



POWERFACTORY

PowerFactory 2021

Technical Reference

Schneider SEPAM x20

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POWER SYSTEM SOLUTIONS
MADE IN GERMANY

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1 Model information

Manufacturer Schneider

Model SEPAM x20

Variants The Schneider SEPAM x20 PowerFactory relay models simulate the protective features present in the Schneider SEPAM 20 relay family.

2 General description

The Sepam series 20 family of protection and metering units is designed for the operation of machines and electrical distribution networks of industrial installations and utility substations for all levels of voltage. The Sepam series 20 family consists of the following simple, high-performing solutions, suited to demanding applications that call for current and voltage metering:

- S20 (substation protection).
- T20 (transformer protection).
- M20 (motor protection).
- B21 and B22 (busbar protection).

The PowerFactory Schneider SEPAM x20 relay models are monolithic models and simulate most of the protective features available in the relays.

The following model versions are available:

- SEPAM B21
- SEPAM B22
- SEPAM M20
- SEPAM S20
- SEPAM T20
- SEPAM x20

Please notice that the *x20* PowerFactory relay model represents a generic model supporting all the SEPAM S20, T20, M20, B20, B21 relay main features. The features which are not available in the specific SEPAM relay model the user is going to simulate must be manually disabled.

The model implementations have been based on the information available in the relay technical brochure and manual [1].

3 Supported features

3.1 Measurement and acquisition

It represents the interface between the power system and the relay protective elements.

The phase currents flowing in the power system are converted by a block which simulates a 3 phase CT, by a block which simulates a 3 phase Vt, and (not present in the B21/B22 models) by a block which models a single phase CT detecting the earth current; the secondary currents are then measured in the relay model by four (five in the x20 relay model) measurement elements which simulate the digital sampling of the relay.

3.1.1 Available elements and input signals

The *Measurement and acquisition* feature consists of the following elements:

SEPAM B21 SEPAM B22

- One 3 phase current transformer ("Ct-3P" block).
- One 3 phase voltage transformer ("Vt" block).
- One 3 phase measurement element ("Measure Ph" block).
- One 3 phase measurement element calculating the phase-phase voltages ("Measure Delta V" block).
- One 3 phase sequence components measurement element ("Measure Seq" block).
- One frequency measurement element ("Meas Freq" block).

SEPAM M20 SEPAM S20 SEPAM T20

- One 3 phase current transformer ("Ct-3P" block).
- One neutral current transformer ("Core CT" block).
- One 3 phase voltage transformer ("Vt" block).
- One 3 phase measurement element ("Measure Ph" block).
- One 3 phase sequence components measurement element ("Measure Seq" block).
- One single phase neutral current measurement element ("Meas. Earth" block).
- One 3phase 2^{nd} harmonic measurement element ("Measure 2nd harmonic" block).

SEPAM x20

- One 3 phase current transformer ("Ct-3P" block).
- One neutral current transformer ("Core CT" block).
- One 3 phase voltage transformer ("Vt" block).
- One 3 phase measurement element ("Measure Ph" block).
- One 3 phase sequence components measurement element ("Measure Seq" block).
- One 3 phase measurement element calculating the phase-phase voltages ("Measure Delta V" block).
- One single phase neutral current measurement element ("Meas. Earth" block).
- One 3phase 2nd harmonic measurement element ("Measure 2nd harmonic" block).
- One frequency measurement element ("Meas Freq" block).

The following relay input signals are available in the M20, S20, T20, and x20 relay model to block the protective elements:

- *Block 5051 1A* controlling the "50/51 1A DT" "I> DT" "50/51 1A def reset" "50/51 1A idmt reset" "50/51 1B DT" "I> DT" "50/51 1B def reset" "50/51 1B idmt reset" block.
- *Block 5051 2A* controlling "50/51 2A DT" "I> DT" "50/51 2A def reset" "50/51 2A idmt reset" "50/51 2B DT" "I> DT" "50/51 2B def reset" "50/51 2B idmt reset" block.
- *Block 50N51N 1A* controlling "50N/51N 1A def reset" "50N/51N 1A idmt reset" "50N/51N 1B def reset" "50N/51N 1B idmt reset"
- *Block 50N51N 2A* controlling "50N/51N 2A def reset" "50N/51N 2A idmt reset" "50N/51N 2B def reset" "50N/51N 2B idmt reset"

3.1.2 Functionality

The "Ct" and the "Core Ct" 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 input current and voltage values are sampled by the measurement block at 36 samples/cycle. The values are processed by a DFT filter, operating over a cycle, which then calculates the voltage and current RMS values used by the protective elements.

3.1.3 Data input

The CT secondary rated current (1 or 5 A) value must be set in every measurement blocks.

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

3.2 Protective elements

A set of inverse time and definite time overcurrent elements is modeling the relay protective functions. All the inverse characteristics available in the relay are available in the inverse time model blocks.

3.2.1 Available Units

SEPAM B21 SEPAM B22

- Two phase-phase undervoltage elements ("27 1", "27 2" block).
- Two positive sequence undervoltage elements ("27D/47 1" and "27D/47 2" block).
- Two phase-phase overvoltage elements ("59 1" and "59 2" block).
- One phase-neutral undervoltage element ("27S" block).
- Two zero sequence overvoltage elements ("59N 1" and "59N 2" block).
- One "remanent" voltage overvoltage element monitoring the phase A-phase B voltage ("27R" block).
- Two under frequency elements ("81L 1", "81L 2" block).
- One over frequency element ("81H" block).
- One rate of change of frequency element ("81R" block).

