



Extract of the technical catalogue - 2015.10

# SACE Tmax XT

## New low voltage molded-case circuit breakers up to 250A

# Circuit breakers for power distribution

## Main characteristics

SACE Tmax XT molded-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 molded-case circuit breakers can be equipped with:

- thermomagnetic trip units<sup>(G3.2)</sup>, 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<sup>(G3.4)</sup>, 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) <sup>(1)</sup> <sup>(2)</sup>
Auxiliary supply (where applicable)	24V DC ± 20%
Operating frequency	45...66Hz or 360...440Hz
Electromagnetic compatibility	IEC 60947-2 Annex F

<sup>(1)</sup> 0.32 x In for Ekip N-LS/I <sup>(2)</sup> For 10A: 0.4In

# Construction characteristics

			XT4				
Size <sup>(G2.1)</sup>		[A]	160 / 250				
Poles		[No.]	3, 4				
Rated service voltage, Ue <sup>(G2.4)</sup>	(AC) 50-60Hz	[V]	690				
	(DC)	[V]	500 <sup>(4)</sup>				
Rated insulation voltage, Ui <sup>(G2.5)</sup>		[V]	1000				
Rated impulse withstand voltage, Uimp <sup>(G2.6)</sup>		[kV]	8				
Versions			Fixed, Withdrawable, Plug-in				
Breaking capacities according to IEC 60947-2 Rated ultimate short-circuit breaking capacity, Icu <sup>(G2.7)</sup>			N	S	H	L	V
Icu @ 220-230-240V 50-60Hz (AC)		[kA]	65	85	100	150	200
Icu @ 380V 50-60Hz (AC)		[kA]	36	50	70	120	150
Icu @ 415V 50-60Hz (AC)		[kA]	36	50	70	120	150
Icu @ 440V 50-60Hz (AC)		[kA]	36	50	65	100	150
Icu @ 500V 50-60Hz (AC)		[kA]	30	36	50	60	70
Icu @ 525V 50-60Hz (AC)		[kA]	20	25	45	50	50
Icu @ 690V 50-60Hz (AC)		[kA]	10	12	15	20	25/100 <sup>(1)</sup>
Icu @ 250V (DC) 2 poles in series		[kA]	36	50	70	85	100
Icu @ 500V (DC) 2 poles in series		[kA]	36	50	70	85	100
Icu @ 500V (DC) 3 poles in series <sup>(3)</sup>		[kA]	36	50	70	85	100
Rated service short-circuit breaking capacity, Ics <sup>(G2.8)</sup>							
Ics @ 220-230-240V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	100%
Ics @ 380V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	100%
Ics @ 415V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	100%
Ics @ 440V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	100%
Ics @ 500V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	100%
Ics @ 525V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	100%
Ics @ 690V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	75% (20)/100% <sup>(1)</sup>
Ics @ 250V (DC) 2 poles in series		[kA]	100%	100%	100%	100%	100%
Ics @ 500V (DC) 2 poles in series		[kA]	100%	100%	100%	100%	100%
Ics @ 500V (DC) 3 poles in series <sup>(3)</sup>		[kA]	100%	100%	100%	100%	100%
Rated short-circuit making capacity, Icm <sup>(G2.10)</sup>							
Icm @ 220-230-240V 50-60Hz (AC)		[kA]	143	187	220	330	440
Icm @ 380V 50-60Hz (AC)		[kA]	75.6	105	154	264	330
Icm @ 415V 50-60Hz (AC)		[kA]	75.6	105	154	264	330
Icm @ 440V 50-60Hz (AC)		[kA]	75.6	105	143	220	330
Icm @ 500V 50-60Hz (AC)		[kA]	63	75.6	105	132	154
Icm @ 525V 50-60Hz (AC)		[kA]	40	52.5	94.5	105	105
Icm @ 690V 50-60Hz (AC)		[kA]	17	24	30	40	52.5
Breaking capacities according to NEMA-AB1							
@ 240V 50-60Hz (AC)		[kA]	65	85	100	150	200
@ 480V 50-60Hz (AC)		[kA]	30	36	65	100	150
Utilisation Category (IEC 60947-2) Reference Standard			A IEC 60947-2				
Isolation behaviour			✓				
Mounted on DIN rail			DIN EN 50022				
Mechanical life <sup>(G2.14)</sup>		[No. Operations]	25000				
Electrical life @ 415 V (AC) <sup>(G2.13)</sup>		[No. Hourly operations]	240				
		[No. Operations]	8000				
		[No. Hourly operations]	120				
Dimensions - Fixed		3 poles	[mm]	105 x 82.5 x 160			
(Width x Depth x Height)		4 poles	[mm]	140 x 82.5 x 160			
Total opening time							
Circuit breaker with shunt opening release		[ms]	15				
Circuit breaker with undervoltage release		[ms]	15				
Trip units for power distribution							
TMD/TMA			■				
TMD/TMF			■				
Ekip LS/I			■				
Ekip I			■				
Ekip LSI			■				
Ekip LSIG			■				
Ekip E			■				
Trip units for motor protection							
MF/MA			■				
Ekip M-I			■				
Ekip M-LIU			▲				
Ekip M-LRIU			▲				
Trip units for generator protection							
TMG			▲				
Ekip G-LS/I			▲				
Trip units for oversized Neutral Protection							
Ekip N-LS/I			▲				
Interchangeable protection trip							
units Weight Fixed	3/4 poles	[kg]	2.5 / 3.5				
Plug in (EF terminals)	3/4 poles	[kg]	4.19 / 5.52				
Withdrawable (EF terminals)	3/4 poles	[kg]	5 / 6.76				

