ABSTRAK

RANCANG BANGUN ALAT SISTEM CAS AKI MOBIL DENGAN NOTIFIKASI DAN KEMANAN MENGGUNAKAN KEYPAD

(Restu Ulung Wirayudha 2025:55)

Aki mobil berperan penting dalam sistem kelistrikan kendaraan, namun proses pengisian manual masih sering dilakukan tanpa kontrol keamanan yang memadai. Hal ini berisiko menyebabkan *overcharging*. Penelitian ini bertujuan merancang alat pengecas aki mobil dengan sistem pemantauan, pemutusan arus otomatis, serta fitur keamanan berbasis keypad menggunakan mikrokontroler ESP32. Metode yang digunakan adalah rancang bangun, dimulai dari studi literatur, perancangan perangkat keras dan lunak, hingga pengujian fungsi sistem. Komponen utama alat ini meliputi trafo 10A, *dioda bridge*, relay 3CH, sensor arus ACS712, LCD 20x4, dan *keypad* 4x4. Hasil pengujian menunjukkan alat mampu mengisi aki dengan baik, memutus arus otomatis saat tegangan mencapai batas atas, serta mengirim notifikasi secara real-time kepada pengguna. Sistem keamanan menggunakan keypad juga berfungsi optimal untuk membatasi akses pengambilan aki. Tegangan pengisian meningkat stabil selama proses berjalan, dengan fitur *auto cut-off* yang bekerja sesuai batas yang ditentukan. Kesimpulannya, alat ini efektif untuk meningkatkan efisiensi dan keamanan dalam proses pengisian aki mobil.

Kata Kunci: *Charger* aki mobil, ESP32, *Auto cut-off*, Notifikasi, Keypad, Keamanan.

ABSTRACT

Design and Development of a Car Battery Charging System with Notification and Security Using Keypad

(Restu Ulung Wirayudha 2025:55)

Car batteries play a crucial role in a vehicle's electrical system, yet the charging process is often carried out manually without adequate safety controls, leading to a risk of overcharging. This study aims to design a car battery charger equipped with a monitoring system, automatic current cut-off, and a keypad-based security feature using the ESP32 microcontroller. The method applied is a research and development approach, starting from literature review, hardware and software design, to system functionality testing. The main components of this device include a 10A transformer, bridge diode, 3-channel relay, ACS712 current sensor, 20x4 LCD, and 4x4 keypad. Test results show that the device can charge the battery effectively, automatically disconnect current when the voltage reaches the upper threshold, and send real-time notifications to the user. The keypad-based security system also works optimally to restrict battery access. The charging voltage increases steadily during the process, with the auto cut-off feature functioning properly within the set limits. In conclusion, this device effectively enhances both the efficiency and safety of the car battery charging process.

***Keywords**: Car battery charger, ESP32, Auto cut-off, Notification, Keypad, Safety system*