CATALOG - PRELIMINARY EDITION

SACE EMAX 3

Low voltage air circuit-breakers



START

- Adaptive
- Reliable
- Secure

ENGINEERED
TO OUTRUN

Equipped with cutting-edge technology and intelligent data processing, SACE Emax 3 effectively optimizes control, adapts to emerging challenges, and mitigates risks, all while safeguarding personnel and protecting valuable assets.

GENERAL INDEX

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01

MAIN CHARACTERISTICS

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SACE EMAX 3 LOW-VOLTAGE AIR CIRCUIT-BREAKERS

Main characteristics

The ABB SACE Emax 3 represents the ultimate evolution of the circuit-breaker: It transforms data into actionable insight, helping prevent potential issues and adapting to changing conditions.

Emax 3 protects people, data, assets and investments with the highest reliability, enabling businesses to operate at peak safety and efficiency 24/7/365.

Building on the robust foundation of ABB's revolutionary Emax 2 circuit-breaker, Emax 3 seamlessly integrates into electrical-distribution systems and collaborates with other devices.

This next-generation circuit-breaker constantly collects and intelligently processes information, anticipating critical situations to enable fast decision-making and to avert potential problems.

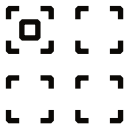
Emax 3 proactively monitors the electrical system, sensing and interpreting environmental data, keeping its own health status under continuous control and optimizing protection to ensure maximum efficiency.



Distinctive Features

To address the challenges of modern electrical distribution systems, ABB SACE Emax 3 has advanced its innovations, becoming more adaptive, secure, and reliable than ever before.

01



Adaptive:

Easily integrate into systems and equipment, adapting to changing user needs by providing scalable solutions and upgrades for future requirements.

02



Secure:

Safeguard assets and prevent unwanted access with Emax 3's offering of expanded protections and extensive level of cybersecurity.

03



Reliable:

Optimize uptime for electrical distribution systems through comprehensive sensing capabilities and effective power and asset management strategies.

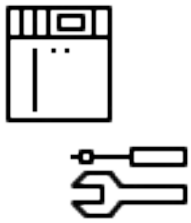
SACE EMAX 3 LOW-VOLTAGE AIR CIRCUIT-BREAKERS

Main characteristics

SACE EMAX 3 IS ADAPTIVE

The power of adaptability is key to drive success in an evolving electrical landscape. The Emax 3 is designed to be adaptive, helping to ensure seamless integration into both new systems and those previously built with Emax 2.

ABB's commitment to adaptability means not only facilitating integration but also evolving alongside customers' needs by providing scalable solutions and fostering continuous advancement to meet changing requirements.



Upgradeable and Customizable

Ekip Aware is the new trip unit platform that supports full customization on field, minimizing lead times and installation efforts, offering:

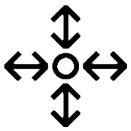
- Customizable set of preinstalled protection plus on-demand protection upgrades
- Digital rating plugs to choose the nominal current without additional hardware
- Digitally upgradable architecture to easily adapt to fast-growing needs



Intuitive interaction

Ekip Aware trip unit enables a comprehensive set of features to improve the overall user experience:

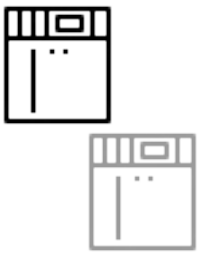
- Improved touchscreen with clear menu for easy navigation
- Standard USB-C interface for software connection by computer and by mobile
- Extended wireless connectivity for smartphones via NFC and Bluetooth



Optimized communication

Emax 3’s optimized communication architecture is adapting to exponentially growing number of connected devices. Ekip Aware matches applications requirements in terms of flexibility and reliability:

- Modbus TCP via daisy chain connection to simplify cabling
- Redundancy with IEC 61850, Profinet and Ethernet IP to increase reliability
- Empowered ethernet modules to manage more devices



Seamless Integration

Emax 3 offers backward compatibility with Emax 2: no redesign or retesting is needed for your system. Compared to Emax 2, the ABB SACE Emax 3 breaker offers:

- The same dimensions and mounting points
- The same minimum enclosure requirements
- The same power and auxiliary connection
- Compatibility between the Emax 2 fixed part and the Emax 3 moving part



SACE EMAX 3 LOW-VOLTAGE AIR CIRCUIT-BREAKERS

Main characteristics

SACE EMAX 3 IS SECURE

In response to the evolving demands of modern electrical systems, the scope of various types of protection for circuit breakers has significantly expanded beyond that of previous generations. This comprehensive offering addresses various levels and scenarios, to help ensure the protection of personnel, and assets.



Arc-flash protection

Emax 3 provides the option to integrate an active protection against arc-flash, to increase operators' safety and to reduce the risk of equipment damages, thanks to the fast detection time:

- Fast protection with a total clearing times of less than 40 ms for swift response
- Extensive monitoring with up to 12 sensors (arc light and pressure) per circuit-breaker



Adaptive microgrid protection

Under diverse plant conditions it is important to ensure high level of selectivity and continuity of service. Emax 3 can adapt its protection settings to different scenarios by changing relevant thresholds during transitions:

- Dual setting for most frequent applications
- Triple setting for an additional set of thresholds



MDGF protection

Emax3 guarantees the Modified Differential Ground Fault protection in a new, smart and easy way, reducing installation time and overall space required in the panel:

- Logic managed via Link internal communication
- No need for additional phase current transformers
- No need for external summing current transformers



RELT protection

Emax 3 improves operator safety during maintenance by Reduced Energy Let-Through protection management in an easier way with Ekip Aware:

- Color change on trip unit display when protection is enabled, for immediate status vision
- Activation/deactivation also via EPiC mobile app, keeping operator away from switchboard



Cybersecurity and IEC 62443-4-2

Emax 3 offers additional levels of security and the compliance with IEC 62443-4-2 Security level 2 (SL2), adding an additional layer of access protection to relevant parameters on trip unit and communication protocols:

- Dedicated module portfolio Ensure that circuit breaker communicate only with original modules thanks to security artifacts. Anti spoofing and anti tampering features.
- Secure USB and BLE: Ensure that circuit breaker communicate only with original ABB tools thanks to security artifacts
- Role based access ABB account management will allow role-based access (Owner, Admin, Engineer, Operator, Viewer)



Remote racking device

Emax 3 completes the offer for Remote Racking Devices to increase operator's safety during breaker racking without being in front of the panel:

- External RRD for all frames, to operate breaker up to a 10 meters distance
- Embedded RRD-E for E4.3 and E6.3 frames, to operate also with EPiC mobile app



Key locks, padlocks and interlock offering

Emax 3 offers new solutions to prevent unwanted openings and closing of the circuit-breakers and to enable interlock logics across different devices:

- Double keylock and padlock in open position for redundancy
- Simplified design for mechanical interlocks to reduce installation time

SACE EMAX 3 LOW-VOLTAGE AIR CIRCUIT-BREAKERS

Main characteristics

SACE EMAX 3 IS RELIABLE

Achieve optimal power management and efficiency, Emax 3 transforms the landscape of electrical systems by providing exceptional measurement accuracy and performance. This innovative solution simplifies power quality, and asset management framework, and enables flexible power management of complex distribution systems, offering ready-to-go solutions and customizable options that can adapt to specific application needs.



Measurement and accuracy

Emax 3 provides top performance in measurement capabilities and accuracy. Keeping power and energy consumption under strict control, it reduces the need for external devices and simplifies the measurement chain:

- Class 0.5 IEC 61557-12 certified for Active Power and Energy for best accuracy
- Total Harmonic Distortion THD and Total Demand Distortion TDD analysis
- Build-in network analyzer for power quality analysis
- Improved data loggers for advanced waveform capture



Custom logics

Emax 3 introduces an innovative and flexible way to manage power-source strategy with logics enabled by distributed intelligence across various devices, without need of external controllers:

- Ready-to-go solutions like integrated ATS, engineered and tested by ABB
- Capability to adapt solutions to fit application needs
- Graphic tool to design new logics from scratch to cover any new requirement



Temperature monitoring

Emax 3 enhances system reliability by offering multiple temperature monitoring solutions at both device and system level. It enables data driven decisions based on collected measurement to keep plant under control:

- Ekip Temperature 4T to monitor up to 4 busbar temperatures
- Distributed wireless sensors to check temperature and humidity
- Internal temperature sensors to evaluate maintenance and protection strategies



Sense accessories

Emax 3 offers a new range of opening, closing and undervoltage coils, plus motor operators, to monitor and communicate health status of such key accessories. It makes possible to reduce unplanned downtime and to execute maintenance based on real condition and usage.

- Real time check of key parameters such as voltage, current, operations duration, etc.
- Standard and Sense coils can be combined for monitoring and redundancy
- Sense accessories are also field mountable for upgrades at any time



Diagnostic management

Emax 3 enables the continuous monitoring of relevant parameters to keep the overall health status of the circuit-breaker under control:

- Health index display to summarize main device and Sense accessories health
- Complete set of alarms and warnings for advanced diagnostic
- Integrated troubleshooting in Ekip Connect software and EPiC mobile app



Predictive maintenance

Emax 3 provides accurate predictions on when maintenance is needed, adapting estimations on real usage information and breaker health:

- Improved predictive algorithm based on real installation data
- Local and remote access to next maintenance date
- Efficient planning of service activities

02

PERFORMANCES

2/2 **SACE Emax 3 E1.3 automatic circuit-breakers**

2/3 **SACE Emax 3 E2.3 automatic circuit-breakers**

2/4 **SACE Emax 3 E4.3 automatic circuit-breakers**

2/5 **SACE Emax 3 E6.3 automatic circuit-breakers**

2/6 **Switch disconnectors**

2/7 **SACE Emax 3 derived versions**

SACE EMAX 3 AUTOMATIC CIRCUIT-BREAKERS

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



SACE Emax 3			**E1.3**		
Performance levels			**B**	**C**	**N**
Rated uninterrupted current Iu @ 40°C		[A]	630	630	250
		[A]	800	800	630
		[A]	1000	1000	800
		[A]	1250	1250	1000
		[A]	1600	1600	1250
		[A]			1600
Neutral pole current-carrying capacity for 4-pole CBs		[%Iu]	100	100	100
Rated ultimate short-circuit breaking capacity Icu	400-415 V	[kA]	42	50	66
	440 V	[kA]	42	50	66
	500-525 V	[kA]	42	42	50
	690 V	[kA]	42	42	50
Rated service short-circuit breaking capacity Ics		[%Icu]	100	100	100 (1)
Rated short-time withstand current Icw	(1s)	[kA]	42	42	50
	(3s)	[kA]	24	24	30
Rated short-circuit making capacity (peak value) Icm	400-415 V	[kA]	88	105	145
	440 V	[kA]	88	105	145
	500-525 V	[kA]	88	88	105
	690 V	[kA]	88	88	105
Utilization category (according to IEC 60947-2)			B	B	B
Breaking (2)	Breaking time for I<Icw	[ms]	40	40	40
	Breaking time for I>Icw	[ms]	25	25	25

1) Ics : 50kA for 400V...440V voltage; 2) Total clearing time is the sum of breaking time and trip time

Dimensions and weight			
Dimensions	H - Fixed/Withdrawable	[mm]	296/363.5
	D - Fixed/Withdrawable	[mm]	185.5/288.6
	W - Fixed 3p/4p	[mm]	214/284
	W - Withdrawable 3p/4p	[mm]	278/348
Weights (CB with trip unit/current sensors/standard accessories)	Fixed 3p/4p	kg	15/19
	Withdrawable 3p/4p including fixed part		38/47

SACE Emax 3			**E1.3**		
Mechanical life with regular maintenance prescribed by the manufacturer		[Iu]	≤ 1000	1250	1600
		[No. cycles x 1000]	20	20	20
	Frequency	[Oper./Hour]	60	60	60
Electrical life with regular maintenance prescribed by the manufacturer	440 V	[No. cycles x 1000]	8	8	8
	690 V	[No. cycles x 1000]	8	6,5	6,5
	Frequency	[Oper./Hour]	30	30	30

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



SACE Emax 3			E2.3			
Performance levels			**B**	**N**	**S**	**H**
Rated uninterrupted current Iu @ 40°C		[A]	1600	800	250	800
		[A]	2000	1000	800	1000
		[A]		1250	1000	1250
		[A]		1600	1250	1600
		[A]		2000	1600	2000
		[A]		2500	2000	2500
		[A]			2500	
Neutral pole current-carrying capacity for 4-pole CBs		[%Iu]	100	100	100	100
Rated ultimate short-circuit breaking capacity Icu	400-415 V	[kA]	42	66	85	100
	440 V	[kA]	42	66	85	100
	500-525 V	[kA]	42	66	66	85
	690 V	[kA]	42	66	66	85
Rated service short-circuit breaking capacity Ics		[%Icu]	100	100	100	100
Rated short-time withstand current Icw	(1s)	[kA]	42	66	66	85
	(3s)	[kA]	42	50	50	66
Rated short-circuit making capacity (peak value) Icm	400-415 V	[kA]	88	145	187	220
	440 V	[kA]	88	145	187	220
	500-525 V	[kA]	88	145	145	187
	690 V	[kA]	88	145	145	187
Utilization category (according to IEC 60947-2)			B	B	B	B
Breaking [1]	Breaking time for I<Icw	[ms]	40	40	40	40
	Breaking time for I>Icw	[ms]	25	25	25	25

1) Total clearing time is the sum of breaking time and trip time

Dimensions and weight			
Dimensions	H - Fixed/Withdrawable	[mm]	371/425
	D - Fixed/Withdrawable	[mm]	277/390
	W - Fixed 3p/4p	[mm]	276/366
	W - Withdrawable 3p/4p	[mm]	317/407
Weights (CB with trip unit/current sensors/standard accessories)	Fixed 3p/4p	kg	43/54
	Withdrawable 3p/4p including fixed part		87/101

SACE Emax 3			E2.3			
Mechanical life with regular maintenance prescribed by the manufacturer		[Iu]	< 1600	1600	2000	2500
		[No. cycles x 1000]	25	25	25	20
	Frequency	[Oper./Hour]	60	60	60	60
Electrical life with regular maintenance prescribed by the manufacturer	440 V	[No. cycles x 1000]	15	12	10	8
	690 V	[No. cycles x 1000]	15	10	8	7
	Frequency	[Oper./Hour]	30	30	30	30

SACE EMAX 3 AUTOMATIC CIRCUIT-BREAKERS

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



SACE Emax 3			**E4.3**			
Performance levels			**N**	**S**	**H**	**V**
Rated uninterrupted current Iu @ 40°C		[A]	3200	3200	3200	2000
		[A]	4000	4000	4000	2500
		[A]				3200
		[A]				4000
Neutral pole current-carrying capacity for 4-pole CBs		[%Iu]	100	100	100	100
Rated ultimate short-circuit breaking capacity Icu	400-415 V	[kA]	66	85	100	150
	440 V	[kA]	66	85	100	150
	500-525 V	[kA]	66	66	85	100
	690 V	[kA]	66	66	85	100
Rated service short-circuit breaking capacity Ics		[%Icu]	100	100	100	100 (1)
Rated short-time withstand current Icw	(1s)	[kA]	66	66	85	100
	(3s)	[kA]	50	66	75 (2)	75
Rated short-circuit making capacity (peak value) Icm	400-415 V	[kA]	145	187	220	330
	440 V	[kA]	145	187	220	330
	500-525 V	[kA]	145	145	187	220
	690 V	[kA]	145	145	187	220
Utilization category (according to IEC 60947-2)			B	B	B	B
Breaking (3)	Breaking time for I<Icw	[ms]	40	40	40	40
	Breaking time for I>Icw	[ms]	25	25	25	25

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

Dimensions and weight			
Dimensions	H - Fixed/Withdrawable	[mm]	371/425
	D - Fixed/Withdrawable	[mm]	277/390
	W - Fixed 3p/4p	[mm]	384/510
	W - Withdrawable 3p/4p	[mm]	425/551
Weights (CB with trip unit/current sensors/standard accessories)	Fixed 3p/4p	kg	58/73
	Withdrawable 3p/4p including fixed part		114/140

SACE Emax 3			**E4.3**			
Mechanical life with regular maintenance prescribed by the manufacturer		[Iu]	< 2500	2500	3200	4000
		[No. cycles x 1000]	20	20	20	15
	Frequency	[Oper./Hour]	60	60	60	60
Electrical life with regular maintenance prescribed by the manufacturer	440 V	[No. cycles x 1000]	10	8	7	5
	690 V	[No. cycles x 1000]	10	8	7	4
	Frequency	[Oper./Hour]	20	20	20	20

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



SACE Emax 3			E6.3		
Performance levels			**H**	**V**	**X**
Rated uninterrupted current Iu @ 40°C		[A]	4000	4000	4000
		[A]	5000	5000	5000
		[A]	6300	6300	6300
Neutral pole current-carrying capacity for 4-pole CBs		[%Iu]	50-100	50-100	50-100
Rated ultimate short-circuit breaking capacity Icu	400-415 V	[kA]	100	150	150
	440 V	[kA]	100	150	150
	500-525 V	[kA]	100	130	130
	690 V	[kA]	100	100	120
Rated service short-circuit breaking capacity Ics		[%Icu]	100	100	100
Rated short-time withstand current Icw	(1s)	[kA]	100	100	120
	(3s)	[kA]	100	100	100
Rated short-circuit making capacity (peak value) Icm	400-415 V	[kA]	220	330	330
	440 V	[kA]	220	330	330
	500-525 V	[kA]	220	286	286
	690 V	[kA]	220	220	220
Utilization category (according to IEC 60947-2)			B	B	B
Breaking [1]	Breaking time for I<Icw	[ms]	40	40	40
	Breaking time for I>Icw	[ms]	25	25	25

1) Total clearing time is the sum of breaking time and trip time

Dimensions and weight			
Dimensions	H - Fixed/Withdrawable	[mm]	371/425
	D - Fixed/Withdrawable	[mm]	277/390
	W - Fixed 3p/4p/4p FS	[mm]	762/888/1014
	W - Withdrawable 3p/4p/4p FS	[mm]	803/929/1069
Weights (CB with trip unit/current sensors/standard accessories)	Fixed 3p/4p/4p FS	kg	112/127/143
	Withdrawable 3p/4p/4p FS including fixed part		211/237/237

SACE Emax 3			E6.3		
Mechanical life with regular maintenance prescribed by the manufacturer		[Iu]	4000	5000	6300
		[No. cycles x 1000]	12	12	12
	Frequency	[Oper./Hour]	60	60	60
Electrical life with regular maintenance prescribed by the manufacturer	440 V	[No. cycles x 1000]	4	3	2
	690 V	[No. cycles x 1000]	4	2	2
	Frequency	[Oper./Hour]	10	10	10

SWITCH DISCONNECTORS

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 - 4/f
Version		Fixed - Withdrawable
Suitable for isolation according to		IEC 60947-3



Frame			**E1.3**		**E2.3**			**E4.3**			**E6.3**	
Performance levels			**B/MS**	**N/MS**	**B/MS**	**N/MS**	**H/MS**	**N/MS**	**H/MS**	**V/MS**	**H/MS**	**X/MS**
Rated uninterrupted current Iu @ 40°C		[A]	630	250	1600	800	800	3200	3200	2000	4000	4000
		[A]	800	630	2000	1000	1000	4000	4000	2500	5000	5000
		[A]	1000	800		1250	1250			3200	6300	6300
		[A]	1250	1000		1600	1600			4000		
		[A]	1600	1250		2000	2000					
		[A]		1600		2500	2500					
Neutral pole current-carrying capacity for 4-pole CBs		[%Iu]	100	100	100	100	100	100	100	100	50-100	50-100
Rated short-time withstand current Icw	(1s)	[kA]	42	50	42	66	85	66	85	100	100	120
	(3s)	[kA]	24	30	42	50	66	50	75 (1)	75	100	100
Rated short-circuit making capacity (peak value) Icm	400-415 V	[kA]	88	145	88	145	187	145	187	220	220	264
	440 V	[kA]	88	145	88	145	187	145	187	220	220	264
	500-525 V	[kA]	88	105	88	145	187	145	187	220	220	264
	690 V	[kA]	88	105	88	145	187	145	187	220	220	264
Utilization category (according to IEC 60947-3)			AC-23A	AC-23A	AC-23A	AC-23A	AC-23A	AC-23A	AC-23A	AC-23A		

1) E4.3H 3200A: 66 Icw (3s)

Dimensions and weight			**E1.3**	**E2.3**	**E4.3**	**E6.3**
Dimensions	H - Fixed/Withdrawable	[mm]	296/363.5	371/425	371/425	371/425
	D - Fixed/Withdrawable	[mm]	185.5/288.6	277/390	277/390	277/390
	W - Fixed 3p/4p/4p FS	[mm]	214/284	276/366	384/510	762/888/1014
	W - Withdrawable 3p/4p/4p FS	[mm]	278/348	317/407	425/551	803/929/1069

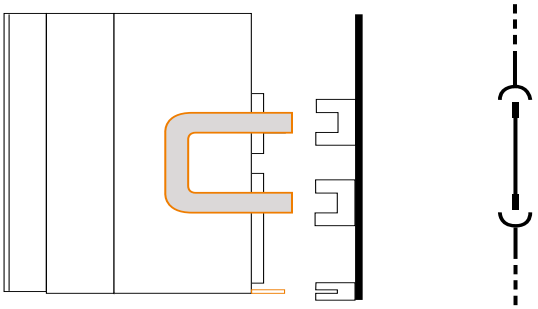
ELECTRICAL AND MECHANICAL LIFE

Frame			**E1.3**			**E2.3**				**E4.3**				**E6.3**		
Mechanical life with regular maintenance prescribed by the manufacturer	[Iu]	[A]	≤ 1000	1250	1600	< 1600	1600	2000	2500	< 2500	2500	3200	4000	4000	5000	6300
		[No. cycles x 1000]	20	20	20	25	25	25	20	20	20	20	15	12	12	12
	Frequency	[Oper./Hour]	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Electrical life with regular maintenance prescribed by the manufacturer	440 V	[No. cycles x 1000]	8	8	8	15	12	10	8	10	8	7	5	4	3	2
	690 V	[No. cycles x 1000]	8	6,5	6,5	15	10	8	7	10	8	7	4	4	2	2
	Frequency	[Oper./Hour]	30	30	30	30	30	30	30	20	20	20	20	10	10	10

SACE EMAX 3 DERIVED VERSIONS

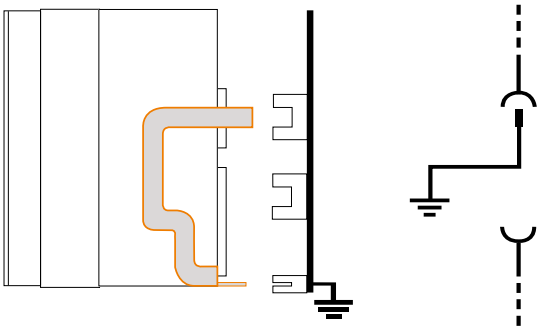
Safety is an indispensable requirement that must always be guaranteed in electrical installations. In this regard, ABB SACE offers devices developed to further increase safety standards during inspection and maintenance activities on electrical installations.
In particular, in a withdrawable version, ABB SACE Emax 3 offers:

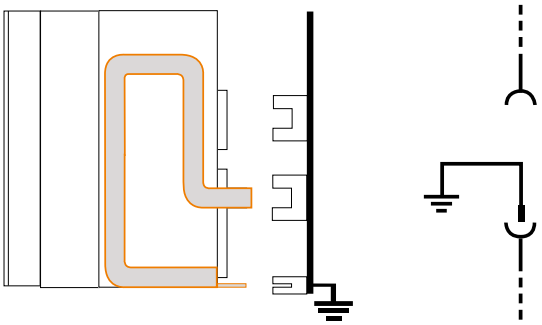
—
The earthing circuit is dimensioned for a short-time current equal to 60% of the maximum Icw of the circuit-breaker from which it is derived (IEC 60439-1)



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

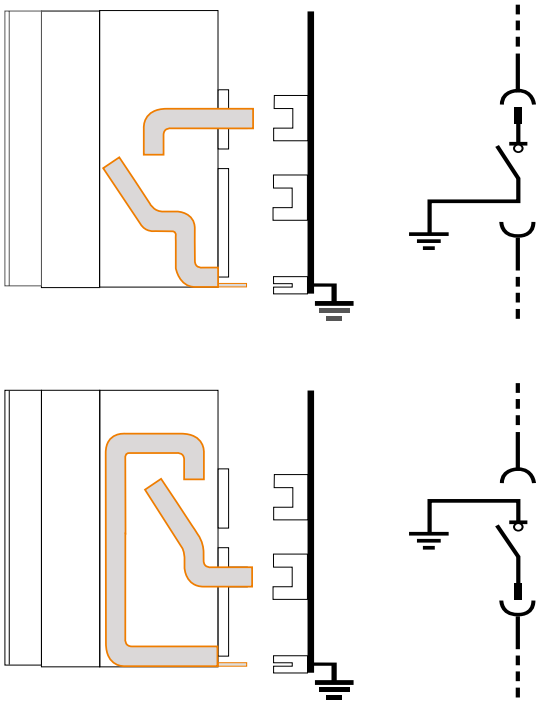
—
The standard fixed parts can not accept MT/MTP device. In order to allow the utilization of MT/MTP mobile parts is mandatory to install the grounding clamps on fixed parts. Accessorizing only in the factory.





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

SACE EMAX 3 DERIVED VERSIONS



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

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

SACE Emax 3	**E2.3**			**E4.3**			**E6.3**		
Performance levels	CS	MT	MTP	CS	MT	MTP	CS	MT	MTP
Rated uninterrupted current Iu @ 40°C	2500	2500	2500	4000	4000	4000	6300	6300	6300
Neutral pole current-carrying capacity for 4-pole CBs	100	100	100	100	100	100	50-100	50-100	50-100
Rated short-time withstand current Icw (1s) [kA]	-	30	30	-	50	50	-	50	50

03

DIGITAL EXPERIENCE

3/2 **Ekip Aware Architecture**

3/7 **Features**

3/8 **System Protection**

3/33 **Power Quality**

3/39 **Connectivity**

3/46 **Power Management**

3/52 **Asset Management**

3/57 **Cybersecurity**

EKIP AWARE ARCHITECTURE

The SACE Emax 3 Digital Experience offers a sophisticated ecosystem that combines customization, advanced functionality, and intuitive logic for a refined user experience. At its core is Ekip Aware, the new electronic trip unit of Emax 3.

This ecosystem of customization and flexibility empowers users to select tailored functionality, protections, measurements, and cybersecurity to meet their specific requirements. The reimagined Digital Experience opens new horizons, integrating comprehensive sensing capabilities for effective asset management strategies. Additionally, Ekip Aware provides enhanced communication architecture options to build a flexible and reliable communication network infrastructure. Create and control distribution systems with a new layer of programmable logics that make power management more effective and customizable than ever before. Finally, Emax 3 offers a refined user experience with an improved HMI display, wired and wireless connection with commissioning and monitoring software Ekip Connect, EPiC mobile app and ABB Ability Marketplace.

Offering

Ekip Aware stands out as the industry's cutting-edge electronic trip unit. Powering the Emax 3 circuit breaker and revolutionizing the digital user experience. Ekip Aware provides a reliable and flexible solution, even under the most challenging conditions, starting from (3) levels of protection:

- Ekip Aware LI
- Ekip Aware LSI
- Ekip Aware LSIG



The Emax 3 Digital Experience goes far beyond basic protection. By providing on demand customizations and upgrades this circuit breaker can be tailormade for its specific application. Upgrades can be configured directly in the circuit breaker at time of order or can be digitally activated in the field. This enables the product to evolve throughout its lifecycle and adapt easily to evolving electrical landscapes. Emax 3 has been expertly engineered to not only be a simple protection device, but to be an active player in the electrical system including solutions for multiple application areas:

- System Protection
- Power Quality
- Power management
- Asset Management
- Connectivity
- Cybersecurity

Digital Rating Plug

Expanding upon the Digit Experience, the SACE Emax 3 offers a flexible method for adjustment of the nominal current of the circuit breaker. The Digital Rating Plug upgrade, eliminates the need for a hardware replacement of the rating plug in order to adjust the nominal current of the circuit breaker.

EKIP AWARE ARCHITECTURE

Refined user experience

Emax 3 users can interact with the circuit breaker in a variety of intuitive ways in order to take full advantage of the potential of the device throughout different stages of it's lifecycle.

Epic
Mobile app support device user experience. Configuring, monitoring, and digitally upgrade the circuit-breaker improving safety, speed, and control.

HMI
Ekip Aware touch screen for easy navigation and programming of key settings and parameters.



Ekip connect
Software tool designed specifically for upgrading, commissioning, programming, monitoring and testing low voltage circuit breakers.

Lite Panel & Lite Panel Pro
Remote HMI Touchscreen Display, enabling users to monitoring and control power distribution systems.

ABB Ability™ Marketplace
Online portal for accessing to the digital upgrades portfolio solutions that can be enabled on Ekip Aware.

Ekip Com modules
Easy integrate the circuit-breakers into automation and energy management systems. A wide range of communication protocols for an efficient and reliable connectivity.



HMI
Ekip Aware trip unit features a high resolution touch-screen display, providing an intuitive interface with Emax 3 circuit breakers. This refined user interface facilitates easier navigation of programming and key settings and parameters. Ekip Aware ensures clear visualization of the circuit breaker status and data.

The app also allows:

- Enable circuit-breaker digital upgrades after purchasing them via the ABB Ability™ Market Place. Most of the digital upgrades after purchasing are available in the digital portfolio for the specific user account, ready to be activated on the device.
- Control remotely the circuit-breaker with a dedicated digital updrade Remote Control. It allows remote opening and closing of the circuit-breaker. In this way, interaction with the electrical system becomes safer, especially during maintenance operations.
- QR Code scanning in front of the circuit-breaker to allow the user to access details about the specific circuit-breaker, such as product information, technical specifications and test reports.



EPiC Mobile App
EPiC allows users to connect safely to the Ekip Aware trip unit via Bluetooth, NFC or USB-C cable. It provides a convenient and user-friendly means of monitoring and managing the circuit-breaker while ensuring maximum flexibility for the end user. EPiC enables users to configure the device, setting thresholds, monitor the device status and electrical measurements available for the single device.
All of this is achieved simply by pairing the trip unit with the mobile device. EPiC allows remote access to the device information while staying safely away from the main system.



Ekip Connect
Dedicated software for upgrading, commissioning, programming, monitoring and testing low voltage circuit breakers. The USB-C front connector of Ekip Aware allows the trip unit to easily connect to PC. Ethernet and serial connection to the circuit breaker are also possible. Ekip Connect allows for adjustment of settings and parameters, secondary injection testing, circuit breaker report generation, and measurement analysis among other functionality.

EKIP AWARE ARCHITECTURE



ABB Ability™ Marketplace
The Marketplace acts as a shop for ABB's digital upgrades offerings, allowing customers to discover, subscribe to, manage and scale their usage of various ABB Ability™ services. It provides access to a growing catalog of on-demand digital upgrades, including both cloud-based and on-premises solutions offered by ABB. Customers can purchase new subscriptions, extend existing ones or even cancel services through the marketplace. Most important, it is possible to upgrade products in brownfield installation without the need to replace a device, saving cost and time.



Lite Panel and Lite Panel Pro
Emax 3 circuit breakers can also be connected to the state of the art in monitoring and control HMI, Lite Panel Pro, offering a versatile large touchscreen display and an intuitive interface. Lite Panel Pro HMI is a modular display solution that can connect to ABB and 3rd party devices using Ethernet communication bus, providing a customizable control options for various devices, combined with remote activation and monitoring of device status.

FEATURES

Emax 3 with Ekip Aware trip unit offers a wide range of features for different types of solutions and applications. These can be configured with the circuit breaker, and many of them can be digitally activated in the field also aftersales.



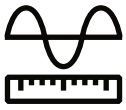
System Protection
- S - Time-Delayed Overcurrent Protection
- G - Earth Protections
- Current Protections
- Voltage Protections
- Advanced Voltage Protections
- Power Protections
- Directional Current Protections
- Frequency Protections
- Dual Setting Protections
- Triple Setting Protections
- RC Protection
- Non Defeatable I Protection
- L Protection OFF
- Advanced MDGF



Cybersecurity
- Cybersecure IEC 62443-4-2



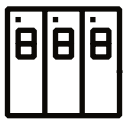
Connectivity
- Com Link
- Modbus TCP Secure



Metering
- Measuring
- Data Logger Pro
- Network Analyzer
- Class 1 Power and Energy metering
- Class 0,5 Power and Energy metering



Power Management
- Custom Logics
- Power Controller
- Adaptive Load Shedding



Asset management
- Predictive Maintenance on-premise
- Internal Temperature Control

SYSTEM PROTECTION

Emax 3 with Ekip Aware trip unit offers a range of protections to safeguard both the equipment and the overall system. These protection functions are essential for adapting to a variety of operational scenarios, ensuring that the circuit-breaker can respond effectively to different fault types and abnormal conditions.

L (ANSI 49), S (ANSI 50TD/51), I (ANSI 50), G (ANSI 50N TD/51N) protection functions are available depending on the type of Ekip Aware selected.
MCR (Making Current Release) protection is available by default on all trip units.

	Protection function			
Ekip Aware type	**L**	**S**	**I**	**G**
LI	●	○	●	○
LSI	●	●	●	○
LSIG	●	●	●	●

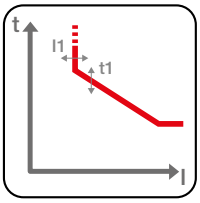
● = supplied with the circuit breaker
○ = optional loose after sales through dedicated digital upgrade

Additional protections can be added to Ekip Aware trip unit with some prerequisite as shown in the table. For example, Advanced voltage protections needs Measuring and Voltage Protections digital upgrades to be ordered separately.

L, S, I, G, Gext, RC, MDGF, MCR, S2, and RELT protection settings can be modified either via the HMI, Ekip Connect 3, or EPiC. All other protection settings can only be modified through Ekip Connect 3 or EPiC. On the HMI, they are visible only if they are enabled.

Upgrade	Protections and alarms included	Prerequisite
S protection	S - Short time delayed overcurrent (ANSI 50TD/51)	/
G protection	G - Earth fault (ANSI 50N TD/51N)	/
	Gext - External Earth Fault (ANSI 50G TD/51G)	Homopolar toroid, Ekip Supply
	MDGF - Conventional Modified Differential Ground Fault	MDGF terminal, phase and summing CT's
RC protection	RC - Residual current protection/differential current (ANSI 64, 50N/51N, 87N)	G protection, RC toroid, Ekip Supply (≥30V DC or ≥110V AC) or Ekip Busbars Supply
Advanced current protections	IU - Current Unbalance (ANSI 46)	S protection
	S2 - 2nd short-time overcurrent (ANSI 50TD/51)	
	LC1 / LC2 - Load Control Alarm	
	Iw1 / Iw2 - Current Warning	
Voltage protections	OV - Overvoltage (ANSI 59)	Measuring
	UV - Undervoltage (ANSI 27)	
	VU - Voltage unbalance (ANSI 47)	
	PS - Cyclical direction of the phases alarm (ANSI 47)	
	S(V) - Voltage controlled overcurrent (ANSI 51V)	
Advanced voltage protections	RV - Residual overvoltage (ANSI 59N)	Measuring, Voltage protections
	OV2 - 2nd Overvoltage (ANSI 59)	
	UV2 - 2nd Undervoltage (ANSI 27)	
	S(V)2 - 2nd Voltage controlled overcurrent (ANSI 51V)	
Power protections	Cos Φ- Power factor alarm (ANSI 78)	Measuring
	OP - Active overpower (ANSI 32OF)	
	OQ - Reactive overpower (ANSI 32RF)	
	RP - Reverse active power (ANSI 32R)	
	RQ - Loss of field or Reverse reactive power (ANSI 40 or 32RQ)	
	UP - Active underpower (ANSI 32LF)	
Directional overcurrent protection	D - Directional overcurrent current (ANSI 67)	Measuring
Frequency protections	OF - Overfrequency (ANSI 81H)	Measuring
	OF2 - 2nd Overfrequency (ANSI 81L)	
	UF - Underfrequency (ANSI 81L)	
	UF2 - 2nd Underfrequency (ANSI 81L)	
	ROCOF - Rate of change of frequency (ANSI 81R)	
Advanced MDGF protection	MDGF - Modified Differential Ground Fault (advanced solution with Com Link comunication)	G protection, Ekip Supply Evo Modbus TCP, neutral current sensors
Dual Setting	Set A, Set B	/
Triple Setting	Set A, Set B, Set C	/
Internal Temperature Control	CB T - Circuit breaker temperature	Ekip Supply
/	AF1, AF2 - Arc Flash 1, Arc Flash 2 (ANSI 50ARC)	Ekip Supply, Ekip Arc-Flash 6F module
/	SC - Synchrocheck (ANSI 25)	Measuring, Ekip Supply, Ekip Synchrocheck module
/	RELT - Reduced Energy Let-Through (ANSI 50)	Depends on the activation mode

SYSTEM PROTECTION



Long Time/Overload protection (L - ANSI 49)

Application: it protects cables, and electrical equipment against thermal damage caused by prolonged overcurrent conditions. Unlike short circuit events, which require rapid reaction and disconnection, overcurrents are not typically catastrophic in the short term but can significantly reduce the operational life of cables and equipment over time. It is especially valuable in applications that can be subjected to small amount of overcurrent for long durations, ensuring timely intervention before thermal stress reaches critical levels.

How it works: if the RMS current of one or more phases exceeds the set threshold/pickup value I1, the L protection function starts a time delay, that is adjustable by the user. If the conditions are maintained for the amount of time defined by the trip curve, adjusted using the parameter time delay t1, the protection sends a trip command to open the circuit breaker.
Three types of trip curves are available:

1. $t = k/I^2$ with inverse long time;
2. Inverse Definite Minimum Time (IDMT) in accordance with IEC 60255-151 for coordination with medium-voltage protections that are available according to the standard inverse (SI), very inverse (VI) and extremely inverse (EI) curves
3. With $t = k/I^4$ curve for better coordination with upstream circuit-breakers or with fuses.

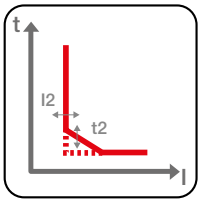
An optional pre-alarm threshold can be set to provide an early warning before the protection function sends a trip command.

Optional functions - (see page 3/16 for more details**)**

- Thermal memory only for $t=k/I^2$.

ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance	Trip time/Delay	Trip time tolerance [2]	Disable Function	Disable Trip (Alarm only)	Pre-alarm	Optional functions: Thermal memory	Optional functions: Zone selectivity	Optional functions: Start up
L	49	$t = k / I^2$	I1 = 0.4…1 x In step 0.001 x In	trip between 1.05 and 1.2 x I1	with I = 3 I1, t1 = 3…144 s step 1s	± 10% I ≤ 6 x In ± 20% I > 6 x In	yes, only with digital upgrade L=off	no	50…90% I1 step 1%	●		
		$t = \frac{t_1 \cdot (3^{\alpha}-1)}{(I_f/I_1)^{\alpha}-1}$ [1]	I1 = 0.4…1 x In step 0.001 x In	trip between 1.05 and 1.2 x I1	with I = 3 I1, t1 = 3…144 s **Standard inverse SI:** k=0.14 α=0,02 **Very Inverse VI:** k=13.5 α=1 **Extremely Inverse EI:** k=80 α=2 step 1s	± 10% I ≤ 6 x In ± 20% I > 6 x In	yes, only with digital upgrade L=off	no	50…90% I1 step 1%			
		$t = k / I^4$	I1 = 0.4…1 x In step 0.001 x In	trip between 1.05 and 1.2 x I1	with I = 3 I1, t1 = 3…144 s step 1s	± 10% I ≤ 6 x In ± 20% I > 6 x In	yes, only with digital upgrade L=off	no	50…90% I1 step 1%			

1) The formula is derived by the follow general equation from IEC 60255-151: b x k / $(I_f/I_1)^{\alpha}$-1), Where b=$(3^{\alpha}$-1) / K when If=3 x I_1 and t=t_1
2) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Short-time delayed overcurrent protection (S – ANSI 50TD/51)

Application: it provides selective short circuit protections by adding an adjustable short-time delay before tripping the circuit breaker. This time delay allows for coordination between upstream and downstream protection devices, ensuring that faults are cleared based on the systems required coordination.

How it works: if the RMS current of one or more phases exceeds the set threshold/pickup I2, the protection function starts a time delay t2, that is adjustable by the user. If the conditions are maintained for the amount of time defined by the trip curve, adjusted using the parameter time delay t2, the protection sends a trip command to open the circuit breaker. Two types of trip curves are available:

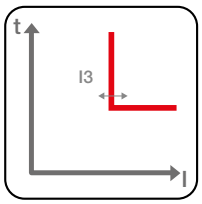
- $t = k / I^2$ where the trip time decreases with higher current magnitudes. It is necessary when time-current discrimination is required so that the tripping is delayed more and more by approaching the supply sources
- t=k providing a fixed delay regardless of current magnitude

Optional functions - (see page 3/16 for more details**)**

- Thermal memory only for $t=k/I^2$
- Zone selectivity (ANSI 68) only for t=k
- Start up: activation 0.6…10 x In with step 0.1 In and range 0.1…30s with step 0.01s

ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance (1)	Trip time/Delay (2)	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm	Optional functions: Thermal memory	Optional functions: Zone selectivity	Optional functions: Start up
S	50TD	t = k	I2 = 0.6...10 x In step 0.1 x In	± 7% I ≤ 6 x In ± 10% I > 6 x In	With I > I2, t2 = 0.05...0.8s step 0.01s	The lower of the two values: ±10% or ±40ms	yes	yes	no		●	●
	51	$t = k / I^2$	I2 = 0.6...10 x In step 0.1 x In	± 7% I ≤ 6 x In ± 10% I > 6 x In	with I = 10 In, t2 = 0.05...0.8s step 0.01s	± 15% I ≤ 6 x In ± 20% I > 6 x In	yes	yes	no	●		●

1) With Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32
2) For E1.3N, t2 must not be set above 0.6 seconds



Overcurrent instantaneous protection (I – ANSI 50)

Application: it provides protection against short circuit, where rapid fault clearance is necessary to prevent damage, safety risks, and fire hazards

How it works: if the RMS current in one or more phases exceeds the threshold I3, the protection function sends a trip command to open the circuit breaker. The trip time/delay (instantaneous) is fixed and cannot be set.

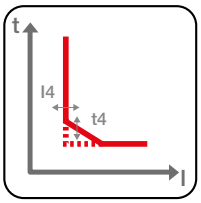
Optional functions - (see page 3/16 for more details**)**

- Zone selectivity (ANSI 68)
- Start-up: activation 1.5…15 x In with step 0.1 x In and range 0.1…30s with step 0.1s.

ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm	Optional functions: Thermal memory	Optional functions: Zone selectivity	Optional functions: Start up
I	50	t = k	I3 = 1.5...15 x In step 0.1 x In	± 10%	With I > I3, instantaneous	≤30ms	yes (no, when non defeatable digital upgrade is enabled)	no	no		●	●

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION



Earh fault protection (G - ANSI 50N TD/51N)

Application: it provides protection against unintended current flow to ground, using the internal current sensors (rogowski coils) of the circuit breaker. In 3 pole circuit breakers where neutral current sensing is required, an external neutral current sensor must be used.

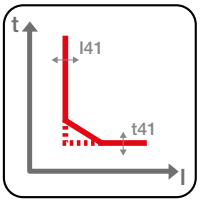
How it works: Ekip Aware continuously monitors the vector sum of currents for all three phases and neutral (if applicable). Under optimal conditions, this sum is equal to zero, since there is no alternative path for the current between source and load. In the event of a earth fault, part of the current returns to the source via the protective conductor or earth, causing an imbalance. This imbalance generates a residual current Ig, which the protection detects and compares to the set threshold/ pickup I4. If Ig exceeds I4, the protection function starts a time delay t4, that is adjustable by the user. If the conditions are maintained for the amount of time defined by the trip curve, adjusted using the parameter time delay t4, the protection sends a trip command to open the circuit breaker. An optional pre-alarm threshold can be set to provide an early warning before the protection function sends a trip command.

Optional functions - (see page 3/16 for more details**)**

- Zone selectivity (ANSI 68) only for t=k
- Start-up: activation 0.2…1 x In with 0.02 x In and range 0.1…30s with step 0.01s.

										Optional functions		
ABB Code	**ANSI Code**	**Trip curve**	**Threshold/ Pickup**	**Threshold tolerance(1)**	**Trip time/Delay**	**Trip time tolerance(1)**	**Disable Function**	**Disable Trip (Alarm only)**	**Pre-alarm**	**Thermal memory**	**Zone selectivity**	**Start up**
G	50N TD	t = k	I4 = 0.1...1 x In step 0.001 x In	± 7%	with I > I4, t4 = Instantaneous (with Vaux) + 0,1...1 s step 0.05s	The lower of the two values: ± 10% or ± 40 ms or 50ms with t4 =istantaneous	yes	yes	50...90% I4 step 1%		●	●
	51N	t = k / I^2	I4 = 0.1...1 x In step 0.001 x In	± 7%	with I = 4 In, t4 = 0.1…1s step 0.05	± 15%	yes	yes	50...90% I4 step 1%			●

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



External Earth Fault protection (Gext - ANSI 50G TD/51G)

Application: it protects against earth faults using an external homopolar toroid that is typically applied where monitoring the return path of fault current is critical to avoid equipment damage or service interruptions. It is referred to as Source Ground Return (SGR). By installing the toroid on the earth conductor at the source, it allows detection of earth faults occurring on both the line and load sides of the circuit breaker.

How it works: if the current measured by the homopolar toroid exceeds the set threshold I41, the protection function starts a time delay t41, that is adjustable by the user. If the conditions are maintained for the amount of time defined by the trip curve, adjusted using the parameter time delay t41, the protection sends a trip command to open the circuit breaker.

Optional functions - (see page 3/16 for more details**)**

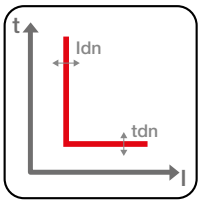
- Zone Selectivity (ANSI 68) only for t=k
- Start-Up: activation 0.1…1 x In with step 0.02 x In and range 0.1…30s with step 0.01s only for t=k.

Prerequisite: G protections, homopolar toroid and auxiliary supply (Ekip Supply Lite or Ekip Supply Evo Modbus TCP).

										Optional functions		
ABB Code	**ANSI Code**	**Trip curve**	**Threshold/Pickup**	**Threshold tolerance (1)**	**Trip time/Delay**	**Trip time tolerance (1)**	**Disable Function**	**Disable Trip (Alarm only)**	**Pre-alarm**	**Thermal memory**	**Zone selectivity**	**Start up**
Gext	50G TD	t = k	I41 = 0.1...1 x In of Toroid step 0.001 x In of Toroid	± 7%	with I > I41, t41 = 0.1…1s step 0.05s	The lower of the two values: 10% or 40 ms	yes	yes	50...90% I41 step 1%		●	●
	51G	t = k / I²	I41 = 0.1...1 x In	± 7%	with I = 4 In, t41 = 0.1…1s step 0.05s	± 15%	yes	yes	50...90% I41 step 1%			

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION



Residual current protection/differential current protection (RC – ANSI 64, 50N/51N, 87N)

Application: it is used for protecting people against indirect contact and additional protection against direct contact with equipment.
The use of the RC function is necessary in certain cases where conventional overcurrent or earth fault protection (G) may not ensure adequate safety. Such cases include:

- TT distribution systems: the fault current returns to the power supply through the earth, resulting in a relatively low magnitude that may not reach the tripping threshold of conventional G protection.
- TN-S systems with a single earthing point, particularly when:
  - standard protections are not sufficient to meet the disconnection times required by safety standards;
  - the environment presents additional hazards (e.g., high humidity or wet conditions), increasing the risk of earth leakage currents;
  - faults involve significant impedance, which limits the magnitude of the fault current and prevents proper operation of overcurrent protections.

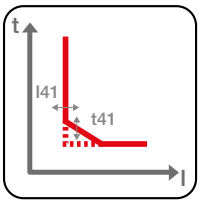
It cannot be used in TN-C systems since the neutral is used also as protective conductor and therefore the detection of the residual current would not be possible if the neutral passes through the toroid, since the vectorial sum of the currents would always be equal to zero.
It is implemented using a dedicated external RC toroid, a rectangular ferromagnetic sensor that surrounds the three phase conductors or the three phases and the neutral.
RC protection is compliant with IEC 60947-2, Annex M, and corresponds to Type A.

How it works: it detects the vectorial sum of the currents flowing through the external RC toroid. Under normal operating conditions, the sum of the phase currents and the neutral (if applicable) is equal to zero. However, in the event of an earth fault, a resulting residual current (denoted as IΔ) appears due to current leakage to earth. When IΔ exceeds the set threshold/pickup IΔn, the protection function starts a time delay tΔn that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay tΔn, the protection sends a trip command to open the circuit breaker.
This protection function is as an alternative to External Earth Fault (Gext) and modified differential ground fault (MDGF) functions.

Prerequisite: RC digital upgrade, RC toroid an auxiliary supply of at least 30 V DC or at least 110 V AC provided via Ekip Supply (without the need for Ekip Busbar supply). In all other cases, the Ekip Busbar Supply is required.

										Optional functions		
ABB Code	**ANSI Code**	**Trip curve**	**Threshold/ Pickup**	**Threshold tolerance (1)**	**Trip time/Delay**	**Trip time tolerance (1)**	**Disable Function**	**Disable Trip (Alarm only)**	**Pre-alarm**	**Thermal memory**	**Zone selectivity**	**Start up**
RC	64 50N TD 87N	t = k	IΔn = 3 - 5 - 7 - 10 - 20 - 30A	- 20% / 0%	with I > IΔn, tΔn = 0.06 - 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.8s	140ms @ 0.06s (max trip time) 950ms @ 0.80s (max trip time)	yes, putting External Toroid Type on None	no	no			

1) with Vaux , Ekip Busbars Supply or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Modified Differential Ground Fault protection (MDGF)

Application: it protects against ground faults in multi-sourced distribution systems where a common solidly grounded neutral conductor is shared between sources and loads. This configuration is commonly found in double-ended substations and generator paralleling switchgear/switchboard applications.
In these types of applications, the conventional G protection becomes ineffective in ensuring selectivity, as the fault current may return through multiple paths, making it difficult to isolate the faulted section accurately.

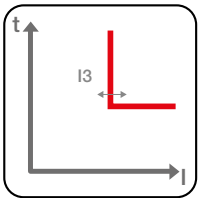
How it works: if the summation of the currents exceeds the set threshold/pickup I41, the protection starts a time delay I41, that is adjustable by the user. If the conditions are maintained for the amount of time defined by the trip curve, adjusted using the parameter time delay t41, the protection sends a trip command to open the circuit breaker.

Optional functions - (see page 3/16 for more details**)**
- Zone Selectivity (ANSI 68) only for t=k
- Start-Up: activation 0.1…1 x In with step 0.02 x In and range 0.1…30s with step 0.01s.

Two solutions are available:
- Conventional solution that needs a dedicated ABB terminal and third-party phase current transformers and summing current transformers.
- Advanced MDGF utilizes the internal Rogowski coils of each circuit breaker involved and requires the Ekip Supply Evo Modbus TCP module, along with the Advanced MDGF digital upgrade, to enable communication between breakers via Com Link. An external neutral sensor is required for each breaker to measure the neutral current, as 3-pole circuit breakers are used. Com Link is automatically included with the purchase of the Advanced MDGF upgrade. This solution eliminates the need for external phase CTs and summing CTs used in traditional solutions, thereby simplifying wiring and reducing installation complexity.

										Optional functions		
ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm	Thermal memory	Zone selectivity	Start up
MDGF		t = k	I41= 0.1…1 x In	± 15%	with I >I41, t41 = 0.05…1s (t=k) with I > I41, t41=0.1…1s ($t=k/I^2$) step 0.05s	The highest of 15% or 15ms	yes	yes	50…90% I41 step 1%		●	●

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Making Current Release (MCR)

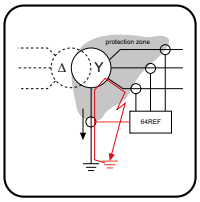
Application: it provides fast tripping when the circuit breaker closes onto a fault. In such scenarios, high fault currents are present immediately upon closing, selectivity is not required and immediate interruption is required. The function overrides any intentional delay and ensures the fault is cleared as quickly as possible, preventing damage caused by closing under short-circuit conditions.

How it works: the protection remains active for a time interval starting from the circuit-breaker's transition from open to closed after which it deactivates. If, during this time interval, the current of one or more phases exceeds threshold I3, the protection transmits the TRIP command after a non-programmable fixed time.
Prerequisite: needs auxiliary supply Vaux (Ekip Supply Lite or Ekip Supply Evo Modbus TCP) or system voltage supply (Ekip Busbars Supply). It is always available by default for all trip units.

										Optional functions		
ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm	Thermal memory	Zone selectivity	Start up
MCR		t = k	I3= 1.5…15 x In step 0.1 x In	± 10%	With I > I3, instantaneous Monitor time range: 40…500ms step 0.01s	≤ 30 ms	yes	no	no		●	

1) Ekip Aware supplied via Vaux or Ekip Busbars Supply

SYSTEM PROTECTION

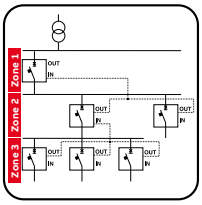


Second protection against earth fault (ANSI 50GTD/51G & 64REF)

Application: Ekip Aware offers the unique capability of simultaneously managing both protection G (via internal current sensors) and Gext (via external homopolar toroid) through two independent earth fault protection curves. Thanks to this feature, the trip unit can effectively differentiate between a unrestricted earth fault (UEF), which triggers the opening of an Emax 3, and a restricted earth fault (REF), which commands the opening of the medium-voltage circuit-breaker.
Another possible configuration involves replacing the Gext protection with RC protection, while maintaining the operation of G protection.

How it works: to determine which circuit-breaker should trip (whether the MV or LV circuit-breaker), a coordinated approach to the trip times is required.

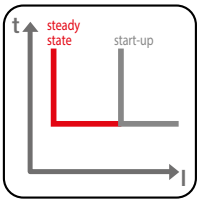
Optional functions



Zone selectivity (ANSI 68)

It can be used for minimizing 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 (Ekip Supply Lite or Ekip Supply Evo Modbus TCP).

Refer the individual protection tables for availability of this function.
For W circuit breaker, FP connector for 3-pin/5-pin terminal block must be ordered.

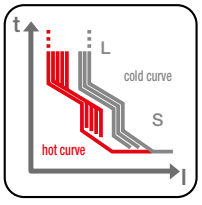


Start-UP

Start-up function enables protections 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 can be set from 100 ms to 30 s with 0.01s step and is recognized automatically by the trip unit:

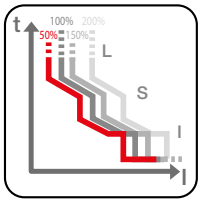
- at the closing of the circuit-breaker with a self-supplied trip unit
- when the peak value of the maximum current exceeds the set threshold (0.1…10 x In, step 0.1 x In) with an externally supplied trip unit; a new start-up is possible after the current falls below the threshold.

Refer the individual protection tables for availability of this function.



Thermal memory

Thermal memory helps prevent overheating of components and cables connected to the circuit-breaker by adjusting the protection tripping time based on recent overload history. In the event of successive trips occurring within short intervals, the function shortens the tripping time depending on the elapsed time since the first overload and the severity of the faults.
Refer the individual protection tables for availability of this function.



Neutral protection

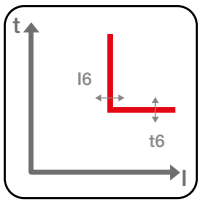
Available at 50%, 100% or 200% of the phase currents, or disabled, it is applied to the overcurrent protections L, S and I.

Advanced current protection digital upgrade

It includes a set of protections and alarms:

- current unbalance protection (IU – ANSI 46)
- 2nd short-time delay protection (S2 - ANSI 50TD)
- Load current thresholds alarms (LC1/LC2)
- Current thresholds alarms (Iw1/Iw2)

Prerequisite: S protection.



Current unbalance protection (IU – ANSI 46)

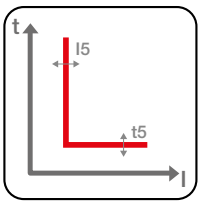
Application: it protects rotating machines, such as motors and generators, against current unbalance. These conditions may arise in non-symmetrical systems, unbalanced loads, or single-phase faults. These conditions generate negative sequence currents in the stator, which induce rotor currents at twice the system frequency. If left unmitigated, this can result in rapid rotor heating and potential mechanical damage.

How it works: if the detected unbalance IU exceeds the set threshold/pickup I6, the protection function starts a time delay t6, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t6, the protection sends a trip command to open the circuit breaker. IU is computed by measuring the difference of RMS values of the current between the phases (phase angle differences not considered) or considering the maximum deviation among the measured currents max IAvg, calculated by comparing each current with the mean value.

$$IU = \frac{100 \times (\max I\,Avg)}{I\,Avg} \quad \text{or} \quad IU = \frac{(Imax) - (Imin)}{(Imax)} \times 100$$

Prerequisite: S protection.

ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance	Trip time/Delay	Trip time tolerance	Disable Function	Disable Trip (Alarm only)	Pre-alarm
IU	46	t = k	I6 = 2...90% In step 1% In	± 10%	with unbalance > I6, t6 = 0.5...60s step 0.5s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ±100ms (for t≥5s)	yes	yes	no



Second overcurrent delayed short-circuit protection (S2 – ANSI 50TD/51)

Application: it is useful for systems requiring precise selectivity and coordination, such as those with multiple power sources (e.g., grid and generator), where fault currents can vary depending on the fault source. The protection enables two independent thresholds for S, ensuring selective fault clearing and preventing unnecessary system trips.

How it works: if the RMS current of one or more phases exceeds the set threshold/pickup I5, the protection function starts a time delay t5, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t5, the protection sends a trip command to open the circuit breaker.

Optional functions

- Zone Selectivity (ANSI 68): t5sel = 0.04...0.2s 0.01s
- Start-Up: activation 0.1...1 x In with step 0.02 x In and range 0.1...30s with step 0.01s.

Prerequisite: S protection.

										Optional function		
ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance [1]	Trip time/Delay	Trip time tolerance [1]	Disable Function	Disable Trip (Alarm only)	Pre-alarm	Thermal memory	Zone selectivity	Start up
S2	50TD	t = k	I2 = 0.6...10 x In step 0.1 x In	± 7% I ≤ 6 x In ± 10% I > 6 x In	With I > I5, t5 = 0.05...0.8s step 0.01s	The lower of the two values: ± 10% or ± 40 ms	yes	yes	no		●	●

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION

Current thresholds alarms (LC1/LC2 and Iw1/Iw2)

Application: four independent alarms are useful for implementing pre-trip logics before the overload protection (L) trips the circuit breaker. For example, they can be used to disconnect loads downstream of the circuit breaker, which are controlled by Ekip Signaling.

How LC1/LC2 work: if the highest of the three or four RMS current exceeds user-defined threshold (50%...100% I1 with step 1%), an alarm is generated.

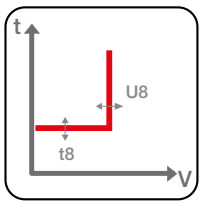
How Iw1/Iw2 work: if the highest of the three or four RMS currents exceeds a user-defined threshold (settable between 0.1 and 1 In, with a step of 0.01 In), either above or below the set point, an alarm is generated.

Prerequisite: S protection.

Voltage protection digital upgrade

It includes a set of protections and alarms:
- Undervoltage protection (UV - ANSI 27)
- Overvoltage protection (OV - ANSI 59)
- Voltage unbalance protection (VU - ANSI 47)
- Voltage-controlled overcurrent protection (S(V) - ANSI 51V)
- Cyclical direction of the phases alarm (PS - ANSI 47)

Prerequisite: Measuring.



Undervoltage protections (UV – ANSI 27)

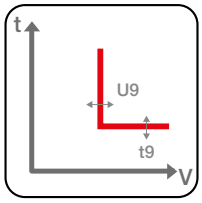
Application: it is particularly useful for generators, as it helps control undervoltage levels at the terminals. For generators, continuous operation with rated power and frequency and with minimum voltage of 95% is normally permitted. Low voltage can cause loss of synchronism between generators, increased reactive power drawn from the grid, and malfunctioning of connected loads. UV protection also serves as a backup in the event of a generator short-circuit combined with the failure of primary protection systems. Additionally, it acts as a back-up in case of automatic voltage regulator failure. Moreover, UV is relevant for sensitive loads, such as motors or solenoids, which may experience malfunctions if the supply voltage drops significantly below nominal levels.

How it works: if one or more RMS line-to-line voltages drops below the set threshold/pickup I8, the protection function starts a time delay t8, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t8, the protection sends a trip command to open the circuit breaker. The function can be configured for alarm only or for both alarm and trip. The alarm status is indicated even when the circuit-breaker is open so that a fault can be identified before the circuit-breaker closes. In this case, voltage measurement cables needs to be put on the supply side.
UV cannot be used as a safety function to prevent mechanical closing of the circuit breaker under undervoltage conditions. For this purpose, a YU undervoltage release coil should be used.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance [1]	Trip time/Delay	Trip time tolerance [1]	Disable Function	Disable Trip (Alarm only)	Pre-alarm
UV	27	t = k	U8 = 0.5….0.98 x Un step 0.001 Un	± 2%	with U < U8, t8 = 0.05…120s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux, Ekip Busbars Supply or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Overvoltage protections (OV – ANSI 59)

Application: it protects a system when voltage exceeds a safe or defined threshold. In applications utilizing generators (in particular gas turbine or hydrogenerators), it can be used to prevent excessive voltage at the terminals which can lead to over excitation and impose damaging stress on the generator's insulation system. Overvoltage conditions may arise due to faults in the voltage regulator or may result from network switching operations.

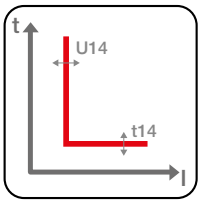
How it works: if one or more RMS line-to-line voltages exceeds the set threshold/pickup U9, the protection starts a time delay t9, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t9, the protection sends a trip command to open the circuit breaker.

The function can be configured for alarm only or for both alarm and trip. The alarm status is indicated even when the circuit-breaker is open so that a fault can be identified before the circuit-breaker closes. In this case, voltage measurement cables needs to be put on the supply side.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
OV	59	t = k	U9 = 1.02….1.5 x Un step 0.001 Un	± 2%	with U > U9, t9 = 0.05…120s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux, Ekip Busbars Supply or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Voltage unbalance protection (VU – ANSI 47)

Application: it protects rotating machines, such as motors and generators, against voltage unbalance.

How it works: if the detected unbalance VU exceeds the set threshold/pickup U14, the protection starts a time delay t14, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t14, the protection sends a trip command to open the circuit breaker.

$$VU = \frac{100 \times (\Delta\max U \text{ mean})}{U \text{ mean}} \qquad \Delta\max U \text{ mean} = \max(U12\text{-}Umean;\ U23\text{-}Umean;\ U31\text{-}Umean)$$

where: Δmax Umean is the maximum deviation among the three voltages calculated by comparing each line-to-line voltage with the mean value; Umean is the mean value of the line-to-line voltages

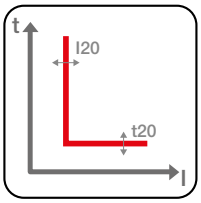
The function can be configured for alarm only or for both alarm and trip. The alarm status is indicated even when the circuit-breaker is open so that a fault can be identified before the circuit-breaker closes. In this case, voltage measurement cables needs to be put on the supply side.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
VU	47	t = k	U14 = 2…90% Un step 1% Un	± 10%	with unbalance > U14, t14 = 0.5…60s step 0.5s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

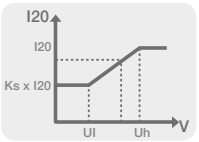
SYSTEM PROTECTION



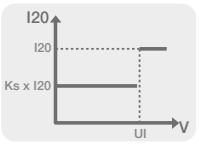
Voltage-controlled overcurrent protection (S(V) - ANSI 51V)

Application: it is useful for converters, which typically have very low short-circuit currents (close to nominal values) but experience severe voltage drops during faults. Under these conditions, fault currents often remain within the tolerance of standard overload protections, potentially delaying fault detection. In addition it is useful for safeguarding generators against faults at their terminals, where a sudden voltage drop and a transient overcurrent (6–10 times nominal) may occur, followed by a steady-state current that can fall below the generator's full-load rated level. By dynamically lowering the current trip threshold during voltage drops, S(V) enables faster and more sensitive fault detection, even in situations where conventional overcurrent protections would not operate. Since it activates only during undervoltage conditions, S(V) also acts as a reliable backup to both instantaneous (I) and time-delayed (S) overcurrent protections, while maintaining coordination with the generator's normal operating conditions.

How it works: if the RMS current in one or more phases exceeds the set threshold/pickup I20, the protection starts a time delay t20, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t20, the protection sends a trip command to open the circuit breaker.
The current threshold I20 is voltage-dependent and can be adjusted in two modes:



- linear mode (restrained mode): the threshold I20 varies linearly from Ks x I20 at the lower voltage threshold UI to I20 at the upper voltage threshold Uh. If the minimum RMS value of the three line-to-line voltages exceeds Uh, the threshold remains at I20; if it falls below UI, the threshold is reduced to I20 x Ks. UI, Uh and Ks must be configured.



- step mode (controlled mode): the threshold I20 is equal to I20 if the minimum RMS value of the three line-to-line voltages is above UI and drops immediately to Ks*I20 when below UI. Ui and Ks must be configured.

The function can be configured for alarm only or for both alarm and trip.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
S(V)	51V	t = k	I20 = 0.6...10 x In step 0.1 In	± 10%	With I > I20, t20 = 0.05...30s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no
			STEP MODE UI= 0.2...1 x Un Ks= 0.1...1						
			LINEAR MODE Uh= 0.2...1 x Un Ks= 0.1...1						

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

Cyclical direction of the phases alarm (PS - ANSI 47)

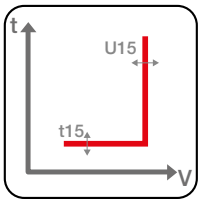
How it works: when the sequence of line-to-line voltages is not aligned with the sequence set by the user an alarm is generated.

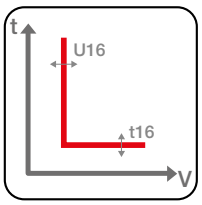
Prerequisite: measuring.

Advanced voltage digital upgrade

It includes a set of protections:
- 2nd overvoltage protection (OV2 - ANSI 59)
- 2nd undervoltage protection (UV2 – ANSI 27)
- 2nd Voltage-controlled overcurrent protection (S(V)2 - ANSI 51V)
- Residual overvoltage protection (RV – ANSI 59N)

Prerequisite: Measuring and Voltage protections.





Second protection against undervoltage and overvoltage (UV2 – ANSI 27 and OV2 – ANSI 59)

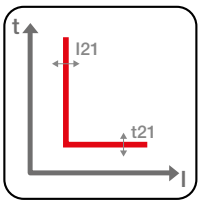
Application: UV2 provides additional undervoltage protection, independent from the primary UV function. This dual configuration allows for flexible programming with separate thresholds and delays to suit different system requirements. For instance, the protection can be set to generate an alarm for minor voltage drops with a long delay, and to trip the circuit-breaker for more severe drops with a shorter delay. Similarly, OV2 offers the same flexibility for overvoltage conditions, operating independently from the primary OV protection.

Prerequisite: measuring and voltage protections.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
UV2	27	t = k	U15 = 0.5....1 x Un step 0.001 In	± 2%	with U < U15, t15 = 0.05...120s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no
OV2	59	t = k	U16 = 1....1.5 x Un step 0.001 In	± 2%	with U > U16, t16 = 0.05...120s step 0.01 s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION



Second protection against voltage-controlled overcurrent protection (S(V)2 - ANSI 51V)

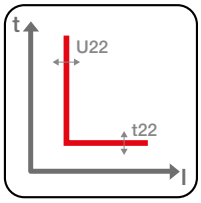
Application: it is useful for enabling full selectivity across all types of installations. The thresholds and operating modes of S(V) and S(V)2 can be independently configured to suit various system needs, for example, using S(V) for alarm signaling and S(V)2 for tripping, or vice versa, or configuring both protections for either signaling or tripping functions.

How it works: it works as S(V) but with different independent parameters.

Prerequisite: measuring and voltage protections.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
S(V)2	51V	t = k	I21 = 0.6...10 x In step 0.1 In **STEP MODE** Ul2= 0.2...1 x Un Ks2= 0.1...1 **LINEAR MODE** Uh2= 0.2...1 x Un Ks2= 0.1...1	± 10%	With I > I21, t21 = 0.05...30s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Residual overvoltage protection (RV – ANSI 59N)

Application: it is useful for detecting earth faults in systems with isolated neutrals (IT), such as in:

- generators, where it helps detect earth faults, particularly in the stator windings, and potential phase-to-phase short circuits that may occur under abnormal operating conditions. These faults are often caused by insulation degradation in the winding, typically due to humidity, oil, or dirt accumulating on coil surfaces outside the stator slots.
- distribution systems, where the neutral is isolated, allowing a measurable residual voltage to appear in the event of an earth fault.

How it works: Ekip Aware continuously monitors the vector sum of all phase voltages , referred to as U0. Under normal conditions, U0 is zero or very small. An earth fault in one phase or generator winding causes a voltage rise in the other two phases and at the neutral point. The magnitude of this rise depends on the fault's location, fault resistance, and the generator's earthing impedance. This imbalance generates a residual voltage U0, which the protection detects and compares to a threshold I22. If U0 exceeds the set threshold/pickup I22, the protection starts a time delay t22, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t20, the protection sends a trip command to open the circuit breaker.

The protection is available for:

- 4 poles
- 3 poles with also Neutral Voltage enabled via Ekip Connect, with Vn measured and wired to the dedicated I/O terminal.

The function can be configured for alarm only or for both alarm and trip. The alarm status is indicated even when the circuit-breaker is open so that a fault can be identified before the circuit-breaker closes. In this case, voltage measurement cables needs to be put on the supply side.

Prerequisite: measuring and voltage protections.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
RV	59N	t = k	U22 = 0.05....0.5 x Un step 0.001 Un	± 10%	with U > U22, t22 = 0.5...120s step 0.01s	The lower of the two values: ± 10% or ± 15 ms (for t22<150ms) / ± 40 ms (for 150 ms≤t22<5s) / ± 100 ms (for t22≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

Power protections digital upgrade

It includes a set of protections and alarm:

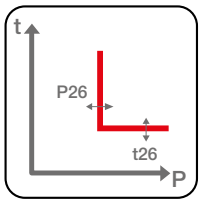
- Power factor alarm (Cos ϕ - ANSI 78)
- Active overpower protection (OP – ANSI 32OF)
- Reactive overpower protection (OQ – ANSI 32RF)
- Reverse active power protection (RP - ANSI 32R)
- Active underpower protection (UP – ANSI 32LF)
- Loss of field or reverse reactive power protection (RQ – ANSI 40 or 32RQ)

Prerequisite: Measuring.

Power factor alarm (Cos ϕ - ANSI 78)

How it works: when the total Cos ϕ value drops below the set threshold (0.5 to 0.95 in 0.01 steps) an alarm is generated.
Total cos ϕ is calculated as ratio between total active power and total apparent power.

Prerequisite: measuring.



Active overpower protection (OP – ANSI 32OF)

Application: it is useful for preventing the generator from supplying excessive active power. For examples, in plants operating in island-mode, the power required from the generator may exceed the maximum power that the machine is able to supply. Such a condition can lead to a step-out (loss of synchronism), where the rotor loses synchronism with the system frequency, resulting in oscillations in the voltage of the electrical system.

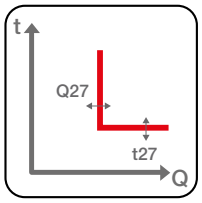
How it works: if the total active power calculated as a sum of the power in the three phases exceeds the set threshold/pickup P26, the protection starts a time delay t26, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t26, the protection sends a trip command to open the circuit breaker.
The function can be configured for alarm only or for both alarm and trip.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
OP	32OF	t = k	P26 = 0.4…2 Sn step 0.001 Sn	± 10%	with P > P26, t26 = 0.5…100s step 0.5s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION



Reactive overpower protection (OQ – ANSI 32OF)

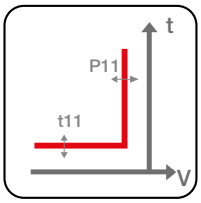
Application: it is useful for preventing the generator from supplying excessive reactive power to the network. This condition may occur during overexcitation, such as when a large load is disconnected but the excitation system fails to reduce the field current accordingly due to a control system fault.

How it works: if the total reactive power calculated as a sum of the power in the three phases exceeds the set threshold/pickup P27, the protection starts a time delay t27, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t27, the protection sends a trip command to open the circuit breaker. The function can be configured for alarm only or for both alarm and trip.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
OQ	32OF	t = k	Q27 = 0.4…2 Sn step 0.001 Sn	± 10%	with Q > Q27, t27 = 0.5…100s step 0.5s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Reverse Active Power protection (RP - ANSI 32R)

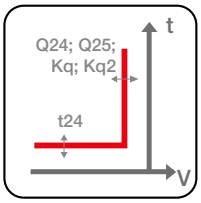
Application: it is useful for safeguarding generators from absorbing active power from the grid, a condition that can occur if the prime mover fails or if there is a malfunction in the speed control system. In such scenarios, instead of delivering active power to the system, the generator begins to draw power from the grid, effectively operating as a motor.

How it works: if the total active power exceeds threshold/pickup P11 and is in opposite direction of the current, the protection starts a time delay t11, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t11, the protection sends a trip command to open the circuit breaker. If the condition persists after the delay, the protection sends a trip command to open the circuit breaker. The function can be configured for alarm only or for both alarm and trip.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
RP	32R	t = k	P11 = -1…-0.05 Sn step 0.001 Sn	± 10%	with P > P11, t11 = 0.5…100s step 0.1s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

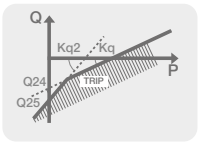
1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Loss of field or reverse reactive power protection (RQ – ANSI 40 or 32RQ)

Application: it is useful for protecting synchronous generators against reactive power absorption from the grid, which can be caused by faults in the excitation or field circuits leading to a loss of excitation. This condition results in temperature rises in the rotor, field, and damper circuits. This phenomenon is particularly evident in smooth rotor generators, whereas it is much less marked in salient pole generators. Additionally, if the grid cannot supply the required reactive power, this fault condition can lead to system instability.

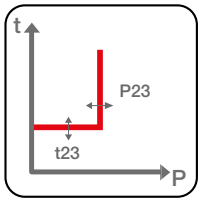
How it works: it works by measuring the total active and reactive power of the generator. A tripping area is defined using one or two curves. When two curves are used, the trip area is determined by the intersection of the areas defined by both. The trip threshold can be adjusted by modifying the curve slopes (angles Kq and Kq2) and the intercepts (Q24 and Q25).
If the operating point is below the set protection curve, the protection starts a time delay t24, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t24, the protection sends a trip command to open the circuit breaker.
The function can be configured for alarm only or for both alarm and trip.
This protection is enabled if the voltage measured in the plant is higher than the set voltage parameter. Vmin. = 0.5...1.2.



Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance [1]	Trip time/Delay	Trip time tolerance [1]	Disable Function	Disable Trip (Alarm only)	Pre-alarm
RQ	40/ 32RQ	t = k	Q24 [1]=0.1...1 Sn step 0.001 Sn Kq = -2...2 step 0.01 Q25 [1]=0.1...1 Sn step 0.001 Sn Kq2 = -2...2 step 0.01	± 10%	with Q > Q24, t24 = 0.5...100s step 0.1s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) The threshold, expressed in Sn, is not preceded by a "–" sign, but it should still be interpreted as reactive power absorbed from the grid (i.e., inverse reactive power)
2) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Active underpower protection (UP – ANSI 32LF)

Application: it is useful for safeguarding generators, especially in island mode, against excessive drops in active power output. A sudden reduction in load from the grid can cause an imbalance between mechanical input (e.g., from a turbine) and electrical output, leading to generator overspeed.

How it works: if one or more of the active power values detected by the unit drop below threshold/pickup P23, the protection starts a time delay t23, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t23, the protection sends a trip command to open the circuit breaker. The protection is active also for negative (reverse) active power but is independent from the RP protection. The protection excludes itself if the maximum value of the line-to-line voltage is less than 30 V. The protection can be disabled 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. The function can be configured for alarm only or for both alarm and trip.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance [1]	Trip time/Delay	Trip time tolerance [1]	Disable Function	Disable Trip (Alarm only)	Pre-alarm
UP	32LF	t = k	P23 = 0.1...1 x Sn step 0.001 x Sn	± 10%	with P < P23, t23 = 0.5...100s step 0.5s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

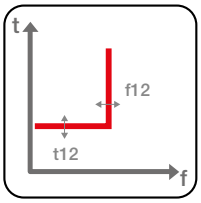
1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION

Frequency protections digital upgrade

It includes a set of protections:
- Underfrequency protection (UF - ANSI 81L)
- Overfrequency protection (OF - ANSI 81H)
- Second protection against underfrequency and overfrequency protection (UF2 and OF2 – ANSI 81L and 87H)
- Rate of change of frequency protection (ROCOF – ANSI 81R)

Prerequisite: Measuring.
Frequency protections are based on voltage



Underfrequency protection (UF - ANSI 81L)

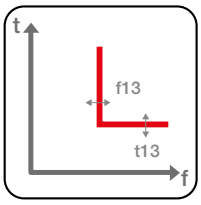
Application: it is useful:
- for safeguarding generators when frequency falls below the rated value, typically due to insufficient power generation relative to load demand, a condition that often occurs during island-mode operation following a network disconnection. UF protection can initiate load shedding to restore power balance and stabilize frequency, or disconnect the generator if necessary. This function is especially important for protecting the mechanical prime mover, such as a steam turbine, from damage caused by prolonged low-frequency operation.
- in general, for ensuring that electrical systems operate within acceptable frequency limits, avoiding performance degradation, equipment damage or malfunction of critical loads.

How it works: if the grid frequency read by the unit drops below threshold/pickup f12, the protection starts a time delay t12, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t12, the protection sends a trip command to open the circuit breaker.
The function can be configured for alarm only or for both alarm and trip. The alarm status is indicated even when the circuit-breaker is open so that a fault can be identified before the circuit-breaker closes. In this case, voltage measurement cables needs to be put on the supply side.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
UF	81L	t = k	f12 = 0.9....0.999 x fn step 0.001 x fn	± 1% (with fn ±2%)	with f < f12, t12 = 0.06...300s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Overfrequency protection (OF - ANSI 81H)

Application: it is useful:

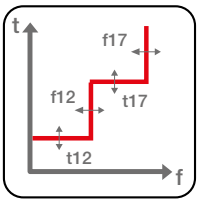
- for protecting generators from excessive frequency increases, which occur when the mechanical driving power exceeds the active power demanded by the load, typically following a load disconnection due to a fault. While the generator's speed regulator attempts to restore frequency to its rated value, if it fails, OF protection intervenes to prevent mechanical damage to the turbine/alternator unit and to avoid supplying loads at unsafe frequency levels.
- in general, to ensure that electrical systems operate within acceptable frequency limits, avoiding performance degradation, equipment damage or malfunction of critical loads.

How it works: if the frequency read by the unit exceeds threshold/pickup f13, the protection starts a time delay t13, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t13, the protection sends a trip command to open the circuit breaker.
The function can be configured for alarm only or for both alarm and trip. The alarm status is indicated even when the circuit-breaker is open so that a fault can be identified before the circuit-breaker closes. In this case, voltage measurement cables needs to be put on the supply side.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
OF	81H	t = k	f13 = 1.001….1.1 x fn step 0.001 x fn	± 1% (with fn ±2%)	with f > f13, t13 = 0.06…300s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32



Second protection against underfrequency and overfrequency protection (UF2 and OF2 – ANSI 81L and 87H)

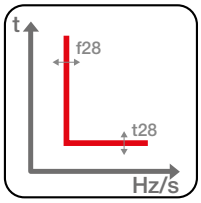
Application: UF2 provides additional underfrequency protection, independent from the primary UF function. This dual configuration allows for flexible programming with separate thresholds and delays to suit different system requirements. For instance, the protection can be set to generate an alarm for minor voltage drops with a long delay, and to trip the circuit-breaker for more severe drops with a shorter delay. Similarly, OF2 offers the same flexibility for overfrequency conditions, operating independently from the primary OF protection.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (1)	Disable Function	Disable Trip (Alarm only)	Pre-alarm
UF2	81L	t = k	f17 = 0.9….0.999 x fn step 0.001 x fn	± 1% (with fn ±2%)	with f < f17, t17 = 0.15…300s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no
OF2	81H	t = k	f18 = 1.001….1.1 x fn step 0.001 x fn	± 1% (with fn ±2%)	with f > f18, t18 = 0.15…300s step 0.01s	The lower of the two values: ± 10% or ± 40 ms (for t<5s) / ± 100 ms (for t≥5s)	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION



Rate of change of frequency protection (ROCOF – ANSI 81R)

Application: it is useful:

- in plants where generators operate in parallel with the main grid, a fault in the distribution network may lead the grid to disconnection from the plant. As a result, the generator must operate in island mode, where its electrical parameters may no longer match those of the grid. To prevent the risk of an unsynchronized reconnection, which could cause severe damage to both the generator and the grid, ROCOF protection detects the event and triggers immediate disconnection of the circuit-breaker.
- to prevent islanding operation when the generator cannot sustain the connected loads (i.e., when load demand exceeds generator capacity). In such cases, system instability may occur, potentially resulting in equipment failure.

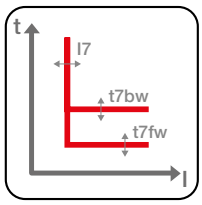
This protection enables both positive and negative frequency variations to be detected rapidly and with greater sensitivity, thus ensuring a protection faster than what is possible to obtain with traditional under and overfrequency functions.

How it works: if the frequency variation read by the trip unit exceeds threshold/pickup f28, the protection starts a time delay t28, that is adjustable by the user. If the conditions are maintained for the amount of time set in the time delay t28, the protection sends a trip command to open the circuit breaker.

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/Pickup	Threshold tolerance [1]	Trip time/Delay	Trip time tolerance [1]	Disable Function	Disable Trip (Alarm only)	Pre-alarm
ROCOF	81R	t = k	f28 = 0.4....10 Hz/s up &/or down step 0.2 Hz/s	± 10%	with f > f28, t28 = 0.5...10s step 0.01s	The lower of the two values: ± 20% or ± 200 ms	yes	yes	no

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases.



Directional overcurrent protection (D – ANSI 67)

Application: it is useful 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. In ring distribution systems, this enables the distribution portion in which the fault occurred to be identified and to disconnect it while maintaining the operation of the rest of the installation.

How it works: depending on the direction of the fault, if the current of one or more phases exceeds threshold I7 (I7fw or I7bw) for longer than time t7 (t7fw or t7bw), the protection activates and sends a TRIP command.

Optional functions:

- Start-up: it enables higher trip thresholds to be set at the outgoing point, as available for protections S, I and G. Activation: 0.6…10 x In, Range: 0.1…30s with 0.01s step
- Zone selectivity: This protection enables circuit-breakers to be interconnected 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 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. t7sel = 0.1…0.8s, with 0.01s step).

Prerequisite: measuring.

ABB Code	ANSI Code	Trip curve	Threshold/ Pickup	Threshold tolerance (1)	Trip time/Delay	Trip time tolerance (2)	Disable Function	Disable Trip (Alarm only)	Pre-alarm	Optional function		
										Thermal memory	Zone selectivity	Start up
D	67	t = k	I7 = 0.6...10 x In step 0.1 x In trip direction: forward &/or 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	± 7% I ≤ 6 x In ± 10% I > 6 x In	with I > I7, t7 = 0.1...0.8s step 0.01s	The lower of the two values: ± 10% or ± 40 ms	yes	yes	no		●	●

1) with Vaux or Ekip Aware already powered by the main circuit with current flowing in at least two-phases. In other case see table in page 3/32

SYSTEM PROTECTION

Internal Temperature Control (CB T)

Application: it prevent against overheating caused by various factors, including:
- Mechanical issues: such as broken moving contacts, arc chamber wear, contact surface degradation, or foreign objects between moving and fixed contacts
- Electrical issues: like loose busbar-terminal connections
- Environmental conditions: for example, excessively high ambient temperatures

This protection is particularly important in facilities with high load factors, such as data centers, refrigerated warehouses, laboratories, and hospitals, where continuous power supply is critical and equipment is at greater risk of thermal stress or failure.
When ordered, dedicated temperature sensors are installed

How it works: if temperatures measured by internal sensors exceeds internal preset thresholds, the protection CB T activates and sends a TRIP command. The function can be configured for alarm only or for both alarm and trip. A pre-alarm is available to be used for signaling and triggering actions (e.g., activating fans).

Prerequisite: Ekip Supply
it is not available with the Neutral on the right-side configuration.

Dual and Triple setting of protection

Ekip Aware can store up to two (dual setting) or up to three (triple setting) sets of alternative parameters for all protections. Set B and Set C can replace the default set A, if necessary, 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. They can be activated by:
- Digital input available with an Ekip Signaling module
- Communication network, by means of one of the Ekip Com communication modules
- Directly from the Aware display
- By a settable internal time, after the circuit-breaker has closed
- Programmable logic.

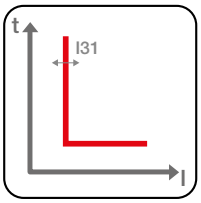
Additional protections

In addition, following protections can be used if dedicated module is installed:
- Arc Flash protection (ANSI 50ARC)
- Reduced Energy Let-Through (RELT - ANSI 50)
- Synchrocheck (SC - ANSI 25).

