
TECHNICAL CATALOG

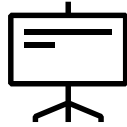
SACE Emax 2

Low voltage power circuit breakers
ANSI C37 / UL 1066 / CSA standards



SACE Emax 2 UL

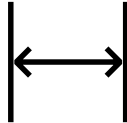
Consultation guide



Chapter 1

Main characteristics

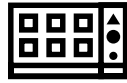
Overview of the SACE Emax 2 family, distinctive features of the series, product conformity and service.



Chapter 2

The ranges

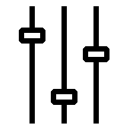
Electrical characteristics of automatic circuit breakers, switch disconnectors and derived versions.



Chapter 3

Protection trip units

Latest generation Ekip protection trip units for power distribution and generation.



Chapter 4

Software functions

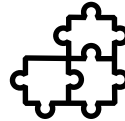
New generation of functionalities ready for every type of system and simple to use.



Chapter 5

Supervision and connectivity

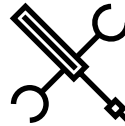
Supervision, Energy Management and complete integration in the systems with the possibility of communicating with several protocols and energy management via cloud.



Chapter 6

Accessories

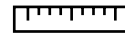
Accessories for SACE Emax 2 circuit breakers (signaling, control, interlocks, etc..) and for Ekip protection trip units (connectivity, measurements, protection, etc).



Chapter 7

Installation

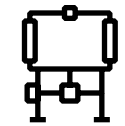
Installation and circuit breaker performance in switchgear, installation environment, degree of protection and limiting curves.



Chapter 8

Overall dimensions

Overall dimensions for fixed circuit breakers, withdrawable circuit breakers and accessories.



Chapter 9

Wiring diagrams

Circuit breaker and accessories wiring diagrams.



Chapter 10

Ordering codes

Ordering codes with configuration examples.


CHAPTER 1

Main characteristics

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Overview of the SACE Emax 2 family

Emax 2, a further leap forward

The world of electrical power distribution changes fast and major new trends such as renewables, energy storage and microgrids are now crowding onto the stage. These trends lead to new customer and application demands. To meet these demands, ABB has now unveiled the innovative Emax 2 all-in-one, the evolution of the Emax 2 into a multifunctional platform that is able to manage the next generation of electrical plants such as microgrids. Emax 2 all-in-one is the first circuit breaker that

matches new grid requirements. It enables a direct communication to the new energy management cloud-computing platform ABB Ability™ Electrical Distribution Control System. Smart and plug and play architecture makes Emax 2 all-in-one easy to use. Leveraging also unmatched electrical performances, Emax 2 sets a new circuit breaker benchmark for the needs of today and tomorrow.



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".

Efficiency

Achieving maximum efficiency of an electrical installation requires intelligent management of power supplies and energy use. For this reason, the new technologies used in the 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.

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:

- Adaptive 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).
- Predictive load shedding: slow load shedding to avoid overloads, giving the possibility to modulate loads consumption.
- 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.
- Interface protection system and Interface Device: Check of Main grid conditions and plant disconnection whenever grid voltage and frequency are out of the ranges.
- Adaptive protection: Network changes recognition and automatic set of thresholds to guarantee protection and coordination in on-grid and off-grid conditions.

Distinctive features

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 functions are also accessible via the Internet, in complete safety, through the Ekip Link switchgear supervision system and the Ekip Control Panel.

Furthermore with an easy connection thanks to Ekip Com Hub module, SACE Emax 2 can be integrated in an energy management system, ABB Ability™ Electrical Distribution Control System.

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.

Performance

The SACE Emax 2 range is made up of 4 sizes: E1.2, E2.2, E4.2 and E6.2 up to 6000A, 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 6000A. Furthermore it can be ordered with a triple marking label, IEC, UL and CCC.



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 units can be programmed and consulted from a tablet, smart phone or portable PC via the Ekip Connect application and all the advanced functionalities can be easily programmed thanks to predefined logic templates.

The trip units are easily interchangeable from the front of the circuit breaker, and all communication units can be installed directly on the terminal box with a few simple operations, 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
 - 8 Signal for springs charged or discharged
 - 9 Mechanical signalling of overcurrent release tripped
 - 10 Size and serial number



Product conformity

The SACE Emax 2 circuit breakers and their accessories conform with ANSI C37.13, C37.16, C37.17 and C37.50 standards and are UL 1066 certified. The UL 1066 certification allows Emax 2 to be used in UL 1558 switchgear, UL 891 switchboards and CSA C22.2 no. 31 switchgear assemblies.

Approvals and certifications

The SACE Emax 2 family also includes a range that conforms to the international IEC 60947, EN 60947 (harmonized in 30 CENELEC countries),

CEI EN 60947 and IEC 61000 Standards and complies with the following EC directives:

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

The IEC range is also certified by the Russian certification body GOST (Russia Certificate of Conformity) and has achieved China CCC Certification (China Compulsory Certification).

Certification of conformity with the above-mentioned 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 IECCE.

The main versions of the devices are approved by the following shipping registers



Registro Italiano Navale (RINA):
Italian



Lloyd's Register of Shipping (LR):
English



American Bureau of 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

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



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 ABB 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 the ISO/IEC 17025 Standard, provides both ABB and external customers with a qualified service of 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 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 retrofill 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.





CHAPTER 2

The ranges

- 12-13** **SACE Emax 2 power circuit breakers UL 1066**
- 14-15** **SACE Emax 2 switch disconnectors UL 1066**
- 16-17** **SACE Emax 2 power circuit breakers multi-standard
version IEC 60947, UL1066 and CCC**

SACE Emax 2 power circuit breakers UL 1066

Common data	
Rated maximum voltage	[V] 635
Rated voltage	[V] 600
Test voltage (1min. 50/60 Hz)	[kV] 2.2
Frequency	[Hz] 50 - 60
Number of poles	3 - 4
Version	Fixed (F) - Drawout (W)



SACE Emax 2 for UL1066		E1.2		
Performance levels		B-A	N-A	S-A
Current		[A] 800	800	250
		[A] 1200	1200	400
		[A]		800
		[A]		1200
		[A]		
Neutral pole current-carrying capacity for 4 pole CBs		[%Iu] 100	100	100
Interrupting rating at rated maximum voltage	254 V	[kA] 42	50	65
	508 V	[kA] 42	50	65
	635 V	[kA] 42	42	42
Rated short time current		[kA] 42	50	50
Trip times	Break time with fault current < rated short time current	[ms] 40	40	40
	Break time with fault current > rated short time current	[ms] 25	25	25
Overall dimensions	H - Fixed	[in/mm] 11.65 / 296		
	D - Fixed	[in/mm] 7.20 / 183		
	W - Fixed 3p	[in/mm] 8.27 / 210		
	W - Fixed 4p/4p full size	[in/mm] 11.02 / 280		
	H - Draw out	[in/mm] 14.33 / 363.5		
	D - Draw out	[in/mm] 11.06 / 281		
	W - Draw out 3p	[in/mm] 10.94 / 278		
	W - Draw out 4p/4p full size	[in/mm] 13.70 / 348		
Weights	Fixed 3p / 4p / 4p full size	[lbs/Kg] 30.9/35.3 lbs - 14/16 kg		
	Draw out 3p / 4p / 4p full size	[lbs/Kg] 90.4/102.5 lbs - 41/46.5 kg		

1) Fixed version only

2) 3 poles and draw out only - Overall dimension as 4 poles full size

SACE Emax 2 for UL1066		E1.2		
Mechanical life with regular ordinary maintenance prescribed by the manufacturer		[A] < 800	800	1200
		[No. cycles x 1000] 20	20	20
Electrical life with regular ordinary maintenance prescribed by the manufacturer	Frequency	[Cycles/Hour] 60	60	60
	508 V	[No. cycles x 1000] 8	8	7
	635 V	[No. cycles x 1000] 8	8	6.5
	Frequency	[Cycles/Hour] 30	30	30



E2.2					E4.2			E6.2		
B-A	N-A	S-A	H-A	V-A	S-A	H-A	V-A	H-A	V-A	
1600	1600	800	800	250	2500	2500	800	4000	4000	
	2000	1200	1200	400	3200	3200	1600	5000	5000	
		1600	1600	800	3600 ¹⁾	3600 ¹⁾	2000	6000 ²⁾	6000 ²⁾	
		2000	2000	1200			2500			
				1600			3200			
				2000			3600 ¹⁾			
100	100	100	100	100	100	100	100	50-100	50-100	
42	50	65	85	100	65	85	100	85	100	
42	50	65	85	100	65	85	100	85	100	
42	50	65	85	85	65	85	100	85	100	
42	50	65	85	85	65	85	100	85	100	
40	40	40	40	40	40	40	40	40	40	
25	25	25	25	25	25	25	25	25	25	
14.61/371					14.61/371			14.61/371		
10.63/270					10.63/270			10.63/270		
10.87/276					15.12/384			30.00/762		
14.41/366					20.08/510			34.96/888 - 39.92/1014		
16.73/425					16.73/425			16.73/425		
15.47/393					15.47/393			15.47/393		
12.48/317					16.73/425			31.61/803		
407/16.02					21.69/551			36.57/929 - 42.09/1069		
115/148 lbs - 52/67 Kg					Up to 2500A: 161/203 lbs - 73/92 kg 3200A: 201/256 lbs - 91/116 kg 3600A: 210 lbs - 95 kg			314/360/406 lbs 142/163/184 kg		
up to 1600A: 128/150 lbs - 58/68 Kg 2000A: 135/239lbs - 61/108kg					Up to 2500A: 261/325 lbs - 118/147 kg 3200A: 300/377 lbs - 136/171 kg			Up to 5000A: 486/554/620 lbs - 220/251/281 kg 6000A: 818 lbs - 371 Kg		

E2.2			E4.2				E6.2		
< 1600	1600	2000	< 2500	2500	3200	3600	4000	5000	6000
25	25	25	20	20	20	20	12	12	12
60	60	60	60	60	60	60	60	60	60
15	12	10	10	8	7	7	4	3	2
15	10	8	10	8	7	7	4	2	2
30	30	30	20	20	20	20	10	10	10

SACE Emax 2 switch disconnectors UL 1066

Common data

Rated maximum voltage	[V] 635
Rated voltage	[V] 600
Test voltage (1min. 50/60 Hz)	[kV] 2.2
Frequency	[Hz] 50 - 60
Number of poles	3 - 4
Version	Fixed (F) - Drawout (W)



SACE Emax 2 for UL1066

SACE Emax 2 for UL1066		E1.2	
Performance levels		B-A	N-A
Current		[A] 800	800
		[A] 1200	1200
		[A]	
		[A]	
		[A]	
Neutral pole current-carrying capacity for 4 pole CBs		[%Iu] 100	100
Rated short time current		[kA] 42	50 ¹⁾
Overall dimensions	H - Fixed	[in/mm] 11.65 / 296	
	D - Fixed	[in/mm] 7.20 / 183	
	W - Fixed 3p	[in/mm] 8.27 / 210	
	W - Fixed 4p/4p full size	[in/mm] 11.02 / 280	
	H - Draw out	[in/mm] 14.33 / 363.5	
	D - Draw out	[in/mm] 11.06 / 281	
	W - Draw out 3p	[in/mm] 10.94 / 278	
	W - Draw out 4p/4p full size	[in/mm] 13.70 / 348	

1) Rated short-time current is equal to 42kA at 635V

2) Fixed version only

3) 3 poles and draw out only - Overall dimension as 4 poles full size

SACE Emax 2 for UL1066

SACE Emax 2 for UL1066		E1.2	
Mechanical life with regular ordinary maintenance prescribed by the manufacturer		[A] 800	1200
		[No. cycles x 1000] 20	20
	Frequency	[Cycles/Hour] 60	60
Electrical life with regular ordinary maintenance prescribed by the manufacturer	508 V	[No. cycles x 1000] 8	7
	635 V	[No. cycles x 1000] 8	6.5
	Frequency	[Cycles/Hour] 30	30



E2.2			E4.2			E6.2
N-A	S-A	V-A	S-A	H-A	V-A	L-A
1600	800	800	2500	2500	800	4000
2000	1600	1600	3200	3200	1600	5000
	2000	2000	3600	3600	2000	6000
					2500	
					3200	
					3600	
100	100	100	100	100	100	50-100
50	65	85	65	85	100	100
14.61/371			14.61/371			14.61/371
10.63/270			10.63/270			10.63/270
10.87/276			15.12/384			30.00/762
14.41/366			20.08/510			34.96/888 - 39.92/1014
16.73/425			16.73/425			16.73/425
15.47/393			15.47/393			15.47/393
12.48/317			16.73/425			31.61/803
407/16.02			21.69/551			36.57/929 - 42.09/1069

E2.2			E4.2				E6.2		
< 1600	1600	2000	< 2500	2500	3200	3600	4000	5000	6000
25	25	25	20	20	20	20	12	12	12
60	60	60	60	60	60	60	60	60	60
15	12	10	10	8	7	7	4	3	2
15	10	8	10	8	7	7	4	2	2
30	30	30	20	20	20	20	10	10	10

SACE Emax 2 power circuit breakers multi-standard version IEC 60947, UL1066 and CCC

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 (F) - Drawout (W)
Isolation behaviour	IEC 60947-2



Standard		E2.2				
Performance levels		B-A	N-A	S-A	H-A	V-A
Rated uninterrupted current Iu @ 40°C		[A] 1600	1600	800	800	400
		[A]	2000	1200	1200	800
		[A]		1600	1600	1200
		[A]		2000	2000	1600
		[A]				2000
UL1066						
Interrupting rating at rated maximum voltage	254 V	[kA] 42	50	65	85	100
	508 V	[kA] 42	50	65	85	100
	635 V	[kA] 42	50	65	85	85
Rated short time current		[kA] 42	50	65	85	85
IEC 60947						
Rated ultimate short-circuit breaking capacity Icu	400-415 V	[kA] 42	50	66	85	100
	440 V	[kA] 42	50	66	85	100
	500-525 V	[kA] 42	50	66	85	85
	690 V	[kA] 42	50	66	85	85
Rated service short-circuit breaking capacity Ics	400-415 V	[kA] 42	50	66	85	100
	440 V	[kA] 42	50	66	85	100
	500-525 V	[kA] 42	50	66	85	85
	690 V	[kA] 42	50	66	85	85
Overall dimensions	H - Fixed	[in/mm] 14.61/371				
	D - Fixed	[in/mm] 10.63/270				
	W - Fixed 3p	[in/mm] 10.87/276				
	W - Fixed 4p/4p full size	[in/mm] 14.41/366				
	H - Draw out	[in/mm] 16.73/425				
	D - Draw out	[in/mm] 15.47/393				
	W - Draw out 3p	[in/mm] 12.48/317				
	W - Draw out 4p/4p full size	[in/mm] 407/16.02				
Weights	Fixed 3p / 4p / 4p full size	[lbs/Kg] 115/148 lbs - 52/67 Kg				
	Draw out 3p / 4p / 4p full size	[lbs/Kg] up to 1600A: 128/150 lbs - 58/68 Kg 2000A: 135/239lbs - 61/108kg				

SACE Emax 2 for IEC 60947, UL1066 and CCC		E2.2			
Mechanical life with regular ordinary maintenance prescribed by the manufacturer		[lu]	< 1600	1600	2000
		[No. cycles x 1000]	25	25	25
Electrical life with regular ordinary maintenance prescribed by the manufacturer	Frequency	[Oper./Hour]	60	60	60
	440 V	[No. cycles x 1000]	15	12	10
	690 V	[No. cycles x 1000]	15	10	8
	Frequency	[Oper./Hour]	30	30	30

1) Fixed version only

2) 3 poles and draw out only - Overall dimension as 4 poles full size



E4.2			E6.2	
S-A	H-A	V-A	V-A	
2500	2500	800	4000	
3200	3200	1600	5000	
		2000		
		2500		
		3200		
65	85	100	100	
65	85	100	100	
65	85	100	100	
65	85	100	100	
66	85	100	100	
66	85	100	100	
66	85	100	100	
66	85	100	100	
66	85	100	100	
66	85	100	100	
66	85	100	100	
14.61/371			14.61/371	
10.63/270			10.63/270	
15.12/384			30.00/762	
20.08/510			34.96/888 - 39.92/1014	
16.73/425			16.73/425	
15.47/393			15.47/393	
16.73/425			31.61/803	
21.69/551			36.57/929 - 42.09/1069	
Up to 2500A: 161/203 lbs - 73/92 kg - 3200A: 201/256 lbs - 91/116 kg			314/360/406 lbs - 142/163/184 kg	
Up to 2500A: 261/325 lbs - 118/147 kg			486/554/620 lbs	
3200A: 300/377 lbs - 136/171 kg			220/251/281 kg	
E4.2			E6.2	
< 2500	2500	3200	4000	5000
20	20	20	12	12
60	60	60	60	60
10	8	7	4	3
10	8	7	4	2
20	20	20	10	10

CHAPTER 3

Protection trip units

20-21	Introduction
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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.

— Ekip Power Controller function monitors installation loads and generators, permitting the power consumed to be limited and allowing savings on electricity bills.

The result of ABB SACE's experience and research, they embed advanced functionality in the Emax 2 circuit breaker to make it an all-in-one solution for distribution systems and microgrids. The protection units are divided into two families: Ekip for distribution protection and Ekip G for generator protection.

The range of trip units is available with three levels of performance, Dip, Touch and Hi-Touch, to satisfy simple to advanced applications. The complete, flexible Ekip protection trip unit offering, which can be adapted to the actual level of protection required, is shown below:

	Fields of applications	Measurement and Protection of Current	Measurement of Voltage, Power, Energy	Measurement and Protection of Voltage, Power, Energy	Network Analyzer
Ekip Dip		with Ekip Multimeter	-	-	-
Ekip Touch	Distribution	•	with Ekip Measuring	with Ekip Measuring Pro	-
Ekip Hi-Touch		•	•	•	•
Ekip G Touch	Generators	•	•	•	-
Ekip G Hi-Touch		•	•	•	•



— Ekip G enables the protection of generators without the use of external devices that require dedicated relays and wiring.

The **protection units for power distribution**, available in the LI, LSI and LSI G versions, are suited to all distribution systems.

The Ekip trip units are designed to protect a vast range of applications, such as use with transformers, motors and drives. Depending on the complexity of the system, the need to take voltage or energy measurements or to include control systems in switchgear. Ekip Dip, Ekip Touch or Ekip Hi-Touch can be selected.

Ekip G enables the **protection of generators** without the use of external devices that require dedicated relays and wiring.

Ekip G increases efficiency from the design stage to installation, minimizing the time needed for realization and commissioning of the system, and ensuring high levels of accuracy and reliability of all protection devices required for running generators in applications such as naval, GenSet or cogeneration.

Thanks to the **Network Analyzer** function integrated in all Hi-Touch versions, the quality of energy in terms of harmonics, micro-interruptions or voltage dips is monitored without the need for dedicated instrumentation. This allows effective preventive and corrective action to be implemented through accurate analysis of the faults, thereby improving the efficiency of the system.



Architecture

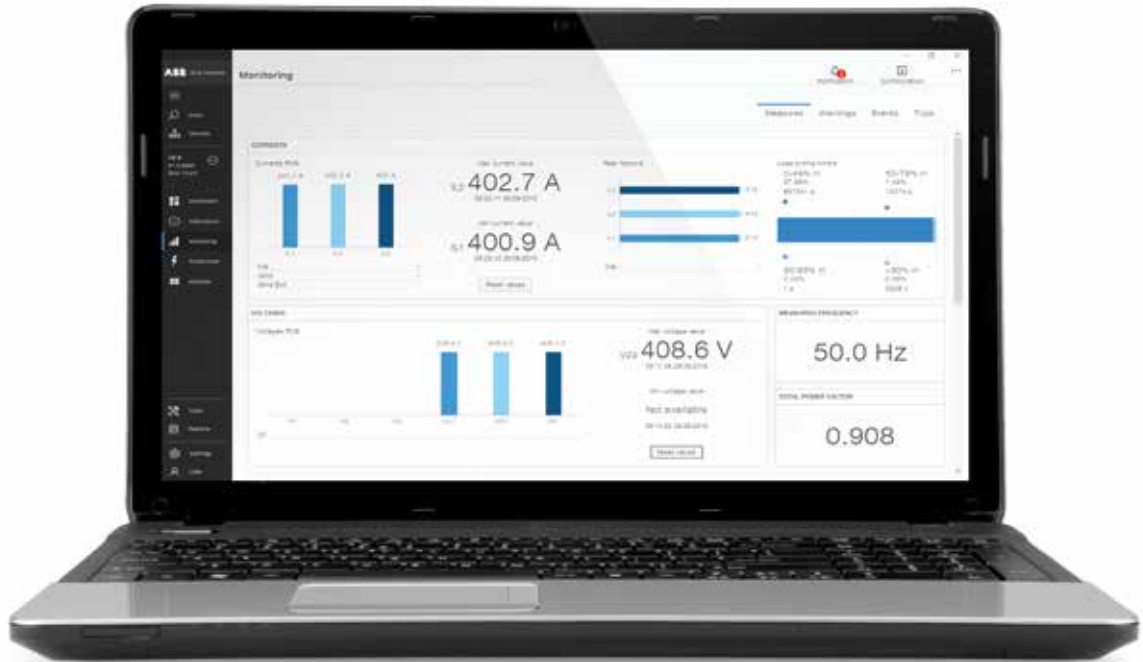
All SACE Emax 2 circuit breakers are equipped with protection trip units that are interchangeable from the front with just a few, simple operations by the customer.

There is no need to dismantle the circuit breaker or access any internal or sensitive parts.

This enables personalization of the functions available, even during commissioning or when the circuit breaker has already been installed. In particular, SACE Ekip consists 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.
- **Ekip Measuring Module**, connected internally to Emax 2, performs voltage, power and energy measurements with high accuracy without requiring any external connection or voltage transformer. The Ekip Measuring Pro version also performs all protection functions based on voltage and power without the need for external units, thereby simplifying design and construction of the system.
- **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™ and open ADR protocols;
- **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..

Protection trip units for power distribution

Ekip Dip

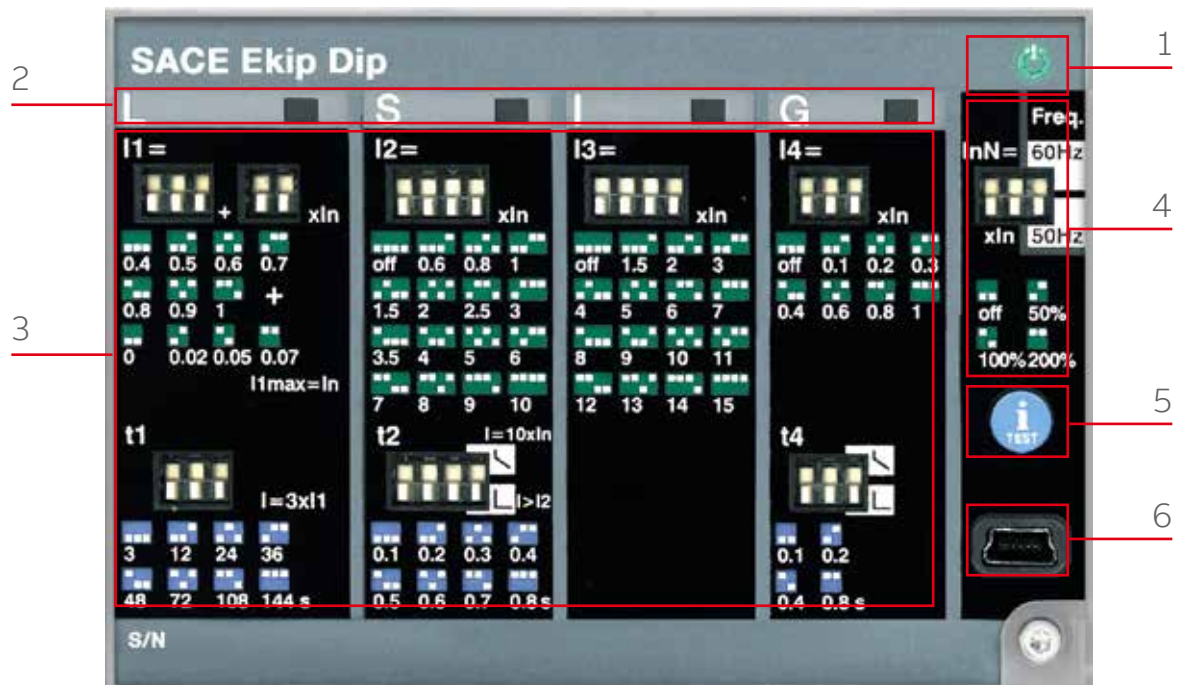
- Key:
1. Power-on LED for signalling correct operation (watchdog)
 2. LEDs for alarm signalling of L, S, I and G protection functions and diagnostics
 3. Dip switches for setting the protection functions
 4. Dip switches for setting the network frequency and neutral protection device
 5. Pushbutton for test and for indicating the cause of tripping
 6. Test and programming connector

Ekip Dip is the new protection trip unit for all applications in which high accuracy and reliable protection against overcurrent are required.

Characteristics

Ekip Dip offers a complete set of standard protection functions. Dedicated LEDs allow the fault that caused tripping to be determined. The unit is available in the following versions:

- Ekip Dip LI
- Ekip Dip LSI
- Ekip Dip LSIG



Protection functions

Ekip Dip offers overcurrent protection functions and, in the event of tripping, controls the opening of the circuit breaker, preventing it from closing again unless it has been reset by the operator (lock-out device – code ANSI 86).

- Overload (L - ANSI 49)
- Time-delayed overcurrent (S - ANSI 51 & 50TD)
- Thermal memory
- Instantaneous overcurrent (I - ANSI 50)
- Earth Fault (G)
- Neutral protection

Measurements

The Ekip Dip unit measures phase and neutral current with great accuracy: 1% including the current transformers in the 0.2 ... 1.2 In range (class 1 in accordance with IEC 61557-12). Using the current sensors in the circuit breaker and without the need to install an external measuring system, it is possible to view the measurements by the display on the front of the Ekip Multimeter and Ekip Control Panel. Ekip Dip also records the characteristics of the circuit breaker, to enable a rapid analysis in the event of maintenance:

- Maximum and average current values per phase;
- Date, time, fault current per phase and type of protection tripped over the last 30 trips;
- Date, time and type of operation of the last 200 events (for example: opening/closing of circuit breaker, pre-alarms, editing settings);
- Number of mechanical and electric operations of the circuit breaker;
- Total operating time;
- Contact wear;
- Date and time of the last maintenance carried out, in addition to the estimate of the next maintenance required;
- Circuit breaker identifying data: type, serial number, firmware version, name of the device as assigned by the user.

The values can be displayed on the front of the Ekip Multimeter or Ekip Control Panel or by Ekip Connect software on a Smartphone, Tablet or PC by using the communication units Ekip T&P or Ekip Bluetooth.

Watchdog

All the protection trip units of the SACE Emax 2 family ensure high reliability owing to an electronic circuit that periodically checks the continuity of the internal connections, such as trip coil, rating plug and each current sensor (Ansi 74). In the event of a malfunction, the LEDs indicate the corresponding alarm to enable the fault to be identified rapidly. Furthermore, Ekip Dip detects and indicates that the circuit breaker has been opened because one of the protection functions has been tripped (Ansi BF code).

In order to ensure the correct operation of the unit, Ekip Dip is also provided with self-protection against abnormal temperature (OT) inside the protection trip unit. The user can set it to open the circuit breaker or to merely indicate an alarm.

User interface

Ekip offers a great variety of thresholds and trip times, which can be set by dip-switches. Up to 5 LEDs are also available (depending on the version) to indicate correct operation or alarms. The interface always enables the status of the installation to be identified clearly and quickly:

- correct operation (green LED)
- overcurrent pre-alarms or alarms
- presence of self-check functions alarms
- maintenance interval expired
- indication of tripped protection after a fault

The protection tripped indication is activated by pressing the iTest key, and operates without the need for an external power supply because a battery is installed inside the unit.

Protection trip units for power distribution

Ekip Dip

Communication

The Ekip Bluetooth wireless communication unit enables the operator to interact with the protection trip unit by computer, Smartphone or Tablet. In fact, the free Ekip Connect software for smartphones, tablets and PC, enables measurements and fault data to be read and alarm status and information on the circuit breaker or maintenance to be displayed. It is also possible to set parameters such as date, time and thermal memory and for the records to be reset.

Test function

The test port on the front of the protection trip unit can be used to run the circuit breaker tests by connecting one of the following devices:

- Ekip TT, which allows trip test, LED test and a check for the absence of alarms detected by the watchdog function;
- Ekip T&P permits not only the trip test and LEDs test but also testing of the individual protection functions and the saving of the relative report;
- iTest key, pressed to run the battery test when the circuit breaker is disconnected.

Supply

The Ekip Dip protection trip unit does not require an external supply for the protection functions or for the alarm indication functions because it is self-supplied by the current sensors installed on the circuit breaker. A three-phase 100A current suffices to activate the LED indications.

The Ekip Supply module enables an auxiliary supply to be easily connected and is able to receive both a direct current supply (24-48V DC or 110-240V DC) and an alternating current (110-240V AC) to activate additional functions such as:

- G protection at values below 100A or below 0.2 In;
- connecting to external devices such as Ekip Multi-meter and Ekip Control Panel;
- recording the number of operations.

The Ekip Dip protection trip unit also has a battery that enables the indication of the cause of the fault to be viewed for an unlimited time after tripping. In addition to that, the battery enables date and time to be maintained and updated, thus ensuring the chronology of the events. On the other hand, when the unit is switched off, the battery test can be run by simply pressing the iTest key.

Supply	Ekip Supply	
Nominal voltage	24-48V DC	110-240V AC/DC
Voltage range	21.5 - 53V DC	105-265V AC/DC
Rated power (including modules)	10W max.	10W max.
Inrush current	~2 A for 20 ms	~2 A for 20 ms

Whenever cartridge modules are not used in the terminal box area, the trip unit can be supplied by means of a galvanically isolated 24V DC auxiliary voltage.

Protection trip units for power distribution

Ekip Touch

Key:

1. Wide high-resolution colour touch-screen display
2. Power-on LED to indicate correct operation (watchdog)
3. Pre-alarm LED
4. Alarm LED
5. Home pushbutton to return to home page
6. Pushbutton for test and indicating cause of trip
7. Test and programming connector

Ekip Touch provides a complete series of protections and high accuracy measurements of all electrical parameters and can be integrated perfectly with the most common automation and supervision systems.

Characteristics

The simple and intuitive interface enables the operator to access all the information and settings rapidly and easily by minimizing installation and commissioning time.

The unit is available in the versions:

- Ekip Touch LI
- Ekip Touch LSI
- Ekip Touch LSIG



Protection trip units for power distribution

Ekip Touch

Protection functions

Ekip Touch enables all the protection functions to be set with a few simple steps directly from the wide touchscreen display. If the circuit breaker is tripped it must be reset manually or electrically by the operator (lockout relay – code ANSI 86).

- Overload (L - ANSI 49)
- Time-delayed overcurrent (S - ANSI 51 & 50TD)
- Thermal memory
- Instantaneous overcurrent (I - ANSI 50)
- Earth fault (G - ANSI 51N & 50NTD)
- Instantaneous Earth Fault (G-ANSI 50N)
- Earth fault on toroid (G ext - ANSI 51G & 50GTD)
- Neutral protection
- Start-up function
- Current unbalance (IU – ANSI 46)
- Zone selectivity for S and G protection (ANSI 68)
- Current thresholds
- Power Controller

In addition, the following protection functions are available with Ekip Measuring Pro:

- Undervoltage (UV - ANSI 27)
- Overvoltage (OV - ANSI 59)
- Underfrequency (UF - ANSI 81L)
- Overfrequency (OF - ANSI 81H)
- Voltage unbalance (VU – ANSI 47)
- Residual current (Rc – ANSI 64 & 50NDT)
- Reverse active power (RP - ANSI 32R)
- Synchrocheck (SC - ANSI 25)
- Cyclical direction of the phases (ANSI 47)
- Power factor (ANSI 78).

Measurements and meters

All versions of the Ekip Touch unit measure the RMS value of the currents of the three phases (L1, L2, L3) and of neutral (Ne) with 1% accuracy in the 0.2 to 1.2 In range (class 1 in accordance with IEC 61557-12).

The complete range of measurement is from 0.03 to 16x In, where In is the value of the rating plug.

The display shows the current of the most loaded phase both in numeric and analogue format on an ammeter with a 0-125% In scale for rapid identification of the load of the circuit breaker.

Alternatively, bar graphs that show the currents of the three phases and of neutral on a 0-125% In scale in addition to the numeric value of the most loaded phase can be selected as the default page. The bar graphs are yellow in the event of a pre-alarm and red in the event of an overload to enable an irregular condition to be identified immediately.

Where applicable, the measurement of the earth fault current is shown on a dedicated page. The ammeter can operate both in self-supplied mode and with auxiliary voltage. In the latter case, the display always has back lighting and the ammeter is also active at currents below 100A.

Adding the Ekip Measuring or Ekip Measuring Pro module to Ekip Touch enables Ekip Touch to be used as a multimeter to measure the values of:

- Voltage: phase-phase, phase-neutral (accuracy 0.5%);
- Power: active, reactive, apparent (accuracy 2%);
- Energy: active, reactive, apparent (accuracy 2%);
- Frequency (accuracy 0.2%);
- Power factor by phase and total;
- Peak factor.

—
Measurements
and meters



Maximum values and values register

The Ekip Touch unit is able to supply the measurement trend of certain parameters over a settable period of time such as: average power, maximum power, maximum and minimum current, maximum and minimum voltage. The values of the last 24 time intervals are recorded in the unit with a relative timestamp and can be consulted directly from the display or remotely using one of the available communication protocols. The communication can also be used to synchronize the recording time interval.

Data logger

Ekip Touch is always supplied with the exclusive Data Logger (register) function that stores with high sampling frequency the instantaneous values of all the measurements in two memory buffer registers. The data can be easily downloaded by the Ekip Connect unit and transferred to any personal computer. This enables the current and voltage waveforms to be analyzed for rapid fault analysis. The function continuously stores and stops recording, with a selectable delay, whenever the event set by the user occurs (e.g. trip or alarm). In this manner, it is possible to analyze the complete evolution of the fault: from the start to its complete elimination.

Information on trip and opening data

If a trip occurs, Ekip Touch stores all the information that is required for rapid identification and elimination of the causes:

- Protection tripped
- Opening data (current, voltage or frequency)
- Time-stamping (data, time and consecutive opening number)

If the iTest key is pressed, the trip unit displays all these data directly on the display. No auxiliary supply is required. The information is also available to the user with the circuit breaker open or without current flow, due to the battery installed inside the unit.

Maintenance indicators

A complete set of information about the circuit-breaker and its operation is available for effective fault analysis and preventive scheduling of maintenance. All the information can be seen from the display or from a PC using a communication unit.

In particular:

- Date, time, fault current by phase and type of protection tripped over the last 30 trips;
- Date, time and type of operation of the last 200 events (example: opening/closing of circuit-breaker, pre-alarms, editing of settings, ect.);
- Number of operations of the circuit breaker: divided into mechanical operations (no current), electrical operations (with current) and protection function (trip);
- Contact wear estimated as a function of the number and type of openings;
- Total operating time of the circuit breaker with circulating current;
- Date and time of the last maintenance session, scheduling of the next maintenance session;
- Circuit breaker identifying data: type, serial number, firmware version, device name assigned by the user.

All the information can be viewed directly from the display and from a Smartphone, Tablet (with Ekip Bluetooth) or PC using the front port of the trip unit or the system communication.

Maintenance indicators



Protection trip units for power distribution

Ekip Touch

Watchdog

All of the trip units in the SACE Emax 2 family ensure high reliability because of an electronic circuit that periodically checks continuity of the internal connections, such as the trip coil, rating plug and each current sensor (ANSI 74). In the event of an alarm, a message is shown on the display, and if it is set during the installation phase, the trip unit can command the opening of the circuit breaker. If a protection function intervenes, Ekip Touch always checks that the circuit breaker has been opened by auxiliary contacts that indicate the position of the main contacts. Otherwise, Ekip Touch indicates an alarm (ANSI BF code - Breaker Failure) to be used to command the opening of the circuit breaker located upstream. Ekip also contains self-protection that ensures the correct operation of the unit under abnormal temperatures (OT) inside the protection trip unit. The user has the following indications or controls:

- “Warning” LED for temperature below $-20\text{ }^{\circ}\text{C}$ or above $+70\text{ }^{\circ}\text{C}$, at which the trip unit operates correctly with the display switched off
- “Alarm” LED for temperature outside the operating range, at which the trip unit commands the opening of the circuit breaker (if set during the configuration phase).

User interface

All Ekip Touch operations are simple and intuitive due to the wide graphic colour touchscreen display. For example, all the main information is listed on one page (settable by default), thus enabling the

state of the installation to be identified rapidly: maximum current, maximum voltage and active, reactive, apparent power and energy.

In addition, the use of Ekip Touch is further simplified by the possibility of scrolling through the menu and reading the alarms in one of the languages that can be set directly from the display: Italian, English, German, French, Spanish, Portuguese, Chinese, Russian, Turkish and Thai.

The home pushbutton enables the user to return, at any moment, to the main page and the iTest key enables the information to be viewed after a circuit breaker trip and test.

As in the previous generation of trip units, a password system is used to manage “Read” or “Edit” modes. The default password, 00001, can be edited by the user. The protection parameters (curve and trip thresholds) are settable in “Edit” mode whereas it is always possible to consult the information in “Read” mode.

On the front of the trip unit there are also two LEDs: a pre-alarm LED (square yellow LED) and an alarm LED (red triangular LED); a message on the display always accompanies the flashing of the LEDs for clear identification of the type of event.

The list of all the alarms active at that moment can be viewed by simply touching the display on the white strip in the bottom left of the alarms zone.

Ekip Touch is also supplied with a front port that permits a temporary connection to devices for test, supply or communication (for example Ekip T&P).

User interface



Communication

Communication modules that can be installed inside the circuit breaker enable Ekip Touch to be integrated into the most modern supervision systems with protocols:

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

The integration into communication systems enables measurements, statuses and alarms to be programmed and viewed by remote functions. If the circuit breaker has to be opened and closed remotely, the Ekip Com Actuator module can be installed in the circuit breaker front, in the right-hand accessories chamber.

For each circuit breaker, several communication modules with different protocols can be used simultaneously; for example, this enables the circuit breaker to be connected to the Ekip link system to obtain local supervision from the front of the switchgear and to simultaneously integrate it into a communication network. In addition, for applications requiring very high reliability, up to two modules using the same protocol can be inserted and two different addresses used to provide a level of redundancy.

Test function

For circuit breaker testing it is possible to use the test port and the iTest key positioned on the front of the protection trip unit.

The available functions are:

- trip test, test of the display and of the LEDs and check of absence of alarms detected by the watchdog function using Ekip TT;
- test of the single protection functions and saving of the report, in addition to the trip test and test of the display, using Ekip T&P;
- test of the battery with the circuit breaker switched off by pressing the iTest key.

Protection trip units for power distribution

Ekip Touch

Supply

The Ekip Touch protection trip unit is self-supplied by the current sensors and does not require an external supply for the basic protection functions or for the alarm indication functions. All protection settings are stored in a non-volatile memory that maintains the information, even without a power supply. To activate the indication functions the ammeter and the display, a 100A three-phase current suffices.

An auxiliary supply can easily be connected. The Ekip Supply module can be connected to supplies of both direct current and alternating current to activate additional functions such as:

- using the unit with circuit breaker open;
- using additional modules such as Ekip Signalling and Ekip Com;
- connection to external devices such as Ekip Multimeter and Ekip Control Panel;
- recording the number of operations;
- G protection with values below 100A or below 0.2 In;
- zone selectivity;
- Gext and MCR protection functions.

The Ekip Supply module allows the cartridge modules to be used in the terminal box area.

Otherwise, the trip unit can be supplied by means of a galvanically isolated 24V DC auxiliary voltage. The Ekip Measuring Pro module can supply the Ekip Touch trip unit with line voltage above 85V. In addition, if the module is installed with voltage pick-ups on the supply side, the trip unit can be used even if the circuit breaker is open.

The Ekip Touch protection trip unit is also supplied with a battery that enables the cause of the fault to be indicated after a trip, without a time limit. In addition, the battery enables date and time to be updated, thus ensuring the chronology of the events. When Ekip Touch is operating, it uses an internal control circuit to indicate automatically that the battery is flat. On the other hand, when the unit is switched off the battery test can be run by simply pressing the iTest key.

Supply	Ekip Supply	
Nominal voltage	24-48V DC	110-240V AC/DC
Voltage range	21.5-53V DC	105-265V AC/DC
Rated power (including modules)	10W max.	10W max.
Inrush current	~10 A for 5 ms	~10 A for 5 ms

Protection trip units for power distribution

Ekip Hi-Touch

Key:

1. Wide high-resolution colour touch-screen display
2. Power-on LED indicating correct operation
3. Pre-alarm LED
4. Alarm LED
5. Home pushbutton to return to home page
6. Pushbutton for test and for indicating cause of the trip
7. Test and programming connector
8. Ekip Measuring Pro module, with relative LED power on

The Ekip Hi-Touch is a high-performance multifunction unit that is extraordinarily versatile and can be used in even the most complex installations.

Characteristics

Ekip Hi-Touch, in fact, features exclusive functions such as: directional protection, restricted earth fault and dual setting of the protections. In addition, Ekip Hi-Touch is supplied with the exclusive Network Analyzer function that can monitor the quality of the power absorbed by the installation in accordance with existing standards.

Ekip Hi-Touch boasts all the features of Ekip Touch; as standard, it features the measuring and protection module Ekip Measuring Pro and can also be fitted, like Ekip Touch, with the additional features provided by the internal modules and by the external accessories. The front interface of the unit, which is common to Ekip Touch, is extremely simply because of the touchscreen colour display; it is able to show measurements, bar graphs and sine curves of the different electrical values.

The unit is available in the versions:

- Ekip Hi-Touch LSI
- Ekip Hi-Touch LSI G



Protection trip units for power distribution

Ekip Hi-Touch

Protection functions

The Ekip Hi-Touch trip unit has the following protection functions, which it shares with Ekip Touch:

- Overload (L – ANSI 49);
- Time-delayed overcurrent (S – ANSI 51 & 50TD);
- Thermal memory;
- Instantaneous overcurrent (I – ANSI 50);
- Closing on short-circuit (MCR);
- Earth fault (G – ANSI 51N & 50NTD);
- Instantaneous Earth Fault (G – ANSI 50N); Earth fault on toroid (G ext – ANSI 51G & 50GTD);
- Neutral protection;
- Start-up function;
- Zone selectivity for functions S and G (ANSI 68);
- Current unbalance (IU – ANSI 46);
- Undervoltage (UV – ANSI 27);
- Overvoltage (OV – ANSI 59);
- Underfrequency (UF – ANSI 81L);
- Overfrequency (OF – ANSI 81H);
- Voltage unbalance (VU – ANSI 47);
- Residual current (Rc – ANSI 64 & 50NTD);
- Reverse active power (RP – ANSI 32R);
- Synchrocheck (SC – ANSI 25, optional);
- Cyclical direction of the phases (ANSI 47);
- Power factor (ANSI 78);
- Current thresholds;
- Power Controller function (optional)
- Second time-delayed overcurrent protection (S2 – ANSI 50TD)
- Second protection against earth fault (ANSI 50GTD/51G & 64REF)
- Directional overcurrent (D – ANSI 67)
- Zone selectivity for protection D (ANSI 68)
- Start-up function for protection D
- Second protection against undervoltage and overvoltage (UV2 and OV2 – ANSI 27 and 59)
- Second protection against underfrequency and overfrequency (UF2 and OF2 – ANSI 81L and 87H)
- Dual setting of protections.

Measurements

The Ekip Hi-Touch trip unit offers a complete series of measurements, common to Ekip Touch:

- Measurements and counters: currents, voltage, power, energy;
- Maximum values and value log;
- Data logger;
- Information on the trip and opening data;
- Maintenance indicators.

Ekip Hi-Touch integrates the exclusive Network Analyzer function, which analyzes the quality of energy consumed by the installation, in accordance with the provisions of international standards EN50160 and IEC 61000-4-30, in terms of harmonic content, average value and long or short term changes in voltage. Changes in the energy quality can cause malfunctions in the switchgear and a reduction in their lifespan, as well as increased losses and reduced energy efficiency of the installation. It is therefore increasingly important to assess the quality of the energy and the economic impact it has on the productive process, so that the appropriate preventive and corrective actions can be taken. With Ekip Hi-Touch, the causes of an increase in power lost in transformers or motors, or a reduction in the lifespan of cables and capacitors, can be identified without the need to install any external instrumentation.

The Network Analyzer function performs continuous monitoring of the energy quality, and shows all results via 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 obtained from the three line voltages and compared with the limits. If the limits are exceeded, Ekip Hi-Touch generates a signalling event. The quantity of these events is stored in a suitable counter. The counter values are available for each of the last 7 days, as is the total. The measurements 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** (voltage interruptions / voltage dip): if the voltage remains below the threshold for more than 40ms, Ekip Hi-Touch 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 the threshold for 40ms, for a pre-determined time, Ekip Hi-Touch generates an event that is counted.
- **Slow-voltage sags and swells** (voltage sag / voltage swell): when the voltage goes outside the range of acceptable limit values for a time greater than the one set, Ekip Hi-Touch generates an event that is counted. Three values can be configured for voltage sags and two for voltage swells, each of which associated with a time limit: this enables us to verify 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 voltages are not equal or the phase displacements between them are not exactly 120°, an unbalance occurs, which is manifested by 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 total harmonic distortion (THD), is available in real time on the display or through the communication modules. Ekip Hi-Touch also generates an alarm if the THD value or the magnitude of at least one of the harmonics exceeds the values set. The voltage is monitored on all lines and currents on all phases.

All information can be displayed directly on the screen or on a smartphone, tablet or PC using the front port of the trip unit (with Ekip Bluetooth) or installation communication.

Other functions

Ekip Hi-Touch integrates all the features in terms of user interface, communication, test and supply described for Ekip Touch equipped with Ekip Measuring Pro.

Protection trip units for generators

Ekip G Touch

Key:

1. Wide, high resolution touchscreen display
2. Power-on LED indicating correct operation
3. Pre-alarm LED
4. Alarm LED
5. Home pushbutton to return to home page
6. Pushbutton for test and for indicating cause of the trip
7. Test and programming connector
8. Ekip Measuring Pro module with relative poweron LED

Ekip G Touch is designed for use in applications with generators, such as Genset, cogeneration and marine applications, in conformity with international standards IEC 60034-1 and IEEE C37.102.

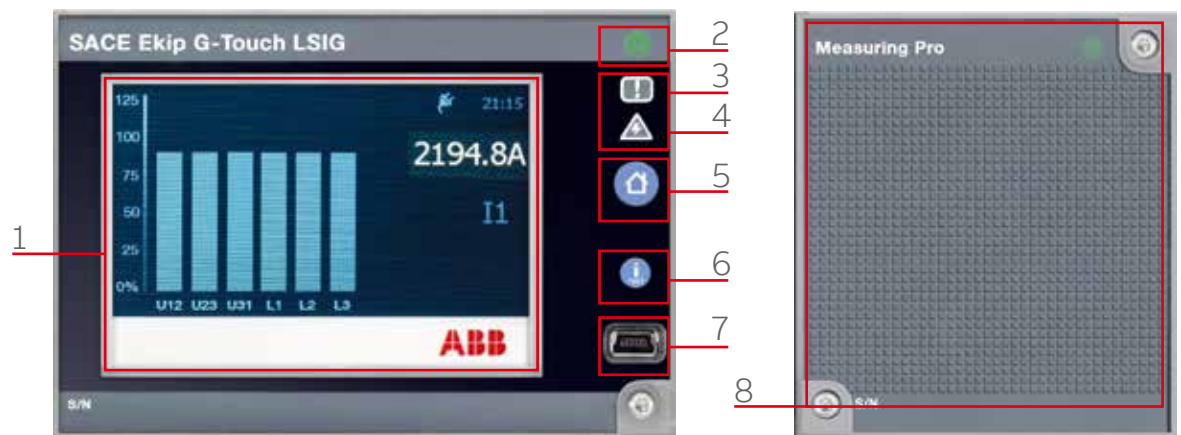
Characteristics

Ekip G Touch has been approved by the main shipping registers and enables the number of components installed, such as external protection devices, current sensors, voltage transformers and the relative cabling, to be reduced.

The reductions allow the installation to be significantly simplified. In addition, all the protection functions can be tested individually, using the Ekip T&P device that enables the function to be tested before commissioning.

The unit is available in the Ekip G Touch LSIG version and features all the characteristics provided by Ekip Touch. The Ekip Measuring Pro measuring and protection module is supplied as standard and, like Ekip Touch; the functions can be increased further using the internal modules and the external accessories.

The front interface of the unit, which is common to the Ekip Touch family, is characterized by a wide, high resolution touchscreen display that is simple to use and displays measurements and alarms clearly and accurately.



Protection functions

The Ekip G Touch trip unit provides all the protection functions of Ekip Touch and, in addition, provides a series of dedicated generator protections. If Ekip is tripped, it opens the circuit breaker and prevents it from closing again until it has been reset manually or electrically by the operator (lockout relay – code ANSI 86).

The trip unit is provided with the following protection functions:

- Overload (L – ANSI 49);
- Time-delayed overcurrent (S – ANSI 51 & 50TD);
- Thermal memory;
- Instantaneous overcurrent (I – ANSI 50);
- Closing on short circuit (MCR);
- Earth fault (G – ANSI 51N & 50NTD);
- Instantaneous Earth Fault (G – ANSI 50N);
- Earth fault on toroid (G ext – ANSI 51G & 50GTD)
- Neutral protection;
- Start-up function;
- Zone selectivity for functions S and G (ANSI 68);
- Current unbalance (IU – ANSI 46);
- Undervoltage (UV – ANSI 27);
- Overvoltage (OV – ANSI 59);
- Underfrequency (UF – ANSI 81L);
- Overfrequency (OF – ANSI 81H);
- Voltage unbalance (VU – ANSI 47);
- Differential ground fault (Rc – ANSI 87N);
- Reverse active power (RP – ANSI 32R);
- Synchrocheck (SC – ANSI 25, optional);
- Cyclical direction of phases (ANSI 47);
- Power factor (ANSI 78);
- Current thresholds;
- Power Controller function (optional)
- Differential ground fault (Rc - ANSI 87N)
- Voltage controlled overcurrent protection (S(V) - ANSI 51V)
- Residual overvoltage (RV – ANSI 59N)
- Loss of field or reverse reactive power (RQ – ANSI 40 or 32RQ)
- Loss of field or reverse reactive power (RQ – ANSI 40 or 32RQ)
- Reactive overpower (OQ – ANSI 32OF)
- Active overpower (OP – ANSI 32OF)
- Active underpower (UP – ANSI 32LF).

Measurements

The Ekip G Touch trip unit provides a complete series of measurements, which are common to Ekip Touch:

- Measurements and meters: currents, voltage, power, energy, frequency;
- Maximum values and values register;
- Data logger;
- Information on trip and opening data;
- Maintenance indicators.

All the information can be viewed directly on the display of the trip-unit, by means of the external Ekip Multimeter display or by Smartphone, Tablet or PC using the front port of the trip unit (with Ekip Bluetooth) or the system communications.

Other functions

Ekip G Touch provides the same characteristics in terms of user interface, communication, test and power supply described for Ekip Touch equipped with Ekip Measuring Pro.

Protection trip units for generators

Ekip G Hi-Touch

Key:

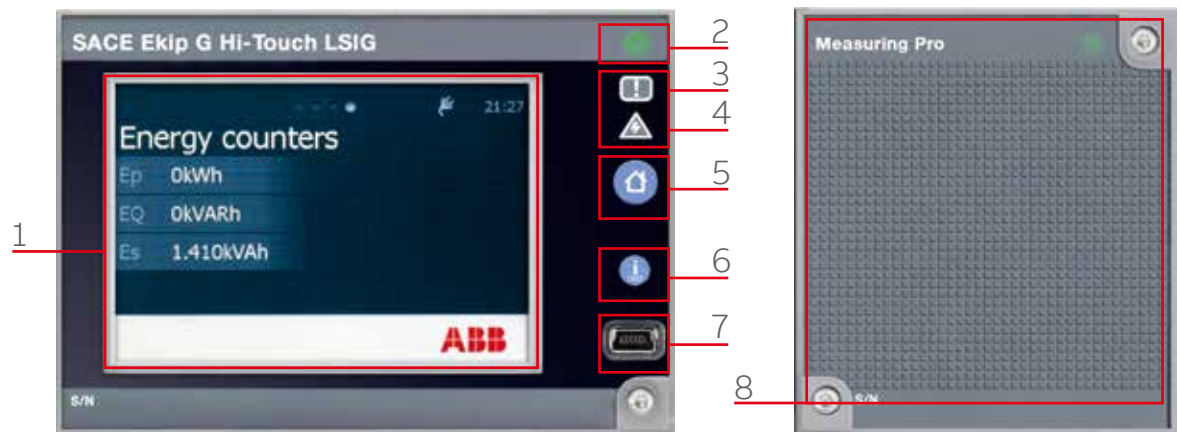
1. Wide, high resolution touchscreen display
2. Power-on LED indicating correct operation
3. Pre-alarm LED
4. Alarm LED
5. Home pushbutton to return to home page
6. Pushbutton for test and for indicating cause of the trip
7. Test and programming connector
8. Ekip Measuring Pro module with relative poweron LED

Ekip G Hi-Touch is the new benchmark for the protection of low-voltage electric generators. It provides optimum protection, even in complex installations, due to exclusive functions such as protection against frequency creep and maximum directional current.

Characteristics

Ekip G Hi-Touch, like all Hi-Touch trip units, is supplied as standard with the Ekip Measuring Pro measurement and protection module and enables an independent second set of protections to be set. In addition, the Network Analyzer function enables it to monitor the quality of the power delivered by the generator.

Ekip G Hi-Touch is available in the LSIG version and ensures all the protection and control functions of Ekip Hi-Touch and the specific protections for generators protected by Ekip G Touch. The user interface and the accessories are common to the rest of the family.



Protection functions

The Ekip G Hi-Touch trip unit is provided with the following protection functions, common to Ekip Hi-Touch:

- Overload (L – ANSI 49);
- Time-delayed overcurrent (S – ANSI 51 & 50TD);
- Time-delayed overcurrent, second threshold (S2 – ANSI 50TD);
- Thermal memory;
- Instantaneous overcurrent (I – ANSI 50);
- Directional overcurrent (D – ANSI 67);
- Voltage controlled overcurrent protection (S(V) – ANSI 51V);
- Closing on short circuit (MCR);
- Earth fault (G – ANSI 51N & 50NTD);
- Second protection against earth fault (ANSI 50GTD/51G & 64REF);
- Earth fault on toroid (Gext – ANSI 51G & 50GTD);
- Neutral protection;
- Start-up function;
- Zone selectivity for functions S and G (ANSI 68);
- Zone selectivity for directional protection D (ANSI 68)
- Start-up function for protection D;
- Current unbalance (IU – ANSI 46);
- Undervoltage (UV – ANSI 27);
- Undervoltage, second threshold (UV2 – ANSI 27);
- Overvoltage (OV – ANSI 59);
- Overvoltage, second threshold (OV2 – ANSI 59);
- Underfrequency (UF – ANSI 81L);
- Underfrequency, second threshold (UF2 – ANSI 81L);
- Overfrequency (OF – ANSI 81H);
- Overfrequency, second threshold (OF2 – ANSI 81H);
- Voltage unbalance (VU – ANSI 47);
- Residual overvoltage (RV – ANSI 59N);
- Differential ground fault (Rc – ANSI 87N);
- Loss of field or reverse reactive power (RQ – ANSI 40 or 32R);
- Reverse active power (RP – ANSI 32R);
- Reactive overpower (OQ – ANSI 32OF);
- Active overpower (OP – ANSI 32OF);
- Active underpower (UP - ANSI 32LF);
- Synchrocheck (SC – ANSI 25, optional);

- Cyclical direction of phases (ANSI 47);
- Power factor (ANSI 78);
- Current thresholds;
- Dual setting of protections;
- Power Controller function (optional)
- Rate of change of frequency (ROCOF – ANSI 81R)
- Second protection against voltage controlled overcurrent protection (S2(V) - ANSI 51V)
- Second protection against loss of field or reverse reactive power (RQ – ANSI 40 or 32R).

Measurements

The Ekip G Hi-Touch trip unit provides all the measurements available with Ekip Hi-Touch:

- Network Analyzer, in conformity with EN50160 and IEC 61000-4-30;
- Measurements and meters: currents, voltage, power, energy, frequency;
- Maximum values and values register;
- Data logger;
- Information on trip and opening data;
- Maintenance indicators.

Other functions

Ekip G Hi-Touch has all the features of Ekip Touch equipped with Ekip Measuring Pro in terms of user interface, communication, test and power supply.

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	tripping 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 ± 10% If > 6 x In
		51	Time-delayed overcurrent protection
	51	Thermal memory	
		Tolerance	± 7% If ≤ 6 x In ± 10% If > 6 x In
I	50	Istantaneous 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 ⁽¹⁾⁽²⁾ = 0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1 x In
		Tolerance	± 7%
	51N	Earth fault protection	I4 ⁽¹⁾⁽²⁾ = 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: 0.3 In (with In = 100 A), 0.25 In (with In = 400 A) or 0.2 In (for all others ratings).

(2) Maximum acceptable setting = 1200A; if user sets higher values, Ekip Dip limits the active threshold at 0.4s and shows the incongruency by led flashing.

(3) Maximum acceptable setting = 0.4s; if user sets higher values, Ekip Dip limits the active tripping time time at 0.4s and shows the incongruency by led flashing.

The tollerances 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 tollerance 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	Disable function	Pre Alarm	Trip curve	Ekip Dip
with $I_f = 3 I_n$ $t_1 = 3 - 12 - 24 - 36 - 48 - 72 - 108 - 144 \text{ s}$	Not allowed for UL	50 ... 90 I1 Step 1%	$t = k / I^2$	●
	Yes			●
$\pm 10\% I_f \leq 6 \times I_n$ $\pm 20\% I_f > 6 \times I_n$				
with $I_f > I_2$ $t_2 = 0,1 - 0,2 - 0,3 - 0,4\text{s}^{(3)}$	Yes		$t = k$	●
The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms}''$				
with $I_f = 10 I_n$ $t_2 = 0,1 - 0,2 - 0,3 - 0,4\text{s}^{(3)}$	Yes		$t = k / I^2$	●
	Yes			
$\pm 15\% I_f \leq 6 \times I_n$ $\pm 20\% I_f > 6 \times I_n$				
Instantaneous $\leq 30 \text{ ms}$	Yes		$t = k$	●
with $I_f > I_4$ $t_4 = 0,1 - 0,2 - 0,4\text{s}^{(3)}$	Yes	50.....90% I4 step 1%	$t = k$	●
The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms}$				
with $I_f = 3 I_n$ $t_4 = 0,1 - 0,2 - 0,4\text{s}^{(3)}$	Yes	50.....90% I4 step 1%	$t = k / I^2$	●
$\pm 15\%$				

Technical characteristics for protection trip units

Protection functions

ABB Code	ANSI Code	Function	Threshold	Threshold step	Tripping 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	Activation: $1,05...1,2 \times I1$		$\pm 10\% I \leq 6 \times I_n$ $\pm 20\% I > 6 \times I_n$	
S	50TD	Time-delayed overcurrent protection	$I2 = 0,6...10 \times I_n$	$0,1 \times I_n$	with $I > I2$ $t2 = 0,05...0,4 \text{ s}$	0,01s
		Zone selectivity			$t2sel = 0,04...0,2 \text{ s}$	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	$\pm 7\% I \leq 6 \times I_n$ $\pm 10\% I > 6 \times I_n$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms}$	
	51	Time-delayed overcurrent protection	$I2 = 0,6...10 \times I_n$	$0,1 \times I_n$	with $I = 10 I_n$ $t2 = 0,05...0,4 \text{ s}$	0,01s
		Thermal Memory				
I	50	Istantaneous 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
		Tolerance	$\pm 10\%$		$\leq 30 \text{ ms}$	
G	50N TD	Earth fault protection	$I4^{(1)(2)} = 0,1...1 \times I_n$	$0,001 \times I_n$	with $I > I4$ $t4 = \text{Instantaneous (with vaux)}$ $+ 0,1...0,4 \text{ s}$	0,05s
		Zone selectivity			$t4sel = 0,04...0,2 \text{ s}$	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: $\pm 10\% \text{ o } \pm 40 \text{ ms}$ or 50 ms with $t4 = \text{Instantaneous}$	
	51N	Earth fault protection	$I4^{(1)(2)} = 0,1...1 \times I_n$	$0,001 \times I_n$	with $I = 4 I_n$ $t4 = 0,1...0,4 \text{ s}$	0,05s
		Tolerance	$\pm 7\%$		$\pm 15\%$	
IU	46	Current unbalance protection	$I6 = 2...90\% I_n$ unbalance	$1\% I_n$	with unbalance $> I6$ $t6 = 0,5...60 \text{ s}$	0,5s
		Tolerance	$\pm 10\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
2I	50	Programmable istantaneous overcurrent protection	$I31 = 1,5...15 \times I_n$	$0,1 \times I_n$	with $I > I31$ Instantaneous	
		Tolerance	$\pm 10\%$		$\leq 30 \text{ ms}$	
MRC		Closing on short-circuit protection	$I3 = 1,5...15 \times I_n$	$0,1 \times I_n$	with $I > I3$ Instantaneous Monitor time Range: $40...500 \text{ ms}$	0,01s
		Tolerance	$\pm 10\%$		$\leq 30 \text{ ms}$	



Disable function	Disable trip	Block	Pre-alarm	Trip curve	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
Not allowed for UL	no	no	50...90% I1 step 1%	$t = k / I^2$	●	●	●	●
Not allowed for UL					●	●	●	●
yes	yes	yes	no	$t = k$	●	●	●	●
yes					●	●	●	●
yes					●	●	●	●
yes	yes	yes	no	$t = k / I^2$	●	●	●	●
yes					●	●	●	●
yes	no	yes	no	$t = k$	●	●	●	●
yes					●	●	●	●
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	no	$t = k$	●	●	●	●
yes	no	no		$t = k$	●	●	●	●
yes	no	yes	no	$t = k$	●	●	●	●

Technical characteristics for protection trip units

Protection functions

ABB Code	ANSI Code	Function	Threshold	Threshold step	Tripping time	Time Step
Gext	50G TD	Earth fault protection	$I_{41}^{(1)(2)} = 0,1...1 \times I_n$ Toroid	0,001 x I_n Toroid	with $I > I_{41}$ $t_{41} = 0,1...0,4s$	0,05s
	68	Zone selectivity			$t_{41sel} = 0,04...0,2s$	0,01s
		Start up	Activation: $0,1...1 \times I_n$	0,02 x I_n	Range: $0,1...30s$	0,01s
		Tolerance	$\pm 7\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms}$	
	51G	Earth fault protection	$I_{41}^{(1)(2)} = 0,1...1 \times I_n$	0,001 x I_n	with $I = 4 I_n$ $t_{41} = 0,1...0,4s$	0,05s
		Tolerance	$\pm 7\%$	$\pm 15\%$		
Rc	64 50N TD 87N	Residual current protection Differential ground fault protection	$I_{\Delta n} = 3 - 5 - 7 - 10 - 20 - 30A$		with $I > I_{\Delta n}$ $t_{\Delta n} = 0,06 - 0,1 - 0,2 - 0,3 - 0,4 - 0,5 - 0,8s$	
		Tolerance	$- 20\% \div 0\%$		140ms@0.06s (maximum trip time) 950ms@0.80s (maximum trip time)	
LC1/2 lw1/2		Current threshold LC	LC1=50%...100% I_l LC2=50%...100% I_l	1% 1%		
		Current threshold lw	lw1= $0,1...10 I_n$ Activation lw1: Up/Down lw2= $0,1...10 I_n$ Activation lw2: Up/Down	0,01 x I_n 0,01 x I_n		
		Tolerance	$\pm 10\%$			
UV	27	Undervoltage Protection	$U_8 = 0,5...0,98 \times U_n$	0,001 x U_n	with $U < U_8$ $t_8 = 0,05...120s$	0,01s
		Tolerance	$\pm 2\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) / } \pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
OV	59	Overvoltage protection	$U_9 = 1,02...1,5 \times U_n$	0,001 x U_n	with $U > U_9$ $t_9 = 0,05...120s$	0,01s
		Tolerance	$\pm 2\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) / } \pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
VU	47	Voltage unbalance protection	$U_{14} = 2...90\% U_n$ unbalance	1% U_n	with unbalance $> U_{14}$ $t_{14} = 0,5...60s$	0,5s
		Tolerance	$\pm 5\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) / } \pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
UF	81L	Underfrequency protection	$f_{12} = 0,9...0,999 \times f_n$	0,001 x f_n	with $f < f_{12}$ $t_{12} = 0,15...300s$	0,01s
		Tolerance	$\pm 1\%$ (with $f_n \pm 2\%$)		The better of the two data: $\pm 10\%$ (min=30ms) $\text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) / } \pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
OF	81H	Overfrequency protection	$f_{13} = 1,001...1,1 \times f_n$	0,001 x f_n	with $f > f_{13}$ $t_{18} = 0,15...300s$	0,01s
		Tolerance	$\pm 1\%$ (with $f_n \pm 2\%$)		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) / } \pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	



Disable function	Disable trip	Block	Pre-alarm	Trip curve	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
yes	yes	yes	50.....90% I41 step 1%	$t = k$	●	●	●	●
yes					●	●	●	●
yes	yes	yes	50.....90% I41 step 1%	$t = k / I^2$	●	●	●	●
Attivabile with rating plug Rc	no	no		$t = k$	●	●	●	●
yes	only signalling	no	no	-	●	●	●	●
yes	only signalling	no	no	-	●	●	●	●
yes	yes	yes	no	$t = k$	○	●	●	●
yes	yes	yes	no	$t = k$	○	●	●	●
yes	yes	yes	no	$t = k$	○	●	●	●
yes	yes	yes	no	$t = k$	○	●	●	●
yes	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
RP	32R	Reverse active power protection	$P_{11} = -1 \dots -0,05 S_n$	0,001 S_n	$P > P_{11}$ $t_{11} = 0,5 \dots 100s$	0,1s
		Tolerance	$\pm 10\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
Cyclical direction	47	Cyclical direction of the phases	1-2-3 or 3-2-1			
Power factor	78	3phase Power factor	$PF_3 = 0,5 \dots 0,95$	0,01		
S2	50TD	Time-delayed overcurrent protection	$I_5 = 0,6 \dots 10 \times I_n$	0,1 $\times I_n$	with $I > I_5$ $t_5 = 0,05 \dots 0,8s$	0,01s
		Zone selectivity			$t_{5sel} = 0,04 \dots 0,2s$	0,01s
		Start up	Activation: $0,6 \dots 10 \times I_n$	0,1 $\times I_n$	Range: 0,1...30s	0,01s
		Tolerance	" $\pm 7\% I \leq 6 \times I_n$ $\pm 10\% I > 6 \times I_n$ "		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms}$	
D	67	Directional overcurrent protection (forward & backward)	$I_7 = 0,6 \dots 10 \times I_n$	0,1 $\times I_n$	with $I > I_7$ $t_7 = 0,1 \dots 0,8s$	0,01s
		Zone selectivity			$t_{7sel} = 0,1 \dots 0,8s$	0,01s
		Start up (forward & backward)	Activation: $0,6 \dots 10 \times I_n$	0,1 $\times I_n$	Range: 0,1...30s	0,01s
		Trip direction	Forward & backward			
		Minimum angle direction	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 (°)			
		Tolerance	$\pm 7\% I \leq 6 \times I_n$ $\pm 10\% I > 6 \times I_n$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms}$	
UV2	27	Undervoltage Protection	$U_{15} = 0,5 \dots 0,98 \times U_n$	0,001 $\times U_n$	with $U < U_{15}$ $t_{15} = 0,05 \dots 120s$	0,01s
		Tolerance	$\pm 2\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
OV2	59	Overvoltage protection	$U_{16} = 1,02 \dots 1,5 \times U_n$	0,001 $\times U_n$	with $U > U_{16}$ $t_{16} = 0,05 \dots 120s$	0,01s
		Tolerance	$\pm 2\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
UF2	81L	Underfrequency protection	$f_{17} = 0,9 \dots 0,999 \times f_n$	0,001 $\times f_n$	with $f < f_{17}$ $t_{17} = 0,15 \dots 300s$	0,01s
		Tolerance	$\pm 1\%$ (with $f_n \pm 2\%$)		The better of the two data: $\pm 10\% \text{ (min=30ms) o } \pm 40 \text{ ms}$ $\text{(for } t < 5 \text{ s) / } \pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
OF2	81H	Overfrequency protection	$f_{18} = 1,001 \dots 1,1 \times f_n$	0,001 $\times f_n$	with $f > f_{18}$ $t_{18} = 0,15 \dots 300s$	0,01s
		Tolerance	$\pm 1\%$ (with $f_n \pm 2\%$)		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	



Disable function	Disable trip	Block	Pre-alarm	Trip curve	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
yes	yes	yes	no	t = k	○	●	●	●
yes	only signalling	no	no	-	○	●	●	●
yes	only signalling	no	no	-	○	●	●	●
yes	yes	yes	no	t = k		●		●
yes						●		●
yes						●		●
yes	yes	no	no	t = k		●		●
yes		no				●		●
yes						●		●
yes						●		●
yes	yes	yes	no	t = k		●		●
yes	yes	yes	no	t = k		●		●
yes	yes	yes	no	t = k		●		●
yes	yes	yes	no	t = k		●		●

Technical characteristics for protection trip units

Protection functions

ABB Code	ANSI Code	Function	Threshold	Threshold step	Tripping time	Time Step
S(V)	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	$U1 = 0,2...1 \times U_n$	$0,01 \times U_n$		
			$K_s = 0,1...1$	0,01		
		Linear Mode	$U1 = 0,2...1 \times U_n$	$0,01 \times U_n$		
			$U_h = 0,2...1 \times U_n$	$0,01 \times U_n$		
		$K_s = 0,1...1$	0,01			
		Tolerance	$\pm 10\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
RV	59N	Residual overvoltage protection	$U22 = 0,05...0,5 \times U_n$	$0,001 \times U_n$	with $U > U22$ $t22 = 0,05...120s$	0,01s
		Tolerance	$\pm 5\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
OP	32OF	Active overpower protection	$P26 = 0,4...2 \text{ Sn}$	$0,001 \text{ Sn}$	$P > P26$ $t26 = 0,5...100s$	0,5s
		Tolerance	$\pm 10\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
OQ	32OF	Reactive overpower protection	$Q27 = 0,4...2 \text{ Sn}$	$0,001 \text{ Sn}$	$Q > Q27$ $t27 = 0,5...100s$	0,5s
		Tolerance	$\pm 10\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	
UP	32LF	Active underpower protection	$P23 = 0,1...1 \times \text{Sn}$	$0,001 \times \text{Sn}$	with $P < P23$ $t23 = 0,5...100s$	0,5s
		Start up			Range: 0,1...30s	
		Tolerance	$\pm 10\%$		The better of the two data: $\pm 10\% \text{ o } \pm 40 \text{ ms (for } t < 5 \text{ s) /}$ $\pm 100 \text{ ms (for } t \geq 5 \text{ s)}$	

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

2) The maximum value for G protection is 1200A.

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	$\pm 20\%$
S	$\pm 10\%$	$\pm 20\%$
I	$\pm 15\%$	$\leq 60\text{ms}$
G	$\pm 15\%$	$\pm 20\%$
Other protection	$\pm 15\%$	$\pm 20\%$



Disable function	Disable trip	Block	Pre-alarm	Trip curve	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
yes	yes	yes	no	t = k			●	●
							●	●
							●	●
yes	yes	yes	no	t = k			●	●
yes	yes	yes	no	t = k			●	●
yes	yes	yes	no	t = k			●	●
yes	yes		no	t = k			●	●
yes								

Key:
 - not available
 ● available
 ○ available with Ekip Measuring and Ekip Measuring Pro.
 ○○ 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
Ground fault current (RMS)	[A] ●	I _g
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 (1)	[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 referenc	Ekip Dip
1%	Class 1 IEC 61557-12	●
2%		●
Window	Intervals	
Fixed, synchronizable by remote	Duration: 5...120min Number of intervals: 24	●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
		●
Note: Opening of the 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
Ground fault current (RMS)	[A] Ig
Phase-phase voltage (RMS)	[V] U12, U23, U31
Phase-neutral voltage (RMS)	[V] U1, U2, U3
Phase sequence	
Frequency	[Hz] f
Active power	[kW] P1, P2, P3, Ptot
Reactive power	[kVAR] Q1, Q2, Q3, Qtot
Apparent power	[KVA] S1, S2, S3, Stot
Power factor	PF1, PF2, PF3, PF total
Peak factor	total
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] - Umin= 0.75...0.95 x Un [no] - Umax= 1.05...1.25 x Un - 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] - Umin= 0.75...0.95 x Un - 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] - Umax= 1,05...1,25 x Un - 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] - Umin1= 0.75...0.95 x Un - Umin2= 0.75...0.95 x Un - Umin3= 0.75...0.95 x Un - Umax1= 1.05...1.25 x Un - Umax2= 1.05...1.25 x Un - Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime)
Voltage imbalance	[V] - U neg. seq.= 0.02...0.10 x Un [no] - 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 - up to 50° - Alarm THD: 5...20% - Single harmonic alarm: 3...10% plus a count of minutes the harmonic has been exceeded



	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
Precision				
1%	●	●	●	●
2%	●	●	●	●
0.5%	○	●	●	●
0.5%	○	●	●	●
0.2%	○	●	●	●
2%	○	●	●	●
2%	○	●	●	●
2%	○	●	●	●
2%	○	●	●	●
2%	○	●	●	●
Precision				
2%	○	●	●	●
2%	○	●	●	●
2%	○	●	●	●
Intervals				
t = 5...120min	-	●	-	●
t <40ms	-	●	-	●
t <40ms	-	●	-	●
t = 0.02s...60s	-	●	-	●
t = 5...120min	-	●	-	●
	-	●	-	●

Technical characteristics for protection trip units

Measurement functions

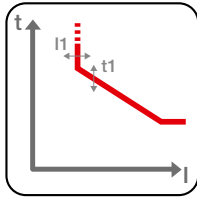
Record of values: of the parameter for each interval with time-stamping	Parameters
Current: minimum and maximum	[A] I Min, I Max
Phase-phase voltage: minimum and maximum	[V] U Min, U max
Active power: average and maximum	[kW] P Mean, P Max
Reactive power: average and maximum	[kVAR] Q Mean, Q Max
Apparent power: average and maximum	[KVA] S Mean, 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] 1200-9600
Maximum recording duration	[s] 18
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 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 (1)	[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 (OT)	Prealarm and alarm for abnormal temperature

(1) with auxiliary supply present



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

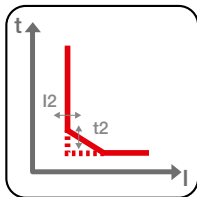
Description of protection functions



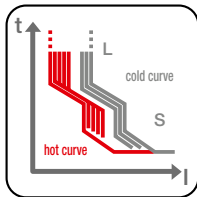
Overload (L - ANSI 49): available with three different types of trip curve:

1. $t = k/I^2$ with inverse long time;
2. with $t = k/I^4$ curve for better coordination with upstream circuit breakers or with fuses.

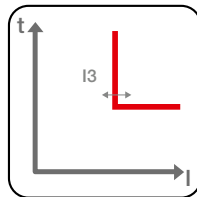
The thresholds can be fine tuned (for example 1A for circuit breaker E1.2 1000A) and the timings to the second can be set directly from the display. The settable pre-alarm indicates the set threshold is reached before the protection is tripped. Available for Ekip touch and Hi-Touch.



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".

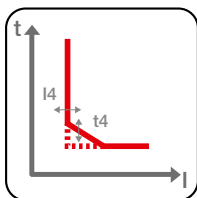


Thermal memory: for L and S protection functions, this is used to protect components, such as transformers, from overheating following an overload. The function, which can be enabled by the Ekip Connect software, adjusts the protection tripping time according to the length of time that has elapsed since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

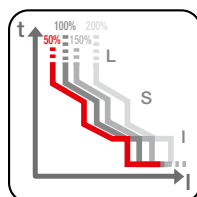


Instantaneous overcurrent (I - ANSI 50): with tripping curve without intentional delay, it offers 15 tripping thresholds and can be excluded by setting the dip switch combination to "OFF".

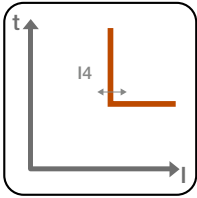
Closing on short-circuit (MCR): the protection uses the same algorithm of the protection I, limiting operation to a settable time window from the closing of the circuit breaker. The protection can be disabled, also alternatively to protection I. The function is active with an auxiliary supply.



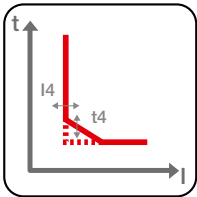
Earth fault (G - ANSI 51N & 50NTD): with tripping time independent of current ($t = k$) or constant specific let-through energy ($t = k/I^2$). The function can be excluded by setting the dip switch combination to "OFF".



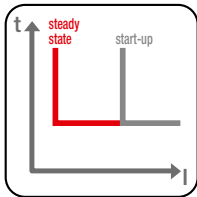
Neutral protection: available at 50%, 100% or 200% of the phase currents, or disabled, it is applied to the overcurrent protections L, S and I.



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

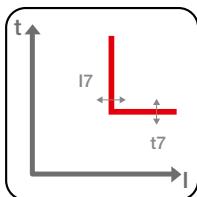


Earth fault on toroid (G ext - ANSI 51G & 50GTD): with trip time independent of the current ($t = k$) or with constant specific let-through energy ($t = k/I^2$). Pre-alarm that 90% threshold has been reached permits the fault to be reported to supervision systems without interruption of continuity. The 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.

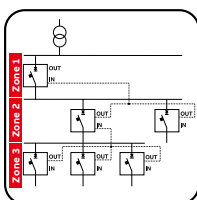


Start-up function: enables protections S, I and G to operate with higher trip thresholds during the starting phase, avoiding untimely trips due to high inrush currents of certain loads (motors, transformers, lamps). The starting phase lasts 100 ms to 30 s and is recognized automatically by the trip unit:

- 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.



Zone selectivity for S and G protection (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.

Description of protection functions

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.

Power Controller: Power controller function (optional) with Ekip Measuring module.

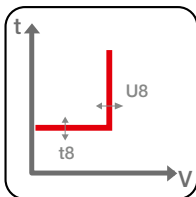
Protection functions with Ekip Measuring Pro

The Ekip Touch protection functions can be further increased by using the Ekip Measuring Pro measuring and protection module. With this module, all the protection functions linked to voltage, frequency and power can be enabled, thus making Ekip Touch a multifunction unit that can measure, control and protect even the most complex installation.

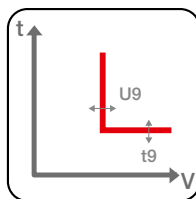
A different operating mode can be chosen for each protection function:

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.

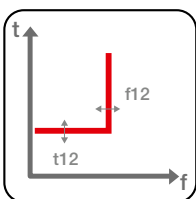
Furthermore, when the voltage and frequency protections are activated, they indicate an alarm status even when the circuit breaker is open so that a fault can be identified before the circuit breaker closes.



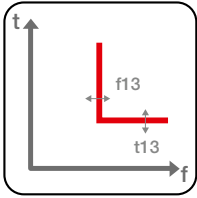
Undervoltage (UV - ANSI 27): with constant trip time ($t = k$), function is tripped when phase voltage falls below set threshold.



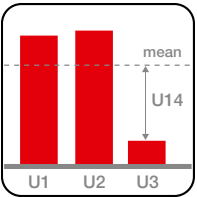
Overvoltage (OV - ANSI 59): with constant trip time ($t = k$), function is tripped when phase voltage exceeds the set threshold.



