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# Relay Retrofit Program for SPACOM to REX610

## Product Guide



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## 1. Description

ABB's life cycle extension initiative is aimed at supporting the life cycle management (LCM) of utility and industrial power distribution systems. One strategic consideration of the LCM of a power system is to extend the life cycle of a switchgear panel through retrofit programs targeted at selected switchgear equipment. A timely executed retrofit program for selected devices allows full utilization of the life cycle of the remaining switchgear components.

ABB's Relay Retrofit Program for SPACOM offers smooth and controlled replacement of selected SPACOM protection relays with the all-in-one protection relay REX610, representing the latest protection and control technology.

The result is extended switchgear lifetime, full availability of relay life cycle services, and the possibility to adapt the power protection system to meet the new requirements.

In addition to the REX610 replacement relay, the Relay Retrofit Program for selected SPACOM relay types offers all the necessary accessories and hardware and software tools needed for a successful and timely scheduled execution of retrofit projects. To minimize the need for rewiring and updating the existing schematic drawings, the relays come with pre-wired terminals. This complete package ensures that the downtime of production or power distribution processes is reduced to a bare minimum.

## 2. Existing SPACOM relays and replacement relay REX610

The selection of replacement relays for the existing SPACOM series relays has been carefully considered based on expert knowledge of the previous product generations and recent developments in protection and control technology. The selected replacement relay types belong to the Relion® family and their functionality corresponds to that of the selected SPACOM series relays. In addition, the REX610 offers the possibility to expand the functionality of the power protection system further, for example, by adding an optional protection, control and condition monitoring features. The REX610 relays are characterized by their compactness and withdrawable unit design.

The Relay Retrofit Program for replacing SPACOM with REX610 relays supports the entire replacement process – from engineering, through installation, to testing of the relay – and covers:

- 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 stand-alone REX610 relay)
  - Training

Re-engineered from the ground up, the Relion® family REX610 relays have been designed to unleash the full potential of the IEC 61850 standard for communication and interoperability between the substation automation devices. The REX610 relays support a range of communication protocols, including IEC 61850-8-1 MMS, IEC 61850-8-1 GOOSE and Modbus.

## Relay Retrofit Program for SPACOM to REX610

Table 1. SPACOM relay types and replacement relay REX610 order code

SPACOM relay type to be retrofitted	Replacement relay REX610 order code <sup>3)</sup>
SPAJ 110 C <sup>1)</sup>	REX6101GA#####
SPAJ 111 C <sup>2)</sup>	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#####

- 1) SPAJ110 (SPCJ1C8) high-set stage earth-fault protection function (I<sub>o</sub>>) is not fully compatible with REX610. EFxPTOC -function blocks don't have built in an automatic doubling feature. For multiplication, an INRPBAR -function blocking is needed, therefore at least one of the phase current inputs must be connected in series with the I<sub>o</sub>-input. Note! INRPBAR blocking is based on 2nd harmonic.
- 2) SPAJ111 (SPCJ1C7) low-set stage earth-fault protection function (I<sub>o</sub>>) is not fully compatible with REX610. The lowest setting value for SPAJ111 is 0.2 %In, the lowest setting value for REX610 (EFLPTOC) is 1.0 %In.
- 3) The order code for a replacement relay REX610 includes a fixed part in capital letters and a non-fixed part in hashes (#). The non-fixed part can be freely selected when ordering a REX610 relay.

### 3. Replacement relay engineering

Relay Retrofit Program for SPACOM to REX610 supports twelve configuration templates corresponding to the selected SPACOM relays' standard configurations, and their default settings are available for the REX610 protection and control relay. The configuration templates are available after ordering Relay Retrofit Program for selected SPACOM relays.

- SPAJ110C\_RRP\_REX610\_Vx.pcmi
- SPAJ111C\_RRP\_REX610\_Vx.pcmi
- SPAJ131C\_RRP\_REX610\_Vx.pcmi
- SPAJ135C\_RRP\_REX610\_Vx.pcmi
- SPAJ140C\_RRP\_REX610\_Vx.pcmi
- SPAJ141C\_RRP\_REX610\_Vx.pcmi
- SPAJ142C\_RRP\_REX610\_Vx.pcmi
- SPAJ144C\_RRP\_REX610\_Vx.pcmi
- SPAU110C\_RRP\_REX610\_Vx.pcmi
- SPAU121C\_RRP\_REX610\_Vx.pcmi
- SPAU130C\_RRP\_REX610\_Vx.pcmi
- SPAS120C\_RRP\_REX610\_Vx.pcmi

The standard configuration parameter settings can be read from SPACOM relays by using CAP 505 configuration tool. With the Protection and Control IED Manager PCM600, the configuration templates can be used while replacing the selected SPACOM relay with a corresponding REX610 protection and control relay.

The template defines the configuration equivalent to the SPACOM relay standard configuration. Thus, using a template results in a default configuration equivalent to the SPACOM relay, with the exception of parameter settings and communication configuration. REX610 relays are delivered from the factory as per own standard default configuration and are typically re-configured by using Relay Retrofit Program configuration templates when taken into use in place of SPACOM relay.

