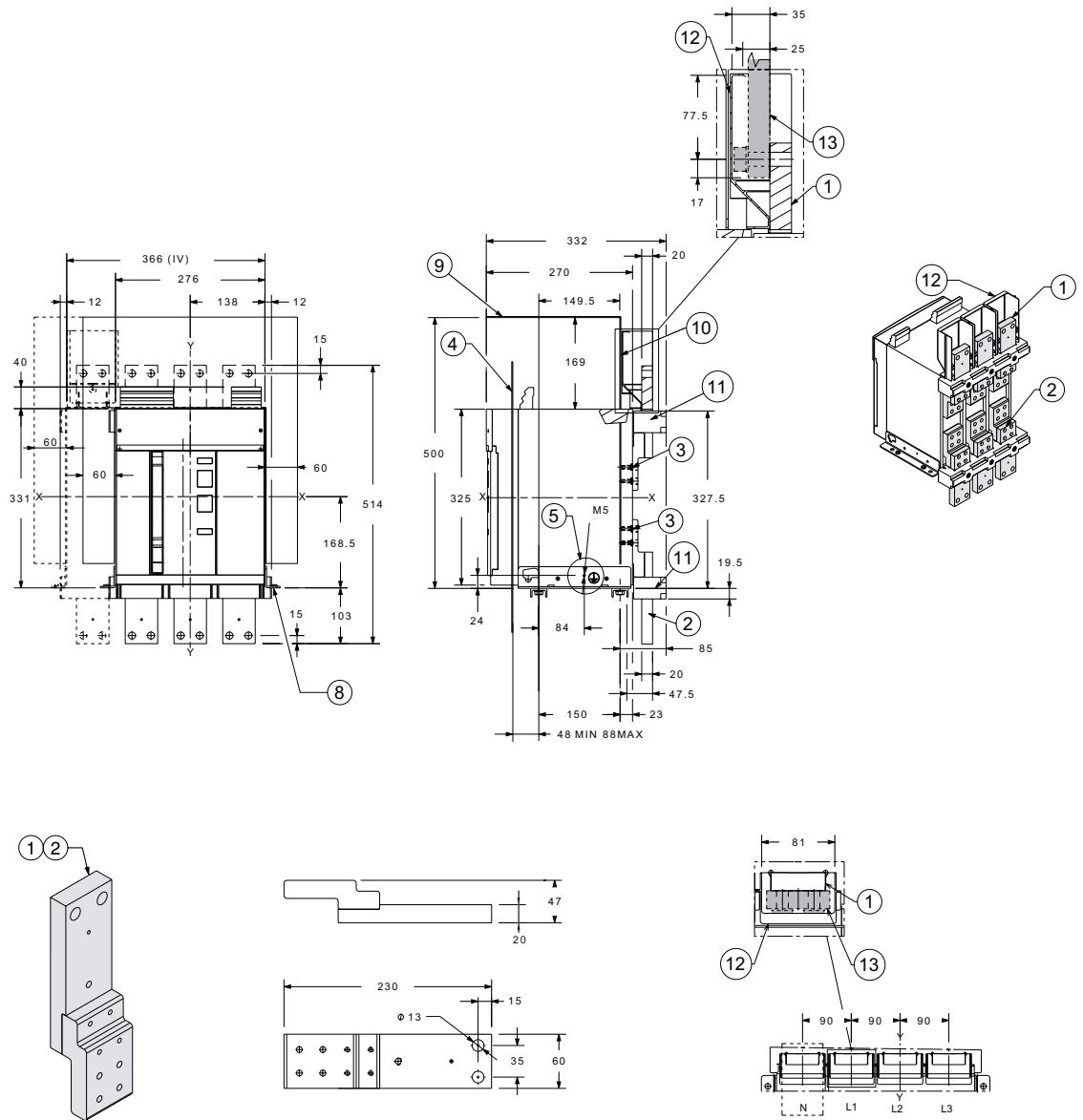
## E2.2 N/S/H 2500A - LHR/LVR



### Key

- 1 Horizontal terminals  
2000A
- 2 Vertical terminals  
2000A
- 3 Horizontal terminals  
2500A
- 4 Vertical terminals  
2500A
- 5 Tightening torque  
2000A 8.6Nm
- 6 Tightening torque  
2500A 8.6Nm
- 7 Door position -  
Ref. page 7/2
- 8 Earthing device -  
Ref. page 7/3
- 9 Metallic sheet
- 10 Insulating sheet or  
insulated metallic  
sheet

## Front terminals – F



### Key

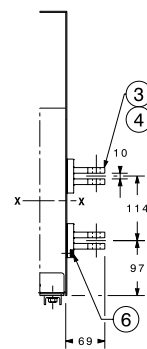
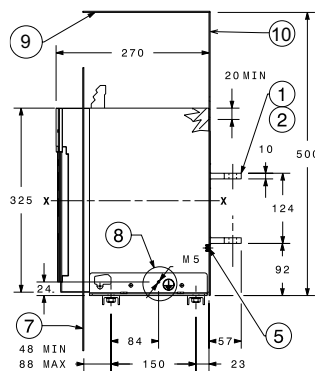
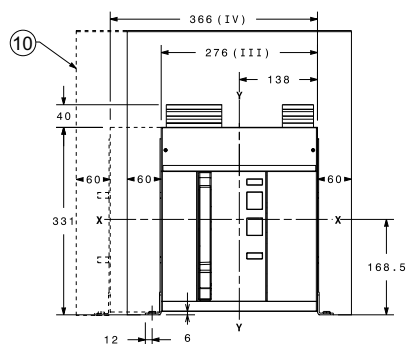
- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque 8.6Nm
- 4 Door position - Ref. page 7/2
- 5 Earthing device - Ref. page 7/3
- 8 External fixing point. Recommended screws M10x25 high class
- 9 Metallic sheet
- 10 Insulating sheet or insulated metallic sheet
- 11 Crossbeam front terminals
- 12 Plastic protection
- 13 Customer bus bar and screws (not provided)

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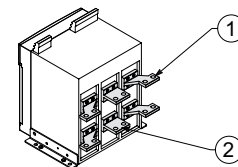
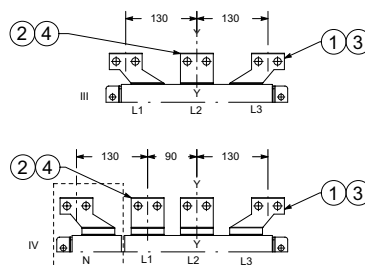
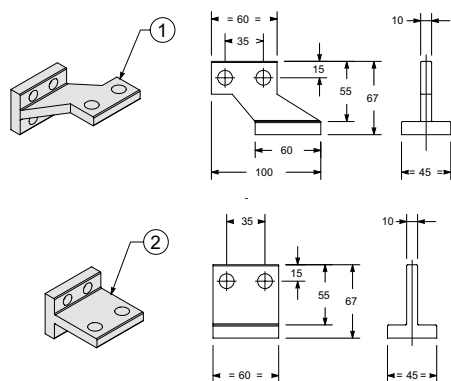
Horizontal spread terminals – SHR

## E2.2 B/N/S/H 2000A

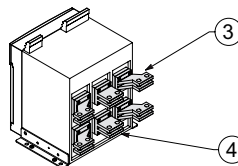
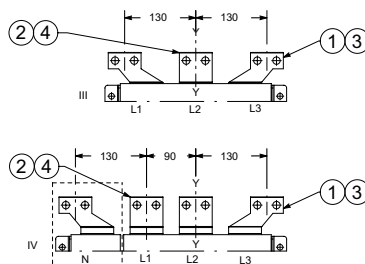
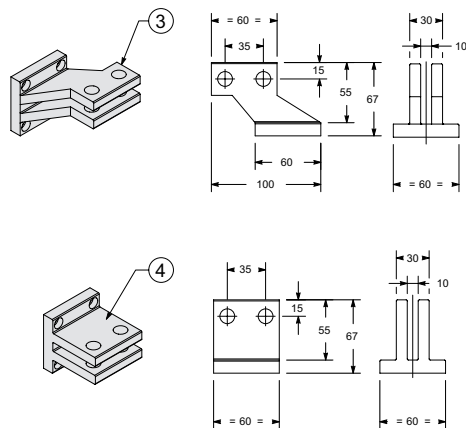
## E2.2 N/S/H 2500A



## E2.2 B/N/S/H 2000A



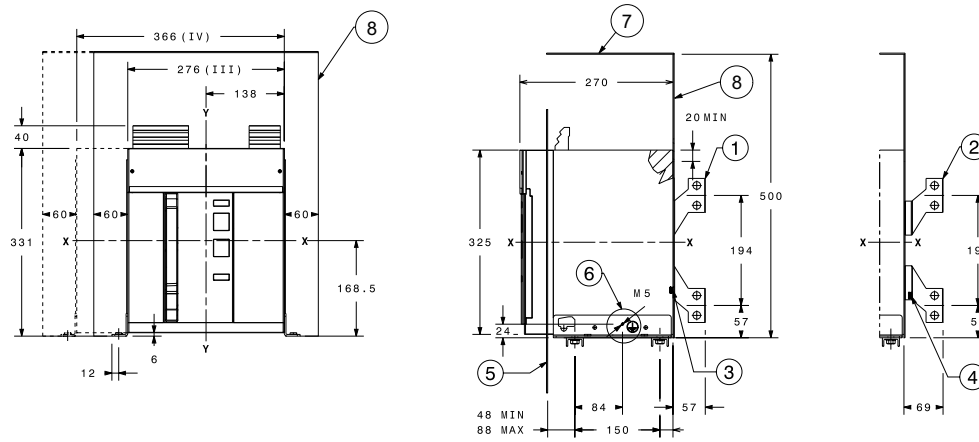
## E2.2 N/S/H 2500A



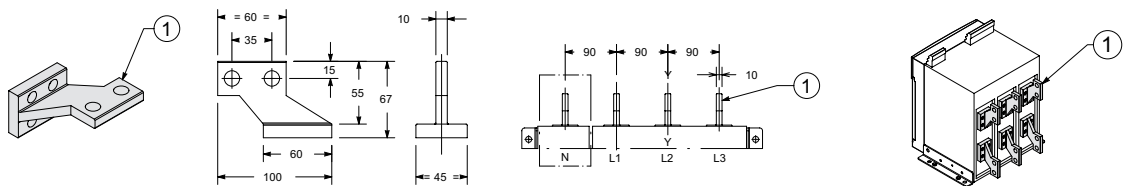
### Key

- 1 Side horizontal  
splayed terminals  
2000A
- 2 Central horizontal  
splayed terminals  
2000A
- 3 Side horizontal  
splayed terminals  
2500A
- 4 Central horizontal  
splayed terminals  
2500A
- 5 Tightening torque  
2000A 8.6Nm
- 6 Tightening torque  
2500A 8.6Nm
- 7 Door position -  
Ref. page 7/2
- 8 Earthing device -  
Ref. page 7/3
- 9 Metallic sheet
- 10 Insulating sheet or  
insulated metallic  
sheet

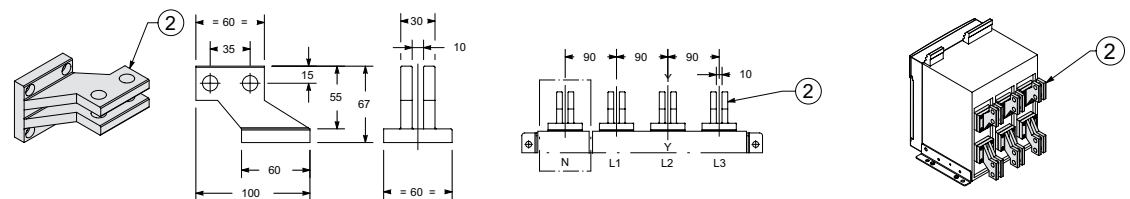
## Vertical spread terminals – SVR



### E2.2 B/N/S/H 2000A



### E2.2 N/S/H 2500A



Key

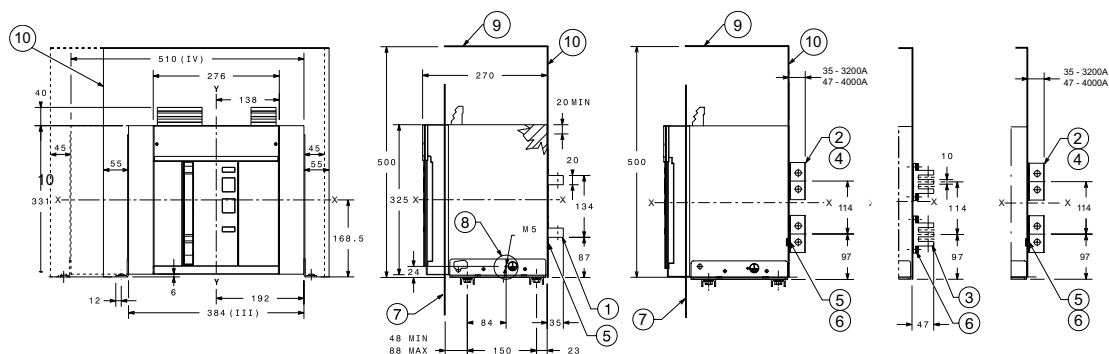
- 1 Vertical splayed terminals 2000A
- 2 Vertical splayed terminals 2500A
- 3 Tightening torque 2000A 8.6Nm
- 4 Tightening torque 2500A 8.6Nm
- 5 Door position - Ref. page 7/2
- 6 Earthing device - Ref. page 7/3
- 7 Metallic sheet
- 8 Insulating sheet or insulated metallic sheet

# Fixed circuit-breaker - E4.2

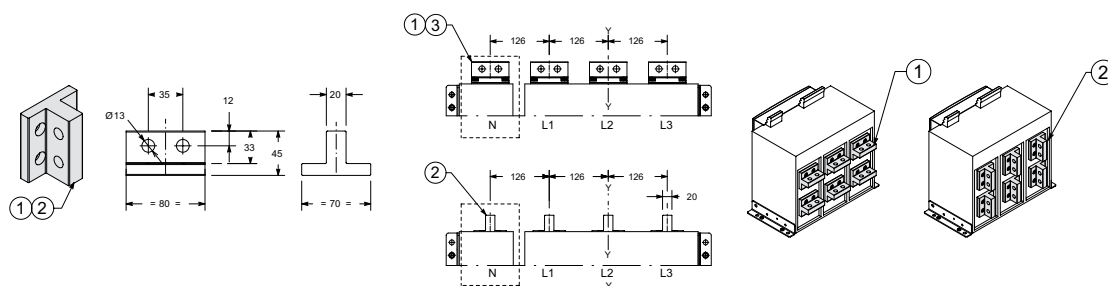
Orientable rear terminals

**E4.2 N/S/H/V 3200A**

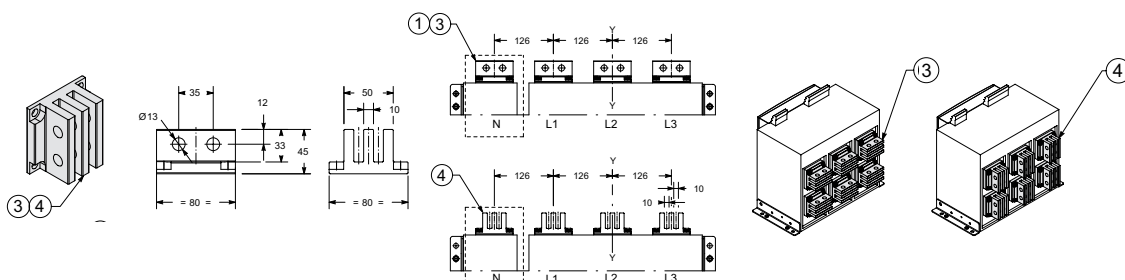
**E4.2 N/S/H/V 4000A**



**E4.2 N/S/H/V 3200A**



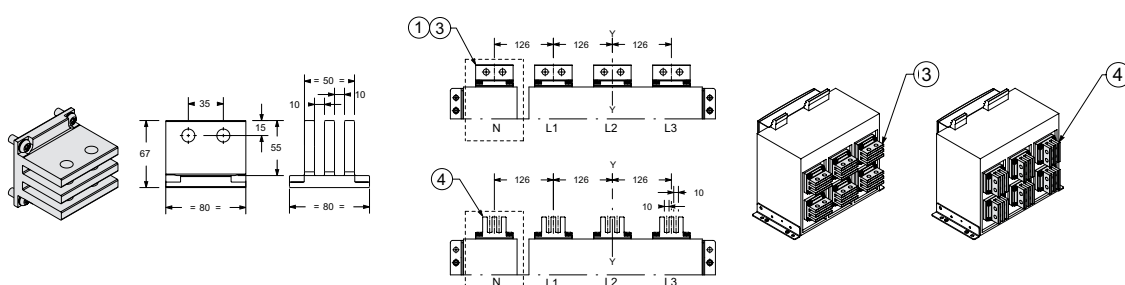
**E4.2 N/S/H/V 4000A**



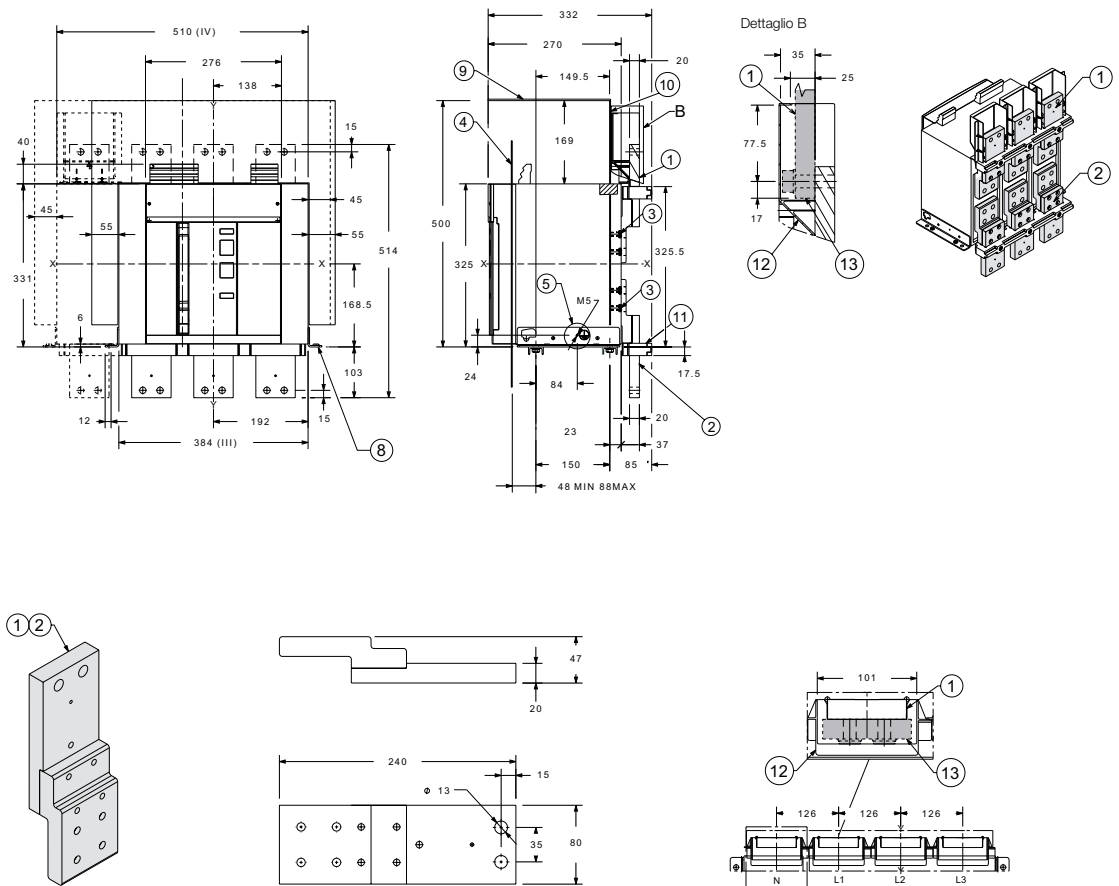
## Key

- 1 Horizontal terminals 3200A
- 2 Vertical terminals 3200A
- 3 Horizontal terminals 4000A
- 4 Vertical terminals 4000A
- 5 Tightening torque 3200A 20Nm
- 6 Tightening torque 4000A 20Nm
- 7 Door position - Ref. page 7/2
- 8 Earthing device - Ref. page 7/3
- 9 Metallic sheet
- 10 Insulating sheet or insulated metallic sheet

**E4.2 N/S/H/V 4000A - LHR/LVR**



## Front terminals – F



## Key

- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque 8.6Nm
- 4 Door position - Ref. page 7/2
- 5 Earthing device - Ref. page 7/3
- 8 External fixing point. Recommended screws M10x25 high class
- 9 Metallic sheet
- 10 Insulating sheet or insulated metallic sheet
- 11 Crossbeam front terminals
- 12 Plastic protection
- 13 Customer busbar and screws (not provided)

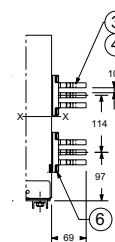
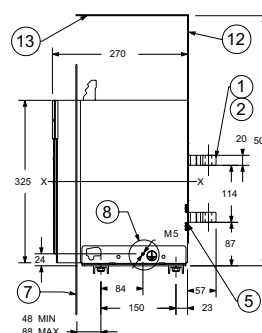
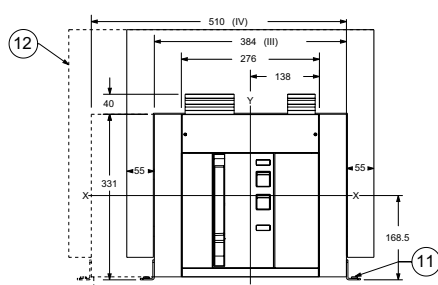


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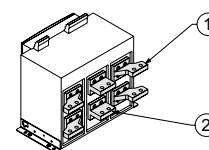
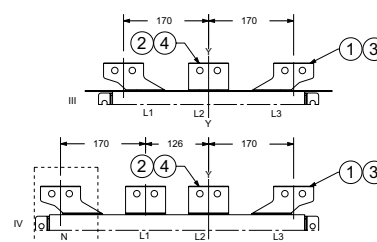
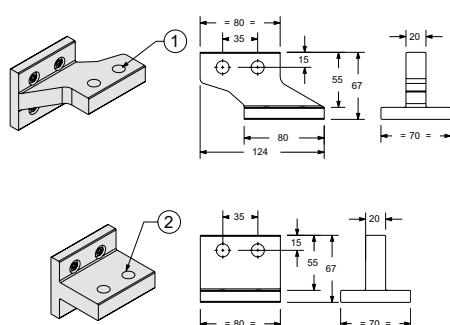
Horizontal spread terminals – SHR

### E4.2 N/S/H 3200A

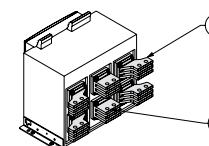
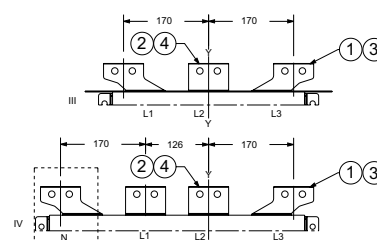
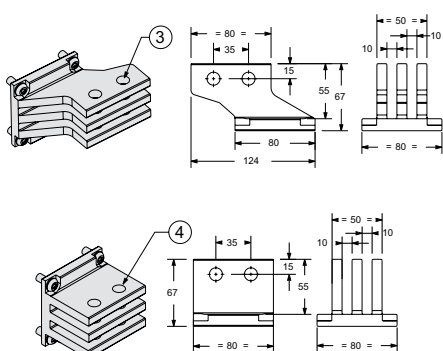
E4.2 N/S/H 4000A  
E4.2 V 2000 ... 4000A



### E4.2 N/S/H 3200A

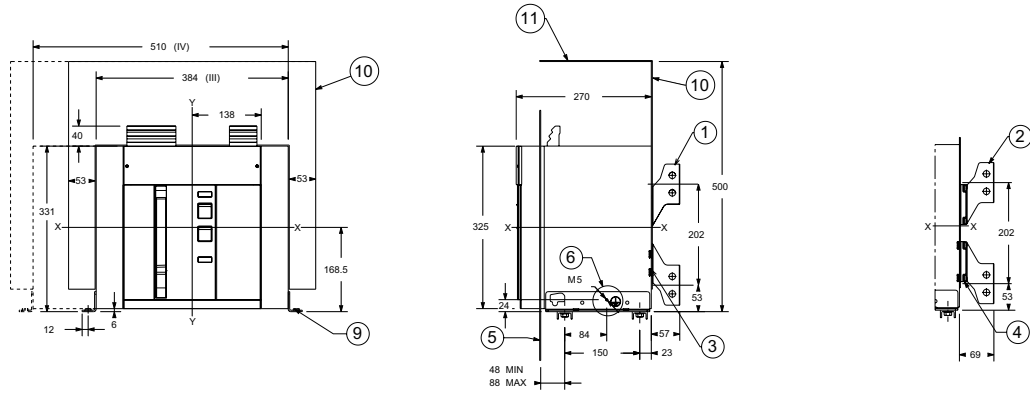


**E4.2 N/S/H 4000A**  
**E4.2 V 2000 ... 4000A**

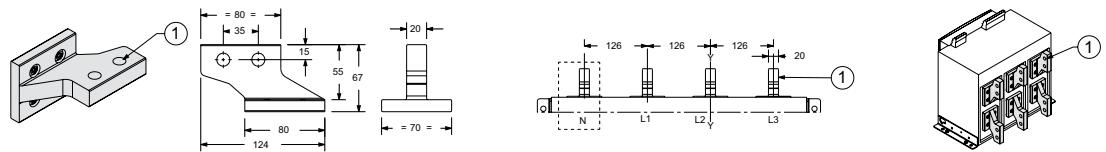


- |     |                                                                                                                                                                     |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Key |                                                                                                                                                                     |
| 1   | Side horizontal<br>divaricate terminals<br>3200A                                                                                                                    |
| 2   | Central horizontal<br>divaricate terminals<br>3200A                                                                                                                 |
| 3   | Side horizontal<br>divaricate terminals<br>4000A                                                                                                                    |
| 4   | Central horizontal<br>divaricate terminals<br>4000A                                                                                                                 |
| 5   | Tightening torque<br>3200A 8.6Nm                                                                                                                                    |
| 6   | Tightening torque<br>4000A 8.6Nm                                                                                                                                    |
| 7   | Door position -<br>Ref. page 7/2                                                                                                                                    |
| 8   | Grounding                                                                                                                                                           |
| 11  | Mounting outside<br>feet - screws<br>recommend M10x25<br>high class 8.8 or<br>couple superior<br>Tightening torque<br>40Nm compulsory<br>fixing screws from<br>high |
| 12  | Insulating sheet or<br>insulated metallic<br>sheet                                                                                                                  |
| 13  | Metallic sheet                                                                                                                                                      |

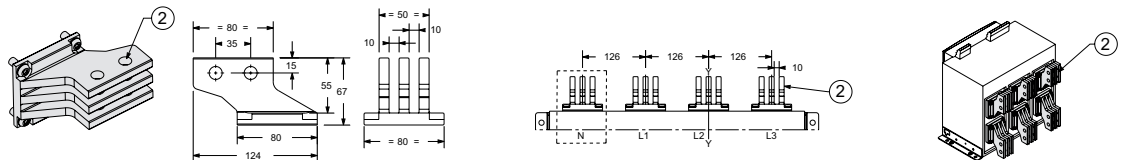
## Vertical spread terminals – SVR



### E4.2 N/S/H 3200A



### E4.2 N/S/H 4000A E4.2 V 2000 ... 4000A



#### Key

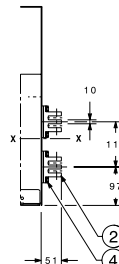
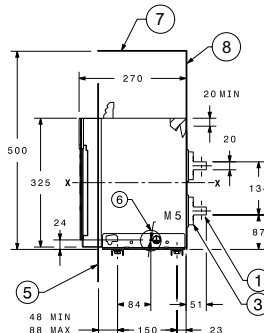
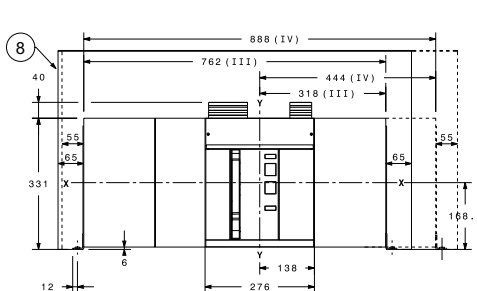
- 1 Vertical divaricate terminals 3200A
- 2 Vertical divaricate terminals 4000A
- 3 Tightening torque 3200A 8.6Nm
- 4 Tightening torque 4000A 8.6Nm
- 5 Door position - Ref. page 7/2
- 6 Grounding
- 9 Mounting outside feet - screws recommend M10x25 high class 8.8 or couple superior Tightening torque 40Nm compulsory fixing screws from high
- 10 Insulating sheet or insulated metallic sheet
- 11 Metallic sheet

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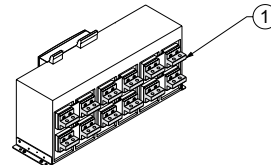
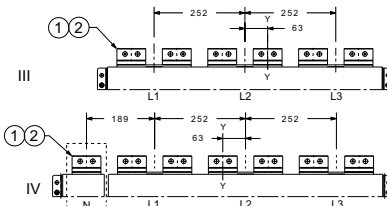
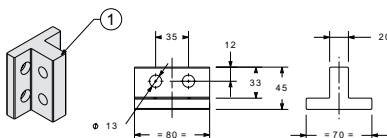
Horizontal rear terminals – HR

## E6.2 H/V/X 4000-5000A

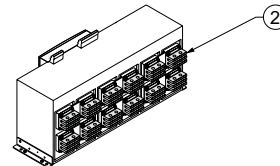
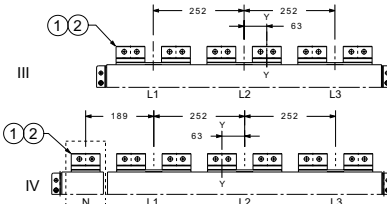
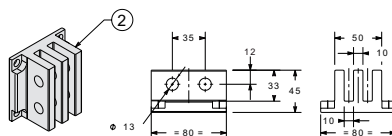
## E6.2 H/V/X 4000-6300A



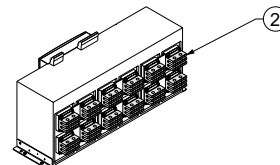
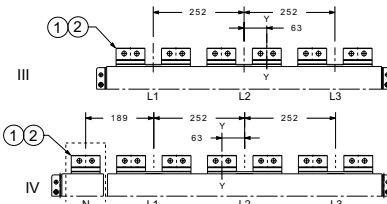
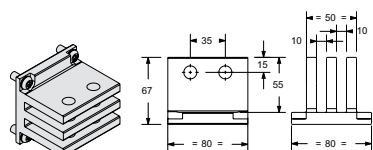
### E6.2 H/V/X 4000-5000A



## E6.2 H/V/X 4000-6300A



## E6.2 H/V/X 4000-6300A LHR

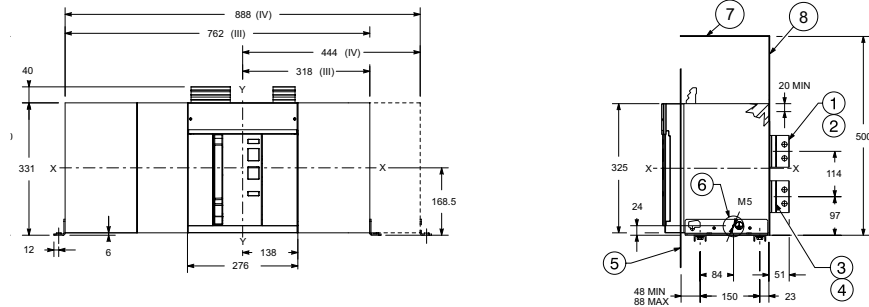


### Key

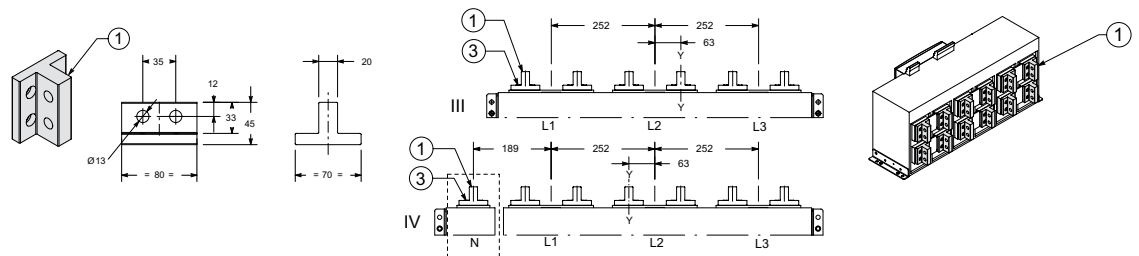
- 1 Horizontal terminals  
5000A
- 2 Horizontal terminals  
6300A
- 3 Tightening torque  
5000A 20Nm
- 4 Tightening torque  
6300A 20Nm
- 5 Door position -  
Ref. page 7/2
- 6 Earthing device -  
Ref. page 7/3
- 7 Metallic sheet
- 8 Insulating sheet or  
insulated metallic  
sheet

## Vertical rear terminals – VR

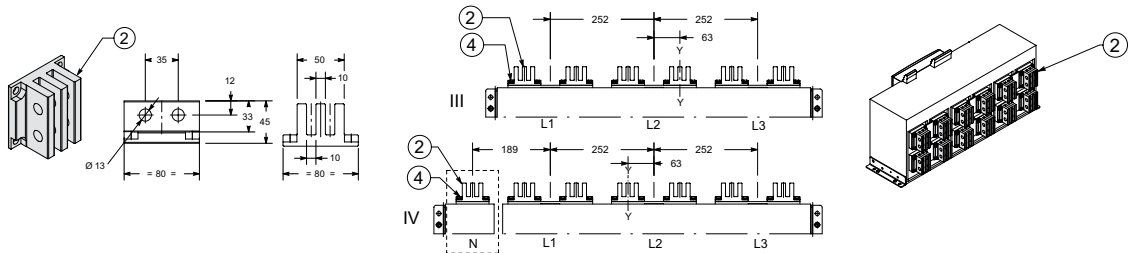
## E6.2 H/V/X 4000...6300A



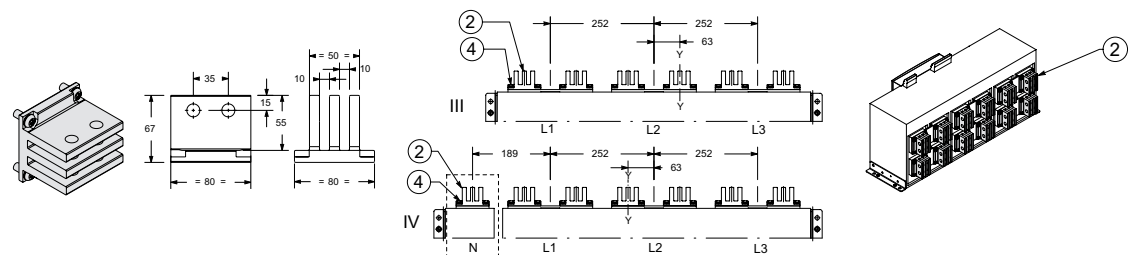
## E6.2 H/V/X 4000-5000A



## E6.2 H/V/X 4000-6300A



## E6.2 H/V/X 4000-6300A LVR



- ### Key

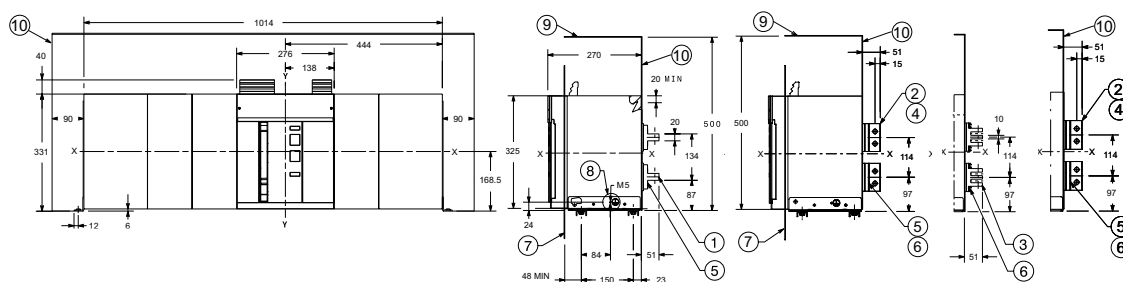
- 1 Vertical terminals 5000A
- 2 Vertical terminals 6300A
- 3 Tightening torque 5000A 20Nm
- 4 Tightening torque 6300A 20Nm
- 5 Door position - Ref. page 7/2
- 6 Earthing device - Ref. page 7/3
- 7 Metallic sheet
- 8 Insulating sheet or insulated metallic sheet

## Fixed circuit-breaker - E6.2

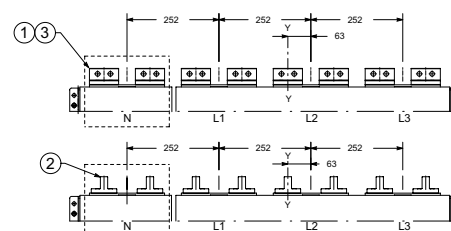
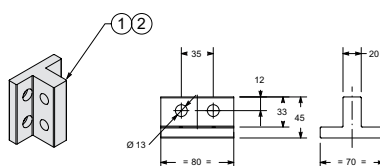
### Orientable rear terminals - HR/VR full size

## E6.2 H/V/X 4000-5000A

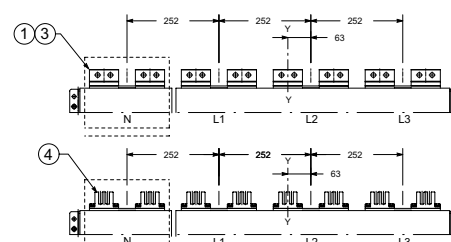
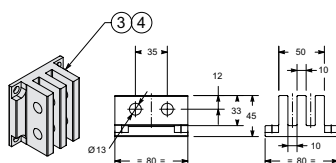
**E6.2 H/V/X**  
**4000-6300A**



## E6.2 H/V/X 4000-5000A



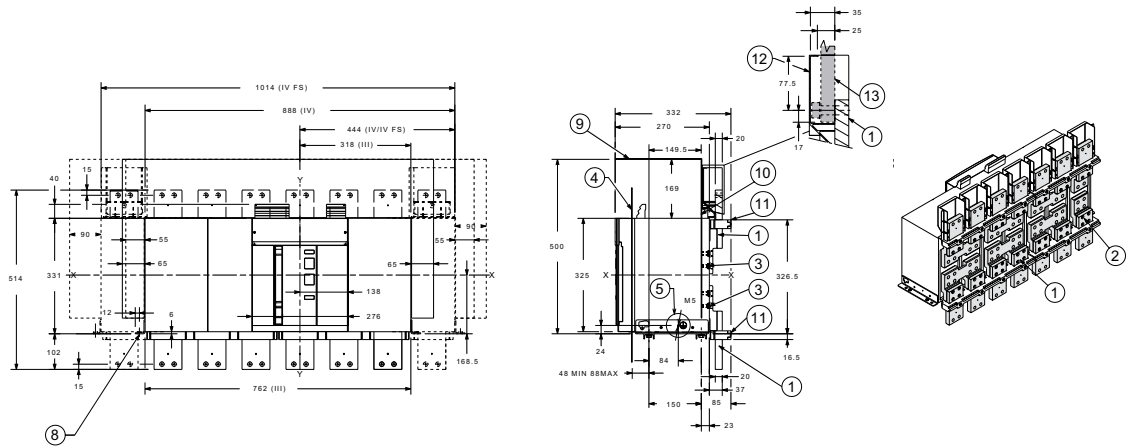
## E6.2 H/V/X 4000-6300A



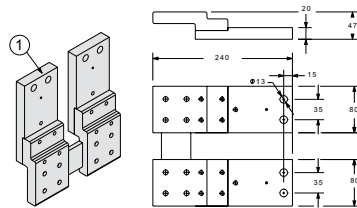
### Key

- 1 Horizontal terminals  
5000A
- 2 Vertical terminals  
5000A
- 3 Horizontal terminals  
6300A
- 4 Vertical terminals  
6300A
- 5 Tightening torque  
5000A 20Nm
- 6 Tightening torque  
6300A 20Nm
- 7 Door position -  
Ref. page 7/2
- 8 Earthing device -  
Ref. page 7/3
- 9 Metallic sheet
- 10 Insulating sheet or  
insulated metallic  
sheet

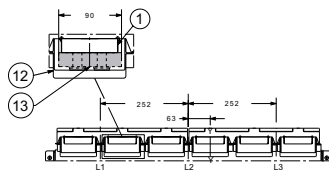
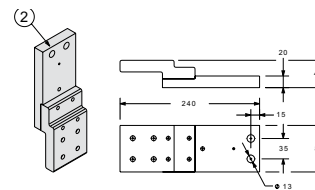
## Front terminals – F



## Upper front terminals



## Lower front terminal



3-pole



4-pole



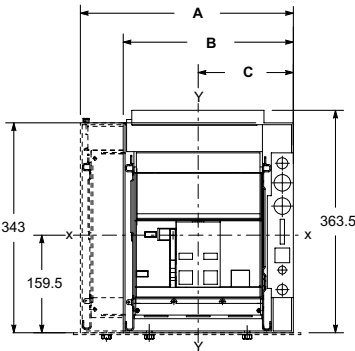
4-pole full size

## Key

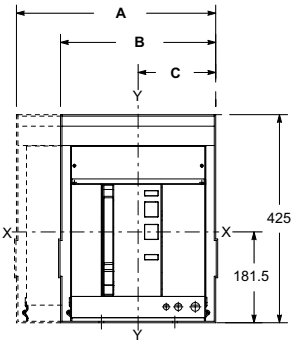
- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque 8.6Nm
- 4 Door position - Ref. page 7/2
- 5 Earthing device - Ref. page 7/3
- 8 External fixing point. Recommended screws M10x25 high class
- 9 Metallic sheet
- 10 Insulating sheet or insulated metallic sheet
- 11 Crossbeam front terminals
- 12 Plastic protection
- 13 Customer busbar and screws (not provided)

# Withdrawable circuit-breaker

E1.2



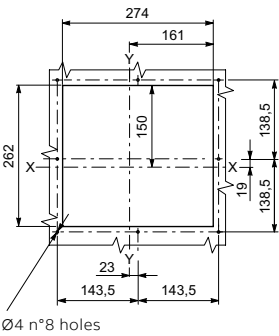
E2.2 - E4.2 - E6.2



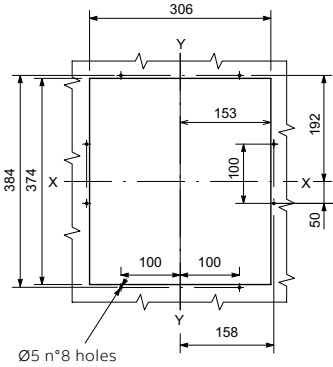
|        | A    | B   | C     |       |
|--------|------|-----|-------|-------|
| [mm]   | 4p   | 3p  | 3p    | 4p    |
| E1.2   | 348  | 278 | 155.5 | 155.5 |
| E2.2   | 407  | 317 | 158.5 | 158.5 |
| E4.2   | 551  | 425 | 212.5 | 212.5 |
| E6.2   | 929  | 803 | 338.5 | 464.5 |
| E6.2/f | 1055 | -   | -     | 464.5 |

## Compartment door drilling

E1.2

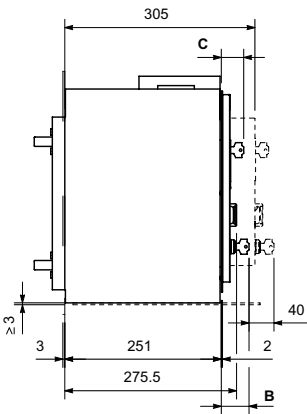


E2.2 - E4.2 - E6.2



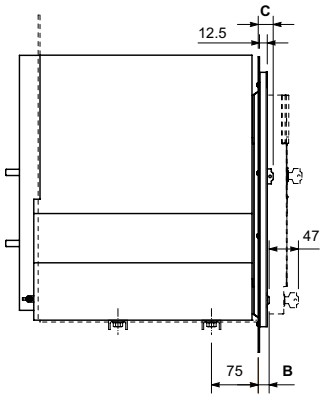
## Distance from connected to isolated position

E1.2



| E1.2 |      | Standard | Ronis/STI | Kirk | Castell |
|------|------|----------|-----------|------|---------|
| B    | [mm] | 44.5     | 55        | 55   | 85      |
| C    | [mm] | 36       | 46.5      | 46.5 | 76.5    |

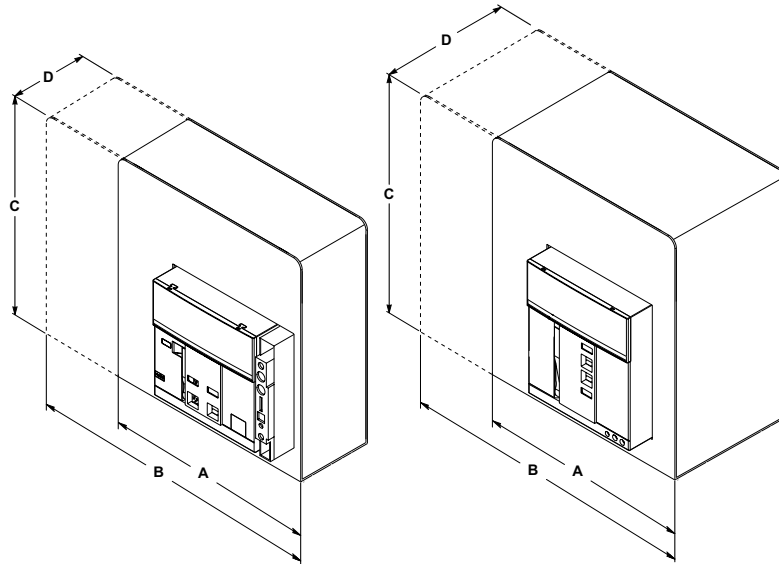
E2.2 - E4.2 - E6.2



| E2.2-E4.2-E6.2 |      | Standard | Ronis/STI | Kirk | Castell |
|----------------|------|----------|-----------|------|---------|
| B              | [mm] | 22       | 34        | 39   | 57.5    |
| C              | [mm] | 23       | 35        | 40   | 58.5    |

B refers to KLC; C refers to KLP

## Dimensions of the compartment

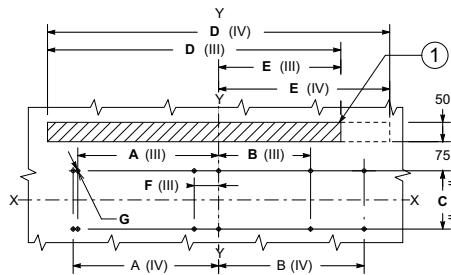


|               | A   | B    | C    | D   |
|---------------|-----|------|------|-----|
| [mm]          | 3p  | 4p   |      |     |
| <b>E1.2</b>   | 280 | 350  | 440* | 252 |
| <b>E2.2</b>   | 400 | 490  | 500  | 355 |
| <b>E4.2</b>   | 500 | 600  | 500  | 355 |
| <b>E6.2</b>   | 900 | 1000 | 500  | 355 |
| <b>E6.2/f</b> | -   | 1200 | 500  | 355 |

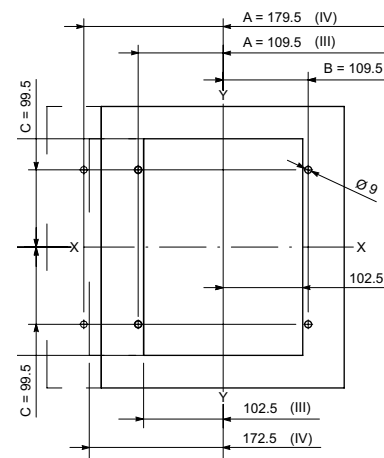
\* 390 for voltages ≤ 440V AC

### Floor fixing

—  
Key  
1 Ventilation drilling  
on the switchgear

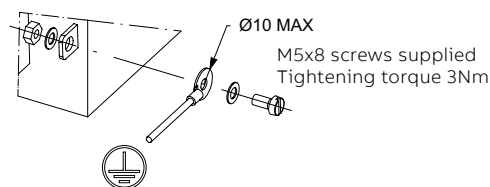


### Wall fixing (only for E1.2)

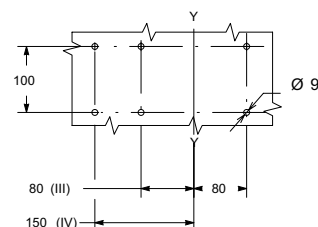


|               | A   | B   | C   | D   | E   | F    | G  |
|---------------|-----|-----|-----|-----|-----|------|----|
| [mm]          | 3p  | 4p  | 3p  | 4p  | 3p  | 4p   |    |
| <b>E1.2</b>   | 80  | 150 | 80  | 80  | 100 | -    | 9  |
| <b>E2.2</b>   | 75  | 175 | 75  | 75  | 150 | 270  | 10 |
| <b>E4.2</b>   | 100 | 225 | 100 | 100 | 150 | 378  | 10 |
| <b>E6.2</b>   | 363 | 375 | 237 | 375 | 150 | 756  | 10 |
| <b>E6.2/f</b> | -   | 425 | -   | 425 | 150 | 1008 | 10 |

### Earthing device E2.2 - E4.2 - E6.2



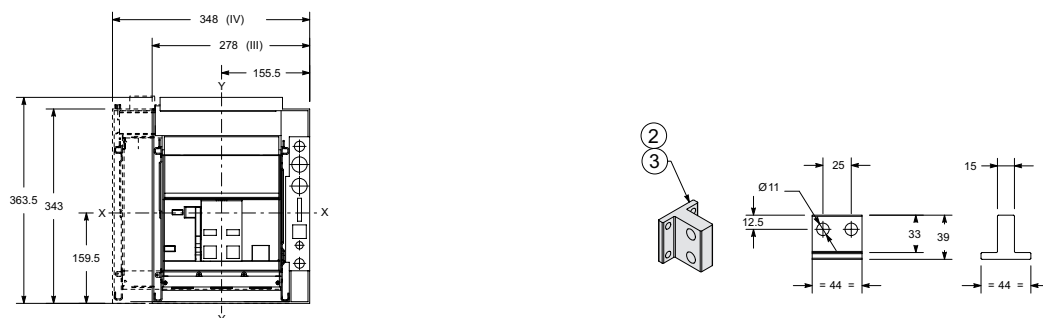
### Fixing on support sheet (only for E1.2)



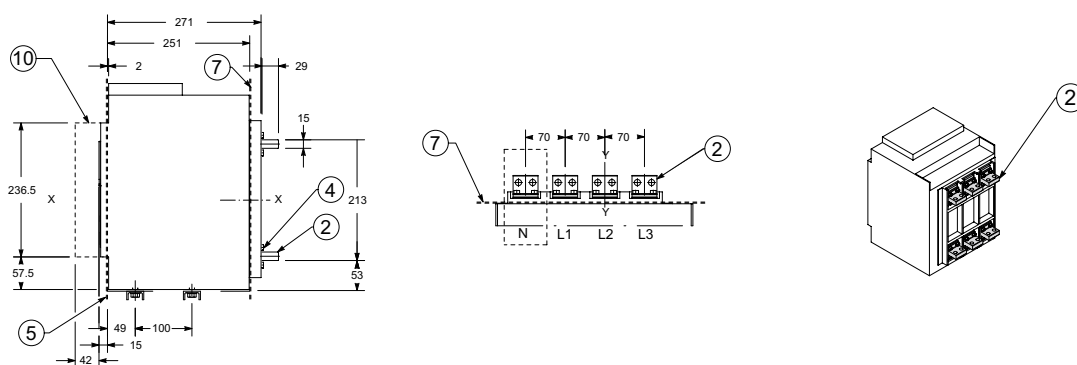


# Withdrawable circuit-breaker - E1.2

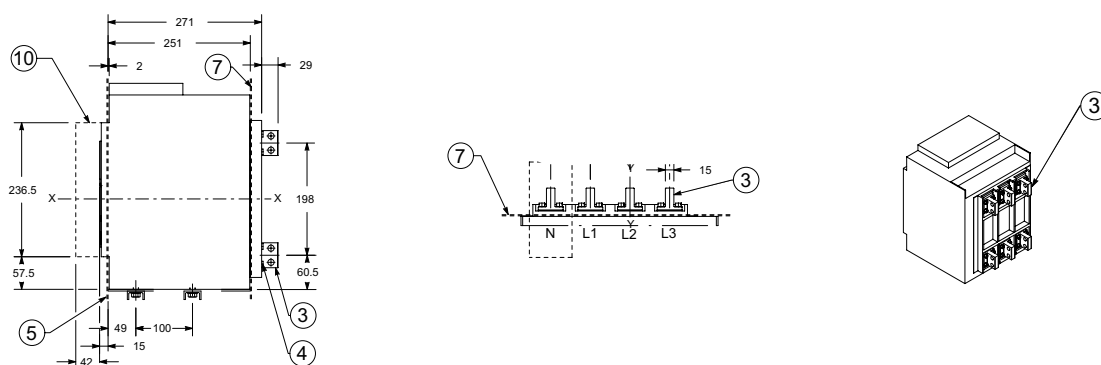
## Rear orientable terminals - HR/VR



### Terminals HR



### Terminals VR



—

Key

2 Horizontal rear terminals

3 Vertical rear terminals

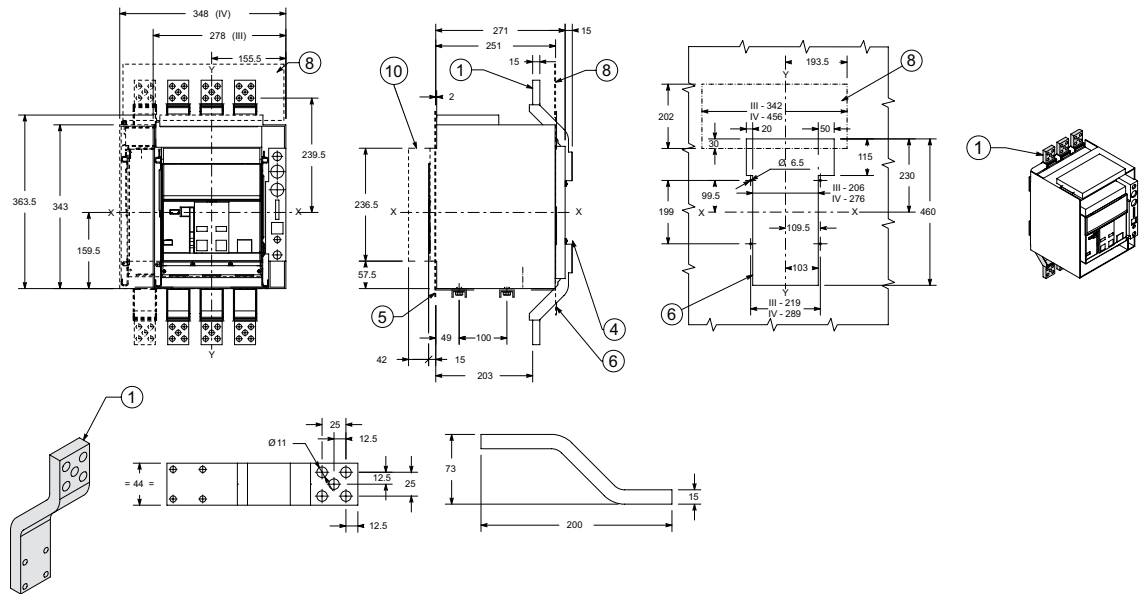
4 Tightening torque 12 Nm

5 Door position - Ref. page 7/20

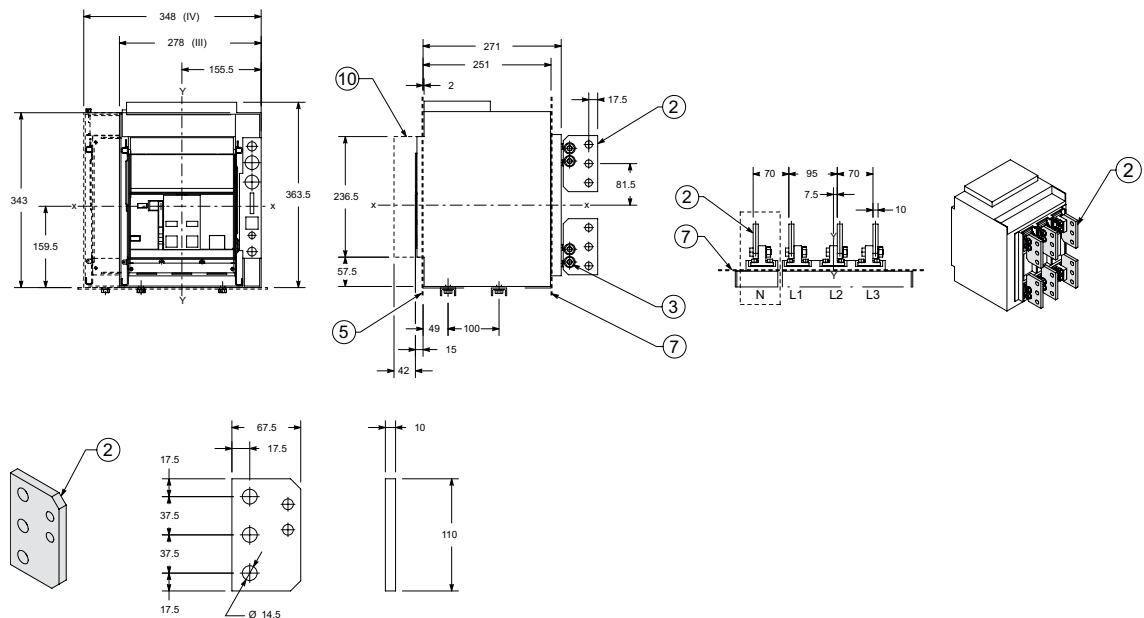
7 Rear segregation for rear terminals

10 Sectioning run

## Extended front terminals – EF



## Rear terminals for cables – FcCuAl



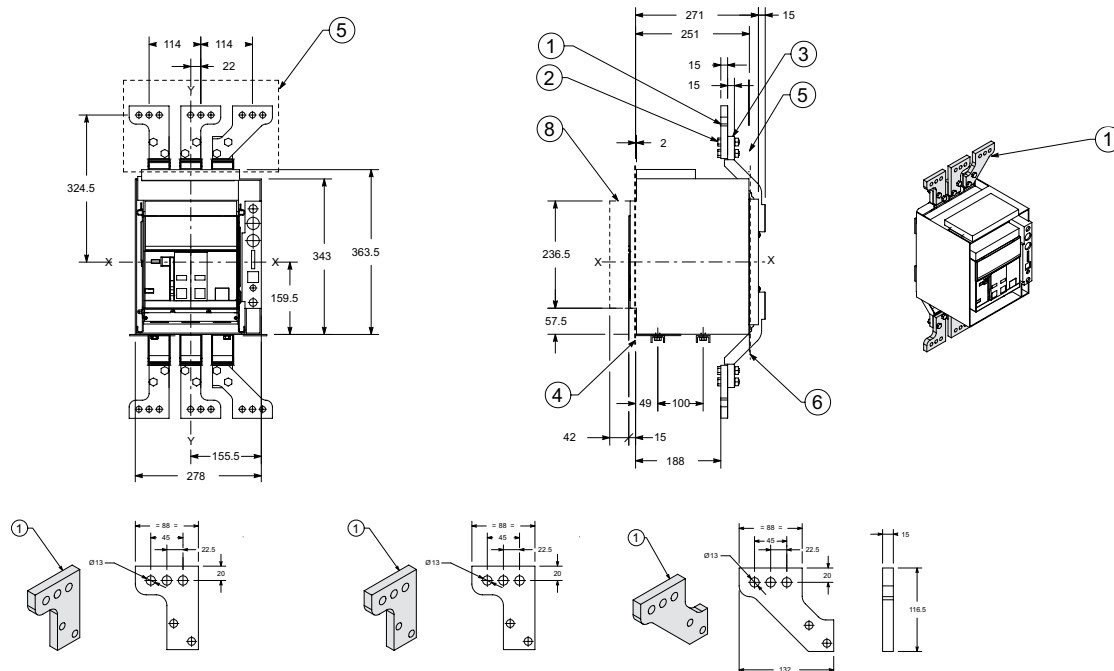
### Key

- 1 Front terminals
- 2 Rear terminals for cables
- 3 Tightening torque 48 Nm
- 4 Tightening torque 12 Nm
- 5 Door position - Ref. page 7/20
- 6 Rear segregation for front terminals
- 7 Rear segregation for rear terminals - Ref. page 7/23
- 8 Insulating protection
- 10 Sectioning run

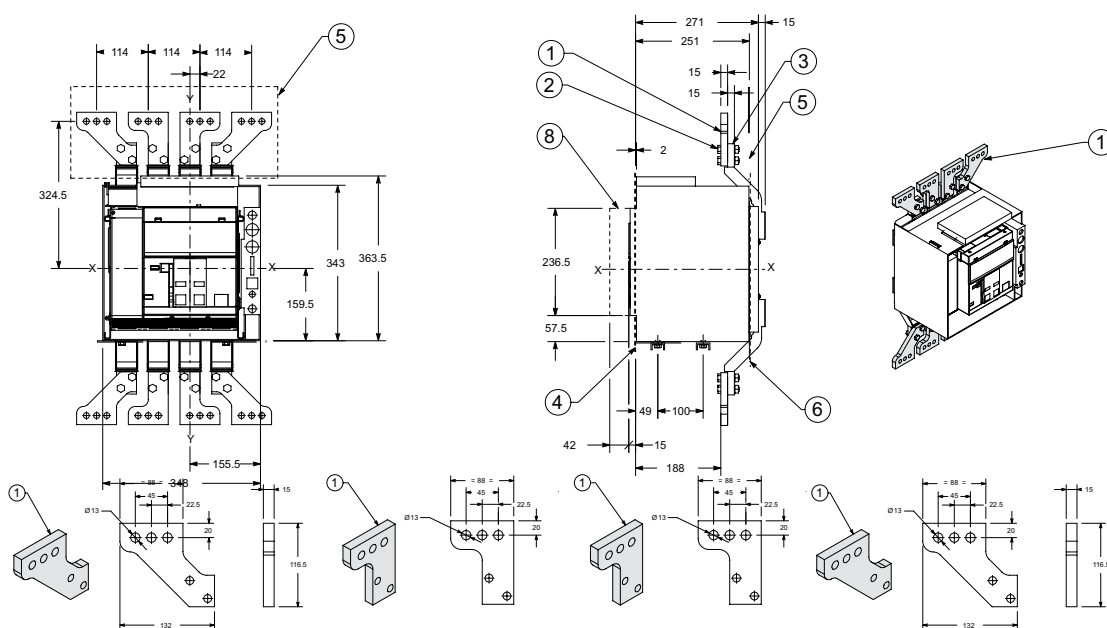
# Withdrawable circuit-breaker - E1.2

## Front spread terminals - ES

### 3-pole version



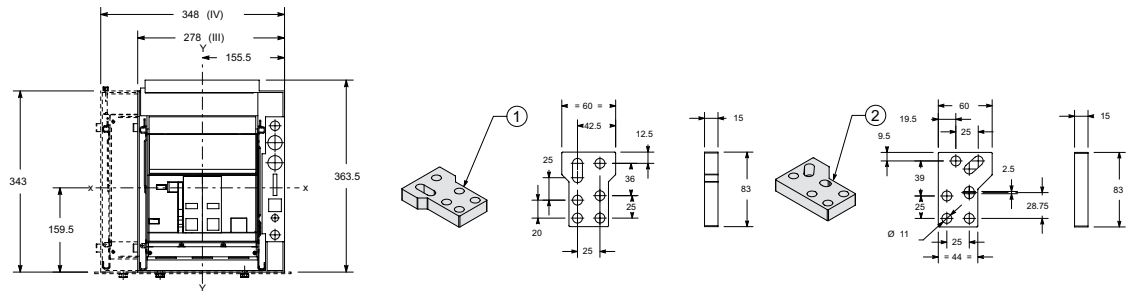
### 4-pole version



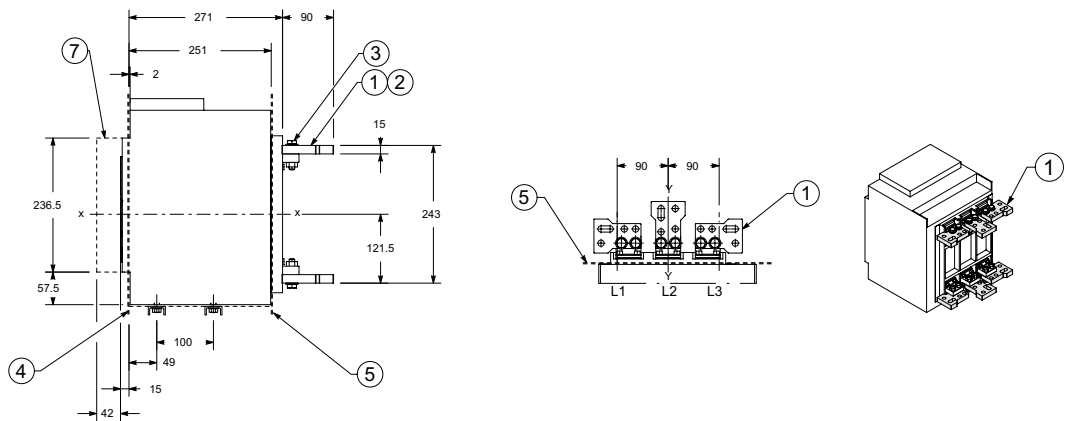
#### Key

- 1 Spread terminal
- 2 Tightening torque  
40 Nm
- 3 Front terminal
- 4 Door position -  
Ref. page 7/20
- 5 Insulating protection  
(refer to front  
terminals page 7/23)
- 6 Rear segregation for  
front terminals -  
Ref. page 7/23
- 8 Sectioning run

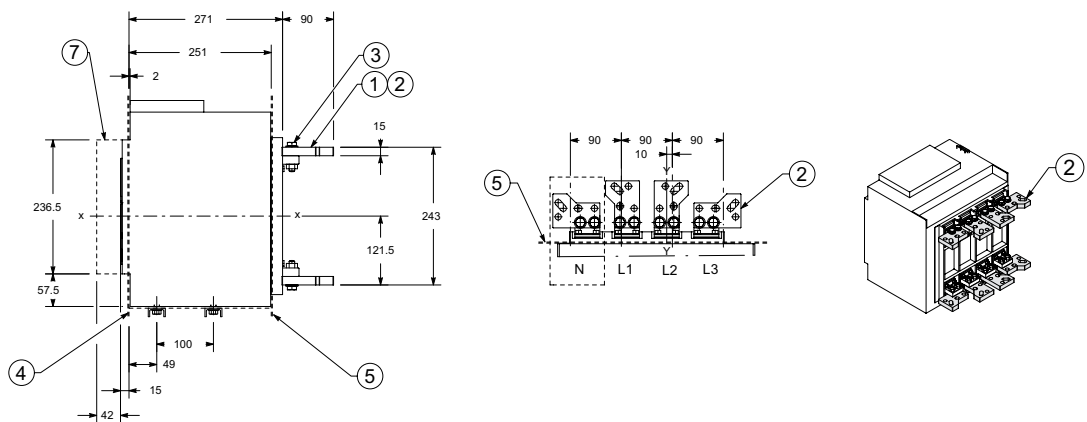
## Horizontal rear spread terminals – SHR



### 3-pole version



### 4-pole version



#### Key

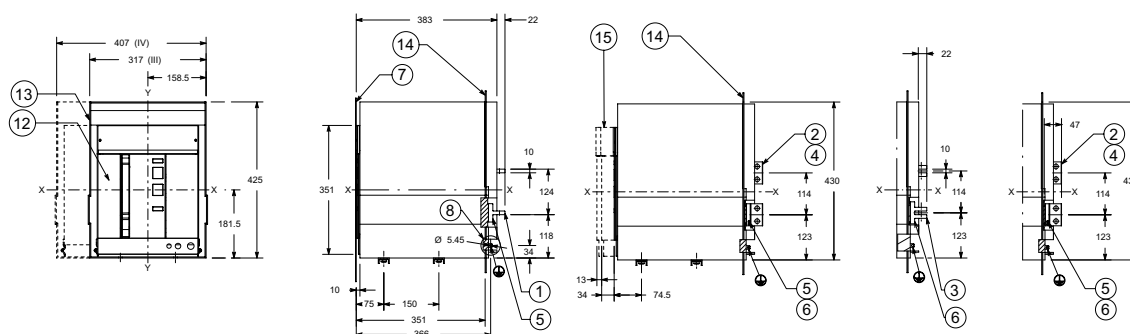
- 1 Spread rear terminals for 3-pole version
- 2 Spread rear terminals for 4-pole version
- 3 Tightening torque 18 Nm
- 4 Door position - Ref. page 7/20
- 5 Rear segregation of rear terminals
- 7 Sectioning run

