

PUBLIC



ABB OY, DISTRIBUTION SOLUTIONS

PROTECTION AND CONTROL REX600

Product presentation

ENGINEERED
TO OUTFIT



Contents

- 01. Introduction
- 02. Features and benefits
- 03. Cyber security
- 04. Applications
- 05. Human-machine interface
- 06. Tools
- 07. Ordering
- 08. Technical data
- 09. Summary

01

INTRODUCTION

Protection and control REX600

Building block of the smart digital substation



Introducing a compact, secure, and cost-efficient protection and control device that features merging unit functionality and backup protection. REX600 seamlessly integrates with ABB's centralized protection solution, SSC600, to provide reliable applications in utility and industrial substations. With compact design and DIN-rail mounting REX600 simplifies installation and reduces assembly time.

REX600 is fully compatible with Relion® protection relays and ABB's SSC600. This integration creates a complete solution that simplifies installation and reduces engineering time.

The REX600 includes overcurrent, voltage, frequency, and earth-fault protection functions. It also features proven multi-frequency admittance protection and current-based fault passage indication, making it suitable for secondary substation applications.

WebHMI is included, offering parameter setting, an event list, and a single-line diagram with control functionality.

REX600 provides freely configurable protection, control, and measurement functions, along with application logics and six setting groups.

02

**FEATURES AND
BENEFITS**



Protection and control REX600

Product highlights



Merging unit with compact, cost-efficient design and DIN-rail mounting

- Space-saving installation
- Reduced installation costs
- Shorter engineering time



Multi-frequency neutral admittance earth-fault protection

- Excellent fault detection accuracy and precise localization
- Minimized false trips for reliable operation
- Faster restoration and reduced downtime



Current-based fault passage indicator

- Rapid fault localization
- Lower operational costs
- Improved grid reliability



Strong protection against cyber threats

- Meets IEC 62443-4-2 Security Level 1 for device security
- Secure boot ensures only verified ABB software runs, preventing malicious code
- Complies with international security standards for trusted operation

Protection and control REX600

Features and benefits



Compliance with IEC standards

- Meets international requirements for merging units and the latest protection relay standards, ensuring robustness, accuracy and reliability (IEC 61869-13, IEC 60255)
- IEC 61850 Edition 2 enables integration and compatibility with other vendors' devices and seamless integration with Relion® relays and SSC600

Flexible digital substation support

- IEC 61850-9-2LE and IEC 61869-9 sampled values are supported
- Provides flexibility for digital substation architectures
- Future-proof investment, easier migration to fully digital substations

Precise time synchronization

- IEEE 1588 v2 Precision Time Protocol (PTP) with power and utility profiles provides accurate timing for protection and control
- Improved system reliability, reduced risk of misoperations
- Simple Network Time Protocol (SNTP) also supported when microsecond accuracy is not needed.

Robust hardware design with conformal coating

- Protects electronics against moisture, dust, and corrosive environments
- Longer equipment lifespan, reduced maintenance costs

Protection and control REX600

Product overview

PROTECTION AND CONTROL UNIT FOR DIGITAL SUBSTATIONS



Extensive protection capabilities

- Directional and non-directional overcurrent protection
- Directional and non-directional earth-fault protection
- Residual overvoltage protection
- Multifrequency admittance-based earth-fault protection (MFA)
- Over- and undervoltage protection
- Frequency protection
- Current based fault passage indicator

... and measurement functions

- 3-phase measurements for current, voltage, power and energy
- Sequence current measurement
- Residual current measurement
- Sequence voltage measurement
- Residual voltage measurement
- Frequency measurement

Protection and control REX600

Product overview

PROTECTION AND CONTROL UNIT FOR DIGITAL SUBSTATIONS



Control functions

- Circuit-breaker control
- Disconnecter control and indication
- Earthing switch control and indication

Logging functions

- Fault recorder with max. 128 records
- Disturbance recorder with max. 250 records

Communication functions

- IEC 61850-8-1 MMS
- IEC 61850-7-2 GOOSE Edition 2.1
- IEC 61850-9-2LE or IEC 61869-9 sampled values (Sampled values protocol is selected with PCM600 Application Configuration Tool)

Other functions:

- Programmable LEDs (WHMI and Local HMI)
- Logic functions, timers, generic control points etc.

Merging unit functionality

Comparison



REX600



SMU615

Feature	SMU615	REX600
Compatibility	IEC 61850, ed.1/ed.2	IEC 61850, ed.2 IEC 61869-13 (Stand-Alone Merging Unit)
Backup protection	Not available	Overcurrent, earth-fault, over-and undervoltage, frequency, multifrequency admittance-based earth-fault, current-based fault passage indicator
Control	Through MMS: breaker, disconnector and earthing switch	Through WHMI and MMS: breaker, disconnector and earthing switch
Size (W x H x D), mm	177 x 177 (4U) x 201	91 x 133 (3U) x 100
Mounting	Withdrawable plug-in unit	DIN-rail
Sampled values standard	IEC 61850-9-2 LE	IEC 61869-9 IEC 61850-9-2 LE
HMI	Web browser-based interface for configuration and monitoring	Web browser-based interface for configuration, monitoring and control
Sensor compatibility	Current: Rogowski or conventional current transformer (CT) Voltage: Resistive or capacitive voltage divider or conventional voltage transformer (VT)	Current: Rogowski and low-power current transformer Voltage: Resistive or capacitive voltage divider
Cyber security	FTPS, HTTPS, Role Based Access management, audit trail with 2048 events	FTPS, HTTPS Role Based Access management Audit trail with 2048 events Secure boot and signed firmware Designed to fulfill IEC 62443-4-2 Security Level 1

