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CATALOG

# **SACE Tmax XT ML**

Protection you can count on



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**SACE Tmax XT ML series is the ABB low voltage circuit breakers series from 160A up to 1600A with the ability to efficiently and simply control electrical navy installations, from the traditional to the more complex with the highest availability and continuity of service.**

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# Overview of the SACE ML family

Based on the long experience, ABB SACE is proud to offer a new family of circuit breakers for naval application and critical environment which sets a new circuit breaker benchmark for the needs of today and tomorrow.

A modern ship's operational ability is fully dependent on its onboard electrical infrastructure. Over the years, the growth in the number of electrically powered subsystems on a typical naval vessel has made this infrastructure ever more complex and extensive. It has also led to a steady increase in power requirements. These trends lead to new customer and application needs. To meet these demands, ABB has now unveiled the innovative ML family, the evolution of the ABB circuit breaker into a multifunctional platform that is able to manage the next generation of electrical plants such as microgrids.

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A RINA MIL certificate is available for all the breakers of this range, in order to ensure maximum market acceptance and users confidence.

For over 50 years, ABB SACE has been building shockproof equipment for navies around the world. The considerable installed base of the company's products on ships of the world's main navies underlines the reliability of ABB SACE electrical equipment.





# Distinctive features

SACE Tmax XT ML series is the ABB low voltage circuit breakers available from 160A up to 1600A and with the ability to efficiently and simply control electrical navy installations – from the traditional to the more complex with the highest availability and continuity of service.

The low-voltage electrical distribution plants inside the modern ship are driven by these following growing needs:

- Ensure **service continuity** by minimizing the time needed to identify and isolate faults
- Guarantee **space optimization**
- Optimize energy efficiency **maintaining the performance**
- **Safety** and **ease** of use

#### Reliability and service continuity

ABB SACE Tmax XT ML circuit breakers are the most advanced and complete solution for ensuring service continuity.

With built in communication modules, integrated software functions and excellent selectivity combinations, these circuit breakers take electrical system reliability to new levels.

ABB's solution is the only one that uses both a communication bus and electrical connections to prevent, detect and isolate electrical faults.

Its unique “digital zone selectivity” function, identifies the fault zone faster and isolate it reducing the stress in the remaining active zone. As a result, the electrical protection is more robust and costly shutdowns are more effectively prevented. Moreover SACE Tmax XT ML series features enhancements to the standard circuit breaker that guarantees operation under stressful conditions:

- **Shock resistance up to 15g ( IEC 60068-2-27)**
- High temperatures and humidity range in a saline atmosphere; ML circuit breakers can be used in ambient conditions where air temperature varies between **-25 °C and +70 °C (-13 °F and +158 °F)**
- Presence of vibrations that are persistent and have a high amplitude in specific frequency ranges



### **Dimension and weight optimization**

The SACE Tmax XT ML range offers higher performance, better protection and more precise metering than equivalent units, and can handle from 160 up to 1600A. Combined with the world's most precise electronic trip units in the smallest frames, the new range delivers significant time savings and enhances installation quality.

The different levels of rated nominal current and breaking capacity levels have been studied to ensure optimal sizing for all ships' configurations. SACE Tmax XT ML series makes it possible to standardize the circuit breaker support structures, considerably simplifying construction of the switchboards themselves. All trip units are easily upgradable and all communication units can be installed directly on the breaker with a few simple operations, making the complex system ready for a new digital experience.

### **Performance**

Next-generation ships will use more advanced microgrid technologies to overcome current power distribution challenges. Electrical distribution on a ship is an islanded microgrid, connecting multiple power generators and energy storage systems, that manages directional power flows. By using smart technologies to protect, connect and control the electrical system, ships can operate more efficiently and productively.

SACE Tmax XT ML low-voltage circuit breaker is the industry's first smart circuit breaker. Its embedded connectivity and load management software provides a comprehensive energy management solution.

The load profile optimization functions of SACE Tmax XT ML circuit breaker reduce CO2 emissions and fuel costs. The innovative circuit breaker safeguards a ship's mission-critical loads and generators, using advanced adaptive protection to maximize productivity under all conditions.

### **Safety and ease of use**

The ML range is available in fixed, plug-in and withdrawable versions, with double insulation between the front of the switchgear and the live parts to ensure operation in complete safety. The protection trip units are equipped with a large display which enables safe and intuitive operation. Furthermore the trip units can be programmed and consulted from a tablet, smart phone or portable PC via the Ekip Connect application some the advanced functionalities can be easily programmed thanks to predefined logic templates.

# Products conformity

SACE Tmax XT circuit-breakers and their accessories comply with IEC 60947, EN 60947 international Standards

## Compliance with Standards

Tmax XT circuit-breakers and their accessories are constructed in compliance with:

- Standard:
  - IEC 60947-2;
- Directives:
  - EC “Low Voltage Directive” (LVD) N° 2014/35/EC;
  - EC “Electromagnetic Compatibility Directive” (EMC) 2014/30/EC;



Registro Italiano Navale (RINA):  
Italy

- Shipping Registers:
  - Rina.

Certification of conformity with product Standards is carried out at the ABB SACE test laboratory (accredited by ACCREDIA - certificate no. 0062L-D2/2020) in compliance with UNI CEI EN ISO/IEC 17025 European Standard, by the Italian certification body ACAE, member of the European LOVAG organization and by the Swedish certification body SEMKO recognized by the international IECEE organization.



LOVAG low voltage agreement group

For more information about circuit-breakers, certified ratings and their corresponding validity, please contact ABB SACE.





### Company Quality System

The ABB SACE Quality System complies 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 Standards.

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

### Environmental Health & Safety Management System, Social Responsibility and Ethics

Special care for the environment is a priority commitment for ABB SACE. This is confirmed through the company's Environmental Management System which is certified by the 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. All this amounts to solid evidence of ABB's commitment to respecting business ethics and promoting a safe and healthy working environment.

ISO 14001, OHSAS 18001 and SA8000 recognitions together with ISO 9001 made it possible to obtain RINA BEST<sup>4</sup> (Business Excellence Sustainable Task) certification.

