

ABSTRAK

SISTEM PROTEKSI MOTOR DC PADA *VENDING MACHINE* MENGGUNAKAN *EMERGENCY STOP* BERBASIS PLC MODICON M221CE24T

(2026: xiv + 62 Halaman + 27 Gambar + 9 Tabel + Lampiran)

ADE ARI ZUHUD

062330320635

PROGRAM STUDI DIII TEKNIK ELEKTRONIKA

JURUSAN TEKNIK ELEKTRO

POLITEKNIK NEGERI SRIWIJAYA

Penelitian ini bertujuan untuk merancang dan menganalisis sistem proteksi motor DC pada *vending machine* menggunakan *emergency stop* berbasis PLC Modicon M221CE24T. Sistem ini dirancang untuk menghentikan putaran motor DC secara cepat dan aman saat terjadi kondisi darurat sehingga dapat meningkatkan keamanan operasional. Metode penelitian meliputi studi literatur, perancangan perangkat keras dan perangkat lunak, pengujian sistem, serta analisis hasil pengujian. Pengujian dilakukan pada enam motor DC dengan mengamati perubahan tegangan dan arus sebelum dan sesudah aktivasi *emergency stop*. Hasil pengujian menunjukkan bahwa seluruh motor bekerja normal pada tegangan 24 V dan setelah *emergency stop* diaktifkan, tegangan serta arus turun menjadi 0 sehingga motor berhenti sesuai dengan logika kontrol PLC. Hasil penelitian menunjukkan bahwa sistem proteksi yang dirancang mampu bekerja sesuai dengan perancangan dalam menghentikan motor DC secara cepat, aman, dan andal, sehingga dapat meningkatkan keselamatan pada sistem *vending machine*.

Kata kunci: *emergency stop*, PLC Modicon M221CE24T, motor DC, sistem proteksi, *vending machine*.

ABSTRACT

DC MOTOR PROTECTION SYSTEM ON A VENDING MACHINE USING EMERGENCY STOP BASED ON PLC MODICON M221CE24T

(2026: xiv + 62 Pages + 27 Figures + 9 Tables + Appendices)

ADE ARI ZUHUD

062330320635

STUDY PROGRAM OF ELECTRONIC ENGINEERING

ELECTRICAL ENGINEERING

SRIWIJAYA STATE POLYTECHNIC

This study aims to design and analyze a DC motor protection system for a vending machine using an emergency stop based on the PLC Modicon M221CE24T. The system is designed to stop the DC motor quickly and safely during emergency conditions to improve operational safety. The research method consisted of a literature review, hardware and software design, system testing, and analysis of the test results. The system was tested on six DC motors by observing the voltage and current before and after the emergency stop was activated. The test results showed that all motors operated normally at a supply voltage of 24 V. After the emergency stop was activated, both the voltage and current decreased to 0, causing the motors to stop according to the PLC control logic. The results indicate that the proposed protection system performed as designed by stopping the DC motors quickly, safely, and reliably, thereby improving the operational safety of the vending machine.

Keywords: *emergency stop, PLC Modicon M221CE24T, DC motor, protection system, vending machine.*