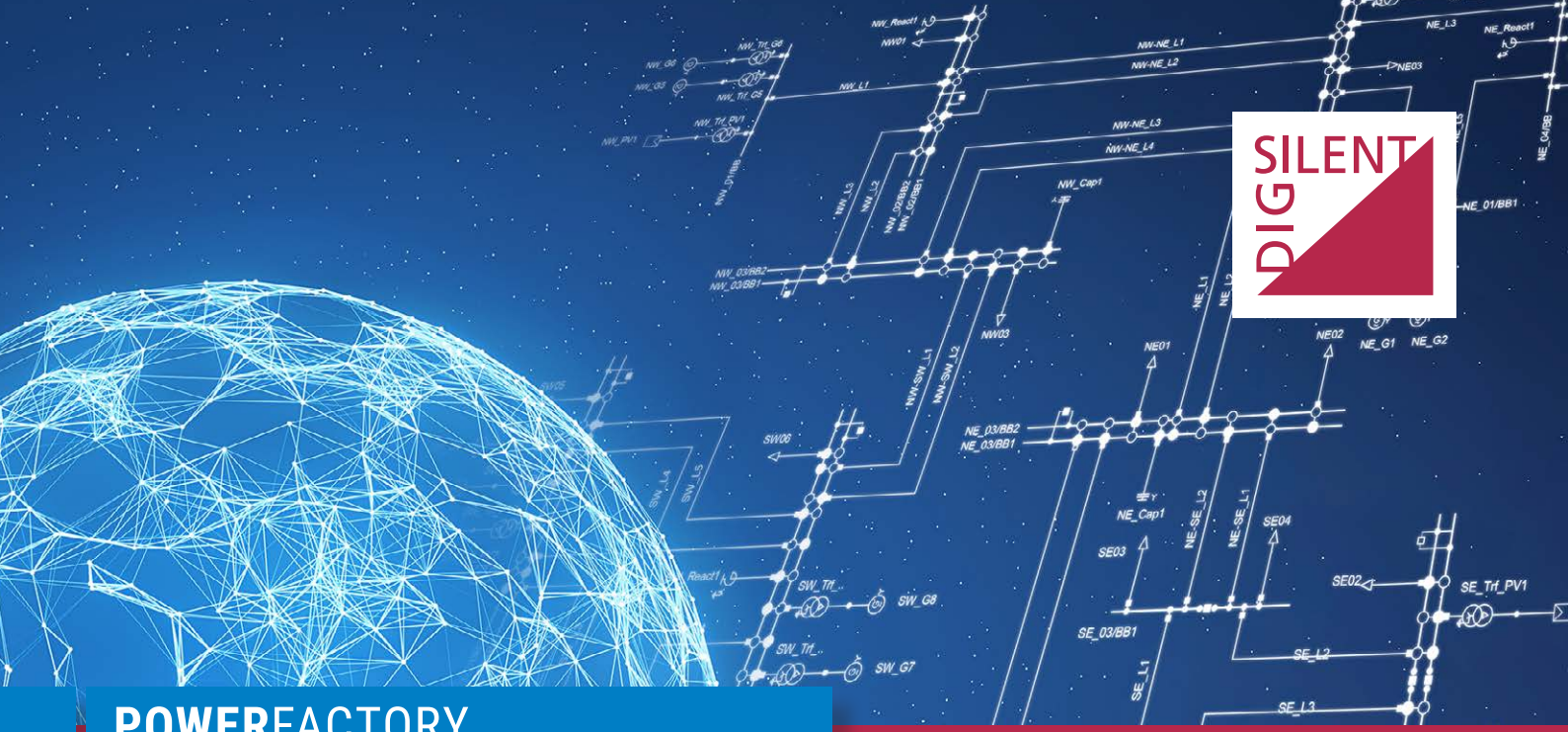

POWERFACTORY

PowerFactory 2021

Technical Reference

ABB REM 630

PF2021

POWER SYSTEM SOLUTIONS

MADE IN GERMANY

Publisher:
DIgSILENT GmbH
Heinrich-Hertz-Straße 9
72810 Gomaringen / Germany
Tel.: +49 (0) 7072-9168-0
Fax: +49 (0) 7072-9168-88
info@digsilent.de

Please visit our homepage at:
https://www.digsilent.de

November 26, 2019
PowerFactory 2021
Revision 938

Contents

Disclaimer

DIgSILENT protection device models are developed using publicly accessible information, such as user manuals, and are not validated or tested by the respective manufacturers.

1 Model information

Manufacturer ABB

Model REM 630

Variants The ABB REM 630 consists of one model for the pre-configurations A and supports the connection of both 1A and 5A current transformers. Pre-configuration B is not modelled, as the additional machine differential protection can not be adequately considered in PowerFactory and it's otherwise identical with pre-configuration A. Model parameters and pre-configurations were taken from [1] and [2].

