Scientech 2425RB HMI & PLC based Process Training System with conveyor belt application helps teach and familiarize students with real-life PLC and HMI application in automation and mechatronics industry. Operation and control of a conveyor using PLC and HMI is demonstrated. Various electro-mechanical components are controlled by a PLC and HMI.

Features

- Industry standard, modular PLC with minimum 16 digital inputs, 16 digital outputs, 2 analog inputs and 1 analog output.

- Human machine interface.

- This system includes E-stop button, green pushbutton, red pushbutton, selector switch intermittent buzzer, 24V DC power supply , MCB , ELCB, DPDT relay, tower light.

- Different types of sensors like thru - beam sensor, diffuse reflective sensor.

- Conveyor belt with DC brushless motor and its driver.

- Experiments performed using a patch cord.

- PC based ladder and HMI programming.

- User friendly software.

- Easy downloading of programs.

- Compact tabletop ergonomic design.

- Ready assignment details.

- Robust construction.

Scope of Learning

Study and use of:

- Exposure to technology of Programmable Logic Controller (PLC) and understanding the importance of automation in industries.

- Student will be familiarized with a variety of ladder logic instructions to create complete PLC program from scratch.

- Study the difference between digital and analog signals and how to bring them into a PLC, process them and send them back out.

PLC operation

- Sequence of operation.

- Program scans cycle.

- Addressing example.

- Upload/download/monitoring.

Program operation

- NO (normally open) and NC (normally close) instruction bit.

- Types of logic gates.

- Set and reset bit.

- ON delay timer.

- OFF delay timer.

- UP/Down counter.

- Analog input and analog output.

Human Machine Interface (HMI)

- Creating applications/screens in HMI.

- Downloading and uploading programs.

Design screen for:

- Design GUI for normally open and close contact in HMI and communication with PLC.

- Design GUI for Timer in HMI and communication with PLC.

- Design GUI for Counter in HMI and communication with PLC.

- Design GUI for analog input in HMI and communication with PLC.

- Design GUI for analog output in HMI and communication with PLC.

Process Control Operation by PLC & HMI:

A work piece is placed on the right side of the conveyor. The selector switch is positioned to the left side. When the green pushbutton is depressed, the conveyor will have turned on and moves to through beam sensor 1. The green light of the tower light is turned on. When the work piece activates through beam sensor 1, the conveyor will stop, and after 10 seconds, the conveyor will turn on again. When the work piece moves and activates through beam sensor 2, the conveyor will stop. After 15 seconds, the conveyor will be turned on again. When the work piece activates through beam sensor 3, the conveyor will stop. A buzzer will turn on to indicate that there is part at the end of the conveyor. When the selector switch is positioned to the right side, the 2 diffused reflective sensors input signal to PLC will replace signal of through beam sensor 1 and through beam sensor 2.

Technical Specifications

PLC

- Digital inputs : 16 nos.
- Digital outputs : 16 nos.
- Analog inputs : 4 nos.
- Resolution : 10-bit
- Analog outputs : 2 nos.
- Resolution : 10-bit
- Communication : Ethernet

General Specification

- Panel mounted e-stop button : 1 no.
- Panel mounted momentary push button (green) : 1 no.
- Panel mounted momentary push button (red) : 1 no.
- Panel mounted 2-way selector switch : 1 no.
- 24VDC intermittent buzzer : 1 no.
- Power Supply : 24VDC , 14.5 Ampere
- DIN rail mounted socket with DPDT relay : 1 no.
- 24VDC tower light : 1 no.
- Flat belt conveyor system : 1 no.
- Push to On switch : 4 nos.
- Toggle switches : 3 nos.
- Through beam sensor : 3 nos.
- Diffuse reflective sensor with amplifier : 2 nos.
- Override switches : 32 nos.
- MCB (double pole, 10A) : 1 no.
- ELCB (30mA) : 1 no.
- 5 port unmanned switch : 1 no
- Power Supply : 230VAC

List of Accessories

- PLC & HMI software : 1 no.(each)
- Ethernet cable : 3 nos.
- 2mm patch cord yellow & blue 16" : 16 nos.(each)
- 2mm patch cord red & black 16" : 4 nos.(each)
- Conveyor unit : 1 no.

Optional

PLC programming with 3D factory simulation

Test PLC programming skills on Factory I/O software

Subject to Change