SEPAM M20

- Four inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1A def reset", "50/51 1B def reset", "50/51 2A def reset", and "50/51 2B def reset" block).
- Four inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1A idmt reset", "50/51 1B idmt reset", "50/51 2A idmt reset", and "50/51 2B idmt reset" block).
- Four definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1A DT", "50/51 1B DT", "50/51 2A DT", and "50/51 2B DT" block).
- Four inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1A def reset", "50N/51N 1B def reset", "50N/51N 2A def reset", and "50N/51N 2B def reset" block).
- Four inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1A idmt reset", "50N/51N 1B idmt reset", "50N/51N 2A idmt reset", and "50N/51N 2B idmt reset" block).
- One negative sequence time defined element ("46" block).
- Two thermal overload elements ("Thermal K", "49 A" and "49 B" block). The "Thermal K" block allows setting the percentage of I₂ used in the thermal image calculation.
- One phase undercurrent element ("37" block).

SEPAM S20

- Four inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1A def reset", "50/51 1B def reset", "50/51 2A def reset", and "50/51 2B def reset" block).
- Four inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1A idmt reset", "50/51 1B idmt reset", "50/51 2A idmt reset", and "50/51 2B idmt reset" block).
- Four definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1A DT", "50/51 1B DT", "50/51 2A DT", and "50/51 2B DT" block).
- Four inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1A def reset", "50N/51N 1B def reset", "50N/51N 2A def reset", and "50N/51N 2B def reset" block).
- Four inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1A idmt reset", "50N/51N 1B idmt reset", "50N/51N 2A idmt reset", and "50N/51N 2B idmt reset" block).
- One negative sequence time defined element ("46" block).
- Auto reclosing feature ("Reclosing" block).

SEPAM T20

- Four inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1A def reset", "50/51 1B def reset", "50/51 2A def reset", and "50/51 2B def reset" block).
- Four inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1A idmt reset", "50/51 1B idmt reset", "50/51 2A idmt reset", and "50/51 2B idmt reset" block).
- Four definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1A DT", "50/51 1B DT", "50/51 2A DT", and "50/51 2B DT" block).
- Four inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1A def reset", "50N/51N 1B def reset", "50N/51N 2A def reset", and "50N/51N 2B def reset" block).
- Four inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1A idmt reset", "50N/51N 1B idmt reset", "50N/51N 2A idmt reset", and "50N/51N 2B idmt reset" block).
- One negative sequence time defined element ("46" block).
- Two thermal overload elements ("Thermal K", "49 A" and "49 B" block). The "Thermal K" block allows setting the percentage of I₂ used in the thermal image calculation.

SEPAM x20

- Four inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1A def reset", "50/51 1B def reset", "50/51 2A def reset", and "50/51 2B def reset" block).

- Four inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1A idmt reset", "50/51 1B idmt reset", "50/51 2A idmt reset", and "50/51 2B idmt reset" block).
- Four definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1A DT", "50/51 1B DT", "50/51 2A DT", and "50/51 2B DT" block).
- Four inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1A def reset", "50N/51N 1B def reset", "50N/51N 2A def reset", and "50N/51N 2B def reset" block).
- Four inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1A idmt reset", "50N/51N 1B idmt reset", "50N/51N 2A idmt reset", and "50N/51N 2B idmt reset" block).
- One negative sequence time defined element ("46" block).
- Two thermal overload elements ("Thermal K", "49 A" and "49 B" block). The "Thermal K" block allows setting the percentage of I₂ used in the thermal image calculation.
- One phase undercurrent element ("37" block).
- Two phase-phase undervoltage elements ("27 1", "27 2" block).
- Two positive sequence undervoltage elements ("27D/47 1" and "27D/47 2" block).
- Two phase-phase overvoltage elements ("59 1" and "59 2" block).
- One phase-neutral undervoltage element ("27S" block).
- Two zero sequence overvoltage elements ("59N 1" and "59N 2" block).
- One "remanent" voltage overvoltage element monitoring the phase A-phase B voltage ("27R" block).
- Two under frequency elements ("81L 1", "81L 2" block).
- One over frequency element ("81H" block).
- One rate of change of frequency element ("81R" block).
- Auto reclosing feature ("Reclosing" block).

3.2.2 Functionality

Each phase inverse time overcurrent element is represented in the model by three blocks: Indeed each inverse time overcurrent element can be set in the relay to use:

- one of the available inverse time trip characteristics with a definite time reset characteristic.
- one of the available inverse time trip characteristics with an inverse time reset characteristic.
- a definite time trip characteristic (with an extended trip threshold) and a definite time reset characteristic.

The block whose name is ended by the "(Def reset)" string represents the element when a definite time reset characteristic is set. The block whose name is ended by the "(Idmt reset)" string represents the element when an inverse time reset characteristic is set. The block whose name is ended by the "(DT)" string represents the element when a definite time trip characteristic is set.

The protective element in the relay is unique therefore only one between these three blocks can be enabled at the same time.

Each block is hosting a double set of tripping characteristics: in this way the time delay can be entered as a T sec value (using the characteristics whom name is ended by the "(T)" string) or as "TMS" value (using the characteristics whom name is ended by the "(TMS)" string). ("50/51 1A def reset", "50/51 1A idmt reset", "50/51 2A def reset", "50/51 2A idmt reset", "50/51 1B def reset", "50/51 1B idmt reset", "50/51 2B def reset", "50/51 2B idmt reset" block).

Each neutral inverse time overcurrent element is represented in the model by two blocks: Indeed each inverse time overcurrent element can be set in the relay to use:

- one of the available inverse time trip characteristics with a definite time reset characteristic.
- one of the available inverse time trip characteristics with an inverse time reset characteristic.

The block whom name is ended by the "(Def reset)" string represenst the element when a definite time reset characteristic is set. The block whom name is ended by the "(Idmt reset)" string represents the element when a inverse time reset characteristic is set. The protective element in the relay is unique therefore only one between these two blocks can be enabled at the same time.

Each block is hosting a double set of tripping characteristics: in this way the time delay can be entered as a T sec value (using the characteristics whom name is ended by the "(T)" string) or as "TMS" value (using the characteristics whom name is ended by the "(TMS)" string). ("50N/51N 1A def reset", "50N/51N 1A idmt reset", "50N/51N 2A def reset", "50N/51N 2A idmt reset", "50N/51N 1B def reset", "50N/51N 1B idmt reset", "50N/51N 2B def reset", "50N/51N 2B idmt reset" block).

