Engineered flexibility for secondary distribution
SDA500 cabinet

- Agile, cost-effective and future-proof solution for all levels of secondary distribution automation
- Easy installation, commissioning and maintenance
- Pre-wired and fully tested cabinet
The RTU-based SDA500 Smart Control Cabinet provides the full bandwidth of secondary distribution system functionality in an off-the-shelf solution. It is a standardized, pre-engineered and cost effective automation system for secondary distribution substations.

We improve grid reliability and efficiency so that you can control the grid, anywhere, anytime.
**The challenge**

Power grids are undergoing swift and dramatic changes. Distribution grid operators need to effectively deal with many issues, such as the increasing penetration of distributed generation, fluctuating peak times as prosumers such as EVs and home battery energy storage systems expand, the need to minimize power supply interruptions, meet regulatory requirements and deal with aging infrastructure, as well as growing customer demand for a reliable power supply that also tightly controls operational expenditures.

Responding to these trends effectively requires more automation deeper inside the grid. This means automation must be extended to the edge of the grid from primary distribution substations to medium-voltage feeders and secondary distribution substations.

**Benefits of extending automation to the secondary distribution grid**

- Increases visibility of the distribution network
- Adapts to any type of secondary substations and pole mounted switch
- Improves operational efficiency with shorter fault repair time
- Enables advanced distribution management applications, such as self-healing grids, FDIR (Fault Detection, Isolation and Load Restoration), or VVO (Volt/VAr Optimization) to improve power quality. These applications can run autonomously at the edge of the grid or be managed from control centers
- Supports connection of distributed energy resources such as PV on MV networks
- Helps manage network congestion deep in the grid utilizing existing infrastructure to its full potential, thus avoiding or deferring additional investments (CAPEX)
- Helps reduce the duration and impact of outages (reduced SAIDI/CAIDI), avoiding costly penalties and increasing customer satisfaction with better power reliability
- Reduces non-technical losses and lowers OpEx (Operational Excellence) cost for the network operator, and gives a power system the potential to make “efficiency” equivalent to “generation” in operations
- Increases safety for utility personnel
There are multiple ways to automate secondary distribution substations that meet a variety of requirements, from basic to very complex. RTU-based smart cabinets support three different automation levels, and are easily upgraded from level to level.

1 Monitoring & Control

The basic level of automation is monitoring. This enables the collection and communication of status information about various switching devices, and conveys general alarm indications in the substations to the distribution control center and/or the next-level substation automation system. Control functionality can be easily added to enable remote control of actuators in the network, such as circuit breakers, load break switches, on-load tap changers, etc.

2 Monitoring & Control + Measurement & Fault Detection

The smart cabinet can be easily extended to reach the next highest automation level. This version enables the acquisition of analog measurements from the network, and can detect the passage of fault current. Analog measurements can include currents and voltages, active and reactive power, power quality analysis as well as environmental measurements of the substations (temperature, humidity). Various technology is available to acquire analog measurements that will depend on the sensors available in the network, such as conventional current and voltage transformers or digital sensors.

3 Monitoring & Control + Measurement & Fault Detection + Protection

The most advanced smart control cabinet also includes protection functionality. With protection added, the system can trip the circuit breaker when a fault is detected, going one step beyond simple fault passage indication. Adding protection devices deeper into the network enables more rapid segregation of a faulty section, further improving system reliability*.

Benefits at a glance

- Agile, cost-effective and future-proof solution for new or retrofit installations that covers all levels of secondary distribution automation
- Easy installation, commissioning and maintenance thanks to its plug-and-play approach requiring minimum parametrization via the integrated web-HMI tool
- Pre-wired and fully tested cabinet with optimized footprint
- Supports the integration of 3rd party substation devices
- Designed with the highest cyber security requirements in mind, complies with IEC 62351 and IEEE 1686 standards offering communication security and protection against malicious software that keeps your infrastructure safe from cyber threats
- Supports international standards such as IEC 61850, IEC 60870-5-101/103/104, DNP3, etc
- Supports both traditional CT/VTs and low-power sensor inputs
- Remote fleet management, including firmware update, for more efficient operations*
- Adapts to your existing communication infrastructure with its multitude of available utility grade, wired (Ethernet, DSL) and public (GPRS, 3G, 4G, LTE) or private (Wi-Fi mesh) wireless communication module options**
- Modular design reduces inventory requirements
- Suitable for rough ambient conditions with an extended temperature range of -40°C to +70°C
- Advanced fault detection, complete power measurement (IEC 61557-12) and power quality (IEC 61000-4-30 class 5) functionalities
- Comes with built-in RTU PLC capabilities and thus supports advanced applications like Fault Detection Isolation and Restoration (FDIR) or Volt-VAr Optimization (VVO)***

* Via system data management tool SDM600, which can be purchased separately.
** ABB wireless mesh TropOS router is not part of the standard solution, but can be added as an option.
*** Advanced applications like FDIR (Fault Detection, Isolation and load Restoration) or VVO (Volt/VAr Optimization) are not part of the standard solution, but can be added as options.
The solution

Secondary distribution automation can be easy and cost-effective.

The ABB solution comes fully wired and wall-mounted with pre-engineered software, based on the RTU500 product family. The standard design enables simple, fast and cost-effective deployment, with minimal installation and commissioning costs.

This versatile solution encompasses a wide range of automation levels and is extendable on request, combining minimal space requirements and reduced total cost of ownership. It provides many configuration options, such as cubicle size, means of communication with the control center, or battery size, to name just a few, and has been designed to meet the most demanding requirements.

Key components

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>780 x 780 x 300mm (WxHxD)</td>
</tr>
<tr>
<td>Protection Category</td>
<td>IP 66 according to IEC 60 529</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40°C ... 110°C</td>
</tr>
<tr>
<td>Power Supply</td>
<td>230VAC</td>
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</tbody>
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Optional:
- Uninterruptible power supply.
- Battery options: 7.2-12 Ah Li-Ion or Lead Acid battery modules, cooler, heater, local/remote switch.

- 520CMD01 Communication unit
- 520PSD01 Power supply
- 520BID01 Binary input module, 16 inputs
- 520BOD01 Binary output module, 8 outputs
- 520AID01 Analog input module
- 520PTD01 Temperature measurement
- 560CVD03 Multimeter
- 560CVD11 Digital power transducer
- 500CVD90 Digital power transducer
- 500MDD03 Cellular modem
- TropOS 6420/6410
- REx615 Numerical relays for protection and control
ABB solutions for distribution automation improve grid reliability and efficiency with products that enable customers to control the grid anywhere, anytime.

Backed by more than 100 years of experience in substation automation, communication and protection, ABB solutions help customers see inside the grid, and are supported by a comprehensive range of automation products, solutions and systems designed for basic to advanced power distribution networks, renewable power integration and battery storage systems.