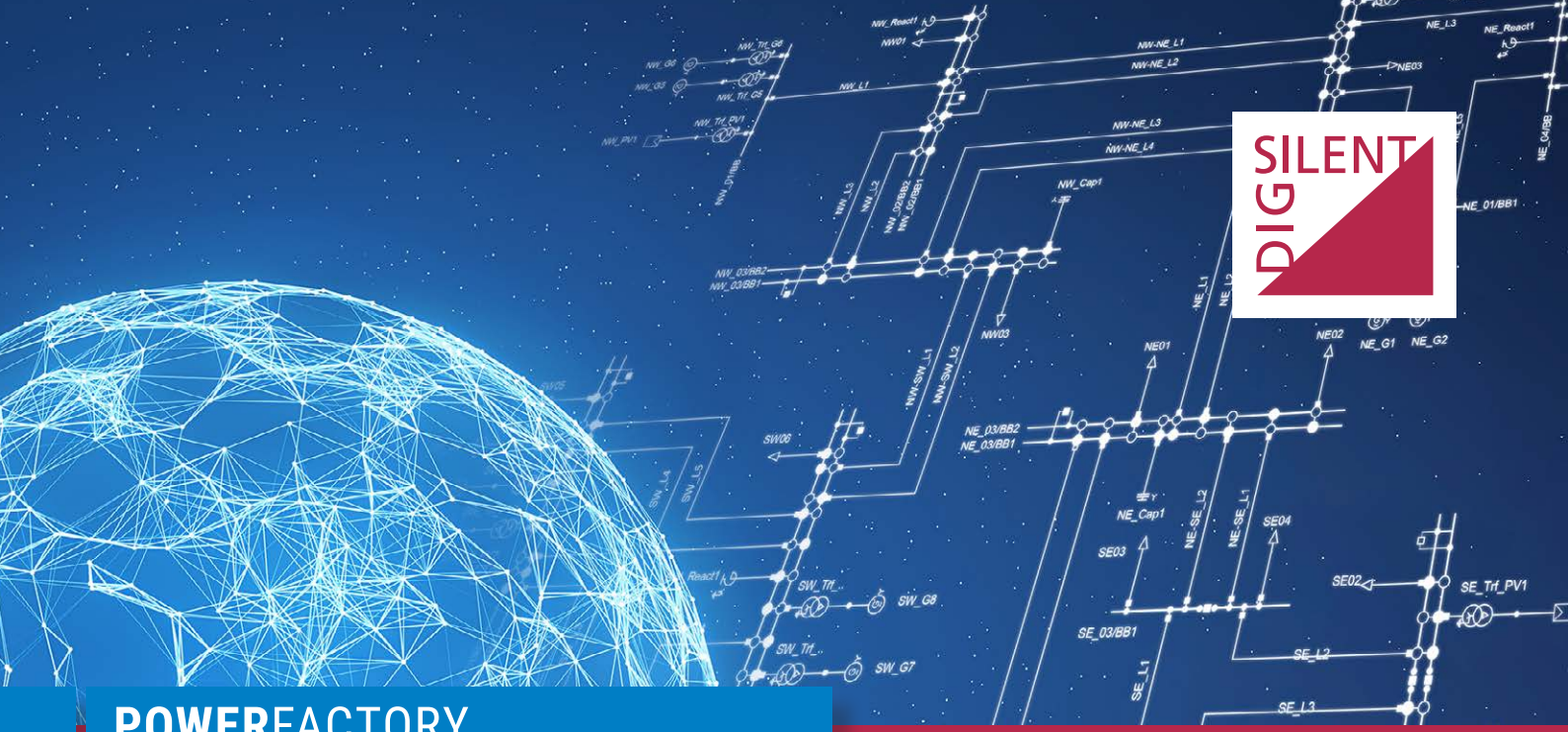

PowerFactory 2021

Technical Reference

ABB RXIG

PF2021

POWER SYSTEM SOLUTIONS

MADE IN GERMANY

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November 15, 2019
PowerFactory 2021
Revision 924

Contents

1 Model information

Manufacturer ABB

Model RXIG

Variants This family of PowerFactory relay model types simulates the following overcurrent relays manufactured by ABB:

- RXIG 21
- RXIG 22
- RXIG 28

2 General description

The ABB RXIG protective relays are static non directional ac overcurrent devices. Two- and three-phase, instantaneous and definite time delayed versions are available for use as short-circuit protection on all type of objects. Single-phase, definite time delayed assemblies are used as earth fault protection for unearthed, high ohmic earthed or directly earthed systems, when definite time delay is required.

For the user convenience the relevant PowerFactory ABB RXIG relay models have been implemented including a 3 phase time defined overcurrent element which can be used to mock a set of 3 RXIG devices. Moreover some relay models have been implemented with a single phase time defined overcurrent element which can be used to simulate a single RXIG device. The ABB RXIG family of PowerFactory relay models consists of models using three different schemes:

- *IOC RXIG 3/2Ph* scheme type: One 3 phase time defined element(”Ioc”) which can be used to model 3 phases or 2 phases assemblies
- *IOC-1ph RXIG* scheme type: One single phase time defined element(”Ioc”) which can be used to model one single RXIG used for phase overcurrent protection
- *IOC-Earth RXIG* scheme type: One single phase time defined element(”Ioc”) which can be used to model one single RXIG used for earth overcurrent protection

These relays have been manufactured for decades and many sub type have been delivered. The PowerFactory relay library cannot cover all subtypes manufactured during the long life of the ABB RXIG relays but a large set of subtype is available.

