



POWERFACTORY

PowerFactory 2021

Technical Reference

Schneider SEPAM x8x

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MADE IN GERMANY

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1 Model information

Manufacturer Schneider

Model SEPAM x8x

Variants The Schneider SEPAM x8x PowerFactory relay models simulate the protective features present in the Schneider SEPAM 80 relay family (SEPAM S80, S81, S82, S84, T81, T82, T87, M81, M87, M88, G82, G87, G88, B80, and B83 relay).

2 General description

Specially designed for demanding customers on large industrial sites, the Sepam series 80 relay family provides proved solutions for electrical distribution and machine protection.

The Sepam series 80 family consists of the following relays:

- B80, B83 (busbar protection).
- G82, G87, G88 (generator protection).
- M81, M87, M88 (motor protection).
- S80, S81, S82, S84 (substation protection).
- T81, T82, T87 (transformer protection).
- S42 (substation protection).
- T42 (transformer protection).

The Schneider SEPAM x8x PowerFactory relay models consist of a main relay model which contains the transducers (blocks modeling the Ct and the VT), the measurement elements and a subset of the following sub relays:

- Current.
- Differential.
- Distance.
- Frequency & Flux.
- Power.
- Voltage.

The following model versions are available:

- SEPAM B8x. (simulating the B80, and B83 relays)
- SEPAM G8x. (simulating the G82, G87, and G88 relays)
- SEPAM M8x. (simulating the M81, M87, and M88 relays)
- SEPAM S8x. (simulating the S80, S81, S82, and S84 relays)
- SEPAM T8x. (simulating the T81, T82, and T87 relays)
- SEPAM x8x. (simulating the relays)

Please notice that the x8x PowerFactory relay model represents a generic model supporting all the SEPAM S80, S81, S82, S84, T81, T82, T87, M81, M87, M88, G82, G87, G88, B80 and B83 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 blocks which simulates a 3 phase CT, a 3 phase VT, a residual voltage VT and by a block which models a single phase CT detecting the earth current; when a differential element is present, in the model an additional 3 phase CT converting the phase current in a remote location is also available. The secondary currents are then measured in the relay models by seven (SEPAM B8x and S8x) or by ten (SEPAM G8x, M8x, T8x, and x8x) 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 B8x, S8x

- One 3 phase current transformer ("Ct-3P" block).
- One neutral current transformer ("Residual CT" block).
- One 3 phase voltage transformer ("Vt" block).
- One neutral voltage transformer ("Residual 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. Residual" block).
- One residual voltage measurement element ("Measure Residual V" block).
- One 3phase 2nd harmonic measurement element ("Measure 2nd harmonic" block).
- One frequency measurement element ("Meas Freq" block).

SEPAM G8x, M8x, T8x, x8x

- Two 3 phase current transformers ("Ct-3P" and "Ct diff(remote)" block).
- Two neutral current transformers ("Residual CT" and "Additional residual CT" block).
- One 3 phase voltage transformer ("Vt" block).
- One neutral voltage transformer ("Residual Vt" block).
- Two 3 phase measurement elements ("Measure Ph" and "Measure Ph Diff(remote)" 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).
- Two single phase neutral current measurement elements ("Meas. Residual" and "Meas. Additiona residual" block).
- One residual voltage measurement element ("Measure Residual V" block).
- One 3phase 2nd harmonic measurement element ("Measure 2nd harmonic" block).
- Two frequency measurement elements ("Meas Freq" and "Measure 2nd harmonic Diff(remote)" block).

The following relay input signals are available to block the protective elements:

- *y1* controlling the "50/51 1 DT" "I> DT" "50/51 1 def reset" "50/51 1 idmt reset" block.
- *y11* controlling the "50/51 2 DT" "I> DT" "50/51 2 def reset" "50/51 2 idmt reset" block.
- *y12* controlling the "50/51 3 DT" "I> DT" "50/51 3 def reset" "50/51 3 idmt reset" block.
- *y13* controlling the "50/51 4 DT" "I> DT" "50/51 4 def reset" "50/51 4 idmt reset" block.
- *y14* controlling the "50/51 5 DT" "I> DT" "50/51 5 def reset" "50/51 5 idmt reset" block.
- *y15* controlling the "50/51 6 DT" "I> DT" "50/51 6 def reset" "50/51 6 idmt reset" block.
- *y16* controlling the "50/51 7 DT" "I> DT" "50/51 7 def reset" "50/51 7 idmt reset" block.
- *y17* controlling the "50/51 8 DT" "I> DT" "50/51 8 def reset" "50/51 8 idmt reset" block.

3.1.2 Functionality

The "Ct-3P", "Ct diff(remote)", "Residual CT" and the "Additional residual 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.

Using the two neutral current transformer ("Residual CT" and "Additional residual CT" block) the earth fault current can be monitored in two different part of the power system.

3.1.3 Data input

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

If no core CT is available please select the 3 phases CT also in the "Residual Ct" and in the "Additional Residual 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, differential, distance, overpower, overflux, voltage and frequency elements is modeling the relay protective functions. All the inverse characteristics available in the relay are available in the inverse time overcurrent model blocks.

3.2.1 Available Units

The protective elements are contained inside the following subrelays:

SEPAM B8x

- Current. (see 3.2.2)
- Frequency & Flux. (see 3.2.12)
- Voltage. (see 3.2.19)

SEPAM G8x, M8x, x8x

- Current.(see 3.2.3, 3.2.4, 3.2.6)
- Differential. (see 3.2.7, 3.2.8)

- Distance. (see 3.2.10)
- Frequency & Flux. (see 3.2.12, 3.2.13, 3.2.15)
- Power. (see 3.2.16, 3.2.17)
- Voltage. (see 3.2.20)

SEPAM S8x

- Current. (see 3.2.5)
- Frequency & Flux. (see 3.2.14)
- Power. (see 3.2.18)
- Voltage. (see 3.2.20)

SEPAM T8x

- Current. (see 3.2.5)
- Differential. (see 3.2.9)
- Frequency & Flux. (see 3.2.13)
- Power. (see 3.2.18)
- Voltage. (see 3.2.20)

3.2.2 Current subrelay SEPAM B8x

The *SEPAM B8x Current subrelay* contains the following protective elements:

- Two negative sequence inverse time elements ("46 1" and "46 2" block).
- Eight inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1 def reset", "50/51 2 def reset"... "50/51 8 def reset" block).
- Eight inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1 idmt reset", "50/51 2 idmt reset"... "50/51 8 idmt reset" block).
- Eight definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1 DT", "50/51 2 DT"... "50/51 8 DT" block).
- Eight inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1 def reset", "50N/51N 2 def reset" ... "50N/51N 8 def reset" block).
- Eight inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1 idmt reset", "50N/51N 2 idmt reset"... "50N/51N 8 idmt reset" block).

