SkillsUSA ILLINOIS

Mechatronics

Career Competition

Career Cluster: Manufacturing/STEM

State Qualifying Event: No **National Contest:** Yes **Participation:** Team of 2

Competition Description

Competition requires competitors to have the ability to understand complex systems that integrate various elements in the mechanical, fluid power, and controls domain, combined with the ability to work in a team environment with people with different areas of expertise. Mechatronic specialists must have well-developed skills in pneumatic technology, electrical and electronics systems, PLCs, mechanical systems, and general automation techniques and practices, including systematic troubleshooting methods. This competition consists of up to 5 events designed to measure the skills required in the modern automated manufacturing environment. Competitors will be required to assemble, program, adjust, troubleshoot, repair, and test different aspects of an automated machine system. The competition elements have been designed to be as realistic as possible, closely resembling the tasks and activities of modern automation professionals. In addition, there is an individual oral interview testing the competitor's knowledge of electrical and pneumatic circuits, symbols, and processes.

Tasks To Be Evaluated

Read and interpret technical drawings of various types. Identify and troubleshoot competition modified mechanical, pneumatic, electrical and electronic components.

Clothing Requirement

National Requirement:
Class C: Competition Specific: Manufacturing/ Construction Khaki Attire

- Official SkillsUSA khaki short-sleeve work shirt
- Khaki pants
- Black, brown, or tan leather work shoes.

State Requirement:
National Requirement OR

- Khaki short-sleeve work shirt
- Work pants of any kind are acceptable dress (no jeans)
- Black, brown, or tan leather work shoes.
- Any embroidered names or school patches must be covered, if applicable.

Provided by Technical Committee

- All physical hardware and software necessary to run the competition.

Provided by Competitor

- Resume: Printed, one per competitor
- Pen/Pencil
- Safety Glasses
- Multimeter
- Small Screw Drivers (Phillips and Straight Slotted)
- Wire Cutter/Stripper
- Allen Wrench Set (Inch and Metric)
- Open-Ended Wrenches (Inch and Metric)
- Appropriate Work Clothing

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New to 2025 Mechatronics:
The 2025 competition will incorporate one new rotation using contest team provided PLCs and software. Students will be required to write a simple program that allows the PLC to control a small automation cell with sensors, mechanical components, and pneumatics. Teams will be required to provide a PLC with a power supply and software. Please check the Tool Requirements for specifics.

Competition Length:
5+ hours, depending on the number of competing teams. Plan for 4-5 rotations testing various skills as described in the Competition Description.

Orientation
8:30 am at the Mechatronics Competition Area

- Competition will start immediately after orientation.
- All competitors must check in by 8:30 a.m. Computers and other items may be dropped off and set up before 8:30am.
- No instructors are permitted inside the contest zone.
- Competitors will eat lunch in the competition area. A break will be given to competitors to get lunches.

Provided by Competitor (continued)

- New in 2025! – One (1) PLC assembly. Teams will be required to write a PLC program. This necessitates each team to provide its own PLC assembly and programming device/software (e.g., laptop computers or hand-held programming devices). The PLC assembly must meet the following requirements:
  - Power supply: The PLC must be capable of operating at 24VDC, or 120VAC rated for 5 Amps. All 120VAC units must be wired ahead of time to an inline ground-fault interrupter device and standard (NEMA 5-15P) 120VAC line cord. All 120VAC wiring must meet PLC manufacturer's requirements and follow standard industry practice. Judges reserve the right to disallow the use of any competitor supplied equipment that presents a safety hazard. No line cords or 120VAC wiring devices will be supplied at the competition.
  - PLC shall have a minimum of 4 digital inputs and 4 digital outputs.
  - Inputs shall be 24VDC Sinking (inputs shall be activated by application of a +24VDC signal to the input terminal).
  - Outputs shall be 24VDC Sourcing (outputs shall supply a +24VDC signal to the load when activated). All loads will be returned to ground. Output capacity shall be no less than 0.5A, each.