03

CYBER SECURITY



Cyber security

Fulfilling Defense-in-Depth (DiD)¹ strategy



REX600 complies with the following standards

- IEC 62443-4-1 outlines secure development practices
- IEC 62443-4-2 defines Security Level 1 for device security



Secure firmware updates

- Secure boot verifies firmware authenticity and integrity, ensuring that only verified ABB-signed software operates



Secure communication and event logging

- File transfers and the Web HMI utilize Transport Layer Security (TLS) encryption, along with FTPS and HTTPS protocols. A file system integrity check ensures that data remains uncorrupted and unaltered.
- Security event logging provides traceability (up to 2048 events) and accountability, helping detect unauthorized changes or suspicious activity



Role-Based Access Control (RBAC)

- Enhances security by limiting access to only those users who have the appropriate role
- Simplifies user management and auditing



Password-protected access for engineering tools and HMIs

- Prevents unauthorized use and manipulation of interfaces and engineering tools

1. Defense in Depth is a cybersecurity strategy that uses multilayered security controls to protect systems and data. It protects communication channels, secures system updates, controls user access and monitors and logs activity.

O4

APPLICATIONS

Applications

Suitable for both primary and secondary applications



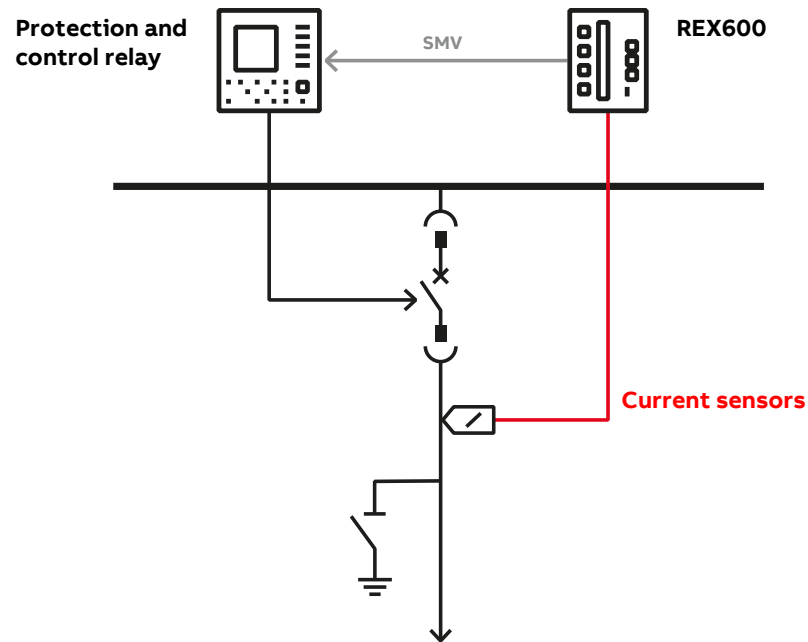
REX600 provides the physical interface between the primary equipment in the switchgear and SSC600 i.e. REX600 acts as a Process Interface Unit (PIU)



For secondary substations REX600 provides fault passage indication and protection functions.

Applications

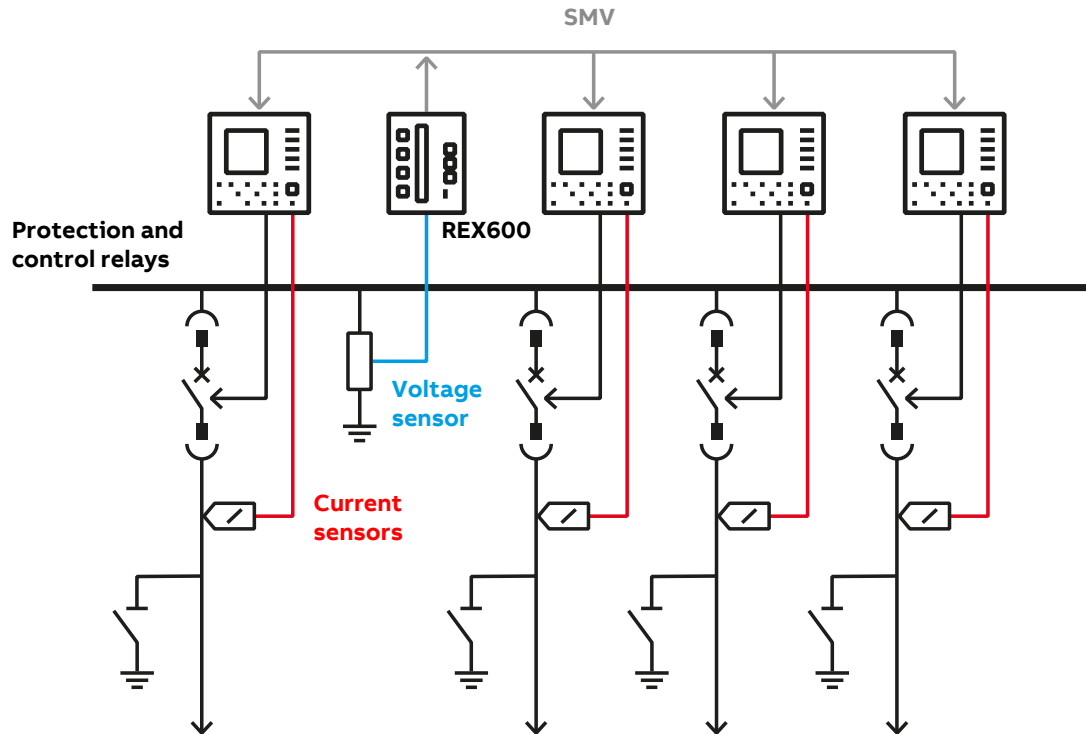
REX600 sending current measurements as sampled measured values to a protection relay