The inverse time overcurrent elements support the following trip characteristics:

- EI/F IEEE extremely inverse (T)
- EI/F IEEE extremely inverse (TMS)
- EIT/C IEC extremely inverse (T)
- EIT/C IEC extremely inverse (TMS)
- IAC Extremely Inverse (T)
- IAC Extremely Inverse (TMS)
- IAC Inverse (T)
- IAC Inverse (TMS)
- IAC Very Inverse (T)
- IAC Very Inverse (TMS)
- IEC ultra inverse (T)
- IEC ultra inverse (TMS)
- LTI/B IEC long-time inverse (T)
- LTI/B IEC long-time inverse (TMS)
- MI/D IEEE moderately inverse (T)
- MI/D IEEE moderately inverse (TMS)

- RI-Type inverse (T)
- RI-Type inverse (TMS)
- SIT/A IEC standard inverse (T)
- SIT/A IEC standard inverse (TMS)
- VI/E IEEE very inverse (T)
- VI/E IEEE very inverse (TMS)
- VIT/B IEC very inverse (T)
- VIT/B IEC very inverse (TMS)
- EIT/C extremely inverse (T)
- EIT/C extremely inverse (TMS)
- LTI/B long-time inverse (T)
- LTI/B long-time inverse (TMS)
- SIT/A standard inverse (T)
- SIT/A standard inverse (TMS)
- VIT/B very inverse (T)
- VIT/B very inverse (TMS)
- ultra inverse (T)
- ultra inverse (TMS)

The relationship between current and time values for the trip characteristics whose name contains the "IEC" string complies with the IEC 60255-3 standards. When the characteristic name contains the "IEEE" string the relationship between current and time values complies with the ANSI/IEEE C37.112 standards.

A delayed reset characteristic is available for every IEEE, IEC, RI, and IAC tripping characteristic and can be enabled or disabled by the user.

The "RI" and the "IAC" characteristic are special characteristics which are used mainly in combination with existing mechanical relays.

2nd harmonic blocking In the SEPAM M20, SEPAM S20, SEPAM T20, and SEPAM x20 relay model, the phase and the ground overcurrent elements can be blocked when the current 2nd harmonic content is greater than a given (17% fixed) threshold.

3.2.3 Data input

The relationships between the relay settings and the model parameters can be found in the following tables (the relay model parameter names are listed between brackets):

SEPAM B21 SEPAM B22 :

Address	Relay Setting	Model block	Model setting	Note
	Phase-to-phase undervoltage 27 1 Us set point	27 1	Pickup Voltage (Uset)	
	Phase-to-phase undervoltage 27 1 Time delay T	27 1	Time Delay (Tdel)	
	Phase-to-phase undervoltage 27 2 Us set point	27 2	Pickup Voltage (Uset)	
	Phase-to-phase undervoltage 27 2 Time delay T	27 2	Time Delay (Tdel)	
	Positive sequence undervoltage and phase rotation direction check 27D/47 1 Vsd set point	27D/47 1	Pickup Voltage (Uset)	
	Positive sequence undervoltage and phase rotation direction check 27D/47 1 Time delay	27D/47 1	Time Delay (Tdel)	
	Positive sequence undervoltage and phase rotation direction check 27D/47 2 Vsd set point	27D/47 2	Pickup Voltage (Uset)	
	Positive sequence undervoltage and phase rotation direction check 27D/47 2 Time delay	27D/47 2	Time Delay (Tdel)	
	Remanent undervoltage 27R Us set point	27R	Pickup Voltage (Uset)	
	Remanent undervoltage 27R Time delay T	27R	Time Delay (Tdel)	
	Phase-to-neutral undervoltage 27S Us set point	27S	Pickup Voltage (Uset)	
	Phase-to-neutral undervoltage 27S Time delay T	27S	Time Delay (Tdel)	
	Phase-to-phase overvoltage 59 1 Us set point	59 1	Pickup Voltage (Uset)	
	Phase-to-phase overvoltage 59 1 Time delay T	59 1	Time Delay (Tdel)	
	Phase-to-phase overvoltage 59 2 Us set point	59 2	Pickup Voltage (Uset)	
	Phase-to-phase overvoltage 59 2 Time delay T	59 2	Time Delay (Tdel)	
	Neutral voltage displacement 59N 1 Vs0 set point	59N 1	Pickup Voltage (Uset)	
	Neutral voltage displacement 59N 1 Time delay T	59N 1	Time Delay (Tdel)	
	Neutral voltage displacement 59N 2 Vs0 set point	59N 2	Pickup Voltage (Uset)	
	Neutral voltage displacement 59N 2 Time delay T	59N 2	Time Delay (Tdel)	
	Overfrequency 81H Fs set points	81H	Frequency (Fset)	
	Overfrequency 81H Time delay T	81H	Time Delay (Tdel)	
	Underfrequency 81L 1 Fs set points	81L1	Frequency (Fset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Underfrequency 81L 1 Time delay T	81L1	Time Delay (Tdel)	
	Underfrequency 81L 2 Fs set points	81L2	Frequency (Fset)	
	Underfrequency 81L 2 Time delay T	81L2	Time Delay (Tdel)	
	Rate of change of frequency 81R dFs/dt set point	81R	Gradient df/dt(dFset)	
	Rate of change of frequency 81R Time delay T	81R	Time Delay (Tdel)	

SEPAM M20 :