<sup>(1)</sup> Icu=100kA and Ics=100%Icu @690V only for XT4 160

XT1 plug-in In max=125A<sup>2</sup>

<sup>(2)</sup> XT1 plug-in In max=125A

<sup>(3)</sup> XT1 500V DC 4 poles in series

<sup>(4)</sup> XT4 750V DC please ask ABB SACE for availability

■ Complete circuit breaker

▲ Loose trip unit

# Regulations and reference standards



Hologram

## Conformity with standards

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

- Standard<sup>(G6.1)</sup>:
  - IEC 60947-2;
- Directives<sup>(G6.2)</sup>:
  - EC “Low Voltage Directive” (LVD) N° 2006/95/EC (in replacement of 73/23/EEC and subsequent amendments);
  - EC “Electromagnetic Compatibility Directive” (EMC) 2004/108/CE;
- Naval Registers<sup>(G6.3)</sup> (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:

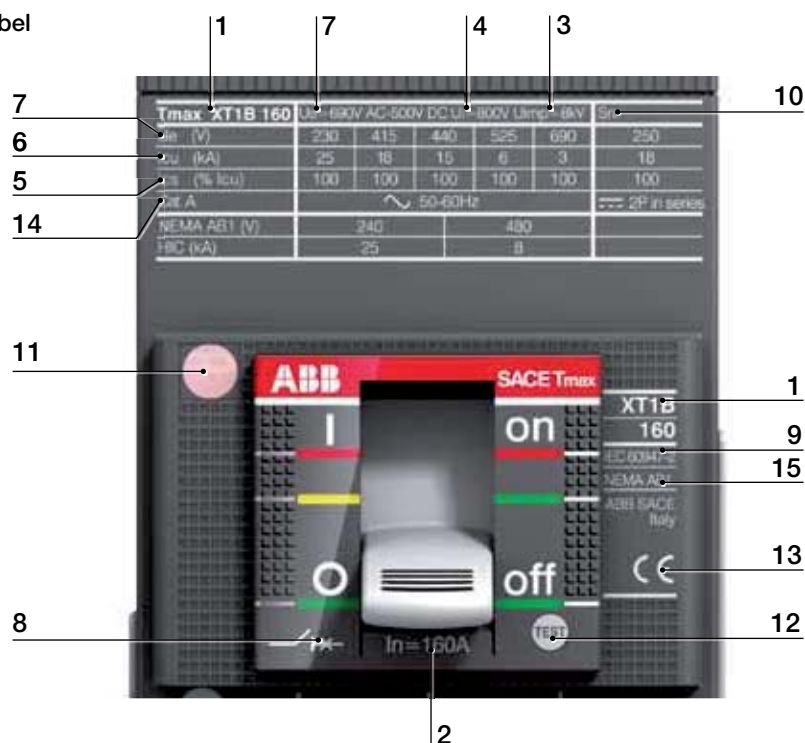
- selection of materials, processes and packaging which optimise the true environmental impact of the product;
- use of recyclable materials;
- voluntary respect of the RoHS directive<sup>(G6.4)</sup>.

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

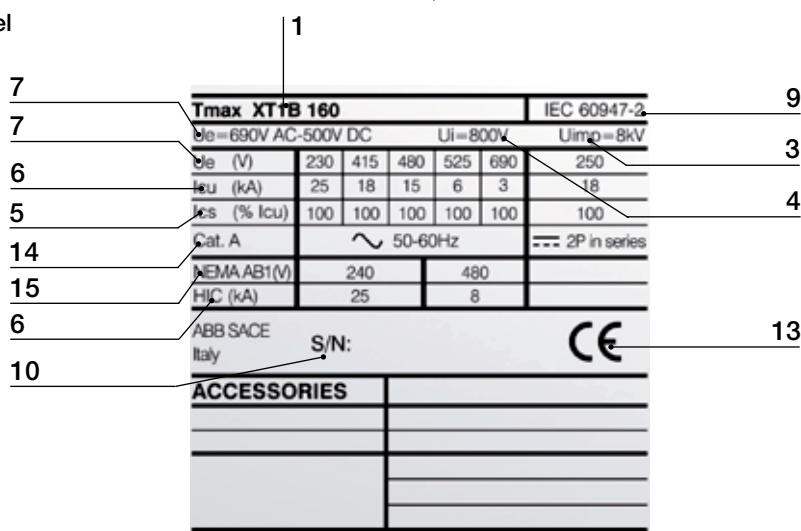
# Identification of the SACE Tmax XT circuit breakers

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.

Front label



Side label



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

<sup>(1)</sup> In compliance with the IEC 60947-2 Standard

# Circuit breakers for power distribution

## Electronic trip units

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

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# ABB SACE documentation

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The technical documentation is available on-line on BOL web site <http://bol.it.abb.com> in “Work tools - Technical guides” section:

- Technical Application Paper, volume 1 “Low voltage selectivity with ABB circuit breakers”
- Technical Application Paper, volume 2 “MV/LV transformer substations: theory and example of short-circuit calculation”
- Technical Application Paper, volume 3 “Distribution system and protection against indirect contact and earth fault”
- Technical Application Paper, volume 4 “ABB circuit breakers inside LV switchboards”
- Technical Application Paper, volume 5 “ABB circuit breakers for direct current applications”
- Technical Application Paper, volume 6 “Arc-proof low voltage switchgear and controlgear assemblies”
- Technical Application Paper, volume 7 “Three-phase asynchronous motors. Generalities and ABB proposals for the coordination of protective devices”
- Technical Application Paper, volume 8 “Power factor correction and harmonic filtering in electrical plants”
- Technical Application Paper, volume 9 “Bus communication with ABB circuit breakers”

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