



- 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



SDA500 IOT box

# Engineered flexibility for distribution automation

Hitachi Energy helps improve grid reliability and efficiency so that you can control the grid, anywhere, anytime.

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# The challenge

Power grids are undergoing swift and dramatic changes.

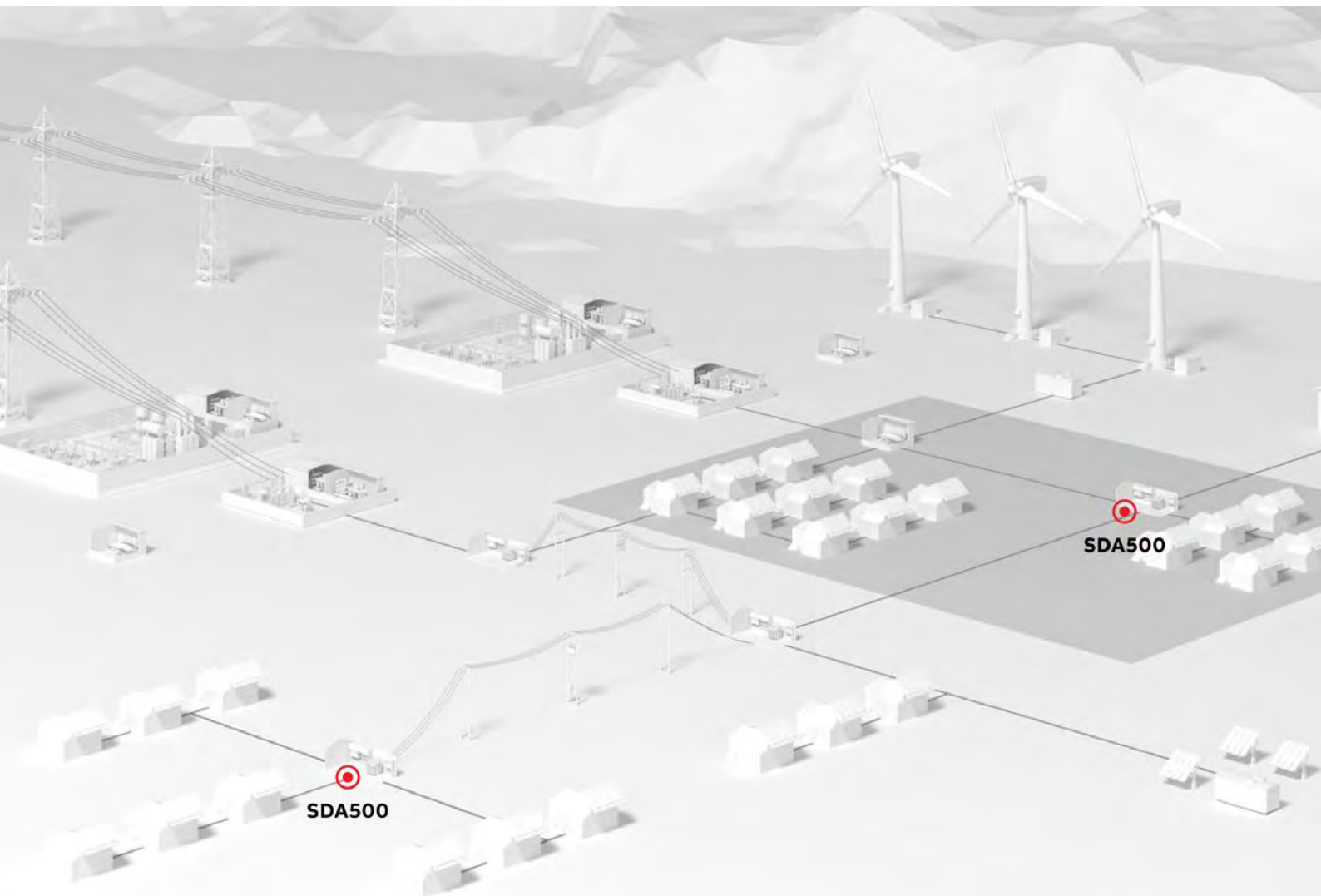
Distribution grid operators need to effectively deal with many issues, such as:

- Increasing penetration of distributed generation
- Fluctuating peak times as prosumers such as EVs and home battery energy storage systems expand
- Need to minimize power supply interruptions
- Meeting regulatory requirements and dealing with aging infrastructure
- Growing customer demand for a reliable power supply that also tightly controls operational expenditures.

Effectively responding to these trends requires more automation deeper inside the grid. Automation must be extended to the edge of the grid, from primary distribution substations to medium-voltage feeders and secondary distribution substations.

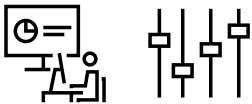
# Benefits of extending automation to the secondary distribution grid

- Increases visibility of the distribution network
- Adapts to any type of secondary distribution substation and pole-mounted switch
- Improves operational efficiency with shorter fault repair time
- Enables advanced distribution management applications, such as self-healing grids, Fault Detection, Isolation and Load Restoration (FDIR), or Volt/VAr Optimization (VVO) 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 for the network operator, and gives a power system the potential to make “efficiency” equivalent to “generation” in operations
- Increases safety for utility personnel



# Levels of automation

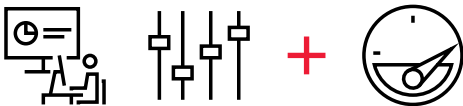
There are multiple ways to automate secondary distribution substations that meet a variety of requirements, from basic to very complex. The SDA500 IOT box supports three different automation levels, and is easily upgraded from one level to the next.



## 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 substation 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, and environmental measurements of the substation (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.



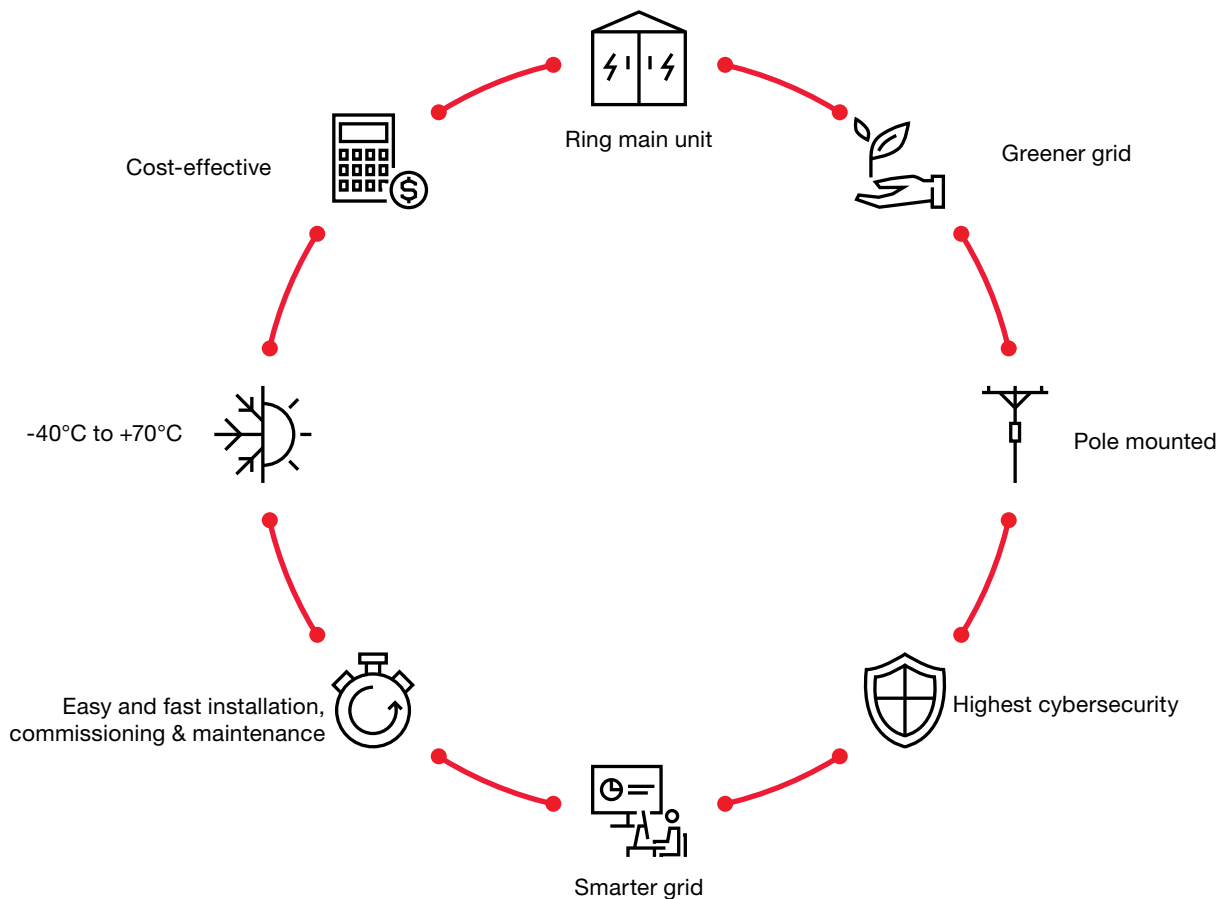
## 3. Monitoring & control + measurement & fault detection + protection