### Product Material Compliance

The XT family complies with the following international regulations:

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



# SACE Tmax XT ML automatic circuit-breakers for alternating current (AC) distribution



Size	XT1					
Rated uninterrupted current	[A]	160				
Poles	[No.]	3				
Rated service voltage, U <sub>e</sub>	(AC) 50-60Hz	[V]				
Rated insulation voltage, U <sub>i</sub>	[V]	800				
Rated impulse withstand voltage, U <sub>imp</sub>	[kV]	8				
Versions		Fixed, Plug-in <sup>(1)</sup>				
Max supply voltage on bottom side (F, P, W)	[V]	690				
<b>Breaking capacities according to IEC 60947-2</b>		<b>B</b>	<b>C</b>	<b>N</b>	<b>S</b>	<b>H</b>
<b>Rated ultimate short-circuit breaking capacity, I<sub>cu</sub></b>						
I <sub>cu</sub> @ 220-230-240V 50-60Hz (AC)	[kA]	25	40	65	85	100
I <sub>cu</sub> @ 380V 50-60Hz (AC)	[kA]	18	25	36	50	70
I <sub>cu</sub> @ 415V 50-60Hz (AC)	[kA]	18	25	36	50	70
I <sub>cu</sub> @ 440V 50-60Hz (AC)	[kA]	15	25	36	50	65
I <sub>cu</sub> @ 500V 50-60Hz (AC)	[kA]	8	18	30	36	50
I <sub>cu</sub> @ 525V 50-60Hz (AC)	[kA]	6	8	22	35	35
I <sub>cu</sub> @ 690V 50-60Hz (AC)	[kA]	3	4	6	8	10
<b>Rated service short-circuit breaking capacity, I<sub>cs</sub></b>						
I <sub>cs</sub> @ 220-230-240V 50-60Hz (AC)	[kA]	100%	100%	75% (50)	75%	75%
I <sub>cs</sub> @ 380V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	75%
I <sub>cs</sub> @ 415V 50-60Hz (AC)	[kA]	100%	100%	100%	75%	50% (37.5)
I <sub>cs</sub> @ 440V 50-60Hz (AC)	[kA]	75%	50%	50%	50%	50%
I <sub>cs</sub> @ 500V 50-60Hz (AC)	[kA]	100%	50%	50%	50%	50%
I <sub>cs</sub> @ 525V 50-60Hz (AC)	[kA]	100%	100%	50%	50%	50%
I <sub>cs</sub> @ 690V 50-60Hz (AC)	[kA]	100%	100%	75% (5)	50% (5)	50%
<b>Rated short-circuit making capacity, I<sub>cm</sub></b>						
I <sub>cm</sub> @ 220-230-240V 50-60Hz (AC)	[kA]	52.5	84	143	187	220
I <sub>cm</sub> @ 380V 50-60Hz (AC)	[kA]	36	52.5	75.6	110	154
I <sub>cm</sub> @ 415V 50-60Hz (AC)	[kA]	36	52.5	75.6	110	154
I <sub>cm</sub> @ 440V 50-60Hz (AC)	[kA]	30	52.5	75.6	110	143
I <sub>cm</sub> @ 500V 50-60Hz (AC)	[kA]	13.6	36	63	75.6	110
I <sub>cm</sub> @ 525V 50-60Hz (AC)	[kA]	9	13.6	46.2	73.5	73.5
I <sub>cm</sub> @ 690V 50-60Hz (AC)	[kA]	4.26	5.88	9	13.6	17
<b>Breaking capacities according to NEMA-AB1</b>						
@ 240V 50-60Hz (AC)	[kA]	25	40	65	85	100
@ 480V 50-60Hz (AC)	[kA]	8	18	30	36	65
Utilization Category (IEC 60947-2)		A				
I <sub>cw</sub>	[kA]	-				
Reference Standard		IEC 60947-2				
Insulation behaviour		■				
Mounted on DIN rail		DIN EN 50022				
Mechanical life	[No. Operations]	25,000				
	[No. Hourly operations]	240				
Electrical life @ 415 V (AC)	[No. Operations]	8,000				
	[No. Hourly operations]	120				

(1) XT1 plug-in I<sub>n</sub> max=125A(2) I<sub>n</sub><32A I<sub>cu</sub>=25kA/I<sub>cs</sub>=20kA, with magnetic trip unit only and I<sub>ns</sub>52A/I<sub>cu</sub>=I<sub>cs</sub>=5kA(3) I<sub>cs</sub>=100% I<sub>cu</sub> up to 250 A with EF, ES, Rear and external FC CuAl (2x...) terminal. When any other terminals are used and load >200A I<sub>cu</sub>=25%



XT2					XT3		XT4					
160					250		160 / 250					
3					3		3					
690					690		690					
1000					800		1000					
8					8		8					
Fixed, Withdrawable, Plug-in					Fixed, Plug-in		Fixed, Withdrawable, Plug-in					
≤ 480					690		≤ 600					
N	S	H	L	V	N	S	N	S	H	L	V	X
65	85	100	150	200	50	85	65	85	100	150	200	200
36	50	70	120	150	36	50	36	50	70	120	150	200
36	50	70	120	150	36	50	36	50	70	120	150	200
36	50	65	100	150	25	40	36	50	65	100	150	200
30	36	50	60	70	20	30	30	36	50	60	85	100
20	25	30	36	50	13	20	20	25	45	50	70	100
10	12	15	18	20	5	6	10	12	15	20	50 <sup>(2)</sup>	100
100%	100%	100%	100%	100%	75%	50%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	75%	50% (27)	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	75%	50% (27)	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	75%	50%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	75%	50%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	75%	50%	100%	100%	100%	100%	100%	100%
100%	100%	100%	75% (15)	75%	50% (3)	50%	100%	100%	100%	100%	100% <sup>(3)</sup>	100% <sup>(3)</sup>
143	187	220	330	440	110	187	143	187	220	330	440	440
75.6	110	154	264	330	75.6	110	75.6	110	154	264	330	440
75.6	110	154	264	330	75.6	110	75.6	110	154	264	330	440
75.6	110	143	220	330	52.5	84	75.6	110	143	220	330	440
63	75.6	110	132	154	40	63	63	75.6	110	132	187	220
40	52.5	63	75.6	110	26	40	40	52.5	94.5	110	154	220
17	24	30	36	40	7.5	9	17	24	30	40	110	220
65	85	100	150	200	50	85	65	85	100	150	200	200
30	36	65	100	150	25	35	30	36	65	100	150	100
A					A		A					
-					-		-					
IEC 60947-2					IEC 60947-2		IEC 60947-2					
■					■		■					
DIN EN 50022					DIN EN 50022		DIN EN 50022					
25,000					25,000		25,000					
240					240		240					
8,000					8,000		8,000		10,000			
120					120		120					

# SACE Tmax XT ML automatic circuit-breakers for alternating current (AC) distribution



Size		XT1	
<b>Dimensions</b>			
Fixed (Width x Depth x Height)	3 poles	[mm]	76.2 x 70 x 130
<b>Trip units for power distribution</b>			
TMD/TMA			
TMD/TMF			
Ekip Dip			
Ekip Touch			
<b>Trip units for motor protection</b>			
MF/MA			
Ekip Dip			
Ekip Touch			
<b>Trip units for generator protection</b>			
TMG			
Ekip Dip			
Ekip Touch			
<b>Interchangeable trip units</b>			
<b>Weight</b>			
Fixed	3 poles	[kg]	1.1
Plug in (EF terminals)	3 poles	[kg]	2.21
Withdrawable (EF terminals)	3 poles	[kg]	



