

26th National Symposium on Cryogenics and Superconductivity

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Invited talk-IT: Experimental Demonstration of a 0.6MJ/3.4kW Superconducting Magnetic Energy Storage System based Dynamic Voltage Restorer

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Content :

The paper describes the experimental demonstration of a 0.6MJ/3.4kW Superconducting Magnetic Energy Storage (SMES) system based Dynamic Voltage Restorer (DVR) for momentary voltage sag mitigation for critical electrical loads. The system primarily consists of three major sub-systems viz, a superconducting coil for storing the energy to be used during sag compensation, a DC-DC chopper and a Voltage Source Inverter (VSI). The chopper charges the coil during normal mains and configures itself to source energy from the coil during a sag. The VSI serves the dual purpose of sensing and compensating for the voltage sag in the utility mains. The control philosophy is based on sensing the depth and duration of the voltage sag in the utility and compensating accordingly. In the first phase of the development each system was individually tested for its proper functioning. Subsequently all the systems were integrated and tested on the rated load of 3.4kW/415V, 3- ϕ 50Hz. The results thus obtained are reported and discussed in the paper.

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