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 1 Tripping curve	50/51 1A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 1A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 1 Is set point	50/51 1A DT	Current Setting (Ipset)	
		50/51 1A def reset	Current Setting (Ipset)	
		50/51 1A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 1 Time delay T	50/51 1A DT	Time Dial (Tpset)	
		50/51 1A def reset	Time Dial (Tpset)	
		50/51 1A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 1 Timer hold delay T1	50/51 1A DT	Reset Delay (ResetT)	
		50/51 1A def reset	Reset Delay (ResetT)	
		50/51 1A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 2 Tripping curve	50/51 1B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 1B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 2 Is set point	50/51 1B DT	Current Setting (Ipset)	
		50/51 1B def reset	Current Setting (Ipset)	
		50/51 1B idmt reset	Current Setting (Ipset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 2 Time delay T	50/51 1B DT	Time Dial (Tpset)	<p>Enable the block when the "Definite time" Tripping curve is active</p> <p>Enable the block when an IDMT Tripping curve with a definite time Reset curve is active</p> <p>Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active</p>
		50/51 1B def reset	Time Dial (Tpset)	
		50/51 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 2 Timer hold delay T1	50/51 1B DT	Reset Delay (ResetT)	
		50/51 1B def reset	Reset Delay (ResetT)	
		50/51 1B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 3 Tripping curve	50/51 2A DT	Characteristic (pcharac)	
		50/51 2A def reset	Characteristic (pcharac)	
		50/51 2A idmt reset	Characteristic (pcharac)	
	Phase overcurrent 50/51 3 Is set point	50/51 2A DT	Current Setting (Ipset)	
		50/51 2A def reset	Current Setting (Ipset)	
		50/51 2A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 3 Time delay T	50/51 2A DT	Time Dial (Tpset)	
		50/51 2A def reset	Time Dial (Tpset)	
		50/51 2A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 3 Timer hold delay T1	50/51 2A DT	Reset Delay (ResetT)	
		50/51 2A def reset	Reset Delay (ResetT)	
		50/51 2A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 4 Tripping curve	50/51 2B DT	Characteristic (pcharac)	
		50/51 2B def reset	Characteristic (pcharac)	
		50/51 2B idmt reset	Characteristic (pcharac)	
	Phase overcurrent 50/51 4 Is set point	50/51 2B DT	Current Setting (Ipset)	
		50/51 2B def reset	Current Setting (Ipset)	
		50/51 2B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 4 Time delay T	50/51 2B DT	Time Dial (Tpset)	
		50/51 2B def reset	Time Dial (Tpset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 4 Timer hold delay T1	50/51 2B idmt reset 50/51 2B DT	Time Dial (Tpset) Reset Delay (ResetT)	
		50/51 2B def reset	Reset Delay (ResetT)	
		50/51 2B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 1 Tripping curve	50N/51N 1A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N 1A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 1A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50N/51N 1 Is0 set point	50N/51N 1A DT	Current Setting (Ipset)	
		50N/51N 1A def reset	Current Setting (Ipset)	
		50N/51N 1A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 1 Time delay T	50N/51N 1A DT	Time Dial (Tpset)	
		50N/51N 1A def reset	Time Dial (Tpset)	
		50N/51N 1A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 1 Timer hold delay T1	50N/51N 1A DT	Reset Delay (ResetT)	
		50N/51N 1A def reset	Reset Delay (ResetT)	
		50N/51N 1A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 2 Tripping curve	50N/51N 1B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N 1B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 1B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50N/51N 2 Is0 set point	50N/51N 1B DT	Current Setting (Ipset)	
		50N/51N 1B def reset	Current Setting (Ipset)	
		50N/51N 1B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 2 Time delay T	50N/51N 1B DT	Time Dial (Tpset)	
		50N/51N 1B def reset	Time Dial (Tpset)	
		50N/51N 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 2 Timer hold delay T1	50N/51N 1B DT	Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50N/51N 3 Tripping curve	50N/51N 1B def reset 50N/51N 1B idmt reset 50N/51N 2A DT 50N/51N 2A def reset 50N/51N 2A idmt reset	Reset Delay (ResetT) Reset Delay (ResetT) Characteristic (pcharac) Characteristic (pcharac) Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active Enable the block when an IDMT Tripping curve with a definite time Reset curve is active Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N 3 Is0 set point	50N/51N 2A DT 50N/51N 2A def reset 50N/51N 2A idmt reset	Current Setting (Ipset) Current Setting (Ipset) Current Setting (Ipset)	
	Phase overcurrent 50N/51N 3 Time delay T	50N/51N 2A DT 50N/51N 2A def reset 50N/51N 2A idmt reset	Time Dial (Tpset) Time Dial (Tpset) Time Dial (Tpset)	
	Phase overcurrent 50N/51N 3 Timer hold delay T1	50N/51N 2A DT 50N/51N 2A def reset 50N/51N 2A idmt reset	Reset Delay (ResetT) Reset Delay (ResetT) Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 4 Tripping curve	50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Characteristic (pcharac) Characteristic (pcharac) Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active Enable the block when an IDMT Tripping curve with a definite time Reset curve is active Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N 4 Is0 set point	50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Current Setting (Ipset) Current Setting (Ipset) Current Setting (Ipset)	
	Phase overcurrent 50N/51N 4 Time delay T	50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Time Dial (Tpset) Time Dial (Tpset) Time Dial (Tpset)	
	Phase overcurrent 50N/51N 4 Timer hold delay T1	50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Reset Delay (ResetT) Reset Delay (ResetT) Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase undercurrent 37 Is set point	37	Pickup Current (Ipset)	
	Phase undercurrent 37 Time delay T	37	Time Setting (Tset)	
	Negative sequence / unbalance 46 Curve	46	Characteristic (pcharac)	
	Negative sequence / unbalance 46 Is set point	46	Current Setting (Ipset)	
	Negative sequence / unbalance 46 Time delay T	46	Time Dial (Tpset)	
	Thermal Overload 49RMS 1 Set points	49A	Current Setting (Ipset)	
	Thermal Overload 49RMS 1 Time constant T1	49A	Time Dial (Tpset)	
	Thermal Overload 49RMS 1 Accounting for negative sequence component	Thermal K	K (K)	In the "Logic" tab page
	Thermal Overload 49RMS 2 Set points	49B	Current Setting (Ipset)	
	Thermal Overload 49RMS 2 Time constant T1	49B	Time Dial (Tpset)	
	Thermal Overload 49RMS 2 Accounting for negative sequence component	Thermal K	K (K)	In the "Logic" tab page

