

**Learning Objectives:**

- How your facility is wired
- Working with AC and DC currents
- Practical knowledge of voltage, current & resistance
- The difference between single-phase and three-phase current
- How to calculate and apply electrical formulas
- Measuring electrical power
- The most commonly used electrical circuits
- How to select and use electrical test equipment
- How to read a basic electrical distribution diagram
- How OSHA, NFPA 70E® and the NEC® affect your work
- What an Arc Flash is and other dangerous hazards
- Lockout/Tagout rules and procedures
- When to use and how to select PPE
- Finding electrical answers in the NEC®
- Types of conductors and insulation materials to use
- Select proper wire size and raceways for your job
- The dos and don'ts of wiring
- Causes of most electrical problems & how to prevent and fix them
- Grounding basics and proper application of GFCI's
- General electrical maintenance and repair practices

**“Hands-On”**

# Basic Electricity

## for the Non-Electrician™

**Specifically Designed for Maintenance Technicians and Other Non-Electrical Personnel Working in Industrial Plants and Commercial Buildings**



▶ *“The most practical course I’ve ever taken. This seminar was excellent!”*

*Jim Monteith - Maintenance  
Gorham House*

**Day 1 - Understanding Industrial Electricity**

**Day 2 - Working with Industrial Electricity**

- This seminar can also be presented at your facility for larger groups
- Reserve your space now! **CALL 1-877-978-7246**
- Check us out online at **www.TPCTrainco.com** for a complete listing of all seminars coming to your area

# Basic Electricity

## for the Non-Electrician™

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### PURPOSE OF SEMINAR

This electrical training course was created to bring students up to speed in their knowledge of basic electricity as quickly and safely as possible. It includes hands-on skills improvement and is specifically designed for maintenance technicians and other non-electrical personnel working in industrial plants and commercial buildings. It is also a great refresher for experienced electricians and engineers. It provides a practical, real world electrical education. Students' specific needs and concerns are also addressed during the class so that they can go back to their workplace and immediately apply what they've learned.

The goal of this course is to teach students how reduce equipment downtime, improve overall efficiency and safety, and fix problems they've never been able to fix before. This course can also be adopted as part of a company's regular Qualified Electrical Worker program.

### WHO SHOULD TAKE THIS COURSE?

This electrical training course aims to give those without any significant electrical experience the basic industrial electricity understanding necessary to change practices in the workplace and improve efficiency and safety. No matter what your skill level, as long as you work with electricity, this class will be beneficial for you.

- Mechanics
- HVAC Technicians
- Machine Operators
- Alarm Technicians
- Non-Electrical Engineers
- Building & Stationary Engineers
- Low Voltage Specialists
- Multi-craft & Cross Training Personnel

As well, it will benefit those who work in:

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

### TRAINING OUTCOMES

During this course attendees will perform basic electrical "hands on" maintenance tasks. When they return to work their employer can expect them to present a training certificate indicating he or she has successfully learned to do the following:

1. Safely and correctly verify a circuit is de-energized
2. Take voltage and resistance readings using a digital multimeter
3. Take clamp-on ammeter readings
4. Perform basic circuit checks for shorts, opens and ground faults using a multimeter
5. Read and interpret your facility one-line electrical drawings and electrical floor plans
6. Identify what electrical PPE they must wear for routine electrical jobs
7. Choose the right type and size wire for common electrical jobs
8. Determine how many of the same size wires they can pull into a given type and size conduit
9. Terminate and splice control, lighting and power circuit wiring using compression terminals and twist-on wire connectors
10. Wire devices such as switches, receptacles and plugs, including receptacles on extension cords
11. Make the electrical checks required as part of an Assured Equipment Grounding Conductor Program as required by OSHA and the National Electrical Code®.