- REX600 measures the feeder currents using sensors and sends the data forward as Sampled Measured Values (SMVs) over Ethernet
- The protection relay on the same feeder receives the SMVs over Ethernet and uses them for protection purposes

Applications

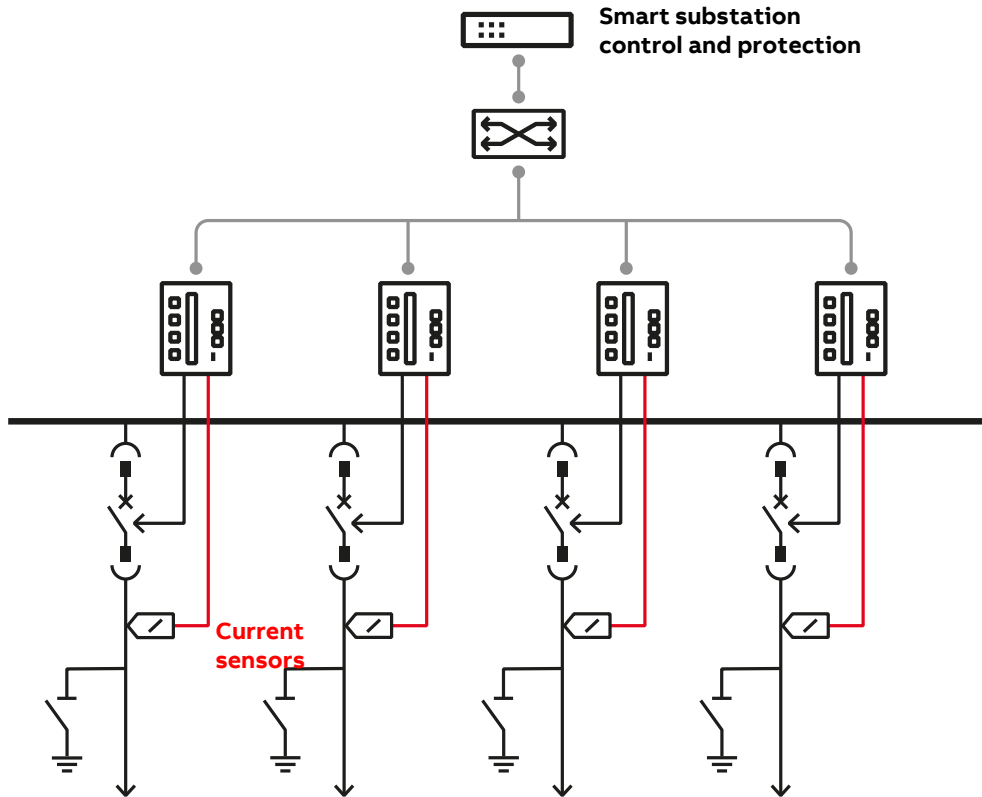
REX600 sending voltage measurements as sampled measured values to protection relays



- REX600 measures the voltages in the substation and sends the data forward as Sampled Measured Values (SMVs) over Ethernet
- Protection relays with phase voltage-based functions receive the values and use them instead of the physically measured voltages from voltage transformers or voltage sensors