3.2.3 Current subrelay SEPAM G8x

The *SEPAM G8x Current subrelay* contains the following protective elements:

- Two negative sequence inverse time elementS ("46 1" and "46 2" 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.
- Eight inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1 def reset", "50/51 2 def reset"... "50/51 8 def reset" block).
- Eight inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1 idmt reset", "50/51 2 idmt reset"... "50/51 8 idmt reset" block).
- Eight definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1 DT", "50/51 2 DT"... "50/51 8 DT" block).
- Two voltage restrained inverse time phase overcurrent elements with a definite time reset characteristic ("50V/51V 1 def reset" and "50V/51V 2 def reset" block).
- Two voltage restrained inverse time phase overcurrent elements with an inverse time reset characteristic ("50V/51V 1 idmt reset" and "50V/51V 2 idmt reset" block).
- Two voltage restrained definite time phase overcurrent elements with a definite time reset characteristic ("50V/51V 1 DT" and "50V/51V 2 DT" block).
- Eight inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1 def reset", "50N/51N 2 def reset" ... "50N/51N 8 def reset" block).
- Eight inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1 idmt reset", "50N/51N 2 idmt reset"... "50N/51N 8 idmt reset" block).
- Two directional inverse time phase overcurrent elements with a definite time reset characteristic ("67 1 def reset", and "67 2 def reset" block).
- Two directional inverse time phase overcurrent elements with an inverse time reset characteristic ("67 1 idmt reset", and "67 2 idmt reset" block).
- Two directional definite time phase overcurrent elements with a definite time reset characteristic ("67 1 DT", and "67 2 DT" block).
- One 3 phase directional element ("Dir phase" block).
- Two directional inverse time neutral overcurrent elements with a definite time reset characteristic ("67N 1 def reset", and "67N 2 def reset" block).
- Two directional inverse time neutral overcurrent elements with an inverse time reset characteristic ("67N 1 idmt reset", and "67N 2 idmt reset" block).
- One neutral directional element ("Dir ground" block).

3.2.4 Current subrelay SEPAM M8x

The *SEPAM M8x Current subrelay* contains the following protective elements:

- One phase undercurrent element ("37" block).
- Two negative sequence inverse time elementS ("46 1" and "46 2" 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.
- Eight inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1 def reset", "50/51 2 def reset"... "50/51 8 def reset" block).
- Eight inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1 idmt reset", "50/51 2 idmt reset"... "50/51 8 idmt reset" block).
- Eight definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1 DT", "50/51 2 DT"... "50/51 8 DT" block).
- Eight inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1 def reset", "50N/51N 2 def reset" ... "50N/51N 8 def reset" block).
- Eight inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1 idmt reset", "50N/51N 2 idmt reset"... "50N/51N 8 idmt reset" block).
- Two directional inverse time neutral overcurrent elements with a definite time reset characteristic ("67N 1 def reset", and "67N 2 def reset" block).
- Two directional inverse time neutral overcurrent elements with an inverse time reset characteristic ("67N 1 idmt reset", and "67N 2 idmt reset" block).
- One neutral directional element ("Dir ground" block).

3.2.5 Current subrelay SEPAM S8x, SEPAM T8x

The *SEPAM S8x and SEPAM T8x Current subrelay* contains the following protective elements:

- Two negative sequence inverse time elementS ("46 1" and "46 2" 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.
- Eight inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1 def reset", "50/51 2 def reset"... "50/51 8 def reset" block).
- Eight inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1 idmt reset", "50/51 2 idmt reset"... "50/51 8 idmt reset" block).
- Eight definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1 DT", "50/51 2 DT"... "50/51 8 DT" block).
- Eight inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1 def reset", "50N/51N 2 def reset" ... "50N/51N 8 def reset" block).
- Eight inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1 idmt reset", "50N/51N 2 idmt reset"... "50N/51N 8 idmt reset" block).
- Two directional inverse time phase overcurrent elements with a definite time reset characteristic ("67 1 def reset", and "67 2 def reset" block).
- Two directional inverse time phase overcurrent elements with an inverse time reset characteristic ("67 1 idmt reset", and "67 2 idmt reset" block).
- Two directional definite time phase overcurrent elements with a definite time reset characteristic ("67 1 DT", and "67 2 DT" block).
- One 3 phase directional element ("Dir phase" block).

- Two directional inverse time neutral overcurrent elements with a definite time reset characteristic ("67N 1 def reset", and "67N 2 def reset" block).
- Two directional inverse time neutral overcurrent elements with an inverse time reset characteristic ("67N 1 idmt reset", and "67N 2 idmt reset" block).
- One neutral directional element ("Dir ground" block).

3.2.6 Current subrelay SEPAM x8x

The *SEPAM x8x Current subrelay* contains the following protective elements:

- One phase undercurrent element ("37" block).
- Two negative sequence inverse time elementS ("46 1" and "46 2" 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.
- Eight inverse time phase overcurrent elements with a definite time reset characteristic ("50/51 1 def reset", "50/51 2 def reset"... "50/51 8 def reset" block).
- Eight inverse time phase overcurrent elements with an inverse time reset characteristic ("50/51 1 idmt reset", "50/51 2 idmt reset"... "50/51 8 idmt reset" block).
- Eight definite time phase overcurrent elements with a definite time reset characteristic ("50/51 1 DT", "50/51 2 DT"... "50/51 8 DT" block).
- Two voltage restrained inverse time phase overcurrent elements with a definite time reset characteristic ("50V/51V 1 def reset" and "50V/51V 2 def reset" block).
- Two voltage restrained inverse time phase overcurrent elements with an inverse time reset characteristic ("50V/51V 1 idmt reset" and "50V/51V 2 idmt reset" block).
- Two voltage restrained definite time phase overcurrent elements with a definite time reset characteristic ("50V/51V 1 DT" and "50V/51V 2 DT" block).
- Eight inverse time neutral overcurrent elements with a definite time reset characteristic ("50N/51N 1 def reset", "50N/51N 2 def reset" ... "50N/51N 8 def reset" block).
- Eight inverse time neutral overcurrent elements with an inverse time reset characteristic ("50N/51N 1 idmt reset", "50N/51N 2 idmt reset"... "50N/51N 8 idmt reset" block).
- Two directional inverse time phase overcurrent elements with a definite time reset characteristic ("67 1 def reset", and "67 2 def reset" block).
- Two directional inverse time phase overcurrent elements with an inverse time reset characteristic ("67 1 idmt reset", and "67 2 idmt reset" block).
- Two directional definite time phase overcurrent elements with a definite time reset characteristic ("67 1 DT", and "67 2 DT" block).
- One 3 phase directional element ("Dir phase" block).
- Two directional inverse time neutral overcurrent elements with a definite time reset characteristic ("67N 1 def reset", and "67N 2 def reset" block).
- Two directional inverse time neutral overcurrent elements with an inverse time reset characteristic ("67N 1 idmt reset", and "67N 2 idmt reset" block).
- One neutral directional element ("Dir ground" block).

3.2.7 Differential subrelay SEPAM G8x, SEPAM x8x

The *SEPAM G8x and SEPAM x8x Differential subrelay* contains the following protective elements:

- One 3 phase differential element with double biased restraint characteristic and 2nd harmonic blocking ("87T" block).
- One 3 phase differential element with double threshold and 2nd harmonic blocking ("87T" block).
- Two restricted earth fault elements ("64 REF 1" and "64 REF 2" block).

3.2.8 Differential subrelay SEPAM M8x

The *SEPAM M8x Differential subrelay* contains the following protective elements:

- One 3 phase differential element with double biased restraint characteristic and 2nd harmonic blocking ("87T" block).
- One 3 phase differential element with double threshold and 2nd harmonic blocking ("87T" block).

3.2.9 Differential subrelay SEPAM T8x

The *SEPAM T8x Differential subrelay* contains the following protective elements:

- One 3 phase differential element with double threshold and 2nd harmonic blocking ("87T" block).
- Two restricted earth fault elements ("64 REF 1" and "64 REF 2" block).

3.2.10 Distance subrelay SEPAM G8x, SEPAM x8x

The *SEPAM G8x and SEPAM x8x Distance subrelay* contains the following protective elements:

- Two loss of field detection elements with separated delay elements ("40 1" and "40 1 TD", "40 2" and "40 2 TD" block).
- One underimpedance element with delay element ("Z<" and "Z< TD" block).
- Two polarizing blocks ("Polarizing 40" and "Polarizing underimpedance" block).

