

How to configure short circuit fault locator

When relay includes a stand-alone fault location algorithm, the algorithm can locate a short circuit in radial operated networks. The fault location is given as in reactance (ohms) and kilometers. The distance value is valid only if the line reactance is set correctly. Furthermore, the line should be homogenous, that is, the wire type of the line should be the same for the whole length. If there are several wire types on the same line, an average line reactance value can be used to get an approximate distance value to the fault.

The algorithm functions in the following order:

1. The needed measurements (phase currents and voltages) are continuously available.
2. When Xfault calc is enabled sudden increase in phase currents will trigger calculation. As additional function DI signal for example from opening circuit breaker due a fault can be added as an extra condition needed for triggering the calculation.
3. Phase currents and voltages are registered in three stages: before the fault, during the fault and after the faulty feeder/incomer circuit-breaker was opened.
4. The fault distance quantities are calculated.
5. Two phases with the biggest fault current are selected.
6. The load currents are compensated.
7. The faulty line length reactance is calculated.

DISTANCE TO SHORT CIRCUIT

Enable Xfault calc <input checked="" type="checkbox"/>	
Fault reactance	0.00 ohm
Distance to fault	0.0 km
Voltage drop	0 %
Fault duration	0.00 s
Fault type	-
Number of faults	0
Fault date	-
Fault time hh:mm:ss.mss	-
Current before fault	0 A
Fault current	0 A
Current after fault	0 A
Algorithm condition OK	
Reference current	0 A
Trig limit current	0 A
Current change to trig	50 %
Triggering digital input	-
Line reactance/unit	0.389 ohm
Blocked before next trig	15 s
Xmax limit	10.0 ohm
Unit(km)	km
Event enabling	<input checked="" type="checkbox"/>

Enable Xfault calc

→ When enabled sudden increase in phase currents will trigger calculation

Current change to trig

→ Amount of needed sudden current change to trigger calculation

Triggering digital input

→ Extra condition needed with sudden increase on phase currents to trigger calculation

(if “-“ no extra conditions in use)

Line reactance/unit

→ Line reactance of the line. This is used only to convert the fault reactance to kilometers.

Blocked before next trig

→ Time when new calculation is blocked after calculation triggered.

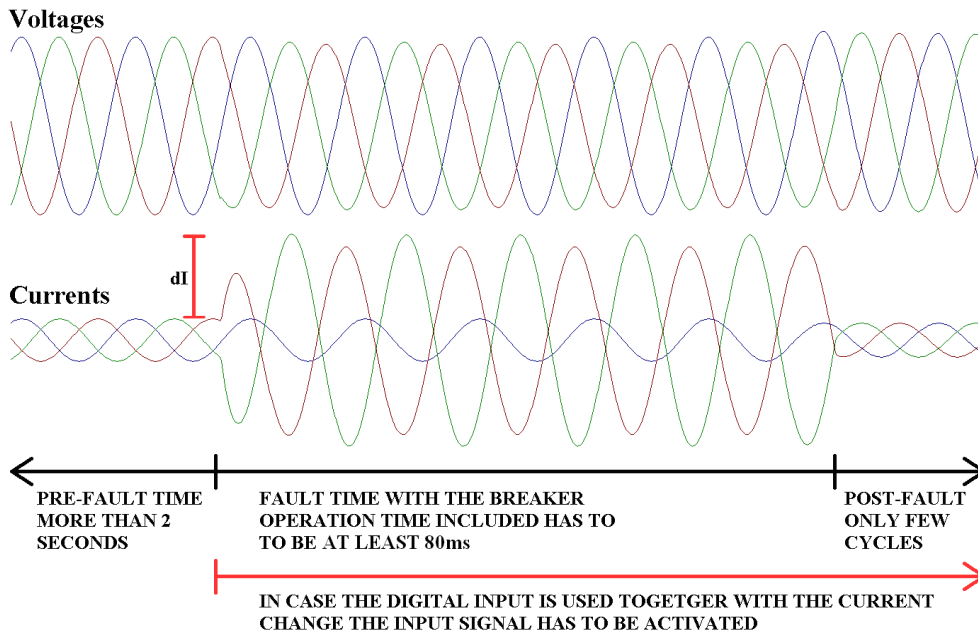
(Used to prevent calculation after Auto reclose)

Xmax limit

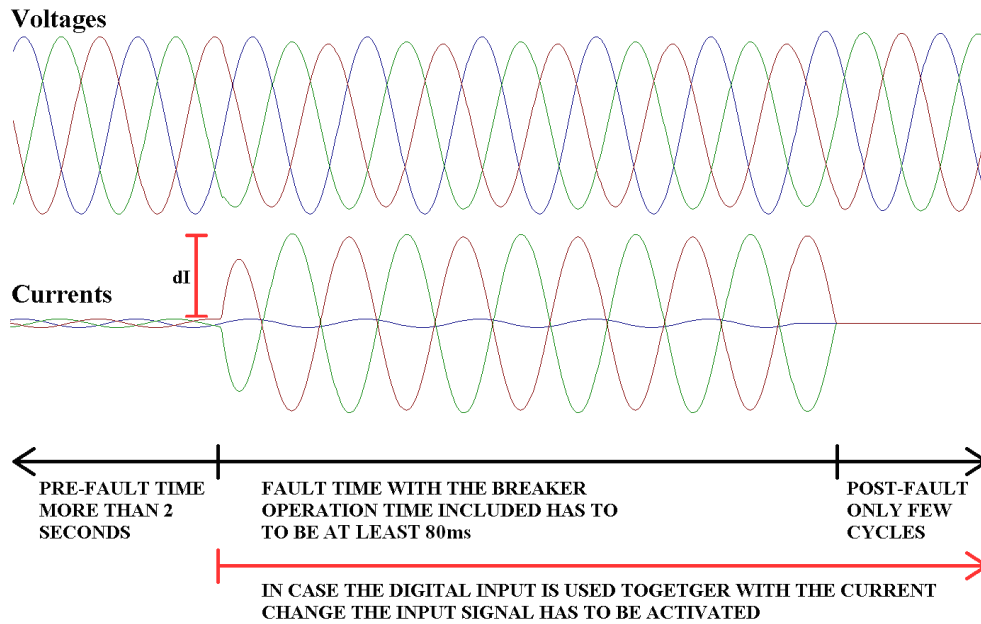
→ Maximum fault reactance value which is calculated.

(if value too big, the fault is far from the protection zone)

Below is presented an application example where the fault location algorithm is used at the incomer side. Notice following things while commissioning the relay:



Below is presented an application example where the fault location algorithm is used at the feeder side. Notice following things while commissioning the relay:



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