XT2	XT3	XT4
90 x 82.5 x 130	105 x 70 x 150	105 x 82.5 x 160
■		■
	■	
■		■
■		■
■	■	■
■		■
■		■
■	■	
■		■
■		■
■		■
1.2	1.7	2.5
2.54	3.24	4.19
3.32		5

# SACE Tmax XT ML automatic circuit-breakers for alternating current (AC) distribution



Size	XT5						
Rated uninterrupted current	[A]	400 / 630					
Poles	[No.]	3					
Rated service voltage. <b>Ue</b>	(AC) 50-60Hz [V]	690					
Rated insulation voltage. <b>Ui</b>	[V]	1000					
Rated impulse withstand voltage. <b>Uimp</b>	[kV]	8					
Versions	Fixed. Withdrawable. Plug-in <sup>(5)</sup>						
Max supply voltage on bottom side (F. P. W)	[V]	690					
<b>Breaking capacities according to IEC 60947-2</b>		<b>N</b>	<b>S</b>	<b>H</b>	<b>L</b>	<b>V</b>	<b>X</b>
<b>Rated ultimate short-circuit breaking capacity. Icu</b>							
Icu @ 220-230-240V 50-60Hz (AC)	[kA]	70	85	100	150	200	200
Icu @ 380V 50-60Hz (AC)	[kA]	36	50	70	120	200	200
Icu @ 415V 50-60Hz (AC)	[kA]	36	50	70	120	200	200
Icu @ 440V 50-60Hz (AC)	[kA]	36	50	65	100	180	200
Icu @ 500V 50-60Hz (AC)	[kA]	25	30	50	85	150	150
Icu @ 525V 50-60Hz (AC)	[kA]	25	30	50	85	100	120
Icu @ 690V 50-60Hz (AC)	[kA]	20	25	40	70	80	100
<b>Rated service short-circuit breaking capacity. Ics</b>							
Ics @ 220-230-240V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 380V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 415V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 440V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 500V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 525V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 690V 50-60Hz (AC)	[kA]	100%	100%	100% <sup>(2)</sup>	100% <sup>(3)</sup>	100% <sup>(3)</sup>	100% <sup>(3)</sup>
<b>Rated short-circuit making capacity. Icm</b>							
Icm @ 220-230-240V 50-60Hz (AC)	[kA]	154	187	220	330	440	440
Icm @ 380V 50-60Hz (AC)	[kA]	75.6	110	154	264	440	440
Icm @ 415V 50-60Hz (AC)	[kA]	75.6	110	154	264	440	440
Icm @ 440V 50-60Hz (AC)	[kA]	75.6	110	143	220	396	440
Icm @ 500V 50-60Hz (AC)	[kA]	52.5	63	110	187	330	330
Icm @ 525V 50-60Hz (AC)	[kA]	52.5	63	110	187	220	264
Icm @ 690V 50-60Hz (AC)	[kA]	40	52.5	84	154	176	220
<b>Breaking capacities according to NEMA-AB1</b>							
@ 240V 50-60Hz (AC)	[kA]						
@ 480V 50-60Hz (AC)	[kA]						
Utilization Category (IEC 60947-2)		A (up to 630A). B (up to 500A) <sup>(4)</sup>					
Icw (1 sec)	[kA]	6					
Reference Standard		IEC 60947-2					
Insulation behaviour		■					
Mounted on DIN rail		-					
Mechanical life	[No. operations]	20,000					
	[No. hourly operations]	120					
Electrical life @ 415 V (AC)	[No. operations]	7,000 (400A) - 5,000 (630A)					
	[No. hourly operations]	60					

(1) Not suitable for IT distribution systems &gt; 440Vac

(2) Ics = 75% In &gt; 500A

(3) Ics = 50% In &gt; 500A

(4) Category B: only when equipped with an electronic trip unit

(5) Plug-in/Withdrawable: max In 40°C=600A

(6) 1000A only for fixed execution with EF, ES, R and FCCuAl terminals.

EF terminals are supplied as standard if no other terminals are ordered



<b>XT6<sup>(4)</sup></b>			<b>XT7</b>			<b>XT7 M</b>		
800 / 1000 <sup>(6)</sup>			800 / 1000 / 1250 / 1600			800 / 1000 / 1250 / 1600		
3			3			3		
690			690			690		
1000			1000			1000		
8			8			8		
Fixed. Withdrawable			Fixed. Withdrawable			Fixed. Withdrawable		
690			690			690		
<b>N</b>	<b>S</b>	<b>H</b>	<b>S</b>	<b>H</b>	<b>L</b>	<b>S</b>	<b>H</b>	<b>L</b>
70	85	100	85	100	200	85	100	200
36	50	70	50	70	120	50	70	120
36	50	70	50	70	120	50	70	120
30	45	50	50	65	100	50	65	100
25	35	50	45	50	85	45	50	85
25	35	50	45	50	65	45	50	65
20	22	25	30	42	50	30	42	50
100%	100%	100%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%
154	187	220	187	220	440	187	220	440
75.6	110	154	110	154	264	110	154	264
75.6	110	154	110	154	264	110	154	264
63	94.5	110	110	143	220	110	143	220
52.5	73.5	110	94.5	110	187	94.5	110	187
52.5	73.5	110	94.5	110	143	94.5	110	143
40	46.2	52.5	63	88.2	110	63	88.2	110
A (up to 1000A) - B (800A) <sup>(4)</sup>			B			B		
10			20			20		
IEC 60947-2			IEC 60947-2			IEC 60947-2		
■			■			■		
-			-			-		
20,000			10,000			20,000		
120			60			60		
5,000			3,000			3,000		
60			60			60		

# SACE Tmax XT ML automatic circuit-breakers for alternating current (AC) distribution



Size			XT5
<b>Dimensions</b>			
Fixed (Width x Depth x Height)	3 poles	[mm]	140 x 103 x 205
<b>Trip units for power distribution</b>			
TMD/TMA			■
TMD/TMF			
Ekip Dip			■
Ekip Touch			■
<b>Trip units for motor protection</b>			
MF/MA			■
Ekip Dip			■
Ekip Touch			■
<b>Trip units for generator protection</b>			
TMG			■
Ekip Dip			■
Ekip Touch			■
<b>Interchangeable trip units</b>			
■			
<b>Weight</b>			
Fixed	3 poles	[kg]	3.25
Plug in (EF terminals)	3 poles	[kg]	5.15
Withdrawable (EF terminals)	3 poles	[kg]	5.4

(1) Not suitable for IT distribution systems > 440Vac

(2)  $I_{cs} = 75\% I_n > 500A$

(3)  $I_{cs} = 50\% I_n > 500A$

(4) Category B: only when equipped with an electronic trip unit

(5) Plug-in/Withdrawable: max  $I_n 40^\circ C = 600A$

(6) 1000A only for fixed execution with EF, ES, R and FCCuAl terminals. EF terminals are supplied as standard if no other terminals are ordered





