

Heat Transfer in Direct-Driven Generator for Large-Scaled Wind Turbine

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Abstract : For the sustainable development of wind energy, energy industries have invested in the development of highly efficient wind generators such as the Axial Flux Permanent Magnet (AFPM) generator. The AFPM generator, however, has a history of overheating on the surface of the stator, so that power production decreases significantly. A proper cooling system, therefore, is needed. Although a convective-type cooling system has been developed, the size of the air blower must be increased when the generator's capacity exceeds 2.5MW. In this study, a newly developed conductive-type cooling system was proposed for the 2.5MW AFPM generator installed on an offshore wind turbine. Through electromagnetic thermal analysis, the efficiency of the heat transfer on the stator surface was investigated. When using the proposed cooling system, the temperatures on the stator surface and on the permanent magnet under conditions of thermal saturation were 76 and 66 C, respectively. (KETEP 20134030200320)

Keywords : heat transfer, thermal analysis, axial flux permanent magnet, conductive-type cooling system

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