ABSTRAK

RANCANG BANGUN ALAT PENGISIAN BAHAN BAKAR OTOMATIS MENGGUNAKAN MIKROKONTROLER ESP 32

(2025 : 50 Halaman + 27 Gambar + 10 Tabel + Lampiran)

FAKHRI FAHRIZAN

062230320651

JURUSAN TEKNIK ELEKTRONIKA

Penelitian ini membahas perancangan dan implementasi sistem pengisian bahan bakar otomatis yang dikendalikan menggunakan teknologi barcode. Barcode digunakan sebagai media akses untuk membuka menu pada website, di mana pengguna dapat memilih nominal pengisian sesuai kebutuhan. Sistem ini dikontrol oleh mikrokontroler ESP32 yang berfungsi sebagai pusat pengendali, menghubungkan perangkat keras dengan website, sekaligus mencatat data transaksi ke dalam database. Proses pengujian dilakukan dengan target volume 5 L, 10 L, dan 15 L. Hasil percobaan menunjukkan terdapat selisih volume aktual terhadap target berkisar antara 0,2 hingga 0,8 liter. Meskipun demikian, tingkat akurasi sistem masih mencapai rata-rata lebih dari 94%. Ketidakakuratan tersebut umumnya disebabkan oleh faktor keterlambatan penutupan solenoid valve, perubahan tekanan aliran, serta respons mikrokontroler terhadap sensor. Seluruh data pengujian tercatat otomatis dalam database dan dapat dipantau melalui dashboard website secara real time. Berdasarkan hasil penelitian, sistem ini dapat dikategorikan cukup stabil dan layak untuk aplikasi pengisian otomatis. Namun, perbaikan pada mekanisme kontrol solenoid serta peningkatan sensitivitas sensor tetap diperlukan untuk meningkatkan akurasi dan keandalan sistem di masa mendatang.

Kata kunci: Otomasi, ESP32, IoT, flow, solenoid.

ABSTRACT

DESIGN OF AUTOMATIC FUEL FILLING DEVICE USING ESP 32 MICROCONTROLLER

(2025 : 50 *pages* + 27 *Pictures* + 10 *Tables* + *Appendiks*)

FAKHRI FAHRIZAN

062230320651

MAJORING ELECTRICAL ENGINEERING

This research presents the design and implementation of an automatic fuel filling system controlled through barcode technology. The barcode functions as an access key to open a menu on the website, where users can select the desired filling volume. The system is managed by an ESP32 microcontroller, which serves as the central controller, linking the hardware with the website and recording each transaction into a database. Experimental testing was carried out with target volumes of 5 L, 10 L, and 15 L. The results show that the actual filled volume differed from the target by approximately 0.2 to 0.8 liters. Nevertheless, the system achieved an average accuracy level of more than 94%. The observed discrepancies were mainly caused by delays in solenoid valve closure, fluctuations in flow pressure, and the microcontroller's response to sensor readings. All experimental data were automatically stored in the database and could be monitored in real time through the website dashboard. Based on the findings, the system demonstrates sufficient stability and is feasible for automatic fueling applications. However, improvements in solenoid control mechanisms and sensor sensitivity are still required to enhance the system's accuracy and reliability in future development.

Keywords: Automation, ESP32, IoT, flow, solenoid.