The PowerFactory ABB RXIG relay model type names have the following structure: <type name>(i.e. ”RXIG 21”) + ”-” + ”<range ID> (i.e. ”DK”) + ”/” + ”<RAIG ID>” (i.e. ”RAIG1”)
Please notice that the overcurrent protections RAIG are built-up based upon the overcurrent relay RXIG 2x.

They following PowerFactory relay model types can be found at \Library\Relays\Relays\Overcurrent Relays\ABB/Westinghouse\RX\RXIG arranged in two directories hosting the earth (”Earth Relays” directory) and the 3/2 phases relay (”Phase Relays” directory) models:

- Earth Relays
  - RXIG 21-DK/RAIG1 (scheme type:IOC-Earth RXIG)
  - RXIG 21-DL/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DA/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DB/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DC/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DD/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DE/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DF/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DG/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 21/22-DH/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 28-DD/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 28-DE/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 28-DF/RAIG1 (scheme type: IOC-Earth RXIG)
  - RXIG 28-DG/RAIG1 (scheme type: IOC-Earth RXIG)
- Phase Relays
  - RXIG 21-DK/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21-DK/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21-DL/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21-DL/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DA/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DA/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DB/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DB/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DC/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DC/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DD/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DD/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DE/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DE/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DF/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DF/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DG/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DG/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 21/22-DH/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 21/22-DH/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 28-DD/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 28-DD/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 28-DE/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 28-DE/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)
  - RXIG 28-DF/RAIG1 (scheme type: IOC-1ph RXIG)
  - RXIG 28-DF/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)

- RXIG 28-DG/RAIG1 (scheme type: IOC-1ph RXIG)
- RXIG 28-DG/RAIG3/2 (scheme type: IOC RXIG 3/2Ph)

Please notice that different relay models using the same scheme type (i.e. ”RXIG 28-DD/RAIG1” and ”RXIG 28-DF/RAIG1”) have the same type of protective elements with different setting ranges.

The model implementation has been based on the information available in the relay documentation [1]

3 Supported features

3.1 Measurement and acquisition

It represents the interface between the power system and the relay protective element. The currents flowing in the power system are converted by an element simulating a 3 phase CT or a single phase CT.

3.1.1 Available Units

***IOC RXIG 3/2Ph* scheme**

- one 3ph current transformer (”Ct” block)
- one 3phases measurement element (”Measure” block)

***IOC-Earth RXIG* and *IOC-1ph RXIG* scheme**

- one single phase current transformer (”Ct” block in the ”IOC-Earth RXIG” scheme, ”Ct-1p” block in the ”IOC-1ph RXIG” scheme)
- one single phase measurement element (”Measure” block)

3.1.2 Functionality

The ”Ct” and the ”Ct-1P” block represent ideal CTs. Using the CT default configuration the current at the primary side are converted to the secondary side using the CT ratio. The CT saturation and/or its magnetizing characteristic are not considered. Please set the ”Detailed Model” check box in the ”Detailed Data”” tab page of the CT dialog and insert the data regarding the CT burden, the CT secondary resistance and the CT excitation parameter if more accurate simulation results are required.

The measurement block simulate a second order low pass analog filter with DC component filter; its time constant is 1 ms.

3.1.3 Data input

No user input is required

3.2 Protective elements

A time defined overcurrent element is modeling the relay protective function.

3.2.1 Available Units

- *IOC RXIG 3/2Ph* scheme type
  - one 3 phases time defined overcurrent element(”I>” block)
- *IOC-1ph RXIG* scheme type
  - one single phase time defined overcurrent element(”I>” block)
- *IOC-Earth RXIG* scheme type
  - one earth current time defined overcurrent element(”I>” block)

3.2.2 Functionality

Each protective relay of the ABB RXIG family supports an unique time defined tripping characteristic.

The protective element (”I>” block) can be disabled using the ”iblock” relay input signal.

3.2.3 Data input

The relationships between the relay settings and the model parameters can be found in the following table:

Address	Relay Setting	Model block	Model setting	Note
	Set Value Time Delay	I> I>	Pickup Current Time Setting	

3.3 Output logic

It represents the output stage of the relay; it’s the interface between the relay and the power breaker.

3.3.1 Available Units

- one output logic element (”Logic” block)

3.3.2 Functionality

The ”Logic” block is getting the trip signal coming from the time defined protective element and is operating the power circuit breaker and the relay output contact. The output contact is named ”yout”.

3.3.3 Data input

No user input is required. To disable the relay model ability to open the power circuit breaker simply disable the ”Logic” block.

4 Features not supported

The following features are not supported:

- Multiple output contacts

5 References

[1] ABB Automation Products AB, Substation Automation Division, SE-721 59 Vasteras, Sweden. *Overcurrent relay and protection RXIG 2 and RAIG 1MRK 509 010-BEN Issued: December 1999*, 1998.