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Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 1 Tripping curve	50/51 1A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 1A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 1 Is set point	50/51 1A DT	Current Setting (Ipset)	
		50/51 1A def reset	Current Setting (Ipset)	
		50/51 1A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 1 Time delay T	50/51 1A DT	Time Dial (Tpset)	
		50/51 1A def reset	Time Dial (Tpset)	
		50/51 1A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 1 Timer hold delay T1	50/51 1A DT	Reset Delay (ResetT)	
		50/51 1A def reset	Reset Delay (ResetT)	
		50/51 1A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 2 Tripping curve	50/51 1B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
		50/51 1B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 2 Is set point	50/51 1B DT	Current Setting (Ipset)	
		50/51 1B def reset	Current Setting (Ipset)	
		50/51 1B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 2 Time delay T	50/51 1B DT	Time Dial (Tpset)	
		50/51 1B def reset	Time Dial (Tpset)	
		50/51 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 2 Timer hold delay T1	50/51 1B DT	Reset Delay (ResetT)	
		50/51 1B def reset	Reset Delay (ResetT)	
		50/51 1B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 3 Tripping curve	50/51 2A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 2A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 2A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 3 Is set point	50/51 2A DT	Current Setting (Ipset)	
		50/51 2A def reset	Current Setting (Ipset)	
		50/51 2A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 3 Time delay T	50/51 2A DT	Time Dial (Tpset)	
		50/51 2A def reset	Time Dial (Tpset)	
		50/51 2A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 3 Timer hold delay T1	50/51 2A DT	Reset Delay (ResetT)	
		50/51 2A def reset	Reset Delay (ResetT)	
		50/51 2A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 4 Tripping curve	50/51 2B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 2B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
		50/51 2B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 4 Is set point	50/51 2B DT	Current Setting (Ipset)	
		50/51 2B def reset	Current Setting (Ipset)	
		50/51 2B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 4 Time delay T	50/51 2B DT	Time Dial (Tpset)	
		50/51 2B def reset	Time Dial (Tpset)	
		50/51 2B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 4 Timer hold delay T1	50/51 2B DT	Reset Delay (ResetT)	
		50/51 2B def reset	Reset Delay (ResetT)	
		50/51 2B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 1 Tripping curve	50N/51N 1A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N 1A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 1A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N 1 Is0 set point	50N/51N 1A DT	Current Setting (Ipset)	
		50N/51N 1A def reset	Current Setting (Ipset)	
		50N/51N 1A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 1 Time delay T	50N/51N 1A DT	Time Dial (Tpset)	
		50N/51N 1A def reset	Time Dial (Tpset)	
		50N/51N 1A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 1 Timer hold delay T1	50N/51N 1A DT	Reset Delay (ResetT)	
		50N/51N 1A def reset	Reset Delay (ResetT)	
		50N/51N 1A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 2 Tripping curve	50N/51N 1B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N 1B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 1B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50N/51N 2 Is0 set point	50N/51N 1B DT	Current Setting (Ipset)	
		50N/51N 1B def reset	Current Setting (Ipset)	
		50N/51N 1B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 2 Time delay T	50N/51N 1B DT	Time Dial (Tpset)	
		50N/51N 1B def reset	Time Dial (Tpset)	
		50N/51N 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 2 Timer hold delay T1	50N/51N 1B DT	Reset Delay (ResetT)	
		50N/51N 1B def reset	Reset Delay (ResetT)	
		50N/51N 1B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 3 Tripping curve	50N/51N 2A DT	Characteristic (pcharac)	
		50N/51N 2A def reset	Characteristic (pcharac)	
		50N/51N 2A idmt reset	Characteristic (pcharac)	
	Phase overcurrent 50N/51N 3 Is0 set point	50N/51N 2A DT	Current Setting (Ipset)	
		50N/51N 2A def reset	Current Setting (Ipset)	
		50N/51N 2A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 3 Time delay T	50N/51N 2A DT	Time Dial (Tpset)	
		50N/51N 2A def reset	Time Dial (Tpset)	
		50N/51N 2A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 3 Timer hold delay T1	50N/51N 2A DT	Reset Delay (ResetT)	
		50N/51N 2A def reset	Reset Delay (ResetT)	
		50N/51N 2A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 4 Tripping curve	50N/51N 2B DT	Characteristic (pcharac)	
		50N/51N 2B def reset	Characteristic (pcharac)	
		50N/51N 2B idmt reset	Characteristic (pcharac)	
	Phase overcurrent 50N/51N 4 Is0 set point	50N/51N 2B DT	Current Setting (Ipset)	
		50N/51N 2B def reset	Current Setting (Ipset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50N/51N 4 Time delay T	50N/51N 2B idmt reset	Current Setting (Ipset)	
		50N/51N 2B DT	Time Dial (Tpset)	
		50N/51N 2B def reset	Time Dial (Tpset)	
		50N/51N 2B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 4 Timer hold delay T1	50N/51N 2B DT	Reset Delay (ResetT)	
		50N/51N 2B def reset	Reset Delay (ResetT)	
		50N/51N 2B idmt reset	Reset Delay (ResetT)	
	Negative sequence / unbalance 46 Curve	46	Characteristic (pcharac)	
	Negative sequence / unbalance 46 Is set point	46	Current Setting (Ipset)	
	Negative sequence / unbalance 46 Time delay T	46	Time Dial (Tpset)	
	Recloser 79 Number of cycles	Reclosing	Operations to lockout (oplockout)	
	Recloser 79 Activation of cycle 1	Reclosing	Logic (Trip1 column)	in the "Logic" tab page
	Recloser 79 Activation of cycles 2, 3 and 4	Reclosing	Logic (Trip2, Trip3, Trip4 column)	in the "Logic" tab page
	Recloser 79 Memory time delay	Reclosing	Reset Time (resettime)	
	Recloser 79 Isolation time delay cycle 1	Reclosing	Reclosing interval 1 (recltime1)	
	Recloser 79 Isolation time delay cycle 2	Reclosing	Reclosing interval 2 (recltime2)	
	Recloser 79 Isolation time delay cycle 3	Reclosing	Reclosing interval 3 (recltime3)	
	Recloser 79 Isolation time delay cycle 4	Reclosing	Reclosing interval 4 (recltime4)	