# Withdrawable circuit-breaker - E2.2

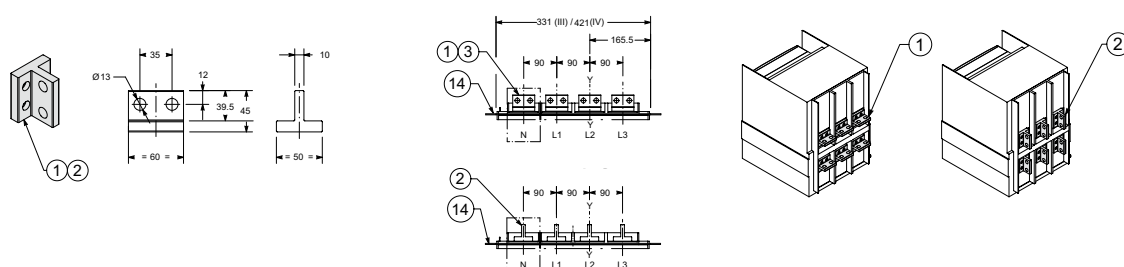
## Rear orientable terminals

E2.2 B/N/S/H 2000A

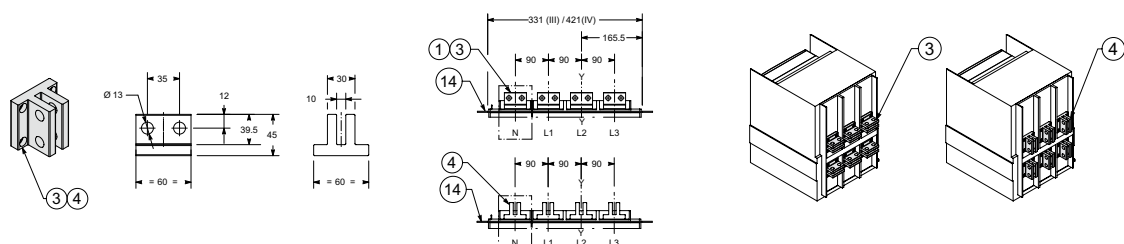
E2.2 N/S/H 2500A



E2.2 B/N/S/H 2000A



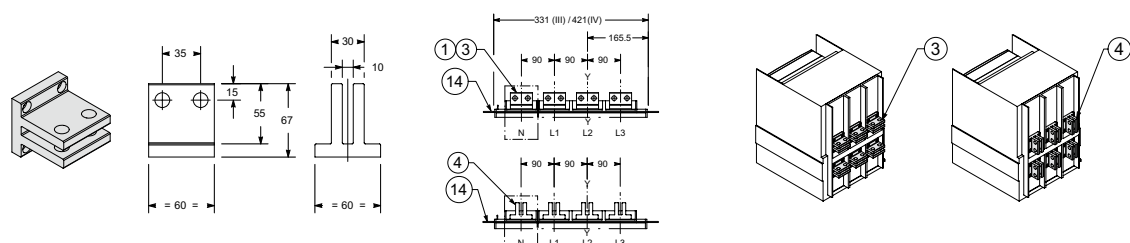
E2.2 N/S/H 2500A



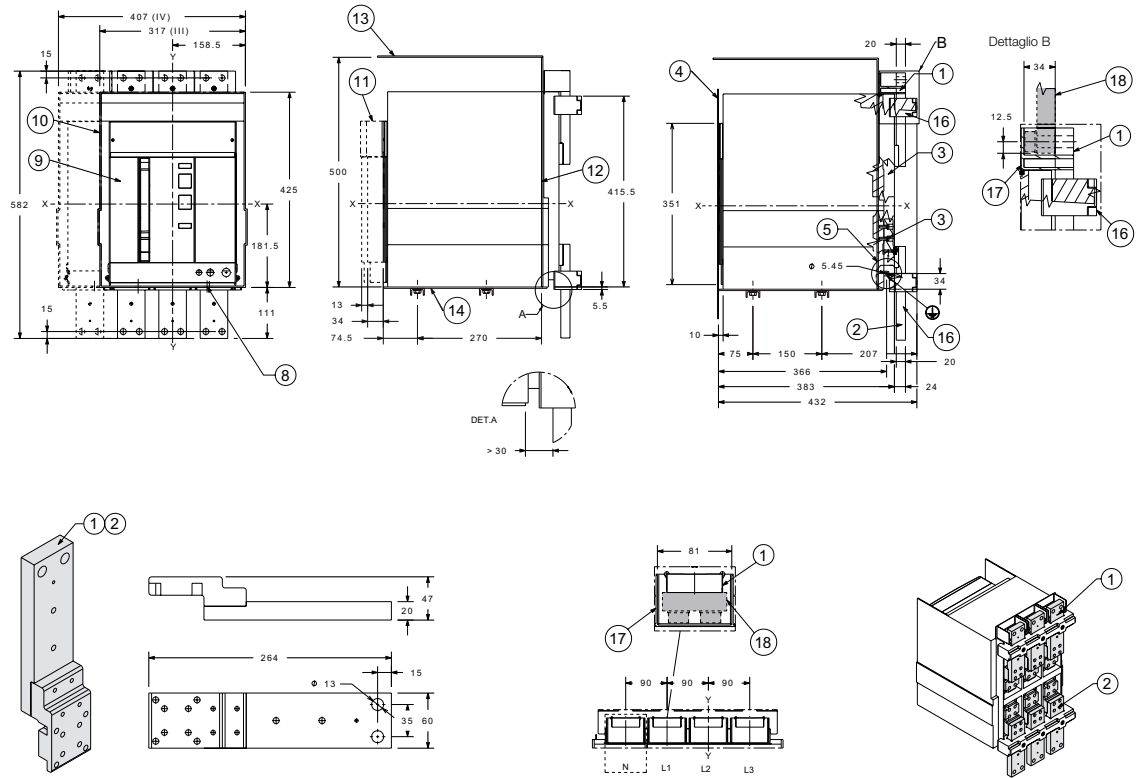
### Key

- 1 Horizontal terminals 2000A
- 2 Vertical terminals 2000A
- 3 Horizontal terminals 2500A
- 4 Vertical terminals 2500A
- 5 Tightening torque 2000A 8.6Nm
- 6 Tightening torque 2500A 8.6Nm
- 7 Door position - Ref. page 7/20
- 8 Earthing device
- 12 Mobile part
- 13 Fixed part
- 14 Segregation (where envisaged)
- 15 Distance from connected for testing to isolated

E2.2 N/S/H 2500A LHR/LVR



Front terminals – F



### Key

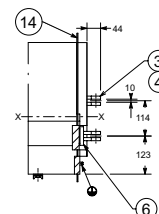
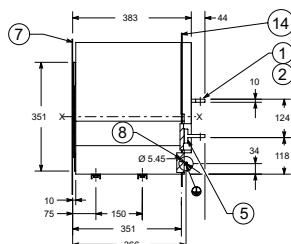
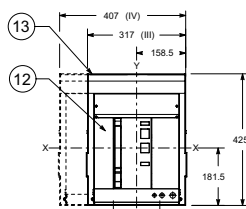
- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque 8.6Nm
- 4 Door position - Ref. page 7/20
- 5 Earthing device
- 8 External fixing point
- Recommended screws M10x25 high class
- 9 Moving part
- 10 Fixed part
- 11 Connected, test, disconnected distances
- 12 Insulating sheet or insulated metallic sheet
- 13 Roof insulation or insulated metal
- 14 Fixing plate
- 15 Crossbeam front terminal
- 16 Plastic protection
- 17 Customer busbar and screws (not provided)

# Withdrawable circuit-breaker - E2.2

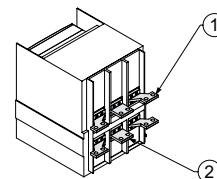
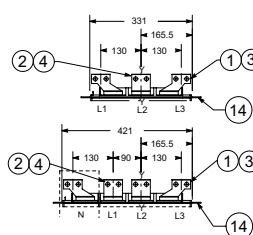
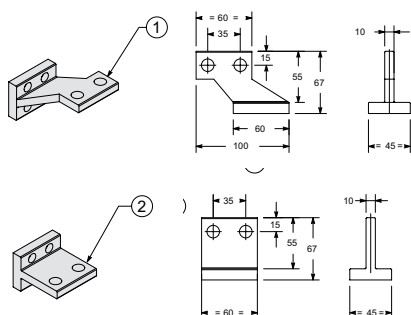
Horizontal rear spread terminals – SHR

E2.2 B/N/S/H 2000A

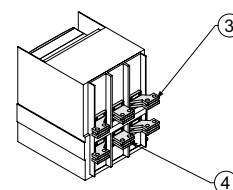
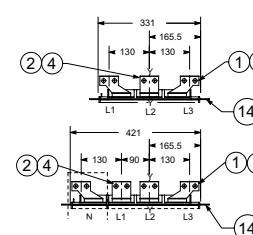
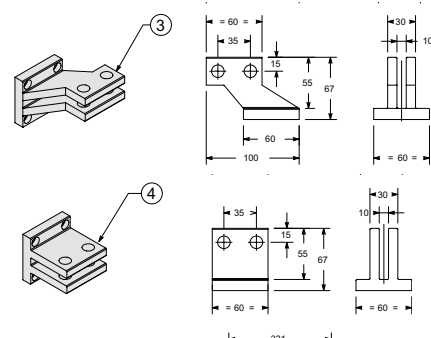
E2.2 N/S/H 2500A



E2.2 B/N/S/H 2000A



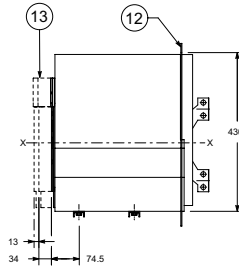
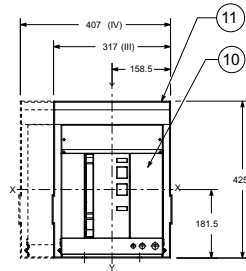
E2.2 N/S/H 2500A



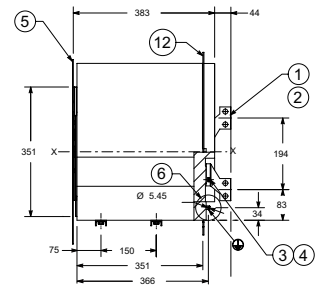
- Key
- 1 Side horizontal splayed terminals 2000A
  - 2 Central horizontal splayed terminals 2000A
  - 3 Side horizontal splayed terminals 2500A
  - 4 Central horizontal splayed terminals 2500A
  - 5 Tightening torque 2000A 8.6Nm
  - 6 Tightening torque 2500A 8.6Nm
  - 7 Door position - Ref. page 7/20
  - 8 Earthing device
  - 12 Mobile part
  - 13 Fixed part
  - 14 Segregation (where envisaged)

## Vertical rear spread terminals – SVR

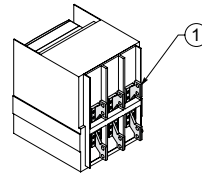
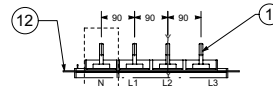
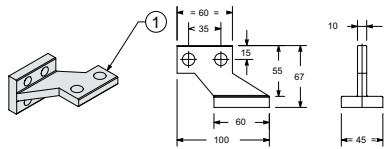
### E2.2 B/N/S/H 2000A



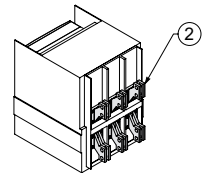
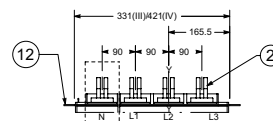
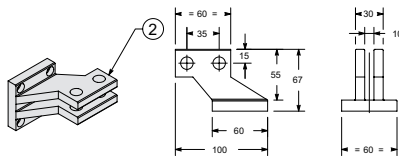
### E2.2 N/S/H 2500A



### E2.2 B/N/S/H 2000A



### E2.2 N/S/H 2500A



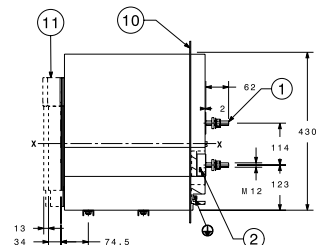
#### Key

- 1 Vertical splayed terminals 2000A
- 2 Vertical splayed terminals 2500A
- 3 Tightening torque 2000A 8.6Nm
- 4 Tightening torque 2500A 8.6Nm
- 5 Door position - Ref. page 7/20
- 6 Earthing device
- 10 Mobile part
- 11 Fixed part
- 12 Segregation (where envisaged)
- 13 Distance from connected for testing to isolated

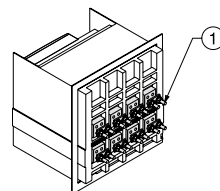


\_\_\_\_\_

## Flat terminals

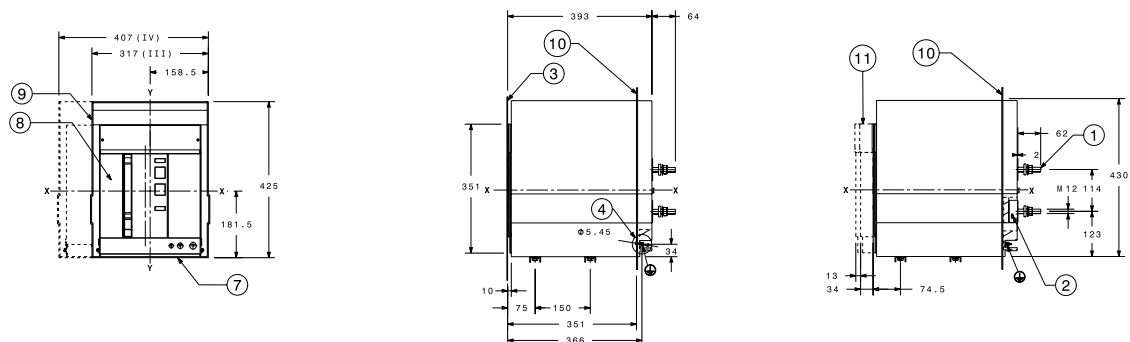


## E2.2 B/N/S/H 2000A

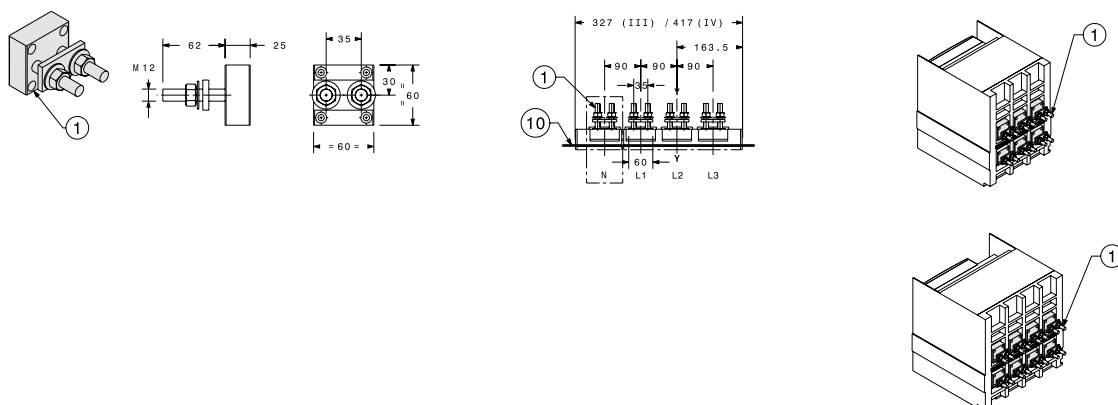


- 1 Flat terminals 2000A
- 2 Tightening torque  
8.6Nm
- 3 Door position -  
Ref. page 7/20
- 4 Grounding
- 7 Mounting fixed part  
screws provided  
M8x25
- 8 Moving part
- 9 Fixed part
- 10 Segregation (where  
envisaged)
- 11 Connected, test,  
disconnected  
distances

## Flat terminals



## E2.2 N/S/H 2500A



### Key

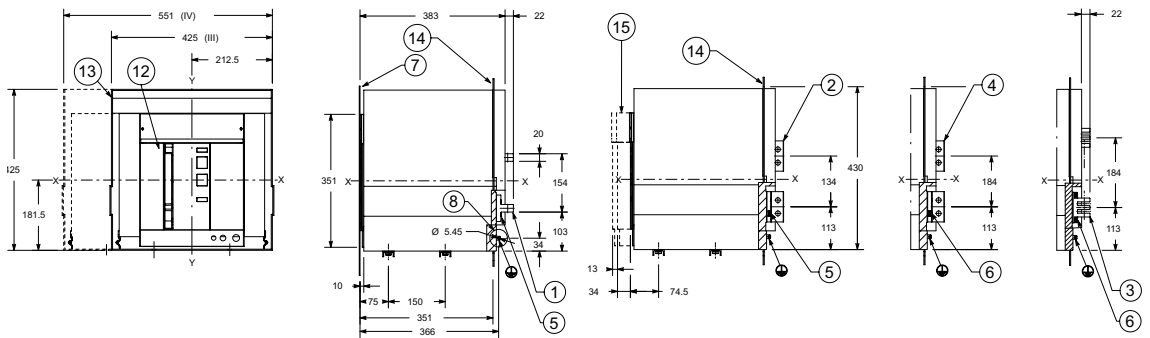
- 1 Flat terminals 2500A
- 2 Tightening torque  
8.6Nm
- 3 Door position -  
Ref. page 7/20
- 4 Grounding
- 7 Mounting fixed part  
screws provided  
M8x25
- 8 Moving part
- 9 Fixed part
- 10 Segregation  
(where envisaged)
- 11 Connected, test,  
disconnected  
distances

# Withdrawable circuit-breaker - E4.2

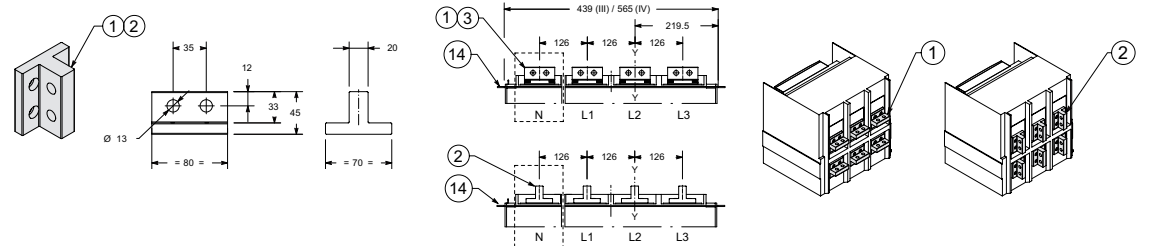
Rear orientable terminals - HR/VR

**E4.2 N/S/H 3200A**

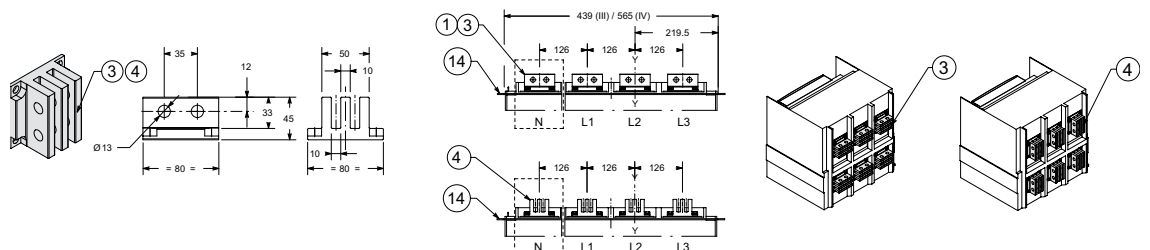
**E4.2 N/S/H 4000A  
E4.2 V 2000...4000A**



**E4.2 N/S/H 3200A**



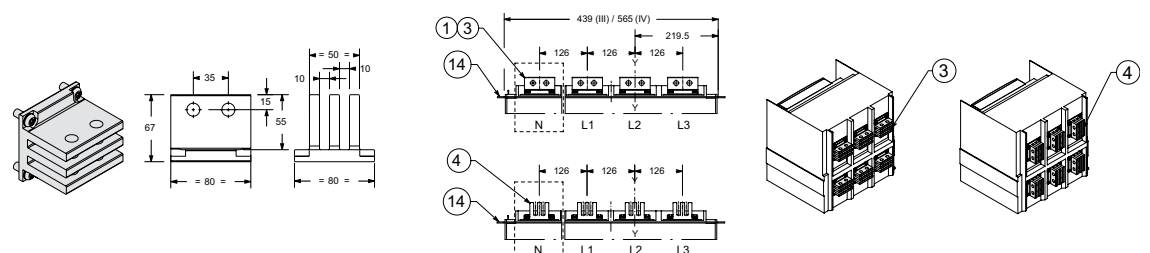
**E4.2 N/S/H 4000A  
E4.2 V 2000...4000A**



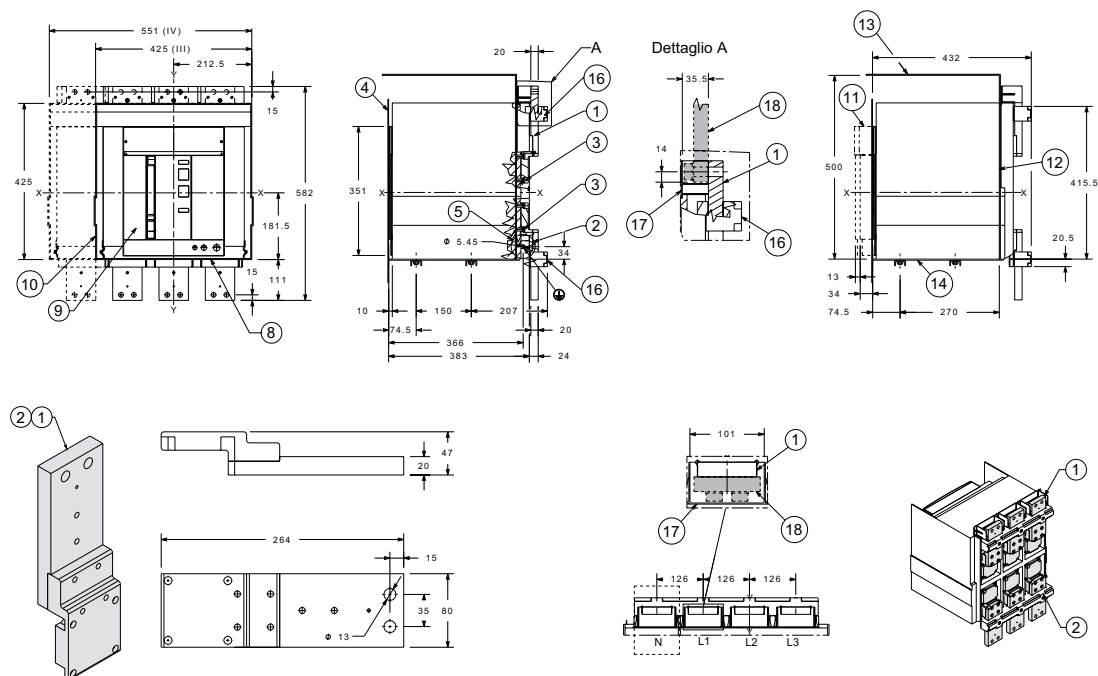
## Key

- 1 Horizontal terminals 3200A
- 2 Vertical terminals 3200A
- 3 Horizontal terminals 4000A
- 4 Vertical terminals 4000A
- 5 Tightening torque 3200A 20Nm
- 6 Tightening torque 4000A 20Nm
- 7 Door position - Ref. page 7/20
- 8 Earthing device
- 12 Mobile part
- 13 Fixed part
- 14 Segregation (where envisaged)
- 15 Distance from connected for testing to isolated

**E4.2 N/S/H 4000A LHR/LVR**



Front terminals – F



### Key

- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque  
8.6Nm
- 4 Door position -  
Ref. page 7/20
- 5 Earthing device
- 8 External fixing point  
Recommended screws  
M10x25 high class
- 9 Moving part
- 10 Fixed part
- 11 Connected, test,  
disconnected  
distances
- 12 Insulating sheet or in-  
sulated metallic sheet
- 13 Roof insulation or  
insulated metal
- 14 Fixing plate
- 15 Crossbeam front  
terminal
- 16 Plastic protection
- 17 Customer busbar  
and screws  
(not provided)

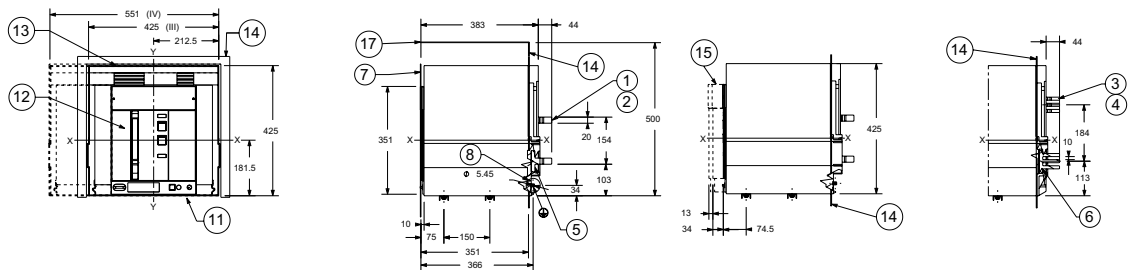
# Withdrawable circuit-breaker - E4.2

Horizontal rear spread terminals – SHR

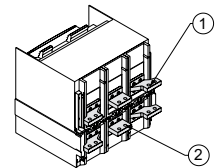
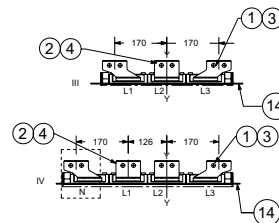
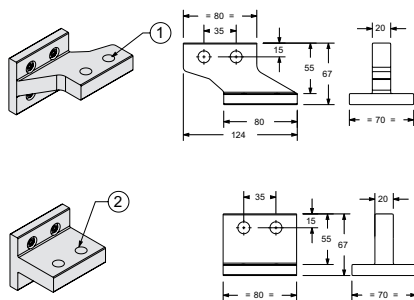
**E4.2 N/S/H 3200A**

**E4.2 N/S/H 4000A**

**E4.2 V 2000 ... 4000A**

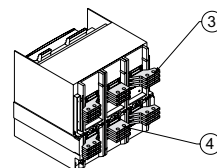
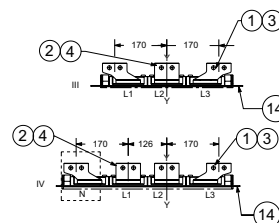
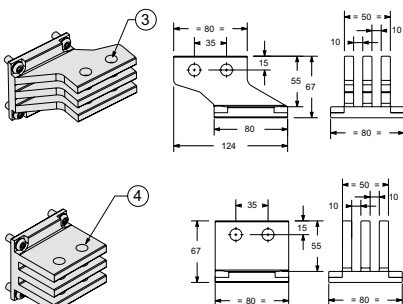


**E4.2 N/S/H 3200A**



**E4.2 N/S/H 4000A**

**E4.2 V 2000 ... 4000A**



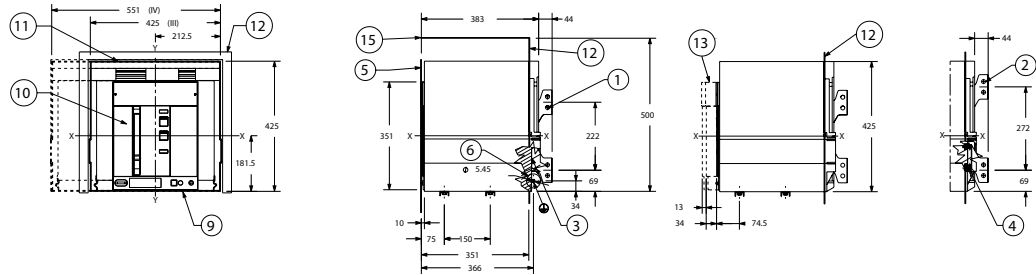
Key

- 1 Side horizontal divaricated terminals 3200A
- 2 Central horizontal divaricated terminals 3200A
- 3 Side horizontal divaricated terminals 4000A
- 4 Central horizontal divaricated terminals 4000A
- 5 Tightening torque 3200A 8.6Nm
- 6 Tightening torque 4000A 8.6Nm
- 7 Door position - Ref. page 7/20
- 8 Grounding
- 11 Mounting fixed part - screws recommend M8x25 high class 8.8 or couple superior Tightening torque 20Nm compulsory fixing screws from high
- 12 Moving part
- 13 Fixed part
- 15 Connected, test, disconnected distances
- 17 Metallic sheet

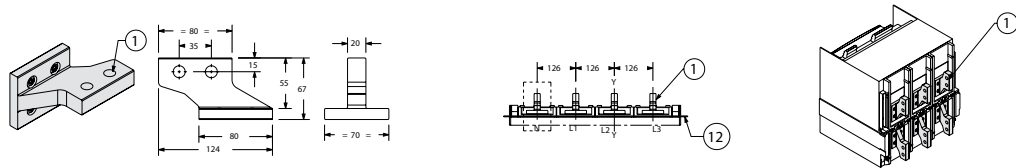
## Vertical rear spread terminals – SVR

### E4.2 N/S/H 3200A

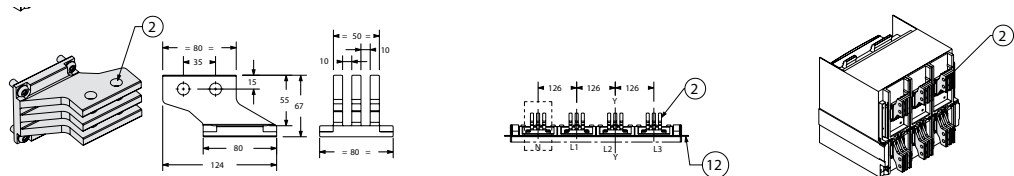
**E4.2 N/S/H 4000A**  
**E4.2 V 2000 ... 4000A**



#### E4.2 N/S/H 3200A



**E4.2 N/S/H 4000A**  
**E4.2 V 2000 ... 4000A**

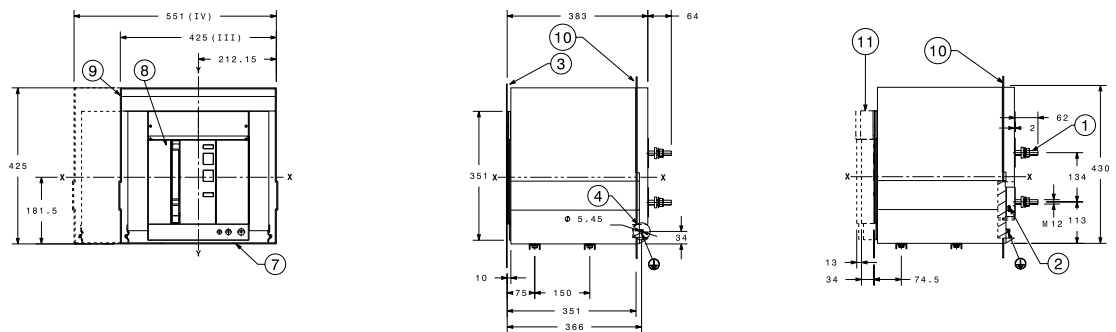


—  
Key

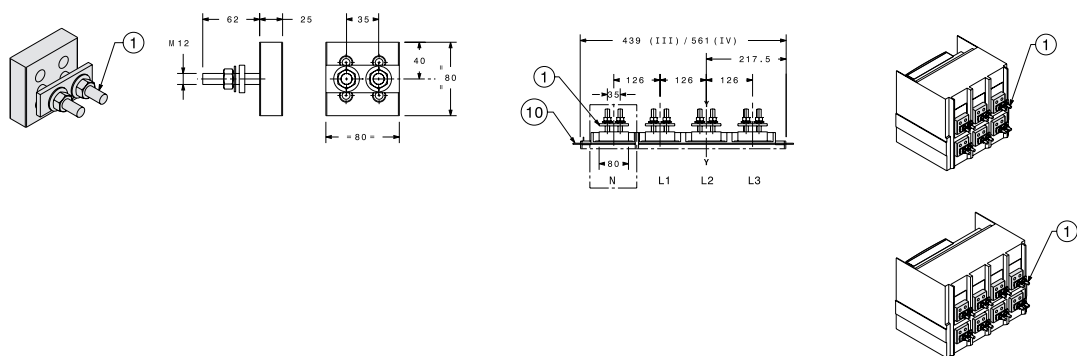
- 1 Vertical divaricated terminals 3200A
- 2 Vertical divaricated terminals 4000A
- 3 Tightening torque 3200A 8.6Nm
- 4 Tightening torque 4000A 8.6Nm
- 5 Door position - Ref. page 7/20
- 6 Grounding
- 9 Mounting fixed part - screws recommend M8x25 high class 8.8 or couple superior
- 10 Tightening tourque 20Nm compulsory fixing screws from high
- 10 Moving part
- 11 Fixed part
- 12 Metallic segregation (when provided)
- 13 Connected, test, disconnected distances
- 15 Metallic sheet

# Withdrawable circuit-breaker - E4.2

## Flat terminals



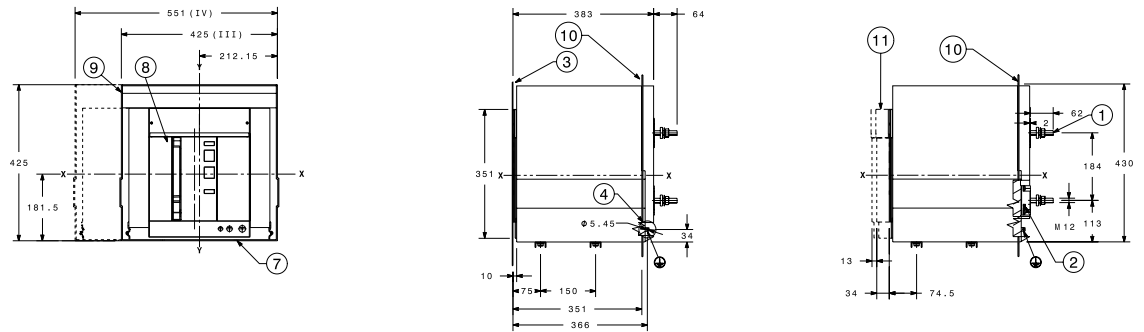
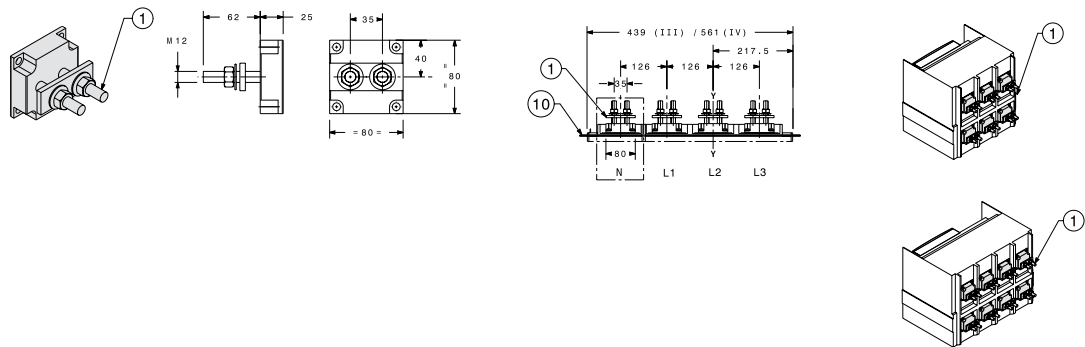
## E4.2 N/S/H 3200A



### Key

- 1 Flat terminals 3200A
- 2 Tightening torque 20Nm
- 3 Door position - Ref. page 7/20
- 4 Grounding
- 7 Mounting fixed part screws provided M8x25
- 8 Moving part
- 9 Fixed part
- 10 Segregation (where envisaged)
- 11 Connected, test, disconnected distances

## Flat terminals


**E4.2 N/S/H 4000A**  
**E4.2 V 2000...4000A**


## Key

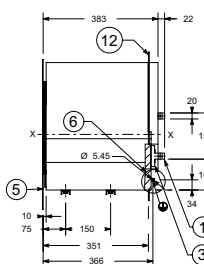
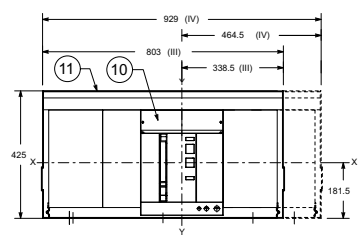
- 1 Flat terminals 4000A
- 2 Tightening torque  
20Nm
- 3 Door position -  
Ref. page 7/20
- 4 Grounding
- 7 Mounting fixed part  
screws provided  
M8x25
- 8 Moving part
- 9 Fixed part
- 10 Segregation  
(where envisaged)
- 11 Connected, test,  
disconnected  
distances



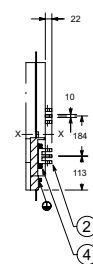
\_\_\_\_\_

Horizontal rear terminals – HR

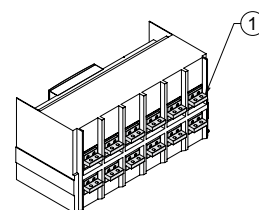
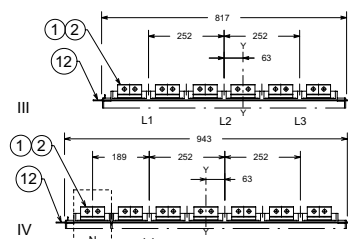
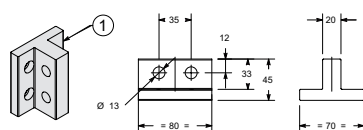
## E6.2 H/V 4000-5000A



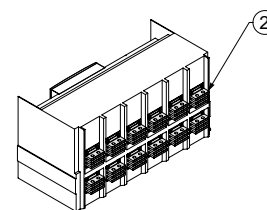
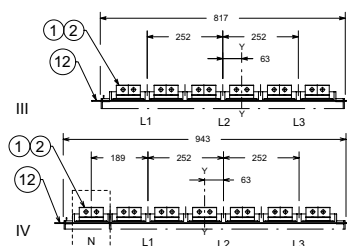
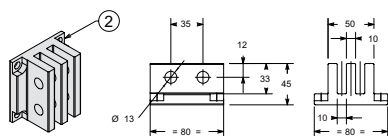
**E6.2 H/V 4000A-6300A**  
**E6.2 X 4000A-6300A**



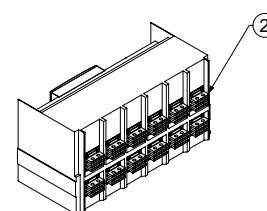
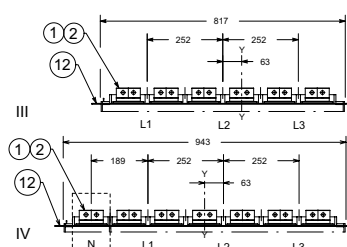
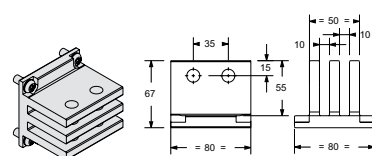
## E6.2 H/V 4000-5000Å



**E6.2 H/V 4000A-6300A**  
**E6.2 X 4000A-6300A**



## E6.2 H/V 6300A LHR

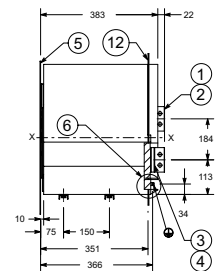
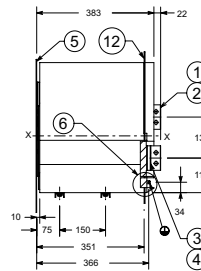
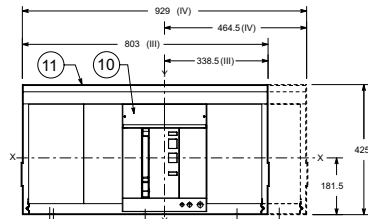


- Key
- 1 Horizontal terminals  
4000-5000A
  - 2 Horizontal terminals  
6300A
  - 3 Tightening torque  
4000-5000A 20Nm
  - 4 Tightening torque  
6300A 20Nm
  - 5 Door position -  
Ref. page 7/20
  - 6 Earthing device
  - 10 Mobile part
  - 11 Fixed part
  - 12 Segregation  
(where envisaged)

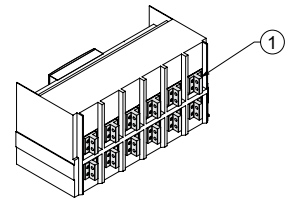
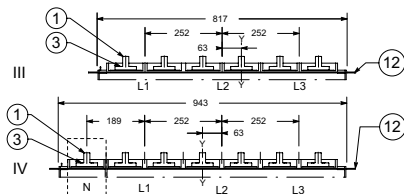
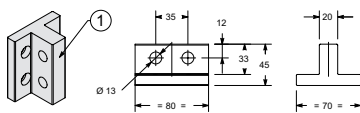
## Vertical rear terminals – VR

### E6.2 H/V 4000-5000A

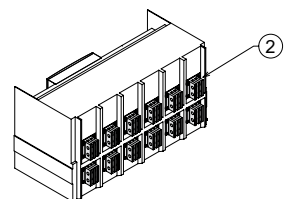
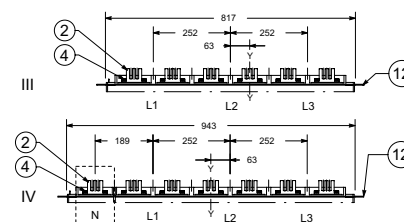
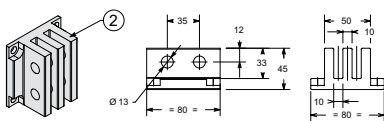
### E6.2 H/V 4000A-6300A E6.2 X 4000A-6300A



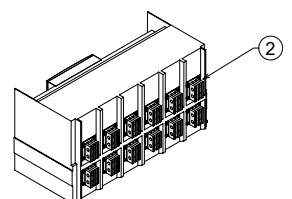
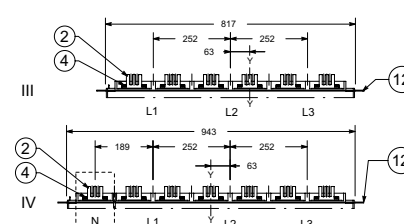
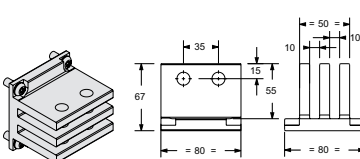
### E6.2 H/V 4000-5000A



### E6.2 H/V 4000A-6300A E6.2 X 4000A-6300A



### E6.2 H/V 6300A LVR



#### Key

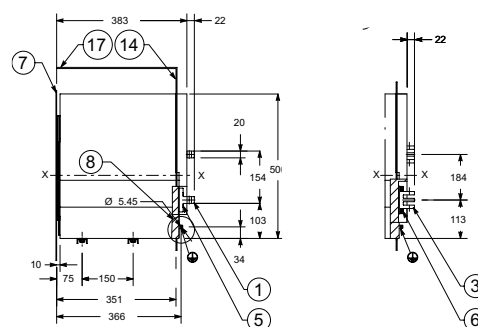
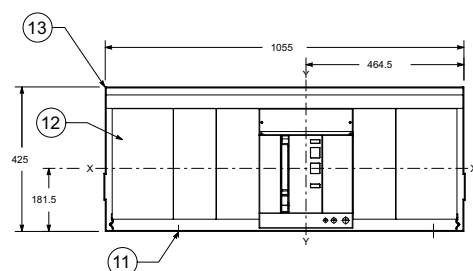
- 1 Vertical terminals  
4000-5000A
- 2 Vertical terminals  
6300A
- 3 Tightening torque  
4000-5000A 20Nm
- 4 Tightening torque  
6300A 20Nm
- 5 Door position -  
Ref. page 7/20
- 6 Earthing device
- 10 Mobile part
- 11 Fixed part
- 12 Segregation  
(where envisaged)

# Withdrawable circuit-breaker - E6.2

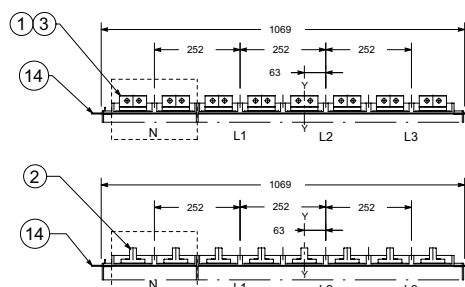
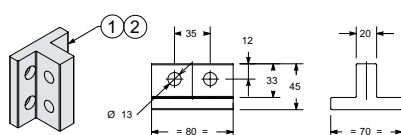
Rear orientable terminals - HR/VR full size

**E6.2 H/V 4000...5000A**

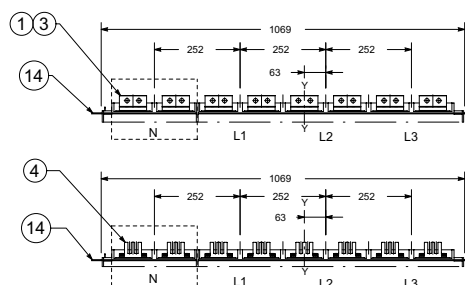
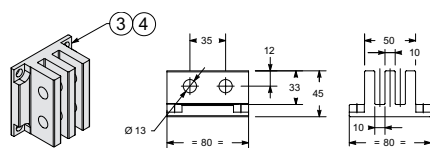
**E6.2 H/V 4000A-6300A**  
**E6.2 X 4000A-6300A**



**E6.2 H/V 4000-5000A**

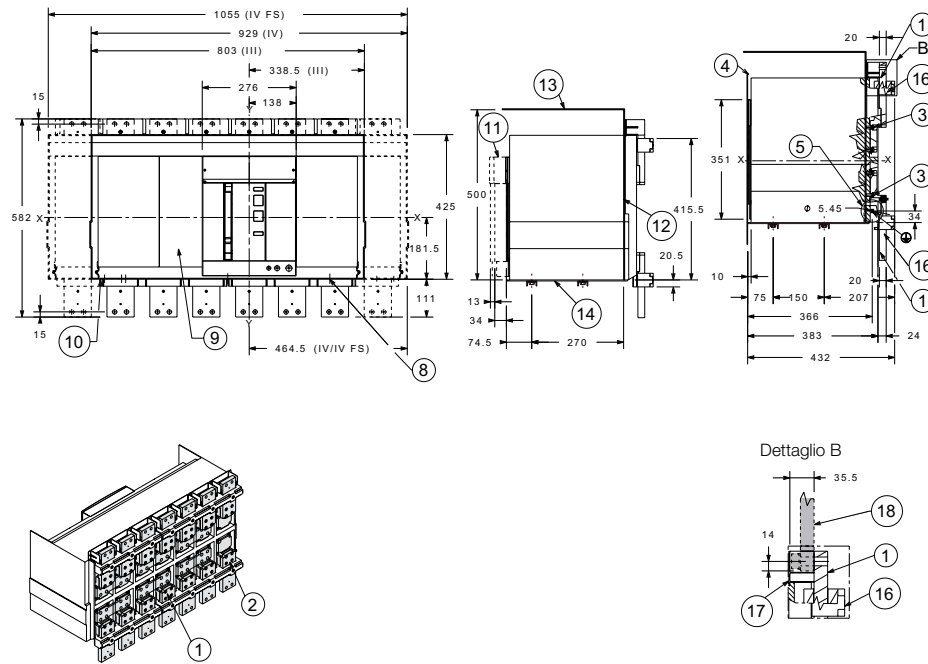


**E6.2 H/V 4000A-6300A**  
**E6.2 X 4000A-6300A**

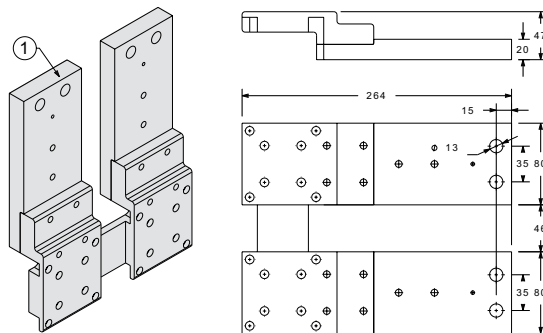


- Key
- 1 Horizontal terminals 4000-5000A
  - 2 Vertical terminals 4000-5000A
  - 3 Horizontal terminals 6300A
  - 4 Vertical terminals 6300A
  - 5 Tightening torque 4000-5000A 20Nm
  - 6 Tightening torque 6300A 20Nm
  - 7 Door position - Ref. page 7/20
  - 8 Earthing device
  - 12 Mobile part
  - 13 Fixed part
  - 14 Segregation (where envisaged)
  - 17 Metallic sheet

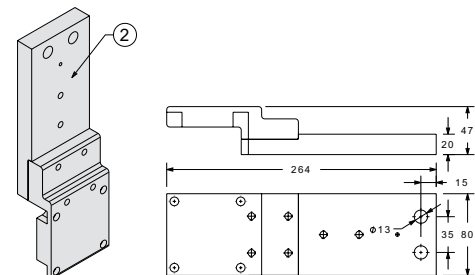
## Front terminals – F



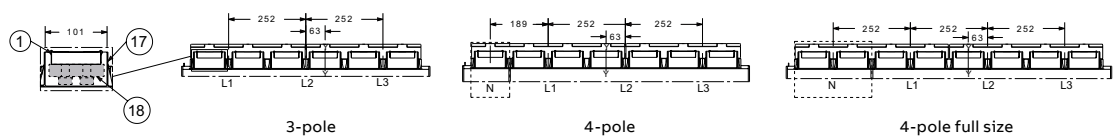
### Upper front terminals



### Lower front terminal

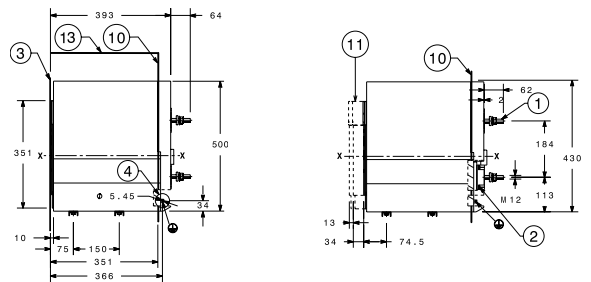


- Key
- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque  
8.6Nm
- 4 Door position -  
Ref. page 7/20
- 5 Earthing device
- 8 External fixing point  
Recommended screws  
M10x25 high class
- 9 Moving part
- 10 Fixed part
- 11 Connected, test,  
disconnected  
distances
- 12 Insulating sheet or  
insulated metallic  
sheet
- 13 Roof insulation or  
insulated metal
- 14 Fixing plate
- 15 Crossbeam front  
terminal
- 16 Plastic protection
- 17 Customer busbar  
and screws  
(not provided)

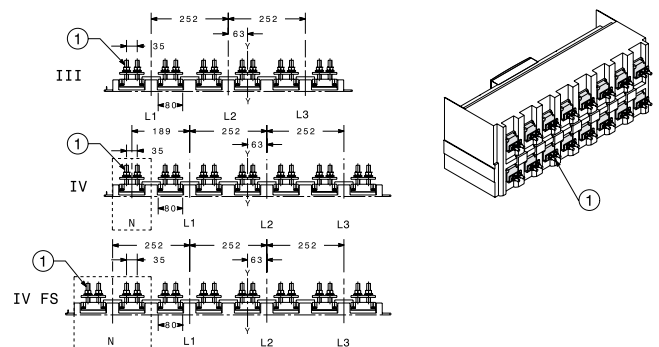


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## Flat terminals



## E6.2 H/V/X 4000...6300A



- 1 Flat terminal
- 2 Tightening torque on  
power circuit  
connections 45Nm
- 3 Door position -  
Ref. page 7/20
- 4 Grounding
- 7 Mounting fixed part  
screws provided  
M8x25 head convex  
high class 8.8 or  
couple superior  
Tightening torque  
20Nm compulsory  
fixing from high
- 8 Moving part
- 9 Fixed part
- 10 Segregation  
(when provided)
- 11 Connected, test,  
disconnected  
distances
- 13 Metallic sheet

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# Electrical diagrams

- 9/2**      **Reading information**
- 9/7**      **Circuit-breakers**
- 9/8**      **Terminal box E1.2**
- 9/9**      **Terminal box E2.2 - E4.2 - E6.2**
- 9/10**     **Electrical accessories**

# Reading information

## Circuit-breakers

### Operating state shown

The diagram is shown in the following conditions:

- withdrawable version circuit-breaker, open and racked-in
- with de-energized circuits
- trip units not tripped
- motor operator with unloaded springs.

### Versions

The diagram shows a withdrawable version circuit-breaker, but it is also valid for fixed version circuit-breakers.

### Fixed version

The control circuits are included between the XV terminals (the X connector is not supplied).

### Withdrawable version

The control circuits are included between the poles of the X connector (the XV terminal box is not supplied).

### Description of figures

- 1) Supplementary open/closed auxiliary contacts of the circuit-breaker - AUX 6Q (6 Form C)
- 2) Ekip Signalling 4K
- 11) Trip signalling contact
- 12) Contact for signalling position of loaded springs - S33 M/2
- 13) Motor for loading closing springs- M
- 14) Remote reset - YR
- 20) Measurement Enabler/Measurement Enabler with voltage sockets inside the four-pole circuit breaker
- 21) Measurement Enabler/Measurement Enabler with voltage sockets inside the three-pole circuit breaker and connection to the external neutral
- 22) Measurement Enabler/Measurement Enabler with voltage sockets for residual voltage protection (for Ekip G only)
- 23) Measurement Enabler/Measurement Enabler with voltage sockets with external voltage transformer
- 24) Rc residual current protection sensor input
- 25) Transformer star center sensor input
- 26) Zone selectivity
- 27) Current sensor input on external neutral (only for 3-pole circuit-breakers)
- 31) Direct auxiliary supply 24V DC and local bus - Ekip Supply
- 32) Auxiliary supply through module 110-240V AC/DC or 24-48V DC and local bus - Ekip Supply
- 41) Ekip signalling 2K-1
- 42) Ekip signalling 2K-2
- 43) RELT Ekip signalling 2K-3
- 48) Ekip sinchrocheck
- 51) Ekip COM Modbus RS-485
- 52) Ekip COM Modbus TCP
- 53) Ekip COM Profibus
- 54) Ekip COM Profinet
- 55) Ekip COM EtherNet/IP™
- 56) Ekip COM EtherNet/IP™
- 57) Ekip COM IEC61850
- 58) Ekip LINK
- 59) Ekip Com Hub
- 61) Ekip COM R Modbus RS-485 Redundant
- 62) Ekip COM R Modbus TCP Redundant
- 63) Ekip COM R Profibus Redundant
- 64) Ekip COM R Profinet Redundant
- 65) Ekip COM R DeviceNet™ Redundant
- 66) Ekip COM R EtherNet/IP™ Redundant
- 71) Ready to close contact - RTC
- 72) Second opening coil - YO2
- 73) Undervoltage coil - YU
- 74) Undervoltage coil with external time-lag device - YU, D
- 75) First opening coil - YO
- 76) First opening coil with control from protection trip unit - YO, Ekip Com Actuator
- 77) First closing coil - YC
- 78) First closing coil with control from protection trip unit - YC, Ekip Com Actuator
- 79) Second closing coil - YC2

- 81) Open/closed auxiliary contacts of circuit-breaker - AUX 4Q (4 Form C)
- 91) External supplementary open/closed auxiliary contacts of circuit-breaker - AUX 15Q (15 Form C)
- 95) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position
- 96) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (first set)
- 97) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (second set)
- 97A) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (second set)



# Reading information

## Circuit-breakers

| Key        |                                                                                                                                                                                  |                                                                                                                       |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| *          | = See the note indicated by the letter                                                                                                                                           | Q/1...Q/25 = Auxiliary contacts of circuit-breaker                                                                    |
| A1         | = Applications located on the mobile part of the circuit-breaker                                                                                                                 | Q/26...Q/27 = Auxiliary open/close contacts used internally by the trip unit                                          |
| A3         | = Applications located on the fixed part of the circuit-breaker                                                                                                                  | RC = RC (residual current) protection sensor                                                                          |
| A4         | = Indicative devices and connections for control and signalling, outside the circuit-breaker                                                                                     | RT1...RT3 = Temperature sensors                                                                                       |
| BUS1       | = Serial interface with external bus                                                                                                                                             | RTC EKIP = Auxiliary ready to close contact of circuit-breaker, used internally by the trip unit                      |
| D          | = Electronic time-lag device of YU undervoltage coil, outside the circuit-breaker                                                                                                | RTC = Contact for signalling circuit-breaker is ready to close                                                        |
| F1         | = Time-delayed trip fuse                                                                                                                                                         | S33M/1...2 = Limit contacts of spring loading motor                                                                   |
| GZi(DBi)   | = Zone selectivity input for G protection or input in "reverse" direction for D protection                                                                                       | S43 = Switch for presetting remote/local control                                                                      |
| GZo(DBo)   | = Zone selectivity output for G protection or output in "reverse" direction for D protection                                                                                     | S51 = Trip signalling contact                                                                                         |
| I O1...32  | = Programmable digital inputs of the EKIP protection trip unit                                                                                                                   | S75E/1...4 = Contacts for signalling circuit-breaker in racked-out position (provided only with withdrawable version) |
| K51        | = Electronic overcurrent protection trip unit of the types: EKIP DIP, EKIP TOUCH, EKIP LCD, EKIP HI-TOUCH, EKIP HI-LCD, EKIP G TOUCH, EKIP G LCD, EKIP G HI-TOUCH, EKIP G HI-LCD | S75I/1...5 = Contacts for signalling circuit-breaker in racked-in position (provided only with withdrawable version)  |
| K51/COM    | = Communication module                                                                                                                                                           | S75T/1...2 = Contact for signalling circuit-breaker in test position (provided only with withdrawable version)        |
| K51/MEAS   | = Measurement module                                                                                                                                                             | SC = Pushbutton or contact for closing the circuit-breaker                                                            |
| K51/SIGN   | = Signalling module                                                                                                                                                              | SO = Pushbutton or contact for immediate opening of the circuit-breaker                                               |
| K51/SUPPLY | = Optional auxiliary supply module (110-220VAC/DC and 24-48VDC)                                                                                                                  | SO1 = Pushbutton or contact for opening the circuit-breaker with time-delayed trip                                    |
| K51/SYNC   | = Synchronization module                                                                                                                                                         | SR = Pushbutton or contact for electrical resetting of S51trip contact                                                |
| K51/YC     | = Closing control from the EKIP protection trip unit                                                                                                                             | SZi(DFi) = Input for zone selectivity for S and I protection or input in "direct" direction for D protection          |
| K51/YO     | = Opening control from the EKIP protection trip unit                                                                                                                             | SZo(DFo) = Output for zone selectivity for S and I protection or output in "direct" direction for D protection        |
| M          | = Motor for loading closing springs                                                                                                                                              |                                                                                                                       |
| O 01...32  | = Programmable signalling contacts of the EKIP protection trip unit                                                                                                              |                                                                                                                       |
| O SC       | = EKIP protection trip unit contact for synchronism control                                                                                                                      |                                                                                                                       |
| Q          | = Circuit-breaker                                                                                                                                                                |                                                                                                                       |

|           |                                                                                                  |
|-----------|--------------------------------------------------------------------------------------------------|
| TI/L1     | = Current transformer phase L1                                                                   |
| TI/L2     | = Current transformer phase L2                                                                   |
| TI/L3     | = Current transformer phase L3                                                                   |
| TI/N      | = Current transformer on neutral                                                                 |
| TU1...TU2 | = Insulation voltage transformer<br>(outside circuit-breaker)                                    |
| Uaux      | = Auxiliary supply voltage                                                                       |
| UI/L1     | = Current sensor phase L1                                                                        |
| UI/L2     | = Current sensor phase L2                                                                        |
| UI/L3     | = Current sensor on phase L3                                                                     |
| UI/N      | = Current sensor on neutral                                                                      |
| UI/O      | = Single-pole current sensor                                                                     |
| W2        | = Serial interface with internal bus<br>(local bus)                                              |
| W9...W13  | = RJ45 connector for communication<br>modules                                                    |
| W9R.W11R  | = RJ45 connector for redundant<br>communication modules                                          |
| X         | = Delivery connector for auxiliary cir-<br>cuits for withdrawable version of<br>circuit-breaker  |
| XB1...XB7 | = Connectors for circuit-breaker<br>applications                                                 |
| XF        | = Delivery terminal board for<br>position contacts of withdrawable<br>version of circuit-breaker |
| XK1...XK3 | = Connectors for auxiliary circuits of<br>the EKIP protection trip unit                          |
| XK7       | = Connector for auxiliary circuits of<br>communication module                                    |
| XV        | = Delivery terminal box for auxiliary<br>circuits of fixed version circuit-<br>breaker           |
| YC        | = Closing coil                                                                                   |
| YC2       | = Second closing coil                                                                            |
| YO        | = Opening coil                                                                                   |
| YO1       | = Opening coil for overcurrent                                                                   |
| YO2       | = Second opening coil                                                                            |
| YR        | = Coil for electrical resetting of trip<br>contact S51                                           |
| YU        | = Undervoltage coil                                                                              |

# Reading information

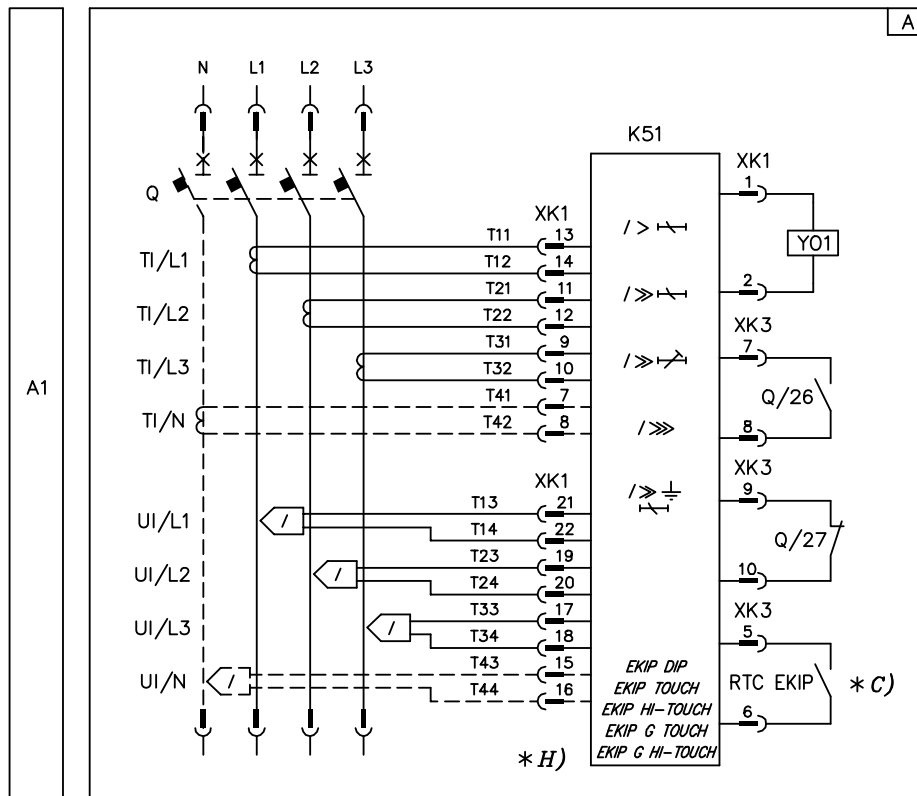
## Circuit-breakers

### Notes

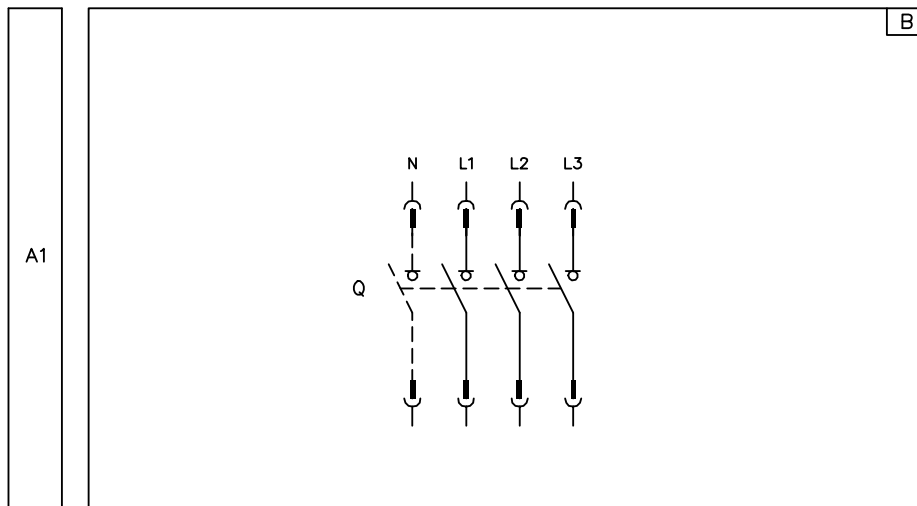
- A) Auxiliary supply for Ekip trip unit is mandatory (refer to diagram 1SDM00009R0001 figures 31 - 32- 33 - 34).
- B) When there are mixed auxiliary contacts Q1 and Q2 are 400V, while Q3 and Q4 are 24V. Then Q5, Q6, Q7 are 400V, while Q8, Q9, Q10 are 24V.
- C) Always supplied with Ekip Com module.
- D) Always supplied with motor for loading closing springs in Fig. 13.
- E) Obligatory voltage transformer in the case of external sockets. Obligatory external sockets for systems with rated voltage greater than 690V.
- F) The connections between the RC residual current protection sensor and the poles of the X connector (or XV) of the circuitbreaker must be made with 4-pole shielded cable with conductors interwoven in pairs (type BELDEN 9696 paired or equivalent), of a length no greater than 10 m. The shield should be earthed on circuit-breaker side.
- G) With all electronic protection trip units equipped with display interface with LSIG protections, protection against an earth fault is available (Gext) by means of current sensor positioned on the star centre of the MV/LV transformer. The connection between terminals 1 and 2 of the UI/O current transformer and Ge+ and Ge- poles of the X connector (or XV) must be made with shielded and stranded 2-pole cable (type BELDEN 9841 or equivalent) of length no greater than 15 m.
- H) The connection between the terminal box and external neutral sensor must be made with the 2m cable provided. For three pole circuit-breakers, the Ne+ and Ne- poles of the X connector (or XV) must be short-circuited if no sensor is present on the external neutral conductor.
- I) Obligatory in the case of the presence of any Ekip module.
- J) Only for E2.2, E4.2 and E6.2 withdrawable version circuit-breakers as an alternative to Fig. 31-32-34.
- K) Only for E2.2, E4.2 and E6.2 withdrawable version circuit-breakers as an alternative to Fig. 31-32-33.
- M) Only for E2.2, E4.2 and E6.2 withdrawable version circuit-breakers as an alternative to Fig. 31-32-33.
- L) In the presence of Fig. 32, for E2.2, E4.2 and E6.2 circuit-breakers up to three applications between Fig. 41...58 taken only once can be supplied, instead for E1.2 circuit-breakers, up to two applications between Fig. 41...58 taken only once can be supplied. The Ekip Com module selected can be duplicated if required, by choosing between Fig. 61...66.
- M) In the presence of Fig. 33, for E2.2, E4.2 and E6.2 circuit-breakers, up to two applications between Fig. 41...58 taken only once can be supplied. The Ekip Com module selected can be duplicated if required, by choosing between Fig. 61...66.
- N) In the presence of Fig. 34, for E2.2, E4.2 and E6.2 circuit-breakers, a single application between Fig. 41...58 can be supplied.
- O) In the presence of several Ekip Com modules with withdrawable version circuit-breakers, the contact S751/5 should be connected only once to a single module.
- P) The auxiliary voltage Uaux. enables activation of all the functions of the EKIP electronic protection trip units. Since an earth insulated Uaux was requested, it is necessary to use "galvanically separated convertors" which comply with the standards IEC 60950 (UL 1950) or equivalent, which guarantee a common mode current or leakage current (refer to IEC 478/1, CEI 22/3) no greater than 3.5mA, IEC 60364-41 and CEI 64-8.
- Q) Regarding local bus the maximum cable length is 15m.
- R) Suggested RJ45 cable: CAT6 STP.
- T) Connect terminals 120  $\Omega$  on if you want to insert a termination resistance on the Local Bus.

