



ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship
Training Standard

Schedule of Training

Electrical Control
(Machine) Builder

Trade Code: 617A

Development Date: March 2000

NOTICE OF COLLECTION OF PERSONAL INFORMATION

1. At any time during your apprenticeship training, you may be required to show this training standard to the Ministry of Training, Colleges and Universities (the Ministry). You will be required to disclose the signed Apprenticeship Completion form to the Ministry in order to complete your program. The Ministry will use your personal information to administer and finance Ontario's apprenticeship training system, including confirming your completion and issuing your certificate of apprenticeship.
2. The Ministry will disclose information about your program completion and your certificate of apprenticeship to the Ontario College of Trades, as it is necessary for the College to carry out its responsibilities.
3. Your personal information is collected, used and disclosed by the Ministry under the authority of the Ontario College of Trades and Apprenticeship Act, 2009.
4. Questions about the collection, use and disclosure of your personal information by the Ministry may be addressed to the:

Manager, Employment Ontario Contact Centre
Ministry of Training, Colleges and Universities
33 Bloor St. E, 2nd floor, Toronto, Ontario M7A 2S3
Toll-free: 1-800-387-5656; Toronto: 416-326-5656
TTY: 1-866-533-6339 or 416-325-4084.

Please Note: Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the Trades Qualification and Apprenticeship Act (TQAA) or the Apprenticeship and Certification Act, 1998 (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the Ontario College of Trades and Apprenticeship Act, 2009 (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College's website (<http://www.collegeoftrades.ca>) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: <http://www.collegeoftrades.ca/about/legislation-and-regulations>



**SCHEDULE OF TRAINING
APPRENTICESHIP TRADE**

ELECTRICAL CONTROL (MACHINE) BUILDER - 617A

A. Description/Duties

An Electrical Control (Machine) Builder prepares and organizes wiring layout from electrical schematics and is primarily involved in the **electrical portion of machine tool building** and performs some or all of the following duties:

- * Fabricates and installs brackets, hangers, and other equipment for the support of electrical devices such as control panels, limit switches, solenoids, push buttons, pilot light stations and installs these electrical devices;
- * Installs various types of electrical conductor enclosures (eg. conduit) that connect panels and other machine-related electrical devices;
- * Prepares and installs electrical conductors, installs connections by mechanical means, and re-insulates and protects conductor connection;
- * Identifies installed electrical devices with appropriate I/O (Input/Output) device identifications numbers, using appropriate tags or labels including lamicaid or metal tags.

2. Is knowledgeable in:

- Occupational Health and Safety Act.
- Fire Codes and Regulations.
- Accident prevention and safe practices.
- First Aid/CPR
- Government regulations.
- Canadian Electrical Code.

**Benchmark/Guideline Total Training Time Frames
(On-The-Job and In-School) (Min/Max)**
5,000 - 5,400 hours

Company/Sector/IC Name:

Originating AC/TC/PDSU

District Manager/PDSU Manager

Date

Date

Program Standards Approval

Director's Approval

**Assigned
Trade Code**

By _____

By _____

617A

Date _____

Date _____



**SCHEDULE OF TRAINING
APPRENTICESHIP TRADE**

ELECTRICAL CONTROL (MACHINE) BUILDER - 617A

B. ON-THE JOB TRAINING

Unit No	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
617A -1	<p><u>Demonstrate Safe Working Practices and Techniques</u></p> <p>Protect self and others by wearing, adjusting, and maintaining protective clothing, and equipment; practising safe work habits, industrial hygiene, and good housekeeping; handling designated substances; following company fire procedures; operating safety equipment, lifting devices, and material handling equipment; applying basic first aid; reporting injuries; conducting pre-operational check of equipment, and locking out and tagging equipment.</p> <p style="text-align: center;"> Apprentice's Signature Sponsor/Trainer Signature </p>
617A -2	<p><u>Devise and Detail the Job Interface</u></p> <p>Devise and detail the job by reading and interpreting engineering drawings, component prints, assembly and part/product drawings, and schematics; verifying correct materials, tools, equipment, and electrical components needed to complete machine control installation and repair job.</p> <p style="text-align: center;"> Apprentice's Signature Sponsor/Trainer Signature </p>



