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Operation test of the cryocooler system of the superconducting cable in a power grid

Korea Electric Power Corporation (KEPCO) has been carried out extensive research into superconducting cable systems in a distribution class since 2006. We have installed and attached the Stirling cryocooler to a 22.9kV, 100m superconducting power cable in 2013, and this superconducting power cable system was operated in the ICheon substation, the real power grid of Korea. The superconducting power cable has a hybrid cooling system, that is sub-cooled liquid nitrogen and stirling cryocooler mode. Before connecting to the real grid, the Stirling cryocooler has been modified and improved the performance for cooling the cable. The results of the Stirling cryocooler operation with the superconducting power cable are discussed in terms of the system temperature control, and also, the cooling capacity of the cryocooler in the real grid is verified in this paper.

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