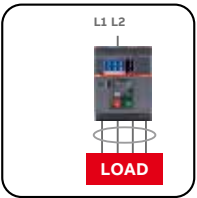
Underfrequency (UF - ANSI 81L): with constant trip time ($t = k$), function is tripped when network frequency falls below set threshold.



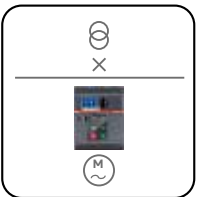
Overfrequency (OF - ANSI 81H): with constant trip time ($t = k$), function is tripped when network frequency exceeds the set threshold.



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.



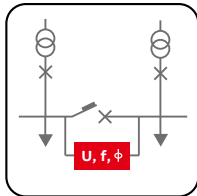
Residual current (Rc – ANSI 64 & 50NDT): with constant trip time ($t=k$) protects against indirect contacts and is integrated into Ekip Touch LSIG with Ekip Measuring Pro by a dedicated residual current rating plug and external toroid. The protection is an alternative to the functions G and Gext.



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).



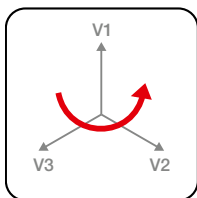
Synchrocheck (SC - ANSI 25): the synchronism control function compares the voltages in the modules as well as the frequencies and phases of two circuit breakers to which the circuit breaker is connected. Ekip Touch indicates that conditions have been reached that enable the two lines to be made parallel.

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 ΔU
 3. difference in the frequency of the two voltages below the threshold Δf
 4. difference in the phase of the two voltages below the threshold Δ
 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 to any Ekip Touch provided with an Ekip Measuring Pro module.

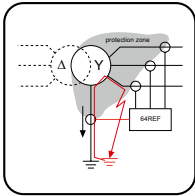


Cyclical direction of the phases (ANSI 47): indicates an alarm through inversion of the phases sequence.

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:

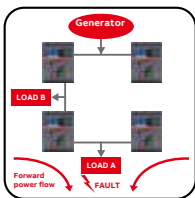
Second time-delayed overcurrent protection (S2 – ANSI 50TD): in addition to the standard protection S, a second (excludable) time-constant protection is available that enables two independent thresholds to be set in order to ensure precise selectivity, especially in highly critical conditions.



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.

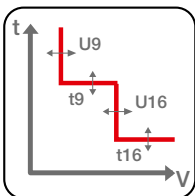
Another possible configuration is with the residual current protection replacing the Gext protection, whilst the G protection remains active. The residual current protection is activated in the presence of the residual current rating-plug and of the toroid.

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.

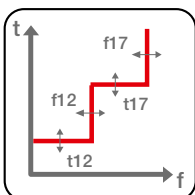


Zone selectivity for protection D (ANSI 68): enables the possibility to interconnect circuit breakers so that, in the event of a fault, the fault area can be rapidly isolated. Disconnection only occurs at the level close to the fault and operation to the rest of the operation continues uninterrupted. 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.

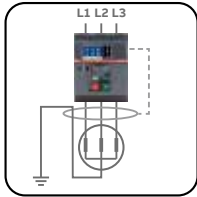


Second protection against underfrequency and overfrequency (UF2 and OF2 – ANSI 81L and 87H): enables two minimum and maximum frequency thresholds to be set simultaneously. For example, only an alarm can be set to be tripped when the first threshold is reached, and the circuit breaker can be set to be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

Description of protection functions

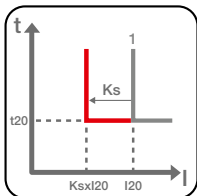
Dual setting of protections: Ekip Hi-Touch can store a set of alternative parameters for all protections. This second series (set B) can replace, if necessary, the default series (set A) by an external command. The command can be given when the network configuration is edited, for example when an emergency 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.

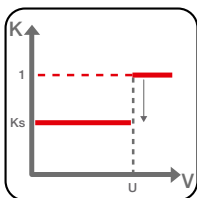


Differential ground fault (Rc - ANSI 87N): protects against internal earth fault on generator winding. It is required that the toroid hugs the active conductors and the ground conductor. Rc protection is integrated by a dedicated residual current rating plug and the external toroid.

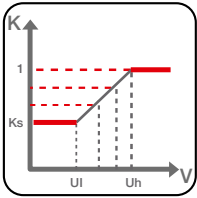
The specific functions for generator protections are described below. For each of these it is possible to choose the operating mode: active, only alarm or deactivated. All the voltage and frequency protections also operate when the circuit-breaker is open, enabling the fault to be identified before the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



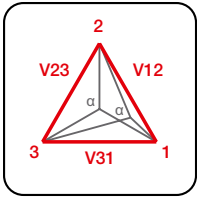
Voltage controlled overcurrent protection (S(V) - ANSI 51V): protection from maximum current with a constant trip time ($t = k$) that is sensitive to the voltage value. The set current threshold, following a voltage drop, decreases by steps or linearly.



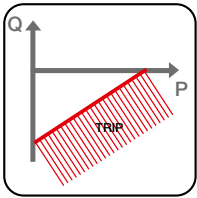
In step mode (controlled mode) the protection is tripped at the set threshold (I_{20}) if the voltage is above U , whereas it is tripped at the lower threshold of the factor K_s ($I_{20} * K_s$) if the voltage is below U .



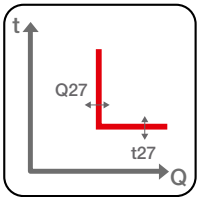
On the other hand, in linear mode (restrained mode) two voltage limits are selected within which the protection is tripped at the set threshold (I_{20}) reduced by the factor K corresponding to the measured voltage. The variation of the factor K is proportional to the voltage, and for voltages greater 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.



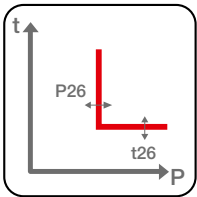
Residual overvoltage (RV – ANSI 59N): with constant trip time ($t = k$), protects against insulation loss in systems with insulated neutral or with neutral earthed with impedance.



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 ($k \neq 0$).

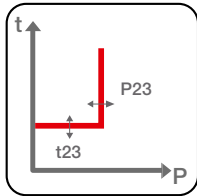


Reactive overpower (OQ – ANSI 32OF): with constant trip time ($t = k$), the function is tripped when reactive power exceeds the set threshold in the generator to network direction.

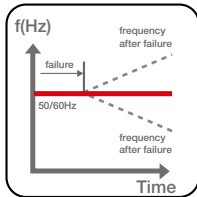


Active overpower (OP – ANSI 32OF): with constant trip time ($t = k$), the function is tripped when the active power exceeds the threshold set in the delivering direction of the generator.

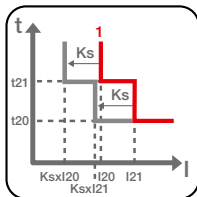
Description of protection functions



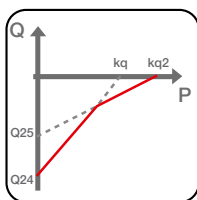
Active underpower (UP – ANSI 32LF): with constant trip time ($t = k$), the function is tripped when the active power delivered by the generator is lower than the set threshold. It is possible to disable the protection temporarily, to manage the start-up phase, by setting a time window from the closing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



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.



CHAPTER 4

Software functions

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68-69	Interface Protection System and Interface Device
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75-76	ATS function
77-78	Power Controller

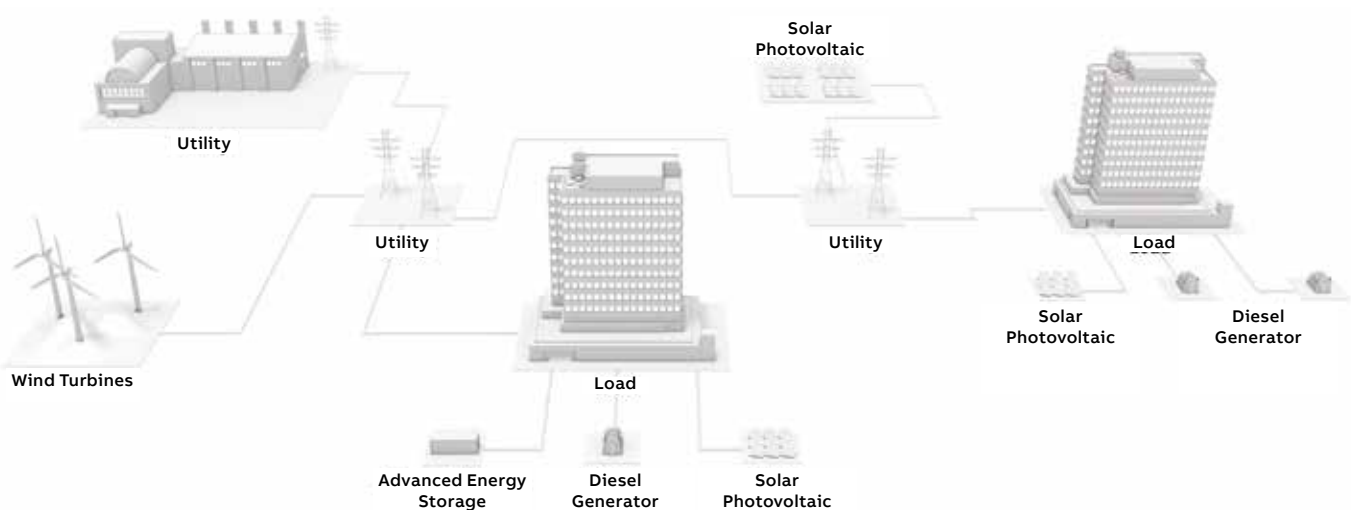
Introduction

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.

Installed downstream the MV/LV transformer, Emax 2 works like a certified **Interface Protection System** in order to check the Main Grid conditions and disconnect the User's plant whenever grid voltage and frequency are out of the ranges prescribed by the connection local standard.

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 switch-gear 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.

When the main grid comes back stable, thanks to **Synchro** logics, synchronizes the plant voltage and frequency to reconnect it. 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 which have been developed and integrated in Emax 2 follows the below compatibility table.

	Interface Protection	Load Shedding	Automatic Transfer Switch	Power Controller
Interface Protection	●	●		●
Load Shedding	●		●	●
Automatic Transfer Switch		●	●	●
Power Controller	●	●	●	●

Interface Protection System

Emax 2 embeds in a single device both the functions of Interface Protection System and Interface Device.

Purpose

The connection of Active Users to the Utility is subject to the satisfaction of the Standard requirements. The Interface Protection System is a relay with dedicated protections able to satisfy such requirements. In particular, the generating units installed in the User's plant shall be disconnected from the grid whenever voltage and frequency values of the grid itself are out of the ranges prescribed by the standard. Such a disconnection is usually carried out by means of an Interface Device that trips after receiving an opening command provided by an external Interface Protection System. ABB has developed an integrated solution which embeds in a single device both the functions of Interface Protection System and Interface Device. This advanced feature is possible thanks to the integration of the several interface protections into the Ekip Hi-Touch trip unit installed on board Emax 2. Today Emax 2 is suitable for Standard CEI 0-16, the most important Standard for the connection of Active Users. A lot of local Standards take CEI 0-16 as reference.

Application examples

ABB has been able to integrate in a single device the following functions to be used in the scenarios described below. Thanks to these embedded functions, the number of devices to be installed is reduced, with consequent space saving inside the switchboard. Emax 2 with embedded Interface Protection System have been tested and certified in compliance with the Standard CEI 0-16 and are suitable for the following scenarios.

Emax 2 as Microgrid Main protection unit

In such scenario, Emax 2 with embedded Interface Protection System can fulfill the function of Interface Protection System (IPS). In case of IPS tripping, microgrid, downstream Emax 2 main unit, remains active thanks to both the local generation and the load shedding feature also embedded in the main unit.

Emax 2 as local generation protection unit

In such scenario, there are loads non-operating in islanding condition, so, when there is an Utility outage, Emax 2 detects that voltage and frequency values are out of the range prescribed. According to the standard the local generation must be disconnected from the Utility, so Emax 2 opens, acting as interface device, thanks to the IPS embedded. In this condition loads are not operating as there is no voltage on the secondary of the MV/LV transformer and no local generation connected.

Benefits

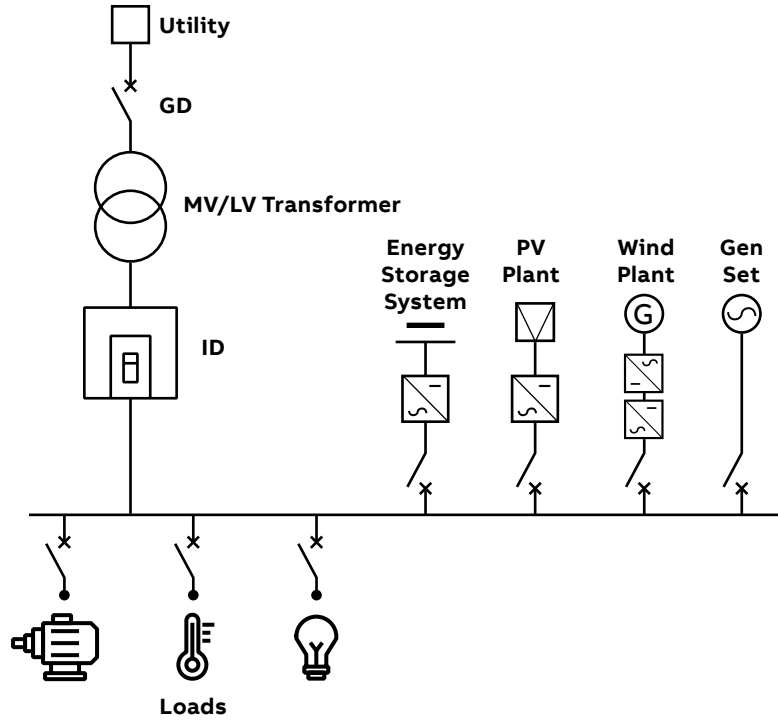
Thanks to Emax 2 with embedded Interface Protection System, the following benefits are guaranteed:

- Emax 2 performs interface protections with every possible switching device, ensuring also reclosing operation.
- If the Emax 2 is installed on the generator feeder, the unit will be able to perform the triple function of Interface Protection System and Generator Device thanks to the Interface Protection System integrated also in the Ekip G Hi-Touch trip unit.
- Ease of use, thanks to Ekip Connect software which allows an immediate and intuitive commissioning phase.

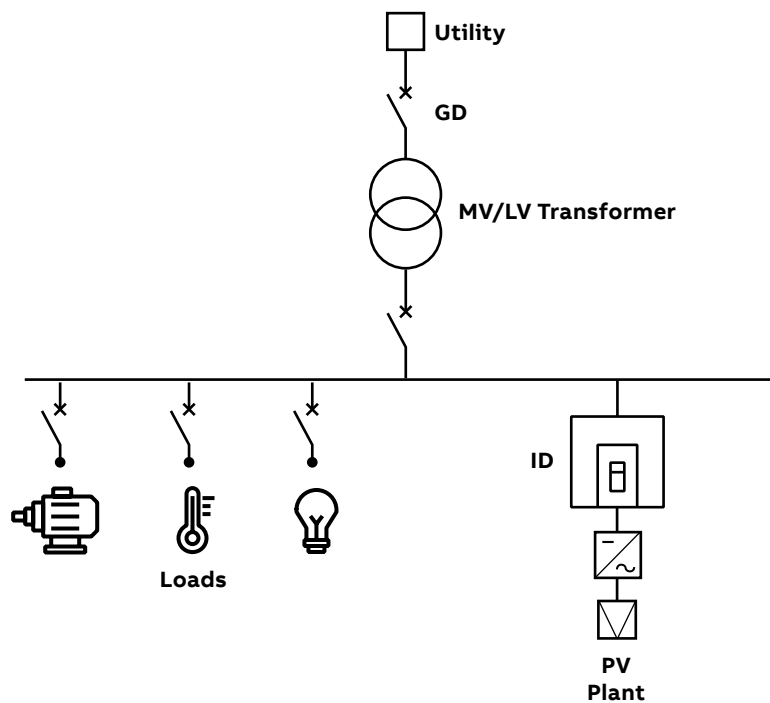
For further information, please refer to the White Paper "Emax 2, all-in-one innovation – Interface Protection System and Interface Device" (1SDC007117G0201).



— Emax 2 as Microgrid Main protection unit



— Emax 2 as local generation protection unit



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).

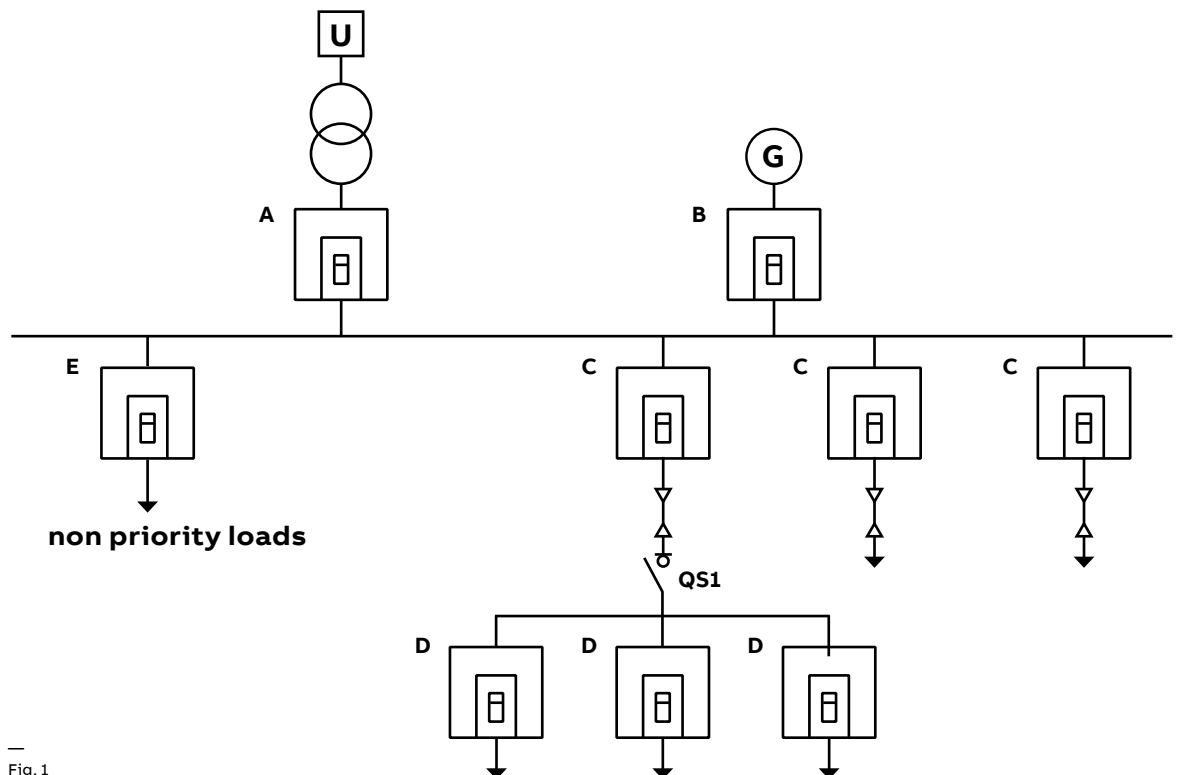


Fig. 1

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.

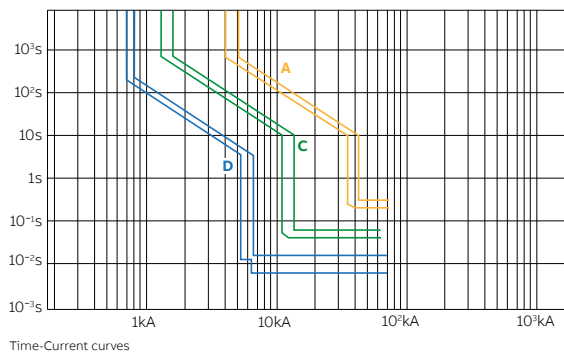


Fig. 2

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).

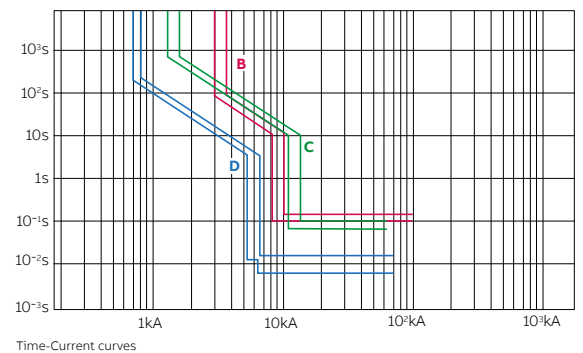


Fig. 3

Load Shedding

Emax 2 has many 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.

Microgrid in grid-connected operation

Under normal circumstances, the microgrid point is generally connected to the Utility in order to inject/adsorb the surplus or the lacking energy. In this situation, with Emax 2 as main circuit breaker installed immediately downstream the MV/LV transformer in closed status, power overload should be avoided so as not to excessively stress plant elements. In order to do this, the circuit-breaker embeds a patented load shedding algorithm:

- Predictive Load Shedding, slow disconnection of loads based on the limit of the average power flow towards the Microgrid according to the transformer size designed for the power peak profile.

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.

Load Shedding

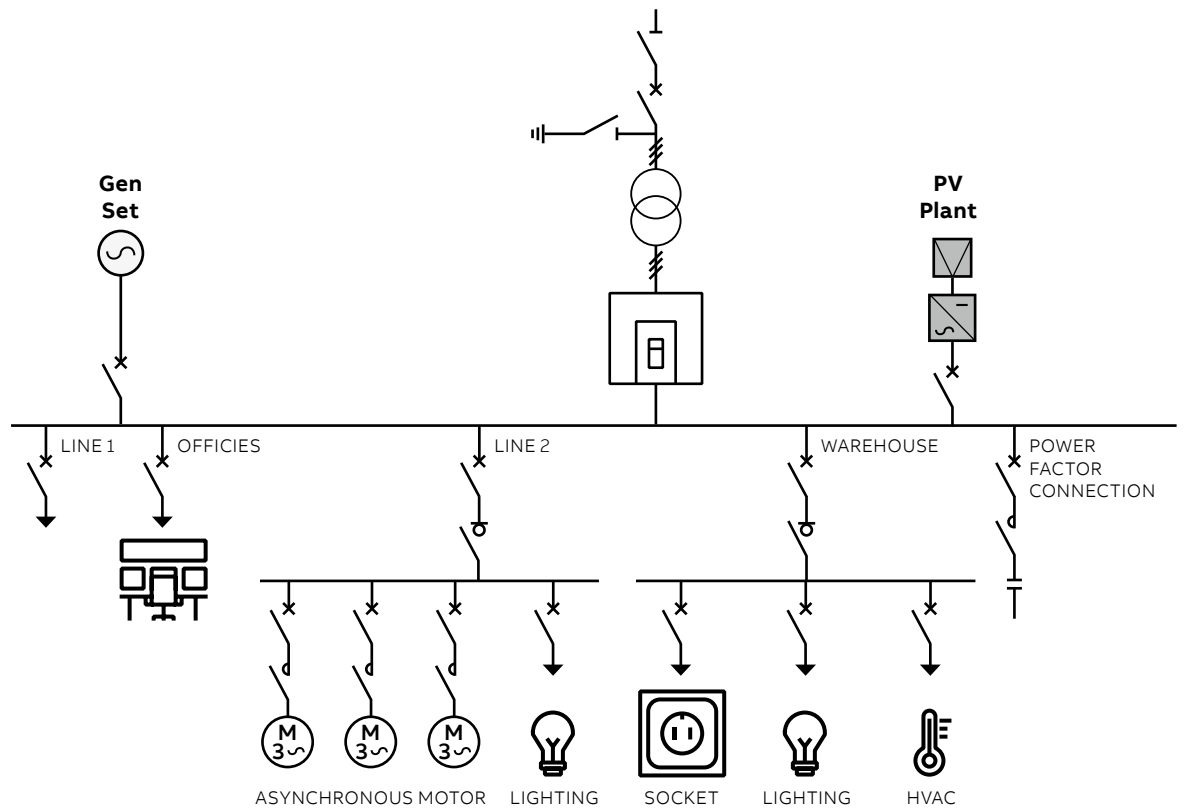
Ease of use

- 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).

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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.

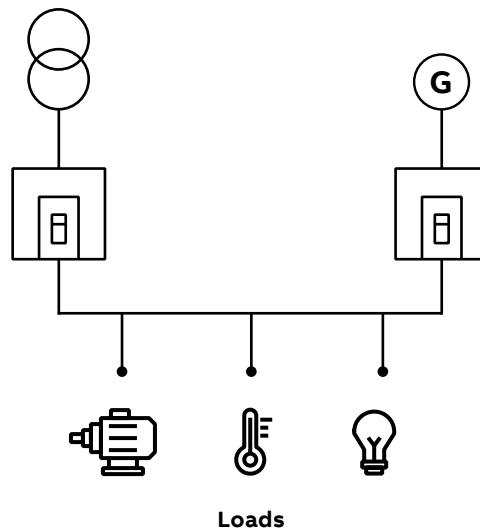
Application example

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 micro-grid, can be disconnected from main grid.



Automatic Transfer Switch

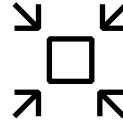
The ATS is a high-performances energy automation system, easy to install and program.



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" (1SDC007115G0201). **SACE Emax 2 is suitable for UL 1008 equipment.**

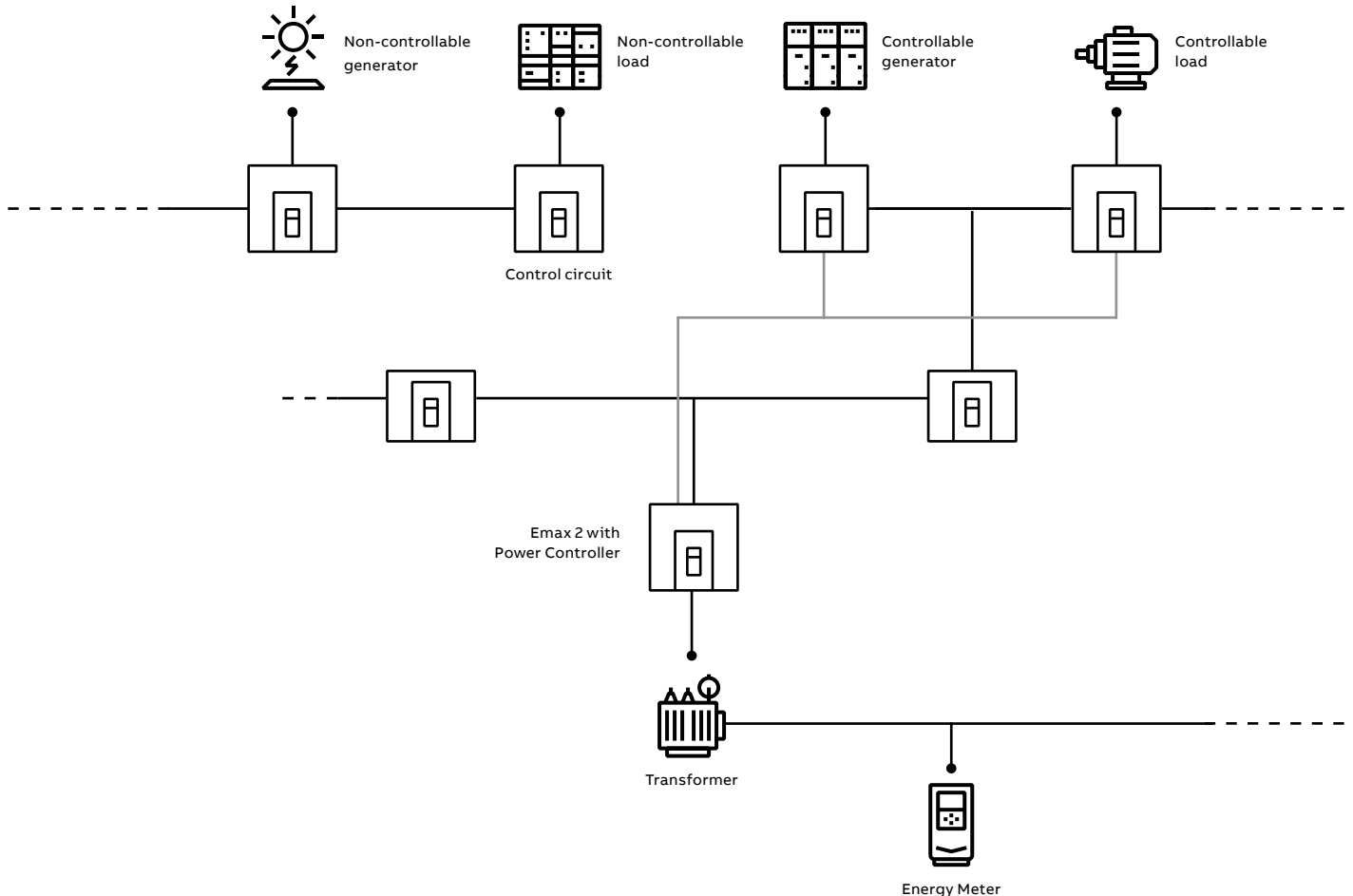
Power Controller

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.



Power Controller

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.

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.

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).


CHAPTER 5

Supervision and connectivity

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96-97	ABB Ability Electrical Distribution Control System

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:** to manage complex systems in which devices must be integrated with automated industrial processes or in intelligent electrical networks, better known as smart grids. The system can be supervised by the Ekip View software or via Internet with the ABB Ability™ Electrical Distribution Control System webapp.





Supervision and control

Supervision of the 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.

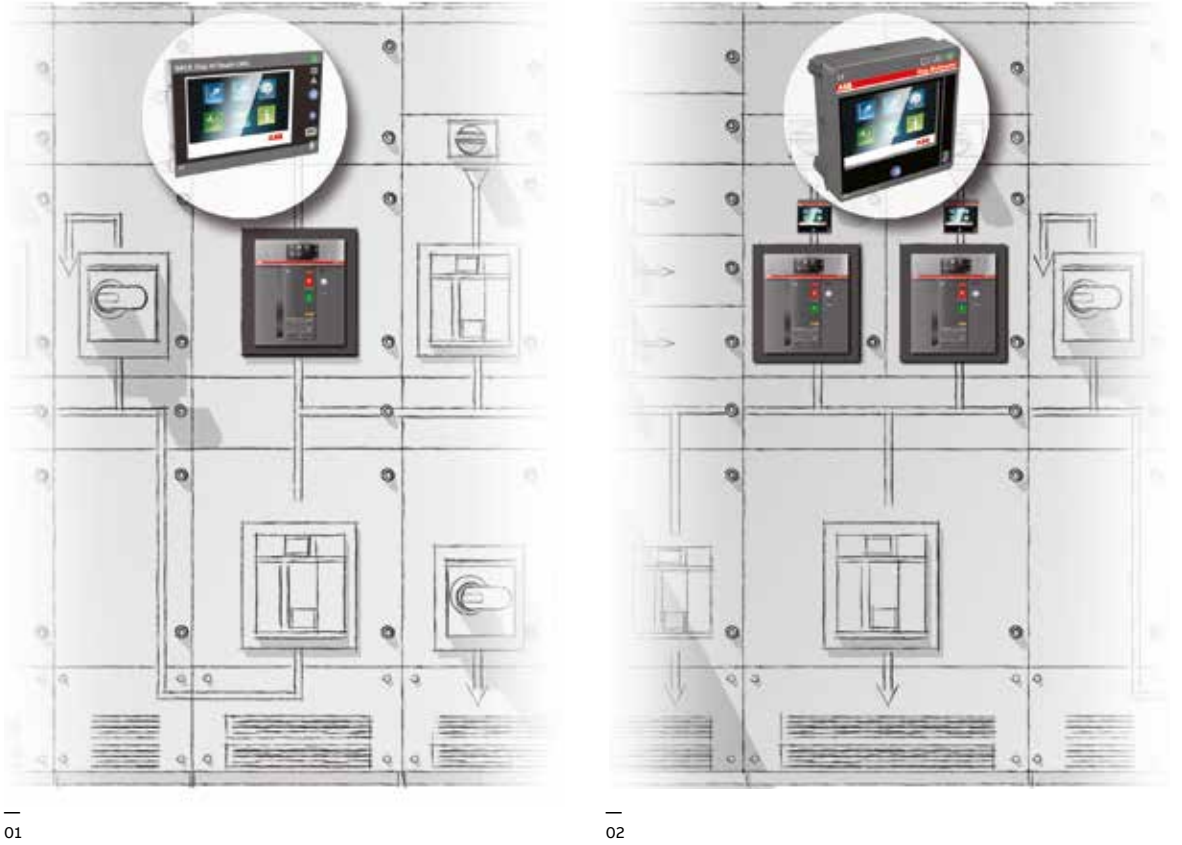
Solution with Ekip Multimeter Display on the front of the switchgear

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

— 01

— 02

Electronic trip unit	Ekip Dip	Ekip Touch	Ekip Touch + Ekip measuring module	Ekip Hi Touch
			Ekip G Touch	Ekip Hi-G Touch
Solution	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			
Measurement functions				
Currents	●	●	●	●
Voltages	-	-	●	●
Powers	-	-	●	●
Energies	-	-	●	●
Harmonics	-	-	-	●
Network analyzer	-	-	-	●
Adjustment functions				
Setting of thresholds	-	●	●	●
Setting of thresholds second set	-	-	-	●
Resetting of alarms	●	●	●	●
Diagnostics				
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 ¹⁾	●	●	●	●
Local/remote mode	●	●	●	●

1) Circuit breakers equipped with auxiliary contacts to indicate position

Supervision and control

Switchgear supervision

Ekip Link is a flexible and efficient solution for controlling and supervising low-voltage electrical switchgear.

It is a system that enables SACE Emax 2 circuit-breakers to be connected to the Ekip Control Panel operator panel by means of Ekip Link interface modules.

Ekip Link system

The main characteristics of the Ekip Link System are:

- **centralized control**; from the Ekip Control Panel operator panel, all the main values of the installation (electrical measurements, system diagnostics, trends...) can be monitored and controlled.
- **adaptation to real requirements**; when the electrical values to be monitored are limited to currents only, the Ekip Dip trip unit can be connected to the Ekip Link without having to use circuit breakers equipped with communication modules.
- **access via the Internet** with any Internet browser using the web server function performed by the Ekip Control Panel.
- **rapid installation**, through the use of standardized Ethernet™ components such as STP cables and RJ45 type connectors.
- **ease of use**; due to the Ekip Control Panel operator panel in front of the switchgear with colour touch screen, the system mimic panel can be displayed so that the entire installation can be controlled rapidly and intuitively.
- **ready to use**; Ekip Control Panel is supplied with pre-configured software that requires no programming. It is only necessary to start scanning the Ekip Link system from the operator panel and in a few seconds communication with the connected devices is active.

Ekip Link enables supervision of electrical switchgear on which up to 30 ABB SACE circuit breakers have been installed. Tmax T and Tmax XT series circuit breakers equipped with Modbus RTU communication can also be easily integrated into the Ekip Link system using the multi-serial port fitted on the Ekip Control Panel.



Electronic trip unit	Ekip Dip	Ekip Touch	Ekip Touch + Ekip measuring module	Ekip Hi Touch
			Ekip G Touch	Ekip Hi-G Touch
Solution	Ekip protection trip units equipped with Ekip link module + Ekip Control Panel operator panel + standard EtherNet™ components			
Type of trip units connectable	Ekip protection trip units			
Number of trip units connectable to the Ekip link system	up to 30 ¹⁾			
Data exchange rate of Ekip link system	100 Mbit/sec			
Supervision and control functions				
Opening and Closing of circuit breakers ²⁾	●	●	●	●
Electrical value trends			I,V,P	I,V,P
Log of electrical value trends			I,V,P	I,V,P
Dynamic installation mimic panel	•	•	●	●
Automatic scanning of the Ekip link system	•	•	●	●
Centralized synchronizing of time	•	•	●	●
Web server function	● ³⁾	● ³⁾	● ³⁾	● ³⁾
Measurement functions				
Currents	●	●	●	●
Voltages	-	-	●	●
Powers	-	-	●	●
Energies	-	-	●	●
Harmonics	-	-	-	●
Network analyzer	-	-	-	●
Data logger	-	●	●	●
Adjustment functions				
Setting of thresholds	-	●	●	●
Resetting of alarms	●	●	●	●
Diagnostics				
Protection function alarms	●	●	●	●
Device alarms	●	●	●	●
Protection unit tripping details	●	●	●	●
Events log	●	●	●	●
Protection unit tripping log	●	●	●	●
Transmission of alarms via text message	optional	optional	optional	optional
Transmission of alarms via e-mail	optional	optional	optional	optional
Maintenance				
Number of operations	●	●	●	●
Number of trips	●	●	●	●
Wear of contacts	●	●	●	●
Other data				
Status of circuit breaker	●	●	●	●
Circuit breaker position ⁴⁾	●	●	●	●
Local/remote mode	●	●	●	●

1) Ekip Control Panel is available in two versions that can manage a maximum of 10 or 30 circuit breakers. The number of circuit breakers may vary depending on their type. For details, ask ABB SACE

2) Circuit breakers equipped with actuation module, electric accessories, opening and closing releases and spring charging motor

3) Two client web accesses included in the licence

4) Circuit breakers equipped with auxiliary contacts to indicate position

Supervision and control

Supervision of the electrical installation

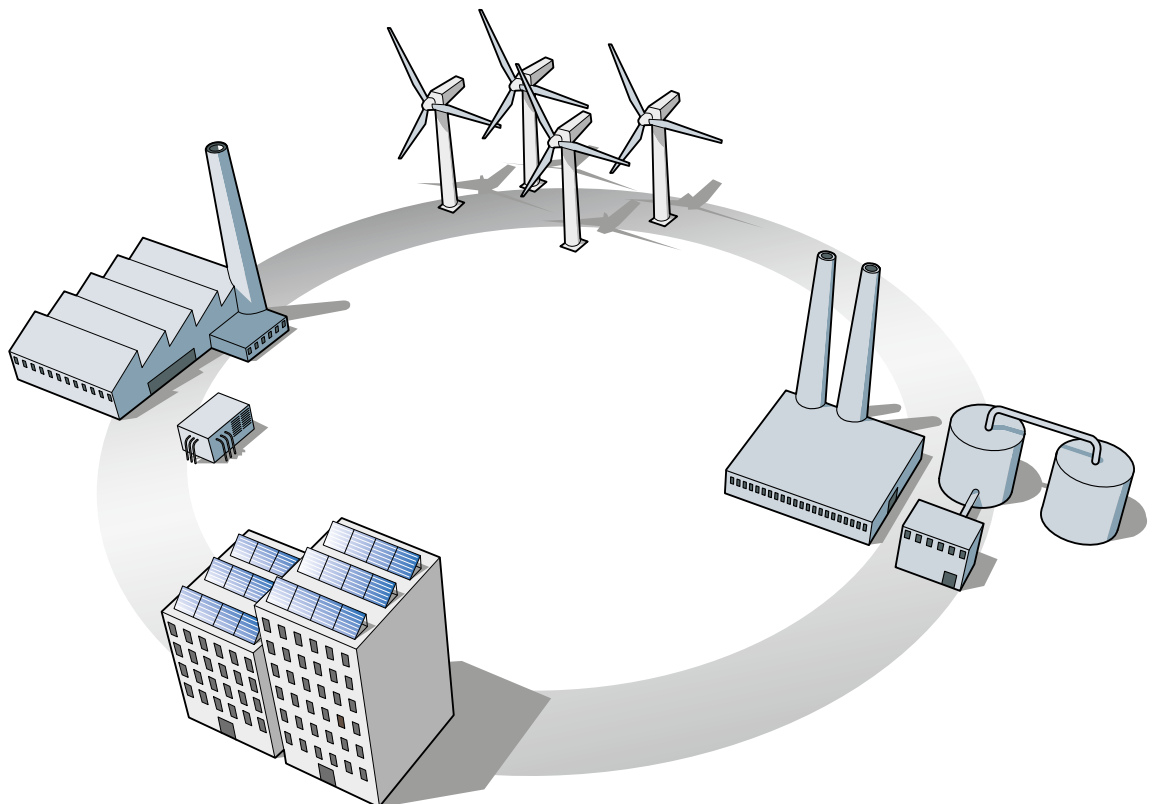
The integration of low-voltage devices in communication networks is required in particular for: automated industrial processes, industrial and petrochemical sites, modern data centres and intelligent electricity networks, better known as smart grids.

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.
- **Complete supervision** of Modbus RTU or Modbus TCP/IP networks via the software for PC Ekip View.



Supervision of the electrical installation			
Electronic trip unit	Ekip Touch	Ekip Touch + Ekip measuring module	Ekip Hi Touch
		Ekip G Touch	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		
Open ADR	Ekip com OpenADR		
Hub	Ekip com Hub		
Control functions			
Circuit breakers opening and closing ¹⁾	●	●	●
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 ²⁾	●	●	●
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

Ekip E-Hub

This is a DIN-rail mounted communication module for cloud-connectivity. Ekip E-Hub can collect data throughout the system from ACBs to MCCBs, multi-meter, miniature 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 application

Ekip connect

ABB SACE offers software applications that allow the potential of the Ekip electronic trip units to be utilized in the best possible way in terms of the management of power, acquisition and analysis of the electrical values, and testing of the protection, maintenance and diagnostic functions.

Overview of the software

An overview of the software available and their main characteristics are given below:

Software	Functions	Distinctive characteristics
Ekip Connect	<ul style="list-style-type: none"> - commissioning of circuit breakers - analysis of faults - testing of communication bus 	<ul style="list-style-type: none"> - simple and intuitive use - integrated with DOC electrical design software - useable via EtherNet™ - automatic updating from Internet - off-line mode - multi-media (smart phone, tablet or PC)
Ekip View	<ul style="list-style-type: none"> - supervision and control of communication networks - analysis of electrical value trends - condition monitoring 	<ul style="list-style-type: none"> - engineering free - analysis of past trends - customizable reports - access via Internet to the installation - possibility of integrating third party devices
ABB Ability™ Electrical Distribution Control System	<ul style="list-style-type: none"> - monitoring of plants - optimization of the plant - control center 	<ul style="list-style-type: none"> - alerts notification via mail - automatic report for energy efficiency - asset management

Ekip Connect

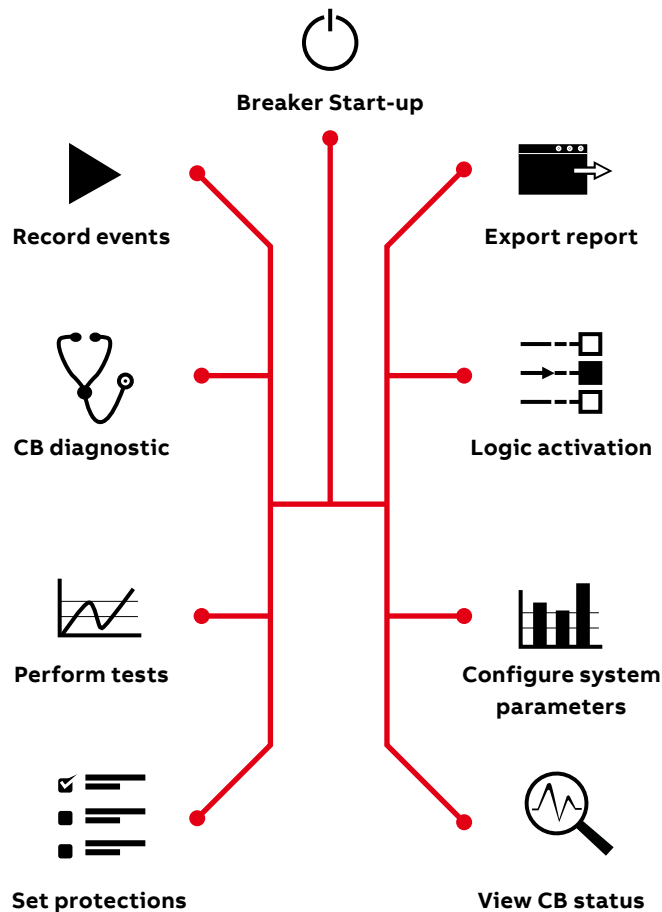
The ABB programming and commissioning software tool that allows the user to unlock the full potential of circuit breakers, improving the efficiency of the electrical plant.

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.

Ekip Connect is the ABB commissioning and programming software that allows the potential of Ekip electronic trip units to be fully realized. 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.



Software and web application

Ekip connect

—
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. You can! Using Ekip Connect it is possible to cut commissioning time by up to 50%. Providing a stress-free interaction with the device complexity, Ekip Connect 's easy-to-use software has all the answers.

Ekip Connect's simple and intuitive interface means that, from the very start, it is possible to easily navigate through the tool and access every circuit breaker operation. At a glance, the user can see all the information he needs, giving him the possibility 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 in order to have everything under control and avoid failures. You can! Using Ekip Connect you can exploit the full capabilities of your device and thanks to the customizable dashboard you can organize the functions displayed, just the way you want it. It is possible to manage all the CB settings and specifications directly with Ekip Connect, making it the perfect instrument for exploring and using the breaker. Diagnostics are easy too: It is possible to consult and download the log of events, alarms and unit trips, thereby facilitating the identification and understanding of any anomalies.

This software able to manage all ABB low-voltage circuit breakers equipped with an electronic trip unit, giving a full integration of air and molded case circuit breakers.

—
Consultant/system
integrator
Complex logic at your
fingertips



Product enhancement

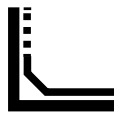
Imagine you are a consultant or a system integrator and you want to implement advanced features while avoiding the risk of errors. You can! Using Ekip Connect it's possible to implement complex logic with a few clicks of your mouse.

To add, set and manage advanced functions has never been so easy. Automatic transfer switch logic, load shedding, advanced protection and demand management can be managed and

easily set through the Ekip Connect software.

Expand software features by purchasing and downloading software packages for advanced functions directly using Ekip Connect.

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 of your mouse.



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

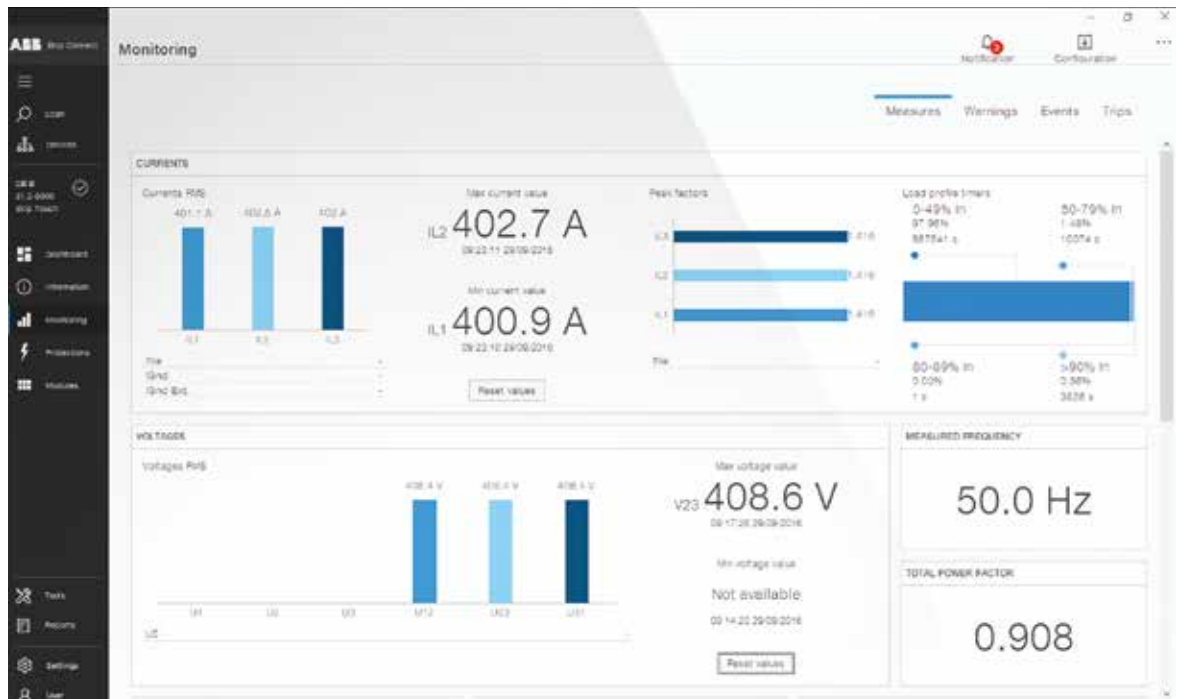
Test



Testing & reporting

- **Check correct functionality**
- **Perform tests**
- **Export report**

Ekip Connect is available for free download at <http://www.abb.com/abblibrary/Download-Center/>



Software and web application

Ekip View

Ekip View is the software for supervising devices connected to a communication network that uses the Modbus RTU or Modbus TCP protocol.

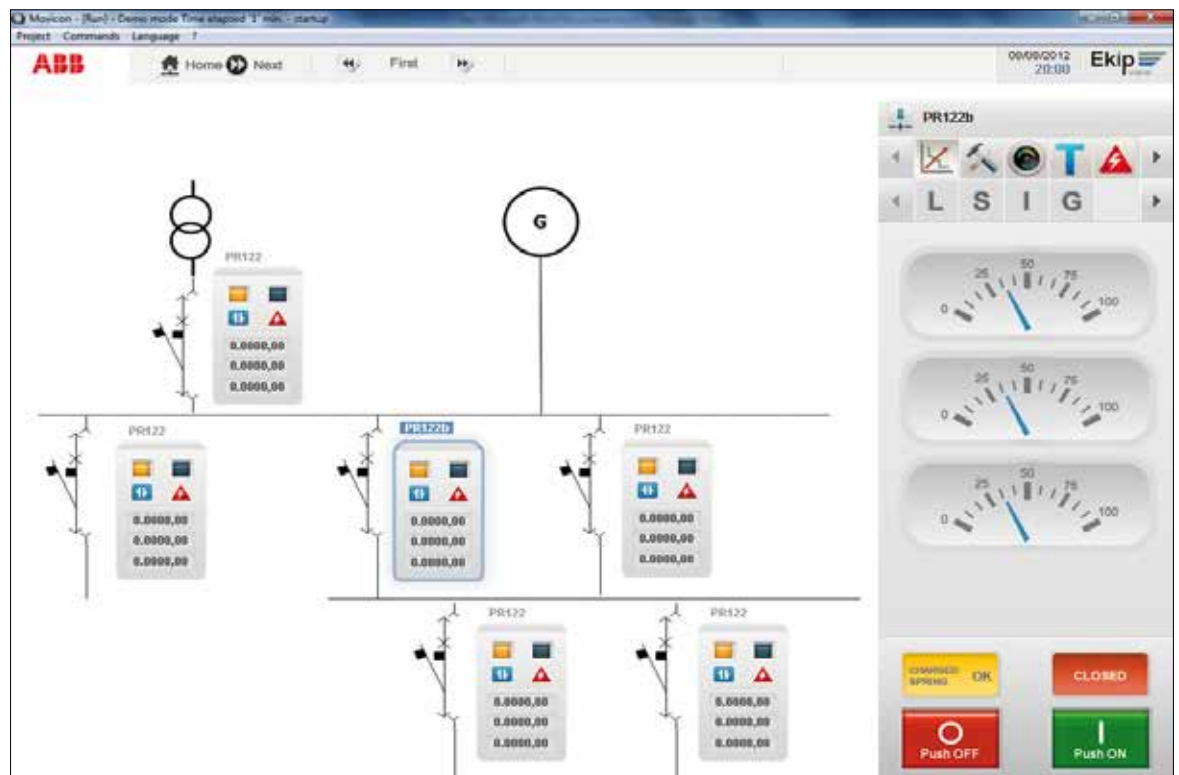
It is the ideal tool for all applications that require:

- remote control of the system,
- monitoring of power consumption,
- fault detection of the system,
- allocation of energy consumption to the different processes and departments,
- preventative planning of maintenance.

The main characteristics of Ekip View are:

- **Engineering free and ready to use software** which guides the user in the recognition and configuration of the protection units without the need for any supervision system engineering activities.

- **Dynamic mimic panel;** after automatic scanning of the network, for each of the devices found, Ekip View proposes a dynamic symbol that summarizes the most important information (status, electrical measurements, alarms). The extensive library of electrical symbols enables the entire electrical system to be depicted in detail.
- **Analysis of trends;** the instantaneous and past trends of currents, powers and power factors are represented graphically and can be exported into Microsoft Excel for detailed analysis.
- **Reports;** advanced reports can be created regarding system and communication network diagnostics. Using the Alarm Dispatcher option, the user can receive the most important indications via SMS or e-mail.
- **Access via web** to the installation, due to the Web Server function of Ekip View.



Ekip View Software		
Communication characteristics		
Protocol Supported	Modbus RTU	Modbus TCP
Physical layer	RS 485	EtherNet™
Maximum data exchange rate	19200 bps	100 Mbps
Operating system	Windows XP, Windows 7, Windows Vista	
Devices supported		
SACE Emax 2 trip units	Ekip com Modbus RS485	Ekip com Modbus TCP
SACE Emax,T7,X1,T8 trip units	PR120/D-M, PR330/D-M	-
SACE Tmax T trip units	PR222DS/PD, PR223DS	-
SACE Tmax XT trip units	Ekip com	-
Third party devices	optional ¹⁾	optional ¹⁾
Licences available	- up to 30 ²⁾ controllable devices - up to 60 ²⁾ controllable devices - unlimited number ³⁾ controllable devices	- up to 30 ²⁾ controllable devices - up to 60 ²⁾ controllable devices - unlimited number ³⁾ controllable devices
Supervision and control functions		
Opening and Closing of circuit breakers ⁴⁾	●	●
Electrical value trends	●	●
Log of electrical value trends	●	●
Dynamic installation mimic panel	●	●
Automatic scanning	●	●
Centralized synchronizing of time	●	●
Web server function ⁵⁾	● ⁵⁾	● ⁵⁾
Measurement functions		
Currents	●	●
Voltages	●	●
Powers	●	●
Energies	●	●
Harmonics	●	●
Network analyzer	●	●
Data logger	●	●
Adjustment functions		
Setting of thresholds	●	●
Resetting of alarms	●	●
Diagnostics		
Protection function alarms	●	●
Device alarms	●	●
Communication system alarms	●	●
Protection unit tripping details	●	●
Events log	●	●
Protection unit tripping log	●	●
Generation of Reports	●	●
Maintenance		
Number of operations	●	●
Number of trips	●	●
Wear of contacts	●	●
Other data		
Status of circuit breaker	●	●
Circuit breaker position ⁷⁾	●	●
local/remote mode	●	●

1) Contact ABB SACE to integrate other devices in the Ekip View software

2) can be increased

3) within the physical limit of the protocol used

4) circuit breakers equipped with Ekip com Actuator module and electrical accessories

5) two client web accesses included in the licence

6) according to the values supported by the trip units

7) circuit breakers equipped with auxiliary contacts for position indication

Software and web application

ABB Ability Electrical Distribution Control System

ABB Ability™ Electrical Distribution Control System is the innovative cloudcomputing platform designed to monitor, optimize and control the electrical system.

Part of the ABB Ability™ offering, ABB Ability™ Electrical Distribution Control System is built on a state-of-the-art cloud architecture for data collection, processing and storage. This cloud architecture has been developed together with Microsoft in order to enhance performance and guarantee the highest reliability and security. Through a compelling web app interface, ABB Ability™ Electrical Distribution Control System assists anytime and anywhere via smartphone, tablet or personal computer so the user can:

- **Monitor**
Discover plant performance, supervise the electrical system and allocate costs.
- **Optimize**
Schedule and analyze automatic reports, improve the use of assets and take the right business decision.

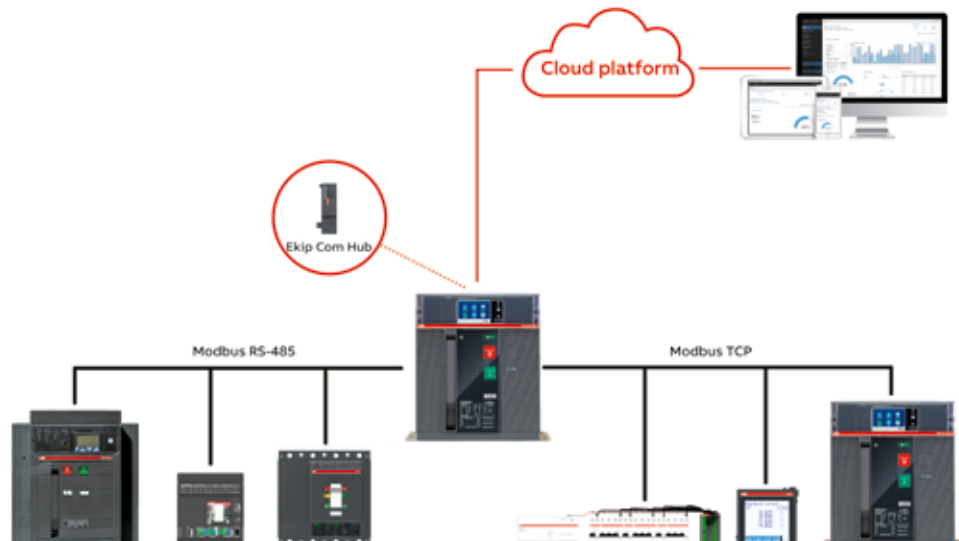
- **Control**

Set up alerts and notify key personnel, and remotely implement an effective power management strategy to achieve energy savings in a simple way.

ABB Ability™ Electrical Distribution Control System also provides access on a multi-site level - monitoring and comparing the performances of different facilities at the same time. In addition, it allows profiling of the users' experience according to the level of access they require. According to the customer needs and application, the user can choose between two configurations to connect the system to ABB Ability™ Electrical Distribution Control System: embedded or external. The first, just a cartridge-type module, the innovative Ekip Com Hub, has to be provided to Emax 2 circuit breaker. The second, the Ekip E-Hub module has to be mounted on DIN-rail.

Embedded solution with Ekip Com Hub

Emax 2 equipped with the new Ekip Com Hub establishes the cloud connection for the whole switchboard. This dedicated cartridge type communication module just needs to be inserted into the terminal box and connected to the internet.

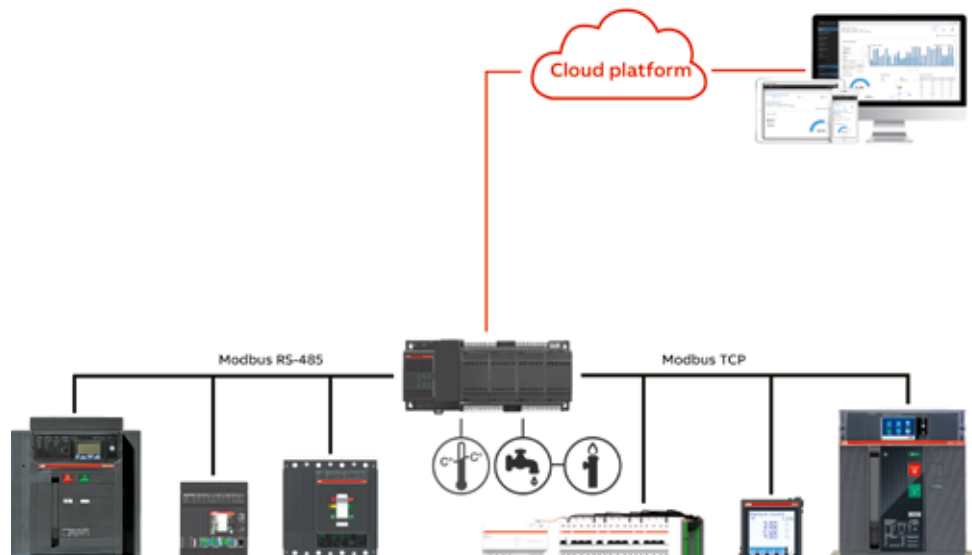




External solution with Ekip E-Hub

The Ekip E-Hub 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 : <http://new.abb.com/low-voltage/launches/abb-ability-edcs>.



CHAPTER 6

Accessories

100-100	Functional areas
101-101	Standard supply
102-116	Accessories for circuit-breakers
103-105	Signalling
106-107	Control
109-109	Safety
110-111	Protection devices
112-113	Connections
114-115	Interlocks and switching devices
118-126	Accessories for Ekip trip units
118-118	Power supply
118-119	Connectivity
120-121	Signalling
121-124	Measurements and protection
125-125	Displaying and supervision
126-126	Testing and programming
127-128	Service

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
- lifting plates for E2.2 ... E6.2 circuit-breaker
- 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
- E1.2 wall mount provided as standard.

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
- lifting plates for E2.2 ... E2.6 circuit-breakers
- lever for racking in and racking out
- anti-insertion lock
- anti-racking out device (fail safe).

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 application and installation requirements of every customer.

	Automatic circuit-breaker		Switch-disconnector	
	E1.2	E2.2 - E4.2 - E6.2	E1.2	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 **	○/○○	○/○○	○/○○	○/○○
Fail Safe				
	●	●	●	●

- 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
- ** IEC only



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	-	0.1A
	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



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



Fig. 02-A



Fig. 02-B

		Standard contact	Contact for digital signals
Type		changeover contacts	changeover contacts
Minimum load		100mA @ 24V	1mA @ 5V
Breaking capacity			
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



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.

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



Fig. 03

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
Breaking capacity			
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 is 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 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	35 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 a 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 (P_s)	300VA	300W
Continuous power (P_c)	3.5VA	3.5W
Opening time (YU)		
E1.2	30 ms	
E2.2 ... E6.2	50 ms	

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 over-current 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	●	●
380V...415V	●	-
440V...480V (E2.2 ... E6.2)	●	-
Operating limits (IEC60947-2 standards)	85%...110% Un	
Inrush power (Ps)	300VA E1.2 500VA E2.2 ... E6.2	300W E1.2 500W E2.2 ... E6.2
Inrush time	200ms	
Continuous power (Pc)	100VA E1.2 150VA E2.2 ... E6.2	100W E1.2 150W E2.2 ... E6.2
Charging time		
E1.2	8 sec	
E2.2 ... E6.2	7 sec	



Fig. 09A



Fig. 09B

Electrical diagram reference: figure 13



Fig. 10



Fig. 11



Fig. 12



Fig. 13

Safety

Anti-racking out device / Fail safe - FS

The anti-racking out, or fail safe device prevents the moving part of a drawout circuit breaker from being racked out of the cradle when the springs are charged. It is always supplied with the moving part of a UL version drawout circuit breaker or switch and is an alternative to the undervoltage coil or second shunt coil.

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.

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.

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.

Accessories for circuit breakers

Protection devices



Fig. 14

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.

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. 19

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.

Separators - PB (Fig. 22)

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

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. Standard on UL versions.



Fig. 20



Fig. 21



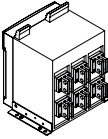
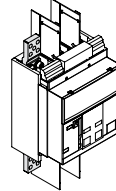
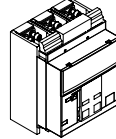
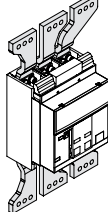
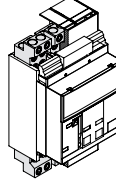
Fig. 22

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.

Solution for fixed circuit breakers

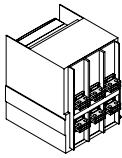
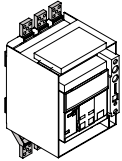
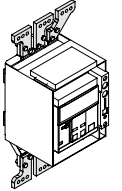
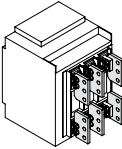
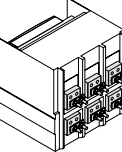
Type	Abbreviation		E1.2	E2.2	E4.2	E6.2
Rear adjustable terminal *	HR VR		Single stab design			
			○			
			Multiple stab design			
			● Iu = 2000A ● Iu = 3600A * ● Iu = 6000A			
Extended front terminal **	EF		○			
Front terminal **	F		●	○	○	○
Front spread terminal **	ES		○			
Terminal for cable FcCuAl 4x500kcmil / 240mm2 **	FcCuAl		○			

- Standard configuration
- Configuration on request

(*) The adjustable terminals are supplied as standard in the HR – HR configuration, with exception for E4.2 L version, E4.2 3200A/3600A and E6.2 6000A in which they are supplied in VR - VR configuration.

(**) Not UL listed

Solutions for fixed parts, withdrawable circuit breakers

Type	Abbreviation		E1.2	E2.2	E4.2	E6.2
Rear adjustable terminal *	HR VR		Single stab design			
			●			
			Multiple stab design			
				● Iu = 2000A	● Iu = 3200A *	● Iu = 6000A
Extended front terminal **	EF		○			
Front spread terminal **	ES		○			
Terminal for cable FcCuAl 4x240mm ² **	Fc CuAl		○			
Flat terminal **	FL			○	○	○

● Standard configuration

○ Configuration on request

(*) The adjustable terminals are supplied as standard in the HR – HR configuration, with exception for E4.2 L version, E4.2 3200A and E6.2 6000A in which they are supplied in VR - VR configuration.

(**) Not UL listed

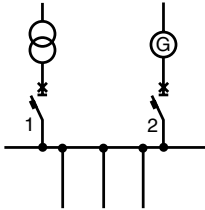
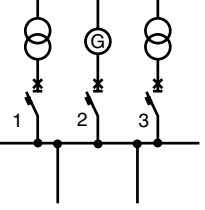
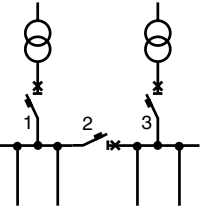
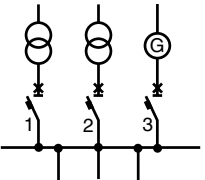
Accessories for circuit breakers

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. 	<table border="1"> <tr> <td>1</td> <td>2</td> </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. 	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> </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). 	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> </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																									
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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. 	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> </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																									
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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 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
Power supply					
Ekip Supply	○	○	○	○	○
Battery for Ekip trip units	○	○	○	○	○
Connectivity					
Ekip Com		○	○	○	○
Ekip Com Redundant		○	○	○	○
Ekip Com Actuator	○	○	○	○	○
Ekip Link	○	○	○	○	○
Ekip Bluetooth	○	○	○	○	○
Signalling					
Ekip Signalling 2K		○	○	○	○
Ekip Signalling 4K ⁽¹⁾		○	○	○	○
Ekip Signalling 10K	○	○	○	○	○
Ekip Power Controller		○	○	○	○
Measurement and Protection					
Ekip Measuring Pro		○	●	●	●
Ekip Measuring		○			
Ekip AUP	○	○	○	○	○
Ekip RTC	○	○	○	○	○
Ekip Synchrocheck		○	○	○	○
Ekip LCD		○	○	○	○
Rating Plug	○	○	○	○	○
Homopolar toroid		○	○	○	○
Toroid for differential protection		○	○	○	○
Current sensor for neutral conductor outside the circuit breaker	○	○	○	○	○
Displaying and Supervision					
Ekip Multimeter	○	○	○	○	○
Ekip Control Panel	○	○	○	○	○
Testing and Programming					
Ekip TT	○	○	●	●	●
Ekip T&P	○	○	○	○	○
Ekip T&P: Ekip Programming	○	○	○	○	○

● Standard accessory

○ Accessory on request

⁽¹⁾ not available for E1.2

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: - Ekip Com - Ekip Link - Ekip 2K - Ekip Supply - Ekip Synchrocheck	- The Ekip Supply module enables the trip units to be supplied with a wide range of control voltages - The Ekip supply module must be present for the other modules to be used - 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 - 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
Accessorizing area	Ekip LCD Ekip Com Actuator Ekip RTC Ekip AUP Ekip Measuring Ekip Signalling 4K Rating Plug Battery for Ekip	- These are installed in specific housings from the front of the circuit breaker - For all the trip units with a touch screen interface, an LCD version is available with any adjustment in the protection and measurements functions - 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. - 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
Ekip trip unit test port	Ekip T&P Ekip TT Ekip Bluetooth	- These can be connected to the front test port of the trip units even with the device in operation - Compatible also with the SACE Tmax XT range
External	Ekip Multimeter Ekip Control Panel Ekip 10K External neutral sensor Homopolar toroid Differential toroid	- Ekip Multimeter can supply a 24V DC output to the trip unit it is connected to - Several Ekip units and / or Ekip Signalling 10K can be connected at the same time to the same Ekip trip unit - These are connected to the trip unit by the terminal box of the circuit breaker

Accessories for Ekip trip units



Power supply

Ekip Supply Power 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



Fig. 23



Connectivity (Fig. 24)

The Ekip Com modules enable all 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 complete with auxiliary position contacts Ekip AUP and ready to close circuit breaker contacts Ekip RTC.

For industrial applications where superior reliability of the communication network is required, the Ekip Com R communication modules, installed together with the corresponding Ekip Com modules, guarantee redundant connection to the network.



Fig. 24

The Ekip Com modules enable Ekip trip units to be connected to networks that use the following protocols:

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

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



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



—
Fig. 25



—
Fig. 26

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 Ekip SmartVision 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 Ekip SmartVision, please visit the dedicated website <http://new.abb.com/low-voltage/launches/ekip-smartvision>.



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. 27

Ekip Bluetooth wireless communication unit (Fig. 28)

Ekip Bluetooth permits remote connection with the trip unit by portable PC, tablet or smart phone on which Ekip Connect software has been installed. The device is connected to the front test connector found on all Ekip trip units in SACE Emax 2 and SACE Tmax XT circuitbreakers and supplies power by means of a rechargeable Li-ion battery.



—
Fig. 28

Accessories for Ekip trip units



Fig. 29

Signalling

Ekip 2K Signalling modules (Fig. 29)

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, 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.

—
Electrical diagram reference: figures 41, 42, 43



Ekip 3T Signalling modules (Fig. 29A)

The Ekip 3T Signalling modules supply three analog inputs for thermo-resistances PT1000 and one analog input 4-20mA for external sensors. Through the Ekip Connect software is possible to set different thresholds and link them to a digital signal. The Ekip 3T Signalling modules are suitable for all distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units. Two versions of the Ekip 3T Signalling modules are available: Ekip 3T-1, Ekip 3T-2.



Fig. 30

Ekip 4K signalling module (Fig.30)

The Ekip 4K Signalling module, available for E2.2 – E4.2 – E6.2, supplies 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

Ekip 10K signalling unit (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 (max 4) 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.

—
Electrical diagram reference: figure 103



Fig. 31



Fig. 32

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.

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	2	4	10
	50V DC	output + 2	output + 4	output + 11
	150V DC	input	input	input
	250V AC			
Contact/coil insulation	1000 Vrms (1min @50Hz)			



Fig. 33

Ekip 10K signalling unit 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

Signalling contacts for Ekip trip units (Ekip RTC and Ekip AUP) Ekip trip units can acquire the status of circuit breaker ready to close (RTC) and the racked-in, test, or racked-out position through the optional signalling contacts Ekip RTC and Ekip AUP. These contacts, housed in the accessories area of the circuit breakers, are available with Ekip Dip, Ekip Touch and Ekip Hi-Touch.

Ekip COM communication modules and Ekip Link modules are always supplied with Ekip AUP and Ekip RTC contacts. (Fig. 33)



Fig. 34

Measurement and protection

Ekip Measuring module (Fig. 34)

The Ekip Measuring module enables the trip unit to measure the phase and neutral voltages, powers and energy.

The Ekip Measuring module is installed on the front, right housing of the distribution protection versions of the Ekip Touch trip units, without having to remove the trip unit itself. The voltage connections are installed by default on the lower terminals, but can be altered to the upper terminals on request. The measuring module requires no external connection since it is connected internally to the lower or upper terminals of Emax 2. If necessary, the voltage outlet connection can be moved outside the circuit breaker by using voltmetric transformers and the alternative connection positioned in the terminal box. The use of external connections is obligatory for rated voltages that are higher than 690V. The module must be disconnected for dielectric strength tests on the main busbars.

Electrical diagram reference: figures 20, 21, 22, 23

Accessories for Ekip trip units



Fig. 35

Ekip Measuring Pro module (Fig. 35)

The module has the same connection and installation characteristics as the Ekip Measuring module. In addition, the Ekip Measuring Pro version offers:

- Protection features voltage and power values
- Ekip trip unit power supply from busbar voltage (for line voltages greater than 85V)
- LED signalling when voltage is detected on the main busbars.

The Ekip Measurement Pro module comes standard with the Ekip Hi-Touch, Ekip G Touch and Ekip G-Hi Touch trip units.



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 equipped with the Ekip Measuring Pro module.

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 utilizing the Ekip Measuring Pro Module. 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
	50V DC	0.8A
	150V DC	0.2A
	250V AC	4A
Contact/coil insulation	1000 Vrms (1min @50Hz)	

Electrical diagram reference: figure 48

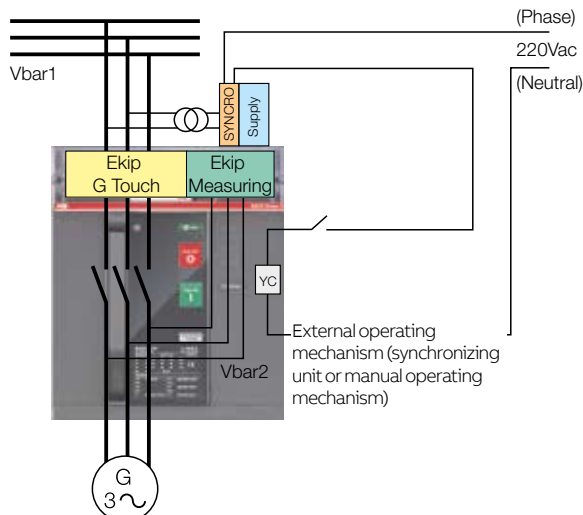




Fig. 37

Ekip LCD display interface (Fig. 37)

For installations in particularly aggressive environments, as low temperatures, high humidity or presence of dust or chemical agents, the Ekip protection trip units can be requested with an LCD black and white display interface with pushbuttons for navigation. This version guarantees excellent immunity by integrating all functions, with regard to protection devices, measuring devices and the possibility of introducing accessories, available on the colour touch screen.



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. The L OFF versions of the rating plugs are IEC rated only.

Circuit breaker	Rating plugs available (both in standard and L OFF versions) - IEC only
E1.2	400-600-800-1000-1200
E1.2 250	100-200-250
E2.2	400-600-800-1000-1200-2000
E2.2 250	100-200-250
E4.2	400-600-800-1000-1200-2000-2500-3200
E6.2	400-600-800-1000-1200-2000-2500-3200-4000-5000-6000

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

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	400-630-800-1250-2000-3200-3600-4000

Accessories for Ekip trip units



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) - IEC only

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) - IEC only

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

Displaying and supervision



Fig. 42

Ekip Multimeter Display on front of switchgear (Fig. 42)

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, 96mmx96mm sized, 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 (24-48V DC or 110-240V DC) or in alternating current (110-240V AC). 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. 43

Ekip Control Panel on front of switchgear (Fig. 43)

The Ekip Control Panel enables the SACE Emax 2 circuit breakers connected to the Ekip Link system to be controlled and monitored.

The panel is supplied already equipped with supervision software and requires no programming. Ekip Control Panel requires a 24V DC power supply and is equipped with:

- 2 RJ45 EtherNet ports for connection to the Ekip Link system and to the local network for remote control via web server option
- 1 RS485 serial port for integration of the Modbus network if it is to be used with circuitbreakers of the Tmax series
- 4 USB ports for downloading data.

Accessories for Ekip trip units

Testing and programming



Fig. 44

Ekip TT testing and power supply unit (Fig. 44)

It also allows a trip unit not provided with auxiliary power supply to be supplied with power so that the last protection device tripped can be displayed directly on the screen or by the lighting up of corresponding LEDs. Ekip TT is a device that allows you to verify that the circuit breaker trip mechanism is functioning correctly (trip test).

The device can be connected to the front test connector of any Ekip trip unit of SACE Emax 2 to set protection functions setting.



Fig. 45

Ekip T&P testing kit (Fig. 45)

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. 46

Ekip Programming Module (Fig. 46)

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.

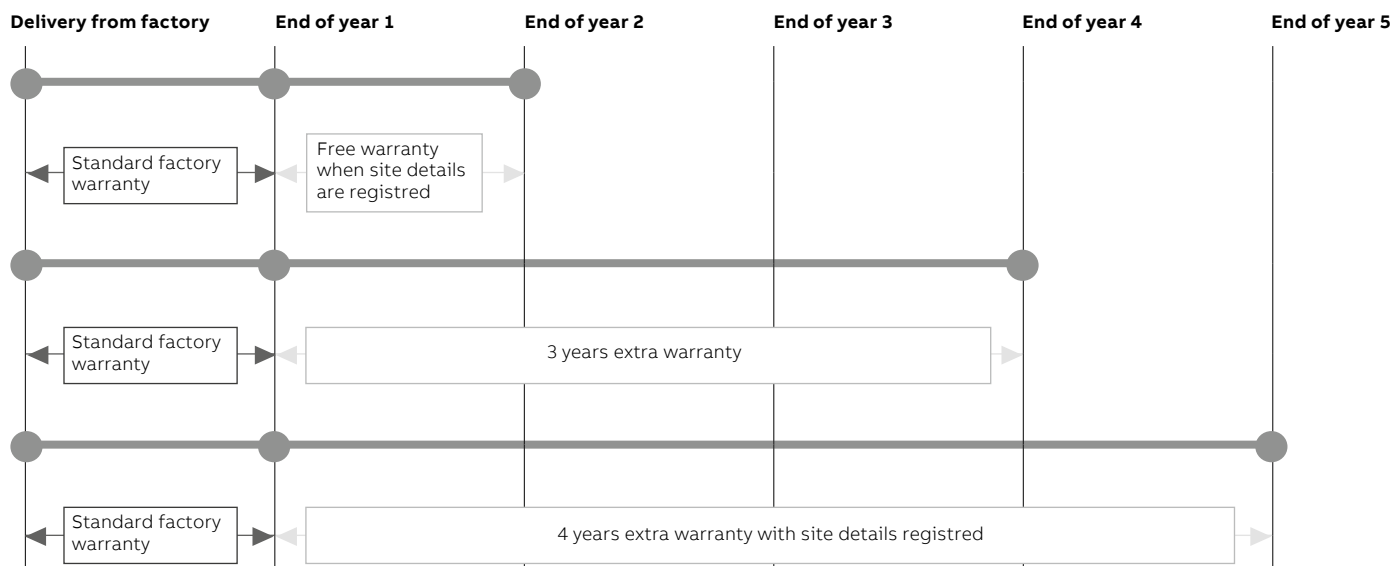
When end users details are registered, one year of extra warranty is offered free-of-charge.

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.



