

Technical catalogue - 2017.06

SACE Tmax XT

New low voltage moulded-case circuit-breakers up to 250 A







Construction Characteristics	7
The SACE Tmax XT Ranges	2
Accessories	3
Characteristic Curves and Technical Information	4
Overall dimensions	5
Wiring Diagrams	6
Ordering codes	7
Glossary	8



Construction Characteristics

Index

Construction characteristics	. 1 /2
Regulations and Reference Standards	. 1 /5
Identification of the SACE Tmax XT circuit-breakers	. 1 /6
Nomenclature of the trip units and residual current protection devices	.1/7

Construction characteristics

					XT1		
Size ^(G2.1)		[A]		•••••	160		
Poles		[No.]		•••••	3, 4		
Rated service voltage, Ue (G2.4)	(AC) 50-60Hz (DC)			•••••	690 500	•	•
Rated insulation voltage, Ui ^(G2.5)	(DO)	[V] [V]		• • • • • • • • • • • • • • • • • • • •	800	•	•
Rated impulse withstand voltage, Uimp (G2.6)		[kV]		• • • • • • • • • • • • • • • • • • • •	8	•	• · · · · · · · · · · · · · · · · · · ·
Versions					Fixed, Plug-in	2)	
Breaking capacities according to IEC 60947-2	······		В	С	N	S	Н
Rated ultimate short-circuit breaking capacity, Icu ^(G2.7)	······································					·····	·····
Icu @ 220-230-240V 50-60Hz (AC)	······································	[kA]	25	40	65	85	100
Icu @ 380V 50-60Hz (AC) Icu @ 415V 50-60Hz (AC)	······································	[kA]	18 18	25 25	36 36	50 50	70 70
Icu @ 440V 50-60Hz (AC)	······································	[kA]	15	25	36	50	7 U
Icu @ 500V 50-60Hz (AC)	······································	[kA]	8	18	30	36	50
Icu @ 525V 50-60Hz (AC)	••••••	[kA]	6	8	22	35	35
Icu @ 690V 50-60Hz (AC)	••••••	[kA]	6 3	8 4 25	6	8	10
Icu @ 250V (DC) 2 poles in series		[kA]	18	25	36	50	70
lcu @ 500V (DC) 2 poles in series	· · · · · · · · · · · · · · · · · · ·	[kA]				-	-
lcu @ 500V (DC) 3 poles in series(3)		[kA]	18	25	36	50	70
ated service short-circuit breaking capacity, Ics ^(G2.8)					,	,	,
Ics @ 220-230-240V 50-60Hz (AC)		[kA]	100%	100%	75% (50)	75%	75%
Ics @ 380V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	75%
lcs @ 415V 50-60Hz (AC)		[kA]	100%	100%	100%	75%	50% (37.5)
lcs @ 440V 50-60Hz (AC) lcs @ 500V 50-60Hz (AC)	······································	[kA]	75% 100%	50% 50%	50% 50%	50% 50%	50% 50%
Ics @ 500V 50-60Hz (AC)		[kA]	100%	100%	50%	50%	50%
Ics @ 690V 50-60Hz (AC)		[kA]	100%	100%	75% (5)	50% (5)	50%
lcs @ 250V (DC) 2 poles in series	······································	[kA]	100%	100%	100%	100%	75%
Ics @ 500V (DC) 2 poles in series		[kA]	-	-	-		-
lcs @ 500V (DC) 3 poles in series(3)		[kA]	100%	100%	100%	100%	75%
Rated short-circuit making capacity, Icm(G2.10)	•						
Icm @ 220-230-240V 50-60Hz (AC)		[kA]	52.5	84	143	187	220
lcm @ 380V 50-60Hz (AC)		[kA]	36	52.5	75.6	105	154
Icm @ 415V 50-60Hz (AC)		[kA]	36	52.5	75.6	105	154
Icm @ 440V 50-60Hz (AC)		[kA]	30	52.5	75.6	105	143
Icm @ 500V 50-60Hz (AC)		[kA]	13.6	36	63	75,6	105
Icm @ 525V 50-60Hz (AC)		[kA]	9.18	13.6	46.2	73.5 13.6	73.5 17
Icm @ 690V 50-60Hz (AC) Breaking capacities according to NEMA-AB1		[kA]	4.26	5.88	9.18	13.0	!/
@ 240V 50-60Hz (AC)	•••••••••	[kA]	25	40	65	85	100
@ 480V 50-60Hz (AC)	······································	[kA]	8	18	30	36	65
Itilisation Category (IEC 60947-2)		(-1			A		
Reference Standard	•••••••••••••			• • • • • • • • • • • • • • • • • • • •	IEC 60947-2	•	•
solation behaviour					· · ·		
founted on DIN rail	······································				DIN EN 50022	<u>2</u>	
flechanical life(G2.14)		[No. Operations]			25000	•	
		[No. Hourly operations]			240		
electrical life @ 415 V (AC)(G2.13)		[No. Operations] [No. Hourly operations]		• • • • • • • • • • • • • • • • • • • •	8000 120	•	•
Dimensions - Fixed	3 poles	[mm]		7	76.2 x 70 x 13	in	
Width x Depth x Height)	4 poles	[mm]		· •····	01.6 x 70 x 13	•	
	, polos	[iiiiii]		· ·	01.0 A 10 A II		
D*w"							-
otal opening time		[m-1		•••••	1.5	•	• • • • • • • • • • • • • • • • • • • •
Circuit-breaker with shunt opening release Circuit-breaker with undervoltage release		[ms] [ms]		• • • • • • • • • • • • • • • • • • • •	15 15	•	•
rip units for power distribution		[۱۱۱۵]			10		
TMD/TMA				•••••	***************************************	•····	• • • • • • • • • • • • • • • • • • • •
TMD/TMF				• • • • • • • • • • • • • • • • • • • •		•····	
Ekip LS/I							
Ekip l				•••••	•	•••••	
Ekip LSI					•····		
Ekip LSIG				•••••			
Ekip E							
ip units for motor protection				•••••			•
MF/MA Ekip M-I				• • • • • • • • • • • • • • • • • • • •		•····	• • • • • • • • • • • • • • • • • • • •
Ekip M-IU				• • • • • • • • • • • • • • • • • • • •	•	•	•
Ekip M-LRIU				• • • • • • • • • • • • • • • • • • • •	•	•····	• • • • • • • • • • • • • • • • • • • •
rip units for generator protection							
TMG				••••••	***************************************	•····	• • • • • • • • • • • • • • • • • • • •
Ekip G-LS/I				•••••	***************************************	•····	• • • • • • • • • • • • • • • • • • • •
rip units for oversized Neutral Protection							
Ekip N-LS/I							
nterchangeable protection trip units							
Value Fire d	3/4 poles	[kg]			1.1 / 1.4		
	· · · · · · · · · · · · · · · · · · ·	······································					
Weight Fixed Plug in (EF terminals) Withdrawable (EF terminals)	3/4 poles 3/4 poles	[kg]			2.21 / 2.82	•	

 $^{^{(!)}}$ Icu=100kA and Ics=100%Icu @690V only for XT4 160. Please ask ABB SACE about availability $^{(2)}$ XT1 plug-in In max=125A

⁽³⁾ XT1 500V DC 4 poles in series (4) XT4 750V DC please ask ABB SACE for availability

[■] Complete circuit-breaker

		XT2					XT3 XT4					
		160					250	160 / 250				
		•	3, 4 690	•			5, 4 690	3, 4 690				
		•	500	•	•••••		600		•	500(4)	
		•	1000	•			800			1000		
			8	D		E	8			8		
	N	Fixed, '	Withdrawable, H	Plug-in L	V	N	Plug-in S	N	Fixed S	d, Withdrawa	bie, Plug-in L	V
		<u></u>	i	<u>=</u>	<u>v</u>		· i · · · · · · · · · · · · · · · · · ·			· i	<u>-</u>	
	65	85	100	150	200	50	85	65	85	100	150	200
	36	50	70	120	150	36	50	36	50	70	120	150
	36	50	70	120	150	36	50	36	50	70	120	150
	36 30	50 36	65 50	100 60	150 70	25 20	40 30	36 30	50 36	65 50	100 60	150 70
	20	25	30	36	50	13	20	20	25	45	50	50
• •	10	12	15	18	20	13 5	6	10	12	15	20	25/100(1)
	36	50	70	85	100	36	50	36	50	70	85	100
	-	-	- 70	– 85	-	-	- 50	36	50	70	85	100
	36	50	70	85	100	36	50	36	50	70	85	100
	100%	100%	100%	100%	100%	75%	50%	100%	100%	100%	100%	100%
	100%	100%	100%	100%	100%	75%	50% (27)	100%	100%	100%	100%	100%
	100%	100%	100%	100%	100%	75%	50% (27)	100%	100%	100%	100%	100%
	100%	100%	100%	100%	100%	75%	50%	100%	100%	100%	100%	100%
	100% 100%	100% 100%	100% 100%	100%	100% 100%	75% 75%	50%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%
	100%	100%	100%	100% 75% (15)	75%	75% 75%	50% 50%	100%	100%	100%	100%	75% (20)/100%
	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%	100%
	_	<u> </u>	- 100%	- 100%	_	_	- 75%	100%	100%	100%	100%	100%
	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%	100%
	1/10	187	220	330	440	105	187	143	187	220	330	140
	143 75.6	105	154	264	440 330	75.6	105	75.6	105	154	264	440 330
	75.6	105	154	264	330	75.6	105	75.6	105	154	264	330
	75.6	105	143	220	330	52.5	84	75.6	105	143	220	330
	63	75.6	105	132	154	40	63 40	63	75.6 52.5	105 94.5	132 105	154
	40 17	52.5 24	63 30	75.6 36	105 40	26 7.65	13.6	40 17	24	30	40	105 52.5
	65	85	100	150	200	50	85	65	85	100	150	200
_	30	36	65 A	100	150	25	35 A	30	36	65 A	100	150
		•	IEC 60947-2			•	0947-2			IEC 6094	7-2	
		•	V			<i>'</i>						
		•	DIN EN 50022 25000	•			N 50022 5000	DIN EN 50022 25000				
••••		•····	240	• · · · · · · · · · · · · · · · · · · ·	•••••		40		•	240		
		·····	8000	•		•	000			8000		
-			120 90 x 82.5 x 13	<u> </u>			20 70 x 150			120	v 160	
			20 x 82.5 x 13	•			70 x 150 70 x 150	105 x 82.5 x 160 140 x 82.5 x 160				
-												
		•	15 15	•			15 15 15 15					
		•		• • • • • • • • • • • • • • • • • • • •					•			
		•		•					•		***************************************	
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_												
											•••••	
		•		•						_	***************************************	
		•	A						•••••	A	•	
_			1.2 / 1.6			17	/ 2.1			2.5 / 3.	5	
			2.54 / 3.27				/ 2.1 1 / 4.1		•	4.19 / 5.		
	:											

Construction characteristics

The references in round brackets (GXX) in the technical catalogue refer to the Glossary in the final charter of the technical catalogue.

All the moulded-case circuit-breakers in the SACE Tmax XT family are realized in accordance with the following construction characteristics:



- positive operation^(G1.6);
- isolation behaviour^(G1.7);
- electromagnetic compatibility^(G1.8);
- tropicalization(G1.9);
- impact and vibration resistance^(G1.10);
- power supply from the top towards the bottom or vice versa;
- versatility of the installation. It is possible to mount the circuit-breaker in horizontal, vertical, or lying down position without any derating of the rated characteristics;
- no nominal performance derating for use up to an altitude of 2000m. Above 2000m, the properties of the atmosphere (composition of the air, dielectric strength, cooling power and pressure) change, having an impact on the main parameters which define the circuit-breaker. The table below gives the changes to the main performance parameters;

Altitude		2000m	3000m	4000m	5000m
Rated employ voltage, Ue	[V]	690	600	540	470
Rated uninterrupted current	%	100	98	93	90

the SACE Tmax XT circuit-breakers can be used in environments where the temperature is between -25°C and +70°C and stored in environments where the temperature is between -40°C and +70°C. To use temperatures other than 40°C, see the "Temperature Performances"

paragraph of the Characteristic Curves and the technical information chapter;

different degrees of protection IP (International Protection)^(G 1.11);

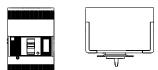


	With front	Without front ⁽¹⁾	With Front for lever -FLD-		With transmitted rotary handle and accessory IP54	terminal	With low terminal covers LTC
Α	IP40	IP20	IP40	IP40	IP54	IP40	IP40
В	IP20	IP20	IP20	IP20	IP20	IP40	IP40
С	NC	NC	NC	NC	NC	IP40	IP30

During the installation of electrical accessories NC Not classifiable



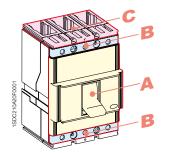
Positive operation







Installation positions



Protection degrees



Test pushbutton

Accessories

Accessories				
	Motor operator MOD, MOE or MOE-E	Residual current devices	Residual current from switchboard RCQ020	Automatic Transfer Switch ATS021 and ATS022
On Front	IP30	IP40	IP41	IP40

all the circuit-breakers in the XT family are fitted with a test pushbutton which allows the release test to be done. This test must be carried out with the circuit-breaker closed and with no current.

Regulations and Reference Standards



Hologram

Conformity with Standards

The SACE Tmax XT circuit-breakers and their accessories are constructed in conformity with:

- Standard(G6.1):
- IEC 60947-2:
- Directives^(G6.2):
 - EC "Low Voltage Directive" (LVD) nr. 2014/35/EC;
 - EC "Electromagnetic Compatibility Directive" (EMC) 2014/30/EC;
- Naval Registers^(G6.3) (ask ABB SACE for the versions available):
 - Lloyd's Register of Shipping, Germanischer Lloyd, Bureau Veritas, Rina, Det Norske Veritas, Russian Maritime Register of Shipping, ABS.

Certification of conformity with the product Standards is carried out in the ABB SACE tests laboratory (accredited by SINAL) in respect of the EN 45011 European Standard, by the Italian certification body ACAE (Association for Certification of Electrical Apparatus), member of the European LOVAG organisation (Low Voltage Agreement Group) and by the Swedish certification body SEMKO belonging to the international IECEE organisation.

The SACE Tmax XT series has a hologram on the front, obtained using special anti-forgery techniques, a guarantee of the quality and genuineness of the circuit-breaker as an ABB SACE product.















Naval Registers

Company Quality System

The ABB SACE Quality System conforms with the following Standards:

- ISO 9001 international Standard;
- EN ISO 9001 (equivalent) European Standards;
- UNI EN ISO 9001 (equivalent) Italian Standards;
- IRIS International Railway Industry Standard.

The ABB SACE Quality System attained its first certification with the RINA certification body in 1990.

Environmental Management System, Social Responsibility and Ethics

Attention to protection of the environment is a priory commitment for ABB SACE. Confirmation of this is the realisation of an Environmental Management System certified by RINA (ABB SACE was the first industry in the electromechanical sector in Italy to obtain this recognition) in conformity with the International ISO14001 Standard. In 1999 the Environmental Management System was integrated with the Occupational Health and Safety Management System according to the OHSAS 18001 Standard and later, in 2005, with the SA 8000 (Social Accountability 8000) Standard, committing itself to respect of business ethics and working conditions.

The commitment to environmental protection becomes concrete through:

- selection of materials, processes and packaging which optimise the true environmental impact of the product;
- use of recyclable materials;
- voluntary respect of the RoHS directive(G6.4).

ISO 14001, 18001 and SA8000 recognitions togheter with ISO 9001 made it possible to obtain RINA BEST FOUR CERTIFICATION.

Warranty

Standard warranty for ABB Low Voltage circuit breakers is 1-year standard, but it can be extended up to 5 years. 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:

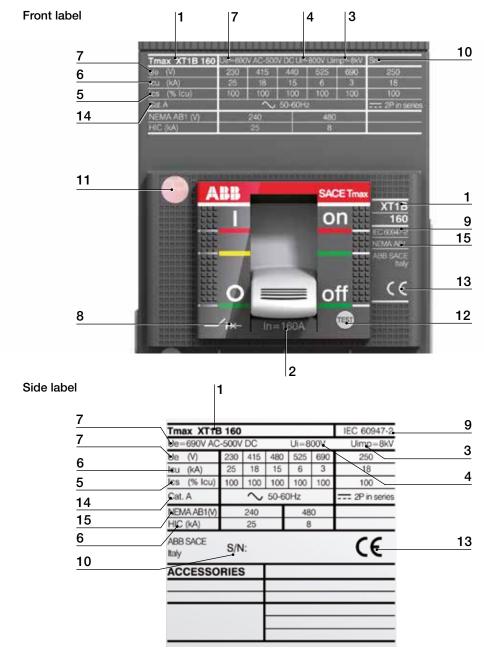
- Registration in the online tool (Extended Warranty Tool) to verify the application. Use Qr code below to access the tool
- Extended Warranty part number(s) and registration code received by email
- Place the order of the circuit breaker(s) together with:
 - Extended warranty part number(s)
 - Unique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

Warranty coverage:

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

Identification of the SACE Tmax XT circuit-breakers

The characteristics of the circuit-breaker are given on the rating nameplate on the front of the circuit-breaker, and on the side rating plate.



- 1 Name of the circuit-breaker and performance level(*)
- 2 In: rated current of the circuit-breaker^(*)
- 3 Uimp: rated impulse withstand voltage(*)
- 4 Ui: insulation voltage(*)
- 5 Ics rated short-circuit duty breaking capacity(*)
- 6 Icu: rated ultimate short-circuit breaking capacity(*)
- 7 Ue: rated service voltage(*)
- 8 Symbol of isolation behaviour(*)
- 9 Reference Standard IEC 60947-2(*)
- 10 Serial number
- 11 Anti-forgery logo
- 12 Test pushbutton
- 13 CE marking
- 14 Utilisation Category
- 15 Reference Standard NEMA-AB1

⁽¹⁾ In compliance with the IEC 60947-2 Standard

Nomenclature of the trip units and residual current protection devices

The tables below give details of the logic with which each thermomagnetic trip units, electronic trip units and residual current devices has been named.

Magnetic trip units						
Family Name		Protection				
M: magnetic	+	F: with fixed threshold A: with adjustable threshold				

Thermomagnetic trip units						
Family Name		Protection				
TM: thermomagnetic	+	A: with adjustable thermal and magnetic threshold D: with adjustable thermal and fixed magnetic threshold G: with adjustable thermal and fixed magnetic threshold (for generator protection)				

Example:

- MA: magnetic only trip unit, with adjustable protection threshold;
- TMD: thermomagnetic trip unit, with adjustable thermal and fixed magnetic protection threshold;
- TMG: thermomagnetic trip unit, with adjustable thermal and fixed magnetic protection threshold, specifically for protection of generators.

Family Name		Application	Protection	Circuit-breaker ⁽¹
Ekip	+	: Distribution M: Motor protection G: Generator protection N: Neutral E: Energy measurements	I LS/I LSIG LIU LRIU	XT2 XT4

⁽¹⁾ Circuit-breaker has to be defined only with loose release.

Example:

- Ekip LS/I: electronic trip unit for distribution networks protection, with "L" against overload and as an alternative "S" protection function against delay short circuit or "I" protection function against instantaneous short circuit;
- Ekip M-LRIU: electronic trip unit for motors protection, with LRIU protection functions;
- Ekip N-LS/I XT2: loose electronic trip unit for the neutral protection, with "L" against overload and as an alternative "S" protection function against delay short circuit or "I" protection function against instantaneous short circuit.

Residual Current Protection Devices		
Family Name		Typology
RC	+	Inst: instantaneous type "A" Sel: selective type "A" Sel 200: selective type "A" reduced to 200mm B Type: selective type "B"

Example:

- RC Inst: residual current protection device with instantaneous timing;
- RC Sel 200: residual current protection device with adjustable time trip, reduced to 200mm;
- RC B type: residual current protection device "B" type.



The SACE Tmax XT Ranges

Index

The SACE Tmax XT family ranges	2 /2
Circuit-breakers for power distribution	
Main characteristics	2/3
Thermomagnetic trip units	2 /5
Electronic trip units	2 /7
Circuit-breakers for motors protection	
Main characteristics	2 /15
Magnetic trip units	2 /17
Electronic trip units	2 /18
Circuit-breakers for generator protection	
Main characteristics	2 /22
Circuit-breakers for oversized neutral protection	
Main characteristics	2 /26
Switch-disconnectors	
Main characteristics	2 /28
Special applications	
Communication system	2 /30

The SACE Tmax XT family ranges

The SACE Tmax XT moulded-case circuit-breaker family complies with different installation requirements. Circuit-breakers are available with trip units dedicated to different applications, such as power distribution, generator protection, motor protection and oversized neutral protection. Some of these circuit-breakers can also be used in communication systems and plants that function at 400Hz. Switch-disconnectors are also available.

In = Rated uninterrupted current ^(G2.2)	XT1 160	XT2 160	XT3 250	XT4 250
Power distribution				
Thermomagnetic trip units				
TMD/TMF	16160		63250	
TMD/TMA		1.6160		16250
Electronic trip units				
Ekip LS/I		10160		40250
Ekip I		10160		40250
Ekip LSI		10160		40250
Ekip LSIG		10160		40250
Ekip E-LSIG				40250
Motor protection				
Magnetic trip units				
MF/MA	3.2125	1160 ⁽¹⁾	100200 ⁽¹⁾	10200(1)
Electronic trip units				
Ekip M-I		20100(1)		
Ekip M-LIU		25160 ⁽¹⁾		40160(1)
Ekip M-LRIU		25100 ⁽¹⁾		40200(1)
Generator Protection				
Thermomagnetic trip units				
TMG		16160	63250	
Electronic trip units				
Ekip G-LSI		10160		40250
Oversized Neutral Protection 160%				
Electronic trip units				
Ekip N-LS/I		10100 ⁽²⁾		40160(2)
Switch-disconnectors				-
Special applications				
400Hz				
Communication				

⁽¹⁾ Only 3 poles version

⁽²⁾ Only 4 poles version

Main characteristics

SACE Tmax XT moulded-case circuit-breakers are the ideal solution for all distribution levels, from the main low voltage switchboard to the subswitchboards in the installation. They feature high specific let-through current peak and energy limiting characteristics that allow the circuits and equipment on the load side to be sized in an optimum way. SACE Tmax XT circuit-breakers with thermomagnetic and electronic trip units protect against overloads, short-circuits, earth faults and indirect contacts in low voltage distribution networks.

The SACE Tmax XT family of moulded-case circuit-breakers can be equipped with:

- thermomagnetic trip units^(G3,2), for direct and alternating current network protection, using the physical properties of a bimetal and an electromagnet to detect the overloads and short-circuits;
- electronic trip units^(G3.4), for alternating current network protection. Releases with microprocessor technology obtain protection functions that make the operations extremely reliable and accurate. The power required for operating them correctly is supplied straight from the current sensors of the releases. This ensures that they trip even in single-phase conditions and on a level with the minimum setting.

The electronic protection trip unit consists of:

- 3 or 4 current sensors (current transformers);
- a protection unit;
- an opening solenoid (built into the electronic trip unit).

Characteristics of Electronic trip units SACE Tmax	XT
Operating temperature	-25°C+70°C
Relative humidity	98%
Self-supplied	0.2xIn (single phase) ^{(1) (2)}
Auxiliary supply (where applicable)	24V DC ± 20%
Operating frequency	4566Hz or 360440Hz
Electromagnetic compatibility	IEC 60947-2 Annex F

^{(1) 0.32} x In for Ekip N-LS/I

⁽²⁾ For 10A: 0.4In

Main characteristics

Characteristics of circuit-breakers for power distribution

			XT1			XT	2	XT	3		XT4	
Size(G2.1)	[A]		160)		16	0	25	0	1	60/250	
Poles	[Nr.]		3, 4	1		3,	4	3, 4			3, 4	
Rated service voltage, Ue (G2.4)	(AC) 50-60Hz [V]		690)	:	69	0	69	0		690	
	(DC) [V]		500)		50	0	50	0		500	
Rated insulation voltage, Ui (G2.5)	[V]	800				100	00	80	0		1000	
Rated impulse withstand voltage,	Uimp ^(G2.6) [kV]		8			8		8			8	
Versions		Fixed, Plug-in			Fixe	d, With Plug	drawable, _I -in	Fixe Plug	,	: '	/ithdrawab lug-in	ıle,
Breaking capacities		В	C N	S H	N	S H	L V	N	S	N S	H L	٧
rip units			Thermoma	agnetic	Tł	nermom Electr	agnetic, onic	Thermo		:	omagnetic ectronic	;,
TMD/TMA												
TMD/TMF	•					•••••						
Ekip LS/I					ln	= 10A, 2 100A,	1 25A, 63A, 160A			:	■ A, 63A, 100 DA, 250A)A,
Ekip I			•••••	•	ln	= 10A, 2 100A,	25A, 63A, 160A			:	■ A, 63A, 100 DA, 250A	Α,
Ekip LSI			•••••	•	ln :	= 10A, 2 100A,	25A, 63A, 160A			:	■ A, 63A, 100 DA, 250A	Α,
Ekip LSIG					ln	= 10A, 2 100A,	25A, 63A, 160A			:	■ A, 63A, 100 DA, 250A	Α,
Ekip E-LSIG											■ A, 63A, 100 DA, 250A	Α,
Interchangeability												

[■] Complete circuit-breaker

Thermomagnetic trip units

TMD/TMF

Main characteristics:

- available for XT1 and XT3 in the three-pole and four-pole versions;
- protections:
 - against overload (L): adjustable protection threshold from 0.7...1xln, with inverse long-time trip curve (TMD)*;
 - against instantaneous short-circuits (I): fixed 10xln protection threshold, with instantaneous trip curve;
- 100% neutral protection in four-pole circuit-breakers. 50% neutral protection is only available for In≥125A;
- the thermal protection setting is made by turning the relative cursor on the front of the release.
- * fixed protection at 1xln (TMF)



XT1

TMD/TMF												
Breaking capac	ity	TMD	/TMF	TMD TMD		TMD						
	In [A]	16*	20*	25	32	40	50	63	80	100	125	160
I, = 1xIn (TMF)	Neutral [A] - 100%	16	20	25	32	40	50	63	80	100	125	160
I ₁ = 0.71xln (TMD	n) Neutral [A] - 50%	-	-	-	-	-	-	-	-	-	80	100
	I ₃ [A]	450	450	450	450	450	500	630	800	1000	1250	1600
	Neutral [A] - 100%	450	450	450	450	450	500	630	800	1000	1250	1600
l ₃ = 10xIn	Neutral [A] - 50%	-	-	-	-	-	-	-	-	-	800	1000

^{* 16}A and 20A for N, S, H have the TMF trip unit

TMD								
	In [A]	63	80	100	125	160	200	250
J = 1	Neutral [A] - 100%	63	80	100	125	160	200	250
I ₁ = 0.71xIn	Neutral [A] - 50%	-	-	-	80	100	125	160
	I ₃ [A]	630	800	1000	1250	1600	2000	2500
	Neutral [A] - 100%	630	800	1000	1250	1600	2000	2500
$I_{3} = 10xIn$	Neutral [A] - 50%	_	_	-	800	1000	1250	1600

Thermomagnetic trip units

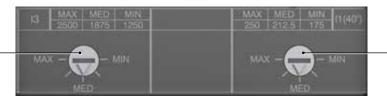
TMD/TMA

Main characteristics:

- available for XT2 and XT4 in the three-pole and four-pole versions;
- - against overload (L): adjustable protection threshold from 0.7...1xln, with inverse long time trip curve;
 - against instantaneous short-circuit (I):
 - fixed protection threshold for In≤32A,
 - adjustable threshold beteewn 8...10xln for 40A,
 - adjustable threshold beteewn 6...10xln for 50A,
 - adjustable threshold beteewn 5...10xln for In≥63A;
- 100% neutral protection in four-pole circuit-breakers. 50% neutral protection is only available for In≥125A;
- the thermal and magnetic protection settings are made by turning the relative cursors on the front of the release.

Example with XT4 250A

Rotary switch for magnetic protection setting



Rotary switch for thermal protection setting

XT2

ı	IVI	D/	ı	IVI	A
_				_	Г
		ı	ı		

	In [A]	1.6(1)	2(1)	2.5(1)	3.2(1)	4(1)	5(1)	6.3(1)	8(1)	10(1)	12.5(1)	16	20	25	32	40	50	63	80	100	125	160
	Neutral [A] - 100%	1.6	2	2.5	3.2	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160
$I_1 = 0.71xIn$	Neutral [A] - 50%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80	100
	TMD	16	20	25	32	40	50	63	80	100	125	300	300	300	320							
	TMA																				625	
										<u> </u>			<u>.</u>			400	500	630	800	1000	1250	1600
	Neutral [A] - 100%	16	20	25	32	40	50	63	80	100	125	300	300	300	320							
										İ			Ī			400	500	630	800	1000	1250	1600
	Neutral [A] - 50%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400	500
																					800	1000

⁽¹⁾ Available only as complete circuit-breaker

XT4

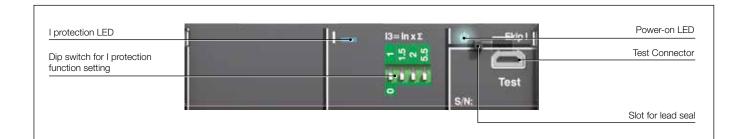
IMD/IMA															
	In [A]	16	20	25	32	40	50	63	80	100	125	160	200	225	250
	Neutral [A] - 100%	16	20	25	32	40	50	63	80	100	125	160	200	225	250
I ₁ = 0.71xIn	Neutral [A] - 50%	-	-	-	-	-	-	-	-	-	80	100	125	125	160
	TMD	300	300	300	320										
	TMA					300 400	300 500	315 630	400 800	500 1000	625 1250	800 1600	1000 2000	1125 2250	1250 2500
	Neutral [A] - 100%	300	300	300	320	300 400	300 500	315 630	400 800	500 1000	625 1250	800 1600	1000 2000	1125 2250	1250 2500
	Neutral [A] - 50%	-	-	-	-	-	-	-	-	-	315 630	500 1000	625 1250	625 1250	500 1000

Electronic trip units

Ekip I

Main characteristics:

- usable with the XT2 and XT4 circuit-breaker in the three-pole and four-pole versions;
- protections:
 - against instantaneous short-circuit (I): adjustable protection threshold from 1...10xln, with instantaneous trip curve;
 - of the neutral in four-pole circuit-breakers:
 - for In≥100A in the OFF or ON positions, 50% and 100% of the phases can be selected;
 - for In<100A, neutral protection is fixed at 100% of the phases and disableded by user;
- manual setting using the relative dip-switches, which allow the settings to be made even when the trip unit is off;
- LED:
 - LED lit with a steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xln;
 - LED with a steady red light, indicating that protection I has tripped; red LED light on connecting Ekip TT or Ekip T&P accessories after circuit-breaker opening for "I protection" interven-
 - Ekip I is equipped with a trip coil disconnection protection device that detects whether the opening solenoid has disconnected. Signalling is made by the red LED flashing;
- test connector on the front of the trip unit;
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted and the I protection function test to be carried out;
- self-supply from a minimum current of 0.2xln up.



Ekip I

Protection function	Trip threshold	Trip curve ⁽¹⁾	Excludability	Relation
Against sho adjustable ti instantaneoi	Manual setting: I ₃ = 1, 1.5, 2, 2.5, 3, 3.5, 4.5, 5.5, 6.5, 7, 7.5, 8, 8.5, 9, 10xln Tolerance: ±20% l>4ln ±10% l≤4ln	≤20ms	Yes	t = k

⁽¹⁾ Tollerances in case of:

 $-\,2$ or 3 phase power supply. In conditions other than those considered, the trip time is $\leq\!60\text{ms}.$

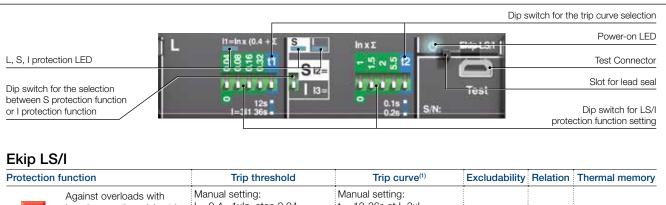
⁻ self-powered trip unit at full power;

Electronic trip units

Ekip LS/I

Main characteristics:

- available for XT2 and XT4 in the three-pole and four-pole versions;
- protections:
 - against overload (L): 0.4...1xln adjustable protection threshold, with adjustable time trip curve;
 - against short-circuit with delay (S): 1...10xln adjustable protection threshold, with adjustable time trip curve (as an alternative to I protection);
 - against instantaneous short-circuit (I): 1...10xln adjustable protection threshold, with instantaneous trip curve (as an alternative to S protection);
 - of the neutral in four-pole circuit-breakers:
 - for In ≥100A can be selected in the OFF or ON positions, 50%, 100% of the phases;
 - for In <100A, neutral protection is fixed at 100% of the phases and disableded by user;
- manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- LED:
 - LED with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xln;
 - red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xl,;
 - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - LS/I: LED with steady red light, shows that the protection has tripped. After the circuitbreaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
 - Ekip LS/I is equipped with a trip coil disconnection detection device that detects whether the opening solenoid has disconnected. Signalling is made by all the red LEDs flashing simultaneously;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted and the protection functions test to be carried out;
- thermal memory which can be activated by Ekip T&P;
- self-supply from 0.2xln minimum current up.



Protection function		Trip threshold	Trip curve ⁽¹⁾	Excludability	Relation	Thermal memory	
long inverse time delay trip according to IEC 60947-2 Standard		I ₁ = 0.41xIn step 0.04 Tolerance: trip between 1.051.3 I, (IEC 60947-2)	Manual setting: t,= 12-36s at l=3xl, Tolerance: ±10% up to 4xln ±20% from 4xln		t = k/l²	Yes	
s	Against short-circuits with indipendend time delay (t=k) Against short-circuits with indipendend time delay (t=k) Manual setting: I ₂ = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xln Tolerance: ±10%		t ₂ = 0.1-0.2s Tolerance: ±15%	Yes	t = k	-	
	Against short-circuits with adjustable treshold and instantaneous trip time	Manual setting: I _s = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	≤20ms	Yes	t = k	-	

- (1) Tollerances in case of:
 - self-powered trip unit at full power;
 - 2 or 3 phase power supply.
 In conditions other than those considered, the following tollerance hold:

Protection	Trip threshold	Trip time
L	release between 1.05 and 1.3 x I,	±20%
S	±10%	±20%
I	±15%	≤60ms

Ekip LSI and Ekip LSIG

Main characteristics:

- available for XT2 and XT4 in three-pole and four-pole versions;
- protections:
 - against overloads (L): 0.4...1xln adjustable protection threshold, with adjustable time trip curve;
 - against short-circuits with delay (S): 1...10xln adjustable protection threshold, with adjustable time trip curve (short inverse time (t=k²) or indipendent time (t=k));
 - against instantaneous short-circuits (I): 1...10xln adjustable protection threshold, with instantaneous trip curve;
 - against earth faults (G): 0.2...1xln adjustable protection threshold, with indipendent time trip curve;
 - of the neutral in four-pole circuit-breakers:
 - for In≥100A can be selected in OFF or ON, 50%, 100% of phases;
 - for In<100A neutral protection is fixed on 100% of phases and disableded by user;

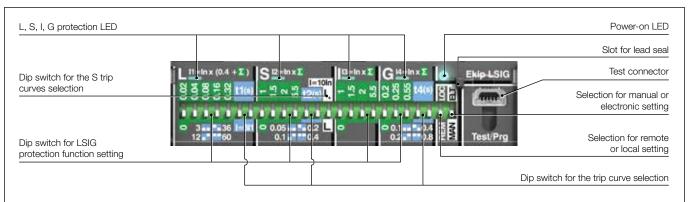
settina:

- manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- electronic setting, made both locally using the Ekip T&P or Ekip Display accessory and via remote control, by means of the Ekip Com unit;

I FD:

- LED on with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xln;
- red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xl,;
 - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - LSIG: LED with steady red light, shows that the protection has tripped. After the circuitbreaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
- the trip unit is equipped with a device that detects the eventual opening solenoid disconnection thanks to the simultaneous blinking of all the LED;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about the latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted, the protection functions test to be carried out, electronic setting of the protection functions of the trip unit and of the communication parameters;
- thermal memory which can be activated by Ekip T&P or Ekip Display;
- self-supply from a minimum current of 0.2xln up;
- the three-pole version can be accessorized with external neutral;
- with the addition of the Ekip Com in the circuit-breaker, you can:
 - acquire and transmit a wide range of information via remote control;
 - accomplish the circuit-breaker opening and closing commands by means of the motor operator in the electronic version (MOE-E);
 - know the state of the circuit-breaker (open/closed/trip) via remote control;
 - setting the configuration and programming the unit, such as the current thresholds and the protection function curves.

Electronic trip units



Ekip LSI – Ekip LSIG

Against overloads with long inverse time delay trip		Trip threshold	Trip curve ⁽¹⁾	Excludability	Relation	Thermal memory	
		Manual setting: I ₁ = 0.41xIn step 0.02 Tolerance: trip between 1.051.3 I ₁ (IEC 60947-2)	Manual setting: $t_1 = 3-12-36-60s$ at $1=3xI_1$ Tolerance: $\pm 10\%$ up to $4xIn$ $\pm 20\%$ from $4xIn$	-	t = k/l ²	Yes	
according to IEC 60947-2 Standard	according to IEC 60947-2	Electronic setting: I ₁ = 0.41xln step 0.01 Tolerance: trip between 1.051.3 I ₁ (IEC 60947-2)	Electronic setting: t ₁ = 360s at I=3xI ₁ step 0.5 Tolerance: ±10% up to 4xIn ±20% from 4xIn	-	t = k/l²	Yes	
Against short-circuits with inverse short (t=k/l²) or indipendent (t=k) time delay trip	$\begin{aligned} & \text{Manual setting:} \\ & \textbf{I}_2 = \ 1\text{-}1.5\text{-}2\text{-}2.5\text{-}3\text{-}3.5\text{-}4.5\text{-}5.5\text{-}} \\ & 6.5\text{-}7\text{-}7.5\text{-}8\text{-}8.5\text{-}9\text{-}10\text{xIn} \end{aligned}$ $& \text{Tolerance:} \ \ \pm 10\%$	$\begin{array}{ll} \text{Manual setting:} \\ \textbf{t}_2 = \ 0.05\text{-}0.10\text{-}0.20\text{-}0.40\text{s} \\ \text{at } 10\text{xln} \\ \\ \text{Tolerance: } \pm 10\% \text{ up to } 4\text{xln} \\ \pm 20\% \text{ from } 4\text{xln} \\ \end{array}$	Yes	t = k/l²	-		
	with inverse short (t=k/l²) or indipendent (t=k) time	Electronic setting: $I_2 = 110$ xln step 0.1 Tolerance: $\pm 10\%$	Electronic setting: t_2 = 0.050.40s at 10xln step 0.01 Tolerance: ±10% up to 4xln ±20% from 4xln	Yes	t = k/l²	-	
		Manual setting: I ₂ = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	Manual setting: $t_2 = 0.05-0.1-0.2-0.4s$ Tolerance: $\pm 15\%$ $t_2 > 100ms$ $\pm 20\%$ $t_2 \le 100ms$	Yes	t = k	-	
		Electronic setting: $I_2 = 110$ xln step 0.1 Tolerance: ±10%	Electronic setting: t_2 = 0.050.4s step 0.01 Tolerance: ±15% t_2 >100ms ±20% t_2 ≤100ms	Yes	t = k	-	
П	Against short-circuits with adjustable threshold and	Manual setting: I ₃ = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	≤40ms	Yes	t = k	-	
ir	instantaneous trip time	Electronic setting: $I_3 = 110$ xln step 0.1 Tolerance: ±10%	≤40ms	Yes	t = k	-	
G	Against earth fault with independent time delay	Manual setting: I ₄ = 0.2-0.25-0.45-0.55-0.75- 0.8-1xIn Tolerance: ±10%	Manual setting: t_4 = 0.1-0.2-0.4-0.8s Tolerance: ±15%	Yes	t = k	-	
	trip ⁽²⁾	Electronic setting: $I_4 = 0.21$ xln step 0.02 Tolerance: ±10%	Electronic setting: $t_4 = 0.10.8s$ step 0.05 Tolerance: ±15%	Yes	t = k	_	

⁻ self-powered trip unit at full power;
- 2 or 3 phase power supply.
In conditions other than those considered, the following tollerance hold:

	Protection	Trip threshold	Trip time			
	L	release between 1.05 and 1.3 x I,	±20%			
	S ±10% I ±15%		±20%			
			≤60ms			
	G ⁽³⁾	Ifault>15A ±15%, Ifault≤15A up to 50%	Ifault>15A ±20%, Ifault≤15A up to 40%			

Protection G is inhibited for currents

higher than 2 ln. $\,^{\mbox{\tiny{(3)}}}$ Ask ABB for further clarifications

Ekip E-LSIG

Main characteristics:

- available for XT4 in three-pole and four-pole versions;
- protections:
 - against overloads (L): 0.4...1xln adjustable protection threshold, with adjustable time trip curve:
 - against short-circuits with delay (S): 1...10xln adjustable protection threshold, with adjustable time trip curve;
 - against instantaneous short-circuits (I): 1...10xln adjustable protection threshold, with instantaneous trip curve;
 - of the neutral in four-pole circuit-breakers;

measurements:

- available from 0xln in Vaux mode and starting from 0.5xln in self supply mode; external current or voltage transformers are not required. See table for ranges and accuracy;
- Currents: three phases (L1, L2, L3), neutral (Ne) and earth fault;
- Voltage: phase-phase, phase-neutral;
- Power: active, reactive and apparent;
- Power factor:
- Frequency and peak factor;
- Energy: active, reactive, apparent, counter;

setting:

- manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- electronic setting, made both locally using Ekip T&P or Ekip Display accessory and via remote control, by means of the dialogue unit Ekip Com. The electronic setting have a wider range and a thicker regulation step.

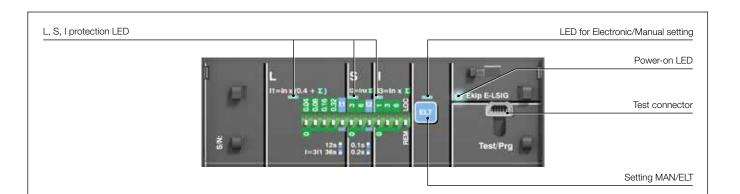
Use of electronic setting allows other functions to be activated:

- function for protection against earth faults (G): 0.2..1xln adjustable protection threshold, with a time constant trip curve;
- over voltage protection 0.5...0.95 Un with a time constant trip curve;
- under voltage protection 1.05...1.2 Un with a time constant trip curve;

LED:

- LED on with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xln;
- red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xl,;
 - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - fixed LED MAN/ELT show the kind of active parameters;
 - LSIG: LED with steady red light, shows that the protection has tripped. After the circuitbreaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
- the trip unit is equipped with a device that detects the eventual opening solenoid disconnection thanks to the simultaneous blinking of all the LED;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about the latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted, the protection functions test to be carried out, electronic setting of the protection functions of the trip unit and of the communication parameters;
- self-supply from a minimum current of 0.2xln up; measurements starting from 0.5xln;
- the three-pole version can be accessorized with external neutral current transformer and external neutral voltage connection kit;
- with the addition of the Ekip Com in the circuit-breaker, you can:
 - acquire and transmit a wide range of information via remote control;
 - accomplish the circuit-breaker opening and closing commands by means of the motor operator in the electronic version (MOE-E);
 - know the state of the circuit-breaker (open/closed/trip) via remote control;
 - setting the configuration and programming the unit, such as the current thresholds and the protection function curves.

Electronic trip units



Ekip E-LSIG

rotection function	Trip threshold	Trip curve ⁽¹⁾	Excludability	Relation	
Against overloads with	Manual setting: I,= 0.41xln step 0.04 Tolerance: trip between 1.051.3 I, (IEC 60947-2)	Manual setting: t ₁ = 12-36s at I=3xI ₁ Tolerance: ±10% up to 4xIn ±20% from 4xIn	-	t = k/l ²	
long inverse time delay according to IEC 6094		Electronic setting: t ₁ = 360s at I=3xI ₁ step 0.5 Tolerance: ±10% up to 4xIn ±20% from 4xIn	-	t = k/l ²	
	Manual setting: I ₂ = OFF 3-6-9 Tolerance: ±10%	Manual setting: t ₂ = 0.10-0.20s at 10xln Tolerance: ±10% up to 4xln ±20% from 4xln	Yes	t = k	
Against short-circuits with inverse short (t=k/l²) or indipendent (t=k) time delay trip		Electronic setting: t ₂ = 0.050.4s at 10xIn step 0.01 Tolerance: ±10% up to 4xIn ±20% from 4xIn	Yes	t = k	
	Electronic setting: $I_2 = 110$ xln step 0.1 Tolerance: $\pm 10\%$	Electronic setting: t_2 = 0.050.4s step 0.01 Tolerance: ±10% up to 4xln ±20% from 4xln	Yes	t = k/l ²	
Against short-circuits w		≤40ms	Yes	t = k	
adjustable threshold and instantaneous trip time		≤40ms	Yes	t = k	
Against earth fault with independent time delay trip ⁽²⁾		Electronic setting: t ₄ = 0.10.8s step 0.05s Tolerance: ±15%	Yes	t = k	
Standard adjustable constant tim	Standard adjustable constant time Electronic setting: $U_{\rm g}=0.50.95 {\rm xUn}$ step=0.01xUn Tolerance: $\pm 5\%$		Yes	t = k	
Against overvoltage with adjustable constar time	Electronic setting: U _g = 1.051.2xUn step=0.01xUn Tolerance: ±5%	Electronic setting: t _g = 0.15s step 0.1s Tolerance: min (±20% ±100ms)	Yes	t = k	

⁽¹⁾ Tollerances in case of:

⁻ self-powered trip unit at full power;
- 2 or 3 phase power supply.
In conditions other than those considered, the following tollerance hold:

Protection Trip threshold		Trip time
L	release between 1.05 and 1.3 x I,	±20%
S	±10%	±20%
I	±15%	≤60ms
G ⁽³⁾	Ifault>15A ±15%, Ifault≤15A up to 50%	Ifault>15A ±20%, Ifault≤15A up to 40%
	•	

⁽²⁾ Protection G is inhibited for currents

higher than 2 ln.
⁽³⁾ Ask ABB for further clarifications

		Value	Range	Accuracy	Specified measuring rang	
Current		Phase current (I1, I2, I3, IN)	0 12 ln	Cl 1	0.2 1.2 ln	
		Phase current minimum value	**			
		Phase current maximum value				
		Ground current (Ig)	0 4 ln	_	-	
Voltage		Phase voltage runtime, max and min (V1N, V2N, V3N) ⁽¹⁾	5 V 480 V	±0.5%	30 V 400 V	
		Line voltage runtime, max and min (U12, U23, U31)	10 V 828 V	±0.5%	50 V 690 V	
Power	Active	Phase power runtime, max and min (P1, P2, P3) ⁽¹⁾	-1440 kW 1440 kW	Cl 2	-120 kW1500 W 1500 W 120 kW ⁽³⁾	
		Total power runtime,	-4320 kW 4320 kW	Cl2	-360 kW4500 W	
		max and min			4500 W 360 kW ⁽³⁾	
	Reactive	Phase power runtime, max and min (Q1, Q2, Q3) (1)	-1440 kVar 1440 kVar	CI 2	-120 kVar1500 Var 1500 Var 120 kVar ⁽³⁾	
		Total power runtime, max and min	-4320 kVar 4320 kVar	Cl 2	-360 kVar4500 Var 4500 Var 360 kVar ⁽³⁾	
	Apparent	Phase power runtime, max and min (S1, S2, S3) (1)	In VA 1440 kVA	CI 2	1500 VA 120 kVA	
		Total power runtime, max and min	750 VA 4320 kVA	CI 2	4500 VA 369 kVA	
Energy	Active Total energy		1 kWh 214,75 GWh	Cl 2	1 kWh 214,75 GWh	
		Incoming energy				
		Outgoing energy				
	Reactive	Total energy	1 kvarh 214,75 GVarh	CI 2	1 kvarh 214,75 GVarh	
		Incoming energy				
		Outgoing energy				
	Apparent	Total energy	1 kVAh 214,75 GVAh	CI 2	1 kVAh 214,75 GVAh	
Power quality		Harmonic analisys (2)	11th (50 - 60Hz)	_	-	
		THD of phase L1, L2, L3 (2)	0 1000%	±10%	0 500%	
		Frequency runtime, max, min	44 440Hz	±0.5%	45 66 Hz	
		PF of phase L1, L2, L3 (1)	-1 1	±2%	-10.5 0.5 1	

Not available if Neutral is not connected
 Available on demand by sending a Modbus command
 O,2ln1,2ln and 30V<Vi<400V

Electronic trip units

Current	Ekip Display	HMI030	Modbus
Phase current (I1, I2, I3, IN)			
Ground current (Ig)			
Voltage	·······		
Phase voltage (V1N, V2N, V3N)			
Phase-phase Voltage (U12, U23, U31)			
Active Power	······································		
Phase active power (P1, P2, P3)			
Total active power	_		
Reactive Power	······································		
Phase power (Q1, Q2, Q3)			
Total reactive power			
Apparent Power	······································		
Phase power (S1, S2, S3)			
Total apparent power	_		
Active Energy			
Total energy			
Incoming energy			
Outgoing energy			
Reactive energy	i		
Total energy			
Incoming energy			
Outgoing energy			
Apparent Energy	······································		
Total apparent energy			
THD (I)	······································		
THD della fase I1			
THD della fase I2			
THD della fase I3			
THD della fase Ne			
Harmonics	······································		
Harmonics phase L1			
Harmonics phase L2			
Harmonics phase L3			
Harmonics phase Ne			
Frequency	<u>.</u>		
Frequency	-		
Power factor	<u>i</u> .		
PF phase I1			
PF phase I2			
PF phase I3			
Total Power Factor			

Main characteristics

The safety and reliability of the solution are important aspects that must be considered when choosing and manufacturing the system for starting [G4.3 and G4.4] and monitoring motors.

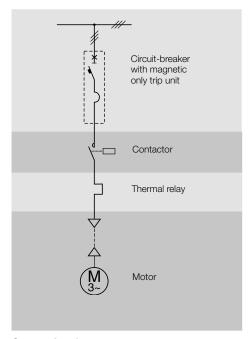
Start-up is a particularly critical phase for the motor itself and for the installation powering it. Even rated service needs to be adequately monitored and protected so as to deal with any faults that might occur.

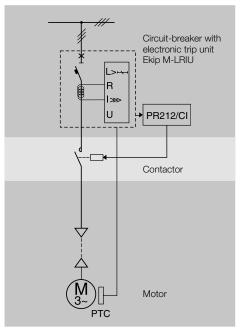
When it comes to direct starting, ABB SACE proposes two different solutions:

- **a conventional system** with three poles a circuit-breaker equipped with a magnetic only trip unit for protection against short-circuits, a thermal relay for protection against overloads and phase failure or imbalance, and a contactor to operate the motor;
- **an advanced protection system** which integrates all the protection and monitoring functions, and a contactor for operating the motor, in the circuit-breaker itself.

Several different factors must be considered when choosing and coordinating the protection and operating devices, e.g.:

- the electrical specifications of the motor (type, power rating, efficiency, cosφ);
- the starting type and diagram;
- the fault current and voltage in the part of the network where the motor is installed.





Conventional system

Advanced protection system

Consult the QT7 Technical Application Paper: "The asynchronous three-phase motor: general information and ABB's offer for coordinating the protections" for further details.

The motor protection and operating devices must be chosen in accordance with the coordination tables provided by ABB either through documentation "Coordination tables" or on the web site: http://www.abbcontrol.fr/coordination_tables/.

Main characteristics

Characteristics of circuit-breakers for protecting motors

			XT1	XT2	XT3	XT4	
Size(G2.1)		[A]	160	160	250	160/250	
Poles	•••••	[Nr.]	3	3	3	3	
D-11	(AC) 50-60Hz	[V]	690	690	690	690	
Rated service voltage, Ue (G2.4)	(DC)	[V]	500	500	500	500	
Rated insulation voltage, Ui (G2.5)		[V]	1000	1000	800	1000	
Rated impulse withstand voltage	, Uimp ^(G2.6)	[kV]	8	8	8	8	
Versions		•••••	Fixed, Plug in	Fixed, Withdrawable, Plug-in	Fixed, Plug-in	Fixed, Withdrawable, Plug-in	
Breaking capacities		•••••	N ⁽¹⁾	N S H L V	N S	N S H L V	
Trip Units		•••••	Magnetic	Magnetic, Electronic	Magnetic	Magnetic, Electronic	
MF/MA							
Ekip M-I		•••••		■ In = 20A, 32A, 52A, 100A			
Ekip M-LIU		•••••		▲ In = 25A, 63A, 160A		In = 40A, 63A, 100A, 160A	
Ekip M-LRIU			In = 25A, 63A, 100A		In = 40A, 63A, 100A, 160A, 200A		
Interchangeability	•	• • • • • • • • • • • • • • • • • • • •					

⁽¹⁾ Icu@415V = 5kA In<16A

Complete circuit-breaker

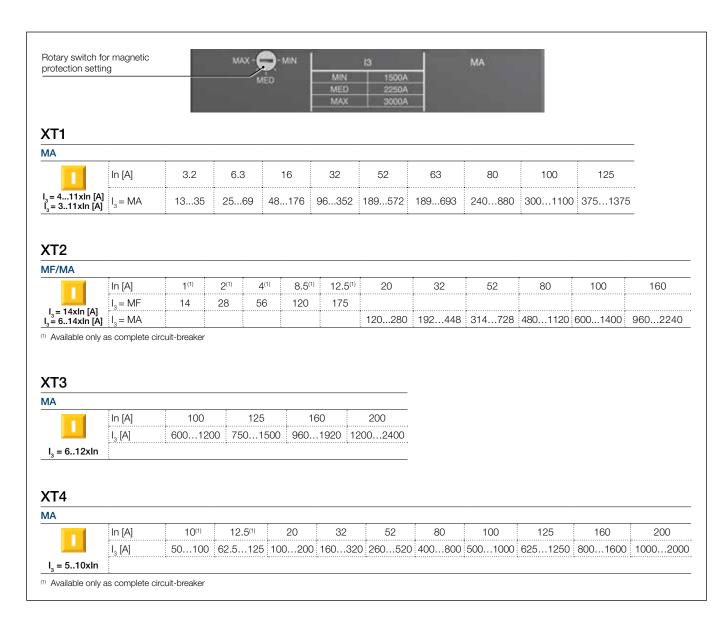
Loose trip unit

Magnetic trip units

MF/MA

Main characteristics:

- available for XT1, XT2, XT3 and XT4 in the three-pole version only, these trip units are mainly used for protecting motors, in conjunction with a thermal relay and a contactor;
- protections:
 - against instantaneous short-circuit (I) for XT1: for In≤6.3A the protection threshold is adjustable from 4..11xln; whereas for In>6.3A the protection threshold I is adjustable from 3..11xln;
 - against instantaneous short-circuit (I) for XT2: for In≤12.5A the protection threshold I is fixed at 14xIn, whereas for In>12.5A the protection threshold I is adjustable from 6..14xIn;
 - against instantaneous short-circuit (I) for XT3: the protection threshold I is adjustable from 6..12xln;
 - against instantaneous short-circuit (I) for XT4: the protection threshold I is adjustable from 5..10xln;
- the magnetic protection setting is made by turning the relative cursor on the front of the release.



Electronic trip units

Ekip M-I

Main characteristics:

- only available for XT2 in three-pole version. It is normally used in combination with a thermal relay and a contactor for motor protection;
- protections:
 - against instantaneous short-circuit (I): protection threshold adjustable from 6...14xIn, with instantaneous trip curve;
- manual setting by means of the special dip-switches positioned on the front of the trip unit, which allow its adjustment even with the trip unit off;
- LED:
 - fixed green LED which indicates correct operation of the trip unit; the LED lights up for a current over 0.2xln;
- Test connector positioned on the front of the trip unit:
 - for connection of the Ekip TT test unit, which allows the trip test and the LED test;
 - for connection of the Ekip T&P unit, which allows the measurements to be read, to carry out the trip test and to carry out the protection function test;
 - self-supply starting from a minimum current of 0.2 x ln.



Ekip M-I

Protection function		Trip threshold	Trip curve ⁽¹⁾	Excludability	:	Thermal memory
a	gainst short-circuits with djustable threshold and astantaneous trip time	Manual setting: I ₃ = 6-6,5-7-7,5-8-8,5-9-9,5- 10,5-11-11,5-12-12,5-13- 13,5-14xln Tolerance: ±10%	≤15ms	-	t = k	-

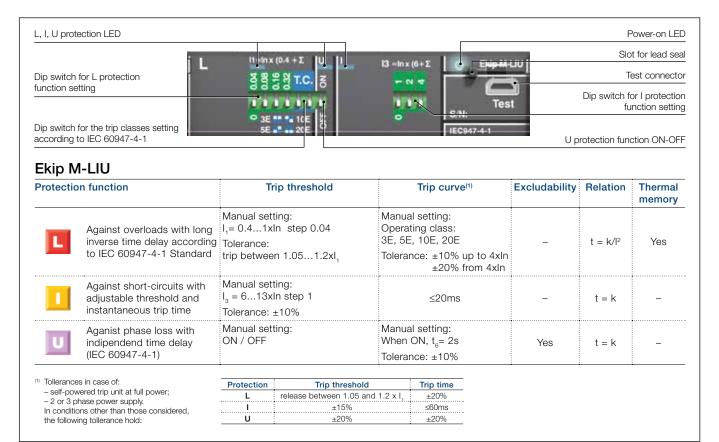
- (1) Tollerances in case of:
 - self-powered trip unit at full power;
 - 2 or 3 phase power supply.
 In conditions other than those considered, the following tollerance hold:

Protection	Trip threshold	Trip time
l l	±15%	≤60ms

Ekip M-LIU

Main characteristics:

- available for XT2 and XT4 in the three-pole version, this device protects motors. The L protection function protects the motor against overloads, in accordance with the indications and classes defined by standard IEC 60947-4-1;
- protections:
 - against overloads (L): 0.4...1xln adjustable threshold. The operating time is established by choosing the operating class defined by Standard IEC 60947-4-1: Class 3E, 5E, 10E, 20E;
 - against short-circuits (I): 6...13xln adjustable threshold with instantaneous operating time;
 - against phase loss (U): the protection can be selected either in the ON or OFF position. With selector in ON position, circuit breaker trips if at least one current phase is lower than 0.1xln and at least a second one higher than 0.5xl1;
- manual setting using the relative dip-switches on the front of the release;
- LED:
 - LED on with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xln;
 - red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xl,;
 - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - LIU: LED with steady red light, shows that the protection has tripped. After the circuit-breaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
 - release Ekip M-LIÜ is equipped with a trip coil disconnection detection device that detects whether the opening solenoid has disconnected. Signalling is made by all the red LEDs flashing simultaneously;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about the latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted and the protection function test to be carried out;
- thermal memory always active;
- self-supply starting from a minimum current of 0.2xln.



Electronic trip units

Ekip M-LRIU

Main characteristics:

- available for XT2 and XT4 in the three-pole version, this device is generally used for protecting integrated motors;
- protections:
 - against overloads (L): 0.4...1xln adjustable threshold. The operating time is established by choosing the operating class defined by standard IEC 60947-4-1;
 - rotor locking (R): with adjustable threshold in the OFF position or from 3...9xl₁, with settable operating time;
 - against instantaneous short-circuits (I): with adjustable threshold from 6...13xln and instantaneous operating time;
 - against phase loss (U): With selector in ON position, circuit breaker trips if at least one current phase is lower than 0.1xln and at least a second one higher than 0.25xln;

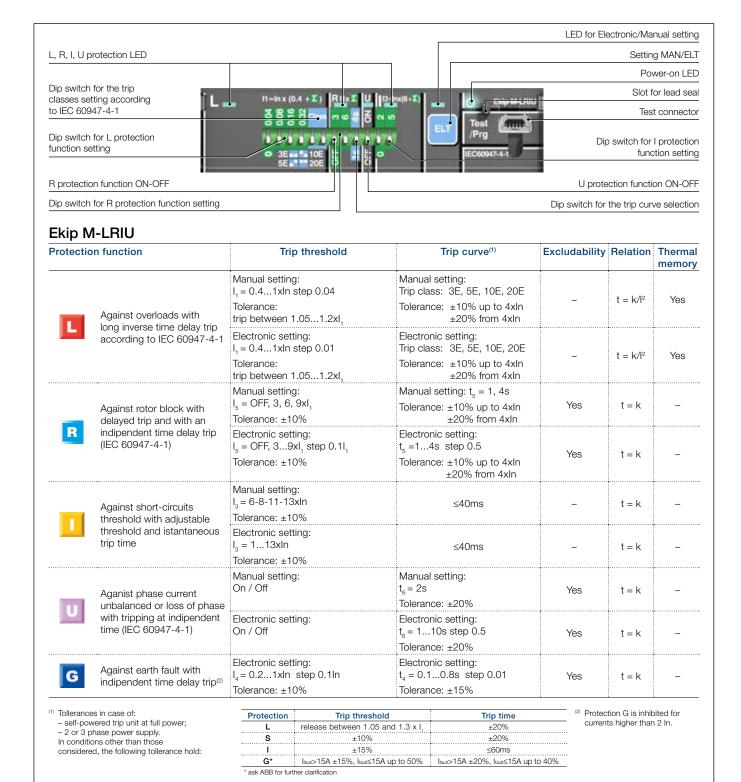
setting:

- manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- electronic setting, made both locally using Ekip T&P or Ekip Display accessory and via remote control, by means of the dialogue unit Ekip Com. Use of electronic setting allows other functions to be activated:
 - function for protection against earth faults (G): 0.2..1xln adjustable protection threshold, with a time constant trip curve;
 - duty mode setting (Normal/Heavy):
 - the Normal duty mode requires use of a circuit-breaker and a contactor. In the case of tripping, the Ekip M-LRIU release commands the opening of the contactor via PR212/CI;
 - the Heavy duty mode foresees circuit-breaker opening for all overcurrent conditions, and just the function of motor operation is entrusted to the contactor;
 - BACK UP function:
 - this protection is designed to handle the situation whereby, in the Normal duty mode, the opening command transmitted to the contactor via PR212/CI has not been implemented, i.e. the contactor has not tripped. If this happens, the Ekip M-LRIU release transmits a trip command directly to the circuit-breaker after having waited a time defined. A waiting time between the command transmitted to the contactor and the back-up command transmitted to the circuit-breaker is required so as to take the contactor opening time into account;
 - PTC protection setting:
 - PTC: this protection, monitors the temperature inside the protected motor by means of a PTC sensor. If the temperature is too high, the Ekip M-LRIU release will command contactor opening (if the mode is "Normal") or circuit-breaker opening (if the mode is "Heavy"). To realize this protection is necessary to order the connector available for PTC;

LED:

- LED on with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xln;
- red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xl,;
 - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - fixed LED ELT show the kind of active parameters;
 - LRIU: LED with steady red light, shows that the protection has tripped. After the circuitbreaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
- Ekip M-LRIU is equipped with a trip coil disconnection detection device that detects whether the opening solenoid has disconnected. Signalling is made by all the LEDs flashing simultaneously;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about the latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted, the protection function test to be carried out, and electronic setting of the protection function of the release and of the communication parameters;
- thermal memory always active;
- self-supply from a minimum current of 0.2xln up;

- with the addition of the Ekip Com in the circuit-breaker, you can:
 - acquire and transmit a wide range of information via remote control;
 - accomplish the circuit-breaker opening and closing commands by means of the motor operator in the electronic version (MOE-E);
 - know the state of the circuit-breaker (open/closed/trip) via remote control;
 - setting the configuration and programming parameters of the unit, such as the current thresholds and the protection function curves.



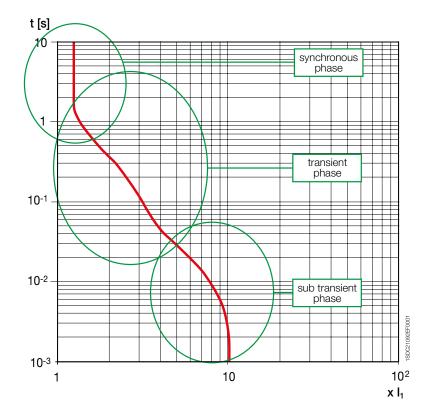
Circuit-breakers for generator protection

Main characteristics

SACE Tmax XT circuit-breakers can be equipped with thermomagnetic trip units with a low magnetic threshold.

This type of release can been designed and made so as to provide a solution for protecting small generators and distribution networks with very long cables (slight end of line fault current owing to the high cable impedance).

Generator protection requires a low magnetic threshold, typically about three times circuit-breaker's rated current, so as to "cut" the short-circuit current in the "transient" zone of the decrement curve of the generator fault current. Consult the "Electrical installation handbook" ABB SACE guide vol. 2 for further details.



Characteristics of circuit-breakers for protecting generators

		•	0 0				
			XT2)	CT3	XT4
Size(G2.1)		[A]	160		2	250	160/250
Poles		[Nr.]	3, 4		(3, 4	3, 4
Rated service voltage, Ue (G2.4)	(AC) 50-60Hz	[V]	690		(590	690
	(DC)	(DC) [V]			Ę	500	500
Rated insulation voltage, Ui (G2.5)		[V]] 1000		800		1000
Rated impulse withstand voltage, Uimp (G2.6) [kV]		8		8		8	
Versions			Fixed, Withdrawable, Plug-in		Fixed, Plug-in		Fixed, Withdrawable, Plug-in
Breaking capacities			N	S	N	s	N S
Trip units			Thermomagnetic, Electronic				c Electronic
TMG							
Ekip G-LS/I			In = 10A, 25A, 63A,	100A, 160A			In = 40A, 63A, 100A, 160A, 250A
Interchangeability	•						

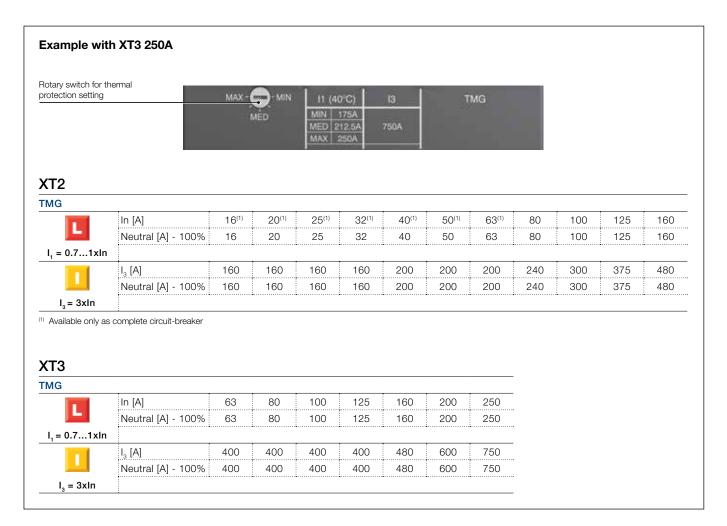
[■] Complete circuit-breaker

[▲] Loose trip unit

TMG

Main characteristics:

- available for XT2 and XT3 in the three-pole and four-pole versions;
- protections:
 - against overloads (L): adjustable 0.7...1xln protection threshold, with inverse long-time trip curve:
 - against instantaneous short-circuits (I): fixed 3xIn protection threshold, with instantaneous trip curve;
 - 100% neutral protection in four-pole circuit-breakers;
- the thermal protection setting is made by turning the relative cursor on the front of the release.



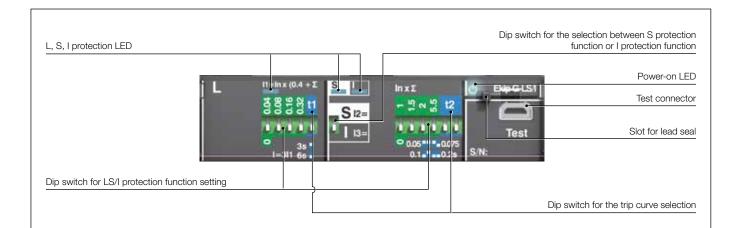
Circuit-breakers for generator protection

Main characteristics

Ekip G-LS/I

Main characteristics:

- available for XT2 and XT4 in the three-pole and four-pole versions. Allows the protection against overloads to be extensively adjusted;
- protections
 - against overloads (L): I₁=0.4...1xln adjustable protection threshold, with inverse long-time trip curve:
 - against delayed short-circuits (S): 1...10xln adjustable protection threshold, with adjustable trip curve (as an alternative to I protection);
 - against instantaneous short-circuits (I): 1...10xln adjustable protection threshold, with instantaneous operating time (as an alternative to S protection);
 - neutral, in four-pole circuit-breakers, can be set in the OFF, ON positions at 50% or 100% of the phases;
- manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- I FD:
 - LED on with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xln;
 - red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding setted threshold;
 - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - LS/I: LED with steady red light, shows that the protection has tripped. After the circuitbreaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
 - Ekip G-LS/I is equipped with a trip coil disconnection detection device that detects whether the opening solenoid has disconnected. Signalling is made by all the LEDs flashing simultaneously;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about the latest trip happened;
 - for connecting the Ekip T&P unit which allows the measurements to be read and the trip test to be carried out;
- thermal memory which can be activated by Ekip T&P;
- self-supply from 0.2xln up.



Ekip G-LS/I

Protection function		Trip threshold	Trip curve ⁽¹⁾	Excludability	Relation	Thermal memory
L	Against overloads with inverse long-time delayed tripping according to IEC 60947-2 standard	Manual setting: I ₁ = 0.41xIn step 0.04 Tolerance: trip between 1.051.3xI ₁ (IEC 60947-2)	$\begin{aligned} &\text{Manual setting:} \\ &t_1 = 3\text{-6s at I} = 3\text{xl}_1 \\ &\text{Tolerance: } \pm 10\% \text{ up to } 4\text{xln} \\ &\pm 15\% \text{ from } 4\text{xln} \end{aligned}$	-	t = k/l²	Yes
S	Against short-circuit with indipendent time delay trip	Manual setting: $I_2 = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xIn$ Tolerance: ±10% up to 2xIn ±20% from 2xIn	$\begin{aligned} \mathbf{t_2} &= 0.05\text{-}0.075\text{-}0.1\text{-}0.2s \\ &\text{Tolerance: } \pm 10\% \ \mathbf{t_2}\text{>}0.075 \\ &\pm 20\% \ \mathbf{t_2}\text{\leq}0.075 \end{aligned}$	Yes	t = k	-
	Against short-circuits with adjustable threshold and istantaneous trip time	Manual setting: I _g = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	≤20ms	Yes	t = k	-

⁽¹⁾ Tollerances in case of:

- self-powered trip unit at full power;

- 2 or 3 phase power supply.

In conditions other than those considered, the following tollerance hold:

Protection	Trip threshold	Trip time
L	release between 1.05 and 1.3 x I,	±20%
S	±10%	±20%
I	±15%	≤60ms
-		

Circuit-breakers for oversized neutral protection

Main characteristics

The SACE Tmax XT range of circuit-breakers with oversized neutral is used in certain applications where harmonics or unbalance loads or single phase create an overload on the neutral conductor. Under these conditions, a current of a considerable value could travel along the neutral conductor. In particular, third-order harmonics and relative multiples add together on the neutral and give rise to a current value that could be higher than the one which travels along the phase conductors. For this reason, circuit-breakers with oversized neutral provide adequate protection in installations where the neutral conductor is sized with a larger section than the phase conductors.

The main types of equipment that generate harmonics are given below by way of example:

- personal computers;
- fluorescent lamps;
- static converters;
- no-break power units;
- variable speed drives;
- welding machines.

By and large, the wave shape is distorted owing to the presence of semiconductor devices able to conduct for a fraction of the entire cycle, creating discontinuous trends and consequently introducing numerous harmonics.

Consult the "Electrical installation handbook" ABB SACE guide vol. 2 for further details.

Characteristics of circuit-breakers for oversized neutral protection

							XT2									XT4				
Size ^(G2.1)		[A]			160			160/250												
Uninterrupted nominal current, In	•	[A]	10, 63, 100		40, 63, 100, 16					 										
Poles		[Nr.]	4] 4							4								
Rated service voltage, Ue (G2.4)	(AC) 50-60Hz	[V]	690		690															
Rated insulation voltage, Ui (G2.5)		[V]					1000									1000				
Rated impulse withstand voltage, U i	mp ^(G2.6)	[kV]		····•			8									8				
Versions							ndrawa									ndrawat				
Breaking capacity			N		s		Н		L		٧	N		s		Н		L	٧	
Trip units						Ε	lectror	ic					•		Ε	lectroni	С			
Ekip N-LS/I																				
Interchangeability	•••••																		 	

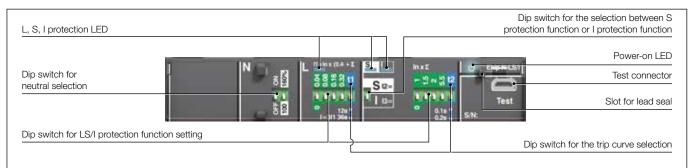
[■] Complete circuit-breaker

[▲] Loose trip unit

Ekip N-LS/I

Main characteristics:

- available for XT2 and XT4 in the four-pole version;
- protections:
 - against overload (L): I,=0.4...1xln adjustable protection threshold, with inverse long-time trip curve;
 - against delayed short-circuits (S): 1...10xln adjustable protection threshold, with adjustable trip curve (as an alternative to I protection);
 - against instantaneous short-circuit (I): 1...10xln adjustable protection threshold, with instantaneous operating time (as an alternative to S protection);
 - neutral can be set in the OFF or ON positions, at 100% or at 160% of the phases;
- manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- LED:
 - LED on with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.32xln;
 - red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xl,;
 - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - LS/I: LED with steady red light, shows that the protection has tripped. After the circuitbreaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
 - Ekip N-LS/I is equipped with a device that detects whether the opening solenoid has disconnected. Signalling is made by all the LEDs flashing simultaneously;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit which allows trip test, LED test and signalling about the latest trip happened;
 - for connecting the Ekip T&P unit, which allows the measurements to be read and the trip test to be carried out;
- thermal memory which can be activated by Ekip T&P;
- self-supply from 0.32xln.



Ekip N-LS/I

Protection	n function	Trip threshold	Time-current curve ⁽¹⁾	Excludability	Relation	Thermal memory
L	Against overloads with inverse long-time delayed tripping. According to IEC 60947-2 Standard		$\begin{aligned} &\text{Manual setting:} \\ &t_1 = 12\text{-}36\text{s at l} = 3\text{xl}_1 \\ &\text{Tolerance:} \pm 10\% \text{ up to } 4\text{xln} \\ & \pm 15\% \text{ from } 4\text{xln} \end{aligned}$	-	t = k/l ²	Yes
S	Against short-circuits with time delay trip (t=k)	$\begin{aligned} & \text{Manual setting:} \\ & \textbf{I}_2 = \ 1 \text{-} 1.5 \text{-} 2 \text{-} 2.5 \text{-} 3.5 \text{-} 4.5 \text{-} 5.5 \text{-} \\ & 6.5 \text{-} 7 \text{-} 7.5 \text{-} 8.8.5 \text{-} 9 \text{-} 10 \text{xIn} \end{aligned}$ $& \text{Tolerance:} \ \ \pm 10\%$	$t_2 = 0.1-0.2s$ Tolerance: ±15%	Yes	t = k	-
	Against short-circuits with istantaneous trip time	Manual setting: I ₃ = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xln Tolerance: ±10%	≤20ms	Yes	t = k	-

- (1) Tollerances in case of:
 - self-powered trip unit at full power;
 2 or 3 phase power supply.

In conditions other than those considered, the following tollerance hold:

Protection	Trip threshold	Trip time
L release between 1.05 and 1.3 x I,		±20%
S	±10%	±20%
I	±15%	≤60ms

Switch-disconnectors

Main characteristics



XT1D



Applications

Switch-disconnectors are generally used as:

and ability to be fitted with accessories).

- general disconnectors of subswitchboards;
- operating and disconnecting devices for lines, pan-assembliess or groups of equipment;

The switch-disconnector (or, in short, disconnector) is a device created from the corresponding circuit-breakers (of which it features the same overall dimensions, versions, fastening mechanisms

The main function of these devices is to disconnect the circuit they are installed in. In the open

- bus-ties:
- general disconnecting devices for groups of machines;
- general group disconnecting devices for motor operation and protection;
- insulation of small tertiary distribution units.

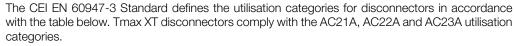


XT3D

Protection

A disconnector is unable to automatically break the short-circuit or overload current. For this reason, each switch-disconnector must be protected on the supply side by a coordinated device that safeguards it against short-circuits. The circuit-breaker able to act as a protection for each switch-disconnector is indicated in the table below.

Category of use (G2.11)





XT4D

Class of use		
Infrequent operation	Frequent operation	Typical applications
AC-21B	AC-21A	Control of resistive loads with overloads of modest entity
AC-22B	AC-22A	Control of mixed resistive and inductive loads with overloads of modest entity
AC-23B	AC-23A	Control of motors or other highly inductive loads

Characteristics of switch-disconnectors

			XT1D	XT3D	XT4D
Size ^(G2.1)		[A]	160	250	250
Rated operating current in class AC	21, le ^(G.2.12)	[A]	160	250	250
Rated operating current in class AC	22, le ^(G.2.12)	[A]	160	250	250
Rated operating current in class AC	23, le ^(G.2.12)	[A]	125	200	200
Poles	•	[Nr.]	3, 4	3, 4	3, 4
Detect convice voltage Lie(G2.4)	(AC) 50-60Hz	[V]	690	690	690
Rated service voltage, Ue (G2.4)	(DC)	[V]	500	500	500
Rated insulation voltage, Ui (G2.5)	•	[V]	800	800	800
Rated impulse withstand voltage, U	imp ^(G2.6)	[kV]	8	8	8
Test voltage at industrial frequency	for 1 min	[V]	3000	3000	3000
Rated making capacity	(Min) Disconnector only	[kA]	2.8	5.3	5.3
in short-circuit, Icm (G2.10)	(Max) With automatic circuit-breaker on supply side	[kA]	154	105	330
Rated short-time withstand current	for 1s, Icw ^(G2.9)	[kA]	2	3	3.6
Versions			Fixed, Plug-in	Fixed, Plug-in	Fixed, Withdrawable, Plug-in

Switch-disconnectors coordination

			Load S.	XT1D	XT3D	XT4D
			lcw [kA]	2	3,6	3.6
Supply S.	Version	lcu	lu lth	160	250	250
	В	18		18	18	18
	С	25		25	25	25
XT1	N	36	160	36	36	36
	S	50		50	50	50
	Н	70		70	50	70
	N	36		36	36	36
	S	50	160	50	50	50
XT2	Н	70		70	50	70
	L	120		70	50	120
	V	150		70	50	150
VTO	N	36	050		36	36
XT3	S	50	250		50	50
	N	36			36	36
	S	50			50	50
XT4	Н	70	160 250		50	70
	L	120	200		50	120
	V	150			50	150

Special applications

Communication system

XT2 and XT4 moulded-case circuit-breakers, equipped with Ekip LSI, Ekip LSIG

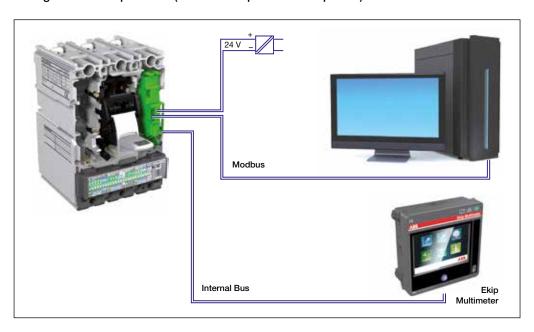
or Ekip M-LRIU trip unit and Ekip Com dialogue module, can be integrated in supervision systems for control and management of electrical and technological plants.

XT2 and XT4 equipped with thermomagnetic trip units or in switch-disconnector version are able to communicate CB status and to be operated remotely, when Ekip Com and MOE-E motor operators are installed.

The communication protocol available is Modbus RTU.

Necessaries accessories for communications are:

- Ekip Com communication module and electronic auxiliary contacts (1Q + 1SY) included in the Ekip Com module. For further details about the Ekip Com communication module, see the paragraph dedicated to this in the Accessories chapter;
- Electronic motor operator MOE-E only if operation from remote is required;



Configuration 1: Supervision (Electronic trip unit and Ekip Com)

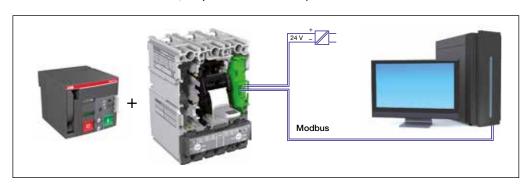
Positioned in the right-hand slot of the circuit-breaker, the Ekip Com accessory connects to the Ekip LSI, Ekip LSIG, Ekip E-LSIG or Ekip M-LRIU trip unit via connector supplied. Six cables come out of Ekip Com, of which two are required for auxiliary supply, two for connection to the Modbus and two for connection to Internal Bus.

This configuration allows you to:

- read the measurements and settings from the electronic trip unit in remote mode;
- program the electronic trip unit in remote mode;
- know the state of the circuit-breaker (Open/Closed/Tripped) in remote mode;
- visualize locally Ekip Multimeter or on HMI 030 all the relevant information of the CB.

Consult the Electric Diagrams chapter for further details about wiring.

Configuration 2: Supervision and Remote control (Thermomagnetic trip unit or switch-disconnector, Ekip Com and MOE-E)



The Ekip Com accessory, positioned in the right-hand slot of the circuit-breaker, is connected with the MOE-E by means of the connector on the rear of the MOE-E.

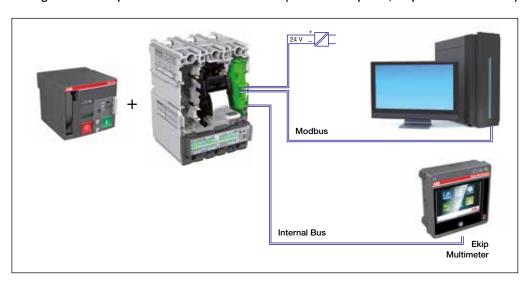
Six cables come out of the Ekip Com, of which two are needed for the auxiliary power supply and two for connection to the Modbus.

With this configuration it is possible to:

- read the Open/Closed/Tripped state of the circuit-breaker remotely;
- open/close the circuit-breaker or of the switch-disconnector remotely.

For further details regarding cabling of the various devices, please refer to the chapter on Electric Diagrams.

Configuration 3: Supervision and Remote Control (Electronic trip unit, Ekip Com and MOE-E)



Ekip Com accessory, positioned in the right-hand slot of the circuit-breaker, is connected to MOE-E and to Ekip LSI, Ekip LSIG, Ekip E-LSIG or Ekip M-LRIU trip unit by means of two connectors Six cables come out of Ekip Com of which two are required for auxiliary supply, two for connection to the Modbus and two for connection to Internal Bus.

This configuration allows you to:

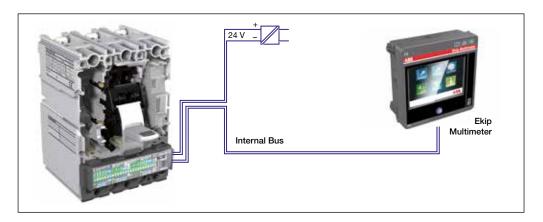
- read the measurements and settings from the solid-state release in remote mode;
- program the electronic trip unit in remote mode;
- read the state of the circuit-breaker (Open/Closed/Tripped) in remote mode;
- open/close the circuit-breaker in remote mode;
- visualize locally Ekip Multimeter or on HMI 030 all the relevant information of the CB.

Consult the Electric Diagrams chapter for further details about wiring.

Special applications

Communication system

Configuration 4: Interface from front panel (Electronic trip unit and Ekip Multimeter or HMI030 Unit)



With XT2 and XT4 circuit-breakers, equipped with electronic trip unit Ekip LSI, Ekip LSIG, Ekip E-LSIG or Ekip M-LRIU, in addition to Ekip Multimeter or HMI030, it's possible to visualize directly on the panel door the main electrical parameters and the last trip information.

The necessary accessories, useful to permit the lecture directly from the front of the switchboard are:

- interface device Ekip Multimeter or HMI030;
- kit of 24V DC auxiliary voltage for electronic trip unit.

Four cables come out of kit of 24V DC auxiliary voltage, two of which are needed for the auxiliary power supply and two for connection to Ekip Multimeter or to HMI030 on Internal Bus.

This configuration makes it possible to read the measurements and alarms from the electronic trip unit by means of the HMI030 accessory positioned on the front of the panel.

For further details on cabling the various different devices, refer to the Electric Diagram Chapter.

Measurement, signalling and available data functions

	Ekip LSI	Ekip M-LRIU	Ekip E-LSIG	Ekip LS/I
	Ekip LSIG			TM
				Switch- disconnector
Electrical quantities				
Phase current (I _{L1} , I _{L2} , I _{L3})				
Neutral current (I _N) ⁽¹⁾				<u>.</u>
Ground current (I _g)	(1)			
Phase to phase voltage (V ₁₂ -V ₂₃ -V ₃₁)			=	
Phase-Neutral Voltage (V _{1N} -V _{2N} -V _{3N}) (2)				
Frequency				
Power (active P, reactive Q, apparent S) total power and phase power (2)			-	
Power factor (total and phase) (2)				
Energy (active, reative, apparent) total				
Harmonic calcualtion (THDi, spectre)				
Status information				
CB status (open, closed, tripped)	_			
Modality (local, remote)				:
Protection parameters				
Thermal memory				
Maintenance data				
Total number of operation				
Total number of protection trips				
Total number of trip test				<u>.</u>
Total number of manual operations				<u>.</u>
Total number of failed trip				
Last trip data recording	20	20	20	:
Protection alarm				
I Protection (trip)				<u>.</u>
S Protection (timing and trip)		<u> </u>		<u> </u>
L Protection (timing and trip)	_			:
	(1)	-	-	
G Protection (timing and trip) R Protection U Protection (timing and trip)		-		
L protection Prealarm ⁽³⁾				<u>:</u> :
Diagnostic Alarm		_		
Trip command failed				
Trip coil disconnected			_	<u>.</u>
Commands			-	
CB Open/CB Close (with MOE-E motor operator)	-	-	-	-
CB Reset (with MOE-E motor operator)	-	-	-	-
Alarm Reset				
Trip test				
Protection parameter setting	•		•	
Run Time Events				
CB status changes, protection status change and alarms status change	-	-	-	

 $^{^{(1)}}$ Only with Ekip LSIG trip unit $^{(2)}$ Measurements available only with Neutral connected $^{(3)}$ $90\%I_{_1} < I < 105\%I_{_1}$



Index

Versions and types	
Fixed part of plug-in and withdrawable versions	3 /2
Conversion kits	3 /3
Mechanical Accessories	
Connection terminals	3/5
Terminal covers, phase separators and sealable screws for terminal covers	
Rotary handle operating mechanism	
IP54 Protection	
Front for operating lever mechanism	
Locks	
Rear mechanical interlock	
Bracket for fixing on DIN rail	
Flanges	
Electrical Accessories	
Service releases	3 /17
Auxiliary contacts	
Motor operators	3 /23
Connectors for electrical accessories	
Residual current releases	3 /28
Accessories for electronic trip units	
Ekip Display	3/3/
Ekip LED Meter	
SACE PR212/Cl contactor operator	
Current sensor for external neutral	
Connection accessories	
	o , oc
Communication devices and systems	
Ekip Com	
Ekip Bluetooth	
HMI030	3 /38
Ekip Multimeter	3 /39
Ekip Control Panel	3 /40
Ekip Connect	3 /41
Ekip View	3 /42
Test and configuration accessories	
Ekip T&P	3 /43
Ekip TT	
·	
Automatic network-generator transfer unit ATS021-ATS022	3 /45
Compatibility of accessories	3 /47

Versions and types



Fixed circuit-breaker

Tmax XT automatic circuit-breakers are available in the following versions:

- FIXED. Fixed circuit-breakers consist of a current-interrupting part connected to the trip unit, to be installed on the back plate of the cubicle or on a DIN rail;
- PLUG-IN. Plug-in circuit-breakers consist of a fixed part that must be installed on the back plate of the cubicle, and of a moving part, obtained from the fixed circuit-breaker plus the relative kit that converts it from the fixed version into the moving part of the plug-in version;
- WITHDRAWABLE. Withdrawable circuit-breakers consist of a fixed part that must be installed on the back plate of the cubicle equipped with side runners to allow the moving part to be easily racked out and in, winch is obtained from the fixed circuit-breaker plus the relative kit that converts it from the fixed version into the withdrawable moving part. To obtain the withdrawable version, a front accessory to be applied onto the front of the circuit-breaker must be ordered so as to maintain the IP40 degree of protection over the entire isolation run of the circuit-breaker.

If the plug-in circuit-breaker is fitted with electrical accessories, the appropriate connectors for isolation of the relative auxiliary circuits must also be ordered on the other hand, for the withdrawable version there are dedicated accessories, fitted with connectors which allow automatic disconnection in the case of racking-out (consult the "connection of electrical accessories" section in the Accessories chapter).



Plug-in circuit-breaker

Starting from the fixed version, SACE Tmax XT circuit-breakers can easily be converted into the plug-in and withdrawable versions using the relative conversion kits.

The moving part can always be obtained in the required version, fully pre-engineered in the factory, by ordering the fixed circuit-breaker and the conversion kit at the same time.

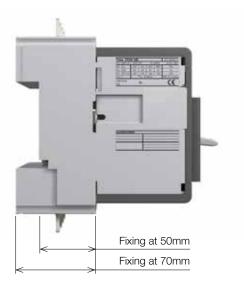
		Version						
	Fixed	Plug-in	Withdrawable					
XT1								
XT2								
XT3								
XT4								

Withdrawable circuit-breaker

Fixed part of plug-in and withdrawable versions

The fixed parts of the plug-in/withdrawable versions are available with front terminals (F) or with horizontal or vertical rear terminals (HR/VR). The terminals are factory-mounted in the horizontal position. In case of need, the Customer can easily rotate the terminals into the vertical position. These fixed parts can be equipped with the same terminal, terminal-cover and phase separator kits used for the fixed circuit-breakers, using the proper adapter.

The fixed parts of a plug-in/withdrawable circuit-breaker can be installed at a distance of 50mm from the back of the panel or at 70mm as shown in the picture. Installation at 50mm is only compulsory in the case where rear vertical or horizontal terminals (HR/VR) are used.





Conversion kit for turning a fixed circuit-breaker into the moving part of a plug-in circuit-breaker



Conversion kit for turning a fixed circuit-breaker into the moving part of a withdrawable circuit-breaker



Conversion kit for turning a fixed part of plug-in version into the fixed part of a withdrawable version

Conversion kits

The following conversion kits can be obtained in order to create the different versions:

- Kit for converting the fixed circuit-breaker into the moving part of plug-in/withdrawable versions. The conversion kit converts the fixed circuit-breaker into the moving part of plug-in/withdrawable versions. Only when withdrawable versions are made is it essential to order an accessory to apply to the front of the circuit-breaker so as to maintain the IP40 degree of protection over the entire isolation run. This accessory can be chosen from:
 - front for lever operating mechanism (FLD);
 - motor operator (MOE);
 - direct or transmitted rotary handle operating mechanisms (RHD or RHE).

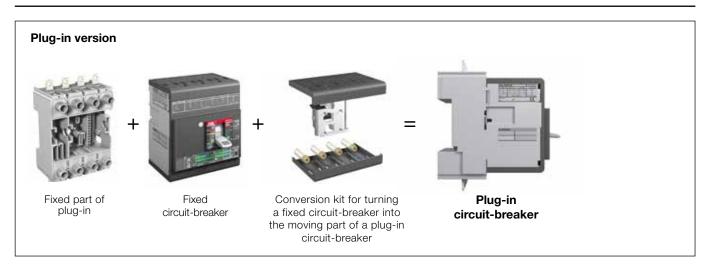
In the case where no accessory to be applied onto the front is indicated, the front for lever operating mechanism (FLD) is automatically included in the order.

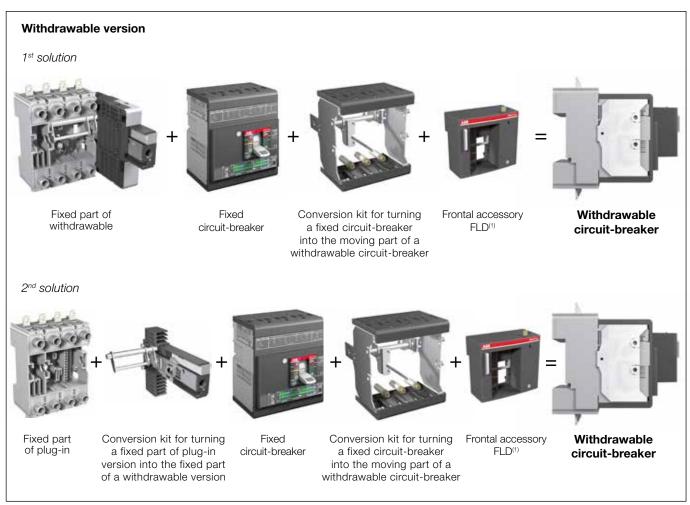
- kit for converting the fixed part of plug-in versions into the fixed part of withdrawable versions. The kit comprises:
 - a guide for turning the fixed part of the plug-in circuit-breaker into the fixed part of the withdrawable circuit-breaker;
 - a racking-out rotary handle that allows the moving part to be inserted and withdrawn. The mechanism allows the circuit-breaker to be set to the isolated position (with the power and auxiliary circuits disconnected) with the compartment door closed, all to the advantage of operator safety. The rotary handle can only be inserted when the circuit-breaker is open. Once it has been removed or withdrawn, the circuit-breaker can be set to the open/closed position;
 - a flange for the compartment door, which replaces the one supplied with the fixed version of the circuit-breaker.
- Kit for converting fixed type into the plug-in version for RC Sel residual current devices for XT2-XT4. RC Sel four-pole residual current devices for XT2 e XT4 can be converted from the fixed version into the plug-in version using the special kit.
- Kit for converting plug-in types into the withdrawable version for RC Sel residual current devices for XT2-XT4. RC Sel four-pole residual current devices for XT2 and XT4 can be converted from the plug-in version to the withdrawable version using the special kit, which comprises a bellows to apply to the front of the residual current device so as to allow it and the residual current part to be withdrawn when the panel door is closed. This kit can also be assembled on fixed circuit-breakers fitted with the front part for locks or the direct rotary handle, thus adding to the range of uses for residual current devices.

In the plug-in to withdrawable conversion kit, there is also a 6 pin connector to be applied onto the right side of the circuit-breaker to facilitate disconnection of the auxiliary circuits connected to the residual current device.

This kit contains also the shunt opening release of the residual current device dedicated to the withdrawable version, which is fitted with a connector for the fixed part and the moving part.

Versions and types





⁽¹⁾ Frontal accessory mandatory. If not specified in the order, the FLD is supplied automatically

Mechanical Accessories

Mechanical Accessories		XT1	XT2	XT3	XT4
	F- Front			•	
	EF - Front extended				
	ES - Front extended spread				
	FCCu - Front for copper cables				
	FCuAl - Front for copper/aluminium cables				
Terminals	FB - For flexible busbars				
TOTTIIITAIS	MC - Multi-cable				
	R - Rear orientated				
	EF - Extended front for the fixed part				
	HR/VR - Horizontal rear / Vertical rear for fixed part	-			
	HR for RC - for residual current release		_		_
	RHD - Direct rotary handle				
Rotary handle operating	RHE - Transmitted rotary handle				
mechanism	RHE-LH - Wide transmitted rotary handle				
	RHS - Side rotary handle				
Front for lever operating mechanism	FLD - Front for locks	_		_	
L l OD	Padlock device				
Locks on CB	Key lock				
Locks on handle	Key lock				
Locks on FLD	Key lock	-		_	
	Key lock				
Locks on Motor Operator	Key lock against manual operation	_		_	
Look for fixed part	Key lock	_		_	
Rear interlock	Interlock				
Bracket for DIN rail	Bracket				

Consult the relative section for more details.

Connection terminals

Connection terminals allow the circuit-breaker to be connected to the system in the way most suited to the installation requirements. By and large they consist of:

- front terminals: for connecting cables or busbars directly from the front of the circuit-breaker;
- rear terminals: for installing circuit-breakers in segregated panels with rear access.

Where possible, the terminals have laser marking on the surface indicating the tightening torques for the correct isolation of cables and bars.

Fixed version

The part of the standard equipment, fixed version SACE Tmax XT circuit-breakers are supplied with front terminals (F). However, they can be fitted with the following types of terminals as accessories thanks to the special kits:

- extended front (EF);
- extended spread front (ES);
- front for copper/aluminium cables (FCCuAl). A pitch adapter must be applied to the terminal zone of the circuit-breaker to ensure that copper and aluminium cables with sections of up to 240mm² can be connected to all the circuit-breakers. The pitch adapter is automatically supplied when it is necessary (see table page 3/9);
- front for copper cables (FCCu);
- for flexible busbars (FB);
- multicable (MC);
- rear oriented (R).

For XT 1 and XT3 sizes, the use of not isulated busbar with Ue <= 480V involves the mandatory assembly of terminal covers HTC.

Mechanical Accessories

Plug-in and withdrawable versions

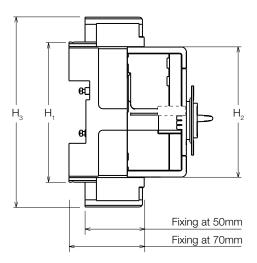
Fixed part of plug-in and withdrawable version circuit-breakers are normally suplied with extended front terminals (EF) or horizontal/vertical rear terminals (HR/VR).

The terminals are factory-mounted in the horizontal position. In case of need, the Customer can easily rotate the terminals into the vertical position.

A fixed part with front terminals (EF) can be converted into a fixed part with rear terminals (HR/VR) by ordering the appropriate terminal kit. The fixed parts can also be fitted with the same types of terminals available on the fixed circuit-breaker after an adapter has been installed on the terminal zone of the fixed part itself. Consequently, the following types of connection terminals are also available for the fixed part:

- extended spread front (ES);
- for copper-aluminium cables (FCCuAl);
- for copper cables (FCCu);
- for flexible busbars (FB);
- multi-cable (MC).

The adapter reproduces the terminal zone of the fixed circuit-breaker. This means that fixed parts can also be equipped with the same terminal covers and phase separators as those used for fixed circuit-breakers.





Fixed part adapter

Fixed part adapter			
Circuit- breakers	H ₁ fixed part [mm]	H ₂ circuit-breaker [mm]	H ₃ fixed part with two adapters [mm]
XT1	146	134	181
XT2	153	134	188
XT3	166	154	225
XT4	182	164	228

Front terminals - F CB. Vers. **Busbar dimensions** Cable terminals Tightening H Terminal covers H Separators [mm] [mm] [mm] [mm] W min W max W 50 100 200 D min D max Ø 2 60 25 Н Ø Cable or busbar /Terminal XT1 F 13 16 7.5 6.5 3.5 5 16 6.5 M6 6Nm S R R XT2 F 13 20 7.5 6.5 2.5 5 20 6.5 M6 6Nm R S R R хт3 F 8 R R R 17 24 9.5 8.5 5 24 8.5 M8 8Nm S

8.5

M8

8Nm

25



F

17

25

10

8.5

XT4

Front terminal - F



5

8

F terminal with cable lug



R

R

S

S

S

R

R

S

R

R

F terminal with busbar

Front e	xtended	terminals	- EF													
СВ	Vers.	Busbar	dimensi [mm]	ons MAX		erminals ım]		Tigh	tening		Н Те	erminal co	overs	Н	Separato [mm]	ors
		W	D	Ø	W	Ø		ninal CB		r busbar minal	2	50	60	25	100	200
XT1	F	20	4	8.5	20	8.5	M6	6Nm	M8	9Nm	-	R	-	-	S	R
XT2	F	20	4	8.5	20	8.5	M6	6Nm	M8	9Nm	_	S	_	_	S	R

8Nm

8Nm

M10

M10

18Nm

18Nm



F

F

20

20

6

10

10

10

20

20

XT3

XT4

Front extended terminal - EF



10

10

M8

M8

EF terminal with cable lug



EF terminal with busbar



Width

Hole Heigth

Depth

Fixed

Plug-in Withdrawable P W Ø S R

Diameter

Standard

On Request

Mechanical Accessories

Front extended spread terminals - ES

СВ	Vers.	Busbar	dimension [mm]	ons MAX		erminals ım]		Tigh	tening		Н Те	erminal co	overs	Н	Separato [mm]	ors
		W	D	Ø	W	Ø		ninal CB		r busbar minal	2	50	60	25	100	200
XT1	F-P	25	4	8.5	25	8.5	M6	6Nm	M8	9Nm	-	_	-	-	<u> </u>	S
XT2	F-P-W	30	4	10.5	30	10.5	M6	6Nm	M10	18Nm	-	<u> </u>	<u> </u>	_	<u> </u>	S
XT3	F-P	30	4	10.5	30	10.5	M8	8Nm	M10	18Nm	-	<u> </u>	<u> </u>	_	<u> </u>	S
XT4	F-P-W	30	6	10.5	30	10.5	M8	8Nm	M10	18Nm	-	-	-	_	-	S



Front extended spread terminal - ES



ES terminal with cable lug



ES terminal with busbar

Terminals for copper cables - FCCu

СВ	Type of terminal	Vers.		ble m²]	Tig	htening	L cable	ΗT	erminal co [mm]	vers	Н	Separato [mm]	rs
			Rigid	Flexible		or busbar erminal	stripping [mm]	2	50	60	25	100	200
VT4	internal	F-P	1x2.570	1x2.550	10::10	701	10	-	R	-	S ⁽¹⁾	R	R
XT1	internal	F-P	-	2x2.535	12x12mm	7Nm	12	-	R	-	S ⁽¹⁾	R	R
VTO	internal	F-P-W	1x195	1x470		≤ 50mm²: 7Nm	- 4	-	R	-	S ⁽¹⁾	R	R
XT2	internal	F-P-W	-	2x2.550	14x14mm	>50mm²: 8,5Nm	14	-	R	-	S ⁽¹⁾	R	R
VT0	internal	F-P	1x6185	1x6150	00.40	4.651	00	-	-	R	S ⁽¹⁾	R	R
XT3	internal	F–P	-	2x670	20x18mm	14Nm	20	-	-	R	S ⁽¹⁾	R	R
	internal	F-P-W	1x6185	1x6150	50		-	-	R	S ⁽¹⁾	R	R	
XT4	internal	F-P-W	-	2x670	20x18mm	14Nm	4Nm 20	-	-	R	S ⁽¹⁾	R	R

⁽¹⁾ Phase separators supplied as standard with basic version circuit-breaker



FCCu terminal



FCCu terminal with cable



FCCu terminal with busbar



Width Hole Heigth Depth

Fixed Plug-in Withdrawable

Diameter

Standard On Request

СВ	Type of terminal	Vers.	Cal [mi				Tightenin	g	L cable	H Te	rminal c [mm]	overs	Н	Separat [mm]	ors
			Rigid	Flexible	:	minal CB		le or busbar Terminal	stripping [mm]	2	50	60	25	100	200
	internal	F-P	1x1.570	1x 1.550	M5	3Nm	Ø 9.5mm	≤10mm² 2,5 Nm >10mm² 5 Nm	16	-	R	-	S	R	R
XT1	external	F-P	1x3595	NO	M6	6Nm	Ø 14mm	13.5Nm	16	-	S	-	-	-	-
	external ⁽¹⁾	F-P	1x120240	NO	М6	6Nm	Ø 24mm	31Nm	24		•	ADAI	PTER	•••••	• • • • • • • • • • • • • • • • • • • •
***************************************	internal	F-P-W	1x195	1x2.570	-	-	Ø 14mm	\leq 25mm ² 4 Nm $>$ 25mm ² 6 Nm	14	-	R	-	S	R	R
XT2	external ⁽¹⁾	F-P-W	1x120240	NO	M6	6Nm	Ø 24mm	31Nm	24		•	ADAI	PTER	•••••	•
	external ⁽¹⁾	F-P-W	1x70185	NO	M6	6Nm	Ø 18mm	31Nm	20	-	S	-	-	-	-
	external ⁽¹⁾	F-P-W	2x3570	NO	М6	6Nm	Ø 16mm	12Nm	18/33	_	_	S	_	-	-
***************************************	internal ⁽¹⁾	F-P-W	1x35150	NO	M9	9Nm	Ø 17mm	22.6Nm	20	-	-	R	S	R	R
VTO	internal	F-P	1x95185	NO	-	-	Ø 17mm	16Nm	20	-	-	R	S	R	R
XT3	external ⁽¹⁾	F-P	1x120240	NO	M8	8Nm	Ø 24mm	31Nm	24		***************************************	ADAI	PTER	•••••	***************************************
	external ⁽¹⁾	F-P	2x35120	NO	M8	8Nm	Ø 18mm	16Nm	22/42	_	-	S	-	-	-
	internal	F-P-W	1x1150	NO	-	-	Ø 17mm	10Nm	20	-	-	R	S	R	R
XT4	external ⁽¹⁾	F-P-W	1x120240	NO	M8	8Nm	Ø 24mm	31Nm	24		•	ADAI	PTER		•••••
	external ⁽¹⁾	F-P-W	2x35120	NO	M8	8Nm	Ø 18mm	16Nm	22/42	-	-	S	-	-	-

⁽¹⁾ Take-up auxiliary voltage device included



Internal FCCuAl terminal for copper/aluminium cables



Internal FCCuAl terminal for copper and aluminium cable with take-up of auxiliary voltage



External FCCuAl terminal for copper/aluminium cables



FCCuAl internal terminal with cable



FCCuAl external terminal with cables



Pitch adapter

Adaptor for FCCuAl terminals up to 240mm²

Circuit-breaker	Poles	Dimensions [mm] [WxHxD]
VT4	3	105x50x68
All "	4	140x50x68
XT2	3	105x50x68
XI2	4	140x50x68
. —	3	105x50x68
XT3	4	140x50x68
VT4	3	105x50x68
X14	4	140x50x68

Note: With XT1 and XT2 the adaptor increases the width of the circuit-breaker



- Width Hole Heigth Depth

- Fixed Plug-in Withdrawable Diameter
- Standard
- P W Ø S R On Request

Mechanical Accessories

Terminals for flexible busbars - FB

СВ	Type of terminal	Vers.		oar dimen MIN [mm]			ar dimen MAX [mm		Tightening [Nm]	H Te	rminal co [mm]	overs	Н	Separate [mm]	ors
			W	D	Nr	W	D	Nr	Cable or busbar /Terminal	2	50	60	25	100	200
XT1	internal	F-P	10	0.8	2	10	0.8	9	7Nm	-	R	-	S ⁽¹⁾	R	R
XT2	internal	F-P-W	10	0.8	2	10	0.8	9	7Nm	-	R	-	S ⁽¹⁾	R	R
XT3	internal	F-P	16	0.8	2	16	0.8	10	14Nm	-	-	R	S ⁽¹⁾	R	R
XT4	internal	F-P-W	16	0.8	2	16	0.8	10	14Nm	_	-	R	S ⁽¹⁾	R	R

⁽¹⁾ Phase separators supplied as standard with basic version circuit-breaker







FB terminal with flexible busbars

Multi-cable terminals - MC

СВ	Vers.		ible m²]		Ti	ghtening		L cable	H Te	rminal co [mm]	overs	Н	Separato [mm]	ors
	4 FD	Rigid	Flexible		ninal CB		le or busbar /terminal	stripping [mm]	2	50	60	25	100	200
XT1	F-P	6x2.535	6x2.535	M6	6Nm	Ø8	≤10mm² 2.5 Nm >10mm² 4 Nm	10, 20, 30	-	S	-	-	-	-
XT2	F-P-W	6x2.535	6x2.535	M6	6Nm	Ø8	≤10mm² 2.5 Nm >10mm² 4 Nm	10, 20, 30	-	S	_	_	_	-
XT3 ⁽¹⁾	F-P	6x2.535	6x2.525	M8	8Nm	Ø8	7Nm	15, 30	-	_	S	<u> </u>	<u> </u>	-
XT4 ⁽¹⁾	F-P-W	6x2.535	6x2.525	M8	8Nm	Ø8	7Nm	15, 30	-	-	S	_	-	-

⁽¹⁾ Take up auxiliary voltage device included



Multi-cable terminals (MC)



Multi-cable terminals with cables

Rear horizontal terminals - R

СВ	Vers.	Bu		ensions M ım]	1AX		Tight	ening		H Te	erminal co [mm]	vers	Н	Separato [mm]	ors
		W	Н	D	Ø		ninal CB	:	r busbar minal	2	50	60	25	100	200
XT1	F	15	7.5	5	6.5	M5	5Nm	M6	6Nm	S	-	-	-	-	_
XT2	F	20	9	4	8.5	M6	6Nm	M8	6Nm	S	<u> </u>	-	-	-	-
хтз	F	20	9	6	8.5	M8	8Nm	M8	8Nm	S	<u> </u>	<u> </u>	-	-	-
XT4	F	20	9	6	8.5	M8	8Nm	M8	8Nm	S	<u> </u>	<u> </u>	-	-	<u> </u>



Rear horizontal terminals (R)



R terminal with horizontal busbar



R terminal with vertical busbar

Extended front terminals for fixed part - EF

CB XT1	Vers.	Busba	ar dimensions [mm]	s MAX	:	erminals ım]		Tight	ening		Rear Se [m	parators m]
		W	D	Ø	W	Ø	:	ninal/ B		r busbar minal	100	200
	Р	20	5	6.5	21	6.5	M6	6Nm	M6	9Nm	S	R
XT2	P-W	20	5	6.5	21	6.5	M6	6Nm	M6	9Nm	S	R
ХТ3	Р	25	8	8.5	30	8.5	M6	6Nm	M8	18Nm	S	R
XT4	P-W	25	8	8.5	30	8.5	M6	6Nm	M8	18Nm	S	R



EF terminals for fixed part

Rear flat horizontal terminals for fixed part - HR

СВ	Vers.	Busba	ar dimensions [mm]	s MAX		erminals ım]	Tight	ening	Rear Separators [mm]
		W	D	Ø	W	Ø	Terminal /CB	Cable or busbar /Terminal	90
XT1	Р	20	4	8.5	20	8.5	6Nm	9Nm	R
XT2	P-W	20	4	8.5	20	8.5	6Nm	9Nm	R
XT3	Р	25	6	8.5	25	8.5	8Nm	9Nm	R
XT4	P-W	25	10	8.5	25	8.5	8Nm	9Nm	R



HR terminals for fixed part

Rear flat vertical terminals for fixed part - VR

СВ	Vers.	ers. Busbar dimensions MAX [mm]		Cable terminals [mm]		Tightening		Rear Separators [mm]	
		W	D	Ø	W	Ø	Terminal /CB	Cable or busbar /Terminal	90
XT1	Р	20	4	8.5	20	8.5	6Nm	9Nm	R
XT2	P-W	20	4	8.5	20	8.5	6Nm	9Nm	R
ХТ3	Р	25	6	8.5	25	8.5	8Nm	9Nm	R
XT4	P-W	25	10	8.5	25	8.5	8Nm	9Nm	R



VR terminals for fixed part



- Width Hole Heigth Depth

- Fixed
 Plug-in
 Withdrawable
 Diameter
 Standard
 On Request

- P W Ø S R On Request

Mechanical Accessories





Phase separators



Sealable screws

Terminal covers, phase separators and sealable screws for terminal covers

Terminal covers are applied to the circuit-breaker to prevent accidental contact with live parts, thus providing protection against direct contacts. The terminal covers are pre-punched for know-out on the front to facilitate installation of busbars and/or cables, guaranteeing correct insulation.

The phase separator partitions increase the insulation characteristics between the phases on a level with the connections. They are mounted from the front, even when the circuit-breaker has already been installed, by inserting them into the corresponding slots.

The table lists the various different terminal covers and phase separators available for each SACE Tmax XT circuit-breaker. The terminal covers/phase separators able to guarantee adequate circuit-breaker installation and correct insulation are listed in the "Connection Terminals" section of the Accessories Chapter alongside each terminal.

The lead sealing kit consists of screws which, when applied to the terminal covers, prevent their removal, providing protection against direct contacts and tampering. The screws can be locked with wire and lead seals.

Each sealing kit consists of two screws. The maximum number of sealable screws that can be used for each circuit-breaker is given in the table below.

	Í	XT1		X	XT2		XT3		T4
	Ī	3р	4p	3р	4p	3р	4p	3р	4p
HTC - High terminal covers	[mm]	50	50	50	50	60	60	60	60
LTC - Low terminal covers	[mm]	2	2	2	2	2	2	2	2
Max number sealable screws for each terminal cover	[No.]	1	1	1	1	1	2	1	1
Phase separator - low	[mm]	25	25	25	25	25	25	25	25
Phase separator - medium	[mm]	100	100	100	100	100	100	100	100
Phase separator - high	[mm]	200	200	200	200	200	200	200	200
Rear phase separator for FP	[mm]	n] 90		g	0	9	00	g	0

Rotary handle operating mechanism

Operating device that allows the circuit-breaker to be operated by means of a rotary handle, which makes the circuit-breaker easier to open and close thanks to its ergonomic handgrip. Different types of handles are available:

- direct (RHD): installed directly on the front of the circuit-breaker. Allows it to be operated frontally:
- transmitted (RHE): installed on the panel door. Allows the circuit-breaker to be operated by means of a rod which acts on a base installed on the front of the circuit-breaker;
- lateral left (RHS-L) and lateral right (RHS-R): installed directly on the front of the circuit-breaker. Allows it to be operated from the side.

The wide handle grip (LH) only is also available, which can be combined with the transmitted handle (RHE) and with the lateral handle (RHS).

All rotary handle operating mechanisms allow the opening of the switchboard door only with the circuit-breaker in open position.



All rotary handles are available in two versions:

- standard: grey colour;
- emergency: red on a yellow background. Suitable for operating machine tools.

Rotary handles can be ordered:

- by specifying one single sales code (for RHD, RHE, RHS L/R);
- by indicating the following three devices (only for RHE):
 - rotary handle on compartment door with normal standard handgrip (RHE_H, RHE_H LH) or emergency handgrip (RHE_H_EM, RHE_H_EM LH);
 - 500mm transmission rod (RHE_S). The minimum and maximum distances between the fixing plate and the door are 60.5mm and 470.5mm;
 - base on the circuit-breaker to fix to the circuit-breaker (RHE_B).

Use of the rotary handle is an alternative to the motor operator and to all accessories of the front type.

The rotary handles can be locked by means of a vast range of key locks and padlocks (consult the "locks" section of the Accessories chapter).

The direct and transmitted rotary operating mechanisms allow early contacts to be used on closing so as to supply the undervoltage release in advance of circuit-breaker closing (consult the "early auxiliary contacts" section of the Accessories chapter).



IP54 protection

IP54 Protection

Device which can be applied onto the transmitted rotary and lateral handle allowing IP54 degree of protection^(G.1.11) to be achieved.





Front for locks

Front for operating lever mechanism

This device can be installed on the front of the circuit-breaker and allows it to be locked with key locks and padlocks.

The front for lever operating mechanism can only be installed on XT2 and XT4 three-pole and four-pole circuit-breakers. The front for lever operating mechanism can be fitted with a vast range of key locks and padlocks (see the "locks" section of the Accessories chapter).

Mechanical Accessories



Key lock



Fixed padlock in open position

Locks

Padlocks or key locks that prevent the circuit-breaker from being closed and/or opened. They can be fitted:

- directly on the front of the circuit-breaker;
- on the rotary handle operating mechanism;
- on the front for lever operating mechanism;
- on the motor;
- to the fixed and withdrawable part, to prevent the moving part from being inserted;
- on the front of the thermomagnetic trip unit, to prevent the adjuster of the thermal part from being tampered with.

All locks that hold the circuit-breaker in the open position ensure circuit isolation in accordance with the IEC 60947-2 Standard. In the closed position, the locks do not prevent the mechanism from releasing after a fault or remote control.



Fixed padlock in open/closed position



Removable padlock in open position



Key lock/padlock for withdrawable fixed part



Circuit-breaker with removable padlock in open position



Circuit-breaker with fixed padlock in open position



Circuit-breaker with fixed padlock in open/close position



RHD with key lock



RHE with key lock



FLD with key lock



MOD with key lock



MOE with key lock



Withdrawable fixed part with key lock/padlock

T	ype of lock	Circuit- breaker	Optional/ Standard supply	Position of circuit-breaker lock	Type of lock	Removability of key
	PLL	XT1XT4	Optional	OPEN / CLOSED	padlocks max 3 padlocks Ø 7mm stem (not supplied)	-
Circuit- breaker	Fixed padlock device	XT1XT4	Optional	OPEN	padlocks max 3 padlocks Ø 7mm stem (not supplied)	-
	PLL Removable padlock device	XT1, XT3	Optional	OPEN	padlocks max 3 padlocks Ø 7mm stem (not supplied)	-
breaker		XT1XT4	Optional	OPEN	Ronis Same key (A, B, C, D type)	OPEN
Rotary handle (RHD/RHE/RHE-LH/RHS) Frontal for operating lever (FLD)	KLC Key lock ⁽⁵⁾	XT1XT4	Optional	OPEN	Ronis Different key	OPEN
		XT1XT4	Optional	OPEN	Ronis Same key	OPEN / CLOSE
		XT1XT4	Optional	OPEN	Ronis Same key	OPEN
	RHL Key lock ⁽¹⁾	XT1XT4	Optional	OPEN	Ronis Different key	OPEN
(RHD/RHE/		XT1XT4	Optional	OPEN / CLOSED	Ronis Different key	OPEN / CLOSE
	Padlock device	XT1XT4	Standard	OPEN	padlocks max 3 padlocks Ø 6mm stem (not supplied)	_
	Door lock ⁽⁴⁾	XT1XT4	Standard	DOOR LOCKED WHEN CIRCUIT-BREAKER CLOSED	-	_
	Padlock device	XT2, XT4	Standard	OPEN	padlocks max 3 padlocks Ø 6mm stem (not supplied)	_
operating lever	Door lock	XT2, XT4	Standard	DOOR LOCKED WHEN CIRCUIT-BREAKER CLOSED	_	_
	RHL Key lock ⁽¹⁾	XT2, XT4	Optional	OPEN	Ronis Same key	OPEN
		XT2, XT4	Optional	OPEN	Ronis Different key	OPEN
		XT2, XT4	Optional	OPEN / CLOSED	Ronis Different key	OPEN / CLOSE
	Padlock device	XT1XT4	Standard	OPEN	padlocks max 3 padlocks Ø 8mm stem (not supplied)	-
Motor	Key lock on motor MOL-D	XT1XT4	Optional	OPEN	Ronis Different keys	OPEN
MOD, MOE, MOE-E)	MOL-S	XT1XT4	Optional	OPEN	Ronis Same keys	OPEN
	Key lock against manual operation MOL-M ⁽²⁾	XT1XT4	Optional	MANUAL	Ronis key	WITH LOCK INSERTED
		XT2, XT4	Optional	Key WITHDRAWN / INSERTED Padlock WITHDRAWN	Ronis key Different + padlocks max 3 padlocks Ø 6mm stem (not supplied)	-
ixed part of	KLF-FP Key lock / padlock	XT2, XT4	Optional	Key WITHDRAWN / INSERTED Padlock WITHDRAWN	Ronis key Same + padlocks max 3 padlocks Ø 6mm stem (not supplied)	_
	for fixed part of withdrawable device	XT2, XT4	Optional	Key WITHDRAWN / INSERTED Padlock WITHDRAWN	Giussani key Different + padlocks max 3 padlocks Ø 6mm stem (not supplied)	_
		XT2, XT4	Optional	Key WITHDRAWN / INSERTED Padlock WITHDRAWN	Giussani key Same + padlocks max 3 padlocks Ø 6mm stem (not supplied)	-
Trip unit	Lock of thermal	XT1, XT3	Optional	-	_	-
IIIP UIIII	regulation(3)	XT2, XT4	Standard	_	_	_

On the transmitted rotary handle (RHE), the lock is mounted on the base. The key lock is not available on the lateral handle (RHS).
 Only for MOE and MOE-E.
 Applied to the cover of the circuit-breakers on a level with the regulator of the thermal element of thermomagnetic release TMD and prevents it from being tampered with.
 This function can be totally inhibited by the customer when the handle is assembled by means of a simple operation that can be reversed if needed.
 Moreover, if the door lock function is not disabled by the customer during the assembly phase, the door lock can be temporarily deactivated with a tool in exceptional cases, so that the door can be opened without opening the circuit-breaker.

(5) Incompatible with electrical accessories mounted in the third pole.

Mechanical Accessories



Rear mechanical interlock

Support, designed for installation on the rear of two circuit-breakers to be interlocked, and which, by means of linkages, prevents the two circuit-breakers it is installed on from closing simultaneously. The circuit-breakers in the Tmax XT family are interlocked two-by-two (IO-OI-OO) by means of a chassis and special plates. Interlocked circuit-breakers can be in fixed, plug-in or withdrawable version. Both circuit-breakers and switch-disconnectors in the three-pole and four-pole versions can be interlocked.

The acceptable combinations are:

XT1-XT1
 XT2-XT4
 XT1-XT2
 XT2-XT2
 XT2-XT2
 XT3-XT3
 XT3-XT3
 XT4-XT4

The following equipment must be ordered to make the rear interlock:

- a vertical or horizontal chassis;
- a plate for each circuit-breaker to be interlocked.

Please advise that remote closing commands sent to interlocked CB in open position must be prevented in order to ensure correct functioning of mechanical interlock. If it is not possible to prevent them, key lock in open position for MOE is necessary.





Bracket for fixing on DIN rail

Bracket for fixing on DIN rail

Support designed for installation on the back of the circuit-breakers to simplify assembly on standardized DIN EN 50022 rail.

The following can be installed on DIN EN 50022 rail:

- all Tmax XT circuit-breakers in the fixed three-pole or four-pole versions;
- XT1, XT3 circuit-breakers equipped with RC Sel 200; RC Inst, RC Sel for XT1 and XT3 residual current releases.

Flanges

Plastic plate that acts as an interface between the circuit-breaker and the hole in the panel door. All the Tmax XT series flanges are newly designed and do not require screws for installation. Flanges are applied:

- around the front part of the fixed/plug-in circuit-breaker;
- around the operating lever for all fixed/plug-in/withdrawable version circuit-breakers;
- around the MOD or MOE motor operator;
- around the front for FLD locks:
- around the direct rotary handle operating mechanism;
- around the transmitted rotary handle operating mechanism;
- around the RC Inst, RC Sel for XT1 and XT3, RC Sel for XT2 and XT4 residual current release



XT1-XT3 circuit-breaker

with standard flange

XT2-XT4 circuit-breaker with standard flange



Circuit-breaker with optional flange



Rotary handle with flange



MOE with flange



MOD with flange

Electrical Accessories

Electrical Accessories	XT1	XT2	ХТ3	XT4	
Shunt opening release	SOR				
Undervoltage release	UVR				
Time-delay device for undervoltage release	UVD				
	1Q 1SY 24V DC				
	3Q 1SY 24V DC	_			
	1S51 24V DC	_		<u> </u>	
Auxiliary contacts	1Q 1SY 250V AC/DC				
Q: open/close signalling contact	2Q 2SY 1S51 250V AC/DC	_		<u> </u>	
3. Open/close signalling contact	3Q 2SY 250V AC/DC	_		<u> </u>	
SY: trip signalling contact	3Q 1SY 250V AC/DC	-			
S51: electronic trip signalling contact	1S51 250V AC/DC	_		_	
	2Q 1SY 250V AC/DC				
	3Q on left 250V AC/DC				
	400V 1Q 1SY 400V AC	_		_	
	400V 2Q 400V AC	_		<u> </u>	
	AUP-Racked-in				
Position contacts	AUP-Racked-out	_		_	
Early auxiliary contacts	AUE-In handle				
	MOD		_		<u> </u>
Motor operator	MOE	_		_	
	MOE-E	_		_	
	RC Inst		_		<u> </u>
	RC Sel 200		_	<u> </u>	<u> </u>
	RC Sel for XT1 XT3		_		<u> </u>
	RC Sel for XT2 XT4	-	•	_	
	RC Sel B Type	_	_		<u> </u>



Service releases

Shunt opening release (SOR). Allows the circuit-breaker to be opened by means of a non-permanent electrical control. Release operation is guaranteed for voltage between 70% and 110% of the rated power supply voltage Un, in both alternating and direct current. SOR is equipped with a built-in limit contact to shut-off the power supply in the open position with the relay tripped. A remote controlled emergency opening command can be created by connecting an opening button to the SOR.



Cabled SOR - UVR for withdrawable circuit-breaker

Undervoltage release (UVR). Allows the circuit-breaker to open when the release is subjected to either a power failure or voltage drop. Opening, as prescribed in the Standard, is guaranteed when the voltage is between 70% to 35% of Un. After tripping, the circuit-breaker can be closed again if the voltage exceeds the 85% of Un. When the undervoltage release is nor energized, neither the circuit-breaker nor the main contacts can be closed. A remote controlled emergency opening command can be created by connecting an opening button to the UVR.

None of the service releases in the Tmax XT series require screws for installation. They are extremely easy to fit. Just use slight pressure in the appropriate place. All service releases are available in two versions:

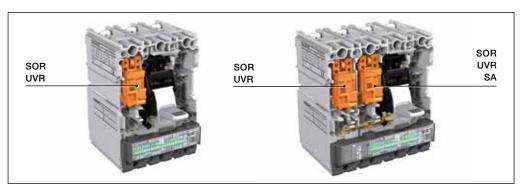
- cabled (AWG20 cable section 0.5mm² up to 300V, AWG17 1mm² up to 525V):
 - for fixed/plug-in circuit-breakers with 1m long cables;
 - for withdrawable circuit-breakers with fixed part and moving part connector;
- not cabled:
 - for fixed/plug-in circuit-breakers with cables from 1.5 mm² in section.



Electrical Accessories

In circuit-breakers:

- three-pole: as an alternative, SOR or UVR can be installed in the slot on the left of the operating lever:
- four-pole: SOR or UVR can be housed at the same time in the slot of the third and fourth pole. If the circuit-breaker is the withdrawable type, the connector for the fourth pole must be ordered to be able to install SOR and UVR in the fourth pole. If there is a residual current release, the opening solenoid (SA) of the residual current device must be installed in the slot of the third pole on the left of the operating lever.



SOR Electrical specifications

Version	Max power abs	orbed on inrush	Resistance		
	AC [VA]	DC [W]	Internal [ohm]	External [ohm]	
12V DC		50	2,67	0	
24-30V AC/DC	50	50	11	0	
48-60V AC/DC	60	60	62	0	
110127V AC-110125V DC	50	50	248	0	
220240V AC-220250V DC	50	50	930	0	
380-440V AC	55		2300	0	
480-525V AC	55		5830	0	

UVR Electrical specification

Version	Power absorbed dur	Resistance		
	AC [VA]	DC [W]	Internal [ohm]	External [ohm]
24-30V AC/DC	1.5	1.5	399	0
48V AC/DC	1	1	1447	100
60V AC/DC	1	1	2405	100
110127V AC-110125V DC	2	2	8351	390
220240V AC-220250V DC	2.5	2.5	20502	9000
380-440V AC	3		20502	39000
480-525V AC	4		20502	59000



Time delay device for undervoltage release

Time delay device for undervoltage release (UVD)

The undervoltage release (UVD) can be combined with an external electronic power supply time delay which allows circuit-breaker opening to be delayed with preset and adjustable timing if the power supply voltage of the release either drops or fails, thus preventing untimely tripping caused by temporary faults. The time delay must be used with the undervoltage release (UVR) of the corresponding voltage.

A remote control positive safety opening command can be created by connecting an opening pushbutton to the UVR combined with the UVD.

UVD - Electrical specifications	
D 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2430V AC/DC
	4860V AC/DC
Power supply Voltage [V]	110125V AC/DC
	220250V AC/DC
Settable delay [s]	0.25 - 0.5 - 0.75 - 1 - 1.25 - 2 - 2.5 - 3
Opening time tolerance	±15%

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

On Tmax XT the opening and closing releases test unit helps ensure that the various version of releases are running smoothly, to guarantee a high level of reliability in controlling circuit-breaker opening. The test unit ensures the continuity of the opening releases with a rated operating voltage between 24V and 250V (AC and DC). Continuity is checked cyclically with an interval of 20s between tests. The unit has optic signals via LEDs on the front, which provide the following information:

POWER ON: power supply present **TESTING:** testing in progress

TEST FAILED: signal following a failed test or lack of auziliary power supply

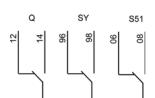
ALARM: signal given following three failed tests.

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

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

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

Characteristics of devices	
Auxiliary power supply	24250V AC/DC
Specifications of the signalling relays	3
Maximum interrupted current	6A
Maximum interrupted voltage	250V AC



Auxiliary contacts

Contacts which allow information about the operating state of the circuit-breaker to be routed outside the circuit-breaker. The following information is available:

- open/closed: indication of the position of the circuit-breaker power contacts (Q);
- trip: signalling circuit-breaker opening due to the current release tripping (owing to overload or short-circuit), the residual current device, the opening or undervoltage releases, the emergency opening pushbutton of the motor operator, or owing to use of the test button (SY);
- trip unit tripping: indicates that one of the protection functions of the electronic or thermomagnetic trip unit has tripped (S51).

Changeover of auxiliary cor	ntacts Q (open/clos	ed), SY (Relay	tripped) and S51 (tr	ip unit tripping)
Normal anguanga	CB Open	Q=12	SY=96	S51=06
Normal sequence	CB Closed	Q=14	SY=96	S51=06
Trip Sequence	CB Open	Q=12	SY=96	S51=06
(trip caused by:	CB Closed	Q=14	SY=96	S51=06
- SOR, - UVR.	CB Trips	Q=12	SY=98	S51=06
- Trip Test)	CB Resets	Q=12	SY=96	S51=06
	CB Open	Q=12	SY=96	S51=06
Trip Sequence	CB Closed	Q=14	SY=96	S51=06
(trip caused by trip unit)	CB Trips	Q=12	SY=98	S51=08
	CB Resets	Q=12	SY=96	S51=06



24V DC and 250V AC/DC auxiliary contacts

250V AC/DC and 24VAC/ DC auxiliary contacts are installed without the need for any screws. They are extremely easy to fit. Simply use slight pressure in the appropriate place. The following versions of auxiliary contacts are available:

Electrical Accessories

- cabled (AWG20 cable section -0.5mm²):
 - for fixed/plug-in circuit-breakers with 1m long cables;
 - for withdrawable circuit-breakers with fixed part and moving part connector;
- not cabled:
 - for fixed/plug-in circuit-breakers with cables from 0.5 up to 1.5 mm² in section.

Auxiliary contacts are supplied for each circuit-breaker in the SACE XT family in various different combinations, as shown in the table. The following items can be ordered to make installation even more flexible:

- a non-cabled auxiliary contact can create different signals (Q or SY) as the position of the circuitbreaker it is installed in varies;
- a non-cabled S51 auxiliary contact, which can be used for XT2 and XT4 circuit-breakers;
- a cabled auxiliary contact, with non numerates cables. Changing the placement in circuit-breaker, it's possible to obtain different signals (Q or SY).

Combinations of cabled auxiliary	XT1	XT2	XT3	XT4
contacts with cables numbered	3/4p	3/4p	3/4p	3/4p
1Q 1SY 24V DC	F-P	F-P-W	F-P	F-P-W
3Q 1SY 24V DC	_	F-P-W	F-P	F-P-W
1S51 24V DC	-	F-P-W	_	F-P-W
1Q 1SY 250V AC/DC	F-P	F-P-W	F-P	F-P-W
2Q 2SY 1S51 250V AC/DC	_	F-P-W	_	F-P-W
3Q 2SY 250V AC/DC	_	F-P-W	_	F-P-W
3Q 1SY 250V AC/DC	-	F-P-W	F-P	F-P-W
1S51 250V AC/DC	-	F-P-W	_	F-P-W
2Q 1SY 250V AC/DC	F-P	F-P	F-P	F-P
3Q on the left 250V AC/DC	F-P	F-P	F-P	F-P

F = Fixed, P = Plug-in, W = Withdrawable

Auxiliary contacts 24V DC - 250V AC/DC Circuit-breaker 3p Circuit-breaker 4p 2Q 2Q 1SY 1SY XT1 3Q left 3Q left 3Q 3Q 1SY 1SY хт3 3Q left 3Q left 2SY 2SY 2Q 2Q 3Q left 3Q left XT2 **1S51** 1S51 XT4 or 1Q or 1Q

AUX 250V AC/DC - Electrical specifications							
Power supply voltage	Operating current according to class of use(G2.16)						
	AC-15	AC-14	AC-13	DC-14	DC-13	DC-12	
250 V AC	4 A	5 A	6 A	-	-	-	
125 V AC	5 A	6 A	6 A	-	-	-	
250 V DC	-	-	-	0.03 A	0.03 A	0.3 A	
110 V DC	-	_	-	0.05 A	0.05 A	0.5 A	

AUX 24V DC - Electrical specification	ns
---------------------------------------	----

Power supply Voltage	Operating current
5 V DC	0.001 A
30 V DC	0.1 A



Cabled auxiliary contact



Cabled auxiliary contact for withdrawable circuit-breaker

400V AC auxiliary contacts

400V AC auxiliary contacts are only available for XT2 and XT4 circuit-breakers in the following versions:

- cabled (AWG17 cable section -1mm²):
 - for fixed/plug-in circuit-breakers with 1m long cables;
 - for withdrawable circuit-breakers with fixed part and moving part connector.

The 400V auxiliary contacts take up the whole right-hand slot of the circuit-breaker.

Combinations	XT1	XT2	XT3	XT4
	3/4p	3/4p	3/4p	3/4p
1Q 1SY 400V	-	F-P-W	-	F-P-W
2Q 400V	-	F-P-W	-	F-P-W

F = Fixed, P = Plug-in, W = Withdrawable

Auxiliary contacts 400V AC

	Circuit-breaker 3p		Circuit-breaker 4p	
XT2 XT4	o do de	AUX 400V	ogo go c	AUX 400V

AUX 400V AC - Electrical specifications

Power supply Voltage		current [A]
[V]	AC	DC
125 AC/DC	=	0.5
250 AC/DC	12	0.3
400 AC/DC	3	-

Electrical Accessories



Auxiliary position contact

Auxiliary position contacts - AUP

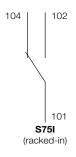
These allow information about the position of the circuit-breaker in relation to the fixed part of plug-in or withdrawable versions to be routed outside the circuit-breaker itself.

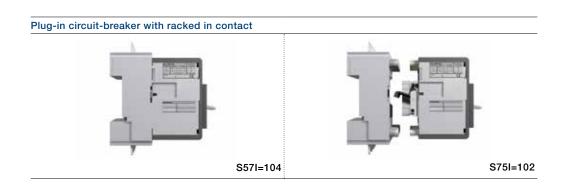
Two types of position contact (AUP) are available, at 250V AC/DC and 24V AC/DC:

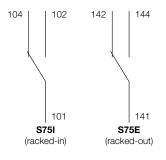
- racked-in contact for all plug-in and withdrawable SACE Tmax XT circuit-breakers, to be positioned in the fixed part;
- racked-out contact for all withdrawable SACETmax XT2 and XT4 circuit-breakers, to be installed in the side part of the withdrawable version.

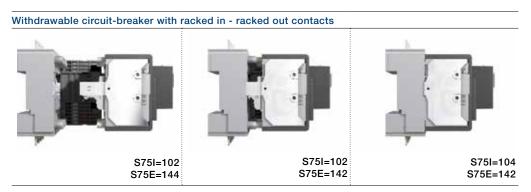
For further details about the electrical specifications of the contacts, consult the "24V DC and 250V AC contacts" section of the Accessories chapter.

Circuit-breaker		N° racked-in contact	N° racked-out contact	
XT1	3/4 poles	4	-	
VTO	3 poles	2	2	
X12	4 poles	4	2	
XT3	3/4 poles	4	-	
XT4	3/4 poles	4	2	











Early auxiliary contacts in the handle

Early auxiliary contacts - AUE

Early contacts in relation to **closing**: allow the undervoltage release to be supplied before the main contacts close, in accordance with the IEC 60204-1, VDE 0113 Standards.

Early contacts in relation to **opening**: allow any electronic devices connected to the system that could be damaged owing to overvoltages generated by the circuit-breaker opening operation to be disconnected in advance.

The early opening/closing auxiliary contacts can be installed inside the direct and transmitted rotary handle operating mechanisms for all the SACE Tmax XT family circuit-breakers (max two contacts @ 400V):

- in the cabled version with 1m long cables (AWG20 cable sections);
- a dedicated code is available in the withdrawable version which includes the connector for the moving part and fixed part;

For further details about the electrical specifications of the contacts, consult the "400V DC and 250V AC contacts" section of the Accessories chapter.

Motor operators

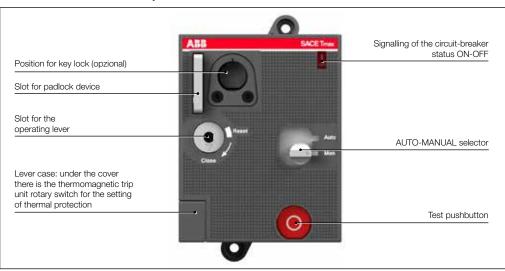
Devices that allow circuit-breaker opening and closing to be controlled:

- in the remote mode, by means of electric controls;
- locally directly from the front, by means of a special mechanisms.



Direct action motor operator (MOD)

MOD direct action motor operator



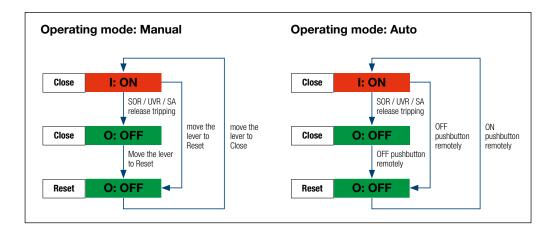
The direct action motor control available for XT1 and XT3, is supplied:

- complete with 1m long cables;
- with flange, to replace the standard one supplied with the circuit-breaker;
- with padlock device, only removable when the motor is in the open position. The padlock device accepts up to three 8 mm padlocks;
- auxiliary contacts (AU-MO) which allow the motor control mode (manual or auto) signal to be routed outside;
- (on request) the motor operator can be fitted with a key lock (consult the "locks" section in the Accessories chapter).

Electrical Accessories

Operating principles:

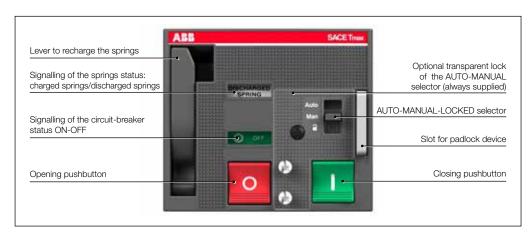
- a selector on the front of the MOD, is used for selecting the operating mode:
 - AUTO: when the selector is in this position, circuit-breaker closing can only take place remotely by means of an electric impulse, whereas opening is allowed both remotely and from the front of the motor;
 - MANUAL: when the selector is in this position, the circuit-breaker can only be opened/closed from the front of the motor by means of the relative lever housed in a slot made in the motor itself:
- operation of the motor operator via remote control is also guaranteed by permanent electrical opening/closing impulses;
- the resetting modes shown in the diagrams below depend on the reset wiring diagram chosen by the customer (consult the reset wiring diagrams in the "Electric Diagrams") chapter.





