

Analysis of Current Limiting Characteristics According to Fault Angles in Integrated Three-Phase Flux-Lock Type Superconducting Fault Current Limiting

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In this paper, we investigated the characteristics of fault current limiting according to variation of inductance in the integrated three-phase flux-lock type SFCL in types such as single-line-to-ground fault, the double-line-to-ground fault and the three-line-to-ground fault. When the SFCL in operating under normal condition, the magnetic flux generated between primary and secondary coils of each single phase is canceled out perfectly, so that the impedance of the SFCL is also not generated and the power system can be operated normally without any loss. However, if a fault occurs even in any phase out of three phases, quench happened in the SFCL elements and the current flowing secondary coil is restricted abruptly. Finally, the balance of magnetic flux in whole SFCL system is destroyed, and the fault currents in every phase could be limited at the same time irrespective of the fault types. As a result, the developed SFCL in this study were operated normally as expected and purpose of the integration of three phases current limiting was also achieved successfully. However, the fault current limiting characteristics of the SFCL was dependant on the quench characteristics of HTSC element in each phase, and it was expected that the improvement of the SFCL could be possible through the introduction of HTSC elements, which have better critical characteristics

Keywords : inductance, fault types, integrated three-Phase flux-lock type SFCL, HTSC elements