**XT6<sup>(4)</sup>**

**XT7**

**XT7 M**

210 x 103.5 x 268

210 x 166 x 268

210 x 178 x 268



9.5

12.1



9.7

29.7



11

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# SACE Tmax XT ML automatic circuit-breakers for direct current (DC) distribution



<b>Size</b>		<b>XT1</b>				
<b>Rated uninterrupted current</b>	[A]	160				
<b>Poles</b>	[No.]	3				
<b>Rated service voltage, Ue</b>	(DC) [V]	500				
<b>Rated insulation voltage, Ui</b>	(DC) [V]	800				
<b>Rated impulse withstand voltage, Uimp</b>	[kV]	8				
<b>Versions</b>		Fixed, Plug-in <sup>(1)</sup>				
<b>Breaking capacities according to IEC 60947-2</b>		<b>B</b>	<b>C</b>	<b>N</b>	<b>S</b>	<b>H</b>
<b>Rated ultimate short-circuit breaking capacity, Icu</b>						
Icu @ 250V (DC) 2-pole in series	[kA]	18	25	36	50	70
Icu @ 500V (DC) 2-pole in series	[kA]	-	-	-	-	-
Icu @ 500V (DC) 3-pole in series	[kA]	-	-	-	-	-
Icu @ 750V (DC) 3-pole in series	[kA]	-	-	-	-	-
<b>Rated service short-circuit breaking capacity, Ics</b>						
Ics @ 250V (DC) 2-pole in series	[kA]	100%	100%	100%	100%	75%
Ics @ 500V (DC) 2-pole in series	[kA]	-	-	-	-	-
Ics @ 500V (DC) 3-pole in series	[kA]	-	-	-	-	-
Ics @ 750V (DC) 3-pole in series	[kA]	-	-	-	-	-
<b>Utilization Category (IEC 60947-2)</b>		A				
<b>Reference Standard</b>		IEC 60947-2				
<b>Insulation behaviour</b>		■				
<b>Mounted on DIN rail</b>		DIN EN 50022				
<b>Mechanical life</b>	[No. Operations]	25,000				
	[No. Hourly operations]	240				
<b>Dimensions</b>						
<b>Fixed (Width x Depth x Height)</b>	3 poles	[mm]	76.2 x 70 x 130			
<b>Trip units for power distribution</b>						
TMD/TMA						
TMD/TMF						
MF/MA						
<b>Trip units with low magnetic (TMG)</b>						
TMG						
<b>Interchangeable trip units</b>						
<b>Weight</b>						
<b>Fixed</b>	3 poles	[kg]	1.1			
<b>Plug in (EF terminals)</b>	3 poles	[kg]	2.21			
<b>Withdrawable (EF terminals)</b>	3 poles	[kg]				

(1) XT1 plug-in In max=125A



Fixed, Withdrawable, Plug-in					Fixed, Plug-in		
N	S	H	L	V	N	S	
36	50	70	85	100	36	50	
-	-	-	-	-	-	-	
36	50	70	85	100	36	50	
-	-	-	-	-	-	-	
100%	100%	100%	100%	100%	100%	75%	
-	-	-	-	-	-	-	
100%	100%	100%	100%	100%	100%	75%	
-	-	-	-	-	-	-	
A					A		
IEC 60947-2					IEC 60947-2		
■					■		
DIN EN 50022					DIN EN 50022		
25,000					25,000		
240					240		
90 x 82.5 x 130					105 x 70 x 150		
■					■		
■					■		
■					■		
■					■		
1.2					1.7		
2.54					3.24		
3.32							

# SACE Tmax XT ML automatic circuit-breakers for direct current (DC) distribution



Size		XT4					
Rated uninterrupted current	[A]	160 / 250					
Poles	[No.]	3					
Rated service voltage, Ue	(DC) [V]	750					
Rated insulation voltage, Ui	(DC) [V]	1000					
Rated impulse withstand voltage, Uimp	[kV]	8					
Versions		Fixed, Withdrawable, Plug-in					
Breaking capacities according to IEC 60947-2		N	S	H	L	V	X
<b>Rated ultimate short-circuit breaking capacity, Icu</b>							
Icu @ 250V (DC) 2 poles in series	[kA]	36	50	70	85	100	100
Icu @ 500V (DC) 2 poles in series	[kA]	36	50	70	85	100	100
Icu @ 500V (DC) 3 poles in series	[kA]	36	50	70	85	100	100
Icu @ 750V (DC) 3p in series	[kA]	-	-	-	-	50	70
<b>Rated service short-circuit breaking capacity, Ics</b>							
Ics @ 250V (DC) 2 poles in series	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 500V (DC) 2 poles in series	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 500V (DC) 3 poles in series	[kA]	100%	100%	100%	100%	100%	100%
Ics @ 750V (DC) 3 poles in series	[kA]	-	-	-	-	100%	100%
Utilization Category (IEC 60947-2)		A					
Reference Standard		IEC 60947-2					
Insulation behaviour		■					
Mounted on DIN rail		DIN EN 50022					
Mechanical life	[No. Operations]	25,000					
	[No. Hourly operations]	240					
<b>Dimensions</b>							
Fixed	3 poles	[mm]	105 x 82.5 x 160				
(Width x Depth x Height)	4 poles	[mm]	140 x 82.5 x 160				
<b>Trip units</b>							
TMD/TMA		■					
TMD/TMF		■					
MF/MA		■					
<b>Trip units with low magnetic (TMG)</b>							
TMG		■					
<b>Interchangeable trip units</b>							
■							
<b>Weight</b>							
Fixed	3 poles	[kg]	2.5				
Plug in (EF terminals)	3 poles	[kg]	4.19				
Withdrawable (EF terminals)	3 poles	[kg]	5				



XT5						XT6		
400 / 630						800		
3						3		
750						750		
1,000						1,000		
8						8		
Fixed, Withdrawable, Plug-in						Fixed, Withdrawable		
N	S	H	L	V	X	N	S	H
25	35	50	70	85	100	35	50	70
25	35	50	70	85	100	20	35	50
-	-	-	-	-	-	-	-	-
-	-	-	-	85	100	18	24	36
100%	100%	100%	100%	100%	100%	100%	50% (35kA)	50%
100%	100%	100%	100%	100%	100%	100%	50%	50%
-	-	-	-	-	-	-	-	-
-	-	-	-	100%	100%	100%	75%	50%
A						A		
IEC 60947-2						IEC 60947-2		
■						■		
-						-		
20,000						20,000		
120						120		
140 x 103 x 205						210 x 103.5 x 268		
-						-		
■						■		
■						■		
■						■		
3.25						9.5		
5.15						-		
5.4						12.1		

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# Protection trip units

SACE Tmax XT trip units break new ground: they represent a new benchmark for the molded case circuit-breakers as they are able to satisfy any performance requirement.