Service



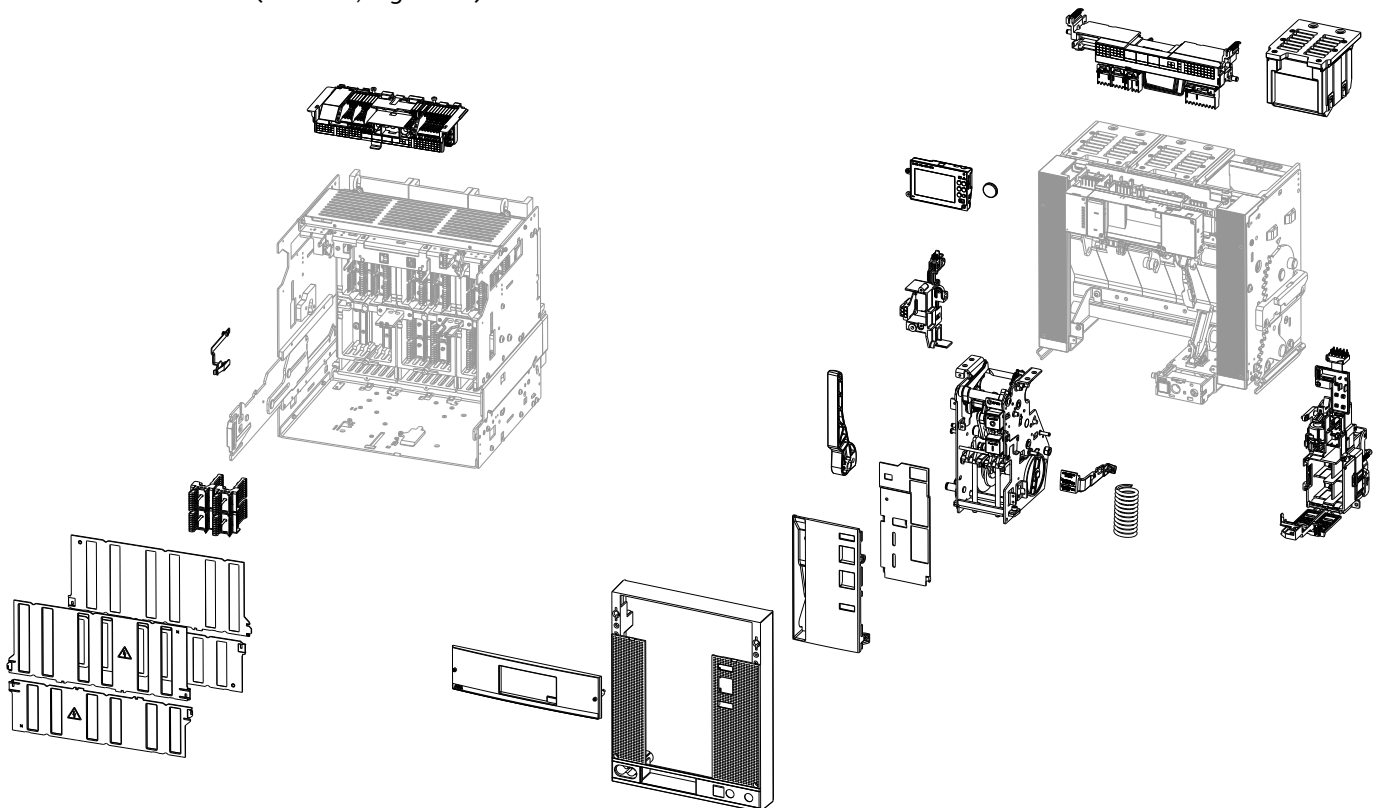
Spare parts

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.

For further details, please refer to ABB SACE Spare Parts Catalog (1SDC001007D0203).



CHAPTER 7

Installation

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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.

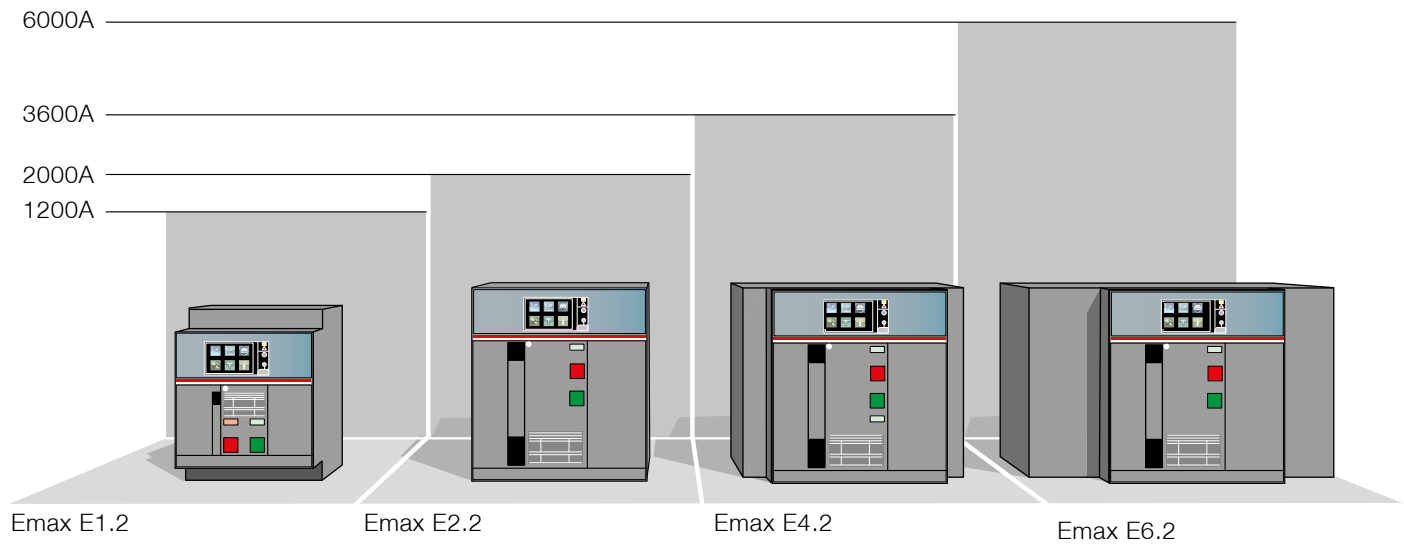
	Distinctive characteristics	Benefits
Simplicity of use and safety	- Ekip protection trip units are interchangeable from front of circuit breaker	Reduced times during the stages of: - installation - wiring - configuration - commissioning - maintenance
	- Rapid configuration of the Ekip trip units	
	- Electronic modules can be installed on terminal box without removing the electronic trip units and protection shield	
	- Electrical plug-in accessories can be installed from the front of circuit breaker	
	- New push-in terminal box allows rapid auxiliary connections	Increased level of safety
	- Horizontal or vertical rear connections can be modified on-site by turning 90°	
	- Accessorizing logic common to the entire family of circuit breakers	
	- 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 6000A, 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.

Fixed



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

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 265 for the commercial codes).

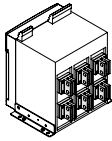
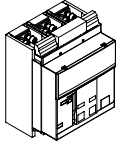
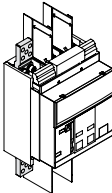
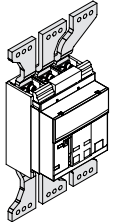
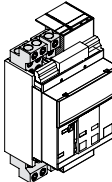
Circuit breaker	Standard version			Optional version with neutral on the right								
	Three-pole			Four-pole	Four-pole							
Emax E1.2	L1	L2	L3	N	L1	L2	L3	L1	L2	L3	N	
Emax E2.2												
Emax E4.2												
Emax E6.2												

Circuit breaker

Terminals

The integration of the circuit breaker into an electrical system is simplified because of the connection terminals of the circuit breakers. The silver-plated copper terminals are designed to assist installation 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 requirements, the circuit breakers can be equipped with different combinations of terminals for the upper and lower part.

Type	Abbreviation		E1.2	E2.2	E4.2	E6.2
Rear adjustable terminal (1)	HR VR		F, W	F, W	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 FcCuAl 4x500kcmil / 240mm ²	Fc CuAl **		F			

(1) The rear adjustable terminals are supplied as standard in the HR-HR configuration, with exception for E4.2 L version, E4.2 3200A and E6.2 6000A in which they are supplied in VR - VR configuration.

(**) Not UL listed

Degree of protection

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

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

The values given in the table refer to total power for three and four pole circuit breakers with balanced loads with a current flow equal to rated uninterrupted current "I_u" at 60Hz.

Circuit breaker type	[W]/[A]	250	400	800	1200	1600	2000	2500	3200	3600	4000	5000	6000
Fixed	E1.2 B-A, N-A, S-A	W	7	17	59	125							
	E2.2 B-A, N-A, S-A	W		15	48	100	170						
	E2.2 H-A, V-A / E2.2 2000A B-A, N-A, S-A	W		15	48	99	167	250					
	E4.2 S-A, H-A, V-A	W			44	86	143	211	310				
	E4.2 3200A/3600A S-A, H-A, V-A	W			42	81	132	193	280	445	578		
	E6.2 H-A, V-A	W								323	395	476	700
Drawout	E1.2 B-A, N-A, S-A	W	14	35	118	250							
	E2.2 B-A, N-A, S-A	W		22	73	152	260						
	E2.2 H-A, V-A / E2.2 2000A B-A, N-A, S-A	W		22	68	138	233	350					
	E4.2 S-A, H-A, V-A	W			58	114	189	279	410				
	E4.2 3200A S-A, H-A, V-A	W			49	111	181	264	384	610			
	E6.2 H-A, V-A	W								438	536	646	950

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		Temperature [°C/°F]						
		<40/104	45/113	50/122	55/131	60/140	65/149	70/158
E1.2	250	100%	100%	100%	100%	100%	100%	100%
E1.2	400	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	1200	100%	98%	96%	94%	91%	88%	84%

Emax 2 E2.2		Temperature [°C/°F]						
		<40/104	45/113	50/122	55/131	60/140	65/149	70/158
E2.2	250	100%	100%	100%	100%	100%	100%	100%
E2.2	400	100%	100%	100%	100%	100%	100%	100%
E2.2	800	100%	100%	100%	100%	100%	100%	100%
E2.2	1200	100%	100%	100%	100%	100%	100%	100%
E2.2	1600	100%	100%	98%	94%	90%	84%	78%
E2.2	2000	100%	100%	97%	93%	88%	82%	76%

Emax 2 E4.2		Temperature [°C/°F]						
		<40/104	45/113	50/122	55/131	60/140	65/149	70/158
E4.2	800	100%	100%	100%	100%	100%	100%	100%
E4.2	1600	100%	100%	100%	100%	100%	100%	100%
E4.2	2000	100%	100%	100%	100%	100%	100%	100%
E4.2	3200	100%	98%	96%	92%	87%	81%	75%
E4.2	3600	100%	98%	95%	92%	88%	85%	81%

Emax 2 E6.2		Temperature [°C/°F]						
		<40/104	45/113	50/122	55/131	60/140	65/149	70/158
E6.2	4000	100%	100%	100%	100%	100%	100%	100%
E6.2	5000	100%	98%	96%	91%	86%	80%	74%
E6.2	6000	100%	97%	94%	91%	88%	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		
	Operating	Active Display	Storage
Emax 2 with Ekip DIP	-25°C ... +70°C -13°F...+158°F	-	-40°C ... +70°C -40°F...+158°F
Emax 2 with Ekip Touch, Hi-Touch	-25°C ... +70°C -13°F...+158°F	-20°C ... +70°C -4°F...+158°F	-30°C ... +70°C -22°F...+158°F
Emax 2 with LCD	-25°C ... +70°C -13°F...+158°F	-25°C ... +70°C -13°F...+158°F	-40°C ... +70°C -40°F...+158°F
Emax 2 swith-disconnectors	-25°C ... +70°C -13°F...+158°F	-	-40°C ... +70°C -40°F...+158°F

Installation environment

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 6600 feet. 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	[ft]	6600	9900	13200	16500
	[m]	2000	3000	4000	5000
Rated service voltage - Ue	[V]	600	600	500	440
Rated current	[% In]	100	98	93	90

Vibration

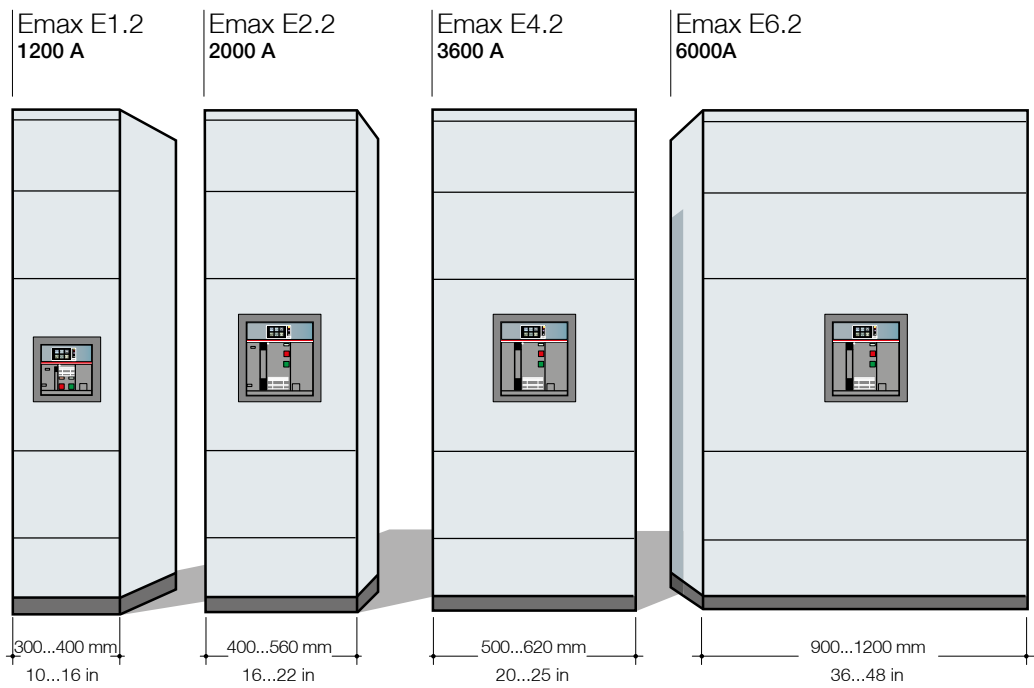
The circuit breakers have been tested according to:

- 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

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, ANSI C37.90.1 and C37.90.2.

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.

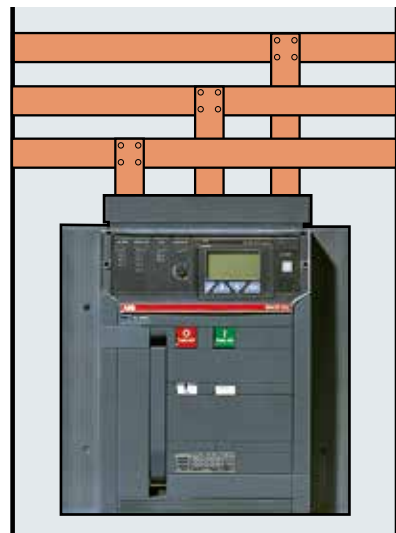


Installation environment

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:

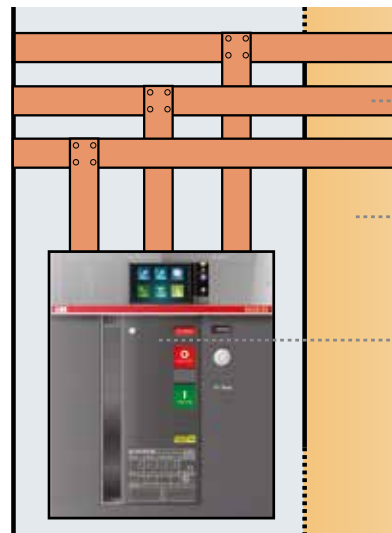
- **Copper:** thanks to the possibility of developing compact units, the length of the distribution system / busbar can be minimized.
- **Metal frame and structure:** reduced volumes also mean less surface space is used for panels and internal structures.
- **Space:** the optimization of the individual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

Traditional circuit breaker 3p lu 2000A



600 mm
24 in

Emax E2.2 3p lu 2000A



400 mm 200 mm
16 in 8 in

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 switchgear compartment.

The E1.2 circuit breaker can also be installed in a horizontal position and wall mounted. Conveniently, 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 configurations and dimensions of copper bars.

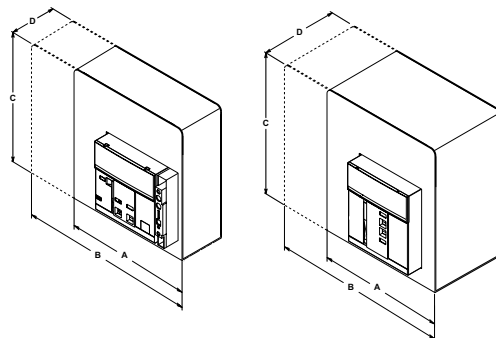
Installation of live parts must ensure:

- **Minimum insulation distances between the phases**

Rated insulation voltage Ui	Minimum distance [mm]
1000V	The use of phase barriers is recommended for fixed version circuit breakers used in voltages over 480V.

• Insulation distance of installation cubicle

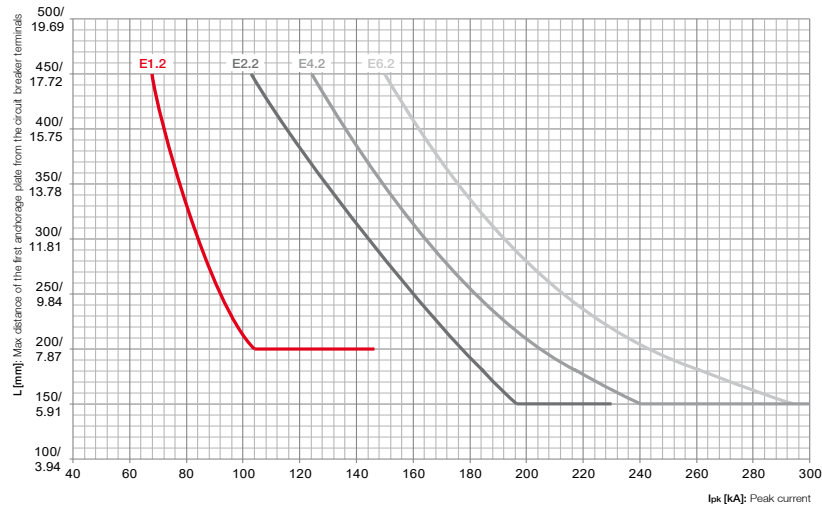
	Fixed circuit breakers				Drawout circuit breakers			
	Width		C - Height	D - Depth	Width		C - Height	D - Depth
	3p	4P			3p	4P		
E1.2	[mm] 250	322	382.5	130	280	350	440	252
	[inch] 9.84	12.67	15.05	5.11	11.02	13.77	17.32	9.92
E2.2	[mm] 400	490	500	221	400	490	440	355
	[inch] 15.74	19.29	19.68	8.7	15.74	19.29	17.32	13.97
E4.2	[mm] 500	620	500	221	500	620	440	355
	[inch] 19.68	24.41	19.68	8.7	19.68	24.41	17.32	13.97
E6.2	[mm] 900	1020	500	221	900	1020	440	355
	[inch] 35.43	40.16	19.68	8.7	35.43	40.16	17.32	13.97
E6.2/f	[mm] -	1200	500	221	-	1200	440	355
	[inch] -	47.24	19.68	8.7	-	47.24	17.32	13.97



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



- **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
Adjustable HR/VR rear	40 Nm / 354.03 lb-in	70 Nm / 619.55 lb-in
Spread rear	40 Nm / 354.03 lb-in	–
Front	40 Nm / 354.03 lb-in	70 Nm / 619.55 lb-in
Extended front	40 Nm / 354.03 lb-in	–
Spread front	70 Nm / 619.55 lb-in	–
Front for cables	43 Nm / 380.58 lb-in	–

- **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 barriers are available as an optional accessory for E1.2.

Earthing connection

To achieve continuity and equal potential of earthing between the Emax 2 circuit breaker and the protection circuit of the switchgear, customers can use either option below:

- Connect the Emax 2 fixed circuit breaker or the cradle of the drawout circuit breaker to the protective circuit by means of a cable with suitable cross-sectional area to fulfil the switchgear requirements.

- 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.

Installation in switchgear

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.

Bars recommendation

Frame	Iu	Vertical		Horizontal			
		Qty	Size (in)	Size (mm)	Qty	Size (in)	Size (mm)
E1.2	800	1	1/4 x 3	6.35 x 76.2	2	1/4 x 2	6.35 x 50.8
E1.2	1200	2	1/4 x 3	6.35 x 76.2	4	1/4 x 2	6.35 x 50.8
E2.2	1600	2	1/4 x 3	6.35 x 76.2	3	1/4 x 2.5	6.35 x 63.5
E2.2	1600	3	1/4 x 2	6.35 x 50.8	4	1/4 x 2	6.35 x 50.8
E2.2	2000	4	1/4 x 2	6.35 x 50.8	4	1/4 x 2.5	6.35 x 63.5
E4.2	2000	4	1/4 x 2	6.35 x 50.8	4	1/4 x 2.5	6.35 x 63.5
E4.2	2500	3	1/4 x 4	6.35 x 101.6	4	1/4 x 4	6.35 x 101.6
E4.2	3200	4	1/4 x 4	6.35 x 101.6	-	-	-
E4.2	3600	4	1/4 x 5	6.35 x 127	-	-	-
E6.2	4000	4	1/4 x 5	6.35 x 127	6	1/4 x 4	6.35 x 101.6
E6.2	5000	6	1/4 x 5	6.35 x 127	10	1/4 x 4	6.35 x 101.6
E6.2	6000	6	1/4 x 6	6.35 x 152.4	-	-	-

The tables should be used solely as a general guideline for selecting products. Due to the extensive variety of switchgear construction shapes and conditions that can affect the behavior of the apparatus, the solution used must always be verified.

Bars connection

The Emax 2 terminal design maximizes the thermal performance into the switchgear. Thanks to the busbar friendly, single to multiple stab design, it is possible to connect bars easily and smartly:

- a wide contact surface between terminals and bars improves the current carrying capacity;
- a spacing between stabs and multi bars increase the ventilation efficiency on E2.2, E4.2 and E6.2;
- a 1/4" spacing eliminates the need to bend bars and allows for an easier connection to the main busbars.

Auxiliary connection

The new terminal box uses spring clamp technology. All cables can be connected to each terminal without tools, guaranteeing time saving during the wiring activities.



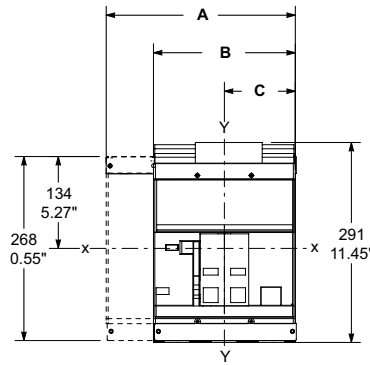
CHAPTER 8

Dimensions

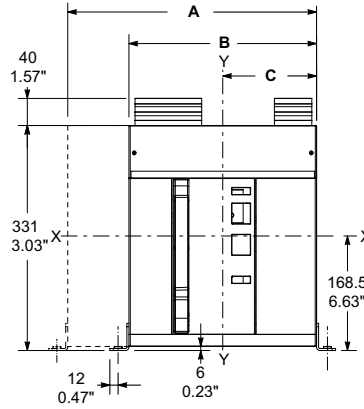
146-158 **Fixed circuit breaker****148-151** E1.2**152-153** E2.2**154-157** E4.2**158-160** E6.2**160-172** **Withdrawable circuit breaker****162-164** E1.2**165-166** E2.2**167-169** E4.2**170-172** E6.2

Fixed circuit breaker

E1.2



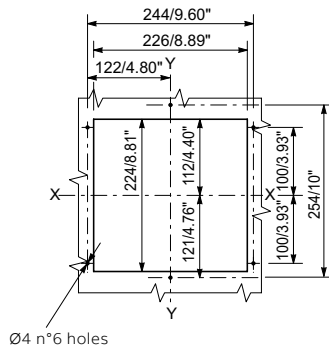
E2.2 - E4.2 - E6.2



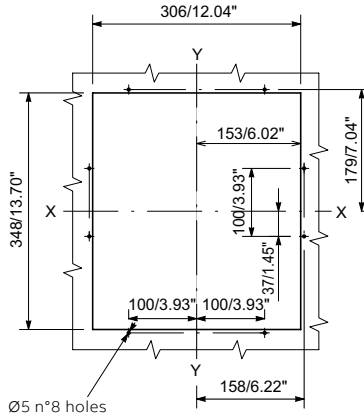
[mm/in]	A	B	C	
	4p	3p	3p	4p
E1.2	284/ 11.18	214/ 8.42	107/ 4.21	107/ 4.21
E2.2	366/ 14.40	276/ 10.86	138/ 5.43	138/ 5.43
E4.2	510/ 20.07	384/ 15.11	192/ 7.55	192/ 7.55
E6.2	888/ 34.96	762/ 30	318/ 12.42	444/ 17.48
E6.2/f	1014/ 39.92	-	-	444/ 17.48

Compartment door drilling

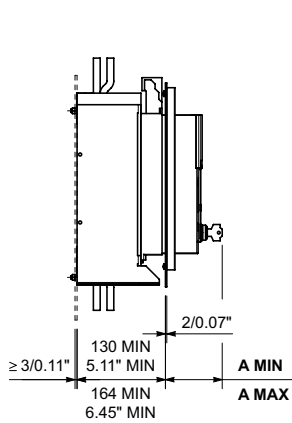
E1.2



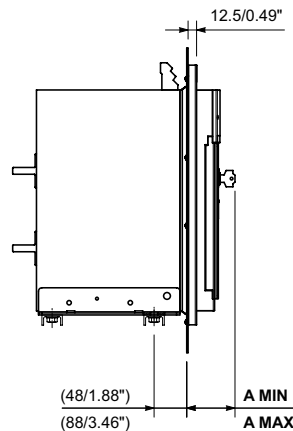
E2.2 - E4.2 - E6.2



E1.2



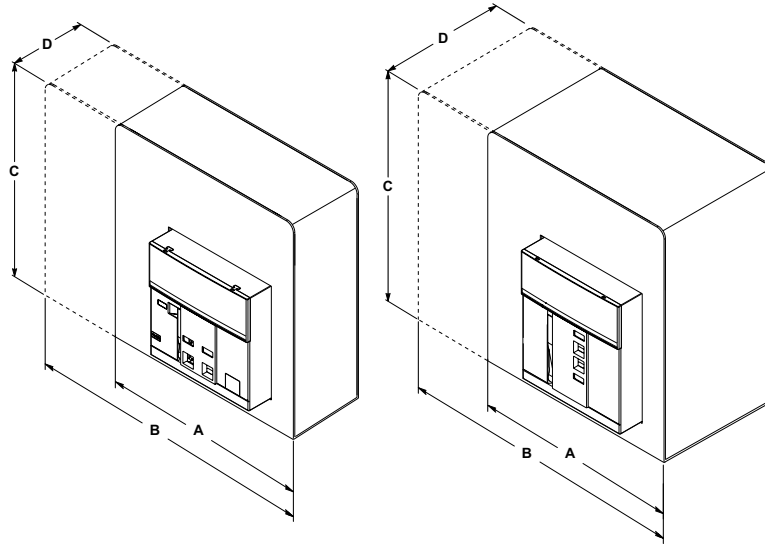
E2.2 - E4.2 - E6.2



E1.2	Standard	Ronis/ Profalux	Kirk	Castell
A MIN	[mm/ 49.5/ in] 1.94"	63.5/ 2.5"	63.5/ 2.5"	83.5/ 3.28"
A MAX	[mm/ 83.5/ in] 3.28"	97.5/ 3.83"	97.5/ 3.83"	117.5/ 4.62"

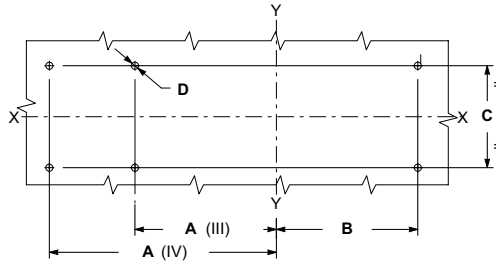
E2.2- E4.2-E6.2	Standard	Ronis/ Profalux	Kirk	Castell
A MIN	[mm/ 29.5/ in] 1.16"	41.5/ 1.63"	46.5/ 1.83"	65/ 2.55"
A MAX	[mm/ 69.5/ in] 2.73"	81.5/ 3.20"	86.5/ 3.40"	105/ 4.13"

Dimensions of the compartment



[mm/in]	A		B		C	D
	3p	4p	3p	4p		
E1.2	250/ 9.84	322/ 12.67	382.5/ 15.05	130/ 5.11		
E2.2	400/ 15.74	490/ 19.29	500/ 19.68	221/ 8.70		
E4.2	500/ 19.68	620/ 24.41	500/ 19.68	221/ 8.70		
E6.2	900/ 35.43	1020/ 40.16	500/ 19.68	221/ 8.70		
E6.2/f	-	1200/ 47.24	500/ 19.68	221/ 8.70		

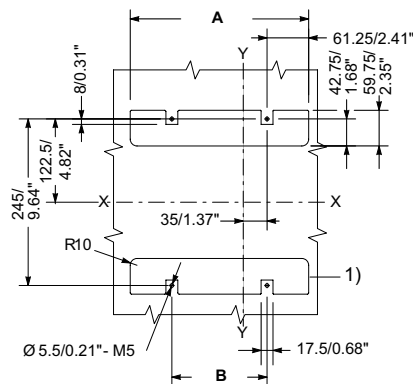
Floor fixing



Floor fixing plate required for E1.2 in order to floor mount.
Ordering code ZE1FFPF missing 1SDA code now 1SDA076020R1

[mm/in]	A		B		C	D
	3p	4p	3p	4p		
E1.2	117/ 4.60	187/ 7.36	117/ 4.60	117/ 4.60	80/ 3.14	5.5/ 0.21
E2.2	154/ 6.06	244/ 9.60	154/ 6.06	154/ 6.06	150/ 5.90	10.5/ 0.41
E4.2	208/ 8.18	334/ 13.14	208/ 8.18	208/ 8.18	150/ 5.90	10.5/ 0.41
E6.2	460/ 18.11	460/ 18.11	334/ 13.14	460/ 18.11	150/ 5.90	10.5/ 0.41
E6.2/f	-	586/ 23.07	-	460/ 18.11	150/ 5.90	10.5/ 0.41

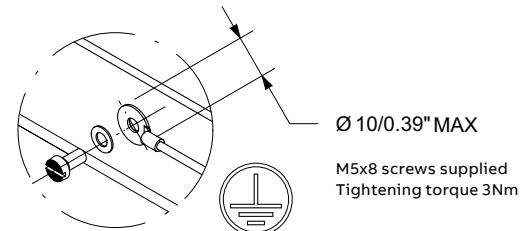
Wall fixing (only for E1.2)



[mm]	3 p	4 p
A	192.5/7.57"	262.5/10.33"
B	70/2.75"	140/5.51"

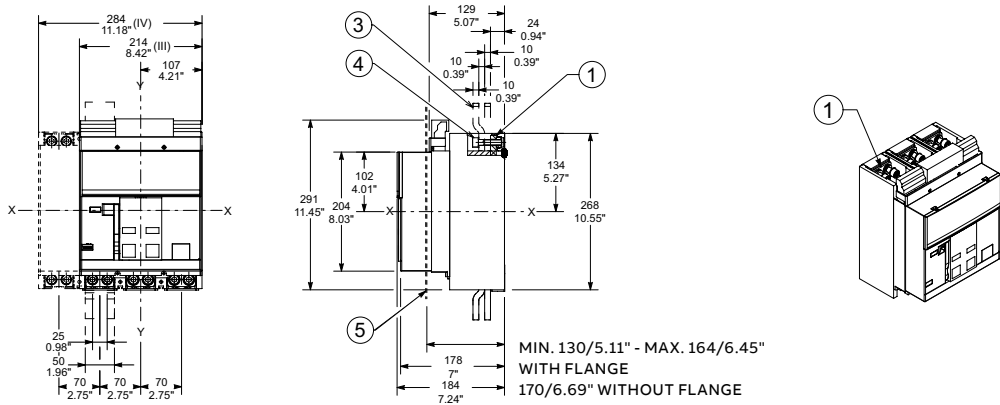
1) for fixing with rear terminals

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

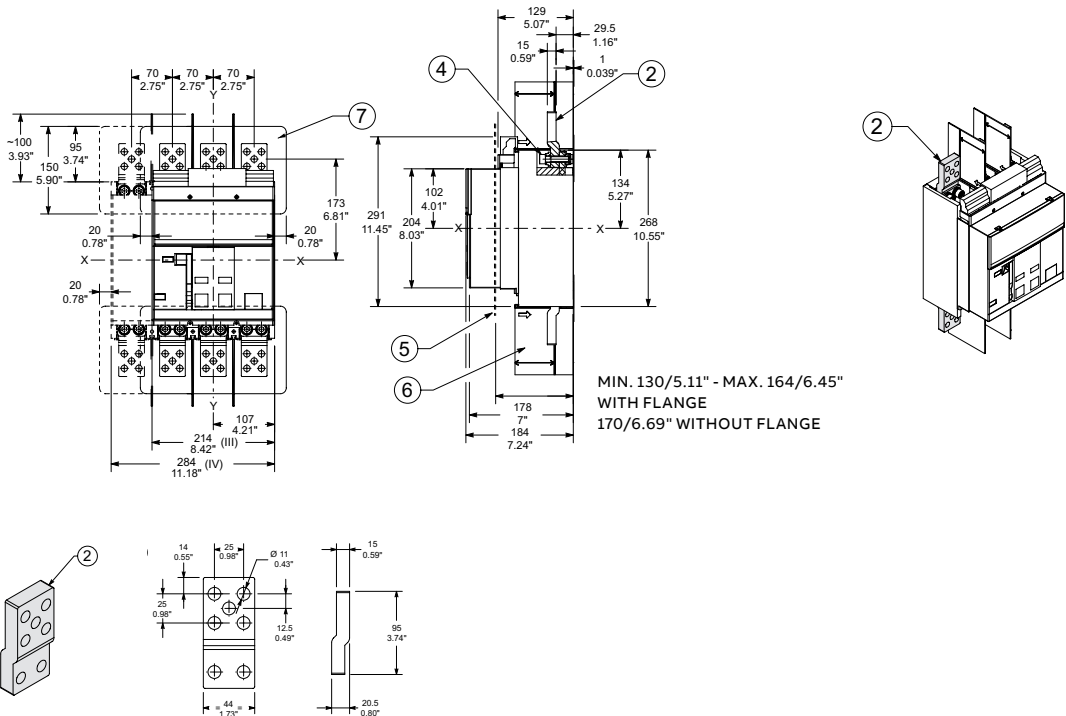


Fixed circuit breaker - E1.2

Front terminals – F



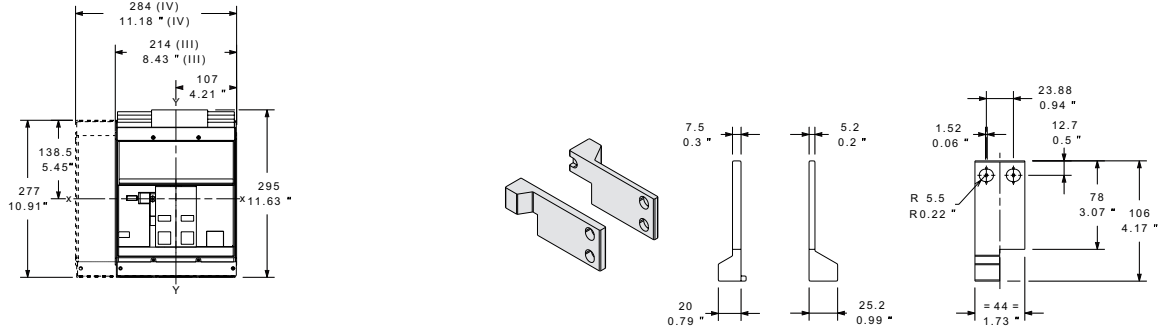
Extended front terminals – EF (not UL listed)



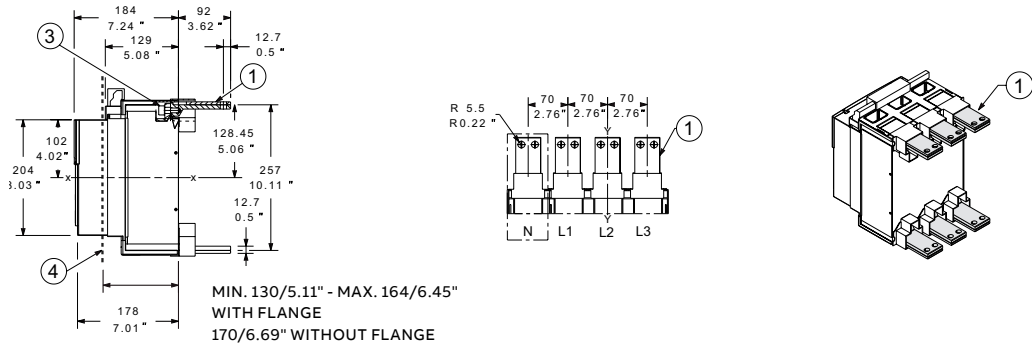
Key

- 1 Front terminals for flat connection
- 2 Extended front terminals
- 3 To be supplied by the customer
- 4 Tightening torque 18Nm - 159lb in
- 5 Door position - Ref. page 7/2
- 6 Obligatory phase separators 100mm/3.93in
- 7 Obligatory insulating plate to be supplied by the customer

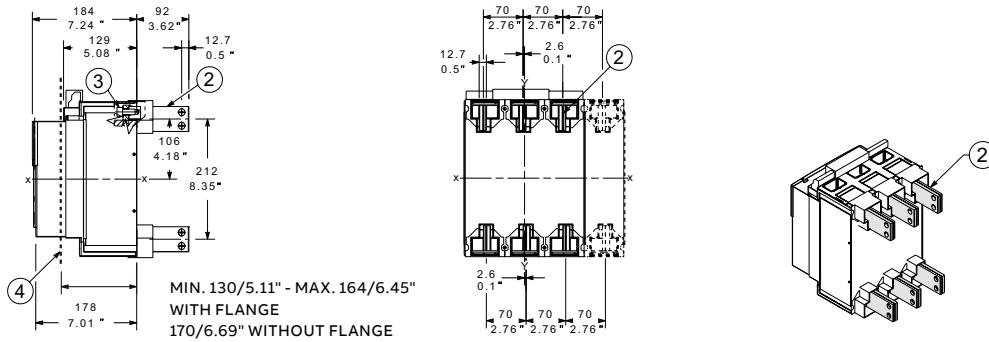
Orientable rear terminals - HR/VR



Terminals HR



Terminals VR

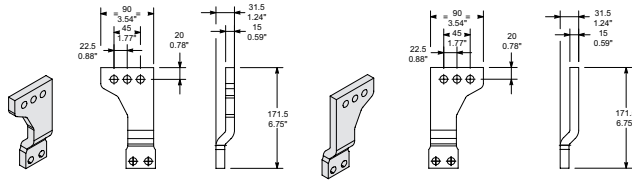
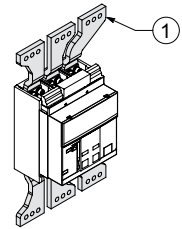
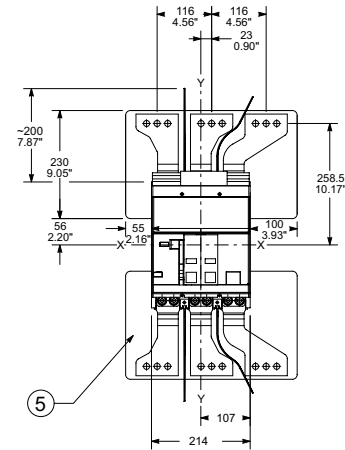


- Key
- 1 Horizontal orientable terminals HR
 - 2 Vertical orientable terminals VR
 - 3 Tightening torque 20Nm - 177lb in
 - 4 Door position - Ref. page 7/2

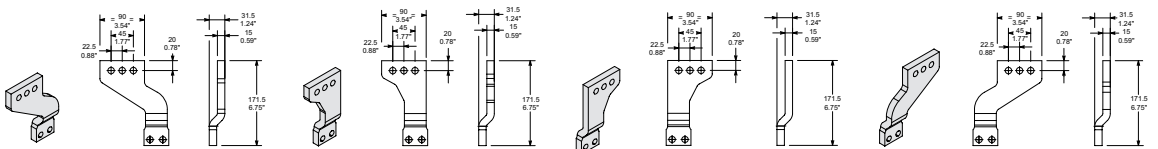
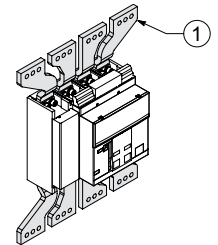
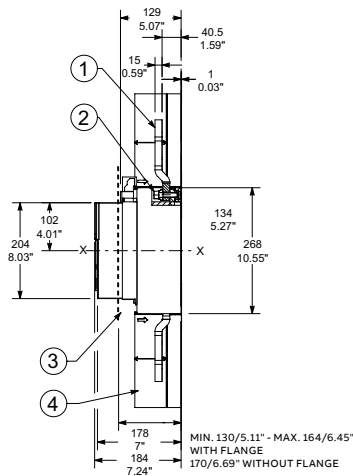
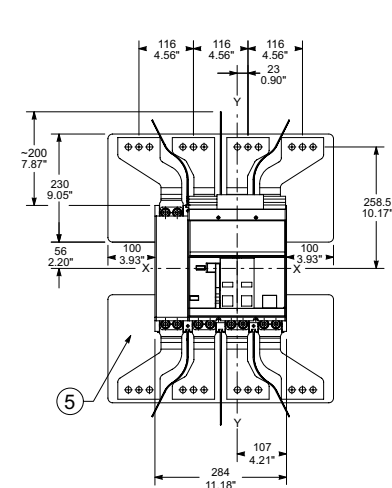
Fixed circuit breaker - E1.2

Extended spread front terminals - ES

3-pole version (not UL listed)



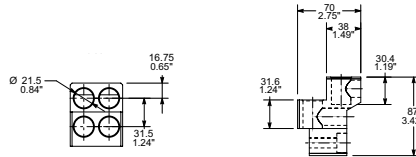
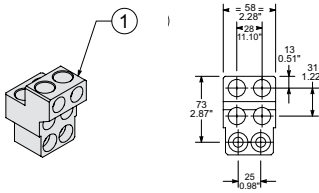
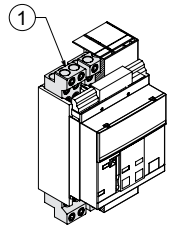
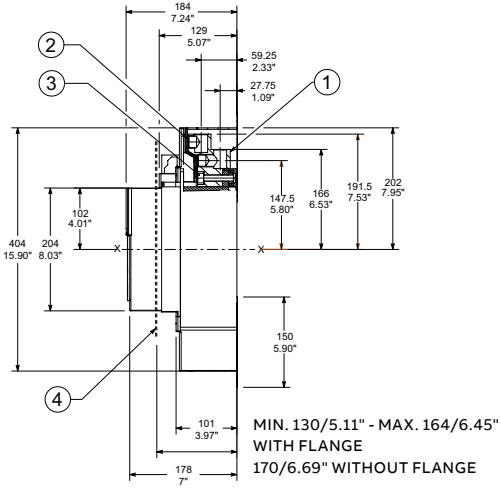
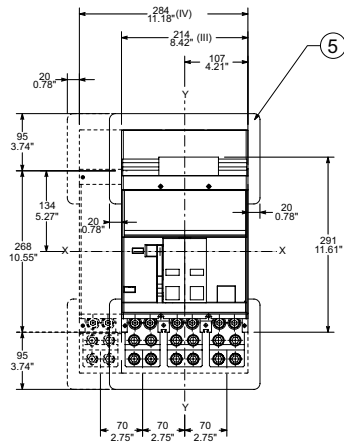
4-pole version



- Key
- 1 Splayed extended front terminals
 - 2 Tightening torque 18Nm - 159lb in
 - 3 Door position - Ref. page 7/2
 - 4 Obligatory phase separators 200mm/7.87in
 - 5 Obligatory insulating plate to be supplied by the customer

Not UL Listed

Front terminals for cables – FcCuAl



- Key
- 1 Front terminals for cables FC CU AL
 - 2 Tightening torque 43Nm - 379lb in
 - 3 Tightening torque 18Nm - 159lb in
 - 4 Door position - Ref. page 7/2
 - 5 Obligatory insulating plate to be supplied by the customer

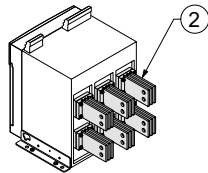
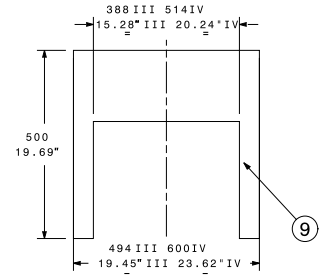
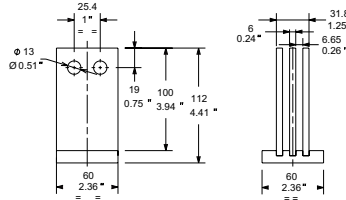
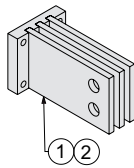
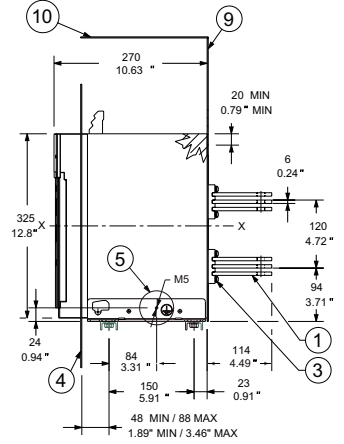
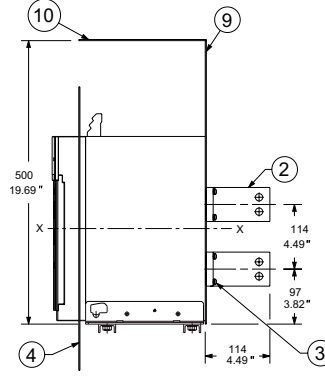
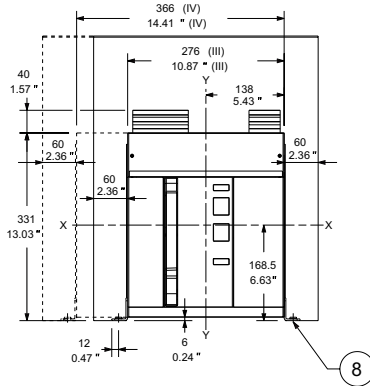
Fixed circuit breaker - E2.2

Orientable rear terminals - HR/VR

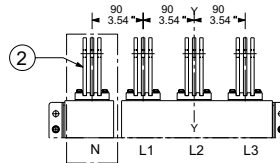
E2.2 B-A, N-A, S-A, H-A,
V-A 250A - 2000A

VR adjustment

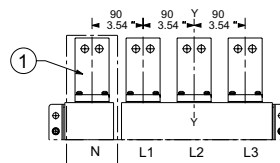
HR adjustment



VR adjustment

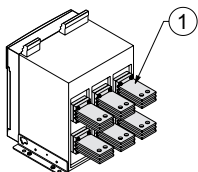


HR adjustment



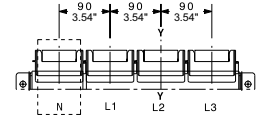
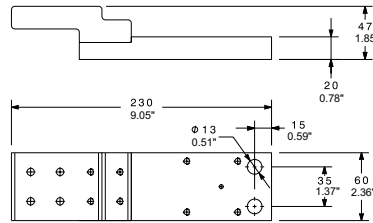
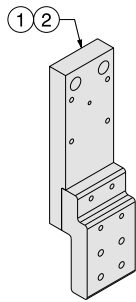
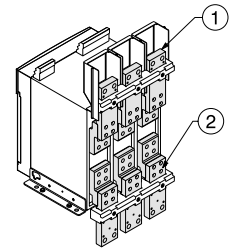
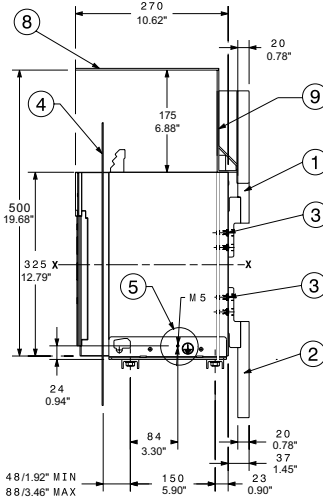
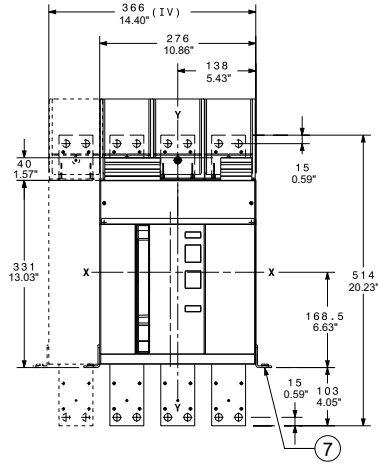
Key

- 1 Horizontal terminals
1600A-2000A
- 2 Vertical terminals
1600A-2000A
- 3 Tightening torque
8.6Nm - 76lb in
- 4 Door position -
Ref. page 7/2
- 5 Grounding
- 8 Mounting outside feet
- 9 Insulating sheet or
insulating metallic
sheet
- 10 Metallic sheet



Front terminals – F (not UL listed)

E2.2 B-A, N-A, S-A, H-A, V-A 250A - 2000A



- Key
- 1 Upper front terminals
 - 2 Lower front terminals
 - 3 Tightening torque
8.6Nm - 76lb in
 - 4 Door position -
Ref. page 7/2
 - 8 External fixing point.
Recommended screws
M10x25 high class

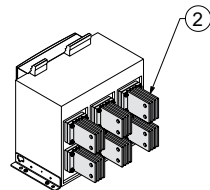
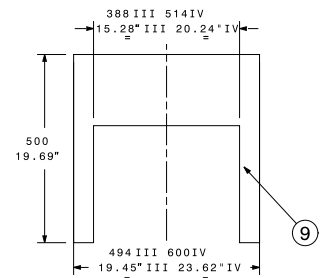
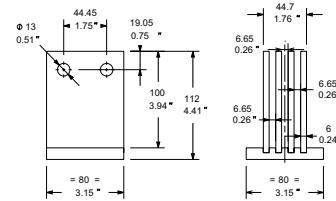
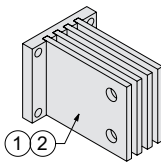
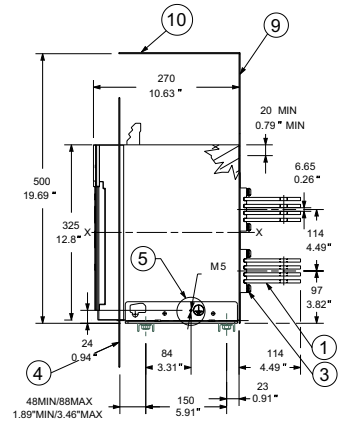
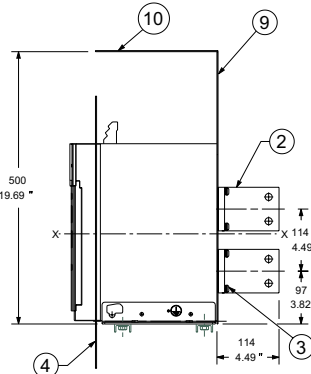
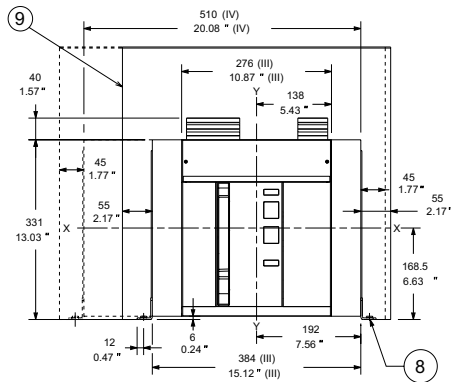
Fixed circuit breaker - E4.2

Orientable rear terminals - HR/VR

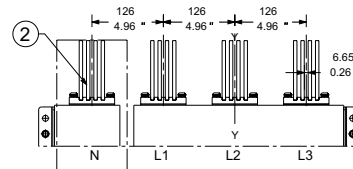
E4.2 S-A, H-A, V-A 800A - 2500A

VR adjustment

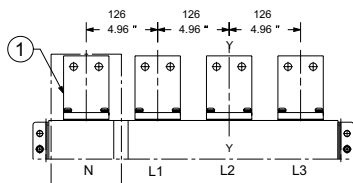
HR adjustment



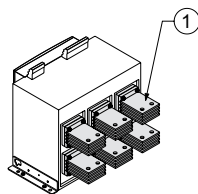
VR adjustment



HR adjustment

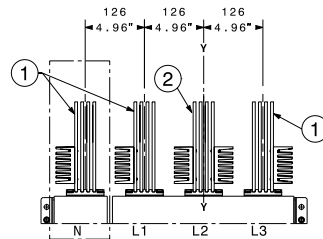
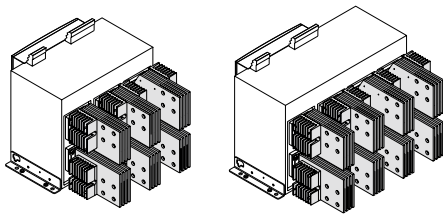
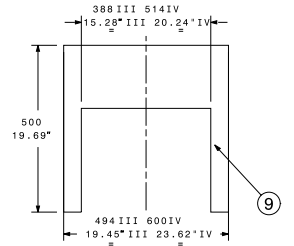
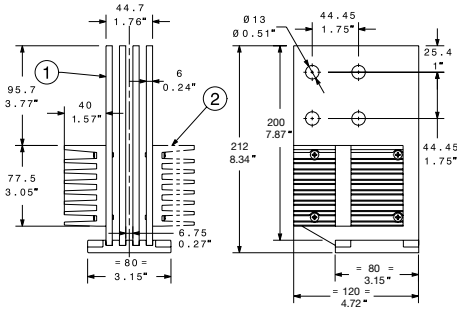
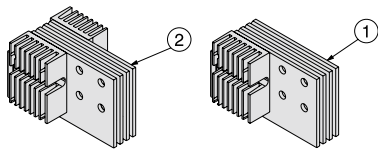
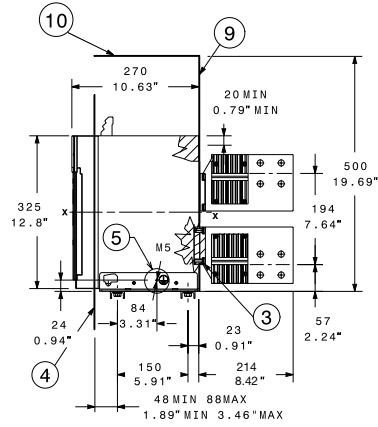
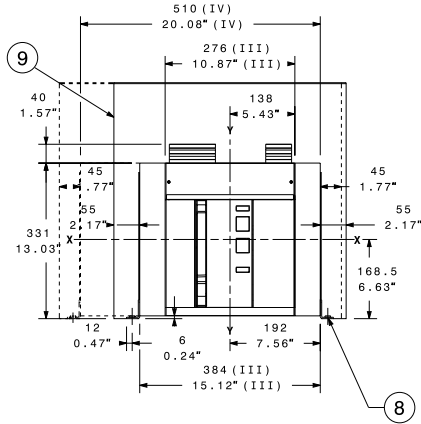


- Key
- 1 Horizontal terminals 2500A
 - 2 Vertical terminals 2500A
 - 3 Tightening torque 20Nm - 177lb in
 - 4 Door position - Ref. page 7/2
 - 5 Grounding
 - 8 Mounting outside feet
 - 9 Insulating sheet or insulated metallic sheet
 - 10 Metallic sheet



Vertical rear terminals - VR

E4.2 S-A, H-A, V-A 3200A



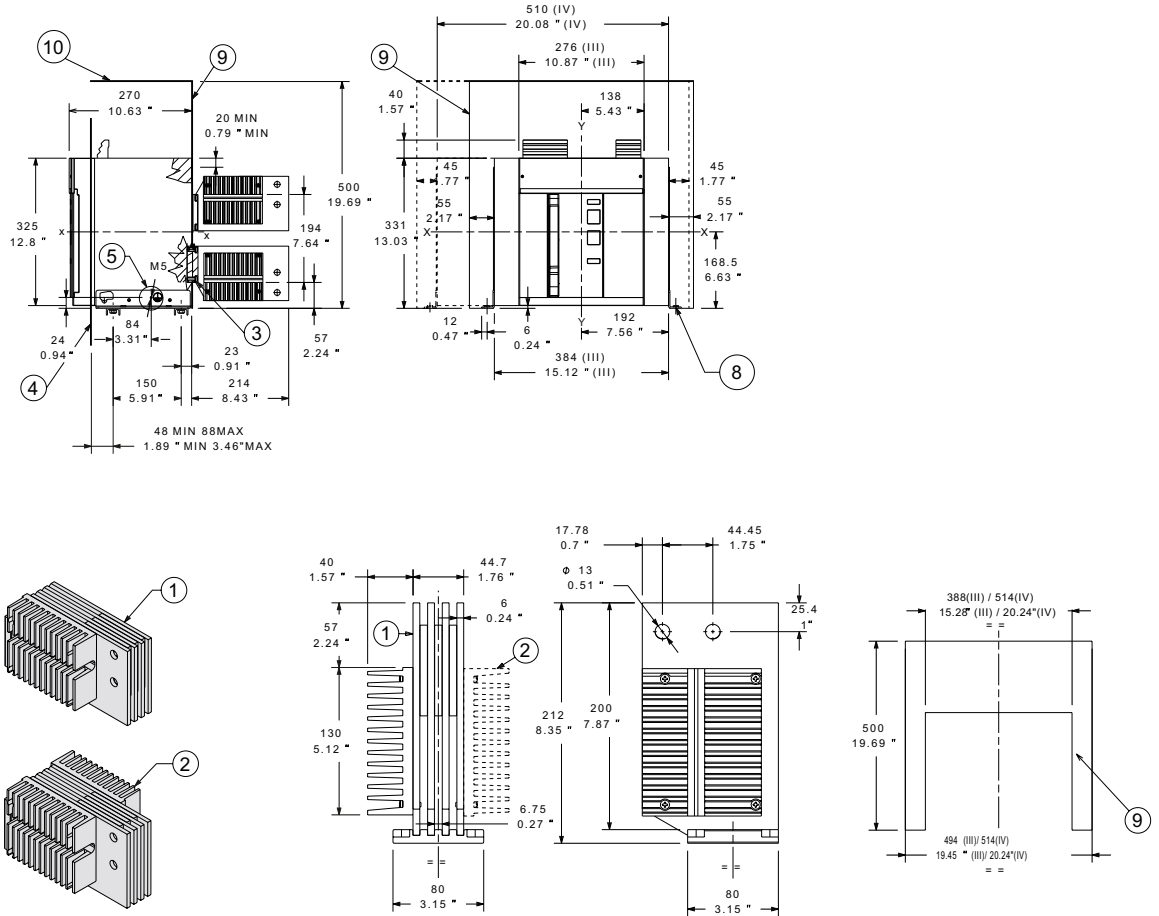
Key

- 1 Lateral vertical terminals 3200A
- 2 Central vertical terminals 3200A
- 3 Tightening torque 20Nm - 177lb in
- 4 Door position - Ref. page 7/2
- 8 Mounting outside feet. Recommended screws M10x25 high class
- 9 Insulating sheet or insulated metallic sheet
- 10 Metallic sheet

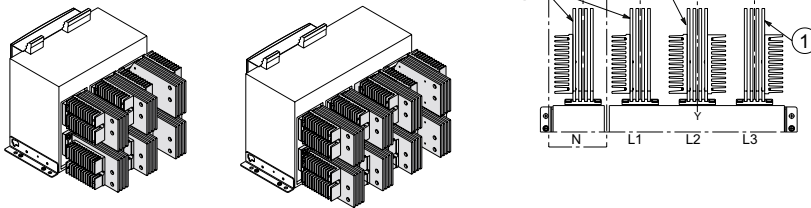
Fixed circuit breaker - E4.2

Vertical rear terminals - VR

E4.2 S-A, H-A, V-A 3600A

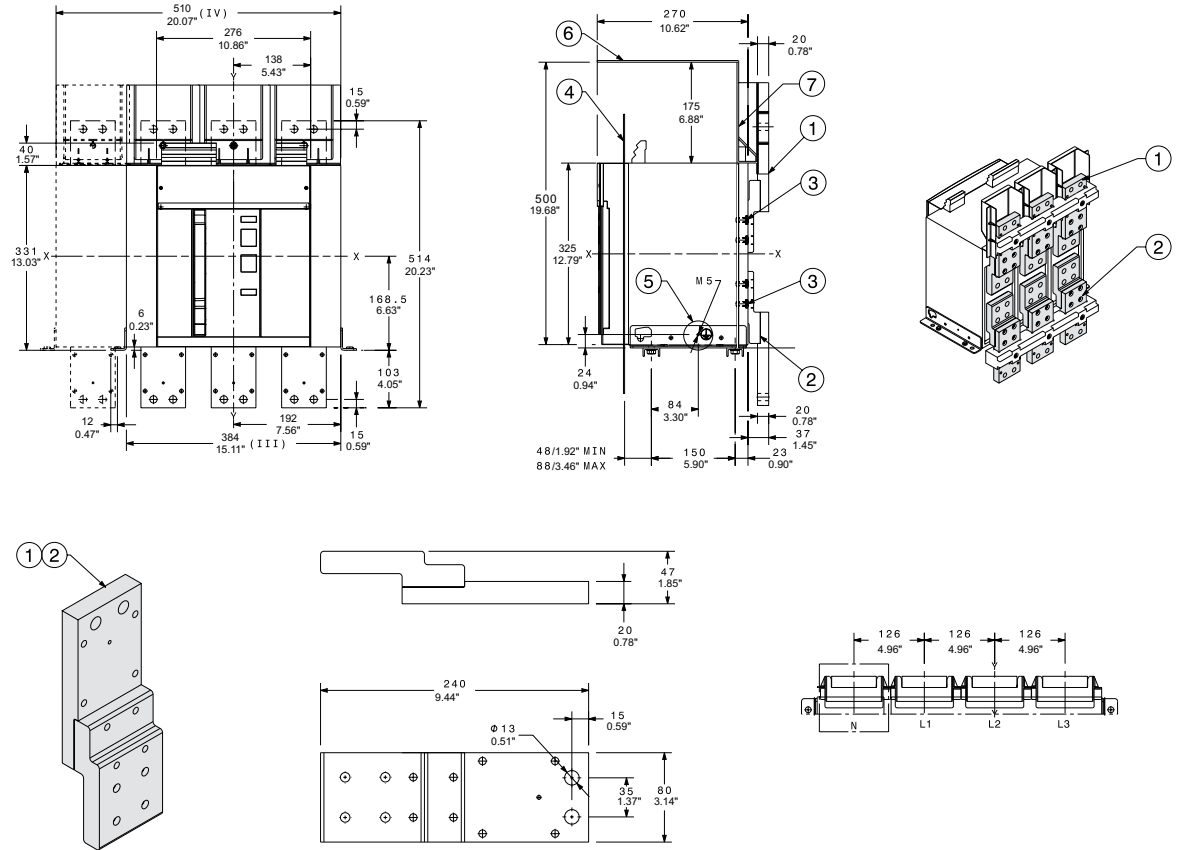


- Key**
- 1 Lateral vertical terminal 3600A (*)
 - 2 Central vertical terminal 3600A (*)
 - 3 Tightening torque 20 Nm - 177 lb in
 - 4 Door position - Ref. page 7/2
 - 5 Grounding
 - 8 Mounting outside feet screws recommend m10x25 high class 8.8 or couple superior tightening torque 40 nm - 354 lb in compulsory fixing screws from top
 - 9 Insulating sheet or insulated metallic sheet
 - 10 Metallic sheet
- (*) for applications with neutral pole on the right, terminals with double radiator must be installed at the left of y-y axis



Front terminals – F (not UL listed)

E4.2 S-A, H-A, V-A 800A - 3200A



- Key
- 1 Upper front terminals
 - 2 Lower front terminals
 - 3 Tightening torque
8.6Nm - 76lb in
 - 4 Door position -
Ref. page 7/2
 - 5 Earthing device -
Ref. page 7/3
 - 6 Metallic sheet
 - 7 Insulating sheet or
insulated metallic
sheet

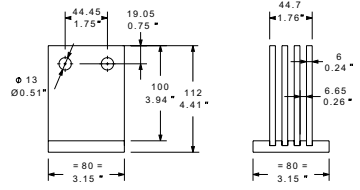
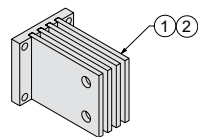
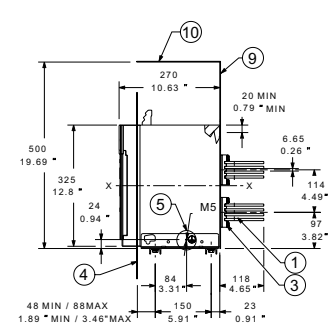
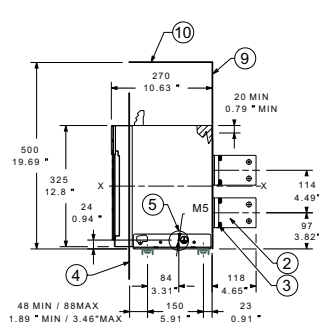
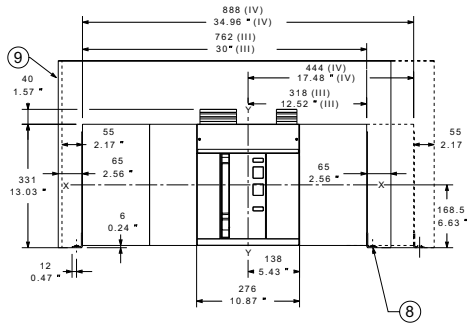
Fixed circuit breaker - E6.2

Orientable rear terminals - HR/VR

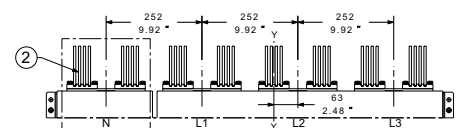
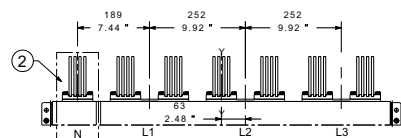
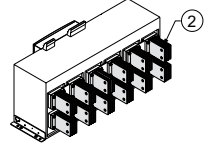
E6.2 H-A, V-A 4000A - 5000A

VR adjustment

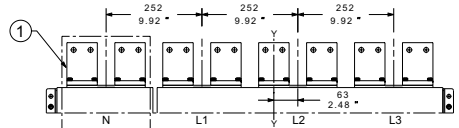
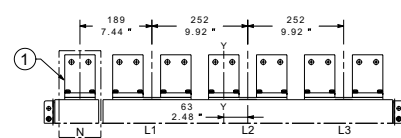
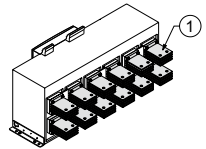
HR adjustment



VR adjustment



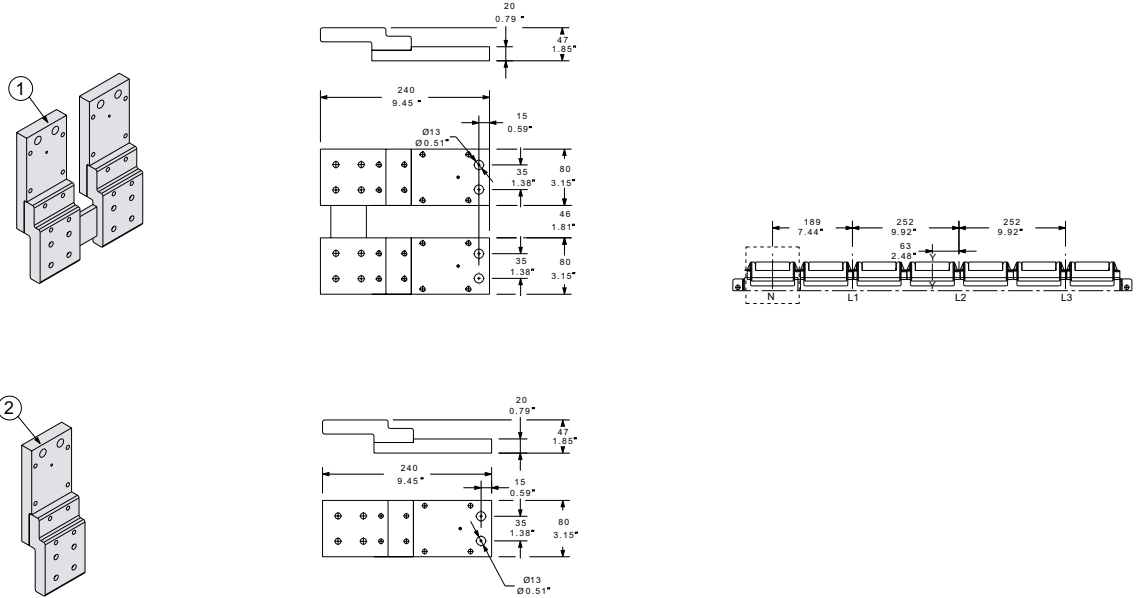
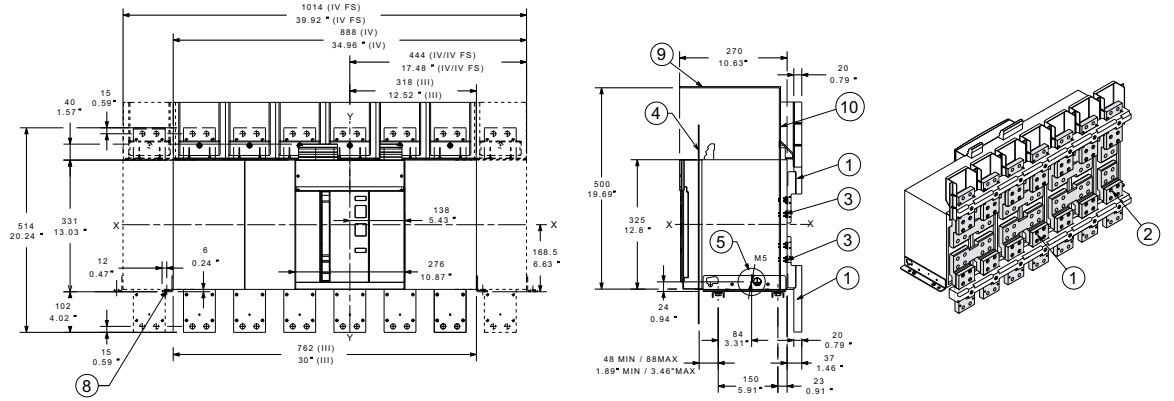
HR adjustment



- Key
- 1 Horizontal terminals 5000A
- 2 Vertical terminals 5000A
- 3 Tightening torque 20Nm - 177lb in
- 4 Door position
- 5 Grounding
- 6 Ferrule for grounding
- 7 Screws M5x8 provided Tightening torque 3Nm - 26lb in
- 8 Mounting outside feet
- 9 Insulating sheet or insulated metallic sheet
- 10 Metallic sheet

Front terminals – F (not UL listed)

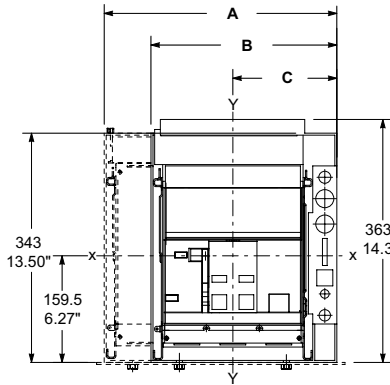
E6.2 H-A, V-A 4000A - 5000A



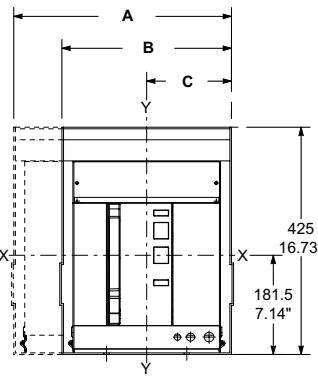
- Key
- 1 Upper and lower front terminals
 - 2 Single front terminals
 - 3 Tightening torque 20Nm - 177lb in
 - 4 Door position - Ref. page 7/2
 - 5 Grounding
 - 8 Mounting outside feet
 - 9 Metallic sheet
 - 10 Insulating sheet or insulated metallic sheet

Withdrawable circuit breaker

E1.2



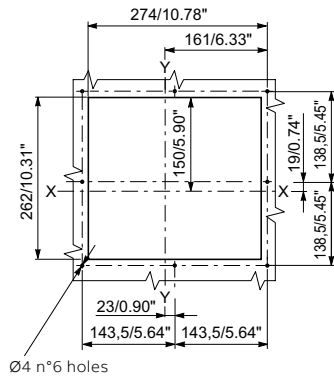
E2.2 - E4.2 - E6.2



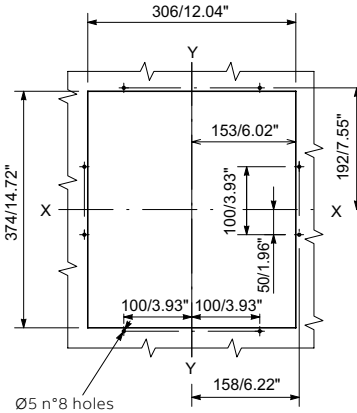
[mm/in]	A		B		C	
	4p	3p	3p	4p	3p	4p
E1.2	348/ 13.70	278/ 10.94	155.5/ 6.12	155.5/ 6.12		
E2.2	407/ 16.02	317/ 12.48	158.5/ 6.24	158.5/ 6.24		
E4.2	551/ 21.69	425/1 6.73	212.5/ 8.36	212.5/ 8.36		
E6.2	929/ 36.57	803/ 31.61	338.5/ 13.32	464.5/ 18.28		
E6.2/f	1055/ 41.53	-	-	464.5/ 18.28		

Compartment door drilling

E1.2

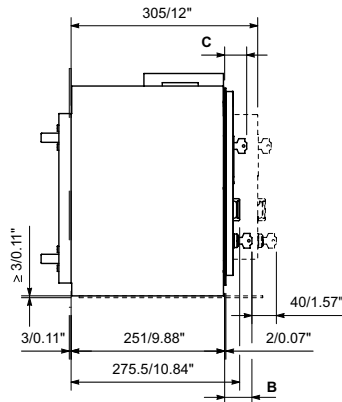


E2.2 - E4.2 - E6.2

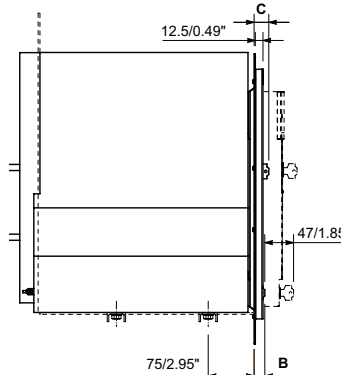


Distance from connected to isolated position

E1.2



E2.2 - E4.2 - E6.2

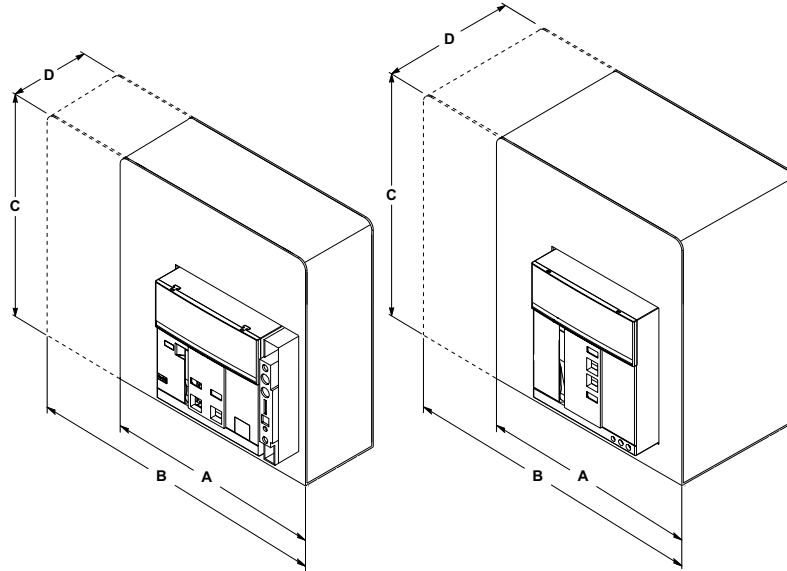


E1.2	Standard	Ronis/ Profalux	Kirk	Castell
A MIN	[mm/ 44.5/ in] 1.75	55/ 2.16	55/ 2.16	85
A MAX	[mm/ 36/ in] 1.41	46.5/ 1.83	46.5/ 1.83	76.5

E2.2- E4.2-E6.2	Standard	Ronis/ Profalux	Kirk	Castell
A MIN	[mm/ 22/ in] 0.86"	34/ 1.33"	39/ 1.53"	57.5/ 2.26"
A MAX	[mm/ 23/ in] 0.90"	35/ 1.37"	40/ 1.57"	58.5/ 2.30"

B refers to KLC; C refers to KLP

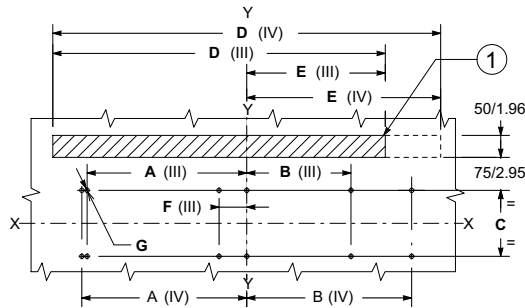
Dimensions of the compartment



[mm/in]	A	B	C	D
	3p	4p		
E1.2	280/ 11.02	350/ 13.77	440/ 17,32	252/ 9.92
E2.2	400/ 15.74	490/ 19.29	440/ 17,32	355/ 13.97
E4.2	500/ 19.68	620/ 24.41	440/ 17,32	355/ 13.97
E6.2	900/ 35.43	1020/ 40.16	440/ 17,32	355/ 13.97
E6.2/f	-	1200/ 47.24	440/ 17,32	355/ 13.97

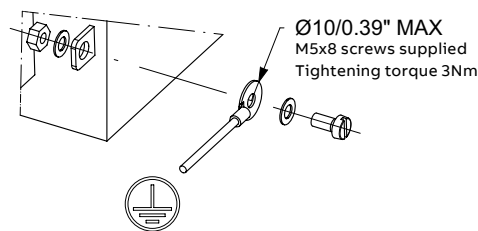
Floor fixing

- Key
- 1 Ventilation drilling on the switchgear

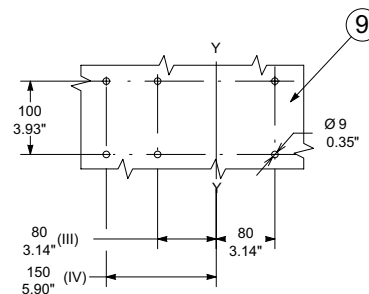


	A		B		C	D		E		F	G
[mm/in]	3p	4p	3p	4p		3p	4p	3p	4p		
E1.2	80/3.14	150/5.90	80/3.14	80/3.14	100/3.93	-	-	-	-	-	9/0.35
E2.2	75/2.95	175/6.88	75/2.95	75/2.95	150/5.90	270/10.62	360/14.17	135/5.31	135/5.31	-	10/0.39
E4.2	100/3.93	225/8.85	100/3.93	100/3.93	150/5.90	378/14.88	504/19.84	189/7.44	189/7.44	-	10/0.39
E6.2	363/14.29	375/14.76	237/9.33	375/14.76	150/5.90	756/29.76	882/34.72	315/12.40	441/17.36	63/2.48	10/0.39
E6.2/f	-	425/16.73	-	425/16.73	150/5.90	-	1008/39.68	-	441/17.36	-	10/0.39

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



Fixing on support sheet (only for E1.2)

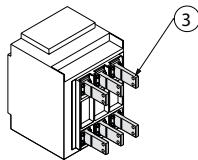
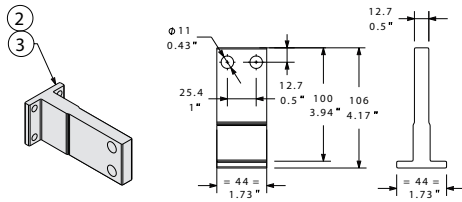
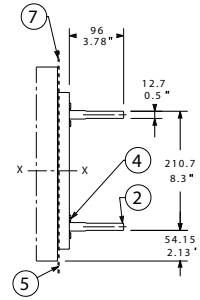
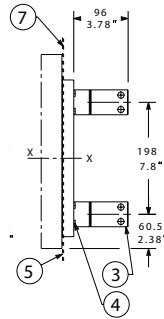
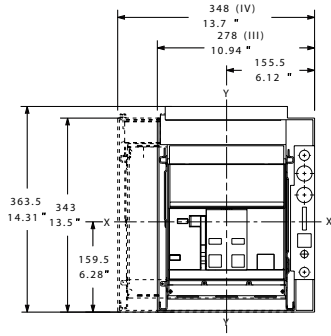