Stored energy motor operators (MOE)

Stored energy motor operators - MOE and MOE-E



The MOE or MOE-E stored energy motor operator available for XT2 and XT4 is supplied:

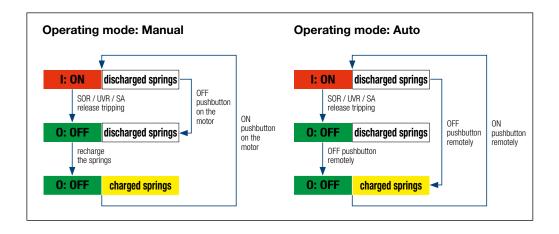
- complete with 1m long cables;
- complete with connector for the fixed part and moving part of withdrawable devices. If the motor operator is used with fixed or plug-in circuit-breakers, the connector can be easily removed;
- with flange, to use instead of the standard one supplied with the circuit-breaker;
- with padlock device, only removable when the motor is in the open position. The padlock device accepts up to three 8mm padlocks;
- with lock of the AUTO-MANUAL selector;
- with auxiliary contacts (AUX-MO) that allow the motor's control mode (manual or remote) signal
 to be routed outside;

- (on request) the motor operator can be equipped with key lock (consult the "locks" section in the Accessories chapter);
- (on request) the motor operator can be equipped with lock to safeguard against manual operation MOL-M (consult the "locks" section in the Accessories chapter).

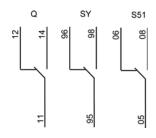
Operating principles:

- a selector on the front of the MOE, is used for selecting the operating mode:
 - AUTO: when the selector is in this position, the pushbuttons on the front of the motor are locked. Circuit-breaker closing can only take place remotely by means of an electric impulse, whereas opening is allowed both remotely and from the front of the motor;
 - MANUAL: the circuit-breaker can only be opened/closed from the front of the motor using the relative pushbuttons;
 - LOCKED: when the selector is in this position, the circuit-breaker is in the open position. The
 padlock device can be withdrawn and the motor locked in the open position;
- operation of the motor operator via remote control is also guaranteed by permanent electrical opening/closing impulses. Once an opening command has been given, the next closing command (permanent) is taken over by the motor operator once opening has been completed. In the same way, an opening command is taken over once the previous closing operation has been completed;
- the resetting modes shown in the diagrams below depend on the reset wiring diagram chosen by the customer (consult the reset wiring diagrams in the "Electric Diagrams") chapter.

When Ekip Com module is used, motor operator MOE-E can be used instead of motor operator MOE. MOE-E allows the digital signals from the supervision and monitoring system to be used by means of the release and Ekip Com contacts and to be converted into power signals for operating the motor operator. All the features described above for the MOE motor operator are also valid for the MOE-E version.



Electrical Accessories



Changeover of au	xiliary contacts Q (open/closed), SY (Relay tripped	d) and S51	(trip unit trip	ping)
Circuit-breaker wi	th MOE (MANUAL Mode)			
Normal sequence	CB Closed	Q=14	SY=96	S51=06
	By pressing the Red pushbutton, the CB trips	Q=12	SY=98	S51=06
	Charging the springs, CB opens	Q=12	SY=96	S51=06
	By pressing the Green pushbutton, the CB Closes	Q=14	SY=96	S51=06
Trip Sequence	CB Closed	Q=14	SY=96	S51=06
(trip caused by: - SOR.	CB trips	Q=12	SY=98	S51=06
- 50R, - UVR.	Charging the springs, CB opens	Q=12	SY=96	S51=06
- Trip Test)	By pressing the Green pushbutton, the CB Closes	Q=14	SY=96	S51=06
	CB Closed	Q=14	SY=96	S51=06
Trip Sequence	CB trips	Q=12	SY=98	S51=08
(trip caused by trip unit)	Charging the springs, CB opens	Q=12	SY=96	S51=06
	By pressing the Green pushbutton, the CB Closes	Q=14	SY=96	S51=06
Circuit-breaker wi	th MOE (AUTO Mode)			
	CB Closed	Q=14	SY=96	S51=06
Normal sequence	By pressing the Opening pushbutton remotely, the CB opens	Q=12	SY=98	S51=06
	By pressing the Closing pushbutton remotely, the CB Closes	Q=14	SY=96	S51=06
	CB Closed	Q=14	SY=96	S51=06
Trip Sequence	CB trips	Q=12	SY=98	S51=06
(trip caused by: - SOR, - UVR, - Trip Test)	By pressing the Opening pushbutton remotely, the CB opens	Q=12	SY=96	S51=06
	By pressing the Closing pushbutton remotely, the CB Closes	Q=14	SY=96	S51=06
Trip Sequence (trip caused by trip unit)	CB Closed	Q=14	SY=96	S51=06
	CB trips	Q=12	SY=98	S51=08
	By pressing the Opening pushbutton remotely, the CB opens	Q=12	SY=96	S51=06
	By pressing the Closing pushbutton remotely, the CB Closes	Q=14	SY=96	S51=06

Electrical specifications		MOD		MOE and MOE-E	
	[V]	-	24 DC	-	24 DC
Rated voltage, Un	[V]	_	4860 DC	-	4860 DC
	[V]	110125 AC	110125 DC	110125 AC	110125 DC
	[V]	220250 AC	220250 DC	220250 AC	220250 DC
	[V]	380440 AC	-	380440 AC	-
	[V]	480525 AC	-	480525 AC	-
Operating Voltage	[% Un]	MIN=85% Un; MAX=110% Un			
Power absorbed on inrush Ps	[VA - W]	≤ 500	≤ 500	≤ 300	≤ 300
Power absorbed in Pc service	[VA - W]	≤ 300	≤ 300	≤ 150	≤ 150
Operating frequency	[Hz]	5060		5060	
	$CL \rightarrow OP [s]$	< 0.1		< 1.5	
Duration (1)	$OP \to CL [s]$	< 0.1		< 0.1	
	$TR \rightarrow OP [s]$	< 0.1		< 3	
Mechanical life	[N° operations]	25000		25000	
Minimum duration of electrical opening and closing command	[ms]	≥ 150		≥ 150	

 $^{^{\}mbox{\scriptsize (1)}}$ Total time, from transmission of impulse to opening/closing of circuit-breaker

Connectors for electrical accessories

Plug-in circuit-breaker

In the plug-in version of SACE Tmax XT circuit-breakers, the auxiliary circuits can be disconnected by means of two different types of adapter:

- plug and socket adapter to be fixed on the bottom of the panel: for XT1, XT2, XT3, XT4;
- plug and socket adapter installed on the rear of the circuit-breaker and in the fixed part of plug-in devices: for XT2, XT4.



Plug and socket adapters on the back of the panel

Plug and socket adapters on the back of the panel

To make it easier to connect/disconnect auxiliary circuits, wired electrical accessories can be connected to one or more plug and socket connectors to be installed on the back of the panel. 3, 6, 9 and 15 PIN connectors are available. The cables connect/disconnect to and from the connector in a fast and simple way without the aid of any dedicated tools.

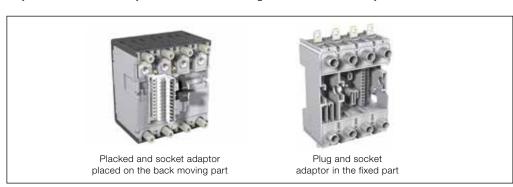
Consider the number of cables of each electrical accessory when calculating the number of connectors required.

Accessory	Number of cables
SOR, UVR, External Neutral, PTC	2
SA, 1 AUX	3
Auxiliary power supply 24V DC, AUE, PR212Cl	4
MOE-E	5
Ekip Com, Residual current	6
MOE (with AUX-MO), MOD (with AUX-MO)	7

Plug and socket adapters installed on the rear of the circuit-breaker and in the fixed part

Only for the plug-in versions of Tmax XT2 and XT4 circuit-breakers, the auxiliary circuits can be automatically disconnected by means of an adapter installed on the rear of the circuit-breaker and in the fixed part of plug-in versions.

The 12 PIN connector can only be used with accessories that function at a voltage of not more than 250V AC/DC. The cables are connected to /disconnected from the connector in a fast and simple way without the aid of any dedicated tools. Wiring is to be carried out by the Customer.





Cabling of withdrawable version

Withdrawable circuit-breaker

When withdrawable circuit-breakers are used, the codes of the electrical accessories specifically designed for this version must be ordered. These dedicated codes contain the wired electrical accessory with connector for the moving part and for the fixed part to be inserted in the side of the fixed part. If the MOE motor operator is ordered, connectors for the fixed part and moving part are always supplied since there is no dedicated code for the withdrawable version.

The connectors of electrical accessories for withdrawable circuit-breakers must all be installed on the right side of the circuit-breaker in housings made in the side of the fixed part.

This type of connection allows the auxiliary circuits to be disconnected automatically when the circuit-breaker is withdrawn from the fixed part.

If the Customer wants to wire the fixed part in advance of the moving part, the fixed part mounting connectors can be ordered as spare parts.

Electrical Accessories

Residual current releases

Both circuit-breakers and switch-disconnectors are pre-engineered for assembly combined with residual current releases.

Residual current circuit-breakers derived from the circuit-breaker are known as "mixed", meaning that, besides protection against the typical overloads and short-circuits of circuit-breakers, they also provide protection for people and against earth fault currents, thus protecting against direct, indirect contacts and the risk of fires.

Residual current circuit-breakers derived from the switch-disconnector are "pure" residual current circuit-breakers, i.e. they only provide residual current protection and not the protections typical of circuit-breakers. "Pures" residual current circuit-breakers are only sensitive to earth fault current and are generally used as main switches in small panels for distribution to end users.

Use of "pure" and "mixed" residual current circuit-breakers allows the insulation state of the installation to be continuously monitored. It ensures efficient protection against the risks of fires and explosions and, in the case that detect fault at $I\Delta n$ <30mA devices, also protects people against indirect and direct contacts, thereby integrating the compulsory measures established by the accident prevention standards and regulations.

The residual current releases comply with the following Standards:

- IEC 60947-2 annex B;
- IEC 61000: for protection against unwarranted tripping.

The table gives all the residual current devices which can be used with the Tmax XT family of circuit-breakers:

	Х	T1	Х	T2	Х	Т3	XT4		
	3р	4p	3р	4p	3р	4p	3р	4p	
RC Inst	F	F			F	F			
RC Sel XT1-XT3	F	F			F	F			
RC Sel 200		F							
Rc Sel XT2-XT4				F-P-W				F-P-W	
RC B type						F			

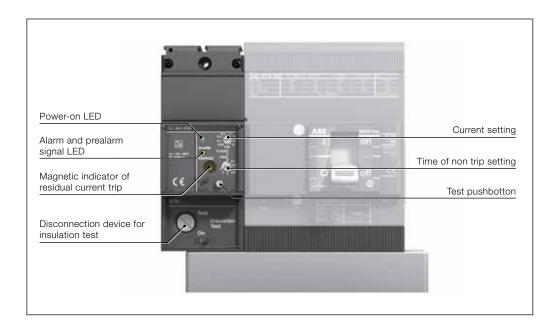
F = Fixed, P = Plug-in, W = Withdrawable

All Tmax XT residual current devices:

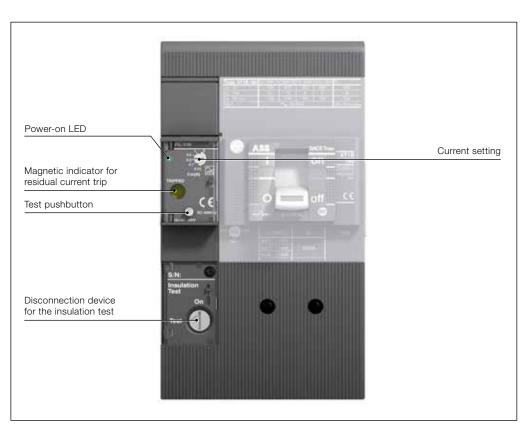
- feature microprocessor technology and act directly on the circuit-breaker by means of a dedicated opening solenoid (supplied with the residual current release and also available as a spare part) which must be housed in the relative slot formed in the third pole are to the left of the operating lever;
- do not need an auxiliary supply as they are powered directly from the mains;
- can be supplied either from above or below;
- functionality is guaranteed even with a single phase plus neutral or just two live phases and in the presence of pulsating unidirectional currents with direct components (minimum auxiliary voltage PHASE-NEUTRAL 85 Vrms);
- all possible connection combinations are permitted, as long as the neutral connection to the first pole on the left in the four-pole version is guaranteed.

RC Sel 200 residual current releases (type A) XT1

Thanks to its low height, the RC Sel 200 residual current release can be installed in 200mm modules. Moreover, its special shape reduces the overall size of the installation if two or more units are to be installed side by side.

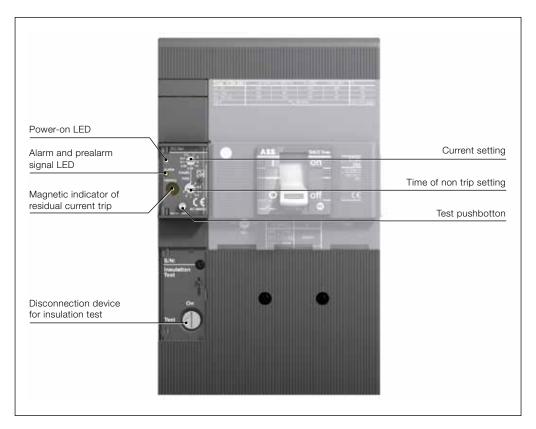


RC Inst residual current releases for XT1 and XT3



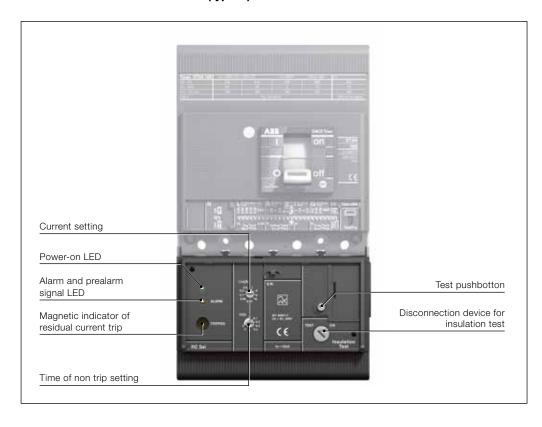
Electrical Accessories

RC Sel residual current releases (type A) for XT1 and XT3



With RC Inst and RC Sel residual current release for XT1 - XT3, available only in Fixed version, it is possible to have rear terminal connection, ordering RC Rear terminals 4p kits.

RC Sel residual current releases (type A) for XT2 and XT4

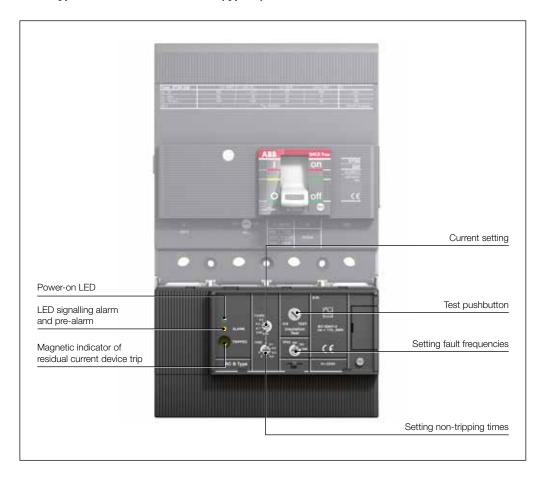


The fixed version of the RC Sel residual current release can easily be converted:

- into the plug-in type:
 - by ordering the kit for converting the residual current release from the fixed to the plug-in version.
- into the withdrawable type:
 - by ordering the kit for converting the residual current release from the plug-in to the withdrawable version. This kit contains the shunt opening release of the withdrawable residual current device to replace the shunt opening release supplied with the fixed version. The shunt opening release of the withdrawable residual current device contains both the connector for the moving part and the connector for the fixed part.

With the RC Sel residual current release for XT2-XT4, it is possible to use the same terminals usable for the fixed circuit-breaker and for the fixed parts of plug-in and withdrawable circuit-breakers. Whitdrawable and plug-in versions frame 160A with RC can be used up to a maximum current of 135A, whereas frame 250A can be used up to 210A.





The RC B Type residual current release, to be used in conjunction with the XT3 circuit-breaker, has the following features:

- it complies with type B operation, which guarantees sensitivity to residual fault currents with alternating, pulsating alternating and direct current components (IEC 60947-1, IEC 60947-2 Annex B, IEC 60755);
- the maximum frequency band of the residual fault current can be selected (3 steps: 400 700 1000Hz). The residual current device can therefore be adapted to suit various industrial installation requirements according to the prospective fault frequencies generated on the load side of the release. Typical installations that may require different frequency thresholds from the standard ones (50 60Hz) are welding systems for the automobile industry (1000Hz), the textile industry (700Hz), airports and three-phase drives (400Hz).

Electrical Accessories

Electrical characteristic		Re	sidual current devic	ces	
	RC Sel 200mm XT1	RC Inst XT1-XT3	RC Sel XT1-XT3	RC Sel XT2-XT4	RC B Type XT3
Primary power supply Voltage [V]	85690	85690	85690	85690	110500
Operating frequency [Hz]	4566	4566	4566	4566	4566
Fault frequency [Hz]	50-60	50-60	50-60	50-60	400-700-1000
Test operating range [V]	85690	85690	85690	85690	110500
Rated operating current [A]	up to 160	XT1 up to 160 XT3 up to 250	up to 160 XT1 up to 250 XT3	up to 160 XT2 ⁽²⁾ up to 250 XT4 ⁽²⁾	up to 225
Adjustable trip thresholds [A]	0.03-0.05-0.1-0.3 0.5-1-3-5-10	0.03-0.1-0.3 0.5-1-3	0.03-0.05-0.1-0.3 0.5-1-3-5-10	0.03-0.05-0.1-0.3 0.5-1-3-5-10	0.03-0.05-0.1 0.3-0.5-1
Selective type S		-			
Adiustolala NONI tuis tissa aattissa [a]	instantaneous		instantaneous	instantaneous	instantaneous
Adjustable NON-trip time settings [s] at 2xlΔn	0.1-0.2-0.3- 0.5-1-2-3	instantaneous	0.1-0.2-0.3- 0.5-1-2-3	0.1-0.2-0.3- 0.5-1-2-3	0-0.1-0.2-0.3- 0.5-1-2-3
Power input	<5 W at 690V AC	<5 W at 690V AC	<5 W at 690V AC	<5 W at 690V AC	<10 W at 500V AC
Trip Coil with switch contact for trip signal					
Input for remote controlled opening command		-			
NO contact for pre-alarm signal		-			
NO contact for alarm signal		-			
Prealarm indication from 25% I∆n. Steady yellow Led light		_			
Alarm timing indication at 75% I∆n. Flashing yellow Led light ⁽¹⁾		-			
Type A for pulsating alternating current, Type AC for alternating current					
Type B for pulsating current and direct current	-	-	-	-	

 $^{^{(1)}}$ indication of alarm timing at 90% $I\Delta n$ for 30mA



Toroid

SACE RCQ020/A panel type residual current release (type A)

Tmax circuit-breakers can also be used in conjunction with RCQ020 panel type residual current relays with separate toroid to be installed on the line conductors ("/A" letter show the necessity to have on auxiliary power supply).

Thanks to its wide range of settings, the panel relay is suitable for:

- applications where the installation conditions are particularly restrictive, such as circuit-breakers already installed or limited space in the circuit-breaker compartment;
- creating a residual current protection system coordinated at various distribution levels, from the main switchboard to the end user;
- where residual current protection with low sensitivity is required, e.g. in partial (current) or total (time) selective chains;
- highly sensitive applications (physiological sensitivity) for protecting people against direct contacts.

Thanks to the 115-230...415V external auxiliary power supply, the RCQ020 panel-type residual current device is able to detect current leakage from 30mA to 30A and to act with a trip time that can be adjusted from instantaneous to delayed by 5s. The opening mechanism is the indirect action type and acts on the circuit-breaker release mechanism by means of the shunt opening or undervoltage release of the circuit-breaker itself.

The opening command to the circuit-breaker (Trip delay) can be temporarily inhibited, and the circuit-breaker can be opened by remote control by means of the RCQ020 device.

The following equipment must be requested when ordering:

- the RCQ020 device;
- an opening coil (SOR) or an undervoltage release (UVR) of the circuit-breaker to be housed in the relative slot made in the left pole of the circuit-breaker itself;
- a closed toroid, that can be used for cables and busbars, chosen from amongst those available, with a diameter from 60mm to 185mm.

plug in and withdrawable version: the 160 frame can be used with a max In = 135A the 250 frame can be used with a max In = 210A

Signals available:

- LED to indicate the status of the residual current device (supplied or not supplied). RCQ020 is equipped with the positive safety function thanks to which the RCQ020 commands automatic circuit-breaker opening in the absence of auxiliary voltage;
- LED for signalling faults;
- LED for signalling tripping of the residual current device;
- pre-alarm/alarm/trip electrical signals.



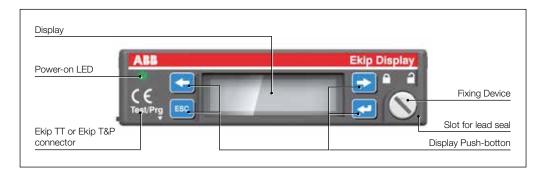
RCQ020/A residual current relea	ase		
Power supply Voltage	AC	[V]	115-230415
Operating frequency		[Hz]	45÷66Hz
	@115V AC		500mA for 50ms
Inrush current	@230V AC		150mA for 50ms
	@415V AC		100mA for 50ms
Power input at full rate			2 [VA] / 2 [W]
Trip threshold adjustment I∆n		[A]	0.03-0.05-0.1-0.3-0.5-1-3-5-10-30
No trip time adjustment	<u>.</u>	[s]	instantaneous 0.1-0.2-0.3-0.5-0.7-1-2-3-5
Pre-alarm threshold		x l∆n	25%
A type for pulsing alternate curren	t		•
Signals			
Device powered visual signalling			
Visual signalling of device not fund configured	ctioning/ not		
Visual signalling of residual curren	t protection		
Electrical alarm/pre-alarm signal	•		
Electric trip signal	••••••		
Controls			·
Remotely controlled opening com	mand		
Remotely controlled reset comma	nd		
Operating range of closed tran	sformers		
Ø 60 [mm] toroidal transformer		[A]	In max = 250A Use 0.0330A
Ø 110 [mm] toroidal transformer		[A]	In max = 400A Use 0.0330A
Ø 185 [mm] toroidal transformer		[A]	In max = 800A Use 0.130A
Connection to toroidal transforme	r		By means of 4 shielded or twisted conductors. Maximum tolerated length: 15m
Dimensions W x H x D		[mm]	96 x 96 x 77
Drilling for assembly on door		[mm]	92 x 92
Standard			IEC 60947-2 annex M

Accessories for electronic trip units

		Accessories for e	lectronic trip units							
	Ekip Display	Ekip LED Meter	SACE PR212/CI	External neutral						
Distribution protection										
Ekip LS/I	-	-	-	-						
Ekip I	-	-	-	-						
Ekip LSI			-							
Ekip LSIG			-							
Motor protection										
Ekip M-I	-	-	-	-						
Ekip M-LIU	-	-	-	-						
Ekip M-LRIU				-						
Generator Protection										
Ekip G-LS/I	-	-	-	-						
Oversized Neutral Prote	ction									
Ekip N-LS/I	-	-	-	-						
Energy measurement										
Ekip E-LSIG			-							

Ekip Display

The Ekip Display is a unit which can be applied on the front of the solid-state trip unit and shows the current values, alarms and protection and communication parameter programming.

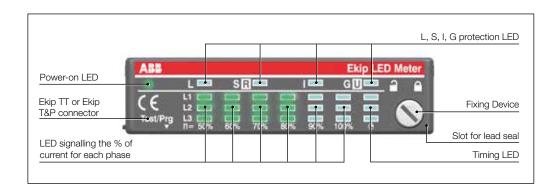


Main features:

- installation: Ekip Display can easily be installed on the front of the Ekip LSI, Ekip LSIG, Ekip M-LRIU and Ekip E-LSIG electronic trip units. It is connected by means of the test connector on the front of the trip unit, and fixing is simple and reliable thanks to a specially designed mechanism. This mechanism also provides a practical way of fastening the accessories to the circuit-breaker in order to prevent undesired access to the dip-switches. Installation can be carried out under any conditions, even with the door closed and the electronic trip unit already on and functioning;
- functions: Ekip Display has four buttons for browsing through the menus. It functions in the self-supply mode starting from a current of I>0.2xIn circulating through at least one phase. Backlighting is activated in the presence of higher loads, thereby allowing a better leggibility of visualized informations. The rear lighting comes on in self-supply for a current I>0.4xIn and is always on when there is electronic trip unit auxiliary power supply. Ekip Display:
 - shows the current, voltage, power and energy values;
 - shows the settings of the protection functions in Amperes or in In:
 - shows the protection that caused the release to trip and the fault current (only when there is 24V external voltage or the Ekip TT unit);
 - allows the trip thresholds of the trip unit to be programmed and the communication parameters to be set on bus system;
- compatibility: Ekip Display can be fitted even when front accessories, such as the motor, direct and transmitted rotary handles etc. are already installed. It's possible to use Ekip TT or Ekip T&P without removing Ekip Display. It's not possible to use Ekip Display when the breaker is in the withdrawable version.

Ekip LED Meter

The Ekip LED Meter can be applied to the front of the electronic trip unit and displays the current values and alarms.



Main features:

- installation: Ekip LED Meter can be easily installed on the front of Ekip LSI, Ekip LSIG, Ekip M-LRIU and Ekip E-LSIG electronic trip units. It is connected by means of the test connector on the front of the release and fixing is simple and reliable thanks to a specially designed mechanism. This mechanism also provides a practical way of fastening the accessories to the circuit-breaker in order to prevent undesired access to the dip-switches. Installation can be carried out under any conditions, even with the door closed and the electronic trip unit already on and functioning;
- **functions**: Ekip LED Meter provides an accurate indication about the value of the current circulating in the trip unit. It does this by means of a scale of LED. Their different colours allow the normal operation, prealarm and alarm states of the circuit-breaker to be recognized at a glance. It functions in self-supply mode from a current of I>0.2xIn circulating through at least one phase or when electronic trip unit's auxiliary power is available;
- compatibility: the Ekip LED Meter can also be fitted when front accessories, such as the motor, direct and transmitted rotary handles. It's possible to use Ekip TT or Ekip T&P without removing Ekip LED Meter. It's not possible to use Ekip LED Meter when the breaker is in the withdrawable version.

SACE PR212/CI contactor operator



PR212/CI is an interface device that allow Ekip M-LRIU to comand the contactor. The stand-by position normally corresponds to the opening position of the main contacts. PR212/CI can be used in conjunction with XT2-XT4 circuit-breakers equipped with the electronic trip unit for Ekip M-LRIU motor protection.

Main features:

- **installation**: PR212/Cl can be installed both on a DIN rail and on the back of the door. It is connected to the electronic trip unit with a dedicated connector, which has to be ordered in relation to the circuit-breaker version;
- **functions**: when the release is set to "Normal Mode" the contactor can be opened if a fault occurs due to overload L, locked rotor R or phase failure/unbalance U.

Accessories for electronic trip units

Current sensor for external neutral

The current sensor for external neutral is applied to the uninterrupted neutral conductor. It allows the reading of the neutral current for all the protection functions.

Main features:

■ **installation**: the external neutral current sensor is available for XT2 and XT4 three-pole circuit-breakers in the fixed/plug-in and withdrawable version equipped with Ekip LSI, Ekip LSIG electronic trip unit. The sensor must be connected to the release with the specific connector, which must be ordered separately.

Connection accessories

Devices which allow the electronic trip unit to be connected to external plant units or components. The connectors are available for the circuit-breakers in fixed, plug-in and withdrawable version.

Name of connector	Trip Units						
External neutral connector	Ekip LSI – Ekip LSIG – Ekip E-LSIG						
Connector for PR212/Cl	Ekip M-LRIU						
Connector for 24V DC auxiliary power supply	Ekip LSI – Ekip LSIG – Ekip M-LRIU – Ekip E-LSIG						
Connector for PTC	Ekip M-LRIU						
Connector for external neutral voltage	Ekip E-LSIG						

The connector for the auxiliary power supply is inserted inside the right-hand slot of the circuit-breaker, and occupies the space of two due auxiliary contacts. To check compatibility with the auxiliary contacts, consult the compatibility tables in the Accessories chapter.



Communication devices and systems

Ekip Com

Ekip Com allows the MOE-E motor operator to be controlled, to determine the ON/OFF/TRIP state of the circuit-breaker and to connect the electronic trip unit to a Modbus communication line. Ekip Com is available in two versions: one version for the circuit-breakers in the fixed/plug-in version and a version complete with connector for the fixed part and the moving part for circuit-breakers in the withdrawable version.

Main characteristics:

- installation: the Ekip Com module is inserted in the right-hand slot of the circuit-breaker and fixing is carried out without any need for screws or tools.
 Connection to the trip unit is made using the special small cable which, for greater practicality and safety, is fitted with a cable guide. The connection towards the Modbus line is made by means of the terminal box to which a 24V DC auxiliary power supply must also be connected, which activates both the module and the protection trip unit;
- **functions**: the Ekip Com module offers the possibility of acquiring the state of the circuit-breaker remotely and, in combination with the MOE-E motor operator, allows it to be opened and closed. If combined with a trip unit fitted with communication (Ekip LSI, Ekip E, Ekip LSIG or Ekip M-LRIU), the Ekip Com module allows the trip unit to be connected to a Modbus network, offering the possibility of programming the protections and acquiring the measurements and alarms when it is connected to a control and/or supervision system. When it is connected to the HMI030 unit, it is possible to have these data locally on the front of the switchboard.

For further details on the comunication systems which can be made by means of the Ekip Commodule, refer to the "Communication Systems" paragraph in the "Ranges" chapter.



Ekip Bluetooth wireless communication unit

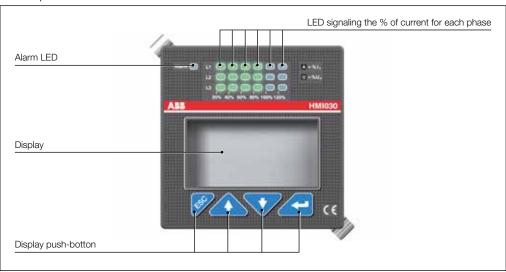
Ekip Bluetooth permits remote connection with the trip unit by portable PC, tablet or smart phone on which Ekip Connect software has been installed. The device is connected to Tmax trip units by means of a dedicated additional connector. It supplies power by means of a rechargeable Li-ion battery.



Communication devices and systems

HMI030 interface on the front of the switchboard

HMI030 is an interface on the front of the switchboard only usable with protection trip units fitted with Ekip Com.



Main features:

- installation: HMI030 can be fitted into the hole in the door using the automatic click-in method. In situations where mechanical stress is particularly intense, it can also be installed by using the special clips supplied. It must be connected directly to the Ekip LSI, Ekip LSIG, Ekip M-LRIU or Ekip E-LSIG protection trip unit with Ekip Com via the serial communication line. HMI030 requires a 24V DC power supply;
- **functions**: HMI030 consists of a graphic display and 4 buttons for browsing through the menus. This accessory allows you to view:
 - the measurements taken by the release to which it is connected;
 - the alarms/events of the release.

Thanks to its high level of accuracy, the same as that of the trip unit protection, the device is a valid substitute for conventional instruments without any additional current transformers.

- **communication**: HMI030 is provided with two communication lines, to be used in alternative:
 - Modbus
 - Local Bus.

Connecting Ekip LSI, Ekip LSIG, Ekip M-LRIU or Ekip E-LSIG to the Local Bus gives the possibility to connect the Modbus line of the Ekip Com module to a different communication network. Consult the Electrical Diagrams Chapter for further details about wiring.

Ekip Multimeter Display on front of switchboard

Ekip Multimeter is a display unit on the front of the switchboard, which is only usable with protection trip units fitted with one of the following accessories:

- Ekip Com
- Kit of 24V DC auxiliary voltage for electronic trip unit



Main features:

■ installation: Ekip Multimeter can be easily fitted on the switchboard door. In situations where mechanical stress is particularly intense, it can also be installed by using the special clips supplied. The dimensions of the device are 96mmx96mm. It must be connected directly to the Ekip LSI, Ekip LSIG, Ekip M-LRIU or Ekip E-LSIG protection trip unit with "Ekip Com" or "kit of 24V DC auxiliary voltage for electronic trip unit" via the serial communication line. Ekip Multimeter can be powered either in direct current (24-48V DC or 110-240V DC) or in alternating current (110-240V AC). It is equipped with a 24V DC output that can supply the connected trip unit.

Power supply	24-48V DC, 110-240V AC/DC
Tolerance	21.5-53V DC, 105-265V AC/DC
Rated Power	8W

- functions: Ekip Multimeter is equipped with a large touch screen display and enables measurements to be displayed. This accessory allows you to view the following:
 - measurements of the connected trip unit
 - alarms/events of the trip unit
 - modify the protection threshold directly from the display.
- communication: Ekip Multimeter is provided with a Local Bus communication line. One device can be connected to each trip unit. Connecting Ekip LSI, Ekip LSIG, Ekip M-LRIU or Ekip E-LSIG to the local bus gives the possibility to connect the Modbus line of the Ekip Com module to a different communication network. Consult the "Electrical Diagrams" chapter for further details about wiring.

Communication devices and systems

Ekip Control Panel on front of the switchgear front

The Ekip Control Panel enables the SACE Emax 2 circuit-breakers connected to the Ekip Link System and Tmax T or XT connected to a Modbus network to be controlled and monitored. The panel is supplied already equipped with supervision software and requires no

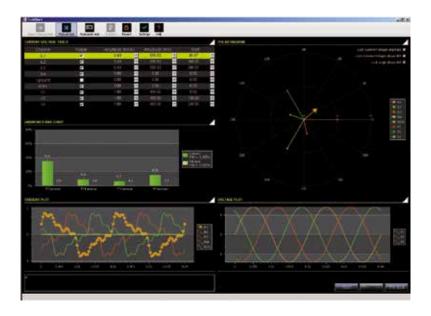
programming. Ekip Control Panel requires a 24V DC power supply and is equipped with:

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



Ekip Connect

Installation and diagnosis software for ABB SACE products with Modbus RTU communication. The software can be used during the commissioning stage, or for troubleshooting in an up and running communication network.





Ekip Connect automatically scans the RS-485 bus, detects all the devices connected and checks their configuration, checking all the possible address, parity and baud rate combinations. A simple click over SCAN will highlight:

- devices that fail to respond;
- configuration errors;
- incorrect addresses and parity;
- any wiring errors (with the SACE electronic trip unit);

thus achieving a complete diagnosis of the communication network.

Thanks to this friendly program, the Modbus communication network installation is very easy. Ekip Connect is distributed free of charge and can be downloaded from the BOL web site (http://bol.it.abb.com).

Communication devices and systems

Ekip View

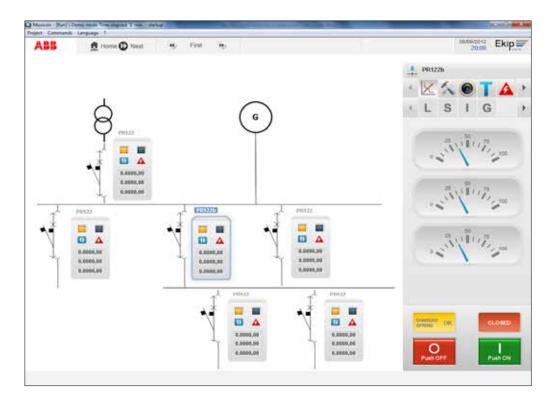
Ekip View is the software for supervising devices connected to a communication network that uses the Modbus RTU or Modbus TCP protocol.

It is the ideal tool for all applications that require:

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

The main characteristics of Ekip View are:

- Engineering free and ready to use software which guides the user in the recognition and configuration of the protection units without the need for any supervision system engineering activities.
- Dynamic mimic panel: after automatic scanning of the network, for each of the devices found, Ekip View proposes a dynamic symbol that summarizes the most important information (status, electrical measurements, alarms). The extensive library of electrical symbols enables the entire electrical system to be depicted in detail.
- Analysis of trends: the instantaneous and past trends of currents, powers and power factors
 are represented graphically and can be exported into Microsoft Excel for detailed analysis.
- Reports: advanced reports can be created regarding system and communication network diagnostics. Using the Alarm Dispatcher option, the user can receive the most important indications via SMS or e-mail.
- Access via web to the installation, thanks to the Web Server function of Ekip View.



Test and configuration accessories



Ekip T&P

Ekip T&P

Ekip T&P is a kit purpose studied to supervise, configure and testing electronic protection trip units.

The kit is composed by:

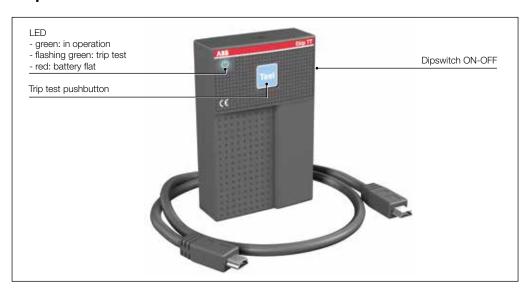
- Ekip T&P unit;
- Ekip TT unit;
- Adaptors for Emax and Tmax trip units;
- USB cable for connecting the Ekip T&P unit to the electronic trip unit;
- CD for installing Ekip Connect and the Ekip T&P driver.

The Ekip T&P unit is connected on one side to the USB port of its own PC and on the other, by means of a cable provided, to the protection trip unit of the SACE Tmax XT series.

The Ekip T&P unit allows automatic, manual test and the trip test of the device it is connected to. These functions are managed by means of the Ekip T&P Interface which can only be activated directly by the Ekip Connect when the Ekip T&P is present and connected to the PC.

Test and configuration accessories

Ekip TT



The Ekip TT accessory is supplied with a special connector which makes connection between the electronic trip unit and the Ekip TT unit easier. The kit also include san adaptor which allows use of the Ekip TT unit with the current Tmax breakers.

Ekip TT is a device which allows:

- verify the correct functioning of the electronic trip unit's opening solenoid and the trip mechanism of circuit-breaker (trip test);
- testing of the LEDs on the electronic trip unit it is connected to;
- (in case of intervention by electronic trip unit) to supply the trip unit powered by auxiliary power to show the latest intervened protection. Simply linking Ekip TT to the electronic trip unit (or to the Ekip display or to the Ekip LED Meter), the LED light on the latest protection intervened.

Its reduced dimension make it pocket size.

			Ekip	T&P functions			Ekip TT functions			
	Trip Test	Protection function test	Parameter reading	Protection parameter programming	Communication parameter programming	Thermal memory enabling/ disabling	Trip test	LED test	Latest trip detection	
Distribution protection	•	•		•			•		•	
Ekip LS/I				-	-					
Ekip I				-	-	-				
Ekip LSI										
Ekip LSIG										
Ekip E-LSIG						-				
Motor Protection			•						•	
Ekip M-I	-	-	-	-	-	-				
Ekip M-LIU				-	-	-				
Ekip M-LRIU						-				
Generator Protection									•	
Ekip G-LS/I				-	-					
Oversized Neutral Prote	ection									
Ekip N-LS/I				-	-					

Automatic network-generator transfer unit ATS021-ATS022



ATS021



ATS022

The ATS (Automatic Transfer Switch) is the network-generator transfer unit used in installations where switching the main power line to an emergency one is required, to ensure power supply to the loads in the case of anomalies in the main line.

The unit is able to manage the entire transfer procedure automatically, and prepares the commands for carrying out the procedure manually as well.

In the case of an anomaly in the main line voltage, in accordance with the parameters set by the user, the opening of the circuit-breaker of the main line, the starting of the generator set (when provided) and the closing of the emergency line are performed. In the same way, in the case of the main line returning, the procedure of reverse transfer is controlled automatically.

The new generation of ATS (ATS021 and ATS022) offers the most advanced and complete solutions to guarantee service continuity. The ATS021 and ATS022 can be used both with all the circuit-breakers in the SACE Tmax XT family and with the switch-disconnectors.

The ATS021 and ATS022 devices have been designed to operate with self-supply. The ATS022 unit also prepares the connection for auxiliary power supply, which allows additional functions to be used.

The ATS021 and ATS022 devices carry out control of both the power supply lines and analyse:

- phase unbalance;
- frequency unbalance;
- phase loss.

Apart from the standard control functions, with the ATS022 unit, the following is possible:

- selecting the priority line;
- controlling a third circuit-breaker;
- incorporating the device in a supervision system with Modbus communication (auxiliary power supply is needed);
- reading and setting the parameters, and displaying the measurements and alarms, by means of a graphic display.

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

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

- mechanical interlock;
- motorised control of opening and closing;
- key lock against just manual operation for the motor operator;
- contact for signalling the state (open/closed) and contact for tripped;
- contact for racked-in (in the case of a withdrawable version circuit-breaker).

Automatic network-generator transfer unit ATS021-ATS022

	ATS021	ATS022			
General					
		Not Required			
Auxiliary Power Supply	Not Required	(24-110 Vdc is required only for Modbus dialogue and 16 2/3 Hz system)			
Rated Voltage, Un [VAC]	Max 480	Max 480			
Frequency [Hz]	50, 60	16 2/3, 50, 60, 400			
Dimensions (HxLxD) [mm]	96x144x170	96x144x170			
Tune of installation	Door mounting	Door mounting			
Type of installation	DIN-rail mounting	DIN-rail mounting			
Operating Mode	Auto/Manual	Auto/Manual			
eatures					
Monitoring of the Normal and Emergency lines		•			
Controlling CBs of the Normal and Emergency lines		•			
Generator set startup					
Generator set shutdown with adjustable delay					
Bus-tie	_	•			
No-priority Line	_				
Modbus RS485	-				
Display	_				
Ambient conditions					
Operating temperature	-20+60 °C	-20+60 °C			
Humidity	5% - 90% without condensation	5% - 90% without condensation			
Operating thresholds					
Minimum voltage	-30%5%Un	-30%5%Un			
Maximum voltage	+5%+30%Un	+5%+30%Un			
Fixed frequency thresholds	-10%+10%fn	-10%+10%fn			
est					
Test Mode		•			
Compliance with standards					
Electronic equipment for use in power installations	EN-IEC 50178	EN-IEC 50178			
Electromagnetic competibility	EN 50081-2	EN 50081-2			
Electromagnetic compatibility	EN 50082-2	EN 50082-2			
	IEC 68-2-1	IEC 68-2-1			
Environmental conditions	IEC 68-2-2	IEC 68-2-2			
	IEC 68-2-3	IEC 68-2-3			

Compatibility of accessories

Check whether the different devices are compatible/incompatible with each other when ordering accessories. The following table allow provides a simple check of the compatibility between:

- mechanical accessories, accessories for electronic trip units, motors and residual current devices;
- internal electrical accessories.

To understand the abbreviations used to identify the accessories more easily, refer to the "Symbols" paragraph in chapter 8, "Glossary".



Three-pole circuit-breaker

Example of reading the compatibility tables

Fixed/plug-ir	circuit	-bre	aker	com	patib	ility	XT1	-XT3					
		DR p	R UVR 3p		- :		SA 3p		SOR 4p		UVR 4p		
SOR 3p			Í							v	(/	
UVR 3p 1	\longrightarrow	2	\rightarrow	3	\rightarrow	5	\rightarrow	6	\rightarrow	7_		8	•
3Q sx 3p										V	(/	
SA 3p										V	(/	
SOR 4p	6	/		/	6	V		V			(/	
UVR 4p	b	/		V		V		V	V		-		
					:		-				:		



Four-pole circuit-breaker

The **UVR** positioned in the slot of the **3rd pole**⁽¹⁾ is:

- incompatible with the SOR positioned in the 3rd pole⁽²⁾;
- incompatible with the UVR positioned in the 3rd pole⁽³⁾;
- incompatible with the 3Q contacts on the left in the 3rd pole⁽⁵⁾;
- incompatible with the SA of the residual current device⁽⁶⁾;
- compatible with the SOR positioned in the slot of the 4th pole⁽⁷⁾;
- compatible with the UVR positioned in the slot of the 4th pole⁽⁸⁾;
- ...

Compatibility of mechanical accessories

	RHD	RHE	RHS	FLD	PLL on CB	KLC on CB	RHL	on	MOD/ MOE/ MOE-E	Ekip Display		SOR/ UVR/SA/ 3Q sx 3p	1Q + 1SY	2Q + 1SY	3Q + 1SY
RHD							V			~	V	V	V	~	V
RHE							V			~	V	V	V	V	V
RHS										'	V	V	V	V	V
FLD							V			V	V	V	V	V	V
PLL on CB										V	V	V	V	V	V
KLC on CB										V	V		V	V	V
RHL	V	V		V						V	V	V	/	V	V
MOL on motor									V	V	V	V	V	V	V
MOD/MOE/MOE-E								V		V	V	V	V	/ (1)	(2)
Ekip Display	V	V	V	V	V	V	V	V	V			V	V	V	V
Ekip LED Meter	V	V	V	V	V	V	V	V	V			V	V	V	V
SOR/UVR/SA/3Q sx 3p	V	V	V	V	V		V	V	V	V	V		V	V	V
1Q + 1SY	V	V	V	/	V	V	V	V	~	V	V	V			
2Q + 1SY	V	V	V	V	V	V	V	V	(1)	V	V	V			
3Q + 1SY	V	V	V	V	V	V	V	V	(2)	/	V	V			

[✓] Compatibility

⁽¹⁾ Not valid for XT1

⁽²⁾ Not valid for XT3

Compatibility of accessories

Compatibility of electrical accessories

	SOR 3p	UVR 3p	3Q sx 3p	SA 3p	SOR 4p	UVR 4p	3Q sx 4p	1Q 1SY	2Q 1SY	3Q 1SY	KLC on CB	MOD
SOR 3p					V	V	V	V	V	V		V
UVR 3p					V	V	V	/	V	V		V
3Q sx 3p					V	V	V	/	V	V		~
SA 3p					V	V	V	V	V	V		~
SOR 4p	V	V	V	V		7		/	V	V	V	V
UVR 4p	V	'	V	V	:			V	V	V	V	V
3Q sx 4p	V	~	V	V	:	• • • • • •		/	V	V	V	V
1Q 1SY	V	V	V	V	V	V	V				V	V
2Q 1SY	V	'	V	V	V	'	V				V	(1)
3Q 1SY	V	'	V	V	V	'	V				V	
KLC on CB					V	V	V	V	V	V		
MOD	V	V	V	V	/	V	V	V	(1)			

✓ Compatibility

(1) Not valid for XT1

Compatibility of electrical accessories

	SOR 3p	UVR 3p	3Q sx 3p	SA	SOR 4p	UVR 4p	3Q sx 4p	S51	1Q 1SY	2Q 1SY	3Q SY	3Q 2SY	2Q 2SY	400V 2Q	400V 1Q	24V	Ekip Com	KLC on CB	MOE/ MOE-E
													1S51		1SY				
SOR 3p					V	V	V	~	V	V	V	V	V	V	V	V	V		~
UVR 3p					V	V	V	V	V	V	V	V	V	V	V	V	V		~
3Q sx 3p					V	V	V	V	V	V	V	V	V	V	V	V	V	*	V
SA					/	'	V	V	'	V	'	V	'	'	V	V	V		V
SOR 4p	'	~	'	V				V	~	V	'	V	V	V	V	V	V	~	V
UVR 4p	'	V	'	V				V	'	V	'	V	V	'	V	V	V	/	V
3Q sx 4p	V	V	V	V				V	V	V	V	V	V	'	V	V	V	'	V
S51	V	V	V	V	V	V	V		V	V						V	V	'	~
1Q 1SY	V	V	V	V	V	V	V	V								'		'	V
2Q 1SY	V	V	'	V	V	'	V	V										~	V
3Q 1SY	V	V	V	V	V	V	V											~	~
3Q 2SY	V	V	V	V	V	V	V											V	V
2Q 2SY 1S51	V	V	V	V	V	V	V											'	'
400V 2Q	V	V	V	V	V	V	V											V	'
400V 1Q 1SY	V	V	'	V	V	V	V								.		-	V	V
24 V	V	V	V	V	V	V	V	V	V	V								V	~
Ekip Com	V	V	V	V	V	V	V	V										V	V
KLC on CB	-				V	V	V	V	V	V	V	V	V	V	V	V	V		
MOE/MOE-E	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	

✓ Compatibility

Withdrawable circuit-breaker compatibility XT2-XT4 1Q 3Q 3Q 2Q 400V 400V Ekip 24V PR PTC MOE MOE AUX- AUE SOR UVR SA SOR UVR 1SY 1SY 2SY 2SY 2Q 1Q 212CI MOE Com -E Зр Зр 4p 4p S51 1SY S51 V V 1Q 1SY V **3Q 1SY** 3Q 2SY V V 2Q 2SY S51 400V 2Q V 400V 1Q 1SY **Ekip Com** V 24V PR212CI V NE V 1 V V V PTC MOE MOE-E AUX-MOE V V (1) (1) V V V V AUE SOR 3p V V V V UVR 3p SA V SOR 4p V \checkmark UVR 4p V V

[✓] Compatibility

⁽¹⁾ AUX-MOE always supplied with MOE and MOE-E



Characteristic Curves and Technical Information

Index

Characteristic Curves	
Examples of Curve reading	4 /2

Trip curves with thermomagnetic trip unit
Trip curves for distribution
Trip curves for motor protection
Trip curves for generator protection
Trip curves with electronic trip unit
Trip curves for distribution
Trip curves for motor protection
Trip curves for generator protection
Trip curves for oversized neutral protection
Specific let-through energy curves
240V
415V
440V
5 00V 4 /21
690V 4 /22
Limiting curves
240V
415V
440V
500V
690V
Technical Information
Temperature performances
Power losses
Magnetic trip values4/35
Applications at 440 Hz4/36

Examples of Curve reading

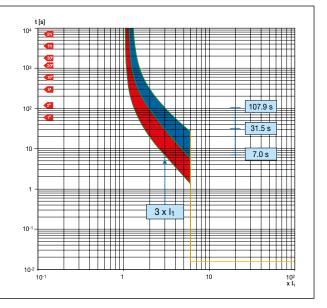
Example 1 – XT3N 250 Trip curves for distribution (thermomagnetic trip unit)

Let us consider an XT3N 250 TMD In=250 A circuit-breaker.

According to the conditions the overload is found in, i.e. with the circuit-breaker at thermal regime or not, tripping of the thermal protection varies considerably.

For example, for an overload current $3xI_1$, the trip time is between 107.9 s and 31.5 s for cold tripping and between 31.5 s and 7.0 s for hot tripping.

For fault current values higher than 2500 A the circuit-breakers trips with the instantaneous magnetic protection I_a .

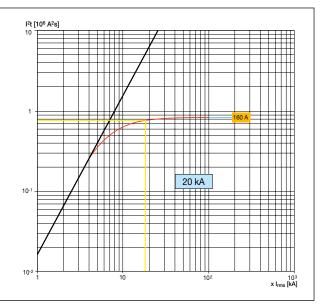


Example 2 – XT2N 160 Specific let-through energy curves

The following figure shows an example of the graph of the specific let-through energy of the XT2N 160 In=160A circuit-breaker at a voltage of 220/230 V.

The prospective symmetrical short-circuit current is indicated on the abscissas, whereas the values of the specific let-through energy expressed in A^2s are shown on the ordinates.

The circuit-breaker lets through a value of I^2t equal to 0.76 \cdot 10^6 \cdot A²s in correspondence with a short-circuit current of 20 kA.



Example 3 – XT2N 160

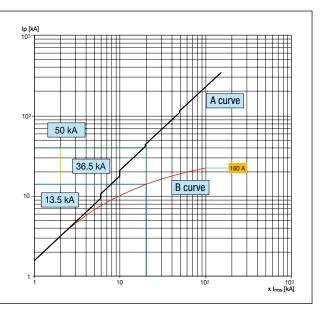
Limitation curves

The figure below gives the trend of the Limitation curves of the XT2N 160 In=160 A circuit-breaker.

The effective value of the prospective symmetrical short-circuit current is given on the abscissas of the diagram, whereas the peak value of the short-circuit current is indicated on the ordinates.

The limiting effect can be evaluated by comparing the peak value corresponding to the prospective short-circuit current (curve A) with the peak limited value (curve B), at the same value of symmetrical short-circuit current.

For a fault current of 20 kA, the XT2N 160 circuit-breaker with a thermomagnetic trip unit In =160 A limits the peak prospective short-circuit current to 13.5 kA at a voltage of 500 V, with a reduction in relation to the peak value of the prospective short-circuit current of 36.5 kA.

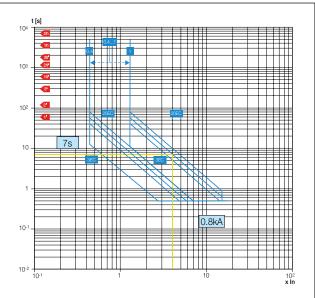


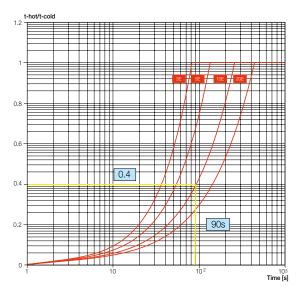
Example 4 - XT4N 250 Ekip M-LIU Cold trip / hot trip curves

The first curve gives indication of time of intervention of trip unit in case of fault in cold condition. Each curve is related to a single operating class defined by Standard IEC 60947-4-1 (3E, 5E, 10E or 10E). The second curve, hot trip, must be read in conjunction with the previous one. Given the time CB has been kept open after the first trip, t-off on the abscissas, t-hot/t-cold ratio can be identified on the ordinates. So, once cold trip time has been identified on the first chart in relation to a fault current, hot trip time can be calculated on the second chart, based on t-off and class of intervention.

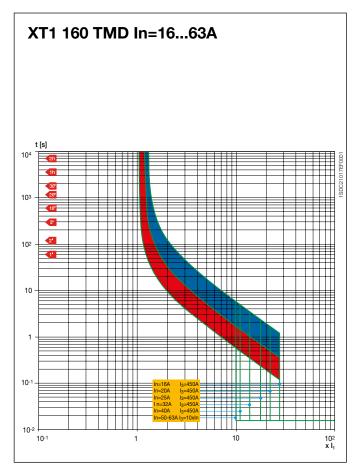
For a XT4N 250 In=200A under operating class 10E, given a fault current of 0.8kA (4xIn), cold trip time for intervention is 7s.

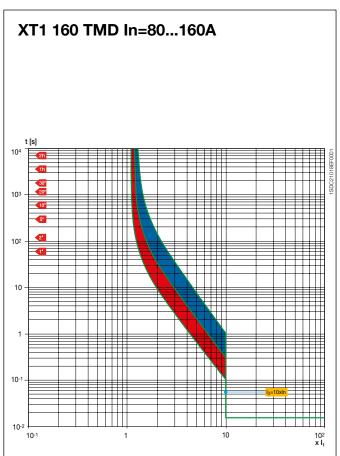
If we consider a t_{off} = 90s, t-hot/t-cold = 0.4, so hot trip time for intervention is going to be 2.8s.

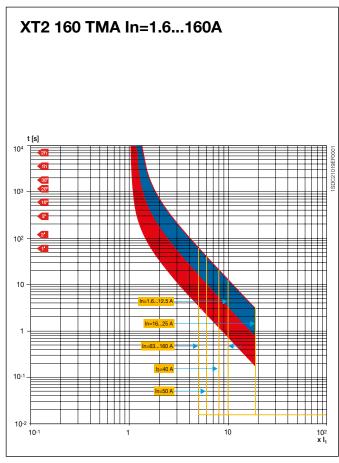


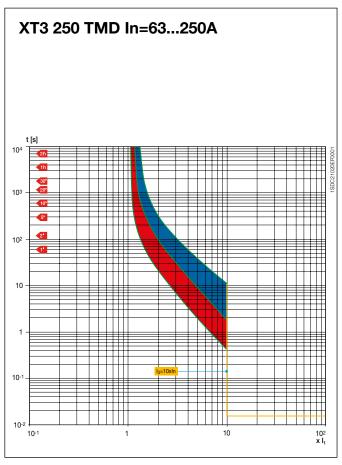


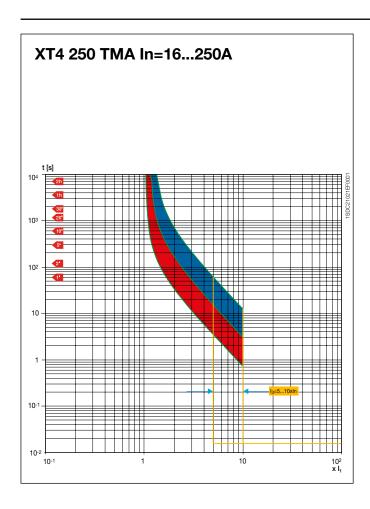
Trip curves with thermomagnetic trip unit





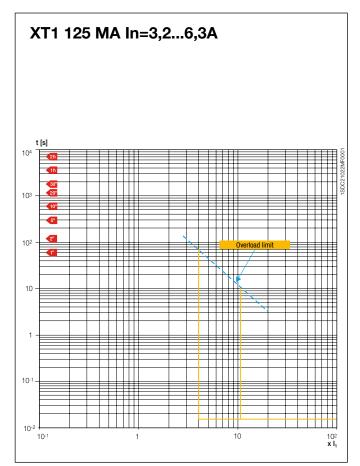


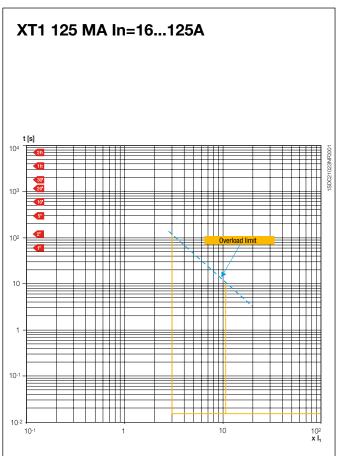


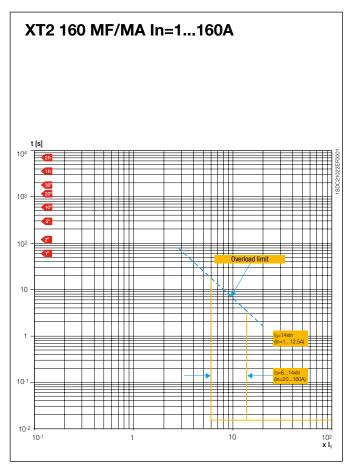


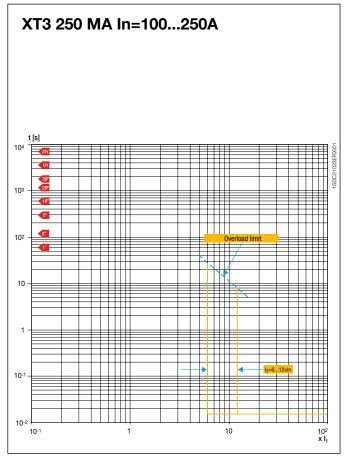
Trip curves with thermomagnetic trip unit

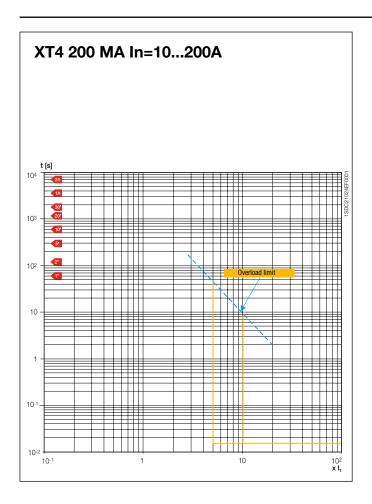
Trip curves for motor protection





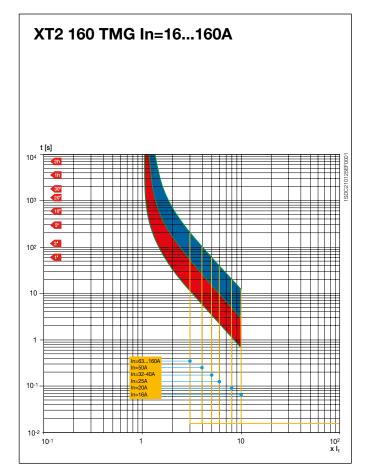


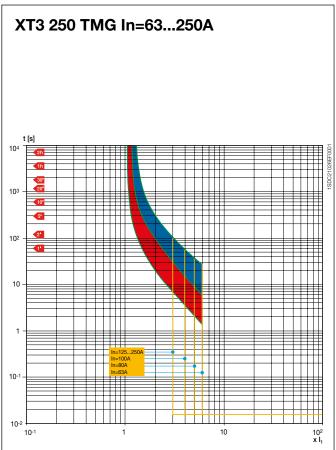




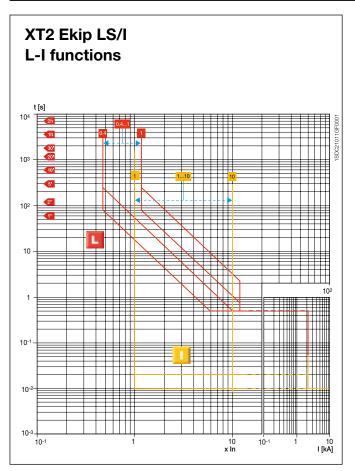
Trip curves with thermomagnetic trip unit

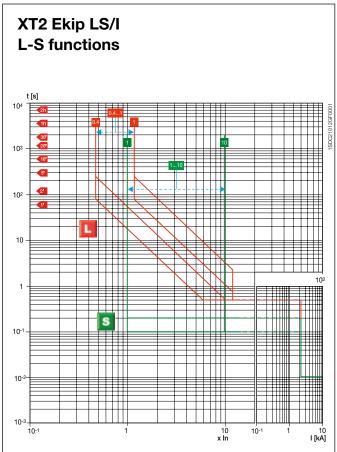
Trip curves for generator protection

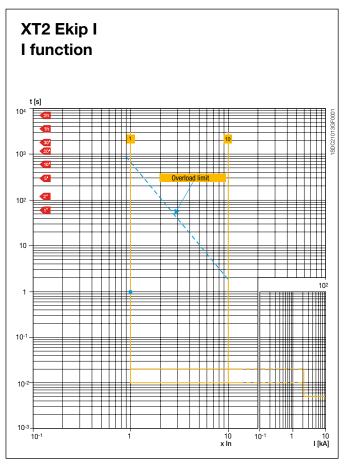


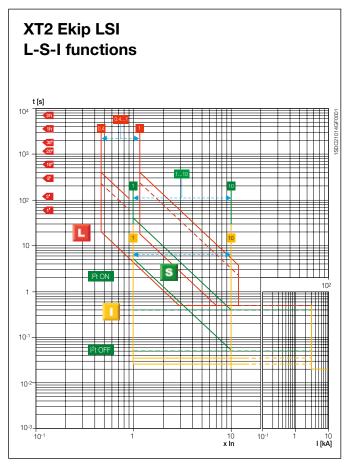


Trip curves with electronic trip unit

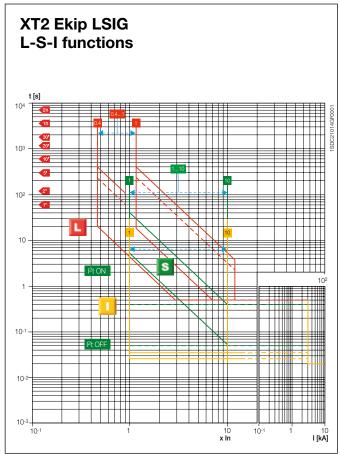


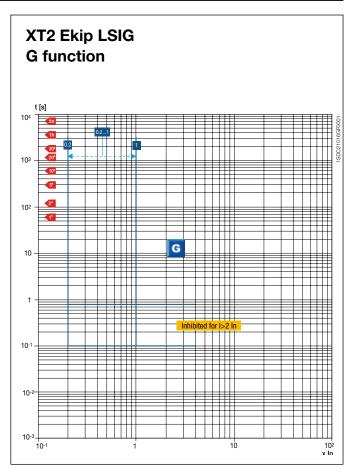


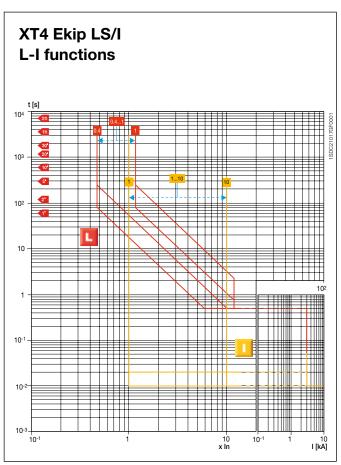


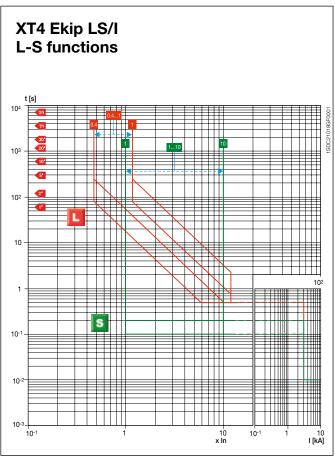


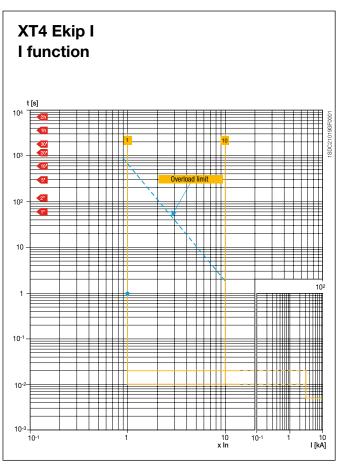
Trip curves with electronic trip unit

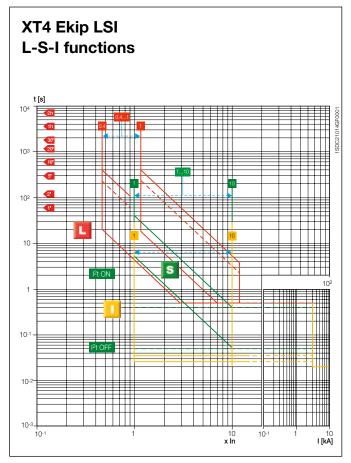


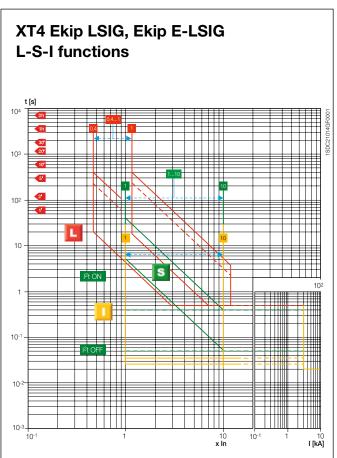


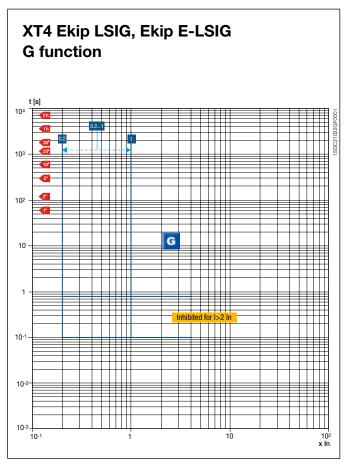




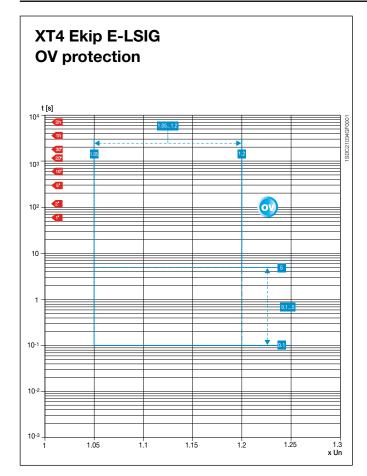


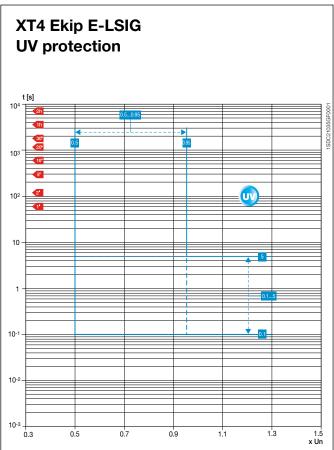






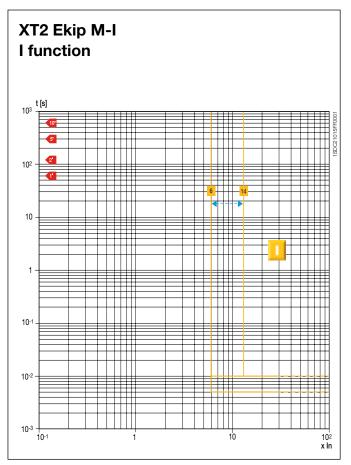
Trip curves with electronic trip unit

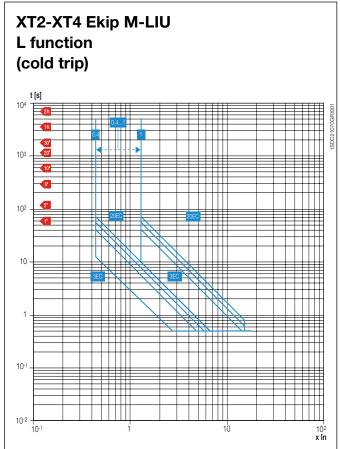


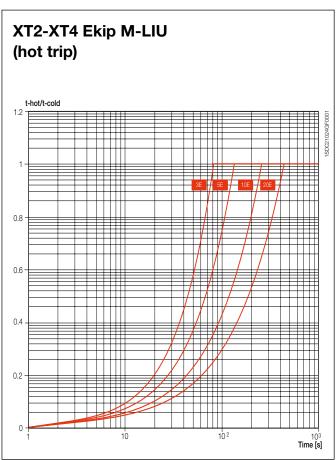


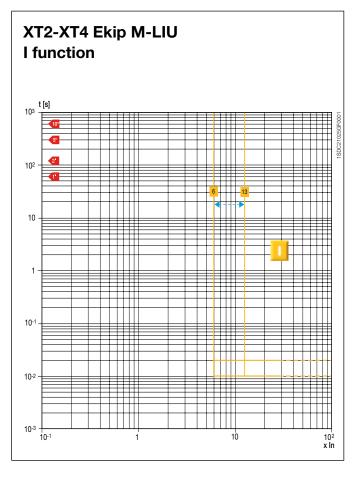
Trip curves with electronic trip unit

Trip curves for motor protection



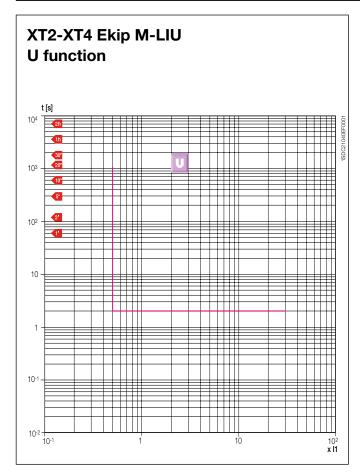


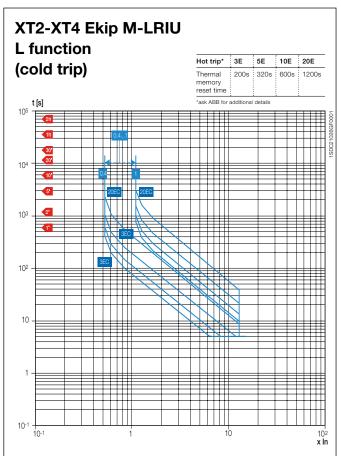


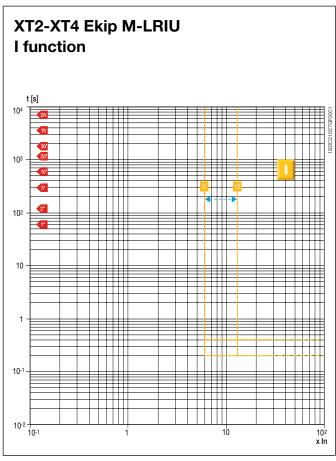


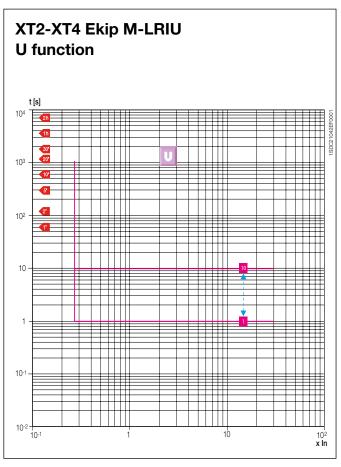
Trip curves with electronic trip unit

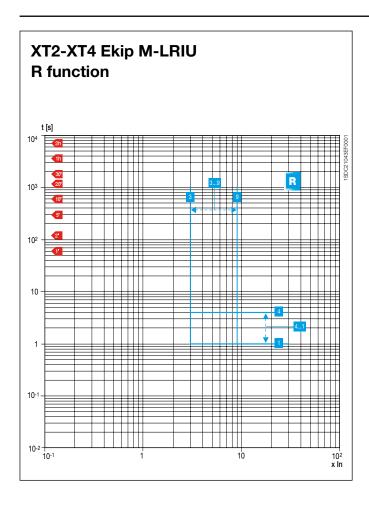
Trip curves for motor protection





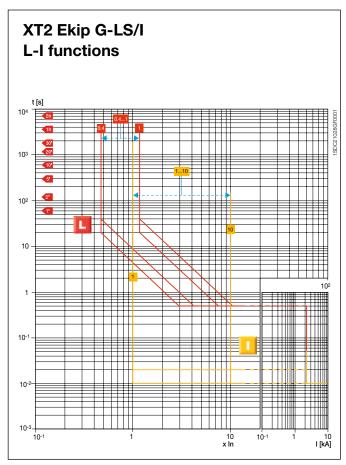


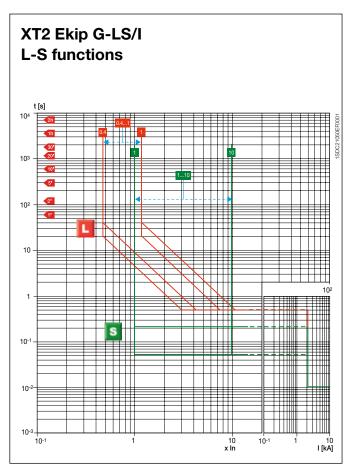


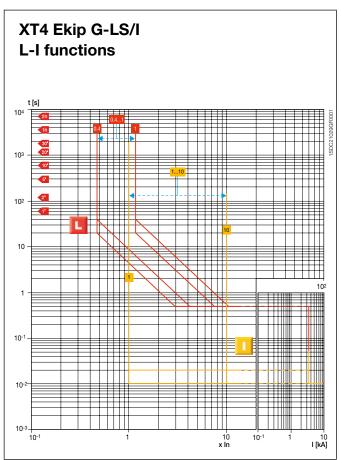


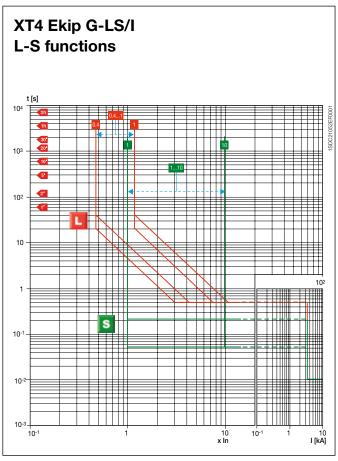
Trip curves with electronic trip unit

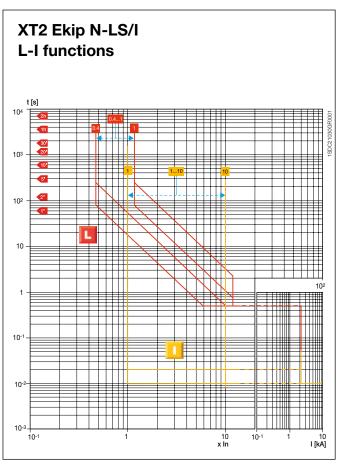
Trip curves for generator protection

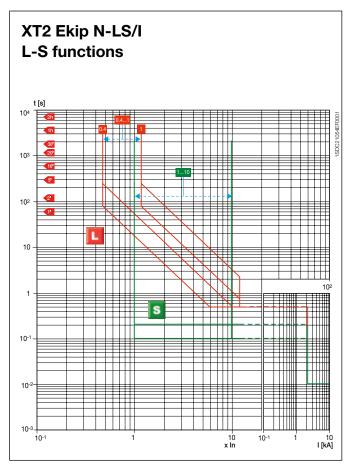


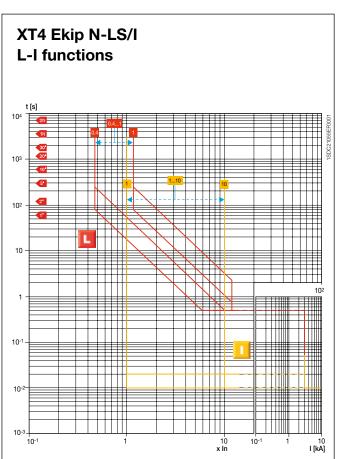


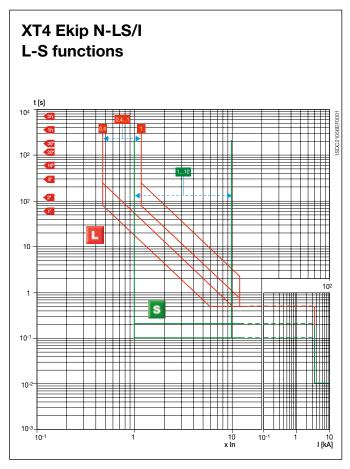


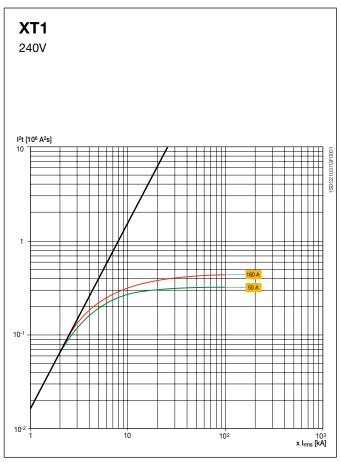


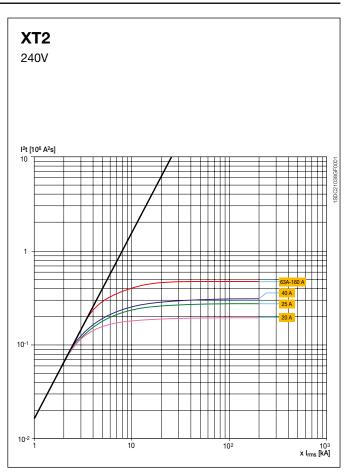


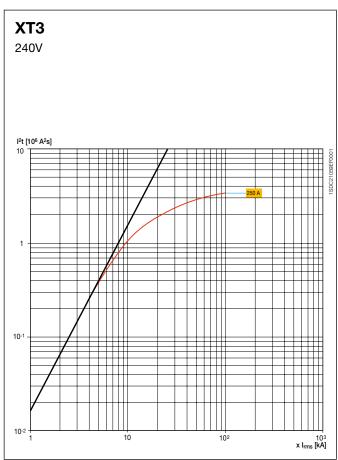


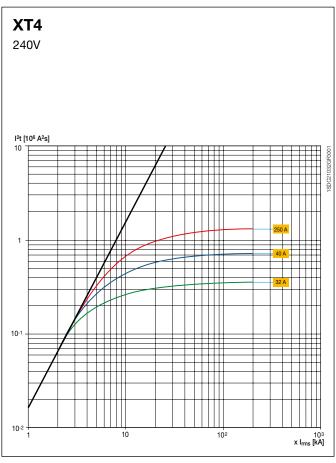


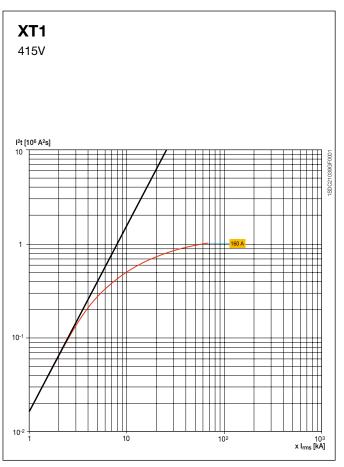


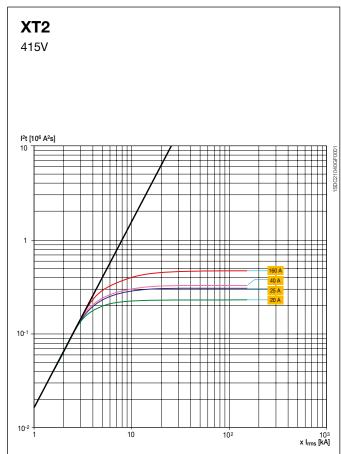


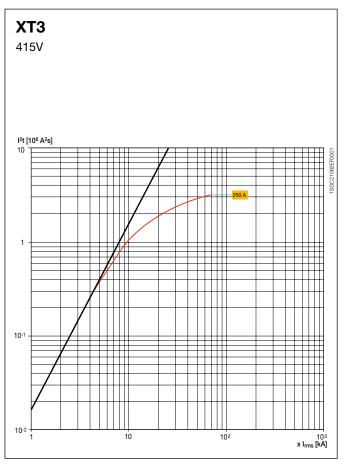


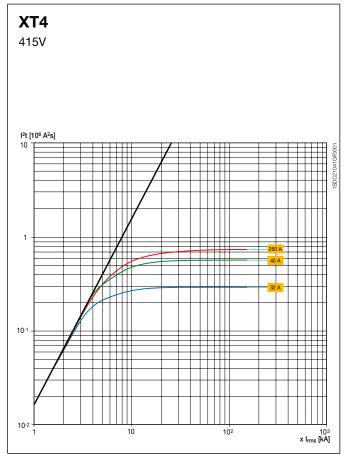


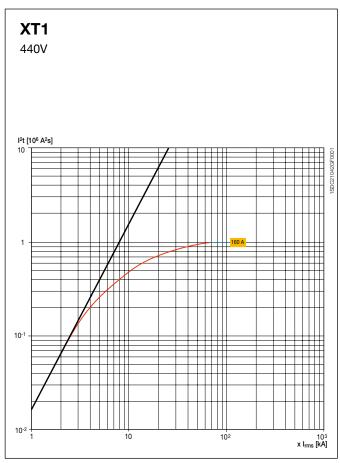


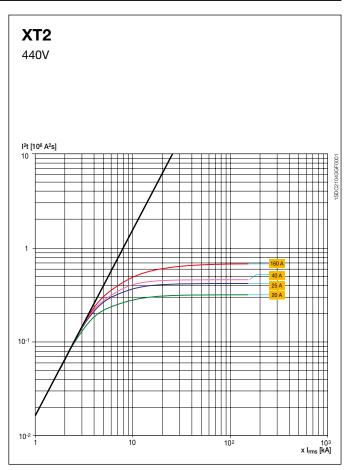


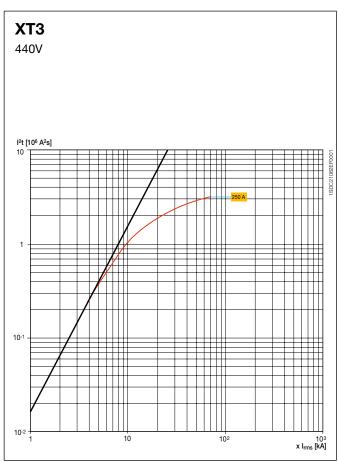


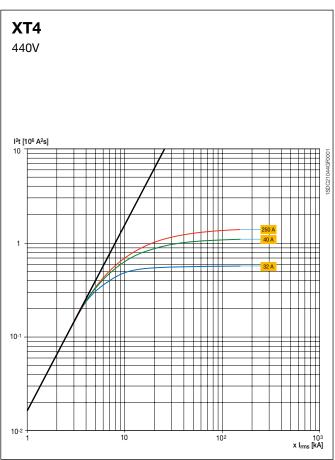


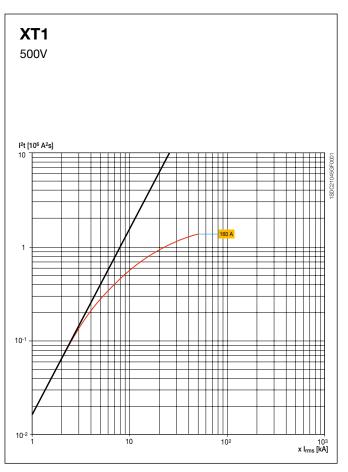


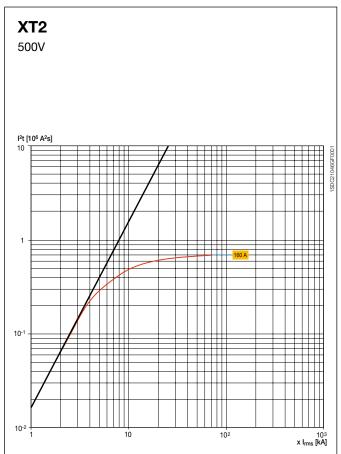


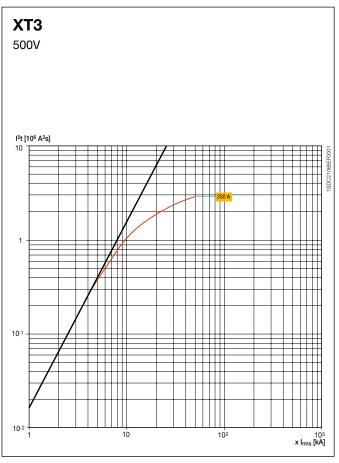


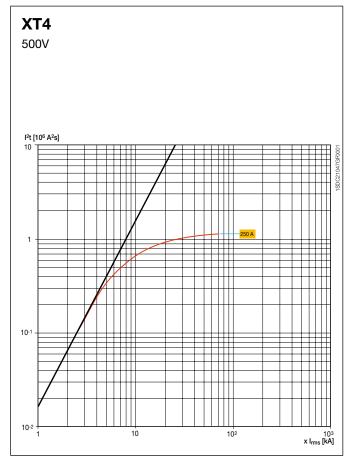


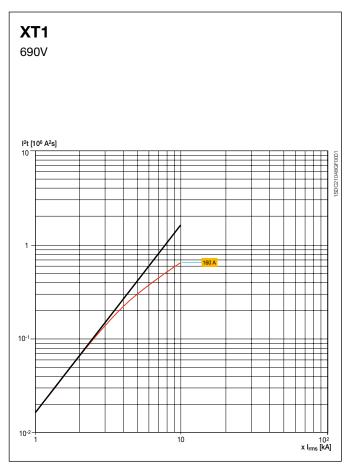


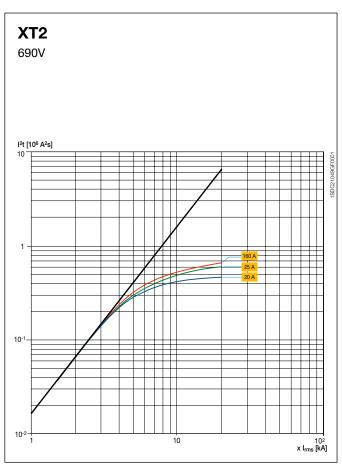


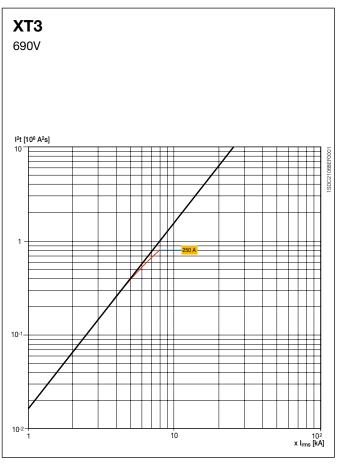


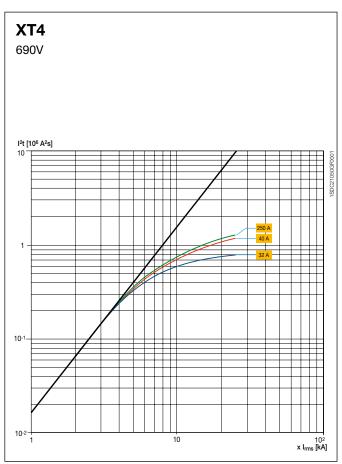


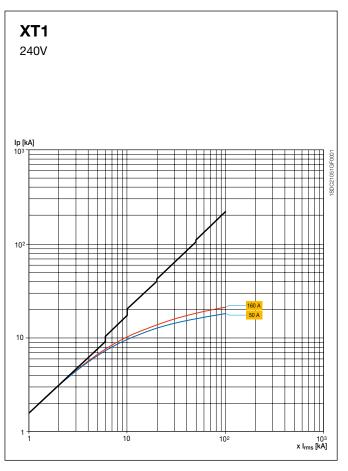


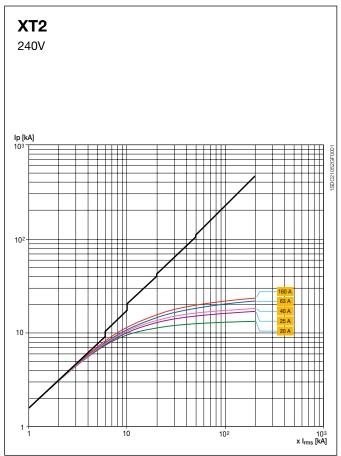


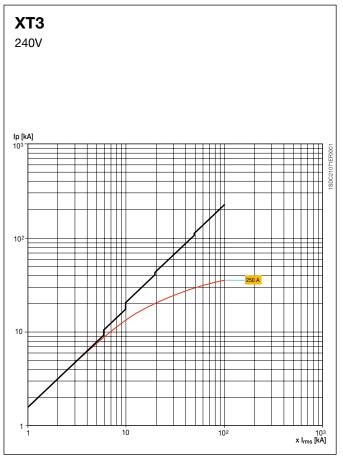


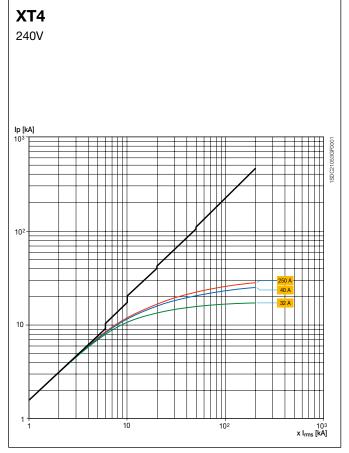


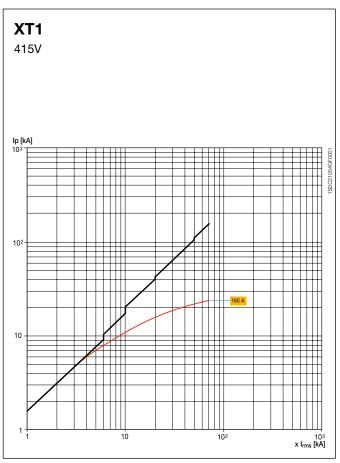


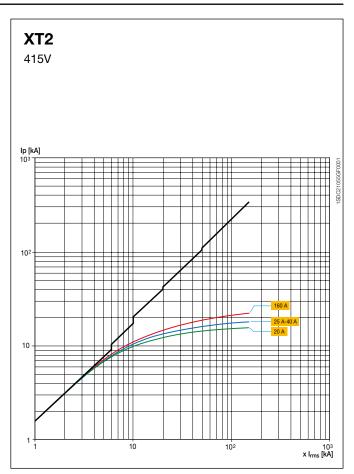


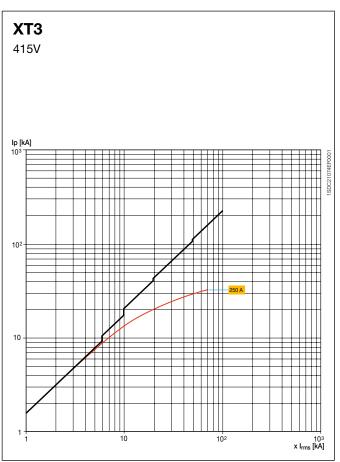


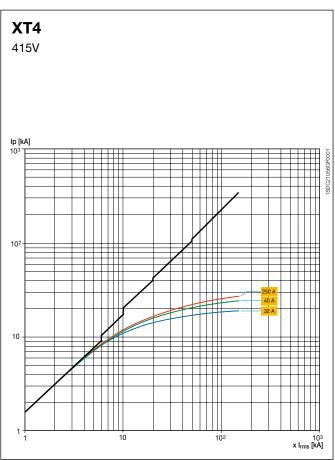


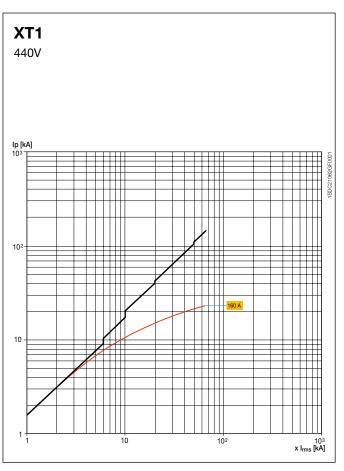


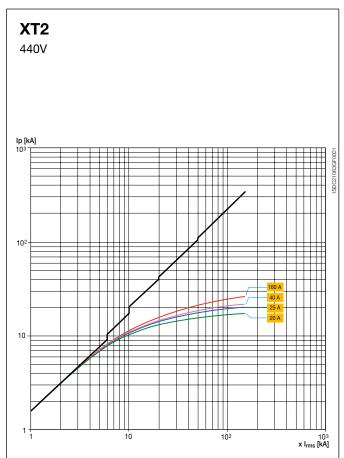


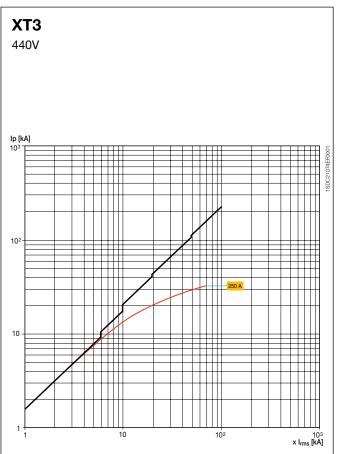


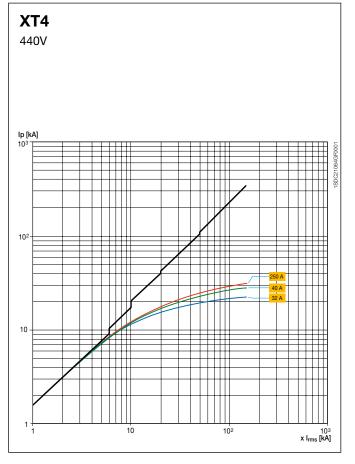


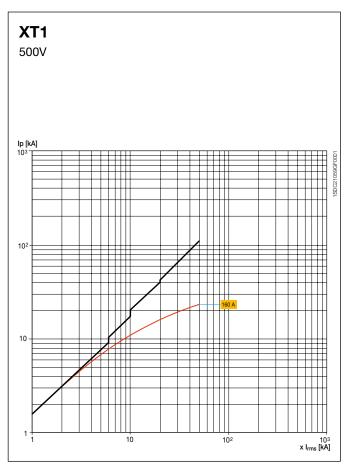


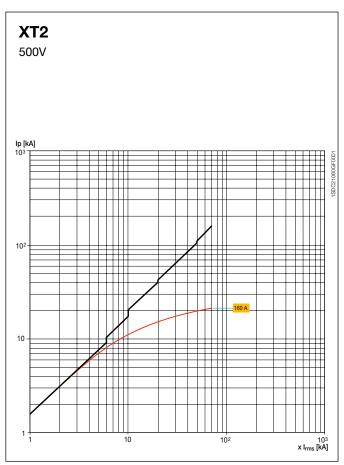


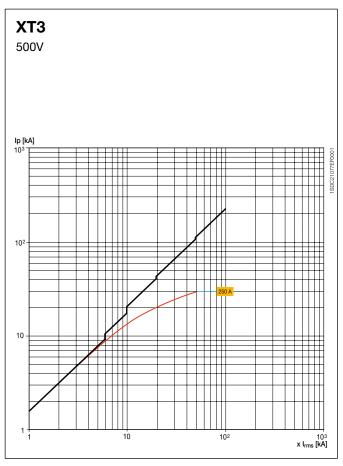


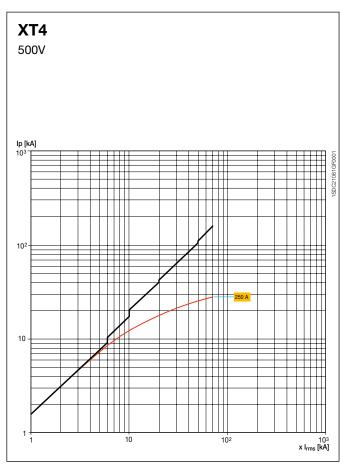


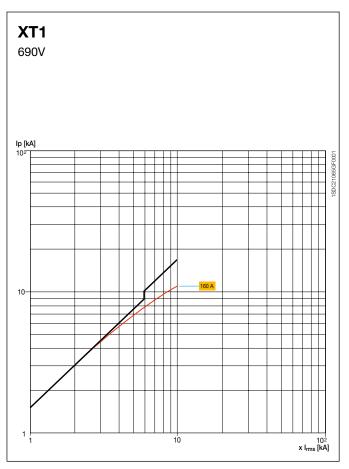


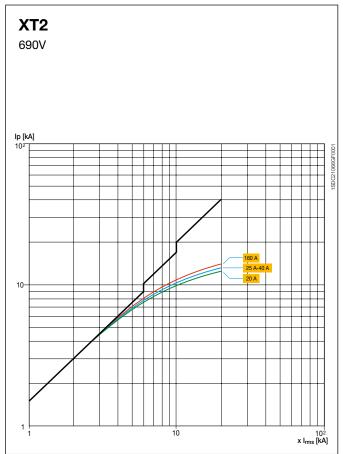


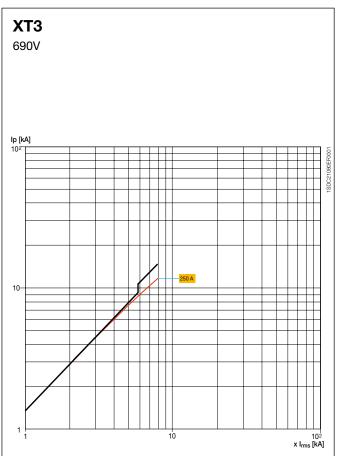


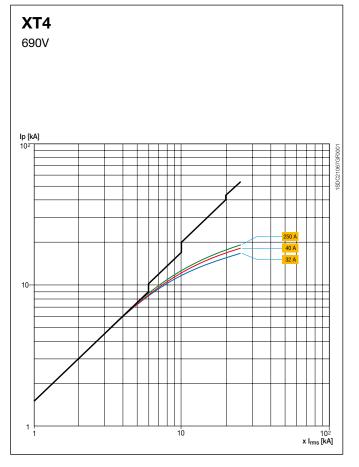












Temperature performances

All the Tmax XT circuit-breakers can be used under the following environmental conditions:

- -25°C +70°C: range of atmospheric temperature where the circuit-breaker is installed;
- -40°C +70°C: range of atmospheric temperature where the circuit-breaker is stored.

The circuit-breakers fitted with thermomagnetic trip unit have the thermal element set for a reference temperature of $+40^{\circ}$ C. With the same setting, for temperatures other than $+40^{\circ}$ C there is a variation in the thermal trip threshold as indicated in the tables below.

XT1																
T amb (°C)	1	0	2	:0	3	0	4	10	4	5	5	0	6	30	7	70
In [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]
16	13	18	12	18	11.9	17	11.2	16	10.8	15.5	11	15	10	14	9	13
20	16	23	15	22	14.7	21	14	20	13.6	19.4	13	19	12	18	11	16
25	20	29	19	28	18.2	26	17.5	25	16.9	24.2	16	23	15	22	14	20
32	26	37	25	35	23.8	34	22.4	32	21.7	31.0	21	30	20	28	18	26
40	32	46	31	44	29.4	42	28	40	27.1	38.7	27	38	25	35	23	33
50	40	58	39	55	37.1	53	35	50	33.9	48.4	33	47	31	44	28	41
63	51	72	49	69	46.2	66	44.1	63	42.7	61	41	59	39	55	36	51
80	64	92	62	88	58.8	84	56	80	54.2	77	53	75	49	70	46	65
100	81	115	77	110	73.5	105	70	100	67.8	97	66	94	61	88	57	81
125	101	144	96	138	91.7	131	87.5	125	84.7	121	82	117	77	109	71	102
160	129	184	123	176	117.6	168	112	160	108.4	155	105	150	98	140	91	130

XT2 with the	hermom	agnetic	trip units	3												
T amb (°C)	1	0	2	0	3	0	4	10	4	5	5	0	6	30	7	0
In [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]
1.6	1.3	1.8	1.2	1.8	1.2	1.7	1.1	1.6	1.1	1.5	1.1	1.5	1.0	1.4	0.9	1.3
2	1.6	2.3	1.5	2.2	1.5	2.2	1.4	2.0	1.3	1.9	1.3	1.9	1.2	1.7	1.1	1.6
2.5	2.0	2.9	1.9	2.8	1.8	2.6	1.8	2.5	1.7	2.4	1.6	2.3	1.5	2.2	1.4	2.0
3	2.5	3.6	2.5	3.5	2.5	3.5	2.1	3.0	2.0	2.9	2.0	2.8	1.8	2.6	1.6	2.3
4	3.2	4.6	3.1	4.4	2.9	4.2	2.8	4.0	2.7	3.9	2.6	3.7	2.5	3.5	2.2	3.2
5	4	5.7	3.9	5.5	3.7	5.3	3.5	5	3.4	4.8	3.3	4.7	3	4.3	2.8	4
6.3	5.0	7.2	4.9	6.9	4.6	6.6	4.4	6.3	4.2	6.1	4.1	5.9	3.9	5.5	3.6	5.1
8	6.4	9.2	6.2	8.8	5.9	8.4	5.6	8.0	5.4	7.7	5.3	7.5	4.9	7.0	4.6	6.5
10	8.1	11.5	7.7	11.0	7.4	10.5	7.0	10.0	6.7	9.6	6.5	9.3	6.1	8.7	5.7	8.1
12.5	10.1	14.4	9.7	13.8	9.2	13.2	8.8	12.5	8.4	12.0	8.2	11.7	7.6	10.9	7.1	10.1
16	13	18.0	12.0	18.0	11.9	17.0	11.2	16.0	10.8	15.4	10.5	15.0	9.8	14.0	9.1	13.0
20	16	23.0	15.4	22.0	14.7	21.0	14.0	20.0	13.5	19.3	13.3	19.0	11.9	17.0	11.2	16.0
25	20	29.0	19.6	28.0	18.2	26.0	17.5	25.0	16.8	24.0	16.1	23.0	15.4	22.0	14.0	20.0
32	26	37.0	24.5	35.0	23.8	34.0	22.4	32.0	21.6	30.8	21.0	30.0	19.6	28.0	18.2	26.0
40	32	46.0	30.8	44.0	29.4	42.0	28.0	40.0	27.0	38.5	25.9	37.0	24.5	35.0	22.4	32.0
50	40	57.0	38.5	55.0	37.1	53.0	35.0	50.0	33.7	48.2	32.9	47.0	30.1	43.0	28.0	40.0
63	50	72.0	48.3	69.0	46.2	66.0	44.1	63.0	42.5	60.7	41.3	59.0	38.5	55.0	35.7	51.0
80	64	92.0	61.6	88.0	58.8	84.0	56.0	80.0	54.0	77.1	52.5	75.0	49.0	70.0	45.5	65.0
100	81	115.0	77.0	110.0	73.5	105.0	70.0	100.0	67.5	96.4	65.1	93.0	60.9	87.0	56.7	81.0
125	101	144.0	96.6	138.0	92.4	132.0	87.5	125.0	84.3	120.5	81.9	117.0	76.3	109.0	70.7	101.0
160	129	184.0	123.0	178.0	117.6	168.0	112.0	160.0	107.9	154.2	105.0	150.0	97.3	139.0	90.3	129.0

XT3																
T amb (°C)	10		2	20		30		40		45		50	60		70	
In [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]	MIN [A]	MAX [A]
63	51	72	49	69	46	66	44	63	43	61	41	59	39	55	36	51
80	64	92	62	88	59	84	56	80	54	77	53	75	48	69	45	64
100	80	115	77	110	74	105	70	100	68	97	65	93	61	87	56	80
125	101	144	96	138	92	132	88	125	85	121	81	116	76	108	70	100
160	129	184	123	176	118	168	112	160	108	155	104	149	97	139	90	129
200	161	230	154	220	148	211	140	200	136	194	130	186	121	173	113	161
250	201	287	193	278	184	263	175	250	169	242	163	233	151	216	141	201

T amb (°C)	1	0	2	20	3	0	4	10	4	15	5	50	6	30	7	70
In [A]	MIN[A]	MAX [A]	MIN[A]	MAX [A]	MIN[A]	MAX [A]	MIN[A]	MAX [A]	MIN[A]	MAX [A]	MIN[A]	MAX [A]	MIN[A]	MAX [A]	MIN[A]	MAX [A]
16	13	19	13	18	12	17	11	16	11	15	10	14	9	13	8	12
20	19	27	17	24	16	23	14	20	14	19	12	17	11	15	9	13
25	21	30	20	28	19	27	18	25	17	24	16	23	15	21	13	19
32	26	43	24	39	25	36	22	32	22	31	19	27	17	24	15	21
40	33	48	32	45	30	43	28	40	27	39	26	37	24	34	21	30
50	37	62	35	58	38	54	35	50	34	48	32	46	29	42	27	39
63	53	75	50	71	47	67	44	63	43	61	41	58	37	53	33	48
80	59	98	55	92	60	86	56	80	54	77	52	74	46	66	41	58
100	83	118	79	113	74	106	70	100	68	97	67	95	60	85	53	75
125	102	145	100	140	94	134	88	125	85	121	81	115	74	105	67	95
160	130	185	123	176	118	168	112	160	108	155	105	150	96	137	91	130
200	161	230	154	220	147	210	140	200	136	194	133	190	123	175	112	160
225	188	269	179	255	168	241	158	225	152	218	146	208	133	190	119	170
250	200	285	193	275	183	262	175	250	169	242	168	240	161	230	154	220

The electronic overcurrent trip units do not undergo any variations in performance as the temperature varies.

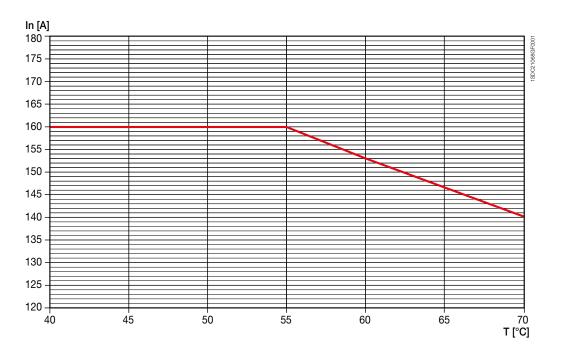
However, even if heating does not affect the trip thresholds of the electronic trip units, in the case of temperatures exceeding +40°C it is advisable to reduce the maximum setting for protection against overloads (L) to preserve the copper parts of the circuit-breaker against high temperatures.

The same considerations can be done about the switch-disconnectors and magnetic only circuit-breakers.

The table and graph below show the maximum adjustment at which the threshold I₁ of the overcurrent protection (L) must be set according to the ambient temperature and to the type of terminals used.

XT1 - Fixed circuit-breakers wit	th only magneti	ic trip unit or	switch-disconnectors

	40°C	50°C	60°C	70°0	3
	lmax [A]	lmax [A]	lmax [A]	lmax	[A]
F-EF-ES-FCCu-R	160	160	153	140)
F = Front flat terminals	EF = Extended front	ES = Extended spreaded	FCCu = Front for cop	oper cables	R = Rear



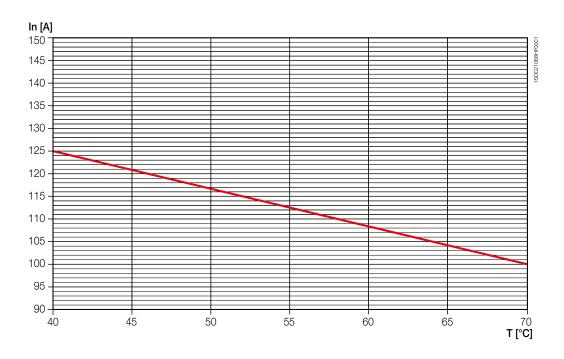
Temperature performances

XT1 - Plug-in circuit-breakers with magnetic only trip unit or switch-disconnectors

	40°C	50°C	60°C	70°C
	lmax [A]	lmax [A]	lmax [A]	lmax [A]
EF-HR/VR	125	117	108	100

EF = Extended front

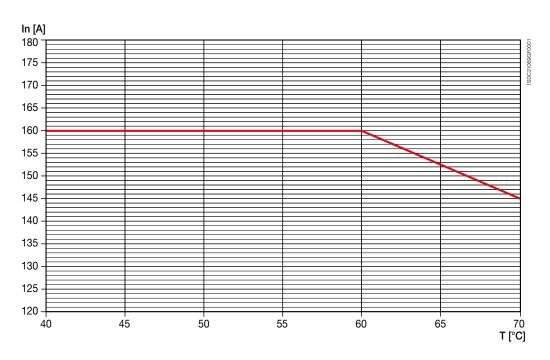
HR/VR = Rear horizontal/vertical



XT2 - Fixed circuit-breakers with only magnetic and electronic trip unit

	40°C	50°C	60°C	70°C
	lmax [A]	lmax [A]	lmax [A]	Imax [A]
F-FCCu-EF-ES-R	160	160	160	145

 $F = Front \ flat \ terminals \qquad FCCu = Front \ for \ copper \ cables \qquad EF = Extended \ front \qquad ES = Extended \ spreaded \qquad R = Rear$

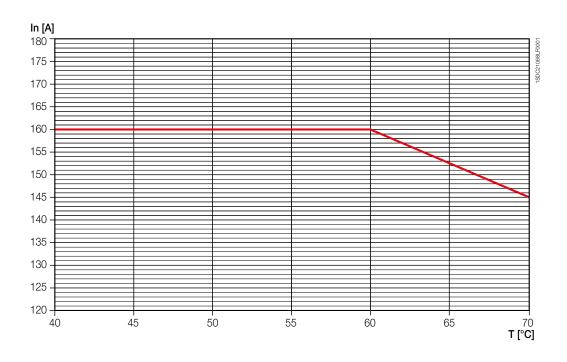


XT2 - Plug-in/withdrawable circuit-breakers with electronic trip unit, magnetic only trip unit or switch-disconnectors

	40°C	50°C	60°C	70°C
	Imax [A]	Imax [A]	Imax [A]	lmax [A]
EF-HR/VR	160	160	160	146

EF = Extended front

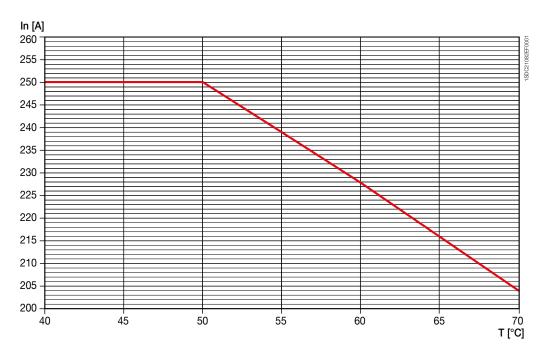
HR/VR = Rear horizontal/vertical



XT3 - Fixed circuit-breakers with only magnetic trip unit or switch-disconnectors

	40°C	50°C	60°C	70°C
	lmax [A]	lmax [A]	lmax [A]	lmax [A]
F-FCCu-EF-ES-R	250	250	228	204

 $F = Front \ flat \ terminals \qquad FCCu = Front \ for \ copper \ cables \qquad EF = Extended \ front \qquad ES = Extended \ spreaded \qquad R = Rearres \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ copper \ cables \qquad FCCu = Front \ for \ cables \ for \ cabl$



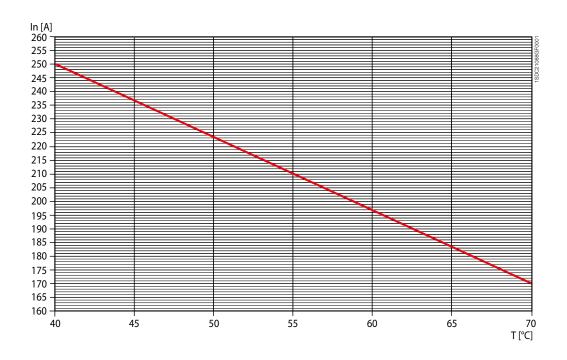
Temperature performances

XT3 - Plug-in circuit-breakers with magnetic only trip unit or switch-disconnectors

	40°C	50°C	60°C	70°C
	lmax [A]	lmax [A]	lmax [A]	lmax [A]
EF-HR/VR	250	222	196	170

EF = Extended front terminals

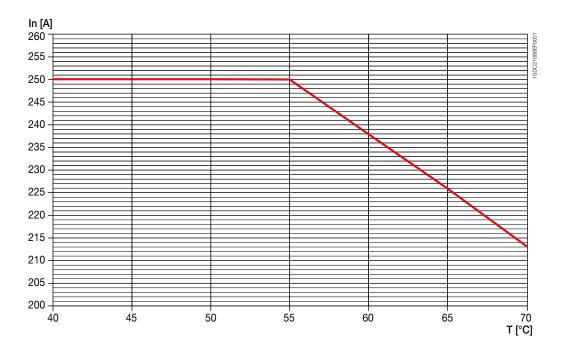
HR/VR = Rear horizontal/vertical terminals



XT4 - Fixed circuit-breakers with only magnetic, electronic trip unit and switch-disconnector

	40°C	50°C	60°C	70°C
	lmax [A]	lmax [A]	lmax [A]	lmax [A]
F-FCCu-EF-ES-R	250	250	238	213

 $F = Front \ flat \ terminals \qquad FCCu = Front \ for \ copper \ cables \qquad EF = Extended \ front \qquad ES = Extended \ spreaded \qquad R = Rear$

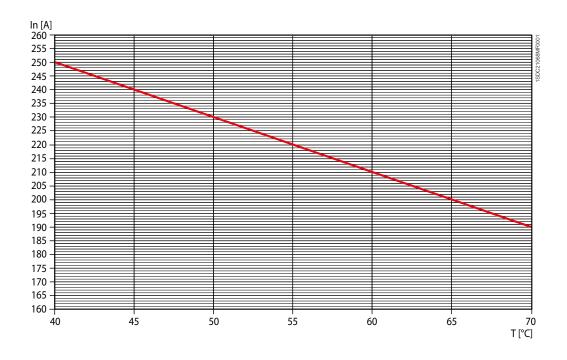


XT4 - Plug-in/withdrawable circuit-breakers with electronic trip unit, magnetic only trip unit or switch-disconnectors

	40°C	50°C	60°C	70°C	
	lmax [A]	lmax [A]	lmax [A]	lmax [A]	
EF-HR/VR	250	231	211	190	

EF = Extended front

HR/VR = Rear horizontal/vertical



Power losses

To ensure service continuity of the plants, how to keep the temperature within acceptable levels for operation of the various devices and not only for the circuit-breakers must be carefully assessed, for example with recourse to forced ventilation in the switchboards and in the rooms where they are installed.

The table gives the dissipated power values per single pole at the rated current In for each circuit-breaker used. The total maximum dissipated power for a circuit-breaker used at 50/60Hz is equal to the power per single pole multiplied by the number of poles.

Power [W/pole]	In	Х	Г1	X	Γ2	X	T3	XT4	
	[A]	F	Р	F	P/W	F	Р	F	P/W
	1.6			2.00	2.40				
	2			2.40	2.80				
	2.5			2.50	2.80				
	3			2.80	3.20				
	4			2.50	2.80				
	6.3			3.30	3.90				
	8			2.60	3.00				
	10			2.90	3.40			2.00	2.20
	12.5			1.00	1.20			2.30	2.40
TMD	16	1.50	1.60	1.30	1.50			2.50	2.60
TMA TMG	20	1.80	2.00	1.60	1.90			2.60	2.70
MF	25	2.00	2.80	2.00	2.5			2.70	2.80
MA	32	2.10	3.20	2.60	3.00			4.40	4.50
	40	2.60	4.60	3.70	4.40			4.50	4.70
	50	3.70	5.00	4.10	4.70			4.70	4.90
	63	4.30	6.00	4.80	5.70	4.30	5.10	5.30	5.70
	80	4.80	7.20	5.80	6.80	4.80	5.80	5.50	6.10
	100	7.00	10.00	8.10	9.50	5.60	6.80	6.20	7.20
	125	10.70	14.70	11.40	14.00	6.60	7.90	7.40	9.00
	160	15.00		16.10	19.00	7.90	9.50	8.90	10.80
	200					13.20	15.80	11.90	14.90
	250					17.80	21.40	16.40	21.10
Ekip LS/I	10			0.10	0.10				
Ekip I	25			0.80	0.90				
Ekip LSI Ekip LSIG	40							0.60	0,.70
Ekip E-LSIG	63			1.70	2.10			1.40	1.80
Ekip M-LRIU Ekip M-LIU	100			4.20	5.20			3.50	4.50
Ekip N-LS/I	160			10.80	13.40			8.90	11.50
EKip G-LS/I	250							16.40	22.70

Magnetic Trip Values

Breaker	Trip Unit	In [A]	I ₃ [A]	Single-phase trip current (%I ₃) (1)
XT1	TMD	16160	4501600	150%
<u> </u>	MF/MA	1160	142240	150%
	TMD/TMA	1.6160	161600	150%
	TMG	16160	160480	150%
	Ekip I	10160	110xln	100%
	Ekip LS/I	10160	110xln	100%
XT2	Ekip LSI	10160	110xln	100%
A12	Ekip LSIG	10160	110xln	100%
	Ekip M-I	20100	614xln	100%
	Ekip M-LIU	25160	613xln	100%
	Ekip M-LRIU	25100	613xln	100%
	Ekip G-LS/I	10160	110xln	100%
	Ekip N-LS/I	10100	110xln	100%
	MA	100200	6002400	150%
XT3	TMD	63250	6302500	150%
	TMG	63250	400750	150%
	MA	10200	502000	150%
	TMD/TMA	16250	3002500	150%
	Ekip I	40250	110xln	100%
	Ekip LS/I	40250	110xln	100%
	Ekip LSI	40250	110xln	100%
XT4	Ekip LSIG	40250	110xln	100%
	Ekip M-LIU	40160	613xln	100%
	Ekip M-LRIU	40200	613xln	100%
	Ekip G-LS/I	40250	110xln	100%
	Ekip N-LS/I	40160	110xln	100%
	Ekip E-LSIG	40250	110xln	100%

 $^{^{\}mbox{\scriptsize (1)}}$ Satisfies the requirements of the IEC 60947-2 Standard, section 8.3.3.1.2

Applications at 400Hz

The circuit-breakers used for power distribution can operate in alternating current at different frequencies from 50/60Hz (frequencies which the rated performance of the apparatus refers to) so long as the appropriate derating coefficients are applied.

At 400Hz, the performance of the circuit-breakers is reclassified so as to take the following phenomena into account:

- an increase in the skin effect and increased inductive reactance in a way that is directly proportional to the frequency, overheat the conductors or the copper components that normally carry the current in the circuit-breaker;
- lengthening of the hysteresis loop and reduction of the magnetic saturation value, which consequently varies the forces associated with the magnetic field to a given current value.

By and large, these phenomena influence the behaviour of both thermomagnetic trip units' thresholds and circuit breakers' current carrying capacity.

All the circuit-breakers in the SACE Tmax XT family equipped with thermomagnetic or electronic trip units (except for the Ekip M-I, Ekip M-LIU and Ekip M-LRIU trip units) can be used in 400Hz installations with deviation described below.

Trip thresholds of thermal components decrease as the frequency increases, due to reduced conductivity of the materials and to the increase of associated thermal phenomena.

Viceversa magnetic thresholds, I3, increase in accordance to Km multiplication factor, due to induced magnetic fields. Circuit breakers with electronic trip units do not undergo any modification of trip thresholds, but maximum current carrying capacity of circuit breakers may be reduced.

Following tables refer to circuit breakers with a breaking capacity up to 36kA, 400 Hz plants are usually characterized by fairly low short-circuit currents.

