CNC Technical Solutions - Phase 2 Training Outline

Phase 2 - Training outline 136 hours

1. Electrical Print Review, Panel build/Test and Practical Applications Class

1. This will be an instructor lead class design to teach students how to interpret and properly read electrical diagram for each print reviewed. The student will be provided a real world electrical diagram for a Machine Tool, Manufacturing Plant or Factory for this lab.

2. The student will then be provided a small scale machine tool electrical enclosure or MTEC and a corresponding print set. The student will now be required to read the print set then physically wire and troubleshoot the panel for proper operation.

3. This portion of the course is designed to expose the students to the techniques and math behind wire sizing, properly sizing conduit, mathematically creating angles and making proper bends in EMT Conduit. Also included is determining the number of physical conductors required to add electrical hardware between control panels, color codes, fusing and over current protection.

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2. PLC Theory/Fundamentals & PLC Soft Simulator Debug Class

This is an instructor lead class which covers the Theory, Implementation and Practical Review of Programmable Logic Controls (PLC) and their associated devices and systems. Students will design and debug a virtual PLC control system using a PC based Software System Simulator. This is a pre-requisite class to the practical PLC Troubleshooting class which follows this directly.

Note - There is a text book and study guide being used for this class and it will cover the following areas although not all areas listed below may be covered.

Introduction to Programmable Controllers
- Number Systems and Codes
- Logic Concepts
- Processors, the Power Supply, and Programming Devices
- The Memory System and I/O Interaction
- The Discrete Input/Output System
- The Analog Input/Output System
- Special Function I/O and Serial Communication Interfacing
- Programming Languages
- System Programming and Implementation

PLC System Documentation
PLC Start-Up and Maintenance

2.1 This portion of the course the student will convert the MTEC magnetic relay logic control wiring into PLC wiring and finally the magnetic control logic will be converted to PLC logic.

3.0 **PLC Practical Application and Troubleshooting Class**

This is an highly interactive Instructor led class that has been designed to maximize the students PLC & Machinery Troubleshooting Skills. The center piece for this training is our CNCTS designed miniature scale automation system. This system has been designed to replicate a multi-station conveyor with a fully functional part handling automation system complete with a gantry pick & place including an error checking sort station all using open loop motor controls and an AB PLC control system. This technology has been painstakingly designed and miniaturized by CNCTS to replicate this widely used factory technology all in a 16in by 16in desktop footprint.

Key areas the student will be exposed to:

- The Automation Simulator -
- Allen Bradley PLC Controls -
- Relay Logic -
- Motor Controls -
- Laptop/cabling - PC to PLC communications using RS Logics for PLC code debug and development -
- Electrical drawing set for the automation simulator -
- Sequence of operations theory and sequence outline -
- All associated test eq. including DVMs, Scope etc.