



Content
Community
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Shielded Cable Grounding Techniques

[View Course Details](#)

COURSE DATES AND TIMES

Our Shielded Cable Grounding Training course teaches how improper grounding and cable shielding create electrical noise, ground loops, and electromagnetic interference in industrial power, control, and instrumentation systems.

Modern industrial facilities rely on sensitive control equipment, data communications networks, and electronic instrumentation that can be disrupted by electromagnetic noise. Poor cable shielding and grounding practices allow noise currents to couple into signal wiring, producing unreliable measurements, communication errors, and unpredictable control system behavior.

This course explains the electromagnetic compatibility (EMC) principles that govern noise coupling in electrical wiring systems. Participants learn how electromagnetic interference propagates through grounding networks, cable shields, and signal return paths, and how proper grounding and shielding techniques prevent these problems.

The program combines grounding theory with practical engineering techniques used to diagnose and eliminate electrical noise in industrial installations.

Participants will learn how to:

- Identify common and differential mode noise sources
- Diagnose ground loop interference
- Apply single-point and multipoint grounding methods
- Implement effective cable shield grounding techniques
- Reduce electromagnetic coupling between power and signal circuits

- Apply filtering and shielding to control conducted and radiated noise

Through real-world examples and troubleshooting methods, this training helps engineers and technicians design wiring systems that maintain signal integrity and reliable operation in electrically noisy environments.

WHO SHOULD ATTEND

This course is designed for engineers and technical professionals responsible for designing, installing, maintaining, or troubleshooting electrical wiring and instrumentation systems where electrical noise and electromagnetic interference can affect system performance.

The training is particularly valuable for professionals working with industrial control systems, instrumentation networks, and sensitive electronic equipment.

This course will benefit:

- Electrical engineers responsible for power, control, and instrumentation wiring design
- Instrumentation and control engineers working with measurement and automation systems
- Automation engineers designing PLC, SCADA, and industrial control networks
- Electrical technicians and electricians installing shielded cable systems
- Maintenance personnel troubleshooting electrical noise and grounding problems
- Control system integrators responsible for reliable signal and communication performance
- Engineers working with industrial data communication systems and field instrumentation
- Design engineers responsible for grounding, shielding, and EMI mitigation in electrical installations

Industries That Benefit From This Training

Professionals working in electrically noisy industrial environments will benefit most, including:

- Manufacturing facilities
- Power generation plants
- Oil and gas installations
- Mining operations
- Water and wastewater facilities
- Pulp and paper plants
- Chemical processing facilities
- Utilities and electrical infrastructure systems

STUDENTS RECEIVE

- Shielded Cable Grounding Course Certificate

- 1.2 Continuing Education Unit (CEU) Credits
- **FREE** 100-Page Digital Electrical Grounding Handbook (Value \$20)
- **\$100** Coupon Toward any Future Electricity Forum Event (Restrictions Apply)
- **FREE** Magazine Subscription (Value \$25.00)
- Course Materials in PDF Format

COURSE OUTLINE

Shielded Cable Grounding Training Course Outline

DAY ONE

Session 1: Basic Principles of Noise Reduction

- Importance of wiring inductance
- Bandwidth of pulse waveforms
- Sources of electrical noise in industrial systems
- Noise coupling mechanisms
- Capacitive coupling
- Inductive coupling
- Radiated electromagnetic coupling
- How to identify the coupling mechanism
- Common-mode and differential-mode noise
- Signal integrity and noise susceptibility

Session 2: Grounding: Why and How?

- What is electrical ground
- Purpose of grounding in electrical systems
- Safety grounding vs signal grounding
- Signal ground and signal return paths
- Ground impedance and ground reference stability
- Ground grid technique
- Isolated grounding technique
- Ground loop formation and mitigation
- Ground loop noise reduction strategies

Session 3: Signal Ground Techniques

- Ground each current only once
- Unsafe signal grounding practices
- Single-point grounding techniques
- Multipoint grounding techniques
- Single point versus ground grid systems
- Signal isolation techniques
- Differential signaling for noise rejection
- Instrumentation grounding best practices

Session 4: Diagnosing Electrical Noise Problems

- Ringing, rounding, and reflections
- Transmission line effects in cables
- Effects of signal impedance distribution on noise susceptibility
- Practical diagnostic techniques
- Oscilloscope measurement techniques
- Noise coupling examples in industrial systems
- Ground loop detection methods
- Troubleshooting control system interference

Session 5: Cable Shielding Fundamentals

- Purpose of cable shields
- How shields reduce electromagnetic interference
- Shield transfer impedance
- Shield effectiveness versus frequency
- Foil shields vs braided shields
- Combination shield designs
- Drain wires and shield continuity
- Shielded cable selection for industrial environments

Session 6: Shield Grounding Methods

- Single-point shield grounding
- Multi-point shield grounding
- Hybrid grounding methods
- High-frequency versus low-frequency grounding
- Grounding shields at one end vs both ends
- Avoiding shield ground loops
- Proper shield termination techniques
- Shield bonding at equipment interfaces

DAY TWO

Session 7: Noise Reduction Techniques

- Filtering and shielding strategies
- Reducing mutual inductance
- Cable routing techniques
- Separation of power and signal cables
- Twisted pair noise reduction
- Control of return current paths
- Best practices for industrial wiring layout

Session 8: Filtering Conducted Noise

- Common-mode and differential-mode filter techniques
- Improving circuit balance
- Filtering high-frequency noise
- 1 GHz filtering techniques
- DC power bus design for noise reduction
- Grounding filters properly
- Avoiding filter bypass problems

Session 9: Inductive and Capacitive Shielding

- Inductive shielding principles
- Capacitive shielding principles
- Self-shielding techniques
- Misuse of twisted pair wiring
- Shield grounding strategies
- Cable shielding examples in industrial systems
- Shielding for high-speed data circuits

Session 10: Reducing Electromagnetic Coupling

- Identifying electromagnetic coupling paths
- Controlling common-mode currents
- Cable routing to reduce coupling
- Bonding and grounding strategies
- Isolation techniques for sensitive signals
- Shielding enclosures and cable trays

Session 11: Industrial Shield Grounding Applications

- Shielded cables in instrumentation systems
- Grounding PLC communication cables
- Shield grounding for VFD motor cables
- Shielded cables in control systems
- Shielding for industrial data networks
- Grounding in high-noise industrial environments

Session 12: Standards and Best Practices

- IEEE grounding standards
- IEEE 1100 (Emerald Book) grounding guidance
- EMC grounding principles
- Shield grounding recommendations
- Installation practices for industrial control wiring
- Documentation and inspection procedures

Session 13: Field Troubleshooting and Case Studies

- Diagnosing ground loop problems
- Troubleshooting instrumentation noise
- Resolving communication interference
- Shield termination failures
- Industrial case studies of EMI problems
- Corrective grounding solutions

Questions and Answers

Open discussion and review of field grounding problems.

COURSE TIMETABLE

Both days:

10:00 a.m. ET

Finish: 4:00 p.m. ET

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

[Request Quote](#)