XT1B 160		I1 (400H	z)		13		
XT1C 160	In	MIN	MED	MAX	I3 (50Hz)	km	I3 (400Hz)
XT1N 160	16	10	12	14	450	2	900
	20	13	15	18	450	2	900
	25	16	20	23	450	2	900
	32	20	25	29	450	2	900
	40	25	31	36	450	2	900
	50	32	38	45	500	2	1000
	63	40	48	57	630	2	1260
	80	50	61	72	800	2	1600
	100	63	77	90	1000	2	2000

63 40 48 57 630 2 1260 80 50 61 72 800 2 1600 100 63 77 90 1000 2 2000 XT2 160 - TMD/TMA 1.6÷100 A XT2N 160 I1 (400Hz) I3

T2N 160		I1 (400Hz)			13		
	In	MIN	MED	MAX	I3 (50Hz)	km	I3 (400Hz)
	1,6	1	1,2	1,4	16	1,2	19,2
	2	1,3	1,5	1,8	20	1,2	24
	2,5	1,6	2	2,3	25	1,2	30
	3,2	2	2,5	2,9	32	1,2	38,4
	4	2,5	3,1	3,6	40	1,2	48
	5	3,2	3,8	4,5	50	1,2	60
	6,3	4	4,8	5,7	63	1,2	75,6
	8	5	6,1	7,2	80	1,2	96
	10	6,3	7,7	9	100	1,2	120
	12,5	7,9	9,6	11,3	125	1,2	150
	16	10	12	14	300	1,2	360
	20	13	15	18	300	1,2	360
	25	16	20	23	300	1,2	360
	32	20	25	29	320	1,2	384
	40	25	31	36	300400	1,2	360480
	50	32	38	45	300500	1,2	360600
	63	40	48	57	300630	1,2	360756
	80	50	61	72	400800	1,2	480960
	100	63	77	90	5001000	1,2	6001200

XT3 250 - TMD/TMA 63÷160 A

XT3N 250		I1 (400Hz)			13		
	In	MIN	MED	MAX	13 (50Hz)	km	I3 (400Hz)
	63	40	48	57	630	2	1260
	80	50	61	72	800	2	1600
	100	63	77	90	1000	2	2000
	125	79	96	113	1250	2	2500
	160	101	122	144	1600	2	3200

XT4 160 - TMD/TMA 16÷160 A

XT4N 160		I1 (400Hz)			13		
	In	MIN	MED	MAX	13 (50Hz)	km	13 (400Hz)
	16	10	12	14	300	1,2	360
	20	13	15	18	300	1,2	360
	25	16	20	23	300	1,2	360
	32	20	25	29	320	1,2	384
	40	25	31	36	300400	1,2	360480
	50	32	38	45	300500	1,2	360600
	63	40	48	57	315630	1,2	378756
	80	50	61	72	400800	1,2	480960
	100	63	77	90	5001000	1,2	6001200
	125	79	96	113	6251250	1,2	7502400
	160	101	122	144	8001600	1,2	9601920

XT2 160 - Ekip trip units 10÷100 A*

XT2N 160		I1 (400Hz)
	In	MAX
	10	10
	25	25
	63	63
	100	100
	160	125

XT4 160 - Ekip trip units 40÷160 A*

XT4N 160		I1 (400Hz)
	In	MAX
	40	40
	63	63
	100	100
	160	160

XT4 250 - Ekip trip units 160÷200 A*

XT4N 250		I1 (400Hz)
	In	MAX
	250	200

^{*} not valid for Ekip M-I, Ekip M-LIU and Ekip M-LRIU trip units



Index

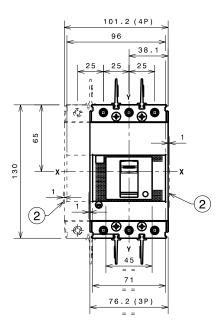
Tmax XT1 - Installation for fixed circuit-breaker	5/2
Tmax XT1 - Terminals for fixed circuit-breaker	5/
Tmax XT1 - Accessories for fixed circuit-breaker	5/8
Tmax XT1 - Installation for plug-in circuit-breaker	5 /16
Tmax XT1 - Terminals for plug-in circuit-breaker	5 /19
Tmax XT1 - Accessories for plug-in circuit-breaker	5 /22
Tmax XT2 - Installation for fixed circuit-breaker	5 /20
Tmax XT2 - Terminals for fixed circuit-breaker	5 /26
Tmax XT2 - Accessories for fixed circuit-breaker	5 /30
Tmax XT2 - Installation for plug-in circuit-breaker	5 /36
Tmax XT2 - Terminals for plug-in circuit-breaker	5 /38
Tmax XT2 - Accessories for plug-in circuit-breaker	5/43
Tmax XT2 - Installation for withdrawable circuit-breaker	5 /4
Tmax XT2 - Terminals for withdrawable circuit-breaker	5 /50
Tmax XT2 - Accessories for withdrawable circuit-breaker	5 /5
Tmax XT3 - Installation for fixed circuit-breaker	5 /60
Tmax XT3 - Terminals for fixed circuit-breaker	5 /60
Tmax XT3 - Accessories for fixed circuit-breaker	5 /6
Tmax XT3 - Installation for plug-in circuit-breaker	5 /73
Tmax XT3 - Terminals for plug-in circuit-breaker	5/76
Tmax XT3 - Accessories for plug-in circuit-breaker	5 /80
Tmax XT4 - Installation for fixed circuit-breaker	5 /8
Tmax XT4 - Terminals for fixed circuit-breaker	5 /8
Tmax XT4 - Accessories for fixed circuit-breaker	5 /89
Tmax XT4 - Installation for plug-in circuit-breaker	5 /9
Tmax XT4 - Terminals for plug-in circuit-breaker	5 /99
Tmax XT4 - Accessories for plug-in circuit-breaker	5 /103
Tmax XT4 - Installation for withdrawable circuit-breaker	5 /107
Tmax XT4 - Terminals for withdrawable circuit-breaker	5 /110
Tmax XT4 - Accessories for withdrawable circuit-breaker	5 /11
Tmax XT - Common accessories	
Distances to be respected	5 /120

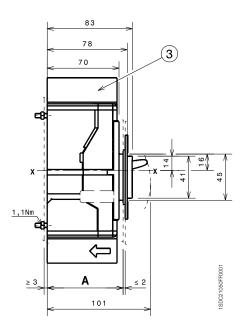
Tmax XT1 - Installation for fixed circuit-breaker

Fixing on support sheet

Caption

- 2 Overall dimension of optional wiring ducts
- (3) 25mm insulating barriers between phases (compulsory) provided

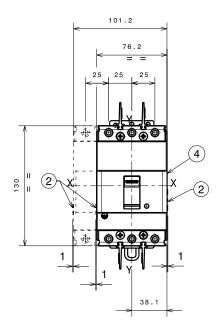


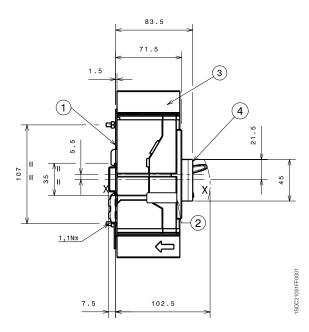


		Α
With standard flange	III - IV	74
Without flange	III - IV	71
	III - IV	79

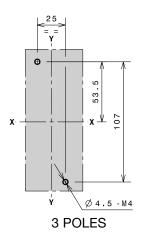
Fixing on DIN 50022 rail

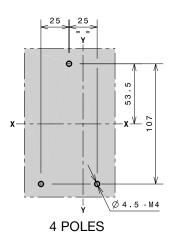
- 1 Bracket for fixing
- 2 Overall dimension of optional wiring ducts
- 3 25mm insulating barriers between phases (compulsory) provided
- (4) Optional front cover for DIN rail

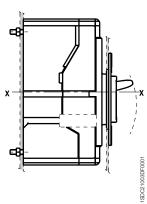




Drilling template for circuit-breaker fixing



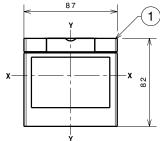


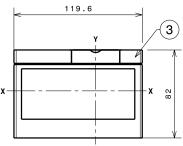


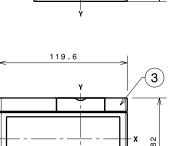
Flanges

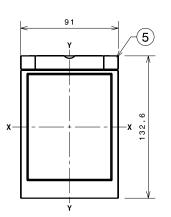
Caption

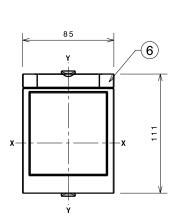
- 1) Flange for circuit-breaker III
- 2 Flange for circuit-breaker IV
- (3) Flange for circuit-breaker III with RC Sel RC Inst residual current release
- 4 Flange for circuit-breaker IV with RC Sel RC Inst residual current release
- 5 Flange for fixed circuit-breaker III-IV with direct motor operator
- 6 Flange for circuit-breaker III-IV with direct rotary handle (RHD)
- (7) Optional flange

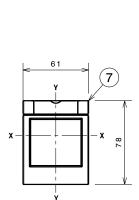












(4)

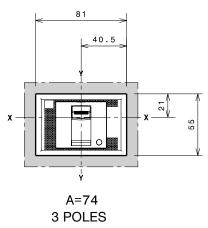
82

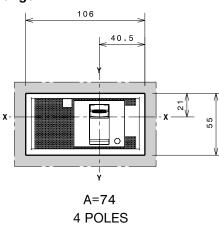
144.6

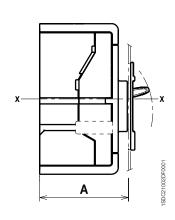
Tmax XT1 - Installation for fixed circuit-breaker

Drilling templates compartment door

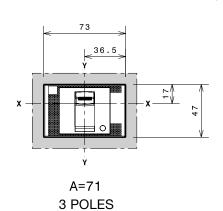
With standard flange

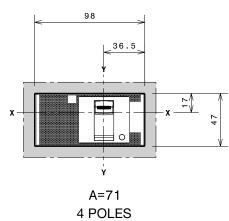


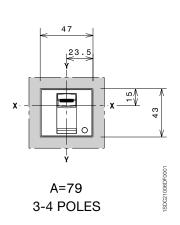




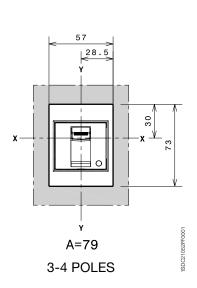
Without flange

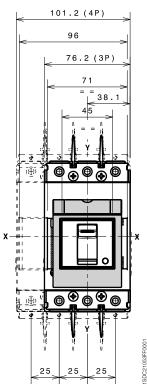






With optional flange



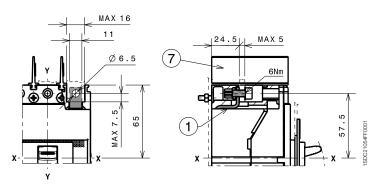


Tmax XT1 - Terminals for fixed circuit-breaker

Terminals F

Caption

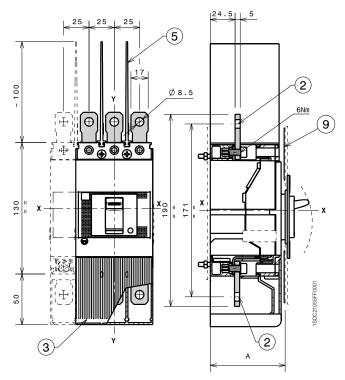
- 1 Front terminals for busbars connection
- (7) 25mm insulating barriers between phases (compulsory) provided



Terminals EF

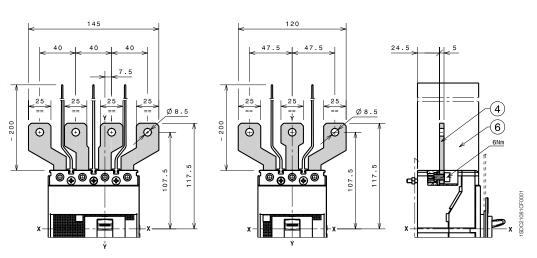
Caption

- (2) Front extended terminals
- (3) High terminal covers with degree of protection IP40 (optional) not provided
- (5) 100mm insulating barriers between phases (compulsory) provided
- (9) Internal insulating plate compulsory with phase barriers (customer attention)



Terminals ES

- 4 Front extended spread terminals for busbar connection
- (6) 200mm insulating barriers between phases (compulsory) provided

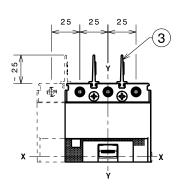


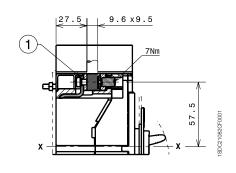
Tmax XT1 - Terminals for fixed circuit-breaker

1x1.5...50mm² terminals FCCuAl

Caption

- 1 1x1.5...50mm² front terminal FCCuAl
- (3) 25mm insulating barriers between phases (compulsory) provided

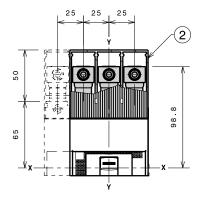


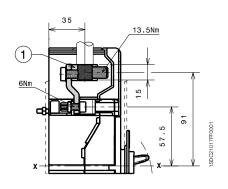


1x35...95mm² terminals FCCuAl

Caption

- 1 External terminal FCCuAl
- (2) High terminal covers with degree of protection IP40 (optional) provided

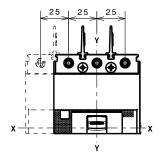


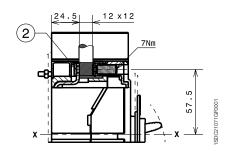


Terminals FCCu

Caption

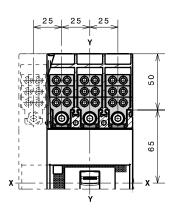
(2) Front terminal FCCu

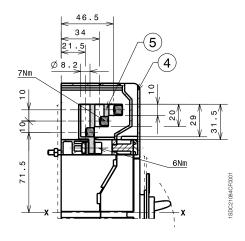




Terminals MC

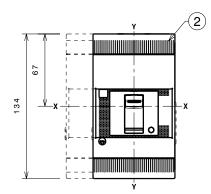
- (4) Terminal covers with degree of protection IP40 (compulsory) provided
- 5 Front terminal for multicable connection

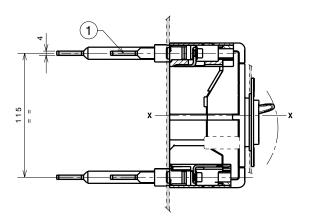


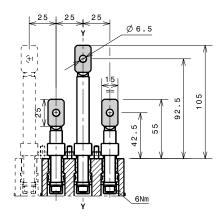


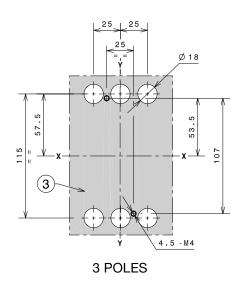
Terminals R

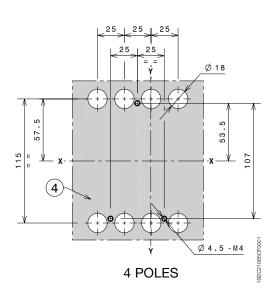
- 1) Adjustable rear terminals
- (2) Bottom terminal covers with degree of protection IP30 (optional) not provided
- 3 Drilling template for circuitbreaker III fixing on sheet
- 4 Drilling template for circuitbreaker IV fixing on sheet





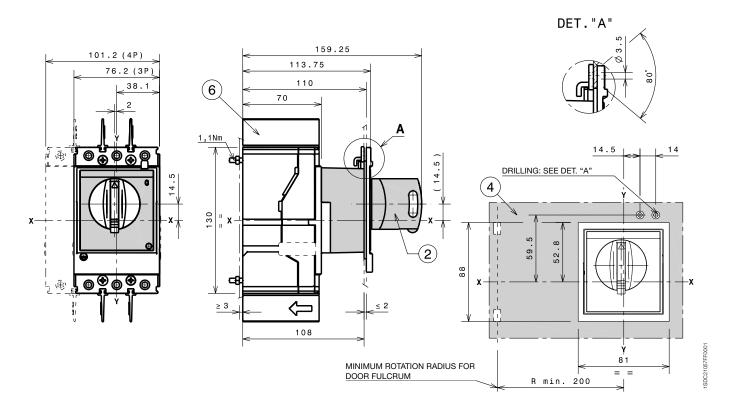






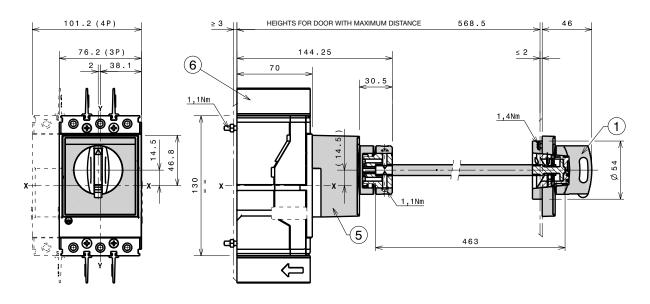
Tmax XT1 - Accessories for fixed circuit-breaker

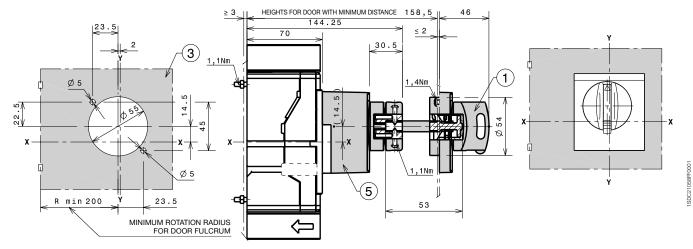
Rotary handle operating mechanism on circuit-breakers (RHD)



- 2 Rotary handle operating mechanism on circuit-breaker RHD
- 4 Door drilling template with direct rotary handle
- 6 25mm insulating barriers between phases (compulsory) provided

Rotary handle operating mechanism on the compartment door (RHE)

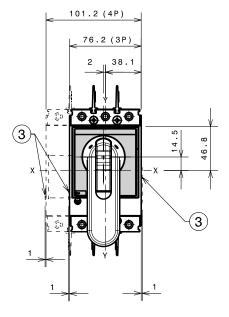


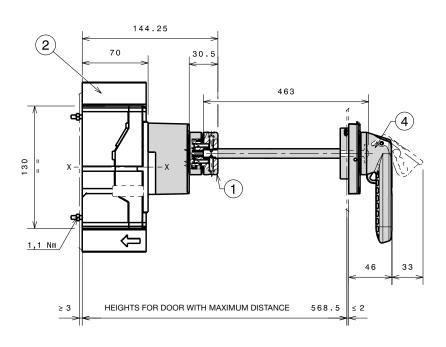


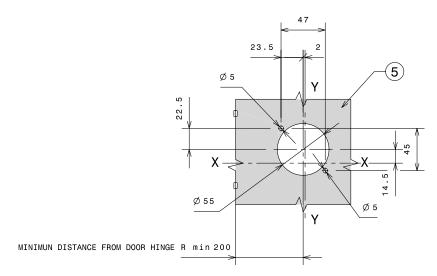
- 1) Transmitted rotary handle
- 3 Door drilling template with transmitted rotary mandly
- (5) Transmission unit
- (6) 25mm insulating barriers between phases provided with circuit-breaker

Tmax XT1 - Accessories for fixed circuit-breaker

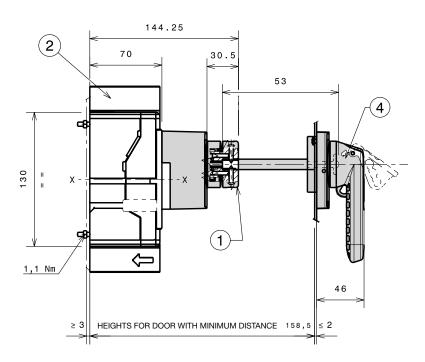
Large rotary handle operating mechanism on the compartment door (RHE-LH)







- 1 Transmission unit
- 2 25mm insulating barriers between phases provided with circuit-breaker
- (3) Optional wiring ducts
- 4 Wide type rotary handle
- 5 Door drilling template with transmitted rotary handle

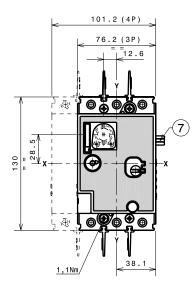


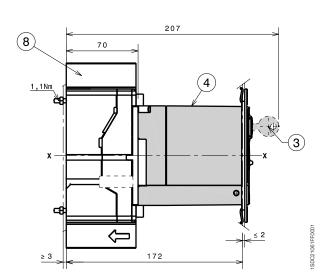
- 1 Transmission unit
- (2) 25mm insulating barriers between phases (compulsory) provided
- 3 Optional wiring ducts
- 4 Wide type rotary handle
- 5 Door drilling template with transmitted rotary handle

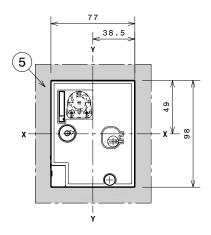
Tmax XT1 - Accessories for fixed circuit-breaker

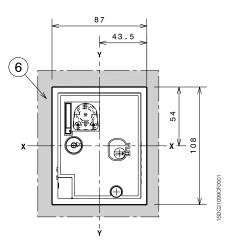
Direct motor operator (MOD)

- 3 Key lock (on request)
- (4) Direct motor operator (MOD)
- (5) Drilling template of door with MOD without flange
- 6 Drilling template of door with MOD with flange
- (7) Cables connection
- (8) 25mm phase barriers



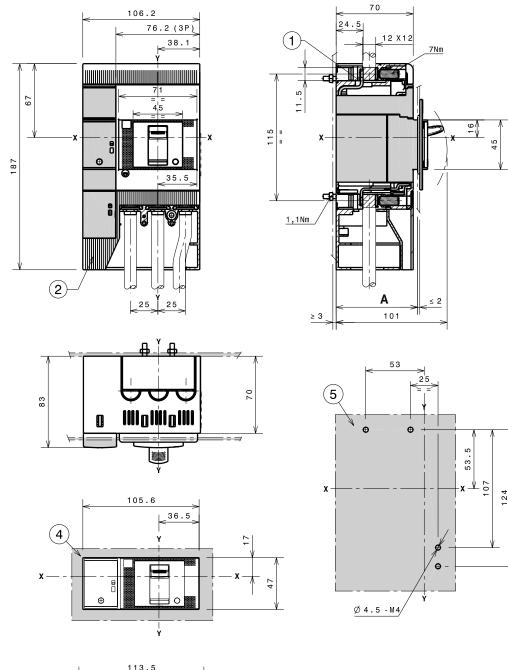


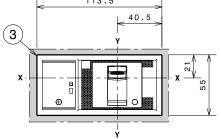




RC Inst and RC Sel residual current release for 3 poles circuit-breaker

- 1 Front terminals for busbars connection
- 2 Terminal covers with degree of protection IP40
- 3 Drilling template of door with direct rotary handle with flange
- (4) Drilling template of door with direct rotary handle without flange
- 5 Drilling template for circuitbreaker fixing on sheet



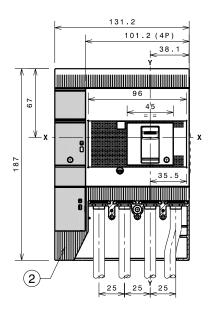


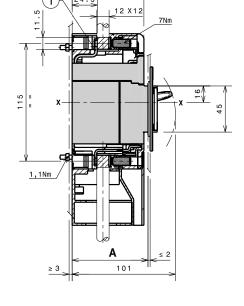
With standard flange	Ш	74
Without flange	Ш	71

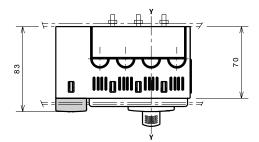
Tmax XT1 - Accessories for fixed circuit-breaker

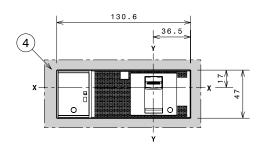
RC Inst and RC Sel residual current release for 4 poles circuit-breaker

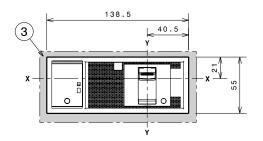
- 1 Front terminals for busbars connection
- 2 Terminal covers with degree of protection IP40
- 3 Drilling template of door with direct rotary handle with flange
- (4) Drilling template of door with direct rotary handle without flange
- 5 Drilling template for circuitbreaker fixing on sheet

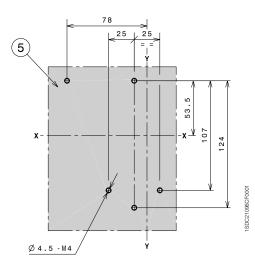








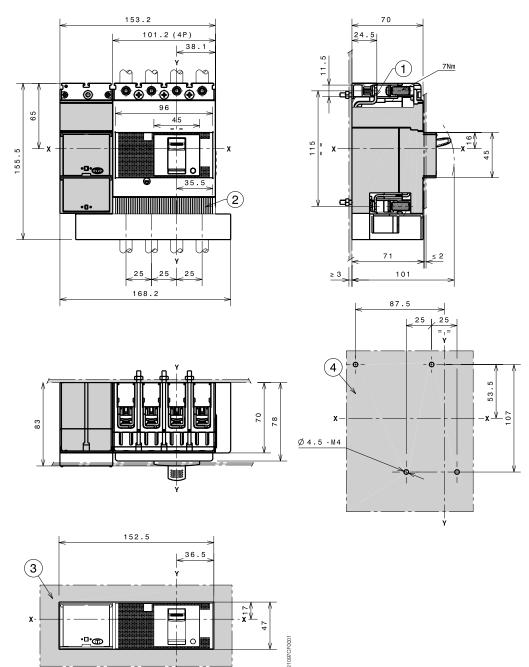




		Α
With standard flange	IV	74
Without flange	IV	71

RC Sel 200 4 poles residual current release

- 1 Front terminals for busbars connection
- 2 Terminal covers with degree of protection IP40
- 3 Drilling template of door with direct rotary handle
- 4 Drilling template for circuitbreaker fixing on sheet



Tmax XT1 - Installation for plug-in circuit-breaker

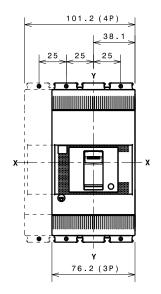
Fixing on support sheet

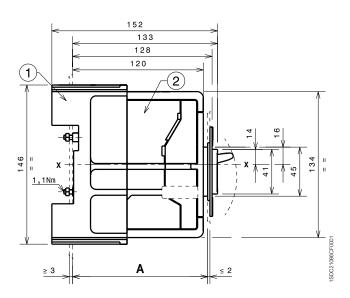
Caption

- 1) Fixed part
- (2) Moving part

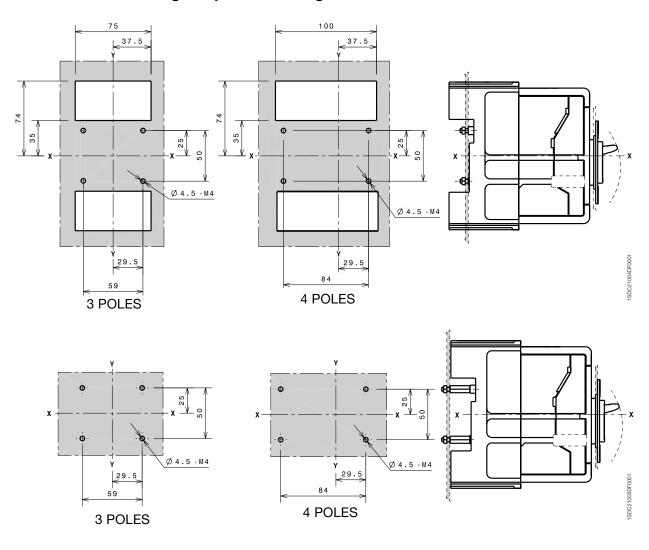
Fixing at 50mi	Α	
With standard flange	III - IV	124
Without flange	III - IV	121
	III - IV	129

Fixing at 70mm extended front term	Α	
With standard flange	III - IV	144
\A#\	III - IV	141
Without flange	III - IV	149



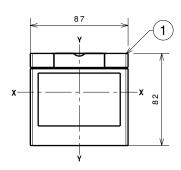


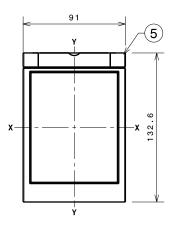
Drilling template for fixing circuit-breaker

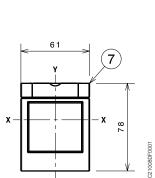


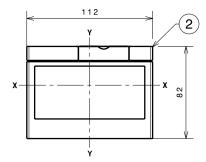
Flanges

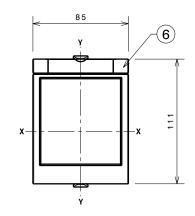
- 1 Flange for plug-in circuit-breaker III
- 2 Flange for circuit-breaker IV
- (5) Flange for plug-in circuitbreaker III-IV with direct motor operator (MOD)
- 6 Flange for plug-in circuitbreaker III-IV with direct rotary handle RHD
- 7 Optional flange







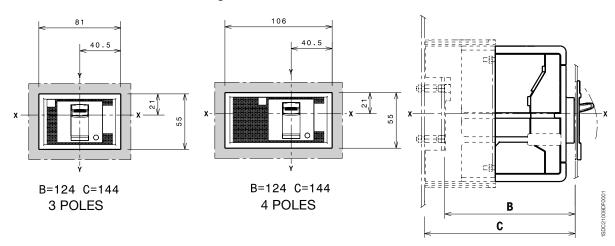




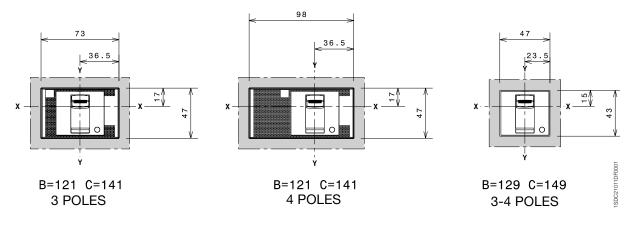
Tmax XT1 - Installation for plug-in circuit-breaker

Drilling templates compartment door

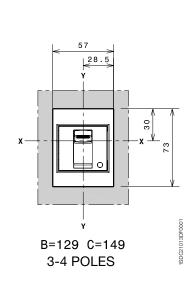
With standard flange

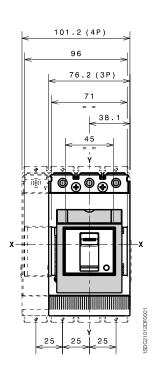


Without flange



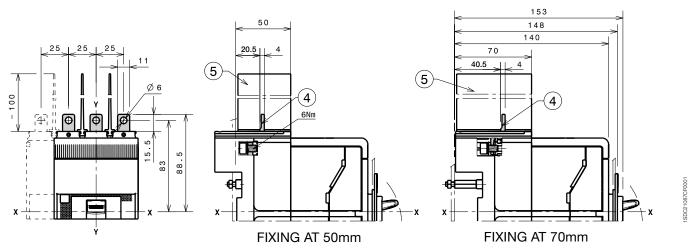
With optional flange





Tmax XT1 - Terminals for plug-in circuit-breaker

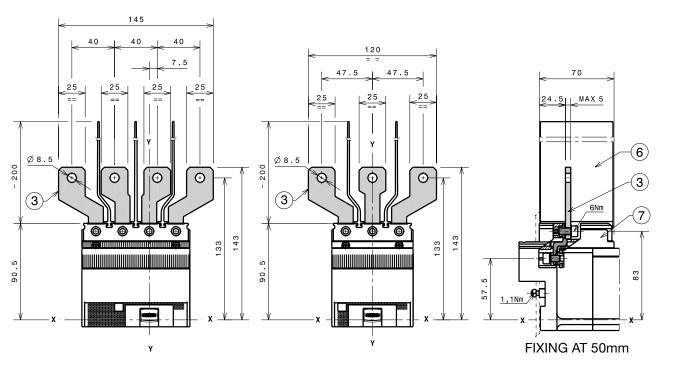
Terminals EF



Caption

- 4) Front extended terminals
- (5) 100mm insulating barriers between phases (compulsory) provided

Terminals ES



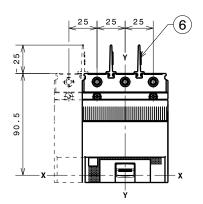
- 3 Front extended spread terminals
- 6 200mm insulating barriers between phases (compulsory) provided
- 7 Adaptor (compulsory) not provided

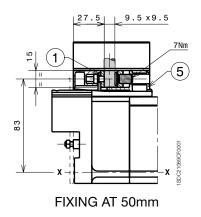
Tmax XT1 - Terminals for plug-in circuit-breaker

1x1.5...50mm² terminals FCCuAl

Caption

- 1 1x1.5...50mm² front terminal FCCuAl
- 5 Adaptor (compulsory) optional
- 6 25mm insulating barriers between phases (compulsory) provided

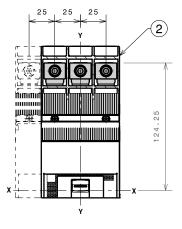


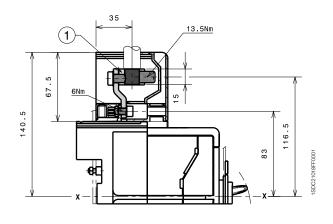


1x35...95mm² terminals FCCuAl

Caption

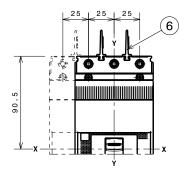
- 1 External terminal FCCuAl
- (2) High terminal covers with degree of protection IP40 (optional) provided

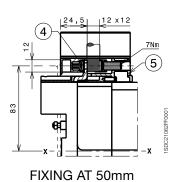




Terminals FCCu

- (4) Terminals FCCu
- (5) Adaptor (compulsory) not provided
- 6 25mm insulating barriers between phases (compulsory) provided

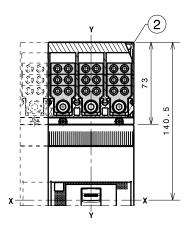


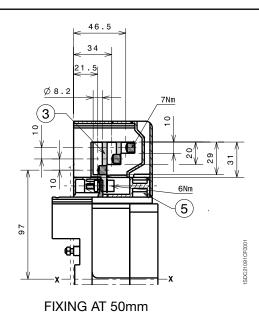


Terminals MC

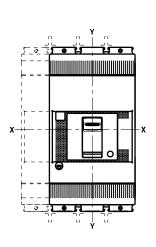
Caption

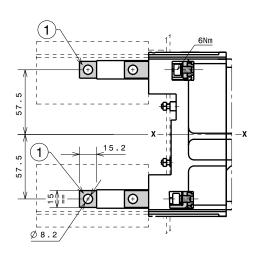
- 2 Terminal covers with degree of protection IP40 (optional) provided
- 3 Front terminal for multicable connection
- (5) Adaptor (compulsory) not provided

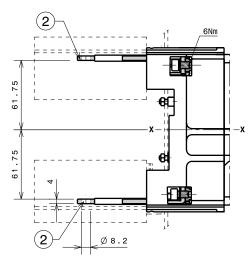




Terminals HR/VR





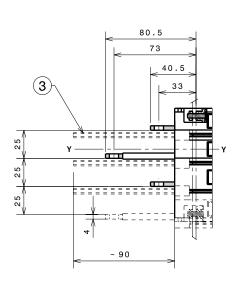


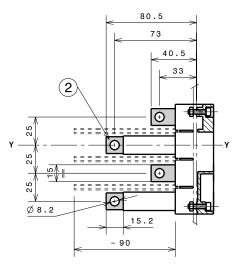
FIXING AT 50mm

FIXING AT 50mm

Caption

- 1 Rear vertical terminals
- 2 Rear horizontal terminals
- 3 90mm insulating barriers between phases (compulsory) not provided



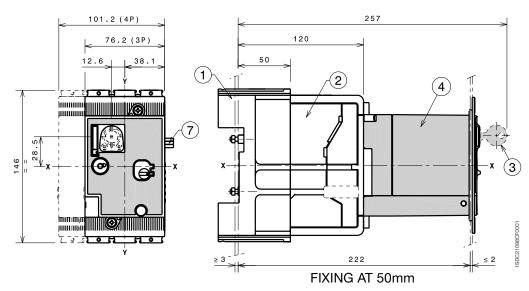


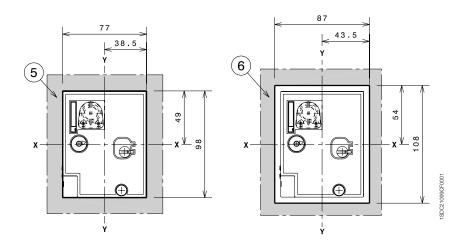
100000000

Tmax XT1 - Accessories for plug-in circuit-breaker

Direct motor operator (MOD)

- 1) Fixed part
- (2) Moving part
- (3) Key lock (on request)
- (4) Direct motor operator (MOD)
- 5 Drilling template of door with MOD without flange
- 6 Drilling template of door with MOD with flange
- 7 Cables connection



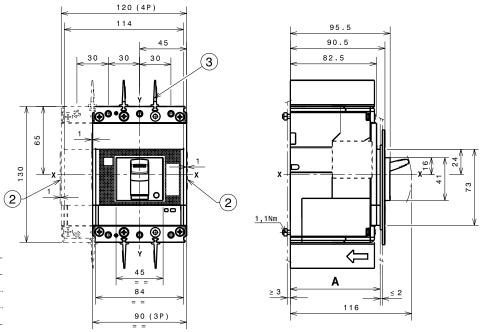


Tmax XT2 - Installation for fixed circuit-breaker

Fixed circuit-breaker fixing on sheet

Caption

- 2 Optional wiring ducts
- 3 25mm insulating barriers between phases (compulsory) provided

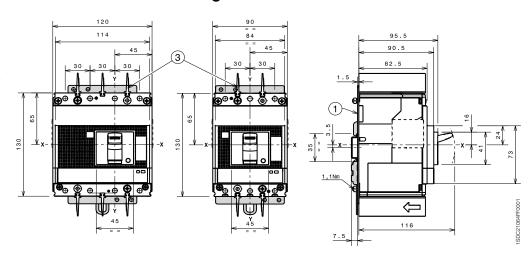


		Α
With standard flange	III - IV	86
Without flange	III - IV	83.5
	III - IV	91.5

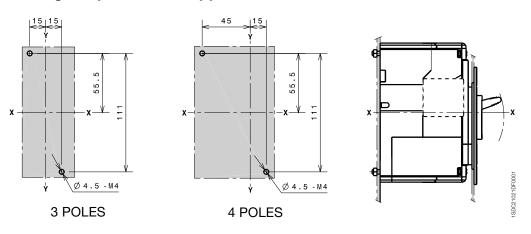
Fixed circuit-breaker fixing on DIN EN 50022 rail

Caption

- 1 Bracket for fixing
- 3 25mm insulating barriers between phases (compulsory) provided



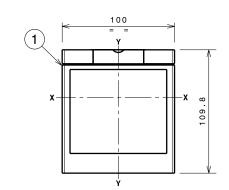
Drilling templates and support sheet

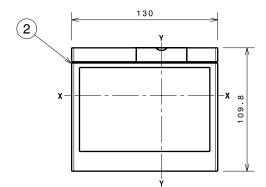


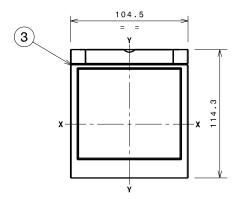
Tmax XT2 - Installation for fixed circuit-breaker

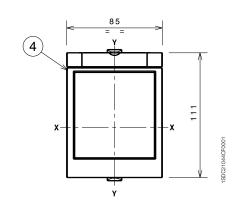
Flanges

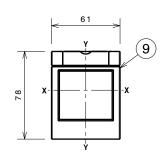
- 1 Flange for fixed circuit-breaker
- 2 Flange for fixed circuit-breaker
- (3) Flange for fixed circuit-breaker III-IV with MOE and FLD
- 4 Flange for circuit-breaker III-IV with direct rotary handle RHD
- 8 Flange for circuit-breaker IV with fixed residual current and front terminals
- 9 Optional flange

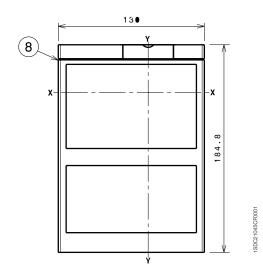






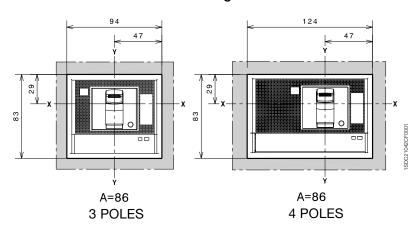


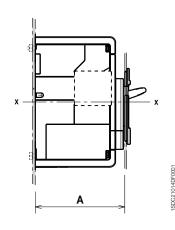




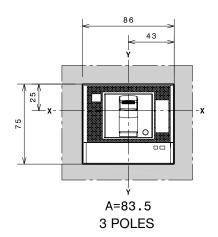
Drilling templates compartment door

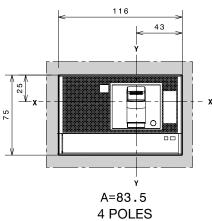
With standard flange

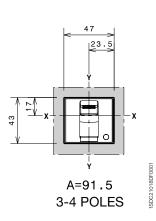




Without flange



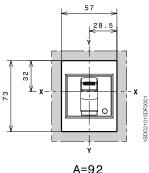




With optional flange

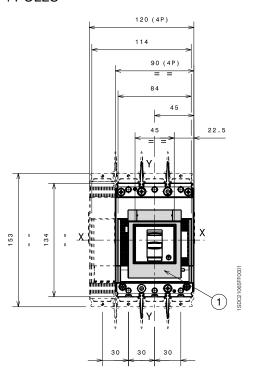
Caption

1 Optional flange



	•	٠.	J	_		
3-4		Ρ	O	L	ES	

	Execution	Α	В	С	
	fixed	92			3-4 poles
With optional flange	plug-in, fixing at 50mm		142		3-4 poles
	plug-in, fixing at 70mm			162	3-4 poles

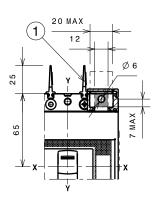


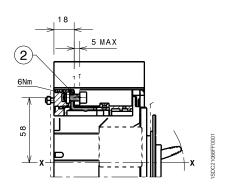
Tmax XT2 - Terminals for fixed circuit-breaker

Terminals F

Caption

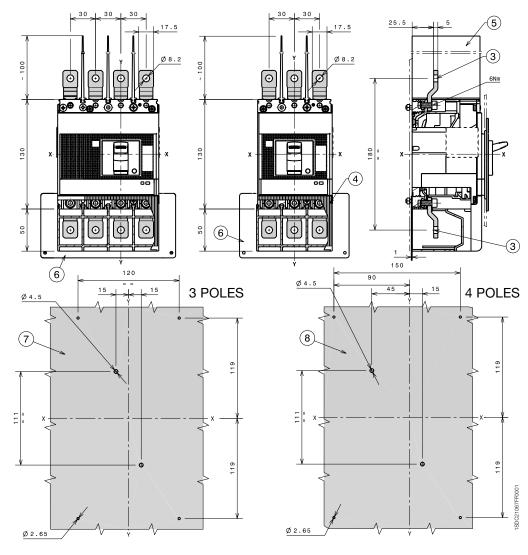
- 25mm insulating barriers between phases (compulsory) not provided
- (2) Front terminals for busbars connection





Terminals EF

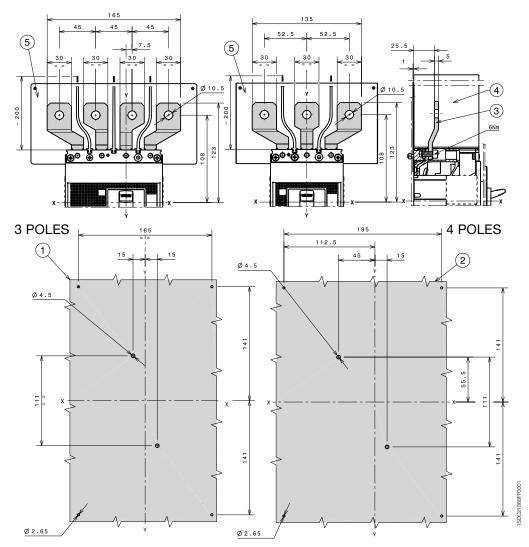
- (3) Front extended terminals
- (4) Terminal covers with degree of protection IP40 (optional) not provided
- (5) 100mm insulating barriers between phases (compulsory) provided
- 6 Insulated plate (compulsory) provided for XT2 Ue>440V
- 7 Drilling template for 3p circuitbreaker Ue>440V (compulsory)
- 8 Drilling template for 4p circuitbreaker Ue>440V (compulsory)



Terminals ES

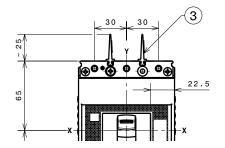
Caption

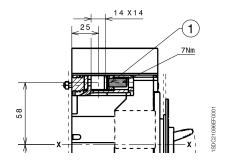
- 1 Drilling template for 3p circuitbreaker Ue>440V (compulsory)
- 2 Drilling template for 4p circuitbreaker Ue>440V (compulsory)
- 3 Front extended spread terminals
- 4 200mm insulating barriers between phases (compulsory) provided for Ue>440V
- (5) Insulated plate (compulsory) provided for XT2 Ue>440V



1x1...95mm² terminals FCCuAl

- 1) 1x1...95mm² terminals FCCuAl
- (3) 25mm insulating barriers between phases (compulsory) provided



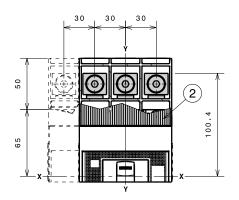


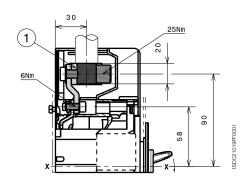
Tmax XT2 - Terminals for fixed circuit-breaker

1x70...185mm² terminals FCCuAl

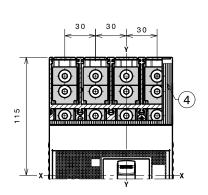
Caption

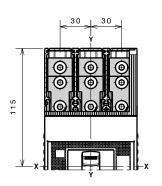
- 1 External terminal FCCuAl
- (2) High terminal covers with degree of protection IP40 (optional) provided

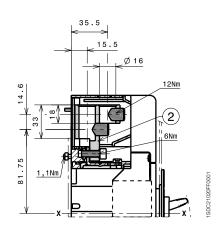




2x35...95mm² terminals FCCuAl





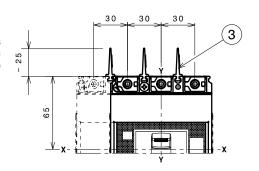


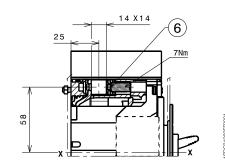
Caption

- 2 2x35...95mm² terminals FCCuAl
- (4) Terminal covers with degree of protection IP40 (optional) provided

Terminals FCCu

- 3 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker
- (6) Terminals FCCu

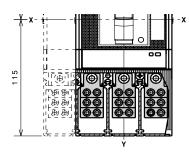


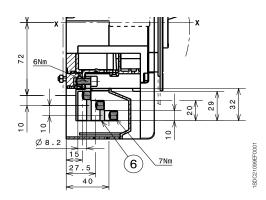


Terminals MC

Caption

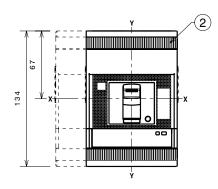
6 Multicable terminals

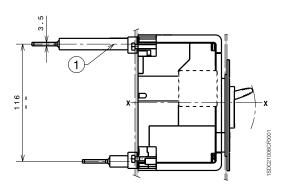


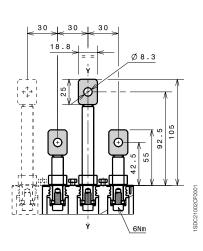


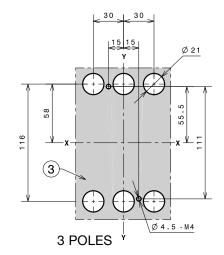
Terminals R

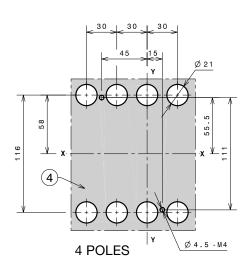
- 1) Rear adjustable terminals
- (2) Bottom terminal covers with degree of protection IP30 (optional) provided
- 3 Drilling template for circuitbreaker III fixing on sheet
- 4 Drilling template for circuitbreaker IV fixing on sheet





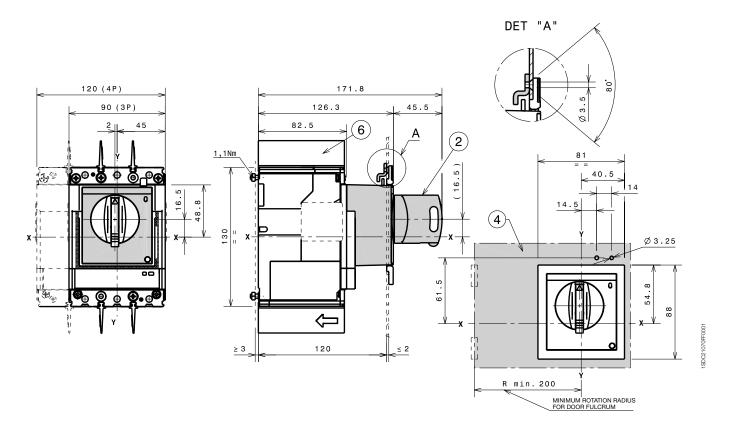






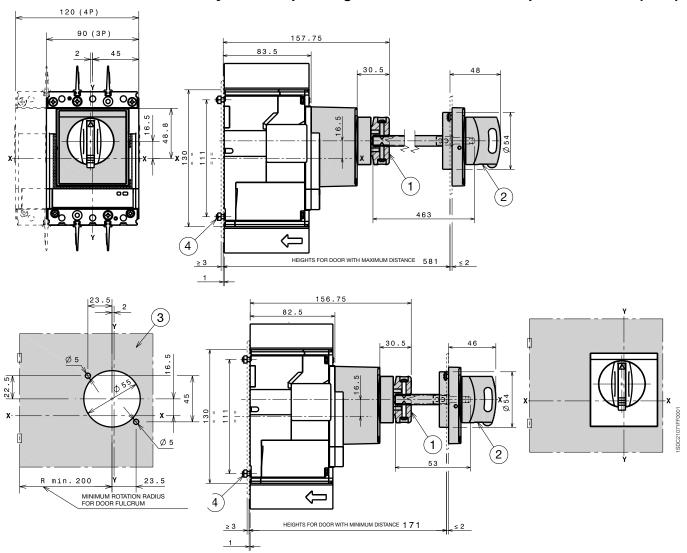
Tmax XT2 - Accessories for fixed circuit-breaker

Rotary handle operating mechanism on circuit-breaker (RHD)



- 2 Rotary handle operating mechanism on circuit-breaker
- 4 Drilling template of door with direct rotary handle
- (6) 25mm insulating barriers between phases provided with circuit-breaker

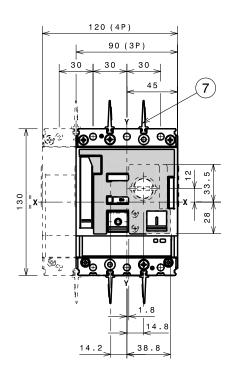
Rotary handle operating mechanism on the compartment door (RHE)

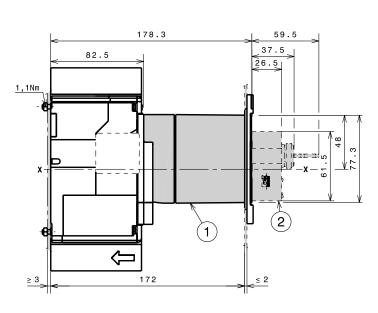


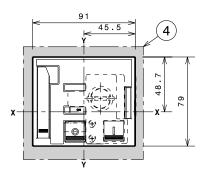
- 1 Transmission mechanism
- (2) Rotary handle operating mechanism for compartment door
- 3 Compartment door shett steel drilling
- 4 Tightening torque 1.1Nm

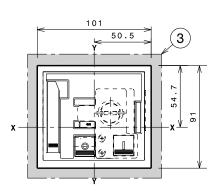
Tmax XT2 - Accessories for fixed circuit-breaker

Stored energy motor operator (MOE)





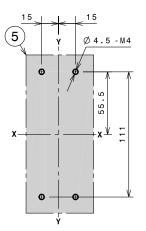




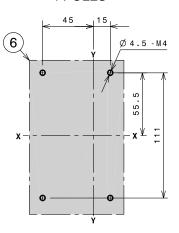
Caption

- 1 Stored energy motor operator (MOE)
- (2) Key lock optional
- 3 Drilling template of door with MOE with flange
- 4 Door drilling template with MOE without flange
- 5 Drilling template for circuitbreaker 3p fixing on sheet
- 6 Drilling template for circuitbreaker 4p fixing on sheet
- 7 25mm insulating barriers between phases provided with circuit-breaker

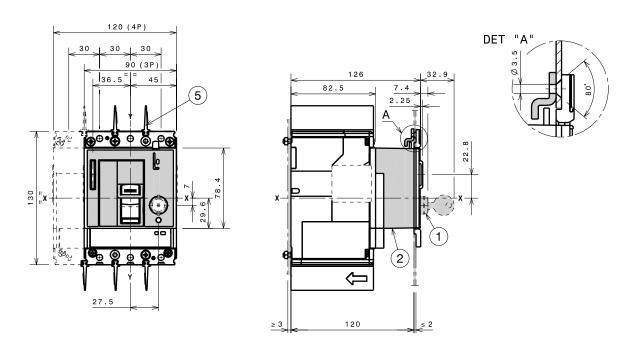
3 POLES

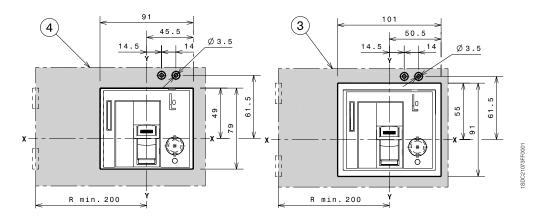


4 POLES



Front for lever operating mechanism (FLD)





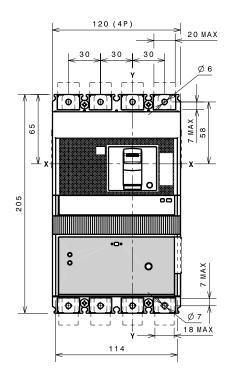
- 1) Key lock optional
- 2 Front for lever operating mechanism (FLD)
- 3 Drilling template of door with FLD with flange
- 4 Drilling template of door with FLD without flange
- (5) 25mm insulating barriers between phases provided with circuit-breaker

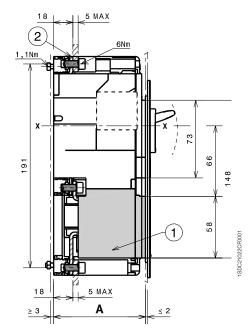
Tmax XT2 - Accessories for fixed circuit-breaker

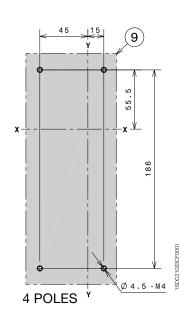
Ekip Display or Ekip LED Meter

Caption 120 (4P) 99.35 114 95.5 1) 25mm insulating barriers between phases provided with circuit-breaker 90.5 45 30 30 82.5 30 (2) Ekip Display or Ekip LED Meter **⊕** ⊕ ⊕ 130 <u>1,1Nm</u> ⊕_•⊕ ⊕ 19.3 (2) (2) 90 (3P)

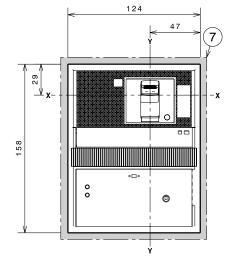
Residual current RC Sel

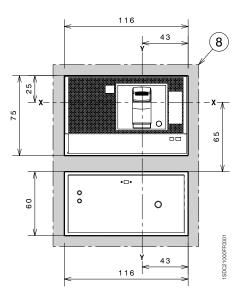






- 1 Residual current
- (2) Front terminals
- 7 Drilling template of door with direct rotary handle and fixing with flange
- (8) Drilling template of door with direct rotary handle and fixing without flange
- Drilling template for circuitbreaker fixing on sheet





		Α
With standard flange	IV	86
Without flange	IV	83.5

Tmax XT2 - Installation for plug-in circuit-breaker

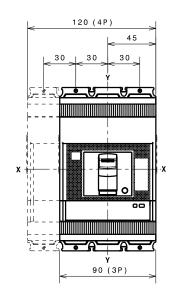
Plug-in circuit-breaker fixing on sheet

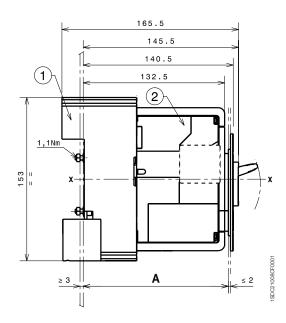
Caption

- 1 Fixed part
- (2) Moving part

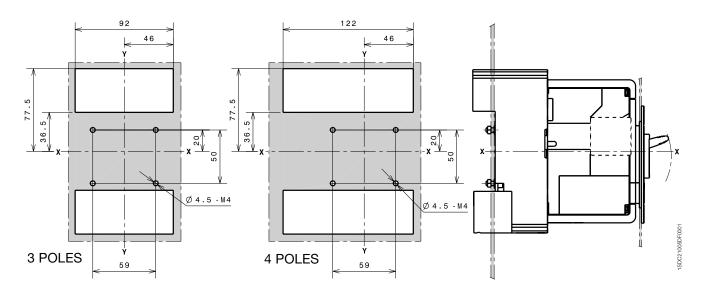
Fixing at 50m	Α		
With standard flange	h standard flange III - IV		
Without flange	III - IV	133.5	
	III - IV	141.5	

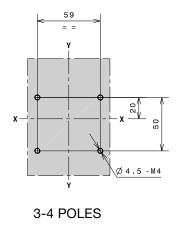
Fixing at 70mm extended front term	Α	
With standard flange	III - IV	156
Without flange	III - IV	153.5
	III - IV	161.5

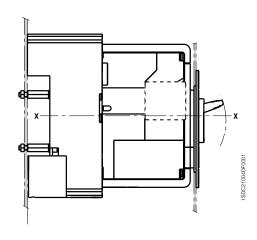




Drilling templates for support sheet

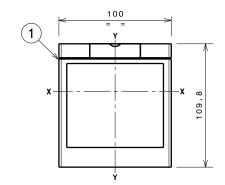


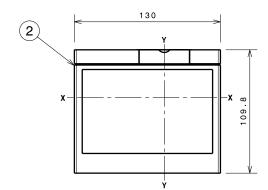


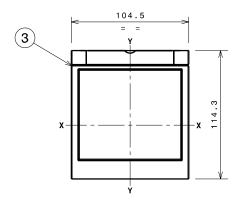


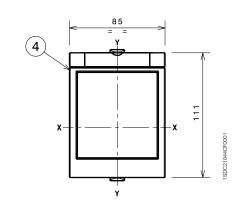
Flanges

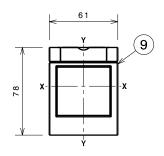
- 1 Flange for circuit-breaker rimovibile III
- 2 Flange for circuit-breaker IV
- (3) Flange for plug-in circuit-breaker III-IV with MOE and FLD
- 4 Flange for circuit-breaker III-IV with direct rotary handle (RHD)
- 8 Flange for circuit-breaker IV with residual current and plugin with front terminals
- 9 Optional flange

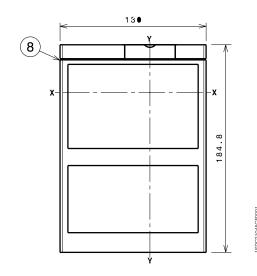








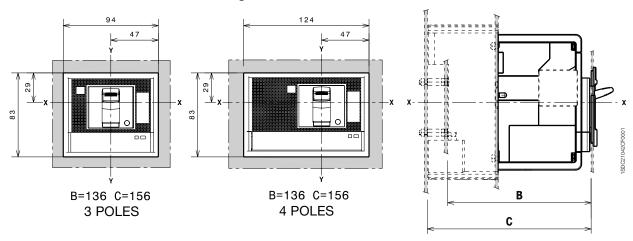




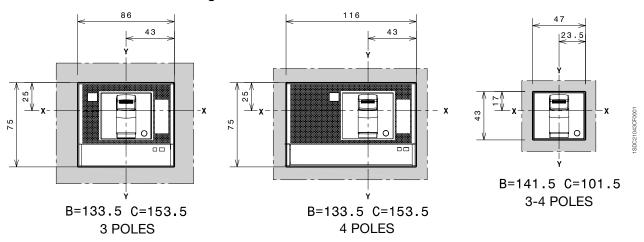
Tmax XT2 - Terminals for plug-in circuit-breaker

Drilling templates compartment door

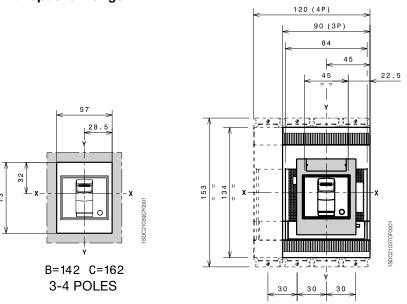
With standard flange

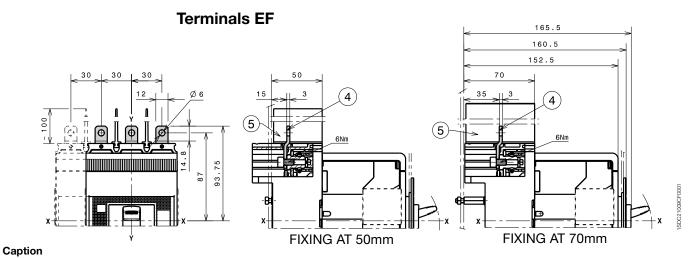


Without flange



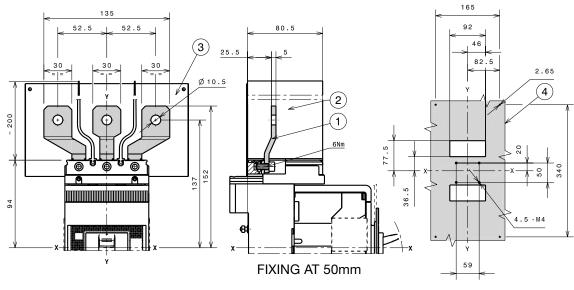
With optional flange



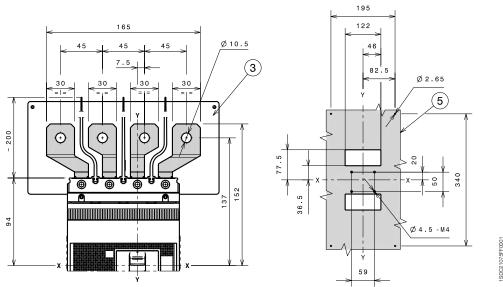


- (4) Front extended terminals
- (5) 100mm insulating barriers between phases (compulsory) provided

Terminals ES



- 1) Front extended spread terminals
- (2) 200mm insulating barriers between phases (compulsory) provided
- ③ Insulated plate (compulsory) provided
- 4 Drilling template for 3p circuitbreaker Ue>440V (compulsory)
- 5 Drilling template for 4p circuitbreaker Ue>440V (compulsory)

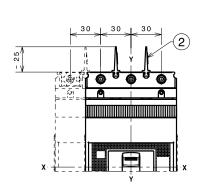


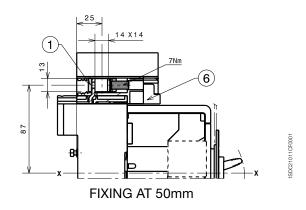
Tmax XT2 - Terminals for plug-in circuit-breaker

1x1...95mm² terminals FCCuAl

Caption

- 1 1x1...95mm² front terminal FCCuAl
- (2) 25mm insulating barriers between phases (compulsory) provided
- 6 Adaptor (compulsory) not provided

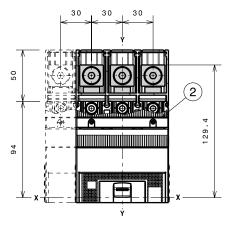


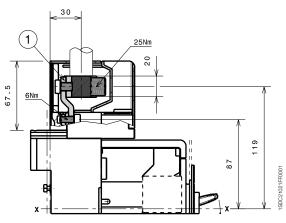


1x70...185mm² terminals FCCuAl

Caption

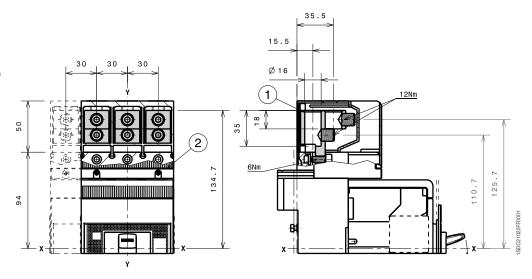
- 1) External terminal FCCuAl
- (2) High terminal covers with degree of protection IP40 (optional) provided





2x35...95mm² terminals FCCuAl

- 1) External terminal FCCuAl
- 2 High terminal covers with degree of protection IP40 (optional) provided

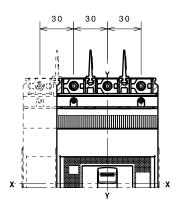


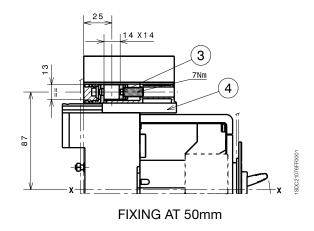
Terminals FCCu

Caption

- (3) Terminals FCCu
- 4 Adaptor (compulsory) not provided

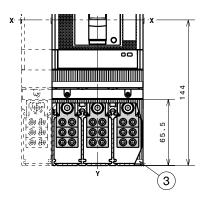
Note: 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker

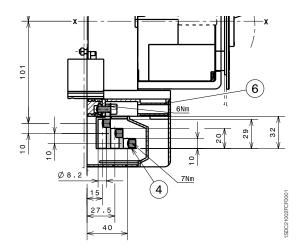




Terminals MC

- (3) High terminal covers with degree of protection IP40 (optional) provided
- 4 Multicable terminals
- 6 Adaptor (compulsory) not provided

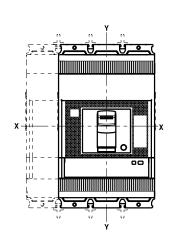


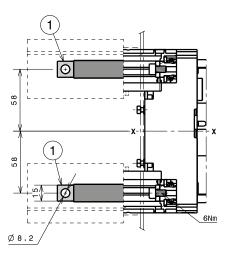


FIXING AT 50mm

Tmax XT2 - Terminals for plug-in circuit-breaker

Terminals HR/VR

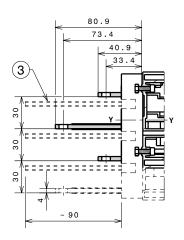


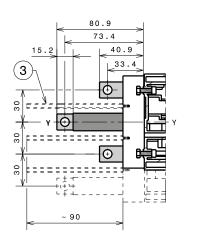


2 52.29 2 2 88.2

FIXING AT 50mm

FIXING AT 50mm

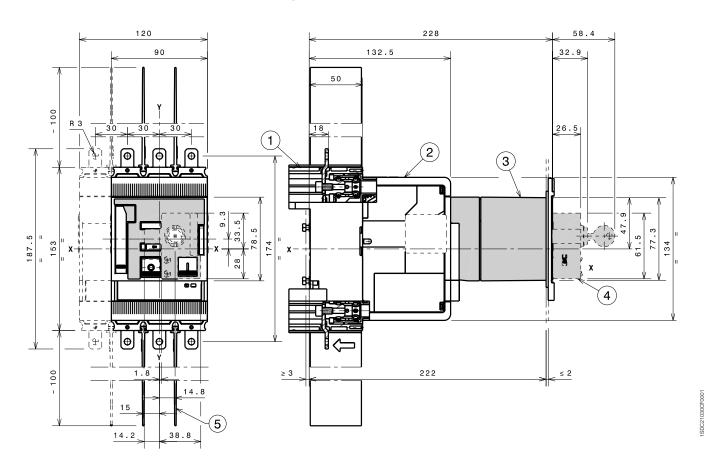


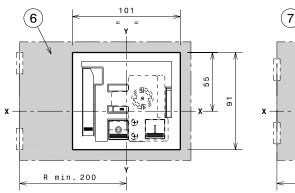


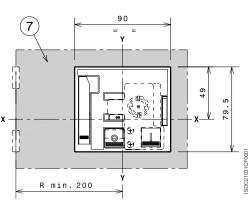
- 1) Rear vertical terminals
- 2 Rear horizontal terminals
- 3 90mm insulating barriers between phases (compulsory) not provided

Tmax XT2 - Accessories for plug-in circuit-breaker

Stored energy motor operator (MOE)



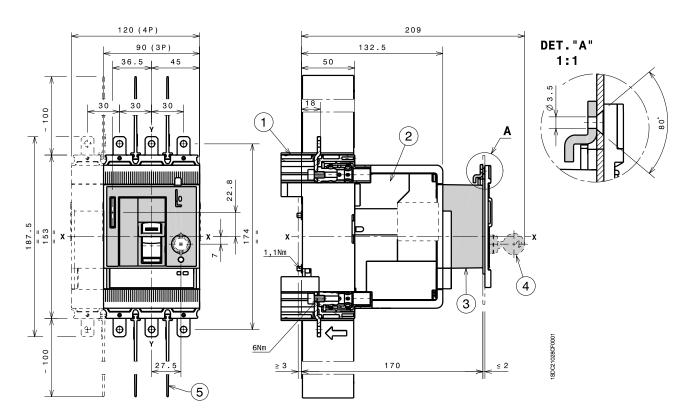


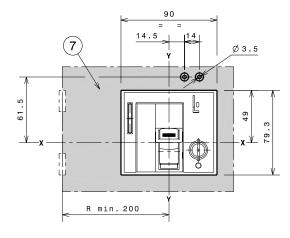


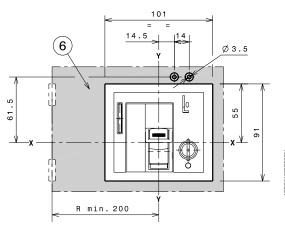
- 1) Fixed part
- 2 Moving part
- 3 MOE
- (4) Key lock optional
- (5) 100mm insulating barriers between phases (compulsory) provided
- 6 Drilling template of door with direct rotary handle with flange
- 7 Drilling template of door with direct rotary handle without flange

Tmax XT2 - Accessories for plug-in circuit-breaker

Front for lever operating mechanism (FLD)

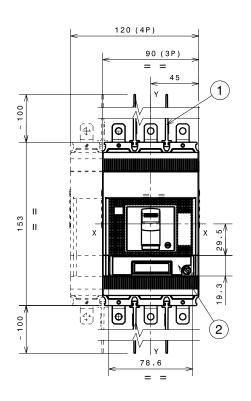


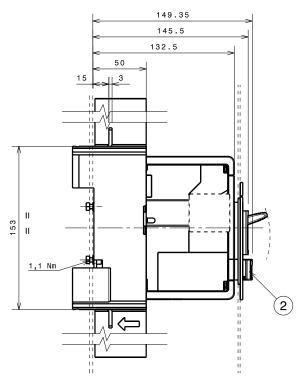




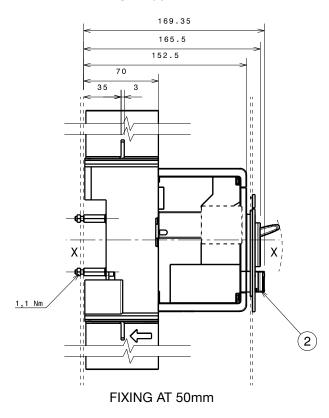
- (1) Fixed part
- (2) Moving part
- (3) Front for lever operating mechanism (FLD)
- 4 Key lock optional
- (5) 100mm insulating barriers between phases (compulsory) provided
- 6 Drilling template of door with direct rotary handle with flange
- 7 Drilling template of door with direct rotary handle without flange

Ekip Display or Ekip LED Meter





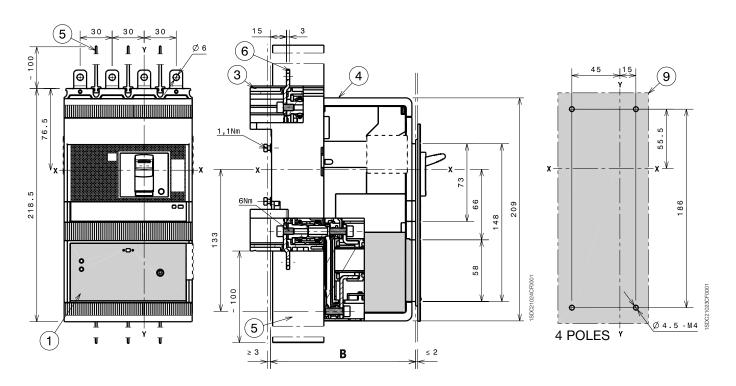
FIXING AT 50mm



- 100mm insulating barriers between phases
- (2) Ekip Display or Ekip LED Meter

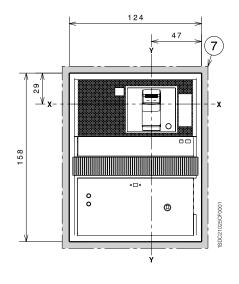
Tmax XT2 - Accessories for plug-in circuit-breaker

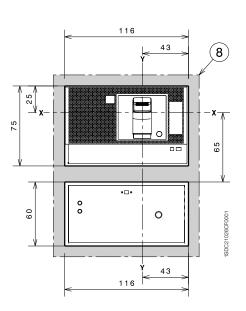
Residual current RC Sel





- 1 Residual current
- (3) Fixed part
- 4 Moving part
- (5) 100mm insulating barriers between phases (compulsory) provided
- (6) Extended terminals
- 7 Drilling template of door with direct rotary handle and fixing with flange
- (8) Drilling template of door with direct rotary handle and fixing without flange
- 9 Drilling template for circuitbreaker fixing on sheet

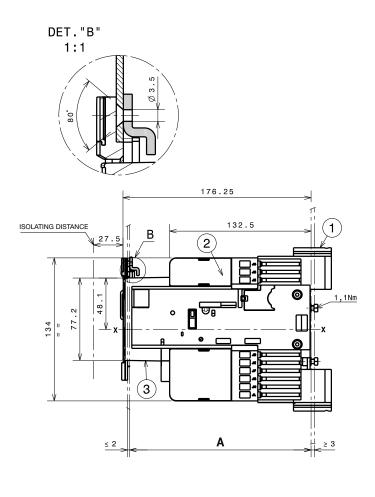


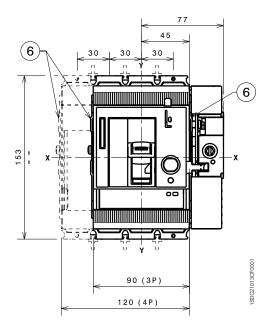


		Α
With standard flange	IV	136
Without flange	IV	133,5

Tmax XT2 - Installation for withdrawable circuit-breaker

Fixing on sheet



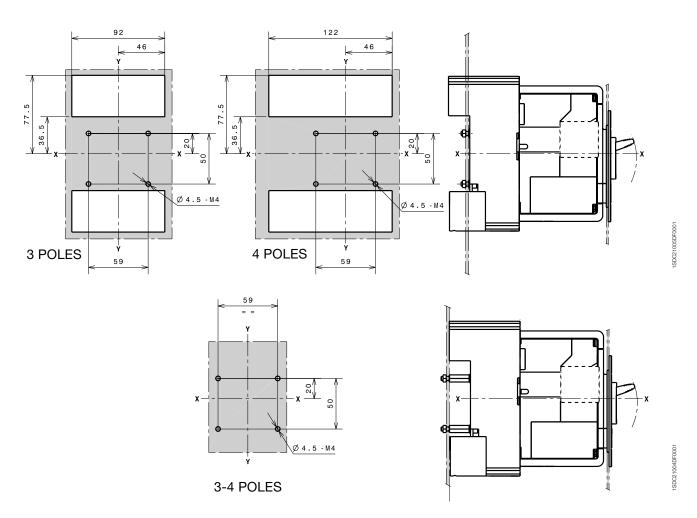


- 1) Fixed part
- 2 Moving part
- ③ FLD (FLD o RHD o RHE o MOE) mandatory for withdrawable version
- (6) Optional wiring ducts

			Α
	III - IV	Fixing at 50mm	170
With standard flange	III - IV	Fixing at 70mm for extended front terminals	190

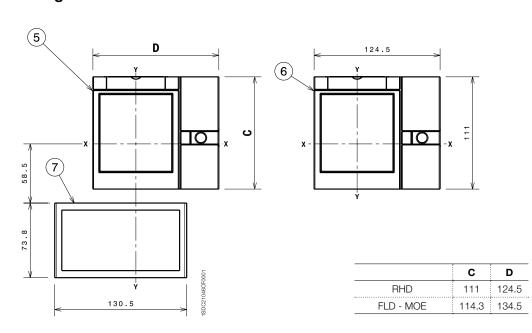
Tmax XT2 - Installation for withdrawable circuit-breaker

Drilling templates for support sheet



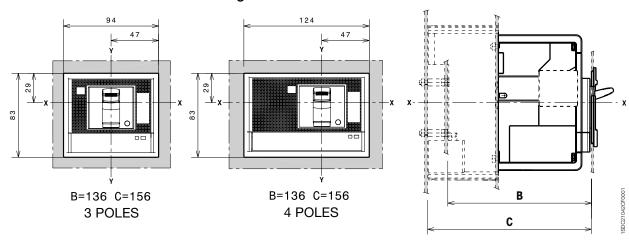
Flanges

- 5 Flange for circuit-breaker III-IV withdrawable
- 6 Flange for circuit-breaker withdrawable III-IV with direct rotary handle RHD
- 7 Flange for circuit-breaker residual current IV withdrawable with front extended terminals

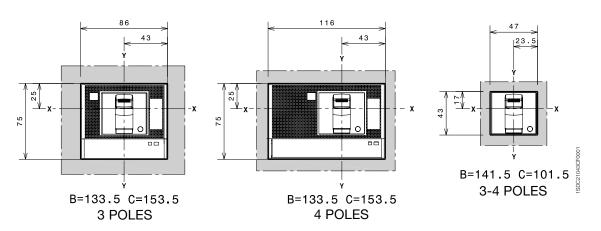


Drilling templates compartment door

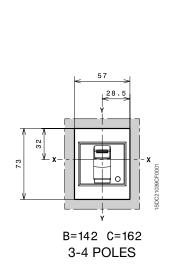
With standard flange

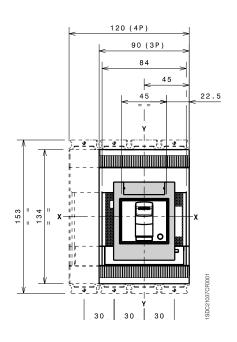


Without flange



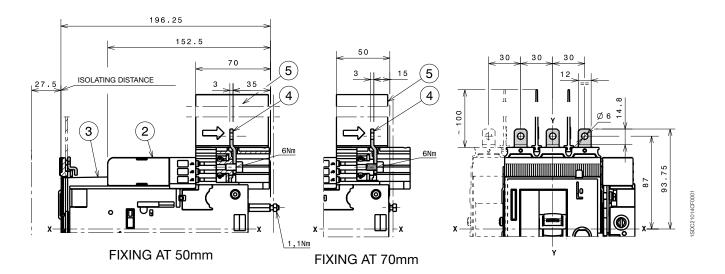
With standard flange





Tmax XT2 - Terminals for withdrawable circuit-breaker

Terminals EF

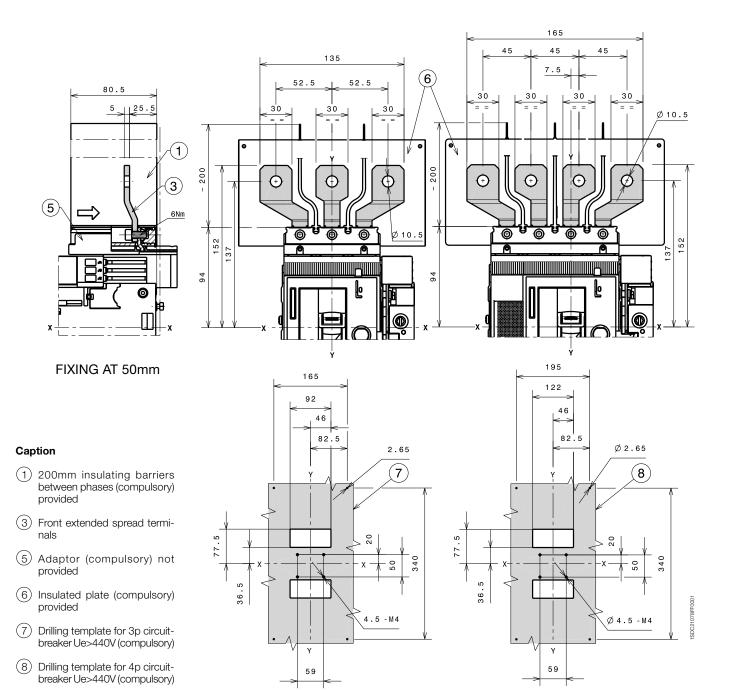


Caption

- 2 Moving part
- (3) FLD (FLD or RHD or RHE or MOE) mandatory for withdrawable version
- 4 Front extended terminals
- (5) 100mm insulating barriers between phases (compulsory) provided

Note: insulated plate (compulsory) provided

Terminals ES

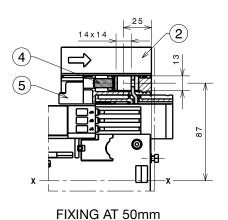


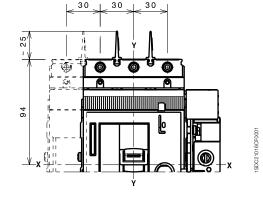
Tmax XT2 - Terminals for withdrawable circuit-breaker

1x1...95mm² terminals FCCuAl

Caption

- 2 25mm insulating barriers between phases (compulsory) provided
- (4) 1x1...95mm² front terminals FcCuAl
- (5) Adaptor (compulsory) not provided

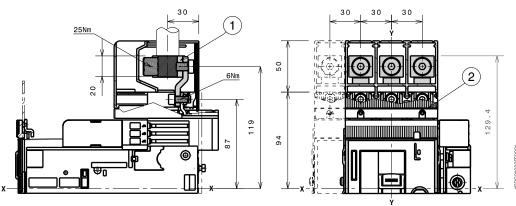




1x70...185mm² terminals FCCuAl

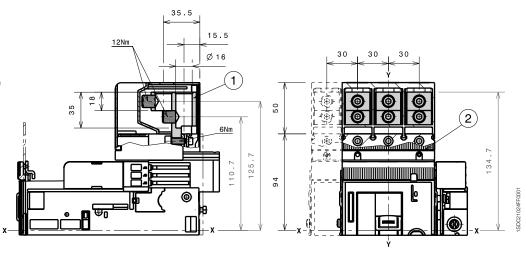
Caption

- 1) External terminal FCCuAl
- (2) High terminal covers with degree of protection IP40 (optional) provided



2x35...95mm² terminals FCCuAl

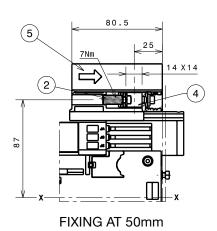
- 1 External terminal FCCuAl 2x95mm²
- 2 High terminal covers with degree of protection IP40 (optional) provided

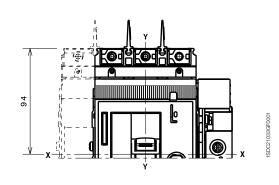


Terminals FCCu

Caption

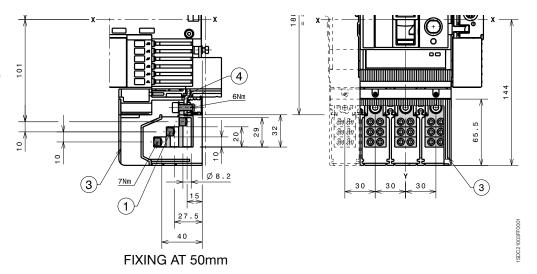
- (2) Terminals FCCu
- 4 Adaptor (compulsory) not provided
- (5) 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker





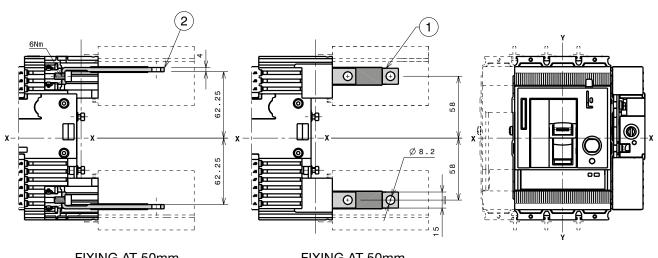
Terminals MC

- 1) Multicable terminals
- (3) High terminal covers with degree of protection IP40 (optional) provided
- 4 Adaptor (compulsory) not provided



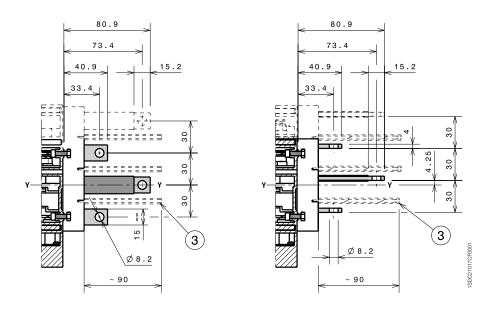
Tmax XT2 - Terminals for withdrawable circuit-breaker

Terminals HR/VR



FIXING AT 50mm

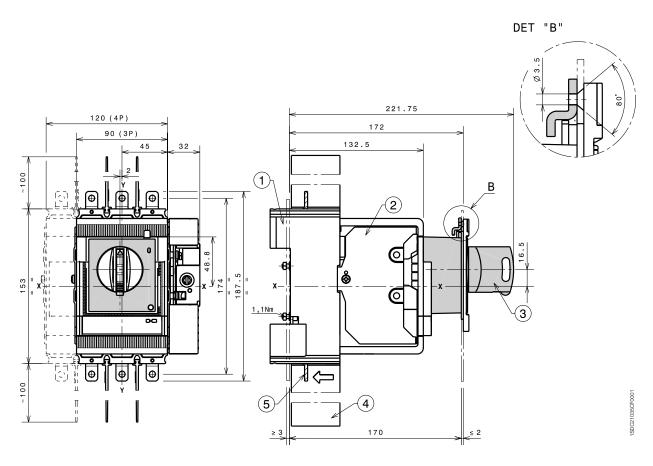
FIXING AT 50mm

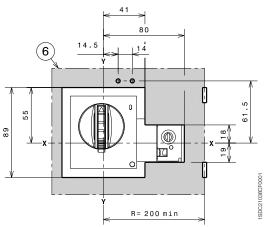


- 1) Rear vertical terminals
- (2) Rear horizontal terminals
- 3) 90mm insulating barriers between phases (compulsory) not provided

Tmax XT2 - Accessories for withdrawable circuit-breaker

Rotary handle operating mechanism on circuit-breakers (RHD)

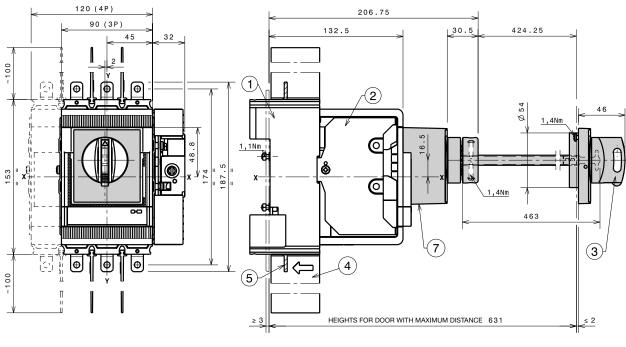


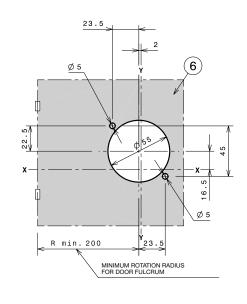


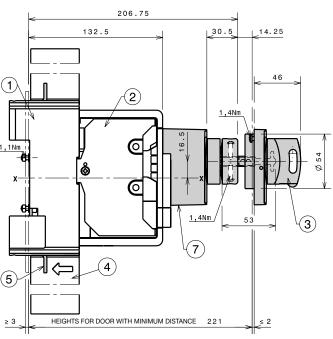
- 1 Fixed part
- (2) Moving part
- 3 Rotary handle operating mechanism on circuit-breaker
- (4) 100mm insulating barriers between phases (compulsory) provided
- (5) Extended terminals
- 6 Drilling template of door with direct rotary handle

Tmax XT2 - Accessories for withdrawable circuit-breaker

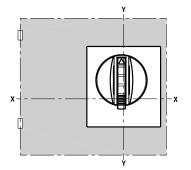
Rotary handle operating mechanism on the compartment door (RHE)





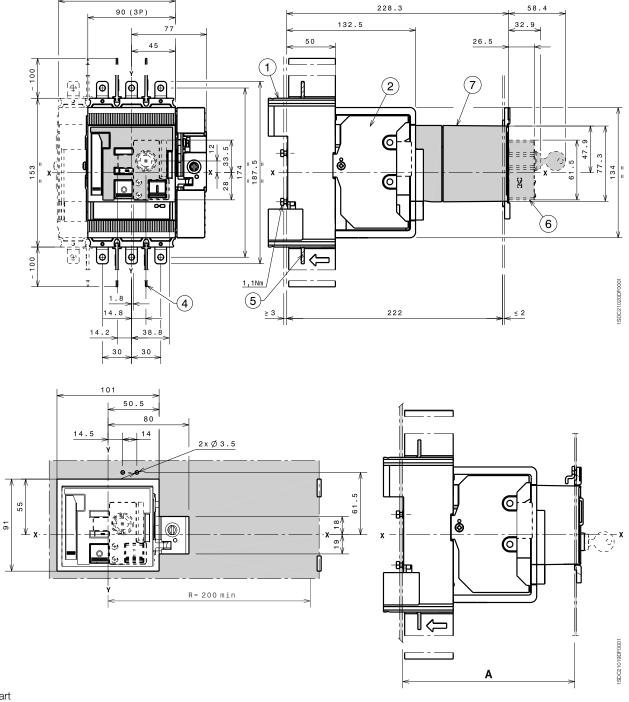


- 1 Fixed part
- (2) Moving part
- (3) Rotary handle operating mechanism on the compartment door (RHE)
- (4) 100mm insulating barriers between phases (compulsory) provided
- (5) Extended terminals
- 6 Door drilling template with transmetted rotary handle
- (7) Transmission unit



Stored energy motor operator (MOE)

120 (4P)

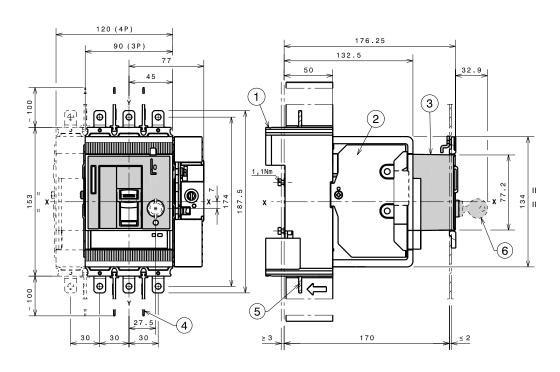


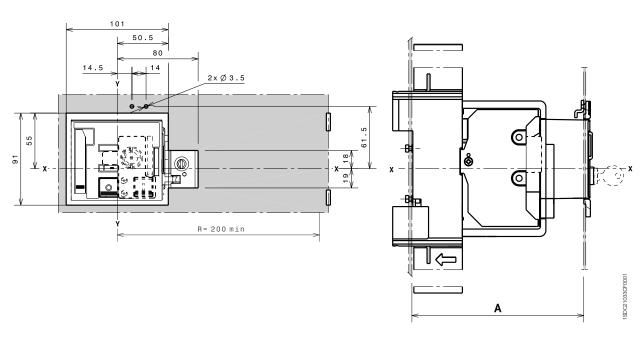
- 1 Fixed part
- 2 Moving part
- (4) 100mm insulating barriers between phases (compulsory) provided
- 5 Extended terminals
- 6 Key lock optional
- 7 Stored energy motor operator (MOE)

		Α
Motor operator MOE	III - IV	222

Tmax XT2 - Accessories for withdrawable circuit-breaker

Front for lever operating (FLD)

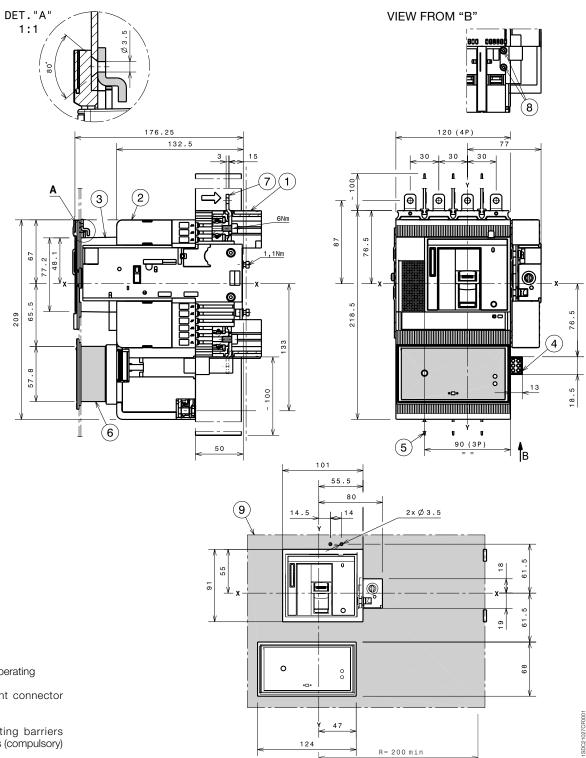




- 1 Fixed part
- 2 Moving part
- (3) Front for lever operating (FLD)
- 4 100mm insulating barriers between phases (compulsory) provided
- (5) Extended terminals
- (6) Key lock optional

		Α
Front for lever operating FLD	III - IV	170

Residual current RC Sel 4 poles



- 1) Fixed part
- (2) Moving part
- (3) Front for lever operating
- (4) Residual current connector (optional)
- (5) 100mm insulating barriers between phases (compulsory) provided
- 6 Residual current
- 7) Extended terminals
- 8 Fixing screws for fixed part of connector
- 9 Door drilling template and flange fixing

Tmax XT3 - Installation for fixed circuit-breaker

52.5

(3)

35

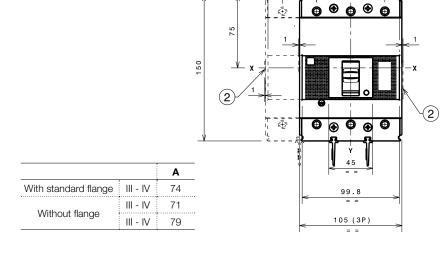
140 (4P)

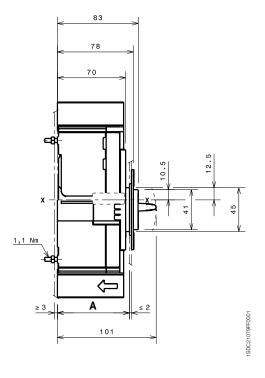
134.8

Fixing on sheet

Caption

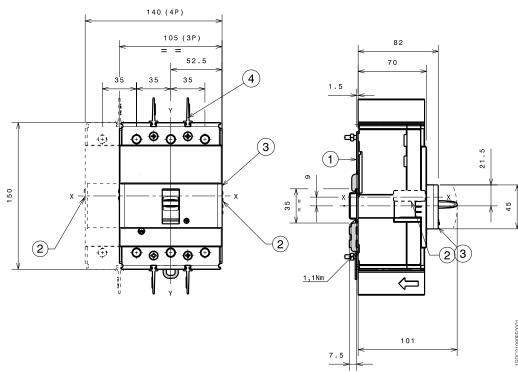
- Overall dimension of optional wiring ducts
- 3 25mm insulating barriers between phases (compulsory) provided



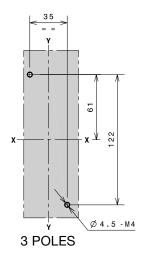


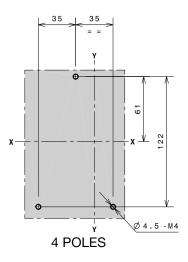
Fixing on DIN EN 50022 rail

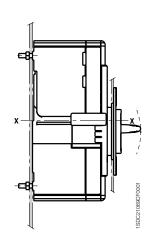
- 1 Bracket for fixing
- (2) Optional wiring ducts
- (3) Optional front cover for DIN rail
- (4) 25mm insulating barriers between phases (compulsory) provided



Drilling template for circuit-breaker fixing

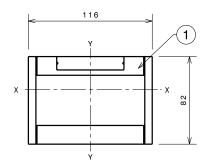


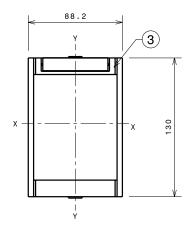


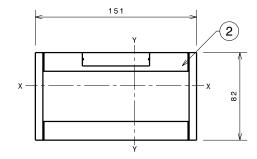


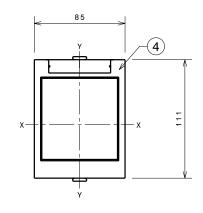
Flanges

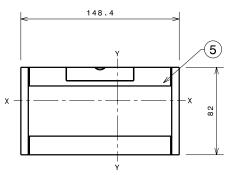
- 1) Flange for fixed circuit-breaker III
- 2 Flange for fixed circuit-breaker IV
- (3) Flange for circuit-breaker with direct motor operator MOD
- 4 Flange for circuit-breaker with direct rotary handle (RHD)
- 5 Flange for circuit-breaker III with residual current
- 6 Flange for circuit-breaker IV with residual current
- (7) Optional flange

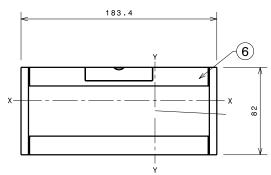


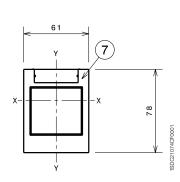








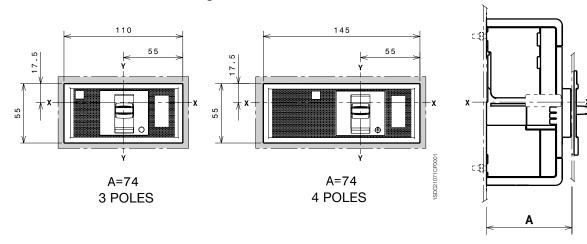




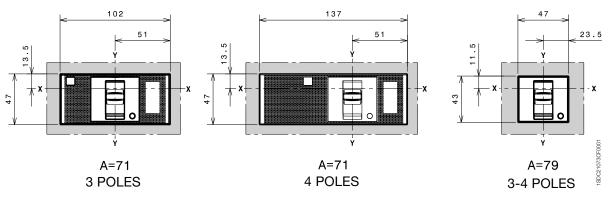
Tmax XT3 - Installation for fixed circuit-breaker

Drilling templates compartment door

With standard flange



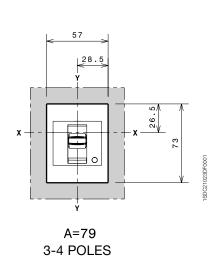
Without flange

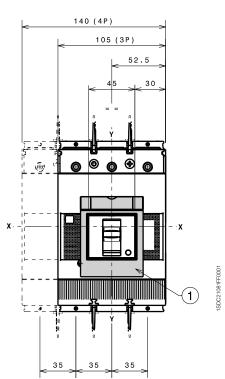


With optional flange

Caption

1 Optional flange



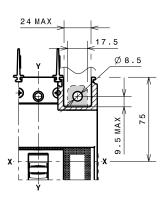


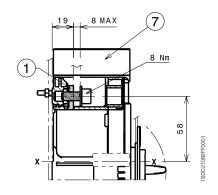
Tmax XT3 - Terminals for fixed circuit-breaker

Terminals F

Caption

- 1 Front terminals for busbars connection
- (7) 25mm insulating barriers between phases (compulsory) provided

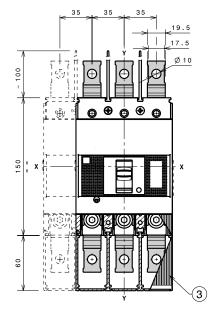


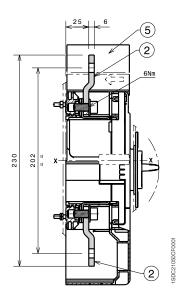


Terminals EF

Caption

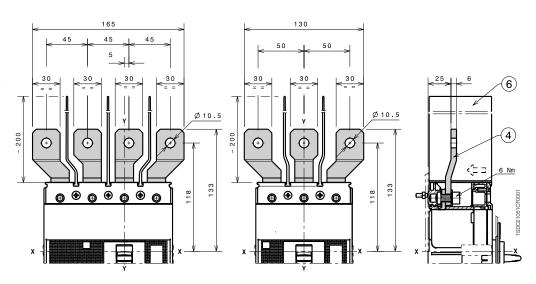
- (2) Front extended terminals
- Terminal covers with degree of protection IP40 (optional) not provided
- (5) 100mm insulating barriers between phases (compulsory) provided





Terminals ES

- 4 Front extended spread terminals for busbars connection
- 6 200mm insulating barriers between phases (compulsory) provided

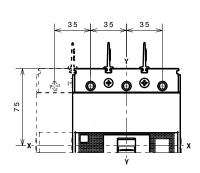


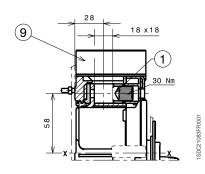
Tmax XT3 - Terminals for fixed circuit-breaker

1x90...185mm² terminals FCCuAl

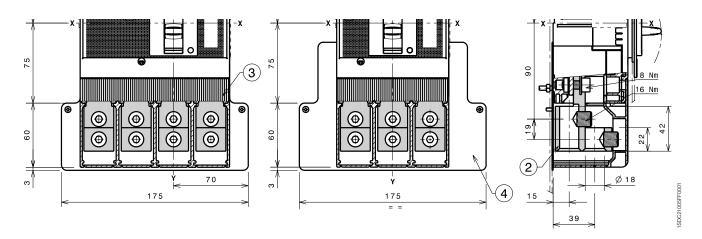
Caption

- 1 1x90...185mm² terminals FCCuAl
- (9) 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker

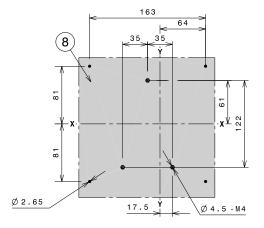


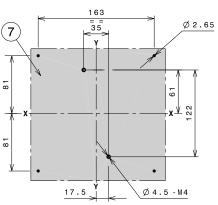


2x35...150mm² terminals FCCuAl



- 2 2x35...150mm² terminals FCCuAl
- (3) Terminal covers with degree of protection IP40 (optional) provided
- (4) Provided rear insulated plate (mandatory for CuAl 2x150mm² cables)
- 7 Drilling template for circuitbreaker fixing on sheet III with rear insulated plate
- (8) Drilling template for circuitbreaker fixing on sheet IV with rear insulated plate

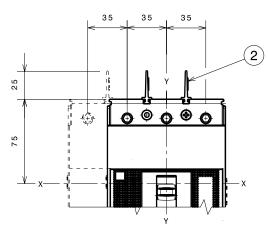


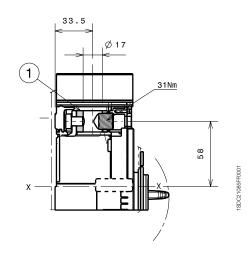


30...150mm² terminals FCCuAl

Caption

- 1) 30...150mm² terminals FCCuAl
- 2 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker

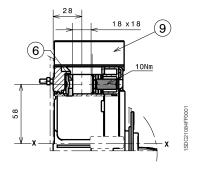




Terminals FCCu

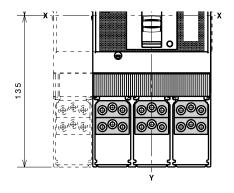
Caption

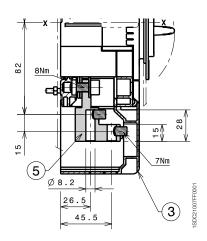
- 6 Front terminals FCCu
- 9 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker



Terminals MC

- (3) Terminal covers with degree of protection IP40 (optional) provided
- 5 Front terminal for multicable connection

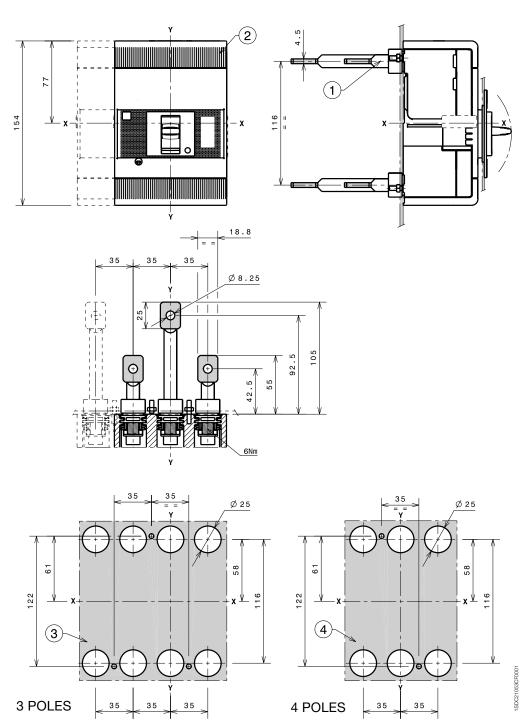




Tmax XT3 - Terminals for fixed circuit-breaker

Terminals R

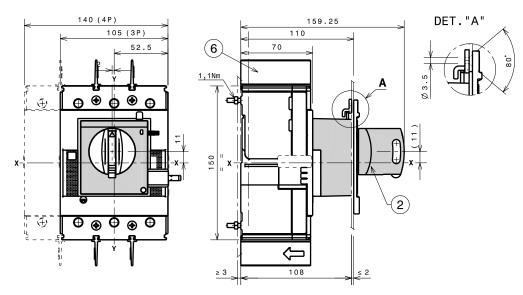
- 1 Adjustable rear terminals
- (2) Bottom terminal covers with degree of protection IP30 (optional) provided
- 3 Drilling tamplate for circuitbreaker IV fixing on sheet
- 4 Drilling tamplate for circuitbreaker III fixing on sheet

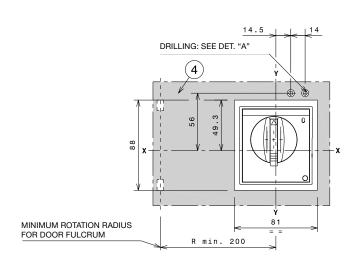


Tmax XT3 - Accessories for fixed circuit-breaker

Rotary handle operating mechanism on circuit-breaker (RHD)

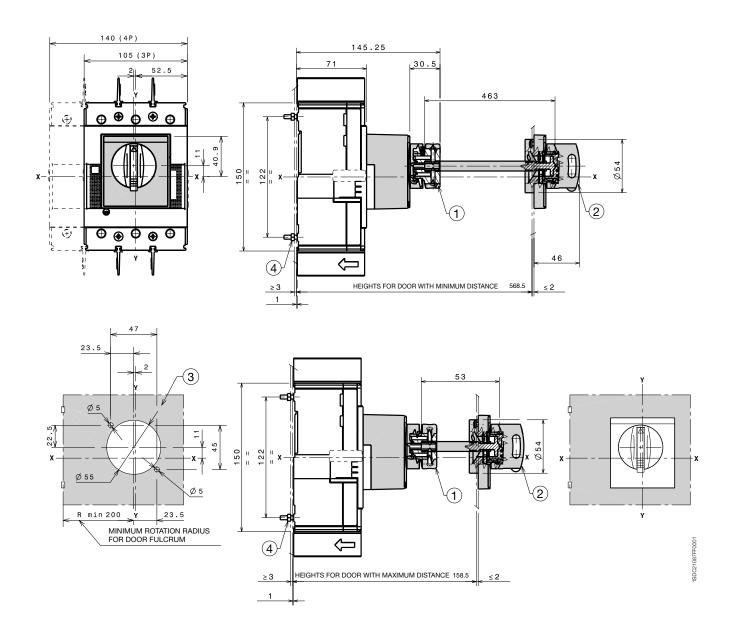
- 2 Rotary handle operating mechanism on circuit-breaker RHD
- 4 Drilling template of door with direct rotary handle
- 6 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker





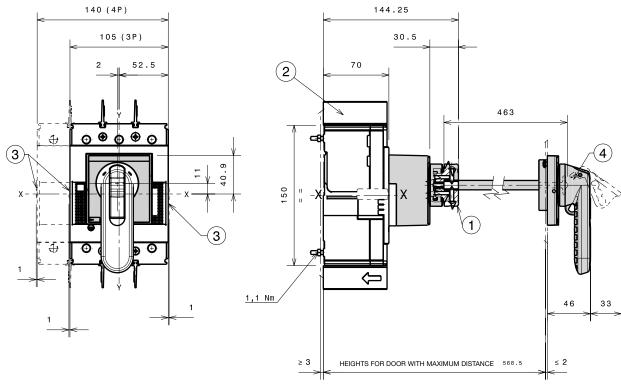
Tmax XT3 - Accessories for fixed circuit-breaker

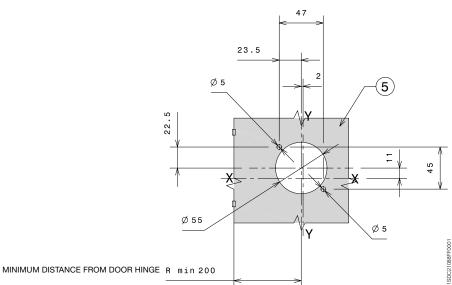
Rotary handle operating mechanism on the compartment door (RHE)



- 1 Transmission mechanism
- 2 Rotary handle operating mechanism for compartment door (RHE)
- (5) Compartment door shett steel drilling
- 4 Tightening torque 1.1Nm

Large rotary handle operating mechanism on the compartment door (RHE-LH)



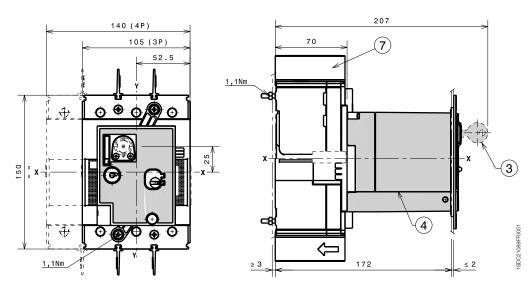


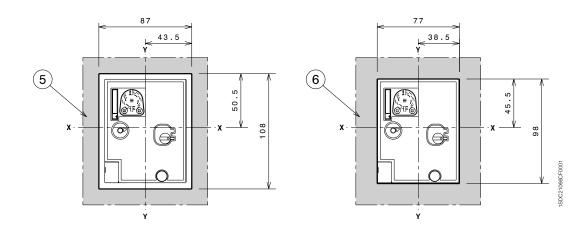
- 1 Transmission unit
- (2) 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker
- 3 Optional wiring ducts
- 4 Large transmitted rotary handle
- (5) Drilling template of door with large transmitted rotary handle

Tmax XT3 - Accessories for fixed circuit-breaker

Direct motor operator (MOD)

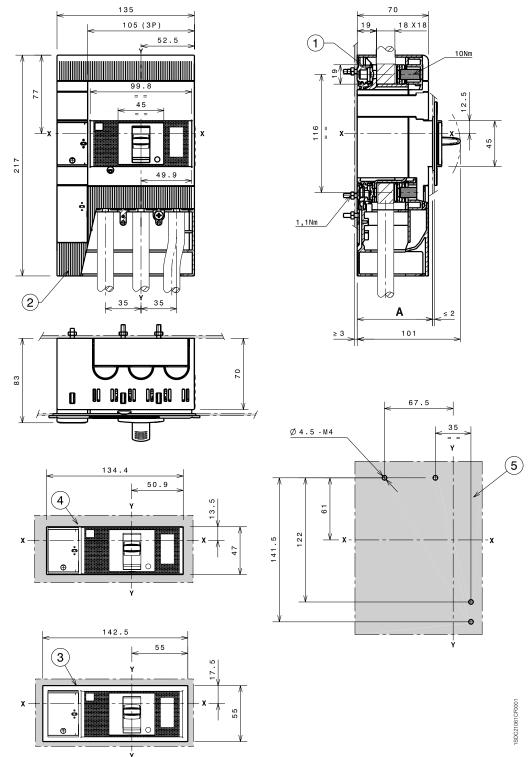
- (3) Key lock (on request)
- (4) Direct motor operator MOD
- (5) Drilling template of door with MOD with flange
- 6 Drilling template of door with MOD without flange
- 7) 25mm insulating barriers





RC Inst and RC Sel residual current release for 3 poles circuit-breaker

- 1 Front terminals for cables connection
- Terminal covers with degree of protection IP40
- 3 Drilling template of door with direct rotary handle with flange
- (4) Drilling template of door with direct rotary handle without flange
- 5 Drilling template for circuitbreaker fixing on sheet

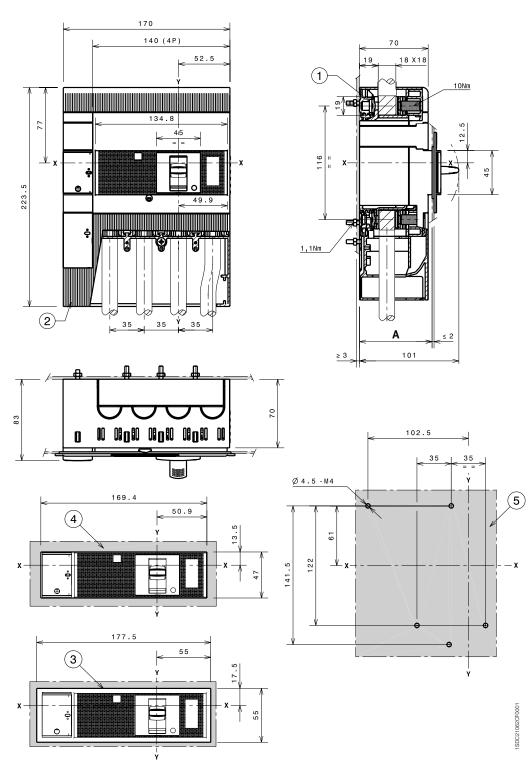


		Α
With standard flange	III	74
Without flange	III	71

Tmax XT3 - Accessories for fixed circuit-breaker

RC Inst and RC Sel residual current release for 4 poles circuit-breaker

- 1 Front terminals for cables connection
- 2 Terminal covers with degree of protection IP40
- 3 Drilling template of door with direct rotary handle with flange
- (4) Drilling template of door with direct rotary handle without flange
- 5 Drilling template for circuitbreaker fixing on sheet

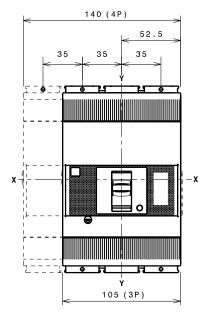


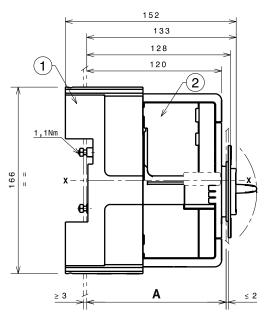
		Α
With standard flange	IV	74
Without flange	IV	71

Tmax XT3 - Installation for plug-in circuit-breaker

Fixing on support sheet

- 1 Fixed part
- (2) Moving part



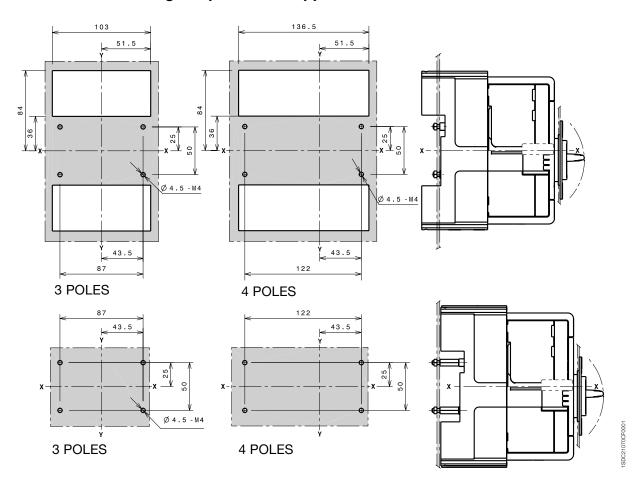


Fixing at 50mm		Α
With standard flange	III - IV	124
Without flange	III - IV	121
	III - IV	129

Fixing at 70mm for extended front terminals		Α
With standard flange	III - IV	144
Without flange	III - IV	141
	III - IV	149

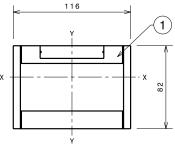
Tmax XT3 - Installation for plug-in circuit-breaker

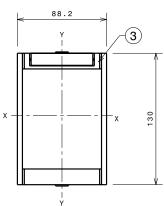
Drilling templates for support sheet

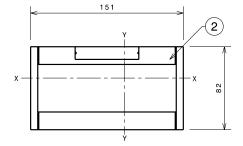


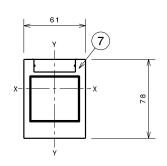
Flanges

- 1 Flange for plug-in circuit-breaker III
- 2 Flange for plug-in circuitbreaker IV
- (3) Flange for plug-in circuitbreaker with direct motor operator MOD
- (7) Optional flange



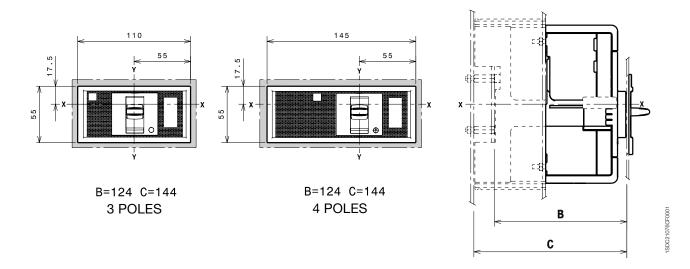




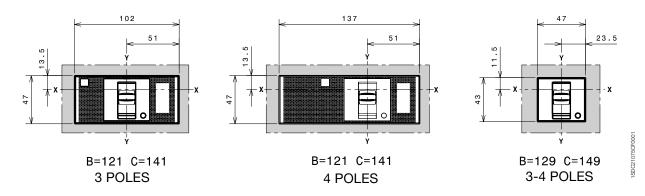


Drilling templates compartment door

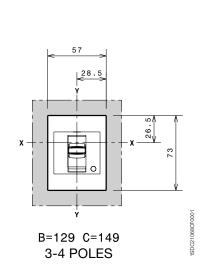
With standard flange

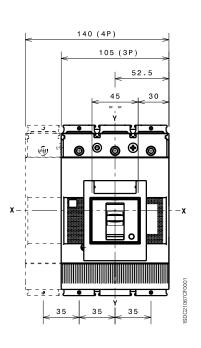


Without flange



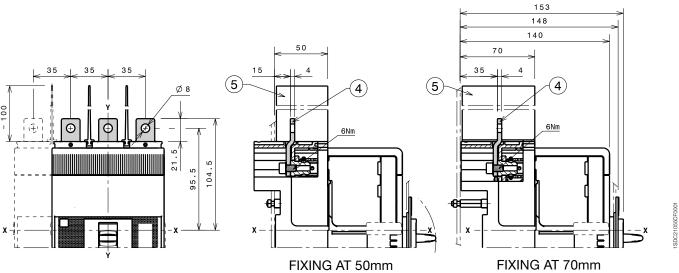
With optional flange





Tmax XT3 - Terminals for plug-in circuit-breaker

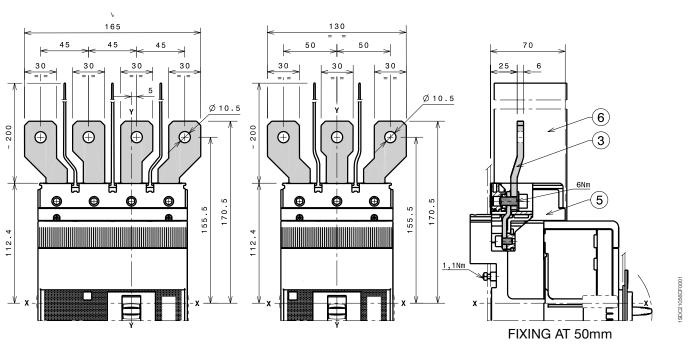
Terminals EF



Caption

- 4 Front extended terminals
- (5) 100mm insulating barriers between phases (compulsory) provided

Terminals ES



Caption

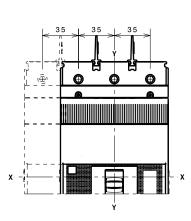
- (3) Front extended spread terminals for busbars connection
- (5) Adapter for fixed part (compulsory) not provided
- (6) 200mm insulating barriers between phases (compulsory) provided

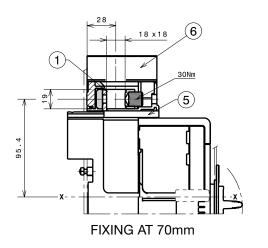
5/76

1x90...185mm² terminals FCCuAl

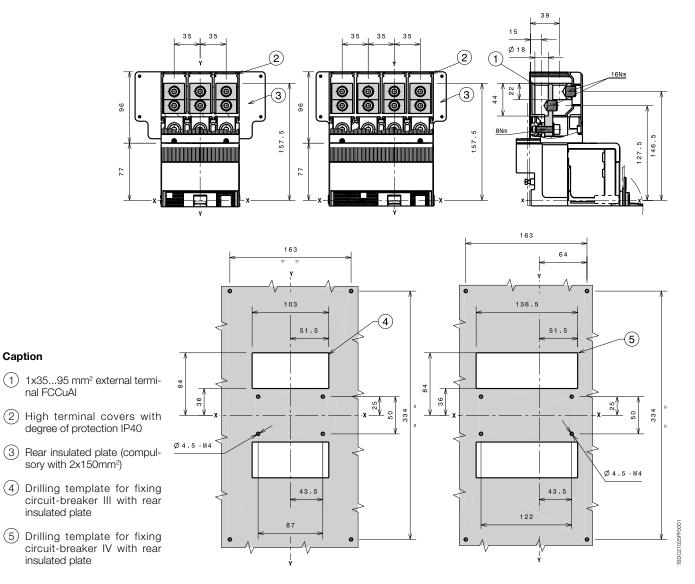
Caption

- 1 1x90...185mm² front terminal FCCuAl
- 5 Adapter for fixed part (compulsory) not provided
- 6 25mm insulating barriers between phases (compulsory) provided





2x35...150mm² terminals FCCuAl

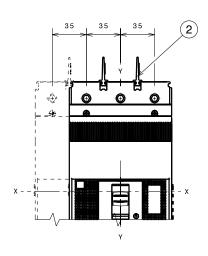


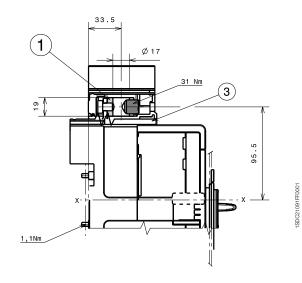
Tmax XT3 - Terminals for plug-in circuit-breaker

30...150mm² terminals FCCuAl

Caption

- 1) 30...150mm² terminals FCCuAl
- 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker
- 3 Adapter for fixed part (compulsory) not provided

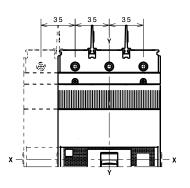


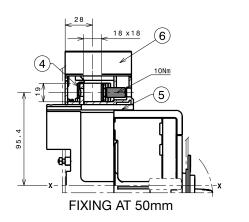


Terminals FCCu

Caption

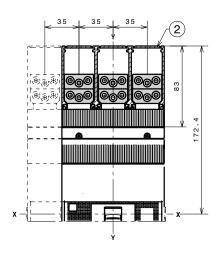
- (4) Front terminals FCCu
- (5) Adapter for fixed part (compulsory) not provided
- 6 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker

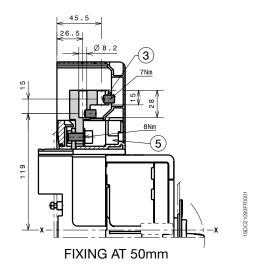




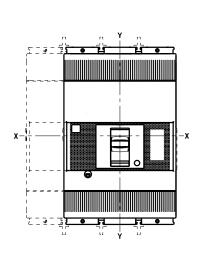
Terminals MC

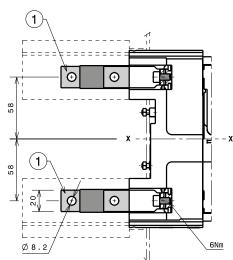
- (2) High terminal covers with degree of protection IP40 (compulsory with multicable)
- (3) Front terminal for multicable connection
- 5 Adapter for fixed part (compulsory) not provided

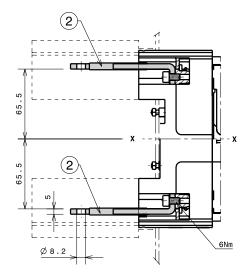




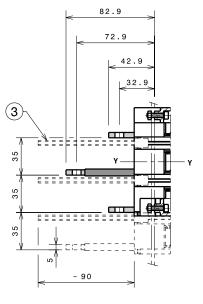
Terminals HR/VR



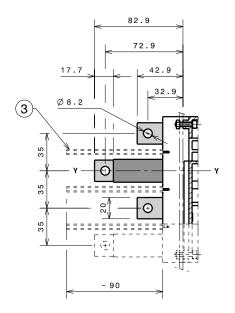




- (1) Rear vertical terminals
- (2) Rear horizontal terminals
- (3) 90mm insulating barriers between phases (compulsory) not provided



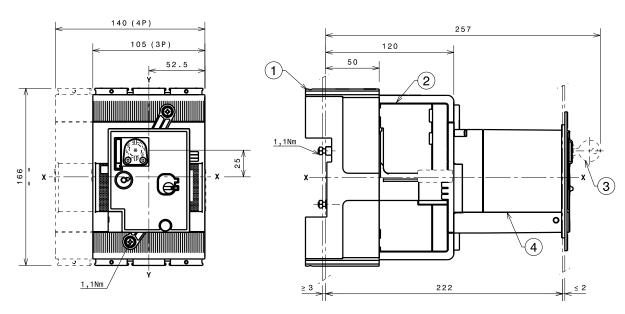
FIXING AT 50mm



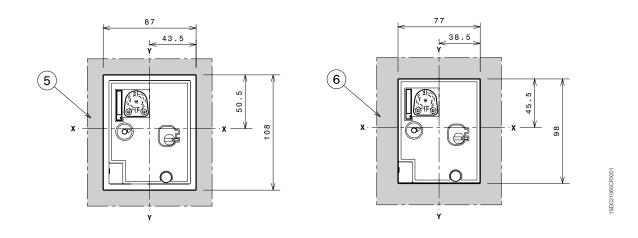
FIXING AT 50mm

Tmax XT3 - Accessories for plug-in circuit-breaker

Direct motor operator (MOD)



FIXING AT 50mm



- (1) Fixed part
- (2) Moving part
- (3) Key lock (on request)
- (4) Direct motor opetrator MOD
- (5) Drilling template of door with MOD with flange
- 6 Drilling template of door with MOD without flange

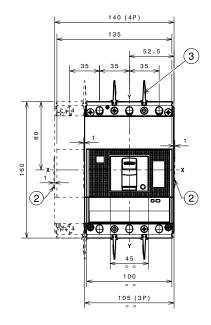
Tmax XT4 - Installation for fixed circuit-breaker

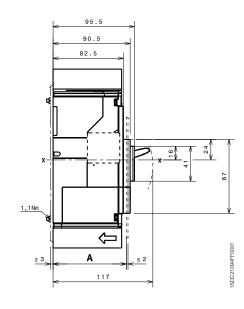
Fixing on sheet

Caption

- 2 Overall dimension of optional wiring ducts
- (3) 25mm insulating barriers between phases (compulsory) provided

		Α
With standard flange	III - IV	86
Without flange	III - IV	83.5
	III _ I\/	01.5

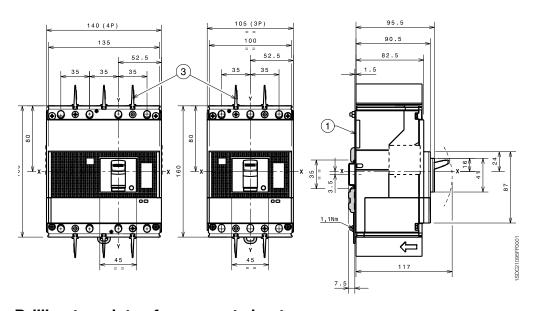




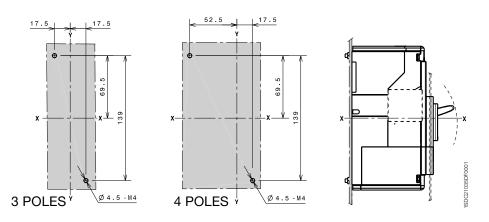
Fixing on DIN 50022 rail

Caption

- 1 Bracket for fixing
- ② 25mm insulating barriers between phases (compulsory) provided



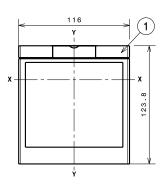
Drilling templates for support sheet

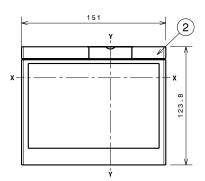


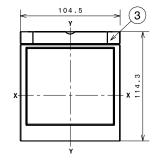
Tmax XT4 - Installation for fixed circuit-breaker

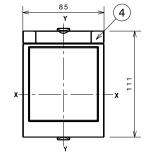
Flanges

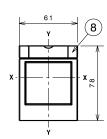
- 1) Flange for fixed circuit-breaker III
- 2 Flange for fixed circuit-breaker IV
- (3) Flange for fixed circuit-breaker III-IV with MOE and FLD
- 4 Flange for circuit-breaker III-IV with direct rotary handle RHD
- (7) Flange for fixed circuit-breaker IV with front extended terminals and residual current
- (8) Optional flange

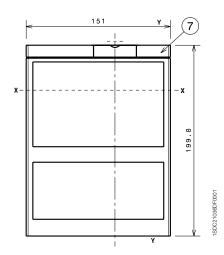






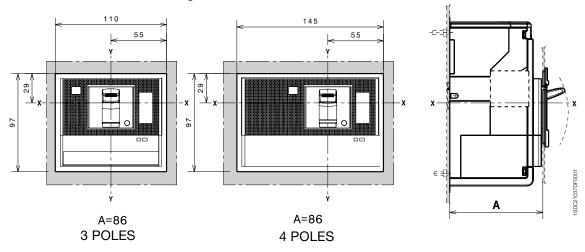




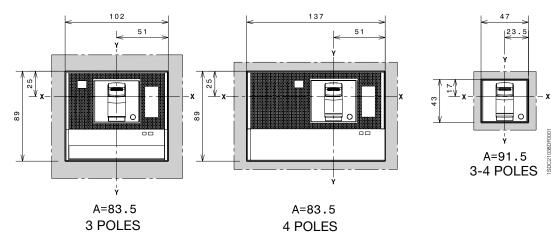


Drilling templates compartment door

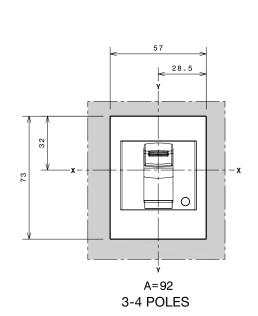
With standard flange

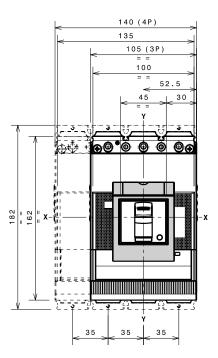


Without flange



With optional flange



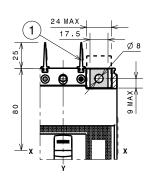


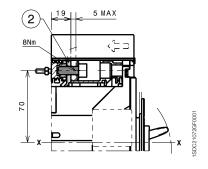
Tmax XT4 - Terminals for fixed circuit-breaker

Terminals F

Caption

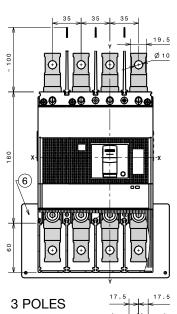
- 25mm insulating barriers between phases (compulsory) provided
- (2) Top terminal covers with degree of protection IP30 (optional) not provided

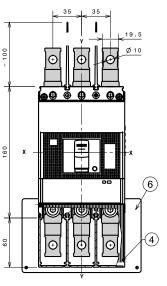


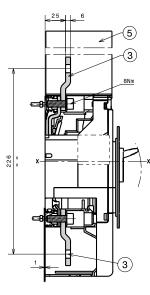


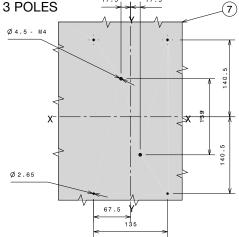
Terminals EF

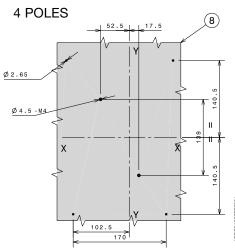
- (3) Front extended terminals
- (4) Terminal covers with degree of protection IP40 (optional) not provided
- (5) 100mm insulating barriers between phases (compulsory) provided
- 6 Insulated plate provided compulsory for Ue>440V
- 7 Drilling template for 3p circuitbreaker
- 8 Drilling template for 4p circuitbreaker







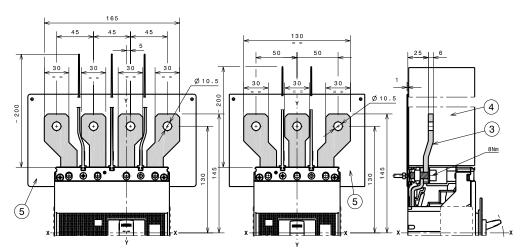


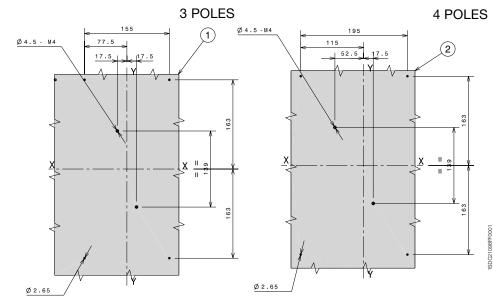


Terminals ES

Caption

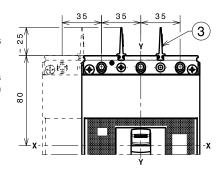
- 1 Drilling template for 3p circuitbreaker
- 2 Drilling template for 4p circuitbreaker
- 3 Front extended spread terminals
- (4) 200mm insulating barriers between phases (compulsory) provided
- (5) Insulated plate provided compulsory for Ue>440V

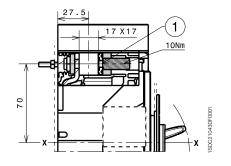




1x1...185mm² terminals FCCuAl

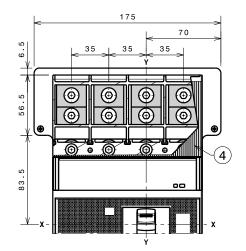
- 1 1x1...185mm² terminals FCCuAl
- 3 25mm insulating barriers between phases (compulsory) provided

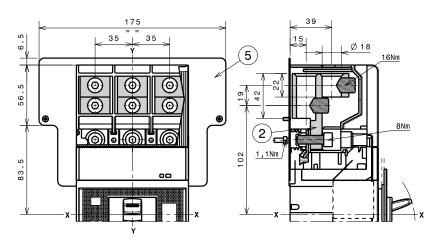


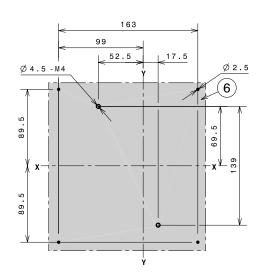


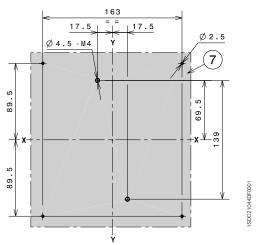
Tmax XT4 - Terminals for fixed circuit-breaker

2x35...150mm² terminals FCCuAl







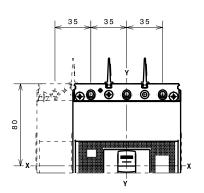


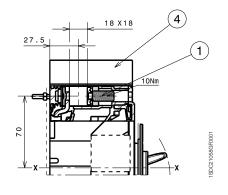
- 2) 2x35...150mm² terminals FCCuAl
- (4) Terminal covers with degree of protection IP40 (optional) provided
- (5) Provided rear insulated plate (mandatory for CuAl 2x150mm² cables)
- 6 Drilling template for circuitbreaker IV fixing with insulating courtes plate
- 7 Drilling template for circuitbreaker III fixing with insulating courtes plate

Terminals FCCu

Caption

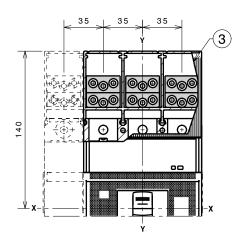
- 1) Terminals FCCu
- 4 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker

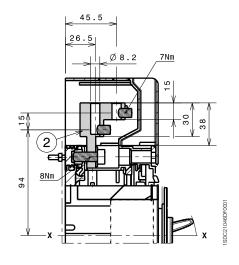




Terminals MC

- (2) Multicable terminals
- (3) Terminal covers with degree of protection IP40 (optional) provided



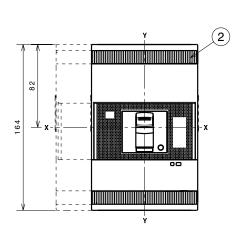


Tmax XT4 - Terminals for fixed circuit-breaker

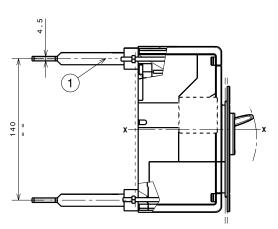
Terminals R

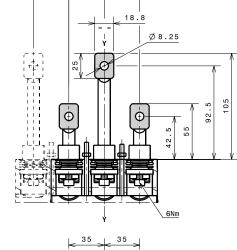
Caption

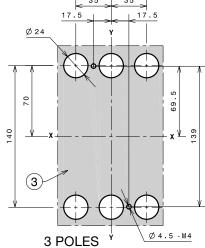
- 1 Adjustable rear terminals
- (2) Bottom terminal covers with degree of protection IP40 (optional) provided
- 3 Drilling template for circuitbreaker III fixing on sheet
- 4 Drilling template for circuitbreaker IV fixing on sheet

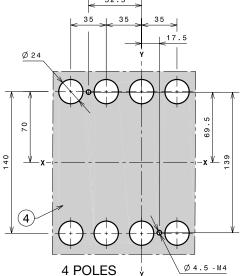


35





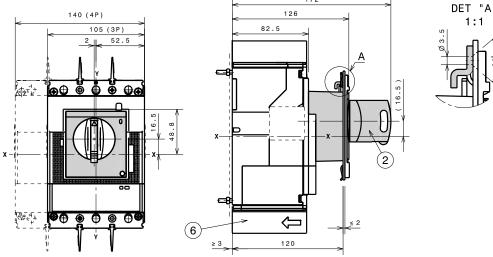


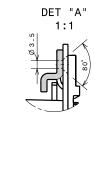


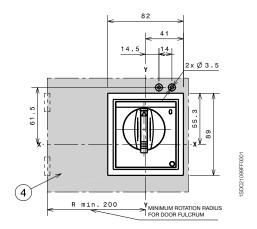
Tmax XT4 - Accessories for fixed circuit-breaker

Rotary handle operating mechanism on circuit-breaker (RHD)

- 2) Rotary handle operating mechanism on circuit-breaker
- 4) Drilling template of door with direct rotary handle
- 6 25mm insulating barriers between phases

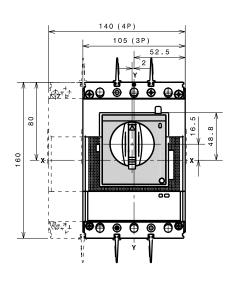


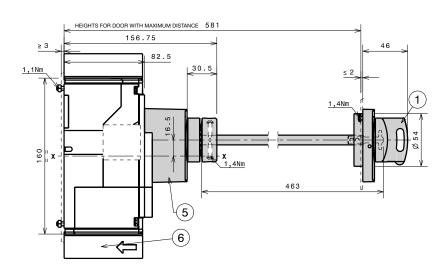


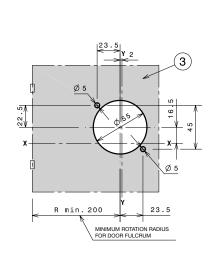


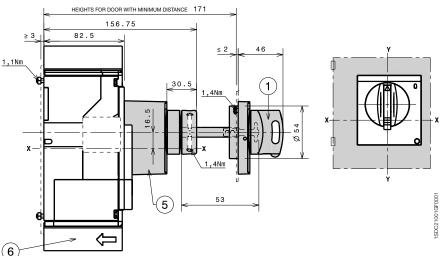
Tmax XT4 - Accessories for fixed circuit-breaker

Rotary handle operating mechanism of the compartment door (RHE)



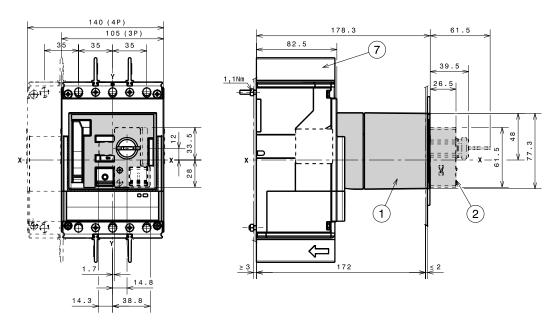


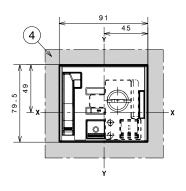


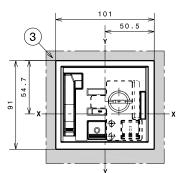


- Rotary handle operating mechanism of the compartment door
- 3 Drilling template for RHE
- (5) Transmission unit
- 6 25mm insulating barriers between phases

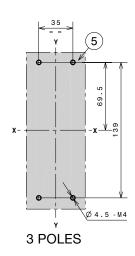
Stored energy motor operator (MOE)

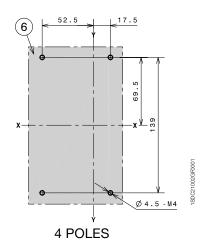






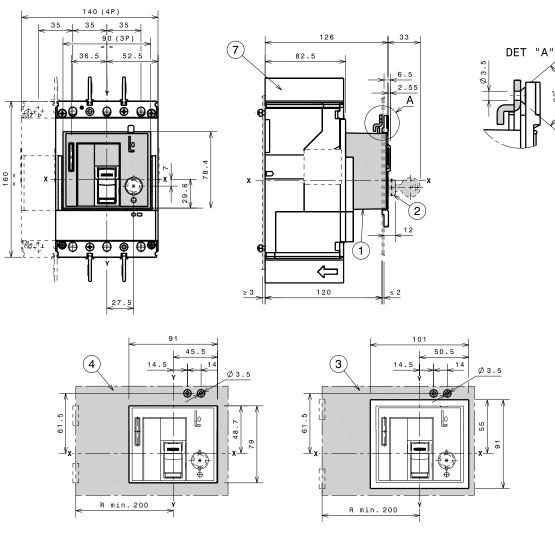
- ① Stored energy motor operator (MOE)
- (2) Key lock optional
- (3) Drilling template of door with direct rotary handle with flange (MOE)
- 4 Drilling template of door with direct rotary handle without flange (MOE)
- 5 Drilling template for circuitbreaker III fixing on sheet
- 6 Drilling template for circuitbreaker IV fixing on sheet
- 7 25mm insulating barriers between phases



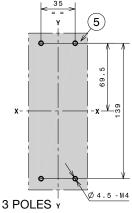


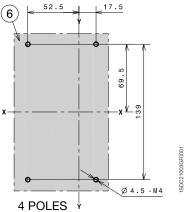
Tmax XT4 - Accessories for fixed circuit-breaker

Front for lever operating mechanism (FLD)



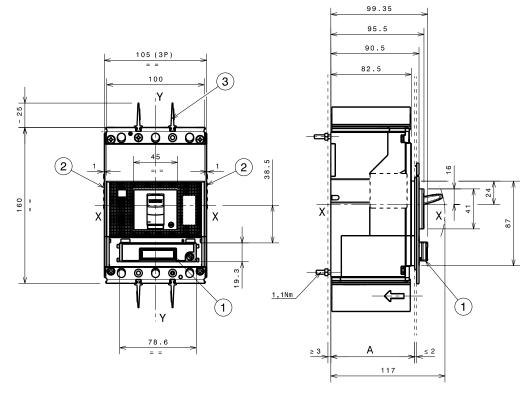
- 1) Front for lever operating mechanism (FLD)
- 2 Key lock optional
- 3 Drilling template of door with direct rotary handle with flange (FLD)
- 4 Drilling template of door with direct rotary handle without flange (FLD)
- (5) Drilling template for circuitbreaker III fixing on sheet
- 6 Drilling template for circuitbreaker IV fixing on sheet
- 7 25mm insulating barriers between phases

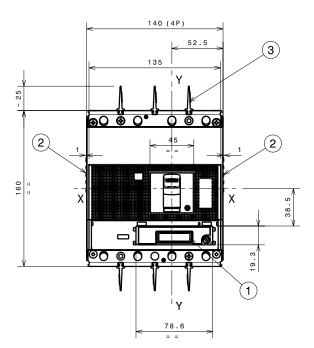




Ekip Display or LED Meter

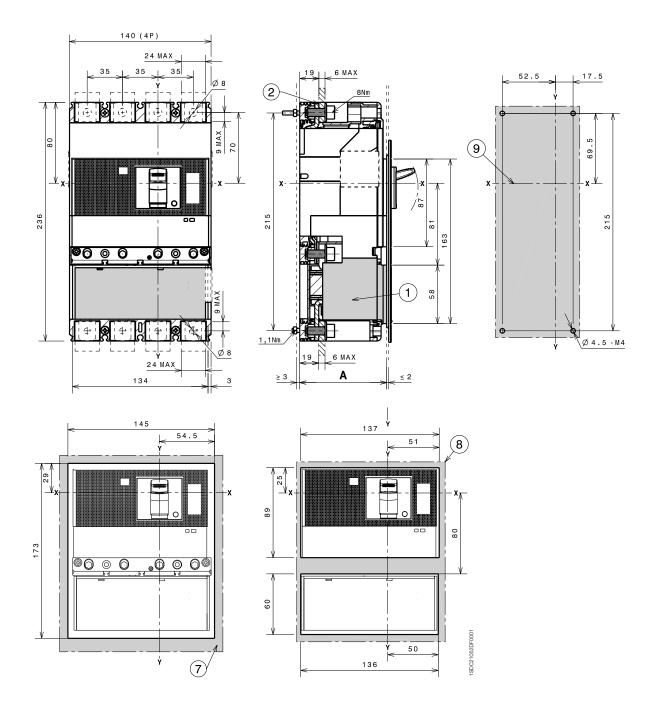
- 1 Ekip Display or LED Meter
- (2) Optional wiring ducts
- 3 25mm insulating barriers between phases





Tmax XT4 - Accessories for fixed circuit-breaker

Residual current RC Sel



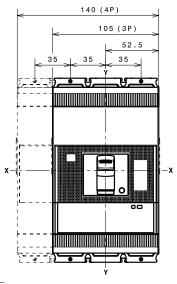
- 1) Residual current
- (2) Front terminals
- 7 Drilling template of door with direct rotary handle and fixing with flange
- (8) Drilling template of door with direct rotary handle and fixing without flange
- 9 Drilling template for circuitbreaker fixing on sheet

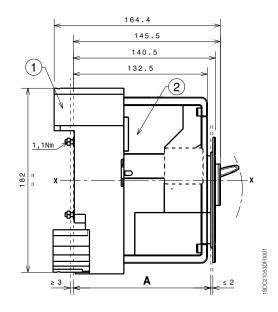
		Α
With standard flange	IV	86
Without flange	IV	83.5

Tmax XT4 - Installation for plug-in circuit-breaker

Fixing on sheet

- 1 Fixed part
- (2) Moving part



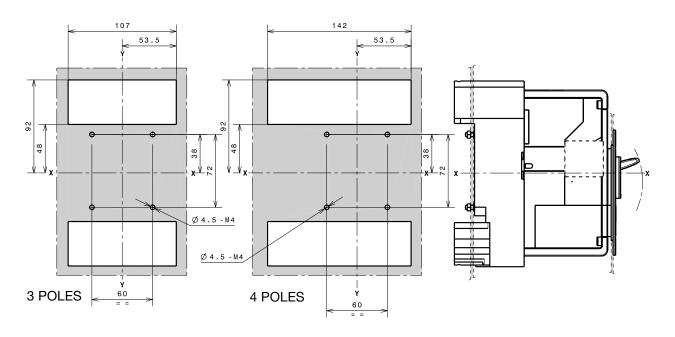


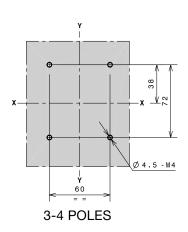
Fixing at 50mm		Α
With standard flange	III - IV	136
Mithaut flanca	III - IV	133.5
Without flange	III - IV	141.5

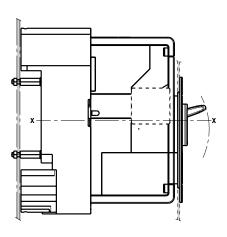
Fixing at 70mm for extended termin	Α	
With standard flange	III - IV	156
Mithaut flanca	III - IV	153.5
Without flange	III - IV	161.5

Tmax XT4 - Installation for plug-in circuit-breaker

Drilling templates for support sheet

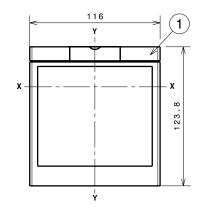


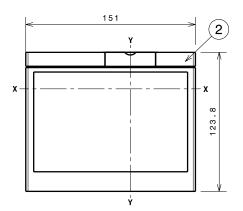


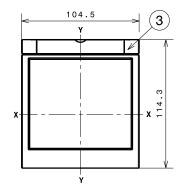


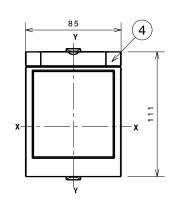
Flanges

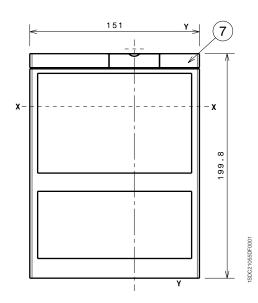
- 1 Flange for plug-in circuit-breaker III
- 2 Flange for plug-in circuitbreaker IV
- (3) Flange for plug-in circuit-breaker III-IV with MOE and FLD
- 4 Flange for circuit-breaker III-IV with direct rotary handle
- (7) Flange for plug-in circuitbreaker IV with front extended terminals and residual current
- 8 Optional flange

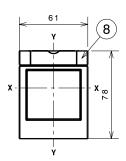








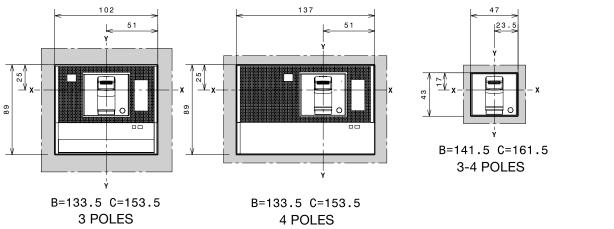




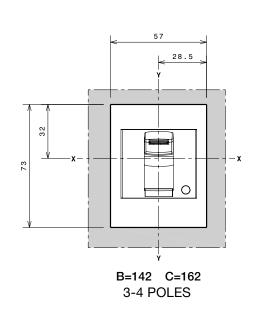
Tmax XT4 - Installation for plug-in circuit-breaker

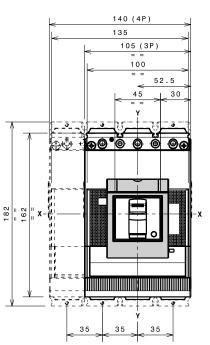
Drilling templates compartment door

Without flange



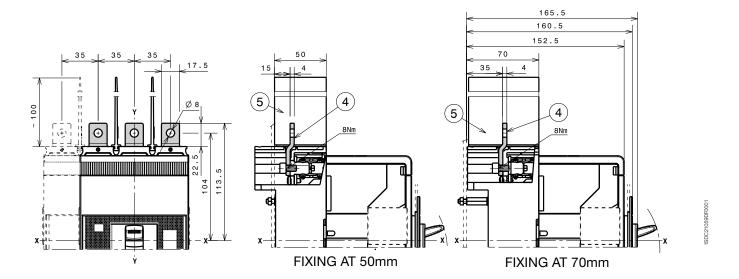
With optional flange





Tmax XT4 - Terminals for plug-in circuit-breaker

Terminals EF



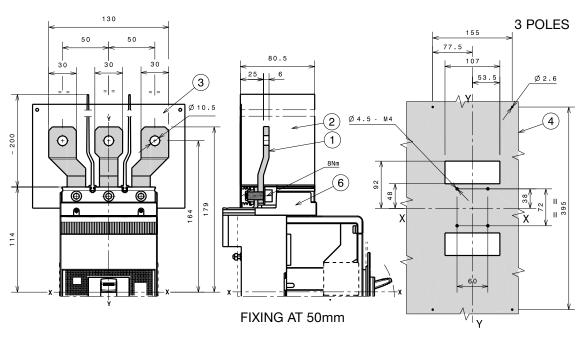
Caption

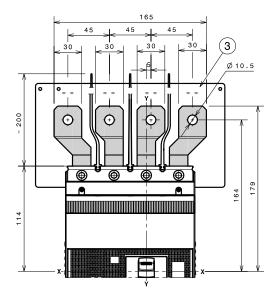
- 4) Front extended terminals
- (5) 100mm insulating barriers between phases (compulsory) provided

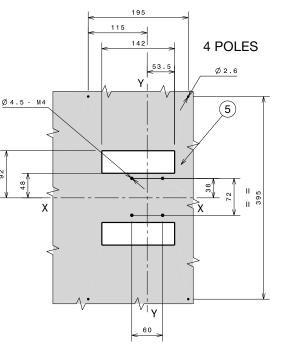
Note: insulated plate to be provided by customer

Tmax XT4 - Terminals for plug-in circuit-breaker

Terminals ES







Caption

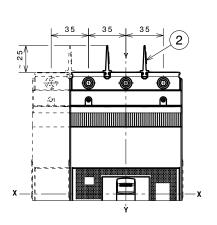
- 1 Front extended spread terminals
- 2 200mm insulating barriers between phases (compulsory) provided
- (3) Insulated plate (compulsory) provided
- 4 Drilling template for 3p circuitbreaker
- 5 Drilling template for 4p circuitbreak
- 6 Adaptor (compulsory) not provided

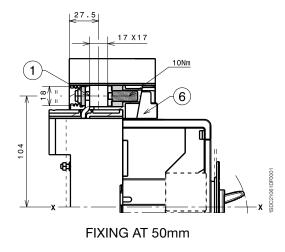
5/100

1x1...185mm² terminals FCCuAl

Caption

- 1 1x1...185mm² front terminals FCCuAl
- 2 25mm insulating barriers between phases (compulsory) provided
- 6 Adaptor (compulsory) not provided

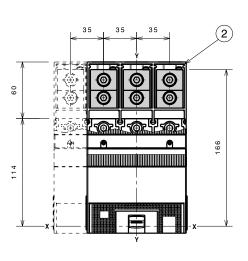


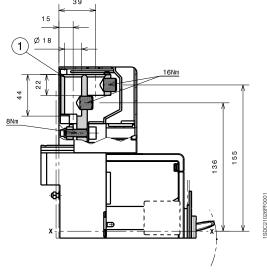


2x35...150mm² terminals FCCuAl

Caption

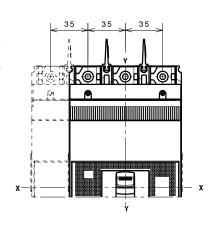
- 1) 2x150mm² external terminal FCCuAl
- (2) High terminal covers with degree of protection IP40 (optional) provided

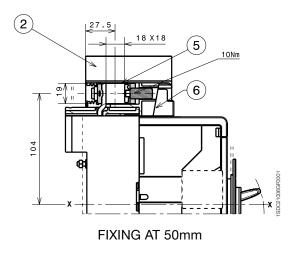




Terminals FCCu

- 2 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker
- (5) Terminals FCCu
- 6 Adaptor (compulsory) not provided



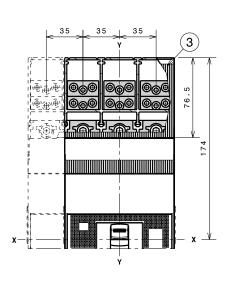


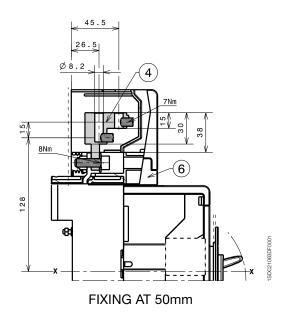
Tmax XT4 - Terminals for plug-in circuit-breaker

