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APPLICATION BROCHURE

# **SACE Emax 2**

All-in-one innovation



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**ABB's Emax 2 All-in-one innovation integrates protection, control, connectivity and power management to ensure continuity of service, reliability and productivity of Microgrid installations.**

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# Introduction

## The future is today

### **A forced model change**

Renewable energy generation has experienced remarkable growth in the last 10 years. Society is increasingly aware of environmental changes and the limitation of fossil energy resources, creating a need for independent, self contained power generation systems, especially renewable energy sources.

In addition, traditional power grids are increasingly susceptible to failure caused by climate and other major events. The very structure of these networks, in turn, hinder the integration of distributed renewable energy sources.

### **What is a Microgrid ?**

A Microgrid installation is a power grid with consumption loads and generation sources controlled and properly managed to ensure constant service. This is true when loads and sources are either connected or disconnected from the main grid.

Microgrid installations have a single point of connection to the electrical distribution network, as can be the case of shopping centers, campuses, industry, etc. Other examples show how a Microgrid can work permanently in an isolated manner from the distribution network, such as boats or rural communities.

ABB's All-in-One innovation is the only integrated breaker innovation on the market that can intelligently manage and control Microgrid installations to ensure continuity of service, reliability and productivity.

ABB offers a unique solution that combines innovative protection, control, connectivity and management that simplify and accelerate the user interaction like never before.

### **Protection**

A building connected to a traditional power grid suffers from numerous electrical service failures every year. This seriously affects productivity, safety and comfort of the user and the connected devices.

This can lead to significant economic losses. The new Interface Protection feature of the All-in-one innovation allows you to properly protect the installations of active equipment that pours energy into the grid.

It is a complex algorithm of voltage, current and frequency protection which detects faults in the network and disconnects active elements of the Microgrid. This prevents these sources of energy from contributing to network failure.

The Interface Protection function is a regulatory requirement for all active users and is also complementary to the interlocking signals of the Medium Voltage protection.

The integration of this new function into ABB's Emax 2 Low Voltage circuit breaker avoids the installation of an external relay for interface protection in the installation.

Additionally, the new Interface Protection disconnects the network installation from distribution in case of failure and allows the Microgrid to start working in isolation, without losing continuity of service.

At the same time, ABB's Emax 2 automatically adapts the protection settings and electrical selectivity to the new electrical conditions and requirements of the isolated Microgrid (short-circuit currents of the auxiliary generation sources are usually much smaller than those of the network).

This innovative feature called Adaptive Protection ensures the correct protection and safety of the installation in any Microgrid scenario.

In addition, Emax 2 offers a wide range of protective functions for generators (generator-sets), ensuring adequate protection for all energy resources of the installation.

### **Control**

The ABB All-in-One innovation offers the option to include the automatic transfer function (ATS) integrated in the Emax 2 circuit breaker, being the first low voltage breaker on the market to combine and coordinate both protection and control functions.

This function enables the activation of auxiliary generation sources (eg. generators) and transfers the feed of the Microgrid from the distribution network to such auxiliary sources, thus ensuring a secure transfer to maintain continuity of service and reliability of the system.

The integration of this new function into the Emax 2 is an alternative to the use of external sensors and controllers used in traditional solutions, guaranteeing savings of up to 30% of the space occupied by the electrical distribution gear and maximizing the level of reliability of the ATS solution.

The solution is Plug & Play thanks to pre-configured templates. Without any programming, it allows modularization and standardization of the installation controls.

### Connectivity

Energy supervision allows for the monitoring and control of the conditions present in an electrical system. In addition to the conventional energy parameters, it is also possible to monitor advanced network quality parameters which are integrated into Emax 2.

ABB integrates into Microgrid installations of substation and Smartgrid control systems through IEC61850 communication protocol, embedded in the Emax 2 circuit breaker. This breaker is the only one on the market capable of communicating in 7 different protocols.