Arc Flash protections (AF1, AF2 - ANSI 50ARC)

Application: it provides active arc flash mitigation, reducing the risks to personnel (such as burns and pressure related injuries) and help mitigate damage to switchgear equipment. Thanks to an integrated solution, arc flash events can be detected and cleared in less than 40 ms, enabling rapid tripping that can lower incident energy produced during an arc flash event and reduces the need for traditional external relay based systems.

How it works: it utilizes dedicated Ekip Arc Flash 6F module along with arc flash detectors. When triggered, each detector sends a signal to the corresponding channel of the module. To trigger the Emax 3 to trip or alarm, a protection function must be enabled and assigned to each channel.
Two independent protection functions are available (AF1 and AF2) allowing adaptation to different operating conditions. These functions are automatically visible in Ekip Connect 3 or EPiC mobile app when at least one Ekip Arc Flash 6F module is installed.
An optional current check can be enabled for each protection function, enabling both light (arc flash) and current threshold verification before issuing a trip command.
Prerequisite: Ekip Arc-Flash 6F module and Light-Sense Detectors and/or Light&Pressure-Sense Detectors.



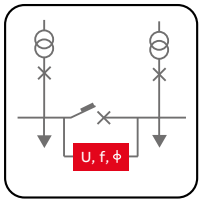
Reduced Energy Let-Through protection (RELT - ANSI 50)

Application: it enhances operator safety during maintenance activities by reducing the energy let-through in the event of a short circuit. This function supports compliance with NEC 240.87, which requires the use of an energy-reducing maintenance switching system with a local visual indicator to minimize arc flash energy during work on energized equipment. The dedicated RELT protection ensures faster tripping times than the standard Instantaneous protection when activated.
RELT protection can be activated in three ways:
- via Ekip RELT module with an external input signal (e.g., a switch): the switch can be located outside the arc flash boundary, allowing RELT to be activated before the operator approaches. A local status indicator is typically installed near the switch to provide visual confirmation locally on Ekip Aware
- HMI: activation does not require additional hardware.
- Via EPiC Mobile App (only if the Ekip RELT module is installed): enables remote activation.

When RELT is active, a local status indicator (e.g., LED) or the Ekip Aware HMI blue indicator confirms state of the protection. Once maintenance is completed, and RELT protection is deactivated, the indicator returns to its normal color, confirming the system has reverted to standard protection mode.

Prerequisite: depends on the activation way.

SYSTEM PROTECTION



Synchrocheck (SC - ANSI 25)

Application: for distribution systems with two power sources that are to be connected in parallel, electrical synchronism (phase angle, frequency, and voltage) must be verified before closing the Emax 3 in the tie position.

How it works: when equipped with the dedicated Ekip Synchrocheck module the synchrocheck function supports two operating modes (Live Bus and Dead Bus) and two input configurations (single-phase or three phase).

1. Live Bus Mode: used when both sources are energized.
- Single-phase mode: synchronism is achieved when all the following conditions are met:
  - one line-to-line voltage of first source and the correspondent one of the second source above the Ulive threshold for the tref set time
  - Difference of the two line-to-line voltages of the two sources below the threshold ΔU
  - Difference of the two frequencies between the two sources below the threshold Δf
  - Difference of the two phase angle of the two line-to-line voltages below the threshold ΔΦ
  - All required synchronism conditions maintained for the programmed amount of time tsyn
  - The circuit breaker is open
- In three phase mode three line-to-line voltages are considered and all must satisfy the conditions at the same time

2. Dead Bus Mode: used when one source is de-energized (dead bus) and the other is energized (live bus).
- In single phase mode, synchronism is achieved when:
  - Line-to-line voltage of the energized source (live bus) above the specified threshold Ulive
  - Line-to-line voltage of the de-energized source (dead bus) below the threshold Udead
  - Circuit breaker open
- In three phase mode three line-to-line voltages are considered and all must satisfy the conditions at the same time

Dead Bus mode has both Standard and Reversed configurations

In both live and dead modes, 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).

Voltages of one source are measured using two inputs (single-phase) or three inputs (three-phase) via the Ekip Synchrocheck module. Voltages of the second source are measured using the internal voltage measurement cables of the Emax 3, provided they are correctly configured.

Prerequisite: Measuring, Ekip Synchrocheck module.

If Ekip Aware trip unit is not already powered by the main circuit with current flowing in at least two-phases or there is no auxiliary power supply, 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%
Other protection	± 15%	± 20%

POWER QUALITY

Measurement

When it comes to energy monitoring, even a small percentage of measurement errors can lead to significant financial losses. Therefore, measurement accuracy is paramount.

Measuring digital upgrade

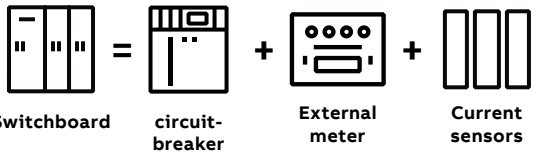
The "measuring" digital upgrade enhances the Ekip Aware trip unit by providing the integration of additional measurements such as voltage, frequency, power and energy. Users can display instantaneous measurements and counter in various ways:

- Ekip Aware HMI display
- EPiC mobile app, connected via Bluetooth Low Energy (BLE) or USB-C cable.
- Ekip Connect software
- Supervisory system (i.e. SCADA) using multiple communication protocols.
- Lite Panel Pro display

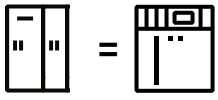
Accuracy class

The SACE Emax 3 family of circuit breakers are equipped with internal Rogowski coils, ensuring Class 2 accuracy by default for active power and energy measurements according to the IEC 61557-12 standard. For those requiring higher accuracy measurements, Emax 3 can be configured from with factory with Class 1 or 0.5 accuracy in compliance with IEC 61557-12 standard. When used as a EPMF-DD power meter device as defined in IEC61557-12, the Emax 3 eliminates the need for additional devices, sensors/CT's, resulting in cost savings, reduced space requirements, and optimized installation. The declared accuracy is the accuracy of Emax 3 is that of the complete measuring system as shown below.

From



To



POWER QUALITY

The following table summarizes:
- Which measurement function are included by default and which are included with measuring digital upgrade
- Precision for each measurements depending on class accuracy chosen, following IEC 61557-12.

Instantaneous measurements	**Unit**	**Parameters**	**Digital upgrade needed**	**Class 2 - default**	**Class 1 - optional (1)**	**Class 0.5 - optional (1)**
Currents (RMS)	[A]	L1, L2, L3, Ne	/	2%	0.5%	0.5%
Earth fault current (RMS)	[A]	Ig	/	2%	2%	2%
Phase-to-phase voltage (RMS)	[V]	U12, U23, U31	Measuring	1%	0.5%	0.2%
Phase-neutral voltage (RMS)	[V]	U1, U2, U3	Measuring	1%	0.5%	0.5%
Phase sequence			Measuring			
Frequency	[Hz]	f	Measuring	0.2%	0.1%	0.1%
Active power	[kW]	P1, P2, P3, Ptot	Measuring	2%	1%	0.5%
Reactive power	[kVAR]	Q1, Q2, Q3, Qtot	Measuring	3%	2%	1%
Apparent power	[KVA]	S1, S2, S3, Stot	Measuring	2%	1%	0.5%
Power factor		total	Measuring	2%	1%	0.5%
Peak factor		L1, L2, L3, Ne	Measuring			
Current THD		THD for (V12, V23, V31, V1N, V2N, V3N) VTHDavg, VTHDavgmax	Measuring	3%	2%	1%
Voltage THD		THD (I1, I2, I3, IN) ITHDavg, ITHDavgMAX	Measuring	3%	2%	1%
Current TDD		TDD, TDD for (I1, I2, I3)	Measuring			

1) Supplied with the circuit-breaker only. Not available in case of 4 poles circuit breaker with neutral on right side; not available for application below 400 V; not available when circuit breaker is equipped with external voltage cables; not available for Iu < 250 A. Measuring digital upgrade mandatory for class 1 and class 0.5 upgrade

Counters recorded from installation or from the last reset	**Unit**	**Parameters**	**Digital upgrade needed**	**Class 2 - default**	**Precision (Class 1) (1)**	**Precision (Class 0.5) (1)**
Active energy	[kWh]	Ep total, Ep positive, Ep negative	Measuring	2%	1%	0.5%
Reactive energy	[kVARh]	Eq total, Ep positive, Ep negative	Measuring	3%	2%	2%
Apparent energy	[KVAh]	Es total	Measuring	2%	1%	0.5%

1) Supplied with the circuit-breaker only. Not available in case of 4 poles circuit breaker with neutral on right side; not available for application below 400 V; not available when circuit breaker is equipped with external voltage cables; not available for Iu < 250 A. Measuring digital upgrade mandatory for class 1 and class 0.5 upgrade

Record of values: of the parameter for each interval with time-stamping	**Unit**	**Parameters**	**Digital upgrade needed**	**Window**	**Intervals**	**Where**
Current: minimum and maximum	[A]	I Min, I Max	Measuring	Fixed synchronizable by remote	Duration: 5...120min Number of intervals: 24	EPiC, Ekip Connect, SCADA through communication protocols
Phase-phase voltage: minimum and maximum	[V]	U Min, U max				
Active power: average and maximum	[kW]	P Avg, P Max				
Reactive power: average and maximum	[kVAR]	Q Avg, Q Max				
Apparent power: average and maximum	[KVA]	S Avg, S Max				

POWER QUALITY

Network Analyzer

The Network Analyzer provides a means of diagnostics by analyzing the electrical characteristics of the system, based on harmonics and voltage and frequency fluctuations and imbalance without the need of external instrumentation. Effective preventative and corrective action can be implemented through accurate analysis, thereby improving the efficiency of the system.

Applications

Electrical equipment is designed for use under optimum operation and uniform or balanced voltage levels. Power Quality is the description of how well a power system complies with ideal conditions. Power quality issues can have negative consequences on the efficiency of systems and components. Monitoring the power quality of a system is more important than ever in order to achieve optimal system efficiency.

In particular, power quality analysis includes the following aspects:

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

POWER QUALITY

Network Analyzer

The first step toward better power quality: Measurement

A power quality monitor is the most commonly used tool for detecting voltage sags and power quality issues. Measurement is the first step in checking the status of the installation and starting the root cause analysis. Power quality measurements and related instrumentation are described in specific industrial standards such as IEC61000-4-30. With the Ekip Aware trip unit for Emax 3, the power quality monitor is embedded in a low-voltage air circuit-breaker. The Network Analyzer function of Emax 3 complies with the IEC61000-4-30 Class S standard for the calculation of voltage imbalances, overvoltages, and sags. **The measuring digital upgrade is needed in order to install the network analyzer.**

The Network Analyzer has the ability to monitor and signal three kinds of sag classes which can be defined by the user:

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

In addition, for the last 50 voltage events, a table with voltage, duration and time stamp is available and can be downloaded from Ekip Connect 3.
Two different types of counters for each power quality monitoring function are available directly on the trip unit touch screen. One is a cumulative counter, which stores all the alarms (for example, all the voltage sags) from the beginning, and one is a 24-hour counter, that shows the alarms in the last 24 hours.
With the optional communication module (Modbus, Profibus, Profinet, etc.) eight counters for each power quality monitoring function are available. One is the cumulative and the other seven are the daily counters of the last seven days of activity.
The harmonic content of voltages and currents, measured to the 50th harmonic and voltage unbalance data are available with the Network Analyzer digital upgrade. The following table summarize the parameters monitored by the Network Analyzer.

Network Analyzer		Parameters	Intervals
Hourly average voltage value	[V] [no]	- Umin= 0.75…0.95 x Un	t = 5…120min
		- 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	t <20ms
		- 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	t <20ms
		- 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	t = 0.02s...60s
		- 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 unbalance	[V] [no]	- U neg. seq.= 0.02…0.10 x Un	t = 5…120min
		- 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	

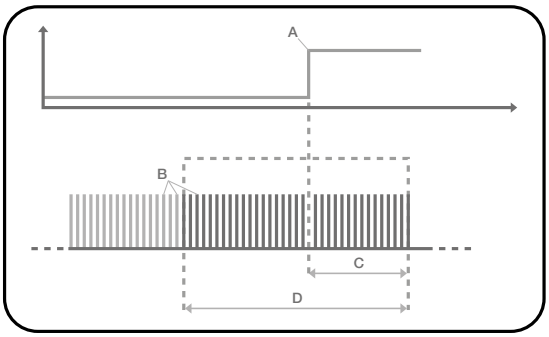
POWER QUALITY

Data Logger and Data Logger Pro

The Data Logger function allows for data associated with a trigger event (i.e. trip event) to be recorded and stored within the trip unit of the circuit breaker. A user can then analyze the even in detail and investigate the root cause of the event to determine any potential issues with the system.

When the Data Logger is enabled and activated, Ekip Aware will continuously acquire data by filling and emptying an internal buffer (B). If a trigger event (A) occurs, Ekip Aware will then collect the data up until the event occurs or by a user defined time delay (C) and stores all the data of the window (D), which can then be download to a PC for analysis. The recording duration (D) depends on the sample frequency.

Two Data Loggers are available and can work independently. One event trigger can be selected on the Data Logger Pro and a different trigger on the standard Data Logger. The Data Logger is included as standard with Ekip Aware while the optional Data Logger Pro is available configured or by digital upgrade. For Data Logger Pro an SD card must be purchased separately from a 3rd party.



Data can be displayed in two methods:
- EPiC mobile app via Bluetooth or USB-C on mobile device
- Ekip Connect 3 software on PC.

	Data Logger	**Data Logger Pro**
Digital upgrade needed	No	Data Logger Pro
Hardware needed	No	• Ekip supply Lite or Ekip Supply Evo Modbus TCP • SD card
Number of registers recorded	• 8 • 16 • 32	• 8 • 16 • 32 • 64
Recording Duration (D)/ Sampling frequency	With 32 registers: • 3,4 s/1200 Hz • 1,7 s/2400 Hz • 850 ms/4800 Hz • 424 ms/9600 Hz With 16 registers: duration is the double	D limited by memory up to 256 gb (SD card) • 1200 Hz • 2400 Hz • 4800 Hz • 9600 Hz
Recorded Electrical parameters	• V (line) (1) • I (phase) • Digital Events (protection events or alarms, circuit-breaker status signals, protection trips)	• V (line- to-line) (1) • I (phase) • Digital Events (protection events or alarms, circuit-breaker status signals, protection trips) • Temperature (2)
Trigger	• Trip • Alarm (limited) • Status (limited)	• Trip • Alarm • Status • Warning • Programmable Status • Manual • Multitrigger function
N° of buffers	1	2 (1 Data Logger + 1 Data Logger Pro)
Supply mode	Self/auxiliary	Auxiliary
File extension	.abb/.COMTRADE (Ekip Connect 3 conversion)	.abb/.COMTRADE (Ekip Connect 3 conversion)

1) Measuring digital upgrade needed
2) Temperature sensors needed

CONNECTIVITY

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Recognizing the need for adaptability in an era of rapidly increasing connected devices, Emax 3 and Ekip Aware features an optimized communication architecture that meets modern application requirements for flexibility and reliability.



CONNECTIVITY

Architecture

Emax 3 circuit breakers are designed to seamlessly integrate into various automation, building, and energy management systems. By supporting a wide range of communication protocols such as Modbus RTU, Profibus, Modbus TCP, Profinet, EtherNet/IP(TM) and IEC 61850, Emax 3 can help ensure efficient and reliable connectivity.

Emax 3's communication architecture integrates both hardware and software components to ensure robust performance. A version of Ekip Supply is required when a communication or signaling module is present. Two version of Ekip Supply are available:

- Ekip Supply Lite
- Ekip Supply Evo Modbus TCP

Note: Ekip Supply Evo Modbus TCP is required when protocols IEC 61850, Profinet, EtherNet/IP(TM) are used.

Refer to module compatibility table below for more details.



Compatible with

Ekip Supply EVO Modbus TCP												
10K	6F-1-2	Modbus RTU	Profibus	2K 1-2	RELT	4T-1-2	Synchro-check	Profinet	External Cartridge	IEC 61850	Com Link	Modbus TCP Security Protocol

Compatible with

Ekip Supply Lite						
Modbus RTU	6F-1-2	Profibus	2K 1-2	RELT	4T-1-2	Synchro-check

Ekip Supply Evo Modbus TCP enables the circuit breaker to communicate using Modbus TCP protocol and facilitates daisy chain connections for streamlined networking. Com Link is an upgrade of the circuit-breaker, enabling an exclusive ABB proprietary bus that serves as the communication backbone between circuit-breakers.
As the communication layer, Com Link enables the execution of custom logic within the system. Furthermore, it provides the capability to program digital logic selectivity and interlock, leveraging the robust Link network. This feature-rich communication solution is designed to enhance the functionality and performance of power systems.
Modbus TCP Security Protocol is an upgrade that must be specified at the time of ordering the circuit-breaker. When configured with Ekip Supply Evo Modbus TCP, it enhances security in communications, following the Modbus Security Protocol Specification. Com Link and Modbus TCP Secure are circuit breakers features that require Ekip Supply Evo Modbus TCP in order to run.

The Ekip Signaling system enables the ability to program custom functions through inputs from the Ekip Signaling modules. Employing digital input/output and temperature sensors, the circuit-breaker is aware of what is happening in the environment. This adaptability allows for seamless adjustment to varying grid conditions, establishing Ekip Signaling as a flexible and reliable choice for low-voltage distribution system management.
Ordering codes are conveniently located in a dedicated section of the catalog for easy reference (Chapter 8).
The external cartridge is designed for exclusive connection to the embedded cartridge in the circuit-breaker through the Ekip Supply Evo Modbus TCP. For the external cartridge, the Ekip Supply Lite is the only permitted supply unit.

CONNECTIVITY

Communication protocols

Ethernet communication

Modbus TCP

The Ekip Supply Evo Modbus TCP facilitates communication over the Modbus network for the circuit-breaker. The Modbus connection enables monitoring of the breaker's status, collection of operational data and parameter setting via the Ekip Connect configuration software.

The Ekip Supply Evo Modbus TCP module is essential hardware for Modbus communication. It can be easily integrated into the circuit-breaker's terminal box and Ekip Cartridge. This module is equipped with an RJ45 port and a 2-wire Ethernet port (100 base T1).



The module's architecture allows for the creation of a Modbus daisy chain connection among various devices.

IEC 61850

IEC 61850 defines a common communication protocol for intelligent electronic devices (IEDs) in substations.

In adhering to this standard, Emax 3 can seamlessly communicate with other IEDs, such as protection relays, meters and SCADA systems.

This simplifies system integration, reduces custom development effort, and ensures consistent data exchange across various vendors' equipment.

With Ekip COM IEC 61850 GOOSE, Process Bus and .COMTRADE file transmission are available on Emax 3.

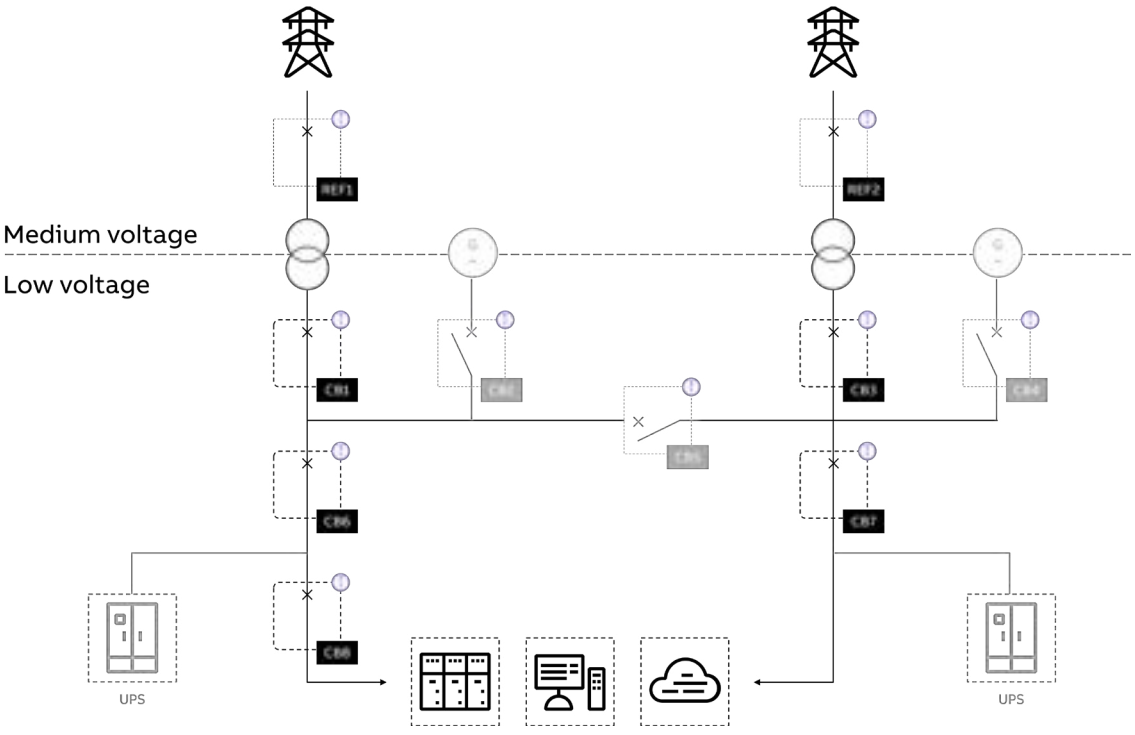
PRP and HSR redundancy are also supported by the Ekip COM IEC 61850.



Emax 3 supports Generic Object-Oriented Substation Event (GOOSE) messaging, enabling fast tripping and isolation of faulty sections, thus minimizing damage and improving personnel safety. With GOOSE messages, it is possible to implement interlock and selectivity logic without the need for a SCADA system. Here are the key applications:

- **LV Selectivity (CB1...CB7):** Low-voltage selectivity among circuit-breakers (from CB1 to CB7) ensures that only the breaker closest to the fault trips, minimizing service disruption.
- **LV-MV Interlock (REF1-CB1; REF2-CB3):** The interlock between low voltage (LV) and medium voltage (MV) devices prevents hazardous operations and ensures coordination between the devices.
- **Communication between LV and MV:** IEC 61850, widely used in MV systems, facilitates communication between LV and MV equipment.
- **Control LV and MV equipment with a single SCADA:** Both LV and MV equipment can be managed with a single SCADA system, eliminating the need for additional hardware.
- **Remote control of the CBs:** Circuit-breakers can be remotely controlled, enhancing the flexibility and responsiveness of the system.
- **Selectivity integration with MV:** Selectivity is integrated with the MV system for optimal protection.
- **Integration with external PLCs:** Integration with an external programmable logic controller (PLC) allows for greater customization and control of the system.

These points highlight the versatility and efficiency of advanced communication systems in managing and protecting electrical infrastructures.



CONNECTIVITY

Communication protocols

In the context of substations and distribution systems, the use of sampled values (SV IEC 61850-9-2) messages proves to be an efficient method for exchanging sampled data between intelligent electronic devices.
Regarding network resilience, the Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR) play pivotal roles in ensuring communication reliability, especially in critical infrastructures like substations.
Redundancy can be implemented using the RJ45 ports of the Ekip COM IEC 61850 and Ekip Supply Evo Modbus TCP, providing a redundant communication path to prevent single points of failure.

Profinet
The Emax 3 Ekip Com Profinet Module is a Profinet-compatible communication module for the Emax 3 circuit-breaker series. It enables real-time data exchange for energy distribution management in industrial settings, enhancing operational efficiency and productivity.
The Emax 3 Ekip Com Profinet Module supports both cyclical and acyclical communication, catering to diverse industrial automation needs. Cyclical communication allows for regular data exchange at fixed intervals, ensuring consistent monitoring and control. Acyclical communication, on the other hand, is event-driven and allows for data transfer as needed, providing flexibility in managing critical events or specific tasks.
In addition, the module supports S2 redundancy, a Profinet feature that ensures uninterrupted operation, even in the event of a network failure. This redundancy feature enhances the reliability and robustness of the system, making the Emax 3 Ekip Com Profinet Module an ideal choice for demanding industrial environments.



Ethernet IP
The Ekip Com Ethernet/IP Module is an Ethernet/IP-compatible communication module designed for the Emax 3 circuit-breaker series. It facilitates real-time data exchange for energy distribution management in industrial automation systems, thereby enhancing operational efficiency and productivity.



Fieldbus communication

Modbus RTU

The Modbus RTU communication module in Emax 3 circuit-breakers offers several advantages. Modbus RTU is a well-established, widely accepted protocol for industrial communication, known for its simplicity and reliability. By integrating Modbus RTU, Emax 3 circuit-breakers can seamlessly communicate with other industrial electronic devices, making them an integral part of any building management system (BMS) or industrial automation system (IAS). This allows for real-time monitoring and control of the circuit-breakers, enhancing operational efficiency and safety. The Ekip Com Modbus RTU and Profibus-DP contain a terminating resistor and dip switch for optional activation to terminate the serial network or bus.



Profibus

The Profibus communication module in Emax 3 provides a robust and versatile solution for fieldbus communication in various industrial environments. Profibus is a widely accepted protocol for fieldbus communication in automation technology, used to operate sensors and actuators via a centralized controller. With Profibus integration, Emax 3 circuit-breakers can be easily monitored and controlled via a process control system, improving the overall efficiency and safety of industrial processes. This makes Emax 3 a reliable choice for various industrial applications. The Ekip Com Profibus-DP module contain a terminating resistor and dip switch for optional activation to terminate the serial network or bus. It also contains a polarization resistor and dip switch for its activation.



POWER MANAGEMENT

The importance of power management in electrical installation

Power management is an essential aspect that involves not only the protection of the electrical system but also the optimization of power usage, the prevention of power interruptions and longevity of your electrical system. It's a key component of modern electrical systems and plays a crucial role in the efficient operation of any facility.
Effective power management ensures that electricity is distributed evenly and safely, preventing potential issues such as overloads or power surges. These can cause significant damage to both the electrical installation and the devices connected to it. Moreover, efficient power management contributes to energy conservation, leading to cost savings and a reduced environmental impact.
Therefore, power management is not just crucial, but indispensable in electrical installations, ensuring their optimal performance and durability.



Emax 3 contributes to improving power management in the system, capitalizing on the smart capabilities of the Ekip Aware trip unit:

- **Custom logic** software, a brand-new functionality available only on Emax 3, ensures the creation of embedded logics inside the circuit-breaker that becomes able to control loads and power sources. Integrated automatic transfer switch solutions are available.
- **Power Controller** software optimizes power management by reducing peak loads and shifting loads. It operates based on a patented algorithm that allows control of a list of loads where users can set the priority for load management. The algorithm is configured based on an average power consumption over a specified time interval. If the power consumption exceeds the set limit, the Power Controller intervenes to bring it back within the boundaries.
- **Load shedding** features prioritize certain loads over others, prioritizing power to essential machinery over less critical systems. This level of control can help to prevent interruptions in the event of a power surge or drop in the power supply.

POWER MANAGEMENT

Custom Logic

Purpose

It is an innovative tool within the Ekip Connect 3 software, designed to enable users to create custom logics for a wide range of applications. This tool simplifies the process of creating connections and logics with devices, significantly reducing the time spent on complex programming and extra wiring and eliminating the need for external controllers.

The Custom Logic tool features an intuitive graphical interface, making programming much simpler compared to traditional programmable logic controllers (PLCs). The tool is always accessible within the Ekip Connect 3 software. To transfer a logic to a device, a Digital upgrade must be purchased for each device, either from the factory or through the ABB Ability™ Marketplace (1SDA126527R1).

Features

Key features of the Custom Logic functionality include:

- **Convenient programming:** The tool does not require a physical connection to circuit-breakers during the programming of the logic in Ekip Connect. This ensures the comfort and safety of the operator by allowing logic configuration without needing a direct connection to the device. A connection tool-device is required when transferring logic from Ekip Connect to Emax 3 to enable the execution of the logic.
- **Graphical User Interface:** The intuitive interface through the Ekip Connect 3 software tool makes it user-friendly. Unlike traditional programmable logic controllers that require high engineering skills, a block-based approach, guides users in employing the available inputs on the device and combining them with the available operators.
- **Ready-to-go solutions available:** ABB provides ready-to-go solutions with pre-tested templates inside Custom logic Library. These plug-and-play templates are programmed and tested by ABB, allowing users to deploy applications quickly without extensive customization, saving time in programming.
- **Bill of materials generation:** The tool provides the necessary product configuration for each device to implement the programmed logic.
- **Validation and testing:** The tool checks the accuracy of the connections within the logic and allows users to monitor the behavior of inputs and outputs at the tool level.



POWER MANAGEMENT

Custom Logic

Usage

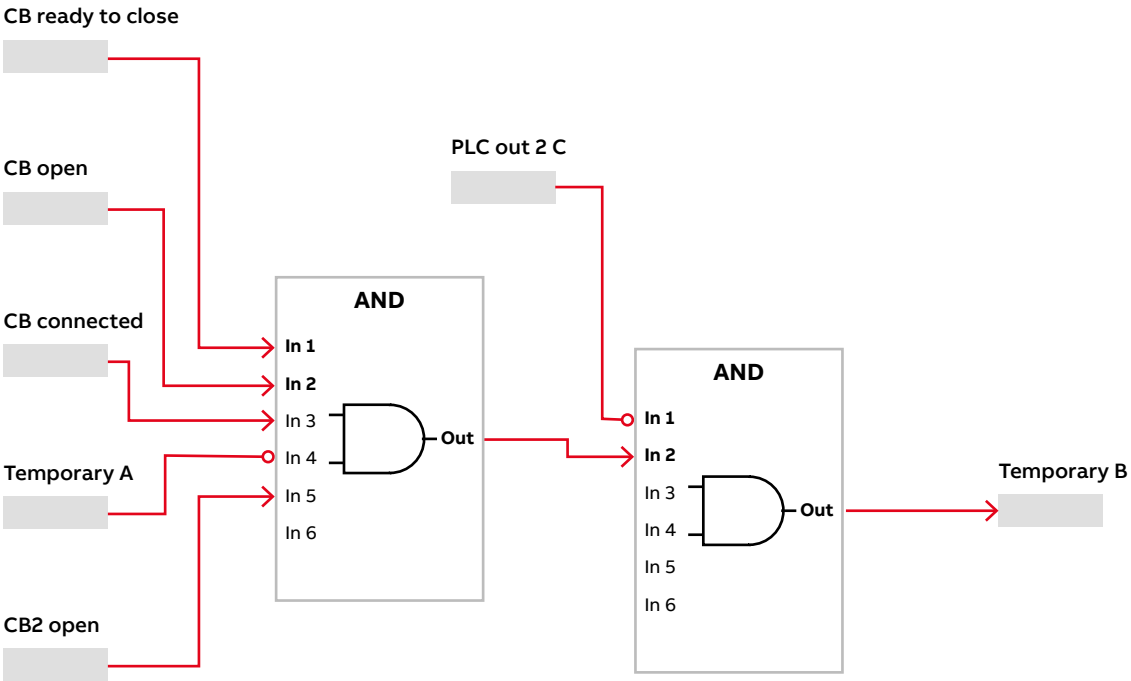
ABB custom logic software offers three different approaches:

- **Ready-to-go solutions:** These templates come with ABB preset configurations that significantly reduce the time and effort required. They are available inside the tool in Ekip Connect, in the Custom Logic Library section.
- **Customization of Ready to go solutions:** These solutions offer a degree of customizability, despite being pre-programmed, allowing users to modify the logic template to fit specific needs.
- **Design from scratch:** Custom logics offer the ability to design a full solution from scratch, leveraging the powerful electronics of Emax 3. This option enables the highest flexibility of logic design, giving users complete control over the configuration.

The Custom Logic Library, accessible to all users, provides a variety of solutions tailored to meet specific requirements:

- **Main Gen -Open Transition:** Perfect for scenarios requiring an open transition between the main power source and the generator (or Main).
- **Main Gen -Close Transition:** Designed for situations that need a close transition between the main power source and the generator (or Main).

For more information about ABB's innovative solution, please refer to the Custom Logic user guide.



POWER MANAGEMENT

Power Controller

Benefits

Emax 3 equipped with a Power Controller offers several key advantages:

- **Energy Savings:** By disconnecting loads from the power supply for brief periods and in a prioritized order, the Power Controller helps limit peak power consumption. This allows for renegotiation of the contract with the energy provider, leading to a decrease in allocated power and a consequent reduction in overall energy costs.
- **Controlled Power Consumption:** The Power Controller can manage up to four different time bands, enabling it to adhere to a specific power limit during peak (day) and off-peak (night) hours. This helps to control consumption during the day when rates are typically higher.
- **Integrated Logic:** The Power Controller enables efficient management of the installation with a straightforward architecture. It measures the total power of the installation without the need to measure the power consumed by each individual load, thereby minimizing installation costs and time. The logic is already implemented in the protection unit and is ready for use.
- **Load Curve Optimization:** The Power Controller aids in flattening the load curve, promoting the use of base- load power plants with higher efficiency than peaking power plants.
- **Integrated Communication Modules:** The Power Controller can receive the maximum absorbable power directly from the medium voltage control system, determining consumption for the next 15 minutes. Based on the information received, it manages the disconnection of non-priority loads or the activation of reserve generators. Non-programmable preferred energy sources, such as wind and solar, are given maximum priority and are considered uninterruptable.
- **Cogeneration System Advantage:** The Power Controller controls the total consumption drawn from the electrical network, interrupting non-essential loads when production is reduced and reconnecting them when generator power is sufficient to not exceed limits. This leads to multiple advantages: reduction in energy costs, maximum use of local production and greater overall energy efficiency.

POWER MANAGEMENT

Load Shedding

Purpose

The Emax 3 circuit-breaker, integrates algorithms to safeguard microgrids and manage their resources, maximizing the efficiency. It embeds patented functions based on load shedding, which reduces microgrid stress in all situations.

A typical application scenario is one in which Emax 3 is the main circuit-breaker for the low voltage microgrid located at the interface point with the medium voltage grid, able to control the plant in every circumstance.

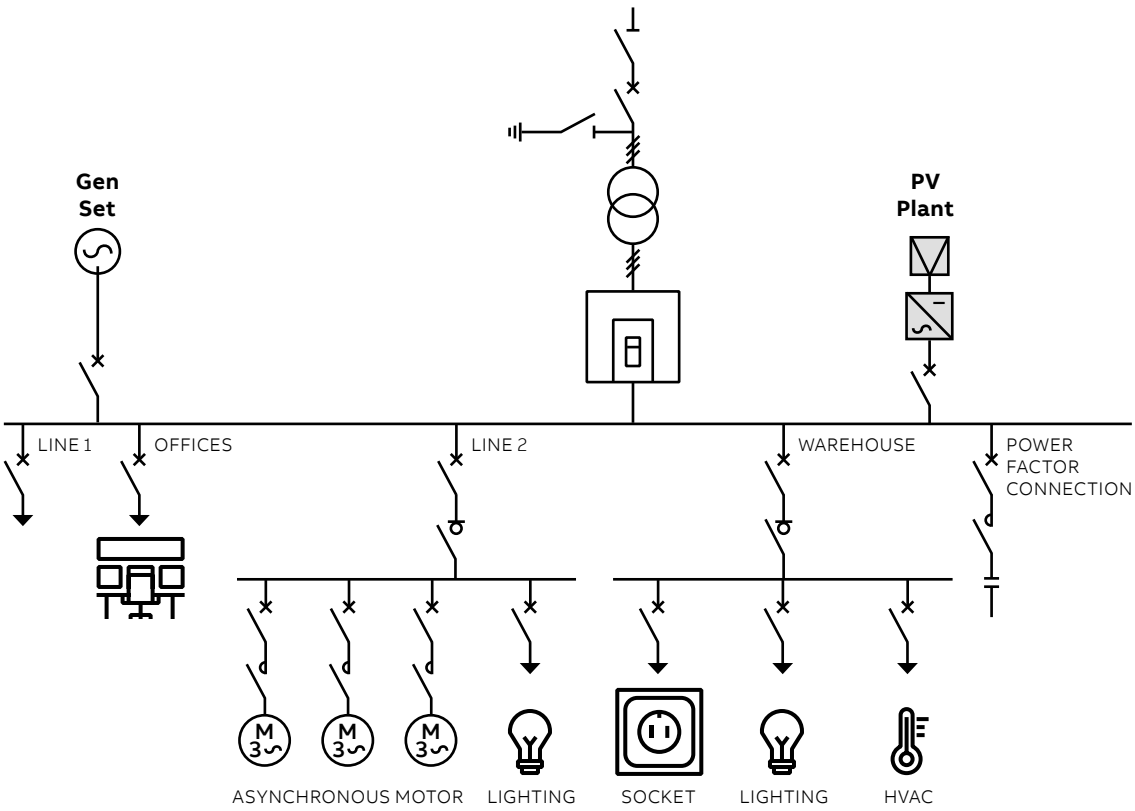
After the Emax 3 circuit-breaker opens, because of interface protection systems intervention or external command, the microgrid should transit from on-grid to off-grid state. When it is standalone, the power absorption from the main grid ceases so that the microgrid load continue to be supplied by the local generation, like diesel genset or energy storage systems.

During the islanding transition, it is very important to avoid the frequency drop; otherwise, the generation protections could trip, jeopardizing the microgrid's stability with consequently a long downtime.

Emax 3, employing embedded voltage 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 microgrid disconnection events and shed a group of low-priority loads, ensuring a fast response and power balance.
- **Adaptive Load Shedding:** The advanced algorithm available with Emax 3 as an enhancement of the basic version. The intelligent software embedded in the circuit-breaker very quickly sheds low-priority loads according to the microgrid power consumption and frequency measurements.

While Basic Load Shedding is available by default, Adaptive Load Shedding requires an additional digital upgrade.



POWER MANAGEMENT

Load Shedding

Benefits

- **Service Continuity:**
  When a plant remains disconnected from the utility grid, even with active local production, there is a significant stress that turns off all the generators with consequent blackout. Thanks to its load shedding function, Emax 3 not only improves the service continuity but also enhances the lifetime of the spinning generators.
- **Space Optimization:**
  Neither PLC nor external relays are needed as Emax 3 has embedded the intelligence to realize the load shedding logic, taking advantage of the internal current and voltage sensors for electrical parameter measurements.
- **Ease of Use:**
  Load-shedding logics are generally set with high engineering skills and customization effort with such devices as programmable logic controllers. Emax 3 ensures ease of use, with predefined templates and the user-friendly graphic interface in Ekip Connect.

ASSET MANAGEMENT

Enabling Asset Management Through Embedded Intelligence

True asset management becomes possible only when the Emax 3 circuit breaker is equipped with intelligent accessories, such as embedded sensors and temperature monitoring systems. These integrated components are essential for capturing real-time operational data, enabling the breaker to continuously assess its own condition and monitor the overall health of the switchgear. As a result, the Emax 3 can detect anomalies and highlight areas where performance may be compromised. With built-in diagnostic capabilities, the breaker evolves from a passive component into an active contributor to system reliability, enabling predictive maintenance and reducing the risk of unexpected failures.



Advanced Monitoring with Sense Accessories

Sense accessories retain all the core functionalities of standard accessories, but they go a step further by integrating advanced monitoring and communication capabilities. Specifically:

- They can track a range of operational parameters—such as the number of operations, power consumption—providing continuous feedback on their status directly to Ekip Aware.
- They can be remotely controlled through a variety of communication protocols without the need for any other additional device

Monitoring the parameters of sense coils is especially critical. These coils are responsible for key actuation functions—such as opening, closing, and undervoltage release—and their performance directly impacts the reliability and responsiveness of the circuit breaker.

In addition to real-time monitoring, two key indicators provide deeper insights into the condition of these components:

- **Health Index:** This metric reflects the current health status of the accessory, offering a clear and immediate understanding of its operational integrity in percentage.
- **Estimated End of Life:** This predictive indicator estimates the remaining useful life of components such as coils and motors. It is calculated based on the number of operations and operating temperature—two factors that significantly influence the aging and degradation of electrical components.

Together, these indicators empower users with actionable intelligence, enabling a shift from reactive to predictive maintenance strategies and ensuring long-term system reliability.



Thermal monitoring

Thermal issues are among the most prevalent and underestimated threats to low-voltage switchgear. Excessive heat often serves as an early indicator of underlying problems, which can range from loose or faulty connections and deteriorating insulation to equipment wear. If left unaddressed, these issues can lead to unplanned downtime and, in extreme cases, severe failures that jeopardize operational continuity.

While thermographic inspections have long been employed to identify such anomalies, they come with inherent drawbacks, providing only limited, periodic snapshots of equipment conditions. As electrical systems become increasingly complex and operational uptime grows more critical, continuous monitoring offers real-time, proactive detection of overheating, enabling early intervention before failures occur.

The Emax 3 circuit breaker supports continuous thermal monitoring at two levels of the asset:

- **Switchgear-Level Monitoring:**
  - T-Sense Ambient
  - T-Sense Busbars
  - Ekip Temperature 4T
- **Device-Level Monitoring:**
  - Internal Temperature Sensors

In particular:

- **T-Sense Ambient** is a wireless sensor typically installed in the upper and lower sections of the switchgear to monitor heat dissipation over time. It can also be placed inside auxiliary cubicles (e.g., aux cubicle) to monitor internal ambient temperature conditions.
- **T-Sense Busbars** is a wireless sensor typically mounted at critical junctions, such as HR–VR busbar joints, breaker terminal–busbar joints etc
  Both T-Sense Ambient and T-Sense Busbars communicate directly with Emax 3 via a **Bluetooth Low Energy (BLE) mesh network.** This setup creates a scalable, robust wireless communication infrastructure without the need for external concentrators.
- **Ekip Temperature 4T with PT100/PT1000 Probes** are typically installed at high-risk junctions (e.g., HR–VR busbar joints, breaker terminal–busbar joints) and provide cabled temperature measurements, offering an effective alternative where wireless solutions are not ideal.
- With the **Internal Temperature Control** solution, **internal temperature sensors** continuously monitor the Emax 3's internal heat levels. When abnormal conditions are detected, the system can automatically trigger self-protection actions, such as opening the breaker to prevent damage. Additionally, a pre-alarm function enables early detection of rising temperatures, allowing preventive measures, like activating cooling fans, to be taken before critical thresholds are reached. Internal Temperature Control is not available with the Neutral on the right-side configuration.

Asset management strategies

The breaker asset comprises several key components that are critical for its functionality:

- Internal Circuit Breaker Temperature
- Internal Trip Unit Temperature
- Current Sensors
- Opening, Closing, and Undervoltage Coils
- Ekip Modules

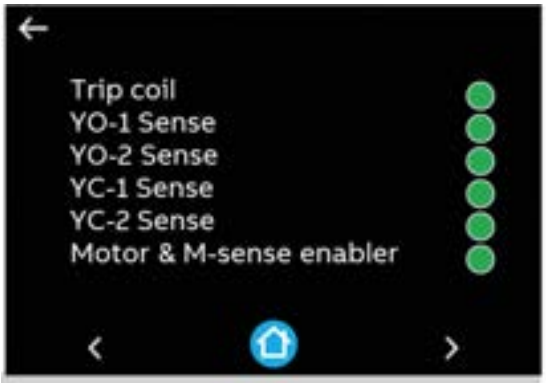
These components play a vital role in enhancing the functionality of the circuit breaker, providing users with the necessary information for optimal operation and maintenance.

ASSET MANAGEMENT

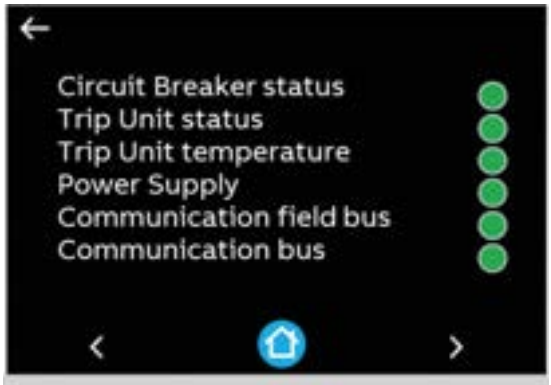
Condition based monitoring

Thanks to embedded sensors and intelligence, Emax 3 incorporates a comprehensive condition-based monitoring system that continuously oversees critical areas to ensure optimal performance and safety. This monitoring is seamlessly integrated into the HMI, Ekip Connect, and Epic interfaces, providing real-time insights into the following areas:

- **Poles and Power Terminals:** the temperature monitoring ensures secure and efficient electrical connections.
- **Mechanism:** Evaluating the functionality of the circuit breaker's mechanism, including the switching time.
- **Coils:** Inspecting the winding and performance of the coils every 30 s.
- **Current Sensors:** Verifying that the current sensors are consistently and correctly connected.
- **Ekip Modules:** Monitoring the status of various Ekip modules to ensure proper communication with the trip unit.
- **Trip Unit:** Assessing the functionality and temperature of the trip unit.
- **Circuit Breaker Status:** Providing a comprehensive overview of the circuit breaker to ensure that its status is accurately recorded by the trip unit.



Sense accessories & trip coil



Trip Unit, Communication Modules, Supply, Breaker status

Each of these areas contains multiple indicators displayed through the HMI. A green dot signifies that everything is functioning well, while an orange or red dot indicates an alarm or warning, prompting users to check their system. In such cases, a "System check" will appear on the HMI, alerting operators to potential issues.

The purpose of these monitoring pages is to provide early detection of potential failures, allowing for timely intervention before a functional failure occurs, thereby enhancing system reliability and safety.

Additionally, Ekip Connect will integrate troubleshooting features within these monitoring pages, enabling customers to understand how to correctly address specific situations effectively. The purpose of these monitoring pages is to provide early detection of potential failures, allowing for timely intervention before a functional failure occurs, thereby enhancing system reliability and safety.

Advanced Predictive Maintenance on premise

Emax 3 is equipped with a cutting-edge predictive maintenance algorithm that transforms traditional maintenance strategies into a proactive, data-driven process. This innovation is powered by an embedded algorithm located directly within the trip unit—no cloud connection is required.

The embedded algorithm uses all the real-time data and data inputted by the user to calculate the optimal next maintenance date, which is clearly displayed on the HMI, Ekip Connect, Epic or accessible via local communication protocols.

In addition to displaying the next scheduled maintenance date, the system also provides a Health Index, expressed as a percentage. This index is calculated by the same embedded algorithm and reflects the current health status of the circuit breaker. A higher percentage indicates better operational condition.

The operational and environmental parameters that directly impact the health and longevity of the circuit breaker include:

Utilization condition

- **Internal Temperature:** Measured via internal temperature sensors, this is a critical indicator of thermal stress and aging. While ordering predictive maintenance on premise functionality, internal temperature sensors are automatically installed.
- **Contact Wear:** Tracks the degradation of contact surfaces due to arcing and mechanical operations.
- **Actual Load Current:** Monitors real-time current flow to assess thermal loading and stress.
- Number of Operations: counts mechanical open/close cycles

Environmental Conditions

- **Ambient Temperature:** High or fluctuating temperatures can accelerate material aging. The temperature can be dynamically inputted in the algorithm if the Ekip Temperature 4T-1 is installed
- **Humidity Levels:** Excess moisture can lead to corrosion and insulation breakdown. Humidity can be dynamically inputted in the algorithm if the Ekip Temperature 4T-1 is installed
- **Vibration Exposure:** Mechanical vibrations may loosen connections or damage internal components. Vibration can be dynamically inputted in the algorithm if the Ekip Temperature 4T-1 is installed
- **Corrosive Atmosphere:** Presence of chemicals or gases that can degrade metallic and insulating parts.
- **Dust Concentration:** Accumulated dust can impair insulation and cooling, increasing the risk of faults.

The next maintenance date and the health index of the device ensures the equipment operates efficiently and safely, preventing unexpected breakdowns that could lead to costly downtime and repairs. Additionally, it helps in planning and allocating resources effectively, minimizing disruptions to operations.





ASSET MANAGEMENT

Whenever maintenance is conducted on the circuit breaker, the user must document that the maintenance has been completed in Ekip Connect. The algorithm will then update the date for the next maintenance. This next maintenance date encompasses both the first and second levels of maintenance in a single schedule. Detailed operations for these maintenance levels are outlined in the manual. Please note that these values are the result of an algorithmic estimation based on a mathematical model. While it is designed to provide a reliable indication of the circuit breaker's condition, it may not always reflect the exact real-world status. Therefore, the Predictive maintenance feature should be used as a supporting tool and not as the sole basis for critical maintenance decisions.

Advanced Predictive Maintenance on premise is not available with the Neutral on the right-side configuration.

CYBERSECURITY

Safeguard your assets

In an age where cyber threats are a growing concern, the Emax 3 air circuit breakers have been meticulously designed to offer robust cybersecurity features, ensuring the safety and integrity of electrical distribution systems.

Emax 3 with Ekip Aware provides two distinct offerings: a standard configuration that includes essential cybersecurity features, and an advanced IEC 62443-4-2 SL2 configuration that incorporates enhanced security measures for organizations with stringent cybersecurity requirements. This version can be selected during the purchase, by ordering the corresponding upgrade.

The standard offer of the Emax 3 includes a suite of cybersecurity functionalities that provide a solid foundation for protecting against potential threats. Key features include:

- **PIN Access:** A secure PIN is required to access and modify settings from the Human-Machine Interface (HMI), laptop, or mobile devices, ensuring that only authorized personnel can make changes.
- **Secure Firmware Update:** The firmware is digitally signed and includes anti-roll-back mechanisms, ensuring that only authorized updates can be applied.In case of a firmware upgrade, any device verifies the new firmware's digital signature before installing it, thus ensuring that original ABB firmware has been received and that no tampering has been carried out by an external attacker. Unverified firmware is discarded, preventing any insecure upgrade and keeping the system protected from potential vulnerabilities.
- **Secure Storage:** Device parameters are protected against tampering, enhancing the overall security of the circuit breaker.
- **Secure Communication:** The Emax 3 offer a dedicated communication protocol for Modbus TCP: Modbus TCP Security Protocol, that follows the Modbus Security Protocol Specification.
- **Bluetooth Low Energy (BLE)** communication is protected through PIN pairing, with any change in the HMI PIN resulting in the removal of all bonded devices.
- **Remote/Local Setting Optimization:** Each communication module can operate in local or remote mode independently, allowing for flexible configuration while maintaining security.

CYBERSECURITY

Safeguard your assets

The IEC 62443-4-2 SL2 upgrade, on the other hand, builds upon the standard features by incorporating additional security measures designed to mitigate more sophisticated cyber threats. This enhanced configuration includes:

- **Dedicated Communication and Signallling Modules Portfolio:** Ensures that the circuit breaker communicates only with original modules, supported by security artifacts that prevent unauthorized access. Note: These are the only modules that work with an IEC 62443-42 SL2 Emax 3. It is possible to find ordering codes in the accessories chapter.
- **Secure USB and BLE:** Communication via USB and BLE is restricted to original ABB tools, ensuring that only certified devices can interact with the Emax 3.
- **Role-Based Access Control:** ABB's account management system allows for role-based access, categorizing users into Owner, Admin, Engineer, Operator, and Viewer roles, thus controlling the level of access each user has. Each role has different permission in terms of viewing and modify parameters on the circuit breaker.

Both configurations of the Emax 3 air circuit breakers are designed to provide a high level of cybersecurity, catering to different organizational needs. The following table summarizes the features available in the standard offer and the IEC 62443-4-2 SL2 offer, highlighting the key cybersecurity capabilities of each configuration.

With Ekip Aware, users can have confidence in their power system's protection, knowing that they are equipped with top-of-the-line technology that prioritizes safety and security. This system not only offers robust protection against cyber threats but also ensures that daily operations are conducted efficiently and without interruptions, contributing to a safe and reliable operational environment. This upgrade is available to be purchased with circuit-breaker and it cannot be added aftersales.

Feature	Description	Emax 3 standard	Emax 3 IEC 62443
PIN	Pin to access and modify settings from HMI, Laptop and mobile	●	●
Secure Firmware Update	Digitally signed FW. Anti roll-back.	●	●
Secure Storage	Anti tampering of device parameters	●	●
Modbus TCP Security Protocol	Dedicated communication protocol (digital upgrade). This protocol follows the Modbus Security Protocol Specification.	●	●
Secure Communications - BLE	Pairing (HMI PIN-protected). A charge of HMI PIN will force the removal of all bonded devices. BLE Encryption.	●	●
Remote/Local setting optimized	Each communication module can be in local/remote mode independently from the other	●	●
Dedicated module portfolio	Ensure that circuit breaker communicate only with original modules thanks to security artifacts. Anti spoofing and tampering features.		●
Secure USB	Ensure that circuit breaker communicate only with original ABB tools thanks to security artifacts		●
Secure BLE	Ensure that circuit breaker communicate only with original ABB tools thanks to security artifacts		●
Role based access	ABB account management will allow role-based access (Owner, Admin, Engineer, Operator, Viewer)		●

04

ACCESSORIES

4/3 **Functional areas**

4/4 **Available accessories**

4/6 **Signalling & Input/Output**

4/10 **Control**

4/15 **Safety & IP Protection**

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4/37 **Measurements & Protection**

4/40 **Displaying**

4/41 **Miscellaneous**

4/42 **Service**


ABB
CLOSED
Push OFF
Push ON
CE

FUNCTIONAL AREAS

SACE Emax 3 circuit-breakers have been expertly engineered to optimize accessory installation and commissioning.

The following features make it possible:

- Two functional areas at the front of the breaker, protected by a cover:
  - **Accessorizing Area** provides easy access to the areas dedicated to electrical accessories. Upon removing the accessory cover, the operating mechanism area remains separated and isolated, ensuring operator safety.
  - **Safety area** effectively confines the stored energy mechanism to ensure safe maintenance. To perform maintenance on the operating mechanism, removing a metallic cover is necessary.
- Terminal Box, with two areas:
  - a housing for wiring terminals, and
  - a cartridge module area for the installation of Ekip modules.

These modules can be installed directly into the circuit-breaker or the fixed parts/cradles above.

This design significantly reduces the time and the effort needed for accessory installation and commissioning, optimizing the overall operation of the circuit-breaker.

AVAILABLE ACCESSORIES

SACE Emax 3 circuit-breakers are the solution for all circuit protection needs. A wide range of accessories is offered specifically designed to meet the unique application and installation requirements of every customer.

Our circuit-breakers have been engineered with the latest technology and are guaranteed to perform optimally throughout their lifespan.

STANDARD SUPPLY

	Automatic circuit-breaker		Switch-disconnector		Derived versions (2)		
		E2.3 E4.3		E2.3 E4.3	CS	MT	MTP
	E1.3	E6.3	E1.3	E6.3	E2.3 - E4.3 - E6.3		
Signalling & Input/Output							
Open/closed auxiliary contacts - AUX 4Q (400V)	F/MP	F/MP	-	-	-	-	-
TU Reset mechanical signalling of the tripping of protection trip unit - TU Reset	F/MP	F/MP	-	-	-	-	-
Contact signalling tripping of Ekip protection trip unit - S51 (250V)	F/MP	F/MP	-	-	-	-	-
3-pin terminal blocks	F/FP	F/FP	F/FP	F/FP	F/FP	F/FP	F/FP
Safety & IP Protection							
Shutter lock – SL and Rail Lock - RL	FP	FP	FP	FP	FP	FP	FP
Lock for racking-out mechanism with circuit-breaker in closed position	FP	MP	FP	MP	MP	MP	MP
Anti-insertion pin	FP/MP	FP/MP	FP/MP	FP/MP	FP/MP	FP/MP	FP/MP
Lifting plates	-	F/MP	-	F/MP	MP	MP	MP
IP30 Protection	F/FP	F/FP	F/FP	F/FP	-	-	FP
Open trip unit cover	F/MP	F/MP	-	-	-	-	-
Power Connections							
Orientable rear terminal - HR/VR	FP	F/FP	FP	F/FP	-	-	F
Front terminal - F	F	-	F	-	-	-	-
Connectivity							
Power Supply							
Battery for Ekip Aware	F/MP	F/MP	-	-	-	-	-

ON REQUEST

	Automatic circuit-breaker		Switch-disconnector		Derived versions (2)		
		E2.3 E4.3		E2.3 E4.3	CS	MT	MTP
	E1.3	E6.3	E1.3	E6.3	E2.3 - E4.3 - E6.3		
Signalling & Input/Output							
Open/closed auxiliary contacts - AUX 4Q (400V)	-	-	F/MP	F/MP	-	-	-
Open/closed auxiliary contacts - AUX 6Q	-	F/MP	-	F/MP	-	-	MP
Open/closed auxiliary contacts- AUX 15Q	F/FP	F/FP	F/FP	F/FP	-	-	MP
Conventional/fast auxiliary position contacts - AUP	FP	FP	FP	FP	FP	FP	FP
Ready to close signalling contact - RTC	F/MP	F/MP	F/MP	F/MP	-	-	-
Second contact signalling tripping of Ekip protection trip unit - S51/2	-	F/MP	-	-	-	-	-
Contact signalling loaded springs – S33 M/2 (supplied with Motor)	F/MP	F/MP	F/MP	F/MP	-	-	MP
5-pin terminal blocks	F/FP	F/FP	F/FP	F/FP	F/FP	F/FP	F/FP
Control							
Opening and closing release - YO/YC	F/MP	F/MP	F/MP	F/MP	-	-	MP*
Second opening release - YO2	F/MP	F/MP	F/MP	F/MP	-	-	-
Second closing release - YC2	-	F/MP	F/MP	F/MP	-	-	-
Undervoltage release - YU	F/MP	F/MP	F/MP	F/MP	-	-	-
Second undervoltage release - YU2	F/MP	F/MP	F/MP	F/MP	-	-	-
YO-Sense / YC-Sense / YU-Sense	F/MP	F/MP	-	-	-	-	-
Electronic time-delay device for undervoltage release - UVD	F/MP	F/MP	F/MP	F/MP	-	-	-
Motor - M	F/MP	F/MP	F/MP	F/MP	-	-	MP
M-Sense Enabler	F/MP	F/MP	-	-	-	-	-
Remote reset - YR	F/MP	F/MP	-	-	-	-	-

F: Fixed circuit-breaker
MP: Mobile part
FP: Fixed part

* Only closing release YC
** external installation but connected to the breaker

1) only for E4.3 and E6.3
2) CS Sectionalizing truck; MT Earthing truck; MTP Earthing switch with making capacity

CONTINUE →

ON REQUEST

	Automatic circuit-breaker		Switch-disconnector		Derived versions (2)		
	E1.3	E2.3 E4.3 E6.3	E1.3	E2.3 E4.3 E6.3	CS	MT	MTP
					E2.3 - E4.3 - E6.3		
Safety & IP Protection							
Key lock and padlock in open position - KLC and PLC	F/MP	F/MP	F/MP	F/MP	-	-	MP
Key lock and padlock in racked-in / test / racked-out position - KLP and PLP	FP	MP	FP	MP	MP	MP	MP
Lock for racking-in / racking-out the mobile part when the door is open - DLR	-	FP	-	FP	-	-	MP
Lock to prevent door opening when CB is in racked-in / test position - DLP	FP	FP	-	FP	FP	FP	FP
Lock to prevent door opening when circuit-breaker is in closed position - DLC	F/MP	F/MP	F/MP	F/MP	-	-	
Lifting plates	F/MP	-	F/MP	-	-	-	-
Mechanical operation counter - MOC	F/MP	F/MP	F/MP	F/MP	-	-	MP
Protection device for opening and closing pushbuttons - PBC	F/MP	F/MP	F/MP	F/MP	-	-	MP
IP54 Protection	F/FP	F/FP	F/FP	F/FP	-	-	FP
Terminal covers - HTC / LTC	F/MP	-	-	-	-	-	-
Separators - PB	F/FP	F/FP	F/FP	F/FP	-	-	-
Back flange - BF	F/FP	F/FP	F/FP	F/FP	F/FP	F/FP	F/FP
External Remote Racking Device - RRD**	F/MP	F/MP	F/MP	F/MP	-	-	-
Embedded Remote Racking Device RRD-E	-	MP (1)	-	-	-	-	-
Power Connections							
Orientable rear terminal - HR/VR	F	-	F	-	-	-	-
Front terminal - F	-	F/FP	-	F/FP	-	-	FP
Other configurations	F/FP	F/FP	F/FP	F/FP	-	-	FP
Interlocks							
Mechanical interlock - MI	F/MP/FP	F/MP/FP	F/MP/FP	F/MP/FP	-	-	-
Connectivity							
Power Supply							
Ekip Supply Lite	F/FP	F/FP	-	-	-	-	-
Ekip Supply Evo Modbus TCP	F/FP	F/FP	-	-	-	-	-
Ekip Busbars Supply	F/MP	F/MP	-	-	-	-	-
Communication							
Ekip Com Modbus RTU	F/FP	F/FP	-	-	-	-	-
Ekip Com Profibus	F/FP	F/FP	-	-	-	-	-
Ekip Com Profinet	F/FP	F/FP	-	-	-	-	-
Ekip Com EtherNet/IP™	F/FP	F/FP	-	-	-	-	-
Ekip Com IEC61850	F/FP	F/FP	-	-	-	-	-
Ekip Cartridge**	F/MP	F/MP	-	-	-	-	-
Signalling							
Ekip Signalling 2K-1 and 2K-2	F/FP	F/FP	-	-	-	-	-
Ekip Signalling 4K	F/MP	F/MP	-	-	-	-	-
Ekip Signalling 10K Link / Ekip Signalling Modbus TCP			-	-	-	-	-
Ekip AUP	F/FP	F/FP	-	-	-	-	-
Ekip RTC	F/MP	F/MP	-	-	-	-	-
Temperature							
Ekip Temperature 4T-1 and 4T-2	F/FP	F/FP	-	-	-	-	-
T-Sense Ambient / Busbars**	F/MP	F/MP	-	-	-	-	-
Protection							
Ekip RELT	F/FP	F/FP	-	-	-	-	-
Ekip Arc-Flash 6F-1 and Ekip Arc-Flash 6F-2	F/FP	F/FP	-	-	-	-	-
Measurement & Protection							
Ekip Synchrocheck	F/FP	F/FP	-	-	-	-	-
Homopolar toroid**	F/MP	F/MP	-	-	-	-	-
Toroid for differential protection**	F/MP	F/MP	-	-	-	-	-
Current sensor for neutral conductor outside the CB (standard and openable)**	F/MP	F/MP	-	-	-	-	-
Dedicated terminal for MDGF	F/FP	F/FP	-	-	-	-	-
Displaying							
Lite Panel	F/MP	F/MP	-	-	-	-	-
Lite Panel Pro	F/MP	F/MP	-	-	-	-	-

F: Fixed circuit-breaker
MP: Mobile part
FP: Fixed part

* Only closing release YC
** external installation but connected to the breaker

1) only for E4.3 and E6.3
2) CS Sectionalizing truck; MT Earthing truck; MTP Earthing switch with making capacity

SIGNALLING & INPUT/OUTPUT





Open / closed auxiliary contacts - AUX



Open / closed auxiliary contacts - AUX



Open / closed auxiliary contacts - AUX

Open / closed auxiliary contacts - AUX

SACE Emax 3 circuit-breakers can be equipped with auxiliary contacts that signal the open or closed status of the circuit-breaker. The first block (AUX 4Q) 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)		**E1.3**	**E2.3 - E4.3 - E6.3**
4 auxiliary contacts	standard	●	●
	digital signals	●	●
	mixed	●	●
Open / closed supplementary auxiliary contacts (AUX 6Q)			
6 auxiliary contacts	additional	-	●
	digital signals	-	●
	mixed	-	●
Open / closed external supplementary auxiliary contacts (AUX 15Q)			
15 auxiliary contacts	additional	●	●
	digital signals	●	●
Maximum number of open / closed auxiliary contacts that can be installed		19	25

In the table below all the electrical features related to the contacts for all the frames are reported:

		Standard contact	**Contact for digital signals**
Type		changeover contacts	changeover contacts
Minimum load (1)		100mA @ 24V	1mA @ 5V
Breaking capacity (2)			
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	-

1) minimum load (or minimum switching capacity) refers to the smallest amount of electrical power that a relay contact can reliably switch (i.e., open or close) without failure or degradation over time.
2) Breaking capacity is the maximum current that a relay contact can safely interrupt without being damaged.

—

Electrical diagram reference: figures 1, 81, 91.

Aux 6Q is an alternative to the Ekip Signalling 4K module and M-Sense Enabler. AUX 15Q is an alternative to the mechanical interlock and fast right AUP, the DLC for E1.3 lock or the DLP lock if mounted on the right side.

Order code



E1.3 Conventional auxiliary position contacts - AUP



E2.3 - E4.3 - E6.3 Conventional auxiliary position contacts - AUP



E2.3 - E4.3 - E6.3 Fast auxiliary position contacts - Fast AUP

Conventional/Fast auxiliary position contacts - AUP

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)		E1.3	E2.3 ... E6.3
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

SACE Emax 3 offers two types of auxiliary position contacts (AUPs): conventional and fast AUP. Fast AUP is an alternative to the conventional AUP for E2.3, E4.3 and E6.3. Mounted on the fixed part of the circuit breaker, it includes a plug-and-socket connector that facilitates quick and easy wiring.
The table below reports all the features related to the contacts for all the frames:

		Standard contact	Contact for digital signals
Type		changeover contacts	changeover contacts
Minimum load (1)		100mA @ 24V	1mA @ 5V
Breaking capacity (2)			
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	-

1) minimum load (or minimum switching capacity) refers to the smallest amount of electrical power that a relay contact can reliably switch (i.e., open or close) without failure or degradation over time.
2) Breaking capacity is the maximum current that a relay contact can safely interrupt without being damaged

—

Electrical diagram reference: figures 95, 95A, 96, 96A, 97, 97A

Order code

SIGNALLING & INPUT/OUTPUT



Ready to close signalling contact - RTC

Ready to close signalling contact - RTC

The ready to close signalling contact (RTC) electrically signals that the circuit breaker is ready to receive a closing command. A circuit breaker is ready to close when the following conditions have been met:

- Circuit breaker is in the open position
- Springs are fully charged
- No opening command is present
- TU Reset is in normal position.
- UVR (YU) is energized
- Device is not locked in the open position via Keylock/Padlock

		Standard contact	Contact for digital signals
Type		Switching	
Minimum load (1)		100mA @ 24V	1mA @ 5V
Breaking capacity (2)			
DC	24V	-	0.1
	250V	0.5A @ 0ms / 0.2A 10ms	-
AC	250V	3A @ cosφ 0.7	-

1) minimum load (or minimum switching capacity) refers to the smallest amount of electrical power that a relay contact can reliably switch (i.e., open or close) without failure or degradation over time.
2) Breaking capacity is the maximum current that a relay contact can safely interrupt without being damaged.

—

Electrical diagram reference: figure 71



Mechanical signalling of the tripping of protection trip unit - TU Reset

Mechanical signalling of the tripping of protection trip unit - TU Reset

Circuit-breaker are provided as standard with a mechanical trip indicator flag that signals status of a trip event from the trip unit. After the Ekip Aware has tripped due to a protection function, the mechanical flag clearly indicates the tripped status on the front of the circuit breaker. The circuit breaker can be reset only after the mechanical flag pushbutton has been restored to its normal position. Conforming to ANSI 86T standards. In addition, Emax 3 is equipped with an anti-pumping function, so that an opening command always takes priority and precedence over a closing command. Additionally, when the circuit breaker is in the open position due to a trip, the anti-pumping function prevents the reclosing of the operating mechanism until the mechanical flag has been reset to its normal position, avoiding improper or accidental closing.

Order code



Contact signalling tripping of protection trip unit Ekip – S51

Contact signalling tripping of protection trip unit Ekip – S51

S51 contact is provided as standard with all SACE Emax 3 circuit breakers. This contact electrically signals the opening of the circuit breaker due to a protection function of Ekip Aware. Optional versions for digital signals and S51/2 are available. S51/2 are available for E2.3 - E4.3 - E6.3 and are an alternative to the Remote Reset contact (YR).

—

Electrical diagram reference: figure 11

Contact signalling loaded springs – S33 M/2

This contact is provided as standard with a Spring Charging Motor - M. This contact electrically signals the status of the closing springs. It is available in both a standard version and version for digital signals.

		Standard contact	Contact for digital signals
Type		changeover contacts	changeover contacts
Minimum load (1)		100mA @ 24V	1mA @ 5V
Breaking capacity (2)			
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	-

1) minimum load (or minimum switching capacity) refers to the smallest amount of electrical power that a relay contact can reliably switch (i.e., open or close) without failure or degradation over time.
2) Breaking capacity is the maximum current that a relay contact can safely interrupt without being damaged.

—

Electrical diagram reference: figure 12



3-pin terminal block

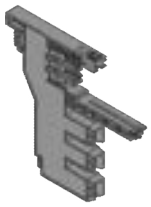


5-pin terminal block

Standard 3-pin terminal block and 5-pin terminal block

Two types of terminal blocks are available:

- 3-pin terminal blocks: Supplied as standard with electrical accessories that require wiring to the terminal box. It is also possible to order sets of 8 or 18 pieces supplied with the circuit breaker. Additionally, 10 pieces can be purchased as loose items.
- 5-pin terminal blocks: Available as an optional accessory. They allow for multiple connections to simplify wiring and reduce the need for extensive cabling such as interconnecting cabling for coils and spring charging motors sequentially. It is also possible to order sets of 8 or 18 pieces supplied with the circuit breaker. Additionally, 10 pieces can be purchased as loose items.



FP connector for 3-pin/5-pin terminal block

FP connector for 3-pin/5-pin terminal block

It must be installed on the fixed part and in particular in the 'Trip Unit I/O' section of the terminal box. It is necessary for the installation of the 3-pin and 5-pin terminal blocks. Thanks to it, a terminal block is electrically connected to FP sliding contact.
It must be ordered if zone selectivity is required or if terminal for MDGF is bought aftersales.

Order code

CONTROL





Opening and closing release- YO/YC

Opening and closing release- YO/YC

In order to remotely close the circuit breaker the springs must be fully charged or be equipped with a Spring Charging Motor M. YO/YC coils operate by means of an impulse current lasting a minimum of 100ms. Additionally, they can also operate in permanent service/supply. In this case, if an opening command is given by the opening coil, the circuit breaker can then be closed by de-energizing the opening coil with a duration of at least 30ms. The circuit breaker operating mechanism has an anti-pumping function that ensures a opening command takes priority/precedence over a closing command to help ensure safety and reliability.

—

Electrical diagram reference: figures 75, 77

Second opening and closing release - YO2/YC2

For critical power installations, the redundancy of electrical operation/control are key to ensure reliability and efficiency of the system. SACE Emax 3 circuit breakers can be equipped with redundant opening and closing coils. Second closing coil YC2 can only be equipped on frames E2.3 - E4.3 - E6.3, and the second opening release is an alternate to a Undervoltage Release YU.

—

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
Operations	10.000	
Breaker opening time (YO/YO2)		
E1.3	35 ms	
E2.3 - E4.3 - E6.3	55 ms	
Breaker closing time (YC/YC2)		
E1.3	50 ms	
E2.3 - E4.3 - E6.3	70 ms	

Order code



Undervoltage release – YU

Undervoltage release – YU

The YU opening the circuit-breaker when there is a significant drop in voltage in the supply to the YU. It can be used to prevent closing of the circuit breaker when voltage is not present or to protect primary and secondary circuits. The power supply of the YU can be obtained from the supply side of the circuit breaker or from an independent source. Closing of the circuit breaker can only be performed when the YU is energized within the range of 85 - 110% of the nominal voltage (Un). The undervoltage release is an alternative of the second opening coil YO2 and anti-pumping device. Refer to the electrical characteristics below for more details.

—
Electrical diagram reference: figure 73

Second undervoltage release - YU2

SACE Emax 3 circuit breakers can be equipped with a second YU2 to provide redundancy for certain applications.

—
Electrical diagram reference: figure 73A

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	●	-
Inrush power (Ps)		300VA	300W
Continuous power (Pc)		3.5VA	3.5W
Breaker opening time (YU/YU2)			
	E1.3	30 ms	
	E2.3 - E4.3 - E6.3	50 ms	

Order code

CONTROL

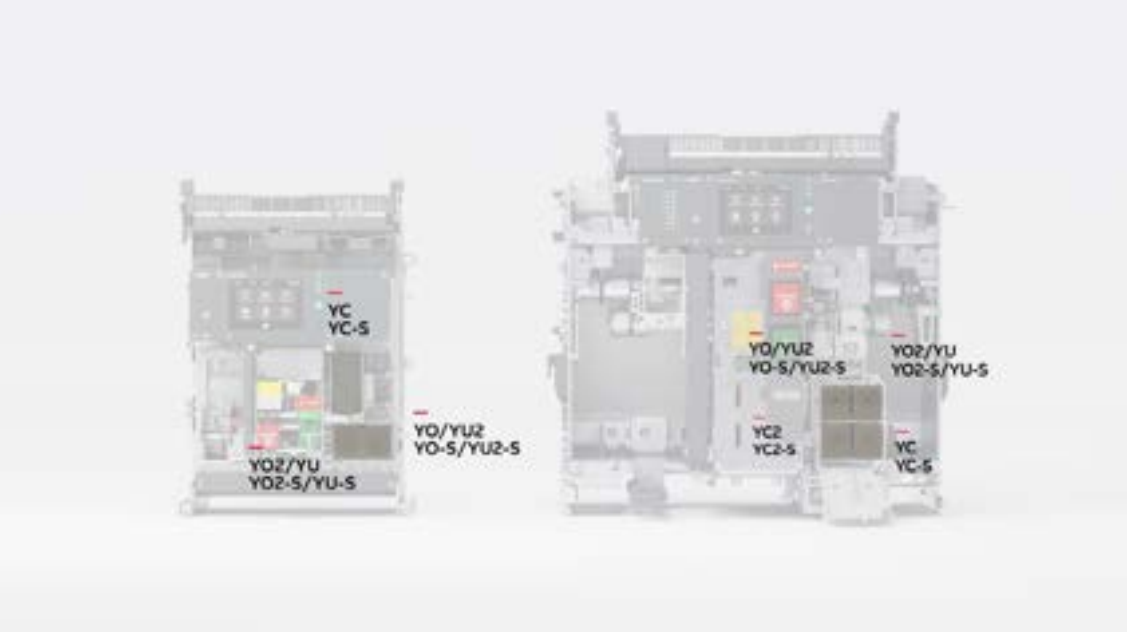


FIG. O1



YO-Sense/YC-Sense/
YU-Sense

YO-Sense/YC-Sense/YU-Sense

Sense coils offer the same base functionality as the standard coils - YO/YC/YU but provide additional functionality that can monitor and sense health status, as well as enable remote control via communications. By verifying wiring and power continuity, as well as monitoring inrush and continuous current, voltage and the number of operations, Sense coils can accurately predict the maintenance needs and evaluate remaining service life. For Remote Operation via communications the circuit breaker can be equipped with the following accessories:

- Sense Opening Coil - YO-S
- Sense Closing Coil - YC-S
- Spring Charging Motor - M
- Ekip Com module
- Remote Reset - YR

Ekip Supply Lite or Ekip Supply Evo Modbus TCP are mandatory, however coil protection is still available in absence of auxiliary supply.

General characteristics

Power supply (Un)		AC	DC
YO-S/YC-S	24V...60V	●	●
	110V...250V	●	●
YU-S	24V	●	●
	30V	●	●
	48V	●	●
	60V	●	●
	110-120V	●	●
	120-127V	●	●
	220-240V	●	●
	240-250V	●	●

As for standard coils, redundancy can be guaranteed using first and second Sense coils of the same type. Moreover, standard coils can be used in conjunction with Sense coils.

Order code

Time-delay device for undervoltage release (UVD)

Standard and Sense Undervoltage Releases can be combined with an electronic time-delay device (UVD), providing a delayed external opening with adjustable preset times. Each undervoltage release can be combined with one UVD device only. The use of the UVD is recommended to prevent opening of the circuit breaker when the power supply network is subject to brief drops or power supply interruptions. Circuit breaker closing is inhibited when the device is not powered. The time-delay device (UVD) must be used with a 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 Remote Reset (YR) allows for remote resetting of the circuit breaker after a trip event. It is available for circuit breaker versions only with the following voltage ranges:

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

—

Electrical diagram reference: figure 14

Motor – M

This device automatically charges the closing springs of the circuit breaker when discharged after a closing command and power is present. In the event where no power is present, the springs can be manually charged via the lever on the front of the device. The Motor is always supplied with auxiliary contact S33 M/2 for signalling status of the closing springs.



Motor – M for E1.3



Motor – M for E2.3...E6.3

General characteristics		
Power supply (Un)	AC	DC
24V-30V	●	●
48V-60V	●	●
100V...130V	●	●
220V...250V	●	●
380V...415V	●	●
Operating limits (IEC60947-2 standards)	85%...110% Un	
Inrush power (Ps)	300VA E1.3 500VA E2.3 - E4.3 - E6.3	300W E1.3 500W E2.3 - E4.3 - E6.3
Inrush time	200ms	
Continuous power (Pc)	100VA E1.3 150VA E2.3 - E4.3 - E6.3	100W E1.3 150W E2.3 - E4.3 - E6.3
Charging time		
E1.3	8 sec	
E2.3 ... E6.3	7 sec	
Frequency of operation	Tamb≤ 50°C and V>=95%Un 60 [Oper./Hour] (1)	Tamb>50°C or V<95%Un 30 [Oper./Hour] (2)

1) 30 [Oper./Hour] only for E4.3V, E6.3V, and E6.3X
2) 20 [Oper./Hour] only for E4.3V, E6.3V, and E6.3X

—

Electrical diagram reference: figure 13

Order code

CONTROL



M-Sense Enabler E1.3



M-Sense Enabler
E2.3-E4.3-E6.3

M-Sense Enabler

The M-Sense Enabler monitors and assesses the health status of the Spring Charging Motor. By monitoring both inrush current and voltage supplied to the Motor as well as the number of operations, it can accurate assess and predict maintenance needs and help diagnose potential issues. M-Sense Enabler can only be used when a Motor (M) is present and is an alternate to Ekip Signalling 4K, and AUX 6Q.

Two versions of the M-Sense Enabler are available depending on the voltage range of the Spring Charging Motor (M) and must match each other. Ekip Supply Lite or Ekip Supply Modbus Evo TCP is a mandatory accessory to supply the module.

General characteristics			**Motor Size**
Power supply (Un)	AC	DC	
24V…60V	●	●	24V...30V, 48V...60V
100V…415V	●	●	100...130V, 220...250V, 380...415V
Operating limits (IEC60947-2 standards)	85%...110% Un		

Order code

SAFETY & IP PROTECTION





Key lock in open position - KLC

Key lock in open position - KLC

SACE Emax3 circuit-breaker (either fixed or withdrawable versions) can be locked in the open position using one or two keylocks (KLC).

KLCs are available in the following configurations:

- KLC-D with a provided key (classical key or Ronis 1351-10A);
- KLC-S with specific numbered key, particularly useful when the same key is used for different circuit-breakers. Five different key typology number are available (from n°20001 to n°20005)
- KLC-A includes support for Castell, STI or Kirk. Keys must be supplied separately by the customer.

In E1.3, the only available second key is the 2nd KLC-D (classical key), which can be used with either the 1st KLC-D (classical key) or the 1st KLC-S (from n°20001 to n°20005).

In E2.3, E4.3, and E6.3, the 2nd KLC requires the 1st KLC to function and must be of the same type as the 1st KLC. When using a 1st KLC-S (from n°20001 to n°20005), only a 2nd KLC-D (classical key) can be used.



Padlocks - PLC

Padlocks - PLC

SACE Emax3 circuit-breaker (available in both fixed and withdrawable versions) can be locked in the open position using one or two padlock devices (PLC). Please note that the padlocks required for the padlock device must be purchased separately. It is essential to adhere to the specified padlock diameters for safe operation:

- Ø 4 mm: up to 3 padlocks
- Ø 6 mm: maximum 1 padlock
- Ø 7 mm: maximum 1 padlock
- Ø 8 mm: maximum 1 padlock

The Emax 3 also offers the option to install both KLC and PLC on the device for all frame types.

E1.3



FIG. 02

E2.3-E4.3-E6-3



FIG. 03

Order code

SAFETY & IP PROTECTION



Key lock in racked-in / test / racked-out position - KLP E1.3



Key lock in racked-in / test / racked-out position - KLP E2.3 - E4.3 - E6.3



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

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

The SACE Emax3 withdrawable circuit-breaker can be locked in the connected (racked-in), test, and disconnected (racked-out) positions using one or two keylocks (KLP). The second KLP must be of the same type as the first one. The KLP is available in the following configurations:

- KLP-D: with a provided key (classical key or Ronis 1351-10A).
- KLP-S: with a specific numbered key, particularly useful when the same key is used for different circuit-breakers. Five different key number typologies are available (from n°20001 to n°20005).
- KLP-A: includes support for Castell, STI, or Kirk locks. Keys must be supplied separately by the customer.

To lock the moving part in the racked-out position, a supplementary lock accessory is required.

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

The SACE Emax3 withdrawable circuit-breaker can be locked in the connected (racked-in), test, or disconnected (racked-out) positions using one padlock device (PLP). The padlock required for the padlock device must be purchased separately.

The Emax3 also offers the option to install both KLPs and PLP on the device for all frame sizes. 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.

E2.3-E4.3-E6-3 on withdrawable part



E1.3 on fixed part



FIG. 04

Order code



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

Lock for racking-out mechanism with circuit- breaker in closed position
All SACE Emax 3 withdrawable versions are always supplied with a lock that prevents the mobile part/ circuit breaker from be racked-in and racked-out when the circuit breaker is in the closed position. In order to start the rack in/out procedure, 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/cradle, prevents the mobile part from being racked in/out when the equipment door is open. It is available only for E2.3 - E4.3 - E6.3 frames.



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

Lock to prevent door opening when the circuit- breaker is in racked-in / test position - DLP
The DLP prevents the equipment door from being opened while the mobile part is in the connected (racked-in) or test position. It is available only for withdrawable versions.
- For E1.3 only one option is available and can be mounted only on the left hand side.
- For E2.3 - E4.3 - E6.3 frames, options to be installed on the right-hand or left-hand side of the fixed part/ cradles are available. If mounted on the right-hand side, it is an alternative to the mechanical interlock or the AUX 15Q.



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

Lock to prevent door opening when the circuit- breaker is in the closed position - DLC
This prevents the equipment door from being opened when the circuit breaker is in the closed position (and when the circuit breaker is racked-in for withdrawable circuit-breakers). Additionally, it blocks the circuit breaker from closing when the equipment door is open.
Two versions (fixed and withdrawable) are available depending on the version, and they can be mounted only on the left-hand side.
For E1.3, the DLC is not compatible with the mechanical interlock and the AUX 15Q.

SAFETY & IP PROTECTION

Compatibility chart

E1.3 FIXED

		Signalling							Safety					Protection Devices									RRD
		4Q	15Q	RTC	Ekip RTC	TU reset	S51	S33	KLC	PLC	DLP	DLC	MOC	PBC	IP30 (F)	IP54	PB - Phase barrier (F)	Back flange (F)	0-Arc distance top cover for fixed parts	HTC	LTC	Mechanical interlock	RRD external
Signalling	4Q	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	15Q		-	•	•	•	•	•	•	•	•	-	•	•	•	•	•	•	•	•	•	-	•
	RTC			-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Ekip RTC				-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	TU reset					-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S51						-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S33							-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Safety	KLC								see Fig. 2		•	•	•	•	•	•	•	•	•	•	•	•	•
	PLC								see Fig. 2		•	•	•	•	•	•	•	•	•	•	•	•	•
	DLC										•	-	•	•	•	•	•	•	•	•	•	-	•
	MOC												-	•	•	•	•	•	•	•	•	•	•
Protection device	PBC													-	•	•	•	•	•	•	•	•	•
	IP30 (W)														-	-	•	•	•	•	•	•	•
	IP54														-	-	•	•	•	•	•	•	•
	PB - Phase barrier (F)																-	•	•	-	-	•	•
	Back flange (F)																	-	•	•	•	•	•
	0-Arc distance top cover for fixed parts																		-	•	•	•	•
	LTC																			-	-	•	•
	RTC																			-	-	•	•
	Mechanical interlock																					-	•
RRD	RRD external																						-

Order code

E1.3 WITHDRAWABLE

		Signalling								Safety							Protection Devices									RRD
		4Q	15Q	AUP	RTC	Ekip RTC	TU reset	S51	S33	KLC	PLC	KLP	PLP	DLP	DLC	MOC	PBC	IP30 (W)	IP54	PB - Phase barrier (W)	Back flange (W)	0-Arc distance top cover for fixed parts	HTC	LTC	Mechanical interlock	RRD external
Signalling	4Q	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	15Q		-	•	•	•	•	•	•	•	•	•	•	•	-	•	•	•	•	•	•	•	•	•	-	•
	AUP			-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	RTC				-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Ekip RTC					-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	TU reset						-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S51							-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S33								-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Safety	KLC									see Fig. 2		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	PLC									see Fig. 2		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	KLP											see Fig. 4	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	PLP												-	•	•	•	•	•	•	•	•	•	•	•	•	•
	DLP													-	•	•	•	•	•	•	•	•	•	•	-	•
	DLC														-	•	•	•	•	•	•	•	•	•	-	•
	MOC															-	•	•	•	•	•	•	•	•	•	•
Protection device	PBC																-	•	•	•	•	•	•	•	•	•
	IP30 (W)																	-	-	•	•	•	•	•	•	•
	IP54																	-	-	•	•	•	•	•	•	•
	PB - Phase barrier (W)																			-	•	•	-	-	•	•
	Back flange (W)																				-	•	•	•	•	•
	0-Arc distance top cover for fixed parts																					-	•	•	•	•
	LTC																						-	-	•	•
	RTC																						-	-	•	•
	Mechanical interlock																								-	•
RRD	RRD external																									-

Order code

SAFETY & IP PROTECTION

Compatibility chart

E2.3-E4.3-E6.3 FIXED

		Signalling									Safety				Protection Devices							RRD	
		4Q	6Q	15Q	RTC	Ekip RTC	TU reset	S51	S51/2	S33	KLC	PLC	DLC	MOC	PBC	IP30 (F)	IP54	PB - Phase barrier (F)	Back flange (F)	0-Arc distance top cover for fixed parts	Mechanical interlock	RRD external	RRD-E
Signalling	4Q	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	6Q		-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	15Q			-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	-	•	•
	RTC				-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Ekip RTC					-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	TU reset						-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S51							-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S51/2									•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S33									-	•	•	•	•	•	•	•	•	•	•	•	•	•
Safety	KLC										see Fig. 3		•	•	•	•	•	•	•	•	•	•	•
	PLC										see Fig. 3		•	•	•	•	•	•	•	•	•	•	•
	DLC												-	•	•	•	•	•	•	•	•	•	•
	MOC													-	•	•	•	•	•	•	•	•	•
Protection device	PBC														-	•	•	•	•	•	•	•	•
	IP30 (F)															-	-	•	•	•	•	•	•
	IP54															-	-	•	•	•	•	•	•
	PB - Phase barrier (F)																	-	•	•	•	•	•
	Back flange (F)																		-	•	•	•	•
	0-Arc distance top cover for fixed parts																			-	•	•	•
	Mechanical interlock																				-	•	•
RRD	RRD external																					-	•
	RRD-E																						-

Order code

E2.3-E4.3-E6.3 WITHDRAWABLE

		Signalling										Safety								Protection Devices							RRD	
		4Q	6Q	15Q	AUP	RTC	Ekip RTC	TU reset	S51	S51/2	S33	KLC	PLC	KLP	PLP	DLR	DLP	DLC	MOC	PBC	IP30 (W)	IP54	PB - Phase barrier (W)	Back flange (W)	0-Arc distance top cover for fixed parts	Mechanical interlock	RRD external	RRD internal
Signalling	4Q	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	6Q		-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	15Q			-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	AUP (1)				-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	RTC					-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Ekip RTC						-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	TU reset							-	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S51							-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S51/2								-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	S33									-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Safety	KLC											see Fig. 3		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	PLC											see Fig. 3		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	KLP													see Fig. 4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	PLP														-	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	DLR															-	•	•	•	•	•	•	•	•	•	•	•	•	•
	DLP																-	•	•	•	•	•	•	•	•	•	•	•	•
	DLC																	-	•	•	•	•	•	•	•	•	•	•	•
	MOC																		-	•	•	•	•	•	•	•	•	•	•
Protection device	PBC																			-	•	•	•	•	•	•	•	•	•
	IP30 (W)																				-	-	•	•	•	•	•	•	•
	IP54																				-	-	•	•	•	•	•	•	•
	PB - Phase barrier (W)																						-	•	•	•	•	•	•
	Back flange (W)																							-	•	•	•	•	•
	0-Arc distance top cover for fixed parts																								-	•	•	•	•
	Mechanical interlock																									-	•	•	•
RRD	RRD external																										-	•	•
	RRD internal																											-	•

1) Fast right AUP is not compatible with interlock, 15Q and DLC.

