Design and analysis of a single phase slot-less permanent magnet generator

ABSTRACT

This paper discussed on the design and analysis of a permanent magnet generator (PMG). Basically, the PMG is a slot-less type topology and operated in a single-phase. The flux direction in the air gap is in radial. It was developed for energizing the linear motor in pruner application. Due to this application, a compact generator that can produce 500W output power is required since the overall size of the PMG is important. Permeance Analysis Method (PAM) and Finite Element Method (FEM) were used to analyzed the PMG performance characteristic in addition of measurement of the PMG prototype. Various numbers of poles and rotor size were considered during this analysis. The results show that the slot-less PMG with stator size of 104 mm will produce maximum power of 650 W when it has 6-poles with rotor radius is 37 mm. Based on the results, the calculation method using PAM shows good agreement with measurement and simulation.

Keyword: Generator; Permanent magnet; Permeance; Pole numbers; Slot-less