

Distribution automation

Distribution network availability

Grid reconfiguration with automatic transfer of power sources

The variety of power redundancy schemes increase the complexity of operation for the operator during disturbances in the distribution grid.

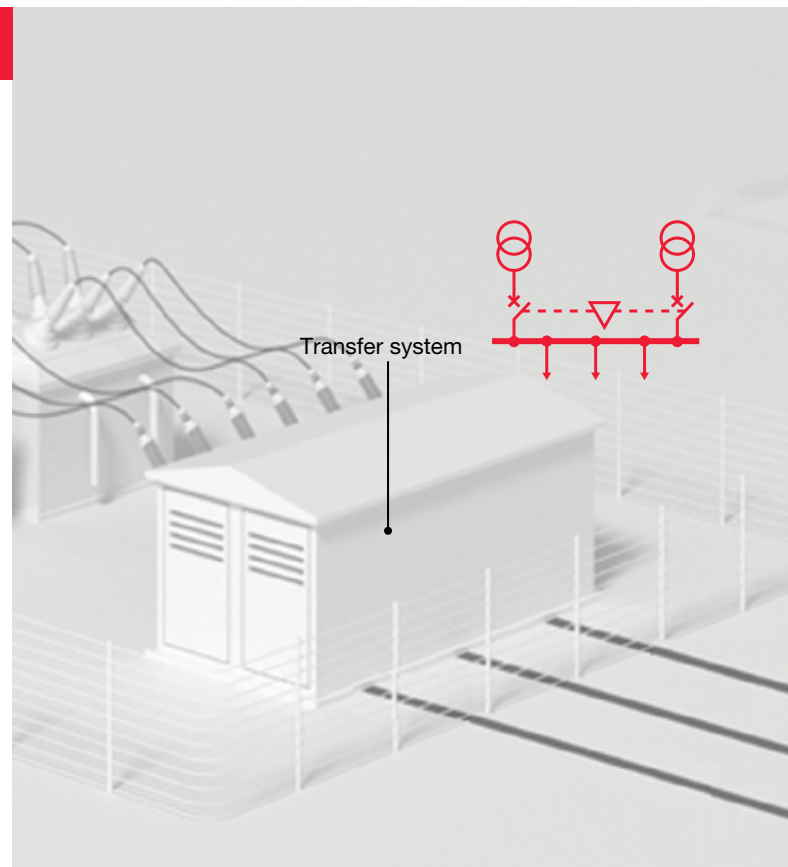
Hitachi Energy's RTU500 series offers a restoration automation feature that can minimize stressful situations and help operators react quickly to prevent blackouts.

Challenges

Disturbances in the distribution grid can result in blackouts, reduced asset life and/or asset damage.

Health and safety:

Constantly growing grid complexity puts increased mental pressure on the operator in the control center. For service personnel in the field, the need to carry out manual reconfiguration increases risk exposure.



Asset protection:

An undetected imbalance or invalid frequency can damage sensitive loads or generators. Switching on a MV-busbar with non-detected earth fault at the load side could trigger an overvoltage which may develop an electric arc. The extraordinary heat can destroy the medium voltage switchgear or reduce the expected lifecycle of the switchboard and equipment.

Cost-cutting:

Manual reconfiguration of the grid is time-consuming and resource-intensive, but lower maintenance budgets often result in less personnel to carry out such tasks.

Solution

Hitachi Energy's RTU-based automatic transfer system (ATS) is designed to provide an automatic change-over from the main power source to an alternative energy source. Triggered by voltage loss at the main power source, the detection function ensures a reliable transfer to the backup power supply within a predictable time. The solution is based on intelligent measurement, which allows analysis of the grid and protects connected assets that are sensitive to under-frequency. In combination with motorized breakers in the substation, Hitachi Energy's RTU enables a self-healing grid and leads to a highly reliable power supply.