3.2.11 Distance subrelay SEPAM M8x

The *SEPAM M8x Distance subrelay* contains the following protective elements:

- Two loss of field detection elements with separated delay elements ("40 1" and "40 1 TD", "40 2" and "40 2 TD" block).
- One polarizing block ("Polarizing 40" block).

3.2.12 Frequency & Flux subrelay SEPAM B8x, SEPAM M8x

The *SEPAM B8x and SEPAM M8x Frequency & Flux subrelay* contains the following protective elements:

- Four under frequency elements ("81L 1", "81L 2", "81L 3", and "81L 4" block).
- Two over frequency elements ("81H 1" and "81H 2" block).
- One undervoltage element blocking the frequency elements ("Vs" block).

3.2.13 Frequency & Flux subrelay SEPAM G8x, SEPAM T8x

The *SEPAM G8x and SEPAM T8x Frequency & Flux subrelay* contains the following protective elements:

- Four under frequency elements ("81L 1", "81L 2", "81L 3", and "81L 4" block).
- Two over frequency elements ("81H 1" and "81H 2" block).
- One undervoltage element blocking the frequency elements ("Vs" block).
- Two inverse time overfluxing elements ("24 1" and "24 2" block).

3.2.14 Frequency & Flux subrelay SEPAM S8x

The *SEPAM S8x Frequency & Flux subrelay* contains the following protective elements:

- Four under frequency elements ("81L 1", "81L 2", "81L 3", and "81L 4" block).
- Two over frequency elements ("81H 1" and "81H 2" block).
- One undervoltage element blocking the frequency elements ("Vs" block).
- Two rate of change of frequency elements ("81R1" and "81R2" block).
- Two frequency elements and one undervoltage elements blocking the rate of change of frequency elements ("FmaxFreq", "FminFreq", and "Vsr" block).

3.2.15 Frequency & Flux subrelay SEPAM x8x

The *SEPAM x8x Frequency & Flux subrelay* contains the following protective elements:

- Four under frequency elements ("81L 1", "81L 2", "81L 3", and "81L 4" block).
- Two over frequency elements ("81H 1" and "81H 2" block).
- One undervoltage element blocking the frequency elements ("Vs" block).
- Two rate of change of frequency elements ("81R1" and "81R2" block).
- Two frequency elements and one undervoltage elements blocking the rate of change of frequency elements ("FmaxFreq", "FminFreq", and "Vsr" block).
- Two inverse time overfluxing elements ("24 1" and "24 2" block).

3.2.16 Power subrelay SEPAM G8x, SEPAM x8x

The *SEPAM G8x and SEPAM x8x Power subrelay* contains the following protective elements:

- Two directional active overpower with definite time trip characteristic elements ("32P 1" and "32P 2" block).
- One directional reactive overpower with definite time trip characteristic element ("32Q" block).
- One directional active underpower with definite time trip characteristic element ("37P" block).

3.2.17 Power subrelay SEPAM M8x

The *SEPAM M8x Power subrelay* contains the following protective elements:

- Two directional active overpower with definite time trip characteristic elements ("32P 1" and "32P 2" block).
- One directional reactive overpower with definite time trip characteristic element ("32Q" block).

3.2.18 Power subrelay SEPAM S8x, SEPAM T8x

The *SEPAM S8x and SEPAM T8x Power subrelay* contains the following protective elements:

- Two directional active overpower with definite time trip characteristic elements ("32P 1" and "32P 2" block).
- One directional active underpower with definite time trip characteristic element ("37P" block).

3.2.19 Voltage subrelay SEPAM B8x

The *SEPAM B8x Voltage subrelay* contains the following protective elements:

- Two phase-phase undervoltage elements ("27LL 1" and "27LL 2" block).
- Two phase-ground undervoltage elements ("27LN 1" and "27LN 2" block).
- Four phase-phase overvoltage elements ("59LL 1", "59LL 2", "59LL 3", and "59LL 4" block).
- Four phase-ground overvoltage elements ("59LN 1", "59LN 2", "59LN 3", and "59LN 4" block).
- Two negative sequence overvoltage elements ("47 1" and "47 2" block).
- Two zero sequence overvoltage elements ("59N 1" and "59N 2" block).
- Six positive sequence undervoltage elements ("27R V1 1", "27R V1 2", "27D 1", "27D 2", "27D 3", and "27D 4" block).
- Two phase-phase undervoltage elements ("27R U21 1" and "27R U21 2" block).

3.2.20 Voltage subrelay SEPAM G8x, SEPAM M8x, SEPAM S8x, SEPAm T8x SEPAM x8x

The *SEPAM G8x*, *SEPAM M8x*, *SEPAM S8x*, *SEPAM T8x* and *SEPAM x8x* Voltage subrelay contains the following protective elements:

- Four phase-phase undervoltage elements ("27LL 1", "27LL 2", "27LL 3", and "27LL 4" block).
- Four phase-ground undervoltage elements ("27LN 1", "27LN 2", "27LN 3", and "27LN 4" block).
- Four phase-phase overvoltage elements ("59LL 1", "59LL 2", "59LL 3", and "59LL 4" block).
- Four phase-ground overvoltage elements ("59LN 1", "59LN 2", "59LN 3", and "59LN 4" block).
- Two negative sequence overvoltage elements ("47 1" and "47 2" block).
- Two zero sequence overvoltage elements ("59N 1" and "59N 2" block).
- Four positive sequence undervoltage elements ("27R V1 1", "27R V1 2", "27D 1", and "27D 2" block).
- Two phase-phase undervoltage elements ("27R U21 1" and "27R U21 2" block).

3.2.21 Functionality

Overcurrent subrelay 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 whose name is ended by the "(T)" string) or as "TMS" value (using the characteristics whose name is ended by the "(TMS)" string). ("50/51 1 def reset", "50/51 1 idmt reset", "50/51 2 def reset", "50/51 2 idmt reset", "50/51 3 def reset", "50/51 3 idmt reset", "50/51 4 def reset", "50/51 4 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 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 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 whose name is ended by the "(T)" string) or as "TMS" value (using the characteristics whose name is ended by the "(TMS)" string). ("50N/51N 1 def reset", "50N/51N 1 idmt reset", "50N/51N 2 def reset", "50N/51N 2 idmt reset", "50N/51N 3 def reset", "50N/51N 3 idmt reset", "50N/51N 4 def reset", "50N/51N 4 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 or IEC 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.

Frequency & Flux subrelay The *overfrequency(81H)* and the *underfrequency(81L)* elements are blocked when the positive sequence voltage is below an user configurable threshold ("Vs" block).

The *rate of change of frequency (81R)* are enabled only when the frequency is between 56.2 Hz and 42.2 Hz and the positive sequence voltage is greater than 0.5 pu.

Differential subrelay The differential subrelay includes detailed models of the transformer differential feature ("87T" block) and of the motor differential feature ("87M" block). Both differential blocks have a 2nd harmonic restrain feature. The transformer differential has a double bias restrained trip feature. The motor differential has a percentage-based characteristic made up to two half curves defined according to the following formulas:

- 1st half curve depending on the I_s set point

$$|diff_x^2 - I_{tx}^2|/32 > I_s^2 \text{ where } 0 \leq I_{tx} \leq \sqrt{2} I_n \text{ and } x = 1, 2, 3$$

- 2nd half curve

$$|diff_x^2/8 - I_{tx}^2|/32 \geq (0.005)I_n \text{ where } \sqrt{2} I_n < I_{tx} \text{ and } x = 1, 2, 3.$$

2nd harmonic blocking The phase and the ground overcurrent elements can be blocked when the current 2nd harmonic content is greater than a given (17% fixed) threshold.

