



Contest Description  
Edmonton Expo Centre, Edmonton  
May 7 & 8, 2025

<b>EVENT:</b> Mechatronics (Teams of Two)	<b>LEVEL:</b> Post-Secondary																
<b>WORLDSKILLS TRADE #:</b> 4	<b>LOCATION:</b> Hall B, Edmonton Expo Centre, Edmonton																
<b>DURATION:</b> 12 Hours (Two Days)																	
<b>COMPETITION SCHEDULE:</b> <div> <div> <b>May 7:</b> <table> <tr><td>ORIENTATION</td><td>8:00AM-8:30AM</td></tr> <tr><td>COMPETITION</td><td>8:30AM-11:30AM</td></tr> <tr><td>LUNCH</td><td>11:30AM-12:00 NOON</td></tr> <tr><td>COMPETITION</td><td>12:00 NOON-4:00PM</td></tr> </table> </div> <div> <b>May 8:</b> <table> <tr><td>ORIENTATION</td><td>8:00AM-8:10AM</td></tr> <tr><td>COMPETITION</td><td>8:10AM-11:30AM</td></tr> <tr><td>LUNCH</td><td>11:30AM-12:00 NOON</td></tr> <tr><td>COMPETITION</td><td>12:00 NOON-3:00PM</td></tr> </table> </div> </div>		ORIENTATION	8:00AM-8:30AM	COMPETITION	8:30AM-11:30AM	LUNCH	11:30AM-12:00 NOON	COMPETITION	12:00 NOON-4:00PM	ORIENTATION	8:00AM-8:10AM	COMPETITION	8:10AM-11:30AM	LUNCH	11:30AM-12:00 NOON	COMPETITION	12:00 NOON-3:00PM
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*The times may vary- subject to participant progress.																	

**Please Note: This document is subject to change as competition information is updated. Competitors are responsible for staying up to date with the most recent information. Check the footer for last updated date. Changes will be highlighted in yellow.**



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## **1 CONTEST INTRODUCTION**

### **1.1 Description of the associated work role(s) or occupation(s)**

<https://skillsalberta.com/skills/mechatronics/>

### **1.2 Purpose of the Challenge**

- The goal is to provide competitors with the opportunity to demonstrate certain skills and knowledge that every technician must have in the field of Manufacturing, Automation and Technology.
- Mechatronics skills will be judged on a practical demonstration of abilities to complete the mechanical, electrical and pneumatic assembly of a manufacturing production system as well as creating and commissioning the controls based on a documented working sequence using Programmable Logic Controllers (PLC).
- Competition is for teams of two participants.
- Open to Mechatronics, Industrial Automation & Robotics, Instrumentation, Electro-Mechanical or related Technologies sectors.

### **1.3 Duration of contest**

12 hours (6 hours a day for 2 days)

### **1.4 Skills and Knowledge to be tested.**

- General Electrical and Mechanical knowledge
- Interpret and use electronic, electrical and mechanical schematics
- Render operational and modify sequential mechanisms that have a PLC
- Commissioning electrical, pneumatic and mechanical systems
- Programming PLCs
- Skillful troubleshooting techniques
- Speed of execution
- Wiring skills
- System optimization (increasing the system performance)
- Professional workmanship
- Professional practices
- Know-how to look for information efficiently in and on industrial equipment

## 2 CONTEST DESCRIPTION

**2.1** List of documents produced and timeline for when competitors have access to the documents on the Skills Canada Alberta website.

DOCUMENT	DATE OF DISTRIBUTION
Previous years documents	Available on our Website
Standards and Guidelines	December 2024
PLC Wiring	December 2024

**2.2** Tasks that may be performed during the contest.

- Unpacking and preparation of components including cutting cables to length, stripping of insulation and crimping of ferrules
- Install mechanical modules with proper alignment
- Wire solenoid valves and sensors according to schematics
- Pneumatic tubing for cylinders, valves terminals and service unit according to schematics
- Write PLC programs according to instructions
- Conduct maintenance task by replacing various components in the system
- Debug and troubleshoot the assembly to operate according to instructions
- Optimize the system performance

## 3 EQUIPMENT, MATERIAL, CLOTHING

**3.1** Equipment and material supplied by the Committee:

- Manufacturing Production Stations (MPS®): A model of a real production system from Festo Didactic.
- Pneumatic Tubing
- Wires
- Ferrules
- Tie-wraps
- Compressed Air
- A 120 VAC power bar will be provided to each team complete with electrical power (15 amps)
- Workpieces



All the equipment and infrastructure provided by the committee must be left in the competitor's workspace during the competition.