ATS can be applied in areas with availability requirements or with secure applications:

- Industries
- Utilities
- Data centers
- Transportation
- Commercial and public buildings

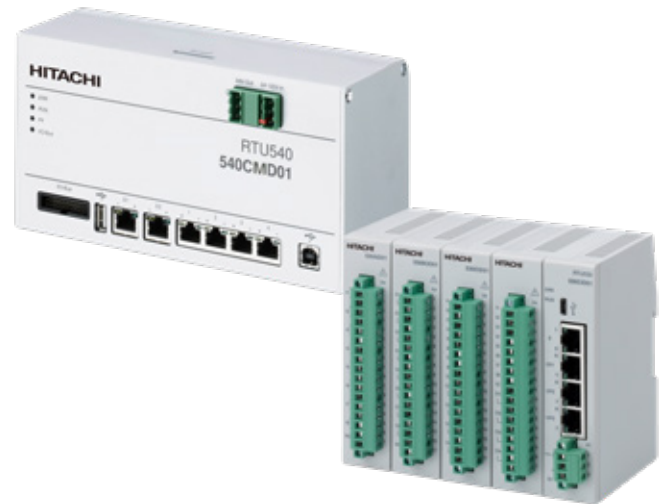
Enabling products

500CVD90



- Direct current and voltage measurement in one device
- Separate analog input for zero-sequence current and voltage provides support for multiple neutral earthing options
- Offers advanced features such as detection functionality (e.g., under-voltage, direction overcurrent and earth fault detection)

RTU540 and RTU530



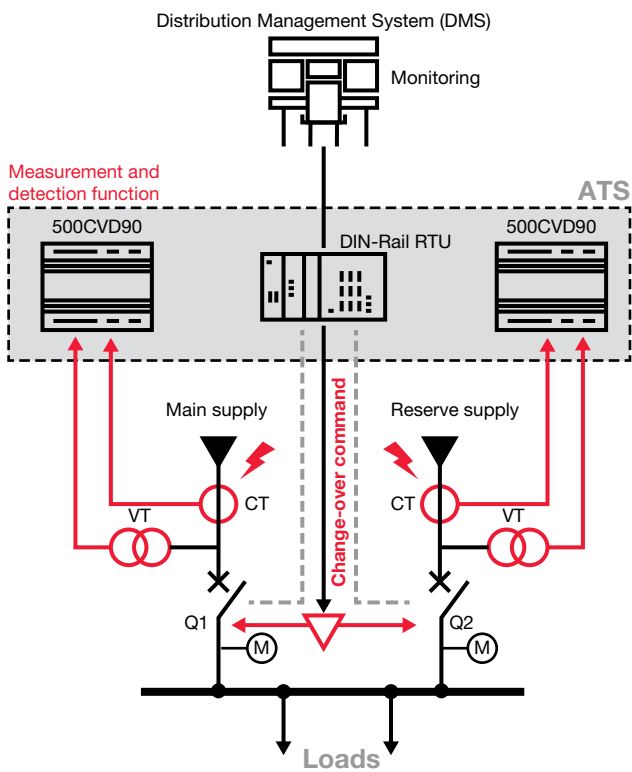
- The logic-based algorithm in combination with the gateway functionality enables a wide range of usability for distribution and sub-transmission applications with cycle times less than 50ms
- Scalable input and output modules can be adapted based on customer application requirements
- Efficient footprint allows the RTU DIN-Rail portfolio to fit within limited spaces
- Versatile combinations with 500CVD90 for indoor and outdoor applications

Functions

- Five automatic transfer variants
- Auto and manual mode
- Automatic switch-back option
- Emergency generator control and monitoring
- Definition of main source priority
- Optional busbar voltage measuring
- Load-shedding functionality of non-priority loads
- Monitoring and remote control

ATS recognizes a failure on the active source by under-voltage detection. The transfer sequence with the final changeover from main to reserve supply will be initiated by an upstream failure via the ATS detection function or external signal. Downstream disturbances such as a failure at the busbar or load side will block the transfer function to achieve selective failure isolation.

Application example



Benefits

- Verified and tested algorithm for supply restoration in less than three seconds to support grid operation and ensure more selective failure detection.
- Flexible for use as a retrofit solution, regardless of switchgear vendors

- Based on proven RTU500 series with predefined application functionality
- Reduces SAIDI and SAIFI for more reliable operations
- Ready to use in combination with Hitachi Energy's SDA500 cabinet