



ELECTRIFICATION SERVICE

Relay Retrofit Program for SPACOM to REX610

Presentation

Relay Retrofit Program for SPACOM to REX610

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Introduction

Introduction

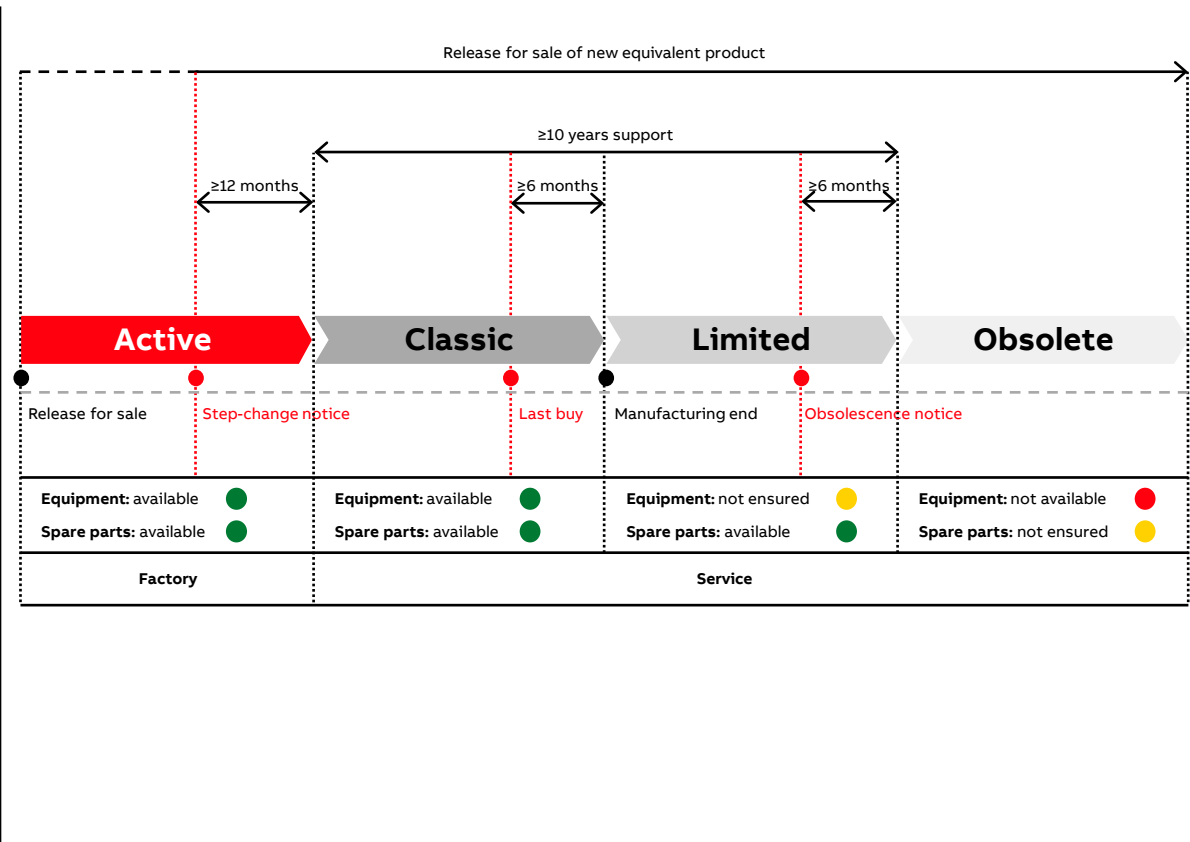
Life-cycle management

ABB offers full support for all medium-voltage protection and control relays throughout their entire life cycle.

Our extensive portfolio of life-cycle services ensures safe, reliable, durable and cost-effective protection solutions with predictable maintenance costs.

The portfolio also allows easy adaption to changing protection requirements.

ABB's life-cycle services ensure smooth and easy asset management throughout the entire product life cycle, with optimal return on your investments as a result.