Withdrawable circuit breaker - E1.2

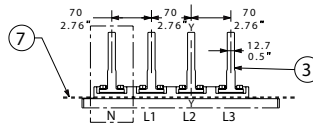
Orientable rear terminals - HR/VR

VR adjustment

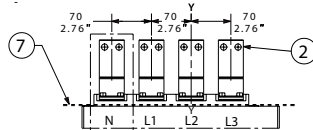
HR adjustment



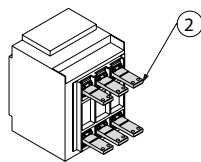
VR adjustment



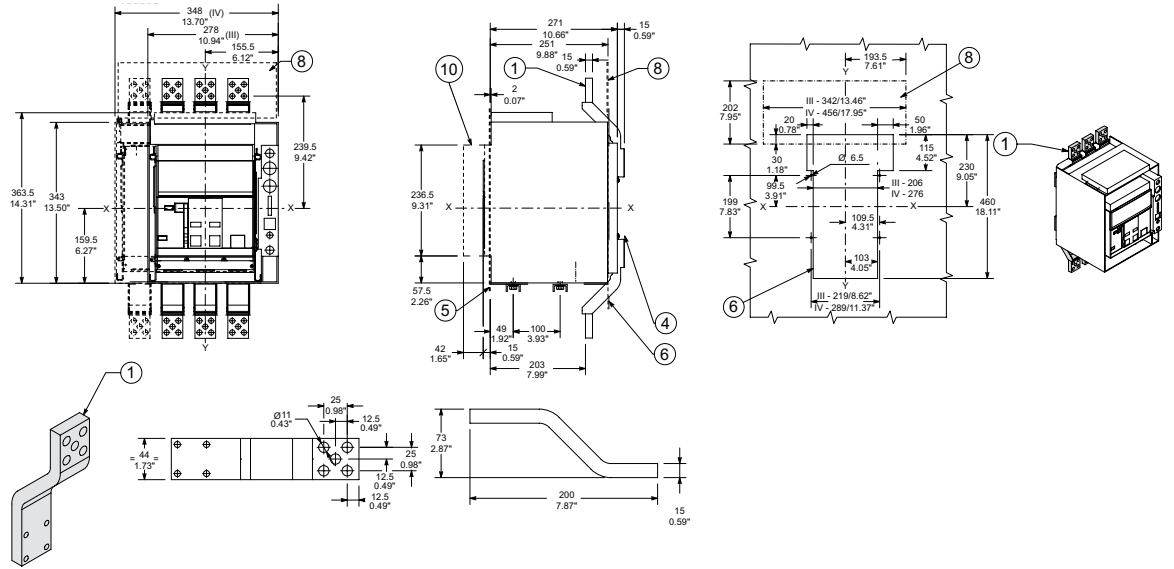
HR adjustment



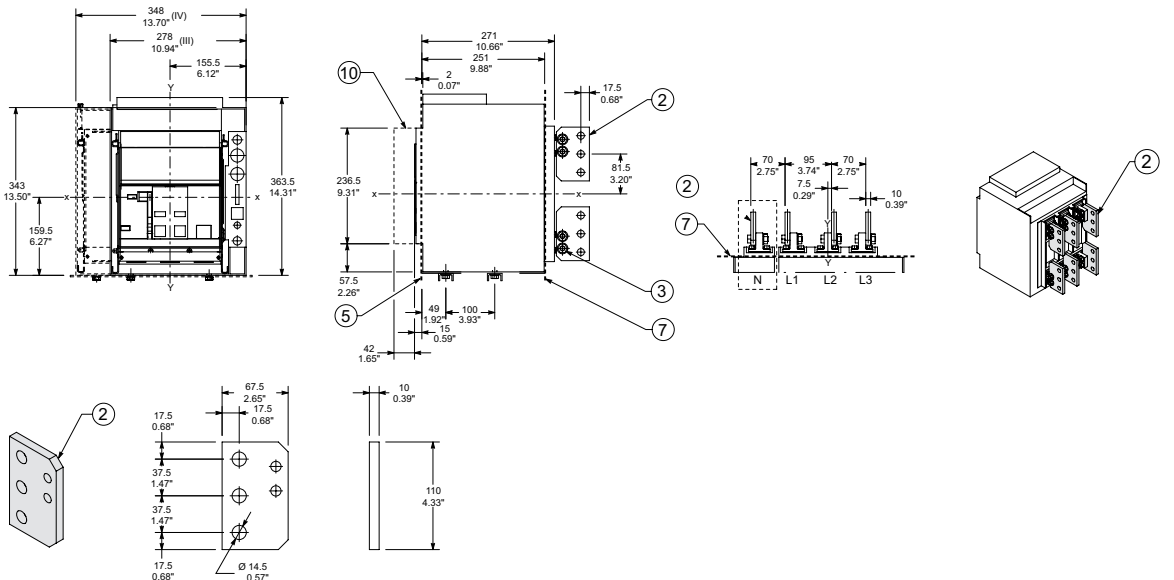
- Key
- 2 Horizontal rear terminals
- 3 Vertical rear terminals
- 3 Tightening torque 12 Nm - 106lb in
- 5 Door position - Ref. page 7/12
- 7 Rear segregation for rear terminals
- 8 Insulating Protection



Extended front terminals – EF (not UL listed)



Rear terminals for cables – FcCuAl (not UL listed)

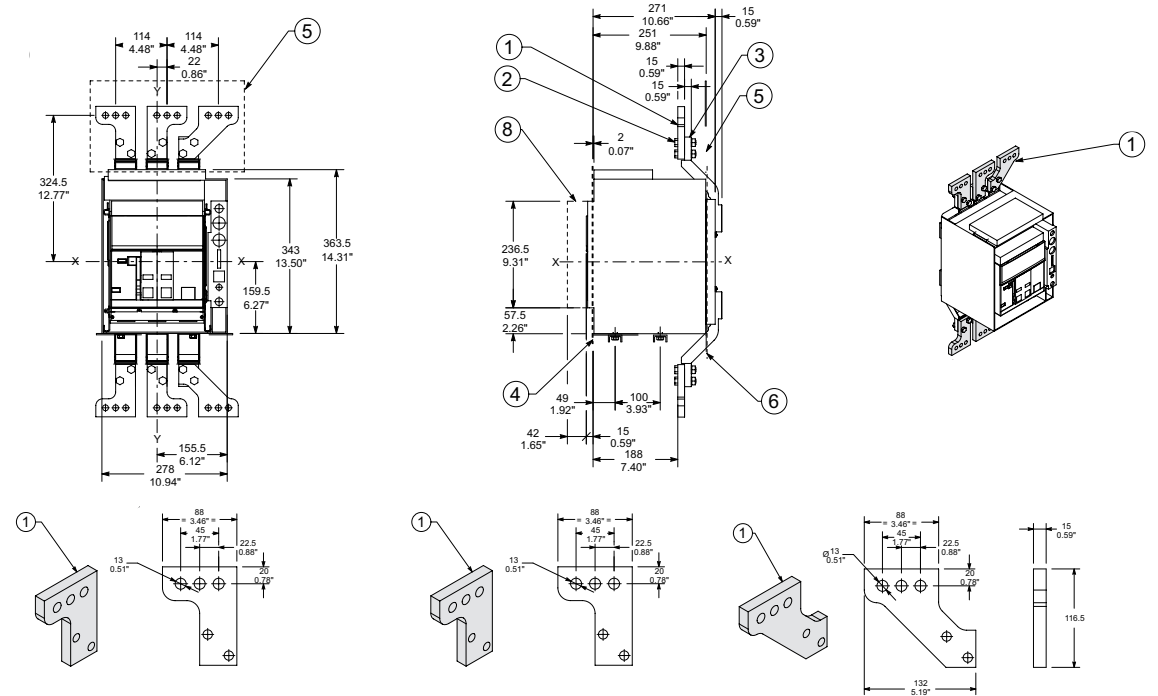


- Key
- 1 Front terminals
 - 2 Rear terminals for cables
 - 3 Tightening torque 48 Nm - 424lb in
 - 4 Tightening torque 12 Nm - 106lb in
 - 5 Door position - Ref. page 7/12
 - 6 Rear segregation for front terminals
 - 7 Rear segregation for rear terminals - Ref. page 7/15
 - 8 Insulating protection
 - 10 Sectioning run

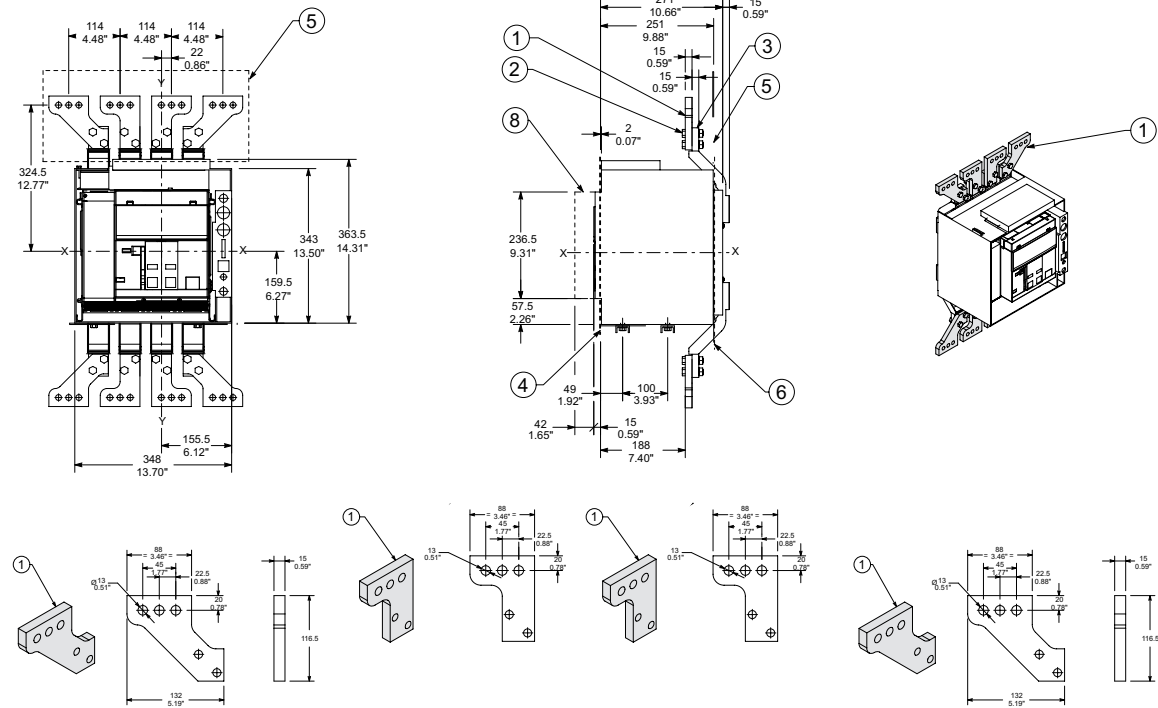
Withdrawable circuit breaker - E1.2

Front spread terminals - ES (not UL listed)

3-pole version



4-pole version

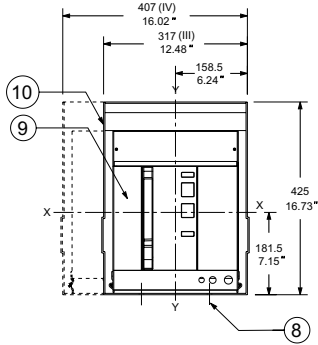


- Key
- 1 Spread terminal
 - 2 Tightening torque 40 Nm - 353lb in
 - 3 Front terminal
 - 4 Door position - Ref. page 7/12
 - 5 Insulating protection (refer to front terminals page 7/15)
 - 6 Rear segregation for front terminals - Ref. page 7/15
 - 8 Sectioning run

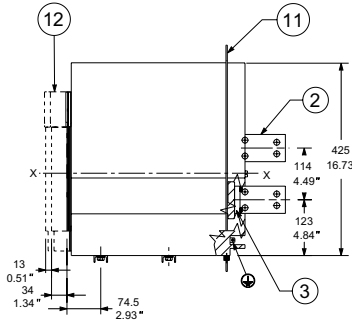
Withdrawable circuit breaker - E2.2

Orientable rear terminals - HR/VR

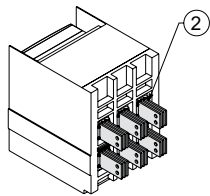
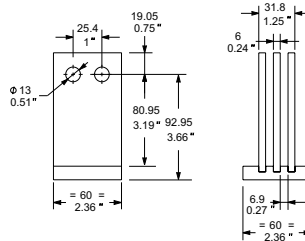
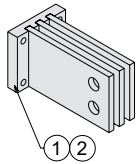
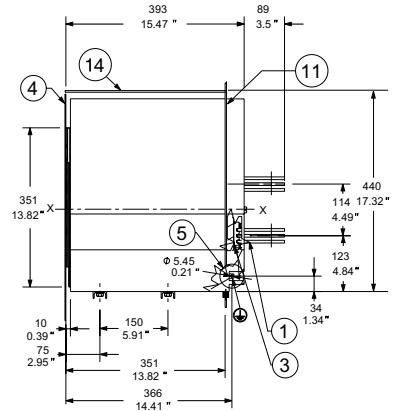
**E2.2 B-A, N-A, S-A, H-A,
V-A 250A - 2000A**



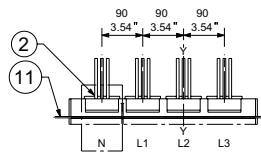
VR adjustment



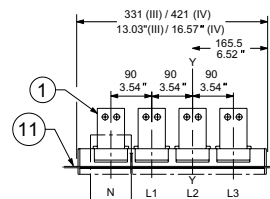
HR adjustment



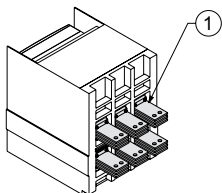
VR adjustment



HR adjustment



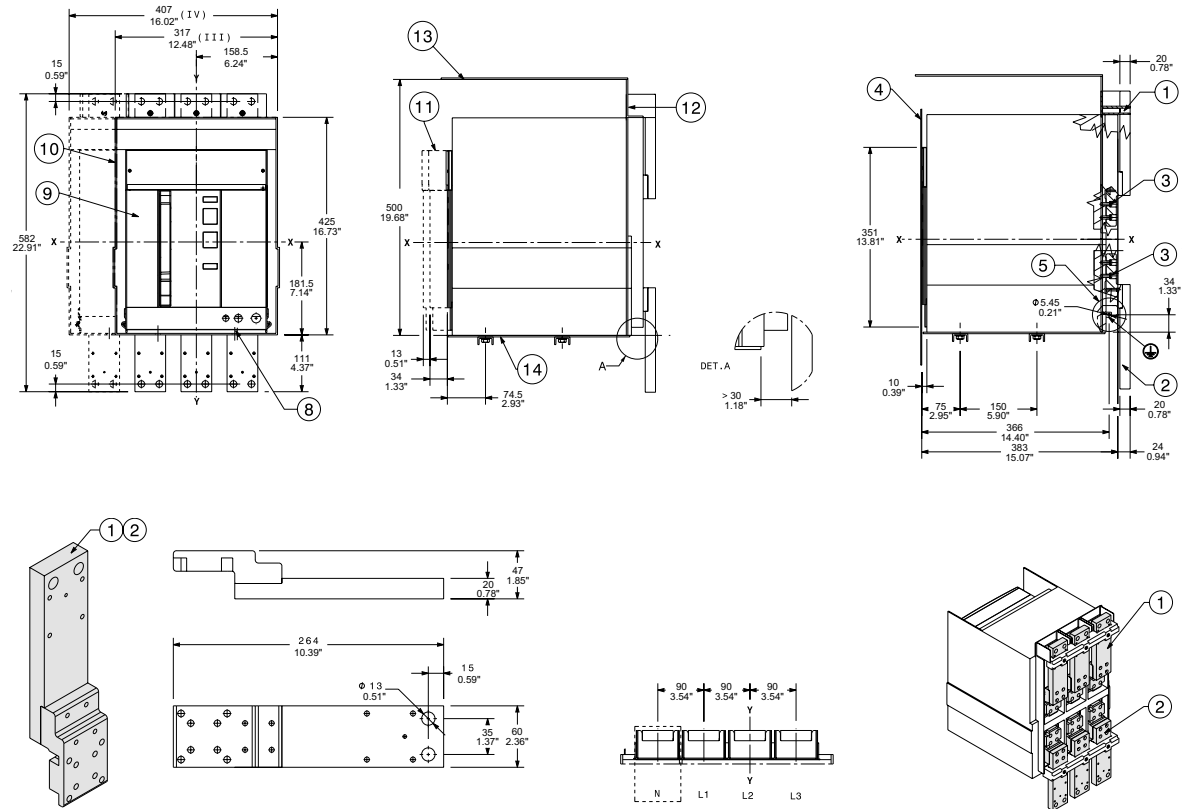
- Key
- 1 Horizontal terminals
1600A-2000A
 - 2 Vertical terminals
1600A-2000A
 - 3 Tightening torque
8.6Nm - 76lb in
 - 4 Door position -
Ref. page 7/13
 - 5 Grounding
 - 8 Mounting fixed part
screws
 - 9 Moving part
 - 10 Fixed part
 - 11 Segregation
 - 12 Connected, test,
disconnected
distances
 - 14 Metallic sheet



Withdrawable circuit breaker - E2.2

Front terminals – F (not UL listed)

E2.2 B-A, N-A, S-A, H-A, V-A 250A - 2000A



Key

- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque
8.6Nm - 76lb in
- 4 Door position -
Ref. page 7/13
- 5 Earthing device
- 8 External fixing point.
Recommended screws
M10x25 high class
- 9 Moving part
- 10 Fixed part
- 11 Connected, test, dis-
connected distances
- 12 Insulating sheet or in-
sulated metallic sheet
- 13 Roof insulation or
insulated metal
- 14 Fixing plate

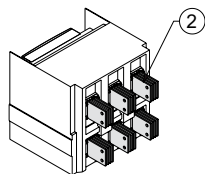
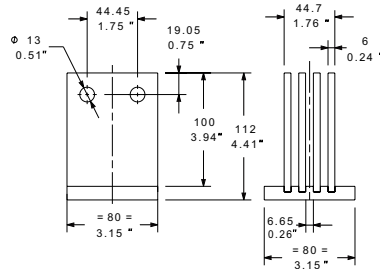
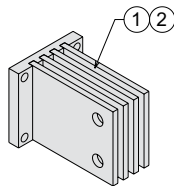
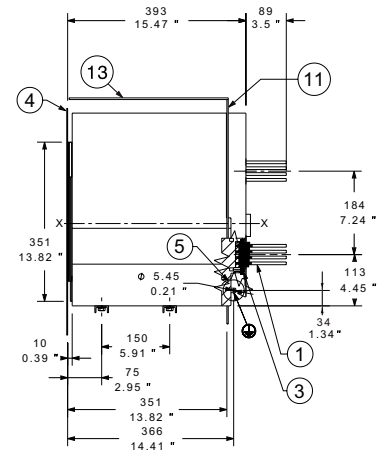
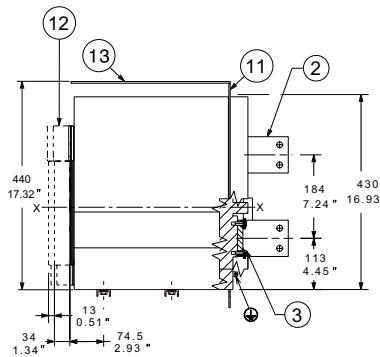
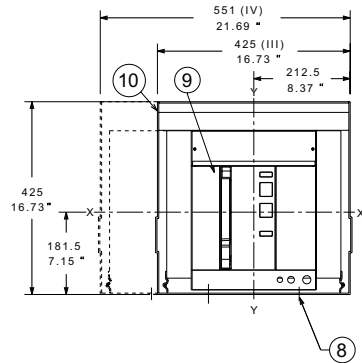
Withdrawable circuit breaker - E4.2

Orientable rear terminals - HR/VR

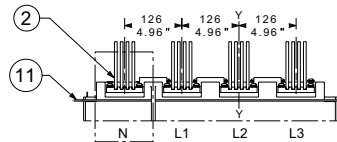
E4.2 S-A, H-A, V-A 800A - 2500A

VR adjustment

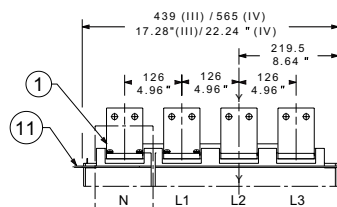
HR adjustment



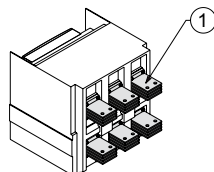
VR adjustment



HR adjustment



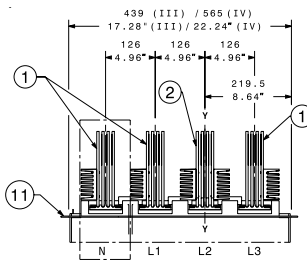
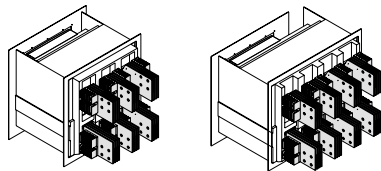
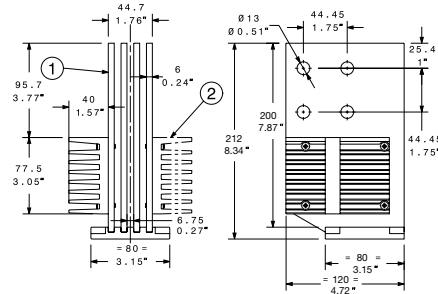
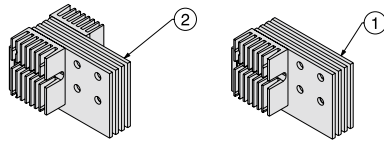
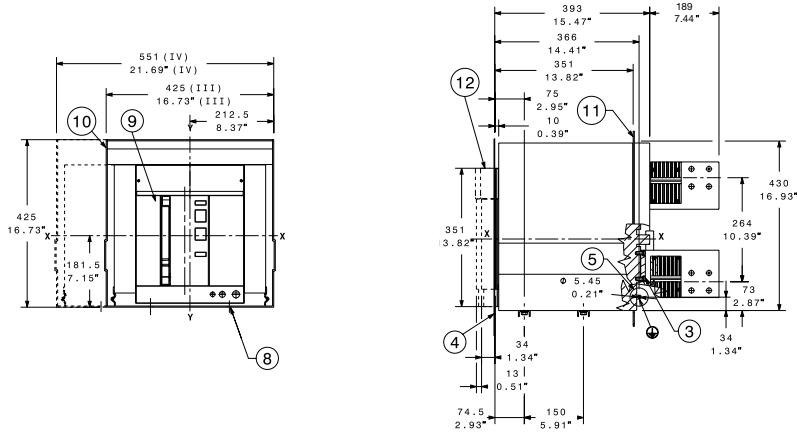
- Key
- 1 Horizontal terminals 2500A
 - 2 Vertical terminals 2500A
 - 3 Tightening torque 20Nm - 177lb in
 - 4 Door position - Ref. page 7/13
 - 5 Grounding
 - 8 Mounting fixed part screws
 - 9 Moving part
 - 10 Fixed part
 - 11 Segregation
 - 12 Connected, test, disconnected distances
 - 13 Roof insulation or insulated metal



Withdrawable circuit breaker - E4.2

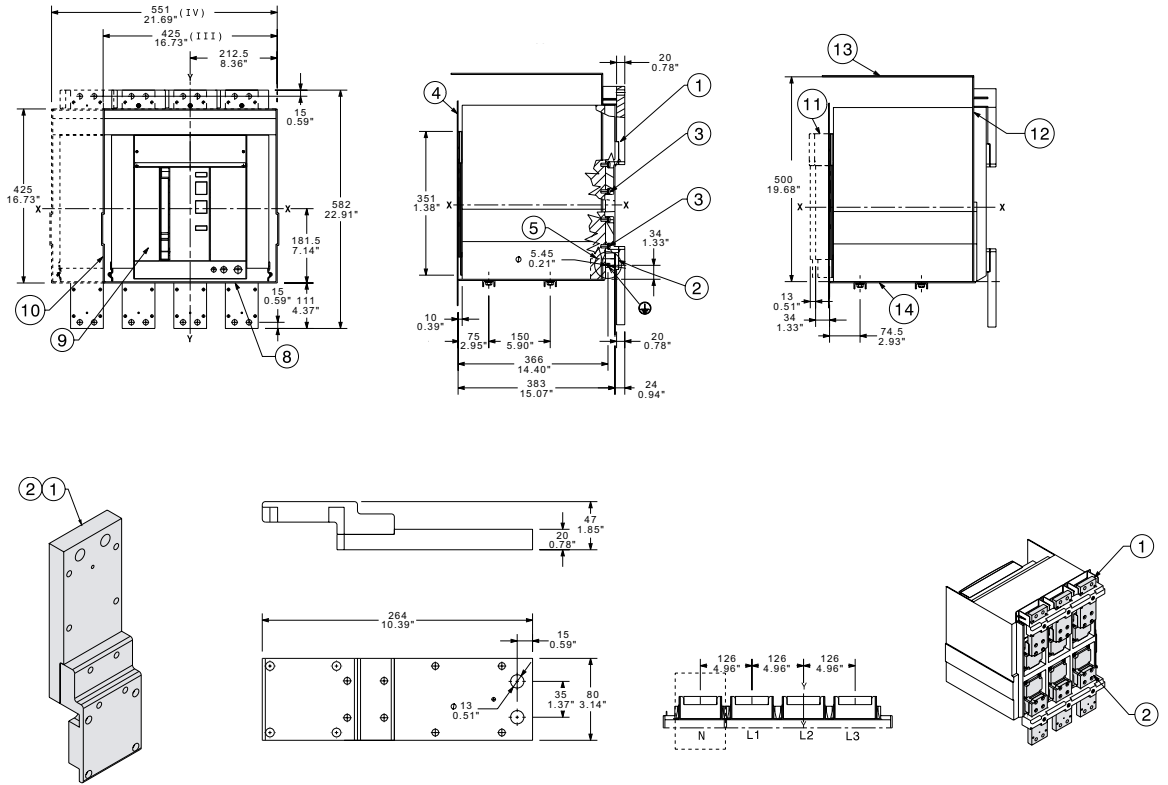
Rear terminals VR

E4.2 S-A, H-A, V-A 3200A



Front terminals – F (not UL listed)

E4.2 S-A, H-A, V-A 800 - 3200A



- Key
- 1 Upper front terminals
 - 2 Lower front terminals
 - 3 Tightening torque
20Nm - 176lb in
 - 4 Door position -
Ref. page 7/13
 - 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

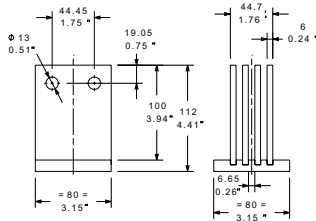
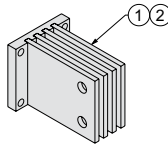
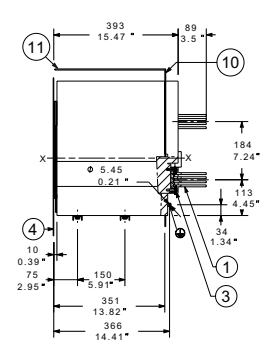
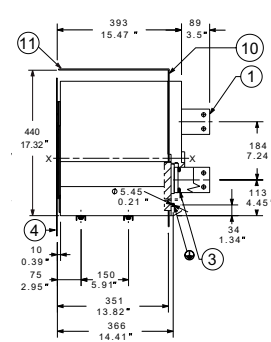
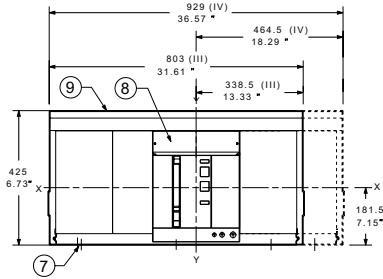
Withdrawable circuit breaker - E6.2

Orientable rear terminals - HR/VR

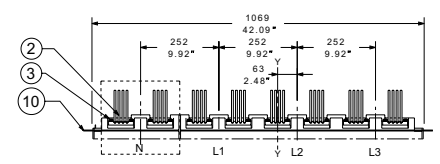
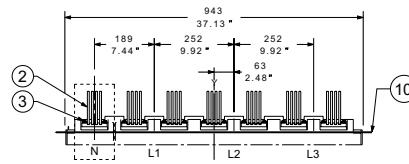
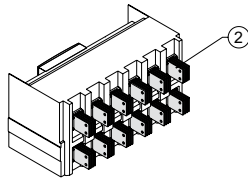
E6.2 H-A, V-A 4000A - 5000A

VR adjustment

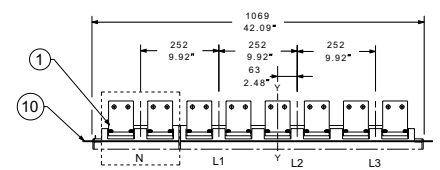
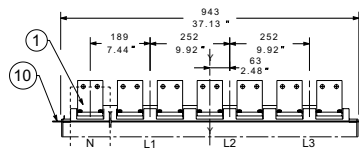
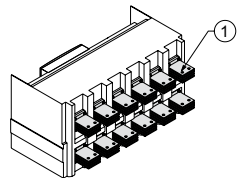
HR adjustment



VR adjustment



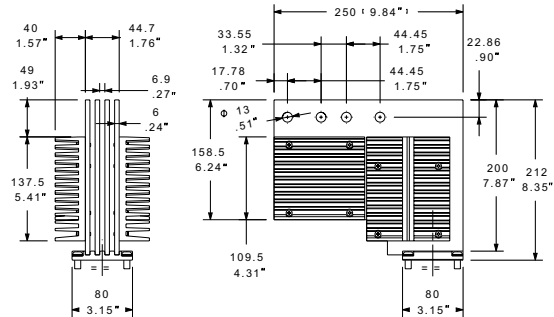
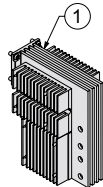
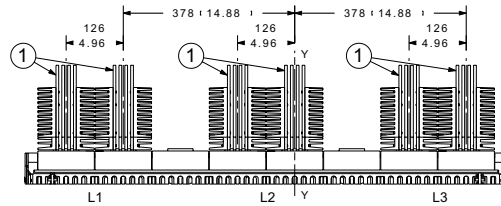
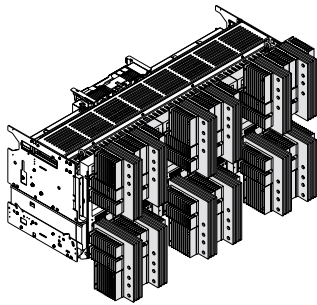
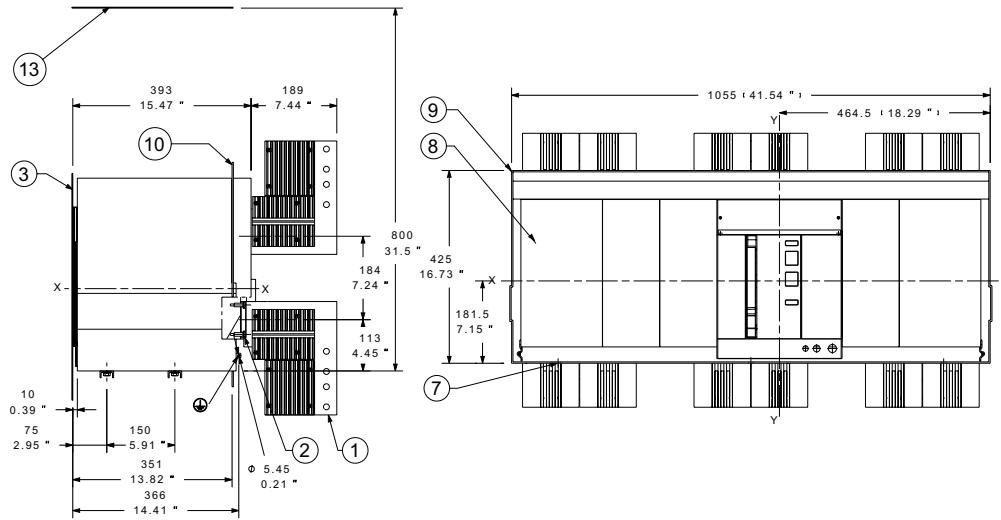
HR adjustment



- Key
- 1 Horizontal terminals 5000A
 - 2 Vertical terminals 5000A
 - 3 Tightening torque 20Nm - 177lb in
 - 4 Door position
 - 7 Mounting fixed part screws M8x25 provided
Tightening torque 20Nm - 177lb in
 - 8 Moving part
 - 9 Fixed part
 - 10 Segregation
 - 11 Roof insulation or insulated metal

Vertical terminals – VR

E6.2 H-A, V-A 6000A

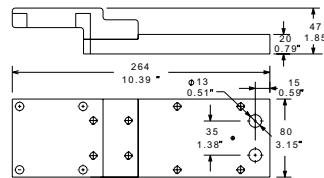
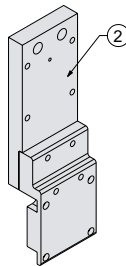
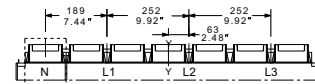
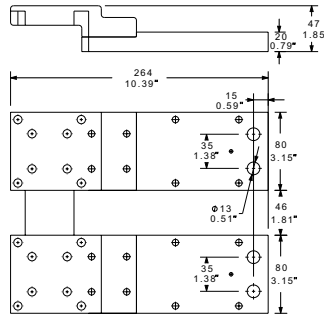
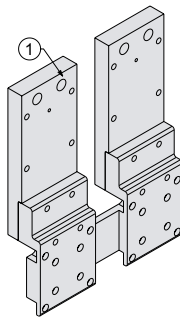
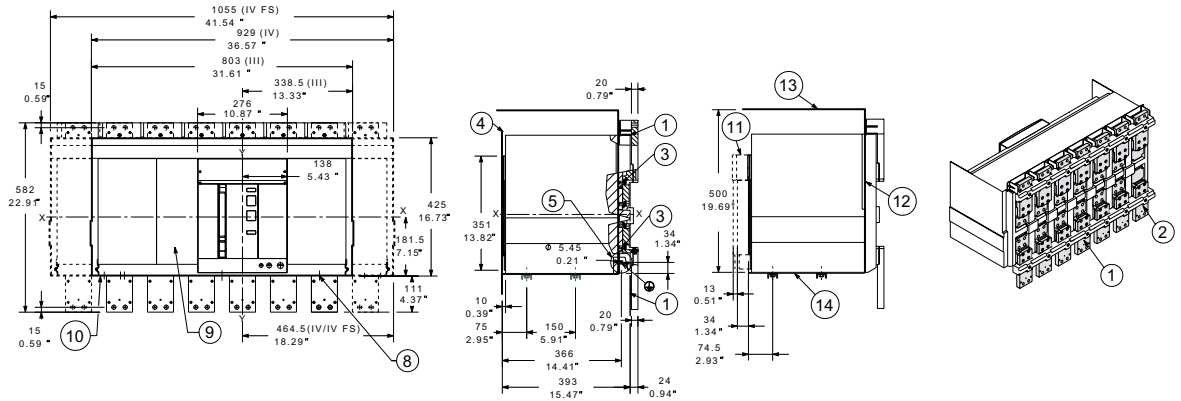


- Key
- 1 Terminal 6000A
 - 2 Tightening Torque
20 Nm - 177 Lb In
 - 3 Door position
 - 7 Mounting fixed
part screws M8x25
provided
Tightening torque
20Nm - 177lb in
 - 8 Moving part
 - 9 Fixed part
 - 10 Segregation
(When Provided)
 - 13 Metallic Sheet

Withdrawable circuit breaker - E6.2

Front terminals – F (not UL listed)

E6.2 H-A, V-A 4000A - 5000A



Key

- 1 Upper and lower front terminals
- 2 Single front terminals
- 3 Tightening torque
20Nm - 177lb in
- 4 Door position - Ref.
page 7/2
- 5 Grounding
- 8 Mounting fixed part
- 9 Moving part
- 10 Fixed part
- 11 Connected, test,
disconnected distance
- 12 Insulating sheet or
insulated metallic
sheet
- 13 Roof insulation or
insulated metal
- 14 Fixing plate

CHAPTER 9

Electrical diagrams

174-178	Reading information
174-178	Circuit breakers
179-179	Circuit breakers
180-180	Terminal box E1.2
181-181	Terminal box E2.2 - E4.2 - E6.2
182-207	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) Ekip Measuring/Measuring Pro with voltage socket inside the four pole circuit breaker
- 21) Ekip Measuring/Measuring Pro with voltage sockets inside the three-pole circuit breaker and connection for external neutral
- 22) Ekip Measuring Pro for residual voltage protection (for Ekip G only)
- 23) Ekip Measuring/Measuring Pro with external voltage socket
- 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) 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
- 60) Ekip Com Open ADR
- 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)

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Reading information

Circuit breakers

Key			
*	= See the note indicated by the letter	O 01...32	= Programmable signalling contacts of the EKIP protection trip unit
A1	= Applications located on the mobile part of the circuit breaker	O SC	= EKIP protection trip unit contact for synchronism control
A3	= Applications located on the fixed part of the circuit breaker	Q	= Circuit breaker
A4	= Indicative devices and connections for control and signalling, outside the circuit breaker	Q/1...Q/25	= Auxiliary contacts of circuit- breaker
BUS1	= Serial interface with external bus	Q/26...Q/27	= Auxiliary open/close contacts used internally by the trip unit
D	= Electronic time-lag device of YU undervoltage coil, outside the circuit breaker	RC	= RC (residual current) protection sensor
F1	= Time-delayed trip fuse	RT1...RT3	= Temperature sensors
GZi(DBi)	= Zone selectivity input for G protection or input in "reverse" direction for D protection	RTC EKIP	= Auxiliary ready to close contact of circuit breaker, used internally by the trip unit
GZo(DBo)	= Zone selectivity output for G protection or output in "reverse" direction for D protection	RTC	= Contact for signalling circuit-breaker is ready to close
I 01...32	= Programmable digital inputs of the EKIP protection trip unit	S33M/1...2	= Limit contacts of spring loading motor
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	S43	= Switch for presetting remote/local control
K51/COM	= Communication module	S51	= Trip signalling contact
K51/MEAS	= Measurement module	S75E/1...4	= Contacts for signalling circuit- breaker in racked-out position (provided only with withdrawable version)
K51/SIGN	= Signalling module	S75I/1...5	= Contacts for signalling circuit- breaker in racked-in position (provided only with withdrawable version)
K51/SUPPLY	= Optional auxiliary supply module (110-220VAC/DC and 24-48VDC)	S75T/1...2	= Contact for signalling circuit-breaker in test position (provided only with withdrawable version)
K51/SYNC	= Synchronization module	SC	= Pushbutton or contact for closing the circuit-breaker
K51/YC	= Closing control from the EKIP protection trip unit	SO	= Pushbutton or contact for immediate opening of the circuit-breaker
K51/YO	= Opening control from the EKIP protection trip unit	SO1	= Pushbutton or contact for opening the circuit-breaker with time-delayed trip
M	= Motor for loading closing springs	SR	= Pushbutton or contact for electrical resetting of S51trip contact

SZi(DFi)	= Input for zone selectivity for S protection or input in "direct" direction for S protection	YC	= Closing coil
SZo(DFo)	= Output for zone selectivity for S protection or output in "direct" direction for D protection	YC2	= Second closing coil
TI/L1	= Current transformer phase L1	YO	= Opening coil
TI/L2	= Current transformer phase L2	YO1	= Opening coil for overcurrent
TI/L3	= Current transformer phase L3	YO2	= Second opening coil
TI/N	= Current transformer on neutral	YR	= Coil for electrical resetting of trip contact S51
TU1...TU2	= Insulation voltage transformer (outside circuit breaker)	YU	= Undervoltage coil
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 (local bus)		
W9...W13	= RJ45 connector for communication modules		
W9R.W11R	= RJ45 connector for redundant communication modules		
X	= Delivery connector for auxiliary circuits for withdrawable version of circuit breaker		
XB1...XB7	= Connectors for circuit breaker applications		
XF	= Delivery terminal board for position contacts of withdrawable version of circuit breaker		
XK1...XK3	= Connectors for auxiliary circuits of the EKIP protection trip unit		
XK7	= Connector for auxiliary circuits of communication module		
XV	= Delivery terminal box for auxiliary circuits of fixed version circuit-breaker		

Reading information

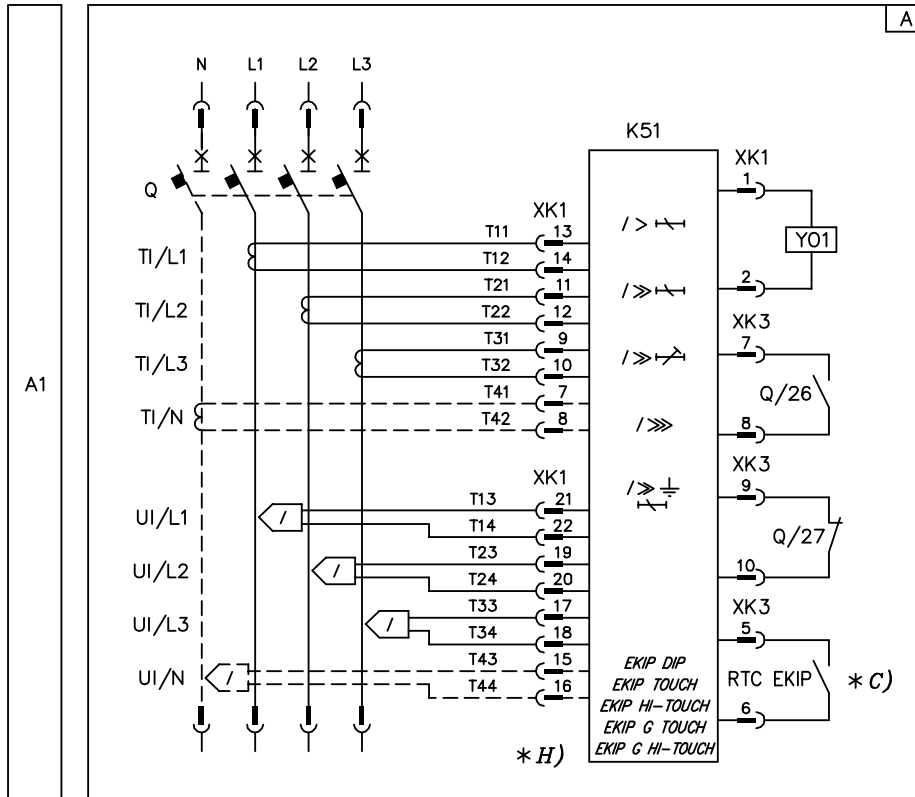
Circuit breakers

Notes

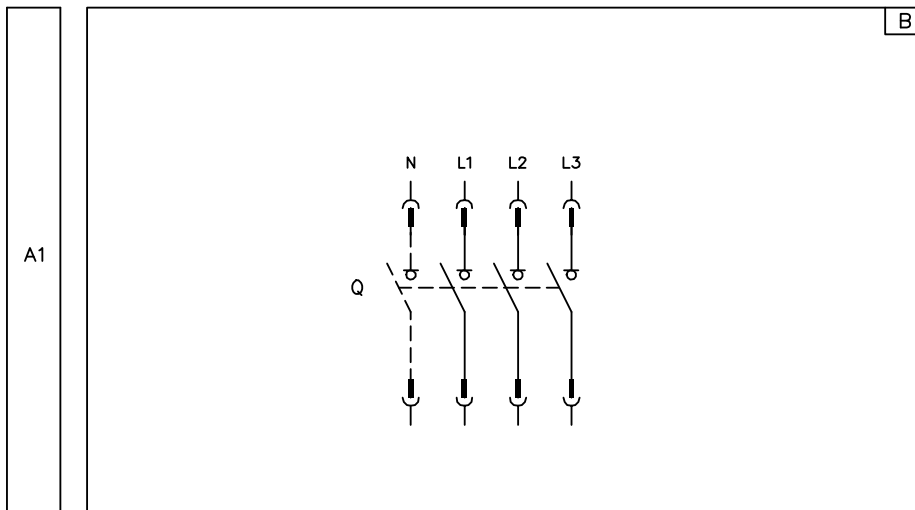
- A) Auxiliary supply for Ekip trip unit is mandatory (refer to diagram 1SDM00009R0001 figures 31 - 32- 33 - 34).
- B) When there are mixed auxiliary contacts Q1 and Q2 are 400V, while Q3 and Q4 are 24V. Then Q5, Q6, Q7 are 400V, while Q8, Q9, Q10 are 24V.
- C) Always supplied with Ekip Com module.
- 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.
- K) 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 S75I/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 Ω 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

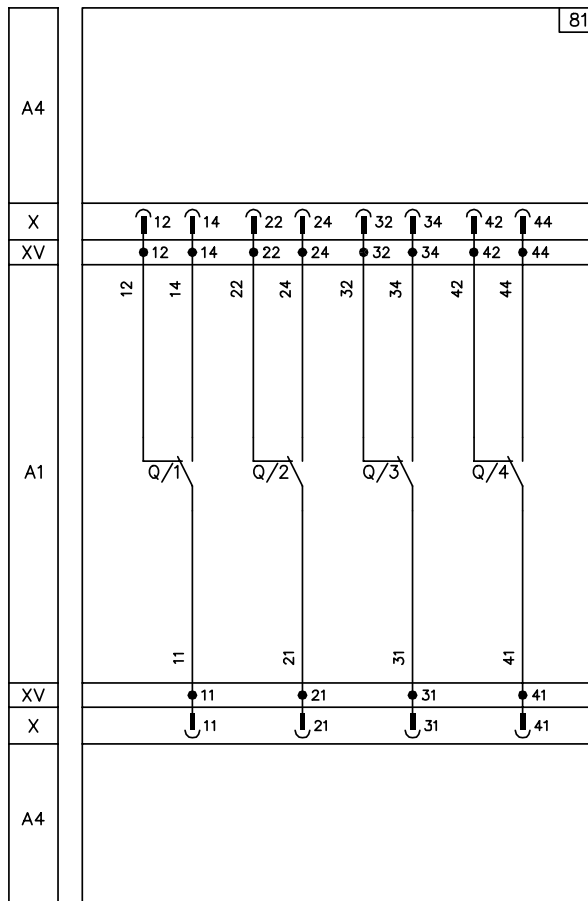


Electrical accessories

51	81	71	81	91	01	95	35		R1	V3	Vn	Ge+	Szi	Ne-					45	D1	C1	C11	C21	11	21	31	41	
52	82	72	82	92	02	96	36	U1	R2	V2	Rct	Ge-	Szo	Ne+	W3	K1			46		C3	C13		12	22	32	42	
54	84	74	84	94	04	98	38	U2		V1	Gzo	Szo	Gzi	Rca	W4	K2			48	D2	C2	C12	C22	14	24	34	44	
Q5...Q10 EKIP Signalling 4K						S51	S33	M	YR	Trip Unit I/O				EKIP Supply		Module	Module	Module	RTC	YU	YO2	YC	YO	YC2	Q1	Q2	Q3	Q4

11	21	31	41
12	22	32	42
14	24	34	44
Q1	Q2	Q3	Q4

81) Open/closed auxiliary contacts of circuit-breaker - AUX 4Q (4 Form C)



*B)

51	81	71	81	91	01	95	35		R1	V3	Vn	Ge+	Szi	Ne-					45	D1	C1	C11	C21	11	21	31	41
62	72	82	92	02	H4	96	36	U1	R2	V2	Rct	Ge-	Szo	Ne+	W3	K1			46		C3	C13		12	22	32	42
64	74	84	94	04	K6	98	38	U2		V1	Gzo	Szc	Gzi	Rca	W4	K2			48	D2	C2	C12	C22	14	24	34	44
Q5...Q10 Ekip Signalling 4K						S51	S33	M	YR	Trip Unit I/O				Ekip Supply		Module	Module	Module	RTC	YU YO2	YC	YO	YC2	Q1	Q2	Q3	Q4

45	D1	C1	C11	C21
46		C3	C13	
48	D2	C2	C12	C22
RTC	YU YO2	YC	YO	YC2

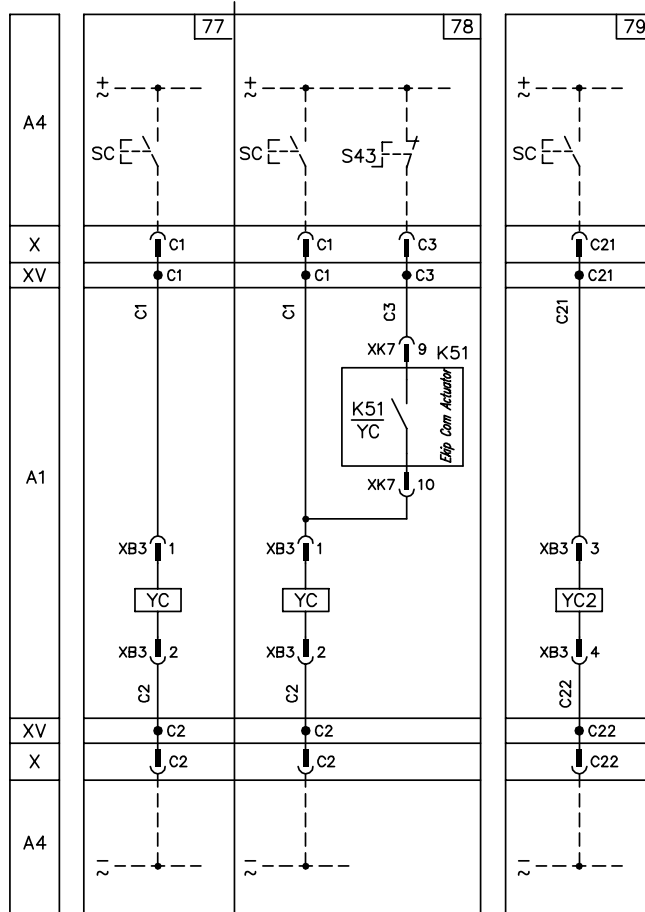
77) First closing coil - YC

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



*M)

Electrical accessories

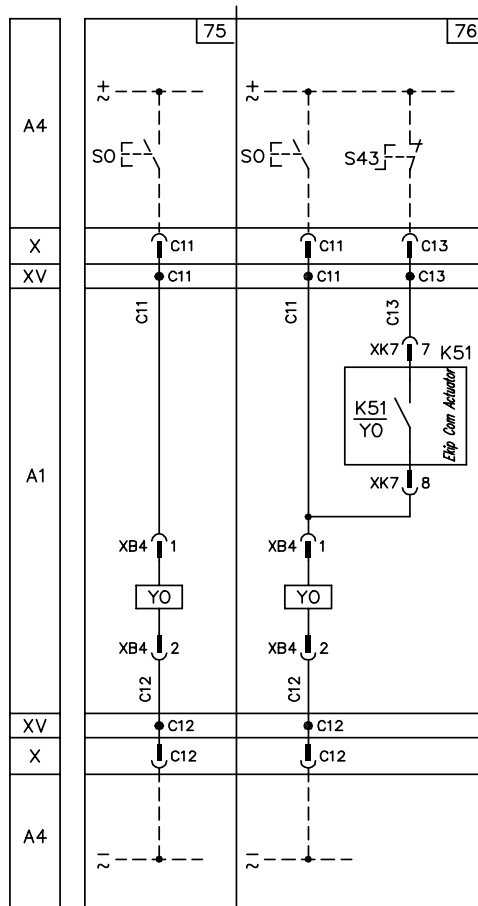
51	61	71	81	91	01	95	35		R1	V3	Vn	Ge+	Szi	Ne-	W3	K1					45	D1	C1	C11	C21	11	21	31	41
52	62	72	82	92	02	96	36	U1	R2	V2	Rct	Ge-	Szo	Ne+	W4	K2					46		C3	C13		12	22	32	42
54	64	74	84	94	04	98	38	U2		V1	Gzo	Szc	Gzi	Rca							48	D2	C2	C12	C22	14	24	34	44
Q5...Q10 Ekip Signalling 4K						S51	S33	M	YR	Trip Unit I/O					Ekip Supply		Module	Module	Module	RTC	YU YO2	YC	YO	YC2	Q1	Q2	Q3	Q4	

45	D1	C1	C11	C21
46		C3	C13	
48	D2	C2	C12	C22
RTC	YU YO2	YC	YO	YC2

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



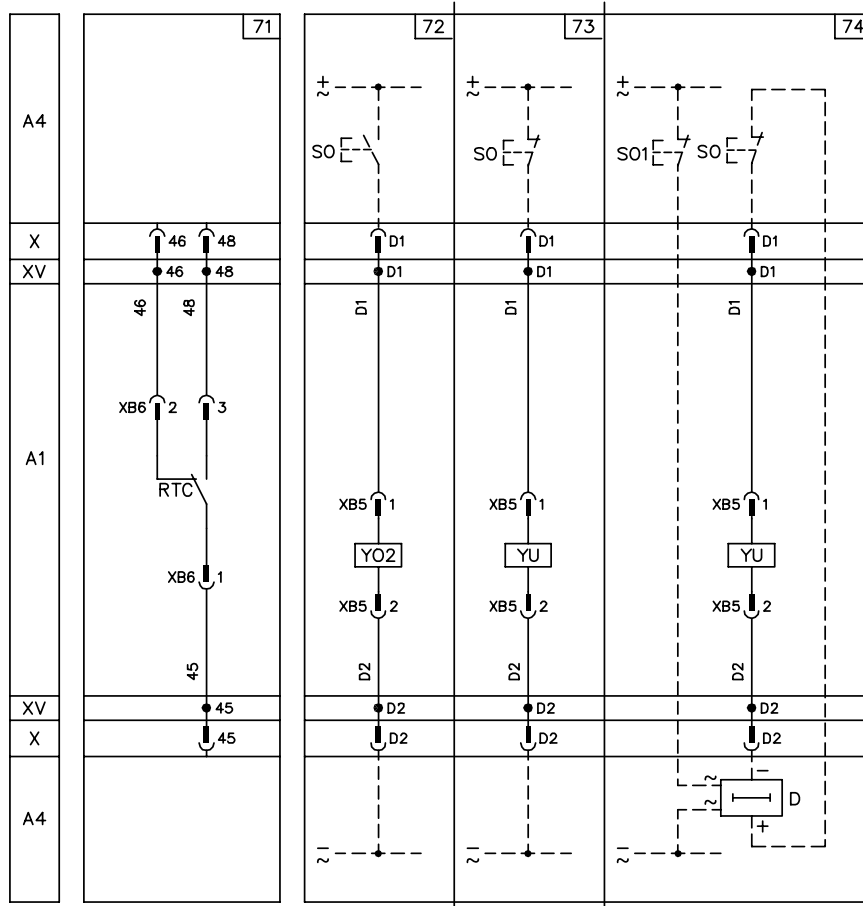
*M)

51	61	71	81	91	01	95	35		R1	V3	Vn	Ge+	Szi	Ne-						45	D1	C1	C11	C21	11	21	31	41		
52	62	72	82	92	02	96	36	U1	R2	V2	Rct	Ge-	Szo	Ne+						46		C3	C13		12	22	32	42		
54	64	74	84	94	04	98	38	U2		V1	Gzo	Szc	Gzi	Rca						48	D2	C2	C12	C22	14	24	34	44		
Q5...Q10 EKIP Signalling 4K						S51	S33	M	YR	Trip Unit I/O				EKIP Supply		Module		Module		Module		RTC	YU	YC	YO	YC2	Q1	Q2	Q3	Q4

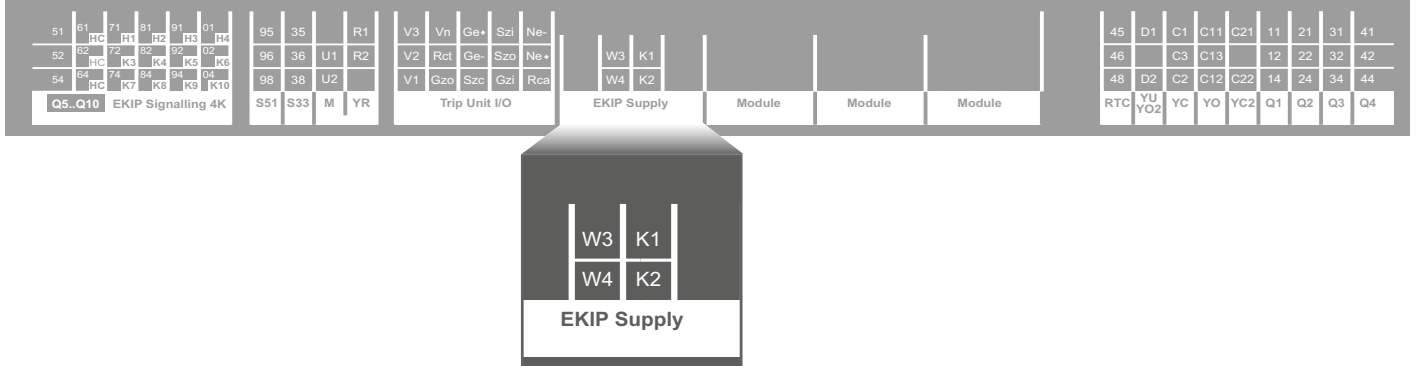
45	D1	C1	C11	C21
46		C3	C13	
48	D2	C2	C12	C22
RTC	YU	YC	YO	YC2

- 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

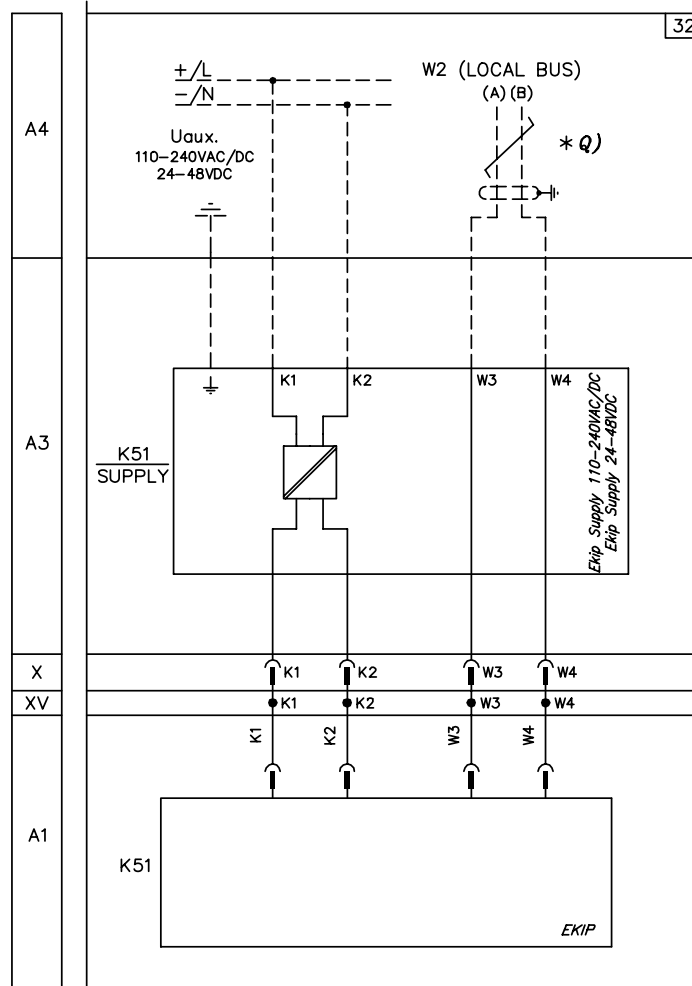


Electrical accessories

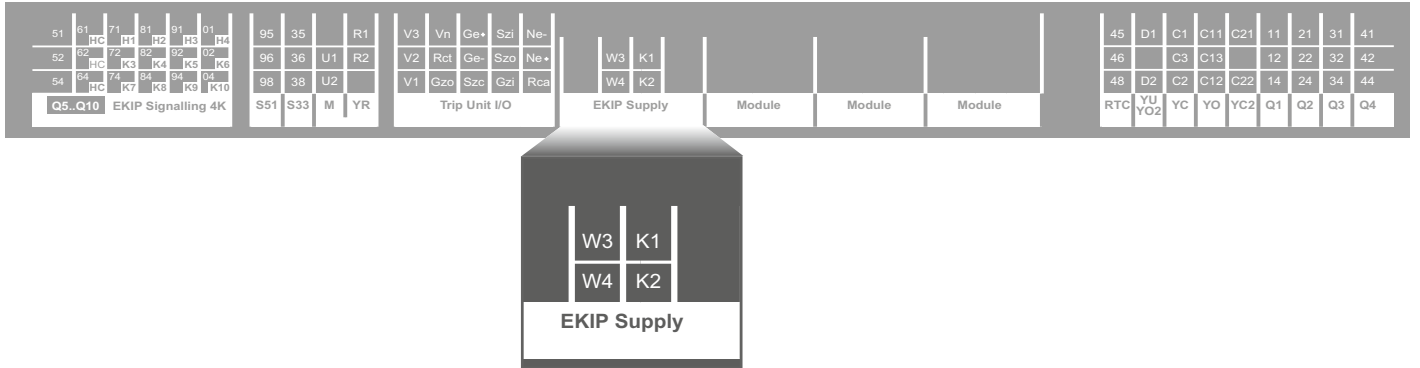


32) Auxiliary supply through module 110-240V AC/DC or 24-48V DC and local bus - Ekip Supply

As an alternative to figure 31

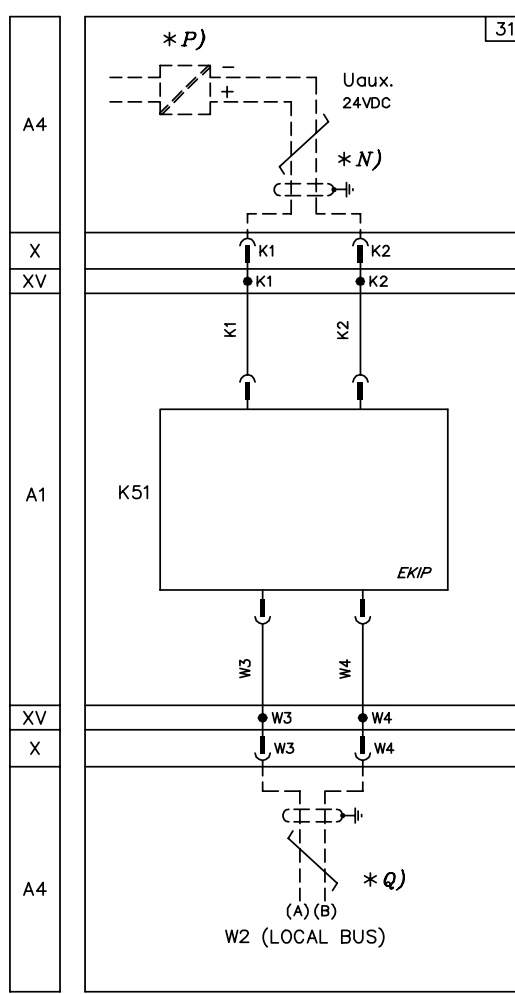


*A) *1)



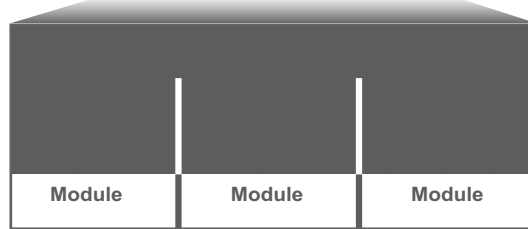
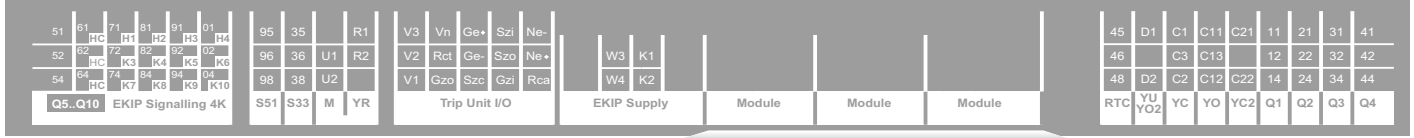
31) Direct auxiliary supply 24V DC and local bus - Ekip Supply

—
As an alternative
to figure 32



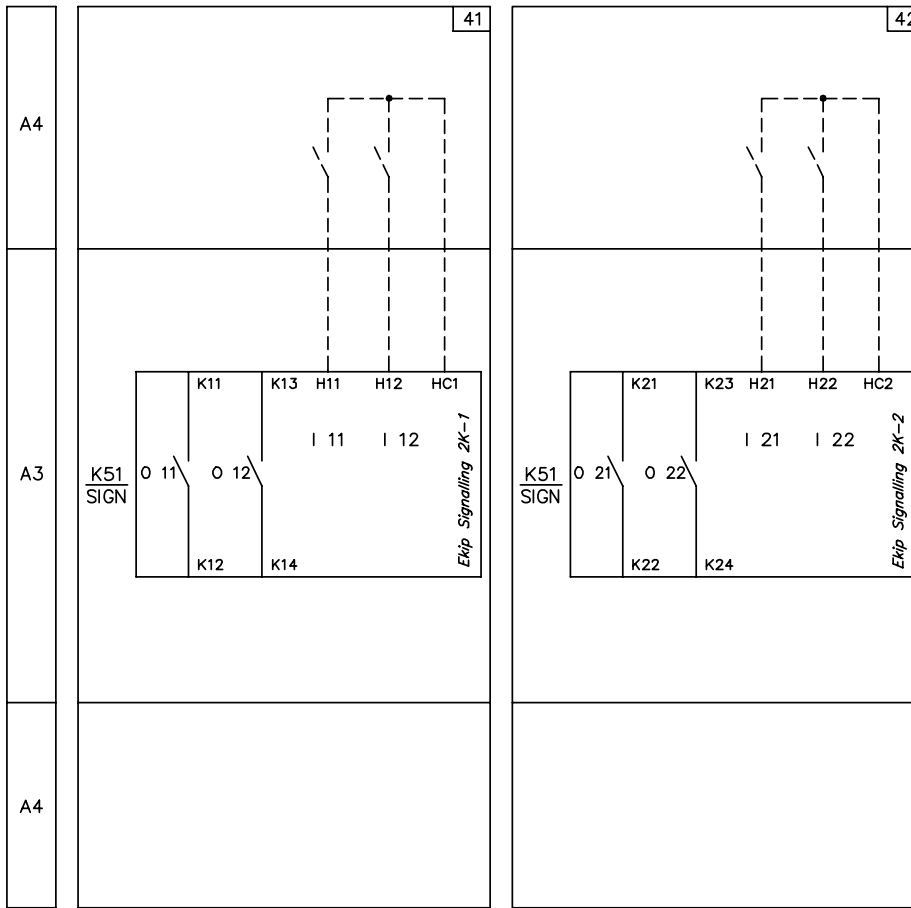
*A)

Electrical accessories



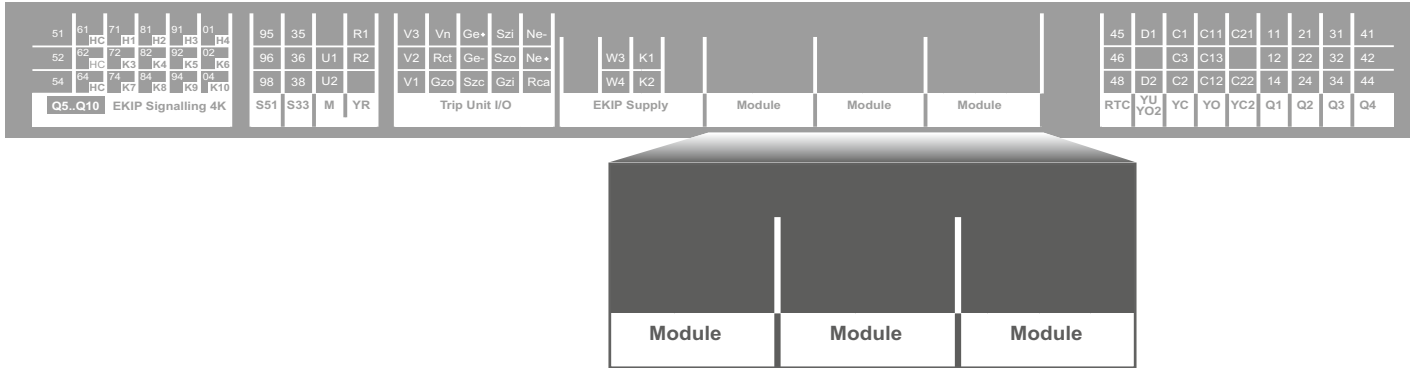
41) Ekip signalling 2K-1

42) Ekip signalling 2K-2



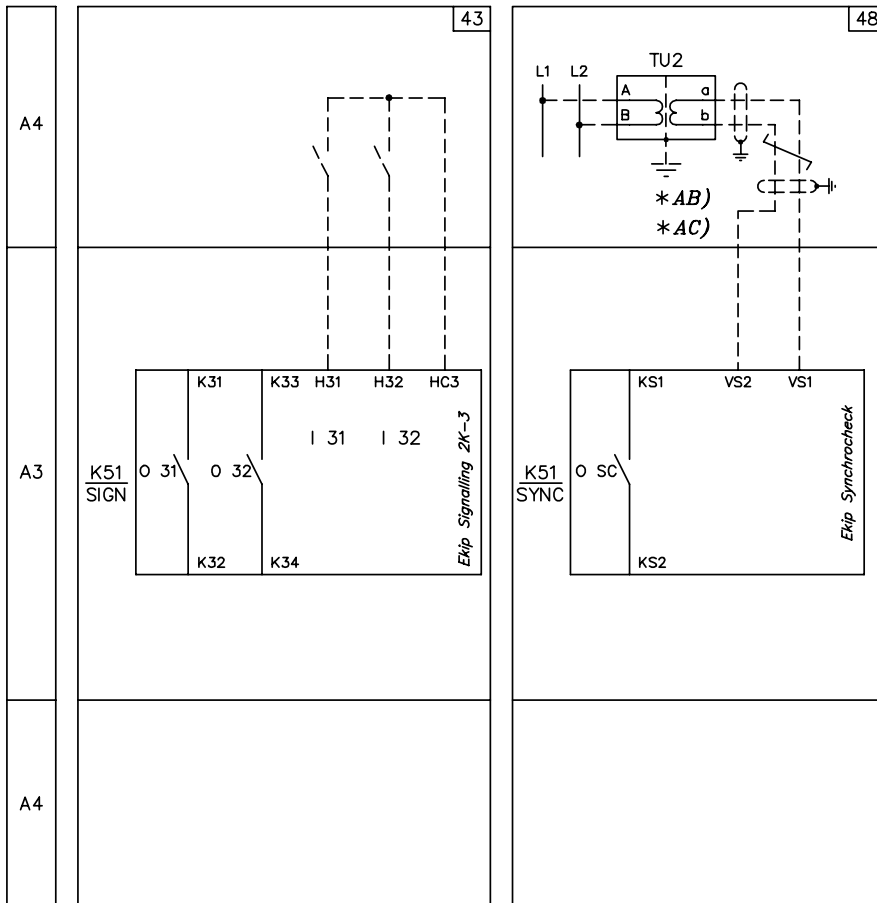
*L)

*L)



43) Ekip signalling 2K-3

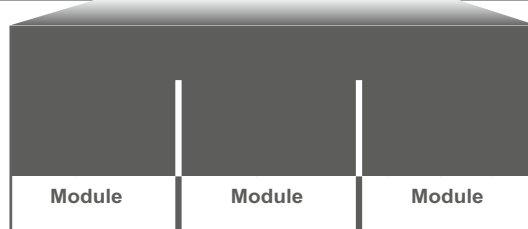
48) Ekip Synchrocheck



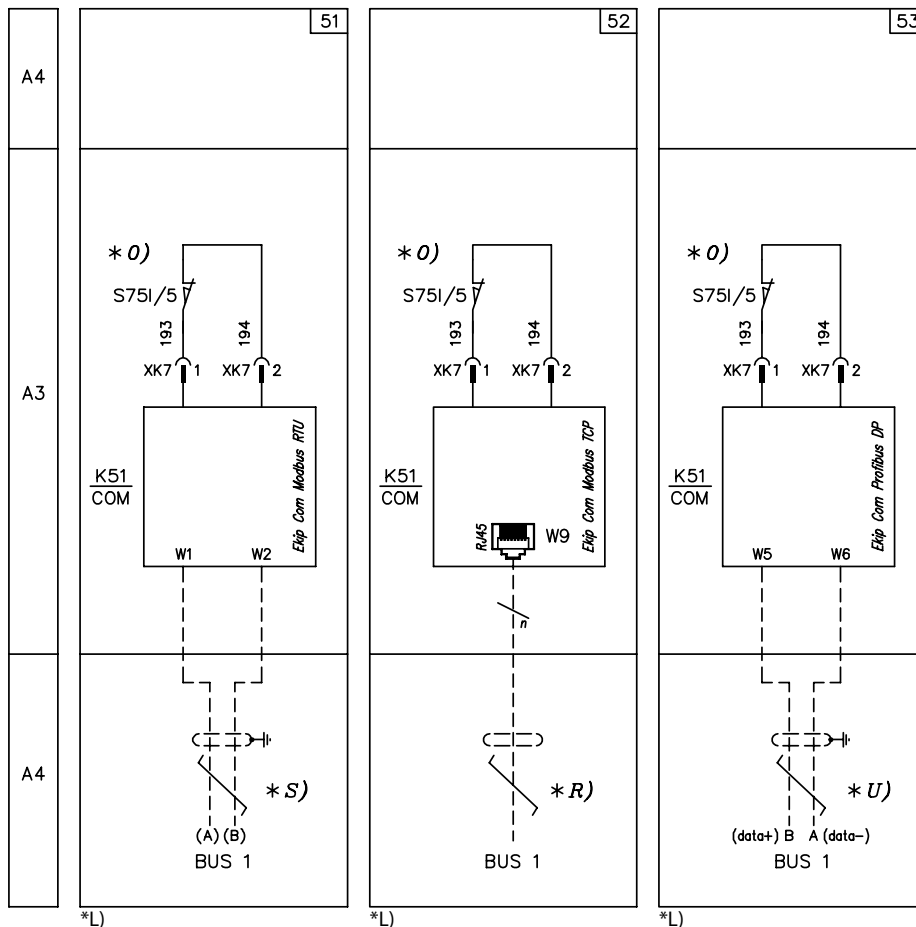
*L)

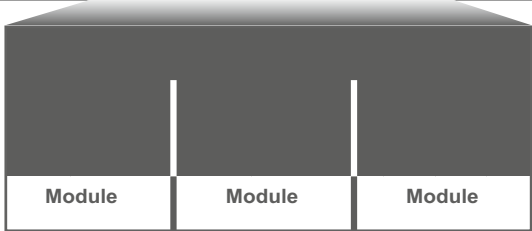
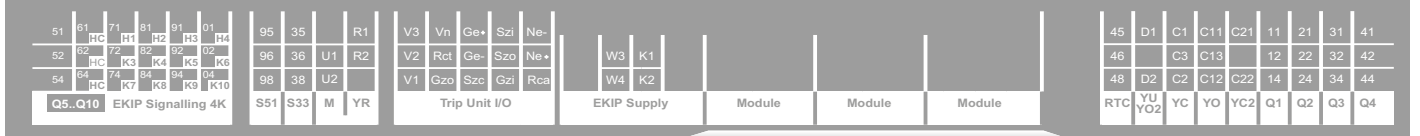
*L)

Electrical accessories

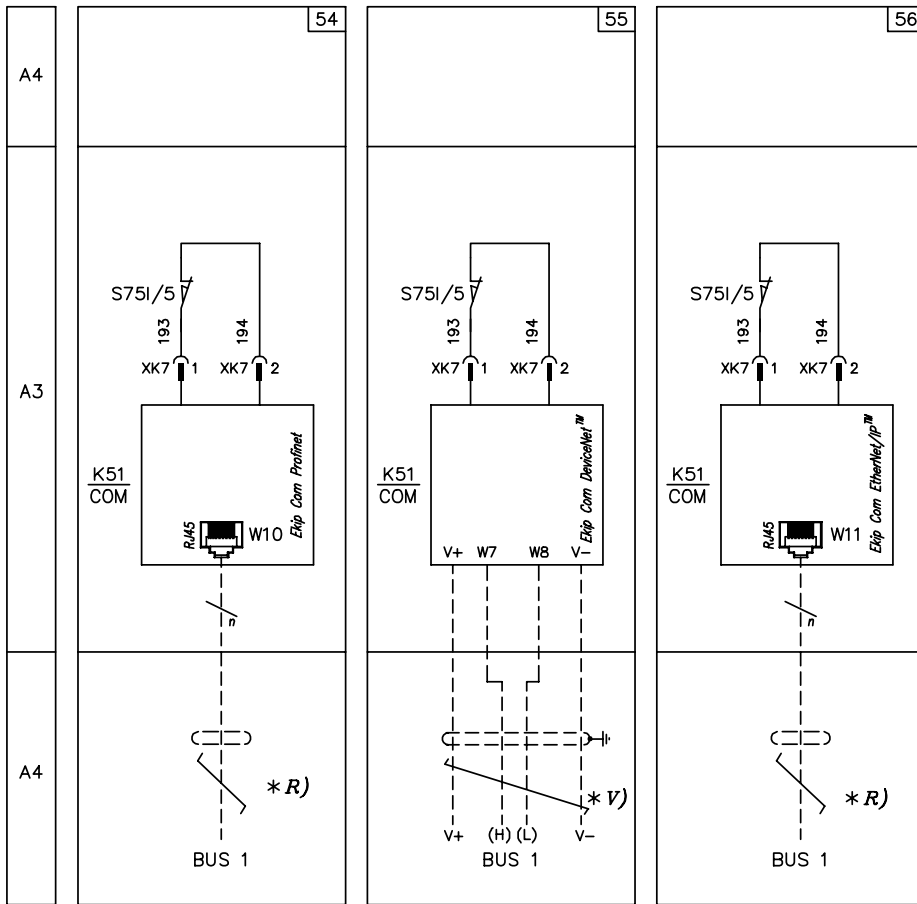


- 51) Ekip COM Modbus RS-485
- 52) Ekip COM Modbus TCP
- 53) Ekip COM Profibus





- 54) Ekip COM Profinet
- 55) Ekip COM DeviceNet™
- 56) Ekip COM EtherNet/IP™



*O) *L)

*O) *L)