In addition, ABB offers energy management solutions to monitor, optimize and control the energy consumption of multiple installations through ABB Ability™ EDCS, an innovative cloud technology. The user now has a convenient, quick and simple way for system monitoring.

### Management

ABB's All-in-One innovation, based on protection and control algorithms specifically developed for Microgrid networks, increases productivity and reduces energy costs of your installation.

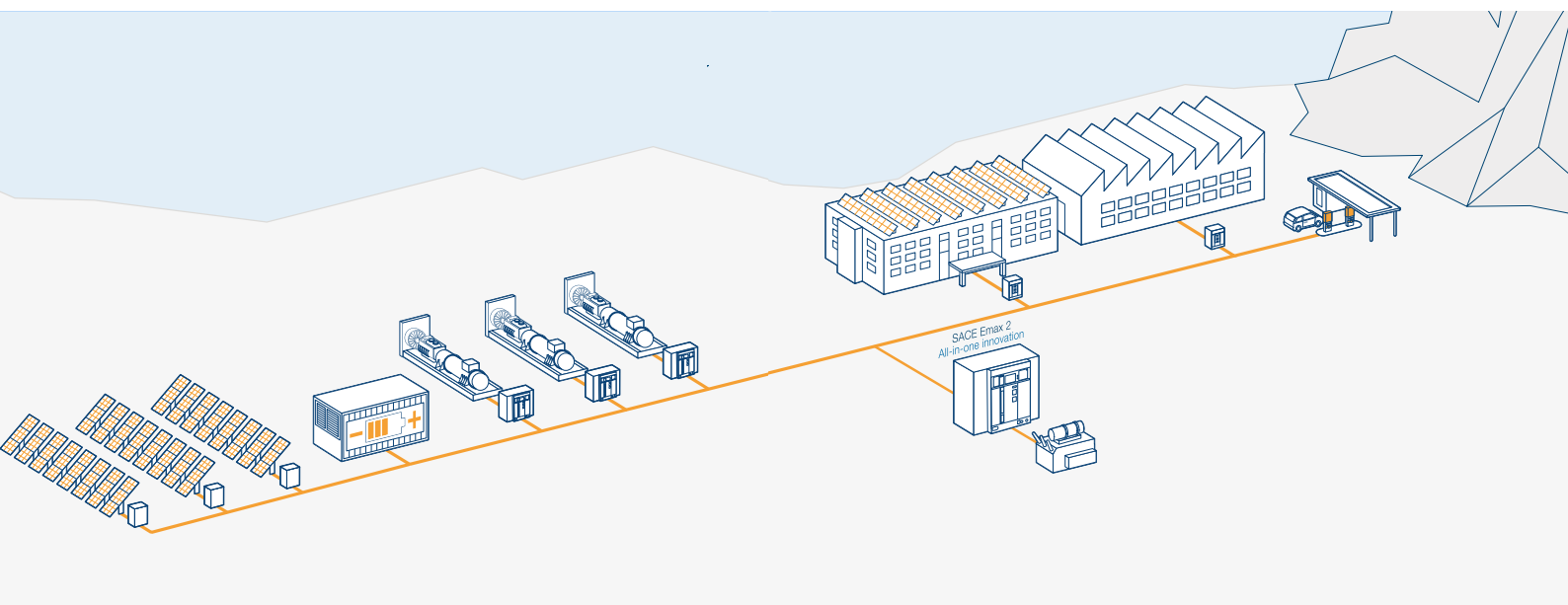
The automatic load shedding function ensures the continuity of service of the Microgrid installation, disconnecting only the non-priority loads during a main's failure.

The loads that the user identifies as non-priority are disconnected before transfer (ATS) from the distribution network to the auxiliary sources.

Emax 2 checks the ROCOF protection, which activates the load shedding, only when the energy consumed by the installation is higher than that produced by the auxiliary generation sources. With the installation connected to the distribution network and without any service failure, the Ekip Power Controller function integrated into the Emax 2 circuit breaker allows for management of the energy demand.

