

"Hands-On" Electrical Troubleshooting & Preventive Maintenance™

For a schedule of open enrollment classes or to bring this training to your plant or facility, contact us @



1-877-97-TRAIN

www.AmericanTrainco.com

Specifically Designed For Building, Plant, Facility and Electrical Equipment Maintenance

"A straightforward and no bull course..."

Glen A. Butler – SPS
FPLE

College Credit & Testing Available with this Course

This course now carries American Council on Education (ACE) College Credit Recommendations.

Build and Troubleshoot Electrical Circuits Using Real World Components!

- This seminar can also be presented at your facility for larger groups
- Reserve Your Space Now! **CALL 1-877-97-TRAIN**
- Check us out online at **www.AmericanTrainco.com** for a complete listing of all seminars coming to your area

"I've learned more in two days than I have at work in five years!"

Art Ramirez
Maintenance Technician
Dixon Valve Coupling Co.

Real World Training...for Real World Needs™

Specifically
Designed
for Building,
Plant, Facility
and Electrical
Equipment
Maintenance

Electrical Troubleshooting & Preventive Maintenance™

▶ *"I needed this training 25 years ago."*

Jim Chesley – Power Plant Maintenance
Benton PUD

▶ *"A ... cure for spending big dollars
on electrical safety & maintenance"*

Kevin Halbig – Electrical Tradesman – Sandia National Labs

▶ *"Learned more in 2 days
than in the first 4 years of
my job! Thank you!"*

Peter F. Scott – Maintenance Tech
B/E Aerospace

PURPOSE OF SEMINAR

More than just a "hands-on" training course, we have analyzed the job of the maintenance technician and provide training on some of the most commonly performed electrical troubleshooting tasks. You can and should expect results from this seminar!

Your employees will not be playing with trainers built for a classroom but, instead, they'll be working with real world industrial components found in your facility. They will be using CAT III industrial meters to troubleshoot – just as they should in your facility. They will troubleshoot industrial components from pushbuttons to relays and motor starters. They will wire basic electrical circuits using wiring diagrams and then, once they understand how they operate, your employees will troubleshoot faults inserted by the instructor. They will use a phase-rotation meter, Megohmmeter and different types of multimeters and voltage testers. They will see three-phase power in action and learn to measure its values. They will learn what electrical PPE they should wear and will even have the opportunity to try on Flame Resistant (FR) clothing. They will try on different sizes and types of electrically rated rubber gloves and learn what they should be using in the field.

Granted, we can't substitute years of experience in a day or two of training, but we can show your employees how to safely and correctly troubleshoot electrical components and circuits based on their career level. At American Trainco we provide "Real World Training... for Real World Needs."

ABOUT OUR INSTRUCTORS

All American Trainco instructors are required to have a formal education and real world work experience. They need to be leaders in their field. We don't hire field people without teaching experience, and we don't hire teachers without field experience. They must have both. And since attendees critique the instructor at the end of each class, a positive and enjoyable learning experience is virtually guaranteed.

TRAINING OUTCOMES

During this seminar your employee will perform the following basic electrical maintenance tasks. When they return from this American Trainco seminar, you can expect your employee to present you with a training certificate indicating he or she has successfully completed the following:

1. Interpret the OSHA requirements for troubleshooting and working on energized circuits
2. Determine the Personal Protective Equipment (PPE) requirements for electrical troubleshooting.
3. Safely and correctly verify a circuit is de-energized.
4. Perform basic circuit checks for shorts, opens and ground faults using a multimeter.
5. Read, interpret simple ladder and schematic diagrams.
6. Perform continuity and resistance checks on relay coils and contacts, overloads, fuses, circuit breakers, switches and other control circuit components.
7. Wire and troubleshoot basic electrical control circuits to develop a logical, systematic approach to troubleshooting.
8. Take clamp-on ammeter readings on 3-phase circuits and interpret readings.
9. Measure voltage on 3-phase Wye and Delta connected circuits and calculate percent phase imbalance as part of troubleshooting motors.
10. Test single-phase power distribution systems for correct wiring.
11. Use a Megohmmeter to perform the following insulation resistance tests used on motors and distribution systems: Spot Reading, Dielectric Absorption Ratio, Polarization Index.
12. Observe power quality problems and troubleshooting techniques for facility distribution systems, three-phase loads and commercial lighting.
13. Read and interpret basic PLC ladder diagrams.
14. Learn how to troubleshoot Variable Frequency Drives (VFD).
15. Be ready to read and interpret your facility one-line electrical drawings and electrical floor plans.
16. Identify components of a successful electrical preventive maintenance program.