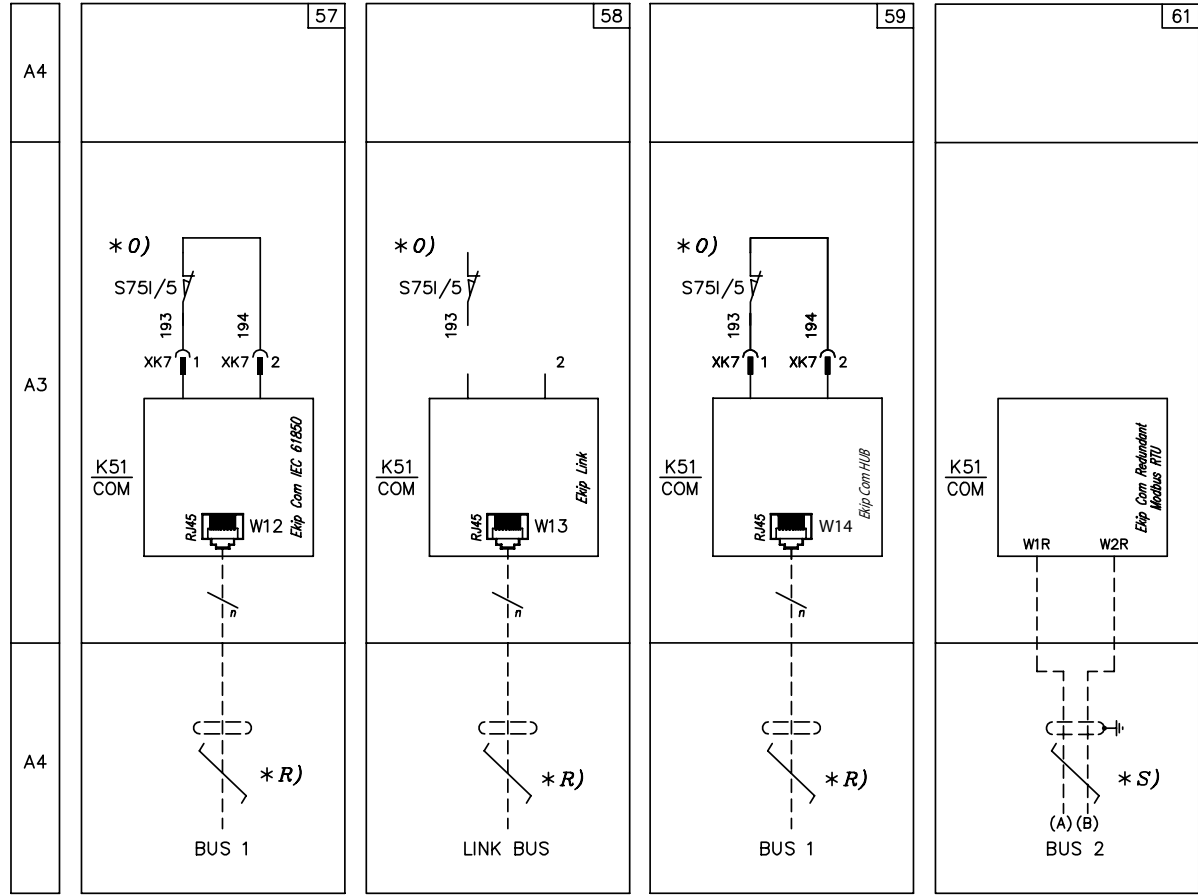
*O) *L)

Electrical accessories

51	61	71	81	91	01	95	35		R1	V3	Vn	Ge+	Szi	Ne-	W3	K1	45	D1	C1	C11	C21	11	21	31	41								
52	62	72	82	92	02	96	36	U1	R2	V2	Rcl	Ge-	Szo	Ne+	W4	K2	46		C3	C13		12	22	32	42								
54	64	74	84	94	04	98	38	U2		V1	Gzo	Szo	Gzi	Rca			48	D2	C2	C12	C22	14	24	34	44								
Q5..Q10 Ekip Signalling 4K						S51	S33	M	YR	Trip Unit I/O					Ekip Supply			Module		Module		Module		RTC	YU	YO2	YC	YO	YC2	Q1	Q2	Q3	Q4



- 57) Ekip COM IEC61850
- 58) Ekip LINK
- 59) Ekip Com Hub
- 61) Ekip COM R Modbus RS-485 Redundant

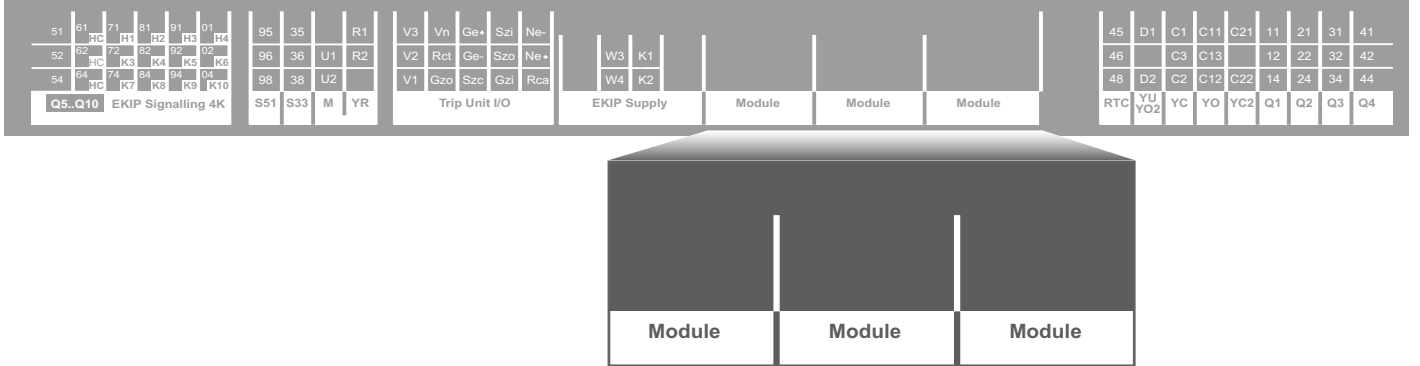


*L)

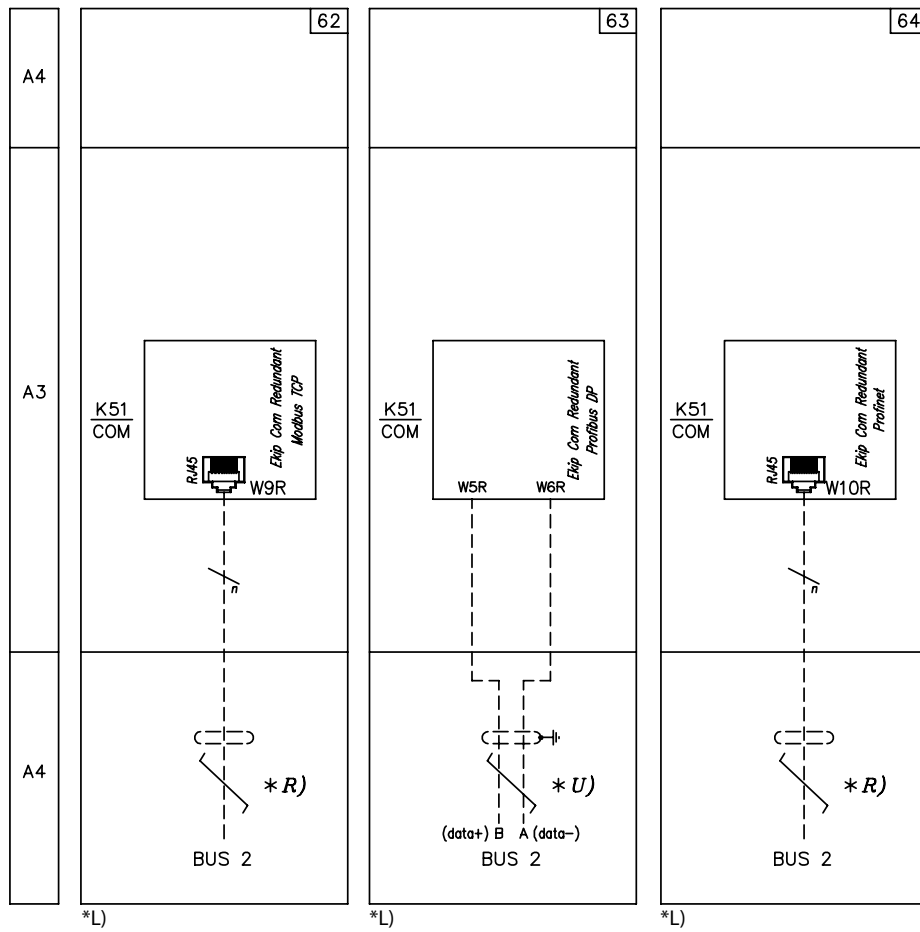
*L)

*L)

*L)

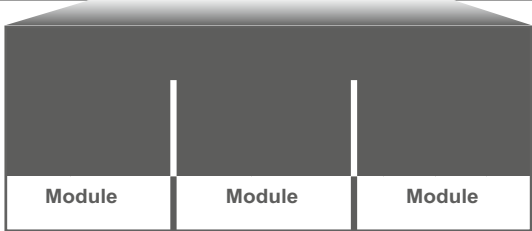


- 62) Ekip COM R Modbus TCP Redundant**
- 63) Ekip COM R Profibus Redundant**
- 64) Ekip COM R ProfiNet Redundant**

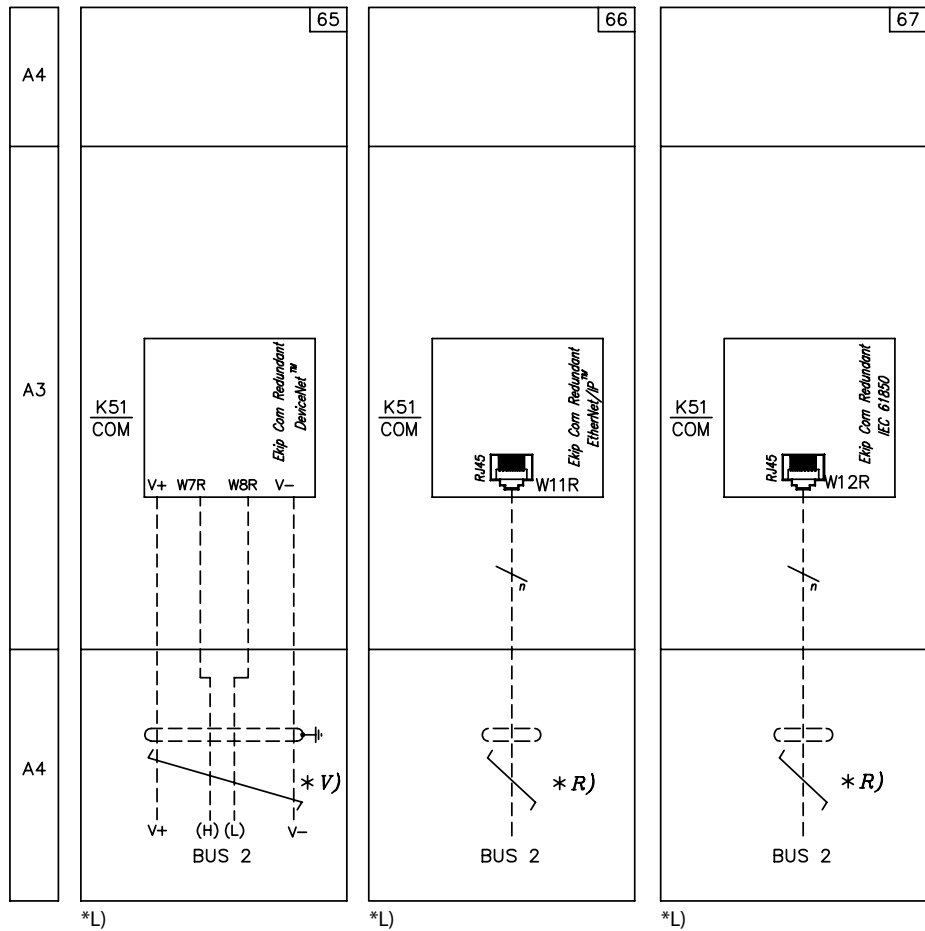


Electrical accessories

51	61	71	81	91	01	95	35		R1	V3	Vn	Ge+	Szi	Ne-	W3	K1	45	D1	C1	C11	C21	11	21	31	41					
52	62	72	82	92	02	96	36	U1	R2	V2	Rcl	Ge-	Szo	Ne+	W4	K2	46		C3	C13		12	22	32	42					
54	64	74	84	94	04	98	38	U2		V1	Gzo	Szo	Gzi	Rca			48	D2	C2	C12	C22	14	24	34	44					
Q5..Q10 Ekip Signalling 4K						S51	S33	M	YR	Trip Unit I/O					Ekip Supply			Module	Module	Module	RTC	YU	YO2	YC	YO	YC2	Q1	Q2	Q3	Q4



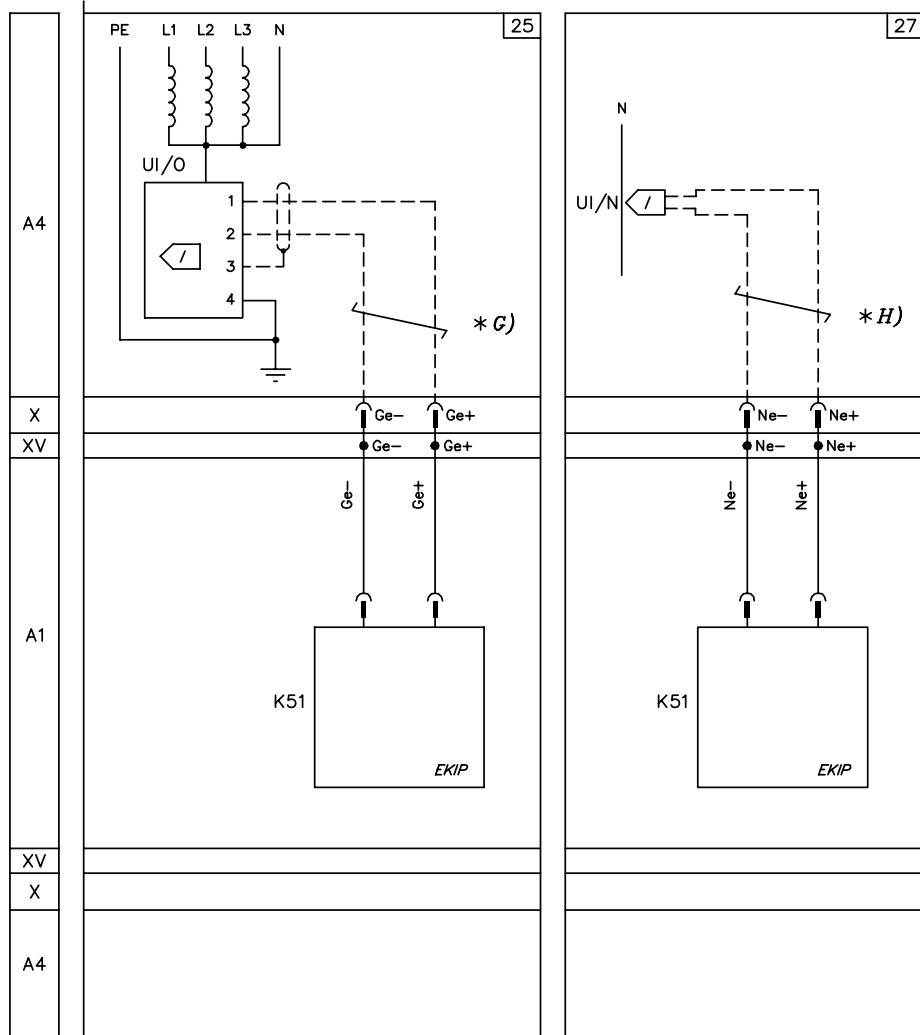
- 65) Ekip COM R DeviceNet™ Redundant
- 66) Ekip COM R EtherNet/IP™ Redundant
- 66) Ekip COM R IEC 61850 Redundant





- 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 figure 24-24A



Electrical accessories

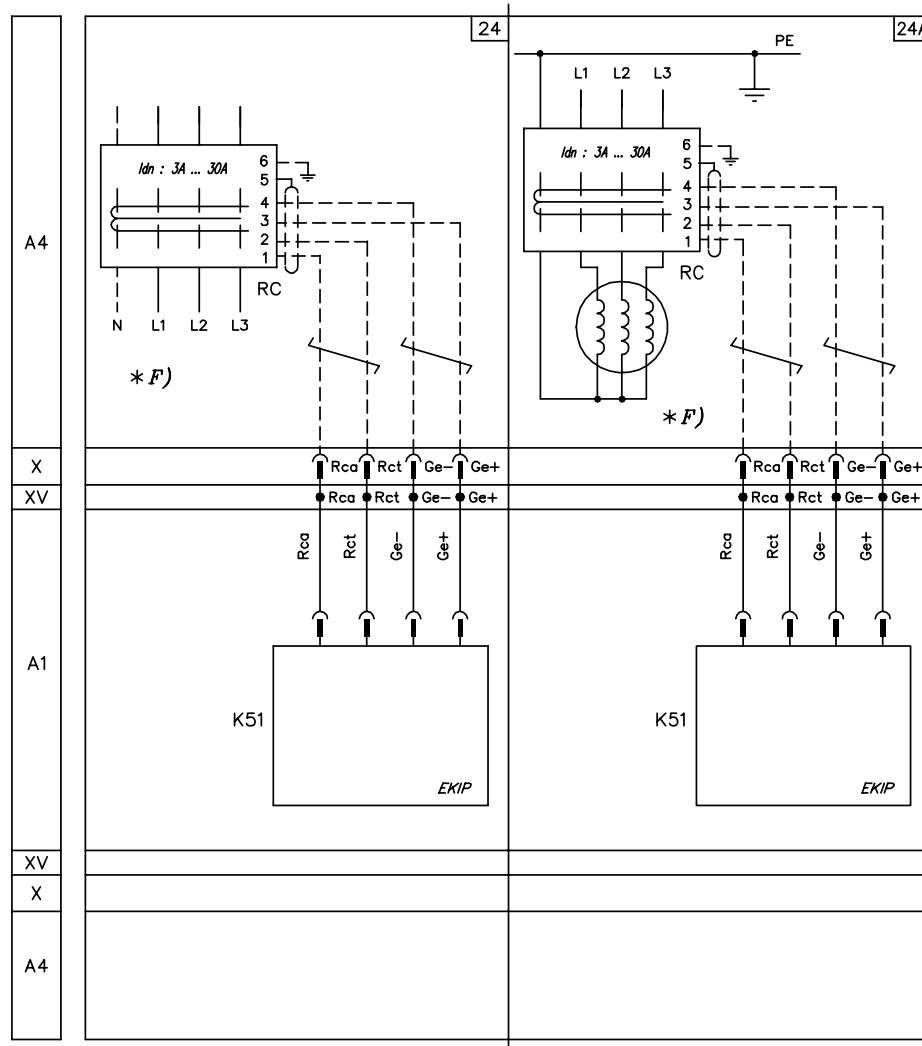
51	81	71	81	91	01	95	35	R1	V3	Vn	Ge+	Szi	Ne-	W3	K1	45	D1	C1	C11	C21	11	21	31	41									
52	82	72	82	92	02	96	36	U1	V2	Rct	Ge-	Szo	Ne+	W4	K2	46	C3	C13			12	22	32	42									
54	84	74	84	94	04	98	38	U2	V1	Gzo	Szc	Gzi	Rca			48	D2	C2	C12	C22	14	24	34	44									
Q5..Q10 EKIP Signalling 4K						S51	S33	M	YR	Trip Unit I/O						EKIP Supply		Module		Module		Module		RTC	YU	YO2	YC	YO	YC2	Q1	Q2	Q3	Q4

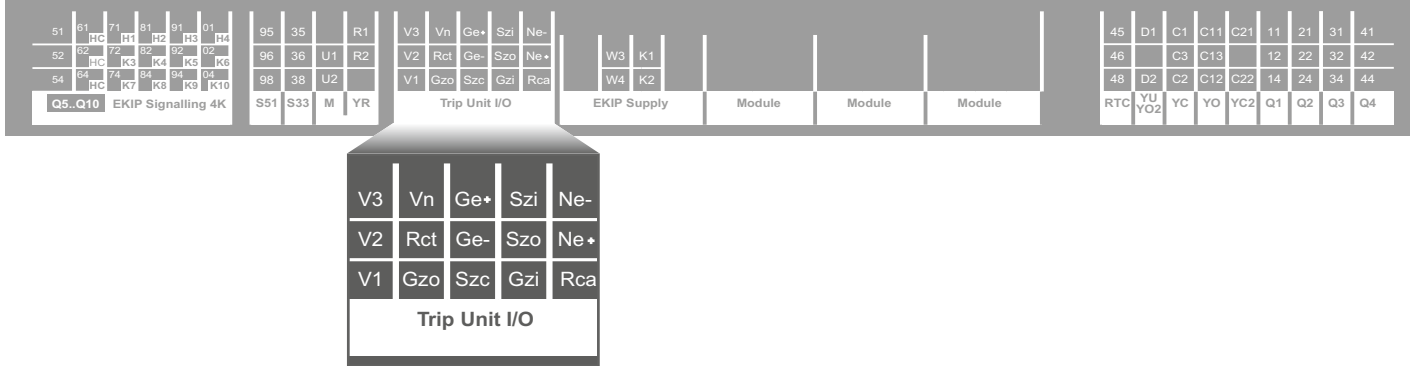
V3	Vn	Ge+	Szi	Ne-
V2	Rct	Ge-	Szo	Ne+
V1	Gzo	Szc	Gzi	Rca
Trip Unit I/O				

24) Rc residual current protection sensor input (ANSI 64 & 50NTD)

24a) Rc differential ground fault protection (ANSI 87N)

As an alternative to figure 25

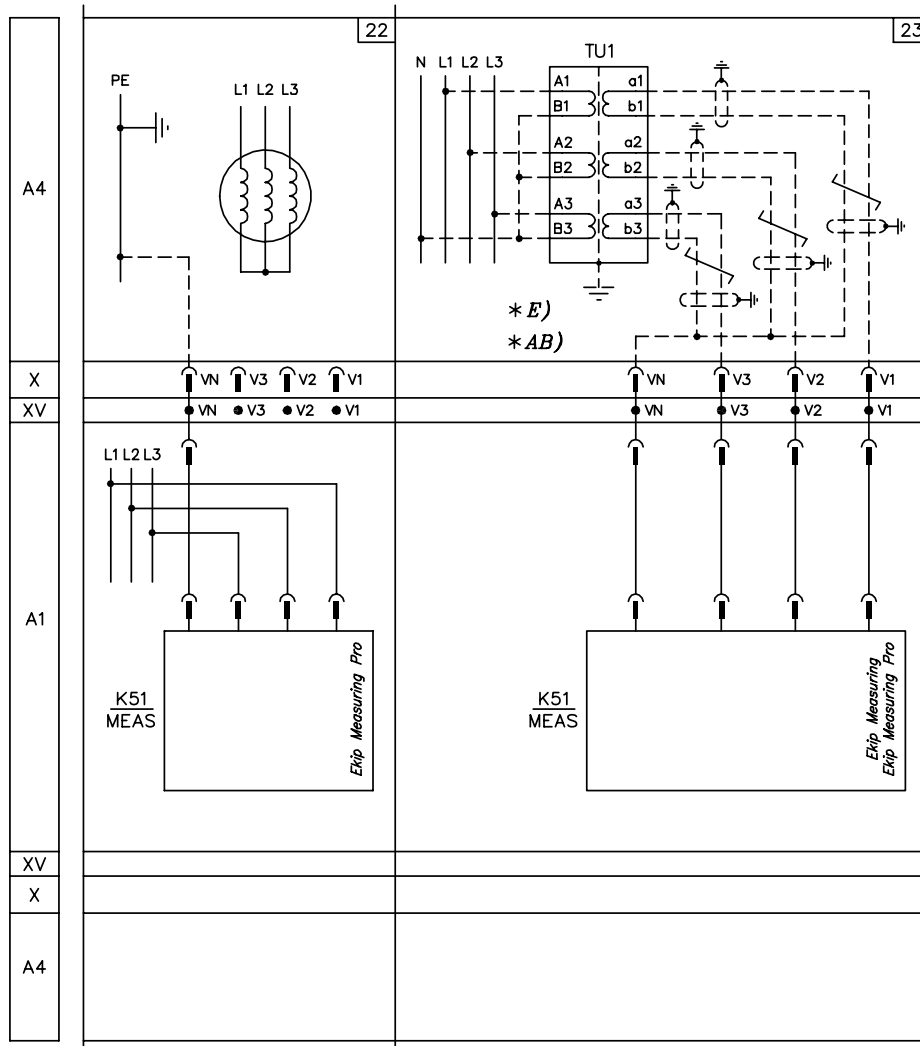




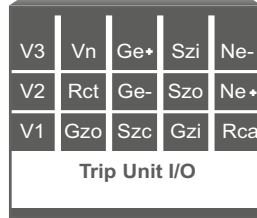
22) Ekip Measuring Pro for residual voltage protection (for Ekip G only)

23) Ekip Measuring/Measuring Pro with external voltage socket

As an alternative to each other or to 20-21 diagram

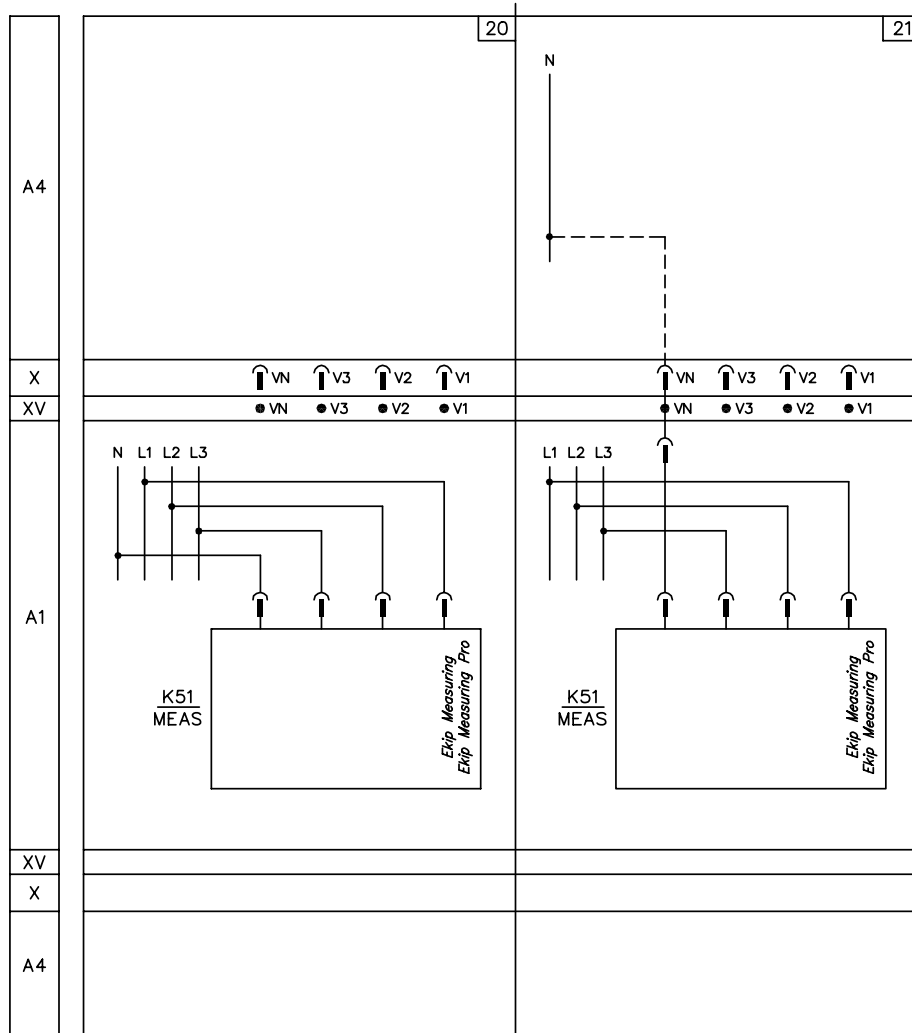


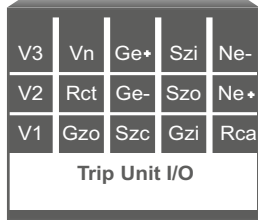
Electrical accessories



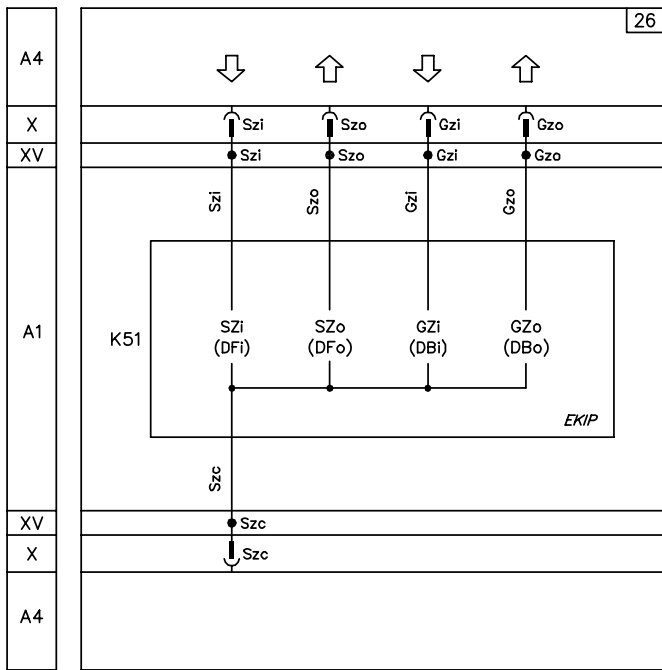
- 20) Ekip Measuring/Measuring Pro with voltage socket inside the four pole circuit-breaker
- 21) Ekip Measuring/Measuring Pro with voltage sockets inside the three-pole circuit-breaker and connection to the external neutral

As an alternative to each other or to 22-23 diagram

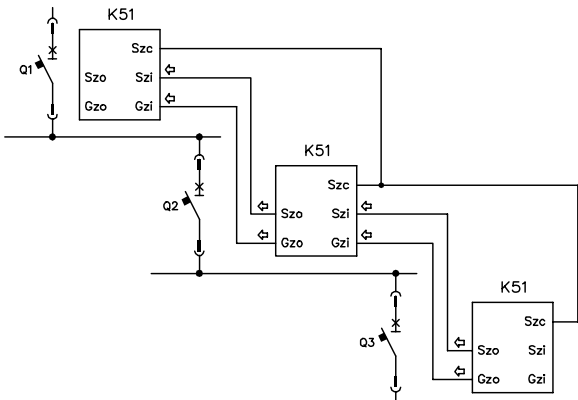


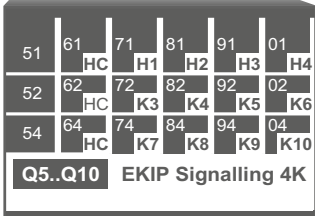


26) Zone selectivity

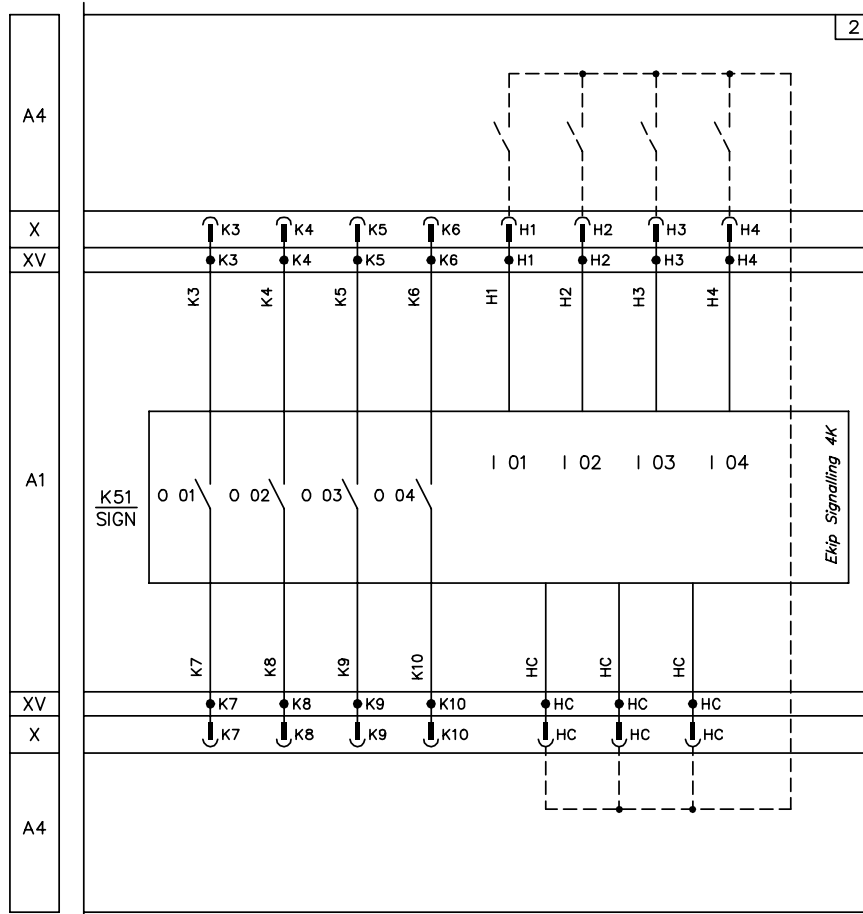


Example for application diagram (among 3 circuit breakers)





2) Ekip Signalling 4K

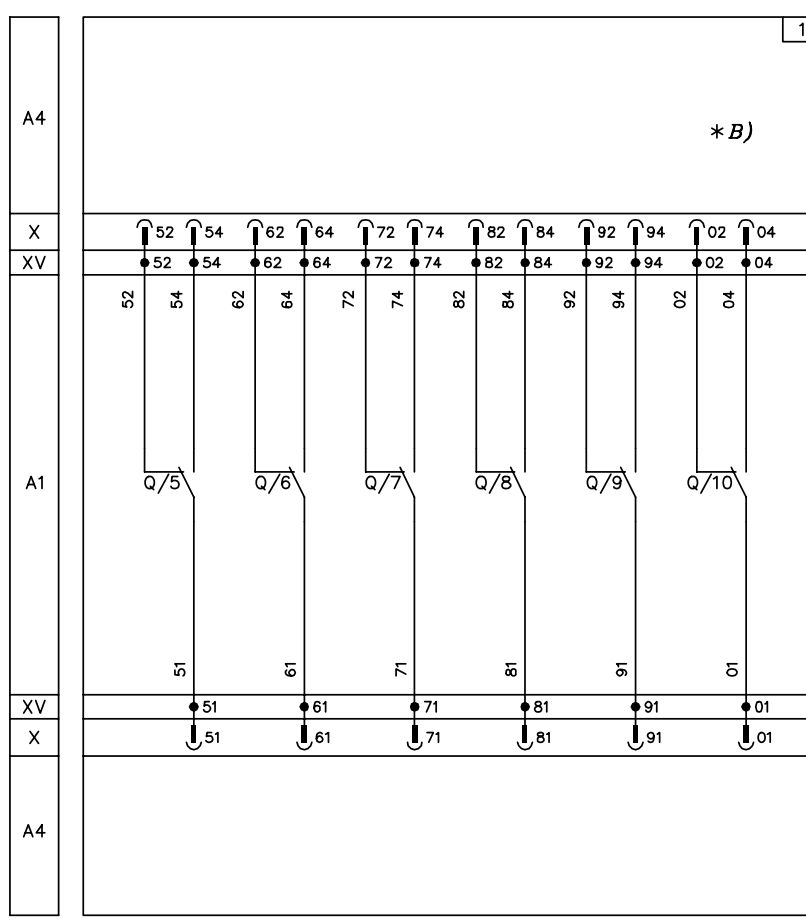


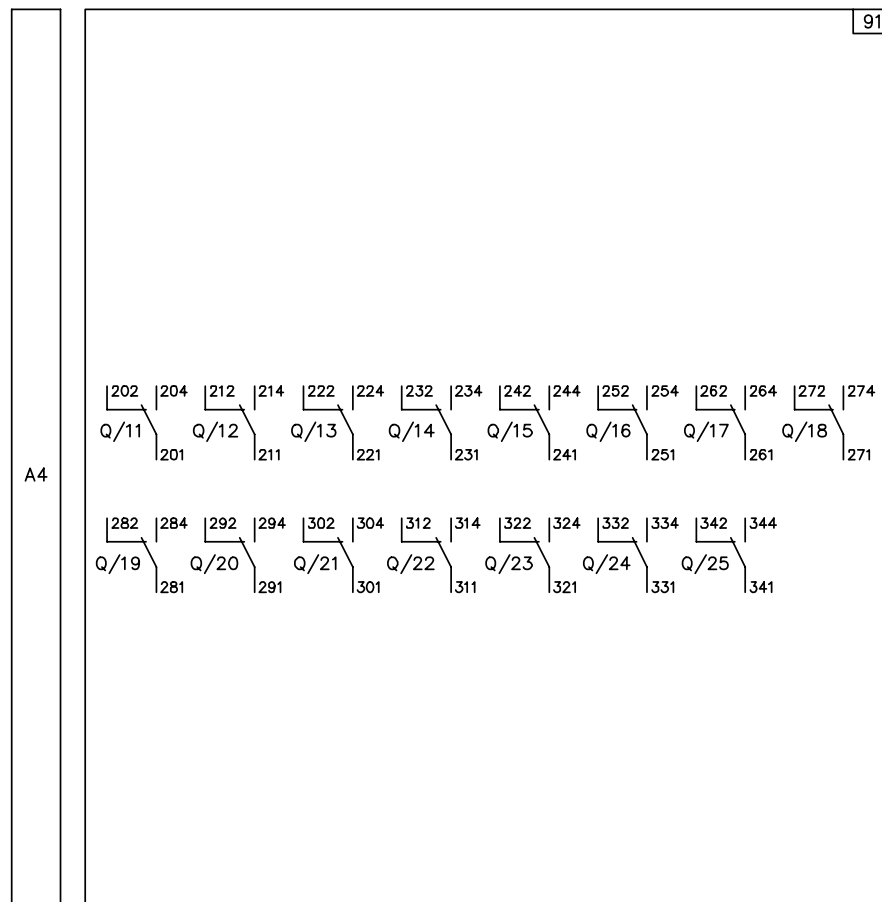
Electrical accessories

51	61	71	81	91	01	95	35		R1	V3	Vn	Ge+	Szi	Ne-					45	D1	C1	C11	C21	11	21	31	41
52	62	72	82	92	02	96	36	U1	R2	V2	Rct	Ge-	Szo	Ne+	W3	K1			46		C3	C13		12	22	32	42
54	64	74	84	94	04	98	38	U2		V1	Gzo	Szc	Gzi	Rca	W4	K2			48	D2	C2	C12	C22	14	24	34	44
Q5..Q10 EKIP Signalling 4K						S51	S33	M	YR	Trip Unit I/O				EKIP Supply		Module	Module	Module	RTC	YU YO2	YC	YO	YC2	Q1	Q2	Q3	Q4

51	61	71	81	91	01
52	62	72	82	92	02
54	64	74	84	94	04
Q5..Q10 EKIP Signalling 4K					

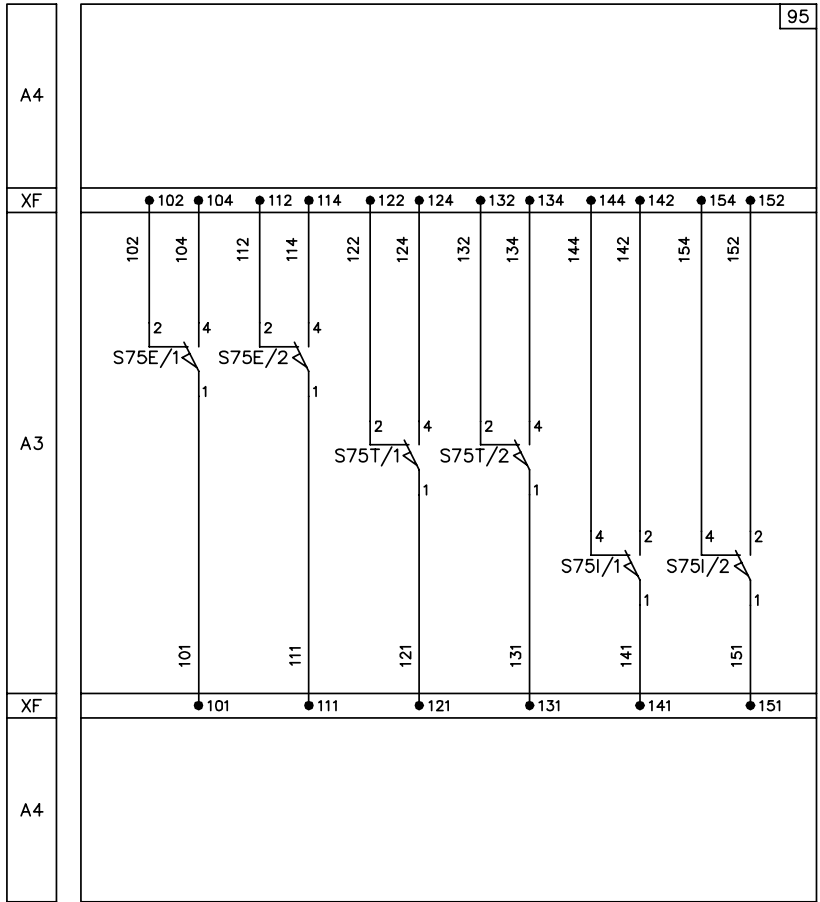
1) Supplementary open/closed auxiliary contacts of the circuit-breaker - AUX 6Q (6 Form C)



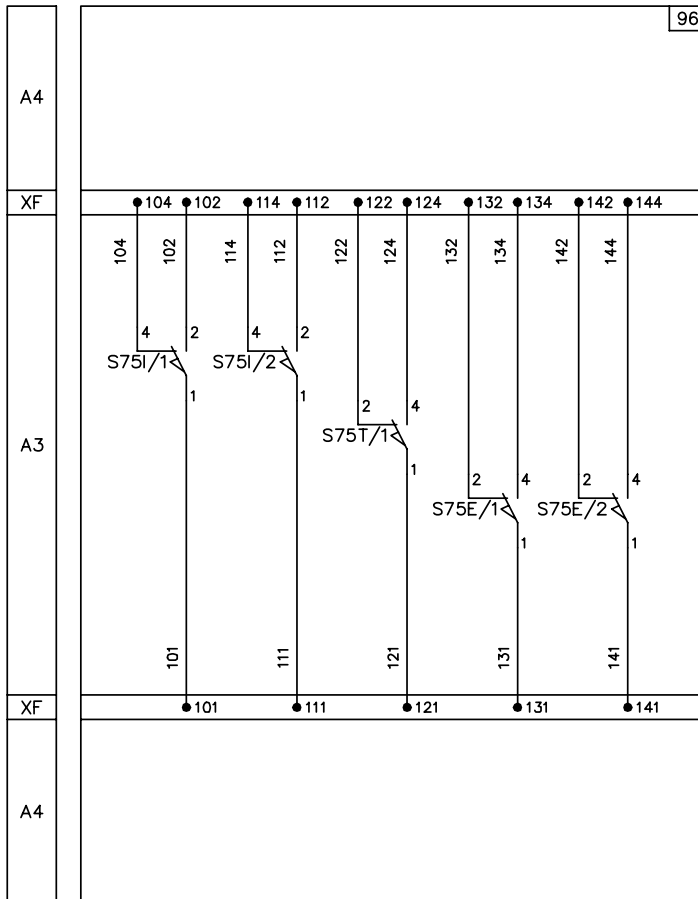
91) Supplementary open/closed auxiliary contacts outside the circuit breaker

Electrical accessories

95) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position

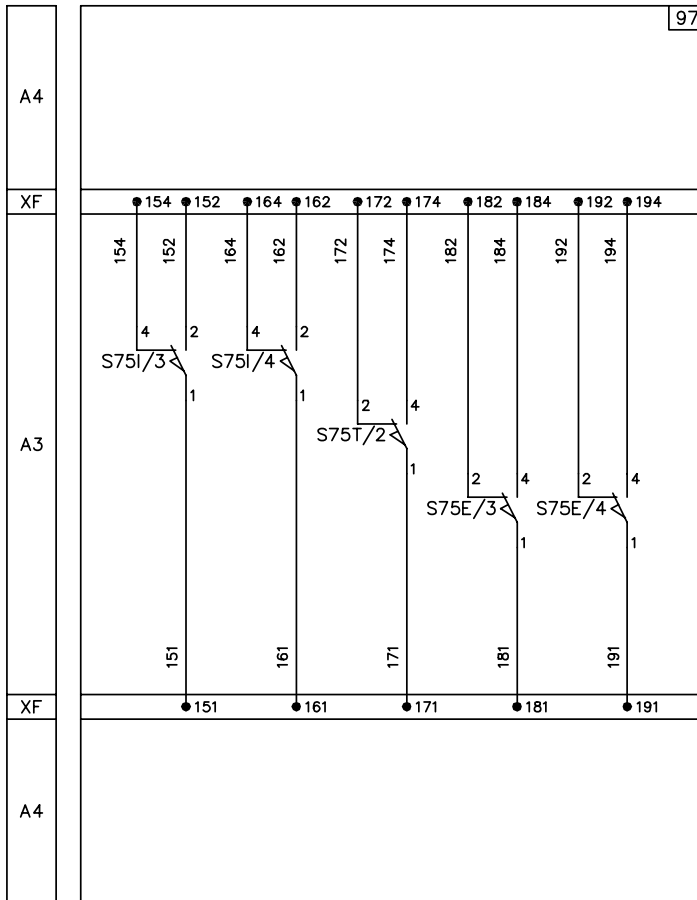


96) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (first set)

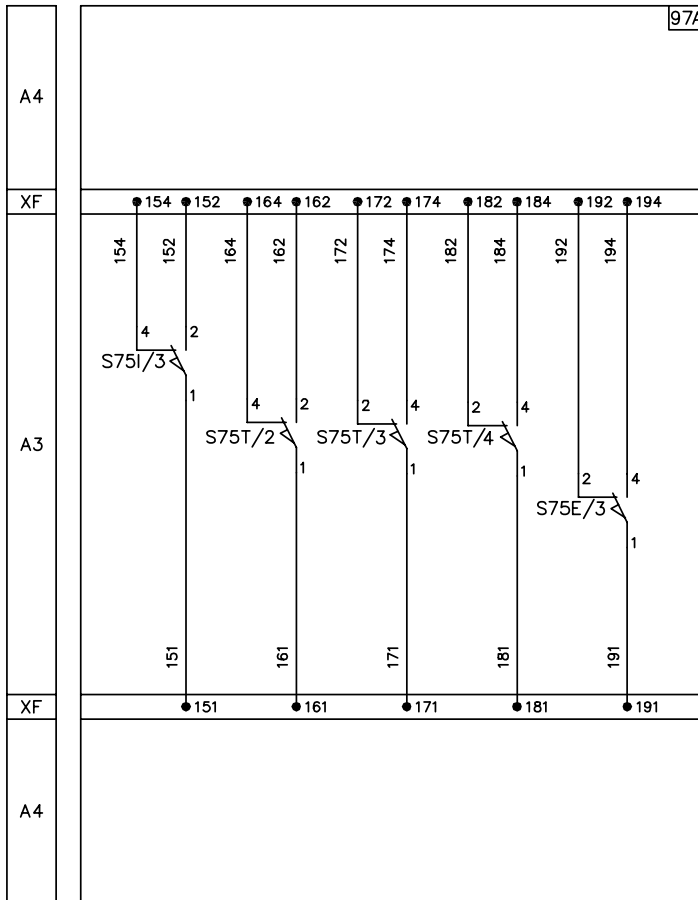


Electrical accessories

97) Contacts for signalling of circuit breakers 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)



CHAPTER 10

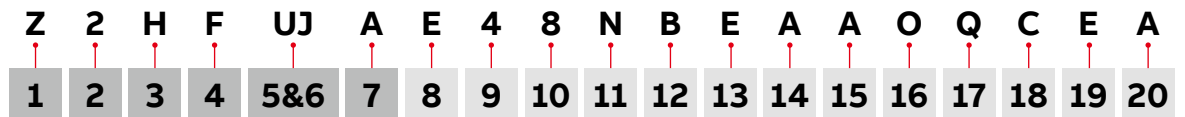
Ordering codes

210-221	Instructions for ordering
210-217	SACE Emax 2 configured circuit breaker/switch disconnecter order code breakdown
218-219	SACE Emax 2 cradle (fixed part) order code breakdown
220-221	Ordering examples
222-222	General information
223-253	Automatic circuit-breakers
223-233	Fixed version for power distribution
234-243	Drawout version for power distribution
244-248	Fixed version for generators
249-253	Drawout version for generators
254-257	Switch-disconnectors
254-255	Fixed version
256-257	Drawout version
258-258	Circuit breakers
259-259	Cradles
260-283	Accessories
260-264	Electrical accessories
265-268	Mechanical accessories
269-269	Mechanical interlock
270-272	Ekip modules
273-276	Terminals
277-277	Service
278-283	Spare Parts
284-284	Contact informations

Instructions for ordering

SACE Emax 2 configured circuit breaker/ switch disconnect order code breakdown

Emax 2 circuit breaker order code explanation



1 - Emax 2 Prefix

Z	Standard AC version
L	Triple Certification (UL/IEC/CCC)
M	ML Naval version (IEC)
9	800 - 900VAC version (IEC)

2 - Frame

	E1.2	E2.2	E4.2	E6.2	E6.2/f
3p	1	2	4	6	-
4p - N Left	A	B	C	D	E
4p - N Right	F	G	H	J	K

3 - Short Circuit Rating / Version

	B	C	N	S	H	V	L	X
kA @ 508V AC	42	-	50	65	85	100	-	-
UL kA @ 635V AC	42	-	50 ⁽¹⁾	65 ⁽¹⁾	85	85/100 ⁽⁴⁾	-	-
IEC kA @ 440V AC	42	50	66	85	100	150	-	150
IEC kA @ 690V AC	42	42	66 ⁽²⁾	66	85/100 ⁽³⁾	100	-	100

- 1) E1.2N = 42kA
- 2) E1.2N = 50kA
- 3) E2.2H and E4.2H = 85kA / E6.2H = 100kA
- 4) E2.V and E4.2V = 85kA / E6.2V = 100kA

4 - Frame Rating [A]

UL	A	B	C	D	E	F	G	H	Z	J	K	L
	250	400	800	1200	1600	2000	2500	3200	3600	4000	5000	6000
IEC	M	N	P	Q	R	S	T	U	V	W	X	Y
	250	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300

5 & 6 - Rating Plug [A]

Switch	00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UL	UA	UB	UC	UD	UE	UF	UG	UH	UJ	UK	UL	UN	UQ	UR	US	UT
	100	200	250	400	600	800	1000	1200	1600	2000	2500	3200	3600	4000	5000	6000
IEC	EA	EB	EC	ED	EE	EF	EG	EH	EJ	EK	EL	EN	ER	ES	ET	-
	100	200	250	400	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300	-
IEC L-Off	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LN	LR	LS	LT	-
	100	200	250	400	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300	-
IEC RC	RA	RB	RC	RD	RE	RF	RH	RK	RN	RR	-	-	-	-	-	-
	100	200	250	400	630	800	1250	2000	3200	4000	-	-	-	-	-	-

7 - Fixed/Drawout and Terminal connections

Drawout (less cradle) A							
Fixed (std. terminals) B⁽¹⁾							
Fixed (alt. terminals) Upper Terminals							
Lower Terminals	Horiz. Rear(HR)⁽²⁾	Vert. Rear (VR)	Front (F)⁽⁷⁾	Ext. Front (EF)⁽⁷⁾	FCCUAL Lugs⁽⁷⁾	Horiz. Rear Spread (SHR)^{(6) (7)}	Vert. Rear Spread (SVR)^{(6) (7)}
Horiz. Rear (HR)^{(2) C⁽³⁾}		D	E	F	G	-	-
Vert. Rear (VR)	H	J ⁽⁴⁾	K	L	M	-	-
Front (F)⁽⁷⁾	N	P	Q ⁽⁵⁾	R	S	-	-
Ext. Front (EF)⁽⁷⁾	T	U	V	W	X	-	-
FCCUAL Lugs^{(3) (7)}	2	3	4	5	6	-	-
Horiz. Rear Spread (SHR)^{(6) (7)}	-	-	-	-	-	7	
Vert. Rear Spread (SVR)^{(6) (7)}	-	-	-	-	-	-	8

1) Standard terminals: E1=F / E2.2 - E6.2 = HR with exception of E4.2 3200 & 3600, and E6.2 6000A which are VR

2) Not available for E4.2 3200, 3600A and E6.2 6000A

3) Available for E1.2 only (IEC version)

4) Not available for E4.2 3200, 3600A and E6.2 6000A

5) Available for E2.2 - E6.2 (IEC versions)

6) Available for E2.2 and E4.2 (IEC version)

7) Not UL Listed

Instructions for ordering

SACE Emax 2 configured circuit breaker/ switch disconnect order code breakdown

Z	2	H	F	UJ	A	E	4	8	N	B	E	A	A	O	Q	C	E	A
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
1	2	3	4	5&6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

8 - Ekip Trip Unit

Switch Disconnecter	0			
		Protection Functions		
		LI	LSI	LSIG
	DIP	A	B	C
	Touch	D	E	F
	Touch + Power Controller ⁽¹⁾	G	H	I
	Hi-Touch	-	J	K
Ekip Trip Unit + Standard 250V Bell Alarm	Hi-Touch + Power Controller ⁽¹⁾	-	L	M
	G Touch	-	-	N
	G Touch + Power Controller ⁽¹⁾	-	-	P
	G Hi-Touch	-	-	Q
	G Hi-Touch + Power Controller ⁽¹⁾	-	-	R
	DIP	S	T	U
	Touch	V	W	X
	Touch + Power Controller ⁽¹⁾	Y	Z	1
	Hi-Touch	-	2	3
Ekip Trip Unit + optional 24VDC Bell Alarm	Hi-Touch + Power Controller ⁽¹⁾	-	4	5
	G Touch	-	-	6
	G Touch + Power Controller ⁽¹⁾	-	-	7
	G Hi-Touch	-	-	8
	G Hi-Touch + Power Controller ⁽¹⁾	-	-	9

1) Ekip Power Controller requires the use of Ekip Measuring or Measuring Pro modules

9 - Auxiliary Power Supply (Ekip Supply) and Measuring Module

	None	0	-	-
	-	Measuring	Measuring Pro	Future
	-	1	2	N
24V - 48V DC Supply	3	4	5	P
110 - 240V AC/DC Supply	6	7	8	Q
Measuring - Top Supply	-	A	B	R
Measuring - External Mtg Cables	-	C	D	S
Measuring - Top Supply + 24V DC Supply	-	E	F	T
Measuring - Top + 110-240V AC/DC Supply	-	G	H	U
Measuring - Ext. Mtg + 24V DC Supply	-	J	K	V
Measuring - Ext. Mtg + 110-240V AC/DC Supply	-	L	M	W

10 - Communication Modules

None	0	-	-	-	-	-	-
Single	2	3	4	5	6	7	8
	Modbus RS-485	Modbus TCP/IP	Profibus	Profinet	DeviceNet	EtherNet/IP	IEC 61850
Combos	A	B	C	D	E	F	-
	RS-485 + TCP/IP	TCP/IP + Profibus	Profibus + Profinet	Profinet + DeviceNet	DeviceNet + EtherNet/IP	EtherNet/IP + IEC 61850	-
	G	H	J	K	L	-	-
	RS-485 + Profibus	TCP/IP + Profinet	Profibus + DeviceNet	Profinet + EtherNet/IP	DeviceNet + IEC 61850	-	-
	M	N	P	Q	-	-	-
	RS-485 + Profinet	TCP/IP + DeviceNet	Profibus + EtherNet/IP	Profinet + IEC 61850	-	-	-
	R	S	T	-	-	-	-
	RS-485 + DeviceNet	TCP/IP + EtherNet/IP	Profibus + IEC 61850	-	-	-	-
	U	V	-	-	-	-	-
	RS-485 + EtherNet/IP	TCP/IP + IEC 61850	-	-	-	-	-
	W	-	-	-	-	-	-
	RS-485 + IEC 61850	-	-	-	-	-	-

Note: not valid with Ekip Dip or Switch Disconnectors

Instructions for ordering

SACE Emax 2 configured circuit breaker/ switch disconnect order code breakdown

Z	2	H	F	UJ	A	E	4	8	N	B	E	A	A	O	Q	C	E	A
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
1	2	3	4	5&6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

11 - Redundant Communications and Additional Ekip Modules

None	0	-	-	-	-	-	-
Redundant Com.	2	3	4	5	6	7	8
	Modbus RS-485	Modbus TCP/IP	Profibus	Profinet	DeviceNet	EtherNet/IP	IEC 61850
Other Modules	A	B	C	Q	W	-	-
	Ekip Link	Synchrocheck	Signalling 2K-1	Ekip Com Hub	Signalling 3T-1	-	-
	D	E	F	R	X	-	-
	Redundant Com + Ekip Link	Redundant Com + Synchrocheck	Redundant Com + Signalling 2K	Redundant Com + Ekip Com Hub	Redundant Com + Signalling 3T-1	-	-
	G	H	J	S	Y	-	-
	Ekip Link + Synchrocheck	Synchrocheck + Signalling 2K	Signalling 2K-1 + Signalling 2K-2	Ekip Link + Ekip Com Hub	Ekip Link + Ekip 3T-1	-	-
	K	L	M	V	Z	-	-
Combos	Ekip Link + Synchrocheck + Signalling 2K	Synchrocheck + Signalling 2K-1 + Signalling 2K-2	Signalling 2K-1 + Signalling 2K-2 + Signalling 2K-3	Ekip Com Hub + Signalling 3T	Synchrocheck + Ekip 3T-1	-	-
	N	T	U	9	1	-	-
	Ekip Link + Signalling 2K-1	Synchrocheck + Ekip Com Hub	Signalling 2K-1 + Ekip Com Hub	Ekip Com Hub + Signalling 2K + Signalling 3T	Signalling 2K-1 + Signalling 3T-1	-	-
	P						
	Ekip Link + Signalling 2K-1 + Signalling 2K-2						

Note 1: Communication, Synchrocheck, 2K, 3T, and Ekip Link are not compatible with Switch Disconnectors

Note 2: Ekip Touch or greater trip unit is required for Communication, Ekip 2K, Ekip 3T, and Synchrocheck modules

Note 3: Redundant Com will match communication module selected in digit 10

12 - Auxiliary Contacts (AUX) and Additional Signaling (4K)

None	0	-	-
	-	-	4 AUX (4Q) 400V(3)
	-	-	4 AUX (2Q+2Q) 24 & 400V
	-	-	A
	-	-	C
6 AUX (6Q) 400V⁽¹⁾	D	E	G
6 AUX (6Q) 24V⁽¹⁾	H	J	L
6 AUX (3Q+3Q) 400 & 24V⁽¹⁾	M	N	Q
4K Signaling⁽¹⁾⁽²⁾	-	R	T

(1) Not compatible with E1.2

(2) Not compatible with Ekip Dip or Switch disconnectors

(3) Provided as standard for all circuit breakers

Note: Options O, D, H and M are for use with switch disconnectors only

13 - Remote Reset (YR), 2nd Bell Alarm (S51/2) and Ready to Close Contacts (RTC)

None	0					
	-	YR 24V AC/DC	YR 110V AC/DC	YR 220V AC/DC	S51/2 250V ⁽¹⁾	S51/2 24V DC ⁽¹⁾
	-	A	B	C	P	Q
RTC 24VDC	D	E	F	G	R	S
RTC 250V AC/DC	H	J	K	L	S	T

(1) Not compatible with E1.2
 (2) Not compatible with Ekip Dip or Switch disconnectors
 (3) Provided as standard for all circuit breakers
 Note: Options O, D, H and M are for use with switch disconnectors only

14 - Closing Coil (YC) and Redundant Closing Coil (YC2)

None	0											
		24V AC/DC	30V AC/DC	48V AC/DC	60V AC/DC	110-120V AC/DC	120-127V AC/DC	220-240V AC/DC	240-250V AC/DC	380-400V AC	415-440V AC	480-500V AC
YC	A	B	C	D	E	F	G	H	K	L	M	
YC + YC2	N	P	Q	R	S	T	U	V	X	Y	Z	

Note: YC2 will have the same control voltage as YC1

15 - Opening Coil (YO)

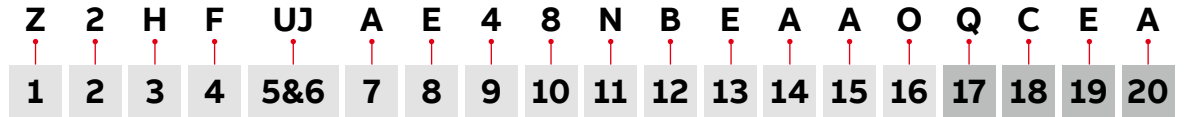
None	0											
		24V AC/DC	30V AC/DC	48V AC/DC	60V AC/DC	110-120V AC/DC	120-127V AC/DC	220-240V AC/DC	240-250V AC/DC	380-400V AC	415-440V AC	480-500V AC
YO	A	B	C	D	E	F	G	H	K	L	M	

16 - Undervoltage Release (UVR) or Redundant Opening Coil (YO2)

None	0											
		24V AC/DC	30V AC/DC	48V AC/DC	60V AC/DC	110-120V AC/DC	120-127V AC/DC	220-240V AC/DC	240-250V AC/DC	380-400V AC	415-440V AC	480-500V AC
UVR	A	B	C	D	E	F	G	H	K	L	M	
YO2 only	N	P	Q	R	S	T	U	V	X	Y	Z	

Instructions for ordering

SACE Emax 2 configured circuit breaker/ switch disconnect order code breakdown



17 - Spring Charging Motor (M) and Ekip Com Actuator

None	0					
Ekip Com Actuator	1					
	24-30V AC/DC	48-60V AC/DC	100-130V AC/DC	220-250V AC/DC	380-415V AC	440-480V AC ⁽¹⁾
M with standard aux. for status indication of springs	2	3	4	5	7	8
M with 24V DC aux. contacts for status indication of springs	A	B	C	D	F	G
M with standard aux. for status indication of springs + Ekip Com Actuator	H	J	K	L	N	P
M with 24V DC aux. contacts for status indication of springs + Ekip Com Actuator	Q	R	S	T	U	V

Note: Standard aux = E1.2 = 250V / E2.2 - E6.2 = 400V
 (1) not compatible with E1.2

18 - Push Button Locking Options

None	0							
	Push Button Covers (PBC)				Padlock in Open Position (PLC)			
	PBC Special Key	PBC Padlock (4mm)	PBC Padlock (7mm)	PBC Padlock (8mm)	PLC (4mm)	PLC (7mm)	PLC (8mm)	
	2	3	4	5	6	7	8	
Key Lock in Open Position - Different Keys (KLC-D)	A	D	E	F	G	H	J	K
Key Lock in Open Position - Same Keys (KLC-S) ⁽¹⁾	B	L	M	N	P	Q	R	S
Key Lock in Open Position - Kirk Key provisions (KLA)	C	T	I	V	W	X	Y	Z

(1) Standard key for Same Key option is #20005. Locks for #20006 - 20009 are available for order as loose accessories.
 Note: Key lock options for Castell and Ronis/Profalux are available for order as loose accessories.

19 - Racking Lock Options (1st lock) and Factory Test Report

None	X	Keylock in racked in/ out - Same Keys (KLP-S) ⁽¹⁾	Keylock in racked in/ out - Different Keys (KLP-D) ⁽¹⁾	Keylock in racked in/ out - Kirk/Ronis/ Profulaux provisions (KLP-A) ⁽¹⁾	Keylock in racked in/ out - Castell provisions (KLP-A) ⁽²⁾
	-	A	B	C	D
Padlock in racked in/out position (PLP)	E	F	G	H	J
Factory Test Report	K	M	N	P	Q
PLP + Factory Test Report	R	S	T	U	V

(1) Standard key for Same Key option is #20005. Locks for #20006 - 20009 are available for order as loose accessories.

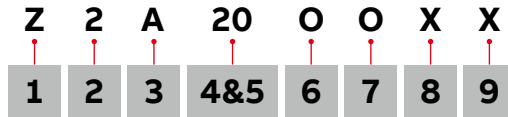
20 - 2nd Racking Lock Options, Mechanical Operations Counter (MOC) and Extended Warranty's

None	X	Keylock in racked in/ out - Same Keys (KLP-S) ⁽¹⁾	Keylock in racked in/ out - Different Keys (KLP-D) ⁽¹⁾	Keylock in racked in/ out - Kirk/Ronis/ Profulaux provisions (KLP-A) ⁽¹⁾	Keylock in racked in/ out - Castell provisions (KLP-A) ⁽²⁾
		B	C	D	E
Mechanical Operations Counter (MOC)	A	F	G	H	J
2 Year Extended Warranty	2	N	R	U	Y
4 Year Extended Warranty	4	P	S	V	Z
5 Year Extended Warranty	5	Q	T	W	6
Additional Combinations					
MOC + 2 Year Extended Warranty	K	7	-	-	-
MOC + 4 Year Extended Warranty	L	8	-	-	-
MOC + 5 Year Extended Warranty	M	9	-	-	-

Note: for additional combinations please contact your local ABB sales person

Instructions for ordering

SACE Emax 2 cradle (fixed part) order code breakdown



1 - Emax 2 Prefix

Z	Standard AC version
M	ML Naval version (IEC)

2 - Frame

	E1.2	E2.2	E4.2	E6.2	E6.2/f
3p	1	2	4	6	-
4p	A	B	C	D	E

3 - Standard

UL	A
IEC	C

4 & 5 - Amp Ratings by Frame

	E1.2 1200A	E2.2 2000A	E4.2 2500A	E4.2 3200A	E6.2 5000A	E6.2 6000A	
UL	12	20	25	32	50	60	
	E1.2 1600A	E2.2 2000A	E4.2 2500A	E4.2 3200A	E4.2 4000A	E6.2 5000A	E6.2 6300A
IEC	16	20	25	32	40	50	63

Note: E4.2 3200A (IEC) is compatible with N, S, and H versions for V version use E4.2 4000A

6 - Terminal Connections

Standard Terminals		A⁽¹⁾						
Alternate Terminals		Upper Terminals						
Lower Terminals		Horiz. Rear (HR)⁽²⁾	Vert. Rear (VR)	Front (F)⁽⁷⁾	Ext. Front (EF)⁽⁷⁾	FCCUAL Lugs⁽⁷⁾	Horiz. Rear Spread (SHR)⁽⁷⁾	Vert. Rear Spread (SVR)⁽⁷⁾
Horiz. Rear (HR)⁽¹⁾	-		D	E	F	G	-	-
Vert. Rear (VR)	H		J ⁽⁴⁾	K	L	M	-	-
Front (F)⁽²⁾⁽⁵⁾	N		P	Q	-	-	-	-
Ext. Front (EF)⁽³⁾⁽⁵⁾	T		U	-	W	X	-	-
FCCUAL Lugs⁽³⁾⁽⁵⁾	2		3	-	5	6	-	-
Horiz. Rear Spread (SHR)⁽⁵⁾⁽⁶⁾	-		-	-	-	-	7	-
Vert. Rear Spread (SVR)⁽⁵⁾⁽⁶⁾	-		-	-	-	-	-	8

(1) Standard terminals for cradles are horizontal rear (HR) with exception of: E4.2 3200A = VR, E6.2 6000A = VR

(2) Not compatible with E1.2

(3) Available only for E1.2

(4) Not available for E4.2 3200A, E6.2 6000A as this is the standard terminals

7 - Auxiliary Cradle Position Contacts (AUP)

None	0				
	6 AUP (400V AC)	6 AUP (24V DC)	5 AUP (400V AC)	5 AUP (24V DC)	-
E1.2	A	B	-	-	-
E2.2 - E6.2 Left position	-	-	C	D	-
E2.2 - E6.2 Right position	-	-	E	F	-
E2.2 - E6.2 Left & Right positions	-	-	G	H	J ⁽¹⁾

(1) Includes one 400V set (left) and one 24VDC set (right)

8 - Racking Lock Options (1st lock)

None	X	Keylock in racked in/ out - Same Keys (KLP-S)⁽¹⁾	Keylock in racked in/ out - Different Keys (KLP-D)⁽¹⁾	Keylock in racked in/ out - Kirk/Ronis/ Profulaux provisions (KLP-A)⁽¹⁾	Keylock in racked in/ out - Castell provisions (KLP-A)⁽²⁾
	-	A	B	C	D
Padlock in racked in/out position (PLP)	E	F	G	H	J
Racked out Position Lock (Supplementary)	K ⁽³⁾	L	M	N	P
PLP + Racked out Position Lock	Q	R	S	T	U

(1) Standard key for Same Key option is #20005. Locks for #20006 - 20009 are available for order as loose accessories.

(2) Two Castell adapter cannot be used at once, but can be used in either position with another style of lock

(3) Available for E2.2-E6.2 and only if a racking lock option has been selected on the circuit breaker side

Note: Racking locks are for E1.2 For E2.2 - E6.2 they are configured within the circuit breaker

9 - 2nd Racking Lock Options

None	X	Keylock in racked in/ out - Same Keys (KLP-S)⁽¹⁾	Keylock in racked in/ out - Different Keys (KLP-D)⁽¹⁾	Keylock in racked in/ out - Kirk/Ronis/ Profulaux provisions (KLP-A)⁽¹⁾	Keylock in racked in/ out - Castell provisions (KLP-A)⁽²⁾
	-	B	C	D	E

(1) Standard key for Same Key option is #20005. Locks for #20006 - 20009 are available for order as loose accessories.

(2) Two Castell adapter cannot be used at once, but can be used in either position with another style of lock.

Note: Racking locks are for E1.2 For E2.2 - E6.2 they are configured within the circuit breaker

Instructions for ordering

Ordering examples

Standard version Emax 2 series circuit breakers are identified by codes that can be accessorized.

Ordering examples

- **Terminal kit codes** (other than standard supply) for fixed circuit breakers or cradles.
The codes refer to 3 or 4 pieces for mounting on either the top or bottom terminals.

To convert a complete circuit breaker, 1 kit for upper terminals and 1 kit for lower terminals must be specified on the order.

Example no. 1

Emax E2.2N 3 poles fixed with vertical rear terminals (VR)

1SDA077293R1	E2.2N-A 2000 Ekip Touch LSIG 3p F HR
1SDA079852R1	Kit VR Upper E2.2 Iu=2000 3pcs INST
1SDA079854R1	Kit VR Lower E2.2 Iu=2000 3pcs INST

Example no. 2

Emax E1.2N 4 poles fixed with upper vertical rear (VR) and lower front (F) terminals (standard supply)

1SDA077020R1	E1.2N-A 1200 Ekip Dip LSIG 4p F F
1SDA079837R1	Kit VR Upper E1.2 Iu=1200 4pcs INST

- **Rating plug for lower rated current values.**
Rating plugs installed on the circuit breaker allow for current values that are lower than the rated current of the circuit breaker.

Example no. 3

Emax E2.2S 2000 3 poles fixed In=1000A

1SDA077333R1	E2.2S-A 2000 Ekip Touch LSIG 3p F HR
1SDA074264R1	Rating Plug 1000A E1.2...E6.2 INST

- **Ordering Ekip modules.**
The Ekip Supply module enables Ekip Com, Ekip Link, Ekip 2K and Ekip Synchrocheck modules to be installed.
In addition to the Ekip Supply module, up to 3 additional modules can be installed on E2.2, E4.2 and E6.2 and up to 2 additional modules on E1.2.

Example no. 4

Emax E4.2H 3 poles fixed with modules: Ekip Supply, Ekip Com Modbus TCP, Ekip Signalling 2K, Ekip Com Modbus RCP Redundant and Ekip Signalling 4K

1SDA077926R1	E4.2H-A 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. 5**Emax E4.2H 3 poles fixed with modules: Ekip Supply, Ekip Com EtherNet/IP, Ekip Com Modbus RS-485 and Ekip Measuring Pro**

1SDA077923R1	E4.2H-A 3200 Ekip Touch LSIg 3p F HR
1SDA074173R1	Ekip Supply 24-48V DC E1.2..E6.2
1SDA074155R1	Ekip Com EtherNet/IP E1.2..E6.2
1SDA074150R1	Ekip Com Modbus RS-485 E1.2..E6.2
1SDA074189R1	Ekip Measuring Pro E4.2

Example no. 6**Emax E1.2N 4 poles fixed with modules: Ekip Supply and Ekip Link**

1SDA077020R1	E1.2N-A 1200 Ekip Dip LSIg 4p F F
1SDA074172R1	Ekip Supply 110-240V AC/DC E1.2..E6.2
1SDA074163R1	Ekip Link E1.2..E6.2

- Ordering for electrical accessories.

Example no. 7**Emax E2.2S 3 poles drawout with accessories: shunt coil, closing coil, motor and second shunt coil**

1SDA077662R1	E2.2S-A 1600 Ekip Touch LSI 3p WMP
1SDA073674R1	YO E1.1..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 locks.