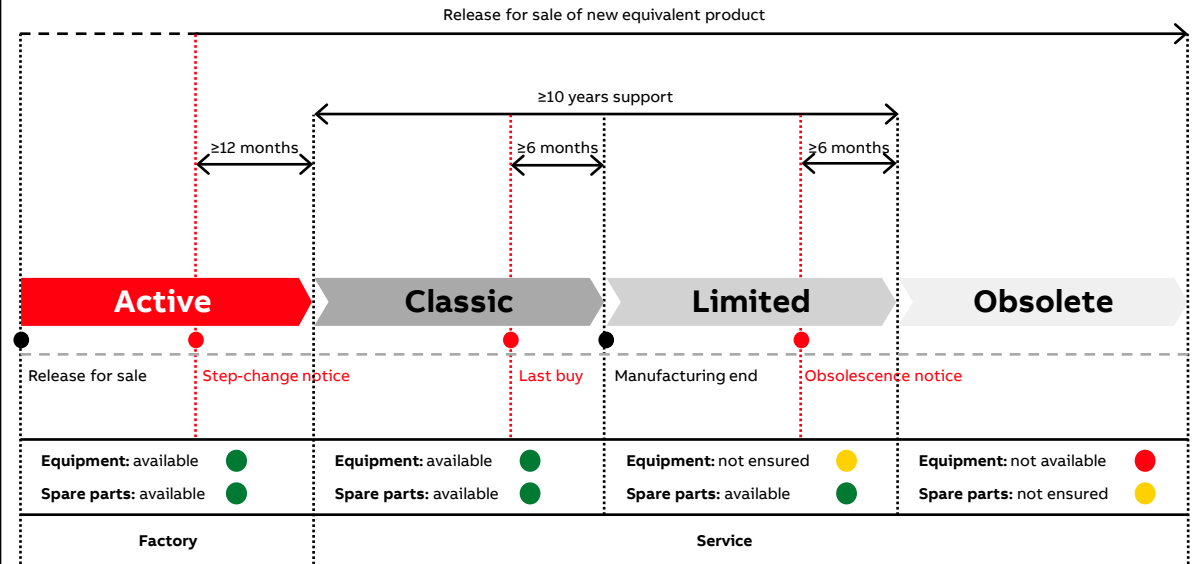
Introduction

Product life cycle

Over 700,000 SPACOM relays installed worldwide, dating back to the 1980's.

The SPACOM relay types* selected for the Relay Retrofit Program for SPACOM to REX610 are either in the Classic stage or in the Limited stage with reduced availability of life-cycle services:

- SPAJ 110 C (Limited)
- SPAJ 111 C (Limited)
- SPAJ 131 C (Limited)
- SPAJ 135 C (Limited)
- SPAJ 140 C (Classic)
- SPAJ 141 C (Classic)
- SPAJ 142 C (Classic)
- SPAJ 144 C (Classic)
- SPAU 110 C (Limited)
- SPAU 121 C (Limited)
- SPAU 130 C (Limited)
- SPAS 120 C (Limited)
- SPAM 150 C (Classic)



Customer benefits

Relay Retrofit Program for SPACOM to REX610

Customer benefits

Relay Retrofit Program for SPACOM to REX610 (1/2)

- Controlled and repeatable procedure for replacing selected SPACOM relays with the new all-in-one protection and control relay REX610
- Complete program for successful and timely scheduled execution of retrofit projects – saving time and money
- Fast and easy installation due to same cutout dimensions and no major new wiring – minimizing downtime
- Enhanced personnel safety with access to the latest protection and control functionality



Customer benefits

Relay Retrofit Program for SPACOM to REX610 (2/2)

- Benefit of the latest software developments
- Extended switchgear lifetime with new protection relay and technology
- Future-proof protection solution with IEC 61850 standard-based REX610 relays
- Assured, future availability of life cycle services





Protection and control REX610

Protection and control REX610

Overview

Replacement relay REX610

- Freely configurable all-in-one protection relay covering the full range of basic utility and industrial applications
- Small number of variants for easy ordering, set up, use and maintenance – and easy to keep in store
- Plug-and-play solution with fully modular hardware unlocking all available functionality
- Extensive range of default functionality, including communication, for easy alteration
- IEC 61850-compliant communication and interoperability between substation automation devices
- Continuous access to new developments via firmware updates
- Extensive life cycle services for safe, reliable and cost-effective protection solutions
- Latest addition to ABB's renowned Relion® protection and control family relays



