

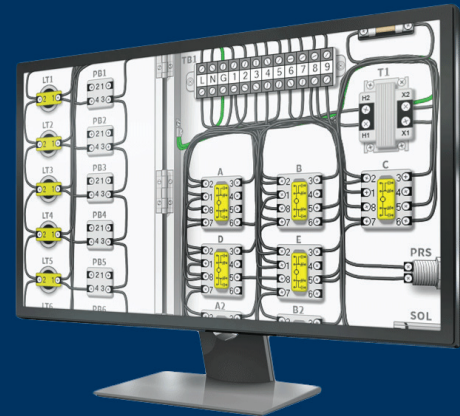
# TROUBLESHOOTING CONTROL CIRCUITS

**Troubleshooting Control Circuits (TCC)** is the second in our core skills series of simulation-based training modules. In this module, your professionals will diagnose and repair more than **45 faults** in a simulated control circuit consisting of lights, relay, switches, pushbuttons, a control transformer, solenoid, proximity sensor, and circuit protection.

This module is designed to teach professionals troubleshooting techniques for control circuits containing electro-mechanical components, widely found in industrial and manufacturing settings such as manufacturing production lines, the petrochemical industry, utilities, and mining.

## WHAT'S COVERED

1. Shock and arc flash hazards
2. How relays are used to provide operational logic for control circuits
3. Analysis techniques for solving problems in control circuits
4. Specific techniques for solving shorts and grounds
5. Tips and considerations for solving difficult faults such as intermittent or multiple component failures
6. Troubleshooting tips specifically for dealing with problems in control circuits
7. Application of Simutech Multimedia's Systematic Troubleshooting Approach to control circuits



## LEARNING OBJECTIVES

### **Your staff will:**

- Learn a proven process for troubleshooting electro-mechanical control circuits with Simutech Multimedia's Systematic Troubleshooting Approach
- Develop new techniques to diagnose complex control circuit malfunctions using 2 unique simulations
- Troubleshoot more than 45 control circuit faults
- Develop and refine troubleshooting skills with many hours of hands-on learning

## DESIGNED FOR

- Electrical and maintenance staff responsible for maintaining electrical equipment with control systems
- Learning skills that are directly transferable to the workplace
- Worldwide use: simulations on resources provided for NEMA and IEC electrical standards

## ADDED BENEFITS

- Challenges all expertise levels with multiple degrees of fault difficulty in each simulation
- Demonstrations, hands-on labs, and continuous performance measurement
- Step-by-step guides help users apply new problem solving techniques to solve faults
- Printable resources including circuit diagrams, schematics and worksheets
- Extra and Genius Faults available for skill maintenance

## THE SIMULATIONS

The lab circuit simulation allows your professionals to learn the concepts of typical control circuits and the behavior of their components, including relays, transformers, and switches.

An electric door lock—the main simulation—contains a variety of components including relays, pushbuttons, a transformer, proximity switch, and a solenoid lock, allowing users to troubleshoot more complex problems.

### **Activities include:**

- Use the multimeter to take voltage, resistance, and current readings
- Repair and replace electrical components
- Disconnect and ring out wires
- Trace and replace wires

## FEATURES

Safe hands-on troubleshooting practice with **2 control circuit simulations**

Lab exercises (core)	2
Practice exercises (core)	6
Practice faults (core)	6
Guided faults (core)	3
Skill test faults (core)	18
Extra faults	16
Genius faults	4
Practice	Limitless

## EVALUATING SKILLS

### **Managers can:**

- Track skills development with comprehensive evaluations for each fault and overall individual performance
- Measure and record users' achievements on safety, accuracy, and efficiency
- Use all-inclusive reports to monitor professionals' progress, achievements, and areas that need improvement
- Print certificates when a professional finishes all skill test faults

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