# Circuit-breakers (IEC60617 standards)

3-pole or 4-pole circuit-breaker

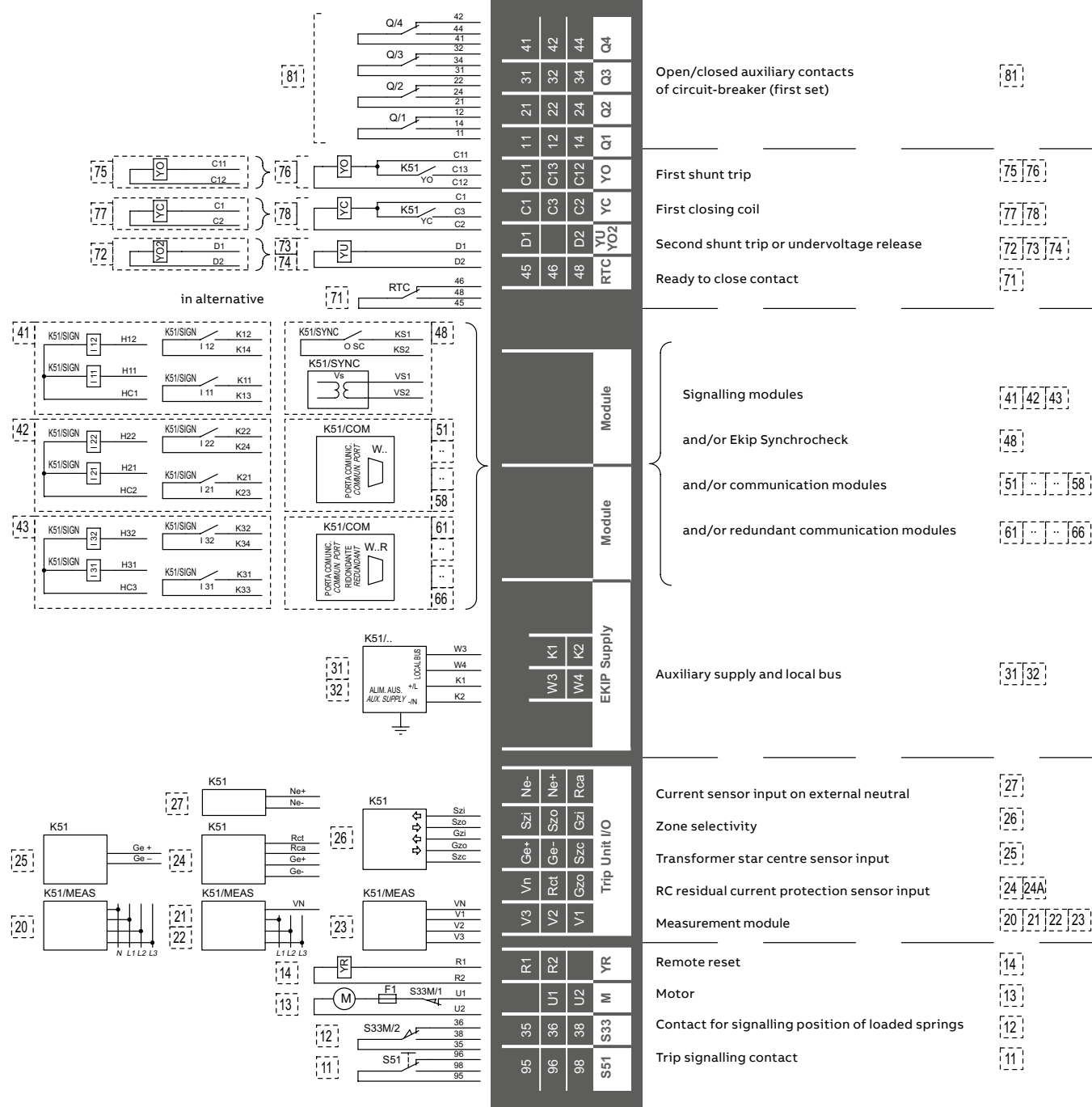


3-pole or 4-pole switch-disconnector



## Terminal box E1.2

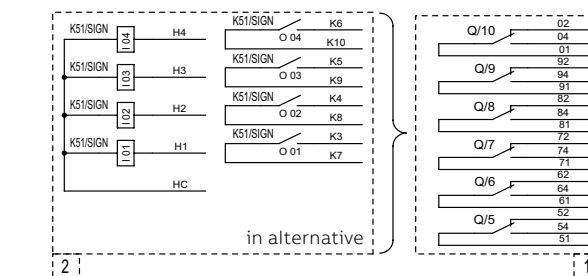
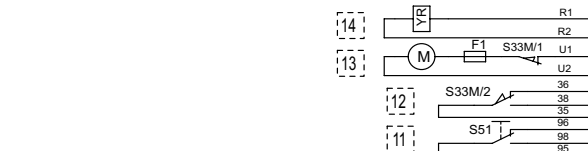
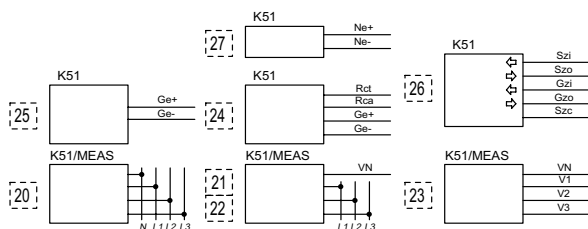
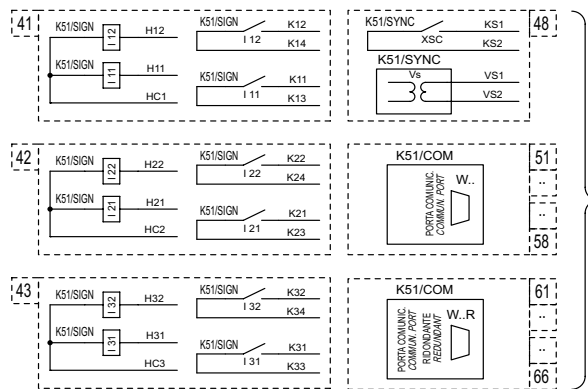
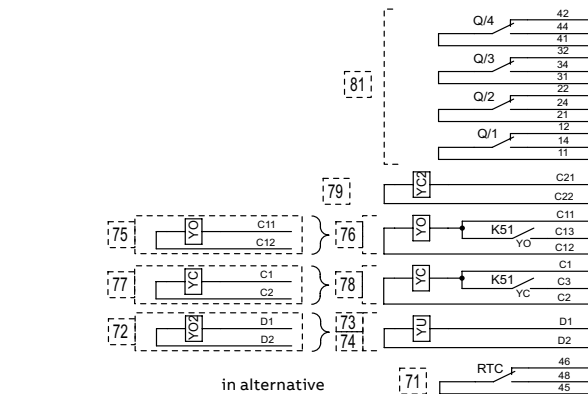
「ん」



# Terminal box E2.2 - E4.2 - E6.2

Diagram figure number

[n]

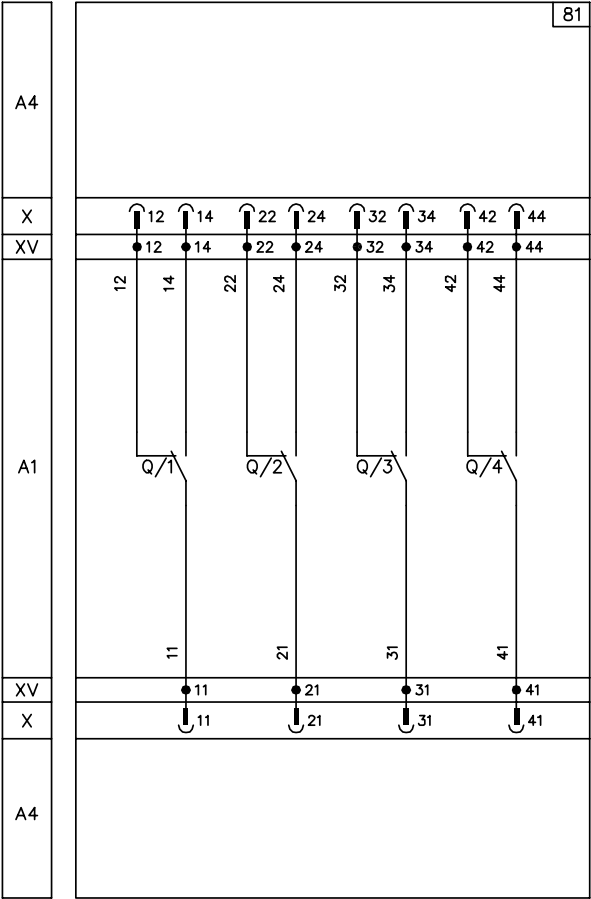


| Module                                                            |     |     |     | Module      |     |     |     | Module |     |     |     | Module |     |     |     |
|-------------------------------------------------------------------|-----|-----|-----|-------------|-----|-----|-----|--------|-----|-----|-----|--------|-----|-----|-----|
| 41                                                                | 31  | 42  | 44  | Q4          | Q3  | Q2  | Q1  | 45     | D1  | D2  | YU  | YU2    | 46  | 48  | 45  |
| 31                                                                | 21  | 22  | 24  | Q3          | Q2  | Q1  | Q1  | 46     | D1  | D2  | YU  | YU2    | 47  | 49  | 46  |
| 21                                                                | 11  | 12  | 14  | Q2          | Q1  | Q1  | Q1  | 47     | D1  | D2  | YU  | YU2    | 48  | 50  | 47  |
| 11                                                                | 11  | 12  | 14  | Q1          | Q1  | Q1  | Q1  | 48     | D1  | D2  | YU  | YU2    | 49  | 51  | 48  |
| C21                                                               | C21 | C22 | C22 | YC2         | YC2 | YC2 | YC2 | C21    | C21 | C22 | C22 | YC2    | C21 | C21 | C22 |
| C11                                                               | C11 | C13 | C12 | YO          | YO  | YO  | YO  | C11    | C11 | C13 | C12 | YO     | C11 | C11 | C13 |
| C1                                                                | C1  | C3  | C2  | YC          | YC  | YC  | YC  | C1     | C1  | C3  | C2  | YC     | C1  | C1  | C3  |
| D1                                                                | D1  | D2  | D2  | YU          | YU2 | YU  | YU2 | D1     | D1  | D2  | D2  | YU     | D1  | D1  | D2  |
| 45                                                                | 46  | 48  | 48  | RTC         | RTC | RTC | RTC | 45     | 46  | 48  | 48  | RTC    | 45  | 46  | 48  |
| Open/closed auxiliary contacts of the circuit-breaker (first set) |     |     |     | 81          |     |     |     |        |     |     |     |        |     |     |     |
| Second closing coil                                               |     |     |     | 79          |     |     |     |        |     |     |     |        |     |     |     |
| First shunt trip                                                  |     |     |     | 75 76       |     |     |     |        |     |     |     |        |     |     |     |
| First closing coil                                                |     |     |     | 77 78       |     |     |     |        |     |     |     |        |     |     |     |
| Second shunt trip or undervoltage coil                            |     |     |     | 72 73 74    |     |     |     |        |     |     |     |        |     |     |     |
| Ready to close contact                                            |     |     |     | 71          |     |     |     |        |     |     |     |        |     |     |     |
| Signalling modules                                                |     |     |     | 41 42 43    |     |     |     |        |     |     |     |        |     |     |     |
| and/or Ekip Synchrocheck                                          |     |     |     | 48          |     |     |     |        |     |     |     |        |     |     |     |
| and/or communication modules                                      |     |     |     | 51 ... 58   |     |     |     |        |     |     |     |        |     |     |     |
| and/or redundant communication modules                            |     |     |     | 61 ... 66   |     |     |     |        |     |     |     |        |     |     |     |
| Auxiliary supply and local bus                                    |     |     |     | 31 32       |     |     |     |        |     |     |     |        |     |     |     |
| Current sensor input on external neutral                          |     |     |     | 27          |     |     |     |        |     |     |     |        |     |     |     |
| Zone selectivity                                                  |     |     |     | 26          |     |     |     |        |     |     |     |        |     |     |     |
| Transformer star centre sensor input                              |     |     |     | 25          |     |     |     |        |     |     |     |        |     |     |     |
| RC residual current protection sensor input                       |     |     |     | 24 24A      |     |     |     |        |     |     |     |        |     |     |     |
| Measurement module                                                |     |     |     | 20 21 22 23 |     |     |     |        |     |     |     |        |     |     |     |
| Remote reset                                                      |     |     |     | 14          |     |     |     |        |     |     |     |        |     |     |     |
| Motor                                                             |     |     |     | 13          |     |     |     |        |     |     |     |        |     |     |     |
| Contact for signalling position of loaded springs                 |     |     |     | 12          |     |     |     |        |     |     |     |        |     |     |     |
| Trip signalling contact                                           |     |     |     | 11          |     |     |     |        |     |     |     |        |     |     |     |
| Ekip signalling 4K                                                |     |     |     | 2           |     |     |     |        |     |     |     |        |     |     |     |
| Supplementary auxiliary contacts of circuit-breaker               |     |     |     | 1           |     |     |     |        |     |     |     |        |     |     |     |

# Electrical accessories



81) Open/closed auxiliary contacts of circuit-breaker - AUX 4Q (4 Form C)



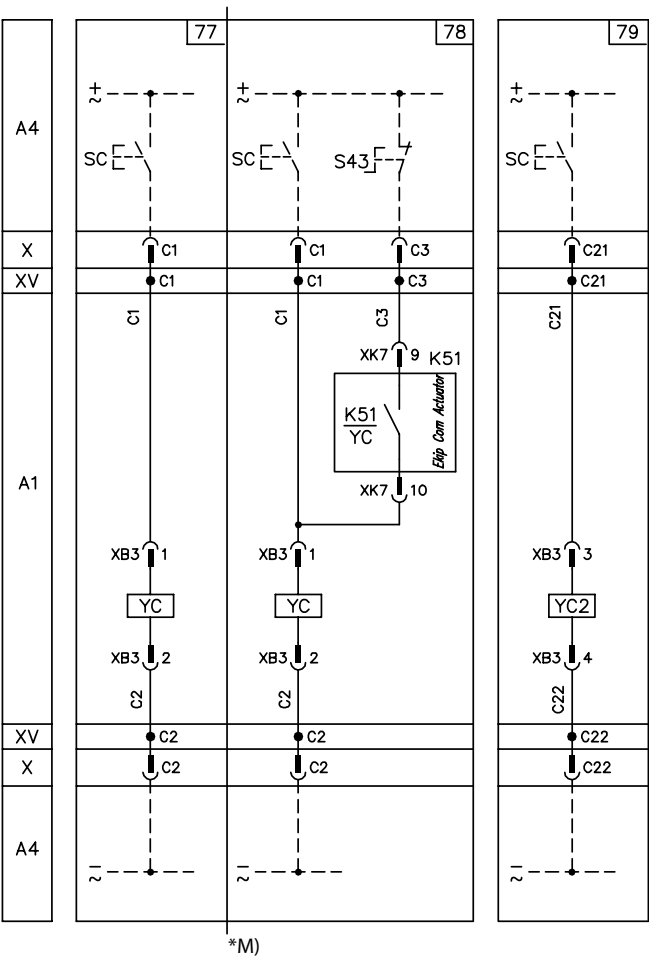
\*B)



- 77) First closing coil - YC
- 78) First closing coil with control from protection trip unit - YC, Ekip Com Actuator
- 79) Second closing coil - YC2

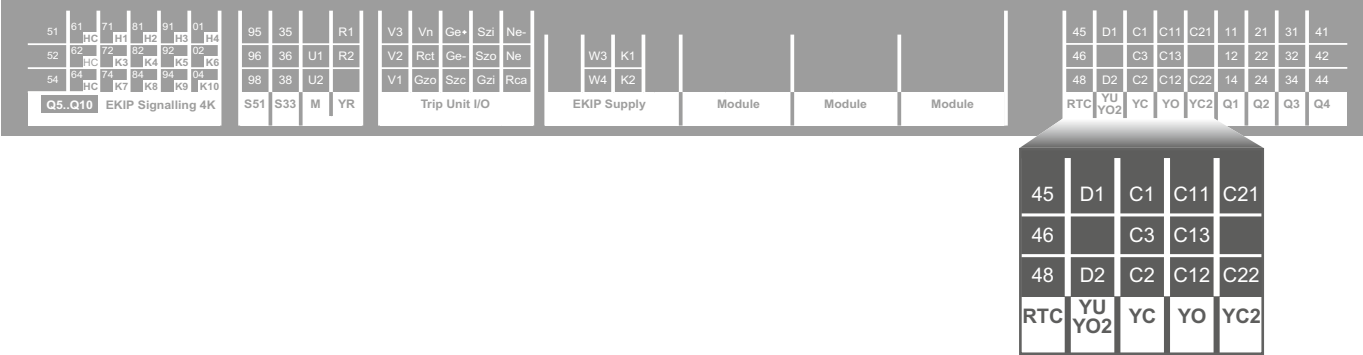
77- 78 as an alternative to each other

79 valid only for E2.2 - E4.2 - E6.2



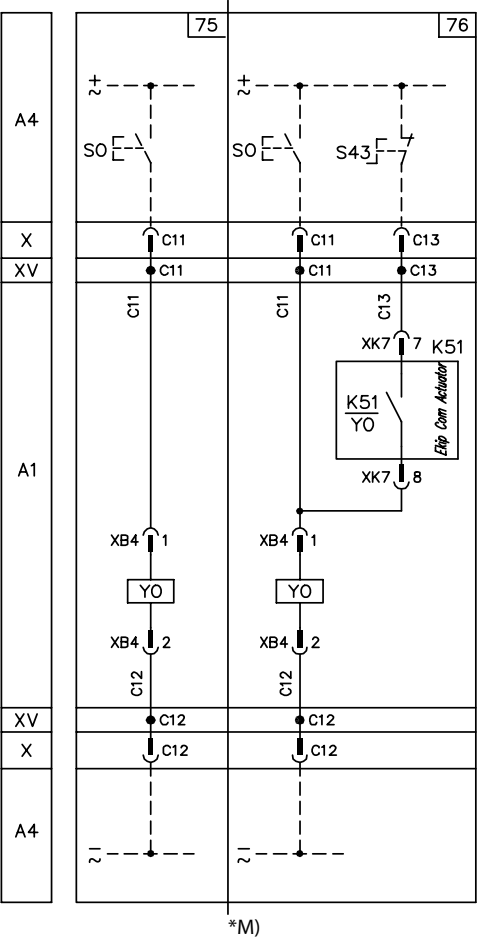


Electrical accessories



- 75) First opening coil - YO
- 76) First opening coil with control from protection trip unit - YO, Ekip Com Actuator

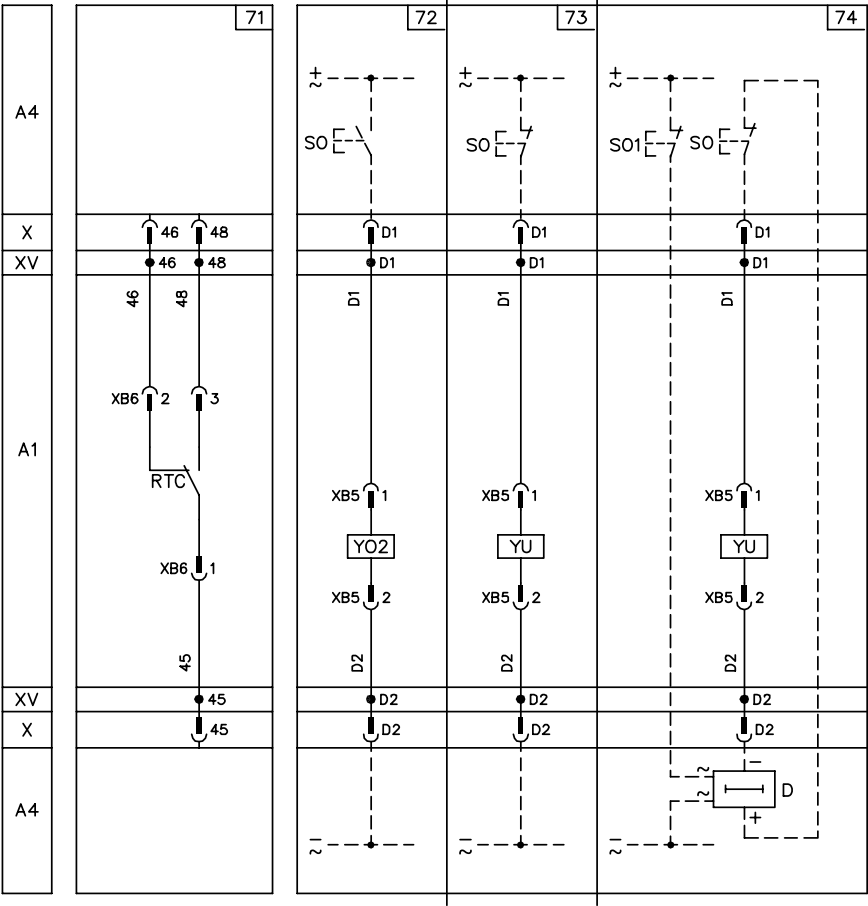
75-76 as an alternative to each other



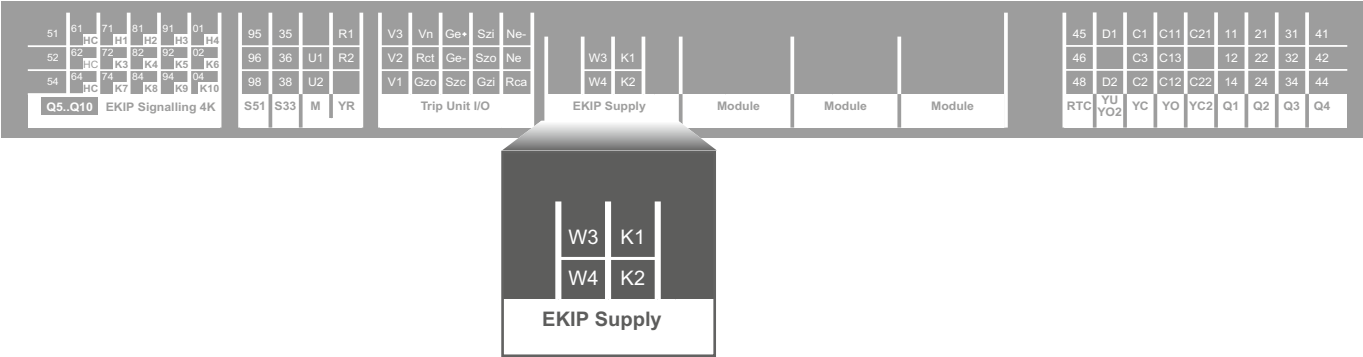


- 71) Ready to close signalling contact - RTC
- 72) Second opening coil - YO2
- 73) Undervoltage coil - YU
- 74) Undervoltage coil with external time-lag device - YU, D

72-73 or 74 as an alternative to each other

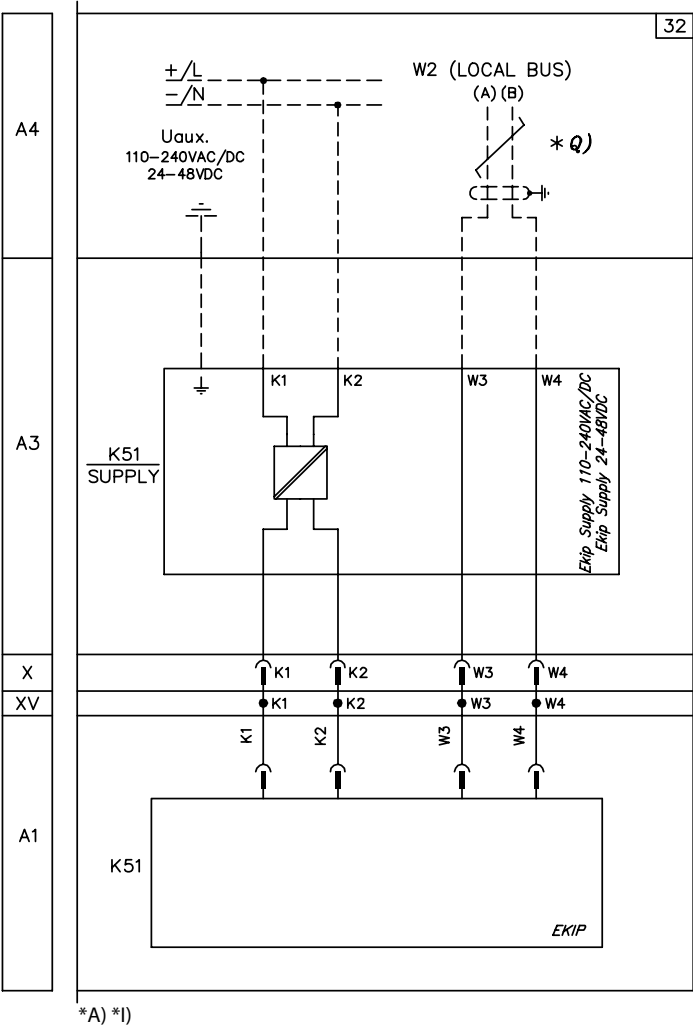


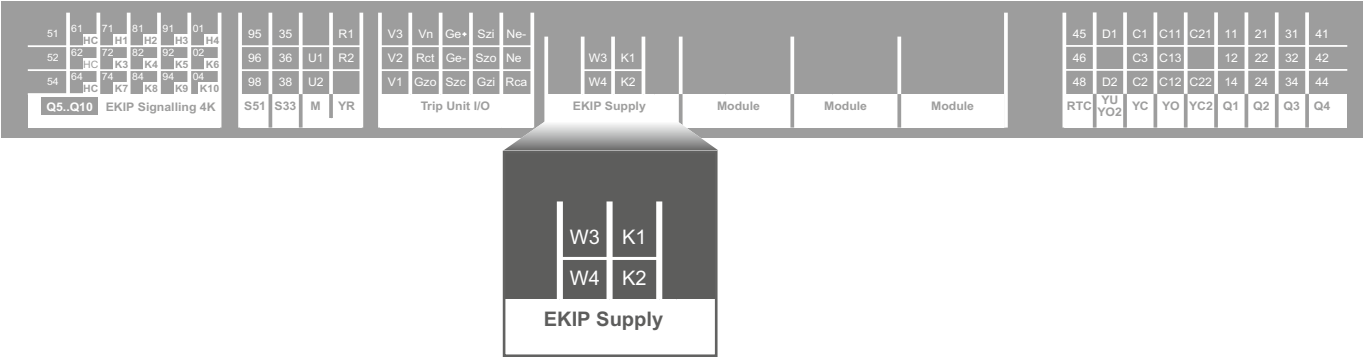
# Electrical accessories



## 32) Auxiliary supply through module 110-240V AC/DC or 24-48V DC and local bus - Ekip Supply

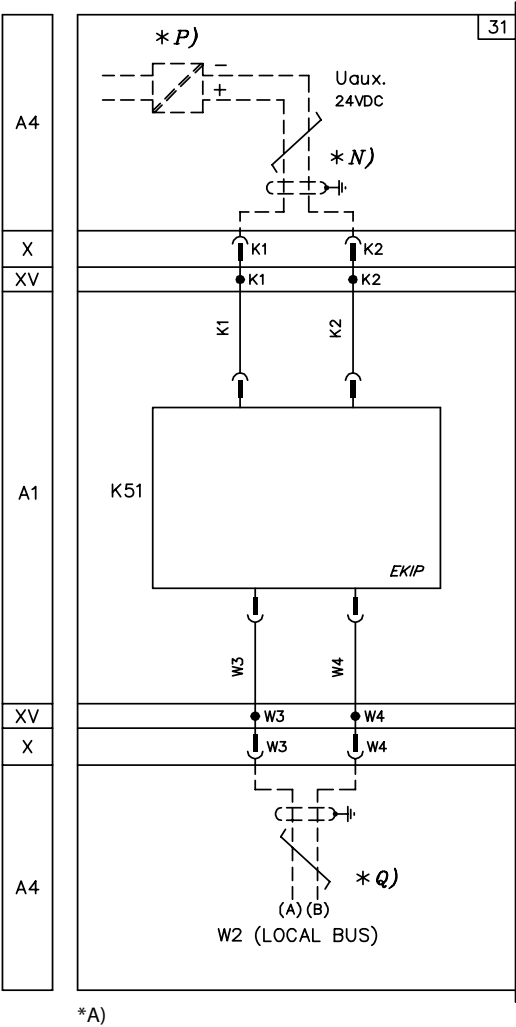
As an alternative to figures 31



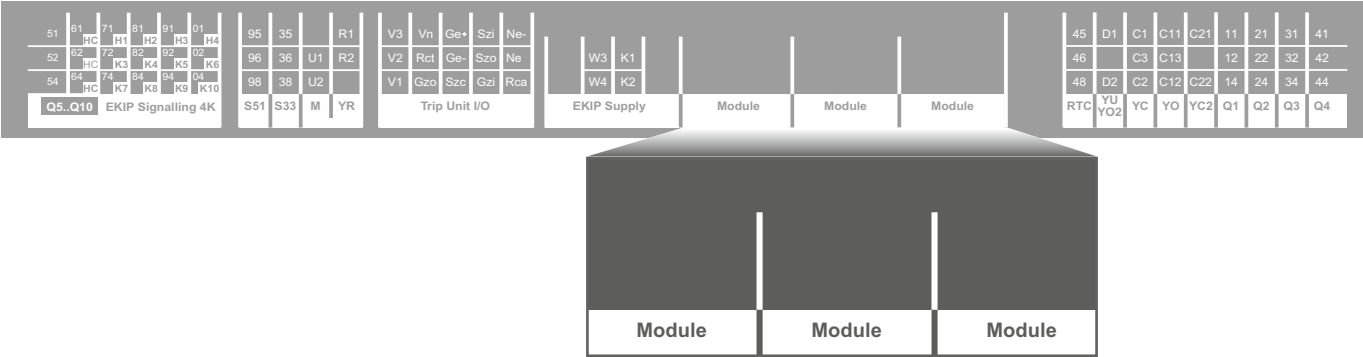


31) Direct auxiliary supply 24V DC and local bus - Ekip Supply

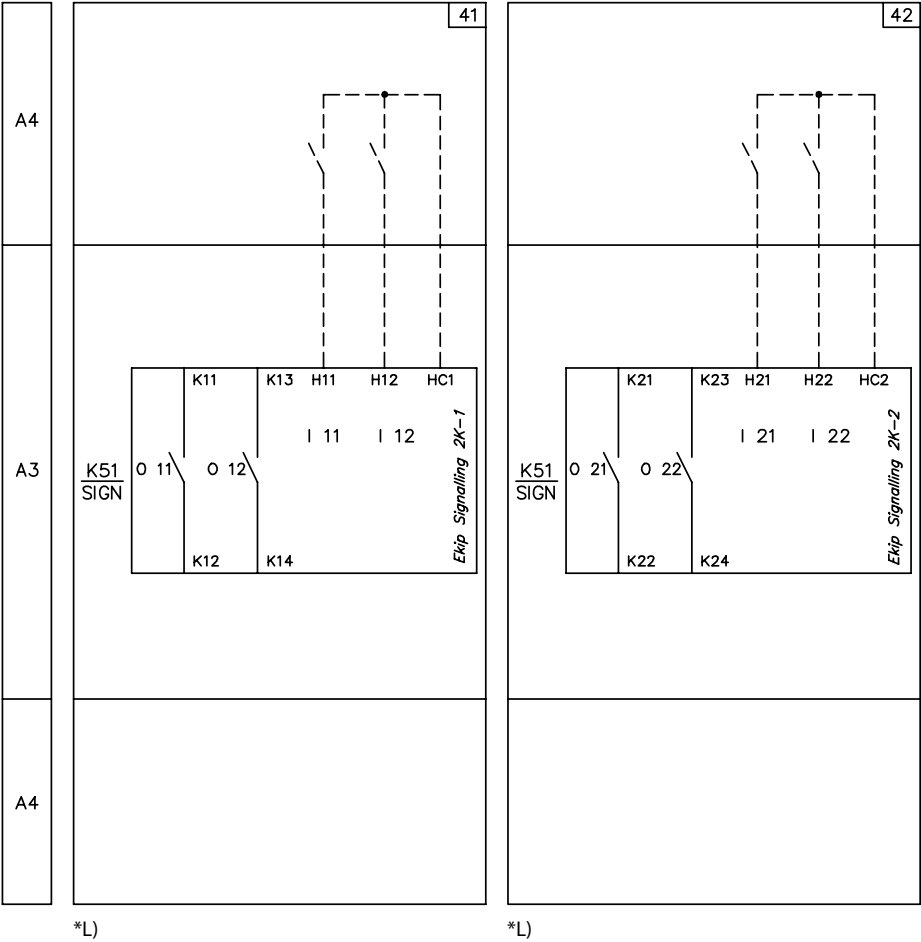
As an alternative to figures 32

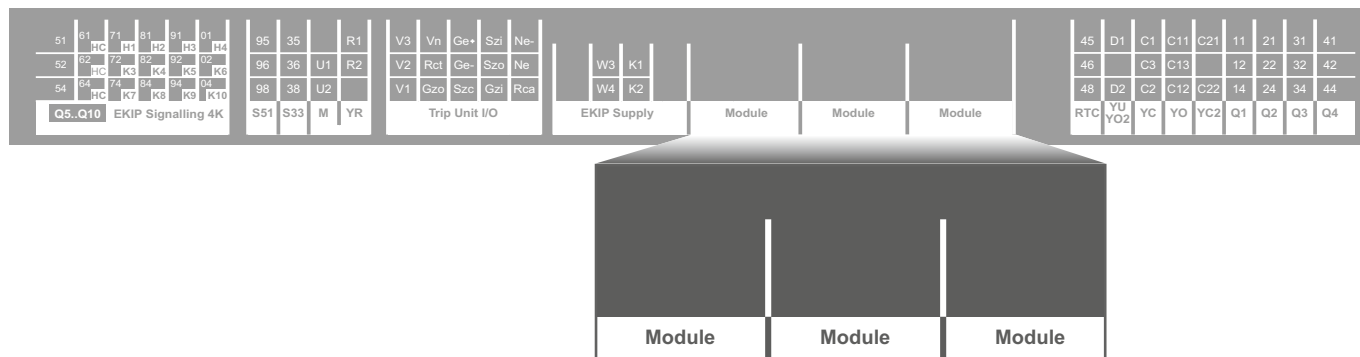


# Electrical accessories



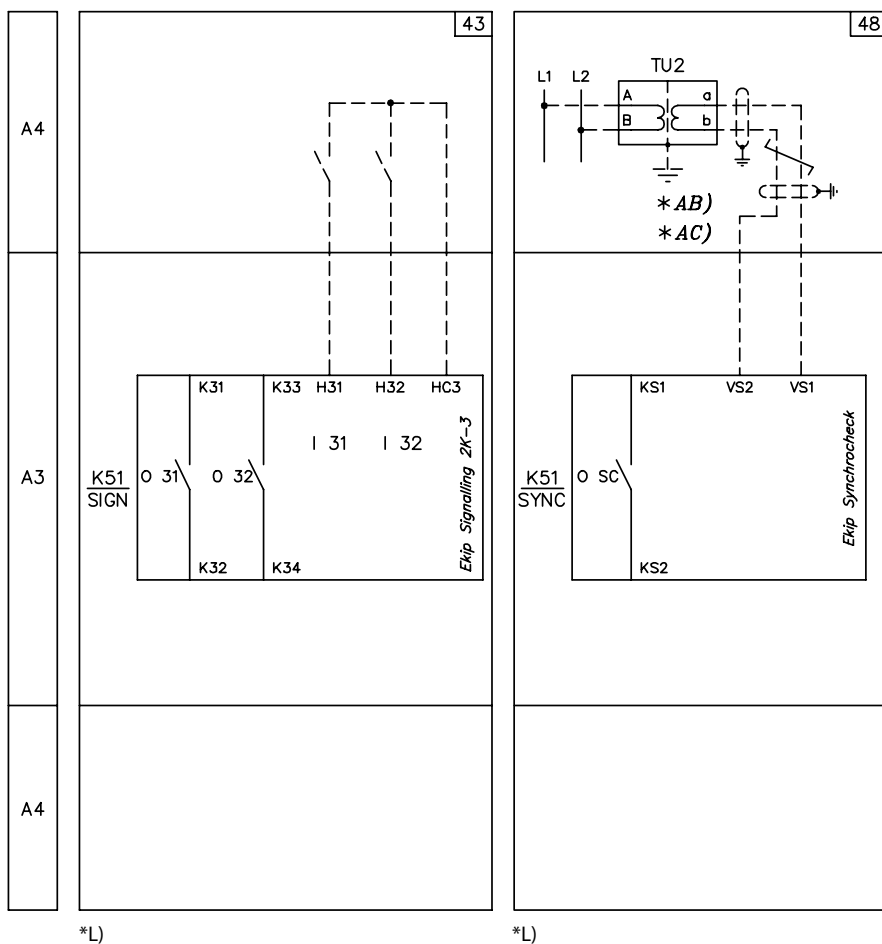
- 41) Ekip signalling 2K-1  
42) Ekip signalling 2K-2



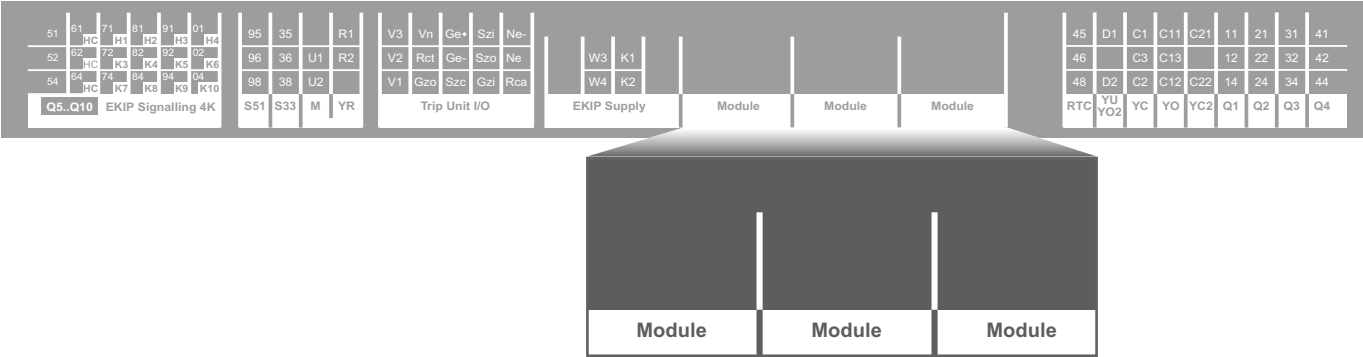


### 43) RELT Ekip Signalling 2K-3

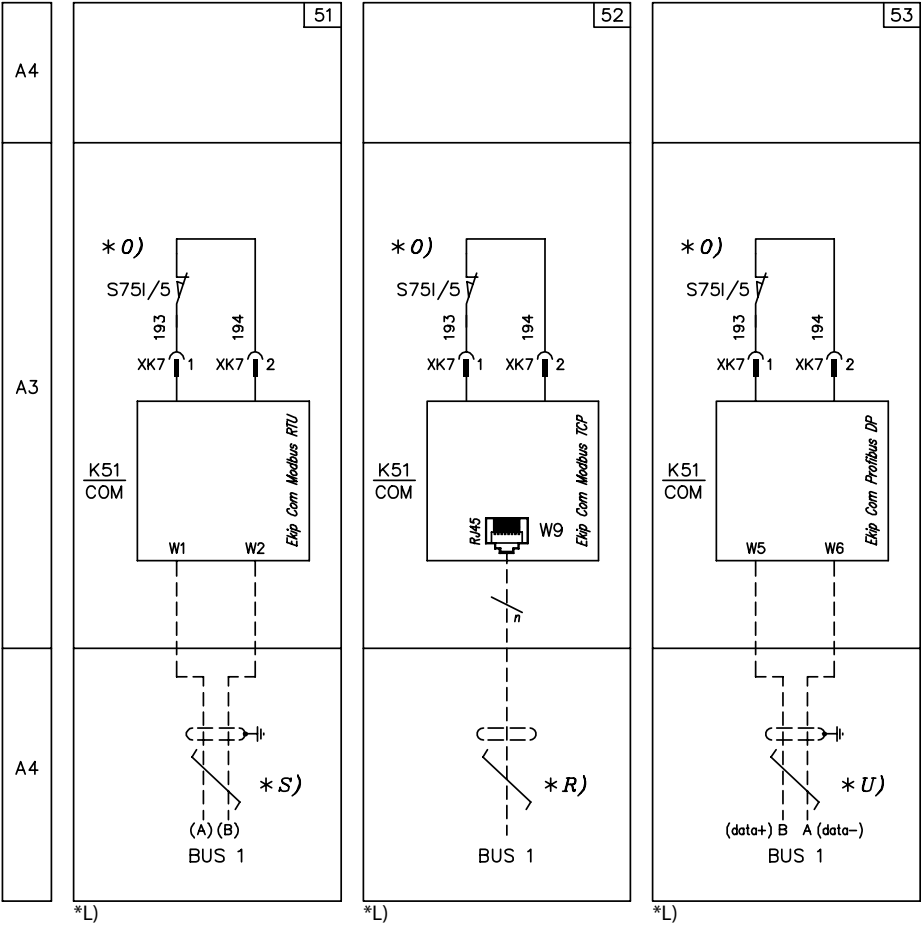
#### 48) Ekip Synchrocheck

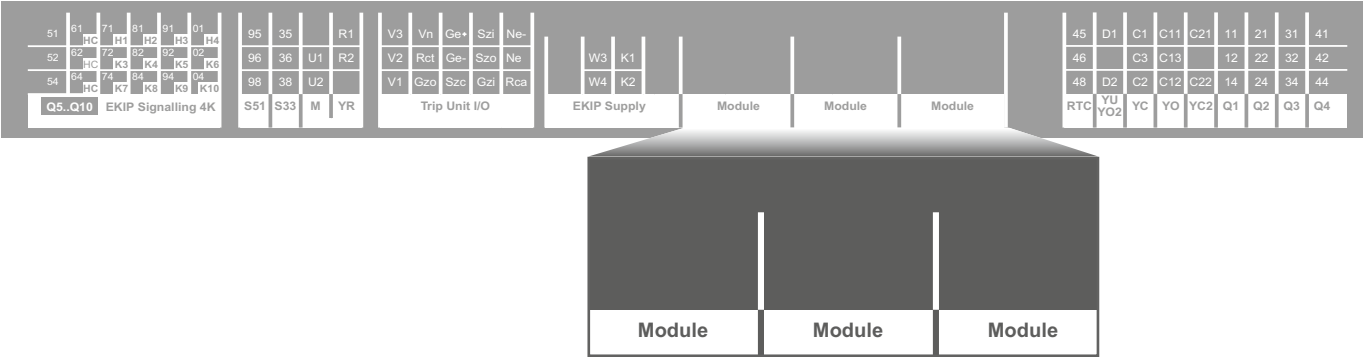


# Electrical accessories

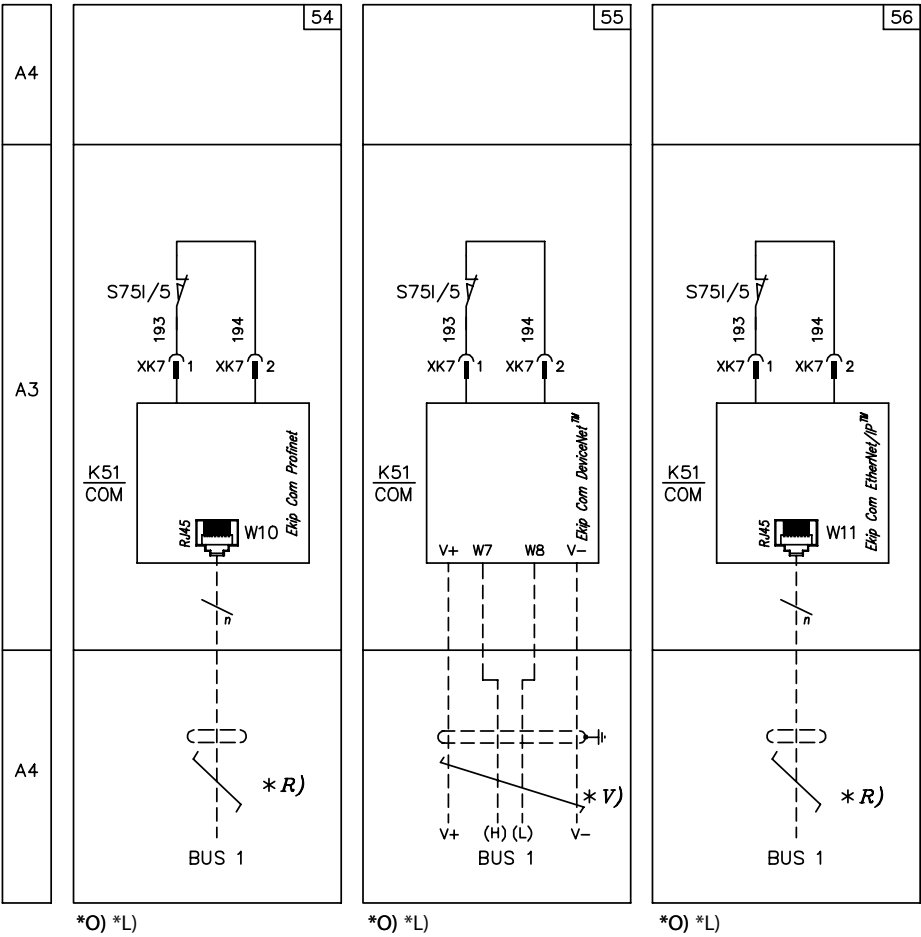


- 51) Ekip COM Modbus RS-485
- 52) Ekip COM Modbus TCP
- 53) Ekip COM Profibus



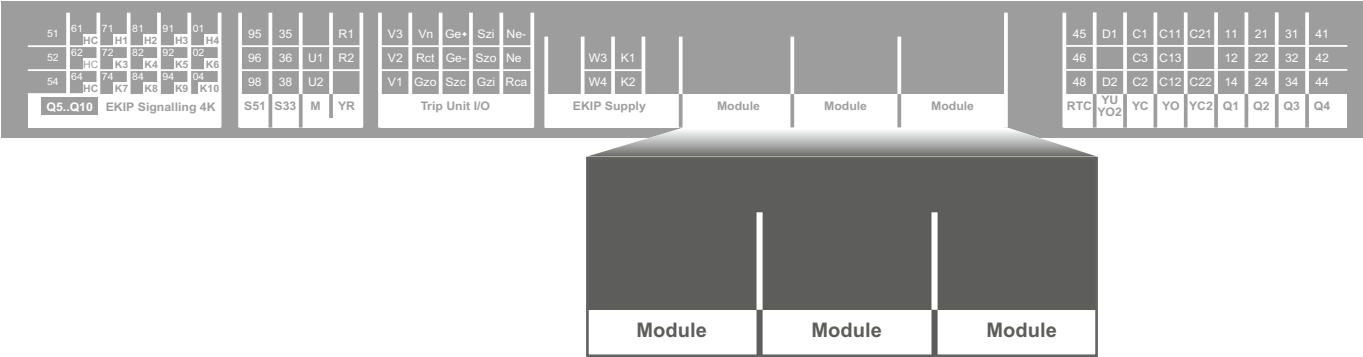


- 54) Ekip COM Profinet
- 55) Ekip COM DeviceNet™
- 56) Ekip COM EtherNet/IP™

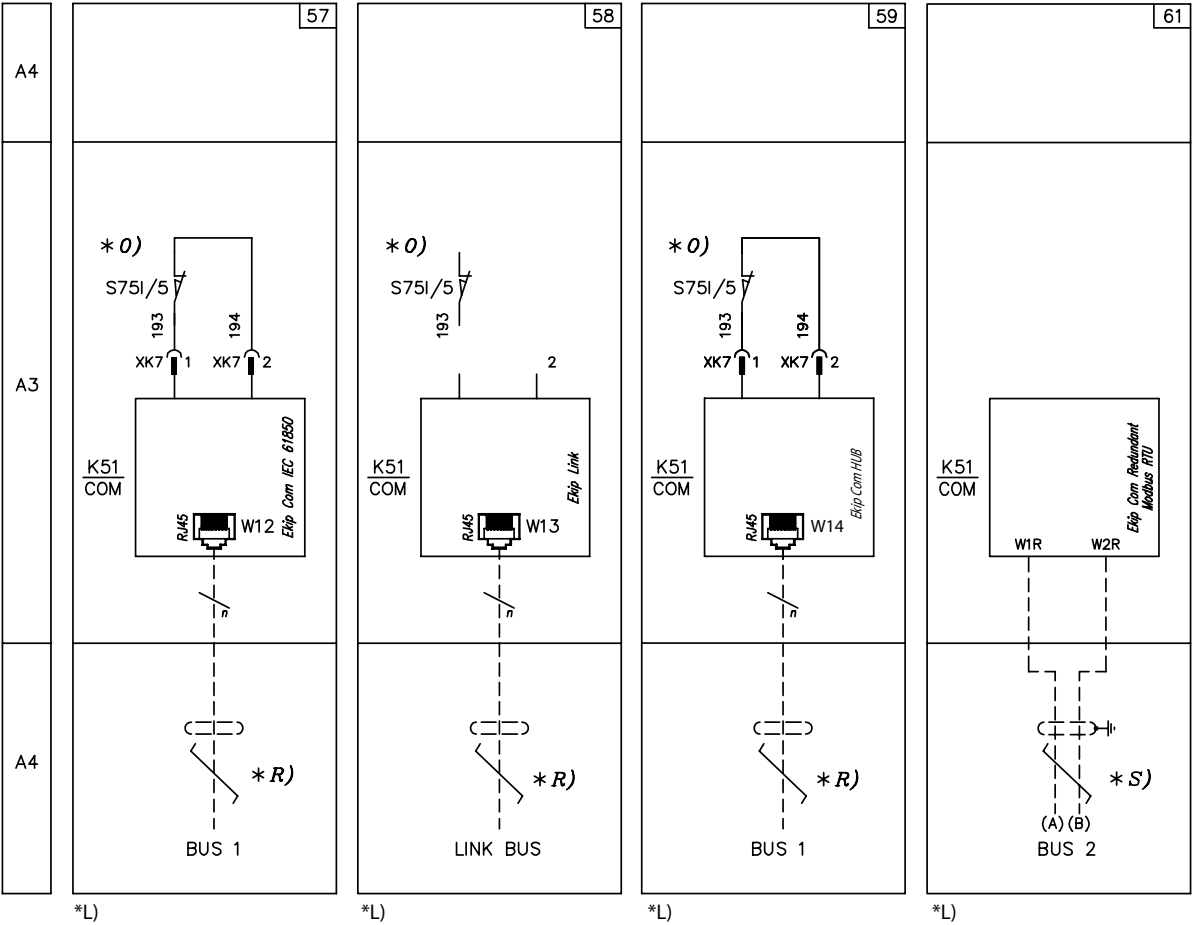


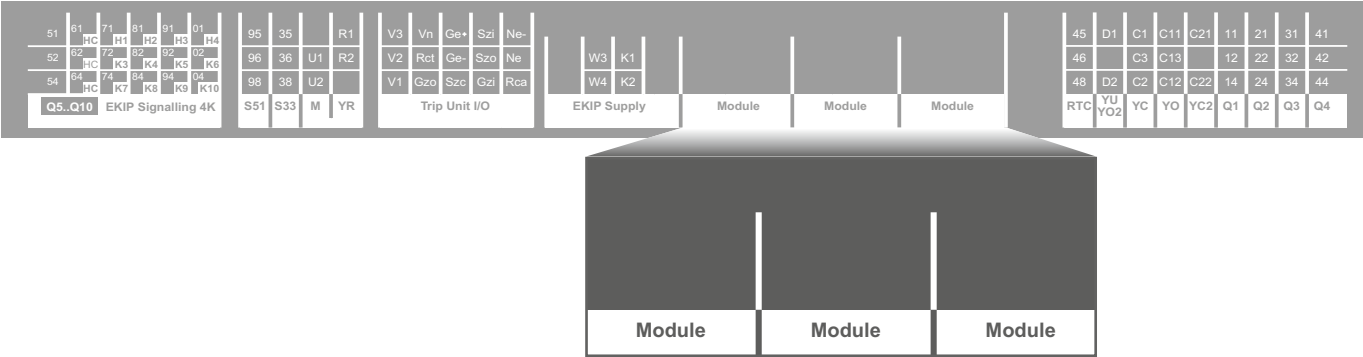


# Electrical accessories

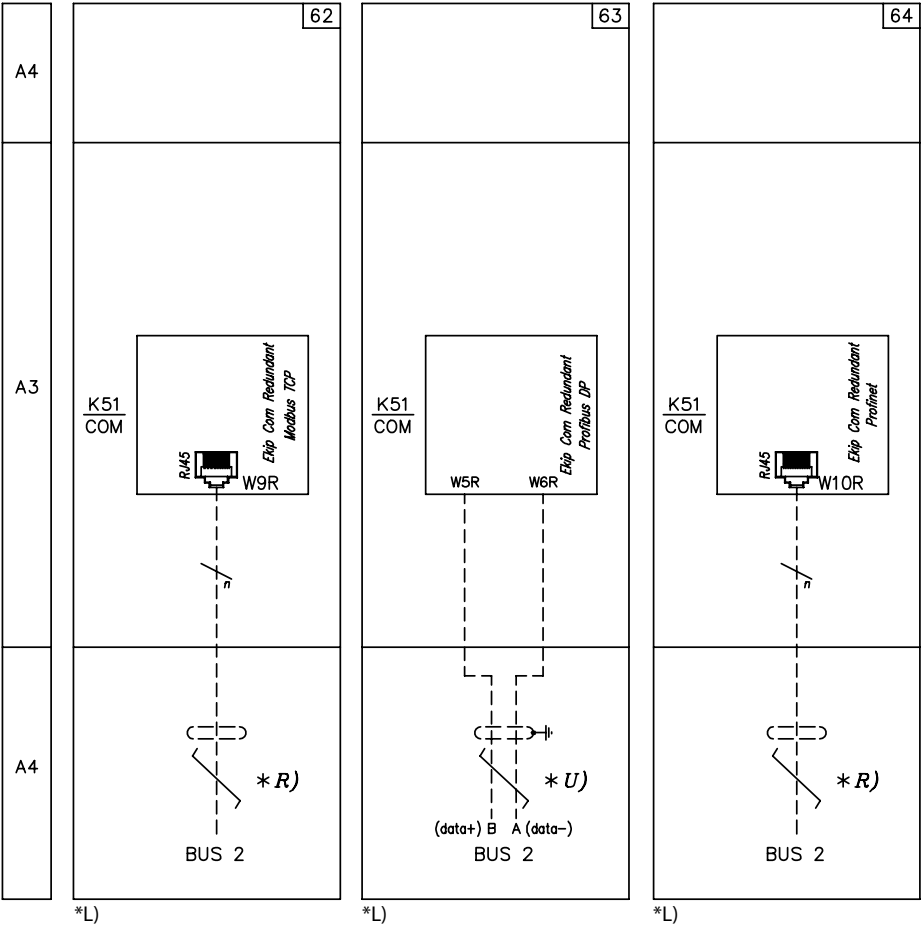


- 57) Ekip COM IEC61850
- 58) Ekip LINK
- 59) Ekip Com Hub
- 61) Ekip COM R Modbus RS-485 Redundant

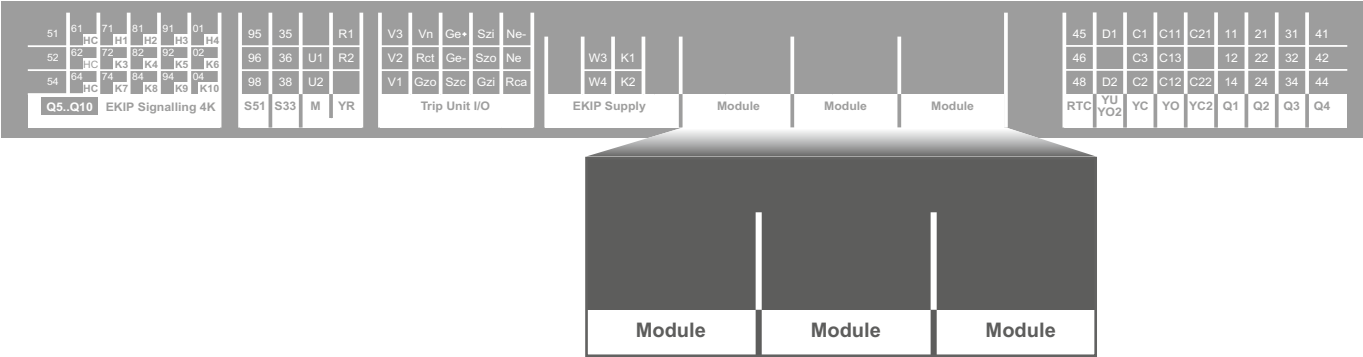




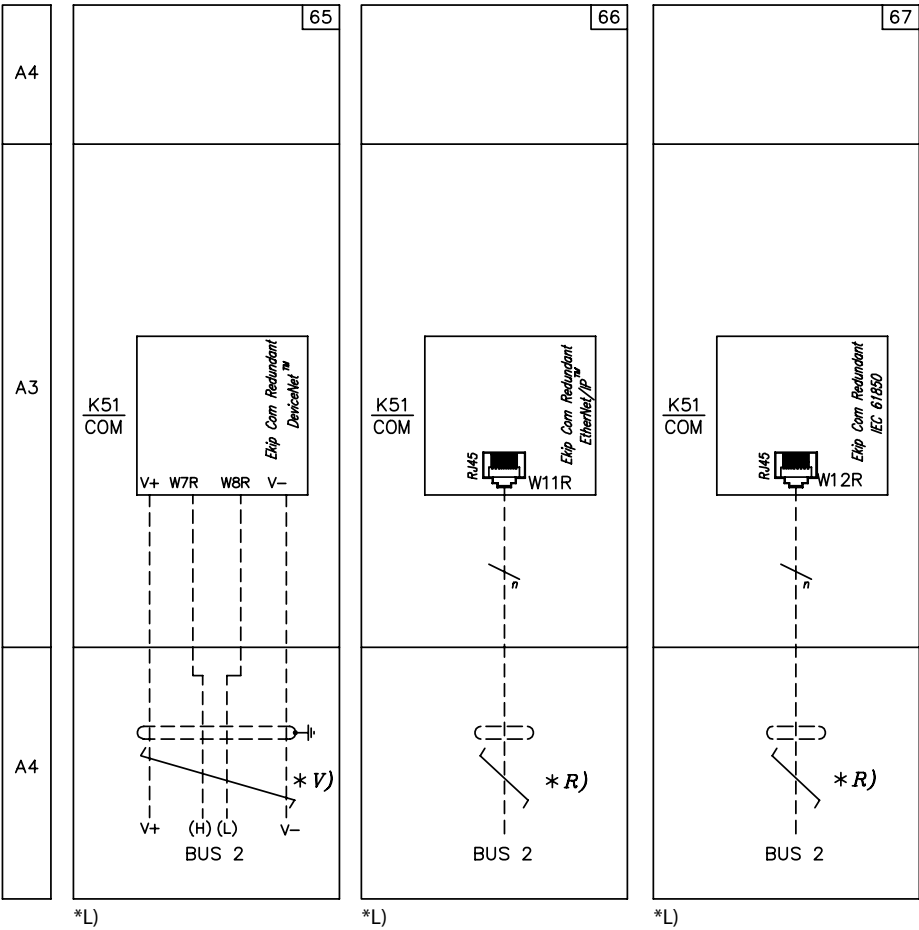
- 62) Ekip COM R Modbus TCP Redundant
- 63) Ekip COM R Profibus Redundant
- 64) Ekip COM R ProfiNet Redundant

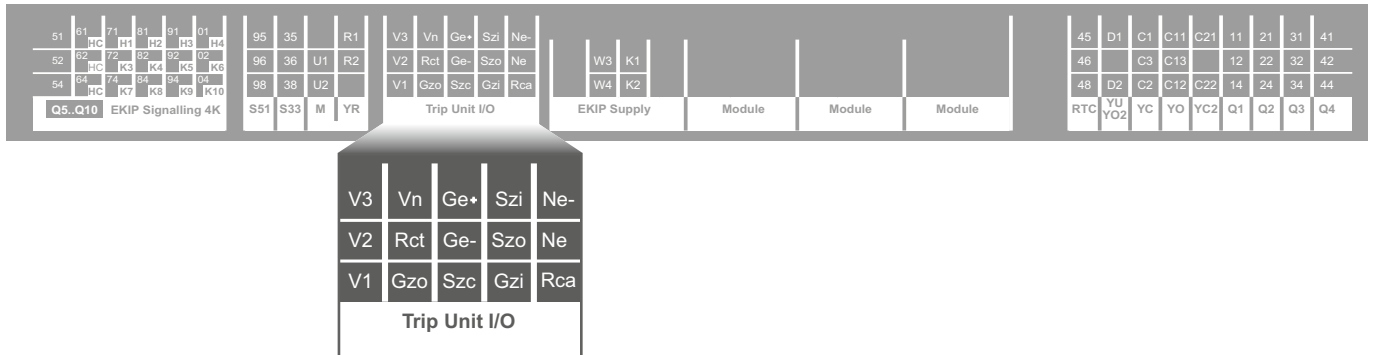


# Electrical accessories



- 65) Ekip COM R DeviceNet™ Redundant
- 66) Ekip COM R EtherNet/IP™ Redundant
- 67) Ekip COM R IEC 61850 Redundant

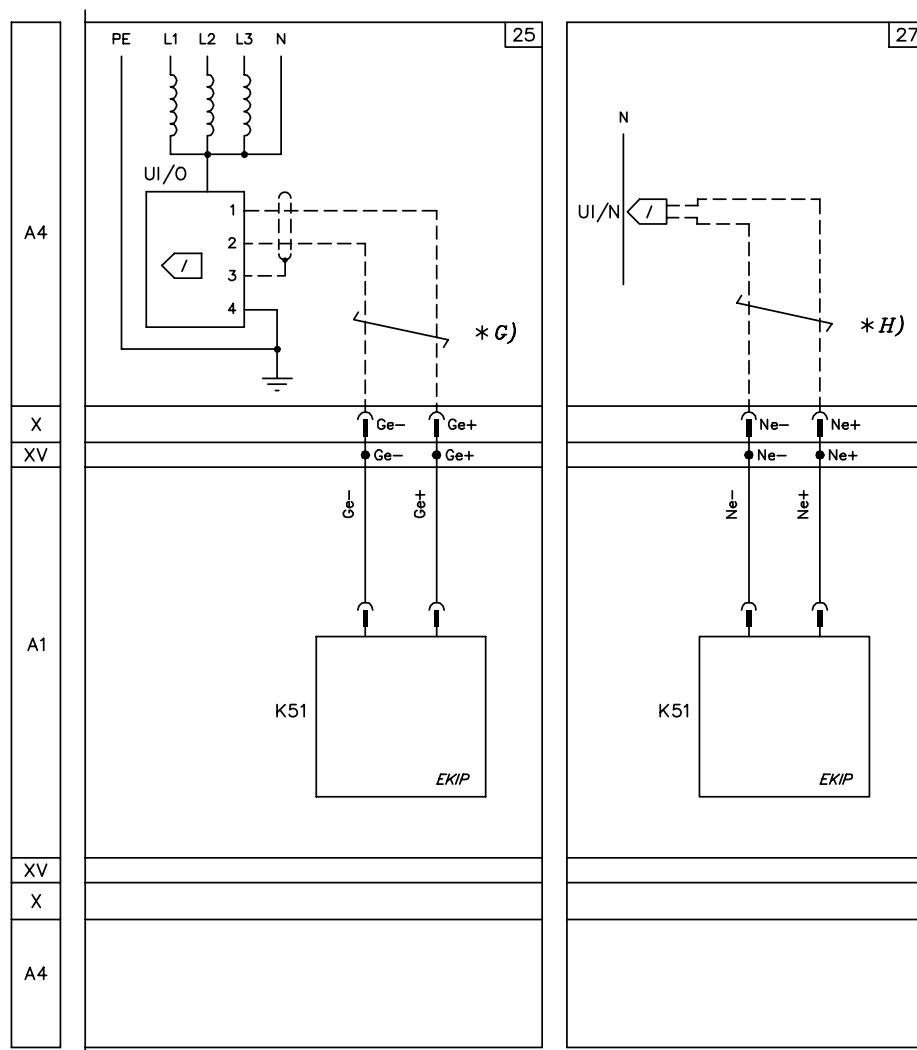




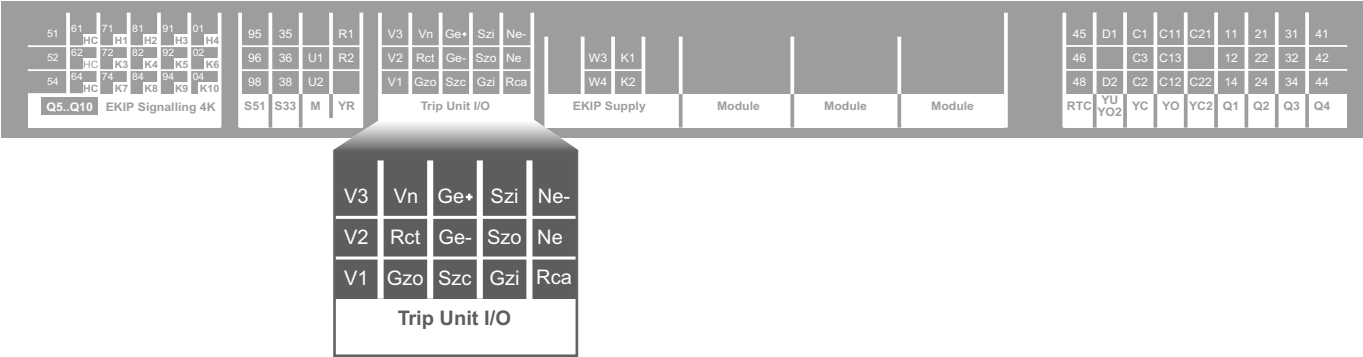
**25) Transformer star center sensor input (homopolar toroid for the earthing conductor of main power supply)**

**27) Current sensor input on external neutral (only for 3-pole circuit-breakers)**

As an alternative to  
figures 24 - 24A

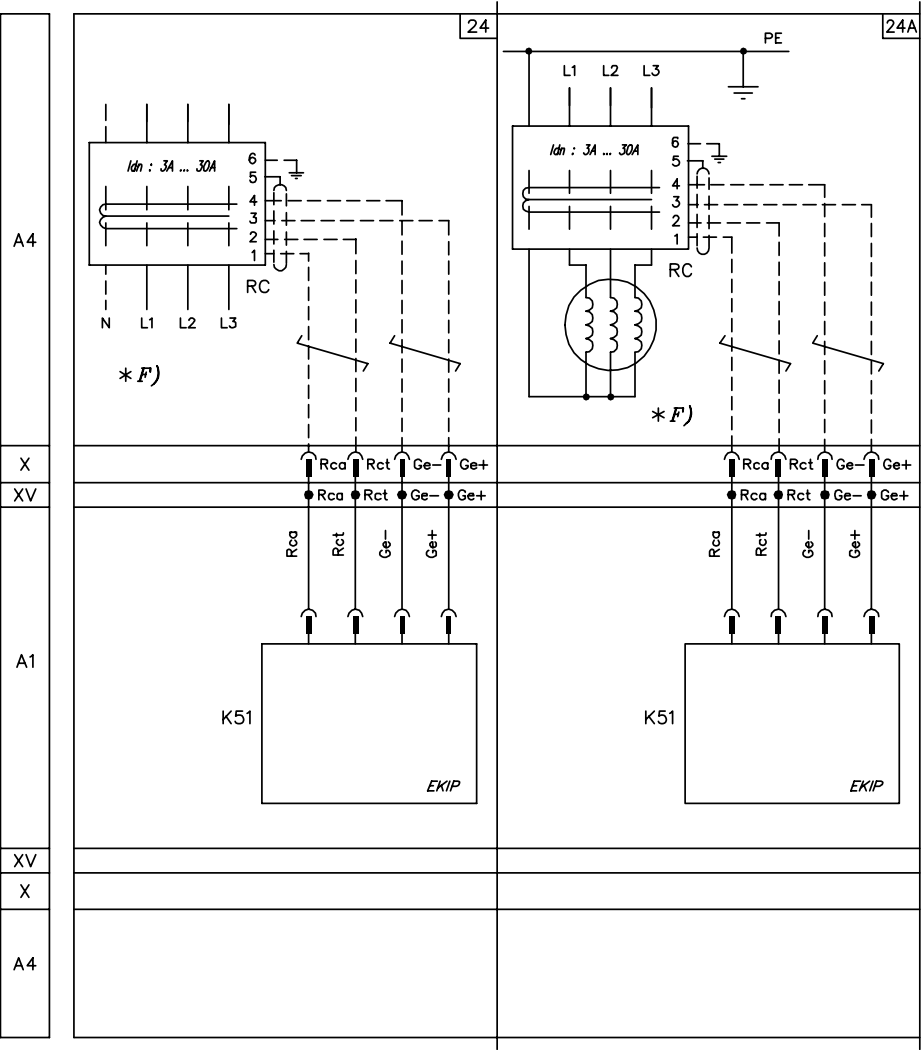


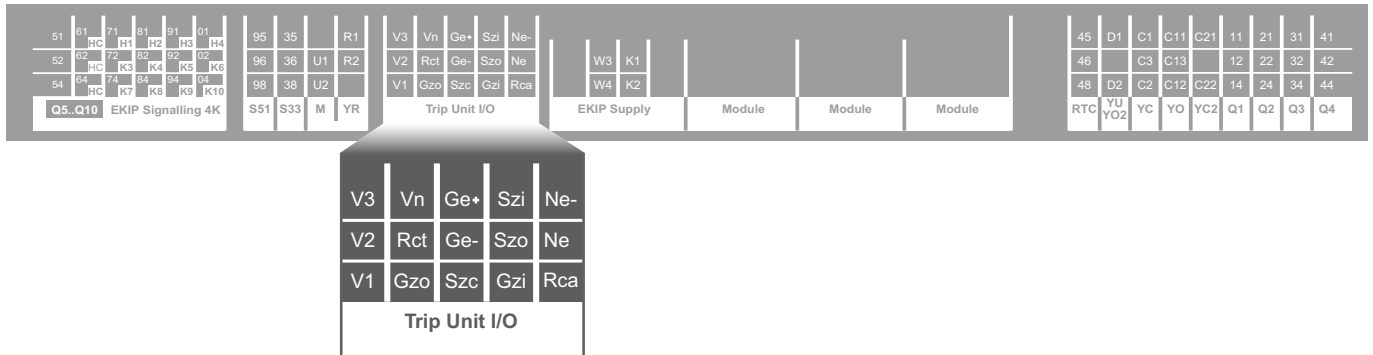
# Electrical accessories



24) Rc residual current protection sensor input (ANSI 64 & 50NTD)  
24a) Rc differential ground fault protection (ANSI 87N)

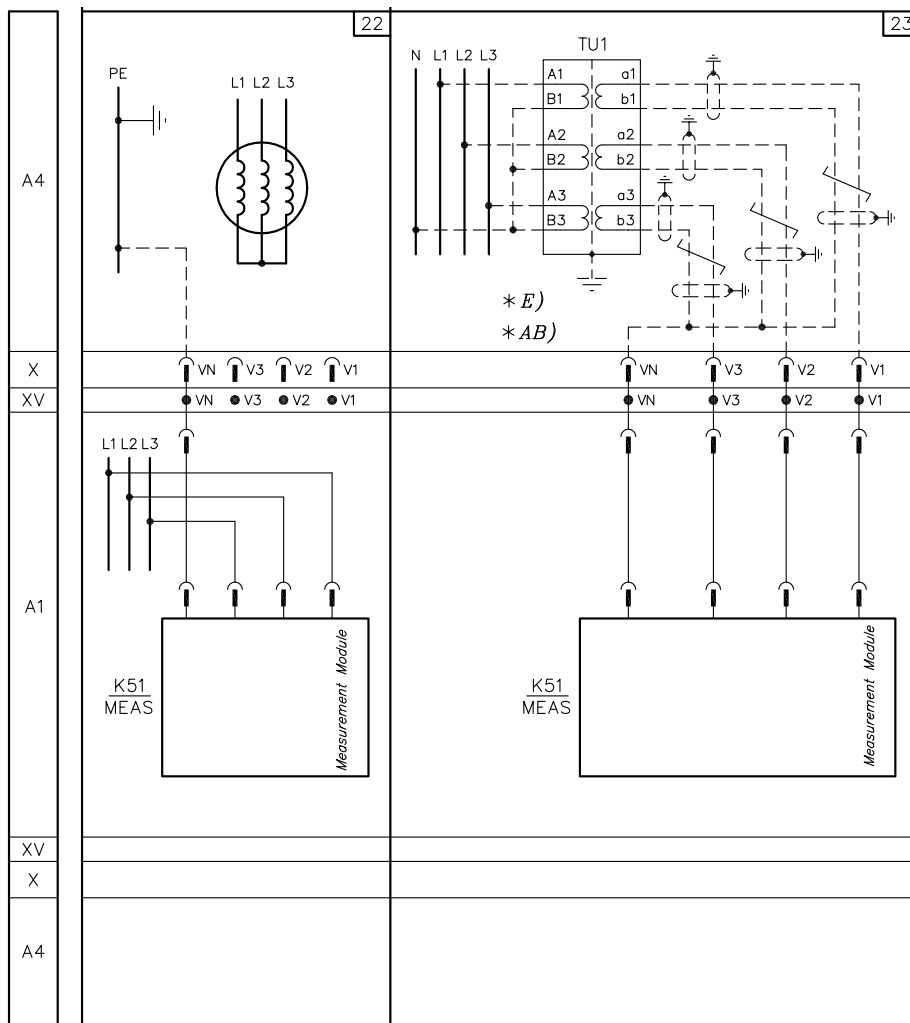
As an alternative  
to figures 25



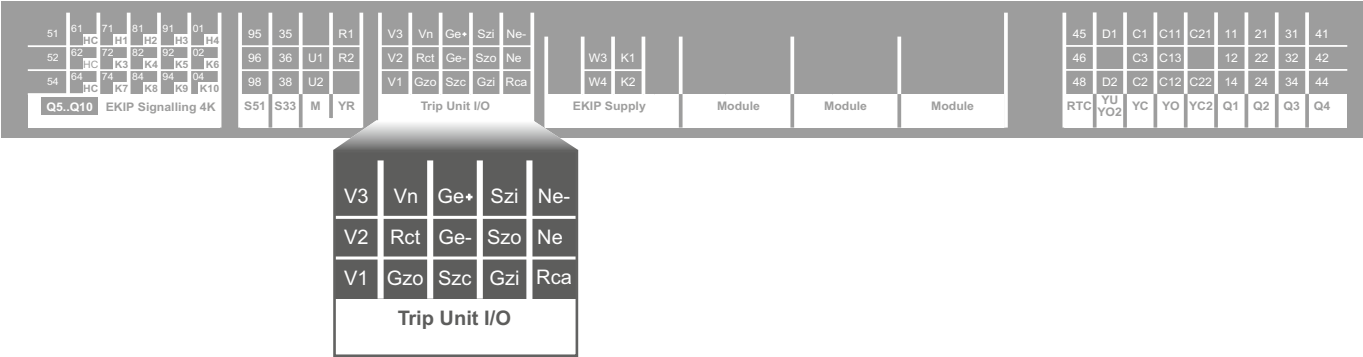


- 22) Measurement Enabler/Measurement Enabler with voltage sockets for residual voltage protection (for Ekip G only)
- 23) Measurement Enabler/Measurement Enabler with voltage sockets with external voltage transformer