Applications

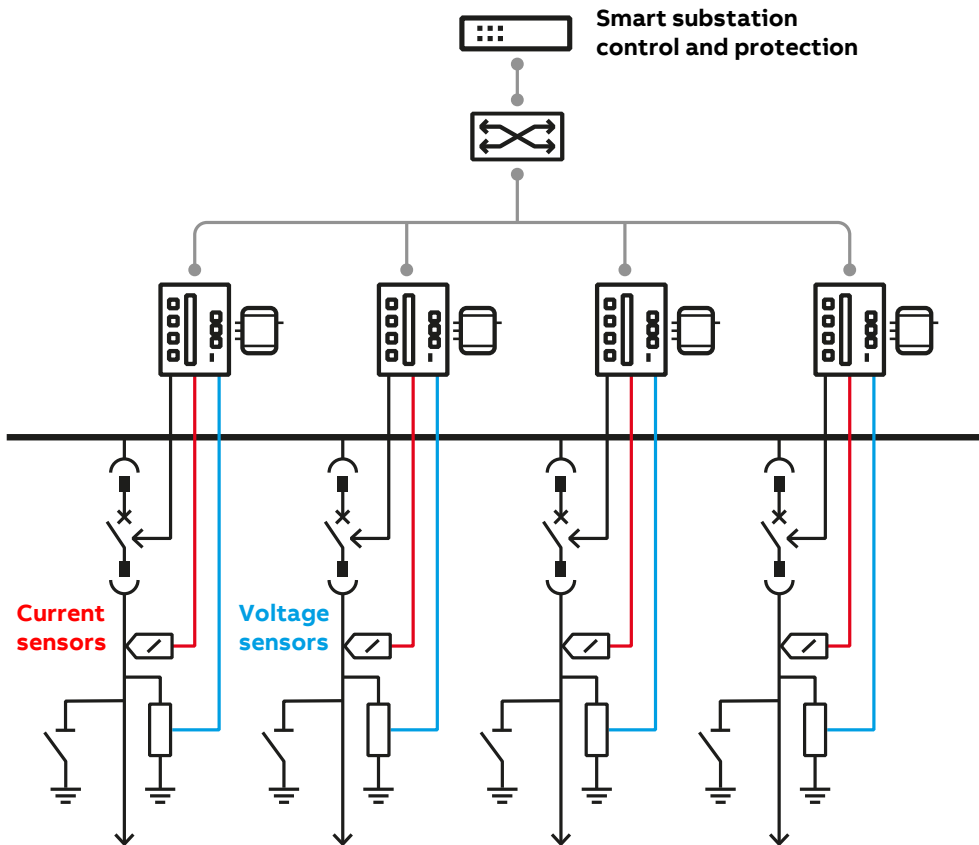
Smart substation control and protection SSC600 with REX600



- REX600 devices measure the feeder currents in the substation and send the data as Sampled Measured Values (SMVs) over the Ethernet
- The centralized protection device in the substation receives the SMVs from each REX600 over the Ethernet and use these values for the protection of each feeder
- REX600 offers the physical interface to the switchgear primary equipment, that is, circuit breaker, disconnector and earthing switch which are accessible via REX600 with GOOSE (Generic Object-Oriented Substation Event) communication

