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Reading Electrical Schematics - One-Line and Three-Line Drawings

View Course Details

COURSE DATES AND TIMES

April 9, 2026

10:00 am - 4:30 pm ET

September 9, 2026

10:00 am - 4:30 pm ET

How To Read Electrical Schematics

Reading Electrical Schematics training provides electrical professionals with the skills needed to accurately interpret and work with electrical drawings used in industrial, commercial, and institutional installations. The course focuses on understanding wiring diagrams, one-line and three-line schematics, electrical symbols, legends, circuit identification, and equipment layouts used in North American electrical systems.

Participants learn how electrical schematics are used for installation, maintenance, inspection, and troubleshooting, with clear references to both Canadian and U.S. electrical practices. The course addresses how schematics support code-compliant work under the Canadian Electrical Code (CEC / CSA C22.1) and the U.S. National Electrical Code (NEC / NFPA 70), while also supporting safe work practices required by NFPA 70E and CSA Z462.

Reading Electrical Schematics Training includes interpretation of AC and DC schematics, control circuits, power distribution diagrams, grounding and bonding representations, and equipment identification, enabling participants to work confidently across jurisdictions.

An electrical circuit shows how a power source or power supply delivers energy through defined wires and connections to electrical loads, using standardized schematic symbols to represent components clearly and consistently. By understanding how each symbol corresponds to actual conductors, devices, and interconnections, electricians and technicians can trace current flow, verify proper installation, and safely and efficiently troubleshoot

problems.

COMPLIANCE REGULATIONS:

This Reading Electrical Schematics course supports an understanding of electrical schematics as they relate to commonly referenced North American standards and regulations, including:

- Canadian Electrical Code (CEC / CSA C22.1) – current adopted editions
- National Electrical Code (NEC / NFPA 70) – U.S. installations
- NFPA 70E – Standard for Electrical Safety in the Workplace (U.S.)
- CSA Z462 – Workplace Electrical Safety (Canada)
- CSA Z460 – Control of Hazardous Energy (Lockout/Tagout)
- CSA Z432 / CSA Z142 – Machinery Safeguarding Standards
- Occupational Health and Safety regulations (federal, provincial, and state)
- Applicable local Authority Having Jurisdiction (AHJ) inspection and permitting requirements

The course clarifies the difference between installation codes, workplace safety standards, and equipment maintenance requirements, helping participants understand how schematics support compliance in each area.

To comply with the regulations mentioned above, electrical single-line diagrams and equipment operating and control schematics must be made available in the workplace and kept up to date. These important documents must be updated as necessary, when equipment changes or is modified, and sometimes verified on an annual basis. In addition, this two-day program is designed to provide knowledge of the various types of electrical diagrams used in the industry and to develop the skills necessary to read, draw, and interpret them.

Learning Outcomes

- Read and interpret electrical schematics, wiring diagrams, single-line and three-line diagrams used in Canadian and U.S. electrical installations.
- Understand standard electrical symbols, legends, conductor identification, and circuit numbering conventions.
- Interpret schematics for low-, medium-, and high-voltage systems commonly found in North American facilities.

- Identify grounding and bonding methods as represented on schematics in accordance with CEC and NEC practices.
- Use schematics for effective troubleshooting, fault finding, maintenance planning, and equipment identification.
- Understand how schematics support safe work practices, lockout/tagout procedures, and arc-flash risk awareness.
- Create, update, and maintain electrical schematics that support inspection, maintenance, and regulatory compliance.

WHO SHOULD ATTEND

Electrical technicians, field engineers, project managers, inspectors, contractors, and journeyman electricians who depend on effective skills and knowledge required in this ever changing fast pace electrically driven environment.

STUDENTS RECEIVE

- Reading Electrical Schematics Training Certificate
- .6 Continuing Education Unit (CEU) Credits (6 Professional Development Hours)
- FREE Electricity Forum Digital Electrical Testing & Measurement Handbook (Value $20.00)
- $50 Coupon Toward any Future Electricity Forum Event (Restrictions Apply)
- FREE Magazine Subscription (Value $25.00)
- Course Materials in PDF Format

COURSE OUTLINE

Reading Electrical Schematics Course Outline

INTRODUCTION AND REVIEW OF THE REGULATIONS

How do the regulations apply and what do we need to know?

- Occupational Health and Safety Act and Regulations
- Provincial Regulations
- CSA Standard Z460 Control of Hazardous Energy
- CSA Standard Z432 Safeguarding of Machinery
- CSA Standard Z142 Code for Power Press Operations
- Canadian Electrical Code 2006 Changes
- NPFA 70E
- Manufacturers Standards
- Company Policy, Procedures and Practices

PRINT READING BASICS

Legends

- What is the purpose of the legend?
- What information can be found in the legend?

Electrical Symbols

- Review of standard symbols.
- Symbol identification and meaning.

Basic layout

- Familiarization with the layout of different schematics and one-line diagrams

Practical exercise using example prints

- Participants will be involved in practical exercises and skills demonstrations of symbol identification and meaning, basic information location and schematic diagram layout.

ELEMENTARY ELECTRICAL DIAGRAMS
Purpose

- What are schematics used for and why are they necessary

DC voltage schematic

- Introduction, familiarization and review of:
- Series circuits,
- Parallel circuits, and
- Series/parallel circuits.

Single-Line Diagram

- Purpose of a single-line
- Equipment identification
- Hazardous energy control

ELEMENTARY ELECTRICAL DIAGRAMS (Continue)

AC voltage schematic

- Equipment identification
- Troubleshooting and fault finding

Three-Line Diagram, and
Practical exercise using elementary diagrams

- Participants will be involved in practical exercises and skills demonstrations on the identification of circuits, and the uses of single-line, AC schematic and three-line diagrams.

DEVELOPING AND MAINTAINING A SINGLE-LINE DIAGRAM

- Regulation compliance
- Site familiarization
- Equipment identification and inventory
- Nomenclature verification
- Preparing a block diagram
- Interconnecting the equipment
- Verification of accuracy
- Practical exercise
- Participants will be involved in the development of a single-line diagram using narrative information.

TROUBLESHOOTING USING ELECTRICAL SCHEMATICS

Purpose

- Effective troubleshooting approach

Evaluating and assessing the fault
Mapping a solution

- Task identification

Identifying the hazards

- Introduction to Job Hazard Analysis

Practical exercise using schematics

- DC circuits
- AC single-phase circuits
- AC three-phase circuits

Questions and Answers

COURSE TIMETABLE

Start: 10:00 a.m. Eastern
Finish: 4:30 p.m. Eastern

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

Request Quote