Terminals MC

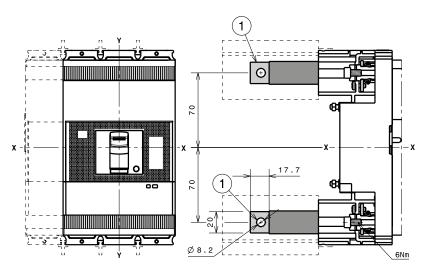
Caption

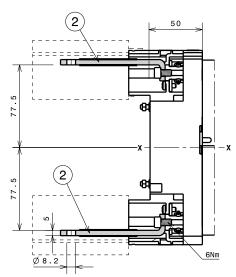
- ③ Provided high terminal covers with degree of protection IP40 (mandatory for multicables terminals)
- (4) Multicable terminals
- 6 Adaptor (compulsory) not provided





Terminals HR/VR

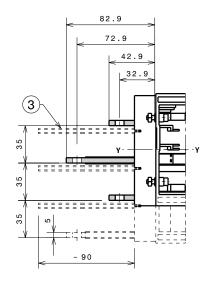


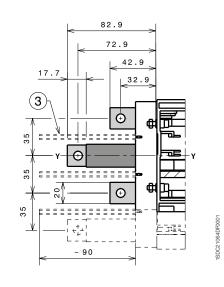


FIXING AT 50mm

FIXING AT 50mm

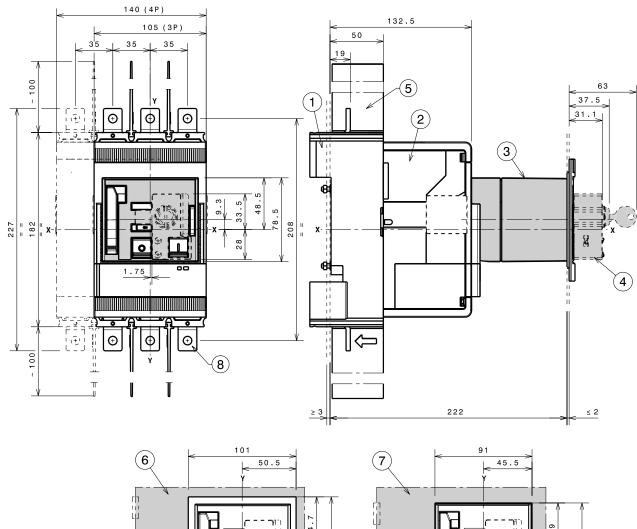
- 1) Rear vertical terminals
- (2) Rear horizontal terminals
- 3 90mm insulating barriers between phases (compulsory) not provided





Tmax XT4 - Accessories for plug-in circuit-breaker

Stored energy motor operator (MOE)



Caption

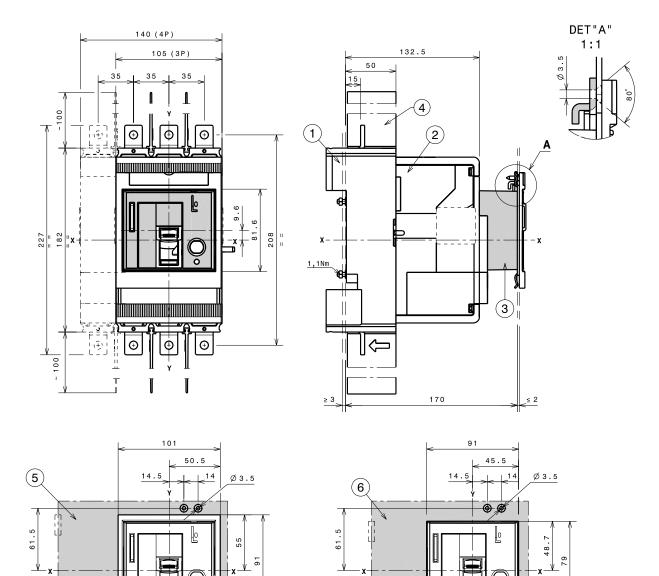
- 1) Fixed part
- (2) Moving part
- 3 Stored energy motor operator (MOE)

R min. 200

- 4 Key lock optional
- (5) 100mm insulating barriers between phases (compulsory) provided
- 6 Drilling template of door with direct rotary handle with flange
- 7 Drilling template of door with direct rotary handle without flange
- (8) Extended terminals

Tmax XT4 - Accessories for plug-in circuit-breaker

Front for lever operating mechanism (FLD)



R min 200

Caption

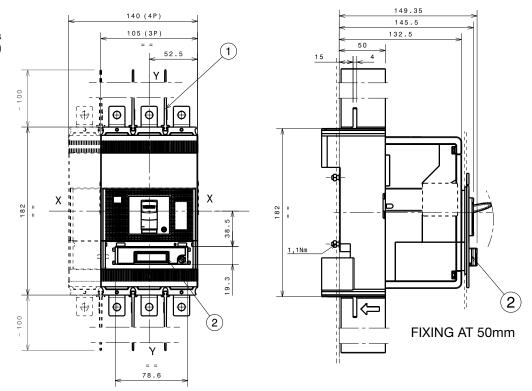
- 1 Fixed part
- 2 Moving part
- (3) Front for lever operating mechanism (FLD)

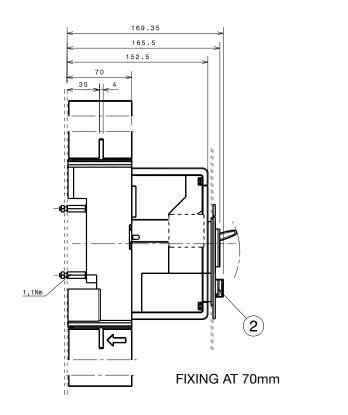
R min 200

- (4) 100mm insulating barriers between phases (compulsory) provided
- 5 Drilling template of door with direct rotary handle with flange
- 6 Drilling template of door with direct rotary handle without flange

Ekip Display or LED Meter

- 100mm insulating barriers between phases (compulsory) provided
- 2 Ekip Display or LED Meter





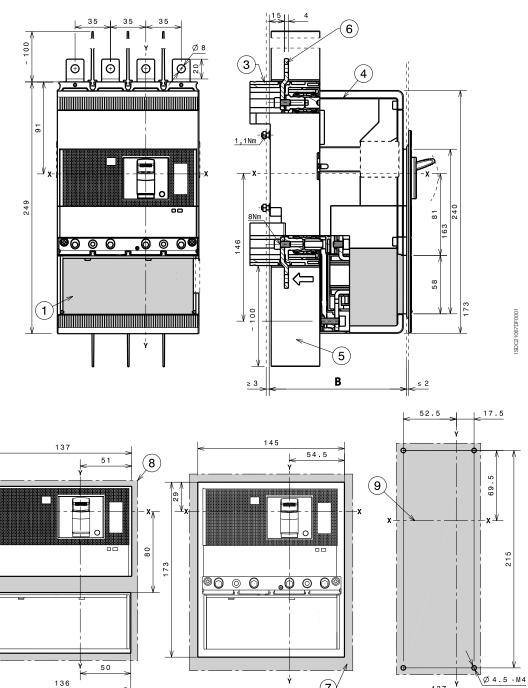
Tmax XT4 - Accessories for plug-in circuit-breaker

Residual current RC Sel

Caption

- 1 Residual current
- (3) Fixed part
- (4) Moving part
- (5) 100mm insulating barriers between phases (compulsory) provided
- (6) Extended terminals
- 7 Drilling template of door with direct rotary handle and fixing with flange
- 8 Drilling template of door with direct rotary handle and fixing without flange
- 9 Drilling template for circuitbreaker fixing on sheet

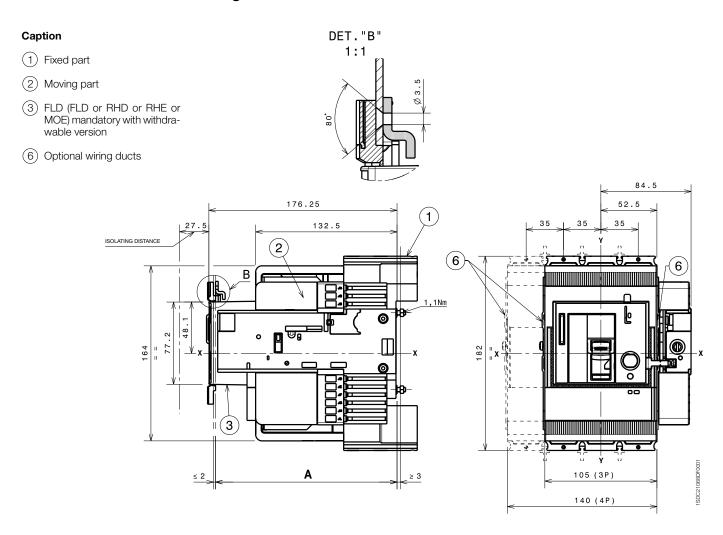
89



		В
With standard flange	IV	136
Without flange	IV	133.5

Tmax XT4 - Installation for withdrawable circuit-breaker

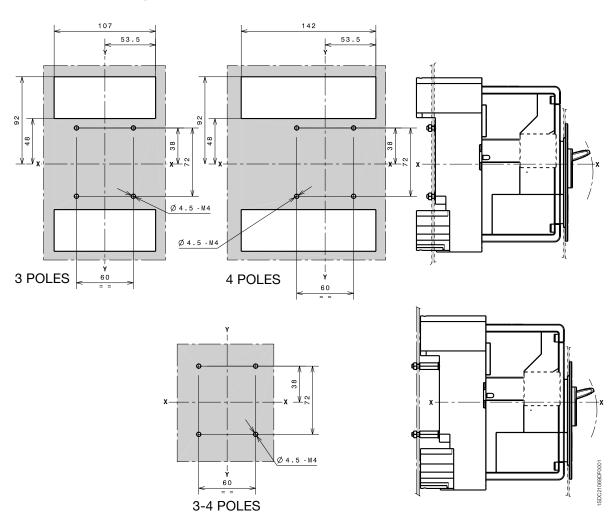
Fixing on sheet



			Α
	III - IV	Fixing at 50mm	170
With standard flange	III - IV	Fixing at 70mm for front extended terminals	190

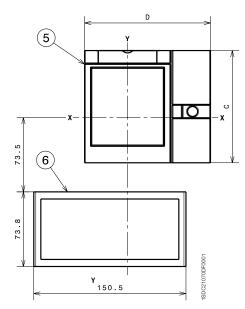
Tmax XT4 - Installation for withdrawable circuit-breaker

Drilling templates for support sheet



Flanges

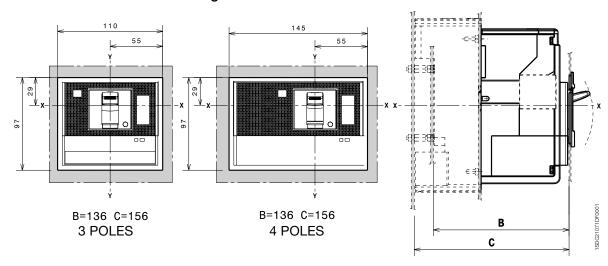
- (5) Flange for circuit-breaker III-IV estraibile
- 6 Flange for circuit-breaker residual current IV withdeawable with front extended terminals



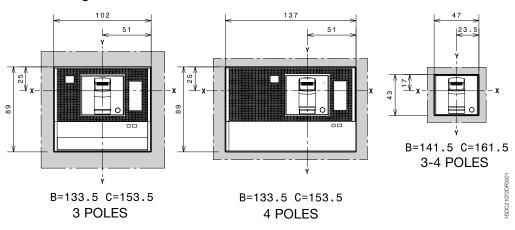
	С	D
RHD	111	124.5
FLD - MOE	114.3	134.5

Drilling templates compartment door

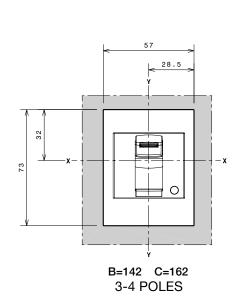
With standard flange

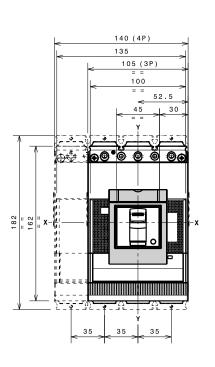


Without flange



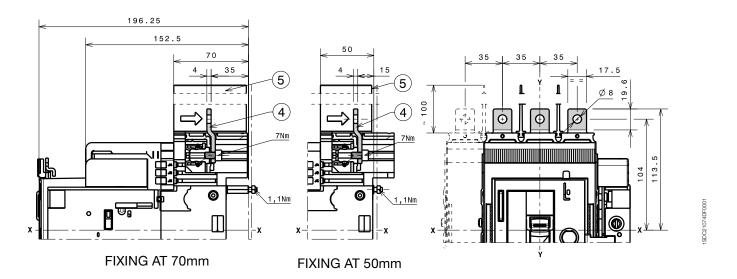
With optional flange





Tmax XT4 - Terminals for withdrawable circuit-breaker

Terminals EF

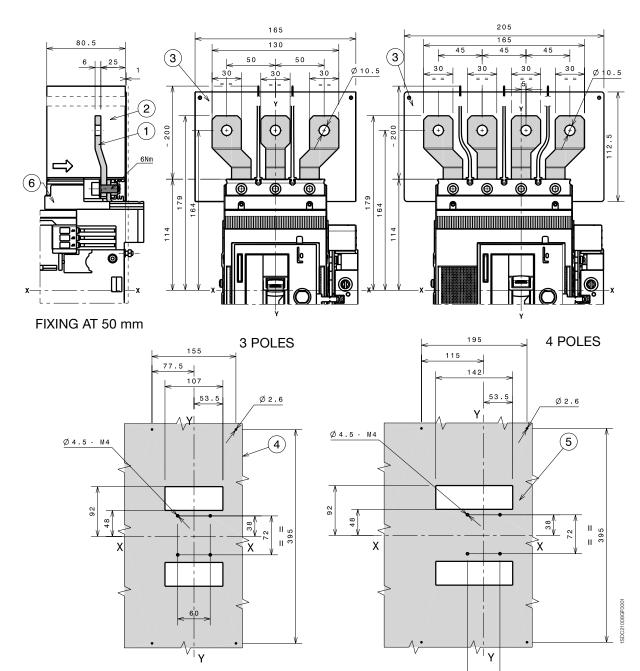


Caption

- 4 Front extended terminals
- (5) 100mm insulating barriers between phases (compulsory) provided

Note: insulated plate (compulsory) provided

Terminals ES



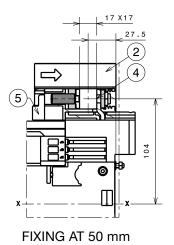
- 1) Front extended spread terminals
- 2 200mm insulating barriers between phases (compulsory) provided
- (3) Insulated plate provided compulsory for Ue>440V
- 4 Drilling template for 3p circuitbreaker
- (5) Drilling template for 4p circuitbreaker
- 6 Adaptor (compulsory) not provided

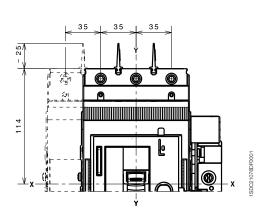
Tmax XT4 - Terminals for withdrawable circuit-breaker

1x1...185mm² terminals FCCuAl

Caption

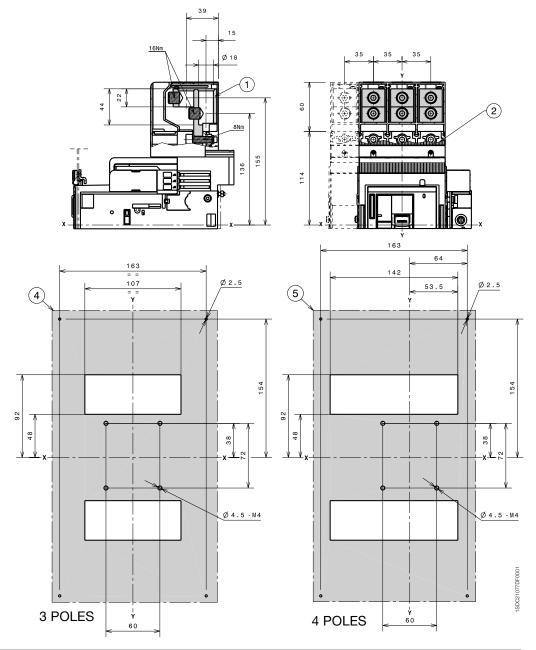
- (2) 25mm insulating barriers between phases (compulsory) provided
- (4) Front terminals FCCuAl
- 5 Adaptor (compulsory) not provided





2x35...150mm² terminals FCCuAl

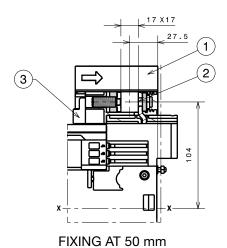
- 1 2x35...150mm² terminals FCCuAl
- Terminal covers with degree of protection IP40 (optional) provided
- (3) Provided rear insulated plate (mandatory for CuAl 2x150mm² cables)
- (4) Drilling template for circuitbreaker III fixing with insulating courtes plate
- (5) Drilling template for circuitbreaker IV fixing with insulating courtes plate

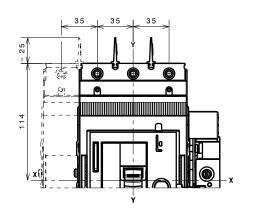


Terminals FCCu

Caption

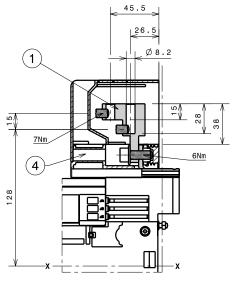
- 1) 25mm insulating barriers between phases (compulsory) provided as standard with the circuit-breaker
- (2) Terminals FCCu
- Adaptor (compulsory) not provided



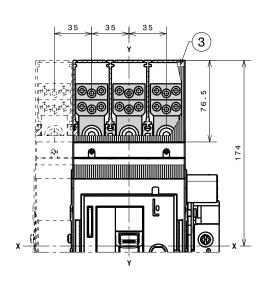


Terminals MC

- 1 Multicable terminals
- (3) High terminal covers with degree of protection IP40 (optional) provided
- 4 Adaptor (compulsory) not provided

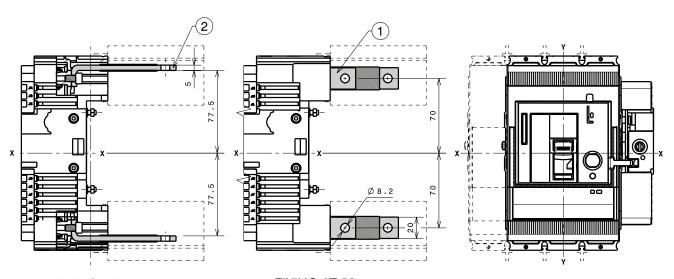






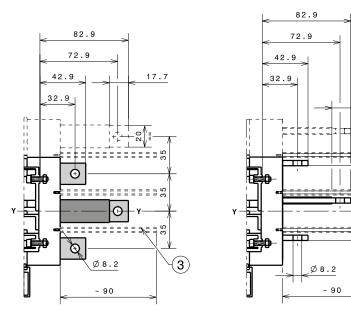
Tmax XT4 - Terminals for withdrawable circuit-breaker

Terminals HR/VR



FIXING AT 50 mm

FIXING AT 50 mm



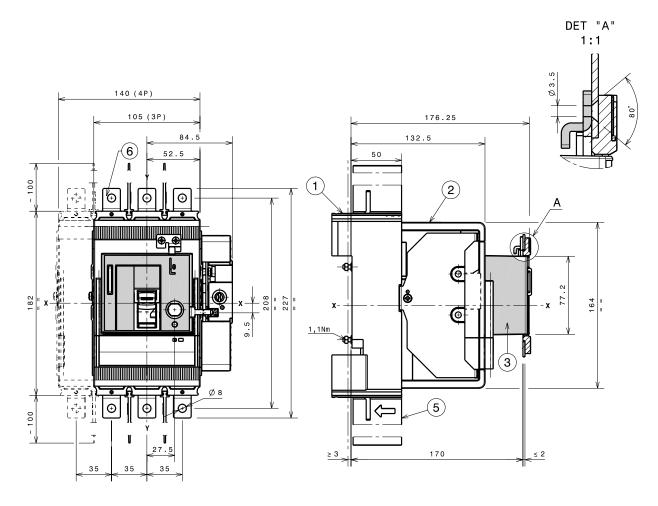
SDC21080DF0001

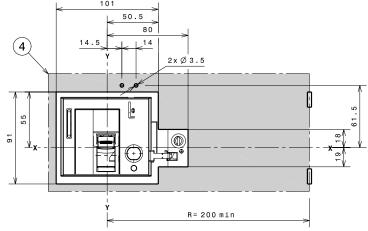
3

- (1) Rear vertical terminals
- 2 Rear horizontal terminals
- 3 90mm insulating barriers between phases (compulsory) not provided

Tmax XT4 - Accessories for withdrawable circuit-breaker

Front for lever operating mechanism (FLD)

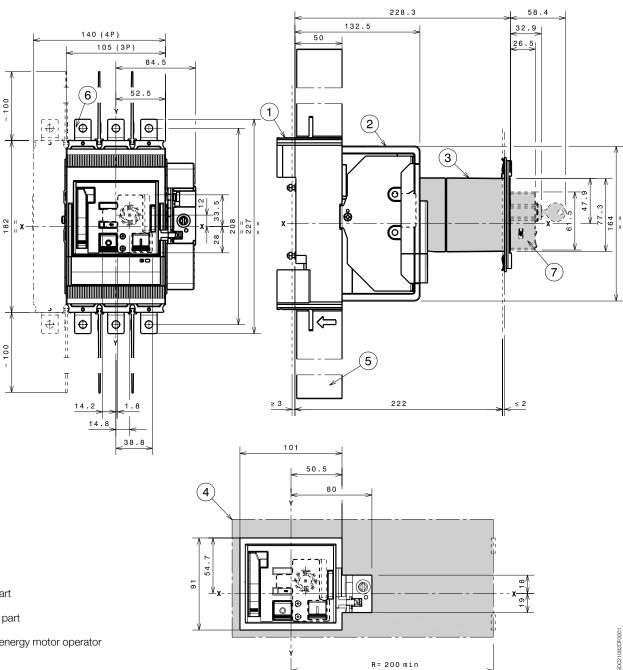




- (1) Fixed part
- (2) Moving part
- (3) Front for lever operating mechanism FLD
- 4 Drilling template of door with direct rotary handle and fixed flange
- (5) 100mm insulating barriers between phases (compulsory) provided
- (6) Extended terminals

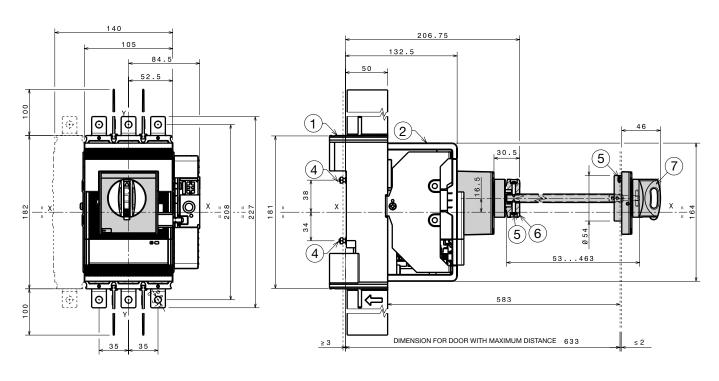
Tmax XT4 - Accessories for withdrawable circuit-breaker

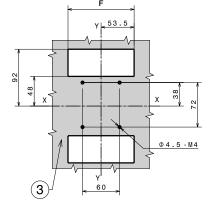
Stored energy motor operator (MOE)

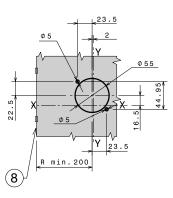


- 1) Fixed part
- (2) Moving part
- 3 Stored energy motor operator (MOE)
- 4 Drilling template of door with MOE and fixing flange
- (5) 100mm insulating barriers between phases (compulsory) provided
- (6) Extended terminals
- (7) Key lock optional

Rotary handle operating mechanism on the compartment door (RHE)





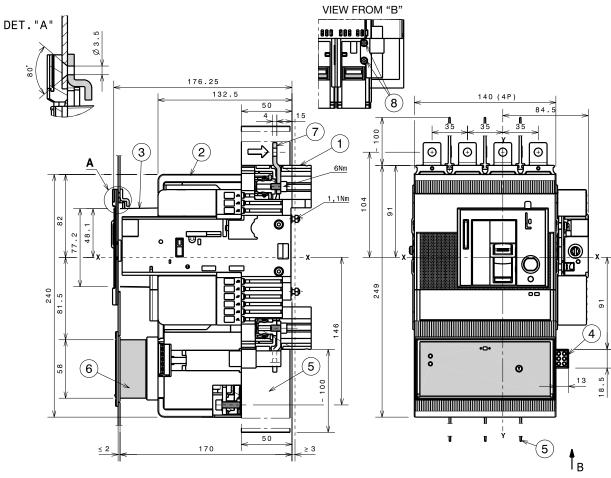


	F
Fixing 3 poles	107
Fixing 4 poles	142

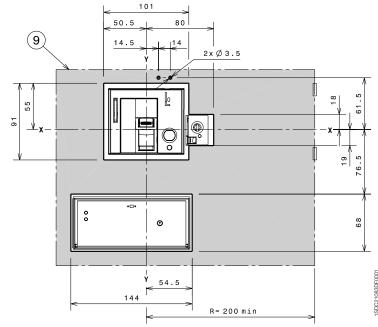
- 1 Fixed part
- (2) Moving part
- 3 Shape for compartment door sheet steel drilling for fixed part
- (4) Tightening torque 1.1 Nm
- (5) Tightening torque 1.4 Nm
- 6 Transmission mechanism
- 7 Rotary handle operating mechanism for compartment door
- 8 Compartment door sheet steel drilling

Tmax XT4 - Accessories for withdrawable circuit-breaker

Residual current RC Sel 4 poles



- 1) Fixed part
- (2) Moving part
- 3 Front for lever operating mechanism
- (4) Connector residual current (optional)
- (5) 100mm insulating barriers between phases (compulsory) provided
- (6) Residual current
- (7) Extended terminals
- 8 Fixing screws for fixed part of connector
- Drilling template of door with direct rotary handle and fixed flange

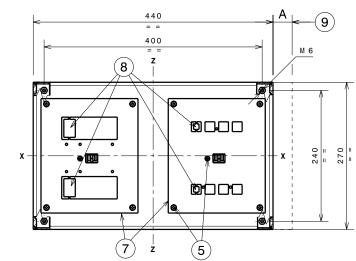


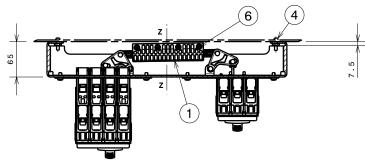
Overall dimensions

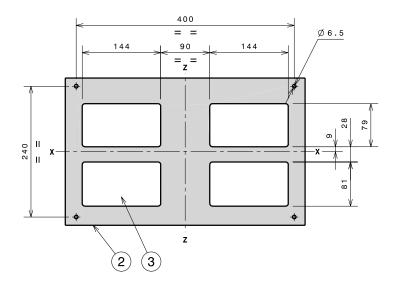
Tmax XT - Common accessories

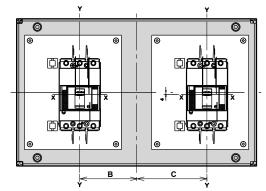
Horizontal interlock XT serie

- 1) Interlocking mechanism
- 2 Drilling template for fixing interlocking system
- 3 Drilling template for all version with rear terminals
- (4) Tightening torque 3.7Nm
- 5 Tightening torque 3Nm
- (6) Tightening torque 2.5Nm
- 7 Couplink plate for circuitbreakers
- 8 Breaking for 4p version
- A = 35mm XT4 withdrawable with key lock for fixed part A = 25mm XT2 withdrawable with key lock for fixed part









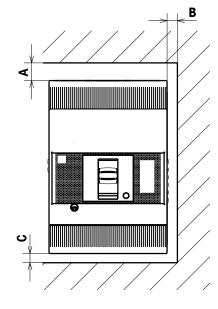
	В	С
XT1	104,25	129,25
XT2	101,75	131,75
XT3	99,75	133,75
XT4	99,25	134,25

Overall dimensions

Distances to be respected

Insulation distances for installation in metallic cubicle

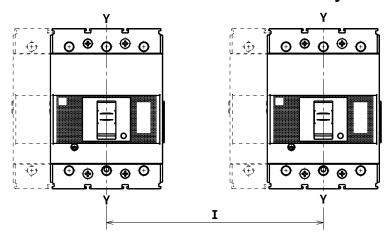
Ue≤440V AC Ue≤250V DC	A (mm)	B (mm)	C (mm)
XT1	25	20	20
XT2	30	10	25
XT3	50	20	20
XT4	30	20	25
Ue>440V AC	A (mm)	B (mm)	C (mm)
XT1	25	20	20
XT2	50	20	45
XT3	50	20	20
XT4	50	20	45
250 <ue≤500v dc<="" th=""><th>A (mm)</th><th>B (mm)</th><th>C (mm)</th></ue≤500v>	A (mm)	B (mm)	C (mm)
XT1	25	20	20
XT2	50	50	45
XT3	50	20	20
XT4	50	50	45



Minimum center distance between two circuit-breaker side-by-side

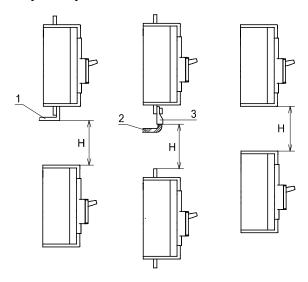
	Circuit-breaker width (mm)		Centre distance (mm)	
	3 poles	4 poles	3 poles	4 poles
XT1	76	102	76(*)	102(*)
XT2	90	120	90(*)	120 ^(*)
хтз	105	140	105	140
XT4	105	140	105 ^(*)	140(*)

^(*) with phases separator between two circuit-breakers



Minimum centre distance for superimposed circuit-breakers

	Н
	(mm)
XT1	80
XT2	100
XT3	140
XT4	150



- 1) Connection not insulated
- (2) Insulated cable
- (3) Cable terminal



Wiring Diagrams

Index

Information on how to read the diagrams	6/2
Graphic symbols (IEC 60617 and CEI 3-143-26 Standards)	6 /3
Wiring Diagrams of the circuit-breakers	6/4
Wiring Diagrams of the accessories	6 /8
Resetting instructions	6 /22

Wiring Diagrams

Information on how to read the diagrams

State of operation shown

The diagrams are shown in the following conditions:

- fixed version circuit-breaker, open;
- withdrawable or plug-in version circuit-breaker, open and connected;
- contactor for starting the motor open;
- circuits de-energised;
- trip units not tripped;
- motor operator with springs charged.

The diagram shows a circuit-breaker or a switch-disconnector in the withdrawable or plug-in version, but is also valid for fixed version circuit-breakers or switch-disconnectors.

For the fixed version circuit-breakers, the auxiliary circuits are headed at terminal box XV: connectors J.. and XB.., XC.., XD.. and XE.. are not supplied.

For the plug-in version circuit-breakers, the auxiliary circuits are headed at connectors XB.., XC.., XD.. and XE..: connectors J.. are not supplied.

For the withdrawable version circuit-breakers, the auxiliary circuits are headed at connectors J..: connectors XB.., XC.., XD.. and XE.. are not supplied.

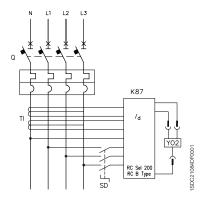
Wiring Diagrams

Graphic symbols (IEC 60617 and CEI 3-14 ...3-26 Standards)

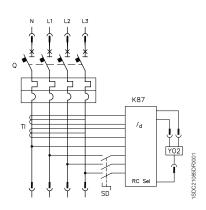
	Thermal effect		Conductors with corded cables (example two conductors)	7	Opening contact	/>>	Overcurrent release with short adjustable time delay characteristic
	Electromagnetic effect	•	Connection of conductors		Changeover contact with momentary break	/>>	Overcurrent release with short inverse adjustable time delay characteristic
<u> </u>	Timing	•	Terminal or clamp		Closing position contact (limit switch)	/>-	Overcurrent release with long inverse adjustable time delay characteristic
	Mechanical connection	_(=	Socket and plug (female and male)	7	Opening position contact (limit switch)	/» -	Overcurrent release for earth fault with short inverse time characteristic
ļ	Manual mechanical operating mechanism (general case)		Resistor (general symbol)		Changeover contact with momentary break (limit switch)	/>)	Current relay for unbalance between phases
	Rotary handle operating mechanism	9	Resistor dependent on the temperature		Contactor (closing contact)	/ _d	Residual current release
E	Pushbutton operating mechanism	M	Motor (general symbol)	*	Power cut-off of switch- disconnector power with automatic opening	m<3	Relay for detecting lack of phase in a three-phase system
8	Key operating mechanism	M 3 ~	Three-phase asynchro- nous motor, with short- circuited rotor (cage)	\0	Switch-disconnector	n≈0 />	Relay for detecting blocked rotor by means of current measurement
Ğ	Cam operating mechanism		Current transformer		Control coil (general symbol)	\otimes	Lamp, general symbol
	Ground (general symbol)		Current transformer with primary consisting of 4 passing conductors and with wound secondary, with socket	4	Thermal trip unit		Motor with excitation in series
	Converter separated galvanically		Closing contact	/>>>	Instantaneous overcurrent release	> -	Brush
<==;	Conductors in shielded cable (example two conductors)	V	Voltmeter	A	Ammeter	W	Wattmeter
Wh	Watt-hour meter						

Wiring Diagrams of the circuit-breakers

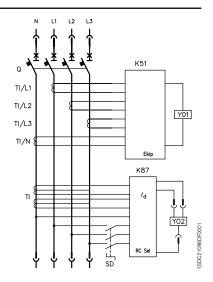
State of operation



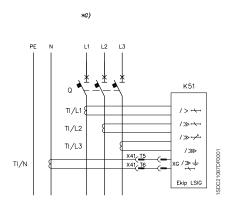
Four-pole circuit-breaker with thermomagnetic trip unit and RC Sel 200 or RC B type residual current release



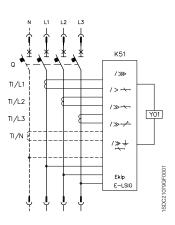
Four-pole circuit-breaker with thermomagnetic trip unit and RC Sel residual current release



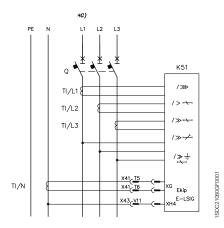
Four-pole circuit-breaker with electronic trip unit and RC Sel residual current release



Three-pole fixed version circuit-breaker with current transformer on the neutral conductor outside the circuit-breaker



Three-pole or four-pole XT4 circuit-breaker with Ekip E-LSIG microprocessor based release



Fixed version three-pole XT4 circuit-breaker with Ekip E-LSIG with current transformer on neutral conductor, external to circuit-breaker

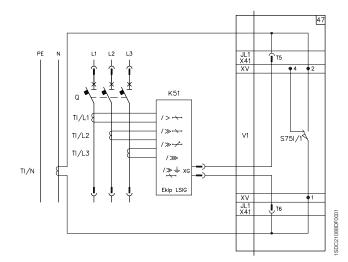
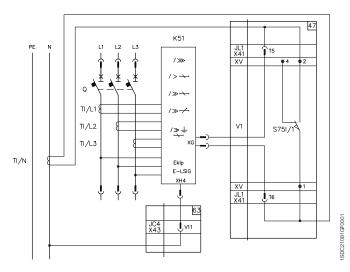


Diagram recommended for three-pole plug-in or withdrawable version circuit-breakers with current transformer on the neutral conductor outside the circuit-breaker



Advisable diagram for plug-in or withdrawable version three-pole circuit-breakers with current transformer and voltage connection on neutral conductor, external to circuit-breaker

Description of Figures

Fig. 47 = Current transformer circuit on the neutral conductor outside the circuit-breaker (for plug-in or withdrawable version circuit-breaker).

Fig. 63 = Circuit of the voltage socket on the neutral conductor outside the circuit-breaker (for Ekip E_LSIG type microprocessor-based plug-in or withdrawable circuit-breaker).

Notes

G) In the case of a three-pole fixed version circuit-breaker with a current transformer on the neutral conductor outside the circuit-breaker, when you want to remove the circuit-breaker it is necessary to short-circuit the terminals of the TI/N transformer.

Caption

TΙ

□ = Diagram figure number

= See the note indicated by the letter

J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker.

K51 = Electronic trip unit:

- overcurrent release type Ekip LS/I, Ekip N-LS/I, Ekip LSI, Ekip LSIG, Ekip E-LSIG

- of motor protection type Ekip I, Ekip M-I, Ekip M-LIU, Ekip M-LRIU

- of generator protection Ekip G-LSI

K87 = Residual current release type RC Inst, RC Sel, RC Sel 200, RC B Type

) = Main circuit-breaker

S75I/1..4 = Contacts for electrical signalling of circuit-breaker in the connected position (only provided with plug-in or withdrawable version circuit-breakers)

S75S/1-2 = Contacts for electrical signalling of circuit-breaker in the racked-out position (only provided with withdrawable version circuit-breakers)

SD = Power supply switch-disconnector of the residual current release type RC Inst, RC Sel, RC Sel 200 or RC B Type

= Toroidal current transformer

TI/L1 = Current transformer placed on phase L1
TI/L2 = Current transformer placed on phase L2
TI/L3 = Current transformer placed on phase L3
TI/N = Current transformer placed on the neutral

V1 = Circuit-breaker applications

X41 = Circuit connector for external neutral

XG-XH = Electronic trip unit connectors

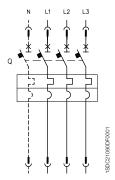
XV = Terminal boxes of the circuit-breaker applications

YO1 = Opening solenoid of the microprocessor-based overcurrent release

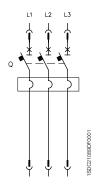
YO2 = Opening solenoid of the residual current release

Wiring Diagrams of the circuit-breakers

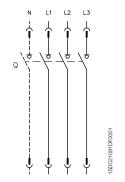
State of operation



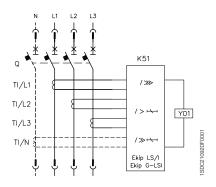
Three-pole or four-pole circuitbreaker with TMD, TMA or TMG thermomagnetic trip unit



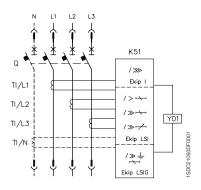
Three-pole circuit-breaker with MA magnetic trip unit



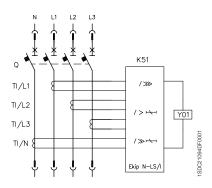
Three-pole or four-pole XT1D, XT3D or XT4D switch-disconnector



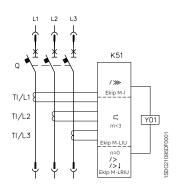
Three-pole or four-pole circuit-breaker with Ekip LS/I or Ekip G-LSI electronic trip unit



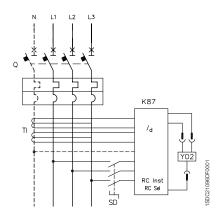
Three-pole or four-pole circuit-breaker with Ekip I, Ekip LSI or Ekip LSIG electronic trip unit



Four-pole circuit-breaker with Ekip N-LS/I electronic trip unit



Three-pole circuit-breaker with Ekip M-I, Ekip M-LIU or Ekip M-LRIU electronic trip unit



Three-pole or four-pole circuit-breaker with thermomagnetic trip unit and RC Inst or RC Sel residual current release

Caption

= Diagram figure number

= See the note indicated by the letter

K51 = Microprocessor-based release:

- overcurrent release type Ekip LS/I, Ekip N-LS/I, Ekip LSI, Ekip LSIG, Ekip E-LSIG

motor protection release type Ekip I, Ekip M-I, Ekip M-LIU, Ekip M-LRIU
 generator protection release type Fkip G-I SI

generator protection release type Ekip G-LSI

K87 = Residual current release type RC Inst, RC Sel, RC Sel 200, RC B Type

= Main circuit-breaker Q

SD = Power supply switch-disconnector of the residual current release type RC Inst, RC Sel, RC Sel 200

or RC B Type

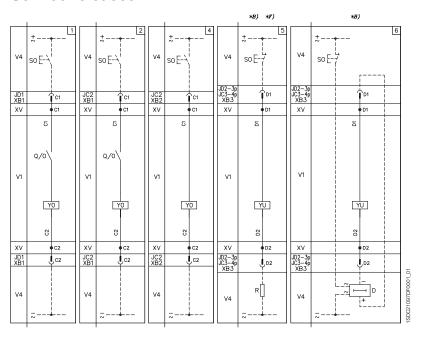
= Toroidal current transformer

TI/L1 = Current transformer placed on phase L1 TI/L2 = Current transformer placed on phase L2 TI/L3 = Current transformer placed on phase L3 TI/N = Current transformer placed on the neutral

YO1 = Opening solenoid of the microprocessor-based overcurrent release

YO2 = Opening solenoid of the residual current release

Service releases



Description of Figures

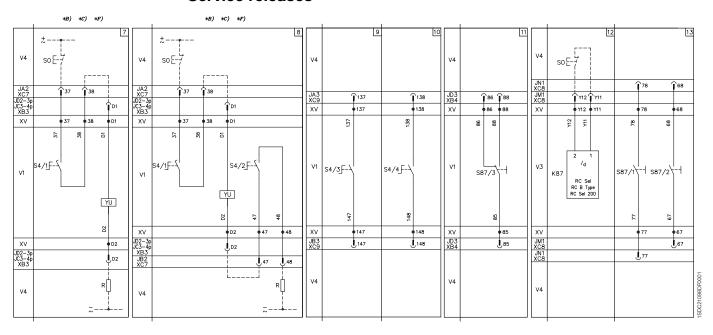
- Fig. 1 = Shunt opening release.
- Fig. 2 = Supplementary shunt opening release (only for four-pole circuit-breakers).
- Fig. 4 = Supplementary permanent shunt opening release (only for four-pole circuit-breakers).
- Fig. 5 = Instantaneous undervoltage release (see Notes B and F).
- Fig. 6 = Undervoltage release with electronic time delay device outside the circuit-breaker, see note B).

Notes

- B) The undervoltage release is supplied for power supply branched on the supply side of the circuit-breaker or from an independent source: closing is only possible with the release energised (the lock on closing is made mechanically).
- F) Additional external resistor for undervoltage supplied at 380/440V AC and 480/525V AC.

- □ = Diagram figure number
- * = See the note indicated by the letter
- D = Undervoltage release electronic time delay device (outside the circuit-breaker) (only for voltages up to 250V)
- J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker
- Q/0..7 = Circuit-breaker auxiliary contacts
- R = Resistor (see note F)
- SO = Pushbutton or contact for opening the circuit-breaker
- V1 = Circuit-breaker applications
- V4 = Indicative apparatus and connections for control and signalling, outside the circuit-breaker
- XB.. = Three-way connector for the plug-in version circuit-breaker auxiliary circuits
- XV = Terminal boxes of the circuit-breaker applications
- YO = Shunt opening release
- YU = Undervoltage release (see note B)

Service releases



Description of Figures

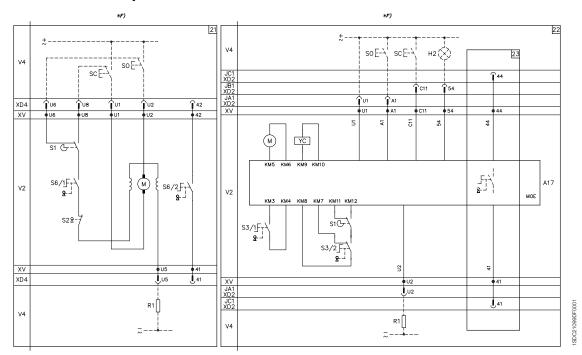
- Fig. 7 = Instantaneous undervoltage release in the version for machine tools with one contact in series (see notes B. C and F).
- Fig. 8 = Instantaneous undervoltage release in the version for machine tools with two contacts in series (see Notes B, C and F).
- Fig. 9 = First auxiliary early contact operated by the crank handle.
- Fig. 10 = Second auxiliary early contact operated by the crank handle.
- Fig. 11 = One changeover contact for electrical signalling of circuit-breaker open due to tripping of the residual current release type RC Inst, RC Sel, RC B Type or RC Sel 200.
- Fig. 12 = Residual current release circuits type RC Sel, RC B Type or RC Sel 200.
- Fig. 13 = Two contacts for electrical signalling of residual current release pre-alarm and alarm type RC Sel, RC B Type or RC Sel 200.

Notes

- B) The undervoltage release is supplied for power supply branched on the supply side of the circuitbreaker or from an independent source: closing is only possible with the release energised (the lock on closing is made mechanically).
- C) Contacts S4/1 and S4/2 shown in figures 7-8 open the circuit with the circuit-breaker open and reclose it when a manual closing command is given by means of the rotary handle, in accordance with the Standards regarding machine tools (in any case closing does not take place if the undervoltage release is not supplied).
- F) Additional external resistor for undervoltage supplied at 480/525V AC.

- □ = Diagram figure number
- = See the note indicated by the letter
- J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker
- K87 = Residual current release type RC Sel, RC Sel 200, RC B Type
- R = Resistor (see note F)
- S4/1-4 = Auxiliary early contacts operated by the circuit-breaker mounted crank handle (see note C)
- S87/1 = Contact for electrical signalling of pre-alarm of the residual current release type RC Sel, RC B or RC Sel 200
- S87/2 = Contact for electrical signalling of alarm of the residual current release type RC Sel, RC B or RC Sel 200
- S87/3 = Contact for electrical signalling of circuit-breaker open due to tripping of the residual current release type RC Sel, RC Inst, RC B or RC Sel 200
- SO = Pushbutton or contact for opening the circuit-breaker
- V1 = Circuit-breaker applications
- V4 = Indicative apparatus and connections for control and signalling, outside the circuit-breaker
- XB.. = Three-way connector for the plug-in version circuit-breaker auxiliary circuits
 XC.. = Six-way connector for the plug-in version circuit-breaker auxiliary contacts
- XV = Terminal boxes of the circuit-breaker applications
- YU = Undervoltage release (see note B)

Motor operator



Description of Figures

- Fig. 21 = Direct control motor operator (MOD) (only for XT1 and XT3 fixed or plug-in circuit-breakers) (see note I).
- Fig. 22 = Motor operator with stored energy (MOE) (only for circuit-breakers XT2 and XT4).
- Fig. 23 = A contact for electrical signalling of stored energy motor operator that can be operated remotely.

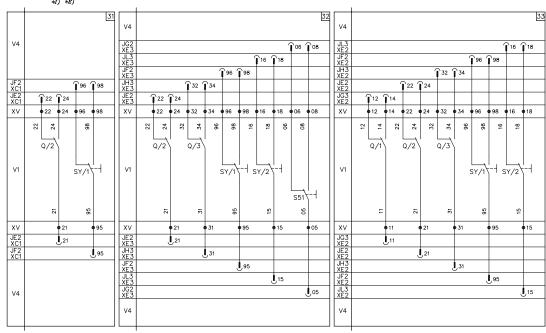
Notes

F) Additional external resistor -supplied with the motor- for MOD/MOE with supply voltage starting from 480/525V AC.

- □ = Diagram figure number
 - = See the note indicated by the letter
- A17 = Actuator unit type MOE for the stored energy motor operator
- H2 = Signalling lamp for stored energy motor operator blocked
- J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker
- M = Motor with excitation in series for opening and closing the circuit-breaker (fig. 21)
- M = Motor for opening the circuit-breaker and spring charging for closing the circuit-breaker (fig. 22)
- M1 = Three-phase asynchronous motor
- R1 = Resistor (see note F)
- S1 = Contact controlled by the cam of the motor operator
- S2 = Contact controlled by the key lock of the motor operator with direct action
- S3/1-2 = Contacts controlled by the Auto/Manual selector and key lock of the stored energy motor operator
- S4 = Contact controlled by the cam of the motor operator with direct action
- S6/1-2 = Contacts controlled by the Auto/Manual selector of the motor operator with direct action
- SC = Pushbutton or contact for closing the circuit-breaker SO = Pushbutton or contact for opening the circuit-breaker
- V2 = Motor operator applications
- V4 = Indicative apparatus and connections for control and signalling, outside the circuit-breaker
- XD.. = Nine-way connector for the auxiliary circuits of the plug-in version circuit-breaker
- XV = Terminal boxes of the circuit-breaker applications
- YC = Shunt closing release of the stored energy motor operator

Signalling contacts





Description of Figures

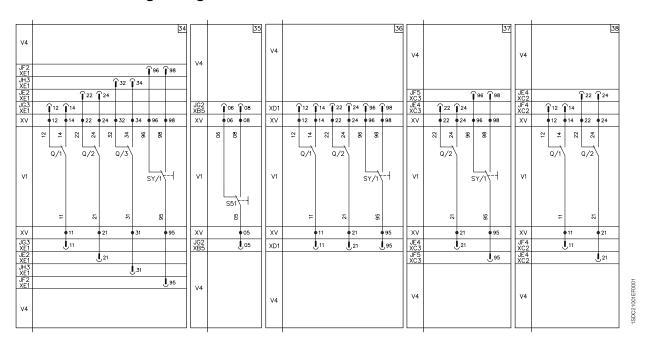
- Fig. 31 = One changeover contact for electrical signalling of circuit-breaker open or closed and one changeover contact for electrical signalling of circuit-breaker open due to tripping of the magnetic, thermomagnetic or electronic trip units, YO, YO1, YO2, YU (tripped position) (only for voltages up to 250V) (see notes E and I).
- Fig. 32 = Two changeover contacts for electrical signalling of circuit-breaker open or closed, two changeover contacts for electrical signalling of circuit-breaker open due to tripping of the magnetic, thermomagnetic or electronic trip units, YO, YO1, YO2, YU (tripped position) and one changeover contact for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic or electronic trip unit (only for voltages up to 250V).
- Fig. 33 = Three changeover contacts for electrical signalling of circuit-breaker open or closed and two changeover contacts for electrical signalling of circuit-breaker open due to tripping of the magnetic, thermomagnetic or electronic trip units, YO, YO1, YO2, YU (tripped position) (only for voltages up to 250V).

Notes

- E) The 24V auxiliary power supply unit of fig. 48 must necessarily be installed in the circuit-breaker seats marked SY/1 and Q/2. Therefore, should you want to install the unit in fig. 48 and the contacts in fig. 31 at the same time, the contacts of fig. 31 must be installed in the adjacent slots; that is, contact SY/1 in the slot marked SY/2 and contact Q/2 in the slot marked Q/1.
- I) If MOD (application in figure 21) and auxiliary contacts 1Q+1SY (in figure 31) are installed at the same time, contact Q/2 must be installed in the slot marked as Q/1.

- □ = Diagram figure number
- = See the note indicated by the letter
- J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker
- Q/0..3 = Circuit-breaker auxiliary contacts
- S51 = Contact for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic or electronic trip unit
- SY/1..2 = Contacts for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic trip units, YO, YO1, YO2, YU (tripped position)
- V1 = Circuit-breaker applications
- V4 = Indicative apparatus and connections for control and signalling, outside the circuit-breaker
- XC.. = Six-way connector for the plug-in version circuit-breaker auxiliary contacts
 XD.. = Nine-way connector for the auxiliary circuits of the plug-in version circuit-breaker
- XE.. = Fifteen-way connector for the auxiliary circuits of the plug-in version circuit-breaker
- XV = Terminal boxes of the circuit-breaker applications

Signalling contacts

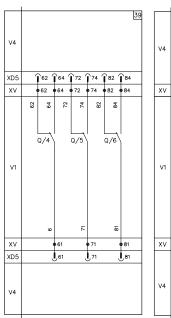


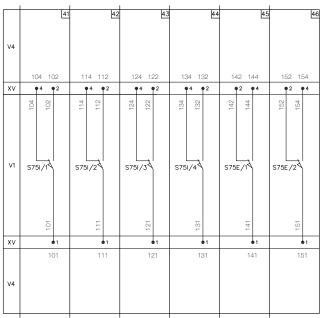
Description of Figures

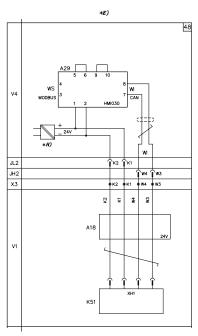
- Fig. 34 = Three changeover contacts for electrical signalling of circuit-breaker open and one changeover contact for electrical signalling of circuit-breaker open due to tripping of the magnetic, thermomagnetic or electronic trip units, YO, YO1, YO2, YU (tripped position) (only for voltages up to 250V).
- Fig. 35 = One changeover contact for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic electronic trip unit (only for voltages up to 250V).
- Fig. 36 = Two changeover contacts for electrical signalling of circuit-breaker open or closed and one changeover contact for electrical signalling of circuit-breaker open due to tripping of the magnetic, thermomagnetic or electronic trip units, YO, YO1, YO2, YU (tripped position) (only for voltages up to 250V).
- Fig. 37 = One changeover contact for electrical signalling of circuit-breaker open or closed and one changeover contact for electrical signalling of circuit-breaker open due to tripping of the magnetic, thermomagnetic or electronic trip units, YO, YO1, YO2, YU (tripped position) (only for voltage up to 400V).
- Fig. 38 = Two changeover contacts for electrical signalling of circuit-breaker open or closed (only for voltage up to 400V).

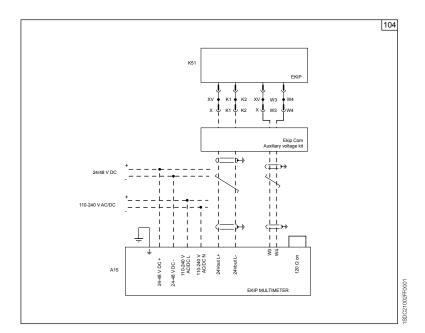
- □ = Diagram figure number
- = See the note indicated by the letter
- J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker
- Q/0..3 = Circuit-breaker auxiliary contacts
- S51 = Contact for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic or electronic trip unit
- SY/1 = Contacts for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic trip units, YO, YO1, YO2, YU (tripped position)
- V1 = Circuit-breaker applications
- V4 = Indicative apparatus and connections for control and signalling, outside the circuit-breaker
- XB.. = Three-way connector for the plug-in version circuit-breaker auxiliary circuits
- XC.. = Six-way connector for the plug-in version circuit-breaker auxiliary contacts
- XD.. = Nine-way connector for the auxiliary circuits of the plug-in version circuit-breaker
 XE.. = Fifteen-way connector for the auxiliary circuits of the plug-in version circuit-breaker
- XV = Terminal boxes of the circuit-breaker applications

Signalling contacts









Description of Figures

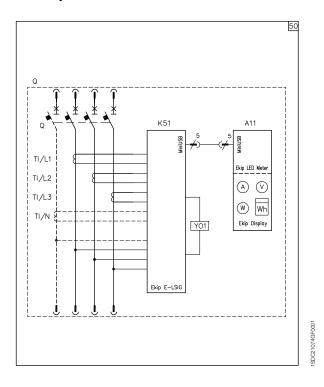
- Fig. 39 = Three supplementary changeover contacts for electrical signalling of circuit-breaker open or closed (only for fixed or plug-in version circuit-breakers).
- Fig. 41 = First changeover position contact of the circuit-breaker, for electrical signalling of connected (only for plug-in or withdrawable version circuit-breakers).
- Fig. 42 = Second changeover position contact of the circuit-breaker, for electrical signalling of connected (only for plug-in or withdrawable version circuit-breakers).
- Fig. 43 = Third changeover position contact of the circuit-breaker, for electrical signalling of connected(only for plug-in or withdrawable version circuit-breakers).
- Fig. 44 = Fourth changeover position contact of the circuit-breaker, for electrical signalling of connected (only for plug-in or withdrawable version circuit-breakers).
- Fig. 45 = First changeover position contact of the circuit-breaker, for electrical signalling of isolated (only for withdrawable version circuit-breakers).
- Fig. 46 = Second changeover position contact of the circuit-breaker, for electrical signalling of isolated (only for withdrawable version circuit-breakers).
- Fig. 48 = Auxiliary circuits of the 24V auxiliary power supply unit and of the HMI030 type interface unit (see note F).
- Fig. 104 = Auxiliary circuits of Ekip Com or Kit of 24V DC auxiliary voltage for electronic trip units and of Ekip Multimeter display.

Notes

- E) The 24V auxiliary power supply unit of fig. 48 must necessarily be installed in the circuit-breaker seats marked SY/1 and Q/2. Therefore, should you want to install the unit in fig. 48 and the contacts in fig. 31 at the same time, the contacts of fig. 31 must be installed in the adjacent slots; that is, contact SY/1 in the slot marked SY/2 and contact Q/2 in the slot marked Q/1.
- H) Having requested a Uaux insulated from earth, one must use "galvanically separated converters" in compliance with IEC 60950 (UL 1950) or equivalent standards that ensure a common mode current or leakage current (see IEC 478/1, CEI 22/3) no greater than 3.5 mA, IEC 60364-41 and CEI 64-8.

- □ = Diagram figure number
- = See the note indicated by the letter
- J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker
- K51 = Electronic trip unit:
 - of overcurrent type Ekip LS/I, Ekip N-LS/I, Ekip LSI, Ekip LSIG
 - of motor protection type Ekip I, Ekip M-I, Ekip M-LIU, Ekip M-LRIU
 - of generator protection type Ekip G-LSI
- Q/0..7 = Circuit-breaker auxiliary contacts
- S75I/1..4 = Contacts for electrical signalling of circuit-breaker in connected position (only provided with plug-in or withdrawable version circuit-breakers)
- S75E/1-2 = Contacts for electrical signalling of circuit-breaker in racked-out position (only provided with with-drawable version circuit-breakers)
- V1 = Circuit-breaker applications
- V4 = Indicative apparatus and connections for control and signalling, outside the circuit-breaker
- WI = Serial interface with the trip unit accessories
- X3 = Connector of the circuit for the 24V auxiliary power supply unit
- XD.. = Nine-way connector for the auxiliary circuits of the plug-in version circuit-breaker
- XV = Terminal boxes of the circuit-breaker applications
- A18 = 24V auxiliary power supply unit (see note E)
- XH1 = Electronic trip unit contacts
- A15 = Ekip Multimeter.

Electronic trip unit Ekip E-LSIG connected with Ekip Display or Ekip LED Meter



Description of Figures

Fig. 50 = Auxiliary circuits of the Ekip E-LSIG microprocessor-based release connected to the Ekip Display (display) or Ekip LED Meter (current display) display unit.

Caption

□ = Reference number of diagram figure

A11 = Display unit type Ekip Display (display) or Ekip LED Meter (current display)

K51 = Microprocessor-based release:

- overcurrent release type Ekip LS/I, Ekip N-LS/I, Ekip LSI, Ekip LSIG, Ekip E-LSIG

- motor protection release type Ekip I, Ekip M-I, Ekip M-LIU, Ekip M-LRIU

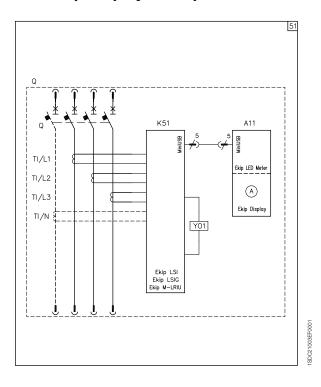
- generator protection release type Ekip G-LSI

Q = Main switch

TI/L1 = Current transformer located on phase L1
TI/L2 = Current transformer located on phase L2
TI/L3 = Current transformer located on phase L3
TI/N = Current transformer located on neutral

YO1 = Opening solenoid of microprocessor-based overcurrent release

Electronic trip unit Ekip LSI, Ekip LSIG, Ekip M-LRIU connected with Ekip Display or Ekip LED Meter



Description of Figures

Fig. 51 = Auxiliary circuits of the electronic trip unit type Ekip LSI, Ekip LSIG or Ekip MLRIU connected to display unit type Ekip Display (display) or Ekip LED Meter (current display).

Caption

□ = Diagram figure number

A11 = Display unit type Ekip Display (display) or Ekip LED Meter (current display)

K51 = Microprocessor-based release:

- overcurrent release type Ekip LS/I, Ekip N-LS/I, Ekip LSI, Ekip LSIG, Ekip E-LSIG

- motor protection release type Ekip I, Ekip M-I, Ekip M-LIU, Ekip M-LRIU

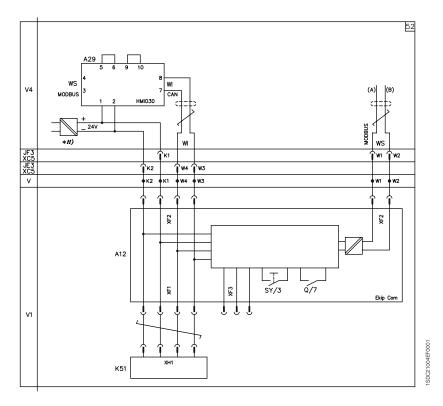
- generator protection release type Ekip G-LSI

Q = Main circuit-breaker

TI/L1 = Current transformer placed on phase L1
TI/L2 = Current transformer placed on phase L2
TI/L3 = Current transformer placed on phase L3
TI/N = Current transformer placed on the neutral

YO1 = Opening solenoid of the microprocessor-based overcurrent release

Auxiliary circuit of Ekip-Com and HMI030



Description of Figures

Fig. 52 = Auxiliary circuits of the Ekip Com type interface unit and of the HMI030 type interface unit (see note E).

Notes

H)

Having requested a Uaux insulated from earth, one must use "galvanically separated converters" in compliance with IEC 60950 (UL 1950) or equivalent standards that ensure a common mode current or leakage current (see IEC 478/1, CEI 22/3) no greater than 3.5 mA, IEC 60364-41 and CEI 64-8.

Caption

□ = Diagram figure number

A12 = Interface unit type Ekip Com (with MODBUS serial communication)

A13 = Signalling unit type LD030 DO

K51 = Electronic trip unit:

of overcurrent type Ekip LSI, Ekip LSIGof motor protection type Ekip M-LRIU

Q = Main circuit-breaker

Q/0..7 = Circuit-breaker auxiliary contacts

SY/1..3 = Contacts for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic trip

units, YO, YO1, YO2, YU (tripped position)

TI/L1 = Current transformer placed on phase L1
TI/L2 = Current transformer placed on phase L2
TI/L3 = Current transformer placed on phase L3
TI/N = Current transformer placed on the neutral
WI = Serial interface with the trip unit accessories

WS = Serial interface with the control system (MODBUS EIA RS485 interface)

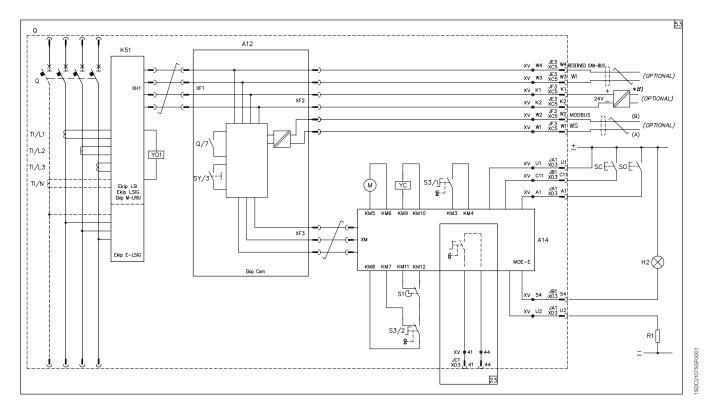
XF = Connector of the Interface unit type Ekip Com

XG-XH = Electronic trip unit connectors

XV = Terminal boxes of the circuit-breaker applications

YO1 = Opening solenoid of the microprocessor-based overcurrent release

Electronic trip unit Ekip LSI, Ekip LSIG or Ekip M-LRIU connected to interface unit Ekip Com and with actuator unit type MOE-E for the stored energy motor operator



Description of Figures

Fig. 23 = One Contact for electrical signalling of stored energy motor operator that can be operated remotely.

ig. 53 = Auxiliary circuits of the electronic trip unit type Ekip LSI, Ekip LSIG or Ekip M-LRIU connected to interface unit type Ekip Com and with actuator unit type MOE-E for the stored energy motor operator.

Notes

H) Having requested a Uaux insulated from earth, one must use "galvanically separated converters" in compliance with IEC 60950 (UL 1950) or equivalent standards that ensure a common mode current or leakage current (see IEC 478/1, CEI 22/3) no greater than 3.5 mA, IEC 60364-41 and CEI 64-8.

Caption

= Diagram figure number

A12 = Interface unit type Ekip Com (with MODBUS serial communication)
A14 = Actuator unit type MOE-E for the stored energy motor operator
H2 = Signalling lamp for blocked stored energy motor operator

J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker

K51 = Electronic trip unit:

of overcurrent type Ekip LSI, Ekip LSIGof motor protection type Ekip M-LRIU

M = Motor with excitation in series for opening and closing the circuit-breaker (fig. 21)

Q = Main circuit-breaker

Q/0..7 = Circuit-breaker auxiliary contacts

R1 = Resistor (see note H)

S1 = Contact controlled by the cam of the motor operator

S3/1-2 = Contacts controlled by the Auto/Manual selector and key lock of the stored energy motor operator

SC = Pushbutton or contact for closing the circuit-breaker SO = Pushbutton or contact for opening the circuit-breaker

SY/1..3 = Contacts for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic trip

units, YO, YO1, YO2, YU (tripped position)

TI = Toroidal current transformer

TI/L1 = Current transformer placed on phase L1
TI/L2 = Current transformer placed on phase L2
TI/L3 = Current transformer placed on phase L3
TI/N = Current transformer placed on the neutral
WI = Serial interface with the trip unit accessories

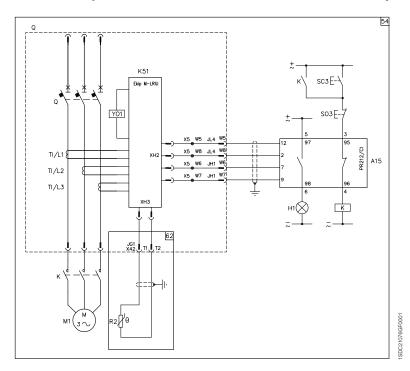
WS = Serial interface with the control system (MODBUS EIA RS485 interface)
 XC.. = Six-way connector for the plug-in version circuit-breaker auxiliary contacts
 XD.. = Nine-way connector for the auxiliary circuits of the plug-in version circuit-breaker

XF = Connector of the Interface unit type Ekip Com

XG-XH = Electronic trip unit connectors

XV = Terminal boxes of the circuit-breaker applications
 YC = Shunt closing release of the stored energy motor operator
 YO1 = Opening solenoid of the microprocessor-based overcurrent release

Auxiliary circuits of the electronic trip unit Ekip M-LRIU connected to the contactor control unit for starting the motor PR212/CI (the circuit to the motor thermistor is optional)



Description of Figures

Fig. 54 = Auxiliary circuits of the electronic trip unit type Ekip M-LRIU connected to the contactor control unit for starting the motor type PR212/CI (the circuit to the motor thermistor is optional).

Fig. 62 = Motor thermistor circuit.

Caption

□ = Diagram figure number

A15 = Contactor control unit for starting the motor type PR212/CI

H1 = Signalling lamp

J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the

connectors takes place at the same time as that of the circuit-breaker

K = Contactor for starting the motor K51 = Electronic trip unit Ekip M-LRIU M1 = Three-phase asynchronous motor

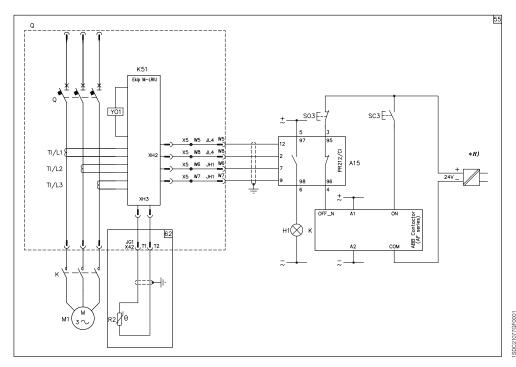
Q = Main circuit-breaker R2 = Motor thermistor

SC3 = Pushbutton for starting the motor
SO3 = Pushbutton for stopping the motor
TI/L1 = Current transformer placed on phase L1
TI/L2 = Current transformer placed on phase L2
TI/L3 = Current transformer placed on phase L3
X42 = Circuit connector for the motor thermistor
X5 = Circuit connector towards PR212/CI unit

XG-XH = Electronic trip unit connectors

YO1 = Opening solenoid of the microprocessor-based overcurrent release

Electronic trip unit Ekip M-LRIU connected to the contactor control unit for starting the motor PR212/Cl and with ABB AF series contactor (the circuit to the motor thermistor is optional)



Description of Figures

Fig. 55 = Auxiliary circuits of the electronic trip unit type Ekip M-LRIU connected to the contactor control unit for starting the motor type PR212/Cl and with ABB AF series contactor (the circuit to the motor thermistor is optional).

Fig. 62 = Motor thermistor circuit.

Notes

H) Having requested a Uaux insulated from earth, one must use "galvanically separated converters" in compliance with IEC 60950 (UL 1950) or equivalent standards that ensure a common mode current or leakage current (see IEC 478/1, CEI 22/3) no greater than 3.5 mA, IEC 60364-41 and CEI 64-8.

Caption

Diagram figure numberA15 = Contactor control unit for

= Contactor control unit for starting the motor type PR212/CI

H1 = Signalling lamp

 J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker

K = Contactor for starting the motor K51 = Electronic trip unit Ekip M-LRIU M1 = Three-phase asynchronous motor

Q = Main circuit-breaker

R2 = Motor thermistor SC3 = Pushbutton for starting the motor

SC3 = Pushbutton for starting the motor
TI/L1 = Current transformer placed on phase L1
TI/L2 = Current transformer placed on phase L2
TI/L3 = Current transformer placed on phase L3
X42 = Circuit connector for the motor thermistor
X5 = Circuit connector towards PR212/CI unit

XG-XH = Electronic trip unit connectors

YO1 = Opening solenoid of the microprocessor-based overcurrent release

Resetting instructions

Instructions for resetting the circuit-breaker following release tripping

Selection of the type of circuit-breaker resetting depends on design requirements and on service conditions.

Resetting can take place following tripping of the following releases:

- overcurrent;
- undervoltage;
- shunt opening.

The following three possibilities are suggested (see diagrams below):

1. Only manual resetting

To be wired (by the customer): contact SO1, contact SY/1 and the auxiliary relay KO (only for MOD).

Opening is prevented until the circuit-breaker is in the tripped position.

To reset the circuit-breaker it is necessary to activate the special lever on the front of the motor until the circuit-breaker goes into the open position.

2. Electrical resetting making the operator responsible

To be wired (by the customer): contact SO1, SO2, contact SY/1 and the auxiliary relay KO (only for MOD).

Opening is allows by means of contact S02, which must be placed in custody and can only be used if the information the person in charge of the control station has received make it possible to exclude tripping due to a short-circuit, or if the causes of the short-circuit have been removed.

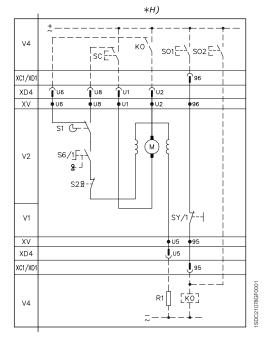
3. Electrical resetting always allowed

To be wired (by the customer): contact SO1, SO2, contact SY/1 and the auxiliary relay KO (only for MOD).

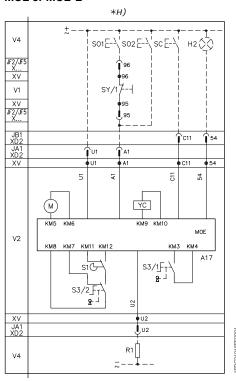
Opening is always allowed by means of contact S02.

NB: If the magnetic, thermomagnetic or electronic trip unit is present, it is necessary to find the causes which led to the circuit-breaker being in the tripped position so as to prevent reclosing under short-circuit conditions. In all cases, manual resetting is always allowed.

MOD



MOE or MOE-E



Notes

H) Having requested a Uaux insulated from earth, one must use "galvanically separated converters" in compliance with IEC 60950 (UL 1950) or equivalent standards that ensure a common mode current or leakage current (see IEC 478/1, CEI 22/3) no greater than 3.5 mA, IEC 60364-41 and CEI 64-8.

- A17 = Actuator unit type MOE for the stored energy motor operator H2 = Signalling lamp for blocked stored energy motor operator
- J.. = Connectors for the auxiliary contacts of the withdrawable version circuit-breaker; extraction of the connectors takes place at the same time as that of the circuit-breaker
- KO = Auxiliary opening relay
- M = Motor with excitation in series for opening and closing the circuit-breaker (fig. 21)
- M = Motor for opening the circuit-breaker and spring charging for closing the circuit-breaker (fig. 22)
- R1 = Resistor supplied with the motor (see note H)
- S1 = Contact controlled by the cam of the motor operator
- S2 = Contact controlled by the key lock of the motor operator with direct action
- S3/1-2 = Contacts controlled by the Auto/Manual selector and key lock of the stored energy motor operator
- S6/1-2 = Contacts controlled by the Auto/Manual selector of the motor operator with direct action
- SC = Pushbutton or contact for closing the circuit-breaker SO1,S02 = Pushbuttons or contacts for opening the circuit-breaker (see "Instructions for resetting the circuit-breaker following release tripping")
- SY/1..3 = Contacts for electrical signalling of circuit-breaker open due to tripping of the thermomagnetic trip units, YO, YO1, YO2, YU (tripped position)
- V1 = Circuit-breaker applications
- V2 = Motor operator applications
- V4 = Indicative apparatus and connections for control and signalling, outside the circuit-breaker
- XB.. = Three-way connector for the plug-in version circuit-breaker auxiliary circuits XC.. = Six-way connector for the plug-in version circuit-breaker auxiliary contacts
- XD.. = Nine-way connector for the auxiliary circuits of the plug-in version circuit-breaker
- XV = Terminal boxes of the circuit-breaker applications
- YC = Shunt closing release of the stored energy motor operator



Index

Examples of ordering	7/2
Ordering codes for XT1	
Circuit-breakers	7/2
Accessories	7 /5
Ordering codes for XT2	
Circuit-breakers	7 /12
Accessories	7 /19
Ordering codes for XT3	
Circuit-breakers	7 /29
Accessories	7 /31
Ordering codes for XT4	
Circuit-breakers	7 /38
•	7/46

Ordering codes

Examples of ordering

EXAMPLE 1: Terminals for fixed or fixed part of plug-in/withdrawable circuit-breaker

To fit the circuit-breaker with terminals other than those supplied on the basic circuit-breaker, the whole kits (6 or 8 pieces) or half-kits (3 or 4 pieces) can be requested. In the case of a mixed solution, the first code indicates the terminals to be mounted in the top part of the circuit-breaker, whereas the second code indicates the terminals to be mounted in the lower part. However, when only 3 or 4 pieces are requested, you must expressly specify whether the half-kit is to be mounted at the top or at the bottom. The fixed parts of plug-in and withdrawable version circuit-breakers can be fitted with the terminals (EF or HR/VR) specifically for the fixed parts, or with the same terminals used for the fixed version (ES, FCCu, FCCuAl, MC, FB) after the installation of the specific adapter for the fixed part.

XT1B 160A 3p fixed with EF top and FCCuAl bottom terminals for 240mm² cables	
	1SDAR1
YT1R 160 TMD 160-1600 3n F F	066800

X11B 100 11VID 100-1000 3P F F	000009
EF Extended front terminals 3 pieces	066865
FCCuAl Terminals for Copper/Aluminium cables 1x95240mm ² 3 pieces	067159

XT1 plug-in with EF top and HR/VR bottom terminals

	1SDAR1
XT1B 160 TMD 160-1600 3p F F	066809
KIT P PF EF (Fixed part of plug-in with EF terminals)	068183
KIT P MP (Kit for conversion from Fixed to Moving Part of Plug-in version)	066276
R - Rear HR/VR terminals (terminals for the fixed parts)	066268

XT2 withdrawable with ES top and MC bottom terminals

	1SDAR1
XT2S 160 TMA 160-1600 3p F F	067560
KIT W PF EF (Fixed part of withdrawable with EF extended front terminals)	068200
KIT W MP (Kit for conversion from Fixed to Moving Part of Withdrawable version)	066284
ADP Adapter for mounting terminals of the fixed version on the fixed part (2 pieces)	066307
ES Extended spread front terminals	066893
MC Multic-cable terminals 6x2.535mm ²	066925

EXAMPLE 2: Electrical accessories for plug-in circuit-breaker

With the plug-in version circuit-breakers, disconnection of the auxiliary circuits can be made by means of two types of connectors:

- socket plug adapter to be fixed at the back of the panel for XT1, XT2, XT3 and XT4;
- socket plug adapter placed in the fixed part of plug-in and on the rear of the circuit-breaker for XT2 and XT4.

XT2N in plug-in version with SOR, AUX 1Q+1SY, connector on rear of panel

	1SDAR1
XT2N 160 TMA 160-1600 3p F F	067560
KIT P MP	066278
KIT P PF EF (Fixed part of plug-in with EF terminals)	068187
SOR-C 220-240V AC / 220-250V DC	066325
AUX-C 1Q+1SY 250V AC	066431
Socket plug connector for panel with 9PINS	066411

XT2N in plug-in version with SOR, AUX 1Q+1SY, connector on rear of circuit-breaker

	1SDAR1
XT2N 160 TMA 160-1600 3p F F	067560
KIT P MP	066278
KIT P PF EF (Fixed part of plug-in with EF terminals)	068187
SOR-C 220-240V AC / 220-250V DC	066325
AUX-C 1Q+1SY 250V	066431
SOCKET-PLUG CONNECTOR MP 12PINS XT2-XT4	066413
SOCKET-PLUG CONNECTOR FP 12PINS XT2-XT4	066414

EXAMPLE 3: Electrical accessories for withdrawable version

With the circuit-breakers in the withdrawable version it is necessary to only and exclusively order the accessories dedicated to this version. The electrical accessories specified for the withdrawable version are fitted both with the connector for fixed part to be installed in the side of the fixed part, and with the connector for the moving part.

XT2N in withdrawable version with SOR, AUX 1Q+1SY, RHD	
	1SDAR1
XT2N 160 TMA 160-1600 3p F F	067560
KIT W PF EF (Fixed part of withdrawable with EF terminals)	068200
KIT W MP (Kit for conversion from fixed to withdrawable version)	066284
SOR-C 220-240V AC / 220-250V DC for Withdrawable	066332
AUX-C 1Q+1SY 250V for Withdrawable	066432
RHD Normal Direct Handle for Withdrawable	066476

EXAMPLE 4: Connector for 4th pole of withdrawable circuit-breaker

Should it be necessary to insert a SOR or a UVR in the slot of the fourth pole of a withdrawable version circuit-breaker, it is necessary to order the connector for 4th pole of withdrawable circuit-breaker.

	1SDAR1
XT2S 160 TMA 160-1600 4p F F	067583
KIT W PF EF (Fixed part of withdrawable with EF terminals)	068202
KIT W MP (Kit for conversion from fixed to withdrawable version)	066285
Connector 4th Pole SOR	066415
SOR-C 220-240V AC / 220-250V DC for Withdrawable	066332
UVR-C 220-240V AC / 220-250V DC for Withdrawable	066406

EXAMPLE 5: Rear mechanical interlock

The rear interlock is made up of the (horizontal) MIR-H or (vertical) MIR-V frame unit and the MIR-P plates. To receive the circuit breakers, fixed version only, directly mounted on the mechanical interlock together with the plates, it is necessary to make the order as follows:

- the sales code of each circuit breaker you need to interlock, explaining through a note the position of the other interlocked circuit breaker as indicated in the table here below;
- the sales code of the mechanical interlock;
- the sales code of the plate associated to each circuit breaker.

Horizontal mechanical interlock XT1 - XT1 in fixed version							
		1SDAR1					
Pos. 1	XT1B TMD 160-1600A, 3p - Note: To be interlocked with circuit-breaker at Pos. 2	066809					
	MIR-H - Horizontal mechanical interlock	066637					
	PLATE - XT1 Fixed	066639					
Pos. 2	XT1B TMD 160-1600A, 3p - Note: To be interlocked with circuit-breaker at Pos. 1	066809					
	PLATE - XT1 Fixed	066639					

In order to receive the fixed parts directly mounted on the mechanical interlock together with related plates, follow previous instructions considering the fixed parts instead of the circuit breakers and anyway ordering related plates. In this case, the mobile parts of the circuit breakers must be ordered separately and will be supplied apart.

EXAMPLE 6: Extended Warranty

Extended Warranty is ordered as an accessory "mounted" on the circuit-breaker.

The unique Registration Number, defined after the subscription in the Extended Warranty tool (Web Page), needs to be specified to activate the warranty extension.

Extended W	arranty	
		1SDAR1
Pos. 1	XT1B TMD 160-1600A, 3p	066809
	EF Extended front terminals 3 pieces	066865
	XT Extended Warranty 2 years*	069206

^{*} Add the note with the Registration Number (ie: 20161010xxxxxxxx03) to activate the warranty

Circuit-breakers



XT1 circuit-breaker

Thermomagn	etic trin u	nit -				1SDA	R1		
Thermomagnetic trip unit - TMD /TMF			lcu (415V)		В	С	N N	S	Н
***************************************	ln	l ₃	(,	18kA	25kA	36kA	50kA	70kA	
TMD/TMF	16	450		066799	080825	080827*	080830*	080835*	
TMD/TMF	20	450		066800	080826	080828*	080831*	080836*	
TMD	25	450		066801	067391	080829	080832	080837	
TMD	32	450		066802	067392	067411	080833	080838	
TMD	40	450		066803	067393	067412	080834	080839	
TMD	50	500		066804	067394	067413	067431	067449	
TMD	63	630		066805	067395	067414	067432	067450	
TMD	80	800		066806	067396	067415	067433	067451	
TMD	100	1000		066807	067397	067416	067434	067452	
TMD	125	1250		066808	067398	067417	067435	067453	
TMD	160	1600		066809	067399	067418	067436	067454	

^{*} TMF trip unit

Thermomagnetic trip unit - TMD /TMF					1SDAI	₹1		
		lcu (415V)	В	С	N	S	Н	
	ln	l ₃		8kA	25kA	36kA	50kA	70kA
TMD/TMF	16	450	066	810	080840	080842*	080845*	080850*
TMD/TMF	20	450	066	811	080841	080843*	080846*	080851*
TMD	25	450	066	812	067400	080844	080847	080852
TMD	32	450	066	813	067401	067419	080848	080853
TMD	40	450	066	814	067402	067420	080849	080854
TMD	50	500	066	815	067403	067421	067439	067457
TMD	63	630	066	816	067404	067422	067440	067458
TMD	80	800	066	817	067405	067423	067441	067459
TMD	100	1000	066	818	067406	067424	067442	067460
In N=50%	125	1250	066	819	067407	067425	067443	067461
In N=50%	160	1600	066	820	067408	067426	067444	067462
In N=100%	125	1250	066	888	067409	067427	067445	067463
In N=100%	160	1600	066	821	067410	067428	067446	067464

^{*} TMF trip unit

XT1 160 I	MA - Fixed (F)	- 3 poles - Fro	ont terminals (F)
Magnetic only trip unit - MA		- MA	1SDAR1
			N
	ln i	l ₃	36kA ⁽¹⁾
MA	3.2	1335	
MA	6.3	2569	
MA	16	48176	
MA	32	96352	
MA	52	156572	Please ask ABB SACE about availability
MA	63	189693	
MA	80	240880	
MA	100	3601100	
MA	125	3751375	

⁽¹⁾ lcu@415V = 5kA ln<16A



XT1D switch-disconnector

XT1D - Switch-disconnector	1SDAR1		
	3 poles	4 poles	
XT1D	068208	068209	

Accessories

Fixed part of plug-in

Fixed Parts, conversion kit and accessories for fixed parts

Fixed part of plug-in (P)					
Туре	1SDAR1				
	3 poles		4 poles		
Kit P PF EF	068183		068185		
Kit P PF HR/VR ⁽¹⁾	068184		068186		

The terminals are factory-mounted in the horizontal position (HR)

Terminals for the fixed parts	Termina	s for the	fixed	parts
-------------------------------	---------	-----------	-------	-------

Туре	1SDAR1			
	3 pcs	4 pcs	6 pcs	
EF - Front Extended terminals	066260	066261		
R - Rear terminals HR/VR	066268	066269		
PS - Rear phase separators 90mm		068953	068954	



Conversion kit for turning a fixed circuit-breaker into the moving part of a plug-in circuit-breaker



Fixed part adapter

Type	eaker from fixed into moving part of plug-in	1SDAR1
турс	3 poles	4 poles
P MP KIT	066276	066277

Adapter for mounting the terminals of the fixed circuit-breaker on the fixed part

Туре	1SDAR1			
	3 poles		4 poles	
ADP adapter for fixed part (2 pieces)	066305		066306	

Note: when use ADP with F/EF/MC terminal, order also "Kit F Front Terminals" - see page 7/11

Service releases

4/10	E.
	7
-	2,
5	100

SOR uncabled



Shunt Opening release -SOR-		
Туре	1SDAR1	
Uncabled Version		
	222212	
SOR 12V DC	066313	
SOR 24-30V AC/DC	066314	
SOR 48-60V AC/DC	066315	
SOR 110127V AC / 110125V DC	066316	
SOR 220240V AC / 220250V DC	066317	
SOR 380-440V AC	066318	
SOR 480-525V AC	066319	
Cabled Version		
SOR-C 12V DC	066321	
SOR-C 24-30V AC/DC	066322	
SOR-C 48-60V AC/DC	066323	
SOR-C 110-127V AC / 110-125V DC	066324	
SOR-C 220-240V AC / 220-250V DC	066325	
SOR-C 380-440V AC	066326	
SOR-C 480-525V AC	066327	

YO Test Unit		
Туре	1SDAR1	
YO Test Unit	082751	

Accessories



UVR uncabled



Undervoltage release -UVR-		
Туре	1SDAR1	
Uncabled Version		
UVR 24-30V AC/DC	066389	
UVR 48V AC/DC	069064	
UVR 60V AC/DC	066390	
UVR 110127V AC / 110125V DC	066391	
UVR 220240V AC / 220250V DC	066392	
UVR 380-440V AC	066393	
UVR 480-525V AC	066394	
Cabled Version		
UVR-C 24-30V AC/DC	066396	
UVR-C 48V AC/DC	069065	
UVR-C 60V AC/DC	066397	
UVR-C 110-127V AC / 110-125V DC	066398	
UVR-C 220-240V AC / 220-250V DC	066399	
UVR-C 380-440V AC	066400	
UVR-C 480-525V AC	066401	



Time delay device for undervoltage release

Туре	1SDAR1
UVD 2430V AC/DC	051357
UVD 4860V AC/DC	051358
UVD 110125V AC/DC	051360
UVD 220250V AC/DC	051361

Connectors



Socket Plug Connector

Socket Plug Connector on rear of panel		
Туре	1SDAR1	
Socket-plug panel connector with 3PINS	066409	
Socket-plug panel connector with 6PINS	066410	
Socket-plug panel connector with 9PINS	066411	
Socket-plug panel connector with 15PINS	066412	

Electrical signals



AUX uncabled



AUX cabled

Auxiliary Contacts -AUX-	
Type	1SDAR1
Uncabled Version	
AUX 250V AC	066422
AUX 24V DC	066423
Cabled Version	
AUX-C 3Q 250V Left	066426
AUX-C 1Q+1SY 250V	066431
AUX-C 2Q+1SY 250V	066433
AUX-C 1Q+1SY 24V DC	066446



AUP - Auxiliary position contacts

Туре	1SDAR1	
Cabled Version		
AUP-I – Four Racked-in contacts 250V AC for plug-in circuit-breaker	066450	
AUP-I – Four Racked-in contacts 24V DC for plug-in circuit-breaker	066451	



AUE - Early auxiliary contacts

Туре	1SDAR1
AUE - Two contacts in the rotary handle RHx (Closed)	066454
AUE – Two contacts in the rotary handle RHx (Open)	067118

Accessories

0, 0,

Motor operator

Motor Operators

Motor Operator with direct action -MOD-		
Туре	1SDAR1	
MOD 24V DC	066457	
MOD 4860V DC	066458	
MOD 110125V AC/DC	066459	
MOD 220250V AC/DC	066460	
MOD 380440V AC	066461	
MOD 480525V AC	066462	

Rotary Handle Operating Mechanisms



Direct rotary handle



Transmitted rotary handle

Туре	1SDAR1
RHD Normal Direct Handle	066475
RHD Direct Emergency Handle	066477
RHE Normal Transmitted Handle	066479
RHE Emergency Transmitted Handle	066481
RHS-L Normal left lateral handle	066579
RHS-L Emergency left lateral handle	066580
RHS-R Normal right lateral handle	066581
RHS-R Emergency right lateral handle	066582
ransmitted Handle Spare Parts	
RHE_B Base for Transmitted Handle	066483
RHE_S Rod of 500mm	066576
RHE_H Normal Transmitted Handle	066577
RHE_H Emergency Transmitted Handle	066578
H Normal large handle	066583
H Large emergency handle	066585



П	P54

IP54 Protection for transmitted rotary handle		
Туре	1SDAR1	
IP54 PROTECTION for transmitted handle -RHE-	066587	

Locks



Fixed padlock

Padlock on the circuit-breaker			
Туре	1SDAR1	1SDAR1	
PLL Removable lock with padlocks in open position	066588		
PLL Fixed lock with padlocks in open position	066589		
PLL Fixed lock with padlocks in open/closed position	066591		



Key lock on the circuit-breaker

Key lock on the circuit-breaker		
Туре	1SDAR1	
KLC Ronis key lock open, different keys, removable in open position	066593	
KLC Ronis key lock open, same Type A keys, removable in open position	066594	
KLC Ronis key lock open, same Type B keys, removable in open position	066595	
KLC Ronis key lock open, same Type C keys, removable in open position	066596	
KLC Ronis key lock open, same Type D keys, removable in open position	066597	
KLC Ronis key lock open, same keys, removable in both position	066598	



Key lock on the handle

Key lock on the handle
Туре

Туре	1SDAR1
RHL Ronis key lock open, different keys - RHx	066617
RHL Ronis key lock open, same Type A keys - RHx	066618
RHL Ronis key lock open, same Type B keys - RHx	066619
RHL Ronis key lock open, same Type C keys - RHx	066620
RHL Ronis key lock open, same Type D keys - RHx	066621
RHL Ronis key lock open/closed, different keys - RHx	066622



Key lock on the motor

Key lock on the motor

Туре	1SDAR1
MOL-D Ronis key lock open, different keys	066623
MOL-S Ronis key lock open, same Type A keys	066624
MOL-S Ronis key lock open, same Type B keys	066625
MOL-S Ronis key lock open, same Type C keys	066626
MOL-S Ronis key lock open, same Type D keys	066627



Interlock

Mechanical interlock

Туре	1SDAR1	
MIR-H	066637	
MIR-V	066638	
Plate XT1 F	066639	
Plate XT1 P	066640	
Plate XT3 F	066643	
Plate XT3 P	066644	

Sealable Lock of Thermal Setting

Туре	1SDAR1	
Lock on thermal setting for TMD trip unit	066651	

Accessories

No.

RC Inst / RC Sel

Residual current devices

Туре		1SDAR1		
	3 poles	4 poles		
RC Sel Low 200mm		067121		
RC Inst	067122	067124		
RC Sel	067123	067125		

Panel type residual current relay			
Туре	1SDAR1		
RCQ020/A 115-230V AC	065979		
RCQ020/A 415V AC	065980		
Toroid closed Ø 60mm	037394		
Toroid closed Ø 110mm	037395		
Toroid closed Ø 185mm	050543		

Installation



DIN Guide

Bracket for fixing onto DIN rail				
Туре	1SDAR1			
	3 poles	4 poles		
KIT DIN50022	066652	066419		
DIN50022 KIT XT1+RC Low 200mm		067134		
KIT DIN50022 XT1+RC Sel/RC Inst	067135	067135		

Terminals, terminal covers and phase separators



Туре	1SDAR1		
	3 poles	4 poles	
LTC Low terminal covers	066655	066656	
HTC High terminal covers	066664	066665	



Sealable screw

Sealable screws for terminal covers			
Туре	1SDAR1		
Kit (2 pcs) sealable screws	066672		



Phase separators



EF Terminal



FCCuAl Terminal



ATS021

Phase separators

Type			
	4 pcs	6 pcs	
PB Height 25mm	066674	066679	
PS Height 100mm	066676	066681	
PS Height 200mm	066678	066683	

Terminals

Туре	1SDAR1							
	3 pcs	4 pcs	6 pcs	8 pcs				
F Front Terminals	066849	066850	066851	066852				
EF Extended front terminals	066865	066866	066867	066868				
ES Extended spread front terminals	066889	066890	066891	066892				
FC CuAl Terminals for CuAl cables 1x1.570mm ²	067163	067164	067165	067166				
FC CuAl Terminals for CuAl cables 1x3595mm ²	067155	067156	067157	067158				
FC CuAl Terminals for CuAl cables 1x120240mm ² + ADP	067159	067160	067161	067162				
FC Cu Terminals for Cu cables	066905	066906	066907	066908				
MC Multi-cable Terminals 6x2.535mm²	066925	066926	066927	066928				
R Rear Adjustable Terminals	066937	066938	066939	066940				
R-RC Rear terminals for Residual current		066953						
FB Flexible busbar Terminals	066957	066958	066959	066960				

Automatic transfer devices

ATS021 - ATS022 Automatic transfer devices
--

ype 1SDAF		\R1
ATS021	065523	
ATS022	065524	

Warranty

Extended warranty***

Туре	1SD/	\R1
Warranty 2 years - Tmax XT*	069206	
Warranty 4 years - Tmax XT XT1**	069207	
Warranty 5 years - Tmax XT XT1**	082429	

The registration in the Extended Warranty online tool is mandatory

Spare parts

Туре	1SDA	R1
SA RC Sel / RC Inst - Opening solenoid of the residual current device	066990	
AUX-C - Loose cabled auxiliary contact 250V ⁽¹⁾	066994	
AUX-C - Loose cabled auxiliary contact 20V ⁽¹⁾	066996	

⁽¹⁾ un-numbered cables



Flange for compartment door

Туре	1SDAR1				
	3 poles	4 poles			
Small flange for circuit-breaker	068657	068657			
Large flange for circuit-breaker	068639	068640			
Flange MOD	068648	068648			
Flange for direct handle RHD	068651	068651			
Flange for residual current RC Sel / Inst	068653	068654			

^{*} free-of-charge with site details entered

** Warranty durations (Warranty periods are measured from the date the circuit breaker leaves the factory):

^{- 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

^{***} Order only with the circuit breaker. Specify Registration code in the order to activate the warranty.



XT2 circuit-breaker

			hermomagnetic trip unit -					1SDAF	11		
TMD/TMA	/ID/TMA			MA		lcu (415V)	N	S	Н	L	٧
***************************************	ln	l ₃	(,	36kA	50kA	70kA	120kA	150kA			
TMD	1.6	16		067000	067540	067584	067628	067672			
TMD	2	20		067001	067541	067585	067629	067673			
TMD	2.5	25		067002	067542	067586	067630	067674			
TMD	3.2	32		067003	067543	067587	067631	067675			
TMD	4	40		067004	067544	067588	067632	067676			
TMD	5	50		067005	067545	067589	067633	067677			
TMD	6.3	63		067006	067546	067590	067634	067678			
TMD	8	80		067007	067547	067591	067635	067679			
TMD	10	100		067008	067548	067592	067636	067680			
TMD	12.5	125		067009	067549	067593	067637	067681			
TMD	16	300		067010	067550	067594	067638	067682			
TMD	20	300		067011	067551	067595	067639	067683			
TMD	25	300		067012	067552	067596	067640	067684			
TMD	32	320		067013	067553	067597	067641	067685			
TMA	40	400		067014	067554	067598	067642	067686			
TMA	50	500		067015	067555	067599	067643	067687			
TMA	63	630		067016	067556	067600	067644	067688			
TMA	80	800		067017	067557	067601	067645	067689			
TMA	100	1000		067018	067558	067602	067646	067690			
TMA	125	1250		067019	067559	067603	067647	067691			
TMA	160	1600		067020	067560	067604	067648	067692			

XT2 160 TMD/TI	MA - Fix	ced (F) -	4 poles	s - Front terr	ninals (F)			
							1	
TMD/TMA			lcu (415V)	N	S	Н	L	V
	In	l ₃	(,	36kA	50kA	70kA	120kA	150kA
TMD	1.6	16		067021	067561	067605	067649	067693
TMD	2	20		067022	067562	067606	067650	067694
TMD	2.5	25		067023	067563	067607	067651	067695
TMD	3.2	32		067024	067564	067608	067652	067696
TMD	4	40		067025	067565	067609	067653	067697
TMD	5	50		067026	067566	067610	067654	067698
TMD	6.3	63		067027	067567	067611	067655	067699
TMD	8	80		067028	067568	067612	067656	067700
ΓMD	10	100		067029	067569	067613	067657	067701
ΓMD	12.5	125		067030	067570	067614	067658	067702
TMD	16	300		067031	067571	067615	067659	067703
TMD	20	300		067032	067572	067616	067660	067704
TMD	25	300		067033	067573	067617	067661	067705
TMD	32	320		067034	067574	067618	067662	067706
ГМА	40	400		067035	067575	067619	067663	067707
ГМА	50	500		067036	067576	067620	067664	067708
ГМА	63	630		067037	067577	067621	067665	067709
ГМА	80	800		067038	067578	067622	067666	067710
ГМА	100	1000		067039	067579	067623	067667	067711
TMA In N=50%	125	1250		067040	067580	067624	067668	067712
TMA In N=50%	160	1600		067041	067581	067625	067669	067713
TMA In N=100%	125	1250	:	067042	067582	067626	067670	067714
TMA In N=100%	160	1600		067043	067583	067627	067671	067715



XT2 circuit-breaker

XT2 160 TMG - Fixed (F) - 3 poles - Front terminals (F) Thermomagnetic trip unit - TMG 1SDA...R1 Icu (415V) Ν s 36kA 50kA In TMG
XT2 160 TI	MG - Fixed (F) - 4 pol	es - Fro	ont terminals	s (F)							
Thermoma	gnetic trip u	nit -			1SDAR1							
TMG			lcu (415V)	N	S							
•••••	ln	l ₃	(,	36kA	50kA							
TMG	16	160		067727	067749							
TMG	20	160		067728	067750							
TMG	25	160		067729	067751							
TMG	32	160		067730	067752							
TMG	40	160		067731	067753							
TMG	50	200		067732	067754							
TMG	63	200		067733	067755							
TMG	80	240		067734	067756							
TMG	100	300		067735	067757							
TMG	125	375		067736	067758							
TMG	160	480		067737	067759						:	

Magnetic only trip unit -		Magnetic only trip unit - MF/MA						1SDAR	1	
MF/MA					Icu (415V)	N	S	Н	L	V
	ln	l ₃	(,	36kA	50kA	70kA	120kA	150kA		
MF	1	14		067044	067760	067770	067780	067790		
MF	2	28		067045	067761	067771	067781	067791		
MF	4	56		067046	067762	067772	067782	067792		
MF	8.5	120		067047	067763	067773	067783	067793		
MF	12.5	175		067048	067764	067774	067784	067794		
MA	20	120280		067049	067765	067775	067785	067795		
MA	32	192448		067050	067766	067776	067786	067796		
MA	52	314728		067051	067767	067777	067787	067797		
MA	80	4801120		067052	067768	067778	067788	067798		
MA	100	6001400		067053	067769	067779	067789	067799		
MA	160	9602240		076529	076530	076535	076536	076537		



XT2 circuit-breaker

Electronic trip unit -					1SDAR	1	
Ekip LS/I		lcu (415V)	N	S	Н	L	V
	In	(,	36kA	50kA	70kA	120kA	150kA
Ekip LS/I	10		067054	067800	067857	067914	067971
Ekip LS/I	25		067055	067801	067858	067915	067972
Ekip LS/I	63		067056	067802	067859	067916	067973
Ekip LS/I	100		067057	067803	067860	067917	067974
Ekip LS/I	160		067058	067804	067861	067918	067975

Electronic to	rip unit -		1SDAR1							
Ekip I		lcu (415V)	N	S	Н	L	٧			
	ln .	(,	36kA	50kA	70kA	120kA	150kA			
Ekip I	10		067059	067805	067862	067919	067976			
Ekip I	25		067060	067806	067863	067920	067977			
Ekip I	63		067061	067807	067864	067921	067978			
Ekip I	100		067062	067808	067865	067922	067979			
Ekip I	160	:	067063	067809	067866	067923	067980			

Electronic tri	p unit -			1SDAR1						
Ekip LSI		lcu (415V)	N	S	Н	L	٧			
	ln	(,	36kA	50kA	70kA	120kA	150kA			
Ekip LSI	10		067067	067810	067867	067924	067981			
Ekip LSI	25		067068	067811	067868	067925	067982			
Ekip LSI	63		067069	067812	067869	067926	067983			
Ekip LSI	100		067070	067813	067870	067927	067984			
Ekip LSI	160		067071	067814	067871	067928	067985			

Electronic tri	p unit -			1SDAR1							
Ekip LSIG		lcu (415V)	N 36kA	S	Н	L	٧				
ln		(,		50kA	70kA	120kA	150kA				
Ekip LSIG	10		067072	067815	067872	067929	067986				
Ekip LSIG	25		067073	067816	067873	067930	067987				
Ekip LSIG	63		067074	067817	067874	067931	067988				
Ekip LSIG	100		067075	067818	067875	067932	067989				
Ekip LSIG	160		067076	067819	067876	067933	067990				

Electronic tr	ip unit -		1SDAR1						
Ekip M-I		lcu (415V)	N	S	Н	L	٧		
***************************************	ln	(4101)	36kA	50kA	70kA	120kA	150kA		
Ekip M-I	20		067086	067829	067886	067943	068000		
Ekip M-I	32		067087	067830	067887	067944	068001		
Ekip M-I	52		067088	067831	067888	067945	068002		
Ekip M-I	100		067089	067832	067889	067946	068003		



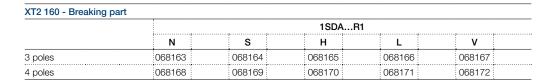
XT2 circuit-breaker

	Electronic trip unit -		1SDAR1						
Ekip LS/I		lcu (415V)	N	S	Н	L	٧		
	In	(,	36kA	50kA	70kA	120kA	150kA		
Ekip LS/I	10		067090	067833	067890	067947	068004		
Ekip LS/I	25		067091	067834	067891	067948	068005		
Ekip LS/I	63		067092	067835	067892	067949	068006		
Ekip LS/I	100		067093	067836	067893	067950	068007		
Ekip LS/I	160		067095	067838	067895	067952	068009		

XT2 160 Ekip	I - Fixed (F) -	4 poles - Fr	ont terminal	s (F)						
Electronic tri	Electronic trip unit -		1SDAR1							
Ekip I		lcu (415V)	N 36kA	S	Н	L	V			
In		(4101)		50kA	70kA	120kA	150kA			
Ekip I	10		067096	067839	067896	067953	068010			
Ekip I	25		067097	067840	067897	067954	068011			
Ekip I	63		067098	067841	067898	067955	068012			
Ekip I	100		067099	067842	067899	067956	068013			
Ekip I	160	:	067101	067844	067901	067958	068015			

Electronic tr	ip unit -		1SDAR1							
Ekip LSI		lcu (415V)	N	S	Н	L	٧			
	In	(,	36kA	50kA	70kA	120kA	150kA			
Ekip LSI	10		067102	067845	067902	067959	068016			
Ekip LSI	25		067103	067846	067903	067960	068017			
Ekip LSI	63		067104	067847	067904	067961	068018			
Ekip LSI	100		067105	067848	067905	067962	068019			
Ekip LSI	160		067107	067850	067907	067964	068021			

Electronic tri	p unit -		1SDAR1						
Ekip LSIG		lcu (415V)	N	S	Н	L	V		
	In	(,	36kA	50kA	70kA	120kA	150kA		
Ekip LSIG	10		067108	067851	067908	067965	068022		
Ekip LSIG	25		067109	067852	067909	067966	068023		
Ekip LSIG	63		067110	067853	067910	067967	068024		
Ekip LSIG	100		067111	067854	067911	067968	068025		
Ekip LSIG	160		067113	067856	067913	067970	068027		





Loose trip unit

Loose trip units X7	Γ2							
Thermomagnetic -	- TMA/TMD				1SD/	\R1		
			3 poles	4 poles	***************************************			
	ln	I ₃						
TMD	16	300	067226	067247				
TMD	20	300	067227	067248				
TMD	25	300	067228	067249				
TMD	32	320	067229	067250				
TMA	40	400	067230	067251				
TMA	50	500	067231	067252				
TMA	63	630	067232	067253				
TMA	80	800	067233	067254				
TMA	100	1000	067234	067255				
TMA	125	1250	067235	067258				
TMA	160	1600	067236	067259	*			
TMA In N=50%	125	1250		067256	•			
TMA In N=50%	160	1600		067257				
			<u>: : : : : : : : : : : : : : : : : : : </u>		:	:	 	<u>. </u>

Loose trip units	XT2										
Thermomagnet	ic - TMG			1SDAR1							
			3 poles	4 poles							
	ln	l ₃									
TMG	80	240	067267	067278							
TMG	100	300	067268	067279							
TMG	125	375	067269	067280							
TMG	160	480	067270	067283							

Loose trip u	nits XT2									
Magnetic on	ıly - MA			1SDAR1						
			3 poles							
	In	l ₃						-	:	
MA	20	120280	067290							
MA	32	192448	067291							
MA	52	314728	067292							
MA	80	4801120	067293							
MA	100	6001400	067294							
MA	160	9602240	076538	:		:	:	:		



Loose trip unit

Ekip LS/I

160

Loose trip units XT2 Electronic - Ekip LS/I 1SDA...R1 3 poles 4 poles In Ekip LS/I 25 067296 067329 Ekip LS/I 63 067297 067330 Ekip LS/I 100 067331 067298

067333

067299

Loose trip units >	KT2										
Electronic - Ekip	I		1SDAR1								
		3 poles	4 poles								
	ln										
Ekip I	25	067301	067335								
Ekip I	63	067302	067336								
Ekip I	100	067303	067337								
Ekip I	160	067304	067339								

Loose trip units	XT2									
Electronic - Ekip LSI			1SDAR1							
		3 poles	4 poles							
	ln									
Ekip LSI	25	067306	067341							
Ekip LSI	63	067307	067342							
Ekip LSI	100	067308	067343							
Ekip LSI	160	067309	067345							

Loose trip units 2	XT2								
Electronic - Ekip LSIG			1SDAR1						
		3 poles	4 poles						
	ln								
Ekip LSIG	25	067311	067347						
Ekip LSIG	63	067312	067348						
Ekip LSIG	100	067313	068052						
Ekip LSIG	160	067314	067350						

Loose trip units XT2									
Electronic - Ekip M-I			1SDAR1						
		3 poles							
	ln								
Ekip M-I	20	067324							
Ekip M-I	32	067325							
Ekip M-I	52	067326				***************************************			
Ekip M-I	100	067327							



Loose trip unit

Electronic - Ekip	M-LIU			1SDA	R1		
		3 poles					
	In						
Ekip M-LIU	25	067352					
Ekip M-LIU	63	067353					
Ekip M-LIU	100	067354					
Ekip M-LIU	160	067355					

Loose trip units XT2	2							
Electronic - Ekip M-LRIU					1SDA	\R1		
			3 poles		•	•		
	ln							
Ekip M-LRIU	25		067357					
Ekip M-LRIU	63		067358		•	•	7	
Ekip M-LRIU	100		067359					

Loose trip units XT2									
Electronic - Ekip G-LS/I			1SDAR1						
		3 poles	4 poles						
	In								
Ekip G-LS/I	25	067362	067368						
Ekip G-LS/I	63	067363	067369						
Ekip G-LS/I	100	067364	067370						
Ekip G-LS/I	160	067365	067372						

Loose trip units XT2	2								
Electronic - Ekip N-LS/I			1SDAR1						
			4 poles						
	In								
Ekip N-LS/I	63		067375						
Ekip N-LS/I	100		067376						

Accessories



Fixed part of plug-in

Fixed parts, conversion kit and accessories for fixed parts

Fixed part of plug-in (P)		

Туре		1SDAR1
	3 poles	4 poles
Kit P PF EF	068187	068190
Kit P PF HR/VR ⁽¹⁾	068189	068191

¹⁾ The terminals are factory-mounted in the horizontal position (HR)



Fixed part of withdrawable

Fixed part of withdrawable (W)

Туре	1SDAR1					
	3 poles	4 poles				
Kit W PF EF	068200	068202				
Kit W PF HR/VR ⁽¹⁾	068201	068203				

⁽¹⁾ The terminals are factory-mounted in the horizontal position (HR)

Terminals for the fixed parts

Туре	1SDAR1						
	3 pcs	4 pcs	6 pcs				
EF - Front Extended Terminals	066262	066263					
R - Rear Terminals HR/VR	066270	066271					
PS - Rear phase separators 90mm		068953	068954				



Conversion kit for turning a fixed circuit-breaker into the moving part of a plug-in circuit-breaker

Conversion Kit of the circuit-breaker from fixed to the moving part of plug-in

Туре	1SDAR1				
	3 poles	4 poles			
P MP KIT	066278	066279			



Conversion kit for turning a fixed circuit-breaker into the moving part of a withdrawable circuit-breaker

Conversion Kit of the circuit-breaker from fixed to the moving part of withdrawable

Туре	1SDAR1	
	3 poles	4 poles
W MP KIT	066284	066285

Conversion Kit of the fixed part from plug-in to withdrawable

Туре	e 1SDA		n i	
FP P>W KIT		066288		

Conversion Kit of RC Sel from Fixed to Plug-in

		R1
	4 poles	
P MP RC Sel 4p KIT	066290	

Accessories

Conversion Kit of RC Sel from plug-in to withdrawable	
Туре	1SDAR1
	4 poles
W MP RC Sel 4p KIT	066292



Key lock/Padlock for fixed part

Key lock for fixed part of withdrawable		
Туре	1SDAR1	
KL-D Key Lock FP, different keys	066293	
KL-S Key Lock FP, same keys N.20005	066294	



Ronis key lock/Padlock for fixed part

Ronis key lock for fixed part of withdrawable		
Туре	1SDAR1	
KL-D Ronis FP key lock, different keys	066298	
KL-S Ronis FP key lock, same Type A keys	066300	



Fixed part adapter

Adapter for mounting the terminals of the fixed circuit-breaker on the fixed part			
Туре		1SDAR1	
	3 poles	4 poles	
ADP Adapter fixed part (2 pieces)	066307	066308	

Note: when use ADP with F/EF/MC terminal, order also "Kit F Front Terminals" - see page 7/27



SOR uncabled

Service releases

SOR-C 380-440V AC

SOR-C 480-525V AC

Shunt opening release -SOR-

	Fixed/Plug-in	Withdrawable		
Uncabled Version				
SOR 12V DC	066313			
SOR 24-30V AC/DC	066314			
SOR 48-60V AC/DC	066315			
SOR 110127V AC / 110125V DC	066316			
SOR 220240V AC / 220250V DC	066317			
SOR 380-440V AC	066318			
SOR 480-525V AC	066319			
Cabled Version				
SOR-C 12V DC	066321	066328		
SOR-C 24-30V AC/DC	066322	066329		
SOR-C 48-60V AC/DC	066323	066330		
SOR-C 110-127V AC / 110-125V DC	066324	066331		
SOR-C 220-240V AC / 220-250V DC	066325	066332		

1SDA...R1

066333

066334



SOR cabled



SOR for withdrawable

YO Test Unit	
Туре	1SDAR1
YO Test Unit	082751

066326

066327



Undervoltage release -UVR-

UVR 110...127V AC / 110...125V DC

UVR 220...240V AC / 220...250V DC

UVR-C 110-127V AC / 110-125V DC

UVR-C 220-240V AC / 220-250V DC

Uncabled Version
UVR 24-30V AC/DC

UVR 48V AC/DC

UVR 60V AC/DC

UVR 380-440V AC

UVR 480-525V AC

UVR-C 48V AC/DC

UVR-C 60V AC/DC

UVR-C 380-440V AC

UVR-C 480-525V AC

Cabled Version
UVR-C 24-30V AC/DC

Type

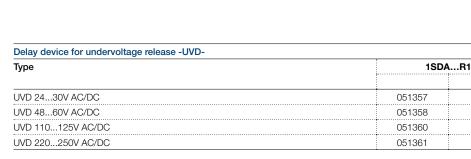
UVR uncabled



UVR cabled



UVR for withdrawable



1SDA...R1

Withdrawable

066403

069066

066404

066405

066406

066407

066408

Fixed/Plug-in

066389

069064

066390

066391

066392

066393

066394

066396

069065

066397

066398

066399

066400

066401



Time delay device for undervoltage release

Accessories

Connectors

Connector of fourth pole for Withdrawable		
Туре	1SDAR1	
Connector 4 th Pole SOR	066415	
Connector 4 th Pole UVR	066418	



Socket-plug panel connector

Socket-Plug Connector on rear of panel		
Туре	1SDAR1	
Socket-plug panel connector with 3PINS	066409	
Socket-plug panel connector with 6PINS	066410	
Socket-plug panel connector with 9PINS	066411	
Socket-plug panel connector with 15PINS	066412	



Fixed part socket-plug connector

Fixed part socket-plug connector	
Туре	1SDAR1
Socket-plug connector of Moving Part 12PINS	066413
Socket-plug connector of Fixed Part 12PINS	066414

Electrical signals



AUX uncabled



AUX cabled



Туре		1SDAR1		
	Fixed/Plug-in	Withdrawable		
Uncabled Version				
AUX 24V DC	066423			
AUX-SA 24V DC	066425			
AUX 250V AC	066422			
AUX-SA 250V AC	066424			
Cabled Version				
AUX-SA-C 24V DC	067116	067117		
AUX-C 1Q+1SY 24V DC	066446	066447		
AUX-C 3Q+1SY 24V DC	066448	066449		
AUX-SA-C 250V AC	066429	066430		
AUX-C 1Q+1SY 250V AC	066431	066432		
AUX-C 2Q+1SY 250V AC	066433			
AUX-C 2Q+2SY+1SA 250V AC	066438	066439		
AUX-C 3Q 250V AC Left	066427			
AUX-C 3Q+1SY 250V AC	066434	066435		
AUX-C 3Q+2SY 250V AC	066436	066437		
AUX-C 1Q+1SY 400V AC	066444	066445		
AUX-C 2Q 400V AC	066440	066443		



AUP - Auxiliary position contacts

Auxiliary Position Contacts -AUP- Type	1SDA R1	
туре	IODAIII	
Cabled Version		
AUP-I – Four Racked-in contacts 250V AC for plug-in/withdrawable circuit-breaker	066450	
AUP-I – Four Racked-in contacts 24V DC for plug-in/withdrawable circuit-breaker	066451	
AUP-R – Two Racked-out contacts 250V AC for withdrawable circuit-breaker	066452	
AUP-R – Two Racked-out contacts 24V DC for withdrawable circuit-breaker	066453	



AUE - Early auxiliary contacts

Early Auxiliary Contacts -AUE-

Туре	1SDAR1		
	Fixed/Plug-in	Withdrawable	
AUE – Two contacts in the rotary handle RHx (Open)	067118	067119	
AUE - Two contacts in the rotary handle RHx (Close)	066454	066455	

Motor Operators



MOE - Motor operator

Stored energy Motor Operator MOE		
Туре	1SDAR1	
NOT ON CO.	200400	
MOE 24V DC	066463	
MOE 4860V DC	066464	
MOE 110125V AC/DC	066465	
MOE 220250V AC/DC	066466	
MOE 380440V AC	066467	
MOE 480525V AC	066468	

Electronic stored energy motor operator MOE-E		
Туре	1SDAR1	
MOE-E 24V DC	066469	
MOE-E 4860V DC	066470	
MOE-E 110125V AC/DC	066471	
MOE-E 220250V AC/DC	066472	
MOE-E 380440V AC	066473	
MOE-E 480525V AC	066474	

Accessories

Direct handle



Transmitted handle

Rotary Handle Operating Mechanism

Rotary Handles			
Туре	1SDAR1		
	Fixed/Plug-in	Withdrawable	
RHD Normal Direct Handle	069053	066476	
RHD Direct Emergency Handle	069054	066478	
RHE Normal Transmitted Handle	069055	066480	
RHE Emergency Transmitted Handle	069056	066482	
RHS L Normal Left Lateral Handle	069058		
RHS L Emergency Left Lateral Handle	069059		
RHS R Normal Right Lateral Handle	069060		
RHS R Emergency Right Lateral Handle	069061		
Transmitted Handle Spare Parts			
RHE_B Base for Transmitted Handle	069057	066484	
RHE_S Rod of 500mm	066576		
RHE_H Normal Transmitted Handle	066577		
RHE_H Emergency Transmitted Handle	066578		
LH Wide Normal Handle	066583		
LH Wide Emergency Handle	066585		



IP54	
------	--

IP54 Protection for transmitted rotary handle		
Туре	1SDAR1	
IP54 protection for transmitted handle -RHE-	066587	

Locks



Fixed padlock

Lock and Padlocks on the circuit-breaker		
Туре	1SDAR1	
PLL Fixed lock with padlocks in open position	066590	
PLL Fixed lock with padlocks in open/closed position	066592	



Key lock on the circuit-breaker

Key lock on the circuit-breaker

Туре	1SDAR1	
KLC Ronis key lock open, different keys, removable in open position	066599	
KLC Ronis key lock open, same Type A keys, removable in open position	066600	
KLC Ronis key lock open, same Type B keys, removable in open position	066601	
KLC Ronis key lock open, same Type C keys, removable in open position	066602	
KLC Ronis key lock open, same Type D keys, removable in open position	066603	
KLC Ronis key lock open, same keys, removable in both position	066604	



Key lock on the handle

Key lock on the handle / front for locks

Туре	1SDAR1
RHL Ronis key lock open, different keys - RHx/FLD	066617
RHL Ronis key lock open, same Type A keys - RHx/FLD	066618
RHL Ronis key lock open, same Type B keys - RHx/FLD	066619
RHL Ronis key lock open, same Type C keys - RHx/FLD	066620
RHL Ronis key lock open, same Type D keys - RHx/FLD	066621
RHL Ronis key lock open/closed, different keys - RHx	066622
RHL Ronis key lock open/closed, different keys - FLD	069182



Key lock on the motor

Key lock on the motor

Туре	1SDAR1
MOL-D Ronis key lock open, different keys	066629
MOL-S Ronis key lock open, same Type A keys	066630
MOL-S Ronis key lock open, same Type B keys	066631
MOL-S Ronis key lock open, same Type C keys	066632
MOL-S Ronis key lock open, same Type D keys	066633
MOL-M Key lock against manual operation	066634



Front for locks

Front for FLD locks

Туре	1SDAR1			
	Fixed/Plug-in		Withdrawable	
Front for FLD locks	066635		066636	



Interlock

Mechanical interlock*

Туре	1SDAR1
MIR-H	066637
MIR-V	066638
Plate XT2 F	066641
Plate XT2 P/W	066642
Plate XT4 F	066645
Plate XT4 P/W	066646

^{*} If the CB interlocked has got a stored energy motor operator (MOE/MOE-E) a key lock between MOL-D and MOL-S is mandatory

Accessories

RC Sel

Residual current devices

Residual current devices		
Туре	1SDAR1	
	4 poles	
RC Sel	067126	

Panel type residual current relay			
Туре	1SDAR1		
RCQ020/A 115-230V AC	065979		
RCQ020/A 415V AC	065980		
Toroid closed Ø 60mm	037394		
Toroid closed Ø 110mm	037395		
Toroid closed Ø 185mm	050543		



Installation

Bracket for fixing onto DIN rail				
Туре		1SDAR1		
	3 poles	4 poles		
DIN50022 KIT	080704	080325		



Terminals, terminal cover and phase separators

Insulating terminal covers			
Туре	1SDAR1		
	3 poles	4 poles	
LTC Low terminal covers	066657	066659	
HTC High terminal covers	066666	066667	



Sealable screws for terminal covers		
Туре	1SDAR1	
Kit with two sealable scrows	066672	



Phase separators

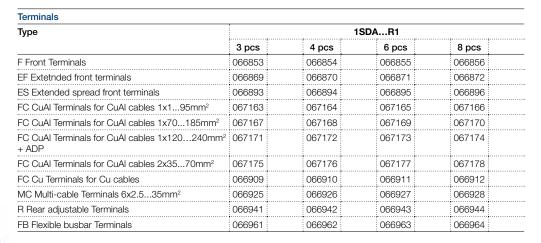
Phase separators				
Туре		1SDAR1		
	4 pcs	6 pcs		
PB Height 25mm	069062	069063		
PB Height 100mm	066675	066680		
PB Height 200mm	066677	066682		



EF Terminal



FCCuAl Terminal





Ekip Display



Ekip LED Meter



Ekip Multimiter Display



Ekip Bluetooth



Ekip Control Panel



Ekip T&P unit

Accessories for electronic trip units

Туре	1SDAR1		
	Fixed/Plug-in	Withdrawable	
Ekip Display	068659	068659	
Ekip LED Meter	068660	068660	
Ekip Com	068661	068662	
Ekip Multimeter Display on front of switchboard	074192	074192	
PR212/CI Contactor control unit	050708	050708	
Ekip Bluetooth	074164	074164	
Ekip Control Panel for 10 circuit-breakers	074311	074311	
Ekip control panel for 30 circuit-breakers	074312	074312	
Ekip View Software for 30 circuit-breakers	074298	074298	
Ekip View software for 60 circuit-breakers	074299	074299	
Ekip View software for unlimited circuit-breakers	074300	074300	
HMI030 Interface on front of panel	063143	063143	

CT	External	noutral

Туре	1SDAR1
CT External neutral of 10A	067211
CT External neutral of 25A	067212
CT External neutral of 63A	069142
CT External neutral of 100A	069143
CT External neutral of 160A	069144

Туре		1SDAR1	
it of 24V DC auxiliary voltage for electronic trip unit it for PTC Connection it for external neutral Connection	Fixed/Plug-in	Withdrawable	
Kit of 24V DC auxiliary voltage for electronic trip units	066980	066981	
Kit for PTC Connection	066982	066983	
Kit for external neutral Connection	066984	066985	
Kit for PR212/CI Connection	066986	066987	

Туре	1SDA	R1
Ekip TT Trip Test Unit	066988	
Ekip T&P Programming and test Unit	066989	

Accessories



ATS021

Automatic transfer devices

ATS021- ATS022 Automatic transfer devices					
Туре	;	4R1			
ATS021	065523				
ATS022	065524				

Warranty

Extended warranty***					
Туре	1SDAR1				
Warranty 2 years - Tmax XT*	069206				
Warranty 4 years - Tmax XT XT1**	069208				
Warranty 5 years - Tmax XT XT1**	082430				

- The registration in the Extended Warranty online tool is mandatory

 * free-of-charge with site details entered

 ** Warranty durations (Warranty periods are measured from the date the circuit breaker leaves the factory):

 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

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

Spare parts

Туре	1SDAR1						
	Fixed/Plug-in		Withdrawable				
SA RC Sel - Opening solenoid of the residual current device	066991		066993				
AUX-C -Loose cabled Auxiliary Contact 250V AC(1)	066994		066995				
AUX-C -Loose cabled Auxiliary Contact 24V DC(1)	066996		066997				

⁽¹⁾ un-numbered cables



Fixed/Moving part connector for withdrawable

Fixed Part Connector for Withdrawable						
Туре	1SD/	R1				
1 connector for fixed part/moving part of withdrawable with 2 PINS for SOR/UVR up to 400V	067213					
1 connector for fixed part/moving part of withdrawable with 3 PINS for AUX up to 400V	067214					



Flange

Туре	1SDAR1								
	3 poles	4 poles	3 poles	4 poles					
Small flange for circuit-breaker	Fixed/ Plug-in	Fixed/ Plug-in	With- drawable	With- drawable					
Small flange for circuit-breaker	068657	068657							
Large flange for circuit-breaker	068641	068642							
Flange for MOE/MOE-E/FLD	068649	068649	068650	068650					
Flange for direct handle RHD	068651	068651	068652	068652					
Flange for residual current RC Sel		066647		066648					



XT3 circuit-breaker

Thermomagnetic trip unit - TMD											
		Icu (415V)	N	S							
••••••	In	l ₃	(,	36kA	50kA						
TMD	63	630		068053	068215				:		
TMD	80	800		068054	068216						
TMD	100	1000		068055	068217						
TMD	125	1250		068056	068218						
TMD	160	1600		068057	068219						
TMD	200	2000		068058	068220						
TMD	250	2500		068059	068221				:	:	

XT3 250 TMD	- Fixed (I	F) - 4 pol	es - Fro	nt terminal	s (F)							
	Thermomagnetic trip unit -			1SDAR1								
TMD			Icu (415V)	N	S							
	ln	l ₃	(,	36kA	50kA							
TMD	63	630		068060	068222							
TMD	80	800		068061	068223							
TMD	100	1000		068062	068224							
In N=50%	125	1250		068063	068225							
In N=50%	160	1600		068064	068226							
In N=50%	200	2000		068065	068227							
In N=50%	250	2500		068066	068228							
In N=100%	125	1250		068067	068229							
In N=100%	160	1600		068068	068230							
In N=100%	200	2000		068069	068231							
In N=100%	250	2500		068070	068232						:	

XT3 250 TMG - Fixed (F) - 3 po Thermomagnetic trip unit -		1	:	, (·)	\R1			-			
TMG		lcu	ļ		IOUF	NI	<u>.</u>	·····	·····	·····	
		(415V)	. N	S							
	ln	I ₃		36kA	50kA						
TMG	63	400		068251	068265						
TMG	80	400		068252	068266						
TMG	100	400		068253	068267	:					
TMG	125	400		068254	068268						
TMG	160	480		068255	068269						
TMG	200	600		068256	068270						
TMG	250	750		068257	068271	:	:	.	:	:	

Thermomagnetic trip unit - TMG					18	SDAR1				
		lcu (415V)	N	S						
•••••	ln	l ₃	(,	36kA	50kA					
TMG	63	400		068258	068272					
TMG	80	400		068259	068273					
TMG	100	400		068260	068274					
TMG	125	400		068261	068275					
TMG	160	480		068262	068276					
TMG	200	600		068263	068277					
TMG	250	750		068264	068278	:	:	:		



XT3 circuit-breaker

Magnetic only trip unit - MA					1SDAR1						
		lcu (415V)	N	S							
***************************************	ln	l ₃	(,	36kA	50kA						
MA	100	6001200		068071	068279						
MA	125	7501500		068072	068280						
MA	160	9601920		068073	068281						
MA	200	12002400		068074	068282						



XT3D switch-disconnector

XT3D - Switch-disconnector					
		1SDAR1			
	3 poles	4 poles			
XT3D	068210	068211			

Accessories

Fixed parts, conversion kit and accessories for fixed parts



Fixed part of plug-in

Fixed part of plug-in (P)					
Туре		1SDAR1			
	3 poles	4 poles			
Kit P PF EF	068192	068194			
Kit P PF HR/VR ⁽¹⁾	068193	068195			

The terminals are factory-mounted in the horizontal position (HR)

Туре	1SDAR1			
	3 pcs	4 pcs	6 pcs	
EF - Front Extended Terminals	066264	066265		
R - Rear Terminals HR/VR	066272	066273		
PS - Rear phase separators 90mm		068953	068954	



Conversion kit for turning a fixed circuit-breaker into the moving part of a plug-in circuit-breaker

Туре		1SDAR1		
	3 poles	4 poles		
P MP KIT	066280	066281		



Fixed part adapter

Adapter for mounting the terminals of the fixed circuit-breaker on the fixed part

Туре	1SDAR1			
	3 poles	4 poles		
ADP adapter fixed part (2 pieces)	066309	066310		

Note: when use ADP with F/EF/MC terminal, order also "Kit F Front Terminals" - see page 7/37



SOR uncabled



SOR cabled

Service releases

SOR-C 480-525V AC

Shunt Opening release -SOR-				
Туре	1SDAR1			
Uncabled Version				
SOR 12V DC	066313			
SOR 24-30V AC/DC	066314			
SOR 48-60V AC/DC	066315			
SOR 110127V AC / 110125V DC	066316			
SOR 220240V AC / 220250V DC	066317			
SOR 380-440V AC	066318			
SOR 480-525V AC	066319			
Cabled Version				
SOR-C 12V DC	066321			
SOR-C 24-30V AC/DC	066322			
SOR-C 48-60V AC/DC	066323			
SOR-C 110-127V AC / 110-125V DC	066324			
SOR-C 220-240V AC / 220-250V DC	066325			
SOR-C 380-440V AC	066326			

YO Test Unit				
Туре	1SDAR1			
YO Test Unit	082751			

Accessories



UVR uncabled



Туре	1SDAR1
туре	IODAnı
Uncabled Version	
UVR 24-30V AC/DC	066389
UVR 48V AC/DC	069064
UVR 60V AC/DC	066390
UVR 110127V AC - 110125V DC	066391
UVR 220240V AC - 220250V DC	066392
UVR 380-440V AC	066393
UVR 480-525V AC	066394
Cabled Version	
UVR-C 24-30V AC/DC	066396
UVR-C 48V AC/DC	069065
UVR-C 60V AC/DC	066397
UVR-C 110-127V AC - 110-125V DC	066398
UVR-C 220-240V AC - 220-250V DC	066399
UVR-C 380-440V AC	066400
UVR-C 480-525V AC	066401



Time delay device for undervoltage release

Туре	1SDAR1
UVD 2430V AC/DC	051357
UVD 4860V AC/DC	051358
UVD 110125V AC/DC	051360
UVD 220250V AC/DC	051361

Socket-plug panel connector

Connectors

Socket Plug Connector on rear of panel				
Туре	1SDAR1			
Socket-plug panel connector with 3PINS	066409			
Socket-plug panel connector with 6PINS	066410			
Socket-plug panel connector with 9PINS	066411			
Socket-plug panel connector with 15PINS	066412			



AUX uncabled



AUX cabled

Electrical signals

Auxiliary Contacts -AUX-		
Туре	1SDAR1	
Uncabled Version		
AUX 24V DC	066423	
AUX 250V AC	066422	
Cabled Version		
AUX-C 1Q+1SY 24V DC	066446	
AUX-C 3Q+1SY 24V DC	066448	
AUX-C 1Q+1SY 250V AC	066431	
AUX-C 2Q+1SY 250V AC	066433	
AUX-C 3Q 250V AC Left	066428	
AUX-C 3Q+1SY 250V AC	066434	



AUP - Auxiliary position contacts

Auxiliary position contacts -AUP-			
Туре		1SDAR1	
Cabled Version			
AUP-I – Four Racked-in contacts 250V AC for plug-in circuit-breaker	066450		
AUP-I – Four Racked-in contacts 24V DC for plug-in circuit-breaker	066451		



AUE - Early auxiliary contacts

Early auxiliary contacts -AUE-		
Туре	1SDAR1	
AUE – Two contacts in the rotary handle RHx (closed)	066454	
AUE - Two contacts in the rotary handle RHx (open)	067118	

Accessories



Motor operator

Motor Operators

Motor operator with direct action -MOD-		
Туре	1SDAR1	
MOD 24V DC	066457	
MOD 4860V DC	066458	
MOD 110125V AC/DC	066459	
MOD 220250V AC/DC	066460	
MOD 380440V AC	066461	
MOD 480525V AC	066462	

to an

Rotary Handles



Transmitted rotary handle

Rotary Handle Operating Mechanism

Rotary Handles		
Туре	1SDAR1	
Rotary Handle Operating Mechanism		
RHD Normal Direct Handle	066475	
RHD Direct Emergency Handle	066477	
RHE Normal Transmitted Handle	066479	
RHE Emergency Transmitted Handle	066481	
RHS-L Normal left lateral handle	066579	
RHS-L Emergency left lateral handle	066580	
RHS-R Normal right lateral handle	066581	
RHS-R Emergency right lateral handle	066582	
Transmitted Handle Spare Parts		
RHE_B Base for Transmitted Handle	066483	
RHE_S Rod of 500mm	066576	
RHE_H Normal Transmitted Handle	066577	
RHE_H Emergency Transmitted Handle	066578	
LH Normal large handle	066583	
LH Large emergency handle	066585	



IP54

IP54 Protection for transmitted rotary handle		
Туре	1SDAR1	
IP54 Protection for transmitted handle -RHF-	066587	



Fixed padlock

Locks

Padlock on the circuit-breaker		
Туре	1SDAR1	
PLL Removable lock with padlocks in open position	066588	
PLL Fixed lock with padlocks in open position	066589	
PLL Fixed lock with padlocks in open/closed position	066591	



Key lock on the circuit-breaker

Key lock on the circuit-breake		Key	lock	on	the	circui	t-b	rea	ker
--------------------------------	--	-----	------	----	-----	--------	-----	-----	-----

Туре	1SDAR1		
KLC Ronis key lock open, different keys, removable in open position	066605		
KLC Ronis key lock open, same Type A keys, removable in open position	066606		
KLC Ronis key lock open, same Type B keys, removable in open position	066607		
KLC Ronis key lock open, same Type C keys, removable in open position	066608		
KLC Ronis key lock open, same Type D keys, removable in open position	066609		
KLC Ronis key lock open, same keys, removable in both position	066610		



Key lock on the handle

Key lock on the handle

Туре	1SDAR1
RHL Ronis key lock open, different keys - RHx	066617
RHL Ronis key lock open, same Type A keys - RHx	066618
RHL Ronis key lock open, same Type B keys - RHx	066619
RHL Ronis key lock open, same Type C keys - RHx	066620
RHL Ronis key lock open, same Type D keys - RHx	066621
RHL Ronis key lock open/closed, different keys - RHx	066622



Key lock on the motor

Key lock on the motor

Туре	1SDAR1
MOL-D Ronis key lock open, different keys	066623
MOL-S Ronis key lock open, same Type A keys	066624
MOL-S Ronis key lock open, same Type B keys	066625
MOL-S Ronis key lock open, same Type C keys	066626
MOL-S Ronis key lock open, same Type D keys	066627



Interlock

Mechanical interlock

Туре	1SDAR1
MIR-H	066637
MIR-V	066638
Plate XT1 F	066639
Plate XT1 P	066640
Plate XT3 F	066643
Plate XT3 P	066644

Couldbio 200k of Mornial Cotting	
Туре	1SDAR1

Accessories



RC Inst / RC Sel

Lock on thermal setting for TMD trip unit	066651	

Residual current devices

Residual current devices			
Туре		1SDAR1	
	3 poles	4 poles	
RC Inst	067127	067129	
RC Sel	067128	067130	
RC B Type		067132	

Panel type residual current relay		
Туре	1SDAR1	
RCQ020/A 115-230V AC	065979	
RCQ020/A 415V AC	065980	
Toroid closed Ø 60mm	037394	
Toroid closed Ø 110mm	037395	
Toroid closed Ø 185mm	050543	



DIN Guide

Installation

Bracket for fixing onto DIN rail			
Туре	1SDAR1		
	3 poles	4 poles	
DIN50022 KIT	066420	066421	
DIN50022 XT3+BC Inst / BC Sel	067139	067139	



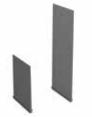
Terminals, terminal covers, phase separators

Insulating terminal covers				
Type 1SDA		1SDAR1	\R1	
	3 poles	4 poles		
LTC Low terminal covers	066660	066661		
HTC High terminal covers	06668	066669		



Sealable screw

Sealable screws for terminal covers				
Туре	1SDAR1			
Kit (2 pcs) sealable screws	066672			



Phase separators

Phase separators			
Туре	1SDAR1		
	4 pcs	6 pcs	
PB Height 25mm	066674	066679	
PB Height 100mm	066676	066681	
PB Height 200mm	066678	066683	



EF Terminal



FCCuAl Terminal



ATS021

Terminals 1SDA...R1 Туре 6 pcs 3 pcs 4 pcs 8 pcs F Front Terminals 066857 066858 066859 066860 EF Extetnded front terminals 066874 066875 066873 066876 066899 ES Extended spread front terminals 066897 066898 066900 067181 FC CuAl terminals for CuAl cables 1x185mm² 067179 067180 067182 FC CuAl terminals for CuAl cables $1x120...240 mm^2 \ 067183$ 067184 067185 067186 + ADP FC CuAl terminals for CuAl cables 2x35...120mm² 067187 067188 067189 067190 FC CuAl terminals for CuAl cables 1x35...150mm² 066274 066275 066584 066586 FC Cu terminals for Cu cables 066913 066914 066915 066916 MC Multi-cable Terminals 6x2.5...35mm² 066929 066930 066931 066932 R Rear adjustable terminals 066945 066946 066947 066948

066965

Automatic transfer devices

R-RC Rear terminal for Residual current Inst-Sel

FB Flexible busbar Terminals

ATS021- ATS022 Automatic transfer devices				
Туре	1SDAR1			
ATS021	065523			
ATS022	065524			

066966

066954

066967

066968

Warranty

Extended warranty***			
Туре	1SDAR1		
Warranty 2 years - Tmax XT*	069206		
Warranty 4 years - Tmax XT XT1**	069209		
Warranty 5 years - Tmax XT XT1**	082431		

The registration in the Extended Warranty online tool is mandatory

Spare parts

Туре	1SDAR1	
SA RC Sel/RC Inst/RC B Type - Opening solenoid of the residual current device	066992	
SA RC B Type - Opening solenoid of the residual current device	067208	
AUX-C - Loose uncabled Auxiliary Contact 250V ⁽¹⁾	066994	
AUX-C - Loose cabled auxiliary contact 24V ⁽¹⁾	066996	

⁽¹⁾ un-numbered cables



Flange

Туре		1SDAR1
	3 poles	4 poles
Small flange for Circuit-breaker	068657	068657
Large flange for Circuit-breaker	068644	068645
Flange for MOD	068648	068648
Flange for direct handle RHD	068651	068651
Flange for residual current RC Sel/RC Inst	068655	068656

^{*} free-of-charge with site details entered

** Warranty durations (Warranty periods are measured from the date the circuit breaker leaves the factory):

^{- 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

^{***} Order only with the circuit breaker. Specify Registration code in the order to activate the warranty.