The Tmax XT trip units are designed to be used in a wide range of applications. This complete, flexible protection trip unit can be adapted to the actual level of protection required, independently of the complexity of the system.

The range is available for three levels of performance, to meet any requirement, from simple to advanced applications.

- **TM, thermal-magnetic trip unit**
- **Ekip Dip, electronic trip unit**
- **Ekip Touch/Hi-Touch, electronic trip units**






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### Thermal-magnetic trip units

Used in both AC and DC networks, these are a solution for protection against overloads and short-circuits. Overload protection is ensured thanks to ABB thermal device based on a temperature dependent bimetal heated by the current. Protection against short-circuiting is realized with a magnetic device.

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### The Ekip Dip trip units

The first level of electronic trip units, used for the protection of AC network: these are based on microprocessor technologies and guarantee high reliability and tripping precision. They provide protection against overloads, selective short-circuits, short-circuits and earth faults. The power required for their operation is provided directly from the current sensors.

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### The Ekip Touch/Hi-Touch trip units

These represent the state of the art in terms of technology for AC network protection with advanced protection and system management functions. Diverse communication protocols enable the reading of measurement parameters and circuit-breaker control remotely. Class 1 active energy measurement in compliance with the IEC 61557-12 Standard permits highly demanding requirements of energy efficiency to be satisfied. The integrated display makes interaction with the Ekip Touch an easy and intuitive experience for the user and the embedded Bluetooth functionality allows fast interaction via EPiC (Electrification products intuitive Configurator). The Ekip Touch trip unit guarantees maximum flexibility. In fact, by selecting among the numerous software solutions available, it is possible to customize the functionality of the device at will. On the other side, the Ekip Hi-Touch trip unit includes all functions by default, representing the top-of-the-line in the SACE Tmax XT offer.

#### **New digital experience**

With the new Ekip Touch and Hi-Touch trip units, it is always possible to select and install the desired functions on the device. The functions can be selected when ordering the circuit-breaker or downloaded directly from the ABB Ability Marketplace™, even from a smart phone or tablet, thus reducing installation time to zero.

# Protection trip units offering

The Tmax XT trip units represent the ideal solution for any application up to 1600A.

The Tmax XT molded case circuit-breaker family complies with numerous installation requirements. Circuit-breakers are available with trip units dedicated to three different application groups. The table below shows the trip units for each circuit-breaker frame and the related rated interrupted current ranges.

With the XT2, XT4, XT5, XT6, XT7 and XT7 M versions the trip units are interchangeable, in order to make a performance upgrade of the system easier. For complete information about Tmax XT trip units refer to Tmax XT catalog and Tmax XT Technical characteristics documents.



Rated uninterrupted current ranges [A]	XT1	XT2	XT3
<b>Power Distribution Protection</b>			
<b>Thermal-magnetic</b>			
TMD	16...160 <sup>(1)</sup>	1,6...32	63...250
TMA		40...160	
<b>Ekip Dip</b>			
Ekip Dip LS/I		10...160	
Ekip Dip LIG		10...160	
Ekip Dip LSI		10...160	
Ekip Dip LSIG		10...160	
<b>Ekip Touch</b>			
Ekip Touch LSI		40...160	
Ekip Touch LSIG		40...160	
Ekip Touch Measuring LSI		40...160	
Ekip Touch Measuring LSIG		40...160	
Ekip Hi-Touch LSI		40...160	
Ekip Hi-Touch LSIG		40...160	
<b>Motor Protection</b>			
<b>Magnetic</b>			
MF/MA		1...160	100...200
<b>Ekip Dip</b>			
Ekip M Dip I		10...160	
Ekip M Dip LIU		25...160	
<b>Ekip Touch</b>			
Ekip M Touch LRIU		40...100	
<b>Generator Protection</b>			
<b>Thermal-magnetic</b>			
TMG		16...160	63...250
<b>Ekip Dip</b>			
Ekip G Dip LS/I		25...160	
<b>Ekip Touch</b>			
Ekip G Touch LSIG			
Ekip G Hi-Touch LSIG			

1) 16A and 20A for N, S, H have the TMF trip unit



Maximum flexibility is guaranteed for customers: on the XT5, XT7 and XT7 M, with Ekip Touch trip units, the interchangeable rating plug enables the rated current to be changed according to system requirements.



XT4	XT5	XT6	XT7	XT7 M
16...32				
40...250	320...630	630...800		
40...250	250...630	630...1000	630...1600	630...1600
40...250	250...630	630...1000	630...1600	630...1600
40...250	250...630	630...1000	630...1600	630...1600
40...250	250...630	630...1000	630...1600	630...1600
100...250	250...630		630...1600	630...1600
100...250	250...630		630...1600	630...1600
100...250	250...630		630...1600	630...1600
100...250	250...630		630...1600	630...1600
100...250	250...630		630...1600	630...1600
100...250	250...630		630...1600	630...1600
10...200	320...500			
40...250	250...630	630...1000	630...1600	630...1600
40...160	250...500	630...800		
100...200	250...500		630...1600	630...1600
	320...630			
40...250	250...630	630...1000	630...1600	630...1600
	250...630		630...1600	630...1600
	250...630		630...1600	630...1600

# Thermal-magnetic trip unit

## Overview

The thermal-magnetic trip units are used for the protection of AC and DC networks. They are a solution for systems where only protection against overloads and short-circuits are needed.

### Power Distribution Protection

- TMD
- TMA

### Motor Protection

- MA

### Generator Protection

- TMG

- Key:
1. Current threshold for short-circuit protection;
  2. Rotary switch for short-circuit protection;
  3. Current threshold for overload protection;
  4. Rotary switch for overload threshold setting.



### Rotary switch

Depending on the version it is possible to set the desired thresholds for protection by turning the front rotary switch.

# Ekip Dip

## Overview

The Ekip Dip is a first level of electronic trip unit, used for the protection of AC networks.

### Power Distribution Protection

- Ekip Dip LS/I
- Ekip Dip LIG
- Ekip Dip LSI
- Ekip Dip LSIG

### Motor Protection

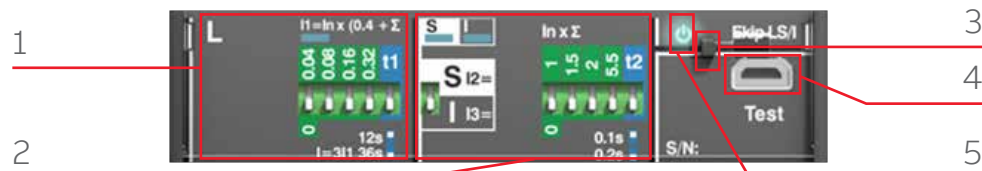
- Ekip M Dip I
- Ekip M Dip LIU

### Generator Protection

- Ekip G Dip LS/I

Key:

1. Dip switches for an overload protection setting.
2. Dip switches for short-circuit and time delayed short-circuit protection settings.
3. Slot for lead seal.
4. Test connector.
5. Power-on LED.



