ABSTRAK

IMPLEMENTASI SISTEM CONVEYOR MENGGUNAKAN PROGRAMMABLE LOGIC CONTROLLER PADA ALAT PENGISIAN BOTOL MINYAK
(2026: xii + 73 Halaman + 26 Gambar + 14 Tabel + Lampiran)

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PROGRAM STUDI DIII TEKNIK ELEKTRONIKA

JURUSAN TEKNIK ELEKTRO

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Penelitian ini bertujuan untuk mengimplementasikan sistem conveyor berbasis Programmable Logic Controller (PLC) pada alat pengisian botol minyak serta menganalisis tingkat keberhasilan sistem berdasarkan ketepatan posisi berhenti botol, kestabilan pergerakan conveyor, dan respons sensor terhadap objek. Sistem dirancang dengan mengintegrasikan PLC, sensor infrared, sensor proximity, motor conveyor, pompa DC, motor capping, dan Human Machine Interface (HMI) untuk mengatur proses perpindahan, pengisian, dan penutupan botol secara otomatis. Sensor infrared digunakan untuk mendeteksi posisi botol, sedangkan sensor proximity digunakan untuk mendeteksi batas pengisian minyak. Pengujian dilakukan sebanyak 10 kali pada setiap parameter untuk mengetahui kinerja sistem. Hasil pengujian menunjukkan bahwa ketepatan posisi berhenti botol mencapai 100% dengan rata-rata error sebesar 0,09 cm. Kestabilan pergerakan conveyor mencapai 90% dengan waktu tempuh antara 48,00–48,40 detik. Sementara itu, respons sensor terhadap objek mencapai 100% dengan delay rata-rata sebesar 3,00 detik. Berdasarkan hasil pengujian tersebut, sistem conveyor berbasis PLC mampu mengendalikan perpindahan dan penghentian botol serta mengatur proses pengisian dan penutupan secara otomatis sesuai dengan urutan kerja yang telah dirancang.
Kata kunci: Conveyor, Programmable Logic Controller, Sensor Infrared, Sensor Proximity, Pengisian Botol Minyak.

ABSTRACT

IMPLEMENTATION OF A CONVEYOR SYSTEM USING A PROGRAMMABLE LOGIC CONTROLLER ON AN OIL BOTTLE FILLING MACHINE

(2026: xii + 73 Pages + 26 Figures + 14 Tables + Appendices)

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This study aims to implement a conveyor system based on a Programmable Logic Controller (PLC) in an oil bottle filling machine and analyze its performance based on bottle stopping position accuracy, conveyor movement stability, and sensor response to objects. The system integrates a PLC, infrared sensors, proximity sensors, a conveyor motor, a DC pump, a capping motor, and a Human Machine Interface (HMI) to automatically control the bottle transfer, filling, and capping processes. Infrared sensors are used to detect the bottle position, while the proximity sensor is used to detect the oil filling limit. Testing was conducted through 10 trials for each parameter to evaluate system performance. The results showed that the bottle stopping position accuracy reached 100% with an average error of 0.09 cm, conveyor movement stability reached 90% with a travel time ranging from 48.00 to 48.40 seconds, and sensor response reached 100% with an average delay of 3.00 seconds. Based on these results, the PLC-based conveyor system is capable of automatically controlling the bottle transfer, filling, and capping processes according to the designed operating sequence.

Keywords: Conveyor, Programmable Logic Controller, Infrared Sensor, Proximity Sensor, Oil Bottle Filling.