Order code

SAFETY & IP PROTECTION

Compatibility chart

ELECTRICAL ACCESSORIES

		Accessory for Ground protection				Control							
		MDGF terminal	Toroid RC	Homopolar toroid	Ext CS for N (standard)	Motor	Motor+MC	M-Sense Enabler	YC	YO	YU	UVD	YR
Accessory for Ground protection	MDGF terminal				•	•	•	•	•	•	•	•	•
	Toroid RC				•	•	•	•	•	•	•	•	•
	Homopolar Toroid				•	•	•	•	•	•	•	•	•
	Ext CS for N	•	•	•	•	•	•	•	•	•	•	•	•
Control	Motor	•	•	•	•			•	•	•	•	•	•
	Motor+MC	•	•	•	•			•	•	•	•	•	•
	M-Sense Enabler	•	•	•	•	•	•	•	•	•	•	•	•
	YC	•	•	•	•	•	•	•	see Fig. 1			•	•
	YO	•	•	•	•	•	•	•				•	•
	YU	•	•	•	•	•	•	•				•	•
	UVD	•	•	•	•	•	•	•	•	•	•	•	•
	YR	•	•	•	•	•	•	•	•	•	•	•	•

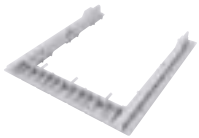
Order code



Mechanical operation counter - MOC

Mechanical operation counter - MOC
The number of mechanical operations is a key element that determines the frequency of ordinary maintenance. The optional MOC is visible from the front of the circuit breaker and indicates the total number of mechanical operations the device has performed.

Lifting plates
The lifting plates are integrated in all E2.3 - E4.3 - E6.3 moving parts to lift them in a safe way. For E1.3 they are available as loose accessories.



Back flange
The optional back flange helps isolate and segregate the circuit breaker from gas and smoke during a fault/event. It is available for E2.3 - E4.3 - E6.3 fixed and withdrawable versions and available only for the withdrawable version of E1.3.



Protection device for opening and closing pushbuttons - PBC

Protection device for opening and closing pushbuttons - PBC
This accessory is applied to the safety cover of the circuit-breaker and is available in three 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 cover in place.
- Padlockable pushbutton protection device, which makes it possible to block only closing pushbutton.



IP30 Protection

IP30 Protection
Provided as standard with each fixed circuit breaker or fixed part/cradle, the IP30 door flange is installed in the door of the equipment to provide IP30 degree of protection.



IP54 Protection

IP54 Protection
This transparent cover completely protects the front of the circuit-breaker, enabling an IP54 degree of protection. The IP54 cover is provided with double key lock KLC (same or different keys).
This is not compatible with second key lock (KLC) Kirk, STI, Ronis and first Castell, or with a padlock in open position PLC 4mm.

IP30 blind door
It is an accessory used in low-voltage switchgear assemblies to cover a pre-cut opening in the panel door. This cutout allows the pre-installation of the fixed part (cradle), either as a backup or to reserve space for future expansion. When the IP30 blind door is installed, it maintains the panel's IP30 protection rating, allowing the moving part to be added later without any modifications to the door or front cover.

Trip unit cover
Ekip Aware is supplied by default with an open transparent cover that allows access to the touchscreen. For E2.3, E4.3, and E6.3, a closed cover is optionally available in two versions: a conventional closed cover, which prevents access to the touchscreen, and a sealable closed cover, which also prevents access to the touchscreen but additionally allows tamper indication if someone attempts to remove the cover to access the trip unit.
For E1.3, only the closed cover is optionally available. The same closed cover can be used as a sealable version by applying a wire seal.

Order code

SAFETY & IP PROTECTION



Terminal covers – HTC / LTC

Terminal covers – HTC / LTC

Available for E1.3 frame, terminal covers can be installed on the top and bottom terminals to help reduce the risk of direct contact with live parts. They are available in two versions: high terminal covers (HTC) and low terminal covers (LTC).

Separators / Phase Barriers - PB

Phase barriers can be used to help insulate the terminal connections between phases. They are available for all the frames.



Separators - PB

0-ARC Distance top cover

This accessory allows the circuit-breakers to reach the 0-arc distance performance. Installable on the fixed part of E2.3, E4.3 and E6.3 gives the possibility to dimension the cubicle at the same height of the fixed part.



RRD

Remote Racking Device - RRD

The RRD allows for the racking-in/out of a withdrawable circuit breaker from a remote distrance of up to 10m in order to stay outside of the arc flash boundary. The RRD can only operate with the circuit breaker in the open position and with springs discharged. The RRD kit includes Motor, power supply, adapter and pendant controller.

GENERAL FEATURES

Rated service voltage	100...240V AC, 142...340V DC
Frequency	50-60Hz
Rated power	300 VA, 300 W
Inrush power	450 VA, 450 W
Working temperature range	-5°C ... + 40°C
Storage temperature range	-40°C ... +80°C
Minimum time interval between operation	3 minutes
Maximum operating distance	10m
Weight	3Kg

Order code



RRD-E

Remote Racking Device Embedded - RRD-E

Available for frame E4.3 and E6.3 an embedded version of Remote Racking is fitted directly inside the mobile part and linked to the Ekip Aware trip unit. Racking procedures can be performed in two methods:

- Wireless: Remote operation via EPiC mobile app
- Wired: Utilize the pendant controller utilizing the USB-C port on the front of the circuit breaker. The controller is the same of external motor solution.

To ensure safety, the device was primarily designed to operated via RRD-E remotely, with manual operation to be used as back up or emergency measure. 24VDC must be supplied and is not compatible with switch disconnector versions.

GENERAL CHARATERISTICS

Supply voltage	24V DC ± 10%
Rated power	190W (peak)
Working and storage temperature range	-20°C...+70°C
Minimum time interval between operation	3 minutes T=25°C, 25 minutes -20°C<T<70°C
Maximum operating distance	100m

As a power supply, it is suggested to use ABB CP-S.1 24/40.0 (ordering code 1SVR320861R1000) or a similar one with these characteristics:

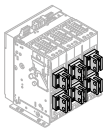
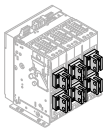
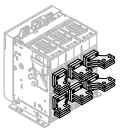
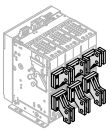
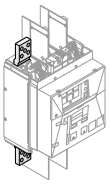
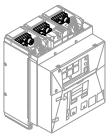
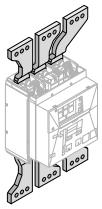
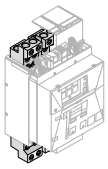
Description	Rated output voltage	Rated output current	Output power	Order code
CP-S.1 24/40.0	24V DC	40.0 A	960 W	1SVR320861R1000

POWER CONNECTIONS



The SACE Emax 3 offers a wide variety of terminal connections, providing an optimal solution for connection to the power circuit.
Emax 3 product family is tested according to IEC standard 60947-2 and 60947-3.

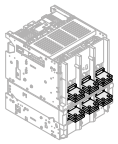
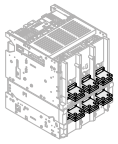
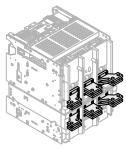
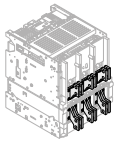
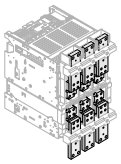
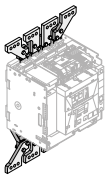
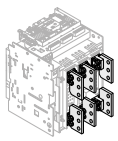
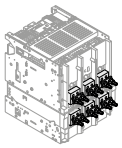
SOLUTION FOR FIXED CIRCUIT-BREAKERS

Type	Abbreviation		E1.3	E2.3	E4.3	E6.3
Rear adjustable terminal (1)	HR VR		Single stab design ○	● Iu = 2000A Multiple stab design ● Iu = 2500A	● Iu =4000A ○ Iu =3200A	● Iu = 5000A ● Iu = 6300A
Long Rear adjustable terminal	LHR LVR		Multiple stab design	○ Iu =2500A	○ Iu =4000A	○ Iu =6300A
Horizontal rear spread terminal	SHR		Single stab design Multiple stab design	○ Iu = 2000A ○ Iu = 2500A	○ Iu = 3200A ○ Iu =4000A	
Vertical rear spread terminal	SVR		Single stab design Multiple stab design	○ Iu = 2000A ○ Iu = 2500A	○ Iu = 3200A ○ Iu =4000A	
Extended front terminal	EF		○			
Front terminal	F		●	○	○	○
Front spread terminal	ES		○			
Terminal for cable FcCuAl 4x240mm²	FcCuAl		○			

● Standard configuration; ○ Configuration on request;
1) The adjustable terminals are supplied as standard in the HR – HR configuration.

Order code

SOLUTIONS FOR FIXED PARTS/CRADLES, WITHDRAWABLE CIRCUIT-BREAKERS

Type	Abbreviation		E1.3	E2.3	E4.3	E6.3
Rear adjustable terminal (1)	HR VR		Single stab design ●	Single stab design ● Iu = 2000A Multiple stab design ● Iu = 2500A	Single stab design ● Iu = 3200A Multiple stab design ● Iu =4000A ○ Iu =3200A	Single stab design ● Iu = 5000A Multiple stab design ● Iu = 6300A ○ Iu = 5000A (2) or X performance
Long Rear adjustable terminal	LHR LVR		Multiple stab design	Multiple stab design ○ Iu =2500A	Multiple stab design ○ Iu =4000A	Multiple stab design ○ Iu =6300A or X performance
Horizontal rear spread terminal	SHR		Single stab design	Single stab design ○ Iu = 2000A Multiple stab design ○ Iu = 2500A	Single stab design ○ Iu = 3200A Multiple stab design ○ Iu =4000A	
Vertical rear spread terminal	SVR		Single stab design	Single stab design ○ Iu = 2000A Multiple stab design ○ Iu = 2500A	Single stab design ○ Iu = 3200A Multiple stab design ○ Iu =4000A	
Extended front terminal	F			○	○	○
Front terminal	EF		○			
Front spread terminal	ES		○			
Terminal for cable FcCuAl 4x240mm²	FcCuAl		○			
Flat terminal	FL			○	○	○

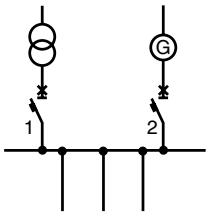
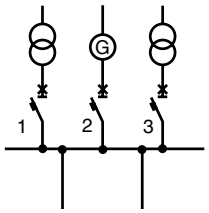
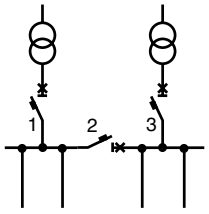
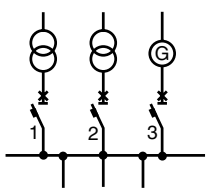
● Standard configuration
○ Configuration on request
1) The adjustable terminals are supplied as standard in the HR – HR configuration
2) Fixed parts acessorized with rear orientable terminals with multiple stabs guarantee higher performances in switchboard installations.

Order code

INTERLOCKS

Mechanical interlocks

The following interlock schemes are available to enable various mechanical opening/closing configurations between circuit breakers.

Types of interlock	Example application	Logic	Circuit-breakers
Type A			
Prevents two circuit breakers from being closed at the same time.	Main line power supply and emergency power supply. 	1 2 O O I O O I	Available between circuit-breakers of different sizes and with any fixed / withdrawable version
Type B			
Allows a pair of circuit breakers to be closed only if the third is open or vice versa.	Two power supplies from transformers and one emergency power supply. 	1 2 3 O O O I O O O O I I O I O I O	Available between E2.3, E4.3 and E6.3 circuit-breakers and with any fixed / withdrawable version
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). 	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 E2.3, E4.3 and E6.3 circuit-breakers and with any fixed / withdrawable version
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. 	1 2 3 O O O I O O O I O O O I	Available between E2.3, E4.3 and E6.3 circuit-breakers and with any fixed / withdrawable version

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		3000mm	2000mm
Vertical		1000mm	1000mm
Breakers	E1.3	●	-
	E2.3	●	●
	E4.3	●	●
	E6.3	●	●

For types B, C, and D the maximum distance between the two furthest circuit breakers is 4000m for horizontal, and 2000m for vertical configurations. It is also possible to make the connections with three circuit breakers in an "L" position by using the cable of three horizontal circuit breakers. Please note to make sure the distance between the horizontal and vertical circuit breakers respects the minimum and maximum distances. All cables can be cut to length for easy installation.
DLCs, DLPs and AUX15Q are not compatible when mechanical interlocks are installed.

CONNECTIVITY



The following accessories are automatically recognized by Ekip Aware and based on the installation method and connection to the trip unit, the accessories can be divided into:

Installation	Modules	Highlights
Terminal box	Cartridge modules: - Ekip Com Modbus RTU - Ekip Com Profibus - Ekip Com Profinet - Ekip Com EtherNet/IP™ - Ekip Com IEC61850 - Ekip Signalling 2K - Ekip RELT - Ekip Temperature 4T - Ekip Supply Lite - Ekip Supply Evo Modbus TCP - Ekip Synchrocheck - Ekip Arc-Flash 6F	- Ekip Supply Lite/Ekip Supply Evo Modbus TCP enables the trip units to be supplied with a wide range of control voltages - Ekip Supply Lite/Ekip Supply Evo Modbus TCP must be present for the other modules to be used - Ekip Supply Lite/Ekip Supply Evo Modbus TCP 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 Lite module, up to 2 additional modules can be installed on E1.3, and up to 3 on E2.3, E4.3 and E6.3 - Ekip Supply Evo Modbus TCP can be used as an alternative to Ekip Supply Lite. In this case up to 1 additional modules can be installed on E1.3, and up to 2 on E2.3, E4.3 and E6.3. It enables Modbus TCP, redundancy and daisy chain.
Accessorizing area	- Ekip RTC - Ekip AUP - Ekip Signalling 4K - Battery for Ekip	- These are installed in specific housings from the front of the circuit-breaker - Thanks to the optional modules Ekip RTC and Ekip AUP, the Ekip trip unit can acquire and monitor the ready to close state and the racked-in/test isolated/racked-out position of the circuit-breaker. - The Ekip Signalling 4K module increases the remote signalling possibilities for E2.3, E4.3 and E6.3 and must be supplied with the Ekip Supply Lite (or Ekip Supply Evo Modbus TCP)
External	- Ekip Signalling 10K Link / Ekip Signalling Modbus TCP	- Up to three Ekip Signalling 10K Link / Ekip Signalling Modbus TCP can be connected at the same time to the same Ekip trip unit
	- External neutral sensor - Homopolar toroid - RC toroid	- These are connected to the trip unit by the terminal box of the circuit-breaker
	- T-Sense Ambient - T-Sense Busbar	- These are wireless sensors connected to the trip unit via BLE mesh network
	- Ekip Cartridge	- The external cartridge expands connectivity possibilities. It can contain one Ekip Supply Lite and up to three cartridge modules.



Ekip Supply Lite

Power Supply

Ekip Supply Lite

The Ekip Supply Lite module supplies the Ekip Aware and all the modules present on the terminal box of the circuit-breaker. It can be field installed in the dedicated position.
Ekip Supply Lite covers an extended range of control voltage:

	Supply	Ekip Supply Lite
Ekip Aware	Nominal voltage	24-240V DC / 110-240V AC
	Tolerance	±10%
	Rated power (including modules)	10W max.
	Inrush current	~2A for 20ms
	AWG cable	Max 14 AWG

—
Electrical diagram reference: figures 32, 99 (in the Ekip Cartridge)



Ekip Supply Evo Modbus TCP

Ekip Supply Evo Modbus TCP

Ekip Supply Evo Modbus TCP has the same functionality as Ekip Supply Lite and this module is suitable for:
- Modbus TCP and Modbus TCP Secure, which are alternatives to each other;
- Com Link, an internal ABB protocol;
- Daisy-chain (for more information, see the chapter “Digital Experience”);
- Ethernet modules.

Modbus TCP is provided by default, while all the others are optional.

	Supply	Ekip Supply Evo Modbus TCP
Ekip Aware	Nominal voltage	24-240V DC / 110-240V AC
	Tolerance	±10%
	Rated power (including modules)	10W max.
	Inrush current	~2A for 20ms
	AWG cable	Max 14 AWG

Communication Protocol	Availability
Modbus TCP	Standard supply
Com Link	Digital upgrade
Modbus TCP Secure	Upgrade (only supplied with the breaker)

—
Electrical diagram reference: figure 33



Ekip Busbars Supply

Ekip Busbars Supply

The module supplies the trip unit through the main system busbars and is installed to the right of the trip unit. All the circuit-breakers include already the internal bottom voltage measurement cables that allow the trip unit to be supplied with a voltage higher than 80V if the module is present. See page 3/14 for RC protection prerequisite.

Order code

CONNECTIVITY

Communication



Ekip Com Modbus RTU



Ekip Com Profinet

Ekip Com modules

The Ekip communication modules enable SACE Emax 3 circuit-breakers to be integrated in an industrial communication network for remote supervision and control of the circuit-breaker. 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, which belong to two main groups—fieldbus and Ethernet—can be installed simultaneously, enabling connections to communication systems that use different protocols.
The Ekip Com modules are supplied with auxiliary position contacts Ekip AUP and ready to close circuit-breaker contacts Ekip RTC.
When higher reliability of the communication network is required, redundancy ensures a backup connection to the network. For further information, please refer to the paragraph in the Digital Experience chapter.
The user can select local or remote to allow one single module as remote and the others as local.
The following communication protocols are available for Ekip Aware:

Protocol	Ekip Com Module	Other modules needed
Fieldbus		
Modbus RTU	Ekip Com Modbus RTU	
Profibus-DP	Ekip Com Profibus	
Ethernet		
Profinet	Ekip Com Profinet	Ekip Supply Evo Modbus TCP
EtherNet/IP™	Ekip Com EtherNet/IP™	Ekip Supply Evo Modbus TCP
IEC61850	Ekip Com IEC61850	Ekip Supply Evo Modbus TCP
Profinet Redundancy S2	Ekip Com Profinet	Ekip Supply Evo Modbus TCP
IEC61850 Redundancy (PRP and HSR)	Ekip Com IEC61850	Ekip Supply Evo Modbus TCP

Electrical diagram reference: figures from 51, 52, 53, 56, 57, 59.



Ekip Cartridge

Ekip Cartridge

The Ekip Cartridge is used to expand the connectivity of the circuit breaker. The external mounted device connects directly with Ekip Supply Evo Modbus TCP and Ekip Aware, allowing the use of connectivity modules, including Ekip Com, Ekip Signalling 2K, Ekip Synchrocheck. It is mandatory to have an Ekip Supply Lite module installed in the Ekip Cartridge.

Electrical diagram reference: figure 98



Order code

Signalling



Ekip Signalling 2K

Ekip Signalling 2K

The Ekip Signalling 2K modules supply two input and two output contacts for control and remote signalling of alarms, warnings, status, trips and circuit-breaker events. They can be programmed through the Ekip Connect software. Furthermore, when using Ekip Connect, combinations of events can be freely configured. Two versions of the Ekip 2K Signalling modules are available: Ekip 2K-1 and Ekip 2K-2. In this way, a maximum of two modules for all the frames can be installed at the same time.

—

Electrical diagram reference: figures 41, 42



Ekip 4K Signalling module

Ekip Signalling 4K

The Ekip Signalling 4K is available for E2.3, E4.3, E6.3. This module provides four input contacts and four output contacts for control and remote signalling. It can be programmed 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 the Ekip Aware, without having to remove the trip unit itself and is an alternative to the AUX 6Q auxiliary contacts unit and to Motor-Sense Enabler.

—

Electrical diagram reference: figure 2



Ekip 10K Link Signalling module

Ekip Signalling 10K Link

Ekip Signalling 10K Link is an external signalling unit designed for DIN rail installation for SACE Emax 3 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.
Up to 3 Ekip 10K Link Signalling modules can be connected at the same time to the same circuit-breaker.
The Ekip Signalling 10K Link can be powered either by AC or DC prower supply and can be connected using Ekip Supply Evo Modbus TCP with Link SW package.

Order code

CONNECTIVITY



Ekip Signalling Modbus TCP

Ekip Signalling Modbus TCP

It is an external signalling unit designed for DIN rail installation. 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.
Up to 3 Ekip Signalling Modbus TCP modules can be installed at the same time on the same circuit-breaker.
Function of the signalling module is to share, via an Ethernet network with Modbus TCP or 100baseT1 communication protocol, information about the status of circuit-breakers that might not have the ability to provide such information via Ethernet, and 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 Link / Ekip Signalling Modbus TCP**
Maximum switching voltage		150V DC / 250V AC	2 output + 2 input	4 output + 4 input	10 output + 11 input
Maximum switching current					
	30V DC	2A			
	50V DC	0.8A			
	150V DC	0.2A			
	250V AC	4A			
Contact/coil insulation		1000 Vrms (1min @50Hz)			

Ekip Signalling 10K Link/ Ekip Signalling Modbus TCP		
Auxiliary supply	24-240V AC/DC	
Tolerance	±10%	
Rated power	7W	
Inrush current	1A for 10ms	
5 inputs + 5 outputs	4-20mA	1 DIN-rail type
5 inputs + 5 outputs	0-5V	1 DIN-rail type



Ekip RTC and Ekip AUP Signalling contacts

Ekip RTC and Ekip AUP Signalling contacts

The signalling contacts allow the Ekip Aware to acquire the ready-to-close status of the circuit-breaker, as well as its racked-in, test or racked-out position. These contacts can be optionally installed in the accessories area of SACE Emax 3. Ekip Com modules are always supplied with Ekip RTC and Ekip AUP.

Order code

Protection



Ekip RELT

Ekip RELT

The Ekip RELT module reduces the impact of a possible arc flash event by means of the RELT protection. This module automatically assigns the Input/Outputs for remote activation and positive feedback that the protection is active. Activation and deactivation are possible via communication as well and via EPiC mobile app. For additional information about RELT see "Digital experience - Protections".

—

Electrical diagram reference: figure 43



Ekip Arc-Flash 6F and Arc-Flash Sense

Ekip Arc-Flash 6F and Light-Sense Detector/Light&Pressure-Sense Detector

Ekip Arc-Flash 6F uses dedicated Light-Sense and Light & Pressure-Sense sensors that can quickly detect a potential arc flash event and trip the circuit breaker in less than 40ms without the need for an external arc flash monitoring relay. It can be installed within the module cartridge area of the terminal box or externally via Ekip Cartridge. In addition, 2 Ekip Arc-Flash 6F modules with up to 12 total sensors can be installed for each circuit breaker. For additional information about Ekip Arc-Flash see "Digital experience - Protections".

—

Electrical diagram reference: figure 49,50

Order code

CONNECTIVITY



4T

Temperature

Ekip Temperature 4T

The Ekip Temperature 4T modules provide four analog inputs for PT100/PT1000 thermo-resistances. Through the Ekip Connect commissioning tool, it is possible to set different control thresholds and associate them to digital signals. ABB external probes PT1000 are available for busbar applications as loose parts.
Two versions are available, 4T-1 and 4T-2.



T-Sense Ambient and
T-Sense Busbars

T-Sense Ambient and T-Sense Busbar

Monitor real-time temperature and humidity directly from the Ekip Aware trip unit HMI. These devices are capable of providing environmental information to the trip unit, which is connected via a Bluetooth mesh network allowing the sensors to be installed strategically within the equipment.
Two versions are available:

- T-Sense Ambient is a non-contact sensor, powered by an internal battery used to monitor ambient temperature conditions and humidity.
- T-Sense Busbar is a self-supplied device from the current flowing through the busbars (minimum of 40A) used for continuous humidity monitoring and thermal hotspot detection.

Order code

MEASUREMENT & PROTECTION



Ekip Synchrocheck

Ekip Synchrocheck

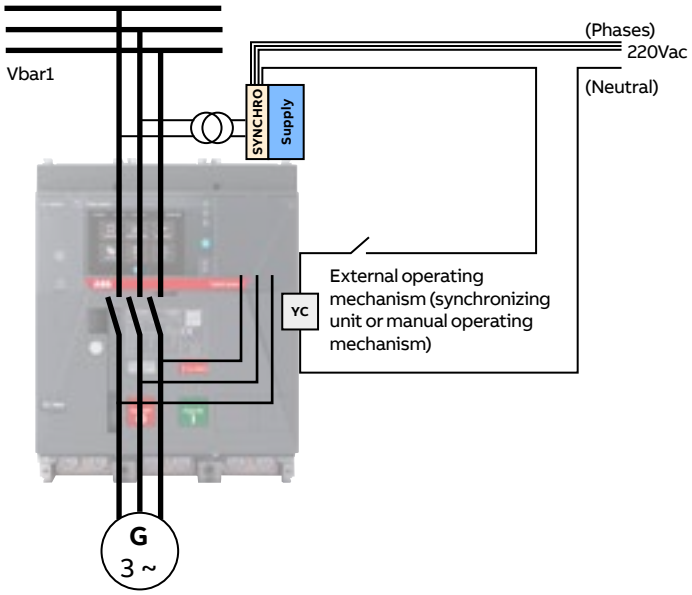
This module enables the control of the synchronism condition when placing two lines in parallel. The module can be used with the Ekip Aware with the measurement function enabled.

Ekip Synchrocheck measures the voltages from three phases of one line through an external transformer and compares the concatenated voltages to the measured voltages at the breaker. The maximum concatenated voltage value is 120V AC. It also works single phase.

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 release.

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	1 output
	150V DC	0.2A	
	250V AC	4A	
Contact/coil insulation		1000 Vrms (1min @50Hz)	

Electrical diagram reference: figure 48



Order code

MEASUREMENT & PROTECTION



Current sensor for neutral conductor outside the circuit-breaker

Current sensor for neutral conductor outside the circuit-breaker

This is only for three-pole circuit-breakers; it enables protection of the neutral conductor to be achieved through connection (3m) to the trip unit. It is supplied on request. 10m cable available for connecting to the trip unit.

—

Electrical diagram reference: figure 27

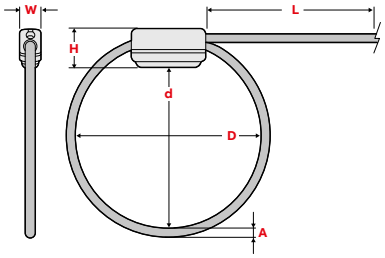


Openable current sensor for neutral conductor outside the circuit-breaker

With same functionality to the conventional current sensor for neutral conductor outside the circuit-breaker, this allows for easy installation by means of plug-in sensor that can be installed around the busbar or cables without the need for a hardbus connection, offering 80% less installation time than external neutral sensor.

—

Electrical diagram reference: figure 27



Frame	d [mm]	D [mm]	A [mm]	W [mm]	H [mm]	L [m]	Current [A]
CT100	65	85	12	22.5	27	3	Up to 6300
CT120	105	90	12	22.5	27	3	Up to 6300
CT200	165	180	12	22.5	27	3	Up to 6300
CT290	225	245	12	22.5	27	3	Up to 6300



Homopolar toroid for Gext protection

Homopolar toroid for Gext protection

When protection against an earth fault (Gext) is required, Ekip Aware trip unit 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 five sizes of the toroid: 100A, 250A, 400A, 800A, 1200A. The homopolar toroid is an alternative to the toroid for differential protection.

—

Electrical diagram reference: figure 25



Toroid for differential protection

Toroid for differential protection RC

When RC protection is required, this toroid enables earth fault currents of 3...30A to be monitored. See page 3/14 for RC protection prerequisite.

—

Electrical diagram reference: figures 24, 24A

Order code



Dedicated terminal for Modified Differential Ground Fault (MDGF) protection

Dedicated terminal for Modified Differential Ground Fault (MDGF) protection

There are two methods to have MDGF protection on Emax 3 :
1) conventional, with the dedicated terminal
2) advanced with the MDGF digital upgrade

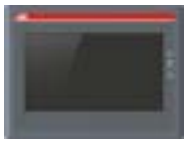
For the first one, a dedicated terminal is needed. Two types of terminal are available: one for the fixed circuit-breakers and one for the withdrawable ones. The application needs the mounting of external phase current transformers and summing current transformers. SACE Emax 3 MDGF scheme is compatible only with current transformers from Amram that must be purchased separately.

For the complete application wiring diagram, please refer to 1SDM000019A1001. Listed below the commercial codes of Phase CTs and Summing CTs compatible with SACE Emax 3 MDGF scheme.

Current rating (A)	Phase current transformer	Summing current transformer
800	CT409-801-01 or CT420-801-01 or CT430-801-01	CT550-5X4-01000
1200	CT409-122-01 or CT420-122-01	CT550-5X4-01515
1600	CT409-162-01 or CT430-162-01	CT550-5X4-02000
2000	CT409-202-01 or CT421-202-01 or CT430-202-01	CT550-5X4-02500
2500	CT409-252-01 or CT421-252-01 or CT430-252-01	CT550-5X4-03125
3200	CT409-322-01 or CT421-322-01 or CT430-322-01	CT550-5X4-04167
4000	CT421-402-01 or CT430-402-01	CT550-5X4-05000
5000	CT421-502-01 or CT430-502-01	CT550-5X4-06250
6000	CT422-602-01 or CT430-602-01	CT550-5C4-07692

If the terminal for MDGF is bought after sales, FP connector for 3-pin/5-pin terminal block must be ordered.

DISPLAYING



Lite Panel

Lite Panel

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

The most important functionalities of this device:

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



Lite Panel Pro

Lite Panel Pro

Lite Panel Pro is a 12.1 inches local control panel that can monitor and control up to 90 devices connected via Modbus TCP/IP or Modbus RTU. It must be supplied with 24V. This is a very customizable device according to customer's needs, and it can also be used to integrate and monitor third party devices.The most important functionalities of this device:

- User administration: 5 types of local user accounts available inside the Lite Panel Pro
- Automatic Scan of various devices already mapped inside the Lite Panel Pro: Emax 2, Tmax XT, ITS2, M4M, CMS700 etc… (see detailed list in the user installation manual)
- Local monitoring directly on the front of the panel for all the devices since real-time data are always visible
- Local control of devices such as breakers and ATSs: open, closing, reset
- Alarm list and event log directly visible from one access point, taking in consideration also the single-line diagram
- Data historization and trend visualization
- Report download
- Web server available via LAN or Wi-Fi (EPiC)
- Possibility to enable cloud connection to ABB Ability Energy Manager, without any additional hardware
- Third party device support enabled via pre-defined templates.

MISCELLANEOUS

Test report
Various types of reports are available:

- **Routine Test Certificate:** it certifies that all mandatory tests have been performed. No detailed measurement values are included. It is always available free of charge.
- **Test Report Lite:** it includes information on the mechanical operation test, electrical accessories test, primary injection test, and dielectric withstand voltage test.
- **Test Report:** it is a more comprehensive version that includes all the information in the Test Report Lite, plus the pole resistance test.

Test reports can be easily downloaded via the EPiC mobile app by scanning the QR code located on the front of the circuit breaker, or via Ekip Connect.

SERVICE

Extended warranty

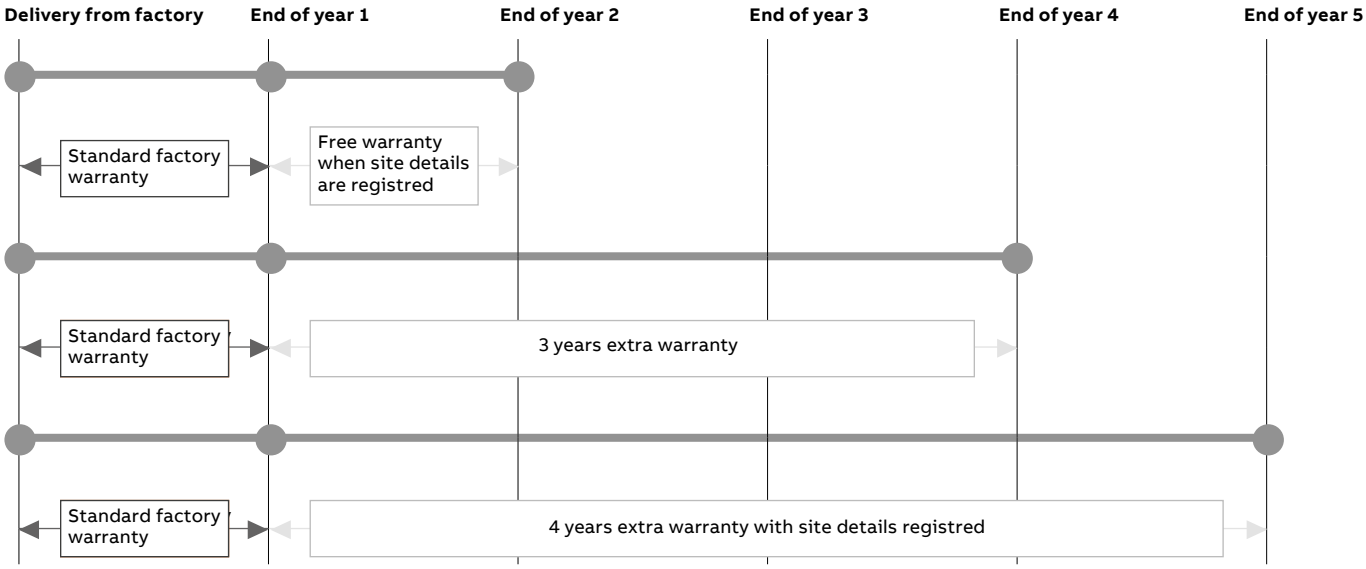
For ABB Low Voltage circuit-breakers, extending the 1-year standard factory warranty to up to 5 years is possible.
Extended warranty activation can be requested after the online registration in the Extended Warranty tool. This web-tool verifies that the application of the circuit-breaker is within the 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.





Order code

Spare parts

The following original and guaranteed spare parts are available:

- Front Cover
- 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 Disconnector 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
- 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 “Ordering Codes” or to ABB SACE Spare Parts Catalogue (1SDC001007D0206).





Order code

05

INSTALLATION

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5/14 **Performance in switchgear**

CIRCUIT-BREAKER

The new SACE Emax 3 family maintains the characteristics of strength and reliability that have always distinguished the tradition of ABB SACE air circuit-breakers.

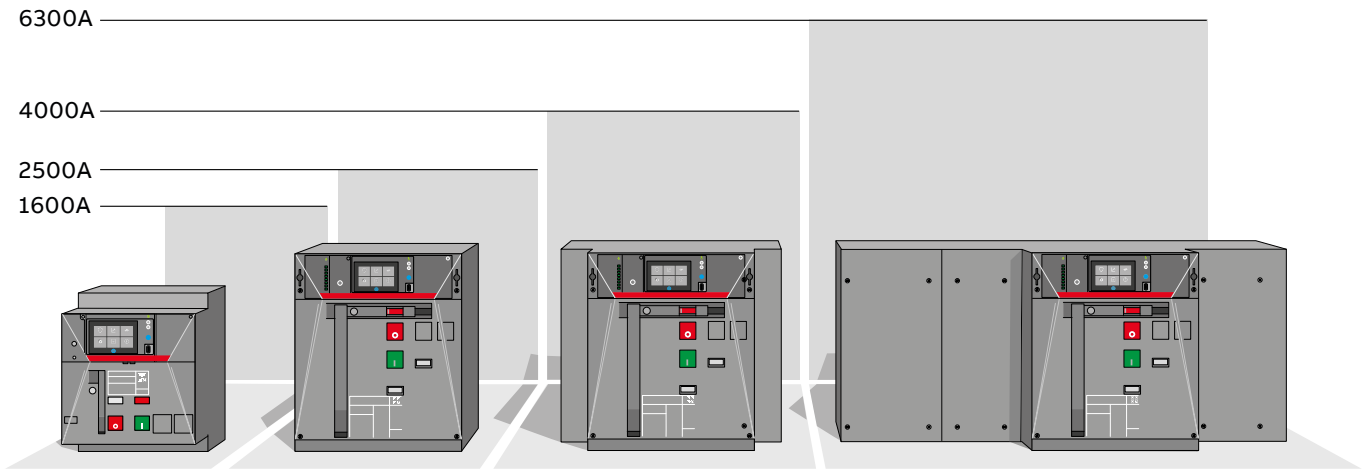
The new SACE Emax 3 circuit-breakers, available in four sizes, are extremely compact: with low depths and heights, combined with standardized widths, they provide the answer to the most stringent installation requirements.

Safety is guaranteed thanks to double insulation between the live power parts and the front parts of the apparatus and thanks to total segregation of the phases. Furthermore, the design of the SACE Emax 3 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.

Sizes

The SACE Emax 3 circuit-breakers, available in 4 sizes up to 6300A, provide:

- **Versatility:** this is particularly important since the design of Emax 3 can fit comfortably within the confined space of the switchgear, ensuring it operates efficiently in various demanding environments.
- **Saving:** optimizing the dimensions of electrical switchgear can lead to a potential reduction in material consumption.



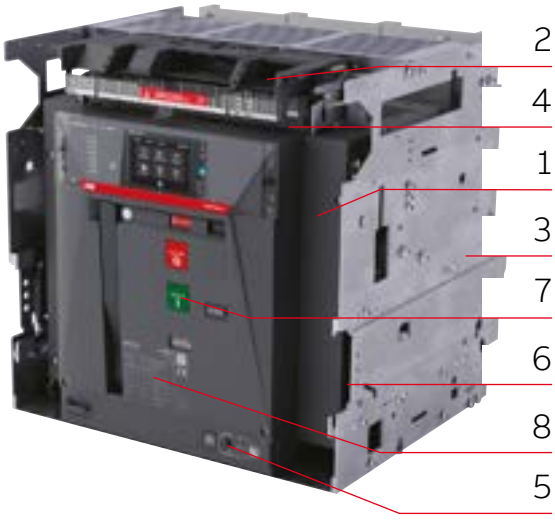
Versions

The SACE Emax 3 circuit-breakers are available in both fixed and withdrawable versions.

The withdrawable version is recommended for applications where service continuity is essential. This version allows for the replacement of the moving part using a remote racking device (either external or embedded) without requiring any intervention on power or auxiliary connections, thus permitting reset in the shortest time possible.
The fixed version is connected directly to the power system through the circuit-breaker terminals. It is ideal for applications where space is limited, providing a compact solution without compromising performance or the ability to fit accessories.

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

Withdrawable



Fixed



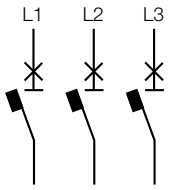
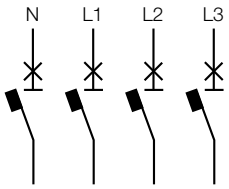
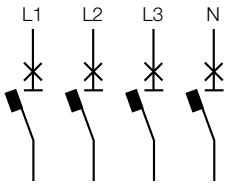
CIRCUIT-BREAKER

Poles

SACE Emax 3 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 E1.3, E2.3 and E4.3 are always provided with full-size neutral pole with rated uninterrupted current-carrying capacity identical to the phase poles. The E6.3 circuit- breakers, thanks to their construction modularity, are available with neutral set at 50 percent of nor- mal 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 circuit-breakers, 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 chapter 08 for the commercial codes).

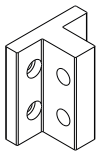
	Standard version		**Optional version with neutral on the right**
Circuit-breaker	**Three-pole**	**Four-pole**	**Four-pole**
Emax E1.3 Emax E2.3 Emax E4.3 Emax E6.3			

Terminals

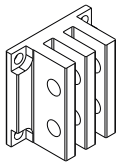
Silver-plated copper terminals make installation of circuit-breaker easier since they are designed to connect the breaker to busbars based on circuit-breaker's rated capacity. Each terminal matches the standard busbar width based on its amperage and has one, two or three stabs to connect to multiple bus runs if needed. For specific installation needs, the circuit-breaker can be fitted with different terminal combinations for the upper and lower parts.

Emax 3 product family is tested according to IEC standard 60947-2 and 60947-3.
Customer applications need to be validated applying the type tests of the related standards.

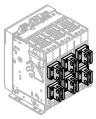
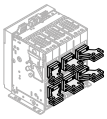
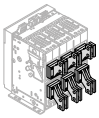
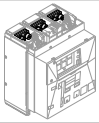
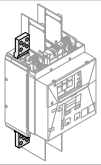
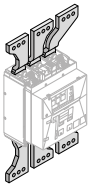
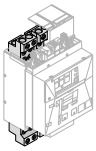
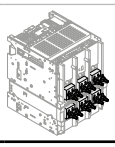
Examples of terminal stab design:



Single stab design



Multiple stab design

Type	Abbreviation		E1.3	E2.3	E4.3	E6.3
Rear adjustable terminal (1)	HR VR		F, W	F, W	F, W	F, W
Long Rear adjustable terminal	LHR LVR		F, W	F, W	F, W	F, W
Horizontal rear spread terminal	SHR		W	F, W	F, W	
Vertical rear spread terminal	SVR			F, W	F, W	
Front terminal	F		F	F, W	F, W	F, W
Extended front terminal	EF		F, W			
Front spread terminal	ES		F, W			
Terminal for cable FcCuAl 4x240mm²	Fc CuAl		F, W			
Flat terminal	FL			W	W	W

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

CIRCUIT-BREAKER

Degree of protection

The SACE Emax 3 circuit-breakers guarantee the following degrees of protection:

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

Power losses

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

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

Circuit-breaker type		Iu	630A	800A	1000A	1250A	1600A	2000A	2500A	3200A	4000A	5000A	6300A
Fixed	**E1.3 B/C/N**	[W]	31	50	78	122	201	-	-	-	-	-	-
	E2.3 B/N/S/H	[W]	-	34	53	83	136	212	267	-	-	-	-
	E4.3 N/S/H/V	[W]	-	-	-	-	-	-	-	425	465	-	-
	E6.3 H/V/X	[W]	-	-	-	-	-	-	-	-	309	483	767
Withdrawable	**E1.3 B/C/N**	[W]	62	100	156	244	400	-	-	-	-	-	-
	E2.3 B/N/S/H	[W]	-	72	113	176	288	450	550	-	-	-	-
	E4.3 N/S/H/V	[W]	-	-	-	-	-	-	-	743	900	-	-
	E6.3 H/V/X	[W]	-	-	-	-	-	-	-	-	544	850 (1)	1550

1) with fixed part E6.3H 4000-5000A, power losses are 950 W

OPERATING CONDITIONS

SACE Emax 3 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 with the aim to increase performances and extending the lifecycle of the circuit-breaker.

Temperature

SACE Emax 3 circuit-breakers can operate in the following environmental conditions:

	Temperature (°C)		
	Operating	**Active Display**	**Storage**
Emax 3 with Ekip Aware	-25°C ... +70°C	-20°C ... +70°C	-30°C ... +75°C
Emax 3 switch-disconnectors	-25°C ... +70°C	-	-40°C ... +85°C

Environmental conditions

The SACE Emax 3 circuit-breakers are designed to be installed in industrial environments with pollution level 3 according to IEC 60947. Additionally, they comply with:

- IEC 60721-3-6 Class 6C3, making them suitable for outdoor and industrial applications that involve moderate mechanical stress and moderate climate conditions (temperature range from -5°C to +40°C).
- IEC 60721-3-3 Class 3C2, making them suitable with indoor environments subject to moderate mechanical stress and moderate climate conditions (temperature range from +5°C to +40°C, with controlled humidity).

This ensures the SACE Emax 3 circuit-breakers are versatile and reliable across a range of installation environments.

Altitude

SACE Emax 3 air circuit-breakers maintain their rated performance up to an altitude of 2000 meters. Beyond this altitude, atmospheric properties such as composition, dielectric strength, cooling capacity and pressure can vary, leading to a derating of the circuit-breakers' performance. This derating can be assessed through changes in the maximum rated service voltage and the rated uninterrupted current.

Altitude		[m]	**2000**	**3000**	**4000**	**5000**
Rated service voltage - Ue	Versions 690V	[V]	690	624	544	477
Rated current		[% In]	100	98	93	90

OPERATING CONDITIONS

Vibration

The SACE Emax 3 circuit-breakers have been tested in accordance with several key standards to ensure their reliability and performance under various conditions:

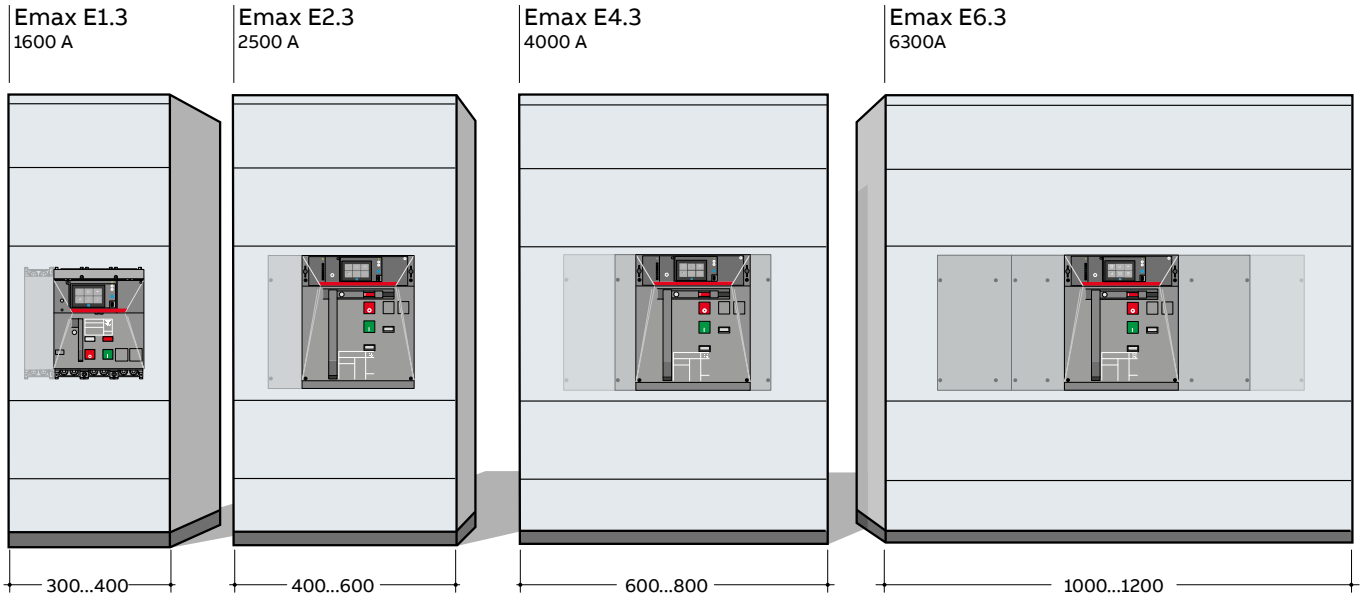
- **IEC 60068-2-6:** this standard covers vibration testing. The circuit-breakers were tested with:
  - Frequency range of 2 to 13 Hz with an amplitude of ±1mm.
  - Frequency range of 13 to 100 Hz with a constant acceleration of ±0.7g.
- **IEC 60721-3-1:** this standard specifies the conditions for storage. The circuit-breakers were tested for storage in a 1M3 environment (a controlled indoor environment with moderate conditions).
- **IEC 60721-3-2:** this standard covers the conditions for transportation. The circuit-breakers were tested for transport in a 2M2 environment (subject to moderate mechanical stress and temperature variations).
- **IEC 60721-3-3:** This standard defines the operational conditions for the circuit-breakers. They were tested for operation in a 3M2 environment (designed to handle moderate mechanical stress and typical industrial conditions).

Additionally, the circuit-breakers have been registered or certified for shipping, ensuring they meet the required standards for safe handling and transportation.

Electromagnetic compatibility

The use of specific devices in industrial installations may cause electromagnetic interference in the electrical system. SACE Emax 3 circuit-breakers have been developed and tested for electro-magnetic compatibility in accordance with IEC 60947-2, Appendices J and F.

Due to the four construction sizes and the reduced insulation distances required, SACE Emax 3 circuit-breakers optimize the installation spaces of the compartments of electrical switchgear, thereby providing a rational solution to the customers' application needs.



INSTALLATION IN SWITCHGEAR

Position

All SACE Emax 3 circuit-breakers can be floor mounted in a vertical position inside the switchgear compartment.
The E1.3 circuit-breaker can also be installed in a horizontal position and wall mounted.

Power supply

The Emax 3 circuit-breakers can be supplied from either the upper or lower terminals. If Measuring digital upgrade is present, the voltage measurement cables (installed by default on the bottom part) must be installed on the power supply side to ensure that all information is accessible when the circuit-breaker is in the open position.

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:

1. **Minimum insulation distances between the phases**

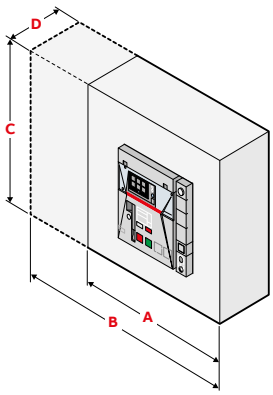
Rated insulation voltage Ui	Minimum distance [mm]
1000V	for voltages upper to 440V in fixed circuit-breakers, please use phase separators

2. **Insulation distance of installation cubicle**

FIXED CIRCUIT-BREAKERS

[mm]	A 3p	B 4P	C	D
E1.3	250	322	382.5 (1)	130
E2.3	400	490	500	221
E4.3	500	600	500	221
E6.3	900	1000	500	221
E6.3/f	-	1200	500	221

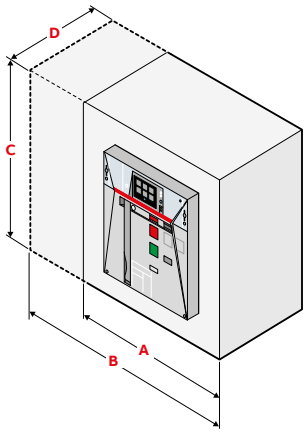
1) 332.5mm for voltage less ≤ 440V AC



WITHDRAWABLE CIRCUIT-BREAKERS

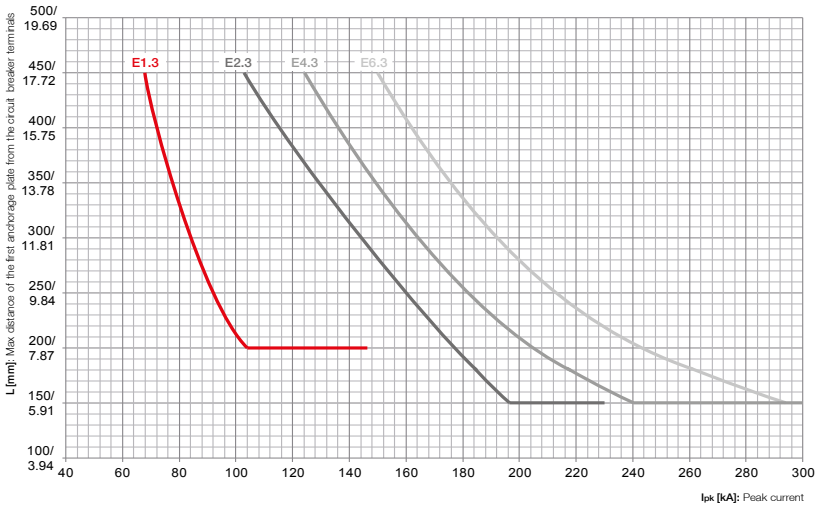
[mm]	A 3p	B 4P	C	D
E1.3	280	350	440 (1)	252
E2.3	400	490	500	355
E4.3	500	600	500	355
E6.3	900	1000	500	355
E6.3/f	-	1200	500	355

1) 390mm for voltage less ≤ 440V AC
0-arc distance top cover is an accessory available for E2.3, E4.4 and E6.3 (only withdrawable) that allow to reduce C distance of the cubicle at the same height of the fixed part.

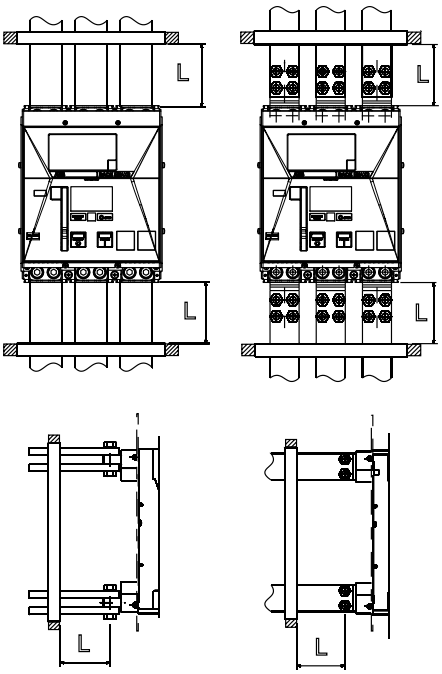


3. Anchorage plates

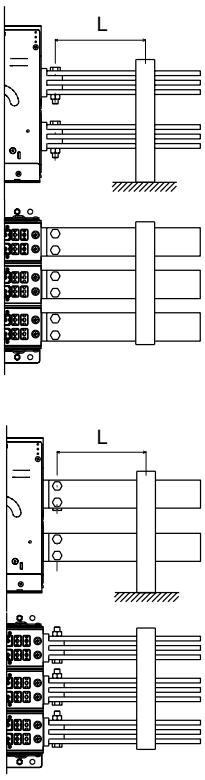
During a short-circuit event, electrodynamic forces are generated, which can exert significant mechanical stress on both the circuit-breakers and the surrounding switchgear structures. To mitigate the impact of these forces, it is essential to position fastening anchor plates near the terminals of the circuit-breaker. These plates help absorb and distribute the mechanical stress, preventing damage to the components. The diagram below illustrates the recommended distance for positioning the first anchor plate for the Emax 3 circuit-breakers, which is determined based on the peak current expected during a short-circuit. Proper placement of these anchor plates is critical for ensuring the structural integrity and reliable operation of the switchgear under fault conditions.



E1.3



E2.3, E4.3, E6.3



INSTALLATION IN SWITCHGEAR

4. **Tightening torques**
   For connecting CB and burbars.

Terminals	E1.3	E2.3 / E4.3 / E6.3
Modifiable HR/VR rear	45 Nm	70 Nm
Spread rear	45 Nm	70 Nm
Front	45 Nm	70 Nm
Extended front	45 Nm	70 Nm
Spread front	70 Nm	70 Nm
Front for cables	43 Nm	

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

Earthing connection

To achieve continuity and equal potential of earthing between the Emax 3 circuit-breaker and the protection circuit of the switchboard, customers can choose one of the following options:

- Connect the Emax 3 fixed circuit-breaker or the fixed part of the withdrawable circuit-breaker to the protective circuit by means of a cable with suitable cross sectional area to fulfil the requirements of clause 10.5.2 of the Standard IEC 61439-1.
- If the continuity of the circuit-breaker frame with the switchboard earthing is guaranteed by the metal contact (support) between the circuit-breaker and the metal structure of the switch- board (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 E1.3, fixed version, does not require any earthing connection.

Busbar types

The circuit-breakers, via the terminals, can be connected to the main distribution system by busbars of different types: copper, silver-plated copper and tinned aluminum when the main distribution system is made of aluminum.
The circuit-breakers can be connected directly with copper or aluminum cables in the case of E1.3 circuit-breakers, or indirectly by cable-carrying bars in the case of E2.3, E4.3 and E6.3.

Replacing Emax 2 with Emax 3

A critical factor when introducing a new circuit-breaker into the electrical distribution system is ensuring investment protection by preserving the existing switchboard design certified under IEC 61439-2. Maintaining the original design not only avoids costly and time-consuming modifications but also simplifies the migration process to leverage on the new features derived from the new product. Following IEC guidelines allows for a seamless replacement of the original device in an already IEC 61439 verified assembly, using an alternative component without needing to repeat assembly verification tests.
The main design characteristics and performance must remain unchanged or improved.
By preserving the existing design, businesses avoid the added expenses and time delays associated with extensive re-testing.
Emax 3 has the same rated current availability across the different frames as the Emax 2 range as well same perfomances (e.g. Ue, Ui, Icu, power losses, temperature derating etc). For details consult "Emax 2 to Emax 3 Product Replacement" white paper and 1SDH002310A1002.



PERFORMANCE IN SWITCHGEAR

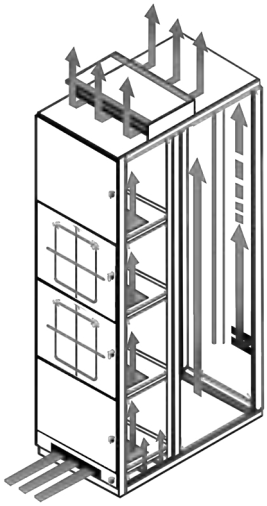
Performance in switchgear

The following tables provide an indication of the performance of the apparatus inside the switchgear. The data shown are a summary of software model simulations and real tests.
They take into consideration the main factors that can influence the performance of the circuit-breaker in switchgear:

- Type of switchgear
- Switchgear degree of protection
- Segregation Form 3
- Size of circuit-breaker
- Number of devices connected at the same time in the unit
- Type of terminal and connection
- Environmental temperature Ta (IEC61439-1)

Withdrawable circuit-breakers are taken in consideration. The maximum withstand temperature for the terminal is 120° C.
Emax 3 product family is tested according to IEC standard 60947-2 and 60947-3.
The type of switchgear design, along with installation and environmental conditions, can significantly influence the performance of a circuit breaker.
Customer applications need to be validated applying the type tests of the related standards.

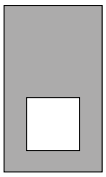
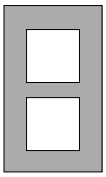
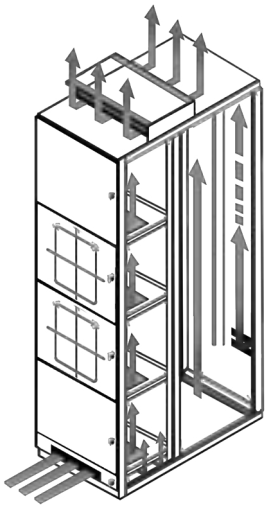
SACE EMAX 3 E1.3 B C N CIRCUIT-BREAKER - SWITCHGEAR DIMENSIONS 2200x400x600 (HxWxD)



IP	Iu	Connection [mm]	Compartment	HR Terminal One circuit-breaker in the column			HR Terminal Two circuit-breakers in the column		
				Environment temperature			Environment temperature		
				35 °C	45 °C	55 °C	35 °C	45 °C	55 °C
IP31	630	2x40x5	2				630	630	630
			1	630	630	630	630	630	630
	800	2x50x5	2				800	800	800
			1	800	800	800	800	800	800
	1000	2x50x10	2				970	930	900
			1	1000	1000	1000	1000	960	920
		2x50x8	2						
			1						
	1250	2x50x10	2				1200	1150	1100
			1	1250	1250	1200	1250	1200	1140
		2x50x8	2						
			1						
	1600	3x50x8	2				1330	1260	1220
			1	1440	1360	1290	1370	1315	1262
		2x50x10	2						
			1						

Performances with EF, SHR and F terminals can be compared, with the same connection sections, to the performances of circuit-breaker with HR terminal.
Performances with ES terminals can be compared to the VR terminals.
Performances with FC CuAl terminals, with cables in the prescribed sections, can be compared to HR performances.
Performances depend on switchboard design and testing condition. ABB is not responsible for the overall performances result.

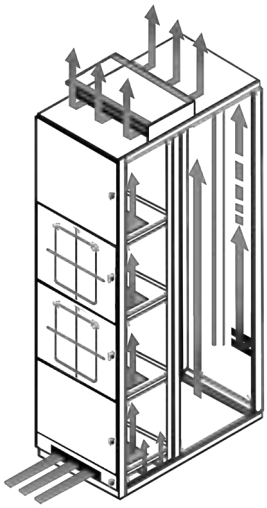
SACE EMAX 3 E1.3 B C N CIRCUIT-BREAKER - SWITCHGEAR DIMENSIONS 2200x400x600 (HxWxD)

					VR Terminal One circuit-breaker in the column			VR Terminal Two circuit-breakers in the column		
										
					Environment temperature			Environment temperature		
IP		**Iu**	**Connection [mm]**	**Compartment**	**35 °C**	**45 °C**	**55 °C**	**35 °C**	**45 °C**	**55 °C**
IP31		630	2x40x5	2				630	630	630
				1	630	630	630	630	630	630
		800	2x50x5	2				800	800	800
				1	800	800	800	800	800	800
		1000	2x50x10	2						
				1						
			2x50x8	2				1000	1000	950
Compartment 2				1	1000	1000	1000	1000	1000	970
		1250	2x50x10	2						
				1						
Compartment 1			2x50x8	2				1250	1250	1150
				1	1250	1250	1250	1250	1250	1200
		1600	3x50x8	2						
				1						
			2x50x10	2				1430	1355	1265
				1	1520	1440	1330	1475	1415	1310

Performances with EF, SHR and F terminals can be compared, with the same connection sections, to the performances of circuit-breaker with HR terminal.
Performances with ES terminals can be compared to the VR terminals.
Performances with FC CuAl terminals, with cables in the prescribed sections, can be compared to HR performances.
Performances depend on switchboard design and testing condition. ABB is not responsible for the overall performances result.

PERFORMANCE IN SWITCHGEAR

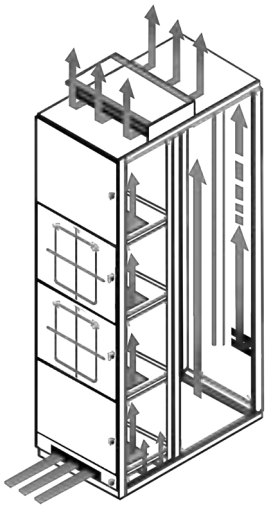
SACE EMAX 3 E2.3 B N S H CIRCUIT-BREAKER - SWITCHGEAR DIMENSIONS 2200x600x900 (HxWxD)

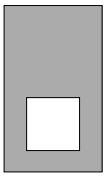


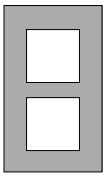
				HR Terminal One circuit-breaker in the column			HR Terminal Two circuit-breakers in the column		
				Environment temperature			Environment temperature		
IP	**Iu**	**Connection [mm]**	**Compartment**	**35 °C**	**45 °C**	**55 °C**	**35 °C**	**45 °C**	**55 °C**
IP31	800	1x60x10	2				800	800	800
			1	800	800	800	800	800	800
	1000	1x60x10	2				1000	1000	1000
			1	1000	1000	1000	1000	1000	1000
	1250	2x60x10	2				1250	1250	1250
			1	1250	1250	1250	1250	1250	1250
	1600	2x60x10	2				1470	1410	1360
			1	1600	1540	1480	1550	1490	1430
		1x100x10	2						
			1						
	2000	3x60x10	2				1920	1810	1720
			1	2000	1940	1850	1950	1850	1760
		2x80x10	2						
			1						
		3x60x10 (1)	2				2000	1900	1810
			1	2000	2000	1940	2000	1945	1850
		2x80x10 (1)	2						
			1						
	2500	3x60x10	2				2280	2200	2100
			1	2400	2320	2200	2400	2310	2170
		4x100x5	2						
			1						
		3x60x10 (1)	2				2394	2310	2205
			1	2500	2460	2320	2500	2430	2280
		4x100x5 (1)	2						
			1						

1) Performances refer to SHR and SVR terminals.
Performances with F and FL terminals can be compared to the performance of circuit-breakers with HR terminals.
Performances depend on switchboard design and testing condition. ABB is not responsible for the overall performances result.

SACE EMAX 3 E2.3 B N S H CIRCUIT-BREAKER - SWITCHGEAR DIMENSIONS 2200x600x900 (HxWxD)





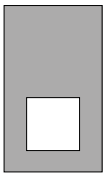
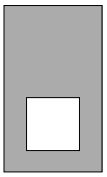
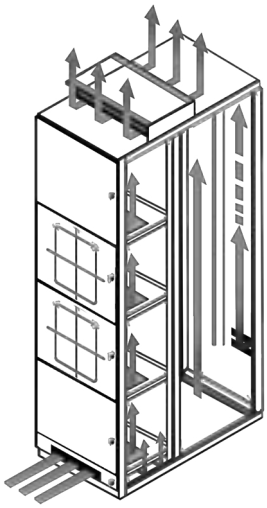


				VR Terminal One circuit-breaker in the column			VR Terminal Two circuit-breakers in the column		
				Environment temperature			Environment temperature		
IP	**Iu**	**Connection [mm]**	**Compartment**	**35 °C**	**45 °C**	**55 °C**	**35 °C**	**45 °C**	**55 °C**
IP31	800	1x60x10	2				800	800	800
			1	800	800	800	800	800	800
	1000	1x60x10	2				1000	1000	1000
			1	1000	1000	1000	1000	1000	1000
	1250	2x60x10	2				1250	1250	1250
			1	1250	1250	1250	1250	1250	1250
	1600	2x60x10	2						
			1						
		1x100x10	2				1500	1470	1400
			1	1600	1600	1520	1580	1550	1475
	2000	3x60x10	2						
			1						
		2x80x10	2				1950	1860	1760
			1	2000	2000	1920	2000	1920	1810
		3x60x10 (1)	2						
			1						
		2x80x10 (1)	2				2000	1950	1850
			1	2000	2000	2000	2000	2000	1900
	2500	3x60x10	2						
			1						
		4x100x5	2				2400	2270	2160
			1	2500	2450	2350	2500	2380	2270
		3x60x10 (1)	2						
			1						
		4x100x5 (1)	2				2500	2390	2270
			1	2500	2500	2460	2500	2500	2380

1) Performances refer to SHR and SVR terminals.
Performances with F and FL terminals can be compared to the performance of circuit-breakers with HR terminals.
Performances depend on switchboard design and testing condition. ABB is not responsible for the overall performances result.

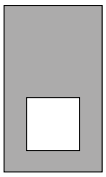
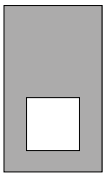
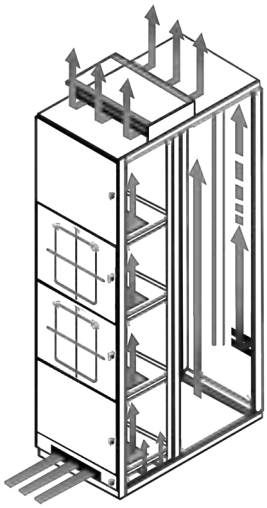
PERFORMANCE IN SWITCHGEAR

SACE EMAX 3 E4.3 N S H V CIRCUIT-BREAKER - SWITCHGEAR DIMENSIONS 2200x800x900 (HxWxD)

					HR Terminal One circuit-breaker in the column			VR Terminal One circuit-breaker in the column		
										
					Environment temperature			Environment temperature		
IP		**Iu**	**Connection [mm]**	**Compartment**	**35 °C**	**45 °C**	**55 °C**	**35 °C**	**45 °C**	**55 °C**
IP31		2000	2x80x10	1	2000	2000	2000	2000	2000	2000
Compartment 2		2500	2x100x10	1	2500	2450	2400	2500	2500	2500
Compartment 1		3200	3x100x10	1	3050	2900	2755	3200	3080	2920
		3200	3x100x10 (1)	1	3200	3050	2850	3200	3200	3020
		4000	4x100x10	1	3450	3200	2970	3650	3400	3200

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

SACE EMAX 3 E6.3 H V X CIRCUIT-BREAKER - SWITCHGEAR DIMENSIONS 2200x1200x900 (HxLxD)

					HR Terminal One circuit-breaker in the column			VR Terminal One circuit-breaker in the column		
										
					Environment temperature			Environment temperature		
IP		**Iu**	**Connection [mm]**	**Compartment**	**35 °C**	**45 °C**	**55 °C**	**35 °C**	**45 °C**	**55 °C**
IP31		4000	4x100x10	1	4000	4000	4000	4000	4000	4000
Compartment 2		5000	5x100x10	1	5000	5000	4900	5000	5000	5000
Compartment 1		6300	6x100x10	1	5650	5350	5100	6000	5700	5250

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

06

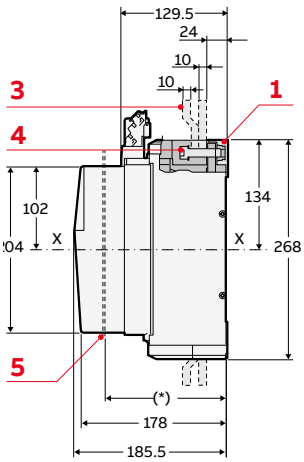
OVERALL DIMENSIONS

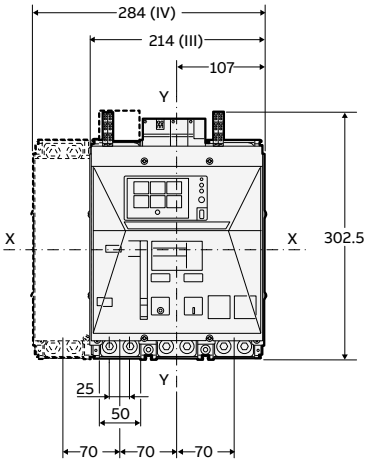
6/2 **Fixed circuit-breaker**
6/2 E1.3
6/6 E2.3
6/10 E4.3
6/12 E6.3

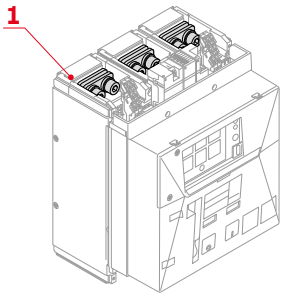
6/16 **Withdrawable circuit-breaker**
6/16 E1.3
6/21 E2.3
6/26 E4.3
6/30 E6.3

FIXED CIRCUIT-BREAKER - E1.3

Front terminals – F

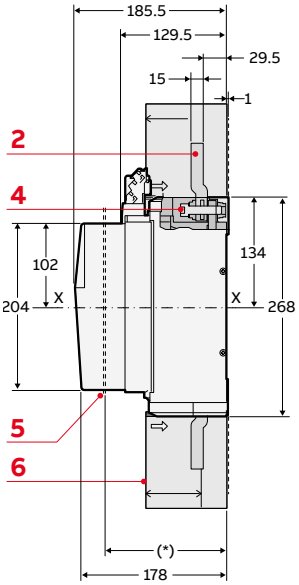


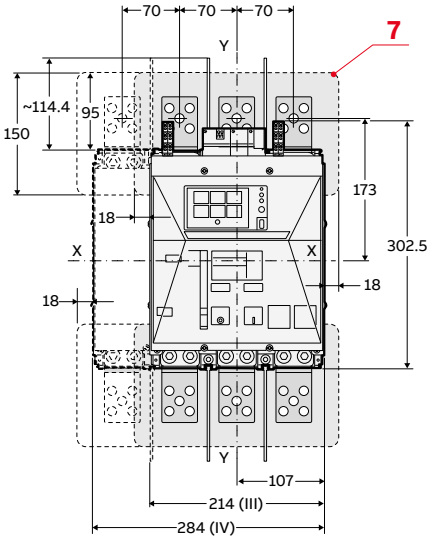


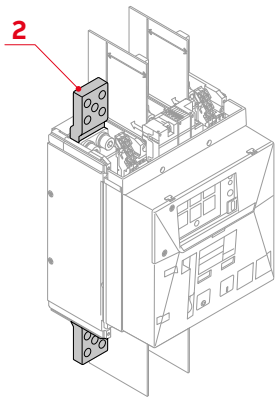


(*) Min. 130 - Max.164mm with flange, 170mm without flange

Extended front terminals – EF







(*) Min. 130 - Max.164mm with flange, 170mm without flange

1 Front terminal for flat connection

2 Extended front terminal

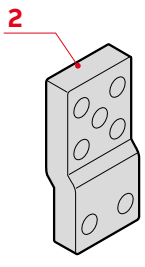
3 In charge of the customer

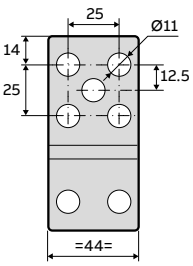
4 Tightening torque 18Nm

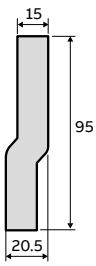
5 Door position for dimensions flange: see TN 1SDH002309A1120

6 Phase separators 100mm compulsory

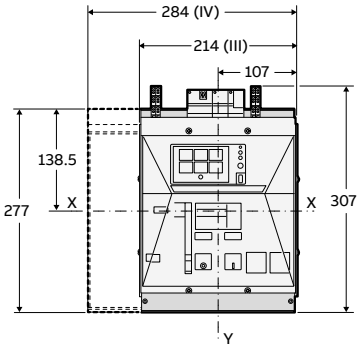
7 Compulsory insulating plate in charge of the customer

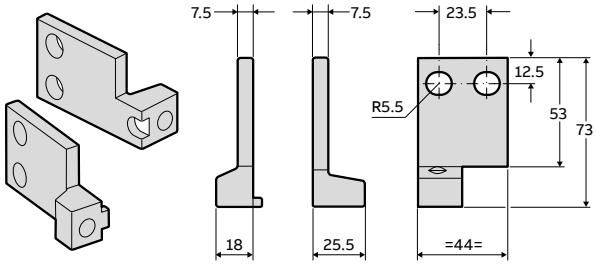




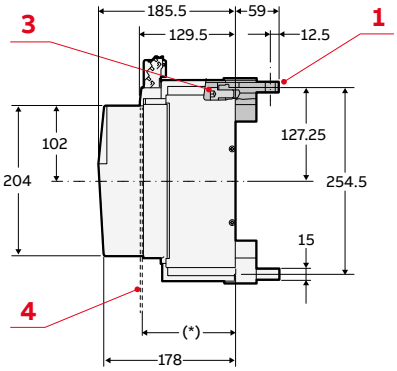


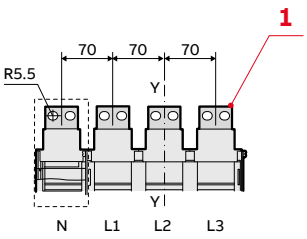
Orientable rear terminals - HR/VR

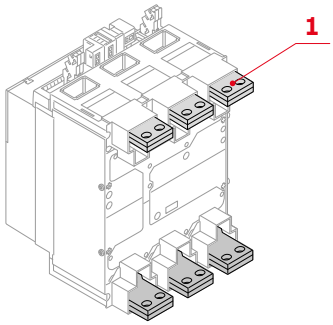




Terminals HR

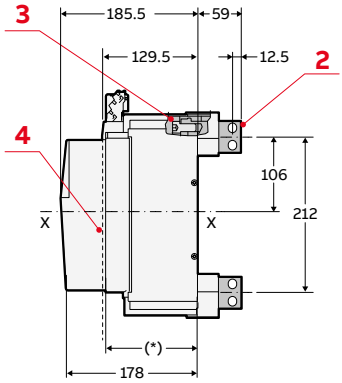


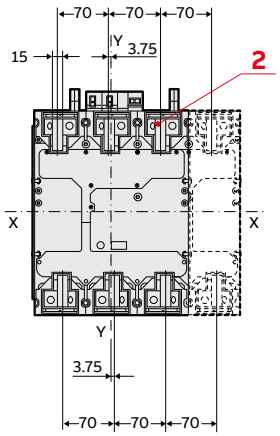


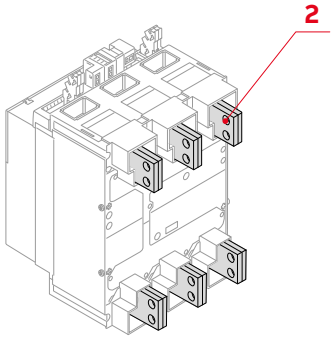


(*) Min. 130 - Max.160mm with flange, 170mm without flange

Terminals VR







(*) Min. 130 - Max.160mm with flange, 170mm without flange

1 Horizontal rotary terminals HR

2 Vertical rotary terminals VR

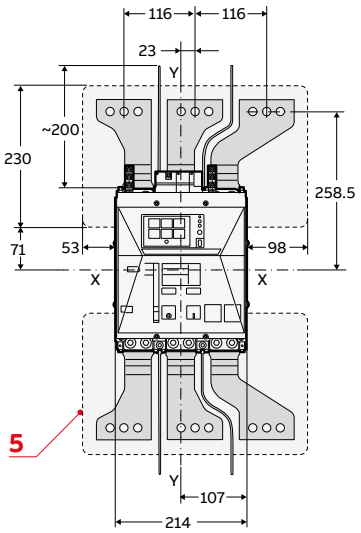
3 Tightening torque 20Nm

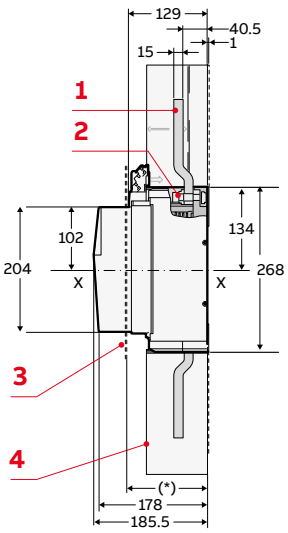
4 Door position for dimensions flange: see TN 1SDH002309A1120

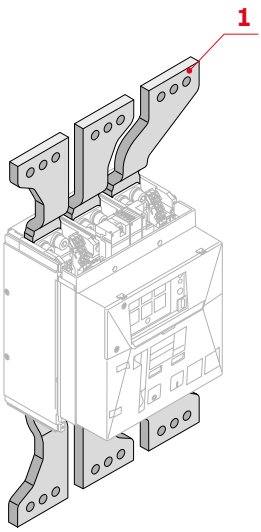
FIXED CIRCUIT-BREAKER - E1.3

Splayed extended front terminals - ES

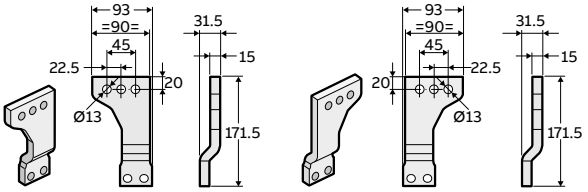
3-pole version



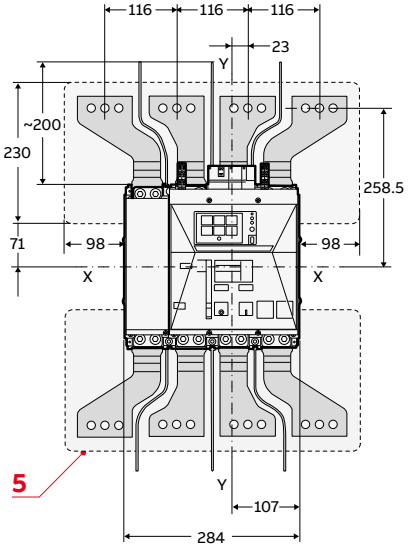


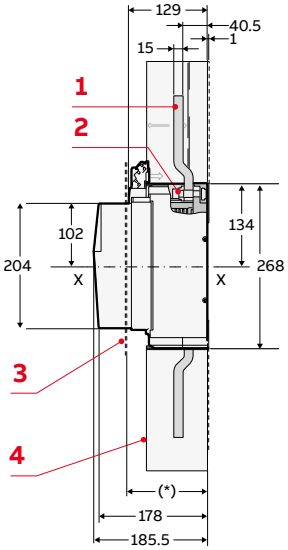


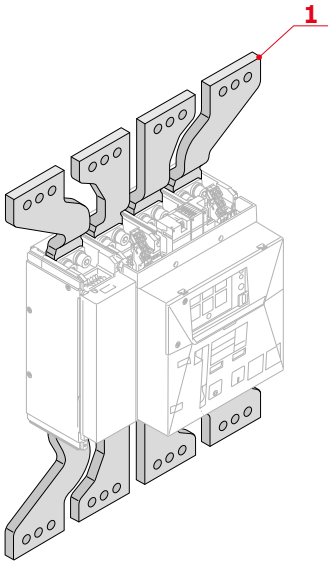
(*) Min. 130 - Max.160mm with flange, 170mm without flange



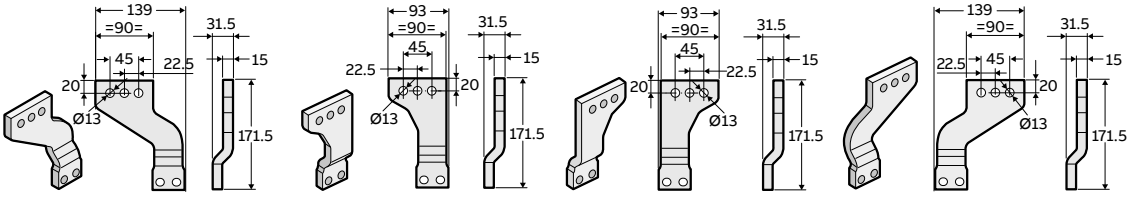
4-pole version







(*) Min. 130 - Max.160mm with flange, 170mm without flange



1 Sreaded extended front terminals

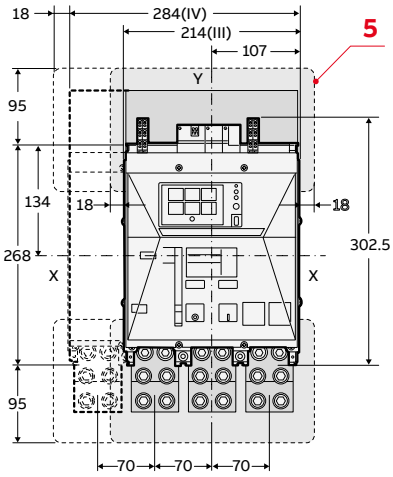
2 Tightening torque 18Nm

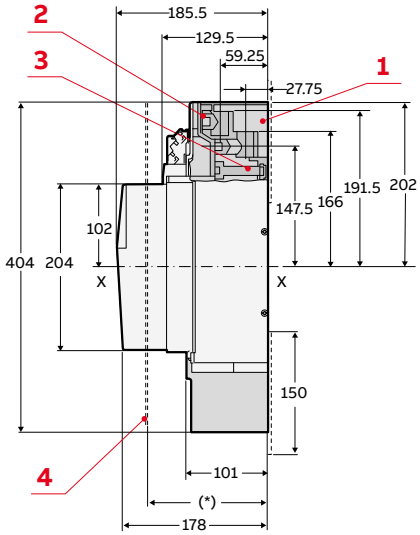
3 Door position for dimensions flange: see TN 1SDH002309A1120

4 Compulsory phase separators 200mm

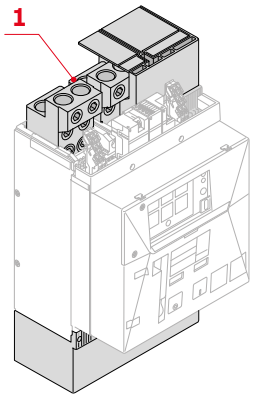
5 Compulsory insulating plate in charge of the customer

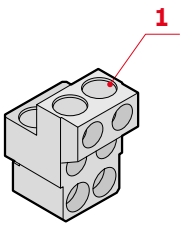
Front terminals for cables – FcCuAl

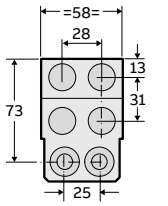


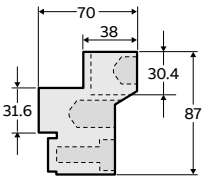


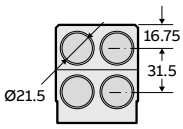
(*) Min. 130 - Max.160mm with flange, 170mm without flange