Applications

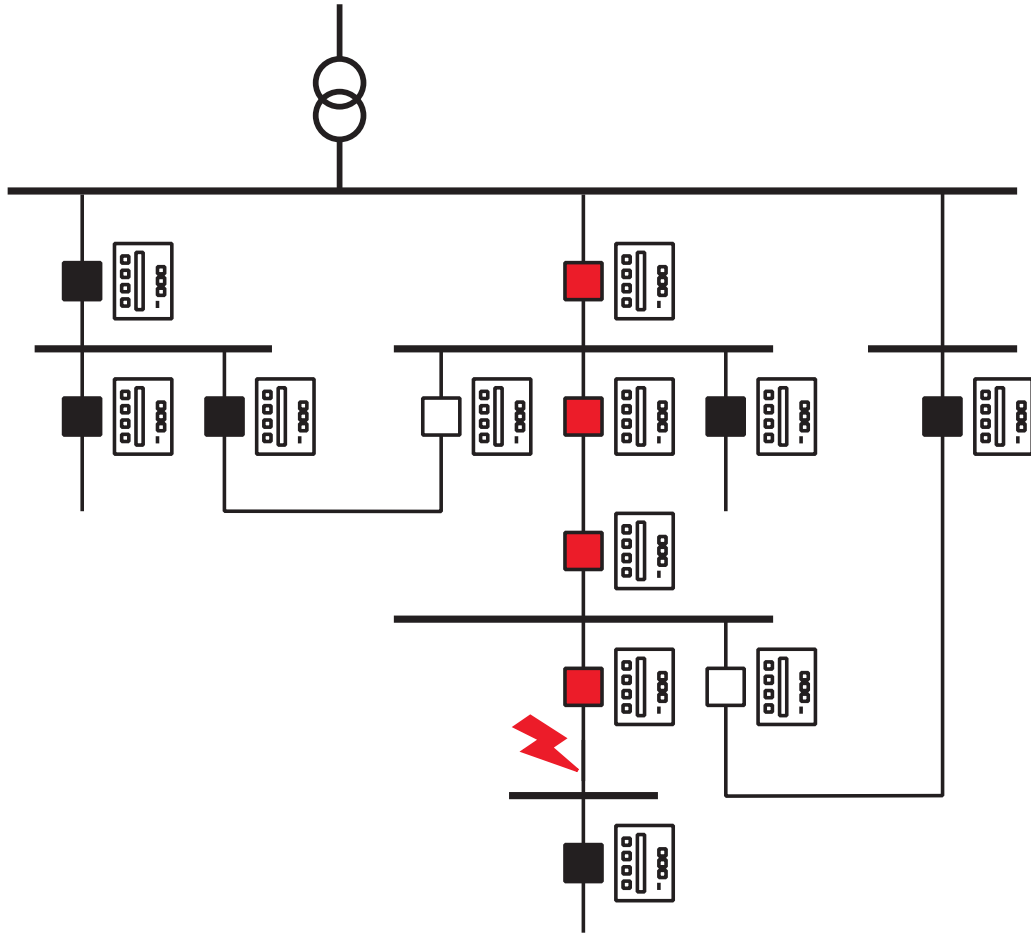
Back-up protection with REX600



- REX600 devices measure the feeder currents and voltage in the busbar and send the data as Sampled Measured Values (SMVs) over the Ethernet
- The centralized protection device in the substation receives the SMVs from each REX600 over the Ethernet and use these values for the protection of each feeder
- REX600 offers the physical interface to the switchgear primary equipment
- If communication between SSC600 and REX600 is comprised due e.g. Ethernet switch failure, then REX600 backup protection will take care of protection and control

Applications

Advanced fault passage indication with REX600



- Fault passage indicator is used to detect a fault downstream of the line
- REX600 can be used for advanced fault passage indication, reporting the information further to the upper-level system for faster fault restoration
- By applying ABB's unique, multifrequency admittance-based earth-fault detection (MFA) or fault passage indication algorithm based on current measurements, REX600 is able to detect all types of earth faults with unequalled accuracy, irrespective of the type of distribution network

05

**HUMAN-MACHINE
INTERFACE**

WebHMI

Secure access via Web browser



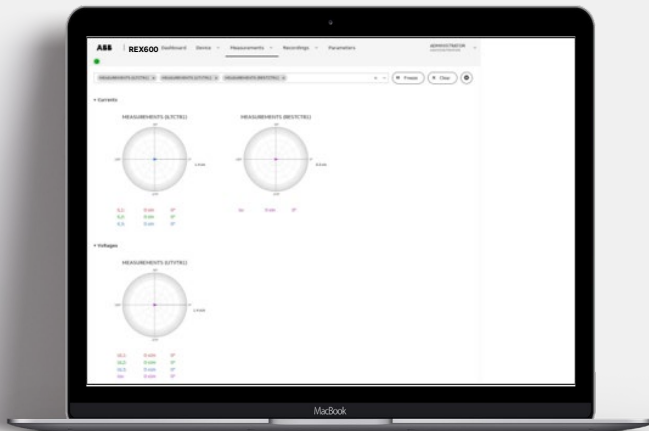
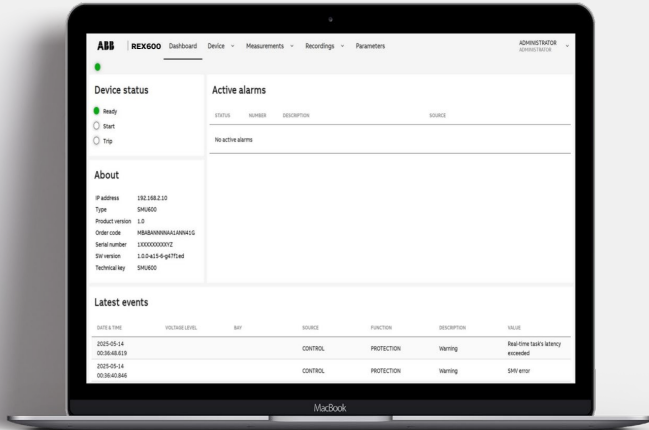
User interface features

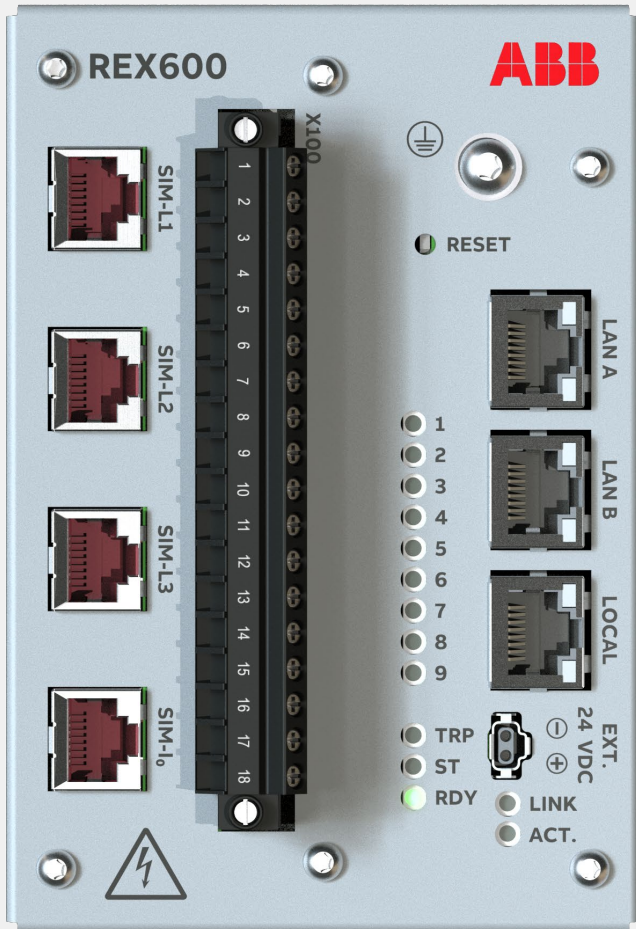
- User interface functionality with menu navigation and view
- User-configurable single line diagram (SLD) includes position indication and control functionality for primary equipment
- Displays related measuring values
- Editable via Graphical Display Editor in PCM600



