
Integrating PLC-Based Automated Beverage Dispensing Systems into Engineering Education: A Sustainable and Hygienic Approach to Service Optimization

Roslinda binti Ismail¹, Suhairi bin Suaibun²

¹ *Electrical Engineering Department, Politeknik Kota Bharu, Kota Bharu, Kelantan, Malaysia*
E-mail: roslinda@pkb.edu.my

³ *Mechanical Engineering Department, Politeknik Kota Bharu, Kota Bharu, Kelantan, Malaysia*
E-mail: suhairisuaibon@pkb.edu.my

Abstract

This paper presents the design and implementation of a PLC-based automated beverage dispensing system featuring a conveyor mechanism and dual proximity sensors to optimize service efficiency, dispensing accuracy, and hygiene management. The conveyor transports cups through the dispensing station, while the proximity sensors detect cup position and presence, enabling precise timing control for beverage filling. The PLC coordinates sensor inputs and actuator outputs to automate the process, ensuring consistent portion sizes and minimizing spillage or waste. Importantly, the system incorporates cleanliness objectives by minimizing direct human contact with beverages and cups, reducing contamination risks and maintaining sanitary conditions throughout operation. This integration of automation and hygiene control enhances operational flow, reliability and repeatability, making it ideal for high-volume beverage service in events and commercial settings. The modular design supports customization and scalability, contributing to improved user experience, operational efficiency, and food safety compliance.

Keywords: PLC-based automated beverage dispensing