XT4 circuit-breaker

Thermomagne	etic trip ur	nit -	:			1SDAF	R1	
TMD/TMA			lcu (415V)	N	S	Н	L	٧
	ln	l ₃	, ,	36kA	50kA	70kA	120kA	150kA
TMD	16	300		068076	068299	068332	068365	068398
TMD	20	300		068080	068300	068333	068366	068399
TMD	25	300		068081	068301	068334	068367	068400
TMD	32	320		068082	068302	068335	068368	068401
TMA	40	400		068083	068303	068336	068369	068402
TMA	50	500		068084	068304	068337	068370	068403
TMA	63	630		068085	068305	068338	068371	068404
TMA	80	800		068086	068306	068339	068372	068405
TMA	100	1000		068087	068307	068340	068373	068406
TMA	125	1250		068088	068308	068341	068374	068407
TMA	160	1600		068089	068309	068342	068375	068408

XT4 250 TMD	XT4 250 TMD/TMA - Fixed (F) - 3 poles - Front terminals (F)											
Thermomagne	etic trip ur	nit -				1SDAR	1					
TMD/TMA			lcu (415V)	N	S	Н	L	V				
	ln	I ₃	(,	36kA	50kA	70kA	120kA	150kA				
TMA	200	2000		068090	068310	068343	068376	068409				
TMA	225	2250		068091	068311	068344	068377	068410				
TMA	250	2500		068092	068312	068345	068378	068411				

XT4 160 TMD/TN			4 poles	S - FTOTIL LETT	illiais (r)	1SDAF	.4	
Thermomagnetic TMD/TMA	c trip ti	IIL -	lcu (415V)	N	S	Н	L	V
	ln	l ₃	(4101)	36kA	50kA	70kA	120kA	150kA
TMD	16	300		068093	068313	068346	068379	068412
TMD	20	300		068094	068314	068347	068380	068413
TMD	25	300		068095	068315	068348	068381	068414
TMD	32	320		068096	068316	068349	068382	068415
TMA	40	400		068097	068317	068350	068383	068416
TMA	50	500		068098	068318	068351	068384	068417
TMA	63	630		068099	068319	068352	068385	068418
TMA	80	800		068100	068320	068353	068386	068419
ГМА	100	1000		068101	068321	068354	068387	068420
ΓΜΑ In N=50%	125	1250		068102	068322	068355	068388	068421
ΓMA In N=50%	160	1600		068103	068323	068356	068389	068422
ΓMA In N=100%	125	1250		068107	068327	068360	068393	068426
TMA In N=100%	160	1600		068108	068328	068361	068394	068427

Thermomagnetic	c trip ui	nit -		1SDAR1							
TMD/TMA	MD/TMA		lcu (415V)	N	S	Н	L	٧			
			In I ₃		(,	36kA	50kA	70kA	120kA	150kA	
TMA In N=50%	200	2000		068104	068324	068357	068390	068423			
TMA In N=50%	225	2250		068105	068325	068358	068391	068424			
TMA In N=50%	250	2500		068106	068326	068359	068392	068425			
TMA In N=100%	200	2000		068109	068329	068362	068395	068428			
TMA In N=100%	225	2250		068110	068330	068363	068396	068429			
TMA In N=100%	250	2500		068111	068331	068364	068397	068430			



XT4 circuit-breaker

XT4 160 MA - Fixed (F) - 3 poles - Front terminals (F)

Magnet	c only trip i	unit -				1SDAR	1	
MA			lcu (415V)	N	S	Н	L	٧
•••••	ln	l ₃	(,	36kA	50kA	70kA	120kA	150kA
MA	10(1)	50100		068112	068431	068441	068451	068461
MA	12.5(1)	62.5125		068113	068432	068442	068452	068462
MA	20	100200		068114	068433	068443	068453	068463
MA	32	160320		068115	068434	068444	068454	068464
MA	52	260520		068116	068435	068445	068455	068465
MA	80	400800		068117	068436	068446	068456	068466
MA	100	5001000		068118	068437	068447	068457	068467
MA	125	6251250		068119	068438	068448	068458	068468
MA	160	8001600		068120	068439	068449	068459	068469

⁽¹⁾ Available stortly, please ask ABB SACE

XT4 250 MA - Fixed (F) - 3 poles - Front terminals (F)

Magnetic or	nly trip	unit -				1SDA	R1			
MA			lcu (415V)	N	S	Н		L	٧	
	ln	l ₃	(,	36kA	50kA	70kA		120kA	150kA	
MA	200	10002000		068121	068440	068450		068460	068470	

XT4 160 Ekip LS/I - Fixed (F) - 3 poles - Front terminals (F)

Electronic tr	ip unit -				1SDAF	11	
Ekip LS/I		lcu (415V)		S	Н	L	V
•••••	In	(4100)	36kA	50kA	70kA	120kA	150kA
Ekip LS/I	40		068122	068471	068511	068551	068591
Ekip LS/I	63		068123	068472	068512	068552	068592
Ekip LS/I	100		068124	068473	068513	068553	068593
Ekip LS/I	160		068125	068474	068514	068554	068594

XT4 250 Ekip LS/I - Fixed (F) - 3 poles - Front terminals (F)

Electronic trip	unit -							1SDA	R1			
Ekip LS/I	:		(415V)				Н		L	٧		
•••••	ln		(,	36kA		50kA		70kA		120kA	150kA	
Ekip LS/I	250			068126		068475		068515		068555	068595	

XT4 160 Ekip I - Fixed (F) - 3 poles - Front terminals (F)

Electronic tri	p unit -		1SDAR1								
Ekip I		lcu (415V)	N	S	Н	L	V				
	ln	(,	36kA	50kA	70kA	120kA	150kA				
Ekip I	40		068127	068476	068516	068556	068596				
Ekip I	63		068128	068477	068517	068557	068597				
Ekip I	100	 :	068129	068478	068518	068558	068598				
Ekip I	160		068130	068479	068519	068559	068599				

XT4 250 Ekip I - Fixed (F) - 3 poles - Front terminals (F)

Electronic trip	unit -		1SDAR1				 			
Ekip I		lcu (415V)	N		S		Н	L	V	
	ln	(,	36kA		50kA		70kA	120kA	150kA	
Ekip I	250		068131		068480		068520	068560	068600	



XT4 circuit-breaker

Electronic to	ip unit -			1SDAR1							
Ekip LSI	p LSI		N	S	Н	L	٧				
***************************************	In	(415V)	36kA	50kA	70kA	120kA	150kA				
Ekip LSI	40		068132	068481	068521	068561	068601				
Ekip LSI	63		068133	068482	068522	068562	068602				
Ekip LSI	100		068134	068483	068523	068563	068603				
Ekip LSI	160		068135	068484	068524	068564	068604				

XT4 250 Ekip	LSI - Fixe	ed (F) - 3	poles -	Front te	rminals	(F)					
Electronic trip	unit -						1SDA	R1			
Ekip LSI			lcu (415V)	N		S	 Н		L	٧	
	ln		(36kA		50kA	70kA		120kA	150kA	
Ekip LSI	250			068136		068485	068525		068565	068605	

Electronic tri	p unit -				1SDAR	11	
Ekip LSIG		(415V)	lcu (415V) N S H	Н	L	٧	
	In	(1.01)	36kA	50kA	70kA	120kA	150kA
Ekip LSIG	40		068137	068486	068526	068566	068606
Ekip LSIG	63		068138	068487	068527	068567	068607
Ekip LSIG	100		068139	068488	068528	068568	068608
Ekip LSIG	160		068140	068489	068529	068569	068609

XT4 250 Ekip	LSIG - Fi	xed (F) -	3 poles	- Front	terminal	s (F)					
Electronic trip	unit -						1SDA	R1			
Ekip LSIG			lcu (415V)	N		S	Н		L	٧	
	ln		,,	36kA		50kA	70kA		120kA	150kA	
Ekip LSIG	250			068141		068490	068530		068570	068610	

Electronic trip	unit -				1SDAR	1	
Ekip E-LSIG		lcu (415V)	N	S	Н	L	٧
	In	(,	36kA	50kA	70kA	120kA	150kA
Ekip E-LSIG	40		069601	069611	069621	069631	069641
Ekip E-LSIG	63		069602	069612	069622	069632	069642
Ekip E-LSIG	100		069603	069613	069623	069633	069643
Ekip E-LSIG	160		069604	069614	069624	069634	069644

XT4 250 Ekip	E-LSIG -	Fixed (F)	- 3 pol	es - Fror	nt termin	als (F)						
Electronic trip	unit -						1SDA	R1				
Ekip E-LSIG			lcu (415V)	N		S	 Н		L		٧	
	ln		(4101)	36kA		50kA	70kA		120kA		150kA	
Ekip E-LSIG	250			069605		069615	069625		069635	(069645	



XT4 circuit-breaker

Electronic tr	ip unit -				1SDAR	1	
Ekip LS/I		lcu (415V)	N	S	Н	L	٧
•••••	In	(,	36kA	50kA	70kA	120kA	150kA
Ekip LS/I	40		068142	068491	068531	068571	068611
Ekip LS/I	63		068144	068492	068532	068572	068612
Ekip LS/I	100		068145	068493	068533	068573	068613
Ekin I S/I	160	:	068146	068494	068534	068574	068614

XT4 250 Ekip	LS/I - Fix	ed (F) - 4	poles	- Front t	erminals (F)				
Electronic tri	p unit -					1SD	AR1		
Ekip LS/I	Ekip LS/I lo				S	Н	L	V	
••••••	In		(4101)	36kA	50kA	70kA	120k	A 150k/	٩
Ekin I C/I	250			060147	06040	06053	0605	75 06061	5

Electronic	trip unit -				1SDAF	1	
Ekip I		lcu (415V)	N	S	Н	L	٧
	ln	(,	36kA	50kA	70kA	120kA	150kA
Ekip I	40		068148	068496	068536	068576	068616
Ekip I	63		068149	068497	068537	068577	068617
Ekip I	100		068150	068498	068538	068578	068618
Ekip I	160		068151	068499	068539	068579	068619

XT4 250 Ekip	I - Fixed ((F) - 4 po	les - Fr	ont term	inals (F))							
Electronic trip	unit -			1SDAR1									
Ekip I			lcu (415V)	N		S		Н		L		٧	
	In		(,	36kA		50kA		70kA		120kA		150kA	
Ekip I	250			068152		068500		068540		068580		068620	

Electronic to	rip unit -				1SDAR	1	
Ekip LSI		lcu (415V)	N	S	Н	L	٧
••••••	ln	(1.01)	36kA	50kA	70kA	120kA	150kA
Ekip LSI	40		068153	068501	068541	068581	068621
Ekip LSI	63		068154	068502	068542	068582	068622
Ekip LSI	100		068155	068503	068543	068583	068623
Ekip LSI	160		068156	068504	068544	068584	068624

XT4 250 Ekip Electronic trip		ed (F) - 4	poles -	Front te	rminals	(F)	1SDA	R1			
Ekip LSI			lcu (415V)	N		S	 Н		L	٧	
	In		(,	36kA		50kA	70kA		120kA	150kA	
Ekip LSI	250			068157		068505	068545		068585	068625	



XT4 circuit-breaker

Electronic tri	p unit -				1SDAR	1	
Ekip LSIG		lcu (415V)	N	S	Н	L	V
***************************************	In	(,	36kA	50kA	70kA	120kA	150kA
Ekip LSIG	40		068158	068506	068546	068586	068626
Ekip LSIG	63		068159	068507	068547	068587	068627
Ekip LSIG	100		068160	068508	068548	068588	068628
Ekip LSIG	160		068161	068509	068549	068589	068629

XT4 250 Ekip LSIG - Fixed (F) - 4 poles - Front terminals (F) Electronic trip unit - 1SDAR1													
Ekip LSIG			lcu (415V)	N	N S H L V								
•••••	ln		(+101)	36kA		50kA		70kA		120kA		150kA	
Ekip LSIG	250			068162		068510		068550		068590	C	068630	

Electronic trip	unit -				1SDAR	1	
Ekip E-LSIG		lcu (415V)	N	S	Н	L	٧
	In	(,	36kA	50kA	70kA	120kA	150kA
Ekip E-LSIG	40		069606	069616	069626	069636	069646
Ekip E-LSIG	63		069607	069617	069627	069637	069647
Ekip E-LSIG	100		069608	069618	069628	069638	069648
Ekip E-LSIG	160		069609	069619	069629	069639	069649

Electronic trip unit - Ekip E-LSIG						1SD/	\R1				
		lcu (415V)	N		S	Н		L	٧		
	ln		(,	36kA		50kA	70kA	12	0kA	150kA	
Ekip E-LSIG	250			069610	0	69620	069630	069	9640	069650	



XT4D switch-disconnector

XT4 D - Switch-disconnector			
		1SDAR1	
	3 poles	4 poles	
XT4 D	068212	068213	-

XT4 160 - Breaking part 1SDA...R1 Ν s Н 3 poles 068289 068290 068291 068292 068293 4 poles 068294 068295 068296 068297 068298

XT4 250 - Breaking part									
		1SDAR1							
	N	S	Н	L	٧				
3 poles	068173	068174	068175	068176	068177				
4 poles	068178	068179	068180	068181	068182				



Loose trip units

Loose trip units XT4 Thermomagnetic - TMD	/TMA			1SDAR1
			3 poles	4 poles
	In	l ₃		
TMD	16	300	067377	067465
TMD	20	300	067378	067468
TMD	25	300	067379	067469
TMD	32	320	067380	067470
TMA	40	400	067381	067471
TMA	50	500	067382	067472
TMA	63	630	067383	067473
TMA	80	800	067384	067474
TMA	100	1000	067385	067475
TMA	125	1250	067386	067481
TMA	160	1600	067387	067482
TMA	200	2000	067388	067483
TMA	225	2250	067389	067484
TMA	250	2500	067390	067485
TMA In N=50%	125	1250		067476
TMA In N=50%	160	1600		067477
TMA In N=50%	200	2000		067478
TMA In N=50%	225	2250		067479
TMA In N=50%	250	2500		067480

Loose trip units XT4						
Magnetic only - MA			1SDAR1			
			3 poles			
	ln	l ₃				
MA	20	100200	067490			
MA	32	160320	067491			
MA	52	260520	067492			
MA	80	400800	067493			
MA	100	5001000	067494			
MA	125	6251250	067495			
MA	160	8001600	067496			
MA	200	10002000	067497			



Loose trip units

Loose trip units XT4	<u> </u>					
Electronic - Ekip LS	/I	1SDAR1				
	3 poles		4 poles			
	ln					
Ekip LS/I	40	067498	067518			
Ekip LS/I	63	067499	067519			
Ekip LS/I	100	067500	067520			
Ekip LS/I	160	067501	067521			
Ekip LS/I	250	067502	067522			

Loose trip units XT4	4					
Electronic - Ekip I		1SDAR1				
		3 poles	4 poles			
	In					
Ekip I	40	067503	067523			
Ekip I	63	067504	067524			
Ekip I	100	067505	067525			
Ekip I	160	067506	067526			
Ekip I	250	067507	067527			

Electronic - Ekip LSI		1SDAR1				
		3 poles	4 poles			
	ln					
Ekip LSI	40	067508	067528			
Ekip LSI	63	067509	067529			
Ekip LSI	100	067510	067530			
Ekip LSI	160	067511	067531			
Ekip LSI	250	067512	067532			

Loose trip units XT4						
Electronic - Ekip LSI	G	1SDAR1				
		3 poles	4 poles			
•••••	ln					
Ekip LSIG	40	067513	067533			
Ekip LSIG	63	067514	067534			
Ekip LSIG	100	067515	067535			
Ekip LSIG	160	067516	067536			
Ekip LSIG	250	067517	067537			

Loose trip units XT4						
Electronic - Ekip E-LSI	G	1SDAR1				
		3 poles	4 poles			
	ln					
Ekip E-LSIG	40	069591	069596			
Ekip E-LSIG	63	069592	069597			
Ekip E-LSIG	100	069593	069598			
Ekip E-LSIG	160	069594	069599			
Ekip E-LSIG	250	069595	069600			



Loose trip units

Loose trip units XT4 Electronic - Ekip M-LIU 1SDA...R1 3 poles In Ekip M-LIU 40 068028 Ekip M-LIU 63 068029 Ekip M-LIU 068030 100 Ekip M-LIU 068031 160

Loose trip units XT4				
Electronic - Ekip M-LRIU		1SDAR1		
		3 poles		
	In			
Ekip M-LRIU	40	068033		
Ekip M-LRIU	63	068034		
Ekip M-LRIU	100	068035		
Ekip M-LRIU	160	068036		
Ekip M-LRIU	200	068037		

Loose trip units XT4				
Electronic - Ekip G-LS/I		1SDAR1		
		3 poles	4 poles	
	ln			
Ekip G-LS/I	40	068038	068043	
Ekip G-LS/I	63	068039	068044	
Ekip G-LS/I	100	068040	068045	
Ekip G-LS/I	160	068041	068046	
Ekip G-LS/I	250	068042	068047	

Loose trip units XT4					
Electronic - Ekip N-LS/I			1SDAR1		
			4 poles	•	
	ln .				
Ekip N-LS/I	40		068048		
Ekip N-LS/I	63		068049		
Ekip N-LS/I	100		068050	•	
Ekip N-LS/I	160		068051		

Accessories



Fixed part of plug-in

Fixed parts, conversion kit and accessories for fixed parts

Туре	1SDAR1			
	3 poles		4 poles	
Kit P PF EF	068196		068198	
Kit P PF HR/VR ⁽¹⁾	068197		068199	

The terminals are factory-mounted in the horizontal position (HR)



Fixed part of withdrawable

Fixed part of withdrawable (W)				
Туре		1SDAR1		
	3 poles	4 poles		
Kit W PF EF	068204	068206		

068207

⁽¹⁾ The terminals are factory-mounted in the horizontal position (HR)

Terminals for the fixed parts						
Туре	1SDAR1					
	3 pcs		4 pcs		6 pcs	
EF - Front Extended Terminals	066266		066267			
R - Rear Terminals HR/VR	066272		066273			
PS - Rear phase separators 90mm			068953		068954	



Conversion kit for turning a fixed circuit-breaker into the moving part of a plug-in circuit-breaker

Conversion Kit of the circuit-breaker from fixed into moving part of plug-in				
Туре		1SDAR1		
	3 poles	4 poles		
P MP KIT	066282	066283		



Conversion kit for turning a fixed circuit-breaker into the moving part of a withdrawable circuit-breaker

Туре	1SDAR1		
	3 pcs	4 pcs	
W MP KIT	066286	066287	

Conversion Kit of the fixed part from plug-in to withdrawable				
Туре		1SDA	\R1	
FP P>W KIT		066289		

Conversion Kit of RC from fixed to plug-in			
Туре	1SDAR1		
	4 poles		
P MP RC Sel XT2 4p KIT	066291		

Conversion Kit of RC from plug-in to withdrawable Type 1SDA...R1 4 poles W MP RC Sel KIT 067115



Key lock/padlock for fixed part

Key lock/padlock for fixed part of withdrawable		
Туре	1SDAR1	
KL-D Key Lock FP, different keys	066293	
KL-S Key Lock FP. same keys N.20005	066294	



Ronis key lock/padlock for fixed part

Ronis key/padlock lock for fixed part of withdrawable		
Туре	1SDAR1	
KL-D Ronis FP key lock, different keys	066298	
KL-S Ronis FP key lock, same Type A keys	066300	



Fixed part adapter

Туре	1SDAR1		
	3 poles	4 poles	
ADP adapter fixed part (2 pieces)	066311	066312	

Note: when use ADP with F/EF/MC terminal, order also "Kit F Front Terminals" - see page 7/54



SOR uncabled

Service releases

Shunt Opening release -SOR-			
Туре	1SDAR1		
	Fixed/Plug-in	Withdrawable	
Uncabled Version			
SOR 12V DC	066313		
SOR 24-30V AC/DC	066314		
SOR 48-60V AC/DC	066315		
SOR 110127V AC / 110125V DC	066316		
SOR 220240V AC / 220250V DC	066317		
SOR 380-440V AC	066318		
SOR 480-525V AC	066319		
Cabled Version			
SOR-C 12V DC	066321	066328	
SOR-C 24-30V AC/DC	066322	066329	
SOR-C 48-60V AC/DC	066323	066330	
SOR-C 110-127V AC / 110-125V DC	066324	066331	
SOR-C 220-240V AC / 220-250V DC	066325	066332	
SOR-C 380-440V AC	066326	066333	
SOR-C 480-525V AC	066327	066334	



YO Test Unit		
Туре	1SDAR1	
YO Test Unit	082751	

Ordering codes for XT4

Accessories



UVR uncabled



UVR cabled



SOR for withdrawable



Time delay device for undervoltage release

Undervoltage release -UVR-			
Туре	1SDAR1		
	Fixed/Plug-in	Withdrawable	
Uncabled Version			
UVR 24-30V AC/DC	066389		
UVR 48V AC/DC	069064		
UVR 60V AC/DC	066390		
UVR 110127V AC / 110125V DC	066391		
UVR 220240V AC / 220250V DC	066392		
UVR 380-440V AC	066393		
UVR 480-525V AC	066394		
Cabled Version			
UVR-C 24-30V AC/DC	066396	066403	
UVR-C 48V AC/DC	069065	069066	
UVR-C 60V AC/DC	066397	066404	
UVR-C 110-127V AC / 110-125V DC	066398	066405	
UVR-C 220-240V AC / 220-250V DC	066399	066406	
UVR-C 380-440V AC	066400	066407	
UVR-C 480-525V AC	066401	066408	

Delay device for undervoltage release -UVD-		
Туре	1SDAR1	
	051357	
UVD 4860V AC/DC	051358	
UVD 110125V AC/DC	051360	
UVD 220250V AC/DC	051361	

Connectors

Connector of fourth pole for withdrawable		
Туре	1SDAR1	
	Withdrawable	
Connector 4 th Pole SOR	066415	
Connector 4th Pole UVR	066418	



Socket-Plug connector on rear of panel		
Туре	1SDAR1	
Socket-plug panel connector with 3PINS	066409	
Socket-plug panel connector with 6PINS	066410	
Socket-plug panel connector with 9PINS	066411	
Socket-plug panel connector with 15PINS	066412	



Fixed part socket-plug connector			
Туре	;	1SDAR1	
Socket-plug connector of Moving Part 12PINS	066413		
Socket-plug connector of Fixed Part 12PINS	066414		

Electrical signals

3	
3	
2/	
2	

AUX uncabled



AUX cabled



AUX for withdrawable

Auxiliary contacts -AUX-					
Туре		1SDAR1			
	Fixed/Plug-in	Withdrawable			
Uncabled Version					
AUX 24V DC	066423				
AUX-SA 24V DC	066425				
AUX 250V AC	066422				
AUX-SA 250V AC	066424				
Cabled Version					
AUX-C 1Q+1SY 24V DC	066446	066447			
AUX-C 3Q+1SY 24V DC	066448	066449			
AUX-SA-C 24V DC	067116	067117			
AUX-C 1Q+1SY 250V AC	066431	066432			
AUX-C 2Q+1SY 250V AC	066433				
AUX-C 2Q+2SY+1SA 250V AC	066438	066439			
AUX-C 3Q 250V AC Left	066427				
AUX-C 3Q+1SY 250V AC	066434	066435			
AUX-C 3Q+2SY 250V AC	066436	066437			
AUX-SA-C 250V AC	066429	066430			
AUX-C 1Q+1SY 400V AC	066444	066445			
AUX-C 2Q 400V AC	066440	066443			

Ordering codes for XT4

Accessories



AUP - Auxiliary position contacts

Туре	1SDAR1	
Cabled Version		
AUP-I – Four Racked-in contacts 250V AC for plug-in/withdrawable circuit-breaker	066450	
AUP-I – Four Racked-in contacts 24V DC for plug-in/withdrawable circuit-breaker	066451	
AUP-R – Two Racked-out contacts 250V AC for withdrawable circuit-breaker	066452	
AUP-R – Two Racked-out contacts 24V DC for withdrawable circuit-breaker	066453	



AUE - Early auxiliary contacts

Early auxiliary contacts -AUEType 1SDA...R1

	Fixed/Plug-in	Withdrawable	
AUE - Two contacts in the rotary handle RHx (open)	067118	067119	
AUE - Two contacts in the rotary handle RHx (closed)	066454	066455	

Motor Operators



MOE - Motor operator

Stored energy motor operator MOE		
Туре	1SDAR1	
MOE 24V DC	066463	
MOE 4860V DC	066464	
MOE 110125V AC/DC	066465	
MOE 220250V AC/DC	066466	
MOE 380440V AC	066467	
MOE 480525V AC	066468	

Туре	1SDAR1
MOE-E 24V DC	066469
MOE-E 4860V DC	066470
MOE-E 110125V AC/DC	066471
MOE-E 220250V AC/DC	066472
MOE-E 380440V AC	066473
MOE-E 480525V AC	066474
100 2 100020 7 10	000111

Rotary Handles



Direct handle



Transmitted handle

Rotary Handles				
Туре	1SDAR1			
	Fixed/Plug-in	Withdrawable		
RHD Normal Direct Handle	069053	066476		
RHD Direct Emergency Handle	069054	066478		
RHE Normal Transmitted Handle	069055	066480		
RHE Emergency Transmitted Handle	069056	066482		
RHS L Normal Left Lateral Handle	069058			
RHS L Emergency Left Lateral Handle	069059			
RHS R Normal Right Lateral Handle	069060			
RHS R Emergency Right Lateral Handle	069061			
Transmitted Handle Spare Parts				
RHE_B Base for Transmitted Handle	069057	066484		
RHE_S Rod of 500mm	066576			
RHE_H Normal Transmitted Handle	066577			
RHE_H Emergency Transmitted Handle	066578			
LH Wide Normal Handle	066583			
LH Wide Emergency Handle	066585			



IP54

Туре	1SDAR1
IP54 protection for transmitted handle -RHE-	066587

Locks



Fixed padlock

Padlock on the circuit-breaker			
Туре	1SDAR1		
PLL Fixed lock with padlocks in open position	066590		
PLL Fixed lock with padlocks in open/closed position	066592		

Ordering codes for XT4

Accessories



Key lock on the circuit-breaker

Key lock on the circuit-breaker		
Туре	1SDAR1	
KLC Ronis key lock open, different keys, removable in open position	066599	
KLC Ronis key lock open, same Type A keys, removable in open position	066600	
KLC Ronis key lock open, same Type B keys, removable in open position	066601	
KLC Ronis key lock open, same Type C keys, removable in open position	066602	
KLC Ronis key lock open, same Type D keys, removable in open position	066603	
KLC Ronis key lock open, same keys, removable in both position	066604	



Key lock on the handle

Key lock on the handle / front for locks

Туре	1SDAR1
RHL Ronis key lock open, different keys - RHx/FLD	066617
RHL Ronis key lock open, same Type A keys - RHx/FLD	066618
RHL Ronis key lock open, same Type B keys - RHx/FLD	066619
RHL Ronis key lock open, same Type C keys - RHx/FLD	066620
RHL Ronis key lock open, same Type D keys - RHx/FLD	066621
RHL Ronis key lock open/closed, different keys - RHx	066622
RHL Ronis key lock open/closed, different keys - FLD	069182



Key lock on the motor

Key lock on the motor

Туре	1SDAR1
MOL-D Ronis key lock open, different keys	066629
MOL-S Ronis key lock open, same Type A keys	066630
MOL-S Ronis key lock open, same Type B keys	066631
MOL-S Ronis key lock open, same Type C keys	066632
MOL-S Ronis key lock open, same Type D keys	066633
MOL-M Key lock against manual operation	066634



Front for locks

Front for FLD locks

Туре	1SDAR1			
	Fixed/Plug-in		Withdrawable	
Front for FLD locks	066635		066636	



Interlock

Mechanical interlock* Type	1SDAR1
.,,,,,	
MIR-H	066637
MIR-V	066638
Plate XT2 F	066641
Plate XT2 P/W	066642
Plate XT4 F	066645
Plate XT4 P/W	066646

^{*} If the CB interlocked has got a stored energy motor operator (MOE/MOE-E) a key lock between MOL-D and MOL-S is mandatory

RC Sel

Residual current devices

Residual current devices			
Туре	1SDAR1		
	4 poles		
RC Sel	067131		

Panel type residual current relay	
Туре	1SDAR1
RCQ020/A 115-230V AC	065979
RCQ020/A 415V AC	065980
Toroid closed Ø 60mm	037394
Toroid closed Ø 110mm	037395
Toroid closed Ø 185mm	050543



Installation

Bracket for fixing onto DIN rail		
Туре		1SDAR1
	3 poles	4 poles
KIT DIN50022	080326	080327



Terminals

Insulating Terminal Covers				
Туре		1SDAR1		
	3 poles	4 poles		
LTC Low terminal covers	066662	066663		
HTC High terminal covers	066670	066671		



Sealable screws for Terminal Covers

Туре	1SDAR1	
	2 pcs	
Kit with two sealable screws	066672	



Phase separators

Туре		1SDAR1		
	4 pcs	6 pcs		
PB Height 25mm	069062	069063		
PB Height 100mm	066675	066680		
PB Height 200mm	066677	066682		

Ordering codes for XT4

Accessories



EF Terminal



FCCuAl Terminal

Terminals					
Туре	1SDAR1				
	3 pcs	4 pcs	6 pcs	8 pcs	
F Front Terminals	066861	066862	066863	066864	
EF Extended front terminals	066877	066878	066879	066880	
ES Extended spread front terminals	066901	066902	066903	066904	
FC CuAl Terminals for CuAl cables 1x1150mm ²	067191	067192	067193	067194	
FC CuAl Terminals for CuAl cables 1x120240mm ² + ADP	067195	067196	067197	067198	
FC CuAl Terminals for CuAl cables 2x35120mm ²	067199	067200	067201	067202	
FC Cu Terminals for Cu cables	066917	066918	066919	066920	
MC Multi-cable Terminals 6x2.535mm²	066933	066934	066935	066936	
R Rear adjustable Terminals	066949	066950	066951	066952	
FB Flexible busbar Terminals	066969	066970	066971	066972	



Ekip Display



Ekip LED Meter



Ekip Multimiter Display



Ekip Bluetooth



Ekip Control Panel



Ekip T&P unit

Accessories for electronic trip units

Туре	1SDAR1		
	Fixed/Plug-in	Withdrawable	
Ekip Display	068659	068659	
Ekip LED Meter	068660	068660	
Ekip Com	068661	068662	
Ekip Multimeter Display on front of switchboard	074192	074192	
PR212/CI Contactor control unit	050708	050708	
Ekip Bluetooth	074164	074164	
Ekip Control Panel for 10 circuit-breakers	074311	074311	
Ekip control panel for 30 circuit-breakers	074312	074312	
Ekip View Software for 30 circuit-breakers	074298	074298	
Ekip View software for 60 circuit-breakers	074299	074299	
Ekip View software for unlimited circuit-breakers	074300	074300	
HMI030 Interface on front of panel	063143	063143	

CT External neutral	
Туре	1SDAR1
CT External neutral 40A	066975
CT External neutral 63A	066976
CT External neutral 100A	066977
CT External neutral 160A	066978
CT External neutral 250A	066979

Туре	1SDAR1		
	Fixed/Plug-in	Withdrawable	
KIT of 24V DC auxiliary voltage for electronic trip units	066980	066981	
KIT for PTC Connection	066982	066983	
KIT for Ext NE Connection	066984	066985	
KIT for PR212/CI Connection	066986	066987	
KIT for external neutral voltage connection	069651	069652	

Test and Configuration Unit			
Туре	1SDAR1		
Ekip TT - Trip Test Unit	066988		
Ekip T&P - Programming and test Unit	066989		

ATS021

Automatic transfer devices

Туре	1SDAR1
TS021	065523
ATS022	065524

Warranty

Extended warranty***		
Туре	1SDAR1	
Warranty 2 years - Tmax XT*	069206	
Warranty 4 years - Tmax XT XT1**	082428	
Warranty 5 years - Tmax XT XT1**	082432	

- The registration in the Extended Warranty online tool is mandatory

 * free-of-charge with site details entered

 ** Warranty durations (Warranty periods are measured from the date the circuit breaker leaves the factory):

 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

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

Spare parts

Туре	1SDAR1			
	Fixed/Plug-in		Withdrawable	
SA RC Sel - Opening solenoid of the residual current device	067209		067210	
AUX-C -Loose cabled Auxiliary Contact 250V AC(1)	066994		066995	
AUX-C -Loose cabled Auxiliary Contact 24V DC(1)	066996		066997	

⁽¹⁾ un-numbered cables



Fixed/Moving part connector for withdrawable

Fixed	Part	Connec	tor for	Witho	Irawable

Туре		1SDA	
	1 connector for fixed part/moving part of withdrawable with 2 PINS for SOR/UVR up to 400V	067213	
	1 connector for fixed part/moving part of withdrawable with 3 PINS for AUX up to 400V	067214	••••••



Flange

Flange for Compartment door

Туре			1SDAR1		
	3 poles	4 poles	3 poles	4 poles	
	Fixed/ Plug-in	Fixed/ Plug-in	With- drawable	With- drawable	
Small flange for circuit-breaker	068657	068657			
Large flange for circuit-breaker	068646	068647			
Flange for MOE/MOE-E/FLD	068649	068649	068650	068650	
Flange for direct handle RHD	068651	068651	068652	068652	
Flange for residual current RC Sel		066649		066650	



Index

Circuit-breaker	8 /2
Performance Parameters	8/4
Releases and Protections.	8 /6
Motor protection	8 /9
Communication	8 /10
Standards and Regulations	8/11
Symbols	8 /12
ARR CACE de como estations	0/10

Circuit-breaker

G1.1 Circuit-breaker

Mechanical switching apparatus, able to close, carry and break currents in normal short-circuit condition and also close, carry for a specified time and break currents in specific abnormal circuit conditions such as that verified in case of short-circuit.

G1.2 Non-automatic circuit-breaker (switch-disconnector)

Mechanical switching device which, in the open position, complies with the specified requirements for the isolating function.

G1.3 Current-limiting circuit-breaker

Circuit-breaker with a break time short enough to prevent the short-circuit current from reaching the peak value it would otherwise reach.

G1.4 Rate of contact wear

Percentage of contact wear. Indicatively shows the state of electrical life of the circuit-breaker contacts.

G1.5 Double insulation

all the circuit-breakers in the SACE Tmax XT family have double insulation between the active power parts and the front parts of the apparatus where the operator works during normal plant service, so as to prevent the risk of contact with live parts. Each electrical accessory is completely segregated from the power circuit, and particularly the control assembly, which is completely isolated from the energised circuits. Moreover, the circuit-breaker has redundant insulation between both the internal live parts and the connection terminal area. The distances between connection terminals are greater than those required by the IEC Standards and conform to those established by the American regulations (UL 489 Standard).

G1.6 Positive operation

The operating lever always indicates the exact position of the circuit-breaker moving contacts:

- red line (I): Closed position;
- green line (O): Open position;
- yellow-green line: Trip position, open following tripping by the releases or test pushbutton. The signals are precise and reliable, in compliance with the requirements established by the IEC 60073 and IEC 60417-2 Standards.

When the releases trip, the moving contacts automatically open and the lever moves to the Trip position; to reclose the circuit-breaker the latter must be reset by pushing the operating lever from the trip position to the Open position. From this position is possible re-closing the circuit-breaker

The circuit-breaker operating mechanism is the free trip type and acts regardless of the pressure put on the lever or the speed of the operation.

G1.7 Isolation behaviour

Characteristic of a mechanical switching device which, in the open and trip position, carries out a disconnection function and provides a sufficient insulating distance (distance between contacts) to guarantee safety.

G1.8 Electromagnetic compatibility

In accordance with the IEC 60947-2 Standard (Annex B + Annex F, European Directive N° 89/336) concerning EMC electromagnetic compatibility, the Tmax family circuit-breakers used with electronic trip units and residual current releases are guaranteed for operation in the presence of interference caused by:

- electromagnetic equipment;
- atmospheric disturbance (static) flowing through the electrical networks;
- interference from radio waves;
- electrostatic discharges.

Moreover, the circuit-breakers do not generate disturbe to the other electronic devices situated in the vicinity of the installation site is generated.

G1.9 Tropicalization

All the Tmax XT series circuit-breakers can be used in the most critical environmental conditions defined by the following standards:

- IEC 60721-2-1 (climatogram 8);
- IEC 60068-2-30;
- IEC 60068-2-2;
- IEC 60068-2-52.

Tropicalization is guaranteed by:

- moulded-case made of synthetic resins reinforced with glass fiber;
- rust-preventive treatment on the main metal parts;
- Fe/Zn galvanisation (UNI ISO 2081), protected by a conversion layer free of hexavalent chrome (in compliance with ROHS) with the corrosion resistance guaranteed by ISO 4520 class 2c;
- application of anti-condensation protection for electronic trip units and relative accessories.

G1.10 Resistance to impact and vibrations

In compliance with IEC 60068-2-6 standards and with the regulations established by the most important classification bodies (RINA, Det Norske Veritas, Bureau Veritas, Lloyd's Register of Shipping, Germanischer Lloyd, ABS and the Russian Maritime Register of Shipping), all the Tmax circuit-breakers are unaffected by mechanically and electromagnetically generated vibrations.

G1.11 Degree of protection (IP)

The IP degree of protection indicates the level of protection of a device against contacts with live parts and penetration of foreign bodies of the liquid and solid type.

Performance Parameters

G2.1 Size

Term that indicates a group of circuit-breakers with phisical dimension common to a nominal current size (same poles number).

G2.2 Rated uninterrupted current (In)

The rated uninterrupted current for a circuit-breaker is the current value, that the circuit-breaker can carry during uninterrupted service.

G2.3 Rated service current (le)

Current value defined by the manufacturer, which takes into account the rated service voltage at the rated frequency, the rated service, the utilisation category and the type of protective casing, if any.

G2.4 Rated service voltage (Ue)

The rated service voltage of a device is the voltage value which, along with the rated current value, determines the use of the device itself and which the applicable tests and utilisation category refer to.

G2.5 Rated insulation voltage (Ui)

The rated insulation voltage of a device is the voltage value to which the dielectric tests and surface insulation distances refer. In no case may the rated service voltage value exceed the rated insulation voltage.

G2.6 Rated impulse withstand voltage (Uimp)

Peak value of an impulse voltage of given shape and polarity that the device can withstand without faults under specified test conditions and to which the insulation clearances refer.

G2.7 Rated ultimate short-circuit breaking capacity (Icu)

The rated ultimate short-circuit breaking capacity of a circuit-breaker is the value of the short-circuit current the circuit-breaker is able to break twice (according to the O-t-CO cycle) at the corresponding rated operating voltage. The circuit-breaker is not required to carry its rated current after the opening and closing cycle.

G2.8 Rated service short-circuit breaking capacity (Ics)

The rated service short-circuit breaking capacity of a circuit-breaker is the current value the circuit-breaker is able to break three times according to a cycle of opening, pause and closing operations (O - t - CO - t - CO) at a given rated service voltage (Ue) and at a given power factor. After this cycle, the circuit-breaker must be able to carry its rated current.

G2.9 Rated short-time withstand current (Icw)

The rated short-time withstand current is the current value the circuit-breaker can carry in the closed position for a short time under specified conditions of service and behaviour. The circuit-breaker must be able to carry this current for as long as the established delay time lasts so as to quarantee selectivity among circuit-breakers installed in series.

G2.10 Rated short-circuit making capacity (Icm)

The rated short-circuit making capacity of a device is the value, declared by the manufacturer, that coincides with the rated service voltage, the rated frequency and with a specified alternating current power factor or direct current time constant. It is expressed as the maximum peak value of the prospective current under specified conditions.

G2.11 Utilisation category of circuit-breakers

The utilisation category of a circuit-breaker must be established according to whether it is specifically designed to achieve selectivity by means of an intentional delay or not, in relation to other devices installed in series on the load side, under short-circuit conditions. It's possible to distinguish two user classes:

Class A - Circuit-breakers not specifically designed for selectivity under short-circuit conditions in relation to other protection devices installed in series on the load side, i.e. without intentional delay, applicable in short-circuit conditions and, therefore, without specification of the short-time withstand current.

Class B - Circuit-breakers specifically designed for selectivity under short-circuit conditions in relation to other protection devices installed in series on the load side, i.e. with an intentional delay (which can be adjusted), applicable under short-circuit conditions. The short-time withstand current is specified for these circuit-breakers (lcw).

A circuit-breaker belongs to category B if its lcw value exceeds:

- between 12In and 5kA, whichever is higher, for In≤2500A;
- 30kA for In>2500A.

G2.12 Utilisation category of non-automatic circuit-breakers

The utilisation category of non-automatic circuit-breakers establishes the type of condition of use.

It is identified by two letters, which indicate the type of circuit in which the device may be installed (AC for alternating current and DC for direct current), a two-digit number for the type of load that can be controlled and an additional letter (A or B), which indicates the operating frequency.

With reference to the utilisation categories, the product Standard establishes the current values the switch-disconnector must be able to break and interrupt under abnormal conditions. The utilisation categories of non-automatic circuit-breakers are listed in the table below:

Nature		Utilisation categories	
of the current	Utilisation category		
	Frequent operation	Infrequent operation	Typical applications
	AC-20A	AC-20B	Connection and disconnection under no-load conditions
Alternating	AC-21A	AC-21B	Connection and disconnection under no-load conditions
current	AC-22A	AC-22B	Resistive load operation including moderate overloads
	AC-23A	AC-23B	Mixed resistive and inductive load operation including moderate overloads
	DC-20A	DC-20B	Operation of motors or other highly inductive loads
Direct	DC-21A	DC-21B	Operation of resistive loads including moderate overloads
current	DC-22A	DC-22B	Mixed resistive and inductive load operation including a moderate overload (e.g. motors with shunt)
Ī	DC-23A	DC-23B	Operation of highly inductive loads

G2.13 Electrical life

The electrical life of a device indicates the number of on-load operating cycles and the resistance of the contacts to electrical wear under the conditions specified in the relative product Standard.

G2.14 Mechanical life

The mechanical life of a device indicates the number of no-load operating cycles (each operating cycle consists of a closing and opening operation) the device is able to carry out without overhauls or replacement of mechanical parts (routine maintenance is allowed).

G2.15 Dissipated power

This is the loss, caused by the joule effect, due to the electrical resistance of the circuit-breaker poles; the energy lost is dissipated in heat.

G2.16 Utilisation categories for operating parts

The utilisation categories given in the table are considered to be standard (CEI EN 60947-5-1).

Type of current	Class	Typical applications
	AC-12	Control of resistive loads and electronic loads with insulation obtained by use of optoinsulators
AC	AC-13	Control of electronic loads with insulation transformer
	AC-14	Control of small electromagnetic loads (≤72VA)
	AC-15	Control of electromagnetic loads (>72VA)
DC	DC-12	Control of resistive loads and electronic loads with insulation obtained by use of optoinsulators
	DC-13	Control of electromagnets
	DC-14	Control of electromagnetic loads with economiser resistors in the circuit

Releases and Protections

G3.1 Release

Device, mechanically connected to a mechanical operating device, which frees the latching components and allows the operating device to be opened or closed.

G3.2 Thermomagnetic trip unit

Thermomagnetic trip units use a bimetal and an electromagnet to detect respectively overloads and short-circuits. They are suitable for protecting both alternating and direct current networks.

G3.3 Magnetic only trip unit

Device for protection against short-circuits which provides a higher magnetic trip threshold than the one available with a thermomagnetic circuit-breaker. The magnetic only release is better able to deal with any problems concerning the particularly high current the motor absorbs during the first instants of its starting phase.

G3.4 Electronic trip unit

Releases connected to current transformers (three or four, depending on the number of conductors to be protected) which, installed inside the circuit-breaker, provide the double function of supplying the power able to operate the release correctly (self-supply) and detecting the value of the current that passes through the live conductors. They are therefore only compatible with alternating current networks.

The signal from the transformers is processed by the electronic part (microprocessor), which compares it with the threshold settings. When the signal exceeds the thresholds, circuit-breaker release is controlled by means of an opening solenoid, which acts directly on the circuit-breaker control unit.

If there is an auxiliary power supply in addition to self-supply, the voltage value must be $24V\ DC\ \pm20\%$.

G3.5 Residual current release

Device able to detect the earth fault current by means of a toroidal transformer which includes all the live conductors, as well as the neutral if distributed.

Residual current releases can be used in conjunction with the circuit-breaker to obtain two main functions in one single device:

- protection against overloads and short-circuits;
- protection against indirect contacts (voltage on conductive parts owing to loss of insulation).

G3.6 Magnetic protection

Protection against short-circuits with instantaneous trip.

G3.7 Thermal protection

Protection against overloads with inverse long-time delayed trip.

G3.8 Protection against Overloads (L)

Protection against overloads with long inverse time delay trip even with the trip curve established by the IEC 60255-3 Standard. Used in coordination with fuses and medium voltage protections.

G3.9 Protection against instantaneous short-circuit (I)

Provides instantaneous protection against short-circuits.

G3.10 Protection against delayed short-circuit (S)

Provides protection against short-circuit currents with delayed intervention at fixed time or inverse short time. Thanks to the delay setting, this device is particularly suitable when selective coordination must be achieved among the various different devices.

G3.11 Protection against earth faults (G)

Protection against earth faults with delayed fixed time of trip.

G3.12 Residual current protection (I∆n)

This function is particularly suitable when residual current protection is required for protection against indirect contacts.

G3.13 Protection of the neutral

Detection of overcurrents in the neutral conductor so as to break the phase conductors (neutral protected but not isolated) or to break the neutral conductor itself (neutral protected and isolated).

G3.14 Distribution systems

The distribution system establishes the status of the neutral in the power supply system and the method for connecting the conductive part towards earth.

The Italian standard, CEI 64-8/3 (which is aligned with the IEC 60364-3 international Standard), classifies electrical systems with a combination of two letters. The first indicates the situation of the power supply system towards earth:

- T direct earth connection of an alternating current point, generally the neutral;
- I earth insulation, or earth connection of a point, generally the neutral, by means of an impedance.

The second letter gives the situation of the conductive parts of the electrical installation in relation to the earth:

- T conductive parts directly earthed;
- N conductive parts connected to the earthing point of the power supply system.

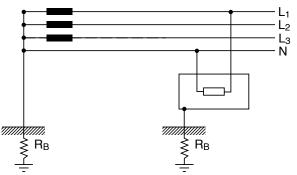
Other letters may follow which indicate the arrangement of the neutral and protection conductors:

- S neutral and protection functions carried out by separate conductors;
- C neutral and protection functions carried out by a single conductor (PEN conductor).

The main distribution systems used are illustrated below with reference to these definitions.

G3.15 TT system

In the TT system, the neutral and conductive parts are connected to two electrically independent earthing systems.

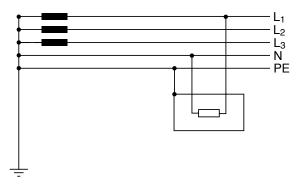


G3.16 TN system

In the TN system, the neutral is connected directly to the earth, while the conductive parts are connected to the same earthing system as the neutral.

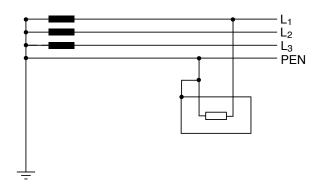
The TN system is divided into three different types, depending on whether the neutral and protection conductors are separate or not:

1. TN-S: the neutral conductor N and the protection conductor PE are separate

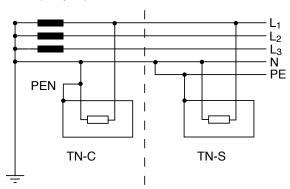


Releases and Protections

2. TN-C: the neutral and protection functions are combined in a single conductor called PEN



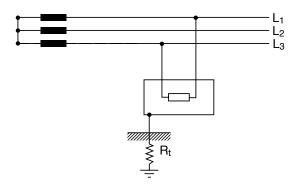
3. TN-C-S: the neutral and protection functions are partly combined in a single conductor called PEN and partly separate PE+N



Consult QT3: "Distribution systems and protection against indirect contacts and earth faults" for further details.

G3.17 IT system

IT system have no active parts directly earthed, but may have live parts connected to earth through high value impedance. All the exposed-conductive-parts, separately or in group, are connected to an independent earth electrode.



Motor protection

G4.1 Protection against phase unbalance and phase loss (U)

Protection function which acts if unbalance between the current values of the individual phases protected by the circuit-breaker is detected (according to IEC 60947 annex T).

G4.2 Rotor lock protection (R)

The function protects motor from possible damages caused by rotor stopping during functioning.

G4.3 Starting current

Is the current value which, in accordance with the CEI EN 60947-4-1 Standard, is assigned a value of about 7.2xle. It represents the current required by the motor during the starting phase, and which persists throughout the starting time.

G4.4 Starting time

This is the time the motor takes to reach its rated running speed. The starting time depends on the characteristics of the load the motor must drive, and particularly on the type of motor.

G4.5 Operating class

The starting classes distinguish the thermal relays according to their trip curves. The following table (which refers to the most common applications) lists the classes defined in the IEC60947-4-1 Standard.

Operating class	Trip time Ti [s] for 7.2xlr	Trip time Ti [s] for 7.2xlr (banda "E")
2	-	Ti ≤ 2
3	-	2 < Ti ≤ 3
5	0,5 < Ti ≤ 5	3 < Ti ≤ 5
10A	2 < Ti ≤ 10	-
10	4 < Ti ≤ 10	5 < Ti ≤ 10
20	6 < Ti ≤ 20	10 < Ti ≤ 20
30	9 < Ti ≤ 30	20 < Ti ≤ 30
40	-	30 < Ti ≤ 40

Time Ti is the cold trip time of the thermal relay at 7.2 times the set current value. It is common practice to associate class 10 with the normal starting type and class 30 with the heavy-duty starting type.

The other trip classes and trip time indicated under band "E", have recently been introduced in a variant to the CEI EN 60947-4-1 Standard, and are characterised by a more restricted trip range due to raising the minimum non-trip time.

G4.6 Contactor

Mechanical operating device with a single stand-by position and non-manual operation able to make, carry and break currents under normal circuit conditions, including overload operating conditions.

G4.7 Utilisation category of the contactor

The Standard establishes different utilisation categories for the contactor. Each category defines precise minimum performance values (e.g. application range or rated breaking capacity) according to current, voltage, power factor or time constant values and test conditions specified in the Standard.

G4.8 PTC

Thermostatic probe able to measure the internal temperature of an electric motor.

Consult QT7: The asynchronous three-phase motor, general information and ABB offer for coordinating the protections" for further details.

The load characteristics which the motor must carry, the type of motor and the starting methods, are factors which affect the starting time and therefore selection of the thermal trip unit.

Communication

G5.1 Communication protocol

Specification of standardized dialogue among several digital devices which exchange data. It is an operating mode based on the structure or length of binary words that must be common to all the elements that exchange data. Communication without dialogue protocol is not possible.

G5.2 Modbus RS485

This is a basic communication protocol, one of the most widespread standards in industrial automation and power distribution spheres.

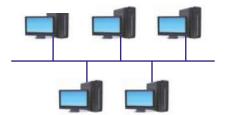
G5.3 Network

A network generically consists of nodes interconnected with communication lines:

- the node (an "intelligent" device able to dialogue with other devices) is the data transmission and/or reception point;
- the communication line is the element that connects two nodes and represents the direct path the information takes in order to be transferred between two nodes. In practice, it is the physical means (coaxial cable, twisted telephone cable, optic fibre, infrared rays) along which the information and data travel.

G5.4 Bus network

The bus network structure is based on a common transmitting means (usually a twisted cable or coaxial cable) for all the nodes connected, therefore in parallel.



Consult QT9: "Communication with ABB circuit-breakers via Bus" for further details.

Standards and Regulations

G6.1 Standards

Technical specification approved by a recognised organisation with the task of defining the state-of-the-art characteristics (dimensional, environmental, safety, etc.) of a product or service.

G6.2 Directive

Ensemble of rules which define the essential requirements regarding safety which the products must comply with in order to guarantee user safety.

G6.3 Naval Register

A Body able to certify a product/service as conforming to the regulations/criteria fixed internationally by the International Maritime Organization. The certification issued confirms that a ship is authorised to carry out the activity it was designed for.

G6.4 RoHS Directive

European Directive 2002/95/EC of 27 January 2003 (Decree Law 25 N° 151 of July 2005) aimed at eliminating or reducing the use of dangerous substances in electrical and electronic equipment. It requires manufacturers and companies to adapt to the relative provisions and to compile a manufacturer's declaration, without certification by third parties.

G6.5 CE marking

This is a mark that must be affixed to certain types of product by the manufacturer in order to self-certify correspondence (or conformity) with the essential requirements for marketing and use of that product in the European Union. The law requires this mark to be affixed on the product so that it can be marketed in the European Economic Area (EEA) member states.

Symbols

SYMBOL	DESCRIPTION
СВ	Circuit-breaker
PF	Fixed part
PM	Mobile part
F Version	Circuit-breaker in fixed version
P Version	Circuit-breaker in plug-in version
W Version	Circuit-breaker in withdrawable version
F	Front terminals
EF	Front extended terminals
ES	Front extended spread terminals
FCCuAl	Terminal for copper/aluminium cables
FCCu	Terminal for copper cables
R	Rear terminals
HR/VR	Rear flat vertical/horizontal terminals
FB	Terminals for flexible busbars
MC	Multi-cable terminal
HTC	High terminal covers
LTC	Low terminal covers
PS	Phase separators
RHD	Direct rotary handle
RHE	Transmitted rotary handle
RHE-LH	Transmitted rotary handle with wide handgrip
RHS	Lateral rotary handle
FLD	Front for locks
PLL	Padlock device
KLC	Key lock
SOR or YO	Shunt opening release
UVR or YU	Undervoltage release
UVD	Time-delay device for undervoltage release
AUX Q	Auxiliary contact in open/closed position
AUX SY	Auxiliary contact tripped
AUX S51	Release tripped auxiliary contact
SA	Opening solenoid of residual current device
AUP-I	Plugged-in auxiliary position contacts
AUP-E	Withdrawn auxiliary position contacts
AUE	Early auxiliary contacts on the handle
MOD	Direct action motor operator
MOE	Stored energy motor operator
MOE-E	Electronic motor operator
СВ	Circuit-breaker Circuit-breaker
NE	External neutral
RHx	All the handles (RHD, RHE, RHE-UI, RHS)
3Q	Left open/closed auxiliary contacts
24V	24V auxiliary voltage
AUE inside	Early auxiliary contacts inside the circuit-breaker

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Technical catalogue - Edition 03.2013 - Preliminary

SACE Emax 2 New low voltage air circuit-breakers

Index

Main characteristics
The ranges
Protection trip units
Communication devices and systems
Accessories
Installation
Overall dimensions
Wiring diagrams
Ordering codes

SACE Emax 2 Consultation guide



Chapter 1

Main characteristics

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



Chapter 5

Accessories

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



Chapter 2

The ranges

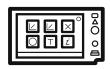
Electrical characteristics of automatic circuit-breakers, switch-disconnectors and derived versions.



Chapter 6

Installation

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



Chapter 3

Protection trip units

Latest generation Ekip protection trip units for power distribution, generator protection and power control.



Chapter 7

Overall dimensions

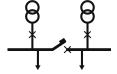
Overall dimensions for fixed circuitbreakers, withdrawable circuit-breakers and accessories.



Chapter 4

Communication devices and systems

Supervision, Energy Management and complete integration in the systems with the possibility of communicating with all the main protocols used in the industrial sector.



Chapter 8

Wiring diagrams

Circuit-breaker and accessories wiring diagrams.



Chapter 9

Ordering codes

Ordering codes with configuration examples.

Main characteristics

Overview of the SACE Emax 2 family	
Guide to selection	1/2
Distinctive features of the series	
Efficiency	1/3
Control	1/4
Connectivity	1/5
Performance	1/6
Ease of use and safety	1/7
Product conformity	
Approvals and certifications	1/9
Quality and Sustainability	1/10
ABB SACE Global Service	1/12

Overview of the SACE Emax 2 family

Guide to selection

Ranges available

	E1.2	E2.2	E4.2	E6.2
Automatic circuit-breakers @ 690-1150 V AC	•	•	•	•
Switch-disconnectors @ 690-1150 V AC, 1000 V DC	•	•	•	•
Sectionalizing truck		•	•	•
Earthing switch with making capacity		•	•	•
Earthing truck		•	•	•

Automatic circuit-breakers

Icu (440Vac)	Versione	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300
200	Х											
150	V										E	6.2
100	Н				- 0.0	E4.2						
85	S			E2.2								
66	N											
50	С			F1 2								
42	В			E1.2								

Switch-disconnectors

Icw (1s)	Version	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300
120	Χ										F6	0
100	V									E6.		.2
85	Н			F2 2								
66	N					۷.۷						
50	N			E1 2								
42	В			E1.2								

Protection trip units

Version Ekip Dip	Application								
	Distribution	Power control	Generators						
	Protection devices	-	-						
Ekip Touch	Protection devices and Measurements	Protection devices and Measurements	-						
Ekip Hi-Touch	Protection devices, Measurements, Network analyzer	Protection devices, Measurements, Network analyzer	-						
Ekip G Touch		Protection devices and Measurements	Protection devices and Measurements						
Ekip G Hi-Touch		Protection devices, Measurements, Network analyzer	Protection devices, Measurements, Network analyzer						

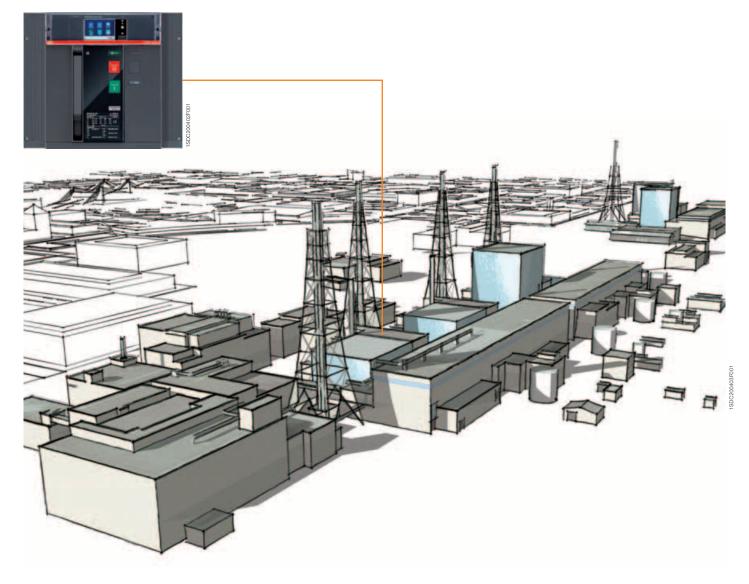
Distinctive features

SACE Emax 2 is a new series of low voltage air circuit-breakers up to 6300 A. With the ability to efficiently and simply control electrical installations – from the traditional to the more complex – with minimum impact, the new SACE Emax 2 circuit-breakers represent the evolution of a circuit-breaker into a Power Manager.

Efficiency

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

Achieving maximum efficiency of an electrical installation in order to reduce consumption and waste requires intelligent management of power supplies and energy use. For this reason, the new technologies used in the SACE Emax 2 circuitbreakers allow the productivity and reliability of installations to be optimized, and at the same time, power consumption to be reduced while fully respecting the environment.



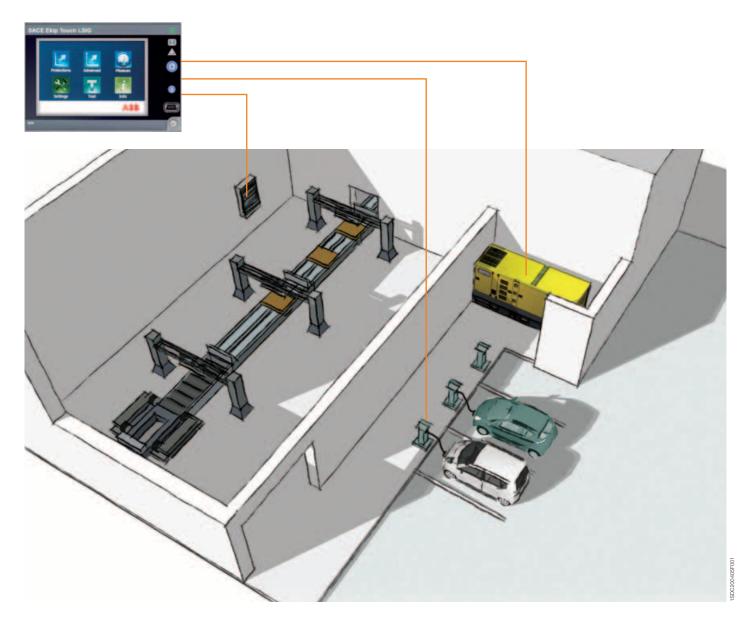
Distinctive features

Control

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

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

SACE Emax 2 circuit-breakers are equipped with a new generation of protection trip units that are easy to programme and read. The Ekip Touch trip units measure power and energy with precision and save the most recent alarms, events and measurements in order to prevent faults to the installation or trip effectively when necessary. On request, the **Network Analyzer** function is also available, which controls the quality of absorbed power in real time and with extreme precision. In addition, the innovative Ekip Touch and Hi Touch trip units in the G version include all the functions of generator protection switchgear, offering a safe control solution that is ready to use. No external devices, wiring or inspections are required.



Connectivity

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

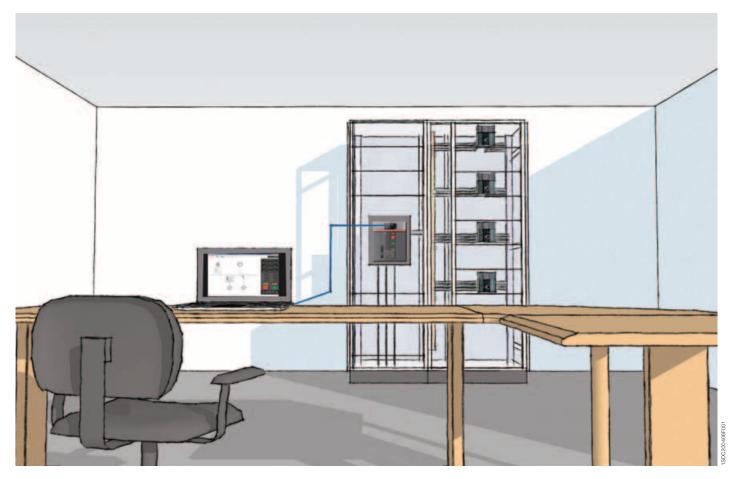
All circuit-breakers can be equipped with communication units available for use with Modbus, Profibus, and DeviceNet protocols as well as the modern Modbus TCP, Profinet and EtherNet IP protocols. The cartridge-type modules can be easily installed directly on the terminal box, even at a later date.

Furthermore, the integrated IEC61850 communication module enables connection to automation systems widely used in medium voltage power distribution to create intelligent networks (Smart Grids).

Accurate measurements of current, voltage, power and energy are all available by means of the communication modules. The trip units themselves can be used as multimeters that display the measurements available, or the Ekip Multimeter can be connected in the front of the switchgear without the need for external instruments and bulky transformers.

All circuit-breaker functions are also accessible via the Internet, in complete safety, through the Ekip Link switchgear supervision system and the Ekip Control Panel operator panel.

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



Distinctive features

Performance

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

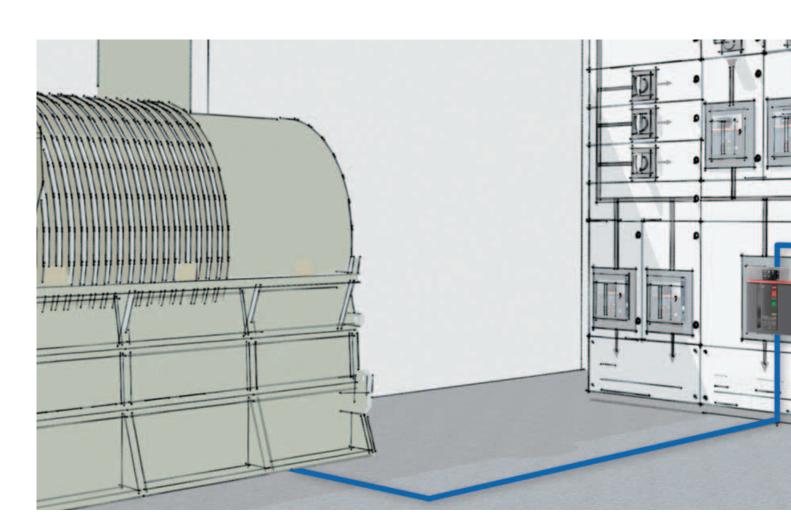
The protection trip units, auxiliary connections and main accessories are the same throughout the range to simplify design and installation. Furthermore, the sizes from E2.2 to E6.2 have the same height and depth.

The rating levels are updated and uniform throughout the sizes to meet the demands and needs of today's installations, from 42kA to 200kA, and to standardize switchgear projects.

High short-time currents, together with the efficiency of the protection functions, guarantee complete selectivity in all situations. Accurate design and choice of materials enable optimization of the overall dimensions of the circuit-breaker. In this way switchgear of compact dimensions can be built and outstanding savings at the same performance can be obtained.

In particular:

- E1.2 offers 1,600A with breaking capacity up to 66kA and withstand current of 50kA for 1 second in an extremely compact structure. In the three and four pole version, it offers the sturdiness of SACE Emax with reduced dimensions and enables switchgear of 66kA to be built in units of 400mm, which is indispensable in places where reduced dimensions are essential, such as naval and offshore installations.
- **E2.2** enables in the three pole version ratings of up to 2,500A to be achieved in switchgear with a width of 400mm. In addition, it provides short-circuit currents up to 100kA and 85kA for 1 second.
- **E4.2** is the new 4,000A circuit-breaker designed to withstand high currents with a withstand rating of 100kA for 1 second without the need for particular precautions.
- **E6.2** is the top of the range, with an interrupting rating of 200kA and a structure that allows 6,300A to be reached, even in complex installation conditions.



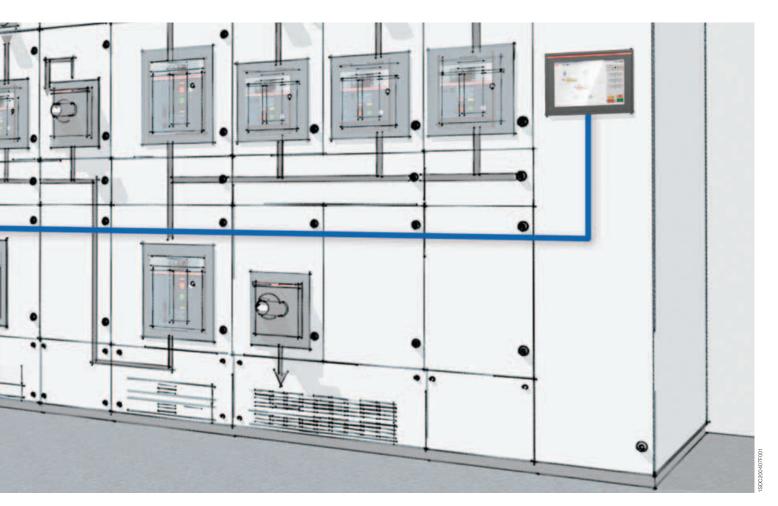
Ease of use and safety

The entire range is available in fixed and withdrawable versions, with double insulation between the front of the switchgear and the live parts to ensure operation in complete safety. The circuit-breakers can be powered indifferently from above or below. All essential information is available in the central area of the front shield and enables immediate identification of the status of the circuit-breaker: open, closed, ready to close, charged and discharged springs.

Maintenance is simply and safe. Thanks to the new front shield, the main accessories can be frontally accessed without completely removing it.

The withdrawable circuit-breaker is inserted and removed via dedicated guide rails that simplify movement. The correct movement from racked-in, test isolated, to racked-out position is guaranteed by a lock in each position. As a further guarantee of safety, the shutters of the fixed part can be locked from the front when the circuit-breaker is removed. The shutters of the upper terminals are independent of those of the lower terminals to facilitate checking and maintenance operations. The Ekip Touch protection trip units are equipped with a large colour touch-screen display which enables safe and intuitive operation. Furthermore the Ekip units can be programmed and consulted from a tablet, smart phone or portable PC via the Ekip Connect application, which allows the parameters of the safety devices calculated in the DOC software to be set automatically.

The trip units are easily interchangeable from the front of the circuit-breaker, and all communication units can be installed directly on the terminal box with a few simple operations.



Distinctive features



- Key

 1 Trademark and size of circuit- breaker

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

Product conformity

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

Approvals and certifications

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

- "Low Voltage Directives" (LVD) no. 2006/95/EC
- "Electromagnetic Compatibility Directive" (EMC) no. 2004/108/EC.

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

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

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



Registro Italiano Navale (RINA): Italian



Germanischer Lloyd (GL): Deutsch



Russian Maritime Register of Shipping (RMRS): Russian



Lloyd's Register of Shipping (LR): English



Bureau Veritas (BV): French



Nippon Kaiji Kyokai (NKK): Japan



American Bureau Shipping (ABS): American



Det Norske Veritas (DNV): Norway

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

Product conformity

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

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

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



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

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

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

A further commitment aimed at safeguarding the environment has been achieved by assessing products' life cycles (LCA, Life Cycle Assessment): this includes the assessment and improvement of the environmental performance of products from the engineering stage throughout their entire life cycle. The materials, processes and packaging used are chosen with a view to optimising the actual environmental impact of each product, including its energy efficiency and recyclability.





ABB catalogue | 1SDC200023D0201 | 1/11

ABB SACF Global Service

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

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

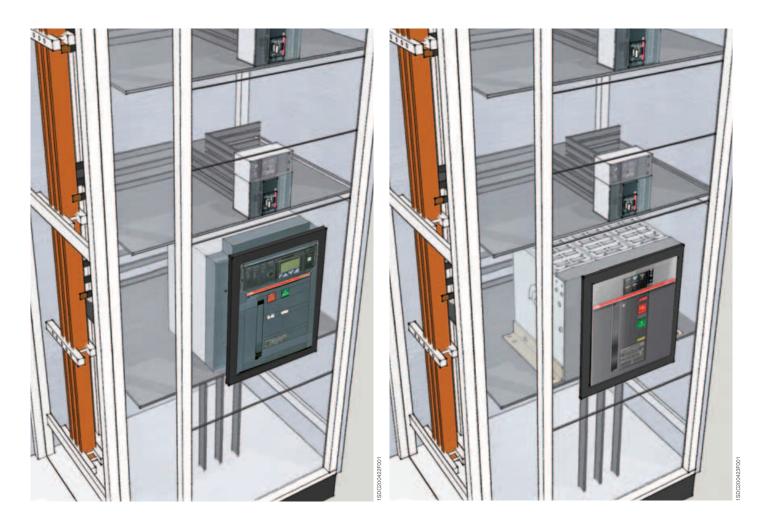
ABB's organisation offers services that include installation and commissioning, technical training on the use and maintenance of products, the supply of original spare parts, corrective and preventive maintenance, equipment diagnostics, modernisation of systems with upgrades and retrofitting kits, consultancy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

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

Retrofitting kit

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

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



The Ranges

SACE Emax 2 automatic circuit-breakers	2/2
SACE Emax 2 switch-disconnectors	2/4
SACE Emax 2 automatic circuit-breakers	
for applications up to 1150V AC	2/6
SACE Emax 2 switch-disconnectors	
for applications up to 1150V AC	2/8
SACE Emax 2 switch-disconnectors	
for applications up to 1000 V DC	2/10
SACE Emax 2 derived versions	2/12

SACE Emax 2 automatic circuit-breakers

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



SACE Emax 2			E1.2				
Performance levels			В	С	N	L	
Rated uninterrupted current lu	@ 40°C	[A]	630	630	250	630	
	[A]	800	800	630	800		
		[A]	1000	1000	800	1000	
		[A]	1250	1250	1000	1250	
		[A]	1600	1600	1250		
		[A]			1600		
		[A]					
Neutral pole current-carrying ca	apacity for 4-pole CBs	[%lu]	100	100	100	100	
Rated ultimate short-circuit	400-415 V	[kA]	42	50	66	150	
breaking capacity Icu	440 V	[kA]	42	50	66	130	
	500-525 V	[kA]	42	42	50	100	
	690 V	[kA]	42	42	50	60	
Rated service short-circuit brea	king capacity Ics	[%lcu]	100	100	100 ¹⁾	100	
Rated short-time withstand	(1s)	[kA]	42	42	50	15	
current Icw	(3s)	[kA]	24	24	36	-	
Rated short-circuit making	400-415 V	[kA]	88	105	145	330	
capacity (peak value) Icm	440 V	[kA]	88	105	145	286	
	500-525 V	[kA]	88	88	105	220	
	690 V	[kA]	88	88	105	132	
Utilization category (according t	to IEC 60947-2)		В	В	В	A	
Breaking	Breaking time for I <icw< td=""><td></td><td>40</td><td>40</td><td>40</td><td>40</td><td></td></icw<>		40	40	40	40	
	Breaking time for I>lcw		25	25	25	10	
Dimensions	H - Fixed/Withdrawable	[mm]	296/363.5	296/363.5	296/363.5	296/363.5	
	D - Fixed/Withdrawable	[mm]	183/271	183/271	183/271	183/271	
	W - Fixed 3p/4p/4p FS	[mm]	210/280				
	W - Withdrawable 3p/4p/4p FS	[mm]	278/348				

¹⁾ lcs: 50kA for 400V...440V voltage

SACE Emax 2	E1.2						
Mechanical and electrical	[lu]	≤ 1000	1250	1600	1600 L		
maintenance prescribed by the manufacturer		[No.oper.x 1000]	20	20	20	20	
	Frequency	[Oper./Hour]	60	60	60	60	
Electrical life	440 V	[No.oper.x 1000]	8	8	8	3	
	690 V	[No.oper.x 1000]	8	6,5	6,5	1	
	Frequency	[Oper./Hour]	30	30	30	30	







E2.2				E4.2			E6.2				
В	N	S	Н	N	S	Н	V	Н	V	Х	
 1600	800	250	800	3200	3200	3200	2000	4000	4000	4000	
2000	1000	800	1000	4000	4000	4000	2500	5000	5000	5000	
	1250	1000	1250				3200	6300	6300	6300	
	1600	1250	1600				4000				
	2000	1600	2000								
	2500	2000	2500								
		2500									
100	100	100	100	100	100	100	100	50-100	50-100	50-100	
 42	66	85	100	66	85	100	150	100	150	200	
42	66	85	100	66	85	100	150	100	150	200	
 42	66	66	85	66	66	85	100	100	130	130	
42	66	66	85	66	66	85	100	100	100	120	
 100	100	100	100	100	100	100	85	100	100	100	
 42	66	66	85	66	66	85	100	100	100	120	
 42	50	50	66	36	50	66	75	100	100	100	
88	145	187	220	145	187	220	330	220	330	440	
88	145	187	220	145	187	220	330	220	330	440	
88	145	145	187	145	145	187	220	220	286	286	
 88	145	145	187	145	145	187	220	220	220	264	
В	В	В	В	В	В	В	В	В	В	В	
 40	40	40	40	40	40	40	40	40	40	40	
25	25	25	25	25	25	25	25	25	25	25	
 371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	
270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	
 276/366	276/366				384/510				762/888/1014		
317/407				425/551				803/929/10	169		

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

SACE Emax 2 switch-disconnectors

Switch-disconnectors, identified with the abbreviation "/MS", are devices that satisfy the isolating specifications provided by the IEC 60947-3 Standard. The switch-disconnectors are derived from the corresponding automatic circuit-breakers, and they have the same dimensions and accessory options. This version differs from the automatic circuit-breakers only because of the absence of protection trip units.

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	
Isolation behaviour		IEC 60947-3



SACE Emax 2		E1.2	E1.2			
Performance levels			B/MS	N/MS		
Rated uninterrupted current lu	@ 40°C	[A]	630	250		
		[A]	800	630		
		[A]	1000	800		
		[A]	1250	1000		
		[A]	1600	1250		
		[A]		1600		
Neutral pole current-carrying carrying	apacity for 4-pole CBs	[%lu]	100	100		
Rated short-time withstand	(1s)	[kA]	42	50		
current Icw	(3s)	[kA]	24	36		
Rated short-circuit making	400-415 V	[kA]	88	105		
capacity (peak value) Icm	440 V	[kA]	88	105		
	500-525 V	[kA]	88	105		
	690 V	[kA]	88	105		
Utilization category (according	y to IEC 60947-3)	•••••	AC-23A	AC-23A		
Dimensions	H - Fixed / Withdrawable	[mm]	296 / 363.5	296 / 363.5		
	D - Fixed / Withdrawable	[mm]	183 / 271	183 / 271		
	W - Fixed 3p/4p/4p FS	[mm]	210 / 280			
	W - Withdrawable 3p/4p/4p FS		278 / 348			

SACE Emax 2		E1.2				
Mechanical and electric	[lu]	< 1000	1000	1600		
maintenance prescribed by the manufacturer		[No.oper.x 1000]	20	20	20	
	Frequency	[Oper./Hour]	60	60	60	
Electrical life	440 V	[No.oper.x 1000]	8	8	8	
	690 V	[No.oper.x 1000]	8	6.5	6.5	
	Frequency	[Oper./Hour]	30	30	30	

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

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







E2.2			E4.2		E6.2	E6.2			
B/MS	N/MS	H/MS	N/MS	H/MS	V/MS	H/MS	X/MS		
 1600	800	800	3200	3200	2000	4000	4000		
2000	1000	1000	4000	4000	2500	5000	5000		
	1250	1250			3200	6300	6300		
	1600	1600			4000				
	2000	2000							
	2500	2500							
100	100	100	100	100	100	50-100	50-100		
42	66	85	66	85	100	100	120		
42	50	66	36	66	75	100	100		
88	145	187	145	187	220	220	264		
88	145	187	145	187	220	220	264		
88	145	187	145	187	220	220	264		
 88	145	187	145	187	220	220	264		
AC-23A	AC-23A	AC-23A	AC-23A	AC-23A	AC-23A	AC-23A	AC-23A		
 371 / 425	371 / 425	371 / 425	371 / 425	371 / 425	371 / 425	371 / 425	371 / 425		
270 / 383	270 / 383	270 / 383	270 / 383	270 / 383	270 / 383	270 / 383	270 / 383		
276 / 366			384 / 510	384 / 510			762 / 888 / 1014		
317 / 407			425 / 551	425 / 551			69		

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

SACE Emax 2 automatic circuit-breakers for applications up to 1150V AC

ABB SACE offers a solution designed for electrical applications with voltages up to 1150V in alternating current. The 1150V AC range, which maintains the same dimensions and accessories as the standard 690V AC range, is identified by the letters "/E".

Common data		
Rated service voltage Ue	[V]	1150
Rated insulation voltage Ui	[V]	1250
Rated impulse withstand voltage Uimp	[kV]	12
Frequency	[Hz]	50 - 60
Number of poles		3- 4
Version	Fixed - Withdrawable	
Isolation behaviour		IEC 60947-2



SACE Emax 2		E1.2		
Performance levels			N/E	
Rated uninterrupted current lu @	40°C	[A]	630	
		[A]	800	
		[A]	1000	
		[A]	1250	
		[A]	1600	
		[A]		
Neutral pole current-carrying capacity for 4-pole CBs		[%lu]	100	
Rated ultimate short-circuit breaking	ng 1000 V	[kA]	30	
capacity Icu	1150 V	[kA]	25	
Rated service short-circuit breaking	g capacity Ics	[%lcu]	100	
Rated short-time withstand curren	t lcw (1s)	[kA]	25	
	(3s)	[kA]	25	
Rated short-circuit making	1000 V	[kA]	63	
capacity (peak value) Icm	1150 Z	[kA]	53	
Utilization category (according to I	EC 60947-3)		В	

SACE Emax 2			E1.2	E1.2			
Mechanical and electrical life with regular ordinary maintenance prescribed by the manufacturer		[lu]	< 1000	1000	1600		
		[No.oper.x 1000]	20	20	20		
	Frequency	[Oper./Hour]	60	60	60		
Electrical life	1150 V	[No.oper.x 1000]	1	1	1		
	Frequency	[Oper./Hour]	30	30	30		







E2.2	E4.2	E6.2
H/E	H/E	X/E
800	3200	4000
1000	4000	5000
1250		6300
1600		
2000		
2500		
100		50 - 100
30	50	65
30	30	65
100	100	100
30	50	65
30	30	65
63	105	143
53	105	143
В	В	В

E2.2			E4.2			E6.2		
< 2000	2000	2500	< 3200	3200	4000	4000	5000	6300
25	25	20	20	20	15	12	12	12
60	60	60	60	60	60	60	60	60
2	2	2	1	1	1	1	1	1
30	30	30	20	20	20	10	10	10

SACE Emax 2 switch-disconnectors for applications up to 1150V AC

The switch-disconnectors for applications at 1150V, identified by the letters "/E" and "/MS", are derived from the corresponding standard automatic circuit-breakers, of which maintain the overall dimensions and the possibility of mounting accessories. The switch-disconnectors are not equipped with Ekip protection trip units. By means of external protection relay with 500 ms maximum timing, the Icu breaking capacity is equal to the value of Icw (1s).

Common data		
Rated service voltage Ue	[V]	1150
Rated insulation voltage Ui	[V]	1250
Rated impulse withstand voltage Uimp	[kV]	12
Frequency	[Hz]	50 - 60
Number of poles		3- 4
Version		Fixed - Withdrawable
Isolation behaviour	IEC 60947-3	



SACE Emax 2			E1 2	
SACE EIIIdX 2			E1.2	
Performance levels			N/E MS	
Rated uninterrupted current lu @ 40°C		[A]	630	
		[A]	800	
		[A]	1000	
		[A]	1250	
		[A]	1600	
		[A]		
Neutral pole current-carrying capacity for 4-pole CB	3	[%lu]	100	
Rated short-time withstand current lcw	(1s)	[kA]	25	
	(3s)	[kA]	25	
Rated short-circuit making capacity (peak value) Icm	1000 V	[kA]	53	
	1150 V	[kA]	53	

SACE Emax 2				E1.2			
Mechanical and electrical life with regular ordinary		[lu]	< 1000	1000	1600		
maintenance prescribed	•	[No.oper.x 1000]	20	20	20		
	Frequency	[Oper./Hour]	60	60	60		
Electrical life	1150 V	[No.oper.x 1000]	1	1	1		
	Frequency	[Oper./Hour]	30	30	30		







E2.2	E4.2	E6.2
H/E MS	H/E MS	X/E MS
800	3200	4000
1000	4000	5000
1250		6300
1600		
2000		
2500		
100	100	50 - 100
30	50	65
30	30	65
53	105	143
53	105	143

E2.2			E4.2			E6.2		
< 2000	2000	2500	< 3200	3200	4000	4000	5000	6300
25	25	20	20	20	15	12	12	12
60	60	60	60	60	60	60	60	60
2	2	2	1	1	1	1	1	1
30	30	30	20	20	20	10	10	10

SACE Emax 2 Switch-disconnectors for applications up to 1000V DC

ABB SACE extends its solutions to applications in direct current with a range of switch-disconnectors for applications up to 1000V, which comply with the international IEC60947-3 standard.

For all applications in which integrated protection is requested in addition to isolation, ABB SACE offers SACE Emax automatic circuit-breakers with PR122/DC and PR123/DC. For further information, please refer to the technical catalogue "SACE Emax DC. Low voltage air circuit-breakers for direct current applications".

Common data		
Rated service voltage Ue	[V]	750 (3p) / 1000 (4p)
Rated insulation voltage Ui	[V]	1000
Rated impulse withstand voltage Uimp	[kV]	12
Number of poles	•	3- 4
Version		Fixed - Withdrawable
Isolation behaviour		IEC 60947-3



SACE Emax 2	E1.2	E1.2 N/DC MS				
Performance levels						
Rated uninterrupted current lu @ 40°C	••••••	[A]	800			
		[A]	1250			
		[A]				
		[A]				
		[A]			•	
		[A]				
Poles		•	3	4	4	
Rated service voltage Ue		•	750	750	1000	
Rated insulation voltage Ui		•	1000	1000	1000	
Rated short-time withstand current lcw	(1s)	[kA]	20	25	20	
Rated short-circuit making capacity (peak value) Icm		[kA]	40	53	40	
	1000 V	[kA]			40	
Utilization category (according to IEC 60947-3)	••••	•				

SACE Emax 2				E1.2		
Mechanical and electrical life with regular ordinary		[lu]		1250		
maintenance prescribed by the manufacturer		[No.oper.x 1000]	20	20		
	Frequency	[Oper./Hour]	60	60		
Electrical life	1000 V	[No.oper.x 1000]	1	1		
	Frequency	[Oper./Hour]				

Note: by means of external protection relay with 500 ms maximum timing, the breaking capacity Icu at the maximum rated use voltage is equal to the value of Icw (1s).





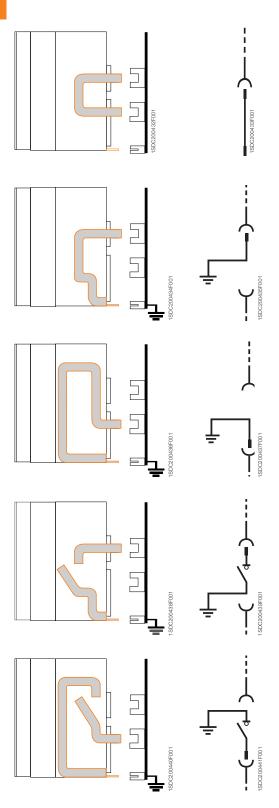


E2.2			E4.2			E6.2			
			H/DC MS	C MS			X/DC MS		
1250	·=**			1250			4000		
1600			1600			5000			
2000			2000			6300			
2500			2500	500					
			3200						
			4000						
3	4	4	3	4	4	3	4	4	
750	750	1000	750	750	1000	750	750	1000	
1000	1000	1000	1000	1000	1000	1000	1000	1000	
25	40	25	40	50	40	65	65	65	
53	84	53	84	105	84	143	143	143	
		53			84			143	

E2.2			E4.2			E6.2		
< 2000	2000	2500	< 3200	3200	4000	4000	5000	6300
25	25	20	20	20	15	12	12	12
60	60	60	60	60	60	60	60	60
2	2	2	1	1	1	1	1	1

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

In particular, in a withdrawable version, ABB SACE Emax 2 offers:



- Sectionalizing truck CS: in normal operating conditions of the electrical circuit, this device is inserted in the fixed part and 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 accessorised with a keylock and padlocks for locking in the withdrawn position.
- Earthing truck MT: this device enables all phases of the electrical circuit in 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.

- 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 accessorised with a keylock or padlocks for locking in the open position.

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

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

SACE Emax 2				E4.2			E6.2		
Performance levels		MT	MTP	cs	MT	MTP	cs	MT	MTP
Rated uninterrupted current lu @ 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 lcw (1s) [kA]	-	30	30	-	50	50	-	50	50

Other versions

Corrosive substances, vibrations, shocks or very low temperatures can be present in particular applications. In this regard, SACE Emax 2 circuit-breakers offer specific solutions developed precisely for:

- Aggressive environments, such as industrial processes for paper production, oil refining or water treatment, which are subject to high levels of sulphur dioxide (SO₂) and hydrogen sulphide (H₂S) contamination.
- Antiseismic installations, for areas with seismic risk where industrial and civil activities take place and where the continuity of critical processes must be guaranteed even in the case of particular natural events.

For further detail, please contact ABB SACE.

Protection trip units

Introduction	3/2
Architecture	3/4
Protection trip units for power distribution	
Ekip Dip	3/6
Ekip Touch	3/10
Ekip Hi-Touch	3/20
Protection trip units for generators Ekip G Touch Ekip G Hi-Touch	3/24 3/29
Protection trip units for power control	
Ekip Power Controller	3/32
Technical characteristics for protection trip units	
Protection functions	3/38
Measurement functions	3/46

Protection trip units Introduction

The SACE Emax 2 Ekip protection trip units are the new benchmark for the protection, measurement and control of low voltage electrical systems. The result of ABB SACE's experience and research, they make Emax 2 not only a circuitbreaker, but an actual Power Manager with all the functions necessary for optimal management of the system without the need for external devices.

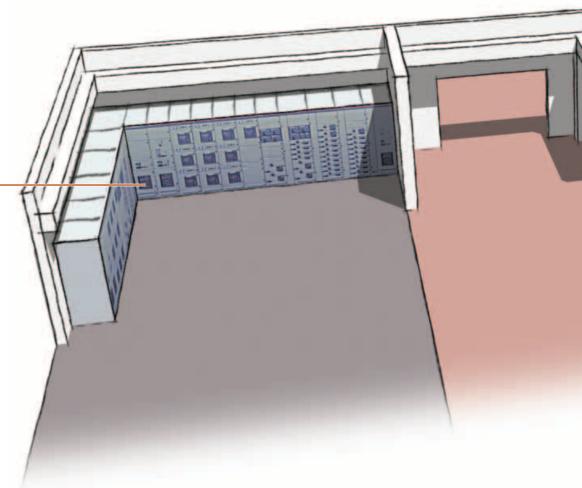
The protection units are divided into two families: Ekip for distribution protection and Ekip G for generator protection. The range of trip units is available with three levels of performance, Dip, Touch and Hi-Touch, to satisfy simple to advanced applications. Exclusive functions such as the Ekip Power Controller and Network Analyzer complete the range, enabling power management and analysis of energy quality.

The complete, flexible Ekip protection trip unit offering, which can be adapted to the actual level of protection required, is shown below:

	Fields of applications		Voltage, Power, Energy	Measurement and Protection of Voltage, Power, Energy	Network Analyzer	Power Control
Ekip Dip		with Ekip Multimeter	_	-	-	-
Ekip Touch	Distribution	•	with Ekip Measuring	with Ekip Measuring Pro	_	with Elia Dawar Cantrallar
Ekip Hi-Touch		•	•	•	•	with Ekip Power Controller
Ekip G Touch	Conoratora	•	•	•	_	with Ekin Dower Controller
Ekip G Hi-Touch	Generators	•	•	•	•	with Ekip Power Controller



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

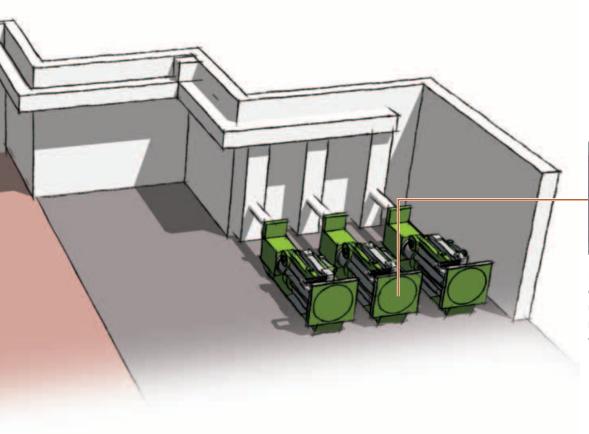


The protection units for power distribution, available in the LI, LSI and LSIG versions, are suited to all distribution systems. The Ekip trip units are designed to protect a vast range of applications, such as use with transformers, motors and drives. Ekip Dip, Ekip Touch or Ekip Hi-Touch can be selected, depending on the complexity of the system, the need to take voltage or energy measurements or to include control systems in switchgear.

Ekip G enables the protection of generators without the use of external devices that require dedicated relays and wiring. Ekip G increases efficiency from the design stage to installation, minimizing the time needed for realization and commissioning of the system, and ensuring high levels of accuracy and reliability of all protection devices required for running generators in applications such as naval, GenSet or cogeneration.

Ekip Power Controller is the new function that controls the power absorbed, thereby increasing the efficiency of the system. This ABB SACE patented function measures power and energy but also controls, without the use of complex external automation logic, loads and generators in order to optimize the power consumed.

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





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

Protection trip units **Architecture**

All SACE Emax 2 circuit-breakers are equipped with protection trip units that are interchangeable from the front with just a few, simple operations by the customer. There is no need to dismantle the circuit-breaker or access dangerous parts.

This enables personalization of the functions available, even during commissioning or when the circuit-breaker has already been installed. In particular, SACE Ekip consists of:

- Protection trip unit, available with different interfaces and versions that range from basic to more complete; it contains a latest generation microprocessor that performs all the functions of protection and control.
- Ekip Measuring Module, connected internally to Emax 2, performs voltage, power and energy measurements with high accuracy without requiring any external connection or voltage transformer. The Ekip Measuring Pro version also performs all protection functions based on voltage and power without the need for external units, thereby simplifying design and construction of the system.
- Interchangeable rating plug enables all protection thresholds to be adjusted according to the rated current, increasing flexibility for the customer. It is useful in installations that are prepared for future development or in cases in which the power supplied may be limited temporarily.
- Main board is the mechanical housing of the trip unit, which includes a micro-controller for measuring currents and the self-protection functions. The separation of trip units ensures excellent reliability and immunity to conducted and radiated emissions. Integrated new generation Rogowski sensors, which are sensitive to the true r.m.s. value of the current, guarantee high accuracy of both measurements and protection.



All protection trip units of the SACE Emax 2 family are self-powered by current that crosses the circuit-breaker. They guarantee excellent reliability thanks to a system of self-control of internal connections. The setting, testing and downloading of reports can be carried out directly from a Smartphone, Tablet or PC.

In addition, the commissioning stage can be further accelerated, minimizing the possibility of errors, by directly configuring the protection trip unit with the DOC design software settings.

Cartridge-type modules that are easily installed on-board enable the units to be integrated into the most complex systems. Additional functions can be created, such as:

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



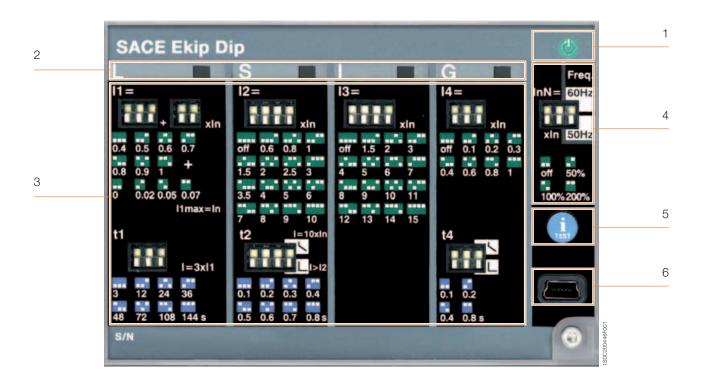
Protection trip units for power distribution Ekip Dip

Characteristics

Ekip Dip is the new protection trip unit of the SACE Emax 2 family for all applications in which high accuracy and reliable protection against overcurrent are required. Ekip Dip offers a complete set of standard protection functions. Dedicated LEDs allow the fault that caused tripping to be determined.

The unit is available in the following versions:

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



Key:

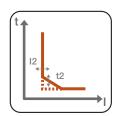
- Power-on LED for signalling correct operation (watchdog)
- 2. LEDs for alarm signalling of L, S, I and G protection functions and diagnostics
- 3. Dip switches for setting the protection functions
- 4. Dip switches for setting the network frequency and neutral protection device
- Pushbutton for test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

Protection functions

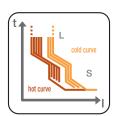
Ekip Dip offers overcurrent protection functions and, in the event of tripping, controls the opening of the circuit-breaker, preventing it from closing again unless it has been reset by the operator (lockout device - code ANSI 86).



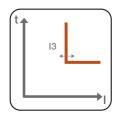
Overload (L - ANSI 49): with inverse long-time delay trip of the type $t = k/l^2$ available with 25 current thresholds and 8 curves, it provides effective protection of all systems. A pre-alarm warning is also available on reaching 90% of the threshold set.



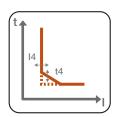
Time-delayed overcurrent (S - ANSI 51 & 50TD): with constant tripping time (t = k), or with constant specific let-through energy ($t = k/l^2$), it provides 15 current thresholds and 8 curves, for fine adjustment. The function can be excluded by setting the dip switch combination to "OFF".



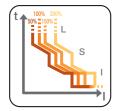
Thermal memory: for L and S protection functions, this is used to protect components, such as transformers, from overheating following an overload. The function, which can be enabled by the Ekip Connect software, adjusts the protection tripping time according to the length of time that has elapsed since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



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



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



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

Protection trip units for power distribution Ekip Dip

Measurements

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

Ekip Dip also records the characteristics of the circuit-breaker, to enable a rapid analysis in the event of maintenance:

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

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

Watchdog

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

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

User interface

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

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

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

Communication

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

Test function

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

- Ekip TT to run the trip test, the LEDs test and check absence of alarms detected by the watchdog function;
- Ekip T&P to permit not only the trip test and LEDs test but also to run the test of the individual protection functions and save the relative report;
- ITest key that is pressed to run the battery test when the circuit-breaker is disconnected.

VlaguZ

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

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

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

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

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

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

Protection trip units for power distribution Ekip Touch

Characteristics

Ekip Touch is the new protection trip unit for SACE Emax 2 that provides a complete series of protections and high accuracy measurements of all electric parameters and can be integrated perfectly with the most common automation and supervision systems.

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

The unit is available in the versions:

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



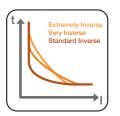
Key

- 1. Wide high-resolution colour touchscreen display
- Power-on LED to indicate correct operation (watchdog)
- 3. Pre-alarm LED

- 4. Alarm LED
- 5. Home pushbutton to return to home page
- 6. Pushbutton for test and indicating cause of trip
- 7. Test and programming connector

Protection functions

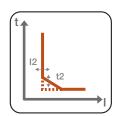
Ekip Touch enables all the protection functions to be set with a few simple steps directly from the wide touchscreen display. If the circuit breaker is tripped it must be reset manually or electrically by the operator (lockout relay - code ANSI 86).



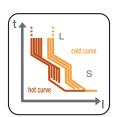
Overload (L - ANSI 49): available with three different types of trip curve:

- 1. $t = k/l^2$ with inverse long time;
- 2. IDMT in accordance with IEC 60255-3 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 $t = k/l^4$ curve for better coordination with upstream circuit-breakers or with fuses.

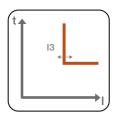
The thresholds can be fine tuned (for example 1A for circuit-breaker E1.2 1000A) and the timings to the second can be set directly from the display. The settable pre-alarm indicates the set threshold is reached before the protection is tripped. The protection can be disabled by rating plug L=off.



Time-delayed overcurrent (S - ANSI 51 & 50TD): with constant trip time (t = k), or constant specific letthrough energy ($t = k/l^2$).

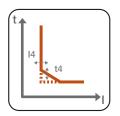


Thermal memory: for protections L and S it is used to protect the components, such as transformers, against overheating following overloads. The protection adjusts the trip time of the protection according to how much time has elapsed after the first overload, taking account of the overheating caused.



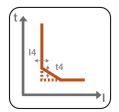
Instantaneous overcurrent (I - ANSI 50): with trip curve without intentional delay.

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



Earth fault (G - ANSI 51N & 50NTD): with trip time independent of the current (t = k) or with constant specific let-through energy ($t = k/l^2$). A pre-alarm indication is also available when 90% of the threshold is reached to activate corrective measures before the protection is tripped. The function also enables the trip to be excluded so that only the alarm is indicated, for use in installations where continuity of service is an essential requirement.

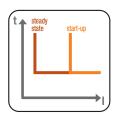
Protection trip units for power distribution Ekip Touch



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

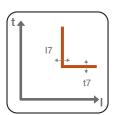


Neutral protection: available at 50%, 100%, 150% or 200% of the phase currents, or disabled, it is applied to the overcurrent protections L, S and I.

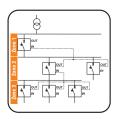


Start-up function: enables protections S, I and G to operate with higher trip thresholds during the starting phase, avoiding untimely trips due to high inrush currents of certain loads (motors, transformers, lamps). The starting phase lasts 100 ms to 30 s and is recognized automatically by the trip unit:

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



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



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

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

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

Protection functions with Ekip Measuring Pro

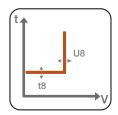


The Ekip Touch protection functions can be further increased by using the Ekip Measuring Pro measuring and protection module. With this module, all the protection functions linked to voltage, frequency and power can be enabled, thus making Ekip Touch a multifunction unit that can measure, control and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

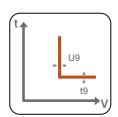
A different operating mode can be chosen for each protection function:

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

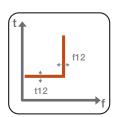
Furthermore, when the voltage and frequency protections are activated, they indicate an alarm status even when the circuit-breaker is open so that a fault can be identified before the circuit-breaker closes.



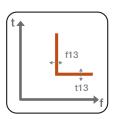
Undervoltage (UV - ANSI 27): with constant trip time (t = k), function is tripped when phase voltage falls below set threshold.



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

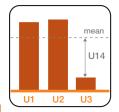


Underfrequency (UF - ANSI 81L): with constant trip time (t = k), function is tripped when network frequency falls below set threshold.



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

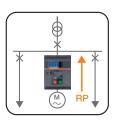
Protection trip units for power distribution Ekip Touch



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

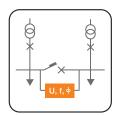


Residual current (Rc – ANSI 64 & 50NDT): with constant temperature (t=k) protects against indirect contacts and is integrated into Ekip Touch by a dedicated residual current rating plug and external toroid. The protection is an alternative to the functions G and Gext.



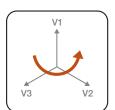
Reverse active power (RP - ANSI 32R): with constant trip time (t = k), function is tripped when total active power – in the opposite direction of the current - exceeds the set threshold.

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



Synchrocheck (SC - ANSI 25): the synchronism control function compares the voltages in the module, the frequency and phase of the two circuits to which the circuit-breaker is connected. Ekip Touch indicates that conditions have been reached that enable the two lines to be made parallel. The function is available with two work modes:

- In systems with both busbars supplied, where synchronism is determined by:
 - 1. voltage of the two half-busbars above the Ulive threshold for the set time
 - 2. difference of the module of the two voltages below the threshold ΔU
 - 3. difference of the frequency of the two voltages below the threshold Δf
 - 4. difference of the phase of the two voltages below the threshold $\Delta\Phi$
- 5. desirable time for synchronism condition tsyn
- 6. circuit-breaker open
- In systems with an out-of-service line (dead busbar), where the synchronism condition is determined by the concurrence of the following conditions for the tref set time:
 - 1. voltage of the active half-busbar above threshold Ulive
 - 2. voltage of the dead half-busbar below threshold Udead
 - 3. circuit-breaker open



In both cases, synchronism consent is withdrawn when one of the above conditions is missing and it has not been less than 200ms from the change of the circuit-breaker condition (when the relationship has been set). The indication of reached synchronism is available directly as an electrical indication via a contact that is always supplied with the module. The function can be activated simply by connecting the Ekip Synchrocheck module to any Ekip Touch provided with an Ekip Measuring Pro module.

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

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

Measurements



Measurements and meters

All versions of the Ekip Touch unit measure the RMS value of the currents of the three phases (L1, L2, L3) and of neutral (Ne) with 1% accuracy in the 0.2 to 1.2 In range (class 1 in accordance with IEC 61557-12). The complete range of measurement is from 0.03 to 16x In, where In is the value of the rating plug. The display shows the current of the most loaded phase both in numeric and analogue format on an ammeter with a 0-125% In scale for rapid identification of the load of the circuit-breaker.



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

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



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

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

Maximum values and values register

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

Data logger

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

Protection trip units for power distribution Ekip Touch

Information on trip and opening data

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

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

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



Maintenance indicators

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

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

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

Watchdog

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

Ekip also contains self-protection that preserves the correct operation of the unit against abnormal temperatures (OT) inside the protection trip unit. The user disposes of the following indications or controls:

- "Warning" LED for temperature below -20°C or above +70 °C, at which the trip unit operates correctly with the display switched off
- "Alarm" LED for temperature outside the operating range, at which the trip unit commands the opening of the circuit-breaker (if set during the configuration phase).

User interface



All Ekip Touch operations are simple and intuitive due to the wide graphic colour touchscreen display. For example, all the main information is listed on one page (settable by default), thus enabling the state of the installation to be identified rapidly: maximum current, maximum voltage, active, reactive, apparent power and energy. In addition, the use of Ekip Touch is further simplified by the possibility of scrolling through the menu and reading the alarms in one of the languages that can be set directly from the display: Italian, English, German, French, Spanish, Chinese, Russian, Turkish and Thai.

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

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



On the front of the trip unit there are also two LEDs: a pre-alarm LED (square yellow LED) and an alarm LED (red triangular LED); a message on the display always accompanies the flashing of the LEDs for clear identification of the type of event. The list of all the alarms active at that moment can be viewed by simply touching the display on the white strip in the bottom left of the alarms zone.

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

Protection trip units for power distribution Ekip Touch

Communication

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

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

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

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

Test function

For circuit-breaker testing it is possible to use the test port and the iTest key positioned on the front of the protection trip unit. The available functions are:

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

Supply

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

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

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

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

The Ekip Supply module allows the cartridge modules to be used in the terminal box area. Otherwise, the trip unit can be supplied by means of a galvanically isolated 24 VDC auxiliary voltage.

The Ekip Measuring Pro module can supply the Ekip Touch trip unit with line voltage above 85V. In addition, if the module is installed with voltage pick-ups on the supply side, the trip unit can be used even if the circuit-breaker is open.

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

Protection trip units for power distribution Ekip Hi-Touch

Characteristics

The Ekip Hi-Touch of SACE Emax 2 is a high-performance multifunction unit that is extraordinarily versatile and can be used in even the most complex installations. Ekip Hi-Touch, in fact, features exclusive functions such as: directional protection, restricted earth fault and dual setting of the protections. In addition, Ekip Hi-Touch is supplied with the exclusive Network Analyzer function that can monitor the quality of the power absorbed by the installation in accordance with existing standards.

Ekip Hi-Touch boasts all the features of Ekip Touch; as standard, it features the measuring and protection module Ekip Measuring Pro and can also be fitted, like Ekip Touch, with the additional features provided by the internal modules and by the external accessories.

The front interface of the unit, which is common to Ekip Touch, is extremely simply because of the touchscreen colour display; it is able to show measurements, bar graphs and sine curves of the different electrical values.

The unit is available in the versions:

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



Key:

- 1. Wide high-resolution colour touchscreen display
- 2. Power-on LED indicating correct operation
- 3. Pre-alarm LED
- 4. Alarm LED

- 5. Home pushbutton to return to home page
- 6. Pushbutton for test and for indicating cause of the trip
- 7. Test and programming connector
- 8. Ekip Measuring Pro module, with relative LED power on

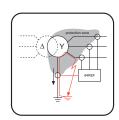
Protection functions

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

- Overload (L ANSI 49);
- Time-delayed overcurrent (S ANSI 51 & 50TD);
- Thermal memory;
- Instantaneous overcurrent (I ANSI 50);
- Closing on short-circuit (MCR);
- Earth fault (G ANSI 51N & 50NTD);
- Earth fault on toroid (G ext ANSI 51G & 50GTD)
- Neutral protection;
- Start-up function;
- Zone selectivity for functions S and G (ANSI 68);
- Current unbalance (IU ANSI 46);
- Undervoltage (UV ANSI 27);
- Overvoltage (OV ANSI 59);
- Underfrequency (UF ANSI 81L);
- Overfrequency (OF ANSI 81H);
- Voltage unbalance (VU ANSI 47);
- Residual current (Rc ANSI 64 & 50NTD);
- Reverse active power (RP ANSI 32R);
- Synchrocheck (SC ANSI 25, optional);
- Cyclical direction of the phases (ANSI 47);
- Power factor (ANSI 78);
- Current thresholds;
- Power Controller function (optional).

The following protections are also available:

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

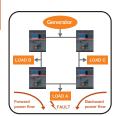


Second protection against earth fault (ANSI 50GTD/51G & 64REF): whereas with Ekip Touch the user has to choose between implementation of the protection G by internal current sensors (calculating the vector sum of the currents) or G ext external toroids (direct measurement of the earth fault current),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

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

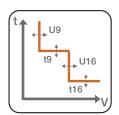
Protection trip units for power distribution Ekip Hi-Touch

Directional overcurrent (D - ANSI 67): the protection is able to recognize the direction of the current during the fault period and thus detect if the fault is upstream or downstream of the circuit-breaker. The protection, with fixed time trip curve (t=k), intervenes with two different time delays (t7bw and t7fw), according to the current direction. In ring distribution systems, this enables the distribution portion to be identified in which the fault occurred and to disconnect it while maintaining the operation of the rest of the installation.

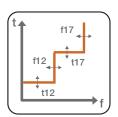


Zone selectivity for protection D (ANSI 68): enables the possibility to connect circuit-breakers among them, that in case of fault rapidly isolate the fault area, disconnecting the installation only at the level nearest to the fault, maintaining the operation of the rest of the installation. The function is particularly useful in ring and grid installations where, in addition to the zone, it is also essential to define the flow direction of the power that supplies the fault. It is possible to enable directional zone selectivity alternatively to the zone selectivity of the protections S and G, and in the presence of an auxiliary supply.

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



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



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

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

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

Measurements

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

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

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

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

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

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

Other functions

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

Protection trip units for generators Ekip G Touch

Characteristics

Ekip G Touch by SACE Emax 2 is the new protection trip unit designed for use in applications with generators, such as Genset, cogeneration and marine applications, in conformity to international standards IEC 60034-1 and IEEE C37.102. Ekip G Touch has been approved by the main shipping registers and enables the number of components installed, such as external protection devices, current sensors, voltage transformers and the relative cabling, to be reduced. The reductions allow the installation to be significantly simplified. In addition, all the protection functions can be tested individually, using the Ekip T&P device that enables the function to be tested before commissioning.

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

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



Kev:

- 1. Wide, high resolution touchscreen display
- 2. Power-on LED indicating correct operation
- 3. Pre-alarm LED
- 4. Alarm LED

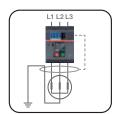
- 5. Home pushbutton to return to home page
- 6. Pushbutton for test and for indicating cause of the trip
- 7. Test and programming connector
- 8. Ekip Measuring Pro module with relative poweron LFD

Protection functions

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

The trip unit is provided with the following protection functions:

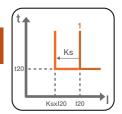
- Overload (L ANSI 49);
- Time-delayed overcurrent (S ANSI 51 & 50TD);
- Thermal memory;
- Instantaneous overcurrent (I ANSI 50);
- Closing on short circuit (MCR);
- Earth fault (G ANSI 51N & 50NTD);
- Earth fault on toroid (G ext ANSI 51G & 50GTD)
- Neutral protection;
- Start-up function;
- Zone selectivity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



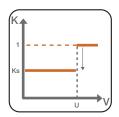
Differential ground fault (Rc - ANSI 87N): protects against internal earth fault on generator winding. It is required that the toroid hugs the active conductors and the ground conductor. Rc protection is integrated by a dedicated residual current rating plug and the external toroid.

Protection trip units for generators Ekip G Touch

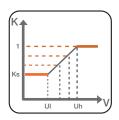
The specific functions for generator protections are described below, for each of which it is possible to choose the operating mode: active, only alarm or deactivated. All the voltage and frequency protections also operate when the circuit-breaker is open, enabling the fault to be identified before the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



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



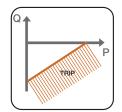
In step mode (controlled mode) the protection is tripped at the set threshold (I20) if the voltage is above U, whereas it is tripped at the lower threshold of the factor Ks (I20 * Ks) if the voltage is below U.



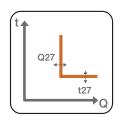
On the other hand, in linear mode (restrained mode) two voltage limits are selected within which the protection is tripped at the set threshold (I20) reduced by the factor K corresponding to the measured voltage. The variation of the factor K is proportional to the voltage, and for voltages greater than the upper threshold (Uh) the threshold I20 works, whereas for voltages below the lower threshold (UI) the minimum threshold (I20 * Ks) applies.



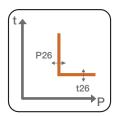
Residual overvoltage (RV – ANSI 59N): with constant trip time (t = k), protects against insulation loss in systems with insulated neutral or with neutral earthed with impedance.



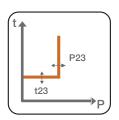
Loss of field or reverse reactive power (RQ - ANSI 40 or 32RQ): with constant trip time (t = k), is tripped when the total reactive power absorbed by the generator exceeds the set threshold. It is possible to select the constant threshold (k=0) or a function of the delivered active power of the generator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



Reactive overpower (OQ - ANSI 320F): with constant trip time (t = k), the function is tripped when reactive power exceeds the set threshold in the generator to network direction.



Active overpower (OP - ANSI 320F): with constant trip time (t = k), the function is tripped when the active power exceeds the threshold set in the delivering direction of the generator.



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

Protection trip units for generators Ekip G Touch

Measurements

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

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

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

Other functions

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

Protection trip units for generators Ekip G Hi-Touch

Characteristics

SACE Emax 2's Ekip G Hi-Touch is the new benchmark for the protection of low voltage electric generators. It provides optimum protection, even in complex installations, due to exclusive functions such as protection against frequency creep and maximum directional current.

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

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



Key:

- 1. Wide, high resolution touchscreen display
- 2. Power-on LED indicating correct operation
- 3. Pre-alarm LED
- 4. Alarm LED

- 5. Home pushbutton to return to home page
- 6. Pushbutton for test and for indicating cause of the trip
- 7. Test and programming connector
- 8. Ekip Measuring Pro module with relative poweron LED

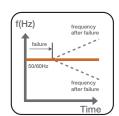
Protection trip units for generators Ekip G Hi-Touch

Protection functions

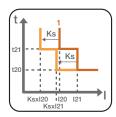
The Ekip G Hi-Touch trip unit is provided with the following protection functions, common to Ekip Hi-Touch:

- Overload (L ANSI 49);
- Time-delayed overcurrent (S ANSI 51 & 50TD);
- Time-delayed overcurrent, second threshold (S2 ANSI 50TD);
- Thermal memory;
- Instantaneous overcurrent (I ANSI 50);
- Directional overcurrent (D ANSI 67);
- Voltage controlled overcurrent protection (S(V) ANSI 51V);
- Closing on short circuit (MCR);
- Earth fault (G ANSI 51N & 50NTD);
- Second protection against earth fault (ANSI 50GTD/51G & 64REF);
- Earth fault on toroid (Gext ANSI 51G & 50GTD);
- Neutral protection;
- Start-up function;
- Zone selectivity for functions S and G (ANSI 68);
- Zone selectivity for directional protection D (ANSI 68)
- Start-up function for protection D;
- Current unbalance (IU ANSI 46);
- Undervoltage (UV ANSI 27);
- Undervoltage, second threshold (UV2 ANSI 27);
- Overvoltage (OV ANSI 59);
- Overvoltage, second threshold (OV2 ANSI 59);
- Underfrequency (UF ANSI 81L);
- Underfrequency, second threshold (UF2 ANSI 81L);
- Overfrequency (OF ANSI 81H);
- Overfrequency, second threshold (OF2 ANSI 81H);
- Voltage unbalance (VU ANSI 47);
- Residual overvoltage (RV ANSI 59N);
- Differential ground fault (Rc ANSI 87N);
- Loss of field or reverse reactive power (RQ ANSI 40 or 32R);
- Reverse active power (RP ANSI 32R);
- Reactive overpower (OQ ANSI 32OF);
- Active overpower (OP ANSI 32OF);
- Active underpower (UP ANSI 32LF);
- Synchrocheck (SC ANSI 25, optional);
- Cyclical direction of phases (ANSI 47);
- Power factor (ANSI 78);
- Current thresholds;
- Dual setting of protections;
- Power Controller function (optional).

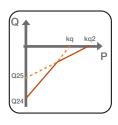
In addition, the following protections are also available:



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



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



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

Measurements

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

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

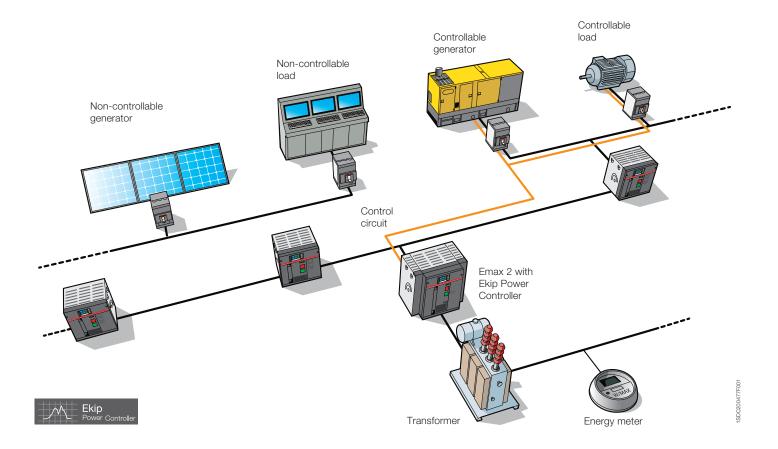
Other functions

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

Protection trip units for power control **Ekip Power Controller**

The exclusive Ekip Power Controller function, patented by ABB and available on new SACE Emax 2 circuit-breakers, monitors installation loads and generators, permitting the power consumed to be limited and allowing savings on electricity bills.

Ekip Power Controller, which can be used with all Ekip Touch trip units of the Emax 2 series, effectively helps to improve energy efficiency by managing the entire low voltage electrical system. It is, in fact, able to adapt the demand for power according to the availability of the energy source, the time of day and the costs indicated in the current pricing plan. In this way Ekip Power Controller is able to maintain power consumption within the limits defined, thereby optimizing the costs of managing the installation and reducing emissions.



Distinctive features

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

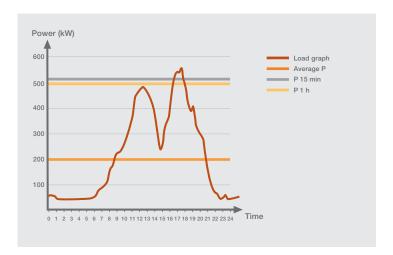
Power limited only when necessary. Ekip Power Controller manages up to four different time bands: it is therefore possible to respect a particular power limit according to whether it is during the day (peak) or night (off peak). In this way, consumption during the day when rates are at their highest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

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

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

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

Graph of daily load



Perfect integration into intelligent networks. Thanks to integrated communication modules, Ekip Power Controller can receive the maximum absorbable power directly from the medium voltage control system, determining consumption for the next 15 minutes. Ekip Power Controller, according to the information received, manages the switching off of non-priority loads or the switching on of reserve generators. Ekip Power Controller gives maximum priority to non-programmable preferred energy sources, such as wind and solar, and they are therefore considered uninterruptable. In the event the production of internal power to the controlled network is reduced, due, for example, to decreased production of solar power, Ekip Power Controller will disconnect the necessary loads to respect the consumption limit set.

Perfect integration in self-generation systems. This benefit is used, for example, in installations with a system of cogeneration. Ekip Power Controller controls the total consumption drawn from the electrical network, interrupting non-indispensable loads when production is reduced and reconnecting them when generator power is sufficient to not exceed limits. There are multiple advantages: reduction in energy costs, maximum use of local production and greater overall energy efficiency.

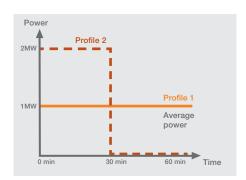
Protection trip units for power control Ekip Power Controller

Operating principle

Ekip Power Controller is an advanced system of control in real time that limits the average power consumed in each time range to a maximum, pre-determined value. This is achieved by delaying, only when necessary, the operation of controllable loads, which are then put back into operation as soon as possible without exceeding the limits of power set. In each instance, Ekip Power Controller optimizes the number of deactivated loads on the basis of a determined order of priority, constantly seeking to supply the most extensive part possible of the installation. If controllable generators are present such as, for example, diesel generators, Ekip Power Controller controls their switching on and off to limit the peak of power consumed. The types of loads that can be interrupted for a few minutes with a limited impact are many and vary according to the application, for example:

- industrial ovens, fridges;
- ventilation or air compression systems;
- electric car charging systems;
- electrical air conditioning/heating of corridors, stairways and passageways;
- electric kitchens in hotels/hospitals;
- swimming pool heating systems and circulation pumps.

The method of calculation



Ekip Power Controller controls the maximum power consumed by the installation, utilizing the same method as that used for fiscal metering, thereby achieving savings on the component connected to maximum power (\$/kW) on electricity bills. The power consumed is calculated by the energy meter as an average value over pre-determined time periods such as, for example, 15 minutes, or even 1 hour. The user therefore pays the same bill both in the event he consumes 1MW continuously (profile 1) or 2MW for 50% of the time and 0MW for the remaining 50% (profile 2), since the average power is the same.

Estimation of consumption

Ekip Power Controller uses this principle together with a predictive algorithm that estimates, moment by moment, power at the end of the period in order to decide whether to disconnect or connect loads and generators. This enables brief transient requests for high power to be tolerated, such as, for example, the starting up of motors, without causing the disconnection of loads as soon as the power exceeds the threshold set.

The operations of connection and disconnection therefore depend on the consumption from the beginning of the period up to the present moment: for example, if during the first few minutes of the period of reference consumption was very high, Ekip Power Controller will disconnect a greater number of loads in the minutes after; if, on the other hand, the initial consumption was low, it will leave a greater number of loads in operation.

Management of loads

According to the consumption estimate at the end of the period, Ekip Power Controller will take different actions:

- if the value estimated is greater than the power set as a target, Ekip Power Controller makes the decision to disconnect one of the loads controlled from the power supply, or to connect a generator;
- if the value estimated is equal or slightly less than the average power set as a target, Ekip Power Controller makes the decision to leave the conditions of the controlled loads and generators unchanged;
- if the value estimated is significantly lower than the average power set as a target, Ekip Power Controller makes the decision to reconnect one of the loads controlled to the power supply, or switch off a generator if one or more of these have been switched on previously.

This operation is carried out cyclically each time by calculating a new estimate: therefore, if the estimate of power consumed continues to be too high despite the fact that a load has been disconnected, Ekip Power Controller will proceed to disconnect another and so on, until the power limit is respected. In this way, the number of connected or disconnected loads varies dynamically, and always with the guarantee that only the minimum number needed to respect the power limit are disconnected.

Priority of loads

If the decision made is to disconnect or re-connect one of the loads controlled, Ekip Power Controller proceeds according to an established order: the load indicated as the first will be that of least importance, or that for which a temporary period of deactivation is acceptable; the load indicated as the second will be the next one in order of importance, and so on. The loads that have been disconnected in that order will be later re-connected in the reverse order, beginning with the load that is most important for the installation. In this way, the impact on the production process can be minimized, limiting the disconnection time for loads of the highest priority. Furthermore, by gradually connecting and disconnecting the loads in order of priority, voltage imbalances and consumption peaks affecting the network are avoided.

Protection of the installation

Ekip Power Controller can be integrated perfectly into the installation's protection devices. In fact, if one of the controlled circuit-breakers opens due to an overcurrent or by manual operation, Ekip Power Controller considers the load unavailable until the operator resets it, making it available again. In this way, safe operation of the installation is always guaranteed.

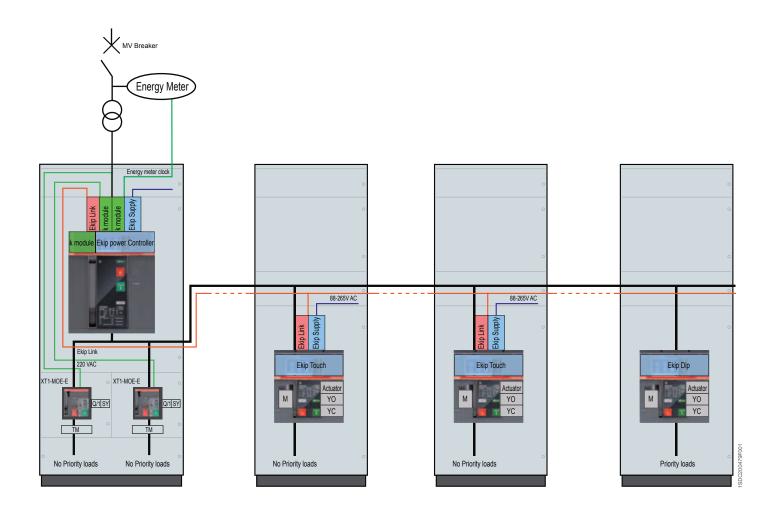
Protection trip units for power control Ekip Power Controller

Architecture

Ekip Power Controller is installed on the main low voltage circuit-breaker, immediately downstream of the transformer and energy meter. By using the high precision current and voltage sensors located inside the SACE Emax 2, it is able to measure the average power consumed by the installation, using the same method as that used for fiscal metering, over an established time period. To control this average power, Ekip Power Controller performs controlled opening and closing of the switching devices.

A Power Controller system consists of:

- a SACE Emax 2 circuit-breaker with Ekip Touch protection trip unit equipped with Ekip Power Controller and Ekip Measuring.
 This circuit-breaker is the power controller and meterand implements the Power Controller function, determining the connection and disconnection of loads:
- up to 15 controlled loads and/or generators. The connection between Ekip Power Controller and users can be achieved:
 - with Ekip Signalling modules for connections inside the same switchboard. This allows circuit-breakers or contactors installed on the power circuit to be commanded directly through available outputs. The opening and closing operations are always carried out in safety thanks to an input that receives feedback on the state of the device.
 - with Ekip Signalling modules by acting on the generator starting circuit or on the control circuit of the loads. This allows, for example, the consumption of motors powered by drives to be reduced without interrupting the production cycle.
 - with Ekip Link communication modules for installations with circuit-breakers in different switchboards. This enables wiring between switchboards to be simplified to the use of only one EtherNet cable.



In the event that the installation is constructed with a single medium voltage delivery point and two or more transformers in parallel, Ekip Power Controller can acquire, via Ekip Link, the power measurement carried out by the other Emax 2 devices present. In this way the power limit can be respected at the medium voltage measuring point, without having to duplicate the control circuit of the loads.

Installation

Ekip Power Controller is not only simple to implement and use, it is also very flexible thanks to parameters which have been specially developed to satisfy the needs of all applications.

Installation parameters:

- Power limit: this is the average power that Ekip Power Controller respects, which can be selected in kW directly from the display.
- Evaluation window: this is the period in which the distributor of electrical energy evaluates the maximum power, which can be selected within a wide range to respect the local needs of each country.
- Synchronization input: this is used to synchronize the clock inside Ekip with that of the meter. It can also be used to signal a change in band.

Parameters of the user:

- Type of user: can be selected from among load and generator.
- Minimum disconnection time (T off min): this is the minimum time for which a load or generator is not supplied with power following disconnection. This is useful when you wish to avoid frequent operations on users that are at the top of the priority list. Ekip Power Controller reconnects the load or generator only after the time set has passed.
- Maximum disconnection time (T off max): this is the maximum time for which no power is permitted. It is required, for example, in the case of an oven to keep the temperature within the established limits. When the time has passed, Ekip Power Controller reactivates it automatically, disconnecting, if necessary, a load of a higher priority.
- Minimum connection time (T on min): minimum time for which a load or generator is kept powered following reconnection. It is useful in the event the generator has a minimum time for which it must remain connected. Until the time set has passed, Ekip Power Controller will not disconnect the load, connecting, if necessary, loads of a higher priority.
- Time window: this is the hours in the day when a load or generator can be operated. It is useful, for example, in the case of a canteen that cannot be disconnected during meal times, or a diesel generator that can not be operated at night due to noise
- Temporary unavailability: a user can be temporarily deactivated, for example, because it is undergoing maintenance, through the circuit-breaker display or digital input connected to a manual/automatic selector. The digital input can also be used, for example, in the case of a fridge, to manage its interruptability: with active input the fridge cannot be disconnected as it is above the minimum temperature, with inactive input, on the other hand, it can be disconnected.

Power limit	can be set directly in kW			
Time bands	up to 4			
Synchronization with contactor	•			
Evaluation time	5120 min			
Number of loads/generators	up to 15			
Priority	from 1 to 15			
t on min	1360 min			
t off min	1360 min			
t off max	1360 min			
Temporary disabling input	1 for each device			
Controllable devices	load/generator			
Type of control	- moulded-case and air circuit-breaker			
	- modular circuit-breakers			
	- contactors			
	- control circuit of load/generator			
Type of connections	- wired			
	- with Ekip Link communication for ACB			

Technical characteristics for protection trip units Protection functions

ABB Code	ANSI/IEEE C37.2 Code	Function	Threshold	
L	49	Overload protection	11 = 0.4 - 0.42 - 0.45 - 0.47 - 0.5 - 0.52 - 0.55 - 0.57 - 0.6 - 0.62 - 0.65 - 0.67 - 0.7 - 0.72 - 0.75 - 0.77 - 0.8 - 0.82 - 0.85 - 0.87 - 0.9 - 0.92 - 0.95 - 0.97 - 1 x ln	
		Thermal memory		
		Tolerance	tripping between 1.05 and 1.2 x l1	
S	51	Short-circuit selective protection	12 = 0.6 - 0.8 - 1 - 1.5 - 2 - 2.5 - 3 - 3.5 - 4 - 5 - 6 - 7 - 8 - 9 - 10 x ln	
		Tolerance	\pm 7% If \leq 6 x In \pm 10% If $>$ 6 x In	
		Short-circuit selective protection	I2 = 0.6 - 0.8 - 1 - 1.5 - 2 - 2.5 - 3 - 3.5 - 4 - 5 - 6 - 7 - 8 - 9 - 10 x ln	
		Thermal memory		
		Tolerance	± 7% If ≤ 6 x In ± 10% If > 6 x In	
I	50	Short-circuit instantaneous protection	13= 1.5 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 x ln	
		Tolerance	± 10%	
G	51N	Earth fault protection	I4 ⁽¹⁾ = 0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1 x ln	
		Tolerance	± 7%	
		Earth fault protection	I4 ⁽¹⁾ = 0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1 x In	
		Tolerance	± 7%	

⁽¹⁾ G protection below 100A or below 0.2 In available with auxiliary supply

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

ABB Code	Trip threshold	Trip time
L	Trip between 1.05 and 1.2 x l1	± 20%
S	± 10%	± 20%
I	± 15%	≤ 60ms
G	± 15%	± 20%

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



Trip time	Excludibility	Pre Alarm	Trip curve	Ekip Dip	
with I = 3 I1, t1 = 3 - 12 - 24 - 36 - 48 - 72 - 108 - 144 s (2)	No	50 90 I1 Step 1%	t = k / l ²	•	
	Yes			•	
 ± 10% f ≤ 6 x n ± 20% f > 6 x n					
t2 = 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.6 - 0.7 - 0.8s	Yes	No	t = k	•	
 The better of the two data: \pm 10% or \pm 40 ms					
 with I = 10 In, t2 = 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.6 - 0.7 - 0.8s	Yes	No	$t = k / l^2$	•	
	Yes	No			
± 15% f ≤ 6 x n ± 20% f > 6 x n					
Instantaneous	Yes	No	t = k	•	
 ≤ 30 ms					
t4 = 0.1 - 0.2 - 0.4 - 0.8s	Yes	No	t = k	•	
 The better of the two data: \pm 10% or \pm 40 ms					
 t4 = 0.1 - 0.2 - 0.4 - 0.8s	Yes	No	$t = k / l^2$	•	
± 15%					
 		•	_	·	

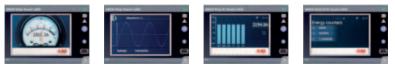
Technical characteristics for protection trip units Protection functions

ABB Code	ANSI Code	Function	Thereshold	Threshold step	Tripping time	Time Step	
L	49	Overload Protection	I1 = 0.41 x In	0.001 x ln	with I = 3 I1, t1 = 3144 s	1s	
		Thermal Memory					
		Tolerance	tripping between 1.05 and 1.2 x l1		± 10% l ≤ 6 x ln ± 20% l > 6 x ln		
	49	Overload Protection	11 = 0.41 x ln	0.001 x ln	with I = 3 I1, t1 = 3144 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 t = k /I4: k =80 α =4	1s	
		Tolerance	tripping between 1.05 and 1.2 x I1		± 10% I ≤ 6 x In ± 20% I > 6 x In		
S	50TD	Time-delayed overcurrent protection	I2 = 0.610 x In	0.1 x ln	t2 = 0.050.8s	0.01s	
	68	Zone selectivity			t2sel = 0.040.2s	0.01s	
		Start up	Activation: 0.110 x In	0.1 x ln	Range: 0.130s	0.01s	
		Tolerance	$\pm 7\% I \le 6 x In$ $\pm 10\% I > 6 x In$		The better of the two data: \pm 10% or \pm 40 ms		
	51	Time-delayed overcurrent protection	I2 = 0.610 x In	0.1 x ln	with I = 10 In, t2 = 0.050.8s	0.01s	
		Thermal Memory					
		Tolerance	± 7% l2 ≤ 6 x ln ± 10% l2 > 6 x ln		± 15% I ≤ 6 x In ± 20% I > 6 x In		
S2	50TD	Time-delayed overcurrent protection	I5 = 0.610 x In	0.1 x ln	t5 = 0.050.8s	0.01s	
		Start up	Activation: 0.110 x In	0.1 x ln	Range: 0.130s	0.01s	
		Tolerance	± 7% l5 ≤ 6 x ln ± 10% l5 > 6 x ln		The better of the two data: \pm 10% or \pm 40 ms		
S(V)	51V	Voltage controlled overcurrent protection	I20 = 0.610 x In	0.1 x ln	t20 = 0.0530s	0.01s	
		Step mode (controlled mode)	UI= 0.21 x Un	0.01 x Un			
			Ks= 0.11	0.01			
		Linear mode (restrianed mode)	UI= 0.21 x Un	0.01 x Un			
			Uh= 0.21 x Un	0.01 x Un			
			Ks= 0.11	0.01			
		Tolerance	± 10%		The better of the two data: \pm 10% or \pm 40 ms		
S2(V)	51V	Voltage controlled overcurrent protection	I21 = 0.610 x ln	0.1 x ln	t21 = 0.0530s	0.01s	
		Step mode (controlled mode)	Ul2= 0.21 x Un	0.01 x Un			
			Ks2= 0.11	0.01			
		Linear mode (restrianed mode)	UI2= 0.21 x Un	0.01 x Un			
			Uh2= 0.21 x Un	0.01 x Un			
			Ks2= 0.11	0.01			
		Tolerance	± 10%		The better of the two data: \pm 10% or \pm 40 ms		
I	50	Istantaneous overcurrent protection	l3= 1.515 x ln	0.1 x ln	Instantaneous	-	
		Start up	Activation: 0.110 x In	0.1 x ln	Range: 0.130s	0.01s	
		Tolerance	± 10%		≤ 30 ms		
MCR		Closing on short-circuit protection	I3= 1.515 x In	0.1 x ln	Instantaneous Activation range: 40500ms	0.01s	
		Tolerance	± 10%		≤ 30 ms		









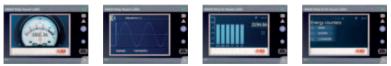
Excludibility	Excludibility trip	Pre-allarm	Trip curve	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
 yes, with rating plug L=off	no	5090% l1	t = k / l ²	•	•	•	•
 yes				•	•	•	•
 yes, with rating plug L=off	no	5090% l1	. kt1ß	•	•	•	•
you, man raining plag 2 on		00111007011	$t = \frac{k t1 B}{\left(\frac{if}{I1}\right)^{\alpha} - 1}$				
			(11)				
		<u> </u>					
yes	yes	no	t = k	•	•	•	•
 yes	<u>.</u>			•	•	•	•
 yes				•	•	•	•
		:					
 voo	voo	no	+ 1, /12				
 •	yes	no	t = k / l ²			•	•
 yes		<u> </u>		•	•	•	•
yes	yes	no	t = k		•		•
 yes					•		•
yes	yes	no	t = k			•	•
						•	•
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 yes	yes	no	t = k				•
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		<u>:</u> :					
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 ÷	no	no	t = k	•	•	•	•
 yes				•	•	•	•
				_	_	_	_
yes	no	no	t = k	•	•	•	•

Table continued on next page

Technical characteristics for protection trip units Protection functions

ABB Code	ANSI Code	Function	Thereshold	Threshold step	Tripping time	Time Step
G	50N TD	Earth fault protection	I4 ⁽¹⁾ = 0.11 x ln	0.001 x ln	with I > I4, t4 = 0.11s	0.05s
	68	Zone selectivity			t4sel = 0.040,2s	0.01s
		Start up	Activation: 0.110 x In	0.1 x ln	range: 0.130s	0.01s
		Tolerance	± 7%		The better of the two data: ± 10% or ± 40 ms	
	51N	Earth fault protection	I4 ⁽¹⁾ = 0.11 x ln	0.001 x ln	with I = 4 In, t4 = 0.11s	0.01s
	•	Tolerance	± 7%		± 15%	
Gext	50G TD	Earth fault protection	I4 ⁽¹⁾ = 0.11 x In Toroid	0.001 x In Toroid	t4 = 0.11s	0.05s
		Start up	Activation: 0.110 x In	0.1 x ln	range: 0.130s	0.01s
		Tolerance	± 7%		The better of the two data: ± 10% or ± 40 ms	
	51G	Earth fault protection	I4 ⁽¹⁾ = 0.11 x ln	0.001 x ln	with I = 4 In, t4 = 0.11s	0.01s
		Tolerance	± 7%		± 15%	
D	67	Directional overcurrent protection	I7 = 0.610 x In	0.1 x ln	t7 = 0.20.8s	0.01s
	68	Zone selectivity			t7sel = 0.130.5s	0.01s
		Start up	Activation: 0.110 x In	0.1 x ln	range: 0.130s	0.01s
		Tolerance	± 7% l7 ≤ 6 x ln ± 10% l7 > 6 x ln		The better of the two data: ± 10% or ± 40 ms	
IU	46	Current unbalance protection	I6= 290% In unbalance	1%ln	t6 = 0.560s	0.5s
		Tolerance	± 10%		The better of the two data: ± 10% or ± 40 ms	
Rc	64 50N TD 87N	Residual current protection Differential ground fault protection	IΔn= 3 - 5 - 7 - 10 - 20 - 30A		t\Delta n = 0.06 - 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.8s	
		Tolerance	- 20% ÷ 0%		0.06s	
UV	27	Undervoltage Protection	U8= 0.50.98 x Un	0.001 x Un	t8 = 0.0560s	0.05s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	
UV2	27	Undervoltage Protection	U15= 0.50.98 x Un	0.001 x Un	t15 = 0.0560s	0.05s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	
OV	59	Overvoltage protection	U9= 1.021.5 x Un	0.001 x Un	t9 = 0.0560s	0.05s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	
0V2	59	Overvoltage protection	U16= 1.021.5 x Un	0.001 x Un	t16 = 0.0560s	0.05s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	
RV	59N	Residual overvoltage protection	U22= 0.10.5 x Un	0.001 x Un	t22 = 0.560s	0.05s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	
VU	47	Voltage unbalance protection	U14= 290% Un unbalance	1%Un	t14 = 0.560s	0.5s
		Tolerance	± 10%		The better of the two data: ± 10% or ± 40 ms	
UF	81L	Underfrequency protection	f12= 0.90.99 x fn	0.01 x fn	t12 = 0.260s	0.1s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	
UF2	81L	Underfrequency protection	f17= 0.90.99 x fn	0.01 x fn	t17 = 0.260s	0.1s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	
0F	81H	Overfrequency protection	f13= 1.011.1 x fn	0.01 x fn	t13 = 0.560s	0.1s
		Tolerance	± 5%		The better of the two data: ± 10% or ± 40 ms	









	Excludibility	Excludibility trip	Pre-allarm	Trip curve	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
	yes	yes	90% 4	t = k	•	•	•	•
	yes				•	•	•	•
	yes				•	•	•	•
	yes	yes	90% 4	$t = k / l^2$	•	•	•	•
	yes	yes	90% 14	t = k	•	•	•	•
	yes				•	•	•	•
	yes	yes	90% 4	$t = k / l^2$	•	•	•	•
			•	7				
	yes	yes	no	t = k		•		•
	yes					•		•
	yes					•		•
	yes	yes	no	t = k	•	•	•	•
	Attivabile with rating plug Rc	no	no	t = k	•	•	•	•
	yes	yes	no	t = k	0	•	•	•
	yes	yes	no	t = k		•		•
	yes	yes	no	t = k	0	•	•	•
	yes	yes	no	t = k		•		•
	yes	yes	no	t = k			•	•
			<u> </u>					
	yes	yes	no	t = k	0	•	•	•
	yes	yes	no	t = k	0	•	•	•
	yes	yes	no	t = k		•		•
:					<u> </u>			<u> </u>
	yes	yes	no	t = k	0	•	•	•

Table continued on next page

Technical characteristics for protection trip units Protection functions

ABB Code	ANSI Code	Function	Thereshold	Threshold step	Tripping time	Time Step	
0F2	81H	Overfrequency protection	f18= 1.011.1 x fn	0.01 x fn	t18 = 0.560s	0.1s	
		Tolerance	± 5%		The better of the two data: \pm 10% or \pm 40 ms		
ROCOF	81R	Rate of change of frequency protection	f28= 0.410 Hz/s	0.2 Hz/s	with f > f28 128 = 0.410s with f28=0.41.0 Hz/s 128 = 0.2510s with f28=1.25.0 Hz/s 128 = 0.1510s with f28> 5.2 Hz/s	0.1s	
		Tolerance	± 10%		The better of the two data: \pm 10% or \pm 40 ms		
RP	32R	Reverse active power protection	P11= -10.08 Sn	0.001 Sn	t11 = 0.5100s	0.1s	
		Tolerance	± 10%		The better of the two data: ± 10% or ± 40 ms		
RQ	40/32R	Loss of field or reverse reactive power protection	Q24= -10.1 Sn	0.001 Sn	t24 = 0.5100s	0.1s	
			Kq= -22	0.01			
	:	Loss of field or reverse reactive power protection	Q25= -10.1 Sn	0.001 Sn	t24 = 0.5100s	0.1s	
			Kq2= -22	0.01			
		Tolerance	± 10%		The better of the two data: ± 10% or ± 40 ms		
0P	320F	Active overpower protection	P26= 0.42 Sn	0.001 Sn	t26 = 0.5100s	0.5s	
		Tolerance	± 10%		The better of the two data: ± 10% or ± 40 ms		
OQ	320F	Reactive overpower protection	Q27= 0.42 Sn	0.001 Sn	t27 = 0.5100s	0.5s	
		Tolerance	± 10%		The better of the two data: \pm 10% or \pm 40 ms		
UP	32LF	Active underpower protection	P23 = 0.11 x ln	0.001 x Sn	t23 = 0.5100s	0.5s	
		Temporary deactivation			range from closing: 0.130s o with digital input	0.1s	
		Tolerance	± 10%		The better of the two data: \pm 10% or \pm 40 ms		
Synchrocheck SC	25	Synchrocheck (Live busbars)	Ulive= 0.51.1 Un ΔU = 0.020.12 Un Δf = 0.11Hz $\Delta \Phi$ = 550° elt tsyn= 0.13s	0.01 Un 0.01 Un 0.1Hz 5° elt 0.1s	tref= 0.130s	0.1s	
		Tolerance	± 10%				
		Synchrocheck (Live,Dead busbars)	Ulive= 0.51.1 Un Udead= 0.020.2 Un	0.01 Un 0.01 Un	tref= 0.130s	0.1s	
		Tolerance	± 10%				
	47	Cyclical direction of the phases	1-2-3 or 3-2-1				
	78	3phase Power factor	PF3= 0.20,95	0.01			
		Current thereshold	LC1=50%100% l1 LC2=50%100% l1 lw= 0.310 ln	1% 1% 0.01 x ln			
	:	Tolerance	± 10%				

1) G protection below 100A or 0.2 x In available with auxiliary supply.