WHMI Functionalities

- Programmable LEDs view and event lists
- System supervision
- Parameter settings
- Disturbance records
- Fault records
- Phasor diagram
- Single line diagram (SLD)
- Importing/exporting parameters
- Report summary
- Device self-supervision





Local HMI

Simple LED indications

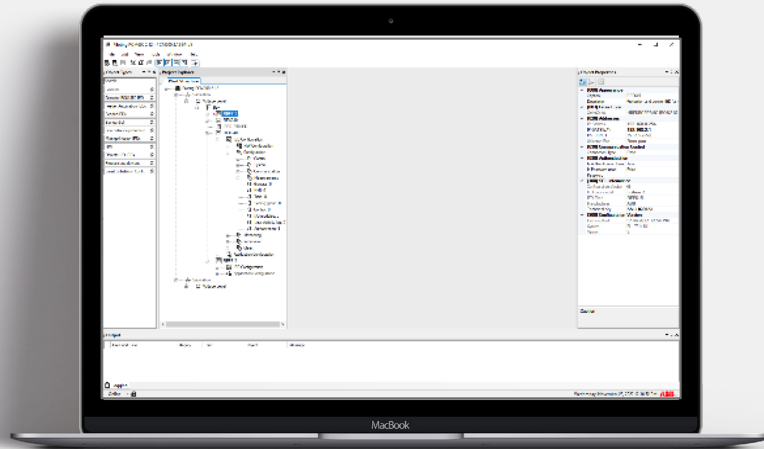


Front panel of the device includes

- Three protection indicators:
 - Ready (RDY)
 - Start (ST)
 - Trip (TRP)
- 9 freely programmable LEDs with status text on WebHMI
- Communication activity LEDs
- Reset button for restarting the device

06

TOOLS



Tools

Configuration and setting tool PCM600

PCM600 contains all the necessary tools to manage REX600.

Tools	Version
PCM600	2.14 or later
Web browser	Google Chrome Mozilla Firefox Microsoft Edge
REX600 Connectivity Package	1.0 or later

- Application configuration
- Device parameter setting
- Programmable LED configuration
- Device signal configuration (Signal Matrix)
- Signal monitoring
- Saving of device parameter settings in the tool
- Firmware updates
- Event viewing
- Disturbance recorder handling
- Disturbance record analysis
- XRIO parameter export/import
- Graphical display configuration
- IEC 61850 (GOOSE and process bus) communication configuration
- Access control management
- Saving of event data on the user's PC
- Online monitoring

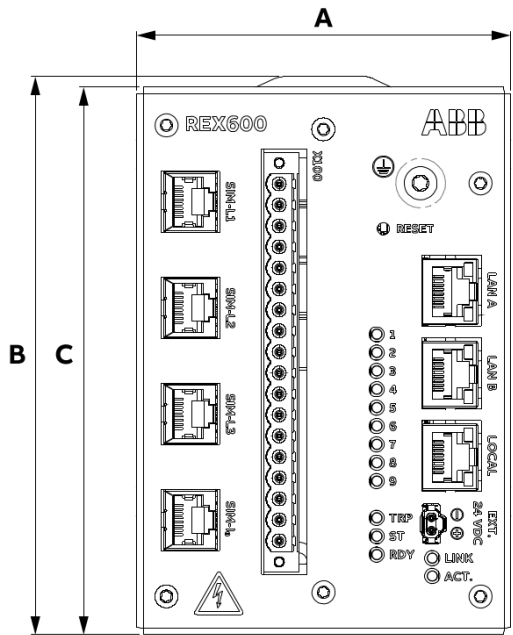
GOOSE = Generic Object-Oriented Substation Event

