

RANCANG BANGUN *CONTROLLER* AC SPLIT BERBASIS *INTERNET OF THINGS* (IoT)

Oleh

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ABSTRAK

Penelitian ini bertujuan untuk merancang dan membangun prototipe *controller* AC Split berbasis *Internet of Things* (IoT) yang dapat mengendalikan AC secara jarak jauh melalui smartphone serta memantau suhu ruangan. Penelitian ini menggunakan metode *Research and Development* (R&D) dengan model pengembangan 4-D yang terdiri dari *Define*, *Design*, *Develop*, dan *Disseminate*. Sistem yang dikembangkan menggunakan ESP32 sebagai mikrokontroler, sensor DHT22 untuk mendeteksi suhu ruangan, relay dan kontaktor sebagai pengendali AC, serta aplikasi Blynk sebagai media kontrol dan monitoring. Pengujian dilakukan dalam skala laboratorium yang meliputi uji kalibrasi sensor suhu, uji kinerja sensor terhadap kompresor, validasi instrumen, dan uji kelayakan desain produk. Hasil pengujian menunjukkan bahwa pembacaan sensor DHT22 sesuai dengan termometer pada rentang suhu 28°C–20°C. Pada pengujian kinerja, kompresor dalam kondisi ON pada suhu 28°C–25°C dan berubah menjadi OFF ketika suhu mencapai 24°C pada menit ke-6. Hasil validasi instrumen memperoleh nilai 1 dengan kategori validitas sangat tinggi, sedangkan hasil uji kelayakan desain produk memperoleh persentase 99,3% dengan kategori sangat layak. Berdasarkan hasil tersebut, prototipe *controller* AC Split berbasis IoT dapat menjalankan fungsi pengendalian ON/OFF AC dan monitoring suhu ruangan melalui smartphone sesuai dengan rancangan yang dikembangkan. Namun, penelitian ini masih terbatas pada pengujian laboratorium sehingga belum mencakup pengujian pada kondisi lapangan.

Kata kunci: *Controller* AC Split, *Internet of Things* (IoT), ESP32, Sensor DHT22, Blynk, *Research and Development* (R&D).

DESIGN AND DEVELOPMENT OF AN INTERNET OF THINGS (IoT)-BASED AC SPLIT CONTROLLER

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ABSTRACT

This study aims to design and develop a prototype of an Internet of Things (IoT)-based AC Split controller that can remotely control an air conditioner through a smartphone and monitor room temperature. This study employed the Research and Development (R&D) method using the 4-D development model, consisting of Define, Design, Develop, and Disseminate. The developed system uses an ESP32 as the microcontroller, a DHT22 sensor to detect room temperature, a relay and contactor as AC control components, and the Blynk application as a control and monitoring platform. Testing was conducted on a laboratory scale, including temperature sensor calibration, sensor performance testing in relation to compressor operation, instrument validation, and product design feasibility testing. The test results showed that the DHT22 sensor readings were consistent with the thermometer readings within a temperature range of 28°C to 20°C. In the performance test, the compressor remained ON at temperatures between 28°C and 25°C and switched OFF when the temperature reached 24°C at the sixth minute. The instrument validation results obtained a value of 1, categorized as very high validity, while the product design feasibility test obtained a percentage of 99.3%, categorized as highly feasible. Based on these results, the IoT-based AC Split controller prototype was able to perform the ON/OFF control function and monitor room temperature through a smartphone as designed. However, this study was limited to laboratory testing and did not include testing under field conditions.

Keywords: Split AC Controller, Internet of Things (IoT), ESP32, DHT22 Sensor, Blynk, Research and Development (R&D).