### WHAT YOU WILL TAKE HOME

- A laminated, full-color ATMT® Reference Guide detailing all the "must-know" information covered in the class. Keep this with you while on the job for immediate knowledge recall.
- A comprehensive Study Guide for additional reference and preparation for optional ATMT® Testing and Certification
- A Personalized Training Certificate with 0.8 TPC Trainco Continuing Education Units for each day attended, 1.6 for both days.
- All the information you need from asking our instructors specific questions about your own unique equipment or facility.

### HANDS-ON ACTIVITIES

- Multimeter Exercises
  - Inspect multimeter for proper working condition
  - Follow safe measurement practices
  - Measure voltage, resistance and current
- Build Working Electrical Circuits
  - Build series circuits
  - Build parallel circuits
  - Use meter to measure voltage and resistance in both
  - Measure both AC and DC values
- Measure a Capacitor
- Verify a Circuit is De-energized
- Check portable tools and extension cords in accordance with an Assured Equipment Grounding Conductor Program
- Motor Replacement Exercises
  - Determine conductor type and size
  - Select conduit type, size, and installation procedure
  - Size motor starter
  - Size fuse protection and overloads
  - Determine motor rotation
  - Properly terminate motor leads
- Receptacle Wiring Exercises

### ATMT CERTIFICATION® TESTING

An optional ATMT® Certification exam is available for this and some of our electrical courses. Students may take it online or as a written test any time after the class is over. Please visit ATMT® Testing and Certification for more information.

### CONTINUING EDUCATION

Upon completion of this seminar, the student will receive a Certification of Completion and .8 TPC Trainco CEUs per day attended. Most employers and many government agencies accept TPC Trainco CEUs to fulfill their continuing education requirements. If the student needs CEUs to renew a state license, please contact us at 303-867-5035 to ensure the state licensing board has approved the seminar. If we are currently not approved by your state licensing board, we are happy to begin the process as long as we receive your request at least one month before the training date.

Reserve Your Space Now!

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or Online at [www.TPCTrainco.com](http://www.TPCTrainco.com)

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

### Day 1

In Day One – “Understanding Industrial Electricity” - students will gain a basic understanding of how electricity works in commercial and industrial settings. Starting with easily understood analogies to explain the fundamentals of electricity, students are then quickly immersed in practical, real world examples that illustrate how electricity is distributed and used in their own plants and facilities. They’ll learn how to use electrical test equipment in their everyday jobs before moving on to an in-depth discussion about major electrical components, where & how these components work, and their purposes within electrical systems. Topics to be discussed in day one include...

#### DISCUSSION TOPICS

##### Electrical Fundamentals

- Production & Distribution of Electricity
- DC and AC in Plants and Facilities
- Voltage, Current and Resistance; Ohm’s Law
- Basic Electric Circuits: Series/Parallel
- Power: Types & Control
- Single-phase and Three-phase Systems
- Workplace Electrical Safety

##### Electrical Test Equipment

- Multimeters
- Voltage Testers
- Verifying a Circuit De-energized
- 3 Modes of Failure: Opens, Shorts and Ground Faults
- Clamp-on Ammeter, Megohmmeters and Others

##### Understanding Your Building Electrical System

- Reading Electrical Single-Line Diagrams
- Major Components
- The Electrical Service
- Main Distribution Centers
- Transformers
- Switchgear and Circuit Breakers
- Overcurrent Protective Devices
- Feeders
- Disconnects
- Motors
- Panelboards and Branch Circuits
- Lighting Circuits
- Electrical Floor Plans & Facility Wiring

### Day 2

In Day Two – “Working with Industrial Electricity” – discussions and activities focus on real world, everyday electrical tasks performed on the job. Students will receive a short introduction to NFPA 70E® and the National Electrical Code® as the starting point for all electrical work. Next they will learn how to choose the right materials for the job and how to perform basic electrical repairs and installations. A discussion on proper wiring will be followed by practical tips for electrical troubleshooting. The day will end with an overview of other common electrical work activities such as preventive maintenance. By the end of this seminar students will have gained a solid foundation for safely performing electrical work in their plants and facilities. Topics to be discussed in day two include.