**SCHEDULE OF TRAINING
APPRENTICESHIP TRADE**

ELECTRICAL CONTROL (MACHINE) BUILDER - 617A

B. ON-THE JOB TRAINING (cont'd)

Unit No	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
617A -3	<p><u>Select, Use, and Maintain Hand and Power Tools and Equipment</u></p> <p>Maintain and use hand and power tools and equipment including screwdrivers, pliers, wrenches, scale, callipers, tap, dies, hammers, chisels, punches, drifts, hack saw, drill press, files, soldering iron, and grinder so that tools selected are the correct ones for the application; prepare tooling by sharpening drills, taps, and tool bits to required angles and edges, using bench drills, and by measuring points and edges; operate measuring and testing equipment including ammeter, voltmeter, ohmmeters, wattmeters, oscilloscopes, phase rotation indicators, insulation tests, and stroboscope so that specified testing and measurement accuracies are obtained and devices are clean, calibrated, and correctly stored.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">Apprentice's Signature Sponsor/Trainer Signature</p>
617A -4	<p><u>Prepare Electrical Control Equipment</u></p> <p>Lay out, assemble, repair, maintain, and connect test electrical control equipment, apparatus, and wiring for machine tool electrification.</p> <p>Plan proposed installations from blue prints and specifications; install control panels, limit switches solenoids, push button, pilot light stations, pull and terminal boxes, and all other related electrical devices.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">Apprentice's Signature Sponsor/Trainer Signature</p>



**SCHEDULE OF TRAINING
APPRENTICESHIP TRADE**

ELECTRICAL CONTROL (MACHINE) BUILDER - 617A

B. ON-THE JOB TRAINING(cont'd)

Unit No	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
617A-5	<p><u>Install Conduits</u></p> <p>Measure, cut, thread, bend, assemble, and install conduit, duct wire way, sealtite, C.N. non-metallic flexible conduit, and all other types of electrical conductor enclosures that connect panels, terminal boxes, and other related electrical devices.</p> <p style="text-align: center;"> _____ _____ Apprentice's Signature Sponsor/Trainer Signature </p>
617A-6	<p><u>Fabricate Brackets and Hangers</u></p> <p>Fabricate and install brackets, hangers, and any other equipment for support of electrical devices.</p> <p style="text-align: center;"> _____ _____ Apprentice's Signature Sponsor/Trainer Signature </p>
617A-7	<p><u>Install Conductors</u></p> <p>Installs in or draws electrical conductors through conductor enclosures; prepares conductor for splicing or electrical connections by mechanical means, re-insulates and protects conductor connection; identifies installed electrical devices with appropriate Input/Output devices identification numbers, using appropriate tags or labels including lamicaid or metal tags.</p> <p style="text-align: center;"> _____ _____ Apprentice's Signature Sponsor/Trainer Signature </p> <p>Note: 61A Certificate of Apprenticeship holder wishing to write the 442A Certificate of Qualification exam must successfully complete and additional 4,000 hours of training including:</p> <p>442A - Training Standards - U0781, U0782, U0785, U0786, U0787</p>



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C: Off-the-Job Learning Outcomes

CONTENT (To be written in learning outcomes and benchmark timeframes). On successful completion of off-the-job (in-school) training, the apprentice will demonstrate the ability to:

- * Demonstrate an understanding of the fundamental of AC/DC current including an understanding of electrical conductors, raceways, wiring devices, protective devices, distributions, transformers, grounding, and measuring instruments.
- * Demonstrate use of safe working practices including knowledge in appropriate clothing and safety precautions required when handling electrical/electronic components. Understands and can demonstrate safe use of material handling and lifting equipment including hoisting, rigging, and ropes.
- * Demonstrate working knowledge in industrial electronics including semi-conductors, power ratings, heat sinks, diodes, rectifiers (1PLH to 3PH), transistor theory and applications, and SCR both in AC/DC circuits, diac, triac, and phase shifting Digital Logic Devices.
- * Demonstrate working knowledge in Programmable Logic Controllers (PLCs) including installation practices, editing, troubleshooting, and reading control schematic.

Recommended Texts

Canadian Electrical Code
IPT Electrical Training Manual
Electronics for Industrial Electricians
Programmable Logic Controller - Petruzella

Source & Type (Specify in detail: block or day release; night school; in-plant; correspondence).

Flexible delivery model - part time, day, block, correspondence

**Benchmark/Guideline Time Frames of Off-The-Job/In-School/ Learning Outcomes:
288 - 300 hours**

Funding

Performance Objectives and Learning Outcomes reached:

Date: _____

Sponsor/Employer/Trainer Signature: _____

Apprentice Signature: _____

You will be required to disclose this signed form to the Ministry of Training, Colleges and Universities in order to complete your program. The Ministry will use your personal information to administer and finance Ontario's apprenticeship training system.

For further information please see the notice/declaration for collection of personal information that is referenced in the table of contents of this training standard.