

FOR EXTERNAL RELEASE

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Using Fault Locator Algorithms on the Overhead Electricity Distribution Network

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Fault location is a perennial problem of managing overhead distribution networks. For any outage, the restoration time is proportional to the fault location time. That is, the faster you find the fault, the faster the power can be restored.

It sounds simple but finding faults on the overhead distribution line can be challenging and time consuming. When relying on switchgear operation alone, line patrols become the common answer to find faults. The longer the feeder section, the longer the patrol, and the longer the outage.

Fortunately, there are tools for identifying fault location estimates using fault parameters recorded at the upstream protection device. If you are using an OSM Recloser on a resistance earthed network, you can rely on the Fault Locator functionality to provide an estimate of the distance to the fault site. Any information that can be gleaned from fault records that inform location advice will lead to faster restoration times.

[ANSI 21 FL Fault Locator](#)

The Fault Locator functionality in NOJA Power's OSM Recloser provides single ended impedance-based fault location estimation in a radial distribution system. This function operates based on current and voltage phasors measured at the Recloser during the fault.

The fault location algorithm uses zero and negative phase sequence current as the polarising values, eliminating dependency on load, source or load impedances and provides improved accuracy.

The NOJA Power OSM Recloser uses the modified Takagi method for fault location.

Operational Overview

After an overcurrent fault has occurred on the line protected by the OSM Recloser, the device uses the zero sequence and positive sequence impedances to calculate the distance to fault. These network parameters allow the controller to provide an estimate for fault location in metres away from the Recloser.

For radial feeders, this provides a high level of fault location specificity. On networks with many spurs, the list of plausible fault locations are greatly reduced.

An extensive technical application note on this technique is available here.

[Document Download - Application Note - Fault Locator | NOJA Power - Recloser Switchgear Engineers](#)

Applicability to Single Phase Lines

The 21FL Fault Locator functionality can also be applied Single Wire Earth Return lines. As these lines commonly are radial with few spurs themselves, fault location can be highly useful for reducing outage times and improving fault finding.

Conclusion

“The feedback we have received from customers who use our fault locator function is it has literally saved hundreds of fault finding hours, reduced cost and increased system reliability which is exactly what we designed it to do,” reports NOJA Power Group Managing Director Neil O’Sullivan.

The 21FL fault locator functionality in NOJA Power’s OSM Recloser system with RC control has been available since version 1.18 in the RC10, and since release with the RC20 control platform. By entering the network parameters, Electrical engineers can reduce outage times and speed up patrols by providing location estimation for faults. For more information, visit www.nojapower.com.au or contact your local NOJA Power Distributor.