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Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 1 Tripping curve	50/51 1A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 1A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50/51 1 Is set point	50/51 1A DT	Current Setting (Ipset)	
		50/51 1A def reset	Current Setting (Ipset)	
		50/51 1A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 1 Time delay T	50/51 1A DT	Time Dial (Tpset)	
		50/51 1A def reset	Time Dial (Tpset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 1 Timer hold delay T1	50/51 1A idmt reset	Time Dial (Tpset)	
		50/51 1A DT	Reset Delay (ResetT)	
		50/51 1A def reset	Reset Delay (ResetT)	
		50/51 1A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 2 Tripping curve	50/51 1B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 1B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50/51 2 Is set point	50/51 1B DT	Current Setting (Ipset)	
		50/51 1B def reset	Current Setting (Ipset)	
		50/51 1B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 2 Time delay T	50/51 1B DT	Time Dial (Tpset)	
		50/51 1B def reset	Time Dial (Tpset)	
		50/51 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 2 Timer hold delay T1	50/51 1B DT	Reset Delay (ResetT)	
		50/51 1B def reset	Reset Delay (ResetT)	
		50/51 1B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 3 Tripping curve	50/51 2A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 2A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 2A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50/51 3 Is set point	50/51 2A DT	Current Setting (Ipset)	
		50/51 2A def reset	Current Setting (Ipset)	
		50/51 2A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 3 Time delay T	50/51 2A DT	Time Dial (Tpset)	
		50/51 2A def reset	Time Dial (Tpset)	
		50/51 2A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 3 Timer hold delay T1	50/51 2A DT	Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 4 Tripping curve	50/51 2A def reset 50/51 2A idmt reset 50/51 2B DT	Reset Delay (ResetT) Reset Delay (ResetT) Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 2B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 2B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 4 Is set point	50/51 2B DT	Current Setting (Ipset)	
		50/51 2B def reset	Current Setting (Ipset)	
		50/51 2B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 4 Time delay T	50/51 2B DT	Time Dial (Tpset)	
		50/51 2B def reset	Time Dial (Tpset)	
		50/51 2B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 4 Timer hold delay T1	50/51 2B DT	Reset Delay (ResetT)	
		50/51 2B def reset	Reset Delay (ResetT)	
		50/51 2B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 1 Tripping curve	50N/51N 1A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N 1A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 1A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N 1 Is0 set point	50N/51N 1A DT	Current Setting (Ipset)	
		50N/51N 1A def reset	Current Setting (Ipset)	
		50N/51N 1A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 1 Time delay T	50N/51N 1A DT	Time Dial (Tpset)	
		50N/51N 1A def reset	Time Dial (Tpset)	
		50N/51N 1A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 1 Timer hold delay T1	50N/51N 1A DT	Reset Delay (ResetT)	
		50N/51N 1A def reset	Reset Delay (ResetT)	
		50N/51N 1A idmt reset	Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50N/51N 2 Tripping curve	50N/51N 1B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N 1B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 1B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N 2 Is0 set point	50N/51N 1B DT	Current Setting (Ipset)	
		50N/51N 1B def reset	Current Setting (Ipset)	
		50N/51N 1B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 2 Time delay T	50N/51N 1B DT	Time Dial (Tpset)	
		50N/51N 1B def reset	Time Dial (Tpset)	
		50N/51N 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 2 Timer hold delay T1	50N/51N 1B DT	Reset Delay (ResetT)	
		50N/51N 1B def reset	Reset Delay (ResetT)	
		50N/51N 1B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 3 Tripping curve	50N/51N 2A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N 2A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 2A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N 3 Is0 set point	50N/51N 2A DT	Current Setting (Ipset)	
		50N/51N 2A def reset	Current Setting (Ipset)	
		50N/51N 2A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 3 Time delay T	50N/51N 2A DT	Time Dial (Tpset)	
		50N/51N 2A def reset	Time Dial (Tpset)	
		50N/51N 2A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 3 Timer hold delay T1	50N/51N 2A DT	Reset Delay (ResetT)	
		50N/51N 2A def reset	Reset Delay (ResetT)	
		50N/51N 2A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 4 Tripping curve	50N/51N 2B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
		50N/51N 2B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N 2B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N 4 Is0 set point	50N/51N 2B DT	Current Setting (Ipset)	
		50N/51N 2B def reset	Current Setting (Ipset)	
		50N/51N 2B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 4 Time delay T	50N/51N 2B DT	Time Dial (Tpset)	
		50N/51N 2B def reset	Time Dial (Tpset)	
		50N/51N 2B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 4 Timer hold delay T1	50N/51N 2B DT	Reset Delay (ResetT)	
		50N/51N 2B def reset	Reset Delay (ResetT)	
		50N/51N 2B idmt reset	Reset Delay (ResetT)	
	Negative sequence / unbalance 46 Curve	46	Characteristic (pcharac)	
	Negative sequence / unbalance 46 Is set point	46	Current Setting (Ipset)	
	Negative sequence / unbalance 46 Time delay T	46	Time Dial (Tpset)	
	Thermal Overload 49RMS 1 Set points	49A	Current Setting (Ipset)	
	Thermal Overload 49RMS 1 Time constant T1	49A	Time Dial (Tpset)	
	Thermal Overload 49RMS 1 Accounting for negative sequence component	Thermal K	K (K)	In the "Logic" tab page
	Thermal Overload 49RMS 2 Set points	49B	Current Setting (Ipset)	
	Thermal Overload 49RMS 2 Time constant T1	49B	Time Dial (Tpset)	
	Thermal Overload 49RMS 2 Accounting for negative sequence component	Thermal K	K (K)	In the "Logic" tab page

