

► **"Learned to apply schematics to real life situations"**

Michael Taylor - Elec/Instr Tech - LaFourche Sugars

Electrical **LADDER DRAWINGS, SCHEMATICS & DIAGRAMS™**

In Industrial Plants, Public Facilities and Commercial Buildings

PURPOSE OF TRAINING

Being able to understand, operate, maintain and troubleshoot your own facility and plant electrical system is only possible if you understand the electrical language first. That's what this course is all about. We will supply the basic building blocks and information you need to become proficient in the proper use of various electrical schematics and drawings. This course is perfect for the multi-craft technician or even a skilled electrician who just needs a refresher. 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. 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 1.6 Continuing Education Units indicating that the student has learned to:

- Identify common electrical symbols
- Apply common electrical formulas
- Read and interpret a variety of schematics and drawings
- Relate actual equipment components to diagram symbols
- Troubleshoot equipment problems based on symptoms
- Create drawings based on descriptions and observations
- Provide written/verbal descriptions of circuit diagrams

Course graduates will also have learned how to use drawings and schematics to solve common problems resulting in reduced downtime. This means a lower cost of operation with less dependence on outside service contractors. And to be 100% certain you get the training you need, students are encouraged to bring schematics and diagrams of the equipment in their own facility! If you have a unique problem or situation with schematics or drawings, 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.

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 in the presentation.

WHO SHOULD ATTEND

This course is designed for anyone who needs to understand electrical drawings and schematics for servicing and troubleshooting facility and industrial electrical systems. 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 with electricity! People who will benefit from attending this seminar include...

All Maintenance Personnel in:

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

Including:

Mechanics	HVAC Technicians
Machine Operators	Apprentices
Alarm Technicians	Electricians
Facility Managers	Non-Electrical Engineers
Building Engineers	Stationary Engineers

UNAFFILIATED & 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 any other company's products or services, so you know that by attending one of our seminars, your time and money is well spent.

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

In the field of equipment maintenance, installation or modification, the ability to read and understand schematics and drawings is an absolute must. Several types of drawings and diagrams will be examined during this course including Block, Pictorial, One-line, Wiring, Terminal, and Schematic. The differences between these drawings will be emphasized and the purpose and flow of each type will be clarified.

In order to learn the symbolic language, you must start at the beginning. In doing so, individual component symbols will be presented along with an explanation of their function and purpose in the circuit. In order to make it easier to relate the diagrams to the actual equipment, students will see pictorial examples or photos of the components along with the description. Training will include exercises where students create schematic diagrams based on circuit descriptions, as well as interpreting schematic drawings so that they can provide verbal or written circuit descriptions.

I. Electrical Fundamentals for Print Reading

Clarifying Terminology
Effects of Current Flow
Voltage Drop Calculations
Understanding Ampacity Tables
Importance of Electrical Drawings
NEC® Drawing Requirements
Drawing Control

II. Electrical Drawing Basics

Types and Uses of Electrical Drawings
Drawing Preparation and Ownership
Design/Bid/Build Process
Written Specifications

III. Electrical Drawings for Building Maintenance & Construction

Component Symbols

- Wiring & Connections
- Power Source
- Breakers
- Disconnects
- Fuses
- Fuse Block
- Contactors
- Overloads
- Loads
- Grounds
- Others

Electrical Drawings

- Site or Plot Plan
- Elevation
- Section
- Detail
- Power Riser
- One-Line Diagram
- Electrical Floor Plan
- Lighting Plan
- Schedules
- Feeder Schedules
- Lighting Schedules
- Panelboard Schedules
- Motor & Equipment Schedules
- Wiring Diagrams

Reading & Interpreting Code Requirements
Real World Applications

IV. Industrial Control Prints

Component Symbols

- Transformers
- Fuses
- Jumpers
- Switches
- Relays
- Timers
- Transducers
- Sensors
- Circuit Loads
- Grounds
- Circuit Commons
- Others

Understanding Relay Operation

Electrical Schematic Diagrams

Motor Termination Diagrams

Electrical Ladder Diagrams for Control Circuits

Block Diagrams

IEC Symbols

NEMA and IEC Circuit Comparison

Reading & Interpreting Basic Motor Control Circuits

Forward-Reverse Motor control

V. Real-World Applications

Conveyors

Air Compressors

HVAC Controls

Burner Combustion

Extruder DC Drive Motor (VSD)

Process Temperature Controls

Exterior Lighting Controls

Generator Controls

Chemical Process Controls

Others

VI. PLC Ladder Diagrams

PLC Basics - Inputs & Outputs

Comparison of Relay Logic to PLC Ladder Logic

Real-World Applications

VII. Cross-Referencing International & European Symbols

▶ *"Explained with good examples and exercises."*

Adam Ransick - Test Engineer - Rolls Royce

▶ *"Exactly what I wanted"*

Raymond Mitchell
Technical Planner - Philip Morris USA

Real World Training...for Real World Needs™

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 & 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.

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:

- **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**

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. Visit us on the web at www.AmericanTrainco.com

Reserve Your Space Now!

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REGISTRATION

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In Industrial Plants, Public Facilities
and Commercial Buildings

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

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**"Understand
the Electrical
Languages
that Run your
Facility and
Equipment!"**

**SEMINAR FEE
\$985 Both Days**

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



Authorizing Person/Supervisor: Name _____

Title _____	Company Name _____
Address _____	
City _____	State _____ Zip _____
Phone _____	Fax _____ Email _____

▶ "The perfect 2-day Course!"
Anita High - Mechanical Eng.
Duke Power

Seminar Attendees: Name	Title	E-Mail	Seminar City

Billing Information: (Please fill out this section only if the "Bill To" name and address is different than the Authorizing Person's name and address above.)

Individual's Name _____	Title _____	Company Name _____	
Address _____	City _____	State _____	Zip _____
Phone _____	Fax _____	Email _____	

Payment Method:

- Visa
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Card Number: _____

Expiration Date: _____

Name on Card: _____

Signature: _____

Check Enclosed (Make payable to: American Trainco, Inc.)

Bill Purchase Order #: _____



PO Box 3397
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PROMOTION CODE

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