TECHNICAL PAPER

Ekip™ UP

UP-date, UP-grade and UP-load existing electrical facilities

ABB's Ekip UP is a trouble-free, cost-effective way to monitor power consumption and optimize operations, maximizing your uptime for core processes. The multi-purpose device enables the installed base to leverage the latest digital innovations, with minimum impact on switchgear and maximum uptime.

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Abstract

Countless electrical installations lack the control and monitoring features found in more modern facilities. However, you don't have to replace all of the electrical equipment to gain this important functionality. ABB offers a way to UP-date, UP-grade and UP-load your existing facility, maximizing UP-time with the Ekip UP multifunctional relay.

Introduction

The ABB Ekip UP multifunctional relay offers many advanced digital innovations for the user with options for monitoring and data collection, protecting the system with advanced protective functions and controlling events and actions in your existing electrical facility. You can UP-date your older facility without having to replace all of the existing electrical equipment, UP-grade basic equipment with protection and control capabilities and UP-load the data collected to the cloud using the ABB Ability™ electrical distribution control system (EDCS) cloud-based platform. Send data to a building management system (BMS) or SCADA system for internal monitoring of the facility using the application programming interface (API). All of this is possible with a minimal impact on installation and commissioning time, increasing UP-time.

UP-date

UP-date existing facilities with the latest digital protection and monitoring innovations. Ekip UP is compatible with all electrically operated switching devices, making it a simple yet flexible solution to UP-date an electrical distribution system.

UP-grade

UP-grade the efficiency of existing facilities with up to 30% operational cost savings via the asset and energy management system. Network your power distribution system to gain visibility to your facility's power usage and power quality information.

Ekip UP monitors resources, ensuring protections are in place, and provides fast fault diagnosis as well as network analyzer functionality.

Ekip UP

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01 UP-load electrical system data measurements
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02 Type C open current sensor

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01

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02

UP-load
UP-load electrical system data measurements to the cloud-connected ABB Ability platform to enable advanced analytics by observing trends from over 2 years of data collection with a standard subscription. Data is updated every 30 seconds to the monitoring platform.

UP-time
Maximize UP-time thanks to easy installation — saving up to 50 percent of the time needed for electronic retrofitting, with reduced impact on equipment design. Mount Ekip UP either through the door of the equipment or install it on a DIN-rail behind the door, allowing maximum freedom of installation location.

The user-friendly Ekip Connect commissioning tool makes configuring the tool simple and with much less downtime. Even advanced features require minimal programming skills. The intuitive color touchscreen interface, which supports 10 languages, lets the user browse settings, check alerts and set parameters quickly and easily.

Ekip UP Monitor
The Ekip UP Monitor allows the user to have full metering capability and power quality monitoring thanks to its built-in network analyzer feature. Open-core Rogowski coil current sensor technology ensures linearity throughout the complete measurement range in addition to allowing for easy installation with little or no impact on equipment design. Ekip UP Monitor can measure up to six temperature values inside the switchgear or at MV/LV transformer windings, as well as receive up to 2 analog inputs from other meters (like gas or water), due to an optional Ekip Signaling 3T module. Two data loggers for current and voltage waveforms provide information for diagnosis of plant behavior after triggering events.

Simple logic commands are possible based on the availability of more than 1000 metering data points and up to 10 embedded I/O signals. Add additional DIN-rail mounted units for more I/O capability.

Advanced fieldbus connectivity is in every installation with a choice of seven popular communication protocols; Modbus TCP, Modbus RTU or IEC61850 in power distribution supervision or Profinet, Profibus, DeviceNet or Ethernet/IP for automation process integration (for example PLC, SCADA or building management systems)[1]. You can simultaneously run redundant communication modules or up to four different communication modules.

Ekip UP

03 Homopolar toroid (CT) for the grounding conductor of main power supply (transformer star center sensor input)

03

Ekip UP allows direct communication to ABB Ability EDCS using the Ekip Com Hub communication module, with no external meter or gateway required. Besides its own advanced metering information, it is possible to gather data from master Ekip Com Modbus TCP and Ekip Com RS485 modules of another 50 ABB devices, including low voltage circuit breakers, multi-meters, contactors, disconnect switches, TruONE™ ATS, and even from medium voltage protective relays.