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

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









				*	*	- 1	-
Excludibility	Excludibility trip	Pre-allarm	Trip curve	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
 yes	yes	no	t = k		•		•
yes	yes	no	t = k				•
yes	yes	no	t = k	•	•	•	•
yes	yes	no	t = k			•	•
 yes	yes	no	t = k				•
yes	yes	no	t = k			•	•
yes	yes	no	t = k			•	•
yes	yes	no	t = k			•	•
 yes		:					
		<u>:</u>					
yes	only signalling	no	-	0 00	00	00	00
 yes	only signalling	no	-				
 yes	only signalling	no	-	0	•	•	•
 yes	only signalling	no	-	0	•	•	•
 *	only signalling	no	-	•	•	•	•

Key:

- not available
- available
- O available with Ekip Measuring Pro
 OO available with Ekip Synchrocheck

Technical characteristics for protection trip units Measurement functions

Instantaneous measurements		Displayed with Ekip Multimeter	Parameters	
Currents (RMS)	[A]	•	I1, I2, I3, neutral	
Earth fault current (RMS)	[A]	•	lg	
Record of values: of the parameter for each interval with time-stamping			Parameters	
Current: minimum and maximum	[A]	•	11, 12, 13, neutral	
Information on trip and opening data: after a fault with or without au	xiliary supply	:	Parameters	
Type of protection tripped		•	eg. L, S, I, G	
Fault values per phase	[A]	•	eg. I1, I2, I3, neutral for S protection	
Time-stamping		•	Date, time and progressive number	
Maintenance indicators			Parameters	
Information on last 30 trips		•	Type of protection, fault values and time-stamping	
Information on last 200 events		•	Type of event, time-stamping	
Number of mechanical operations (1)	[no]	•	Can be associated to alarm	
Total number of trips	[no]	•		
Total operating time	[h]	•		
Wear of contacts	[%]	•	Prealarm >80%, Alarm = 100%	
Date of maintenance operations performed		•	Last	
Indication of maintenance operation needed		•		
Circuit-breaker I.D.		•	Type of circuit-breaker, assigned device name, serial number	
Self-diagnosis			Parameters	
Check of continuity of internal connnections		•	Alarm due to disconnection: rating plug, sensors, trip coil	
Failure of circuit-breaker to open (ANSI 50BF)		•	Alarm following non-tripping of protection functions	
Temperature (OT)		•	Pre-alarm and alarm for abnormal temperature	

⁽¹⁾ with auxiliary supply present



Precision	Standard di riferimento	Ekip Dip
1%	Class 1 IEC 61557-12	•
 2%		•
Window	Intervals	
Fixed, synchronizable by remote	Duration: 5120min Number of intervals: 24	•
		•
		•
		•
		•
		•
		•
		•
		•
		•
		•
		•
		•
Note: Opening of circuit-breaker can be set in the event of alarm		•
		•
		•

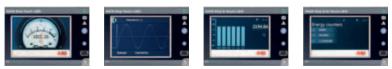
Technical characteristics for protection trip units Measurement functions

Instantaneous measurements		Parameters	
Currents (RMS)	[A]	I1, I2, I3, neutral	
Earth fault current (RMS)	[A]	lg	
Phase-phase voltage (RMS)	[V]	V12, V23, V31	
Phase-neutral voltage (RMS)	[V]	V1n, V2n, V3n	
Phase sequence			
Frequency	[Hz]	f	
Active power	[kW]	P1, P2, P3, Ptot	
Reactive power	[kVAR]	Q1, Q2, Q3, Qtot	
Apparent power	[KVA]	S1, S2, S3, Stot	
Power factor		PF1, PF2, PF3, PF total	
Peak factor		total	
Counters recorded from installation or from the last reset		Parameters	
Active energy	[kWh]	Ep total, Ep absorbed, Ep consumed	
Reactive energy	[kVARh]	Eq total, Ep absorbed, Ep consumed	
Apparent energy	[KVAh]	Es total	
Network Analyzer		Parameters	
Hourly average voltage value	[V] [no]	- Umin= 0.750.95 x Un - Umax= 1.051.25 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= 0.750.95 x Un - Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime)	
Short voltage spikes	[no]	- Umax= 1,051,25 x Un - Events counter (nr. of events day by day in the last year plus the total events in the breaker's lifetime)	
Slow voltage sags and swells	[no]	- Umin1= 0.750.95 x Un - Umin2= 0.750.95 x Un - Umin3= 0.750.95 x Un - Umax1= 1.051.25 x Un - Umax2= 1.051.25 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]	Uneg. seq.= 0.020.10 x Un 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: 520% - Single harmonic alarm: 310% plus a count of minutes the harmonic has been exceeded	









	*	*	*	***************************************
Precision	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
1%	•	•	•	•
2%	•	•	•	•
0.5%	0	•	•	•
 0.5%	0	•	•	•
	0	•	•	•
0.2%	0	•	•	•
2%	0	•	•	•
2%	0	•	•	•
2%	0	•	•	•
2%	0	•	•	•
	0	•	•	•
Precision				
 2%				
 2%				
2%				
Intervals				
t = 5120min	-	•	-	•
t <40ms	-	•	-	•
 t <40ms	-	•	-	•
		-		
t = 0.04ms60s	-	•	-	•
 4 E 100min				
t = 5120min	-	•	-	•
	-	•	-	•

Technical characteristics for protection trip units Measurement functions

Record of values: of the parameter for each interval with time-stamping		Parameters	
Current: minimum and maximum	[A]	I1, I2, I3, neutral	
Phase-phase voltage: minimum and maximum	[V]	V12, V23, V31	
Active power: average and maximum	[kW]	Ptot	
Reactive power: average and maximum	[kVAR]	Qtot	
Apparent power: average and maximum	[KVA]	Stot	
Data logger: record of high sampling rate parameters	·	Parameters	
Currents	[A]	I1, I2, I3, neutral, Ig	
Voltages	[V]	U12, U23, U31	
Sampling rate	[Hz]	1200-9600	
Maximum recording duration	[s]	18	
Recording stop delay	[s]	0-10s	
Number of registers	[no]	2 independent	
Information on trip and opening data: after a fault without auxiliary supply		Parameters	
Type of protection tripped		eg. L, S, I, G, UV, OV	
Fault values per phase	[A/V/Hz w/VAR]	eg. I1, I2, I3, neutral for S protection V12, V23, V32 for UV protection	
Time-stamping		Date, time and progressive number	
Maintenance indicators		Parameters	
Information on last 30 trips		Type of protection, fault values and time-stamping	
Information on last 200 events		Type of event, time-stamping	
Number of mechanical operations (1)	[no]	Can be associated to alarm	
Total number of trips	[no]		
Total operating time	[h]		
Wear of contacts	[%]	Prealarm >80% Alarm = 100%	
Date of maintenance operations performed		Last	
Indication of maintenance operation needed			
Circuit-breaker I.D.		Type of circuit-breaker, assigned device name, serial number	
Self-diagnosis		Parameters	
Check of continuity of internal connnections		Alarm due to disconnection: rating plug, sensors, trip coil	
Failure of circuit-breaker to open (ANSI 50BF)		Alarm following non-tripping of protection functions	
Temperature (OT)		Prealarm and alarm for abnormal temperature	

⁽¹⁾ with auxiliary supply present









 Window	Intervals	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
 Fixed	Duration: 5120min	•	•	•	•
synchronizable by remote	Number of intervals: 24	•	•	•	•
		0	•	•	•
		0	•	•	•
		0	•	•	•
		•	•	•	•
		0	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		-	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
		•	•	•	•
Note: Opening of circuit-breaker		•	•	•	•
 Note: Opening of circuit-breaker can be set in the event of alarm		•	•	•	•
	<u>;</u>				

Key:

- not available
- available
- available with Ekip Measuring Pro

Communication devices and systems

Introduction	4/2
Supervision and control	
Supervision of the switchgear compartment	4/4
Supervision of the electrical switchgear	4/6
Supervision of the electrical installation	4/8
Software	
Ekip Connect	4/10
Ekip View	4/12
Ekip T&P Interface	4/14

Typical sector

Communication devices and systems Introduction

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

The rapid spread of systems for the supervision and control of low voltage electrical distribution plants is determined by the growing need to:

Industrial

Hospital

OEMs

Naval

- optimize energy efficiency by analyzing energy consumption;
- ensure service continuity, minimizing the time needed to identify and rectify faults;
- guarantee efficient planning of maintenance activities.

Level of supervision and control in low voltage systems	Switchgear compartment	
Sulution with SACE Emax 2	- Ekip Touch trip units with high resolution display	- Ekip trip units - Ekip Multimeter display on the front of switchgear
Benefit of the ABB solution	 simple and intuitive use does not require an auxiliary power supply for safety 	 reduced dimensions flexible installation simultaneous reading of various electrical values

Smart grids

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

Office buildings

Shopping

centres

Industries

of medium

dimensions

- switchgear compartment: for the control of the main electrical values of the circuit-breaker. It provides a general but precise indication of the level of absorption of the system (main circuit-breaker) and the individual utilities (outgoing feeder circuit-breakers).
- electrical switchgear: to display the data of all circuit-breakers installed in the switchgear from a single point: in local mode via the operator panel on the front of the switchgear, or remotely via an Internet connection.
- electrical system: to manage complex systems in which devices must be integrated with automated industrial processes or in intelligent electrical networks, better known as smart grids.

Oil & gas

Automated

industrial

processes

Data centers

	Electrical switchgear	Electrical installation			
	- Ekip trip units	- Ekip Touch trip units			
	- Ekip link modules	- Ekip com communication modules			
	- Ekip Control Panel operator panel colour touch screen	- Ekip View supervision software			
	- Standardized EtherNet components				
	- centralized control from front of switchgear	- wide range of protocols supported			
	- access via web to the installation	- installation times reduced to a minimum			
- rapid installation		- redundancy of communication			
- ease of use		- ready to smart grid circuit-breakers			
	- system ready to use	- complete network supervision			

Communication devices and systems Supervision of the switchgear compartment

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

Solution with Ekip Touch trip units

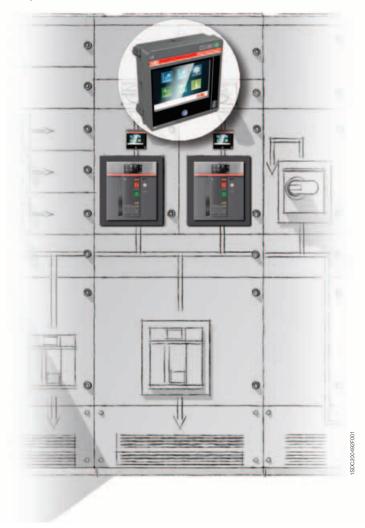
The Ekip Touch electronic trip units are, therefore, the ideal solution for supervision and control of the compartments in switchgear. In particular:

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

Ekip Touch



Ekip Multimeter



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

Solution with Ekip Multimeter Display on switchgear front

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

This device remotely displays the information about the system that is available in the trip unit to which it is connected. The main characteristics of the Ekip Multimeter unit are:

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

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

	Supervision	Supervision of switchgear compartment				
Electronic trip unit	Ekip Dip	Ekip Touch	Ekip Touch + Ekip measuring module	Ekip Hi Touch		
			Ekip G Touch	Ekip Hi-G Touch		
Solution	Ekip trip unit	s + Ekip Multimete	er	-		
Type of trip units connectable to Ekip Multimeter	Ekip trip unit	S				
Number of trip units connectable to Ekip Multimeter	1	······	••••			
Measurement functions	•					
Currents	•	•	•	•		
Voltages	-	-	•	•		
Powers	-	-	•	•		
Energies	-	-	•	•		
Harmonics	-	-	-	•		
Network analyzer	-	-	-	•		
Adjustment functions	·	·		•		
Setting of thresholds	-	•	•	•		
Setting of thresholds sacond set	-	-	-	•		
Resetting of alarms	•	•	•	•		
Diagnostics						
Protection function alarms	•	•	•	•		
Device alarms	•	•	•	•		
Protection unit tripping details	•	•	•	•		
Events log	•	•	•	•		
Protection unit tripping log	•	•	•	•		
Maintenance				•		
Number of operations	•	•	•	•		
Number of trips	•	•	•	•		
Wear of contacts	•	•	•	•		
Other data						
Status of circuit-breaker	•	•	•	•		
Circuit-breaker position ¹⁾	•	•	•	•		
Local/remote mode	•	•	•	•		

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

Communication devices and systems Supervision of the electrical switchgear

Ekip Link is a flexible and efficient solution for controlling and supervising low voltage electrical switchgear; it is a system that enables SACE Emax 2 circuit-breakers to be connected to the Ekip Control Panel operator panel by means of Ekip Link interface modules.

Ekip Link system

The main characteristics of the Ekip Link System are:

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

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



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

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

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

³⁾ Two client web accesses included in the licence

⁴⁾ Circuit-breakers equipped with auxiliary contacts to indicate position

Communication devices and systems Supervision of the electrical installation

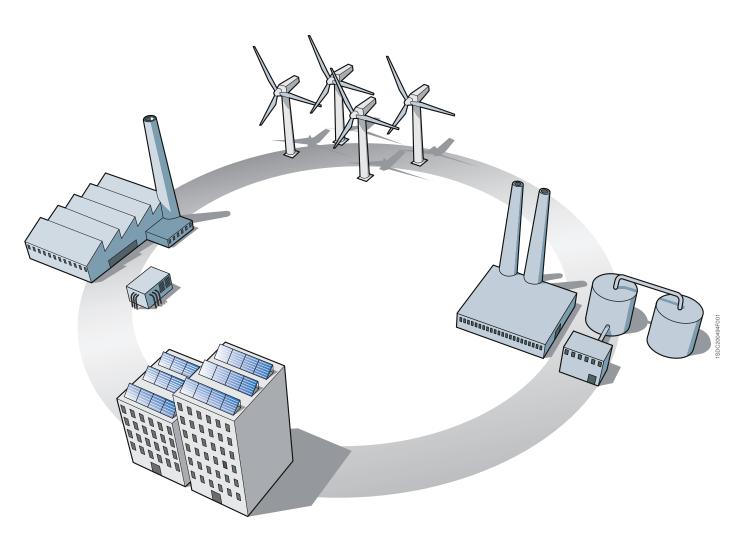
The integration of low voltage devices in communication networks is required in particular for: automated industrial processes, industrial and petrochemical sites, modern data centres and intelligent electricity networks, better known as smart grids.

Ekip Com Modules

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

The distinctive characteristics of the SACE Emax 2 circuit-breakers offering for industrial communication are:

- Wide range of protocols supported; the Ekip Com communication modules enable integration with the most common communication protocols based on RS485 serial lines and the most modern communication systems based on EtherNet infrastructures, which guarantee an exchange of data in the order of 100 Mbit/s.
- Installation times reduced to a minimum due to the plug & play technology of the communication modules, which are connected directly to the circuit-breaker terminal box without having to remove the electronic trip unit.
- Repetition of communication for greater reliability of the system; the circuit-breaker can be equipped with two communication modules at the same time, allowing the information on two buses to be exchanged simultaneously.
- Ready to smart grid; the Ekip Com 61850 module is the solution for integrating SACE Emax 2 circuit-breakers into the automated systems of electrical substations based on the IEC 61850 standard without the need for complex external devices.
- Complete supervision of Modbus RTU or Modbus TCP/IP networks via the software for PC Ekip View.



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

¹⁾ Circuit-breakers equipped with Ekip Com Actuator module, electrical accessories, opening and closing releases and spring charging motor 2) Circuit-breakers equipped with auxiliary contacts to indicate position

Communication devices and systems Supervision and control software

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

Overview of the software

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

Software	Functions	Distinctive characteristics	
Ekip Connect	- commissioning of circuit-breakers	- simple and intuitive use	
	- analysis of faults - testing of communication bus	- integrated with DOC electrical design software	
		- useable via EtherNet	
		- automatic updating from Internet	
		- off-line mode	
		- multi-media (smart phone, tablet or PC)	
Ekip View	- supervision and control of communication networks	- engineering free	
	 - analysis of electrical value trends - condition monitoring 	- analysis of past trends	
		- customizable reports	
		- access via Internet to the installation	
		- possibility of integrating third party devices	
Ekip T&P interface	- testing of protection functions	- test signals can be pre-set or configured as desired	
	- ordinary maintenance of trip units	- advanced graphical interface	
		- generation of test reports	

Ekip Connect

Ekip Connect enables data to be exchanged with one or more protection trip units, which:

- Assists commissioning of the system; all system parameters and the protection thresholds can be set rapidly in the Ekip trip units thanks to the easy and intuitive navigation pages of the software.
- Permits rapid access to diagnostics; it is possible to consult and download the records of events, alarms and the tripping of the trip units, thereby facilitating the identification and understanding of the anomalies.



- Enables testing of the communication network; Ekip Connect performs an automatic scan of the Modbus RS-485 or Modbus TCP network and determines whether the circuit-breakers have been correctly connected and, when necessary, signals incorrect configurations of the communication parameters (addresses, baud rate, parity).

The distinctive characteristics of the software are:

- Integration with DOC electrical design software; the adjustments and settings calculated by the DOC software can be downloaded directly into the protection trip units, thereby reducing commissioning times and the probability of errors.
- Ease of connection: the Ekip trip units equipped with Modbus TCP Ekip com modules can be controlled directly by the EtherNet network.
- Multi-media; Ekip Connect is designed to operate on a PC or on the more modern tablet PCs and smart phones.
- Automatic updating from the Internet site; if connected to an Internet site, the software is able to constantly control the availability of any updates.

The software is available free of charge on the ABB website www.abb.com/lowvoltage.

Media	Ekip Connect Software						
	Personal PC		Smartphone/Tablet	iPhone/iPad iOS			
Operating system	Windows XP, Windo	ws 7, Windows Vista	Android				
Method of connection to the trip units	Communication network	Test connector	Wireless communication	Wireless communication	Wireless communication		
SACE Emax 2 trip units	Ekip com Modbus RS485 or TCP	Ekip T&P	Ekip Bluetooth	Ekip Bluetooth	Ekip Bluetooth		
SACE Tmax XT trip units	Ekip com	Ekip T&P	Ekip Bluetooth	-	-		
SACE Emax,T7,X1,T8 trip units	PR120/D-M, PR330/D-M	Ekip T&P or BT030	BT030	-	-		
SACE Tmax T trip units	PR222DS/PD, PR223DS; PR223/EF	Ekip T&P or BT030	BT030	-	-		
Functions of reading and control				•			
Automatic network scan	•	=	-	-	-		
Opening and closing of circuit-breakers ¹⁾	•	•	•	•	•		
Setting of thresholds	•	•	•	•	•		
Resetting of alarms	•	•	•	•	•		
Reading of electrical measurements	•	•	•	•	•		
Displaying of time-current curve	•	•	•	•	•		
Reading of past records	•	•	•	•	•		
DataLogger download	•	•	•	-	-		
Other functions							
Generating of Reports	•	•	•	•	•		
Automatic updating from Internet	•	•	•	•	•		
Integration with DOC	•	•	•	•	•		
Enabling of Ekip T&P Interface	•	•	•	•	•		
Use via EtherNet	•2)	-	-	-	-		

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

²⁾ only in the presence of Modbus TCP Ekip Com modules

Communication devices and systems Supervision and control software

Ekip View

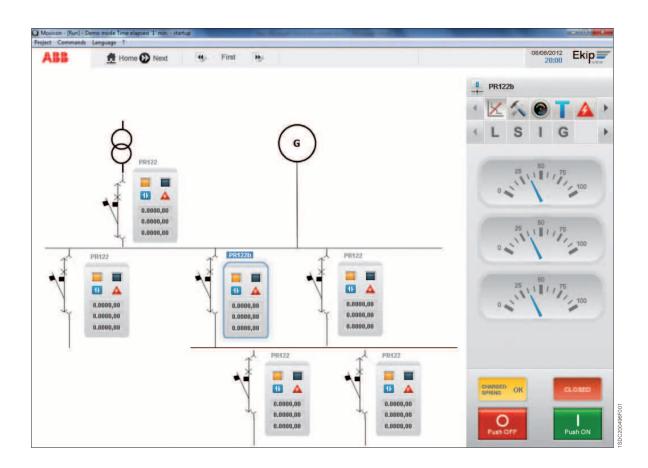
Ekip View is the software for supervising devices connected to a communication network that uses the Modbus RTU or Modbus TCP protocol.

It is the ideal tool for all applications that require:

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

The main characteristics of Ekip View are:

- **Engineering free** and ready to use **software** which guides the user in the recognition and configuration of the protection units without the need for any supervision system engineering activities.
- **Dynamic mimic panel;** after automatic scanning of the network, for each of the devices found, Ekip View proposes a dynamic symbol that summarizes the most important information (status, electrical measurements, alarms). The extensive library of electrical symbols enables the entire electrical system to be depicted in detail.
- **Analysis of trends;** the instantaneous and past trends of currents, powers and power factors are represented graphically and can be exported into Microsoft Excel for detailed analysis.
- **Reports**; advanced reports can be created regarding system and communication network diagnostics. Using the Alarm Dispatcher option, the user can receive the most important indications via SMS or e-mail.
- Access via web to the installation, thanks to the Web Server function of Ekip View.



	Ekip View Software			
Communication characteristics	•			
Protocol Supported	Modbus RTU	Modbus TCP		
Physical layer	RS 485	EtherNet		
Maximum data exchange rate	19200 bps	100 Mbps		
Operating system				
Devices supported				
SACE Emax 2 trip units	Ekip com Modbus RS485	Ekip com Modbus TCP		
SACE Emax,T7,X1,T8 trip units	PR120/D-M, PR330/D-M	-		
SACE Tmax T trip units	PR222DS/PD, PR223DS	-		
SACE Tmax XT trip units	Ekip com	-		
Third party devices	optional 1)			
Licences available	- up to 30 ²⁾ controllable devices			
	- up to 60 ²⁾ controllable devices			
	- unlimited number 3 controllable device	res		
Supervision and control functions	entition named action			
Opening and Closing of circuit-breakers ⁴⁾	•			
Electrical value trends	•			
Log of electrical value trends	•			
Dynamic installation mimic panel	•			
	•			
Automatic scanning	•			
Centralized synchronizing of time	• 5)			
Web server function				
Redundancy	optional			
OPC server-client	optional			
Measurement functions 6)				
Currents	•			
Voltages	•			
Powers	•			
Energies	•			
Harmonics	•			
Network analyzer	•			
Data logger				
Adjustment functions	•			
Setting of thresholds	•			
Resetting of alarms	•			
Diagnostics				
Protection function alarms	•			
Device alarms	•			
Communication system alarms	•			
Protection unit tripping details	•			
Events log	•			
Protection unit tripping log	•			
Generation of Reports	•			
Transmission of alarms via SMS	optional			
Transmission of alarms via e-mail	optional			
Maintenance				
Number of operations	•			
Number of trips	•			
Wear of contacts	•			
Other data				
Status of circuit-breaker	•			
Circuit-breaker position 7)	•			
local/remote mode	•			

Contact ABB SACE to integrate other devices in the Ekip View software
 can be increased
 within the physical limit of the protocol used
 circuit-breakers equipped with Ekip com Actuator module and electrical accessories

⁵⁾ two client web accesses included in the licence, optional up to 5 accesses 6) according to the values supported by the trip units 7) circuit-breakers equipped with auxiliary contacts for position indication

Communication devices and systems Supervision and control software

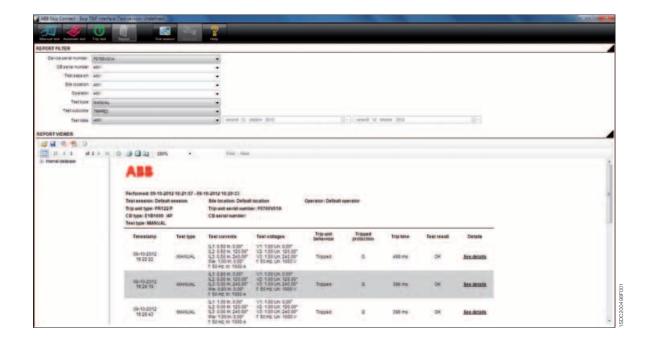
Ekip T&P Interface

The Ekip T&P Interface software, used together with the Ekip T&P device, enables the electronic protection trip units to be tested for correct operation during the stages of commissioning and system maintenance.

Thanks to advanced graphical interfaces, the user can simply select the test to perform: from simple current and voltage signals to more complex wave forms with the presence of harmonic distortion.



The software creates and stores all reports, keeping a record of the tests carried out and essential information such as the operator name, date, serial number of the circuit-breaker, type of test and the result.



Accessories

Functional areas	5/2
Standard supply	5/4
Accessories for circuit-breakers	5/6
Signalling	5/7
Control	5/10
Safety	5/15
Protection devices	5/16
Connections	5/18
Interlocks and switching devices	5/20
Accessories for Ekip trip units	5/23
Power supply	5/25
Connectivity	5/25
Signalling	5/27
Measurements and protection	5/28
Displaying and supervision	5/32
Testing and programming	5/33
Spare parts	5/34

Accessories Functional areas

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

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

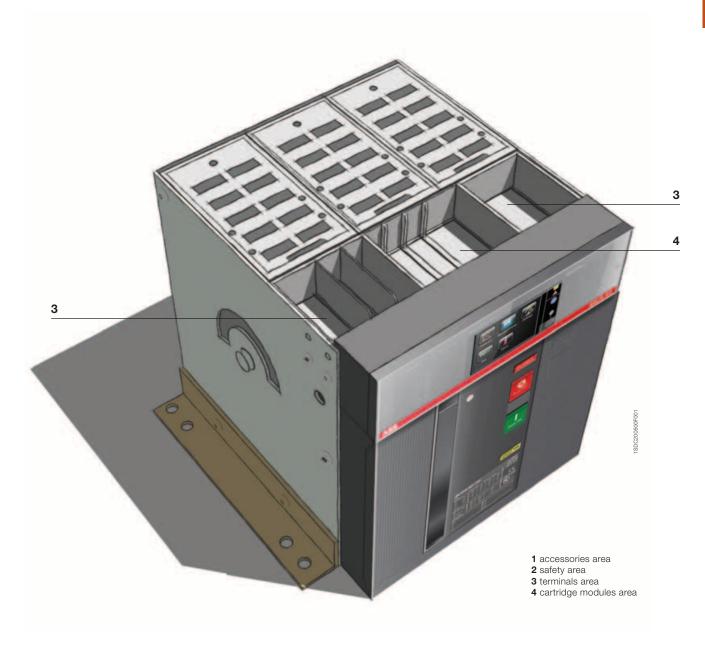
- Accessories area for the installation of accessories inside the circuit-breaker and Ekip trip unit. The areas dedicated to accessories can be accessed by removing the flange and the accessories covers. On removal, the operating mechanism area remains segregated and protected, providing safety for operators.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



As a result of distinct functional areas that determine the operating spaces, the accessorizing logic of the circuit-breakers has been considerably simplified.

The auxiliary connection terminal box also features two areas:

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



Accessories Standard supply

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

- IP30 protection for switchgear door
- lifting plates for E2.2 ... E6.2 circuit-breaker
- front terminals for E1.2 circuit-breaker
- adjustable rear terminals for E2.2 ... E6.2 circuit-breaker, mounted in HR HR configuration
- screws for securing in the switchgear

In addition, for fixed automatic circuit-breakers only:

- four standard open/closed auxiliary contacts AUX 4Q
- four terminals for auxiliary connections
- mechanical signalling of the tripping of the protection trip unit TU Reset
- Ekip TT power supply and test unit, when a protection trip unit is present with display
- contact signalling tripping of Ekip protection trip unit S51.



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

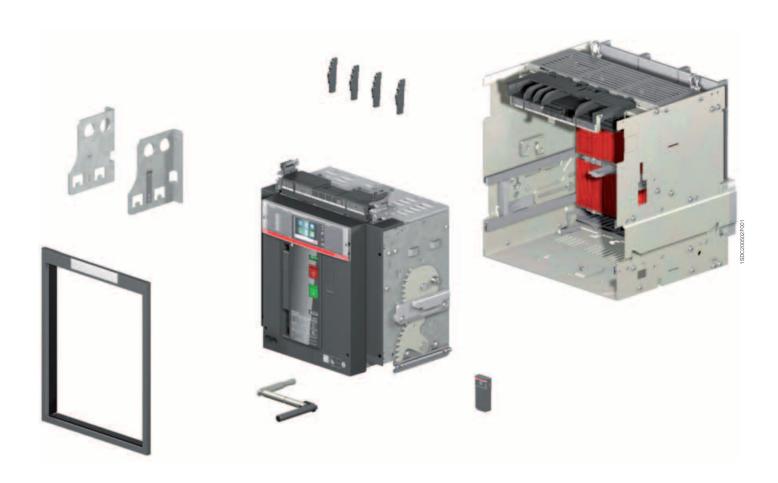
- closed circuit-breaker racked-out mechanism lock
- lifting plates for E2.2 ... E2.6 circuit-breakers
- lever for racking in and racking out
- anti-insertion lock

In addition, for withdrawable automatic circuit-breakers only:

- four standard open/closed auxiliary contacts AUX 4Q
- four terminals for auxiliary connections
- mechanical signalling of the tripping of the protection trip unit TU Reset
- Ekip TT power supply and test unit, when a protection trip unit is present with display.

The fixed parts feature:

- IP30 protection for switchgear door
- anti-insertion lock
- standard shutter lock SL
- screws for securing to the floor
- adjustable rear terminals, mounted in HR HR configuration



SACE Emax 2 circuit-breakers offer a wide range of accessories developed to satisfy the application and installation requirements of every customer.

-	Automatic circuit-breaker		Switch-d	isconnector	Derived versions		sions
-	E1.2	E2.2 - E4.2 - E6.2	E1.2	E2.2 - E4.2 - E6.2	CS E2.2	MT - E4.2	MTP - E6.2
Signalling		<u>:</u>	<u>:</u>	<u>:</u>			
Standard open/closed auxiliary contacts - AUX 4Q	• / ••	• / ••	0/00	0/00	-	-	-
Open/closed auxiliary contacts - AUX 6Q	-	0/00	-	0/00	-	-	-
Open/closed auxiliary contacts- AUX 15Q	0/00	0/00	0/00	0/00	-	-	-
Auxiliary position contacts - AUP	•	•	•	•	•	•	•
Ready to close signalling contact - RTC	0/00	0/00	0/00	0/00	-	-	-
TU Reset mechanical signalling of the tripping of protection trip unit - TU Reset	• / ••	• / ••	-	-	-		
Contact signalling tripping of Ekip protection trip unit - S51	• / ••	•/••	-	-	-	- -	i -
Contact signalling loaded springs - S33 M/2 (supplied with Motor)	0/00	0/00	0/00	0/00	-	-	-
Control		<u>:</u>	1	·	:		-
Opening and closing release - YO/YC	0/00	0/00	0/00	0/00	-	-	-
Second opening and closing release - YO2/YC2	0/00	0/00	0/00	0/00	-	-	-
Undervoltage release - YU	0/00	0/00	0/00	0/00	-	-	-
Electronic time-delay device for undervoltage release - UVD	0/00	0/00	0/00	0/00	-	-	-
Motor - M	0/00	0/00	0/00	0/00	-	-	_
Remote reset - YR	0/00	0/00	-	-	-	-	-
Opening and closing release test unit - YO/YC Test Unit	0/•	0/•	0/•	0/•	_	<u> </u>	
Safety				, -	<u> </u>	Ē	
Key lock and padlock in open position - KLC and PLC	0/00	0/00	0/00	0/00	_	-	_
Key lock and padlock in racked-in / test / racked-out position - KLP and PLP		00	•	00	00	00	00
Shutter lock - SL	•	•	•	•	•		•
External shutter lock - SLE	-	•	-		-	<u> </u>	-
Lock for racking-out mechanism with circuit-breaker in closed position		••	•	••	-	<u>.</u>	••
Lock for racking in / racking out the mobile part when the door is open - DLR	-	•	_	•	-	_	00
Lock to prevent door opening when circuit-breaker is in racked-in / test position - DLP	-	•	-	•	-	-	•
Lock to prevent door opening when circuit-breaker is in closed position - DLC	0/00	0/00	0/00	0/00	-	-	00
Anti-insertion lock	• / ••	• / ••	•/••	• / ••	-	-	••
Mechanical operation counter - MOC	0/00	0/00	0/00	0/00	-	<u>-</u>	00
Protection devices		•	•	•		•	•
Protection device for opening and closing pushbuttons - PBC	0/00	0/00	0/00	0/00	-	· -	00
IP30 Protection	• / •	•/•	•/•	•/•	-	-	•/•
IP54 Protection	0/•	0/•	0/•	0/•	-	-	•
Terminal covers - HTC / LTC	0/00	-	-	-	-	-	-
Separators - PB	0/00	-	-	-	-	-	-
Connections		:	:	:	:	<u>:</u>	÷
Orientable rear terminal - HR/VR	0	•	0	•	-	-	•
······································	•	0	•	0	-	-	0
Front terminal - F					<u> </u>		
······································		0/•	0/	0/	-	_	•
Front terminal - F Other configurations Interlocks and switching devices	0/•	0/•	0/•	0/•	-	-	•
······································		0/0	0/•	0/00/	-	-	00

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







Signalling

Open / closed auxiliary contacts - AUX

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

Open / closed auxili	ary contacts (AUX 4Q)	E1.2	E2.2 E6.2
4 auxiliary contacts	standard	•	•
	digital signals	•	•
	mixed	•	•
Open / closed suppl	lementary auxiliary contacts	(AUX 6Q)	
6 auxiliary contacts	standard	-	•
	digital signals	-	•
	mixed	-	•
Open / closed exter	nal supplementary auxiliary	contacts (AUX 15Q)	
15 auxiliary contacts	standard	•	•
	digital signals	•	•
Maximum number o auxiliary contacts th		19	25
		Standard contact	Contact for digital signals
Туре		changeover contacts	changeover contacts
Minimum load		100mA @ 24V	1mA @ 5V
Breaking capacity		·	·
DC	24V	=	0.1A

0.3A @ 0ms

0.15A @ 0ms

5A @ cosφ 1 5A @ cosφ 0.7 5A @ cosφ 0.3

3A @ cosφ 1 2A @ cosφ 0.7 1Α @ cosφ 0.3

Electrical diagram reference: figure 1, 81, 91

AC

125V

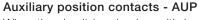
250V

250V

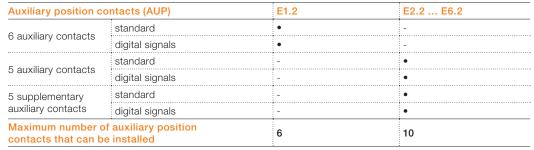
400V

AUX 6Q is an alternative to the Ekip Signalling 4K module. AUX 15Q is an alternative to the mechanical interlock (MI) and the DLP and DLC locks.





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:



		Standard contact	Contact for digital signals
Type		changeover contacts	changeover contacts
Minimum load		100mA @ 24V	1mA @ 5V
Breaking cap	acity		•
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	-





Ready to close signalling contact - RTC

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

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

Standard contact		Contact for digital signals		
	Switching	Switching		
1	100mA @ 24V	1mA @ 5V		
oacity		·		
24V	-	0.1		
250V	0.5A @ 0ms / 0.2A 10ms	-		
250V	3A @ cosφ 0.7	-		
	24V 250V	Switching 100mA @ 24V pacity 24V - 250V 0.5A @ 0ms / 0.2A 10ms		

Electrical diagram reference: figure 71



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

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

Contact signalling tripping of protection trip unit Ekip - S51

The contact signals the opening of the circuit-breaker after the Ekip protection trip unit has tripped. The circuit-breaker can only be closed after the "TU Reset" tripped trip unit mechanical signalling pushbutton has been restored to its normal operating position. The switching contact, which is always supplied with the standard version of the automatic circuit-breakers, is also available on request in a version for digital signals (for electrical characteristics, please refer to the RTC contact). It can also be associated to an optional accessory for resetting by remote control - YR. For electromechanical characteristics, please refer to the RTC contact.

Electrical diagram reference: figure 11

Contact signalling loaded springs - S33 M/2

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

		Standard contact	Contact for digital signals
Туре		changeover contacts	changeover contacts
Minimum loa	ıd	100mA @ 24V	1mA @ 5V
Breaking ca	apacity		
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	-
		2Α @ cosφ 0.7	-
		1Α @ cosφ 0.3	-

Electrical diagram reference: figure 12



Control

Opening and closing release- YO/YC

The opening and closing releases enable the circuit-breaker to be controlled remotely. Opening is always possible, while closing is available only when the closing springs of the operating mechanism are loaded and the circuit-breakers is ready to close.

The releases operate by means of minimum impulse current duration time of 100 ms. Furthermore, they can operate in permanent service. In this case, if opening command is given by means of the opening release, the circuit-breaker can be closed by de-energizing the opening release and, after a time of at least 30 ms, by controlling the closing. Electrical diagram reference: figure 75, 77

Second opening and closing release - YO2/YC2

For certain installations the redundancy of mechanisms and circuit-breaker operating circuits is often requested. To answer these needs, the SACE Emax 2 circuit-breakers can be equipped with double opening release and double closing release. The technical characteristics of the second opening release remain the same as those of the first opening and closing release. A double opening release can be used for E2.2, E4.2 and E6.2 circuit-breakers; an undervoltage release cannot be used in this case.

Electrical diagram reference: figure 72, 79

General characteristics			
Power supply (Un)	AC	DC	
24V	•	•	
30V	•	•	
48V	•	•	
60V	•	•	
110V120V	•	•	
220V240V	•	•	
240V250V	•	•	
380V400V	•	-	
415V440V	•	-	
480V500V	•	-	
Operating limits (IEC60947-2 standards)	YO/YO2: 70%110% Un YC/YC2: 85%110% Un		
Inrush power (Ps)	300VA	300W	
Continuous power (Pc)	3.5VA	3.5W	
Opening time (YO/YO2)	•		
E1.2	20 ms		
E2.2 E6.2	35 ms		
Closing time (YC/YC2)	•		
E1.2	50 ms		
E2.2 E6.2	50 ms		

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

The opening and closing releases test unit helps ensure that the various version of releases are running smoothly, to guarantee a high level of reliability in controlling circuit-breaker opening. The test unit ensures the continuity of the opening and closing releases with a rated operating voltage between 24V and 250V (AC and DC), as well as verifies the functions of the opening and closing coil electronic circuit.

Continuity is checked cyclically with an interval of 20s between tests. The unit has optic signals via LEDs on the front, which provide the following information:

POWER ON: power supply present **TESTING**: testing in progress

TEST FAILED: signal following a failed test or lack of auziliary power supply

ALARM: signal given following three failed tests.

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

Failure of a test - resetting takes place automatically when the alarm stops Failure of three tests - resetting occurs only by pressing the manual RESET on the unit.

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



Undervoltage release - YU

The undervoltage release opens the circuit-breaker when there is a significant voltage drop or power failure. It can be used for safe remote tripping, for locking on closing or to control the voltage in the primary and secondary circuits. The power supply for the release is therefore obtained on the supply side of the circuit-breaker or from an independent source. Circuit-breaker closing is permitted only when the release is powered.

General characteristics				
Power supply (Un)	AC	DC		
24V	•	•		
30V	•	•		
48V	•	•		
60V	•	•		
110V120V	•	•		
220V240V	•	•		
240V250V	•	-		
380V400V	•	-		
415V440V	•	-		
480V500V	•	-		
Operating limits (IEC60947-2 standards)	70%110% Un			
Inrush power (Ps)	300VA	300W		
Continuous power (Pc)	3.5VA	3.5W		
Opening time (YU)				
E1.2	30 ms	30 ms		
E2.2 E6.2	50 ms			

Electrical diagram reference: figure 73

Time-delay device for undervoltage release (UVD)

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

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



Resetting remotely- YR

The reset coil YR permits remote resetting of the circuit-breaker after a release has tripped due to an overcurrent condition.

It is available, for all automatic circuit-breakers, with different voltage supply:

General characteristics					
Power supply (Un)	AC	DC			
24V	•	•			
110V	•	•			
250V	•	•			
Operating limits	90%110% Un				

Electrical diagram reference: figure 12 and 13





Motor - M

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

General characteristics			
Power supply (Un)	AC	DC	
24V-30V	•	•	
48V-60V	•	•	
100V130V	•	•	
220V250V	•	•	
380V400V	•	-	
440V480V (E2.2 E6.2)	•	-	
Operating limits (IEC60947-2 standards)	85%110% Un		
Inrush power (Ps)	300VA	500W	
Continuous power (Pc)	100VA	100W	
Loading time	•	•	
E1.2	E1.2 8 sec		
E2.2 E6.2	7 sec		

Electrical diagram reference: figure 12 and 13



Safety

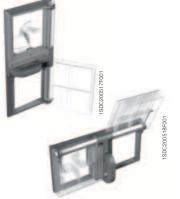
Key lock in open position - KLC

Thanks to these safety devices, the SACE Emax 2 circuit-breaker can be locked in the open position. The lock can also be used during maintenance activities when the shield of the accessories area is removed. The device is available with lock with different keys - KLC-D (for only one circuit-breaker) or with the same keys - KLC-S (for several circuit-breakers). In this latter case, four different key numbers are available.

SACE Emax 2 also allows additional key locks to be installed. With the KLC-A type, the following key locks can be used:

- Ronis
- Profalux
- Kirk
- Castell

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



Padlocks - PLC

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

- Locking device with plastic structure for up to a maximum of three padlocks of 4 mm
- Locking device with metal structure for up to a maximum of two padlocks of 8 mm
- Locking device with metal structure for one padlock of 7 mm or for padlock holders The padlocks are always supplied by the customer.



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

This device enables the mobile part to be locked in one of the three positions: racked-in, test and racked-out.

This device can be supplied with locks with different keys - KLP-D or with the same keys -KLP-S. Each circuit-breaker can be equipped with a maximum of two key locks.

Locking in the racked-in, test and racked-out positions can be achieved by using other key locks - KLP-A. This device is made for Ronis, Profalux, Kirk and Castell keys, which are to be provided by the customer. With the exception of the Castell version, every circuit-breaker can accept up to two key locks.



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

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

Shutter lock - SL

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



Protection devices

External shutter lock - SLE

This accessory is optional and, using padlocks of 4 mm, 6 mm or 8 mm, allows the shutters to be locked directly from the outside of the fixed part, avoiding the need to work inside. For both lock versions, the padlocks are supplied by the customer.

Lock for racking-out mechanism with circuit-breaker in closed position

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

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

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



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

This safety device prevents the switchgear door from being opened when the mobile part of the withdrawable version of the circuit-breaker is in the racked-in or test position. The circuit-breaker can be racked in when the door is open, which is then closed. This accessory can be installed on both the right-hand or left-hand side of the fixed part. It is available for circuit-breakers E2.2, E4.2 and E6.2. It is an alternative to the mechanical interlock.

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

This prevents the compartment door from being opened when the circuit-breaker is in the closed position (and with the circuit-breaker racked in for withdrawable circuit-breakers). It also locks circuit-breaker closed when the compartment door is open.

Anti-insertion lock

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



Mechanical operation counter - MOC

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



Protection device for opening and closing pushbuttons - PBC

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

- Pushbutton protection device, which prevents operations on both opening and closing pushbuttons unless the special key is used.
- Padlockable pushbutton protection device, which inhibits one or both of the circuit-breaker switching pushbuttons.
- PBC is not compatible with PLC padlocks.



IP30 Protection

Always supplied with the circuit-breaker, the cover frame is applied to the door of the switchgear to achieve IP30 degree of protection on the front part of the circuit-breaker.



IP54 Protection

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



Terminal covers - HTC / LTC

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



Separators - PB

These protection devices increase the insulation distance between adjacent phases. They are available for E1.2.

Connections

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

Solution for fixed circuit-breakers

Туре	Abbreviation	E1.2	E2.2	E4.2	E6.2
		Single stab d	esign		
Rear orientable terminal *	HR	0	● lu = 2000A	● lu = 3200A	● lu = 5000A
Rear orientable terminal	VR	Multiple stab design			
			● lu = 2500A	● lu = 4000A	● lu = 6300A
Horizontal rear spread terminal	SHR		0		
Vertical rear spread terminal	SVR		Ο		
Extended front terminal	EF	0			
Front terminal	F	•	0	0	0
Front spread terminal	ES	0			
Terminal for cable FcCuAl 4x240mm²	FcCuAl	0			

- Standard configuration
- O Configuration on request
- (*) The orientable terminals are supplied as standard in the HR HR configuration.

Solutions for fixed parts, withdrawable circuit-breakers

Туре	Abbreviation		E1.2	E2.2	E4.2	E6.2
		→	Single stab	design		
	HR VR	•	● Iu = 2000A	● lu = 3200A	● Iu = 5000A	
Rear orientable terminal *		Multiple st	Multiple stab design			
				● Iu = 2500A	● lu = 4000A ○ lu = 3200A**	● Iu = 6300A or X performance
Horizontal rear terminal	SHR		0	0		
Vertical rear spread terminal	SVR			0		
Front terminal	F			0	0	0
Extended front terminal	EF		0			
Front spread terminal	ES		Ο			
Terminal for cable FcCuAl 4x240mm ²	Fc CuAl		0			
Flat terminal	FL			0	0	0

Standard configuration

Configuration on request

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

(**) Fixed parts with Iu 3200A accessorized with rear orientable terminals with multiple stabs guarantee higher performances in switchboard installations.

Interlocks and switching devices

Mechanical interlocks

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

Types of interlock	Possible application	Logic	Circuit-breakers	
Туре А				
Excludes the possibility of having two circuit-breakers in the closed position at the same time.	it-breakers in the closed position power supply.		Available between circuit-breakers of different sizes and with any fixed / withdrawable version	
Туре В			_ :	
Permits a pair of circuit-breakers to be closed if the third is open. The latter can only be closed when the pair is open.	Two power supplies from transformers and one emergency power supply.	1 2 3 0 0 0 1 0 0 0 0 1 1 0 1 0 1 0	Available between E2.2, E4.2 and E6.2 circuit-breakers and with any fixed / withdrawable version	
Туре С				
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 0 0 0 1 0 0 0 1 0 0 0 1 0 1 1 1 0 0	Available between E2.2, E4.2 and E6.2 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 0 0 0 1 0 0 0 1 0 0 0 1	Available between E2.2, E4.2 and E6.2 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	on	Type A	Type B, C, D
Horizontal		2750mm	1600mm
Vertical		-	1000mm
Breakers	E1.2	•	-
	E2.2	•	•
	E4.2	•	•
	E6.2	•	•

For B, C and D types, the maximum distance between the two furthest breakers is 3200mm for horizontal configurations and 2000mm for vertical configurations. All cables can be cut to guarantee easy installation in switchboards. Mechanical interlocks are not compatible with AUX 15Q or DLP and DLC locks.

Automatic Transfer Switches ATS

The ATS (Automatic Transfer Switch) is a network-unit transfer device used in installations where switching from the main power line to an emergency line is required in order to ensure that power is supplied to the loads in the case of power abnormalities from the main line.

These devices are able to control the entire transfer procedure automatically, but also offer commands for performing the procedure manually. In the event of anomalies in the main line voltage, the opening of the main line circuit-breaker, the starting of the generator set (if present) and the closing of the emergency line are activated according to the parameters set by the user. In the same way, when the main line returns to normal, the reverse transfer procedure is performed automatically.

The new generation of ATSs (ATS021 and ATS022) offers the most advanced and complete solution for ensuring service continuity. The ATS021 and ATS022 devices can be used with all automatic circuit-breakers and switch-disconnectors of the Tmax XT family.

The ATS021 and ATS022 devices have been designed to be self-powered. ATS022 is also designed for the connection of an auxiliary supply, which enables the use of further functions.

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

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

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

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

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

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

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





Technical characteristics

				ATS021	ATS022
General	Auxiliary supply voltage		Not required	Not required (24-110V DC is required only for Modbus communication and systems of 16 2/3 Hz)	
	Supply voltage, Un		•••••	Max 480 VAC	Max 480 VAC
	Frequency, fn			50, 60 Hz	16 2/3, 50, 60, 400 Hz
	Dimensions	$\langle \rangle$	H mm	96	96
	 		L mm	144	144
	1	L D	D mm	170	170
	Type of installation		•••••	Installation on front of switchgear Installation on DIN rail	Installation on front of switchgear Installation on DIN rail
	Operating mode		•	Automatic/Manual	Automatic/Manual
Characteristics	Monitoring of normal and emergend	y line	•	•	•
	Control of circuit-breakers on norm	al and emerge	ncy line	•	•
	Setting start-up of generator		•••••	•	•
	Setting switch-off of generator with	settable time	delay	•	•
	Third circuit-breaker			-	•
	Selection priority line		•••••	-	•
	Modbus Rs485 communication		-	•	
	Display		•	-	•
Environmental	Grado di protezione		••••••	IP20	IP20
conditions	Operating temperature			-20 +60 °C	-20 +60 °C
	Humidity		•••••	5% - 90% without condensation	5% - 90% without condensation
Operating	Undervoltage		•••••	-30%5% Un	-30%5% Un
thresholds	Overvoltage		+5%+30% Un	+5%+30% Un	
	Frequency thresholds		•	-10% / +10% fn	-10% +10% fn
Tests	Test Mode		•••••	•	•
	Mode Test Gen set		••••••	•	•
Standards	Electronic devices for use in electric	al installations	3	EN-IEC 50178	EN-IEC 50178
	Electromagnetic compatibility		•••••	EN 50081-2	EN 50081-2
				EN 50082-2	EN 50082-2
	Environmental conditions		••••••	IEC 68-2-1	IEC 68-2-1
	Ī			IEC 68-2-2	IEC 68-2-2
				IEC 68-2-3	IEC 68-2-3

Electrical diagram reference: figures 100,101 and 102.

Accessories Accessories for Ekip trip units

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

	Electronic trip unit				
	Ekip DIP	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
Power supply	·	· ·	· ·	· ·	· ·
Ekip Supply	0	0	0	0	0
Battery for Ekip trip units	0	0	0	0	0
Connectivity	·	•	·		
Ekip Com		0	0	0	0
Ekip Com Redundant		0	0	0	0
Ekip Com Actuator	0	0	0	0	0
Ekip Link	0	0	0	0	0
Ekip Bluetooth	0	0	0	0	0
Signalling	·	•	<u> </u>		
Ekip Signalling 2K		0	0	0	0
Ekip Signalling 4K ⁽¹⁾		0	0	0	0
Ekip Signalling 10K	0	0	0	0	0
kip Power Controller		0	0	0	0
Measurement and Protection					•
Ekip Measuring Pro		0	•	•	•
Ekip Measuring		0			
Ekip AUP	0	0	0	0	0
Ekip RTC	0	0	0	0	0
Ekip Synchrocheck		0	0	0	0
kip LCD		0	0	0	0
Ekip Fan ⁽¹⁾		0	0	0	0
Rating Plug	0	0	0	0	0
Homopolar toroid		0	0	0	0
Foroid for differential protection		0	0	0	0
Current sensor for neutral conductor butside the circuit-breaker	Ο	0	0	0	0
Displaying and Supervision					
kip Multimeter	0	0	0	0	0
Ekip Control Panel	0	0	0	0	0
esting and Programming	•	•	•	•	•
Ekip TT	0	0	0	0	0
Ekip T&P	0	0	0	0	0

Standard accessory

O Accessory on request

⁽¹⁾ not available for E1.2

Accessories for Ekip trip units

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

Installation	Modules	Highlights
		- The Ekip Supply module enables the trip units to be supplied with several line voltage
	Cartridge modules: Ekip Com	 If the Ekip Supply module is present, the other cartridge modules can be installed
Terminal box	Ekip Link Ekip 2K Ekip Supply	 The Ekip Supply module has a dedicated position in the installation area in the terminal box; the other modules can be installed as desired in the positions available
	Ekip Fan Ekip Synchrocheck	- In addition to the Ekip Supply module, up to 2 modules can be installed on E1.2, and up to 3 on E2.2, E4.2 and E6.2
		- Ekip fan module is available for E2.2, E4.2 and E6.2 as an aletnative to Ekip supply module
Accessorizing area		- These are installed in specific housings from the front of the circuit-breaker
	Ekip LCD Ekip Com Actuator Ekip RTC Ekip AUP Ekip Measuring Ekip Signalling 4K Rating Plug Battery for Ekip	 For all the trip units with a touch screen interface, the LCD interface is available with any adjustment in the protection and measurements functions
		 Thanks to the optional modules Ekip RTC and Ekip AUP, all the Ekip trip units can acquire and monitor the ready to close state and the racked-in/ test isolated/racked-out position of the circuit-breaker. The module to acquire the open/closed position is supplied as standard for all Ekip trip units.
		 The Ekip Signalling 4k module increases the remote signalling possibilities for E2.2, E4.2 and E6.2
Ekip trip unit test	Ekip T&P Ekip TT	These are connected to the front test connector of the trip units even with the device in operation
connector	Ekip Bluetooth	- Compatible also with the SACE Tmax XT range
***************************************	Ekip Multimeter	- Ekip Multimeter can supply the trip unit to which it is connected
External	Ekip Control Panel Ekip 10K	 Several Ekip Multimeter units and / or Ekip Signalling 10K can be connected at the same time to the same Ekip trip unitsganciatore Ekip
External	External neutral sensor Homopolar toroid Differential toroid	- These are connected to the trip unit by the terminal box of the circuit- breaker





Ekip Supply Power Supply module

The Ekip Supply module enables all Ekip trip units and modules present on the terminal box to be supplied with several auxiliary power in AC or DC available in the switchgear.

The module can be mounted at any time on the circuit-breaker terminal box and permits installation of the cartridge modules; it is an alternative to the Ekip Fan module.

Two versions are available according to the primary voltage used:

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

Electrical diagram reference: figures 31, 32



Connectivity

The Ekip Com modules enable all SACE Emax 2 circuit-breakers to be integrated in an industrial communication network for remote supervision and control of the circuit-breaker. They are suitable for all distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units.

Since it is mounted to the terminal box, communication can be maintained with withdrawable circuit-breakers, even while in the racked-out position.

Several Ekip Com modules can be installed at the same time, thereby enabling connection to communication systems that use different protocols.

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

The Ekip Com and Profibus module are equipped with a dip switch that allows the introduction of a 120Ω resistor to terminate a Modbus RTU network.

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

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

Protocol	Ekip Com Module	Ekip Com Redundant Module
Modbus RTU	Ekip Com Modbus RS-485	Ekip Com R Modbus RS-485
Modbus TCP	Ekip Com Modbus TCP	Ekip com R Modbus TCP
Profibus-DP	Ekip Com Profibus	Ekip Com R Profibus
Profinet	Ekip Com Profinet	Ekip Com R Profinet
EtherNet / IP	Ekip Com EtherNet / IP	Ekip Com R EtherNet / IP
DeviceNet	Ekip Com DeviceNet	Ekip Com R DeviceNet
IEC61850	Ekip com IEC61850	

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

Accessories Accessories for Ekip trip units



Ekip Link Module

The Ekip Link module enables the SACE Emax 2 circuit-breaker to be connected to ABB communication system for locally supervising switchgear by means of the Ekip Control Panel and to act as Power Controller. It is suitable for all Ekip trip units and can be fitted at any time to the circuit-breaker terminal box, even when Ekip Com communication modules are present. In this way, it is possible to have both local supervision of the control panel by means of the Ekip Control Panel and supervision of the system by means of the Ekip Com modules connected to the communication network.

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

Electrical diagram reference: figure 58



Ekip Com Actuator module

The Ekip Com Actuator module enables the SACE Emax 2 circuit-breakers to be opened and closed remotely.

The Ekip com Actuator is optional and can be ordered for all Ekip trip units equipped with Ekip Com or Ekip Link modules; it is installed on the front of the circuit-breaker in the right-hand accessories area.

Electrical diagram reference: figure 76, 78



Ekip Bluetooth wireless communication unit

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



Signalling

Ekip 2K Signalling modules

The Ekip 2K Signalling modules supply two input and two output contacts for control and remote signalling of alarms and circuit-breaker trips. They can be programmed from the trip unit's display. Furthermore, by means of the Ekip Connect software, combinations of events can be freely configured. They are suitable for all distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units.

Three different Ekip 2K Signalling modules are available: Ekip 2K-1, Ekip 2K-2, Ekip 2K-3. In this way, a maximum of three modules for E2.2, E4.2, E6.2, and two for E1.2 can be installed at the same time.

Electrical diagram reference: figures 41, 42, 43



Ekip 4K signalling module

The Ekip 4K Signalling module, available for E2.2 - E4.2 - E6.2, supplies four input contacts and four output contacts for control and remote signalling. It can be programmed from the trip unit's display. Furthermore, by means of the Ekip Connect software, combinations of events can be freely configured.

It is installed in the housing provided in the front left of distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units, without having to remove the trip unit itself. Electrical diagram reference: figure 2



Ekip 10K signalling unit

Ekip 10K Signalling is a signalling unit on a DIN rail for SACE Emax 2 automatic circuitbreakers. The unit provides ten contacts for electrical signalling of timing and tripping of protection devices.

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

Several Ekip 10K Signalling (max 4) can be installed at the same time on the same Ekip trip unit. The Ekip 10K Signalling module can be powered both in direct current and in the alternating current and can be connected to Ekip Touch and Hi-Touch trip units via internal bus or Ekip Link modules.

Electrical diagram reference: figure 103

Accessories Accessories for Ekip trip units

Characteristics of output contacts		Number of contacts						
Туре	Monostable	Ekip 2K	Ekip 4K	Ekip 10K				
Maximum switching power (resistive load)	1250VA							
Maximum switching voltage	150V DC / 250V AC							
Maximum switching current	•	2	1	10				
30V DC	2A	output output + 2 + 4 input input	output	+ 4	output			
50V DC	0.8A		+ 2 + 4		+ 4	+ 4	+ 11	+ 11
150V DC	0.2A		Input	input				
250V AC	4A							
Contact/coil insulation	2000 Vrms (1min @50Hz)							

Ekip 10K signalling unit power supply			
Auxiliary supply	24-48V DC, 110-240V AC/DC		
Voltage range	21.5-53V DC, 105-265V AC/DC		
Rated power	8W		



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

Ekip COM communication modules and Ekip Link modules are always supplied with Ekip AUP and Ekip RTC contacts.



Measurement and protection

Ekip Measuring module

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

The Ekip Measuring module is installed on the front, right housing of the distribution protection versions of the Ekip Touch trip units, without having to remove the trip unit itself. The voltage connections are installed by default on the lower terminals.

The measuring module requires no external connection since it is connected internally to the lower or upper terminals of Emax 2. If necessary, the voltage outlet connection can be moved outside the circuit-breaker by using voltmetric transformers and the alternative connection positioned in the terminal box. The use of external connections is obligatory for rated voltages that are higher than 690V. The module must be disconnected for dielectric strength tests on the main busbars.

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







Ekip Measuring Pro module

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

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

The Ekip Hi-Touch, Ekip G Touch and Ekip G-Hi Touch trip units are provided as standard with the Ekip Measuring Pro module.

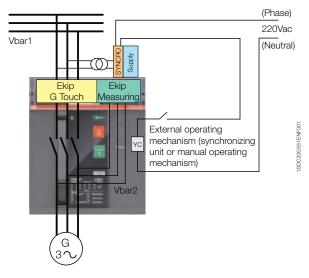
Electrical diagram reference: figures 20, 21, 22, 23

Ekip Synchrocheck

This module enables the control of the synchronism condition for placing two lines in parallel. The module can be used with distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units equipped with the Ekip Measuring Pro module.

Ekip Synchrochek acquires the voltages of two phases of one line through an external transformer and, through the Ekip Measuring Pro module, the voltages of another line. 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		
Туре		Monostable	Ekip Synchrocheck	
Maximum switchir	ng power (resistive load)	120W /1250VA		
Maximum switching voltage		150V DC / 250V AC		
Maximum switchir	ng current			
	30V DC	3A	1	
	50V DC	1A	output	
	150V DC	0.3A		
250V DC		4A		
Contact/coil insula	ation	2000 Vrms (1min @50H	z)	



Electrical diagram reference: figure 48

Accessories for Ekip trip units



Ekip LCD display interface

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



Ekip Fan cooling module

The Ekip Fan cooling module continuously monitors the temperature inside the fixed parts of E2.2, E4.2 and E6.2 that are equipped with cooling fans and activates them in the event of overheating.

It is an alternative to the Ekip Supply module and enables the protection trip unit to be supplied with DC auxiliary power available in the switchgear. Ekip Fan can be used with Ekip Touch and Ekip Hi-Touch trip units.

The Ekip Fan 24V DC is available. If an Ekip Fan 24V DC module is installed, another two cartridge modules can also be installed.

Electrical diagram reference: figure 33



Rating Plug

The rating plugs are field interchangeable from the front on all trip units and enable the protection thresholds to be adjusted according to the actual rated current of the system. This function is particularly advantageous in installations that may require future expansion or in cases in which the power supplied needs to be limited temporarily (e.g. mobile Gen Set). The Overload (L) protection function can be disabled at any time by using an L OFF version of the rating plug. There is a matching L OFF version for each standard version of rating plug.

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

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

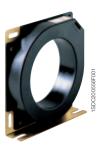
Circuit-breaker	Rating plug available for Rc protection
E1.2	400-630-800-1000-1250-1600
E1.2 250	100-200-250
E2.2	400-630-800-1000-1250-1600-2000-2500
E2.2 250	100-200-250
E4.2	400-630-800-1000-1250-1600-2000-2500-3200-4000



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 to the Ekip trip unit. It is supplied on request.

Electrical diagram reference: figure 27



Homopolar toroid for the earthing conductor of main power supply

The distribution and generator protection versions of the Ekip Touch and Hi-Touch trip units can be used with an external toroid positioned, for example, on the conductor that connects the star centre of the MV/LV transformer to earth (homopolar transformer): in this case, the earth protection is called Source Ground Return. Through two different combinations of connections of its terminals, the In of the toroid can be set at 100 A, 250 A, 400 A, 800 A.

Electrical diagram reference: figure 25



Toroid for differential protection

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

Electrical diagram reference: figure 24

Accessories Accessories for Ekip trip units



Displaying and supervision

Ekip Multimeter Display on front of switchgear

Ekip Multimeter is a display unit to be installed on the front of the switchgear for SACE Emax 2 circuit-breakers equipped with Ekip electronic trip units. The device, 96mmx96mm sized, is equipped with a large touch screen display and enables measurements to be displayed with the same levels of precision. If connected to trip units with a display, Ekip Multimeter enables the adjustment of parameters and protection thresholds.

Several Ekip Multimeter devices can be connected at the same time to the same Ekip protection trip unit to display currents, voltage, powers and energy.

Ekip Multimeter can be powered either in direct current (24-48V DC or 110-240V DC) or in alternating current (110-240V AC). It is equipped with a 24V DC output that supplies the trip unit to which it is connected.

	24-48V DC, 110-240V AC/DC
	19.2-60V DC, 105-265V AC/DC
Rated Power	8W



Ekip Control Panel on front of switchgear

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

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

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





Testing and programming

Ekip TT testing and power supply unit

Ekip TT is a device that allows you to verify that the circuit-breaker trip mechanism is functioning correctly (trip test).

It also allows a trip unit not provided with auxiliary power supply to be supplied with power so that the last protection device tripped can be displayed directly on the screen or by the lighting up of corresponding LEDs.

The device can be connected to the front test connector of any Ekip trip unit of SACE Emax 2; it is supplied as standard with the versions for distribution and generator protection of the Ekip Touch, Hi-Touch trip units to set protection functions setting.

Ekip T&P testing kit

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

The kit includes:

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

The Ekip T&P unit is connected on one side to the USB port of a PC and on the other, by means of the cable provided, to a protection trip unit of the SACE Emax 2 series.

The Ekip T&P unit performs the automatic testing, manual testing and trip testing of the device to which it is connected and generates reports.

These functions are managed via the Ekip T&P Interface, which is activated directly by Ekip Connect only in the presence of the Ekip T&P connected to a PC.

Accessories Spare parts

Spare parts

The following original and guaranteed spare parts are available:

- Front shield and lateral covers
- Opening solenoid for Ekip protection trip unit
- Arc chamber
- Complete pole
- Operating mechanism and closing springs
- Loading lever for closing springs
- Racking-out lever
- Racking-out handle and plates
- Jaw isolating contact for fixed part of withdrawable circuit-breaker
- Shutters for fixed part
- Trip units current transformers wires
- Transparent protection for trip unit
- Mainboard for protection trip units
- Terminal box and e sliding contacts
- Grease and oil.

For further details, please refer to ABB SACE Spare Parts Catalogue.

Installation

Circuit-breaker	6/2
Sizes	6/3
Versions	6/4
Poles	6/5
Terminals	6/6
Degree of protection	6/7
Power losses	6/7
Temperature derating	6/8
Current-limiting curves	6/9
Installation environment	
Temperature	6/10
Environmental conditions	6/10
Vibration	6/10
Electromagnetic compatibility	6/10
Installation in switchgear	6/11
Position	6/12
Power supply	6/12
Insulation distances and connection	6/12
Busbar types	6/14
Accessories	6/14
Performance in switchgear	6/15

Installation Circuit-breaker

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

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

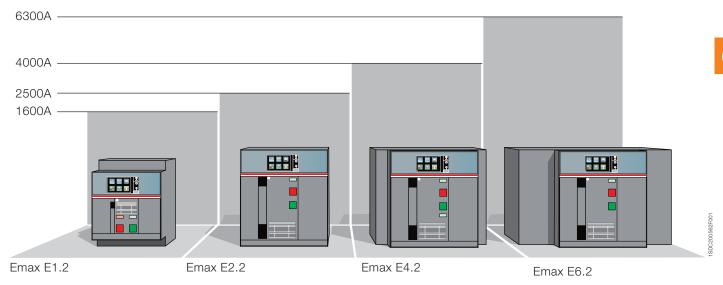
Safety is guaranteed thanks to the double insulation of the live parts and total segregation of the phases. Furthermore, the new functional design of the SACE Emax2 circuit-breakers has been developed with the purpose of improving installation operations and use of the devices and accessories; making them simple, intuitive and safe.

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

Sizes

The SACE Emax2 circuit-breakers, available in 4 sizes up to 6300A, provide:

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



Installation Circuit-breaker

Versions

The SACE Emax2 circuit-breakers are available in both fixed and withdrawable versions. The withdrawable version is recommended in applications in which service continuity is a fundamental requirement: replacement of the moving part with a new device does not require any intervention on power connections or on auxiliary connections, thus permitting reset in the shortest time possible.

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

Fixed



Withdrawable



- Moving part
- 2. Sliding contacts
- Fixed part
- Terminal box
- Racking-out mechanism
- 6. Racking-out guide rails
- 8. Data label and accessories

Poles

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

The four-pole circuit-breakers E1.2, E2.2 and E4.2 are always provided with full-size neutral pole with rated uninterrupted current-carrying capacity identical to the phase poles. The E6.2 circuit-breakers, thanks to their construction modularity, are available with neutral set at 50% - normal supply - and with full-size neutral, so that the customer does not need to oversize the neutral unless strictly necessary.

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

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

Installation Circuit-breaker

Terminals

The integration of the circuit-breaker in the electrical system is simplified thanks to the connection terminals of the circuit-breakers. The silver-plated copper terminals are designed to assist installation of connecting bars according to the change in the rated capacity of the circuit-breaker. Each terminal has been created to the standard width of busbar for that amperage and is equipped with one, two or three terminal stabs for easy connection to multiple bus runs that may be required for the application. For particular installation requirements, the circuit-breakers can be equipped with different combinations of terminals for the upper and lower part.

Typo	Abbreviation	E1.2	E2.2	E4.2	E6.2
Туре	Appreviation	E1.Z	E2.2	E4.2	E0.2
Rear orientated terminal (1)	HR VR	F, W	F, W	F, W	F, W
Horizontal rear spread terminal	SHR	W	F, W		
Vertical rear spread terminal	SVR		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 4x240mm ²	Fc CuAl	F, W			
Flat terminal	FL		W	W	w

⁽¹⁾ The reare orientated terminals are supplied as sandard in the HR-HR configuration.

Degree of protection

The SACE Emax2 circuit-breakers guarantee the following degrees of protection:

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

Power losses

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

These power losses are measured according to IEC 60947 product standard, the values given in the table refer to total power for three and four pole circuit-breakers with balanced loads with a current flow equal to rated uninterrupted current "lu" at 50/60Hz.

Circuit-breaker	r type	lu	630A	800A	1000A	1250A	1600A	2000A	2500A	3200A	4000A	5000A	6300A
	E1.2 B/C/N	[W]	31	50	78	122	201	-	-	-	-	-	-
	E2.2 B/N/S/H	[W]	-	34	53	83	136	212	267	-	-	-	-
Fixed	E4.2 N/S/H/V	[W]	-	-		-		-	: -	425	465	-	
	E6.2 H/V/X	[W]	-	-	-	-	-	-	-	-	309	483	767
	E1.2 B/C/N	[W]	62	100	156	244	400	-	-	-	-	-	-
Maria la	E2.2 B/N/S/H	[W]	-	72	113	176	288	450	550	-	-	-	-
Withdrawable	E4.2 N/S/H/V	[W]	-	-		-		-		743	900	-	
	E6.2 H/V/X	[W]	-	-	-	-	-	-	-	-	544	850	1350

Installation Circuit-breaker

Temperature derating

Under certain installation conditions, the circuit-breakers can operate at higher temperatures than the reference temperature of 40°C. In this case the current-carrying capacity of the circuit-breaker may be lower than the rated current-carrying capacity at the reference temperature: therefore the derating coefficients shown in the table must be applied. Percentage values refer to withdrawable circuit breakers.

Emax 2 E1.2	Temperatu	Temperature [°C]								
	<40	45	50	55	60	65	70			
E1.2 250	100%	100%	100%	100%	100%	100%	100%			
E1.2 630	100%	100%	100%	100%	100%	100%	100%			
E1.2 800	100%	100%	100%	100%	100%	100%	100%			
E1.2 1000	100%	100%	100%	100%	100%	100%	100%			
E1.2 1250	100%	100%	100%	100%	100%	100%	100%			
E1.2 1600	100%	100%	100%	98%	95%	93%	90%			

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

Emax 2 E4.2	Temperatur	Temperature [°C]								
	<40	45	50	55	60	65	70			
E4.2 2000	100%	100%	100%	100%	100%	100%	100%			
E4.2 2500	100%	100%	100%	100%	100%	100%	100%			
E4.2 3200	100%	100%	97%	93%	89%	86%	82%			
E4.2 4000	100%	100%	94%	90%	86%	83%	80%			

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

Current-limiting curves

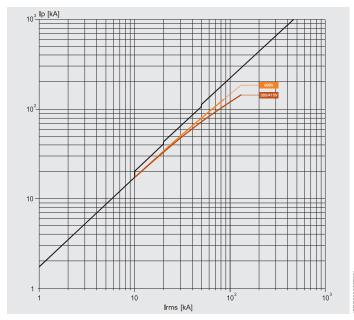
The SACE Emax2 series features a series of current-limiting circuit-breakers in sizes E1.2 up to 1600A. These circuit-breakers are distinguished constructively by:

- Dedicated stored energy operating mechanism, which reduces opening times.
- Specific main contacts which, utilizing the electrodynamic forces generated by the short-circuit current, accelerate opening of the main contacts.

These features ensure rapid interruption which consequently reduces electromechanical and thermal stress on the system during a short-circuit. The current-limiting circuit-breakers are distinguished by short-time withstand currents low that are not particularly high and therefore not indicated for applications in which chronoamperometric selectivity is required with several downstream devices or in which devices are present with high inrush current in the start-up stage.

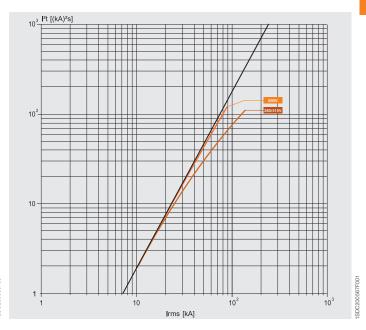
Current-limiting curves

E1.2 L



Current-limiting curves of specific let-through energy

E1.2 L



Installation environment

SACE Emax 2 circuit-breakers have been designed and tested in accordance with major international Standards to manage with maximum reliability the electrical plant. The installation requirements prescribed by the international Standards are listed below. In addition, ABB provides instructions for the use of circuit-breakers in nonstandard environments, as for example personalized maintenance program or installation solutions aimed at increasing performances and extending the lifecycle of the circuit-breaker.

Temperature

SACE Emax2 circuit-breakers can operate in the following environmental conditions:

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

Environmental conditions

The devices can be installed in industrial environments with pollution level 3, IEC 60947. SACE Emax 2 circuit-breakers also comply with:

- IEC60721-3-6 class 6C3
- IEC60721-3-2 class 3C2

Altitude

SACE Emax2 air circuit-breakers do not undergo changes in rated performance up to 2000 metres. Beyond this altitude, the properties of the atmosphere in terms of composition, dielectric capacitance, cooling power and pressure vary and, therefore, the performance of the circuit-breakers is subject to derating, which can be measured by means of the variation in maximum rated service voltage and rated uninterrupted current.

Altitude		[m]	2000	3000	4000	5000
Rated service voltage - Ue	Versions 690V	[V]	690	607	538	470
	Versions 1150V	[V]	1150	1012	897	782
Rated current		[% In]	100	98	93	90

An installation at 3000 m of a 690 V AC rated service voltage can be an explicative example. The altitude, as shown in the table, may cause a derating which precludes the use of a standard automatic circuit-breaker. To grant the use of a circuit-breaker at 690 V AC rated service voltage is therefore required a 1150V AC version that – despite the derating – fulfill the necessary rated service voltage. In addition, the selection of the circuit-breakers has to be based on the short -circuit performance required by the application.

Vibration

The circuit-breakers have been tested according to:

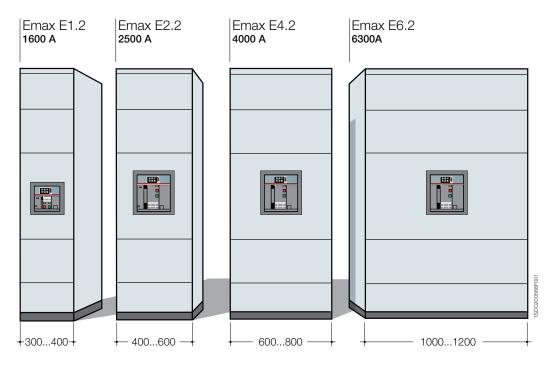
- IEC60068-2-6
 - From 1 to 13 Hz with amplitude 1mm
 - From 13 to 100 Hz with constant acceleration 0.7g
- IEC60721-3-1Storage: 1M3IEC60721-3-2Transport: 2M2
- Transport: 2M2 - IEC60721-3-3
- Operational conditions: 3M2Shipping registers or certifications

Electromagnetic compatibility

The use of specific devices in industrial installations may cause electromagnetic interference in the electrical system. SACE Emax2 circuit-breakers have been developed and tested for electromagnetic compatibility in accordance with IEC 60947-2, Appendices J and F.

Installation Installation in switchgear

Thanks to the four construction sizes and the reduced insulation distances required, SACE Emax2 circuit-breakers enable the installation spaces of the compartments of electrical switchgear to be optimized, thereby providing a rational solution to the customers' application needs.



SACE Emax2 circuit-breakers enable the design of electrical switchgear to be improved, allowing it to be optimized not just in terms of performance, but also in the use of the main materials:

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

Traditional circuit-breaker 3p lu 2500A Emax E2.2 3p lu 2500A Efficiencies with Emax 2: Possibility of saving in copper Possibility of saving in metal frame, segregation and plates Possibility of saving in the installation surface **-** 200 -600 400

Installation Installation in switchgear

Position

All SACE Emax2 circuit-breakers can be floor mounted in a vertical position inside the switchgear compartment.

The E1.2 circuit-breaker can also be installed in a horizontal position and wall mounted.

Power supply

The Emax2 circuit-breakers can be supplied, indifferently, from either upper or lower terminals. In the event a measurement module is present, in order to make use of all information when the circuit-breaker is in the open position, the voltage sockets must be installed on the power supply side.

Insulation distances and connection

The circuit-breakers can be connected to the main power system using the most common configurations and dimensions of copper bars. Installation of live parts must ensure:

- Minimum insulation distances between the phases

Rated insulation voltage Ui	Minimum distance [mm]
1000V	14mm according to IEC 61439; ABB suggests 25mm

- Insulation distance of installation cubicle

Fixed circuit-breakers

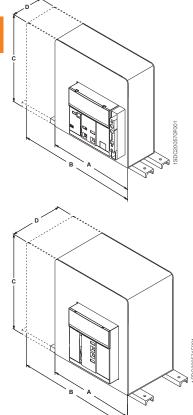
	Α	В	С	D
[mm]	3р	4P		
E1.2	250	322	382.5*	130
E2.2	400	490	500	221
E4.2	500	600	500	221
E6.2	900	1000	500	221
E6.2/f	-	1200	500	221

^{* 332.5}mm for voltage less ≤ 440V AC

Withdrawable circuit-breakers

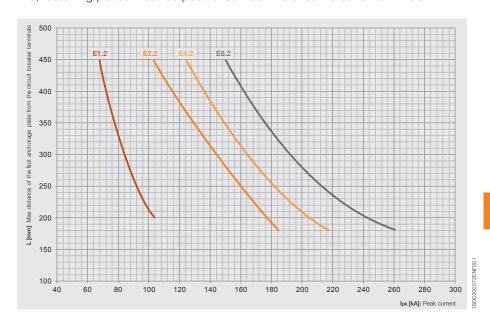
	Α	В	С	D
[mm]	3р	4P		
E1.2	280	350	440*	252
E2.2	400	490	500	355
E4.2	500	600	500	355
E6.2	900	1000	500	355
E6.2/f	-	1200	500	355

^{* 390}mm for voltage less ≤ 440V AC



- Anchorage plates

The electrodynamic force released during a short-circuit can cause high levels of mechanical stress to the devices and structures of the switchgear. To minimize this, fastening plates must be positioned near the circuit-breaker terminals.



- Tightening torques

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

Terminals	E1.2	E2.2 / E4.2 / E6.2
Modifiable HR/VR rear	40 Nm	70 Nm
Spread rear	40 Nm	70 Nm
Front	40 Nm	70 Nm
Extended front	40 Nm	70 Nm
Spread front	70 Nm	70 Nm
Front for cables	43 Nm	70 Nm

- Segregation plates and separator plates

The rear part of the circuit-breaker has been designed with specific slots in which insulating walls can be housed to facilitate segregation of live parts. In addition, phase separators are available as an optional accessory for E1.2.

Earthing connection

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

- Connect the Emax 2 fixed circuit-breaker or the fixed part of the withdrawable circuit-breaker to the protective circuit by means of a cable with suitable crosssectional area to fulfil the requirements of clause 10.5.2 fo the Standard IEC 61439-1.
- If the continuity of the circuit-breaker frame with the switchboard earthing is guaranteed by the metal contact (support) between the circuit-breaker and the metal structure of the switchboard (which is a part of the protective circuit) no connection is necessary (provided that no panels of insulating material are interposed between the circuit-breaker and the metal frame of the switchboard). Emax E1.2, fixed version, does not require any earthing connection.

Installation Installation in switchgear

Busbar types

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

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

Accessories

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

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

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



Installation Performance in switchgear

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

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

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

Compartment 1

Installation Performance in switchgear

The following tables provide an indication of the performance of the **HR Terminal** One circuit-breaker in the column apparatus inside the switchgear. The data shown are a summary of software model simulations and real tests. SACE Emax 2 E1.2 B C N Circuit-breaker Switchgear dimensions 2200x400x600 (HxLxD) **Environment temperature** ΙP 55 °C lu Connection [mm] Compartment 35 °C 45 °C IP31 630 2x40x5 630 630 2 800 2x50x5 800 800 800 2x50x10 1000 1000 1000 1000 2x50x8 Compartment 2 2 2x50x10 1 1250 1250 1200 1250

2

1

1290

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

2x50x10

2x50x8

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.

1600

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

Installation 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.

	,				Environment temperature		
	lu	Connection [mm]	Compartment	35 °C	45 °C	55 °C	
31	800	1x50x10	2				
4	4	1700710	1	800	800	800	
4 ~	1000	2x50x5	2				
	1000	2,000,0	1	1000	1000	1000	
	1250	2x50x10	2				
	11.11.11	2,00,10	1	1250	1250	1250	
	111111111111111111111111111111111111111	2x60x10	2				
	1600	2,,00,,10	1	1600	1540	1480	
mpartment 2	1000	1x100x10	2				
41.0		TATOOATO	1				
mpartment 1		3x60x10	2				
inpartinent i	74 F00-		1	2000	1940	1850	
	52005	2x80x10	2				
	2000		1				
		3x60x10 *	2				
			1	2000	2000	1940	
· ·		2x80x10 *	2				
			1				
		3x60x10	2				
			1	2500	2350	2200	
		4x100x5	2				
	2500		1				
		3x60x10 *	2				
		2007.10	1	2500	2460	2320	
		4x100x5 *	2				
			1	:			

HR Terminal

One circuit-breaker in the column

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

^{*} Performances refer to SHR and SVR terminals.

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

Installation Performance in switchgear

The following tables provide an indication of the **HR Terminal** VR Terminal One circuit-breaker in the column performance of the apparatus inside the switchgear. The data shown are a summary of software model simulations and real tests. SACE Emax 2 E4.2 N S H V Circuit-breaker Switchgear dimensions 2200x800xx900 (HxLxD) Environment temperature **Environment temperature** ΙP lu Connection Compartment 35 °C 45 °C 55 °C 35 °C 45 °C 55 °C [mm] IP31 2000 2x80x10 2000 2000 2000 2000 2000 2000 2500 2x100x10 2500 2450 2400 2500 2500 2500 Compartment 2 3050 3200 2900 3080 3x100x10 2755 3200 2920 Compartment 1 3200 3200 3050 3200 3x100x10* 2850 3200 3020 4000 4x100x10 3450 3200 2970 3650 3400 3200

^{*} Performances refer to withdrawable circuit-breakers with a fixed part accessorized with three stab rear terminals for 4000A (Example: 1SDA074021R1 - KIT VR 4000A) Performances with F and FL terminals can be compared to the performances of circuit-breaker with HR terminal.

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

SACE Emax 2 E6.2 H V X Circuit-breaker

Switchgear dimensions 2200x1200xx900 (HxLxD)

HR Terminal One circuit-breaker in the column	VR Terminal One circuit-breaker in the column			
Environment temperature	Environment temperature			

				Environme	nt temperat	ure	Environme	nt temperat	ure
IP	lu	Connection [mm]	Compartment	35 °C	45 °C	55 °C	35 °C	45 °C	55 °C
IP31	4000		1	4000	4000	4000	4000	4000	4000
Compart- ment 2	5000	5x100x10	1	5000	5000	4900	5000	5000	5000
Compartment 1	6300	7x100x10	1	5650	5350	4850	6000	5700	5250

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

Installation Performance in switchgear

S

The following tables provide an indication of the performance of the apparatus inside the switchgear. The data shown are a summary of software model simulations and real tests. SACE Emax 2 E1.2 L Circuit-breaker					al t-breaker in	the column	VR Termin One circuit		the column
Switchgear dimensions 2200x400x600 (HxLxD)					ent temperat	ture	Environme	nt temperat	ure
IP	lu	Connection [mm]	Compartment	•	45 °C	55 °C	35 °C	45 °C	55 °C
IP31	630	2x40x5	1	630	630	630	630	630	630
	800	2x50x5	1	800	800	800	800	800	800
Compartment 2	1000	2x50x10	1	1000	1000	950			
Compart-	1000	2x50x8					1000	1000	1000
ment 1	1SDC200574F	2x50x10	1	1250	1125	955			
	1250	!		<u>.</u>	:	:	<u>:</u>	:	:

1250

1205

1050

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

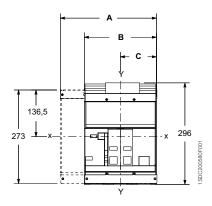
2x50x8

Dimensions

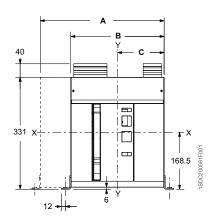
Fixed circuit-breaker	7/2
E1.2	7/4
E2.2	7/9
E4.2	7/12
E6.2	7/14
Withdrawable circuit-breaker	7/18
E1.2	7/20
E2.2	7/24
E4.2	7/28
E6.2	7/30

Dimensions Fixed circuit-breaker

E1.2



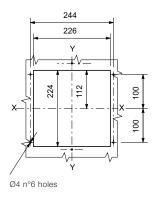
E2.2 - E4.2 - E6.2



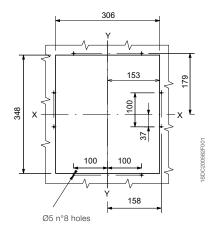
	Α	В	С	
[mm]	4p	3p	3p	4p
E1.2	280	210	103.6	103.6
E2.2	366	276	138	138
E4.2	510	384	192	192
E6.2	888	762	318	444
E6.2/f	1014	-	-	444

Compartment door drilling

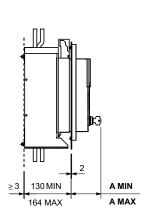
E1.2



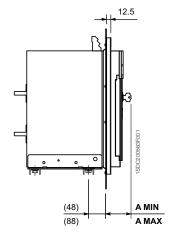
E2.2 - E4.2 - E6.2



E1.2



E2.2 - E4.2 - E6.2



E1.2		Standard	Ronis/Profalux	Kirk	Castell
A MIN	[mm]	49.5	63.5	63.5	83.5
A MAX	[mm]	83.5	97.5	97.5	117.5
E2.2-E4	.2-E6.2	Standard	Ronis/Profalux	Kirk	Castell
A MIN	[mm]	31	41.5	45.5	-

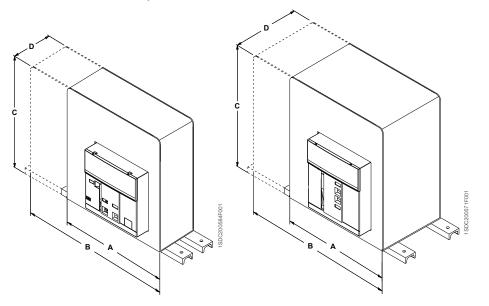
81.5

A MAX

[mm] 71

85.5

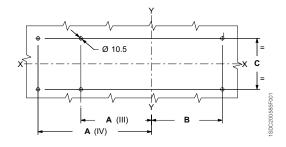
Dimensions of the compartment



	Α	В	С	D
[mm]	3p	4p		
E1.2	250	322	382.5 *	130
E2.2	400	490	500	221
E4.2	500	600	500	221
E6.2	900	1000	500	221
E6.2/f	-	1200	500	221

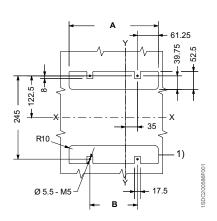
^{* 332.5} for voltages \leq 440V AC

Floor fixing



	Α		В		С
[mm]	3p	4p	3p	4p	
E1.2	117	187	117	117	80
E2.2	154	244	154	154	150
E4.2	208	334	208	208	150
E6.2	460	460	334	460	150
E6.2/f	-	586	-	460	150

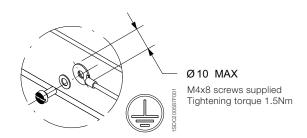
Wall fixing (only for E1.2)



[mm]	3 p	4 p
Α	192.5	262.5
В	70	140

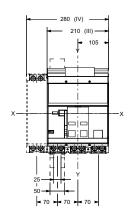
¹⁾ for fixing with rear terminals

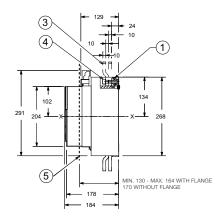
Earthing device E2.2 - E4.2 - E6.2

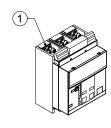


Dimensions Fixed circuit-breaker - E1.2

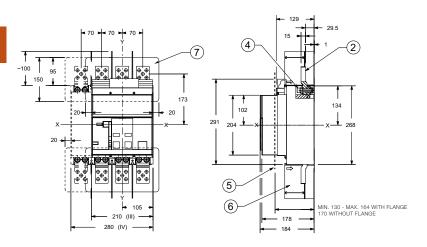
Front terminals - F

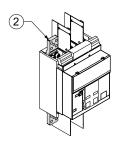


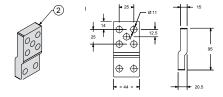




Extended front terminals - EF



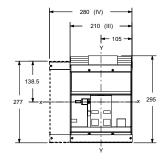


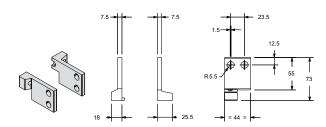


- Front terminals for flat connection
- Extended front terminals
- To be supplied by the customer
- Tightening torque 18Nm

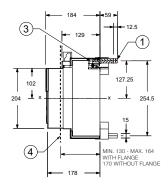
- 5 Door position Ref. page 7/26 Obligatory phase separators 100mm
- Obligatory insulating plate to be supplied by the customer

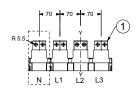
Orientable rear terminals - HR/VR

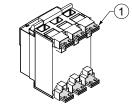




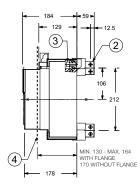
Terminals HR

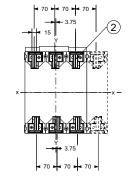


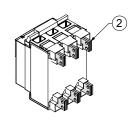




Terminals VR





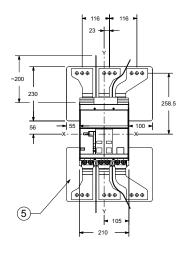


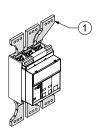
- Horizontal orientable terminals HR
 Vertical orientable terminals VR
- Vertical orientable terminals VF
 Tightening torque 20Nm
 Door position Ref. page 7/2

Dimensions Fixed circuit-breaker - E1.2

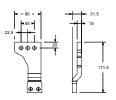
Splayed extended front terminals - ES

3-pole version

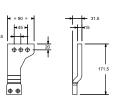




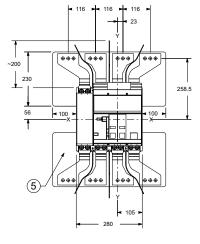


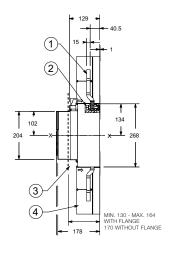


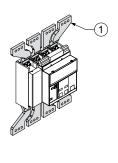




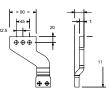
4-pole version



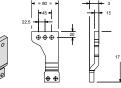










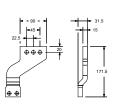






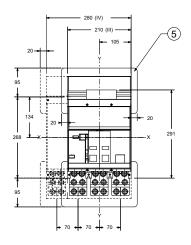


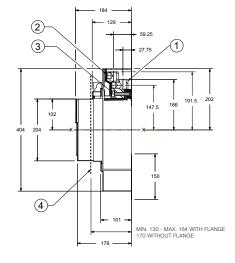


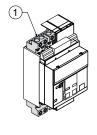


- Splayed extended front terminals
- Tightening torque 18Nm Door position Ref. page 7/2
- Obligatory phase separators 200mm
 Obligatory insulating plate to be supplied by the customer

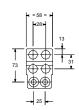
Front terminals for cables - FcCuAl















- 1 Front terminals for cables FC CU AL 2 Tightening torque 43Nm 3 Tightening torque 18Nm

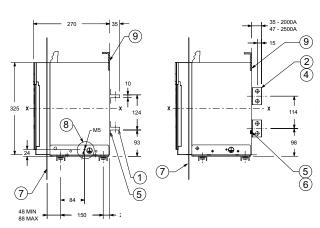
- Door position Ref. page 7/2Obligatory insulating plate to be supplied by the customer

Dimensions Fixed circuit-breaker - E2.2

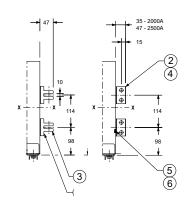
Orientable rear terminals - HR/VR

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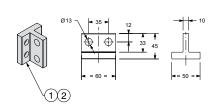
E2.2 B/N/S/H 2000A

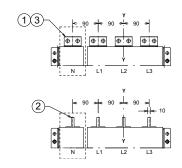


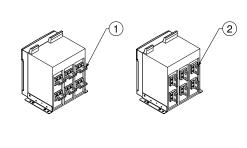
E2.2 N/S/H 2500A



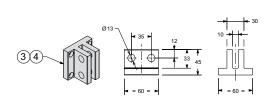
E2.2 B/N/S/H 2000A

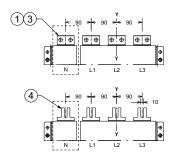


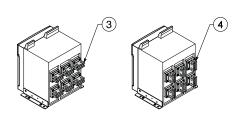




E2.2 N/S/H 2500A

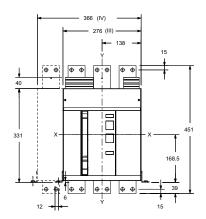


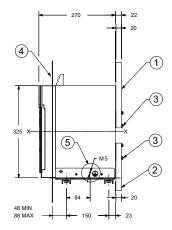


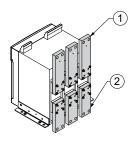


- 1 Horizontal terminals 2000A
- Vertical terminals 2000A
- Horizontal terminals 2500A
- 4 Vertical terminals 2500A
 5 Tightening torque 2000A 8.6Nm
 6 Tightening torque 2500A 8.6Nm
- Door position Ref. page 7/2
- 8 Earthing device Ref. page 7/3
- 9 Insulating wall

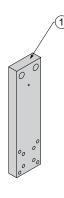
Front terminals - F

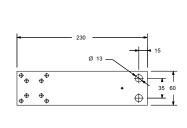




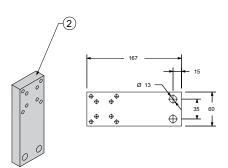


Upper front terminals - F





Lower front terminals - F



- Upper front terminalsLower front terminalsTightening torque 8.6Nm

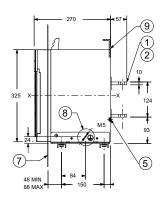
- 4 Door position Ref. page 7/25 Earthing device Ref. page 7/3

Dimensions Fixed circuit-breaker - E2.2

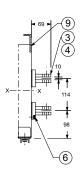
Horizontal spread terminals - SHR

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

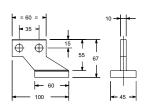


E2.2 N/S/H 2500A

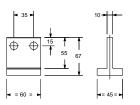


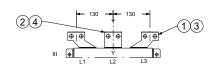
E2.2 B/N/S/H 2000A

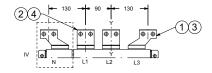


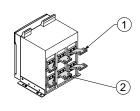






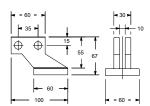




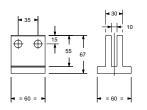


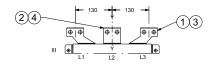
E2.2 N/S/H 2500A

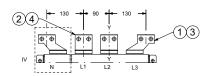


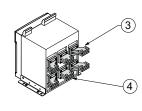






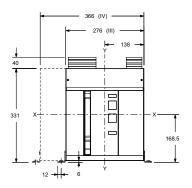


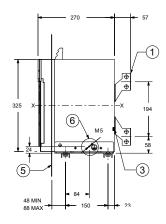


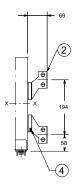


- Side horizontal splayed terminals 2000A Central horizontal splayed terminals 2000A
- Side horizontal splayed terminals 2500A
- Central horizontal splayed terminals 2500A
- Tightening torque 2000A 8.6Nm Tightening torque 2500A 8.6Nm
- Door position Ref. page 7/2
- Earthing device Ref. page 7/3 Insulating wall

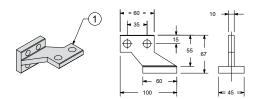
Vertical spread terminals - SVR

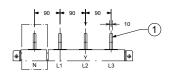


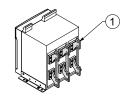




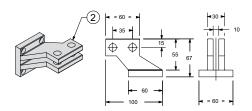
E2.2 B/N/S/H 2000A

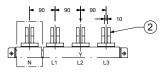


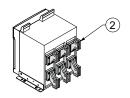




E2.2 N/S/H 2500A





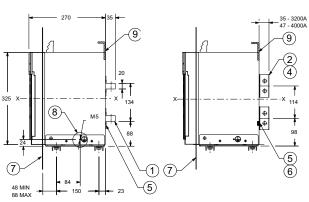


- Vertical splayed terminals 2000A
 Vertical splayed terminals 2500A
 Tightening torque 2000A 8.6Nm
- Tightening torque 2500A 8.6Nm Door position Ref. page 7/2 Earthing device Ref. page 7/3

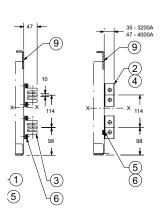
Dimensions Fixed circuit-breaker - E4.2

Orientable rear terminals - HR/VR

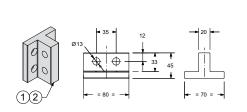
E4.2 N/S/H/V 3200A

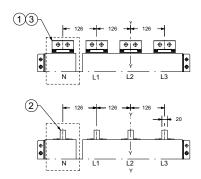


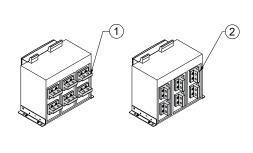
E4.2 N/S/H/V 4000A



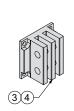
E4.2 N/S/H/V 3200A

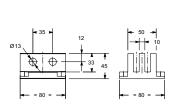


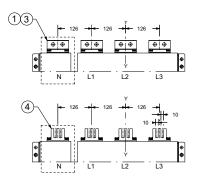


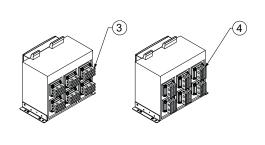


E4.2 N/S/H/V 4000A



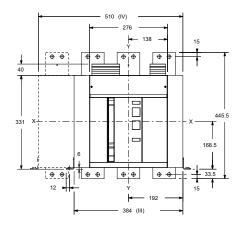


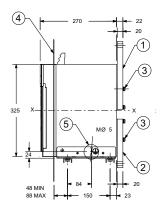


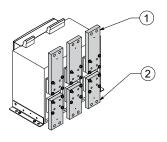


- Horizontal terminals 3200A
- Vertical terminals 3200A
- Horizontal terminals 4000A
- 4 Vertical terminals 4000A
- Tightening torque 3200A 20Nm
- 6 Tightening torque 4000A 20Nm
- 7 Door position Ref. page 7/28 Earthing device Ref. page 7/3
- 9 Insulating wall

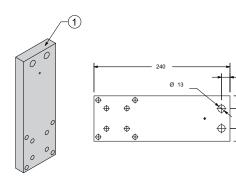
Front terminals - F



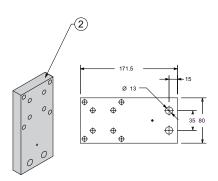




Upper front terminals



Lower front terminals

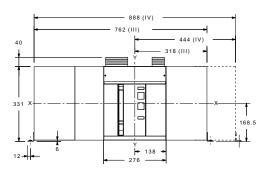


- Upper front terminals
 Lower front terminals
 Tightening torque 20Nm

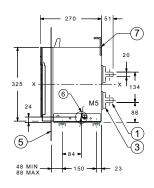
- 4 Door position Ref. page 7/25 Earthing device Ref. page 7/3

Dimensions Fixed circuit-breaker - E6.2

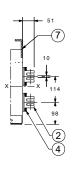
Horizontal rear terminals - HR



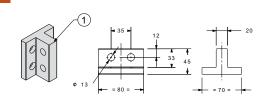
E6.2 H/V/X 5000A

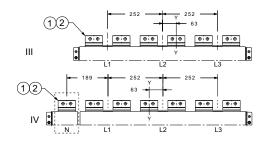


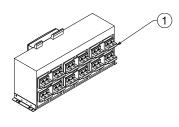
E6.2 H/V/X 6300A



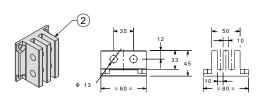
E6.2 H/V/X 5000A

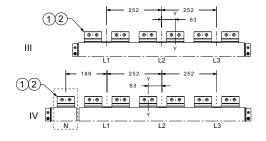


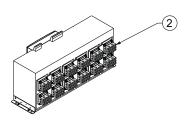




E6.2 H/V/X 6300A





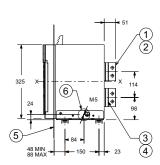


- Horizontal terminals 5000A Horizontal terminals 6300A Tightening torque 5000A 20Nm Tightening torque 6300A 20Nm
- Door position Ref. page 7/2
- Earthing device Ref. page 7/3 Insulating wall

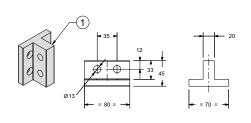
Vertical rear terminals - VR

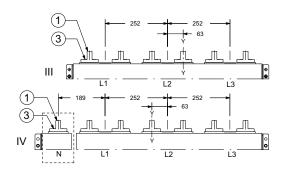
444 (IV) - 318 (III)-

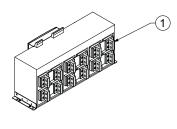
E6.2 H/V/X 5000...6300A



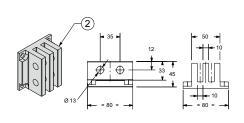
E6.2 H/V/X 5000A

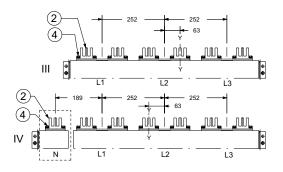


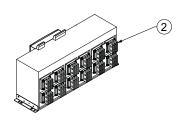




E6.2 H/V/X 6300A







- 1 Vertical terminals 5000A 2 Vertical terminals 6300A 3 Tightening torque 5000A 20Nm 4 Tightening torque 6300A 20Nm
- Door position Ref. page 7/2
- Earthing device Ref. page 7/3

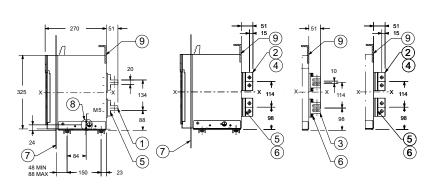
Dimensions Fixed circuit-breaker - E6.2

Orientable rear terminals - HR/VR full size

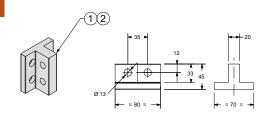
138 12

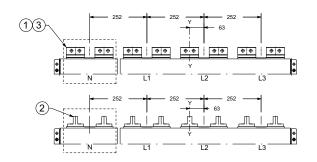
E6.2 H/V/X 5000A

E6.2 H/V/X 6300A

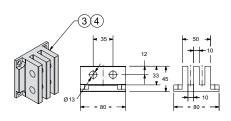


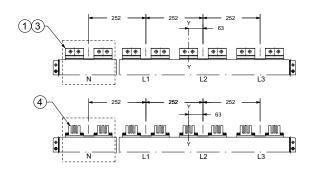
E6.2 H/V/X 5000A





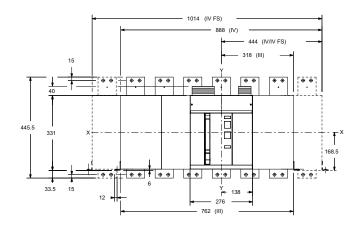
E6.2 H/V/X 6300A

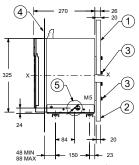


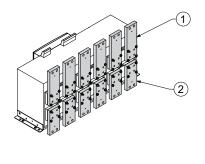


- Horizontal terminals 5000A
- Vertical terminals 5000A
- Horizontal terminals 6300A
- Vertical terminals 6300A
- Tightening torque 5000A 20Nm Tightening torque 6300A 20Nm
- Door position Ref. page 7/2
- Earthing device Ref. page 7/3
- Insulating wall

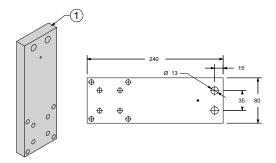
Front terminals - F



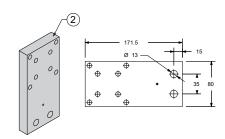


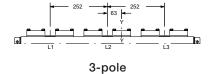


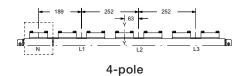
Upper front terminals

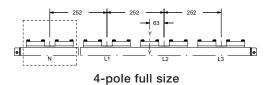


Lower front terminal









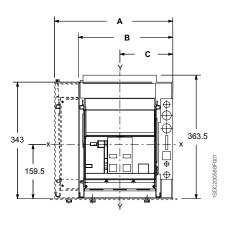
- 1 Upper front terminals2 Lower front terminals3 Tightening torque 20Nm

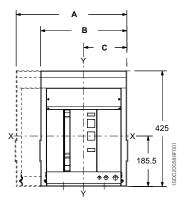
- 4 Door position Ref. page 7/25 Earthing device Ref. page 7/3

Dimensions Withdrawable circuit-breaker

E1.2

E2.2 - E4.2 - E6.2

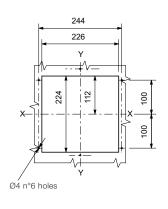




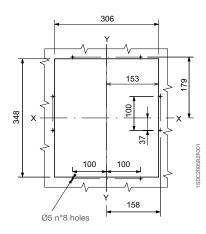
	Α	В	С	
[mm]	4p	3 p	3 p	4p
E1.2	348	278	155.5	155.5
E2.2	407	317	158.5	158.5
E4.2	551	425	212.5	212.5
E6.2	929	803	338.5	464.5
E6.2/f	1055	-	-	464.5

Compartment door drilling

E1.2



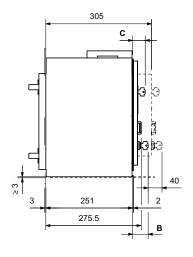
E2.2 - E4.2 - E6.2

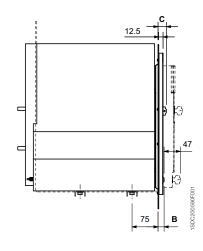


Distance from connected to isolated position

E1.2

E2.2 - E4.2 - E6.2



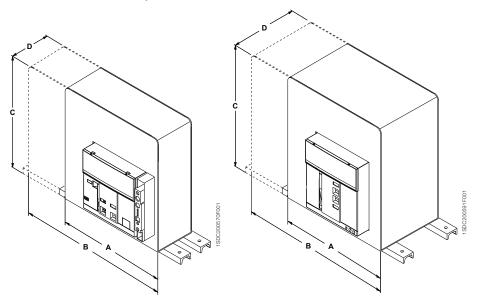


E1.2		Standard	Ronis/Profalux	Kirk	Castell
В	[mm]	44.5	55	55	85
С	[mm]	36	46.5	46.5	76.5

E2.2	2-E4.2-E6.2	Standard	Ronis/Profalux	Kirk	Castell
С	[mm]	17.5	28	32	-
В	[mm]	24	34.5	38.5	-

B refers to KLC; C refers to KLP

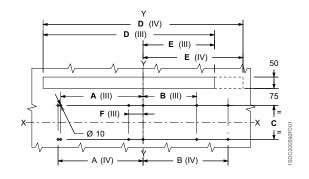
Dimensions of the compartment



	Α	В	С	D
[mm]	3 p	4p		
E1.2	280	350	440*	252
E2.2	400	490	500	355
E4.2	500	600	500	355
E6.2	900	1000	500	355
E6.2/f	-	1200	500	355

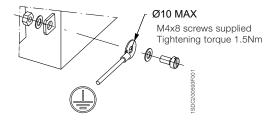
^{* 390} for voltages \leq 440V AC

Floor fixing

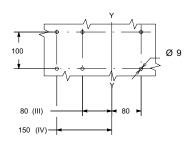


	Α		В		С	D		Е		F
[mm]	3p	4p	3p	4p		3p	4p	3p	4p	
E1.2	80	150	80	80	100	-	-	-	-	-
E2.2	75	170	75	80	150	270	360	135	135	-
E4.2	100	225	100	100	150	378	504	189	189	-
E6.2	363	375	237	375	150	756	882	315	441	63
E6.2/f	-	375	-	375	150		1008		441	0

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

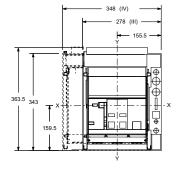


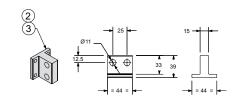
Fixing on support sheet (only for E1.2)



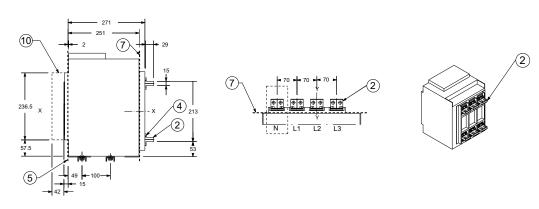
Dimensions Withdrawable circuit-breaker - E1.2

Rear orientable terminals - HR/VR

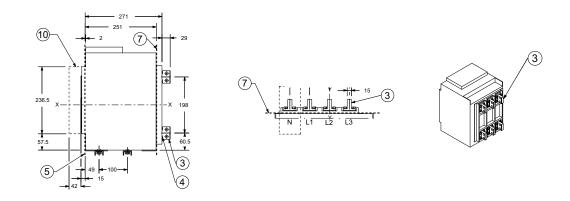




Terminals HR



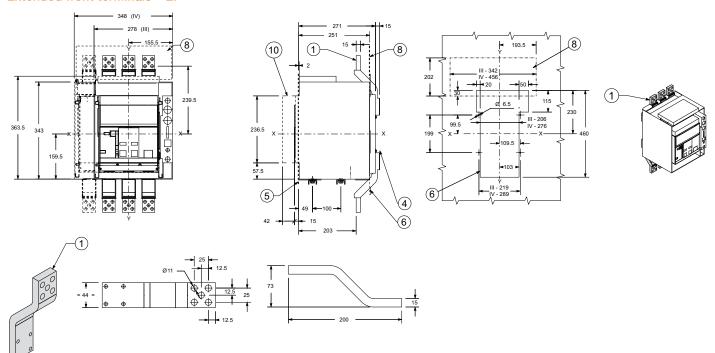
Terminals VR



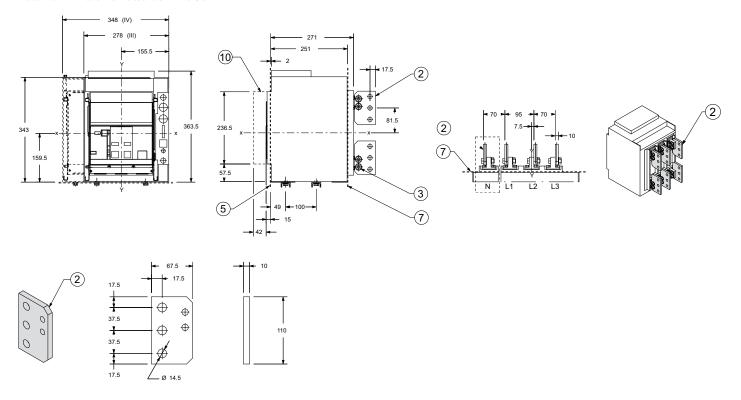
- 2 Horizontal rear terminals
- Vertical rear terminals
- Tightening torque 12 Nm

- Door position Ref. page 7/18
 Rear segregation for rear terminals
 Isolating distance

Extended front terminals - EF



Rear terminals for cables - FcCuAl



- 1 Front terminals
- Rear terminals for cables
- 3 Tightening torque 48 Nm

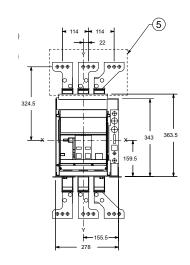
- Tightening torque 12 Nm
 Door position Ref. page 7/18
 Rear segregation for front terminals
- 7 Rear segregation for rear terminals
- 8 Insulating protection
- 10 Isolating distance

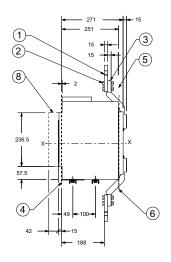
Dimensions

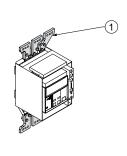
Withdrawable circuit-breaker - E1.2

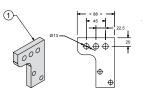
Front spread terminals - ES

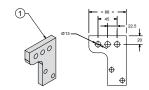
3-pole version

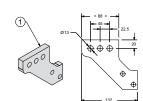






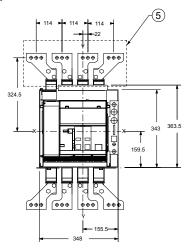


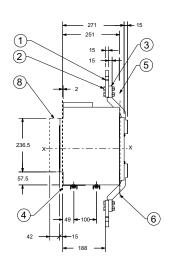


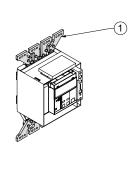


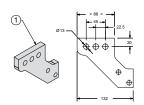


4-pole version

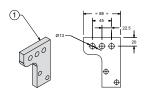


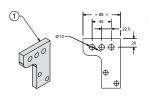


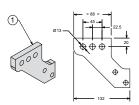










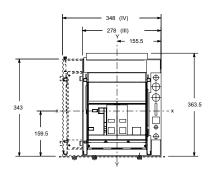


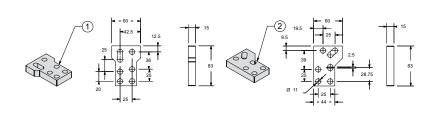


- Splayed terminal
- Tightening torque 40 Nm
- Front terminal

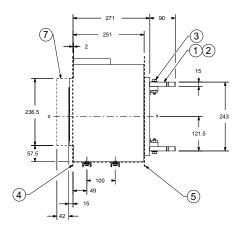
- 4 Door position Ref. page 7/185 Insulating protection (refer to front terminals page 7/21
- 6 Rear segregation for front terminals 8 Isolating distance

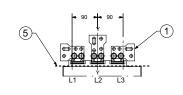
Horizontal rear spread terminals - SHR

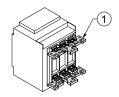




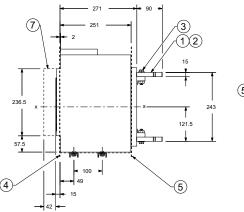
3-pole version

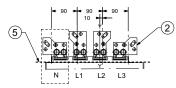


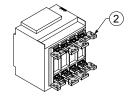




4-pole version







- 1 Splayed rear terminals for 3-pole version 2 Splayed rear terminals for 4-pole version 3 Tightening torque 18 Nm

- Door position Ref. page 7/18 Rear segregation of rear terminals
- Isolating distance

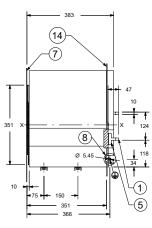
Dimensions

Withdrawable circuit-breaker - E2.2

Rear orientable terminals - HR/VR

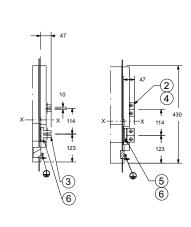
407 (IV) (13) (12)

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

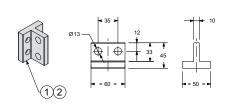


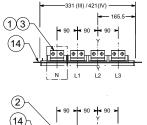
E2.2 N/S/H 2500A

(2) (4)

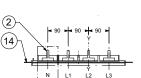


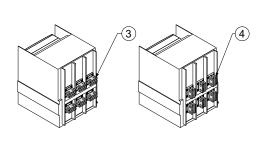
E2.2 B/N/S/H 2000A



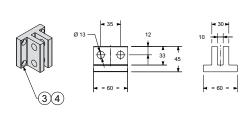


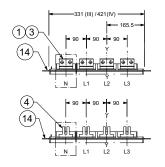
(14)

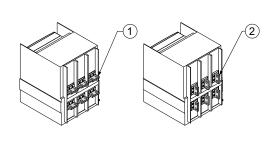




E2.2 N/S/H 2500A







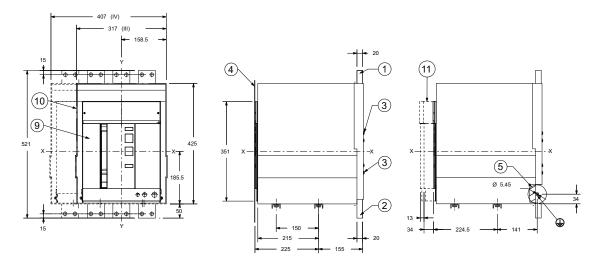
- Horizontal terminals 2000A
- Vertical terminals 2000A
- Horizontal terminals 2500A
- Vertical terminals 2500A

- Tightening torque 2000A 8.6Nm Tightening torque 2500A 8.6Nm Door position Ref. page 7/19

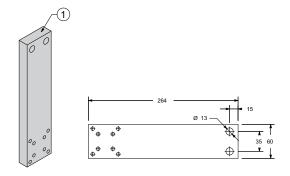
- Earthing device

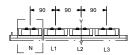
- 12 Mobile part
- 13 Fixed part
- 13 Fixed part
 14 Segregation (where envisaged)
 15 Distance from connected for testing to isolated

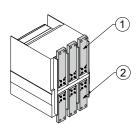
Front terminals - F



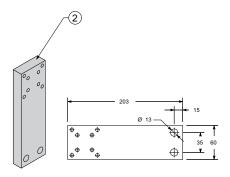
Upper front terminals







Lower front terminals



- Upper front terminals Lower front terminals
- Lower front terminalsTightening torque 8.6NmDoor position Ref. page 7/19

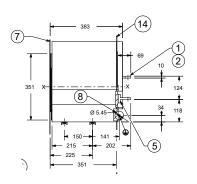
- 5 Earthing device
 9 Mobile part
 10 Fixed part
 11 Distance from connected for testing to isolated

Dimensions Withdrawable circuit-breaker - E2.2

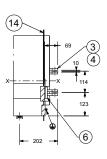
Horizontal rear spread terminals - SHR

(13)

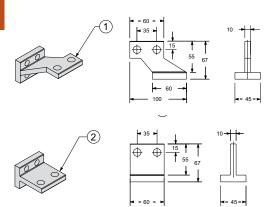
E2.2 B/N/S/H 2000A

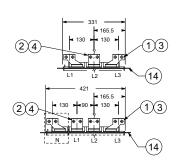


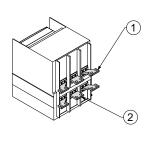
E2.2 N/S/H 2500A



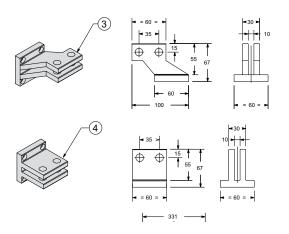
E2.2 B/N/S/H 2000A

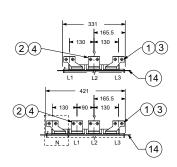


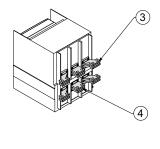




E2.2 N/S/H 2500A







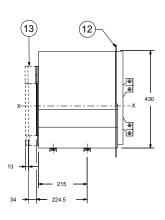
- Side horizontal splayed terminals 2000A
- Central horizontal splayed terminals 2000A
- Side horizontal splayed terminals 2500A
- Central horizontal splayed terminals 2500A
- Tightening torque 2000A 8.6Nm
- Tightening torque 2500A 8.6Nm Door position Ref. page 7/19
- 8 Earthing device

- 12 Mobile part
- 13 Fixed part
- 14 Segregation (where envisaged)

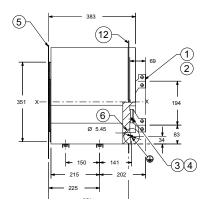
Vertical rear spread terminals - SVR

(10)

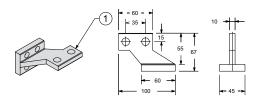
E2.2 B/N/S/H 2000A

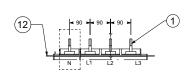


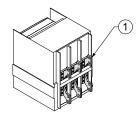
E2.2 N/S/H 2500A



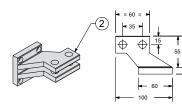
E2.2 B/N/S/H 2000A

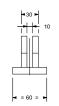


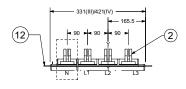


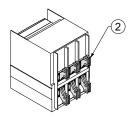


E2.2 N/S/H 2500A









- Vertical splayed terminals 2000A Vertical splayed terminals 2500A

- 3 Tightening torque 2000A 8.6Nm 4 Tightening torque 2500A 8.6Nm
- 5 Door position Ref. page 7/19
 6 Earthing device
 10 Mobile part
 11 Fixed part

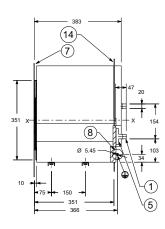
- 12 Segregation (where envisaged)13 Distance from connected for testing to isolated

Dimensions Withdrawable circuit-breaker - E4.2

Rear orientable terminals - HR/VR

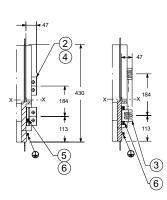
551 (IV) - 212.5 (13) (12

E4.2 N/S/H 3200A

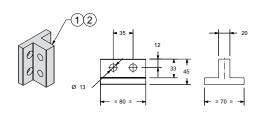


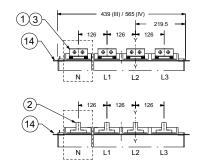
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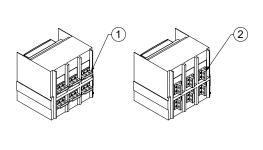
E4.2 N/S/H 4000A E4.2 V 2000...4000A



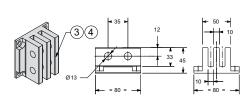
E4.2 N/S/H 3200A

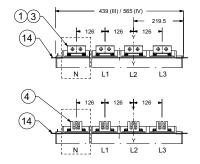


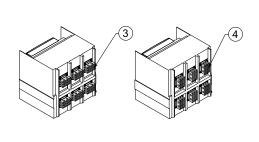




E4.2 N/S/H 4000A E4.2 V 2000...4000A







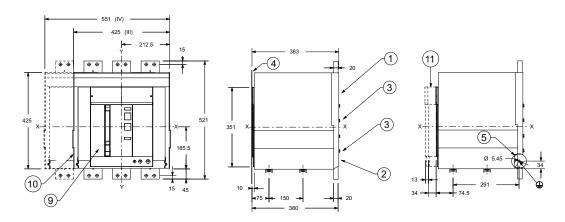
- Horizontal terminals 3200A
- Vertical terminals 3200A
- Horizontal terminals 4000A
- Vertical terminals 4000A

- Tightening torque 3200A 20Nm Tightening torque 4000A 20Nm Door position Ref. page 7/19

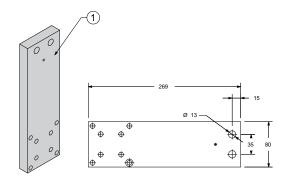
- 8 Earthing device

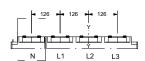
- 14 Segregation (where envisaged)
 15 Distance from connected for testing to isolated

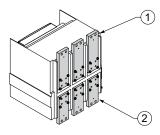
Front terminals - F



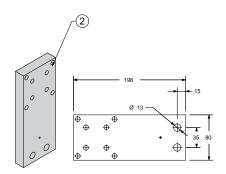
Upper front terminals







Lower front terminals



- 1 Upper front terminals
- 2 Lower front terminals
- 3 Tightening torque 20Nm

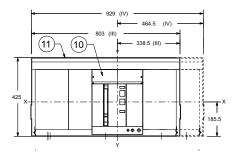
- Door position Ref. page 7/19 Earthing device
- Mobile part

- 10 Fixed part
- 11 Distance from connected for testing to isolated

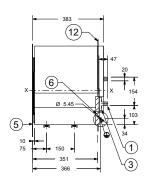
7

Dimensions Withdrawable circuit-breaker - E6.2

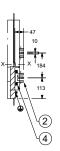
Horizontal rear terminals - HR



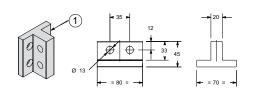
E6.2 H/V 5000A

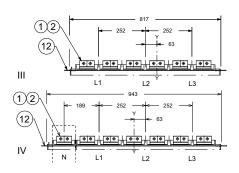


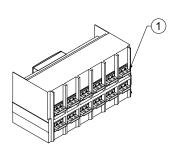
E6.2 H/V 6300A E6.2 X 5000...6300A



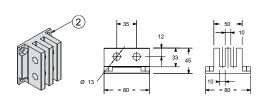
E6.2 H/V 5000A

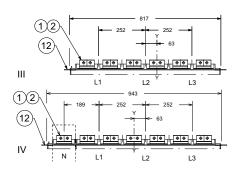


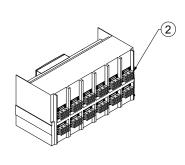




E6.2 H/V 6300A E6.2 X 5000...6300A







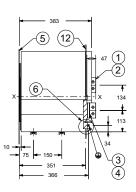
- 1 Horizontal terminals 5000A
- 2 Horizontal terminals 6300A
- 3 Tightening torque 5000A 20Nm
- 4 Tightening torque 6300A 20Nm
- 5 Door position Ref. page 7/19
- 6 Earthing device 10 Mobile part

- 11 Fixed part
- 12 Segregation (where envisaged)
- 13 Distance from connected for testing to isolated

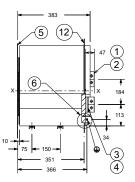
Vertical rear terminals - VR

(10) (11)

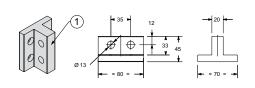
E6.2 H/V 5000A

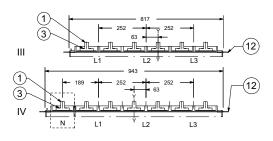


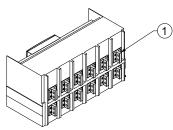
E6.2 H/V 6300A E6.2 X 5000...6300A



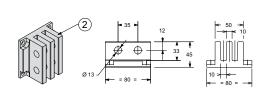
E6.2 H/V 5000A

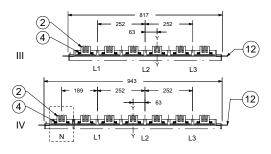


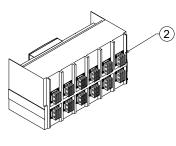




E6.2 H/V 6300A E6.2 X 5000...6300A







- Vertical terminals 5000A
- Vertical terminals 6300A
- Tightening torque 5000A 20Nm
 Tightening torque 6300A 20Nm
- Door position Ref. page 7/19
- Earthing device 10 Mobile part

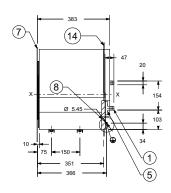
- 11 Fixed part
- 12 Segregation (where envisaged)
- 13 Distance from connected for testing to isolated

Dimensions Withdrawable circuit-breaker - E6.2

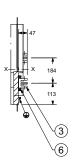
Rear orientable terminals - HR/VR full size

(12) 464.5 185.5

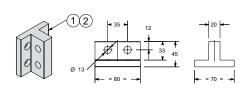
E6.2 H/V 5000A

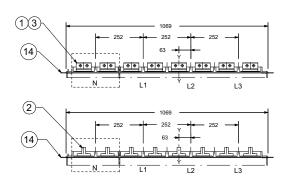


E6.2 H/V 6300A E6.2 X 5000...6300A

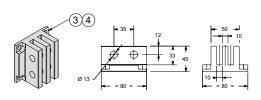


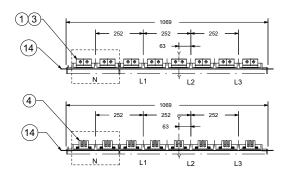
E6.2 H/V 5000A





E6.2 H/V 6300A E6.2 X 5000...6300A





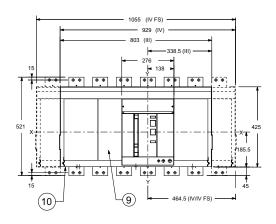
- Horizontal terminals 5000A
- Vertical terminals 5000A
- Horizontal terminals 6300A
- Vertical terminals 6300A

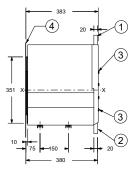
- Tightening torque 5000A 20Nm Tightening torque 6300A 20Nm Door position Ref. page 7/19

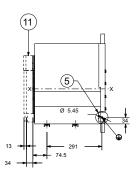
- 8 Earthing device

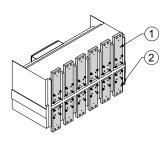
- 12 Mobile part
- 13 Fixed part
- 14 Segregation (where envisaged)

Front terminals - F

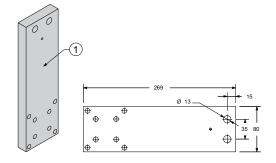




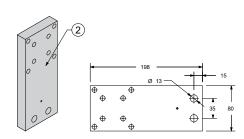


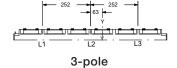


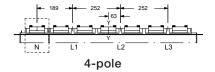
Upper front terminals

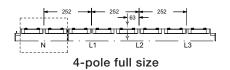


Lower front terminals









- 1 Upper front terminals
- 2 Lower front terminals3 Tightening torque 20Nm

- Door position Ref. page 7/19 Earthing device
- Mobile part

- 10 Fixed part11 Distance from connected for testing to isolated

Electrical diagrams

Reading information	
Circuit-breakers	8/2
ATS021 and ATS022	8/7
Power controller	8/8
Circuit-breakers	8/9
Terminal box E1.2	8/10
Terminal box E2.2 - E4.2 - E6.2	8/11
Electrical accessories	8/12
ATCOM and ATCOM	0/20

Electrical diagrams Reading information – Circuit-breakers

Operating state shown

The diagram is shown in the following conditions:

- withdrawable version circuit-breaker, open and racked-in
- with de-energized circuits
- trip units not tripped
- motor operator with unloaded springs.

Versions

The diagram shows a withdrawable version circuit-breaker, but it is also valid for fixed version circuit-breakers.

Fixed version

The control circuits are included between the XV terminals (the X connector is not supplied).

Withdrawable version

The control circuits are included between the poles of the X connector (the XV terminal box is not supplied).

Description of figures

- 1) Supplementary open/closed auxiliary contacts of the circuit-breaker (second set)
- 2) Ekip Signalling 4K
- 11) Trip signalling contact
- 12) Contact for signalling position of loaded springs
- 13) Motor for loading closing springs- M
- 14) Trip reset coil YR
- 20) Ekip Measuring/Measuring Pro with voltage socket inside the four pole circuit-breaker
- 21) Ekip Measuring/Measuring Pro with voltage sockets inside the three-pole circuit-breaker and connection for external neutral
- 22) Ekip Measuring Pro for residual voltage protection (for Ekip G only)
- 23) Ekip Measuring/Measuring Pro with external voltage socket
- 24) Rc residual current protection sensor input
- 25) Transformer star centre sensor input
- 26) Zone selectivity
- 27) Current sensor input on external neutral (only for 3-pole circuit-breakers)
- 31) Direct auxiliary supply 24V DC and local bus
- 32) Auxiliary supply through module 110-240V AC/DC or 24-48V DC and local bus
- 33) Ekip Fan 24V DC
- 41) Ekip signalling 2K-1
- 42) Ekip signalling 2K-2
- 43) Ekip signalling 2K-3
- 48) Ekip sinchrocheck
- 51) Ekip COM Modbus RS-485
- 52) Ekip COM Modbus TCP
- 53) Ekip COM Profibus
- 54) Ekip COM Profinet
- 55) Ekip COM DeviceNet
- 56) Ekip COM EtherNet IP
- 57) Ekip COM IEC61850
- 58) Ekip LINK
- 61) Ekip COM R Modbus RS-485 Redundant
- 62) Ekip COM R Modbus TCP Redundant
- 63) Ekip COM R Profibus Redundant

- 64) Ekip COM R Profinet Redundant
- 65) Ekip COM R DeviceNet Redundant
- 66) Ekip COM R EtherNet IP Redundant
- 71) Contact ready to close RTC
- 72) Second opening coil YO2
- 73) Undervoltage coil YU
- 74) Undervoltage coil with external time-lag device YU, D
- 75) First opening coil YO
- 76) First opening coil with control from protection trip unit YO, Ekip Com Actuator
- 77) First closing coil YC
- 78) First closing coil with control from protection trip unit YC, Ekip Com Actuator
- 79) Second closing coil YC2
- 81) Open/closed auxiliary contacts of circuit-breaker (first set)
- 91) External supplementary open/closed auxiliary contacts of circuit-breaker
- 95) Contacts for signalling circuit-breakers in racked-in, test, racked-out position
- 96) Contacts for signalling circuit-breakers in racked-in, test, racked-out position (first set)
- 97) Supplementary contacts for signalling circuit-breakers in racked-in, test, racked-out position (second set)
- 98) Circuit-breakers without auxiliary safety voltage
- 99) Circuit-breakers with auxiliary safety voltage in direct and alternating current
- 100) ATS021
- 101) ATS022
- 102) Third circuit-breaker controlling with ATS022
- 103) Ekip Signalling 10K
- 104) Ekip Multimeter
- 105) Application diagram for Ekip Touch, Hi-Touch, G Touch, G Hi-Touch with Power Controller function.

Electrical diagrams Reading information - Circuit-breakers

Key

= See the note indicated by the letter

Α1 = Applications located on the mobile part of the circuit-breaker АЗ = Applications located on the fixed part of the circuit-breaker

= Indicative devices and connections for control and signalling, outside the circuit-breaker A4

BUS1 = Serial interface with external bus

D = Electronic time-lag device of YU undervoltage coil, outside the circuit-breaker

F1 = Time-delayed trip fuse

= Zone selectivity input for G protection or input in "reverse" direction for D protection GZi(DBi) GZo(DBo) = Zone selectivity output for G protection or output in "reverse" direction for D protection

= Programmable digital inputs of the EKIP protection trip unit I O1...32

K51 = Electronic overcurrent protection trip unit of the types: EKIP DIP, EKIP TOUCH, EKIP LCD,

EKIP HI-TOUCH, EKIP HI-LCD, EKIP G TOUCH, EKIP G LCD, EKIP G HI-TOUCH, EKIP G HI-LCD

K51/COM = Communication module K51/FAN = Ventilation supply module = Measurement module K51/MEAS K51/SIGN = Signalling module

K51/SUPPLY = Optional auxiliary supply module (110-220VAC/DC and 24-48VDC)

K51/SYNC = Synchronization module

K51/YC = Closing control from the EKIP protection trip unit K51/YO = Opening control from the EKIP protection trip unit

M = Motor for loading closing springs

M2 = Motor for fans

O 01...32 = Programmable signalling contacts of the EKIP protection trip unit

O SC = EKIP protection trip unit contact for synchronism control

= Circuit-breaker

Q/1...Q/25 = Auxiliary contacts of circuit-breaker

Q/26...Q/27 = Auxiliary open/close contacts used internally by the trip unit

RC = RC (residual current) protection sensor

RT1...RT3 = Temperature sensors

RTC EKIP = Auxiliary ready to close contact of circuit-breaker, used internally by the trip unit

RTC = Contact for signalling circuit-breaker is ready to close

S33M/1...2 = Limit contacts of spring loading motor S43 = Switch for presetting remote/local control

= Trip signalling contact S51

S75E/1...4 = Contacts for signalling circuit-breaker in racked-out position (provided only with withdrawable version) = Contacts for signalling circuit-breaker in racked-in position (provided only with withdrawable version) S75I/1...5

S75T/1...2 = Contact for signalling circuit-breaker in test position (provided only with withdrawable version)

SC = Pushbutton or contact for closing the circuit-breaker

SO = Pushbutton or contact for immediate opening of the circuit-breaker

SO1 = Pushbutton or contact for opening the circuit-breaker with time-delayed trip

SR = Pushbutton or contact for electrical resetting of S51trip contact

= Input for zone selectivity for S protection or input in "direct" direction for S protection SZi(DFi) SZo(DFo) = Output for zone selectivity for S protection or output in "direct" direction for D protection

TI/L1 = Current transformer phase L1 TI/L2 = Current transformer phase L2 TI/L3 = Current transformer phase L3 = Current transformer on neutral TI/N

TU1...TU2 = Insulation voltage transformer (outside circuit-breaker) Uaux = Auxiliary supply voltage UI/L1 = Current sensor phase L1 UI/L2 = Current sensor phase L2 UI/L3 = Current sensor on phase L3 UI/N = Current sensor on neutral UI/O = Single-pole current sensor

W2 = Serial interface with internal bus (local bus) W9...W13 = RJ45 connector for communication modules

W9R.W11R = RJ45 connector for redundant communication modules

= Delivery connector for auxiliary circuits for withdrawable version of circuit-breaker Χ

XB1...XB7 = Connectors for circuit-breaker applications

XF = Delivery terminal board for position contacts of withdrawable version of circuit-breaker

XF1...XF2 = Contact of the EKIP protection trip unit for activating fans XK1...XK3 = Connectors for auxiliary circuits of the EKIP protection trip unit XK7 = Connector for auxiliary circuits of communication module

XV= Delivery terminal box for auxiliary circuits of fixed version circuit-breaker

YC = Closing coil

YC2 = Second closing coil

YO = Opening coil

YO1 = Opening coil for overcurrent

YO2 = Second opening coil

= Coil for electrical resetting of trip contact S51 YR

YU = Undervoltage coil

Electrical diagrams Reading information - Circuit-breakers

Notes

- A) Auxiliary supply for Ekip trip unit is mandatory (refer to diagram 1SDM00009R0001 figures 31 32 33 34).
- C) Always supplied with Ekip Com module.
- D) Always supplied with motor for loading closing springs in Fig. 13.
- E) Obligatory voltage transformer in the case of external sockets. Obligatory external sockets for systems with rated voltage greater than 690V.
- F) The connections between the RC residual current protection sensor and the poles of the X connector (or XV) of the circuitbreaker must be made with 4-pole shielded cable with conductors interwoven in pairs (type BELDEN 9696 paired or equivalent), of a length no greater than 10 m. The shield should be earthed on circuit-breaker side.
- G) With all electronic protection trip units equipped with display interface with LSIG protections, protection against an earth fault is available (Gext) by means of current sensor positioned on the star centre of the MV/LV transformer. The connection between terminals 1 and 2 of the UI/O current transformer and Ge+ and Ge- poles of the X connector (or XV) must be made with shielded and stranded 2-pole cable (type BELDEN 8762/8772 or equivalent) of length no greater than a 15 m. The shield should be earthed on the circuit-breaker side and current sensor side.
- H) The connection between the terminal box and external neutral sensor must be made with the 2m cable provided. The Ne+ and Ne-poles of the X connector (or XV) must be short-circuited if no sensor is present on the external neutral conductor.
- Obligatory in the case of the presence of any Ekip module.
- J) Only for E2.2, E4.2 and E6.2 withdrawable version circuit-breakers as an alternative to Fig. 31-32-34. N.B.: Ekip Fan 24VDC occupies in the terminal box the space of the Ekip Supply and one slot Module.
- K) Only for E2.2, E4.2 and E6.2 withdrawable version circuit-breakers as an alternative to Fig. 31-32-33.
- K) Only for E2.2, E4.2 and E6.2 withdrawable version circuit-breakers as an alternative to Fig. 31-32-33. N.B.: Ekip Fan 220VAC occupies in the terminal box the space of the Ekip Supply and two slot Modules.
- L) In the presence of Fig. 32, for E2.2, E4.2 and E6.2 circuit-breakers up to three applications between Fig. 41...58 taken only once can be supplied, instead for E1.2 circuit-breakers, up to two applications between Fig. 41...58 taken only once can be supplied. The Ekip Com module selected can be duplicated if required, by choosing between Fig. 61...66.
- M) In the presence of Fig. 33, for E2.2, E4.2 and E6.2 circuit-breakers, up to two applications between Fig. 41...58 taken only once can be supplied. The Ekip Com module selected can be duplicated if required, by choosing between Fig. 61...66.
- N) In the presence of Fig. 34, for E2.2, E4.2 and E6.2 circuit-breakers, a single application between Fig. 41...58 can be supplied.
- O) In the presence of several Ekip Com modules with withdrawable version circuit-breakers, the contact S75I/5 should be connected only once to a single module.
- P) The auxiliary voltage Uaux. enables activation of all the functions of the EKIP electronic protection trip units. Since an earth insulated Uaux was requested, it is necessary to use "galvanically separated convertors" which comply with the standards IEC 60950 (UL 1950) or equivalent, which guarantee a common mode current or leakage current (refer to IEC 478/1, CEI 22/3) no greater than 3.5mA, IEC 60364-41 and CEI 64-8.
- Q) Regarding local bus the maximum cable length is 15m.