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Address	Relay Setting	Model block	Model setting	Note
	Phase-to-phase undervoltage 27 1 Us set point	27 1	Pickup Voltage (Uset)	
	Phase-to-phase undervoltage 27 1 Time delay T	27 1	Time Delay (Tdel)	
	Phase-to-phase undervoltage 27 2 Us set point	27 2	Pickup Voltage (Uset)	
	Phase-to-phase undervoltage 27 2 Time delay T	27 2	Time Delay (Tdel)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Positive sequence undervoltage and phase rotation direction check 27D/47 1 Vsd set point	27D/47 1	Pickup Voltage (Uset)	
	Positive sequence undervoltage and phase rotation direction check 27D/47 1 Time delay	27D/47 1	Time Delay (Tdel)	
	Positive sequence undervoltage and phase rotation direction check 27D/47 2 Vsd set point	27D/47 2	Pickup Voltage (Uset)	
	Positive sequence undervoltage and phase rotation direction check 27D/47 2 Time delay	27D/47 2	Time Delay (Tdel)	
	Remanent undervoltage 27R Us set point	27R	Pickup Voltage (Uset)	
	Remanent undervoltage 27R Time delay T	27R	Time Delay (Tdel)	
	Phase-to-neutral undervoltage 27S Us set point	27S	Pickup Voltage (Uset)	
	Phase-to-neutral undervoltage 27S Time delay T	27S	Time Delay (Tdel)	
	Phase undercurrent 37 Is set point	37	Pickup Current (Ipset)	
	Phase undercurrent 37 Time delay T	37	Time Setting (Tset)	
	Negative sequence / unbalance 46 Curve	46	Characteristic (pcharac)	
	Negative sequence / unbalance 46 Is set point	46	Current Setting (Ipset)	
	Negative sequence / unbalance 46 Time delay T	46	Time Dial (Tpset)	
	Thermal Overload 49RMS 1 Set points	49A	Current Setting (Ipset)	
	Thermal Overload 49RMS 1 Time constant T1	49A	Time Dial (Tpset)	
	Thermal Overload 49RMS 1 Accounting for negative sequence component	Thermal K	K (K)	In the "Logic" tab page
	Thermal Overload 49RMS 2 Set points	49B	Current Setting (Ipset)	
	Thermal Overload 49RMS 2 Time constant T1	49B	Time Dial (Tpset)	
	Thermal Overload 49RMS 2 Accounting for negative sequence component	Thermal K	K (K)	In the "Logic" tab page
	Phase overcurrent 50/51 1 Tripping curve	50/51 1A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 1A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 1 Is set point	50/51 1A DT	Current Setting (Ipset)	
		50/51 1A def reset	Current Setting (Ipset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 1 Time delay T	50/51 1A idmt reset 50/51 1A DT	Current Setting (Ipset) Time Dial (Tpset)	
		50/51 1A def reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 1 Timer hold delay T1	50/51 1A idmt reset 50/51 1A DT	Time Dial (Tpset) Reset Delay (ResetT)	
		50/51 1A def reset	Reset Delay (ResetT)	
		50/51 1A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 2 Tripping curve	50/51 1B DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 1B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 1B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 2 Is set point	50/51 1B DT	Current Setting (Ipset)	
		50/51 1B def reset	Current Setting (Ipset)	
		50/51 1B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 2 Time delay T	50/51 1B DT	Time Dial (Tpset)	
		50/51 1B def reset	Time Dial (Tpset)	
		50/51 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 2 Timer hold delay T1	50/51 1B DT	Reset Delay (ResetT)	
		50/51 1B def reset	Reset Delay (ResetT)	
		50/51 1B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 3 Tripping curve	50/51 2A DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 2A def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 2A idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 3 Is set point	50/51 2A DT	Current Setting (Ipset)	
		50/51 2A def reset	Current Setting (Ipset)	
		50/51 2A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 3 Time delay T	50/51 2A DT	Time Dial (Tpset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 3 Timer hold delay T1	50/51 2A def reset 50/51 2A idmt reset 50/51 2A DT	Time Dial (Tpset) Time Dial (Tpset) Reset Delay (ResetT)	
	Phase overcurrent 50/51 4 Tripping curve	50/51 2A def reset 50/51 2A idmt reset 50/51 2B DT	Reset Delay (ResetT) Reset Delay (ResetT) Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 2B def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is ac- tive
		50/51 2B idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a in- verse time Reset curve is ac- tive
	Phase overcurrent 50/51 4 Is set point	50/51 2B DT 50/51 2B def reset 50/51 2B idmt reset	Current Setting (Ipset) Current Setting (Ipset) Current Setting (Ipset)	
	Phase overcurrent 50/51 4 Time delay T	50/51 2B DT 50/51 2B def reset 50/51 2B idmt reset	Time Dial (Tpset) Time Dial (Tpset) Time Dial (Tpset)	
	Phase overcurrent 50/51 4 Timer hold delay T1	50/51 2B DT 50/51 2B def reset 50/51 2B idmt reset	Reset Delay (ResetT) Reset Delay (ResetT) Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 1 Tripping curve	50N/51N 1A DT 50N/51N 1A def reset 50N/51N 1A idmt reset	Characteristic (pcharac) Characteristic (pcharac) Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active Enable the block when an IDMT Tripping curve with a definite time Reset curve is ac- tive Enable the block when an IDMT Tripping curve with a in- verse time Reset curve is ac- tive
	Phase overcurrent 50N/51N 1 Is0 set point	50N/51N 1A DT 50N/51N 1A def reset 50N/51N 1A idmt reset	Current Setting (Ipset) Current Setting (Ipset) Current Setting (Ipset)	