3.2.22 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):

Current subrelay SEPAM B8x :

Address	Relay Setting	Model block	Model setting	Note
	Negative sequence / unbalance 46 z ¹ Curve	46 z ¹	Characteristic (pcharac)	
	Negative sequence / unbalance 46 z ¹ Is set point	46 z ¹	Current Setting (Ipset)	
	Negative sequence / unbalance 46 z ¹ Time delay T	46 z ¹	Time Dial (Tpset)	
	Phase overcurrent 50/51 x ² Tripping curve	50/51 x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50/51 x ¹ Is set point	50/51 x ¹ DT	Current Setting (Ipset)	
		50/51 x ¹ def reset	Current Setting (Ipset)	
		50/51 x ¹ idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 x ¹ Time delay T	50/51 x ¹ DT	Time Dial (Tpset)	
		50/51 x ¹ def reset	Time Dial (Tpset)	
		50/51 x ¹ idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 x ¹ Timer hold delay T1	50/51 x ¹ DT	Reset Delay (ResetT)	
		50/51 x ¹ def reset	Reset Delay (ResetT)	
		50/51 x ¹ idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N x ¹ Tripping curve	50N/51N x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N x ¹ Is0 set point	50N/51N x ¹ DT	Current Setting (Ipset)	
		50N/51N x ¹ def reset	Current Setting (Ipset)	

¹z = 1,2

²x = 1,2,3,4,5,6,7,8

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50N/51N x ¹ Time delay T	50N/51N x ¹ idmt reset	Current Setting (Ipset)	
		50N/51N x ¹ DT	Time Dial (Tpset)	
		50N/51N x ¹ def reset	Time Dial (Tpset)	
		50N/51N x ¹ idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N x ¹ Timer hold delay T1	50N/51N x ¹ DT	Reset Delay (ResetT)	
		50N/51N x ¹ def reset	Reset Delay (ResetT)	
		50N/51N x ¹ idmt reset	Reset Delay (ResetT)	

Current subrelay SEPAM G8x :

Address	Relay Setting	Model block	Model setting	Note
	Negative sequence / unbalance 46 z ³ Curve	46 z ¹	Characteristic (pcharac)	
	Negative sequence / unbalance 46 z ¹ Is set point	46 z ¹	Current Setting (Ipset)	
	Negative sequence / unbalance 46 z ¹ Time delay T	46 z ¹	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 x ⁴ Tripping curve	50/51 x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50/51 x ¹ Is set point	50/51 x ¹ DT	Current Setting (Ipset)	
		50/51 x ¹ def reset	Current Setting (Ipset)	
		50/51 x ¹ idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 x ¹ Time delay T	50/51 x ¹ DT	Time Dial (Tpset)	

³z = 1,2

⁴x = 1,2,3,4,5,6,7,8

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
		50/51 x ¹ def reset	Time Dial (Tpset)	
		50/51 x ¹ idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 x ¹ Timer hold delay T1	50/51 x ¹ DT	Reset Delay (ResetT)	
		50/51 x ¹ def reset	Reset Delay (ResetT)	
		50/51 x ¹ idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N x ¹ Tripping curve	50N/51N x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N x ¹ Is0 set point	50N/51N x ¹ DT	Current Setting (Ipset)	
		50N/51N x ¹ def reset	Current Setting (Ipset)	
		50N/51N x ¹ idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N x ¹ Time delay T	50N/51N x ¹ DT	Time Dial (Tpset)	
		50N/51N x ¹ def reset	Time Dial (Tpset)	
		50N/51N x ¹ idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N x ¹ Timer hold delay T1	50N/51N x ¹ DT	Reset Delay (ResetT)	
		50N/51N x ¹ def reset	Reset Delay (ResetT)	
		50N/51N x ¹ idmt reset	Reset Delay (ResetT)	
	Voltage-restrained phase overcurrent 50V/51V z ⁵ Tripping curve	50V/51V z ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50V/51V z ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50V/51V z ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Voltage-restrained phase overcurrent 50V/51V z ¹ Is set point	50V/51V z ¹ DT	Current Setting (Ipset)	
		50V/51V z ¹ def reset	Current Setting (Ipset)	
		50V/51V z ¹ idmt reset	Current Setting (Ipset)	
	Voltage-restrained phase overcurrent 50V/51V z ¹ Time delay T	50V/51V z ¹ DT	Time Dial (Tpset)	
		50V/51V z ¹ def reset	Time Dial (Tpset)	

⁵z = 1,2

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Voltage-restrained phase overcurrent 50V/51V z ¹ Timer hold delay T1	50V/51V z ¹ idmt reset 50V/51V z ¹ DT	Time Dial (Tpset) Reset Delay (ResetT)	
		50V/51V z ¹ def reset 50V/51V z ¹ idmt reset	Reset Delay (ResetT) Reset Delay (ResetT)	
	Directional phase overcurrent 67 z ¹ Characteristic angle θ	Dir Phase	Max. Torque Angle (mtau)	In the "Voltage Polarizing " tab page.
	Directional phase overcurrent 67 z ¹ Tripping direction	67 z ¹ DT	Tripping Direction (idir)	
		67 z ¹ def reset	Tripping Direction (idir)	
		67 z ¹ idmt reset	Tripping Direction (idir)	
	Directional phase overcurrent 67 z ¹ Tripping curve	67 z ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		67 z ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		67 z ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Directional phase overcurrent 67 z ¹ Is set point	67 z ¹ DT	Current Setting (Ipset)	
		67 z ¹ def reset	Current Setting (Ipset)	
		67 z ¹ idmt reset	Current Setting (Ipset)	
	Directional phase overcurrent 67 z ¹ Time delay T	67 z ¹ DT	Time Dial (Tpset)	
		67 z ¹ def reset	Time Dial (Tpset)	
		67 z ¹ idmt reset	Time Dial (Tpset)	
	Directional phase overcurrent 67 z ¹ Timer hold delay T1	67 z ¹ DT	Reset Delay (ResetT)	
		67 z ¹ def reset	Reset Delay (ResetT)	
		67 z ¹ idmt reset	Reset Delay (ResetT)	
	Directional earth fault 67N z ¹ Characteristic angle θ_0	Dir Ground	Max. Torque Angle (mtau)	In the "Voltage Polarizing " tab page.
	Directional earth fault 67N z ¹ Tripping direction	67N z ¹ def reset	Tripping Direction (idir)	
		67N z ¹ idmt reset	Tripping Direction (idir)	
	Directional earth fault 67N z ¹ Tripping curve	67N z ¹ def reset	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		67N z ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
	Directional earth fault 67N z ¹ Is0 set point	67N z ¹ def reset	Current Setting (Ipset)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Directional earth fault 67N z ¹ Time delay T	67N z ¹ idmt reset 67N z ¹ def re- set 67N z ¹ idmt reset	Current Setting (Ipset) Time Dial (Tpset) Time Dial (Tpset)	
	Directional earth fault 67N z ¹ Timer hold delay T1	67N z ¹ def re- set 67N z ¹ idmt reset	Reset Delay (ResetT) Reset Delay (ResetT)	

Current subrelay SEPAM M8x :

