PROVINCIAL CONTEST DESCRIPTION & INSTRUCTIONS

ELECTRICAL WIRING TRADE 18

Secondary 2020

GENERAL INSTRUCTIONS

Safety

- All judges will monitor the competitors to see that proper safety practices are followed
- Hard hat, safety glasses and steel toed footwear are mandatory at all times in competition area
- Hearing protection shall be worn depending on the task
- Maintain a clean work area, brooms and dustpans are available
    - Please do not allow tools, garbage and materials to spill into walkways
- **DO NOT** energize stations without judge present
- Work safely at all times

Material

- Each station area contains the material for the entire competition
- Please check the material against the competition parameters to ensure that it is all there
    - Extra material needed later will result in marks lost
- Some of the material may be in lightly used condition. If found to be defective it will be replaced
    - No marks will be lost for replacing defective components
- Wire and miscellaneous materials are located in central areas
    - This is to be shared by all competitors
    - Please take only the amount of material that you need, and keep it in your area
    - Excessive wire and material use will be penalised
- Put your garbage and extra material in the box in your area
- Supporting of conductors and raceways is marked based on the requirements for minimum code and a quality installation. Use just enough without being excessive.

Dimensions

- All dimensions are from the floor
    - Even if not level please go off the floor
- All dimensions are given in **feet and inches**
- The print indicates the measurement reference point for boxes (top/bottom/center)
- Use of a straight-edge is recommended to verify alignment of boxes on drawings

Discussion

- Each competitor must engage in the competition without advice or assistance from spectators, fellow competitors or mentors
- During the contest, direct all questions to the specified judges only
- Please do not discuss the competition details with people outside the contest area
- We encourage fair competition and want you to interact with the other competitors
    - Please refrain from specifically discussing the competition with other competitors
- You may leave the competition area to use the washroom but please let the judges know

Tools and PPE – Competitor

Each competitor is required to bring the following tools and PPE as a **bare minimum**:

- Electrical hand-tools
- Hacksaw + blade
- Auger bit/s
- Uni-bit/s
- Hard Hat
- Steel toe boots
- Safety glasses
- Ear protection

Competition Components

Note: This competition is designed to test your real world skills. As such, you must expect to receive competition parameter changes in real time on the day, and you must be able to adapt to the changes.

1. **Stud Wall Wiring**
   This will evaluate your ability to install common residential circuits and devices. The wiring method will consist of NMD cable. The installation must be done safely and to current code.

2. **Surface Wall Wiring**
   This will evaluate your ability to install common commercial circuits & devices, including controls. The wiring method will consist of BX cable and ½" EMT with building wire. The installation must be done safely and to current code.

3. **Troubleshooting and CEC Violation Challenge**
   There will be a separate area set up with two walls and a wiring installation installed on them. The installation will have a number of faults built into it, and will have been done in such a way that it violates a number of CEC requirements. Each competitor will be given a 15 minute time period to troubleshoot the electrical installation in order to identify the circuit faults, and to identify as many CEC violations in the installation as possible.

Schedule

- The contest is 6 hours in length
- Lunch is 30 minutes
  - All competitors must stop working during lunch break
- Stud Wiring & Surface Wiring
  - Competitors may complete the installations in whatever order they choose
  - It is recommended that competitors focus on finishing one wall before beginning the next
- The motor control wiring exercise will be completed by one competitor at a time, throughout the day
  - Competitors will complete the exercise in an order determined on the day
  - This exercise will be judged as each competitor completes it

Registration & Set-up	7:30-7:45 AM
Orientation, contest outline	7:45-8:00 AM
Contest Start	8:00 AM
Lunch (30 min)	11:30 AM
Competition Finished	2:30 PM
Clean-up	2:30-2:45 PM (pack up tools and tidy work area)

These are estimated times and may be adjusted to account for any delays.

Testing & Completion

- If time allows you may test your circuitry before official judging
  - **Before** testing you must notify the Tech Chair and have proper PPE
- When you have completed all competition components, **turn all breakers off** and make area safe
- If the cover is left off your panel, no testing will done on your installation during the judging phase and you will receive a mark of Zero for Operation
- **Notify the appropriate judge when you have completed all components of the competition**
  - You will not be permitted to perform any more work after you notify the judge and your completion time is recorded

General Marking & Evaluation

Below are guidelines for the weighting and scope of evaluation criteria:

Operation (30)
- Ensure that all circuitry works safely and according to the specifications
- Check the panel wiring
- Complete the panel schedule accurately and legibly

Equipment (10)
- Check that all devices are installed correctly
- Devices should be mounted level

Use of supplies (5)
- No wastage of material
- No KO fillers (other than those already installed in used equipment)

