Comparison of single-and multiple-pole permanents magnets in a double-stator slot-less permanent magnet generator

ABSTRACT

This paper compares double-stator slot-less-type topologies for a permanent magnet generator (PMG), focusing on the characteristics of the PMG with differently shaped permanent magnets (PMs) and pole types. A comparison is made between an arc-shaped PM and a rectangular-shaped PM. In addition, the effects of a single-pole PM and multiple-pole PM are investigated. According to the results obtained by using the finite element method (FEM), the generated power of both types of PMG is almost the same when all parameters are fixed except the PM shape and pole type. However, the double-stator slot-less PMG with a rectangular shaped multiple-pole PM is superior in terms of PMG weight and cost. The results are verified by comparing the calculation, simulation, and measurement results for a prototype of the PMG.

Keyword: Permanent magnet generator; Double-stator; Slot-less; Multiple poles; Permanent magnet shape