Example no. 8**Emax E2.2N 3 poles with double key lock in racked in / test / racked out position, using different keys**

1SDA077293R1	E2.2N-A 2000 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

General informations

Abbreviations used for the description of the product

Versions and terminals	
F	Fixed circuit breaker
W	Drawout circuit breaker
MP	Mobile part of drawout circuit breaker
FP	Fixed part (Cradle) of drawout circuit breaker
Iu	Rated uninterrupted current
In	Rated current of the rating plug
Icu	Rated ultimate short-circuit breaking capacity
Icw	Rated short-time withstand current
/MS	Switch disconnecter
/E	Circuit breakers for 1150V applications
/f	Four-pole circuit breakers with neutral pole at 100%
CS	Sectionalizing truck
MT	Earthing truck
MTP	Earthing switch with making capacity
HR VR	Rear orientable terminals
SHR	Horizontal rear spread terminals
SVR	Vertical rear spread terminals
F	Front terminals
FL	Flat terminals
EF	Extended front terminals
ES	Front spread terminals
Fc CuAl	Terminals for cables
Protection trip units and functions	
Ekip Dip	Protection trip unit for power distribution
Ekip Touch	Measurement and protection trip unit for power distribution
Ekip Hi Touch	Measurement and protection trip unit and network analyzer for power distribution
Ekip G Touch	Measurement and protection trip unit for generators
Ekip G Hi-Touch	Measurement and protection trip unit and protection network analyzer for generators
L	Overload protection
S	Protection against selective short circuit
I	Protection against instantaneous short circuit
G	Earth fault protection
Rc	Residual current protection
Power Controller	Load management function

Automatic circuit breakers

Fixed version for power distribution



SACE Emax E1.2B-A/N-A • Front terminals (F)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2B-A	800	42	42	E1.2B-A 800 Ekip Dip LI	1SDA076908R1	Z1BCUFBA000A000000XX	1SDA076988R1	ZABCUFBA000A000000XX
				E1.2B-A 800 Ekip Dip LSI	1SDA076909R1	Z1BCUFBB000A000000XX	1SDA076989R1	ZABCUFBB000A000000XX
				E1.2B-A 800 Ekip Dip LSIG	1SDA076910R1	Z1BCUFBC000A000000XX	1SDA076990R1	ZABCUFBC000A000000XX
				E1.2B-A 800 Ekip Touch LI	1SDA076911R1	Z1BCUFBD000A000000XX	1SDA076991R1	ZABCUFBD000A000000XX
				E1.2B-A 800 Ekip Touch LSI	1SDA076912R1	Z1BCUFBE000A000000XX	1SDA076992R1	ZABCUFBE000A000000XX
				E1.2B-A 800 Ekip Touch LSIG	1SDA076913R1	Z1BCUFBF000A000000XX	1SDA076993R1	ZABCUFBF000A000000XX
				E1.2B-A 800 Ekip Hi-Touch LSI	1SDA076915R1	Z1BCUFBJ200A000000XX	1SDA076995R1	ZABCUFBJ200A000000XX
				E1.2B-A 800 Ekip Hi-Touch LSIG	1SDA076916R1	Z1BCUFBK200A000000XX	1SDA076996R1	ZABCUFBK200A000000XX
	1200	42	42	E1.2B-A 1200 Ekip Dip LI	1SDA076918R1	Z1BDUHBA000A000000XX	1SDA076998R1	ZABDUHBA000A000000XX
				E1.2B-A 1200 Ekip Dip LSI	1SDA076919R1	Z1BDUHBB000A000000XX	1SDA076999R1	ZABDUHBB000A000000XX
				E1.2B-A 1200 Ekip Dip LSIG	1SDA076920R1	Z1BDUHBC000A000000XX	1SDA077000R1	ZABDUHBC000A000000XX
				E1.2B-A 1200 Ekip Touch LI	1SDA076921R1	Z1BDUHBD000A000000XX	1SDA077001R1	ZABDUHBD000A000000XX
				E1.2B-A 1200 Ekip Touch LSI	1SDA076922R1	Z1BDUHBE000A000000XX	1SDA077002R1	ZABDUHBE000A000000XX
				E1.2B-A 1200 Ekip Touch LSIG	1SDA076923R1	Z1BDUHBF000A000000XX	1SDA077003R1	ZABDUHBF000A000000XX
				E1.2B-A 1200 Ekip Hi-Touch LSI	1SDA076925R1	Z1BDUHBJ200A000000XX	1SDA077005R1	ZABDUHBJ200A000000XX
				E1.2B-A 1200 Ekip Hi-Touch LSIG	1SDA076926R1	Z1BDUHBK200A000000XX	1SDA077006R1	ZABDUHBK200A000000XX
E1.2N-A	800	50	50	E1.2N-A 800 Ekip Dip LI	1SDA076928R1	Z1NCUFBA000A000000XX	1SDA077008R1	ZANCUFBA000A000000XX
				E1.2N-A 800 Ekip Dip LSI	1SDA076929R1	Z1NCUFBB000A000000XX	1SDA077009R1	ZANCUFBB000A000000XX
				E1.2N-A 800 Ekip Dip LSIG	1SDA076930R1	Z1NCUFBC000A000000XX	1SDA077010R1	ZANCUFBC000A000000XX
				E1.2N-A 800 Ekip Touch LI	1SDA076931R1	Z1NCUFBD000A000000XX	1SDA077011R1	ZANCUFBD000A000000XX
				E1.2N-A 800 Ekip Touch LSI	1SDA076932R1	Z1NCUFBE000A000000XX	1SDA077012R1	ZANCUFBE000A000000XX
				E1.2N-A 800 Ekip Touch LSIG	1SDA076933R1	Z1NCUFBF000A000000XX	1SDA077013R1	ZANCUFBF000A000000XX
				E1.2N-A 800 Ekip Hi-Touch LSI	1SDA076935R1	Z1NCUFBJ200A000000XX	1SDA077015R1	ZANCUFBJ200A000000XX
				E1.2N-A 800 Ekip Hi-Touch LSIG	1SDA076936R1	Z1NCUFBK200A000000XX	1SDA077016R1	ZANCUFBK200A000000XX
	1200	50	50	E1.2N-A 1200 Ekip Dip LI	1SDA076938R1	Z1NDUHBA000A000000XX	1SDA077018R1	ZANDUHBA000A000000XX
				E1.2N-A 1200 Ekip Dip LSI	1SDA076939R1	Z1NDUHBB000A000000XX	1SDA077019R1	ZANDUHBB000A000000XX
				E1.2N-A 1200 Ekip Dip LSIG	1SDA076940R1	Z1NDUHBC000A000000XX	1SDA077020R1	ZANDUHBC000A000000XX
				E1.2N-A 1200 Ekip Touch LI	1SDA076941R1	Z1NDUHBD000A000000XX	1SDA077021R1	ZANDUHBD000A000000XX
				E1.2N-A 1200 Ekip Touch LSI	1SDA076942R1	Z1NDUHBE000A000000XX	1SDA077022R1	ZANDUHBE000A000000XX
				E1.2N-A 1200 Ekip Touch LSIG	1SDA076943R1	Z1NDUHBF000A000000XX	1SDA077023R1	ZANDUHBF000A000000XX
				E1.2N-A 1200 Ekip Hi-Touch LSI	1SDA076945R1	Z1NDUHBJ200A000000XX	1SDA077025R1	ZANDUHBJ200A000000XX
				E1.2N-A 1200 Ekip Hi-Touch LSIG	1SDA076946R1	Z1NDUHBK200A000000XX	1SDA077026R1	ZANDUHBK200A000000XX

About wall mount is standard; for floor fixing must order: 1SDA076020R1 ZE1FFPF

Automatic circuit breakers

Fixed version for power distribution



SACE Emax E1.2S-A • Front terminals (F)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2S-A	250	65	50	E1.2S-A 250 Ekip Dip LI	1SDA076948R1	Z1SAUCBA000A000000XX	1SDA077028R1	ZASAUCEBA000A000000XX
				E1.2S-A 250 Ekip Dip LSI	1SDA076949R1	Z1SAUCBB000A000000XX	1SDA077029R1	ZASAUCEBB000A000000XX
				E1.2S-A 250 Ekip Dip LSIG	1SDA076950R1	Z1SAUCBC000A000000XX	1SDA077030R1	ZASAUCEBC000A000000XX
				E1.2S-A 250 Ekip Touch LI	1SDA076951R1	Z1SAUCBD000A000000XX	1SDA077031R1	ZASAUCEBD000A000000XX
				E1.2S-A 250 Ekip Touch LSI	1SDA076952R1	Z1SAUCBE000A000000XX	1SDA077032R1	ZASAUCEBE000A000000XX
				E1.2S-A 250 Ekip Touch LSIG	1SDA076953R1	Z1SAUCBF000A000000XX	1SDA077033R1	ZASAUCEBF000A000000XX
				E1.2S-A 250 Ekip Hi-Touch LSI	1SDA076955R1	Z1SAUCBJ200A000000XX	1SDA077035R1	ZASAUCEBJ200A000000XX
				E1.2S-A 250 Ekip Hi-Touch LSIG	1SDA076956R1	Z1SAUCBK200A000000XX	1SDA077036R1	ZASAUCEBK200A000000XX
	400	65	50	E1.2S-A 400 Ekip Dip LI	1SDA076958R1	Z1SBUDBA000A000000XX	1SDA077038R1	ZASBUDBA000A000000XX
				E1.2S-A 400 Ekip Dip LSI	1SDA076959R1	Z1SBUDBB000A000000XX	1SDA077039R1	ZASBUDBB000A000000XX
				E1.2S-A 400 Ekip Dip LSIG	1SDA076960R1	Z1SBUDBC000A000000XX	1SDA077040R1	ZASBUDBC000A000000XX
				E1.2S-A 400 Ekip Touch LI	1SDA076961R1	Z1SBUDBD000A000000XX	1SDA077041R1	ZASBUDBD000A000000XX
				E1.2S-A 400 Ekip Touch LSI	1SDA076962R1	Z1SBUDEB000A000000XX	1SDA077042R1	ZASBUDEB000A000000XX
				E1.2S-A 400 Ekip Touch LSIG	1SDA076963R1	Z1SBUDBF000A000000XX	1SDA077043R1	ZASBUDBF000A000000XX
				E1.2S-A 400 Ekip Hi-Touch LSI	1SDA076965R1	Z1SBUDBJ200A000000XX	1SDA077045R1	ZASBUDBJ200A000000XX
				E1.2S-A 400 Ekip Hi-Touch LSIG	1SDA076966R1	Z1SBUDBK200A000000XX	1SDA077046R1	ZASBUDBK200A000000XX
	800	65	50	E1.2S-A 800 Ekip Dip LI	1SDA076968R1	Z1SCUFBA000A000000XX	1SDA077048R1	ZASCUFBA000A000000XX
				E1.2S-A 800 Ekip Dip LSI	1SDA076969R1	Z1SCUFBB000A000000XX	1SDA077049R1	ZASCUFBB000A000000XX
				E1.2S-A 800 Ekip Dip LSIG	1SDA076970R1	Z1SCUFBC000A000000XX	1SDA077050R1	ZASCUFBC000A000000XX
				E1.2S-A 800 Ekip Touch LI	1SDA076971R1	Z1SCUFBD000A000000XX	1SDA077051R1	ZASCUFBD000A000000XX
				E1.2S-A 800 Ekip Touch LSI	1SDA076972R1	Z1SCUFBE000A000000XX	1SDA077052R1	ZASCUFBE000A000000XX
				E1.2S-A 800 Ekip Touch LSIG	1SDA076973R1	Z1SCUFBF000A000000XX	1SDA077053R1	ZASCUFBF000A000000XX
				E1.2S-A 800 Ekip Hi-Touch LSI	1SDA076975R1	Z1SCUFBJ200A000000XX	1SDA077055R1	ZASCUFBJ200A000000XX
				E1.2S-A 800 Ekip Hi-Touch LSIG	1SDA076976R1	Z1SCUFBK200A000000XX	1SDA077056R1	ZASCUFBK200A000000XX
	1200	65	50	E1.2S-A 1200 Ekip Dip LI	1SDA076978R1	Z1SDUHBA000A000000XX	1SDA077058R1	ZASDUHBA000A000000XX
				E1.2S-A 1200 Ekip Dip LSI	1SDA076979R1	Z1SDUHBB000A000000XX	1SDA077059R1	ZASDUHBB000A000000XX
				E1.2S-A 1200 Ekip Dip LSIG	1SDA076980R1	Z1SDUHBC000A000000XX	1SDA077060R1	ZASDUHBC000A000000XX
				E1.2S-A 1200 Ekip Touch LI	1SDA076981R1	Z1SDUHBD000A000000XX	1SDA077061R1	ZASDUHBD000A000000XX
				E1.2S-A 1200 Ekip Touch LSI	1SDA076982R1	Z1SDUHBE000A000000XX	1SDA077062R1	ZASDUHBE000A000000XX
				E1.2S-A 1200 Ekip Touch LSIG	1SDA076983R1	Z1SDUHBF000A000000XX	1SDA077063R1	ZASDUHBF000A000000XX
				E1.2S-A 1200 Ekip Hi-Touch LSI	1SDA076985R1	Z1SDUHBJ200A000000XX	1SDA077065R1	ZASDUHBJ200A000000XX
				E1.2S-A 1200 Ekip Hi-Touch LSIG	1SDA076986R1	Z1SDUHBK200A000000XX	1SDA077066R1	ZASDUHBK200A000000XX

About wall mount is standard; for floor fixing must order: 1SDA076020R1 ZE1FFPF



SACE Emax 2 E2.2B-A/N-A • Orientable rear terminals (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2B-A	1600	42	42	E2.2B-A 1600 Ekip Dip LI	1SDA077228R1	Z2BEUJBA000A000000XX	1SDA077398R1	ZBBEUJBA000A000000XX
				E2.2B-A 1600 Ekip Dip LSI	1SDA077229R1	Z2BEUJBB000A000000XX	1SDA077399R1	ZBBEUJBB000A000000XX
				E2.2B-A 1600 Ekip Dip LSIG	1SDA077230R1	Z2BEUJBC000A000000XX	1SDA077400R1	ZBBEUJBC000A000000XX
				E2.2B-A 1600 Ekip Touch LI	1SDA077231R1	Z2BEUJBD000A000000XX	1SDA077401R1	ZBBEUJBD000A000000XX
				E2.2B-A 1600 Ekip Touch LSI	1SDA077232R1	Z2BEUJBE000A000000XX	1SDA077402R1	ZBBEUJBE000A000000XX
				E2.2B-A 1600 Ekip Touch LSIG	1SDA077233R1	Z2BEUJBF000A000000XX	1SDA077403R1	ZBBEUJBF000A000000XX
				E2.2B-A 1600 Ekip Hi-Touch LSI	1SDA077235R1	Z2BEUJBJ200A000000XX	1SDA077405R1	ZBBEUJBJ200A000000XX
				E2.2B-A 1600 Ekip Hi-Touch LSIG	1SDA077236R1	Z2BEUJBK200A000000XX	1SDA077406R1	ZBBEUJBK200A000000XX
E2.2N-A	1600	50	E2.2N-A 1600 Ekip Dip LI	1SDA077278R1	Z2NEUJBA000A000000XX	1SDA077448R1	ZBNEUJBA000A000000XX	
			E2.2N-A 1600 Ekip Dip LSI	1SDA077279R1	Z2NEUJBB000A000000XX	1SDA077449R1	ZBNEUJBB000A000000XX	
			E2.2N-A 1600 Ekip Dip LSIG	1SDA077280R1	Z2NEUJBC000A000000XX	1SDA077450R1	ZBNEUJBC000A000000XX	
			E2.2N-A 1600 Ekip Touch LI	1SDA077281R1	Z2NEUJBD000A000000XX	1SDA077451R1	ZBNEUJBD000A000000XX	
			E2.2N-A 1600 Ekip Touch LSI	1SDA077282R1	Z2NEUJBE000A000000XX	1SDA077452R1	ZBNEUJBE000A000000XX	
			E2.2N-A 1600 Ekip Touch LSIG	1SDA077283R1	Z2NEUJBF000A000000XX	1SDA077453R1	ZBNEUJBF000A000000XX	
			E2.2N-A 1600 Ekip Hi-Touch LSI	1SDA077285R1	Z2NEUJBJ200A000000XX	1SDA077455R1	ZBNEUJBJ200A000000XX	
			E2.2N-A 1600 Ekip Hi-Touch LSIG	1SDA077286R1	Z2NEUJBK200A000000XX	1SDA077456R1	ZBNEUJBK200A000000XX	
	2000	50	E2.2N-A 2000 Ekip Dip LI	1SDA077288R1	Z2NFUKBA000A000000XX	1SDA077458R1	ZBNFUKBA000A000000XX	
			E2.2N-A 2000 Ekip Dip LSI	1SDA077289R1	Z2NFUKBB000A000000XX	1SDA077459R1	ZBNFUKBB000A000000XX	
			E2.2N-A 2000 Ekip Dip LSIG	1SDA077290R1	Z2NFUKBC000A000000XX	1SDA077460R1	ZBNFUKBC000A000000XX	
			E2.2N-A 2000 Ekip Touch LI	1SDA077291R1	Z2NFUKBD000A000000XX	1SDA077461R1	ZBNFUKBD000A000000XX	
			E2.2N-A 2000 Ekip Touch LSI	1SDA077292R1	Z2NFUKBE000A000000XX	1SDA077462R1	ZBNFUKBE000A000000XX	
			E2.2N-A 2000 Ekip Touch LSIG	1SDA077293R1	Z2NFUKBF000A000000XX	1SDA077463R1	ZBNFUKBF000A000000XX	
			E2.2N-A 2000 Ekip Hi-Touch LSI	1SDA077295R1	Z2NFUKBJ200A000000XX	1SDA077465R1	ZBNFUKBJ200A000000XX	
			E2.2N-A 2000 Ekip Hi-Touch LSIG	1SDA077296R1	Z2NFUKBK200A000000XX	1SDA077466R1	ZBNFUKBK200A000000XX	

Automatic circuit breakers

Fixed version for power distribution



SACE Emax 2 E2.2S-A • Orientable rear terminals (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2S-A	800	65	65	E2.2S-A 800 Ekip Dip LI	1SDA077298R1	Z2SCUFBA000A000000XX	1SDA077468R1	ZBSCUFBA000A000000XX
				E2.2S-A 800 Ekip Dip LSI	1SDA077299R1	Z2SCUFBB000A000000XX	1SDA077469R1	ZBSCUFBB000A000000XX
				E2.2S-A 800 Ekip Dip LSIG	1SDA077300R1	Z2SCUFBC000A000000XX	1SDA077470R1	ZBSCUFBC000A000000XX
				E2.2S-A 800 Ekip Touch LI	1SDA077301R1	Z2SCUFBD000A000000XX	1SDA077471R1	ZBSCUFBD000A000000XX
				E2.2S-A 800 Ekip Touch LSI	1SDA077302R1	Z2SCUFBE000A000000XX	1SDA077472R1	ZBSCUFBE000A000000XX
				E2.2S-A 800 Ekip Touch LSIG	1SDA077303R1	Z2SCUFBF000A000000XX	1SDA077473R1	ZBSCUFBF000A000000XX
				E2.2S-A 800 Ekip Hi-Touch LSI	1SDA077305R1	Z2SCUFBJ200A000000XX	1SDA077475R1	ZBSCUFBJ200A000000XX
				E2.2S-A 800 Ekip Hi-Touch LSIG	1SDA077306R1	Z2SCUFBK200A000000XX	1SDA077476R1	ZBSCUFBK200A000000XX
1200	65	65	E2.2S-A 1200 Ekip Dip LI	1SDA077308R1	Z2SDUHBA000A000000XX	1SDA077478R1	ZBSDUHBA000A000000XX	
			E2.2S-A 1200 Ekip Dip LSI	1SDA077309R1	Z2SDUHBB000A000000XX	1SDA077479R1	ZBSDUHBB000A000000XX	
			E2.2S-A 1200 Ekip Dip LSIG	1SDA077310R1	Z2SDUHBC000A000000XX	1SDA077480R1	ZBSDUHBC000A000000XX	
			E2.2S-A 1200 Ekip Touch LI	1SDA077311R1	Z2SDUHBD000A000000XX	1SDA077481R1	ZBSDUHBD000A000000XX	
			E2.2S-A 1200 Ekip Touch LSI	1SDA077312R1	Z2SDUHBE000A000000XX	1SDA077482R1	ZBSDUHBE000A000000XX	
			E2.2S-A 1200 Ekip Touch LSIG	1SDA077313R1	Z2SDUHBF000A000000XX	1SDA077483R1	ZBSDUHBF000A000000XX	
			E2.2S-A 1200 Ekip Hi-Touch LSI	1SDA077315R1	Z2SDUHBJ200A000000XX	1SDA077485R1	ZBSDUHBJ200A000000XX	
			E2.2S-A 1200 Ekip Hi-Touch LSIG	1SDA077316R1	Z2SDUHBK200A000000XX	1SDA077486R1	ZBSDUHBK200A000000XX	
1600	65	65	E2.2S-A 1600 Ekip Dip LI	1SDA077318R1	Z2SEUJBA000A000000XX	1SDA077488R1	ZBSEUJBA000A000000XX	
			E2.2S-A 1600 Ekip Dip LSI	1SDA077319R1	Z2SEUJBB000A000000XX	1SDA077489R1	ZBSEUJBB000A000000XX	
			E2.2S-A 1600 Ekip Dip LSIG	1SDA077320R1	Z2SEUJBC000A000000XX	1SDA077490R1	ZBSEUJBC000A000000XX	
			E2.2S-A 1600 Ekip Touch LI	1SDA077321R1	Z2SEUJBD000A000000XX	1SDA077491R1	ZBSEUJBD000A000000XX	
			E2.2S-A 1600 Ekip Touch LSI	1SDA077322R1	Z2SEUJBE000A000000XX	1SDA077492R1	ZBSEUJBE000A000000XX	
			E2.2S-A 1600 Ekip Touch LSIG	1SDA077323R1	Z2SEUJBF000A000000XX	1SDA077493R1	ZBSEUJBF000A000000XX	
			E2.2S-A 1600 Ekip Hi-Touch LSI	1SDA077325R1	Z2SEUJBJ200A000000XX	1SDA077495R1	ZBSEUJBJ200A000000XX	
			E2.2S-A 1600 Ekip Hi-Touch LSIG	1SDA077326R1	Z2SEUJBK200A000000XX	1SDA077496R1	ZBSEUJBK200A000000XX	
2000	65	65	E2.2S-A 2000 Ekip Dip LI	1SDA077328R1	Z2SFUKBA000A000000XX	1SDA077498R1	ZBSFUKBA000A000000XX	
			E2.2S-A 2000 Ekip Dip LSI	1SDA077329R1	Z2SFUKBB000A000000XX	1SDA077499R1	ZBSFUKBB000A000000XX	
			E2.2S-A 2000 Ekip Dip LSIG	1SDA077330R1	Z2SFUKBC000A000000XX	1SDA077500R1	ZBSFUKBC000A000000XX	
			E2.2S-A 2000 Ekip Touch LI	1SDA077331R1	Z2SFUKBD000A000000XX	1SDA077501R1	ZBSFUKBD000A000000XX	
			E2.2S-A 2000 Ekip Touch LSI	1SDA077332R1	Z2SFUKBE000A000000XX	1SDA077502R1	ZBSFUKBE000A000000XX	
			E2.2S-A 2000 Ekip Touch LSIG	1SDA077333R1	Z2SFUKBF000A000000XX	1SDA077503R1	ZBSFUKBF000A000000XX	
			E2.2S-A 2000 Ekip Hi-Touch LSI	1SDA077335R1	Z2SFUKBJ200A000000XX	1SDA077505R1	ZBSFUKBJ200A000000XX	
			E2.2S-A 2000 Ekip Hi-Touch LSIG	1SDA077336R1	Z2SFUKBK200A000000XX	1SDA077506R1	ZBSFUKBK200A000000XX	



SACE Emax 2 E2.2H-A • Orientable rear terminals (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2H-A	800	85	85	E2.2H-A 800 Ekip Dip LI	1SDA077238R1	Z2HCUFBA000A000000XX	1SDA077408R1	ZBHCUFBA000A000000XX
				E2.2H-A 800 Ekip Dip LSI	1SDA077239R1	Z2HCUFBB000A000000XX	1SDA077409R1	ZBHCUFBB000A000000XX
				E2.2H-A 800 Ekip Dip LSIG	1SDA077240R1	Z2HCUFBC000A000000XX	1SDA077410R1	ZBHCUFBC000A000000XX
				E2.2H-A 800 Ekip Touch LI	1SDA077241R1	Z2HCUFBD000A000000XX	1SDA077411R1	ZBHCUFBD000A000000XX
				E2.2H-A 800 Ekip Touch LSI	1SDA077242R1	Z2HCUFBE000A000000XX	1SDA077412R1	ZBHCUFBE000A000000XX
				E2.2H-A 800 Ekip Touch LSIG	1SDA077243R1	Z2HCUFBF000A000000XX	1SDA077413R1	ZBHCUFBF000A000000XX
				E2.2H-A 800 Ekip Hi-Touch LSI	1SDA077245R1	Z2HCUFBJ200A000000XX	1SDA077415R1	ZBHCUFBJ200A000000XX
				E2.2H-A 800 Ekip Hi-Touch LSIG	1SDA077246R1	Z2HCUFBK200A000000XX	1SDA077416R1	ZBHCUFBK200A000000XX
1200	85	85	E2.2H-A 1200 Ekip Dip LI	1SDA077248R1	Z2H DUHBA000A000000XX	1SDA077418R1	ZBHDUHBA000A000000XX	
			E2.2H-A 1200 Ekip Dip LSI	1SDA077249R1	Z2H DUHBB000A000000XX	1SDA077419R1	ZBHDUHBB000A000000XX	
			E2.2H-A 1200 Ekip Dip LSIG	1SDA077250R1	Z2H DUHBC000A000000XX	1SDA077420R1	ZBHDUHBC000A000000XX	
			E2.2H-A 1200 Ekip Touch LI	1SDA077251R1	Z2H DUHBD000A000000XX	1SDA077421R1	ZBHDUHBD000A000000XX	
			E2.2H-A 1200 Ekip Touch LSI	1SDA077252R1	Z2H DUHBE000A000000XX	1SDA077422R1	ZBHDUHBE000A000000XX	
			E2.2H-A 1200 Ekip Touch LSIG	1SDA077253R1	Z2H DUHBF000A000000XX	1SDA077423R1	ZBHDUHBF000A000000XX	
			E2.2H-A 1200 Ekip Hi-Touch LSI	1SDA077255R1	Z2H DUHBJ200A000000XX	1SDA077425R1	ZBHDUHBJ200A000000XX	
			E2.2H-A 1200 Ekip Hi-Touch LSIG	1SDA077256R1	Z2H DUHBK200A000000XX	1SDA077426R1	ZBHDUHBK200A000000XX	
1600	85	85	E2.2H-A 1600 Ekip Dip LI	1SDA077258R1	Z2HEUJBA000A000000XX	1SDA077428R1	ZBHEUJBA000A000000XX	
			E2.2H-A 1600 Ekip Dip LSI	1SDA077259R1	Z2HEUJBB000A000000XX	1SDA077429R1	ZBHEUJBB000A000000XX	
			E2.2H-A 1600 Ekip Dip LSIG	1SDA077260R1	Z2HEUJBC000A000000XX	1SDA077430R1	ZBHEUJBC000A000000XX	
			E2.2H-A 1600 Ekip Touch LI	1SDA077261R1	Z2HEUJBD000A000000XX	1SDA077431R1	ZBHEUJBD000A000000XX	
			E2.2H-A 1600 Ekip Touch LSI	1SDA077262R1	Z2HEUJBE000A000000XX	1SDA077432R1	ZBHEUJBE000A000000XX	
			E2.2H-A 1600 Ekip Touch LSIG	1SDA077263R1	Z2HEUJBF000A000000XX	1SDA077433R1	ZBHEUJBF000A000000XX	
			E2.2H-A 1600 Ekip Hi-Touch LSI	1SDA077265R1	Z2HEUJBJ200A000000XX	1SDA077435R1	ZBHEUJBJ200A000000XX	
			E2.2H-A 1600 Ekip Hi-Touch LSIG	1SDA077266R1	Z2HEUJBK200A000000XX	1SDA077436R1	ZBHEUJBK200A000000XX	
2000	85	85	E2.2H-A 2000 Ekip Dip LI	1SDA077268R1	Z2HFUKBA000A000000XX	1SDA077438R1	ZBHFUKBA000A000000XX	
			E2.2H-A 2000 Ekip Dip LSI	1SDA077269R1	Z2HFUKBB000A000000XX	1SDA077439R1	ZBHFUKBB000A000000XX	
			E2.2H-A 2000 Ekip Dip LSIG	1SDA077270R1	Z2HFUKBC000A000000XX	1SDA077440R1	ZBHFUKBC000A000000XX	
			E2.2H-A 2000 Ekip Touch LI	1SDA077271R1	Z2HFUKBD000A000000XX	1SDA077441R1	ZBHFUKBD000A000000XX	
			E2.2H-A 2000 Ekip Touch LSI	1SDA077272R1	Z2HFUKBE000A000000XX	1SDA077442R1	ZBHFUKBE000A000000XX	
			E2.2H-A 2000 Ekip Touch LSIG	1SDA077273R1	Z2HFUKBF000A000000XX	1SDA077443R1	ZBHFUKBF000A000000XX	
			E2.2H-A 2000 Ekip Hi-Touch LSI	1SDA077275R1	Z2HFUKBJ200A000000XX	1SDA077445R1	ZBHFUKBJ200A000000XX	
			E2.2H-A 2000 Ekip Hi-Touch LSIG	1SDA077276R1	Z2HFUKBK200A000000XX	1SDA077446R1	ZBHFUKBK200A000000XX	

Automatic circuit breakers

Fixed version for power distribution



SACE Emax 2 E2.2V-A • Orientable rear terminals (HR)

Size	Frame Amps	Int. Rating (kA@50kV)	Withstand (kA)	Type	3 Poles		4 Poles			
					Global code	U.S. / Canada code	Global code	U.S. / Canada code		
E2.2V-A	250	100	85	E2.2V-A 250 Ekip Dip LI	1SDA077338R1	Z2VAUCBA000A000000XX	1SDA077508R1	ZBVAUCBA000A000000XX		
				E2.2V-A 250 Ekip Dip LSI	1SDA077339R1	Z2VAUCBB000A000000XX	1SDA077509R1	ZBVAUCBB000A000000XX		
				E2.2V-A 250 Ekip Dip LSIG	1SDA077340R1	Z2VAUCBC000A000000XX	1SDA077510R1	ZBVAUCBC000A000000XX		
				E2.2V-A 250 Ekip Touch LI	1SDA077341R1	Z2VAUCBD000A000000XX	1SDA077511R1	ZBVAUCBD000A000000XX		
				E2.2V-A 250 Ekip Touch LSI	1SDA077342R1	Z2VAUCBE000A000000XX	1SDA077512R1	ZBVAUCBE000A000000XX		
				E2.2V-A 250 Ekip Touch LSIG	1SDA077343R1	Z2VAUCBF000A000000XX	1SDA077513R1	ZBVAUCBF000A000000XX		
	400	100	85	E2.2V-A 250 Ekip Hi-Touch LSI	1SDA077345R1	Z2VAUCBJ200A000000XX	1SDA077515R1	ZBVAUCBJ200A000000XX		
				E2.2V-A 250 Ekip Hi-Touch LSIG	1SDA077346R1	Z2VAUCBK200A000000XX	1SDA077516R1	ZBVAUCBK200A000000XX		
				E2.2V-A 400 Ekip Dip LI	1SDA077348R1	Z2VBUDBA000A000000XX	1SDA077518R1	ZBVBUDBA000A000000XX		
				E2.2V-A 400 Ekip Dip LSI	1SDA077349R1	Z2VBUDBB000A000000XX	1SDA077519R1	ZBVBUDBB000A000000XX		
				E2.2V-A 400 Ekip Dip LSIG	1SDA077350R1	Z2VBUDBC000A000000XX	1SDA077520R1	ZBVBUDBC000A000000XX		
				E2.2V-A 400 Ekip Touch LI	1SDA077351R1	Z2VBUDBD000A000000XX	1SDA077521R1	ZBVBUDBD000A000000XX		
		800	100	85	E2.2V-A 400 Ekip Touch LSI	1SDA077352R1	Z2VBUDE000A000000XX	1SDA077522R1	ZBVBUDE000A000000XX	
					E2.2V-A 400 Ekip Touch LSIG	1SDA077353R1	Z2VBUDBF000A000000XX	1SDA077523R1	ZBVBUDBF000A000000XX	
					E2.2V-A 400 Ekip Hi-Touch LSI	1SDA077355R1	Z2VBUDBJ200A000000XX	1SDA077525R1	ZBVBUDBJ200A000000XX	
					E2.2V-A 400 Ekip Hi-Touch LSIG	1SDA077356R1	Z2VBUDBK200A000000XX	1SDA077526R1	ZBVBUDBK200A000000XX	
					E2.2V-A 800 Ekip Dip LI	1SDA077358R1	Z2VCUFBA000A000000XX	1SDA077528R1	ZBVCUFBA000A000000XX	
					E2.2V-A 800 Ekip Dip LSI	1SDA077359R1	Z2VCUFBB000A000000XX	1SDA077529R1	ZBVCUFBB000A000000XX	
			1200	100	85	E2.2V-A 800 Ekip Dip LSIG	1SDA077360R1	Z2VCUFBC000A000000XX	1SDA077530R1	ZBVCUFBC000A000000XX
						E2.2V-A 800 Ekip Touch LI	1SDA077361R1	Z2VCUFBD000A000000XX	1SDA077531R1	ZBVCUFBD000A000000XX
						E2.2V-A 800 Ekip Touch LSI	1SDA077362R1	Z2VCUFBE000A000000XX	1SDA077532R1	ZBVCUFBE000A000000XX
						E2.2V-A 800 Ekip Touch LSIG	1SDA077363R1	Z2VCUFBF000A000000XX	1SDA077533R1	ZBVCUFBF000A000000XX
						E2.2V-A 800 Ekip Hi-Touch LSI	1SDA077365R1	Z2VCUFBJ200A000000XX	1SDA077535R1	ZBVCUFBJ200A000000XX
						E2.2V-A 800 Ekip Hi-Touch LSIG	1SDA077366R1	Z2VCUFBK200A000000XX	1SDA077536R1	ZBVCUFBK200A000000XX
1600	100	85		E2.2V-A 1200 Ekip Dip LI	1SDA077368R1	Z2VDUHBA000A000000XX	1SDA077538R1	ZBVDUHBA000A000000XX		
				E2.2V-A 1200 Ekip Dip LSI	1SDA077369R1	Z2VDUHBB000A000000XX	1SDA077539R1	ZBVDUHBB000A000000XX		
				E2.2V-A 1200 Ekip Dip LSIG	1SDA077370R1	Z2VDUHBC000A000000XX	1SDA077540R1	ZBVDUHBC000A000000XX		
				E2.2V-A 1200 Ekip Touch LI	1SDA077371R1	Z2VDUHBD000A000000XX	1SDA077541R1	ZBVDUHBD000A000000XX		
				E2.2V-A 1200 Ekip Touch LSI	1SDA077372R1	Z2VDUHBE000A000000XX	1SDA077542R1	ZBVDUHBE000A000000XX		
				E2.2V-A 1200 Ekip Touch LSIG	1SDA077373R1	Z2VDUHBF000A000000XX	1SDA077543R1	ZBVDUHBF000A000000XX		
	2000	100	85	E2.2V-A 1200 Ekip Hi-Touch LSI	1SDA077375R1	Z2VDUHBJ200A000000XX	1SDA077545R1	ZBVDUHBJ200A000000XX		
				E2.2V-A 1200 Ekip Hi-Touch LSIG	1SDA077376R1	Z2VDUHBK200A000000XX	1SDA077546R1	ZBVDUHBK200A000000XX		
				E2.2V-A 1600 Ekip Dip LI	1SDA077378R1	Z2VEUJBA000A000000XX	1SDA077548R1	ZBVEUJBA000A000000XX		
				E2.2V-A 1600 Ekip Dip LSI	1SDA077379R1	Z2VEUJBB000A000000XX	1SDA077549R1	ZBVEUJBB000A000000XX		
				E2.2V-A 1600 Ekip Dip LSIG	1SDA077380R1	Z2VEUJBC000A000000XX	1SDA077550R1	ZBVEUJBC000A000000XX		
				E2.2V-A 1600 Ekip Touch LI	1SDA077381R1	Z2VEUJBD000A000000XX	1SDA077551R1	ZBVEUJBD000A000000XX		
2000	100	85	E2.2V-A 1600 Ekip Touch LSI	1SDA077382R1	Z2VEUJBE000A000000XX	1SDA077552R1	ZBVEUJBE000A000000XX			
			E2.2V-A 1600 Ekip Touch LSIG	1SDA077383R1	Z2VEUJBF000A000000XX	1SDA077553R1	ZBVEUJBF000A000000XX			
			E2.2V-A 1600 Ekip Hi-Touch LSI	1SDA077385R1	Z2VEUJBJ200A000000XX	1SDA077555R1	ZBVEUJBJ200A000000XX			
			E2.2V-A 1600 Ekip Hi-Touch LSIG	1SDA077386R1	Z2VEUJBK200A000000XX	1SDA077556R1	ZBVEUJBK200A000000XX			
			E2.2V-A 2000 Ekip Dip LI	1SDA077388R1	Z2VFUKBA000A000000XX	1SDA077558R1	ZBVFUKBA000A000000XX			
			E2.2V-A 2000 Ekip Dip LSI	1SDA077389R1	Z2VFUKBB000A000000XX	1SDA077559R1	ZBVFUKBB000A000000XX			
	2000	100	85	E2.2V-A 2000 Ekip Dip LSIG	1SDA077390R1	Z2VFUKBC000A000000XX	1SDA077560R1	ZBVFUKBC000A000000XX		
				E2.2V-A 2000 Ekip Touch LI	1SDA077391R1	Z2VFUKBD000A000000XX	1SDA077561R1	ZBVFUKBD000A000000XX		
				E2.2V-A 2000 Ekip Touch LSI	1SDA077392R1	Z2VFUKBE000A000000XX	1SDA077562R1	ZBVFUKBE000A000000XX		
				E2.2V-A 2000 Ekip Touch LSIG	1SDA077393R1	Z2VFUKBF000A000000XX	1SDA077563R1	ZBVFUKBF000A000000XX		
				E2.2V-A 2000 Ekip Hi-Touch LSI	1SDA077395R1	Z2VFUKBJ200A000000XX	1SDA077565R1	ZBVFUKBJ200A000000XX		
				E2.2V-A 2000 Ekip Hi-Touch LSIG	1SDA077396R1	Z2VFUKBK200A000000XX	1SDA077566R1	ZBVFUKBK200A000000XX		



SACE Emax 2 E4.2S-A/H-A - Orientable rear terminals up to 2500 A (HR)

Size	Frame Amps	Int. Rating (kA@50kV)	Withstand (kA)	Type	3 Poles		4 Poles		
					Global code	U.S. / Canada code	Global code	U.S. / Canada code	
E4.2S-A	2500	65	65	E4.2S-A 2500 Ekip Dip LI	1SDA077998R1	Z4SGULBA000A000000XX	1SDA078228R1	ZCSGULBA000A000000XX	
				E4.2S-A 2500 Ekip Dip LSI	1SDA077999R1	Z4SGULBB000A000000XX	1SDA078229R1	ZCSGULBB000A000000XX	
				E4.2S-A 2500 Ekip Dip LSIG	1SDA078000R1	Z4SGULBC000A000000XX	1SDA078230R1	ZCSGULBC000A000000XX	
				E4.2S-A 2500 Ekip Touch LI	1SDA078001R1	Z4SGULBD000A000000XX	1SDA078231R1	ZCSGULBD000A000000XX	
				E4.2S-A 2500 Ekip Touch LSI	1SDA078002R1	Z4SGULBE000A000000XX	1SDA078232R1	ZCSGULBE000A000000XX	
				E4.2S-A 2500 Ekip Touch LSIG	1SDA078003R1	Z4SGULBF000A000000XX	1SDA078233R1	ZCSGULBF000A000000XX	
		E4.2S-A 2500 Ekip Hi-Touch LSI	1SDA078005R1	Z4SGULBJ200A000000XX	1SDA078235R1	ZCSGULBJ200A000000XX			
		E4.2S-A 2500 Ekip Hi-Touch LSIG	1SDA078006R1	Z4SGULBK200A000000XX	1SDA078236R1	ZCSGULBK200A000000XX			
		3200 (*)	65	65	E4.2S-A 3200 Ekip Dip LI	1SDA078008R1	Z4SHUNBA000A000000XX	1SDA078238R1	ZCSHUNBA000A000000XX
					E4.2S-A 3200 Ekip Dip LSI	1SDA078009R1	Z4SHUNBB000A000000XX	1SDA078239R1	ZCSHUNBB000A000000XX
					E4.2S-A 3200 Ekip Dip LSIG	1SDA078010R1	Z4SHUNBC000A000000XX	1SDA078240R1	ZCSHUNBC000A000000XX
					E4.2S-A 3200 Ekip Touch LI	1SDA078011R1	Z4SHUNBD000A000000XX	1SDA078241R1	ZCSHUNBD000A000000XX
	E4.2S-A 3200 Ekip Touch LSI				1SDA078012R1	Z4SHUNBE000A000000XX	1SDA078242R1	ZCSHUNBE000A000000XX	
	E4.2S-A 3200 Ekip Touch LSIG				1SDA078013R1	Z4SHUNBF000A000000XX	1SDA078243R1	ZCSHUNBF000A000000XX	
	3600 (*)	65	65	E4.2S-A 3200 Ekip Hi-Touch LSI	1SDA078015R1	Z4SHUNBJ200A000000XX	1SDA078245R1	ZCSHUNBJ200A000000XX	
				E4.2S-A 3200 Ekip Hi-Touch LSIG	1SDA078016R1	Z4SHUNBK200A000000XX	1SDA078246R1	ZCSHUNBK200A000000XX	
				E4.2S-A 3600 Ekip Dip LI	1SDA078018R1	Z4SZUSBA000A000000XX	-	-	
				E4.2S-A 3600 Ekip Dip LSI	1SDA078019R1	Z4SZUSBB000A000000XX	-	-	
				E4.2S-A 3600 Ekip Dip LSIG	1SDA078020R1	Z4SZUSBC000A000000XX	-	-	
				E4.2S-A 3600 Ekip Touch LI	1SDA078021R1	Z4SZUSBD000A000000XX	-	-	
	E4.2H-A	2500	85	85	E4.2H-A 2500 Ekip Dip LI	1SDA077908R1	Z4HGULBA000A000000XX	1SDA078138R1	ZCHGULBA000A000000XX
					E4.2H-A 2500 Ekip Dip LSI	1SDA077909R1	Z4HGULBB000A000000XX	1SDA078139R1	ZCHGULBB000A000000XX
					E4.2H-A 2500 Ekip Dip LSIG	1SDA077910R1	Z4HGULBC000A000000XX	1SDA078140R1	ZCHGULBC000A000000XX
					E4.2H-A 2500 Ekip Touch LI	1SDA077911R1	Z4HGULBD000A000000XX	1SDA078141R1	ZCHGULBD000A000000XX
E4.2H-A 2500 Ekip Touch LSI					1SDA077912R1	Z4HGULBE000A000000XX	1SDA078142R1	ZCHGULBE000A000000XX	
E4.2H-A 2500 Ekip Touch LSIG					1SDA077913R1	Z4HGULBF000A000000XX	1SDA078143R1	ZCHGULBF000A000000XX	
E4.2H-A 2500 Ekip Hi-Touch LSI			1SDA077915R1	Z4HGULBJ200A000000XX	1SDA078145R1	ZCHGULBJ200A000000XX			
E4.2H-A 2500 Ekip Hi-Touch LSIG			1SDA077916R1	Z4HGULBK200A000000XX	1SDA078146R1	ZCHGULBK200A000000XX			
3200 (*)			85	85	E4.2H-A 3200 Ekip Dip LI	1SDA077918R1	Z4HHUNBA000A000000XX	1SDA078148R1	ZCHHUNBA000A000000XX
					E4.2H-A 3200 Ekip Dip LSI	1SDA077919R1	Z4HHUNBB000A000000XX	1SDA078149R1	ZCHHUNBB000A000000XX
					E4.2H-A 3200 Ekip Dip LSIG	1SDA077920R1	Z4HHUNBC000A000000XX	1SDA078150R1	ZCHHUNBC000A000000XX
					E4.2H-A 3200 Ekip Touch LI	1SDA077921R1	Z4HHUNBD000A000000XX	1SDA078151R1	ZCHHUNBD000A000000XX
		E4.2H-A 3200 Ekip Touch LSI			1SDA077922R1	Z4HHUNBE000A000000XX	1SDA078152R1	ZCHHUNBE000A000000XX	
		E4.2H-A 3200 Ekip Touch LSIG			1SDA077923R1	Z4HHUNBF000A000000XX	1SDA078153R1	ZCHHUNBF000A000000XX	
3600 (*)		65	65	E4.2H-A 3200 Ekip Hi-Touch LSI	1SDA077925R1	Z4HHUNBJ200A000000XX	1SDA078155R1	ZCHHUNBJ200A000000XX	
				E4.2H-A 3200 Ekip Hi-Touch LSIG	1SDA077926R1	Z4HHUNBK200A000000XX	1SDA078156R1	ZCHHUNBK200A000000XX	
				E4.2H-A 3600 Ekip Dip LI	1SDA077928R1	Z4HZUSBA000A000000XX	-	-	
				E4.2H-A 3600 Ekip Dip LSI	1SDA077929R1	Z4HZUSBB000A000000XX	-	-	
				E4.2H-A 3600 Ekip Dip LSIG	1SDA077930R1	Z4HZUSBC000A000000XX	-	-	
				E4.2H-A 3600 Ekip Touch LI	1SDA077931R1	Z4HZUSBD000A000000XX	-	-	
3600 (*)		65	65	E4.2H-A 3600 Ekip Touch LSI	1SDA077932R1	Z4HZUSBE000A000000XX	-	-	
				E4.2H-A 3600 Ekip Touch LSIG	1SDA077933R1	Z4HZUSBF000A000000XX	-	-	
				E4.2H-A 3600 Ekip Hi-Touch LSI	1SDA077935R1	Z4HZUSBJ200A000000XX	-	-	
				E4.2H-A 3600 Ekip Hi-Touch LSIG	1SDA077936R1	Z4HZUSBK200A000000XX	-	-	

* 3200A/3600A ratings only with rear vertical terminals

Automatic circuit breakers

Fixed version for power distribution



SACE Emax 2 E4.2V-A • Orientable rear terminals up to 2500 A (HR)

Size	Frame Amps	Int. Rating (kA@50kV)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E4.2V-A	800	100	85	E4.2V-A 800 Ekip Dip LI	1SDA078028R1	Z4VCUFBA000A000000XX	1SDA078258R1	ZCVCUFBA000A000000XX
				E4.2V-A 800 Ekip Dip LSI	1SDA078029R1	Z4VCUFBB000A000000XX	1SDA078259R1	ZCVCUFBB000A000000XX
				E4.2V-A 800 Ekip Dip LSIG	1SDA078030R1	Z4VCUFBC000A000000XX	1SDA078260R1	ZCVCUFBC000A000000XX
				E4.2V-A 800 Ekip Touch LI	1SDA078031R1	Z4VCUFBD000A000000XX	1SDA078261R1	ZCVCUFBD000A000000XX
				E4.2V-A 800 Ekip Touch LSI	1SDA078032R1	Z4VCUFBE000A000000XX	1SDA078262R1	ZCVCUFBE000A000000XX
				E4.2V-A 800 Ekip Touch LSIG	1SDA078033R1	Z4VCUFBF000A000000XX	1SDA078263R1	ZCVCUFBF000A000000XX
				E4.2V-A 800 Ekip Hi-Touch LSI	1SDA078035R1	Z4VCUFBJ200A000000XX	1SDA078265R1	ZCVCUFBJ200A000000XX
				E4.2V-A 800 Ekip Hi-Touch LSIG	1SDA078036R1	Z4VCUFBK200A000000XX	1SDA078266R1	ZCVCUFBK200A000000XX
1600	100	85	E4.2V-A 1600 Ekip Dip LI	1SDA078038R1	Z4VEUJBA000A000000XX	1SDA078268R1	ZCVEUJBA000A000000XX	
			E4.2V-A 1600 Ekip Dip LSI	1SDA078039R1	Z4VEUJBB000A000000XX	1SDA078269R1	ZCVEUJBB000A000000XX	
			E4.2V-A 1600 Ekip Dip LSIG	1SDA078040R1	Z4VEUJBC000A000000XX	1SDA078270R1	ZCVEUJBC000A000000XX	
			E4.2V-A 1600 Ekip Touch LI	1SDA078041R1	Z4VEUJBD000A000000XX	1SDA078271R1	ZCVEUJBD000A000000XX	
			E4.2V-A 1600 Ekip Touch LSI	1SDA078042R1	Z4VEUJBE000A000000XX	1SDA078272R1	ZCVEUJBE000A000000XX	
			E4.2V-A 1600 Ekip Touch LSIG	1SDA078043R1	Z4VEUJBF000A000000XX	1SDA078273R1	ZCVEUJBF000A000000XX	
			E4.2V-A 1600 Ekip Hi-Touch LSI	1SDA078045R1	Z4VEUJBJ200A000000XX	1SDA078275R1	ZCVEUJBJ200A000000XX	
			E4.2V-A 1600 Ekip Hi-Touch LSIG	1SDA078046R1	Z4VEUJBK200A000000XX	1SDA078276R1	ZCVEUJBK200A000000XX	
2000	100	85	E4.2V-A 2000 Ekip Dip LI	1SDA078048R1	Z4VFUKBA000A000000XX	1SDA078278R1	ZCVFUKBA000A000000XX	
			E4.2V-A 2000 Ekip Dip LSI	1SDA078049R1	Z4VFUKBB000A000000XX	1SDA078279R1	ZCVFUKBB000A000000XX	
			E4.2V-A 2000 Ekip Dip LSIG	1SDA078050R1	Z4VFUKBC000A000000XX	1SDA078280R1	ZCVFUKBC000A000000XX	
			E4.2V-A 2000 Ekip Touch LI	1SDA078051R1	Z4VFUKBD000A000000XX	1SDA078281R1	ZCVFUKBD000A000000XX	
			E4.2V-A 2000 Ekip Touch LSI	1SDA078052R1	Z4VFUKBE000A000000XX	1SDA078282R1	ZCVFUKBE000A000000XX	
			E4.2V-A 2000 Ekip Touch LSIG	1SDA078053R1	Z4VFUKBF000A000000XX	1SDA078283R1	ZCVFUKBF000A000000XX	
			E4.2V-A 2000 Ekip Hi-Touch LSI	1SDA078055R1	Z4VFUKBJ200A000000XX	1SDA078285R1	ZCVFUKBJ200A000000XX	
			E4.2V-A 2000 Ekip Hi-Touch LSIG	1SDA078056R1	Z4VFUKBK200A000000XX	1SDA078286R1	ZCVFUKBK200A000000XX	
2500	100	85	E4.2V-A 2500 Ekip Dip LI	1SDA078058R1	Z4VGULBA000A000000XX	1SDA078288R1	ZCVGULBA000A000000XX	
			E4.2V-A 2500 Ekip Dip LSI	1SDA078059R1	Z4VGULBB000A000000XX	1SDA078289R1	ZCVGULBB000A000000XX	
			E4.2V-A 2500 Ekip Dip LSIG	1SDA078060R1	Z4VGULBC000A000000XX	1SDA078290R1	ZCVGULBC000A000000XX	
			E4.2V-A 2500 Ekip Touch LI	1SDA078061R1	Z4VGULBD000A000000XX	1SDA078291R1	ZCVGULBD000A000000XX	
			E4.2V-A 2500 Ekip Touch LSI	1SDA078062R1	Z4VGULBE000A000000XX	1SDA078292R1	ZCVGULBE000A000000XX	
			E4.2V-A 2500 Ekip Touch LSIG	1SDA078063R1	Z4VGULBF000A000000XX	1SDA078293R1	ZCVGULBF000A000000XX	
			E4.2V-A 2500 Ekip Hi-Touch LSI	1SDA078065R1	Z4VGULBJ200A000000XX	1SDA078295R1	ZCVGULBJ200A000000XX	
			E4.2V-A 2500 Ekip Hi-Touch LSIG	1SDA078066R1	Z4VGULBK200A000000XX	1SDA078296R1	ZCVGULBK200A000000XX	



SACE Emax 2 E4.2V-A • Orientable rear terminals up to 2500 A (HR)

Size	Frame Amps	Int. Rating (kA@50kV)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E4.2V-A	3200 (*)	100	85	E4.2V-A 3200 Ekip Dip LI	1SDA078068R1	Z4VHUNBA000A000000XX	1SDA078298R1	ZCVHUNBA000A000000XX
				E4.2V-A 3200 Ekip Dip LSI	1SDA078069R1	Z4VHUNBB000A000000XX	1SDA078299R1	ZCVHUNBB000A000000XX
				E4.2V-A 3200 Ekip Dip LSIG	1SDA078070R1	Z4VHUNBC000A000000XX	1SDA078300R1	ZCVHUNBC000A000000XX
				E4.2V-A 3200 Ekip Touch LI	1SDA078071R1	Z4VHUNBD000A000000XX	1SDA078301R1	ZCVHUNBD000A000000XX
				E4.2V-A 3200 Ekip Touch LSI	1SDA078072R1	Z4VHUNBE000A000000XX	1SDA078302R1	ZCVHUNBE000A000000XX
				E4.2V-A 3200 Ekip Touch LSIG	1SDA078073R1	Z4VHUNBF000A000000XX	1SDA078303R1	ZCVHUNBF000A000000XX
				E4.2V-A 3200 Ekip Hi-Touch LSI	1SDA078075R1	Z4VHUNBJ200A000000XX	1SDA078305R1	ZCVHUNBJ200A000000XX
				E4.2V-A 3200 Ekip Hi-Touch LSIG	1SDA078076R1	Z4VHUNBK200A000000XX	1SDA078306R1	ZCVHUNBK200A000000XX
	3600 (*)	100	85	E4.2V-A 3600 Ekip Dip LI	1SDA078078R1	Z4VZUSBA000A000000XX	-	-
				E4.2V-A 3600 Ekip Dip LSI	1SDA078079R1	Z4VZUSBB000A000000XX	-	-
				E4.2V-A 3600 Ekip Dip LSIG	1SDA078080R1	Z4VZUSBC000A000000XX	-	-
				E4.2V-A 3600 Ekip Touch LI	1SDA078081R1	Z4VZUSBD000A000000XX	-	-
				E4.2V-A 3600 Ekip Touch LSI	1SDA078082R1	Z4VZUSBE000A000000XX	-	-
				E4.2V-A 3600 Ekip Touch LSIG	1SDA078083R1	Z4VZUSBF000A000000XX	-	-
E4.2V-A 3600 Ekip Hi-Touch LSI				1SDA078085R1	Z4VZUSBJ200A000000XX	-	-	
E4.2V-A 3600 Ekip Hi-Touch LSIG				1SDA078086R1	Z4VZUSBK200A000000XX	-	-	

* 3200A/3600A ratings only with rear vertical terminals

Automatic circuit breakers

Fixed version for power distribution



SACE Emax 2 E6.2H-A/V-A • Orientable rear terminals up to 5000A (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E6.2H-A	4000	85	85	E6.2H-A 4000 Ekip Dip LI	1SDA078828R1	Z6HJURBA000A000000XX	1SDA078948R1	ZDHJURBA000A000000XX
				E6.2H-A 4000 Ekip Dip LSI	1SDA078829R1	Z6HJURBB000A000000XX	1SDA078949R1	ZDHJURBB000A000000XX
				E6.2H-A 4000 Ekip Dip LSIG	1SDA078830R1	Z6HJURBC000A000000XX	1SDA078950R1	ZDHJURBC000A000000XX
				E6.2H-A 4000 Ekip Touch LI	1SDA078831R1	Z6HJURBD000A000000XX	1SDA078951R1	ZDHJURBD000A000000XX
				E6.2H-A 4000 Ekip Touch LSI	1SDA078832R1	Z6HJURBE000A000000XX	1SDA078952R1	ZDHJURBE000A000000XX
				E6.2H-A 4000 Ekip Touch LSIG	1SDA078833R1	Z6HJURBF000A000000XX	1SDA078953R1	ZDHJURBF000A000000XX
				E6.2H-A 4000 Ekip Hi-Touch LSI	1SDA078835R1	Z6HJURBJ200A000000XX	1SDA078955R1	ZDHJURBJ200A000000XX
				E6.2H-A 4000 Ekip Hi-Touch LSIG	1SDA078836R1	Z6HJURBK200A000000XX	1SDA078956R1	ZDHJURBK200A000000XX
	5000	85	85	E6.2H-A 5000 Ekip Dip LI	1SDA078838R1	Z6HKUSBA000A000000XX	1SDA078958R1	ZDHKUSBA000A000000XX
				E6.2H-A 5000 Ekip Dip LSI	1SDA078839R1	Z6HKUSBB000A000000XX	1SDA078959R1	ZDHKUSBB000A000000XX
				E6.2H-A 5000 Ekip Dip LSIG	1SDA078840R1	Z6HKUSBC000A000000XX	1SDA078960R1	ZDHKUSBC000A000000XX
				E6.2H-A 5000 Ekip Touch LI	1SDA078841R1	Z6HKUSBD000A000000XX	1SDA078961R1	ZDHKUSBD000A000000XX
				E6.2H-A 5000 Ekip Touch LSI	1SDA078842R1	Z6HKUSBE000A000000XX	1SDA078962R1	ZDHKUSBE000A000000XX
				E6.2H-A 5000 Ekip Touch LSIG	1SDA078843R1	Z6HKUSBF000A000000XX	1SDA078963R1	ZDHKUSBF000A000000XX
E6.2V-A	4000	100	100	E6.2V-A 4000 Ekip Dip LI	1SDA078888R1	Z6VJURBA000A000000XX	1SDA079008R1	ZDVJURBA000A000000XX
				E6.2V-A 4000 Ekip Dip LSI	1SDA078889R1	Z6VJURBB000A000000XX	1SDA079009R1	ZDVJURBB000A000000XX
				E6.2V-A 4000 Ekip Dip LSIG	1SDA078890R1	Z6VJURBC000A000000XX	1SDA079010R1	ZDVJURBC000A000000XX
				E6.2V-A 4000 Ekip Touch LI	1SDA078891R1	Z6VJURBD000A000000XX	1SDA079011R1	ZDVJURBD000A000000XX
				E6.2V-A 4000 Ekip Touch LSI	1SDA078892R1	Z6VJURBE000A000000XX	1SDA079012R1	ZDVJURBE000A000000XX
				E6.2V-A 4000 Ekip Touch LSIG	1SDA078893R1	Z6VJURBF000A000000XX	1SDA079013R1	ZDVJURBF000A000000XX
				E6.2V-A 4000 Ekip Hi-Touch LSI	1SDA078895R1	Z6VJURBJ200A000000XX	1SDA079015R1	ZDVJURBJ200A000000XX
				E6.2V-A 4000 Ekip Hi-Touch LSIG	1SDA078896R1	Z6VJURBK200A000000XX	1SDA079016R1	ZDVJURBK200A000000XX
	5000	100	100	E6.2V-A 5000 Ekip Dip LI	1SDA078898R1	Z6VKUSBA000A000000XX	1SDA079018R1	ZDVKUSBA000A000000XX
				E6.2V-A 5000 Ekip Dip LSI	1SDA078899R1	Z6VKUSBB000A000000XX	1SDA079019R1	ZDVKUSBB000A000000XX
				E6.2V-A 5000 Ekip Dip LSIG	1SDA078900R1	Z6VKUSBC000A000000XX	1SDA079020R1	ZDVKUSBC000A000000XX
				E6.2V-A 5000 Ekip Touch LI	1SDA078901R1	Z6VKUSBD000A000000XX	1SDA079021R1	ZDVKUSBD000A000000XX
				E6.2V-A 5000 Ekip Touch LSI	1SDA078902R1	Z6VKUSBE000A000000XX	1SDA079022R1	ZDVKUSBE000A000000XX
				E6.2V-A 5000 Ekip Touch LSIG	1SDA078903R1	Z6VKUSBF000A000000XX	1SDA079023R1	ZDVKUSBF000A000000XX
E6.2V-A 5000 Ekip Hi-Touch LSI	1SDA078905R1	Z6VKUSBJ200A000000XX	1SDA079025R1	ZDVKUSBJ200A000000XX				
	E6.2V-A 5000 Ekip Hi-Touch LSIG	1SDA078906R1	Z6VKUSBK200A000000XX	1SDA079026R1	ZDVKUSBK200A000000XX			

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB



SACE Emax 2 E6.2H-A/f/V-A/f full size • Orientable rear terminals up to 5000A (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	4 Poles	
					Global code	U.S. / Canada code
E6.2H-A/f	4000	85	85	E6.2H-A/f 4000 Ekip Dip LI	1SDA079308R1	ZEHJURBA000A000000XX
				E6.2H-A/f 4000 Ekip Dip LSI	1SDA079309R1	ZEHJURBB000A000000XX
				E6.2H-A/f 4000 Ekip Dip LSIG	1SDA079310R1	ZEHJURBC000A000000XX
				E6.2H-A/f 4000 Ekip Touch LI	1SDA079311R1	ZEHJURBD000A000000XX
				E6.2H-A/f 4000 Ekip Touch LSI	1SDA079312R1	ZEHJURBE000A000000XX
				E6.2H-A/f 4000 Ekip Touch LSIG	1SDA079313R1	ZEHJURBF000A000000XX
				E6.2H-A/f 4000 Ekip Hi-Touch LSI	1SDA079315R1	ZEHJURBJ200A000000XX
				E6.2H-A/f 4000 Ekip Hi-Touch LSIG	1SDA079316R1	ZEHJURBK200A000000XX
	5000	85	85	E6.2H-A/f 5000 Ekip Dip LI	1SDA079318R1	ZEHKUSBA000A000000XX
				E6.2H-A/f 5000 Ekip Dip LSI	1SDA079319R1	ZEHKUSBB000A000000XX
				E6.2H-A/f 5000 Ekip Dip LSIG	1SDA079320R1	ZEHKUSBC000A000000XX
				E6.2H-A/f 5000 Ekip Touch LI	1SDA079321R1	ZEHKUSBD000A000000XX
				E6.2H-A/f 5000 Ekip Touch LSI	1SDA079322R1	ZEHKUSBE000A000000XX
				E6.2H-A/f 5000 Ekip Touch LSIG	1SDA079323R1	ZEHKUSBF000A000000XX
E6.2V-A/f	4000	100	100	E6.2V-A/f 4000 Ekip Dip LI	1SDA079368R1	ZEVJURBA000A000000XX
				E6.2V-A/f 4000 Ekip Dip LSI	1SDA079369R1	ZEVJURBB000A000000XX
				E6.2V-A/f 4000 Ekip Dip LSIG	1SDA079370R1	ZEVJURBC000A000000XX
				E6.2V-A/f 4000 Ekip Touch LI	1SDA079371R1	ZEVJURBD000A000000XX
				E6.2V-A/f 4000 Ekip Touch LSI	1SDA079372R1	ZEVJURBE000A000000XX
				E6.2V-A/f 4000 Ekip Touch LSIG	1SDA079373R1	ZEVJURBF000A000000XX
				E6.2V-A/f 4000 Ekip Hi-Touch LSI	1SDA079375R1	ZEVJURBJ200A000000XX
				E6.2V-A/f 4000 Ekip Hi-Touch LSIG	1SDA079376R1	ZEVJURBK200A000000XX
	5000	100	100	E6.2V-A/f 5000 Ekip Dip LI	1SDA079378R1	ZEVKUSBA000A000000XX
				E6.2V-A/f 5000 Ekip Dip LSI	1SDA079379R1	ZEVKUSBB000A000000XX
				E6.2V-A/f 5000 Ekip Dip LSIG	1SDA079380R1	ZEVKUSBC000A000000XX
				E6.2V-A/f 5000 Ekip Touch LI	1SDA079381R1	ZEVKUSBD000A000000XX
				E6.2V-A/f 5000 Ekip Touch LSI	1SDA079382R1	ZEVKUSBE000A000000XX
				E6.2V-A/f 5000 Ekip Touch LSIG	1SDA079383R1	ZEVKUSBF000A000000XX
E6.2V-A/f 5000 Ekip Hi-Touch LSI	1SDA079385R1	ZEVKUSBJ200A000000XX				
E6.2V-A/f 5000 Ekip Hi-Touch LSIG	1SDA079386R1	ZEVKUSBK200A000000XX				

Automatic circuit breakers

Drawout version for power distribution



SACE Emax 2 E1.2B-A/N-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2B-A	800	42	42	E1.2B-A 800 Ekip Dip LI	1SDA077068R1	Z1BCUFAA000A000000XX	1SDA077148R1	ZABCUFAA000A000000XX
				E1.2B-A 800 Ekip Dip LSI	1SDA077069R1	Z1BCUFAB000A000000XX	1SDA077149R1	ZABCUFAB000A000000XX
				E1.2B-A 800 Ekip Dip LSIG	1SDA077070R1	Z1BCUFAC000A000000XX	1SDA077150R1	ZABCUFAC000A000000XX
				E1.2B-A 800 Ekip Touch LI	1SDA077071R1	Z1BCUFAD000A000000XX	1SDA077151R1	ZABCUFAD000A000000XX
				E1.2B-A 800 Ekip Touch LSI	1SDA077072R1	Z1BCUFAE000A000000XX	1SDA077152R1	ZABCUFAE000A000000XX
				E1.2B-A 800 Ekip Touch LSIG	1SDA077073R1	Z1BCUFAF000A000000XX	1SDA077153R1	ZABCUFAF000A000000XX
				E1.2B-A 800 Ekip Hi-Touch LSI	1SDA077075R1	Z1BCUFAJ200A000000XX	1SDA077155R1	ZABCUFAJ200A000000XX
				E1.2B-A 800 Ekip Hi-Touch LSIG	1SDA077076R1	Z1BCUFAK200A000000XX	1SDA077156R1	ZABCUFAK200A000000XX
	1200	42	42	E1.2B-A 1200 Ekip Dip LI	1SDA077078R1	Z1BDUHAA000A000000XX	1SDA077158R1	ZABDUHAA000A000000XX
				E1.2B-A 1200 Ekip Dip LSI	1SDA077079R1	Z1BDUHAB000A000000XX	1SDA077159R1	ZABDUHAB000A000000XX
				E1.2B-A 1200 Ekip Dip LSIG	1SDA077080R1	Z1BDUHAC000A000000XX	1SDA077160R1	ZABDUHAC000A000000XX
				E1.2B-A 1200 Ekip Touch LI	1SDA077081R1	Z1BDUHAD000A000000XX	1SDA077161R1	ZABDUHAD000A000000XX
				E1.2B-A 1200 Ekip Touch LSI	1SDA077082R1	Z1BDUHAEE000A000000XX	1SDA077162R1	ZABDUHAEE000A000000XX
				E1.2B-A 1200 Ekip Touch LSIG	1SDA077083R1	Z1BDUHAF000A000000XX	1SDA077163R1	ZABDUHAF000A000000XX
				E1.2B-A 1200 Ekip Hi-Touch LSI	1SDA077085R1	Z1BDUHAJ200A000000XX	1SDA077165R1	ZABDUHAJ200A000000XX
				E1.2B-A 1200 Ekip Hi-Touch LSIG	1SDA077086R1	Z1BDUHAK200A000000XX	1SDA077166R1	ZABDUHAK200A000000XX
E1.2N-A	800	50	50	E1.2N-A 800 Ekip Dip LI	1SDA077088R1	Z1NCUFAA000A000000XX	1SDA077168R1	ZANCUFAA000A000000XX
				E1.2N-A 800 Ekip Dip LSI	1SDA077089R1	Z1NCUFAB000A000000XX	1SDA077169R1	ZANCUFAB000A000000XX
				E1.2N-A 800 Ekip Dip LSIG	1SDA077090R1	Z1NCUFAC000A000000XX	1SDA077170R1	ZANCUFAC000A000000XX
				E1.2N-A 800 Ekip Touch LI	1SDA077091R1	Z1NCUFAD000A000000XX	1SDA077171R1	ZANCUFAD000A000000XX
				E1.2N-A 800 Ekip Touch LSI	1SDA077092R1	Z1NCUFAE000A000000XX	1SDA077172R1	ZANCUFAE000A000000XX
				E1.2N-A 800 Ekip Touch LSIG	1SDA077093R1	Z1NCUFAF000A000000XX	1SDA077173R1	ZANCUFAF000A000000XX
				E1.2N-A 800 Ekip Hi-Touch LSI	1SDA077095R1	Z1NCUFAJ200A000000XX	1SDA077175R1	ZANCUFAJ200A000000XX
				E1.2N-A 800 Ekip Hi-Touch LSIG	1SDA077096R1	Z1NCUFAK200A000000XX	1SDA077176R1	ZANCUFAK200A000000XX
	1200	50	50	E1.2N-A 1200 Ekip Dip LI	1SDA077098R1	Z1NDUHAA000A000000XX	1SDA077178R1	ZANDUHAA000A000000XX
				E1.2N-A 1200 Ekip Dip LSI	1SDA077099R1	Z1NDUHAB000A000000XX	1SDA077179R1	ZANDUHAB000A000000XX
				E1.2N-A 1200 Ekip Dip LSIG	1SDA077100R1	Z1NDUHAC000A000000XX	1SDA077180R1	ZANDUHAC000A000000XX
				E1.2N-A 1200 Ekip Touch LI	1SDA077101R1	Z1NDUHAD000A000000XX	1SDA077181R1	ZANDUHAD000A000000XX
				E1.2N-A 1200 Ekip Touch LSI	1SDA077102R1	Z1NDUHAEE000A000000XX	1SDA077183R1	ZANDUHAE000A000000XX
				E1.2N-A 1200 Ekip Touch LSIG	1SDA077103R1	Z1NDUHAF000A000000XX	1SDA077182R1	ZANDUHAE000A000000XX
				E1.2N-A 1200 Ekip Hi-Touch LSI	1SDA077105R1	Z1NDUHAJ200A000000XX	1SDA077185R1	ZANDUHAJ200A000000XX
				E1.2N-A 1200 Ekip Hi-Touch LSIG	1SDA077106R1	Z1NDUHAK200A000000XX	1SDA077186R1	ZANDUHAK200A000000XX



SACE Emax 2 E1.2S-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2S-A	250	65	50	E1.2S-A 250 Ekip Dip LI	1SDA077108R1	Z1SAUCAA000A000000XX	1SDA077188R1	ZASAUCAA000A000000XX
				E1.2S-A 250 Ekip Dip LSI	1SDA077109R1	Z1SAUCAB000A000000XX	1SDA077189R1	ZASAU CAB000A000000XX
				E1.2S-A 250 Ekip Dip LSIG	1SDA077110R1	Z1SAUCAC000A000000XX	1SDA077190R1	ZASAU CAC000A000000XX
				E1.2S-A 250 Ekip Touch LI	1SDA077111R1	Z1SAUCAD000A000000XX	1SDA077191R1	ZASAU CAD000A000000XX
				E1.2S-A 250 Ekip Touch LSI	1SDA077112R1	Z1SAUCAE000A000000XX	1SDA077192R1	ZASAU CAE000A000000XX
				E1.2S-A 250 Ekip Touch LSIG	1SDA077113R1	Z1SAUCA F000A000000XX	1SDA077193R1	ZASAU CAF000A000000XX
				E1.2S-A 250 Ekip Hi-Touch LSI	1SDA077115R1	Z1SAUCAJ200A000000XX	1SDA077195R1	ZASAU CAJ200A000000XX
				E1.2S-A 250 Ekip Hi-Touch LSIG	1SDA077116R1	Z1SAUCAK200A000000XX	1SDA077196R1	ZASAU CAK200A000000XX
400	65	50	E1.2S-A 400 Ekip Dip LI	1SDA077118R1	Z1SBUDAA000A000000XX	1SDA077198R1	ZASBUDAA000A000000XX	
			E1.2S-A 400 Ekip Dip LSI	1SDA077119R1	Z1SBUDAB000A000000XX	1SDA077199R1	ZASBUDAB000A000000XX	
			E1.2S-A 400 Ekip Dip LSIG	1SDA077120R1	Z1SBUDAC000A000000XX	1SDA077200R1	ZASBUDAC000A000000XX	
			E1.2S-A 400 Ekip Touch LI	1SDA077121R1	Z1SBUDAD000A000000XX	1SDA077201R1	ZASBUDAD000A000000XX	
			E1.2S-A 400 Ekip Touch LSI	1SDA077122R1	Z1SBUDAE000A000000XX	1SDA077202R1	ZASBUDAE000A000000XX	
			E1.2S-A 400 Ekip Touch LSIG	1SDA077123R1	Z1SBUDAF000A000000XX	1SDA077203R1	ZASBUDAF000A000000XX	
			E1.2S-A 400 Ekip Hi-Touch LSI	1SDA077125R1	Z1SBUDAJ200A000000XX	1SDA077205R1	ZASBUDAJ200A000000XX	
			E1.2S-A 400 Ekip Hi-Touch LSIG	1SDA077126R1	Z1SBUDAK200A000000XX	1SDA077206R1	ZASBUDAK200A000000XX	
800	65	50	E1.2S-A 800 Ekip Dip LI	1SDA077128R1	Z1SCUFAA000A000000XX	1SDA077208R1	ZASCUFAA000A000000XX	
			E1.2S-A 800 Ekip Dip LSI	1SDA077129R1	Z1SCUFAB000A000000XX	1SDA077209R1	ZASCUFAB000A000000XX	
			E1.2S-A 800 Ekip Dip LSIG	1SDA077130R1	Z1SCUFAC000A000000XX	1SDA077210R1	ZASCUFAC000A000000XX	
			E1.2S-A 800 Ekip Touch LI	1SDA077131R1	Z1SCUFAD000A000000XX	1SDA077211R1	ZASCUFAD000A000000XX	
			E1.2S-A 800 Ekip Touch LSI	1SDA077132R1	Z1SCUFAE000A000000XX	1SDA077212R1	ZASCUFAE000A000000XX	
			E1.2S-A 800 Ekip Touch LSIG	1SDA077133R1	Z1SCUF AF000A000000XX	1SDA077213R1	ZASCUFAF000A000000XX	
			E1.2S-A 800 Ekip Hi-Touch LSI	1SDA077135R1	Z1SCUFAJ200A000000XX	1SDA077215R1	ZASCUFAJ200A000000XX	
			E1.2S-A 800 Ekip Hi-Touch LSIG	1SDA077136R1	Z1SCUF AK200A000000XX	1SDA077216R1	ZASCUFAK200A000000XX	
1200	65	50	E1.2S-A 1200 Ekip Dip LI	1SDA077138R1	Z1SDUHAA000A000000XX	1SDA077218R1	ZASDUHAA000A000000XX	
			E1.2S-A 1200 Ekip Dip LSI	1SDA077139R1	Z1SDUHAB000A000000XX	1SDA077219R1	ZASDUHAB000A000000XX	
			E1.2S-A 1200 Ekip Dip LSIG	1SDA077140R1	Z1SDUHAC000A000000XX	1SDA077220R1	ZASDUHAC000A000000XX	
			E1.2S-A 1200 Ekip Touch LI	1SDA077141R1	Z1SDUHAD000A000000XX	1SDA077221R1	ZASDUHAD000A000000XX	
			E1.2S-A 1200 Ekip Touch LSI	1SDA077142R1	Z1SDUHAE000A000000XX	1SDA077222R1	ZASDUHAE000A000000XX	
			E1.2S-A 1200 Ekip Touch LSIG	1SDA077143R1	Z1SDUHAF000A000000XX	1SDA077223R1	ZASDUHAF000A000000XX	
			E1.2S-A 1200 Ekip Hi-Touch LSI	1SDA077145R1	Z1SDUHAJ200A000000XX	1SDA077225R1	ZASDUHAJ200A000000XX	
			E1.2S-A 1200 Ekip Hi-Touch LSIG	1SDA077146R1	Z1SDUHAK200A000000XX	1SDA077226R1	ZASDUHAK200A000000XX	

Automatic circuit breakers

Drawout version for power distribution



SACE Emax 2 E2.2B-A/N-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles		
					Global code	U.S. / Canada code	Global code	U.S. / Canada code	
E2.2B-A	1600	42	42	E2.2B-A 1600 Ekip Dip LI	1SDA077568R1	Z2BEUJAA000A000000XX	1SDA077738R1	ZBBEUJAA000A000000XX	
				E2.2B-A 1600 Ekip Dip LSI	1SDA077569R1	Z2BEUJAB000A000000XX	1SDA077739R1	ZBBEUJAB000A000000XX	
				E2.2B-A 1600 Ekip Dip LSIG	1SDA077570R1	Z2BEUJAC000A000000XX	1SDA077740R1	ZBBEUJAC000A000000XX	
				E2.2B-A 1600 Ekip Touch LI	1SDA077571R1	Z2BEUJAD000A000000XX	1SDA077741R1	ZBBEUJAD000A000000XX	
				E2.2B-A 1600 Ekip Touch LSI	1SDA077572R1	Z2BEUJAE000A000000XX	1SDA077742R1	ZBBEUJAE000A000000XX	
				E2.2B-A 1600 Ekip Touch LSIG	1SDA077573R1	Z2BEUJAF000A000000XX	1SDA077743R1	ZBBEUJAF000A000000XX	
				E2.2B-A 1600 Ekip Hi-Touch LSI	1SDA077575R1	Z2BEUJAJ200A000000XX	1SDA077745R1	ZBBEUJAJ200A000000XX	
				E2.2B-A 1600 Ekip Hi-Touch LSIG	1SDA077576R1	Z2BEUJAK200A000000XX	1SDA077746R1	ZBBEUJAK200A000000XX	
E2.2N-A	1600	50	50	E2.2N-A 1600 Ekip Dip LI	1SDA077618R1	Z2NEUJAA000A000000XX	1SDA077788R1	ZBNEUJAA000A000000XX	
				E2.2N-A 1600 Ekip Dip LSI	1SDA077619R1	Z2NEUJAB000A000000XX	1SDA077789R1	ZBNEUJAB000A000000XX	
				E2.2N-A 1600 Ekip Dip LSIG	1SDA077620R1	Z2NEUJAC000A000000XX	1SDA077790R1	ZBNEUJAC000A000000XX	
				E2.2N-A 1600 Ekip Touch LI	1SDA077621R1	Z2NEUJAD000A000000XX	1SDA077791R1	ZBNEUJAD000A000000XX	
				E2.2N-A 1600 Ekip Touch LSI	1SDA077622R1	Z2NEUJAE000A000000XX	1SDA077792R1	ZBNEUJAE000A000000XX	
				E2.2N-A 1600 Ekip Touch LSIG	1SDA077623R1	Z2NEUJAF000A000000XX	1SDA077793R1	ZBNEUJAF000A000000XX	
				E2.2N-A 1600 Ekip Hi-Touch LSI	1SDA077625R1	Z2NEUJAJ200A000000XX	1SDA077795R1	ZBNEUJAJ200A000000XX	
				E2.2N-A 1600 Ekip Hi-Touch LSIG	1SDA077626R1	Z2NEUJAK200A000000XX	1SDA077796R1	ZBNEUJAK200A000000XX	
	2000	50	50	50	E2.2N-A 2000 Ekip Dip LI	1SDA077628R1	Z2NFUKAA000A000000XX	1SDA077798R1	ZBNFUKAA000A000000XX
					E2.2N-A 2000 Ekip Dip LSI	1SDA077629R1	Z2NFUKAB000A000000XX	1SDA077799R1	ZBNFUKAB000A000000XX
					E2.2N-A 2000 Ekip Dip LSIG	1SDA077630R1	Z2NFUKAC000A000000XX	1SDA077800R1	ZBNFUKAC000A000000XX
					E2.2N-A 2000 Ekip Touch LI	1SDA077631R1	Z2NFUKAD000A000000XX	1SDA077801R1	ZBNFUKAD000A000000XX
					E2.2N-A 2000 Ekip Touch LSI	1SDA077632R1	Z2NFUKAE000A000000XX	1SDA077802R1	ZBNFUKAE000A000000XX
					E2.2N-A 2000 Ekip Touch LSIG	1SDA077633R1	Z2NFUKAF000A000000XX	1SDA077803R1	ZBNFUKAF000A000000XX
					E2.2N-A 2000 Ekip Hi-Touch LSI	1SDA077635R1	Z2NFUKAJ200A000000XX	1SDA077805R1	ZBNFUKAJ200A000000XX
					E2.2N-A 2000 Ekip Hi-Touch LSIG	1SDA077636R1	Z2NFUKAK200A000000XX	1SDA077806R1	ZBNFUKAK200A000000XX



SACE Emax 2 E2.2S-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2S-A	800	65	65	E2.2S-A 800 Ekip Dip LI	1SDA077638R1	Z2SCUFAA000A000000XX	1SDA077808R1	ZBSCUFAA000A000000XX
				E2.2S-A 800 Ekip Dip LSI	1SDA077639R1	Z2SCUFAB000A000000XX	1SDA077809R1	ZBSCUFAB000A000000XX
				E2.2S-A 800 Ekip Dip LSIg	1SDA077640R1	Z2SCUFAC000A000000XX	1SDA077810R1	ZBSCUFAC000A000000XX
				E2.2S-A 800 Ekip Touch LI	1SDA077641R1	Z2SCUFAD000A000000XX	1SDA077811R1	ZBSCUFAD000A000000XX
				E2.2S-A 800 Ekip Touch LSI	1SDA077642R1	Z2SCUFAE000A000000XX	1SDA077812R1	ZBSCUFAE000A000000XX
				E2.2S-A 800 Ekip Touch LSIg	1SDA077643R1	Z2SCUFAF000A000000XX	1SDA077813R1	ZBSCUFAF000A000000XX
				E2.2S-A 800 Ekip Hi-Touch LSI	1SDA077645R1	Z2SCUFAJ200A000000XX	1SDA077815R1	ZBSCUFAJ200A000000XX
				E2.2S-A 800 Ekip Hi-Touch LSIg	1SDA077646R1	Z2SCUFAK200A000000XX	1SDA077816R1	ZBSCUFAK200A000000XX
1200	65	65	E2.2S-A 1200 Ekip Dip LI	1SDA077648R1	Z2SDUHAA000A000000XX	1SDA077818R1	ZBSDUHAA000A000000XX	
			E2.2S-A 1200 Ekip Dip LSI	1SDA077649R1	Z2SDUHAAB000A000000XX	1SDA077819R1	ZBSDUHAAB000A000000XX	
			E2.2S-A 1200 Ekip Dip LSIg	1SDA077650R1	Z2SDUHAC000A000000XX	1SDA077820R1	ZBSDUHAC000A000000XX	
			E2.2S-A 1200 Ekip Touch LI	1SDA077651R1	Z2SDUHAD000A000000XX	1SDA077821R1	ZBSDUHAD000A000000XX	
			E2.2S-A 1200 Ekip Touch LSI	1SDA077652R1	Z2SDUHAEE000A000000XX	1SDA077822R1	ZBSDUHAEE000A000000XX	
			E2.2S-A 1200 Ekip Touch LSIg	1SDA077653R1	Z2SDUHAF000A000000XX	1SDA077823R1	ZBSDUHAF000A000000XX	
			E2.2S-A 1200 Ekip Hi-Touch LSI	1SDA077655R1	Z2SDUHAJ200A000000XX	1SDA077825R1	ZBSDUHAJ200A000000XX	
			E2.2S-A 1200 Ekip Hi-Touch LSIg	1SDA077656R1	Z2SDUHAK200A000000XX	1SDA077826R1	ZBSDUHAK200A000000XX	
1600	65	65	E2.2S-A 1600 Ekip Dip LI	1SDA077658R1	Z2SEUJAA000A000000XX	1SDA077828R1	ZBSEUJAA000A000000XX	
			E2.2S-A 1600 Ekip Dip LSI	1SDA077659R1	Z2SEUJAB000A000000XX	1SDA077829R1	ZBSEUJAB000A000000XX	
			E2.2S-A 1600 Ekip Dip LSIg	1SDA077660R1	Z2SEUJAC000A000000XX	1SDA077830R1	ZBSEUJAC000A000000XX	
			E2.2S-A 1600 Ekip Touch LI	1SDA077661R1	Z2SEUJAD000A000000XX	1SDA077831R1	ZBSEUJAD000A000000XX	
			E2.2S-A 1600 Ekip Touch LSI	1SDA077662R1	Z2SEUJAE000A000000XX	1SDA077832R1	ZBSEUJAE000A000000XX	
			E2.2S-A 1600 Ekip Touch LSIg	1SDA077663R1	Z2SEUJAF000A000000XX	1SDA077833R1	ZBSEUJAF000A000000XX	
			E2.2S-A 1600 Ekip Hi-Touch LSI	1SDA077665R1	Z2SEUJAJ200A000000XX	1SDA077835R1	ZBSEUJAJ200A000000XX	
			E2.2S-A 1600 Ekip Hi-Touch LSIg	1SDA077666R1	Z2SEUJAK200A000000XX	1SDA077836R1	ZBSEUJAK200A000000XX	
2000	65	65	E2.2S-A 2000 Ekip Dip LI	1SDA077668R1	Z2SFUKAA000A000000XX	1SDA077838R1	ZBSFUKAA000A000000XX	
			E2.2S-A 2000 Ekip Dip LSI	1SDA077669R1	Z2SFUKAB000A000000XX	1SDA077839R1	ZBSFUKAB000A000000XX	
			E2.2S-A 2000 Ekip Dip LSIg	1SDA077670R1	Z2SFUKAC000A000000XX	1SDA077840R1	ZBSFUKAC000A000000XX	
			E2.2S-A 2000 Ekip Touch LI	1SDA077671R1	Z2SFUKAD000A000000XX	1SDA077841R1	ZBSFUKAD000A000000XX	
			E2.2S-A 2000 Ekip Touch LSI	1SDA077672R1	Z2SFUKAE000A000000XX	1SDA077842R1	ZBSFUKAE000A000000XX	
			E2.2S-A 2000 Ekip Touch LSIg	1SDA077673R1	Z2SFUKAF000A000000XX	1SDA077843R1	ZBSFUKAF000A000000XX	
			E2.2S-A 2000 Ekip Hi-Touch LSI	1SDA077675R1	Z2SFUKAJ200A000000XX	1SDA077845R1	ZBSFUKAJ200A000000XX	
			E2.2S-A 2000 Ekip Hi-Touch LSIg	1SDA077676R1	Z2SFUKAK200A000000XX	1SDA077846R1	ZBSFUKAK200A000000XX	