1 FC Cu Al Front cable terminal

2 Tightening torque 43Nm

3 Tightening torque 18Nm

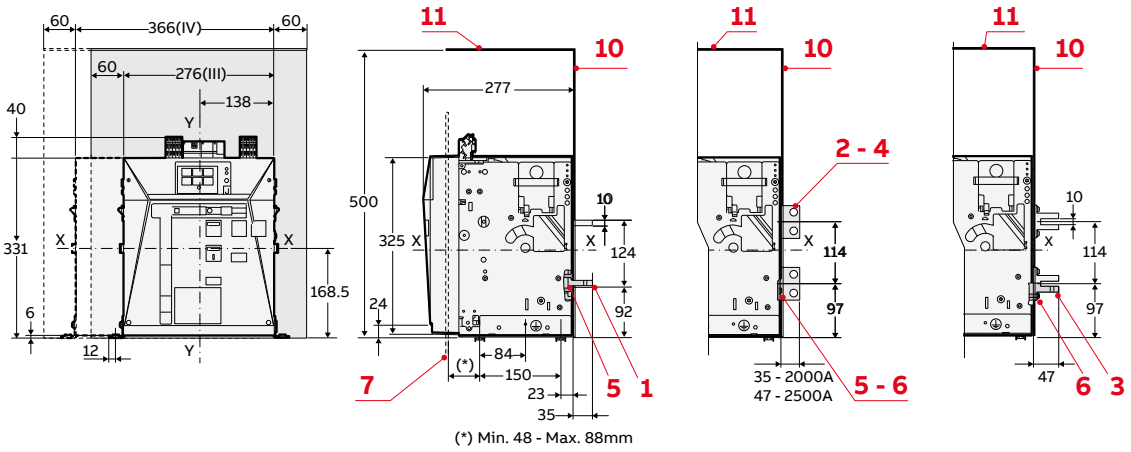
4 Door position for dimensions flange: see TN 1SDH002309A1120

5 Compulsory insulating plate in charge of the customer

FIXED CIRCUIT-BREAKER - E2.3

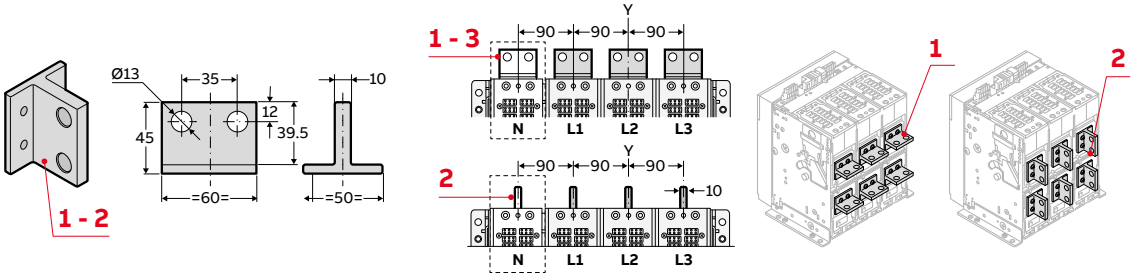
Orientable rear terminals

E2.3 B/N/S/H 2000A **E2.3 N/S/H 2500A**

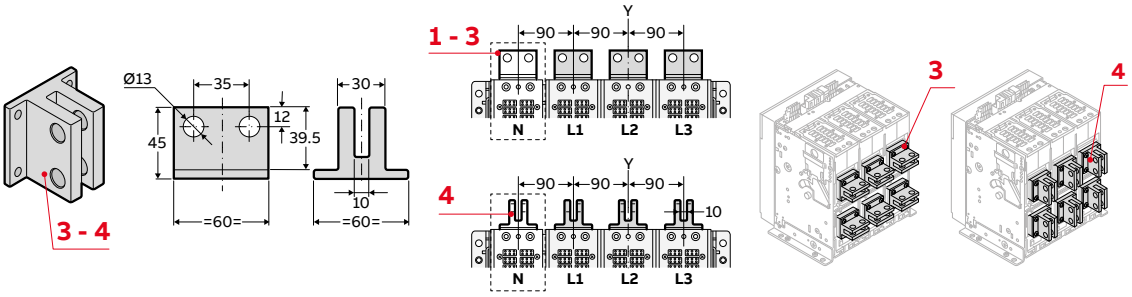


(*) Min. 48 - Max. 88mm

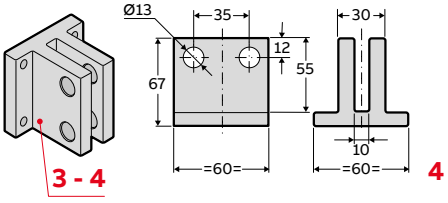
E2.3 B/N/S/H 2000A HR/VR



E2.3 N/S/H 2500A HR/VR



E2.3 N/S/H 2500A - LHR/LVR



1 Horizontal terminal 2000A

2 Vertical terminal 2000A

3 Horizontal terminal 2500A

4 Vertical terminal 2500A

5 Tightening torque 8.6Nm

6 Tightening torque 8.6Nm

7 Door position for dimensions flange: see TN 1SDH002310A1120

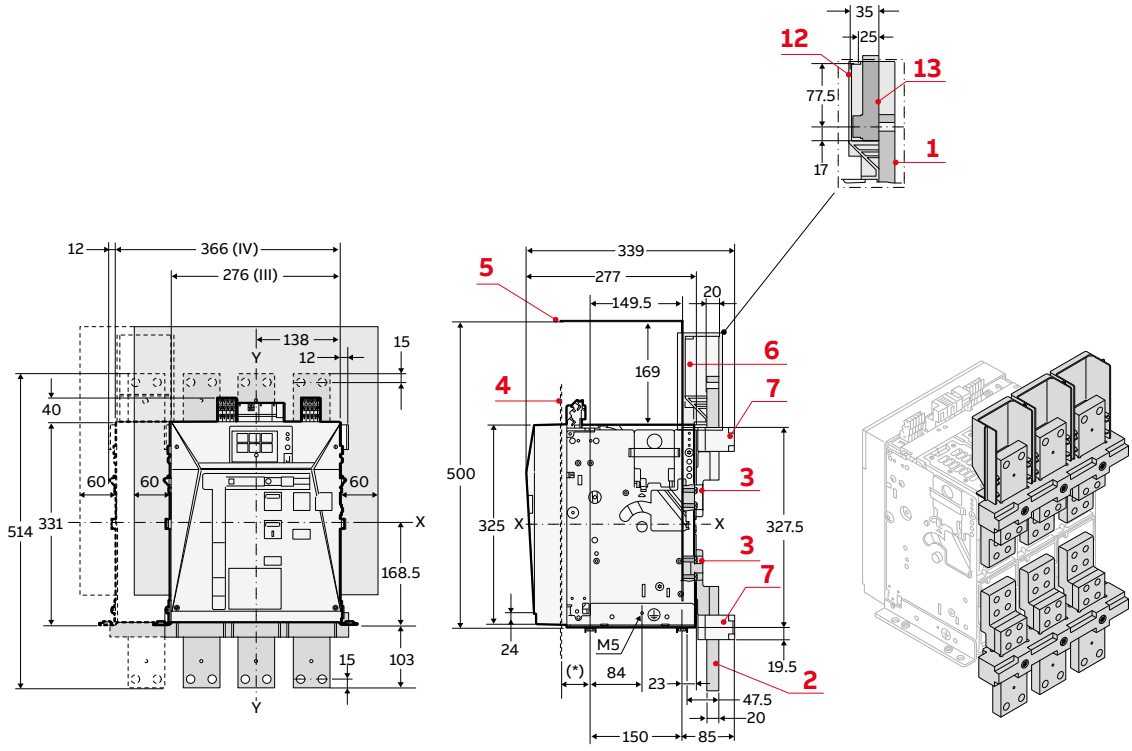
8 Grounding

9 Ferrule for grounding by the customer

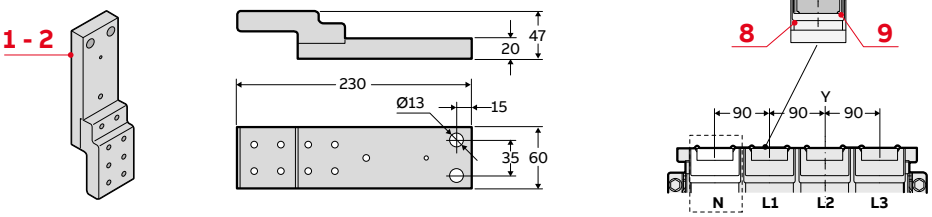
10 Insulating sheet or insulated metallic sheet

11 Metallic sheet

Front terminals – F



(*) Min. 48 - Max. 88mm

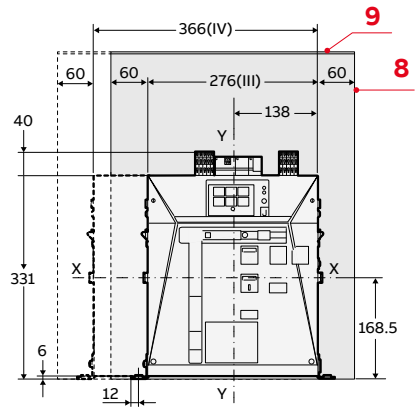


1 Front terminal upper
2 Front terminal lower
3 Tightening torque 8.6Nm
4 Door position for dimensions flange: see TN 1SDH002310A1120
5 Metallic sheet
6 Insulating sheet or nsulated metallic sheet
7 Crossbeam front terminals
8 Plastic protection
9 Customer busbar and screws (not provided)

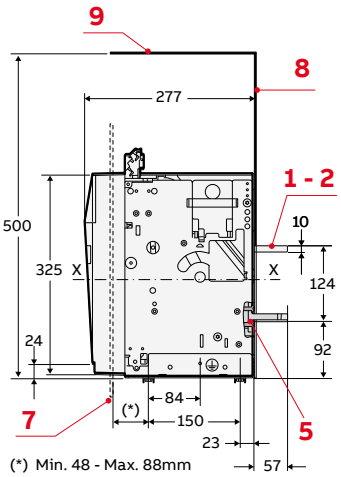
FIXED CIRCUIT-BREAKER - E2.3

Horizontal spread terminals – SHR

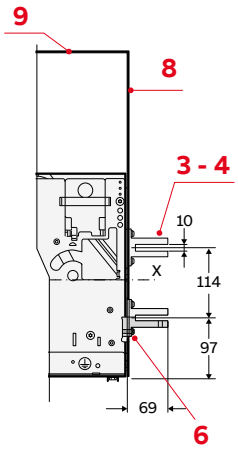
E2.3 B/N/S/H 2000A



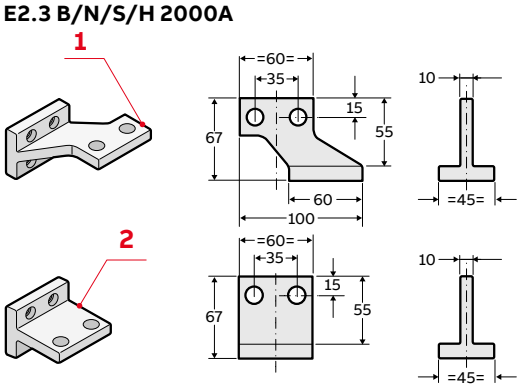
E2.3 B/N/S/H 2000A

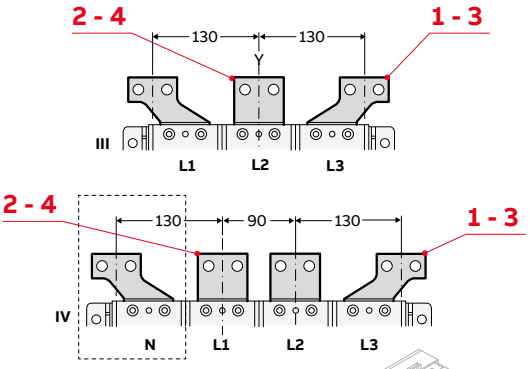


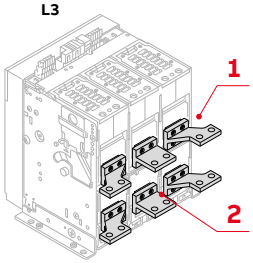
E2.3 N/S/H 2500A



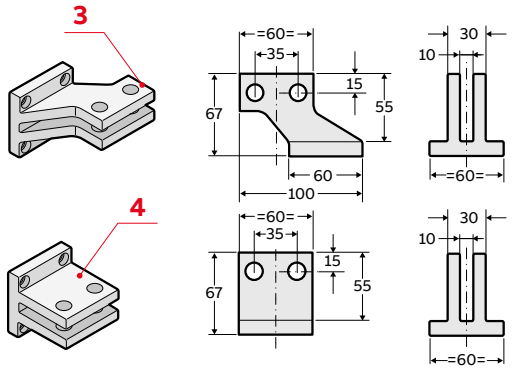
E2.3 B/N/S/H 2000A

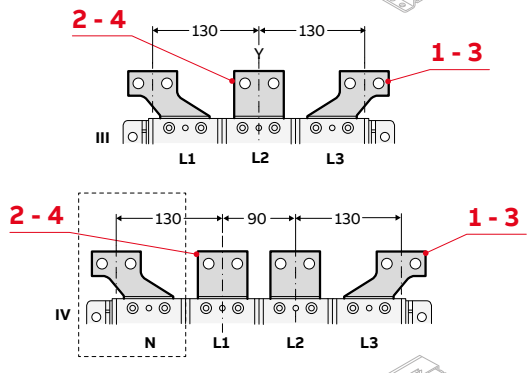


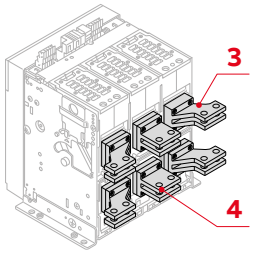




E2.3 N/S/H 2500A







1 Side horizontal divericate terminal 2000A

2 Central horizontal divericate terminals 2000A

3 Side horizontal divericate terminals 2500A

4 Central horizontal divericate terminals 2500A

5 Tightening torque 8.6Nm

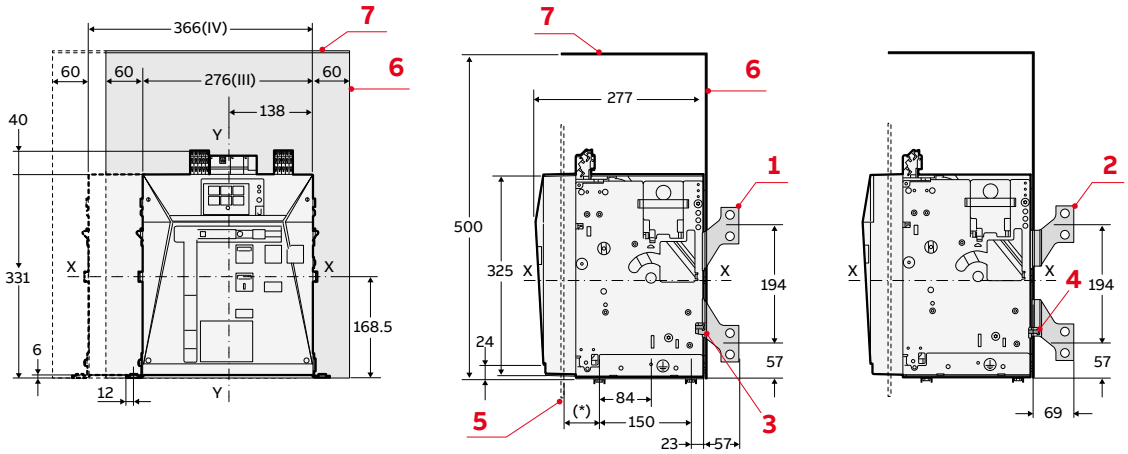
6 Tightening torque 8.6Nm

7 Door position for dimensions flange: see TN 1SDH002310A1120

8 Insulating sheet or insulated metallic sheet

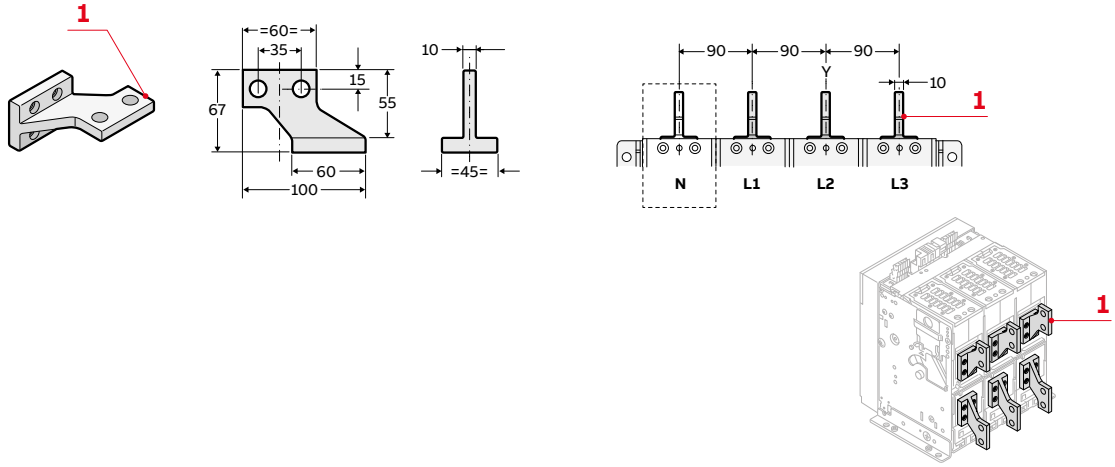
9 Metallic sheet

Vertical spread terminals – SVR

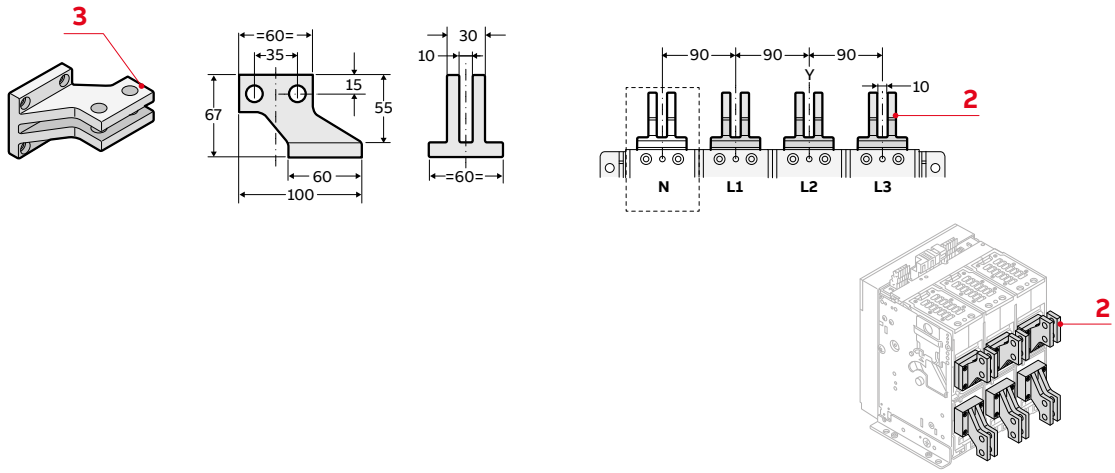


(*) Min. 48 - Max. 88mm

E2.3 B/N/S/H 2000A



E2.3 N/S/H 2500A



1 Vertical diveticated terminals 2000A

2 Vertical diveticated terminals 2500A

3 Tightening torque 8.6Nm

4 Tightening torque 8.6Nm

5 Door position for dimensions flange: see TN 1SDH002310A1120

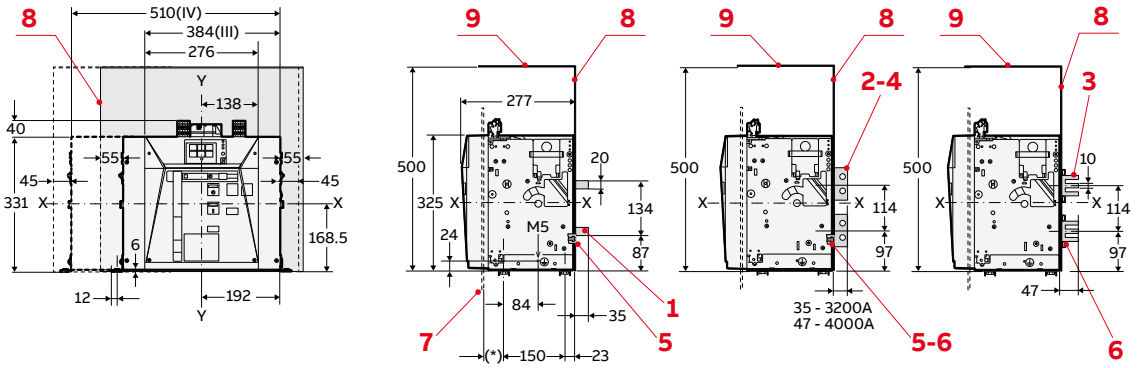
6 Insulating sheet or insulated metallic sheet

7 Metallic sheet

FIXED CIRCUIT-BREAKER - E4.3

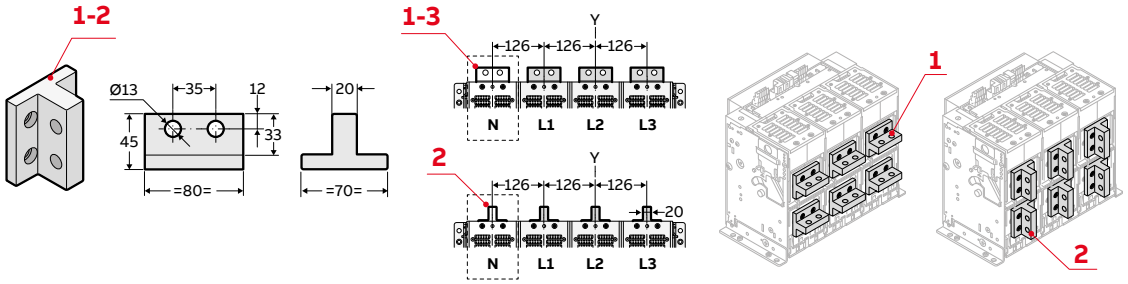
Orientable rear terminals

E4.3 N/S/H/V 3200A **E4.3 N/S/H/V 4000A**

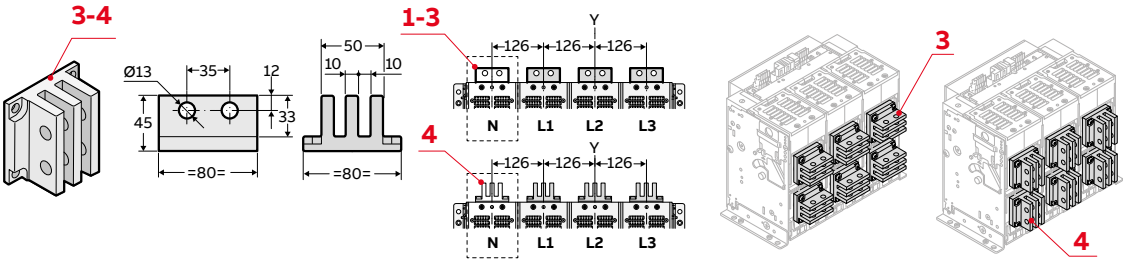


(*) Min. 48 - Max. 88mm

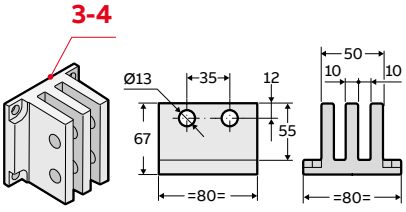
E4.3 N/S/H/V 3200A



E4.3 N/S/H/V 4000A



E4.3 N/S/H/V 4000A - LHR/LVR



1 Horizontal terminal 3200A

2 Vertical terminal 3200A

3 Horizontal terminal 4000A

4 Vertical terminal 4000A

5 Tightening torque 20Nm

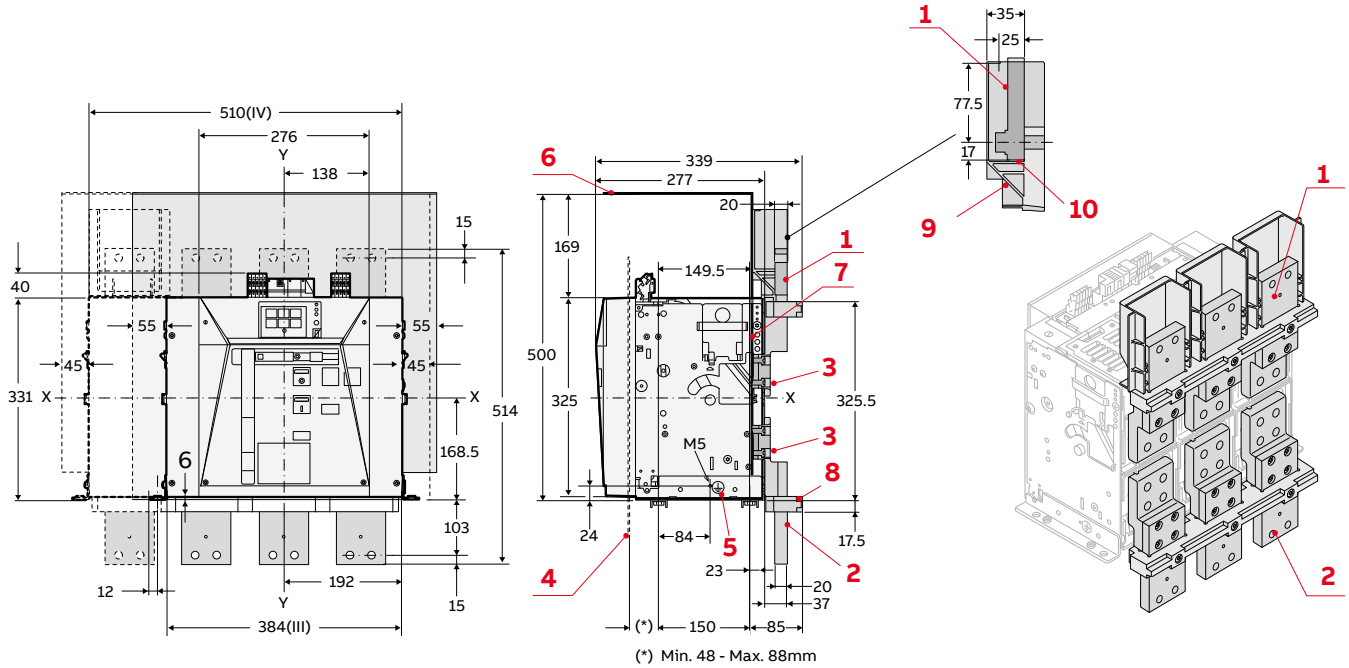
6 Tightening torque 20Nm

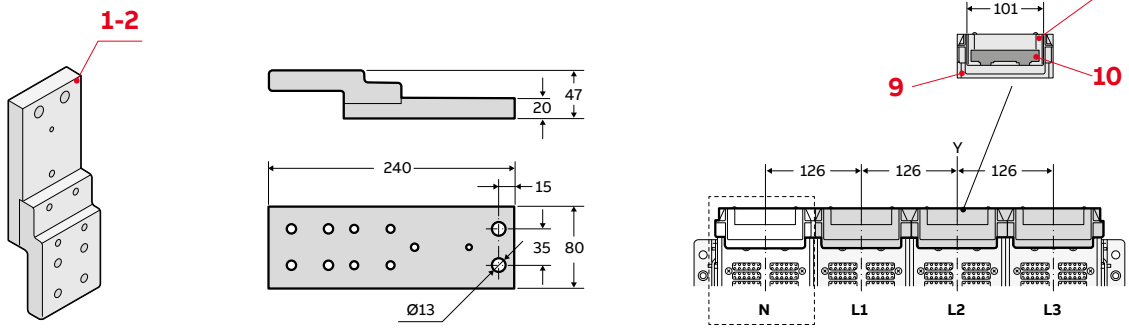
7 Door position for dimensions flange: see TN 1SDH002310A1120

8 Insulating sheet or insulated metallic sheet

9 Metallic sheet

Front terminals – F





1 Front terminal upper

2 Front terminal lower

3 Tightening torque 20Nm

4 Door position for dimensions flange: see TN 1SDH002310A1120

5 Grounding

6 Insulating sheet or insulated metallic sheet

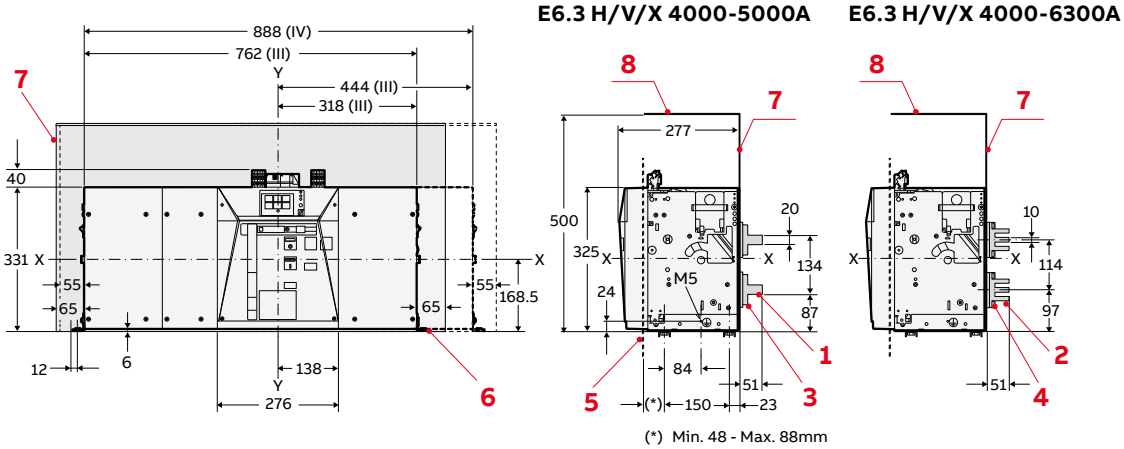
7 Crossbeam front terminal

8 Plastic protection

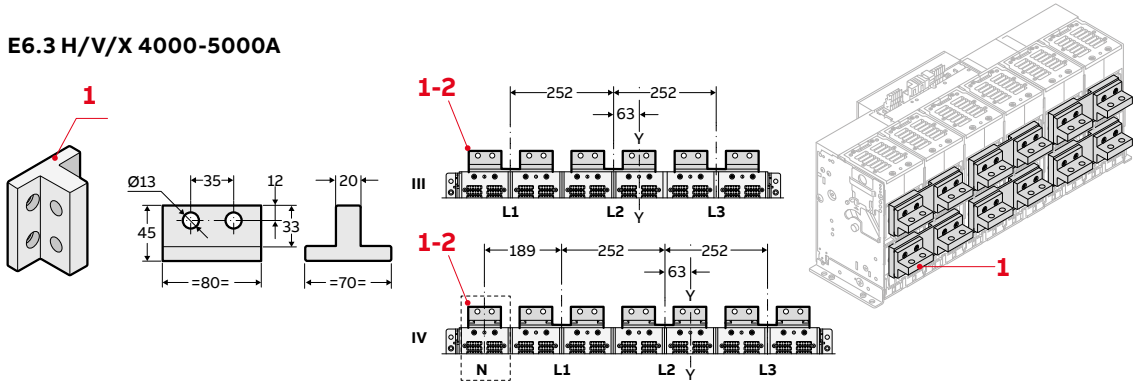
9 Customer busbar and screws (not provided)

FIXED CIRCUIT-BREAKER - E6.3

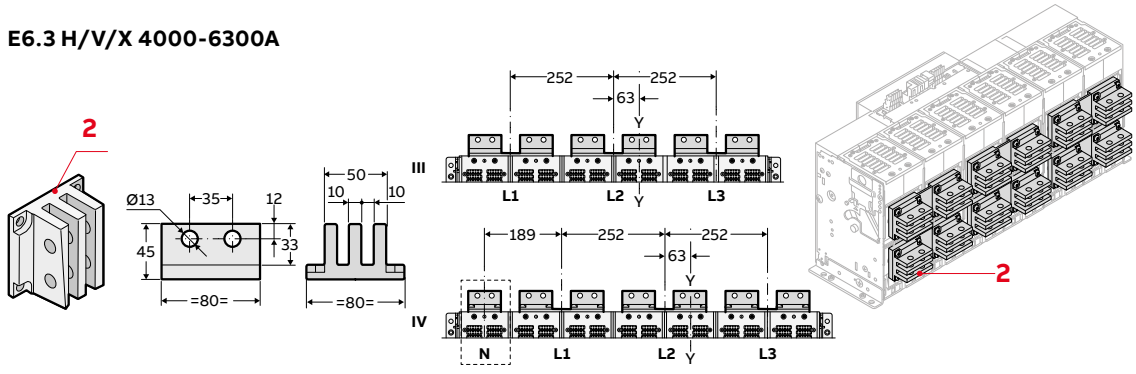
Horizontal rear terminals – HR



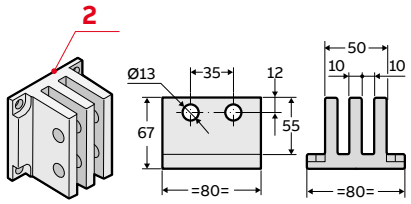
E6.3 H/V/X 4000-5000A



E6.3 H/V/X 4000-6300A



E6.3 H/V/X 4000-6300A LHR



1 Horizontal terminal 5000A

2 Horizontal terminal 6300A

3 Tightening torque 20Nm

4 Tightening torque 20Nm

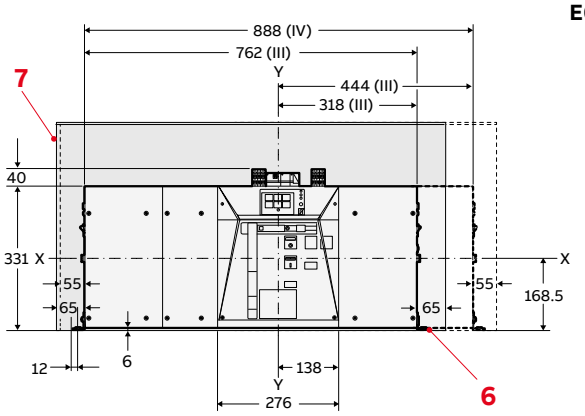
5 Door position for dimensions flange: see TN 1SDH002310A1120

6 Mounting outside feet screws reccomend M10x25 high class 8.8 or couple superior tightening torque 40Nm compulsory fixing screws from top

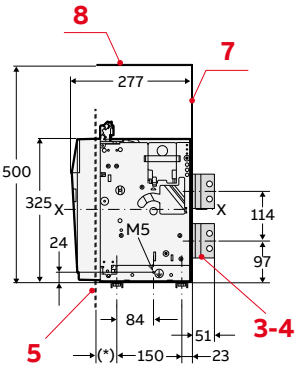
7 Insulating sheet or insulated metallic sheet

8 Metallic sheet

Vertical rear terminals – VR

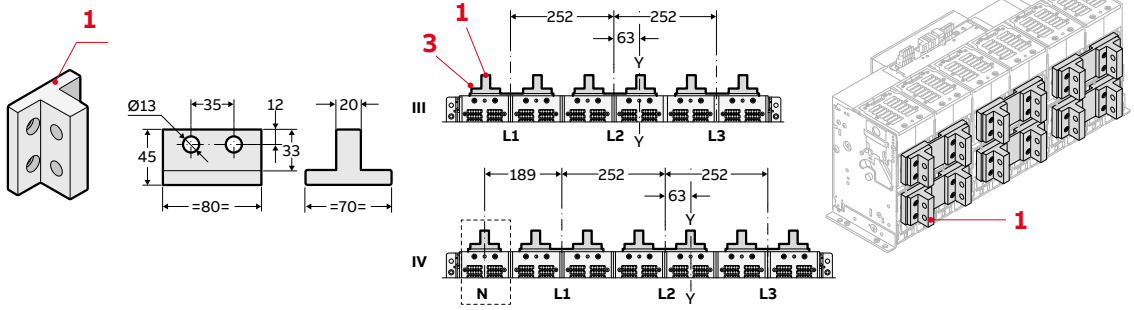


E6.3 H/V/X 4000...6300A

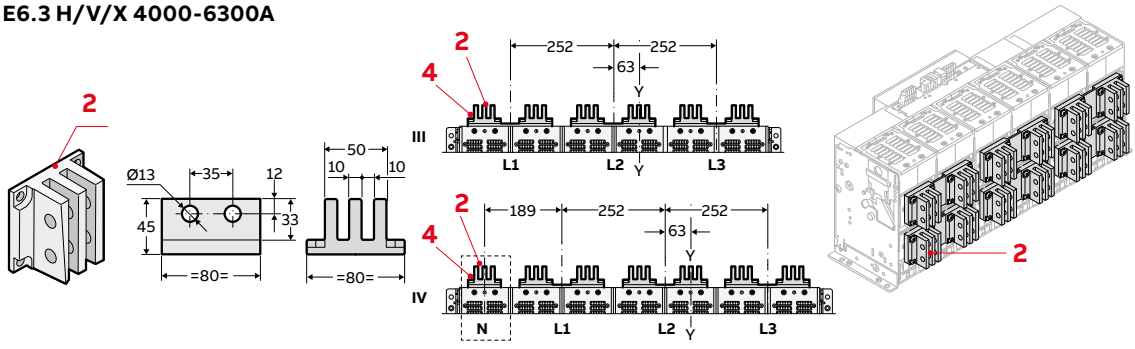


(*) Min. 48 - Max. 88mm

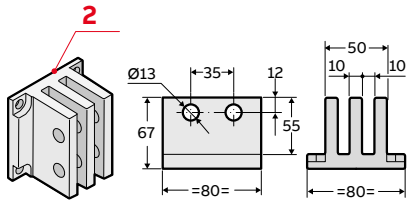
E6.3 H/V/X 4000-5000A



E6.3 H/V/X 4000-6300A



E6.3 H/V/X 4000-6300A LVR



1 Vertical terminal 5000A

2 Vertical terminal 6300A

3 Tightening torque 20Nm

4 Tightening torque 20Nm

5 Door position for dimensions flange: see TN 1SDH002310A1120

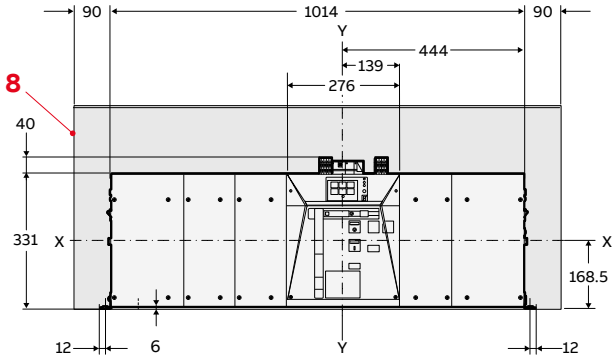
6 Mounting outside feet screws reccomend M10x25 high class 8.8 or couple superior tightening torque 40Nm compulsory

7 Insulating sheet or insulated metallic sheet

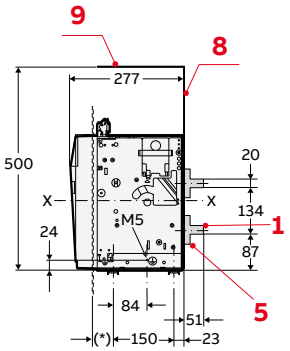
8 Metallic sheet

FIXED CIRCUIT-BREAKER - E6.3

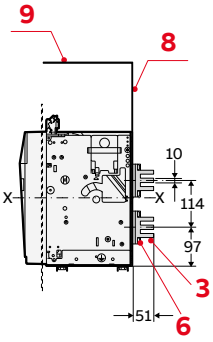
Orientable rear terminals - HR/VR full size



E6.3 H/V/X 4000-5000A

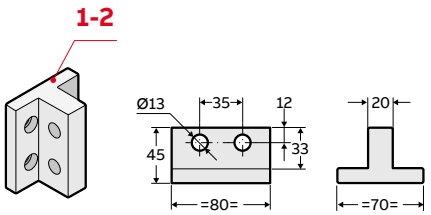


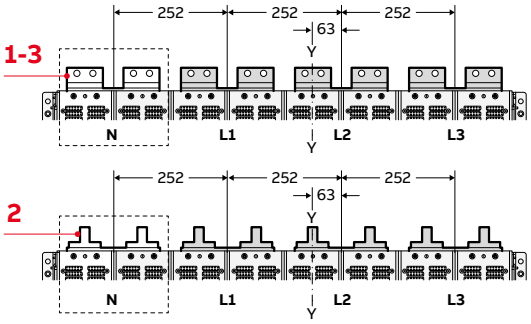
E6.3 H/V/X 4000-6300A



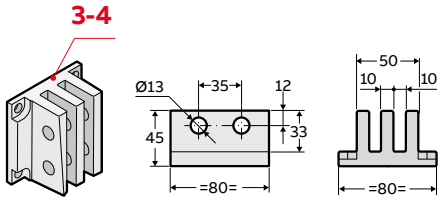
(*) Min. 48 - Max. 88mm

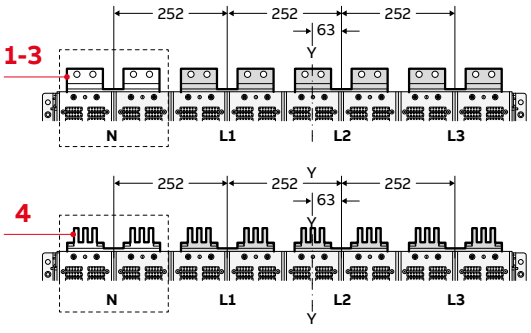
E6.3 H/V/X 4000-5000A





E6.3 H/V/X 4000-6300A





1 Horizontal terminal 5000A

2 Vertical terminal 5000A

3 Horizontal terminal 6300A

4 Vertical terminal 6300A

5 Tightening torque 20Nm

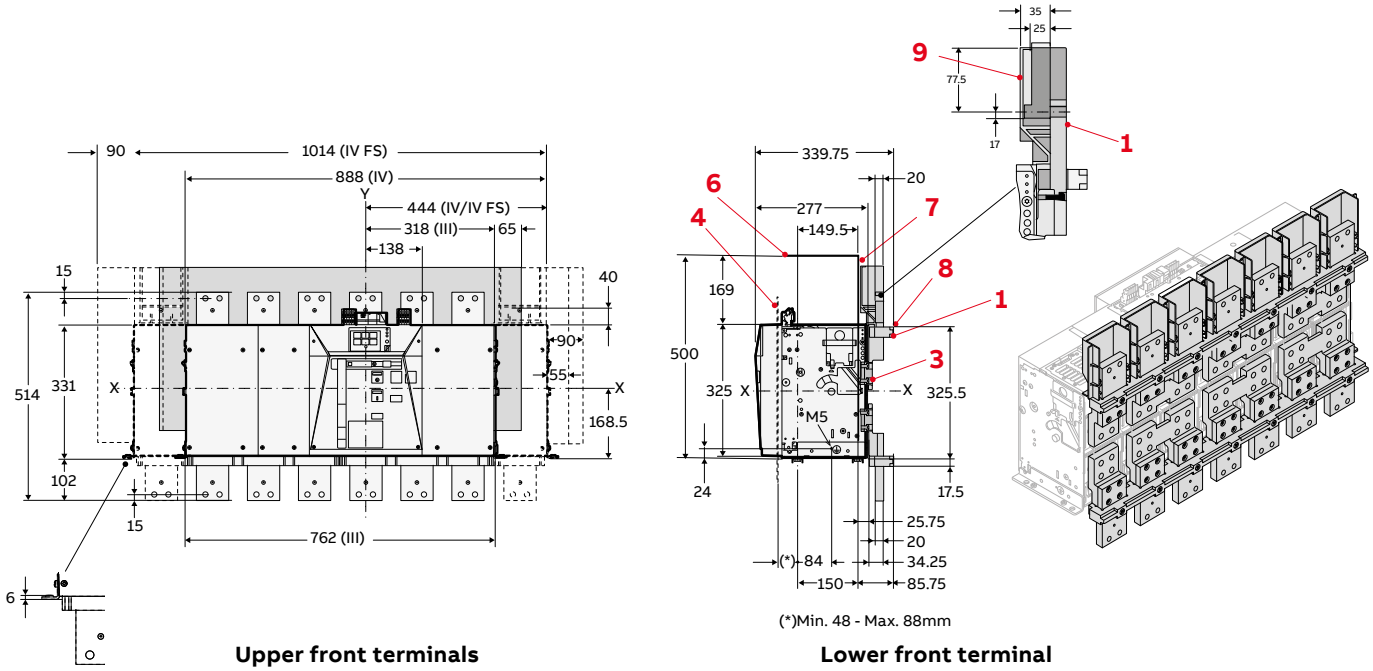
6 Tightening torque 20Nm

7 Door position for dimensions flange: see TN 1SDH002310A1120

8 Insulating sheet or insulated metallic sheet

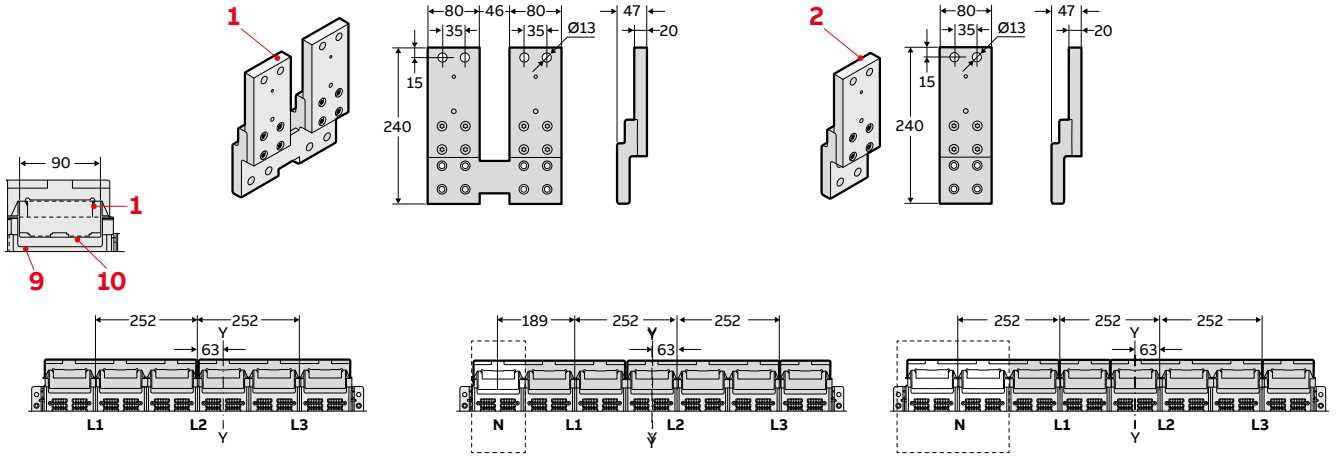
9 Metallic sheet

Front terminals – F



Upper front terminals

Lower front terminal



3-pole

4-pole

4-pole full size

1 Front terminal upper and lower

2 Single front terminal

3 Tightening torque 20Nm

4 Door position for dimensions flange: see TN 1SDH002310A1120

5 Grounding

6 Metallic sheet

7 Insulating sheet or insulated metallic sheet

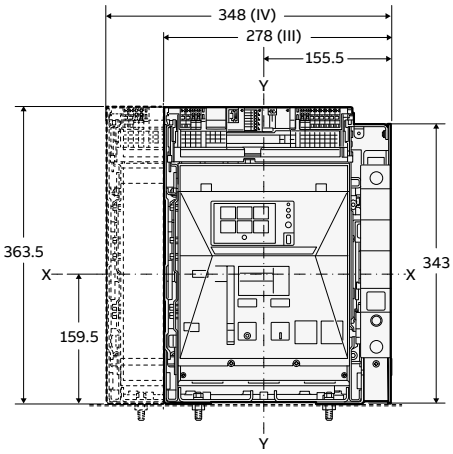
8 Crossbeam front terminals

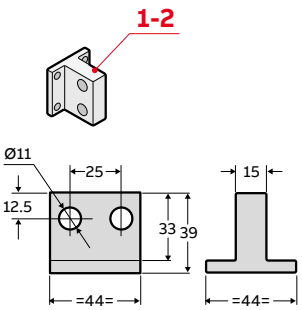
9 Plastic protection

10 Customer busbar and screws (not provided)

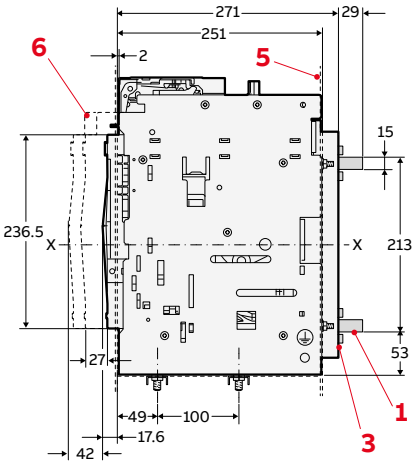
WITHDRAWABLE CIRCUIT-BREAKER - E1.3

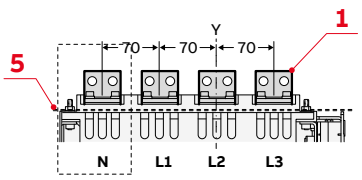
Rear orientable terminals - HR/VR

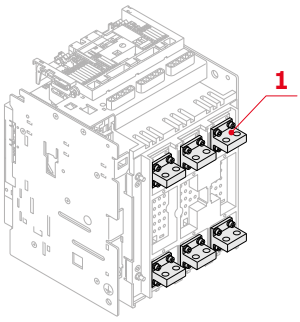




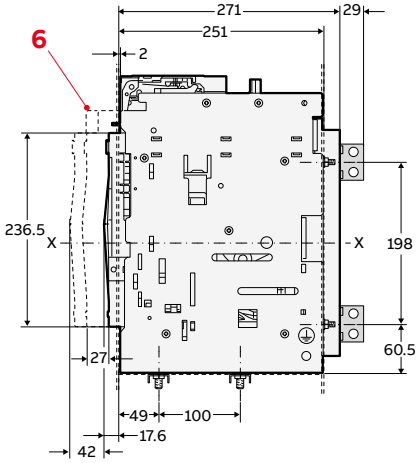
Terminals HR

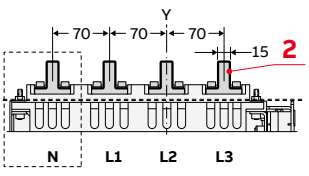


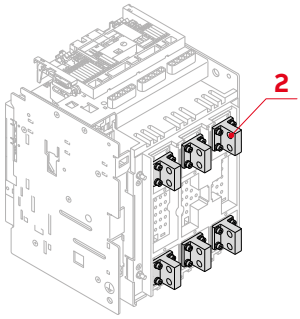




Terminals VR







1 Horizontal rear terminal

2 Vertical rear terminal

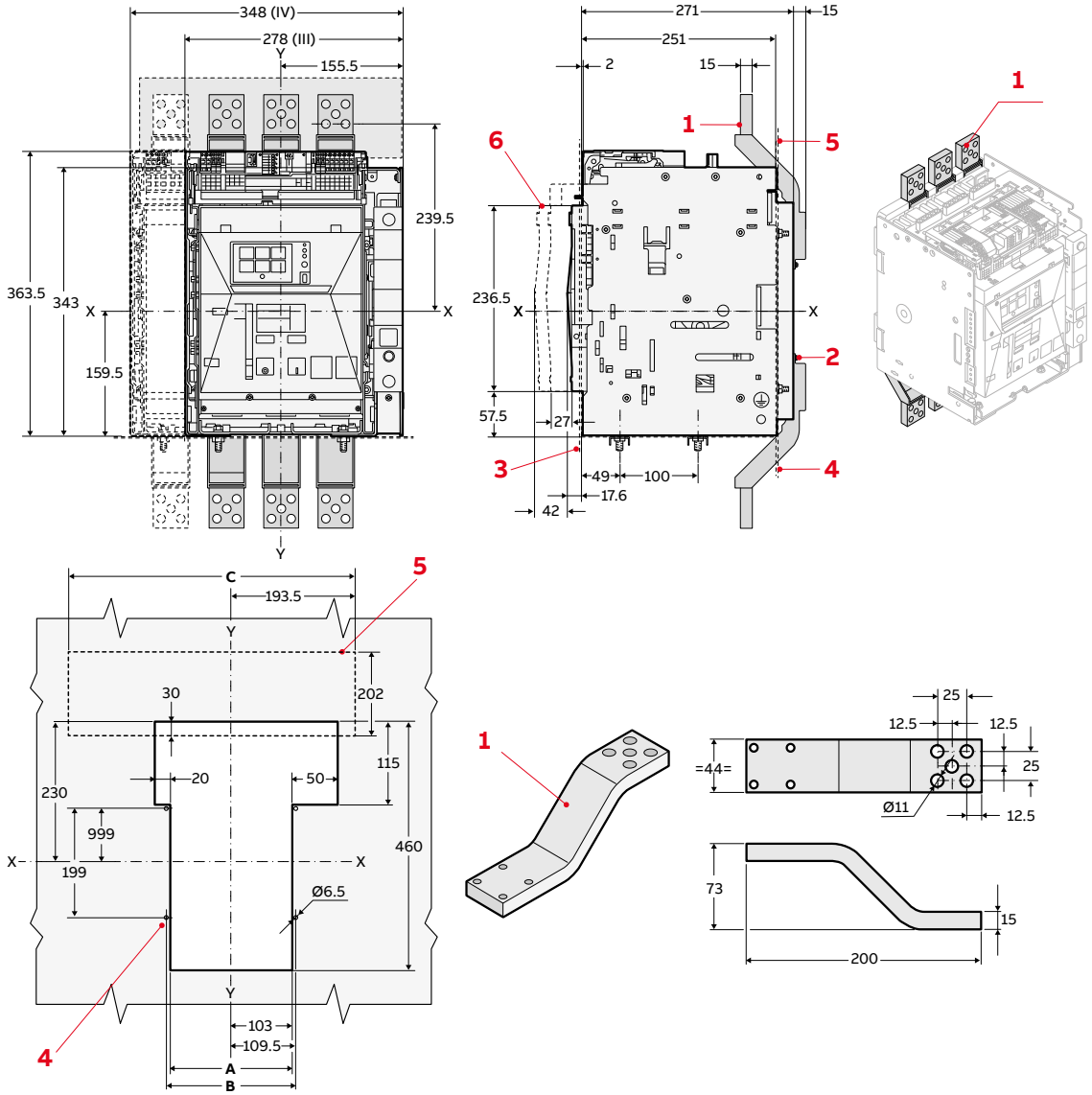
3 Tightening torque 12 Nm

4 Door position for dimensions flange: see TN 1SDH002309A1120

5 Rear segregation for rear terminals

6 Connented, test, disconnected distances

Extended front terminals – EF



1 Extended front terminal

2 Tightening torque 12 Nm

3 Door position for dimensions flange: see TN 1SDH002309A1120

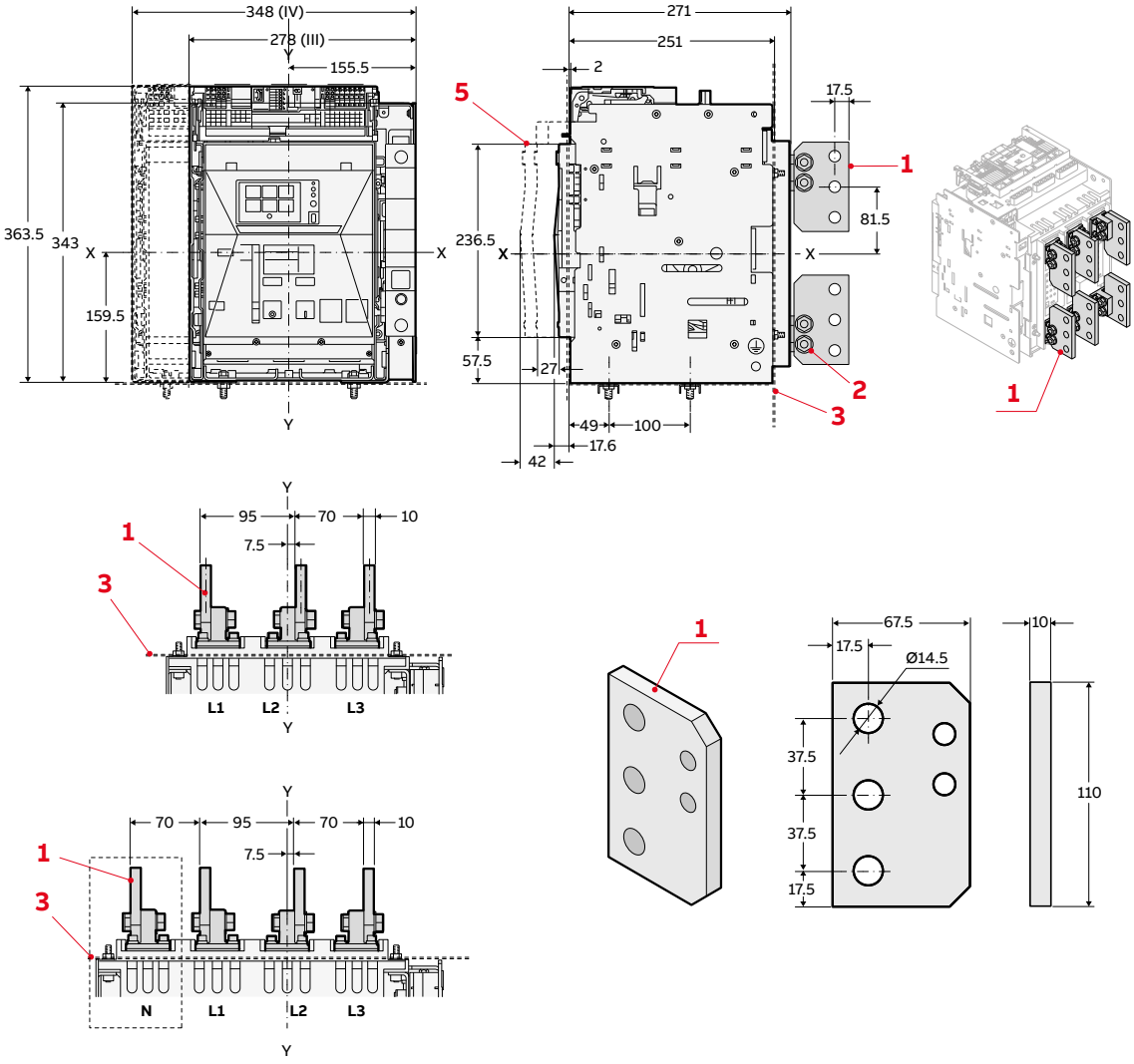
4 Rear segregation for fronta terminals

5 Insulating protection

6 Connected, test, disconnected distances

WITHDRAWABLE CIRCUIT-BREAKER - E1.3

Rear terminals for cables – FcCuAl



1 Rear terminal cable

2 Tightening torque 48 Nm

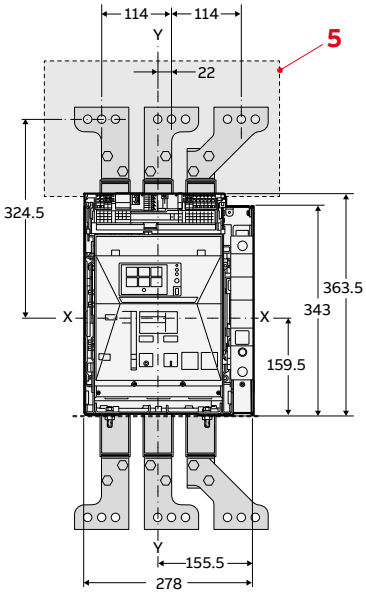
3 Rear segregation for rear terminals

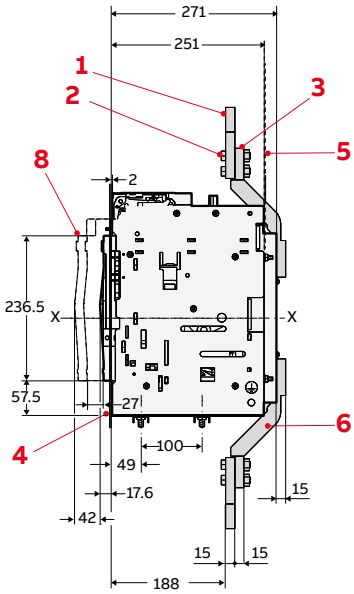
4 Door position for dimensions flange: see TN 1SDH002309A1120

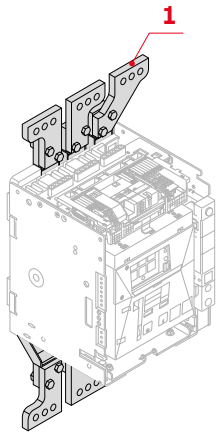
5 Connected, test, disconnected distances

Front spread terminals - ES

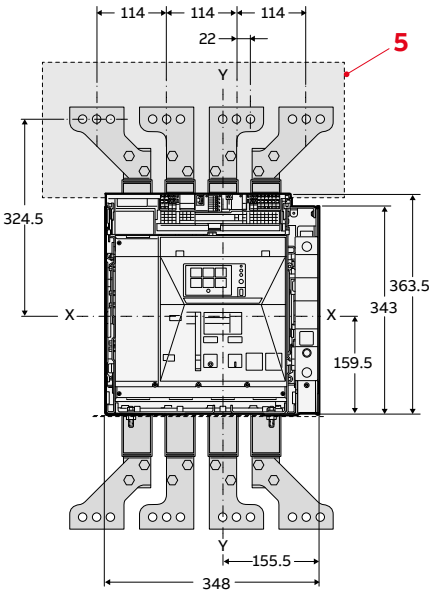
3-pole version

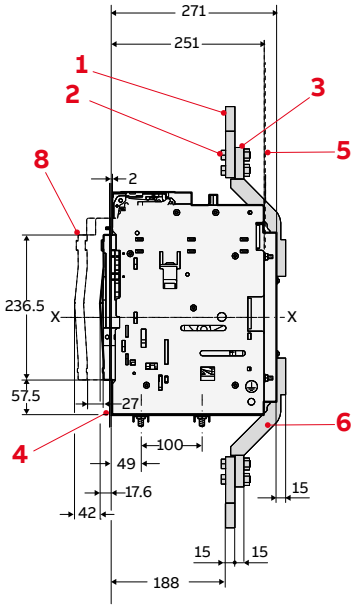


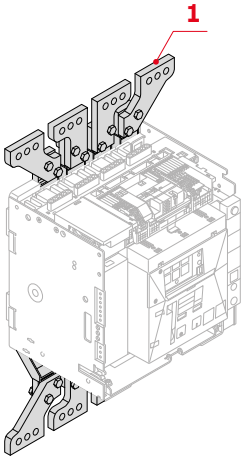




4-pole version







1 Spread terminal

2 Tightening torque 40 Nm

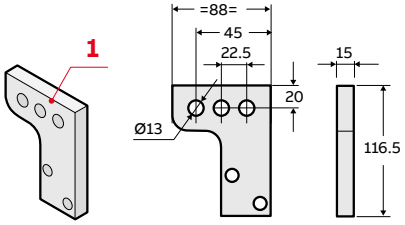
3 Front terminal

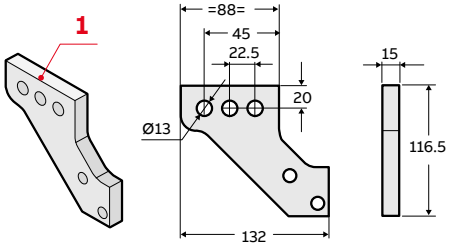
4 Door position for dimensions flange: see TN 1SDH002309A1120

5 Insulating protection

6 Rear segregation for rear terminals

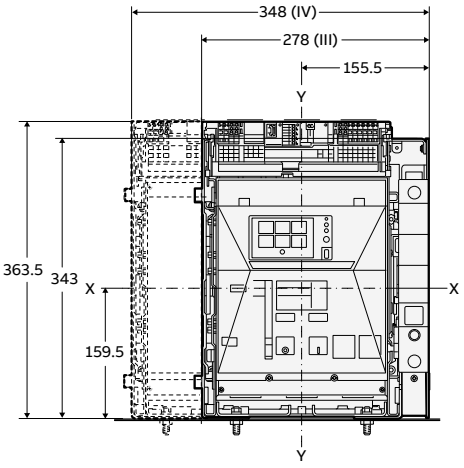
7 Connected, test,disconnected distances

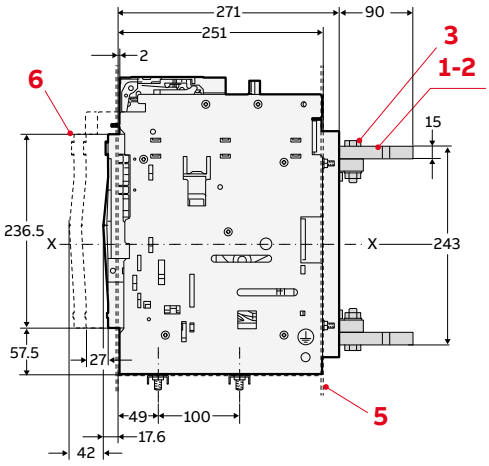




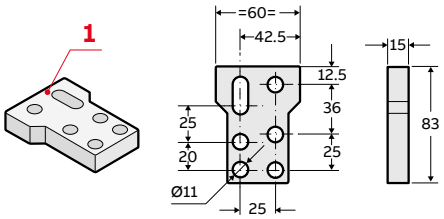
WITHDRAWABLE CIRCUIT-BREAKER - E1.3

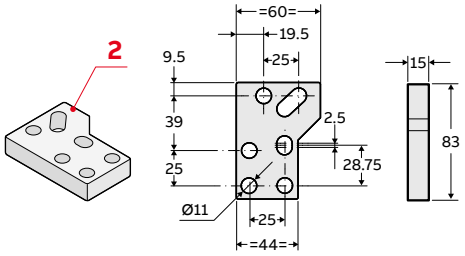
Horizontal rear spread terminals – SHR



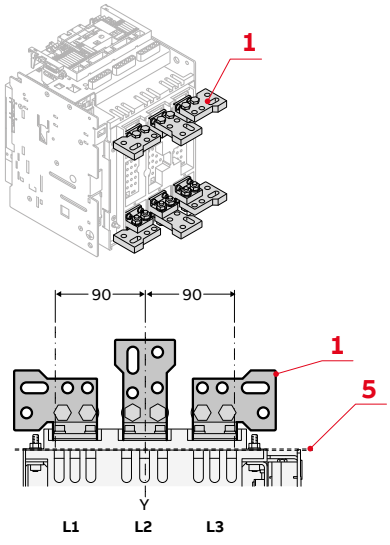


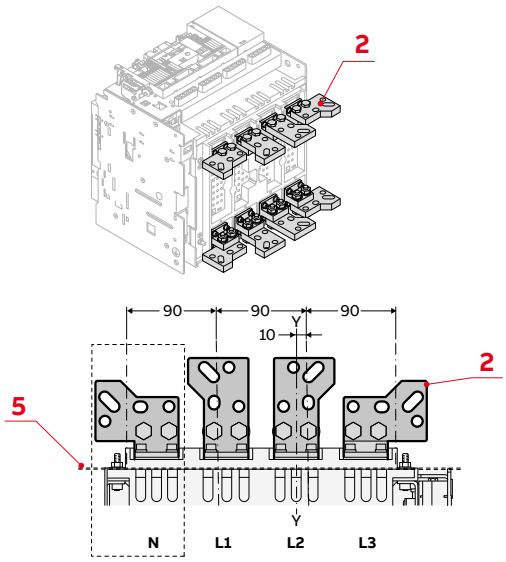
3-pole version





4-pole version





1 Extended spread rear terminal for tripolar

2 Extended spread rear terminal for tetrapolar

3 Tightening torque 18 Nm

4 Door position for dimensions flange: see TN 1SDH002309A1120

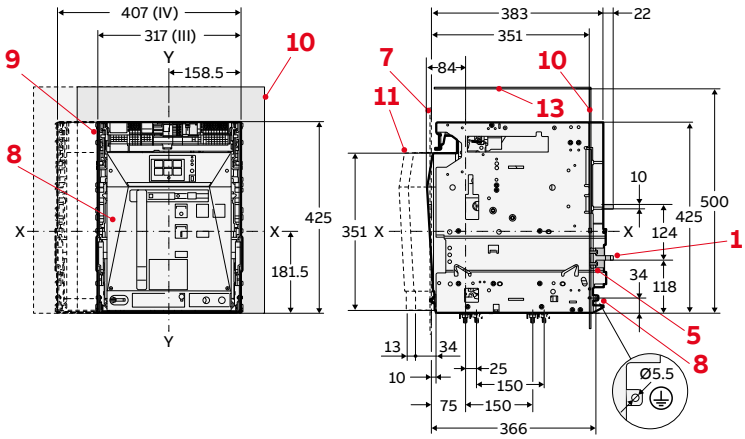
5 Rear segregation for rear terminals

6 Connected, test, disconnected distances

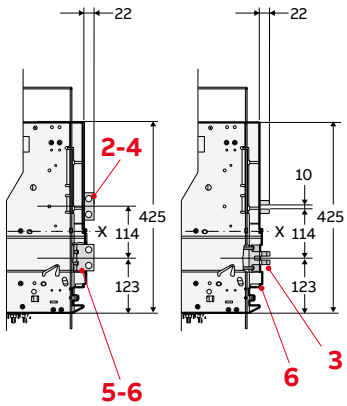
WITHDRAWABLE CIRCUIT-BREAKER - E2.3

Rear orientable terminals

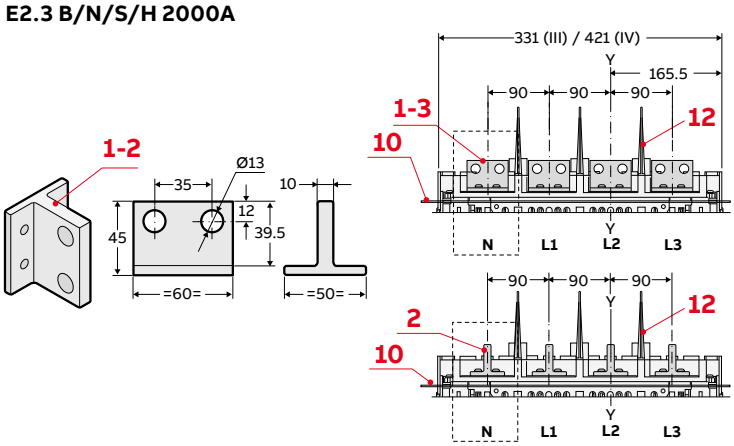
E2.3 B/N/S/H 2000A

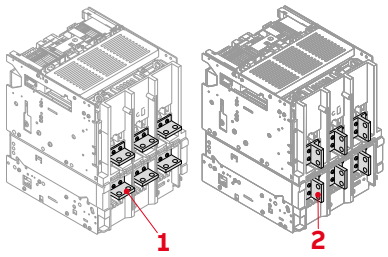


E2.3 N/S/H 2500A

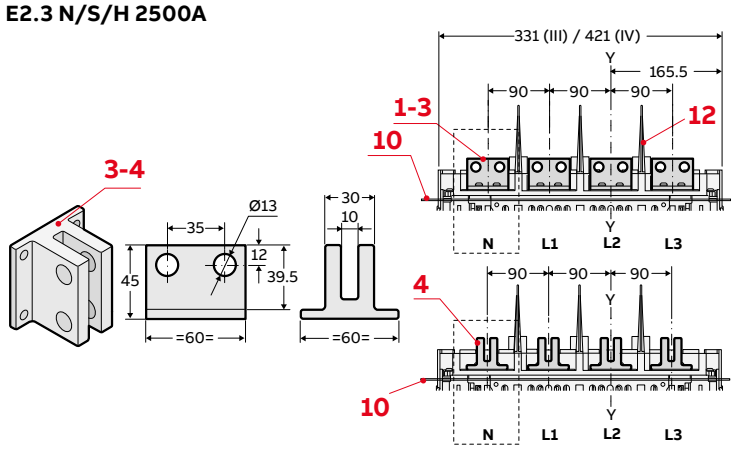


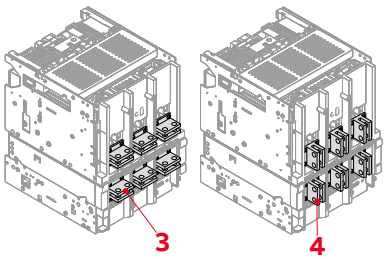
E2.3 B/N/S/H 2000A



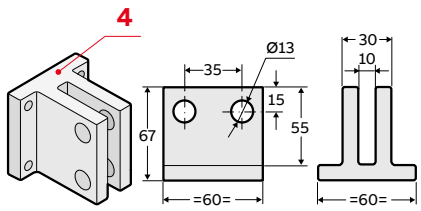


E2.3 N/S/H 2500A





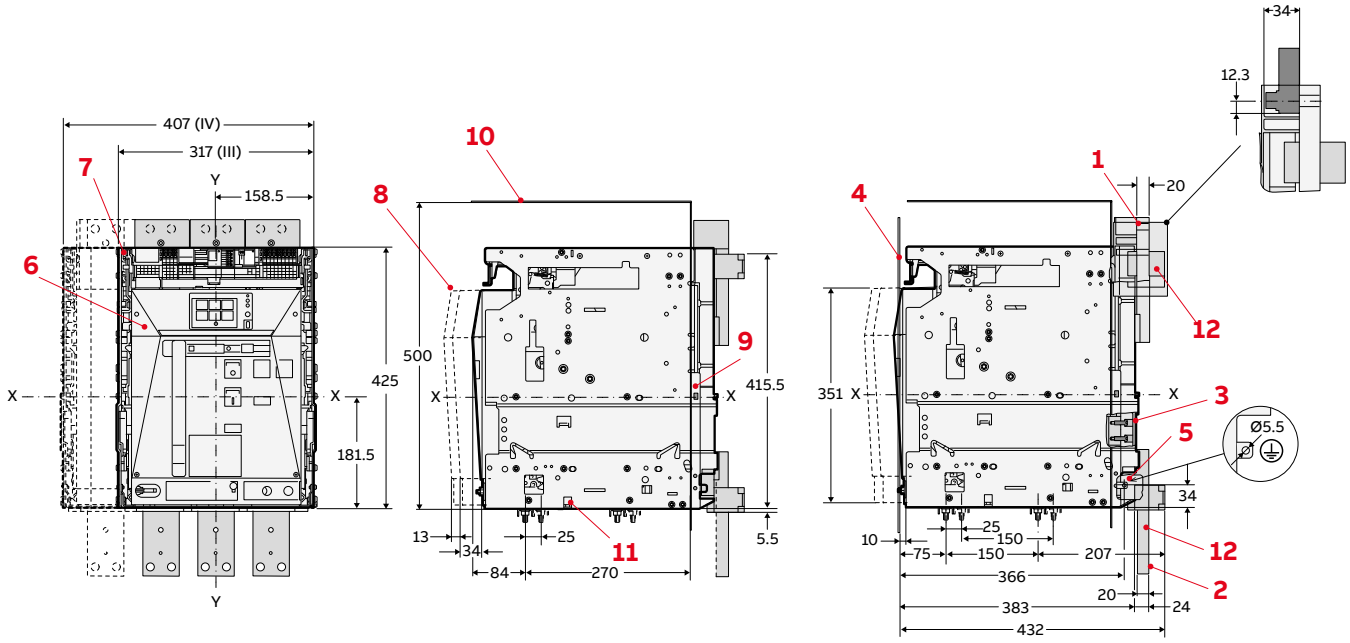
E2.3 N/S/H 2500A LHR/LVR

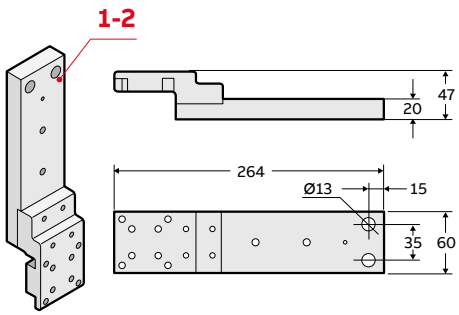


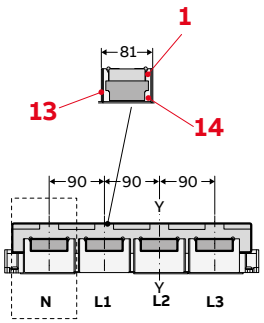
1 Horizontal ter. 2000A
2 Vertical ter. 2000A
3 Horizontal ter. 2500A
4 Vertical ter. 2500A
5 Tighten. torque 8.6Nm
6 Tighten. torque 8.6Nm
7 Door position for dimensions flange: see TN 1SDH002309A1120
8 Moving part
9 Fixed part
10 Metallic segregation - segr. shape is optional for E2.3 supplied by the customer see ABB accessories catalog
11 Connected, test, disconnected distances
12 Phase barriers - optional
13 Metallic part

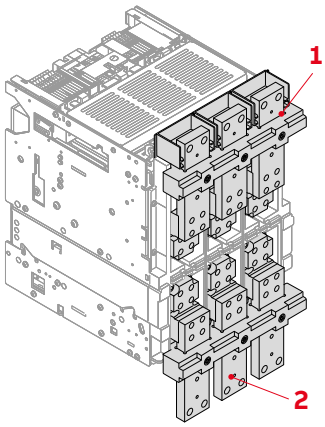
WITHDRAWABLE CIRCUIT-BREAKER - E2.3

Front terminals – F









1 Front terminal upper

2 Front terminal lower

3 Tightening torque 8.6Nm

4 For dimension flange: see TN 1SDH002310A1120

5 Grounding

6 Fixed part

7 Moving part

8 Connected, test, disconnected distances

9 Insulating sheet or insulated metallic sheet

10 Roof insulation or insulated metal

11 Ventilation drilling on the switchgear and throught terminals

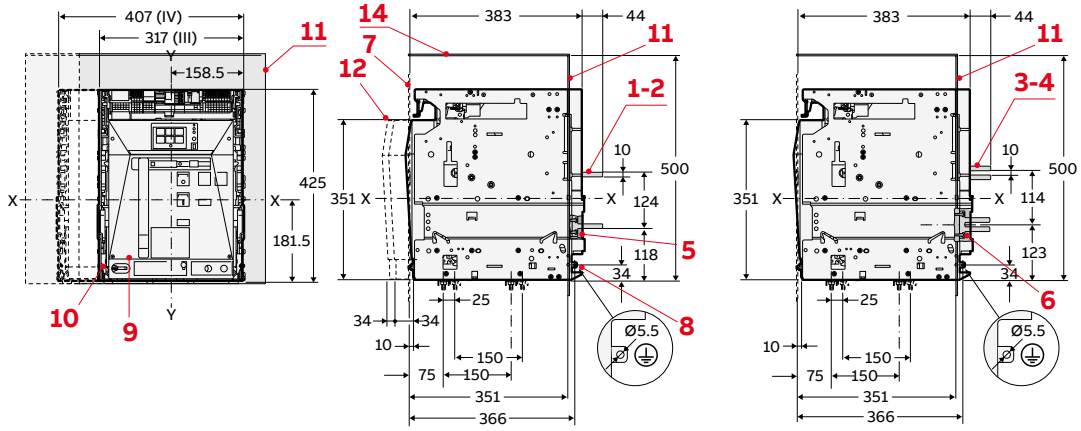
12 Crossbeam front terminal

13 Plastic protection

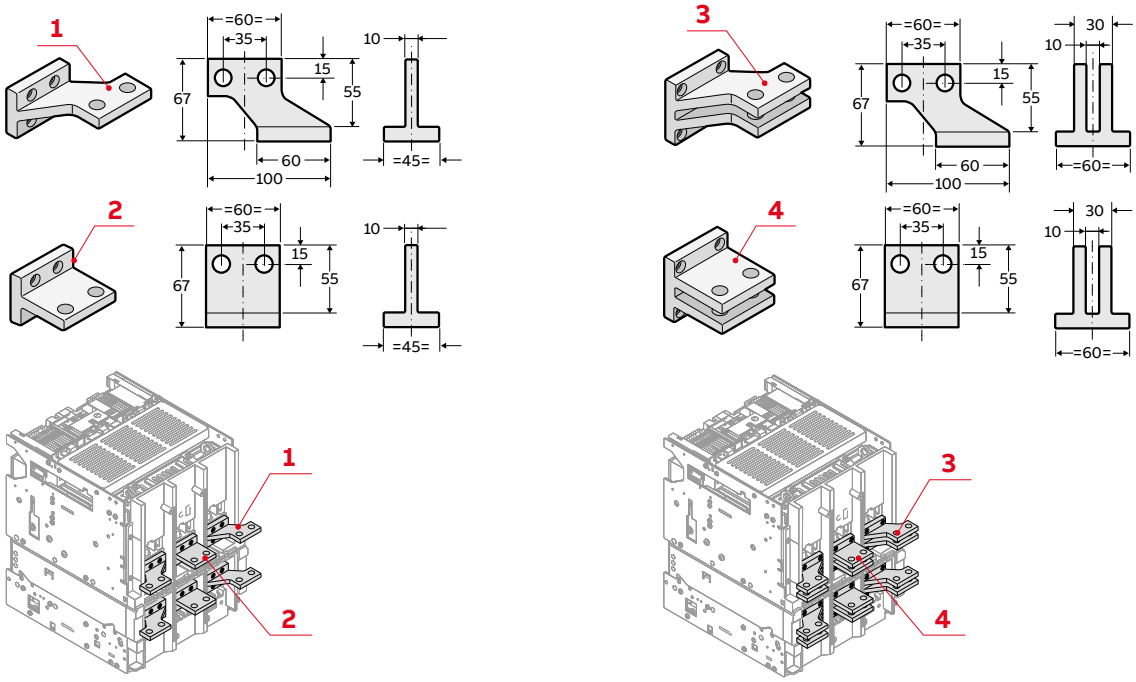
14 Customer busbar and screws (not provided)

Horizontal rear spread terminals – SHR

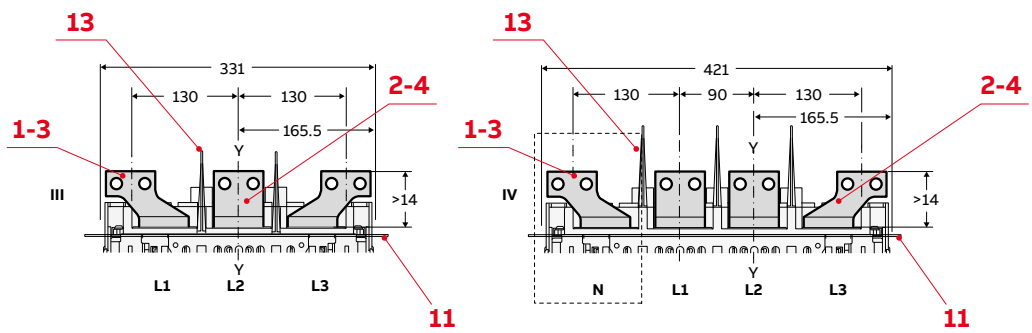
E2.3 B/N/S/H 2000 **E2.3 N/S/H 2500A**



E2.3 B/N/S/H 2000A



E2.3 N/S/H 2500A



1 Side horizontal divericate ter. 2000A

2 Central horizontal divericate ter. 2000A

3 Side horizontal divericate ter. 2500A

4 Central horizontal divericate ter. 2500A

5 Tighten. torque 8.6Nm

6 Tighten. torque 8.6Nm

7 Door position for dimension flange: see TN 1SDH002310A1120

8 Grounding

9 Moving part

10 Fixed part

11 Metallic segregation - segr. shape is optional for E2.3 supplied by the customer see ABB accessiories catalog

12 Connected, test, disconnected distances

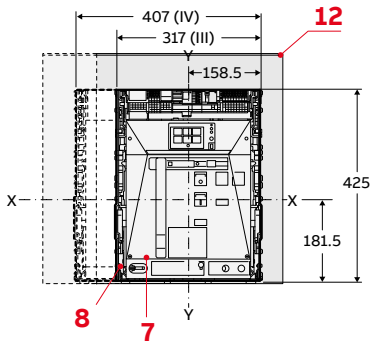
13 Phase barriers - optional

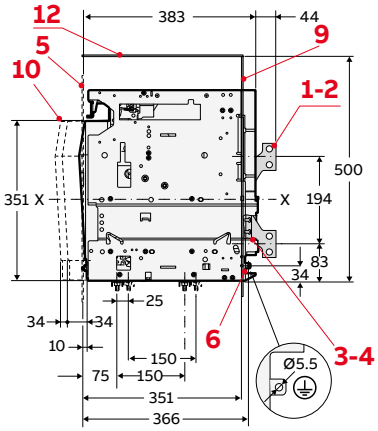
14 Metallic part

WITHDRAWABLE CIRCUIT-BREAKER - E2.3

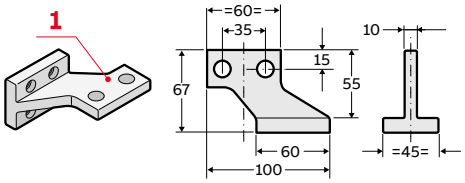
Vertical rear spread terminals – SVR

E2.3 B/N/S/H 2000A **E2.3 N/S/H 2500A**

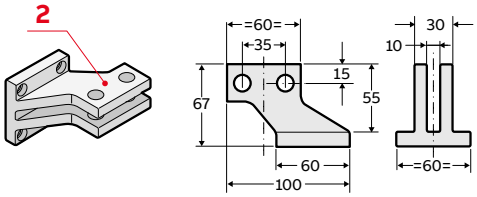


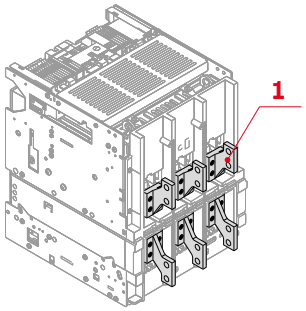


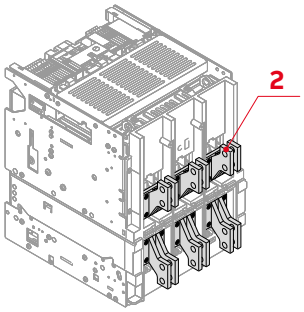
E2.3 B/N/S/H 2000A

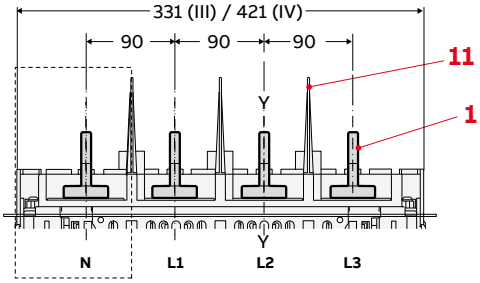


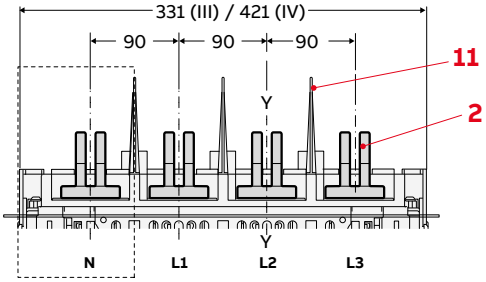
E2.3 N/S/H 2500A











1 Vertical divericate terminals 2000A

2 Vertical divericate terminals 2500A

3 Tighten. torque 8.6Nm

4 Tighten. torque 8.6Nm

5 Door position for dimension flange: see TN 1SDH002310A1120

6 Grounding

7 Moving part

8 Fixed part

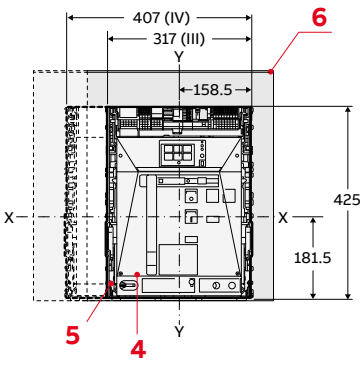
9 Metallic segregation - segr. shape is optional for E2.3 supplied by the customer see ABB accessiories catalog

