IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 1, March 2025

Design and Implementation of an Automated Soft Drink Manufacturing and Packaging System using Beckhoff PLC

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Abstract: *This paper describes the automation of a soft drink manufacturing/packaging plant with Beckhoff PLC technology [2]. It includes steps such as mixing, bottling, capping, labeling, and carton packing for accurate process control [6]. The PLC programming is done in Structured Text, and this makes for modularity and scalability [3]. To gain more safety and reliability, several interlocks and sensors were added to the system [5]. It also features an emergency stop operation to quit operations in case of malfunction [5]. The Beckhoff PLC was selected over alternative PLCs due to its superior functions such as high-speed processing, EtherCAT communication, and flexible automation control [2]. Also, its modularity and economy make it an ideal choice for industrial automation [8]. This paper talks about aspects such as system architecture, operational workflow, and technical comparisons with an emphasis on the efficiency gains in automated beverage production [7]. The paper also gives specifications of why Beckhoff was chosen over traditional PLCs and discusses its classification as a soft PLC [2].*

Keywords: Automation, Beckhoff PLC, Structured Text, Soft Drink Manufacturing, EtherCAT, Industrial Automation, Packaging Process

DOI: 10.48175/IJARSCT-23613