Automatic circuit breakers

Drawout version for power distribution



SACE Emax 2 E2.2H-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2H-A	800	85	85	E2.2H-A 800 Ekip Dip LI	1SDA077578R1	Z2HCUFAA000A000000XX	1SDA077748R1	ZBHCUFAA000A000000XX
				E2.2H-A 800 Ekip Dip LSI	1SDA077579R1	Z2HCUFAB000A000000XX	1SDA077749R1	ZBHCUFAB000A000000XX
				E2.2H-A 800 Ekip Dip LSIG	1SDA077580R1	Z2HCUFAC000A000000XX	1SDA077750R1	ZBHCUFAC000A000000XX
				E2.2H-A 800 Ekip Touch LI	1SDA077581R1	Z2HCUFAD000A000000XX	1SDA077751R1	ZBHCUFAD000A000000XX
				E2.2H-A 800 Ekip Touch LSI	1SDA077582R1	Z2HCUFAE000A000000XX	1SDA077752R1	ZBHCUFAE000A000000XX
				E2.2H-A 800 Ekip Touch LSIG	1SDA077583R1	Z2HCUFAF000A000000XX	1SDA077753R1	ZBHCUFAF000A000000XX
				E2.2H-A 800 Ekip Hi-Touch LSI	1SDA077585R1	Z2HCUFAJ200A000000XX	1SDA077755R1	ZBHCUF AJ200A000000XX
				E2.2H-A 800 Ekip Hi-Touch LSIG	1SDA077586R1	Z2HCUFAK200A000000XX	1SDA077756R1	ZBHCUF AK200A000000XX
1200	85	85	E2.2H-A 1200 Ekip Dip LI	1SDA077588R1	Z2H DUHAA000A000000XX	1SDA077758R1	ZBHDUHAA000A000000XX	
			E2.2H-A 1200 Ekip Dip LSI	1SDA077589R1	Z2H DUHAB000A000000XX	1SDA077759R1	ZBHDUHAB000A000000XX	
			E2.2H-A 1200 Ekip Dip LSIG	1SDA077590R1	Z2H DUHAC000A000000XX	1SDA077760R1	ZBHDUHAC000A000000XX	
			E2.2H-A 1200 Ekip Touch LI	1SDA077591R1	Z2H DUHAD000A000000XX	1SDA077761R1	ZBHDUHAD000A000000XX	
			E2.2H-A 1200 Ekip Touch LSI	1SDA077592R1	Z2H DUHAE000A000000XX	1SDA077762R1	ZBHDUHAE000A000000XX	
			E2.2H-A 1200 Ekip Touch LSIG	1SDA077593R1	Z2H DUHAF000A000000XX	1SDA077763R1	ZBHDUHAF000A000000XX	
			E2.2H-A 1200 Ekip Hi-Touch LSI	1SDA077595R1	Z2H DUHAJ200A000000XX	1SDA077765R1	ZBHDUHAJ200A000000XX	
			E2.2H-A 1200 Ekip Hi-Touch LSIG	1SDA077596R1	Z2H DUHAK200A000000XX	1SDA077766R1	ZBHDUHAK200A000000XX	
1600	85	85	E2.2H-A 1600 Ekip Dip LI	1SDA077598R1	Z2HEUJAA000A000000XX	1SDA077768R1	ZBHEUJAA000A000000XX	
			E2.2H-A 1600 Ekip Dip LSI	1SDA077599R1	Z2HEUJAB000A000000XX	1SDA077769R1	ZBHEUJAB000A000000XX	
			E2.2H-A 1600 Ekip Dip LSIG	1SDA077600R1	Z2HEUJAC000A000000XX	1SDA077770R1	ZBHEUJAC000A000000XX	
			E2.2H-A 1600 Ekip Touch LI	1SDA077601R1	Z2HEUJAD000A000000XX	1SDA077771R1	ZBHEUJAD000A000000XX	
			E2.2H-A 1600 Ekip Touch LSI	1SDA077602R1	Z2HEUJAE000A000000XX	1SDA077772R1	ZBHEUJAE000A000000XX	
			E2.2H-A 1600 Ekip Touch LSIG	1SDA077603R1	Z2HEUJAF000A000000XX	1SDA077773R1	ZBHEUJAF000A000000XX	
			E2.2H-A 1600 Ekip Hi-Touch LSI	1SDA077605R1	Z2HEUJAJ200A000000XX	1SDA077775R1	ZBHEUJAJ200A000000XX	
			E2.2H-A 1600 Ekip Hi-Touch LSIG	1SDA077606R1	Z2HEUJAK200A000000XX	1SDA077776R1	ZBHEUJAK200A000000XX	
2000	85	85	E2.2H-A 2000 Ekip Dip LI	1SDA077608R1	Z2HFUKAA000A000000XX	1SDA077778R1	ZBHFUKAA000A000000XX	
			E2.2H-A 2000 Ekip Dip LSI	1SDA077609R1	Z2HFUKAB000A000000XX	1SDA077779R1	ZBHFUKAB000A000000XX	
			E2.2H-A 2000 Ekip Dip LSIG	1SDA077610R1	Z2HFUKAC000A000000XX	1SDA077780R1	ZBHFUKAC000A000000XX	
			E2.2H-A 2000 Ekip Touch LI	1SDA077611R1	Z2HFUKAD000A000000XX	1SDA077781R1	ZBHFUKAD000A000000XX	
			E2.2H-A 2000 Ekip Touch LSI	1SDA077612R1	Z2HFUKAE000A000000XX	1SDA077782R1	ZBHFUKAE000A000000XX	
			E2.2H-A 2000 Ekip Touch LSIG	1SDA077613R1	Z2HFUKAF000A000000XX	1SDA077783R1	ZBHFUKAF000A000000XX	
			E2.2H-A 2000 Ekip Hi-Touch LSI	1SDA077615R1	Z2HFUKAJ200A000000XX	1SDA077785R1	ZBHFUKAJ200A000000XX	
			E2.2H-A 2000 Ekip Hi-Touch LSIG	1SDA077616R1	Z2HFUKAK200A000000XX	1SDA077786R1	ZBHFUKAK200A000000XX	



SACE Emax 2 E2.2V-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2V-A	250	100	85	E2.2V-A 250 Ekip Dip LI	1SDA077678R1	Z2VAUCAA000A000000XX	1SDA077848R1	ZBVAUCAA000A000000XX
				E2.2V-A 250 Ekip Dip LSI	1SDA077679R1	Z2VAUCAB000A000000XX	1SDA077849R1	ZBVAUCAB000A000000XX
				E2.2V-A 250 Ekip Dip LSI SIG	1SDA077680R1	Z2VAUCAC000A000000XX	1SDA077850R1	ZBVAUCAC000A000000XX
				E2.2V-A 250 Ekip Touch LI	1SDA077681R1	Z2VAUCAD000A000000XX	1SDA077851R1	ZBVAUCAD000A000000XX
				E2.2V-A 250 Ekip Touch LSI	1SDA077682R1	Z2VAUCAE000A000000XX	1SDA077852R1	ZBVAUCAE000A000000XX
				E2.2V-A 250 Ekip Touch LSI SIG	1SDA077683R1	Z2VAUCAF000A000000XX	1SDA077853R1	ZBVAUCAF000A000000XX
				E2.2V-A 250 Ekip Hi-Touch LSI	1SDA077685R1	Z2VAUCAJ200A000000XX	1SDA077855R1	ZBVAUCAJ200A000000XX
				E2.2V-A 250 Ekip Hi-Touch LSI SIG	1SDA077686R1	Z2VAUCAK200A000000XX	1SDA077856R1	ZBVAUCAK200A000000XX
	400	100	85	E2.2V-A 400 Ekip Dip LI	1SDA077688R1	Z2VBUDAA000A000000XX	1SDA077858R1	ZBVBUDAA000A000000XX
				E2.2V-A 400 Ekip Dip LSI	1SDA077689R1	Z2VBUDAB000A000000XX	1SDA077859R1	ZBVBUDAB000A000000XX
				E2.2V-A 400 Ekip Dip LSI SIG	1SDA077690R1	Z2VBUDAC000A000000XX	1SDA077860R1	ZBVBUDAC000A000000XX
				E2.2V-A 400 Ekip Touch LI	1SDA077691R1	Z2VBUDAD000A000000XX	1SDA077861R1	ZBVBUDAD000A000000XX
				E2.2V-A 400 Ekip Touch LSI	1SDA077692R1	Z2VBUDAE000A000000XX	1SDA077862R1	ZBVBUDAE000A000000XX
				E2.2V-A 400 Ekip Touch LSI SIG	1SDA077693R1	Z2VBUDAF000A000000XX	1SDA077863R1	ZBVBUDAF000A000000XX
				E2.2V-A 400 Ekip Hi-Touch LSI	1SDA077695R1	Z2VBUDAJ200A000000XX	1SDA077865R1	ZBVBUDAJ200A000000XX
				E2.2V-A 400 Ekip Hi-Touch LSI SIG	1SDA077696R1	Z2VBUDAK200A000000XX	1SDA077866R1	ZBVBUDAK200A000000XX
	800	100	85	E2.2V-A 800 Ekip Dip LI	1SDA077698R1	Z2VCUFAA000A000000XX	1SDA077868R1	ZBVCUFAA000A000000XX
				E2.2V-A 800 Ekip Dip LSI	1SDA077699R1	Z2VCUFAB000A000000XX	1SDA077869R1	ZBVCUFAB000A000000XX
				E2.2V-A 800 Ekip Dip LSI SIG	1SDA077700R1	Z2VCUFAC000A000000XX	1SDA077870R1	ZBVCUFAC000A000000XX
				E2.2V-A 800 Ekip Touch LI	1SDA077701R1	Z2VCUFAD000A000000XX	1SDA077871R1	ZBVCUFAD000A000000XX
				E2.2V-A 800 Ekip Touch LSI	1SDA077702R1	Z2VCUFAE000A000000XX	1SDA077872R1	ZBVCUFAE000A000000XX
				E2.2V-A 800 Ekip Touch LSI SIG	1SDA077703R1	Z2VCUFAF000A000000XX	1SDA077873R1	ZBVCUFAF000A000000XX
				E2.2V-A 800 Ekip Hi-Touch LSI	1SDA077705R1	Z2VCUFAJ200A000000XX	1SDA077875R1	ZBVCUFAJ200A000000XX
				E2.2V-A 800 Ekip Hi-Touch LSI SIG	1SDA077706R1	Z2VCUFAK200A000000XX	1SDA077876R1	ZBVCUFAK200A000000XX
	1200	100	85	E2.2V-A 1200 Ekip Dip LI	1SDA077708R1	Z2VDUHAA000A000000XX	1SDA077878R1	ZBVDUHAA000A000000XX
				E2.2V-A 1200 Ekip Dip LSI	1SDA077709R1	Z2VDUHAB000A000000XX	1SDA077879R1	ZBVDUHAB000A000000XX
				E2.2V-A 1200 Ekip Dip LSI SIG	1SDA077710R1	Z2VDUHAC000A000000XX	1SDA077880R1	ZBVDUHAC000A000000XX
				E2.2V-A 1200 Ekip Touch LI	1SDA077711R1	Z2VDUHAD000A000000XX	1SDA077881R1	ZBVDUHAD000A000000XX
E2.2V-A 1200 Ekip Touch LSI				1SDA077712R1	Z2VDUHA000A000000XX	1SDA077882R1	ZBVDUHA000A000000XX	
E2.2V-A 1200 Ekip Touch LSI SIG				1SDA077713R1	Z2VDUHAF000A000000XX	1SDA077883R1	ZBVDUHAF000A000000XX	
E2.2V-A 1200 Ekip Hi-Touch LSI				1SDA077715R1	Z2VDUHAJ200A000000XX	1SDA077885R1	ZBVDUHAJ200A000000XX	
E2.2V-A 1200 Ekip Hi-Touch LSI SIG				1SDA077716R1	Z2VDUHAK200A000000XX	1SDA077886R1	ZBVDUHAK200A000000XX	
1600	100	85	E2.2V-A 1600 Ekip Dip LI	1SDA077718R1	Z2VEUJAA000A000000XX	1SDA077888R1	ZBVEUJAA000A000000XX	
			E2.2V-A 1600 Ekip Dip LSI	1SDA077719R1	Z2VEUJAB000A000000XX	1SDA077889R1	ZBVEUJAB000A000000XX	
			E2.2V-A 1600 Ekip Dip LSI SIG	1SDA077720R1	Z2VEUJAC000A000000XX	1SDA077890R1	ZBVEUJAC000A000000XX	
			E2.2V-A 1600 Ekip Touch LI	1SDA077721R1	Z2VEUJAD000A000000XX	1SDA077891R1	ZBVEUJAD000A000000XX	
			E2.2V-A 1600 Ekip Touch LSI	1SDA077722R1	Z2VEUJAE000A000000XX	1SDA077892R1	ZBVEUJAE000A000000XX	
			E2.2V-A 1600 Ekip Touch LSI SIG	1SDA077723R1	Z2VEUJAF000A000000XX	1SDA077893R1	ZBVEUJAF000A000000XX	
			E2.2V-A 1600 Ekip Hi-Touch LSI	1SDA077725R1	Z2VEUJAJ200A000000XX	1SDA077895R1	ZBVEUJAJ200A000000XX	
			E2.2V-A 1600 Ekip Hi-Touch LSI SIG	1SDA077726R1	Z2VEUJAK200A000000XX	1SDA077896R1	ZBVEUJAK200A000000XX	
2000	100	85	E2.2V-A 2000 Ekip Dip LI	1SDA077728R1	Z2VFUKAA000A000000XX	1SDA077898R1	ZBVFUKAA000A000000XX	
			E2.2V-A 2000 Ekip Dip LSI	1SDA077729R1	Z2VFUKAB000A000000XX	1SDA077899R1	ZBVFUKAB000A000000XX	
			E2.2V-A 2000 Ekip Dip LSI SIG	1SDA077730R1	Z2VFUKAC000A000000XX	1SDA077900R1	ZBVFUKAC000A000000XX	
			E2.2V-A 2000 Ekip Touch LI	1SDA077731R1	Z2VFUKAD000A000000XX	1SDA077901R1	ZBVFUKAD000A000000XX	
			E2.2V-A 2000 Ekip Touch LSI	1SDA077732R1	Z2VFUKAE000A000000XX	1SDA077902R1	ZBVFUKAE000A000000XX	
			E2.2V-A 2000 Ekip Touch LSI SIG	1SDA077733R1	Z2VFUKAF000A000000XX	1SDA077903R1	ZBVFUKAF000A000000XX	
			E2.2V-A 2000 Ekip Hi-Touch LSI	1SDA077735R1	Z2VFUKAJ200A000000XX	1SDA077905R1	ZBVFUKAJ200A000000XX	
			E2.2V-A 2000 Ekip Hi-Touch LSI SIG	1SDA077736R1	Z2VFUKAK200A000000XX	1SDA077906R1	ZBVFUKAK200A000000XX	

Automatic circuit breakers

Drawout version for power distribution



SACE Emax 2 E4.2S-A/H-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E4.2S-A	2500	65	65	E4.2S-A 2500 Ekip Dip LI	1SDA078458R1	Z4SGULAA000A000000XX	1SDA078688R1	ZCSGULAA000A000000XX
				E4.2S-A 2500 Ekip Dip LSI	1SDA078459R1	Z4SGULAB000A000000XX	1SDA078689R1	ZCSGULAB000A000000XX
				E4.2S-A 2500 Ekip Dip LSIG	1SDA078460R1	Z4SGULAC000A000000XX	1SDA078690R1	ZCSGULAC000A000000XX
				E4.2S-A 2500 Ekip Touch LI	1SDA078461R1	Z4SGULAD000A000000XX	1SDA078691R1	ZCSGULAD000A000000XX
				E4.2S-A 2500 Ekip Touch LSI	1SDA078462R1	Z4SGULAE000A000000XX	1SDA078692R1	ZCSGULAE000A000000XX
				E4.2S-A 2500 Ekip Touch LSIG	1SDA078463R1	Z4SGULAF000A000000XX	1SDA078693R1	ZCSGULAF000A000000XX
				E4.2S-A 2500 Ekip Hi-Touch LSI	1SDA078465R1	Z4SGULAJ200A000000XX	1SDA078695R1	ZCSGULAJ200A000000XX
				E4.2S-A 2500 Ekip Hi-Touch LSIG	1SDA078466R1	Z4SGULAK200A000000XX	1SDA078696R1	ZCSGULAK200A000000XX
	3200	65	65	E4.2S-A 3200 Ekip Dip LI	1SDA078468R1	Z4SHUNAA000A000000XX	1SDA078698R1	ZCSHUNAA000A000000XX
				E4.2S-A 3200 Ekip Dip LSI	1SDA078469R1	Z4SHUNAB000A000000XX	1SDA078699R1	ZCSHUNAB000A000000XX
				E4.2S-A 3200 Ekip Dip LSIG	1SDA078470R1	Z4SHUNAC000A000000XX	1SDA078700R1	ZCSHUNAC000A000000XX
				E4.2S-A 3200 Ekip Touch LI	1SDA078471R1	Z4SHUNAD000A000000XX	1SDA078701R1	ZCSHUNAD000A000000XX
				E4.2S-A 3200 Ekip Touch LSI	1SDA078472R1	Z4SHUNAE000A000000XX	1SDA078702R1	ZCSHUNAE000A000000XX
				E4.2S-A 3200 Ekip Touch LSIG	1SDA078473R1	Z4SHUNAF000A000000XX	1SDA078703R1	ZCSHUNAF000A000000XX
				E4.2S-A 3200 Ekip Hi-Touch LSI	1SDA078475R1	Z4SHUNAJ200A000000XX	1SDA078705R1	ZCSHUNAJ200A000000XX
				E4.2S-A 3200 Ekip Hi-Touch LSIG	1SDA078476R1	Z4SHUNAK200A000000XX	1SDA078706R1	ZCSHUNAK200A000000XX
E4.2H-A	2500	85	85	E4.2H-A 2500 Ekip Dip LI	1SDA078368R1	Z4HGULAA000A000000XX	1SDA078598R1	ZCHGULAA000A000000XX
				E4.2H-A 2500 Ekip Dip LSI	1SDA078369R1	Z4HGULAB000A000000XX	1SDA078599R1	ZCHGULAB000A000000XX
				E4.2H-A 2500 Ekip Dip LSIG	1SDA078370R1	Z4HGULAC000A000000XX	1SDA078600R1	ZCHGULAC000A000000XX
				E4.2H-A 2500 Ekip Touch LI	1SDA078371R1	Z4HGULAD000A000000XX	1SDA078601R1	ZCHGULAD000A000000XX
				E4.2H-A 2500 Ekip Touch LSI	1SDA078372R1	Z4HGULAE000A000000XX	1SDA078602R1	ZCHGULAE000A000000XX
				E4.2H-A 2500 Ekip Touch LSIG	1SDA078373R1	Z4HGULAF000A000000XX	1SDA078603R1	ZCHGULAF000A000000XX
				E4.2H-A 2500 Ekip Hi-Touch LSI	1SDA078375R1	Z4HGULAJ200A000000XX	1SDA078605R1	ZCHGULAJ200A000000XX
				E4.2H-A 2500 Ekip Hi-Touch LSIG	1SDA078376R1	Z4HGULAK200A000000XX	1SDA078606R1	ZCHGULAK200A000000XX
	3200	85	85	E4.2H-A 3200 Ekip Dip LI	1SDA078378R1	Z4HHUNAA000A000000XX	1SDA078608R1	ZCHHUNAA000A000000XX
				E4.2H-A 3200 Ekip Dip LSI	1SDA078379R1	Z4HHUNAB000A000000XX	1SDA078609R1	ZCHHUNAB000A000000XX
				E4.2H-A 3200 Ekip Dip LSIG	1SDA078380R1	Z4HHUNAC000A000000XX	1SDA078610R1	ZCHHUNAC000A000000XX
				E4.2H-A 3200 Ekip Touch LI	1SDA078381R1	Z4HHUNAD000A000000XX	1SDA078611R1	ZCHHUNAD000A000000XX
				E4.2H-A 3200 Ekip Touch LSI	1SDA078382R1	Z4HHUNAE000A000000XX	1SDA078612R1	ZCHHUNAE000A000000XX
				E4.2H-A 3200 Ekip Touch LSIG	1SDA078383R1	Z4HHUNAF000A000000XX	1SDA078613R1	ZCHHUNAF000A000000XX
				E4.2H-A 3200 Ekip Hi-Touch LSI	1SDA078385R1	Z4HHUNAJ200A000000XX	1SDA078615R1	ZCHHUNAJ200A000000XX
				E4.2H-A 3200 Ekip Hi-Touch LSIG	1SDA078386R1	Z4HHUNAK200A000000XX	1SDA078616R1	ZCHHUNAK200A000000XX



SACE Emax 2 E4.2V-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E4.2V-A	800	100	85	E4.2V-A 800 Ekip Dip LI	1SDA078488R1	Z4VCUFAA000A000000XX	1SDA078718R1	ZCVCUFAA000A000000XX
				E4.2V-A 800 Ekip Dip LSI	1SDA078489R1	Z4VCUFAB000A000000XX	1SDA078719R1	ZCVCUFAB000A000000XX
				E4.2V-A 800 Ekip Dip LSIG	1SDA078490R1	Z4VCUFAC000A000000XX	1SDA078720R1	ZCVCUFAC000A000000XX
				E4.2V-A 800 Ekip Touch LI	1SDA078491R1	Z4VCUFAD000A000000XX	1SDA078721R1	ZCVCUFAD000A000000XX
				E4.2V-A 800 Ekip Touch LSI	1SDA078492R1	Z4VCUFAE000A000000XX	1SDA078722R1	ZCVCUFAE000A000000XX
				E4.2V-A 800 Ekip Touch LSIG	1SDA078493R1	Z4VCUFAF000A000000XX	1SDA078723R1	ZCVCUFAF000A000000XX
				E4.2V-A 800 Ekip Hi-Touch LSI	1SDA078495R1	Z4VCUF AJ200A000000XX	1SDA078725R1	ZCVCUF AJ200A000000XX
				E4.2V-A 800 Ekip Hi-Touch LSIG	1SDA078496R1	Z4VCUF AK200A000000XX	1SDA078726R1	ZCVCUF AK200A000000XX
1600	100	85	E4.2V-A 1600 Ekip Dip LI	1SDA078498R1	Z4VEUJAA000A000000XX	1SDA078728R1	ZCVEUJAA000A000000XX	
			E4.2V-A 1600 Ekip Dip LSI	1SDA078499R1	Z4VEUJAB000A000000XX	1SDA078729R1	ZCVEUJAB000A000000XX	
			E4.2V-A 1600 Ekip Dip LSIG	1SDA078500R1	Z4VEUJAC000A000000XX	1SDA078730R1	ZCVEUJAC000A000000XX	
			E4.2V-A 1600 Ekip Touch LI	1SDA078501R1	Z4VEUJAD000A000000XX	1SDA078731R1	ZCVEUJAD000A000000XX	
			E4.2V-A 1600 Ekip Touch LSI	1SDA078502R1	Z4VEUJAE000A000000XX	1SDA078732R1	ZCVEUJAE000A000000XX	
			E4.2V-A 1600 Ekip Touch LSIG	1SDA078503R1	Z4VEUJAF000A000000XX	1SDA078733R1	ZCVEUJAF000A000000XX	
			E4.2V-A 1600 Ekip Hi-Touch LSI	1SDA078505R1	Z4VEUJAJ200A000000XX	1SDA078735R1	ZCVEUJAJ200A000000XX	
			E4.2V-A 1600 Ekip Hi-Touch LSIG	1SDA078506R1	Z4VEUJAK200A000000XX	1SDA078736R1	ZCVEUJAK200A000000XX	
2000	100	85	E4.2V-A 2000 Ekip Dip LI	1SDA078508R1	Z4VFUKAA000A000000XX	1SDA078738R1	ZCVFUKAA000A000000XX	
			E4.2V-A 2000 Ekip Dip LSI	1SDA078509R1	Z4VFUKAB000A000000XX	1SDA078739R1	ZCVFUKAB000A000000XX	
			E4.2V-A 2000 Ekip Dip LSIG	1SDA078510R1	Z4VFUKAC000A000000XX	1SDA078740R1	ZCVFUKAC000A000000XX	
			E4.2V-A 2000 Ekip Touch LI	1SDA078511R1	Z4VFUKAD000A000000XX	1SDA078741R1	ZCVFUKAD000A000000XX	
			E4.2V-A 2000 Ekip Touch LSI	1SDA078512R1	Z4VFUKAE000A000000XX	1SDA078742R1	ZCVFUKAE000A000000XX	
			E4.2V-A 2000 Ekip Touch LSIG	1SDA078513R1	Z4VFUKAF000A000000XX	1SDA078743R1	ZCVFUKAF000A000000XX	
			E4.2V-A 2000 Ekip Hi-Touch LSI	1SDA078515R1	Z4VFUKAJ200A000000XX	1SDA078745R1	ZCVFUKAJ200A000000XX	
			E4.2V-A 2000 Ekip Hi-Touch LSIG	1SDA078516R1	Z4VFUKAK200A000000XX	1SDA078746R1	ZCVFUKAK200A000000XX	
2500	100	85	E4.2V-A 2500 Ekip Dip LI	1SDA078518R1	Z4VGULAA000A000000XX	1SDA078748R1	ZCVGULAA000A000000XX	
			E4.2V-A 2500 Ekip Dip LSI	1SDA078519R1	Z4VGULAB000A000000XX	1SDA078749R1	ZCVGULAB000A000000XX	
			E4.2V-A 2500 Ekip Dip LSIG	1SDA078520R1	Z4VGULAC000A000000XX	1SDA078750R1	ZCVGULAC000A000000XX	
			E4.2V-A 2500 Ekip Touch LI	1SDA078521R1	Z4VGULAD000A000000XX	1SDA078751R1	ZCVGULAD000A000000XX	
			E4.2V-A 2500 Ekip Touch LSI	1SDA078522R1	Z4VGULAE000A000000XX	1SDA078752R1	ZCVGULAE000A000000XX	
			E4.2V-A 2500 Ekip Touch LSIG	1SDA078523R1	Z4VGULAF000A000000XX	1SDA078753R1	ZCVGULAF000A000000XX	
			E4.2V-A 2500 Ekip Hi-Touch LSI	1SDA078525R1	Z4VGULAJ200A000000XX	1SDA078755R1	ZCVGULAJ200A000000XX	
			E4.2V-A 2500 Ekip Hi-Touch LSIG	1SDA078526R1	Z4VGULAK200A000000XX	1SDA078756R1	ZCVGULAK200A000000XX	
3200	100	85	E4.2V-A 3200 Ekip Dip LI	1SDA078528R1	Z4VHUNAA000A000000XX	1SDA078758R1	ZCVHUNAA000A000000XX	
			E4.2V-A 3200 Ekip Dip LSI	1SDA078529R1	Z4VHUNAB000A000000XX	1SDA078759R1	ZCVHUNAB000A000000XX	
			E4.2V-A 3200 Ekip Dip LSIG	1SDA078530R1	Z4VHUNAC000A000000XX	1SDA078760R1	ZCVHUNAC000A000000XX	
			E4.2V-A 3200 Ekip Touch LI	1SDA078531R1	Z4VHUNAD000A000000XX	1SDA078761R1	ZCVHUNAD000A000000XX	
			E4.2V-A 3200 Ekip Touch LSI	1SDA078532R1	Z4VHUNAE000A000000XX	1SDA078762R1	ZCVHUNAE000A000000XX	
			E4.2V-A 3200 Ekip Touch LSIG	1SDA078533R1	Z4VHUNAF000A000000XX	1SDA078763R1	ZCVHUNAF000A000000XX	
			E4.2V-A 3200 Ekip Hi-Touch LSI	1SDA078535R1	Z4VHUNAJ200A000000XX	1SDA078765R1	ZCVHUNAJ200A000000XX	
			E4.2V-A 3200 Ekip Hi-Touch LSIG	1SDA078536R1	Z4VHUNAK200A000000XX	1SDA078766R1	ZCVHUNAK200A000000XX	

Automatic circuit breakers

Drawout version for power distribution



SACE Emax 2 E6.2H-A/V-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles			
					Global code	U.S. / Canada code	Global code	U.S. / Canada code		
E6.2H-A	4000	85	85	E6.2H-A 4000 Ekip Dip LI	1SDA079068R1	Z6HJURAA000A000000XX	1SDA079188R1	ZDHJURAA000A000000XX		
				E6.2H-A 4000 Ekip Dip LSI	1SDA079069R1	Z6HJURAB000A000000XX	1SDA079189R1	ZDHJURAB000A000000XX		
				E6.2H-A 4000 Ekip Dip LSIG	1SDA079070R1	Z6HJURAC000A000000XX	1SDA079190R1	ZDHJURAC000A000000XX		
				E6.2H-A 4000 Ekip Touch LI	1SDA079071R1	Z6HJURAD000A000000XX	1SDA079191R1	ZDHJURAD000A000000XX		
				E6.2H-A 4000 Ekip Touch LSI	1SDA079072R1	Z6HJURAE000A000000XX	1SDA079192R1	ZDHJURAE000A000000XX		
				E6.2H-A 4000 Ekip Touch LSIG	1SDA079073R1	Z6HJURAF000A000000XX	1SDA079193R1	ZDHJURAF000A000000XX		
		5000	85	85	E6.2H-A 4000 Ekip Hi-Touch LSI	1SDA079075R1	Z6HJURAJ200A000000XX	1SDA079195R1	ZDHJURAJ200A000000XX	
					E6.2H-A 4000 Ekip Hi-Touch LSIG	1SDA079076R1	Z6HJURAK200A000000XX	1SDA079196R1	ZDHJURAK200A000000XX	
					E6.2H-A 5000 Ekip Dip LI	1SDA079078R1	Z6HKUSAA000A000000XX	1SDA079198R1	ZDHKUSAA000A000000XX	
					E6.2H-A 5000 Ekip Dip LSI	1SDA079079R1	Z6HKUSAB000A000000XX	1SDA079199R1	ZDHKUSAB000A000000XX	
					E6.2H-A 5000 Ekip Dip LSIG	1SDA079080R1	Z6HKUSAC000A000000XX	1SDA079200R1	ZDHKUSAC000A000000XX	
					E6.2H-A 5000 Ekip Touch LI	1SDA079081R1	Z6HKUSAD000A000000XX	1SDA079201R1	ZDHKUSAD000A000000XX	
	6000 (*)	85	85	E6.2H-A 5000 Ekip Touch LSI	1SDA079082R1	Z6HKUSAE000A000000XX	1SDA079202R1	ZDHKUSAE000A000000XX		
				E6.2H-A 5000 Ekip Touch LSIG	1SDA079083R1	Z6HKUSAF000A000000XX	1SDA079203R1	ZDHKUSAF000A000000XX		
				E6.2H-A 5000 Ekip Hi-Touch LSI	1SDA079085R1	Z6HKUSAJ200A000000XX	1SDA079205R1	ZDHKUSAJ200A000000XX		
				E6.2H-A 5000 Ekip Hi-Touch LSIG	1SDA079086R1	Z6HKUSAK200A000000XX	1SDA079206R1	ZDHKUSAK200A000000XX		
				E6.2H-A 6000 Ekip Dip LI	1SDA079088R1	Z6HLUTAA000A000000XX	1SDA079208R1	ZDHLUTAA000A000000XX		
				E6.2H-A 6000 Ekip Dip LSI	1SDA079089R1	Z6HLUTAB000A000000XX	1SDA079209R1	ZDHLUTAB000A000000XX		
		E6.2V-A	4000	100	100	E6.2H-A 6000 Ekip Dip LSI	1SDA079090R1	Z6HLUTAC000A000000XX	1SDA079210R1	ZDHLUTAC000A000000XX
						E6.2H-A 6000 Ekip Touch LI	1SDA079091R1	Z6HLUTAD000A000000XX	1SDA079211R1	ZDHLUTAD000A000000XX
						E6.2H-A 6000 Ekip Touch LSI	1SDA079092R1	Z6HLUTAE000A000000XX	1SDA079212R1	ZDHLUTAE000A000000XX
						E6.2H-A 6000 Ekip Touch LSIG	1SDA079093R1	Z6HLUTAF000A000000XX	1SDA079213R1	ZDHLUTAF000A000000XX
						E6.2H-A 6000 Ekip Hi-Touch LSI	1SDA079095R1	Z6HLUTAJ200A000000XX	1SDA079215R1	ZDHLUTAJ200A000000XX
						E6.2H-A 6000 Ekip Hi-Touch LSIG	1SDA079096R1	Z6HLUTAK200A000000XX	1SDA079216R1	ZDHLUTAK200A000000XX
E6.2V-A	4000	100	100	E6.2V-A 4000 Ekip Dip LI	1SDA079128R1	Z6VJURAA000A000000XX	1SDA079248R1	ZDVJURAA000A000000XX		
				E6.2V-A 4000 Ekip Dip LSI	1SDA079129R1	Z6VJURAB000A000000XX	1SDA079249R1	ZDVJURAB000A000000XX		
				E6.2V-A 4000 Ekip Dip LSIG	1SDA079130R1	Z6VJURAC000A000000XX	1SDA079250R1	ZDVJURAC000A000000XX		
				E6.2V-A 4000 Ekip Touch LI	1SDA079131R1	Z6VJURAD000A000000XX	1SDA079251R1	ZDVJURAD000A000000XX		
				E6.2V-A 4000 Ekip Touch LSI	1SDA079132R1	Z6VJURAE000A000000XX	1SDA079252R1	ZDVJURAE000A000000XX		
				E6.2V-A 4000 Ekip Touch LSIG	1SDA079133R1	Z6VJURAF000A000000XX	1SDA079253R1	ZDVJURAF000A000000XX		
		5000	100	100	E6.2V-A 4000 Ekip Hi-Touch LSI	1SDA079135R1	Z6VJURAJ200A000000XX	1SDA079255R1	ZDVJURAJ200A000000XX	
					E6.2V-A 4000 Ekip Hi-Touch LSIG	1SDA079136R1	Z6VJURAK200A000000XX	1SDA079256R1	ZDVJURAK200A000000XX	
					E6.2V-A 5000 Ekip Dip LI	1SDA079138R1	Z6VKUSAA000A000000XX	1SDA079258R1	ZDVKUSAA000A000000XX	
					E6.2V-A 5000 Ekip Dip LSI	1SDA079139R1	Z6VKUSAB000A000000XX	1SDA079259R1	ZDVKUSAB000A000000XX	
					E6.2V-A 5000 Ekip Dip LSIG	1SDA079140R1	Z6VKUSAC000A000000XX	1SDA079260R1	ZDVKUSAC000A000000XX	
					E6.2V-A 5000 Ekip Touch LI	1SDA079141R1	Z6VKUSAD000A000000XX	1SDA079261R1	ZDVKUSAD000A000000XX	
	6000 (*)	100	100	E6.2V-A 5000 Ekip Touch LSI	1SDA079142R1	Z6VKUSAE000A000000XX	1SDA079262R1	ZDVKUSAE000A000000XX		
				E6.2V-A 5000 Ekip Touch LSIG	1SDA079143R1	Z6VKUSAF000A000000XX	1SDA079263R1	ZDVKUSAF000A000000XX		
				E6.2V-A 5000 Ekip Hi-Touch LSI	1SDA079145R1	Z6VKUSAJ200A000000XX	1SDA079265R1	ZDVKUSAJ200A000000XX		
				E6.2V-A 5000 Ekip Hi-Touch LSIG	1SDA079146R1	Z6VKUSAK200A000000XX	1SDA079266R1	ZDVKUSAK200A000000XX		
				E6.2V-A 6000 Ekip Dip LI	1SDA079148R1	Z6VLUTAA000A000000XX	1SDA079268R1	-		
				E6.2V-A 6000 Ekip Dip LSI	1SDA079149R1	Z6VLUTAB000A000000XX	1SDA079269R1	-		
		E6.2V-A	6000	100	100	E6.2V-A 6000 Ekip Dip LSIG	1SDA079150R1	Z6VLUTAC000A000000XX	1SDA079270R1	-
						E6.2V-A 6000 Ekip Touch LI	1SDA079151R1	Z6VLUTAD000A000000XX	1SDA079271R1	-
						E6.2V-A 6000 Ekip Touch LSI	1SDA079152R1	Z6VLUTAE000A000000XX	1SDA079272R1	-
						E6.2V-A 6000 Ekip Touch LSIG	1SDA079153R1	Z6VLUTAF000A000000XX	1SDA079273R1	-
						E6.2V-A 6000 Ekip Hi-Touch LSI	1SDA079155R1	Z6VLUTAJ200A000000XX	1SDA079275R1	-
						E6.2V-A 6000 Ekip Hi-Touch LSIG	1SDA079156R1	Z6VLUTAK200A000000XX	1SDA079276R1	-

* Version not yet available. Contact ABB



SACE Emax 2 E6.2H-A/f/V-A/f • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	4 Poles		
					Global code	U.S. / Canada code	
E6.2H-A/f	4000	85	85	E6.2H-A/f 4000 Ekip Dip LI	1SDA079428R1	ZEHJURAA000A000000XX	
				E6.2H-A/f 4000 Ekip Dip LSI	1SDA079429R1	ZEHJURAB000A000000XX	
				E6.2H-A/f 4000 Ekip Dip LSIG	1SDA079430R1	ZEHJURAC000A000000XX	
				E6.2H-A/f 4000 Ekip Touch LI	1SDA079431R1	ZEHJURAD000A000000XX	
				E6.2H-A/f 4000 Ekip Touch LSI	1SDA079432R1	ZEHJURAE000A000000XX	
				E6.2H-A/f 4000 Ekip Touch LSIG	1SDA079433R1	ZEHJURAF000A000000XX	
	5000	85	85	E6.2H-A/f 4000 Ekip Hi-Touch LSI	1SDA079435R1	ZEHJURAJ200A000000XX	
				E6.2H-A/f 4000 Ekip Hi-Touch LSIG	1SDA079436R1	ZEHJURAK200A000000XX	
				E6.2H-A/f 5000 Ekip Dip LI	1SDA079438R1	ZEHKUSAA000A000000XX	
		E6.2H-A/f 5000 Ekip Dip LSI	1SDA079439R1	ZEHKUSAB000A000000XX			
		E6.2H-A/f 5000 Ekip Dip LSIG	1SDA079440R1	ZEHKUSAC000A000000XX			
		E6.2H-A/f 5000 Ekip Touch LI	1SDA079441R1	ZEHKUSAD000A000000XX			
		E6.2H-A/f 5000 Ekip Touch LSI	1SDA079442R1	ZEHKUSAE000A000000XX			
		E6.2H-A/f 5000 Ekip Touch LSIG	1SDA079443R1	ZEHKUSAF000A000000XX			
		E6.2H-A/f 5000 Ekip Hi-Touch LSI	1SDA079445R1	ZEHKUSAJ200A000000XX			
		E6.2H-A/f 5000 Ekip Hi-Touch LSIG	1SDA079446R1	ZEHKUSAK200A000000XX			
		6000 (*)	85	85	E6.2H-A/f 6000 Ekip Dip LI	1SDA079448R1	ZEHLUTAA000A000000XX
					E6.2H-A/f 6000 Ekip Dip LSI	1SDA079449R1	ZEHLUTAB000A000000XX
					E6.2H-A/f 6000 Ekip Dip LSIG	1SDA079450R1	ZEHLUTAC000A000000XX
			E6.2H-A/f 6000 Ekip Touch LI	1SDA079451R1	ZEHLUTAD000A000000XX		
			E6.2H-A/f 6000 Ekip Touch LSI	1SDA079452R1	ZEHLUTAE000A000000XX		
E6.2H-A/f 6000 Ekip Touch LSIG	1SDA079453R1		ZEHLUTAF000A000000XX				
E6.2H-A/f 6000 Ekip Hi-Touch LSI	1SDA079455R1		ZEHLUTAJ200A000000XX				
E6.2H-A/f 6000 Ekip Hi-Touch LSIG	1SDA079456R1		ZEHLUTAK200A000000XX				
E6.2V-A/f	4000		100	100	E6.2V-A/f 4000 Ekip Dip LI	1SDA079488R1	ZEVJURAA000A000000XX
		E6.2V-A/f 4000 Ekip Dip LSI			1SDA079489R1	ZEVJURAB000A000000XX	
		E6.2V-A/f 4000 Ekip Dip LSIG			1SDA079490R1	ZEVJURAC000A000000XX	
		E6.2V-A/f 4000 Ekip Touch LI			1SDA079491R1	ZEVJURAD000A000000XX	
		E6.2V-A/f 4000 Ekip Touch LSI			1SDA079492R1	ZEVJURAE000A000000XX	
		E6.2V-A/f 4000 Ekip Touch LSIG			1SDA079493R1	ZEVJURAF000A000000XX	
		E6.2V-A/f 4000 Ekip Hi-Touch LSI			1SDA079495R1	ZEVJURAJ200A000000XX	
		E6.2V-A/f 4000 Ekip Hi-Touch LSIG			1SDA079496R1	ZEVJURAK200A000000XX	
		5000			100	100	E6.2V-A/f 5000 Ekip Dip LI
	E6.2V-A/f 5000 Ekip Dip LSI		1SDA079499R1	ZEVKUSAB000A000000XX			
	E6.2V-A/f 5000 Ekip Dip LSIG		1SDA079500R1	ZEVKUSAC000A000000XX			
	E6.2V-A/f 5000 Ekip Touch LI		1SDA079501R1	ZEVKUSAD000A000000XX			
	E6.2V-A/f 5000 Ekip Touch LSI		1SDA079502R1	ZEVKUSAE000A000000XX			
	E6.2V-A/f 5000 Ekip Touch LSIG		1SDA079503R1	ZEVKUSAF000A000000XX			
	E6.2V-A/f 5000 Ekip Hi-Touch LSI		1SDA079505R1	ZEVKUSAJ200A000000XX			
	E6.2V-A/f 5000 Ekip Hi-Touch LSIG		1SDA079506R1	ZEVKUSAK200A000000XX			
	6000 (*)		100	100	E6.2V-A/f 6000 Ekip Dip LI	1SDA079508R1	-
					E6.2V-A/f 6000 Ekip Dip LSI	1SDA079509R1	-
					E6.2V-A/f 6000 Ekip Dip LSIG	1SDA079510R1	-
			E6.2V-A/f 6000 Ekip Touch LI	1SDA079511R1	-		
		E6.2V-A/f 6000 Ekip Touch LSI	1SDA079512R1	-			
		E6.2V-A/f 6000 Ekip Touch LSIG	1SDA079513R1	-			
					E6.2V-A/f 6000 Ekip Hi-Touch LSI	1SDA079515R1	-
					E6.2V-A/f 6000 Ekip Hi-Touch LSIG	1SDA079516R1	-

* Version not yet available. Contact ABB

Automatic circuit breakers

Fixed version for generators



SACE Emax E1.2B-N-S • Front terminals (F)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2B-A	800	42	42	E1.2B-A 800 Ekip G Touch LSIG	1SDA076914R1	Z1BCUFBN200A000000XX	1SDA076994R1	ZABCUFBN200A000000XX
				E1.2B-A 800 Ekip G Hi-Touch LSIG	1SDA076917R1	Z1BCUFBQ200A000000XX	1SDA076997R1	ZABCUFBQ200A000000XX
	1200	42	42	E1.2B-A 1200 Ekip G Touch LSIG	1SDA076924R1	Z1BDUHBN200A000000XX	1SDA077004R1	ZABDUHBN200A000000XX
				E1.2B-A 1200 Ekip G Hi-Touch LSIG	1SDA076927R1	Z1BDUHBQ200A000000XX	1SDA077007R1	ZABDUHBQ200A000000XX
E1.2N-A	800	50	50	E1.2N-A 800 Ekip G Touch LSIG	1SDA076934R1	Z1NCUFBN200A000000XX	1SDA077014R1	ZANCUFBN200A000000XX
				E1.2N-A 800 Ekip G Hi-Touch LSIG	1SDA076937R1	Z1NCUFBQ200A000000XX	1SDA077017R1	ZANCUFBQ200A000000XX
	1200	50	50	E1.2N-A 1200 Ekip G Touch LSIG	1SDA076944R1	Z1NDUHBN200A000000XX	1SDA077024R1	ZANDUHBN200A000000XX
				E1.2N-A 1200 Ekip G Hi-Touch LSIG	1SDA076947R1	Z1NDUHBQ200A000000XX	1SDA077027R1	ZANDUHBQ200A000000XX
E1.2S-A	250	65	50	E1.2S-A 250 Ekip G Touch LSIG	1SDA076954R1	Z1SAUCBN200A000000XX	1SDA077034R1	ZASAUCBN200A000000XX
				E1.2S-A 250 Ekip G Hi-Touch LSIG	1SDA076957R1	Z1SAUCBQ200A000000XX	1SDA077037R1	ZASAUCBQ200A000000XX
	400	65	50	E1.2S-A 400 Ekip G Touch LSIG	1SDA076964R1	Z1SBUDBN200A000000XX	1SDA077044R1	ZASBUDBN200A000000XX
				E1.2S-A 400 Ekip G Hi-Touch LSIG	1SDA076967R1	Z1SBUDBQ200A000000XX	1SDA077047R1	ZASBUDBQ200A000000XX
	800	65	50	E1.2S-A 800 Ekip G Touch LSIG	1SDA076974R1	Z1SCUFBN200A000000XX	1SDA077054R1	ZASCUFBN200A000000XX
				E1.2S-A 800 Ekip G Hi-Touch LSIG	1SDA076977R1	Z1SCUFBQ200A000000XX	1SDA077057R1	ZASCUFBQ200A000000XX
1200	65	50	E1.2S-A 1200 Ekip G Touch LSIG	1SDA076984R1	Z1SDUHBN200A000000XX	1SDA077064R1	ZASDUHBN200A000000XX	
			E1.2S-A 1200 Ekip G Hi-Touch LSIG	1SDA076987R1	Z1SDUHBQ200A000000XX	1SDA077067R1	ZASDUHBQ200A000000XX	

About wall mount is standard; for floor fixing must order: 1SDA076020R1 ZE1FFPF



SACE Emax 2 E2.2 B-A, N-A, S-A, H-A, V-A • Orientable rear terminals (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2B-A	1600	42	42	E2.2B-A 1600 Ekip G Touch LSIG	1SDA077234R1	Z2BEUJBN200A000000XX	1SDA077404R1	ZBBEUJBN200A000000XX
				E2.2B-A 1600 Ekip G Hi-Touch LSIG	1SDA077237R1	Z2BEUJBQ200A000000XX	1SDA077407R1	ZBBEUJBQ200A000000XX
E2.2N-A	1600	50	E2.2N-A 1600 Ekip G Touch LSIG	1SDA077284R1	Z2NEUJBN200A000000XX	1SDA077454R1	ZBNEUJBN200A000000XX	
			E2.2N-A 1600 Ekip G Hi-Touch LSIG	1SDA077287R1	Z2NEUJBQ200A000000XX	1SDA077457R1	ZBNEUJBQ200A000000XX	
	2000	50	E2.2N-A 2000 Ekip G Touch LSIG	1SDA077294R1	Z2NFUKBN200A000000XX	1SDA077464R1	ZBNFUKBN200A000000XX	
			E2.2N-A 2000 Ekip G Hi-Touch LSIG	1SDA077297R1	Z2NFUKBQ200A000000XX	1SDA077467R1	ZBNFUKBQ200A000000XX	
E2.2S-A	800	65	E2.2S-A 800 Ekip G Touch LSIG	1SDA077304R1	Z2SCUFBN200A000000XX	1SDA077474R1	ZBSCUFBN200A000000XX	
			E2.2S-A 800 Ekip G Hi-Touch LSIG	1SDA077307R1	Z2SCUFBQ200A000000XX	1SDA077477R1	ZBSCUFBQ200A000000XX	
	1200	65	E2.2S-A 1200 Ekip G Touch LSIG	1SDA077314R1	Z2SDUHBN200A000000XX	1SDA077484R1	ZBSDUHBN200A000000XX	
			E2.2S-A 1200 Ekip G Hi-Touch LSIG	1SDA077317R1	Z2SDUHBQ200A000000XX	1SDA077487R1	ZBSDUHBQ200A000000XX	
	1600	65	E2.2S-A 1600 Ekip G Touch LSIG	1SDA077324R1	Z2SEUJBN200A000000XX	1SDA077494R1	ZBSEUJBN200A000000XX	
			E2.2S-A 1600 Ekip G Hi-Touch LSIG	1SDA077327R1	Z2SEUJBQ200A000000XX	1SDA077497R1	ZBSEUJBQ200A000000XX	
	2000	65	E2.2S-A 2000 Ekip G Touch LSIG	1SDA077334R1	Z2SFUKBN200A000000XX	1SDA077504R1	ZBSFUKBN200A000000XX	
			E2.2S-A 2000 Ekip G Hi-Touch LSIG	1SDA077337R1	Z2SFUKBQ200A000000XX	1SDA077507R1	ZBSFUKBQ200A000000XX	
	E2.2H-A	800	85	E2.2H-A 800 Ekip G Touch LSIG	1SDA077244R1	Z2HCUFBN200A000000XX	1SDA077414R1	ZBHCUFBN200A000000XX
				E2.2H-A 800 Ekip G Hi-Touch LSIG	1SDA077247R1	Z2HCUFBQ200A000000XX	1SDA077417R1	ZBHCUFBQ200A000000XX
1200		85	E2.2H-A 1200 Ekip G Touch LSIG	1SDA077254R1	Z2HDUHBN200A000000XX	1SDA077424R1	ZBHDUHBN200A000000XX	
			E2.2H-A 1200 Ekip G Hi-Touch LSIG	1SDA077257R1	Z2HDUHBQ200A000000XX	1SDA077427R1	ZBHDUHBQ200A000000XX	
1600		85	E2.2H-A 1600 Ekip G Touch LSIG	1SDA077264R1	Z2HEUJBN200A000000XX	1SDA077434R1	ZBHEUJBN200A000000XX	
			E2.2H-A 1600 Ekip G Hi-Touch LSIG	1SDA077267R1	Z2HEUJBQ200A000000XX	1SDA077437R1	ZBHEUJBQ200A000000XX	
2000		85	E2.2H-A 2000 Ekip G Touch LSIG	1SDA077274R1	Z2HFUKBN200A000000XX	1SDA077444R1	ZBHFUKBN200A000000XX	
			E2.2H-A 2000 Ekip G Hi-Touch LSIG	1SDA077277R1	Z2HFUKBQ200A000000XX	1SDA077447R1	ZBHFUKBQ200A000000XX	
E2.2V-A	250	100	E2.2V-A 250 Ekip G Touch LSIG	1SDA077344R1	Z2VAUCBN200A000000XX	1SDA077514R1	ZBVAUCBN200A000000XX	
			E2.2V-A 250 Ekip G Hi-Touch LSIG	1SDA077347R1	Z2VAUCBQ200A000000XX	1SDA077517R1	ZBVAUCBQ200A000000XX	
	400	100	E2.2V-A 400 Ekip G Touch LSIG	1SDA077354R1	Z2VBUDBN200A000000XX	1SDA077524R1	ZBVBUDBN200A000000XX	
			E2.2V-A 400 Ekip G Hi-Touch LSIG	1SDA077357R1	Z2VBUDBQ200A000000XX	1SDA077527R1	ZBVBUDBQ200A000000XX	
	800	100	E2.2V-A 800 Ekip G Touch LSIG	1SDA077364R1	Z2VCUFBN200A000000XX	1SDA077534R1	ZBVCUFBN200A000000XX	
			E2.2V-A 800 Ekip G Hi-Touch LSIG	1SDA077367R1	Z2VCUFBQ200A000000XX	1SDA077537R1	ZBVCUFBQ200A000000XX	
	1200	100	E2.2V-A 1200 Ekip G Touch LSIG	1SDA077374R1	Z2VDUHBN200A000000XX	1SDA077544R1	ZBVDUHBN200A000000XX	
			E2.2V-A 1200 Ekip G Hi-Touch LSIG	1SDA077377R1	Z2VDUHBQ200A000000XX	1SDA077547R1	ZBVDUHBQ200A000000XX	
	1600	100	E2.2V-A 1600 Ekip G Touch LSIG	1SDA077384R1	Z2VEUJBN200A000000XX	1SDA077554R1	ZBVEUJBN200A000000XX	
			E2.2V-A 1600 Ekip G Hi-Touch LSIG	1SDA077387R1	Z2VEUJBQ200A000000XX	1SDA077557R1	ZBVEUJBQ200A000000XX	
	2000	100	E2.2V-A 2000 Ekip G Touch LSIG	1SDA077394R1	Z2VFUKBN200A000000XX	1SDA077564R1	ZBVFUKBN200A000000XX	
			E2.2V-A 2000 Ekip G Hi-Touch LSIG	1SDA077397R1		1SDA077567R1		

Automatic circuit breakers

Fixed version for generators



SACE Emax 2 E4.2 S-A, H-A, V-A • Orientable rear terminals up to 2500A (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E4.2S-A	2500	65	65	E4.2S-A 2500 Ekip G Touch LSIG	1SDA078004R1	Z4SGULBN200A000000XX	1SDA078234R1	ZCSGULBN200A000000XX
				E4.2S-A 2500 Ekip G Hi-Touch LSIG	1SDA078007R1	Z4SGULBQ200A000000XX	1SDA078237R1	ZCSGULBQ200A000000XX
	3200 (*)	65	65	E4.2S-A 3200 Ekip G Touch LSIG	1SDA078014R1	Z4SHUNBN200A000000XX	1SDA078244R1	ZCSHUNBN200A000000XX
				E4.2S-A 3200 Ekip G Hi-Touch LSIG	1SDA078017R1	Z4SHUNBQ200A000000XX	1SDA078247R1	ZCSHUNBQ200A000000XX
	3600 (*)	65	65	E4.2S-A 3600 Ekip G Touch LSIG	1SDA078024R1	Z4SZUSBQ200A000000XX	-	-
				E4.2S-A 3600 Ekip G Hi-Touch LSIG	1SDA078027R1	Z4SZUSBQ200A000000XX	-	-
E4.2H-A	2500	85	85	E4.2H-A 2500 Ekip G Touch LSIG	1SDA077914R1	Z4HGULBN200A000000XX	1SDA078144R1	ZCHGULBN200A000000XX
				E4.2H-A 2500 Ekip G Hi-Touch LSIG	1SDA077917R1	Z4HGULBQ200A000000XX	1SDA078147R1	ZCHGULBQ200A000000XX
	3200 (*)	85	85	E4.2H-A 3200 Ekip G Touch LSIG	1SDA077924R1	Z4HHUNBN200A000000XX	1SDA078154R1	ZCHHUNBN200A000000XX
				E4.2H-A 3200 Ekip G Hi-Touch LSIG	1SDA077927R1	Z4HHUNBQ200A000000XX	1SDA078157R1	ZCHHUNBQ200A000000XX
	3600 (*)	85	85	E4.2H-A 3600 Ekip G Touch LSIG	1SDA077934R1	Z4HZUSBQ200A000000XX	-	-
				E4.2H-A 3600 Ekip G Hi-Touch LSIG	1SDA077937R1	Z4HZUSBQ200A000000XX	-	-
E4.2V-A	800	100	85	E4.2V-A 800 Ekip G Touch LSIG	1SDA078034R1	Z4VCUFBN200A000000XX	1SDA078264R1	ZCVCUFBN200A000000XX
				E4.2V-A 800 Ekip G Hi-Touch LSIG	1SDA078037R1	Z4VCUFBQ200A000000XX	1SDA078267R1	ZCVCUFBQ200A000000XX
	1600	100	85	E4.2V-A 1600 Ekip G Touch LSIG	1SDA078044R1	Z4VEUJBN200A000000XX	1SDA078274R1	ZCVEUJBN200A000000XX
				E4.2V-A 1600 Ekip G Hi-Touch LSIG	1SDA078047R1	Z4VEUJBQ200A000000XX	1SDA078277R1	ZCVEUJBQ200A000000XX
	2000	100	85	E4.2V-A 2000 Ekip G Touch LSIG	1SDA078054R1	Z4VFUKBN200A000000XX	1SDA078284R1	ZCVFUKBN200A000000XX
				E4.2V-A 2000 Ekip G Hi-Touch LSIG	1SDA078057R1	Z4VFUKBQ200A000000XX	1SDA078287R1	ZCVFUKBQ200A000000XX
	2500	100	85	E4.2V-A 2500 Ekip G Touch LSIG	1SDA078064R1	Z4VGULBN200A000000XX	1SDA078294R1	ZCVGULBN200A000000XX
				E4.2V-A 2500 Ekip G Hi-Touch LSIG	1SDA078067R1	Z4VGULBQ200A000000XX	1SDA078297R1	ZCVGULBQ200A000000XX
	3200 (*)	100	85	E4.2V-A 3200 Ekip G Touch LSIG	1SDA078074R1	Z4VHUNBN200A000000XX	1SDA078304R1	ZCVHUNBN200A000000XX
				E4.2V-A 3200 Ekip G Hi-Touch LSIG	1SDA078077R1	Z4VHUNBQ200A000000XX	1SDA078307R1	ZCVHUNBQ200A000000XX
	3600 (*)	100	85	E4.2V-A 3600 Ekip G Touch LSIG	1SDA078084R1	Z4VZUSBQ200A000000XX	-	-
				E4.2V-A 3600 Ekip G Hi-Touch LSIG	1SDA078087R1	Z4VZUSBQ200A000000XX	-	-



SACE Emax 2 E6.2 H-A, V-A • Orientable rear terminals up to 5000A (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E6.2H-A	4000	85	85	E6.2H-A 4000 Ekip G Touch LSIG	1SDA078834R1	Z6HJURBN200A000000XX	1SDA078954R1	ZDHJURBN200A000000XX
				E6.2H-A 4000 Ekip G Hi-Touch LSIG	1SDA078837R1	Z6HJURBQ200A000000XX	1SDA078957R1	ZDHJURBQ200A000000XX
	5000	85	85	E6.2H-A 5000 Ekip G Touch LSIG	1SDA078844R1	Z6HKUSBN200A000000XX	1SDA078964R1	ZDHKUSBN200A000000XX
				E6.2H-A 5000 Ekip G Hi-Touch LSIG	1SDA078847R1	Z6HKUSBQ200A000000XX	1SDA078967R1	ZDHKUSBQ200A000000XX
	6000 ^(*)	85	85	E6.2H-A 6000 Ekip G Touch LSIG	1SDA078854R1	Z6HLUTBN200A000000XX	1SDA078974R1	ZDHLUTBN200A000000XX
				E6.2H-A 6000 Ekip G Hi-Touch LSIG	1SDA078855R1	Z6HLUTBJ200A000000XX	1SDA078977R1	ZDHLUTBQ200A000000XX
E6.2V-A	4000	100	100	E6.2V-A 4000 Ekip G Touch LSIG	1SDA078894R1	Z6VJURBN200A000000XX	1SDA079014R1	ZDVJURBN200A000000XX
				E6.2V-A 4000 Ekip G Hi-Touch LSIG	1SDA078897R1	Z6VJURBQ200A000000XX	1SDA079017R1	ZDVJURBQ200A000000XX
	5000	100	100	E6.2V-A 5000 Ekip G Touch LSIG	1SDA078904R1	Z6VKUSBN200A000000XX	1SDA079024R1	ZDVKUSBN200A000000XX
				E6.2V-A 5000 Ekip G Hi-Touch LSIG	1SDA078907R1	Z6VKUSBQ200A000000XX	1SDA079027R1	ZDVKUSBQ200A000000XX
	6000 ^(*)	100	100	E6.2V-A 6000 Ekip G Touch LSIG	1SDA078914R1	Z6VLUTBN200A000000XX	1SDA079034R1	ZDVLUTBN200A000000XX
				E6.2V-A 6000 Ekip G Hi-Touch LSIG	1SDA078917R1	Z6VLUTBQ200A000000XX	1SDA079037R1	ZDVLUTBQ200A000000XX

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB

Automatic circuit breakers

Fixed version for generators



SACE Emax 2 E6.2 H-A/f, V-A/f • Orientable rear terminals up to 5000A (HR)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	4 Poles	
					Global code	U.S. / Canada code
E6.2H-A/f	4000	85	85	E6.2H-A/f 4000 Ekip G Touch LSIG	1SDA079314R1	ZEHJURBN200A000000XX
				E6.2H-A/f 4000 Ekip G Hi-Touch LSIG	1SDA079317R1	ZEHJURBQ200A000000XX
	5000	85	85	E6.2H-A/f 5000 Ekip G Touch LSIG	1SDA079324R1	ZEHKUSBN200A000000XX
				E6.2H-A/f 5000 Ekip G Hi-Touch LSIG	1SDA079327R1	ZEHKUSBQ200A000000XX
	6000 (*)	85	85	E6.2H-A/f 6000 Ekip G Touch LSIG	1SDA079334R1	ZEHLUTBN200A000000XX
				E6.2H-A/f 6000 Ekip G Hi-Touch LSIG	1SDA079337R1	ZEHLUTBQ200A000000XX
E6.2V-A/f	4000	100	100	E6.2V-A/f 4000 Ekip G Touch LSIG	1SDA079374R1	ZEVJURBN200A000000XX
				E6.2V-A/f 4000 Ekip G Hi-Touch LSIG	1SDA079377R1	ZEVJURBQ200A000000XX
	5000	100	100	E6.2V-A/f 5000 Ekip G Touch LSIG	1SDA079384R1	ZEVKUSBN200A000000XX
				E6.2V-A/f 5000 Ekip G Hi-Touch LSIG	1SDA079387R1	ZEVKUSBQ200A000000XX
	6000 (*)	100	100	E6.2V-A/f 6000 Ekip G Touch LSIG	1SDA079394R1	ZEVLUTBN200A000000XX
				E6.2V-A/f 6000 Ekip G Hi-Touch LSIG	1SDA079397R1	ZEVLUTBQ200A000000XX

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB

Automatic circuit breakers

Drawout version for generators



SACE Emax 2 E1.2 B-A, N-A, S-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2B-A	800	42	42	E1.2B-A 800 Ekip G Touch LSIG	1SDA077074R1	Z1BCUFAN200A000000XX	1SDA077154R1	ZABCUFAN200A000000XX
				E1.2B-A 800 Ekip G Hi-Touch LSIG	1SDA077077R1	Z1BCUFAQ200A000000XX	1SDA077157R1	ZABCUFAQ200A000000XX
	1200	42	42	E1.2B-A 1200 Ekip G Touch LSIG	1SDA077084R1	Z1BDUHAN200A000000XX	1SDA077164R1	ZABDUHAN200A000000XX
				E1.2B-A 1200 Ekip G Hi-Touch LSIG	1SDA077087R1	Z1BDUHAQ200A000000XX	1SDA077167R1	ZABDUHAQ200A000000XX
E1.2N-A	800	50	50	E1.2N-A 800 Ekip G Touch LSIG	1SDA077094R1	Z1NCUFAN200A000000XX	1SDA077174R1	ZANCUFAN200A000000XX
				E1.2N-A 800 Ekip G Hi-Touch LSIG	1SDA077097R1	Z1NCUFAQ200A000000XX	1SDA077177R1	ZANCUFAQ200A000000XX
	1200	50	50	E1.2N-A 1200 Ekip G Touch LSIG	1SDA077104R1	Z1NDUHAN200A000000XX	1SDA077184R1	ZANDUHAN200A000000XX
				E1.2N-A 1200 Ekip G Hi-Touch LSIG	1SDA077107R1	Z1NDUHAQ200A000000XX	1SDA077187R1	ZANDUHAQ200A000000XX
E1.2S-A	250	65	50	E1.2S-A 250 Ekip G Touch LSIG	1SDA077114R1	Z1SAUCAN200A000000XX	1SDA077194R1	ZASAUCAQ200A000000XX
				E1.2S-A 250 Ekip G Hi-Touch LSIG	1SDA077117R1	Z1SAUCAQ200A000000XX	1SDA077197R1	ZASAUCAQ200A000000XX
	400	65	50	E1.2S-A 400 Ekip G Touch LSIG	1SDA077124R1	Z1SBUDAN200A000000XX	1SDA077204R1	ZASBUDAN200A000000XX
				E1.2S-A 400 Ekip G Hi-Touch LSIG	1SDA077127R1	Z1SBUDAQ200A000000XX	1SDA077207R1	ZASBUDAQ200A000000XX
	800	65	50	E1.2S-A 800 Ekip G Touch LSIG	1SDA077134R1	Z1SCUFAN200A000000XX	1SDA077214R1	ZASCUFAN200A000000XX
				E1.2S-A 800 Ekip G Hi-Touch LSIG	1SDA077137R1	Z1SCUFAQ200A000000XX	1SDA077217R1	ZASCUFAQ200A000000XX
	1200	65	50	E1.2S-A 1200 Ekip G Touch LSIG	1SDA077144R1	Z1SDUHAN200A000000XX	1SDA077224R1	ZASDUHAN200A000000XX
				E1.2S-A 1200 Ekip G Hi-Touch LSIG	1SDA077147R1	Z1SDUHAQ200A000000XX	1SDA077227R1	ZASDUHAQ200A000000XX

Automatic circuit breakers

Drawout version for generators



SACE Emax 2 E2.2 B-A, N-A, S-A, H-A, V-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2B-A	1600	42	42	E2.2B-A 1600 Ekip G Touch LSIG	1SDA077574R1	Z2BEUJAN200A000000XX	1SDA077744R1	ZBBEUJAN200A000000XX
				E2.2B-A 1600 Ekip G Hi-Touch LSIG	1SDA077577R1	Z2BEUJAN200A000000XX	1SDA077747R1	ZBBEUJAN200A000000XX
E2.2N-A	1600	50	E2.2N-A 1600 Ekip G Touch LSIG	1SDA077624R1	Z2NEUJAN200A000000XX	1SDA077794R1	ZBNEUJAN200A000000XX	
			E2.2N-A 1600 Ekip G Hi-Touch LSIG	1SDA077627R1	Z2NEUJAN200A000000XX	1SDA077797R1	ZBNEUJAN200A000000XX	
	2000	50	E2.2N-A 2000 Ekip G Touch LSIG	1SDA077634R1	Z2NFUKAN200A000000XX	1SDA077804R1	ZBNFUKAN200A000000XX	
			E2.2N-A 2000 Ekip G Hi-Touch LSIG	1SDA077637R1	Z2NFUKAN200A000000XX	1SDA077807R1	ZBNFUKAN200A000000XX	
E2.2S-A	800	65	E2.2S-A 800 Ekip G Touch LSIG	1SDA077644R1	Z2SCUFAN200A000000XX	1SDA077814R1	ZBSCUFAN200A000000XX	
			E2.2S-A 800 Ekip G Hi-Touch LSIG	1SDA077647R1	Z2SCUFAN200A000000XX	1SDA077817R1	ZBSCUFAN200A000000XX	
	1200	65	E2.2S-A 1200 Ekip G Touch LSIG	1SDA077654R1	Z2SDUHAN200A000000XX	1SDA077824R1	ZBSDUHAN200A000000XX	
			E2.2S-A 1200 Ekip G Hi-Touch LSIG	1SDA077657R1	Z2SDUHAN200A000000XX	1SDA077827R1	ZBSDUHAN200A000000XX	
	1600	65	E2.2S-A 1600 Ekip G Touch LSIG	1SDA077664R1	Z2SEUJAN200A000000XX	1SDA077834R1	ZBSEUJAN200A000000XX	
			E2.2S-A 1600 Ekip G Hi-Touch LSIG	1SDA077667R1	Z2SEUJAN200A000000XX	1SDA077837R1	ZBSEUJAN200A000000XX	
	2000	65	E2.2S-A 2000 Ekip G Touch LSIG	1SDA077674R1	Z2SFUKAN200A000000XX	1SDA077844R1	ZBSFUKAN200A000000XX	
			E2.2S-A 2000 Ekip G Hi-Touch LSIG	1SDA077677R1	Z2SFUKAN200A000000XX	1SDA077847R1	ZBSFUKAN200A000000XX	
E2.2H-A	800	85	E2.2H-A 800 Ekip G Touch LSIG	1SDA077584R1	Z2HCUFAN200A000000XX	1SDA077754R1	ZBHCUFAN200A000000XX	
			E2.2H-A 800 Ekip G Hi-Touch LSIG	1SDA077587R1	Z2HCUFAN200A000000XX	1SDA077757R1	ZBHCUFAN200A000000XX	
	1200	85	E2.2H-A 1200 Ekip G Touch LSIG	1SDA077594R1	Z2HDUHAN200A000000XX	1SDA077764R1	ZBHDUHAN200A000000XX	
			E2.2H-A 1200 Ekip G Hi-Touch LSIG	1SDA077597R1	Z2HDUHAN200A000000XX	1SDA077767R1	ZBHDUHAN200A000000XX	
	1600	85	E2.2H-A 1600 Ekip G Touch LSIG	1SDA077604R1	Z2HEUJAN200A000000XX	1SDA077774R1	ZBHEUJAN200A000000XX	
			E2.2H-A 1600 Ekip G Hi-Touch LSIG	1SDA077607R1	Z2HEUJAN200A000000XX	1SDA077777R1	ZBHEUJAN200A000000XX	
	2000	85	E2.2H-A 2000 Ekip G Touch LSIG	1SDA077614R1	Z2HFUKAN200A000000XX	1SDA077784R1	ZBHFUKAN200A000000XX	
			E2.2H-A 2000 Ekip G Hi-Touch LSIG	1SDA077617R1	Z2HFUKAN200A000000XX	1SDA077787R1	ZBHFUKAN200A000000XX	
E2.2V-A	250	100	E2.2V-A 250 Ekip G Touch LSIG	1SDA077684R1	Z2VAUCAN200A000000XX	1SDA077854R1	ZBVAUCAN200A000000XX	
			E2.2V-A 250 Ekip G Hi-Touch LSIG	1SDA077687R1	Z2VAUCAQ200A000000XX	1SDA077857R1	ZBVAUCAQ200A000000XX	
	400	100	E2.2V-A 400 Ekip G Touch LSIG	1SDA077694R1	Z2VBUDAN200A000000XX	1SDA077864R1	ZBVBUDAN200A000000XX	
			E2.2V-A 400 Ekip G Hi-Touch LSIG	1SDA077697R1	Z2VBUDAQ200A000000XX	1SDA077867R1	ZBVBUDAQ200A000000XX	
	800	100	E2.2V-A 800 Ekip G Touch LSIG	1SDA077704R1	Z2VCUFAN200A000000XX	1SDA077874R1	ZBVCUFAN200A000000XX	
			E2.2V-A 800 Ekip G Hi-Touch LSIG	1SDA077707R1	Z2VCUFAQ200A000000XX	1SDA077877R1	ZBVCUFAQ200A000000XX	
	1200	100	E2.2V-A 1200 Ekip G Touch LSIG	1SDA077714R1	Z2VDUHAN200A000000XX	1SDA077884R1	ZBVDUHAN200A000000XX	
			E2.2V-A 1200 Ekip G Hi-Touch LSIG	1SDA077717R1	Z2VDUHAQ200A000000XX	1SDA077887R1	ZBVDUHAQ200A000000XX	
	1600	100	E2.2V-A 1600 Ekip G Touch LSIG	1SDA077724R1	Z2VEUJAN200A000000XX	1SDA077894R1	ZBVEUJAN200A000000XX	
			E2.2V-A 1600 Ekip G Hi-Touch LSIG	1SDA077727R1	Z2VEUJAN200A000000XX	1SDA077897R1	ZBVEUJAN200A000000XX	
	2000	100	E2.2V-A 2000 Ekip G Touch LSIG	1SDA077734R1	Z2VFUKAN200A000000XX	1SDA077904R1	ZBVFUKAN200A000000XX	
			E2.2V-A 2000 Ekip G Hi-Touch LSIG	1SDA077737R1	Z2VFUKAQ200A000000XX	1SDA077907R1	ZBVFUKAQ200A000000XX	



SACE Emax 2 E4.2 S-A, H-A, V-A • Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E4.2S-A	2500	65	65	E4.2S-A 2500 Ekip G Touch LSIG	1SDA078464R1	Z4SGULAN200A000000XX	1SDA078694R1	ZCSGULAN200A000000XX
				E4.2S-A 2500 Ekip G Hi-Touch LSIG	1SDA078467R1	Z4SGULAQ200A000000XX	1SDA078697R1	ZCSGULAQ200A000000XX
	3200	65	65	E4.2S-A 3200 Ekip G Touch LSIG	1SDA078474R1	Z4SHUNAN200A000000XX	1SDA078704R1	ZCSHUNAN200A000000XX
				E4.2S-A 3200 Ekip G Hi-Touch LSIG	1SDA078477R1	Z4SHUNAQ200A000000XX	1SDA078707R1	ZCSHUNAQ200A000000XX
E4.2H-A	2500	85	85	E4.2H-A 2500 Ekip G Touch LSIG	1SDA078374R1	Z4HGULAN200A000000XX	1SDA078604R1	ZCHGULAN200A000000XX
				E4.2H-A 2500 Ekip G Hi-Touch LSIG	1SDA078377R1	Z4HGULAQ200A000000XX	1SDA078607R1	ZCHGULAQ200A000000XX
	3200 (*)	85	85	E4.2H-A 3200 Ekip G Touch LSIG	1SDA078384R1	Z4HHUNAN200A000000XX	1SDA078614R1	ZCHHUNAN200A000000XX
				E4.2H-A 3200 Ekip G Hi-Touch LSIG	1SDA078387R1	Z4HHUNAQ200A000000XX	1SDA078617R1	ZCHHUNAQ200A000000XX
E4.2V-A	800	100	85	E4.2V-A 800 Ekip G Touch LSIG	1SDA078494R1	Z4VCUFAN200A000000XX	1SDA078724R1	ZCVCUFAN200A000000XX
				E4.2V-A 800 Ekip G Hi-Touch LSIG	1SDA078497R1	Z4VCUFAQ200A000000XX	1SDA078727R1	ZCVCUFAQ200A000000XX
	1600	100	85	E4.2V-A 1600 Ekip G Touch LSIG	1SDA078504R1	Z4VEUJAN200A000000XX	1SDA078734R1	ZCVEUJAN200A000000XX
				E4.2V-A 1600 Ekip G Hi-Touch LSIG	1SDA078507R1	Z4VEUJAQ200A000000XX	1SDA078737R1	ZCVEUJAQ200A000000XX
	2000	100	85	E4.2V-A 2000 Ekip G Touch LSIG	1SDA078514R1	Z4VFUKAN200A000000XX	1SDA078744R1	ZCVFUKAN200A000000XX
				E4.2V-A 2000 Ekip G Hi-Touch LSIG	1SDA078517R1	Z4VFUKAQ200A000000XX	1SDA078747R1	ZCVFUKAQ200A000000XX
	2500	100	85	E4.2V-A 2500 Ekip G Touch LSIG	1SDA078524R1	Z4VGULAN200A000000XX	1SDA078754R1	ZCVGULAN200A000000XX
				E4.2V-A 2500 Ekip G Hi-Touch LSIG	1SDA078527R1	Z4VGULAQ200A000000XX	1SDA078757R1	ZCVGULAQ200A000000XX
	3200 (*)	100	85	E4.2V-A 3200 Ekip G Touch LSIG	1SDA078534R1	Z4VHUNAN200A000000XX	1SDA078764R1	ZCVHUNAN200A000000XX
				E4.2V-A 3200 Ekip G Hi-Touch LSIG	1SDA078537R1	Z4VHUNAQ200A000000XX	1SDA078767R1	ZCVHUNAQ200A000000XX

* 3200A ratings only with rear vertical terminals
 Contact local sales for availability for L version

Automatic circuit breakers

Drawout version for generators



SACE Emax 2 E6.2 H-A, V-A - Mobile part of drawout circuit breaker (MP)

Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E6.2H-A	4000	85	85	E6.2H-A 4000 Ekip G Touch LSIG	1SDA079074R1	Z6HJURAN200A000000XX	1SDA079194R1	ZDHJURAN200A000000XX
				E6.2H-A 4000 Ekip G Hi-Touch LSIG	1SDA079077R1	Z6HJURAQ200A000000XX	1SDA079197R1	ZDHJURAQ200A000000XX
	5000	85	85	E6.2H-A 5000 Ekip G Touch LSIG	1SDA079084R1	Z6HKUSAN200A000000XX	1SDA079204R1	ZDHKUSAN200A000000XX
				E6.2H-A 5000 Ekip G Hi-Touch LSIG	1SDA079087R1	Z6HKUSAQ200A000000XX	1SDA079207R1	ZDHKUSAQ200A000000XX
	6000 (*)	85	85	E6.2H-A 6000 Ekip G Touch LSIG	1SDA079094R1	Z6HLUTAN200A000000XX	1SDA079214R1	ZDHLUTAN200A000000XX
				E6.2H-A 6000 Ekip G Hi-Touch LSIG	1SDA079097R1	Z6HLUTAQ200A000000XX	1SDA079217R1	ZDHLUTAQ200A000000XX
E6.2V-A	4000	100	100	E6.2V-A 4000 Ekip G Touch LSIG	1SDA079134R1	Z6VJURAN200A000000XX	1SDA079254R1	ZDVJURAN200A000000XX
				E6.2V-A 4000 Ekip G Hi-Touch LSIG	1SDA079137R1	Z6VJURAQ200A000000XX	1SDA079257R1	ZDVJURAQ200A000000XX
	5000	100	100	E6.2V-A 5000 Ekip G Touch LSIG	1SDA079144R1	Z6VKUSAN200A000000XX	1SDA079264R1	ZDVKUSAN200A000000XX
				E6.2V-A 5000 Ekip G Hi-Touch LSIG	1SDA079147R1	Z6VKUSAQ200A000000XX	1SDA079265R1	ZDVKUSAJ200A000000XX
	6000 (*)	100	100	E6.2V-A 6000 Ekip G Touch LSIG	1SDA079154R1	Z6VLUTAN200A000000XX	1SDA079274R1	ZDVLUTAN200A000000XX
				E6.2V-A 6000 Ekip G Hi-Touch LSIG	1SDA079157R1	Z6VLUTAQ200A000000XX	1SDA079277R1	ZDVLUTAQ200A000000XX

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB



SACE Emax 2 E6.2 H-A/f, V-A/f - Mobile part of drawout circuit breaker (MP)

						4 Poles	
Size	Frame Amps	Int. Rating (kA@508V)	Withstand (kA)	Type			
					Global code	U.S. / Canada code	
E6.2H-A/f	4000	85	85	E6.2H-A/f 4000 Ekip G Touch LSIG	1SDA079434R1	ZEHJURAN200A000000XX	
				E6.2H-A/f 4000 Ekip G Hi-Touch LSIG	1SDA079437R1	ZEHJURAQ200A000000XX	
	5000	85	85	E6.2H-A/f 5000 Ekip G Touch LSIG	1SDA079444R1	ZEHKUSAN200A000000XX	
				E6.2H-A/f 5000 Ekip G Hi-Touch LSIG	1SDA079447R1	ZEHKUSAQ200A000000XX	
	6000 (*)	85	85	E6.2H-A/f 6000 Ekip G Touch LSIG	1SDA079454R1	ZEHLUTAN200A000000XX	
				E6.2H-A/f 6000 Ekip G Hi-Touch LSIG	1SDA079457R1	ZEHLUTAQ200A000000XX	
E6.2V-A/f	4000	100	100	E6.2V-A/f 4000 Ekip G Touch LSIG	1SDA079494R1	ZEVJURAN200A000000XX	
				E6.2V-A/f 4000 Ekip G Hi-Touch LSIG	1SDA079497R1	ZEVJURAQ200A000000XX	
	5000	100	100	E6.2V-A/f 5000 Ekip G Touch LSIG	1SDA079504R1	ZEVKUSAN200A000000XX	
				E6.2V-A/f 5000 Ekip G Hi-Touch LSIG	1SDA079507R1	ZEVKUSAQ200A000000XX	
	6000 (*)	100	100	E6.2V-A/f 6000 Ekip G Touch LSIG	1SDA079514R1	ZEVLUTAN200A000000XX	
				E6.2V-A/f 6000 Ekip G Hi-Touch LSIG	1SDA079517R1	ZEVLUTAQ200A000000XX	

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB

Switch disconnectors

Fixed version



SACE Emax 2 E1.2 B-A/MS, N-A/MS • Front terminals (F)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2B-A/MS	800	42	E1.2B-A/MS 800	1SDA079548R1	Z1BC00B000000000000XX	1SDA079552R1	ZABC00B000000000000XX
	1200	42	E1.2B-A/MS 1200	1SDA079549R1	Z1BD00B000000000000XX	1SDA079553R1	ZABD00B000000000000XX
E1.2N-A/MS	800	50	E1.2N-A/MS 800	1SDA079550R1	Z1NC00B000000000000XX	1SDA079554R1	ZANC00B000000000000XX
	1200	50	E1.2N-A/MS 1200	1SDA079551R1	Z1ND00B000000000000XX	1SDA079555R1	ZAND00B000000000000XX

About wall mount is standard; for floor fixing must order: 1SDA076020R1 ZE1FFPF



SACE Emax 2 E2.2 N-A/MS, S-A/MS, V-A/MS • Orientable rear terminals (HR)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2N-A/MS	1600	50	E2.2N-A/MS 1600	1SDA079570R1	Z2NE00B000000000000XX	1SDA079578R1	ZBNE00B000000000000XX
	2000	50	E2.2N-A/MS 2000	1SDA079571R1	Z2NF00B000000000000XX	1SDA079579R1	ZBNF00B000000000000XX
E2.2S-A/MS	800	65	E2.2S-A/MS 800	1SDA079564R1	Z2SC00B000000000000XX	1SDA079572R1	ZBSC00B000000000000XX
	1600	65	E2.2S-A/MS 1600	1SDA079565R1	Z2SE00B000000000000XX	1SDA079573R1	ZBSE00B000000000000XX
	2000	65	E2.2S-A/MS 2000	1SDA079566R1	Z2SF00B000000000000XX	1SDA079574R1	ZBSF00B000000000000XX
E2.2V-A/MS	800	85	E2.2V-A/MS 800	1SDA079567R1	Z2VC00B000000000000XX	1SDA079575R1	ZBVC00B000000000000XX
	1600	85	E2.2V-A/MS 1600	1SDA079568R1	Z2VE00B000000000000XX	1SDA079576R1	ZBVE00B000000000000XX
	2000	85	E2.2V-A/MS 2000	1SDA079569R1	Z2VF00B000000000000XX	1SDA079577R1	ZBVF00B000000000000XX



SACE Emax 2 E4.2 S-A/MS, H-A/MS, V-A/MS • Orientable rear terminals up to 2500A (HR)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E4.2S-A/MS	2500	65	E4.2S-A/MS 2500	1SDA079596R1	Z4SG00B00000000000XX	1SDA079612R1	ZCSG00B00000000000XX
	3200 (*)	65	E4.2S-A/MS 3200	1SDA079597R1	Z4SH00B00000000000XX	1SDA079613R1	ZCSH00B00000000000XX
	3600 (*)	65	E4.2S-A/MS 3600	1SDA079598R1	Z4SZ00B00000000000XX	-	-
E4.2H-A/MS	2500	85	E4.2H-A/MS 2500	1SDA081867R1	Z4HG00B00000000000XX	1SDA081872R1	ZCHG00B00000000000XX
	3200 (*)	85	E4.2H-A/MS 3200	1SDA081868R1	Z4HH00B00000000000XX	1SDA081873R1	ZCHH00B00000000000XX
	3600 (*)	85	E4.2H-A/MS 3600	1SDA079611R1	Z4HZ00B00000000000XX	-	-
E4.2V-A/MS	800	100	E4.2V-A/MS 800	1SDA081864R1	Z4VC00B00000000000XX	1SDA081869R1	ZCVC00B00000000000XX
	1600	100	E4.2V-A/MS 1600	1SDA081865R1	Z4VE00B00000000000XX	1SDA081870R1	ZCVE00B00000000000XX
	2000	100	E4.2V-A/MS 2000	1SDA081866R1	Z4VF00B00000000000XX	1SDA081871R1	ZCVF00B00000000000XX
	2500	100	E4.2V-A/MS 2500	1SDA079602R1	Z4VG00B00000000000XX	1SDA079618R1	ZCVG00B00000000000XX
	3200 (*)	100	E4.2V-A/MS 3200	1SDA079603R1	Z4VH00B00000000000XX	1SDA079619R1	ZCVH00B00000000000XX
	3600 (*)	100	E4.2V-A/MS 3600	1SDA079604R1	Z4VZ00B00000000000XX	-	-

* 3200/3600A ratings only with rear vertical terminals



SACE Emax 2 E6.2 L-A/MS • Orientable rear terminals up to 5000A (HR)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E6.2L-A/MS	4000	100	E6.2L-A/MS 4000	1SDA079660R1	Z6LJ00B00000000000XX	1SDA079666R1	ZDLJ00B00000000000XX
	5000	100	E6.2L-A/MS 5000	1SDA079661R1	Z6LK00B00000000000XX	1SDA079667R1	ZDLK00B00000000000XX
	6000 (*)	100	E6.2L-A/MS 6000	1SDA079662R1	Z6LL00B00000000000XX	-	-

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB

SACE Emax 2 E6.2 L-A/f/MS • Orientable rear terminals up to 5000A (HR)

Size	Frame Amps	Withstand (kA)	Type	4 Poles	
				Global code	U.S. / Canada code
E6.2L-A/f/MS	4000	100	E6.2L-A/f/MS 4000	1SDA079684R1	ZDLJ00B00000000000XX
	5000	100	E6.2L-A/f/MS 5000	1SDA079685R1	ZDLK00B00000000000XX
	6000 (*)	100	E6.2L-A/f/MS 6300	-	-

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB

Switch disconnectors

Drawout version



SACE Emax 2 E1.2 B-A/MS, N-A/MS • Mobile part of switch disconnector (MP)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
				E1.2B-A/MS	800	42	E1.2B-A/MS 800
	1200	42	E1.2B-A/MS 1200	1SDA079557R1	Z1BD00A0000000000000XX	1SDA079561R1	ZABD00A0000000000000XX
E1.2N-A/MS	800	50	E1.2N-A/MS 800	1SDA079558R1	Z1NC00A0000000000000XX	1SDA079562R1	ZANC00A0000000000000XX
	1200	50	E1.2N-A/MS 1200	1SDA079559R1	Z1ND00A0000000000000XX	1SDA079563R1	ZAND00A0000000000000XX



SACE Emax 2 E2.2 N-A/MS, S-A/MS, V-A/MS • Mobile part of switch disconnector (MP)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
				E2.2N-A/MS	1600	50	E2.2N-A/MS 1600
	2000	50	E2.2N-A/MS 2000	1SDA079587R1	Z2NF00A0000000000000XX	1SDA079595R1	ZBNF00A0000000000000XX
E2.2S-A/MS	800	65	E2.2S-A/MS 800	1SDA079580R1	Z2SC00A0000000000000XX	1SDA079588R1	ZBSC00A0000000000000XX
	1600	65	E2.2S-A/MS 1600	1SDA079581R1	Z2SE00A0000000000000XX	1SDA079589R1	ZBSE00A0000000000000XX
	2000	65	E2.2S-A/MS 2000	1SDA079582R1	Z2SF00A0000000000000XX	1SDA079590R1	ZBSF00A0000000000000XX
E2.2V-A/MS	800	85	E2.2V-A/MS 800	1SDA079583R1	Z2VC00A0000000000000XX	1SDA079591R1	ZBVC00A0000000000000XX
	1600	85	E2.2V-A/MS 1600	1SDA079584R1	Z2VE00A0000000000000XX	1SDA079592R1	ZBVE00A0000000000000XX
	2000	85	E2.2V-A/MS 2000	1SDA079585R1	Z2VF00A0000000000000XX	1SDA079593R1	ZBVF00A0000000000000XX



SACE Emax 2 E4.2 S-A/MS, H-A/MS, V-A/MS • Mobile part of switch disconnector (MP)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
				E4.2S-A/MS	2500	65	E4.2S-A/MS 2500
	3200	65	E4.2S-A/MS 3200	1SDA079629R1	Z4SH00A0000000000000XX	1SDA079645R1	ZCSH00A0000000000000XX
E4.2H-A/MS	2500	85	E4.2H-A/MS 2500	1SDA081877R1	Z4HG00A0000000000000XX	1SDA081882R1	ZCHG00A0000000000000XX
	3200	85	E4.2H-A/MS 3200	1SDA081878R1	Z4HH00A0000000000000XX	1SDA081883R1	ZCHH00A0000000000000XX
E4.2V-A/MS	800	100	E4.2V-A/MS 800	1SDA081874R1	Z4VC00A0000000000000XX	1SDA081879R1	ZCVC00A0000000000000XX
	1600	100	E4.2V-A/MS 1600	1SDA081875R1	Z4VE00A0000000000000XX	1SDA081880R1	ZCVE00A0000000000000XX
	2000	100	E4.2V-A/MS 2000	1SDA081876R1	Z4VF00A0000000000000XX	1SDA081881R1	ZCVF00A0000000000000XX
	2500	100	E4.2V-A/MS 2500	1SDA079634R1	Z4VG00A0000000000000XX	1SDA079650R1	ZCVG00A0000000000000XX
	3200	100	E4.2V-A/MS 3200	1SDA079635R1	Z4VH00A0000000000000XX	1SDA079651R1	ZCVH00A0000000000000XX



SACE Emax 2 E6.2 L-A/MS • Mobile part of switch disconnecter (MP)

Size	Frame Amps	Withstand (kA)	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E6.2L-A/MS	4000	100	E6.2L-A/MS 4000	1SDA079672R1	Z6LJ00A0000000000000XX	1SDA079678R1	ZDLJ00A0000000000000XX
	5000	100	E6.2L-A/MS 5000	1SDA079673R1	Z6LK00A0000000000000XX	1SDA079679R1	ZDLK00A0000000000000XX
	6000 (*)	100	E6.2L-A/MS 6000	1SDA079674R1	Z6LL00A0000000000000XX	-	-

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB

SACE Emax 2 E6.2 L-A/f/MS • Mobile part of switch disconnecter (MP)

Size	Frame Amps	Withstand (kA)	Type	4 Poles	
				Global code	U.S. / Canada code
E6.2L-A/f/MS	4000	100	E6.2L-A/f/MS 4000	1SDA079690R1	ZELJ00A0000000000000XX
	5000	100	E6.2L-A/f/MS 5000	1SDA079691R1	ZELK00A0000000000000XX
	6000 (*)	100	E6.2L-A/f/MS 6000	-	-

* 6000A ratings only with rear vertical terminals. Version not yet available. Contact ABB

Circuit breakers

Multi-Standard: IEC 60947 / UL1066 / CSA / CCC

Size	Performance	Description	3 Poles		4 Poles	
			Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2	B	Triple certific: UL/IEC/CCC E2.2B-A EXT	1SDA083020R1	Factory installed only	1SDA083020R1	Factory installed only
E2.2	N	Triple certific: UL/IEC/CCC E2.2N-A EXT	1SDA083021R1	Factory installed only	1SDA083021R1	Factory installed only
E2.2	S	Triple certific: UL/IEC/CCC E2.2S-A EXT	1SDA083022R1	Factory installed only	1SDA083022R1	Factory installed only
E2.2	H	Triple certific: UL/IEC/CCC E2.2H-A EXT	1SDA083023R1	Factory installed only	1SDA083023R1	Factory installed only
E2.2	V	Triple certific: UL/IEC/CCC E2.2V-A EXT	1SDA083024R1	Factory installed only	1SDA083024R1	Factory installed only
E4.2	S	Triple certific: UL/IEC/CCC E4.2S-A EXT	1SDA083025R1	Factory installed only	1SDA083025R1	Factory installed only
E4.2	H	Triple certific: UL/IEC/CCC E4.2H-A EXT	1SDA083026R1	Factory installed only	1SDA083026R1	Factory installed only
E4.2	V	Triple certific: UL/IEC/CCC E4.2V-A EXT	1SDA083027R1	Factory installed only	1SDA083027R1	Factory installed only
E6.2	V	Triple certific: UL/IEC/CCC E6.2V-A EXT	1SDA083028R1	Factory installed only	1SDA083028R1	Factory installed only

The multiple-standard Emax2 can be ordered in the same way you accessories are ordered:

1. Select the right UL circuit breaker you need;
2. Like an accessory configuration, upgrade the circuit breaker with multi-standard performance by adding the code shown above.

