



Control Circuits Troubleshooting Simulator Lab

Control circuitry is absolutely essential to industrial operations. Nearly all operations require some degree of automated oversight in order to function at all, much less to function well. What happens when the control circuitry fails or operates poorly? The purpose of this course is to provide a comprehensive overview of control circuitry, including in-depth troubleshooting techniques utilizing controller simulator software. Participants will work either individually or in small teams to operate a user friendly control circuit 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 control circuitry and the myriad of its applications. Anyone who works on or near power generation, transmission, or distribution systems should attend this course. Additionally, supervisors and those responsible for ensuring a safe work environment should attend this course.

Duration: 16 Hour Program

THEORY OF CONTROL CIRCUITRY

Review of Theory Applications

Ohm's Law

Watt's Formula

Kirchoff's Law

Control Circuitry

Manual Control

Automated System Control

SYSTEM COMPONENTS

Multi-Pole Multi-Throw Relays

Contactors

Manual Switches

Control Power Transformer

Control Fuses

Control Relays/Timing Relays

Indicator Lights

End Devices

System Monitoring

DIAGRAM ANALYSIS

Standard Symbols

Power Diagrams

Schematic Reading

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