Sace Tmax XT + Emax 2
with Touch trip units

Break new ground
- Data and connectivity
- Ease of installation
- Future proof (upgradable)

Ekip Touch trip unit: nieuwe standaard

De Ekip Touch is een slimme oplossing om XT en Emax2 automaten te upgraden. De geavanceerde tripunit beveiligt nieuwe en bestaande installaties en is dé standaard om ze toekomstbestendig te maken. De Ekip Touch kan direct of in een later stadium eenvoudig worden uitgebreid met beveiligings- en/of meetfuncties zoals kWh-, spanning- en cos phi-meting. Daarnaast bieden de XT7 en Emax2 de mogelijkheid tot voorspellend onderhoud. Via optionele communicatiemodules kan de informatie worden ingelezen door een bovenliggend systeem of gekoppeld aan het cloud-gebaseerde platform ABB Ability™ Energy and Asset Manager.

In deze Engelstalige brochures worden de belangrijkste mogelijkheden van de Ekip Touch tripunit toegelicht. Uitgebreide informatie kunt u vinden via de volgende QR-codes:

Catalogus

Website

e-Configure

In de e-Configure tool kunnen vermogensautomaten eenvoudig samengesteld worden.

Table of contents

SACE Tmax XT + Emax 2 Touch
Break new ground

Break new ground simply means delivering value through the entire customer journey by leaving behind the traditional concept of circuit-breaker. The SACE Tmax XT range offers a unique customer experience that, sharing the same features and logics with the Emax 2 range, for the first time ever overcomes the differences between molded case and air circuit-breakers. The most advanced products designed to maximize data and connectivity, ease of use and installation, performance and protection, safety and reliability.

The SACE Tmax XT + Emax 2 range offers higher performance, better protection and more precise metering than equivalent units, and can handle from 160 up to 6300A.

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.Reliability is further increased, and speed of installation reduced, thanks to Bluetooth and Ekip connectivity for mobile devices.

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.

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 x In for XT, or > 100A for Emax 2 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:

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 xIn*;
- zone selectivity;
- Gext and MCR protection functions.

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

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

Supply	Ekip Supply	
Nominal voltage	24-48 V DC	110-240 V AC/DC
Voltage range	21.5-53 V DC	105-265 V AC/DC
Rated power (including modules)	10W max.	10W max.
Inrush current	~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 In=40A: 0.3 x In; for XT2 & XT4 with In=100A: 0.25 x In

Ekip Touch/Hi-Touch
Overview

Watchdog
All the Ekip Touch/Hi-Touch trip units for the Tmax XT + Emax 2 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).

Ekip Touch/Hi-Touch
Measurement functions and data

Currents
All the Ekip Touch/Hi-Touch trip units measure the RMS value of the instantaneous currents of the three phases and the neutral. There are two different levels of accuracy depending on the version (0.5% and 1%). In addition, also the minimum and maximum values recorded within an adjustable time interval are available.

Voltage
Instantaneous phase-to-phase and phase-to-neutral voltages can be measured. They are available at a 0.5% level of accuracy. In addition, the minimum and maximum values recorded within an adjustable time interval are available.

Power
Real time measurements of the total and phase power. Available at 2 different level of accuracy depending on the version, 1 % and 2%. In addition, the minimum and maximum values recorded within an adjustable time interval are available.

Energy meters
Measurements of the active, reactive and apparent energy totals, updated every minute. The measurements can be reset when needed.

Frequency
Measurement of line real time frequency, expressed in hertz.

Peak Factor
Real time measurements of the peak factors of the phase currents. The measurements are expressed as a ratio between the peak values and RMS values, for each single phase.

Power Factor
Power factor and real time measurements of the ratio between the total active power and total apparent power, expressed as Cosφ. In addition, the trip unit signals an alarm if the cosφ value drops below an adjustable threshold, settable via Ekip Connect software (from 0.5 to 0.95).

Datalogger
This function allows the data related to a trigger event to be recorded. These data are:
- Analog measurements: phase currents and phase-to-phase voltages
- Digital events: protection alarms, circuit-breaker status signals, tripping of protections.

