



Contribution ID: 1368

Type: **Poster Presentation**

Wed-Mo-Po3.08-11 [61]: Analysis on Operation Characteristics of Double Quench Flux Lock Type Superconducting Fault Current Limiter

Wednesday 25 September 2019 09:30 (1h 45m)

System operators make an effort to solve the fault current problem due to increase of distributed generation and complexity with parallel connection of the power system. Announced methods for solving the fault current such as replacing circuit breaker, installing high-impedance power equipment or series reactors have problems with cost, voltage drop, and power loss. The SFCL (Superconducting Fault Current Limiter) is effective in resolving the fault current with suppressing disadvantages of other methods. The SFCL has no electrical resistance during the normal operation. When the fault occurs and the fault current exceeds the threshold value of the current, the SFCL is quenching and the fault current is suppressed. The SFCL with a quench phenomenon has the feature that it cuts off the fault current at high speed without the control device and the monitoring device and is automatically returned to the normal state. For the above reasons, various type SFCLs have been studied recently. Among various SFCLs, the double quench trigger type which operates according to magnitude of the fault current with two current limit reactors is advanced model than single quench trigger type SFCL. The double quench trigger type SFCL consists of a switch, two HTSCs and resistances. However, the resistive type SFCL and trigger type SFCL could not have to control the HTSC characteristics such as quench time and impedance. We can search the adjustment method of the characteristics in the flux lock type. The flux lock type SFCL consists of iron core, multiple windings and HTSC element with serial connected in one of the windings. The flux lock type SFCL could improve both the quench characteristics and the current limiting effect according to the connection methods of the two coils and the winding directions.

This paper proposes the double quench flux lock type SFCL, combined with double quench type and flux lock type, which derives current limiting and operation controlling characteristics. The suggested method could be confirmed through the simulation using PSCAD/EMTDC.

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Session Classification: Wed-Mo-Po3.08 - Current Limiters I