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C3Po1B-07 [11]: Direct bath cooling structure and Liquid nitrogen feeding device for an 1-kW-class HTS Generator with HTS Contactless Power Supply

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This paper presents results on a design, fabrication, and test of rotor cooling system for a 1-kW-class high-temperature superconducting generator (HTSG). This HTSG technically employs an HTS contactless power supply (CPS) to excite HTS field winding. The rotor of HTSG consists of HTS single pancake coils for field pole and HTS strands of CPS' rotor. They are directly bathed and cooled together by liquid nitrogen which is supplied by open-loop two phase thermosiphon cooling method. The operation process of the cooling scheme is designed and then final assembly of the 1-kW-class HTSG and its liquid nitrogen feeding device are fabricated and together assembled. Finally, cooling performance and characteristics are experimentally tested in both non-loaded and loaded modes

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