ABSTRAK

This research aims to develop and test an ESP32-based electrical power consumption monitoring system that can monitor real-time electricity consumption. The system uses sensors to measure voltage and current and an ESP32 microcontroller to process data and transmit the results to a cloud platform for remote monitoring. Tests were conducted to measure the accuracy of the sensors in detecting voltage, current, and power consumption under various electrical loads. The test results show that the sensors have a high accuracy level with an average deviation of 1.89 V for voltage measurements and 0.02 A for current measurements. The accuracy percentages are 99.15% for voltage and 93.60% for current. Power consumption calculated based on sensor readings also shows accurate results with an accuracy percentage of 97.22%. The system performs well according to the design, effectively collecting and processing data accurately and presenting consistent measurement results. Factors influencing the sensor reading accuracy include sensor calibration, voltage fluctuations, and sensor quality. Implementing this system is expected to help users monitor and manage electricity consumption more efficiently and effectively.

Keywords*: power consumption monitoring, ESP32, Internet of Things, electricity consumption, voltage sensor, current sensor.*