Cradles



Size	Performance	Amperage range	Terminal type	Type	3 Poles		4 Poles	
					Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2	B-A, N-A, S-A	250 - 1200	HR - HR	E1.2-A W FP I _u =1200 HR HR UL	1SDA079696R1	Z1A12A0XX	1SDA079697R1	ZAA12A0XX
E2.2	B-A, N-A, S-A, H-A, V-A	250 - 2000	HR - HR	E2.2-A W FP I _u =2000 HR HR UL	1SDA079698R1	Z2A20A0XX	1SDA079699R1	ZBA20A0XX
E4.2	S-A, H-A, V-A, L-A	800 - 2500	HR - HR	E4.2-A W FP I _u =2500 HR HR UL	1SDA079700R1	Z4A25A0XX	1SDA079701R1	ZCA25A0XX
	S-A, H-A, V-A, L-A	3200	VR - VR	E4.2-A W FP I _u =3200 VR VR UL	1SDA079702R1	Z4A32A0XX	1SDA079703R1	ZCA32A0XX
E6.2	H-A, V-A, L-A	4000 - 5000	HR - HR	E6.2-A W FP I _u =5000 HR HR UL	1SDA079706R1	Z6A50A0XX	-	-
	H-A, V-A, L-A	6000 (*)	VR - VR	E6.2-A W FP I _u =6000 3p VR VR UL	1SDA079709R1	Z6A60A0XX	-	-

* Version not yet available. Contact ABB

Accessories

Electrical accessories



First and second shunt coil - YO

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	YO E1.2..E6.2 24 Vac/dc	1SDA073668R1	ZEASA
E1.2..E6.2	YO E1.2..E6.2 30 Vac/dc	1SDA073669R1	ZEASB
E1.2..E6.2	YO E1.2..E6.2 48 Vac/dc	1SDA073670R1	ZEASC
E1.2..E6.2	YO E1.2..E6.2 60 Vac/dc	1SDA073671R1	ZEASD
E1.2..E6.2	YO E1.2..E6.2 110-120 Vac/dc	1SDA073672R1	ZEASE
E1.2..E6.2	YO E1.2..E6.2 120-127 Vac/dc	1SDA073673R1	ZEASF
E1.2..E6.2	YO E1.2..E6.2 220-240 Vac/dc	1SDA073674R1	ZEASG
E1.2..E6.2	YO E1.2..E6.2 240-250 Vac/dc	1SDA073675R1	ZEASH
E1.2..E6.2	YO E1.2..E6.2 380-400 Vac	1SDA073677R1	ZEASK
E1.2..E6.2	YO E1.2..E6.2 415-440 Vac	1SDA073678R1	ZEASL
E1.2..E6.2	YO E1.2..E6.2 480-500 Vac	1SDA073679R1	ZEASM

Second shunt coils are an alternative to a UVR or anti-racking out device (fail safe)

First and second closing coil - YC

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	YC E1.2..E6.2 24 Vac/dc	1SDA073681R1	ZEACA
E1.2..E6.2	YC E1.2..E6.2 30 Vac/dc	1SDA073682R1	ZEACB
E1.2..E6.2	YC E1.2..E6.2 48 Vac/dc	1SDA073683R1	ZEACC
E1.2..E6.2	YC E1.2..E6.2 60 Vac/dc	1SDA073684R1	ZEACD
E1.2..E6.2	YC E1.2..E6.2 110-120 Vac/dc	1SDA073685R1	ZEACE
E1.2..E6.2	YC E1.2..E6.2 120-127 Vac/dc	1SDA073686R1	ZEACF
E1.2..E6.2	YC E1.2..E6.2 220-240 Vac/dc	1SDA073687R1	ZEACG
E1.2..E6.2	YC E1.2..E6.2 240-250 Vac/dc	1SDA073688R1	ZEACH
E1.2..E6.2	YC E1.2..E6.2 380-400 Vac	1SDA073690R1	ZEACK
E1.2..E6.2	YC E1.2..E6.2 415-440 Vac	1SDA073691R1	ZEACL
E1.2..E6.2	YC E1.2..E6.2 480-500 Vac	1SDA073692R1	ZEACM

Shunt coil and closing coil test unit - YO/YC Test Unit (IEC only)

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	YO/YC test unit E1.2...E6.2	1SDA082751R1	ZEAYOYCT

Undervoltage coil - YU

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	YU E1.2..E6.2 24 Vac/dc	1SDA073694R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 30 Vac/dc	1SDA073695R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 48 Vac/dc	1SDA073696R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 60 Vac/dc	1SDA073697R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 110-120 Vac/dc	1SDA073698R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 120-127 Vac/dc	1SDA073699R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 220-240 Vac/dc	1SDA073700R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 240-250 Vac/dc	1SDA073701R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 380-400 Vac	1SDA073703R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 415-440 Vac	1SDA073704R1	ZEUAU
E1.2..E6.2	YU E1.2..E6.2 440-500 Vac	1SDA073705R1	ZEUAU

The undervoltage coil is an alternative to a second shunt coil or anti-racking out device (fail safe)

Electronic time-delay device for undervoltage coil - UVD (IEC only)

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	24-30 Vdc	1SDA038316R1	ZEATL9
E1.2..E6.2	48 Vac/dc	1SDA038317R1	ZEATL8
E1.2..E6.2	60 Vac/dc	1SDA038318R1	ZEATL7
E1.2..E6.2	110...127 Vac/dc	1SDA038319R1	ZEATL5
E1.2..E6.2	220...250 Vac/dc	1SDA038320R1	ZEATL3

The electronic time-delay device must be used with an undervoltage coil with the same voltage

Remote reset - YR

Size	Type	Global code	U.S. / Canada code
E1.2	YR 24 Vdc E1.2	1SDA073744R1	ZE1YRA
E1.2	YR 110 Vac/dc E1.2	1SDA073745R1	ZE1YRB
E1.2	YR 220 Vac/dc E1.2	1SDA073746R1	ZE1YRC
E2.2..E6.2	YR 24 Vdc E2.2...E6.2	1SDA073747R1	ZE2BYRA
E2.2..E6.2	YR 110 Vac/dc E2.2...E6.2	1SDA073748R1	ZE2BYRB
E2.2..E6.2	YR 220 Vac/Dc E2.2...E6.2	1SDA073749R1	ZE2BYRC

When the remote reset is used in DC, its activation must be done with a maximum impulse time of 50ms. It can not be powered permanently.



Accessories

Electrical accessories



Motor - M

Size	Type	Global code	U.S. / Canada code
E1.2	M E1.2 24-30 Vac/dc + MC 250V	1SDA073708R1	ZE1M2
E1.2	M E1.2 48-60 Vac/dc + MC 250V	1SDA073709R1	ZE1M3
E1.2	M E1.2 100-130 Vac/dc + MC 250V	1SDA073710R1	ZE1M4
E1.2	M E1.2 220-250 Vac/dc + MC 250V	1SDA073711R1	ZE1M5
E1.2	M E1.2 380-415 Vac + MC 250V	1SDA073713R1	ZE1M7
E2.2..E6.2	M E2.2...E6.2 24-30 Vac/dc + MC 400V	1SDA073722R1	ZEBM2
E2.2..E6.2	M E2.2...E6.2 48-60 Vac/dc + MC 400V	1SDA073723R1	ZEBM3
E2.2..E6.2	M E2.2...E6.2 100-130 Vac/dc + MC 400V	1SDA073724R1	ZEBM4
E2.2..E6.2	M E2.2...E6.2 220-250 Vac/dc + MC 400V	1SDA073725R1	ZEBM5
E2.2..E6.2	M E2.2...E6.2 380-415 Vac + MC 400V	1SDA073727R1	ZEBM7
E1.2	M E1.2 24-30 Vac/dc + MC 24V	1SDA073715R1	ZE1MA
E1.2	M E1.2 48-60 Vac/dc + MC 24V	1SDA073716R1	ZE1MB
E1.2	M E1.2 100-130 Vac/dc + MC 24V	1SDA073717R1	ZE1MC
E1.2	M E1.2 220-250 Vac/dc + MC 24V	1SDA073718R1	ZE1MD
E1.2	M E1.2 380-415 Vac + MC 24V	1SDA073720R1	ZE1MF
E2.2..E6.2	M E2.2...E6.2 24-30 Vac/dc + MC 24V	1SDA073729R1	ZEBMA
E2.2..E6.2	M E2.2...E6.2 48-60 Vac/dc + MC 24V	1SDA073730R1	ZEBMB
E2.2..E6.2	M E2.2...E6.2 100-130 Vac/dc + MC 24V	1SDA073731R1	ZEBMC
E2.2..E6.2	M E2.2...E6.2 220-250 Vac/dc + MC 24V	1SDA073732R1	ZEBMD
E2.2..E6.2	M E2.2...E6.2 380-415 Vac + MC 24V	1SDA073734R1	ZEBMF

Current sensor for external neutral

Size	Type	Global code	U.S. / Canada code
E1.2-E2.2	Ext CS N E1.2 - E2.2 (*)	1SDA082134R1	ZE1NCT
E4.2-E6.2	Ext CS N E4.2-E6.2 50% (*)	1SDA082135R1	ZE6NCT
E6.2 FS	Ext CS N E6.2 100% (*)	1SDA082136R1	ZE6NCTF

* Only as loose part



Homopolar toroid for the earthing conductor of the main power supply (Transformer star center sensor input) (IEC only)

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Homopolar toroid E1.2...E6.2 100A (*)	1SDA073743R1	ZEAHT100
E1.2..E6.2	Homopolar toroid E1.2...E6.2 250A (*)	1SDA076248R1	ZEAHT250
E1.2..E6.2	Homopolar toroid E1.2...E6.2 400A (*)	1SDA076249R1	ZEAHT400
E1.2..E6.2	Homopolar toroid E1.2...E6.2 800A (*)	1SDA076250R1	ZEAHT800

The homopolar toroid is an alternative to the toroid for differential protection; (*) Only as loose part



Toroid for differential protection (Rc residual current protection sensor input) (IEC only)

Size	Type	Global code	U.S. / Canada code
E1.2 & E2.2 3p	Toroid RC E1.2, E2.2 3p (*)	1SDA073741R1	ZE12RCT1
E2.2 4p & E4.2	Toroide RC E2 4p, E4.2 (*)	1SDA073742R1	ZE24RCT2

The toroid for differential protection is an alternative to the homopolar toroid for the earthing conductor of the main power supply; (*) Only as loose part





Open closed auxiliary contacts - AUX

Size	Type	Global code	U.S. / Canada code
E1.2 (*)	AUX 4Q (4 Form C) 400V E1.2	1SDA073750R1	ZE1AUX4
E1.2	AUX 4Q (4 Form C) 24V E1.2	1SDA073751R1	ZE1AUX4D
E1.2	AUX 2Q (2 Form C) 400V + 2Q (2 Form C) 24V E1.2	1SDA073752R1	ZE1AUX2-2D
E2.2...E6.2 (**)	AUX 4Q (4 Form C) 400V E2.2...E6.2	1SDA073753R1	ZEB AUX4
E2.2...E6.2	AUX 4Q (4 Form C) 24V E2.2...E6.2	1SDA073754R1	ZEB AUX4D
E2.2...E6.2	AUX 2Q (2 Form C) 400V + 2Q (2 Form C) 24V E2.2...E6.2	1SDA073755R1	ZEB AUX2-2D
E2.2...E6.2	AUX 6Q 400V E2.2...E6.2 1)	1SDA073756R1	ZEB AUX6
E2.2...E6.2	AUX 6Q 24V E2.2...E6.2 1)	1SDA073757R1	ZEB AUX6D
E2.2...E6.2	AUX 3Q (3 Form C) 400V + 3Q (3 Form C) 24V E2.2...E6.2 1)	1SDA075973R1	ZEB AUX3-3D
E1.2	AUX 15Q (15 Form C) 400V E1.2 2) (*)	1SDA073758R1	ZE1AUX15
E1.2	AUX 15Q (15 Form C) 24V E1.2 2) (*)	1SDA073759R1	ZE1AUX15D
E2.2...E6.2	AUX 15Q (15 Form C) 400V (for fixed/drawout with signalling in racked in) E2.2...E6.2 2) (*)	1SDA073760R1	ZEB AUX15
E2.2...E6.2	AUX 15Q (15 Form C) 24V (for fixed/drawout with signalling in racked in) E2.2...E6.2 2) (*)	1SDA073761R1	ZEB AUX15D
E2.2...E6.2	AUX 15Q (15 Form C) 400V (for fixed/drawout with signalling in racked in/test isolated) E2.2...E6.2 2) (*)	1SDA073846R1	ZEB AUX15RT
E2.2...E6.2	AUX 15Q (15 Form C) 24V (for fixed/drawout with signalling in racked in/test isolated) E2.2...E6.2 2) (*)	1SDA073847R1	ZEB AUX15DRT

1) AUX 6Q (6 Form C) is an alternative to the Ekip Signalling 4k module

2) Aux 15 Q (15 Form C) is an alternative to the Mechanical interlock (MI), the lock to prevent door opening when the circuit breaker is in the closed position (DLC) or the lock to prevent door opening when the circuit breaker is in the racked in or test position (DCP) when mounted on the right side. For E1.2 one of the mounting plates is also needed.

For E1.2 you need to order also one of the following items:

Plate for fixed - floor mounted 1SDA079783R1 ZE1AUX15PLF
 Plate for fixed - wall mounted 1SDA079782R1 ZE1AUX15PLW
 Plate for withdrawable 1SDA079784R1 ZE1AUX15PLMP

* Not compatible with mechanical locks on compartment doors or mechanical interlocks

** Standard supply with automatic circuit-breakers



Auxiliary position contacts - AUP

Size	Type	Global code	U.S. / Canada code
E1.2	AUP 6 contacts 400V E1.2	1SDA073762R1	ZE1AUP
E1.2	AUP 6 contacts 24V E1.2	1SDA073763R1	ZE1AUPD
E2.2...E6.2	AUP 5 contacts 400V E2.2...E6.2 - left set	1SDA080373R1	ZEB AUP-L
E2.2...E6.2	AUP 5 contacts 24V E2.2...E6.2 - left set	1SDA080374R1	ZEB AUPD-L
E2.2...E6.2	AUP 5 suppl. contacts 400V E2.2...E6.2 - right set	1SDA080375R1	ZEB AUP-R
E2.2...E6.2	AUP 5 suppl. contacts 24V E2.2...E6.2 - right set	1SDA080376R1	ZEB AUPD-R
E1.2...E6.2	AUP Ekip auxiliary position contact E1.2...E6.2	1SDA073768R1	ZEA AUPE

Accessories

Electrical accessories



Ready to close signalling contact - RTC

Size	Type	Global code	U.S. / Canada code
E1.2	RTC 250V E1.2	1SDA073770R1	ZE1RTC
E1.2	RTC 24V E1.2	1SDA073771R1	ZE1RTCD
E1.2	RTC Ekip 24V E1.2	1SDA073772R1	ZE1RTCDE
E2.2...E6.2	RTC 250V E2.2...E6.2	1SDA073773R1	ZEBRTC
E2.2...E6.2	RTC 24V E2.2...E6.2	1SDA073774R1	ZEBRTCD
E2.2...E6.2	RTC Ekip 24V E2.2...E6.2	1SDA073775R1	ZEBRTCDE



Trip signalling contact - S51 / bell alarm

Size	Type	Global code	U.S. / Canada code
E1.2	S51 / bell alarm 250V E1.2 *	1SDA073776R1	ZE1BA
E1.2	S51 / bell alarm 24V E1.2	1SDA073777R1	ZE1BAD
E2.2...E6.2	S51 / bell alarm 250V E2.2...E6.2 *	1SDA073778R1	ZEBBA
E2.2...E6.2	S51 / bell alarm 24V E2.2...E6.2	1SDA073779R1	ZEBBAD
E2.2...E6.2	250V E2.2...E6.2	1SDA085699R1	ZEBBA2
E2.2...E6.2	24V E2.2...E6.2	1SDA085700R1	ZEBBAD2

* Standard supply with automatic circuit-breakers

Terminal blocks for auxiliary connection

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Terminal blocks 10 pcs	1SDA073906R1	ZEATB10

Accessories

Mechanical accessories



Mechanical operation counter - MOC

Size	Type	Global code	U.S. / Canada code
E1.2	MOC mechanical operation counter ⁽¹⁾	1SDA073780R1	ZE1MOC
E2.2...E6.2	MOC mechanical operation counter	1SDA073781R1	ZEBMOC

* Only available with motor



Key lock in open position - KLC

Size	Type	Global code	U.S. / Canada code
E1.2	KLC-D Key lock open E1.2	1SDA073782R1	ZE1KLCD
E1.2	KLC-S Key lock open N.20005 E1.2	1SDA073783R1	ZE1KLCS5
E1.2	KLC-S Key lock open N.20006 E1.2	1SDA073784R1	ZE1KLCS6
E1.2	KLC-S Key lock open N.20007 E1.2	1SDA073785R1	ZE1KLCS7
E1.2	KLC-S Key lock open N.20008 E1.2	1SDA073786R1	ZE1KLCS8
E1.2	KLC-S Key lock open N.20009 E1.2	1SDA073787R1	ZE1KLCS9
E1.2	KLC-A Key lock open Castell E1.2 ^{1) 2)}	1SDA073788R1	ZE1KLAC
E1.2	KLC-A Key lock open Kirk E1.2 ¹⁾	1SDA073789R1	ZE1KLAK
E1.2	KLC-A Key lock open Ronis Profalux E1.2 ¹⁾	1SDA073790R1	ZE1KLAR
E2.2...E6.2	KLC-D Key lock open E2.2...E6.2	1SDA073791R1	ZEBKLCD
E2.2...E6.2	KLC-S Key lock open N.20005 E2.2..E6.2	1SDA073792R1	ZEBKLCS5
E2.2...E6.2	KLC-S Key lock open N.20006 E2.2..E6.2	1SDA073793R1	ZEBKLCS6
E2.2...E6.2	KLC-S Key lock open N.20007 E2.2..E6.2	1SDA073794R1	ZEBKLCS7
E2.2...E6.2	KLC-S Key lock open N.20008 E2.2..E6.2	1SDA073795R1	ZEBKLCS8
E2.2...E6.2	KLC-S Key lock open N.20009 E2.2..E6.2	1SDA073796R1	ZEBKLCS9
E2.2...E6.2	KLC-A Key lock open Castell E2.2...E6.2 ^{1) 2)}	1SDA073797R1	ZEBKLAC
E2.2...E6.2	KLC-A Key lock open Kirk E2.2..E6.2 ¹⁾	1SDA073798R1	ZEBKLAK
E2.2...E6.2	KLC-A Key lock open Ronis Profalux E2.2..E6.2 ¹⁾	1SDA073799R1	ZEBKLAR

1) Arrangement only; 2) Only mounted. For loose supply contact ABB SACE.



Padlocks in open position - PLC

Size	Type	Global code	U.S. / Canada code
E1.2	PLC E1.2 Padlock open D=4mm/0.15"	1SDA073800R1	ZE1PLC4
E1.2	PLC E1.2 Padlock open D=7mm/0.27"	1SDA073801R1	ZE1PLC7
E1.2	PLC E1.2 Padlock open D=8mm/0.31"	1SDA073802R1	ZE1PLC8
E2.2...E6.2	PLC E2.2..E6.2 Padlock open D=4mm/0.15"	1SDA073803R1	ZEBPLC4
E2.2...E6.2	PLC E2.2..E6.2 Padlock open D=7mm/0.27"	1SDA073804R1	ZEBPLC7
E2.2...E6.2	PLC E2.2..E6.2 Padlock open D=8mm/0.31"	1SDA073805R1	ZEBPLC8

The PLC is an alternative to the protection device for opening and closing pushbuttons (PBC)

Fixed or Mobile Part with neutral on right side

Size	Type	Global code	U.S. / Canada code
E1.2...E6.2	Installation with neutral on right side sequence L1, L2, L3, N	1SDA076153R1	Factory installed only

Floor fixing plate - F

Size	Type	Global code	U.S. / Canada code
E1.2	Floor fixing plate for fixed unit	1SDA076020R1	ZE1FFPF

Accessories

Mechanical accessories



Key lock in racked in / test / racked out position - KLP

Size	Type	Global code	U.S. / Canada code
E1.2	KLP-D Key lock racked in/out E1.2 1st key	1SDA073822R1	ZE1KLPD
E1.2	KLP-S Key lock racked in/out N.20005 E1.2 1st key	1SDA073823R1	ZE1KLPS5
E1.2	KLP-S Key lock racked in/out N.20006 E1.2 1st key	1SDA073824R1	ZE1KLPS6
E1.2	KLP-S Key lock racked in/out N.20007 E1.2 1st key	1SDA073825R1	ZE1KLPS7
E1.2	KLP-S Key lock racked in/out N.20008 E1.2 1st key	1SDA073826R1	ZE1KLPS8
E1.2	KLP-S Key lock racked in/out N.20009 E1.2 1st key	1SDA073827R1	ZE1KLPS9
E1.2	KLP-D Key lock racked in/out E1.2 2nd key	1SDA073828R1	ZE1KLPD-2
E1.2	KLP-S Key lock racked in/out N.20005 E1.2 2nd key	1SDA073829R1	ZE1KLPS5-2
E1.2	KLP-S Key lock racked in/out N.20006 E1.2 2nd key	1SDA073830R1	ZE1KLPS6-2
E1.2	KLP-S Key lock racked in/out N.20007 E1.2 2nd key	1SDA073831R1	ZE1KLPS7-2
E1.2	KLP-S Key lock racked in/out N.20008 E1.2 2nd key	1SDA073832R1	ZE1KLPS8-2
E1.2	KLP-S Key lock racked in/out N.20009 E1.2 2nd key	1SDA073833R1	ZE1KLPS9-2
E1.2	KLP-A Key lock racked in/out RonProfKirk E1.2 1st key ²⁾	1SDA073834R1	ZE1KLPR
E1.2	KLP-A Key lock racked in/out RonProfKirk E1.2 2nd key ²⁾	1SDA073835R1	ZE1KLPR-2
E1.2	KLP-A Key lock racked in/out Castell E1.2 1st key ¹⁾²⁾	1SDA073836R1	ZE1KLPC
E1.2	KLP-A Key lock racked in/out Castell E1.2 2nd key ¹⁾²⁾	1SDA073837R1	ZE1KLPC-2
E2.2...E6.2	KLP-D Key lock racked in/out E2.2...E6.2 1st key	1SDA073806R1	ZEBKLPD
E2.2...E6.2	KLP-S Key lock racked in/out N.20005 E2.2...E6.2 1st key	1SDA073807R1	ZEBKLPS5
E2.2...E6.2	KLP-S Key lock racked in/out N.20006 E2.2...E6.2 1st key	1SDA073808R1	ZEBKLPS6
E2.2...E6.2	KLP-S Key lock racked in/out N.20007 E2.2...E6.2 1st key	1SDA073809R1	ZEBKLPS7
E2.2...E6.2	KLP-S Key lock racked in/out N.20008 E2.2...E6.2 1st key	1SDA073810R1	ZEBKLPS8
E2.2...E6.2	KLP-S Key lock racked in/out N.20009 E2.2...E6.2 1st key	1SDA073811R1	ZEBKLPS9
E2.2...E6.2	KLP-D Key lock racked in/out E2.2...E6.2 2nd key	1SDA073812R1	ZEBKLPD-2
E2.2...E6.2	KLP-S Key lock racked in/out N.20005 E2.2...E6.2 2nd key	1SDA073813R1	ZEBKLPS5-2
E2.2...E6.2	KLP-S Key lock racked in/out N.20006 E2.2...E6.2 2nd key	1SDA073814R1	ZEBKLPS6-2
E2.2...E6.2	KLP-S Key lock racked in/out N.20007 E2.2...E6.2 2nd key	1SDA073815R1	ZEBKLPS7-2
E2.2...E6.2	KLP-S Key lock racked in/out N.20008 E2.2...E6.2 2nd key	1SDA073816R1	ZEBKLPS8-2
E2.2...E6.2	KLP-S Key lock racked in/out N.20009 E2.2...E6.2 2nd key	1SDA073817R1	ZEBKLPS9-2
E2.2...E6.2	KLP-A Key lock racked in/out RonProfKirk E2.2...E6.2 1st key ²⁾	1SDA073818R1	ZEBKLPR
E2.2...E6.2	KLP-A Key lock racked in/out RonProfKirk E2.2...E6.2 2nd key ²⁾	1SDA073819R1	ZEBKLPR-2
E2.2...E6.2	KLP-A Key lock racked in/out Castell E2.2...E6.2 1st key ¹⁾²⁾	1SDA073820R1	ZEBKLPC
E2.2...E6.2	KLP-A Key lock racked in/out Castell E2.2...E6.2 2nd key ¹⁾²⁾	1SDA073821R1	ZEBKLPC-2

To have 2 keys, one each of a 1st key and 2nd key option must be ordered. When the Padlock in racked in/test/racked out (PLP) is also present, the 2nd key option must be ordered.

1) Two Castell key options can not be used together; 2) Arrangement only

Supplementary lock in racked out position accessory

Size	Type	Global code	U.S. / Canada code
E1.2	Suppl. lock in racked out E1.2	1SDA073838R1	ZE1SUP
E2.2...E6.2	Suppl. lock in racked out E2.2...E6.2	1SDA073839R1	ZEBSUP

Padlock in racked in / test / racked out position - PLP

Size	Type	Global code	U.S. / Canada code
E1.2	PLP Padlock racked in/out E1.2	1SDA073840R1	ZE1PLP
E2.2...E6.2	PLP Padlock racked in/out E2.2...E6.2	1SDA073841R1	ZEBPLP

Can also be used with the key lock in racked in/test/racked out device when the 2nd key option is ordered.



Anti-racking out device (fail safe) - FS

Size	Type	Global code	U.S. / Canada code
E1.2	Fail Safe E1.2	1SDA079898R1	ZE1FS
E2.2...E6.2	Fail Safe E2.2...E6.2	1SDA079899R1	ZEBFS

Standard for CBs UL, not compatible with YU

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

Size	Type	Global code	U.S. / Canada code
E1.2...E6.2	DLR E2.2...E6.2 (*)	1SDA073845R1	ZEBDLR

(*) Only as loose part

Lock to prevent door opening when the circuit breaker is in racked in / test position - DLP

Size	Type	Global code	U.S. / Canada code
E2.2...E6.2	DLP E2.2...E6.2 (*)	1SDA073849R1	ZEBDLP

If mounted on the right side, the DLP is an alternative to the mechanical interlock, AUX 15Q (15 Form C) or Lock to prevent door opening when the circuit breaker is in a closed position (DLC); (*) Only as loose part

Lock to prevent door opening when the circuit breaker is in a closed position - DLC

Size	Type	Global code	U.S. / Canada code
E1.2	DLC Interlock cable door for fixed to wall E1.2	1SDA081032R1	ZE1DLCCDFW
E1.2	DLC Interlock cable door for fixed to floor E1.2	1SDA081033R1	ZE1DLCCDFF
E1.2	DLC Interlock cable door for fixed part withdrawable E1.2	1SDA081034R1	ZE1DLCCDFP
E1.2	DLC Interlock direct door for fixed to wall E1.2	1SDA079779R1	ZE1DLCCDFW
E1.2	DLC Interlock direct door for fixed to floor E1.2	1SDA079780R1	ZE1DLCCDFF
E1.2	DLC Interlock direct door for fixed part withdrawable E1.2	1SDA079781R1	ZE1DLCCDFP
E2.2...E6.2	DLC Interlock cable door E2.2...E6.2 (*)	1SDA073852R1	ZEBDLCCD
E2.2...E6.2	DLC Interlock direct door E2.2...E6.2 (*)	1SDA073853R1	ZEBDLCCD

If mounted on the right side, the DLP is an alternative to the mechanical interlock, AUX 15Q (15 Form C) or Lock to prevent door opening when the circuit breaker is in racked in / test position (DLP); * To be ordered with lever for interlock [group 2] and support for interlock [1SDA073895R1]

Protection device for opening and closing pushbuttons - PBC

Size	Type	Global code	U.S. / Canada code
E1.2	PBC Op/Ci BP protection sp. key E1.2	1SDA073854R1	ZE1PBC
E1.2	PBC Op/Ci BP protection PL D=4mm/0.15" E1.2	1SDA073855R1	ZE1PBC4
E1.2	PBC Op/Ci BP protection PL D=7mm/0.27" E1.2	1SDA073856R1	ZE1PBC7
E1.2	PBC Op/Ci BP protection PL D=8mm/0.31" E1.2	1SDA073857R1	ZE1PBC8
E2.2...E6.2	PBC Op/Ci BP protection sp. key E2.2...E6.2	1SDA073858R1	ZEBPBC
E2.2...E6.2	PBC Op/Ci BP protection PL D=4mm/0.15" E2.2...E6.2	1SDA073859R1	ZEBPBC4
E2.2...E6.2	PBC Op/Ci BP protection PL D=7mm/0.27" E2.2...E6.2	1SDA073860R1	ZEBPBC7
E2.2...E6.2	PBC Op/Ci BP protection PL D=8mm/0.31" E2.2...E6.2	1SDA073861R1	ZEBPBC8

* The PBC is an alternative to the Padlock in open position (PLC)



Accessories

Mechanical accessories



Circuit breaker flange / door escutcheon

Size	Type	Global code	U.S. / Canada code
E1.2	IP30 flange E1.2 Fixed	1SDA073862R1	ZE1FLG30F
E1.2	IP30 flange E1.2 Drawout	1SDA073863R1	ZE1FLG30D
E2.2...E6.2	IP30 flange E2.2...E6.2 Fixed	1SDA073864R1	ZEBFLG30F
E2.2...E6.2	IP30 flange E2.2...E6.2 Drawout	1SDA073865R1	ZEBFLG30D
E1.2	IP54 flange, different keys E1.2 ^(*)	1SDA073866R1	ZE1FLG54DK
E2.2...E6.2	IP54 flange, different keys E2.2...E6.2 ^(*)	1SDA073867R1	ZEBFLG54DK
E1.2	IP54 flange, key N.20005 E1.2 ^(*)	1SDA073868R1	ZE1FLG54SK
E2.2...E6.2	IP54 flange, key N.20005 E2.2...E6.2 ^(*)	1SDA073869R1	ZEBFLG54SK
E2.2...E6.2	Sealable trip unit cover E2.2...E6.2	1SDA073870R1	ZEBSTUC

* Only as loose part

High or low terminal covers - HTC/LTC

Size	Type	3 poles		4 poles	
		Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2	HTC high terminal covers E1.2 2pcs	1SDA073871R1	ZE1HTC	1SDA073872R1	ZE1HTC-4
E1.2	LTC low terminal covers E1.2 2pcs	1SDA073873R1	ZE1LTC	1SDA073874R1	ZE1LTC-4

Separators - PB

Size	Type	Global code	U.S. / Canada code
E1.2	PB H=100mm/3.94" 4pcs E1.2 Fixed 3P	1SDA073877R1	ZE1PBF100
E1.2	PB H=100mm/3.94" 6pcs E1.2 Fixed 4P	1SDA073878R1	ZE1PBF100-4
E1.2	PB H=200mm/7.87" 4pcs E1.2 Fixed 3P	1SDA073879R1	ZE1PBF200
E1.2	PB H=200mm/7.87" 6pcs E1.2 Fixed 4P	1SDA073880R1	ZE1PBF200-4
E1.2	PB 2pcs E1.2 Drawout 3P	1SDA076164R1	ZE1PBW
E1.2	PB 3pcs E1.2 Drawout 4P	1SDA076165R1	ZE1PBW-4
E2.2...E6.2	PB 2pcs E2.2...E6.2 Fixed 3P	1SDA076166R1	ZEBPBF
E2.2...E6.2	PB 3pcs E2.2...E6.2 Fixed 4P	1SDA076167R1	ZEBPBF-4
E2.2...E6.2	PB 2pcs E2.2...E6.2 Drawout 3P	1SDA076168R1	ZEBPBW
E2.2...E6.2	PB 3pcs E2.2...E6.2 Drawout 4P	1SDA076169R1	ZEBPBW-4
E4.2	PB Separators E4.2 3200A/3600A UL Fixed 3P	1SDA107410R1	ZEBPBF36
E4.2	PB Separators E4.2 3200A UL Fixed 4P	1SDA107411R1	ZEBPBF32-4
E4.2	PB Separators E4.2 3200A UL Drawout 3P	1SDA107412R1	ZEBPBW32
E4.2	PB Separators E4.2 3200A UL Drawout 4P	1SDA107413R1	ZEBPBW32-4

Accessories

Mechanical interlock

Cables for mechanical interlock [Group 1]

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Type A horizontal	1SDA073881R1	ZEACBLAHR
E2.2..E6.2	Type B,C,D horizontal	1SDA073882R1	ZEACBLBHR
E1.2..E6.2	Type A vertical	1SDA073885R1	ZEACBLAVR
E2.2..E6.2	Type B,C,D vertical	1SDA073886R1	ZE6CBLBVR

On type of cable must be ordered for each interlock. The cable must be ordered with the fixed circuit breaker or the cradle of a drawout circuit breaker.

Lever for mechanical interlock of fixed circuit breaker or cradle [Group 2]

Size	Type	3 Poles		4 Poles	
		Global code	U.S. / Canada code	Global code	U.S. / Canada code
E2.2	Lever for mechanical interlock	1SDA073889R1	ZE2LEV	1SDA073889R1	ZE2LEV
E4.2	Lever for mechanical interlock	1SDA073890R1	ZE4LEV	1SDA073890R1	ZE4LEV
E6.2	Lever for mechanical interlock	1SDA073891R1	ZE6LEV	1SDA073892R1	ZE6LEV-4

The lever for the mechanical interlock is not required for E1.2

Support for mechanical interlock of fixed circuit breaker [Group 3]

Size	Type	Global code	U.S. / Canada code
E1.2	Type A - floor mounted	1SDA073893R1	ZE1SPA
E1.2	Type A - wall mounted	1SDA073894R1	ZE1SPAFM
E2.2...E6.2	Type A / B / D	1SDA073895R1	ZEBSPB
E2.2...E6.2	Type C	1SDA073897R1	ZEBSPC

Support for mechanical interlock of fixed part [Group 4]

Size	Type	Global code	U.S. / Canada code
E1.2	Type A	1SDA073896R1	ZE1SPCRDA
E2.2...E6.2	Type A / B / D	1SDA073895R1	ZEBSPB
E2.2...E6.2	Type C	1SDA073897R1	ZEBSPC

Automatic transfer switch

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	ATS021	1SDA065523R1	ATS021
E1.2..E6.2	ATS022	1SDA065524R1	ATS022



Accessories

Ekip modules



Ekip trip units - loose supply

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Ekip Dip LI	1SDA074194R1	ZEAEDLI
E1.2..E6.2	Ekip Dip LSI	1SDA074195R1	ZEAEDLSI
E1.2..E6.2	Ekip Dip LSIG	1SDA074196R1	ZEAEDLSIG
E1.2..E6.2	Ekip Touch LI	1SDA074197R1	ZEAETLI
E1.2..E6.2	Ekip Touch LSI	1SDA074198R1	ZEAETLSI
E1.2..E6.2	Ekip Touch LSIG	1SDA074199R1	ZEAETLSIG
E1.2..E6.2	Ekip G Touch LSIG ⁽¹⁾	1SDA074200R1	ZEAEGTLSIG
E1.2..E6.2	Ekip Hi-Touch LSI ⁽¹⁾	1SDA074201R1	ZEAHTLSI
E1.2..E6.2	Ekip Hi-Touch LSIG ⁽¹⁾	1SDA074202R1	ZEAHTLSIG
E1.2..E6.2	Ekip G Hi-Touch LSIG ⁽¹⁾	1SDA074203R1	ZEAEGHTLSIG
E1.2..E6.2	Ekip LCD LI ⁽¹⁾	1SDA074204R1	ZEAELCDLI
E1.2..E6.2	Ekip LCD LSI ⁽¹⁾	1SDA074205R1	ZEAELCDLSI
E1.2..E6.2	Ekip LCD LSIG ⁽¹⁾	1SDA074206R1	ZEAELCDLSIG
E1.2..E6.2	Ekip G LCD LSIG ⁽¹⁾	1SDA074207R1	ZEAELCDLSIG
E1.2..E6.2	Ekip Hi-LCD LSI ⁽¹⁾	1SDA074208R1	ZEAHLCDLSI
E1.2..E6.2	Ekip Hi-LCD LSIG ⁽¹⁾	1SDA074209R1	ZEAHLCDLSIG
E1.2..E6.2	Ekip G Hi-LCD LSIG ⁽¹⁾	1SDA074210R1	ZEAHGLCDLSIG
E1.2..E6.2	Battery for Ekip trip units	1SDA074193R1	ZEAEKIPBAT

(1) provided without Ekip Measuring/Ekip Measuring Pro

Options for Ekip trip units

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Ekip LCD installed	1SDA074211R1	Factory installed code only
E1.2..E6.2	Ekip Power Controller	1SDA074212R1	Factory installed code only
E1.2..E6.2	Upper internal installed voltage outlets	1SDA074216R1	Factory installed code only
E1.2..E6.2	External installed voltage outlets	1SDA074217R1	Factory installed code only
E1.2..E6.2	Arrangement for cables with lower internal voltage outlets	1SDA074213R1	Factory installed code only
E1.2..E6.2	Arrangement for cables with upper internal voltage outlets	1SDA074214R1	Factory installed code only
E1.2..E6.2	Arrangement for cables with external voltage outlets	1SDA074215R1	Factory installed code only

Power Supply modules

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Ekip Supply 110-240VAC/DC	1SDA074172R1	ZEAPWRS
E1.2..E6.2	Ekip Supply 24-48VDC	1SDA074173R1	ZEAPWRSD





Connectivity modules

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Ekip Com Hub	1SDA082894R1	ZEAEKIPHUB
E1.2..E6.2	Ekip Com Modbus RS-485	1SDA074150R1	ZEAMOD485
E1.2..E6.2	Ekip Com Modbus TCP	1SDA074151R1	ZEAMODTCP
E1.2..E6.2	Ekip Com Profibus	1SDA074152R1	ZEAPRFIBUS
E1.2..E6.2	Ekip Com Profinet	1SDA074153R1	ZEAPRFINET
E1.2..E6.2	Ekip Com DeviceNet	1SDA074154R1	ZEADEVICNET
E1.2..E6.2	Ekip Com EtherNet/IP	1SDA074155R1	ZEATHRNT
E1.2..E6.2	Ekip Com IEC61850	1SDA074156R1	ZEAIEC61850
E1.2..E6.2	Ekip Com R Modbus RS-485	1SDA074157R1	ZEAMOD485R
E1.2..E6.2	Ekip Com R Modbus TCP	1SDA074158R1	ZEAMODTCP
E1.2..E6.2	Ekip Com R Profibus	1SDA074159R1	ZEAPROFIBUSR
E1.2..E6.2	Ekip Com R Profinet	1SDA074160R1	ZEAPROFINETR
E1.2..E6.2	Ekip Com R DeviceNet	1SDA074161R1	ZEADEVICENETR
E1.2..E6.2	Ekip Com R EtherNet/IP	1SDA074162R1	ZEAIPT
E1.2..E6.2	Ekip Com R IEC61850	1SDA076170R1	
E1.2..E6.2	Ekip Link	1SDA074163R1	ZEALINK
E1.2..E6.2	Ekip Bluetooth	1SDA074164R1	ZEABT
E1.2..E6.2	Ekip Com GPRS-M	1SDA074165R1	ZEAGPRSM
E1.2..E6.2	Ekip Com Actuator	1SDA074166R1	ZEACACT

Signalling modules

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2	Ekip 2K-1	1SDA074167R1	ZE2K1
E1.2..E6.2	Ekip 2K-2	1SDA074168R1	ZE2K2
E1.2..E6.2	Ekip 2K-3	1SDA074169R1	ZE2K3
E2.2..E6.2	Ekip 4K ¹⁾	1SDA074170R1	ZE4K
E1.2..E6.2	Ekip 10K ²⁾	1SDA074171R1	ZE10K
E1.2..E6.2 ³⁾	Ekip Signalling 3T-1 AI-Temp PT1000	1SDA085693R1	ZE3T1
E1.2..E6.2 ³⁾	Ekip Signalling 3T-2 AI-Temp PT1000	1SDA085694R1	ZE3T2

1) Ekip 4k is not available for the E1.2. It is an alternative to the AUX 6Q (6 Form C) auxiliary contacts unit on other frames; 2) only as loose part; 3) External probe PT1000 not supplied

External Probe for signalling 3T module

Size	Type	Global code	U.S. / Canada code
E1.2..E6.2 ^{d)}	External Probe PT1000 3mt	1SDA085695R1	ZE3TPR

d) Use only with Ekip Signalling 3T module

Measuring and Measuring Pro modules

Size	Type	Global code	U.S. / Canada code
E1.2	Ekip Measuring	1SDA074184R1	ZE1MEAS
E1.2	Ekip Measuring Pro	1SDA074185R1	ZE1MEASPRO
E2.2	Ekip Measuring	1SDA074186R1	ZE2MEAS
E2.2	Ekip Measuring Pro	1SDA074187R1	ZE2MEASPRO
E4.2	Ekip Measuring	1SDA074188R1	ZE4MEAS
E4.2	Ekip Measuring Pro	1SDA074189R1	ZE4MEASPRO
E6.2	Ekip Measuring	1SDA074190R1	ZE6MEAS
E6.2	Ekip Measuring Pro	1SDA074191R1	ZE6MEASPRO
E1.2	Voltage socket for neutral on the right side L1 L2 L3 L3 N - E1.2 ^(*)	1SDA076244R1	ZE1VSNRT
E2.2	Voltage socket for neutral on the right side L1 L2 L3 L3 N - E2.2 ^(*)	1SDA076245R1	ZE2VSNRT
E4.2	Voltage socket for neutral on the right side L1 L2 L3 L3 N - E4.2 ^(*)	1SDA076246R1	ZE4VSNRT
E6.2	Voltage socket for neutral on the right side L1 L2 L3 L3 N - E6.2 ^(*)	1SDA076247R1	ZE6VSNRT

* use only with circuit breakers with neutral on right side L1 L2 L3 N

Accessories

Ekip modules



Synchrocheck module

Size	Type	Global code	U.S. / Canada code
E1.2...E6.2	Ekip Synchrocheck	1SDA074183R1	ZEASYNCHK



Displaying and supervision systems

Size	Type	Global code	U.S. / Canada code
E1.2...E6.2	Ekip T&P - Programming, Test Unit and Case	1SDA066989R1	ZEAEKPTP
E1.2...E6.2	Ekip TT - Trip Test	1SDA066988R1	ZEAEKPTT
E1.2...E6.2	Ekip Programming	1SDA076154R1	ZEAEKPPGM
E1.2...E6.2	Ekip Multimeter Display for the front of switchgear (*)	1SDA074192R1	ZEAMM
E1.2...E6.2	Ekip Control Panel for 10 circuit breakers	1SDA074311R1	ZEAEKPCP10
E1.2...E6.2	Ekip Control Panel for 30 circuit breakers	1SDA074312R1	ZEAEKPCP30
E1.2...E6.2	Ekip View Software for 30 circuit breakers	1SDA074298R1	ZEAEKPS30
E1.2...E6.2	Ekip View Software for 60 circuit breakers	1SDA074299R1	ZEAEKPS60
E1.2...E6.2	Ekip View Software for unlimited circuit breakers	1SDA074300R1	ZEAEKPSU

* only as loose part



Rating plugs for Ekip trip units

Size	Type	Global code (loose supply)	U.S. / Canada code (loose supply)	Global code (installed)	U.S. / Canada code (installed)
E1.2...E2.2	Rating Plug 100A	1SDA074218R1	ZEA0100RP	1SDA074258R1	Factory installed only
E1.2...E2.2	Rating Plug 200A	1SDA074219R1	ZEA0200RP	1SDA074259R1	Factory installed only
E1.2...E2.2	Rating Plug 250A	1SDA074220R1	ZEA0250RP	1SDA074260R1	Factory installed only
E1.2...E6.2	Rating Plug 400A	1SDA074221R1	ZEA0400RP	1SDA074261R1	Factory installed only
E1.2...E6.2	Rating Plug 600A ¹⁾	1SDA082038R1	ZEA0600RP	1SDA079826R1	Factory installed only
E1.2...E6.2	Rating Plug 800A	1SDA074223R1	ZEA0800RP	1SDA074263R1	Factory installed only
E1.2...E6.2	Rating Plug 1000A	1SDA074224R1	ZEA1000RP	1SDA074264R1	Factory installed only
E1.2...E6.2	Rating Plug 1200A ¹⁾	1SDA079730R1	ZEA1200RP	1SDA079828R1	Factory installed only
E1.2...E6.2	Rating Plug 1600A ²⁾	1SDA074226R1	ZEA1600RP	1SDA074266R1	Factory installed only
E2.2...E6.2	Rating Plug 2000A	1SDA074227R1	ZEA2000RP	1SDA074267R1	Factory installed only
E2.2...E6.2	Rating Plug 2500A ³⁾	1SDA074228R1	ZEA2500RP	1SDA074268R1	Factory installed only
E4.2...E6.2	Rating Plug 3200A	1SDA074229R1	ZEA3200RP	1SDA074269R1	Factory installed only
E4.2...E6.2	Rating Plug 4000A ⁴⁾	1SDA074230R1	ZEA4000RP	1SDA074270R1	Factory installed only
E6.2	Rating Plug 5000A	1SDA074231R1	ZEA5000RP	1SDA074271R1	Factory installed only
E6.2	Rating Plug 6000A ¹⁾	1SDA079731R1	ZEA6000RP	-	-

1) UL only

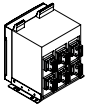
2) IEC only for E1.2, both UL and IEC for all other frames

3) IEC only for E2.2, both UL and IEC for E4.2 and E6.2

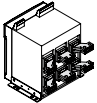
4) IEC only for E4.2, both UL and IEC for E6.2

Accessories

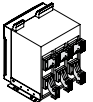
Terminals



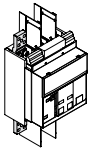
Rear orientable terminal - HR VR



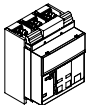
Horizontal rear spread terminal - SHR



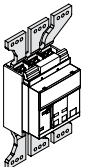
Vertical rear spread terminal - SVR



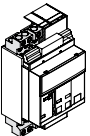
Extended front terminal - EF



Front terminal - F



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

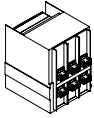
Kit for terminals - installed on fixed circuit breaker

Size	Version	Max amperage	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2	F	1200	Kit EF Upper ¹⁾	1SDA073963R1	Factory installed only	1SDA073964R1	Factory installed only
E1.2	F	1200	Kit EF Lower ¹⁾	1SDA073965R1	Factory installed only	1SDA073966R1	Factory installed only
E1.2	F	1200	Kit ES Upper ¹⁾	1SDA073975R1	Factory installed only	1SDA073976R1	Factory installed only
E1.2	F	1200	Kit ES Lower ¹⁾	1SDA073977R1	Factory installed only	1SDA073978R1	Factory installed only
E1.2	F	1200	Kit HR Upper	1SDA079840R1	Factory installed only	1SDA079841R1	Factory installed only
E1.2	F	1200	Kit HR Lower	1SDA079842R1	Factory installed only	1SDA079843R1	Factory installed only
E1.2	F	1200	Kit VR Upper	1SDA079836R1	Factory installed only	1SDA079837R1	Factory installed only
E1.2	F	1200	Kit VR Lower	1SDA079838R1	Factory installed only	1SDA079839R1	Factory installed only
E1.2	F	1200	Kit FcCuAl 4x500kcmil/240mm ² Upper ¹⁾	1SDA073997R1	Factory installed only	1SDA073998R1	Factory installed only
E1.2	F	1200	Kit FcCuAl 4x500kcmil/240mm ² Lower ¹⁾	1SDA073999R1	Factory installed only	1SDA074000R1	Factory installed only
E2.2	F	2000	Kit F Upper ¹⁾	1SDA074118R1	Factory installed only	1SDA074119R1	Factory installed only
E2.2	F	2000	Kit F Lower ¹⁾	1SDA074120R1	Factory installed only	1SDA074121R1	Factory installed only
E2.2	F	2000	Kit VR Upper	1SDA079852R1	Factory installed only	1SDA079853R1	Factory installed only
E2.2	F	2000	Kit VR Lower	1SDA079854R1	Factory installed only	1SDA079855R1	Factory installed only
E4.2	F	3200	Kit F Upper ¹⁾	1SDA074126R1	Factory installed only	1SDA074127R1	Factory installed only
E4.2	F	3200	Kit F Lower ¹⁾	1SDA074128R1	Factory installed only	1SDA074129R1	Factory installed only
E4.2	F	2500	Kit VR Upper	1SDA079862R1	Factory installed only	1SDA079863R1	Factory installed only
E4.2	F	2500	Kit VR Lower	1SDA079864R1	Factory installed only	1SDA079865R1	Factory installed only
E6.2	F	6000	Kit F Upper ¹⁾	1SDA074134R1	Factory installed only	1SDA074135R1	Factory installed only
E6.2	F	6000	Kit F Lower ¹⁾	1SDA074137R1	Factory installed only	1SDA074138R1	Factory installed only
E6.2	F	5000	Kit VR Upper	1SDA079891R1	Factory installed only	1SDA079892R1	Factory installed only
E6.2	F	5000	Kit VR Lower	1SDA079893R1	Factory installed only	1SDA079894R1	Factory installed only
E6.2/f	F	6000	Kit F Upper ¹⁾	-	-	1SDA074136R1	Factory installed only
E6.2/f	F	6000	Kit F Lower ¹⁾	-	-	1SDA074138R1	Factory installed only

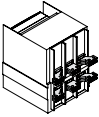
1) Not UL listed

Accessories

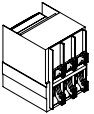
Terminals



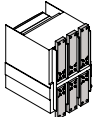
Rear orientable terminal - HR VR



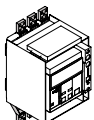
Horizontal rear terminal - SHR



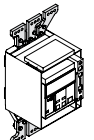
Vertical rear spread terminal - SVR



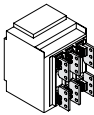
Front terminal - F



Extended front terminal - EF



Front spread terminal - ES

Terminal for cable FcCuAl 4x240mm² - Fc CuAl

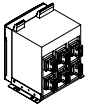
Kit for terminals - installed on cradle

Size	Version	Max amperage	Type	3 Poles		4 Poles	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2	W	1200	Kit EF Upper ³⁾	1SDA073939R1	Factory installed only	1SDA073940R1	Factory installed only
E1.2	W	1200	Kit EF Lower ³⁾	1SDA073941R1	Factory installed only	1SDA073942R1	Factory installed only
E1.2	W	1200	Kit ES Upper ^{1) 3)}	1SDA073951R1	Factory installed only	1SDA073952R1	Factory installed only
E1.2	W	1200	Kit ES Lower ^{1) 3)}	1SDA073953R1	Factory installed only	1SDA073954R1	Factory installed only
E1.2	W	1200	Kit VR Upper	1SDA079830R1	Factory installed only	1SDA079831R1	Factory installed only
E1.2	W	1200	Kit VR Lower	1SDA079832R1	Factory installed only	1SDA079833R1	Factory installed only
E1.2	W	1200	Kit FcCuAl 4x 500kcmil/240mm ² Upper ³⁾	1SDA073991R1	Factory installed only	1SDA073993R1	Factory installed only
E1.2	W	1200	Kit FcCuAl 4x 500kcmil/240mm ² Lower ³⁾	1SDA073992R1	Factory installed only	1SDA073994R1	Factory installed only
E2.2	W	2000	Kit F Upper ³⁾	1SDA074090R1	Factory installed only	1SDA074091R1	Factory installed only
E2.2	W	2000	Kit F Lower ³⁾	1SDA074092R1	Factory installed only	1SDA074093R1	Factory installed only
E2.2	W	2000	Kit VR Upper	1SDA079846R1	Factory installed only	1SDA079847R1	Factory installed only
E2.2	W	2000	Kit VR Lower	1SDA079848R1	Factory installed only	1SDA079849R1	Factory installed only
E4.2	W	3200	Kit F Upper ³⁾	1SDA074098R1	Factory installed only	1SDA074099R1	Factory installed only
E4.2	W	3200	Kit F Lower ³⁾	1SDA074100R1	Factory installed only	1SDA074101R1	Factory installed only
E4.2	W	2500	Kit VR Upper	1SDA079856R1	Factory installed only	1SDA079857R1	Factory installed only
E4.2	W	2500	Kit VR Lower	1SDA079858R1	Factory installed only	1SDA079859R1	Factory installed only
E6.2	W	6000	Kit F Upper ³⁾	1SDA074106R1	Factory installed only	1SDA074107R1	Factory installed only
E6.2	W	6000	Kit F Lower ³⁾	1SDA074109R1	Factory installed only	1SDA074110R1	Factory installed only
E6.2	W	5000	Kit VR Upper	1SDA079882R1	Factory installed only	1SDA079883R1	Factory installed only
E6.2	W	5000	Kit VR Lower	1SDA079885R1	Factory installed only	1SDA079886R1	Factory installed only
E6.2/f	W	6000	Kit F Upper ³⁾	-	-	1SDA074108R1	-
E6.2/f	W	6000	Kit F Lower ³⁾	-	-	1SDA074111R1	-
E6.2/f	W	5000	Kit VR Upper	-	Factory installed only	1SDA079884R1	Factory installed only
E6.2/f	W	5000	Kit VR Lower	-	Factory installed only	1SDA079887R1	Factory installed only

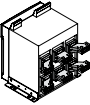
1) ES terminals can be ordered only if the cradle also has EF terminals.

2) Vertical terminals are supplied as standard for E4.2, 3200A. For this size and amperage, HR is not possible.

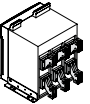
3) Not UL listed



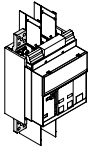
Rear orientable terminal - HR VR



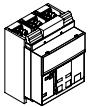
Horizontal rear spread terminal - SHR



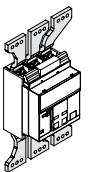
Vertical rear spread terminal - SVR



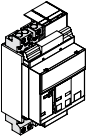
Extended front terminal - EF



Front terminal - F



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

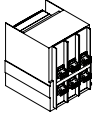
Kit for terminals - loose supply for one side of fixed circuit breaker

Size	Version	Max amperage	Type	3 pieces		4 pieces	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2	F	1200	Kit EF ¹⁾	1SDA073967R1	ZE1EFF	1SDA073968R1	ZE1EFF-4
E1.2	F	1200	Kit F	1SDA073973R1	ZE1FF	1SDA073973R1	ZE1FF
E1.2	F	1200	Kit ES ¹⁾	1SDA073979R1	ZE1ESF	1SDA073980R1	ZE1ESF-4
E1.2	F	1200	Kit Adjustable HR/VR	1SDA079844R1	ZE1HRVRF	1SDA079845R1	ZE2HRVRF-4
E1.2	F	1200	Kit FcCuAl 4x500kcmil/240mm ² ¹⁾	1SDA074001R1	ZE1LUGF	1SDA074002R1	ZE1LUGF-4
E2.2	F	2000	Kit F Upper ¹⁾	1SDA074122R1	ZE2FUF	1SDA074123R1	ZE2FUF-4
E2.2	F	2000	Kit F Lower ¹⁾	1SDA074124R1	ZE2FLF	1SDA074125R1	ZE2FLF-4
E2.2	F	2000	Adjustable HR/VR	1SDA079850R1	ZE2HRVRFW	1SDA079851R1	ZE2HRVRFW-4
E4.2	F	3200	Kit F Upper ¹⁾	1SDA074130R1	ZE4FUF	1SDA074131R1	ZE4FUF-4
E4.2	F	3200	Kit F Lower ¹⁾	1SDA074132R1	ZE4FLF	1SDA074133R1	ZE4FLF-4
E4.2	F	2500	Kit Adjustable HR/VR	1SDA079860R1	ZE4HRVRFW25	1SDA079861R1	ZE4HRVRFW25-4
E4.2	F	3200	Kit VR	1SDA079866R1	ZE4VRFW32	1SDA079867R1	ZE4VRFW32
E6.2	F	6000	Kit F Upper ¹⁾	1SDA074140R1	ZE6FUF	1SDA074141R1	ZE6FU-4
E6.2	F	6000	Kit F Lower ¹⁾	1SDA074143R1	ZE6FLF	1SDA074144R1	ZE6FLF-4
E6.2	F	5000	Kit Adjustable HR/VR	1SDA079888R1	ZE6HRVRFW50	1SDA079889R1	ZE6HRVRFW50-4
E6.2	F	6000	Kit VR	1SDA079895R1	ZE6VRFW60	-	-
E6.2/f	F	6000	Kit F Upper ¹⁾	-	-	1SDA074142R1	ZE6FUF-4F
E6.2/f	F	6000	Kit F Lower ¹⁾	-	-	1SDA074145R1	ZE6FLF-4F
E6.2/f	F	5000	Kit Adjustable HR/VR	-	-	1SDA079890R1	ZE6HRVRFW50-4F

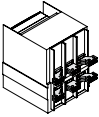
¹⁾ Not UL listed

Accessories

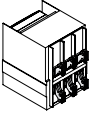
Terminals



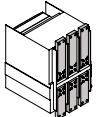
Rear orientable terminal - HR VR



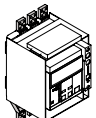
Horizontal rear terminal - SHR



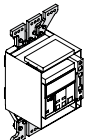
Vertical rear spread terminal - SVR



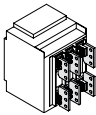
Front terminal - F



Extended front terminal - EF



Front spread terminal - ES



Terminal for cable FcCuAl
4x240mm² - Fc CuAl

Kit for terminals - loose supply for one side of cradle

Size	Version	Max amperage	Type	3 pieces		4 pieces	
				Global code	U.S. / Canada code	Global code	U.S. / Canada code
E1.2	W	1200	Kit EF ²⁾	1SDA073943R1	ZE1EFW	1SDA073944R1	ZE1EFW-4
E1.2	W	1200	Kit ES ^{1) 2)}	1SDA073955R1	ZE1ESW	1SDA073956R1	ZE1ESW-4
E1.2	W	1200	Kit Adjustable HR/VR	1SDA079834R1	ZE1HRVRW	1SDA079835R1	ZE1HRVRW-4
E1.2	W	1200	Kit FcCuAl 4x 500kcmil/240mm ^{2 2)}	1SDA073995R1	ZE1LUGW	1SDA073996R1	ZE1LUGW-4
E2.2	W	2000	Kit F Upper ²⁾	1SDA074094R1	ZE2FUW	1SDA074095R1	ZE2FUW-4
E2.2	W	2000	Kit F Lower ²⁾	1SDA074096R1	ZE2FLW	1SDA074097R1	ZE2FLW-4
E2.2	W	2000	Kit Adjustable HR/VR	1SDA079850R1	ZE2HRVRFW	1SDA079851R1	ZE2HRVRFW-4
E4.2	W	3200	Kit F Upper ²⁾	1SDA074102R1	ZE4FUW	1SDA074103R1	ZE4FUW-4
E4.2	W	3200	Kit F Lower ²⁾	1SDA074104R1	ZE4FLW	1SDA074105R1	ZE4FLW-4
E4.2	W	2500	Kit Adjustable HR/VR	1SDA079860R1	ZE4HRVRFW25	1SDA079861R1	ZE4HRVRFW25-4
E4.2	W	3200	Kit VR	1SDA079866R1	ZE4VRFW32	1SDA079867R1	ZE4VRFW32-4
E6.2	W	6000	Kit F Upper ²⁾	1SDA074112R1	ZE6FUW	1SDA074113R1	ZE6FUW-4
E6.2	W	6000	Kit F Lower ²⁾	1SDA074115R1	ZE6FLW	1SDA074116R1	ZE6FLW-4
E6.2	W	5000	Kit Adjustable HR/VR	1SDA079888R1	ZE6HRVRFW50	1SDA079889R1	ZE6HRVRFW50-4
E6.2	W	6000	Kit VR	1SDA079895R1	ZE6VRFW60	1SDA079896R1	-
E6.2/f	W	6000	Kit F Upper ²⁾	-	-	1SDA074114R1	-
E6.2/f	W	6000	Kit F Lower ²⁾	-	-	1SDA074117R1	-
E6.2/f	W	5000	Kit Adjustable HR/VR	-	-	1SDA079890R1	ZE6HRVRFW50-4F

1) ES terminals can be ordered only if the cradle also has EF terminals.

2) Not UL listed

Accessories

Service



Note:
Warranty periods are measured from the date the circuit breaker leaves the factory.

Extended warranty

Size	Type	Code ^{a)}	U.S. / Canada code
E1.2...E6.2	Warranty 2 years E1.2...E6.2 ^{a)}	1SDA082413R1	Factory installed
E1.2	Warranty 4 years E1.2 ^{b)}	1SDA082414R1	Factory installed
E2.2	Warranty 4 years E2.2 ^{b)}	1SDA082415R1	Factory installed
E4.2	Warranty 4 years E4.2 ^{b)}	1SDA082416R1	Factory installed
E6.2	Warranty 4 years E6.2 ^{b)}	1SDA082417R1	Factory installed
E1.2	Warranty 5 years E1.2 ^{b)}	1SDA082418R1	Factory installed
E2.2	Warranty 5 years E2.2 ^{b)}	1SDA082419R1	Factory installed
E4.2	Warranty 5 years E4.2 ^{b)}	1SDA082420R1	Factory installed
E6.2	Warranty 5 years E6.2 ^{b)}	1SDA082421R1	Factory installed

The registration in the Extended Warranty online tool is mandatory

a) Free-of-charge with site details entered

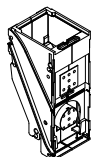
b) Warranty durations:

- 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

c) Order only with the circuit breaker. Specify Registration code in the order to activate the warranty.

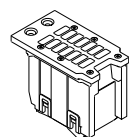
Accessories

Spare parts



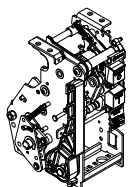
Single phase pole

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, 6 or 7 or 8 for E6.2



Operating mechanism ^{a)}

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

a) Add closing spring

Min quantity = min quantity to complete a circuit-breaker: The quantity is related to the number of phases (3 or 4 pole) of the circuit-breaker (E6.2 has half phases so quantities are double). Type A Spare part = only for ABB L3 technicians

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

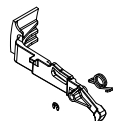
Spring Charging lever

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



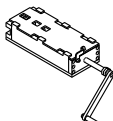
Signalling charged spring lever

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



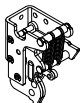
Spring charging device

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



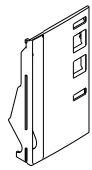
Tripping mechanism

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



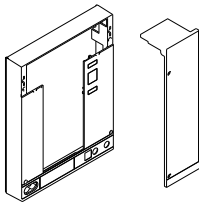
**Fixing screws kit - 50 pcs**

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

**Safety cover**

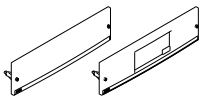
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E1.2	3p; 4p	IEC/UL	F; W (MP)	1SDA081402R1		1
E2.2; E4.2; E6.2	3p; 4p	IEC/UL	F; W (MP)	1SDA081432R1		1

For each part ordered, specify the Serial number of the circuit-breaker it is intended for.

**Accessories cover ^{b)}**

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^{a)}	3p; 4p	IEC	F; W (MP)	1SDA082145R1		1
E2.2...E6.2 - Castell^{a)}	3p; 4p	IEC	F	1SDA082146R1		1
E2.2...E6.2 - Castell^{a)} KLC	3p; 4p	IEC	W (MP)	1SDA082149R1		1
E2.2...E6.2 - Castell^{a)} KLC+ KLP	3p; 4p	IEC	W (MP)	1SDA082150R1		1
E2.2...E6.2 - Castell^{a)} KLP	3p; 4p	IEC	W (MP)	1SDA082151R1		1

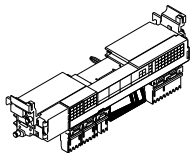
a) The lock is not included; b) TU Reset not included. Use the existing one.

**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

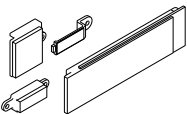
Accessories

Spare parts



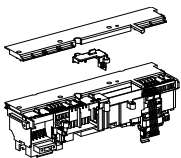
Sliding contact for Moving Part

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



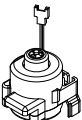
Kit front cover plugs

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



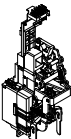
Terminal box connection interface

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



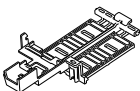
Trip coil

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



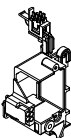
Right plate for accessories (Right MID)

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



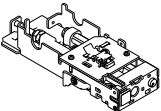
Cover for right plate for accessories (Right MID Cover)

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



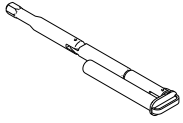
Racked in and out device (CD)

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

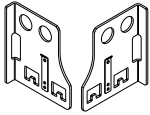


CD lock lever

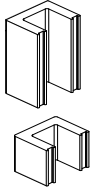
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E2.2; E4.2; E6.2	3p; 4p	IEC/UL	W (MP)	1SDA081256R1	A	1

**Racking in and out lever**

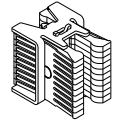
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E1.2	3p; 4p	IEC/UL	W (MP)	1SDA081410R1		1
E2.2; E4.2; E6.2	3p; 4p	IEC/UL	W (MP)	1SDA081455R1		1

**Lifting plates**

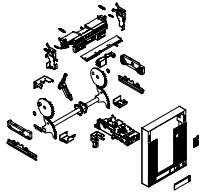
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E2.2; E4.2; E6.2	3p; 4p	IEC/UL	F; W (MP)	1SDA081454R1		1

**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

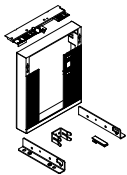
**Jaw contacts**

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

**Conversion kit from Fixed to Moving part ***

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; * moving part terminals not included

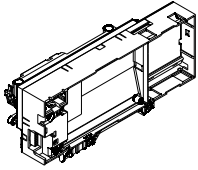
**Conversion kit from Moving Part into Fixed version ***

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; * Standard terminals not included

Accessories

Spare parts



Main board

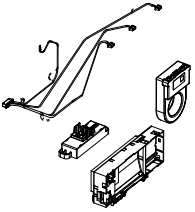
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E1.2	3p; 4p	IEC/UL	F; W (MP)	1SDA081408R1		1
E2.2; E4.2; E6.2	3p; 4p	IEC/UL	F; W (MP)	1SDA081450R1		1

For each part ordered, it is mandatory to specify the Serial number of the circuit-breaker it is intended for.



Trip Unit Battery

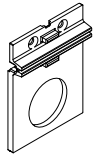
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E1.2; E2.2; E4.2; E6.2	3p; 4p	IEC/UL	F; W (MP)	1SDA074193R1		1



Main board + Sensors + cables

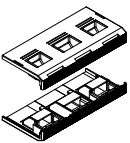
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E2.2	3p	IEC/UL	F; W (MP)	1SDA081200R1	A	1
E2.2	4p	IEC/UL	F; W (MP)	1SDA081201R1	A	1
E4.2	3p	IEC/UL	F; W (MP)	1SDA081202R1	A	1
E4.2	4p	IEC/UL	F; W (MP)	1SDA081203R1	A	1
E6.2	3p	IEC/UL	F; W (MP)	1SDA081204R1	A	1
E6.2	4p	IEC/UL	F; W (MP)	1SDA081205R1	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.



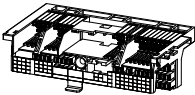
Sensors plastic covers

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



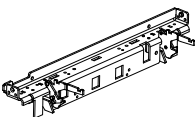
Terminal covers

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



Terminal box fixed part

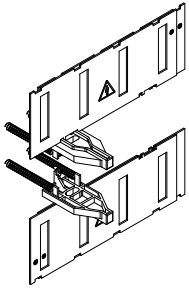
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E1.2	3p; 4p	IEC/UL	W (FP)	1SDA081180R1	A	1
E2.2; E4.2	3p; 4p	IEC	W (FP)	1SDA082152R1	A	1
E6.2	3p; 4p; 4p/f	IEC	W (FP)	1SDA082153R1	A	1



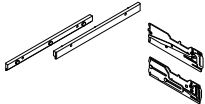
Support for terminal box of Fixed Part

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

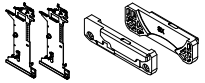
Type A Spare part = only for ABB L3 technicians

**Safety shutters for fixed part**

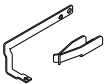
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E1.2	3p	IEC	W (FP)	1SDA081411R1		1
E1.2	4p	IEC	W (FP)	1SDA081412R1		1
E2.2	3p	IEC	W (FP)	1SDA081457R1		1
E2.2	4p	IEC	W (FP)	1SDA081458R1		1
E4.2	3p	IEC	W (FP)	1SDA081459R1		1
E4.2	4p	IEC	W (FP)	1SDA081460R1		1
E6.2	3p	IEC	W (FP)	1SDA081461R1		1
E6.2	4p	IEC	W (FP)	1SDA081462R1		1
E6.2	4p/f	IEC	W (FP)	1SDA081463R1		1

**Lateral guides for fixed part**

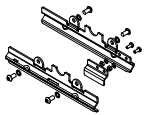
Size	Poles	IEC/UL	Version	Code	Type spare	Min quantity
E2.2; E4.2; E6.2	3p; 4p	IEC	W (FP)	1SDA082154R1	A	1

**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 Catalog – 1SDC001007D0204.

Contact informations

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