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Coordination Strategy of Magneto-biased Superconducting Fault Current Limiter and Relay Protection in 10 kV Urban Power Grid

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The level of fault current increases as urban power grid expands rapidly in recent years. The traditional relay protection has difficulty in preventing increasing fault current damaging electrical devices in power grid. Magneto-biased superconducting fault current limiter (SFCL) is a novel technology with the ability of reducing the level of fault current in the first half of the cycle, which consists of a double-split reactor, a non-inductive YBCO component and a fast circuit breaker. Achieving its coordination with relay protection can reduce the reconstruction cost of power system and contribute to its promotion. This paper analyzes the SFCL's operating mechanism and establishes the SFCL model at first. Then, a power system simulation model consisted of the magneto-biased SFCL is built to theoretically investigate the coordination protection strategy based on a typical 10 kV urban power grid in China. Finally, the response time, the action sequences and relay protection strategy of SFCL in 10 kV urban power grid are given.

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