**COMPETITORS WILL BE REQUIRED TO USE THE MATERIAL AND EQUIPMENT PROVIDED BY THE COMMITTEE. ALL OTHER MATERIAL AND EQUIPMENT WILL BE REMOVED FROM THE SKILL AREA.**

### **3.2 Equipment and material provided by the Competitor.**

- A PLC Programming Computer with PLC programming software. Preprogramed software (software/hardware macros, add-on instructions libraries, any code/files that are not created during the competition, etc.) cannot be used. Only PLC/HMI software, CAD Viewer and Windows will be allowed on this computer. Computers may be inspected by Judges at any time.
- A CAD Viewer Computer (can be the same computer as the PLC programming Computer) with AutoDesk Design Review software (free software) for viewing project 3D files provided at the competition. Preprogramed software (software/hardware macros, add-on instructions libraries, any code/files that are not created during the competition, etc.) cannot be used.
- 2x PLCs with a total of 32 digital inputs and 32 digital outputs (maximum 16 Inputs and 16 Outputs per PLC) and other necessary cables and tools. One PLC will be used for each or multiple MPS Workstations. PLCs must be able to pass tag or data information over a network connection. One of the two PLCs can be replaced with remote IO module. At least one PLC/distributed IO must have a minimum of two analogue inputs and one analogue output.
- A power supply (120 VAC to 24VDC) rated at least 4.5 amps should be used to power each PLC and the MPS station.
- All digital PLC inputs shall be sinking inputs. The sensors and buttons shall switch (source) +24VDC to each PLC input. Sensors are PNP type and shall source the current and the PLC input module will sink the current.
- All digital PLC outputs shall be sourcing outputs. The output shall switch (source) +24VDC to turn an individual load on. The load shall sink the current to 0VDC (Ground).
- All analogue PLC inputs and outputs shall be 0 – 10 v.
- The PLC outputs should be at least 400 mA. All I/Os are 24VDC.
- Each team will have their own table. Mounting the PLC on a back-plate is recommended.
- See PLC Wiring document posted on the Skills Canada Alberta web site for more information.

- SysLink cable connectors (IEEE 488) will be connected to the PLCs (6 cables in total)
- Each cable will connect 8 Inputs and 8 Outputs to the PLC: One cable will connect from the PLC to the MPS station containing sensors and actuators. The other cable will connect from the PLC to the control panel, which contains operator devices such as pushbuttons, switches and pilot lights. These cables must be connected to the PLCs before the competition.
- Multimeter (VOM)
- Set of Screwdrivers - recommended:
  - Pozidriv PZ0, PZ1
  - Philips #0, #1
  - Flat 1.2, 1.6, 2.5, 6 mm
  - Torx T8, T10, T12
- Set of Hex metric keys.
  - Recommended Sizes: 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10 mm
- Set of Open-ended metric wrenches
  - Recommended sizes: 7, 8, 9, 10, 19 mm
- Metric Socket wrenches and/or nut drivers
- Adjustable wrench
- Wire strippers
  - 0.25mm<sup>2</sup> to 1.5mm<sup>2</sup> (AWG 24 – 16)
- Side and flush cutters
- Measuring tape or ruler (metric)
- Ferrule crimping tool
  - .25mm<sup>2</sup> to 1.5mm<sup>2</sup> (AWG 24 – 16)
- Tube cutter for plastic airline (opens less than 6mm)
- Dustpan and a broom

**Note:** No Internet connection will be allowed on any computer and no cell phone or tablet can be used during the competition.

### **3.2.1** Toolboxes Guidelines

One of the objectives of the PTC is the sustainability of the competition. As a result, the toolboxes brought by competitors will be restricted to the following maximum specifications: The Competitor toolbox must not exceed 1.6 meters<sup>3</sup> in volume. It can be multiple toolboxes, but the total of all toolboxes must not exceed the maximum volume indicated. There is no exception to this rule. If the Competitor toolbox is larger than what is indicated, the Competitor with the guidance of the PTC, will need to remove items from the toolbox and those items will



not be used during the competition. All tools must fit inside one or more toolboxes. Tools outside of a toolbox will not be permitted.

### **3.3 Required clothing provided by the Competitor.**

- Competitors are to be dressed in a clean and appropriate manner. The Mechatronics competition recommends that you wear long pants, belt, and socks. Competitors must wear close toe shoes
- Jewellery such as rings, bracelets and necklaces or any deemed unsafe by competition judges shall be removed
- Proper shop attire is to be worn (no loose straps, baggy sleeves etc.). Or any item deemed unsafe by competition judges.

## **4 HEALTH AND SAFETY**

### **4.1 Safety program**

PSCC has implemented a comprehensive safety program as health and safety is an integral part of our competitions. Our safety program includes guidelines and procedures to make the work environment in each skill area safer.

#### **4.1.1 Safety manual**

As part of our program a safety manual has been created to monitor and document health and safety within each skill area. It includes a definite plan of action designed to prevent accidents. The safety manual will be provided for every skill and these instructions must be followed and respected by all participants and officials at the PSCC.

#### **4.1.2 Safety workshop**

During orientation, Competitors will participate in a Safety workshop and they will be expected to work and maintain a safe working area during the competition. Any Competitor breaking any health, safety, and environmental rules, may be required to undertake a second safety workshop, this will not affect the Competitor's competition time.

