

PERFORMANCE ANALYSIS OF A PLC CPM2A-BASED MULTI-TANK LIQUID PROCESS TRAINER

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ABSTRACT

This study aims to analyze the performance of a PLC Omron CPM2A-based Multi-Tank Liquid Process Trainer as a learning medium for liquid process automation systems. The evaluated parameters include cycle time, liquid transfer volume accuracy, pump protection response, and repeated cycle consistency. An experimental method was employed by conducting 10 test cycles for each parameter. The collected data were analyzed using descriptive statistical methods, including the mean, standard deviation, coefficient of variation (CV), and transfer efficiency. The results indicate that the system operates automatically and consistently, achieving an average cycle time of 79.4 seconds with a time coefficient of variation of 4.08%. The average transferred liquid volume was 2613 mL, with a coefficient of variation of 0.18%, indicating excellent volume consistency. The pump protection system achieved a 100% success rate, while the liquid transfer efficiency reached 74.66%, suggesting that improvements are still needed in the liquid transfer process. Overall, the PLC Omron CPM2A-based Multi-Tank Liquid Process Trainer demonstrated good, stable, and reliable performance as a learning platform for liquid process automation systems.

Keywords: Multi-Tank Liquid Process Trainer, PLC Omron CPM2A, performance analysis, industrial automation, volume accuracy, control system.