Ekip UP Protect
Moving up in functionality from the Ekip UP Monitor, ABB offers the Ekip UP Protect, which satisfies several other application requirements by adding programmable protective functions. In a switchgear lineup, it offers protection of non-automatic circuit breakers operating on their actuators (opening/closing coils, motor operators) and guarantees a short circuit breaking capacity equal to the short-time withstand current rating of the switching device.

In existing equipment, the Ekip UP Protect adds the ability to have voltage, frequency and power-based ANSI protections on existing circuit breakers that don't have those capabilities built in. The circuit breaker maintains its current-based protections so to keep the same short-circuit interrupting capacity. Ekip UP Protect provides backup protections of installed circuit breakers in existing equipment to get redundancy and more reliability in the system. This is especially useful for protecting expensive equipment such as generators, motors, and battery banks.

Ekip UP Protect also has capabilities for double G protection and, by using source ground return earth fault protection for transformers, it has the ability to distinguish between restricted and unrestricted earth faults. The external homopolar toroid current sensor is placed on the conductor connecting the transformer neutral point to ground. It must be located between the neutral conductor and ground conductor. In this way, the currents that flow through the neutral won't pass through the homopolar toroid while currents that flow through the ground conductor are detected by the homopolar toroid.

Once a restricted earth fault is detected, the trip unit can make available an output signal to the MV circuit breaker. The MV circuit breaker detects the signal and commands the opening of the breaker, ensuring the complete protection of the plant.[2]

Ekip UP Protect+
Ekip UP Protect+ adds to the protection capabilities of Ekip UP Protect with a set of more than 35 additional ANSI protections. It includes generator protection functions for generators and co-generators.

Ekip UP can be used as a microgrid protection unit via the embedded interface protection system (IPS) monitoring both the medium and low voltage system for active sources connected to the grid.

It also offers adaptive protective functions that can be added to antiquated switching devices to guarantee selective coordination in different grid topologies.

Ekip UP Control
Ekip UP Control is suitable for all monitoring applications; it also introduces plant control features such as power management for peak shaving and load shifting to get energy cost savings on utility bills.

An optional load management feature can be implemented by using the power controller function of the Ekip UP. When conditions arise where the main power source is compromised, Ekip UP can open non-priority loads in a sequence established during the setup process.

An additional communication protocol known as Open Automated Demand Response (OpenADR) can be used by utility companies as well as their customers. OpenADR is a research and standards development effort for energy management led by North American research labs and companies. OpenADR is typically used to send information and signals to cause electrical power-using devices to be turned off during periods of high demand[3]. Title 24 California Energy Code addresses energy crisis management requiring OpenADR to be designed into most building management lighting control systems.[4]

Ekip UP

Synchronization between power sources is very important, so as not to cause major damage to equipment. Applications such as generator paralleling or transfer switch applications are made possible by using the optional Ekip Synchrocheck module. The Ekip Synchrocheck module enables the user to control the voltage, frequency and phase angle when placing two lines in parallel. Ekip Synchrocheck measures the voltages from two phases of one line through an external transformer and compares them to the measured voltages of the second line. Frequency and phase angle are also compared to determine if a proper synchronism condition exists. An output contact is available, which is activated upon reaching synchronism, and enables the circuit breaker to be closed by means of wiring with the closing coil.[5]

Transferring from one power source to another doesn't have to be stressful with Ekip UP. Using ABB's proprietary Ekip Link communication protocol, Ekip UP can manage the functions of an automatic transfer switch or zone select interlocking (ZSI).

Ekip UP Control+
Ekip UP Control+ is the most advanced version of the Ekip UP product range, having all of the capabilities in a single digital unit all of the functionality of the lesser ones, bringing together all the metering, protection and control capabilities.

	Ekip UP Monitor	Ekip UP Protect	Ekip UP Protect+	Ekip UP Control	Ekip UP Control+
Control				●	○
Protect		●	○		○
Metering	○	○	○	○	○