HIGH QUALITY PRESENTATIONS

From the start we've demanded that all our presentations would be lively, attractive, crisp and clear. Our instructors use state-of-the-art computers, projection equipment and software to bring you a high quality visual experience.

CERTIFICATES-TESTING-COLLEGE CREDIT

After completion of this seminar students will receive a Certificate of Completion and 1.6 CEUs (Continuing Education Units) approved by the Maintenance Training Association of the Americas. Students may also elect to take the MTAA Certification test associated with this topic. Those seeking college credit recommendations must attend both days of this course and successfully pass the MTAA Certification test. This course is recommended by ACE for 1 college credit hour. Transcripts are available through American Trainco.

IN-HOUSE TRAINING

You can bring this or any other maintenance training program directly to your plant or facility. Simply call us and tell us what you're looking for. In addition to our own American Trainco seminars and instructors, we have established relationships with literally hundreds of other expert instructors and consultants who conduct training in virtually all areas of maintenance; and our custom training staff is among the most experienced in the industry. Chances are good we will be able to meet your needs. Just call and ask...

Call **1-877-97-TRAIN** and ask for Dan or Adam, or email **AdamC@AmericanTrainco.com**.

You may also visit us on the web at:

www.AmericanTrainco.com to view a listing of courses and to request a quote.

Some of the other training topics we can bring to your site include:

- Basic Electricity for the Non-Electrician™
- Electrical Troubleshooting
- Air Conditioning & Refrigeration
- Boiler Operation, Maintenance & Safety™
- Arc Flash Protection & Electrical Safety™
- 2008 National Electrical Code®

Reserve Your Space Now! **CALL 1-877-97-TRAIN** Or Online at: **www.AmericanTrainco.com**

COURSE OVERVIEW

BASIC SKILLS FOR ELECTRICAL TROUBLESHOOTING

- Safety First
- OSHA requirements regarding troubleshooting and qualified persons
- Using Electrical Drawings
- Using Meters and Circuit Measurements
- Developing a logical, systematic approach to troubleshooting

TROUBLESHOOTING CONTROL CIRCUITS

- Relays, Motor Starters and Control Devices
- Reading and Interpreting Ladder Diagrams
- Power Loss
- Control Circuit Industrial Applications
- Electric Motor Drives
- Solenoid-Operated Valves
- Heating Elements

TROUBLESHOOTING MOTORS

- Most Common Motor Problems
- Electrical Problems
- Testing windings for shorts, opens and ground faults
- Phase Unbalance
- Mechanical Problems
- Phase Rotation Testing

TROUBLESHOOTING POWER DISTRIBUTION

- Wye and Delta Systems
- Overcurrent Protection
- Branch Circuits

TROUBLESHOOTING POWER QUALITY PROBLEMS

- Sources of Power Quality Problems
- Test Equipment for Troubleshooting Power Quality Problems
- Harmonics

TROUBLESHOOTING LIGHTING CIRCUITS

- Lighting Terminology
- Types of Lighting Circuits
- Incandescent Lighting
- Fluorescent Lighting
- HID Lighting

TROUBLESHOOTING PROGRAMMABLE LOGIC CONTROLLERS (PLC's)

- Overview of Programmable Logic Controls
- Reading PLC Ladder Diagrams
- Status Indicators and Error Codes
- Force and Disable
- Startup Procedures

TROUBLESHOOTING VARIABLE FREQUENCY DRIVES (VFD's)

- VFD Terminology
- VFD Basic Operation
- Components
- Pulse Width Modulation
- Types of VFD
- Common problems and corrective action

ELECTRICAL PREVENTIVE MAINTENANCE

- Why Perform Electrical Maintenance
- Overview of an Electrical Maintenance Program
- Building a Walkthrough Inspection Checklist

SEMINAR AGENDA

- 7:30 am Registration
- 8:00 am Class Begins
- 12:00 - 1:00 pm Lunch (on your own)
- 4:30 pm Class Ends

SEMINAR FEE

\$985 Both Days

NO RISK REGISTRATION and MONEY-BACK GUARANTEE

If you're not yet sure you'll be able to attend this seminar, you can still make a reservation to hold your space in class. While payment is due prior to the start of the seminar, you may choose a full refund or credit for cancellations made at least 24 hours in advance. Student substitutions can also be freely made at any time prior to the start of the seminar. Refunds will not be issued for registered attendees who fail to show up and have not given a notice of cancellation. In the rare event that should you not receive the expected value after attending our seminar, simply notify us in writing of your reasons and your money will be promptly refunded.

