

## Motor Circuits Troubleshooting Simulator Lab

Automated motor control systems play a big role in the production and efficiency of industrial operation. Their correct installation, operation and maintenance can save thousands of dollars. However, a motor control system adjusted or functioning incorrectly can cost just as much. Faulty motor control equipment can even cause damage to systems and equipment not directly connected to the motor circuit. The purpose of this course is to provide a comprehensive overview of motor control systems including in-depth troubleshooting techniques utilizing controller simulator software. Participants will work either individually or in small teams to operate a user friendly motor simulator software program that is loaded on laptops. Lectures, visual aids, and student hands-on performance will also be utilized to provide the greatest possible exposure to motor control circuitry. Anyone who works on or near power generation, transmission, or distribution systems should attend this course.

Duration: 16 Hour Program

### **THEORY OF AUTOMATED MOTOR CONTROL**

- Three Phase Motor Operation
- Motor Control Circuitry
- Manual Control of Motors
- Starting Current
- Locked Rotor Current
- Effects of Varying Load
- Automated System Control

### **SYSTEM COMPONENTS**

- Contactors
- Motor Circuit Protectors
- Control Power Transformer
- Control and Line Fuses
- Control Relays/Timing Relays
- Manual Switches
- Motors
- Heaters
- System Monitoring

### **DIAGRAM ANALYSIS**

- Standard Symbols
- Power Diagrams
- Control Diagrams

### **SAFETY**

- PPE
- Boundaries
- Inspection and Use of Test Equipment
- Lock-Out/Tag-Out
- Non-Electrical Hazards

### **TROUBLESHOOTING LAB**

- Observing Normal Operation
- Taking Baseline Data
- Methodological Approaches
- Selecting Measurements and Recording
- Using Front Panel Indications and Controls
- Sequencing Faults
- Motor Failures/Sensor Failures
- Interconnecting Wiring Faults
- Power System Failures/Control Power Failures
- Control Relay Faults/Timing Relay Faults
- Individual Component Testing
- Over 50 Unique Troubleshooting Scenarios

### **COMPONENT REPLACEMENT**

- Nameplate Data and Ratings
- Technical Data
- Component Replacement Criteria
- Verifying Operation Post-Replacement