Modelled Functionality

Functionality	REM 630
Three-phase non-directional overcurrent protection, low stage	X
Three-phase non-directional overcurrent protection, instantaneous stage	-
Non-directional earth-fault protection, low stage	X
Non-directional earth-fault protection, high stage	X
Negative-sequence overcurrent protection for motors	X
Phase reversal protection	-
Three-phase thermal overload protection for motors	-
Motor startup supervision	-
Motor load jam protection	-
Emergency start	-
Loss of load protection	X
Three-phase overvoltage protection	X
Three-phase undervoltage protection	X
Positive-sequence overvoltage protection	-
Positive-sequence undervoltage protection	-
Negative-sequence overvoltage protection	X

Per-Unit System

The per-unit system used in the models is the device per-unit system. If the reference system(s) specified in the device differ, recalculation of settings is necessary.

2 General description

The model consists of a main relay with several sub-functions:

- Main relay : Measurement transformer slots, measurement processing, breaker logics
- Overcurrent : Three-phase non-directional overcurrent protection
- Earth-fault : Non-directional earth-fault protection for feeders
- Loss of load : Loss of load protection
- Unbalance : Negative-sequence overcurrent protection for motors
- Under-Overvoltage : Under- and overvoltage protection

3 Main relay

Measurement transformers

The *"CT"* and *"VT"* slots hold the assigned 3-phase measurement transformers. The *"Ct-N"* slot contains a designated 1-phase current transformer connected to the neutral current.

Measurement units

The *"Measurement"* slots process the transformer input and hold the nominal current and voltage values. Please note that phase current and neutral current may have different rated values. The rated voltage *"VT"* of the relay must be entered in all units except *"Measurement Zero Seq"*.

Address	Relay Setting	Model Unit	Model Parameter	Note
CTsec1	Rated CT secondary current	Measurement Measurement Delta Measurement Seq	Nominal Current	
CTsec5	Rated CT secondary current	Measurement Zero Seq	Nominal Current	
VTsec7	Rated VT secondary voltage	Measurement Measurement Delta Measurement Seq	Nominal Voltage	

Breaker logics

The *"Out Logic"* hold the breaker and signal assignments for relay trips.

4 Overcurrent

The *"Overcurrent"* sub-function models three-phase non-directional overcurrent protection against single-phase, two-phase or three-phase short circuits. The response time characteristics of the protection can be selected equal to a definite time (DT) or inverse definite minimum time (IDMT).

Address	Relay Setting	Model Unit	Model Parameter	Note
PHLPTOC: 1	Operation	PHLPTOC1	Out of Service	
PHLPTOC: 1	Start value	PHLPTOC1	Current Setting	
PHLPTOC: 1	Time multiplier	PHLPTOC1	Time Dial	see 1)
PHLPTOC: 1	Operating curve type	PHLPTOC1	Characteristic	see 2)
PHLPTOC: 1	Operate delay time	PHLPTOC1	Time Dial	see 3)
PHLPTOC: 1	Reset delay time	PHLPTOC1	Reset Delay	see 3)
PHLPTOC: 1	Minimum operate time	PHLPTOC1	Min. Time	see 1)

Notes:

1) Used only in IDMT mode
2) The model does not support the type of characteristic *"Programmable"*
3) Used only in DT mode

5 Earth-fault

The *"Eart-fault"* sub-function models non-directional eart-fault protection. The response time characteristics of the protection can be selected equal to a definite time (DT) or inverse definite minimum time (IDMT).

Address	Relay Setting	Model Unit	Model Parameter	Note
EFLPTOC: 1	Operation	EFLPTOC1	Out of Service	
EFLPTOC: 1	Start value	EFLPTOC1	Current Setting	
EFLPTOC: 1	Time multiplier	EFLPTOC1	Time Dial	see 1)
EFLPTOC: 1	Operating curve type	EFLPTOC1	Characteristic	see 2)
EFLPTOC: 1	Operate delay time	EFLPTOC1	Time Dial	see 3)
EFLPTOC: 1	Reset delay time	EFLPTOC1	Reset Delay	see 3)
EFLPTOC: 1	Minimum operate time	EFLPTOC1	Min. Time	see 1)
EFHPTOC: 1	Operation	EFHPTOC1	Out of Service	
EFHPTOC: 1	Start value	EFHPTOC1	Current Setting	
EFHPTOC: 1	Time multiplier	EFHPTOC1	Time Dial	see 1)
EFHPTOC: 1	Operating curve type	EFHPTOC1	Characteristic	see 2)
EFHPTOC: 1	Operate delay time	EFHPTOC1	Time Dial	see 3)
EFHPTOC: 1	Reset delay time	EFHPTOC1	Reset Delay	see 3)
EFHPTOC: 1	Minimum operate time	EFHPTOC1	Min. Time	see 1)

Notes:

1) Used only in IDMT mode
2) The model does not support the type of characteristic *"Programmable"*
3) Used only in DT mode

6 Loss of load

The *"Loss of load"* sub-function models protection to detect sudden loss of load, which is considered a fault condition. Protection works with definite time (DT) characteristic. The subfunction has no direction determination.

