

PLC Controlled Mixing and Bottling System

Mechanical Engineering

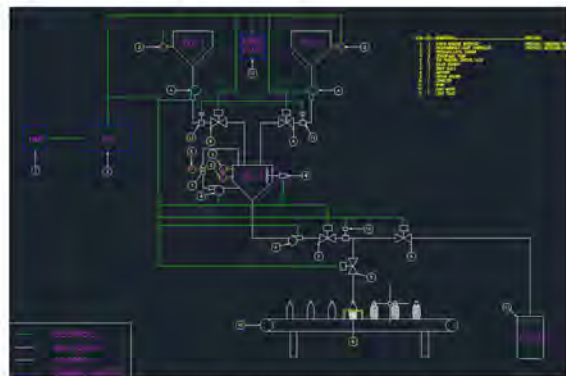
Student: Beau Balswick, Daniel Blancas, and Jalen Harris
 Advisor: Walter Mizuno & Allied Electric

Abstract

The purpose of this project is to design and manufacture a process line that takes two colored fluids, mixes them, and bottles the solution through an automated process. The project came from the proposal for a new class that will be implemented at CSU Fresno. The purpose of this new class is to teach and demonstrate processing and automation that is readily used in industry. The layout of the system is to be user friendly and follows a logical order and has all components in an easily visible location while using an HMI.

Design

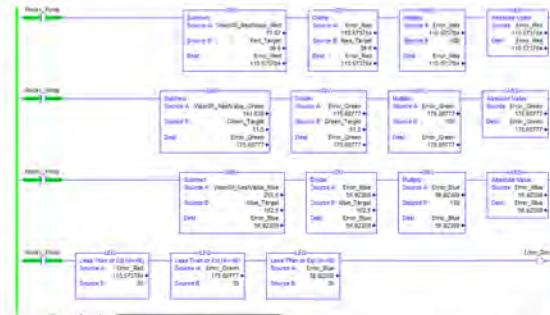
The design begins with two tanks with differing colored fluids (e.g. blue and red). The fluids are then pumped into a third tank for mixing. The third tank contains a recirculating pump and a color sensor to determine when the desired mixed color is reached. The solution is then pumped into a line that fills bottles on a conveyor that are stopped by a proximity sensor connected to a VFD. The entire system is controlled by a Rockwell CompactLogix Programmable logic controller.



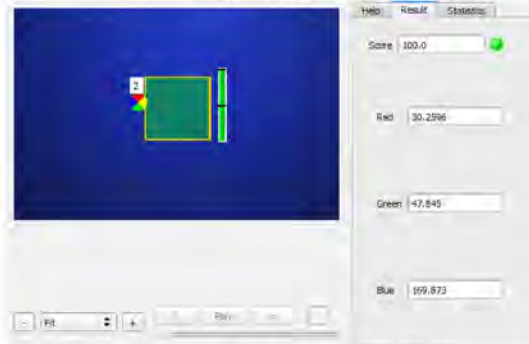
Detailed Process Layout Drawing

Installation

The parts for the process were picked out based upon the expectations and budget given to us. There was a lot of room for picking our own components but cost had to be taken into account. Ultimately, the funding was not approved in time for parts ordering. Instead, code was written for the PLC and a simulation of the process was created using ladder logic and Rockwell RSLogix 5000 software. A simulated process of our design was created.



Data read from color sensor being read into RSLogix 5000.



Acquired Data from SensoPart Visor Color Sensor

Implementation

This process will be implemented in Rockwell FactoryView in order to simulate the real world HMI setup. This will allow for user input and real time visualization of the process being completed. This will also allow for another group to easily continue this project from where we left off with the same equipment.

Summary

Ultimately, this project will be completed in virtual form only due to a lack of available funding but our work thus far will lay a foundation for subsequent senior design groups to implement this process once all the necessary components are acquired.



Fully constructed Laser Decoder Housing