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 / unbal- ance 46 z ⁶ Curve	46 z ¹	Characteristic (pcharac)	
	Negative sequence / unbal- ance 46 z ¹ Is set point	46 z ¹	Current Setting (Ipset)	
	Negative sequence / unbal- ance 46 z ¹ Time delay T	46 z ¹	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 se- quence 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 se- quence component	Thermal K	K (K)	In the "Logic" tab page
	Phase overcurrent 50/51 x ⁷ Tripping curve	50/51 x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is ac- tive
		50/51 x ¹ 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 x ¹ Is set point	50/51 x ¹ DT	Current Setting (Ipset)	
		50/51 x ¹ def reset	Current Setting (Ipset)	
		50/51 x ¹ idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 x ¹ Time delay T	50/51 x ¹ DT	Time Dial (Tpset)	

⁶z = 1,2

⁷x = 1,2,3,4,5,6,7,8

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 x ¹ Timer hold delay T1	50/51 x ¹ def reset 50/51 x ¹ idmt reset 50/51 x ¹ DT	Time Dial (Tpset) Time Dial (Tpset) Reset Delay (ResetT)	
	Phase overcurrent 50N/51N x ¹ Tripping curve	50/51 x ¹ def reset 50/51 x ¹ idmt reset 50N/51N x ¹ DT	Reset Delay (ResetT) Reset Delay (ResetT) Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is ac- tive
		50N/51N x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a in- verse time Reset curve is ac- tive
	Phase overcurrent 50N/51N x ¹ Is0 set point	50N/51N x ¹ DT 50N/51N x ¹ def reset 50N/51N x ¹ idmt reset	Current Setting (Ipset) Current Setting (Ipset) Current Setting (Ipset)	
	Phase overcurrent 50N/51N x ¹ Time delay T	50N/51N x ¹ DT 50N/51N x ¹ def reset 50N/51N x ¹ idmt reset	Time Dial (Tpset) Time Dial (Tpset) Time Dial (Tpset)	
	Phase overcurrent 50N/51N x ¹ Timer hold delay T1	50N/51N x ¹ DT 50N/51N x ¹ def reset 50N/51N x ¹ idmt reset	Reset Delay (ResetT) Reset Delay (ResetT) Reset Delay (ResetT)	
	Directional earth fault 67N z ¹ Characteristic angle θ_0 Directional earth fault 67N z ¹ Tripping direction	Dir Ground 67N z ¹ def re- set 67N z ¹ idmt reset	Max. Torque Angle (mtau) Tripping Direction (idir) Tripping Direction (idir)	In the "Voltage Polarizing " tab page.
	Directional earth fault 67N z ¹ Tripping curve	67N z ¹ def re- set 67N z ¹ idmt reset	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
	Directional earth fault 67N z ¹ Is0 set point	67N z ¹ def re- set 67N z ¹ idmt reset	Current Setting (Ipset) Current Setting (Ipset)	
	Directional earth fault 67N z ¹ Time delay T	67N z ¹ def re- set 67N z ¹ idmt reset	Time Dial (Tpset) Time Dial (Tpset)	
	Directional earth fault 67N z ¹ Timer hold delay T1	67N z ¹ def re- set	Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
		67N z ¹ idmt reset	Reset Delay (ResetT)	

Current subrelay SEPAM S8x, SEPAM T8x :

Address	Relay Setting	Model block	Model setting	Note
	Negative sequence / unbalance 46 z ⁸ Curve	46 z ¹	Characteristic (pcharac)	
	Negative sequence / unbalance 46 z ¹ Is set point	46 z ¹	Current Setting (Ipset)	
	Negative sequence / unbalance 46 z ¹ Time delay T	46 z ¹	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 x ⁹ Tripping curve	50/51 x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50/51 x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with an inverse time Reset curve is active
	Phase overcurrent 50/51 x ¹ Is set point	50/51 x ¹ DT	Current Setting (Ipset)	
		50/51 x ¹ def reset	Current Setting (Ipset)	
		50/51 x ¹ idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50/51 x ¹ Time delay T	50/51 x ¹ DT	Time Dial (Tpset)	
		50/51 x ¹ def reset	Time Dial (Tpset)	
		50/51 x ¹ idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50/51 x ¹ Timer hold delay T1	50/51 x ¹ DT	Reset Delay (ResetT)	
		50/51 x ¹ def reset	Reset Delay (ResetT)	
		50/51 x ¹ idmt reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N x ¹ Tripping curve	50N/51N x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active

⁸z = 1,2

⁹x = 1,2,3,4,5,6,7,8

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
		50N/51N x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N x ¹ Is0 set point	50N/51N x ¹ DT	Current Setting (Ipset)	
		50N/51N x ¹ def reset	Current Setting (Ipset)	
		50N/51N x ¹ idmt reset	Current Setting (Ipset)	
	Phase overcurrent 50N/51N x ¹ Time delay T	50N/51N x ¹ DT	Time Dial (Tpset)	
		50N/51N x ¹ def reset	Time Dial (Tpset)	
		50N/51N x ¹ idmt reset	Time Dial (Tpset)	
	Phase overcurrent 50N/51N x ¹ Timer hold delay T1	50N/51N x ¹ DT	Reset Delay (ResetT)	
		50N/51N x ¹ def reset	Reset Delay (ResetT)	
		50N/51N x ¹ idmt reset	Reset Delay (ResetT)	
	Directional phase overcurrent 67 z ¹ Characteristic angle θ	Dir Phase	Max. Torque Angle (mtau)	In the "Voltage Polarizing " tab page.
	Directional phase overcurrent 67 z ¹ Tripping direction	67 z ¹ DT	Tripping Direction (idir)	
		67 z ¹ def reset	Tripping Direction (idir)	
		67 z ¹ idmt reset	Tripping Direction (idir)	
	Directional phase overcurrent 67 z ¹ Tripping curve	67 z ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		67 z ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		67 z ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Directional phase overcurrent 67 z ¹ Is set point	67 z ¹ DT	Current Setting (Ipset)	
		67 z ¹ def reset	Current Setting (Ipset)	
		67 z ¹ idmt reset	Current Setting (Ipset)	
	Directional phase overcurrent 67 z ¹ Time delay T	67 z ¹ DT	Time Dial (Tpset)	
		67 z ¹ def reset	Time Dial (Tpset)	
		67 z ¹ idmt reset	Time Dial (Tpset)	
	Directional phase overcurrent 67 z ¹ Timer hold delay T1	67 z ¹ DT	Reset Delay (ResetT)	
		67 z ¹ def reset	Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Directional earth fault 67N z ¹ Characteristic angle θ_0	67 z ¹ idmt re-set	Reset Delay (ResetT)	In the "Voltage Polarizing" tab page.
	Directional earth fault 67N z ¹ Tripping direction	Dir Ground	Max. Torque Angle (mtau)	
		67N z ¹ def re-set	Tripping Direction (idir)	<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>
	Directional earth fault 67N z ¹ Tripping curve	67N z ¹ idmt reset	Tripping Direction (idir)	
		67N z ¹ def re-set	Characteristic (pcharac)	
		67N z ¹ idmt reset	Characteristic (pcharac)	
	Directional earth fault 67N z ¹ Is0 set point	67N z ¹ def re-set	Current Setting (Ipset)	
		67N z ¹ idmt reset	Current Setting (Ipset)	
	Directional earth fault 67N z ¹ Time delay T	67N z ¹ def re-set	Time Dial (Tpset)	
		67N z ¹ idmt reset	Time Dial (Tpset)	
	Directional earth fault 67N z ¹ Timer hold delay T1	67N z ¹ def re-set	Reset Delay (ResetT)	
		67N z ¹ idmt reset	Reset Delay (ResetT)	

