



Provincial Scope Document

INDUSTRIAL WIRING (Post Secondary) 2009

Contest Length: 6 hrs

Check in time: 7:30

Orientation: 7:45

Contest Start: 8:00

**Contest Sponsor: BC Electrical Contractors Association
Schneider Electric**

Purpose of the Challenge:

Assess the contestant's skills and abilities associated with the installation, programming and troubleshooting of an industrial control system.

Skills & Knowledge to be Tested:

Throughout the contest, contestants can expect to be evaluated on one or more of the following areas:

- Interpreting and using basic electrical designs and diagrams to assemble a functional control system.
- Designing and commissioning a sequential process using a PLC device.
- Wall-mounting a panel with cables and EMT conduits.
- Installing and commissioning terminal components (push buttons, limit switches, motors, etc.).
- Wiring a panel using standard trade practices, complying with relevant sections of the 19th edition, 2002, Canadian Electrical Code.
- Determining adequate protection for equipment and components.

Pre-requisites:

Contestants must demonstrate mastery of the following technical skills:

- Ability to effectively locate information in technical documents.
- Knowledge of PLC programming .
- Ability to design a PLC program based on specified criteria.
- Ability to design and install PLC input and output control panel wiring.
- Ability to install electrical cables, EMT conduits and pilot devices.

- Theoretical knowledge required to properly select protective devices (fuses, breakers and overloads).
- Knowledge of symbols used in an electrical diagram and a control diagram.
- Knowledge of proper installation practices for a control panel.
- Knowledge in fail-safe designing.
- Knowledge of safety practices.
- Effective troubleshooting techniques.
- Knowledge of the 19th edition, 2002, Canadian Electrical Code.

Equipment, Tools, Supplies, Clothing, Safety Equipment

The equipment and materials used during the contest are standard items commonly used in the electrical industry.

Contestants must have the following tools in their toolkits:

- Key Padlock for Lockout
- Electrician's pliers
- Diagonal cutting pliers
- Needle nose pliers
- Slip-joint gripping (water pump) pliers
- Set of screwdrivers (Robertson, Flat-head, Small terminal, Phillips)
- Wire strippers
- Electrician's knife
- Spirit level (torpedo)
- Metal saw (Hack saw)
- Hammer
- Metric Measuring tape ($\frac{3}{4}$ " x 8m tape measure or equal)
- Tin snips
- Square
- Adjustable wrench
- Flat and Round file
- Centre punch
- Set of metal drill index
- Tri-tap
- Tap Wrench c/w handle
- Set of taps (8/32, 10/32, 10/24, $\frac{1}{4}$ x20)
- Set of K.O. cutters ($\frac{1}{2}$ " to 1 $\frac{1}{4}$ ") not hydraulic
- 3/16" to 7/8" Unibit
- Set of Allen keys (metric and SAE)
- 50-cm minimum length ruler
- Tool Punch

PLC's will be provided for the competitor as follows:

- Schneider Electric Zelio Programmable logic controller, communication cable and software.
- The PLC will have the following:
 - 8 x 120 volts AC inputs
 - 8 x relay outputs
 - Clean PLC technical documents/manuals
 - Software with supplied computer
 - Competitor may choose to supply his own computer

Please advise the technical committee if a PLC is to be provided.

Tools provided if necessary by the Provincial Technical Committee

- Computers with Windows 2000 or NT
- PLC c/w accessories
- ½" EMT bender
- Extension Cords
- Cordless drill
- Ladder
- Multi-meter tester

Safety Requirements:

Contestants **must bring** CSA-approved safety gear (hard hat, boots, goggles, leather gloves). Safety equipment **must** be worn at the competition site. Contestants **must wear** the required safety gear and comply with occupational health and safety regulations in order to compete. Contestants' clothing **must be** neat and clean – torn clothing is not allowed. Contestants **will not** be allowed to compete without the proper safety equipment.

Marking Criteria:

POINT BREAKDOWN	TOTAL 1500
• Panel door	100 points
• External Panel Components and Wall mounting	150 points
• Internal Panel Components	200 points
• Wiring of Components	350 points
• Programming & Functionality	400 points
• Fault Finding and Troubleshooting	200 points
• Safety practices	100 points

Technical Committee:

Clarence Burlock Technical Chair

clarence_burlock@bcit.ca

Gold medal winners at the BC Skills Competition will be eligible to compete at the Canadian Skills Competition May 20-23, 2009, 2009 in Charlottetown, PEI.

Skills Canada BC reserves the right to update contest information. Please check the website prior to the competition for changes.