Electrical diagrams Reading information - ATS021 and ATS022

Operating state shown

The diagram is shown in the following conditions:

- circuit-breakers open and racked-in #
- with de-energized circuits
- trip units not tripped *
- unloaded closing springs.

Key

= ATS021 and ATS022 devices for automatic switching of two circuit-breakers

CB1-N Normal supply line circuit-breaker CB2-E = Emergency supply line circuit-breaker

= Auxiliary contactor type NF22E for voltage presence of normal power supply K1 K2 = Auxiliary contactor type NF22E for voltage presence of emergency power supply

KC1-KC2 = Auxiliary contactors type AL___-30 for the closing of the circuit-breakers KO1-KO2 = Auxiliary contactors type AL__-30 for the opening of the circuit-breakers

= Motor for loading the closing springs Q/1 = Auxiliary contact of the circuit-breaker

 Ω 60 = Thermal relay for isolating and protecting the auxiliary circuits of safety auxiliary voltage

Q61/1-2 = Thermal relays for isolating and protecting the auxiliary circuits of the lines

= Contact for enabling automatic switching of the ATS021 device

S11...S15 = Signalling contacts for the inputs of the ATS022 device S1-S2 = Contacts controlled by the cam of the motor operator

S3 = Changeover contact for electrical signalling of local/remote selector state

S33M/1 = Limit contacts of spring loading motor

= Contact for electrical signalling of circuit-breaker open due to tripping of overcurrent trip unit

S75I/1 = Contact for signalling circuit-breaker racked-in #

BUS 1 = Serial interface with control system (MODBUS EIA RS485 interface) available with the device ATS022

Χ = Connector for auxiliary circuits of withdrawable version circuit-breakers XF = Delivery terminal box for the position contacts of the circuit-breaker

XV= Delivery terminal box for the auxiliary circuits of the fixed version circuit-breakers

YC = Shunt closing release YO = Shunt opening release

- This diagram shows the withdrawable version circuit-breakers, but it is also valid for the fixed version circuit-breakers. In this case, it is not necessary to connect the S75I/1 contacts on the X31:1 input of the ATS021 device otherwise it is necessary to connect the X32:5 and X32:6 terminals with the terminal X32:9 of the ATS022 device.
- This diagram shows circuit-breakers with overcurrent release but it is also valid for circuit-breakers without release (switchdisconnectors). If the S51 contact is not present, the S51 contacts on the X31:1 input of the ATS021 device should not be considered, while it is necessary to connect the X32:7 and X32:8 terminals with the X32:9 terminal of the ATS022 device.

Electrical diagrams Reading information - Power Controller

Operating state shown

The diagram is shown in the following conditions:

- circuit-breaker, open and racked-in #
- with de-energized circuits
- trip units not tripped *
- motor operator with unloaded springs.

Key

A13 = EKIP SIGNALLING 10K unit

= MOE actuator unit for stored energy operating mechanism for the Tmax XT circuit-breaker A17

A21 = EtherNet Switch device = Time-delayed trip fuse

I 01 ... 12 = Programmable digital inputs of the EKIP protection trip unit

J .. = Connectors for auxiliary circuits of the Tmax XT circuit-breaker in the withdrawable version K51 = Electronic overcurrent protection trip unit type EKIP for EMAX 2 circuit-breaker type

K51/COM = Communication module for the EKIP trip unit

K51/SIGN = Signalling module for EKIP trip unit

K51/SUPPLY = Optional auxiliary supply module for the EKIP trip unit K51/YC = Closing control from the EKIP protection trip unit K51/YO = Opening control from the EKIP protection trip unit

Μ = Motor for loading closing springs for EMAX 2 circuit-breaker type

= Motor for opening the circuit-breaker and for loading closing springs for TMAX XT circuit-breaker type M

0 01 ... 12 = Programmable signalling contacts of the EKIP protection trip unit

Q/1= Auxiliary contacts of circuit-breaker

Ω1 = Emax 2 circuit-breaker equipped with EKIP POWER CONTROLLER

Q2 = Emax 2 circuit-breaker

Q3 = Tmax XT circuit-breaker equipped with MOE actuator unit

= Emax 2 MS switch-disconnector Q4

R1 = Resistor

S33M/1 = Limit contacts of spring loading motor

S51 = Trip signalling contact

= Contacts for signalling Emax 2 circuit-breaker in racked-in position (provided only for withdrawable version) S75I/5

W13 = RJ45 connector for communication modules

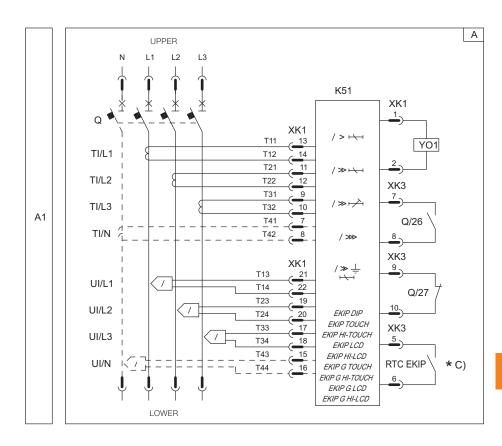
Χ = Delivery connector for auxiliary circuits for withdrawable version of Emax 2 circuit-breaker

XV= Delivery terminal box for auxiliary circuits of fixed version circuit-breaker

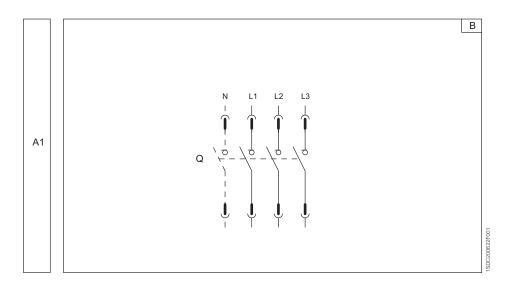
YC = Closing coil YO = Opening coil

Electrical diagrams Circuit-breakers

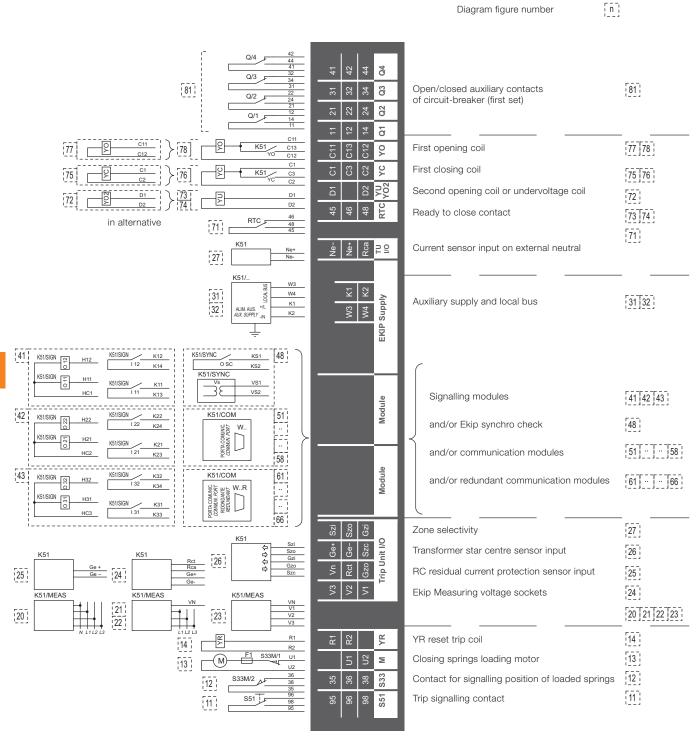
3-pole or 4-pole circuit-breaker



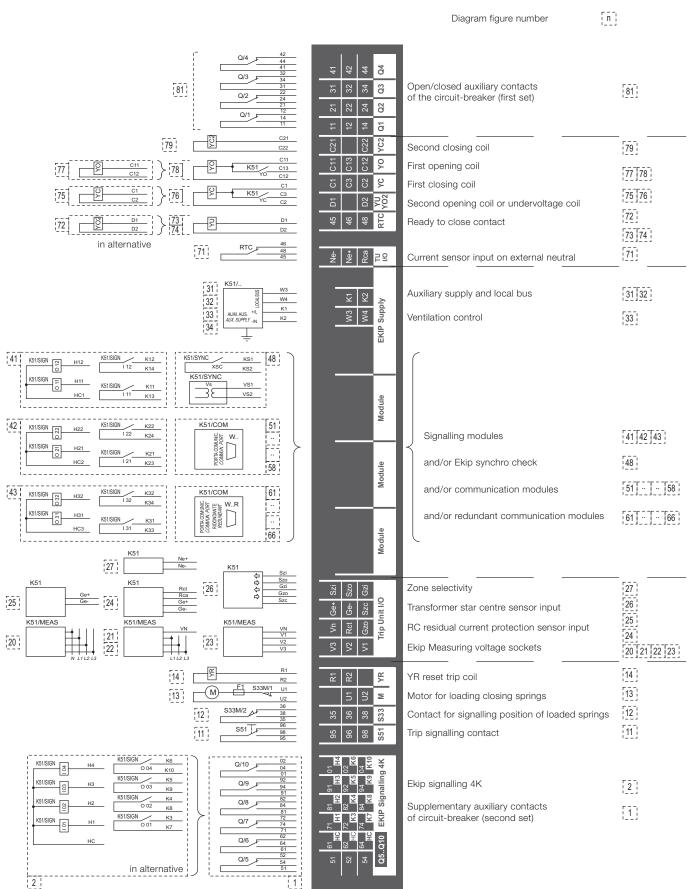
3-pole or 4-pole switch-disconnector

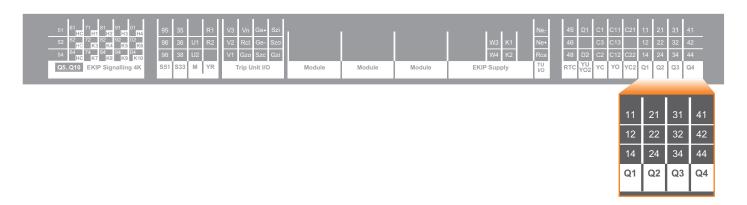


Electrical diagrams Terminal box E1.2

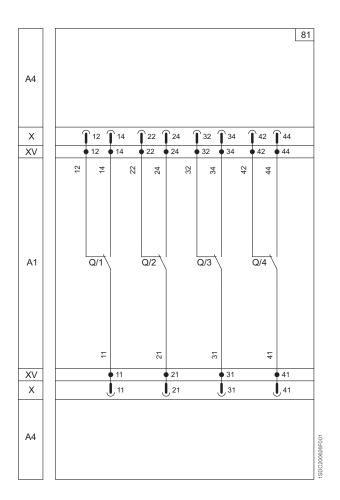


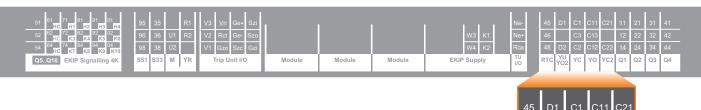
Electrical diagrams Terminal box E2.2 - E4.2 - E6.2





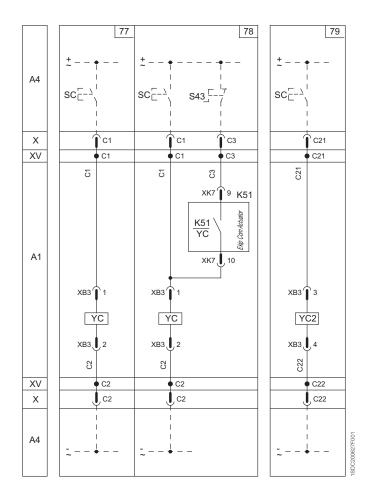
81) Open/closed auxiliary contacts of circuit-breaker (first set)



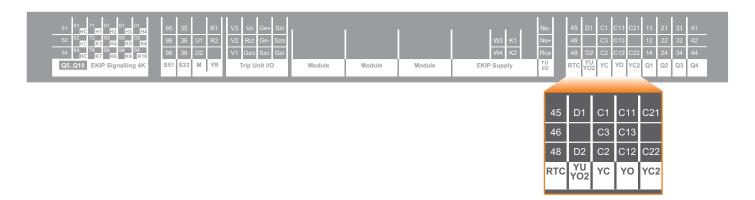




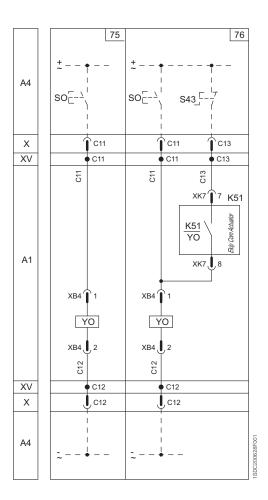
- 77) First closing coil YC
- 78) First closing coil with control from protection trip unit YC, Ekip Com Actuator
- 79) Second closing coil YC2

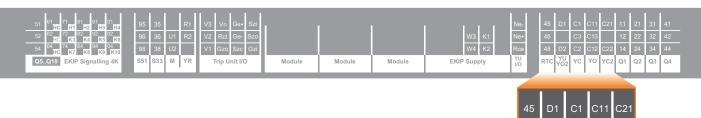


77-78 as an alternative to each other 79 valid only for E2.2 - E4.2 - E6.2



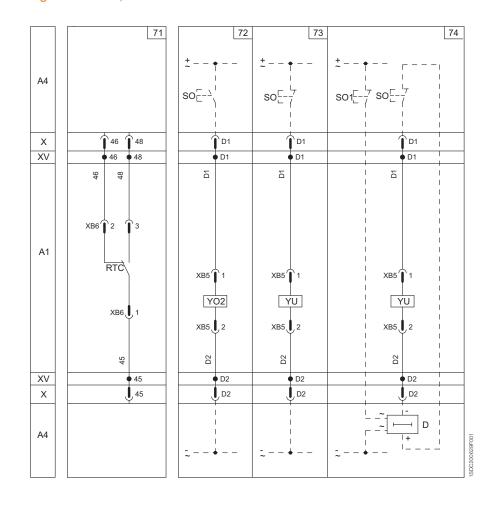
- 75) First opening coil YO
- 76) First opening coil with control from protection trip unit YO, Ekip Com Actuator

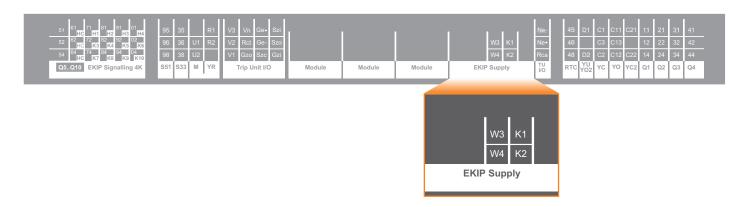




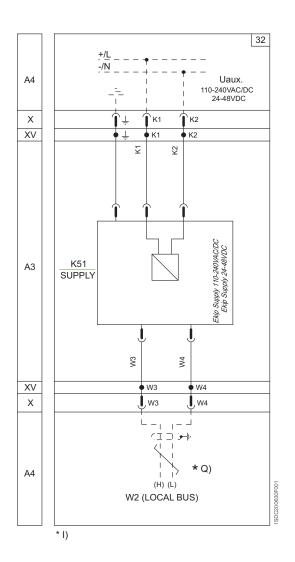


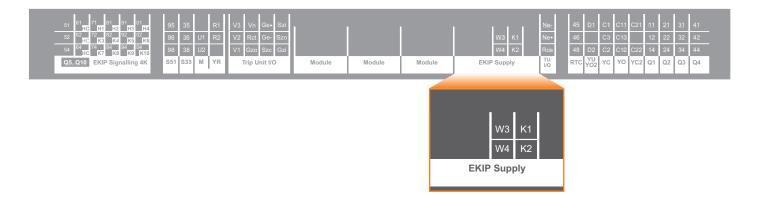
- 71) Contact ready to close RTC
- 72) Second opening coil YO2
- 73) Undervoltage coil YU
- 74) Undervoltage coil with external time-lag device YU, D



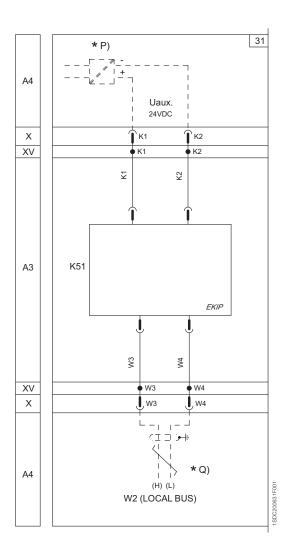


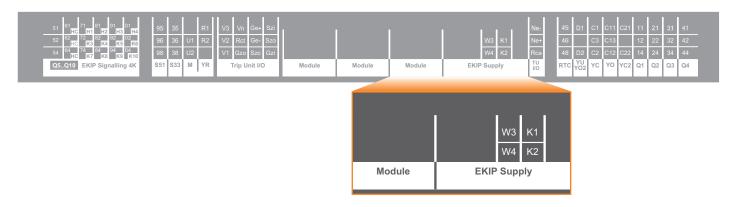
32) Auxiliary supply through module 110-240V AC/DC or 24-48V DC and local bus



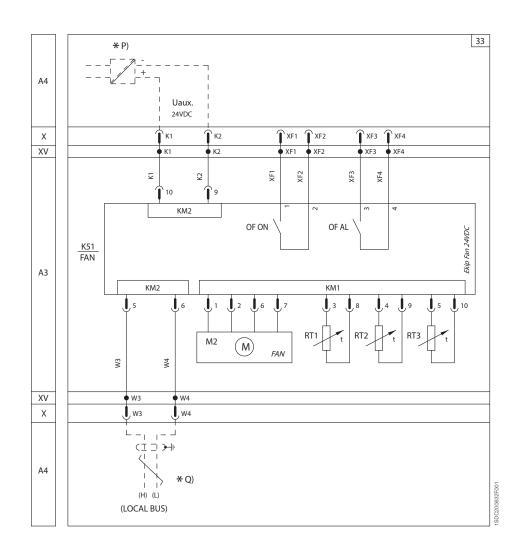


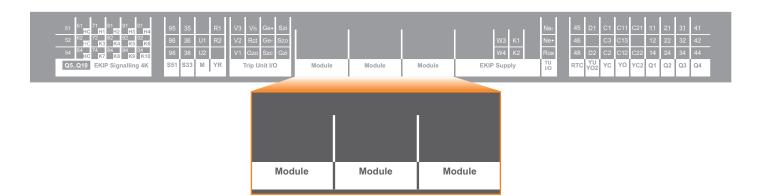
31) Direct auxiliary supply 24V DC and local bus



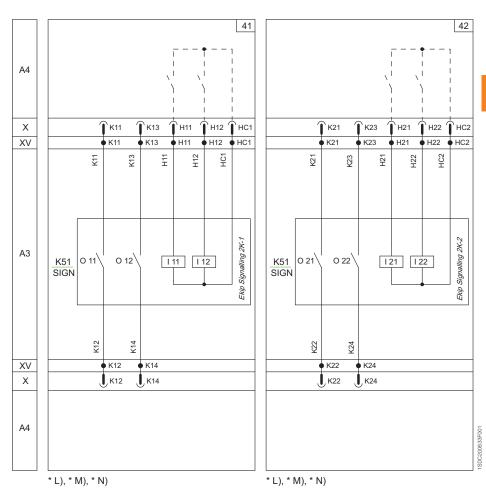


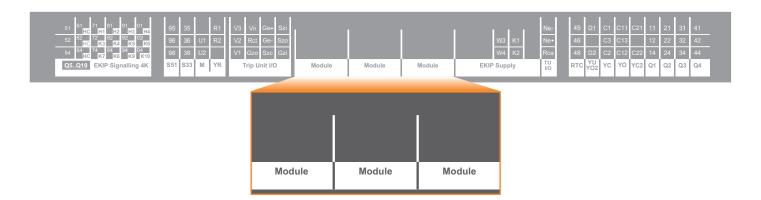
33) Ekip Fan 24V DC



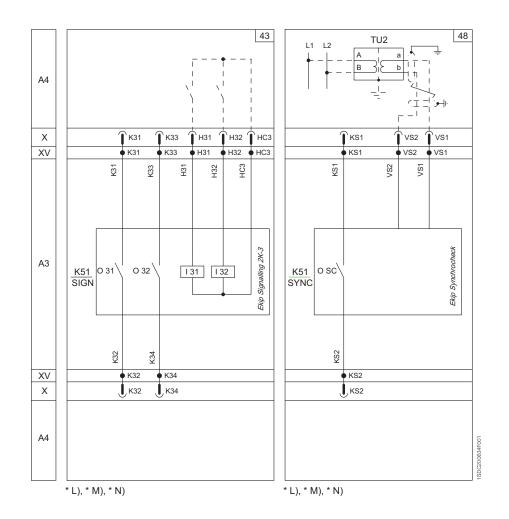


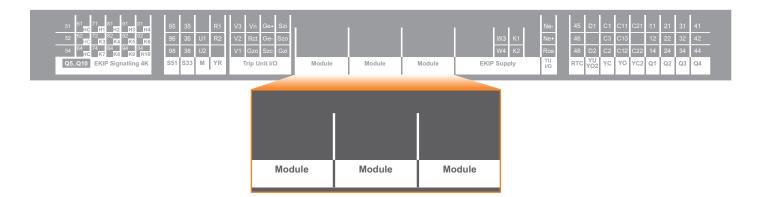
- 41) Ekip signalling 2K-1
- 42) Ekip signalling 2K-2



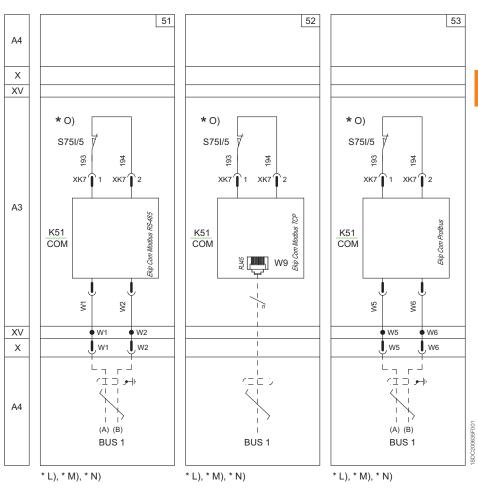


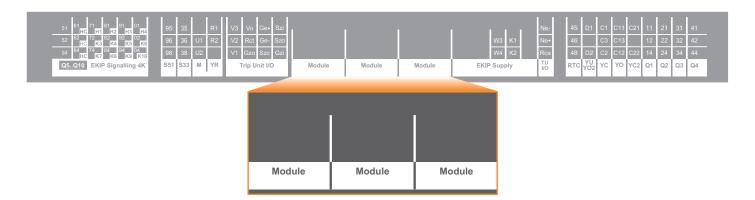
- 43) Ekip signalling 2K-3
- 48) Ekip sinchrocheck



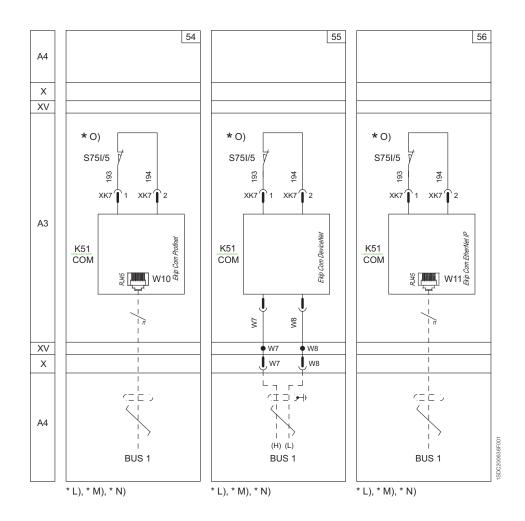


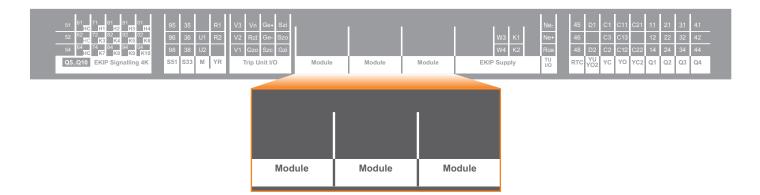
- 51) Ekip COM Modbus RS-485
- 52) Ekip COM Modbus TCP
- 53) Ekip COM Profibus





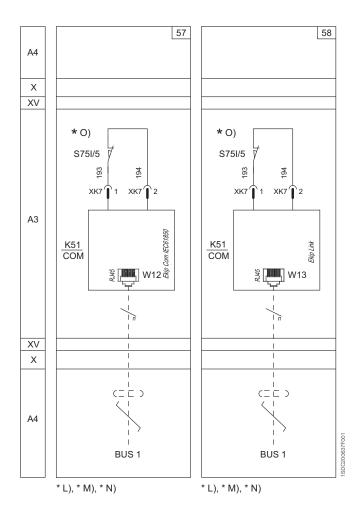
- 54) Ekip COM Profinet
- 55) Ekip COM DeviceNet
- 56) Ekip COM EtherNet IP

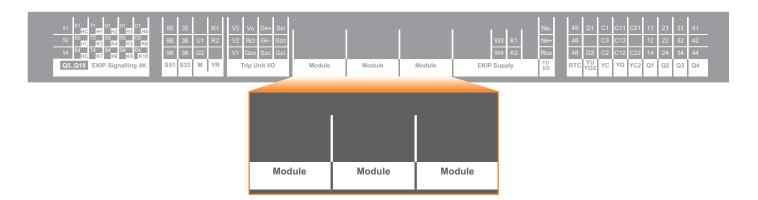




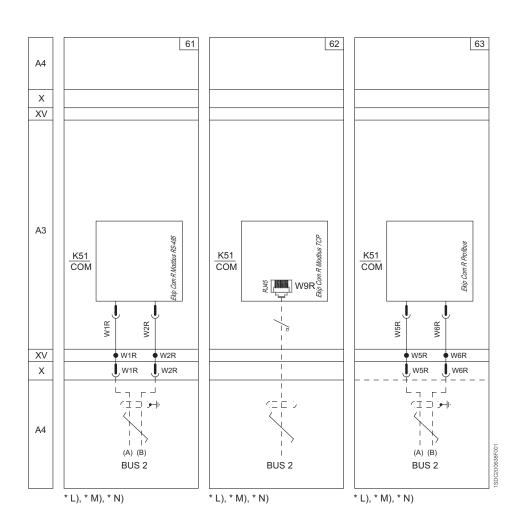
57) Ekip COM IEC61850

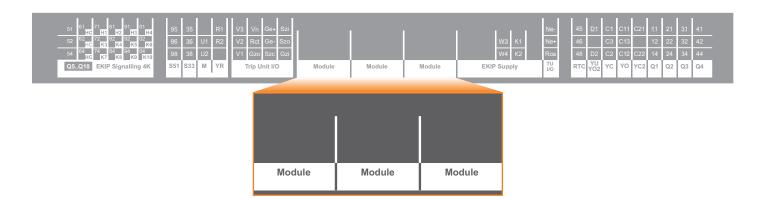
58) Ekip LINK



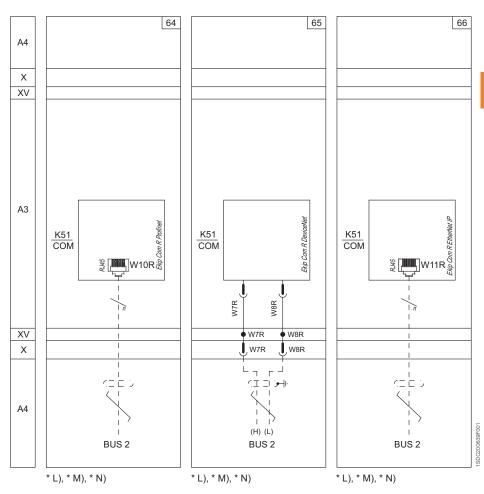


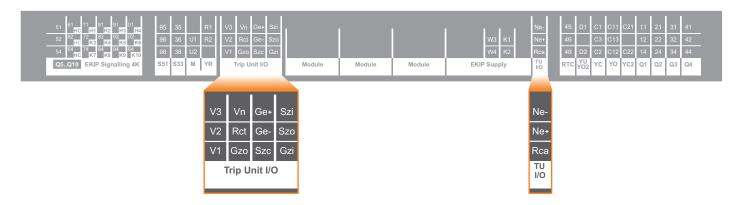
- 61) Ekip COM R Modbus RS-485 Redundant
- 62) Ekip COM R Modbus TCP Redundant
- 63) Ekip COM R Profibus Redundant



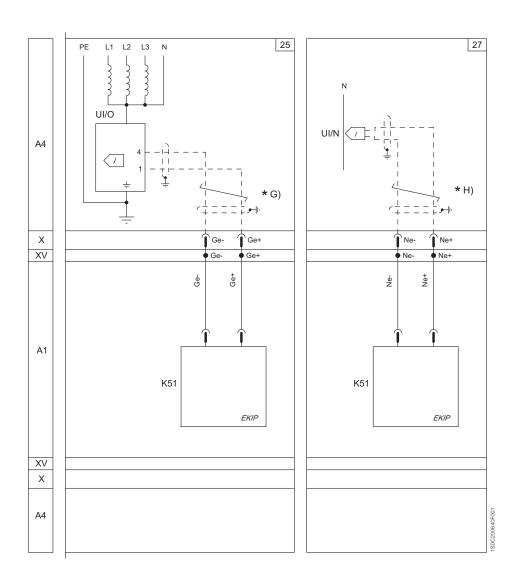


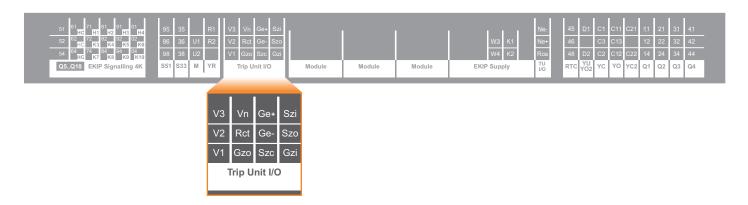
- 64) Ekip COM R Profinet Redundant
- 65) Ekip COM R DeviceNet Redundant
- 66) Ekip COM R EtherNet IP Redundant



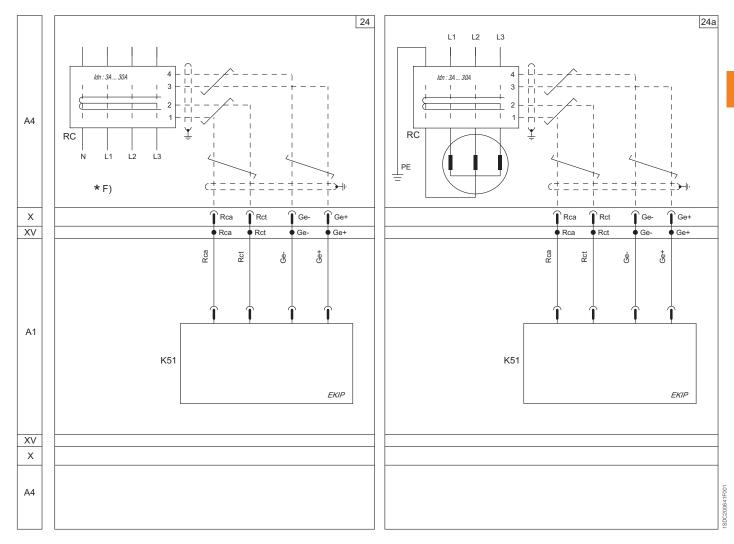


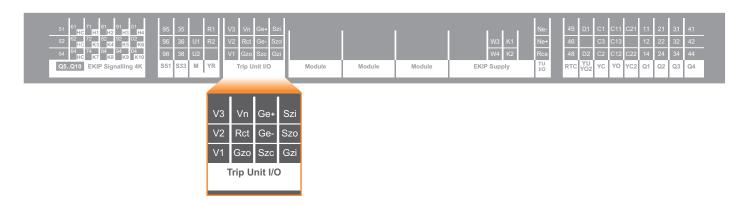
- 25) Transformer star centre sensor input
- 27) Current sensor input on external neutral (only for 3-pole circuit-breakers)



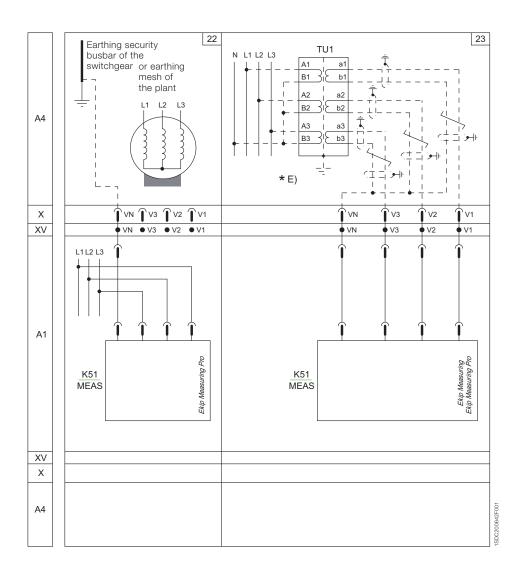


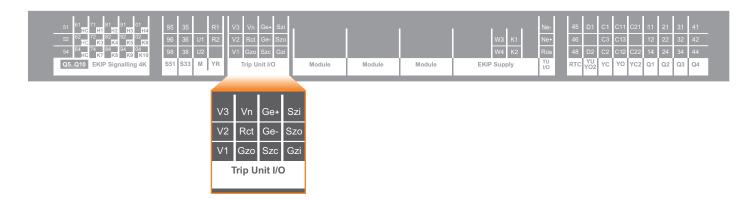
24) Rc residual current protection sensor input (ANSI 64 & 50NTD) 24a) Rc differential ground fault protection (ANSI 87N)



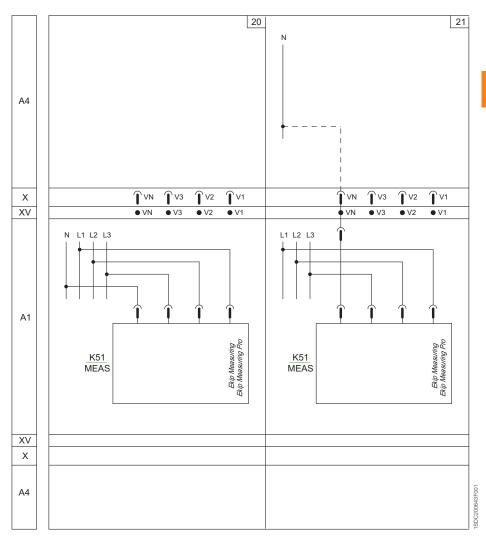


- 22) Ekip Measuring Pro for residual voltage protection (for Ekip G only)
- 23) Ekip Measuring/Measuring Pro with external voltage socket

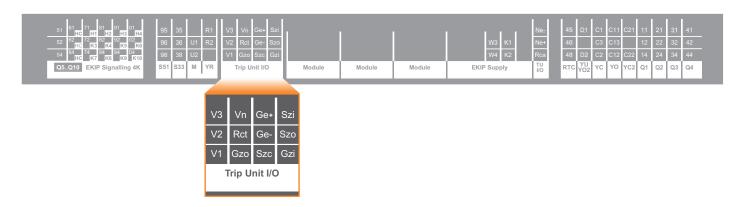




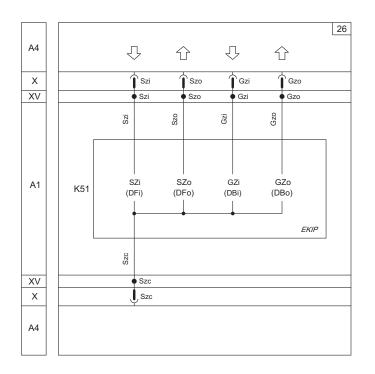
- 20) Ekip Measuring/Measuring Pro with voltage socket inside the four pole circuit-breaker
- 21) Ekip Measuring/Measuring Pro with voltage sockets inside the three-pole circuit-breaker and connection to the external neutral



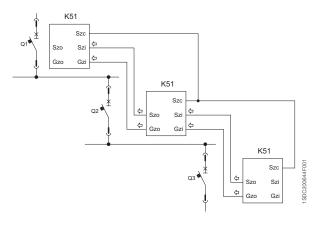
As an alternative to each other or to 22-23 diagram

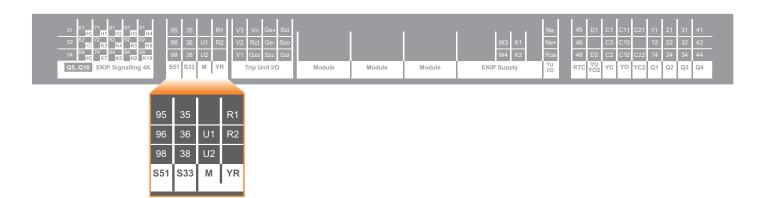


26) Zone selectivity

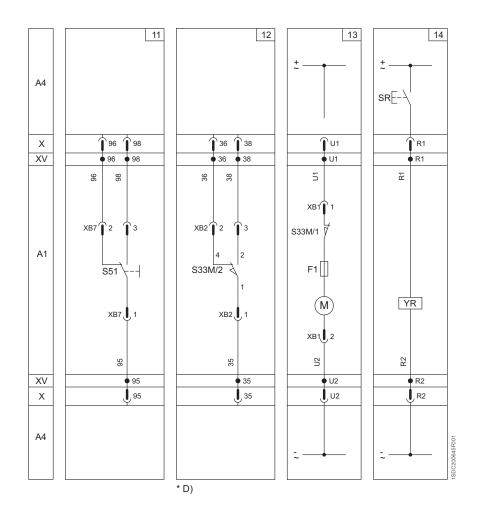


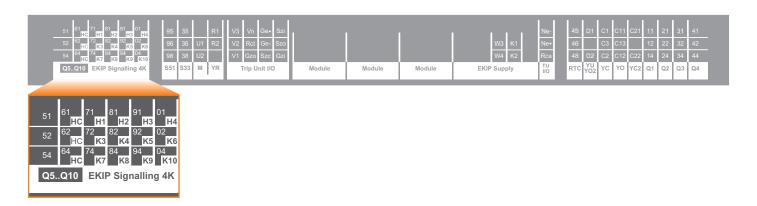
Example for application diagram (among 3 circuit-breakers)



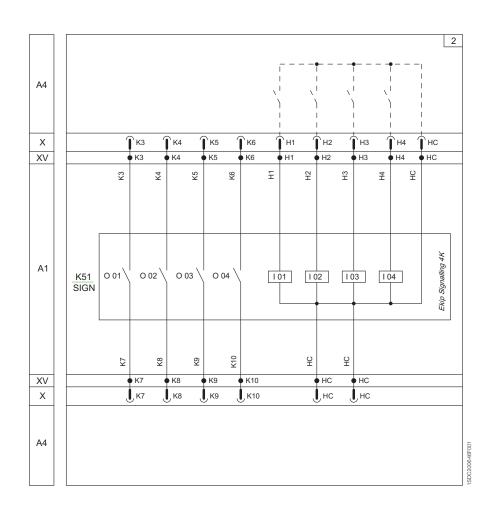


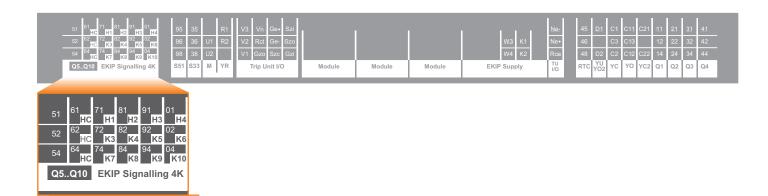
- 11) Trip signalling contact S51
- 12) Contact for signalling position of loaded springs S33
- 13) Motor for loading closing springs M
- 14) Trip contact reset coil YR



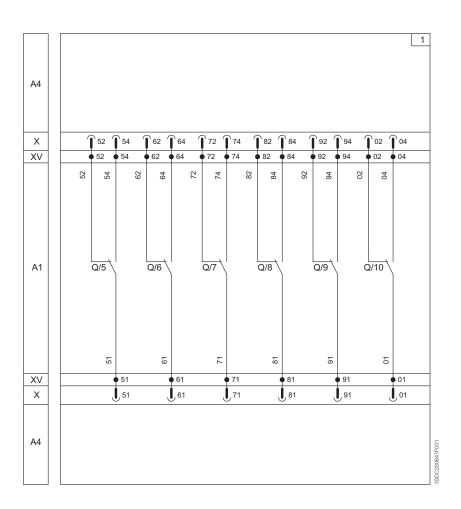


2) Ekip Signalling 4K

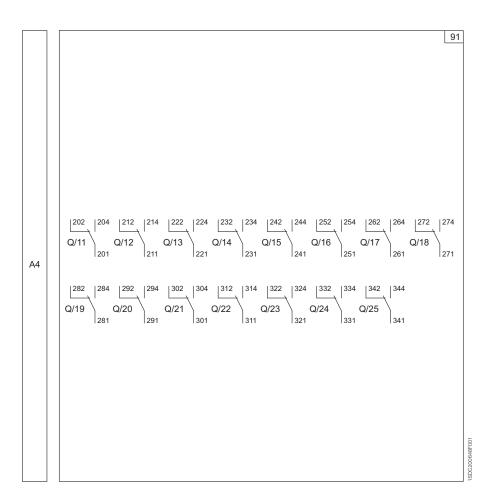




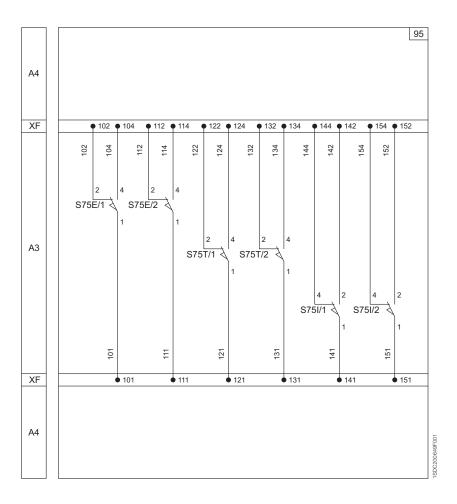
1) Supplementary open/closed auxiliary contacts of the circuit-breaker (second set)



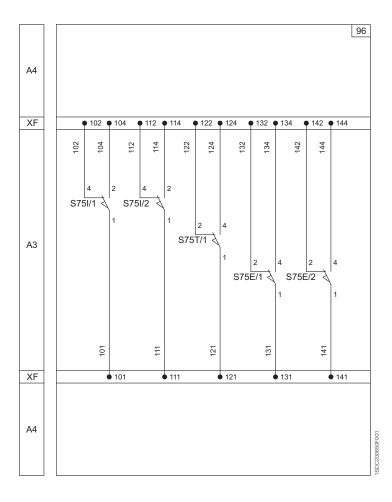
91) Supplementary open/closed auxiliary contacts outside the circuit-breaker



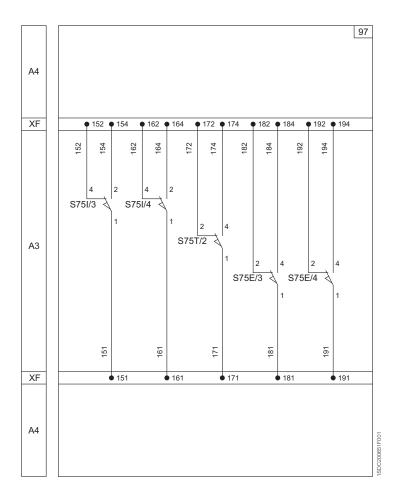
95) Contacts for signalling circuit-breakers in racked-in, test, racked-out position



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

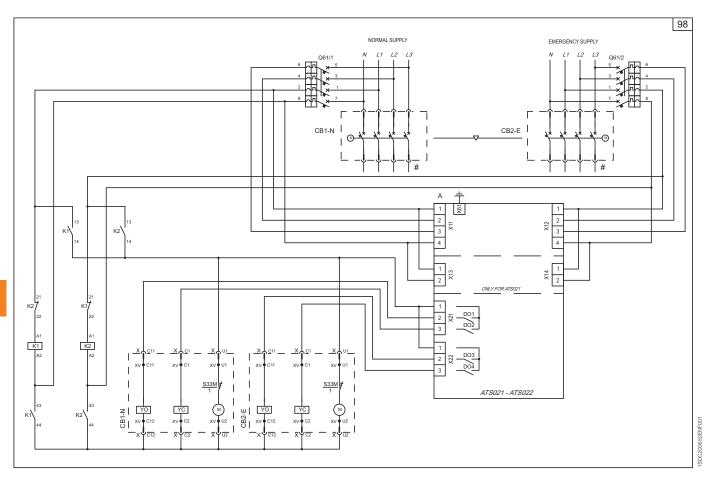


97) Supplementary contacts for signalling circuit-breakers in racked-in, test, racked-out position (second set)

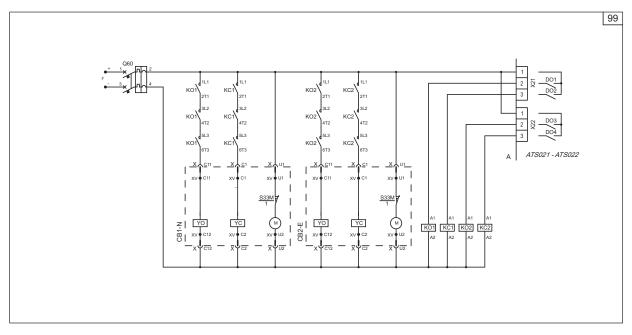


Electrical diagrams ATS021 and ATS022

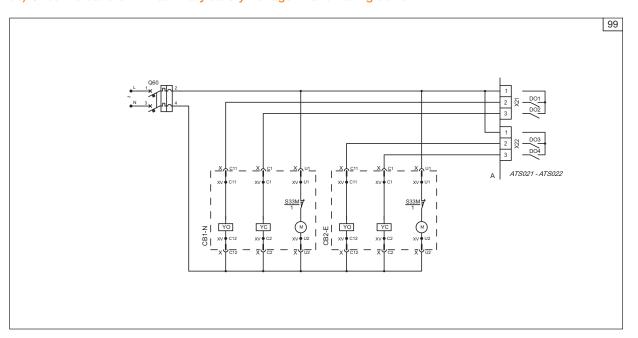
98) Circuit-breakers without auxiliary safety voltage



99) Circuit-breakers with auxiliary safety voltage in direct current

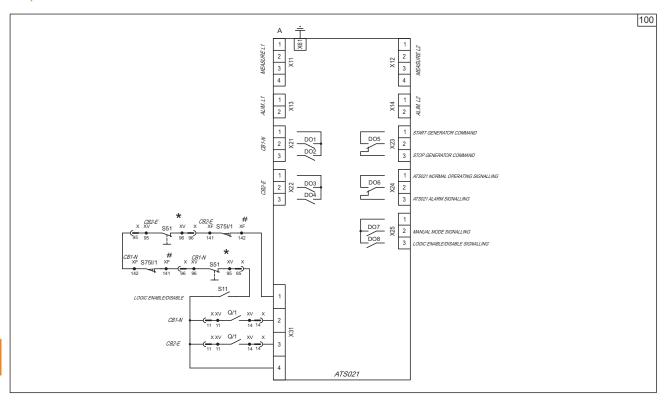


99) Circuit-breakers with auxiliary safety voltage in alternating current

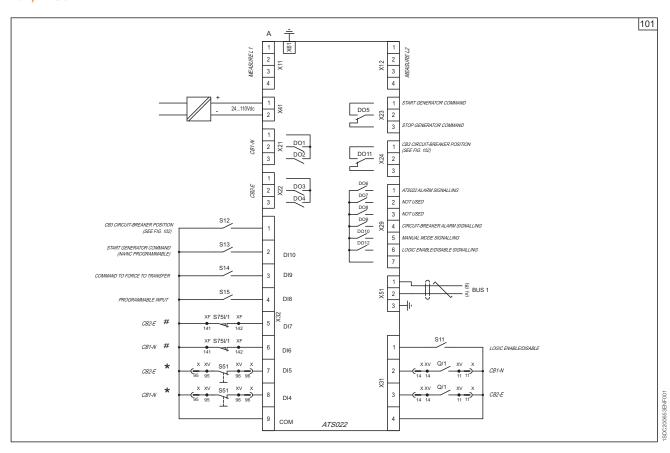


Electrical diagrams ATS021 and ATS022

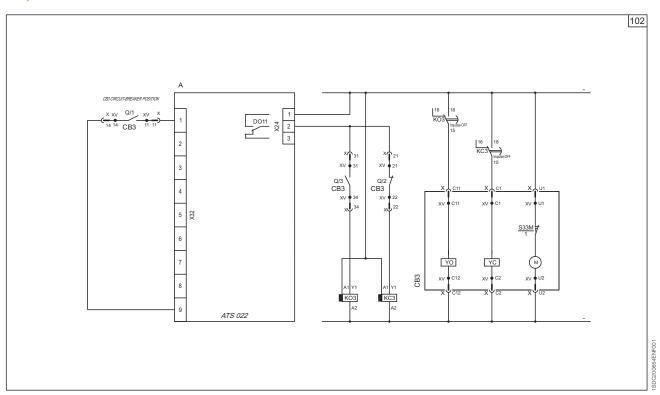
100) ATS021



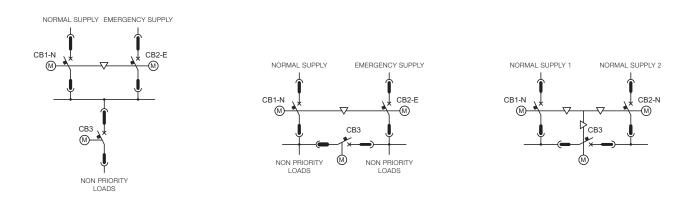
101) ATS022



102) Third circuit-breaker control with ATS022



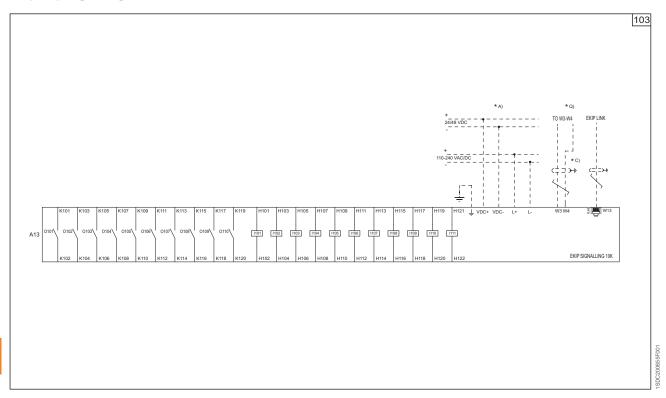
Possible configurations - ATS022 with three circuit-breakers



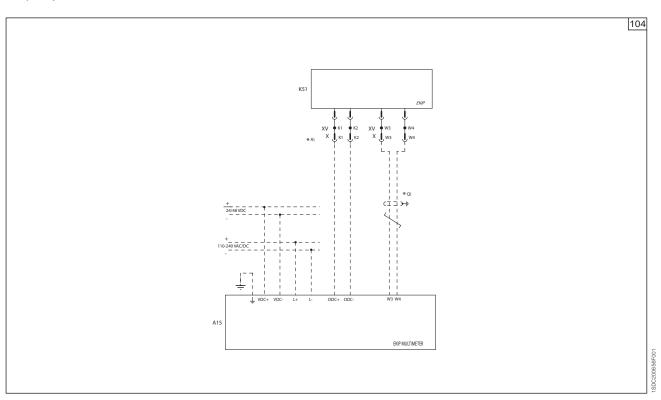
Note: Use auxiliary voltage of 110-130V AC or 220-240V AC.

Electrical diagrams Power Controller

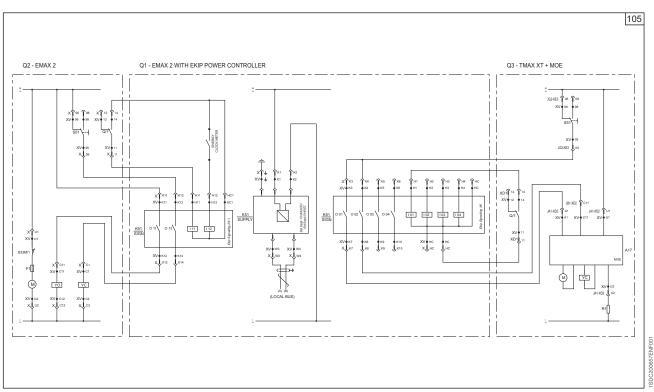
103) Ekip Signalling 10K

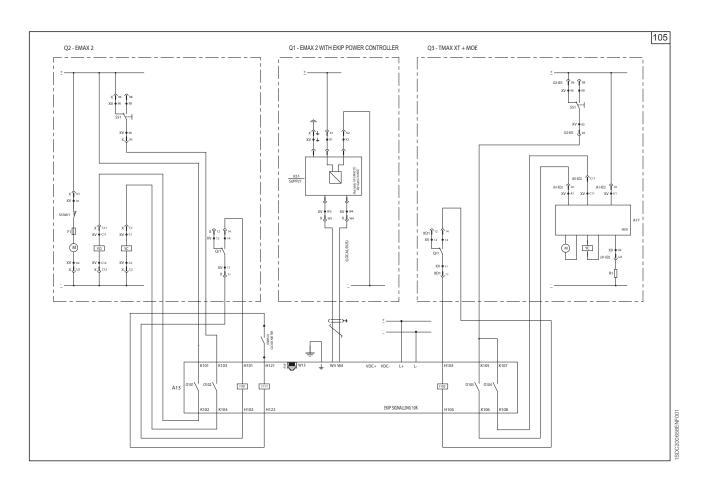


104) Ekip Multimeter

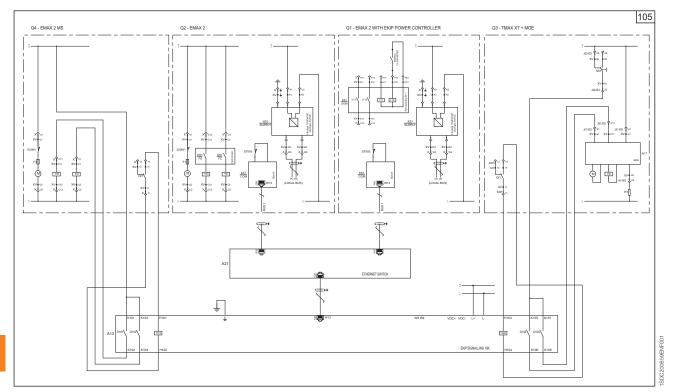


105) Application diagram for Ekip Touch, Hi-Touch, G Touch, G Hi-Touch with Power Controller function





Electrical diagrams Power Controller



Ordering codes

Instructions for ordering	
Ordering examples	9/2
General information	9/5
Automatic circuit-breakers	
Fixed version for power distribution	9/6
Withdrawable version for power distribution	9/21
Fixed version for generators	9/35
Withdrawable version for generators	9/40
Switch-disconnectors	
Fixed version	9/45
Withdrawable version	9/48
Version for applications up to 1150V AC	9/50
Fixed version for applications up to 1000V DC	9/51
Withdrawable version for applications up to 1000V DC	9/52
Derived versions	
Sectionalizing truck	9/53
Earthing truck	9/53
Earthing switch with making capacity	9/53
Fixed parts	9/54
Accessories	
Electrical accessories	9/55
Mechanical accessories	9/58
Mechanical interlock	9/61
Ekip modules	9/62
Terminals	9/65

Instructions for ordering Ordering examples

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

Ordering examples

- Terminal kit codes (other than standard supply) for fixed circuit-breaker or for fixed part of withdrawable circuit-breaker. The codes refer to 3 or 4 pieces (for mounting on top or bottom terminals).

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

Example no. 1

Emax E2.2N 3 poles fixed with vertical rear terminals (VR)	
1SDA071066R1	E2.2N 2500 Ekip Touch LSIG 3p F HR
1SDA074009R1	Kit VR Sup E2.2 lu=2500 3pcs INST
1SDA074011R1	Kit VR Inf E2.2 lu=2500 3pcs INST

Example no. 2

Emax E1.2N 4 poles fixed with upper vertical rear (VR) and front (F) terminals (standard supply)	
1SDA071513R1	E1.2N 1600 Ekip Dip LSIG 4p F F
1SDA073986R1	Kit VR Upper E1.2 F 4pcs INST

Example no. 3

Emax E4.2H 3 poles fixed with upper front terminals (F) and adjustable rear bottom vertical (VR) terminals	
1SDA071169R1	E4.2H 3200 Ekip Hi-Touch LSIG 3p F HR
1SDA074126R1	Kit F upper E4.2 F 3pcs INST
1SDA074017R1	Kit VR lower E4.2 lu=3200 3pcs INST

Example no. 4

Emax E2.2 2000A 3 poles fixed part with spread upper vertical terminals (SVR) and rear bottom adjustable horizontal (HR) terminals (standard supply)	
1SDA073909R1	E2.2 W FP lu=2000 3p HR HR
1SDA074057R1	Kit SVR upper E2.2 lu=2000 3pcs INST

- Rating Plug for lower values than rated current.

Rating plug installed on the circuit-breaker enables to obtain lower current values than rated current.

Example no. 5

Emax E2.2S 2500 4 poles fixed In=1600A	
1SDA071706R1	E2.2S 2500 Ekip Touch LSIG 4p F HR
1SDA074266R1	Rating Plug 1600 E1.2E6.2 INST

- Special version for rated service voltages up to 1150V AC.

Upgrade kits for SACE Emax 2 circuit-breakers enables the version for applications up to 1150V AC.

Example no. 6

Emax E6.2X 6300 4 poles fixed for applications up to 1150V AC	
1SDA071949R1	E6.2X 6300 Ekip HI-Touch LSIG 4p F HR
1SDA074347R1	E6.2X/E lu=6300 Upgrade Kit 1150V AC 4p

- Ordering for Ekip modules.

Ekip Supply module enables Ekip Com, Ekip Link, Ekip 2K, Ekip Syncrocheck cartridge modules to be installed. In addition to Ekip Supply modules, up to 3 cartridge modules can be installed on E2.2, E4.2 and E6.2 and up to 2 modules on E1.2.

Ekip Fan module can be installed as an alternative of Ekip Supply only on withdrawable version of E2.2, E4.2 and E6.2. In addition to Ekip Fan, up to 2 modules can be installed.

Example no. 7

Emax E4.2H 3 poles fixed with modules: Ekip Supply, Ekip Com Modbus TCP, Ekip Signalling 2K-1, Ekip Com Modbus TCP Redundant and Ekip Signalling 4K	
1SDA071169R1	E4.2H 3200 Ekip Hi-Touch LSIG 3p F HR
1SDA074173R1	Ekip Supply 24-48V DC E1.2E6.2
1SDA074151R1	Ekip Com Modbus TCP E1.2E6.2
1SDA074158R1	Ekip Com R Modbus TCP E1.2E6.2
1SDA074167R1	Ekip Sign. 2K-1 E1.2E6.2
1SDA074170R1	Ekip Sign. 4K E2.2E6.2

Example no. 8

Emax E4.2H 3 poles fixed with modules: Ekip Fan, Ekip Com EtherNet/IP, Ekip Com Modbus RS-485 and Ekip Measuring Pro		
1SDA071166R1	E4.2H 3200 Ekip Touch LSIG 3p F HR	
1SDA074174R1	Ekip Fan 24VDC E2.2E6.2	
1SDA074155R1	Ekip Com EtherNet/IP E1.2E6.2	
1SDA074150R1	Ekip Com Modbus RS-485 E1.2E6.2	
1SDA074189R1	Ekip Measuring Pro E4.2	

Example no. 9

Emax E1.2N 4 poles fixed with modules: Ekip Supply, Ekip Link		
1SDA071513R1	E1.2N 1600 Ekip Dip LSIG 4p F F	
1SDA074172R1	Ekip Supply 110-240V AC/DC E1.2E6.2	
1SDA074163R1	Ekip Link E1.2E6.2	

- Ordering for electrical accessories.

All the accessories are available. In particular, up to 3 coils can be ordered for E1.2, whereas up to 4 coils for E2.2, E4.2 and E6.2.

Example no. 10

Emax E2.2S 3 poles withdrawable with accessories: opening release, closing release, motor for automatic charging of the springs, second opening release		
1SDA072395R1	E2.2S 2000 Ekip Touch LSi LSIG 3p WMP	
1SDA073674R1	YO E1.2E6.2 220-240V AC/DC	
1SDA073687R1	YC E1.2E6.2 220-240V AC/DC	
1SDA073725R1	M E2.2E6.2 220-250V AC/DC	
1SDA073674R1	YO E1.2E6.2 220-240V AC/DC	

- Ordering for key locks.

Example no. 11

Emax E2.2N 3 poles with double key lock in racked-in / test / racked-out position, using different keys	
1SDA071066R1	E2.2N 2500 Ekip Touch LSIG 3p F HR
1SDA073806R1	KLP-D Bl. Racked in/out E2.2E6.2 1st key
1SDA073812R1	KLP-D Bl. Racked in/out E2.2E6.2 2nd key

Instructions for ordering Ordering examples

- Ordering for mechanical Interlocks.

Interlocks have several strategy configuration, suitable for fixed circuit-breakers and withdrawable circuit-breakers. Each configuration requires different groups:

- Cables, select one Kit for strategy A / B / C / D. The cables must be ordered on fixed circuit-breaker or fixed part of withdrawable circuit-breaker.
- Lever, required only for E2.2, E4.2 and E6.2. These lever must be mounted on fixed circuit-breaker or on mobile part of withdrawable circuit-breaker.
- **Support**, installed on fixed circuit-breaker or on fixed part of withdrawable circuit-breaker. This support is mounted on the external right side of the circuit-breaker.

Example no. 12

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

Example no. 13

Interlock between three	e fixed circuit-breakers:	one E2.2 and two E4.2
-------------------------	---------------------------	-----------------------

E2.2 Fixed circuit-breaker	E4.2 Fixed circuit-breaker	E4.2 Fixed circuit-breaker						
Cables [Group 1]: 1 Item	Lever [Group 2]: 1 Item	Lever [Group 2]: 1 Item						
Lever [Group 2]: 1 Item	Support [Group 3]: 1 Item	Support [Group 3]: 1 Item						
Support [Group 3]: 1 Item								

Example no. 14

Interlock between two withdrawable circuit-breakers: E1.2 and E2.2

E1.2 Fixed Part	E2.2 Mobile Part
Cables [Group 1]: 1 Item	Lever [Group 2]: 1 Item
Support [Group 4]: 1 Item	+
	E2.2 Fixed Part
	Support [Group 4]: 1 Item

Example no. 15

Interlock between three withdrawable circuit-breakers: one E2.2 and two E4.2						
E2.2 Mobile Part	E4.2 Mobile Part	E4.2 Mobile Part				
Lever [Group 2]: 1 Item	Lever [Group 2]: 1 Item	Lever [Group 2]: 1 Item				
+						
E2.2 Fixed Part	E4.2 Fixed Part	E4.2 Fixed Part				
Cables [Group 1]: 1 Item	Support [Group 4]: 1 Item	Support [Group 4]: 1 Item				
Support [Group 4]: 1 Item						

General informations

Abbreviations used for the description of the product

Versions and terminals

F	Fixed circuit-breaker
W	Withdrawable circuit-breaker
MP	Mobile part of withdrawable circuit-breaker
FP	Fixed part of withdrawable circuit-breaker
lu	Rated uninterrupted current
In	Rated current of the rating plug
lcu	Rated ultimate short-circuit breaking capacity
lcw	Rated short-time withstand current
/MS	Switch-disconnector
/E	Circuit-breakers for 1150V applications
/f	Four-pole circuit-breakers with neutral pole at 100%
CS	Sectionalizing truck
MT	Earthing truck
MTP	Earthing switch with making capacity
HR VR	Rear orientable terminals
SHR	Horizontal rear spread terminals
VHR	Vertical rear spread terminals
F	Front terminals
FL	Flat terminals
EF	Extended front terminals
ES	Front spread terminals
Fc CuAl	Terminals for cables

Protection trip units and functions

Ekip Dip	Protection trip unit for power distribution
Ekip Touch	Measurement and protection trip unit for power distribution
Ekip Hi Touch	Measurement and protection trip unit and network analyzer for power distribution
Ekip G Touch	Measurement and protection trip unit for generators
Ekip G Hi-Touch	Measurement and protection trip unit and protection network analyzer for generators

L	Overload protection
S	Protection against selective short circuit
1	Protection against instantaneous short circuit
G	Earth fault protection
Rc	Residual current protection
Power Controller	Load management function



SACE Emax E1.2B • Front terminals (F)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
E1.2B	630	42	42	E1.2B 630 Ekip Dip LI	1SDA070701R1	1SDA071331R1
				E1.2B 630 Ekip Dip LSI	1SDA070702R1	1SDA071332R1
				E1.2B 630 Ekip Dip LSIG	1SDA070703R1	1SDA071333R1
				E1.2B 630 Ekip Touch LI	1SDA070704R1	1SDA071334R1
				E1.2B 630 Ekip Touch LSI	1SDA070705R1	1SDA071335R1
		:		E1.2B 630 Ekip Touch LSIG	1SDA070706R1	1SDA071336R1
				E1.2B 630 Ekip Hi-Touch LSI	1SDA070708R1	1SDA071338R1
				E1.2B 630 Ekip Hi-Touch LSIG	1SDA070709R1	1SDA071339R1
	800	42	42	E1.2B 800 Ekip Dip LI	1SDA070741R1	1SDA071371R1
				E1.2B 800 Ekip Dip LSI	1SDA070742R1	1SDA071372R1
				E1.2B 800 Ekip Dip LSIG	1SDA070743R1	1SDA071373R1
				E1.2B 800 Ekip Touch LI	1SDA070744R1	1SDA071374R1
				E1.2B 800 Ekip Touch LSI	1SDA070745R1	1SDA071375R1
				E1.2B 800 Ekip Touch LSIG	1SDA070746R1	1SDA071376R1
				E1.2B 800 Ekip Hi-Touch LSI	1SDA070748R1	1SDA071378R1
				E1.2B 800 Ekip Hi-Touch LSIG	1SDA070749R1	1SDA071379R1
	1000	42	42	E1.2B 1000 Ekip Dip LI	1SDA070781R1	1SDA071411R1
				E1.2B 1000 Ekip Dip LSI	1SDA070782R1	1SDA071412R1
				E1.2B 1000 Ekip Dip LSIG	1SDA070783R1	1SDA071413R1
				E1.2B 1000 Ekip Touch LI	1SDA070784R1	1SDA071414R1
				E1.2B 1000 Ekip Touch LSI	1SDA070785R1	1SDA071415R1
				E1.2B 1000 Ekip Touch LSIG	1SDA070786R1	1SDA071416R1
			E1.2B 1000 Ekip Hi-Touch LSI	1SDA070788R1	1SDA071418R1	
			Ĺ	E1.2B 1000 Ekip Hi-Touch LSIG	1SDA070789R1	1SDA071419R1
	1250	42	42	E1.2B 1250 Ekip Dip LI	1SDA070821R1	1SDA071451R1
				E1.2B 1250 Ekip Dip LSI	1SDA070822R1	1SDA071452R1
				E1.2B 1250 Ekip Dip LSIG	1SDA070823R1	1SDA071453R1
				E1.2B 1250 Ekip Touch LI	1SDA070824R1	1SDA071454R1
				E1.2B 1250 Ekip Touch LSI	1SDA070825R1	1SDA071455R1
				E1.2B 1250 Ekip Touch LSIG	1SDA070826R1	1SDA071456R1
				E1.2B 1250 Ekip Hi-Touch LSI	1SDA070828R1	1SDA071458R1
				E1.2B 1250 Ekip Hi-Touch LSIG	1SDA070829R1	1SDA071459R1
	1600	42	42	E1.2B 1600 Ekip Dip LI	1SDA070861R1	1SDA071491R1
				E1.2B 1600 Ekip Dip LSI	1SDA070862R1	1SDA071492R1
				E1.2B 1600 Ekip Dip LSIG	1SDA070863R1	1SDA071493R1
				E1.2B 1600 Ekip Touch LI	1SDA070864R1	1SDA071494R1
				E1.2B 1600 Ekip Touch LSI	1SDA070865R1	1SDA071495R1
				E1.2B 1600 Ekip Touch LSIG	1SDA070866R1	1SDA071496R1
				E1.2B 1600 Ekip Hi-Touch LSI	1SDA070868R1	1SDA071498R1
				E1.2B 1600 Ekip Hi-Touch LSIG	1SDA070869R1	1SDA071499R1



SACE Emax E1.2C • Front terminals (F)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles		
	:	(440 V)	(1s)		Code	Code		
1.2C	630	50	50	50	42	E1.2C 630 Ekip Dip LI	1SDA070711R1	1SDA071341R1
				E1.2C 630 Ekip Dip LSI	1SDA070712R1	1SDA071342R1		
				E1.2C 630 Ekip Dip LSIG	1SDA070713R1	1SDA071343R1		
				E1.2C 630 Ekip Touch LI	1SDA070714R1	1SDA071344R1		
				E1.2C 630 Ekip Touch LSI	1SDA070715R1	1SDA071345R1		
				E1.2C 630 Ekip Touch LSIG	1SDA070716R1	1SDA071346R1		
				E1.2C 630 Ekip Hi-Touch LSI	1SDA070718R1	1SDA071348R1		
				E1.2C 630 Ekip Hi-Touch LSIG	1SDA070719R1	1SDA071349R1		
	800	50	42	E1.2C 800 Ekip Dip LI	1SDA070751R1	1SDA071381R1		
				E1.2C 800 Ekip Dip LSI	1SDA070752R1	1SDA071382R1		
				E1.2C 800 Ekip Dip LSIG	1SDA070753R1	1SDA071383R1		
				E1.2C 800 Ekip Touch LI	1SDA070754R1	1SDA071384R1		
				E1.2C 800 Ekip Touch LSI	1SDA070755R1	1SDA071385R1		
				E1.2C 800 Ekip Touch LSIG	1SDA070756R1	1SDA071386R1		
				E1.2C 800 Ekip Hi-Touch LSI	1SDA070758R1	1SDA071388R1		
				E1.2C 800 Ekip Hi-Touch LSIG	1SDA070759R1	1SDA071389R1		
	1000	50	42	E1.2C 1000 Ekip Dip LI	1SDA070791R1	1SDA071421R1		
				E1.2C 1000 Ekip Dip LSI	1SDA070792R1	1SDA071422R1		
				E1.2C 1000 Ekip Dip LSIG	1SDA070793R1	1SDA071423R1		
				E1.2C 1000 Ekip Touch LI	1SDA070794R1	1SDA071424R1		
				E1.2C 1000 Ekip Touch LSI	1SDA070795R1	1SDA071425R1		
			•	E1.2C 1000 Ekip Touch LSIG	1SDA070796R1	1SDA071426R1		
				E1.2C 1000 Ekip Hi-Touch LSI	1SDA070798R1	1SDA071428R1		
			E1.2C 1000 Ekip Hi-Touch LSIG	1SDA070799R1	1SDA071429R1			
	1250 50	50	42	E1.2C 1250 Ekip Dip LI	1SDA070831R1	1SDA071461R1		
				E1.2C 1250 Ekip Dip LSI	1SDA070832R1	1SDA071462R1		
				E1.2C 1250 Ekip Dip LSIG	1SDA070833R1	1SDA071463R1		
				E1.2C 1250 Ekip Touch LI	1SDA070834R1	1SDA071464R1		
				E1.2C 1250 Ekip Touch LSI	1SDA070835R1	1SDA071465R1		
				E1.2C 1250 Ekip Touch LSIG	1SDA070836R1	1SDA071466R1		
		-		E1.2C 1250 Ekip Hi-Touch LSI	1SDA070838R1	1SDA071468R1		
				E1.2C 1250 Ekip Hi-Touch LSIG	1SDA070839R1	1SDA071469R1		
	1600	50	42	E1.2C 1600 Ekip Dip LI	1SDA070871R1	1SDA071501R1		
				E1.2C 1600 Ekip Dip LSI	1SDA070872R1	1SDA071502R1		
				E1.2C 1600 Ekip Dip LSIG	1SDA070873R1	1SDA071503R1		
				E1.2C 1600 Ekip Touch LI	1SDA070874R1	1SDA071504R1		
	:			E1.2C 1600 Ekip Touch LSI	1SDA070875R1	1SDA071505R1		
	:	-		E1.2C 1600 Ekip Touch LSIG	1SDA070876R1	1SDA071506R1		
	:	:		E1.2C 1600 Ekip Hi-Touch LSI	1SDA070878R1	1SDA071508R1		
	:	[E1.2C 1600 Ekip Hi-Touch LSIG	1SDA070879R1	1SDA071509R1		



SACE Emax E1.2N • Front terminals (F)

ze	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
1.2N	250	66	50	E1.2N 250 Ekip Dip LI	1SDA070691R1	1SDA071321R1
				E1.2N 250 Ekip Dip LSI	1SDA070692R1	1SDA071322R1
				E1.2N 250 Ekip Dip LSIG	1SDA070693R1	1SDA071323R1
				E1.2N 250 Ekip Touch LI	1SDA070694R1	1SDA071324R1
				E1.2N 250 Ekip Touch LSI	1SDA070695R1	1SDA071325R1
				E1.2N 250 Ekip Touch LSIG	1SDA070696R1	1SDA071326R1
				E1.2N 250 Ekip Hi-Touch LSI	1SDA070698R1	1SDA071328R1
				E1.2N 250 Ekip Hi-Touch LSIG	1SDA070699R1	1SDA071329R1
	630	66	50	E1.2N 630 Ekip Dip LI	1SDA070721R1	1SDA071351R1
				E1.2N 630 Ekip Dip LSI	1SDA070722R1	1SDA071352R1
				E1.2N 630 Ekip Dip LSIG	1SDA070723R1	1SDA071353R1
			•	E1.2N 630 Ekip Touch LI	1SDA070724R1	1SDA071354R1
				E1.2N 630 Ekip Touch LSI	1SDA070725R1	1SDA071355R1
				E1.2N 630 Ekip Touch LSIG	1SDA070726R1	1SDA071356R1
				E1.2N 630 Ekip Hi-Touch LSI	1SDA070728R1	1SDA071358R1
				E1.2N 630 Ekip Hi-Touch LSIG	1SDA070729R1	1SDA071359R1
	800	66	50	E1.2N 800 Ekip Dip LI	1SDA070761R1	1SDA071391R1
				E1.2N 800 Ekip Dip LSI	1SDA070762R1	1SDA071392R1
				E1.2N 800 Ekip Dip LSIG	1SDA070763R1	1SDA071393R1
				E1.2N 800 Ekip Touch LI	1SDA070764R1	1SDA071394R1
				E1.2N 800 Ekip Touch LSI	1SDA070765R1	1SDA071395R1
				E1.2N 800 Ekip Touch LSIG	1SDA070766R1	1SDA071396R1
				E1.2N 800 Ekip Hi-Touch LSI	1SDA070768R1	1SDA071398R1
				E1.2N 800 Ekip Hi-Touch LSIG	1SDA070769R1	1SDA071399R1
	1000	66	50	E1.2N 1000 Ekip Dip LI	1SDA070801R1	1SDA071431R1
				E1.2N 1000 Ekip Dip LSI	1SDA070802R1	1SDA071432R1
			1	E1.2N 1000 Ekip Dip LSIG	1SDA070803R1	1SDA071433R1
				E1.2N 1000 Ekip Touch LI	1SDA070804R1	1SDA071434R1
				E1.2N 1000 Ekip Touch LSI	1SDA070805R1	1SDA071435R1
				E1.2N 1000 Ekip Touch LSIG	1SDA070806R1	1SDA071436R1
				E1.2N 1000 Ekip Hi-Touch LSI	1SDA070808R1	1SDA071438R1
	1250	66	50	E1.2N 1000 Ekip Hi-Touch LSIG	1SDA070809R1	1SDA071439R1
	1230	00	50	E1.2N 1250 Ekip Dip LI	1SDA070841R1	1SDA071471R1
				E1.2N 1250 Ekip Dip LSI	1SDA070842R1	1SDA071472R1
				E1.2N 1250 Ekip Dip LSIG	1SDA070843R1	1SDA071473R1
				E1.2N 1250 Ekip Touch LI	1SDA070844R1	1SDA071474R1
			-	E1.2N 1250 Ekip Touch LSI	1SDA070845R1	1SDA071475R1
				E1.2N 1250 Ekip Touch LSIG	1SDA070846R1	1SDA071476R1
				E1.2N 1250 Ekip Hi-Touch LSI	1SDA070848R1	1SDA071478R1
	1000	00		E1.2N 1250 Ekip Hi-Touch LSIG	1SDA070849R1	1SDA071479R1
	1600	66	50	E1.2N 1600 Ekip Dip LI	1SDA070881R1	1SDA071511R1
		į		E1.2N 1600 Ekip Dip LSI	1SDA070882R1	1SDA071512R1
				E1.2N 1600 Ekip Dip LSIG	1SDA070883R1	1SDA071513R1
				E1.2N 1600 Ekip Touch LI	1SDA070884R1	1SDA071514R1
			į	E1.2N 1600 Ekip Touch LSI	1SDA070885R1	1SDA071515R1
			į	E1.2N 1600 Ekip Touch LSIG	1SDA070886R1	1SDA071516R1
				E1.2N 1600 Ekip Hi-Touch LSI	1SDA070888R1	1SDA071518R1
	:			E1.2N 1600 Ekip Hi-Touch LSIG	1SDA070889R1	1SDA071519R1



SACE Emax E1.2L • Front terminals (F)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
E1.2L	630	130	15	E1.2L 630 Ekip Dip LI	1SDA070731R1	1SDA071361R1
	:	:		E1.2L 630 Ekip Dip LSI	1SDA070732R1	1SDA071362R1
	:	:		E1.2L 630 Ekip Dip LSIG	1SDA070733R1	1SDA071363R1
		:		E1.2L 630 Ekip Touch LI	1SDA070734R1	1SDA071364R1
	-	:		E1.2L 630 Ekip Touch LSI	1SDA070735R1	1SDA071365R1
	:	:		E1.2L 630 Ekip Touch LSIG	1SDA070736R1	1SDA071366R1
		:		E1.2L 630 Ekip Hi-Touch LSI	1SDA070738R1	1SDA071368R1
		:		E1.2L 630 Ekip Hi-Touch LSIG	1SDA070739R1	1SDA071369R1
	800	130	15	E1.2L 800 Ekip Dip LI	1SDA070771R1	1SDA071401R1
				E1.2L 800 Ekip Dip LSI	1SDA070772R1	1SDA071402R1
		:		E1.2L 800 Ekip Dip LSIG	1SDA070773R1	1SDA071403R1
	-	7		E1.2L 800 Ekip Touch LI	1SDA070774R1	1SDA071404R1
	:			E1.2L 800 Ekip Touch LSI	1SDA070775R1	1SDA071405R1
		:		E1.2L 800 Ekip Touch LSIG	1SDA070776R1	1SDA071406R1
		:		E1.2L 800 Ekip Hi-Touch LSI	1SDA070778R1	1SDA071408R1
	-			E1.2L 800 Ekip Hi-Touch LSIG	1SDA070779R1	1SDA071409R1
	1000	130	15	E1.2L 1000 Ekip Dip LI	1SDA070811R1	1SDA071441R1
	:	:		E1.2L 1000 Ekip Dip LSI	1SDA070812R1	1SDA071442R1
				E1.2L 1000 Ekip Dip LSIG	1SDA070813R1	1SDA071443R1
				E1.2L 1000 Ekip Touch LI	1SDA070814R1	1SDA071444R1
				E1.2L 1000 Ekip Touch LSI	1SDA070815R1	1SDA071445R1
		:		E1.2L 1000 Ekip Touch LSIG	1SDA070816R1	1SDA071446R1
		:		E1.2L 1000 Ekip Hi-Touch LSI	1SDA070818R1	1SDA071448R1
		-		E1.2L 1000 Ekip Hi-Touch LSIG	1SDA070819R1	1SDA071449R1
	1250	130	15	E1.2L 1250 Ekip Dip LI	1SDA070851R1	1SDA071481R1
				E1.2L 1250 Ekip Dip LSI	1SDA070852R1	1SDA071482R1
				E1.2L 1250 Ekip Dip LSIG	1SDA070853R1	1SDA071483R1
				E1.2L 1250 Ekip Touch LI	1SDA070854R1	1SDA071484R1
	-			E1.2L 1250 Ekip Touch LSI	1SDA070855R1	1SDA071485R1
	-			E1.2L 1250 Ekip Touch LSIG	1SDA070856R1	1SDA071486R1
	:	:		E1.2L 1250 Ekip Hi-Touch LSI	1SDA070858R1	1SDA071488R1
				E1.2L 1250 Ekip Hi-Touch LSIG	1SDA070859R1	1SDA071489R1



SACE Emax E2.2B • Orientable rear terminals (HR)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
E2.2B	1600	42	42	E2.2B 1600 Ekip Dip LI	1SDA070981R1	1SDA071611R1
				E2.2B 1600 Ekip Dip LSI	1SDA070982R1	1SDA071612R1
			:	E2.2B 1600 Ekip Dip LSIG	1SDA070983R1	1SDA071613R1
			:	E2.2B 1600 Ekip Touch LI	1SDA070984R1	1SDA071614R1
				E2.2B 1600 Ekip Touch LSI	1SDA070985R1	1SDA071615R1
				E2.2B 1600 Ekip Touch LSIG	1SDA070986R1	1SDA071616R1
				E2.2B 1600 Ekip Hi-Touch LSI	1SDA070988R1	1SDA071618R1
				E2.2B 1600 Ekip Hi-Touch LSIG	1SDA070989R1	1SDA071619R1
	2000 42	42	42	E2.2B 2000 Ekip Dip LI	1SDA071021R1	1SDA071651R1
				E2.2B 2000 Ekip Dip LSI	1SDA071022R1	1SDA071652R1
			:	E2.2B 2000 Ekip Dip LSIG	1SDA071023R1	1SDA071653R1
				E2.2B 2000 Ekip Touch LI	1SDA071024R1	1SDA071654R1
				E2.2B 2000 Ekip Touch LSI	1SDA071025R1	1SDA071655R1
				E2.2B 2000 Ekip Touch LSIG	1SDA071026R1	1SDA071656R1
			:	E2.2B 2000 Ekip Hi-Touch LSI	1SDA071028R1	1SDA071658R1
				E2.2B 2000 Ekip Hi-Touch LSIG	1SDA071029R1	1SDA071659R1



SACE Emax E2.2N • Orientable rear terminals (HR)

	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
N	800	66	66	E2.2N 800 Ekip Dip LI	1SDA070891R1	1SDA071521R1
				E2.2N 800 Ekip Dip LSI	1SDA070892R1	1SDA071522R1
		-		E2.2N 800 Ekip Dip LSIG	1SDA070893R1	1SDA071523R1
		•		E2.2N 800 Ekip Touch LI	1SDA070894R1	1SDA071524R1
				E2.2N 800 Ekip Touch LSI	1SDA070895R1	1SDA071525R1
				E2.2N 800 Ekip Touch LSIG	1SDA070896R1	1SDA071526R1
		:		E2.2N 800 Ekip Hi-Touch LSI	1SDA070898R1	1SDA071528R1
				E2.2N 800 Ekip Hi-Touch LSIG	1SDA070899R1	1SDA071529R1
	1000	66	66	E2.2N 1000 Ekip Dip LI	1SDA070921R1	1SDA071551R1
		:		E2.2N 1000 Ekip Dip LSI	1SDA070922R1	1SDA071552R1
				E2.2N 1000 Ekip Dip LSIG	1SDA070923R1	1SDA071553R1
		-		E2.2N 1000 Ekip Touch LI	1SDA070924R1	1SDA071554R1
			; :	E2.2N 1000 Ekip Touch LSI	1SDA070925R1	1SDA071555R1
				E2.2N 1000 Ekip Touch LSIG	1SDA070926R1	1SDA071556R1
				E2.2N 1000 Ekip Hi-Touch LSI	1SDA070928R1	1SDA071558R1
		-		E2.2N 1000 Ekip Hi-Touch LSIG	1SDA070929R1	1SDA071559R1
	1250	66	66	E2.2N 1250 Ekip Dip LI	1SDA070951R1	1SDA071581R1
	•	:		E2.2N 1250 Ekip Dip LSI	1SDA070952R1	1SDA071582R1
		İ		E2.2N 1250 Ekip Dip LSIG	1SDA070953R1	1SDA071583R1
	-	-		E2.2N 1250 Ekip Touch LI	1SDA070954R1	1SDA071584R1
				E2.2N 1250 Ekip Touch LSI	1SDA070955R1	1SDA071585R1
			-	E2.2N 1250 Ekip Touch LSIG	1SDA070956R1	1SDA071586R1
	-		-	E2.2N 1250 Ekip Hi-Touch LSI	1SDA070958R1	1SDA071588R1
	-		-	E2.2N 1250 Ekip Hi-Touch LSIG	1SDA070959R1	1SDA071589R1
	1600	66	66	E2.2N 1600 Ekip Dip LI	1SDA070991R1	1SDA071621R1
		-	-	E2.2N 1600 Ekip Dip LSI	1SDA070992R1	1SDA071622R1
	-		İ	E2.2N 1600 Ekip Dip LSIG	1SDA070993R1	1SDA071623R1
				E2.2N 1600 Ekip Touch LI	1SDA070994R1	1SDA071624R1
				E2.2N 1600 Ekip Touch LSI	1SDA070995R1	1SDA071625R1
				E2.2N 1600 Ekip Touch LSIG	1SDA070996R1	1SDA071626R1
	•			E2.2N 1600 Ekip Hi-Touch LSI	1SDA070998R1	1SDA071628R1
				E2.2N 1600 Ekip Hi-Touch LSIG	1SDA070999R1	1SDA071629R1
	2000	66	66	E2.2N 2000 Ekip Dip LI	1SDA071031R1	1SDA071661R1
		}	-	E2.2N 2000 Ekip Dip LSI	1SDA071032R1	1SDA071662R1
		-		E2.2N 2000 Ekip Dip LSIG	1SDA071033R1	1SDA071663R1
	•	-		E2.2N 2000 Ekip Touch LI	1SDA071034R1	1SDA071664R1
		:		E2.2N 2000 Ekip Touch LSI	1SDA071035R1	1SDA071665R1
		-		E2.2N 2000 Ekip Touch LSIG	1SDA071036R1	1SDA071666R1
				E2.2N 2000 Ekip Hi-Touch LSI	1SDA071038R1	1SDA071668R1
				E2.2N 2000 Ekip Hi-Touch LSIG	1SDA071039R1	1SDA071669R1
	2500	66	66	E2.2N 2500 Ekip Dip LI	1SDA071061R1	1SDA071691R1
		-	; :	E2.2N 2500 Ekip Dip LSI	1SDA071062R1	1SDA071692R1
				E2.2N 2500 Ekip Dip LSIG	1SDA071063R1	1SDA071693R1
			:	E2.2N 2500 Ekip Touch LI	1SDA071064R1	1SDA071694R1
			:	E2.2N 2500 Ekip Touch LSI	1SDA071065R1	1SDA071695R1
				E2.2N 2500 Ekip Touch LSIG	1SDA071066R1	1SDA071696R1
			•	E2.2N 2500 Ekip Hi-Touch LSI	1SDA071068R1	1SDA071698R1
	Ė	}	<u> </u>	E2.2N 2500 Ekip Hi-Touch LSIG	1SDA071069R1	1SDA071699R1



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

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
2.28	250	85	66	E2.2S 250 Ekip Dip LI	1SDA073628R1	1SDA073638R1
		:		E2.2S 250 Ekip Dip LSI	1SDA073629R1	1SDA073639R1
				E2.2S 250 Ekip Dip LSIG	1SDA073630R1	1SDA073640R1
				E2.2S 250 Ekip Touch LI	1SDA073631R1	1SDA073641R1
				E2.2S 250 Ekip Touch LSI	1SDA073632R1	1SDA073642R1
			:	E2.2S 250 Ekip Touch LSIG	1SDA073633R1	1SDA073643R1
		:	:	E2.2S 250 Ekip Hi-Touch LSI	1SDA073635R1	1SDA073645R1
		:		E2.2S 250 Ekip Hi-Touch LSIG	1SDA073636R1	1SDA073646R1
	800	85	66	E2.2S 800 Ekip Dip LI	1SDA070901R1	1SDA071531R1
				E2.2S 800 Ekip Dip LSI	1SDA070902R1	1SDA071532R1
				E2.2S 800 Ekip Dip LSIG	1SDA070903R1	1SDA071533R1
				E2.2S 800 Ekip Touch LI	1SDA070904R1	1SDA071534R1
				E2.2S 800 Ekip Touch LSI	1SDA070905R1	1SDA071535R1
				E2.2S 800 Ekip Touch LSIG	1SDA070906R1	1SDA071536R1
		:		E2.2S 800 Ekip Hi-Touch LSI	1SDA070908R1	1SDA071538R1
				E2.2S 800 Ekip Hi-Touch LSIG	1SDA070909R1	1SDA071539R1
	1000	85	66	E2.2S 1000 Ekip Dip LI	1SDA070931R1	1SDA071561R1
				E2.2S 1000 Ekip Dip LSI	1SDA070932R1	1SDA071562R1
				E2.2S 1000 Ekip Dip LSIG	1SDA070933R1	1SDA071563R1
				E2.2S 1000 Ekip Touch LI	1SDA070934R1	1SDA071564R1
				E2.2S 1000 Ekip Touch LSI	1SDA070935R1	1SDA071565R1
				E2.2S 1000 Ekip Touch LSIG	1SDA070936R1	1SDA071566R1
				E2.2S 1000 Ekip Hi-Touch LSI	1SDA070938R1	1SDA071568R1
			<u>.</u>	E2.2S 1000 Ekip Hi-Touch LSIG	1SDA070939R1	1SDA071569R1
	1250	85	66	E2.2S 1250 Ekip Dip LI	1SDA070961R1	1SDA071591R1
				E2.2S 1250 Ekip Dip LSI	1SDA070962R1	1SDA071592R1
				E2.2S 1250 Ekip Dip LSIG	1SDA070963R1	1SDA071593R1
				E2.2S 1250 Ekip Touch LI	1SDA070964R1	1SDA071594R1
				E2.2S 1250 Ekip Touch LSI	1SDA070965R1	1SDA071595R1
				E2.2S 1250 Ekip Touch LSIG	1SDA070966R1	1SDA071596R1
				E2.2S 1250 Ekip Hi-Touch LSI	1SDA070968R1	1SDA071598R1
				E2.2S 1250 Ekip Hi-Touch LSIG	1SDA070969R1	1SDA071599R1



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

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
2.2\$	1600	85	66	E2.2S 1600 Ekip Dip LI	1SDA071001R1	1SDA071631R1
		-		E2.2S 1600 Ekip Dip LSI	1SDA071002R1	1SDA071632R1
				E2.2S 1600 Ekip Dip LSIG	1SDA071003R1	1SDA071633R1
				E2.2S 1600 Ekip Touch LI	1SDA071004R1	1SDA071634R1
				E2.2S 1600 Ekip Touch LSI	1SDA071005R1	1SDA071635R1
				E2.2S 1600 Ekip Touch LSIG	1SDA071006R1	1SDA071636R1
		•		E2.2S 1600 Ekip Hi-Touch LSI	1SDA071008R1	1SDA071638R1
				E2.2S 1600 Ekip Hi-Touch LSIG	1SDA071009R1	1SDA071639R1
	2000	85	66	E2.2S 2000 Ekip Dip LI	1SDA071041R1	1SDA071671R1
				E2.2S 2000 Ekip Dip LSI	1SDA071042R1	1SDA071672R1
				E2.2S 2000 Ekip Dip LSIG	1SDA071043R1	1SDA071673R1
		Ī		E2.2S 2000 Ekip Touch LI	1SDA071044R1	1SDA071674R1
				E2.2S 2000 Ekip Touch LSI	1SDA071045R1	1SDA071675R1
				E2.2S 2000 Ekip Touch LSIG	1SDA071046R1	1SDA071676R1
				E2.2S 2000 Ekip Hi-Touch LSI	1SDA071048R1	1SDA071678R1
				E2.2S 2000 Ekip Hi-Touch LSIG	1SDA071049R1	1SDA071679R1
	2500	85	66	E2.2S 2500 Ekip Dip LI	1SDA071071R1	1SDA071701R1
				E2.2S 2500 Ekip Dip LSI	1SDA071072R1	1SDA071702R1
				E2.2S 2500 Ekip Dip LSIG	1SDA071073R1	1SDA071703R1
				E2.2S 2500 Ekip Touch LI	1SDA071074R1	1SDA071704R1
				E2.2S 2500 Ekip Touch LSI	1SDA071075R1	1SDA071705R1
		:		E2.2S 2500 Ekip Touch LSIG	1SDA071076R1	1SDA071706R1
				E2.2S 2500 Ekip Hi-Touch LSI	1SDA071078R1	1SDA071708R1
				E2.2S 2500 Ekip Hi-Touch LSIG	1SDA071079R1	1SDA071709R1



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

•	lu	lcu	lcw	Type	3 Poles	4 Poles	
		(440 V)	(1s)		Code	Code	
2H	800	100	85	E2.2H 800 Ekip Dip LI	1SDA070911R1	1SDA071541R1	
				E2.2H 800 Ekip Dip LSI	1SDA070912R1	1SDA071542R1	
				E2.2H 800 Ekip Dip LSIG	1SDA070913R1	1SDA071543R1	
				E2.2H 800 Ekip Touch LI	1SDA070914R1	1SDA071544R1	
				E2.2H 800 Ekip Touch LSI	1SDA070915R1	1SDA071545R1	
				E2.2H 800 Ekip Touch LSIG	1SDA070916R1	1SDA071546R1	
				E2.2H 800 Ekip Hi-Touch LSI	1SDA070918R1	1SDA071548R1	
				E2.2H 800 Ekip Hi-Touch LSIG	1SDA070919R1	1SDA071549R1	
	1000	100	85	E2.2H 1000 Ekip Dip LI	1SDA070941R1	1SDA071571R1	
				E2.2H 1000 Ekip Dip LSI	1SDA070942R1	1SDA071572R1	
		•		E2.2H 1000 Ekip Dip LSIG	1SDA070943R1	1SDA071573R1	
				E2.2H 1000 Ekip Touch LI	1SDA070944R1	1SDA071574R1	
				E2.2H 1000 Ekip Touch LSI	1SDA070945R1	1SDA071575R1	
				E2.2H 1000 Ekip Touch LSIG	1SDA070946R1	1SDA071576R1	
				E2.2H 1000 Ekip Hi-Touch LSI	1SDA070948R1	1SDA071578R1	
			-	E2.2H 1000 Ekip Hi-Touch LSIG	1SDA070949R1	1SDA071579R1	
	1250	100	85	E2.2H 1250 Ekip Dip LI	1SDA070971R1	1SDA071601R1	
	1200	100		E2.2H 1250 Ekip Dip LSI	1SDA070972R1	1SDA071602R1	
				E2.2H 1250 Ekip Dip LSIG	1SDA070973R1	1SDA071603R1	
				E2.2H 1250 Ekip Touch LI	1SDA070974R1	1SDA071604R1	
				E2.2H 1250 Ekip Touch LSI	1SDA070975R1	1SDA071605R1	
				E2.2H 1250 Ekip Touch LSIG	1SDA070976R1	1SDA071606R1	
			ŀ	E2.2H 1250 Ekip Hi-Touch LSI	1SDA070978R1	1SDA071608R1	
				E2.2H 1250 Ekip Hi-Touch LSIG	···j·········j·······	·····	
	1600	100	0.5		1SDA070979R1	1SDA071609R1 1SDA071641R1	
	1000	100	85	E2.2H 1600 Ekip Dip LI	1SDA071011R1		
				E2.2H 1600 Ekip Dip LSI	1SDA071012R1	1SDA071642R1	
				E2.2H 1600 Ekip Dip LSIG	1SDA071013R1	1SDA071643R1	
				E2.2H 1600 Ekip Touch LI	1SDA071014R1	1SDA071644R1	
				E2.2H 1600 Ekip Touch LSI	1SDA071015R1	1SDA071645R1	
				E2.2H 1600 Ekip Touch LSIG	1SDA071016R1	1SDA071646R1	
				E2.2H 1600 Ekip Hi-Touch LSI	1SDA071018R1	1SDA071648R1	
				E2.2H 1600 Ekip Hi-Touch LSIG	1SDA071019R1	1SDA071649R1	
	2000	100	85	E2.2H 2000 Ekip Dip LI	1SDA071051R1	1SDA071681R1	
				E2.2H 2000 Ekip Dip LSI	1SDA071052R1	1SDA071682R1	
				E2.2H 2000 Ekip Dip LSIG	1SDA071053R1	1SDA071683R1	
			-	E2.2H 2000 Ekip Touch LI	1SDA071054R1	1SDA071684R1	
				E2.2H 2000 Ekip Touch LSI	1SDA071055R1	1SDA071685R1	
				E2.2H 2000 Ekip Touch LSIG	1SDA071056R1	1SDA071686R1	
				E2.2H 2000 Ekip Hi-Touch LSI	1SDA071058R1	1SDA071688R1	
			<u>.</u>	E2.2H 2000 Ekip Hi-Touch LSIG	1SDA071059R1	1SDA071689R1	
	2500	100	85	E2.2H 2500 Ekip Dip LI	1SDA071081R1	1SDA071711R1	
				E2.2H 2500 Ekip Dip LSI	1SDA071082R1	1SDA071712R1	
				E2.2H 2500 Ekip Dip LSIG	1SDA071083R1	1SDA071713R1	
				E2.2H 2500 Ekip Touch LI	1SDA071084R1	1SDA071714R1	
				E2.2H 2500 Ekip Touch LSI	1SDA071085R1	1SDA071715R1	
				E2.2H 2500 Ekip Touch LSIG	1SDA071086R1	1SDA071716R1	
				E2.2H 2500 Ekip Hi-Touch LSI	1SDA071088R1	1SDA071718R1	
				E2.2H 2500 Ekip Hi-Touch LSIG	1SDA071089R1	1SDA071719R1	



SACE Emax E4.2N-S • Orientable rear terminals (HR)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
	-	(440 V)	(1s)		Code	Code
4.2N	3200	66	66	E4.2N 3200 Ekip Dip LI	1SDA071141R1	1SDA071771R1
				E4.2N 3200 Ekip Dip LSI	1SDA071142R1	1SDA071772R1
				E4.2N 3200 Ekip Dip LSIG	1SDA071143R1	1SDA071773R1
				E4.2N 3200 Ekip Touch LI	1SDA071144R1	1SDA071774R1
				E4.2N 3200 Ekip Touch LSI	1SDA071145R1	1SDA071775R1
				E4.2N 3200 Ekip Touch LSIG	1SDA071146R1	1SDA071776R1
				E4.2N 3200 Ekip Hi-Touch LSI	1SDA071148R1	1SDA071778R1
				E4.2N 3200 Ekip Hi-Touch LSIG	1SDA071149R1	1SDA071779R1
	4000	66	66	E4.2N 4000 Ekip Dip LI	1SDA071191R1	1SDA071821R1
				E4.2N 4000 Ekip Dip LSI	1SDA071192R1	1SDA071822R1
				E4.2N 4000 Ekip Dip LSIG	1SDA071193R1	1SDA071823R1
				E4.2N 4000 Ekip Touch LI	1SDA071194R1	1SDA071824R1
				E4.2N 4000 Ekip Touch LSI	1SDA071195R1	1SDA071825R1
				E4.2N 4000 Ekip Touch LSIG	1SDA071196R1	1SDA071826R1
				E4.2N 4000 Ekip Hi-Touch LSI	1SDA071198R1	1SDA071828R1
				E4.2N 4000 Ekip Hi-Touch LSIG	1SDA071199R1	1SDA071829R1
4.28	3200	85	66	E4.2S 3200 Ekip Dip LI	1SDA071151R1	1SDA071781R1
				E4.2S 3200 Ekip Dip LSI	1SDA071152R1	1SDA071782R1
				E4.2S 3200 Ekip Dip LSIG	1SDA071153R1	1SDA071783R1
				E4.2S 3200 Ekip Touch LI	1SDA071154R1	1SDA071784R1
				E4.2S 3200 Ekip Touch LSI	1SDA071155R1	1SDA071785R1
			:	E4.2S 3200 Ekip Touch LSIG	1SDA071156R1	1SDA071786R1
				E4.2S 3200 Ekip Hi-Touch LSI	1SDA071158R1	1SDA071788R1
				E4.2S 3200 Ekip Hi-Touch LSIG	1SDA071159R1	1SDA071789R1
	4000	85	66	E4.2S 4000 Ekip Dip LI	1SDA071201R1	1SDA071831R1
				E4.2S 4000 Ekip Dip LSI	1SDA071202R1	1SDA071832R1
				E4.2S 4000 Ekip Dip LSIG	1SDA071203R1	1SDA071833R1
				E4.2S 4000 Ekip Touch LI	1SDA071204R1	1SDA071834R1
				E4.2S 4000 Ekip Touch LSI	1SDA071205R1	1SDA071835R1
				E4.2S 4000 Ekip Touch LSIG	1SDA071206R1	1SDA071836R1
				E4.2S 4000 Ekip Hi-Touch LSI	1SDA071208R1	1SDA071838R1
	-			E4.2S 4000 Ekip Hi-Touch LSIG	1SDA071209R1	1SDA071839R1



SACE Emax E4.2H-V • Orientable rear terminals (HR)

ize	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
4.2H	3200	100	85	E4.2H 3200 Ekip Dip LI	1SDA071161R1	1SDA071791R1
				E4.2H 3200 Ekip Dip LSI	1SDA071162R1	1SDA071792R1
		:		E4.2H 3200 Ekip Dip LSIG	1SDA071163R1	1SDA071793R1
				E4.2H 3200 Ekip Touch LI	1SDA071164R1	1SDA071794R1
				E4.2H 3200 Ekip Touch LSI	1SDA071165R1	1SDA071795R1
				E4.2H 3200 Ekip Touch LSIG	1SDA071166R1	1SDA071796R1
				E4.2H 3200 Ekip Hi-Touch LSI	1SDA071168R1	1SDA071798R1
				E4.2H 3200 Ekip Hi-Touch LSIG	1SDA071169R1	1SDA071799R1
	4000	100	85	E4.2H 4000 Ekip Dip LI	1SDA071211R1	1SDA071841R1
				E4.2H 4000 Ekip Dip LSI	1SDA071212R1	1SDA071842R1
				E4.2H 4000 Ekip Dip LSIG	1SDA071213R1	1SDA071843R1
				E4.2H 4000 Ekip Touch LI	1SDA071214R1	1SDA071844R1
				E4.2H 4000 Ekip Touch LSI	1SDA071215R1	1SDA071845R1
		:		E4.2H 4000 Ekip Touch LSIG	1SDA071216R1	1SDA071846R1
		:		E4.2H 4000 Ekip Hi-Touch LSI	1SDA071218R1	1SDA071848R1
		-		E4.2H 4000 Ekip Hi-Touch LSIG	1SDA071219R1	1SDA071849R1
.2V	2000	150	100	E4.2V 2000 Ekip Dip LI	1SDA071101R1	1SDA071731R1
				E4.2V 2000 Ekip Dip LSI	1SDA071102R1	1SDA071732R1
		:		E4.2V 2000 Ekip Dip LSIG	1SDA071103R1	1SDA071733R1
				E4.2V 2000 Ekip Touch LI	1SDA071104R1	1SDA071734R1
				E4.2V 2000 Ekip Touch LSI	1SDA071105R1	1SDA071735R1
		-		E4.2V 2000 Ekip Touch LSIG	1SDA071106R1	1SDA071736R1
				E4.2V 2000 Ekip Hi-Touch LSI	1SDA071108R1	1SDA071738R1
				E4.2V 2000 Ekip Hi-Touch LSIG	1SDA071109R1	1SDA071739R1
	2500	150	100	E4.2V 2500 Ekip Dip LI	1SDA071121R1	1SDA071751R1
				E4.2V 2500 Ekip Dip LSI	1SDA071122R1	1SDA071752R1
				E4.2V 2500 Ekip Dip LSIG	1SDA071123R1	1SDA071753R1
		:		E4.2V 2500 Ekip Touch LI	1SDA071124R1	1SDA071754R1
				E4.2V 2500 Ekip Touch LSI	1SDA071125R1	1SDA071755R1
		:		E4.2V 2500 Ekip Touch LSIG	1SDA071126R1	1SDA071756R1
				E4.2V 2500 Ekip Hi-Touch LSI	1SDA071128R1	1SDA071758R1
		:		E4.2V 2500 Ekip Hi-Touch LSIG	1SDA071129R1	1SDA071759R1
	3200	150	100	E4.2V 3200 Ekip Dip LI	1SDA071171R1	1SDA071801R1
				E4.2V 3200 Ekip Dip LSI	1SDA071172R1	1SDA071802R1
				E4.2V 3200 Ekip Dip LSIG	1SDA071173R1	1SDA071803R1
				E4.2V 3200 Ekip Touch LI	1SDA071174R1	1SDA071804R1
		-		E4.2V 3200 Ekip Touch LSI	1SDA071175R1	1SDA071805R1
				E4.2V 3200 Ekip Touch LSIG	1SDA071176R1	1SDA071806R1
		:		E4.2V 3200 Ekip Hi-Touch LSI	1SDA071178R1	1SDA071808R1
				E4.2V 3200 Ekip Hi-Touch LSIG	1SDA071179R1	1SDA071809R1
	4000	150	100	E4.2V 4000 Ekip Dip LI	1SDA071221R1	1SDA071851R1
				E4.2V 4000 Ekip Dip LSI	1SDA071222R1	1SDA071852R1
			:	E4.2V 4000 Ekip Dip LSIG	1SDA071223R1	1SDA071853R1
			:	E4.2V 4000 Ekip Touch LI	1SDA071224R1	1SDA071854R1
				E4.2V 4000 Ekip Touch LSI	1SDA071225R1	1SDA071855R1
				E4.2V 4000 Ekip Touch LSIG	1SDA071226R1	1SDA071856R1
			:	E4.2V 4000 Ekip Hi-Touch LSI	1SDA071228R1	1SDA071858R1
			:	E4.2V 4000 Ekip Hi-Touch LSIG	1SDA071229R1	1SDA071859R1



SACE Emax E6.2H-V • Orientable rear terminals (HR)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
6.2H	4000	100	100	E6.2H 4000 Ekip Dip LI	1SDA071231R1	1SDA071861R1
				E6.2H 4000 Ekip Dip LSI	1SDA071232R1	1SDA071862R1
				E6.2H 4000 Ekip Dip LSIG	1SDA071233R1	1SDA071863R1
	:			E6.2H 4000 Ekip Touch LI	1SDA071234R1	1SDA071864R1
				E6.2H 4000 Ekip Touch LSI	1SDA071235R1	1SDA071865R1
				E6.2H 4000 Ekip Touch LSIG	1SDA071236R1	1SDA071866R1
				E6.2H 4000 Ekip Hi-Touch LSI	1SDA071238R1	1SDA071868R1
				E6.2H 4000 Ekip Hi-Touch LSIG	1SDA071239R1	1SDA071869R1
	5000	100	100	E6.2H 5000 Ekip Dip LI	1SDA071261R1	1SDA071891R1
				E6.2H 5000 Ekip Dip LSI	1SDA071262R1	1SDA071892R1
	:			E6.2H 5000 Ekip Dip LSIG	1SDA071263R1	1SDA071893R1
				E6.2H 5000 Ekip Touch LI	1SDA071264R1	1SDA071894R1
				E6.2H 5000 Ekip Touch LSI	1SDA071265R1	1SDA071895R1
				E6.2H 5000 Ekip Touch LSIG	1SDA071266R1	1SDA071896R1
				E6.2H 5000 Ekip Hi-Touch LSI	1SDA071268R1	1SDA071898R1
				E6.2H 5000 Ekip Hi-Touch LSIG	1SDA071269R1	1SDA071899R1
	6300	100	100	E6.2H 6300 Ekip Dip LI	1SDA071291R1	1SDA071921R1
	:			E6.2H 6300 Ekip Dip LSI	1SDA071292R1	1SDA071922R1
	:	İ		E6.2H 6300 Ekip Dip LSIG	1SDA071293R1	1SDA071923R1
				E6.2H 6300 Ekip Touch LI	1SDA071294R1	1SDA071924R1
		İ		E6.2H 6300 Ekip Touch LSI	1SDA071295R1	1SDA071925R1
	:	İ		E6.2H 6300 Ekip Touch LSIG	1SDA071296R1	1SDA071926R1
	:	Ì		E6.2H 6300 Ekip Hi-Touch LSI	1SDA071298R1	1SDA071928R1
				E6.2H 6300 Ekip Hi-Touch LSIG	1SDA071299R1	1SDA071929R1
.2V	4000	150	100	E6.2V 4000 Ekip Dip LI	1SDA071241R1	1SDA071871R1
	4000			E6.2V 4000 Ekip Dip LSI	1SDA071242R1	1SDA071872R1
				E6.2V 4000 Ekip Dip LSIG	1SDA071243R1	1SDA071873R1
		İ		E6.2V 4000 Ekip Touch LI	1SDA071244R1	1SDA071874R1
	:	İ		E6.2V 4000 Ekip Touch LSI	1SDA071245R1	1SDA071875R1
	:	İ		E6.2V 4000 Ekip Touch LSIG	1SDA071246R1	1SDA071876R1
		Ì	; :	E6.2V 4000 Ekip Hi-Touch LSI	1SDA071248R1	1SDA071878R1
	•			E6.2V 4000 Ekip Hi-Touch LSIG	1SDA071249R1	1SDA071879R1
	5000	150	100	E6.2V 5000 Ekip Dip LI	1SDA071271R1	1SDA071901R1
	:	Ì	<u>;</u>	E6.2V 5000 Ekip Dip LSI	1SDA071272R1	1SDA071902R1
		Ì		E6.2V 5000 Ekip Dip LSIG	1SDA071273R1	1SDA071903R1
				E6.2V 5000 Ekip Touch LI	1SDA071274R1	1SDA071904R1
	:	İ		E6.2V 5000 Ekip Touch LSI	1SDA071275R1	1SDA071905R1
		İ		E6.2V 5000 Ekip Touch LSIG	1SDA071276R1	1SDA071906R1
		İ		E6.2V 5000 Ekip Hi-Touch LSI	1SDA071278R1	1SDA071908R1
	:	İ		E6.2V 5000 Ekip Hi-Touch LSIG	1SDA071279R1	1SDA071909R1
	6300	150	100	E6.2V 6300 Ekip Dip LI	1SDA071301R1	1SDA071931R1
	-		:	E6.2V 6300 Ekip Dip LSI	1SDA071302R1	1SDA071932R1
				E6.2V 6300 Ekip Dip LSIG	1SDA071303R1	1SDA071933R1
	-			E6.2V 6300 Ekip Touch LI	1SDA071304R1	1SDA071934R1
	:		:	E6.2V 6300 Ekip Touch LSI	1SDA071305R1	1SDA071935R1
	:		:	E6.2V 6300 Ekip Touch LSIG	1SDA071306R1	1SDA071936R1
	:		•	E6.2V 6300 Ekip Hi-Touch LSI	1SDA071308R1	1SDA071938R1
	<u> </u>	1	-	E6.2V 6300 Ekip Hi-Touch LSIG	1SDA071309R1	1SDA071939R1



SACE Emax E6.2X • Orientable rear terminals (HR)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
E6.2X	4000	200	120	E6.2X 4000 Ekip Dip LI	1SDA071251R1	1SDA071881R1
				E6.2X 4000 Ekip Dip LSI	1SDA071252R1	1SDA071882R1
				E6.2X 4000 Ekip Dip LSIG	1SDA071253R1	1SDA071883R1
				E6.2X 4000 Ekip Touch LI	1SDA071254R1	1SDA071884R1
				E6.2X 4000 Ekip Touch LSI	1SDA071255R1	1SDA071885R1
				E6.2X 4000 Ekip Touch LSIG	1SDA071256R1	1SDA071886R1
				E6.2X 4000 Ekip Hi-Touch LSI	1SDA071258R1	1SDA071888R1
			:	E6.2X 4000 Ekip Hi-Touch LSIG	1SDA071259R1	1SDA071889R1
	5000	200	120	E6.2X 5000 Ekip Dip LI	1SDA071281R1	1SDA071911R1
				E6.2X 5000 Ekip Dip LSI	1SDA071282R1	1SDA071912R1
				E6.2X 5000 Ekip Dip LSIG	1SDA071283R1	1SDA071913R1
				E6.2X 5000 Ekip Touch LI	1SDA071284R1	1SDA071914R1
				E6.2X 5000 Ekip Touch LSI	1SDA071285R1	1SDA071915R1
				E6.2X 5000 Ekip Touch LSIG	1SDA071286R1	1SDA071916R1
				E6.2X 5000 Ekip Hi-Touch LSI	1SDA071288R1	1SDA071918R1
				E6.2X 5000 Ekip Hi-Touch LSIG	1SDA071289R1	1SDA071919R1
	6300	200	120	E6.2X 6300 Ekip Dip LI	1SDA071311R1	1SDA071941R1
				E6.2X 6300 Ekip Dip LSI	1SDA071312R1	1SDA071942R1
				E6.2X 6300 Ekip Dip LSIG	1SDA071313R1	1SDA071943R1
				E6.2X 6300 Ekip Touch LI	1SDA071314R1	1SDA071944R1
				E6.2X 6300 Ekip Touch LSI	1SDA071315R1	1SDA071945R1
				E6.2X 6300 Ekip Touch LSIG	1SDA071316R1	1SDA071946R1
				E6.2X 6300 Ekip Hi-Touch LSI	1SDA071318R1	1SDA071948R1
				E6.2X 6300 Ekip Hi-Touch LSIG	1SDA071319R1	1SDA071949R1



SACE Emax E6.2H-V/f Full size • Orientable rear terminals (HR)

Size	lu	Icu (440V)	lcw (1s)	Туре	4 Poles
					Code
6.2H/f	4000	100	100	E6.2H/f 4000 Ekip Dip LI	1SDA071951R1
				E6.2H/f 4000 Ekip Dip LSI	1SDA071952R1
				E6.2H/f 4000 Ekip Dip LSIG	1SDA071953R1
				E6.2H/f 4000 Ekip Touch LI	1SDA071954R1
			7	E6.2H/f 4000 Ekip Touch LSI	1SDA071955R1
				E6.2H/f 4000 Ekip Touch LSIG	1SDA071956R1
				E6.2H/f 4000 Ekip Hi-Touch LSI	1SDA071958R1
				E6.2H/f 4000 Ekip Hi-Touch LSIG	1SDA071959R1
	5000	100	100	E6.2H/f 5000 Ekip Dip LI	1SDA071981R1
				E6.2H/f 5000 Ekip Dip LSI	1SDA071982R1
				E6.2H/f 5000 Ekip Dip LSIG	1SDA071983R1
		-		E6.2H/f 5000 Ekip Touch LI	1SDA071984R1
				E6.2H/f 5000 Ekip Touch LSI	1SDA071985R1
				E6.2H/f 5000 Ekip Touch LSIG	1SDA071986R1
				E6.2H/f 5000 Ekip Hi-Touch LSI	1SDA071988R1
			-	E6.2H/f 5000 Ekip Hi-Touch LSIG	1SDA071989R1
	6300	100	100	E6.2H/f 6300 Ekip Dip LI	1SDA072011R1
	0000			E6.2H/f 6300 Ekip Dip LSI	1SDA072012R1
				E6.2H/f 6300 Ekip Dip LSIG	1SDA072013R1
				E6.2H/f 6300 Ekip Touch LI	1SDA072014R1
				E6.2H/f 6300 Ekip Touch LSI	1SDA072015R1
				E6.2H/f 6300 Ekip Touch LSIG	1SDA072016R1
				E6.2H/f 6300 Ekip Hi-Touch LSI	1SDA072018R1
				E6.2H/f 6300 Ekip Hi-Touch LSIG	1SDA072019R1
6.2V/f	4000	150	100		1SDA072019R1
J. Z W/ I	4000	130		E6.2V/f 4000 Ekip Dip LS	
				E6.2V/f 4000 Ekip Dip LSI	1SDA071962R1
				E6.2V/f 4000 Ekip Dip LSIG	1SDA071963R1
				E6.2V/f 4000 Ekip Touch LI	1SDA071964R1
		-		E6.2V/f 4000 Ekip Touch LSI	1SDA071965R1
				E6.2V/f 4000 Ekip Touch LSIG	1SDA071966R1
				E6.2V/f 4000 Ekip Hi-Touch LSI	1SDA071968R1
				E6.2V/f 4000 Ekip Hi-Touch LSIG	1SDA071969R1
	5000	150	100	E6.2V/f 5000 Ekip Dip LI	1SDA071991R1
				E6.2V/f 5000 Ekip Dip LSI	1SDA071992R1
				E6.2V/f 5000 Ekip Dip LSIG	1SDA071993R1
				E6.2V/f 5000 Ekip Touch LI	1SDA071994R1
				E6.2V/f 5000 Ekip Touch LSI	1SDA071995R1
				E6.2V/f 5000 Ekip Touch LSIG	1SDA071996R1
				E6.2V/f 5000 Ekip Hi-Touch LSI	1SDA071998R1
				E6.2V/f 5000 Ekip Hi-Touch LSIG	1SDA071999R1
	6300	150	100	E6.2V/f 6300 Ekip Dip LI	1SDA072021R1
	į			E6.2V/f 6300 Ekip Dip LSI	1SDA072022R1
	į			E6.2V/f 6300 Ekip Dip LSIG	1SDA072023R1
	į			E6.2V/f 6300 Ekip Touch LI	1SDA072024R1
	į			E6.2V/f 6300 Ekip Touch LSI	1SDA072025R1
				E6.2V/f 6300 Ekip Touch LSIG	1SDA072026R1
				E6.2V/f 6300 Ekip Hi-Touch LSI	1SDA072028R1
				E6.2V/f 6300 Ekip Hi-Touch LSIG	1SDA072029R1



SACE Emax E6.2X/f Full size • Orientable rear terminals (HR)

Size	lu	Icu (440V)	lcw (1s)	Туре	4 Poles
					Code
6.2X/f	4000	200	120	E6.2X/f 4000 Ekip Dip LI	1SDA071971R1
				E6.2X/f 4000 Ekip Dip LSI	1SDA071972R1
				E6.2X/f 4000 Ekip Dip LSIG	1SDA071973R1
				E6.2X/f 4000 Ekip Touch LI	1SDA071974R1
				E6.2X/f 4000 Ekip Touch LSI	1SDA071975R1
				E6.2X/f 4000 Ekip Touch LSIG	1SDA071976R1
				E6.2X/f 4000 Ekip Hi-Touch LSI	1SDA071978R1
	•			E6.2X/f 4000 Ekip Hi-Touch LSIG	1SDA071979R1
	5000	200	120	E6.2X/f 5000 Ekip Dip LI	1SDA072001R1
				E6.2X/f 5000 Ekip Dip LSI	1SDA072002R1
				E6.2X/f 5000 Ekip Dip LSIG	1SDA072003R1
				E6.2X/f 5000 Ekip Touch LI	1SDA072004R1
				E6.2X/f 5000 Ekip Touch LSI	1SDA072005R1
				E6.2X/f 5000 Ekip Touch LSIG	1SDA072006R1
				E6.2X/f 5000 Ekip Hi-Touch LSI	1SDA072008R1
				E6.2X/f 5000 Ekip Hi-Touch LSIG	1SDA072009R1
	6300	200	120	E6.2X/f 6300 Ekip Dip LI	1SDA072031R1
				E6.2X/f 6300 Ekip Dip LSI	1SDA072032R1
	į	Ī		E6.2X/f 6300 Ekip Dip LSIG	1SDA072033R1
				E6.2X/f 6300 Ekip Touch LI	1SDA072034R1
				E6.2X/f 6300 Ekip Touch LSI	1SDA072035R1
	ĺ	•		E6.2X/f 6300 Ekip Touch LSIG	1SDA072036R1
			:	E6.2X/f 6300 Ekip Hi-Touch LSI	1SDA072038R1
		į		E6.2X/f 6300 Ekip Hi-Touch LSIG	1SDA072039R1



SACE Emax E1.2B • Mobile part of withdrawable circuit-breaker (MP)

ze	lu	lcu	lcw (1a)	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
1.2B	630	42	42	E1.2B 630 Ekip Dip LI	1SDA072051R1	1SDA072681R1
				E1.2B 630 Ekip Dip LSI	1SDA072052R1	1SDA072682R1
				E1.2B 630 Ekip Dip LSIG	1SDA072053R1	1SDA072683R1
				E1.2B 630 Ekip Touch LI	1SDA072054R1	1SDA072684R1
				E1.2B 630 Ekip Touch LSI	1SDA072055R1	1SDA072685R1
				E1.2B 630 Ekip Touch LSIG	1SDA072056R1	1SDA072686R1
				E1.2B 630 Ekip Hi-Touch LSI	1SDA072058R1	1SDA072688R1
				E1.2B 630 Ekip Hi-Touch LSIG	1SDA072059R1	1SDA072689R1
	800	42	42	E1.2B 800 Ekip Dip LI	1SDA072091R1	1SDA072721R1
				E1.2B 800 Ekip Dip LSI	1SDA072092R1	1SDA072722R1
	-			E1.2B 800 Ekip Dip LSIG	1SDA072093R1	1SDA072723R1
				E1.2B 800 Ekip Touch LI	1SDA072094R1	1SDA072724R1
			:	E1.2B 800 Ekip Touch LSI	1SDA072095R1	1SDA072725R1
		-		E1.2B 800 Ekip Touch LSIG	1SDA072096R1	1SDA072726R1
	•			E1.2B 800 Ekip Hi-Touch LSI	1SDA072098R1	1SDA072728R1
				E1.2B 800 Ekip Hi-Touch LSIG	1SDA072099R1	1SDA072729R1
	1000	42	42	E1.2B 1000 Ekip Dip LI	1SDA072131R1	1SDA072761R1
				E1.2B 1000 Ekip Dip LSI	1SDA072132R1	1SDA072762R1
				E1.2B 1000 Ekip Dip LSIG	1SDA072133R1	1SDA072763R1
			:	E1.2B 1000 Ekip Touch LI	1SDA072134R1	1SDA072764R1
				E1.2B 1000 Ekip Touch LSI	1SDA072135R1	1SDA072765R1
	-			E1.2B 1000 Ekip Touch LSIG	1SDA072136R1	1SDA072766R1
				E1.2B 1000 Ekip Hi-Touch LSI	1SDA072138R1	1SDA072768R1
	-		:	E1.2B 1000 Ekip Hi-Touch LSIG	1SDA072139R1	1SDA072769R1
	1250	42	42	E1.2B 1250 Ekip Dip LI	1SDA072171R1	1SDA072801R1
				E1.2B 1250 Ekip Dip LSI	1SDA072172R1	1SDA072802R1
				E1.2B 1250 Ekip Dip LSIG	1SDA072173R1	1SDA072803R1
				E1.2B 1250 Ekip Touch LI	1SDA072174R1	1SDA072804R1
				E1.2B 1250 Ekip Touch LSI	1SDA072175R1	1SDA072805R1
				E1.2B 1250 Ekip Touch LSIG	1SDA072176R1	1SDA072806R1
		-		E1.2B 1250 Ekip Hi-Touch LSI	1SDA072178R1	1SDA072808R1
		-	:	E1.2B 1250 Ekip Hi-Touch LSIG	1SDA072179R1	1SDA072809R1
	1600	42	42	E1.2B 1600 Ekip Dip LI	1SDA072211R1	1SDA072841R1
	-	-		E1.2B 1600 Ekip Dip LSI	1SDA072212R1	1SDA072842R1
	:		:	E1.2B 1600 Ekip Dip LSIG	1SDA072213R1	1SDA072843R1
				E1.2B 1600 Ekip Touch LI	1SDA072214R1	1SDA072844R1
				E1.2B 1600 Ekip Touch LSI	1SDA072215R1	1SDA072845R1
		:		E1.2B 1600 Ekip Touch LSIG	1SDA072216R1	1SDA072846R1
	:			E1.2B 1600 Ekip Hi-Touch LSI	1SDA072218R1	1SDA072848R1
	-		:	E1.2B 1600 Ekip Hi-Touch LSIG	1SDA072219R1	1SDA072849R1



SACE Emax E1.2C • Mobile part of withdrawable circuit-breaker (MP)

ize	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
.2C	630	50	42	E1.2C 630 Ekip Dip LI	1SDA072061R1	1SDA072691R1
				E1.2C 630 Ekip Dip LSI	1SDA072062R1	1SDA072692R1
			:	E1.2C 630 Ekip Dip LSIG	1SDA072063R1	1SDA072693R1
			:	E1.2C 630 Ekip Touch LI	1SDA072064R1	1SDA072694R1
				E1.2C 630 Ekip Touch LSI	1SDA072065R1	1SDA072695R1
			:	E1.2C 630 Ekip Touch LSIG	1SDA072066R1	1SDA072696R1
			:	E1.2C 630 Ekip Hi-Touch LSI	1SDA072068R1	1SDA072698R1
				E1.2C 630 Ekip Hi-Touch LSIG	1SDA072069R1	1SDA072699R1
	800	50	42	E1.2C 800 Ekip Dip LI	1SDA072101R1	1SDA072731R1
			:	E1.2C 800 Ekip Dip LSI	1SDA072102R1	1SDA072732R1
		-	:	E1.2C 800 Ekip Dip LSIG	1SDA072103R1	1SDA072733R1
				E1.2C 800 Ekip Touch LI	1SDA072104R1	1SDA072734R1
				E1.2C 800 Ekip Touch LSI	1SDA072105R1	1SDA072735R1
			:	E1.2C 800 Ekip Touch LSIG	1SDA072106R1	1SDA072736R1
				E1.2C 800 Ekip Hi-Touch LSI	1SDA072108R1	1SDA072738R1
				E1.2C 800 Ekip Hi-Touch LSIG	1SDA072109R1	1SDA072739R1
	1000	50	42	E1.2C 1000 Ekip Dip LI	1SDA072141R1	1SDA072771R1
			:	E1.2C 1000 Ekip Dip LSI	1SDA072142R1	1SDA072772R1
				E1.2C 1000 Ekip Dip LSIG	1SDA072143R1	1SDA072773R1
				E1.2C 1000 Ekip Touch LI	1SDA072144R1	1SDA072774R1
			:	E1.2C 1000 Ekip Touch LSI	1SDA072145R1	1SDA072775R1
				E1.2C 1000 Ekip Touch LSIG	1SDA072146R1	1SDA072776R1
				E1.2C 1000 Ekip Hi-Touch LSI	1SDA072148R1	1SDA072778R1
				E1.2C 1000 Ekip Hi-Touch LSIG	1SDA072149R1	1SDA072779R1
	1250	50	42	E1.2C 1250 Ekip Dip LI	1SDA072181R1	1SDA072811R1
				E1.2C 1250 Ekip Dip LSI	1SDA072182R1	1SDA072812R1
				E1.2C 1250 Ekip Dip LSIG	1SDA072183R1	1SDA072813R1
				E1.2C 1250 Ekip Touch LI	1SDA072184R1	1SDA072814R1
				E1.2C 1250 Ekip Touch LSI	1SDA072185R1	1SDA072815R1
				E1.2C 1250 Ekip Touch LSIG	1SDA072186R1	1SDA072816R1
				E1.2C 1250 Ekip Hi-Touch LSI	1SDA072188R1	1SDA072818R1
				E1.2C 1250 Ekip Hi-Touch LSIG	1SDA072189R1	1SDA072819R1
	1600	50	42	E1.2C 1600 Ekip Dip LI	1SDA072221R1	1SDA072851R1
				E1.2C 1600 Ekip Dip LSI	1SDA072222R1	1SDA072852R1
				E1.2C 1600 Ekip Dip LSIG	1SDA072223R1	1SDA072853R1
				E1.2C 1600 Ekip Touch LI	1SDA072224R1	1SDA072854R1
				E1.2C 1600 Ekip Touch LSI	1SDA072225R1	1SDA072855R1
				E1.2C 1600 Ekip Touch LSIG	1SDA072226R1	1SDA072856R1
				E1.2C 1600 Ekip Hi-Touch LSI	1SDA072228R1	1SDA072858R1
				E1.2C 1600 Ekip Hi-Touch LSIG	1SDA072229R1	1SDA072859R1



SACE Emax E1.2N • Mobile part of withdrawable circuit-breaker (MP)

e	lu	lcu	lcw	Туре	3 Poles	4 Poles
	-	(440 V)	(1s)		Code	Code
2N	250	66	50	E1.2N 250 Ekip Dip LI	1SDA072041R1	1SDA072671R1
				E1.2N 250 Ekip Dip LSI	1SDA072042R1	1SDA072672R1
				E1.2N 250 Ekip Dip LSIG	1SDA072043R1	1SDA072673R1
				E1.2N 250 Ekip Touch LI	1SDA072044R1	1SDA072674R1
				E1.2N 250 Ekip Touch LSI	1SDA072045R1	1SDA072675R1
		-	:	E1.2N 250 Ekip Touch LSIG	1SDA072046R1	1SDA072676R1
		-		E1.2N 250 Ekip Hi-Touch LSI	1SDA072048R1	1SDA072678R1
		-		E1.2N 250 Ekip Hi-Touch LSIG	1SDA072049R1	1SDA072679R1
	630	66	50	E1.2N 630 Ekip Dip LI	1SDA072071R1	1SDA072701R1
		:	:	E1.2N 630 Ekip Dip LSI	1SDA072072R1	1SDA072702R1
	:	i	:	E1.2N 630 Ekip Dip LSIG	1SDA072073R1	1SDA072703R1
	-	ŧ	-	E1.2N 630 Ekip Touch LI	1SDA072074R1	1SDA072704R1
	-	•		E1.2N 630 Ekip Touch LSI	1SDA072075R1	1SDA072705R1
				E1.2N 630 Ekip Touch LSIG	1SDA072076R1	1SDA072706R1
		į		E1.2N 630 Ekip Hi-Touch LSI	1SDA072078R1	1SDA072708R1
	-	į	-	E1.2N 630 Ekip Hi-Touch LSIG	1SDA072079R1	1SDA072709R1
	800	66	50	E1.2N 800 Ekip Dip LI	1SDA072111R1	1SDA072741R1
			30	E1.2N 800 Ekip Dip LSI	1SDA072112R1	1SDA072742R1
	-			E1.2N 800 Ekip Dip LSIG	1SDA072113R1	1SDA072743R1
				E1.2N 800 Ekip Touch LI	1SDA072114R1	1SDA072744R1
				E1.2N 800 Ekip Touch LSI	1SDA072115R1	1SDA072745R1
		•		E1.2N 800 Ekip Touch LSIG	1SDA072116R1	1SDA072746R1
	-			E1.2N 800 Ekip Hi-Touch LSI	1SDA072118R1	1SDA072748R1
				-	1SDA072118R1	1SDA072749R1
	1000	66	50	E1.2N 800 Ekip Hi-Touch LSIG		
	1000	00	30	E1.2N 1000 Ekip Dip LI	1SDA072151R1	1SDA072781R1
	-	-		E1.2N 1000 Ekip Dip LSI	1SDA072152R1	1SDA072782R1
		į		E1.2N 1000 Ekip Dip LSIG	1SDA072153R1	1SDA072783R1
		į		E1.2N 1000 Ekip Touch LI	1SDA072154R1	1SDA072784R1
	:	į		E1.2N 1000 Ekip Touch LSI	1SDA072155R1	1SDA072785R1
		į		E1.2N 1000 Ekip Touch LSIG	1SDA072156R1	1SDA072786R1
				E1.2N 1000 Ekip Hi-Touch LSI	1SDA072158R1	1SDA072788R1
				E1.2N 1000 Ekip Hi-Touch LSIG	1SDA072159R1	1SDA072789R1
	1250	66	50	E1.2N 1250 Ekip Dip LI	1SDA072191R1	1SDA072821R1
		į		E1.2N 1250 Ekip Dip LSI	1SDA072192R1	1SDA072822R1
		į		E1.2N 1250 Ekip Dip LSIG	1SDA072193R1	1SDA072823R1
		į		E1.2N 1250 Ekip Touch LI	1SDA072194R1	1SDA072824R1
		-		E1.2N 1250 Ekip Touch LSI	1SDA072195R1	1SDA072825R1
				E1.2N 1250 Ekip Touch LSIG	1SDA072196R1	1SDA072826R1
			:	E1.2N 1250 Ekip Hi-Touch LSI	1SDA072198R1	1SDA072828R1
	<u></u>			E1.2N 1250 Ekip Hi-Touch LSIG	1SDA072199R1	1SDA072829R1
	1600	66	50	E1.2N 1600 Ekip Dip LI	1SDA072231R1	1SDA072861R1
		į		E1.2N 1600 Ekip Dip LSI	1SDA072232R1	1SDA072862R1
		į		E1.2N 1600 Ekip Dip LSIG	1SDA072233R1	1SDA072863R1
	:	į	;	E1.2N 1600 Ekip Touch LI	1SDA072234R1	1SDA072864R1
				E1.2N 1600 Ekip Touch LSI	1SDA072235R1	1SDA072865R1
				E1.2N 1600 Ekip Touch LSIG	1SDA072236R1	1SDA072866R1
	:	:		E1.2N 1600 Ekip Hi-Touch LSI	1SDA072238R1	1SDA072868R1
	:			E1.2N 1600 Ekip Hi-Touch LSIG	1SDA072239R1	1SDA072869R1



SACE Emax E1.2L-B • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	Icu (440 V)	lcw (1s)	Туре	3 Poles	4 Poles
					Code	Code
1.2L	630	130	15	E1.2L 630 Ekip Dip LI	1SDA072081R1	1SDA072711R1
				E1.2L 630 Ekip Dip LSI	1SDA072082R1	1SDA072712R1
				E1.2L 630 Ekip Dip LSIG	1SDA072083R1	1SDA072713R1
				E1.2L 630 Ekip Touch LI	1SDA072084R1	1SDA072714R1
				E1.2L 630 Ekip Touch LSI	1SDA072085R1	1SDA072715R1
			:	E1.2L 630 Ekip Touch LSIG	1SDA072086R1	1SDA072716R1
				E1.2L 630 Ekip Hi-Touch LSI	1SDA072088R1	1SDA072718R1
				E1.2L 630 Ekip Hi-Touch LSIG	1SDA072089R1	1SDA072719R1
	800	130	15	E1.2L 800 Ekip Dip LI	1SDA072121R1	1SDA072751R1
			:	E1.2L 800 Ekip Dip LSI	1SDA072122R1	1SDA072752R1
				E1.2L 800 Ekip Dip LSIG	1SDA072123R1	1SDA072753R1
				E1.2L 800 Ekip Touch LI	1SDA072124R1	1SDA072754R1
				E1.2L 800 Ekip Touch LSI	1SDA072125R1	1SDA072755R1
				E1.2L 800 Ekip Touch LSIG	1SDA072126R1	1SDA072756R1
				E1.2L 800 Ekip Hi-Touch LSI	1SDA072128R1	1SDA072758R1
	;		-	E1.2L 800 Ekip Hi-Touch LSIG	1SDA072129R1	1SDA072759R1
	1000	130	15	E1.2L 1000 Ekip Dip LI	1SDA072161R1	1SDA072791R1
	•			E1.2L 1000 Ekip Dip LSI	1SDA072162R1	1SDA072792R1
				E1.2L 1000 Ekip Dip LSIG	1SDA072163R1	1SDA072793R1
				E1.2L 1000 Ekip Touch LI	1SDA072164R1	1SDA072794R1
				E1.2L 1000 Ekip Touch LSI	1SDA072165R1	1SDA072795R1
	•			E1.2L 1000 Ekip Touch LSIG	1SDA072166R1	1SDA072796R1
	•			E1.2L 1000 Ekip Hi-Touch LSI	1SDA072168R1	1SDA072798R1
	•			E1.2L 1000 Ekip Hi-Touch LSIG	1SDA072169R1	1SDA072799R1
	1250	130	15	E1.2L 1250 Ekip Dip LI	1SDA072201R1	1SDA072831R1
	1200			E1.2L 1250 Ekip Dip LSI	1SDA072202R1	1SDA072832R1
	•			E1.2L 1250 Ekip Dip LSIG	1SDA072203R1	1SDA072833R1
	į			E1.2L 1250 Ekip Touch LI	1SDA072204R1	1SDA072834R1
	•			E1.2L 1250 Ekip Touch LSI	1SDA072205R1	1SDA072835R1
	•			E1.2L 1250 Ekip Touch LSIG	1SDA072206R1	1SDA072836R1
	; ;			E1.2L 1250 Ekip Hi-Touch LSI	1SDA072208R1	1SDA072838R1
				E1.2L 1250 Ekip Hi-Touch LSIG	1SDA072209R1	1SDA072839R1
.2B	1600	42	42	E2.2B 1600 Ekip Dip LI	1SDA072331R1	1SDA072961R1
	•		-	E2.2B 1600 Ekip Dip LSI	1SDA072332R1	1SDA072962R1
	•			E2.2B 1600 Ekip Dip LSIG	1SDA072333R1	1SDA072963R1
	•			E2.2B 1600 Ekip Touch LI	1SDA072334R1	1SDA072964R1
			-	E2.2B 1600 Ekip Touch LSI	1SDA072335R1	1SDA072965R1
	į			E2.2B 1600 Ekip Touch LSIG	1SDA072336R1	1SDA072966R1
	İ			E2.2B 1600 Ekip Hi-Touch LSI	1SDA072338R1	1SDA072968R1
	•			E2.2B 1600 Ekip Hi-Touch LSIG	1SDA072339R1	1SDA072969R1
	2000	42	42	E2.2B 2000 Ekip Dip LI	1SDA072371R1	1SDA073001R1
			<u> </u>	E2.2B 2000 Ekip Dip LSI	1SDA072372R1	1SDA073002R1
	•			E2.2B 2000 Ekip Dip LSIG	1SDA072373R1	1SDA073003R1
				E2.2B 2000 Ekip Touch LI	1SDA072374R1	1SDA073004R1
	:		<u> </u>	E2.2B 2000 Ekip Touch LSI	1SDA072375R1	1SDA073005R1
	;			E2.2B 2000 Ekip Touch LSIG	1SDA072376R1	1SDA073006R1
				E2.2B 2000 Ekip Hi-Touch LSI	1SDA072378R1	1SDA073008R1
	1			E2.2B 2000 Ekip Hi-Touch LSIG	1SDA072379R1	1SDA073009R1