As an alternative to  
to each other or to  
20-21 diagram

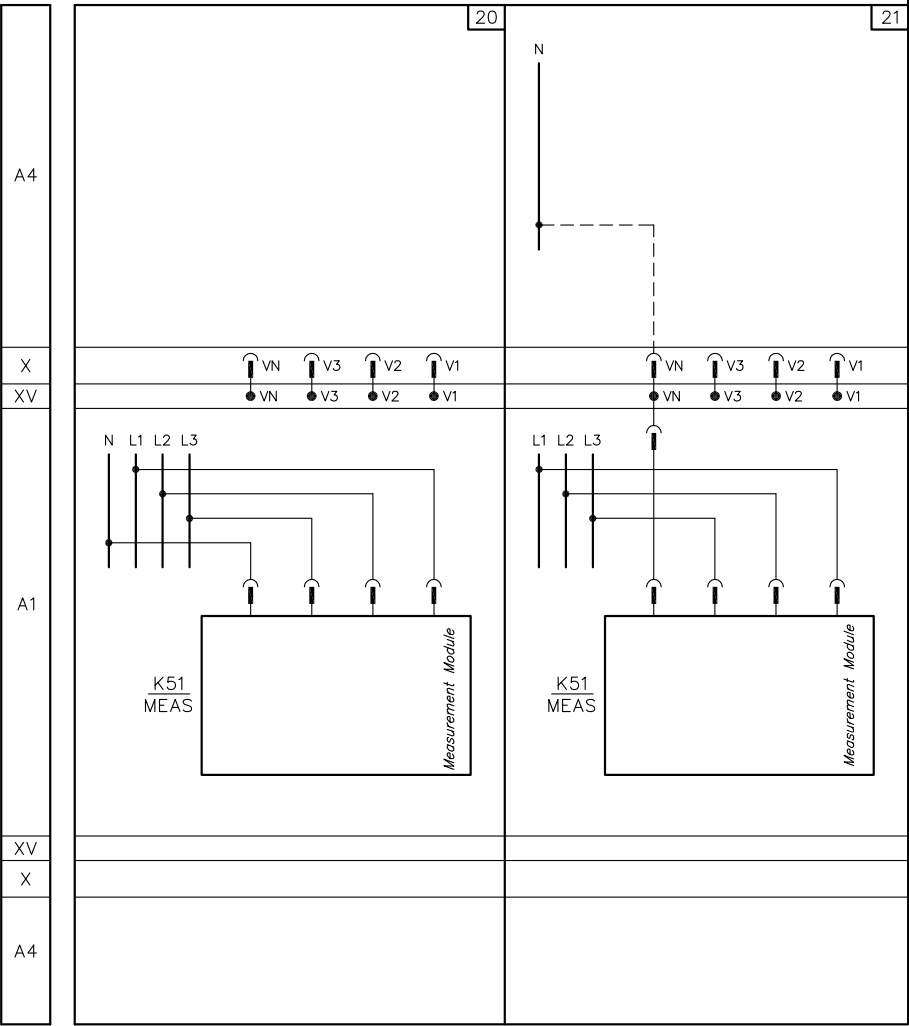


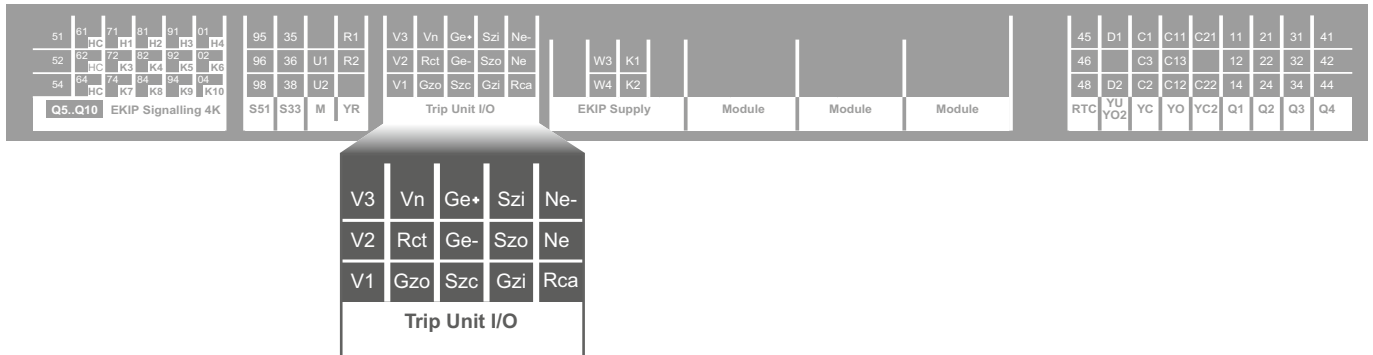
# Electrical accessories



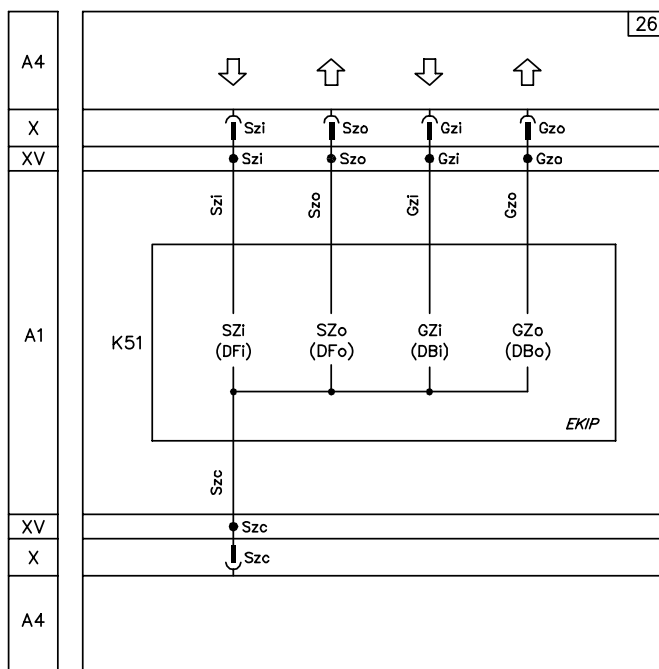
- 20) Measurement Enabler/Measurement Enabler with voltage sockets inside the four-pole circuit breaker
- 21) Measurement Enabler/Measurement Enabler with voltage sockets inside the three-pole circuit breaker and connection to the external neutral

As an alternative to each other or to 22-23 diagram

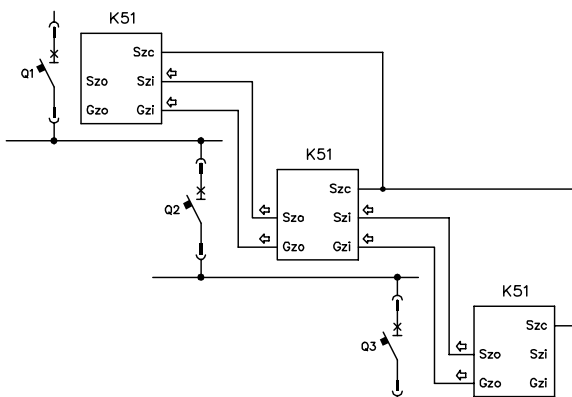




## 26) Zone selectivity



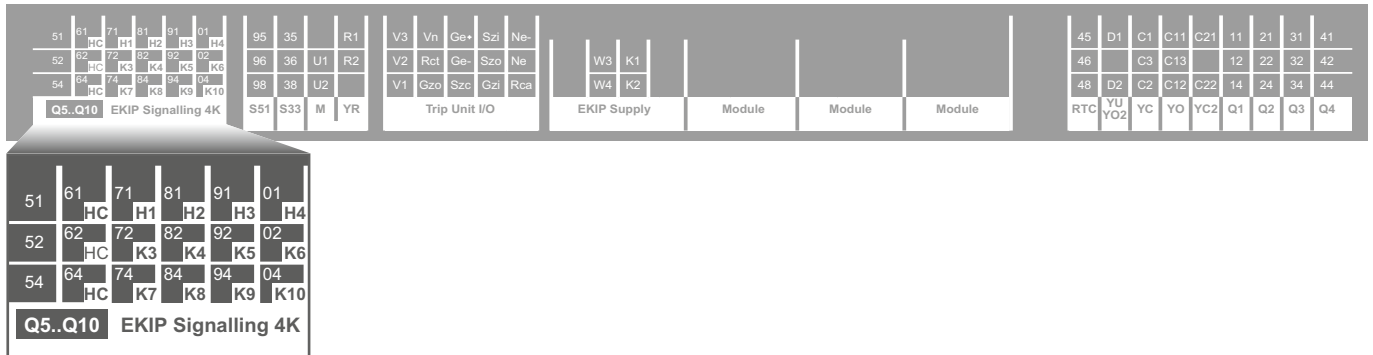
## Example for application diagram (among 3 circuit-breakers)



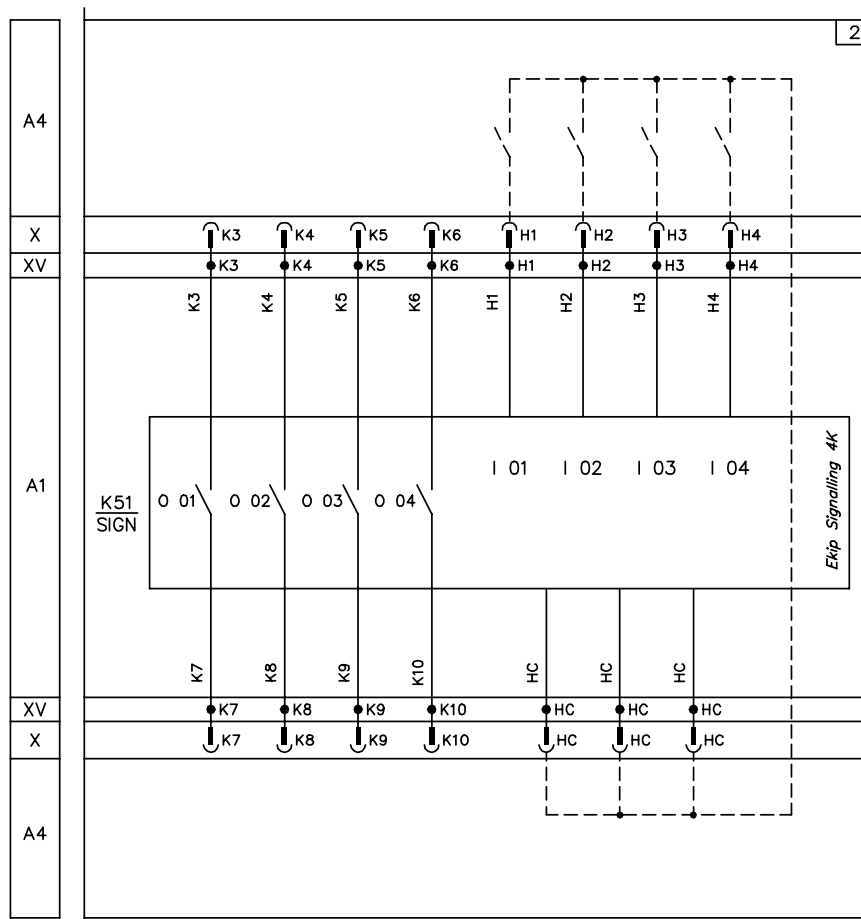


# Electrical accessories





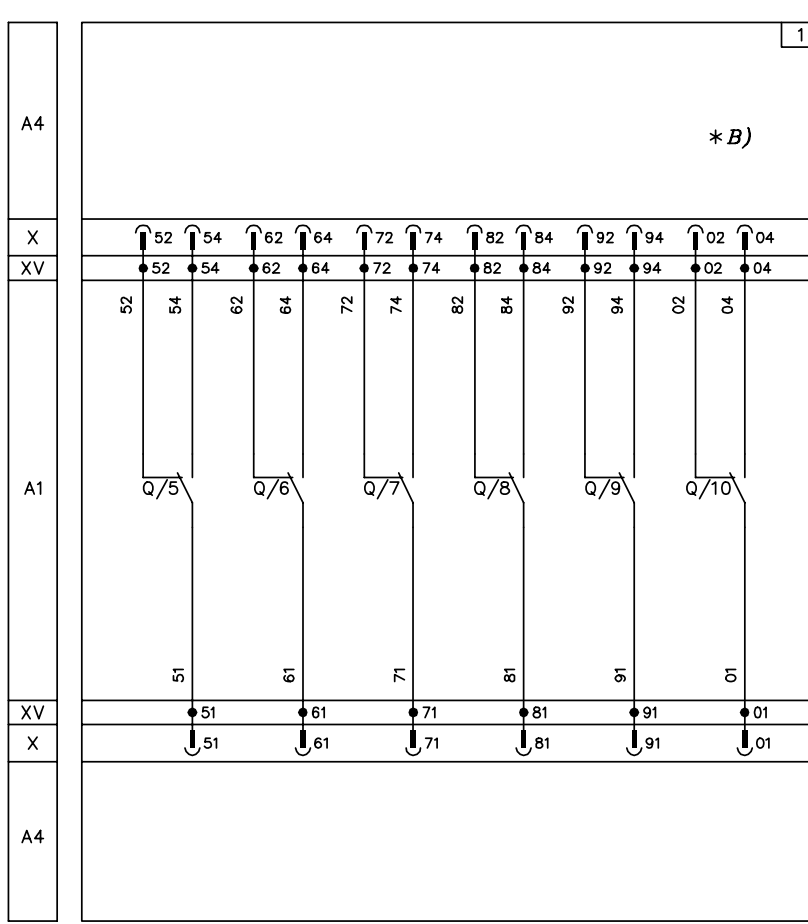
## 2) Ekip Signalling 4K

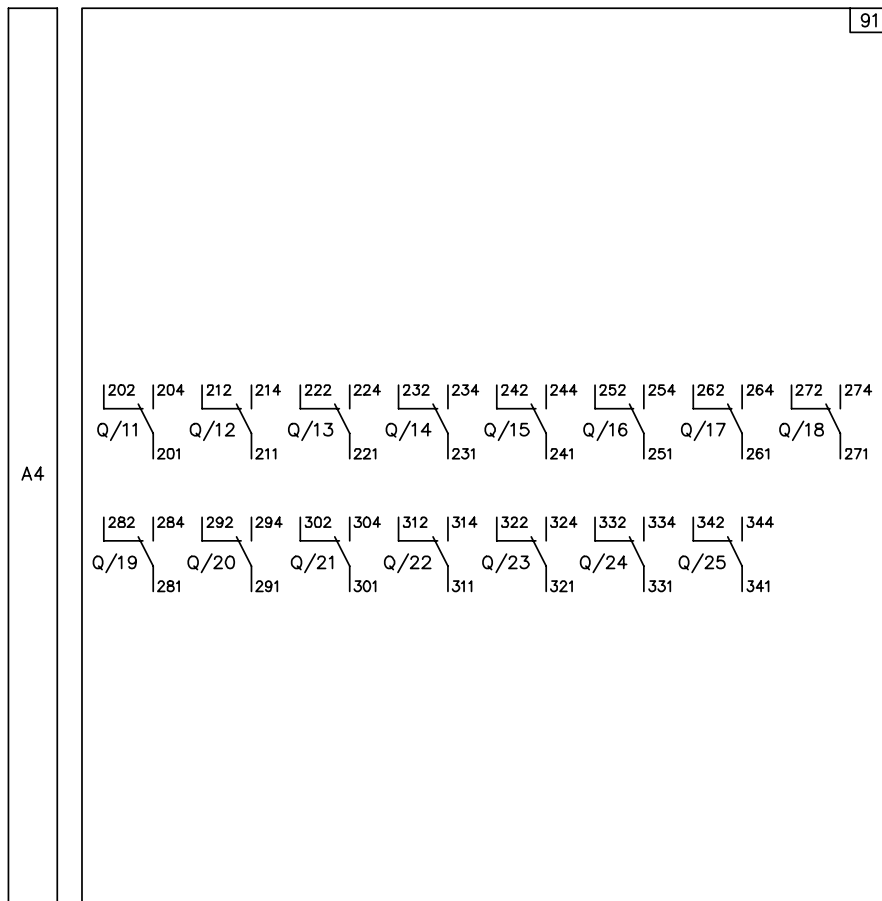


## Electrical accessories



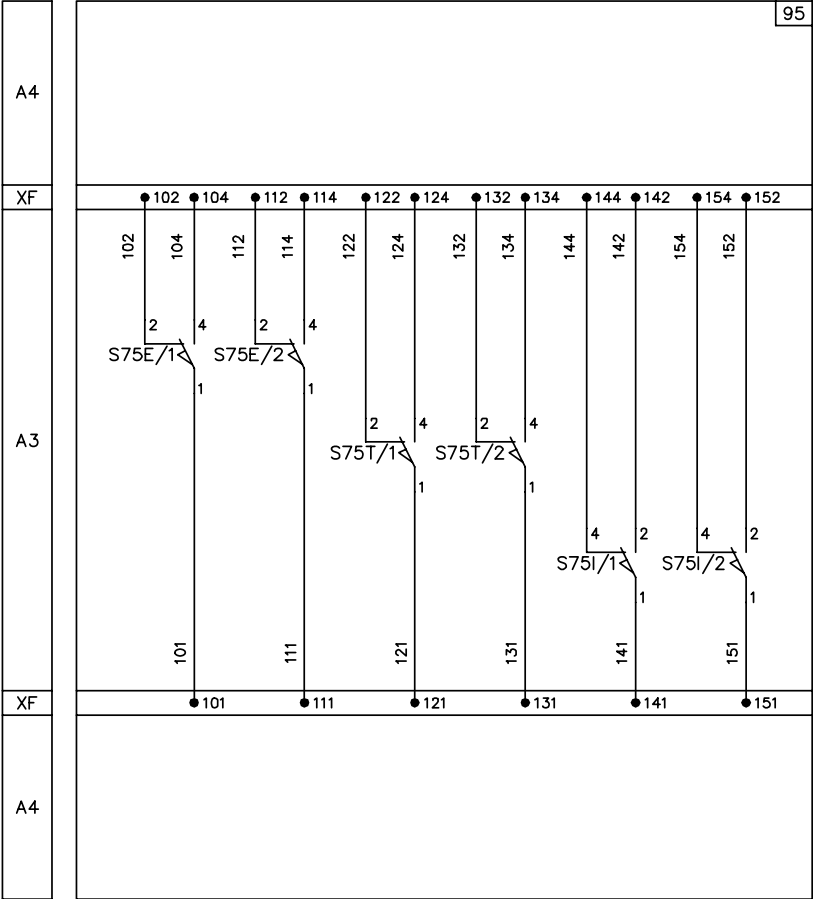
**1) Supplementary open/closed auxiliary contacts of the circuit-breaker - AUX 6Q (6 Form C)**



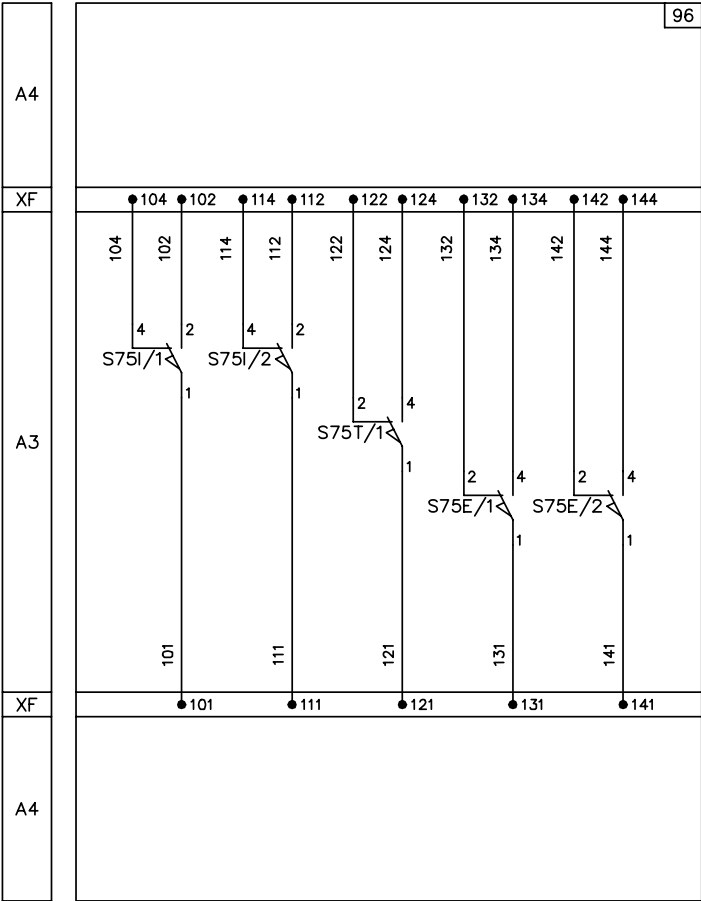
**91) Supplementary open/closed auxiliary contacts outside the circuit-breaker - AUX 15Q (15 Form C)**

# Electrical accessories

95) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position

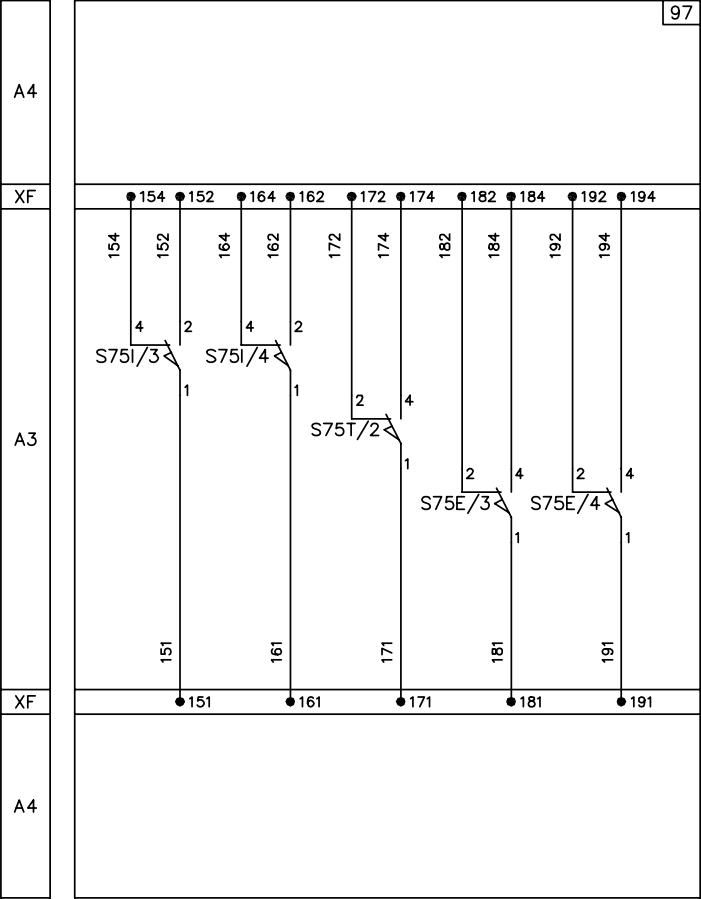


96) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (first set)

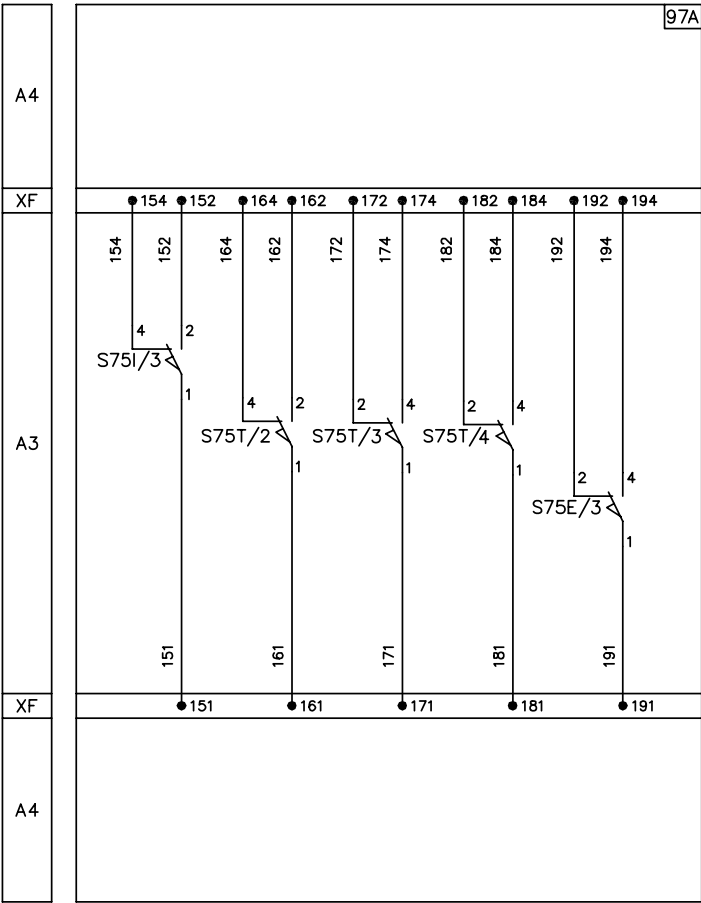


# Electrical accessories

97) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (second set)



97A) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (second set)







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# Ordering codes

|              |                                                 |
|--------------|-------------------------------------------------|
| <b>10/2</b>  | <b>Instructions for ordering</b>                |
| <b>10/2</b>  | Ordering examples                               |
| <b>10/5</b>  | <b>General information</b>                      |
| <b>10/6</b>  | <b>Automatic circuit-breakers</b>               |
| <b>10/6</b>  | Fixed version for power distribution            |
| <b>10/21</b> | Withdrawable version for power distribution     |
| <b>10/35</b> | Fixed version for generators                    |
| <b>10/40</b> | Withdrawable version for generators             |
| <b>10/45</b> | <b>Switch-disconnectors</b>                     |
| <b>10/45</b> | Fixed version                                   |
| <b>10/47</b> | Withdrawable version                            |
| <b>10/49</b> | <b>Derived versions</b>                         |
| <b>10/49</b> | Sectionalizing truck                            |
| <b>10/49</b> | Earthing truck                                  |
| <b>10/50</b> | Earthing switch with making capacity            |
| <b>10/50</b> | Accessories for MT and MTP                      |
| <b>10/50</b> | Fixed or Mobile Part with neutral on right side |
| <b>10/51</b> | <b>Fixed parts</b>                              |
| <b>10/52</b> | <b>Accessories</b>                              |
| <b>10/52</b> | Electrical accessories                          |
| <b>10/56</b> | Mechanical accessories                          |
| <b>10/59</b> | Mechanical interlock                            |
| <b>10/60</b> | Ekip modules                                    |
| <b>10/64</b> | Terminals                                       |
| <b>10/70</b> | Spare parts Grey Platform                       |
| <b>10/72</b> | Service                                         |
| <b>10/73</b> | Spare Parts                                     |

# Instructions for ordering

## Ordering examples

Standard version Emax 2 series circuit-breakers are identified by means of commercial codes that can be accessorized.

### Ordering examples

- Terminal kit codes (other than standard supply) for fixed circuit-breaker or for fixed part of withdrawable circuit-breaker. The codes refer to 3 or

4 pieces (for mounting on top or bottom terminals). To convert a complete circuit-breaker, 1 kit for upper terminals and 1 kit for lower terminals must be specified in the order.

#### Example no. 1

##### Emax E2.2N 3 poles fixed with vertical rear terminals (VR)

|              |                                    |
|--------------|------------------------------------|
| 1SDA071066R1 | E2.2N 2500 Ekip Touch LSIG 3p F HR |
| 1SDA074009R1 | Kit VR Sup E2.2 Iu=2500 3pcs INST  |
| 1SDA074011R1 | Kit VR Inf E2.2 Iu=2500 3pcs INST  |

#### Example no. 2

##### Emax E1.2N 4 poles fixed with upper vertical rear (VR) and front (F) terminals (standard supply)

|              |                                 |
|--------------|---------------------------------|
| 1SDA071513R1 | E1.2N 1600 Ekip Dip LSIG 4p F F |
| 1SDA073986R1 | Kit VR Upper E1.2 F 4pcs INST   |

#### Example no. 3

##### Emax E4.2H 3 poles fixed with upper front terminals (F) and adjustable rear bottom vertical (VR) terminals

|              |                                       |
|--------------|---------------------------------------|
| 1SDA071169R1 | E4.2H 3200 Ekip Hi-Touch LSIG 3p F HR |
| 1SDA074126R1 | Kit F upper E4.2 F 3pcs INST          |
| 1SDA074017R1 | Kit VR lower E4.2 Iu=3200 3pcs INST   |

#### Example no. 4

##### Emax E2.2 2000A 3 poles fixed part with spread upper vertical terminals (SVR) and rear bottom adjustable horizontal (HR) terminals (standard supply)

|              |                                      |
|--------------|--------------------------------------|
| 1SDA073909R1 | E2.2 W FP Iu=2000 3p HR HR           |
| 1SDA074057R1 | Kit SVR upper E2.2 Iu=2000 3pcs INST |

- Rating Plug for lower values than rated current.  
Rating plug installed on the circuit-breaker enables to obtain lower current values than rated current.

#### Example no. 5

##### Emax E2.2S 2500 4 poles fixed In=1600A

|              |                                    |
|--------------|------------------------------------|
| 1SDA071706R1 | E2.2S 2500 Ekip Touch LSIG 4p F HR |
| 1SDA074266R1 | Rating Plug 1600 E1.2..E6.2 INST   |

- Ordering for Ekip modules.

Ekip Supply module enables Ekip Com, Ekip Link, Ekip 2K, Ekip Syncrocheck cartridge modules to be installed.

In addition to Ekip Supply modules, up to 3 cartridge modules can be installed on E2.2, E4.2 and E6.2 and up to 2 modules on E1.2.

#### Example no. 6

**Emax E4.2H 3 poles fixed with modules: Ekip Supply, Ekip Com Modbus TCP, Ekip Signalling 2K-1, Ekip Com Modbus TCP Redundant and Ekip Signalling 4K**

|              |                                       |
|--------------|---------------------------------------|
| 1SDA071169R1 | E4.2H 3200 Ekip Hi-Touch LSIG 3p F HR |
| 1SDA074173R1 | Ekip Supply 24-48V DC E1.2...E6.2     |
| 1SDA074151R1 | Ekip Com Modbus TCP E1.2...E6.2       |
| 1SDA074158R1 | Ekip Com R Modbus TCP E1.2...E6.2     |
| 1SDA074167R1 | Ekip Sign. 2K-1 E1.2...E6.2           |
| 1SDA074170R1 | Ekip Sign. 4K E2.2...E6.2             |

#### Example no. 7

**Emax E4.2H 3 poles fixed with modules: Ekip Supply, Ekip Com Modbus RS-485, RC protection, Measurement Enabler with voltage sockets**

|              |                                                              |
|--------------|--------------------------------------------------------------|
| 1SDA071166R1 | E4.2H 3200 Ekip Touch LSIG 3p F HR                           |
| 1SDA074173R1 | Ekip Supply 24-48V DC E1.2...E6.2                            |
| 1SDA074150R1 | Ekip Com Modbus RS-485 E1.2...E6.2                           |
| 1SDA074269R1 | Rating Plug RC 3200 E4.2-E6.2 INST                           |
| 1SDA107548R1 | Measurement Enabler with voltage sockets E4.2 <sup>(1)</sup> |
| 1SDA073742R1 | Toroid RC E2.2 4p, E4.2 3p                                   |

1) By default Ekip Touch trip unit has the Measurement Enabler module installed. The RC protection requires busbar supply, so Measurement Enabler with voltage sockets is required.

#### Example no. 8

**Emax E1.2B 3 poles fixed with modules: Ekip Supply, Ekip Com Modbus RS-485, Measuring package, 1% Accuracy**

|              |                                    |
|--------------|------------------------------------|
| 1SDA070785R1 | E1.2B 1000 Ekip Touch LSI 3p F F   |
| 1SDA074173R1 | Ekip Supply 24-48V DC E1.2...E6.2  |
| 1SDA074150R1 | Ekip Com Modbus RS-485 E1.2...E6.2 |
| 1SDA107525R1 | Measuring Package for Emax 2       |
| 1SDA107551R1 | Class 1 Power&Energy Metering E1.2 |

- Ordering for electrical accessories.

All the accessories are available. In particular, up to 3 coils can be ordered for E1.2, whereas up to 4 coils for E2.2, E4.2 and E6.2.

#### Example no. 9

**Emax E2.2S 3 poles withdrawable with accessories: opening release, closing release, motor for automatic charging of the springs, second opening release**

|              |                                       |
|--------------|---------------------------------------|
| 1SDA072395R1 | E2.2S 2000 Ekip Touch LSi LSIG 3p WMP |
| 1SDA073674R1 | YO E1.2...E6.2 220-240V AC/DC         |
| 1SDA073687R1 | YC E1.2...E6.2 220-240V AC/DC         |
| 1SDA073725R1 | M E2.2...E6.2 220-250V AC/DC          |
| 1SDA073674R1 | YO E1.2...E6.2 220-240V AC/DC         |

- Ordering for key locks.

#### Example no. 10

**Emax E2.2N 3 poles with double key lock in racked-in / test / racked-out position, using different keys**

|              |                                             |
|--------------|---------------------------------------------|
| 1SDA071066R1 | E2.2N 2500 Ekip Touch LSIG 3p F HR          |
| 1SDA073806R1 | KLP-D Bl. Racked in/out E2.2...E6.2 1st key |
| 1SDA073812R1 | KLP-D Bl. Racked in/out E2.2...E6.2 2nd key |

# Instructions for ordering

## Ordering examples

- **Ordering for mechanical Interlocks.**

Interlocks have several strategy configuration, suitable for fixed circuit-breakers and withdrawable circuit-breakers.

Each configuration requires different groups:

- **Cables**, select one Kit for strategy A / B / C / D. The cables must be ordered on fixed circuit-breaker or fixed part of withdrawable circuit-breaker.

- **Lever**, required only for E2.2, E4.2 and E6.2.

These lever must be mounted on fixed circuit-breaker or on mobile part of withdrawable circuit-breaker.

- **Support**, installed on fixed circuit-breaker or on fixed part of withdrawable circuit-breaker. This support is mounted on the external right side of the circuit-breaker.

### Example no. 12

#### Interlock between two fixed circuit-breakers: E1.2 and E2.2

|                            |                            |
|----------------------------|----------------------------|
| E1.2 Fixed circuit-breaker | E2.2 Fixed circuit-breaker |
| Cables [Group 1]: 1 Item   | Lever [Group 2]: 1 Item    |
| Support [Group 3]: 1 Item  | Support [Group 3]: 1 Item  |

### Example no. 13

#### Interlock between three fixed breakers: one E2.2 and two E4.2

|                            |                            |                            |
|----------------------------|----------------------------|----------------------------|
| E2.2 Fixed circuit-breaker | E4.2 Fixed circuit-breaker | E4.2 Fixed circuit-breaker |
| Cables [Group 1]: 1 Item   | Lever [Group 2]: 1 Item    | Lever [Group 2]: 1 Item    |
| Lever [Group 2]: 1 Item    | Support [Group 3]: 1 Item  | Support [Group 3]: 1 Item  |
| Support [Group 3]: 1 Item  |                            |                            |

### Example no. 14

#### Interlock between two withdrawable breakers: E1.2 and E2.2

|                           |                           |
|---------------------------|---------------------------|
| E1.2 Fixed Part           | E2.2 Mobile Part          |
| Cables [Group 1]: 1 Item  | Lever [Group 2]: 1 Item   |
| Support [Group 4]: 1 Item | +                         |
|                           | E2.2 Fixed Part           |
|                           | Support [Group 4]: 1 Item |

### Example no. 15

#### Interlock between three withdrawable breakers: one E2.2 and two E4.2

|                           |                           |                           |
|---------------------------|---------------------------|---------------------------|
| E2.2 Mobile Part          | E4.2 Mobile Part          | E4.2 Mobile Part          |
| Lever [Group 2]: 1 Item   | Lever [Group 2]: 1 Item   | Lever [Group 2]: 1 Item   |
| +                         |                           |                           |
| E2.2 Fixed Part           | E4.2 Fixed Part           | E4.2 Fixed Part           |
| Cables [Group 1]: 1 Item  | Support [Group 4]: 1 Item | Support [Group 4]: 1 Item |
| Support [Group 4]: 1 Item |                           |                           |

# General informations

## Abbreviations used for the description of the product

| Versions and terminals              |                                                                                     |
|-------------------------------------|-------------------------------------------------------------------------------------|
| <b>F</b>                            | Fixed circuit-breaker                                                               |
| <b>W</b>                            | Withdrawable circuit-breaker                                                        |
| <b>MP</b>                           | Mobile part of withdrawable circuit-breaker                                         |
| <b>FP</b>                           | Fixed part of withdrawable circuit-breaker                                          |
|                                     |                                                                                     |
| <b>Iu</b>                           | Rated uninterrupted current                                                         |
| <b>In</b>                           | Rated current of the rating plug                                                    |
| <b>Icu</b>                          | Rated ultimate short-circuit breaking capacity                                      |
| <b>Icw</b>                          | Rated short-time withstand current                                                  |
|                                     |                                                                                     |
| <b>/MS</b>                          | Switch-disconnector                                                                 |
| <b>/f</b>                           | Four-pole circuit-breakers with neutral pole at 100%                                |
| <b>CS</b>                           | Sectionalizing truck                                                                |
| <b>MT</b>                           | Earthing truck                                                                      |
| <b>MTP</b>                          | Earthing switch with making capacity                                                |
|                                     |                                                                                     |
| <b>HR VR</b>                        | Rear orientable terminals                                                           |
| <b>SHR</b>                          | Horizontal rear spread terminals                                                    |
| <b>SVR</b>                          | Vertical rear spread terminals                                                      |
| <b>F</b>                            | Front terminals                                                                     |
| <b>FL</b>                           | Flat terminals                                                                      |
| <b>EF</b>                           | Extended front terminals                                                            |
| <b>ES</b>                           | Front spread terminals                                                              |
| <b>Fc CuAl</b>                      | Terminals for cables                                                                |
|                                     |                                                                                     |
| Protection trip units and functions |                                                                                     |
| <b>Ekip Dip</b>                     | Protection trip unit for power distribution                                         |
| <b>Ekip Touch</b>                   | Measurement and protection trip unit for power distribution                         |
| <b>Ekip Hi Touch</b>                | Measurement and protection trip unit and network analyzer for power distribution    |
| <b>Ekip G Touch</b>                 | Measurement and protection trip unit for generators                                 |
| <b>Ekip G Hi-Touch</b>              | Measurement and protection trip unit and protection network analyzer for generators |
|                                     |                                                                                     |
| <b>L</b>                            | Overload protection                                                                 |
| <b>S</b>                            | Protection against selective short circuit                                          |
| <b>I</b>                            | Protection against instantaneous short circuit                                      |
| <b>G</b>                            | Earth fault protection                                                              |
| <b>Rc</b>                           | Residual current protection                                                         |
| <b>Power Controller</b>             | Load management function                                                            |

# Automatic circuit-breakers

## Fixed version for power distribution


**SACE Emax E1.2B • Front terminals (F)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|-------------------------------|--------------|--------------|
|              |      |                |             |                               | Code         | Code         |
| <b>E1.2B</b> | 630  | 42             | 42          | E1.2B 630 Ekip Dip LI         | 1SDA070701R1 | 1SDA071331R1 |
|              |      |                |             | E1.2B 630 Ekip Dip LSI        | 1SDA070702R1 | 1SDA071332R1 |
|              |      |                |             | E1.2B 630 Ekip Dip LSIG       | 1SDA070703R1 | 1SDA071333R1 |
|              |      |                |             | E1.2B 630 Ekip Touch LI       | 1SDA070704R1 | 1SDA071334R1 |
|              |      |                |             | E1.2B 630 Ekip Touch LSI      | 1SDA070705R1 | 1SDA071335R1 |
|              |      |                |             | E1.2B 630 Ekip Touch LSIG     | 1SDA070706R1 | 1SDA071336R1 |
|              |      |                |             | E1.2B 630 Ekip Hi-Touch LSI   | 1SDA070708R1 | 1SDA071338R1 |
|              |      |                |             | E1.2B 630 Ekip Hi-Touch LSIG  | 1SDA070709R1 | 1SDA071339R1 |
|              | 800  | 42             | 42          | E1.2B 800 Ekip Dip LI         | 1SDA070741R1 | 1SDA071371R1 |
|              |      |                |             | E1.2B 800 Ekip Dip LSI        | 1SDA070742R1 | 1SDA071372R1 |
|              |      |                |             | E1.2B 800 Ekip Dip LSIG       | 1SDA070743R1 | 1SDA071373R1 |
|              |      |                |             | E1.2B 800 Ekip Touch LI       | 1SDA070744R1 | 1SDA071374R1 |
|              |      |                |             | E1.2B 800 Ekip Touch LSI      | 1SDA070745R1 | 1SDA071375R1 |
|              |      |                |             | E1.2B 800 Ekip Touch LSIG     | 1SDA070746R1 | 1SDA071376R1 |
|              |      |                |             | E1.2B 800 Ekip Hi-Touch LSI   | 1SDA070748R1 | 1SDA071378R1 |
|              |      |                |             | E1.2B 800 Ekip Hi-Touch LSIG  | 1SDA070749R1 | 1SDA071379R1 |
|              | 1000 | 42             | 42          | E1.2B 1000 Ekip Dip LI        | 1SDA070781R1 | 1SDA071411R1 |
|              |      |                |             | E1.2B 1000 Ekip Dip LSI       | 1SDA070782R1 | 1SDA071412R1 |
|              |      |                |             | E1.2B 1000 Ekip Dip LSIG      | 1SDA070783R1 | 1SDA071413R1 |
|              |      |                |             | E1.2B 1000 Ekip Touch LI      | 1SDA070784R1 | 1SDA071414R1 |
|              |      |                |             | E1.2B 1000 Ekip Touch LSI     | 1SDA070785R1 | 1SDA071415R1 |
|              |      |                |             | E1.2B 1000 Ekip Touch LSIG    | 1SDA070786R1 | 1SDA071416R1 |
|              |      |                |             | E1.2B 1000 Ekip Hi-Touch LSI  | 1SDA070788R1 | 1SDA071418R1 |
|              |      |                |             | E1.2B 1000 Ekip Hi-Touch LSIG | 1SDA070789R1 | 1SDA071419R1 |
|              | 1250 | 42             | 42          | E1.2B 1250 Ekip Dip LI        | 1SDA070821R1 | 1SDA071451R1 |
|              |      |                |             | E1.2B 1250 Ekip Dip LSI       | 1SDA070822R1 | 1SDA071452R1 |
|              |      |                |             | E1.2B 1250 Ekip Dip LSIG      | 1SDA070823R1 | 1SDA071453R1 |
|              |      |                |             | E1.2B 1250 Ekip Touch LI      | 1SDA070824R1 | 1SDA071454R1 |
|              |      |                |             | E1.2B 1250 Ekip Touch LSI     | 1SDA070825R1 | 1SDA071455R1 |
|              |      |                |             | E1.2B 1250 Ekip Touch LSIG    | 1SDA070826R1 | 1SDA071456R1 |
|              |      |                |             | E1.2B 1250 Ekip Hi-Touch LSI  | 1SDA070828R1 | 1SDA071458R1 |
|              |      |                |             | E1.2B 1250 Ekip Hi-Touch LSIG | 1SDA070829R1 | 1SDA071459R1 |
|              | 1600 | 42             | 42          | E1.2B 1600 Ekip Dip LI        | 1SDA070861R1 | 1SDA071491R1 |
|              |      |                |             | E1.2B 1600 Ekip Dip LSI       | 1SDA070862R1 | 1SDA071492R1 |
|              |      |                |             | E1.2B 1600 Ekip Dip LSIG      | 1SDA070863R1 | 1SDA071493R1 |
|              |      |                |             | E1.2B 1600 Ekip Touch LI      | 1SDA070864R1 | 1SDA071494R1 |
|              |      |                |             | E1.2B 1600 Ekip Touch LSI     | 1SDA070865R1 | 1SDA071495R1 |
|              |      |                |             | E1.2B 1600 Ekip Touch LSIG    | 1SDA070866R1 | 1SDA071496R1 |
|              |      |                |             | E1.2B 1600 Ekip Hi-Touch LSI  | 1SDA070868R1 | 1SDA071498R1 |
|              |      |                |             | E1.2B 1600 Ekip Hi-Touch LSIG | 1SDA070869R1 | 1SDA071499R1 |

**SACE Emax E1.2C • Front terminals (F)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E1.2C | 630  | 50             | 42          | E1.2C 630 Ekip Dip LI         | 1SDA070711R1 | 1SDA071341R1 |
|       |      |                |             | E1.2C 630 Ekip Dip LSI        | 1SDA070712R1 | 1SDA071342R1 |
|       |      |                |             | E1.2C 630 Ekip Dip LSIG       | 1SDA070713R1 | 1SDA071343R1 |
|       |      |                |             | E1.2C 630 Ekip Touch LI       | 1SDA070714R1 | 1SDA071344R1 |
|       |      |                |             | E1.2C 630 Ekip Touch LSI      | 1SDA070715R1 | 1SDA071345R1 |
|       |      |                |             | E1.2C 630 Ekip Touch LSIG     | 1SDA070716R1 | 1SDA071346R1 |
|       |      |                |             | E1.2C 630 Ekip Hi-Touch LSI   | 1SDA070718R1 | 1SDA071348R1 |
|       |      |                |             | E1.2C 630 Ekip Hi-Touch LSIG  | 1SDA070719R1 | 1SDA071349R1 |
|       | 800  | 50             | 42          | E1.2C 800 Ekip Dip LI         | 1SDA070751R1 | 1SDA071381R1 |
|       |      |                |             | E1.2C 800 Ekip Dip LSI        | 1SDA070752R1 | 1SDA071382R1 |
|       |      |                |             | E1.2C 800 Ekip Dip LSIG       | 1SDA070753R1 | 1SDA071383R1 |
|       |      |                |             | E1.2C 800 Ekip Touch LI       | 1SDA070754R1 | 1SDA071384R1 |
|       |      |                |             | E1.2C 800 Ekip Touch LSI      | 1SDA070755R1 | 1SDA071385R1 |
|       |      |                |             | E1.2C 800 Ekip Touch LSIG     | 1SDA070756R1 | 1SDA071386R1 |
|       |      |                |             | E1.2C 800 Ekip Hi-Touch LSI   | 1SDA070758R1 | 1SDA071388R1 |
|       |      |                |             | E1.2C 800 Ekip Hi-Touch LSIG  | 1SDA070759R1 | 1SDA071389R1 |
|       | 1000 | 50             | 42          | E1.2C 1000 Ekip Dip LI        | 1SDA070791R1 | 1SDA071421R1 |
|       |      |                |             | E1.2C 1000 Ekip Dip LSI       | 1SDA070792R1 | 1SDA071422R1 |
|       |      |                |             | E1.2C 1000 Ekip Dip LSIG      | 1SDA070793R1 | 1SDA071423R1 |
|       |      |                |             | E1.2C 1000 Ekip Touch LI      | 1SDA070794R1 | 1SDA071424R1 |
|       |      |                |             | E1.2C 1000 Ekip Touch LSI     | 1SDA070795R1 | 1SDA071425R1 |
|       |      |                |             | E1.2C 1000 Ekip Touch LSIG    | 1SDA070796R1 | 1SDA071426R1 |
|       |      |                |             | E1.2C 1000 Ekip Hi-Touch LSI  | 1SDA070798R1 | 1SDA071428R1 |
|       |      |                |             | E1.2C 1000 Ekip Hi-Touch LSIG | 1SDA070799R1 | 1SDA071429R1 |
|       | 1250 | 50             | 42          | E1.2C 1250 Ekip Dip LI        | 1SDA070831R1 | 1SDA071461R1 |
|       |      |                |             | E1.2C 1250 Ekip Dip LSI       | 1SDA070832R1 | 1SDA071462R1 |
|       |      |                |             | E1.2C 1250 Ekip Dip LSIG      | 1SDA070833R1 | 1SDA071463R1 |
|       |      |                |             | E1.2C 1250 Ekip Touch LI      | 1SDA070834R1 | 1SDA071464R1 |
|       |      |                |             | E1.2C 1250 Ekip Touch LSI     | 1SDA070835R1 | 1SDA071465R1 |
|       |      |                |             | E1.2C 1250 Ekip Touch LSIG    | 1SDA070836R1 | 1SDA071466R1 |
|       |      |                |             | E1.2C 1250 Ekip Hi-Touch LSI  | 1SDA070838R1 | 1SDA071468R1 |
|       |      |                |             | E1.2C 1250 Ekip Hi-Touch LSIG | 1SDA070839R1 | 1SDA071469R1 |
|       | 1600 | 50             | 42          | E1.2C 1600 Ekip Dip LI        | 1SDA070871R1 | 1SDA071501R1 |
|       |      |                |             | E1.2C 1600 Ekip Dip LSI       | 1SDA070872R1 | 1SDA071502R1 |
|       |      |                |             | E1.2C 1600 Ekip Dip LSIG      | 1SDA070873R1 | 1SDA071503R1 |
|       |      |                |             | E1.2C 1600 Ekip Touch LI      | 1SDA070874R1 | 1SDA071504R1 |
|       |      |                |             | E1.2C 1600 Ekip Touch LSI     | 1SDA070875R1 | 1SDA071505R1 |
|       |      |                |             | E1.2C 1600 Ekip Touch LSIG    | 1SDA070876R1 | 1SDA071506R1 |
|       |      |                |             | E1.2C 1600 Ekip Hi-Touch LSI  | 1SDA070878R1 | 1SDA071508R1 |
|       |      |                |             | E1.2C 1600 Ekip Hi-Touch LSIG | 1SDA070879R1 | 1SDA071509R1 |



# Automatic circuit-breakers

## Fixed version for power distribution


**SACE Emax E1.2N • Front terminals (F)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E1.2N | 250  | 66             | 50          | E1.2N 250 Ekip Dip LI         | 1SDA070691R1 | 1SDA071321R1 |
|       |      |                |             | E1.2N 250 Ekip Dip LSI        | 1SDA070692R1 | 1SDA071322R1 |
|       |      |                |             | E1.2N 250 Ekip Dip LSIG       | 1SDA070693R1 | 1SDA071323R1 |
|       |      |                |             | E1.2N 250 Ekip Touch LI       | 1SDA070694R1 | 1SDA071324R1 |
|       |      |                |             | E1.2N 250 Ekip Touch LSI      | 1SDA070695R1 | 1SDA071325R1 |
|       |      |                |             | E1.2N 250 Ekip Touch LSIG     | 1SDA070696R1 | 1SDA071326R1 |
|       |      |                |             | E1.2N 250 Ekip Hi-Touch LSI   | 1SDA070698R1 | 1SDA071328R1 |
|       |      |                |             | E1.2N 250 Ekip Hi-Touch LSIG  | 1SDA070699R1 | 1SDA071329R1 |
|       | 630  | 66             | 50          | E1.2N 630 Ekip Dip LI         | 1SDA070721R1 | 1SDA071351R1 |
|       |      |                |             | E1.2N 630 Ekip Dip LSI        | 1SDA070722R1 | 1SDA071352R1 |
|       |      |                |             | E1.2N 630 Ekip Dip LSIG       | 1SDA070723R1 | 1SDA071353R1 |
|       |      |                |             | E1.2N 630 Ekip Touch LI       | 1SDA070724R1 | 1SDA071354R1 |
|       |      |                |             | E1.2N 630 Ekip Touch LSI      | 1SDA070725R1 | 1SDA071355R1 |
|       |      |                |             | E1.2N 630 Ekip Touch LSIG     | 1SDA070726R1 | 1SDA071356R1 |
|       |      |                |             | E1.2N 630 Ekip Hi-Touch LSI   | 1SDA070728R1 | 1SDA071358R1 |
|       |      |                |             | E1.2N 630 Ekip Hi-Touch LSIG  | 1SDA070729R1 | 1SDA071359R1 |
|       | 800  | 66             | 50          | E1.2N 800 Ekip Dip LI         | 1SDA070761R1 | 1SDA071391R1 |
|       |      |                |             | E1.2N 800 Ekip Dip LSI        | 1SDA070762R1 | 1SDA071392R1 |
|       |      |                |             | E1.2N 800 Ekip Dip LSIG       | 1SDA070763R1 | 1SDA071393R1 |
|       |      |                |             | E1.2N 800 Ekip Touch LI       | 1SDA070764R1 | 1SDA071394R1 |
|       |      |                |             | E1.2N 800 Ekip Touch LSI      | 1SDA070765R1 | 1SDA071395R1 |
|       |      |                |             | E1.2N 800 Ekip Touch LSIG     | 1SDA070766R1 | 1SDA071396R1 |
|       |      |                |             | E1.2N 800 Ekip Hi-Touch LSI   | 1SDA070768R1 | 1SDA071398R1 |
|       |      |                |             | E1.2N 800 Ekip Hi-Touch LSIG  | 1SDA070769R1 | 1SDA071399R1 |
|       | 1000 | 66             | 50          | E1.2N 1000 Ekip Dip LI        | 1SDA070801R1 | 1SDA071431R1 |
|       |      |                |             | E1.2N 1000 Ekip Dip LSI       | 1SDA070802R1 | 1SDA071432R1 |
|       |      |                |             | E1.2N 1000 Ekip Dip LSIG      | 1SDA070803R1 | 1SDA071433R1 |
|       |      |                |             | E1.2N 1000 Ekip Touch LI      | 1SDA070804R1 | 1SDA071434R1 |
|       |      |                |             | E1.2N 1000 Ekip Touch LSI     | 1SDA070805R1 | 1SDA071435R1 |
|       |      |                |             | E1.2N 1000 Ekip Touch LSIG    | 1SDA070806R1 | 1SDA071436R1 |
|       |      |                |             | E1.2N 1000 Ekip Hi-Touch LSI  | 1SDA070808R1 | 1SDA071438R1 |
|       |      |                |             | E1.2N 1000 Ekip Hi-Touch LSIG | 1SDA070809R1 | 1SDA071439R1 |

**SACE Emax E1.2N • Front terminals (F)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E1.2N | 1250 | 66             | 50          | E1.2N 1250 Ekip Dip LI        | 1SDA070841R1 | 1SDA071471R1 |
|       |      |                |             | E1.2N 1250 Ekip Dip LSI       | 1SDA070842R1 | 1SDA071472R1 |
|       |      |                |             | E1.2N 1250 Ekip Dip LSIG      | 1SDA070843R1 | 1SDA071473R1 |
|       |      |                |             | E1.2N 1250 Ekip Touch LI      | 1SDA070844R1 | 1SDA071474R1 |
|       |      |                |             | E1.2N 1250 Ekip Touch LSI     | 1SDA070845R1 | 1SDA071475R1 |
|       |      |                |             | E1.2N 1250 Ekip Touch LSIG    | 1SDA070846R1 | 1SDA071476R1 |
|       |      |                |             | E1.2N 1250 Ekip Hi-Touch LSI  | 1SDA070848R1 | 1SDA071478R1 |
|       |      |                |             | E1.2N 1250 Ekip Hi-Touch LSIG | 1SDA070849R1 | 1SDA071479R1 |
|       | 1600 | 66             | 50          | E1.2N 1600 Ekip Dip LI        | 1SDA070881R1 | 1SDA071511R1 |
|       |      |                |             | E1.2N 1600 Ekip Dip LSI       | 1SDA070882R1 | 1SDA071512R1 |
|       |      |                |             | E1.2N 1600 Ekip Dip LSIG      | 1SDA070883R1 | 1SDA071513R1 |
|       |      |                |             | E1.2N 1600 Ekip Touch LI      | 1SDA070884R1 | 1SDA071514R1 |
|       |      |                |             | E1.2N 1600 Ekip Touch LSI     | 1SDA070885R1 | 1SDA071515R1 |
|       |      |                |             | E1.2N 1600 Ekip Touch LSIG    | 1SDA070886R1 | 1SDA071516R1 |
|       |      |                |             | E1.2N 1600 Ekip Hi-Touch LSI  | 1SDA070888R1 | 1SDA071518R1 |
|       |      |                |             | E1.2N 1600 Ekip Hi-Touch LSIG | 1SDA070889R1 | 1SDA071519R1 |

# Automatic circuit-breakers

## Fixed version for power distribution



**SACE Emax E2.2B • Orientable rear terminals (HR)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E2.2B | 1600 | 42             | 42          | E2.2B 1600 Ekip Dip LI        | 1SDA070981R1 | 1SDA071611R1 |
|       |      |                |             | E2.2B 1600 Ekip Dip LSI       | 1SDA070982R1 | 1SDA071612R1 |
|       |      |                |             | E2.2B 1600 Ekip Dip LSIg      | 1SDA070983R1 | 1SDA071613R1 |
|       |      |                |             | E2.2B 1600 Ekip Touch LI      | 1SDA070984R1 | 1SDA071614R1 |
|       |      |                |             | E2.2B 1600 Ekip Touch LSI     | 1SDA070985R1 | 1SDA071615R1 |
|       |      |                |             | E2.2B 1600 Ekip Touch LSIg    | 1SDA070986R1 | 1SDA071616R1 |
|       |      |                |             | E2.2B 1600 Ekip Hi-Touch LSI  | 1SDA070988R1 | 1SDA071618R1 |
|       |      |                |             | E2.2B 1600 Ekip Hi-Touch LSIg | 1SDA070989R1 | 1SDA071619R1 |
|       | 2000 | 42             | 42          | E2.2B 2000 Ekip Dip LI        | 1SDA071021R1 | 1SDA071651R1 |
|       |      |                |             | E2.2B 2000 Ekip Dip LSI       | 1SDA071022R1 | 1SDA071652R1 |
|       |      |                |             | E2.2B 2000 Ekip Dip LSIg      | 1SDA071023R1 | 1SDA071653R1 |
|       |      |                |             | E2.2B 2000 Ekip Touch LI      | 1SDA071024R1 | 1SDA071654R1 |
|       |      |                |             | E2.2B 2000 Ekip Touch LSI     | 1SDA071025R1 | 1SDA071655R1 |
|       |      |                |             | E2.2B 2000 Ekip Touch LSIg    | 1SDA071026R1 | 1SDA071656R1 |
|       |      |                |             | E2.2B 2000 Ekip Hi-Touch LSI  | 1SDA071028R1 | 1SDA071658R1 |
|       |      |                |             | E2.2B 2000 Ekip Hi-Touch LSIg | 1SDA071029R1 | 1SDA071659R1 |

**SACE Emax E2.2N • Orientable rear terminals (HR)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|-------|------|----------------|-------------|-------------------------------|-----------------|-----------------|
| E2.2N | 800  | 66             | 66          | E2.2N 800 Ekip Dip LI         | 1SDA070891R1    | 1SDA071521R1    |
|       |      |                |             | E2.2N 800 Ekip Dip LSI        | 1SDA070892R1    | 1SDA071522R1    |
|       |      |                |             | E2.2N 800 Ekip Dip LSIG       | 1SDA070893R1    | 1SDA071523R1    |
|       |      |                |             | E2.2N 800 Ekip Touch LI       | 1SDA070894R1    | 1SDA071524R1    |
|       |      |                |             | E2.2N 800 Ekip Touch LSI      | 1SDA070895R1    | 1SDA071525R1    |
|       |      |                |             | E2.2N 800 Ekip Touch LSIG     | 1SDA070896R1    | 1SDA071526R1    |
|       |      |                |             | E2.2N 800 Ekip Hi-Touch LSI   | 1SDA070898R1    | 1SDA071528R1    |
|       |      |                |             | E2.2N 800 Ekip Hi-Touch LSIG  | 1SDA070899R1    | 1SDA071529R1    |
|       | 1000 | 66             | 66          | E2.2N 1000 Ekip Dip LI        | 1SDA070921R1    | 1SDA071551R1    |
|       |      |                |             | E2.2N 1000 Ekip Dip LSI       | 1SDA070922R1    | 1SDA071552R1    |
|       |      |                |             | E2.2N 1000 Ekip Dip LSIG      | 1SDA070923R1    | 1SDA071553R1    |
|       |      |                |             | E2.2N 1000 Ekip Touch LI      | 1SDA070924R1    | 1SDA071554R1    |
|       |      |                |             | E2.2N 1000 Ekip Touch LSI     | 1SDA070925R1    | 1SDA071555R1    |
|       |      |                |             | E2.2N 1000 Ekip Touch LSIG    | 1SDA070926R1    | 1SDA071556R1    |
|       |      |                |             | E2.2N 1000 Ekip Hi-Touch LSI  | 1SDA070928R1    | 1SDA071558R1    |
|       |      |                |             | E2.2N 1000 Ekip Hi-Touch LSIG | 1SDA070929R1    | 1SDA071559R1    |
|       | 1250 | 66             | 66          | E2.2N 1250 Ekip Dip LI        | 1SDA070951R1    | 1SDA071581R1    |
|       |      |                |             | E2.2N 1250 Ekip Dip LSI       | 1SDA070952R1    | 1SDA071582R1    |
|       |      |                |             | E2.2N 1250 Ekip Dip LSIG      | 1SDA070953R1    | 1SDA071583R1    |
|       |      |                |             | E2.2N 1250 Ekip Touch LI      | 1SDA070954R1    | 1SDA071584R1    |
|       |      |                |             | E2.2N 1250 Ekip Touch LSI     | 1SDA070955R1    | 1SDA071585R1    |
|       |      |                |             | E2.2N 1250 Ekip Touch LSIG    | 1SDA070956R1    | 1SDA071586R1    |
|       |      |                |             | E2.2N 1250 Ekip Hi-Touch LSI  | 1SDA070958R1    | 1SDA071588R1    |
|       |      |                |             | E2.2N 1250 Ekip Hi-Touch LSIG | 1SDA070959R1    | 1SDA071589R1    |
|       | 1600 | 66             | 66          | E2.2N 1600 Ekip Dip LI        | 1SDA070991R1    | 1SDA071621R1    |
|       |      |                |             | E2.2N 1600 Ekip Dip LSI       | 1SDA070992R1    | 1SDA071622R1    |
|       |      |                |             | E2.2N 1600 Ekip Dip LSIG      | 1SDA070993R1    | 1SDA071623R1    |
|       |      |                |             | E2.2N 1600 Ekip Touch LI      | 1SDA070994R1    | 1SDA071624R1    |
|       |      |                |             | E2.2N 1600 Ekip Touch LSI     | 1SDA070995R1    | 1SDA071625R1    |
|       |      |                |             | E2.2N 1600 Ekip Touch LSIG    | 1SDA070996R1    | 1SDA071626R1    |
|       |      |                |             | E2.2N 1600 Ekip Hi-Touch LSI  | 1SDA070998R1    | 1SDA071628R1    |
|       |      |                |             | E2.2N 1600 Ekip Hi-Touch LSIG | 1SDA070999R1    | 1SDA071629R1    |
|       | 2000 | 66             | 66          | E2.2N 2000 Ekip Dip LI        | 1SDA071031R1    | 1SDA071661R1    |
|       |      |                |             | E2.2N 2000 Ekip Dip LSI       | 1SDA071032R1    | 1SDA071662R1    |
|       |      |                |             | E2.2N 2000 Ekip Dip LSIG      | 1SDA071033R1    | 1SDA071663R1    |
|       |      |                |             | E2.2N 2000 Ekip Touch LI      | 1SDA071034R1    | 1SDA071664R1    |
|       |      |                |             | E2.2N 2000 Ekip Touch LSI     | 1SDA071035R1    | 1SDA071665R1    |
|       |      |                |             | E2.2N 2000 Ekip Touch LSIG    | 1SDA071036R1    | 1SDA071666R1    |
|       |      |                |             | E2.2N 2000 Ekip Hi-Touch LSI  | 1SDA071038R1    | 1SDA071668R1    |
|       |      |                |             | E2.2N 2000 Ekip Hi-Touch LSIG | 1SDA071039R1    | 1SDA071669R1    |
|       | 2500 | 66             | 66          | E2.2N 2500 Ekip Dip LI        | 1SDA071061R1    | 1SDA071691R1    |
|       |      |                |             | E2.2N 2500 Ekip Dip LSI       | 1SDA071062R1    | 1SDA071692R1    |
|       |      |                |             | E2.2N 2500 Ekip Dip LSIG      | 1SDA071063R1    | 1SDA071693R1    |
|       |      |                |             | E2.2N 2500 Ekip Touch LI      | 1SDA071064R1    | 1SDA071694R1    |
|       |      |                |             | E2.2N 2500 Ekip Touch LSI     | 1SDA071065R1    | 1SDA071695R1    |
|       |      |                |             | E2.2N 2500 Ekip Touch LSIG    | 1SDA071066R1    | 1SDA071696R1    |
|       |      |                |             | E2.2N 2500 Ekip Hi-Touch LSI  | 1SDA071068R1    | 1SDA071698R1    |
|       |      |                |             | E2.2N 2500 Ekip Hi-Touch LSIG | 1SDA071069R1    | 1SDA071699R1    |

# Automatic circuit-breakers

## Fixed version for power distribution


**SACE Emax E2.2S • Orientable rear terminals (HR)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|-------------------------------|--------------|--------------|
|              |      |                |             |                               | Code         | Code         |
| <b>E2.2S</b> | 250  | 85             | 66          | E2.2S 250 Ekip Dip LI         | 1SDA073628R1 | 1SDA073638R1 |
|              |      |                |             | E2.2S 250 Ekip Dip LSI        | 1SDA073629R1 | 1SDA073639R1 |
|              |      |                |             | E2.2S 250 Ekip Dip LSIG       | 1SDA073630R1 | 1SDA073640R1 |
|              |      |                |             | E2.2S 250 Ekip Touch LI       | 1SDA073631R1 | 1SDA073641R1 |
|              |      |                |             | E2.2S 250 Ekip Touch LSI      | 1SDA073632R1 | 1SDA073642R1 |
|              |      |                |             | E2.2S 250 Ekip Touch LSIG     | 1SDA073633R1 | 1SDA073643R1 |
|              |      |                |             | E2.2S 250 Ekip Hi-Touch LSI   | 1SDA073635R1 | 1SDA073645R1 |
|              |      |                |             | E2.2S 250 Ekip Hi-Touch LSIG  | 1SDA073636R1 | 1SDA073646R1 |
|              | 800  | 85             | 66          | E2.2S 800 Ekip Dip LI         | 1SDA070901R1 | 1SDA071531R1 |
|              |      |                |             | E2.2S 800 Ekip Dip LSI        | 1SDA070902R1 | 1SDA071532R1 |
|              |      |                |             | E2.2S 800 Ekip Dip LSIG       | 1SDA070903R1 | 1SDA071533R1 |
|              |      |                |             | E2.2S 800 Ekip Touch LI       | 1SDA070904R1 | 1SDA071534R1 |
|              |      |                |             | E2.2S 800 Ekip Touch LSI      | 1SDA070905R1 | 1SDA071535R1 |
|              |      |                |             | E2.2S 800 Ekip Touch LSIG     | 1SDA070906R1 | 1SDA071536R1 |
|              |      |                |             | E2.2S 800 Ekip Hi-Touch LSI   | 1SDA070908R1 | 1SDA071538R1 |
|              |      |                |             | E2.2S 800 Ekip Hi-Touch LSIG  | 1SDA070909R1 | 1SDA071539R1 |
|              | 1000 | 85             | 66          | E2.2S 1000 Ekip Dip LI        | 1SDA070931R1 | 1SDA071561R1 |
|              |      |                |             | E2.2S 1000 Ekip Dip LSI       | 1SDA070932R1 | 1SDA071562R1 |
|              |      |                |             | E2.2S 1000 Ekip Dip LSIG      | 1SDA070933R1 | 1SDA071563R1 |
|              |      |                |             | E2.2S 1000 Ekip Touch LI      | 1SDA070934R1 | 1SDA071564R1 |
|              |      |                |             | E2.2S 1000 Ekip Touch LSI     | 1SDA070935R1 | 1SDA071565R1 |
|              |      |                |             | E2.2S 1000 Ekip Touch LSIG    | 1SDA070936R1 | 1SDA071566R1 |
|              |      |                |             | E2.2S 1000 Ekip Hi-Touch LSI  | 1SDA070938R1 | 1SDA071568R1 |
|              |      |                |             | E2.2S 1000 Ekip Hi-Touch LSIG | 1SDA070939R1 | 1SDA071569R1 |
|              | 1250 | 85             | 66          | E2.2S 1250 Ekip Dip LI        | 1SDA070961R1 | 1SDA071591R1 |
|              |      |                |             | E2.2S 1250 Ekip Dip LSI       | 1SDA070962R1 | 1SDA071592R1 |
|              |      |                |             | E2.2S 1250 Ekip Dip LSIG      | 1SDA070963R1 | 1SDA071593R1 |
|              |      |                |             | E2.2S 1250 Ekip Touch LI      | 1SDA070964R1 | 1SDA071594R1 |
|              |      |                |             | E2.2S 1250 Ekip Touch LSI     | 1SDA070965R1 | 1SDA071595R1 |
|              |      |                |             | E2.2S 1250 Ekip Touch LSIG    | 1SDA070966R1 | 1SDA071596R1 |
|              |      |                |             | E2.2S 1250 Ekip Hi-Touch LSI  | 1SDA070968R1 | 1SDA071598R1 |
|              |      |                |             | E2.2S 1250 Ekip Hi-Touch LSIG | 1SDA070969R1 | 1SDA071599R1 |

**SACE Emax E2.2S • Orientable rear terminals (HR)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|-------------------------------|--------------|--------------|
|              |      |                |             |                               | Code         | Code         |
| <b>E2.2S</b> | 1600 | 85             | 66          | E2.2S 1600 Ekip Dip LI        | 1SDA071001R1 | 1SDA071631R1 |
|              |      |                |             | E2.2S 1600 Ekip Dip LSI       | 1SDA071002R1 | 1SDA071632R1 |
|              |      |                |             | E2.2S 1600 Ekip Dip LSIG      | 1SDA071003R1 | 1SDA071633R1 |
|              |      |                |             | E2.2S 1600 Ekip Touch LI      | 1SDA071004R1 | 1SDA071634R1 |
|              |      |                |             | E2.2S 1600 Ekip Touch LSI     | 1SDA071005R1 | 1SDA071635R1 |
|              |      |                |             | E2.2S 1600 Ekip Touch LSIG    | 1SDA071006R1 | 1SDA071636R1 |
|              |      |                |             | E2.2S 1600 Ekip Hi-Touch LSI  | 1SDA071008R1 | 1SDA071638R1 |
|              |      |                |             | E2.2S 1600 Ekip Hi-Touch LSIG | 1SDA071009R1 | 1SDA071639R1 |
|              | 2000 | 85             | 66          | E2.2S 2000 Ekip Dip LI        | 1SDA071041R1 | 1SDA071671R1 |
|              |      |                |             | E2.2S 2000 Ekip Dip LSI       | 1SDA071042R1 | 1SDA071672R1 |
|              |      |                |             | E2.2S 2000 Ekip Dip LSIG      | 1SDA071043R1 | 1SDA071673R1 |
|              |      |                |             | E2.2S 2000 Ekip Touch LI      | 1SDA071044R1 | 1SDA071674R1 |
|              |      |                |             | E2.2S 2000 Ekip Touch LSI     | 1SDA071045R1 | 1SDA071675R1 |
|              |      |                |             | E2.2S 2000 Ekip Touch LSIG    | 1SDA071046R1 | 1SDA071676R1 |
|              |      |                |             | E2.2S 2000 Ekip Hi-Touch LSI  | 1SDA071048R1 | 1SDA071678R1 |
|              |      |                |             | E2.2S 2000 Ekip Hi-Touch LSIG | 1SDA071049R1 | 1SDA071679R1 |
|              | 2500 | 85             | 66          | E2.2S 2500 Ekip Dip LI        | 1SDA071071R1 | 1SDA071701R1 |
|              |      |                |             | E2.2S 2500 Ekip Dip LSI       | 1SDA071072R1 | 1SDA071702R1 |
|              |      |                |             | E2.2S 2500 Ekip Dip LSIG      | 1SDA071073R1 | 1SDA071703R1 |
|              |      |                |             | E2.2S 2500 Ekip Touch LI      | 1SDA071074R1 | 1SDA071704R1 |
|              |      |                |             | E2.2S 2500 Ekip Touch LSI     | 1SDA071075R1 | 1SDA071705R1 |
|              |      |                |             | E2.2S 2500 Ekip Touch LSIG    | 1SDA071076R1 | 1SDA071706R1 |
|              |      |                |             | E2.2S 2500 Ekip Hi-Touch LSI  | 1SDA071078R1 | 1SDA071708R1 |
|              |      |                |             | E2.2S 2500 Ekip Hi-Touch LSIG | 1SDA071079R1 | 1SDA071709R1 |