● = standard function
○ = advanced function

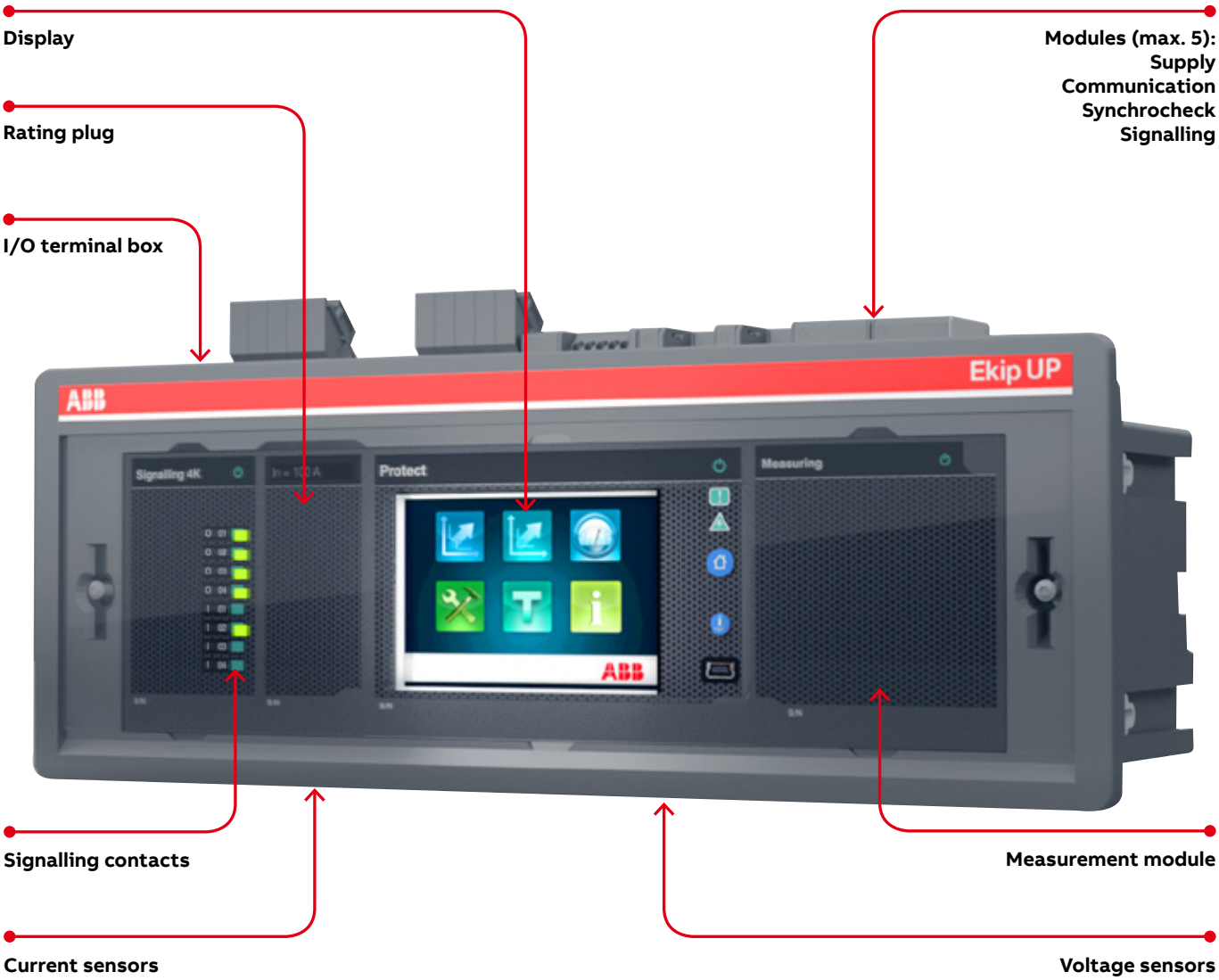
Customer success story

Data from ABB Ekip UP has helped the Printing House of Martinengo identify its higher efficiency equipment and processes among its installed base, steering future investment decisions that will cut power costs and carbon dioxide emissions. Further developments at the facility will upload more digital functions and services from the ABB Ability portfolio, supporting this key player's pursuit of continued profitable growth and ever-higher levels of sustainability.