Current subrelay SEPAM x8x :

Address	Relay Setting	Model block	Model setting	Note
	Phase undercurrent 37 Is set point	37	Pickup Current (Ipset)	<p>In the "Logic" tab page</p> <p>In the "Logic" tab page</p> <p>Enable the block when the "Definite time" Tripping curve is active</p>
	Phase undercurrent 37 Time delay T	37	Time Setting (Tset)	
	Negative sequence / unbalance 46 z ¹⁰ Curve	46 z ¹	Characteristic (pcharac)	
	Negative sequence / unbalance 46 z ¹ Is set point	46 z ¹	Current Setting (Ipset)	
	Negative sequence / unbalance 46 z ¹ Time delay T	46 z ¹	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)	
	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)	
	Phase overcurrent 50/51 x ¹¹ Tripping curve	50/51 x ¹ DT	Characteristic (pcharac)	

¹⁰z = 1,2

¹¹x = 1,2,3,4,5,6,7,8

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Phase overcurrent 50/51 x ¹ Is set point	50/51 x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50/51 x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
		50/51 x ¹ DT	Current Setting (Ipset)	
		50/51 x ¹ def reset	Current Setting (Ipset)	
		50/51 x ¹ idmt reset	Current Setting (Ipset)	
		50/51 x ¹ DT	Time Dial (Tpset)	
	Phase overcurrent 50/51 x ¹ Time delay T	50/51 x ¹ def reset	Time Dial (Tpset)	
		50/51 x ¹ idmt reset	Time Dial (Tpset)	
		50/51 x ¹ DT	Reset Delay (ResetT)	
		50/51 x ¹ def reset	Reset Delay (ResetT)	
	Phase overcurrent 50/51 x ¹ Timer hold delay T1	50/51 x ¹ idmt reset	Reset Delay (ResetT)	
		50/51 x ¹ def reset	Reset Delay (ResetT)	
		50/51 x ¹ idmt reset	Reset Delay (ResetT)	
		50/51 x ¹ def reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N x ¹ Tripping curve	50N/51N x ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50N/51N x ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		50N/51N x ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Phase overcurrent 50N/51N x ¹ Is0 set point	50N/51N x ¹ DT	Current Setting (Ipset)	
		50N/51N x ¹ def reset	Current Setting (Ipset)	
		50N/51N x ¹ idmt reset	Current Setting (Ipset)	
		50N/51N x ¹ DT	Time Dial (Tpset)	
	Phase overcurrent 50N/51N x ¹ Time delay T	50N/51N x ¹ def reset	Time Dial (Tpset)	
		50N/51N x ¹ idmt reset	Time Dial (Tpset)	
		50N/51N x ¹ DT	Reset Delay (ResetT)	
		50N/51N x ¹ def reset	Reset Delay (ResetT)	
	Phase overcurrent 50N/51N x ¹ Timer hold delay T1	50N/51N x ¹ idmt reset	Reset Delay (ResetT)	
		50N/51N x ¹ def reset	Reset Delay (ResetT)	
		50N/51N x ¹ idmt reset	Reset Delay (ResetT)	
		50N/51N x ¹ def reset	Reset Delay (ResetT)	
	Voltage-restrained phase overcurrent 50V/51V z ¹² Tripping curve	50V/51V z ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		50V/51V z ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active

¹²Z = 1,2

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
		50V/51V z ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Voltage-restrained phase overcurrent 50V/51V z ¹ Is set point	50V/51V z ¹ DT	Current Setting (Ipset)	
		50V/51V z ¹ def reset	Current Setting (Ipset)	
		50V/51V z ¹ idmt reset	Current Setting (Ipset)	
	Voltage-restrained phase overcurrent 50V/51V z ¹ Time delay T	50V/51V z ¹ DT	Time Dial (Tpset)	
		50V/51V z ¹ def reset	Time Dial (Tpset)	
		50V/51V z ¹ idmt reset	Time Dial (Tpset)	
	Voltage-restrained phase overcurrent 50V/51V z ¹ Timer hold delay T1	50V/51V z ¹ DT	Reset Delay (ResetT)	
		50V/51V z ¹ def reset	Reset Delay (ResetT)	
		50V/51V z ¹ idmt reset	Reset Delay (ResetT)	
	Directional phase overcurrent 67 z ¹ Characteristic angle θ	Dir Phase	Max. Torque Angle (mtau)	In the "Voltage Polarizing" tab page.
	Directional phase overcurrent 67 z ¹ Tripping direction	67 z ¹ DT	Tripping Direction (idir)	
		67 z ¹ def reset	Tripping Direction (idir)	
		67 z ¹ idmt reset	Tripping Direction (idir)	
	Directional phase overcurrent 67 z ¹ Tripping curve	67 z ¹ DT	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
		67 z ¹ def reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a definite time Reset curve is active
		67 z ¹ idmt reset	Characteristic (pcharac)	Enable the block when an IDMT Tripping curve with a inverse time Reset curve is active
	Directional phase overcurrent 67 z ¹ Is set point	67 z ¹ DT	Current Setting (Ipset)	
		67 z ¹ def reset	Current Setting (Ipset)	
		67 z ¹ idmt reset	Current Setting (Ipset)	
	Directional phase overcurrent 67 z ¹ Time delay T	67 z ¹ DT	Time Dial (Tpset)	
		67 z ¹ def reset	Time Dial (Tpset)	
		67 z ¹ idmt reset	Time Dial (Tpset)	
	Directional phase overcurrent 67 z ¹ Timer hold delay T1	67 z ¹ DT	Reset Delay (ResetT)	
		67 z ¹ def reset	Reset Delay (ResetT)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Directional earth fault 67N z ¹ Characteristic angle θ_0	67 z ¹ idmt re-set	Reset Delay (ResetT)	In the "Voltage Polarizing" tab page.
	Directional earth fault 67N z ¹ Tripping direction	Dir Ground	Max. Torque Angle (mtau)	
		67N z ¹ def re-set	Tripping Direction (idir)	<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>
	Directional earth fault 67N z ¹ Tripping curve	67N z ¹ idmt reset	Tripping Direction (idir)	
		67N z ¹ def re-set	Characteristic (pcharac)	
		67N z ¹ idmt reset	Characteristic (pcharac)	
	Directional earth fault 67N z ¹ Is0 set point	67N z ¹ def re-set	Current Setting (Ipset)	
		67N z ¹ idmt reset	Current Setting (Ipset)	
	Directional earth fault 67N z ¹ Time delay T	67N z ¹ def re-set	Time Dial (Tpset)	
		67N z ¹ idmt reset	Time Dial (Tpset)	
	Directional earth fault 67N z ¹ Timer hold delay T1	67N z ¹ def re-set	Reset Delay (ResetT)	
		67N z ¹ idmt reset	Reset Delay (ResetT)	

Differential subrelay SEPAM G8x, SEPAM x8x :

Address	Relay Setting	Model block	Model setting	Note
	Restricted earth fault differential 64REF 1 Is0	64 REF 1	Differential Current base threshold (Idiff)	
	Restricted earth fault differential 64REF 2 Is0	64 REF 2	Differential Current base threshold (Idiff)	
	Machine differential 87M Is set point	87M	Differential Current base threshold (Idiff)	
		1st half curve	Pickup Current (Ipset)	
	Transformer differential 87T Ids minimum set point	87T	Differential Current base threshold (Idiff)	
	Transformer differential 87T Percentage-based characteristics Id/It	87T	Restrain Percentage 1 (Irestrpercent1)	

Differential subrelay SEPAM M8x :

