

The new SACE Emax 2 family of air circuit-breakers

The evolution from circuit-breaker to power manager

ABB's Low Voltage Products Division is proud to present SACE Emax 2, its next generation of air circuit-breakers. Over 70 years of cutting edge research and experience in the electromechanical industry has allowed ABB SACE to create this new benchmark of air circuit-breakers. Not only does Emax 2 meet or exceed the standard performances and functions that the market demands from an air circuit-breaker, but it has evolved into a true power manager. Emax 2 and its Ekip brand of trip units and accessories contain the perfect blend of control, connectivity, performance, ease of use and safety to efficiently satisfy any application or need.

- A patented, Power Controller monitors and controls power usage to reduce management costs.
- Extensive, direct communication abilities simplify network integration and eliminate the need for costly and difficult conversion components.
- Optimal frame organization and accurate design provide the ability for high performance switchboards and switchgear with a reduction of both materials and space required.
- Busbar friendly, modifiable terminals eliminate the need to bend and extend bus bar and provide quick, easy installation.
- Large, color touchscreen interfaces allow for clear navigation, creating a simple and quick way to find information or make adjustments.
- A wide variety of accessories have been designed to simplify use or installation and to increase safety.
- The Emax 2 contains several features that are either new to the market or superior to existing solutions, making it the best choice for low voltage network needs.



Control

The Power Controller function of Emax 2 uses a patented algorithm to determine the average absorbed power over a period of time and then controls a load list to maintain the maximum power limit specified by the user. The elimination of instantaneous based measurements and ability to synchronize with utility measurement devices creates an efficient environment that saves on electricity bills without the need for additional monitoring systems.

The Ekip Link system and Ekip Control Panel enable local monitoring of circuit-breakers and switchgear functions in an individual switchboard. They require no programming and are available for even the most basic Emax 2 trip unit, providing an economic way for a small plant to increase monitoring capabilities or a large plant to simplify local supervision and maintenance.

A Network Analyzer feature is able on Emax 2 to analyze the quality of power in real time, with extreme precision in

accordance with EN 50160 and IEC 6100-4 30. As a result, it is possible to identify the causes of an increase of power lost or a reduction of the working life of cables and capacitors without having to install costly, external instrumentation. With Emax 2's Network Analyzer, malfunctions can be prevented and installation efficiency and the working life of appliances can be increased.

The Ekip Synchrocheck module enables the control of the synchronism condition for placing two lines in parallel before enabling circuit breaker closing. The ability of the Emax 2 to provide this feature as a module eliminates the need for the purchase and installation of independent monitoring systems.

Emax 2 offers Generator versions of its Ekip Touch and Ekip Hi-touch trip units. These trip units include all the functions of true generator protection switchgear without the need for external relays or devices, wiring or inspections. The G version offers a safe control solution that is immediately ready for use.

Connectivity

Every Emax 2 can be equipped with multiple cartridge-type communication modules at any time. The modules allow the circuit breakers to be directly integrated into automation and energy management systems through the seven most popular global protocols; including IEC 61850 for the creation of Smart Grid Networks. All functions can be accessed via the internet, in complete safety, using the Ekip Link switchgear monitoring system.

Not only can the rear terminals of Emax 2 be field rotated from horizontal to vertical, but they have been specifically designed to fit the most common bus configurations. Each terminal has been created to the standard width of bus bar for that amperage and is equipped with one, two or three terminal stabs for easy connection of one to four bus runs. The terminal technology provides the opportunity for easy connection and installation with less bus bar stock required.

The Ekip Supply Module can be connected to any voltage in AC or DC to internally supply auxiliary power for the trip units and terminal box modules consecutively. The need for any external power supply converter elsewhere in the cabinet is eliminated, saving both space and cost.

The neutral position on Emax 2 can be modified from left to right to provide ultimate flexibility. In addition, the E6.2 is available with neutral conductor sizes of 50% or 100% to allow for the correct sizing of bus bar and an opportunity to reduce construction costs.

Performance

Emax 2 uses four frame sizes, each only as wide as the amperage need requires, so that designers can optimize their space and material. The breaker design and quality materials allow for a small size while maintaining the high performances required by the most demanding conditions.

The family of Emax 2 contains:

- E1.2, 1600A with a 440V Icu of 66kA and Icw 1s of 50kA in a 210mm width.

- E2.2, 2500A with a 440V Icu of 100kA and Icw 1s of 85kA in a 276mm width.
- E4.2, 4000A with a 440V Icu of 150kA and Icw 1s of 100kA in a 384mm width.
- E6.2, 6300A with a 440V Icu of 200kA and Icw 1s of 120kA in a 762mm width.

Emax 2 contains new generation Rogowski sensors that allow the most precise measurement on the market. The tolerance to 1% of the actual value of current, 0.5% of voltage and 2% of power and energies guarantee precision and enable the circuit-breaker to act as a measurement device in switchgear. Measurements can be read directly on the wide trip unit display so additional devices can be eliminated.

The Ekip Fan Module continuously monitors the internal temperature at the fixed part and activates cooling fans if required. This allows for the ability of increased current-carrying capacity in switchgear.

Ease of use and safety

Emax 2 is the first circuit-breaker to offer large, color touch screen displays. They provide clear, easy navigation for quick access to information and adjustment capability that is invaluable in the event of a fault or emergency. The trip units are capable of ten languages, reducing the need for extensive training. In addition, they can be read and used directly, without the need for expensive HMI units. If desired, they can also be programmed and consulted from a tablet, smart phone or PC via the Ekip Connect application.

Removal of the main Emax 2 cover allows access to the accessory mounting area only, not the operating mechanism or other components. This protects both maintenance personnel and the breaker itself from unwanted damage. In addition, the key lock accessory is mounted inside the accessory area and allows for the breaker to remain locked, avoiding unwanted operation during maintenance.

Dedicated guide rails simplify movement and allow correct, locked and clearly identifiable positioning. The rails extend outside the fixed part so that the mobile part can be easily inserted. In addition, shutters on the fixed part can be locked from the front, without access through the inside of the fixed part. These features allow for easy and safe installation and maintenance.

Implementation of breaker settings is simplified with the aid of ABB's DOC software and Ekip Connect interface. Curves and settings can be determined and saved using the DOC software and the Ekip Connect program can open and read the DOC file, eliminating the need to retype the settings into the breaker or software program and allowing for easy, error free implementation.

Emax 2 contains push in terminal box technology, making wiring easy and tooling-free. This feature ensures immediate, safe wiring. In addition, Emax 2 terminal boxes and wiring set ups are common across the line and its trip units are field interchangeable, creating flexibility and the potential for easy, rapid upgrades without the added cost of a service technician.

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