Protection and control REX610

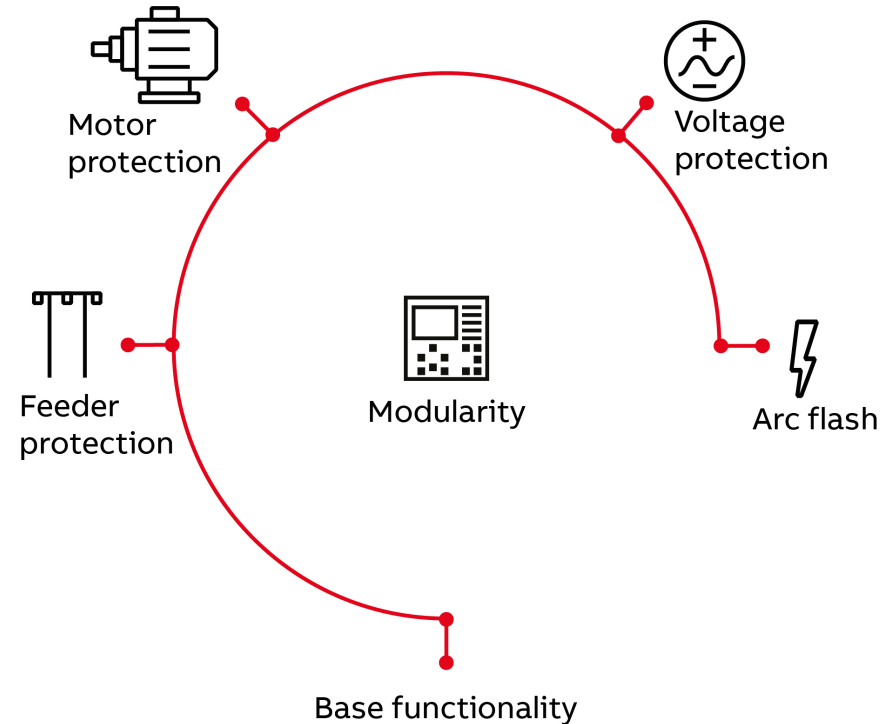
All-in-one protection for any basic power distribution application (1/4)

Rich in functionality – covering the full range of basic utility and industrial applications requiring:

- Feeder protection
- Voltage protection
- Motor protection

Extensive range of default functionality, including communication, covering:

- Protection
- Control
- Condition monitoring and supervision
- Measurements
- Logging
- Communication



Protection and control REX610

All-in-one protection for any basic power distribution application (2/4)

Base functionality

Control functionality

- Circuit-breaker control (1 object, 52)
- Disconnecter position indication (29DS)
- Earthing switch position indication (29GS)
- Auto-reclosing (79)
- Synchronism and energizing check (25)

Condition monitoring and supervision

- Trip circuit supervision (TCM)
- Fuse failure supervision (VCM, 60)
- Circuit-breaker condition monitoring (52CM)
- Current circuit supervision (CCM)

Logging functions

- Disturbance recorder (DR)
 - Analog channels (1..8) + binary channels (1...32)

Communication

IEC 61850-8-1 MMS (Manufacturing message specification)

IEC 61850-8-1 GOOSE (General Object Oriented Substation Event)

Modbus protocol

Measurements

Three-phase current measurement

Residual current measurement

Sequence current measurement

Three-phase voltage measurement

Residual voltage measurement

Frequency measurement

Sequence voltage measurement

Three-phase power and energy measurement

Protection and control REX610

All-in-one protection for any basic power distribution application (3/4)

Protection functionality

- | | |
|---|--|
| <ul style="list-style-type: none">– Three-phase non-directional/directional overcurrent protection (50, 51, 67)– Non-directional/directional earth-fault protection (50N, 51N, 67N)– Three-phase thermal protection for feeders, cables and distribution transformers (49F)– Negative-sequence overcurrent protection (46M)– Phase discontinuity protection (46PD)– Phase undercurrent protection (37)– Three-phase under/overvoltage protection (27, 59)– Residual overvoltage protection (59N)– Multipurpose protection (MAP) | <ul style="list-style-type: none">– Arc protection (AFD)– Frequency protection (81)– Motor load jam protection (50TDJAM)– Loss-of-load supervision (37)– Thermal overload protection for motors (49M)– Negative-sequence overcurrent protection for machines (46M)– Negative-sequence overvoltage protection (59NS)– Phase reversal protection (46R)– Positive-sequence undervoltage protection (27PS)– Motor start-up supervision (49, 66, 48, 50TDLR) |
|---|--|

Protection and control REX610

All-in-one protection for any basic power distribution application (4/4)

Protection functionality

- Three-phase inrush detector (68HB)
- Circuit breaker failure protection (50BF)
- Master trip (94/86)
- Emergency start-up (EST, 62)