When the datalogger is activated, the trip unit continuously acquires data by filling and emptying an internal register. If a trigger event occurs, the trip unit inhibits acquisition (either immediately or with an adjustable time-lag) and stores the data, which is available for downloading.

Network Analyzer
This function fully evaluates the quality of the network. It is possible to set the controls to long cycle voltage and current in order to analyze the system functionality. Voltages and currents are monitored to find:
- The sequence of voltages
- Short term voltage drops or interruptions
- Short duration voltage increases
- Slow voltage drops
- Slow voltage increases
- Unbalances between the voltages
- Harmonic distortion of voltages and currents.

Waveforms
A selected quantity can be represented as a waveform and acquired at the moment of selection. The phase current and phase-phase voltage can be displayed.

Harmonics
A representation in the form of a histogram of the measurements of the harmonics that make up the waveform, and related to the frequency set.

Ekip Touch/Hi-Touch
Measurement functions and data

The parameters measurable for each trip unit are shown in the following tables. Three different software packages are available to upgrade the trip units:
- Measuring package for measurement of voltage, power and energy
- Datalogger for data record
- Network Analyzer for the evaluation of the power quality.

Instantaneous measurements			Ekip Touch	Ekip Touch Measuring	Ekip Hi-Touch	Ekip M Touch	Ekip G Touch	Ekip G Hi-Touch
Currents (RMS)	L1, L2, L3, Ne	[A]	●	●	●	●	●	●
Ground fault current (RMS)	Ig	[A]	●	●	●	●	●	●
Measuring package								
Phase-phase voltage (RMS)	U12, U23, U31	[V]	o	●	●	●	●	●
Phase-neutral voltage (RMS)	U1, U2, U3	[V]	o	●	●	●	●	●
Phase sequence			o	●	●	●	●	●
Frequency	f	[Hz]	o	●	●	●	●	●
Active power	P1, P2, P3, Ptot	[kW]	o	●	●	●	●	●
Reactive power	Q1, Q2, Q3, Qtot	[kVAR]	o	●	●	●	●	●
Apparent power	S1, S2, S3, Stot	[KVA]	o	●	●	●	●	●
Power factor	PF1, PF2, PF3, PF total		o	●	●	●	●	●
Peak factor	total		o	●	●	●	●	●
Active energy	Ep total, Ep positive, Ep negative	[kWh]	o	●	●	●	●	●
Reactive energy	Eq total, Ep positive, Ep negative	[kVARh]	o	●	●	●	●	●
Apparent energy	Es total	[KVAh]	o	●	●	●	●	●

● Available as standard
o Available as software package to be ordered via ABB Ability Marketplace™ or during the circuit-breaker ordering phase

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 (Electrificatio 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.

SACE Tmax XT allows to easily upgrade and customize the Ekip Touch and Hi-Touch trip units, guaranteeing maximum flexibility for any application, delivering value throughout the entire customer journey.

1. Design
Build the circuit-breaker according to specific project requirements.

Key drivers
- Ease of doing business
- Technical specifications
- Application and function

Benefits
- Flexibility of choice
- Customization by application

2. Commissioning
Customize the device thanks to the digital offering. Manage last minute changes through digital upgrades.

Key drivers
- Ease of doing business
- Management of components
- Time to market

Benefits
- Stock optimization
- Zero lead time and installation effort

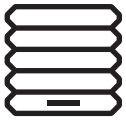
3. Service
Unlock the full potential of your circuit-breaker at any time, minimizing downtime and installation changes.

Key drivers
- Manage installed base
- Simplify diagnostics
- Simplify the hardware re-design

Benefits
- Zero lead time and installation effort
- Avoid downtime

Measuring Package
To monitor the plant through several measurements: Phase-to-phase voltage, Phase-to-neutral voltage, Phase sequence, Frequency, Active power, Reactive power, Apparent power, Power factor, Peak factor.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.



Data Logger
To record data about events in the plant: Currents, Voltages, Sampling rate, Maximum recording duration, Recording stop delay, Number of registers.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.

Network Analyzer
To monitor the power quality of the network through: Harmonic analysis, Hourly average voltage value, Short voltage interruption, Short voltage spikes, Slow-voltage sags and swells, Voltage unbalance.

