

Performance Characteristics of Non-Arc Double Stator Permanent Magnet Generator

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Abstract

The improvement in the power density in the double stator configurations is feasible with increase in the electrical loading of the electrical machines. This type of newer configuration is finding significant applications in improvising energy generation, more commonly for renewable energy generation. Various double stator configurations with non-arc permanent magnet machines for power density are modelled and analyzed in this paper. Finite Element Method (FEM) is used to simulate for the generation capability including the electromagnetics parameters such as flux linkage and open circuit voltage. A new slotted rotor structure is evolved based on the magnetic flux flow control inside the machine. The proposed structure is then fabricated in the laboratory and tested for operating characteristics with load circuit. The proposed machine produces a maximum power of 600 W at speed of 2000 rpm with 75% of maximum efficiency with the micro-hydro generation unit. © 2017, Electromagnetics Academy. All rights reserved.

Keywords :

Engineering controlled terms: Electric machinery; Finite element method; Hydroelectric generators; Magnets; Open circuit voltage; Permanent magnets; Renewable energy resources; Stators; Synchronous generators

Electrical loading; Energy generations; Maximum Efficiency; Micro-hydro generation; Operating characteristics; Performance characteristics; Permanent-magnet machine; Renewable energy generation

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