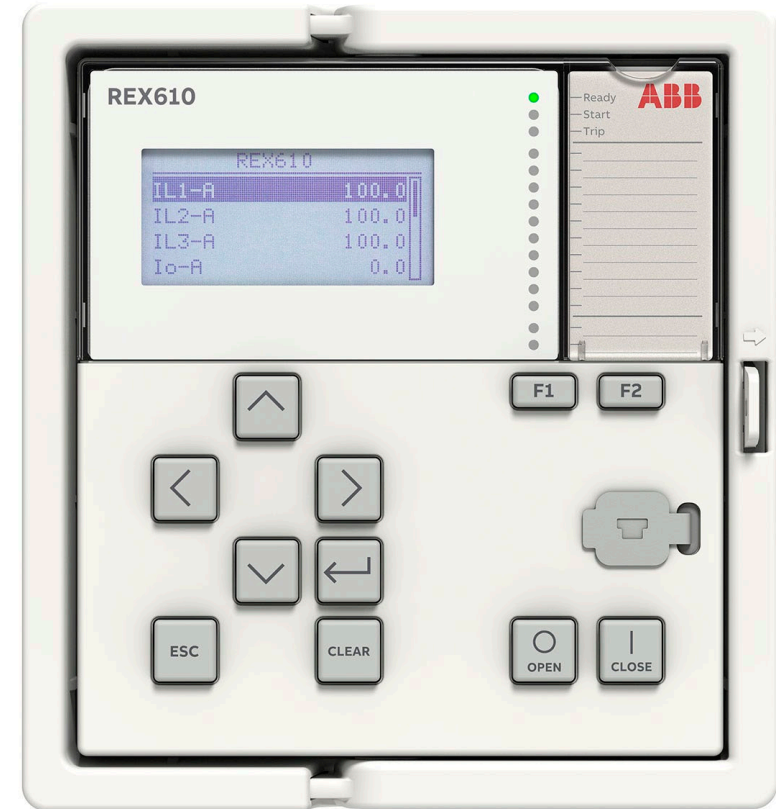


Protection and control REX610

Local human-machine interface

Easy-to-use local human-machine interface (LHMI) for setting, monitoring and controlling the REX610 relay

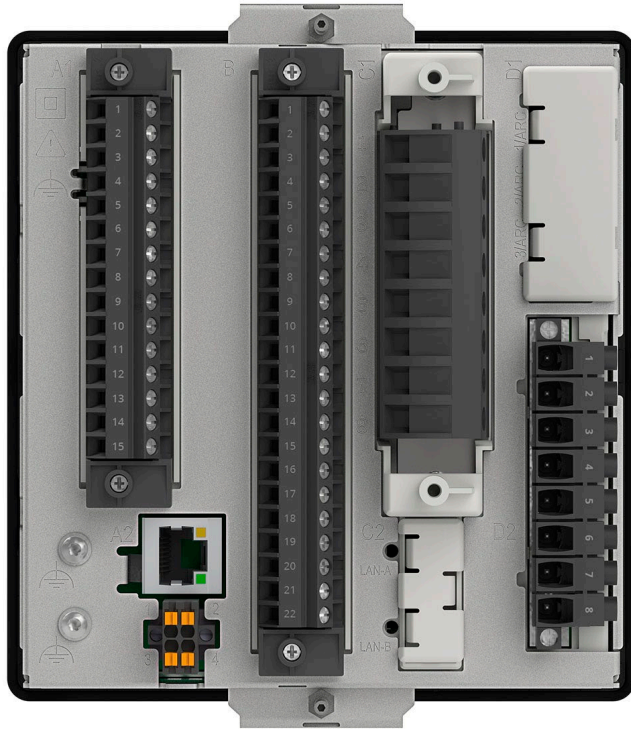
- Graphical display to allow multiple language support
- 3 indicator LEDs (light-emitting diode): Ready, Start and Trip
- 10 programmable LEDs and 2 programmable function keys that can be configured using PCM600
- 9 push buttons for:
 - Navigating the menu
 - Giving open and close commands to primary circuit objects, such as circuit breakers (CB)
 - Acknowledging alarms and resetting indications
- Front USB port for connecting the relay to a PC
 - Easy retrieval of information, such as disturbance recordings, without any additional software
 - Allows powering the relay if the substation is down



Protection and control REX610

Hardware

Rear view



Default hardware

- Universal power supply (24-250VDC/48-240VAC, 50/60 Hz)
- 6 binary inputs (AC/DC), 6 binary outputs and 1 internal relay fault output (extension module for more I/Os coming soon)
- RS-485, RJ45 and USB communication ports (redundant communication coming soon)
- Micro SD (Secure Digital) memory card slot