How to order: via ABB Ability Marketplace™ or traditional ordering channels.

When a package is purchased via ABB Ability Marketplace™, it must be activated through:
- Ekip Connect 3 installed on a PC using Ekip T&P to scan the trip unit.

New digital experience
Solutions

	Functions included	Hardware accessories
PACKAGES		
Voltage Protections	UV - Undervoltage	-
	OV - Overvoltage	
	UV2 – 2nd Undervoltage	
	OV2 – 2nd Overvoltage	
	PS – Phase sequence	
	VU – Voltage unbalance	
Frequency Protections	UF - Underfrequency	-
	OF - Overfrequency	
	UF2 – 2nd Underfrequency	
	OF2 - 2nd Overfrequency	
Power Protections	RP – Reverse active power	-
	Cos Φ- Power factor	
	D – Directional current	
	RQ – Loss of field or Reverse reactive power	
	OQ – Reactive overpower	
	OP – Active overpower	
	UP – Active underpower	
	2RQ – 2nd Loss of field or Reverse reactive power	
Advanced Voltage Protections	S(V) – Voltage controlled overcurrent	-
	S(V)2 – 2nd Voltage controlled overcurrent	
	R – Residual voltage	
ROCOF Protections	ROCOF	-
Adaptive Protections	Dual setting	Ekip Signalling
Measuring Package	Phase-to-phase voltage	-
	Phase-to-neutral voltage	
	Phase sequence	
	Frequency	
	Active power	
	Reactive power	
	Apparent power	
	Power factor	
	Peak factor	
Data Logger	Currents	-
	Voltages	
	Sampling rate	
	Maximum recording duration	
	Recording stop delay	
	Number of registers	
Network Analyzer	Hourly average voltage value	-
	Short voltage interruptions	
	Short voltage spikes	
	Slow voltage sags and swells	
	Voltage unbalance	
	Harmonic analysis	

Bus communication functions

The Tmax XT + Emax 2 circuit-breakers are fully ready for Industry 4.0 requirements. The increasing number of connected objects and people is transforming electrical installation systems, bringing forward new potential in efficiency and productivity.

The Ekip Touch trip unit series can be connected in several ways to different networks and systems. According to their complexity, the supervision of low-voltage systems may involve different levels. Depending on where the supervision is needed, different communication configurations are available.

Switchgear compartment: control of the main electrical values of the circuit-breaker and set the protection functions, thanks to:
- embedded display of the trip units
- Ekip Multimeter display connected to the trip unit
- smartphone connection via embedded Bluetooth.

Electrical switchgear: display of the data of all circuit-breakers installed in the switchgear from a single point remotely via several communication protocols. In this scenario, ABB Lite Panel, the front door display, allows monitoring and control of the circuit-breakers.

Electrical system: management of complex systems in which the devices must be integrated in automated industrial processes or in intelligent electrical networks, better known as smart grids. The system can be supervised by:
- Ekip View software
- Internet with the ABB Ability™ Energy and Asset Manager webapp.

Switchgear compartment
Display solutions

SACE Tmax XT circuit-breakers equipped with Ekip Touch electronic trip units enable electrical measurements and diagnostic data to be displayed on the front of the switchgear.

Solution with Ekip Touch trip units display
The Ekip Touch electronic trip units are the ideal solution for supervision and control of the compartments inside a switchgear. In detail:
- their use is simple and intuitive thanks to an embedded front display with push buttons on XT2 and XT4 sizes and a high resolution color touch screen display on XT5, XT7 and XT7 M sizes + EMAX 2.
- 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.

Embedded Bluetooth for a quick and wireless connection to your smartphone.

Solution with a smartphone connected via Bluetooth to the trip unit thanks to EPiC
Via the EPiC App, it is possible to:
- check and modify the protection functions settings
- read the measurements available on the trip unit
- download and share test reports of the trip unit.

The Ekip Multimeter is a display unit to be installed on the front of the switchgear for SACE Tmax XT molded case circuit-breakers equipped with Ekip Touch electronic trip units.