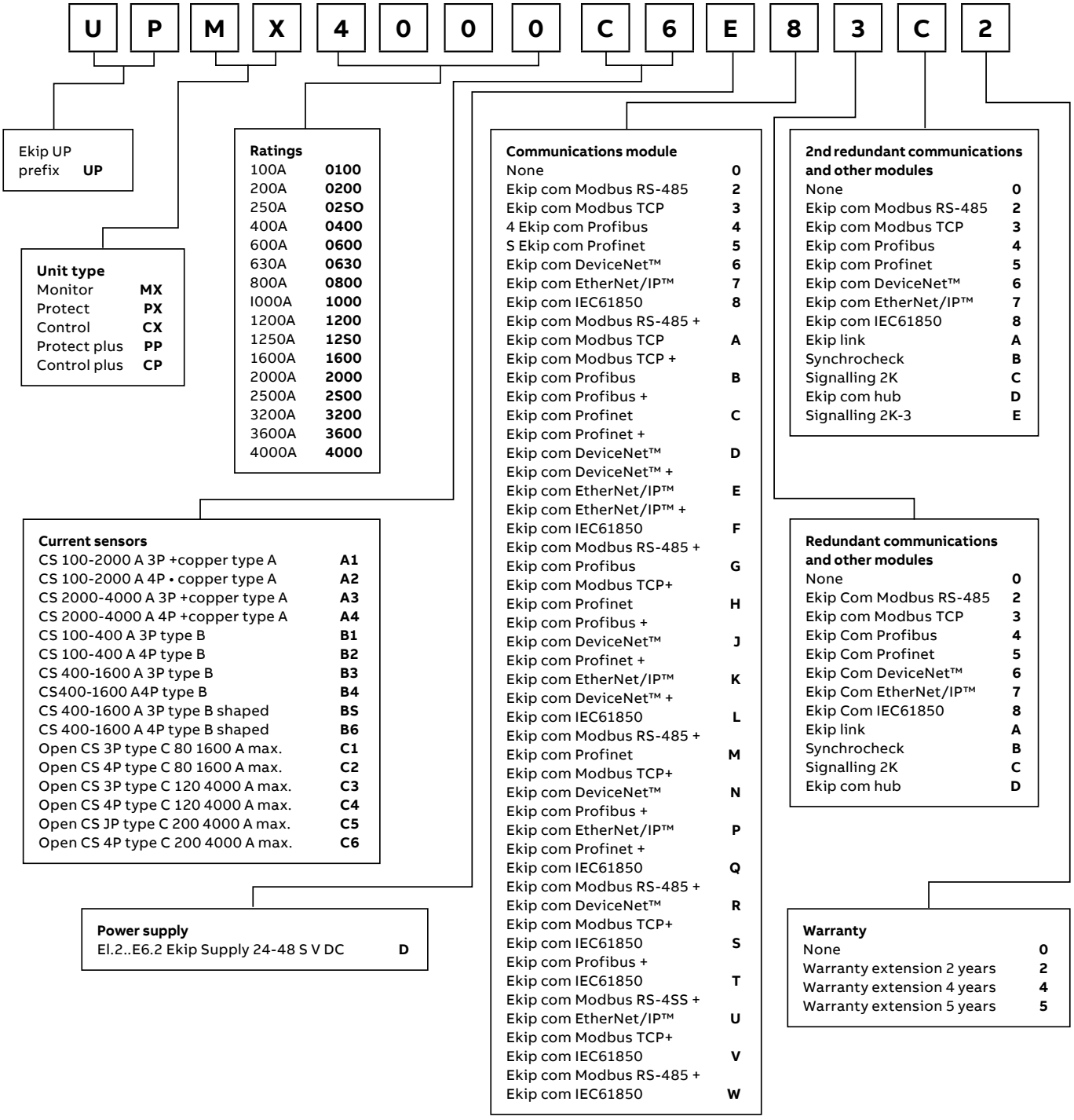
Fabio Ferrari, CEO of the Printing House of Martinengo, added: "ABB's Ekip UP has delivered exactly what we needed. It has given key lines in our facility a simple, effective upgrade that brings more intelligence into our energy saving, power management and CO_2 reduction strategy. This technology is already helping us make smarter investment decisions as we digitize and expand other parts of our facility with a plug and play solution."[6]

Conclusion
ABB is making the digitization of power more accessible and user-friendly by developing a range of smart devices that turn systems data into productivity gains. Ekip UP is an industry-first innovation that lets customers keep their existing power hardware — digitizing it with a simple software-driven plug-in upgrade.
ABB's Ekip UP is a trouble-free, cost-effective way to monitor power consumption and optimize operations, maximizing your uptime for core processes. The multi-purpose device enables the installed base to leverage the latest digital innovations, with minimum impact on switchgear and maximum uptime.

Options and accessories



Part numbering system



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