

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

**Electric**

# Motors, Drives & Control Circuits™

**Practical Solutions for Plant and Facility Maintenance™**

- Find Fixes for Common Motor Problems

- Learn to Resolve Issues in Your Control Circuits

- Start Saving Time & Money Today!

**Earn College Credit with This Course!**

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

*"Large volumes of information in an understandable manner. Good course. Excellent instructor!"*

Kelly Thomas - Electrician  
Western Air Defense Sector, McChord AFB



**DAY 1 - Motor Replacement, Maintenance & Testing**

**DAY 2 - Working with Control Circuits - including PLC Ladder Logic and Variable Frequency Drives basics**

- New Convenient Format - Attend either one or both days!
- This seminar can also be presented at your facility for larger groups
- Reserve Your Space Now! **CALL 1-877-97-TRAIN**

Or check us out online at [www.AmericanTrainco.com](http://www.AmericanTrainco.com) for a complete listing of all seminars coming to your area

**Ideal for Workers in Multi-craft Environments**

▶ **“A great refresher with some new material too!”**

Vincent Iglesias – Power Plant Maintenance – McChord AFB

▶ **“I will recommend this class to my colleagues”**

Mike Tseng – Engineer – King County DNR/WTD

## Electric

# Motors, Drives & Control Circuits™

### PURPOSE OF TRAINING

Motors that fail and the need to replace them is as common as the day is long. But did you know that it doesn't have to be that way? While motor failure may appear to be a common problem, it is more likely that the real enemy is a wrong application or control circuit issue. Failure of the motor can be just a symptom of perhaps an even more serious problem that lies ahead.

This course is designed to help maintenance people identify what the real issue is when a motor burns out and how to prevent it from happening again. It involves understanding the control of the motor as well as the motor itself. And because we know time is money, this seminar is designed to have immediate impact so that you can start saving maintenance dollars on costly repairs and service calls today! We approach our students as if they were our own employees. We give them real world, practical knowledge. And students attending this course are expected to go back to their workplace and immediately apply what they have learned. Now that's "Real World" training!

### TRAINING OUTCOMES

Upon completion of this course, students will receive a training certificate and .8 American Trainco Continuing Education Units for each day attended (1.6 credits for two days), indicating that the student has learned to:

- Identify the different types of motors and their appropriate applications
- Test for & troubleshoot motor problems
- Properly select and replace a motor
- Keep a motor properly maintained
- Identify & understand symbols used in common control circuit drawings
- Use a logical, systematic approach to troubleshooting
- Find and fix common control circuit problems

And to be 100% certain you get the training you need, students are encouraged to bring control circuit drawings of the equipment in their own facility! If you have a unique problem or situation, just let our instructor know. If he can't help you with your specific problem, we'll refund your money – guaranteed!

### TEACHING PHILOSOPHY

"Real World Training...for Real World Needs", is not just our slogan, but also our mission statement. At American Trainco, we approach our students as if they were our own employees. We instruct and guide them in practical knowledge that allows them to immediately go back to their workplace and apply what they have learned. Our instructors are seasoned veterans with years of real world experience, and the students who attend our seminars often get more from a few days of training than an entire year of reading textbooks or watching videos. How do we know? They tell us.

Anyone can teach theory, but there simply is no substitution for experience. What sets American Trainco apart is our ability to communicate that experience to our students. As one attendee told us at the end of his two-day training course, "I think I can go back to work now and teach the veterans a thing or two."

Mission accomplished.

### 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.

### 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.

### UNAFFILIATED and NON-COMMERCIAL

Unlike some training experiences, you won't get a sales presentation at an American Trainco seminar - all you get is an honest, commercially unbiased education. We do not engage in the practice of selling or promoting other company's products or services, so you know that by attending one of our seminars, your time and money is well spent.

### HIGH QUALITY PRESENTATIONS

Black and white transparencies never made it in the door at American Trainco. From the start we 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. And our books are designed with the maintenance person in mind too. We know that they don't always have a lot of time to read volumes of literature so our manuals are quick and to the point, providing students the same charts, descriptions, pictures and bulleted items they'll see during the presentation.

### WHO SHOULD ATTEND

This course is designed for anyone who needs to understand motors and motor control. Attendees come from a wide variety of industries, skill-levels, company sizes, and backgrounds, so if you're not sure you'll fit in or will benefit from these classes, don't worry - you will - as long as you work around motors! People who will benefit from attending this seminar include...

**All Maintenance Related Personnel Working in:**  
**Manufacturing Plants**  
**Commercial Buildings**  
**Hospitals**  
**Waste Water Facilities**  
**Schools**  
**Government Buildings**  
**Or any other environment**  
**where motors are present**

# C O U R S E O V E R V I E W

## DAY 1

### MOTOR REPLACEMENT, MAINTENANCE & TESTING

Discussion Topics:

#### Fundamentals of Motors

- Glossary of Key Motor Terms
- Types of motors available and their applications
- Test equipment you need for testing and maintaining rotating electrical equipment
- Quick checks in the field for troubleshooting rotating electrical equipment
- Selecting the best replacement motor
- Understanding Motor Nameplate Data
- IEC Motor Ratings
- Energy Issues and Motors
- Tips for selecting Energy Efficient Motors

