

A Fast Pilot Protection for DC Distribution Networks Considering the Whole Fault Process

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To improve the consumption of renewable energy and to meet complex load demands. A model of a multi-terminal flexible DC distribution network with multiple overhead branch lines is constructed. Aiming at frequent non-permanent faults of overhead lines, a fast pilot protection scheme is proposed to cover the whole fault process. Using the hybrid DC circuit breaker (HDCCB) action as the boundary mark, the fast pilot protection can be divided into two phases: post-fault and fault restart. The first phase highlights rapidity, sending a trip command to HDCCB within 1-2 ms after the fault. The second stage emphasizes reliability, and points out that the data of the whole fault process should be fully utilized, and to fully excavate the characteristics of fault current. A multi-time scale and multi-criteria fusion protection scheme is proposed, which can effectively improve the reliability of fault area identification. Finally, a corresponding model was built based on PSCAD, a large number of simulation tests and robustness analysis proved that the proposed fast pilot protection scheme is feasible.