WHO SHOULD ATTEND

This seminar is a must for anyone who works with electrical equipment and systems at industrial plants, utilities or commercial and private building facilities. General maintenance personnel, workers in cross-training programs, electricians and engineers will find this course extremely useful. Attendees come from a wide variety of industries, skill-levels, company sizes, and job titles, so if you're not sure you'll fit in or will benefit from the class, don't worry - you will - as long as you work with electricity! People who will benefit from attending this seminar include...

Maintenance Personnel in:

Manufacturing Plants **Commercial Buildings**
Hospitals **Waste Water Facilities**
Schools **Government Buildings**
Research Facilities **Shopping Centers**
Apartment Buildings

Including:

Electricians **Apprentices**
Mechanics **HVAC Technicians**
Boiler Operators **Machine Operators**
Engineers **Alarm Technicians**
Building Engineers **Stationary Engineers**
Maintenance Supervisors
Electronic and Instrumentation Technicians
Multicraft & Cross Training Personnel

FREE - MTAA CERTIFICATION TEST (Optional)

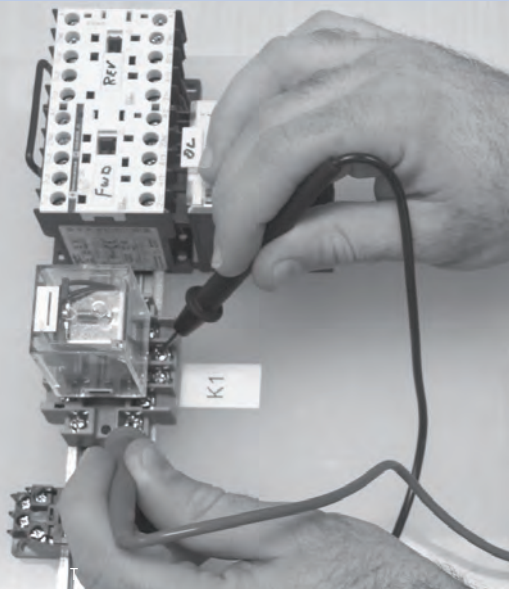
In addition to receiving MTAA approved CEU's for this class, you may also elect to take an MTAA Electrical Troubleshooting Certification test. Instructions for taking the test will be provided at the end of the seminar.

"I recommend this course to anyone working in maintenance or as a refresher for electricians!"

Daniel McCormick
Operation Engineer
Cushman & Wakefield

"Information is invaluable!"

Fabio A. Mancia Jr.
- Oceanside Unified School District



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www.AmericanTrainco.com

Specifically Designed For Building, Plant, Facility and Electrical Equipment Maintenance

SEMINAR FEE
\$985 Both Days

▶ **“Excellent, Practical Knowledge”**
Kshamp Soni
Watson Laboratories

FIVE EASY WAYS TO REGISTER:

- 1) **Internet** www.AmericanTrainco.com
- 2) **Fax** (303) 531-4565
- 3) **Phone** Toll Free 1-877-97-TRAIN 1-877-978-7246 or (303) 531-4560
- 4) **Mail** this form to: American Trainco, Inc. P.O. Box 3397 Englewood, CO 80155
- 5) **E-mail** the information requested on this form to: Sales@AmericanTrainco.com

▶ **“Learned more than I ever expected”**
Marlin Rogers
Maintenance Supervisor
Windsor House Inc

Authorizing Person/Supervisor: Name _____

Title _____ Company Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____ Email _____

| Seminar Attendees: | Name | Title | E-Mail | Seminar City |
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Other Seminars Coming To Your Area!

- Basic Electricity for the Non-Electrician™
- Electrical Troubleshooting
- Air Conditioning & Refrigeration
- Boiler Operation, Maintenance & Safety™
- Arc Flash Protection & Electrical Safety™
- 2008 National Electrical Code®

And 20+ other courses in the following areas:

- Electrical / Electrical Controls
- HVACR
- Mechanical
- Facility & Plant Management
- Fluid Power
- Pumps / Piping
- Codes / Standards / Safety

Call 1-877-97-TRAIN, or visit
www.AmericanTrainco.com
to get your complete schedule today!

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