PowerFactory 2021

Technical Reference

ABB RXIDF

Contents

1   Model information

Manufacturer   ABB

Model   RXIDF

Variants   The PowerFactory ABB RXIDF relay model types simulates the RXIDF relays assemblies manufactured by ABB.

2   General description

The ABB RXIDF protective relay is a static time overcurrent relay mainly used as short circuit and earth fault protection on all types of objects in the network. 10 standard relay assembly versions provide a choice of single, two, three or three-phase and ground instantaneous and time overcurrent protection.

For the user convenience the relevant PowerFactory ABB RXIDF relay model has been implemented including a 3 phase inverse time and a 3 phase time defined overcurrent element which can be used to mock a set of 3 RXIDF devices.

These relays have been manufactured for many years and many versions and assemblies have been delivered. The PowerFactory relay library provides at the moment an unique relay model; at the moment no single phase scheme is available in the library but other ABB RXIDF relay versions and assemblies can be inherited from the model available.

The *RXIDF 2H (0.2A-5A)* PowerFactory relay model types can be found at
\Library\Relays\Relays\Overcurrent Relays\ABB/Westinghouse\RX\RXIDF.

The model implementation has been based on the information available in the relay documentation [1] [2]

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.

3.1.1   Available Units

- one 3ph current transformer ("Ct" block)

- one 3phases 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

Please insert the relay "rated Current I_n" setting in the "Measurement" block "Nominal Current" model setting.

3.2   Protective elements

A 3 phase inverse time and a 3 phase time defined overcurrent element is modeling the relay protective functions.

3.2.1   Available Units

- one 3 phase inverse time overcurrent element("I> t" block)
- one 3 phase definite time overcurrent element("I>>" block)

3.2.2   Functionality

The inverse time overcurrent element supports the following trip characteristics:

- C1 Normal Inverse
- C2 Very Inverse
- C3 Extremely Inverse
- C4 Long Time Inverse
- RI Inverse
- Def. Time 0.1-2.2
- Def. Time 0.3-6.6

All the inverse characteristics available considering any relay version are available in the inverse time model block.Two definite time characteristics are available because different ABB RXIDF relay versions have different time ranges.

The inverse time protective element ("I> t" 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
	Starting operation	I> t	Current Setting	
	Time setting	I> t	Time Dial	
	Characteristic (Ordering No.)	I> t	Characteristic	
	Instantaneous operation	I>>	Pickup Current	
	Instantaneous time delay	I>>	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 combining with an "OR" boolean operator the trip signals coming from the inverse time and the time defined protective element and is operating the associated breaker and the relay output contact named "yout".
The following relay output signals are available as well and can be used for any control logic:

- StartToc (inverse time element starting signal)

- TripToc (inverse time element trip signal)

- TripIoc (definite time element trip signal)

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:

- Two phase and ground, single phase and 2 phase assemblies

- 0.1-4 Scale range for start

- Directional characteristic (together with RXPE 42)

5   References

[1] ABB Automation Products AB, Substation Automation Division, SE-721 59 Vasteras, Sweden. *AC time-overcurrent relay assemblies(RXIDF 2H) B03-2211 January 1989*, 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.