SACE Emax E2.2N • Mobile part of withdrawable circuit-breaker (MP)

ze			lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
2N	800	66	66	E2.2N 800 Ekip Dip LI	1SDA072241R1	1SDA072871R1
				E2.2N 800 Ekip Dip LSI	1SDA072242R1	1SDA072872R1
				E2.2N 800 Ekip Dip LSIG	1SDA072243R1	1SDA072873R1
				E2.2N 800 Ekip Touch LI	1SDA072244R1	1SDA072874R1
				E2.2N 800 Ekip Touch LSI	1SDA072245R1	1SDA072875R1
				E2.2N 800 Ekip Touch LSIG	1SDA072246R1	1SDA072876R1
				E2.2N 800 Ekip Hi-Touch LSI	1SDA072248R1	1SDA072878R1
				E2.2N 800 Ekip Hi-Touch LSIG	1SDA072249R1	1SDA072879R1
	1000	66	66	E2.2N 1000 Ekip Dip LI	1SDA072271R1	1SDA072901R1
				E2.2N 1000 Ekip Dip LSI	1SDA072272R1	1SDA072902R1
	:			E2.2N 1000 Ekip Dip LSIG	1SDA072273R1	1SDA072903R1
				E2.2N 1000 Ekip Touch LI	1SDA072274R1	1SDA072904R1
				E2.2N 1000 Ekip Touch LSI	1SDA072275R1	1SDA072905R1
			:	E2.2N 1000 Ekip Touch LSIG	1SDA072276R1	1SDA072906R1
				E2.2N 1000 Ekip Hi-Touch LSI	1SDA072278R1	1SDA072908R1
				E2.2N 1000 Ekip Hi-Touch LSIG	1SDA072279R1	1SDA072909R1
	1250	66	66	E2.2N 1250 Ekip Dip LI	1SDA072301R1	1SDA072931R1
				E2.2N 1250 Ekip Dip LSI	1SDA072302R1	1SDA072932R1
				E2.2N 1250 Ekip Dip LSIG	1SDA072303R1	1SDA072933R1
				E2.2N 1250 Ekip Touch LI	1SDA072304R1	1SDA072934R1
				E2.2N 1250 Ekip Touch LSI	1SDA072305R1	1SDA072935R1
		-		E2.2N 1250 Ekip Touch LSIG	1SDA072306R1	1SDA072936R1
				E2.2N 1250 Ekip Hi-Touch LSI	1SDA072308R1	1SDA072938R1
				E2.2N 1250 Ekip Hi-Touch LSIG	1SDA072309R1	1SDA072939R1
	1600	66	66	E2.2N 1600 Ekip Dip LI	1SDA072341R1	1SDA072971R1
	•			E2.2N 1600 Ekip Dip LSI	1SDA072342R1	1SDA072972R1
	-			E2.2N 1600 Ekip Dip LSIG	1SDA072343R1	1SDA072973R1
				E2.2N 1600 Ekip Touch LI	1SDA072344R1	1SDA072974R1
				E2.2N 1600 Ekip Touch LSI	1SDA072345R1	1SDA072975R1
				E2.2N 1600 Ekip Touch LSIG	1SDA072346R1	1SDA072976R1
				E2.2N 1600 Ekip Hi-Touch LSI	1SDA072348R1	1SDA072978R1
				E2.2N 1600 Ekip Hi-Touch LSIG	1SDA072349R1	1SDA072979R1
	2000	66	66	E2.2N 2000 Ekip Dip LI	1SDA072381R1	1SDA073011R1
	:		[E2.2N 2000 Ekip Dip LSI	1SDA072382R1	1SDA073012R1
				E2.2N 2000 Ekip Dip LSIG	1SDA072383R1	1SDA073013R1
				E2.2N 2000 Ekip Touch LI	1SDA072384R1	1SDA073014R1
				E2.2N 2000 Ekip Touch LSI	1SDA072385R1	1SDA073015R1
	-			E2.2N 2000 Ekip Touch LSIG	1SDA072386R1	1SDA073016R1
				E2.2N 2000 Ekip Hi-Touch LSI	1SDA072388R1	1SDA073018R1
				E2.2N 2000 Ekip Hi-Touch LSIG	1SDA072389R1	1SDA073019R1
	2500	66	66	E2.2N 2500 Ekip Dip LI	1SDA072411R1	1SDA073041R1
				E2.2N 2500 Ekip Dip LSI	1SDA072412R1	1SDA073042R1
				E2.2N 2500 Ekip Dip LSIG	1SDA072413R1	1SDA073043R1
				E2.2N 2500 Ekip Touch LI	1SDA072414R1	1SDA073044R1
		•		E2.2N 2500 Ekip Touch LSI	1SDA072415R1	1SDA073045R1
	:		:	E2.2N 2500 Ekip Touch LSIG	1SDA072416R1	1SDA073046R1
	:		<u> </u>	E2.2N 2500 Ekip Hi-Touch LSI	1SDA072418R1	1SDA073048R1
		-	:	E2.2N 2500 Ekip Hi-Touch LSIG	1SDA072419R1	1SDA073049R1



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

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
2.28	250	85	66	E2.2S 250 Ekip Dip LI	1SDA073648R1	1SDA073658R1
				E2.2S 250 Ekip Dip LSI	1SDA073649R1	1SDA073659R1
				E2.2S 250 Ekip Dip LSIG	1SDA073650R1	1SDA073660R1
				E2.2S 250 Ekip Touch LI	1SDA073651R1	1SDA073661R1
				E2.2S 250 Ekip Touch LSI	1SDA073652R1	1SDA073662R1
				E2.2S 250 Ekip Touch LSIG	1SDA073653R1	1SDA073663R1
				E2.2S 250 Ekip Hi-Touch LSI	1SDA073655R1	1SDA073665R1
				E2.2S 250 Ekip Hi-Touch LSIG	1SDA073656R1	1SDA073666R1
	800	85	66	E2.2S 800 Ekip Dip LI	1SDA072251R1	1SDA072881R1
				E2.2S 800 Ekip Dip LSI	1SDA072252R1	1SDA072882R1
				E2.2S 800 Ekip Dip LSIG	1SDA072253R1	1SDA072883R1
				E2.2S 800 Ekip Touch LI	1SDA072254R1	1SDA072884R1
				E2.2S 800 Ekip Touch LSI	1SDA072255R1	1SDA072885R1
				E2.2S 800 Ekip Touch LSIG	1SDA072256R1	1SDA072886R1
				E2.2S 800 Ekip Hi-Touch LSI	1SDA072258R1	1SDA072888R1
				E2.2S 800 Ekip Hi-Touch LSIG	1SDA072259R1	1SDA072889R1
	1000	85	66	E2.2S 1000 Ekip Dip LI	1SDA072281R1	1SDA072911R1
				E2.2S 1000 Ekip Dip LSI	1SDA072282R1	1SDA072912R1
				E2.2S 1000 Ekip Dip LSIG	1SDA072283R1	1SDA072913R1
				E2.2S 1000 Ekip Touch LI	1SDA072284R1	1SDA072914R1
				E2.2S 1000 Ekip Touch LSI	1SDA072285R1	1SDA072915R1
				E2.2S 1000 Ekip Touch LSIG	1SDA072286R1	1SDA072916R1
				E2.2S 1000 Ekip Hi-Touch LSI	1SDA072288R1	1SDA072918R1
			:	E2.2S 1000 Ekip Hi-Touch LSIG	1SDA072289R1	1SDA072919R1
	1250	85	66	E2.2S 1250 Ekip Dip LI	1SDA072311R1	1SDA072941R1
			:	E2.2S 1250 Ekip Dip LSI	1SDA072312R1	1SDA072942R1
				E2.2S 1250 Ekip Dip LSIG	1SDA072313R1	1SDA072943R1
				E2.2S 1250 Ekip Touch LI	1SDA072314R1	1SDA072944R1
			:	E2.2S 1250 Ekip Touch LSI	1SDA072315R1	1SDA072945R1
				E2.2S 1250 Ekip Touch LSIG	1SDA072316R1	1SDA072946R1
			:	E2.2S 1250 Ekip Hi-Touch LSI	1SDA072318R1	1SDA072948R1
				E2.2S 1250 Ekip Hi-Touch LSIG	1SDA072319R1	1SDA072949R1



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

Size	lu	lcu	lcw		3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
2.28	1600	85	66	E2.2S 1600 Ekip Dip LI	1SDA072351R1	1SDA072981R1
				E2.2S 1600 Ekip Dip LSI	1SDA072352R1	1SDA072982R1
				E2.2S 1600 Ekip Dip LSIG	1SDA072353R1	1SDA072983R1
				E2.2S 1600 Ekip Touch LI	1SDA072354R1	1SDA072984R1
				E2.2S 1600 Ekip Touch LSI	1SDA072355R1	1SDA072985R1
				E2.2S 1600 Ekip Touch LSIG	1SDA072356R1	1SDA072986R1
				E2.2S 1600 Ekip Hi-Touch LSI	1SDA072358R1	1SDA072988R1
			E2.2S 1600 Ekip Hi-Touch LSIG	1SDA072359R1	1SDA072989R1	
	2000	85	66	E2.2S 2000 Ekip Dip LI	1SDA072391R1	1SDA073021R1
				E2.2S 2000 Ekip Dip LSI	1SDA072392R1	1SDA073022R1
				E2.2S 2000 Ekip Dip LSIG	1SDA072393R1	1SDA073023R1
				E2.2S 2000 Ekip Touch LI	1SDA072394R1	1SDA073024R1
				E2.2S 2000 Ekip Touch LSI	1SDA072395R1	1SDA073025R1
				E2.2S 2000 Ekip Touch LSIG	1SDA072396R1	1SDA073026R1
				E2.2S 2000 Ekip Hi-Touch LSI	1SDA072398R1	1SDA073028R1
				E2.2S 2000 Ekip Hi-Touch LSIG	1SDA072399R1	1SDA073029R1
	2500	85	66	E2.2S 2500 Ekip Dip LI	1SDA072421R1	1SDA073051R1
			-	E2.2S 2500 Ekip Dip LSI	1SDA072422R1	1SDA073052R1
				E2.2S 2500 Ekip Dip LSIG	1SDA072423R1	1SDA073053R1
				E2.2S 2500 Ekip Touch LI	1SDA072424R1	1SDA073054R1
				E2.2S 2500 Ekip Touch LSI	1SDA072425R1	1SDA073055R1
				E2.2S 2500 Ekip Touch LSIG	1SDA072426R1	1SDA073056R1
				E2.2S 2500 Ekip Hi-Touch LSI	1SDA072428R1	1SDA073058R1
				E2.2S 2500 Ekip Hi-Touch LSIG	1SDA072429R1	1SDA073059R1



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

	lu		lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
H	800	100	85	E2.2H 800 Ekip Dip LI	1SDA072261R1	1SDA072891R1
				E2.2H 800 Ekip Dip LSI	1SDA072262R1	1SDA072892R1
				E2.2H 800 Ekip Dip LSIG	1SDA072263R1	1SDA072893R1
	:			E2.2H 800 Ekip Touch LI	1SDA072264R1	1SDA072894R1
				E2.2H 800 Ekip Touch LSI	1SDA072265R1	1SDA072895R1
	:			E2.2H 800 Ekip Touch LSIG	1SDA072266R1	1SDA072896R1
	:			E2.2H 800 Ekip Hi-Touch LSI	1SDA072268R1	1SDA072898R1
				E2.2H 800 Ekip Hi-Touch LSIG	1SDA072269R1	1SDA072899R1
	1000	100	85	E2.2H 1000 Ekip Dip LI	1SDA072291R1	1SDA072921R1
		-		E2.2H 1000 Ekip Dip LSI	1SDA072292R1	1SDA072922R1
				E2.2H 1000 Ekip Dip LSIG	1SDA072293R1	1SDA072923R1
				E2.2H 1000 Ekip Touch LI	1SDA072294R1	1SDA072924R1
				E2.2H 1000 Ekip Touch LSI	1SDA072295R1	1SDA072925R1
				E2.2H 1000 Ekip Touch LSIG	1SDA072296R1	1SDA072926R1
		•	:	E2.2H 1000 Ekip Hi-Touch LSI	1SDA072298R1	1SDA072928R1
		İ		E2.2H 1000 Ekip Hi-Touch LSIG	1SDA072299R1	1SDA072929R1
	1250	100	85	E2.2H 1250 Ekip Dip LI	1SDA072321R1	1SDA072951R1
		•		E2.2H 1250 Ekip Dip LSI	1SDA072322R1	1SDA072952R1
				E2.2H 1250 Ekip Dip LSIG	1SDA072323R1	1SDA072953R1
				E2.2H 1250 Ekip Touch LI	1SDA072324R1	1SDA072954R1
				E2.2H 1250 Ekip Touch LSI	1SDA072325R1	1SDA072955R1
		•		E2.2H 1250 Ekip Touch LSIG	1SDA072326R1	1SDA072956R1
		İ		E2.2H 1250 Ekip Hi-Touch LSI	1SDA072328R1	1SDA072958R1
		İ		E2.2H 1250 Ekip Hi-Touch LSIG	1SDA072329R1	1SDA072959R1
	1600	100	85	E2.2H 1600 Ekip Dip LI	1SDA072361R1	1SDA072991R1
				E2.2H 1600 Ekip Dip LSI	1SDA072362R1	1SDA072992R1
				E2.2H 1600 Ekip Dip LSIG	1SDA072363R1	1SDA072993R1
				E2.2H 1600 Ekip Touch LI	1SDA072364R1	1SDA072994R1
				E2.2H 1600 Ekip Touch LSI	1SDA072365R1	1SDA072995R1
		-		E2.2H 1600 Ekip Touch LSIG	1SDA072366R1	1SDA072996R1
				E2.2H 1600 Ekip Hi-Touch LSI	1SDA072368R1	1SDA072998R1
				E2.2H 1600 Ekip Hi-Touch LSIG	1SDA072369R1	1SDA072999R1
	2000	100	85	E2.2H 2000 Ekip Dip LI	1SDA072401R1	1SDA073031R1
			-	E2.2H 2000 Ekip Dip LSI	1SDA072402R1	1SDA073032R1
				E2.2H 2000 Ekip Dip LSIG	1SDA072403R1	1SDA073033R1
				E2.2H 2000 Ekip Touch LI	1SDA072404R1	1SDA073034R1
			-	E2.2H 2000 Ekip Touch LSI	1SDA072405R1	1SDA073035R1
			-	E2.2H 2000 Ekip Touch LSIG	1SDA072406R1	1SDA073036R1
				E2.2H 2000 Ekip Hi-Touch LSI	1SDA072408R1	1SDA073038R1
			-	E2.2H 2000 Ekip Hi-Touch LSIG	1SDA072409R1	1SDA073039R1
	2500	100	85	E2.2H 2500 Ekip Dip LI	1SDA072431R1	1SDA073061R1
		İ	-	E2.2H 2500 Ekip Dip LSI	1SDA072432R1	1SDA073062R1
	:	<u>;</u>	:	E2.2H 2500 Ekip Dip LSIG	1SDA072433R1	1SDA073063R1
			:	E2.2H 2500 Ekip Touch LI	1SDA072434R1	1SDA073064R1
	:	:	:	E2.2H 2500 Ekip Touch LSI	1SDA072435R1	1SDA073065R1
			:	E2.2H 2500 Ekip Touch LSIG	1SDA072436R1	1SDA073066R1
				E2.2H 2500 Ekip Hi-Touch LSI	1SDA072438R1	1SDA073068R1
	-	-	-	E2.2H 2500 Ekip Hi-Touch LSIG	1SDA072439R1	1SDA073069R1



SACE Emax E4.2N-S-H • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
E4.2N	3200	66	66	E4.2N 3200 Ekip Dip LI	1SDA072491R1	1SDA073121R1
		[E4.2N 3200 Ekip Dip LSI	1SDA072492R1	1SDA073122R1
		-		E4.2N 3200 Ekip Dip LSIG	1SDA072493R1	1SDA073123R1
		ĺ		E4.2N 3200 Ekip Touch LI	1SDA072494R1	1SDA073124R1
				E4.2N 3200 Ekip Touch LSI	1SDA072495R1	1SDA073125R1
		-		E4.2N 3200 Ekip Touch LSIG	1SDA072496R1	1SDA073126R1
		ĺ		E4.2N 3200 Ekip Hi-Touch LSI	1SDA072498R1	1SDA073128R1
		•		E4.2N 3200 Ekip Hi-Touch LSIG	1SDA072499R1	1SDA073129R1
	4000	66	66	E4.2N 4000 Ekip Dip LI	1SDA072541R1	1SDA073171R1
		-		E4.2N 4000 Ekip Dip LSI	1SDA072542R1	1SDA073172R1
		[E4.2N 4000 Ekip Dip LSIG	1SDA072543R1	1SDA073173R1
				E4.2N 4000 Ekip Touch LI	1SDA072544R1	1SDA073174R1
				E4.2N 4000 Ekip Touch LSI	1SDA072545R1	1SDA073175R1
				E4.2N 4000 Ekip Touch LSIG	1SDA072546R1	1SDA073176R1
	:			E4.2N 4000 Ekip Hi-Touch LSI	1SDA072548R1	1SDA073178R1
		[E4.2N 4000 Ekip Hi-Touch LSIG	1SDA072549R1	1SDA073179R1
4.2S	3200	85	66	E4.2S 3200 Ekip Dip LI	1SDA072501R1	1SDA073131R1
				E4.2S 3200 Ekip Dip LSI	1SDA072502R1	1SDA073132R1
				E4.2S 3200 Ekip Dip LSIG	1SDA072503R1	1SDA073133R1
			; ;	E4.2S 3200 Ekip Touch LI	1SDA072504R1	1SDA073134R1
				E4.2S 3200 Ekip Touch LSI	1SDA072505R1	1SDA073135R1
				E4.2S 3200 Ekip Touch LSIG	1SDA072506R1	1SDA073136R1
				E4.2S 3200 Ekip Hi-Touch LSI	1SDA072508R1	1SDA073138R1
				E4.2S 3200 Ekip Hi-Touch LSIG	1SDA072509R1	1SDA073139R1
	4000	85	66	E4.2S 4000 Ekip Dip LI	1SDA072551R1	1SDA073181R1
	:			E4.2S 4000 Ekip Dip LSI	1SDA072552R1	1SDA073182R1
				E4.2S 4000 Ekip Dip LSIG	1SDA072553R1	1SDA073183R1
				E4.2S 4000 Ekip Touch LI	1SDA072554R1	1SDA073184R1
				E4.2S 4000 Ekip Touch LSI	1SDA072555R1	1SDA073185R1
				E4.2S 4000 Ekip Touch LSIG	1SDA072556R1	1SDA073186R1
				E4.2S 4000 Ekip Hi-Touch LSI	1SDA072558R1	1SDA073188R1
				E4.2S 4000 Ekip Hi-Touch LSIG	1SDA072559R1	1SDA073189R1
1.2H	3200	100	85	E4.2H 3200 Ekip Dip LI	1SDA072511R1	1SDA073141R1
				E4.2H 3200 Ekip Dip LSI	1SDA072512R1	1SDA073142R1
				E4.2H 3200 Ekip Dip LSIG	1SDA072513R1	1SDA073143R1
				E4.2H 3200 Ekip Touch LI	1SDA072514R1	1SDA073144R1
				E4.2H 3200 Ekip Touch LSI	1SDA072515R1	1SDA073145R1
		-		E4.2H 3200 Ekip Touch LSIG	1SDA072516R1	1SDA073146R1
				E4.2H 3200 Ekip Hi-Touch LSI	1SDA072518R1	1SDA073148R1
				E4.2H 3200 Ekip Hi-Touch LSIG	1SDA072519R1	1SDA073149R1
	4000	100	85	E4.2H 4000 Ekip Dip LI	1SDA072561R1	1SDA073191R1
		•		E4.2H 4000 Ekip Dip LSI	1SDA072562R1	1SDA073192R1
				E4.2H 4000 Ekip Dip LSIG	1SDA072563R1	1SDA073193R1
				E4.2H 4000 Ekip Touch LI	1SDA072564R1	1SDA073194R1
	:	:		E4.2H 4000 Ekip Touch LSI	1SDA072565R1	1SDA073195R1
	:	:	<u> </u>	E4.2H 4000 Ekip Touch LSIG	1SDA072566R1	1SDA073196R1
			•	E4.2H 4000 Ekip Hi-Touch LSI	1SDA072568R1	1SDA073198R1
	:	<u> </u>		E4.2H 4000 Ekip Hi-Touch LSIG	1SDA072569R1	1SDA073199R1



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

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
4.2V	2000	150	100	E4.2V 2000 Ekip Dip LI	1SDA072451R1	1SDA073081R1
				E4.2V 2000 Ekip Dip LSI	1SDA072452R1	1SDA073082R1
				E4.2V 2000 Ekip Dip LSIG	1SDA072453R1	1SDA073083R1
				E4.2V 2000 Ekip Touch LI	1SDA072454R1	1SDA073084R1
				E4.2V 2000 Ekip Touch LSI	1SDA072455R1	1SDA073085R1
				E4.2V 2000 Ekip Touch LSIG	1SDA072456R1	1SDA073086R1
				E4.2V 2000 Ekip Hi-Touch LSI	1SDA072458R1	1SDA073088R1
				E4.2V 2000 Ekip Hi-Touch LSIG	1SDA072459R1	1SDA073089R1
	2500	150	100	E4.2V 2500 Ekip Dip LI	1SDA072471R1	1SDA073101R1
				E4.2V 2500 Ekip Dip LSI	1SDA072472R1	1SDA073102R1
				E4.2V 2500 Ekip Dip LSIG	1SDA072473R1	1SDA073103R1
				E4.2V 2500 Ekip Touch LI	1SDA072474R1	1SDA073104R1
				E4.2V 2500 Ekip Touch LSI	1SDA072475R1	1SDA073105R1
				E4.2V 2500 Ekip Touch LSIG	1SDA072476R1	1SDA073106R1
				E4.2V 2500 Ekip Hi-Touch LSI	1SDA072478R1	1SDA073108R1
				E4.2V 2500 Ekip Hi-Touch LSIG	1SDA072479R1	1SDA073109R1
	3200	150	100	E4.2V 3200 Ekip Dip LI	1SDA072521R1	1SDA073151R1
				E4.2V 3200 Ekip Dip LSI	1SDA072522R1	1SDA073152R1
				E4.2V 3200 Ekip Dip LSIG	1SDA072523R1	1SDA073153R1
				E4.2V 3200 Ekip Touch LI	1SDA072524R1	1SDA073154R1
				E4.2V 3200 Ekip Touch LSI	1SDA072525R1	1SDA073155R1
				E4.2V 3200 Ekip Touch LSIG	1SDA072526R1	1SDA073156R1
				E4.2V 3200 Ekip Hi-Touch LSI	1SDA072528R1	1SDA073158R1
				E4.2V 3200 Ekip Hi-Touch LSIG	1SDA072529R1	1SDA073159R1
	4000	150	100	E4.2V 4000 Ekip Dip LI	1SDA072571R1	1SDA073201R1
				E4.2V 4000 Ekip Dip LSI	1SDA072572R1	1SDA073202R1
				E4.2V 4000 Ekip Dip LSIG	1SDA072573R1	1SDA073203R1
				E4.2V 4000 Ekip Touch LI	1SDA072574R1	1SDA073204R1
				E4.2V 4000 Ekip Touch LSI	1SDA072575R1	1SDA073205R1
				E4.2V 4000 Ekip Touch LSIG	1SDA072576R1	1SDA073206R1
				E4.2V 4000 Ekip Hi-Touch LSI	1SDA072578R1	1SDA073208R1
				E4.2V 4000 Ekip Hi-Touch LSIG	1SDA072579R1	1SDA073209R1



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

Size	lu	lcu	lcw (1s)	Туре	3 Poles	4 Poles
		(440 V)			Code	Code
6.2H	4000	100	100	E6.2H 4000 Ekip Dip LI	1SDA072581R1	1SDA073211R1
				E6.2H 4000 Ekip Dip LSI	1SDA072582R1	1SDA073212R1
				E6.2H 4000 Ekip Dip LSIG	1SDA072583R1	1SDA073213R1
				E6.2H 4000 Ekip Touch LI	1SDA072584R1	1SDA073214R1
				E6.2H 4000 Ekip Touch LSI	1SDA072585R1	1SDA073215R1
				E6.2H 4000 Ekip Touch LSIG	1SDA072586R1	1SDA073216R1
				E6.2H 4000 Ekip Hi-Touch LSI	1SDA072588R1	1SDA073218R1
				E6.2H 4000 Ekip Hi-Touch LSIG	1SDA072589R1	1SDA073219R1
	5000	100	100	E6.2H 5000 Ekip Dip LI	1SDA072611R1	1SDA073241R1
				E6.2H 5000 Ekip Dip LSI	1SDA072612R1	1SDA073242R1
				E6.2H 5000 Ekip Dip LSIG	1SDA072613R1	1SDA073243R1
				E6.2H 5000 Ekip Touch LI	1SDA072614R1	1SDA073244R1
				E6.2H 5000 Ekip Touch LSI	1SDA072615R1	1SDA073245R1
				E6.2H 5000 Ekip Touch LSIG	1SDA072616R1	1SDA073246R1
				E6.2H 5000 Ekip Hi-Touch LSI	1SDA072618R1	1SDA073248R1
				E6.2H 5000 Ekip Hi-Touch LSIG	1SDA072619R1	1SDA073249R1
	6300	100	100	E6.2H 6300 Ekip Dip LI	1SDA072641R1	1SDA073271R1
				E6.2H 6300 Ekip Dip LSI	1SDA072642R1	1SDA073272R1
				E6.2H 6300 Ekip Dip LSIG	1SDA072643R1	1SDA073273R1
				E6.2H 6300 Ekip Touch LI	1SDA072644R1	1SDA073274R1
				E6.2H 6300 Ekip Touch LSI	1SDA072645R1	1SDA073275R1
				E6.2H 6300 Ekip Touch LSIG	1SDA072646R1	1SDA073276R1
				E6.2H 6300 Ekip Hi-Touch LSI	1SDA072648R1	1SDA073278R1
				E6.2H 6300 Ekip Hi-Touch LSIG	1SDA072649R1	1SDA073279R1
.2V	4000	150	100	E6.2V 4000 Ekip Dip LI	1SDA072591R1	1SDA073221R1
				E6.2V 4000 Ekip Dip LSI	1SDA072592R1	1SDA073222R1
				E6.2V 4000 Ekip Dip LSIG	1SDA072593R1	1SDA073223R1
				E6.2V 4000 Ekip Touch LI	1SDA072594R1	1SDA073224R1
				E6.2V 4000 Ekip Touch LSI	1SDA072595R1	1SDA073225R1
				E6.2V 4000 Ekip Touch LSIG	1SDA072596R1	1SDA073226R1
				E6.2V 4000 Ekip Hi-Touch LSI	1SDA072598R1	1SDA073228R1
				E6.2V 4000 Ekip Hi-Touch LSIG	1SDA072599R1	1SDA073229R1
	5000	150	100	E6.2V 5000 Ekip Dip LI	1SDA072621R1	1SDA073251R1
				E6.2V 5000 Ekip Dip LSI	1SDA072622R1	1SDA073252R1
				E6.2V 5000 Ekip Dip LSIG	1SDA072623R1	1SDA073253R1
				E6.2V 5000 Ekip Touch LI	1SDA072624R1	1SDA073254R1
				E6.2V 5000 Ekip Touch LSI	1SDA072625R1	1SDA073255R1
				E6.2V 5000 Ekip Touch LSIG	1SDA072626R1	1SDA073256R1
				E6.2V 5000 Ekip Hi-Touch LSI	1SDA072628R1	1SDA073258R1
				E6.2V 5000 Ekip Hi-Touch LSIG	1SDA072629R1	1SDA073259R1
	6300	150	100	E6.2V 6300 Ekip Dip LI	1SDA072651R1	1SDA073281R1
				E6.2V 6300 Ekip Dip LSI	1SDA072652R1	1SDA073282R1
				E6.2V 6300 Ekip Dip LSIG	1SDA072653R1	1SDA073283R1
	:		:	E6.2V 6300 Ekip Touch LI	1SDA072654R1	1SDA073284R1
			[E6.2V 6300 Ekip Touch LSI	1SDA072655R1	1SDA073285R1
	:		:	E6.2V 6300 Ekip Touch LSIG	1SDA072656R1	1SDA073286R1
	-			E6.2V 6300 Ekip Hi-Touch LSI	1SDA072658R1	1SDA073288R1
	Ē		[E6.2V 6300 Ekip Hi-Touch LSIG	1SDA072659R1	1SDA073289R1



SACE Emax E6.2X • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
E6.2X	4000	200	120	E6.2X 4000 Ekip Dip LI	1SDA072601R1	1SDA073231R1
				E6.2X 4000 Ekip Dip LSI	1SDA072602R1	1SDA073232R1
			:	E6.2X 4000 Ekip Dip LSIG	1SDA072603R1	1SDA073233R1
			:	E6.2X 4000 Ekip Touch LI	1SDA072604R1	1SDA073234R1
				E6.2X 4000 Ekip Touch LSI	1SDA072605R1	1SDA073235R1
			:	E6.2X 4000 Ekip Touch LSIG	1SDA072606R1	1SDA073236R1
			:	E6.2X 4000 Ekip Hi-Touch LSI	1SDA072608R1	1SDA073238R1
				E6.2X 4000 Ekip Hi-Touch LSIG	1SDA072609R1	1SDA073239R1
	5000	200	120	E6.2X 5000 Ekip Dip LI	1SDA072631R1	1SDA073261R1
				E6.2X 5000 Ekip Dip LSI	1SDA072632R1	1SDA073262R1
				E6.2X 5000 Ekip Dip LSIG	1SDA072633R1	1SDA073263R1
				E6.2X 5000 Ekip Touch LI	1SDA072634R1	1SDA073264R1
				E6.2X 5000 Ekip Touch LSI	1SDA072635R1	1SDA073265R1
				E6.2X 5000 Ekip Touch LSIG	1SDA072636R1	1SDA073266R1
				E6.2X 5000 Ekip Hi-Touch LSI	1SDA072638R1	1SDA073268R1
				E6.2X 5000 Ekip Hi-Touch LSIG	1SDA072639R1	1SDA073269R1
	6300	200	120	E6.2X 6300 Ekip Dip LI	1SDA072661R1	1SDA073291R1
			:	E6.2X 6300 Ekip Dip LSI	1SDA072662R1	1SDA073292R1
				E6.2X 6300 Ekip Dip LSIG	1SDA072663R1	1SDA073293R1
				E6.2X 6300 Ekip Touch LI	1SDA072664R1	1SDA073294R1
				E6.2X 6300 Ekip Touch LSI	1SDA072665R1	1SDA073295R1
				E6.2X 6300 Ekip Touch LSIG	1SDA072666R1	1SDA073296R1
				E6.2X 6300 Ekip Hi-Touch LSI	1SDA072668R1	1SDA073298R1
				E6.2X 6300 Ekip Hi-Touch LSIG	1SDA072669R1	1SDA073299R1



SACE Emax E6.2H-V/f Full size • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	Icu (440 V)	Icw (1s)	Туре	4 Poles	
					Code	
6.2H/f	4000	100	100	E6.2H/f 4000 Ekip Dip LI	1SDA073301R1	
				E6.2H/f 4000 Ekip Dip LSI	1SDA073302R1	
				E6.2H/f 4000 Ekip Dip LSIG	1SDA073303R1	
				E6.2H/f 4000 Ekip Touch LI	1SDA073304R1	
				E6.2H/f 4000 Ekip Touch LSI	1SDA073305R1	
				E6.2H/f 4000 Ekip Touch LSIG	1SDA073306R1	
			:	E6.2H/f 4000 Ekip Hi-Touch LSI	1SDA073308R1	
				E6.2H/f 4000 Ekip Hi-Touch LSIG	1SDA073309R1	
	5000	100	100	E6.2H/f 5000 Ekip Dip LI	1SDA073331R1	
			:	E6.2H/f 5000 Ekip Dip LSI	1SDA073332R1	
			:	E6.2H/f 5000 Ekip Dip LSIG	1SDA073333R1	
				E6.2H/f 5000 Ekip Touch LI	1SDA073334R1	
				E6.2H/f 5000 Ekip Touch LSI	1SDA073335R1	
			•	E6.2H/f 5000 Ekip Touch LSIG	1SDA073336R1	
			:	E6.2H/f 5000 Ekip Hi-Touch LSI	1SDA073338R1	
		ŧ	:	E6.2H/f 5000 Ekip Hi-Touch LSIG	1SDA073339R1	
	6300	100	100	E6.2H/f 6300 Ekip Dip LI	1SDA073361R1	
				E6.2H/f 6300 Ekip Dip LSI	1SDA073362R1	
				E6.2H/f 6300 Ekip Dip LSIG	1SDA073363R1	
				E6.2H/f 6300 Ekip Touch LI	1SDA073364R1	
				E6.2H/f 6300 Ekip Touch LSI	1SDA073365R1	
				E6.2H/f 6300 Ekip Touch LSIG	1SDA073366R1	
				E6.2H/f 6300 Ekip Hi-Touch LSI	1SDA073368R1	
				E6.2H/f 6300 Ekip Hi-Touch LSIG	1SDA073369R1	
.2V/f	4000	150	100	E6.2V/f 4000 Ekip Dip LI	1SDA073311R1	
, .	4000	100		E6.2V/f 4000 Ekip Dip LSI	1SDA073312R1	
				E6.2V/f 4000 Ekip Dip LSIG	1SDA073313R1	
					1SDA073314R1	
				E6.2V/f 4000 Ekip Touch LI E6.2V/f 4000 Ekip Touch LSI		
					1SDA073315R1	
				E6.2V/f 4000 Ekip Touch LSIG	1SDA073316R1	
				E6.2V/f 4000 Ekip Hi-Touch LSI	1SDA073318R1	
	5000			E6.2V/f 4000 Ekip Hi-Touch LSIG	1SDA073319R1	
	5000	150	100	E6.2V/f 5000 Ekip Dip LI	1SDA073341R1	
				E6.2V/f 5000 Ekip Dip LSI	1SDA073342R1	
				E6.2V/f 5000 Ekip Dip LSIG	1SDA073343R1	
				E6.2V/f 5000 Ekip Touch LI	1SDA073344R1	
			-	E6.2V/f 5000 Ekip Touch LSI	1SDA073345R1	
				E6.2V/f 5000 Ekip Touch LSIG	1SDA073346R1	
				E6.2V/f 5000 Ekip Hi-Touch LSI	1SDA073348R1	
				E6.2V/f 5000 Ekip Hi-Touch LSIG	1SDA073349R1	
	6300	150	100	E6.2V/f 6300 Ekip Dip LI	1SDA073371R1	
				E6.2V/f 6300 Ekip Dip LSI	1SDA073372R1	
				E6.2V/f 6300 Ekip Dip LSIG	1SDA073373R1	
			:	E6.2V/f 6300 Ekip Touch LI	1SDA073374R1	
				E6.2V/f 6300 Ekip Touch LSI	1SDA073375R1	
				E6.2V/f 6300 Ekip Touch LSIG	1SDA073376R1	
				E6.2V/f 6300 Ekip Hi-Touch LSI	1SDA073378R1	
				E6.2V/f 6300 Ekip Hi-Touch LSIG	1SDA073379R1	

Automatic circuit-breakers Withdrawable version for power distribution



SACE Emax E6.2X/f Full size • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	Icu (440 V)	lcw (1s)	Туре	4 Poles
	į				Code
E6.2X/f	4000	200	120	E6.2X/f 4000 Ekip Dip LI	1SDA073321R1
				E6.2X/f 4000 Ekip Dip LSI	1SDA073322R1
	:			E6.2X/f 4000 Ekip Dip LSIG	1SDA073323R1
	•			E6.2X/f 4000 Ekip Touch LI	1SDA073324R1
				E6.2X/f 4000 Ekip Touch LSI	1SDA073325R1
	:			E6.2X/f 4000 Ekip Touch LSIG	1SDA073326R1
				E6.2X/f 4000 Ekip Hi-Touch LSI	1SDA073328R1
		į		E6.2X/f 4000 Ekip Hi-Touch LSIG	1SDA073329R1
	5000	200	120	E6.2X/f 5000 Ekip Dip LI	1SDA073351R1
				E6.2X/f 5000 Ekip Dip LSI	1SDA073352R1
	ĺ			E6.2X/f 5000 Ekip Dip LSIG	1SDA073353R1
				E6.2X/f 5000 Ekip Touch LI	1SDA073354R1
				E6.2X/f 5000 Ekip Touch LSI	1SDA073355R1
				E6.2X/f 5000 Ekip Touch LSIG	1SDA073356R1
				E6.2X/f 5000 Ekip Hi-Touch LSI	1SDA073358R1
				E6.2X/f 5000 Ekip Hi-Touch LSIG	1SDA073359R1
	6300	200	120	E6.2X/f 6300 Ekip Dip LI	1SDA073381R1
				E6.2X/f 6300 Ekip Dip LSI	1SDA073382R1
				E6.2X/f 6300 Ekip Dip LSIG	1SDA073383R1
				E6.2X/f 6300 Ekip Touch LI	1SDA073384R1
				E6.2X/f 6300 Ekip Touch LSI	1SDA073385R1
	ĺ			E6.2X/f 6300 Ekip Touch LSIG	1SDA073386R1
				E6.2X/f 6300 Ekip Hi-Touch LSI	1SDA073388R1
				E6.2X/f 6300 Ekip Hi-Touch LSIG	1SDA073389R1

Automatic circuit-breakers Fixed version for generators



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

Size	lu		lcw	Туре	3 Poles	4 Poles	
	•	(440 V)	(1s)		Code	Code	
1.2B	630	42	42	E1.2B 630 Ekip G Touch LSIG	1SDA070707R1	1SDA071337R1	
				E1.2B 630 Ekip G Hi-Touch LSIG	1SDA070710R1	1SDA071340R1	
	800	42	42	E1.2B 800 Ekip G Touch LSIG	1SDA070747R1	1SDA071377R1	
			:	E1.2B 800 Ekip G Hi-Touch LSIG	1SDA070750R1	1SDA071380R1	
	1000	42	42	E1.2B 1000 Ekip G Touch LSIG	1SDA070787R1	1SDA071417R1	
	:			E1.2B 1000 Ekip G Hi-Touch LSIG	1SDA070790R1	1SDA071420R1	
	1250	42	42	E1.2B 1250 Ekip G Touch LSIG	1SDA070827R1	1SDA071457R1	
				E1.2B 1250 Ekip G Hi-Touch LSIG	1SDA070830R1	1SDA071460R1	
	1600	42	42	E1.2B 1600 Ekip G Touch LSIG	1SDA070867R1	1SDA071497R1	
				E1.2B 1600 Ekip G Hi-Touch LSIG	1SDA070870R1	1SDA071500R1	
1.2C	630	50	42	E1.2C 630 Ekip G Touch LSIG	1SDA070717R1	1SDA071347R1	
				E1.2C 630 Ekip G Hi-Touch LSIG	1SDA070720R1	1SDA071350R1	
	800	50	42	E1.2C 800 Ekip G Touch LSIG	1SDA070757R1	1SDA071387R1	
				E1.2C 800 Ekip G Hi-Touch LSIG	1SDA070760R1	1SDA071390R1	
	1000 50		42	E1.2C 1000 Ekip G Touch LSIG	1SDA070797R1	1SDA071427R1	
				E1.2C 1000 Ekip G Hi-Touch LSIG	1SDA070800R1	1SDA071430R1	
	1250	50	42	E1.2C 1250 Ekip G Touch LSIG	1SDA070837R1	1SDA071467R1	
	:			E1.2C 1250 Ekip G Hi-Touch LSIG	1SDA070840R1	1SDA071470R1	
	1600	50	42	E1.2C 1600 Ekip G Touch LSIG	1SDA070877R1	1SDA071507R1	
				E1.2C 1600 Ekip G Hi-Touch LSIG	1SDA070880R1	1SDA071510R1	
1.2N	250	66	50	E1.2N 250 Ekip G Touch LSIG	1SDA070697R1	1SDA071327R1	
			:	E1.2N 250 Ekip G Hi-Touch LSIG	1SDA070700R1	1SDA071330R1	
	630	66	50	E1.2N 630 Ekip G Touch LSIG	1SDA070727R1	1SDA071357R1	
				E1.2N 630 Ekip G Hi-Touch LSIG	1SDA070730R1	1SDA071360R1	
	800	66	50	E1.2N 800 Ekip G Touch LSIG	1SDA070767R1	1SDA071397R1	
		:		E1.2N 800 Ekip G Hi-Touch LSIG	1SDA070770R1	1SDA071400R1	
	1000	66	50	E1.2N 1000 Ekip G Touch LSIG	1SDA070807R1	1SDA071437R1	
	:			E1.2N 1000 Ekip G Hi-Touch LSIG	1SDA070810R1	1SDA071440R1	
	1250	66	50	E1.2N 1250 Ekip G Touch LSIG	1SDA070847R1	1SDA071477R1	
				E1.2N 1250 Ekip G Hi-Touch LSIG	1SDA070850R1	1SDA071480R1	
	1600	66	50	E1.2N 1600 Ekip G Touch LSIG	1SDA070887R1	1SDA071517R1	
				E1.2N 1600 Ekip G Hi-Touch LSIG	1SDA070890R1	1SDA071520R1	
1.2L	630	130	15	E1.2L 630 Ekip G Touch LSIG	1SDA070737R1	1SDA071367R1	
				E1.2L 630 Ekip G Hi-Touch LSIG	1SDA070740R1	1SDA071370R1	
	800	130	15	E1.2L 800 Ekip G Touch LSIG	1SDA070777R1	1SDA071407R1	
				E1.2L 800 Ekip G Hi-Touch LSIG	1SDA070780R1	1SDA071410R1	
	1000	130	15	E1.2L 1000 Ekip G Touch LSIG	1SDA070817R1	1SDA071447R1	
	:			E1.2L 1000 Ekip G Hi-Touch LSIG	1SDA070820R1	1SDA071450R1	
	1250	130	15	E1.2L 1250 Ekip G Touch LSIG	1SDA070857R1	1SDA071487R1	
			:	E1.2L 1250 Ekip G Hi-Touch LSIG	1SDA070860R1	1SDA071490R1	

Automatic circuit-breakers Fixed version for generators



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

Size	lu	lcu	lcw	Type	3 Poles	4 Poles	
		(440 V)	(1s)		Code	Code	
E2.2B	1600	42	42	E2.2B 1600 Ekip G Touch LSIG	1SDA070987R1	1SDA071617R1	
				E2.2B 1600 Ekip G Hi-Touch LSIG	1SDA070990R1	1SDA071620R1	
	2000	42	42	E2.2B 2000 Ekip G Touch LSIG	1SDA071027R1	1SDA071657R1	
				E2.2B 2000 Ekip G Hi-Touch LSIG	1SDA071030R1	1SDA071660R1	
2.2N	800	66	66	E2.2N 800 Ekip G Touch LSIG	1SDA070897R1	1SDA071527R1	
				E2.2N 800 Ekip G Hi-Touch LSIG	1SDA070900R1	1SDA071530R1	
	1000	66	66	E2.2N 1000 Ekip G Touch LSIG	1SDA070927R1	1SDA071557R1	
				E2.2N 1000 Ekip G Hi-Touch LSIG	1SDA070930R1	1SDA071560R1	
	1250	66	66	E2.2N 1250 Ekip G Touch LSIG	1SDA070957R1	1SDA071587R1	
				E2.2N 1250 Ekip G Hi-Touch LSIG	1SDA070960R1	1SDA071590R1	
	1600 66		66	E2.2N 1600 Ekip G Touch LSIG	1SDA070997R1	1SDA071627R1	
			İ	E2.2N 1600 Ekip G Hi-Touch LSIG	1SDA071000R1	1SDA071630R1	
	2000	66	66	E2.2N 2000 Ekip G Touch LSIG	1SDA071037R1	1SDA071667R1	
				E2.2N 2000 Ekip G Hi-Touch LSIG	1SDA071040R1	1SDA071670R1	
	2500	66	66	E2.2N 2500 Ekip G Touch LSIG	1SDA071067R1	1SDA071697R1	
				E2.2N 2500 Ekip G Hi-Touch LSIG	1SDA071070R1	1SDA071700R1	
E2.2S	250	250 85	50 85	66	E2.2S 250 Ekip G Touch LSIG	1SDA073634R1	1SDA073644R1
				E2.2S 250 Ekip G Hi-Touch LSIG	1SDA073637R1	1SDA073647R1	
	800	85	66	E2.2S 800 Ekip G Touch LSIG	1SDA070907R1	1SDA071537R1	
				E2.2S 800 Ekip G Hi-Touch LSIG	1SDA070910R1	1SDA071540R1	
	1000	85	66	E2.2S 1000 Ekip G Touch LSIG	1SDA070937R1	1SDA071567R1	
	•			E2.2S 1000 Ekip G Hi-Touch LSIG	1SDA070940R1	1SDA071570R1	
	1250 85		66	E2.2S 1250 Ekip G Touch LSIG	1SDA070967R1	1SDA071597R1	
		200 00 0		E2.2S 1250 Ekip G Hi-Touch LSIG	1SDA070970R1	1SDA071600R1	
	1600	85	66	E2.2S 1600 Ekip G Touch LSIG	1SDA071007R1	1SDA071637R1	
				E2.2S 1600 Ekip G Hi-Touch LSIG	1SDA071010R1	1SDA071640R1	
	2000	85	66	E2.2S 2000 Ekip G Touch LSIG	1SDA071047R1	1SDA071677R1	
				E2.2S 2000 Ekip G Hi-Touch LSIG	1SDA071050R1	1SDA071680R1	
	2500	85	66	E2.2S 2500 Ekip G Touch LSIG	1SDA071077R1	1SDA071707R1	
				E2.2S 2500 Ekip G Hi-Touch LSIG	1SDA071080R1	1SDA071710R1	
2.2H	800	100	85	E2.2H 800 Ekip G Touch LSIG	1SDA070917R1	1SDA071547R1	
				E2.2H 800 Ekip G Hi-Touch LSIG	1SDA070920R1	1SDA071550R1	
	1000	100	85	E2.2H 1000 Ekip G Touch LSIG	1SDA070947R1	1SDA071577R1	
				E2.2H 1000 Ekip G Hi-Touch LSIG	1SDA070950R1	1SDA071580R1	
	1250	100	85	E2.2H 1250 Ekip G Touch LSIG	1SDA070977R1	1SDA071607R1	
				E2.2H 1250 Ekip G Hi-Touch LSIG	1SDA070980R1	1SDA071610R1	
	1600	100	85	E2.2H 1600 Ekip G Touch LSIG	1SDA071017R1	1SDA071647R1	
		<u> </u>		E2.2H 1600 Ekip G Hi-Touch LSIG	1SDA071020R1	1SDA071650R1	
	2000	100	85	E2.2H 2000 Ekip G Touch LSIG	1SDA071057R1	1SDA071687R1	
		•	•	÷	1SDA071060R1	1SDA071690R1	
	2500	100	85	E2.2H 2500 Ekip G Touch LSIG	1SDA071087R1	1SDA071717R1	
			:	E2.2H 2500 Ekip G Hi-Touch LSIG	ļ <u>-</u>	1SDA071720R1	



SACE Emax E4.2N-S-H-V • Orientable rear terminals (HR)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles	
		(440 V)	(1s)		Code	Code	
E4.2N	3200	66	66	E4.2N 3200 Ekip G Touch LSIG	1SDA071147R1	1SDA071777R1	
		:		E4.2N 3200 Ekip G Hi-Touch LSIG	1SDA071150R1	1SDA071780R1	
	4000	66	66	E4.2N 4000 Ekip G Touch LSIG	1SDA071197R1	1SDA071827R1	
				E4.2N 4000 Ekip G Hi-Touch LSIG	1SDA071200R1	1SDA071830R1	
E4.2S	3200	85	66	E4.2S 3200 Ekip G Touch LSIG	1SDA071157R1	1SDA071787R1	
				E4.2S 3200 Ekip G Hi-Touch LSIG	1SDA071160R1	1SDA071790R1	
	4000	85	66	E4.2S 4000 Ekip G Touch LSIG	1SDA071207R1	1SDA071837R1	
				E4.2S 4000 Ekip G Hi-Touch LSIG	1SDA071210R1	1SDA071840R1	
E4.2H	3200	100	85	E4.2H 3200 Ekip G Touch LSIG	1SDA071167R1	1SDA071797R1	
				E4.2H 3200 Ekip G Hi-Touch LSIG	1SDA071170R1	1SDA071800R1	
	4000	100	85	E4.2H 4000 Ekip G Touch LSIG	1SDA071217R1	1SDA071847R1	
				E4.2H 4000 Ekip G Hi-Touch LSIG	1SDA071220R1	1SDA071850R1	
E4.2V	2000	150	0 150	100	E4.2V 2000 Ekip G Touch LSIG	1SDA071107R1	1SDA071737R1
				E4.2V 2000 Ekip G Hi-Touch LSIG	1SDA071110R1	1SDA071740R1	
	2500	150	100	E4.2V 2500 Ekip G Touch LSIG	1SDA071127R1	1SDA071757R1	
				E4.2V 2500 Ekip G Hi-Touch LSIG	1SDA071130R1	1SDA071760R1	
	3200	150	100	E4.2V 3200 Ekip G Touch LSIG	1SDA071177R1	1SDA071807R1	
		ĺ		E4.2V 3200 Ekip G Hi-Touch LSIG	1SDA071180R1	1SDA071810R1	
	4000	150	100	E4.2V 4000 Ekip G Touch LSIG	1SDA071227R1	1SDA071857R1	
		-		E4.2V 4000 Ekip G Hi-Touch LSIG	1SDA071230R1	1SDA071860R1	

Automatic circuit-breakers Fixed version for generators



SACE Emax E6.2H-V-X • Orientable rear terminals (HR)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
	•	(440 V)	(1s)		Code	Code
E6.2H	4000	100	100	E6.2H 4000 Ekip G Touch LSIG	1SDA071237R1	1SDA071867R1
				E6.2H 4000 Ekip G Hi-Touch LSIG	1SDA071240R1	1SDA071870R1
	5000	100	100	E6.2H 5000 Ekip G Touch LSIG	1SDA071267R1	1SDA071897R1
			:	E6.2H 5000 Ekip G Hi-Touch LSIG	1SDA071270R1	1SDA071900R1
	6300	100	100	E6.2H 6300 Ekip G Touch LSIG	1SDA071297R1	1SDA071927R1
				E6.2H 6300 Ekip G Hi-Touch LSIG	1SDA071300R1	1SDA071930R1
E6.2V	4000	150	100	E6.2V 4000 Ekip G Touch LSIG	1SDA071247R1	1SDA071877R1
				E6.2V 4000 Ekip G Hi-Touch LSIG	1SDA071250R1	1SDA071880R1
	5000	150	100	E6.2V 5000 Ekip G Touch LSIG	1SDA071277R1	1SDA071907R1
				E6.2V 5000 Ekip G Hi-Touch LSIG	1SDA071280R1	1SDA071910R1
	6300	150	100	E6.2V 6300 Ekip G Touch LSIG	1SDA071307R1	1SDA071937R1
				E6.2V 6300 Ekip G Hi-Touch LSIG	1SDA071310R1	1SDA071940R1
E6.2X	4000	200	120	E6.2X 4000 Ekip G Touch LSIG	1SDA071257R1	1SDA071887R1
				E6.2X 4000 Ekip G Hi-Touch LSIG	1SDA071260R1	1SDA071890R1
	5000	200	120	E6.2X 5000 Ekip G Touch LSIG	1SDA071287R1	1SDA071917R1
				E6.2X 5000 Ekip G Hi-Touch LSIG	1SDA071290R1	1SDA071920R1
	6300	200	120	E6.2X 6300 Ekip G Touch LSIG	1SDA071317R1	1SDA071947R1
				E6.2X 6300 Ekip G Hi-Touch LSIG	1SDA071320R1	1SDA071950R1



SACE Emax E6.2H-V-X/f Full size • Orientable rear terminals (HR)

Size	lu	lcu	lcw (1s)	Туре	4 Poles
		(440 V)			Code
E6.2H/f	4000	100	100	E6.2H/f 4000 Ekip G Touch LSIG	1SDA071957R1
				E6.2H/f 4000 Ekip G Hi-Touch LSIG	1SDA071960R1
	5000	100	100	E6.2H/f 5000 Ekip G Touch LSIG	1SDA071987R1
				E6.2H/f 5000 Ekip G Hi-Touch LSIG	1SDA071990R1
	6300	100	100	E6.2H/f 6300 Ekip G Touch LSIG	1SDA072017R1
				E6.2H/f 6300 Ekip G Hi-Touch LSIG	1SDA072020R1
E6.2V/f	4000	150	100	E6.2V/f 4000 Ekip G Touch LSIG	1SDA071967R1
				E6.2V/f 4000 Ekip G Hi-Touch LSIG	1SDA071970R1
	5000	150	100	E6.2V/f 5000 Ekip G Touch LSIG	1SDA071997R1
				E6.2V/f 5000 Ekip G Hi-Touch LSIG	1SDA072000R1
	6300	150	100	E6.2V/f 6300 Ekip G Touch LSIG	1SDA072027R1
				E6.2V/f 6300 Ekip G Hi-Touch LSIG	1SDA072030R1
E6.2X/f	4000	200	120	E6.2X/f 4000 Ekip G Touch LSIG	1SDA071977R1
				E6.2X/f 4000 Ekip G Hi-Touch LSIG	1SDA071980R1
	5000	200	120	E6.2X/f 5000 Ekip G Touch LSIG	1SDA072007R1
				E6.2X/f 5000 Ekip G Hi-Touch LSIG	1SDA072010R1
	6300	200	120	E6.2X/f 6300 Ekip G Touch LSIG	1SDA072037R1
				E6.2X/f 6300 Ekip G Hi-Touch LSIG	1SDA072040R1

Automatic circuit-breakers Withdrawable version for generators



SACE Emax E1.2B-C-N-L • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles	
		(440 V)	(1s)		Code	Code	
1.2B	630	42	42	E1.2B 630 Ekip G Touch LSIG	1SDA072057R1	1SDA072687R1	
				E1.2B 630 Ekip G Hi-Touch LSIG	1SDA072060R1	1SDA072690R1	
	800	42	42	E1.2B 800 Ekip G Touch LSIG	1SDA072097R1	1SDA072727R1	
			:	E1.2B 800 Ekip G Hi-Touch LSIG	1SDA072100R1	1SDA072730R1	
	1000	42	42	E1.2B 1000 Ekip G Touch LSIG	1SDA072137R1	1SDA072767R1	
			:	E1.2B 1000 Ekip G Hi-Touch LSIG	1SDA072140R1	1SDA072770R1	
	1250	42	42	E1.2B 1250 Ekip G Touch LSIG	1SDA072177R1	1SDA072807R1	
				E1.2B 1250 Ekip G Hi-Touch LSIG	1SDA072180R1	1SDA072810R1	
	1600	42	42	E1.2B 1600 Ekip G Touch LSIG	1SDA072217R1	1SDA072847R1	
				E1.2B 1600 Ekip G Hi-Touch LSIG	1SDA072220R1	1SDA072850R1	
1.2C	630	50	42	E1.2C 630 Ekip G Touch LSIG	1SDA072067R1	1SDA072697R1	
			:	E1.2C 630 Ekip G Hi-Touch LSIG	1SDA072070R1	1SDA072700R1	
	800	50	42	E1.2C 800 Ekip G Touch LSIG	1SDA072107R1	1SDA072737R1	
			:	E1.2C 800 Ekip G Hi-Touch LSIG	1SDA072110R1	1SDA072740R1	
	1000	50	42	E1.2C 1000 Ekip G Touch LSIG	1SDA072147R1	1SDA072777R1	
				E1.2C 1000 Ekip G Hi-Touch LSIG	1SDA072150R1	1SDA072780R1	
	1250	50	42	E1.2C 1250 Ekip G Touch LSIG	1SDA072187R1	1SDA072817R1	
				E1.2C 1250 Ekip G Hi-Touch LSIG	1SDA072190R1	1SDA072820R1	
	1600	50	42	E1.2C 1600 Ekip G Touch LSIG	1SDA072227R1	1SDA072857R1	
				E1.2C 1600 Ekip G Hi-Touch LSIG	1SDA072230R1	1SDA072860R1	
1.2N	250	66	50	E1.2N 250 Ekip G Touch LSIG	1SDA072047R1	1SDA072677R1	
			:	E1.2N 250 Ekip G Hi-Touch LSIG	1SDA072050R1	1SDA072680R1	
	630	66	50	E1.2N 630 Ekip G Touch LSIG	1SDA072077R1	1SDA072707R1	
				E1.2N 630 Ekip G Hi-Touch LSIG	1SDA072080R1	1SDA072710R1	
	800	66	50	E1.2N 800 Ekip G Touch LSIG	1SDA072117R1	1SDA072747R1	
				E1.2N 800 Ekip G Hi-Touch LSIG	1SDA072120R1	1SDA072750R1	
	1000	66	50	E1.2N 1000 Ekip G Touch LSIG	1SDA072157R1	1SDA072787R1	
				E1.2N 1000 Ekip G Hi-Touch LSIG	1SDA072160R1	1SDA072790R1	
	1250	66	50	E1.2N 1250 Ekip G Touch LSIG	1SDA072197R1	1SDA072827R1	
				E1.2N 1250 Ekip G Hi-Touch LSIG	1SDA072200R1	1SDA072830R1	
	1600	66	50	E1.2N 1600 Ekip G Touch LSIG	1SDA072237R1	1SDA072867R1	
				E1.2N 1600 Ekip G Hi-Touch LSIG	1SDA072240R1	1SDA072870R1	
1.2L	630	130	15	E1.2L 630 Ekip G Touch LSIG	1SDA072087R1	1SDA072717R1	
				E1.2L 630 Ekip G Hi-Touch LSIG	1SDA072090R1	1SDA072720R1	
	800	130	15	E1.2L 800 Ekip G Touch LSIG	1SDA072127R1	1SDA072757R1	
			:	E1.2L 800 Ekip G Hi-Touch LSIG	1SDA072130R1	1SDA072760R1	
	1000	130	15	E1.2L 1000 Ekip G Touch LSIG	1SDA072167R1	1SDA072797R1	
	[[E1.2L 1000 Ekip G Hi-Touch LSIG	1SDA072170R1	1SDA072800R1	
	1250	130	15	E1.2L 1250 Ekip G Touch LSIG	1SDA072207R1	1SDA072837R1	
				E1.2L 1250 Ekip G Hi-Touch LSIG	1SDA072210R1	1SDA072840R1	



SACE Emax E2.2B-N-S-H • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles	
		(440 V)	(1s)		Code	Code	
E2.2B	1600	42	42	E2.2B 1600 Ekip G Touch LSIG	1SDA072337R1	1SDA072967R1	
				E2.2B 1600 Ekip G Hi-Touch LSIG	1SDA072340R1	1SDA072970R1	
	2000	42	42	E2.2B 2000 Ekip G Touch LSIG	1SDA072377R1	1SDA073007R1	
		Ī	:	E2.2B 2000 Ekip G Hi-Touch LSIG	1SDA072380R1	1SDA073010R1	
E2.2N	800	66	66	E2.2N 800 Ekip G Touch LSIG	1SDA072247R1	1SDA072877R1	
		-		E2.2N 800 Ekip G Hi-Touch LSIG	1SDA072250R1	1SDA072880R1	
	1000	66	66	E2.2N 1000 Ekip G Touch LSIG	1SDA072277R1	1SDA072907R1	
		•	:	E2.2N 1000 Ekip G Hi-Touch LSIG	1SDA072280R1	1SDA072910R1	
	1250	66	66	E2.2N 1250 Ekip G Touch LSIG	1SDA072307R1	1SDA072937R1	
		-	:	E2.2N 1250 Ekip G Hi-Touch LSIG	1SDA072310R1	1SDA072940R1	
	1600	66	66	E2.2N 1600 Ekip G Touch LSIG	1SDA072347R1	1SDA072977R1	
				E2.2N 1600 Ekip G Hi-Touch LSIG	1SDA072350R1	1SDA072980R1	
	2000	66	66	E2.2N 2000 Ekip G Touch LSIG	1SDA072387R1	1SDA073017R1	
	:	:		E2.2N 2000 Ekip G Hi-Touch LSIG	1SDA072390R1	1SDA073020R1	
	2500	66	66	E2.2N 2500 Ekip G Touch LSIG	1SDA072417R1	1SDA073047R1	
				E2.2N 2500 Ekip G Hi-Touch LSIG	1SDA072420R1	1SDA073050R1	
E2.2S	250	85	66	E2.2S 250 Ekip G Touch LSIG	1SDA073654R1	1SDA073664R1	
				E2.2S 250 Ekip G Hi-Touch LSIG	1SDA073657R1	1SDA073667R1	
	800	85	66	E2.2S 800 Ekip G Touch LSIG	1SDA072257R1	1SDA072887R1	
		-		E2.2S 800 Ekip G Hi-Touch LSIG	1SDA072260R1	1SDA072890R1	
	1000	85	66	E2.2S 1000 Ekip G Touch LSIG	1SDA072287R1	1SDA072917R1	
	-			E2.2S 1000 Ekip G Hi-Touch LSIG	1SDA072290R1	1SDA072920R1	
	1250	85	66	E2.2S 1250 Ekip G Touch LSIG	1SDA072317R1	1SDA072947R1	
				E2.2S 1250 Ekip G Hi-Touch LSIG	1SDA072320R1	1SDA072950R1	
	1600	85	66	E2.2S 1600 Ekip G Touch LSIG	1SDA072357R1	1SDA072987R1	
			!	E2.2S 1600 Ekip G Hi-Touch LSIG	1SDA072360R1	1SDA072990R1	
	2000	85	66	E2.2S 2000 Ekip G Touch LSIG	1SDA072397R1	1SDA073027R1	
		:		E2.2S 2000 Ekip G Hi-Touch LSIG	1SDA072400R1	1SDA073030R1	
	2500	85	66	E2.2S 2500 Ekip G Touch LSIG	1SDA072427R1	1SDA073057R1	
				E2.2S 2500 Ekip G Hi-Touch LSIG	1SDA072430R1	1SDA073060R1	
E2.2H	800	100	85	E2.2H 800 Ekip G Touch LSIG	1SDA072267R1	1SDA072897R1	
		:		E2.2H 800 Ekip G Hi-Touch LSIG	1SDA072270R1	1SDA072900R1	
	1000	100	85	E2.2H 1000 Ekip G Touch LSIG	1SDA072297R1	1SDA072927R1	
		:		E2.2H 1000 Ekip G Hi-Touch LSIG	1SDA072300R1	1SDA072930R1	
	1250	100	85	E2.2H 1250 Ekip G Touch LSIG	1SDA072327R1	1SDA072957R1	
	:	:		E2.2H 1250 Ekip G Hi-Touch LSIG	1SDA072330R1	1SDA072960R1	
	1600	100	85	E2.2H 1600 Ekip G Touch LSIG	1SDA072367R1	1SDA072997R1	
		-		E2.2H 1600 Ekip G Hi-Touch LSIG	1SDA072370R1	1SDA073000R1	
	2000	100	85	E2.2H 2000 Ekip G Touch LSIG	1SDA072407R1	1SDA073037R1	
				E2.2H 2000 Ekip G Hi-Touch LSIG	1SDA072410R1	1SDA073040R1	
	2500	100	85	E2.2H 2500 Ekip G Touch LSIG	1SDA072437R1	1SDA073067R1	
	-	•	:	E2.2H 2500 Ekip G Hi-Touch LSIG	1SDA072440R1	1SDA073070R1	

Automatic circuit-breakers Withdrawable version for generators



SACE Emax E4.2N-S-H-V • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles		
		(440 V)	(1s)		Code	Code		
E4.2N	3200	66	66	E4.2N 3200 Ekip G Touch LSIG	1SDA072497R1	1SDA073127R1		
				E4.2N 3200 Ekip G Hi-Touch LSIG	1SDA072500R1	1SDA073130R1		
	4000	66	66	E4.2N 4000 Ekip G Touch LSIG	1SDA072547R1	1SDA073177R1		
			-	E4.2N 4000 Ekip G Hi-Touch LSIG	1SDA072550R1	1SDA073180R1		
E4.2S	3200	85	66	E4.2S 3200 Ekip G Touch LSIG	1SDA072507R1	1SDA073137R1		
			:	E4.2S 3200 Ekip G Hi-Touch LSIG	1SDA072510R1	1SDA073140R1		
	4000	85	66	E4.2S 4000 Ekip G Touch LSIG	1SDA072557R1	1SDA073187R1		
						E4.2S 4000 Ekip G Hi-Touch LSIG	1SDA072560R1	1SDA073190R1
E4.2H	3200	100	85	E4.2H 3200 Ekip G Touch LSIG	1SDA072517R1	1SDA073147R1		
				E4.2H 3200 Ekip G Hi-Touch LSIG	1SDA072520R1	1SDA073150R1		
	4000	100	100	85	E4.2H 4000 Ekip G Touch LSIG	1SDA072567R1	1SDA073197R1	
				E4.2H 4000 Ekip G Hi-Touch LSIG	1SDA072570R1	1SDA073200R1		
E4.2V	2000	150	000 150 1		E4.2V 2000 Ekip G Touch LSIG	1SDA072457R1	1SDA073087R1	
				E4.2V 2000 Ekip G Hi-Touch LSIG	1SDA072460R1	1SDA073090R1		
	2500	150	100	E4.2V 2500 Ekip G Touch LSIG	1SDA072477R1	1SDA073107R1		
				E4.2V 2500 Ekip G Hi-Touch LSIG	1SDA072480R1	1SDA073110R1		
	3200	150	100	E4.2V 3200 Ekip G Touch LSIG	1SDA072527R1	1SDA073157R1		
				E4.2V 3200 Ekip G Hi-Touch LSIG	1SDA072530R1	1SDA073160R1		
	4000	150	100	E4.2V 4000 Ekip G Touch LSIG	1SDA072577R1	1SDA073207R1		
				E4.2V 4000 Ekip G Hi-Touch LSIG	1SDA072580R1	1SDA073210R1		



SACE Emax E6.2H-V-X • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(440 V)	(1s)		Code	Code
E6.2H	4000	100	100	E6.2H 4000 Ekip G Touch LSIG	1SDA072587R1	1SDA073217R1
				E6.2H 4000 Ekip G Hi-Touch LSIG	1SDA072590R1	1SDA073220R1
	5000	100	100	E6.2H 5000 Ekip G Touch LSIG	1SDA072617R1	1SDA073247R1
				E6.2H 5000 Ekip G Hi-Touch LSIG	1SDA072620R1	1SDA073250R1
	6300	100	100	E6.2H 6300 Ekip G Touch LSIG	1SDA072647R1	1SDA073277R1
				E6.2H 6300 Ekip G Hi-Touch LSIG	1SDA072650R1	1SDA073280R1
E6.2V	4000	150	100	E6.2V 4000 Ekip G Touch LSIG	1SDA072597R1	1SDA073227R1
				E6.2V 4000 Ekip G Hi-Touch LSIG	1SDA072600R1	1SDA073230R1
	5000	150	100	E6.2V 5000 Ekip G Touch LSIG	1SDA072627R1	1SDA073257R1
				E6.2V 5000 Ekip G Hi-Touch LSIG	1SDA072630R1	1SDA073260R1
	6300	150	100	E6.2V 6300 Ekip G Touch LSIG	1SDA072657R1	1SDA073287R1
				E6.2V 6300 Ekip G Hi-Touch LSIG	1SDA072660R1	1SDA073290R1
E6.2X	4000	200	120	E6.2X 4000 Ekip G Touch LSIG	1SDA072607R1	1SDA073237R1
			[E6.2X 4000 Ekip G Hi-Touch LSIG	1SDA072610R1	1SDA073240R1
	5000	200	120	E6.2X 5000 Ekip G Touch LSIG	1SDA072637R1	1SDA073267R1
				E6.2X 5000 Ekip G Hi-Touch LSIG	1SDA072640R1	1SDA073270R1
	6300	200	120	E6.2X 6300 Ekip G Touch LSIG	1SDA072667R1	1SDA073297R1
	•			E6.2X 6300 Ekip G Hi-Touch LSIG	1SDA072670R1	1SDA073300R1

Automatic circuit-breakers Withdrawable version per generators



SACE Emax E6.2H-V-X/f Full size • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcu	lcw (1s)	Туре	4 Poles
		(440 V)			Code
E6.2H/f	4000	100	100	E6.2H/f 4000 Ekip G Touch LSIG	1SDA073307R1
	:			E6.2H/f 4000 Ekip G Hi-Touch LSIG	1SDA073310R1
	5000	100	100	E6.2H/f 5000 Ekip G Touch LSIG	1SDA073337R1
	:			E6.2H/f 5000 Ekip G Hi-Touch LSIG	1SDA073340R1
	6300	100	100	E6.2H/f 6300 Ekip G Touch LSIG	1SDA073367R1
				E6.2H/f 6300 Ekip G Hi-Touch LSIG	1SDA073370R1
E6.2V/f	4000	150	100	E6.2V/f 4000 Ekip G Touch LSIG	1SDA073317R1
				E6.2V/f 4000 Ekip G Hi-Touch LSIG	1SDA073320R1
	5000	150	100	E6.2V/f 5000 Ekip G Touch LSIG	1SDA073347R1
				E6.2V/f 5000 Ekip G Hi-Touch LSIG	1SDA073350R1
	6300	150	100	E6.2V/f 6300 Ekip G Touch LSIG	1SDA073377R1
				E6.2V/f 6300 Ekip G Hi-Touch LSIG	1SDA073380R1
E6.2X/f	4000	200	120	E6.2X/f 4000 Ekip G Touch LSIG	1SDA073327R1
				E6.2X/f 4000 Ekip G Hi-Touch LSIG	1SDA073330R1
	5000	200	120	E6.2X/f 5000 Ekip G Touch LSIG	1SDA073357R1
				E6.2X/f 5000 Ekip G Hi-Touch LSIG	1SDA073360R1
	6300	200	120	E6.2X/f 6300 Ekip G Touch LSIG	1SDA073387R1
				E6.2X/f 6300 Ekip G Hi-Touch LSIG	1SDA073390R1

Switch-disconnectors Fixed version





Size	lu	lcw (1s)	Туре	3 Poles	4 Poles
				Code	Code
E1.2B/MS	630	42	E1.2B/MS 630	1SDA073392R1	1SDA073431R1
	800	42	E1.2B/MS 800	1SDA073394R1	1SDA073433R1
	1000	42	E1.2B/MS 1000	1SDA073396R1	1SDA073435R1
	1250	42	E1.2B/MS 1250	1SDA073398R1	1SDA073437R1
	1600	42	E1.2B/MS 1600	1SDA073400R1	1SDA073439R1
E1.2N/MS	250	50	E1.2N/MS 250	1SDA073391R1	1SDA073430R1
	630	50	E1.2N/MS 630	1SDA073393R1	1SDA073432R1
	800	50	E1.2N/MS 800	1SDA073395R1	1SDA073434R1
	1000	50	E1.2N/MS 1000	1SDA073397R1	1SDA073436R1
	1250	50	E1.2N/MS 1250	1SDA073399R1	1SDA073438R1
	1600	50	E1.2N/MS 1600	1SDA073401R1	1SDA073440R1



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

Size	lu	lcw (1s)	Туре	3 Poles	4 Poles
				Code	Code
E2.2B/MS	1600	42	E2.2B/MS 1600	1SDA073408R1	1SDA073447R1
	2000	42	E2.2B/MS 2000	1SDA073411R1	1SDA073450R1
E2.2N/MS	800	66	E2.2N/MS 800	1SDA073402R1	1SDA073441R1
	1000	66	E2.2N/MS 1000	1SDA073404R1	1SDA073443R1
	1250	66	E2.2N/MS 1250	1SDA073406R1	1SDA073445R1
	1600	66	E2.2N/MS 1600	1SDA073409R1	1SDA073448R1
	2000	66	E2.2N/MS 2000	1SDA073412R1	1SDA073451R1
	2500	66	E2.2N/MS 2500	1SDA073414R1	1SDA073453R1
E2.2H/MS	800	85	E2.2H/MS 800	1SDA073403R1	1SDA073442R1
	1000	85	E2.2H/MS 1000	1SDA073405R1	1SDA073444R1
	1250	85	E2.2H/MS 1250	1SDA073407R1	1SDA073446R1
	1600	85	E2.2H/MS 1600	1SDA073410R1	1SDA073449R1
	2000	85	E2.2H/MS 2000	1SDA073413R1	1SDA073452R1
	2500	85	E2.2H/MS 2500	1SDA073415R1	1SDA073454R1

Switch-disconnectors Fixed version



SACE Emax E4.2N-H-V/MS • Orientable rear terminals (HR)

Size	lu	lcw (1s)	Type	3 Poles	4 Poles
	į	:		Code	Code
E4.2N/MS	3200	66	E4.2N/MS 3200	1SDA073418R1	1SDA073457R1
	4000	66	E4.2N/MS 4000	1SDA073421R1	1SDA073460R1
E4.2H/MS	3200	85	E4.2H/MS 3200	1SDA073419R1	1SDA073458R1
	4000	85	E4.2H/MS 4000	1SDA073422R1	1SDA073461R1
E4.2V/MS	2000	100	E4.2V/MS 2000	1SDA073416R1	1SDA073455R1
	2500	100	E4.2V/MS 2500	1SDA073417R1	1SDA073456R1
	3200	100	E4.2V/MS 3200	1SDA073420R1	1SDA073459R1
	4000	100	E4.2V/MS 4000	1SDA073423R1	1SDA073462R1



SACE Emax E6.2H-X/MS • Orientable rear terminals (HR)

Size	lu	Icw (1s)	Type	3 Poles	4 Poles
	:			Code	Code
E6.2H/MS	4000	100	E6.2H/MS 4000	1SDA073424R1	1SDA073463R1
	5000	100	E6.2H/MS 5000	1SDA073426R1	1SDA073465R1
	6300	100	E6.2H/MS 6300	1SDA073428R1	1SDA073467R1
E6.2X/MS	4000	120	E6.2X/MS 4000	1SDA073425R1	1SDA073464R1
	5000	120	E6.2X/MS 5000	1SDA073427R1	1SDA073466R1
	6300	120	E6.2X/MS 6300	1SDA073429R1	1SDA073468R1



SACE Emax E6.2H-X/MS/f Full size • Orientable rear terminals (HR)

Size	lu	lcw (1s)	Туре	4 Poles		
	:			Code		
E6.2H/MS/f	4000	100	E6.2H/MS/f 4000	1SDA073469R1		
	5000	100	E6.2H/MS/f 5000	1SDA073471R1		
	6300	100	E6.2H/MS/f 6300	1SDA073473R1		
E6.2X/MS/f	4000	120	E6.2X/MS/f 4000	1SDA073470R1		
	5000	120	E6.2X/MS/f 5000	1SDA073472R1		
	6300	120	E6.2X/MS/f 6300	1SDA073474R1		

Switch-disconnectors Withdrawable version





Size	lu	lcw (1s)	Туре	3 Poles	4 Poles
				Code	Code
E1.2B/MS	630	42	E1.2B/MS 630	1SDA073476R1	1SDA073515R1
	800	42	E1.2B/MS 800	1SDA073478R1	1SDA073517R1
	1000	42	E1.2B/MS 1000	1SDA073480R1	1SDA073519R1
	1250	42	E1.2B/MS 1250	1SDA073482R1	1SDA073521R1
	1600	42	E1.2B/MS 1600	1SDA073484R1	1SDA073523R1
E1.2N/MS	250	50	E1.2N/MS 250	1SDA073475R1	1SDA073514R1
	630	50	E1.2N/MS 630	1SDA073477R1	1SDA073516R1
	800	50	E1.2N/MS 800	1SDA073479R1	1SDA073518R1
	1000	50	E1.2N/MS 1000	1SDA073481R1	1SDA073520R1
	1250	50	E1.2N/MS 1250	1SDA073483R1	1SDA073522R1
	1600	50	E1.2N/MS 1600	1SDA073485R1	1SDA073524R1



Size	lu	lcw (1s)	Туре	3 Poles	4 Poles
				Code	Code
E2.2B/MS	1600	42	E2.2B/MS 1600	1SDA073492R1	1SDA073531R1
	2000	42	E2.2B/MS 2000	1SDA073495R1	1SDA073534R1
E2.2N/MS	800	66	E2.2N/MS 800	1SDA073486R1	1SDA073525R1
	1000	66	E2.2N/MS 1000	1SDA073488R1	1SDA073527R1
	1250	66	E2.2N/MS 1250	1SDA073490R1	1SDA073529R1
	1600	66	E2.2N/MS 1600	1SDA073493R1	1SDA073532R1
	2000	66	E2.2N/MS 2000	1SDA073496R1	1SDA073535R1
	2500	66	E2.2N/MS 2500	1SDA073498R1	1SDA073537R1
E2.2H/MS	800	85	E2.2H/MS 800	1SDA073487R1	1SDA073526R1
	1000	85	E2.2H/MS 1000	1SDA073489R1	1SDA073528R1
	1250	85	E2.2H/MS 1250	1SDA073491R1	1SDA073530R1
	1600	85	E2.2H/MS 1600	1SDA073494R1	1SDA073533R1
	2000	85	E2.2H/MS 2000	1SDA073497R1	1SDA073536R1
	2500	85	E2.2H/MS 2500	1SDA073499R1	1SDA073538R1







Size	lu	lcw (1s)	Type	3 Poles	4 Poles
				Code	Code
E4.2N/MS	3200	66	E4.2N/MS 3200	1SDA073502R1	1SDA073541R1
	4000	66	E4.2N/MS 4000	1SDA073505R1	1SDA073544R1
E4.2H/MS	3200	85	E4.2H/MS 3200	1SDA073503R1	1SDA073542R1
	4000	85	E4.2H/MS 4000	1SDA073506R1	1SDA073545R1
E4.2V/MS	2000	100	E4.2V/MS 2000	1SDA073500R1	1SDA073539R1
	2500	100	E4.2V/MS 2500	1SDA073501R1	1SDA073540R1
	3200	100	E4.2V/MS 3200	1SDA073504R1	1SDA073543R1
	4000	100	E4.2V/MS 4000	1SDA073507R1	1SDA073546R1



SACE Emax E6.2H-X/MS • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	lcw (1s)	Туре	3 Poles	4 Poles
				Code	Code
E6.2H/MS	4000	100	E6.2H/MS 4000	1SDA073508R1	1SDA073547R1
	5000	100	E6.2H/MS 5000	1SDA073510R1	1SDA073549R1
	6300	100	E6.2H/MS 6300	1SDA073512R1	1SDA073551R1
E6.2X/MS	4000	120	E6.2X/MS 4000	1SDA073509R1	1SDA073548R1
	5000	120	E6.2X/MS 5000	1SDA073511R1	1SDA073550R1
	6300	120	E6.2X/MS 6300	1SDA073513R1	1SDA073552R1

SACE Emax E6.2H-X/MS/f Full size • Mobile part of withdrawable circuit-breaker (MP)

Size	lu	Icw (1s)	Туре	4 Poles
	:			Code
E6.2H/MS/f	4000	100	E6.2H/MS/f 4000	1SDA073553R1
	5000	100	E6.2H/MS/f 5000	1SDA073555R1
	6300	100	E6.2H/MS/f 6300	1SDA073557R1
E6.2X/MS/f	4000	120	E6.2X/MS/f 4000	1SDA073554R1
	5000	120	E6.2X/MS/f 5000	1SDA073556R1
	6300	120	E6.2X/MS/f 6300	1SDA073558R1

Automatic circuit-breakers and switch-disconnectors Version for applications up to 1150V AC

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(1150 V)	(1s)		Code	Code
E1.2N/E	630	25	25	E1.2N/E 630 Upgrade Kit 1150V AC	1SDA074316R1	1SDA074321R1
E1.2N/E	800	25	25	E1.2N/E 800 Upgrade Kit 1150V AC	1SDA074317R1	1SDA074322R1
E1.2N/E	1000	25	25	E1.2N/E 1000 Upgrade Kit 1150V AC	1SDA074318R1	1SDA074323R1
E1.2N/E	1250	25	25	E1.2N/E 1250 Upgrade Kit 1150V AC	1SDA074319R1	1SDA074324R1
E1.2N/E	1600	25	25	E1.2N/E 1600 Upgrade Kit 1150V AC	1SDA074320R1	1SDA074325R1
E2.2H/E	800	30	30	E2.2H/E 800 Upgrade Kit 1150V AC	1SDA074326R1	1SDA074332R1
E2.2H/E	1000	30	30	E2.2H/E 1000 Upgrade Kit 1150V AC	1SDA074327R1	1SDA074333R1
E2.2H/E	1250	30	30	E2.2H/E 1250 Upgrade Kit 1150V AC	1SDA074328R1	1SDA074334R1
E2.2H/E	1600	30	30	E2.2H/E 1600 Upgrade Kit 1150V AC	1SDA074329R1	1SDA074335R1
E2.2H/E	2000	30	30	E2.2H/E 2000 Upgrade Kit 1150V AC	1SDA074330R1	1SDA074336R1
E2.2H/E	2500	30	30	E2.2H/E 2500 Upgrade Kit 1150V AC	1SDA074331R1	1SDA074337R1
E4.2H/E	3200	50	50	E4.2H/E 3200 Upgrade Kit 1150V AC	1SDA074338R1	1SDA074340R1
E4.2H/E	4000	50	50	E4.2H/E 4000 Upgrade Kit 1150V AC	1SDA074339R1	1SDA074341R1
E6.2X/E	4000	65	65	E6.2X/E 4000 Upgrade Kit 1150V AC	1SDA074342R1	1SDA074345R1
E6.2X/E	5000	65	65	E6.2X/E 5000 Upgrade Kit 1150V AC	1SDA074343R1	1SDA074346R1
E6.2X/E	6300	65	65	E6.2X/E 6300 Upgrade Kit 1150V AC	1SDA074344R1	1SDA074347R1

Switch-disconnectors Fixed version for applications up to 1000V DC

Size	lu	lcu	lcw	Туре	3 Poles	4 Poles
		(1000 V)	(1s)		Code	Code
E1.2N/DC/MS	800			E1.2N/DC/MS 800A 750-1000V DC	1SDA074381R1	1SDA074382R1
E1.2N/DC/MS	1250		:	E1.2N/DC/MS 1250A 750-1000V DC	1SDA074383R1	1SDA074384R1
E2.2S/DC/MS	1250			E2.2S/DC/MS 1250A 750-1000V DC	1SDA074389R1	1SDA074390R1
E2.2S/DC/MS	1600			E2.2S/DC/MS 1600A 750-1000V DC	1SDA074391R1	1SDA074392R1
E2.2S/DC/MS	2000		:	E2.2S/DC/MS 2000A 750-1000V DC	1SDA074393R1	1SDA074394R1
E2.2S/DC/MS	2500			E2.2S/DC/MS 2500A 750-1000V DC	1SDA074395R1	1SDA074396R1
E4.2H/DC/MS	1250			E4.2H/DC/MS 1250A 750-1000V DC	1SDA074405R1	1SDA074406R1
E4.2H/DC/MS	1600			E4.2H/DC/MS 1600A 750-1000V DC	1SDA074407R1	1SDA074408R1
E4.2H/DC/MS	2000		:	E4.2H/DC/MS 2000A 750-1000V DC	1SDA074409R1	1SDA074410R1
E4.2H/DC/MS	2500			E4.2H/DC/MS 2500A 750-1000V DC	1SDA074411R1	1SDA074412R1
E4.2H/DC/MS	3200			E4.2H/DC/MS 3200A 750-1000V DC	1SDA074413R1	1SDA074414R1
E4.2H/DC/MS	4000		:	E4.2H/DC/MS 4000A 750-1000V DC	1SDA074415R1	1SDA074416R1
E6.2X/DC/MS	4000			E6.2X/DC/MS 4000A 750-1000V DC	1SDA074429R1	1SDA074430R1
E6.2X/DC/MS	5000			E6.2X/DC/MS 5000A 750-1000V DC	1SDA074431R1	1SDA074432R1
E6.2X/DC/MS	6300			E6.2X/DC/MS 6300A 750-1000V DC	1SDA074433R1	1SDA074434R1

Switch-disconnectors Withdrawable version for applications up to 1000V DC

Withdrawable version - Mobile part

Size	lu	lcu	Cu	3 Poles	4 Poles	
		(1000 V)			Code	Code
E1.2N/DC/MS	800			E1.2N/DC/MS 800A 750-1000VDC	1SDA074385R1	1SDA074386R1
E1.2N/DC/MS	1250		:	E1.2N/DC/MS 1250A 750-1000VDC	1SDA074387R1	1SDA074388R1
E2.2S/DC/MS	1250			E2.2S/DC/MS 1250A 750-1000VDC	1SDA074397R1	1SDA074398R1
E2.2S/DC/MS	1600			E2.2S/DC/MS 1600A 750-1000VDC	1SDA074399R1	1SDA074400R1
E2.2S/DC/MS	2000			E2.2S/DC/MS 2000A 750-1000VDC	1SDA074401R1	1SDA074402R1
E2.2S/DC/MS	2500			E2.2S/DC/MS 2500A 750-1000VDC	1SDA074403R1	1SDA074404R1
E4.2H/DC/MS	1250			E4.2H/DC/MS 1250A 750-1000VDC	1SDA074417R1	1SDA074418R1
E4.2H/DC/MS	1600		-	E4.2H/DC/MS 1600A 750-1000VDC	1SDA074419R1	1SDA074420R1
E4.2H/DC/MS	2000			E4.2H/DC/MS 2000A 750-1000VDC	1SDA074421R1	1SDA074422R1
E4.2H/DC/MS	2500		:	E4.2H/DC/MS 2500A 750-1000VDC	1SDA074423R1	1SDA074424R1
E4.2H/DC/MS	3200			E4.2H/DC/MS 3200A 750-1000VDC	1SDA074425R1	1SDA074426R1
E4.2H/DC/MS	4000			E4.2H/DC/MS 4000A 750-1000VDC	1SDA074427R1	1SDA074428R1
E6.2X/DC/MS	4000			E6.2X/DC/MS 4000A 750-1000VDC	1SDA074435R1	1SDA074436R1
E6.2X/DC/MS	5000		:	E6.2X/DC/MS 5000A 750-1000VDC	1SDA074437R1	1SDA074438R1
E6.2X/DC/MS	6300			E6.2X/DC/MS 6300A 750-1000VDC	1SDA074439R1	1SDA074440R1

Withdrawable version - Fixed part

Size	lu	Type of terminal	Туре	3 Poles	4 Poles
				Code	Code
E1.2	1600	HR - HR	E1.2DC W FP Iu=1600 HR HR	1SDA073923R1	1SDA073924R1
E2.2	2000	HR - HR	E2.2DC W FP Iu=2000 HR HR	1SDA073925R1	1SDA073926R1
E2.2	2500	HR - HR	E2.2DC W FP Iu=2500 HR HR	1SDA073927R1	1SDA073928R1
E4.2	3200	HR - HR	E4.2DC W FP Iu=3200 HR HR	1SDA073929R1	1SDA073930R1
E4.2 / E4.2V	4000	HR - HR	E4.2DC W FP lu=4000 or V HR HR version	1SDA073931R1	1SDA073932R1
E6.2	5000	HR - HR	E6.2DC W FP Iu=5000 HR HR	1SDA073933R1	
E6.2/f	5000	HR - HR	E6.2DC W FP Iu=5000 HR HR		1SDA073935R1
E6.2 / E6.2X	6300	HR - HR	E6.2DC W FP Iu=6300 HR HR	1SDA073936R1	
E6.2/f / E6.2X/f	6300	HR - HR	E6.2DC W FP lu=6300 HR HR		1SDA073938R1

Derived versions

Sectionalizing truck - CS

Size	lu		3 poles	4 poles	
			Code	Code	
E2.2/CS	2500	E2.2/CS 2500 MP 3p	1SDA074348R1	1SDA074349R1	
E4.2/CS	4000	E4.2/CS 4000 MP 3p	1SDA074350R1	1SDA074351R1	
E6.2/CS	6300	E6.2/CS 6300 MP 3p	1SDA074352R1	1SDA074353R1	

Earthing truck - MT

Size	lu	Туре	3 poles	4 poles
			Code	Code
E2.2 MT	2500	E2.2MT 2500 MP Earth connection from upper terminals	1SDA074354R1	1SDA074355R1
E4.2 MT	4000	E4.2MT 4000 MP Earth connection from upper terminals	1SDA074356R1	1SDA074357R1
E6.2 MT	6300	E6.2MT 6300 MP Earth connection from upper terminals	1SDA074358R1	1SDA074359R1
E2.2 MT	2500	E2.2MT 2500 MP Earth connection from lower terminals	1SDA074360R1	1SDA074361R1
E4.2 MT	4000	E4.2MT 4000 MP Earth connection from lower terminals	1SDA074362R1	1SDA074363R1
E6.2 MT	6300	E6.2MT 6300 MP Earth connection from lower terminals	1SDA074364R1	1SDA074365R1

Earthing switch with making capacity - MTP

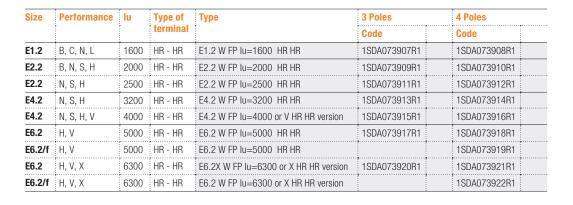
Size	lu	Туре	3 poles	4 poles
	Ī		Code	Code
E2.2 MTP	2500	E2.2MTP 2500 MP Earth connection from upper terminals	1SDA074366R1	1SDA074367R1
E4.2 MTP	4000	E4.2MTP 4000 MP Earth connection from upper terminals	1SDA074368R1	1SDA074369R1
E6.2 MTP	6300	E6.2MTP 6300 MP Earth connection from upper terminals	1SDA074370R1	1SDA074371R1
E2.2 MTP	2500	E2.2MTP 2500 MP Earth connection from lower terminals	1SDA074372R1	1SDA074373R1
E4.2 MTP	4000	E4.2MTP 4000 MP Earth connection from lower terminals	1SDA074374R1	1SDA074375R1
E6.2 MTP	6300	E6.2MTP 6300 MP Earth connection from lower terminals	1SDA074376R1	1SDA074377R1

Accessories for MT and MTP

Size	Туре	Code	
E2.2	Grounding clamp PF E2.2 for MT/MTP	1SDA074378R1	
E4.2	Grounding clamp PF E4.2 for MT/MTP	1SDA074379R1	
E6.2	Grounding clamp PF E6.2 for MT/MTP	1SDA074380R1	

Fixed parts









Accessories Electrical accessories



First and second opening release - YO

Size	Туре	Code
E1.2E6.2	YO E1.2E6.2 24V AC/DC	1SDA073668R1
E1.2E6.2	YO E1.2E6.2 30V AC/DC	1SDA073669R1
E1.2E6.2	YO E1.2E6.2 48V AC/DC	1SDA073670R1
E1.2E6.2	YO E1.2E6.2 60V AC/DC	1SDA073671R1
E1.2E6.2	YO E1.2E6.2 110-120V AC/DC	1SDA073672R1
E1.2E6.2	YO E1.2E6.2 120-127V AC/DC	1SDA073673R1
E1.2E6.2	YO E1.2E6.2 220-240V AC/DC	1SDA073674R1
E1.2E6.2	YO E1.2E6.2 240-250V AC/DC	1SDA073675R1
E1.2E6.2	YO E1.2E6.2 380-400V AC	1SDA073677R1
E1.2E6.2	YO E1.2E6.2 415-440V AC	1SDA073678R1
E1.2E6.2	YO E1.2E6.2 480-500V AC	1SDA073679R1

First and second closing release- YC

Size	Туре	Code
E1.2E6.2	YC E1.2E6.2 24V AC/DC	1SDA073681R1
E1.2E6.2	YC E1.2E6.2 30V AC/DC	1SDA073682R1
E1.2E6.2	YC E1.2E6.2 48V AC/DC	1SDA073683R1
E1.2E6.2	YC E1.2E6.2 60V AC/DC	1SDA073684R1
E1.2E6.2	YC E1.2E6.2 110-120V AC/DC	1SDA073685R1
E1.2E6.2	YC E1.2E6.2 120-127V AC/DC	1SDA073686R1
E1.2E6.2	YC E1.2E6.2 220-240V AC/DC	1SDA073687R1
E1.2E6.2	YC E1.2E6.2 240-250V AC/DC	1SDA073688R1
E1.2E6.2	YC E1.2E6.2 380-400V AC	1SDA073690R1
E1.2E6.2	YC E1.2E6.2 415-440V AC	1SDA073691R1
E1.2E6.2	YC E1.2E6.2 480-500V AC	1SDA073692R1

YO/YC test unit

Size	Туре	Code	
E1.2E6.2	YO/YC test unit E1.2E6.2	1SDA073707R1	

Undervoltage release - YU

Size	Туре	Code
E1.2E6.2	YU E1.2E6.2 24V AC/DC	1SDA073694R1
E1.2E6.2	YU E1.2E6.2 30V AC/DC	1SDA073695R1
E1.2E6.2	YU E1.2E6.2 48V AC/DC	1SDA073696R1
E1.2E6.2	YU E1.2E6.2 60V AC/DC	1SDA073697R1
E1.2E6.2	YU E1.2E6.2 110-120V AC/DC	1SDA073698R1
E1.2E6.2	YU E1.2E6.2 120-127V AC/DC	1SDA073699R1
E1.2E6.2	YU E1.2E6.2 220-240V AC/DC	1SDA073700R1
E1.2E6.2	YU E1.2E6.2 240-250V AC/DC	1SDA073701R1
E1.2E6.2	YU E1.2E6.2 380-400V AC	1SDA073703R1
E1.2E6.2	YU E1.2E6.2 415-440V AC	1SDA073704R1
E1.2E6.2	YU E1.2E6.2 480-500V AC	1SDA073705R1

Electronic time-delay device for undervoltage release - UVD

Size	Туре	Code
E1.2E6.2	2430V DC	1SDA074623R1
E1.2E6.2	48V AC/DC	1SDA074624R1
E1.2E6.2	60V AC/DC	1SDA074625R1
E1.2E6.2	110127V AC/DC	1SDA074626R1
E1.2E6.2	220250V AC/DC	1SDA074627R1

Accessories Electrical accessories













Remote Reset - YR

Size	Туре	Code
E1.2	YR 24V DC E1.2	1SDA073744R1
E1.2	YR 110V AC/DC E1.2	1SDA073745R1
E1.2	YR 250V AC/DC E1.2	1SDA073746R1
E2.2E6.2	YR 24V DC E2.2E6.2	1SDA073747R1
E2.2E6.2	YR 110V AC/DC E2.2E6.2	1SDA073748R1
E2.2E6.2	YR 250V AC/DC E2.2E6.2	1SDA073749R1

Motor - M

Size	Туре	Code
E1.2	M E1.2 24-30V AC/DC	1SDA073708R1
E1.2	M E1.2 48-60V AC/DC	1SDA073709R1
E1.2	M E1.2 100-130V AC/DC	1SDA073710R1
E1.2	M E1.2 220-250V AC/DC	1SDA073711R1
E1.2	M E1.2 380-415V AC	1SDA073713R1
E1.2	M E1.2 440-480V AC	1SDA073714R1
E2.2E6.2	M E2.2E6.2 24-30V AC/DC	1SDA073722R1
E2.2E6.2	M E2.2E6.2 48-60V AC/DC	1SDA073723R1
E2.2E6.2	M E2.2E6.2 100-130V AC/DC	1SDA073724R1
E2.2E6.2	M E2.2E6.2 220-250V AC/DC	1SDA073725R1
E2.2E6.2	M E2.2E6.2 380-415V AC	1SDA073727R1
E2.2E6.2	M E2.2E6.2 440-480V AC	1SDA073728R1
E1.2	M E1.2 24-30V AC/DC + S33 M/2 24V DC	1SDA073715R1
E1.2	M E1.2 48-60V AC/DC + S33 M/2 24V DC	1SDA073716R1
E1.2	M E1.2 100-130V AC/DC + S33 M/2 24V DC	1SDA073717R1
E1.2	M E1.2 220-250V AC/DC + S33 M/2 24V DC	1SDA073718R1
E1.2	M E1.2 380-415V AC + S33 M/2 24V DC	1SDA073720R1
E1.2	M E1.2 440-480V AC + S33 M/2 24V DC	1SDA073721R1
E2.2E6.2	M E2.2E6.2 24-30V AC/DC + S33 M/2 24V DC	1SDA073729R1
E2.2E6.2	M E2.2E6.2 48-60V AC/DC + S33 M/2 24V DC	1SDA073730R1
E2.2E6.2	M E2.2E6.2 100-130V AC/DC + S33 M/2 24V DC	1SDA073731R1
E2.2E6.2	M E2.2E6.2 220-250V AC/DC + S33 M/2 24V DC	1SDA073732R1
E2.2E6.2	M E2.2E6.2 380-415V AC + S33 M/2 24V DC	1SDA073734R1
E2.2E6.2	M E2.2E6.2 440-480V AC + S33 M/2 24V DC	1SDA073735R1

Current sensor for neutral conductor outside the circuit-breaker

Size	Туре	Code
E1.2	Ext CS N E1.2 E2.2 2000A	1SDA073736R1
E2.2	Ext CS N E2.2 2500A	1SDA073737R1
E4.2	Ext CS N E4.2 3200A	1SDA073738R1
E6.2	Ext CS N E4.2 4000A E6.2 50%	1SDA073739R1
E6.2	Ext CS N E6.2	1SDA073740R1

Homopolar toroid for the earthing conductor of main power supply

Size	Туре	Code	
E1.2E6.2	Homopolar toroid E1.2 E6.2	1SDA073743R1	

Toroid for differential protection

Size	Туре	Code
E1.2 - E2.2 3p	Toroid RC E1.2, E2.2 3p	1SDA073741R1
E2.2 4p - E4.2	Toroid RC E2.2 4p, E4.2	1SDA073742R1



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റ	nen/	closed	auviliary	contacts ·	- Alix

Size	Туре	Code
E1.2	AUX 4Q 400V E1.2	1SDA073750R1
E1.2	AUX 4Q 24V E1.2	1SDA073751R1
E1.2	AUX 2Q 400V + 2Q 24V E1.2	1SDA073752R1
E2.2E6.2	AUX 4Q 400V E2.2E6.2	1SDA073753R1
E2.2E6.2	AUX 4Q 24V E2.2E6.2	1SDA073754R1
E2.2E6.2	AUX 2Q 400V + 2Q 24V E2.2E6.2	1SDA073755R1
E2.2E6.2	AUX 6Q 400V E2.2E6.2	1SDA073756R1
E2.2E6.2	AUX 6Q 24V E2.2E6.2	1SDA073757R1
E2.2E6.2	AUX 3Q 400V AC + 3Q 24V DC E2.2E6.2	1SDA075973R1
E1.2	AUX 15Q 400V E1.2 *	1SDA073758R1
E1.2	AUX 15Q 24V E1.2 *	1SDA073759R1
E2.2E6.2	AUX 15Q 400V E2.2E6.2 *	1SDA073760R1
E2.2E6.2	AUX 15Q 24V E2.2E6.2 *	1SDA073761R1

 $^{^{\}star}$ not compatible with mechanical locks on compartment doors or mechanical interlocks; must be ordered with interlock support.

Auxiliary position contacts - AUP

Size	Туре	Code
E1.2	AUP 6 contacts 400V E1.2	1SDA073762R1
E1.2	AUP 6 contacts 24V E1.2	1SDA073763R1
E2.2E6.2	AUP 5 contacts 400V E2.2E6.2 - left set	1SDA073764R1
E2.2E6.2	AUP 5 contacts 24V E2.2E6.2 - left set	1SDA073765R1
E2.2E6.2	AUP 5 suppl. contacts 400V E2.2E6.2 - right set	1SDA073766R1
E2.2E6.2	AUP 5 suppl. contacts 24V E2.2E6.2 - right set	1SDA073767R1
E1.2	AUP Ekip aux. contacts position E1.2	1SDA073768R1
E2.2E6.2	AUP Ekip aux. contacts position E2.2E6.2	1SDA073769R1

Ready to close signalling contact- RTC

Size	Туре	Code
E1.2	RTC 250V E1.2	1SDA073770R1
E1.2	RTC 24V E1.2	1SDA073771R1
E1.2	RTC Ekip 24V E1.2	1SDA073772R1
E2.2E6.2	RTC 250V E2.2E6.2	1SDA073773R1
E2.2E6.2	RTC 24V E2.2E6.2	1SDA073774R1
E2.2E6.2	RTC Ekip 24V E2.2E6.2	1SDA073775R1

Contact signalling tripping of Ekip protection trip unit - S51

Size	Туре	Code
E1.2	S51 250V E1.2	1SDA073776R1
E1.2	S51 24V E1.2	1SDA073777R1
E2.2E6.2	S51 250V E2.2E6.2	1SDA073778R1
E2.2E6.2	S51 24V E2.2E6.2	1SDA073779R1

Terminals for auxiliary connection

Size	Туре	Code	
E1.2E6.2	Terminals 10 pcs	1SDA073906R1	

Accessories Mechanical accessories









Mechanical operation counter - MO

Size	Туре	Code
E1.2	MOC Mechanical operation counter	1SDA073780R1
E2.2E6.2	MOC Mechanical operation counter	1SDA073781R1

Key lock in open position - KLC

Size	Туре	Code
E1.2	KLC-D Bl. Key lock open E1.2	1SDA073782R1
E1.2	KLC-S Bl. Key lock open N.20005 E1.2	1SDA073783R1
E1.2	KLC-S Bl. Key lock open N.20006 E1.2	1SDA073784R1
E1.2	KLC-S Bl. Key lock open N.20007 E1.2	1SDA073785R1
E1.2	KLC-S Bl. Key lock open N.20008 E1.2	1SDA073786R1
E1.2	KLC-S Bl. Key lock open N.20009 E1.2	1SDA073787R1
E1.2	KLA Bl. Castell key lock open E1.2	1SDA073788R1
E1.2	KLA BI. Kirk key lock open E1.2	1SDA073789R1
E1.2	KLA Bl. Ronis Profalux key lock open E1.2	1SDA073790R1
E2.2E6.2	KLC-D Bl. Key lock open E2.2E6.2	1SDA073791R1
E2.2E6.2	KLC-S BI. key lock AP N.20005 E2.2E6.2	1SDA073792R1
E2.2E6.2	KLC-S Bl. key lock AP N.20006 E2.2E6.2	1SDA073793R1
E2.2E6.2	KLC-S Bl. key lock AP N.20007 E2.2E6.2	1SDA073794R1
E2.2E6.2	KLC-S Bl. key lock AP N.20008 E2.2E6.2	1SDA073795R1
E2.2E6.2	KLC-S Bl. key lock AP N.20009 E2.2E6.2	1SDA073796R1
E2.2E6.2	KLA Bl. Castell key lock open E2.2E6.2	1SDA073797R1
E2.2E6.2	KLA BI. AP Castell Kirk key lock E2.2E6.2	1SDA073798R1
E2.2E6.2	KLA BI. AP Ronis Profalux key lock E2.2E6.2	1SDA073799R1

Padlocks in open position - PLC

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Size	Туре	Code	
E1.2	PLC E1.2 Bl. Padlocks in open position D=4mm	1SDA073800R1	
E1.2	PLC E1.2 Bl. Padlocks in open position D=7mm	1SDA073801R1	
E1.2	PLC E1.2 Bl. Padlocks in open position D=8mm	1SDA073802R1	
E2.2E6.2	PLC E2.2E6.2 Bl. Padlocks in open position D=4mm	1SDA073803R1	
E2.2E6.2	PLC E2.2E6.2 Bl. Padlocks in open position D=7mm	1SDA073804R1	
E2.2E6.2	PLC E2.2E6.2 Bl. Padlocks in open position D=8mm	1SDA073805R1	



Size	Туре	Code	
E1.2	KLP-D Bl. Racked in/out E1.2 1st key	1SDA073822R1	
E1.2	KLP-S BI. Racked in/out N.20005 E1.2 1st key	1SDA073823R1	
E1.2	KLP-S BI. Racked in/out N.20006 E1.2 1st key	1SDA073824R1	
E1.2	KLP-S BI. Racked in/out N.20007 E1.2 1st key	1SDA073825R1	
E1.2	KLP-S BI. Racked in/out N.20008 E1.2 1st key	1SDA073826R1	
E1.2	KLP-S BI. Racked in/out N.20009 E1.2 1st key	1SDA073827R1	
E1.2	KLP-D BI. Racked in/out E1.2 2nd key	1SDA073828R1	
E1.2	KLP-S BI. Racked in/out N.20005 E1.2 2nd key	1SDA073829R1	
E1.2	KLP-S BI. Racked in/out N.20006 E1.2 2nd key	1SDA073830R1	
E1.2	KLP-S BI. Racked in/out N.20007 E1.2 2nd key	1SDA073831R1	
E1.2	KLP-S BI. Racked in/out N.20008 E1.2 2nd key	1SDA073832R1	
E1.2	KLP-S BI. Racked in/out N.20009 E1.2 2nd key	1SDA073833R1	
E1.2	KLP-A BI. Racked in/out RonProf Kirk E1.2 1st key	1SDA073834R1	
E1.2	KLP-A BI. Racked in/out RonProf Kirk E1.2 2nd key	1SDA073835R1	
E1.2	KLP-A BI. Racked in/out Castell E1.2 1st key	1SDA073836R1	
E1.2	KLP-A BI. Racked in/out Castell E1.2 2nd key	1SDA073837R1	
E2.2E6.2	KLP-D BI. Racked in/out E2.2E6.2 1st key	1SDA073806R1	
E2.2E6.2	KLP-S BI. Racked in/out N.20005 E2.2E6.2 1st key	1SDA073807R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20006 E2.2E6.2 1st key	1SDA073808R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20007 E2.2E6.2 1st key	1SDA073809R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20008 E2.2E6.2 1st key	1SDA073810R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20009 E2.2E6.2 1st key	1SDA073811R1	
E2.2E6.2	KLP-D BI. Racked in/out E2.2E6.2 2nd key	1SDA073812R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20005 E2.2E6.2 2nd key	1SDA073813R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20006 E2.2E6.2 2nd key	1SDA073814R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20007 E2.2E6.2 2nd key	1SDA073815R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20008 E2.2E6.2 2nd key	1SDA073816R1	
E2.2E6.2	KLP-S Bl. Racked in/out N.20009 E2.2E6.2 2nd key	1SDA073817R1	
E2.2E6.2	KLP-A Bl. Racked in/out RoProKirk E2.2E6.2 1st key	1SDA073818R1	
E2.2E6.2	KLP-A Bl. Racked in/out RoProKirk E2.2E6.2 2nd key	1SDA073819R1	
E2.2E6.2	KLP-A Bl. Racked in/out Castell E2.2E6.2 1st key	1SDA073820R1	
E2.2E6.2	KLP-A Bl. Racked in/out Castell E2.2E6.2 2nd key	1SDA073821R1	

Accessory for supplementary lock in racked-out position

Size	Туре	Code
E1.2	Suppl. locks in racked-out E1.2	1SDA073838R1
E2.2E6.2	Suppl. locks in racked-out E2.2E6.2	1SDA073839R1

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

Size	Туре	Code
E1.2	PLP Bl. padlocks Racked in/out D=4/6/8mm E1.2	1SDA073840R1
E2.2E6.2	PLP BI. padlocks Racked in/out D=4/6/8mm E2.2E6.2	1SDA073841R1

External shutter lock- SLE

Size	Туре	Code
E2.2	SLE BI. shutter lock D=4/6/8mm E2.2	1SDA073842R1
E4.2	SLE BI. shutter lock D=4/6/8mm E4.2	1SDA073843R1
E6.2	SLE Bl. shutter lock D=4/6/8mm E6.2	1SDA073844R1





Accessories Mechanical accessories



Size	Туре	Code
E2.2	DLR E2.2	1SDA073845R1
E4.2	DLR E4.2	1SDA073846R1
E6.2	DLR E6.2	1SDA073847R1



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

Size	Туре	Code	
E1.2	DLC Interlock cable door E1.2	1SDA073850R1	
E1.2	DLC Interlock direct door E1.2	1SDA073851R1	
E2.2E6.2	DLC Interlock cable door E2.2E6.2	1SDA073852R1	
E2.2E6.2	DLC Interlock direct door E2.2E6.2	1SDA073853R1	

Protection device for opening and closing pushbuttons - PBC

Size	Туре	Code	
E1.2	PBC Prot. Pushbuttons AP/CH E1.2	1SDA073854R1	
E1.2	PBC Prot. Pushbuttons AP/CH D=4mm E1.2	1SDA073855R1	
E1.2	PBC Prot. Pushbuttons AP/CH D=7mm E1.2	1SDA073856R1	
E1.2	PBC Prot. Pushbuttons AP/CH D=8mm E1.2	1SDA073857R1	
E2.2E6.2	PBC Prot. Pushbuttons AP/CH E2.2E6.2	1SDA073858R1	
E2.2E6.2	PBC Prot. Pushbuttons AP/CH D=4mm E2.2E6.2	1SDA073859R1	
E2.2E6.2	PBC Prot. Pushbuttons AP/CH D=7mm E2.2E6.2	1SDA073860R1	
E2.2E6.2	PBC Prot. Pushbuttons AP/CH D=8mm E2.2E6.2	1SDA073861R1	

Circuit-breaker flange

	9	
Size	Туре	Code
E1.2	IP30 Flange E1.2 F	1SDA073862R1
E1.2	IP30 Flange E1.2 W	1SDA073863R1
E2.2E6.2	IP30 Flange E2.2E6.2 F	1SDA073864R1
E2.2E6.2	IP30 Flange E2.2E6.2 W	1SDA073865R1
E1.2	IP54 Flange different keys E1.2	1SDA073866R1
E2.2E6.2	IP54 Flange different keys E2.2E6.2	1SDA073867R1
E1.2	IP54 Flange key No. 20005 E1.2	1SDA073868R1
E2.2E6.2	IP54 Flange key No. 20005 E2.2E6.2	1SDA073869R1
E2.2E6.2	Sealable trip unit cover	1SDA073870R1

High or low terminal covers- HTC/LTC

Size	Туре	3 poles 4 poles	
		Code	Code
E1.2	HTC high terminal covers E1.2 2pcs	1SDA073871R1	1SDA073872R1
	LTC low terminal covers E1.2 F 2pcs	1SDA073873R1	1SDA073874R1
E1.2	LTC low terminal covers E1.2 W 2pcs	1SDA073875R1	1SDA073876R1

Separators - PB

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Size	Туре	Code
E1.2	PB Separators H=100mm 4pz E1.2 3P	1SDA073877R1
E1.2	PB Separators H=100mm 6pz E1.2 4P	1SDA073878R1
E1.2	PB Separators H=200mm 4pz E1.2 3P	1SDA073879R1
E1.2	PB Separators H=200mm 6pz E1.2 4P	1SDA073880R1











Accessories Mechanical interlock

Cables for mechanical interlock [Group 1]

	7	7	
Size	Туре	Code	
E1.2E6.2	Type A horizontal	1SDA073881R1	
E2.2E6.2	Type B,C,D horizontal	1SDA073882R1	
E1.2E6.2	Type A vertical	1SDA073885R1	
E2.2E6.2	Type B,C,D vertical	1SDA073886R1	

Order one type of cable for each interlock. The cable must be ordered on the fixed circuit-breaker or on the fixed part of withdrawable circuit-breaker.

Lever for mechanical interlock of fixed circuit-breaker or mobile part [Group 2]

Size	Туре	3 Poles	4 Poles
		Code	Code
E2.2	Lever for mechanical interlock	1SDA073889R1	1SDA073889R1
E4.2	Lever for mechanical interlock	1SDA073890R1	1SDA073890R1
E6.2	Lever for mechanical interlock	1SDA073891R1	1SDA073892R1

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

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

Size	Туре	Code	
E1.2	Type A	1SDA073893R1	
E1.2	Type A - Installed on bottom plate	1SDA073894R1	
E2.2 E6.2	Type A / B / D	1SDA073895R1	
E2.2 E6.2	Type C	1SDA073897R1	

Support for mechanical interlock of fixed part [Group 4]

Size	Туре	Code	
E1.2	Type A	1SDA073896R1	
E2.2 E6.2	Type A / B / D	1SDA073895R1	
E2.2 E6.2	Type C	1SDA073897R1	

Automatic transfer switch

Size	Туре	Code
E1.2E6.2	ATS021	1SDA065523R1
E1.2E6.2	ATS022	1SDA065524R1

Accessories Ekip modules













Size	Туре	Code
E1.2E6.2	Ekip Dip Ll	1SDA074194R1
E1.2E6.2	Ekip Dip LSI	1SDA074195R1
E1.2E6.2	Ekip Dip LSIG	1SDA074196R1
E1.2E6.2	Ekip Touch LI	1SDA074197R1
E1.2E6.2	Ekip Touch LSI	1SDA074198R1
E1.2E6.2	Ekip Touch LSIG	1SDA074199R1
E1.2E6.2	Ekip G Touch LSIG	1SDA074200R1
E1.2E6.2	Ekip Hi-Touch LSI	1SDA074201R1
E1.2E6.2	Ekip Hi-Touch LSIG	1SDA074202R1
E1.2E6.2	Ekip G Hi-Touch LSIG	1SDA074203R1
E1.2E6.2	Ekip LCD LI	1SDA074204R1
E1.2E6.2	Ekip LCD LSI	1SDA074205R1
E1.2E6.2	Ekip LCD LSIG	1SDA074206R1
E1.2E6.2	Ekip G LCD LSIG	1SDA074207R1
E1.2E6.2	Ekip Hi-LCD LSI	1SDA074208R1
E1.2E6.2	Ekip Hi-LCD LSIG	1SDA074209R1
E1.2E6.2	Ekip G Hi-LCD LSIG	1SDA074210R1
E1.2E6.2	Battery for Ekip trip units	1SDA074193R1

Options for Ekip electrical trip units

Size	Туре	Code
E1.2E6.2	Ekip LCD Installed	1SDA074211R1
E1.2E6.2	Ekip Power Controller	1SDA074212R1
E1.2E6.2	Upper internal installed voltage outlets	1SDA074216R1
E1.2E6.2	External installed voltage outlets	1SDA074217R1
E1.2E6.2	Arrangement for cables with lower internal voltage outlets	1SDA074213R1
E1.2E6.2	Arrangement for cables with upper internal voltage outlets	1SDA074214R1
E1.2E6.2	Arrangement for cables with external voltage outlets	1SDA074215R1

Power Supply modules

Size	Туре	Code	
E1.2E6.2	Ekip Supply 110-240V AC/DC	1SDA074172R1	
E1.2E6.2	Ekip Supply 24-48V DC	1SDA074173R1	

Connectivity modules

Size	Туре	Code
E1.2E6.2	Ekip Com Modbus RS-485	1SDA074150R1
E1.2E6.2	Ekip Com Modbus TCP	1SDA074151R1
E1.2E6.2	Ekip Com Profibus	1SDA074152R1
E1.2E6.2	Ekip Com Profinet	1SDA074153R1
E1.2E6.2	Ekip Com DeviceNet	1SDA074154R1
E1.2E6.2	Ekip Com EtherNet/IP	1SDA074155R1
E1.2E6.2	Ekip Com IEC61850	1SDA074156R1
E1.2E6.2	Ekip Com R Modbus RS-485	1SDA074157R1
E1.2E6.2	Ekip Com R Modbus TCP	1SDA074158R1
E1.2E6.2	Ekip Com R Profibus	1SDA074159R1
E1.2E6.2	Ekip Com R Profinet	1SDA074160R1
E1.2E6.2	Ekip Com R DeviceNet	1SDA074161R1
E1.2E6.2	Ekip Com R EtherNet/IP	1SDA074162R1
E1.2E6.2	Ekip Link	1SDA074163R1
E1.2E6.2	Ekip Bluetooth	1SDA074164R1
E1.2E6.2	Ekip Com GPRS-M	1SDA074165R1
E1.2E6.2	Ekip Com Actuator	1SDA074166R1















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Size	Туре	Code	
E1.2E6.2	Ekip 2K-1	1SDA074167R1	
E1.2E6.2	Ekip 2K-2	1SDA074168R1	
E1.2E6.2	Ekip 2K-3	1SDA074169R1	
E2.2E6.2	Ekip 4K	1SDA074170R1	
E1.2E6.2	Ekip 10K	1SDA074171R1	

Measuring and protection modules

Size	Туре	Code	
E1.2	Ekip Measuring	1SDA074184R1	
E1.2	Ekip Measuring Pro	1SDA074185R1	
E2.2	Ekip Measuring	1SDA074186R1	
E2.2	Ekip Measuring Pro	1SDA074187R1	
E4.2	Ekip Measuring	1SDA074188R1	
E4.2	Ekip Measuring Pro	1SDA074189R1	
E6.2	Ekip Measuring	1SDA074190R1	
E6.2	Ekip Measuring Pro	1SDA074191R1	
E1.2E6.2	Ekip Synchrocheck	1SDA074183R1	
E2.2E6.2	Ekip Fan 24V DC	1SDA074174R1	
E2.2	Fan module for three-pole circuit-breaker	1SDA074176R1	
E2.2	Fan module for four-pole circuit-breaker	1SDA074177R1	
E4.2	Fan module for three-pole circuit-breaker	1SDA074178R1	
E4.2	Fan module for four-pole circuit-breaker	1SDA074179R1	
E6.2	Fan module for three-pole circuit-breaker	1SDA074180R1	
E6.2	Fan module for four-pole circuit-breaker	1SDA074181R1	
E6.2	Fan module for four-pole circuit-breaker with full size neutral	1SDA074182R1	

Displaying and supervision systems

Size	Туре	Code
E1.2E6.2	Ekip Multimeter Display on front of switchgear	1SDA074192R1
E1.2E6.2	Ekip Control Panel for 10 circuit-breakers	1SDA074311R1
E1.2E6.2	Ekip control panel for 30 circuit-breakers	1SDA074312R1
E1.2E6.2	Ekip Control Panel license extension to 30 circuit-breakers	1SDA074313R1
E1.2E6.2	Ekip Control Panel alarm dispatcher option	1SDA074314R1
E1.2E6.2	Ekip Control Panel option 5 eccess web client	1SDA074315R1
E1.2E6.2	Ekip View Software for 30 circuit-breakers	1SDA074298R1
E1.2E6.2	Ekip View software for 60 circuit-breakers	1SDA074299R1
E1.2E6.2	Ekip View software for unlimited circuit-breakers	1SDA074300R1
E1.2E6.2	Ekip View license extension to 60 circuit-breakers	1SDA074301R1
E1.2E6.2	Ekip View license extension for an unlimited number of circuit-breakers	1SDA074302R1
E1.2E6.2	Ekip View alarm dispatcher option for 30 circuit-breakers	1SDA074303R1
E1.2E6.2	Ekip View alarm dispatcher option for 60 circuit-breakers	1SDA074304R1
E1.2E6.2	Ekip View alarm dispatcher option for an unlimited number of circuit-breakers	1SDA074305R1
E1.2E6.2	Ekip View 5 web access client option license of 30 circuit-breakers	1SDA074306R1
E1.2E6.2	Ekip View 5 web access client option license of 60 circuit-breakers	1SDA074307R1
E1.2E6.2	Ekip View 5 web access client option license for an unlimited number of circuit-breakers	1SDA074308R1
E1.2E6.2	Ekip View redundancy option	1SDA074309R1
E1.2E6.2	Ekip View OPC server-client option	1SDA074310R1

Accessories Ekip modules



Rating plug for Ekip trip units

Rating plug for Ekip trip units						
Size	Туре	Code (loose supply)	Code (installed)			
E1.2E6.2	Rating Plug 100A	1SDA074218R1	1SDA074258R1			
E1.2E6.2	Rating Plug 200A	1SDA074219R1	1SDA074259R1			
E1.2E6.2	Rating Plug 250A	1SDA074220R1	1SDA074260R1			
E1.2E6.2	Rating Plug 400A	1SDA074221R1	1SDA074261R1			
E1.2E6.2	Rating Plug 630A	1SDA074222R1	1SDA074262R1			
E1.2E6.2	Rating Plug 800A	1SDA074223R1	1SDA074263R1			
E1.2E6.2	Rating Plug 1000A	1SDA074224R1	1SDA074264R1			
E1.2E6.2	Rating Plug 1250A	1SDA074225R1	1SDA074265R1			
E1.2E6.2	Rating Plug 1600A	1SDA074226R1	1SDA074266R1			
E1.2E6.2	Rating Plug 2000A	1SDA074227R1	1SDA074267R1			
E1.2E6.2	Rating Plug 2500A	1SDA074228R1	1SDA074268R1			
E1.2E6.2	Rating Plug 3200A	1SDA074229R1	1SDA074269R1			
E1.2E6.2	Rating Plug 4000A	1SDA074230R1	1SDA074270R1			
E1.2E6.2	Rating Plug 5000A	1SDA074231R1	1SDA074271R1			
E1.2E6.2	Rating Plug 6300A	1SDA074232R1	1SDA074272R1			
E1.2E6.2	Rating Plug 100A L 0FF	1SDA074233R1	1SDA074273R1			
E1.2E6.2	Rating Plug 200A L OFF	1SDA074234R1	1SDA074274R1			
E1.2E6.2	Rating Plug 250A L OFF	1SDA074235R1	1SDA074275R1			
E1.2E6.2	Rating Plug 400A L OFF	1SDA074236R1	1SDA074276R1	· · · · · · · · · · · · · · · · · · ·		
E1.2E6.2	Rating Plug 630A L OFF	1SDA074237R1	1SDA074277R1			
E1.2E6.2	Rating Plug 800A L OFF	1SDA074238R1	1SDA074278R1	······		
E1.2E6.2	Rating Plug 1000A L OFF	1SDA074239R1	1SDA074279R1			
E1.2E6.2	Rating Plug 1250A L OFF	1SDA074240R1	1SDA074280R1	······		
E1.2E6.2	Rating Plug 1600A L OFF	1SDA074241R1	1SDA074281R1			
E1.2E6.2	Rating Plug 2000A L OFF	1SDA074242R1	1SDA074282R1			
E1.2E6.2	Rating Plug 2500A L OFF	1SDA074243R1	1SDA074283R1			
E1.2E6.2	Rating Plug 3200A L OFF	1SDA074244R1	1SDA074284R1			
E1.2E6.2	Rating Plug 4000A L OFF	1SDA074245R1	1SDA074285R1			
E1.2E6.2	Rating Plug 5000A L OFF	1SDA074246R1	1SDA074286R1			
E1.2E6.2	Rating Plug 6300A L OFF	1SDA074247R1	1SDA074287R1			
E1.2E6.2	Rating Plug RC 100A	1SDA074248R1	1SDA074288R1			
E1.2E6.2	Rating Plug RC 200A	1SDA074249R1	1SDA074289R1			
E1.2E6.2	Rating Plug RC 250A	1SDA074250R1	1SDA074290R1			
E1.2E6.2	Rating Plug RC 400A	1SDA074251R1	1SDA074291R1			
E1.2E6.2	Rating Plug RC 630A	1SDA074252R1	1SDA074292R1			
E1.2E6.2	Rating Plug RC 800A	1SDA074253R1	1SDA074293R1			
E1.2E6.2	Rating Plug RC 1250A	1SDA074254R1	1SDA074294R1			
E1.2E6.2	Rating Plug RC 2000A	1SDA074255R1	1SDA074295R1			
E1.2E6.2	Rating Plug RC 3200A	1SDA074256R1	1SDA074296R1			
E1.2E6.2	Rating Plug RC 4000A	1SDA074257R1	1SDA074297R1			

Accessories **Terminals**



Rear orientable terminal - HR VR



Horizontal rear spread terminal - SHR



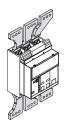
Vertical rear spread terminal - SVR



Extended front terminal - EF



Front terminal - F



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

Kit for terminals	s - installe	d for fixed	circuit-break	er
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Size	Version	lu max	Туре	3 Poles	4 Poles
				Code	Code
E1.2	F	1600	Kit EF Upper	1SDA073963R1	1SDA073964R1
E1.2	F	1600	Kit EF Lower	1SDA073965R1	1SDA073966R1
E1.2	F	1600	Kit ES Upper	1SDA073975R1	1SDA073976R1
E1.2	F	1600	Kit ES Lower	1SDA073977R1	1SDA073978R1
E1.2	F	1600	Kit HR Upper	1SDA073981R1	1SDA073982R1
E1.2	F	1600	Kit HR Lower	1SDA073983R1	1SDA073984R1
E1.2	F	1600	Kit VR Upper	1SDA073985R1	1SDA073986R1
E1.2	F	1600	Kit VR Lower	1SDA073987R1	1SDA073988R1
E1.2	F	1600	Kit FC CuAl 4x240 mm² Upper	1SDA073997R1	1SDA073998R1
E1.2	F	1600	Kit FC CuAl 4x240 mm² Lower	1SDA073999R1	1SDA074000R1
E2.2	F	2000	Kit VR Upper	1SDA074003R1	1SDA074004R1
E2.2	F	2000	Kit VR Lower	1SDA074005R1	1SDA074006R1
E2.2	F	2500	Kit VR Upper	1SDA074009R1	1SDA074010R1
E2.2	F	2500	Kit VR Lower	1SDA074011R1	1SDA074012R1
E2.2	F	2000	Kit SHR Upper	1SDA074045R1	1SDA074046R1
E2.2	F	2000	Kit SHR Lower	1SDA074047R1	1SDA074048R1
E2.2	F	2500	Kit SHR Upper	1SDA074051R1	1SDA074052R1
E2.2	F	2500	Kit SHR Lower	1SDA074053R1	1SDA074054R1
E2.2	F	2000	Kit SVR Upper	1SDA074057R1	1SDA074058R1
E2.2	F	2000	Kit SVR Lower	1SDA074059R1	1SDA074060R1
E2.2	F	2500	Kit SVR Upper	1SDA074063R1	1SDA074064R1
E2.2	F	2500	Kit SVR Lower	1SDA074065R1	1SDA074066R1
E2.2	F	2500	Kit F Upper	1SDA074118R1	1SDA074119R1
E2.2	F	2500	Kit F Lower	1SDA074120R1	1SDA074121R1
E4.2	F	3200	Kit VR Upper	1SDA074015R1	1SDA074016R1
E4.2	F	3200	Kit VR Lower	1SDA074017R1	1SDA074018R1
E4.2	F	4000	Kit VR Upper	1SDA074021R1	1SDA074022R1
E4.2	F	4000	Kit VR Lower	1SDA074023R1	1SDA074024R1
E4.2	F	4000	Kit F Upper	1SDA074126R1	1SDA074127R1
E4.2	F	4000	Kit F Lower	1SDA074128R1	1SDA074129R1
E6.2	F	5000	Kit VR Upper	1SDA074027R1	1SDA074028R1
E6.2	F	5000	Kit VR Lower	1SDA074030R1	1SDA074031R1
E6.2/f	F	5000	Kit VR Upper		1SDA074029R1
E6.2/f	F	5000	Kit VR Lower		1SDA074032R1
E6.2	F	6300	Kit F Upper	1SDA074134R1	1SDA074135R1
E6.2	F	6300	Kit F Lower	1SDA074137R1	1SDA074138R1
E6.2/f	F	6300	Kit F Upper		1SDA074136R1
E6.2/f	F	6300	Kit F Lower		1SDA074139R1
E6.2	F	6300	Kit VR Upper	1SDA074036R1	1SDA074037R1
E6.2	F	6300	Kit VR Lower	1SDA074039R1	1SDA074040R1
E6.2/f	F	6300	Kit VR Upper		1SDA074038R1
E6.2/f	F	6300	Kit VR Lower		1SDA074041R1

Accessories Terminals



Rear orientable terminal - HR VR



Horizontal rear terminal - SHR



Vertical rear spread terminal - SVR



Front terminal - ${\sf F}$



Extended front terminal - EF



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

Kit for terminals - installed for fixed part of withdrawable circuit-breaker

	;				
				Code	Code
1.2	W	1600	Kit EF Upper	1SDA073939R1	1SDA073940R1
1.2	W	1600	Kit EF Lower	1SDA073941R1	1SDA073942R1
1.2	W	1600	Kit VR Upper	1SDA073945R1	1SDA073946R1
1.2	W	1600	Kit VR Lower	1SDA073947R1	1SDA073948R1
1.2	W	1600	Kit ES Upper *	1SDA073951R1	1SDA073952R1
1.2	W	1600	Kit ES Lower *	1SDA073953R1	1SDA073954R1
1.2	W	1600	Kit SHR Upper	1SDA073957R1	1SDA073958R1
1.2	W	1600	Kit SHR Lower	1SDA073959R1	1SDA073960R1
1.2	W	1600	Kit FC CuAl 4x240 mm ² Upper	1SDA073991R1	1SDA073993R1
1.2	W	1600	Kit FC CuAl 4x240 mm ² Lower	1SDA073992R1	1SDA073994R1
2.2	W	2000	Kit VR Upper	1SDA074577R1	1SDA074578R1
2.2	W	2000	Kit VR Lower	1SDA074579R1	1SDA074580R1
2.2	W	2500	Kit VR Upper	1SDA074581R1	1SDA074582R1
2.2	W	2500	Kit VR Lower	1SDA074583R1	1SDA074584R1
 2.2	W	2000	Kit SHR Upper	1SDA074585R1	1SDA074586R1
 2.2	W	2000	Kit SHR Lower	1SDA074587R1	1SDA074588R1
 2.2	W	2500	Kit SHR Upper	1SDA074589R1	1SDA074590R1
 2.2	W	2500	Kit SHR Lower	1SDA074591R1	1SDA074592R1
2.2	W	2000	Kit SVR Upper	1SDA074593R1	1SDA074594R1
 2.2	W	2000	Kit SVR Lower	1SDA074595R1	1SDA074596R1
 2.2	W	2500	Kit SVR Upper	1SDA074597R1	1SDA074598R1
 2.2	W	2500	Kit SVR Lower	1SDA074599R1	1SDA074600R1
 2.2	W	2500	Kit FL Upper	1SDA074069R1	1SDA074070R1
2.2	W	2500	Kit FL Lower	1SDA074003111	1SDA074072R1
2.2	W	2500	Kit F Upper	1SDA074090R1	1SDA074091R1
2.2	W	2500	Kit F Lower	1SDA074092R1	1SDA074093R1
4.2	W	3200	Kit VR Upper	1SDA074601R1	1SDA074602R1
4.2	W	3200	Kit VR Lower	1SDA074603R1	1SDA074604R1
4.2 4.2	W	4000			
4.2	W	4000	Kit VR Upper	1SDA074605R1	1SDA074606R1
4.2	W	4000	Kit VR Lower	1SDA074607R1	1SDA074608R1
4.2 4.2	W	4000	Kit F Lower	1SDA074098R1	1SDA074099R1
4.2 4.2	W	4000	Kit F L Upper	1SDA074100R1	1SDA074101R1
4.2 4.2	W	4000	Kit FL Lower	1SDA074075R1 1SDA074077R1	1SDA074076R1
4.2 6.2	W		Kit FL Lower		1SDA074078R1
	W	5000	Kit VR Lower	1SDA074609R1	1SDA074610R1
6.2 6.2/f	W	5000	Kit VR Lower	1SDA074612R1	1SDA074613R1
	÷	5000	Kit VR Upper		1SDA074611R1
6.2/f	W	5000	Kit VR Lower	100407461501	1SDA074614R1
6.2	W	6300	Kit VR Upper	1SDA074615R1	1SDA074616R1
6.2 6.2/f	W	6300	Kit VR Lower	1SDA074618R1	1SDA074619R1
6.2/f	W	6300	Kit VR Upper		1SDA074617R1
6.2/f	W	6300	Kit VR Lower	100407410001	1SDA074620R1
6.2	W	6300	Kit F Upper	1SDA074106R1	1SDA074107R1
6.2	W	6300	Kit F Llower	1SDA074109R1	1SDA074110R1
6.2/f	W	6300	Kit F Upper		1SDA074108R1
6.2/f	W	6300	Kit F Lower	40040	1SDA074111R1
6.2	W	6300	Kit FL Upper	1SDA074081R1	1SDA074082R1
6.2	W	6300	Kit FL Lower	1SDA074084R1	1SDA074085R1
6.2/f	W	6300 6300	Kit FL Upper Kit FL Lower		1SDA074083R1

^{*} can be ordered only if the fixed part has EF terminals.



Rear orientable terminal - HR VR



Horizontal rear spread terminal - SHR



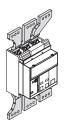
Vertical rear spread terminal - SVR



Extended front terminal - EF



Front terminal - F



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

Size	Version	lu max	Туре	3 Poles	4 Poles
				Code	Code
E1.2	F	1600	Kit EF	1SDA073967R1	1SDA073968R1
E1.2	F	1600	Kit F	1SDA073973R1	1SDA073974R1
E1.2	F	1600	Kit ES	1SDA073979R1	1SDA073980R1
E1.2	F	1600	Kit Adjustable HR/VR	1SDA073989R1	1SDA073990R1
E1.2	F	1600	Kit FC CuAl 4x240 mm ²	1SDA074001R1	1SDA074002R1
E2.2	F	2000	Kit Adjustable HR/VR	1SDA074007R1	1SDA074008R1
E2.2	F	2500	Kit Adjustable HR/VR	1SDA074013R1	1SDA074014R1
E2.2	F	2000	Kit SHR	1SDA074049R1	1SDA074050R1
E2.2	F	2500	Kit SHR	1SDA074055R1	1SDA074056R1
E2.2	F	2000	Kit SVR	1SDA074061R1	1SDA074062R1
E2.2	F	2500	Kit SVR	1SDA074067R1	1SDA074068R1
E4.2	F	3200	Kit Adjustable HR/VR	1SDA074019R1	1SDA074020R1
E4.2	F	4000	Kit Adjustable HR/VR	1SDA074025R1	1SDA074026R1
E4.2	F	4000	Kit F Upper	1SDA074130R1	1SDA074131R1
E4.2	F	4000	Kit F Lower	1SDA074132R1	1SDA074133R1
E6.2	F	5000	Kit Adjustable HR/VR	1SDA074033R1	1SDA074034R1
E6.2/f	F	5000	Kit Adjustable HR/VR		1SDA074035R1
E6.2	F	6300	Kit Adjustable HR/VR	1SDA074042R1	1SDA074043R1
E6.2/f	F	6300	Kit Adjustable HR/VR		1SDA074044R1
E6.2	F	6300	Kit F Upper	1SDA074140R1	1SDA074141R1
E6.2	F	6300	Kit F Lower	1SDA074143R1	1SDA074144R1
E6.2/f	F	6300	Kit F Upper		1SDA074142R1
E6.2/f	F	6300	Kit F Lower		1SDA074145R1

Adapter plate for terminals - loose supply for fixed circuit-breaker

7 10.0.0	read to place to terminate to the capping to the ca						
Size	Version	lu	Туре	3 Poles		4 Poles	
				Code		Code	
E2.2	F	2500	Kit Terminal Adapter Plate	1SDA074146R1		1SDA074147R1	
E4.2	F	4000	1	1SDA074148R1		1SDA074149R1	

Accessories Terminals



Rear orientable terminal - HR VR



Horizontal rear terminal - SHR



Vertical rear spread terminal - SVR



Front terminal - F



Extended front terminal - EF



Front spread terminal - ES



Terminal for cable FcCuAl 4x240mm² - Fc CuAl

Kit for terminals - loose supply for fixed part of withdrawable circuit-breaker

Size	Version	lu max	Туре	3 Poles	4 Poles
				Code	Code
E1.2	W	1600	Kit EF	1SDA073943R1	1SDA073944R1
1.2	W	1600	Kit Adjustable HR/VR	1SDA073949R1	1SDA073950R1
1.2	W	1600	Kit ES	1SDA073955R1	1SDA073956R1
1.2	W	1600	Kit SHR	1SDA073961R1	1SDA073962R1
1.2	W	1600	Kit FC CuAl 4x240 mm ²	1SDA073995R1	1SDA073996R1
2.2	W	2000	Kit Adjustable HR/VR	1SDA074007R1	1SDA074008R1
2.2	W	2500	Kit Adjustable HR/VR	1SDA074013R1	1SDA074014R1
2.2	W	2000	Kit SHR	1SDA074049R1	1SDA074050R1
2.2	W	2500	Kit SHR	1SDA074055R1	1SDA074056R1
2.2	W	2000	Kit SVR	1SDA074061R1	1SDA074062R1
2.2	W	2500	Kit SVR	1SDA074067R1	1SDA074068R1
2.2	W	2500	Kit FL	1SDA074073R1	1SDA074074R1
4.2	W	3200	Kit Adjustable HR/VR	1SDA074019R1	1SDA074020R1
4.2	W	4000	Kit Adjustable HR/VR	1SDA074025R1	1SDA074026R1
4.2	W	4000	Kit F Upper	1SDA074102R1	1SDA074103R1
4.2	W	4000	Kit F Lower	1SDA074104R1	1SDA074105R1
4.2	W	4000	Kit FL	1SDA074079R1	1SDA074080R1
6.2	W	5000	Kit Adjustable HR/VR	1SDA074033R1	1SDA074034R1
6.2/f	W	5000	Kit Adjustable HR/VR		1SDA074035R1
6.2	W	6300	Kit Adjustable HR/VR	1SDA074042R1	1SDA074043R1
6.2/f	W	6300	Kit Adjustable HR/VR		1SDA074044R1
6.2	W	6300	Kit F Upper	1SDA074112R1	1SDA074113R1
6.2	W	6300	Kit F Lower	1SDA074115R1	1SDA074116R1
6.2/f	W	6300	Kit F Upper		1SDA074114R1
6.2/f	W	6300	Kit F Lower		1SDA074117R1
6.2	W	6300	Kit FL	1SDA074087R1	1SDA074088R1
E6.2/f	W	6300	Kit FL		1SDA074089R1

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