### **4.2 List of required personal protective equipment (PPE) provided by the Committee:**

- Safety Glasses

**Note:** Competitors who do not have the required protective equipment will not be allowed to participate in the competition

**4.3** List of required personal protective equipment (PPE) provided by the competitor.

- n/a

**5 ASSESSMENT**

**5.1** Point breakdown

**Note:** This list is subject to change.

TASKS	/100
Professional Practice	30
Time Evaluation	10
I/O Check and Allocation	30
Expected functionality	30

**6 CONTEST SPECIFIC RULES**

Contest specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from contest to contest. Any additional contest rules will be reviewed during the competitor orientation.

TOPIC/TASK	CONTEST SPECIFIC RULE
Use of technology - personal laptops, tablets and mobile phones	<ul style="list-style-type: none"> <li>• Competitors are not allowed to bring personal laptops tablets or mobile phones into the skill area, only the PLC programming computers and the CAD viewing computers will be allowed in the skill area and will remain in the skill area for the duration of the competition</li> <li>• Provincial Technical Committee (PTC) members, Interpreters and judges are allowed to use personal devices in the skill area</li> </ul>
Use of technology - Internet	<ul style="list-style-type: none"> <li>• Competitors are not allowed to use internet in the skill area</li> </ul>
Safety	<ul style="list-style-type: none"> <li>• At the discretion of the Provincial Technical Committee any competitor can be removed from the skill area for not having the proper safety equipment and/or not acting in a safe manner</li> </ul>



Second-chance Voucher	<ul style="list-style-type: none"> <li>• One second-chance voucher will be provided for the complete competition time.</li> <li>• The voucher allows the competitors to get a second evaluation for PLC programs evaluation. They will be allowed to do minor adjustments (2 minutes maximum) to the stations or PLC programs.</li> <li>• In the case where the second chance voucher is used, the first evaluation time will be added to the time used to complete the task.</li> </ul>
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## 7 ADDITIONAL INFORMATION

### 7.1 Ties

- Tiebreaker #1: In the event of a tie, the team with the highest score in “Expected Functionality” over the two days will be declared the winner.
- Tiebreaker #2: If a second tie occurs, the team with the highest score in “Time Evaluation” over the two days will be declared the winner.
- Tiebreaker #3: If a third tie occurs, the team with highest score in “Professional Practices” over the two days will be declared the winner.

### 7.2 Competition Rules

#### **Skills Canada Alberta Regional and Provincial Rules and Regulations** Regional and Provincial Rules and Regulations

### 7.3 Test Project change at the Competition

Where a Test Project has been circulated to competitors in advance, the PTC can change the project up to a maximum of 30% of the work content for the competition.

### 7.4 Lunch

Lunch for competitors will be provided by Skills Canada Alberta.

### 7.5 Parking & Venue Maps <http://edmontonexpocentre.com/attend/parking/>

Parking is FREE for all attendees.



## **7.6 Opening Ceremonies / Competitor Registration**

Opening Ceremonies for the PSCC will take place on Tuesday May 6, 2025, at 6:00 pm in Hall D of the Edmonton EXPO Centre. Admission is free, and everyone is welcome to attend. It is important to note that competitor registration will open immediately following the Opening Ceremonies.

## **7.7 Awards Ceremony**

The Awards Ceremony will take place on Thursday May 8, 2025, at 6:30 pm in Hall D of the Edmonton EXPO Centre. Admission is free and everyone is welcome to attend. The Awards Ceremony will be shown live at <http://skillsalberta.com/>

## **7.8 Team Alberta Information**

Team Alberta will be selected at the PSCC Awards Ceremony. Gold medalists will then be eligible to participate at the Skills Canada National Competition (SCNC) on May 28- May 31, 2025, in Regina, SK. It is recommended that competitors review the SCNC contest description to be familiar with the national contest description and project at <https://www.skillscompetencescanada.com/en/calendars/category/skills-canada-national-competition/>

During the PSCC Awards Ceremony on Thursday May 8, 2025, gold medalists will be given their Team Alberta information package and will confirm their participation in the SCNC. Students must be present at the Awards Ceremony to claim their position on Team Alberta. If the Gold medalist is not able to attend SCNC, the next top ranking individual will be asked to participate. If a student is not able to attend the Awards Ceremony a letter confirming the student's interest in Team Alberta participation must be emailed to [javierad@skillsalberta.com](mailto:javierad@skillsalberta.com) prior to the start of competition on May 7, 2025.

**Please prepare your students in advance to accept a position on Team Alberta and review how your school will support their participation.**

**Please see this link for additional Team Alberta information:** <https://skillsalberta.com/team-alberta/>



### Questions?

Please contact Mike Sury [MikeS@SkillsAlberta.com](mailto:MikeS@SkillsAlberta.com)

### 8 PROVINCIAL TECHNICAL COMMITTEE MEMBERS

Daniel Barrett
Jason Kent
Laine Van Hardeveld
Matthew Henderson
Simon St Jean