

ABSTRAK

Meningkatnya kebutuhan akan mobil listrik sebagai sarana transportasi yang lebih efisien dan ramah lingkungan dibandingkan kendaraan berbahan bakar fosil. Pada pengoperasiannya, mobil listrik sangat dipengaruhi oleh kemampuan baterai dalam menyuplai energi ke motor BLDC melalui pengontrol. Efisiensi penggunaan energi tersebut dipengaruhi oleh berbagai faktor, terutama variasi beban kendaraan dan kondisi permukaan jalan yang dilalui. Oleh karena itu, diperlukan penelitian untuk mengetahui besarnya konsumsi daya baterai pada mobil listrik Bharata dengan motor BLDC 2 kW dan baterai lithium-ion 48 V/45 Ah pada berbagai kondisi pengujian. Kajian teori yang digunakan meliputi prinsip kerja mobil listrik, karakteristik baterai lithium-ion, kinerja motor BLDC, serta fungsi pengontrol dalam mengatur arus dan tegangan menuju motor. Penelitian dilakukan secara eksperimental dengan variasi beban 54 kg dan 62 kg pada tiga jenis jalan, yaitu aspal, paving, dan kerikil. Data berupa tegangan, arus, waktu tempuh, dan konsumsi daya diperoleh menggunakan AVometer, GPS speedometer, stopwatch, dan software KBL&KEB, kemudian dianalisis menggunakan metode ANOVA. Hasil penelitian menunjukkan bahwa konsumsi daya terendah terjadi pada beban 54 kg di jalan aspal sebesar 717,92 W, sedangkan konsumsi daya tertinggi terjadi pada beban 62 kg di jalan kerikil sebesar 854,57 W.

Kata kunci: Mobil listrik, baterai, BLDC, kontroler.

ABSTRACT

The increasing need for electric cars as a means of transportation that is more efficient and environmentally friendly than fossil fuel vehicles. In its operation, electric cars are greatly influenced by the battery's ability to supply energy to the BLDC motor through the controller. The efficiency of energy use is influenced by various factors, especially variations in vehicle load and road surface conditions. Therefore, research is needed to determine the amount of battery power consumption in the Bharata electric car with a 2 kW BLDC motor and a 48 V/45 Ah lithium-ion battery under various test conditions. The theoretical study used includes the working principles of electric cars, the characteristics of lithium-ion batteries, the performance of BLDC motors, and the function of the controller in regulating the current and voltage to the motor. The study was conducted experimentally with variations in loads of 54 kg and 62 kg on three types of roads, namely asphalt, paving, and gravel. Data in the form of voltage, current, travel time, and power consumption were obtained using an AVOMeter, GPS speedometer, stopwatch, and KBL&KEB software, then analyzed using the ANOVA method. The results showed that the lowest power consumption occurred at a load of 54 kg on asphalt roads at 717.92 W, while the highest power consumption occurred at a load of 62 kg on gravel roads at 854.57 W.

Keywords: Electric car, battery, BLDC, controller.