



INTISARI

PENGEMBANGAN SISTEM AKUISISI DATA BERBASIS ARDUINO MODUL PENDINGIN TERMOELEKTRIK

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Sistem akuisisi data berbasis arduino modul pendingin termoelektrik (TEC) telah dikembangkan. Sistem akuisisi data ini dirancang terdiri dari modul arduino, pengkondisian sinyal sensor, sensor suhu, *driver H-Bridge*, Ruang sampel, regulator tegangan dan piranti modul peltier tipe TEC 12704. *Driver H-Bridge* digunakan sebagai pengontrolan daya listrik pada modul TEC menggunakan sinyal *mode fast Pulse Width Modulation* (PWM) dengan frekuensi 1,95 kHz. Tiga sensor LM35DZ masing-masing digunakan untuk mengukur suhu lingkungan, bagian panas dan dingin modul peltier secara otomatis. Hasil pengujian menunjukkan, modul mampu menghasilkan perbedaan suhu antara dua sisi modul TEC. Data yang diukur menggunakan modul TEC ini adalah perbedaan suhu, arus dan tegangan. Berdasarkan data-data hasil pengukuran yang diperoleh kemudian diolah untuk menentukan nilai sensitivitas sensor dan hambatan *internal* dari modul TEC masing-masing sekitar $(10,08 \pm 0,26) \text{ mV}^{\circ}\text{C}$ dan $(3,92 \pm 0,01) \Omega$.

Kata kunci: Sistem akuisisi data, modul thermoelectric, sinyal *fast* PWM.

ABSTRACT

DEVELOPMENT of DATA ACQUISITION SYSTEM for THERMOELECTRIC COOLING MODUL BASED on ARDUINO

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A data acquisition system as a thermoelectric (TEC) module based on arduino has been developed. I consisted of an arduino module, a conditioning of sensor signal, three temperature sensors of LM35DZ type, a H-Bridge driver, a sample holder, a voltage regulator and a Peltier device of TEC 12704 type. The H-Bridge driver was used to control electric power in TEC module using fast Pulse Width Modulation (PWM) signal at a frequency of 1.95 kHz. The three LM35DZ sensors were used to measure automatically temperature of ambient, hot and cold sides of the Peltier module, respectively. As a result, the module was able to generate temperature difference between two sides of TEC module. The measured parameters using this TEC module included temperature difference, current, and voltage. It was also found that sensor sensitivity and the resistance of internal module of TEC around $(10.08 \pm 0.26) \text{ mV}/^\circ\text{C}$ and $(3.92 \pm 0.01) \Omega$, respectively.

Keyword: data acquisition system, thermoelectric module, fast PWM signal.