

Driving force characteristic and power consumption of 4.75 kW permanent magnet motor for a solar vehicle

Abstract

Electric, hybrid-electric and fuel-cell vehicles have received positive response from the market due to their environmental-friendly factors. However, an electric vehicle powered by a solar energy has not yet being produced commercially because of power reliability and also high production cost. At the moment, solar vehicles are being developed for individual use, demonstration and also for research activities. For example a solar vehicle is being developed for the World Solar Challenge (WSC) 2009. Most of the mechanical components and the electrical components such as the solar panels, batteries, permanent magnet motor, controller and maximum power point trackers (MPPT) are available offthe-shelf. In this paper, the driving force characteristics of the permanent magnet motor are described. The motor's torque, speed and current characteristics are used to analyze the potential power performance of the vehicle on the road. Road test has shown that the theoretically calculated performance matches the road test results very closely.

Keywords; Driving force characteristic; Off-the-shelf components; Power performance; Solar vehicle