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\*.

\* Protection devices are not implemented inside the smart control cabinets themselves, but full protection functionality is implemented.

# 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 third-party substation devices
- Designed with the highest cybersecurity 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 cyberthreats
- Supports international standards such as IEC 61850, IEC 60870-5-101/103/104, DMP3, etc.
- Supports both traditional current transformer/voltage transformer 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 S) functionalities
- Comes with built-in remote terminal unit (RTU) programmable logic controller (PLC) capabilities and thus supports advanced applications like FDIR or VVO\*\*\*

\* Via system data management tool SDM600, which can be purchased separately.

\*\* Hitachi Energy wireless mesh Tropos router is not part of the standard solution, but can be added as an option.

\*\*\* Advanced applications like FDIR or VVO are not part of the standard solution, but can be added as options.

# The solution

## Applying automation in any distribution grid can be easy and cost-effective.

The Hitachi Energy 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.

### Specification

Dimensions	600 x 360 x 210mm (HxWxD)
Protection category	IP 66 according to IEC 60 529
Temperature range	-40°C ... +70°C
Power supply	230VAC

01



02



03



04



01 SDA500 IOT box.

02 SDA500 IOT box for monitoring and control.

03 SDA500 IOT box for monitoring, control, measurement and fault detection.

04 SDA500 IOT box connector.



# Key components



530CID01

Communication unit



530IOD01

Multi IO module



530BID01

Binary input module, 16 inputs



530BOD01

Binary output module, 8 outputs



530AID01

Analog input module



530PTD01

Temperature measurement



530CID02

530 Communication unit with 2 x Eth adapters



560CVD03

Fault passage indicator (3U, 3I)

## Optional:

Uninterruptible power supply. Battery options: 7.2-12 Ah Li-Ion or Lead Acid battery modules, cooler, heater, local/remote switch.



560CVD12

Fault passage indicator (3U, 3I, sensors)



560CVD21

Fault passage indicator (4U, 24I)



500CVD90

Fault passage indicator (4U, 4I)



EDS500

Ethernet/serial communication module



Tropos TRO620/210

Next-generation outdoor wireless mesh router

Backed by more than 125 years of experience in substation automation, communication and protection, Hitachi Energy solutions help customers see inside the grid.

Our solutions 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.