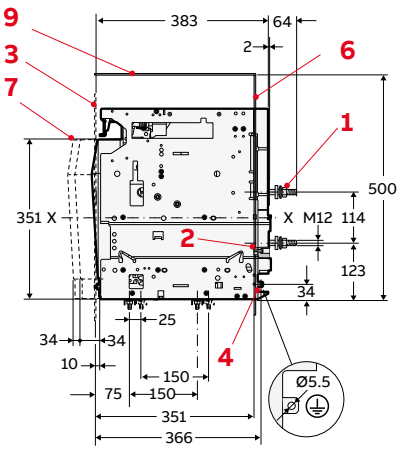
10 Connected, test, disconnected distances

11 Phase barriers - optional

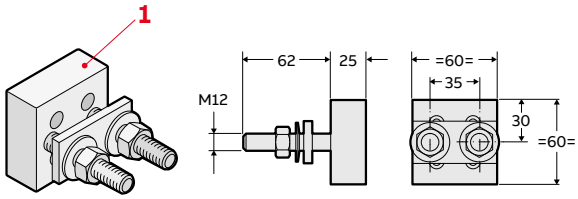
12 Metallic part

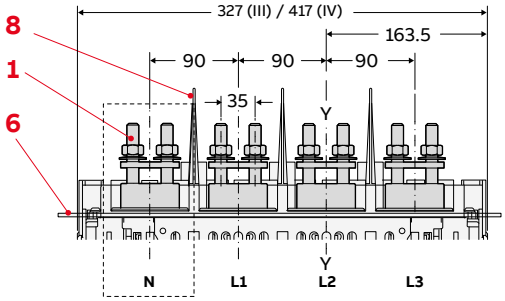
Flat terminals



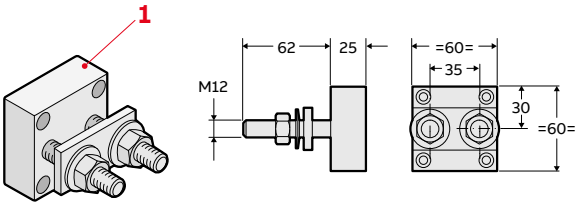


E2.3 B/N/S/H 2000A

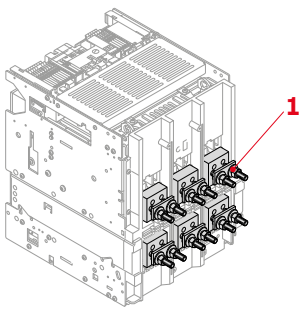




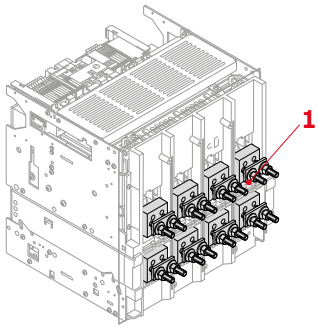
E2.3 N/S/H 2500A



3-pole version



4-pole version



1 Flat terminal 2000A - tightening torque on power circuit connections 45Nm

2 Tightening torque 8.6Nm

3 Door position-flange: see TN 1SDH002310A1120

4 Moving part

9 Fixed part

10 Metallic segregation - segr. shape is mandatory for E2.3 supplied by the customer see ABB accessories catalog

11 Connected, test, disconnected distances

13 Phase barriers - optional

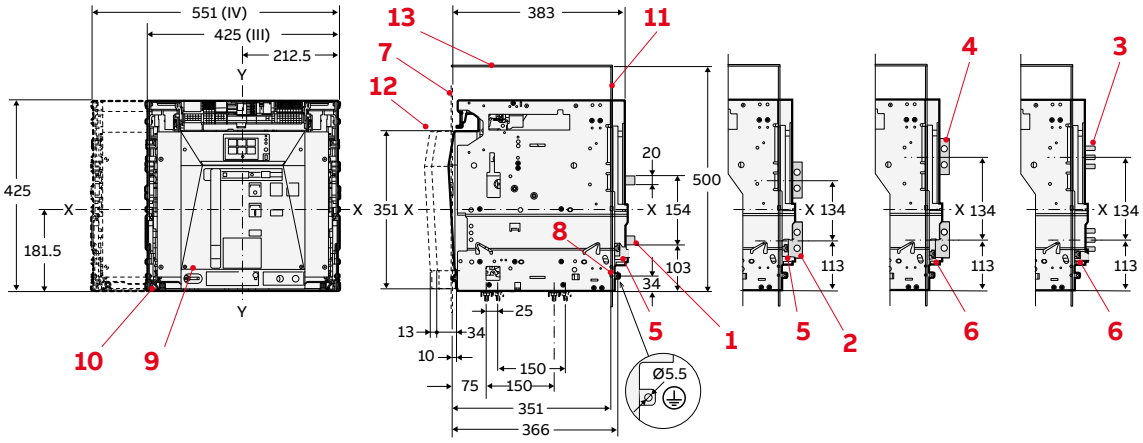
14 Metallic part

WITHDRAWABLE CIRCUIT-BREAKER - E4.3

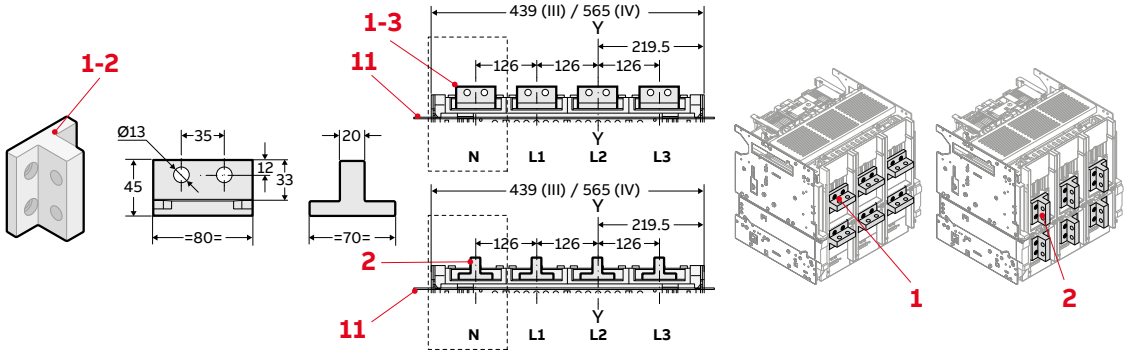
Rear orientable terminals - HR/VR

E4.3 N/S/H 3200A

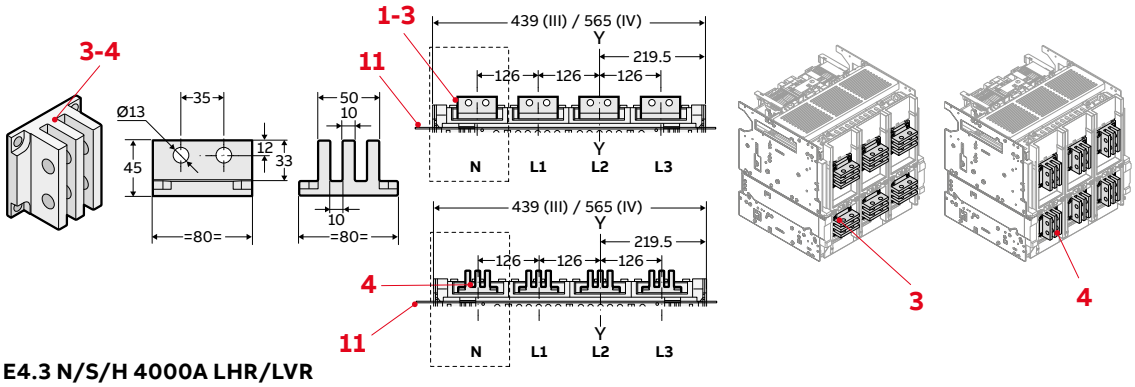
E4.3 N/S/H 4000A
E4.3 V 2000...4000A



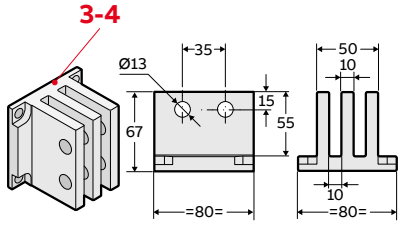
E4.3 N/S/H 3200A



E4.3 N/S/H 4000A
E4.3 V 2000...4000A

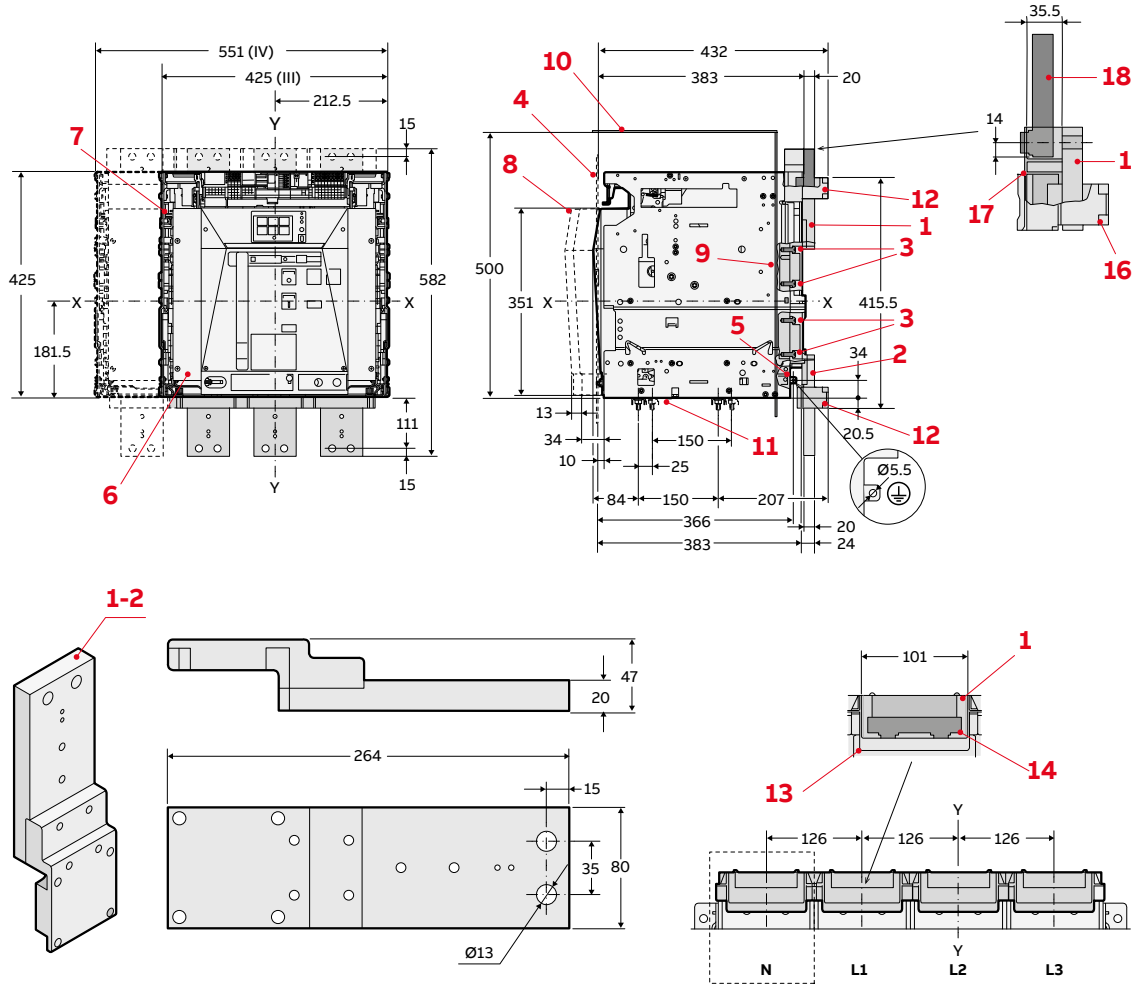


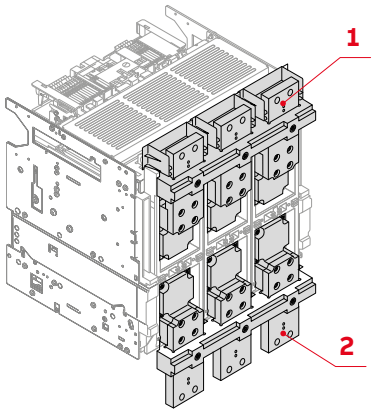
E4.3 N/S/H 4000A LHR/LVR



1 Horizontal ter. 3200A
2 Vertical ter. 3200A
3 Horizontal ter. 4000A
4 Vertical ter. 4000A
5 Tighten. torque 20Nm
6 Tighten. torque 20Nm
7 Door position for dimension flange: see see TN 1SDH002310A1120
8 Grounding
9 Moving part
10 Fixed part
11 Segregation (where provided)
12 Connected, test, disconnected distances
13 Metallic part

Front terminals – F

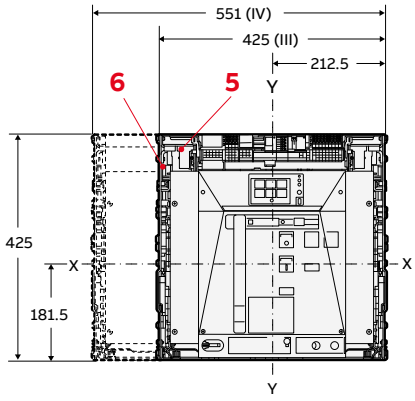


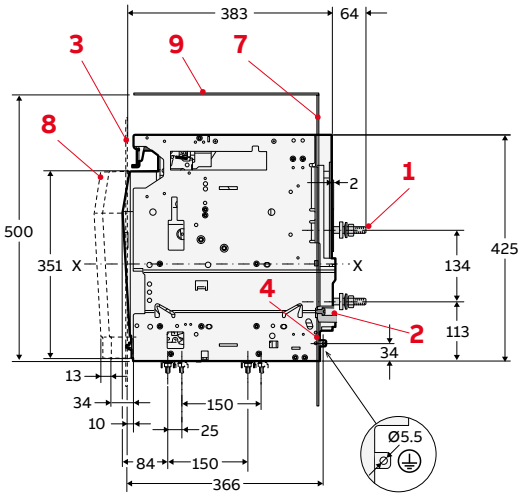


1 Front terminal upper
2 Front terminal lower
3 Tightening torque 20Nm
4 For dimension flange: see TN 1SDH002310A1120
5 Grounding
9 Moving part
7 Fixed part
8 Connected, test, disconnected distances
9 Insulating sheet or insulated metallic sheet
10 Roof insulation or insulated metal
11 Fixing plate
12 Crossbeam front terminal
13 Plastic protection
14 Customer busbar and screws (not provided)

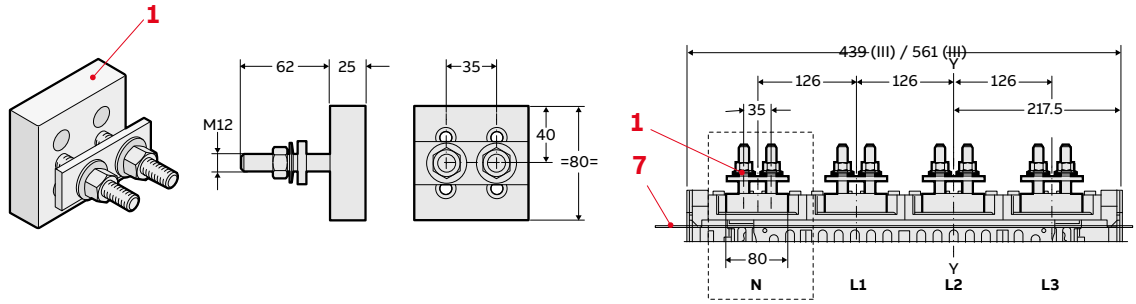
WITHDRAWABLE CIRCUIT-BREAKER - E4.3

Flat terminals

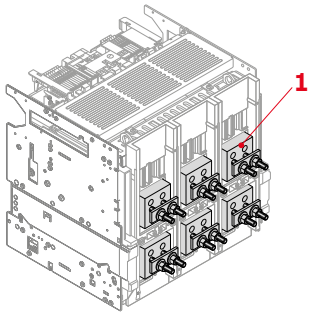




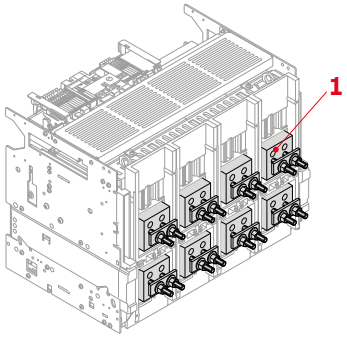
E4.3 N/S/H 3200A



3-pole version



4-pole version



1 Flat terminal 3200A - tightening torque on power circuit connections 45Nm

2 Tighten. torque 20Nm

3 Door position-flange: see TN 1SDH002310A1120

4 Grounding

5 Moving part

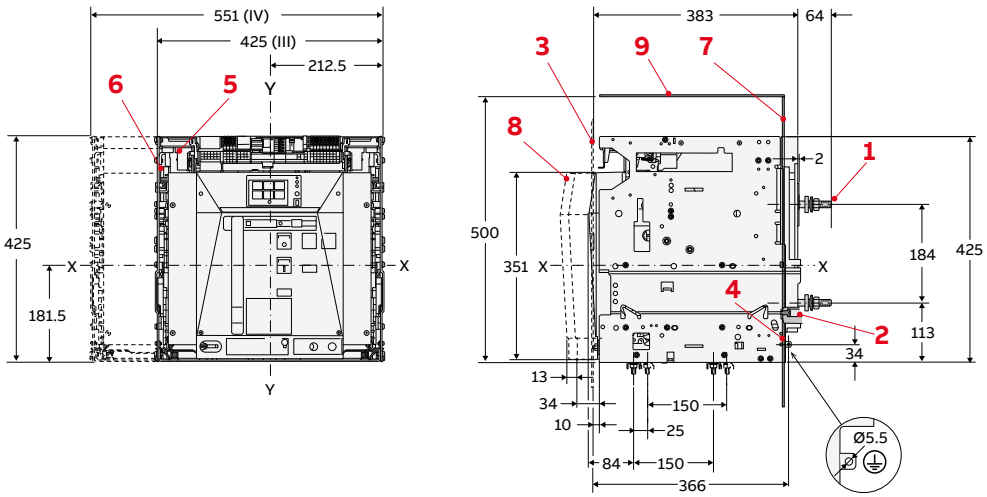
6 Fixed part

7 Segregation (when provided)

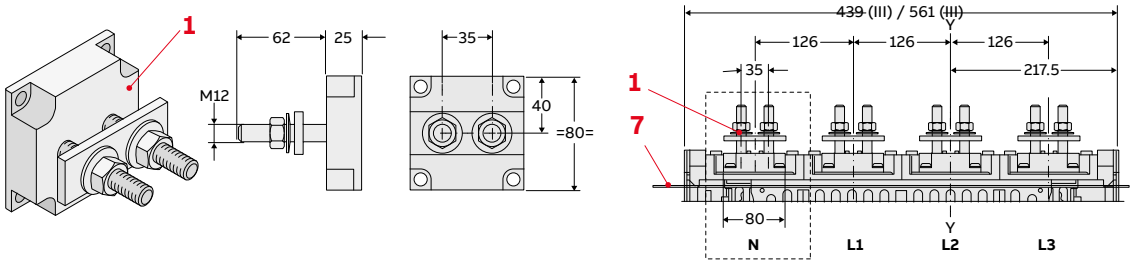
8 Connected, test, dis-connected distances

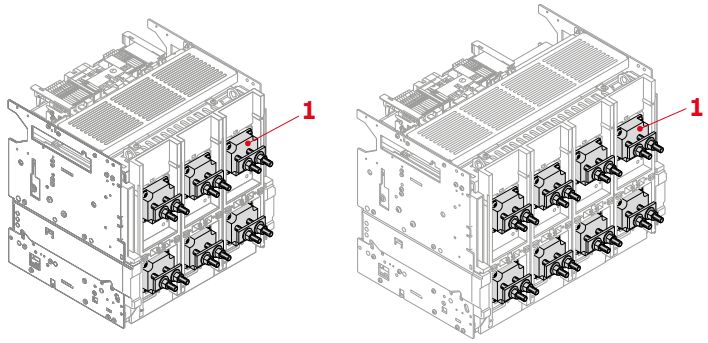
9 Metallic part

Flat terminals



E4.3 N/S/H 4000A
E4.3 V 2000...4000A





1 Flat terminal 3200A - tightening torque on power circuit connections 45Nm

2 Tighten. torque 20Nm

3 Door position-flange: see TN 1SDH002310A1120

4 Grounding

5 Moving part

6 Fixed part

7 Segregation (when provided)

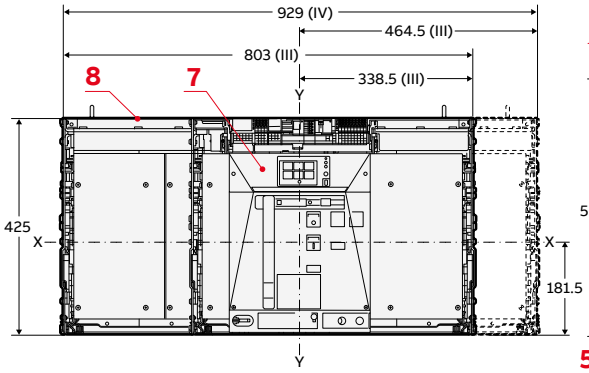
8 Connected, test, dis-connected distances

9 Metallic part

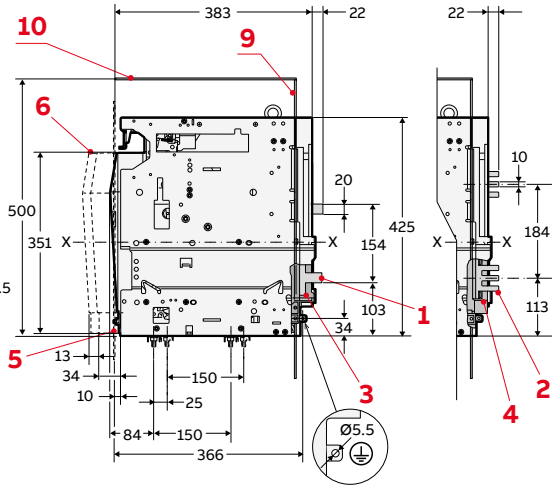
WITHDRAWABLE CIRCUIT-BREAKER - E6.3

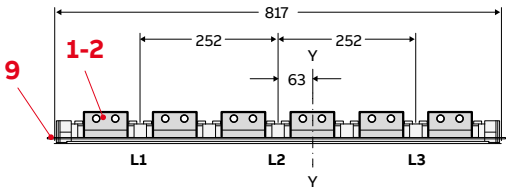
Horizontal rear terminals – HR

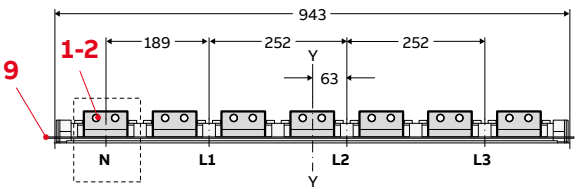
E6.3 H/V 4000-5000A



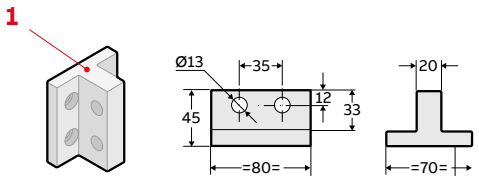
E6.3 H/V 4000A-6300A
E6.3 X 4000A-6300A

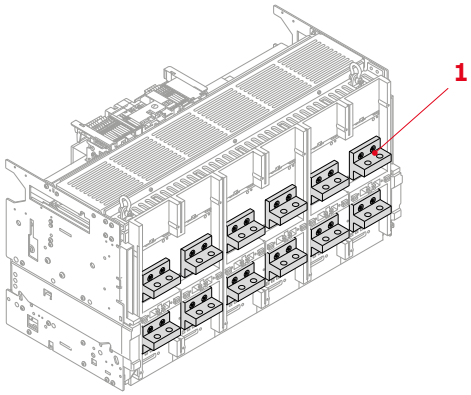




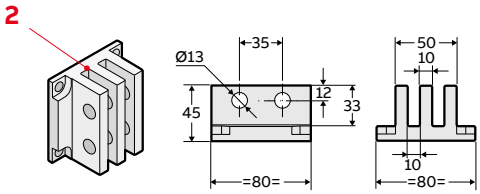


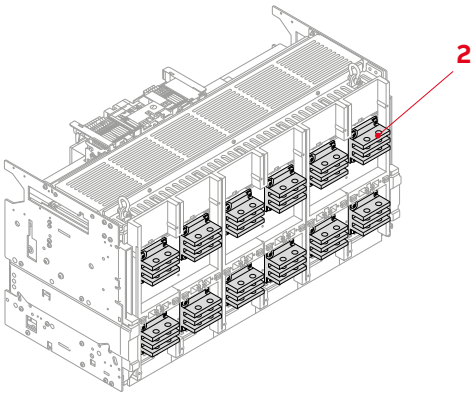
E6.3 H/V 4000-5000A



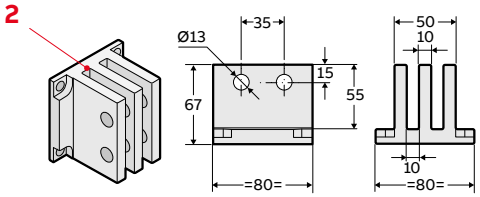


E6.3 H/V 4000A-6300A
E6.3 X 4000A-6300A





E6.3 H/V 6300A LHR

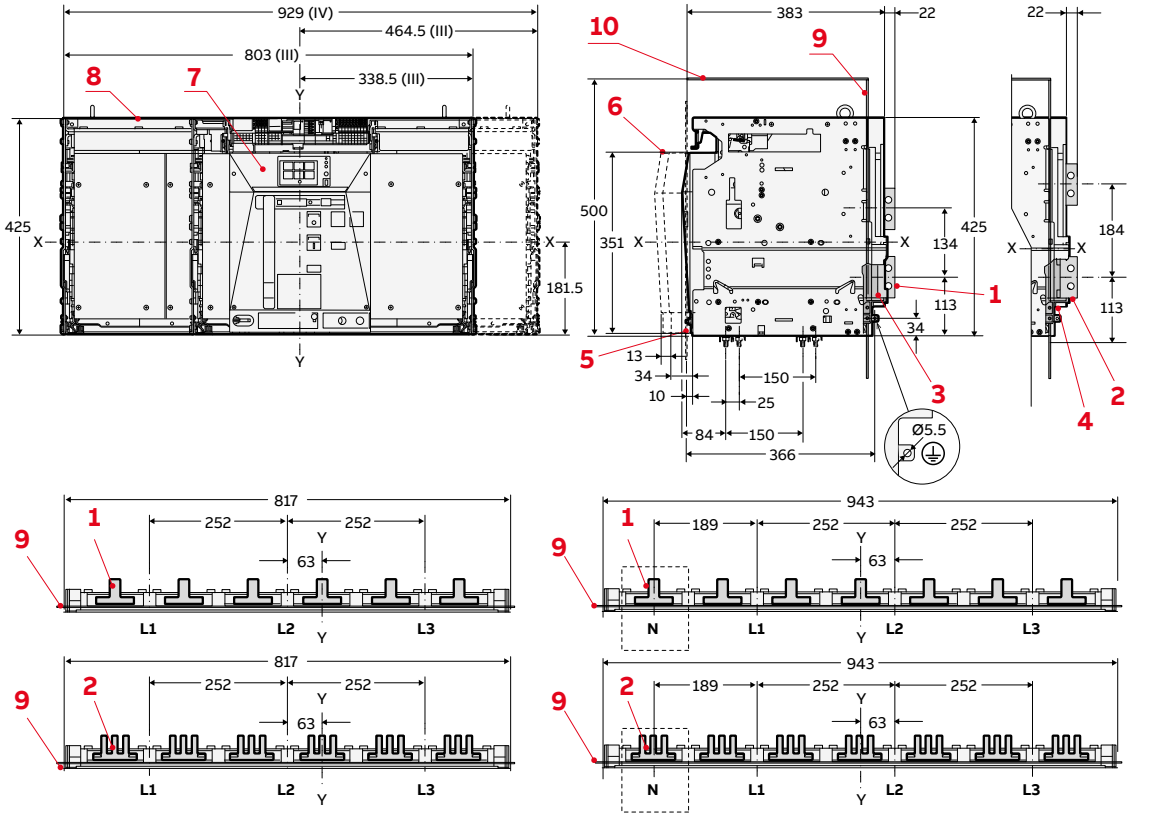


1 Horizontal ter. 5000A
2 Horizontal ter. 6300A
3 Tighten. torque 20Nm
4 Tighten. torque 20Nm
5 Door position for dimensions flange: see TN 1SDH002310A1120
6 Connected test discommected distances
7 Moving part
8 Fixed part
9 Segregation (when provided)
10 Metallic part

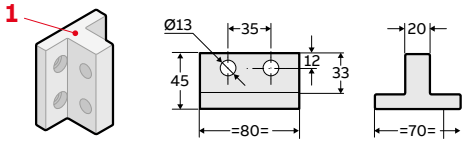
Vertical rear terminals – VR

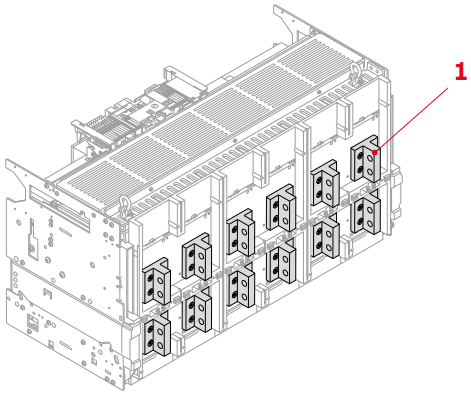
E6.3 H/V 4000-5000A

E6.3 H/V 4000A-6300A
E6.3 X 4000A-6300A

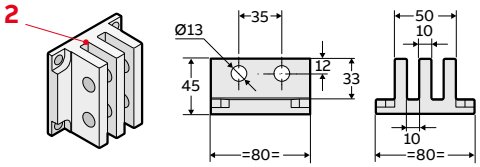


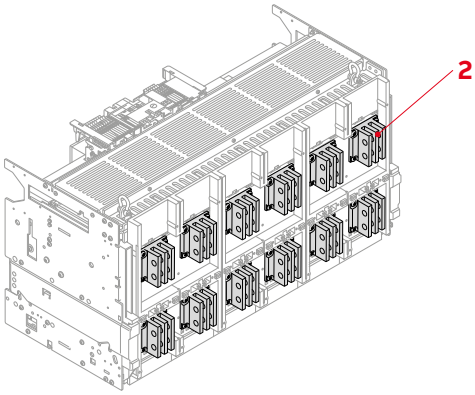
E6.3 H/V 4000-5000A



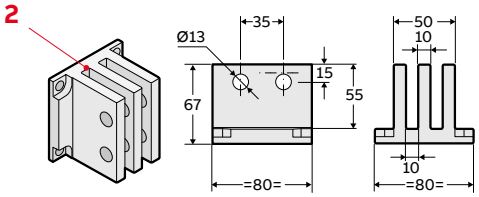


E6.3 H/V 4000A-6300A
E6.3 X 4000A-6300A





E6.3 H/V 6300A LVR



1 Vertical terminal 5000A

2 Vertical terminal 6300A

3 Tightening torque 20Nm

4 Tightening torque 20Nm

5 Door position for dimensions flange: see TN 1SDH002310A1120

6 Connected test discommected distances

7 Moving part

8 Fixed part

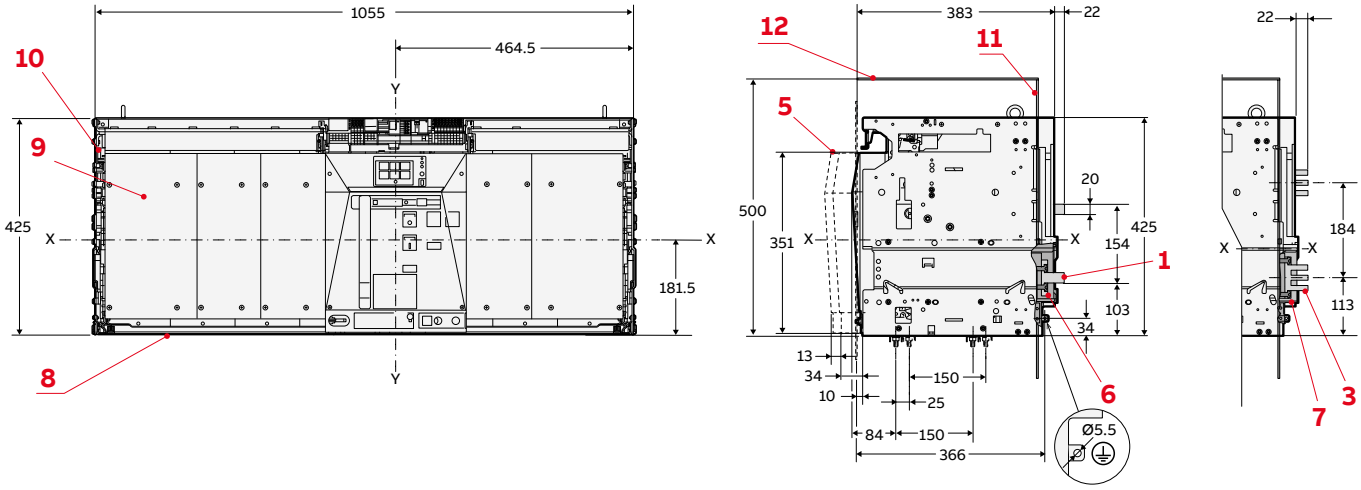
9 Segregation (when provided)

10 Metallic part

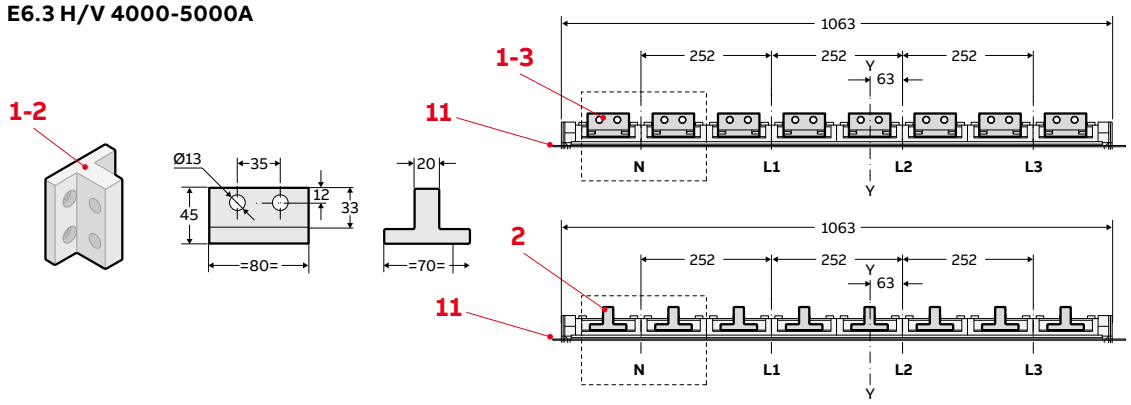
WITHDRAWABLE CIRCUIT-BREAKER - E6.3

Rear orientable terminals - HR/VR full size

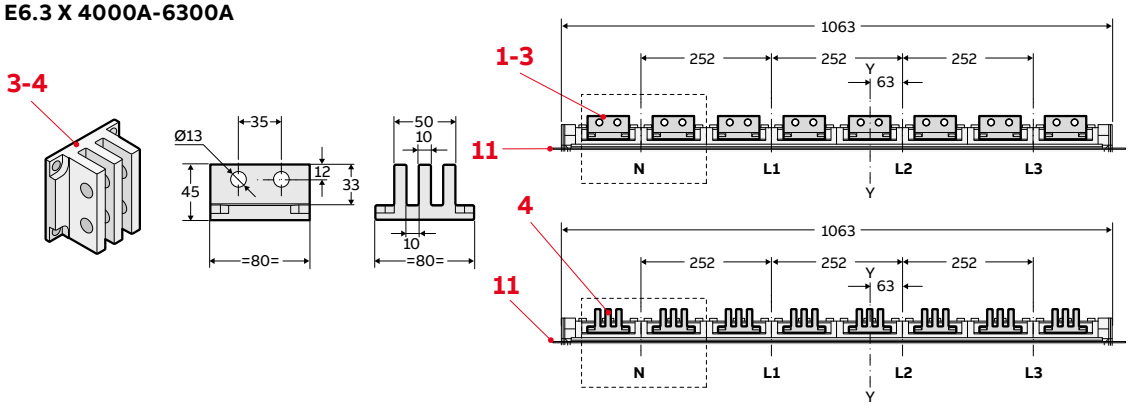
E6.3 H/V 4000...5000A



E6.3 H/V 4000-5000A



E6.3 H/V 4000A-6300A
E6.3 X 4000A-6300A



1 Horizontal terminal 5000A

2 Vertical terminal 5000A

3 Horizontal terminal 6300A

4 Vertical terminal 6300A

5 Connected, test, disconnected distances

6 Tighten. torque 20Nm

7 Tighten. torque 20Nm

8 Mounting fixed part screws provided M8x25 head convex high class 8.8 or couple superior tightening torque 20Nm compulsory fixing from top

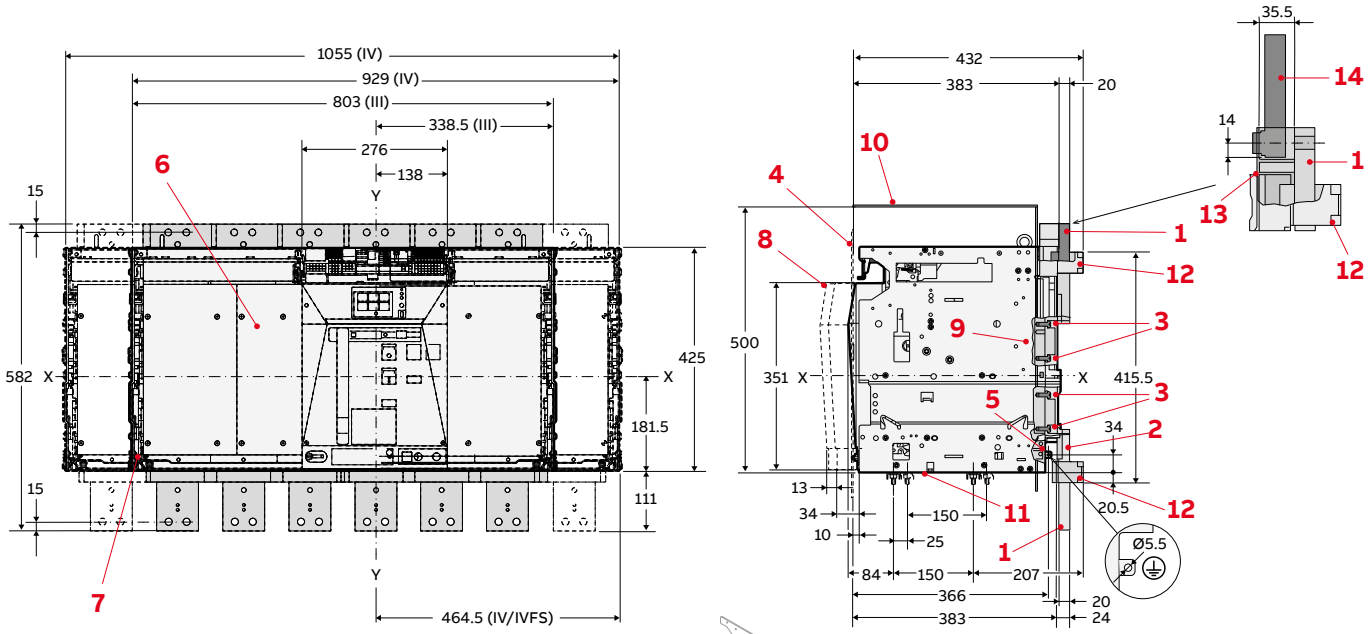
9 Moving part

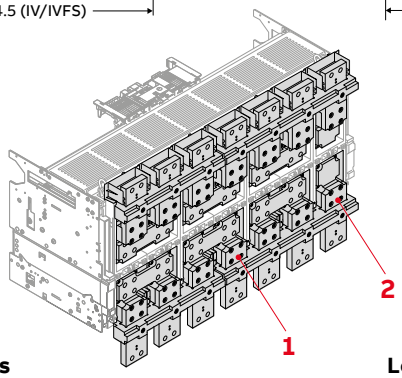
10 Fixed part

11 Segregation (when provided)

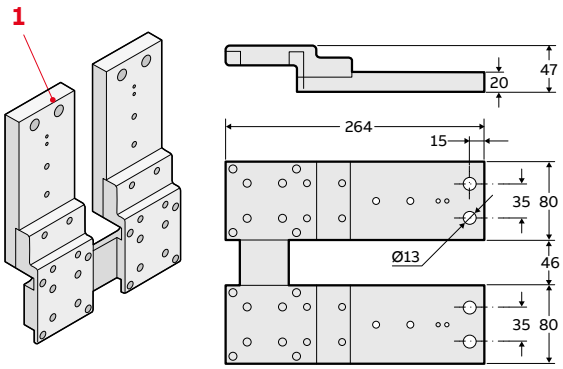
12 Metallic sheet

Front terminals – F

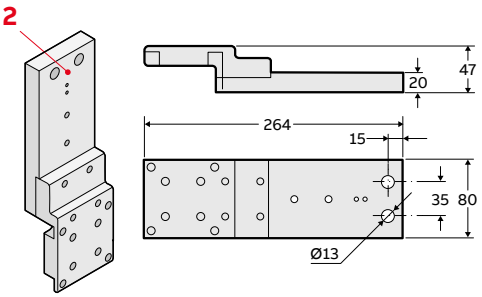


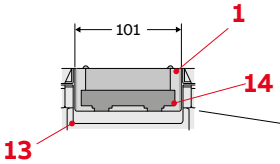


Upper front terminals

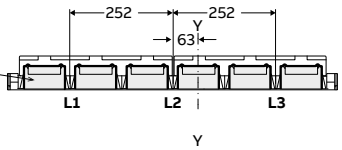


Lower front terminal

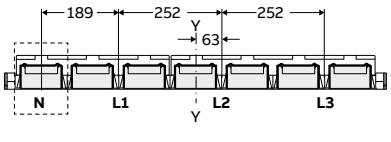




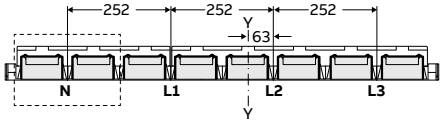
3-pole version



4-pole version



4-pole full size



1 Front terminal upper and lower

2 Single front terminal

3 Tighten. torque 20Nm

4 For dimension flange: see TN 1SDH002310A1120

5 Grounding

6 Moving part

7 Fixed part

8 Connected, test, disconnected distances

9 Insulating sheet or insulated metallic sheet

10 Roof insulation or insulated metal

11 Fixing plate

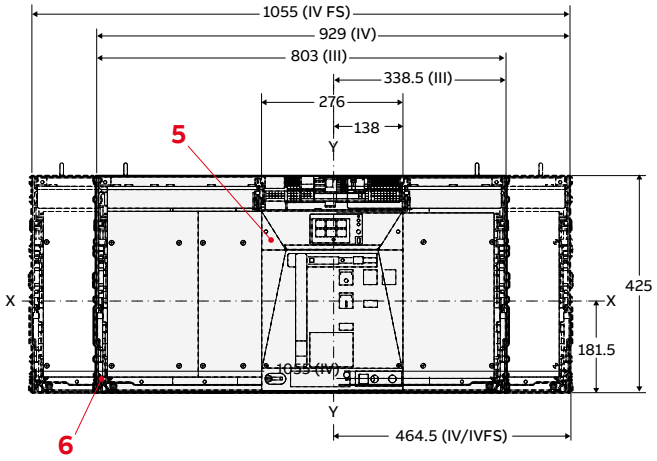
12 Crossbeam front terminal

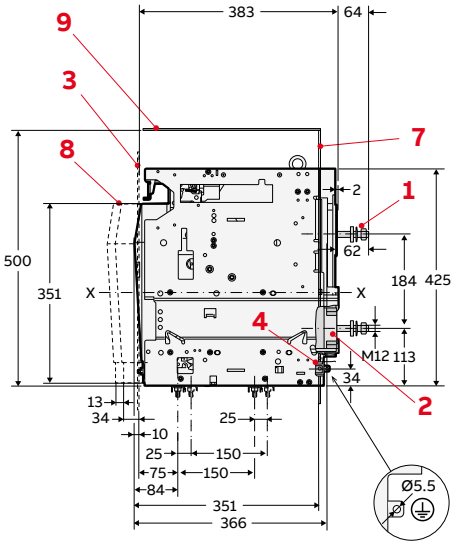
13 Plastic protection

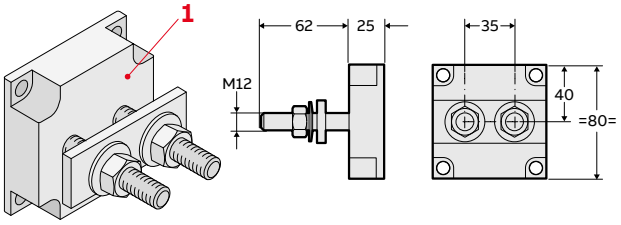
14 Customer busbar and screws (not provided)

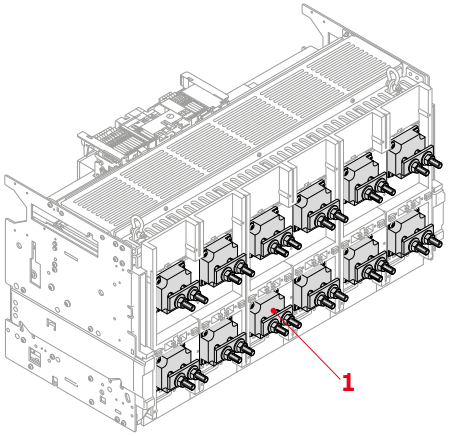
WITHDRAWABLE CIRCUIT-BREAKER - E6.3

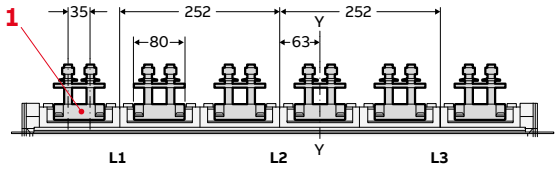
Flat terminals

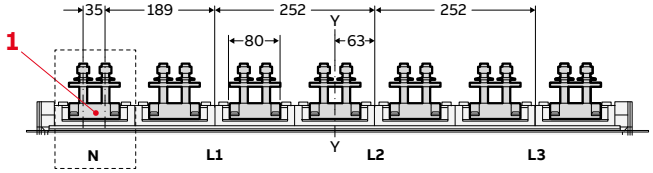


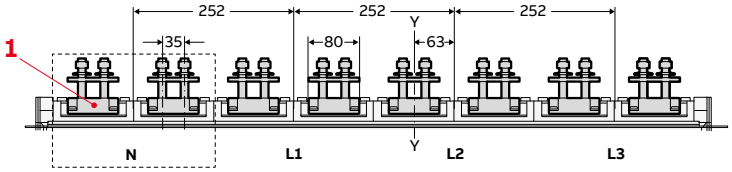












1 Flat terminal 5000A tightening torque on power circuit connections 45Nm

2 Tightening torque 20Nm

3 Door position for dimension flange: see TN 1SDH002310A1120

4 Grounding

5 Moving part

6 Fixed part

7 Segregation (when provided)

8 Connected, test, disconnected distances

9 Metallic sheet

07

WIRING DIAGRAMS

7/2 **Reading information**

7/5 **Circuit-breakers**

7/6 **Wirings rotation on terminal boards**

7/7 **Terminal box E1.3**

7/8 **Terminal box E2.3 - E4.3 - E6.3**

7/9 **Electrical accessories**

READING INFORMATION

Circuit-breakers

Operating state shown

The circuit diagram is for the following conditions:

- withdrawable version circuit-breaker, open and racked-in
- circuits de-energised
- releases not tripped
- motor operating mechanism with springs discharged.

Key

*	= See the note indicated by the letter
A1	= Applications located on the mobile part of the circuit-breaker
A3	= Applications located on the fixed part of the circuit-breaker
A4	= Indicative devices and connections for control and signalling, outside the circuit-breaker
A5	= Modules applications
A6	= Ekip DIN Rail cartridge applications
A13	= Ekip Signalling 10K type signalling unit, outside the circuit-breaker
A19	= Ekip DIN Rail cartridge
AF1÷3	= Inputs for ARC-FLASH protection system
BUS1	= Serial interface with external bus
D	= Electronic time-delay device for undervoltage release coil, outside the circuit-breaker
GZI(DBI)	= Zone selectivity input for G protection or for input in “reverse” direction for D protection
GZo(DBo)	= Zone selectivity output for G protection or for output in “reverse” direction for D protection
I 01÷32	= Programmable digital inputs
I 41÷54	= Programmable analogue inputs for temperature sensors
K51	= Electronic overcurrent protection trip unit type Ekip Aware
K51/COM	= Communication module
K51/AF1-2	= Modules for ARC-FLASH protection system
K51/MEAS	= Measurement module
K51/SIGN	= Signalling module
K51/SUPPLY	= Auxiliary supply module (110÷240VAC 24÷240VDC)
K51/SYNC	= Synchronization module
K51/TEMP	= Temperature monitoring module
M	= Motor for closing springs loading
O 01÷32	= Programmable signalling contacts
O SC	= Contact for synchronism control
Q	= Circuit-breaker
Q/1÷Q/25	= Auxiliary open/closed contacts of circuit-breaker
Q/26-27	= Auxiliary open/closed contacts used internally by the trip unit
RC	= RC (residual current) protection sensor
RTC	= Contact for signalling circuit- breaker is ready to close
RTC EKIP	= Contact for signalling circuit-breaker is ready to close, used internally by the trip unit
S33M/1÷2	= Limit contacts of springs loading motor
S43	= Switch for presetting remote/local control
S51-S51/2	= Trip signalling contacts
S75E/1÷4*	= Contacts for signalling circuit- breaker in racked-out position (provided only with withdrawable circuit-breaker version)
S75I/1÷6*	= Contacts for signalling circuit-breaker in racked-in position (provided only with withdrawable circuit-breaker version)
S75T/1÷4*	= Contact for signalling circuit- breaker in test position (provided only with withdrawable circuit-breaker version)

(*) = Maximum number of 575 contacts is 10 for circuit-breakers E2.3-E4.3-E6.3, for circuit-breakers E1.3 maximum number of contacts is 6.

SC	= Pushbutton or contact for circuit-breaker closing
SO	= Pushbutton or contact for circuit-reaker immediate opening
SO1	= Pushbutton or contact for circuit-breaker opening with time-delayed trip
SR	= Pushbutton or contact for electrical resetting of 551 trip contact
SZI(DFI)	= Zone selectivity input for S protection or for input in 'direct" direction for D protection
SZo(DFo)	= Zone selectivity output for S protection or for output in 'direct" direction for D protection
TI/L1-L2-L3	= Current transformers located on phases Ll ·L2-L3

TI/N	= Current transformer located on neutral conductor
TU1-TU2	= Insulation voltage transformers (outside the circuit-breaker)
UAF/...	= ARC-FLASH protection system sensors for internal arc detection
Uaux	= Auxiliary supply voltage
UI/L1-L2-L3	= Current sensors (Rogowski coils) located on phases Ll-L2-L3
UI/N	= Current sensor (Rogowski coil) located on neutral conductor
UI/O	= Homopolar current sensor (Rogowski coil)
W2	= Serial interface with internal bus (local bus)
W9	= RJ45 connector for external bus (BUS 1 or LINK Bus)
W10÷W14	= RJ45 connectors for communication modules
X	= Connector for delivery auxiliary circuits for withdrawable version circuit-breaker
XB1÷XB7	= Connectors for circuit-breaker applications
XCT1	= Ekip DIN Rail Cartridge terminal board
XF	= Terminal board for delivery position contacts of withdrawable version circuit-breaker
XK1÷XK3	= Connectors for Ekip Aware protection trip unit circuits
XK7	= Connector for modules auxiliary circuits
XV	= Terminal board for delivery auxiliary circuits for fixed version circuit-breaker
YC	= First closing coil
YC2	= Second closing coil
YO	= First opening coil
YO1	= Opening coil for overcurrent protection trip
YO2	= Second opening coil
YR	= Coil for electrical resetting of 551 trip contact
YU	= First undervoltage coil
YU2	= Second undervoltage coil

READING INFORMATION

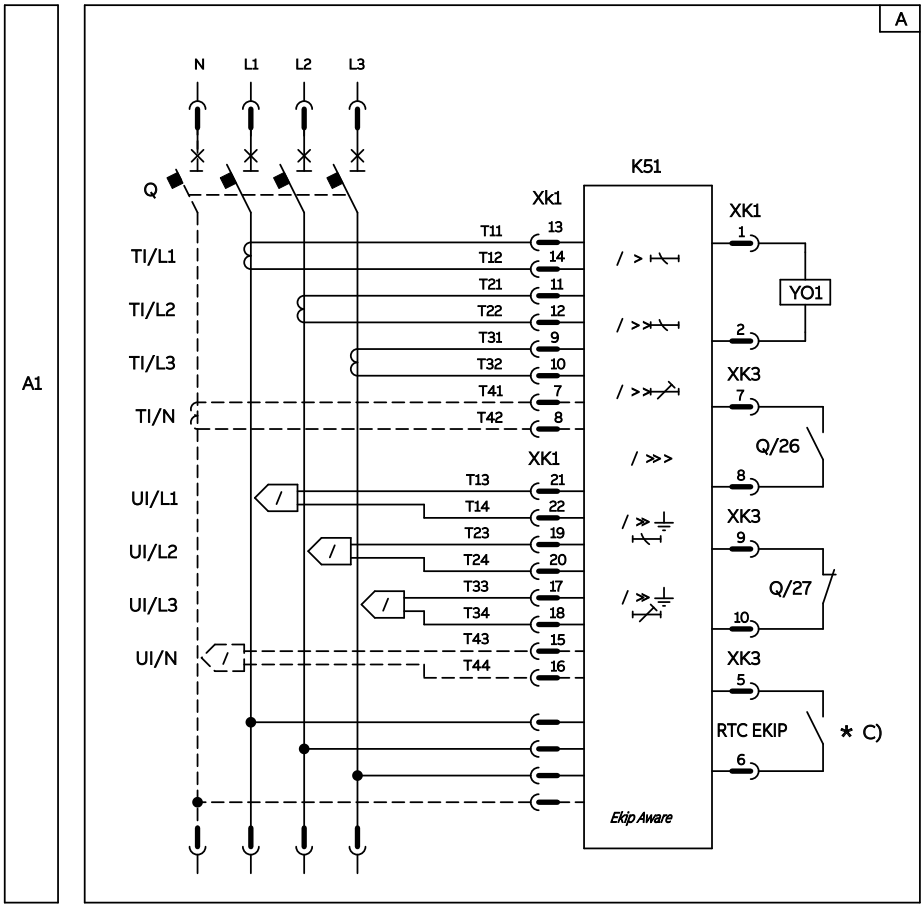
Circuit-breakers

Notes

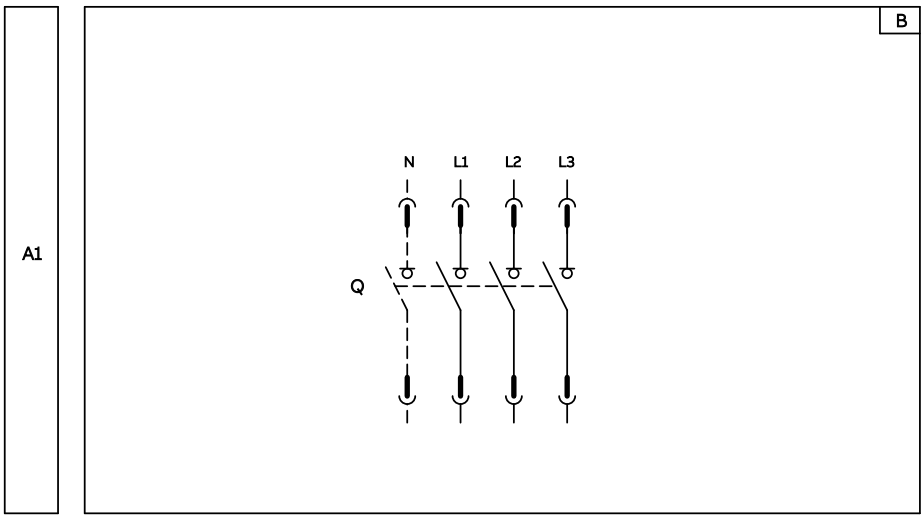
A. For the zone selectivity and local bus functions, the presence of auxiliary power supply is required (see Figs. 32-33).
B. Always supplied with motor for closing springs loading in Fig. 13.
C. Voltage transformer mandatory in the case of external voltage measurement cables. External voltage measurement cables mandatory for systems with rated voltage lower or equal than 100V.
D. The connections between the RC residual current protection sensor and the poles of X connector (or XV) of the circuit-breaker must be made with 4-pole shielded cable with conductors interwoven in pairs (type BELDEN 9696 paired or equivalent), of length no greater than 15m.
E. With Ekip Aware electronic protection trip unit, protection against an earth fault is available (Gext) by means of current sensor located on the star centre of the MV/LV transformer. The connection between terminals 1 and 2 of the current sensor and Ge+ and Ge- poles of the X connector (or XV) of the circuit-breaker must be made with shielded and stranded 2-pole cable (type BELDEN 9841 or equivalent) of length no greater than 15m.
F. Make the connection using the ABB cable supplied. There must be no break in the cable. Use of other cables or extensions using intermediate terminals is not allowed. If external neutral conductor is not present, the poles Ne+ and Ne- of the X connector (or XV) of the circuit-breaker must be short-circuit.
G. Mandatory in the case of the presence of Ekip Cartridge.
H. Circuit-breakers E2.3, E4.3 and E6.3, equipped with Ekip Supply Lite, can use up to three of the applications between Figures 41 and 59, in the quantity of one for each application. Equipped with Ekip Supply Evo Modbus TCP, these same circuit-breakers can use up to two of the applications between Figures 41 and 59, in the quantity of one for each application. Circuit-breakers E1.3, equipped with Ekip Supply Lite, can use up to two of the applications between Figures 41 and 59, in the quantity of one for each application. Equipped with Ekip Supply Evo Modbus TCP, these same circuit-breakers can use one of the applications between Figures 41 and 59.
I. In the Ekip Cartridge device it is possible to mount up to three separate modules, chosen from figures 41 to 59. Check that the same modules are not already present in the circuit-breaker terminal box.
J. In the presence of several Ekip Com modules with withdrawable version circuit-breaker, the contact S75I/5 should be connected only once to a single module.
K. The auxiliary voltage supply Uaux. enables activation of all the functions of the Ekip Aware electronic protection trip unit. Since an earth insulated Uaux. was requested, it is necessary to use “galvanically separated convertors” which comply with the standars IEC 60950 (UL 1950) or equivalent.
L. Use the twisted pair cable supplied with Ekip Cartridge. If a longer cable is required, use BELDEN 3105A shielded cable or equivalent, not more than 15 m in length. The shield must be earthed from both sides.
M. Suggested RJ45 cable type: CAT6 STP.
N. Consult “Technical Application Papers - vol. 9: Communication with ABB circuit-breakers via BUS” when connecting the EIA RS485 serial link wiring. Use BELDEN 3105A cable or equivalent.
O. Use cable type BELDEN 3079A or equivalent. For further details see White Paper 1SDC007412G0201 “Communication with SACE Emax Circuit-Breakers”.
P. The Ekip Signalling 10K Link module in Fig. 103 can be connected to the Ekip Supply Evo Modbus TCP of Fig. 33 via the W13 LINK Bus interface or via the 100M 2-wire Ethernet connection.
Q. Use a multi-conductor shielded and stranded cable type BELDEN 8762/8772 or equivalent. The shield must be earthed on the selectivity input side (for zone selectivity) or on both sides (for other applications).
R. Use PENTRONIC TEXTSITW type insulated cables for PT100/PT1000, no more than 10 m in length.
S. The digital inputs terminals of Ekip Signalling 10K Link unit (HS02÷HS22) are internally short-circuited.
T. Use a suitable 2-wire cable for the Ethernet connection, e.g. a T1 SPE cable with double shielding type HARTING T1 SPE SF/TP 1x2xAWG26/7, up to 15 m in length.
U. Use 3-wire shielded cables type BELDEN 8772 or 9533 or equivalent. The total length of the connections must not exceed 100 m. The shield must be earthed from both sides.

CIRCUIT-BREAKERS (IEC60617 STANDARDS)

3-pole or 4-pole circuit-breaker



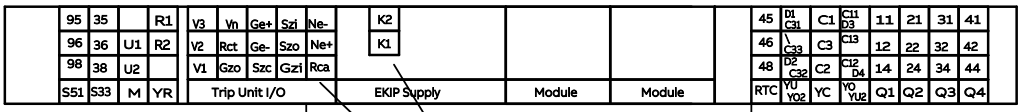
3-pole or 4-pole switch-disconnector



WIRINGS ROTATION ON TERMINAL BOARDS

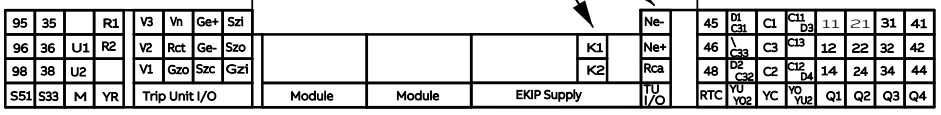
Fixed and withdrawable version

E1.3



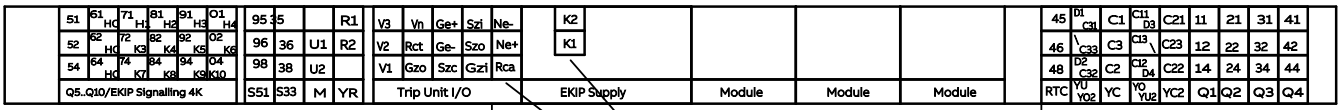
FIXED VERSION

E1.3



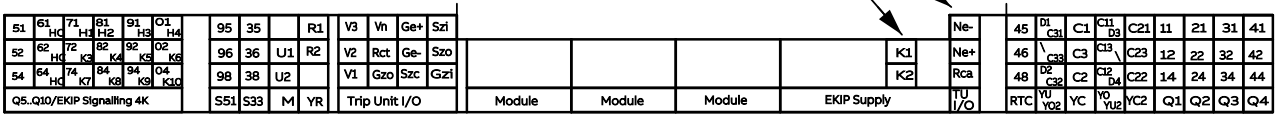
WITHDRAWABLE VERSION

E2.3
E4.3
E6.3



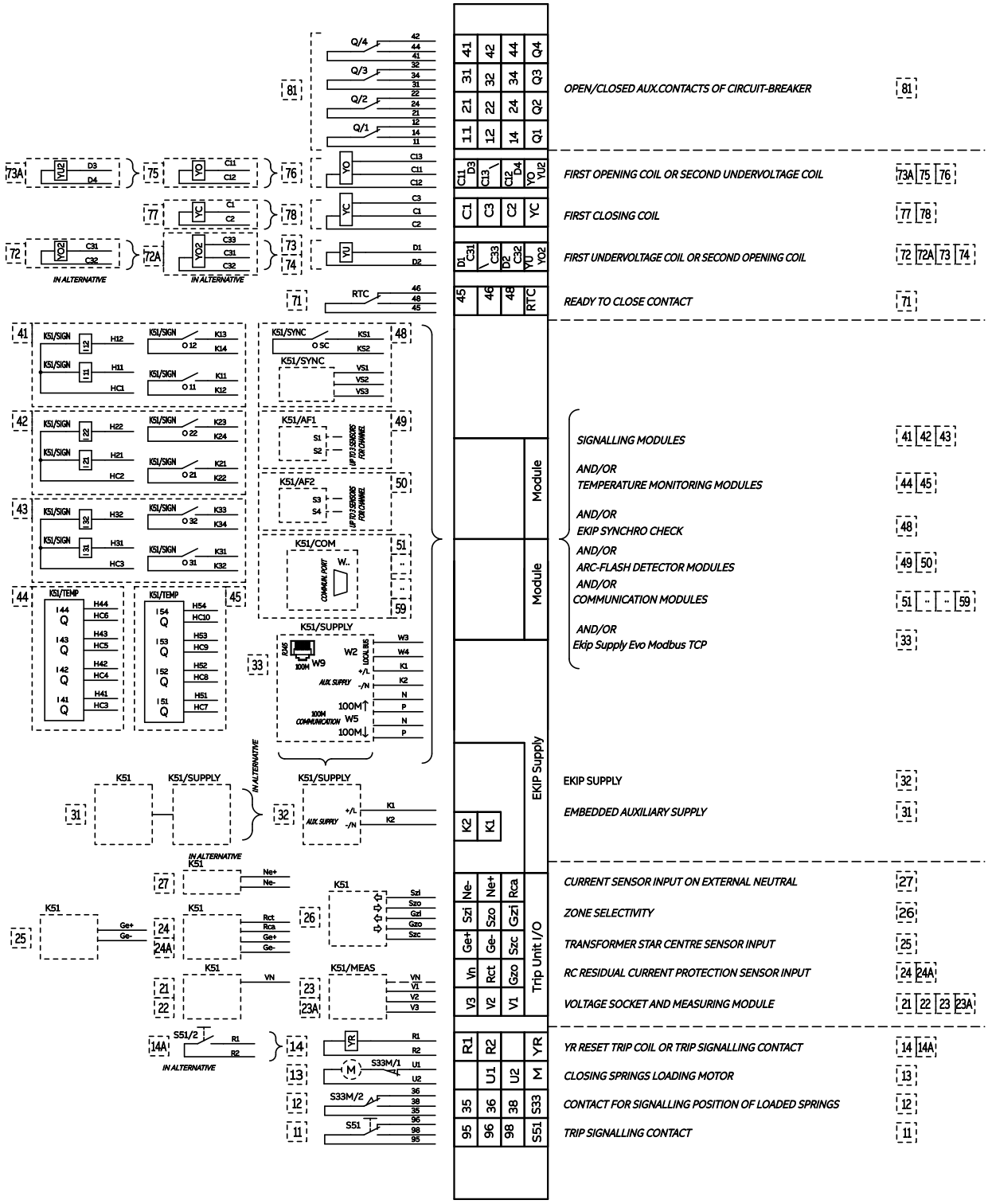
FIXED VERSION

E2.3
E4.3
E6.3

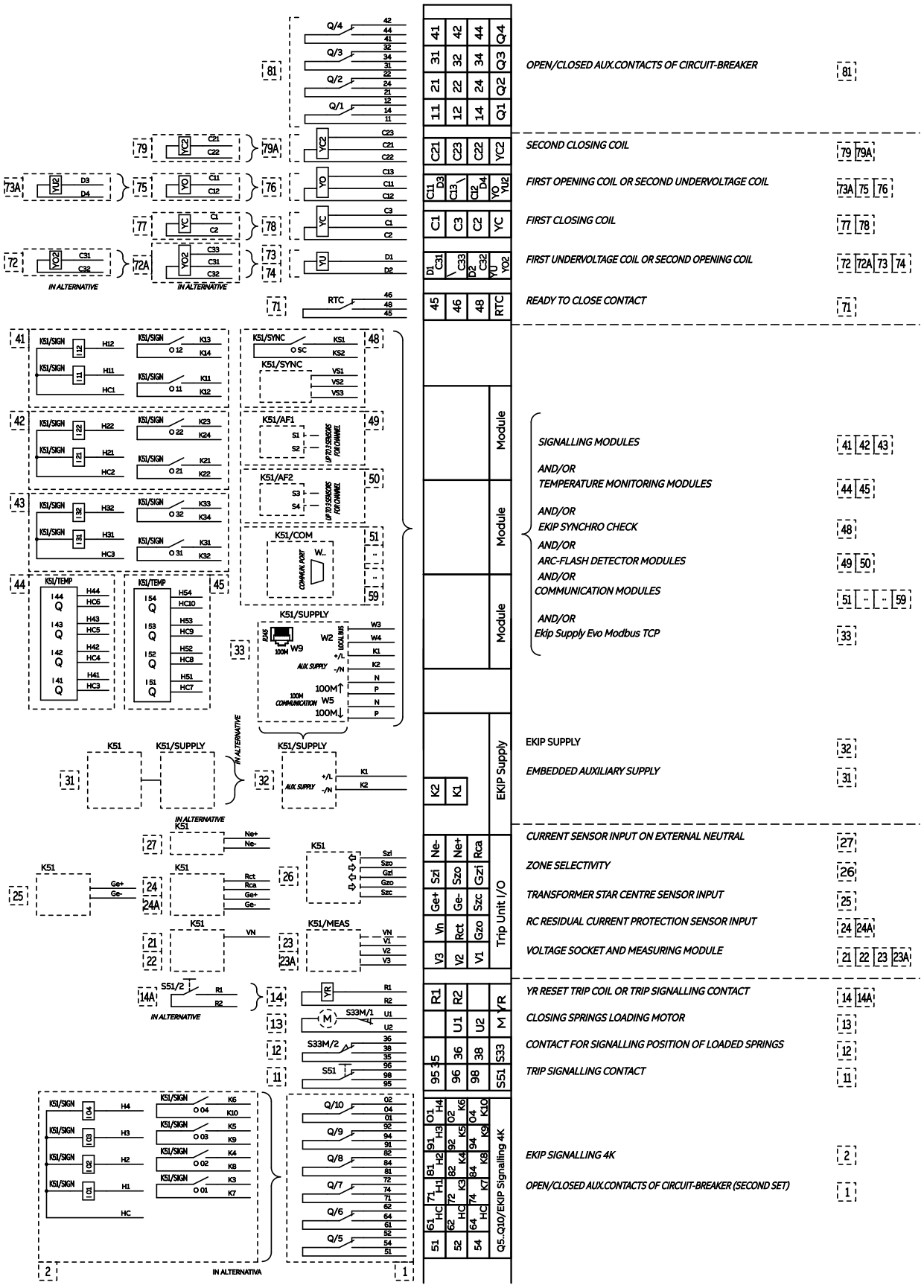


WITHDRAWABLE VERSION

TERMINAL BOX E1.3



TERMINAL BOX
E2.3 - E4.3 - E6.3



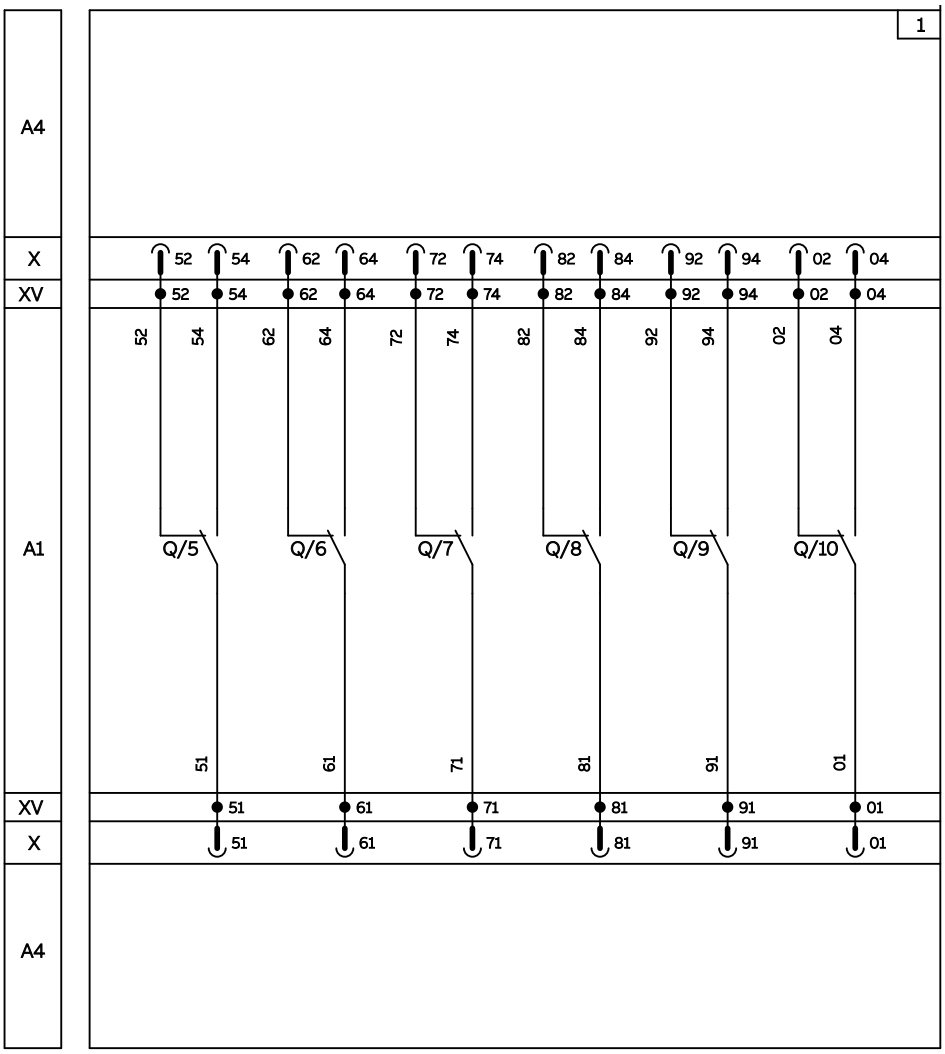
ELECTRICAL ACCESSORIES



1) Supplementary open/closed auxiliary contacts of the circuit-breaker - AUX 4Q

1 Only for circuit-breakers E2.3-E4.3-E6.3

As an alternative to figure 2 (Ekip signalling 4K) and to smart motor



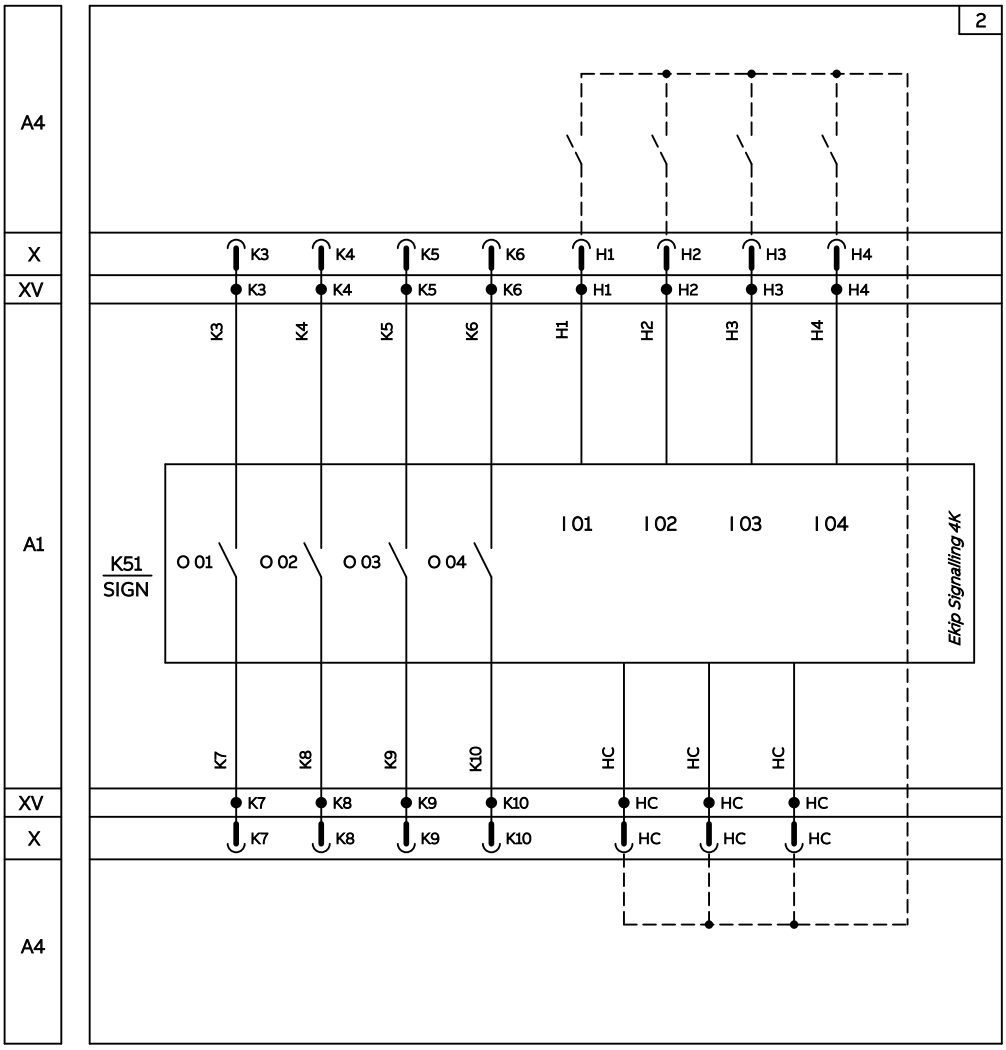
ELECTRICAL ACCESSORIES



2) Ekip Signalling 4K

2 Only for circuit-breakers E2.3-E4.3-E6.3

As an alternative to figure 1 (Q/5 ... Q/10) and to smart motor

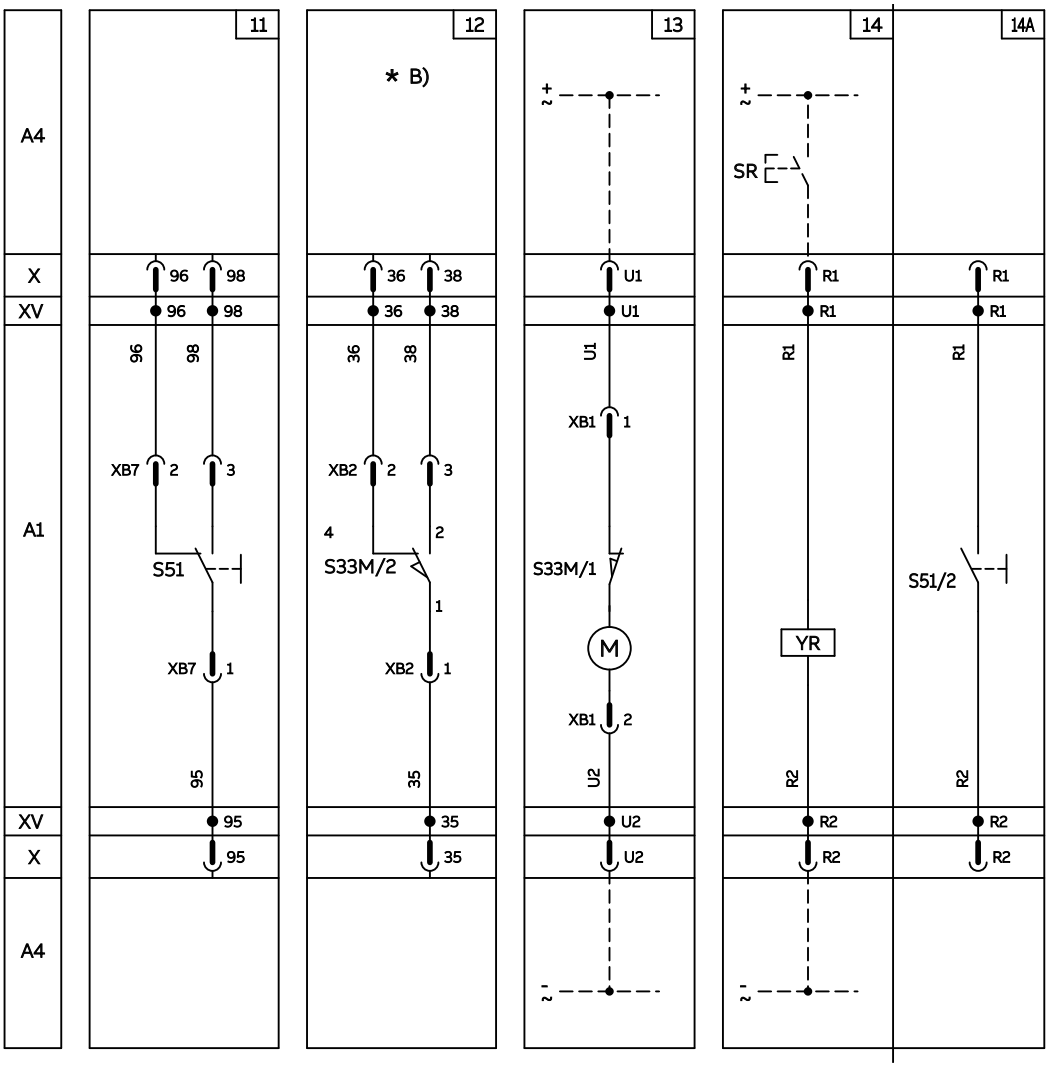




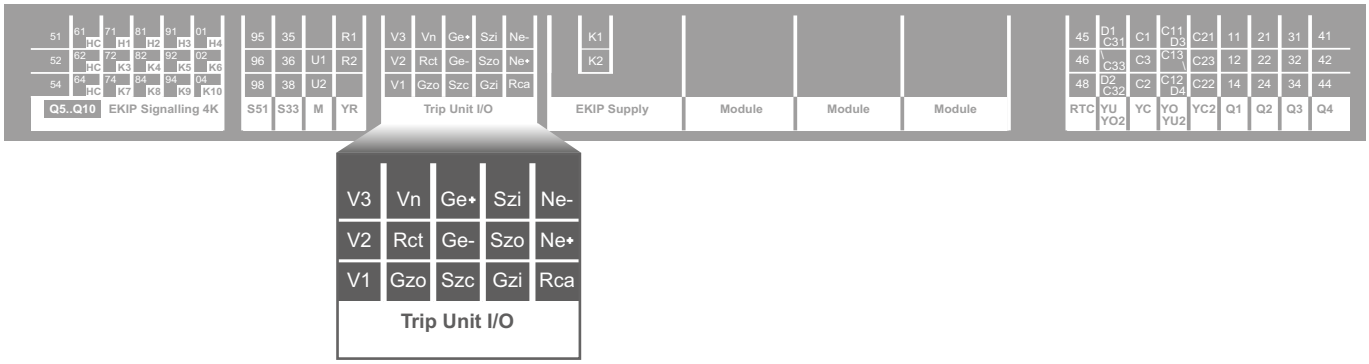
11) Trip signalling contact - S51
12) Contact for signalling position of loaded springs - S33 M/2
13) Motor for loading closing springs - M
14) Trip contact reset coil – YR
14A) Trip signalling contact - S51/2