Solution with Ekip Multimeter Display on the front of the switchgear
This device displays information about the system available in the trip unit to which it is connected and enables the adjustment of the parameters and protection thresholds.

The main characteristics of the Ekip Multimeter unit are:
- **Graphical and functional uniformity with the Ekip Touch trip units**: the Ekip Multimeter uses the same display as the trip unit to which it is connected, ensuring perfect continuity between the graphic display and the menu items.
- **Reduced dimensions**: the Ekip Multimeter guarantees the precision of the trip unit to which it is connected and performs the function of a measuring instrument without requiring the installation of external current and voltage transformers.
- **Flexible installation**: the Ekip Multimeter can be installed at a distance from the trip unit, enabling access to information from the most convenient point.
- **Simultaneous reading of the various electrical values**: the advanced connection system used allows several Ekip Multimeter devices to be connected to the same protection trip unit.

Electrical switchgear
Remote communication

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

Ekip Com Modules

Thanks to the wide range of communication protocols supported, SACE Tmax XT + 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 Tmax XT circuit-breakers offering for industrial communication are:

- A wide range of protocols are 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 are reduced to a minimum due to the plug & play technology of the communication modules, which are connected directly to the circuit-breaker terminal box for XT7 and XT7 M + Emax 2 and to the Ekip Cartridge with XT2, XT4 and XT5.
- Installation space is reduced thanks to the ability to install the communication modules directly inside the circuit-breaker for XT2, XT4 and XT5.
- Redundancy 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 the buses to be exchanged simultaneously.
- Ready for the smart grid; the Ekip Com 61850 module is the solution for integrating SACE Tmax XT + 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.

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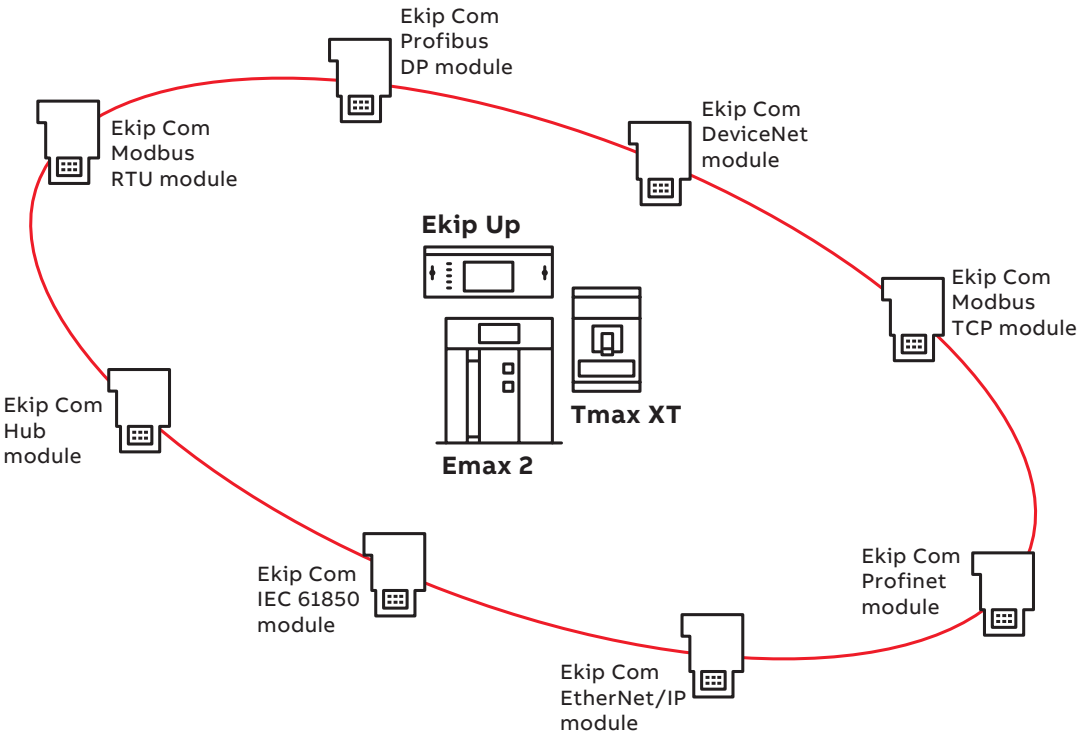
The architecture



Class 1 accuracy

With the Ekip Touch trip units the embedded measurement functionalities allow the measurement of power and energy to a Class 1 degree of accuracy, as specified by the IEC 61557-12 Standard, avoiding the need of additional device saving costs, space and installation time.