It will maintain a stable consumption curve, avoiding penalties of the electric company and reducing its energy cost.

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01 Example of a low voltage installation with the Emax 2 circuit breaker and ABB's All-in-One innovation, to manage your energetic resources intelligently.

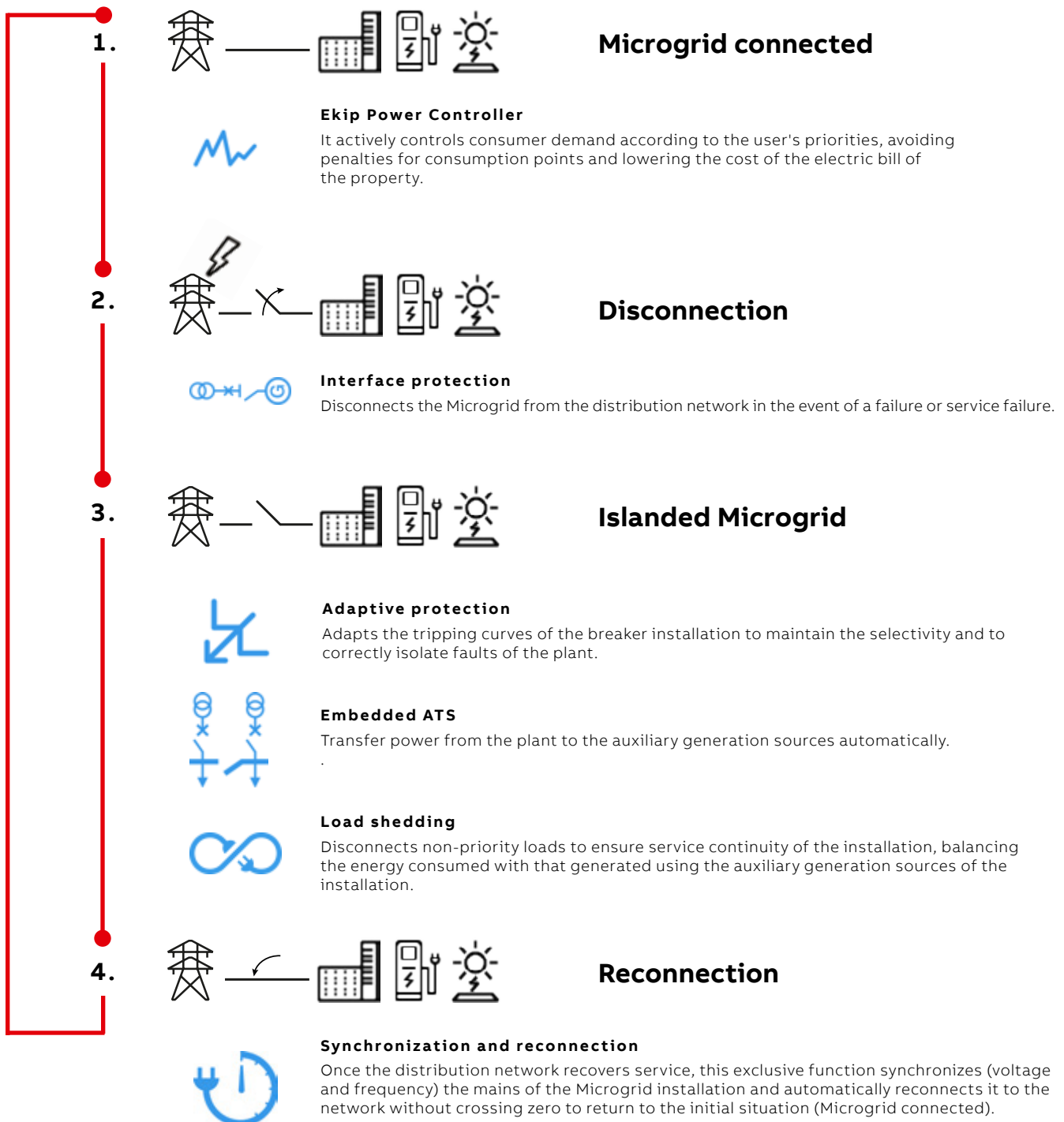


# Operating conditions

## Ensure continuity of service in any situation

### ABB's All-in-One Innovation

Innovative Microgrid Protection, Control, Connectivity, and Intelligent Management functions to ensure service continuity, reliability and productivity of facilities like never before.



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## Benefits and Advantages

Pure innovation to optimize your installation



Ensure continuity of service, reliability and productivity of the installation (24/7/365).



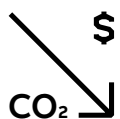
Know the behavior of energy resources and processes.



Integrate sources of renewable energy in the installation.



Simplify user interaction and improve their experience.



Reduce the cost of the energy bill and CO<sub>2</sub> emissions of the installation.

