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Electrical Engineering

Troubleshooting Matrix Applications of Electrical Equipment & Control Circuits

Course Introduction

Troubleshooting Matrix Applications of Electrical Equipment & Control Circuits

Troubleshooting is a method of finding the cause of a problem and correcting it. The ultimate goal of troubleshooting is to get the equipment back into operation. This is a very important job because the entire production operation may depend on the troubleshooter's ability to solve the problem quickly and economically, thus returning the equipment to service. Although the actual steps the troubleshooter uses to achieve the ultimate goal may vary, there are a few general guidelines that should be followed.

There are often cases where a familiar piece of equipment or system breaks down. In those cases, an abbreviated steps troubleshooting process can be used to find the fault, get the system up and running. It is important to note that .

The steps are simply combined to be specific to the problem at hand. This article will briefly cover the troubleshooting process, followed by a more in-depth look at the troubleshooting process..

Target Audience

- Project Engineer
- Test Engineer
- illuminating engineer
- Technician, semiconductor development
- Power-distribution engineer
- Controls design engineer

Learning Objectives

- Verify that a problem actually exists
- Isolate the cause of the problem
- Correct the cause of the problem
- Verify that the problem has been corrected
- Follow up to prevent future problems
- Understand the various types of fault currents
- Determine the causes of overcurrent and short circuit current
- Explain differences between symmetrical & unsymmetrical faults
- Understanding the technology of most electrical equipment and control systems.
- Understanding philosophy of different maintenance methodologies and ways of practically implementing these methods for different equipment at different voltage levels.

Course Outline

- **DAY 01**

  Module (01) Introduction Safety

  - 1.1 Types of fault and factors affecting fault levels
  - 1.2 Maintenance of electrical equipment
  - 1.3 Managing Maintenance
  - 1.4 Safety
  - 1.5 Balanced and Unbalanced faults
  - 1.6 Safe working practices and isolation procedures

  Module (02) General Troubleshooting Guidelines

  - 2.1 Troubleshooting steps
  - 2.2 Action Items

- 2.3 Troubleshooting Documentation
- 2.4 Seven—Step Troubleshooting Philosophy
- 2.5 Step1: Symptom Recognition
- 2.6 Step 2: Symptom Elaboration
- 2.7 Step 3: Listing of Probable Faulty Functions
- 2.8 Step 4: Localizing the Faulty Function
- 2.9 Step 5: Localizing the Fault to a Component
- 2.10 Step 6: Failure Analysis
- 2.11 Step 7: Retest Requirements

• **Day 02**

Module (03) Troubleshooting with Flowcharts & Matrix Investigation

3.1 Typical Troubleshooting Process
3.2 Step 1: Talk with the Operator
3.3 Step 2: Verify Symptoms
3.4 Step3: Attempt Quick Fixes
3.5 Step 4: Review Troubleshooting Aid
3.6 Step 5: Step-by-Step Search
3.7 Step 6: Clear the Trouble
3.8 Step 7: Perform Preventive Maintenance
3.9 Step 8: Make Final Checks
3.10 Step 9: Complete Paperwork
3.11 Step 10: Inform Area Supervision/Instruct Operators
3.12 The Flowchart Model

• **Day 03**

Module (04) Five Action Steps for Systematic Troubleshooting

- 4.1 Five-Step Troubleshooting Process
- 4.2 Step 1: Verify that a problem actually exists
- 4.3 Panel Graphic
- 4.4 Loop Diagram
- 4.5 Piping and Instrumentation Diagram
- 4.6 Block Diagram & Schematic Diagram
- 4.8 Wiring Diagram
- 4.9 Step 2: Isolate the Cause of the problem
- 4.10 Step 3: Correct the Cause of the Problem
- 4.11 Step 4: Verify that the problem has been corrected

- 4.12 Step 5: Follow up to Prevent Future Problems

- **Day 04**

Module (05) Types of Failures

- 5.1 Steps for troubleshooting Intermittent Failures
- 5.2 Attempt to Recreate the Problem
- 5.3 Thermally Induced Failure
- 5.4 Mechanically Induced Failure
- 5.5 Erratic Failure 5.6 Alternatives to Recreating Failures
- 5.7 Identifying all possible causes of trouble

Module (06) Troubleshooting Techniques

- 6.1 Interpret Technical Drawing
- 6.2 Terminate and Connect Electrical Wiring
- 6.3 Perform Electrical/Electronic Measurement
- 6.4 Use hand tools
- 6.5 Required Skills and Knowledge
- 6.6 Appropriate Fault Finding Techniques

- **Day 05**

Module (07) Electrical Equipment: Troubleshooting & Maintenance

- 7.1 Predictive Maintenance
- 7.2 Preventative Maintenance
- 7.3 Reactive Maintenance and Troubleshooting
- 7.4 Conditioning Monitoring
- 7.5 Electrical Testing for Troubleshooting
- 7.6 Transformer Maintenance
- 7.7 Generator Maintenance
- 7.7.1 Transformer Components & Troubleshooting
- 7.7.2 Maintenance of Electric Motors
- 7.7.3 Power Electronics & Pulse Width Modulation Invertors
- 7.7.4 AC Machine Components & problem Solving
- 7.7.5 Synchronous Generators

- 7.7.6 Generator Maintenance & Troubleshooting Course Summary & Conclusion

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 7, 2025	April 11, 2025	5 days	4250.00 $	UAE - Abu Dhabi
July 28, 2025	Aug. 1, 2025	5 days	4250.00 $	UAE - Dubai
Nov. 17, 2025	Nov. 21, 2025	5 days	4950.00 $	Spain - Barcelona
Nov. 9, 2025	Nov. 13, 2025	5 days	4250.00 $	oman - salalah