With the Ekip Touch trip units, measurements of power and energy to a IEC 61557-12 Standard compliant, Class 1 level of accuracy, are guaranteed by the embedded measurement functionalities. Thus, there is no need for a ddditional devices, with consequent advantages in terms of cost savings, space reduction and installation time optimization.

When energy needs monitoring, even a minimal percentage of errors would result in a waste of money. Accuracy is everything and depends on the design and manufacturing quality of solution used. The Tmax XT with Ekip Touch trip units guarantee 1% accuracy for power and energy monitoring.

Thanks to the extremely accurate Rogowsky coil, ABB Ekip Touch trip units are able to guarantee Class 0.5 for voltage and current measurements and Class 1 for active power and energy measurements, complying with and certified by the IEC 61557-12 Standard (see Chapter 3 for more detailed information about the accuracy and the monitored parameters of the electrical system). IEC 61557-12 can be applied to both AC and DC electrical networks up to 1000 V AC or 1500V DC.

Moreover, an upgrade of the device is always guaranteed to be quick and easy: the measurement functions not included in an installed trip unit can be downloaded directly from the MarketPlace, thus allowing new system requirements to be met with ease. Measurement data can be displayed in several ways:

- On the embedded display on the trip unit
- On a smartphone via Bluetooth (EPiC App)
- Using the Ekip Connect software on a PC
- On an Ekip Multimeter external display
- On a cloud-platform thanks to ABB Ability™ Energy and Asset Manager
- In the supervision system (ex SCADA) thanks to several communication protocols.

Electrical system
Software applications

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

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

Software	Functions	Distinctive characteristics
Ekip Connect	- commissioning of circuit-breakers - fault analysis - communication bus testing	- simple and intuitive use - integrated with DOC electrical design software - useable via EtherNet™ - automatic updating from the Internet - off-line mode - multi-media (smart phone, tablet or PC)
EPiC App	- check and modify the protection functions settings - read the measurements available on the trip unit - download and share test reports of the trip unit	- easy to use on smartphone via Bluetooth - augmented Reality - QR Code scanning for breaker details - upgrade breakers via ABB Marketplace
ABB Ability™ Energy and Asset Manager	- monitoring of plants - optimization of the plant - control center	- alerts notification via mail - automatic report for energy efficiency - asset management

Electrical system
Ekip Connect

—
Panel builders
- 50% commissioning time

Ease of use
Imagine you are a panel builder and you have to commission a circuit-breaker and you need to save time. Using Ekip Connect it is possible to cut commissioning time up to 50%. Providing a stress-free interaction with the device complexity, Ekip Connect easy-to-use software has all the answers. Ekip Connect's simple and intuitive interface means that, from the very start, it is possible to easily navigate the tool and access every circuit-breaker operation. At a glance, the user can see all the required information, providing the ability to quickly and effectively assess any situation.

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Facility managers
100% full exploitation
of the device

Full exploitation
Imagine you are a facility manager and you need to perform fast and precise diagnosis in order to keep everything under control and avoid failures. Using Ekip Connect you can exploit the full capabilities of your device and thanks to the customizable dashboard you can organize the functions displayed, just the way you want it. It is possible to manage all the circuit-breaker settings and specifications directly with Ekip Connect, making it the perfect instrument for exploring and using the breaker. Diagnostics are easy too: it is possible to consult and download the log of events, alarms and unit trips, thereby facilitating the identification and understanding of any anomalies.

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

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Consultants/system
integrators
Complex logics at your
fingertips

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

Adding, setting and managing advanced functions has never been so easy. Automatic transfer switch logic, load shedding, advanced protection and demand management can be managed and easily set via the Ekip Connect software. Expand the software features by purchasing and downloading software packages for advanced functions directly using Ekip Connect.

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General information
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