



POWERFACTORY

PowerFactory 2021

Technical Reference

DlgSILENT F21 Distance Polygonal RX Generic Relay

POWER SYSTEM SOLUTIONS
MADE IN GERMANY

F2021

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1 F21 Distance Polygonal RX

1.1 Intent

To simulate a set of distance phase and ground polygonal elements with overcurrent/voltage restraint overcurrent starting.

1.2 Functionality

The *F21 Distance Polygonal RX* generic relay models 5 phase polygonal and 5 ground polygonal, a polarizing element, an overcurrent starting element, one distance directional element and one load encroachment element. The starting element can trigger a delayed back up trip. The polarizing method calculates the R,X values of the fault position and is user configurable; one of the following polarization methods can be used:

- Self.
- Cross Quadrature.
- Cross (Quad L-L).
- Positive sequence.
- Self, Ground compensated.

When an EMT simulation is run the R,X values are calculated using a Discrete Fourier Method (DFT).

The distance elements can operate a single phase (for phase-ground faults), a double phase (for phase-phase faults) or a 3 phase trip.

The POTT (Permissive Overreach Transfer Trip) and the PUTT (Permissive Underreach Transfer Trip) distance protection schemes are supported.

The *F21 Distance Polygonal RX* generic relay can be associated to the following generic relays:

- F50BF Breaker failure.
- F68 OOS/Power Swing.
- F79 Recloser.

1.3 Inputs

- One 3 phase CT ("Phase Ct" block, [*StaCt* class]).
- One 3 phase VT ("Phase Vt" block, [*StaVt* class]).

1.4 Available Units

Measurement

- One 3phase measurement element ("Measurement" block, *RMS Calculation* enabled, *Filter* enabled [*RelMeasure* class]).

- One 3phase delta current and voltages measurement element ("Measurement Delta" block, *RMS Calculation* enabled, *Filter* enabled [RelMeasure class]).

Protective elements

- One polarizing element ("Polarizing" block, [RelZpol class]).
- One starting element ("Starting" block, [RelFdetect class]).
- One directional element ("Directional" block, [RelDisdir class]).
- One load encroachment element ("Load encroachment", [RelDisloadenc class]).
- Five 3 phase-phase loop polygonal elements ("Ph-Ph Polygonal 1", "Ph-Ph Polygonal 2", "Ph-Ph Polygonal 3", "Ph-Ph Polygonal 4" and "Ph-Ph Polygonal 5" block, [RelDispoly class]).
- Five 3 phase-ground loop polygonal elements ("Ph-Grnd Polygonal 1", "Ph-Grnd Polygonal 2", "Ph-Grnd Polygonal 3", "Ph-Grnd Polygonal 4" and "Ph-Grnd Polygonal 5" block, [RelDispoly class]).
- Five timers ("Polygonal 1 Delay", "Polygonal 2 Delay", "Polygonal 3 Delay", "Polygonal 4 Delay", and "Polygonal 5 Delay" block, [RelTimer class]).
- One delayed trip timer triggered by to the starting signal ("Starting Backup trip delay" block, [RelTimer class]).

Output logic

- One output block ("Output logic", RelLogdip class).

The output logic can be configured in the "Logic" tab page of the "Output Logic" block.

1.5 Outputs

- *yout* associated by default to any protective element trip trigs a 3 phase trip.
- *yout_A* associated by default to any protective element trip trigs a phase A trip (*single phase* and *two phase trip* only).
- *yout_B* associated by default to any protective element trip trigs a phase B trip (*single phase* and *two phase trip* only).
- *yout_C* associated by default to any protective element trip trigs a phase C trip (*single phase* and *two phase trip* only).