Address	Relay Setting	Model Unit	Model Parameter	Note
LOFLPTUC: 1	Operation	Loss of load	Out of Service	
LOFLPTUC: 1	Start value high	LOFLPTUC1 lev1	Pickup Current	
LOFLPTUC: 1	Start value low	LOFLPTUC1 lev2	Pickup Current	
LOFLPTUC: 1	Operate delay time	Timer LOFLPTUC1	Time Setting	

7 Unbalance

The *"Unbalance"* sub-function models negative-sequence overcurrent protection for the function of the machine protecting the motors from phase imbalance. The response time characteristics of the protection can be selected equal to a definite time (DT) or inverse definite minimum time (IDMT).

Address	Relay Setting	Model Unit	Model Parameter	Note
MNSPTOC: 1	Operation	MNSPTOC1	Out of Service	
MNSPTOC: 1	Start value	MNSPTOC1 Start MNSPTOC1	Current Setting Pickup Current	
MNSPTOC: 1	Operating curve type	MNSPTOC1	Characteristic	
MNSPTOC: 1	Machine time Mult	MNSPTOC1	Time Dial	see 1)
MNSPTOC: 1	Operate delay time	MNSPTOC1	Time Dial	see 2)
MNSPTOC: 1	Maximum operate time	MNSPTOC1	Max. Time	see 1)
MNSPTOC: 1	Minimum operate time	MNSPTOC1	Min. Time	see 1)
MNSPTOC: 1	Cooling time	MNSPTOC1	Reset Delay	see 1)
MNSPTOC: 1	Reset delay time	MNSPTOC1	Reset Delay	see 2)
MNSPTOC: 2	Operation	MNSPTOC2	Out of Service	
MNSPTOC: 2	Start value	MNSPTOC2 Start MNSPTOC2	Current Setting Pickup Current	
MNSPTOC: 2	Operating curve type	MNSPTOC2	Characteristic	
MNSPTOC: 2	Machine time Mult	MNSPTOC2	Time Dial	see 1)
MNSPTOC: 2	Operate delay time	MNSPTOC2	Time Dial	see 2)
MNSPTOC: 2	Maximum operate time	MNSPTOC2	Max. Time	see 1)
MNSPTOC: 2	Minimum operate time	MNSPTOC2	Min. Time	see 1)
MNSPTOC: 2	Cooling time	MNSPTOC2	Reset Delay	see 1)
MNSPTOC: 2	Reset delay time	MNSPTOC2	Reset Delay	see 2)

Notes:

1) Used only in IDMT mode

2) Used only in DT mode

8 Under-Overvoltage

The ”Under-Overvoltage” sub-function models the functions associated with under / overvoltage: three-phase overvoltage protection, three-phase undervoltage protection and negative-sequence overvoltage protection. Negative-sequence overvoltage protection uses a definite time (DT) characteristic. For other protections, the response time characteristics of the protection can be selected equal to a definite time (DT) or inverse definite minimum time (IDMT). Three-phase protections do not support Phase-Ground voltage protection, only Phase-Phase voltage protection.

Address	Relay Setting	Model Unit	Model Parameter	Note
PHPTOV: 1	Operation	PHPTOV1 PhPh	Out of Service	
PHPTOV: 1	Start value	PHPTOV1 PhPh	Input Setting	
PHPTOV: 1	Time multiplier	PHPTOV1 PhPh	Time Dial	see 1)
PHPTOV: 1	Operating curve type	PHPTOV1 PhPh	Characteristic	see 2)
PHPTOV: 1	Operate delay time	PHPTOV1 PhPh	Time Dial	see 3)
PHPTOV: 1	Reset delay time	PHPTOV1 PhPh	Reset Delay	see 3)
PHPTOV: 1	Minimum operate time	PHPTOV1 PhPh	Min. Time	see 1)
PHPTUV: 1	Operation	PHPTUV1 PhPh	Out of Service	
PHPTUV: 1	Start value	PHPTUV1 PhPh	Input Setting	
PHPTUV: 1	Time multiplier	PHPTUV1 PhPh	Time Dial	see 1)
PHPTUV: 1	Operating curve type	PHPTUV1 PhPh	Characteristic	see 2)
PHPTUV: 1	Operate delay time	PHPTUV1 PhPh	Time Dial	see 3)
PHPTUV: 1	Reset delay time	PHPTUV1 PhPh	Reset Delay	see 3)
PHPTUV: 1	Minimum operate time	PHPTUV1 PhPh	Min. Time	see 1)
NSPTOV: 1	Operation	NSPTOV1	Out of Service	
NSPTOV: 1	Start value	NSPTOV1	Input Setting	
NSPTOV: 2	Operate delay time	NSPTOV1	Time Dial	
NSPTOV: 2	Reset delay time	NSPTOV1	Reset Delay	

Notes:

1) Used only in IDMT mode

2) The model does not support the type of characteristic *”Programmable”*

3) Used only in DT mode

9 Available Mapping Files

Hardware Version	Firmware Version	Language	Multiple Setting Groups	Model
1.3	1.3	en		REM 630

10 References

[1] ABB Distribution Solutions Distribution Automation, P.O. Box 699 FI-65101 VAASA. *630 series Technical Manual*. 1MRS756508 F.

[2] ABB Distribution Solutions Distribution Automation, P.O. Box 699 FI-65101 VAASA. *Motor Protection and Control REM630 Product Guide*. 1MRS756977 D.