12 Not available with smart motor

14 (YR)-14A(S51/2) as an alternative to each other



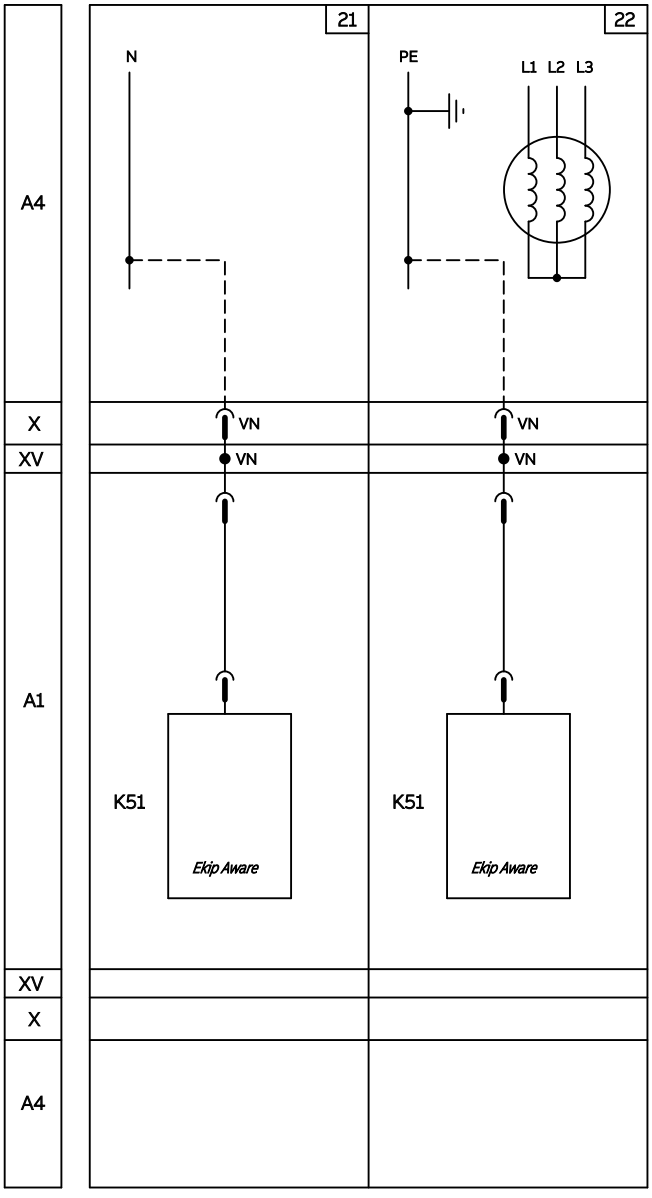
ELECTRICAL ACCESSORIES

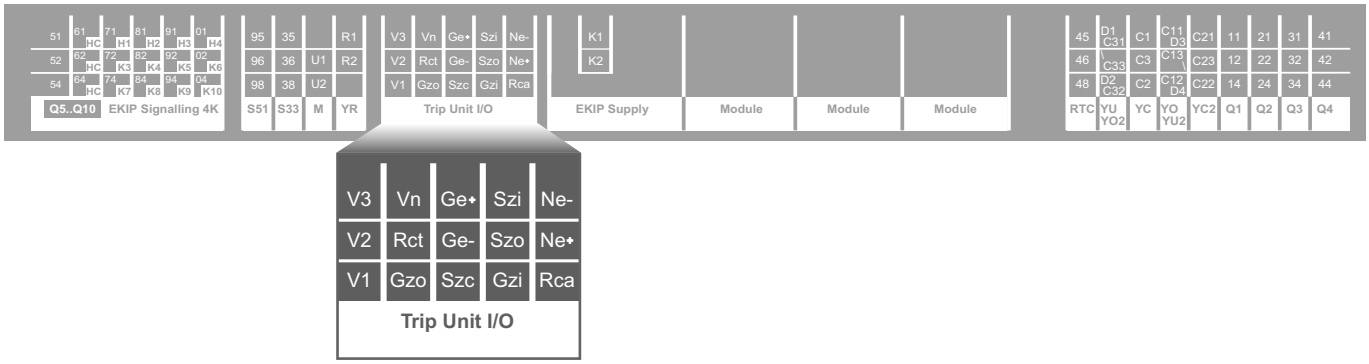


21) Sockets for connection to external neutral conductor on 3- pole c. breaker

22) Sockets for generator residual voltage protection

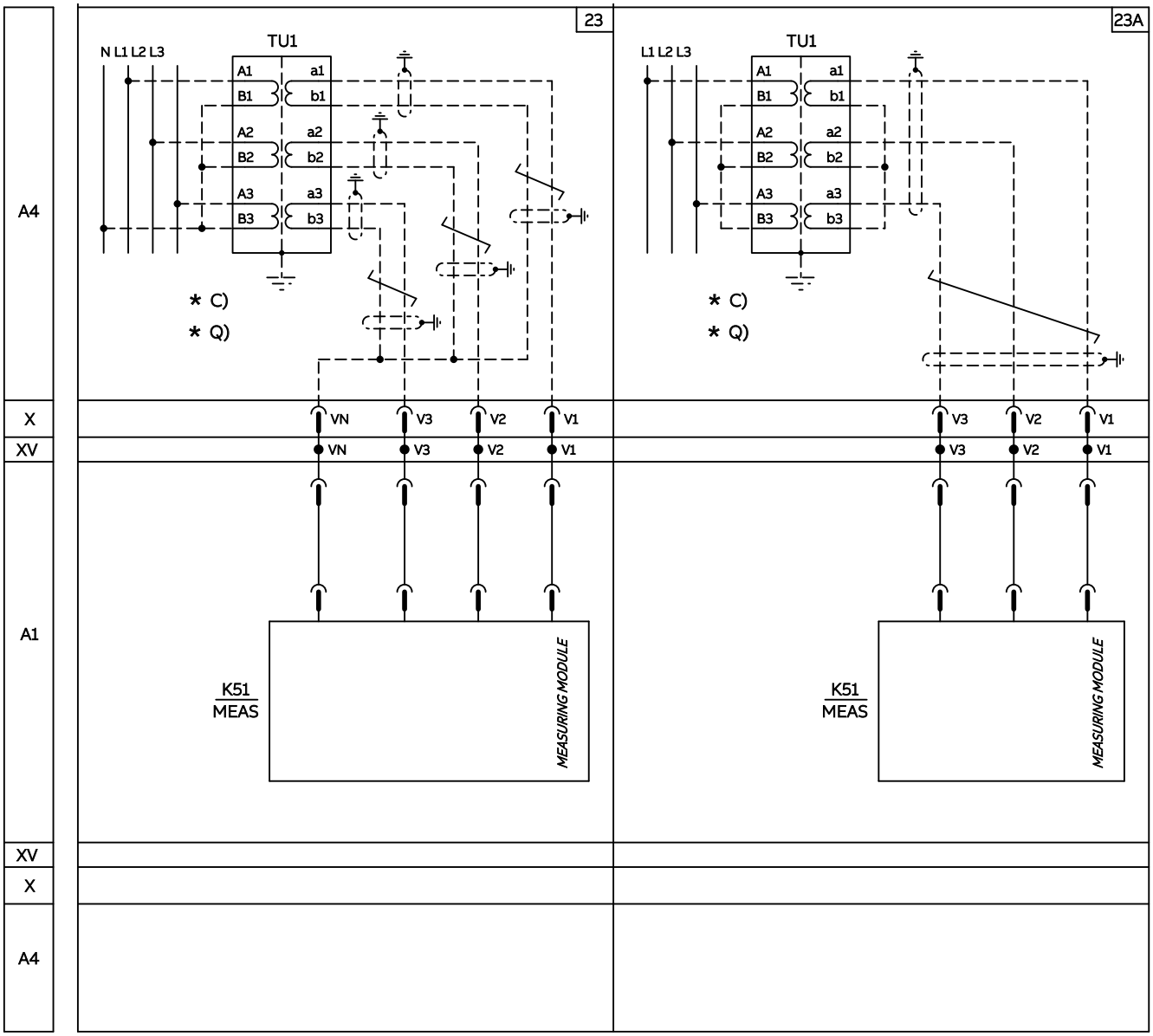
21 22 As an alternative to each other or to figures 23-23A (Measuring module)



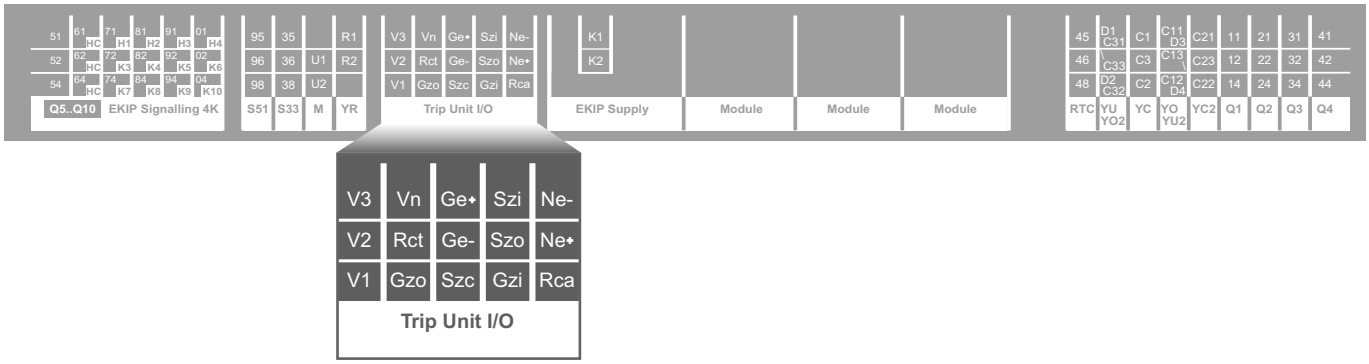


23 23A As an alternative to each other or to figures 21-22 (Voltage socket)

23) Measuring module for 4-pole or 3-pole with external neautral conductor c.breaker
23A) Measuring module for 4-pole c.breaker

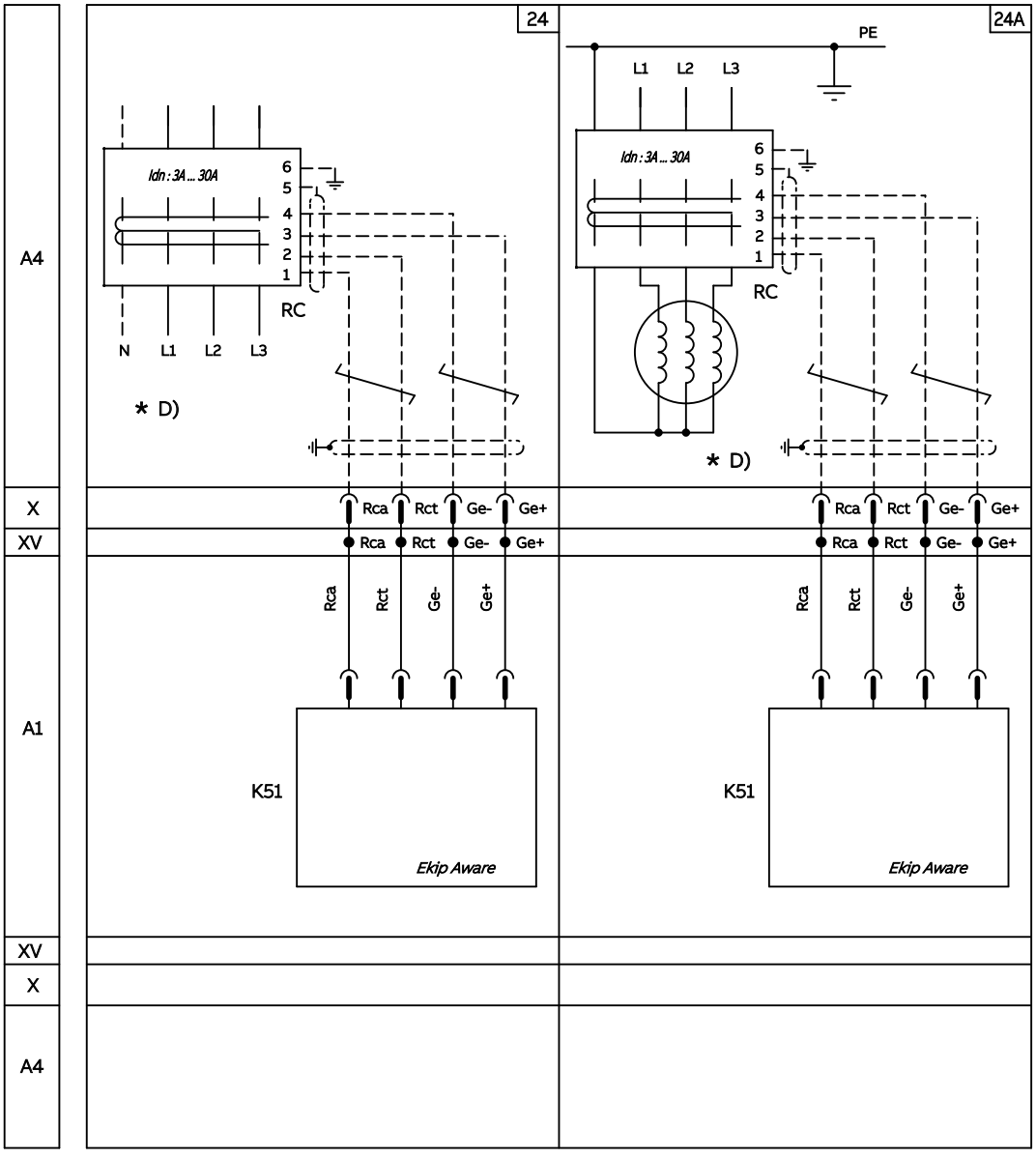


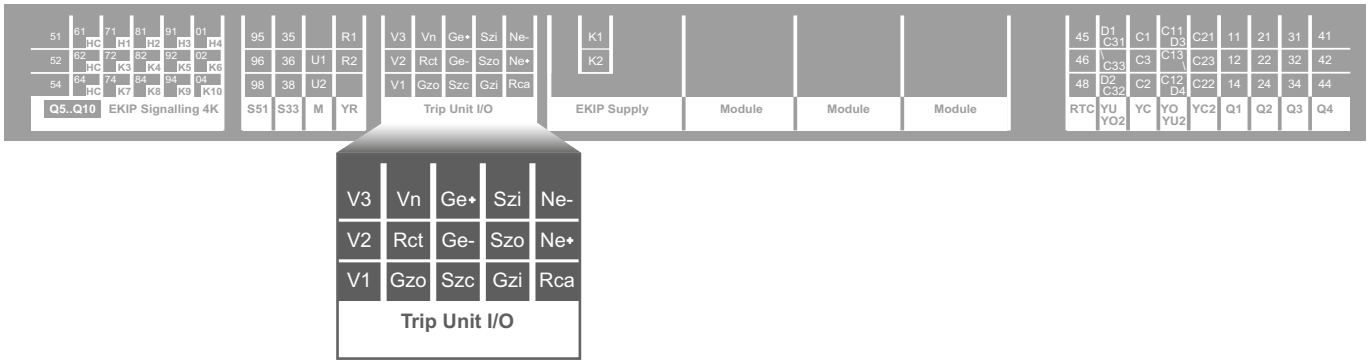
ELECTRICAL ACCESSORIES



24) Rc residual current protection sensor input (ANSI 64 & 50NTD)
24a) Rc differential ground fault protection (ANSI 87N)

24 24A As an alternative to each other or to figure 25





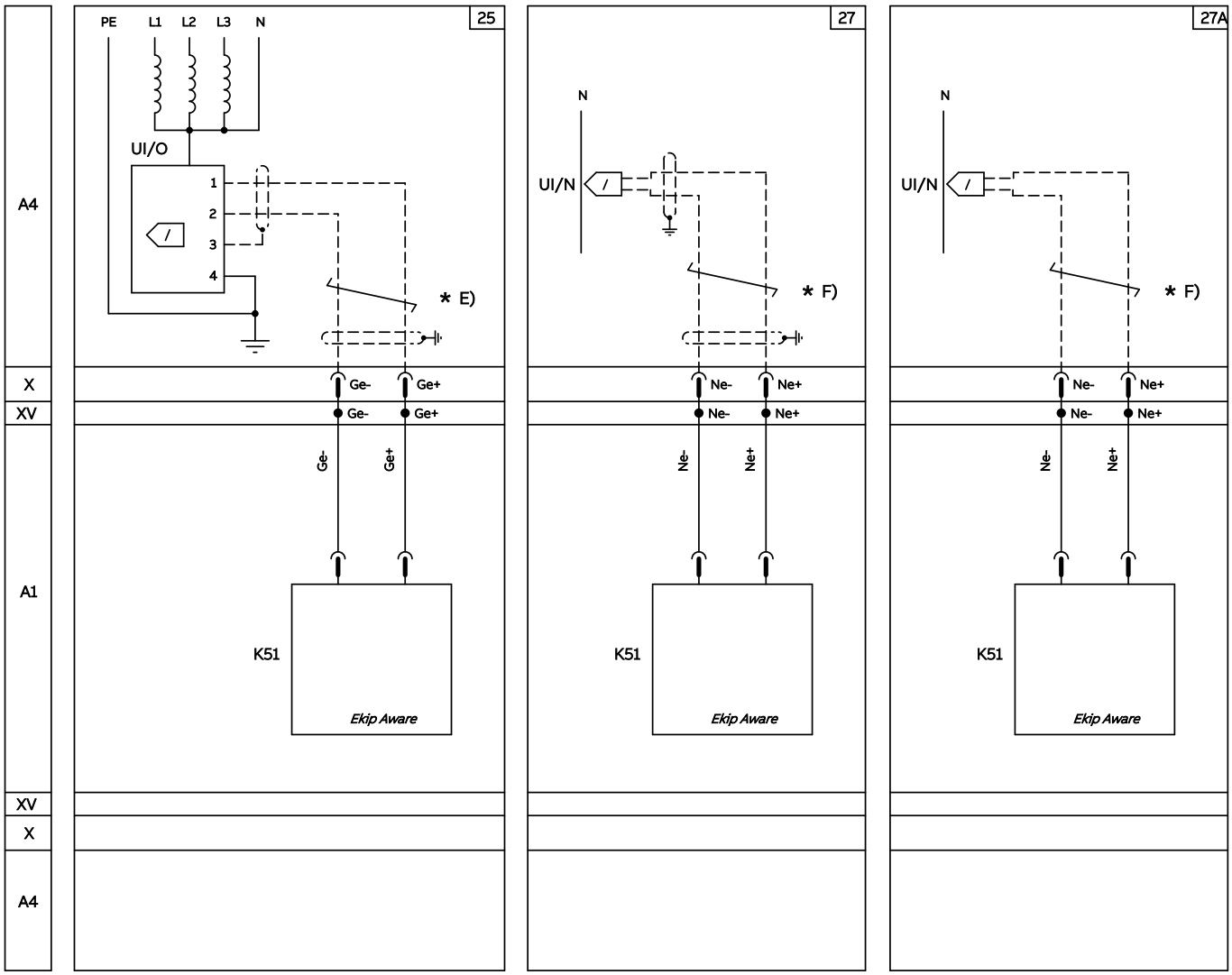
25 As an alternative to figures 24-24A

27A As an alternative to figure 27

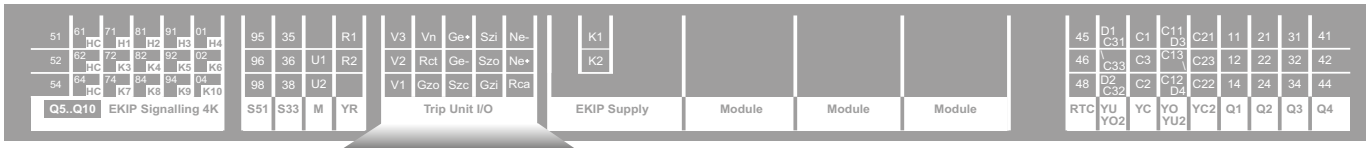
25) Transformer star center sensor input

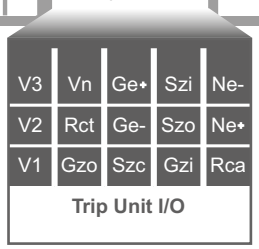
27) Current sensor input on external neutral (only for 3-pole circuit-breakers)

27A) Current sensor input on external neutral (only for 3-pole Ne- circuit-breaker)

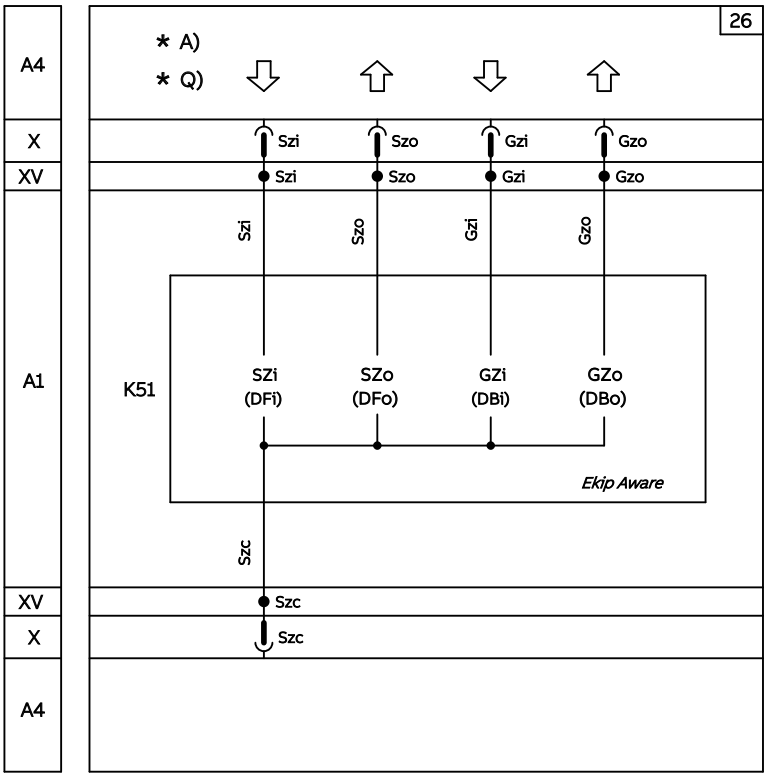


ELECTRICAL ACCESSORIES

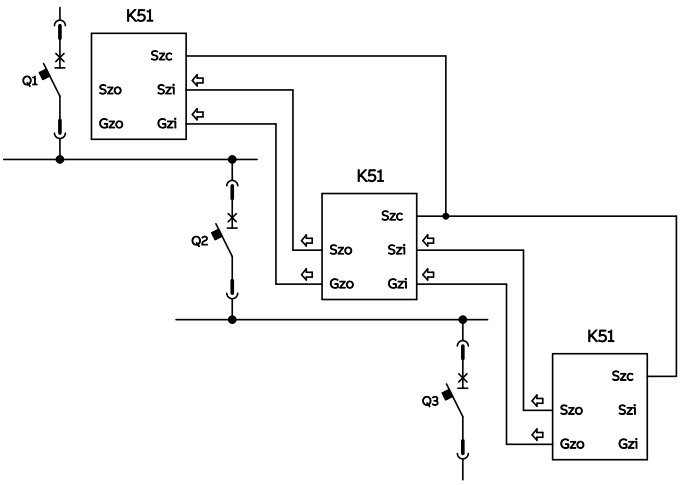


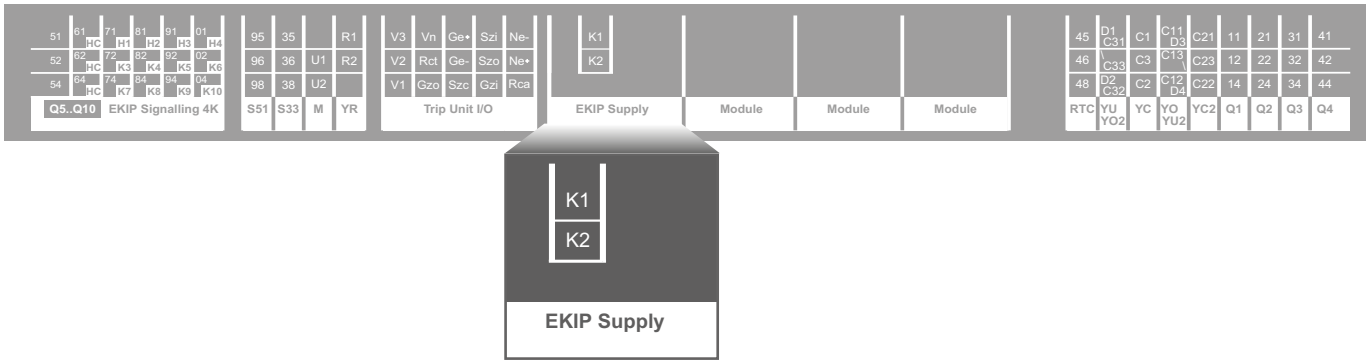


26) Zone selectivity



Example for application diagram (among 3 circuit-breakers)

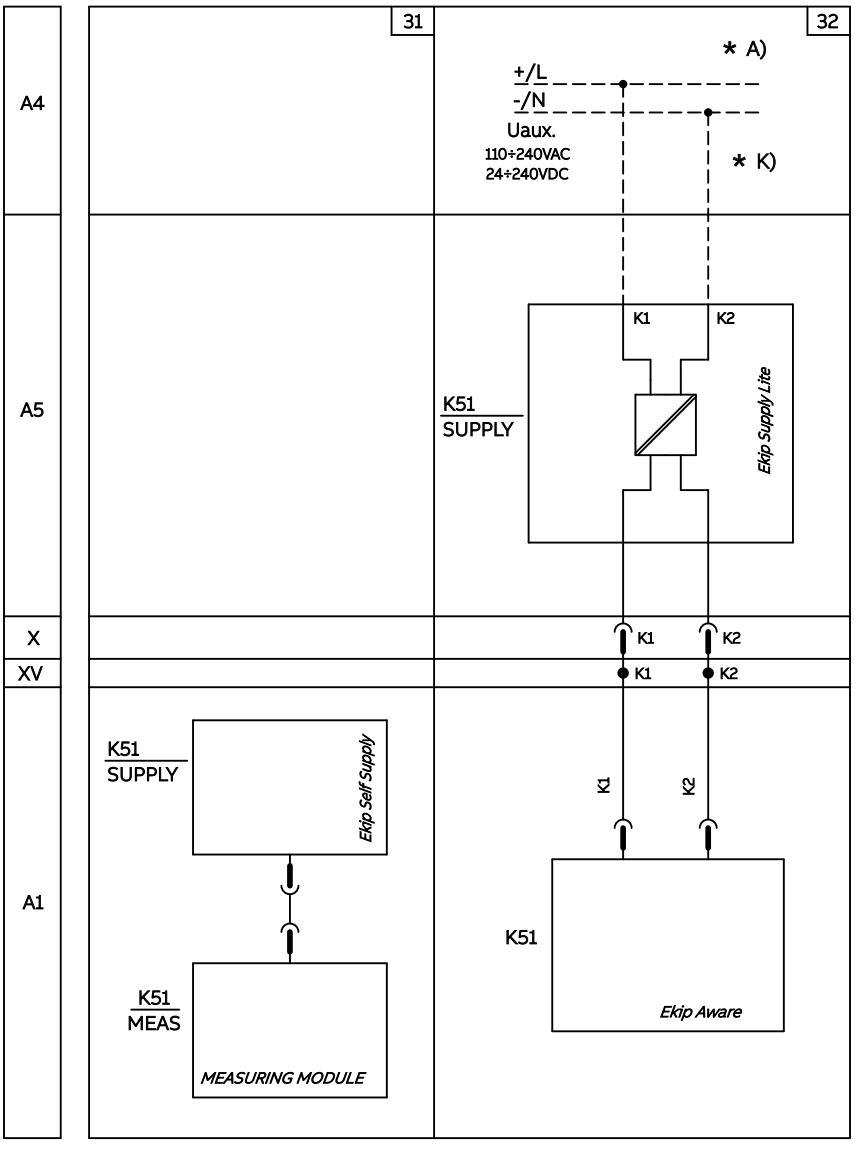




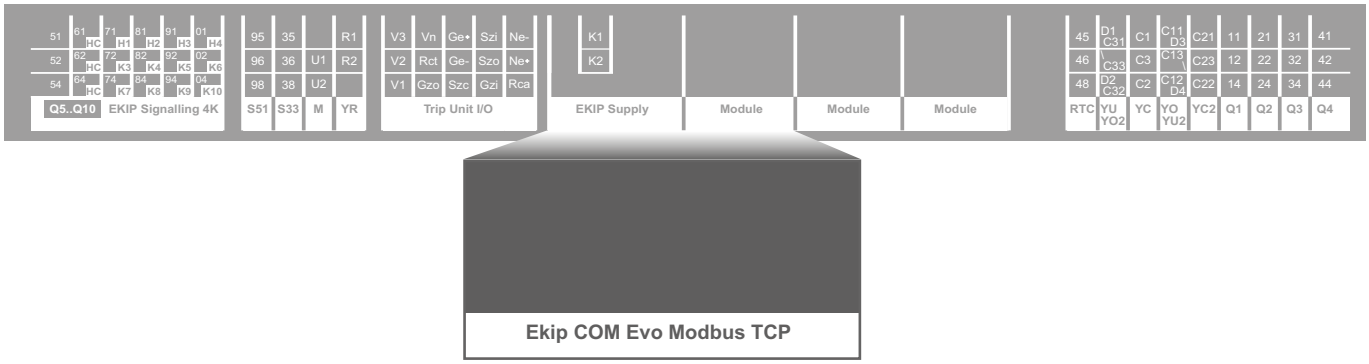
31) Embedded auxiliary supply

32) Auxiliary supply through module 110-240V AC or 24-240DC

31 32 As an alternative to each other or to figure 33

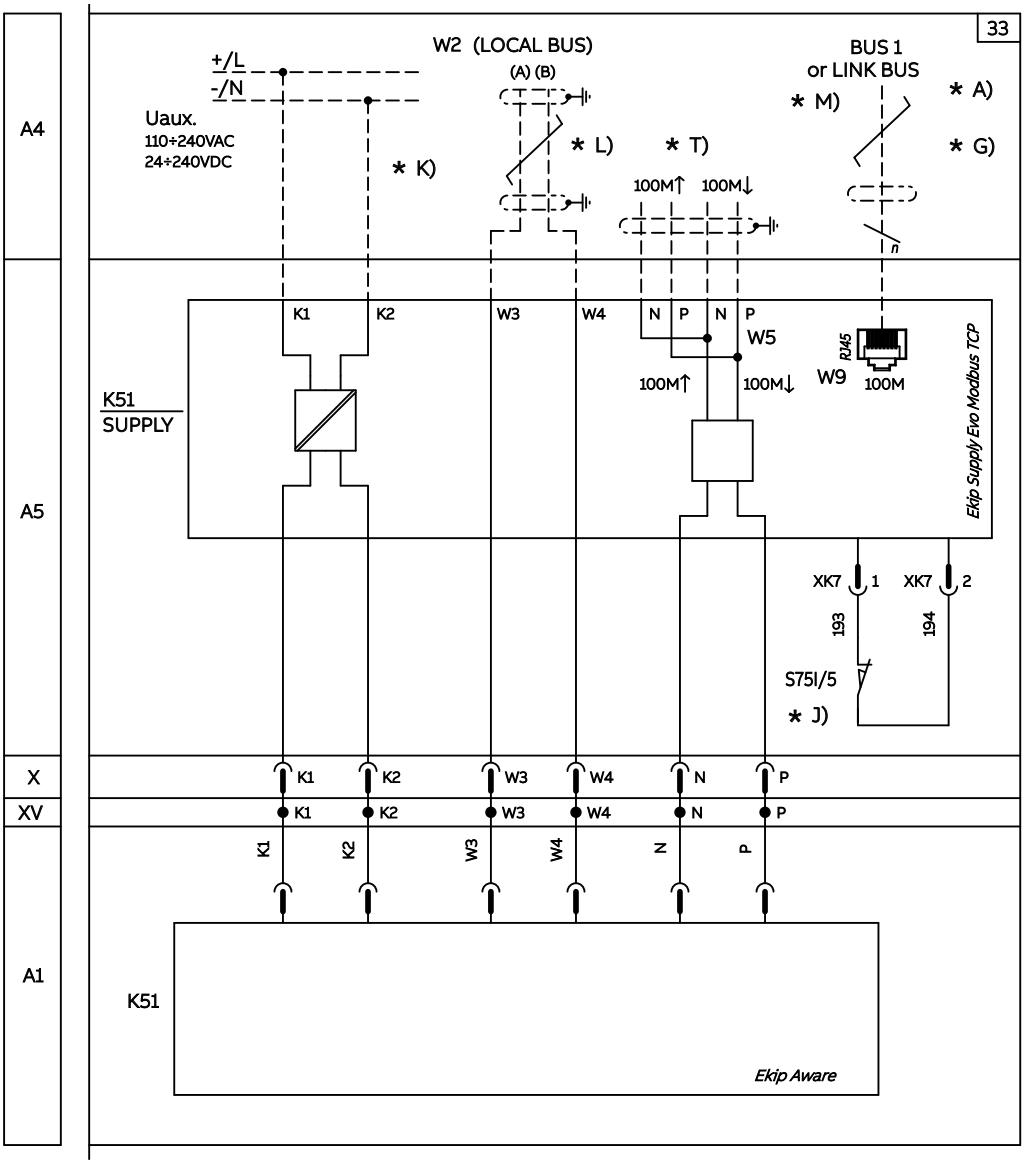


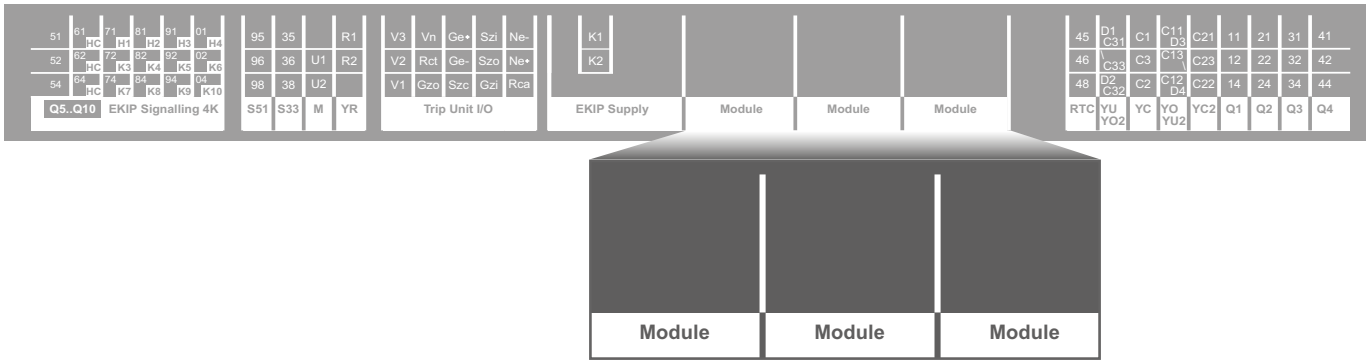
ELECTRICAL ACCESSORIES



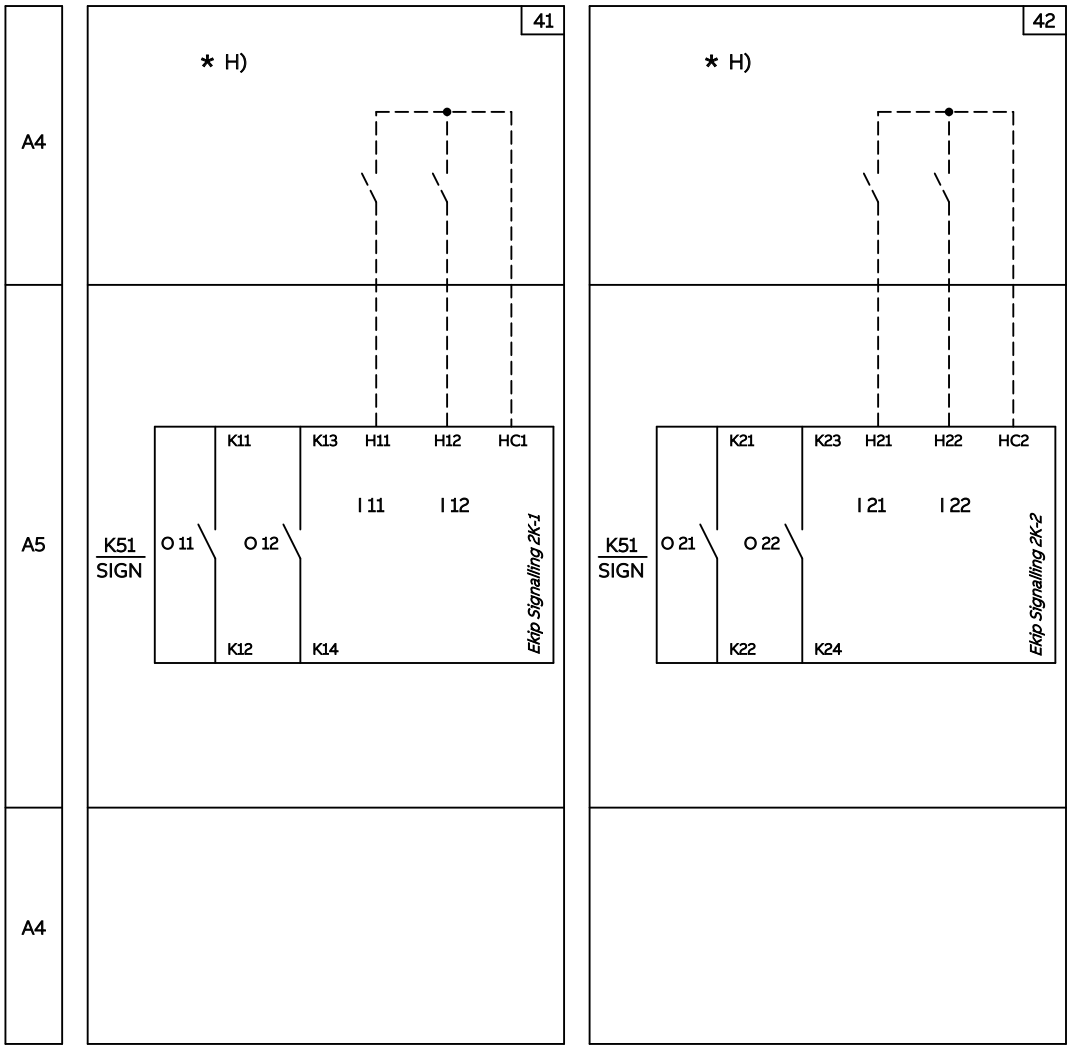
33) Auxiliary supply, local bus and modbus TCP/LINK comunication

33 As an alternative to figures 31-32

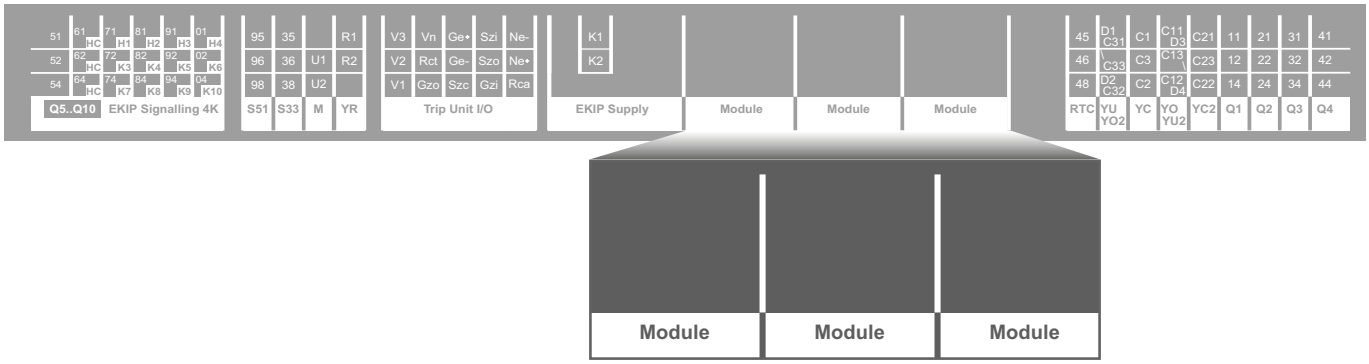




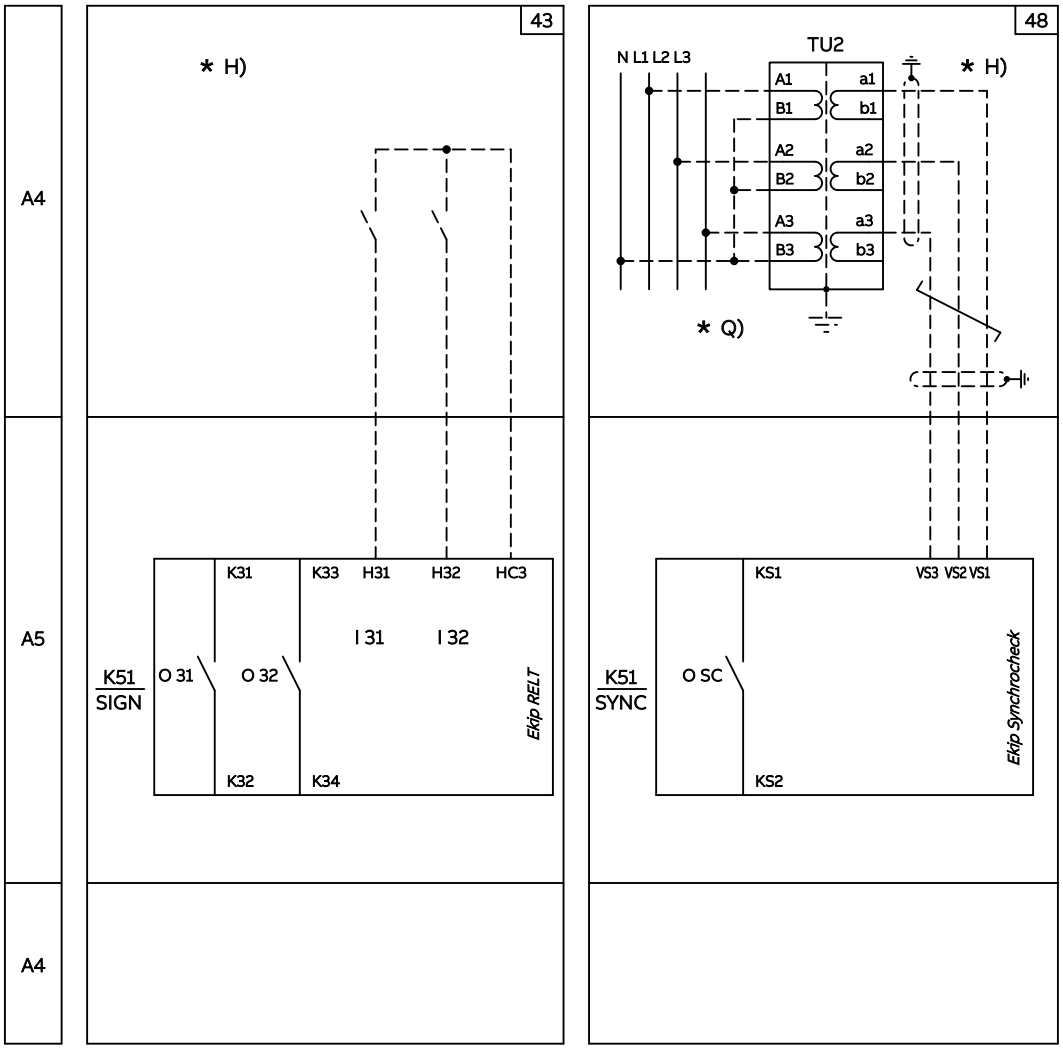
41) Ekip Signalling 2k-1
42) Ekip Signalling 2k-2

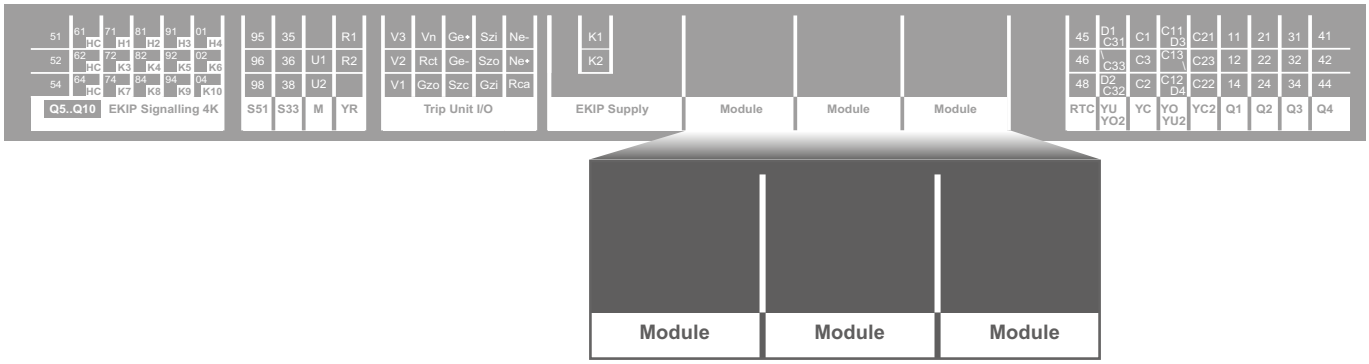


ELECTRICAL ACCESSORIES

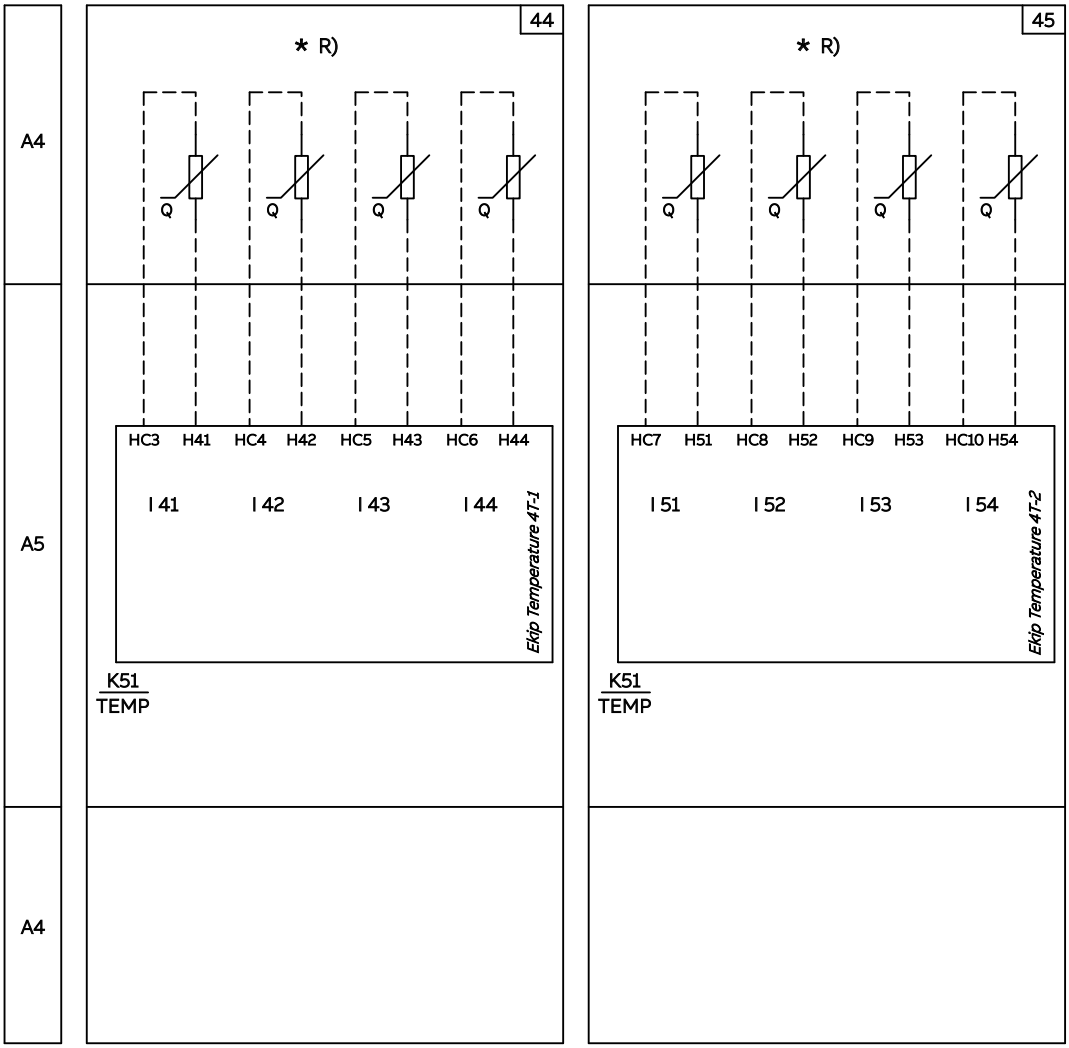


43) Ekip RELT
48) Ekip Sinchrocheck

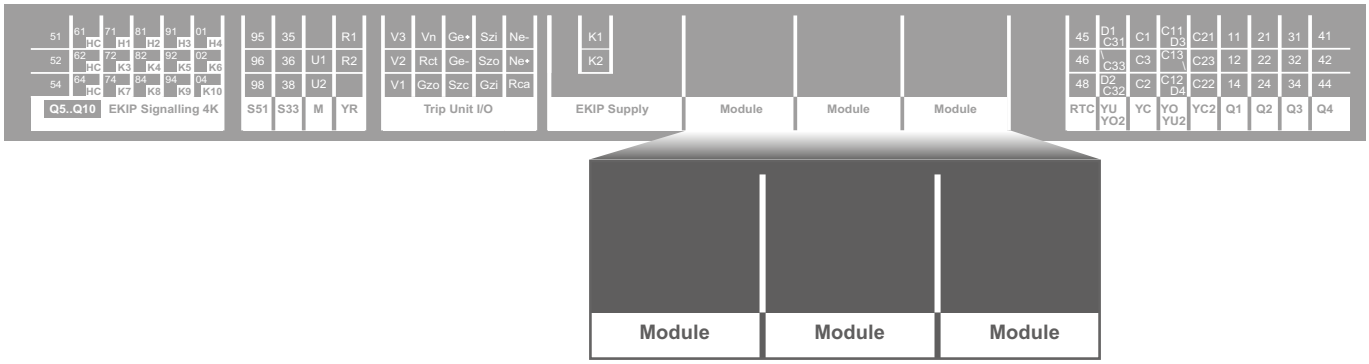




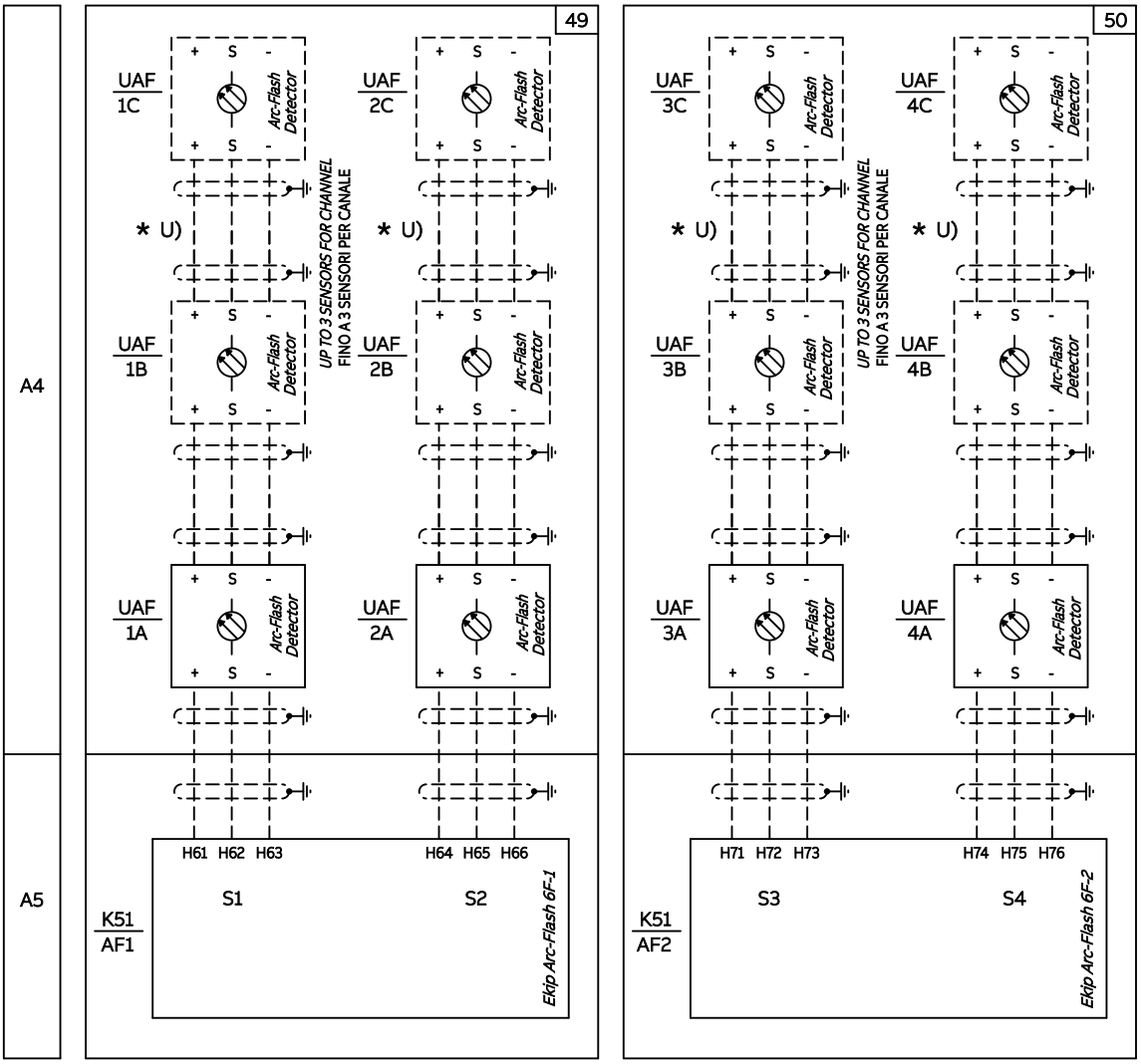
44) Ekip Temperature 4T-1
45) Ekip Temperature 4T-2

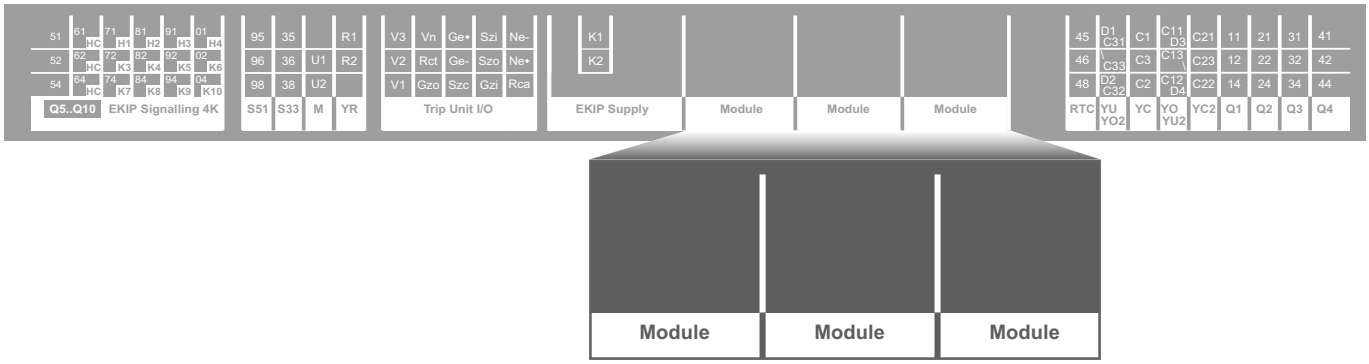


ELECTRICAL ACCESSORIES

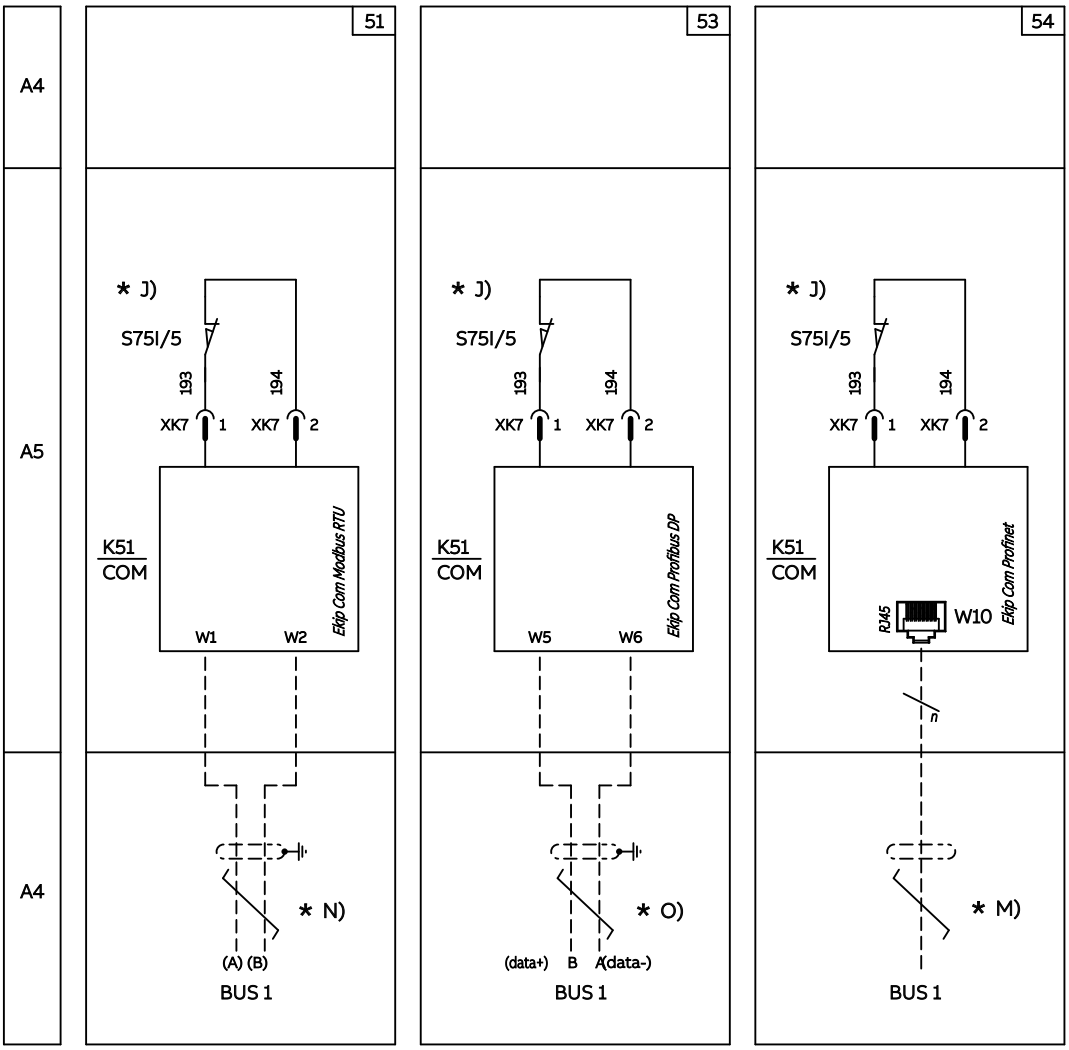


49) Ekip Arc-Flash 6F-1 module
50) Ekip Arc-Flash 6F-2 module

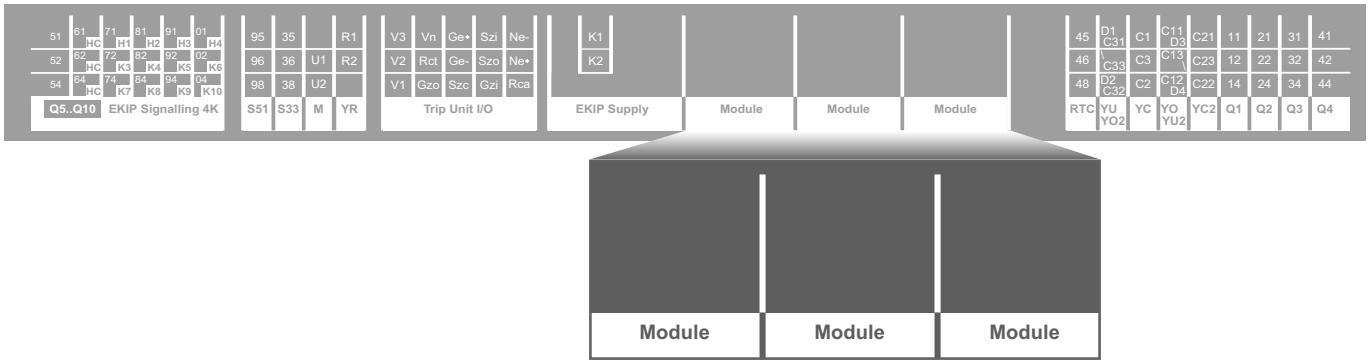




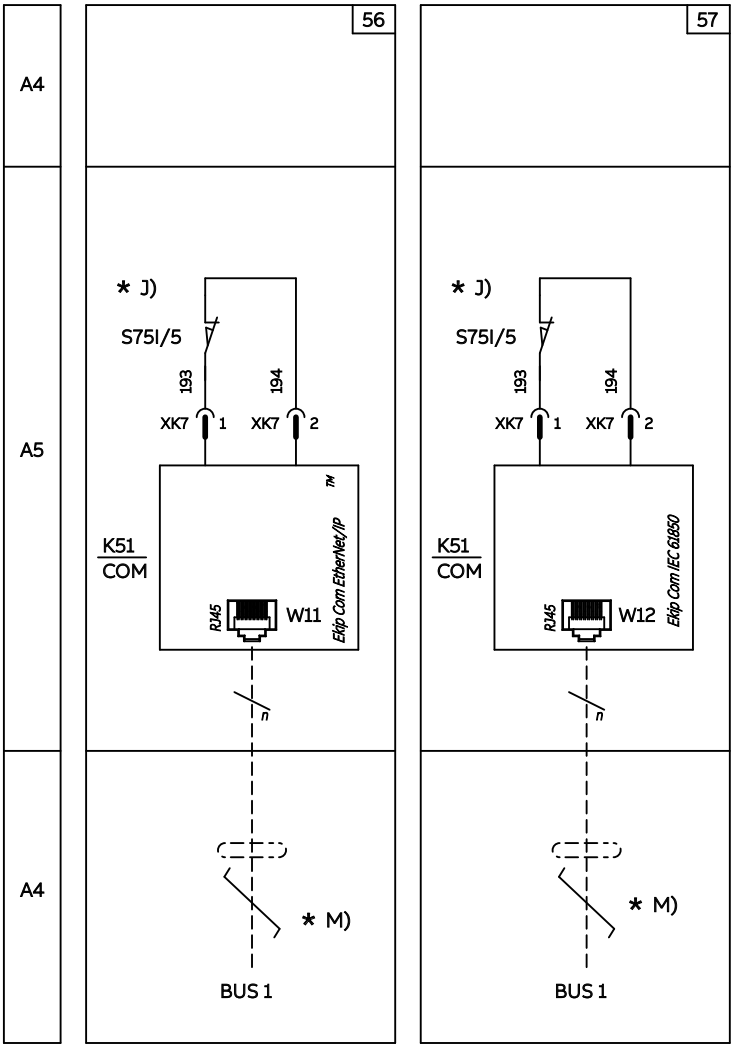
51) Ekip COM Modbus RTU
52) Ekip COM Profibus DP
53) Ekip COM Profinet



ELECTRICAL ACCESSORIES

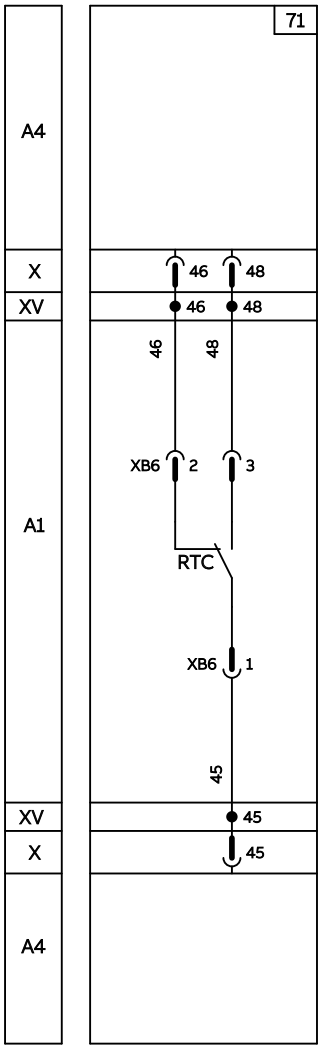


56) Ekip COM EtherNet/IP™
57) Ekip COM IEC61850

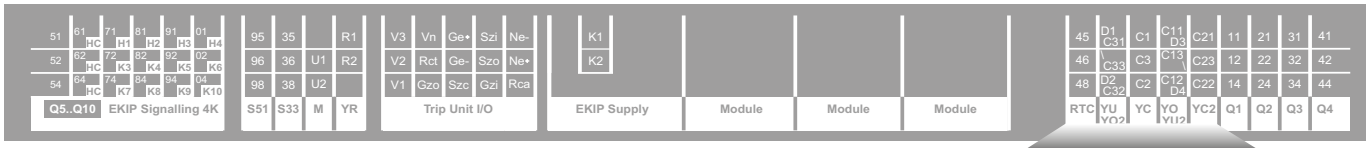


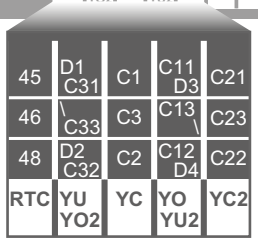


71) Ready to close signalling contact – RTC



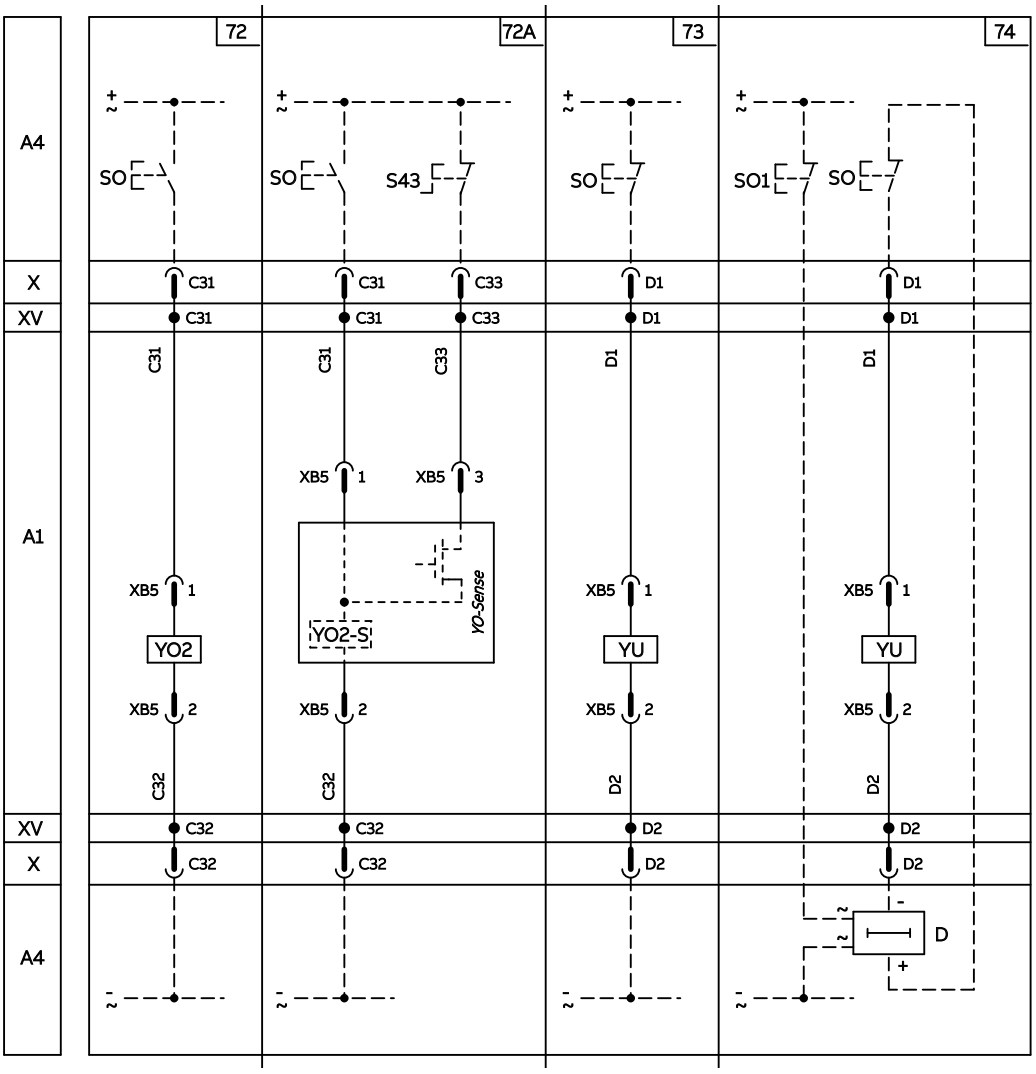
ELECTRICAL ACCESSORIES





72) Second opening coil - YO2
72A) Second opening coil - YO2 YO- Sense
73) First Undervoltage coil - YU
74) Undervoltage coil with external time-lag device - YU

72 (YO2) - 72A (YO Sense) - 73 (YU) - 74(YU,D) as an alternative to each other

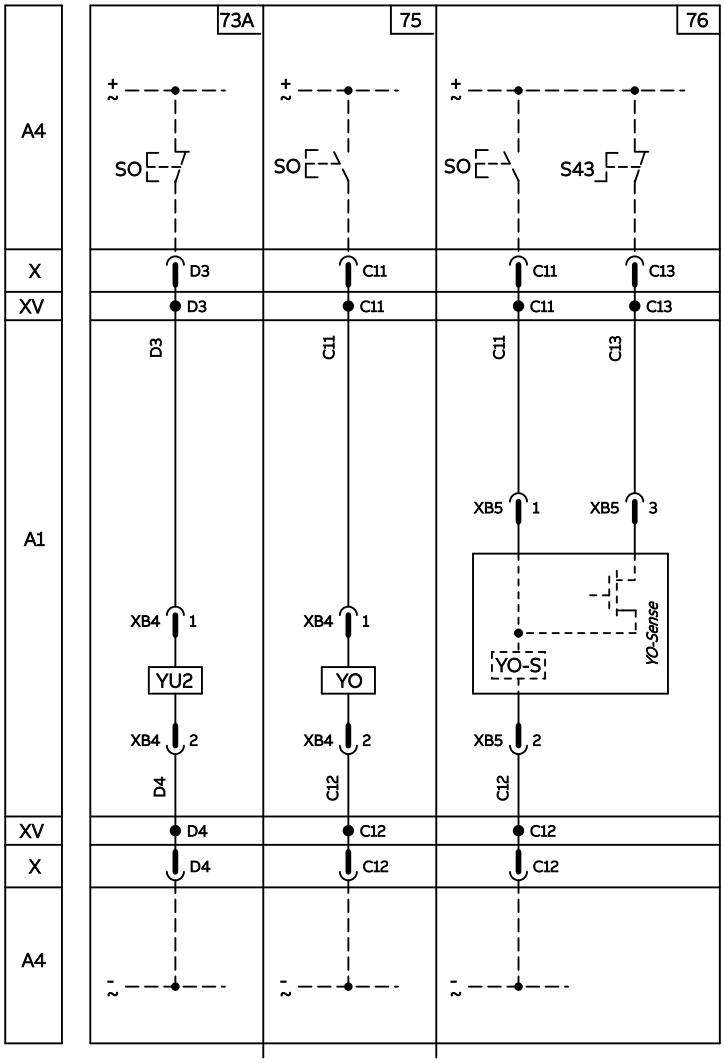




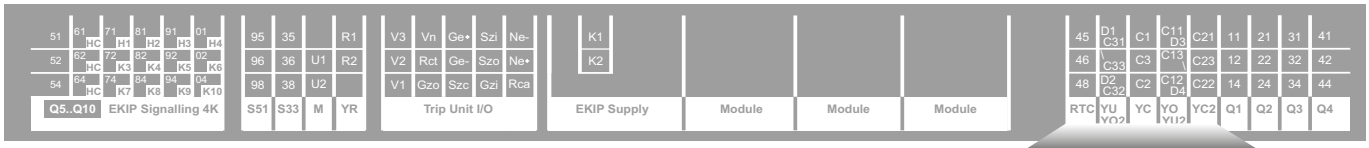
73A) Second undervoltage coil – YU2
75) First opening coil - YO
76) First opening coil YO-Sense

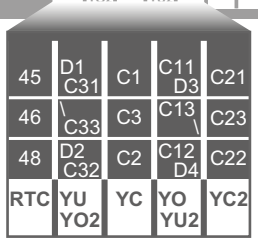
73A (YU2) - 75 (YO) - 76 (YO Sense) as an alternative to each other

73A Only for circuit-breakers E2.3-E4.3-E6.3



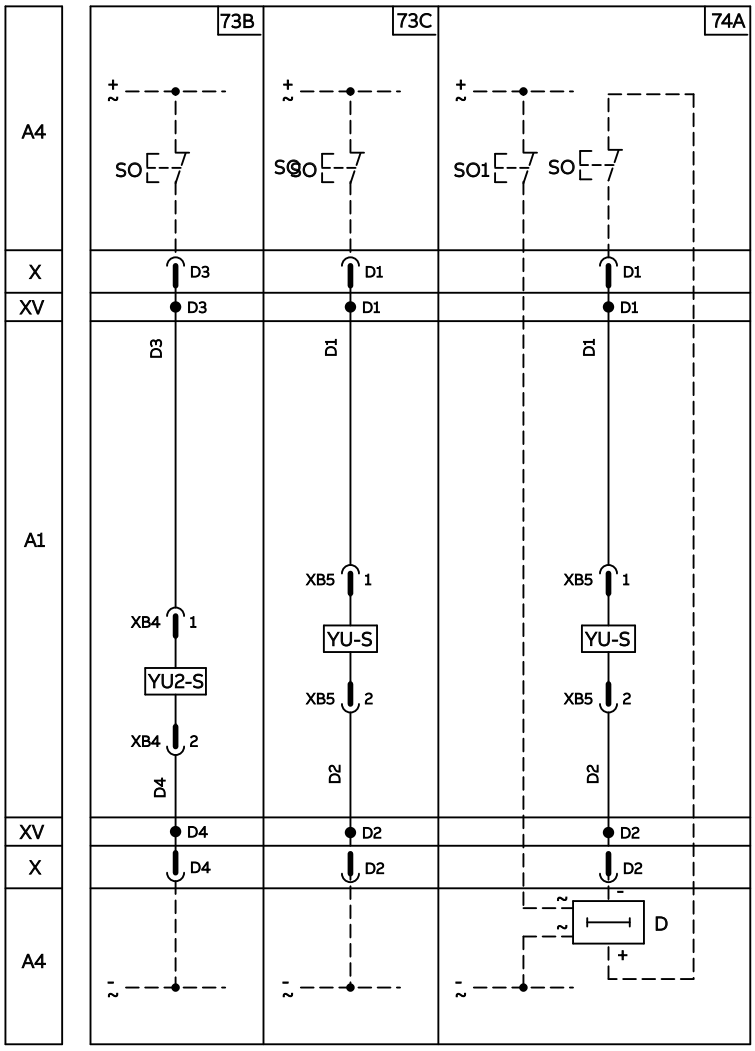
ELECTRICAL ACCESSORIES





73B) Second undervoltage coil - YU2 - YU2-Sense
73C) First undervoltage coil - YU - YU-Sense
74A) Undervoltage coil with external time-lag device - YU, D YU-Sense, D

73B(YU2-Sense)-
c(YU-Sense)-
74A(YU-Sense, D)
as an alternative
to each other



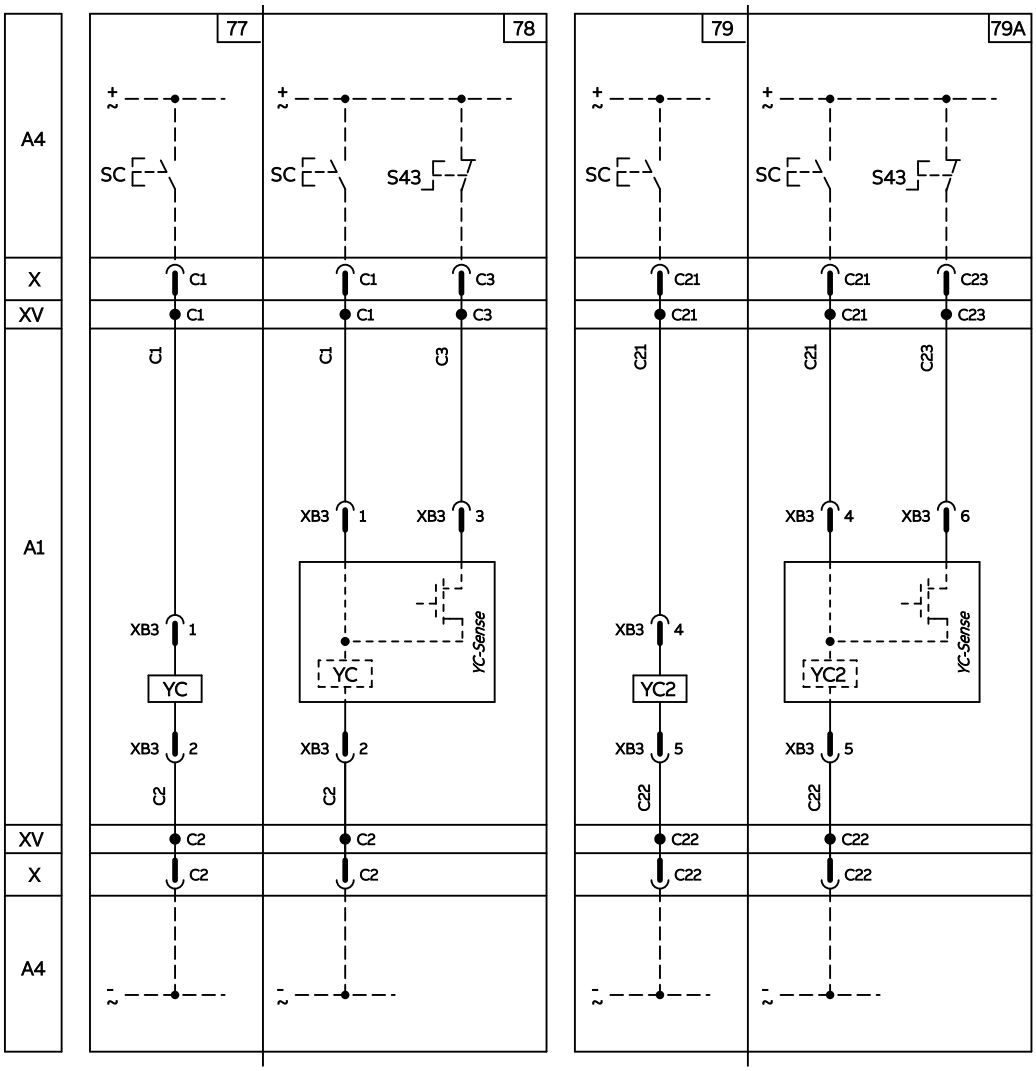


77) First closing coil - YC
78) First closing coil - YC - YC Sense
79) Second closing coil - YC2
79A) Second closing coil - YC2 - YC-Sense

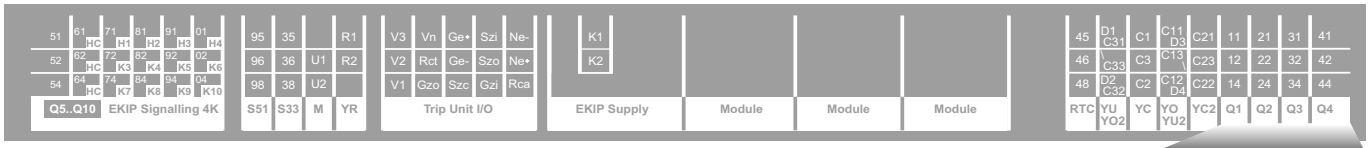
77(YC)
78(YC-Sense)
as an alternative
to each other

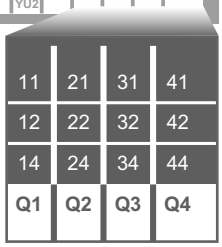
79(YC2)
79A(YC2-Sense)
as an alternative
to each other

Only for circuit-breakers
E2.3-E4.3-E6.3

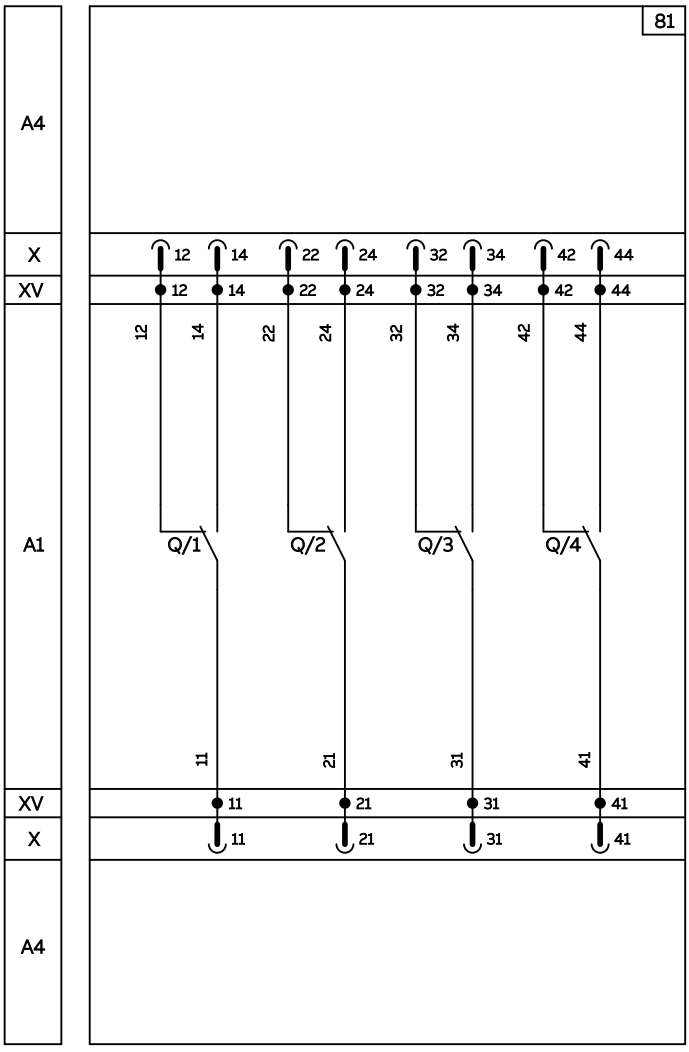


ELECTRICAL ACCESSORIES

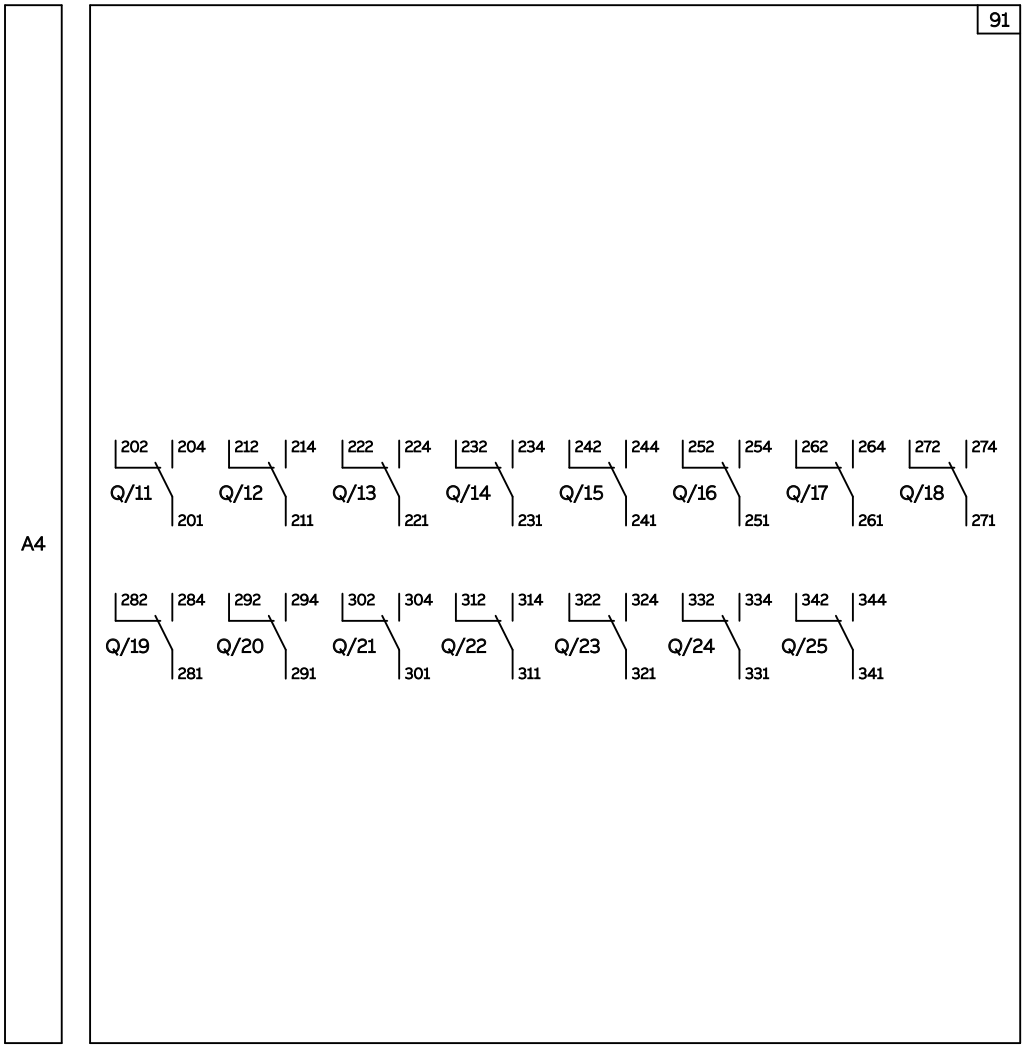




81) Open/closed auxiliary contacts of circuit-breaker

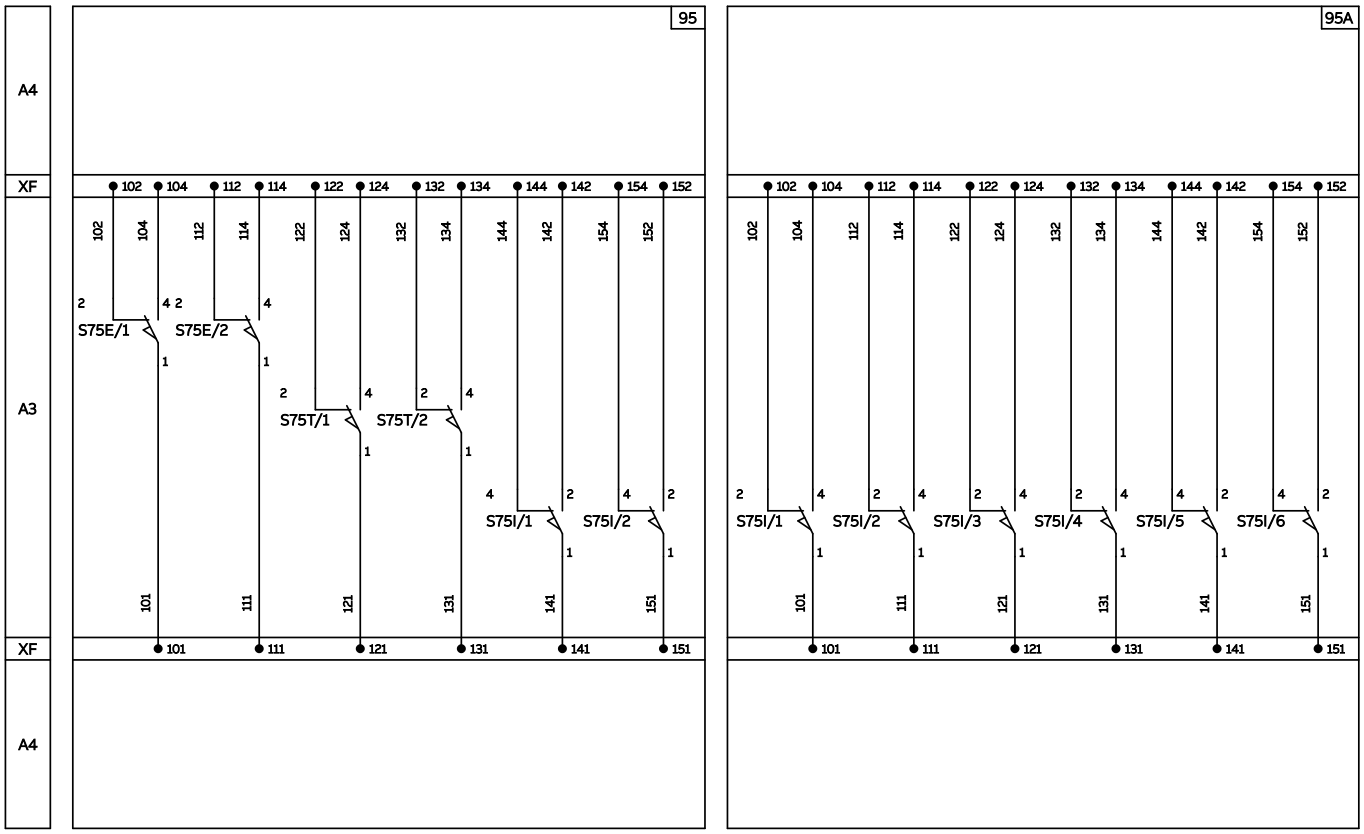


91) Supplementary Open/closed auxiliary contacts outside the circuit-breaker



ELECTRICAL ACCESSORIES

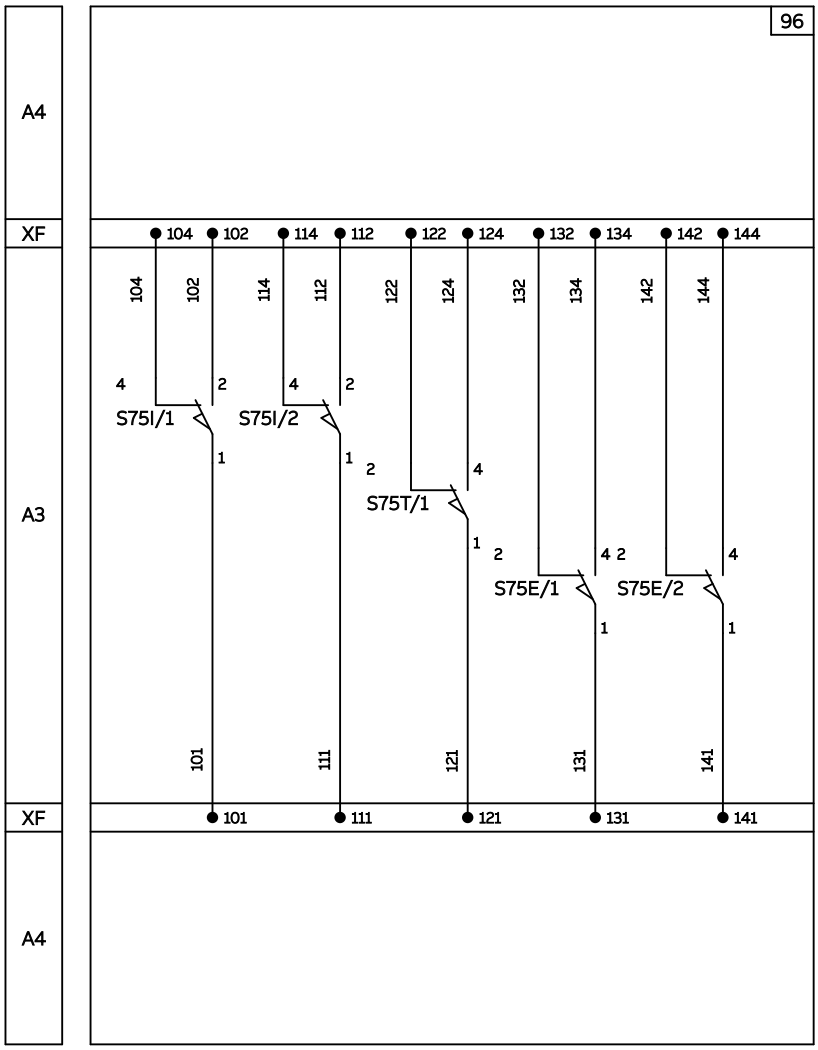
95) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position
95A) Contacts for signalling of circuit-breaker in racked position