### Dip switches

The dip switches on the front of the trip unit allow manual settings also when the trip unit is off.

### LEDs

The LEDs on the front indicate the status of the release (on/off) and provide information about the protection tripped when the Ekip TT accessory is connected.

### Front connector

The connector on the front of the unit allows the connection of:

- Ekip TT for trip testing; LED-test and signaling of the most recent trip.
- Ekip T&P, for connection to a laptop with the Ekip Connect program (thus measurement reading, as well as trip and protection function tests are made available for the user).

### Characteristics of electronic Ekip Dip trip units

Operating temperature	-25°C...+70°C
Relative humidity	98%
Self-supplied	0.2xIn (single phase)*
Auxiliary supply (where applicable)	24V DC ± 20%
Operating Frequency	45...66Hz
Electromagnetic compatibility	IEC 60947-2 Annex F

\*For 10A: 0.4xIn

### Thermal memory

All the Ekip Dip trip units include a thermal memory function. The trip unit records the trips which have occurred in the last few minutes. Since the trip causes overheating, in order to protect the cables and let them cool down, the trip unit imposes a shorter delay tripping time in case of a fault. This way, the system is protected against damage due to cumulative overheating. This can be disabled, if needed, by using the Ekip T&P.

### External neutral

The 3-pole version with earth fault protection (G) can be equipped with an external sensor for the neutral phase. In this way, the external neutral phase is protected and uninterrupted.

### Communication

- Using the dedicated Ekip Com module, XT2 and XT4 can communicate with Modbus RTU when they are equipped with the following trip units:
- Ekip LSI
- Ekip LSIG.

# Ekip Touch/Hi-Touch

## Overview

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

### Power Distribution Protection

- Ekip Touch LSI
- Ekip Touch LSIG
- Ekip Touch Measuring LSI
- Ekip Touch Measuring LSIG
- Ekip Hi-Touch LSI
- Ekip Hi-Touch LSIG

### Motor Protection

- Ekip M Touch LRIU

### Generator Protection

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

Key:

1. Power-on LED; pre-alarm LED; alarm LED
2. Test and programming connector
3. Display
4. Home push-button to return to homepage;
5. Push-button for testing and tripping information



### Communication & Connectivity

The Ekip Touch/Hi-Touch trip units can be integrated perfectly into all automation and energy management systems to improve productivity and energy consumption and for remote control. The circuit-breakers can be equipped with communication modules for Modbus, Profibus, and DeviceNet™ protocols as well as Modbus TCP, Profinet and EtherNet/IP™. The modules can be easily installed even at a later date.

A solution with integrated modules is useful when the space in the switchboard is limited, but also a solution with external Ekip Cartridge modules is highly suitable for when an advanced control and communication system is required.

Furthermore, the IEC61850 communication module enables connection to automation systems widely used in medium voltage power distribution to create intelligent networks (Smart Grids). All circuit-breaker functions are also accessible via the Internet, in complete safety and through the Ekip Link switchgear supervision system. Furthermore, with an easy connection thanks to the Ekip Com Hub module, the circuit-breakers allow the system to be monitored via ABB Ability™ Energy and Asset Manager.

### **Efficiency and measurements**

Achieving maximum efficiency of an electrical installation requires intelligent management of power supplies and energy use. For this reason, the new technologies used in the Ekip Touch/Hi-Touch trip units allow the productivity and reliability of installations to be optimized while reducing consumption and fully respecting the environment. These advanced functionalities, together with the protection and communication functions contribute to making Tmax XT with Ekip Touch/Hi-Touch the circuit-breaker that maximizes efficiency in all low-voltage electrical installations.

With 1% accuracy on power and energy measurements, the trip units are certified according the IEC 61557-12 Standard. Ekip Touch/Hi-Touch trip units are no longer simply protection devices, but integrate multimeter and network analyzer functionality, thus guaranteeing a top level energy management system.

### **Digital Upgrade**

Ekip Touch/Hi-Touch trip units are available in different versions, to enable a wide range of functions: from the Ekip Touch to the Ekip Hi-Touch, it is always possible to customize any device thanks to the additional digital modules.

All functions are available on the ABB Ability Marketplace™ and can be added both when ordering the trip unit as well as after the installation of the circuit-breaker. Ekip Connect efficiently provides desired functions.

Several packages are available to download, and all of them are designed to save time, costs, and space, since no external devices are needed.

### **Interface**

It is possible to interact with the trip unit in several ways via:

- **The front display**

An LCD display with a push button ensures easy navigation on the XT2 and XT4, while a color touch screen is available for intuitive and quick navigation on the XT5 and XT7, together with the possibility of viewing the waveform for different parameters.

- **Smartphone via Bluetooth**

Thanks to the integrated Bluetooth functionality, it is possible to set and check all the measurements and information directly from a smartphone thanks to the EPiC app. Even when the cabinet door is closed, it is always possible to carry out maintenance in a safer way.

- **PC with Ekip Connect**

It is also easy to interact with the trip unit with a PC. Thanks to the Ekip T&P cable the trip unit can be easily connected to a USB PC port and using the Ekip Connect program it is possible to fully interact with the trip unit.

# Ekip Touch/Hi-Touch

## Overview

### Supply

The Ekip Touch/Hi-Touch protection trip unit is self-supplied through the current sensors and does not require an external supply for the basic protection functions or for the alarm indication functions. The trip units for all the circuit-breakers start to power on from a minimum of  $0.2 \times I_n^*$  and activate the indication functions, ammeter and the display. All protection settings are stored in a non-volatile memory that maintains the information, even without a power supply. An auxiliary supply can also be easily connected. In fact, the trip unit can be supplied by means of a galvanically isolated 24V DC auxiliary voltage with the following characteristics:

Parameter	Operation limits
<b>Voltage</b>	24V DC galvanically isolated*
<b>Tolerance</b>	±10%
<b>Maximum wave</b>	±5%
<b>Maximum surge current @24V</b>	10A for 5ms
<b>Maximum rated power @24V</b>	4W
<b>Connecting cable</b>	Insulated with ground cable (characteristics equal to or greater than Belden 3105A/B)

The insulation characteristics must refer to the IEC 60950 (UL 1950) or their equivalent

The Ekip Supply module can be connected to both DC and AC current power supplies 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;
- recording the number of operations;
- G protection with values below 100A or below  $0.2 \times I_n^*$ ;
- zone selectivity;
- Gext and MCR protection functions.

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

The Ekip Touch/Hi-Touch is also supplied with a battery that enables the cause of the fault to be indicated after a trip. In addition, the battery enables the date and time to be updated, thus ensuring the chronology of events. When the Ekip Touch/Hi-Touch is operating, it uses an internal control circuit to automatically indicate that the battery is flat. Furthermore, when the unit is switched off a battery test can be run by simply pressing the iTest key.

