

HOW DO I ACHIEVE ANTI-ISLANDING PROTECTION WITHOUT COMMUNICATIONS AT DISTRIBUTION RECLOSERS?

THE SCENARIO

A utility has a radial distribution line, including several reclosers, from a source station. In addition, a generating plant is connected at the end of this distribution line. **See Page 2: Figure 1.** The utility desires anti-islanding protection between the source station and the generator. Due to the level of generation with respect to the minimum circuit loads, local active or passive methods are not acceptable because of the inherent Non-Detection Zone (NDZ). As a result, Direct Transfer Trip (DTT) is being considered but there is currently no communications between the generator and the pole-mounted reclosers. In the event of a permanent fault, the reclosers will lock-out causing the generator to be islanded. To accurately determine an island condition using DTT, the source station breaker position as well as the recloser position must be known. As a result a DTT transmitter will be required to send the breaker information as well as the recloser information to the generator station. Since there is no existing communications at the reclosers it would be required to provide communications to the reclosers in order to successfully implement a DTT anti-islanding system. **See Page 2: Figure 2.**

THE SOLUTION

Using Phase Comparison to determine the island condition simplifies the need for communications requirements compared with DTT. The principle of phase comparison islanding detection is to know when the source station voltage frequency no longer matches the generator frequency as a result of an island. When an island occurs and the source station and the generator are no longer electrically connected, the frequency at the generator will change. As a result of the change in frequency, the source station phase and the generator phase will begin to drift apart. Phase comparison can be used to detect this apparent phase angle difference. Once the two phase angles drift to a predetermined angle, a trip command is issued. Phase comparison only requires sending the source station voltage phase information to the generator and performing a comparison to the local generator voltage phase. Consequently only one communications channel, one transmitter and one receiver are required, and no communications are required at the reclosers or any other source of islanding. **See Page 2: Figure 3.**

THE RESULT

With the implementation of the Phase Comparison islanding detection system, the utility is able to achieve a reliable islanding detection solution without the inherent NDZ as with local methods. In addition, what would have required communications between the source station and all reclosers with DTT is now a single point-to-point system between the source station and the generator with no communications at the recloser. Communications costs are now kept to a minimum while maintaining a high level of protection.



Because RFL™ and Hubbell® have a policy of continuous product improvement, we reserve the right to change designs and specifications without notice.

FIGURE 1: DISTRIBUTION LINE WITH RECLOSERS

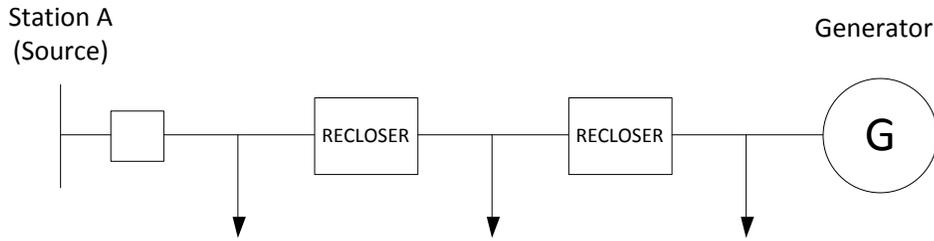


FIGURE 2: DISTRIBUTION LINE ANTI-ISLANDING WITH DTT

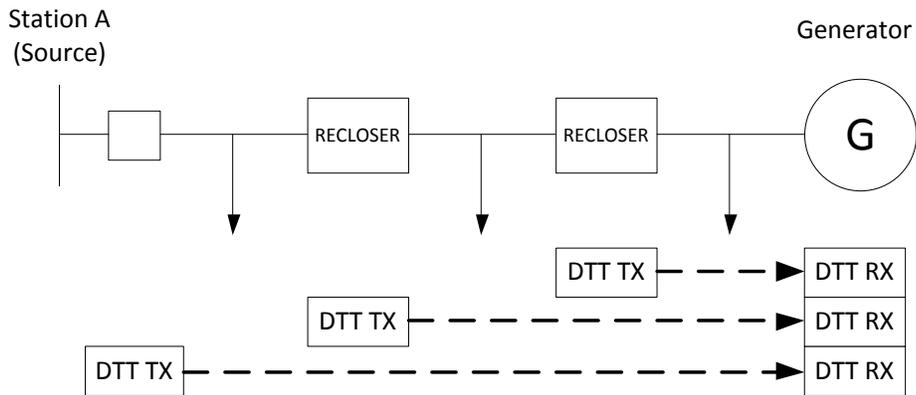
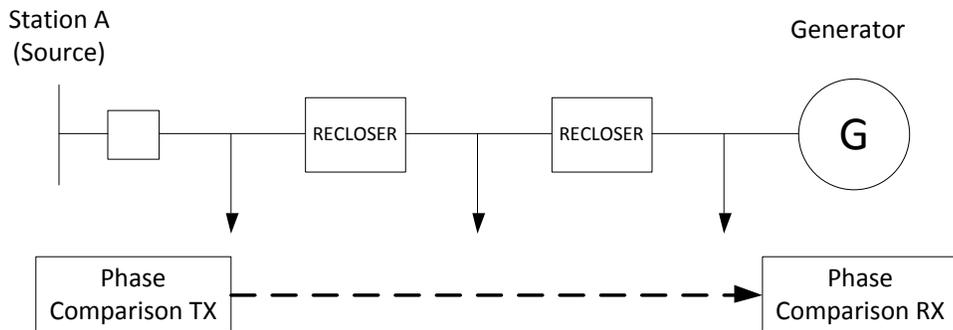


FIGURE 3: DISTRIBUTION LINE ANTI-ISLANDING WITH PHASE COMPARISON



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