

Design Rotor Power Supply for a Synchronous Motor with HTS Field Windings

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Abstract— Simultaneous with the developments of superconducting technology, engineering society is desired to utilize this technology more than before. Manufacturing and distributing devices which consist of the superconducting tapes essentially need for a superconducting power supply. Electric supply of a superconductor is basically makes deferent from other conventional conductor's power suppliers. The main reason is that in a superconductor there is no resistance in current flowing path. So if a usual power supply connects to a superconductor's terminals, consequently we make a short circuit at two end of the power supply. This matter makes the power supply designers think about producing a specific power supply which can safely supply a superconducting device. In this work a practical power supply structure is designed for a 1.1 Mw synchronous motor with superconducting field windings. In this structure a copper winding, 2 heaters and a superconducting coil and a magnetic core were used. Heaters warm up the superconductor winding till the superconducting state be lost. Designed power supply increases the superconducting rotor winding's current step by step until it achieves its nominal current.