# Automatic circuit-breakers

## Fixed version for power distribution


**SACE Emax E2.2H • Orientable rear terminals (HR)**

| Size  | I <sub>u</sub> | I <sub>cu</sub><br>(440 V) | I <sub>cw</sub><br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|-------|----------------|----------------------------|-------------------------|-------------------------------|-----------------|-----------------|
| E2.2H | 800            | 100                        | 85                      | E2.2H 800 Ekip Dip LI         | 1SDA070911R1    | 1SDA071541R1    |
|       |                |                            |                         | E2.2H 800 Ekip Dip LSI        | 1SDA070912R1    | 1SDA071542R1    |
|       |                |                            |                         | E2.2H 800 Ekip Dip LSIG       | 1SDA070913R1    | 1SDA071543R1    |
|       |                |                            |                         | E2.2H 800 Ekip Touch LI       | 1SDA070914R1    | 1SDA071544R1    |
|       |                |                            |                         | E2.2H 800 Ekip Touch LSI      | 1SDA070915R1    | 1SDA071545R1    |
|       |                |                            |                         | E2.2H 800 Ekip Touch LSIG     | 1SDA070916R1    | 1SDA071546R1    |
|       |                |                            |                         | E2.2H 800 Ekip Hi-Touch LSI   | 1SDA070918R1    | 1SDA071548R1    |
|       |                |                            |                         | E2.2H 800 Ekip Hi-Touch LSIG  | 1SDA070919R1    | 1SDA071549R1    |
|       | 1000           | 100                        | 85                      | E2.2H 1000 Ekip Dip LI        | 1SDA070941R1    | 1SDA071571R1    |
|       |                |                            |                         | E2.2H 1000 Ekip Dip LSI       | 1SDA070942R1    | 1SDA071572R1    |
|       |                |                            |                         | E2.2H 1000 Ekip Dip LSIG      | 1SDA070943R1    | 1SDA071573R1    |
|       |                |                            |                         | E2.2H 1000 Ekip Touch LI      | 1SDA070944R1    | 1SDA071574R1    |
|       |                |                            |                         | E2.2H 1000 Ekip Touch LSI     | 1SDA070945R1    | 1SDA071575R1    |
|       |                |                            |                         | E2.2H 1000 Ekip Touch LSIG    | 1SDA070946R1    | 1SDA071576R1    |
|       |                |                            |                         | E2.2H 1000 Ekip Hi-Touch LSI  | 1SDA070948R1    | 1SDA071578R1    |
|       |                |                            |                         | E2.2H 1000 Ekip Hi-Touch LSIG | 1SDA070949R1    | 1SDA071579R1    |
|       | 1250           | 100                        | 85                      | E2.2H 1250 Ekip Dip LI        | 1SDA070971R1    | 1SDA071601R1    |
|       |                |                            |                         | E2.2H 1250 Ekip Dip LSI       | 1SDA070972R1    | 1SDA071602R1    |
|       |                |                            |                         | E2.2H 1250 Ekip Dip LSIG      | 1SDA070973R1    | 1SDA071603R1    |
|       |                |                            |                         | E2.2H 1250 Ekip Touch LI      | 1SDA070974R1    | 1SDA071604R1    |
|       |                |                            |                         | E2.2H 1250 Ekip Touch LSI     | 1SDA070975R1    | 1SDA071605R1    |
|       |                |                            |                         | E2.2H 1250 Ekip Touch LSIG    | 1SDA070976R1    | 1SDA071606R1    |
|       |                |                            |                         | E2.2H 1250 Ekip Hi-Touch LSI  | 1SDA070978R1    | 1SDA071608R1    |
|       |                |                            |                         | E2.2H 1250 Ekip Hi-Touch LSIG | 1SDA070979R1    | 1SDA071609R1    |
|       | 1600           | 100                        | 85                      | E2.2H 1600 Ekip Dip LI        | 1SDA071011R1    | 1SDA071641R1    |
|       |                |                            |                         | E2.2H 1600 Ekip Dip LSI       | 1SDA071012R1    | 1SDA071642R1    |
|       |                |                            |                         | E2.2H 1600 Ekip Dip LSIG      | 1SDA071013R1    | 1SDA071643R1    |
|       |                |                            |                         | E2.2H 1600 Ekip Touch LI      | 1SDA071014R1    | 1SDA071644R1    |
|       |                |                            |                         | E2.2H 1600 Ekip Touch LSI     | 1SDA071015R1    | 1SDA071645R1    |
|       |                |                            |                         | E2.2H 1600 Ekip Touch LSIG    | 1SDA071016R1    | 1SDA071646R1    |
|       |                |                            |                         | E2.2H 1600 Ekip Hi-Touch LSI  | 1SDA071018R1    | 1SDA071648R1    |
|       |                |                            |                         | E2.2H 1600 Ekip Hi-Touch LSIG | 1SDA071019R1    | 1SDA071649R1    |
|       | 2000           | 100                        | 85                      | E2.2H 2000 Ekip Dip LI        | 1SDA071051R1    | 1SDA071681R1    |
|       |                |                            |                         | E2.2H 2000 Ekip Dip LSI       | 1SDA071052R1    | 1SDA071682R1    |
|       |                |                            |                         | E2.2H 2000 Ekip Dip LSIG      | 1SDA071053R1    | 1SDA071683R1    |
|       |                |                            |                         | E2.2H 2000 Ekip Touch LI      | 1SDA071054R1    | 1SDA071684R1    |
|       |                |                            |                         | E2.2H 2000 Ekip Touch LSI     | 1SDA071055R1    | 1SDA071685R1    |
|       |                |                            |                         | E2.2H 2000 Ekip Touch LSIG    | 1SDA071056R1    | 1SDA071686R1    |
|       |                |                            |                         | E2.2H 2000 Ekip Hi-Touch LSI  | 1SDA071058R1    | 1SDA071688R1    |
|       |                |                            |                         | E2.2H 2000 Ekip Hi-Touch LSIG | 1SDA071059R1    | 1SDA071689R1    |
|       | 2500           | 100                        | 85                      | E2.2H 2500 Ekip Dip LI        | 1SDA071081R1    | 1SDA071711R1    |
|       |                |                            |                         | E2.2H 2500 Ekip Dip LSI       | 1SDA071082R1    | 1SDA071712R1    |
|       |                |                            |                         | E2.2H 2500 Ekip Dip LSIG      | 1SDA071083R1    | 1SDA071713R1    |
|       |                |                            |                         | E2.2H 2500 Ekip Touch LI      | 1SDA071084R1    | 1SDA071714R1    |
|       |                |                            |                         | E2.2H 2500 Ekip Touch LSI     | 1SDA071085R1    | 1SDA071715R1    |
|       |                |                            |                         | E2.2H 2500 Ekip Touch LSIG    | 1SDA071086R1    | 1SDA071716R1    |
|       |                |                            |                         | E2.2H 2500 Ekip Hi-Touch LSI  | 1SDA071088R1    | 1SDA071718R1    |
|       |                |                            |                         | E2.2H 2500 Ekip Hi-Touch LSIG | 1SDA071089R1    | 1SDA071719R1    |

**SACE Emax E4.2N-S • Orientable rear terminals (HR)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|-------------------------------|--------------|--------------|
|              |      |                |             |                               | Code         | Code         |
| <b>E4.2N</b> | 3200 | 66             | 66          | E4.2N 3200 Ekip Dip LI        | 1SDA071141R1 | 1SDA071771R1 |
|              |      |                |             | E4.2N 3200 Ekip Dip LSI       | 1SDA071142R1 | 1SDA071772R1 |
|              |      |                |             | E4.2N 3200 Ekip Dip LSIG      | 1SDA071143R1 | 1SDA071773R1 |
|              |      |                |             | E4.2N 3200 Ekip Touch LI      | 1SDA071144R1 | 1SDA071774R1 |
|              |      |                |             | E4.2N 3200 Ekip Touch LSI     | 1SDA071145R1 | 1SDA071775R1 |
|              |      |                |             | E4.2N 3200 Ekip Touch LSIG    | 1SDA071146R1 | 1SDA071776R1 |
|              |      |                |             | E4.2N 3200 Ekip Hi-Touch LSI  | 1SDA071148R1 | 1SDA071778R1 |
|              |      |                |             | E4.2N 3200 Ekip Hi-Touch LSIG | 1SDA071149R1 | 1SDA071779R1 |
|              | 4000 | 66             | 66          | E4.2N 4000 Ekip Dip LI        | 1SDA071191R1 | 1SDA071821R1 |
|              |      |                |             | E4.2N 4000 Ekip Dip LSI       | 1SDA071192R1 | 1SDA071822R1 |
|              |      |                |             | E4.2N 4000 Ekip Dip LSIG      | 1SDA071193R1 | 1SDA071823R1 |
|              |      |                |             | E4.2N 4000 Ekip Touch LI      | 1SDA071194R1 | 1SDA071824R1 |
|              |      |                |             | E4.2N 4000 Ekip Touch LSI     | 1SDA071195R1 | 1SDA071825R1 |
|              |      |                |             | E4.2N 4000 Ekip Touch LSIG    | 1SDA071196R1 | 1SDA071826R1 |
|              |      |                |             | E4.2N 4000 Ekip Hi-Touch LSI  | 1SDA071198R1 | 1SDA071828R1 |
|              |      |                |             | E4.2N 4000 Ekip Hi-Touch LSIG | 1SDA071199R1 | 1SDA071829R1 |
| <b>E4.2S</b> | 3200 | 85             | 66          | E4.2S 3200 Ekip Dip LI        | 1SDA071151R1 | 1SDA071781R1 |
|              |      |                |             | E4.2S 3200 Ekip Dip LSI       | 1SDA071152R1 | 1SDA071782R1 |
|              |      |                |             | E4.2S 3200 Ekip Dip LSIG      | 1SDA071153R1 | 1SDA071783R1 |
|              |      |                |             | E4.2S 3200 Ekip Touch LI      | 1SDA071154R1 | 1SDA071784R1 |
|              |      |                |             | E4.2S 3200 Ekip Touch LSI     | 1SDA071155R1 | 1SDA071785R1 |
|              |      |                |             | E4.2S 3200 Ekip Touch LSIG    | 1SDA071156R1 | 1SDA071786R1 |
|              |      |                |             | E4.2S 3200 Ekip Hi-Touch LSI  | 1SDA071158R1 | 1SDA071788R1 |
|              |      |                |             | E4.2S 3200 Ekip Hi-Touch LSIG | 1SDA071159R1 | 1SDA071789R1 |
|              | 4000 | 85             | 66          | E4.2S 4000 Ekip Dip LI        | 1SDA071201R1 | 1SDA071831R1 |
|              |      |                |             | E4.2S 4000 Ekip Dip LSI       | 1SDA071202R1 | 1SDA071832R1 |
|              |      |                |             | E4.2S 4000 Ekip Dip LSIG      | 1SDA071203R1 | 1SDA071833R1 |
|              |      |                |             | E4.2S 4000 Ekip Touch LI      | 1SDA071204R1 | 1SDA071834R1 |
|              |      |                |             | E4.2S 4000 Ekip Touch LSI     | 1SDA071205R1 | 1SDA071835R1 |
|              |      |                |             | E4.2S 4000 Ekip Touch LSIG    | 1SDA071206R1 | 1SDA071836R1 |
|              |      |                |             | E4.2S 4000 Ekip Hi-Touch LSI  | 1SDA071208R1 | 1SDA071838R1 |
|              |      |                |             | E4.2S 4000 Ekip Hi-Touch LSIG | 1SDA071209R1 | 1SDA071839R1 |



# Automatic circuit-breakers

## Fixed version for power distribution


**SACE Emax E4.2H-V • Orientable rear terminals (HR)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|-------|------|----------------|-------------|-------------------------------|-----------------|-----------------|
| E4.2H | 3200 | 100            | 85          | E4.2H 3200 Ekip Dip LI        | 1SDA071161R1    | 1SDA071791R1    |
|       |      |                |             | E4.2H 3200 Ekip Dip LSI       | 1SDA071162R1    | 1SDA071792R1    |
|       |      |                |             | E4.2H 3200 Ekip Dip LSIG      | 1SDA071163R1    | 1SDA071793R1    |
|       |      |                |             | E4.2H 3200 Ekip Touch LI      | 1SDA071164R1    | 1SDA071794R1    |
|       |      |                |             | E4.2H 3200 Ekip Touch LSI     | 1SDA071165R1    | 1SDA071795R1    |
|       |      |                |             | E4.2H 3200 Ekip Touch LSIG    | 1SDA071166R1    | 1SDA071796R1    |
|       |      |                |             | E4.2H 3200 Ekip Hi-Touch LSI  | 1SDA071168R1    | 1SDA071798R1    |
|       |      |                |             | E4.2H 3200 Ekip Hi-Touch LSIG | 1SDA071169R1    | 1SDA071799R1    |
|       | 4000 | 100            | 85          | E4.2H 4000 Ekip Dip LI        | 1SDA071211R1    | 1SDA071841R1    |
|       |      |                |             | E4.2H 4000 Ekip Dip LSI       | 1SDA071212R1    | 1SDA071842R1    |
|       |      |                |             | E4.2H 4000 Ekip Dip LSIG      | 1SDA071213R1    | 1SDA071843R1    |
|       |      |                |             | E4.2H 4000 Ekip Touch LI      | 1SDA071214R1    | 1SDA071844R1    |
|       |      |                |             | E4.2H 4000 Ekip Touch LSI     | 1SDA071215R1    | 1SDA071845R1    |
|       |      |                |             | E4.2H 4000 Ekip Touch LSIG    | 1SDA071216R1    | 1SDA071846R1    |
|       |      |                |             | E4.2H 4000 Ekip Hi-Touch LSI  | 1SDA071218R1    | 1SDA071848R1    |
|       |      |                |             | E4.2H 4000 Ekip Hi-Touch LSIG | 1SDA071219R1    | 1SDA071849R1    |
| E4.2V | 2000 | 150            | 100         | E4.2V 2000 Ekip Dip LI        | 1SDA071101R1    | 1SDA071731R1    |
|       |      |                |             | E4.2V 2000 Ekip Dip LSI       | 1SDA071102R1    | 1SDA071732R1    |
|       |      |                |             | E4.2V 2000 Ekip Dip LSIG      | 1SDA071103R1    | 1SDA071733R1    |
|       |      |                |             | E4.2V 2000 Ekip Touch LI      | 1SDA071104R1    | 1SDA071734R1    |
|       |      |                |             | E4.2V 2000 Ekip Touch LSI     | 1SDA071105R1    | 1SDA071735R1    |
|       |      |                |             | E4.2V 2000 Ekip Touch LSIG    | 1SDA071106R1    | 1SDA071736R1    |
|       |      |                |             | E4.2V 2000 Ekip Hi-Touch LSI  | 1SDA071108R1    | 1SDA071738R1    |
|       |      |                |             | E4.2V 2000 Ekip Hi-Touch LSIG | 1SDA071109R1    | 1SDA071739R1    |
|       | 2500 | 150            | 100         | E4.2V 2500 Ekip Dip LI        | 1SDA071121R1    | 1SDA071751R1    |
|       |      |                |             | E4.2V 2500 Ekip Dip LSI       | 1SDA071122R1    | 1SDA071752R1    |
|       |      |                |             | E4.2V 2500 Ekip Dip LSIG      | 1SDA071123R1    | 1SDA071753R1    |
|       |      |                |             | E4.2V 2500 Ekip Touch LI      | 1SDA071124R1    | 1SDA071754R1    |
|       |      |                |             | E4.2V 2500 Ekip Touch LSI     | 1SDA071125R1    | 1SDA071755R1    |
|       |      |                |             | E4.2V 2500 Ekip Touch LSIG    | 1SDA071126R1    | 1SDA071756R1    |
|       |      |                |             | E4.2V 2500 Ekip Hi-Touch LSI  | 1SDA071128R1    | 1SDA071758R1    |
|       |      |                |             | E4.2V 2500 Ekip Hi-Touch LSIG | 1SDA071129R1    | 1SDA071759R1    |
|       | 3200 | 150            | 100         | E4.2V 3200 Ekip Dip LI        | 1SDA071171R1    | 1SDA071801R1    |
|       |      |                |             | E4.2V 3200 Ekip Dip LSI       | 1SDA071172R1    | 1SDA071802R1    |
|       |      |                |             | E4.2V 3200 Ekip Dip LSIG      | 1SDA071173R1    | 1SDA071803R1    |
|       |      |                |             | E4.2V 3200 Ekip Touch LI      | 1SDA071174R1    | 1SDA071804R1    |
|       |      |                |             | E4.2V 3200 Ekip Touch LSI     | 1SDA071175R1    | 1SDA071805R1    |
|       |      |                |             | E4.2V 3200 Ekip Touch LSIG    | 1SDA071176R1    | 1SDA071806R1    |
|       |      |                |             | E4.2V 3200 Ekip Hi-Touch LSI  | 1SDA071178R1    | 1SDA071808R1    |
|       |      |                |             | E4.2V 3200 Ekip Hi-Touch LSIG | 1SDA071179R1    | 1SDA071809R1    |
|       | 4000 | 150            | 100         | E4.2V 4000 Ekip Dip LI        | 1SDA071221R1    | 1SDA071851R1    |
|       |      |                |             | E4.2V 4000 Ekip Dip LSI       | 1SDA071222R1    | 1SDA071852R1    |
|       |      |                |             | E4.2V 4000 Ekip Dip LSIG      | 1SDA071223R1    | 1SDA071853R1    |
|       |      |                |             | E4.2V 4000 Ekip Touch LI      | 1SDA071224R1    | 1SDA071854R1    |
|       |      |                |             | E4.2V 4000 Ekip Touch LSI     | 1SDA071225R1    | 1SDA071855R1    |
|       |      |                |             | E4.2V 4000 Ekip Touch LSIG    | 1SDA071226R1    | 1SDA071856R1    |
|       |      |                |             | E4.2V 4000 Ekip Hi-Touch LSI  | 1SDA071228R1    | 1SDA071858R1    |
|       |      |                |             | E4.2V 4000 Ekip Hi-Touch LSIG | 1SDA071229R1    | 1SDA071859R1    |

**SACE Emax E6.2H-V • Orientable rear terminals (HR)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|--------------|------|----------------|-------------|-------------------------------|-----------------|-----------------|
| <b>E6.2H</b> | 4000 | 100            | 100         | E6.2H 4000 Ekip Dip LI        | 1SDA071231R1    | 1SDA071861R1    |
|              |      |                |             | E6.2H 4000 Ekip Dip LSI       | 1SDA071232R1    | 1SDA071862R1    |
|              |      |                |             | E6.2H 4000 Ekip Dip LSIG      | 1SDA071233R1    | 1SDA071863R1    |
|              |      |                |             | E6.2H 4000 Ekip Touch LI      | 1SDA071234R1    | 1SDA071864R1    |
|              |      |                |             | E6.2H 4000 Ekip Touch LSI     | 1SDA071235R1    | 1SDA071865R1    |
|              |      |                |             | E6.2H 4000 Ekip Touch LSIG    | 1SDA071236R1    | 1SDA071866R1    |
|              |      |                |             | E6.2H 4000 Ekip Hi-Touch LSI  | 1SDA071238R1    | 1SDA071868R1    |
|              |      |                |             | E6.2H 4000 Ekip Hi-Touch LSIG | 1SDA071239R1    | 1SDA071869R1    |
|              | 5000 | 100            | 100         | E6.2H 5000 Ekip Dip LI        | 1SDA071261R1    | 1SDA071891R1    |
|              |      |                |             | E6.2H 5000 Ekip Dip LSI       | 1SDA071262R1    | 1SDA071892R1    |
|              |      |                |             | E6.2H 5000 Ekip Dip LSIG      | 1SDA071263R1    | 1SDA071893R1    |
|              |      |                |             | E6.2H 5000 Ekip Touch LI      | 1SDA071264R1    | 1SDA071894R1    |
|              |      |                |             | E6.2H 5000 Ekip Touch LSI     | 1SDA071265R1    | 1SDA071895R1    |
|              |      |                |             | E6.2H 5000 Ekip Touch LSIG    | 1SDA071266R1    | 1SDA071896R1    |
|              |      |                |             | E6.2H 5000 Ekip Hi-Touch LSI  | 1SDA071268R1    | 1SDA071898R1    |
|              |      |                |             | E6.2H 5000 Ekip Hi-Touch LSIG | 1SDA071269R1    | 1SDA071899R1    |
|              | 6300 | 100            | 100         | E6.2H 6300 Ekip Dip LI        | 1SDA071291R1    | 1SDA071921R1    |
|              |      |                |             | E6.2H 6300 Ekip Dip LSI       | 1SDA071292R1    | 1SDA071922R1    |
|              |      |                |             | E6.2H 6300 Ekip Dip LSIG      | 1SDA071293R1    | 1SDA071923R1    |
|              |      |                |             | E6.2H 6300 Ekip Touch LI      | 1SDA071294R1    | 1SDA071924R1    |
|              |      |                |             | E6.2H 6300 Ekip Touch LSI     | 1SDA071295R1    | 1SDA071925R1    |
|              |      |                |             | E6.2H 6300 Ekip Touch LSIG    | 1SDA071296R1    | 1SDA071926R1    |
|              |      |                |             | E6.2H 6300 Ekip Hi-Touch LSI  | 1SDA071298R1    | 1SDA071928R1    |
|              |      |                |             | E6.2H 6300 Ekip Hi-Touch LSIG | 1SDA071299R1    | 1SDA071929R1    |
| <b>E6.2V</b> | 4000 | 150            | 100         | E6.2V 4000 Ekip Dip LI        | 1SDA071241R1    | 1SDA071871R1    |
|              |      |                |             | E6.2V 4000 Ekip Dip LSI       | 1SDA071242R1    | 1SDA071872R1    |
|              |      |                |             | E6.2V 4000 Ekip Dip LSIG      | 1SDA071243R1    | 1SDA071873R1    |
|              |      |                |             | E6.2V 4000 Ekip Touch LI      | 1SDA071244R1    | 1SDA071874R1    |
|              |      |                |             | E6.2V 4000 Ekip Touch LSI     | 1SDA071245R1    | 1SDA071875R1    |
|              |      |                |             | E6.2V 4000 Ekip Touch LSIG    | 1SDA071246R1    | 1SDA071876R1    |
|              |      |                |             | E6.2V 4000 Ekip Hi-Touch LSI  | 1SDA071248R1    | 1SDA071878R1    |
|              |      |                |             | E6.2V 4000 Ekip Hi-Touch LSIG | 1SDA071249R1    | 1SDA071879R1    |
|              | 5000 | 150            | 100         | E6.2V 5000 Ekip Dip LI        | 1SDA071271R1    | 1SDA071901R1    |
|              |      |                |             | E6.2V 5000 Ekip Dip LSI       | 1SDA071272R1    | 1SDA071902R1    |
|              |      |                |             | E6.2V 5000 Ekip Dip LSIG      | 1SDA071273R1    | 1SDA071903R1    |
|              |      |                |             | E6.2V 5000 Ekip Touch LI      | 1SDA071274R1    | 1SDA071904R1    |
|              |      |                |             | E6.2V 5000 Ekip Touch LSI     | 1SDA071275R1    | 1SDA071905R1    |
|              |      |                |             | E6.2V 5000 Ekip Touch LSIG    | 1SDA071276R1    | 1SDA071906R1    |
|              |      |                |             | E6.2V 5000 Ekip Hi-Touch LSI  | 1SDA071278R1    | 1SDA071908R1    |
|              |      |                |             | E6.2V 5000 Ekip Hi-Touch LSIG | 1SDA071279R1    | 1SDA071909R1    |
|              | 6300 | 150            | 100         | E6.2V 6300 Ekip Dip LI        | 1SDA071301R1    | 1SDA071931R1    |
|              |      |                |             | E6.2V 6300 Ekip Dip LSI       | 1SDA071302R1    | 1SDA071932R1    |
|              |      |                |             | E6.2V 6300 Ekip Dip LSIG      | 1SDA071303R1    | 1SDA071933R1    |
|              |      |                |             | E6.2V 6300 Ekip Touch LI      | 1SDA071304R1    | 1SDA071934R1    |
|              |      |                |             | E6.2V 6300 Ekip Touch LSI     | 1SDA071305R1    | 1SDA071935R1    |
|              |      |                |             | E6.2V 6300 Ekip Touch LSIG    | 1SDA071306R1    | 1SDA071936R1    |
|              |      |                |             | E6.2V 6300 Ekip Hi-Touch LSI  | 1SDA071308R1    | 1SDA071938R1    |
|              |      |                |             | E6.2V 6300 Ekip Hi-Touch LSIG | 1SDA071309R1    | 1SDA071939R1    |

# Automatic circuit-breakers

## Fixed version for power distribution



**SACE Emax E6.2X • Orientable rear terminals (HR)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E6.2X | 4000 | 150            | 120         | E6.2X 4000 Ekip Dip LI        | 1SDA071251R1 | 1SDA071881R1 |
|       |      |                |             | E6.2X 4000 Ekip Dip LSI       | 1SDA071252R1 | 1SDA071882R1 |
|       |      |                |             | E6.2X 4000 Ekip Dip LSIG      | 1SDA071253R1 | 1SDA071883R1 |
|       |      |                |             | E6.2X 4000 Ekip Touch LI      | 1SDA071254R1 | 1SDA071884R1 |
|       |      |                |             | E6.2X 4000 Ekip Touch LSI     | 1SDA071255R1 | 1SDA071885R1 |
|       |      |                |             | E6.2X 4000 Ekip Touch LSIG    | 1SDA071256R1 | 1SDA071886R1 |
|       |      |                |             | E6.2X 4000 Ekip Hi-Touch LSI  | 1SDA071258R1 | 1SDA071888R1 |
|       |      |                |             | E6.2X 4000 Ekip Hi-Touch LSIG | 1SDA071259R1 | 1SDA071889R1 |
|       | 5000 | 150            | 120         | E6.2X 5000 Ekip Dip LI        | 1SDA071281R1 | 1SDA071911R1 |
|       |      |                |             | E6.2X 5000 Ekip Dip LSI       | 1SDA071282R1 | 1SDA071912R1 |
|       |      |                |             | E6.2X 5000 Ekip Dip LSIG      | 1SDA071283R1 | 1SDA071913R1 |
|       |      |                |             | E6.2X 5000 Ekip Touch LI      | 1SDA071284R1 | 1SDA071914R1 |
|       |      |                |             | E6.2X 5000 Ekip Touch LSI     | 1SDA071285R1 | 1SDA071915R1 |
|       |      |                |             | E6.2X 5000 Ekip Touch LSIG    | 1SDA071286R1 | 1SDA071916R1 |
|       |      |                |             | E6.2X 5000 Ekip Hi-Touch LSI  | 1SDA071288R1 | 1SDA071918R1 |
|       |      |                |             | E6.2X 5000 Ekip Hi-Touch LSIG | 1SDA071289R1 | 1SDA071919R1 |
|       | 6300 | 150            | 120         | E6.2X 6300 Ekip Dip LI        | 1SDA071311R1 | 1SDA071941R1 |
|       |      |                |             | E6.2X 6300 Ekip Dip LSI       | 1SDA071312R1 | 1SDA071942R1 |
|       |      |                |             | E6.2X 6300 Ekip Dip LSIG      | 1SDA071313R1 | 1SDA071943R1 |
|       |      |                |             | E6.2X 6300 Ekip Touch LI      | 1SDA071314R1 | 1SDA071944R1 |
|       |      |                |             | E6.2X 6300 Ekip Touch LSI     | 1SDA071315R1 | 1SDA071945R1 |
|       |      |                |             | E6.2X 6300 Ekip Touch LSIG    | 1SDA071316R1 | 1SDA071946R1 |
|       |      |                |             | E6.2X 6300 Ekip Hi-Touch LSI  | 1SDA071318R1 | 1SDA071948R1 |
|       |      |                |             | E6.2X 6300 Ekip Hi-Touch LSIG | 1SDA071319R1 | 1SDA071949R1 |

**SACE Emax E6.2H-V/f Full size • Orientable rear terminals (HR)**

| Size           | Iu   | Icu<br>(440V) | Icw (1s) | Type                            | 4 Poles      |
|----------------|------|---------------|----------|---------------------------------|--------------|
|                |      |               |          |                                 | Code         |
| <b>E6.2H/f</b> | 4000 | 100           | 100      | E6.2H/f 4000 Ekip Dip LI        | 1SDA071951R1 |
|                |      |               |          | E6.2H/f 4000 Ekip Dip LSI       | 1SDA071952R1 |
|                |      |               |          | E6.2H/f 4000 Ekip Dip LSIG      | 1SDA071953R1 |
|                |      |               |          | E6.2H/f 4000 Ekip Touch LI      | 1SDA071954R1 |
|                |      |               |          | E6.2H/f 4000 Ekip Touch LSI     | 1SDA071955R1 |
|                |      |               |          | E6.2H/f 4000 Ekip Touch LSIG    | 1SDA071956R1 |
|                |      |               |          | E6.2H/f 4000 Ekip Hi-Touch LSI  | 1SDA071958R1 |
|                |      |               |          | E6.2H/f 4000 Ekip Hi-Touch LSIG | 1SDA071959R1 |
|                | 5000 | 100           | 100      | E6.2H/f 5000 Ekip Dip LI        | 1SDA071981R1 |
|                |      |               |          | E6.2H/f 5000 Ekip Dip LSI       | 1SDA071982R1 |
|                |      |               |          | E6.2H/f 5000 Ekip Dip LSIG      | 1SDA071983R1 |
|                |      |               |          | E6.2H/f 5000 Ekip Touch LI      | 1SDA071984R1 |
|                |      |               |          | E6.2H/f 5000 Ekip Touch LSI     | 1SDA071985R1 |
|                |      |               |          | E6.2H/f 5000 Ekip Touch LSIG    | 1SDA071986R1 |
|                |      |               |          | E6.2H/f 5000 Ekip Hi-Touch LSI  | 1SDA071988R1 |
|                |      |               |          | E6.2H/f 5000 Ekip Hi-Touch LSIG | 1SDA071989R1 |
|                | 6300 | 100           | 100      | E6.2H/f 6300 Ekip Dip LI        | 1SDA072011R1 |
|                |      |               |          | E6.2H/f 6300 Ekip Dip LSI       | 1SDA072012R1 |
|                |      |               |          | E6.2H/f 6300 Ekip Dip LSIG      | 1SDA072013R1 |
|                |      |               |          | E6.2H/f 6300 Ekip Touch LI      | 1SDA072014R1 |
|                |      |               |          | E6.2H/f 6300 Ekip Touch LSI     | 1SDA072015R1 |
|                |      |               |          | E6.2H/f 6300 Ekip Touch LSIG    | 1SDA072016R1 |
|                |      |               |          | E6.2H/f 6300 Ekip Hi-Touch LSI  | 1SDA072018R1 |
|                |      |               |          | E6.2H/f 6300 Ekip Hi-Touch LSIG | 1SDA072019R1 |
| <b>E6.2V/f</b> | 4000 | 150           | 100      | E6.2V/f 4000 Ekip Dip LI        | 1SDA071961R1 |
|                |      |               |          | E6.2V/f 4000 Ekip Dip LSI       | 1SDA071962R1 |
|                |      |               |          | E6.2V/f 4000 Ekip Dip LSIG      | 1SDA071963R1 |
|                |      |               |          | E6.2V/f 4000 Ekip Touch LI      | 1SDA071964R1 |
|                |      |               |          | E6.2V/f 4000 Ekip Touch LSI     | 1SDA071965R1 |
|                |      |               |          | E6.2V/f 4000 Ekip Touch LSIG    | 1SDA071966R1 |
|                |      |               |          | E6.2V/f 4000 Ekip Hi-Touch LSI  | 1SDA071968R1 |
|                |      |               |          | E6.2V/f 4000 Ekip Hi-Touch LSIG | 1SDA071969R1 |
|                | 5000 | 150           | 100      | E6.2V/f 5000 Ekip Dip LI        | 1SDA071991R1 |
|                |      |               |          | E6.2V/f 5000 Ekip Dip LSI       | 1SDA071992R1 |
|                |      |               |          | E6.2V/f 5000 Ekip Dip LSIG      | 1SDA071993R1 |
|                |      |               |          | E6.2V/f 5000 Ekip Touch LI      | 1SDA071994R1 |
|                |      |               |          | E6.2V/f 5000 Ekip Touch LSI     | 1SDA071995R1 |
|                |      |               |          | E6.2V/f 5000 Ekip Touch LSIG    | 1SDA071996R1 |
|                |      |               |          | E6.2V/f 5000 Ekip Hi-Touch LSI  | 1SDA071998R1 |
|                |      |               |          | E6.2V/f 5000 Ekip Hi-Touch LSIG | 1SDA071999R1 |
|                | 6300 | 150           | 100      | E6.2V/f 6300 Ekip Dip LI        | 1SDA072021R1 |
|                |      |               |          | E6.2V/f 6300 Ekip Dip LSI       | 1SDA072022R1 |
|                |      |               |          | E6.2V/f 6300 Ekip Dip LSIG      | 1SDA072023R1 |
|                |      |               |          | E6.2V/f 6300 Ekip Touch LI      | 1SDA072024R1 |
|                |      |               |          | E6.2V/f 6300 Ekip Touch LSI     | 1SDA072025R1 |
|                |      |               |          | E6.2V/f 6300 Ekip Touch LSIG    | 1SDA072026R1 |
|                |      |               |          | E6.2V/f 6300 Ekip Hi-Touch LSI  | 1SDA072028R1 |
|                |      |               |          | E6.2V/f 6300 Ekip Hi-Touch LSIG | 1SDA072029R1 |

# Automatic circuit-breakers

## Fixed version for power distribution



**SACE Emax E6.2X/f Full size - Orientable rear terminals (HR)**

| Size    | Iu   | Icu<br>(440V) | Icw (1s) | Type                            | 4 Poles<br>Code |
|---------|------|---------------|----------|---------------------------------|-----------------|
| E6.2X/f | 4000 | 150           | 120      | E6.2X/f 4000 Ekip Dip LI        | 1SDA071971R1    |
|         |      |               |          | E6.2X/f 4000 Ekip Dip LSI       | 1SDA071972R1    |
|         |      |               |          | E6.2X/f 4000 Ekip Dip LSIG      | 1SDA071973R1    |
|         |      |               |          | E6.2X/f 4000 Ekip Touch LI      | 1SDA071974R1    |
|         |      |               |          | E6.2X/f 4000 Ekip Touch LSI     | 1SDA071975R1    |
|         |      |               |          | E6.2X/f 4000 Ekip Touch LSIG    | 1SDA071976R1    |
|         |      |               |          | E6.2X/f 4000 Ekip Hi-Touch LSI  | 1SDA071978R1    |
|         |      |               |          | E6.2X/f 4000 Ekip Hi-Touch LSIG | 1SDA071979R1    |
|         | 5000 | 150           | 120      | E6.2X/f 5000 Ekip Dip LI        | 1SDA072001R1    |
|         |      |               |          | E6.2X/f 5000 Ekip Dip LSI       | 1SDA072002R1    |
|         |      |               |          | E6.2X/f 5000 Ekip Dip LSIG      | 1SDA072003R1    |
|         |      |               |          | E6.2X/f 5000 Ekip Touch LI      | 1SDA072004R1    |
|         |      |               |          | E6.2X/f 5000 Ekip Touch LSI     | 1SDA072005R1    |
|         |      |               |          | E6.2X/f 5000 Ekip Touch LSIG    | 1SDA072006R1    |
|         |      |               |          | E6.2X/f 5000 Ekip Hi-Touch LSI  | 1SDA072008R1    |
|         |      |               |          | E6.2X/f 5000 Ekip Hi-Touch LSIG | 1SDA072009R1    |
|         | 6300 | 150           | 120      | E6.2X/f 6300 Ekip Dip LI        | 1SDA072031R1    |
|         |      |               |          | E6.2X/f 6300 Ekip Dip LSI       | 1SDA072032R1    |
|         |      |               |          | E6.2X/f 6300 Ekip Dip LSIG      | 1SDA072033R1    |
|         |      |               |          | E6.2X/f 6300 Ekip Touch LI      | 1SDA072034R1    |
|         |      |               |          | E6.2X/f 6300 Ekip Touch LSI     | 1SDA072035R1    |
|         |      |               |          | E6.2X/f 6300 Ekip Touch LSIG    | 1SDA072036R1    |
|         |      |               |          | E6.2X/f 6300 Ekip Hi-Touch LSI  | 1SDA072038R1    |
|         |      |               |          | E6.2X/f 6300 Ekip Hi-Touch LSIG | 1SDA072039R1    |

# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E1.2B • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|-------------------------------|--------------|--------------|
|              |      |                |             |                               | Code         | Code         |
| <b>E1.2B</b> | 630  | 42             | 42          | E1.2B 630 Ekip Dip LI         | 1SDA072051R1 | 1SDA072681R1 |
|              |      |                |             | E1.2B 630 Ekip Dip LSI        | 1SDA072052R1 | 1SDA072682R1 |
|              |      |                |             | E1.2B 630 Ekip Dip LSIG       | 1SDA072053R1 | 1SDA072683R1 |
|              |      |                |             | E1.2B 630 Ekip Touch LI       | 1SDA072054R1 | 1SDA072684R1 |
|              |      |                |             | E1.2B 630 Ekip Touch LSI      | 1SDA072055R1 | 1SDA072685R1 |
|              |      |                |             | E1.2B 630 Ekip Touch LSIG     | 1SDA072056R1 | 1SDA072686R1 |
|              |      |                |             | E1.2B 630 Ekip Hi-Touch LSI   | 1SDA072058R1 | 1SDA072688R1 |
|              |      |                |             | E1.2B 630 Ekip Hi-Touch LSIG  | 1SDA072059R1 | 1SDA072689R1 |
|              | 800  | 42             | 42          | E1.2B 800 Ekip Dip LI         | 1SDA072091R1 | 1SDA072721R1 |
|              |      |                |             | E1.2B 800 Ekip Dip LSI        | 1SDA072092R1 | 1SDA072722R1 |
|              |      |                |             | E1.2B 800 Ekip Dip LSIG       | 1SDA072093R1 | 1SDA072723R1 |
|              |      |                |             | E1.2B 800 Ekip Touch LI       | 1SDA072094R1 | 1SDA072724R1 |
|              |      |                |             | E1.2B 800 Ekip Touch LSI      | 1SDA072095R1 | 1SDA072725R1 |
|              |      |                |             | E1.2B 800 Ekip Touch LSIG     | 1SDA072096R1 | 1SDA072726R1 |
|              |      |                |             | E1.2B 800 Ekip Hi-Touch LSI   | 1SDA072098R1 | 1SDA072728R1 |
|              |      |                |             | E1.2B 800 Ekip Hi-Touch LSIG  | 1SDA072099R1 | 1SDA072729R1 |
|              | 1000 | 42             | 42          | E1.2B 1000 Ekip Dip LI        | 1SDA072131R1 | 1SDA072761R1 |
|              |      |                |             | E1.2B 1000 Ekip Dip LSI       | 1SDA072132R1 | 1SDA072762R1 |
|              |      |                |             | E1.2B 1000 Ekip Dip LSIG      | 1SDA072133R1 | 1SDA072763R1 |
|              |      |                |             | E1.2B 1000 Ekip Touch LI      | 1SDA072134R1 | 1SDA072764R1 |
|              |      |                |             | E1.2B 1000 Ekip Touch LSI     | 1SDA072135R1 | 1SDA072765R1 |
|              |      |                |             | E1.2B 1000 Ekip Touch LSIG    | 1SDA072136R1 | 1SDA072766R1 |
|              |      |                |             | E1.2B 1000 Ekip Hi-Touch LSI  | 1SDA072138R1 | 1SDA072768R1 |
|              |      |                |             | E1.2B 1000 Ekip Hi-Touch LSIG | 1SDA072139R1 | 1SDA072769R1 |
|              | 1250 | 42             | 42          | E1.2B 1250 Ekip Dip LI        | 1SDA072171R1 | 1SDA072801R1 |
|              |      |                |             | E1.2B 1250 Ekip Dip LSI       | 1SDA072172R1 | 1SDA072802R1 |
|              |      |                |             | E1.2B 1250 Ekip Dip LSIG      | 1SDA072173R1 | 1SDA072803R1 |
|              |      |                |             | E1.2B 1250 Ekip Touch LI      | 1SDA072174R1 | 1SDA072804R1 |
|              |      |                |             | E1.2B 1250 Ekip Touch LSI     | 1SDA072175R1 | 1SDA072805R1 |
|              |      |                |             | E1.2B 1250 Ekip Touch LSIG    | 1SDA072176R1 | 1SDA072806R1 |
|              |      |                |             | E1.2B 1250 Ekip Hi-Touch LSI  | 1SDA072178R1 | 1SDA072808R1 |
|              |      |                |             | E1.2B 1250 Ekip Hi-Touch LSIG | 1SDA072179R1 | 1SDA072809R1 |
|              | 1600 | 42             | 42          | E1.2B 1600 Ekip Dip LI        | 1SDA072211R1 | 1SDA072841R1 |
|              |      |                |             | E1.2B 1600 Ekip Dip LSI       | 1SDA072212R1 | 1SDA072842R1 |
|              |      |                |             | E1.2B 1600 Ekip Dip LSIG      | 1SDA072213R1 | 1SDA072843R1 |
|              |      |                |             | E1.2B 1600 Ekip Touch LI      | 1SDA072214R1 | 1SDA072844R1 |
|              |      |                |             | E1.2B 1600 Ekip Touch LSI     | 1SDA072215R1 | 1SDA072845R1 |
|              |      |                |             | E1.2B 1600 Ekip Touch LSIG    | 1SDA072216R1 | 1SDA072846R1 |
|              |      |                |             | E1.2B 1600 Ekip Hi-Touch LSI  | 1SDA072218R1 | 1SDA072848R1 |
|              |      |                |             | E1.2B 1600 Ekip Hi-Touch LSIG | 1SDA072219R1 | 1SDA072849R1 |

# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E1.2C • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E1.2C | 630  | 50             | 42          | E1.2C 630 Ekip Dip LI         | 1SDA072061R1 | 1SDA072691R1 |
|       |      |                |             | E1.2C 630 Ekip Dip LSI        | 1SDA072062R1 | 1SDA072692R1 |
|       |      |                |             | E1.2C 630 Ekip Dip LSIG       | 1SDA072063R1 | 1SDA072693R1 |
|       |      |                |             | E1.2C 630 Ekip Touch LI       | 1SDA072064R1 | 1SDA072694R1 |
|       |      |                |             | E1.2C 630 Ekip Touch LSI      | 1SDA072065R1 | 1SDA072695R1 |
|       |      |                |             | E1.2C 630 Ekip Touch LSIG     | 1SDA072066R1 | 1SDA072696R1 |
|       |      |                |             | E1.2C 630 Ekip Hi-Touch LSI   | 1SDA072068R1 | 1SDA072698R1 |
|       |      |                |             | E1.2C 630 Ekip Hi-Touch LSIG  | 1SDA072069R1 | 1SDA072699R1 |
|       | 800  | 50             | 42          | E1.2C 800 Ekip Dip LI         | 1SDA072101R1 | 1SDA072731R1 |
|       |      |                |             | E1.2C 800 Ekip Dip LSI        | 1SDA072102R1 | 1SDA072732R1 |
|       |      |                |             | E1.2C 800 Ekip Dip LSIG       | 1SDA072103R1 | 1SDA072733R1 |
|       |      |                |             | E1.2C 800 Ekip Touch LI       | 1SDA072104R1 | 1SDA072734R1 |
|       |      |                |             | E1.2C 800 Ekip Touch LSI      | 1SDA072105R1 | 1SDA072735R1 |
|       |      |                |             | E1.2C 800 Ekip Touch LSIG     | 1SDA072106R1 | 1SDA072736R1 |
|       |      |                |             | E1.2C 800 Ekip Hi-Touch LSI   | 1SDA072108R1 | 1SDA072738R1 |
|       |      |                |             | E1.2C 800 Ekip Hi-Touch LSIG  | 1SDA072109R1 | 1SDA072739R1 |
|       | 1000 | 50             | 42          | E1.2C 1000 Ekip Dip LI        | 1SDA072141R1 | 1SDA072771R1 |
|       |      |                |             | E1.2C 1000 Ekip Dip LSI       | 1SDA072142R1 | 1SDA072772R1 |
|       |      |                |             | E1.2C 1000 Ekip Dip LSIG      | 1SDA072143R1 | 1SDA072773R1 |
|       |      |                |             | E1.2C 1000 Ekip Touch LI      | 1SDA072144R1 | 1SDA072774R1 |
|       |      |                |             | E1.2C 1000 Ekip Touch LSI     | 1SDA072145R1 | 1SDA072775R1 |
|       |      |                |             | E1.2C 1000 Ekip Touch LSIG    | 1SDA072146R1 | 1SDA072776R1 |
|       |      |                |             | E1.2C 1000 Ekip Hi-Touch LSI  | 1SDA072148R1 | 1SDA072778R1 |
|       |      |                |             | E1.2C 1000 Ekip Hi-Touch LSIG | 1SDA072149R1 | 1SDA072779R1 |
|       | 1250 | 50             | 42          | E1.2C 1250 Ekip Dip LI        | 1SDA072181R1 | 1SDA072811R1 |
|       |      |                |             | E1.2C 1250 Ekip Dip LSI       | 1SDA072182R1 | 1SDA072812R1 |
|       |      |                |             | E1.2C 1250 Ekip Dip LSIG      | 1SDA072183R1 | 1SDA072813R1 |
|       |      |                |             | E1.2C 1250 Ekip Touch LI      | 1SDA072184R1 | 1SDA072814R1 |
|       |      |                |             | E1.2C 1250 Ekip Touch LSI     | 1SDA072185R1 | 1SDA072815R1 |
|       |      |                |             | E1.2C 1250 Ekip Touch LSIG    | 1SDA072186R1 | 1SDA072816R1 |
|       |      |                |             | E1.2C 1250 Ekip Hi-Touch LSI  | 1SDA072188R1 | 1SDA072818R1 |
|       |      |                |             | E1.2C 1250 Ekip Hi-Touch LSIG | 1SDA072189R1 | 1SDA072819R1 |
|       | 1600 | 50             | 42          | E1.2C 1600 Ekip Dip LI        | 1SDA072221R1 | 1SDA072851R1 |
|       |      |                |             | E1.2C 1600 Ekip Dip LSI       | 1SDA072222R1 | 1SDA072852R1 |
|       |      |                |             | E1.2C 1600 Ekip Dip LSIG      | 1SDA072223R1 | 1SDA072853R1 |
|       |      |                |             | E1.2C 1600 Ekip Touch LI      | 1SDA072224R1 | 1SDA072854R1 |
|       |      |                |             | E1.2C 1600 Ekip Touch LSI     | 1SDA072225R1 | 1SDA072855R1 |
|       |      |                |             | E1.2C 1600 Ekip Touch LSIG    | 1SDA072226R1 | 1SDA072856R1 |
|       |      |                |             | E1.2C 1600 Ekip Hi-Touch LSI  | 1SDA072228R1 | 1SDA072858R1 |
|       |      |                |             | E1.2C 1600 Ekip Hi-Touch LSIG | 1SDA072229R1 | 1SDA072859R1 |

**SACE Emax E1.2N • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E1.2N | 250  | 66             | 50          | E1.2N 250 Ekip Dip LI         | 1SDA072041R1 | 1SDA072671R1 |
|       |      |                |             | E1.2N 250 Ekip Dip LSI        | 1SDA072042R1 | 1SDA072672R1 |
|       |      |                |             | E1.2N 250 Ekip Dip LSIG       | 1SDA072043R1 | 1SDA072673R1 |
|       |      |                |             | E1.2N 250 Ekip Touch LI       | 1SDA072044R1 | 1SDA072674R1 |
|       |      |                |             | E1.2N 250 Ekip Touch LSI      | 1SDA072045R1 | 1SDA072675R1 |
|       |      |                |             | E1.2N 250 Ekip Touch LSIG     | 1SDA072046R1 | 1SDA072676R1 |
|       |      |                |             | E1.2N 250 Ekip Hi-Touch LSI   | 1SDA072048R1 | 1SDA072678R1 |
|       |      |                |             | E1.2N 250 Ekip Hi-Touch LSIG  | 1SDA072049R1 | 1SDA072679R1 |
|       | 630  | 66             | 50          | E1.2N 630 Ekip Dip LI         | 1SDA072071R1 | 1SDA072701R1 |
|       |      |                |             | E1.2N 630 Ekip Dip LSI        | 1SDA072072R1 | 1SDA072702R1 |
|       |      |                |             | E1.2N 630 Ekip Dip LSIG       | 1SDA072073R1 | 1SDA072703R1 |
|       |      |                |             | E1.2N 630 Ekip Touch LI       | 1SDA072074R1 | 1SDA072704R1 |
|       |      |                |             | E1.2N 630 Ekip Touch LSI      | 1SDA072075R1 | 1SDA072705R1 |
|       |      |                |             | E1.2N 630 Ekip Touch LSIG     | 1SDA072076R1 | 1SDA072706R1 |
|       |      |                |             | E1.2N 630 Ekip Hi-Touch LSI   | 1SDA072078R1 | 1SDA072708R1 |
|       |      |                |             | E1.2N 630 Ekip Hi-Touch LSIG  | 1SDA072079R1 | 1SDA072709R1 |
|       | 800  | 66             | 50          | E1.2N 800 Ekip Dip LI         | 1SDA072111R1 | 1SDA072741R1 |
|       |      |                |             | E1.2N 800 Ekip Dip LSI        | 1SDA072112R1 | 1SDA072742R1 |
|       |      |                |             | E1.2N 800 Ekip Dip LSIG       | 1SDA072113R1 | 1SDA072743R1 |
|       |      |                |             | E1.2N 800 Ekip Touch LI       | 1SDA072114R1 | 1SDA072744R1 |
|       |      |                |             | E1.2N 800 Ekip Touch LSI      | 1SDA072115R1 | 1SDA072745R1 |
|       |      |                |             | E1.2N 800 Ekip Touch LSIG     | 1SDA072116R1 | 1SDA072746R1 |
|       |      |                |             | E1.2N 800 Ekip Hi-Touch LSI   | 1SDA072118R1 | 1SDA072748R1 |
|       |      |                |             | E1.2N 800 Ekip Hi-Touch LSIG  | 1SDA072119R1 | 1SDA072749R1 |
|       | 1000 | 66             | 50          | E1.2N 1000 Ekip Dip LI        | 1SDA072151R1 | 1SDA072781R1 |
|       |      |                |             | E1.2N 1000 Ekip Dip LSI       | 1SDA072152R1 | 1SDA072782R1 |
|       |      |                |             | E1.2N 1000 Ekip Dip LSIG      | 1SDA072153R1 | 1SDA072783R1 |
|       |      |                |             | E1.2N 1000 Ekip Touch LI      | 1SDA072154R1 | 1SDA072784R1 |
|       |      |                |             | E1.2N 1000 Ekip Touch LSI     | 1SDA072155R1 | 1SDA072785R1 |
|       |      |                |             | E1.2N 1000 Ekip Touch LSIG    | 1SDA072156R1 | 1SDA072786R1 |
|       |      |                |             | E1.2N 1000 Ekip Hi-Touch LSI  | 1SDA072158R1 | 1SDA072788R1 |
|       |      |                |             | E1.2N 1000 Ekip Hi-Touch LSIG | 1SDA072159R1 | 1SDA072789R1 |
|       | 1250 | 66             | 50          | E1.2N 1250 Ekip Dip LI        | 1SDA072191R1 | 1SDA072821R1 |
|       |      |                |             | E1.2N 1250 Ekip Dip LSI       | 1SDA072192R1 | 1SDA072822R1 |
|       |      |                |             | E1.2N 1250 Ekip Dip LSIG      | 1SDA072193R1 | 1SDA072823R1 |
|       |      |                |             | E1.2N 1250 Ekip Touch LI      | 1SDA072194R1 | 1SDA072824R1 |
|       |      |                |             | E1.2N 1250 Ekip Touch LSI     | 1SDA072195R1 | 1SDA072825R1 |
|       |      |                |             | E1.2N 1250 Ekip Touch LSIG    | 1SDA072196R1 | 1SDA072826R1 |
|       |      |                |             | E1.2N 1250 Ekip Hi-Touch LSI  | 1SDA072198R1 | 1SDA072828R1 |
|       |      |                |             | E1.2N 1250 Ekip Hi-Touch LSIG | 1SDA072199R1 | 1SDA072829R1 |
|       | 1600 | 66             | 50          | E1.2N 1600 Ekip Dip LI        | 1SDA072231R1 | 1SDA072861R1 |
|       |      |                |             | E1.2N 1600 Ekip Dip LSI       | 1SDA072232R1 | 1SDA072862R1 |
|       |      |                |             | E1.2N 1600 Ekip Dip LSIG      | 1SDA072233R1 | 1SDA072863R1 |
|       |      |                |             | E1.2N 1600 Ekip Touch LI      | 1SDA072234R1 | 1SDA072864R1 |
|       |      |                |             | E1.2N 1600 Ekip Touch LSI     | 1SDA072235R1 | 1SDA072865R1 |
|       |      |                |             | E1.2N 1600 Ekip Touch LSIG    | 1SDA072236R1 | 1SDA072866R1 |
|       |      |                |             | E1.2N 1600 Ekip Hi-Touch LSI  | 1SDA072238R1 | 1SDA072868R1 |
|       |      |                |             | E1.2N 1600 Ekip Hi-Touch LSIG | 1SDA072239R1 | 1SDA072869R1 |



# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E2.2B • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E2.2B | 1600 | 42             | 42          | E2.2B 1600 Ekip Dip LI        | 1SDA072331R1 | 1SDA072961R1 |
|       |      |                |             | E2.2B 1600 Ekip Dip LSI       | 1SDA072332R1 | 1SDA072962R1 |
|       |      |                |             | E2.2B 1600 Ekip Dip LSIG      | 1SDA072333R1 | 1SDA072963R1 |
|       |      |                |             | E2.2B 1600 Ekip Touch LI      | 1SDA072334R1 | 1SDA072964R1 |
|       |      |                |             | E2.2B 1600 Ekip Touch LSI     | 1SDA072335R1 | 1SDA072965R1 |
|       |      |                |             | E2.2B 1600 Ekip Touch LSIG    | 1SDA072336R1 | 1SDA072966R1 |
|       |      |                |             | E2.2B 1600 Ekip Hi-Touch LSI  | 1SDA072338R1 | 1SDA072968R1 |
|       |      |                |             | E2.2B 1600 Ekip Hi-Touch LSIG | 1SDA072339R1 | 1SDA072969R1 |
|       | 2000 | 42             | 42          | E2.2B 2000 Ekip Dip LI        | 1SDA072371R1 | 1SDA073001R1 |
|       |      |                |             | E2.2B 2000 Ekip Dip LSI       | 1SDA072372R1 | 1SDA073002R1 |
|       |      |                |             | E2.2B 2000 Ekip Dip LSIG      | 1SDA072373R1 | 1SDA073003R1 |
|       |      |                |             | E2.2B 2000 Ekip Touch LI      | 1SDA072374R1 | 1SDA073004R1 |
|       |      |                |             | E2.2B 2000 Ekip Touch LSI     | 1SDA072375R1 | 1SDA073005R1 |
|       |      |                |             | E2.2B 2000 Ekip Touch LSIG    | 1SDA072376R1 | 1SDA073006R1 |
|       |      |                |             | E2.2B 2000 Ekip Hi-Touch LSI  | 1SDA072378R1 | 1SDA073008R1 |
|       |      |                |             | E2.2B 2000 Ekip Hi-Touch LSIG | 1SDA072379R1 | 1SDA073009R1 |

**SACE Emax E2.2N • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|-------|------|----------------|-------------|-------------------------------|-----------------|-----------------|
| E2.2N | 800  | 66             | 66          | E2.2N 800 Ekip Dip LI         | 1SDA072241R1    | 1SDA072871R1    |
|       |      |                |             | E2.2N 800 Ekip Dip LSI        | 1SDA072242R1    | 1SDA072872R1    |
|       |      |                |             | E2.2N 800 Ekip Dip LSIG       | 1SDA072243R1    | 1SDA072873R1    |
|       |      |                |             | E2.2N 800 Ekip Touch LI       | 1SDA072244R1    | 1SDA072874R1    |
|       |      |                |             | E2.2N 800 Ekip Touch LSI      | 1SDA072245R1    | 1SDA072875R1    |
|       |      |                |             | E2.2N 800 Ekip Touch LSIG     | 1SDA072246R1    | 1SDA072876R1    |
|       |      |                |             | E2.2N 800 Ekip Hi-Touch LSI   | 1SDA072248R1    | 1SDA072878R1    |
|       |      |                |             | E2.2N 800 Ekip Hi-Touch LSIG  | 1SDA072249R1    | 1SDA072879R1    |
|       | 1000 | 66             | 66          | E2.2N 1000 Ekip Dip LI        | 1SDA072271R1    | 1SDA072901R1    |
|       |      |                |             | E2.2N 1000 Ekip Dip LSI       | 1SDA072272R1    | 1SDA072902R1    |
|       |      |                |             | E2.2N 1000 Ekip Dip LSIG      | 1SDA072273R1    | 1SDA072903R1    |
|       |      |                |             | E2.2N 1000 Ekip Touch LI      | 1SDA072274R1    | 1SDA072904R1    |
|       |      |                |             | E2.2N 1000 Ekip Touch LSI     | 1SDA072275R1    | 1SDA072905R1    |
|       |      |                |             | E2.2N 1000 Ekip Touch LSIG    | 1SDA072276R1    | 1SDA072906R1    |
|       |      |                |             | E2.2N 1000 Ekip Hi-Touch LSI  | 1SDA072278R1    | 1SDA072908R1    |
|       |      |                |             | E2.2N 1000 Ekip Hi-Touch LSIG | 1SDA072279R1    | 1SDA072909R1    |
|       | 1250 | 66             | 66          | E2.2N 1250 Ekip Dip LI        | 1SDA072301R1    | 1SDA072931R1    |
|       |      |                |             | E2.2N 1250 Ekip Dip LSI       | 1SDA072302R1    | 1SDA072932R1    |
|       |      |                |             | E2.2N 1250 Ekip Dip LSIG      | 1SDA072303R1    | 1SDA072933R1    |
|       |      |                |             | E2.2N 1250 Ekip Touch LI      | 1SDA072304R1    | 1SDA072934R1    |
|       |      |                |             | E2.2N 1250 Ekip Touch LSI     | 1SDA072305R1    | 1SDA072935R1    |
|       |      |                |             | E2.2N 1250 Ekip Touch LSIG    | 1SDA072306R1    | 1SDA072936R1    |
|       |      |                |             | E2.2N 1250 Ekip Hi-Touch LSI  | 1SDA072308R1    | 1SDA072938R1    |
|       |      |                |             | E2.2N 1250 Ekip Hi-Touch LSIG | 1SDA072309R1    | 1SDA072939R1    |
|       | 1600 | 66             | 66          | E2.2N 1600 Ekip Dip LI        | 1SDA072341R1    | 1SDA072971R1    |
|       |      |                |             | E2.2N 1600 Ekip Dip LSI       | 1SDA072342R1    | 1SDA072972R1    |
|       |      |                |             | E2.2N 1600 Ekip Dip LSIG      | 1SDA072343R1    | 1SDA072973R1    |
|       |      |                |             | E2.2N 1600 Ekip Touch LI      | 1SDA072344R1    | 1SDA072974R1    |
|       |      |                |             | E2.2N 1600 Ekip Touch LSI     | 1SDA072345R1    | 1SDA072975R1    |
|       |      |                |             | E2.2N 1600 Ekip Touch LSIG    | 1SDA072346R1    | 1SDA072976R1    |
|       |      |                |             | E2.2N 1600 Ekip Hi-Touch LSI  | 1SDA072348R1    | 1SDA072978R1    |
|       |      |                |             | E2.2N 1600 Ekip Hi-Touch LSIG | 1SDA072349R1    | 1SDA072979R1    |
|       | 2000 | 66             | 66          | E2.2N 2000 Ekip Dip LI        | 1SDA072381R1    | 1SDA073011R1    |
|       |      |                |             | E2.2N 2000 Ekip Dip LSI       | 1SDA072382R1    | 1SDA073012R1    |
|       |      |                |             | E2.2N 2000 Ekip Dip LSIG      | 1SDA072383R1    | 1SDA073013R1    |
|       |      |                |             | E2.2N 2000 Ekip Touch LI      | 1SDA072384R1    | 1SDA073014R1    |
|       |      |                |             | E2.2N 2000 Ekip Touch LSI     | 1SDA072385R1    | 1SDA073015R1    |
|       |      |                |             | E2.2N 2000 Ekip Touch LSIG    | 1SDA072386R1    | 1SDA073016R1    |
|       |      |                |             | E2.2N 2000 Ekip Hi-Touch LSI  | 1SDA072388R1    | 1SDA073018R1    |
|       |      |                |             | E2.2N 2000 Ekip Hi-Touch LSIG | 1SDA072389R1    | 1SDA073019R1    |
|       | 2500 | 66             | 66          | E2.2N 2500 Ekip Dip LI        | 1SDA072411R1    | 1SDA073041R1    |
|       |      |                |             | E2.2N 2500 Ekip Dip LSI       | 1SDA072412R1    | 1SDA073042R1    |
|       |      |                |             | E2.2N 2500 Ekip Dip LSIG      | 1SDA072413R1    | 1SDA073043R1    |
|       |      |                |             | E2.2N 2500 Ekip Touch LI      | 1SDA072414R1    | 1SDA073044R1    |
|       |      |                |             | E2.2N 2500 Ekip Touch LSI     | 1SDA072415R1    | 1SDA073045R1    |
|       |      |                |             | E2.2N 2500 Ekip Touch LSIG    | 1SDA072416R1    | 1SDA073046R1    |
|       |      |                |             | E2.2N 2500 Ekip Hi-Touch LSI  | 1SDA072418R1    | 1SDA073048R1    |
|       |      |                |             | E2.2N 2500 Ekip Hi-Touch LSIG | 1SDA072419R1    | 1SDA073049R1    |

# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E2.2S • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E2.2S | 250  | 85             | 66          | E2.2S 250 Ekip Dip LI         | 1SDA073648R1 | 1SDA073658R1 |
|       |      |                |             | E2.2S 250 Ekip Dip LSI        | 1SDA073649R1 | 1SDA073659R1 |
|       |      |                |             | E2.2S 250 Ekip Dip LSIG       | 1SDA073650R1 | 1SDA073660R1 |
|       |      |                |             | E2.2S 250 Ekip Touch LI       | 1SDA073651R1 | 1SDA073661R1 |
|       |      |                |             | E2.2S 250 Ekip Touch LSI      | 1SDA073652R1 | 1SDA073662R1 |
|       |      |                |             | E2.2S 250 Ekip Touch LSIG     | 1SDA073653R1 | 1SDA073663R1 |
|       |      |                |             | E2.2S 250 Ekip Hi-Touch LSI   | 1SDA073655R1 | 1SDA073665R1 |
|       |      |                |             | E2.2S 250 Ekip Hi-Touch LSIG  | 1SDA073656R1 | 1SDA073666R1 |
|       | 800  | 85             | 66          | E2.2S 800 Ekip Dip LI         | 1SDA072251R1 | 1SDA072881R1 |
|       |      |                |             | E2.2S 800 Ekip Dip LSI        | 1SDA072252R1 | 1SDA072882R1 |
|       |      |                |             | E2.2S 800 Ekip Dip LSIG       | 1SDA072253R1 | 1SDA072883R1 |
|       |      |                |             | E2.2S 800 Ekip Touch LI       | 1SDA072254R1 | 1SDA072884R1 |
|       |      |                |             | E2.2S 800 Ekip Touch LSI      | 1SDA072255R1 | 1SDA072885R1 |
|       |      |                |             | E2.2S 800 Ekip Touch LSIG     | 1SDA072256R1 | 1SDA072886R1 |
|       |      |                |             | E2.2S 800 Ekip Hi-Touch LSI   | 1SDA072258R1 | 1SDA072888R1 |
|       |      |                |             | E2.2S 800 Ekip Hi-Touch LSIG  | 1SDA072259R1 | 1SDA072889R1 |
|       | 1000 | 85             | 66          | E2.2S 1000 Ekip Dip LI        | 1SDA072281R1 | 1SDA072911R1 |
|       |      |                |             | E2.2S 1000 Ekip Dip LSI       | 1SDA072282R1 | 1SDA072912R1 |
|       |      |                |             | E2.2S 1000 Ekip Dip LSIG      | 1SDA072283R1 | 1SDA072913R1 |
|       |      |                |             | E2.2S 1000 Ekip Touch LI      | 1SDA072284R1 | 1SDA072914R1 |
|       |      |                |             | E2.2S 1000 Ekip Touch LSI     | 1SDA072285R1 | 1SDA072915R1 |
|       |      |                |             | E2.2S 1000 Ekip Touch LSIG    | 1SDA072286R1 | 1SDA072916R1 |
|       |      |                |             | E2.2S 1000 Ekip Hi-Touch LSI  | 1SDA072288R1 | 1SDA072918R1 |
|       |      |                |             | E2.2S 1000 Ekip Hi-Touch LSIG | 1SDA072289R1 | 1SDA072919R1 |
|       | 1250 | 85             | 66          | E2.2S 1250 Ekip Dip LI        | 1SDA072311R1 | 1SDA072941R1 |
|       |      |                |             | E2.2S 1250 Ekip Dip LSI       | 1SDA072312R1 | 1SDA072942R1 |
|       |      |                |             | E2.2S 1250 Ekip Dip LSIG      | 1SDA072313R1 | 1SDA072943R1 |
|       |      |                |             | E2.2S 1250 Ekip Touch LI      | 1SDA072314R1 | 1SDA072944R1 |
|       |      |                |             | E2.2S 1250 Ekip Touch LSI     | 1SDA072315R1 | 1SDA072945R1 |
|       |      |                |             | E2.2S 1250 Ekip Touch LSIG    | 1SDA072316R1 | 1SDA072946R1 |
|       |      |                |             | E2.2S 1250 Ekip Hi-Touch LSI  | 1SDA072318R1 | 1SDA072948R1 |
|       |      |                |             | E2.2S 1250 Ekip Hi-Touch LSIG | 1SDA072319R1 | 1SDA072949R1 |


**SACE Emax E2.2S • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|-------------------------------|--------------|--------------|
|              |      |                |             |                               | Code         | Code         |
| <b>E2.2S</b> | 1600 | 85             | 66          | E2.2S 1600 Ekip Dip LI        | 1SDA072351R1 | 1SDA072981R1 |
|              |      |                |             | E2.2S 1600 Ekip Dip LSI       | 1SDA072352R1 | 1SDA072982R1 |
|              |      |                |             | E2.2S 1600 Ekip Dip LSIG      | 1SDA072353R1 | 1SDA072983R1 |
|              |      |                |             | E2.2S 1600 Ekip Touch LI      | 1SDA072354R1 | 1SDA072984R1 |
|              |      |                |             | E2.2S 1600 Ekip Touch LSI     | 1SDA072355R1 | 1SDA072985R1 |
|              |      |                |             | E2.2S 1600 Ekip Touch LSIG    | 1SDA072356R1 | 1SDA072986R1 |
|              |      |                |             | E2.2S 1600 Ekip Hi-Touch LSI  | 1SDA072358R1 | 1SDA072988R1 |
|              |      |                |             | E2.2S 1600 Ekip Hi-Touch LSIG | 1SDA072359R1 | 1SDA072989R1 |
|              | 2000 | 85             | 66          | E2.2S 2000 Ekip Dip LI        | 1SDA072391R1 | 1SDA073021R1 |
|              |      |                |             | E2.2S 2000 Ekip Dip LSI       | 1SDA072392R1 | 1SDA073022R1 |
|              |      |                |             | E2.2S 2000 Ekip Dip LSIG      | 1SDA072393R1 | 1SDA073023R1 |
|              |      |                |             | E2.2S 2000 Ekip Touch LI      | 1SDA072394R1 | 1SDA073024R1 |
|              |      |                |             | E2.2S 2000 Ekip Touch LSI     | 1SDA072395R1 | 1SDA073025R1 |
|              |      |                |             | E2.2S 2000 Ekip Touch LSIG    | 1SDA072396R1 | 1SDA073026R1 |
|              |      |                |             | E2.2S 2000 Ekip Hi-Touch LSI  | 1SDA072398R1 | 1SDA073028R1 |
|              |      |                |             | E2.2S 2000 Ekip Hi-Touch LSIG | 1SDA072399R1 | 1SDA073029R1 |
|              | 2500 | 85             | 66          | E2.2S 2500 Ekip Dip LI        | 1SDA072421R1 | 1SDA073051R1 |
|              |      |                |             | E2.2S 2500 Ekip Dip LSI       | 1SDA072422R1 | 1SDA073052R1 |
|              |      |                |             | E2.2S 2500 Ekip Dip LSIG      | 1SDA072423R1 | 1SDA073053R1 |
|              |      |                |             | E2.2S 2500 Ekip Touch LI      | 1SDA072424R1 | 1SDA073054R1 |
|              |      |                |             | E2.2S 2500 Ekip Touch LSI     | 1SDA072425R1 | 1SDA073055R1 |
|              |      |                |             | E2.2S 2500 Ekip Touch LSIG    | 1SDA072426R1 | 1SDA073056R1 |
|              |      |                |             | E2.2S 2500 Ekip Hi-Touch LSI  | 1SDA072428R1 | 1SDA073058R1 |
|              |      |                |             | E2.2S 2500 Ekip Hi-Touch LSIG | 1SDA072429R1 | 1SDA073059R1 |

# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E2.2H • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|-------|------|----------------|-------------|-------------------------------|-----------------|-----------------|
| E2.2H | 800  | 100            | 85          | E2.2H 800 Ekip Dip LI         | 1SDA072261R1    | 1SDA072891R1    |
|       |      |                |             | E2.2H 800 Ekip Dip LSI        | 1SDA072262R1    | 1SDA072892R1    |
|       |      |                |             | E2.2H 800 Ekip Dip LSIG       | 1SDA072263R1    | 1SDA072893R1    |
|       |      |                |             | E2.2H 800 Ekip Touch LI       | 1SDA072264R1    | 1SDA072894R1    |
|       |      |                |             | E2.2H 800 Ekip Touch LSI      | 1SDA072265R1    | 1SDA072895R1    |
|       |      |                |             | E2.2H 800 Ekip Touch LSIG     | 1SDA072266R1    | 1SDA072896R1    |
|       |      |                |             | E2.2H 800 Ekip Hi-Touch LSI   | 1SDA072268R1    | 1SDA072898R1    |
|       |      |                |             | E2.2H 800 Ekip Hi-Touch LSIG  | 1SDA072269R1    | 1SDA072899R1    |
|       | 1000 | 100            | 85          | E2.2H 1000 Ekip Dip LI        | 1SDA072291R1    | 1SDA072921R1    |
|       |      |                |             | E2.2H 1000 Ekip Dip LSI       | 1SDA072292R1    | 1SDA072922R1    |
|       |      |                |             | E2.2H 1000 Ekip Dip LSIG      | 1SDA072293R1    | 1SDA072923R1    |
|       |      |                |             | E2.2H 1000 Ekip Touch LI      | 1SDA072294R1    | 1SDA072924R1    |
|       |      |                |             | E2.2H 1000 Ekip Touch LSI     | 1SDA072295R1    | 1SDA072925R1    |
|       |      |                |             | E2.2H 1000 Ekip Touch LSIG    | 1SDA072296R1    | 1SDA072926R1    |
|       |      |                |             | E2.2H 1000 Ekip Hi-Touch LSI  | 1SDA072298R1    | 1SDA072928R1    |
|       |      |                |             | E2.2H 1000 Ekip Hi-Touch LSIG | 1SDA072299R1    | 1SDA072929R1    |
|       | 1250 | 100            | 85          | E2.2H 1250 Ekip Dip LI        | 1SDA072321R1    | 1SDA072951R1    |
|       |      |                |             | E2.2H 1250 Ekip Dip LSI       | 1SDA072322R1    | 1SDA072952R1    |
|       |      |                |             | E2.2H 1250 Ekip Dip LSIG      | 1SDA072323R1    | 1SDA072953R1    |
|       |      |                |             | E2.2H 1250 Ekip Touch LI      | 1SDA072324R1    | 1SDA072954R1    |
|       |      |                |             | E2.2H 1250 Ekip Touch LSI     | 1SDA072325R1    | 1SDA072955R1    |
|       |      |                |             | E2.2H 1250 Ekip Touch LSIG    | 1SDA072326R1    | 1SDA072956R1    |
|       |      |                |             | E2.2H 1250 Ekip Hi-Touch LSI  | 1SDA072328R1    | 1SDA072958R1    |
|       |      |                |             | E2.2H 1250 Ekip Hi-Touch LSIG | 1SDA072329R1    | 1SDA072959R1    |
|       | 1600 | 100            | 85          | E2.2H 1600 Ekip Dip LI        | 1SDA072361R1    | 1SDA072991R1    |
|       |      |                |             | E2.2H 1600 Ekip Dip LSI       | 1SDA072362R1    | 1SDA072992R1    |
|       |      |                |             | E2.2H 1600 Ekip Dip LSIG      | 1SDA072363R1    | 1SDA072993R1    |
|       |      |                |             | E2.2H 1600 Ekip Touch LI      | 1SDA072364R1    | 1SDA072994R1    |
|       |      |                |             | E2.2H 1600 Ekip Touch LSI     | 1SDA072365R1    | 1SDA072995R1    |
|       |      |                |             | E2.2H 1600 Ekip Touch LSIG    | 1SDA072366R1    | 1SDA072996R1    |
|       |      |                |             | E2.2H 1600 Ekip Hi-Touch LSI  | 1SDA072368R1    | 1SDA072998R1    |
|       |      |                |             | E2.2H 1600 Ekip Hi-Touch LSIG | 1SDA072369R1    | 1SDA072999R1    |
|       | 2000 | 100            | 85          | E2.2H 2000 Ekip Dip LI        | 1SDA072401R1    | 1SDA073031R1    |
|       |      |                |             | E2.2H 2000 Ekip Dip LSI       | 1SDA072402R1    | 1SDA073032R1    |
|       |      |                |             | E2.2H 2000 Ekip Dip LSIG      | 1SDA072403R1    | 1SDA073033R1    |
|       |      |                |             | E2.2H 2000 Ekip Touch LI      | 1SDA072404R1    | 1SDA073034R1    |
|       |      |                |             | E2.2H 2000 Ekip Touch LSI     | 1SDA072405R1    | 1SDA073035R1    |
|       |      |                |             | E2.2H 2000 Ekip Touch LSIG    | 1SDA072406R1    | 1SDA073036R1    |
|       |      |                |             | E2.2H 2000 Ekip Hi-Touch LSI  | 1SDA072408R1    | 1SDA073038R1    |
|       |      |                |             | E2.2H 2000 Ekip Hi-Touch LSIG | 1SDA072409R1    | 1SDA073039R1    |
|       | 2500 | 100            | 85          | E2.2H 2500 Ekip Dip LI        | 1SDA072431R1    | 1SDA073061R1    |
|       |      |                |             | E2.2H 2500 Ekip Dip LSI       | 1SDA072432R1    | 1SDA073062R1    |
|       |      |                |             | E2.2H 2500 Ekip Dip LSIG      | 1SDA072433R1    | 1SDA073063R1    |
|       |      |                |             | E2.2H 2500 Ekip Touch LI      | 1SDA072434R1    | 1SDA073064R1    |
|       |      |                |             | E2.2H 2500 Ekip Touch LSI     | 1SDA072435R1    | 1SDA073065R1    |
|       |      |                |             | E2.2H 2500 Ekip Touch LSIG    | 1SDA072436R1    | 1SDA073066R1    |
|       |      |                |             | E2.2H 2500 Ekip Hi-Touch LSI  | 1SDA072438R1    | 1SDA073068R1    |
|       |      |                |             | E2.2H 2500 Ekip Hi-Touch LSIG | 1SDA072439R1    | 1SDA073069R1    |

**SACE Emax E4.2N-S-H • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|--------------|------|----------------|-------------|-------------------------------|-----------------|-----------------|
| <b>E4.2N</b> | 3200 | 66             | 66          | E4.2N 3200 Ekip Dip LI        | 1SDA072491R1    | 1SDA073121R1    |
|              |      |                |             | E4.2N 3200 Ekip Dip LSI       | 1SDA072492R1    | 1SDA073122R1    |
|              |      |                |             | E4.2N 3200 Ekip Dip LSIG      | 1SDA072493R1    | 1SDA073123R1    |
|              |      |                |             | E4.2N 3200 Ekip Touch LI      | 1SDA072494R1    | 1SDA073124R1    |
|              |      |                |             | E4.2N 3200 Ekip Touch LSI     | 1SDA072495R1    | 1SDA073125R1    |
|              |      |                |             | E4.2N 3200 Ekip Touch LSIG    | 1SDA072496R1    | 1SDA073126R1    |
|              |      |                |             | E4.2N 3200 Ekip Hi-Touch LSI  | 1SDA072498R1    | 1SDA073128R1    |
|              |      |                |             | E4.2N 3200 Ekip Hi-Touch LSIG | 1SDA072499R1    | 1SDA073129R1    |
|              | 4000 | 66             | 66          | E4.2N 4000 Ekip Dip LI        | 1SDA072541R1    | 1SDA073171R1    |
|              |      |                |             | E4.2N 4000 Ekip Dip LSI       | 1SDA072542R1    | 1SDA073172R1    |
|              |      |                |             | E4.2N 4000 Ekip Dip LSIG      | 1SDA072543R1    | 1SDA073173R1    |
|              |      |                |             | E4.2N 4000 Ekip Touch LI      | 1SDA072544R1    | 1SDA073174R1    |
|              |      |                |             | E4.2N 4000 Ekip Touch LSI     | 1SDA072545R1    | 1SDA073175R1    |
|              |      |                |             | E4.2N 4000 Ekip Touch LSIG    | 1SDA072546R1    | 1SDA073176R1    |
|              |      |                |             | E4.2N 4000 Ekip Hi-Touch LSI  | 1SDA072548R1    | 1SDA073178R1    |
|              |      |                |             | E4.2N 4000 Ekip Hi-Touch LSIG | 1SDA072549R1    | 1SDA073179R1    |
| <b>E4.2S</b> | 3200 | 85             | 66          | E4.2S 3200 Ekip Dip LI        | 1SDA072501R1    | 1SDA073131R1    |
|              |      |                |             | E4.2S 3200 Ekip Dip LSI       | 1SDA072502R1    | 1SDA073132R1    |
|              |      |                |             | E4.2S 3200 Ekip Dip LSIG      | 1SDA072503R1    | 1SDA073133R1    |
|              |      |                |             | E4.2S 3200 Ekip Touch LI      | 1SDA072504R1    | 1SDA073134R1    |
|              |      |                |             | E4.2S 3200 Ekip Touch LSI     | 1SDA072505R1    | 1SDA073135R1    |
|              |      |                |             | E4.2S 3200 Ekip Touch LSIG    | 1SDA072506R1    | 1SDA073136R1    |
|              |      |                |             | E4.2S 3200 Ekip Hi-Touch LSI  | 1SDA072508R1    | 1SDA073138R1    |
|              |      |                |             | E4.2S 3200 Ekip Hi-Touch LSIG | 1SDA072509R1    | 1SDA073139R1    |
|              | 4000 | 85             | 66          | E4.2S 4000 Ekip Dip LI        | 1SDA072551R1    | 1SDA073181R1    |
|              |      |                |             | E4.2S 4000 Ekip Dip LSI       | 1SDA072552R1    | 1SDA073182R1    |
|              |      |                |             | E4.2S 4000 Ekip Dip LSIG      | 1SDA072553R1    | 1SDA073183R1    |
|              |      |                |             | E4.2S 4000 Ekip Touch LI      | 1SDA072554R1    | 1SDA073184R1    |
|              |      |                |             | E4.2S 4000 Ekip Touch LSI     | 1SDA072555R1    | 1SDA073185R1    |
|              |      |                |             | E4.2S 4000 Ekip Touch LSIG    | 1SDA072556R1    | 1SDA073186R1    |
|              |      |                |             | E4.2S 4000 Ekip Hi-Touch LSI  | 1SDA072558R1    | 1SDA073188R1    |
|              |      |                |             | E4.2S 4000 Ekip Hi-Touch LSIG | 1SDA072559R1    | 1SDA073189R1    |
| <b>E4.2H</b> | 3200 | 100            | 85          | E4.2H 3200 Ekip Dip LI        | 1SDA072511R1    | 1SDA073141R1    |
|              |      |                |             | E4.2H 3200 Ekip Dip LSI       | 1SDA072512R1    | 1SDA073142R1    |
|              |      |                |             | E4.2H 3200 Ekip Dip LSIG      | 1SDA072513R1    | 1SDA073143R1    |
|              |      |                |             | E4.2H 3200 Ekip Touch LI      | 1SDA072514R1    | 1SDA073144R1    |
|              |      |                |             | E4.2H 3200 Ekip Touch LSI     | 1SDA072515R1    | 1SDA073145R1    |
|              |      |                |             | E4.2H 3200 Ekip Touch LSIG    | 1SDA072516R1    | 1SDA073146R1    |
|              |      |                |             | E4.2H 3200 Ekip Hi-Touch LSI  | 1SDA072518R1    | 1SDA073148R1    |
|              |      |                |             | E4.2H 3200 Ekip Hi-Touch LSIG | 1SDA072519R1    | 1SDA073149R1    |
|              | 4000 | 100            | 85          | E4.2H 4000 Ekip Dip LI        | 1SDA072561R1    | 1SDA073191R1    |
|              |      |                |             | E4.2H 4000 Ekip Dip LSI       | 1SDA072562R1    | 1SDA073192R1    |
|              |      |                |             | E4.2H 4000 Ekip Dip LSIG      | 1SDA072563R1    | 1SDA073193R1    |
|              |      |                |             | E4.2H 4000 Ekip Touch LI      | 1SDA072564R1    | 1SDA073194R1    |
|              |      |                |             | E4.2H 4000 Ekip Touch LSI     | 1SDA072565R1    | 1SDA073195R1    |
|              |      |                |             | E4.2H 4000 Ekip Touch LSIG    | 1SDA072566R1    | 1SDA073196R1    |
|              |      |                |             | E4.2H 4000 Ekip Hi-Touch LSI  | 1SDA072568R1    | 1SDA073198R1    |
|              |      |                |             | E4.2H 4000 Ekip Hi-Touch LSIG | 1SDA072569R1    | 1SDA073199R1    |

# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E4.2V • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E4.2V | 2000 | 150            | 100         | E4.2V 2000 Ekip Dip LI        | 1SDA072451R1 | 1SDA073081R1 |
|       |      |                |             | E4.2V 2000 Ekip Dip LSI       | 1SDA072452R1 | 1SDA073082R1 |
|       |      |                |             | E4.2V 2000 Ekip Dip LSIG      | 1SDA072453R1 | 1SDA073083R1 |
|       |      |                |             | E4.2V 2000 Ekip Touch LI      | 1SDA072454R1 | 1SDA073084R1 |
|       |      |                |             | E4.2V 2000 Ekip Touch LSI     | 1SDA072455R1 | 1SDA073085R1 |
|       |      |                |             | E4.2V 2000 Ekip Touch LSIG    | 1SDA072456R1 | 1SDA073086R1 |
|       |      |                |             | E4.2V 2000 Ekip Hi-Touch LSI  | 1SDA072458R1 | 1SDA073088R1 |
|       |      |                |             | E4.2V 2000 Ekip Hi-Touch LSIG | 1SDA072459R1 | 1SDA073089R1 |
|       | 2500 | 150            | 100         | E4.2V 2500 Ekip Dip LI        | 1SDA072471R1 | 1SDA073101R1 |
|       |      |                |             | E4.2V 2500 Ekip Dip LSI       | 1SDA072472R1 | 1SDA073102R1 |
|       |      |                |             | E4.2V 2500 Ekip Dip LSIG      | 1SDA072473R1 | 1SDA073103R1 |
|       |      |                |             | E4.2V 2500 Ekip Touch LI      | 1SDA072474R1 | 1SDA073104R1 |
|       |      |                |             | E4.2V 2500 Ekip Touch LSI     | 1SDA072475R1 | 1SDA073105R1 |
|       |      |                |             | E4.2V 2500 Ekip Touch LSIG    | 1SDA072476R1 | 1SDA073106R1 |
|       |      |                |             | E4.2V 2500 Ekip Hi-Touch LSI  | 1SDA072478R1 | 1SDA073108R1 |
|       |      |                |             | E4.2V 2500 Ekip Hi-Touch LSIG | 1SDA072479R1 | 1SDA073109R1 |
|       | 3200 | 150            | 100         | E4.2V 3200 Ekip Dip LI        | 1SDA072521R1 | 1SDA073151R1 |
|       |      |                |             | E4.2V 3200 Ekip Dip LSI       | 1SDA072522R1 | 1SDA073152R1 |
|       |      |                |             | E4.2V 3200 Ekip Dip LSIG      | 1SDA072523R1 | 1SDA073153R1 |
|       |      |                |             | E4.2V 3200 Ekip Touch LI      | 1SDA072524R1 | 1SDA073154R1 |
|       |      |                |             | E4.2V 3200 Ekip Touch LSI     | 1SDA072525R1 | 1SDA073155R1 |
|       |      |                |             | E4.2V 3200 Ekip Touch LSIG    | 1SDA072526R1 | 1SDA073156R1 |
|       |      |                |             | E4.2V 3200 Ekip Hi-Touch LSI  | 1SDA072528R1 | 1SDA073158R1 |
|       |      |                |             | E4.2V 3200 Ekip Hi-Touch LSIG | 1SDA072529R1 | 1SDA073159R1 |
|       | 4000 | 150            | 100         | E4.2V 4000 Ekip Dip LI        | 1SDA072571R1 | 1SDA073201R1 |
|       |      |                |             | E4.2V 4000 Ekip Dip LSI       | 1SDA072572R1 | 1SDA073202R1 |
|       |      |                |             | E4.2V 4000 Ekip Dip LSIG      | 1SDA072573R1 | 1SDA073203R1 |
|       |      |                |             | E4.2V 4000 Ekip Touch LI      | 1SDA072574R1 | 1SDA073204R1 |
|       |      |                |             | E4.2V 4000 Ekip Touch LSI     | 1SDA072575R1 | 1SDA073205R1 |
|       |      |                |             | E4.2V 4000 Ekip Touch LSIG    | 1SDA072576R1 | 1SDA073206R1 |
|       |      |                |             | E4.2V 4000 Ekip Hi-Touch LSI  | 1SDA072578R1 | 1SDA073208R1 |
|       |      |                |             | E4.2V 4000 Ekip Hi-Touch LSIG | 1SDA072579R1 | 1SDA073209R1 |

**SACE Emax E6.2H-V • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles<br>Code | 4 Poles<br>Code |
|--------------|------|----------------|-------------|-------------------------------|-----------------|-----------------|
| <b>E6.2H</b> | 4000 | 100            | 100         | E6.2H 4000 Ekip Dip LI        | 1SDA072581R1    | 1SDA073211R1    |
|              |      |                |             | E6.2H 4000 Ekip Dip LSI       | 1SDA072582R1    | 1SDA073212R1    |
|              |      |                |             | E6.2H 4000 Ekip Dip LSIG      | 1SDA072583R1    | 1SDA073213R1    |
|              |      |                |             | E6.2H 4000 Ekip Touch LI      | 1SDA072584R1    | 1SDA073214R1    |
|              |      |                |             | E6.2H 4000 Ekip Touch LSI     | 1SDA072585R1    | 1SDA073215R1    |
|              |      |                |             | E6.2H 4000 Ekip Touch LSIG    | 1SDA072586R1    | 1SDA073216R1    |
|              |      |                |             | E6.2H 4000 Ekip Hi-Touch LSI  | 1SDA072588R1    | 1SDA073218R1    |
|              |      |                |             | E6.2H 4000 Ekip Hi-Touch LSIG | 1SDA072589R1    | 1SDA073219R1    |
|              | 5000 | 100            | 100         | E6.2H 5000 Ekip Dip LI        | 1SDA072611R1    | 1SDA073241R1    |
|              |      |                |             | E6.2H 5000 Ekip Dip LSI       | 1SDA072612R1    | 1SDA073242R1    |
|              |      |                |             | E6.2H 5000 Ekip Dip LSIG      | 1SDA072613R1    | 1SDA073243R1    |
|              |      |                |             | E6.2H 5000 Ekip Touch LI      | 1SDA072614R1    | 1SDA073244R1    |
|              |      |                |             | E6.2H 5000 Ekip Touch LSI     | 1SDA072615R1    | 1SDA073245R1    |
|              |      |                |             | E6.2H 5000 Ekip Touch LSIG    | 1SDA072616R1    | 1SDA073246R1    |
|              |      |                |             | E6.2H 5000 Ekip Hi-Touch LSI  | 1SDA072618R1    | 1SDA073248R1    |
|              |      |                |             | E6.2H 5000 Ekip Hi-Touch LSIG | 1SDA072619R1    | 1SDA073249R1    |
|              | 6300 | 100            | 100         | E6.2H 6300 Ekip Dip LI        | 1SDA072641R1    | 1SDA073271R1    |
|              |      |                |             | E6.2H 6300 Ekip Dip LSI       | 1SDA072642R1    | 1SDA073272R1    |
|              |      |                |             | E6.2H 6300 Ekip Dip LSIG      | 1SDA072643R1    | 1SDA073273R1    |
|              |      |                |             | E6.2H 6300 Ekip Touch LI      | 1SDA072644R1    | 1SDA073274R1    |
|              |      |                |             | E6.2H 6300 Ekip Touch LSI     | 1SDA072645R1    | 1SDA073275R1    |
|              |      |                |             | E6.2H 6300 Ekip Touch LSIG    | 1SDA072646R1    | 1SDA073276R1    |
|              |      |                |             | E6.2H 6300 Ekip Hi-Touch LSI  | 1SDA072648R1    | 1SDA073278R1    |
|              |      |                |             | E6.2H 6300 Ekip Hi-Touch LSIG | 1SDA072649R1    | 1SDA073279R1    |
| <b>E6.2V</b> | 4000 | 150            | 100         | E6.2V 4000 Ekip Dip LI        | 1SDA072591R1    | 1SDA073221R1    |
|              |      |                |             | E6.2V 4000 Ekip Dip LSI       | 1SDA072592R1    | 1SDA073222R1    |
|              |      |                |             | E6.2V 4000 Ekip Dip LSIG      | 1SDA072593R1    | 1SDA073223R1    |
|              |      |                |             | E6.2V 4000 Ekip Touch LI      | 1SDA072594R1    | 1SDA073224R1    |
|              |      |                |             | E6.2V 4000 Ekip Touch LSI     | 1SDA072595R1    | 1SDA073225R1    |
|              |      |                |             | E6.2V 4000 Ekip Touch LSIG    | 1SDA072596R1    | 1SDA073226R1    |
|              |      |                |             | E6.2V 4000 Ekip Hi-Touch LSI  | 1SDA072598R1    | 1SDA073228R1    |
|              |      |                |             | E6.2V 4000 Ekip Hi-Touch LSIG | 1SDA072599R1    | 1SDA073229R1    |
|              | 5000 | 150            | 100         | E6.2V 5000 Ekip Dip LI        | 1SDA072621R1    | 1SDA073251R1    |
|              |      |                |             | E6.2V 5000 Ekip Dip LSI       | 1SDA072622R1    | 1SDA073252R1    |
|              |      |                |             | E6.2V 5000 Ekip Dip LSIG      | 1SDA072623R1    | 1SDA073253R1    |
|              |      |                |             | E6.2V 5000 Ekip Touch LI      | 1SDA072624R1    | 1SDA073254R1    |
|              |      |                |             | E6.2V 5000 Ekip Touch LSI     | 1SDA072625R1    | 1SDA073255R1    |
|              |      |                |             | E6.2V 5000 Ekip Touch LSIG    | 1SDA072626R1    | 1SDA073256R1    |
|              |      |                |             | E6.2V 5000 Ekip Hi-Touch LSI  | 1SDA072628R1    | 1SDA073258R1    |
|              |      |                |             | E6.2V 5000 Ekip Hi-Touch LSIG | 1SDA072629R1    | 1SDA073259R1    |
|              | 6300 | 150            | 100         | E6.2V 6300 Ekip Dip LI        | 1SDA072651R1    | 1SDA073281R1    |
|              |      |                |             | E6.2V 6300 Ekip Dip LSI       | 1SDA072652R1    | 1SDA073282R1    |
|              |      |                |             | E6.2V 6300 Ekip Dip LSIG      | 1SDA072653R1    | 1SDA073283R1    |
|              |      |                |             | E6.2V 6300 Ekip Touch LI      | 1SDA072654R1    | 1SDA073284R1    |
|              |      |                |             | E6.2V 6300 Ekip Touch LSI     | 1SDA072655R1    | 1SDA073285R1    |
|              |      |                |             | E6.2V 6300 Ekip Touch LSIG    | 1SDA072656R1    | 1SDA073286R1    |
|              |      |                |             | E6.2V 6300 Ekip Hi-Touch LSI  | 1SDA072658R1    | 1SDA073288R1    |
|              |      |                |             | E6.2V 6300 Ekip Hi-Touch LSIG | 1SDA072659R1    | 1SDA073289R1    |



# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E6.2X • Mobile part of withdrawable circuit-breaker (MP)**

| Size  | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                          | 3 Poles      | 4 Poles      |
|-------|------|----------------|-------------|-------------------------------|--------------|--------------|
|       |      |                |             |                               | Code         | Code         |
| E6.2X | 4000 | 150            | 120         | E6.2X 4000 Ekip Dip LI        | 1SDA072601R1 | 1SDA073231R1 |
|       |      |                |             | E6.2X 4000 Ekip Dip LSI       | 1SDA072602R1 | 1SDA073232R1 |
|       |      |                |             | E6.2X 4000 Ekip Dip LSIG      | 1SDA072603R1 | 1SDA073233R1 |
|       |      |                |             | E6.2X 4000 Ekip Touch LI      | 1SDA072604R1 | 1SDA073234R1 |
|       |      |                |             | E6.2X 4000 Ekip Touch LSI     | 1SDA072605R1 | 1SDA073235R1 |
|       |      |                |             | E6.2X 4000 Ekip Touch LSIG    | 1SDA072606R1 | 1SDA073236R1 |
|       |      |                |             | E6.2X 4000 Ekip Hi-Touch LSI  | 1SDA072608R1 | 1SDA073238R1 |
|       |      |                |             | E6.2X 4000 Ekip Hi-Touch LSIG | 1SDA072609R1 | 1SDA073239R1 |
|       | 5000 | 150            | 120         | E6.2X 5000 Ekip Dip LI        | 1SDA072631R1 | 1SDA073261R1 |
|       |      |                |             | E6.2X 5000 Ekip Dip LSI       | 1SDA072632R1 | 1SDA073262R1 |
|       |      |                |             | E6.2X 5000 Ekip Dip LSIG      | 1SDA072633R1 | 1SDA073263R1 |
|       |      |                |             | E6.2X 5000 Ekip Touch LI      | 1SDA072634R1 | 1SDA073264R1 |
|       |      |                |             | E6.2X 5000 Ekip Touch LSI     | 1SDA072635R1 | 1SDA073265R1 |
|       |      |                |             | E6.2X 5000 Ekip Touch LSIG    | 1SDA072636R1 | 1SDA073266R1 |
|       |      |                |             | E6.2X 5000 Ekip Hi-Touch LSI  | 1SDA072638R1 | 1SDA073268R1 |
|       |      |                |             | E6.2X 5000 Ekip Hi-Touch LSIG | 1SDA072639R1 | 1SDA073269R1 |
|       | 6300 | 150            | 120         | E6.2X 6300 Ekip Dip LI        | 1SDA072661R1 | 1SDA073291R1 |
|       |      |                |             | E6.2X 6300 Ekip Dip LSI       | 1SDA072662R1 | 1SDA073292R1 |
|       |      |                |             | E6.2X 6300 Ekip Dip LSIG      | 1SDA072663R1 | 1SDA073293R1 |
|       |      |                |             | E6.2X 6300 Ekip Touch LI      | 1SDA072664R1 | 1SDA073294R1 |
|       |      |                |             | E6.2X 6300 Ekip Touch LSI     | 1SDA072665R1 | 1SDA073295R1 |
|       |      |                |             | E6.2X 6300 Ekip Touch LSIG    | 1SDA072666R1 | 1SDA073296R1 |
|       |      |                |             | E6.2X 6300 Ekip Hi-Touch LSI  | 1SDA072668R1 | 1SDA073298R1 |
|       |      |                |             | E6.2X 6300 Ekip Hi-Touch LSIG | 1SDA072669R1 | 1SDA073299R1 |

**SACE Emax E6.2H-V/f Full size • Mobile part of withdrawable circuit-breaker (MP)**

| Size           | Iu   | Icu (440 V) | Icw (1s) | Type                            | 4 Poles Code |
|----------------|------|-------------|----------|---------------------------------|--------------|
| <b>E6.2H/f</b> | 4000 | 100         | 100      | E6.2H/f 4000 Ekip Dip LI        | 1SDA073301R1 |
|                |      |             |          | E6.2H/f 4000 Ekip Dip LSI       | 1SDA073302R1 |
|                |      |             |          | E6.2H/f 4000 Ekip Dip LSIG      | 1SDA073303R1 |
|                |      |             |          | E6.2H/f 4000 Ekip Touch LI      | 1SDA073304R1 |
|                |      |             |          | E6.2H/f 4000 Ekip Touch LSI     | 1SDA073305R1 |
|                |      |             |          | E6.2H/f 4000 Ekip Touch LSIG    | 1SDA073306R1 |
|                |      |             |          | E6.2H/f 4000 Ekip Hi-Touch LSI  | 1SDA073308R1 |
|                |      |             |          | E6.2H/f 4000 Ekip Hi-Touch LSIG | 1SDA073309R1 |
|                | 5000 | 100         | 100      | E6.2H/f 5000 Ekip Dip LI        | 1SDA073331R1 |
|                |      |             |          | E6.2H/f 5000 Ekip Dip LSI       | 1SDA073332R1 |
|                |      |             |          | E6.2H/f 5000 Ekip Dip LSIG      | 1SDA073333R1 |
|                |      |             |          | E6.2H/f 5000 Ekip Touch LI      | 1SDA073334R1 |
|                |      |             |          | E6.2H/f 5000 Ekip Touch LSI     | 1SDA073335R1 |
|                |      |             |          | E6.2H/f 5000 Ekip Touch LSIG    | 1SDA073336R1 |
|                |      |             |          | E6.2H/f 5000 Ekip Hi-Touch LSI  | 1SDA073338R1 |
|                |      |             |          | E6.2H/f 5000 Ekip Hi-Touch LSIG | 1SDA073339R1 |
|                | 6300 | 100         | 100      | E6.2H/f 6300 Ekip Dip LI        | 1SDA073361R1 |
|                |      |             |          | E6.2H/f 6300 Ekip Dip LSI       | 1SDA073362R1 |
|                |      |             |          | E6.2H/f 6300 Ekip Dip LSIG      | 1SDA073363R1 |
|                |      |             |          | E6.2H/f 6300 Ekip Touch LI      | 1SDA073364R1 |
|                |      |             |          | E6.2H/f 6300 Ekip Touch LSI     | 1SDA073365R1 |
|                |      |             |          | E6.2H/f 6300 Ekip Touch LSIG    | 1SDA073366R1 |
|                |      |             |          | E6.2H/f 6300 Ekip Hi-Touch LSI  | 1SDA073368R1 |
|                |      |             |          | E6.2H/f 6300 Ekip Hi-Touch LSIG | 1SDA073369R1 |
| <b>E6.2V/f</b> | 4000 | 150         | 100      | E6.2V/f 4000 Ekip Dip LI        | 1SDA073311R1 |
|                |      |             |          | E6.2V/f 4000 Ekip Dip LSI       | 1SDA073312R1 |
|                |      |             |          | E6.2V/f 4000 Ekip Dip LSIG      | 1SDA073313R1 |
|                |      |             |          | E6.2V/f 4000 Ekip Touch LI      | 1SDA073314R1 |
|                |      |             |          | E6.2V/f 4000 Ekip Touch LSI     | 1SDA073315R1 |
|                |      |             |          | E6.2V/f 4000 Ekip Touch LSIG    | 1SDA073316R1 |
|                |      |             |          | E6.2V/f 4000 Ekip Hi-Touch LSI  | 1SDA073318R1 |
|                |      |             |          | E6.2V/f 4000 Ekip Hi-Touch LSIG | 1SDA073319R1 |
|                | 5000 | 150         | 100      | E6.2V/f 5000 Ekip Dip LI        | 1SDA073341R1 |
|                |      |             |          | E6.2V/f 5000 Ekip Dip LSI       | 1SDA073342R1 |
|                |      |             |          | E6.2V/f 5000 Ekip Dip LSIG      | 1SDA073343R1 |
|                |      |             |          | E6.2V/f 5000 Ekip Touch LI      | 1SDA073344R1 |
|                |      |             |          | E6.2V/f 5000 Ekip Touch LSI     | 1SDA073345R1 |
|                |      |             |          | E6.2V/f 5000 Ekip Touch LSIG    | 1SDA073346R1 |
|                |      |             |          | E6.2V/f 5000 Ekip Hi-Touch LSI  | 1SDA073348R1 |
|                |      |             |          | E6.2V/f 5000 Ekip Hi-Touch LSIG | 1SDA073349R1 |
|                | 6300 | 150         | 100      | E6.2V/f 6300 Ekip Dip LI        | 1SDA073371R1 |
|                |      |             |          | E6.2V/f 6300 Ekip Dip LSI       | 1SDA073372R1 |
|                |      |             |          | E6.2V/f 6300 Ekip Dip LSIG      | 1SDA073373R1 |
|                |      |             |          | E6.2V/f 6300 Ekip Touch LI      | 1SDA073374R1 |
|                |      |             |          | E6.2V/f 6300 Ekip Touch LSI     | 1SDA073375R1 |
|                |      |             |          | E6.2V/f 6300 Ekip Touch LSIG    | 1SDA073376R1 |
|                |      |             |          | E6.2V/f 6300 Ekip Hi-Touch LSI  | 1SDA073378R1 |
|                |      |             |          | E6.2V/f 6300 Ekip Hi-Touch LSIG | 1SDA073379R1 |

# Automatic circuit-breakers

## Withdrawable version for power distribution



**SACE Emax E6.2X/f Full size - Mobile part of withdrawable circuit-breaker (MP)**

| Size    | Iu   | Icu (440 V) | Icw (1s) | Type                            | 4 Poles Code |
|---------|------|-------------|----------|---------------------------------|--------------|
| E6.2X/f | 4000 | 150         | 120      | E6.2X/f 4000 Ekip Dip LI        | 1SDA073321R1 |
|         |      |             |          | E6.2X/f 4000 Ekip Dip LSI       | 1SDA073322R1 |
|         |      |             |          | E6.2X/f 4000 Ekip Dip LSIG      | 1SDA073323R1 |
|         |      |             |          | E6.2X/f 4000 Ekip Touch LI      | 1SDA073324R1 |
|         |      |             |          | E6.2X/f 4000 Ekip Touch LSI     | 1SDA073325R1 |
|         |      |             |          | E6.2X/f 4000 Ekip Touch LSIG    | 1SDA073326R1 |
|         |      |             |          | E6.2X/f 4000 Ekip Hi-Touch LSI  | 1SDA073328R1 |
|         |      |             |          | E6.2X/f 4000 Ekip Hi-Touch LSIG | 1SDA073329R1 |
|         | 5000 | 150         | 120      | E6.2X/f 5000 Ekip Dip LI        | 1SDA073351R1 |
|         |      |             |          | E6.2X/f 5000 Ekip Dip LSI       | 1SDA073352R1 |
|         |      |             |          | E6.2X/f 5000 Ekip Dip LSIG      | 1SDA073353R1 |
|         |      |             |          | E6.2X/f 5000 Ekip Touch LI      | 1SDA073354R1 |
|         |      |             |          | E6.2X/f 5000 Ekip Touch LSI     | 1SDA073355R1 |
|         |      |             |          | E6.2X/f 5000 Ekip Touch LSIG    | 1SDA073356R1 |
|         |      |             |          | E6.2X/f 5000 Ekip Hi-Touch LSI  | 1SDA073358R1 |
|         |      |             |          | E6.2X/f 5000 Ekip Hi-Touch LSIG | 1SDA073359R1 |
|         | 6300 | 150         | 120      | E6.2X/f 6300 Ekip Dip LI        | 1SDA073381R1 |
|         |      |             |          | E6.2X/f 6300 Ekip Dip LSI       | 1SDA073382R1 |
|         |      |             |          | E6.2X/f 6300 Ekip Dip LSIG      | 1SDA073383R1 |
|         |      |             |          | E6.2X/f 6300 Ekip Touch LI      | 1SDA073384R1 |
|         |      |             |          | E6.2X/f 6300 Ekip Touch LSI     | 1SDA073385R1 |
|         |      |             |          | E6.2X/f 6300 Ekip Touch LSIG    | 1SDA073386R1 |
|         |      |             |          | E6.2X/f 6300 Ekip Hi-Touch LSI  | 1SDA073388R1 |
|         |      |             |          | E6.2X/f 6300 Ekip Hi-Touch LSIG | 1SDA073389R1 |

# Automatic circuit-breakers

## Fixed version for generators



**SACE Emax E1.2B-C-N-L • Front terminals (F)**

| Size         | I <sub>u</sub> | I <sub>cu</sub><br>(440 V) | I <sub>cw</sub><br>(1s) | Type                            | 3 Poles      | 4 Poles      |
|--------------|----------------|----------------------------|-------------------------|---------------------------------|--------------|--------------|
|              |                |                            |                         |                                 | Code         | Code         |
| <b>E1.2B</b> | 630            | 42                         | 42                      | E1.2B 630 Ekip G Touch LSIG     | 1SDA070707R1 | 1SDA071337R1 |
|              |                |                            |                         | E1.2B 630 Ekip G Hi-Touch LSIG  | 1SDA070710R1 | 1SDA071340R1 |
|              | 800            | 42                         | 42                      | E1.2B 800 Ekip G Touch LSIG     | 1SDA070747R1 | 1SDA071377R1 |
|              |                |                            |                         | E1.2B 800 Ekip G Hi-Touch LSIG  | 1SDA070750R1 | 1SDA071380R1 |
|              | 1000           | 42                         | 42                      | E1.2B 1000 Ekip G Touch LSIG    | 1SDA070787R1 | 1SDA071417R1 |
|              |                |                            |                         | E1.2B 1000 Ekip G Hi-Touch LSIG | 1SDA070790R1 | 1SDA071420R1 |
|              | 1250           | 42                         | 42                      | E1.2B 1250 Ekip G Touch LSIG    | 1SDA070827R1 | 1SDA071457R1 |
|              |                |                            |                         | E1.2B 1250 Ekip G Hi-Touch LSIG | 1SDA070830R1 | 1SDA071460R1 |
|              | 1600           | 42                         | 42                      | E1.2B 1600 Ekip G Touch LSIG    | 1SDA070867R1 | 1SDA071497R1 |
|              |                |                            |                         | E1.2B 1600 Ekip G Hi-Touch LSIG | 1SDA070870R1 | 1SDA071500R1 |
| <b>E1.2C</b> | 630            | 50                         | 42                      | E1.2C 630 Ekip G Touch LSIG     | 1SDA070717R1 | 1SDA071347R1 |
|              |                |                            |                         | E1.2C 630 Ekip G Hi-Touch LSIG  | 1SDA070720R1 | 1SDA071350R1 |
|              | 800            | 50                         | 42                      | E1.2C 800 Ekip G Touch LSIG     | 1SDA070757R1 | 1SDA071387R1 |
|              |                |                            |                         | E1.2C 800 Ekip G Hi-Touch LSIG  | 1SDA070760R1 | 1SDA071390R1 |
|              | 1000           | 50                         | 42                      | E1.2C 1000 Ekip G Touch LSIG    | 1SDA070797R1 | 1SDA071427R1 |
|              |                |                            |                         | E1.2C 1000 Ekip G Hi-Touch LSIG | 1SDA070800R1 | 1SDA071430R1 |
|              | 1250           | 50                         | 42                      | E1.2C 1250 Ekip G Touch LSIG    | 1SDA070837R1 | 1SDA071467R1 |
|              |                |                            |                         | E1.2C 1250 Ekip G Hi-Touch LSIG | 1SDA070840R1 | 1SDA071470R1 |
|              | 1600           | 50                         | 42                      | E1.2C 1600 Ekip G Touch LSIG    | 1SDA070877R1 | 1SDA071507R1 |
|              |                |                            |                         | E1.2C 1600 Ekip G Hi-Touch LSIG | 1SDA070880R1 | 1SDA071510R1 |
| <b>E1.2N</b> | 250            | 66                         | 50                      | E1.2N 250 Ekip G Touch LSIG     | 1SDA070697R1 | 1SDA071327R1 |
|              |                |                            |                         | E1.2N 250 Ekip G Hi-Touch LSIG  | 1SDA070700R1 | 1SDA071330R1 |
|              | 630            | 66                         | 50                      | E1.2N 630 Ekip G Touch LSIG     | 1SDA070727R1 | 1SDA071357R1 |
|              |                |                            |                         | E1.2N 630 Ekip G Hi-Touch LSIG  | 1SDA070730R1 | 1SDA071360R1 |
|              | 800            | 66                         | 50                      | E1.2N 800 Ekip G Touch LSIG     | 1SDA070767R1 | 1SDA071397R1 |
|              |                |                            |                         | E1.2N 800 Ekip G Hi-Touch LSIG  | 1SDA070770R1 | 1SDA071400R1 |
|              | 1000           | 66                         | 50                      | E1.2N 1000 Ekip G Touch LSIG    | 1SDA070807R1 | 1SDA071437R1 |
|              |                |                            |                         | E1.2N 1000 Ekip G Hi-Touch LSIG | 1SDA070810R1 | 1SDA071440R1 |
|              | 1250           | 66                         | 50                      | E1.2N 1250 Ekip G Touch LSIG    | 1SDA070847R1 | 1SDA071477R1 |
|              |                |                            |                         | E1.2N 1250 Ekip G Hi-Touch LSIG | 1SDA070850R1 | 1SDA071480R1 |
|              | 1600           | 66                         | 50                      | E1.2N 1600 Ekip G Touch LSIG    | 1SDA070887R1 | 1SDA071517R1 |
|              |                |                            |                         | E1.2N 1600 Ekip G Hi-Touch LSIG | 1SDA070890R1 | 1SDA071520R1 |

# Automatic circuit-breakers

## Fixed version for generators



### SACE Emax E2.2B-N-S-H • Orientable rear terminals (HR)

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                             | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|----------------------------------|--------------|--------------|
|              |      |                |             |                                  | Code         | Code         |
| <b>E2.2B</b> | 1600 | 42             | 42          | E2.2B 1600 Ekip G Touch L SIG    | 1SDA070987R1 | 1SDA071617R1 |
|              |      |                |             | E2.2B 1600 Ekip G Hi-Touch L SIG | 1SDA070990R1 | 1SDA071620R1 |
|              | 2000 | 42             | 42          | E2.2B 2000 Ekip G Touch L SIG    | 1SDA071027R1 | 1SDA071657R1 |
|              |      |                |             | E2.2B 2000 Ekip G Hi-Touch L SIG | 1SDA071030R1 | 1SDA071660R1 |
| <b>E2.2N</b> | 800  | 66             | 66          | E2.2N 800 Ekip G Touch L SIG     | 1SDA070897R1 | 1SDA071527R1 |
|              |      |                |             | E2.2N 800 Ekip G Hi-Touch L SIG  | 1SDA070900R1 | 1SDA071530R1 |
|              | 1000 | 66             | 66          | E2.2N 1000 Ekip G Touch L SIG    | 1SDA070927R1 | 1SDA071557R1 |
|              |      |                |             | E2.2N 1000 Ekip G Hi-Touch L SIG | 1SDA070930R1 | 1SDA071560R1 |
|              | 1250 | 66             | 66          | E2.2N 1250 Ekip G Touch L SIG    | 1SDA070957R1 | 1SDA071587R1 |
|              |      |                |             | E2.2N 1250 Ekip G Hi-Touch L SIG | 1SDA070960R1 | 1SDA071590R1 |
|              | 1600 | 66             | 66          | E2.2N 1600 Ekip G Touch L SIG    | 1SDA070997R1 | 1SDA071627R1 |
|              |      |                |             | E2.2N 1600 Ekip G Hi-Touch L SIG | 1SDA071000R1 | 1SDA071630R1 |
|              | 2000 | 66             | 66          | E2.2N 2000 Ekip G Touch L SIG    | 1SDA071037R1 | 1SDA071667R1 |
|              |      |                |             | E2.2N 2000 Ekip G Hi-Touch L SIG | 1SDA071040R1 | 1SDA071670R1 |
|              | 2500 | 66             | 66          | E2.2N 2500 Ekip G Touch L SIG    | 1SDA071067R1 | 1SDA071697R1 |
|              |      |                |             | E2.2N 2500 Ekip G Hi-Touch L SIG | 1SDA071070R1 | 1SDA071700R1 |
| <b>E2.2S</b> | 250  | 85             | 66          | E2.2S 250 Ekip G Touch L SIG     | 1SDA073634R1 | 1SDA073644R1 |
|              |      |                |             | E2.2S 250 Ekip G Hi-Touch L SIG  | 1SDA073637R1 | 1SDA073647R1 |
|              | 800  | 85             | 66          | E2.2S 800 Ekip G Touch L SIG     | 1SDA070907R1 | 1SDA071537R1 |
|              |      |                |             | E2.2S 800 Ekip G Hi-Touch L SIG  | 1SDA070910R1 | 1SDA071540R1 |
|              | 1000 | 85             | 66          | E2.2S 1000 Ekip G Touch L SIG    | 1SDA070937R1 | 1SDA071567R1 |
|              |      |                |             | E2.2S 1000 Ekip G Hi-Touch L SIG | 1SDA070940R1 | 1SDA071570R1 |
|              | 1250 | 85             | 66          | E2.2S 1250 Ekip G Touch L SIG    | 1SDA070967R1 | 1SDA071597R1 |
|              |      |                |             | E2.2S 1250 Ekip G Hi-Touch L SIG | 1SDA070970R1 | 1SDA071600R1 |
|              | 1600 | 85             | 66          | E2.2S 1600 Ekip G Touch L SIG    | 1SDA071007R1 | 1SDA071637R1 |
|              |      |                |             | E2.2S 1600 Ekip G Hi-Touch L SIG | 1SDA071010R1 | 1SDA071640R1 |
|              | 2000 | 85             | 66          | E2.2S 2000 Ekip G Touch L SIG    | 1SDA071047R1 | 1SDA071677R1 |
|              |      |                |             | E2.2S 2000 Ekip G Hi-Touch L SIG | 1SDA071050R1 | 1SDA071680R1 |
|              | 2500 | 85             | 66          | E2.2S 2500 Ekip G Touch L SIG    | 1SDA071077R1 | 1SDA071707R1 |
|              |      |                |             | E2.2S 2500 Ekip G Hi-Touch L SIG | 1SDA071080R1 | 1SDA071710R1 |
| <b>E2.2H</b> | 800  | 100            | 85          | E2.2H 800 Ekip G Touch L SIG     | 1SDA070917R1 | 1SDA071547R1 |
|              |      |                |             | E2.2H 800 Ekip G Hi-Touch L SIG  | 1SDA070920R1 | 1SDA071550R1 |
|              | 1000 | 100            | 85          | E2.2H 1000 Ekip G Touch L SIG    | 1SDA070947R1 | 1SDA071577R1 |
|              |      |                |             | E2.2H 1000 Ekip G Hi-Touch L SIG | 1SDA070950R1 | 1SDA071580R1 |
|              | 1250 | 100            | 85          | E2.2H 1250 Ekip G Touch L SIG    | 1SDA070977R1 | 1SDA071607R1 |
|              |      |                |             | E2.2H 1250 Ekip G Hi-Touch L SIG | 1SDA070980R1 | 1SDA071610R1 |
|              | 1600 | 100            | 85          | E2.2H 1600 Ekip G Touch L SIG    | 1SDA071017R1 | 1SDA071647R1 |
|              |      |                |             | E2.2H 1600 Ekip G Hi-Touch L SIG | 1SDA071020R1 | 1SDA071650R1 |
|              | 2000 | 100            | 85          | E2.2H 2000 Ekip G Touch L SIG    | 1SDA071057R1 | 1SDA071687R1 |
|              |      |                |             | E2.2H 2000 Ekip G Hi-Touch L SIG | 1SDA071060R1 | 1SDA071690R1 |
|              | 2500 | 100            | 85          | E2.2H 2500 Ekip G Touch L SIG    | 1SDA071087R1 | 1SDA071717R1 |
|              |      |                |             | E2.2H 2500 Ekip G Hi-Touch L SIG | 1SDA071090R1 | 1SDA071720R1 |

**SACE Emax E4.2N-S-H-V • Orientable rear terminals (HR)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                            | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|---------------------------------|--------------|--------------|
|              |      |                |             |                                 | Code         | Code         |
| <b>E4.2N</b> | 3200 | 66             | 66          | E4.2N 3200 Ekip G Touch LSIG    | 1SDA071147R1 | 1SDA071777R1 |
|              |      |                |             | E4.2N 3200 Ekip G Hi-Touch LSIG | 1SDA071150R1 | 1SDA071780R1 |
|              | 4000 | 66             | 66          | E4.2N 4000 Ekip G Touch LSIG    | 1SDA071197R1 | 1SDA071827R1 |
|              |      |                |             | E4.2N 4000 Ekip G Hi-Touch LSIG | 1SDA071200R1 | 1SDA071830R1 |
| <b>E4.2S</b> | 3200 | 85             | 66          | E4.2S 3200 Ekip G Touch LSIG    | 1SDA071157R1 | 1SDA071787R1 |
|              |      |                |             | E4.2S 3200 Ekip G Hi-Touch LSIG | 1SDA071160R1 | 1SDA071790R1 |
|              | 4000 | 85             | 66          | E4.2S 4000 Ekip G Touch LSIG    | 1SDA071207R1 | 1SDA071837R1 |
|              |      |                |             | E4.2S 4000 Ekip G Hi-Touch LSIG | 1SDA071210R1 | 1SDA071840R1 |
| <b>E4.2H</b> | 3200 | 100            | 85          | E4.2H 3200 Ekip G Touch LSIG    | 1SDA071167R1 | 1SDA071797R1 |
|              |      |                |             | E4.2H 3200 Ekip G Hi-Touch LSIG | 1SDA071170R1 | 1SDA071800R1 |
|              | 4000 | 100            | 85          | E4.2H 4000 Ekip G Touch LSIG    | 1SDA071217R1 | 1SDA071847R1 |
|              |      |                |             | E4.2H 4000 Ekip G Hi-Touch LSIG | 1SDA071220R1 | 1SDA071850R1 |
| <b>E4.2V</b> | 2000 | 150            | 100         | E4.2V 2000 Ekip G Touch LSIG    | 1SDA071107R1 | 1SDA071737R1 |
|              |      |                |             | E4.2V 2000 Ekip G Hi-Touch LSIG | 1SDA071110R1 | 1SDA071740R1 |
|              | 2500 | 150            | 100         | E4.2V 2500 Ekip G Touch LSIG    | 1SDA071127R1 | 1SDA071757R1 |
|              |      |                |             | E4.2V 2500 Ekip G Hi-Touch LSIG | 1SDA071130R1 | 1SDA071760R1 |
|              | 3200 | 150            | 100         | E4.2V 3200 Ekip G Touch LSIG    | 1SDA071177R1 | 1SDA071807R1 |
|              |      |                |             | E4.2V 3200 Ekip G Hi-Touch LSIG | 1SDA071180R1 | 1SDA071810R1 |
|              | 4000 | 150            | 100         | E4.2V 4000 Ekip G Touch LSIG    | 1SDA071227R1 | 1SDA071857R1 |
|              |      |                |             | E4.2V 4000 Ekip G Hi-Touch LSIG | 1SDA071230R1 | 1SDA071860R1 |

# Automatic circuit-breakers

## Fixed version for generators



**SACE Emax E6.2H-V-X • Orientable rear terminals (HR)**

| Size         | I <sub>u</sub> | I <sub>cu</sub><br>(440 V) | I <sub>cw</sub><br>(1s) | Type                            | 3 Poles      | 4 Poles      |
|--------------|----------------|----------------------------|-------------------------|---------------------------------|--------------|--------------|
|              |                |                            |                         |                                 | Code         | Code         |
| <b>E6.2H</b> | 4000           | 100                        | 100                     | E6.2H 4000 Ekip G Touch LSIG    | 1SDA071237R1 | 1SDA071867R1 |
|              |                |                            |                         | E6.2H 4000 Ekip G Hi-Touch LSIG | 1SDA071240R1 | 1SDA071870R1 |
|              | 5000           | 100                        | 100                     | E6.2H 5000 Ekip G Touch LSIG    | 1SDA071267R1 | 1SDA071897R1 |
|              |                |                            |                         | E6.2H 5000 Ekip G Hi-Touch LSIG | 1SDA071270R1 | 1SDA071900R1 |
|              | 6300           | 100                        | 100                     | E6.2H 6300 Ekip G Touch LSIG    | 1SDA071297R1 | 1SDA071927R1 |
|              |                |                            |                         | E6.2H 6300 Ekip G Hi-Touch LSIG | 1SDA071300R1 | 1SDA071930R1 |
| <b>E6.2V</b> | 4000           | 150                        | 100                     | E6.2V 4000 Ekip G Touch LSIG    | 1SDA071247R1 | 1SDA071877R1 |
|              |                |                            |                         | E6.2V 4000 Ekip G Hi-Touch LSIG | 1SDA071250R1 | 1SDA071880R1 |
|              | 5000           | 150                        | 100                     | E6.2V 5000 Ekip G Touch LSIG    | 1SDA071277R1 | 1SDA071907R1 |
|              |                |                            |                         | E6.2V 5000 Ekip G Hi-Touch LSIG | 1SDA071280R1 | 1SDA071910R1 |
|              | 6300           | 150                        | 100                     | E6.2V 6300 Ekip G Touch LSIG    | 1SDA071307R1 | 1SDA071937R1 |
|              |                |                            |                         | E6.2V 6300 Ekip G Hi-Touch LSIG | 1SDA071310R1 | 1SDA071940R1 |
| <b>E6.2X</b> | 4000           | 150                        | 120                     | E6.2X 4000 Ekip G Touch LSIG    | 1SDA071257R1 | 1SDA071887R1 |
|              |                |                            |                         | E6.2X 4000 Ekip G Hi-Touch LSIG | 1SDA071260R1 | 1SDA071890R1 |
|              | 5000           | 150                        | 120                     | E6.2X 5000 Ekip G Touch LSIG    | 1SDA071287R1 | 1SDA071917R1 |
|              |                |                            |                         | E6.2X 5000 Ekip G Hi-Touch LSIG | 1SDA071290R1 | 1SDA071920R1 |
|              | 6300           | 150                        | 120                     | E6.2X 6300 Ekip G Touch LSIG    | 1SDA071317R1 | 1SDA071947R1 |
|              |                |                            |                         | E6.2X 6300 Ekip G Hi-Touch LSIG | 1SDA071320R1 | 1SDA071950R1 |

**SACE Emax E6.2H-V-X/f Full size • Orientable rear terminals (HR)**

| Size           | Iu   | Icu<br>(440 V) | Icw (1s) | Type                              | 4 Poles      |
|----------------|------|----------------|----------|-----------------------------------|--------------|
|                |      |                |          |                                   | Code         |
| <b>E6.2H/f</b> | 4000 | 100            | 100      | E6.2H/f 4000 Ekip G Touch LSIG    | 1SDA071957R1 |
|                |      |                |          | E6.2H/f 4000 Ekip G Hi-Touch LSIG | 1SDA071960R1 |
|                | 5000 | 100            | 100      | E6.2H/f 5000 Ekip G Touch LSIG    | 1SDA071987R1 |
|                |      |                |          | E6.2H/f 5000 Ekip G Hi-Touch LSIG | 1SDA071990R1 |
|                | 6300 | 100            | 100      | E6.2H/f 6300 Ekip G Touch LSIG    | 1SDA072017R1 |
|                |      |                |          | E6.2H/f 6300 Ekip G Hi-Touch LSIG | 1SDA072020R1 |
| <b>E6.2V/f</b> | 4000 | 150            | 100      | E6.2V/f 4000 Ekip G Touch LSIG    | 1SDA071967R1 |
|                |      |                |          | E6.2V/f 4000 Ekip G Hi-Touch LSIG | 1SDA071970R1 |
|                | 5000 | 150            | 100      | E6.2V/f 5000 Ekip G Touch LSIG    | 1SDA071997R1 |
|                |      |                |          | E6.2V/f 5000 Ekip G Hi-Touch LSIG | 1SDA072000R1 |
|                | 6300 | 150            | 100      | E6.2V/f 6300 Ekip G Touch LSIG    | 1SDA072027R1 |
|                |      |                |          | E6.2V/f 6300 Ekip G Hi-Touch LSIG | 1SDA072030R1 |
| <b>E6.2X/f</b> | 4000 | 150            | 120      | E6.2X/f 4000 Ekip G Touch LSIG    | 1SDA071977R1 |
|                |      |                |          | E6.2X/f 4000 Ekip G Hi-Touch LSIG | 1SDA071980R1 |
|                | 5000 | 150            | 120      | E6.2X/f 5000 Ekip G Touch LSIG    | 1SDA072007R1 |
|                |      |                |          | E6.2X/f 5000 Ekip G Hi-Touch LSIG | 1SDA072010R1 |
|                | 6300 | 150            | 120      | E6.2X/f 6300 Ekip G Touch LSIG    | 1SDA072037R1 |
|                |      |                |          | E6.2X/f 6300 Ekip G Hi-Touch LSIG | 1SDA072040R1 |



# Automatic circuit-breakers

## Withdrawable version for generators



**SACE Emax E1.2B-C-N-L • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | I <sub>u</sub> | I <sub>cu</sub><br>(440 V) | I <sub>cw</sub><br>(1s) | Type                            | 3 Poles      | 4 Poles      |
|--------------|----------------|----------------------------|-------------------------|---------------------------------|--------------|--------------|
|              |                |                            |                         |                                 | Code         | Code         |
| <b>E1.2B</b> | 630            | 42                         | 42                      | E1.2B 630 Ekip G Touch LSIG     | 1SDA072057R1 | 1SDA072687R1 |
|              |                |                            |                         | E1.2B 630 Ekip G Hi-Touch LSIG  | 1SDA072060R1 | 1SDA072690R1 |
|              | 800            | 42                         | 42                      | E1.2B 800 Ekip G Touch LSIG     | 1SDA072097R1 | 1SDA072727R1 |
|              |                |                            |                         | E1.2B 800 Ekip G Hi-Touch LSIG  | 1SDA072100R1 | 1SDA072730R1 |
|              | 1000           | 42                         | 42                      | E1.2B 1000 Ekip G Touch LSIG    | 1SDA072137R1 | 1SDA072767R1 |
|              |                |                            |                         | E1.2B 1000 Ekip G Hi-Touch LSIG | 1SDA072140R1 | 1SDA072770R1 |
|              | 1250           | 42                         | 42                      | E1.2B 1250 Ekip G Touch LSIG    | 1SDA072177R1 | 1SDA072807R1 |
|              |                |                            |                         | E1.2B 1250 Ekip G Hi-Touch LSIG | 1SDA072180R1 | 1SDA072810R1 |
|              | 1600           | 42                         | 42                      | E1.2B 1600 Ekip G Touch LSIG    | 1SDA072217R1 | 1SDA072847R1 |
|              |                |                            |                         | E1.2B 1600 Ekip G Hi-Touch LSIG | 1SDA072220R1 | 1SDA072850R1 |
| <b>E1.2C</b> | 630            | 50                         | 42                      | E1.2C 630 Ekip G Touch LSIG     | 1SDA072067R1 | 1SDA072697R1 |
|              |                |                            |                         | E1.2C 630 Ekip G Hi-Touch LSIG  | 1SDA072070R1 | 1SDA072700R1 |
|              | 800            | 50                         | 42                      | E1.2C 800 Ekip G Touch LSIG     | 1SDA072107R1 | 1SDA072737R1 |
|              |                |                            |                         | E1.2C 800 Ekip G Hi-Touch LSIG  | 1SDA072110R1 | 1SDA072740R1 |
|              | 1000           | 50                         | 42                      | E1.2C 1000 Ekip G Touch LSIG    | 1SDA072147R1 | 1SDA072777R1 |
|              |                |                            |                         | E1.2C 1000 Ekip G Hi-Touch LSIG | 1SDA072150R1 | 1SDA072780R1 |
|              | 1250           | 50                         | 42                      | E1.2C 1250 Ekip G Touch LSIG    | 1SDA072187R1 | 1SDA072817R1 |
|              |                |                            |                         | E1.2C 1250 Ekip G Hi-Touch LSIG | 1SDA072190R1 | 1SDA072820R1 |
|              | 1600           | 50                         | 42                      | E1.2C 1600 Ekip G Touch LSIG    | 1SDA072227R1 | 1SDA072857R1 |
|              |                |                            |                         | E1.2C 1600 Ekip G Hi-Touch LSIG | 1SDA072230R1 | 1SDA072860R1 |
| <b>E1.2N</b> | 250            | 66                         | 50                      | E1.2N 250 Ekip G Touch LSIG     | 1SDA072047R1 | 1SDA072677R1 |
|              |                |                            |                         | E1.2N 250 Ekip G Hi-Touch LSIG  | 1SDA072050R1 | 1SDA072680R1 |
|              | 630            | 66                         | 50                      | E1.2N 630 Ekip G Touch LSIG     | 1SDA072077R1 | 1SDA072707R1 |
|              |                |                            |                         | E1.2N 630 Ekip G Hi-Touch LSIG  | 1SDA072080R1 | 1SDA072710R1 |
|              | 800            | 66                         | 50                      | E1.2N 800 Ekip G Touch LSIG     | 1SDA072117R1 | 1SDA072747R1 |
|              |                |                            |                         | E1.2N 800 Ekip G Hi-Touch LSIG  | 1SDA072120R1 | 1SDA072750R1 |
|              | 1000           | 66                         | 50                      | E1.2N 1000 Ekip G Touch LSIG    | 1SDA072157R1 | 1SDA072787R1 |
|              |                |                            |                         | E1.2N 1000 Ekip G Hi-Touch LSIG | 1SDA072160R1 | 1SDA072790R1 |
|              | 1250           | 66                         | 50                      | E1.2N 1250 Ekip G Touch LSIG    | 1SDA072197R1 | 1SDA072827R1 |
|              |                |                            |                         | E1.2N 1250 Ekip G Hi-Touch LSIG | 1SDA072200R1 | 1SDA072830R1 |
|              | 1600           | 66                         | 50                      | E1.2N 1600 Ekip G Touch LSIG    | 1SDA072237R1 | 1SDA072867R1 |
|              |                |                            |                         | E1.2N 1600 Ekip G Hi-Touch LSIG | 1SDA072240R1 | 1SDA072870R1 |

**SACE Emax E2.2B-N-S-H • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                            | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|---------------------------------|--------------|--------------|
|              |      |                |             |                                 | Code         | Code         |
| <b>E2.2B</b> | 1600 | 42             | 42          | E2.2B 1600 Ekip G Touch LSIG    | 1SDA072337R1 | 1SDA072967R1 |
|              |      |                |             | E2.2B 1600 Ekip G Hi-Touch LSIG | 1SDA072340R1 | 1SDA072970R1 |
|              | 2000 | 42             | 42          | E2.2B 2000 Ekip G Touch LSIG    | 1SDA072377R1 | 1SDA073007R1 |
|              |      |                |             | E2.2B 2000 Ekip G Hi-Touch LSIG | 1SDA072380R1 | 1SDA073010R1 |
| <b>E2.2N</b> | 800  | 66             | 66          | E2.2N 800 Ekip G Touch LSIG     | 1SDA072247R1 | 1SDA072877R1 |
|              |      |                |             | E2.2N 800 Ekip G Hi-Touch LSIG  | 1SDA072250R1 | 1SDA072880R1 |
|              | 1000 | 66             | 66          | E2.2N 1000 Ekip G Touch LSIG    | 1SDA072277R1 | 1SDA072907R1 |
|              |      |                |             | E2.2N 1000 Ekip G Hi-Touch LSIG | 1SDA072280R1 | 1SDA072910R1 |
|              | 1250 | 66             | 66          | E2.2N 1250 Ekip G Touch LSIG    | 1SDA072307R1 | 1SDA072937R1 |
|              |      |                |             | E2.2N 1250 Ekip G Hi-Touch LSIG | 1SDA072310R1 | 1SDA072940R1 |
|              | 1600 | 66             | 66          | E2.2N 1600 Ekip G Touch LSIG    | 1SDA072347R1 | 1SDA072977R1 |
|              |      |                |             | E2.2N 1600 Ekip G Hi-Touch LSIG | 1SDA072350R1 | 1SDA072980R1 |
|              | 2000 | 66             | 66          | E2.2N 2000 Ekip G Touch LSIG    | 1SDA072387R1 | 1SDA073017R1 |
|              |      |                |             | E2.2N 2000 Ekip G Hi-Touch LSIG | 1SDA072390R1 | 1SDA073020R1 |
|              | 2500 | 66             | 66          | E2.2N 2500 Ekip G Touch LSIG    | 1SDA072417R1 | 1SDA073047R1 |
|              |      |                |             | E2.2N 2500 Ekip G Hi-Touch LSIG | 1SDA072420R1 | 1SDA073050R1 |
| <b>E2.2S</b> | 250  | 85             | 66          | E2.2S 250 Ekip G Touch LSIG     | 1SDA073654R1 | 1SDA073664R1 |
|              |      |                |             | E2.2S 250 Ekip G Hi-Touch LSIG  | 1SDA073657R1 | 1SDA073667R1 |
|              | 800  | 85             | 66          | E2.2S 800 Ekip G Touch LSIG     | 1SDA072257R1 | 1SDA072887R1 |
|              |      |                |             | E2.2S 800 Ekip G Hi-Touch LSIG  | 1SDA072260R1 | 1SDA072890R1 |
|              | 1000 | 85             | 66          | E2.2S 1000 Ekip G Touch LSIG    | 1SDA072287R1 | 1SDA072917R1 |
|              |      |                |             | E2.2S 1000 Ekip G Hi-Touch LSIG | 1SDA072290R1 | 1SDA072920R1 |
|              | 1250 | 85             | 66          | E2.2S 1250 Ekip G Touch LSIG    | 1SDA072317R1 | 1SDA072947R1 |
|              |      |                |             | E2.2S 1250 Ekip G Hi-Touch LSIG | 1SDA072320R1 | 1SDA072950R1 |
|              | 1600 | 85             | 66          | E2.2S 1600 Ekip G Touch LSIG    | 1SDA072357R1 | 1SDA072987R1 |
|              |      |                |             | E2.2S 1600 Ekip G Hi-Touch LSIG | 1SDA072360R1 | 1SDA072990R1 |
|              | 2000 | 85             | 66          | E2.2S 2000 Ekip G Touch LSIG    | 1SDA072397R1 | 1SDA073027R1 |
|              |      |                |             | E2.2S 2000 Ekip G Hi-Touch LSIG | 1SDA072400R1 | 1SDA073030R1 |
|              | 2500 | 85             | 66          | E2.2S 2500 Ekip G Touch LSIG    | 1SDA072427R1 | 1SDA073057R1 |
|              |      |                |             | E2.2S 2500 Ekip G Hi-Touch LSIG | 1SDA072430R1 | 1SDA073060R1 |
| <b>E2.2H</b> | 800  | 100            | 85          | E2.2H 800 Ekip G Touch LSIG     | 1SDA072267R1 | 1SDA072897R1 |
|              |      |                |             | E2.2H 800 Ekip G Hi-Touch LSIG  | 1SDA072270R1 | 1SDA072900R1 |
|              | 1000 | 100            | 85          | E2.2H 1000 Ekip G Touch LSIG    | 1SDA072297R1 | 1SDA072927R1 |
|              |      |                |             | E2.2H 1000 Ekip G Hi-Touch LSIG | 1SDA072300R1 | 1SDA072930R1 |
|              | 1250 | 100            | 85          | E2.2H 1250 Ekip G Touch LSIG    | 1SDA072327R1 | 1SDA072957R1 |
|              |      |                |             | E2.2H 1250 Ekip G Hi-Touch LSIG | 1SDA072330R1 | 1SDA072960R1 |
|              | 1600 | 100            | 85          | E2.2H 1600 Ekip G Touch LSIG    | 1SDA072367R1 | 1SDA072997R1 |
|              |      |                |             | E2.2H 1600 Ekip G Hi-Touch LSIG | 1SDA072370R1 | 1SDA073000R1 |
|              | 2000 | 100            | 85          | E2.2H 2000 Ekip G Touch LSIG    | 1SDA072407R1 | 1SDA073037R1 |
|              |      |                |             | E2.2H 2000 Ekip G Hi-Touch LSIG | 1SDA072410R1 | 1SDA073040R1 |
|              | 2500 | 100            | 85          | E2.2H 2500 Ekip G Touch LSIG    | 1SDA072437R1 | 1SDA073067R1 |
|              |      |                |             | E2.2H 2500 Ekip G Hi-Touch LSIG | 1SDA072440R1 | 1SDA073070R1 |

# Automatic circuit-breakers

## Withdrawable version for generators



**SACE Emax E4.2N-S-H-V • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                            | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|---------------------------------|--------------|--------------|
|              |      |                |             |                                 | Code         | Code         |
| <b>E4.2N</b> | 3200 | 66             | 66          | E4.2N 3200 Ekip G Touch LSIG    | 1SDA072497R1 | 1SDA073127R1 |
|              |      |                |             | E4.2N 3200 Ekip G Hi-Touch LSIG | 1SDA072500R1 | 1SDA073130R1 |
|              | 4000 | 66             | 66          | E4.2N 4000 Ekip G Touch LSIG    | 1SDA072547R1 | 1SDA073177R1 |
|              |      |                |             | E4.2N 4000 Ekip G Hi-Touch LSIG | 1SDA072550R1 | 1SDA073180R1 |
| <b>E4.2S</b> | 3200 | 85             | 66          | E4.2S 3200 Ekip G Touch LSIG    | 1SDA072507R1 | 1SDA073137R1 |
|              |      |                |             | E4.2S 3200 Ekip G Hi-Touch LSIG | 1SDA072510R1 | 1SDA073140R1 |
|              | 4000 | 85             | 66          | E4.2S 4000 Ekip G Touch LSIG    | 1SDA072557R1 | 1SDA073187R1 |
|              |      |                |             | E4.2S 4000 Ekip G Hi-Touch LSIG | 1SDA072560R1 | 1SDA073190R1 |
| <b>E4.2H</b> | 3200 | 100            | 85          | E4.2H 3200 Ekip G Touch LSIG    | 1SDA072517R1 | 1SDA073147R1 |
|              |      |                |             | E4.2H 3200 Ekip G Hi-Touch LSIG | 1SDA072520R1 | 1SDA073150R1 |
|              | 4000 | 100            | 85          | E4.2H 4000 Ekip G Touch LSIG    | 1SDA072567R1 | 1SDA073197R1 |
|              |      |                |             | E4.2H 4000 Ekip G Hi-Touch LSIG | 1SDA072570R1 | 1SDA073200R1 |
| <b>E4.2V</b> | 2000 | 150            | 100         | E4.2V 2000 Ekip G Touch LSIG    | 1SDA072457R1 | 1SDA073087R1 |
|              |      |                |             | E4.2V 2000 Ekip G Hi-Touch LSIG | 1SDA072460R1 | 1SDA073090R1 |
|              | 2500 | 150            | 100         | E4.2V 2500 Ekip G Touch LSIG    | 1SDA072477R1 | 1SDA073107R1 |
|              |      |                |             | E4.2V 2500 Ekip G Hi-Touch LSIG | 1SDA072480R1 | 1SDA073110R1 |
|              | 3200 | 150            | 100         | E4.2V 3200 Ekip G Touch LSIG    | 1SDA072527R1 | 1SDA073157R1 |
|              |      |                |             | E4.2V 3200 Ekip G Hi-Touch LSIG | 1SDA072530R1 | 1SDA073160R1 |
|              | 4000 | 150            | 100         | E4.2V 4000 Ekip G Touch LSIG    | 1SDA072577R1 | 1SDA073207R1 |
|              |      |                |             | E4.2V 4000 Ekip G Hi-Touch LSIG | 1SDA072580R1 | 1SDA073210R1 |

**SACE Emax E6.2H-V-X • Mobile part of withdrawable circuit-breaker (MP)**

| Size         | Iu   | Icu<br>(440 V) | Icw<br>(1s) | Type                            | 3 Poles      | 4 Poles      |
|--------------|------|----------------|-------------|---------------------------------|--------------|--------------|
|              |      |                |             |                                 | Code         | Code         |
| <b>E6.2H</b> | 4000 | 100            | 100         | E6.2H 4000 Ekip G Touch LSIG    | 1SDA072587R1 | 1SDA073217R1 |
|              |      |                |             | E6.2H 4000 Ekip G Hi-Touch LSIG | 1SDA072590R1 | 1SDA073220R1 |
|              | 5000 | 100            | 100         | E6.2H 5000 Ekip G Touch LSIG    | 1SDA072617R1 | 1SDA073247R1 |
|              |      |                |             | E6.2H 5000 Ekip G Hi-Touch LSIG | 1SDA072620R1 | 1SDA073250R1 |
|              | 6300 | 100            | 100         | E6.2H 6300 Ekip G Touch LSIG    | 1SDA072647R1 | 1SDA073277R1 |
|              |      |                |             | E6.2H 6300 Ekip G Hi-Touch LSIG | 1SDA072650R1 | 1SDA073280R1 |
| <b>E6.2V</b> | 4000 | 150            | 100         | E6.2V 4000 Ekip G Touch LSIG    | 1SDA072597R1 | 1SDA073227R1 |
|              |      |                |             | E6.2V 4000 Ekip G Hi-Touch LSIG | 1SDA072600R1 | 1SDA073230R1 |
|              | 5000 | 150            | 100         | E6.2V 5000 Ekip G Touch LSIG    | 1SDA072627R1 | 1SDA073257R1 |
|              |      |                |             | E6.2V 5000 Ekip G Hi-Touch LSIG | 1SDA072630R1 | 1SDA073260R1 |
|              | 6300 | 150            | 100         | E6.2V 6300 Ekip G Touch LSIG    | 1SDA072657R1 | 1SDA073287R1 |
|              |      |                |             | E6.2V 6300 Ekip G Hi-Touch LSIG | 1SDA072660R1 | 1SDA073290R1 |
| <b>E6.2X</b> | 4000 | 150            | 120         | E6.2X 4000 Ekip G Touch LSIG    | 1SDA072607R1 | 1SDA073237R1 |
|              |      |                |             | E6.2X 4000 Ekip G Hi-Touch LSIG | 1SDA072610R1 | 1SDA073240R1 |
|              | 5000 | 150            | 120         | E6.2X 5000 Ekip G Touch LSIG    | 1SDA072637R1 | 1SDA073267R1 |
|              |      |                |             | E6.2X 5000 Ekip G Hi-Touch LSIG | 1SDA072640R1 | 1SDA073270R1 |
|              | 6300 | 150            | 120         | E6.2X 6300 Ekip G Touch LSIG    | 1SDA072667R1 | 1SDA073297R1 |
|              |      |                |             | E6.2X 6300 Ekip G Hi-Touch LSIG | 1SDA072670R1 | 1SDA073300R1 |