Address	Relay Setting	Model block	Model setting	Note
	Machine differential 87M Is set point	87M	Differential Current base threshold (Idiff)	
		1st half curve	Pickup Current (Ipset)	
	Transformer differential 87T Ids minimum set point	87T	Differential Current base threshold (Idiff)	
	Transformer differential 87T Percentage-based characteristics Id/It	87T	Restrain Percentage 1 (Irestrpercent1)	

3 Supported features

Differential subrelay SEPAM T8x :

Address	Relay Setting	Model block	Model setting	Note
	Restricted earth fault differential 64REF 1 Is0	64 REF 1	Differential Current base threshold (Idiff)	
	Restricted earth fault differential 64REF 2 Is0	64 REF 2	Differential Current base threshold (Idiff)	
	Transformer differential 87T Ids minimum set point	87T	Differential Current base threshold (Idiff)	
	Transformer differential 87T Percentage-based characteristics Id/It	87T	Restrain Percentage 1 (Irestrpercent1)	

Distance subrelay SEPAM G8x, SEPAM x8x :

Address	Relay Setting	Model block	Model setting	Note
	Field loss 40 Common point Xa	40 1	Offset Impedance (Zoff)	
		40 2	Offset Impedance (Zoff)	
	Field loss 40 Circle 1: Xb	40 1	Replica Impedance (Zm)	
	Field loss 40 Circle 2: Xc	40 2	Replica Impedance (Zm)	
	T1 time: tripping time delay circle 1	40 1 TD	Time Setting (Tdelay)	
	T2 time: tripping time delay circle 2	40 2 TD	Time Setting (Tdelay)	
	Underimpedance 21B Set point Ω_s	Z<	Replica Impedance (Zm)	
	Underimpedance 21B Time delay T	Z< TD	Time Setting (Tdelay)	

Distance subrelay SEPAM M8x :

Address	Relay Setting	Model block	Model setting	Note
	Field loss 40 Common point Xa	40 1	Offset Impedance (Zoff)	
		40 2	Offset Impedance (Zoff)	
	Field loss 40 Circle 1: Xb	40 1	Replica Impedance (Zm)	
	Field loss 40 Circle 2: Xc	40 2	Replica Impedance (Zm)	
	T1 time: tripping time delay circle 1	40 1 TD	Time Setting (Tdelay)	
	T2 time: tripping time delay circle 2	40 2 TD	Time Setting (Tdelay)	

Frequency & Flux subrelay SEPAM B8x, SEPAM M8x :

Address	Relay Setting	Model block	Model setting	Note
	Overfrequency 81H z ¹ Vs set point	Vs	Pickup Voltage (Uset)	
	Overfrequency 81H z ¹ Fs set points	81Hz ¹	Frequency (Fset)	
	Overfrequency 81H z ¹ Time delay T	81Hz ¹	Time Delay (Tdel)	

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Underfrequency 81L y ¹³ Fs set points	81Ly ¹	Frequency (Fset)	
	Underfrequency 81L y ¹ Time delay T	81Ly ¹	Time Delay (Tdel)	

Frequency & Flux subrelay SEPAM G8x, SEPAM T8x :

Address	Relay Setting	Model block	Model setting	Note
	Overfluxing (V / Hz) 24 z ¹ Tripping curve	24 z ¹	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active
	Overfluxing (V / Hz) 24 z ¹ Gs set point	24 z ¹	Current Setting (Ipset)	
	Overfluxing (V / Hz) 24 z ¹ Time delay T	24 z ¹	Time Dial (Tpset)	
	Overfrequency 81H z ¹ Vs set point	Vs	Pickup Voltage (Uset)	
	Overfrequency 81H z ¹ Fs set points	81Hz ¹	Frequency (Fset)	
	Overfrequency 81H z ¹ Time delay T	81Hz ¹	Time Delay (Tdel)	
	Underfrequency 81L y ¹ Fs set points	81Ly ¹	Frequency (Fset)	
	Underfrequency 81L y ¹ Time delay T	81Ly ¹	Time Delay (Tdel)	

Frequency & Flux subrelay SEPAM S8x :

Address	Relay Setting	Model block	Model setting	Note
	Overfrequency 81H z ¹ Vs set point	Vs	Pickup Voltage (Uset)	
	Overfrequency 81H z ¹ Fs set points	81Hz ¹	Frequency (Fset)	
	Overfrequency 81H z ¹ Time delay T	81Hz ¹	Time Delay (Tdel)	
	Underfrequency 81L y ¹ Fs set points	81Ly ¹	Frequency (Fset)	
	Underfrequency 81L y ¹ Time delay T	81Ly ¹	Time Delay (Tdel)	
	Rate of change of frequency 81R z ¹ dfs/dt set point	81Rz ¹	Gradient df/dt	
	Rate of change of frequency 81R z ¹ Temporisation	81Rz ¹	Time Delay	

Frequency & Flux subrelay SEPAM x8x :

Address	Relay Setting	Model block	Model setting	Note
	Overfluxing (V / Hz) 24 z ¹⁴ Tripping curve	24 z ¹	Characteristic (pcharac)	Enable the block when the "Definite time" Tripping curve is active

¹³y = 1,2,3,4

¹⁴z = 1,2

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Overfluxing (V / Hz) 24 z ¹ Gs set point	24 z ¹	Current Setting (Ipset)	
	Overfluxing (V / Hz) 24 z ¹ Time delay T	24 z ¹	Time Dial (Tpset)	
	Overfrequency 81H z ¹ Vs set point	Vs	Pickup Voltage (Uset)	
	Overfrequency 81H z ¹ Fs set points	81Hz ¹	Frequency (Fset)	
	Overfrequency 81H z ¹ Time delay T	81Hz ¹	Time Delay (Tdel)	
	Underfrequency 81L y ¹ Fs set points	81Ly ¹	Frequency (Fset)	
	Underfrequency 81L y ¹ Time delay T	81Ly ¹	Time Delay (Tdel)	
	Rate of change of frequency 81R z ¹ df/dt set point	81Rz ¹	Gradient df/dt	
	Rate of change of frequency 81R z ¹ Temporisation	81Rz ¹	Time Delay	

Power subrelay SEPAM G8x, SEPAM x8x :

Address	Relay Setting	Model block	Model setting	Note
	Directional active overpower 32P z ¹⁵ Tripping direction	32P z ¹	Tripping Direction (idir)	
	Directional active overpower 32P z ¹ Ps set point	32P z ¹	Input Setting (Ipset)	
	Directional active overpower 32P z ¹ Time delay T	32P z ¹	Time Dial (Tpset)	
	Directional reactive overpower 32Q Tripping direction	32Q	Tripping Direction (idir)	
	Directional reactive overpower 32Q Ps set point	32Q	Input Setting (Ipset)	
	Directional reactive overpower 32Q Time delay T	32Q	Time Dial (Tpset)	
	Directional active underpower 37P Tripping direction	37P	Tripping Direction (idir)	
	Directional active underpower 37P Ps set point	37P	Input Setting (Ipset)	
	Directional active underpower 37P Time delay T	37P	Time Dial (Tpset)	

Power subrelay SEPAM M8x :

Address	Relay Setting	Model block	Model setting	Note
	Directional active overpower 32P z ¹ Tripping direction	32P z ¹	Tripping Direction (idir)	
	Directional active overpower 32P z ¹ Ps set point	32P z ¹	Input Setting (Ipset)	
	Directional active overpower 32P z ¹ Time delay T	32P z ¹	Time Dial (Tpset)	
	Directional reactive overpower 32Q Tripping direction	32Q	Tripping Direction (idir)	

