SOUTH DAKOTA SCHOOL OF MINES & TECHNOLOGY

Development and Implementation of Human-Machine Interface for Environmental Control Unit

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Introduction

What is a Human Machine Interface?
A Human Machine Interface is a compact way to display a large amount of information. HMIs are dynamic. This allows panels to completely change design depending on what information is currently needed.

Environmental Control Unit HMI
An environmental control unit (ECU) is a device that regulates the temperature of an enclosed space. An array of sensors measure the temperature and occupancy of the room. Occupancy sensors determine the presence of people in the room. The HMI receives the data through the PLC, then controls the ECU to maintain the desired temperature. If nobody is in the room or the desired temperature is reached, the ECU will shut off. The benefit of this project is to save energy by shutting off the ECU when it is not needed.

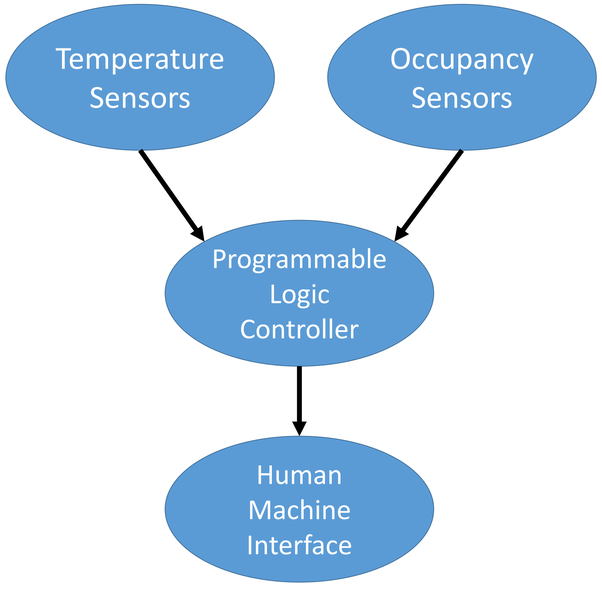


Fig. 1: Information Flowchart

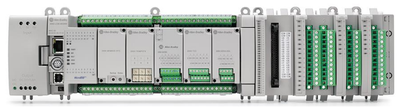
Objective

Design a compact HMI that will handle inputs from multiple sensors and display the information intuitively in a user friendly manner.

Hardware

Rockwell Automation®
Panelview™ 800 HMI
- 10 inch Panel
- High Resolution Touch Screen
- USB Communication

Rockwell Automation®
Micro850® PLC
- Analog I/O
- Digital I/O
- Expandable Ports



Software

Connected Components Workbench™
- Compatible with both the Panelview™ 800 and Micro850® PLC from Rockwell Automation®.
- Tag based I/O programming
- Intuitive HMI design interface

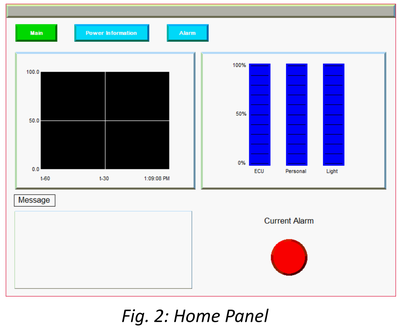


Fig. 2: Home Panel

Results

Evaluation of many HMI options resulted in the selection of the Rockwell Automation® Panelview™ 800 and Micro850® PLC. The last step was to create the HMI interface using Connected Components Workbench™. Figures 2, 3, and 4, shown below, are examples of the final HMI design.

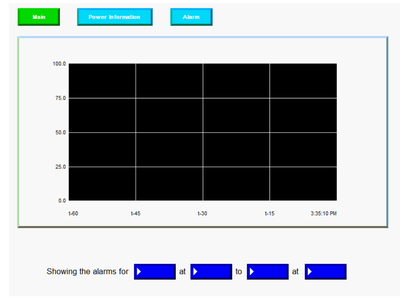


Fig. 3: Power Consumption Panel

Fig. 4: Alarm Panel

Future Work

- Determine the input format for sensor data to further revise the HMI layout
- Complete the tag programming for the PLC to HMI connections
- Assemble the complete system and test

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