



DLO

Open-Line Detector

Transmission grid reliability depends not only on robust power equipment but also on high-performance protection systems.

To preserve grid stability and avoid serious damage to equipment, special protection systems (SPSs) have been designed to quickly detect severe or extreme events so that prompt action can be taken. An event on the grid can be detected through the resulting topological changes or by observing power system response. The open-line detector (DLO) is one tool for doing this.

A second-generation open-line detector with enhanced performance

DLOs determine the state of the transmission system by detecting its topology. They thus provide information crucial for the proper functioning of such SPSs as the RPTC (generation rejection and remote load shedding) and SPSR (permanent system separation control) systems. Developed by a team of Hydro-Québec researchers and engineers, the second-generation DLO is less costly, more complex and more powerful than its predecessors.

The new DLO only relies on feeder bay voltage and current measurements to detect an open line. It uses a fuzzy-logic algorithm and sophisticated signal processing rather than conventional binary logic. It can detect an open line at either end without using a communication link between the two substations. The new algorithm meets all criteria for selectivity, rapidity, reliability and security.

Key advantages

- > Open lines detected without auxiliary contacts on circuit breakers or on disconnect switches
- > Quick detection (25 to 40 ms) at either end of the line with no communication link

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