\* for XT2 with  $I_n=40A$ :  $0.3 \times I_n$ ; for XT2 & XT4 with  $I_n=100A$ :  $0.25 \times I_n$

### Rating Plug

The XT5 and XT7 trip units allow the rated current to be modified by simply changing the front rating plug. Thus, an upgrade of the circuit-breaker, whenever needed, can be carried out without replacing the circuit-breaker.

### Commissioning

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.

### Test function

The test port and the iTest key on the front of the protection unit can be used to carry out circuit-breaker tests by connecting one of the following devices:

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

The following table shows the main features for each version of the trip unit. The additional features can be added to the trip unit at the time of purchase or after via the ABB Ability Marketplace™.

Trip Unit	Current measurement & protection	Voltage, power, energy measurements	Voltage, power, energy protections	Embedded functions*
Ekip Touch LSI	●	○	○	○
Ekip Touch LSIG	●	○	○	○
Ekip Touch Measuring LSI	●	●	○	○
Ekip Touch Measuring LSIG	●	●	○	○
Ekip Hi-Touch LSI	●	●	●	●
Ekip Hi-Touch LSIG	●	●	●	●
Ekip M Touch LRIU	●	●	●	●
Ekip G Touch LSIG	●	●	●	●
Ekip G Hi-Touch LSIG	●	●	●	●

● Default available

○ Additionable features

\* See the following pages for more details

# Ekip Touch/Hi-Touch

## Overview

### Watchdog

All the Ekip Touch/Hi-Touch trip units for the Tmax XT ensure high reliability thanks to an electronic circuit that periodically checks the continuity of the internal connections, such as the trip coil, rating plug and each current sensor (ANSI 74). In the event of an alarm, a message is shown on the display, and if it is set during the installation phase, the trip unit can command the opening of the circuit-breaker. If a protection function intervenes, Ekip Touch/Hi-Touch always checks that the circuit-breaker has been opened by auxiliary contacts that indicate the position of the main contacts. Otherwise, Ekip Touch/Hi-Touch indicates an alarm (ANSI BF code Breaker Failure) to command the opening of the circuit-breaker upstream.

Ekip Touch/Hi-Touch also features self-protection, which ensures the correct operation of the unit in overtemperatures (OT) inside the protection trip unit.

The following indications or controls are available:

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





# Execution and installation

## Fixed, plug-in and withdrawable version

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



Fixed circuit-breaker



Plug-in circuit-breaker



Withdrawable circuit-breaker

- **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 -in and -out. Such a solution is obtained from the fixed circuit-breaker plus the relative kit that converts it from the fixed version to a withdrawable moving part. To obtain the withdrawable version, a front accessory to be applied to the front of the circuit-breaker must be ordered so as to maintain the IP40 degree of protection over the entire disconnection run of the circuit-breaker (except for the XT7). This mandatory accessory is a standard supply for circuit-breakers fitted with accessories in the factory.

If the plug-in circuit-breaker is fitted with electrical accessories, the appropriate connectors for disconnection of the relative auxiliary circuits must also be ordered. For the withdrawable version there are dedicated accessories, fitted with connectors, which allow automatic disconnection in the case of racking-out.

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

The moving parts can always be obtained for the required version, fully pre-engineered from 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	■	■	■
XT5	■	■	■
XT6	■	-	■ <sup>(1)</sup>
XT7	■	-	■
XT7 M	■	-	■

(1) In max = 800A, not suitable for XT6 1000A

The fixed version, which is connected directly to the power system through the circuit-breaker terminals, is recommended for applications in which the need for space can be satisfied by compact products without affecting the performance.

The plug-in version is recommended for applications for which service continuity is a fundamental requirement: the replacement of the moving part with a new one does not require any intervention on the power supply connections.

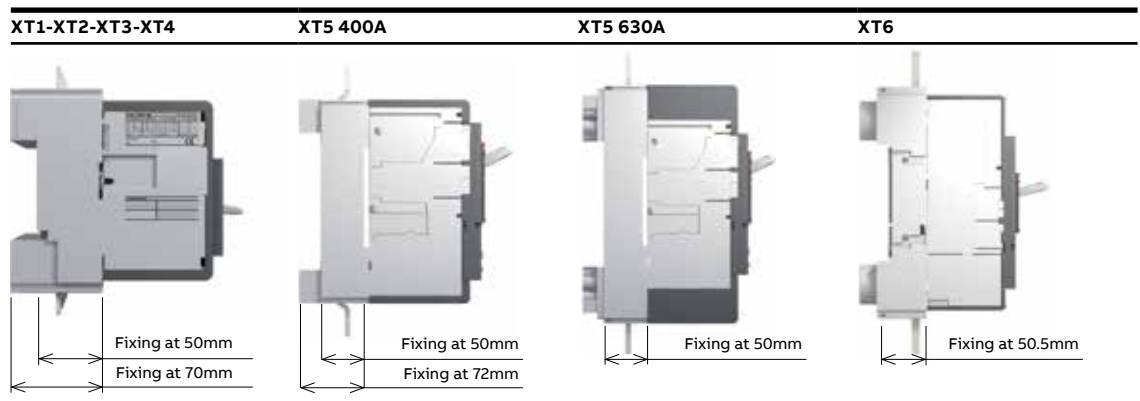
The withdrawable version, in addition to the advantages of the plug-in version, offers three different positions:

- connected: power and auxiliary circuits are connected
- test: power circuits are disconnected, while auxiliary circuits are connected (only for XT5, XT6 and XT7)
- disconnected: both power and auxiliary circuits are disconnected.

#### Fixed part of plug-in and withdrawable versions

The fixed part of the plug-in/withdrawable versions is available with front terminals (EF), with horizontal rear terminals (HR) or with vertical rear terminals (VR). The terminals are factory mounted in the horizontal position if the code is shared between HR and VR. In this case, it is possible to easily rotate the terminals into the vertical position. For the XT5 and XT6 circuit-breakers, the fixed part can be fully pre-engineered in the factory, with the required combination of terminals, by ordering the dedicated configurable fixed part code and the terminals at the same time.

These fixed parts can be equipped with the same terminals, terminal-covers and phase separator kits used for the fixed circuit-breakers, using the proper adapter (see the "Power connection" section). For Tmax XT1, XT2, XT3, XT4 and XT5 400A, the fixed part of a plug-in/withdrawable circuit-breaker can be installed at two different distances from the back of the panel, according to the picture below. For XT1, XT2, XT3 and XT4, installation at 50mm is only compulsory in the case where rear horizontal or vertical terminals (HR/VR) are used.