#### Safety Issues for Troubleshooting and Replacing Motors

- Hazards of Rotating Electrical Equipment
- OSHA Lockout/Tagout Requirements for Electrical Equipment
- Determining motor power supplies and voltages
- Verifying circuits de-energized – safely and correctly!
- The latest Personal Protective Equipment (PPE) requirements
- Visual Inspections of Motor Disconnects and control circuit operation

#### Motor Replacement Procedure

- Verification of safe working condition
- Properly de-terminating motors
- Setting replacement motors
- Overview of shaft coupling/alignment procedure options
- Electrical checks on replacement motors before termination
- Verification of proper size line conductors
- Determining proper connection scheme using nameplate data
- Selecting the best method of motor termination
- Lugs and insulation tapes for termination
- Termination kits
- Methods of verifying proper phase rotation
- Lubrication requirements
- Sizing fuses and overloads
- Final checks prior to re-energizing motor
- Electrical, visual and mechanical checks for startup testing

#### Motor Maintenance Issues

- Testing motor windings
- Megohmmeter testing of motors
- Modern, state-of-the-art predictive maintenance testing for motors
- Bearings and Lubrication
- Motor Storage
- Determining voltage and current imbalance and its effects
- Recommended maintenance practices of NFPA 70B
- Sizing and adjusting overloads per the NEC®
- Common motor problems and how to find them
- Fixes for common motor problems

## DAY 2

### WORKING WITH CONTROL CIRCUITS

Discussion Topics:

#### Fundamentals of Control Circuits

- Types of motor control
- Symbols for control
- Learn to read motor control schematic and ladder diagrams
- Watch motor control circuits operate on-screen
- Learn the basics of PLC ladder logic
- Watch PLC ladder diagrams operate on-screen
- Developing a logical, systematic approach to troubleshooting controls
- Typical control circuit problems and how to find and fix them

#### Motor Drives and Special Control Circuit Applications

- Energy Management and motor drives
- AC and DC drives overview
- Motors for Variable Speed Drives
- Variable Speed Drive Applications
- HVAC applications
- Servo motors and drives for manufacturing
- Review operation of modern automation control such as “pick and place” and conveyor drives

**“Excellent!”**

Mike Butler – Water Operator  
– NM American Water

**“Interesting!”**

James Sanchez – Electrician  
– IC&R

**“Just right -”**

Daniel Mundell – PGS #3  
– Puget Sound Energy

**“Comprehensive”**

Les Martinez – Maint. Specialist  
– Albuquerque Public Schools

## 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 FEES

\$490 Each Day    \$980 Both Days

## NO RISK REGISTRATION & MONEY-BACK GUARANTEE

If you're not 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 you do not receive the expected value after attending our seminar, simply notify us in writing of your reasons and your money will be promptly refunded.

## IN-HOUSE TRAINING

You can bring this or any other maintenance training program directly to your facility. Simply give us a call, tell us what you're looking for, and we'll provide you a quote. We also provide custom training for courses not listed in this brochure.

Call **1-877-97-TRAIN** and ask for Dan or Adam, or email [AdamC@AmericanTrainco.com](mailto:AdamC@AmericanTrainco.com). Visit us on the web at [www.AmericanTrainco.com](http://www.AmericanTrainco.com)

## OTHER SEMINARS

American Trainco presents a variety of maintenance training seminars throughout the country on a regular basis. Contact us to find out more about the training courses coming to your area, including:

- Arc Flash Electrical Safety
- Basic Electricity for Non-Electricians
- Electrical Troubleshooting
- Air Conditioning & Refrigeration
- Boiler Operation, Maintenance & Safety
- Variable Frequency Drives
- PLCs for Non-Programmers
- Electrical Diagrams, Schematics & Drawings
- Standby Generators & Emergency Power
- Pumps & Pump Systems
- 2008 National Electrical Code®
- Electrical PM & Best Practices
- Hydraulics
- Saving Energy at Your Facility
- Inventory Control for Maintenance
- Predictive Maintenance & Condition Monitoring

Reserve Your Space Now!

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▶ **“Great Course and easy to understand”**

Wade McDonald - Electrician  
- Frankfort Sewer Dept.

### Find Fixes for Common Motor and Control Circuit Problems!

**SEMINAR FEE**  
\$490 Each Day    \$980 Both Days

**FIVE EASY WAYS TO REGISTER:**

- 1) **Internet** [www.AmericanTrainco.com](http://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](mailto:Sales@AmericanTrainco.com)

**Primary Contact/Authorizing Supervisor:** Name \_\_\_\_\_

Title \_\_\_\_\_ Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ Email \_\_\_\_\_

Seminar Attendees:	Name	Title	E-Mail	Seminar City	<b>ATTEND</b>		
					Day 1	Day 2	Both Days
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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### Other Seminars Coming To You Area!

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- Basic Electricity for Non-Electricians
- Electrical Troubleshooting
- Air Conditioning & Refrigeration
- Boiler Operation, Maintenance & Safety
- Variable Frequency Drives
- PLCs for Non-Programmers
- Electrical Diagrams, Schematics & Drawings
- Standby Generators & Emergency Power
- Pumps & Pump Systems
- 2008 National Electrical Code®
- Electrical PM & Best Practices
- Hydraulics
- Saving Energy at Your Facility
- Inventory Control for Maintenance
- Predictive Maintenance & Condition Monitoring and more!

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**to get your complete schedule today!**

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PO Box 3397  
Englewood, CO 80155



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