Rancang bangun alat pemantau dan perekam energi pelepasan muatan baterai dengan mikrokontroler ATmega32A = Design of battery discharge monitoring and recording device using microcontroller ATmega32A

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Abstrak

Pada sistem yang memanfaatkan perangkat penyimpanan energi seperti baterai, penting untuk mengetahui kondisi parameter - parameter baterai seperti tegangan, arus, dan suhu agar diketahui kapasitas muatan dari baterai secara akurat. Keakuratan pembacaan ini penting agar baterai dapat bekerja dengan optimal. Rancang bangun alat pemantau dan perekam energi baterai, yang merupakan awal dari riset perangkat sistem manajemen baterai yang lebih kompleks, memanfaatkan mikrokontroler dalam membaca masukan berupa tegangan baterai yang kemudian data tegangan ini disimpan dalam personal computer melalui perangkat pengunduh data untuk mikrokontroler. Metode pemantauan melibatkan dua metode adaptif yaitu pertama, metode berbasis pada pengkuran coulometric lewat pembacaan tegangan oleh multimeter dan mikrokontroler saat baterai berada pada kondisi berbeban dan kedua, metode berbasis prediksi tegangan terminal rangkaian terbuka (predicted open terminal voltage) saat kondisi tanpa beban.

Hasil yang diperoleh pada pengukuran berupa persentase kesalahan rata - rata pembacaan nilai kapasitas baterai antara metode pengukuran coulometric multimeter dan mikrokontroler pada rangkaian tanpa beban sebesar kurang dari 2,5% dan rangkaian berbeban kurang dari 6% serta antara metode pengukuran coulometric mikrokontroler dengan predicted open terminal voltage rata - rata sebesar 16%.
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On systems that use energy storage devices (batteries) it is important to know the condition of the battery parameters such as voltage, current, and temperature so that the battery state-of-charge is known accurately. The accuracy of reading those parameters are important so that the battery can work optimally. The design of battery discharge monitoring and recording device - as the beginning of the study to more complex battery management systems - is utilizing microcontroller that reads the battery voltage as data input then stored them in a personal computer via microcontroller?s downloader data. The monitoring method involves two adaptive monitoring methods. They are coulometric based measurement method with multimeter and microcontroller as voltage readers at loaded conditions and ?predicted open terminal voltage? based measurement method at no load condition.

The results obtained that the battery state-of-charge which is determined by coulometeric measurement method between multimeter and microcontroller as voltage readers at no load circuit overcomes error rate by less than 2.5% and at loaded circuit by less than 6%. Also the error rate between the coulometric measurement method with microcontroller as voltage reader and predicted open terminal voltage method overcomes error rate by less than 16%.