# Automatic circuit-breakers

## Withdrawable version for generators



**SACE Emax E6.2H-V-X/f Full size • Mobile part of withdrawable circuit-breaker (MP)**

| Size           | Iu   | Icu<br>(440 V) | Icw (1s) | Type                              | 4 Poles      |
|----------------|------|----------------|----------|-----------------------------------|--------------|
|                |      |                |          |                                   | Code         |
| <b>E6.2H/f</b> | 4000 | 100            | 100      | E6.2H/f 4000 Ekip G Touch LSIG    | 1SDA073307R1 |
|                |      |                |          | E6.2H/f 4000 Ekip G Hi-Touch LSIG | 1SDA073310R1 |
|                | 5000 | 100            | 100      | E6.2H/f 5000 Ekip G Touch LSIG    | 1SDA073337R1 |
|                |      |                |          | E6.2H/f 5000 Ekip G Hi-Touch LSIG | 1SDA073340R1 |
|                | 6300 | 100            | 100      | E6.2H/f 6300 Ekip G Touch LSIG    | 1SDA073367R1 |
|                |      |                |          | E6.2H/f 6300 Ekip G Hi-Touch LSIG | 1SDA073370R1 |
| <b>E6.2V/f</b> | 4000 | 150            | 100      | E6.2V/f 4000 Ekip G Touch LSIG    | 1SDA073317R1 |
|                |      |                |          | E6.2V/f 4000 Ekip G Hi-Touch LSIG | 1SDA073320R1 |
|                | 5000 | 150            | 100      | E6.2V/f 5000 Ekip G Touch LSIG    | 1SDA073347R1 |
|                |      |                |          | E6.2V/f 5000 Ekip G Hi-Touch LSIG | 1SDA073350R1 |
|                | 6300 | 150            | 100      | E6.2V/f 6300 Ekip G Touch LSIG    | 1SDA073377R1 |
|                |      |                |          | E6.2V/f 6300 Ekip G Hi-Touch LSIG | 1SDA073380R1 |
| <b>E6.2X/f</b> | 4000 | 150            | 120      | E6.2X/f 4000 Ekip G Touch LSIG    | 1SDA073327R1 |
|                |      |                |          | E6.2X/f 4000 Ekip G Hi-Touch LSIG | 1SDA073330R1 |
|                | 5000 | 150            | 120      | E6.2X/f 5000 Ekip G Touch LSIG    | 1SDA073357R1 |
|                |      |                |          | E6.2X/f 5000 Ekip G Hi-Touch LSIG | 1SDA073360R1 |
|                | 6300 | 150            | 120      | E6.2X/f 6300 Ekip G Touch LSIG    | 1SDA073387R1 |
|                |      |                |          | E6.2X/f 6300 Ekip G Hi-Touch LSIG | 1SDA073390R1 |

# Switch-disconnectors

## Fixed version

**SACE Emax E1.2B-N/MS • Front terminals (F)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E1.2B/MS</b> | 630  | 42       | E1.2B/MS 630  | 1SDA073392R1 | 1SDA073431R1 |
|                 | 800  | 42       | E1.2B/MS 800  | 1SDA073394R1 | 1SDA073433R1 |
|                 | 1000 | 42       | E1.2B/MS 1000 | 1SDA073396R1 | 1SDA073435R1 |
|                 | 1250 | 42       | E1.2B/MS 1250 | 1SDA073398R1 | 1SDA073437R1 |
|                 | 1600 | 42       | E1.2B/MS 1600 | 1SDA073400R1 | 1SDA073439R1 |
| <b>E1.2N/MS</b> | 250  | 50       | E1.2N/MS 250  | 1SDA073391R1 | 1SDA073430R1 |
|                 | 630  | 50       | E1.2N/MS 630  | 1SDA073393R1 | 1SDA073432R1 |
|                 | 800  | 50       | E1.2N/MS 800  | 1SDA073395R1 | 1SDA073434R1 |
|                 | 1000 | 50       | E1.2N/MS 1000 | 1SDA073397R1 | 1SDA073436R1 |
|                 | 1250 | 50       | E1.2N/MS 1250 | 1SDA073399R1 | 1SDA073438R1 |
|                 | 1600 | 50       | E1.2N/MS 1600 | 1SDA073401R1 | 1SDA073440R1 |

**SACE Emax E2.2B-N-H/MS • Orientable rear terminals (HR)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E2.2B/MS</b> | 1600 | 42       | E2.2B/MS 1600 | 1SDA073408R1 | 1SDA073447R1 |
|                 | 2000 | 42       | E2.2B/MS 2000 | 1SDA073411R1 | 1SDA073450R1 |
| <b>E2.2N/MS</b> | 800  | 66       | E2.2N/MS 800  | 1SDA073402R1 | 1SDA073441R1 |
|                 | 1000 | 66       | E2.2N/MS 1000 | 1SDA073404R1 | 1SDA073443R1 |
|                 | 1250 | 66       | E2.2N/MS 1250 | 1SDA073406R1 | 1SDA073445R1 |
|                 | 1600 | 66       | E2.2N/MS 1600 | 1SDA073409R1 | 1SDA073448R1 |
|                 | 2000 | 66       | E2.2N/MS 2000 | 1SDA073412R1 | 1SDA073451R1 |
|                 | 2500 | 66       | E2.2N/MS 2500 | 1SDA073414R1 | 1SDA073453R1 |
| <b>E2.2H/MS</b> | 800  | 85       | E2.2H/MS 800  | 1SDA073403R1 | 1SDA073442R1 |
|                 | 1000 | 85       | E2.2H/MS 1000 | 1SDA073405R1 | 1SDA073444R1 |
|                 | 1250 | 85       | E2.2H/MS 1250 | 1SDA073407R1 | 1SDA073446R1 |
|                 | 1600 | 85       | E2.2H/MS 1600 | 1SDA073410R1 | 1SDA073449R1 |
|                 | 2000 | 85       | E2.2H/MS 2000 | 1SDA073413R1 | 1SDA073452R1 |
|                 | 2500 | 85       | E2.2H/MS 2500 | 1SDA073415R1 | 1SDA073454R1 |

# Switch-disconnectors

## Fixed version


**SACE Emax E4.2N-H-V/MS • Orientable rear terminals (HR)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E4.2N/MS</b> | 3200 | 66       | E4.2N/MS 3200 | 1SDA073418R1 | 1SDA073457R1 |
|                 | 4000 | 66       | E4.2N/MS 4000 | 1SDA073421R1 | 1SDA073460R1 |
| <b>E4.2H/MS</b> | 3200 | 85       | E4.2H/MS 3200 | 1SDA073419R1 | 1SDA073458R1 |
|                 | 4000 | 85       | E4.2H/MS 4000 | 1SDA073422R1 | 1SDA073461R1 |
| <b>E4.2V/MS</b> | 2000 | 100      | E4.2V/MS 2000 | 1SDA073416R1 | 1SDA073455R1 |
|                 | 2500 | 100      | E4.2V/MS 2500 | 1SDA073417R1 | 1SDA073456R1 |
|                 | 3200 | 100      | E4.2V/MS 3200 | 1SDA073420R1 | 1SDA073459R1 |
|                 | 4000 | 100      | E4.2V/MS 4000 | 1SDA073423R1 | 1SDA073462R1 |


**SACE Emax E6.2H-X/MS • Orientable rear terminals (HR)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E6.2H/MS</b> | 4000 | 100      | E6.2H/MS 4000 | 1SDA073424R1 | 1SDA073463R1 |
|                 | 5000 | 100      | E6.2H/MS 5000 | 1SDA073426R1 | 1SDA073465R1 |
|                 | 6300 | 100      | E6.2H/MS 6300 | 1SDA073428R1 | 1SDA073467R1 |
| <b>E6.2X/MS</b> | 4000 | 120      | E6.2X/MS 4000 | 1SDA073425R1 | 1SDA073464R1 |
|                 | 5000 | 120      | E6.2X/MS 5000 | 1SDA073427R1 | 1SDA073466R1 |
|                 | 6300 | 120      | E6.2X/MS 6300 | 1SDA073429R1 | 1SDA073468R1 |


**SACE Emax E6.2H-X/MS/f Full size • Orientable rear terminals (HR)**

| Size              | Iu   | Icw (1s) | Type            | 4 Poles      |
|-------------------|------|----------|-----------------|--------------|
|                   |      |          |                 | Code         |
| <b>E6.2H/MS/f</b> | 4000 | 100      | E6.2H/MS/f 4000 | 1SDA073469R1 |
|                   | 5000 | 100      | E6.2H/MS/f 5000 | 1SDA073471R1 |
|                   | 6300 | 100      | E6.2H/MS/f 6300 | 1SDA073473R1 |
| <b>E6.2X/MS/f</b> | 4000 | 120      | E6.2X/MS/f 4000 | 1SDA073470R1 |
|                   | 5000 | 120      | E6.2X/MS/f 5000 | 1SDA073472R1 |
|                   | 6300 | 120      | E6.2X/MS/f 6300 | 1SDA073474R1 |

# Switch-disconnectors

## Withdrawable version



**SACE Emax E1.2B-N/MS • Mobile part of withdrawable circuit-breaker (MP)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E1.2B/MS</b> | 630  | 42       | E1.2B/MS 630  | 1SDA073476R1 | 1SDA073515R1 |
|                 | 800  | 42       | E1.2B/MS 800  | 1SDA073478R1 | 1SDA073517R1 |
|                 | 1000 | 42       | E1.2B/MS 1000 | 1SDA073480R1 | 1SDA073519R1 |
|                 | 1250 | 42       | E1.2B/MS 1250 | 1SDA073482R1 | 1SDA073521R1 |
|                 | 1600 | 42       | E1.2B/MS 1600 | 1SDA073484R1 | 1SDA073523R1 |
| <b>E1.2N/MS</b> | 250  | 50       | E1.2N/MS 250  | 1SDA073475R1 | 1SDA073514R1 |
|                 | 630  | 50       | E1.2N/MS 630  | 1SDA073477R1 | 1SDA073516R1 |
|                 | 800  | 50       | E1.2N/MS 800  | 1SDA073479R1 | 1SDA073518R1 |
|                 | 1000 | 50       | E1.2N/MS 1000 | 1SDA073481R1 | 1SDA073520R1 |
|                 | 1250 | 50       | E1.2N/MS 1250 | 1SDA073483R1 | 1SDA073522R1 |
|                 | 1600 | 50       | E1.2N/MS 1600 | 1SDA073485R1 | 1SDA073524R1 |



**SACE Emax E2.2B-N-H/MS • Mobile part of withdrawable circuit-breaker (MP)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E2.2B/MS</b> | 1600 | 42       | E2.2B/MS 1600 | 1SDA073492R1 | 1SDA073531R1 |
|                 | 2000 | 42       | E2.2B/MS 2000 | 1SDA073495R1 | 1SDA073534R1 |
| <b>E2.2N/MS</b> | 800  | 66       | E2.2N/MS 800  | 1SDA073486R1 | 1SDA073525R1 |
|                 | 1000 | 66       | E2.2N/MS 1000 | 1SDA073488R1 | 1SDA073527R1 |
|                 | 1250 | 66       | E2.2N/MS 1250 | 1SDA073490R1 | 1SDA073529R1 |
|                 | 1600 | 66       | E2.2N/MS 1600 | 1SDA073493R1 | 1SDA073532R1 |
|                 | 2000 | 66       | E2.2N/MS 2000 | 1SDA073496R1 | 1SDA073535R1 |
|                 | 2500 | 66       | E2.2N/MS 2500 | 1SDA073498R1 | 1SDA073537R1 |
| <b>E2.2H/MS</b> | 800  | 85       | E2.2H/MS 800  | 1SDA073487R1 | 1SDA073526R1 |
|                 | 1000 | 85       | E2.2H/MS 1000 | 1SDA073489R1 | 1SDA073528R1 |
|                 | 1250 | 85       | E2.2H/MS 1250 | 1SDA073491R1 | 1SDA073530R1 |
|                 | 1600 | 85       | E2.2H/MS 1600 | 1SDA073494R1 | 1SDA073533R1 |
|                 | 2000 | 85       | E2.2H/MS 2000 | 1SDA073497R1 | 1SDA073536R1 |
|                 | 2500 | 85       | E2.2H/MS 2500 | 1SDA073499R1 | 1SDA073538R1 |



# Switch-disconnectors

## Withdrawable version



**SACE Emax E4.2N-H-V/MS • Mobile part of withdrawable circuit-breaker (MP)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E4.2N/MS</b> | 3200 | 66       | E4.2N/MS 3200 | 1SDA073502R1 | 1SDA073541R1 |
|                 | 4000 | 66       | E4.2N/MS 4000 | 1SDA073505R1 | 1SDA073544R1 |
| <b>E4.2H/MS</b> | 3200 | 85       | E4.2H/MS 3200 | 1SDA073503R1 | 1SDA073542R1 |
|                 | 4000 | 85       | E4.2H/MS 4000 | 1SDA073506R1 | 1SDA073545R1 |
| <b>E4.2V/MS</b> | 2000 | 100      | E4.2V/MS 2000 | 1SDA073500R1 | 1SDA073539R1 |
|                 | 2500 | 100      | E4.2V/MS 2500 | 1SDA073501R1 | 1SDA073540R1 |
|                 | 3200 | 100      | E4.2V/MS 3200 | 1SDA073504R1 | 1SDA073543R1 |
|                 | 4000 | 100      | E4.2V/MS 4000 | 1SDA073507R1 | 1SDA073546R1 |



**SACE Emax E6.2H-X/MS • Mobile part of withdrawable circuit-breaker (MP)**

| Size            | Iu   | Icw (1s) | Type          | 3 Poles      | 4 Poles      |
|-----------------|------|----------|---------------|--------------|--------------|
|                 |      |          |               | Code         | Code         |
| <b>E6.2H/MS</b> | 4000 | 100      | E6.2H/MS 4000 | 1SDA073508R1 | 1SDA073547R1 |
|                 | 5000 | 100      | E6.2H/MS 5000 | 1SDA073510R1 | 1SDA073549R1 |
|                 | 6300 | 100      | E6.2H/MS 6300 | 1SDA073512R1 | 1SDA073551R1 |
| <b>E6.2X/MS</b> | 4000 | 120      | E6.2X/MS 4000 | 1SDA073509R1 | 1SDA073548R1 |
|                 | 5000 | 120      | E6.2X/MS 5000 | 1SDA073511R1 | 1SDA073550R1 |
|                 | 6300 | 120      | E6.2X/MS 6300 | 1SDA073513R1 | 1SDA073552R1 |

**SACE Emax E6.2H-X/MS/f Full size • Mobile part of withdrawable circuit-breaker (MP)**

| Size              | Iu   | Icw (1s) | Type            | 4 Poles      |
|-------------------|------|----------|-----------------|--------------|
|                   |      |          |                 | Code         |
| <b>E6.2H/MS/f</b> | 4000 | 100      | E6.2H/MS/f 4000 | 1SDA073553R1 |
|                   | 5000 | 100      | E6.2H/MS/f 5000 | 1SDA073555R1 |
|                   | 6300 | 100      | E6.2H/MS/f 6300 | 1SDA073557R1 |
| <b>E6.2X/MS/f</b> | 4000 | 120      | E6.2X/MS/f 4000 | 1SDA073554R1 |
|                   | 5000 | 120      | E6.2X/MS/f 5000 | 1SDA073556R1 |
|                   | 6300 | 120      | E6.2X/MS/f 6300 | 1SDA073558R1 |

# Derived versions

## Sectionalizing truck - CS

| Size      | lu   | Type              | 3 poles<br>Code | 4 poles<br>Code |
|-----------|------|-------------------|-----------------|-----------------|
| E2.2/CS   | 2000 | E2.2/CS 2000 MP   | 1SDA081778R1    | 1SDA081779R1    |
| E2.2/CS   | 2500 | E2.2/CS 2500 MP   | 1SDA074348R1    | 1SDA074349R1    |
| E4.2/CS   | 3200 | E4.2/CS 3200 MP   | 1SDA081780R1    | 1SDA081781R1    |
| E4.2/CS   | 4000 | E4.2/CS 4000 MP   | 1SDA074350R1    | 1SDA074351R1    |
| E6.2/CS   | 6300 | E6.2/CS 6300 MP   | 1SDA074352R1    | 1SDA074353R1    |
| E6.2/CS/f | 6300 | E6.2/CS/f 6300 MP | -               | 1SDA082504R1    |

## Earthing truck - MT

| Size      | lu   | Type                                                    | 3 poles<br>Code | 4 poles<br>Code |
|-----------|------|---------------------------------------------------------|-----------------|-----------------|
| E2.2/MT   | 2000 | E2.2/MT 2000 MP Earth connection from upper terminals   | 1SDA081782R1    | 1SDA081783R1    |
| E2.2/MT   | 2500 | E2.2/MT 2500 MP Earth connection from upper terminals   | 1SDA074354R1    | 1SDA074355R1    |
| E4.2/MT   | 3200 | E4.2/MT 3200 MP Earth connection from upper terminals   | 1SDA081784R1    | 1SDA081785R1    |
| E4.2/MT   | 4000 | E4.2/MT 4000 MP Earth connection from upper terminals   | 1SDA074356R1    | 1SDA074357R1    |
| E6.2/MT   | 6300 | E6.2/MT 6300 MP Earth connection from upper terminals   | 1SDA074358R1    | 1SDA074359R1    |
| E2.2/MT   | 2000 | E2.2/MT 2000 MP Earth connection from lower terminals   | 1SDA081786R1    | 1SDA081787R1    |
| E2.2/MT   | 2500 | E2.2/MT 2500 MP Earth connection from lower terminals   | 1SDA074360R1    | 1SDA074361R1    |
| E4.2/MT   | 3200 | E4.2/MT 3200 MP Earth connection from lower terminals   | 1SDA081788R1    | 1SDA081789R1    |
| E4.2/MT   | 4000 | E4.2/MT 4000 MP Earth connection from lower terminals   | 1SDA074362R1    | 1SDA074363R1    |
| E6.2/MT   | 6300 | E6.2/MT 6300 MP Earth connection from lower terminals   | 1SDA074364R1    | 1SDA074365R1    |
| E6.2/MT/f | 6300 | E6.2/MT/f 6300 MP Earth connection from upper terminals | -               | 1SDA082505R1    |
| E6.2/MT/f | 6300 | E6.2/MT/f 6300 MP Earth connection from lower terminals | -               | 1SDA082506R1    |

# Derived versions

## Earthing switch with making capacity - MTP

| Size       | Iu   | Type                                                     | 3 poles<br>Code | 4 poles<br>Code |
|------------|------|----------------------------------------------------------|-----------------|-----------------|
| E2.2/MTP   | 2000 | E2.2/MTP 2000 MP Earth connection from upper terminals   | 1SDA081790R1    | 1SDA081791R1    |
| E2.2/MTP   | 2500 | E2.2/MTP 2500 MP Earth connection from upper terminals   | 1SDA074366R1    | 1SDA074367R1    |
| E4.2/MTP   | 3200 | E4.2/MTP 3200 MP Earth connection from upper terminals   | 1SDA081792R1    | 1SDA081793R1    |
| E4.2/MTP   | 4000 | E4.2/MTP 4000 MP Earth connection from upper terminals   | 1SDA074368R1    | 1SDA074369R1    |
| E6.2/MTP   | 6300 | E6.2/MTP 6300 MP Earth connection from upper terminals   | 1SDA074370R1    | 1SDA074371R1    |
| E2.2/MTP   | 2000 | E2.2/MTP 2000 MP Earth connection from lower terminals   | 1SDA081794R1    | 1SDA081795R1    |
| E2.2/MTP   | 2500 | E2.2/MTP 2500 MP Earth connection from lower terminals   | 1SDA074372R1    | 1SDA074373R1    |
| E4.2/MTP   | 3200 | E4.2/MTP 3200 MP Earth connection from lower terminals   | 1SDA081796R1    | 1SDA081797R1    |
| E4.2/MTP   | 4000 | E4.2/MTP 4000 MP Earth connection from lower terminals   | 1SDA074374R1    | 1SDA074375R1    |
| E6.2/MTP   | 6300 | E6.2/MTP 6300 MP Earth connection from lower terminals   | 1SDA074376R1    | 1SDA074377R1    |
| E6.2/MTP/f | 6300 | E6.2/MTP/f 6300 MP Earth connection from upper terminals | -               | 1SDA082507R1    |
| E6.2/MTP/f | 6300 | E6.2/MTP/f 6300 MP Earth connection from lower terminals | -               | 1SDA082508R1    |

## Accessories for MT and MTP

| Size                     | Type                                                                       | Code         |
|--------------------------|----------------------------------------------------------------------------|--------------|
| E2.2 <sup>(1)</sup>      | Grounding clamp FP E2.2 for MT/MTP                                         | 1SDA074378R1 |
| E4.2-E6.2 <sup>(1)</sup> | Grounding clamp FP E4.2-E6.2 for MT/MTP                                    | 1SDA074379R1 |
| E2.2                     | Grounding clamp retrofitting FP E2.2 for MT/MTP (Front/Side mounting)      | 1SDA085591R1 |
| E4.2-E6.2                | Grounding clamp retrofitting FP E4.2-E6.2 for MT/MTP (Front/Side mounting) | 1SDA085592R1 |

Grounding clamps must be installed in every fixed parts in which a MT/MTP mobile parts is foreseen. Otherwise the standard fixed parts can not accept MT/MTP device.

1) Only mounted. For loose supply contact ABB.

## Fixed or Mobile Part with neutral on right side

| Size        | Type                                                                       | Code         |
|-------------|----------------------------------------------------------------------------|--------------|
| E1.2...E6.2 | Installation with neutral on right side sequence L1,L2,L3,N <sup>(1)</sup> | 1SDA076153R1 |

1) When this configuration is selected, the circuit-breaker is not certified for IEC 61557-12 (Class 1 accuracy)

# Fixed parts



NOTE: the standard fixed parts can not accept MT/MTP device. In order to allow the utilization of MT/MTP mobile parts is mandatory to install the grounding clamps on fixed parts. Accessorizing only in the factory

| Size                  | Performance | Iu range   | Type of terminal | Type                                 | 3 Poles      | 4 Poles      |
|-----------------------|-------------|------------|------------------|--------------------------------------|--------------|--------------|
|                       |             |            |                  |                                      | Code         | Code         |
| E1.2                  | B, C, N, L  | 250 - 1600 | HR - HR          | E1.2 W FP Iu=1600 HR HR              | 1SDA073907R1 | 1SDA073908R1 |
| E2.2                  | B, N, S, H  | 250 - 2000 | HR - HR          | E2.2 W FP Iu=2000 HR HR              | 1SDA073909R1 | 1SDA073910R1 |
| E2.2                  | N, S, H     | 2500 only  | HR - HR          | E2.2 W FP Iu=2500 HR HR              | 1SDA073911R1 | 1SDA073912R1 |
| E4.2                  | N, S, H     | 3200 only  | HR - HR          | E4.2 W FP Iu=3200 HR HR              | 1SDA073913R1 | 1SDA073914R1 |
| E4.2                  | N, S, H     | 4000 only  | HR - HR          | E4.2 W FP Iu=4000 or V version HR HR | 1SDA073915R1 | 1SDA073916R1 |
| E4.2                  | V           | 2000-4000  | HR - HR          | E4.2 W FP Iu=4000 or V version HR HR | 1SDA073915R1 | 1SDA073916R1 |
| E6.2                  | H, V        | 4000-5000  | HR - HR          | E6.2 W FP Iu=5000 HR HR              | 1SDA073917R1 | 1SDA073918R1 |
| E6.2/f                | H, V        | 4000-5000  | HR - HR          | E6.2 W FP Iu=5000 HR HR              |              | 1SDA073919R1 |
| E6.2 <sup>(1)</sup>   | H, V, X     | 4000-6300  | HR - HR          | E6.2 W FP Iu=6300 or X version HR HR | 1SDA073920R1 | 1SDA073921R1 |
| E6.2/f <sup>(1)</sup> | H, V, X     | 4000-6300  | HR - HR          | E6.2 W FP Iu=6300 or X version HR HR |              | 1SDA073922R1 |

1) These types of fixed parts are suitable for all types of E6.2 mobile parts from 4000A to 6300A (all Icu performance level)

## 0-Arc distance top cover for fixed parts

| Size                       | Type                                     | Code         |
|----------------------------|------------------------------------------|--------------|
| E2.2...E6.2 <sup>(1)</sup> | 0-arc distance top cover E2.2...6.2 W FP | 1SDA085710R1 |

1) Factory fitted only. For installation up to 690V AC. Not compatible with standard AUP, it is necessary to order the following codes:  
 AUP 5 contacts 400V E2.2...E6.2 - left set 1SDA080373R1  
 AUP 5 contacts 24V E2.2...E6.2 - left set 1SDA080374R1  
 AUP 5 suppl. contacts 400V E2.2...E6.2 - right set 1SDA080375R1  
 AUP 5 suppl. contacts 24V E2.2...E6.2 - right set 1SDA080376R1

# Accessories

## Electrical accessories



### First and second opening release - YO

| Size       | Type                         | Code         |
|------------|------------------------------|--------------|
| E1.2..E6.2 | YO E1.2..E6.2 24V AC/DC      | 1SDA073668R1 |
| E1.2..E6.2 | YO E1.2..E6.2 30V AC/DC      | 1SDA073669R1 |
| E1.2..E6.2 | YO E1.2..E6.2 48V AC/DC      | 1SDA073670R1 |
| E1.2..E6.2 | YO E1.2..E6.2 60V AC/DC      | 1SDA073671R1 |
| E1.2..E6.2 | YO E1.2..E6.2 110-120V AC/DC | 1SDA073672R1 |
| E1.2..E6.2 | YO E1.2..E6.2 120-127V AC/DC | 1SDA073673R1 |
| E1.2..E6.2 | YO E1.2..E6.2 220-240V AC/DC | 1SDA073674R1 |
| E1.2..E6.2 | YO E1.2..E6.2 240-250V AC/DC | 1SDA073675R1 |
| E1.2..E6.2 | YO E1.2..E6.2 277V AC        | 1SDA073676R1 |
| E1.2..E6.2 | YO E1.2..E6.2 380-400V AC    | 1SDA073677R1 |
| E1.2..E6.2 | YO E1.2..E6.2 415-440V AC    | 1SDA073678R1 |
| E1.2..E6.2 | YO E1.2..E6.2 480-500V AC    | 1SDA073679R1 |

### First and second closing release - YC

| Size       | Type                         | Code         |
|------------|------------------------------|--------------|
| E1.2..E6.2 | YC E1.2..E6.2 24V AC/DC      | 1SDA073681R1 |
| E1.2..E6.2 | YC E1.2..E6.2 30V AC/DC      | 1SDA073682R1 |
| E1.2..E6.2 | YC E1.2..E6.2 48V AC/DC      | 1SDA073683R1 |
| E1.2..E6.2 | YC E1.2..E6.2 60V AC/DC      | 1SDA073684R1 |
| E1.2..E6.2 | YC E1.2..E6.2 110-120V AC/DC | 1SDA073685R1 |
| E1.2..E6.2 | YC E1.2..E6.2 120-127V AC/DC | 1SDA073686R1 |
| E1.2..E6.2 | YC E1.2..E6.2 220-240V AC/DC | 1SDA073687R1 |
| E1.2..E6.2 | YC E1.2..E6.2 240-250V AC/DC | 1SDA073688R1 |
| E1.2..E6.2 | YC E1.2..E6.2 277V AC        | 1SDA073689R1 |
| E1.2..E6.2 | YC E1.2..E6.2 380-400V AC    | 1SDA073690R1 |
| E1.2..E6.2 | YC E1.2..E6.2 415-440V AC    | 1SDA073691R1 |
| E1.2..E6.2 | YC E1.2..E6.2 480-500V AC    | 1SDA073692R1 |

### YO/YC test unit

| Size                       | Type                        | Code         |
|----------------------------|-----------------------------|--------------|
| E1.2...E6.2 <sup>(1)</sup> | YO/YC test unit E1.2...E6.2 | 1SDA082751R1 |

1) Only as loose part

### Undervoltage release - YU

| Size       | Type                         | Code         |
|------------|------------------------------|--------------|
| E1.2..E6.2 | YU E1.2..E6.2 24V AC/DC      | 1SDA073694R1 |
| E1.2..E6.2 | YU E1.2..E6.2 30V AC/DC      | 1SDA073695R1 |
| E1.2..E6.2 | YU E1.2..E6.2 48V AC/DC      | 1SDA073696R1 |
| E1.2..E6.2 | YU E1.2..E6.2 60V AC/DC      | 1SDA073697R1 |
| E1.2..E6.2 | YU E1.2..E6.2 110-120V AC/DC | 1SDA073698R1 |
| E1.2..E6.2 | YU E1.2..E6.2 120-127V AC/DC | 1SDA073699R1 |
| E1.2..E6.2 | YU E1.2..E6.2 220-240V AC/DC | 1SDA073700R1 |
| E1.2..E6.2 | YU E1.2..E6.2 240-250V AC/DC | 1SDA073701R1 |
| E1.2..E6.2 | YU E1.2..E6.2 277V AC        | 1SDA073702R1 |
| E1.2..E6.2 | YU E1.2..E6.2 380-400V AC    | 1SDA073703R1 |
| E1.2..E6.2 | YU E1.2..E6.2 415-440V AC    | 1SDA073704R1 |
| E1.2..E6.2 | YU E1.2..E6.2 480-500V AC    | 1SDA073705R1 |

### Electronic time-delay device for undervoltage release - UVD

| Size        | Type             | Code         |
|-------------|------------------|--------------|
| E1.2...E6.2 | 24...30V DC      | 1SDA038316R1 |
| E1.2...E6.2 | 48V AC/DC        | 1SDA038317R1 |
| E1.2...E6.2 | 60V AC/DC        | 1SDA038318R1 |
| E1.2...E6.2 | 110...127V AC/DC | 1SDA038319R1 |
| E1.2...E6.2 | 220...250V AC/DC | 1SDA038320R1 |

**Remote Reset - YR**

| Size                       | Type                      | Code         |
|----------------------------|---------------------------|--------------|
| E1.2                       | YR 24V DC E1.2            | 1SDA073744R1 |
| E1.2 <sup>(1)</sup>        | YR 110V AC/DC E1.2        | 1SDA073745R1 |
| E1.2 <sup>(1)</sup>        | YR 220V AC/DC E1.2        | 1SDA073746R1 |
| E2.2...E6.2                | YR 24V DC E2.2...E6.2     | 1SDA073747R1 |
| E2.2...E6.2 <sup>(1)</sup> | YR 110V AC/DC E2.2...E6.2 | 1SDA073748R1 |
| E2.2...E6.2 <sup>(1)</sup> | YR 220V AC/DC E2.2...E6.2 | 1SDA073749R1 |

1) when YR is used in DC, the activation of YR must be done with a maximum impulse time of 50ms. The YR cannot be powered permanently.

**Motor - M**

| Size        | Type                                          | Code         |
|-------------|-----------------------------------------------|--------------|
| E1.2        | M E1.2 24-30V AC/DC+S33 M/2 250V              | 1SDA073708R1 |
| E1.2        | M E1.2 48-60V AC/DC+S33 M/2 250V              | 1SDA073709R1 |
| E1.2        | M E1.2 100-130V AC/DC+S33 M/2 250V            | 1SDA073710R1 |
| E1.2        | M E1.2 220-250V AC/DC+S33 M/2 250V            | 1SDA073711R1 |
| E1.2        | M E1.2 380-415V AC+S33 M/2 250V               | 1SDA073713R1 |
| E2.2...E6.2 | M E2.2...E6.2 24-30V AC/DC+S33 M/2 400V       | 1SDA073722R1 |
| E2.2...E6.2 | M E2.2...E6.2 48-60V AC/DC+S33 M/2 400V       | 1SDA073723R1 |
| E2.2...E6.2 | M E2.2...E6.2 100-130V AC/DC+S33 M/2 400V     | 1SDA073724R1 |
| E2.2...E6.2 | M E2.2...E6.2 220-250V AC/DC+S33 M/2 400V     | 1SDA073725R1 |
| E2.2...E6.2 | M E2.2...E6.2 380-415V AC+S33 M/2 400V        | 1SDA073727R1 |
| E1.2        | M E1.2 24-30V AC/DC + S33 M/2 24V DC          | 1SDA073715R1 |
| E1.2        | M E1.2 48-60V AC/DC + S33 M/2 24V DC          | 1SDA073716R1 |
| E1.2        | M E1.2 100-130V AC/DC + S33 M/2 24V DC        | 1SDA073717R1 |
| E1.2        | M E1.2 220-250V AC/DC + S33 M/2 24V DC        | 1SDA073718R1 |
| E1.2        | M E1.2 380-415V AC + S33 M/2 24V DC           | 1SDA073720R1 |
| E2.2...E6.2 | M E2.2...E6.2 24-30V AC/DC + S33 M/2 24V DC   | 1SDA073729R1 |
| E2.2...E6.2 | M E2.2...E6.2 48-60V AC/DC + S33 M/2 24V DC   | 1SDA073730R1 |
| E2.2...E6.2 | M E2.2...E6.2 100-130V AC/DC + S33 M/2 24V DC | 1SDA073731R1 |
| E2.2...E6.2 | M E2.2...E6.2 220-250V AC/DC + S33 M/2 24V DC | 1SDA073732R1 |

**Current sensor for neutral conductor outside the circuit-breaker<sup>(1)</sup>**

| Size        | Type                                                      | Code         |
|-------------|-----------------------------------------------------------|--------------|
| E1.2 - E2.2 | Ext CS N E1.2 E2.2 2000A                                  | 1SDA073736R1 |
| E2.2        | Ext CS N E2.2 2500A                                       | 1SDA073737R1 |
| E4.2        | Ext CS N E4.2 3200A                                       | 1SDA073738R1 |
| E4.2 - E6.2 | Ext CS N E4.2 4000A E6.2 50%                              | 1SDA073739R1 |
| E6.2        | Ext CS N E6.2                                             | 1SDA073740R1 |
| E1.2 - E2.2 | Ext CS N E1.2 - E2.2 2000A for 1% CB <sup>(2)</sup>       | 1SDA107553R1 |
| E2.2        | Ext CS N E2.2 2500A for 1% CB <sup>(2)</sup>              | 1SDA107554R1 |
| E4.2        | Ext CS N E4.2 3200A for 1% CB <sup>(2)</sup>              | 1SDA107555R1 |
| E4.2 - E6.2 | Ext CS N E4.2 4000A - E6.2 N 50% for 1% CB <sup>(2)</sup> | 1SDA107556R1 |
| E6.2        | Ext CS N E6.2 for 1% CB <sup>(2)</sup>                    | 1SDA107557R1 |

1) Only as loose part

2) To be used with circuit-breakers equipped with 1% accuracy feature only. The external neutral is not certified for 1% accuracy.

**Homopolar toroid for the earthing conductor of main power supply<sup>(1)</sup>**

| Size        | Type                                | Code         |
|-------------|-------------------------------------|--------------|
| E1.2...E6.2 | Homopolar toroid E1.2 ... E6.2 100A | 1SDA073743R1 |
| E1.2...E6.2 | Homopolar toroid E1.2 ... E6.2 250A | 1SDA076248R1 |
| E1.2...E6.2 | Homopolar toroid E1.2 ... E6.2 400A | 1SDA076249R1 |
| E1.2...E6.2 | Homopolar toroid E1.2 ... E6.2 800A | 1SDA076250R1 |

1) Only as loose part

**Toroid for differential protection<sup>(1)</sup>**

| Size        | Type                          | Code         |
|-------------|-------------------------------|--------------|
| E1.2 - E2.2 | Toroid RC E1.2 3p/4p, E2.2 3p | 1SDA073741R1 |
| E2.2 - E4.2 | Toroid RC E2.2 4p, E4.2 3p    | 1SDA073742R1 |

1) Only as loose part



# Accessories

## Electrical accessories



### Dedicated terminal for Modified Differential Ground Fault (MDGF) protection

| Size        | Type                                                          | Code         |
|-------------|---------------------------------------------------------------|--------------|
| E1.2...E6.2 | MDGF Terminal for fixed circuit breaker <sup>(1)</sup>        | 1SDA114800R1 |
| E1.2...E6.2 | MDGF Terminal for withdrawable circuit breaker <sup>(1)</sup> | 1SDA114798R1 |

1) The commercial code includes one piece.

External phase current transformers and summing current transformers must be purchased separately.

### Open/closed auxiliary contacts - AUX

| Size                           | Type                                                                     | Code         |
|--------------------------------|--------------------------------------------------------------------------|--------------|
| E1.2 <sup>(2)</sup>            | AUX 4Q 400V E1.2                                                         | 1SDA073750R1 |
| E1.2                           | AUX 4Q 24V E1.2                                                          | 1SDA073751R1 |
| E1.2                           | AUX 2Q 400V + 2Q 24V E1.2                                                | 1SDA073752R1 |
| E2.2...E6.2 <sup>(2)</sup>     | AUX 4Q 400V E2.2...E6.2                                                  | 1SDA073753R1 |
| E2.2...E6.2                    | AUX 4Q 24V E2.2...E6.2                                                   | 1SDA073754R1 |
| E2.2...E6.2                    | AUX 2Q 400V + 2Q 24V E2.2...E6.2                                         | 1SDA073755R1 |
| E2.2...E6.2                    | AUX 6Q 400V E2.2...E6.2                                                  | 1SDA073756R1 |
| E2.2...E6.2                    | AUX 6Q 24V E2.2...E6.2                                                   | 1SDA073757R1 |
| E2.2...E6.2                    | AUX 3Q 400V AC + 3Q 24V DC E2.2...E6.2                                   | 1SDA075973R1 |
| E1.2 <sup>(1) (4)</sup>        | AUX 15Q 400V E1.2                                                        | 1SDA073758R1 |
| E1.2 <sup>(1) (4)</sup>        | AUX 15Q 24V E1.2                                                         | 1SDA073759R1 |
| E2.2...E6.2 <sup>(1)</sup>     | AUX 15Q 400V (for fixed or withdrawable with signaling in racked in)     | 1SDA073760R1 |
| E2.2...E6.2 <sup>(1)</sup>     | AUX 15Q 24V (for fixed or withdrawable with signaling in racked in)      | 1SDA073761R1 |
| E2.2...E6.2 <sup>(1) (3)</sup> | AUX15Q 400V (for withdrawable with signaling in racked in/test isolated) | 1SDA073846R1 |
| E2.2...E6.2 <sup>(1) (3)</sup> | AUX15Q 24V (for withdrawable with signaling in racked in/test isolated)  | 1SDA073847R1 |

1) not compatible with mechanical locks on compartment doors or mechanical interlocks.

For E1.2 you need to order also one of the following items:

Plate for fixed - floor mounted 1SDA079783R1

Plate for fixed - wall mounted 1SDA079782R1

Plate for withdrawable 1SDA079784R1

2) Standard supply with automatic circuit-breakers;

3) also compatible with fixed version;

4) For E1.2 withdrawable, the AUX 15Q works only in racked-in position

**Auxiliary position contacts - AUP**

| Size        | Type                                                                | Code         |
|-------------|---------------------------------------------------------------------|--------------|
| E1.2        | AUP 6 contacts 400V E1.2                                            | 1SDA073762R1 |
| E1.2        | AUP 6 contacts 24V E1.2                                             | 1SDA073763R1 |
| E2.2...E6.2 | AUP 5 contacts 400V E2.2...E6.2 - left set                          | 1SDA073764R1 |
| E2.2...E6.2 | AUP 5 contacts 24V E2.2...E6.2 - left set                           | 1SDA073765R1 |
| E2.2...E6.2 | AUP 5 suppl. contacts 400V E2.2...E6.2 - right set                  | 1SDA073766R1 |
| E2.2...E6.2 | AUP 5 suppl. contacts 24V E2.2...E6.2 - right set                   | 1SDA073767R1 |
| E2.2...E6.2 | AUP 5 suppl. contacts 400V E2.2...E6.2 - 1in 3test 1out - right set | 1SDA082749R1 |
| E1.2...E6.2 | AUP Ekip auxiliary position contact E1.2..E6.2                      | 1SDA073768R1 |

**Ready to close signalling contact- RTC**

| Size        | Type                     | Code         |
|-------------|--------------------------|--------------|
| E1.2        | RTC 250V E1.2            | 1SDA073770R1 |
| E1.2        | RTC 24V E1.2             | 1SDA073771R1 |
| E1.2        | RTC Ekip 24V E1.2        | 1SDA073772R1 |
| E2.2...E6.2 | RTC 250V E2.2...E6.2     | 1SDA073773R1 |
| E2.2...E6.2 | RTC 24V E2.2...E6.2      | 1SDA073774R1 |
| E2.2...E6.2 | RTC Ekip 24V E2.2...E6.2 | 1SDA073775R1 |

**Contact signalling tripping of Ekip protection trip unit - S51**

| Size        | Type                                | Code         |
|-------------|-------------------------------------|--------------|
| E1.2        | S51 250V E1.2 <sup>(1)</sup>        | 1SDA073776R1 |
| E1.2        | S51 24V E1.2                        | 1SDA073777R1 |
| E2.2...E6.2 | S51 250V E2.2...E6.2 <sup>(1)</sup> | 1SDA073778R1 |
| E2.2...E6.2 | S51 24V E2.2...E6.2                 | 1SDA073779R1 |
| E2.2...E6.2 | S51/2 250V                          | 1SDA085699R1 |
| E2.2...E6.2 | S51/2 24V                           | 1SDA085700R1 |

1) Standard supply with automatic circuit-breakers.

**Terminals for auxiliary connection**

| Size                       | Type                  | Code         |
|----------------------------|-----------------------|--------------|
| E1.2...E6.2 <sup>(1)</sup> | Terminals 10 pcs      | 1SDA073906R1 |
| E1.2...E6.2 <sup>(2)</sup> | Terminals 8 pcs INST  | 1SDA114779R1 |
| E1.2...E6.2 <sup>(2)</sup> | Terminals 18 pcs INST | 1SDA114780R1 |

1) Only as Loose part

2) Factory fitted only



# Accessories

## Mechanical accessories



### Mechanical operation counter - MOC

| Size                | Type                             | Code         |
|---------------------|----------------------------------|--------------|
| E1.2 <sup>(1)</sup> | MOC Mechanical operation counter | 1SDA073780R1 |
| E2.2...E6.2         | MOC Mechanical operation counter | 1SDA073781R1 |

1) only available with Motor, for installation without Motor the support 1SDA105237R1 is required



### Key lock in open position - KLC

| Size                           | Type                                    | Code         |
|--------------------------------|-----------------------------------------|--------------|
| E1.2                           | KLC-D Key lock open E1.2                | 1SDA073782R1 |
| E1.2                           | KLC-S Key lock open N.20005 E1.2        | 1SDA073783R1 |
| E1.2                           | KLC-S Key lock open N.20006 E1.2        | 1SDA073784R1 |
| E1.2                           | KLC-S Key lock open N.20007 E1.2        | 1SDA073785R1 |
| E1.2                           | KLC-S Key lock open N.20008 E1.2        | 1SDA073786R1 |
| E1.2                           | KLC-S Key lock open N.20009 E1.2        | 1SDA073787R1 |
| E1.2 <sup>(1) (2)</sup>        | KLC-A Castell key lock open E1.2        | 1SDA073788R1 |
| E1.2 <sup>(2)</sup>            | KLC-A Kirk key lock open E1.2           | 1SDA073789R1 |
| E1.2 <sup>(2) (4)</sup>        | KLC-A STI key lock open E1.2            | 1SDA073790R1 |
| E1.2 <sup>(2) (3)</sup>        | KLC-A Ronis-STI lock Open E1.2          | 1SDA085733R1 |
| E2.2...E6.2                    | KLC-D Key lock open E2.2...E6.2         | 1SDA073791R1 |
| E2.2...E6.2                    | KLC-S key lock open N.20005 E2.2...E6.2 | 1SDA073792R1 |
| E2.2...E6.2                    | KLC-S key lock open N.20006 E2.2...E6.2 | 1SDA073793R1 |
| E2.2...E6.2                    | KLC-S key lock open N.20007 E2.2...E6.2 | 1SDA073794R1 |
| E2.2...E6.2                    | KLC-S key lock open N.20008 E2.2...E6.2 | 1SDA073795R1 |
| E2.2...E6.2                    | KLC-S key lock open N.20009 E2.2...E6.2 | 1SDA073796R1 |
| E2.2...E6.2 <sup>(1) (2)</sup> | KLC-A Castell key lock open E2.2...E6.2 | 1SDA073797R1 |
| E2.2...E6.2 <sup>(2)</sup>     | KLC-A Kirk key lock open E2.2...E6.2    | 1SDA073798R1 |
| E2.2...E6.2 <sup>(2) (4)</sup> | KLC-A STI key lock open E2.2...E6.2     | 1SDA073799R1 |
| E2.2...E6.2 <sup>(2) (3)</sup> | KLC-A Ronis-STI lock open E2.2...E6.2   | 1SDA085734R1 |

1) If you need as loose supply, please order also the dedicated cover on page 304 under [Accessories Cover](#);

2) arrangement only;

3) compatible models: Ronis 1104B - STI ABA90DEL5000 - STI HBA90DPS5000;

4) compatible models: STI ABA90DEL5000 - STI HBA90DPS5000



### Padlocks in open position - PLC

| Size        | Type                                            | Code         |
|-------------|-------------------------------------------------|--------------|
| E1.2        | PLC E1.2 Padlocks in open position D=4mm        | 1SDA073800R1 |
| E1.2        | PLC E1.2 Padlocks in open position D=7mm        | 1SDA073801R1 |
| E1.2        | PLC E1.2 Padlocks in open position D=8mm        | 1SDA073802R1 |
| E2.2...E6.2 | PLC E2.2...E6.2 Padlocks in open position D=4mm | 1SDA073803R1 |
| E2.2...E6.2 | PLC E2.2...E6.2 Padlocks in open position D=7mm | 1SDA073804R1 |
| E2.2...E6.2 | PLC E2.2...E6.2 Padlocks in open position D=8mm | 1SDA073805R1 |

The lock shackle/shank diameter must match for proper operation.

### Floor fixing plate - F

| Size | Type                              | Code         |
|------|-----------------------------------|--------------|
| E1.2 | Floor fixing plate for fixed unit | 1SDA076020R1 |

**Key lock in racked-in / test / racked-out position- KLP**

| Size                           | Type                                             | Code         |
|--------------------------------|--------------------------------------------------|--------------|
| E1.2                           | KLP-D Racked in/out E1.2 1st key                 | 1SDA073822R1 |
| E1.2                           | KLP-S Racked in/out N.20005 E1.2 1st key         | 1SDA073823R1 |
| E1.2                           | KLP-S Racked in/out N.20006 E1.2 1st key         | 1SDA073824R1 |
| E1.2                           | KLP-S Racked in/out N.20007 E1.2 1st key         | 1SDA073825R1 |
| E1.2                           | KLP-S Racked in/out N.20008 E1.2 1st key         | 1SDA073826R1 |
| E1.2                           | KLP-S Racked in/out N.20009 E1.2 1st key         | 1SDA073827R1 |
| E1.2                           | KLP-D Racked in/out E1.2 2nd key                 | 1SDA073828R1 |
| E1.2                           | KLP-S Racked in/out N.20005 E1.2 2nd key         | 1SDA073829R1 |
| E1.2                           | KLP-S Racked in/out N.20006 E1.2 2nd key         | 1SDA073830R1 |
| E1.2                           | KLP-S Racked in/out N.20007 E1.2 2nd key         | 1SDA073831R1 |
| E1.2                           | KLP-S Racked in/out N.20008 E1.2 2nd key         | 1SDA073832R1 |
| E1.2                           | KLP-S Racked in/out N.20009 E1.2 2nd key         | 1SDA073833R1 |
| E1.2 <sup>(4)</sup>            | KLP-A Racked in/out STI Kirk E1.2 1st key        | 1SDA073834R1 |
| E1.2 <sup>(4)</sup>            | KLP-A Racked in/out STI Kirk E1.2 2nd key        | 1SDA073835R1 |
| E1.2 <sup>(2) (3)</sup>        | KLP-A Racked in/out Ronis-STI E1.2 1st key       | 1SDA085737R1 |
| E1.2 <sup>(2) (3)</sup>        | KLP-A Racked in/out Ronis-STI E1.2 2nd key       | 1SDA085738R1 |
| E2.2...E6.2                    | KLP-D Racked in/out E2.2...E6.2 1st key          | 1SDA073806R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20005 E2.2...E6.2 1st key  | 1SDA073807R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20006 E2.2...E6.2 1st key  | 1SDA073808R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20007 E2.2...E6.2 1st key  | 1SDA073809R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20008 E2.2...E6.2 1st key  | 1SDA073810R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20009 E2.2...E6.2 1st key  | 1SDA073811R1 |
| E2.2...E6.2                    | KLP-D Racked in/out E2.2...E6.2 2nd key          | 1SDA073812R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20005 E2.2...E6.2 2nd key  | 1SDA073813R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20006 E2.2...E6.2 2nd key  | 1SDA073814R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20007 E2.2...E6.2 2nd key  | 1SDA073815R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20008 E2.2...E6.2 2nd key  | 1SDA073816R1 |
| E2.2...E6.2                    | KLP-S Racked in/out N.20009 E2.2...E6.2 2nd key  | 1SDA073817R1 |
| E2.2...E6.2 <sup>(2) (4)</sup> | KLP-A Racked in/out STI Kirk E2.2...E6.2 1st key | 1SDA073818R1 |
| E2.2...E6.2 <sup>(2) (4)</sup> | KLP-A Racked in/out STI Kirk E2.2...E6.2 2nd key | 1SDA073819R1 |
| E2.2...E6.2 <sup>(1) (2)</sup> | KLP-A Racked in/out Castell E2.2...E6.2 1st key  | 1SDA073820R1 |
| E2.2...E6.2 <sup>(1) (2)</sup> | KLP-A Racked in/out Castell E2.2...E6.2 2nd key  | 1SDA073821R1 |
| E2.2...E6.2 <sup>(2) (3)</sup> | KLP-A Racked in/out Ronis-STI E2.2/E6.2 1st key  | 1SDA085735R1 |
| E2.2...E6.2 <sup>(2) (3)</sup> | KLP-A Racked in/out Ronis-STI E2.2/E6.2 2nd key  | 1SDA085736R1 |

When the PLP is already present, you have to order the KLP 2nd key and not the KLP 1st key

1) please order with the dedicated KLP cover; 2) arrangement only;

3) compatible models: Ronis 1104B - STI ABA90DEL5000 - STI HBA90DPS5000;

4) compatible models: STI ABA90DEL5000 - STI HBA90DPS5000 - KIRK KCAM00010

**Accessory for supplementary lock in racked-out position**

| Size        | Type                                   | Code                        |
|-------------|----------------------------------------|-----------------------------|
| E1.2        | Suppl. locks in racked-out E1.2        | 1SDA073838R1 <sup>(1)</sup> |
| E2.2...E6.2 | Suppl. locks in racked-out E2.2...E6.2 | 1SDA073839R1                |

1) Not compatible with Castell KLP

**Padlock in racked-in / test / racked-out position - PLP**

| Size        | Type                                                 | Code         |
|-------------|------------------------------------------------------|--------------|
| E1.2        | PLP Bl. padlocks Racked in/out D=4/6/8mm E1.2        | 1SDA073840R1 |
| E2.2...E6.2 | PLP Bl. padlocks Racked in/out D=4/6/8mm E2.2...E6.2 | 1SDA073841R1 |

The lock shackle/shank diameter must match for proper operation.

# Accessories

## Mechanical accessories



### Lock for racking in / racking out the mobile part when the door is open - DLR

| Size                       | Type            | Code         |
|----------------------------|-----------------|--------------|
| E2.2...E6.2 <sup>(1)</sup> | DLR E2.2...E6.2 | 1SDA073845R1 |

1) Only as loose part

### Lock to prevent door opening when circuit-breaker is in racked-in / test position - DLP

| Size                       | Type            | Code         |
|----------------------------|-----------------|--------------|
| E2.2...E6.2 <sup>(1)</sup> | DLP E2.2...E6.2 | 1SDA073849R1 |

1) Only as loose part

### Lock to prevent door opening when circuit-breaker is in closed position - DLC

| Size                       | Type                                                       | Code         |
|----------------------------|------------------------------------------------------------|--------------|
| E1.2                       | DLC Interlock cable door for fixed part withdrawable E1.2  | 1SDA081034R1 |
| E1.2                       | DLC Interlock direct door for fixed to wall E1.2           | 1SDA079779R1 |
| E1.2                       | DLC Interlock direct door for fixed part withdrawable E1.2 | 1SDA079781R1 |
| E2.2...E6.2 <sup>(1)</sup> | DLC Interlock direct door E2.2...E6.2                      | 1SDA073853R1 |

1) To be ordered with lever for interlock [group 2] and support for interlock [1SDA073895R1]

### Protection device for opening and closing pushbuttons - PBC

| Size        | Type                                          | Code         |
|-------------|-----------------------------------------------|--------------|
| E1.2        | PBC Prot. Pushbuttons AP/CH E1.2              | 1SDA073854R1 |
| E1.2        | PBC Prot. Pushbuttons AP/CH D=4mm E1.2        | 1SDA073855R1 |
| E1.2        | PBC Prot. Pushbuttons AP/CH D=7mm E1.2        | 1SDA073856R1 |
| E1.2        | PBC Prot. Pushbuttons AP/CH D=8mm E1.2        | 1SDA073857R1 |
| E2.2...E6.2 | PBC Prot. Pushbuttons AP/CH E2.2...E6.2       | 1SDA073858R1 |
| E2.2...E6.2 | PBC Prot. Pushbuttons AP/CH D=4mm E2.2...E6.2 | 1SDA073859R1 |
| E2.2...E6.2 | PBC Prot. Pushbuttons AP/CH D=7mm E2.2...E6.2 | 1SDA073860R1 |
| E2.2...E6.2 | PBC Prot. Pushbuttons AP/CH D=8mm E2.2...E6.2 | 1SDA073861R1 |

### Circuit-breaker flange

| Size                           | Type                                   | Code         |
|--------------------------------|----------------------------------------|--------------|
| E1.2                           | IP30 Flange E1.2 F                     | 1SDA073862R1 |
| E1.2                           | IP30 Flange E1.2 W                     | 1SDA073863R1 |
| E2.2...E6.2                    | IP30 Flange E2.2...E6.2 F              | 1SDA073864R1 |
| E2.2...E6.2                    | IP30 Flange E2.2...E6.2 W              | 1SDA073865R1 |
| E2.2...E6.2                    | Removal IP30 Flange E2.2...E6.2        | 1SDA020932R1 |
| E1.2 <sup>(1)</sup>            | IP54 Flange different keys E1.2        | 1SDA073866R1 |
| E2.2...E6.2 <sup>(1) (2)</sup> | IP54 Flange different keys E2.2...E6.2 | 1SDA073867R1 |
| E1.2 <sup>(1)</sup>            | IP54 Flange key No. 20005 E1.2         | 1SDA073868R1 |
| E2.2...E6.2 <sup>(1) (2)</sup> | IP54 Flange key No. 20005 E2.2...E6.2  | 1SDA073869R1 |
| E2.2...E6.2                    | Sealable trip unit cover               | 1SDA073870R1 |

1) Only as loose part; 2) Certified for IK10

### Remote Racking Device - RRD

| Size                       | Type                              | Code         |
|----------------------------|-----------------------------------|--------------|
| E2.2...E6.2                | RRD Emax 2 E2.2...E6.2 110Vac/dc  | 1SDA085528R1 |
| E2.2...E6.2                | RRD Emax 2 E2.2...E6.2 220Vac/dc  | 1SDA085529R1 |
| E2.2...E6.2 <sup>(1)</sup> | Kit for fixing RRD on E2.2...E6.2 | 1SDA085530R1 |

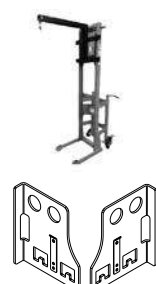
1) One kit per breaker needed

### ACB floor crane

| Size                   | Poles  | IEC/UL | Version   | Code         | Min quantity |
|------------------------|--------|--------|-----------|--------------|--------------|
| E1.2; E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA103910R1 | 1            |

### Lifting plates

| Size             | Poles  | IEC/UL | Version   | Code         | Min quantity |
|------------------|--------|--------|-----------|--------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081454R1 | 1            |



# Accessories

## Mechanical interlock



### High or low terminal covers- HTC/LTC

| Size | Type                                | 3 poles      | 4 poles      |
|------|-------------------------------------|--------------|--------------|
|      |                                     | Code         | Code         |
| E1.2 | HTC high terminal covers E1.2 2pcs  | 1SDA073871R1 | 1SDA073872R1 |
| E1.2 | LTC low terminal covers E1.2 F 2pcs | 1SDA073873R1 | 1SDA073874R1 |



### Separators - PB <sup>(1)</sup>

| Size        | Type                                   | Code         |
|-------------|----------------------------------------|--------------|
| E1.2        | PB Separators H=100mm 4pz E1.2 F 3P    | 1SDA073877R1 |
| E1.2        | PB Separators H=100mm 6pz E1.2 F 4P    | 1SDA073878R1 |
| E1.2        | PB Separators H=200mm 4pz E1.2 F 3P    | 1SDA073879R1 |
| E1.2        | PB Separators H=200mm 6pz E1.2 F 4P    | 1SDA073880R1 |
| E1.2        | PB Separators 2 pz E1.2 W FP 3P        | 1SDA076164R1 |
| E1.2        | PB Separators 3 pz E1.2 W FP 4P        | 1SDA076165R1 |
| E2.2...E6.2 | PB Separators 2 pz E2.2...E6.2 F 3P    | 1SDA076166R1 |
| E2.2...E6.2 | PB Separators 3 pz E2.2...E6.2 F 4P    | 1SDA076167R1 |
| E2.2...E6.2 | PB Separators 2 pz E2.2...E6.2 W FP 3P | 1SDA076168R1 |
| E2.2...E6.2 | PB Separators 3 pz E2.2...E6.2 W FP 4P | 1SDA076169R1 |

1) Only as loose part

### Cables for mechanical interlock [Group 1]

| Size        | Type                  | Code         |
|-------------|-----------------------|--------------|
| E1.2...E6.2 | Type A horizontal     | 1SDA073881R1 |
| E2.2...E6.2 | Type B,C,D horizontal | 1SDA073882R1 |
| E1.2...E6.2 | Type A vertical       | 1SDA073885R1 |
| E2.2...E6.2 | Type B,C,D vertical   | 1SDA073886R1 |

Order one type of cable for each interlock. The cable must be ordered on the fixed circuit-breaker or on the fixed part of withdrawable circuit-breaker.

### Lever for mechanical interlock of fixed circuit-breaker or mobile part [Group 2]

| Size | Type                           | 3 Poles      | 4 Poles      |
|------|--------------------------------|--------------|--------------|
|      |                                | Code         | Code         |
| E2.2 | Lever for mechanical interlock | 1SDA073889R1 | 1SDA073889R1 |
| E4.2 | Lever for mechanical interlock | 1SDA073890R1 | 1SDA073890R1 |
| E6.2 | Lever for mechanical interlock | 1SDA073891R1 | 1SDA073892R1 |

The lever for mechanical interlock is not required for E1.2

### Support for mechanical interlock of fixed circuit-breaker [Group 3]

| Size          | Type                   | Code         |
|---------------|------------------------|--------------|
| E1.2          | Type A - floor mounted | 1SDA073893R1 |
| E1.2          | Type A - wall mounted  | 1SDA073894R1 |
| E2.2 ... E6.2 | Type A / B / D         | 1SDA073895R1 |
| E2.2 ... E6.2 | Type C                 | 1SDA073897R1 |

### Support for mechanical interlock of fixed part [Group 4]

| Size          | Type           | Code         |
|---------------|----------------|--------------|
| E1.2          | Type A         | 1SDA073896R1 |
| E2.2 ... E6.2 | Type A / B / D | 1SDA073895R1 |
| E2.2 ... E6.2 | Type C         | 1SDA073897R1 |

### Automatic transfer switch

| Size        | Type   | Code         |
|-------------|--------|--------------|
| E1.2...E6.2 | ATS021 | 1SDA065523R1 |
| E1.2...E6.2 | ATS022 | 1SDA065524R1 |



# Accessories

## Ekip modules



### Ekip trip units, Black Platform - loose supply

| Size                      | Type                         | Code         |
|---------------------------|------------------------------|--------------|
| E1.2..E6.2                | Ekip Dip LI (Black)          | 1SDA107526R1 |
| E1.2..E6.2                | Ekip Dip LSI (Black)         | 1SDA107527R1 |
| E1.2..E6.2                | Ekip Dip LSIG (Black)        | 1SDA107528R1 |
| E1.2..E6.2                | Ekip Touch LI (Black)        | 1SDA107529R1 |
| E1.2..E6.2                | Ekip Touch LSI (Black)       | 1SDA107530R1 |
| E1.2..E6.2                | Ekip Touch LSIG (Black)      | 1SDA107531R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-Touch LSI (Black)    | 1SDA107532R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-Touch LSIG (Black)   | 1SDA107533R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G Touch LSIG (Black)    | 1SDA107534R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G Hi-Touch LSIG (Black) | 1SDA107535R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip LCD LI (Black)          | 1SDA107536R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip LCD LSI (Black)         | 1SDA107537R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip LCD LSIG (Black)        | 1SDA107538R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-LCD LSI (Black)      | 1SDA107539R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-LCD LSIG (Black)     | 1SDA107540R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G LCD LSIG (Black)      | 1SDA107541R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G Hi-LCD LSIG (Black)   | 1SDA107542R1 |
| E1.2..E6.2                | Battery for Ekip trip units  | 1SDA074193R1 |

1) provided without Measurement Enabler/Measurement Enabler with voltage sockets.

### Options for Ekip trip units

| Size                      | Type                                                       | Code         |
|---------------------------|------------------------------------------------------------|--------------|
| E1.2..E6.2                | Ekip LCD Installed                                         | 1SDA074211R1 |
| E1.2..E6.2 <sup>(3)</sup> | Non-defeatable instantaneous protection                    | 1SDA114799R1 |
| E1.2..E6.2 <sup>(3)</sup> | No Bluetooth connectivity                                  | 1SDA114808R1 |
| E1.2..E6.2 <sup>(1)</sup> | Upper internal installed voltage outlets                   | 1SDA074216R1 |
| E1.2..E6.2 <sup>(1)</sup> | External installed voltage outlets                         | 1SDA074217R1 |
| E1.2..E6.2 <sup>(2)</sup> | Arrangement for cables with lower internal voltage outlets | 1SDA074213R1 |
| E1.2..E6.2 <sup>(2)</sup> | Arrangement for cables with upper internal voltage outlets | 1SDA074214R1 |
| E1.2..E6.2 <sup>(2)</sup> | Arrangement for cables with external voltage outlets       | 1SDA074215R1 |

1) All Ekip Touch and Ekip Hi-Touch trip units have lower voltage outlets installed by default; 2) For Ekip trip units, Grey Platform only;

3) Factory fitted only. Extracode suitable for Ekip Touch and Hi-Touch trip units

### Power Supply modules

| Size       | Type                       | Code         |
|------------|----------------------------|--------------|
| E1.2..E6.2 | Ekip Supply 110-240V AC/DC | 1SDA074172R1 |
| E1.2..E6.2 | Ekip Supply 24-48V DC      | 1SDA074173R1 |

### Connectivity modules

| Size       | Type                     | Code         |
|------------|--------------------------|--------------|
| E1.2..E6.2 | Ekip Com Modbus RS-485   | 1SDA074150R1 |
| E1.2..E6.2 | Ekip Com Modbus TCP      | 1SDA074151R1 |
| E1.2..E6.2 | Ekip Com Profibus        | 1SDA074152R1 |
| E1.2..E6.2 | Ekip Com Profinet        | 1SDA074153R1 |
| E1.2..E6.2 | Ekip Com DeviceNet™      | 1SDA074154R1 |
| E1.2..E6.2 | Ekip Com EtherNet/IP™    | 1SDA074155R1 |
| E1.2..E6.2 | Ekip Com IEC61850        | 1SDA074156R1 |
| E1.2..E6.2 | Ekip Com Hub             | 1SDA082894R1 |
| E1.2..E6.2 | Ekip Com R Modbus RS-485 | 1SDA074157R1 |
| E1.2..E6.2 | Ekip Com R Modbus TCP    | 1SDA074158R1 |
| E1.2..E6.2 | Ekip Com R Profibus      | 1SDA074159R1 |
| E1.2..E6.2 | Ekip Com R Profinet      | 1SDA074160R1 |
| E1.2..E6.2 | Ekip Com R DeviceNet™    | 1SDA074161R1 |
| E1.2..E6.2 | Ekip Com R EtherNet/IP™  | 1SDA074162R1 |
| E1.2..E6.2 | Ekip Com R IEC61850      | 1SDA076170R1 |
| E1.2..E6.2 | Ekip Link                | 1SDA074163R1 |
| E1.2..E6.2 | Ekip Com GPRS-M          | 1SDA074165R1 |
| E1.2..E6.2 | Ekip Com Actuator        | 1SDA074166R1 |





### Signalling modules

| Size                      | Type                       | Code         |
|---------------------------|----------------------------|--------------|
| E1.2..E6.2                | Ekip Signalling 2K-1       | 1SDA074167R1 |
| E1.2..E6.2                | Ekip Signalling 2K-2       | 1SDA074168R1 |
| E1.2..E6.2                | RELT Ekip Signalling 2K-3  | 1SDA074169R1 |
| E2.2..E6.2                | Ekip Signalling 4K (Black) | 1SDA074170R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Signalling 10K        | 1SDA074171R1 |
| E1.2..E6.2 <sup>(2)</sup> | Ekip Signalling 3T-1       | 1SDA085693R1 |
| E1.2..E6.2 <sup>(2)</sup> | Ekip Signalling 3T-2       | 1SDA085694R1 |
| E1.2..E6.2                | Ekip Signalling ModBus TCP | 1SDA082485R1 |

1) Only as loose part; 2) External probe PT100/PT1000 not supplied



### Measurement Enabler and Measurement Enabler with voltage sockets<sup>(2)</sup>

| Size                | Type                                                       | Code         |
|---------------------|------------------------------------------------------------|--------------|
| E1.2                | Measurement Enabler E1.2                                   | 1SDA107543R1 |
| E1.2                | Measurement Enabler with voltage sockets E1.2              | 1SDA107544R1 |
| E2.2                | Measurement Enabler E2.2                                   | 1SDA107545R1 |
| E2.2                | Measurement Enabler with voltage sockets E2.2              | 1SDA107546R1 |
| E4.2                | Measurement Enabler E4.2                                   | 1SDA107547R1 |
| E4.2                | Measurement Enabler with voltage sockets E4.2              | 1SDA107548R1 |
| E6.2                | Measurement Enabler E6.2                                   | 1SDA107549R1 |
| E6.2                | Measurement Enabler with voltage sockets E6.2              | 1SDA107550R1 |
| E1.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E1.2 | 1SDA076244R1 |
| E2.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E2.2 | 1SDA076245R1 |
| E4.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E4.2 | 1SDA076246R1 |
| E6.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E6.2 | 1SDA076247R1 |

1) Suitable for circuit-breakers with neutral on the right side (L1 L2 L3 N)

2) The Measurement Enabler module is provided as standard with Ekip Touch trip units. Select the Measuring Package to activate measurements (V, f, P, E, ...). The Measurement Enabler with voltage sockets module is provided as standard with Ekip Hi-Touch, G Touch and G Hi-Touch trip units. Measurements are also provided as standard, with no need to activate the dedicated software package. Both these modules are available as spare parts.

### Synchrocheck modules

| Size       | Type              | Code         |
|------------|-------------------|--------------|
| E1.2..E6.2 | Ekip Synchrocheck | 1SDA074183R1 |

### External Probe for Ekip 3T Signalling modules

| Size                      | Type                      | Code         |
|---------------------------|---------------------------|--------------|
| E1.2..E6.2 <sup>(1)</sup> | External Probe PT1000 3mt | 1SDA085695R1 |

1) For busbar applications only. The code includes one single probe.

### Displaying and supervision systems

| Size                      | Type                                 | Code         |
|---------------------------|--------------------------------------|--------------|
| E1.2..E6.2                | Ekip T&P - Programming and Test unit | 1SDA066989R1 |
| E1.2..E6.2                | Ekip TT - Trip Test unit             | 1SDA066988R1 |
| E1.2..E6.2                | Ekip Programming                     | 1SDA076154R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Multimeter                      | 1SDA074192R1 |
| E1.2..E6.2                | Lite panel                           | 1SDA114809R1 |

1) Only as loose part



# Accessories

## Ekip modules

### Advanced functionalities



#### Software functions

| Size                      | Type                                | Code         |
|---------------------------|-------------------------------------|--------------|
| E1.2..E6.2 <sup>(1)</sup> | Adaptive Load Shedding              | 1SDA082921R1 |
| E1.2..E6.2 <sup>(2)</sup> | ATS Main-Tie-Main Closed Transition | 1SDA082886R1 |
| E1.2..E6.2 <sup>(2)</sup> | ATS Main-Gen Open Transition        | 1SDA082889R1 |
| E1.2..E6.2                | Power Controller                    | 1SDA074212R1 |

1) Available both factory fitted and via ABB Ability Marketplace™.

2) Available via ABB Ability Marketplace™ only.

#### Software packages

| Size       | Type                        | Code         |
|------------|-----------------------------|--------------|
| E1.2..E6.2 | Measuring Package           | 1SDA107525R1 |
| E1.2..E6.2 | Voltage Protection          | 1SDA105227R1 |
| E1.2..E6.2 | Advanced Voltage Protection | 1SDA105228R1 |
| E1.2..E6.2 | Frequency Protection        | 1SDA105229R1 |
| E1.2..E6.2 | Power Protection            | 1SDA105230R1 |
| E1.2..E6.2 | ROCOF Protection            | 1SDA105231R1 |
| E1.2..E6.2 | Adaptive Protection         | 1SDA105232R1 |
| E1.2..E6.2 | Data Logger                 | 1SDA105233R1 |
| E1.2..E6.2 | Network Analyzer            | 1SDA105234R1 |

#### Metering functions - Class 1 accuracy <sup>(1) (2)</sup>

| Size | Type                               | Code         |
|------|------------------------------------|--------------|
| E1.2 | Class 1 Power&Energy Metering E1.2 | 1SDA107551R1 |
| E2.2 | Class 1 Power&Energy Metering E2.2 | 1SDA107675R1 |
| E4.2 | Class 1 Power&Energy Metering E4.2 | 1SDA107676R1 |
| E6.2 | Class 1 Power&Energy Metering E6.2 | 1SDA107677R1 |

1) Factory fitted only. Extracodes available for Ekip Touch and Ekip G Touch trip units.

