

## **Current Limiting and Recovery Characteristics of 2 MVA Class Superconducting Fault Current Limiting Transformer (SFCLT)**

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**Abstract** - We have been developing Superconducting Fault Current Limiting Transformer (SFCLT) with the function of both superconducting transformer in steady state and superconducting fault current limiter in fault condition. As the Step-5 of SFCLT project, 2 MVA class HTS-SFCLT using YBCO coated conductors with the ratings of 22 kV / 6.6 kV has been developed. One of the important concerns for the development of HTS-SFCLT is the current limiting and recovery characteristics as well as the transformer function. Thus, in this paper, current limitation and recovery tests of the HTS-SFCLT are carried out. The current limiting test have revealed that the HTS-SFCLT exhibits the excellent current limiting function as a superconducting fault current limiter, where the prospective short-circuit current  $I_{PRO} = 784 A_{peak}$  is reduced to 34% at the first peak and 18% at the 5th cycle. The HTS-SFCLT has been able to recover into superconducting state immediately after the fault clearance. According to the transition of generated resistance of the HTS-SFCLT, the criteria of recovery into superconducting state are quantified for different combinations of load current before the fault and prospective short-circuit current during the fault.

**Index Terms** - Current limiting operation, fault current limiter, transformer, recovery characteristics, YBCO coated conductor.

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