95 95A Only for circuit-breakers E1.3 in withdrawable version

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

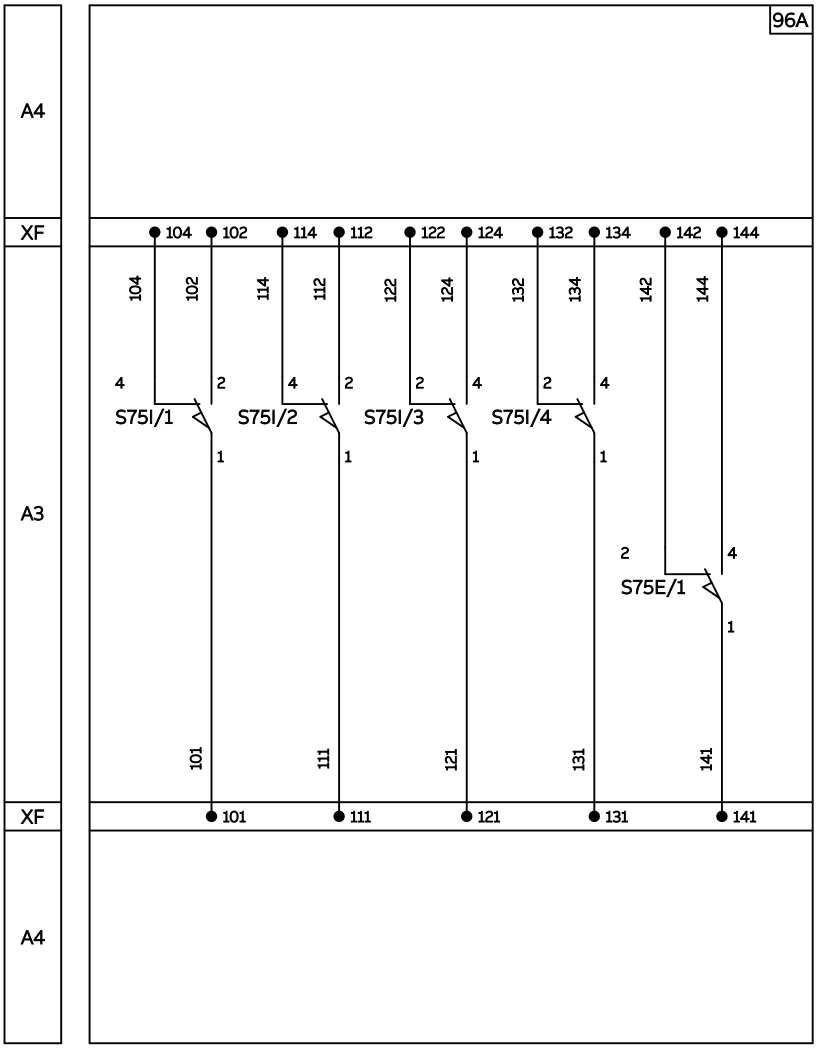
96 Only for circuit-breakers E2.3-E4.3-E6.3 in withdrawable version



ELECTRICAL ACCESSORIES

96A) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (FIRST SET)

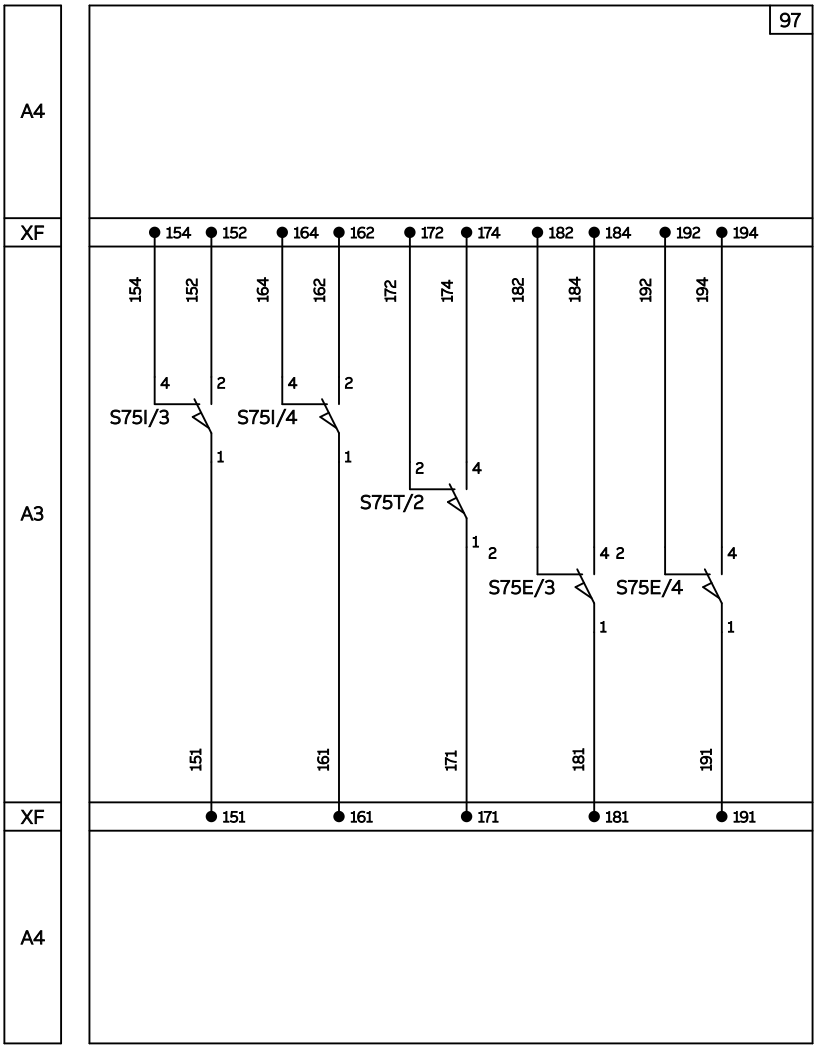
96A Only for circuit-breakers E2.3-E4.3-E6.3 in withdrawable version



97) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (SECOND SET)

97 Only for circuit-breakers E2.3-E4.3-E6.3 in withdrawable version

As an alternative to figure 97A

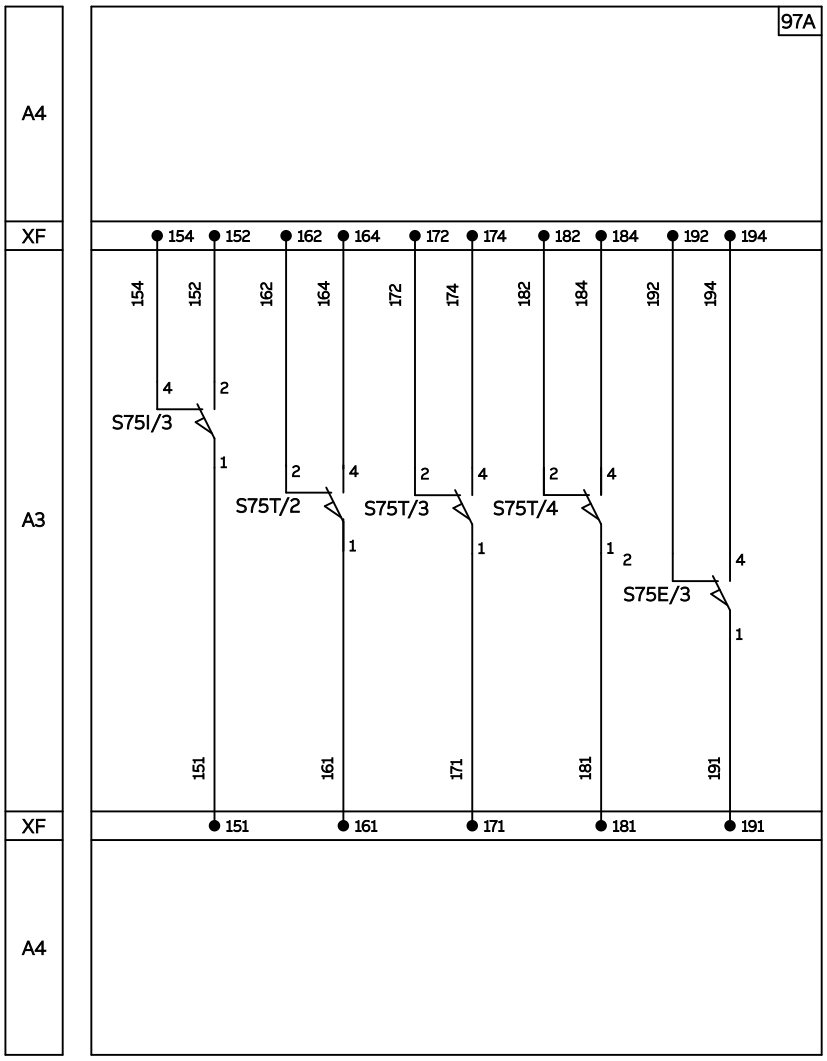


ELECTRICAL ACCESSORIES

97A) Contacts for signalling of circuit-breaker in racked-in, test, racked-out position (SECOND SET)

97A Only for circuit-breakers E2.3-E4.3-E6.3 in withdrawable version

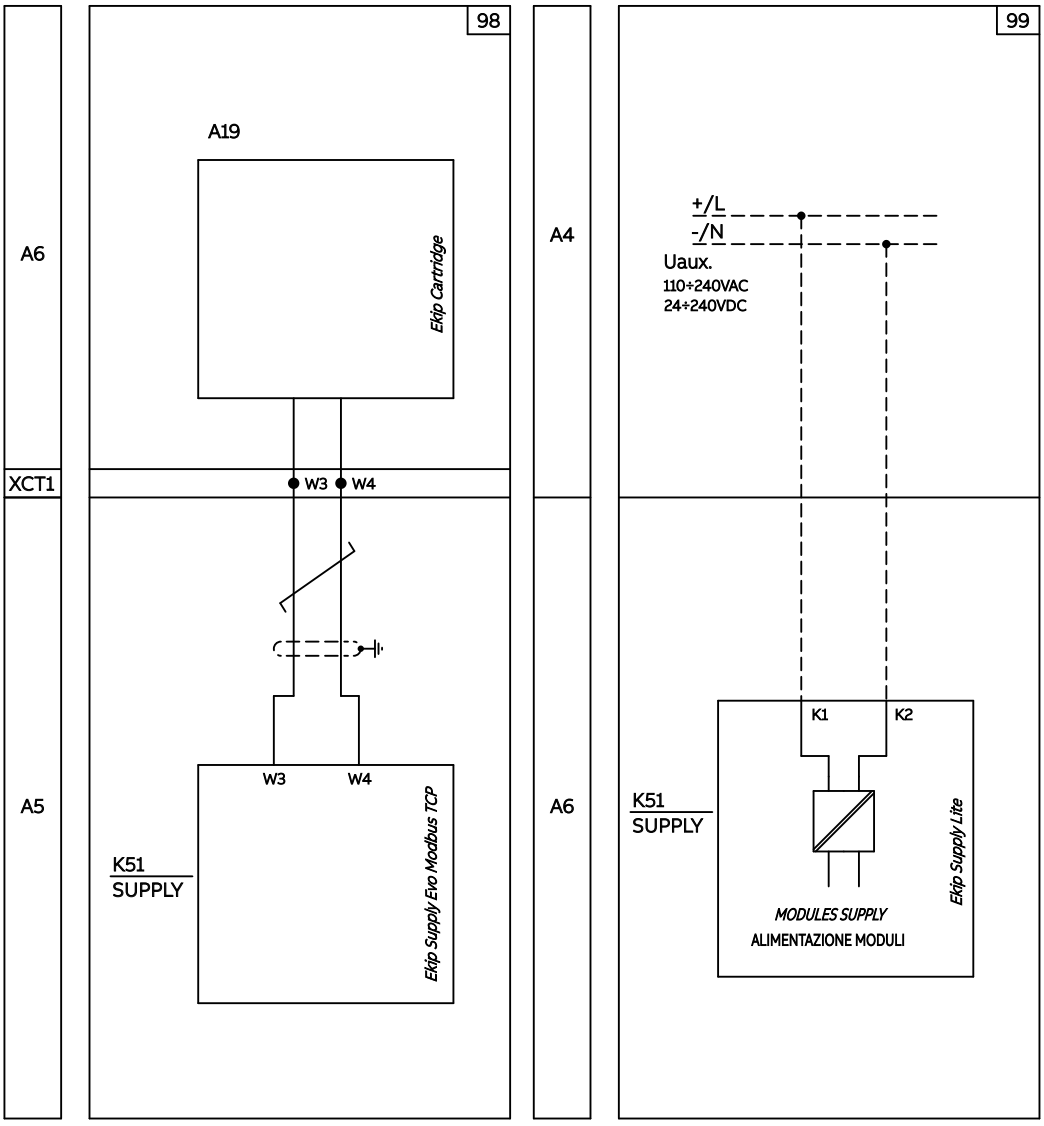
As an alternative to figure 97



98) Bus connection to EKIP Cartridge
99) Auxiliary Supply of moduled of EKIP DIN Cartridge

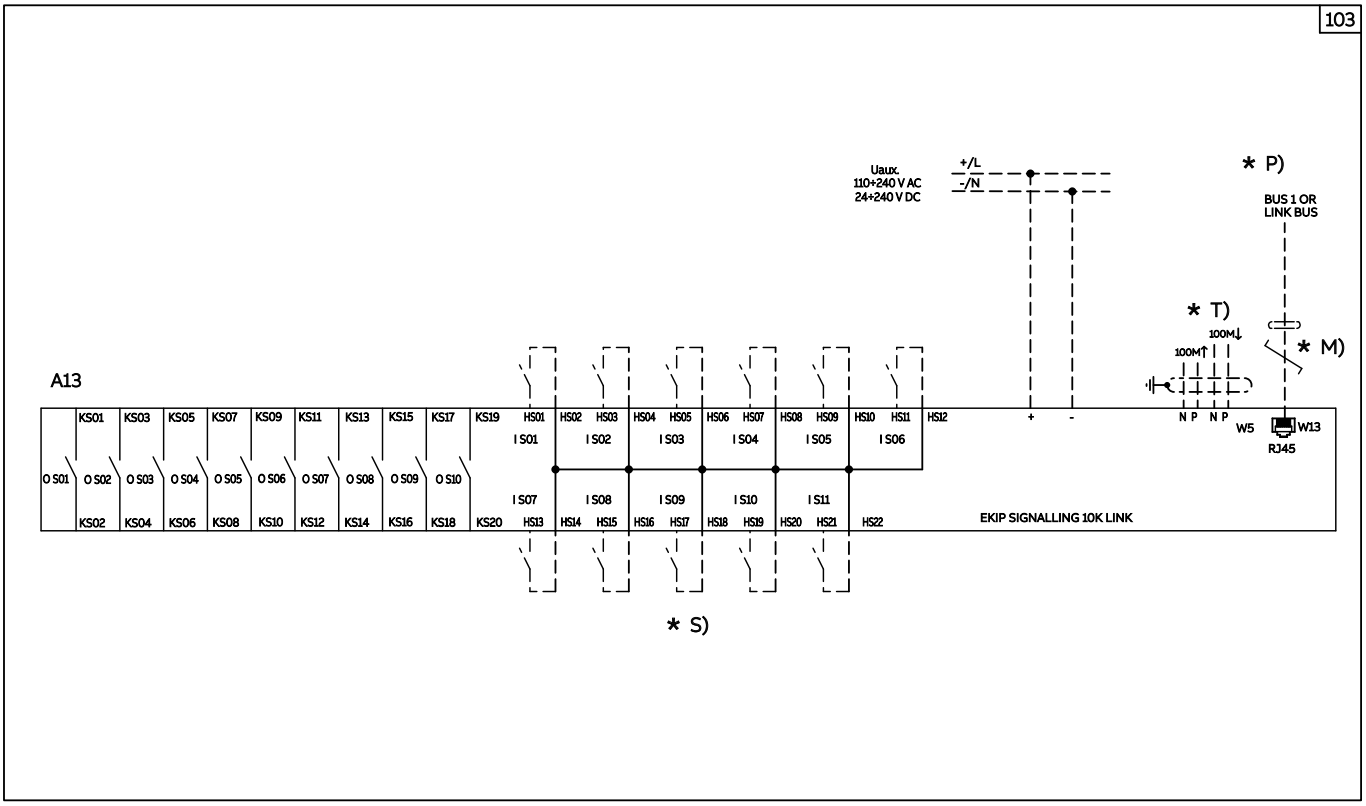
98 99 Up to three applications between Fig. 41 ... 59

Taken only once can be Mounted in Ekip DIN Rail Cartridge.



ELECTRICAL ACCESSORIES

103) Ekip signalling 10K LINK



08

ORDERING PART NUMBERS

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8/2 Ordering examples
8/6 **General information**
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8/14 Withdrawable version for power distribution
8/21 **Switch-disconnectors**
8/21 Fixed version
8/23 Withdrawable version
8/25 **Derived versions**
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8/28 Control
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8/43 Interlocks
8/44 Connectivity
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8/47 Digital upgrades
8/49 Power Connections
8/54 Miscellaneous
8/55 Service

INSTRUCTIONS FOR ORDERING

Ordering examples

Standard version Emax 3 series circuit-breakers are identified by means of commercial Part Numbers that can be accessorized.

Ordering examples

- **Terminal kit Part Numbers** (other than standard supply) for fixed circuit-breaker or for fixed part of withdrawable circuit-breaker.

The Part Numbers refer to 3 or 4 pieces (for mounting on top or bottom terminals). To order a complete circuit-breaker, 1 kit for upper terminals and 1 kit for lower terminals must be specified in the order.

EXAMPLE N°. 1

1SDA124873R1	E2.3N 2500 Ekip Aware LSI 3p FHR
1SDA074009R1	Kit VR Sup E2.3 Iu=2500 3pcs INST
1SDA074011R1	Kit VR Inf E2.3 Iu=2500 3pcs INST

EXAMPLE N°. 2

Emax E1.3N 4 poles fixed with upper vertical rear (VR) and front (F) terminals (standard supply)	
1SDA125054R1	E1.3N 1600 Ekip Aware LI 4p F F
1SDA073986R1	Kit VR Upper E1.3 F 4pcs INST

EXAMPLE N°. 3

Emax E4.3H 3 poles fixed with upper front terminals (F) and adjustable rear bottom vertical (VR) terminals	
1SDA124908R1	E4.3H 3200 Ekip Aware LSI 3p FHR
1SDA074126R1	Kit F upper E4.3 F 3pcs INST
1SDA074017R1	Kit VR lower E4.3 Iu=3200 3pcs INST

EXAMPLE N°. 4

Emax E2.3 2000A 3 poles fixed part with spread upper vertical terminals (SVR) and rear bottom adjustable horizontal (HR) terminals (standard supply)	
1SDA126210R1	E2.3 W FP Iu=2000 3p HR HR
1SDA074057R1	Kit SVR upper E2.3 Iu=2000 3pcs INST

- **Rating Plug** for lower values than rated current. Digital rating plug enables to obtain lower current values than rated current.

EXAMPLE N°. 5

Emax E2.3S 2500 4 poles fixed In=1600A	
1SDA125150R1	E2.3S 2500 Ekip Aware LSI 4p FHR
1SDA126551R1	Rating Plug 1600A E1.3...E6.3 (1)

1) Only supplied with the circuit-breaker

- **Ordering for Ekip modules**
  Ekip Supply Lite module enables Ekip Com, Ekip 4T, Ekip 2K, Ekip Syncrocheck cartridge modules to be installed. In addition to Ekip Supply Lite module, up to 3 cartridge modules can be installed on E2.3, E4.3 and E6.3 and up to 2 modules on E1.3.

As an alternative, Ekip Supply Evo Modbus TCP can be used that also allows Modbus TCP communication. Adding some SW packages, its potential grows. In addition to Ekip Supply Evo Modbus TCP, up to 2 cartridge modules can be installed on E2.3, E4.3 and E6.3 and up to 1 module on E1.3.

EXAMPLE N°. 6

Emax E4.3H 3 poles fixed with modules: Ekip Supply, Ekip Signalling 2K-1, Ekip Temperature 4T-1, Ekip Temperature 4T-2 and Ekip Signalling 4K	
1SDA124908R1	E4.3H 3200 Ekip Aware LSI 3p FHR
1SDA126470R1	Ekip Supply Lite 24-240V AC/DC E1.3...E6.3
1SDA126487R1	Ekip Temperature 4T-1 E1.3...E6.3 (1)
1SDA126488R1	Ekip Temperature 4T-2 E1.3...E6.3 (1)
1SDA126481R1	Ekip Signalling 2K-1 E1.3...E6.3
1SDA126484R1	Ekip Signalling 4K E2.3...E6.3

1) PT100/PT1000 are not supplied

EXAMPLE N°. 7

Emax E4.3H 3 poles fixed with modules: Ekip Supply Lite, Ekip Com Modbus RTU, RC protection, Ekip Busbars Supply	
1SDA124908R1	E4.3H 3200 Ekip Aware LSI 3p FHR
1SDA126470R1	Ekip Supply Lite 24-240V AC/DC E1.3...E6.3
1SDA126471R1	Ekip Com Modbus RTU E1.3...E6.3
1SDA126493R1	Ekip Busbars Supply (1)
1SDA126333R1	Toroid RC E2.3 4p, E4.3 3p
1SDA126562R1	RC protection

1) The RC protection requires busbar supply, so Ekip Busbars Supply.

EXAMPLE N°. 8

Emax E1.3B 3 poles fixed with modules: Ekip Supply Lite, Ekip Com Modbus RTU, Measuring package, 0.5% Accuracy	
1SDA124743R1	E1.3B 1000 Ekip Aware LSI 3p FHR
1SDA126470R1	Ekip Supply Lite 24-240V AC/DC E1.3...E6.3
1SDA126471R1	Ekip Com Modbus RTU E1.3...E6.3
1SDA126519R1	Measuring Package for Emax 3
1SDA126537R1	Class 0.5 Power&Energy Metering E1.3 (1)

1) Only supplied with the circuit-breaker

EXAMPLE N°. 9

Emax E4.3H 3 poles fixed with upgrades: Cyber-Secure Trip Unit, Modbus TCP Secure	
1SDA124908R1	E4.3H 3200 Ekip Aware LSI 3p FHR
1SDA126529R1	Cybersecure IEC 62443-4-2 E1.3...E6.3
1SDA128409R1	Ekip Supply Evo Modbus TCP Secure
1SDA126478R1	Modbus TCP Secure (1) (2)

1) Ekip Com Modbus TCP Secure requires Ekip Supply Evo Modbus TCP
2) Only supplied with the circuit-breaker

INSTRUCTIONS FOR ORDERING

Ordering examples

- **Ordering for control accessories.**
  All the accessories are available loose or supplied with the breaker. Up to 3 coils can be ordered for E1.3, whereas up to 4 coils for E2.3, E4.3 and E6.3.

EXAMPLE N°. 10

Emax E2.3S 3 poles withdrawable with accessories: opening release, closing release, motor for automatic charging of the springs, second opening release	
1SDA125452R1	E2.3S 2000 Ekip Aware LSI 3p WMP
1SDA126259R1	YO E1.3...E6.3 220-240V AC/DC
1SDA126274R1	YC E1.3...E6.3 220-240V AC/DC
1SDA073725R1	M E2.3...E6.3 220-250V AC/DC
1SDA126259R1	YO E1.3...E6.3 220-240V AC/DC

EXAMPLE N°. 11

Emax E2.3S 3 poles withdrawable with accessories: YO-Sense opening release, YC-Sense closing release, motor for automatic charging of the springs, M-Sense enabler, Ekip Supply Evo Modbus TCP, YR Remote Reset. All these modules (except M-sense enabler) are mandatory for remote control.	
1SDA125452R1	E2.3S 2000 Ekip Aware LSI 3p WMP
1SDA126472R1	Ekip Supply Evo Modbus TCP
1SDA126265R1	YO-Sense E1.3...E6.3 110-250 V AC/DC
1SDA126280R1	YC-Sense 1st E1.3...E6.3 110-250 VAC/DC
1SDA073725R1	M E2.3...E6.3 220-250V AC/DC
1SDA126313R1	M-Sense enabler E2.3...E6.3 100V-415V
1SDA073749R1	YR 220V AC/DC E2.3...E6.3

- **Ordering for electrical accessories.**

EXAMPLE N°. 12

Emax E2.3S 3 poles withdrawable with accessories: Ekip Supply Evo Modbus TCP, T-Sense busbar and T-Sense ambient, moreover Ekip Arc-Flash and its sensors	
1SDA125452R1	E2.3S 2000 Ekip Aware LSI 3p WMP
1SDA126472R1	Ekip Supply Evo Modbus TCP
1SDA126489R1	T-Sense Ambient
1SDA126490R1	T-Sense Busbars
1SDA126491R1	Ekip Arc-Flash 6F-1
1SDA126492R1	Light-Sense Detector

EXAMPLE N°. 13

Emax E6.3S 4 poles withdrawable with accessories: Link and RRD embedded	
1SDA125803R1	E6.3V 4000 Ekip Aware LI 4p WMP
1SDA126472R1	Ekip Supply Evo Modbus TCP
1SDA126479R1	Link
1SDA127016R1	RRD Embedded 24V E6.3

1) Link requires Ekip Supply Evo Modbus TCP.

- **Ordering for key locks.**

EXAMPLE N°. 14

Emax E2.3N 3 poles with double key lock in racked-in / test / racked-out position, using different keys	
1SDA124873R1	E2.3N 2500 Ekip Aware LSI 3p FHR
1SDA126407R1	KLP-D Bl. Racked in/out E2.3...E6.3 1st key
1SDA126413R1	KLP-D Bl. Racked in/out E2.3...E6.3 2nd key

- **Ordering for mechanical Interlocks.**
  Interlocks have several strategy configurations, suitable for fixed circuit-breakers and withdrawable circuit-breakers. Each configuration requires different groups:
  - **Cables**, select one Kit for strategy A / B / C /D. The cables must be ordered on fixed circuit-breaker or on fixed part of withdrawable circuit-breaker.
  - **Lever**, required only for E2.3, E4.3 and E6.3. These levers must be mounted on fixed circuit-breaker or on mobile part of withdrawable circuit-breaker.
  - **Support**, installed on the external right of fixed circuit-breaker or on fixed part of withdrawable circuit-breaker.

EXAMPLE N°. 15

Interlock between two fixed circuit-breakers: E1.3 and E2.3	
E1.3 Fixed circuit-breaker	**E2.3 Fixed circuit-breaker**
Cables [Group 1]: 1 Item	Lever [Group 2]: 1 Item
Support [Group 3]: 1 Item	Support [Group 3]: 1 Item

EXAMPLE N°. 16

Interlock between three fixed breakers: one E2.3 and two E4.3		
E2.3 Fixed circuit-breaker	**E4.3 Fixed circuit-breaker**	**E4.3 Fixed circuit-breaker**
Cables [Group 1]: 1 Item	Lever [Group 2]: 1 Item	Lever [Group 2]: 1 Item
Lever [Group 2]: 1 Item	Support [Group 3]: 1 Item	Support [Group 3]: 1 Item
Support [Group 3]: 1 Item		

EXAMPLE N°. 17

Interlock between two withdrawable breakers: E1.3 and E2.3	
E1.3 Fixed Part	**E2.3 Mobile Part**
Cables [Group 1]: 1 Item	Lever [Group 2]: 1 Item
Support [Group 4]: 1 Item	+
	E2.3 Fixed Part
	Support [Group 4]: 1 Item

EXAMPLE N°. 18

Interlock between three withdrawable breakers: one E2.3 and two E4.3		
E2.3 Mobile Part	**E4.3 Mobile Part**	**E4.3 Mobile Part**
Lever [Group 2]: 1 Item	Lever [Group 2]: 1 Item	Lever [Group 2]: 1 Item
+		
E2.3 Fixed Part	**E4.3 Fixed Part**	**E4.3 Fixed Part**
Cables [Group 1]: 1 Item	Support [Group 4]: 1 Item	Support [Group 4]: 1 Item
Support [Group 4]: 1 Item		

GENERAL INFORMATION

Abbreviations used for the description of the product

Versions and terminals	
F	Fixed circuit-breaker
W	Withdrawable circuit-breaker
MP	Mobile part of withdrawable circuit-breaker
FP	Fixed part of withdrawable circuit-breaker

Iu	Rated uninterrupted current
In	Rated current of the digital rating plug
Icu	Rated ultimate short-circuit breaking capacity
Icw	Rated short-time withstand current

/MS	Switch-disconnector
/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 unit and functions	
Ekip Aware	Measurement and protection trip unit for power distribution

L	Overload protection
S	Short-time overcurrent protection
I	Instantaneous overcurrent protection
G	Earth fault protection
Rc	Residual current protection
Power Controller	Load management function

Automatic circuit-breakers

Fixed version for power distribution



SACE EMAX E1.3B • FRONT TERMINALS (F)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E1.3B	630	42	42	E1.3B 630 Ekip Aware LI	1SDA124712R1	1SDA124984R1
				E1.3B 630 Ekip Aware LSI	1SDA124713R1	1SDA124985R1
				E1.3B 630 Ekip Aware LSIG	1SDA128802R1	1SDA128857R1
	800	42	42	E1.3B 800 Ekip Aware LI	1SDA124727R1	1SDA124999R1
				E1.3B 800 Ekip Aware LSI	1SDA124728R1	1SDA125000R1
				E1.3B 800 Ekip Aware LSIG	1SDA128805R1	1SDA128860R1
	1000	42	42	E1.3B 1000 Ekip Aware LI	1SDA124742R1	1SDA125014R1
				E1.3B 1000 Ekip Aware LSI	1SDA124743R1	1SDA125015R1
				E1.3B 1000 Ekip Aware LSIG	1SDA128808R1	1SDA128863R1
	1250	42	42	E1.3B 1250 Ekip Aware LI	1SDA124757R1	1SDA125029R1
				E1.3B 1250 Ekip Aware LSI	1SDA124758R1	1SDA125030R1
				E1.3B 1250 Ekip Aware LSIG	1SDA128811R1	1SDA128866R1
	1600	42	42	E1.3B 1600 Ekip Aware LI	1SDA124772R1	1SDA125044R1
				E1.3B 1600 Ekip Aware LSI	1SDA124773R1	1SDA125045R1
				E1.3B 1600 Ekip Aware LSIG	1SDA128814R1	1SDA128869R1

SACE EMAX E1.3C • FRONT TERMINALS (F)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E1.3C	630	50	42	E1.3C 630 Ekip Aware LI	1SDA124717R1	1SDA124989R1
				E1.3C 630 Ekip Aware LSI	1SDA124718R1	1SDA124990R1
				E1.3C 630 Ekip Aware LSIG	1SDA128803R1	1SDA128858R1
	800	50	42	E1.3C 800 Ekip Aware LI	1SDA124732R1	1SDA125004R1
				E1.3C 800 Ekip Aware LSI	1SDA124733R1	1SDA125005R1
				E1.3C 800 Ekip Aware LSIG	1SDA128806R1	1SDA128861R1
	1000	50	42	E1.3C 1000 Ekip Aware LI	1SDA124747R1	1SDA125019R1
				E1.3C 1000 Ekip Aware LSI	1SDA124748R1	1SDA125020R1
				E1.3C 1000 Ekip Aware LSIG	1SDA128809R1	1SDA128864R1
	1250	50	42	E1.3C 1250 Ekip Aware LI	1SDA124762R1	1SDA125034R1
				E1.3C 1250 Ekip Aware LSI	1SDA124763R1	1SDA125035R1
				E1.3C 1250 Ekip Aware LSIG	1SDA128812R1	1SDA128867R1
	1600	50	42	E1.3C 1600 Ekip Aware LI	1SDA124777R1	1SDA125049R1
				E1.3C 1600 Ekip Aware LSI	1SDA124778R1	1SDA125050R1
				E1.3C 1600 Ekip Aware LSIG	1SDA128815R1	1SDA128870R1

Automatic circuit-breakers

Fixed version for power distribution

SACE EMAX E1.3N • FRONT TERMINALS (F)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E1.3N	250	66	50	E1.3N 250 Ekip Aware LI	1SDA124707R1	1SDA124979R1
				E1.3N 250 Ekip Aware LSI	1SDA124708R1	1SDA124980R1
				E1.3N 250 Ekip Aware LSIG	1SDA128801R1	1SDA128856R1
	630	66	50	E1.3N 630 Ekip Aware LI	1SDA124722R1	1SDA124994R1
				E1.3N 630 Ekip Aware LSI	1SDA124723R1	1SDA124995R1
				E1.3N 630 Ekip Aware LSIG	1SDA128804R1	1SDA128859R1
	800	66	50	E1.3N 800 Ekip Aware LI	1SDA124737R1	1SDA125009R1
				E1.3N 800 Ekip Aware LSI	1SDA124738R1	1SDA125010R1
				E1.3N 800 Ekip Aware LSIG	1SDA128807R1	1SDA128862R1
	1000	66	50	E1.3N 1000 Ekip Aware LI	1SDA124752R1	1SDA125024R1
				E1.3N 1000 Ekip Aware LSI	1SDA124753R1	1SDA125025R1
				E1.3N 1000 Ekip Aware LSIG	1SDA128810R1	1SDA128865R1
	1250	66	50	E1.3N 1250 Ekip Aware LI	1SDA124767R1	1SDA125039R1
				E1.3N 1250 Ekip Aware LSI	1SDA124768R1	1SDA125040R1
				E1.3N 1250 Ekip Aware LSIG	1SDA128813R1	1SDA128868R1
	1600	66	50	E1.3N 1600 Ekip Aware LI	1SDA124782R1	1SDA125054R1
				E1.3N 1600 Ekip Aware LSI	1SDA124783R1	1SDA125055R1
				E1.3N 1600 Ekip Aware LSIG	1SDA128816R1	1SDA128871R1



SACE EMAX E2.3B • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3B	1600	42	42	E2.3B 1600 Ekip Aware LI	1SDA124832R1	1SDA125104R1
				E2.3B 1600 Ekip Aware LSI	1SDA124833R1	1SDA125105R1
				E2.3B 1600 Ekip Aware LSIG	1SDA128826R1	1SDA128881R1
	2000	42	42	E2.3B 2000 Ekip Aware LI	1SDA124852R1	1SDA125124R1
				E2.3B 2000 Ekip Aware LSI	1SDA124853R1	1SDA125125R1
				E2.3B 2000 Ekip Aware LSIG	1SDA128830R1	1SDA128885R1

SACE EMAX E2.3N • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3N	800	66	66	E2.3N 800 Ekip Aware LI	1SDA124787R1	1SDA125059R1
				E2.3N 800 Ekip Aware LSI	1SDA124788R1	1SDA125060R1
				E2.3N 800 Ekip Aware LSIG	1SDA128817R1	1SDA128872R1
	1000	66	66	E2.3N 1000 Ekip Aware LI	1SDA124802R1	1SDA125074R1
				E2.3N 1000 Ekip Aware LSI	1SDA124803R1	1SDA125075R1
				E2.3N 1000 Ekip Aware LSIG	1SDA128820R1	1SDA128875R1
	1250	66	66	E2.3N 1250 Ekip Aware LI	1SDA124817R1	1SDA125089R1
				E2.3N 1250 Ekip Aware LSI	1SDA124818R1	1SDA125090R1
				E2.3N 1250 Ekip Aware LSIG	1SDA128823R1	1SDA128878R1
	1600	66	66	E2.3N 1600 Ekip Aware LI	1SDA124837R1	1SDA125109R1
				E2.3N 1600 Ekip Aware LSI	1SDA124838R1	1SDA125110R1
				E2.3N 1600 Ekip Aware LSIG	1SDA128827R1	1SDA128882R1
	2000	66	66	E2.3N 2000 Ekip Aware LI	1SDA124857R1	1SDA125129R1
				E2.3N 2000 Ekip Aware LSI	1SDA124858R1	1SDA125130R1
				E2.3N 2000 Ekip Aware LSIG	1SDA128831R1	1SDA128886R1
	2500	66	66	E2.3N 2500 Ekip Aware LI	1SDA124872R1	1SDA125144R1
				E2.3N 2500 Ekip Aware LSI	1SDA124873R1	1SDA125145R1
				E2.3N 2500 Ekip Aware LSIG	1SDA128834R1	1SDA128889R1

Automatic circuit-breakers

Fixed version for power distribution

SACE EMAX E2.3S • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3S	250	85	66	E2.3S 250 Ekip Aware LI	1SDA126053R1	1SDA126055R1
				E2.3S 250 Ekip Aware LSI	1SDA126054R1	1SDA126056R1
				E2.3S 250 Ekip Aware LSIG	1SDA129039R1	1SDA129040R1
	800	85	66	E2.3S 800 Ekip Aware LI	1SDA124792R1	1SDA125064R1
				E2.3S 800 Ekip Aware LSI	1SDA124793R1	1SDA125065R1
				E2.3S 800 Ekip Aware LSIG	1SDA128818R1	1SDA128873R1
	1000	85	66	E2.3S 1000 Ekip Aware LI	1SDA124807R1	1SDA125079R1
				E2.3S 1000 Ekip Aware LSI	1SDA124808R1	1SDA125080R1
				E2.3S 1000 Ekip Aware LSIG	1SDA128821R1	1SDA128876R1
	1250	85	66	E2.3S 1250 Ekip Aware LI	1SDA124822R1	1SDA125094R1
				E2.3S 1250 Ekip Aware LSI	1SDA124823R1	1SDA125095R1
				E2.3S 1250 Ekip Aware LSIG	1SDA128824R1	1SDA128879R1
	1600	85	66	E2.3S 1600 Ekip Aware LI	1SDA124842R1	1SDA125114R1
				E2.3S 1600 Ekip Aware LSI	1SDA124843R1	1SDA125115R1
				E2.3S 1600 Ekip Aware LSIG	1SDA128828R1	1SDA128883R1
	2000	85	66	E2.3S 2000 Ekip Aware LI	1SDA124862R1	1SDA125134R1
				E2.3S 2000 Ekip Aware LSI	1SDA124863R1	1SDA125135R1
				E2.3S 2000 Ekip Aware LSIG	1SDA128832R1	1SDA128887R1
	2500	85	66	E2.3S 2500 Ekip Aware LI	1SDA124877R1	1SDA125149R1
				E2.3S 2500 Ekip Aware LSI	1SDA124878R1	1SDA125150R1
				E2.3S 2500 Ekip Aware LSI	1SDA128835R1	1SDA128890R1

SACE EMAX E2.3H • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3H	800	100	85	E2.3H 800 Ekip Aware LI	1SDA124797R1	1SDA125069R1
				E2.3H 800 Ekip Aware LSI	1SDA124798R1	1SDA125070R1
				E2.3H 800 Ekip Aware LSIG	1SDA128819R1	1SDA128874R1
	1000	100	85	E2.3H 1000 Ekip Aware LI	1SDA124812R1	1SDA125084R1
				E2.3H 1000 Ekip Aware LSI	1SDA124813R1	1SDA125085R1
				E2.3H 1000 Ekip Aware LSIG	1SDA128822R1	1SDA128877R1
	1250	100	85	E2.3H 1250 Ekip Aware LI	1SDA124827R1	1SDA125099R1
				E2.3H 1250 Ekip Aware LSI	1SDA124828R1	1SDA125100R1
				E2.3H 1250 Ekip Aware LSIG	1SDA128825R1	1SDA128880R1
	1600	100	85	E2.3H 1600 Ekip Aware LI	1SDA124847R1	1SDA125119R1
				E2.3H 1600 Ekip Aware LSI	1SDA124848R1	1SDA125120R1
				E2.3H 1600 Ekip Aware LSIG	1SDA128829R1	1SDA128884R1
	2000	100	85	E2.3H 2000 Ekip Aware LI	1SDA124867R1	1SDA125139R1
				E2.3H 2000 Ekip Aware LSI	1SDA124868R1	1SDA125140R1
				E2.3H 2000 Ekip Aware LSIG	1SDA128833R1	1SDA128888R1
	2500	100	85	E2.3H 2500 Ekip Aware LI	1SDA124882R1	1SDA125154R1
				E2.3H 2500 Ekip Aware LSI	1SDA124883R1	1SDA125155R1
				E2.3H 2500 Ekip Aware LSIG	1SDA128836R1	1SDA128891R1



SACE EMAX E4.3N-S • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E4.3N	3200	66	66	E4.3N 3200 Ekip Aware LI	1SDA124897R1	1SDA125169R1
				E4.3N 3200 Ekip Aware LSI	1SDA124898R1	1SDA125170R1
				E4.3N 3200 Ekip Aware LSIG	1SDA128839R1	1SDA128894R1
	4000	66	66	E4.3N 4000 Ekip Aware LI	1SDA124917R1	1SDA125189R1
				E4.3N 4000 Ekip Aware LSI	1SDA124918R1	1SDA125190R1
				E4.3N 4000 Ekip Aware LSIG	1SDA128843R1	1SDA128898R1
E4.3S	3200	85	66	E4.3S 3200 Ekip Aware LI	1SDA124902R1	1SDA125174R1
				E4.3S 3200 Ekip Aware LSI	1SDA124903R1	1SDA125175R1
				E4.3S 3200 Ekip Aware LSIG	1SDA128840R1	1SDA128895R1
	4000	85	66	E4.3S 4000 Ekip Aware LI	1SDA124922R1	1SDA125194R1
				E4.3S 4000 Ekip Aware LSI	1SDA124923R1	1SDA125195R1
				E4.3S 4000 Ekip Aware LSIG	1SDA128844R1	1SDA128899R1

SACE EMAX E4.3H-V • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E4.3H	3200	100	85	E4.3H 3200 Ekip Aware LI	1SDA124907R1	1SDA125179R1
				E4.3H 3200 Ekip Aware LSI	1SDA124908R1	1SDA125180R1
				E4.3H 3200 Ekip Aware LSIG	1SDA128841R1	1SDA128896R1
	4000	100	85	E4.3H 4000 Ekip Aware LI	1SDA124927R1	1SDA125199R1
				E4.3H 4000 Ekip Aware LSI	1SDA124928R1	1SDA125200R1
				E4.3H 4000 Ekip Aware LSIG	1SDA128845R1	1SDA128900R1
E4.3V	2000	150	100	E4.3V 2000 Ekip Aware LI	1SDA124887R1	1SDA125159R1
				E4.3V 2000 Ekip Aware LSI	1SDA124888R1	1SDA125160R1
				E4.3V 2000 Ekip Aware LSIG	1SDA128837R1	1SDA128892R1
	2500	150	100	E4.3V 2500 Ekip Aware LI	1SDA124892R1	1SDA125164R1
				E4.3V 2500 Ekip Aware LSI	1SDA124893R1	1SDA125165R1
				E4.3V 2500 Ekip Aware LSIG	1SDA128838R1	1SDA128893R1
	3200	150	100	E4.3V 3200 Ekip Aware LI	1SDA124912R1	1SDA125184R1
				E4.3V 3200 Ekip Aware LSI	1SDA124913R1	1SDA125185R1
				E4.3V 3200 Ekip Aware LSIG	1SDA128842R1	1SDA128897R1
	4000	150	100	E4.3V 4000 Ekip Aware LI	1SDA124932R1	1SDA125204R1
				E4.3V 4000 Ekip Aware LSI	1SDA124933R1	1SDA125205R1
				E4.3V 4000 Ekip Aware LSIG	1SDA128846R1	1SDA128901R1

Automatic circuit-breakers

Fixed version for power distribution



SACE EMAX E6.3H-V • ORIENTABLE REAR TERMINALS (HR)

					3 Poles	4 Poles
Size	**Iu**	**Icu (440 V)**	**Icw (1s)**	**Type**	**Part Number**	**Part Number**
E6.3H	4000	100	100	E6.3H 4000 Ekip Aware LI	1SDA124937R1	1SDA125209R1
				E6.3H 4000 Ekip Aware LSI	1SDA124938R1	1SDA125210R1
				E6.3H 4000 Ekip Aware LSIG	1SDA128847R1	1SDA128902R1
	5000	100	100	E6.3H 5000 Ekip Aware LI	1SDA124952R1	1SDA125224R1
				E6.3H 5000 Ekip Aware LSI	1SDA124953R1	1SDA125225R1
				E6.3H 5000 Ekip Aware LSIG	1SDA128850R1	1SDA128905R1
	6300	100	100	E6.3H 6300 Ekip Aware LI	1SDA124967R1	1SDA125239R1
				E6.3H 6300 Ekip Aware LSI	1SDA124968R1	1SDA125240R1
				E6.3H 6300 Ekip Aware LSIG	1SDA128853R1	1SDA128908R1
E6.3V	4000	150	100	E6.3V 4000 Ekip Aware LI	1SDA124942R1	1SDA125214R1
				E6.3V 4000 Ekip Aware LSI	1SDA124943R1	1SDA125215R1
				E6.3V 4000 Ekip Aware LSIG	1SDA128848R1	1SDA128903R1
	5000	150	100	E6.3V 5000 Ekip Aware LI	1SDA124957R1	1SDA125229R1
				E6.3V 5000 Ekip Aware LSI	1SDA124958R1	1SDA125230R1
				E6.3V 5000 Ekip Aware LSIG	1SDA128851R1	1SDA128906R1
	6300	150	100	E6.3V 6300 Ekip Aware LI	1SDA124972R1	1SDA125244R1
				E6.3V 6300 Ekip Aware LSI	1SDA124973R1	1SDA125245R1
				E6.3V 6300 Ekip Aware LSIG	1SDA128854R1	1SDA128909R1

SACE EMAX E6.3X • ORIENTABLE REAR TERMINALS (HR)

					3 Poles	4 Poles
Size	**Iu**	**Icu (440 V)**	**Icw (1s)**	**Type**	**Part Number**	**Part Number**
E6.3X	4000	150	120	E6.3X 4000 Ekip Aware LI	1SDA124947R1	1SDA125219R1
				E6.3X 4000 Ekip Aware LSI	1SDA124948R1	1SDA125220R1
				E6.3X 4000 Ekip Aware LSIG	1SDA128849R1	1SDA128904R1
	5000	150	120	E6.3X 5000 Ekip Aware LI	1SDA124962R1	1SDA125234R1
				E6.3X 5000 Ekip Aware LSI	1SDA124963R1	1SDA125235R1
				E6.3X 5000 Ekip Aware LSIG	1SDA128852R1	1SDA128907R1
	6300	150	120	E6.3X 6300 Ekip Aware LI	1SDA124977R1	1SDA125249R1
				E6.3X 6300 Ekip Aware LSI	1SDA124978R1	1SDA125250R1
				E6.3X 6300 Ekip Aware LSIG	1SDA128855R1	1SDA128910R1

SACE EMAX E6.3H-V/F FULL SIZE • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E6.3H/f	4000	100	100	E6.3H/f 4000 Ekip Aware LI		1SDA125254R1
				E6.3H/f 4000 Ekip Aware LSI		1SDA125255R1
				E6.3H/f 4000 Ekip Aware LSIG		1SDA128911R1
	5000	100	100	E6.3H/f 5000 Ekip Aware LI		1SDA125269R1
				E6.3H/f 5000 Ekip Aware LSI		1SDA125270R1
				E6.3H/f 5000 Ekip Aware LSIG		1SDA128914R1
	6300	100	100	E6.3H/f 6300 Ekip Aware LI		1SDA125284R1
				E6.3H/f 6300 Ekip Aware LSI		1SDA125285R1
				E6.3H/f 6300 Ekip Aware LSIG		1SDA128917R1
E6.3V/f	4000	150	100	E6.3V/f 4000 Ekip Aware LI		1SDA125259R1
				E6.3V/f 4000 Ekip Aware LSI		1SDA125260R1
				E6.3V/f 4000 Ekip Aware LSIG		1SDA128912R1
	5000	150	100	E6.3V/f 5000 Ekip Aware LI		1SDA125274R1
				E6.3V/f 5000 Ekip Aware LSI		1SDA125275R1
				E6.3V/f 5000 Ekip Aware LSIG		1SDA128915R1
	6300	150	100	E6.3V/f 6300 Ekip Aware LI		1SDA125289R1
				E6.3V/f 6300 Ekip Aware LSI		1SDA125290R1
				E6.3V/f 6300 Ekip Aware LSIG		1SDA128918R1

SACE EMAX E6.3X/F FULL SIZE • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E6.3X/f	4000	150	120	E6.3X/f 4000 Ekip Aware LI		1SDA125264R1
				E6.3X/f 4000 Ekip Aware LSI		1SDA125265R1
				E6.3X/f 4000 Ekip Aware LSIG		1SDA128913R1
	5000	150	120	E6.3X/f 5000 Ekip Aware LI		1SDA125279R1
				E6.3X/f 5000 Ekip Aware LSI		1SDA125280R1
				E6.3X/f 5000 Ekip Aware LSIG		1SDA128916R1
	6300	150	120	E6.3X/f 6300 Ekip Aware LI		1SDA125294R1
				E6.3X/f 6300 Ekip Aware LSI		1SDA125295R1
				E6.3X/f 6300 Ekip Aware LSIG		1SDA128919R1

Automatic circuit-breakers

Withdrawable version for power distribution



SACE EMAX E1.3B • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E1.3B	630	42	42	E1.3B 630 Ekip Aware LI	1SDA125301R1	1SDA125573R1
				E1.3B 630 Ekip Aware LSI	1SDA125302R1	1SDA125574R1
				E1.3B 630 Ekip Aware LSIG	1SDA128921R1	1SDA128976R1
	800	42	42	E1.3B 800 Ekip Aware LI	1SDA125316R1	1SDA125588R1
				E1.3B 800 Ekip Aware LSI	1SDA125317R1	1SDA125589R1
				E1.3B 800 Ekip Aware LSIG	1SDA128924R1	1SDA128979R1
	1000	42	42	E1.3B 1000 Ekip Aware LI	1SDA125331R1	1SDA125603R1
				E1.3B 1000 Ekip Aware LSI	1SDA125332R1	1SDA125604R1
				E1.3B 1000 Ekip Aware LSIG	1SDA128927R1	1SDA128982R1
	1250	42	42	E1.3B 1250 Ekip Aware LI	1SDA125346R1	1SDA125618R1
				E1.3B 1250 Ekip Aware LSI	1SDA125347R1	1SDA125619R1
				E1.3B 1250 Ekip Aware LSIG	1SDA128930R1	1SDA128985R1
	1600	42	42	E1.3B 1600 Ekip Aware LI	1SDA125361R1	1SDA125633R1
				E1.3B 1600 Ekip Aware LSI	1SDA125362R1	1SDA125634R1
				E1.3B 1600 Ekip Aware LSIG	1SDA128933R1	1SDA128988R1

SACE EMAX E1.3C • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E1.3C	630	50	42	E1.3C 630 Ekip Aware LI	1SDA125306R1	1SDA125578R1
				E1.3C 630 Ekip Aware LSI	1SDA125307R1	1SDA125579R1
				E1.3C 630 Ekip Aware LSIG	1SDA128922R1	1SDA128977R1
	800	50	42	E1.3C 800 Ekip Aware LI	1SDA125321R1	1SDA125593R1
				E1.3C 800 Ekip Aware LSI	1SDA125322R1	1SDA125594R1
				E1.3C 800 Ekip Aware LSIG	1SDA128925R1	1SDA128980R1
	1000	50	42	E1.3C 1000 Ekip Aware LI	1SDA125336R1	1SDA125608R1
				E1.3C 1000 Ekip Aware LSI	1SDA125337R1	1SDA125609R1
				E1.3C 1000 Ekip Aware LSIG	1SDA128928R1	1SDA128983R1
	1250	50	42	E1.3C 1250 Ekip Aware LI	1SDA125351R1	1SDA125623R1
				E1.3C 1250 Ekip Aware LSI	1SDA125352R1	1SDA125624R1
				E1.3C 1250 Ekip Aware LSIG	1SDA128931R1	1SDA128986R1
	1600	50	42	E1.3C 1600 Ekip Aware LI	1SDA125366R1	1SDA125638R1
				E1.3C 1600 Ekip Aware LSI	1SDA125367R1	1SDA125639R1
				E1.3C 1600 Ekip Aware LSIG	1SDA128934R1	1SDA128989R1

SACE EMAX E1.3N • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E1.3N	250	66	50	E1.3N 250 Ekip Aware LI	1SDA125296R1	1SDA125568R1
				E1.3N 250 Ekip Aware LSI	1SDA125297R1	1SDA125569R1
				E1.3N 250 Ekip Aware LSIG	1SDA128920R1	1SDA128975R1
	630	66	50	E1.3N 630 Ekip Aware LI	1SDA125311R1	1SDA125583R1
				E1.3N 630 Ekip Aware LSI	1SDA125312R1	1SDA125584R1
				E1.3N 630 Ekip Aware LSIG	1SDA128923R1	1SDA128978R1
	800	66	50	E1.3N 800 Ekip Aware LI	1SDA125326R1	1SDA125598R1
				E1.3N 800 Ekip Aware LSI	1SDA125327R1	1SDA125599R1
				E1.3N 800 Ekip Aware LSIG	1SDA128926R1	1SDA128981R1
	1000	66	50	E1.3N 1000 Ekip Aware LI	1SDA125341R1	1SDA125613R1
				E1.3N 1000 Ekip Aware LSI	1SDA125342R1	1SDA125614R1
				E1.3N 1000 Ekip Aware LSIG	1SDA128929R1	1SDA128984R1
	1250	66	50	E1.3N 1250 Ekip Aware LI	1SDA125356R1	1SDA125628R1
				E1.3N 1250 Ekip Aware LSI	1SDA125357R1	1SDA125629R1
				E1.3N 1250 Ekip Aware LSIG	1SDA128932R1	1SDA128987R1
	1600	66	50	E1.3N 1600 Ekip Aware LI	1SDA125371R1	1SDA125643R1
				E1.3N 1600 Ekip Aware LSI	1SDA125372R1	1SDA125644R1
				E1.3N 1600 Ekip Aware LSIG	1SDA128935R1	1SDA128990R1

Automatic circuit-breakers

Withdrawable version for power distribution



SACE EMAX E2.3B • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3B	1600	42	42	E2.3B 1600 Ekip Aware LI	1SDA125421R1	1SDA125693R1
				E2.3B 1600 Ekip Aware LSI	1SDA125422R1	1SDA125694R1
				E2.3B 1600 Ekip Aware LSIG	1SDA128945R1	1SDA129000R1
	2000	42	42	E2.3B 2000 Ekip Aware LI	1SDA125441R1	1SDA125713R1
				E2.3B 2000 Ekip Aware LSI	1SDA125442R1	1SDA125714R1
				E2.3B 2000 Ekip Aware LSIG	1SDA128949R1	1SDA129004R1

SACE EMAX E2.3N • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3N	800	66	66	E2.3N 800 Ekip Aware LI	1SDA125376R1	1SDA125648R1
				E2.3N 800 Ekip Aware LSI	1SDA125377R1	1SDA125649R1
				E2.3N 800 Ekip Aware LSIG	1SDA128936R1	1SDA128991R1
	1000	66	66	E2.3N 1000 Ekip Aware LI	1SDA125391R1	1SDA125663R1
				E2.3N 1000 Ekip Aware LSI	1SDA125392R1	1SDA125664R1
				E2.3N 1000 Ekip Aware LSIG	1SDA128939R1	1SDA128994R1
	1250	66	66	E2.3N 1250 Ekip Aware LI	1SDA125406R1	1SDA125678R1
				E2.3N 1250 Ekip Aware LSI	1SDA125407R1	1SDA125679R1
				E2.3N 1250 Ekip Aware LSIG	1SDA128942R1	1SDA128997R1
	1600	66	66	E2.3N 1600 Ekip Aware LI	1SDA125426R1	1SDA125698R1
				E2.3N 1600 Ekip Aware LSI	1SDA125427R1	1SDA125699R1
				E2.3N 1600 Ekip Aware LSIG	1SDA128946R1	1SDA129001R1
	2000	66	66	E2.3N 2000 Ekip Aware LI	1SDA125446R1	1SDA125718R1
				E2.3N 2000 Ekip Aware LSI	1SDA125447R1	1SDA125719R1
				E2.3N 2000 Ekip Aware LSIG	1SDA128950R1	1SDA129005R1
	2500	66	66	E2.3N 2500 Ekip Aware LI	1SDA125461R1	1SDA125733R1
				E2.3N 2500 Ekip Aware LSI	1SDA125462R1	1SDA125734R1
				E2.3N 2500 Ekip Aware LSIG	1SDA128953R1	1SDA129008R1

SACE EMAX E2.3S • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3S	250	85	66	E2.3S 250 Ekip Aware LI	1SDA126057R1	1SDA126059R1
				E2.3S 250 Ekip Aware LSI	1SDA126058R1	1SDA126060R1
				E2.3S 250 Ekip Aware LSIG	1SDA129041R1	1SDA129042R1
	800	85	66	E2.3S 800 Ekip Aware LI	1SDA125381R1	1SDA125653R1
				E2.3S 800 Ekip Aware LSI	1SDA125382R1	1SDA125654R1
				E2.3S 800 Ekip Aware LSIG	1SDA128937R1	1SDA128992R1
	1000	85	66	E2.3S 1000 Ekip Aware LI	1SDA125396R1	1SDA125668R1
				E2.3S 1000 Ekip Aware LSI	1SDA125397R1	1SDA125669R1
				E2.3S 1000 Ekip Aware LSIG	1SDA128940R1	1SDA128995R1
	1250	85	66	E2.3S 1250 Ekip Aware LI	1SDA125411R1	1SDA125683R1
				E2.3S 1250 Ekip Aware LSI	1SDA125412R1	1SDA125684R1
				E2.3S 1250 Ekip Aware LSIG	1SDA128943R1	1SDA128998R1
	1600	85	66	E2.3S 1600 Ekip Aware LI	1SDA125431R1	1SDA125703R1
				E2.3S 1600 Ekip Aware LSI	1SDA125432R1	1SDA125704R1
				E2.3S 1600 Ekip Aware LSIG	1SDA128947R1	1SDA129002R1
	2000	85	66	E2.3S 2000 Ekip Aware LI	1SDA125451R1	1SDA125723R1
				E2.3S 2000 Ekip Aware LSI	1SDA125452R1	1SDA125724R1
				E2.3S 2000 Ekip Aware LSIG	1SDA128951R1	1SDA129006R1
	2500	85	66	E2.3S 2500 Ekip Aware LI	1SDA125466R1	1SDA125738R1
				E2.3S 2500 Ekip Aware LSI	1SDA125467R1	1SDA125739R1
				E2.3S 2500 Ekip Aware LSIG	1SDA128954R1	1SDA129009R1

SACE EMAX E2.3H • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3H	800	100	85	E2.3H 800 Ekip Aware LI	1SDA125386R1	1SDA125658R1
				E2.3H 800 Ekip Aware LSI	1SDA125387R1	1SDA125659R1
				E2.3H 800 Ekip Aware LSIG	1SDA128938R1	1SDA128993R1
	1000	100	85	E2.3H 1000 Ekip Aware LI	1SDA125401R1	1SDA125673R1
				E2.3H 1000 Ekip Aware LSI	1SDA125402R1	1SDA125674R1
				E2.3H 1000 Ekip Aware LSIG	1SDA128941R1	1SDA128996R1
	1250	100	85	E2.3H 1250 Ekip Aware LI	1SDA125416R1	1SDA125688R1
				E2.3H 1250 Ekip Aware LSI	1SDA125417R1	1SDA125689R1
				E2.3H 1250 Ekip Aware LSIG	1SDA128944R1	1SDA128999R1
	1600	100	85	E2.3H 1600 Ekip Aware LI	1SDA125436R1	1SDA125708R1
				E2.3H 1600 Ekip Aware LSI	1SDA125437R1	1SDA125709R1
				E2.3H 1600 Ekip Aware LSIG	1SDA128948R1	1SDA129003R1
	2000	100	85	E2.3H 2000 Ekip Aware LI	1SDA125456R1	1SDA125728R1
				E2.3H 2000 Ekip Aware LSI	1SDA125457R1	1SDA125729R1
				E2.3H 2000 Ekip Aware LSIG	1SDA128952R1	1SDA129007R1
	2500	100	85	E2.3H 2500 Ekip Aware LI	1SDA125471R1	1SDA125743R1
				E2.3H 2500 Ekip Aware LSI	1SDA125472R1	1SDA125744R1
				E2.3H 2500 Ekip Aware LSIG	1SDA128955R1	1SDA129010R1

Automatic circuit-breakers

Withdrawable version for power distribution



SACE EMAX E4.3N-S-H • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E4.3N	3200	66	66	E4.3N 3200 Ekip Aware LI	1SDA125486R1	1SDA125758R1
				E4.3N 3200 Ekip Aware LSI	1SDA125487R1	1SDA125759R1
				E4.3N 3200 Ekip Aware LSIG	1SDA128958R1	1SDA129013R1
	4000	66	66	E4.3N 4000 Ekip Aware LI	1SDA125506R1	1SDA125778R1
				E4.3N 4000 Ekip Aware LSI	1SDA125507R1	1SDA125779R1
				E4.3N 4000 Ekip Aware LSIG	1SDA128962R1	1SDA129017R1
E4.3S	3200	85	66	E4.3S 3200 Ekip Aware LI	1SDA125491R1	1SDA125763R1
				E4.3S 3200 Ekip Aware LSI	1SDA125492R1	1SDA125764R1
				E4.3S 3200 Ekip Aware LSIG	1SDA128959R1	1SDA129014R1
	4000	85	66	E4.3S 4000 Ekip Aware LI	1SDA125511R1	1SDA125783R1
				E4.3S 4000 Ekip Aware LSI	1SDA125512R1	1SDA125784R1
				E4.3S 4000 Ekip Aware LSIG	1SDA128963R1	1SDA129018R1
E4.3H	3200	100	85	E4.3H 3200 Ekip Aware LI	1SDA125496R1	1SDA125768R1
				E4.3H 3200 Ekip Aware LSI	1SDA125497R1	1SDA125769R1
				E4.3H 3200 Ekip Aware LSIG	1SDA128960R1	1SDA129015R1
	4000	100	85	E4.3H 4000 Ekip Aware LI	1SDA125516R1	1SDA125788R1
				E4.3H 4000 Ekip Aware LSI	1SDA125517R1	1SDA125789R1
				E4.3H 4000 Ekip Aware LSIG	1SDA128964R1	1SDA129019R1

SACE EMAX E4.3V • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E4.3V	2000	150	100	E4.3V 2000 Ekip Aware LI	1SDA125476R1	1SDA125748R1
				E4.3V 2000 Ekip Aware LSI	1SDA125477R1	1SDA125749R1
				E4.3V 2000 Ekip Aware LSIG	1SDA128956R1	1SDA129011R1
	2500	150	100	E4.3V 2500 Ekip Aware LI	1SDA125481R1	1SDA125753R1
				E4.3V 2500 Ekip Aware LSI	1SDA125482R1	1SDA125754R1
				E4.3V 2500 Ekip Aware LSIG	1SDA128957R1	1SDA129012R1
	3200	150	100	E4.3V 3200 Ekip Aware LI	1SDA125501R1	1SDA125773R1
				E4.3V 3200 Ekip Aware LSI	1SDA125502R1	1SDA125774R1
				E4.3V 3200 Ekip Aware LSIG	1SDA128961R1	1SDA129016R1
	4000	150	100	E4.3V 4000 Ekip Aware LI	1SDA125521R1	1SDA125793R1
				E4.3V 4000 Ekip Aware LSI	1SDA125522R1	1SDA125794R1
				E4.3V 4000 Ekip Aware LSIG	1SDA128965R1	1SDA129020R1



SACE EMAX E6.3H-V • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E6.3H	4000	100	100	E6.3H 4000 Ekip Aware LI	1SDA125526R1	1SDA125798R1
				E6.3H 4000 Ekip Aware LSI	1SDA125527R1	1SDA125799R1
				E6.3H 4000 Ekip Aware LSIG	1SDA128966R1	1SDA129021R1
	5000	100	100	E6.3H 5000 Ekip Aware LI	1SDA125541R1	1SDA125813R1
				E6.3H 5000 Ekip Aware LSI	1SDA125542R1	1SDA125814R1
				E6.3H 5000 Ekip Aware LSIG	1SDA128969R1	1SDA129024R1
	6300	100	100	E6.3H 6300 Ekip Aware LI	1SDA125556R1	1SDA125828R1
				E6.3H 6300 Ekip Aware LSI	1SDA125557R1	1SDA125829R1
				E6.3H 6300 Ekip Aware LSIG	1SDA128972R1	1SDA129027R1
E6.3V	4000	150	100	E6.3V 4000 Ekip Aware LI	1SDA125531R1	1SDA125803R1
				E6.3V 4000 Ekip Aware LSI	1SDA125532R1	1SDA125804R1
				E6.3V 4000 Ekip Aware LSIG	1SDA128967R1	1SDA129022R1
	5000	150	100	E6.3V 5000 Ekip Aware LI	1SDA125546R1	1SDA125818R1
				E6.3V 5000 Ekip Aware LSI	1SDA125547R1	1SDA125819R1
				E6.3V 5000 Ekip Aware LSIG	1SDA128970R1	1SDA129025R1
	6300	150	100	E6.3V 6300 Ekip Aware LI	1SDA125561R1	1SDA125833R1
				E6.3V 6300 Ekip Aware LSI	1SDA125562R1	1SDA125834R1
				E6.3V 6300 Ekip Aware LSIG	1SDA128973R1	1SDA129028R1

SACE EMAX E6.3X • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E6.3X	4000	150	120	E6.3X 4000 Ekip Aware LI	1SDA125536R1	1SDA125808R1
				E6.3X 4000 Ekip Aware LSI	1SDA125537R1	1SDA125809R1
				E6.3X 4000 Ekip Aware LSIG	1SDA128968R1	1SDA129023R1
	5000	150	120	E6.3X 5000 Ekip Aware LI	1SDA125551R1	1SDA125823R1
				E6.3X 5000 Ekip Aware LSI	1SDA125552R1	1SDA125824R1
				E6.3X 5000 Ekip Aware LSIG	1SDA128971R1	1SDA129026R1
	6300	150	120	E6.3X 6300 Ekip Aware LI	1SDA125566R1	1SDA125838R1
				E6.3X 6300 Ekip Aware LSI	1SDA125567R1	1SDA125839R1
				E6.3X 6300 Ekip Aware LSIG	1SDA128974R1	1SDA129029R1

Automatic circuit-breakers

Withdrawable version for power distribution

SACE EMAX E6.3H-V/F FULL SIZE • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	4 Poles Part Number
E6.3H/f	4000	100	100	E6.3H/f 4000 Ekip Aware LI	1SDA125843R1
				E6.3H/f 4000 Ekip Aware LSI	1SDA125844R1
				E6.3H/f 4000 Ekip Aware LSIG	1SDA129030R1
	5000	100	100	E6.3H/f 5000 Ekip Aware LI	1SDA125858R1
				E6.3H/f 5000 Ekip Aware LSI	1SDA125859R1
				E6.3H/f 5000 Ekip Aware LSIG	1SDA129033R1
	6300	100	100	E6.3H/f 6300 Ekip Aware LI	1SDA125873R1
				E6.3H/f 6300 Ekip Aware LSI	1SDA125874R1
				E6.3H/f 6300 Ekip Aware LSIG	1SDA129036R1
E6.3V/f	4000	150	100	E6.3V/f 4000 Ekip Aware LI	1SDA125848R1
				E6.3V/f 4000 Ekip Aware LSI	1SDA125849R1
				E6.3V/f 4000 Ekip Aware LSIG	1SDA129031R1
	5000	150	100	E6.3V/f 5000 Ekip Aware LI	1SDA125863R1
				E6.3V/f 5000 Ekip Aware LSI	1SDA125864R1
				E6.3V/f 5000 Ekip Aware LSIG	1SDA129034R1
	6300	150	100	E6.3V/f 6300 Ekip Aware LI	1SDA125878R1
				E6.3V/f 6300 Ekip Aware LSI	1SDA125879R1
				E6.3V/f 6300 Ekip Aware LSIG	1SDA129037R1

SACE EMAX E6.3X/F FULL SIZE • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icu (440 V)	Icw (1s)	Type	4 Poles Part Number
E6.3X/f	4000	150	120	E6.3X/f 4000 Ekip Aware LI	1SDA125853R1
				E6.3X/f 4000 Ekip Aware LSI	1SDA125854R1
				E6.3X/f 4000 Ekip Aware LSIG	1SDA129032R1
	5000	150	120	E6.3X/f 5000 Ekip Aware LI	1SDA125868R1
				E6.3X/f 5000 Ekip Aware LSI	1SDA125869R1
				E6.3X/f 5000 Ekip Aware LSIG	1SDA129035R1
	6300	150	120	E6.3X/f 6300 Ekip Aware LI	1SDA125883R1
				E6.3X/f 6300 Ekip Aware LSI	1SDA125884R1
				E6.3X/f 6300 Ekip Aware LSIG	1SDA129038R1

Switch-disconnectors

Fixed version



SACE EMAX 3 E1.3 B/MS, N/MS • FRONT TERMINALS (F)

Size	Iu	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E1.3B/MS	630	42	E1.3B/MS 630	1SDA125886R1	1SDA125925R1
	800	42	E1.3B/MS 800	1SDA125888R1	1SDA125927R1
	1000	42	E1.3B/MS 1000	1SDA125890R1	1SDA125929R1
	1250	42	E1.3B/MS 1250	1SDA125892R1	1SDA125931R1
	1600	42	E1.3B/MS 1600	1SDA125894R1	1SDA125933R1
E1.3N/MS	250	50	E1.3N/MS 250	1SDA125885R1	1SDA125924R1
	630	50	E1.3N/MS 630	1SDA125887R1	1SDA125926R1
	800	50	E1.3N/MS 800	1SDA125889R1	1SDA125928R1
	1000	50	E1.3N/MS 1000	1SDA125891R1	1SDA125930R1
	1250	50	E1.3N/MS 1250	1SDA125893R1	1SDA125932R1



SACE EMAX E2.3B-N-H/MS • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E2.3B/MS	1600	42	E2.3B/MS 1600	1SDA125902R1	1SDA125941R1
	2000	42	E2.3B/MS 2000	1SDA125905R1	1SDA125944R1
E2.3N/MS	800	66	E2.3N/MS 800	1SDA125896R1	1SDA125935R1
	1000	66	E2.3N/MS 1000	1SDA125898R1	1SDA125937R1
	1250	66	E2.3N/MS 1250	1SDA125900R1	1SDA125939R1
	1600	66	E2.3N/MS 1600	1SDA125903R1	1SDA125942R1
	2000	66	E2.3N/MS 2000	1SDA125906R1	1SDA125945R1
	2500	66	E2.3N/MS 2500	1SDA125908R1	1SDA125947R1
E2.3H/MS	800	85	E2.3H/MS 800	1SDA125897R1	1SDA125936R1
	1000	85	E2.3H/MS 1000	1SDA125899R1	1SDA125938R1
	1250	85	E2.3H/MS 1250	1SDA125901R1	1SDA125940R1
	1600	85	E2.3H/MS 1600	1SDA125904R1	1SDA125943R1
	2000	85	E2.3H/MS 2000	1SDA125907R1	1SDA125946R1
	2500	85	E2.3H/MS 2500	1SDA125909R1	1SDA125948R1

Switch-disconnectors

Fixed version



SACE EMAX E4.3N-H-V/MS • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E4.3N/MS	3200	66	E4.3N/MS 3200	1SDA125912R1	1SDA125951R1
	4000	66	E4.3N/MS 4000	1SDA125915R1	1SDA125954R1
E4.3H/MS	3200	85	E4.3H/MS 3200	1SDA125913R1	1SDA125952R1
	4000	85	E4.3H/MS 4000	1SDA125916R1	1SDA125955R1
E4.3V/MS	2000	100	E4.3V/MS 2000	1SDA125910R1	1SDA125949R1
	2500	100	E4.3V/MS 2500	1SDA125911R1	1SDA125950R1
	3200	100	E4.3V/MS 3200	1SDA125914R1	1SDA125953R1
	4000	100	E4.3V/MS 4000	1SDA125917R1	1SDA125956R1



SACE EMAX E6.3H-X/MS • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E6.3H/MS	4000	100	E6.3H/MS 4000	1SDA125918R1	1SDA125957R1
	5000	100	E6.3H/MS 5000	1SDA125920R1	1SDA125959R1
	6300	100	E6.3H/MS 6300	1SDA125922R1	1SDA125961R1
E6.3X/MS	4000	120	E6.3X/MS 4000	1SDA125919R1	1SDA125958R1
	5000	120	E6.3X/MS 5000	1SDA125921R1	1SDA125960R1
	6300	120	E6.3X/MS 6300	1SDA125923R1	1SDA125962R1

SACE EMAX E6.3H-X/MS/F FULL SIZE • ORIENTABLE REAR TERMINALS (HR)

Size	Iu	Icw (1s)	Type	4 Poles Part Number
E6.3H/MS/f	4000	100	E6.3H/MS/f 4000	1SDA125963R1
	5000	100	E6.3H/MS/f 5000	1SDA125965R1
	6300	100	E6.3H/MS/f 6300	1SDA125967R1
E6.3X/MS/f	4000	120	E6.3X/MS/f 4000	1SDA125964R1
	5000	120	E6.3X/MS/f 5000	1SDA125966R1
	6300	120	E6.3X/MS/f 6300	1SDA125968R1

Switch-disconnectors
Withdrawable version



SACE EMAX E1.3B-N/MS • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

				3 Poles	4 Poles
Size	Iu	Icw (1s)	Type	Part Number	Part Number
E1.3B/MS	630	42	E1.3B/MS 630	1SDA125970R1	1SDA126009R1
	800	42	E1.3B/MS 800	1SDA125972R1	1SDA126011R1
	1000	42	E1.3B/MS 1000	1SDA125974R1	1SDA126013R1
	1250	42	E1.3B/MS 1250	1SDA125976R1	1SDA126015R1
	1600	42	E1.3B/MS 1600	1SDA125978R1	1SDA126017R1
E1.3N/MS	250	50	E1.3N/MS 250	1SDA125969R1	1SDA126008R1
	630	50	E1.3N/MS 630	1SDA125971R1	1SDA126010R1
	800	50	E1.3N/MS 800	1SDA125973R1	1SDA126012R1
	1000	50	E1.3N/MS 1000	1SDA125975R1	1SDA126014R1
	1250	50	E1.3N/MS 1250	1SDA125977R1	1SDA126016R1
	1600	50	E1.3N/MS 1600	1SDA125979R1	1SDA126018R1



SACE EMAX E2.3B-N-H/MS • ORIENTABLE REAR TERMINALS (HR)

				3 Poles	4 Poles
Size	Iu	Icw (1s)	Type	Part Number	Part Number
E2.3B/MS	1600	42	E2.3B/MS 1600	1SDA125986R1	1SDA126025R1
	2000	42	E2.3B/MS 2000	1SDA125989R1	1SDA126028R1
E2.3N/MS	800	66	E2.3N/MS 800	1SDA125980R1	1SDA126019R1
	1000	66	E2.3N/MS 1000	1SDA125982R1	1SDA126021R1
	1250	66	E2.3N/MS 1250	1SDA125984R1	1SDA126023R1
	1600	66	E2.3N/MS 1600	1SDA125987R1	1SDA126026R1
	2000	66	E2.3N/MS 2000	1SDA125990R1	1SDA126029R1
	2500	66	E2.3N/MS 2500	1SDA125992R1	1SDA126031R1
E2.3H/MS	800	85	E2.3H/MS 800	1SDA125981R1	1SDA126020R1
	1000	85	E2.3H/MS 1000	1SDA125983R1	1SDA126022R1
	1250	85	E2.3H/MS 1250	1SDA125985R1	1SDA126024R1
	1600	85	E2.3H/MS 1600	1SDA125988R1	1SDA126027R1
	2000	85	E2.3H/MS 2000	1SDA125991R1	1SDA126030R1
	2500	85	E2.3H/MS 2500	1SDA125993R1	1SDA126032R1

Switch-disconnectors

Withdrawable version



SACE EMAX E4.3N-H-V/MS • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E4.3N/MS	3200	66	E4.3N/MS 3200	1SDA125996R1	1SDA126035R1
	4000	66	E4.3N/MS 4000	1SDA125999R1	1SDA126038R1
E4.3H/MS	3200	85	E4.3H/MS 3200	1SDA125997R1	1SDA126036R1
	4000	85	E4.3H/MS 4000	1SDA126000R1	1SDA126039R1
E4.3V/MS	2000	100	E4.3V/MS 2000	1SDA125994R1	1SDA126033R1
	2500	100	E4.3V/MS 2500	1SDA125995R1	1SDA126034R1
	3200	100	E4.3V/MS 3200	1SDA125998R1	1SDA126037R1
	4000	100	E4.3V/MS 4000	1SDA126001R1	1SDA126040R1



SACE EMAX E6.3H-X/MS • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E6.3H/MS	4000	100	E6.3H/MS 4000	1SDA126002R1	1SDA126041R1
	5000	100	E6.3H/MS 5000	1SDA126004R1	1SDA126043R1
	6300	100	E6.3H/MS 6300	1SDA126006R1	1SDA126045R1
E6.3X/MS	4000	120	E6.3X/MS 4000	1SDA126003R1	1SDA126042R1
	5000	120	E6.3X/MS 5000	1SDA126005R1	1SDA126044R1
	6300	120	E6.3X/MS 6300	1SDA126007R1	1SDA126046R1

SACE EMAX E6.3H-X/MS/F FULL SIZE • MOBILE PART OF WITHDRAWABLE CIRCUIT-BREAKER (MP)

Size	Iu	Icw (1s)	Type	3 Poles Part Number	4 Poles Part Number
E6.3H/MS/f	4000	100	E6.3H/MS/f 4000		1SDA126047R1
	5000	100	E6.3H/MS/f 5000		1SDA126049R1
	6300	100	E6.3H/MS/f 6300		1SDA126051R1
E6.3X/MS/f	4000	120	E6.3X/MS/f 4000		1SDA126048R1
	5000	120	E6.3X/MS/f 5000		1SDA126050R1
	6300	120	E6.3X/MS/f 6300		1SDA126052R1

Derived versions

SECTIONALIZING TRUCK - CS

			3 Poles	4 Poles
Size	**Iu**	**Type**	**Part Number**	**Part Number**
E2.3/CS	2000	E2.3/CS 2000 MP	1SDA126091R1	1SDA126092R1
E2.3/CS	2500	E2.3/CS 2500 MP	1SDA126061R1	1SDA126062R1
E4.3/CS	3200	E4.3/CS 3200 MP	1SDA126093R1	1SDA126094R1
E4.3/CS	4000	E4.3/CS 4000 MP	1SDA126063R1	1SDA126064R1
E6.3/CS	6300	E6.3/CS 6300 MP	1SDA126065R1	1SDA126066R1
E6.3/CS/f	6300	E6.3/CS/f 6300 MP	-	1SDA126111R1

EARTHING TRUCK - MT

			3 Poles	4 Poles
Size	**Iu**	**Type**	**Part Number**	**Part Number**
E2.3/MT	2000	E2.3/MT 2000 MP Earth connection from upper terminals	1SDA126095R1	1SDA126096R1
E2.3/MT	2500	E2.3/MT 2500 MP Earth connection from upper terminals	1SDA126067R1	1SDA126068R1
E4.3/MT	3200	E4.3/MT 3200 MP Earth connection from upper terminals	1SDA126097R1	1SDA126098R1
E4.3/MT	4000	E4.3/MT 4000 MP Earth connection from upper terminals	1SDA126069R1	1SDA126070R1
E6.3/MT	6300	E6.3/MT 6300 MP Earth connection from upper terminals	1SDA126071R1	1SDA126072R1
E2.3/MT	2000	E2.3/MT 2000 MP Earth connection from lower terminals	1SDA126099R1	1SDA126100R1
E2.37MT	2500	E2.3/MT 2500 MP Earth connection from lower terminals	1SDA126073R1	1SDA126074R1
E4.3/MT	3200	E4.3/MT 3200 MP Earth connection from lower terminals	1SDA126101R1	1SDA126102R1
E4.3/MT	4000	E4.3/MT 4000 MP Earth connection from lower terminals	1SDA126075R1	1SDA126076R1
E6.3/MT	6300	E6.3/MT 6300 MP Earth connection from lower terminals	1SDA126077R1	1SDA126078R1
E6.3/MT/f	6300	E6.3/MT/f 6300 MP Earth connection from upper terminals	-	1SDA126112R1
E6.3/MT/f	6300	E6.3/MT/f 6300 MP Earth connection from lower terminals	-	1SDA126113R1

Derived versions

EARTHING SWITCH WITH MAKING CAPACITY - MTP

			3 Poles	4 Poles
Size	**Iu**	**Type**	**Part Number**	**Part Number**
E2.3/MTP	2000	E2.3/MTP 2000 MP Earth connection from upper terminals	1SDA126103R1	1SDA126104R1
E2.3/MTP	2500	E2.3/MTP 2500 MP Earth connection from upper terminals	1SDA126079R1	1SDA126080R1
E4.3/MTP	3200	E4.3/MTP 3200 MP Earth connection from upper terminals	1SDA126105R1	1SDA126106R1
E4.3/MTP	4000	E4.3/MTP 4000 MP Earth connection from upper terminals	1SDA126081R1	1SDA126082R1
E6.3/MTP	6300	E6.3/MTP 6300 MP Earth connection from upper terminals	1SDA126083R1	1SDA126084R1
E2.3/MTP	2000	E2.3/MTP 2000 MP Earth connection from lower terminals	1SDA126107R1	1SDA126108R1
E2.3/MTP	2500	E2.3/MTP 2500 MP Earth connection from lower terminals	1SDA126085R1	1SDA126086R1
E4.3/MTP	3200	E4.3/MTP 3200 MP Earth connection from lower terminals	1SDA126109R1	1SDA126110R1
E4.3/MTP	4000	E4.3/MTP 4000 MP Earth connection from lower terminals	1SDA126087R1	1SDA126088R1
E6.3/MTP	6300	E6.3/MTP 6300 MP Earth connection from lower terminals	1SDA126089R1	1SDA126090R1
E6.3/MTP/f	6300	E6.3/MTP/f 6300 MP Earth connection from upper terminals	-	1SDA126114R1
E6.3/MTP/f	6300	E6.3/MTP/f 6300 MP Earth connection from lower terminals	-	1SDA126115R1

ACCESSORIES FOR MT AND MTP

Size	**Type**	**3 Poles**
E2.3	Grounding clamp FP E2.3 for MT/MTP (1)	1SDA074378R1
E4.3-E6.3	Grounding clamp FP E4.3-E6.3 for MT/MTP (1)	1SDA074379R1
E2.3	Grounding clamp retrofitting FP E2.3 for MT/MTP (Front/Side mounting)	1SDA085591R1
E4.3-E6.3	Grounding clamp retrofitting FP E4.3-E6.3 for MT/MTP (Front/Side mounting)	1SDA085592R1

Grounding clamps must be installed in every fixed parts in which a MT/MTP mobile parts is foreseen.
Otherwise the standard fixed parts can not accept MT/MTP device.
1)Only supplied with the circuit-breaker. For loose supply contact ABB

FIXED OR MOBILE PART WITH NEUTRAL ON RIGHT SIDE

Size	**Type**	**4 Poles**
E1.3...E6.3	Installation with neutral on right side sequence L1,L2,L3,N (1)	1SDA076153R1

1) When this configuration is selected, the circuit-breaker is not certified for IEC 61557-12 (Class 0,5 and class 1 accuracy)

Fixed parts

FIXED PARTS

Size	Performance	Iu range	Type of terminal	Type	3 Poles Part Number	4 Poles Part Number
E1.3	B, C, N, L	250 - 1600	HR - HR	E1.3 W FP Iu up to 1600 HR HR	1SDA126208R1	1SDA126209R1
E2.3	B, N, S, H	250 - 2000	HR - HR	E2.3 W FP Iu up to 2000 HR HR	1SDA126210R1	1SDA126211R1
E2.3	N, S, H	2500 only	HR - HR	E2.3 W FP Iu=2500 HR HR	1SDA126212R1	1SDA126213R1
E4.3	N, S, H	3200 only	HR - HR	E4.3N-S-H W FP Iu=3200 HR HR	1SDA126214R1	1SDA126215R1
E4.3	N, S, H	4000 only	HR - HR	E4.3N-S-H W FP Iu=4000 HR HR	1SDA126216R1	1SDA126217R1
E4.3	V	2000-4000	HR - HR	E4.3V W FP Iu=2000-4000 HR HR	1SDA126216R1	1SDA126217R1
E6.3	H	4000-5000	HR - HR	E6.3H W FP Iu=4000-5000 HR HR	1SDA126218R1	1SDA126219R1
E6.3/f	H	4000-5000	HR - HR	E6.3H W FP Iu=4000-5000 HR HR		1SDA126220R1
E6.3	H, V	4000-5000	HR - HR	E6.3H-V W FP Iu=4000-5000 HR HR	1SDA126221R1	1SDA126222R1
E6.3/f	H, V	4000-5000	HR - HR	E6.3H-V W FP Iu=4000-5000 HR HR		1SDA126223R1
E6.3	H, V, X	4000-6300	HR - HR	E6.3H-V-X W FP Iu=4000-6300 HR HR	1SDA126224R1	1SDA126225R1
E6.3/f	H, V, X	4000-6300	HR - HR	E6.3H-V-X W FP Iu=4000-6300 HR HR		1SDA126226R1

Note: This table applies regardless of whether the neutral is on the left or right.