#### DISCUSSION TOPICS

##### NFPA 70E® Electrical Safety

- Hazards & Dangers of Electricity
- Personal Protective Equipment (PPE)
- Lockout/Tagout (LOTO)
- Developing Safe Work Practices

##### The National Electrical Code®

- Purpose, Overview & Definitions
- Installation Requirements
- “Qualified Electrical Workers”

##### Wire Selection

- Conductor Types & Materials
- Wire Size and Wire Insulation

##### Installing Wire (Conductors)

- Raceways & Cable Trays
- Conduits
- Fittings and Boxes

##### Wiring Equipment

- Wire Nuts, Terminals and Crimpers
- Switches and Receptacles
- Fluorescent Ballasts
- Motors
- Temporary Wiring

##### Basic Troubleshooting Techniques

- Branch Circuit Problems
- Control Circuit Troubleshooting
- Checking and Replacing Fuses

##### Electrical Maintenance Activities

- Performing Checks as part of an Assured Equipment Grounding Program
- Use and Operation of GFCI’s
- Types of Electrical Maintenance
- Special Precautions

#### 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

\$550 Each Day  
\$1100 Both Days

#### NO RISK REGISTRATION & MONEY-BACK GUARANTEE

If you’re not yet sure you’ll be able to attend this seminar, we can still hold a spot for you in the 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. Substitutions are also freely allowed. Please register early!

#### IN-HOUSE TRAINING

TPC Trainco offers an extensive list of courses available for convenient, in-house training at your facility. We can provide the same expert air conditioning, boilers, HVAC, facility and plant management, fluid hydraulics, piping, and electrical training courses at your facility that we offer in public seminars.

#### Advantages of On-Site Training

1. Modify the content to your specific needs
2. Protect company privacy
3. Workers remain on site in case of an emergency
4. Saves time and travel costs
5. Instructors can discuss your specific equipment
6. Problems can be openly discussed
7. Flexible scheduling
8. Increased price savings as the groups get larger
9. Promote teamwork & camaraderie among workers
10. More comfortable learning environment

**Contact us if you have any questions and to get a no-obligation quote.**

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▶ *“Having been disappointed by other seminars I’ve attended, I was pleasantly surprised by this outstanding presentation by TPC Trainco.”*

Tom Onuschak – Eastwood Printing



**Still Only \$550 Per Day, \$1100 for 2-Days**

**PLEASE HELP OUR LOGISTICS TEAM AND REGISTER EARLY. CANCEL UP TO 24 HOURS IN ADVANCE WITHOUT PENALTY.**

ATTENDEE NAME	ATTENDEE EMAIL	COURSE TITLE	DATE(S)	CITY/STATE	PRICE
		Basic Electricity for the Non-Electrician			

(\*See Public Seminar Pricing Schedule on Previous Page)

**TOTAL** \$ \_\_\_\_\_

**AUTHORIZING PERSON / SUPERVISOR:**

Name \_\_\_\_\_

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

Address \_\_\_\_\_

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

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

*(Needed for Confirmation & Sending Pre-Reading Materials)*

**BILL TO:** *(If Different than Authorizing Person)*

Name \_\_\_\_\_

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

Address \_\_\_\_\_

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

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

*(Needed for Confirmation & Sending Pre-Reading Materials)*

**PAYMENT METHOD:** *(Please make Checks Payable to TPC Trainco)*

Visa  MC  AMEX  Discover  Check Enclosed  Bill Purchase Order #: \_\_\_\_\_

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**QUESTIONS & HOW TO REGISTER**

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 Fax: (303) 531-4565 | E-mail: CustomerService@TPCTrainco.com  
 Send by Mail: TPC Trainco, P.O. Box 3397, Englewood, CO 80155