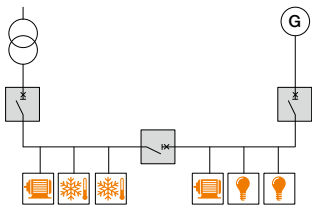


Manage the complexity of the electrical installation and its digitization.

# Added value

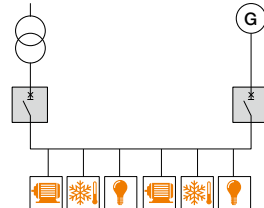
## Fewer components, more reliability, shorter start-up time

### Traditional Solution

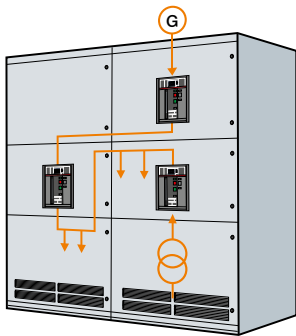


- Bus tie circuit breaker necessary.

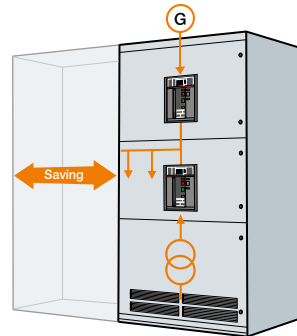
### ABB's **All-in-One** Innovation



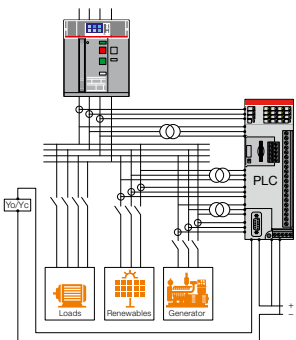
- Without bus tie circuit breaker.
- ATS function built into the circuit breaker.



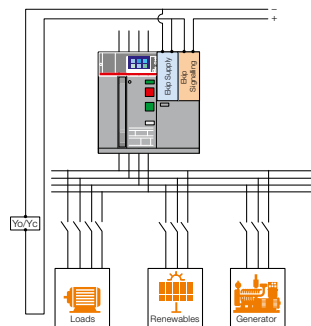
- Three circuit breakers in the gear.
- Solution with two sections.



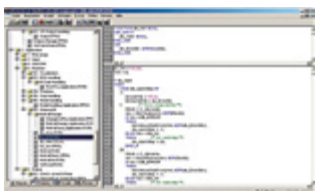
- Only two circuit breakers in the gear.
- Solution with a single section.
- Up to 50% space saving.



- Voltage sensors, current transformers, PLC, auxiliary control device, integration of the application.



- No need for any additional devices. Simplification of schemes and connections.
- Increased reliability of the Solution.



- Expert level programming required.
- Increased time and cost of commissioning.

