PowerFactory 2021

Technical Reference

ABB RXIDG 21H

PF2021

Contents

1 Model information

Manufacturer   ABB

Model   RXIDG 21H

Variants   The PowerFactory ABB RXIDG 21H relay model types simulates the RXIDG 21H and the RXIDG 2H relay manufactured by ABB.

2 General description

The ABB RXIDG 21H protective relay is a static single phase time-overcurrent relay with unique logarithmic inverse time characteristic. The inverse time characteristic has been selected to give a selective trip when used as earth fault protection relays in solidly earthed networks. A binary input to enable or block the operation is available.

The relevant PowerFactory ABB RXIDG 21H relay model has been implemented using a single phase inverse time overcurrent element.

The *RXIDG 21H* PowerFactory relay model type can be found at \Library\Relays\Relays\Overcurrent Relays\ABB/Westinghouse\RX\RXIDG.

The model implementation has been based on the information available in the relay documentation [2] [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 three phase/single phase CT.

3.1.1 Available Units

- one phase current transformer ("Ct" block)

- one single phases measurement element ("Measurement" block)

3.1.2 Functionality

The "Ct" block represents an ideal CT. 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 simulates 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.

If no core CT is available please select a 3 phases CT in the "Ct" slot: the earth current will be calculated assuming that an Holmgreen's connection of the phases is used.

3.2 Protective elements

A single phase inverse time overcurrent element is modeling the relay protective function.

3.2.1 Available Units

- one single phase inverse time overcurrent element("I>" block)

3.2.2 Functionality

The inverse time overcurrent element supports the following trip characteristics:

- RXIDG Inverse Time K1
- RXIDG Inverse Time K2
- RXIDG Inverse Time K3
- RXIDG Inverse Time K4

In the ABB RXIDG 21H relay an unique logarithmic trip characteristic is present; in the Power-Factory ABB RXIDG 21H relay model the four characteristics listed above have been used to simulate the different operating levels available in the relay depending up on the setting of the K setting knob.

The characteristic minimum operating time is modeled using the characteristic time dial setting.

The inverse time 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 parameter	Note
	Basic current setting, I_a	I>	Current Setting	Current setting = $I_a * I_s$
	Scale constant, I_s	I>	Current Setting	Current setting = $I_a * I_s$
	Minimum operating time t_0	I>	Time Dial	
	K setting knob	I>	Characteristic	

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 from the inverse time overcurrent element ("I>" block) and is operating the associated breaker and the relay output contact 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:

- *switch t-t_0* (disabling the inverse time delay)

- no separated relay parameters are available for the *Basic current setting, I_a* and the *Scale constant, I_s* relay setting

- the *Current setting* parameter of the "I>" block doesn't provide a complete support of all available values of the *Basic current setting, I_a* and the *Scale constant, I_s* relay setting

5   References

[1] ABB Automation Products AB, Substation Automation Division, SE-721 59 Vasteras, Sweden. *RAIDK, RAIDG, RAPDK and RACIK Phase overcurrent and earth-fault protection assemblies based on single phase measuring elements User's Guide 1MRK 509 031-UEN Version 1 April 1999*, 1985.

[2] ABB Automation Products AB, Substation Automation Division, SE-721 59 Vasteras, Sweden. *Type RXIDF and RXIDG time-overcurrent relays and protection assemblies 1MDB09005-EN March 1992*, 1985.