Optional hardware

- 4 current transformers, either of ring-lug or compression type
- 4 voltage transformers of compression type
- 3 arc sensor inputs

Program overview

Relay Retrofit Program for SPACOM to REX610

Program overview

Program description (1/2)

Smooth and controlled replacement of selected SPACOM protection relays with the latest addition to the Relion® relay family, the all-in-one protection and control relay REX610, representing the latest protection and control technology

All necessary installation accessories and tools (software and hardware) included for a successful and timely scheduled execution of retrofit projects

Replacement relays delivered with prewired terminals for minimized rewiring and updating of existing schematic drawings

Downtime of production or power distribution processes reduced to a bare minimum



Program overview

Program description (2/2)

Entire replacement process supported – from engineering, through installation, to testing of the relay:

- Always included
 - REX610 replacement relay with retrofit adapter set
 - Documentation
- Optional
 - Configuration template for replacement relay
- On demand
 - ABB Ability™ Backup Management for electrical systems, Data Care
 - Relion® BIO-Tester 610-611-615-620 (for testing of stand-alone REX610 relay)
 - Training





Engineering

Engineering

Selected SPACOM relays and REX610 replacement relay

Relay to be retrofitted	Replacement relay order code
SPAJ 110 C	REX6101GA#####
SPAJ 111 C	REX6101GA#####
SPAJ 131 C	REX6101GA#####
SPAJ 135 C	REX6101GA#####
SPAJ 140 C	REX6101GA#####
SPAJ 141 C	REX6101GA#####
SPAJ 142 C	REX6101GA#####
SPAJ 144 C	REX6101GA#####
SPAU 110 C	REX6101G#B#####
SPAU 121 C	REX6101G#B#####
SPAU 130 C	REX6101G#B#####
SPAS 120 C	REX6101GAB#####
SPAM 150 C (NO)	REX6101GA#####
SPAM 150 C (NC)	REX6101GA#####



Customization of application-specific configurations

Easy tailoring of the configuration to meet application-specific requirements using PCM600 – ABB's IEC 61850-compliant relay setting and configuration tool

- Possibility to create multi-layer logics using the graphical application tool in PCM600 – ACT (Application Configuration Tool)

- ## Freely configurable binary inputs and outputs and analog inputs



Engineering

Configuration templates

Configuration templates and setting parameter guidelines make it fast and easy to process the parameters of the existing relay and map them to the selected replacement relay.

The configuration template defines the configuration of the replacement relay based on the functionality of the existing selected SPACOM relay.

Relay to be retrofitted	Configuration template
SPAJ 110 C	SPAJ110C_RRP_REX610_Vx.apcmi
SPAJ 111 C	SPAJ111C_RRP_REX610_Vx.apcmi
SPAJ 131 C	SPAJ131C_RRP_REX610_Vx.apcmi
SPAJ 135 C	SPAJ135C_RRP_REX610_Vx.apcmi
SPAJ 140 C	SPAJ140C_RRP_REX610_Vx.apcmi
SPAJ 141 C	SPAJ141C_RRP_REX610_Vx.apcmi
SPAJ 142 C	SPAJ142C_RRP_REX610_Vx.apcmi
SPAJ 144 C	SPAJ144C_RRP_REX610_Vx.apcmi
SPAU 110 C	SPAU110C_RRP_REX610_Vx.apcmi
SPAU 121 C	SPAU121C_RRP_REX610_Vx.apcmi
SPAU 130 C	SPAU130C_RRP_REX610_Vx.apcmi
SPAS 120 C	SPAS120C_RRP_REX610_Vx.apcmi
SPAM 150 C (NO)	SPAM150CNO_RRP_REX610_Vx.apcmi
SPAM 150 C (NC)	SPAM150CNC_RRP_REX610_Vx.apcmi



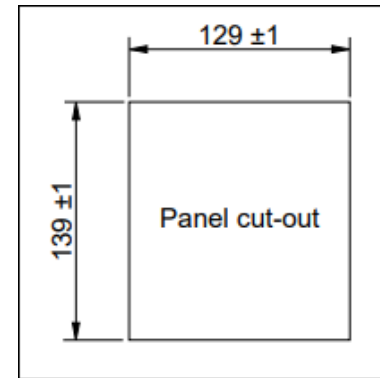
Mounting and installation

Mounting and installation

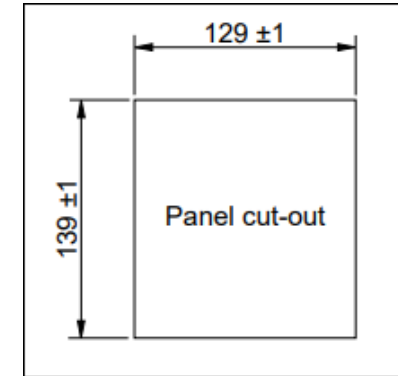
Panel cutout of SPACOM and REX610 relays

