

Operating Characteristics of Current Limiting Elements in a Flux-lock Type High- T_c SFCL

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We investigated operating characteristics of flux-lock type superconducting fault current limiter(SFCL) according to the winding directions of superconducting elements and the connecting method. The flux-lock type SFCL consists of two coils. The primary coil is wound in parallel to secondary coil through an iron core, and the secondary coil is connected with the superconducting elements in series. The operation of the flux-lock type SFCL can be divided into the subtractive and the additive polarity windings according to the winding directions between the coil 1 and coil 2.

In order to increase the rated voltage and current grade of the SFCL, the superconducting elements should be connected in series. However, when it is simply connected in series, the quench is not generated simultaneously due to the slight differences of their intrinsic critical current. When we connected several superconducting elements in flux-Lock type SFCL, the quench was achieved simultaneously due to the flux linkage between the serial elements into secondary winding. Meanwhile, the line current is higher in the subtractive winding than that of the additive winding because of the flux decrease and increase by the winding directions. This means that the capacity of the SFCL could be increased through the serial connection and the subtractive winding.

keywords : operating characteristics, superconducting elements, subtractive polarity winding, additive polarity winding