Depending on the specific application, the appropriate functionality can be selected and own configurations can be created with Application Configuration in PCM600. Functions that are not configured in templates but are supported by REX610 standard configurations can be engineered separately depending on the application requirement. This custom template can be saved and used in other similar applications. Default configurations, connections for binary inputs, binary outputs, function-to-function connections and alarm LEDs are described in the REX610 protection and control relay manuals.

All binary input and output contacts are freely configurable with the signal matrix or the application configuration functionality of PCM600. The default parameter setting values can be changed from the front panel user interface (local HMI) or PCM600 in combination with the relay-specific connectivity package.

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**Relay Retrofit Program for SPACOM to REX610**


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#### 4. Installation accessories

The deliverables of Relay Retrofit Program for SPACOM to REX610 comprise the REX610 replacement relay with retrofit adapter set. A retrofit adapter set consists of mounting assembly with pre-wired terminals.

The pre-wired terminal set is marked on the top based on the existing SPACOM relay terminal numbers. This is done so that the user can remove secondary wires from the existing SPACOM relay and just connect the same on the corresponding terminal of the pre-wired terminal sets. Instrument transformers' (CTs and VTs) wiring is also pre-wired but the user can decide to disconnect it at site and connect it directly to the REX610 relay.

#### 5. Selection and ordering data

The deliverables of Relay Retrofit Program for SPACOM to REX610 can be ordered from the local ABB representative. It always includes REX610 protection and control relay with the retrofit adapter set.

The replacement relay order code should be defined when ordering Relay Retrofit Program for SPACOM to REX610. The order code identifies the relay type as REX610 and consists of a string of letters and digits generated from the relays' hardware and software modules. The latest relevant information on the REX610 protection and control relays is available on the product page. Use ABB Library to access the selection and ordering information and to generate the order number.

Relay retrofit adapter set can be installed with the same mounting arrangement as the one for REX610.

Since the mechanical dimensions of SPACOM and REX610 are the same, there is no need for cutting. REX610 can be installed in the same place as SPACOM without modifying the panel door. The installation is a very time efficient process where the users do not need to refer to any manuals or change any existing schematic drawings.

[Product Selection Tool](#) (PST), a Next-Generation Order Number Tool, supports order code creation for ABB Digital Substation Products (IEC) with the emphasis on, but not exclusively for, the Relion product family. PST is an easy-to-use online tool always containing the latest product information. The complete order code can be created with detailed specification and the result can be printed and mailed. Registration is required.

Parts under warranty and accessories can be ordered separately from the local ABB representative.

## Relay Retrofit Program for SPACOM to REX610



Figure 1. SPACOM and REX610 with retrofit adapter set

Table 2. Order codes for Relay Retrofit Program for SPACOM to REX610

SPACOM relay type to be retrofitted	Order code for Relay Retrofit Program for SPACOM to REX610
SPAJ 110 C	RRPSPAJ110CREX610
SPAJ 111 C	RRPSPAJ111CREX610
SPAJ 131 C	RRPSPAJ131CREX610
SPAJ 135 C	RRPSPAJ135CREX610
SPAJ 140 C	RRPSPAJ140CREX610
SPAJ 141 C	RRPSPAJ141CREX610
SPAJ 142 C	RRPSPAJ142CREX610
SPAJ 144 C	RRPSPAJ144CREX610
SPAU 110 C	RRPSPAU110CREX610
SPAU 121 C	RRPSPAU121CREX610
SPAU 130 C	RRPSPAU130CREX610
SPAS 120 C	RRPSPAS120CREX610

## Relay Retrofit Program for SPACOM to REX610

Table 3. Order codes for parts and accessories for warranty purposes only

Item	Description	Order code
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ110CREX610	1VFR100521A0001
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ111CREX610	1VFR100521A0002
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ131CREX610	1VFR100521A0003
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ135CREX610	1VFR100521A0004
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ140CREX610	1VFR100521A0005
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ141CREX610	1VFR100521A0006
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ142CREX610	1VFR100521A0007
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAJ144CREX610	1VFR100521A0008
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAU110CREX610	1VFR100521A0010
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAU121CREX610	1VFR100521A0011
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAU130CREX610	1VFR100521A0012
Relay retrofit adapter set without REX610 relay	Retrofit Adapter Set_RRPSPAS120CREX610	1VFR100521A0009

## 6. Training

A one-day training course for Relay Retrofit Program can be organized upon request in the Distribution Solutions training center. The aim of the course is to introduce the tools and equipment used in the program. The course also provides practical information on how to effectively carry out relay retrofit projects. For additional information, please visit the [training page](#).

## 7. References

The [www.abb.com/mediumvoltage](http://www.abb.com/mediumvoltage) portal provides information on the entire range of digital substation products and services. The latest information on Relay Retrofit Program and Solutions is found on the [Retrofits](#) page. Scroll down the page to find and download the related documentation.

## 8. Document revision history

Document revision/date	History
A/2022-03-28	First release



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