0-ARC DISTANCE TOP COVER FOR FIXED PARTS

Size	Type	3 Poles Part Number	4 Poles Part Number
E2.3...E6.3	0-arc distance top cover E2.3...6.2 W FP (1)	1SDA085710R1	

1) Only supplied with the circuit-breaker.
For installation up to 690V AC. Not compatible with conventional AUP, it is necessary to order the following Part Numbers:
AUP 5 contacts 400V E2.3...E6.3 - left set 1SDA126341R1
AUP 5 contacts 24V E2.3...E6.3 - left set 1SDA126342R1
AUP 5 suppl. contacts 400V E2.3...E6.3 - right set 1SDA126343R1
AUP 5 suppl. contacts 24V E2.3...E6.3 - right set 1SDA126344R1

Accessories
Control



FIRST AND SECOND OPENING RELEASE - YO

Size	Type	Part Number
E1.3...E6.3	YO E1.3...E6.3 24 Vac/dc	1SDA126253R1
E1.3...E6.3	YO E1.3...E6.3 30 Vac/dc	1SDA126254R1
E1.3...E6.3	YO E1.3...E6.3 48 Vac/dc	1SDA126255R1
E1.3...E6.3	YO E1.3...E6.3 60 Vac/dc	1SDA126256R1
E1.3...E6.3	YO E1.3...E6.3 110-120 Vac/dc	1SDA126257R1
E1.3...E6.3	YO E1.3...E6.3 120-127 Vac/dc	1SDA126258R1
E1.3...E6.3	YO E1.3...E6.3 220-240 Vac/dc	1SDA126259R1
E1.3...E6.3	YO E1.3...E6.3 240-250 Vac/dc	1SDA126260R1
E1.3...E6.3	YO E1.3...E6.3 380-400 Vac	1SDA126261R1
E1.3...E6.3	YO E1.3...E6.3 415-440 Vac	1SDA126262R1
E1.3...E6.3	YO E1.3...E6.3 480-500 Vac	1SDA126263R1



YO-SENSE FIRST AND SECOND OPENING RELEASE-SENSE

Size	Type	Part Number
E1.3...E6.3	YO-Sense 1st E1.3...E6.3 24-60 Vac/dc	1SDA126264R1
E1.3...E6.3	YO-Sense 1st E1.3...E6.3 110-250 Vac/dc	1SDA126265R1
E1.3...E6.3	YO-Sense 2nd E1.3...E6.3 24-60 Vac/dc	1SDA126266R1
E1.3...E6.3	YO-Sense 2nd E1.3...E6.3 110-250 Vac/dc	1SDA126267R1



FIRST AND SECOND CLOSING RELEASE - YC

Size	Type	Global PN
E1.3...E6.3	YC E1.3...E6.3 24 Vac/dc	1SDA126268R1
E1.3...E6.3	YC E1.3...E6.3 30 Vac/dc	1SDA126269R1
E1.3...E6.3	YC E1.3...E6.3 48 Vac/dc	1SDA126270R1
E1.3...E6.3	YC E1.3...E6.3 60 Vac/dc	1SDA126271R1
E1.3...E6.3	YC E1.3...E6.3 110-120 Vac/dc	1SDA126272R1
E1.3...E6.3	YC E1.3...E6.3 120-127 Vac/dc	1SDA126273R1
E1.3...E6.3	YC E1.3...E6.3 220-240 Vac/dc	1SDA126274R1
E1.3...E6.3	YC E1.3...E6.3 240-250 Vac/dc	1SDA126275R1
E1.3...E6.3	YC E1.3...E6.3 380-400 Vac	1SDA126276R1
E1.3...E6.3	YC E1.3...E6.3 415-440 Vac	1SDA126277R1
E1.3...E6.3	YC E1.3...E6.3 480-500 Vac	1SDA126278R1



YC-SENSE FIRST AND SECOND CLOSING RELEASE-SENSE

Size	Type	Part Number
E1.3...E6.3	YC-Sense 1st E1.3...E6.3 24-60 Vac/dc	1SDA126279R1
E1.3...E6.3	YC-Sense 1st E1.3...E6.3 110-250 Vac/dc	1SDA126280R1
E1.3...E6.3	YC-Sense 2nd E1.3...E6.3 24-60 Vac/dc	1SDA126281R1
E1.3...E6.3	YC-Sense 2nd E1.3...E6.3 110-250 Vac/dc	1SDA126282R1



FIRST AND SECOND UNDERVOLTAGE RELEASE - YU

Size	Type	Part Number
E1.3...E6.3	YU E1.3...E6.3 24 Vac/dc	1SDA126283R1
E1.3...E6.3	YU E1.3...E6.3 30 Vac/dc	1SDA126284R1
E1.3...E6.3	YU E1.3...E6.3 48 Vac/dc	1SDA126285R1
E1.3...E6.3	YU E1.3...E6.3 60 Vac/dc	1SDA126286R1
E1.3...E6.3	YU E1.3...E6.3 110-120 Vac/dc	1SDA126287R1
E1.3...E6.3	YU E1.3...E6.3 120-127 Vac/dc	1SDA126288R1
E1.3...E6.3	YU E1.3...E6.3 220-240 Vac/dc	1SDA126289R1
E1.3...E6.3	YU E1.3...E6.3 240-250 Vac/dc	1SDA126290R1
E1.3...E6.3	YU E1.3...E6.3 380-400 Vac	1SDA126291R1
E1.3...E6.3	YU E1.3...E6.3 415-440 Vac	1SDA126292R1
E1.3...E6.3	YU E1.3...E6.3 440-500 Vac	1SDA126293R1



YU-SENSE FIRST AND SECOND UNDERVOLTAGE RELEASE-SENSE

Size	Type	Part Number
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 24 Vac/dc	1SDA126294R1
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 30 Vac/dc	1SDA126295R1
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 48 Vac/dc	1SDA126296R1
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 60 Vac/dc	1SDA126297R1
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 110-120 Vac/dc	1SDA126298R1
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 120-127 Vac/dc	1SDA126299R1
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 220-240 Vac/dc	1SDA126300R1
E1.3...E6.3	YU-Sense 1st E1.3...E6.3 240-250 Vac/dc	1SDA126301R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 24 Vac/dc	1SDA126302R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 30 Vac/dc	1SDA126303R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 48 Vac/dc	1SDA126304R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 60 Vac/dc	1SDA126305R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 110-120 Vac/dc	1SDA126306R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 120-127 Vac/dc	1SDA126307R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 220-240 Vac/dc	1SDA126308R1
E1.3...E6.3	YU-Sense 2nd E1.3...E6.3 240-250 Vac/dc	1SDA126309R1

ELECTRONIC TIME-DELAY DEVICE FOR UNDERVOLTAGE RELEASE - UVD

Size	Type	Part Number
E1.3...E6.3	UVD 24-30 Vdc	1SDA133771R1
E1.3...E6.3	UVD 48-60 Vac/dc	1SDA133772R1
E1.3...E6.3	UVD 110...125 Vac/dc	1SDA133769R1
E1.3...E6.3	UVD 220...250 Vac/dc	1SDA133770R1

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

Accessories
Control



REMOTE RESET - YR

Size	Type	Part Number
E1.3	YR 24 Vdc E1.3	1SDA073744R1
E1.3	YR 110 Vac/dc E1.3 (1)	1SDA073745R1
E1.3	YR 220 Vac/dc E1.3 (1)	1SDA073746R1
E2.3..E6.3	YR 24 Vdc E2.3...E6.3	1SDA073747R1
E2.3..E6.3	YR 110 Vac/dc E2.3...E6.3 (1)	1SDA073748R1
E2.3..E6.3	YR 220 Vac/Dc E2.3...E6.3 (1)	1SDA073749R1

1) when YR is used in DC, the activation of YR must be done with a maximum impulse time of 50ms.
The YR cannot be powered permanently.





MOTOR - M

Size	Type	Part Number
E1.3	M E1.3 24-30 Vac/dc + S33 M/2 250V	1SDA073708R1
E1.3	M E1.3 48-60 Vac/dc + S33 M/2 250V	1SDA073709R1
E1.3	M E1.3 100-130 Vac/dc + S33 M/2 250V	1SDA073710R1
E1.3	M E1.3 220-250 Vac/dc + S33 M/2 250V	1SDA073711R1
E1.3	M E1.3 380-415 Vac + S33 M/2 250V	1SDA073713R1
E2.3..E6.3	M E2.3...E6.3 24-30 Vac/dc + S33 M/2 400V	1SDA073722R1
E2.3..E6.3	M E2.3...E6.3 48-60 Vac/dc + S33 M/2 400V	1SDA073723R1
E2.3..E6.3	M E2.3...E6.3 100-130 Vac/dc + S33 M/2 400V	1SDA073724R1
E2.3..E6.3	M E2.3...E6.3 220-250 Vac/dc + S33 M/2 400V	1SDA073725R1
E2.3..E6.3	M E2.3...E6.3 380-415 Vac + S33 M/2 400V	1SDA073727R1
E1.3	M E1.3 24-30 Vac/dc + S33 M/2 24V	1SDA073715R1
E1.3	M E1.3 48-60 Vac/dc + S33 M/2 24V	1SDA073716R1
E1.3	M E1.3 100-130 Vac/dc + S33 M/2 24V	1SDA073717R1
E1.3	M E1.3 220-250 Vac/dc + S33 M/2 24V	1SDA073718R1
E1.3	M E1.3 380-415 Vac + S33 M/2 24V	1SDA073720R1
E2.3..E6.3	M E2.3...E6.3 24-30 Vac/dc + S33 M/2 24V	1SDA073729R1
E2.3..E6.3	M E2.3...E6.3 48-60 Vac/dc + S33 M/2 24V	1SDA073730R1
E2.3..E6.3	M E2.3...E6.3 100-130 Vac/dc + S33 M/2 24V	1SDA073731R1
E2.3..E6.3	M E2.3...E6.3 220-250 Vac/dc + S33 M/2 24V	1SDA073732R1



M-SENSE ENABLER (1)

Size	Type	Part Number
E1.3	M-Sense Enabler E1.3 24V-60V	1SDA126310R1
E1.3	M-Sense Enabler E1.3 100V-415V	1SDA126311R1
E2.3..E6.3	M-Sense Enabler E2.3...E6.3 24V-60V	1SDA126312R1
E2.3..E6.3	M-Sense Enabler E2.3...E6.3 100V-415V	1SDA126313R1

1) Ekip Supply Lite is mandatory (in alternative Ekip Supply Evo Modbus TCP)

Accessories

Measurement & Protection

UPGRADES

Size	Type	Part Number
E1.3...E6.3	Non defeatable I protection (1)	1SDA114799R1
E1.3...E6.3	Cybersecure breaker IEC 62443-4-2 (1)	1SDA126529R1
E1.3...E6.3	Predictive maintenance on-premise (2)	1SDA126531R1
E1.3...E6.3	Internal temperature control (2)	1SDA126532R1

1) Only supplied with the circuit-breaker.
2) Only supplied with the circuit-breaker. It is not available with the Neutral on the right-side configuration.



CURRENT SENSOR FOR NEUTRAL CONDUCTOR OUTSIDE THE CIRCUIT-BREAKER (1)

Size	Type	Part Number
E1.3-E2.3	Ext CS N E1.3 - E2.3 2000A	1SDA126314R1
E2.3	Ext CS N E2.3 2500A	1SDA126315R1
E4.3	Ext CS N E4.3 3200A	1SDA126316R1
E4.3-E6.3	Ext CS N E4.3 4000A - E6.3 N 50%	1SDA126317R1
E6.3	Ext CS N E6.3	1SDA126318R1
E1.3-E2.3-E4.3	Ext CS N E1.3-E2.3-E4.3 10mt cable (2)	1SDA126322R1
E6.3	Ext CS N E6.3 10mt cable (2)	1SDA128406R1
E1.3...E6.3	External openable CS N CT100	1SDA126327R1
E1.3...E6.3	External openable CS N CT120	1SDA126328R1
E1.3...E6.3	External openable CS N CT200	1SDA126329R1
E1.3...E6.3	External openable CS N CT290	1SDA126330R1

1) Only loose
2) Only for Ext CS N version



HOMOPOLAR TOROID FOR GEXT PROTECTION (1) (2)

Size	Type	Part Number
E1.3...E6.3	Homopolar toroid E1.3...E6.3 100A	1SDA127755R1
E1.3...E6.3	Homopolar toroid E1.3...E6.3 250A	1SDA127762R1
E1.3...E6.3	Homopolar toroid E1.3...E6.3 400A	1SDA127763R1
E1.3...E6.3	Homopolar toroid E1.3...E6.3 800A	1SDA127764R1
E1.3...E6.3	Homopolar toroid E1.3...E6.3 1200A	1SDA126331R1

1) Only loose
2) The homopolar toroid is an alternative to the toroid for differential protection (RC)



TOROID FOR DIFFERENTIAL PROTECTION (RC RESIDUAL CURRENT PROTECTION) (1) (2)

Size	Type	Part Number
E1.3 & E2.3 3p	Toroid RC E1.3, E2.3 3p	1SDA126332R1
E2.3 4p & E4.3	Toroid RC E2.3 4p, E4.3	1SDA126333R1

1) Only loose
2) The toroid for differential protection is an alternative to the homopolar toroid

Accessories

Measurement & Protection



DEDICATED TERMINAL FOR MODIFIED DIFFERENTIAL GROUND FAULT (MDGF) PROTECTION

Size	Type	Part Number
E1.3...E6.3	MDGF Terminal for fixed circuit-breaker (1)	1SDA114800R1
E1.3...E6.3	MDGF Terminal for withdrawable circuit-breaker (1)	1SDA114798R1

1) The commercial Part Number includes one piece.
Note: External phase current transformers and summing current transformers must be purchased separately. If the terminal for MDGF is bought after sales, FP connector for 3-pin/5-pin terminal block must be ordered

METERING (1)

Size	Type	Part Number
E1.3	Class 0,5 Power&Energy Metering E1.3	1SDA126537R1
E2.3	Class 0,5 Power&Energy Metering E2.3	1SDA126538R1
E4.3	Class 0,5 Power&Energy Metering E4.3	1SDA126539R1
E6.3	Class 0,5 Power&Energy Metering E6.3	1SDA126540R1
E1.3	Class 1 Power&Energy Metering E1.3	1SDA132663R1
E2.3	Class 1 Power&Energy Metering E2.3	1SDA132664R1
E4.3	Class 1 Power&Energy Metering E4.3	1SDA132665R1
E6.3	Class 1 Power&Energy Metering E6.3	1SDA132666R1

1) Only supplied with the circuit-breaker. Not available in case of 4 poles circuit breaker with neutral on right side; not available for application below 400 V; not available when circuit breaker is equipped with external voltage cables; not available for Iu < 250 A.

DIGITAL RATING PLUG (1)

Size	Type	Part Number
E1.3...E6.3	Digital Rating Plug 100A	1SDA126541R1
E1.3...E6.3	Digital Rating Plug 200A	1SDA126542R1
E1.3...E6.3	Digital Rating Plug 250A	1SDA126543R1
E1.3...E6.3	Digital Rating Plug 400A	1SDA126544R1
E1.3...E6.3	Digital Rating Plug 630A	1SDA126546R1
E1.3...E6.3	Digital Rating Plug 800A	1SDA126547R1
E1.3...E6.3	Digital Rating Plug 1000A	1SDA126548R1
E1.3...E6.3	Digital Rating Plug 1250A	1SDA126550R1
E1.3...E6.3	Digital Rating Plug 1600A	1SDA126551R1
E2.3...E6.3	Digital Rating Plug 2000A	1SDA126552R1
E2.3...E6.3	Digital Rating Plug 2500A	1SDA126553R1
E4.3...E6.3	Digital Rating Plug 3200A	1SDA126555R1
E4.3...E6.3	Digital Rating Plug 4000A	1SDA126557R1
E6.3	Digital Rating Plug 5000A	1SDA126558R1

1) Only supplied with the circuit-breaker

Accessories

Signalling & Input/Output









OPEN CLOSED AUXILIARY CONTACTS - AUX

Size	Type	Part Number
E1.3	AUX 4Q (4 Form C) 400V E1.3 (4) (6)	1SDA073750R1
E1.3	AUX 4Q (4 Form C) 24V E1.3 (5)	1SDA073751R1
E1.3	AUX 2Q (2 Form C) 400V + 2Q (2 Form C) 24V E1.3 (6)	1SDA073752R1
E2.3..E6.3	AUX 4Q (4 Form C) 400V E2.3...E6.3 (4)	1SDA073753R1
E2.3..E6.3	AUX 4Q (4 Form C) 24V E2.3...E6.3 (5)	1SDA073754R1
E2.3..E6.3	AUX 2Q (2 Form C) 400V + 2Q (2 Form C) 24V E2.3...E6.3 (6)	1SDA073755R1
E2.3..E6.3	AUX 6Q 400V E2.3...E6.3 F (1) (6)	1SDA126334R1
E2.3..E6.3	AUX 6Q 400V E2.3...E6.3 W (1) (6)	1SDA127790R1
E2.3..E6.3	AUX 6Q 24V E2.3...E6.3 F (1) (5)	1SDA126335R1
E2.3..E6.3	AUX 6Q 24V E2.3...E6.3 W (1) (5)	1SDA127791R1
E2.3..E6.3	AUX 3Q (3 Form C) 400V + 3Q (3 Form C) 24V E2.3...E6.3 F (1)	1SDA126340R1
E2.3..E6.3	AUX 3Q (3 Form C) 400V + 3Q (3 Form C) 24V E2.3...E6.3 W (1)	1SDA127792R1
E1.3	AUX 15Q (15 Form C) 400V E1.3 (2) (3) (6)	1SDA073758R1
E1.3	AUX 15Q (15 Form C) 24V E1.3 (2) (3) (5)	1SDA073759R1
E2.3..E6.3	AUX 15Q (15 Form C) 400V (for fixed/drawout with signalling in racked in) E2.3...E6.3 (2) (3) (6)	1SDA126336R1
E2.3..E6.3	AUX 15Q (15 Form C) 24V (for fixed/drawout with signalling in racked in) E2.3...E6.3 (2) (3) (5)	1SDA126337R1
E2.3..E6.3	AUX 15Q (15 Form C) 400V (for fixed/drawout with signalling in racked in/test isolated) E2.3...E6.3 (2) (3) (6)	1SDA126338R1
E2.3..E6.3	AUX 15Q (15 Form C) 24V (for fixed/drawout with signalling in racked in/test isolated) E2.3...E6.3 (2) (3) (5)	1SDA126339R1

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 E1.3 one of the mounting plates is also needed. For E1.3 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
3) Not compatible with mechanical locks on compartment doors or mechanical interlocks
4) Standard supply with automatic circuit-breakers
5) Max load 0.1 A
6) Max working voltage 400V

Accessories

Signalling & Input/Output



AUXILIARY POSITION CONTACTS - AUP

Size	Type	Part Number
E1.3	AUP 6 contacts 400V E1.3 2I/2T/2E - right set	1SDA073762R1
E1.3	AUP 6 contacts 24V E1.3 2I/2T/2E - right set (1)	1SDA073763R1
E1.3...E6.3	AUP Ekip auxiliary position contact E1.3...E6.3	1SDA073768R1
E2.3...E6.3	AUP 5 contacts 400V E2.3...E6.3 2I1T2E - left set (2)	1SDA126341R1
E2.3...E6.3	AUP 5 contacts 24V E2.3...E6.3 2I1T2E - left set (1)	1SDA126342R1
E2.3...E6.3	AUP 5 contacts 400V E2.3...E6.3 2I1T2E - right set (2)	1SDA126343R1
E2.3...E6.3	AUP 5 contacts 24V E2.3...E6.3 2I1T2E - right set (1)	1SDA126344R1
E2.3...E6.3	AUP 5 contacts 400V E2.3..E6.3 1I3T1E - right set (2)	1SDA126345R1
E2.3...E6.3	AUP 5 contacts 400V E2.3..E6.3 2I1T2E - left set Fast Contact (2)	1SDA126346R1
E2.3...E6.3	AUP 5 contacts 24V E2.3..E6.3 2I1T2E - left set Fast Contact (1)	1SDA126347R1
E2.3...E6.3	AUP 5 contacts 400V E2.3..E6.3 4I/1E - left set Fast Contact (2)	1SDA126348R1
E2.3...E6.3	AUP 5 contacts 24V E2.3..E6.3 4I/1E - left set Fast Contact (1)	1SDA126349R1
E2.3...E6.3	AUP 5 contacts. 400V E2.3...E6.3 2I1T2E - right set Fast Contact (2) (3)	1SDA126350R1
E2.3...E6.3	AUP 5 contacts 24V E2.3...E6.3 2I1T2E - right set Fast Contact (1) (3)	1SDA126351R1
E2.3...E6.3	AUP 5 contacts 400Vac E2.3..E6.3 1I3T1E - right set Fast Contact (2) (3)	1SDA126352R1

1) Max load 0.1 A
2) Max working voltage 400V
3) Right Fast AUP is not compatible with mechanical interlocks, 15Q, DLC and right DLP



READY TO CLOSE SIGNALLING CONTACT - RTC

Size	Type	Part Number
E1.3	RTC 250V E1.3	1SDA126353R1
E1.3	RTC 24V E1.3	1SDA126354R1
E1.3	RTC Ekip 24V E1.3	1SDA126355R1
E2.3...E6.3	RTC 250V E2.3...E6.3	1SDA126356R1
E2.3...E6.3	RTC 24V E2.3...E6.3	1SDA126357R1
E2.3...E6.3	RTC Ekip 24V E2.3...E6.3	1SDA126358R1

CONTACT SIGNALLING TRIPPING OF EKIP PROTECTION TRIP UNIT - S51

Size	Type	Part Number
E1.3	S51 / bell alarm 250V E1.3 (1)	1SDA073776R1
E1.3	S51 / bell alarm 24V E1.3	1SDA073777R1
E2.3...E6.3	S51 / bell alarm 250V E2.3...E6.3 (1)	1SDA073778R1
E2.3...E6.3	S51 / bell alarm 24V E2.3...E6.3	1SDA073779R1
E2.3...E6.3	250V E2.3...E6.3	1SDA085699R1
E2.3...E6.3	24V E2.3...E6.3	1SDA085700R1

1) Standard supply with automatic circuit-breakers



TERMINAL BLOCKS FOR AUXILIARY CONNECTION

Size	Type	Part Number
E1.3...E6.3	3 pin terminal blocks 10 pcs (1)	1SDA073906R1
E1.3...E6.3	3 pin terminal blocks 8 pcs INST (2)	1SDA114779R1
E1.3...E6.3	3 pin terminal blocks 18 pcs INST (2)	1SDA114780R1
E1.3...E6.3	Replacement 3-pin to 5-pin terminals INST (2) (3)	1SDA126359R1
E1.3...E6.3	5 pin terminal blocks 10pcs (1)	1SDA126360R1
E1.3...E6.3	5 pin terminal blocks 8pcs INST (2)	1SDA126361R1
E1.3...E6.3	5 pin terminal blocks 18pcs INST (2)	1SDA126362R1

1) Only as Loose part
2) Only supplied with the circuit-breaker
3) All 3-pin terminal blocks are substituted with 5-pin terminal blocks



FIXED PART CONNECTOR

Size	Type	Part Number
E1.3...E6.3	FP connector for 3-pin/5-pin terminal block	1SDA134296R1

Accessories

Safety & IP Protection



MECHANICAL OPERATION COUNTER - MOC

Size	Type	Part Number
E1.3	MOC mechanical operation counter (1)	1SDA073780R1
E2.3...E6.3	MOC mechanical operation counter	1SDA073781R1

1) Available with motor, for installation without Motor the support 1SDA126565R1 is required



KEY LOCK IN OPEN POSITION - KLC

Size	Type	Part Number
E1.3	1st KLC-D Key lock open E1.3	1SDA126363R1
E1.3	2nd KLC-D Key lock open E1.3	1SDA126364R1
E1.3	KLC-S Key lock open N.20005 E1.3	1SDA126365R1
E1.3	KLC-S Key lock open N.20006 E1.3	1SDA126366R1
E1.3	KLC-S Key lock open N.20007 E1.3	1SDA126367R1
E1.3	KLC-S Key lock open N.20008 E1.3	1SDA126368R1
E1.3	KLC-S Key lock open N.20009 E1.3	1SDA126369R1
E1.3	1st KLC-A Key lock open Castell E1.3 (1) (2)	1SDA126371R1
E1.3	1st KLC-A Key lock open Kirk - STI E1.3 (1) (3)	1SDA126372R1
E1.3	1st KLC-D Key lock open Ronis E1.3	1SDA126370R1
E2.3...E6.3	1st KLC-D Key lock open E2.3...E6.3	1SDA126373R1
E2.3...E6.3	2nd KLC-D Key lock open E2.3...E6.3	1SDA126374R1
E2.3...E6.3	KLC-S Key lock open N.20005 E2.3..E6.3	1SDA126375R1
E2.3...E6.3	KLC-S Key lock open N.20006 E2.3..E6.3	1SDA126376R1
E2.3...E6.3	KLC-S Key lock open N.20007 E2.3..E6.3	1SDA126377R1
E2.3...E6.3	KLC-S Key lock open N.20008 E2.3..E6.3	1SDA126378R1
E2.3...E6.3	KLC-S Key lock open N.20009 E2.3..E6.3	1SDA126379R1
E2.3...E6.3	1st KLC-A Key lock open Castell E2.3...E6.3 (1) (2)	1SDA126382R1
E2.3...E6.3	1st KLC-A Key lock open Kirk-STI E2.3..E6.3 (3)	1SDA126383R1
E2.3...E6.3	2nd KLC-A Key lock open Kirk-STI E2.3..E6.3 (1) (3)	1SDA126384R1
E2.3...E6.3	1st KLC-D Key lock open Ronis E2.3..E6.3	1SDA126380R1
E2.3...E6.3	2nd KLC-D Key lock open Ronis E2.3..E6.3	1SDA126381R1

1) Arrangement only
2) If purchased as a loose supply, the dedicated cover must also be ordered separately. Compatible models: Castell PDS05693-FSB, PDS05693-FSS, PDS05693-QB, PDS05693-QS
3) Compatible models: STI ABA90GEL5000 - STI HBA90GPS5000



PADLOCKS IN OPEN POSITION - PLC

Size	Type	Part Number
E1.3	1st PLC E1.3 Padlocks open pos. left	1SDA126385R1
E1.3	2nd PLC E1.3 Padlocks open pos. right	1SDA126386R1
E2.3...E6.3	1st PLC E2.3..E6.3 Padlocks open pos. left	1SDA126387R1
E2.3...E6.3	2nd PLC E2.3..E6.3 Padlocks open pos. right	1SDA126388R1

Note: The lock shackle/shank diameter must match for proper operation as indicated in the Instruction Manual.
The PLC is an alternative to the protection device for opening and closing pushbuttons (PBC)

FLOOR FIXING PLATE - F (1)

Size	Type	Part Number
E1.3	Floor fixing plate for fixed unit	1SDA076020R1

1) Only available with Motor, for installation without Motor the support 1SDA126565R1 is required

Accessories

Safety & IP Protection



KEY LOCK IN RACKED IN / TEST / RACKED OUT POSITION - KLP

Size	Type	Part Number
E1.3	KLP-D Key lock racked in/out E1.3 1st key	1SDA126389R1
E1.3	KLP-S Key lock racked in/out N.20005 E1.3 1st key	1SDA126390R1
E1.3	KLP-S Key lock racked in/out N.20006 E1.3 1st key	1SDA126391R1
E1.3	KLP-S Key lock racked in/out N.20007 E1.3 1st key	1SDA126392R1
E1.3	KLP-S Key lock racked in/out N.20008 E1.3 1st key	1SDA126393R1
E1.3	KLP-S Key lock racked in/out N.20009 E1.3 1st key	1SDA126394R1
E1.3	KLP-D Key lock racked in/out E1.3 2nd key	1SDA126395R1
E1.3	KLP-S Key lock racked in/out N.20005 E1.3 2nd key	1SDA126396R1
E1.3	KLP-S Key lock racked in/out N.20006 E1.3 2nd key	1SDA126397R1
E1.3	KLP-S Key lock racked in/out N.20007 E1.3 2nd key	1SDA126398R1
E1.3	KLP-S Key lock racked in/out N.20008 E1.3 2nd key	1SDA126399R1
E1.3	KLP-S Key lock racked in/out N.20009 E1.3 2nd key	1SDA126400R1
E1.3	KLP-A Key lock racked in/out Kirk-STI E1.3 1st key (4)	1SDA126401R1
E1.3	KLP-A Key lock racked in/out Kirk-STI E1.3 2nd key (4)	1SDA126402R1
E1.3	KLP-A Key lock racked in/out Castell E1.3 1st key (2) (3)	1SDA126403R1
E1.3	KLP-A Key lock racked in/out Castell E1.3 2nd key (2) (3)	1SDA126404R1
E1.3	KLP-A Key lock racked in/out Ronis E1.3 1st key	1SDA126405R1
E1.3	KLP-A Key lock racked in/out Ronis E1.3 2nd key	1SDA126406R1
E2.3...E6.3	KLP-D Key lock racked in/out E2.3...E6.3 1st key	1SDA126407R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20005 E2.3...E6.3 1st key	1SDA126408R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20006 E2.3...E6.3 1st key	1SDA126409R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20007 E2.3...E6.3 1st key	1SDA126410R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20008 E2.3...E6.3 1st key	1SDA126411R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20009 E2.3...E6.3 1st key	1SDA126412R1
E2.3...E6.3	KLP-D Key lock racked in/out E2.3...E6.3 2nd key	1SDA126413R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20005 E2.3...E6.3 2nd key	1SDA126414R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20006 E2.3...E6.3 2nd key	1SDA126415R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20007 E2.3...E6.3 2nd key	1SDA126416R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20008 E2.3...E6.3 2nd key	1SDA126417R1
E2.3...E6.3	KLP-S Key lock racked in/out N.20009 E2.3...E6.3 2nd key	1SDA126418R1
E2.3...E6.3	KLP-A Key lock racked in/out Kirk-STI E2.3...E6.3 1st key (2) (4)	1SDA126419R1
E2.3...E6.3	KLP-A Key lock racked in/out Kirk-STI E2.3...E6.3 2nd key (2) (4)	1SDA126420R1
E2.3...E6.3	KLP-A Key lock racked in/out Castell E2.3...E6.3 1st key (1) (2) (3)	1SDA126421R1
E2.3...E6.3	KLP-A Key lock racked in/out Castell E2.3...E6.3 2nd key (1) (2) (3)	1SDA126422R1
E2.3...E6.3	KLP-D Key lock racked in/out Ronis E2.3/E6.3 1st key	1SDA126423R1
E2.3...E6.3	KLP-D Key lock racked in/out Ronis E2.3/E6.3 2nd key	1SDA126424R1

Note: 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
3) Compatible models: Castell PDS05693-FSB, PDS05693-FSS, PDS05693-QB, PDS05693-QS
4) Compatible models: STI ABA90GEL5000 - STI HBA90GPS5000 - KIRK KCAM00011



ACCESSORY FOR SUPPLEMENTARY LOCK IN RACKED-OUT POSITION

Size	Type	Part Number
E1.3	Suppl. lock in racked out E1.3 (1)	1SDA073838R1
E2.3…E6.3	Suppl. lock in racked out E2.3…E6.3	1SDA073839R1

1) Not compatible with Castell KLP

PADLOCK IN RACKED IN / TEST / RACKED OUT POSITION - PLP

Size	Type	Part Number
E1.3	PLP Padlock racked in/out E1.3	1SDA073840R1
E2.3…E6.3	PLP Padlock racked in/out E2.3…E6.3	1SDA126425R1

Note: The lock shackle/shank diameter must match for proper operation.



LOCK FOR RACKING IN / RACKING OUT THE MOBILE PART WHEN THE DOOR IS OPEN - DLR (1)

Size	Type	Part Number
E1.3…E6.3	DLR E2.3…E6.3	1SDA073845R1

1) Only as loose part



LOCK TO PREVENT DOOR OPENING WHEN THE CIRCUIT-BREAKER IS IN RACKED IN / TEST POSITION - DLP (1)

Size	Type	Part Number
E1.3	DLP E1.3	1SDA126426R1
E2.3…E6.3	DLP E2.3…E6.3 Left	1SDA126427R1
E2.3…E6.3	DLP E2.3…E6.3 Right (2)	1SDA128407R1

Note: 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);
1) Only as loose part
2) Right DLP is not compatible with mechanical interlocks, 15Q, DLC and fast AUP right

LOCK TO PREVENT DOOR OPENING WHEN THE CIRCUIT-BREAKER IS IN A CLOSED POSITION - DLC

Size	Type	Part Number
E1.3	DLC Interlock cable door for fixed part withdrawable E1.3	1SDA081034R1
E1.3	DLC Interlock direct door for fixed to wall E1.3	1SDA079779R1
E1.3	DLC Interlock direct door for fixed part withdrawable E1.3	1SDA079781R1
E2.3…E6.3	DLC Interlock direct door E2.3…E6.3 F (1)	1SDA126428R1
E2.3…E6.3	DLC Interlock direct door E2.3…E6.3 W (1)	1SDA129641R1

Note: 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);
1) To be ordered with lever for interlock [group 2] and support for interlock [1SDA126457R1]

Accessories

Safety & IP Protection



PROTECTION DEVICE FOR OPENING AND CLOSING PUSHBUTTONS - PBC

Size	Type	Part Number
E1.3	PBC Op/Cl Pushbutton Protection sp. key E1.3	1SDA126429R1
E1.3	PBC Op/Cl Pushbutton Protection PL D=4mm/0.15" E1.3	1SDA126430R1
E1.3	PBC Op/Cl Pushbutton Protection PL D=7mm/0.27" E1.3	1SDA126431R1
E1.3	PBC Op/Cl Pushbutton Protection PL D=8mm/0.31" E1.3	1SDA126432R1
E2.3...E6.3	PBC Op/Cl Pushbutton Protection sp. key E2.3...E6.3	1SDA126433R1
E2.3...E6.3	PBC Op/Cl Pushbutton Protection PL D=4mm/0.15" E2.3...E6.3	1SDA126435R1
E2.3...E6.3	PBC Op/Cl Pushbutton Protection PL D=7mm/0.27" E2.3...E6.3	1SDA126436R1
E2.3...E6.3	PBC Op/Cl Pushbutton Protection PL D=8mm/0.31" E2.3...E6.3	1SDA126437R1
E2.3...E6.3	PBC2 Closing Pushbutton Protection E2.3...E6.3	1SDA126434R1

Note: The lock shackle/shank diameter must match for proper operation



CIRCUIT-BREAKER FLANGE

Size	Type	Part Number
E1.3	IP30 flange E1.3 Fixed	1SDA073862R1
E1.3	IP30 flange E1.3 Drawout	1SDA073863R1
E2.3...E6.3	IP30 flange E2.3...E6.3 Fixed	1SDA073864R1
E2.3...E6.3	IP30 flange E2.3...E6.3 Drawout	1SDA073865R1
E1.3	IP30 blind door E1.3	1SDA126438R1
E2.3...E6.3	IP30 blind door E2.3...E6.3	1SDA126439R1
E1.3	IP54 flange, different keys E1.3 (1)	1SDA073866R1
E2.3...E6.3	IP54 flange, different keys E2.3...E6.3 (1)	1SDA073867R1
E1.3	IP54 flange, key N.20005 E1.3 (1)	1SDA073868R1
E2.3...E6.3	IP54 flange, key N.20005 E2.3...E6.3 (1)	1SDA073869R1

1) Only as loose part

TRIP UNIT COVER

Size	Type	Part Number
E1.3	Closed trip unit cover E1.3	1SDA126440R1
E2.3...E6.3	Sealable closed trip unit cover E2.3...E6.3	1SDA126441R1
E2.3...E6.3	Closed trip unit cover E2.3...E6	1SDA128250R1



REMOTE RACKING DEVICE - RRD

Size	Type	Part Number
E1.3	RRD Motor 110-220 Vac/dc (2)	1SDA126190R1
E1.3	Kit for fixing RRD on E1.3 (1)	1SDA126191R1
E2.3...E6.3	RRD Motor 110-220Vac/dc (2)	1SDA126192R1
E2.3...E6.3	Kit for fixing RRD on E2.3...E6.3 (1)	1SDA126193R1
E1.3...E6.3	RRD controller	1SDA126194R1

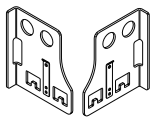
1) One kit per breaker needed
2) It includes Motor, power supply and controller



REMOTE RACKING DEVICE EMBEDDED - RRD-E (1)

Size	Type	Part Number
E4.3	RRD Embedded 24 V	1SDA127015R1
E6.3	RRD Embedded 24 V	1SDA127016R1

1) Only supplied with the circuit-breaker or the switch disconnector



LIFTING PLATES (1)

Size	Poles	IEC/UL	Version	Part Number	Type spare	Min quantity
E1.3	3p; 4p	IEC/UL	F; W (MP)	1SDA126442R1		1

1) Only supplied with the circuit-breaker



HIGH OR LOW TERMINAL COVERS - HTC/LTC

		3 Poles	4 Poles
Size	Type	Part Number	Part Number
E1.3	HTC high terminal covers E1.3 2pcs	1SDA126443R1	1SDA126444R1
E1.3	LTC low terminal covers E1.3 2pcs	1SDA126445R1	1SDA126446R1

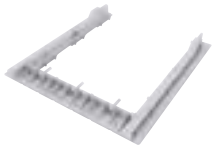
Accessories

Safety & IP Protection



SEPARATORS / PHASE BARRIERS - PB (1)

Size	Type	Part Number
E1.3	PB H=100mm/3.94" 4pcs E1.3 Fixed 3P	1SDA073877R1
E1.3	PB H=100mm/3.94" 6pcs E1.3 Fixed 4P	1SDA073878R1
E1.3	PB H=200mm/7.87" 4pcs E1.3 Fixed 3P	1SDA073879R1
E1.3	PB H=200mm/7.87" 6pcs E1.3 Fixed 4P	1SDA073880R1
E1.3	PB 2pcs E1.3 Drawout 3P	1SDA076164R1
E1.3	PB 3pcs E1.3 Drawout 4P	1SDA076165R1
E2.3...E6.3	PB 2pcs E2.3...E6.3 Fixed 3P	1SDA076166R1
E2.3...E6.3	PB 3pcs E2.3...E6.3 Fixed 4P	1SDA076167R1
E2.3...E6.3	PB 2pcs E2.3...E6.3 Drawout 3P	1SDA076168R1
E2.3...E6.3	PB 3pcs E2.3...E6.3 Drawout 4P	1SDA076169R1



BACK FLANGE (1)

Size	Type	Part Number
E1.3	Back Flange for E1.3 FP 3p	1SDA129642R1
E1.3	Back Flange for E1.3 FP 4p	1SDA129643R1
E2.3	Back Flange for E2.3 F 3p	1SDA126567R1
E2.3	Back Flange for E2.3 F 4p	1SDA126568R1
E2.3	Back Flange for E2.3 W 3p	1SDA126573R1
E2.3	Back Flange for E2.3 W 4p	1SDA126574R1
E4.3	Back Flange for E4.3 F 3p	1SDA126569R1
E4.3	Back Flange for E4.3 F 4p	1SDA126570R1
E4.3	Back Flange for E4.3 W 3p	1SDA126575R1
E4.3	Back Flange for E4.3 W 4p	1SDA126576R1
E6.3	Back Flange for E6.3 F 3p	1SDA126571R1
E6.3	Back Flange for E6.3 F 4p	1SDA126572R1
E6.3	Back Flange for E6.3 W 3p	1SDA126577R1
E6.3	Back Flange for E6.3 W 4p	1SDA126578R1
E6.3	Back Flange for E6.3 W 4p/f	1SDA127788R1

1) Back flanges are not compatible with front terminals.

Accessories
Interlocks

CABLES FOR MECHANICAL INTERLOCK [GROUP 1]

Size	Type	Part Number
E1.3...E6.3	Type A horizontal	1SDA126447R1
E2.3..E6.3	Type B,C,D horizontal	1SDA126448R1
E1.3...E6.3	Type A vertical	1SDA126449R1
E2.3..E6.3	Type B,C,D vertical	1SDA126450R1

Note: One 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]

		3 Poles	4 Poles
Size	Type	Part Number	Part Number
E2.3	Lever for mechanical interlock	1SDA126451R1	1SDA126451R1
E4.3	Lever for mechanical interlock	1SDA126452R1	1SDA126452R1
E6.3	Lever for mechanical interlock	1SDA126453R1	1SDA126454R1

Note: The lever for the mechanical interlock is not required for E1.3

SUPPORT FOR MECHANICAL INTERLOCK OF FIXED CIRCUIT-BREAKER [GROUP 3]

Size	Type	Part Number
E1.3	Type A - floor mounted	1SDA126455R1
E1.3	Type A - wall mounted	1SDA126456R1
E2.3...E6.3	Type A / B / D	1SDA126457R1
E2.3...E6.3	Type C	1SDA126458R1

SUPPORT FOR MECHANICAL INTERLOCK OF FIXED PART [GROUP 4]

Size	Type	Part Number
E1.3	Type A	1SDA126459R1
E2.3...E6.3	Type A / B / D	1SDA126457R1
E2.3...E6.3	Type C	1SDA126458R1

Accessories
Connectivity

OPTIONS FOR EKIP AWARE

Size	Type	Part Number
E1.3...E6.3	No Wireless Connectivity (2)	1SDA128405R1
E1.3...E6.3	Upper internal installed voltage cables (1)	1SDA127756R1
E1.3...E6.3	External installed voltage cables (1)	1SDA127757R1

1) All Ekip Aware trip units have lower voltage cables installed by default
2) It means Bluetooth and NFC disabled. Only supplied with the circuit-breaker



EXTERNAL CARTRIDGE

Size	Type	Part Number
E1.3...E6.3	Ekip Cartridge	1SDA127787R1





POWER SUPPLY

Size	Type	Part Number
E1.3...E6.3	Ekip Supply Lite 24-240VAC/DC	1SDA126470R1
E1.3...E6.3	Ekip Supply Evo Modbus TCP	1SDA126472R1
E1.3...E6.3	Ekip Busbars Supply (3) (4)	1SDA126493R1
E1.3	Voltage cable for neutral on right side L1 L2 L3 N - E1.3 (1) (2)	1SDA127758R1
E2.3	Voltage cable for neutral on right side L1 L2 L3 N - E2.3 (1) (2)	1SDA127759R1
E4.3	Voltage cable for neutral on right side L1 L2 L3 N - E4.3 (1) (2)	1SDA127760R1
E6.3	Voltage cable for neutral on right side L1 L2 L3 N - E6.3 (1) (2)	1SDA076261R1

1) Suitable for circuit-breakers with neutral on the right side (L1 L2 L3 N)
2) Select the Measuring Digital Upgrade to activate measurements
3) Voltage measurement cables always present
4) Only supplied with the circuit-breaker



COMMUNICATION MODULES

Size	Type	Part Number
E1.3...E6.3	Ekip Com Modbus RTU	1SDA126471R1
E1.3...E6.3	Ekip Com Profibus	1SDA126473R1
E1.3...E6.3	Ekip Com Profinet (1)	1SDA126474R1
E1.3...E6.3	Ekip Com EtherNet/IP (1)	1SDA126475R1
E1.3...E6.3	Ekip Com IEC61850 (1)	1SDA126476R1
E1.3...E6.3	Modbus TCP Security Protocol (1) (2)	1SDA126478R1

1) Ekip Supply Evo Modbus TCP mandatory
2) Only supplied with the circuit breaker. It is according to Modbus Security Protocol Specification



SIGNALLING MODULES

Size	Type	Part Number
E1.3...E6.3	Ekip Signalling 2K-1	1SDA126481R1
E1.3...E6.3	Ekip Signalling 2K-2	1SDA126482R1
E2.3..E6.3	Ekip Signalling 4K (1)	1SDA126484R1
E1.3...E6.3	Ekip Signalling 10K Link (2)	1SDA126485R1
E1.3...E6.3	Ekip Signalling Modbus TCP (2)	1SDA082485R1

1) Ekip 4K is not available for the E1.3. It is an alternative to the AUX 6Q (6 Form C) auxiliary contacts unit on other frames
2) Only loose



TEMPERATURE MODULES

Size	Type	Part Number
E1.3...E6.3	Ekip Temperature 4T-1 (1)	1SDA126487R1
E1.3...E6.3	Ekip Temperature 4T-2 (1)	1SDA126488R1
E1.3...E6.3	T-sense Ambient	1SDA126489R1
E1.3...E6.3	T-sense Busbars	1SDA126490R1
E1.3...E6.3	External Probe PT1000 3mt (2)	1SDA085695R1

1) External probe PT100/PT1000 not supplied
2) For busbar applications only. The Part Number includes one loose single probe.



PROTECTION MODULES

Size	Type	Part Number
E1.3...E6.3	Ekip RELT	1SDA126483R1
E1.3...E6.3	Ekip Arc-Flash 6F-1	1SDA126491R1
E1.3...E6.3	Ekip Arc-Flash 6F-2	1SDA128420R1
E1.3...E6.3	Light-Sense Detector (1)	1SDA126492R1
E1.3...E6.3	Light&Pressure-Sense Detector (1)	1SDA128423R1

1) Only loose



SYNCHROCHECK MODULE

Size	Type	Part Number
E1.3...E6.3	Ekip Synchrocheck	1SDA126494R1

CYBERSECURE MODULES (1)

Size	Type	Part Number
E1.3...E6.3	Ekip Supply Evo Modbus TCP Secure	1SDA128409R1
E1.3...E6.3	Ekip Com Modbus RTU Secure	1SDA128408R1
E1.3...E6.3	Ekip Com Profibus Secure	1SDA128410R1
E1.3...E6.3	Ekip Com Profinet Secure	1SDA128411R1
E1.3...E6.3	Ekip Com EtherNet/IP™ Secure	1SDA128412R1
E1.3...E6.3	Ekip Com IEC61850 Secure	1SDA128413R1
E1.3...E6.3	Ekip Signalling 2K-1 Secure	1SDA128415R1
E1.3...E6.3	Ekip Signalling 2K-2 Secure	1SDA128416R1
E1.3...E6.3	Ekip RELT Secure	1SDA128417R1
E1.3...E6.3	Ekip Synchrocheck Secure	1SDA128424R1
E1.3...E6.3	Ekip Temperature 4T-1 Secure	1SDA128418R1
E1.3...E6.3	Ekip Temperature 4T-2 Secure	1SDA128419R1
E1.3...E6.3	Ekip Arc-Flash 6F-1 Secure	1SDA128421R1
E1.3...E6.3	Ekip Arc-Flash 6F-2 Secure	1SDA128422R1
E1.3...E6.3	Ekip Signalling 10K Link Secure	1SDA133779R1

1) To comply with IEC 62443-4-2, both cybersecure modules and cybersecure circuit-breakers (1SDA126529R1) must be purchased together.

Accessories
Displaying





DISPLAYING SYSTEM

Size	Type	Part Number
E1.3...E6.3	Lite Panel	1SDA114809R1
E1.3...E6.3	Lite Panel Pro	1SDA123321R1

Accessories

Digital upgrades

PROTECTION UPGRADES

Size	Type	Part Number
E1.3...E6.3	Protection S (1)	1SDA126499R1
E1.3...E6.3	Protection G (1)	1SDA126507R1
E1.3...E6.3	L protection OFF setting	1SDA126561R1
E1.3...E6.3	RC protection	1SDA126562R1
E1.3...E6.3	Advanced MDGF	1SDA126512R1
E1.3...E6.3	Advanced Current Protections	1SDA126513R1
E1.3...E6.3	Voltage Protection	1SDA126514R1
E1.3...E6.3	Frequency Protection	1SDA126515R1
E1.3...E6.3	Power Protection	1SDA126516R1
E1.3...E6.3	Directional protection	1SDA126517R1
E1.3...E6.3	Advanced Voltage Protection	1SDA126518R1
E1.3...E6.3	Dual Setting	1SDA126524R1
E1.3...E6.3	Triple Setting	1SDA126525R1

1) Only loose from MarketPlace

POWER QUALITY UPGRADES

Size	Type	Part Number
E1.3...E6.3	Measuring	1SDA126519R1
E1.3...E6.3	Network Analyzer	1SDA126520R1
E1.3...E6.3	Datalogger Pro (1)	1SDA126522R1

1) SD card must be purchased separately

DIGITAL TOOLS UPGRADE

Size	Type	Part Number
E1.3...E6.3	Remote Control (1)	1SDA126526R1
E1.3...E6.3	Test Area PRO (2)	1SDA126528R1

1) Only for EPiC mobile
2) Only for Ekip Connect

Accessories

Digital upgrades

POWER MANAGEMENT UPGRADES

Size	Type	Part Number
E1.3...E6.3	Power Controller	1SDA126523R1
E1.3...E6.3	Adaptive Load Shedding	1SDA126530R1
E1.3...E6.3	Custom logic	1SDA126527R1

COMMUNICATION UPGRADES

Size	Type	Part Number
E1.3...E6.3	Com Link (1)	1SDA126479R1

1) Ekip Supply Evo Modbus TCP is mandatory

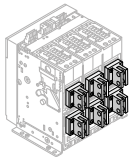
DIGITAL RATING PLUG UPGRADE

Size	Type	Part Number
E1.3...E6.3	Flexible Digital Rating Plug (1) (2)	1SDA126623R1
E1.3...E6.3	Rating Plug Card (3)	1SDA128425R1

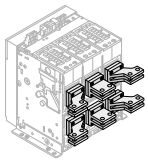
1) When the Digital Rating Plug is changed, Rating Plug card must be purchased
2) Only loose, with MarketPlace
3) The Rating Plug card includes a set of stickers with different In values, which can be applied to the circuit breaker when replacing the Digital Rating Plug.

Accessories

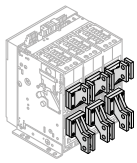
Power Connections



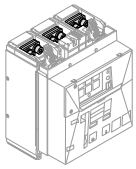
Rear orientable terminal - HR VR



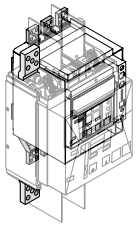
Horizontal rear terminal - SHR



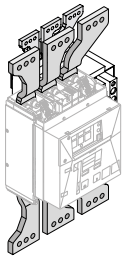
Vertical rear spread terminal - SVR



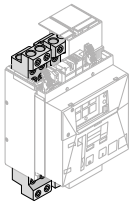
Front terminal - F



Extended front terminal - EF



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

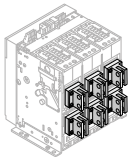
TERMINALS KIT FOR FIXED CIRCUIT-BREAKER ONLY SUPPLIED WITH THE BREAKER AND LOOSE

				Only supplied with the breaker		Loose	
Size	**Version**	**Iu max**	**Type**	**3 Poles**	**4 Poles**	**3 Poles**	**4 Poles**
E1.3	F	1600	Kit EF Upper (2)	1SDA073963R1	1SDA073964R1	1SDA073967R1	1SDA073968R1
E1.3	F	1600	Kit EF Lower (2)	1SDA073965R1	1SDA073966R1	1SDA073967R1	1SDA073968R1
E1.3	F	1600	Kit F (2)			1SDA073973R1	1SDA073974R1
E1.3	F	1600	Kit ES Upper (2)	1SDA073975R1	1SDA073976R1	1SDA073979R1	1SDA073980R1
E1.3	F	1600	Kit ES Lower (2)	1SDA073977R1	1SDA073978R1	1SDA076076R1	1SDA073980R1
E1.3	F	1600	Kit HR Upper (2)	1SDA073981R1	1SDA073982R1	1SDA073989R1	1SDA073990R1
E1.3	F	1600	Kit HR Lower (2)	1SDA073983R1	1SDA073984R1	1SDA073989R1	1SDA073990R1
E1.3	F	1600	Kit VR Upper (2)	1SDA073985R1	1SDA073986R1	1SDA073989R1	1SDA073990R1
E1.3	F	1600	Kit VR Lower (2)	1SDA073987R1	1SDA073988R1	1SDA073989R1	1SDA073990R1
E1.3	F	1600	Kit FC CuAl 4x240 mm² Upper (2)	1SDA073997R1	1SDA073998R1	1SDA074001R1	1SDA074002R1
E1.3	F	1600	Kit FC CuAl 4x240 mm² Lower (2)	1SDA073999R1	1SDA074000R1	1SDA074001R1	1SDA074002R1
E2.3	F	2000	Kit HR Upper (1) (3)			1SDA074007R1	1SDA074008R1
E2.3	F	2000	Kit HR Lower (1) (3)			1SDA074007R1	1SDA074008R1
E2.3	F	2000	Kit VR Upper (3)	1SDA074003R1	1SDA074004R1	1SDA074007R1	1SDA074008R1
E2.3	F	2000	Kit VR Lower (3)	1SDA074005R1	1SDA074006R1	1SDA074007R1	1SDA074008R1
E2.3	F	2500	Kit HR Upper (1)			1SDA074013R1	1SDA074014R1
E2.3	F	2500	Kit HR Lower (1)			1SDA074013R1	1SDA074014R1
E2.3	F	2500	Kit VR Upper	1SDA074009R1	1SDA074010R1	1SDA074013R1	1SDA074014R1
E2.3	F	2500	Kit VR Lower	1SDA074011R1	1SDA074012R1	1SDA074013R1	1SDA074014R1
E2.3	F	2000	Kit SHR Upper	1SDA074045R1	1SDA074046R1	1SDA074049R1	1SDA074050R1
E2.3	F	2000	Kit SHR Lower	1SDA074047R1	1SDA074048R1	1SDA074049R1	1SDA074050R1
E2.3	F	2500	Kit SHR Upper	1SDA074051R1	1SDA074052R1	1SDA074055R1	1SDA074056R1
E2.3	F	2500	Kit SHR Lower	1SDA074053R1	1SDA074054R1	1SDA074055R1	1SDA074056R1
E2.3	F	2000	Kit SVR Upper	1SDA074057R1	1SDA074058R1	1SDA074061R1	1SDA074068R1
E2.3	F	2000	Kit SVR Lower	1SDA074059R1	1SDA074060R1	1SDA074061R1	1SDA074068R1
E2.3	F	2500	Kit SVR Upper	1SDA074063R1	1SDA074064R1	1SDA074067R1	1SDA074062R1
E2.3	F	2500	Kit SVR Lower	1SDA074065R1	1SDA074066R1	1SDA074067R1	1SDA074062R1
E2.3	F	2500	Kit F Upper (2)	1SDA074118R1	1SDA074119R1	1SDA074122R1	1SDA074123R1
E2.3	F	2500	Kit F Lower (2)	1SDA074120R1	1SDA074121R1	1SDA074124R1	1SDA074125R1
E2.3	F	2500	Kit LHR Upper	1SDA115515R1	1SDA115530R1	1SDA115527R1	1SDA115543R1
E2.3	F	2500	Kit LHR Lower	1SDA115516R1	1SDA115532R1	1SDA115527R1	1SDA115543R1
E2.3	F	2500	Kit LVR Upper	1SDA117296R1	1SDA117308R1	1SDA115527R1	1SDA115543R1
E2.3	F	2500	Kit LVR Lower	1SDA117297R1	1SDA117309R1	1SDA115527R1	1SDA115543R1
E4.3	F	3200	Kit HR Upper (1)			1SDA074019R1	1SDA074020R1
E4.3	F	3200	Kit HR Lower (1)			1SDA074019R1	1SDA074020R1
E4.3	F	3200	Kit VR Upper	1SDA074015R1	1SDA074016R1	1SDA074019R1	1SDA074020R1
E4.3	F	3200	Kit VR Lower	1SDA074017R1	1SDA074018R1	1SDA074019R1	1SDA074020R1
E4.3	F	3200	Kit SHR Upper	1SDA082816R1	1SDA082817R1	1SDA082820R1	1SDA082821R1
E4.3	F	3200	Kit SHR Lower	1SDA082818R1	1SDA082819R1	1SDA082820R1	1SDA082821R1
E4.3	F	3200	Kit SVR Upper	1SDA082828R1	1SDA082829R1	1SDA082832R1	1SDA082833R1
E4.3	F	3200	Kit SVR Lower	1SDA082830R1	1SDA082831R1	1SDA082832R1	1SDA082833R1

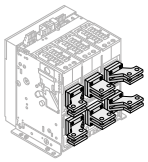
1) HR standard supply
2) For installed terminals: terminals supplied, but not physically installed
3) For loose terminals: in case of replacement with F terminal please contact ABB

Accessories

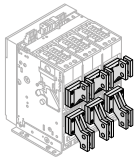
Power Connections



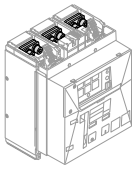
Rear orientable terminal - HR VR



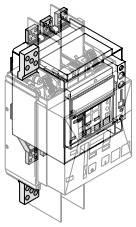
Horizontal rear terminal - SHR



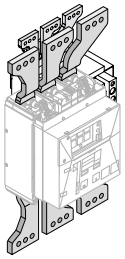
Vertical rear spread terminal - SVR



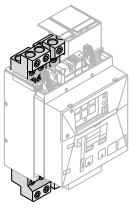
Front terminal - F



Extended front terminal - EF



Front spread terminal - ES

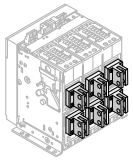


Terminal for cable FcCuAl 4x240mm² - Fc CuAl

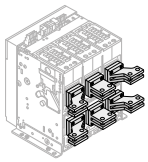
TERMINALS KIT FOR FIXED CIRCUIT-BREAKER ONLY SUPPLIED WITH THE BREAKER AND LOOSE

				Only supplied with the breaker		Loose	
Size	**Version**	**Iu max**	**Type**	**3 Poles**	**4 Poles**	**3 Poles**	**4 Poles**
E4.3	F	3200	Kit HR Upper (multi stab) (1) (3)	1SDA129716R1	1SDA129718R1	1SDA129724R1	1SDA129725R1
E4.3	F	3200	Kit HR Lower (multi stab) (1) (3)	1SDA129720R1	1SDA129722R1	1SDA129724R1	1SDA129725R1
E4.3	F	3200	Kit VR Upper (multi stab) (3)	1SDA129717R1	1SDA129719R1	1SDA129724R1	1SDA129725R1
E4.3	F	3200	Kit VR Lower (multi stab) (3)	1SDA129721R1	1SDA129723R1	1SDA129724R1	1SDA129725R1
E4.3	F	4000	Kit HR Upper (1) (3)			1SDA074025R1	1SDA074026R1
E4.3	F	4000	Kit HR Lower (1) (3)			1SDA074025R1	1SDA074026R1
E4.3	F	4000	Kit VR Upper (3)	1SDA074021R1	1SDA074022R1	1SDA074025R1	1SDA074026R1
E4.3	F	4000	Kit VR Lower (3)	1SDA074023R1	1SDA074024R1	1SDA074025R1	1SDA074026R1
E4.3	F	4000	Kit F Upper (2)	1SDA074126R1	1SDA074127R1	1SDA074130R1	1SDA074131R1
E4.3	F	4000	Kit F Lower (2)	1SDA074128R1	1SDA074129R1	1SDA074132R1	1SDA074133R1
E4.3	F	4000	Kit SHR Upper	1SDA082822R1	1SDA082823R1	1SDA082826R1	1SDA082827R1
E4.3	F	4000	Kit SHR Lower	1SDA082824R1	1SDA082825R1	1SDA082826R1	1SDA082827R1
E4.3	F	4000	Kit SVR Upper	1SDA082834R1	1SDA082835R1	1SDA082838R1	1SDA082839R1
E4.3	F	4000	Kit SVR Lower	1SDA082836R1	1SDA082837R1	1SDA082838R1	1SDA082839R1
E4.3	F	4000	Kit LHR Upper	1SDA115517R1	1SDA115533R1	1SDA115528R1	1SDA115544R1
E4.3	F	4000	Kit LHR Lower	1SDA115518R1	1SDA115534R1	1SDA115528R1	1SDA115544R1
E4.3	F	4000	Kit LVR Upper	1SDA117298R1	1SDA117310R1	1SDA115528R1	1SDA115544R1
E4.3	F	4000	Kit LVR Lower	1SDA117299R1	1SDA117311R1	1SDA115528R1	1SDA115544R1
E6.3	F	5000	Kit HR Upper (1) (3)			1SDA081672R1	1SDA081673R1
E6.3	F	5000	Kit HR Lower (1) (3)			1SDA081672R1	1SDA081673R1
E6.3	F	5000	Kit VR Upper (3)	1SDA074027R1	1SDA074028R1	1SDA081672R1	1SDA081673R1
E6.3	F	5000	Kit VR Lower (3)	1SDA074030R1	1SDA074031R1	1SDA081672R1	1SDA081673R1
E6.3/f	F	5000	Kit HR Upper (1) (3)				1SDA081674R1
E6.3/f	F	5000	Kit HR Lower (1) (3)				1SDA081674R1
E6.3/f	F	5000	Kit VR Upper (3)		1SDA074029R1		1SDA081674R1
E6.3/f	F	5000	Kit VR Lower (3)		1SDA074032R1		1SDA081674R1
E6.3	F	6300	Kit F Upper (2)	1SDA074134R1	1SDA074135R1	1SDA074140R1	1SDA074141R1
E6.3	F	6300	Kit F Lower (2)	1SDA074137R1	1SDA074138R1	1SDA074143R1	1SDA074144R1
E6.3/f	F	6300	Kit F Upper (2)		1SDA074136R1		1SDA074142R1
E6.3/f	F	6300	Kit F Lower (2)		1SDA074139R1		1SDA074145R1
E6.3	F	6300	Kit HR Upper (1) (3)				1SDA074043R1
E6.3	F	6300	Kit HR Lower (1) (3)				1SDA074043R1
E6.3	F	6300	Kit VR Upper (3)	1SDA074036R1	1SDA074037R1	1SDA074042R1	1SDA074043R1
E6.3	F	6300	Kit VR Lower (3)	1SDA074039R1	1SDA074040R1	1SDA074042R1	1SDA074043R1
E6.3/f	F	6300	Kit HR Upper (1) (3)				1SDA074044R1
E6.3/f	F	6300	Kit HR Lower (1) (3)				1SDA074044R1
E6.3/f	F	6300	Kit VR Upper (3)		1SDA074038R1		1SDA074044R1
E6.3/f	F	6300	Kit VR Lower (3)		1SDA074041R1		1SDA074044R1
E6.3	F	6300	Kit LHR Upper	1SDA115519R1	1SDA115535R1	1SDA115529R1	1SDA115545R1
E6.3	F	6300	Kit LHR Lower	1SDA115520R1	1SDA115536R1	1SDA115529R1	1SDA115545R1
E6.3	F	6300	Kit LVR Upper	1SDA117300R1	1SDA117312R1	1SDA115529R1	1SDA115545R1
E6.3	F	6300	Kit LVR Lower	1SDA117301R1	1SDA117313R1	1SDA115529R1	1SDA115545R1
E6.3/f	F	6300	Kit LHR Upper		1SDA115547R1		1SDA115546R1
E6.3/f	F	6300	Kit LHR Lower		1SDA115548R1		1SDA115546R1
E6.3/f	F	6300	Kit LVR Upper		1SDA117320R1		1SDA115546R1
E6.3/f	F	6300	Kit LVR Lower		1SDA117321R1		1SDA115546R1

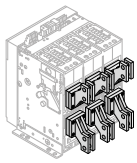
1) HR standard supply
2) For installed terminals: terminals supplied, but not physically installed
3) For loose terminals: in case of replacement with F terminal please contact ABB



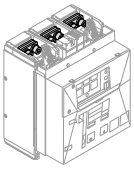
Rear orientable terminal - HR VR



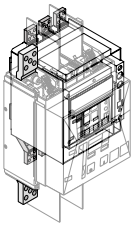
Horizontal rear terminal - SHR



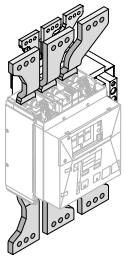
Vertical rear spread terminal - SVR



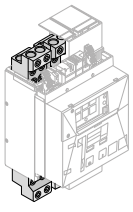
Front terminal - F



Extended front terminal - EF



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

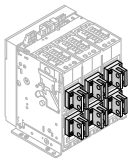
TERMINALS KIT FOR FIXED PART OF WITHDRAWABLE CIRCUIT-BREAKER ONLY SUPPLIED WITH THE BREAKER AND LOOSE

				Only supplied with the breaker		Loose	
Size	**Version**	**Iu max**	**Type**	**3 Poles**	**4 Poles**	**3 Poles**	**4 Poles**
E1.3	W	1600	Kit EF Upper (2)	1SDA073939R1	1SDA073940R1	1SDA073943R1	1SDA073944R1
E1.3	W	1600	Kit EF Lower (2)	1SDA073941R1	1SDA073942R1	1SDA073943R1	1SDA073944R1
E1.3	W	1600	Kit HR Upper (1) (2)			1SDA073949R1	1SDA073950R1
E1.3	W	1600	Kit HR Lower (1) (2)			1SDA073949R1	1SDA073950R1
E1.3	W	1600	Kit VR Upper (2)	1SDA073945R1	1SDA073946R1	1SDA073949R1	1SDA073950R1
E1.3	W	1600	Kit VR Lower (2)	1SDA073947R1	1SDA073948R1	1SDA073949R1	1SDA073950R1
E1.3	W	1600	Kit ES Upper (2) (3)	1SDA073951R1	1SDA073952R1	1SDA073955R1	1SDA073956R1
E1.3	W	1600	Kit ES Lower (2) (3)	1SDA073953R1	1SDA073954R1	1SDA073955R1	1SDA073956R1
E1.3	W	1600	Kit SHR Upper (2)	1SDA073957R1	1SDA073958R1	1SDA073961R1	1SDA073962R1
E1.3	W	1600	Kit SHR Lower (2)	1SDA073959R1	1SDA073960R1	1SDA073961R1	1SDA073962R1
E1.3	W	1600	Kit FC CuAl Upper (2)	1SDA073991R1	1SDA073993R1	1SDA073995R1	1SDA073996R1
E1.3	W	1600	Kit FC CuAl Lower (2)	1SDA073992R1	1SDA073994R1	1SDA073995R1	1SDA073996R1
E2.3	W	2000	Kit FL Upper	1SDA081120R1	1SDA081121R1		
E2.3	W	2000	Kit FL Lower	1SDA081122R1	1SDA081123R1		
E2.3	W	2000	Kit HR Upper (1)			1SDA074007R1	1SDA074008R1
E2.3	W	2000	Kit HR Lower (1)			1SDA074007R1	1SDA074008R1
E2.3	W	2000	Kit VR Upper	1SDA074577R1	1SDA074578R1	1SDA074007R1	1SDA074008R1
E2.3	W	2000	Kit VR Lower	1SDA074579R1	1SDA074580R1	1SDA074007R1	1SDA074008R1
E2.3	W	2500	Kit HR Upper (1)			1SDA074013R1	1SDA074014R1
E2.3	W	2500	Kit HR Lower (1)			1SDA074013R1	1SDA074014R1
E2.3	W	2500	Kit VR Upper	1SDA074581R1	1SDA074582R1	1SDA074013R1	1SDA074014R1
E2.3	W	2500	Kit VR Lower	1SDA074583R1	1SDA074584R1	1SDA074013R1	1SDA074014R1
E2.3	W	2000	Kit SHR Upper	1SDA074585R1	1SDA074586R1	1SDA074049R1	1SDA074050R1
E2.3	W	2000	Kit SHR Lower	1SDA074587R1	1SDA074588R1	1SDA074049R1	1SDA074050R1
E2.3	W	2500	Kit SHR Upper	1SDA074589R1	1SDA074590R1	1SDA074055R1	1SDA074056R1
E2.3	W	2500	Kit SHR Lower	1SDA074591R1	1SDA074592R1	1SDA074055R1	1SDA074056R1
E2.3	W	2000	Kit SVR Upper	1SDA074593R1	1SDA074594R1	1SDA074061R1	1SDA074062R1
E2.3	W	2000	Kit SVR Lower	1SDA074595R1	1SDA074596R1	1SDA074061R1	1SDA074062R1
E2.3	W	2500	Kit SVR Upper	1SDA074597R1	1SDA074598R1	1SDA074067R1	1SDA074068R1
E2.3	W	2500	Kit SVR Lower	1SDA074599R1	1SDA074600R1	1SDA074067R1	1SDA074068R1
E2.3	W	2500	Kit FL Upper	1SDA074069R1	1SDA074070R1		
E2.3	W	2500	Kit FL Lower	1SDA074071R1	1SDA074072R1		
E2.3	W	2500	Kit F Upper (2)	1SDA074090R1	1SDA074091R1	1SDA074094R1	1SDA074095R1
E2.3	W	2500	Kit F Lower (2)	1SDA074092R1	1SDA074093R1	1SDA074096R1	1SDA074097R1
E2.3	W	2500	Kit LHR Upper	1SDA115521R1	1SDA115537R1	1SDA115527R1	1SDA115543R1
E2.3	W	2500	Kit LHR Lower	1SDA115522R1	1SDA115538R1	1SDA115527R1	1SDA115543R1
E2.3	W	2500	Kit LVR Upper	1SDA117302R1	1SDA117314R1	1SDA115527R1	1SDA115543R1
E2.3	W	2500	Kit LVR Lower	1SDA117303R1	1SDA117315R1	1SDA115527R1	1SDA115543R1

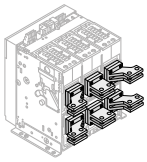
1) HR standard supply
2) for installed terminals: terminals supplied, but not physically installed
3) for loose terminals: can be ordered only if the fixed part has EF terminals

Accessories

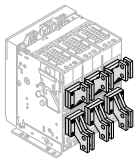
Power Connections



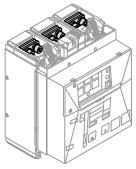
Rear orientable terminal - HR VR



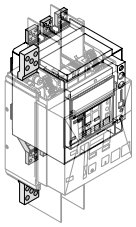
Horizontal rear terminal - SHR



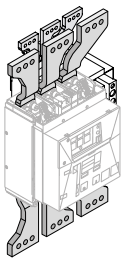
Vertical rear spread terminal - SVR



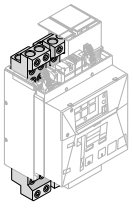
Front terminal - F



Extended front terminal - EF



Front spread terminal - ES

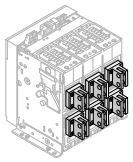


Terminal for cable FcCuAl 4x240mm² - Fc CuAl

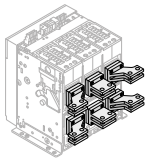
TERMINALS KIT FOR FIXED PART OF WITHDRAWABLE CIRCUIT-BREAKER ONLY SUPPLIED WITH THE BREAKER AND LOOSE

				Only supplied with the breaker		Loose	
Size	**Version**	**Iu max**	**Type**	**3 Poles**	**4 Poles**	**3 Poles**	**4 Poles**
E4.3	W	3200	Kit FL Upper	1SDA081125R1	1SDA081127R1		
E4.3	W	3200	Kit FL Lower	1SDA081128R1	1SDA081129R1		
E4.3	W	3200	Kit HR Upper (1)			1SDA074019R1	1SDA074020R1
E4.3	W	3200	Kit HR Lower (1)			1SDA074019R1	1SDA074020R1
E4.3	W	3200	Kit VR Upper	1SDA074601R1	1SDA074602R1	1SDA074019R1	1SDA074020R1
E4.3	W	3200	Kit VR Lower	1SDA074603R1	1SDA074604R1	1SDA074019R1	1SDA074020R1
E4.3	W	3200	Kit SHR Upper	1SDA082840R1	1SDA082841R1	1SDA082820R1	1SDA082821R1
E4.3	W	3200	Kit SHR Lower	1SDA082842R1	1SDA082843R1	1SDA082820R1	1SDA082821R1
E4.3	W	3200	Kit SVR Upper	1SDA082848R1	1SDA082849R1	1SDA082832R1	1SDA082833R1
E4.3	W	3200	Kit SVR Lower	1SDA082850R1	1SDA082851R1	1SDA082832R1	1SDA082833R1
E4.3	W	4000	Kit HR Upper (1)			1SDA074025R1	1SDA074026R1
E4.3	W	4000	Kit HR Lower (1)			1SDA074025R1	1SDA074026R1
E4.3	W	4000	Kit VR Upper	1SDA074605R1	1SDA074606R1	1SDA074025R1	1SDA074026R1
E4.3	W	4000	Kit VR Lower	1SDA074607R1	1SDA074608R1	1SDA074025R1	1SDA074026R1
E4.3	W	4000	Kit F Upper (2)	1SDA074098R1	1SDA074099R1	1SDA074102R1	1SDA074103R1
E4.3	W	4000	Kit F Lower (2)	1SDA074100R1	1SDA074101R1	1SDA074104R1	1SDA074105R1
E4.3	W	4000	Kit FL Upper	1SDA074075R1	1SDA074076R1		
E4.3	W	4000	Kit FL Lower	1SDA074077R1	1SDA074078R1		
E4.3	W	4000	Kit HR Upper	1SDA076878R1	1SDA076879R1	1SDA074025R1	1SDA074026R1
E4.3	W	4000	Kit HR Lower	1SDA076880R1	1SDA076881R1	1SDA074025R1	1SDA074026R1
E4.3	W	4000	Kit SHR Upper	1SDA082844R1	1SDA082845R1	1SDA082826R1	1SDA082827R1
E4.3	W	4000	Kit SHR Lower	1SDA082846R1	1SDA082847R1	1SDA082826R1	1SDA082827R1
E4.3	W	4000	Kit SVR Upper	1SDA082852R1	1SDA082853R1	1SDA082838R1	1SDA082839R1
E4.3	W	4000	Kit SVR Lower	1SDA082854R1	1SDA082855R1	1SDA082838R1	1SDA082839R1
E4.3	W	4000	Kit LHR Upper	1SDA115523R1	1SDA115539R1	1SDA115528R1	1SDA115544R1
E4.3	W	4000	Kit LHR Lower	1SDA115524R1	1SDA115540R1	1SDA115528R1	1SDA115544R1
E4.3	W	4000	Kit LVR Upper	1SDA117304R1	1SDA117316R1	1SDA115528R1	1SDA115544R1
E4.3	W	4000	Kit LVR Lower	1SDA117305R1	1SDA117317R1	1SDA115528R1	1SDA115544R1

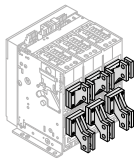
1) HR standard supply
2) for installed terminals: terminals supplied, but not physically installed



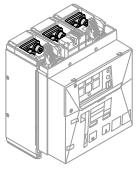
Rear orientable terminal - HR VR



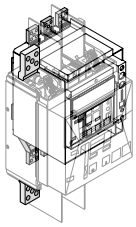
Horizontal rear terminal - SHR



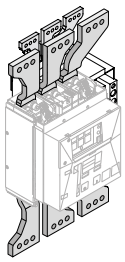
Vertical rear spread terminal - SVR



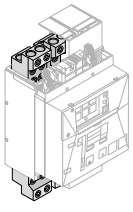
Front terminal - F



Extended front terminal - EF



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

TERMINALS KIT FOR FIXED PART OF WITHDRAWABLE CIRCUIT-BREAKER ONLY SUPPLIED WITH THE BREAKER AND LOOSE

				Only supplied with the breaker		Loose	
Size	**Version**	**Iu max**	**Type**	**3 Poles**	**4 Poles**	**3 Poles**	**4 Poles**
E6.3	W	5000	Kit HR Upper (1)			1SDA074033R1	1SDA074034R1
E6.3	W	5000	Kit HR Lower (1)			1SDA074033R1	1SDA074034R1
E6.3	W	5000	Kit VR Upper	1SDA074609R1	1SDA074610R1	1SDA074033R1	1SDA074034R1
E6.3	W	5000	Kit VR Lower	1SDA074612R1	1SDA074613R1	1SDA074033R1	1SDA074034R1
E6.3/f	W	5000	Kit HR Upper (1)				1SDA074035R1
E6.3/f	W	5000	Kit HR Lower (1)				1SDA074035R1
E6.3/f	W	5000	Kit VR Upper		1SDA074611R1		1SDA074035R1
E6.3/f	W	5000	Kit VR Lower		1SDA074614R1		1SDA074035R1
E6.3	W	6300	Kit HR Upper (1)			1SDA074042R1	1SDA074043R1
E6.3	W	6300	Kit HR Lower (1)			1SDA074042R1	1SDA074043R1
E6.3	W	6300	Kit VR Upper	1SDA074615R1	1SDA074616R1	1SDA074042R1	1SDA074043R1
E6.3	W	6300	Kit VR Lower	1SDA074618R1	1SDA074619R1	1SDA074042R1	1SDA074043R1
E6.3/f	W	6300	Kit HR Upper (1)				1SDA074044R1
E6.3/f	W	6300	Kit HR Lower (1)				1SDA074044R1
E6.3/f	W	6300	Kit VR Upper		1SDA074617R1		1SDA074044R1
E6.3/f	W	6300	Kit VR Lower		1SDA074620R1		1SDA074044R1
E6.3	W	6300	Kit F Upper (2)	1SDA074106R1	1SDA074107R1	1SDA074112R1	1SDA074113R1
E6.3	W	6300	Kit F Lower (2)	1SDA074109R1	1SDA074110R1	1SDA074115R1	1SDA074116R1
E6.3/f	W	6300	Kit F Upper (2)		1SDA074108R1		1SDA074114R1
E6.3/f	W	6300	Kit F Lower (2)		1SDA074111R1		1SDA074117R1
E6.3	W	6300	Kit FL Upper	1SDA074081R1	1SDA074082R1		
E6.3	W	6300	Kit FL Lower	1SDA074084R1	1SDA074085R1		
E6.3/f	W	6300	Kit FL Upper		1SDA074083R1		
E6.3/f	W	6300	Kit FL Lower		1SDA074086R1		
E6.3	W	6300	Kit LHR Upper	1SDA115525R1	1SDA115541R1	1SDA115529R1	1SDA115545R1
E6.3	W	6300	Kit LHR Lower	1SDA115526R1	1SDA115542R1	1SDA115529R1	1SDA115545R1
E6.3	W	6300	Kit LVR Upper	1SDA117306R1	1SDA117318R1	1SDA115529R1	1SDA115545R1
E6.3	W	6300	Kit LVR Lower	1SDA117307R1	1SDA117319R1	1SDA115529R1	1SDA115545R1
E6.3/f	W	6300	Kit LHR Upper		1SDA115550R1		1SDA115546R1
E6.3/f	W	6300	Kit LHR Lower		1SDA115549R1		1SDA115546R1
E6.3/f	W	6300	Kit LVR Upper		1SDA117322R1		1SDA115546R1
E6.3/f	W	6300	Kit LVR Lower		1SDA117323R1		1SDA115546R1
E6.3	W	5000	Kit VR Upper (multi stab)	1SDA122772R1			
E6.3	W	5000	Kit VR Lower (multi stab)	1SDA122775R1			
E6.3	W	5000	Kit HR Upper (multi stab)	1SDA122711R1			
E6.3	W	5000	Kit HR Lower (multi stab)	1SDA122714R1			
E6.3	W	5000	Kit VR Upper (multi stab)		1SDA122773R1		
E6.3	W	5000	Kit VR Lower (multi stab)		1SDA122776R1		
E6.3	W	5000	Kit HR Upper (multi stab)		1SDA122712R1		
E6.3	W	5000	Kit HR Lower (multi stab)		1SDA122715R1		
E6.3/f	W	5000	Kit VR Upper (multi stab)		1SDA122774R1		
E6.3/f	W	5000	Kit VR Lower (multi stab)		1SDA122777R1		
E6.3/f	W	5000	Kit HR Upper (multi stab)		1SDA122713R1		
E6.3/f	W	5000	Kit HR Lower (multi stab)		1SDA122716R1		

1) HR standard supply
2) for installed terminals: terminals supplied, but not physically installed

Accessories

Miscellaneous

INSTALLATION MANUAL

Size	Type	Part Number
E1.3...E6.3	Additional installation manual E1.3...E6.3 IT	1SDA126579R1
E1.3...E6.3	Additional installation manual E1.3...E6.3 EN	1SDA126580R1
E1.3...E6.3	Additional installation manual E1.3...E6.3 DE	1SDA126581R1
E1.3...E6.3	Additional installation manual E1.3...E6.3 FR	1SDA126582R1
E1.3...E6.3	Additional installation manual E1.3...E6.3 ES	1SDA126583R1
E1.3...E6.3	Additional installation manual E1.3...E6.3 CN	1SDA133734R1

LITE TEST REPORT

Size	Type	Part Number
E1.3	Test Report Lite E1.3	1SDA127783R1
E2.3	Test Report Lite E2.3	1SDA127784R1
E4.3	Test Report Lite E4.3	1SDA127785R1
E6.3	Test Report Lite E6.3	1SDA127786R1

TEST REPORT

Size	Type	Part Number
E1.3	Test Report E1.3	1SDA126584R1
E2.3	Test Report E2.3	1SDA126585R1
E4.3	Test Report E4.3	1SDA126586R1
E6.3	Test Report E6.3	1SDA126587R1

CCC MARKING

Size	Type	Part Number
E1.3	Marking CCC E1.3	1SDA132645R1
E1.3	Marking CCC MS E1.3	1SDA133777R1
E2.3...E6.3	Marking CCC E2.3...E6.3	1SDA132646R1
E2.3...E6.3	Marking CCC MS E2.3...E6.3	1SDA133778R1

Accessories
Service



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

EXTENDED WARRANTY

Size	Type	Part Number (3)
E1.3...E6.3	Warranty 2 years E1.3...E6.3 (1)	1SDA129632R1
E1.3	Warranty 4 years E1.3 (2)	1SDA129633R1
E2.3	Warranty 4 years E2.3 (2)	1SDA129634R1
E4.3	Warranty 4 years E4.3 (2)	1SDA129635R1
E6.3	Warranty 4 years E6.3 (2)	1SDA129636R1
E1.3	Warranty 5 years E1.3 (2)	1SDA129637R1
E2.3	Warranty 5 years E2.3 (2)	1SDA129638R1
E4.3	Warranty 5 years E4.3 (2)	1SDA129639R1
E6.3	Warranty 5 years E6.3 (2)	1SDA129640R1

Note: The registration in the Extended Warranty online tool is mandatory
1) Free-of-charge with site details entered
2) Warranty durations:
- 4 years when site details not entered into the Extended Warranty online tool
- 5 years when site details entered into the Extended Warranty online tool.
3) Supplied only with the circuit-breaker. Specify Registration Part Number in the order to activate the warranty.

ABB S.p.A.
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Phone: +39 035 395 111

www.abb.com

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