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DOI: 10.1049/cp.2016.0034

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Managing Post-fault Oscillation Phenomenon in Compensated MV-networks

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Abstract

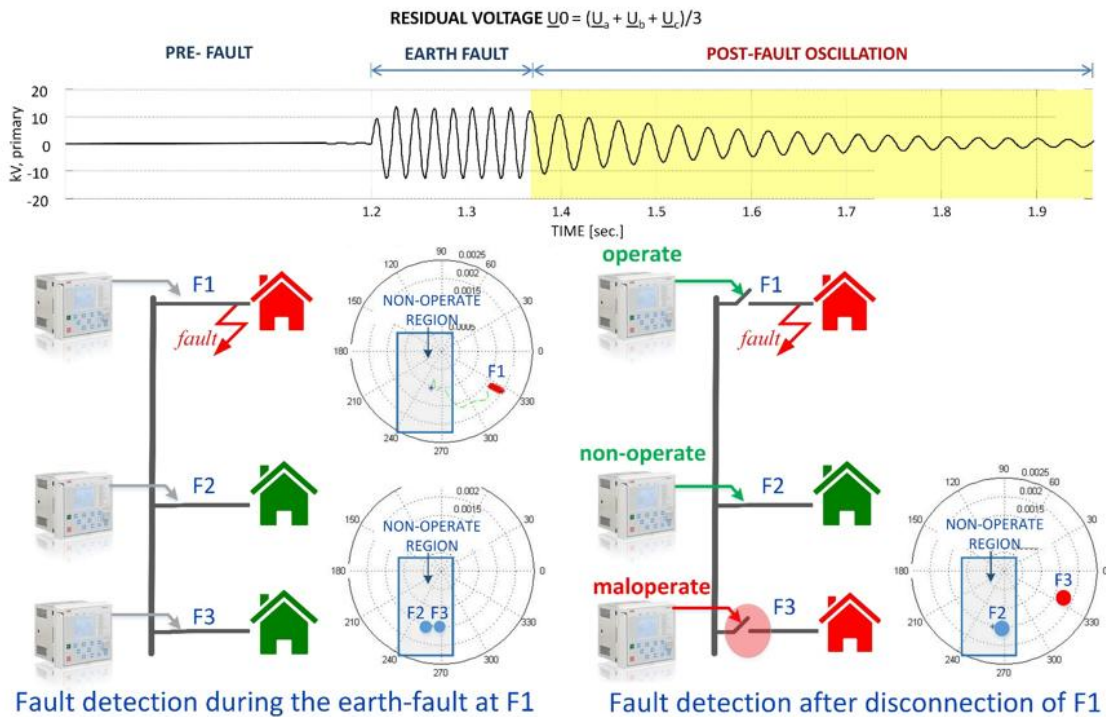
Post-fault oscillations have recently been identified as being one of the main causes of maloperations of earth-fault protection in compensated MV-networks [1]. Until now, the theory regarding post-fault oscillation condition has been missing from 'classical' earth-fault protection analysis, e.g. [2], where only healthy-state, inside and outside fault conditions have been considered. This paper adds this 'missing piece of the puzzle' and presents the necessary theory and hand-calculation equations to analyze the post-fault oscillation condition from earth-fault protection perspective in the level required by a protection engineer.

Conclusions

In this paper analysis of post-fault oscillation phenomenon from earth-fault protection perspective was continued and completed. It was shown that during the post-fault oscillation and especially during restriking earth fault, the resistive operating quantity of 'classical' 50Hz phasor based earth-fault protection may enter the operation sector of the function. The risk for unselective operation is especially high for long cable feeders with high earth-fault current contribution. This paper suggests a hand calculation procedure for evaluating the operation points of earth-fault protection during post-fault oscillations. This information helps to ensure security and dependability of earth-fault protection schemes for modern MV-networks applying classical protection functions. Application of the newest development in the field of directional earth-fault protection, such as multi-frequency admittance protection, provides clear advantages compared with traditional methods, and therefore offers a very promising solution to be considered in protection of modern MV-networks. With such protection function in use, additional fault-type specific functionality is not needed anymore resulting in great simplifications of protection scheme design and settings.

Post-fault transient as the main cause of protection maloperation

(compensated MV network)



Protection maloperation - a simplified explanation

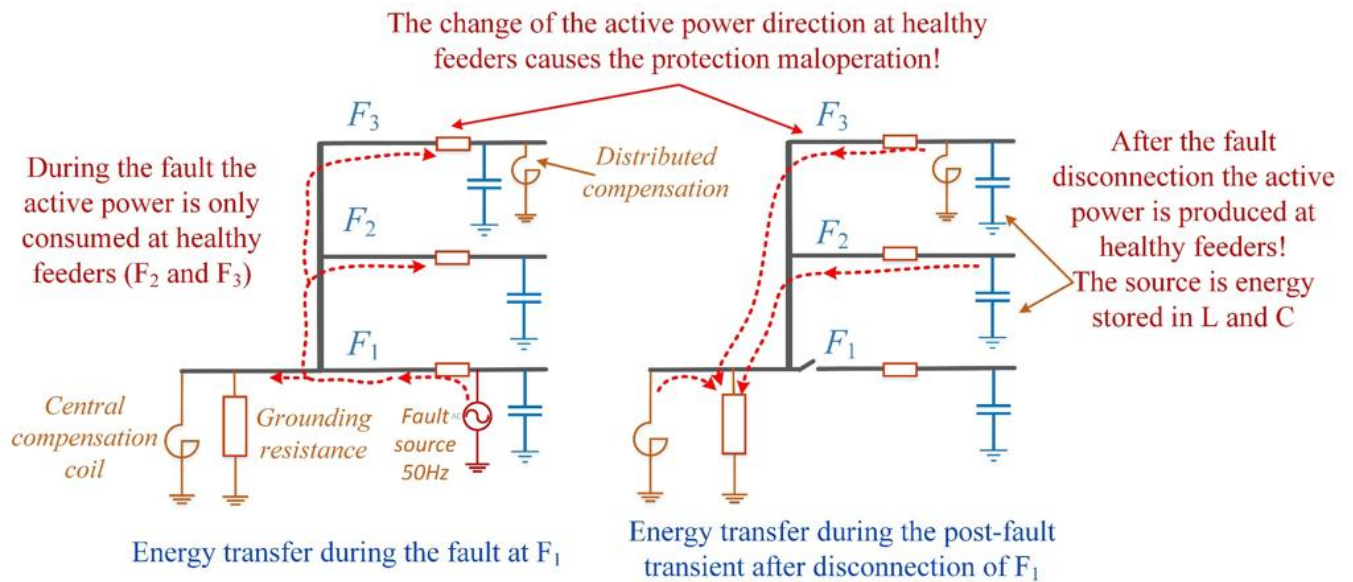


ABB solution REF615/630 - Multifrequency algorithm (MFADPSDE)