07

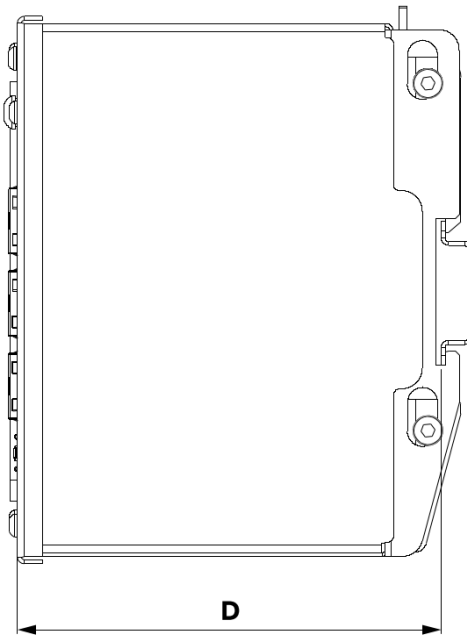
TECHNICAL DATA

Technical data

REX600 1.0



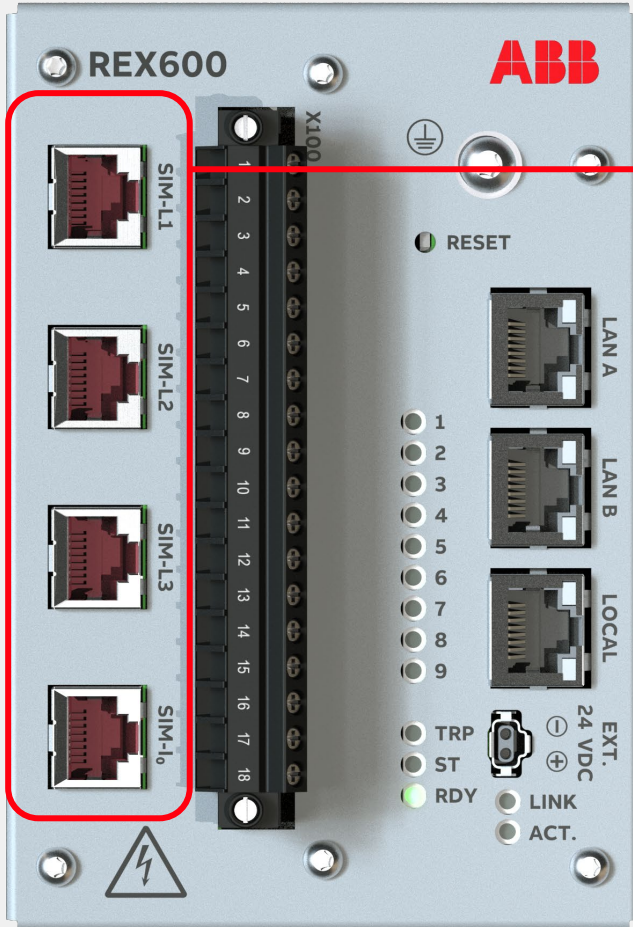
A 90.5 mm
B 135 mm



C 132.5 mm
D 102 mm

Dimensions

Width	91 mm
Height	133 mm (137 mm)
Depth	100 mm
Weight	0.850 kg
Uaux	24 VDC
Power consumption	Pq <4W / operating <6W
Degree of protection	IP20, front side IP30, other sides
Operating temperature range	-25...+55 °C / -40...+70 °C (<16h)



Technical data

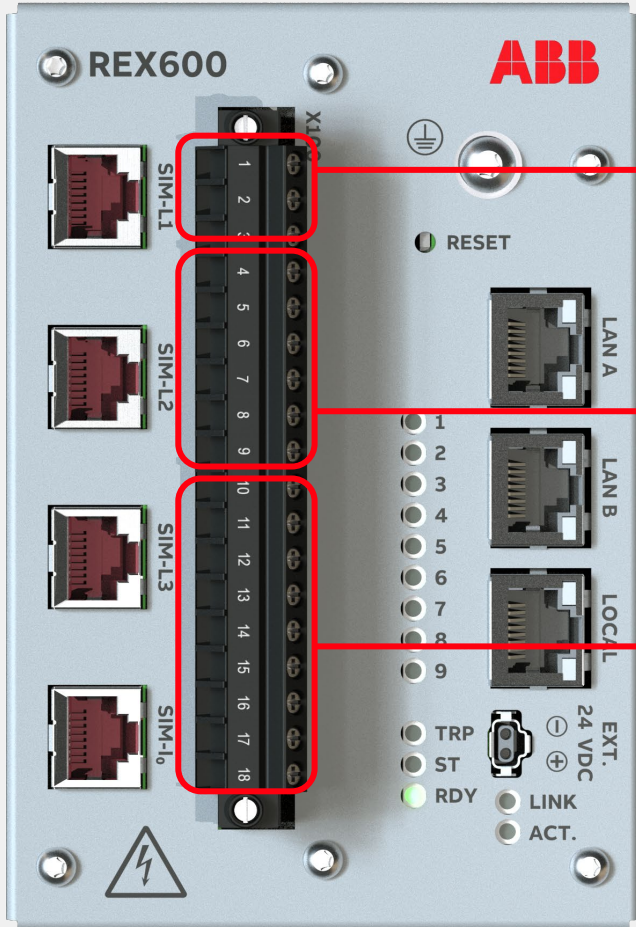
REX600 1.0

Energizing inputs

Supports low-power passive current transformers (LPCT) which have output signal proportional to the primary current or Rogowski coil current sensors which have output proportional to the derivate of the primary current.

