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Wed-Mo-Po3.06-01 [38]: Design and Performance Test of an 1-kW-class HTS Generator with HTS Contactless Rotary Excitation Device

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In this paper, the motor-generator set was developed to test the various output performance of a 1-kW-class high-temperature superconducting generator (HTSG) which is charged by HTS contactless rotary excitation device (CRED). First of all, the various full components for 1-kW-class HTSG were manufactured and assembled including a salient rotor pole with HTS coils, rotating shafts, torque transferring structures, rotating and stationary parts for CRED, and liquid nitrogen cooling system. Then, this assembled machine was connected with induction motor which is driven and controlled by voltage source inverter and three phase resistive and inductive load bank. The rated operating current of HTS field winding can be excited by rotation of HTS strands attached on toroidal rotor head of CRED at rated charging speed. After field winding charging, 1-kW-class HTSG was tested in no-load and electrical load modes to measure output power characteristics.

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