



Content
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Power Quality Troubleshooting Training

Contact us Today for a FREE quotation to deliver this course at your company's location.

<https://www.electricityforum.com/onsite-training-rfq>

Establishing preventative maintenance programs is becoming critical to maintaining the uptime of electrical equipment and can significantly reduce both planned and unplanned downtime. Unplanned downtime costs are difficult to calculate, but often significant. For some industries, it can represent 1 to 3 per cent of revenue (potentially 30 per cent to - 40 per cent of profits) annually.

The course will review equipment necessary to perform a Site Survey, such as industry oscilloscopes and Multimeters, Power Quality Analyzers, Current Clamp meters, and Mini Infrared Thermometers.

LEARNING OBJECTIVES

- Learn how to perform insulation tests, insulation voltages, plus a wide range of DMM tasks with confidence and ease. Necessary for work on motors, cables and switchgear.
- Learn how to accurately measure AC current without breaking the circuit
- Check for hot spots and measure temperature with the Mini non-contact thermometers.

- Measure voltage level, current balance, harmonics, power, energy, power factor, displacement power factor, determine bad or marginal circuit breakers, “K” factor, Crest factor.

WHO SHOULD ATTEND

Design engineers, electrical engineers, commissioning and testing engineers, consulting engineers, electrical technologists, project managers, project engineers, plant managers, operating and maintenance personnel and all individuals involved in electrical equipment maintenance, testing and commissioning project execution.

STUDENTS RECEIVE

- **FREE** 100-Page Digital Power Quality Handbook (Value \$20)
- **\$100 Coupon** Toward Any Future Electricity Forum Event (Restrictions Apply)
- 1.4 Continuing Education Unit (CEU) Credits
- **FREE** Magazine Subscription (Value \$25.00)
- Course Materials In Paper Format

Related Course

[Power Quality Training](#)

[Power Quality and UPS Training](#)

COURSE OUTLINE

DAY ONE

Part 1

Electrical Distribution Systems

- Generation, Transmission & Distribution Systems
- Electrical Systems Theory
- Power Problems in Industrial Plants
- Power Problems in Telecommunication's Sites
- Power Problems affecting sensitive electronic equipment
- Equipment necessary to perform a "Power System Audit"
- Industry Standards

Part 2

Power System Disturbances

- Introduction
- Sine wave Disturbances
- Voltage fluctuations
- Voltage fluctuations effects
- Transient overvoltages
- Subcycle Disturbances
- Electrical Noise
- Energy Interruptions
- Harmonics
- Electromagnetic Interference (EMI)
- Electrostatic Discharge (ESD)

Part 3

Troubleshooting Transient Overvoltage Problems

- Technical Criteria
- Devices that depend on the frequency

- Devices that do not depend on the frequency
- Suppression Technologies against transients
- Gas tube
- Metal Oxide Varistors (MOV)
- Silicon Avalanche Diodes (SAD)
- Hybrid Circuits
- IEEE Location categories
- CBEMA Curve
- ANSI C62.41-1991

Part 4

Troubleshooting Harmonics in the Power System

- DC Power Supplies
- Harmonic generators
- Full wave Rectifier
- Harmonics spectrum for a six pulse converter
- Resonance problems with capacitors
- General solutions to control harmonics

Part 5

Corrective Measures for Power Disturbances

- Line conditioners
- LC Filter
- Harmonics Filter
- UPS
- Interactive UPS
- UPS with Rectifier/Charger
- Redundant UPS System
- UPS with electronic static bypass
- Motor-Generator ac-dc
- Motor-generator with dc driver

- Motor–Generator with ac driver
- Energy Study

Part 6

Troubleshooting Electrical Grounding Systems

- Grounding Systems
- Earth Ground
- Lightning protection System
- Equipment/Safety ground
- Grounded conductor
- Signal reference ground
- Effective grounding
- Grounding electrode System
- Ground resistance measurement
- Computer Room grounding

DAY TWO

Part 7

Troubleshooting Telecommunications Sites

- Telecommunications grounding
- Exterior ground ring/Interior ground ring
- Master Ground Bar (MGB)
- Grounding for Lightning Protection
- Grounding against Electrostatic Discharge (ESD)
- Cable shielding grounding

Part 8

Troubleshooting Industrial Plants (Site Survey)

- Procedures to perform a site audit
- Registration of measurements values
- Electrical Parameters Measurements on service Equipment
- Measurement of feeder Currents
- Measurements on Branch circuits
- Neutral-Ground Voltage test
- Current on the Neutral conductor
- Solutions and Recommendations
- Commercial Lighting
- Energy consumption

Part 9

Troubleshooting Three-Phase Loads

- Voltage & Current Unbalance
- Transformer Load measurement
- Transformer Harmonic spectrum
- Power measurements
- Harmonic sequence
- Total Harmonic Distortion
- K Factor
- Solution to transformer problems

Part 10

Troubleshooting Motors

- Voltage unbalance
- Current unbalance
- Total Harmonic Distortion (THD)
- Loads on three-phase systems
- Equipment inrush current

- Inrush current effects
- Power Factor/ Displacement Power Factor

Part 11

Motor Adjustable speed Drivers (ASD)

- ASD as an interference
- Six and twelve pulse Converters
- SCR Converters
- Converters with diodes and broad pulse modulation
- PWM
- Phase displacement transformers
- Power factor displacement
- Harmonics and Capacitors
- Power System Resonance

Part 12

TROUBLESHOOTING CASE HISTORIES

- Troubleshooting Lighting Loads
- Motor failures
- Transformers failures
- Medical equipment failures
- Electrical noise and transient overvoltages.

Review of expectations
Questions and Answers

COURSE SCHEDULE

Both days:

Start: 8:00 a.m.

Coffee break: 10:00 a.m.

Lunch: 12:00 noon

Finish: 4:30 p.m.

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