Connector: RJ-45 according to IEC 61869-6 and IEC 61869-10

Description	Value
Current (IL1, IL2, IL3, I ₀)	<ul style="list-style-type: none"> Rated input voltage, Rogowski: 75 mV...9000 mV Rated input voltage, LPCT: 85 mV...3860 mV Accuracy class: 0,5 / 2TPM
Voltage (UL1, UL2, UL3)	<ul style="list-style-type: none"> Rated input voltage: 346 mV...2339 mV Accuracy class: 0.5 Fv: 1,9
Input impedance at 50/60 Hz	2 MΩ, 50 pF



Technical data

REX600 1.0

• Self-supervision contact

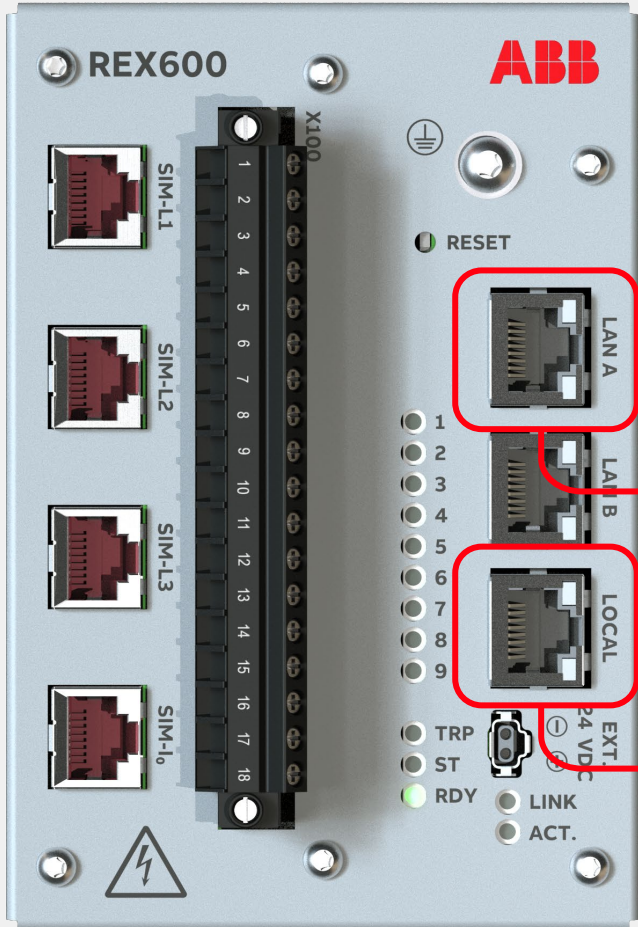
Description	Value
Make and carry (cont./3 sec./0.5 sec.)	5A / 10A / 15A

• 3 x signal output with high make and carry

Description	Value
Make and carry (cont./3 sec./0.5 sec.)	5A / 15A / 30A

• 6 x binary inputs in 2 groups

Description	Value
Nominal range (Un)	24...250 VDC
Programmable threshold range	16...176 VDC
Oxide burn functionality	Included



Technical data

REX600 1.0

Communication

Description	Value
<ul style="list-style-type: none"> Station and process communication 	LAN A: RJ-45, 100M, galvanic
<ul style="list-style-type: none"> Local port for WebHMI and PCM600 	LOCAL; RJ-45, 100M, galvanic

08

ORDERING

Ordering



Ordering **REX600** version 1.0

- One hardware
- Connector and power cable included
- Conformal coating included



Software options

- Option N: Merging Unit with control, measurement, monitoring, logging and logic functions (default option and always included)
- Option A: Merging Unit with control, measurement, monitoring, logging and logic functions **and** basic backup protection
- Option B: Merging Unit with control, measurement, monitoring, logging and logic functions **and** basic backup protection **and** multifrequency admittance-based earth-fault protection + current based fault passage indicator

Three application examples are included as Application Configuration Templates into PCM600 connectivity package

For ordering and configuring, use the same **ABB Relays-Online** as for other medium-voltage protection devices:

[Link](#)

Modification sales



REX600 version 1.0

- Modification sales is a process that enables changes to the functionality of a REX600 unit after it has been delivered from the factory.
- These sales orders provide the same flexibility as the original order. In the current release, modification sales apply to functional application ordering options.
- Modification sales is available for the asset owners and their delegated service providers. ABB Service can also make the necessary modifications even for turnkey deliveries.

For ordering and configuring, use the same **ABB Relays-Online** as for other medium-voltage protection devices:

[Link](#)

Ordering

Extensive life cycle services for optimal usability



Firmware updates can be accessed via ABB's e-business platform, **ABB Relays-Online**.



Training

- Engineering
- Operation
- Maintenance



Maintenance

- Spare parts and devices
- Repair
- Preventive maintenance



Customer support

- Product and application documentation
- Knowledgebase
- Technical support



Modernization

- Modifications and upgrades
- Replacements
- Recycling

09

SUMMARY

Protection and control REX600



ONE DEVICE WITH **SEVERAL** APPLICATIONS

Introducing a compact, secure and cost-efficient protection and control device with merging unit functionality and backup protection. Seamless integration with ABB's centralized protection solution, SSC600, for reliable protection and control in utility and industrial substations.

- **Freely configurable** protection, control and measurement functions for a variety of applications
- Current based fault passage indication for secondary **substation applications**
- Supports the latest sampled value standards and merging unit standards for **interoperability in digital substations**
- **Improved cyber security** with secure boot - verifying firmware authenticity and integrity
- **DIN-rail mounting and compact design** for convenient installation and maintenance

ABB