2) Class 1 accuracy not available for Emax 2/E9, E10 and E12.





## Rating plug for Ekip trip units

| Size                         | Type                            | Code<br>(loose supply) | Code<br>(installed) |
|------------------------------|---------------------------------|------------------------|---------------------|
| E1.2..E2.2 <sup>(2)</sup>    | Rating Plug 100A (Black)        | 1SDA112840R1           | 1SDA074258R1        |
| E1.2..E2.2 <sup>(2)</sup>    | Rating Plug 200A (Black)        | 1SDA112841R1           | 1SDA074259R1        |
| E1.2..E2.2 <sup>(2)</sup>    | Rating Plug 250A (Black)        | 1SDA112842R1           | 1SDA074260R1        |
| E1.2..E6.2                   | Rating Plug 400A (Black)        | 1SDA112843R1           | 1SDA074261R1        |
| E1.2..E6.2                   | Rating Plug 630A (Black)        | 1SDA112845R1           | 1SDA074262R1        |
| E1.2..E6.2                   | Rating Plug 800A (Black)        | 1SDA112846R1           | 1SDA074263R1        |
| E1.2..E6.2                   | Rating Plug 1000A (Black)       | 1SDA112847R1           | 1SDA074264R1        |
| E1.2..E6.2                   | Rating Plug 1250A (Black)       | 1SDA112849R1           | 1SDA074265R1        |
| E1.2..E6.2                   | Rating Plug 1600A (Black)       | 1SDA112850R1           | 1SDA074266R1        |
| E2.2..E6.2                   | Rating Plug 2000A (Black)       | 1SDA112851R1           | 1SDA074267R1        |
| E2.2..E6.2                   | Rating Plug 2500A (Black)       | 1SDA112852R1           | 1SDA074268R1        |
| E4.2..E6.2                   | Rating Plug 3200A (Black)       | 1SDA112854R1           | 1SDA074269R1        |
| E4.2..E6.2                   | Rating Plug 4000A (Black)       | 1SDA112856R1           | 1SDA074270R1        |
| E6.2                         | Rating Plug 5000A (Black)       | 1SDA112857R1           | 1SDA074271R1        |
| E6.2                         | Rating Plug 6300A (Black)       | 1SDA112859R1           | -                   |
| E1.2..E2.2 <sup>(1)(2)</sup> | Rating Plug 100A L OFF (Black)  | 1SDA112860R1           | 1SDA074273R1        |
| E1.2..E2.2 <sup>(1)(2)</sup> | Rating Plug 200A L OFF (Black)  | 1SDA112861R1           | 1SDA074274R1        |
| E1.2..E2.2 <sup>(1)(2)</sup> | Rating Plug 250A L OFF (Black)  | 1SDA112862R1           | 1SDA074275R1        |
| E1.2..E6.2 <sup>(1)</sup>    | Rating Plug 400A L OFF (Black)  | 1SDA112863R1           | 1SDA074276R1        |
| E1.2..E6.2 <sup>(1)</sup>    | Rating Plug 630A L OFF (Black)  | 1SDA112865R1           | 1SDA074277R1        |
| E1.2..E6.2 <sup>(1)</sup>    | Rating Plug 800A L OFF (Black)  | 1SDA112866R1           | 1SDA074278R1        |
| E1.2..E6.2 <sup>(1)</sup>    | Rating Plug 1000A L OFF (Black) | 1SDA112867R1           | 1SDA074279R1        |
| E1.2..E6.2 <sup>(1)</sup>    | Rating Plug 1250A L OFF (Black) | 1SDA112869R1           | 1SDA074280R1        |
| E1.2..E6.2 <sup>(1)</sup>    | Rating Plug 1600A L OFF (Black) | 1SDA112870R1           | 1SDA074281R1        |
| E2.2..E6.2 <sup>(1)</sup>    | Rating Plug 2000A L OFF (Black) | 1SDA112871R1           | 1SDA074282R1        |
| E2.2..E6.2 <sup>(1)</sup>    | Rating Plug 2500A L OFF (Black) | 1SDA112872R1           | 1SDA074283R1        |
| E4.2..E6.2 <sup>(1)</sup>    | Rating Plug 3200A L OFF (Black) | 1SDA112873R1           | 1SDA074284R1        |
| E4.2..E6.2 <sup>(1)</sup>    | Rating Plug 4000A L OFF (Black) | 1SDA112875R1           | 1SDA074285R1        |
| E6.2 <sup>(1)</sup>          | Rating Plug 5000A L OFF (Black) | 1SDA112876R1           | 1SDA074286R1        |
| E6.2 <sup>(1)</sup>          | Rating Plug 6300A L OFF (Black) | 1SDA112878R1           | 1SDA074287R1        |
| E1.2..E2.2 <sup>(2)</sup>    | Rating Plug RC 100A (Black)     | 1SDA112879R1           | 1SDA074288R1        |
| E1.2..E2.2 <sup>(2)</sup>    | Rating Plug RC 200A (Black)     | 1SDA112880R1           | 1SDA074289R1        |
| E1.2..E2.2 <sup>(2)</sup>    | Rating Plug RC 250A (Black)     | 1SDA112881R1           | 1SDA074290R1        |
| E1.2..E6.2                   | Rating Plug RC 400A (Black)     | 1SDA112882R1           | 1SDA074291R1        |
| E1.2..E6.2                   | Rating Plug RC 630A (Black)     | 1SDA112884R1           | 1SDA074292R1        |
| E1.2..E6.2                   | Rating Plug RC 800A (Black)     | 1SDA112885R1           | 1SDA074293R1        |
| E1.2..E6.2                   | Rating Plug RC 1250A (Black)    | 1SDA112887R1           | 1SDA074294R1        |
| E2.2..E6.2                   | Rating Plug RC 2000A (Black)    | 1SDA112888R1           | 1SDA074295R1        |
| E4.2..E6.2                   | Rating Plug RC 3200A (Black)    | 1SDA112889R1           | 1SDA074296R1        |
| E4.2..E6.2                   | Rating Plug RC 4000A (Black)    | 1SDA112891R1           | 1SDA074297R1        |

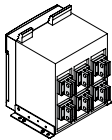
1) Available only with Ekip Touch and Ekip Hi-Touch

2) Available only with 1250A version

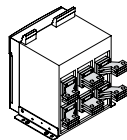


# Accessories

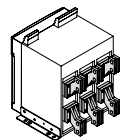
## Terminals



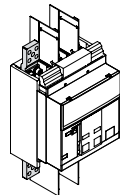
Rear orientable terminal - HR VR



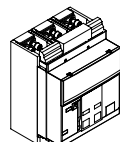
Horizontal rear spread terminal - SHR



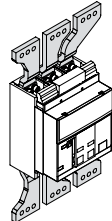
Vertical rear spread terminal - SVR



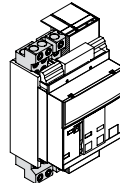
Extended front terminal - EF



Front terminal - F



Front spread terminal - ES

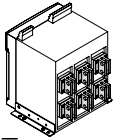


Terminal for cable FcCuAl 4x240mm² - Fc CuAl

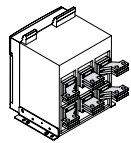
Kit for terminals - installed for fixed circuit-breaker

| Size                | Version | Iu max | Type                        | 3 Poles      | 4 Poles      |
|---------------------|---------|--------|-----------------------------|--------------|--------------|
|                     |         |        |                             | Code         | Code         |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit EF Upper                | 1SDA073963R1 | 1SDA073964R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit EF Lower                | 1SDA073965R1 | 1SDA073966R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit ES Upper                | 1SDA073975R1 | 1SDA073976R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit ES Lower                | 1SDA073977R1 | 1SDA073978R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit HR Upper                | 1SDA073981R1 | 1SDA073982R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit HR Lower                | 1SDA073983R1 | 1SDA073984R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit VR Upper                | 1SDA073985R1 | 1SDA073986R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit VR Lower                | 1SDA073987R1 | 1SDA073988R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit FC CuAl 4x240 mm² Upper | 1SDA073997R1 | 1SDA073998R1 |
| E1.2 <sup>(1)</sup> | F       | 1600   | Kit FC CuAl 4x240 mm² Lower | 1SDA073999R1 | 1SDA074000R1 |
| E2.2                | F       | 2000   | Kit VR Upper                | 1SDA074003R1 | 1SDA074004R1 |
| E2.2                | F       | 2000   | Kit VR Lower                | 1SDA074005R1 | 1SDA074006R1 |
| E2.2                | F       | 2500   | Kit VR Upper                | 1SDA074009R1 | 1SDA074010R1 |
| E2.2                | F       | 2500   | Kit VR Lower                | 1SDA074011R1 | 1SDA074012R1 |
| E2.2                | F       | 2000   | Kit SHR Upper               | 1SDA074045R1 | 1SDA074046R1 |
| E2.2                | F       | 2000   | Kit SHR Lower               | 1SDA074047R1 | 1SDA074048R1 |
| E2.2                | F       | 2500   | Kit SHR Upper               | 1SDA074051R1 | 1SDA074052R1 |
| E2.2                | F       | 2500   | Kit SHR Lower               | 1SDA074053R1 | 1SDA074054R1 |
| E2.2                | F       | 2000   | Kit SVR Upper               | 1SDA074057R1 | 1SDA074058R1 |
| E2.2                | F       | 2000   | Kit SVR Lower               | 1SDA074059R1 | 1SDA074060R1 |
| E2.2                | F       | 2500   | Kit SVR Upper               | 1SDA074063R1 | 1SDA074064R1 |
| E2.2                | F       | 2500   | Kit SVR Lower               | 1SDA074065R1 | 1SDA074066R1 |
| E2.2 <sup>(1)</sup> | F       | 2500   | Kit F Upper                 | 1SDA074118R1 | 1SDA074119R1 |
| E2.2 <sup>(1)</sup> | F       | 2500   | Kit F Lower                 | 1SDA074120R1 | 1SDA074121R1 |
| E2.2                | F       | 2500   | Kit LHR Upper INST          | 1SDA115515R1 | 1SDA115530R1 |
| E2.2                | F       | 2500   | Kit LHR Lower INST          | 1SDA115516R1 | 1SDA115532R1 |
| E2.2                | F       | 2500   | Kit LVR Upper INST          | 1SDA117296R1 | 1SDA117308R1 |
| E2.2                | F       | 2500   | Kit LVR Lower INST          | 1SDA117297R1 | 1SDA117309R1 |

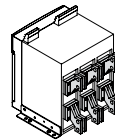
1) terminals supplied, but not physically installed



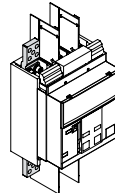
Rear orientable  
terminal - HR VR



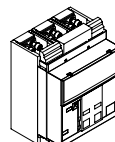
Horizontal rear spread  
terminal - SHR



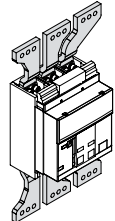
Vertical rear spread  
terminal - SVR



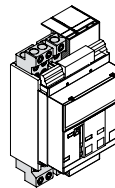
Extended front  
terminal - EF



Front terminal - F



Front spread  
terminal - ES



Terminal for cable FcCuAl  
4x240mm<sup>2</sup> - Fc CuAl

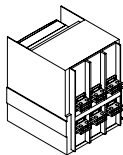
#### Kit for terminals - installed for fixed circuit-breaker

| Size                  | Version | Iu max | Type               | 3 Poles<br>Code | 4 Poles<br>Code |
|-----------------------|---------|--------|--------------------|-----------------|-----------------|
| E4.2                  | F       | 3200   | Kit VR Upper       | 1SDA074015R1    | 1SDA074016R1    |
| E4.2                  | F       | 3200   | Kit VR Lower       | 1SDA074017R1    | 1SDA074018R1    |
| E4.2                  | F       | 3200   | Kit SHR Upper      | 1SDA082816R1    | 1SDA082817R1    |
| E4.2                  | F       | 3200   | Kit SHR Lower      | 1SDA082818R1    | 1SDA082819R1    |
| E4.2                  | F       | 3200   | Kit SVR Upper      | 1SDA082828R1    | 1SDA082829R1    |
| E4.2                  | F       | 3200   | Kit SVR Lower      | 1SDA082830R1    | 1SDA082831R1    |
| E4.2                  | F       | 4000   | Kit VR Upper       | 1SDA074021R1    | 1SDA074022R1    |
| E4.2                  | F       | 4000   | Kit VR Lower       | 1SDA074023R1    | 1SDA074024R1    |
| E4.2 <sup>(1)</sup>   | F       | 4000   | Kit F Upper        | 1SDA074126R1    | 1SDA074127R1    |
| E4.2 <sup>(1)</sup>   | F       | 4000   | Kit F Lower        | 1SDA074128R1    | 1SDA074129R1    |
| E4.2                  | F       | 4000   | Kit SHR Upper      | 1SDA082822R1    | 1SDA082823R1    |
| E4.2                  | F       | 4000   | Kit SHR Lower      | 1SDA082824R1    | 1SDA082825R1    |
| E4.2                  | F       | 4000   | Kit SVR Upper      | 1SDA082834R1    | 1SDA082835R1    |
| E4.2                  | F       | 4000   | Kit SVR Lower      | 1SDA082836R1    | 1SDA082837R1    |
| E4.2                  | F       | 4000   | Kit LHR Upper INST | 1SDA115517R1    | 1SDA115533R1    |
| E4.2                  | F       | 4000   | Kit LHR Lower INST | 1SDA115518R1    | 1SDA115534R1    |
| E4.2                  | F       | 4000   | Kit LVR Upper INST | 1SDA117298R1    | 1SDA117310R1    |
| E4.2                  | F       | 4000   | Kit LVR Lower INST | 1SDA117299R1    | 1SDA117311R1    |
| E6.2                  | F       | 5000   | Kit VR Upper       | 1SDA074027R1    | 1SDA074028R1    |
| E6.2                  | F       | 5000   | Kit VR Lower       | 1SDA074030R1    | 1SDA074031R1    |
| E6.2/f                | F       | 5000   | Kit VR Upper       |                 | 1SDA074029R1    |
| E6.2/f                | F       | 5000   | Kit VR Lower       |                 | 1SDA074032R1    |
| E6.2 <sup>(1)</sup>   | F       | 6300   | Kit F Upper        | 1SDA074134R1    | 1SDA074135R1    |
| E6.2 <sup>(1)</sup>   | F       | 6300   | Kit F Lower        | 1SDA074137R1    | 1SDA074138R1    |
| E6.2/f <sup>(1)</sup> | F       | 6300   | Kit F Upper        |                 | 1SDA074136R1    |
| E6.2/f <sup>(1)</sup> | F       | 6300   | Kit F Lower        |                 | 1SDA074139R1    |
| E6.2                  | F       | 6300   | Kit VR Upper       | 1SDA074036R1    | 1SDA074037R1    |
| E6.2                  | F       | 6300   | Kit VR Lower       | 1SDA074039R1    | 1SDA074040R1    |
| E6.2/f                | F       | 6300   | Kit VR Upper       |                 | 1SDA074038R1    |
| E6.2/f                | F       | 6300   | Kit VR Lower       |                 | 1SDA074041R1    |
| E6.2                  | F       | 6300   | Kit LHR Upper INST | 1SDA115519R1    | 1SDA115535R1    |
| E6.2                  | F       | 6300   | Kit LHR Lower INST | 1SDA115520R1    | 1SDA115536R1    |
| E6.2                  | F       | 6300   | Kit LVR Upper INST | 1SDA117300R1    | 1SDA117312R1    |
| E6.2                  | F       | 6300   | Kit LVR Lower INST | 1SDA117301R1    | 1SDA117313R1    |
| E6.2/f                | F       | 6300   | Kit LHR Upper INST |                 | 1SDA115547R1    |
| E6.2/f                | F       | 6300   | Kit LHR Lower INST |                 | 1SDA115548R1    |
| E6.2/f                | F       | 6300   | Kit LVR Upper INST |                 | 1SDA117320R1    |
| E6.2/f                | F       | 6300   | Kit LVR Lower INST |                 | 1SDA117321R1    |

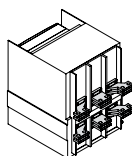
1) terminals supplied, but not physically installed

# Accessories

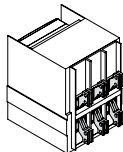
## Terminals



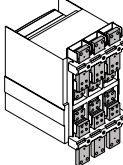
Rear adjustable  
terminal - HR VR



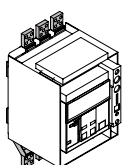
Horizontal rear  
terminal - SHR



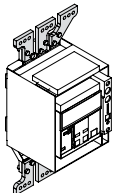
Vertical rear spread  
terminal - SVR



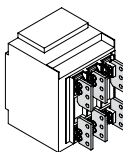
Front terminal - F



Extended front  
terminal - EF



Front spread  
terminal - ES

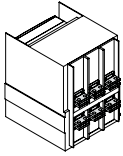


Terminal for cable FcCuAl  
4x240mm² - Fc CuAl

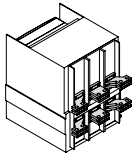
### Kit for terminals - installed for fixed part of withdrawable circuit-breaker

| Size                | Version | Iu max | Type               | 3 Poles<br>Code | 4 Poles<br>Code |
|---------------------|---------|--------|--------------------|-----------------|-----------------|
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit EF Upper       | 1SDA073939R1    | 1SDA073940R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit EF Lower       | 1SDA073941R1    | 1SDA073942R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit VR Upper       | 1SDA073945R1    | 1SDA073946R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit VR Lower       | 1SDA073947R1    | 1SDA073948R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit ES Upper       | 1SDA073951R1    | 1SDA073952R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit ES Lower       | 1SDA073953R1    | 1SDA073954R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit SHR Upper      | 1SDA073957R1    | 1SDA073958R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit SHR Lower      | 1SDA073959R1    | 1SDA073960R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit FC CuAl Upper  | 1SDA073991R1    | 1SDA073993R1    |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit FC CuAl Lower  | 1SDA073992R1    | 1SDA073994R1    |
| E2.2                | W       | 2000   | Kit FL Upper       | 1SDA081120R1    | 1SDA081121R1    |
| E2.2                | W       | 2000   | Kit FL Lower       | 1SDA081122R1    | 1SDA081123R1    |
| E2.2                | W       | 2000   | Kit VR Upper       | 1SDA074577R1    | 1SDA074578R1    |
| E2.2                | W       | 2000   | Kit VR Lower       | 1SDA074579R1    | 1SDA074580R1    |
| E2.2                | W       | 2500   | Kit VR Upper       | 1SDA074581R1    | 1SDA074582R1    |
| E2.2                | W       | 2500   | Kit VR Lower       | 1SDA074583R1    | 1SDA074584R1    |
| E2.2                | W       | 2000   | Kit SHR Upper      | 1SDA074585R1    | 1SDA074586R1    |
| E2.2                | W       | 2000   | Kit SHR Lower      | 1SDA074587R1    | 1SDA074588R1    |
| E2.2                | W       | 2500   | Kit SHR Upper      | 1SDA074589R1    | 1SDA074590R1    |
| E2.2                | W       | 2500   | Kit SHR Lower      | 1SDA074591R1    | 1SDA074592R1    |
| E2.2                | W       | 2000   | Kit SVR Upper      | 1SDA074593R1    | 1SDA074594R1    |
| E2.2                | W       | 2000   | Kit SVR Lower      | 1SDA074595R1    | 1SDA074596R1    |
| E2.2                | W       | 2500   | Kit SVR Upper      | 1SDA074597R1    | 1SDA074598R1    |
| E2.2                | W       | 2500   | Kit SVR Lower      | 1SDA074599R1    | 1SDA074600R1    |
| E2.2                | W       | 2500   | Kit FL Upper       | 1SDA074069R1    | 1SDA074070R1    |
| E2.2                | W       | 2500   | Kit FL Lower       | 1SDA074071R1    | 1SDA074072R1    |
| E2.2 <sup>(1)</sup> | W       | 2500   | Kit F Upper        | 1SDA074090R1    | 1SDA074091R1    |
| E2.2 <sup>(1)</sup> | W       | 2500   | Kit F Lower        | 1SDA074092R1    | 1SDA074093R1    |
| E2.2                | W       | 2500   | Kit LHR Upper INST | 1SDA115521R1    | 1SDA115537R1    |
| E2.2                | W       | 2500   | Kit LHR Lower INST | 1SDA115522R1    | 1SDA115538R1    |
| E2.2                | W       | 2500   | Kit LVR Upper INST | 1SDA117302R1    | 1SDA117314R1    |
| E2.2                | W       | 2500   | Kit LVR Lower INST | 1SDA117303R1    | 1SDA117315R1    |
| E4.2                | W       | 3200   | Kit FL Upper       | 1SDA081125R1    | 1SDA081127R1    |
| E4.2                | W       | 3200   | Kit FL Lower       | 1SDA081128R1    | 1SDA081129R1    |
| E4.2                | W       | 3200   | Kit VR Upper       | 1SDA074601R1    | 1SDA074602R1    |
| E4.2                | W       | 3200   | Kit VR Lower       | 1SDA074603R1    | 1SDA074604R1    |
| E4.2                | W       | 3200   | Kit SHR Upper      | 1SDA082840R1    | 1SDA082841R1    |
| E4.2                | W       | 3200   | Kit SHR Lower      | 1SDA082842R1    | 1SDA082843R1    |
| E4.2                | W       | 3200   | Kit SVR Upper      | 1SDA082848R1    | 1SDA082849R1    |
| E4.2                | W       | 3200   | Kit SVR Lower      | 1SDA082850R1    | 1SDA082851R1    |
| E4.2                | W       | 4000   | Kit VR Upper       | 1SDA074605R1    | 1SDA074606R1    |
| E4.2                | W       | 4000   | Kit VR Lower       | 1SDA074607R1    | 1SDA074608R1    |
| E4.2 <sup>(1)</sup> | W       | 4000   | Kit F Upper        | 1SDA074098R1    | 1SDA074099R1    |
| E4.2 <sup>(1)</sup> | W       | 4000   | Kit F Lower        | 1SDA074100R1    | 1SDA074101R1    |
| E4.2                | W       | 4000   | Kit FL Upper       | 1SDA074075R1    | 1SDA074076R1    |
| E4.2                | W       | 4000   | Kit FL Lower       | 1SDA074077R1    | 1SDA074078R1    |

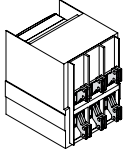
1) terminals supplied, but not physically installed.



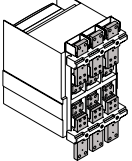
Rear adjustable  
terminal - HR VR



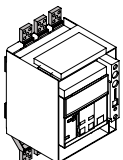
Horizontal rear  
terminal - SHR



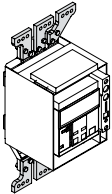
Vertical rear spread  
terminal - SVR



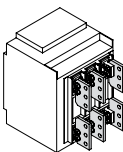
Front terminal - F



Extended front  
terminal - EF



Front spread  
terminal - ES



Terminal for cable FcCuAl  
4x240mm<sup>2</sup> - Fc CuAl

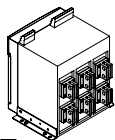
### Kit for terminals - installed for fixed part of withdrawable circuit-breaker

| Size                  | Version | Iu max | Type                      | 3 Poles<br>Code | 4 Poles<br>Code |
|-----------------------|---------|--------|---------------------------|-----------------|-----------------|
| E4.2                  | W       | 4000   | Kit HR Upper              | 1SDA076878R1    | 1SDA076879R1    |
| E4.2                  | W       | 4000   | Kit HR Lower              | 1SDA076880R1    | 1SDA076881R1    |
| E4.2                  | W       | 4000   | Kit SHR Upper             | 1SDA082844R1    | 1SDA082845R1    |
| E4.2                  | W       | 4000   | Kit SHR Lower             | 1SDA082846R1    | 1SDA082847R1    |
| E4.2                  | W       | 4000   | Kit SVR Upper             | 1SDA082852R1    | 1SDA082853R1    |
| E4.2                  | W       | 4000   | Kit SVR Lower             | 1SDA082854R1    | 1SDA082855R1    |
| E4.2                  | W       | 4000   | Kit LHR Upper INST        | 1SDA115523R1    | 1SDA115539R1    |
| E4.2                  | W       | 4000   | Kit LHR Lower INST        | 1SDA115524R1    | 1SDA115540R1    |
| E4.2                  | W       | 4000   | Kit LVR Upper INST        | 1SDA117304R1    | 1SDA117316R1    |
| E4.2                  | W       | 4000   | Kit LVR Lower INST        | 1SDA117305R1    | 1SDA117317R1    |
| E6.2                  | W       | 5000   | Kit VR Upper              | 1SDA074609R1    | 1SDA074610R1    |
| E6.2                  | W       | 5000   | Kit VR Lower              | 1SDA074612R1    | 1SDA074613R1    |
| E6.2/f                | W       | 5000   | Kit VR Upper              |                 | 1SDA074611R1    |
| E6.2/f                | W       | 5000   | Kit VR Lower              |                 | 1SDA074614R1    |
| E6.2                  | W       | 6300   | Kit VR Upper              | 1SDA074615R1    | 1SDA074616R1    |
| E6.2                  | W       | 6300   | Kit VR Lower              | 1SDA074618R1    | 1SDA074619R1    |
| E6.2/f                | W       | 6300   | Kit VR Upper              |                 | 1SDA074617R1    |
| E6.2/f                | W       | 6300   | Kit VR Lower              |                 | 1SDA074620R1    |
| E6.2 <sup>(1)</sup>   | W       | 6300   | Kit F Upper               | 1SDA074106R1    | 1SDA074107R1    |
| E6.2 <sup>(1)</sup>   | W       | 6300   | Kit F Lower               | 1SDA074109R1    | 1SDA074110R1    |
| E6.2/f <sup>(1)</sup> | W       | 6300   | Kit F Upper               |                 | 1SDA074108R1    |
| E6.2/f <sup>(1)</sup> | W       | 6300   | Kit F Lower               |                 | 1SDA074111R1    |
| E6.2                  | W       | 6300   | Kit FL Upper              | 1SDA074081R1    | 1SDA074082R1    |
| E6.2                  | W       | 6300   | Kit FL Lower              | 1SDA074084R1    | 1SDA074085R1    |
| E6.2/f                | W       | 6300   | Kit FL Upper              |                 | 1SDA074083R1    |
| E6.2/f                | W       | 6300   | Kit FL Lower              |                 | 1SDA074086R1    |
| E6.2                  | W       | 6300   | Kit LHR Upper INST        | 1SDA115525R1    | 1SDA115541R1    |
| E6.2                  | W       | 6300   | Kit LHR Lower INST        | 1SDA115526R1    | 1SDA115542R1    |
| E6.2                  | W       | 6300   | Kit LVR Upper INST        | 1SDA117306R1    | 1SDA117318R1    |
| E6.2                  | W       | 6300   | Kit LVR Lower INST        | 1SDA117307R1    | 1SDA117319R1    |
| E6.2/f                | W       | 6300   | Kit LHR Upper INST        |                 | 1SDA115550R1    |
| E6.2/f                | W       | 6300   | Kit LHR Lower INST        |                 | 1SDA115549R1    |
| E6.2/f                | W       | 6300   | Kit LVR Upper INST        |                 | 1SDA117322R1    |
| E6.2/f                | W       | 6300   | Kit LVR Lower INST        |                 | 1SDA117323R1    |
| E6.2                  | W       | 5000   | Kit VR Upper (multi stab) | 1SDA122772R1    |                 |
| E6.2                  | W       | 5000   | Kit VR Lower (multi stab) | 1SDA122775R1    |                 |
| E6.2                  | W       | 5000   | Kit HR Upper (multi stab) | 1SDA122711R1    |                 |
| E6.2                  | W       | 5000   | Kit HR Lower (multi stab) | 1SDA122714R1    |                 |
| E6.2                  | W       | 5000   | Kit VR Upper (multi stab) |                 | 1SDA122773R1    |
| E6.2                  | W       | 5000   | Kit VR Lower (multi stab) |                 | 1SDA122776R1    |
| E6.2                  | W       | 5000   | Kit HR Upper (multi stab) |                 | 1SDA122712R1    |
| E6.2                  | W       | 5000   | Kit HR Lower (multi stab) |                 | 1SDA122715R1    |
| E6.2/f                | W       | 5000   | Kit VR Upper (multi stab) |                 | 1SDA122774R1    |
| E6.2/f                | W       | 5000   | Kit VR Lower (multi stab) |                 | 1SDA122777R1    |
| E6.2/f                | W       | 5000   | Kit HR Upper (multi stab) |                 | 1SDA122713R1    |
| E6.2/f                | W       | 5000   | Kit HR Lower (multi stab) |                 | 1SDA122716R1    |

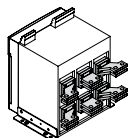
1) terminals supplied, but not physically installed.

# Accessories

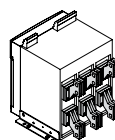
## Terminals



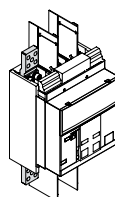
Rear adjustable terminal - HR VR



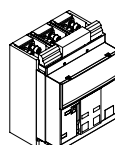
Horizontal rear spread terminal - SHR



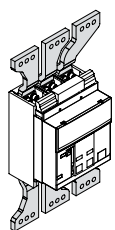
Vertical rear spread terminal - SVR



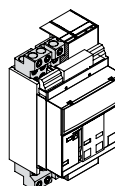
Extended front terminal - EF



Front terminal - F



Front spread terminal - ES

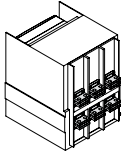


Terminal for cable FcCuAl 4x240mm<sup>2</sup> - Fc CuAl

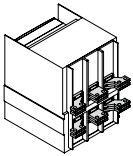
### Kit for terminals - loose supply for fixed circuit-breaker

| Size                  | Version | Iu max | Type                              | Code         | Pieces | Code         | Pieces |
|-----------------------|---------|--------|-----------------------------------|--------------|--------|--------------|--------|
| E1.2                  | F       | 1600   | Kit EF                            | 1SDA073967R1 | 3      | 1SDA073968R1 | 4      |
| E1.2                  | F       | 1600   | Kit F                             | 1SDA073973R1 | 3      | 1SDA073974R1 | 4      |
| E1.2                  | F       | 1600   | Kit ES Upper                      | 1SDA073979R1 | 3      | 1SDA073980R1 | 4      |
| E1.2                  | F       | 1600   | Kit ES Lower                      | 1SDA076076R1 | 3      | 1SDA073980R1 | 4      |
| E1.2                  | F       | 1600   | Kit Adjustable HR/VR              | 1SDA073989R1 | 3      | 1SDA073990R1 | 4      |
| E1.2                  | F       | 1600   | Kit FC CuAl 4x240 mm <sup>2</sup> | 1SDA074001R1 | 3      | 1SDA074002R1 | 4      |
| E2.2                  | F       | 2000   | Kit Adjustable HR/VR              | 1SDA074007R1 | 3      | 1SDA074008R1 | 4      |
| E2.2 <sup>(1)</sup>   | F       | 2500   | Kit Adjustable HR/VR              | 1SDA074013R1 | 3      | 1SDA074014R1 | 4      |
| E2.2                  | F       | 2000   | Kit SHR                           | 1SDA074049R1 | 3      | 1SDA074050R1 | 4      |
| E2.2                  | F       | 2500   | Kit SHR                           | 1SDA074055R1 | 3      | 1SDA074056R1 | 4      |
| E2.2                  | F       | 2000   | Kit SVR                           | 1SDA074061R1 | 3      | 1SDA074062R1 | 4      |
| E2.2                  | F       | 2500   | Kit SVR                           | 1SDA074067R1 | 3      | 1SDA074068R1 | 4      |
| E2.2                  | F       | 2500   | Kit F Upper                       | 1SDA074122R1 | 3      | 1SDA074123R1 | 4      |
| E2.2                  | F       | 2500   | Kit F Lower                       | 1SDA074124R1 | 3      | 1SDA074125R1 | 4      |
| E2.2                  | F       | 2500   | Kit LHR LVR                       | 1SDA115527R1 |        | 1SDA115543R1 |        |
| E4.2                  | F       | 3200   | Kit Adjustable HR/VR              | 1SDA074019R1 | 3      | 1SDA074020R1 | 4      |
| E4.2                  | F       | 3200   | Kit SHR                           | 1SDA082820R1 | 3      | 1SDA082821R1 | 4      |
| E4.2                  | F       | 3200   | Kit SVR                           | 1SDA082832R1 | 3      | 1SDA082833R1 | 4      |
| E4.2 <sup>(1)</sup>   | F       | 4000   | Kit Adjustable HR/VR              | 1SDA074025R1 | 3      | 1SDA074026R1 | 4      |
| E4.2                  | F       | 4000   | Kit F Upper                       | 1SDA074130R1 | 3      | 1SDA074131R1 | 4      |
| E4.2                  | F       | 4000   | Kit F Lower                       | 1SDA074132R1 | 3      | 1SDA074133R1 | 4      |
| E4.2                  | F       | 4000   | Kit SHR                           | 1SDA082826R1 | 3      | 1SDA082827R1 | 4      |
| E4.2                  | F       | 4000   | Kit SVR                           | 1SDA082838R1 | 3      | 1SDA082839R1 | 4      |
| E4.2                  | F       | 4000   | Kit LHR LVR                       | 1SDA115528R1 |        | 1SDA115544R1 |        |
| E6.2 <sup>(1)</sup>   | F       | 5000   | Kit Adjustable HR/VR              | 1SDA081672R1 | 6      | 1SDA081673R1 | 7      |
| E6.2/f <sup>(1)</sup> | F       | 5000   | Kit Adjustable HR/VR              |              |        | 1SDA081674R1 | 8      |
| E6.2 <sup>(1)</sup>   | F       | 6300   | Kit Adjustable HR/VR              | 1SDA074042R1 | 6      | 1SDA074043R1 | 7      |
| E6.2/f <sup>(1)</sup> | F       | 6300   | Kit Adjustable HR/VR              |              |        | 1SDA074044R1 | 8      |
| E6.2                  | F       | 6300   | Kit F Upper                       | 1SDA074140R1 | 6      | 1SDA074141R1 | 7      |
| E6.2                  | F       | 6300   | Kit F Lower                       | 1SDA074143R1 | 6      | 1SDA074144R1 | 7      |
| E6.2                  | F       | 6300   | Kit LHR                           | 1SDA115529R1 |        | 1SDA115545R1 |        |
| E6.2/f                | F       | 6300   | Kit LHR                           |              |        | 1SDA115546R1 |        |

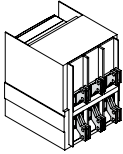
1) In case of replacement with F terminal please contact ABB



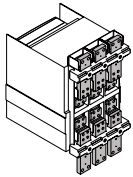
Rear orientable  
terminal - HR VR



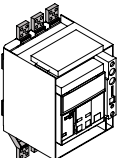
Horizontal rear  
terminal - SHR



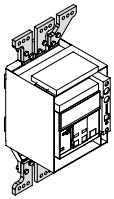
Vertical rear spread  
terminal - SVR



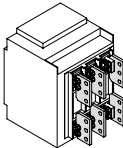
Front terminal - F



Extended front  
terminal - EF



Front spread  
terminal - ES



Terminal for cable FcCuAl  
4x240mm<sup>2</sup> - Fc CuAl

#### Kit for terminals - loose supply for fixed part of withdrawable circuit-breaker

| Size                | Version | Iu max | Type                 | Code         | Pieces | Code         | Pieces |
|---------------------|---------|--------|----------------------|--------------|--------|--------------|--------|
| E1.2                | W       | 1600   | Kit EF               | 1SDA073943R1 | 3      | 1SDA073944R1 | 4      |
| E1.2                | W       | 1600   | Kit Adjustable HR/VR | 1SDA073949R1 | 3      | 1SDA073950R1 | 4      |
| E1.2 <sup>(1)</sup> | W       | 1600   | Kit ES               | 1SDA073955R1 | 3      | 1SDA073956R1 | 4      |
| E1.2                | W       | 1600   | Kit SHR              | 1SDA073961R1 | 3      | 1SDA073962R1 | 4      |
| E1.2                | W       | 1600   | Kit FC CuAl          | 1SDA073995R1 | 3      | 1SDA073996R1 | 4      |
| E2.2                | W       | 2000   | Kit Adjustable HR/VR | 1SDA074007R1 | 3      | 1SDA074008R1 | 4      |
| E2.2                | W       | 2500   | Kit Adjustable HR/VR | 1SDA074013R1 | 3      | 1SDA074014R1 | 4      |
| E2.2                | W       | 2000   | Kit SHR              | 1SDA074049R1 | 3      | 1SDA074050R1 | 4      |
| E2.2                | W       | 2500   | Kit SHR              | 1SDA074055R1 | 3      | 1SDA074056R1 | 4      |
| E2.2                | W       | 2000   | Kit SVR              | 1SDA074061R1 | 3      | 1SDA074062R1 | 4      |
| E2.2                | W       | 2500   | Kit SVR              | 1SDA074067R1 | 3      | 1SDA074068R1 | 4      |
| E2.2                | W       | 2500   | Kit F Upper          | 1SDA074094R1 | 3      | 1SDA074095R1 | 4      |
| E2.2                | W       | 2500   | Kit F Lower          | 1SDA074096R1 | 3      | 1SDA074097R1 | 4      |
| E2.2                | W       | 2500   | Kit LHR              | 1SDA115527R1 |        | 1SDA115543R1 |        |
| E4.2                | W       | 3200   | Kit Adjustable HR/VR | 1SDA074019R1 | 3      | 1SDA074020R1 | 4      |
| E4.2                | W       | 3200   | Kit SHR              | 1SDA082820R1 | 3      | 1SDA082821R1 | 4      |
| E4.2                | W       | 3200   | Kit SVR              | 1SDA082832R1 | 3      | 1SDA082833R1 | 4      |
| E4.2                | W       | 4000   | Kit Adjustable HR/VR | 1SDA074025R1 | 3      | 1SDA074026R1 | 4      |
| E4.2                | W       | 4000   | Kit F Upper          | 1SDA074102R1 | 3      | 1SDA074103R1 | 4      |
| E4.2                | W       | 4000   | Kit F Lower          | 1SDA074104R1 | 3      | 1SDA074105R1 | 4      |
| E4.2                | W       | 4000   | Kit SHR              | 1SDA082826R1 | 3      | 1SDA082827R1 | 4      |
| E4.2                | W       | 4000   | Kit SVR              | 1SDA082838R1 | 3      | 1SDA082839R1 | 4      |
| E4.2                | W       | 4000   | Kit LHR              | 1SDA115528R1 |        | 1SDA115544R1 |        |
| E6.2                | W       | 5000   | Kit Adjustable HR/VR | 1SDA074033R1 | 6      | 1SDA074034R1 | 7      |
| E6.2/f              | W       | 5000   | Kit Adjustable HR/VR |              |        | 1SDA074035R1 | 8      |
| E6.2                | W       | 6300   | Kit Adjustable HR/VR | 1SDA074042R1 | 6      | 1SDA074043R1 | 7      |
| E6.2/f              | W       | 6300   | Kit Adjustable HR/VR |              |        | 1SDA074044R1 | 8      |
| E6.2                | W       | 6300   | Kit F Upper          | 1SDA074112R1 | 6      | 1SDA074113R1 | 7      |
| E6.2                | W       | 6300   | Kit F Lower          | 1SDA074115R1 | 6      | 1SDA074116R1 | 7      |
| E6.2                | W       | 6300   | Kit LHR              | 1SDA115529R1 |        | 1SDA115545R1 |        |
| E6.2/f              | W       | 6300   | Kit LHR              |              |        | 1SDA115546R1 |        |

1) can be ordered only if the fixed part has EF terminals.

# Accessories

## Spare parts Grey Platform



### Ekip trip units, Grey Platform - loose supply

| Size                      | Type                        | Code         |
|---------------------------|-----------------------------|--------------|
| E1.2..E6.2                | Ekip Dip LI                 | 1SDA074194R1 |
| E1.2..E6.2                | Ekip Dip LSI                | 1SDA074195R1 |
| E1.2..E6.2                | Ekip Dip LSIG               | 1SDA074196R1 |
| E1.2..E6.2                | Ekip Touch LI               | 1SDA074197R1 |
| E1.2..E6.2                | Ekip Touch LSI              | 1SDA074198R1 |
| E1.2..E6.2                | Ekip Touch LSIG             | 1SDA074199R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G Touch LSIG           | 1SDA074200R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-Touch LSI           | 1SDA074201R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-Touch LSIG          | 1SDA074202R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G Hi-Touch LSIG        | 1SDA074203R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip LCD LI                 | 1SDA074204R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip LCD LSI                | 1SDA074205R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip LCD LSIG               | 1SDA074206R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G LCD LSIG             | 1SDA074207R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-LCD LSI             | 1SDA074208R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip Hi-LCD LSIG            | 1SDA074209R1 |
| E1.2..E6.2 <sup>(1)</sup> | Ekip G Hi-LCD LSIG          | 1SDA074210R1 |
| E1.2..E6.2                | Battery for Ekip trip units | 1SDA074193R1 |

1) provided without Ekip Measuring/Ekip Measuring Pro.



### Measuring and Measuring Pro modules

| Size                | Type                                                       | Code         |
|---------------------|------------------------------------------------------------|--------------|
| E1.2                | Ekip Measuring                                             | 1SDA074184R1 |
| E1.2                | Ekip Measuring Pro                                         | 1SDA074185R1 |
| E2.2                | Ekip Measuring                                             | 1SDA074186R1 |
| E2.2                | Ekip Measuring Pro                                         | 1SDA074187R1 |
| E4.2                | Ekip Measuring                                             | 1SDA074188R1 |
| E4.2                | Ekip Measuring Pro                                         | 1SDA074189R1 |
| E6.2                | Ekip Measuring                                             | 1SDA074190R1 |
| E6.2                | Ekip Measuring Pro                                         | 1SDA074191R1 |
| E1.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E1.2 | 1SDA076244R1 |
| E2.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E2.2 | 1SDA076245R1 |
| E4.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E4.2 | 1SDA076246R1 |
| E6.2 <sup>(1)</sup> | Voltage socket for neutral on right side L1 L2 L3 N - E6.2 | 1SDA076247R1 |

1) use only with circuit breakers with neutral on right side L1 L2 L3 N

### Signalling modules

| Size        | Type               | Code         |
|-------------|--------------------|--------------|
| E2.2...E6.2 | Ekip Signalling 4k | 1SDA114475R1 |





## Rating plug for Ekip trip units

| Size                      | Type                    | Code<br>(loose supply) |
|---------------------------|-------------------------|------------------------|
| E1.2..E2.2                | Rating Plug 100A        | 1SDA074218R1           |
| E1.2..E2.2                | Rating Plug 200A        | 1SDA074219R1           |
| E1.2..E2.2                | Rating Plug 250A        | 1SDA074220R1           |
| E1.2..E6.2                | Rating Plug 400A        | 1SDA074221R1           |
| E1.2..E6.2                | Rating Plug 630A        | 1SDA074222R1           |
| E1.2..E6.2                | Rating Plug 800A        | 1SDA074223R1           |
| E1.2..E6.2                | Rating Plug 1000A       | 1SDA074224R1           |
| E1.2..E6.2                | Rating Plug 1250A       | 1SDA074225R1           |
| E1.2..E6.2                | Rating Plug 1600A       | 1SDA074226R1           |
| E2.2..E6.2                | Rating Plug 2000A       | 1SDA074227R1           |
| E2.2..E6.2                | Rating Plug 2500A       | 1SDA074228R1           |
| E4.2..E6.2                | Rating Plug 3200A       | 1SDA074229R1           |
| E4.2..E6.2                | Rating Plug 4000A       | 1SDA074230R1           |
| E6.2                      | Rating Plug 5000A       | 1SDA074231R1           |
| E6.2                      | Rating Plug 6300A       | 1SDA074232R1           |
| E1.2..E2.2 <sup>(1)</sup> | Rating Plug 100A L OFF  | 1SDA074233R1           |
| E1.2..E2.2 <sup>(1)</sup> | Rating Plug 200A L OFF  | 1SDA074234R1           |
| E1.2..E2.2 <sup>(1)</sup> | Rating Plug 250A L OFF  | 1SDA074235R1           |
| E1.2..E6.2 <sup>(1)</sup> | Rating Plug 400A L OFF  | 1SDA074236R1           |
| E1.2..E6.2 <sup>(1)</sup> | Rating Plug 630A L OFF  | 1SDA074237R1           |
| E1.2..E6.2 <sup>(1)</sup> | Rating Plug 800A L OFF  | 1SDA074238R1           |
| E1.2..E6.2 <sup>(1)</sup> | Rating Plug 1000A L OFF | 1SDA074239R1           |
| E1.2..E6.2 <sup>(1)</sup> | Rating Plug 1250A L OFF | 1SDA074240R1           |
| E1.2..E6.2 <sup>(1)</sup> | Rating Plug 1600A L OFF | 1SDA074241R1           |
| E2.2..E6.2 <sup>(1)</sup> | Rating Plug 2000A L OFF | 1SDA074242R1           |
| E2.2..E6.2 <sup>(1)</sup> | Rating Plug 2500A L OFF | 1SDA074243R1           |
| E4.2..E6.2 <sup>(1)</sup> | Rating Plug 3200A L OFF | 1SDA074244R1           |
| E4.2..E6.2 <sup>(1)</sup> | Rating Plug 4000A L OFF | 1SDA074245R1           |
| E6.2 <sup>(1)</sup>       | Rating Plug 5000A L OFF | 1SDA074246R1           |
| E6.2 <sup>(1)</sup>       | Rating Plug 6300A L OFF | 1SDA074247R1           |
| E1.2..E2.2                | Rating Plug RC 100A     | 1SDA074248R1           |
| E1.2..E2.2                | Rating Plug RC 200A     | 1SDA074249R1           |
| E1.2..E2.2                | Rating Plug RC 250A     | 1SDA074250R1           |
| E1.2..E6.2                | Rating Plug RC 400A     | 1SDA074251R1           |
| E1.2..E6.2                | Rating Plug RC 630A     | 1SDA074252R1           |
| E1.2..E6.2                | Rating Plug RC 800A     | 1SDA074253R1           |
| E1.2..E6.2                | Rating Plug RC 1250A    | 1SDA074254R1           |
| E2.2..E6.2                | Rating Plug RC 2000A    | 1SDA074255R1           |
| E4.2..E6.2                | Rating Plug RC 3200A    | 1SDA074256R1           |
| E4.2..E6.2                | Rating Plug RC 4000A    | 1SDA074257R1           |

1) Available only with Ekip Touch and Ekip Hi-Touch



# Accessories

## Service



Note:  
Warranty periods are measured from the date the circuit breaker leaves the factory.

### Extended warranty

| Size        | Type                                        | Code <sup>(3)</sup> |
|-------------|---------------------------------------------|---------------------|
| E1.2...E6.2 | Warranty 2 years E1.2...E6.2 <sup>(1)</sup> | 1SDA082413R1        |
| E1.2        | Warranty 4 years E1.2 <sup>(2)</sup>        | 1SDA082414R1        |
| E2.2        | Warranty 4 years E2.2 <sup>(2)</sup>        | 1SDA082415R1        |
| E4.2        | Warranty 4 years E4.2 <sup>(2)</sup>        | 1SDA082416R1        |
| E6.2        | Warranty 4 years E6.2 <sup>(2)</sup>        | 1SDA082417R1        |
| E1.2        | Warranty 5 years E1.2 <sup>(2)</sup>        | 1SDA082418R1        |
| E2.2        | Warranty 5 years E2.2 <sup>(2)</sup>        | 1SDA082419R1        |
| E4.2        | Warranty 5 years E4.2 <sup>(2)</sup>        | 1SDA082420R1        |
| E6.2        | Warranty 5 years E6.2 <sup>(2)</sup>        | 1SDA082421R1        |

The registration in the Extended Warranty online tool is mandatory

1) Free-of-charge with site details entered

2) Warranty durations:

- 4 years when site details not entered into the Extended Warranty online tool

- 5 years when site details entered into the Extended Warranty online tool

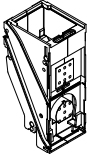
3) Order only with the circuit breaker. Specify Registration code in the order to activate the warranty.

### Test certificate

| Size        | Type                               | Code         |
|-------------|------------------------------------|--------------|
| E2.2...E6.2 | Test certificate - Italian version | 1SDA070197R1 |
| E2.2...E6.2 | Test certificate - English version | 1SDA070198R1 |
| E2.2...E6.2 | Test certificate - German version  | 1SDA070199R1 |
| E2.2...E6.2 | Test certificate - French version  | 1SDA070200R1 |
| E2.2...E6.2 | Test certificate - Spanish version | 1SDA070201R1 |

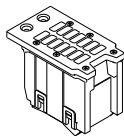
# Accessories

## Spare parts



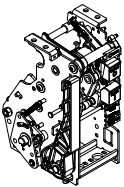
### Single phase pole

| Size              | Poles        | IEC/UL | Version   | Code         | Type spare | Min quantity |
|-------------------|--------------|--------|-----------|--------------|------------|--------------|
| E2.2 - Iu≤2000A   | 3p; 4p       | IEC    | F; W (MP) | 1SDA081187R1 | A          | 3 or 4       |
| E2.2 - Iu=2500A   | 3p; 4p       | IEC    | F; W (MP) | 1SDA081188R1 | A          | 3 or 4       |
| E4.2              | 3p; 4p       | IEC    | F; W (MP) | 1SDA081189R1 | A          | 3 or 4       |
| E6.2 - Half phase | 3p; 4p; 4p/f | IEC    | F; W (MP) | 1SDA081190R1 | A          | 6 or 7 or 8  |



### Arching chamber

| Size       | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity                             |
|------------|--------|--------|-----------|--------------|------------|------------------------------------------|
| E2.2       | 3p; 4p | IEC    | F; W (MP) | 1SDA081430R1 |            | 3 or 4                                   |
| E4.2; E6.2 | 3p; 4p | IEC    | F; W (MP) | 1SDA081431R1 |            | 3 or 4 for E4.2,<br>6 or 7 or 8 for E6.2 |



### Operating mechanism<sup>(1)</sup>

| Size | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------|--------|--------|-----------|--------------|------------|--------------|
| E2.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081191R1 | A          | 1            |
| E4.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081192R1 | A          | 1            |
| E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081193R1 | A          | 1            |
| E6.2 | 4p/f   | IEC/UL | F; W (MP) | 1SDA081194R1 | A          | 1            |

1) Add closing spring

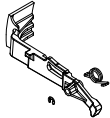
### Closing Spring

| Size                  | Poles    | IEC/UL | Version   | Code         | Type spare | Min quantity |
|-----------------------|----------|--------|-----------|--------------|------------|--------------|
| E2.2 - Iu≤2000A       | 3p       | IEC/UL | F; W (MP) | 1SDA081207R1 | A          | 1            |
| E2.2 - Iu≤2000A       | 4p       | IEC/UL | F; W (MP) | 1SDA081208R1 | A          | 1            |
| E2.2 - Iu=2500A; E4.2 | 3p       | IEC/UL | F; W (MP) | 1SDA081208R1 | A          | 1            |
| E2.2 - Iu=2500A; E4.2 | 4p       | IEC/UL | F; W (MP) | 1SDA081209R1 | A          | 1            |
| E6.2                  | 3p       | IEC/UL | F; W (MP) | 1SDA081210R1 | A          | 1            |
| E6.2                  | 4p; 4p/f | IEC/UL | F; W (MP) | 1SDA081211R1 | A          | 1            |



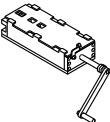
### Spring Charging lever

| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081217R1 | A          | 1            |



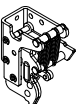
### Signalling charged spring lever

| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081242R1 | A          | 1            |



### Spring charging device

| Size             | Poles  | IEC/UL | Version  | Code         | Type spare | Min quantity |
|------------------|--------|--------|----------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC    | F; W(MP) | 1SDA082230R1 | A          | 1            |



### Tripping mechanism

| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC    | F; W (MP) | 1SDA082187R1 | A          | 1            |



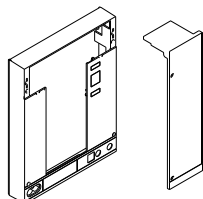
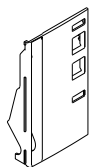
### Fixing screws kit - 50 pcs

| Size                 | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|----------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2 - wall mounted  | 3p; 4p | IEC/UL | F         | 1SDA081179R1 |            | 1            |
| E1.2 - floor mounted | 3p; 4p | IEC/UL | F         | 1SDA081413R1 |            | 1            |
| E1.2 - floor mounted | 3p; 4p | IEC/UL | W (FP)    | 1SDA081414R1 |            | 1            |
| E2.2; E4.2; E6.2     | 3p; 4p | IEC/UL | F; W (FP) | 1SDA081467R1 |            | 1            |

Min quantity = min quantity to complete a circuit-breaker. The quantity is related to the number of phases (3 or 4 poles) of the circuit-breaker (E6.2 has half phases so quantities are double).  
Type A Spare part = only for ABB L3 technicians

# Accessories

## Spare parts



### Safety cover

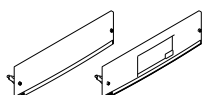
| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2             | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081402R1 |            | 1            |
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081432R1 |            | 1            |

For each part ordered, specify the Serial number of the circuit-breaker it is intended for.

### Accessories cover <sup>(2)</sup>

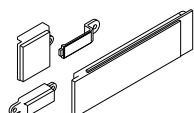
| Size                                          | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|-----------------------------------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2                                          | 3p     | IEC/UL | F; W (MP) | 1SDA081403R1 |            | 1            |
| E1.2                                          | 4p     | IEC/UL | F; W (MP) | 1SDA081404R1 |            | 1            |
| E2.2                                          | 3p     | IEC/UL | F         | 1SDA081433R1 |            | 1            |
| E2.2                                          | 4p     | IEC/UL | F         | 1SDA081434R1 |            | 1            |
| E2.2                                          | 3p     | IEC/UL | W (MP)    | 1SDA081435R1 |            | 1            |
| E2.2                                          | 4p     | IEC/UL | W (MP)    | 1SDA081436R1 |            | 1            |
| E4.2                                          | 3p     | IEC/UL | F         | 1SDA081437R1 |            | 1            |
| E4.2                                          | 4p     | IEC/UL | F         | 1SDA081438R1 |            | 1            |
| E4.2                                          | 3p     | IEC/UL | W (MP)    | 1SDA081439R1 |            | 1            |
| E4.2                                          | 4p     | IEC/UL | W (MP)    | 1SDA081440R1 |            | 1            |
| E6.2                                          | 3p     | IEC/UL | F         | 1SDA081441R1 |            | 1            |
| E6.2                                          | 4p     | IEC/UL | F         | 1SDA081442R1 |            | 1            |
| E6.2                                          | 3p     | IEC/UL | W (MP)    | 1SDA081443R1 |            | 1            |
| E6.2                                          | 4p     | IEC/UL | W (MP)    | 1SDA081444R1 |            | 1            |
| E6.2                                          | 4p/f   | IEC/UL | F         | 1SDA081445R1 |            | 1            |
| E6.2                                          | 4p/f   | IEC/UL | W (MP)    | 1SDA081446R1 |            | 1            |
| E1.2 - Castell <sup>(1)</sup>                 | 3p; 4p | IEC    | F; W (MP) | 1SDA082145R1 |            | 1            |
| E2.2...E6.2 - Castell <sup>(1)</sup>          | 3p; 4p | IEC    | F         | 1SDA082146R1 |            | 1            |
| E2.2...E6.2 - Castell <sup>(1)</sup> KLC      | 3p; 4p | IEC    | W (MP)    | 1SDA082149R1 |            | 1            |
| E2.2...E6.2 - Castell <sup>(1)</sup> KLC+ KLP | 3p; 4p | IEC    | W (MP)    | 1SDA082150R1 |            | 1            |
| E2.2...E6.2 - Castell <sup>(1)</sup> KLP      | 3p; 4p | IEC    | W (MP)    | 1SDA082151R1 |            | 1            |

1) The lock is not included; 2) TU Reset not included. Use the existing one.



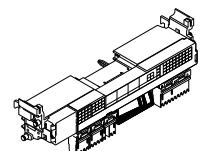
### Transparent cover for trip unit

| Size                   | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2 DIP               | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081405R1 |            | 1            |
| E1.2 Touch             | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081406R1 |            | 1            |
| E2.2; E4.2; E6.2 DIP   | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081447R1 |            | 1            |
| E2.2; E4.2; E6.2 Touch | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081448R1 |            | 1            |



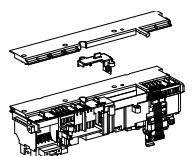
### Kit front cover plugs

| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2             | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081415R1 |            | 1            |
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081471R1 |            | 1            |



### Sliding contact for Moving Part

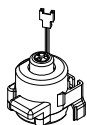
| Size                  | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|-----------------------|--------|--------|---------|--------------|------------|--------------|
| E1.2                  | 3p     | IEC/UL | W (MP)  | 1SDA081167R1 |            | 1            |
| E1.2                  | 4p     | IEC/UL | W (MP)  | 1SDA081168R1 |            | 1            |
| E2.2; E4.2; E6.2      | 3p; 4p | IEC/UL | W (MP)  | 1SDA081212R1 |            | 1            |
| E2.2; E4.2; E6.2 - MS | 3p; 4p | IEC/UL | W (MP)  | 1SDA081213R1 |            | 1            |



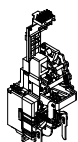
### Terminal box connection interface

| Size                  | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|-----------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2                  | 3p; 4p | IEC/UL | F         | 1SDA081409R1 | A          | 1            |
| E2.2; E4.2; E6.2      | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081451R1 | A          | 1            |
| E2.2; E4.2; E6.2 - MS | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081452R1 | A          | 1            |

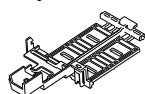
—  
Type A Spare part = only  
for ABB L3 technicians

**Trip coil**

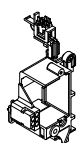
| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2             | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081407R1 |            | 1            |
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081449R1 |            | 1            |

**Right plate for accessories (Right MID)**

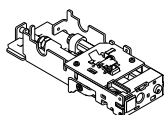
| Size                  | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|-----------------------|--------|--------|-----------|--------------|------------|--------------|
| E2.2; E4.2; E6.2      | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081214R1 | A          | 1            |
| E2.2; E4.2; E6.2 - MS | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081215R1 | A          | 1            |

**Cover for right plate for accessories (Right MID Cover)**

| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081466R1 |            | 1            |

**Left plate for accessories (Left MID)**

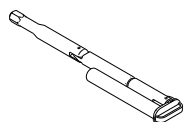
| Size             | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2             | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081170R1 |            | 1            |
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081453R1 |            | 1            |

**Racked in and out device (CD)**

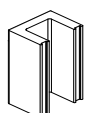
| Size             | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------------|--------|--------|---------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | W (MP)  | 1SDA081216R1 | A          | 1            |

**CD lock lever**

| Size             | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------------|--------|--------|---------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | W (MP)  | 1SDA081256R1 | A          | 1            |

**Racking in and out lever**

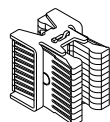
| Size             | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------------|--------|--------|---------|--------------|------------|--------------|
| E1.2             | 3p; 4p | IEC/UL | W (MP)  | 1SDA081410R1 |            | 1            |
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | W (MP)  | 1SDA081455R1 |            | 1            |

**Moving part terminals**

| Size            | Poles    | IEC/UL | Version | Code         | Type spare | Min quantity |
|-----------------|----------|--------|---------|--------------|------------|--------------|
| E2.2 - Iu≤2000A | 3p; 4p   | IEC    | W (MP)  | 1SDA081243R1 | A          | 3 or 4       |
| E2.2 - Iu=2500A | 3p; 4p   | IEC    | W (MP)  | 1SDA081244R1 | A          | 3 or 4       |
| E4.2 - Iu≤3200A | 3p; 4p   | IEC    | W (MP)  | 1SDA081245R1 | A          | 3 or 4       |
| E4.2 - Iu=4000A | 3p; 4p   | IEC    | W (MP)  | 1SDA081246R1 | A          | 3 or 4       |
| E6.2            | 3p; 4p/f | IEC    | W (MP)  | 1SDA081247R1 | A          | 6 or 7 or 8  |

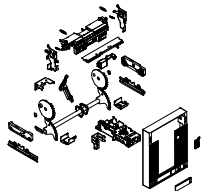
**Jaw contacts**

| Size            | Poles        | IEC/UL | Version | Code         | Type spare | Min quantity |
|-----------------|--------------|--------|---------|--------------|------------|--------------|
| E1.2            | 3p; 4p       | IEC    | W (FP)  | 1SDA081164R1 | A          | 3 or 4       |
| E2.2 - Iu≤2000A | 3p; 4p       | IEC    | W (FP)  | 1SDA081195R1 | A          | 3 or 4       |
| E2.2 - Iu=2500A | 3p; 4p       | IEC    | W (FP)  | 1SDA081196R1 | A          | 3 or 4       |
| E4.2 - Iu≤3200A | 3p; 4p       | IEC    | W (FP)  | 1SDA081197R1 | A          | 3 or 4       |
| E4.2 - Iu=4000A | 3p; 4p       | IEC    | W (FP)  | 1SDA081198R1 | A          | 3 or 4       |
| E6.2            | 3p; 4p; 4p/f | IEC    | W (FP)  | 1SDA081199R1 | A          | 6 or 7 or 8  |



# Accessories

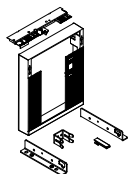
## Spare parts



### Conversion kit from Fixed to Moving part <sup>(1)</sup>

| Size | Poles | IEC/UL | Version | Code         | Type spare | Min quantity |
|------|-------|--------|---------|--------------|------------|--------------|
| E1.2 | 3p    | IEC    | F       | 1SDA081176R1 | A          | 1            |
| E1.2 | 4p    | IEC    | F       | 1SDA081177R1 | A          | 1            |
| E2.2 | 3p    | IEC    | F       | 1SDA081234R1 | A          | 1            |
| E2.2 | 4p    | IEC    | F       | 1SDA081235R1 | A          | 1            |
| E4.2 | 3p    | IEC    | F       | 1SDA081236R1 | A          | 1            |
| E4.2 | 4p    | IEC    | F       | 1SDA081237R1 | A          | 1            |
| E6.2 | 3p    | IEC    | F       | 1SDA081238R1 | A          | 1            |
| E6.2 | 4p    | IEC    | F       | 1SDA081239R1 | A          | 1            |
| E6.2 | 4p/f  | IEC    | F       | 1SDA081240R1 | A          | 1            |

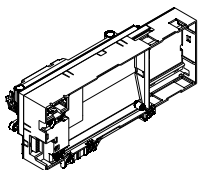
For each part ordered, specify the Serial number of the circuit-breaker it is intended for; (1) moving part terminals not included



### Conversion kit from Moving Part into Fixed version <sup>(1)</sup>

| Size                 | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|----------------------|--------|--------|---------|--------------|------------|--------------|
| E1.2 - wall mounted  | 3p; 4p | IEC/UL | W (MP)  | 1SDA081178R1 | A          | 1            |
| E1.2 - floor mounted | 3p; 4p | IEC/UL | W (MP)  | 1SDA082303R1 | A          | 1            |
| E2.2; E4.2; E6.2     | 3p; 4p | IEC/UL | W (MP)  | 1SDA081241R1 | A          | 1            |

For each part ordered, it is mandatory to specify the Serial number of the circuit-breaker it is intended for; (1) Standard terminals not included



### Main board

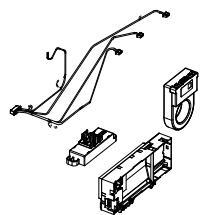
| Size                              | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|-----------------------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2 (Grey platform)              | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081408R1 |            | 1            |
| E2.2; E4.2; E6.2 (Grey platform)  | 3p; 4p | IEC/UL | F; W (MP) | 1SDA081450R1 |            | 1            |
| E1.2 (Black platform)             | 3p; 4p | IEC/UL | F; W (MP) | 1SDA107517R1 |            | 1            |
| E2.2; E4.2; E6.2 (Black platform) | 3p; 4p | IEC/UL | F; W (MP) | 1SDA107516R1 |            | 1            |

For each part ordered, it is mandatory to specify the Serial number of the circuit-breaker it is intended for.



### Trip Unit Battery

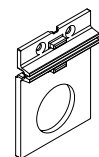
| Size                   | Poles  | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------------------------|--------|--------|-----------|--------------|------------|--------------|
| E1.2; E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | F; W (MP) | 1SDA074193R1 |            | 1            |



### Main board + Sensors + cables

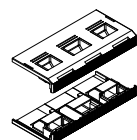
| Size | Poles | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------|-------|--------|-----------|--------------|------------|--------------|
| E2.2 | 3p    | IEC/UL | F; W (MP) | 1SDA081200R1 | A          | 1            |
| E2.2 | 4p    | IEC/UL | F; W (MP) | 1SDA081201R1 | A          | 1            |
| E4.2 | 3p    | IEC/UL | F; W (MP) | 1SDA081202R1 | A          | 1            |
| E4.2 | 4p    | IEC/UL | F; W (MP) | 1SDA081203R1 | A          | 1            |
| E6.2 | 3p    | IEC/UL | F; W (MP) | 1SDA081204R1 | A          | 1            |
| E6.2 | 4p    | IEC/UL | F; W (MP) | 1SDA081205R1 | A          | 1            |
| E6.2 | 4p/f  | IEC/UL | F; W (MP) | 1SDA081206R1 | A          | 1            |

For each part ordered, it is mandatory to specify the Serial number of the circuit-breaker it is intended for.



### Sensors plastic covers

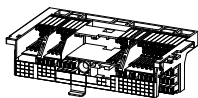
| Size | Poles        | IEC/UL | Version   | Code         | Type spare | Min quantity |
|------|--------------|--------|-----------|--------------|------------|--------------|
| E2.2 | 3p; 4p       | IEC/UL | F; W (MP) | 1SDA081468R1 |            | 1            |
| E4.2 | 3p; 4p       | IEC/UL | F; W (MP) | 1SDA081469R1 |            | 1            |
| E6.2 | 3p; 4p; 4p/f | IEC/UL | F; W (MP) | 1SDA081470R1 |            | 1            |



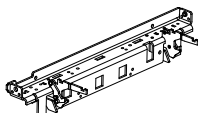
### Terminal covers

| Size | Poles | IEC/UL | Version | Code         | Type spare | Min quantity |
|------|-------|--------|---------|--------------|------------|--------------|
| E1.2 | 3p    | IEC/UL | W (MP)  | 1SDA081182R1 |            | 1            |
| E1.2 | 4p    | IEC/UL | W (MP)  | 1SDA081183R1 |            | 1            |

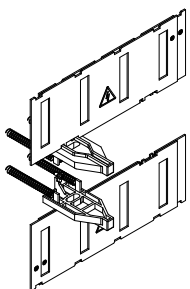
Type A Spare part = only for ABB L3 technicians

**Terminal box fixed part**

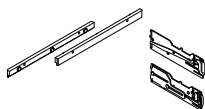
| Size       | Poles        | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------|--------------|--------|---------|--------------|------------|--------------|
| E1.2       | 3p; 4p       | IEC/UL | W (FP)  | 1SDA081180R1 | A          | 1            |
| E2.2; E4.2 | 3p; 4p       | IEC    | W (FP)  | 1SDA082152R1 | A          | 1            |
| E6.2       | 3p; 4p; 4p/f | IEC    | W (FP)  | 1SDA082153R1 | A          | 1            |

**Support for terminal box of Fixed Part**

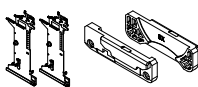
| Size | Poles | IEC/UL | Version | Code         | Type spare | Min quantity |
|------|-------|--------|---------|--------------|------------|--------------|
| E1.2 | 3p    | IEC/UL | W (FP)  | 1SDA082237R1 | A          | 1            |
| E1.2 | 4p    | IEC/UL | W (FP)  | 1SDA082238R1 | A          | 1            |
| E2.2 | 3p    | IEC/UL | W (FP)  | 1SDA081249R1 | A          | 1            |
| E2.2 | 4p    | IEC/UL | W (FP)  | 1SDA081250R1 | A          | 1            |
| E4.2 | 3p    | IEC/UL | W (FP)  | 1SDA081251R1 | A          | 1            |
| E4.2 | 4p    | IEC/UL | W (FP)  | 1SDA081252R1 | A          | 1            |
| E6.2 | 3p    | IEC/UL | W (FP)  | 1SDA081253R1 | A          | 1            |
| E6.2 | 4p    | IEC/UL | W (FP)  | 1SDA081254R1 | A          | 1            |
| E6.2 | 4p/f  | IEC/UL | W (FP)  | 1SDA081255R1 | A          | 1            |

**Safety shutters for fixed part**

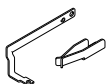
| Size | Poles | IEC/UL | Version | Code         | Type spare | Min quantity |
|------|-------|--------|---------|--------------|------------|--------------|
| E1.2 | 3p    | IEC    | W (FP)  | 1SDA081411R1 |            | 1            |
| E1.2 | 4p    | IEC    | W (FP)  | 1SDA081412R1 |            | 1            |
| E2.2 | 3p    | IEC    | W (FP)  | 1SDA081457R1 |            | 1            |
| E2.2 | 4p    | IEC    | W (FP)  | 1SDA081458R1 |            | 1            |
| E4.2 | 3p    | IEC    | W (FP)  | 1SDA081459R1 |            | 1            |
| E4.2 | 4p    | IEC    | W (FP)  | 1SDA081460R1 |            | 1            |
| E6.2 | 3p    | IEC    | W (FP)  | 1SDA081461R1 |            | 1            |
| E6.2 | 4p    | IEC    | W (FP)  | 1SDA081462R1 |            | 1            |
| E6.2 | 4p/f  | IEC    | W (FP)  | 1SDA081463R1 |            | 1            |

**Lateral guides for fixed part**

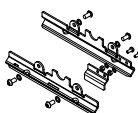
| Size             | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------------|--------|--------|---------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC    | W (FP)  | 1SDA082154R1 | A          | 1            |

**Lateral guides for Moving part**

| Size             | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------------|--------|--------|---------|--------------|------------|--------------|
| E1.2             | 3p; 4p | IEC    | W (MP)  | 1SDA082188R1 |            | 1            |
| E2.2; E4.2; E6.2 | 3p; 4p | IEC    | W (MP)  | 1SDA082302R1 |            | 1            |

**Earth sliding contact for Fixed Part**

| Size             | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------------|--------|--------|---------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | W (FP)  | 1SDA081465R1 |            | 1            |

**Safety cover**

| Size             | Poles  | IEC/UL | Version | Code         | Type spare | Min quantity |
|------------------|--------|--------|---------|--------------|------------|--------------|
| E2.2; E4.2; E6.2 | 3p; 4p | IEC/UL | W (MP)  | 1SDA081464R1 |            | 1            |

—  
Type A Spare part = only  
for ABB L3 technicians

The complete ordering codes for original and guaranteed spare parts are available in the ABB SACE Spare Parts Catalogue – 1SDC001007D0204.



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