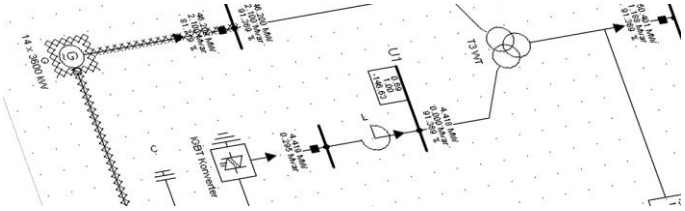

DIgSILENT Technical Documentation

Areva Micom P115
PowerFactory
V001 Relay model description

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1 Model general description

The Areva P115 relay is a phase fault non directional protection relay. The Areva P115 PowerFactory relay model is implementing all the protective functions available in the relay; it consists of the measurement and acquisition units, the protective elements, the breaker failure feature, the start situation detection logic and the output logic.

1.1 Measurement and acquisition

1.1.1 Available Units

The primary current is measured by two current transformers ("Ct" and "Ct-E/N" block). The "Ct-E/N" block can be used to connect a Core CT measuring the zero sequence current or a single phase CT measuring the neutral current. If such CTs are not present the 3phase CT must be connected.

Two measurement units ("Phase Measure" and "Earth Measure" block) are fed by these CTs.

1.1.2 Functionality

The input signals are sampled in the relay model at 20 samples/cycle; a DFT filter operating over a cycle calculates the current values used by the protective elements. Please notice that no info is available in the manual about the sampling rate. For this reason an implementation common in many protective relays has been used.

1.1.3 Data Input

Please note that the nominal current value MUST be entered in the measurement unit.

1.2 Protective elements

1.2.1 Available Units

- Two phase current inverse time overcurrent elements ("I>" and "I>>" block)
- One phase current definite time overcurrent element ("I>>>" block)

- One ground current inverse time overcurrent element ("IN>" block)
- One ground current definite time overcurrent element ("IN>>" block)
- One definite time asymmetry overcurrent protection ("Iasym" block)

1.2.2 Functionality

The PF model contains all the protective elements available in the relay.

The inverse time overcurrent element supports the following trip characteristics:

- "Definite time" (DT)
- IEC EI "Extremely Inverse Time"
- IEC VI "Very Inverse Time"
- IEC SI "Standard Inverse Time"
- IEC LTI "Long Time Inverse Time"
- IEC STI "Short Time Inverse"
- Rectifier (Rect)
- RI
- IEEE MI "Moderately Inverse Time"
- IEEE VI "Very Inverse Time"
- Time inverse CO8
- Short Time inverse CO2

The relevant IDMT reset characteristics (when available for a given trip characteristic) have been implemented as well.

1.3 Breaker failure

1.3.1 Available Units

The Circuit breaker failure protection feature is modelled by the "CBFP" block, by the "Min I" and the "Min IN" block.

1.3.2 Functionality

The "CBFP" block is a timer which is operating the relay model "RL2" output signal when the phase current is still present after *CBFP* (relay setting) seconds that the "RL1" output signal has been activated.

1.3.3 Data input

Please insert the "CBFP" relay setting as "Time setting" of the "CBFP" block in the PF relay model.

1.4 Output logic

1.4.1 Available Units

The output logic is implemented by the "Trip logic" and by the "Output logic" block.

1.4.2 Functionality

The "Output logic" block is operating the breaker. Please disable the "Output Logic" block to disable the relay model ability to open the power circuit.

The signal operating the breaker is "RL1"; the output signal "RL2" is available as well and is controlled by the breaker failure feature. Please notice that the power breaker is not operated by "RL2".

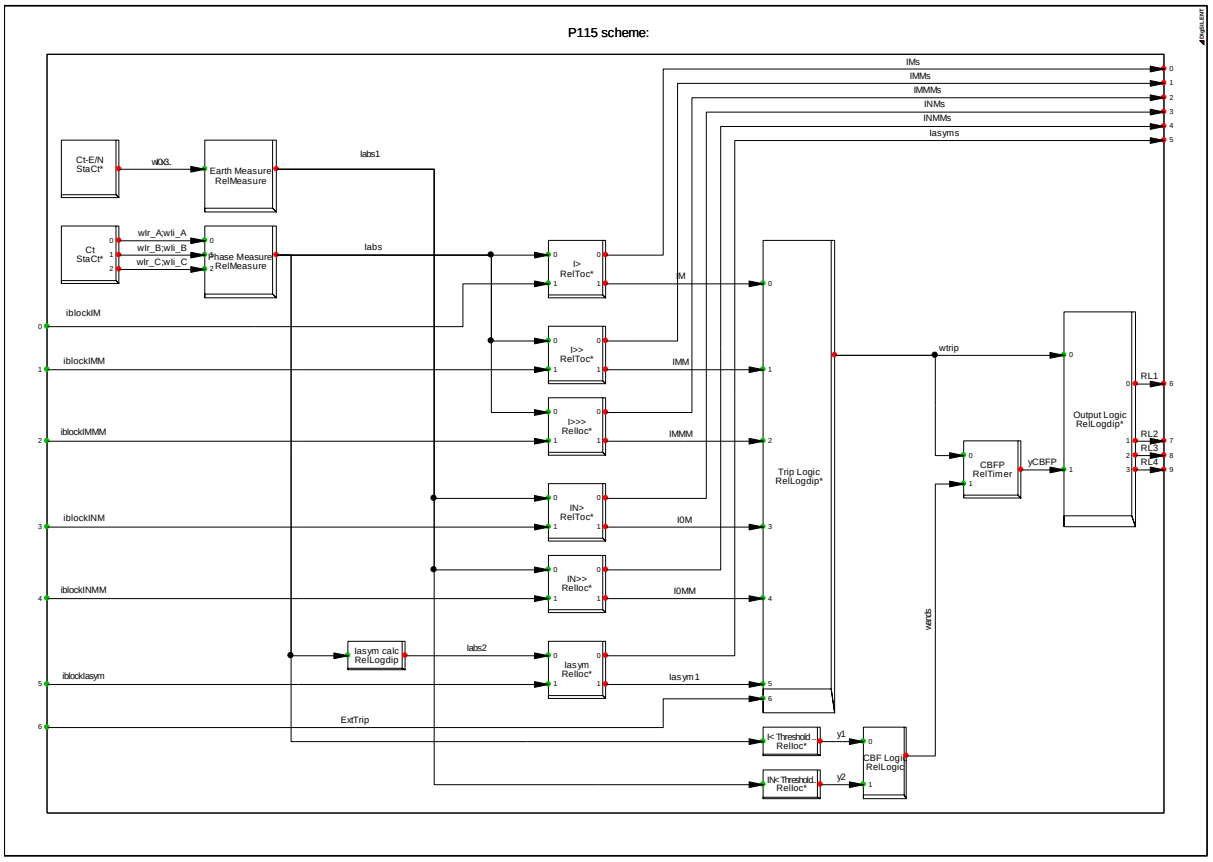
An additional signal ("ExtTrip") is available to mock up the external trip command feature.

2 Relay not supported features

The following features are not supported:

- Additional setting group
- Output latch
- Dynamic range
- DMT reset characteristic

3 Model scheme



4 References

The model implementation has been based on the information available in the "MICOM P115 DUAL /CT POWERED OVERCURRENT RELAY Software Version: 1C Hardware Suffix: A Technical Manual P115/EN M/A31" document.