	Phase overcurrent 50N/51N 1 Time delay T	50N/51N 1A DT 50N/51N 1A def reset 50N/51N 1A idmt reset	Time Dial (Tpset) Time Dial (Tpset) Time Dial (Tpset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50N/51N 1 Timer hold delay T1	50N/51N 1A DT	Reset Delay (ResetT)	
		50N/51N 1A def reset	Reset Delay (ResetT)	
		50N/51N 1A idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 2 Tripping curve	50N/51N 1B DT	Characteristic (pcharac)	
		50N/51N 1B def reset	Characteristic (pcharac)	
		50N/51N 1B idmt reset	Characteristic (pcharac)	
	Phase overcurrent 50N/51N 2 Is0 set point	50N/51N 1B DT	Current Setting (Ipset)	
		50N/51N 1B def reset	Current Setting (Ipset)	
		50N/51N 1B idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 2 Time delay T	50N/51N 1B DT	Time Dial (Tpset)	
		50N/51N 1B def reset	Time Dial (Tpset)	
		50N/51N 1B idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 2 Timer hold delay T1	50N/51N 1B DT	Reset Delay (ResetT)	
		50N/51N 1B def reset	Reset Delay (ResetT)	
		50N/51N 1B idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N 3 Tripping curve	50N/51N 2A DT	Characteristic (pcharac)	
		50N/51N 2A def reset	Characteristic (pcharac)	
		50N/51N 2A idmt reset	Characteristic (pcharac)	
	Phase overcurrent 50N/51N 3 Is0 set point	50N/51N 2A DT	Current Setting (Ipset)	
		50N/51N 2A def reset	Current Setting (Ipset)	
		50N/51N 2A idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N 3 Time delay T	50N/51N 2A DT	Time Dial (Tpset)	
		50N/51N 2A def reset	Time Dial (Tpset)	
		50N/51N 2A idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N 3 Timer hold delay T1	50N/51N 2A DT	Reset Delay (ResetT)	
		50N/51N 2A def reset	Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50N/51N 4 Tripping curve	50N/51N 2A idmt reset 50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Reset Delay (ResetT) Characteristic (pcharac) Characteristic (pcharac) Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active Enable the block when an IDMT Tripping curve with a definite time Reset curve is active Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50N/51N 4 Is0 set point	50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Current Setting (Ipset) Current Setting (Ipset) Current Setting (Ipset)	
	Phase overcurrent 50N/51N 4 Time delay T	50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Time Dial (Tpset) Time Dial (Tpset) Time Dial (Tpset)	
	Phase overcurrent 50N/51N 4 Timer hold delay T1	50N/51N 2B DT 50N/51N 2B def reset 50N/51N 2B idmt reset	Reset Delay (ResetT) Reset Delay (ResetT) Reset Delay (ResetT)	
	Phase-to-phase overvoltage 59 1 Us set point	59 1	Pickup Voltage (Uset)	
	Phase-to-phase overvoltage 59 1 Time delay T	59 1	Time Delay (Tdel)	
	Phase-to-phase overvoltage 59 2 Us set point	59 2	Pickup Voltage (Uset)	
	Phase-to-phase overvoltage 59 2 Time delay T	59 2	Time Delay (Tdel)	
	Neutral voltage displacement 59N 1 Vs0 set point	59N 1	Pickup Voltage (Uset)	
	Neutral voltage displacement 59N 1 Time delay T	59N 1	Time Delay (Tdel)	
	Neutral voltage displacement 59N 2 Vs0 set point	59N 2	Pickup Voltage (Uset)	
	Neutral voltage displacement 59N 2 Time delay T	59N 2	Time Delay (Tdel)	
	Recloser 79 Number of cycles	Reclosing	Operations to lockout (oplockout)	
	Recloser 79 Activation of cycle 1	Reclosing	Logic (Trip1 column)	in the "Logic" tab page
	Recloser 79 Activation of cycles 2, 3 and 4	Reclosing	Logic (Trip2, Trip3, Trip4 column)	in the "Logic" tab page
	Recloser 79 Memory time delay	Reclosing	Reset Time (resettime)	
	Recloser 79 Isolation time delay cycle 1	Reclosing	Reclosing interval 1 (recltime1)	
	Recloser 79 Isolation time delay cycle 2	Reclosing	Reclosing interval 2 (recltime2)	
	Recloser 79 Isolation time delay cycle 3	Reclosing	Reclosing interval 3 (recltime3)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Recloser 79 Isolation time delay cycle 4	Reclosing	Reclosing interval 4 (re-cltime4)	
	Overfrequency 81H Fs set points	81H	Frequency (Fset)	
	Overfrequency 81H Time delay T	81H	Time Delay (Tdel)	
	Underfrequency 81L 1 Fs set points	81L1	Frequency (Fset)	
	Underfrequency 81L 1 Time delay T	81L1	Time Delay (Tdel)	
	Underfrequency 81L 2 Fs set points	81L2	Frequency (Fset)	
	Underfrequency 81L 2 Time delay T	81L2	Time Delay (Tdel)	
	Rate of change of frequency 81R dFs/dt set point	81R	Gradient df/dt(dFset)	
	Rate of change of frequency 81R Time delay T	81R	Time Delay (Tdel)	

2nd harmonic blocking The 2nd harmonic blocking can be disabled putting out of service the "2nd harm limit" block.

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 elements and relay output signals

The trip logic is implemented by the "Logic" block.

The relay trip output signal is "yout".

3.3.2 Functionality

The "Logic" block collects the trip signals coming from the protective elements and, when any protective element trips, operates the power breaker and the "yout" relay output contact.

3.3.3 Data input

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:

SEPAM M20

- Excessive starting time/locked rotor.
- Start inhibit time delay.
- Starts per hour.

SEPAM S20 SEPAM T20 :

- Cumulative breaking current.

5 References

- [1] Schneider Electric Industries SAS, 89, boulevard Franklin Roosevelt F - 92500 Rueil-Malmaison (France). *Electrical network protection Sepam series 20 User's manual 2004 PCRED301005EN/2 06-2004*, 2004.