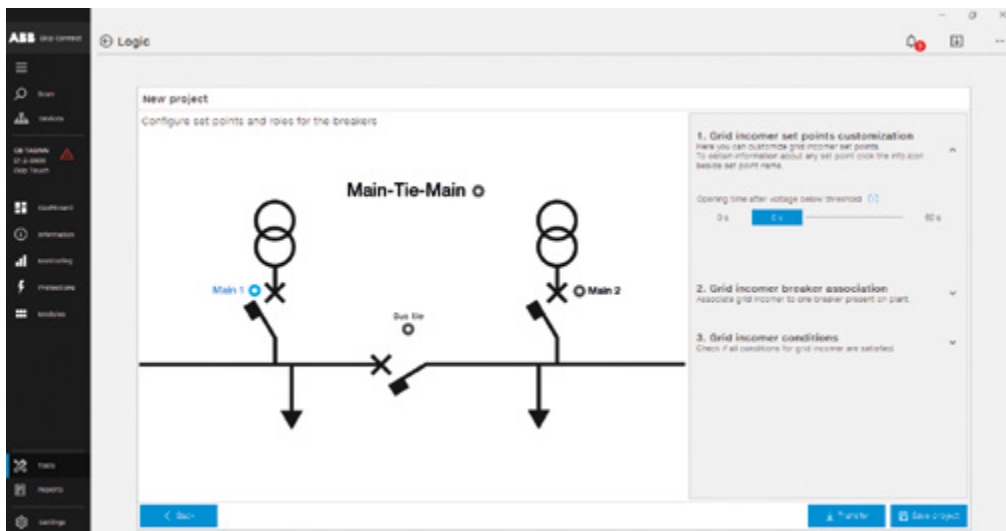


- No programming.
- Immediate commissioning thanks to the templates in ABB's Ekip Connect software.
- Ready for non-specialist level.



# Start-up

Simplify complexity to move to the next level



ABB's All-in-One Innovation marks a before and after in the start-up phase of the Microgrid installation.

The user can quickly and easily configure the protection, control, connectivity and management functions thanks to pre-configured templates in ABB's Ekip Connect software.

The ultra-intuitive interface avoids complex programming and simplifies the interaction with the user.

In this way, ABB ensures a reliable, fast and simple, start-up that saves time and costs in the commissioning of the Microgrid installation.

In addition, Ekip Connect allows you to configure, test the protections, generate maintenance reports and make preventive diagnoses on the state of the circuit breakers.

Connecting with Ekip Connect to devices can be local, through ABB's Ekip programming key, or via bus communication (Modbus or Ethernet). In the second case, the user can scan all devices connected on the same bus and access their configuration remotely.

Download here  
Ekip Connect



# Technical Documentation

## Accelerate your project, increase your value

The White Papers describe the functions of the ABB's All-in-One innovation, show how to implement them with practical schemas and examples, and include the list of ABB components to integrate.



### Interface protection

Check out the advantages and how to implement the Interface protection function on your project.



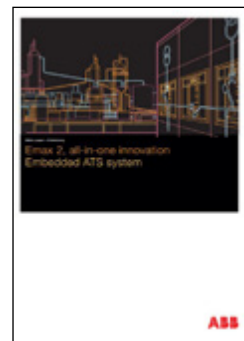
### Adaptive protection

Check out the advantages and how to implement the Adaptive protection function in your project.



### Synchronization and reclosing

Check out the advantages and how to implement the Synchron-reclosing function in your project.



### Embedded ATS

See the advantages and how to implement the embedded ATS solution.



### Automatic Load Shedding

Check out the advantages and how to implement the load shedding function in your project.



### Ekip Power Controller

Check out the advantages and how to implement the Ekip Power Controller function in your project.

Scan the QR code and access the web to get more information about the ABB All-in-One solution and where you can download technical documentation and very useful software or your project.





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