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## Accessories

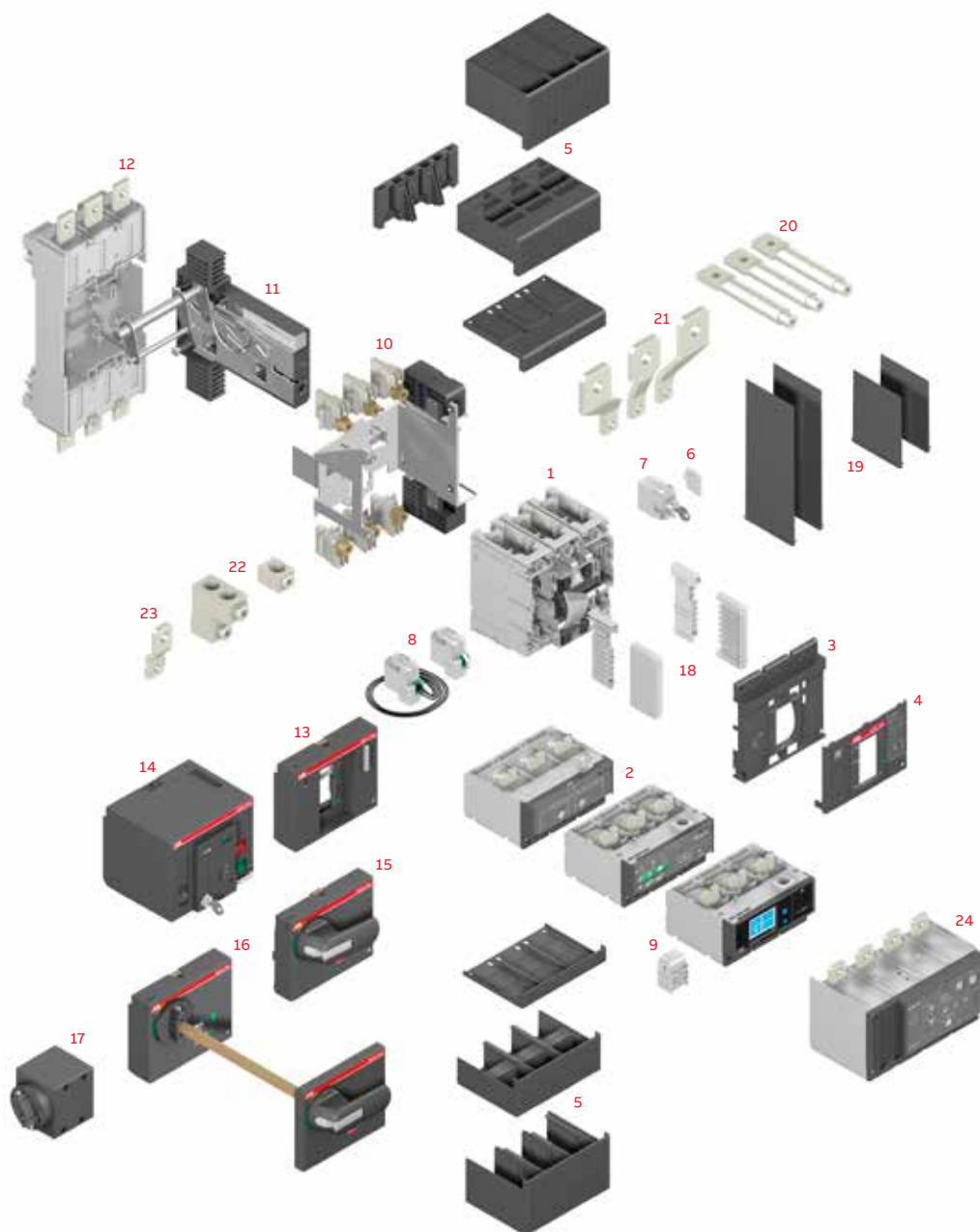
# Expand the capabilities of the SACE Tmax XT range

### Accessories

A large range of connections has been conceived to match the most common distribution systems. Auxiliary contacts can provide precise information regarding breaker status and plant conditions, maximizing operator awareness and the overall accuracy of a supervision system. In addition, different types of coils and motor operator versions, designed to operate with the most common voltage sources and reduced power consumption,

enable the possibility to control all installations remotely. Residual current devices up to 630A, signaling modules, installation components (e.g. phase barriers, terminal covers), key-locks and padlocks are just a few examples of the care taken to safeguard appliances and operators alike. For complete information about Tmax XT accessories refer to Tmax XT catalog and Tmax XT Technical characteristics documents.





**Various accessories are also available:**

- |  |  |
|--|--|
| 1. Breaking unit   | 12. Fixed part - FP                                |
| 2. Trip units  | 13. Front for lever operating mechanism - FLD      |
| 3. Front   | 14. Stored energy motor operator - MOE             |
| 4. Polish plate  | 15. Direct rotary handle - RHD                     |
| 5. Terminal covers                                       | 16. Transmitted rotary handle - RHE                |
| 6. Auxiliary contacts                                    | 17. Conversion kit RHE > RHS                       |
| 7. Key lock  | 18. Cable rack                                     |
| 8. Service releases                                      | 19. Phase separators                               |
| 9. Communication module                                  | 20. Rear orientated terminals - R                  |
| 10. Conversion kit for plug-in/<br>withdrawable versions | 21. Front extended spread terminals - ES           |
| 11. Guide of fixed part in the<br>withdrawable version   | 22. Front terminals for copper-aluminium - FC CuAl |
|  | 23. Front extended terminals - EF                  |
|  | 24. Residual current release                       |

# Ordering codes

ML certification and marking is available for all the three poles breakers of the Sace Tmax XT product range. Accessories, configuration rules and ordering codes are the same of Sace Tmax XT family.

Extracodes for Sace Tmax XT ML version are listed in table below:

## Extracodes for ML version

1SDA118422R1	XT1 Extracode for ML version
1SDA118423R1	XT2 Extracode for ML version
1SDA118424R1	XT3 Extracode for ML version
1SDA118425R1	XT4 Extracode for ML version
1SDA118426R1	XT5 Extracode for ML version
1SDA118427R1	XT6 Extracode for ML version
1SDA118428R1	XT7 Extracode for ML version

## Ordering examples:

### Standard version breaker

1SDA067866R1	XT2H 160 Ekip I In=160A
1SDA069053R1	RHD Normal direct handle
1SDA066431R1	AUX-C 1Q+1SY 250V AC

### ML version breaker

1SDA067866R1	XT2H 160 Ekip I In=160A
1SDA069053R1	RHD Normal direct handle
1SDA066431R1	AUX-C 1Q+1SY 250V AC
1SDA118423R1	XT2 Extracode for ML version

### Standard version breaker

1SDA100567R1	XT5V 630 Breaking part
1SDA100613R1	Ekip Hi-Touch LSIG In=630
1SDA104713R1	W MP Kit 630A
1SDA104692R1	W FP 630A VR

### ML version breaker

1SDA100567R1	XT5V 630 Breaking part
1SDA100613R1	Ekip Hi-Touch LSIG In=630
1SDA104713R1	W MP Kit 630A
1SDA118426R1	XT5 Extracode for ML version
1SDA104692R1	W FP 630A VR





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