Measurement (5)
- Measurements must be accurate to within 1/8”

Cable Installation (10)
- Cables must be installed neatly and according to all relevant code rules

Tubing & Conduit (10)
- No kinking or rippling of EMT
- Offsets as required
    - Avoid doglegs and ensure the offsets are accurately dimensioned

Connections and Terminations (10)
- All terminations, splices and connections must be made up tight
- Avoid stripping the heads of screw terminals
- Terminations on wiring devices must be either compression screw terminations or the wires must be wrapped around the terminal screw
- Avoid excessive bare copper on wires at terminals

Health & Safety (10)
- Maintain a clean work area & use safety equipment
- There will be checks at different times throughout the day

Motor Control Circuit Wiring (10)
- Connect motor control circuits using electrical schematic diagrams

Tie Break
- The first tie break will be decided based on the competitors’ scores for Operation (higher score wins)
- The second tie break will be decided based on the competitors’ recorded completion time (earliest completion time wins)
- The third tie break will be decided based on the competitors’ scores for Safety (highest score wins)

Remember everyone, enjoy the day.
GOOD LUCK and HAVE FUN!

Stud Wall Wiring

Drawings

There is one drawing for the stud wall below. **Figure 1** shows box lay-out and elevations, and can be used in determining device layout and circuitry.

Boxes

All of the boxes are to be mounted on the side of the stud indicated on the drawing allowing for ½" drywall. The dimensions must be treated as "Above Finished Floor" or "Above Finished Grade" respectively; the drawing is not to scale. Boxes that are aligned on the drawing must likewise be aligned in your installation. Box numbers and types are as shown in the table below. Refer to **Figure 1** for box layout.

Box Type	Box/Device Label	Devices
2x Plastic Octagons	L1 & L2	Keyless lamp holders
2x 1G plastic device box	CP1 & CP2	Counter Plugs
1x 1G plastic device box	LS2	4-Way Switch
2x 1G plastic device box	LS1 & LS3	Switches (2x 3-way switches)
1x 1G plastic device box	R1	Living Room Receptacles
1x 4x4 wrap box	R2	Living Room Receptacle

Home runs

All circuitry for the stud wall must be derived from the panel mounted on the surface wall. It is up to you to feed the respective devices from appropriate circuit breakers, taking into account the protection requirements of the CEC. You must also complete the panel schedule in a clear, descriptive and legible manner. The panel may be terminated at any point throughout the competition.

Circuitry

The stud wall is intended to replicate wiring in a single-family, detached dwelling. Installation and circuits must meet the requirements of the CEC. Wiring method must use the minimum material required to meet specifications and be neat. All decisions regarding circuit and device groupings for circuits are up to you. Refer to **Figure 1** for layout of devices. The devices should operate based on the following specification:

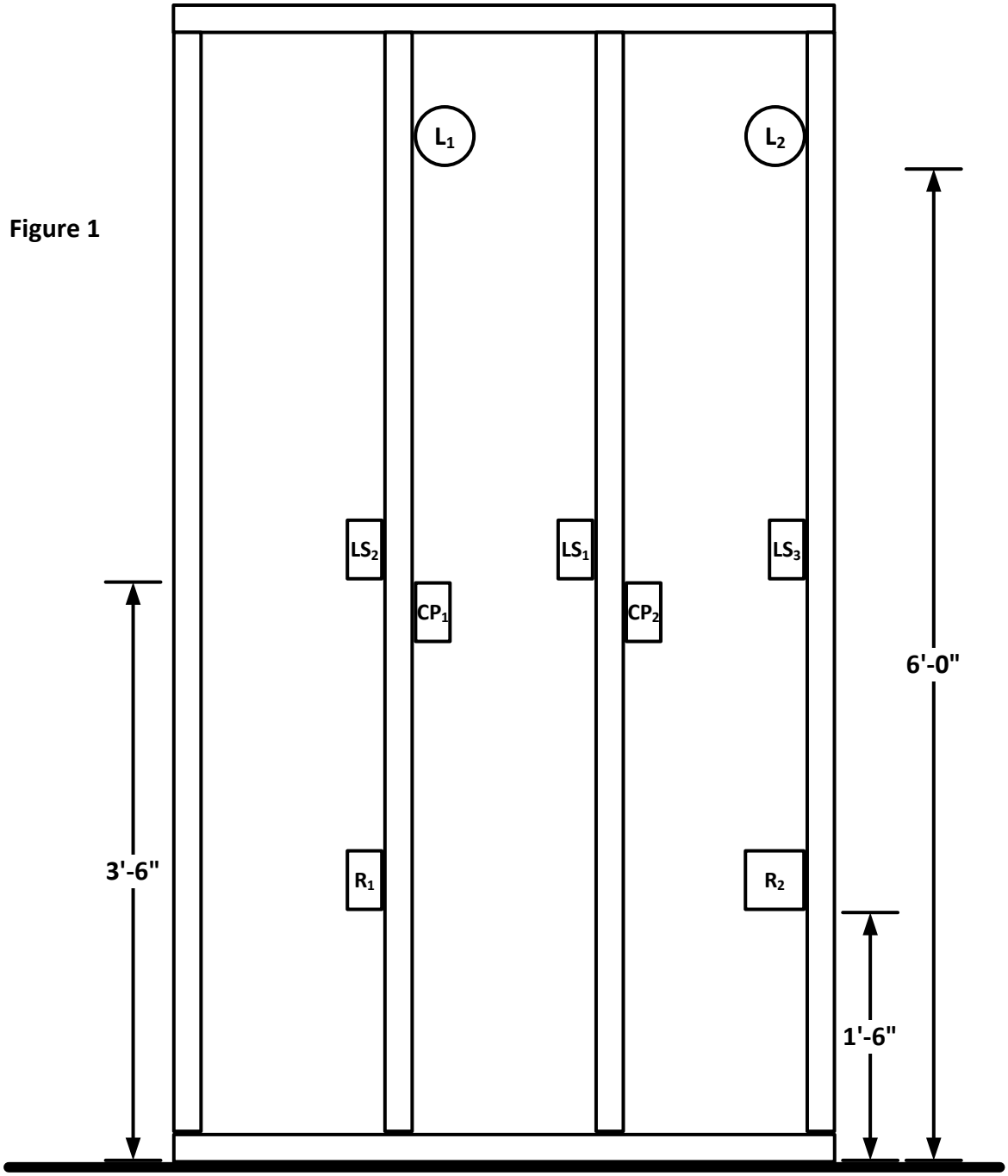
- Lights L_1 and L_2 are on a dedicated circuit and are controlled from three locations by the switches labelled LS_1, LS_2 and LS_3
- Counter plugs CP_1 and CP_2 must be considered as being within 1.5m of a kitchen sink
- Living room receptacles are both on the same circuit

Finishing

Cover plates are not required to be installed on any of the wiring devices. However, devices should be mounted ready for covers.

Stud Wall Layout Diagram

Figure 1



Surface Wall Wiring

Drawings

There is one drawing for the surface wall below. **Figure 2** shows the arrangement of boxes and elevations and may be used for device layout and circuitry.

Boxes

All of the boxes are to be mounted securely on the surface of the wall and must be positioned according to the layout shown in **Figure 2**. Vertical dimensions must be treated as "Above Finished Floor" or "Above Finished Grade" respectively; the drawing is not to scale. Boxes that are aligned on the drawing must likewise be aligned in your installation. Box numbers and types are as indicated in the table below.

Box/Device Type	Box Label	Devices
1x Octagon box	Light	Keyless lamp-holder
1x Octagon box	Photocell	Stem-mount photocell
1x 4x4x2 1/8 metal box	Timer	30 minute, turn-dial timer
1x 1110 device box	Bypass	SPST switch
1x 6x6 box	6x6	8-pin relay

Panel

The panel is to be used to feed all devices on this wall and on the stud wall. You are responsible for assigning circuitry and using appropriate circuit protection for the circuits fed from the panel. You must also complete the panel schedule in a clear, descriptive and legible manner. The panel may be terminated at any point throughout the competition.

The panel is single phase and will be wired as a sub panel. Your panel will be energised via a 3-phase extension cord for testing. You have been provided with a short connection cord and an L21-30P cord-end. You are responsible for entering and terminating one end of this 3-phase connection cord in your panel so that it can be used to power your panel. Terminate only 2 of the 3 phases in your panel; **cap** the unused phase conductor. You must also terminate the L21-30P cord-end on the other end of the connection cord.

Circuitry & Wiring Method

AC-90

- The bypass switch must be fed using AC-90

½" EMT and #14 Building Wire

- The light shall be on a dedicated circuit and shall comply with the following:
  - The light circuit must be switched by the action of the 8-pin relay under both of the following conditions
  - Under normal conditions, the light is to be controlled by the dual interaction of the timer and the stand-alone photocell. In order for the security light to energise, the timer must be active and the photocell must be detecting "dark"
  - The bypass switch must be capable of energising the light at any time

* Only circuit breaker and 8-pin relay terminals are suitable for direct termination of stranded conductors.

Finishing

Cover plates are not required to be installed on any of the wiring devices. However, devices should be mounted ready for covers.

Surface Wall Layout Diagram

Figure 2