Identical panel cut-out dimensions of selected SPACOM relays to be retrofitted and replacement relay REX610 for fast and easy replacement

No need for additional cutting tools or equipment



Selected SPACOM relay panel cut-out



REX610 panel cut-out



Mounting and installation

Retrofit adapter set with prewired terminals

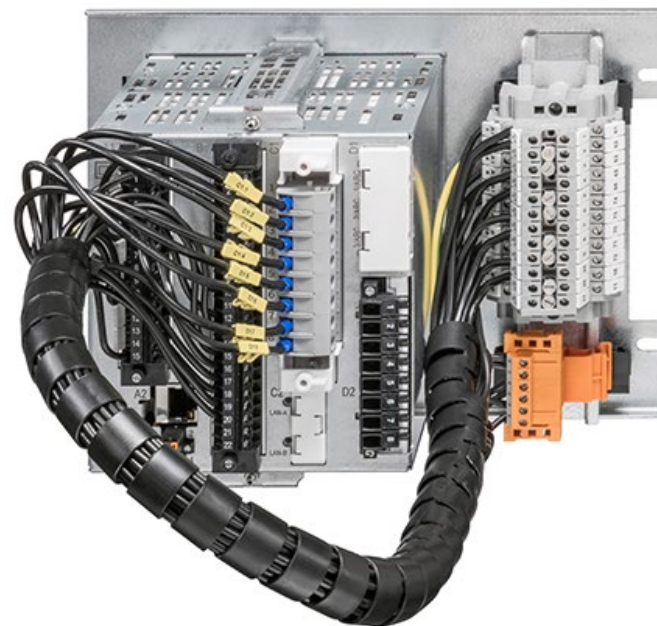
The prewired terminals of REX610 correspond to the terminals of the selected SPACOM relay.

Prewired terminals minimize the need for rewiring and updating of existing schematic drawings.

The secondary wiring of the selected SPACOM relays can be removed and reused for the corresponding terminals of the retrofit adapter set.

The retrofit adapter set allows installation of prewired terminals in all possible directions (left, right, up and down) depending on the amount of space in the relay compartment door.

The instrument transformers (CTs and VTs) are prewired for quick installation but the wiring can also be removed and manually connected to the corresponding terminals of the replacement relay.



Retrofit adapter set
(terminal view)



SPACOM (terminal view)



Testing

Testing

Relion® BIO-Tester 610-611-615-620

Easy simulation and testing

Specifically developed for testing the binary inputs and outputs of stand-alone REX610 protection relay

Fast and easy simulation throughout the relay's entire life cycle – from design and commissioning, through periodic maintenance, to modifications and replacement

- Simulation during the engineering of the application configuration, including troubleshooting
- Testing the operation of inputs and outputs during routine maintenance and testing





Support and ordering

Support and ordering

Extensive life cycle services for optimal usability

Full support from start to finish

Wide variety of life cycle services to ensure safe, reliable and cost-effective protection solutions with predictable maintenance costs – for the entire lifetime of the relay:

- Training
- Customer support
- Maintenance
- Modernization

ABB Ability™ Backup Management for electrical systems, Data Care – available as an optional add-on

- Web-based data-sharing and backup service
- Secure storing and easy sharing of technical information on your protection relays – online
- Easy access to firmware updates with the relay serial number



Support and ordering

Available from the Electrification Service center

The Relay Retrofit Program for SPACOM to REX610 is available through your local ABB.

The customer will be requested to provide technical information prior to quotation.

The delivery time is quoted case by case.

For more information on relay retrofit and downloadable related documentation, visit the [Retrofits](#) page.

Visit our [Services for distribution protection and control relays](#) page for information on other life cycle services.



Summary

Summary

Relay Retrofit Program for SPACOM to REX610

Easy modernization of protection and control systems

Tailor-made retrofit program to allow smooth replacement of SPACOM with REX610 relays

- Identical cut-out for fast and easy replacement
- Access to the latest protection and control technology
- Possibility to adapt the power protection system to meet new requirements
- Full availability of relay life cycle services
- Extended switchgear lifetime



ABB