¹⁵z = 1,2

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Directional reactive over-power 32Q Ps set point	32Q	Input Setting (Ipset)	
	Directional reactive over-power 32Q Time delay T	32Q	Time Dial (Tpset)	

Power subrelay SEPAM S8x, SEPAM T8x :

Address	Relay Setting	Model block	Model setting	Note
	Directional active overpower 32P z ¹ Tripping direction	32P z ¹	Tripping Direction (idir)	
	Directional active overpower 32P z ¹ Ps set point	32P z ¹	Input Setting (Ipset)	
	Directional active overpower 32P z ¹ Time delay T	32P z ¹	Time Dial (Tpset)	
	Directional active under-power 37P Tripping direction	37P	Tripping Direction (idir)	
	Directional active under-power 37P Ps set point	37P	Input Setting (Ipset)	
	Directional active under-power 37P Time delay T	37P	Time Dial (Tpset)	

Voltage subrelay SEPAM B8x :

Address	Relay Setting	Model block	Model setting	Note
	Undervoltage (L-L or L-N) 27 z ¹⁶ Us (or Vs) set point	27LL z ¹	Pickup Voltage (Uset)	
	Undervoltage (L-L or L-N) 27 z ¹⁶ Voltage mode	27LN z ¹ 27LL z ¹	Pickup Voltage (Uset) Out of Service (outserv)	Enable when <i>Voltage mode</i> is Phase-to-phase voltage
	Undervoltage (L-L or L-N) 27 z ¹⁶ Time delay T	27LN z ¹ 27LL z ¹	Out of Service (outserv) Time Delay (Tdel)	Enable when <i>Voltage mode</i> is Phase-to-neutral voltage
	Positive sequence undervoltage and phase rotation direction check 27D y ¹⁷ Vsd set point	27LN z ¹ 27D y ¹	Time Delay (Tdel) Pickup Voltage (Uset)	
	Positive sequence undervoltage and phase rotation direction check 27D y ¹ Time delay T	27D y ¹	Time Delay (Tdel)	
	Remanent undervoltage 27R z ¹ Us set point	27R U21 z ¹	Pickup Voltage (Uset)	
	Remanent undervoltage 27R z ¹ Time delay T	27R V1 z ¹ 27R U21 z ¹	Pickup Voltage (Uset) Time Delay (Tdel)	
	Overvoltage (L-L or L-N) 59 y ¹ Us (or Vs) set point	27R V1 z ¹ 59LL y ¹	Time Delay (Tdel) Pickup Voltage (Uset)	
	Overvoltage (L-L or L-N) 59 y ¹ Voltage mode	59LN y ¹ 59LL y ¹	Pickup Voltage (Uset) Out of Service (outserv)	Enable when <i>Voltage mode</i> is Phase-to-phase voltage

¹⁶z = 1,2

¹⁷y = 1,2,3,4

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Overvoltage (L-L or L-N)59 y ¹ Time delay T	59LN y ¹	Out of Service (outserv)	Enable when <i>Voltage mode</i> is Phase-to-neutral voltage
	Neutral voltage displacement 59N Vs0 z ¹ set point	59LL y ¹	Time Delay (Tdel)	
	Neutral voltage displacement 59N Vs0 z ¹ Time delay T (tripping time at 2 Vs0)	59LN y ¹	Time Delay (Tdel)	
	Negative sequence overvoltage 47 z ¹ Vsi set point	59N z ¹	Pickup Voltage (Uset)	
	Negative sequence overvoltage 47 z ¹ Time delay T	59N z ¹	Time Delay (Tdel)	
		47 z ¹	Pickup Voltage (Uset)	
		47 z ¹	Time Delay (Tdel)	

Voltage subrelay SEPAM G8x, SEPAM M8x, SEPAM S8x, SEPAM T8x, SEPAM x8x :

Address	Relay Setting	Model block	Model setting	Note
	Undervoltage (L-L or L-N) 27 y ¹ Us (or Vs) set point	27LL y ¹	Pickup Voltage (Uset)	Enable when <i>Voltage mode</i> is Phase-to-phase voltage Enable when <i>Voltage mode</i> is Phase-to-neutral voltage
	Undervoltage (L-L or L-N)27 y ¹ Voltage mode	27LN y ¹	Pickup Voltage (Uset)	
		27LL y ¹	Out of Service (outserv)	
		27LN y ¹	Out of Service (outserv)	
	Undervoltage (L-L or L-N)27 y ¹ Time delay T	27LL y ¹	Time Delay (Tdel)	
		27LN y ¹	Time Delay (Tdel)	
	Positive sequence undervoltage and phase rotation direction check 27D z ¹⁸ Vsd set point	27D z ¹	Pickup Voltage (Uset)	Enable when <i>Voltage mode</i> is Phase-to-phase voltage Enable when <i>Voltage mode</i> is Phase-to-neutral voltage
	Positive sequence undervoltage and phase rotation direction check 27D z ¹ Time delay T	27D z ¹	Time Delay (Tdel)	
	Remanent undervoltage 27R z ¹ Us set point	27R U21 z ¹	Pickup Voltage (Uset)	
	Remanent undervoltage 27R z ¹ Time delay T	27R V1 z ¹	Pickup Voltage (Uset)	
		27R U21 z ¹	Time Delay (Tdel)	
	Overvoltage (L-L or L-N) 59 y ¹ Us (or Vs) set point	27R V1 z ¹	Time Delay (Tdel)	
		59LL y ¹	Pickup Voltage (Uset)	
	Overvoltage (L-L or L-N)59 y ¹ Voltage mode	59LN y ¹	Pickup Voltage (Uset)	
		59LL y ¹	Out of Service (outserv)	
		59LN y ¹	Out of Service (outserv)	
	Overvoltage (L-L or L-N)59 y ¹ Time delay T	59LL y ¹	Time Delay (Tdel)	
	Neutral voltage displacement 59N Vs0 z ¹ set point	59LN y ¹	Time Delay (Tdel)	
	Neutral voltage displacement 59N Vs0 z ¹ Time delay T (tripping time at 2 Vs0)	59N z ¹	Pickup Voltage (Uset)	
		59N z ¹	Time Delay (Tdel)	

¹⁸Z = 1,2

3 Supported features

Address	Relay Setting	Model block	Model setting	Note
	Negative sequence overvoltage 47 z ¹ Vsi set point	47 z ¹	Pickup Voltage (Uset)	
	Negative sequence overvoltage 47 z ¹ Time delay T	47 z ¹	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:

- Overspeed ANSI code 12.
- Underspeed ANSI code 14.
- Synchro-check ANSI code 25.
- Third harmonic undervoltage ANSI code 27TN/64G2.
- Breaker failure ANSI code 50BF.
- Capacitor bank unbalance ANSI code 51C.
- Pole slip ANSI code 78PS.

G8x

- Temperature monitoring ANSI code 38/49T.
- Inadvertent energization ANSI code 50/27.
- 100 % stator earth fault ANSI code 64G.

M8x

- Excessive starting time/locked rotor ANSI code 48/51LR.
- Starts per hour ANSI code 66.

Differential subrelay

- Vector magnitude and phase adaptation of the input currents.

Voltage subrelay

- Undervoltage (L-L or L-N) ANSI code 27 idmt trip characteristic.

5 References

- [1] Schneider Electric Industries SAS, 89, boulevard Franklin Roosevelt F - 92500 Rueil-Malmaison (France). *Electrical network protection Sepam series 80 Metering, protection, control and monitoring User's manual January 2005 SEPED303001EN /1 01-2005*, 2004.