



27th ANNUAL SKILLS MANITOBA COMPETITION CONTEST DESCRIPTION APRIL 10, 2025

CONTEST NAME: Mechatronics

CONTEST NO: 04

CATEGORY: Post Secondary

Maximum of 3 teams of 2

CONTEST LOCATION: Red River College - Notre Dame Campus – Room T136

CONTEST START TIME AND DURATION:

Thursday, April 10 th , 2025	
7:30am – 8:00am	Registration
8:00am – 9:00am	Orientation
9:00am - 12:00pm	Contest
12:00pm – 12:30pm	Lunch
12:30pm – 2:30pm	Contest
2:30pm - 3:15pm	Judging

PURPOSE OF CHALLENGE:

The Mechatronics contest provides participants with the opportunity to showcase essential skills and knowledge critical for Industrial Automation and Control Technology. Competitors will be judged on their ability to:

- Assemble mechanical, electrical, and pneumatic systems.
- Program and commission modular systems using one or two Programmable Logic Controllers (PLCs).
- Demonstrate expertise in troubleshooting, optimizing system performance, and professional practices.

This contest advances to the National level (except for 2025).

Qualifying years for WorldSkills are on odd years at the Skills Canada National Competition, and WorldSkills Competitions will occur on even years.

SKILLS AND KNOWLEDGE TO BE TESTED:

- General electrical and mechanical knowledge
- Interpret and use electronic, electrical or mechanical schematics
- Render operational and modify sequential mechanism that have one or two PLC's
- Commissioning electrical, pneumatic and mechanical systems
- Troubleshooting
- Speed of execution
- System optimization (increasing system performance)
- Professional practice (see PP v3 7B doc)

General Requirements:

- Understand the programming of a PLC
- Know how to look for information efficiently in industrial equipment documentation
- Skillful troubleshooting techniques

POINT BREAKDOWN / 100 TOTAL:

Professional practice	20
Time – effectiveness	20
Mechanical/Electrical/Pneumatic conformity	20
Expected functionality	40
Total	100

There can be no ties – if the score is even after the contest, the expected functionality component will be used as the tie breaker.

Rule infractions will result in appropriate mark deductions at the discretion of the Technical Committee. Any disqualifications will be reviewed by the Director of Competitions.

NATIONAL COMPETITION ELIGIBILITY:

- A mark of **70% or higher** must be scored by the gold medalist to attend the National Skills Competition

EQUIPMENT, TOOLS, MATERIALS TO BE PROVIDED BY COMMITTEE:

Supplied by Festo:

- 1 Modular Processing Stations (MPS®): A model of a real production system from Festo Didactic
- Pneumatic consumables
- Wires
- Tie-wraps
- Compressed air
- A 120 V AC power bar will be provided to each team complete with electrical power
- Utility knife
- Tubing cutter
- Lunch

EQUIPMENT, TOOLS, MATERIALS TO BE SUPPLIED BY COMPETITOR

Supplied by Competitor:

- 1 PLC with at least 24 Inputs / 24 Outputs plus computer with the PLC programming software, power supply and other necessary cables and tools
 - A power supply (120 VAC to 24VDC) rated at least 4.5 amps should be used to power the PLC and each MPS station.
 - All 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 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).
 - The PLC outputs should be at least 400 mA. All I/Os are 24VDC.
 - Each team would have their own table. Mounting the PLC on a back-plate is recommended.
- 2 SysLink cable connector (IEEE 488) should be connected for each PLC
 - Each would connect 8 I/Os to the PLC: One cable would connect from the PLC to the MPS station containing sensors and actuators. The other cable would connect from the PLC to the control panel, which contains operator devices such as pushbuttons, switches and pilot lights.
 - Please see the last page of this document for the wiring details.
 - There are no restrictions on the wiring to the PLC but it is recommended to have the same wiring instruction that comes with the SysLink cables. The only wirings that are checked in the competition are the ones connected to the MPS station terminal.
 - These cables should be connected to the PLC before the competition.
- Multimeter (V.O.M.)
- Set of Screwdrivers Recommended:
 - Pozi Drive PZ0, PZ1
 - Philips #0, #1
 - Flat 1.2, 1.6, 2.5, 6 mm
- 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 .25mm² to 1.5mm² (AGW 24 – 16)
- Side and flush cutters
- Refillable water bottle
- Snacks
- All general health and safety guidelines and protective equipment as noted in the Safety section.

Note: The computers used for programming the PLC could have any other software application and could contain any files. However, NO Internet connection would be allowed on any computer and NO PDA or cell phone should be used during the competition. Computer and PLC to be free of all preprogrammed software (macros, add-on instructions, libraries, etc). All PLC code used during the competition must be written on the competition floor during the competition. Computers may be inspected by judges at any point.

Prior to attending the Skills Manitoba Competition, students should be familiar and competent in the use of the tools and equipment listed above as well as safety precautions that should be observed.

WORKSITE SAFETY RULES / REQUIREMENTS:

Safety is a priority at the Skills Manitoba Competition. At the discretion of the judges and technical chairs, any competitor can be removed from the competition site for not having the proper safety equipment and/or not acting in a safe manner.

- It is mandatory for all competitors to wear CSA approved eyewear (including side shields for prescription eyewear).
- It is mandatory for all competitors to wear CSA approved footwear.
- Jewellery such as rings, bracelets and necklaces or any items deemed unsafe by competition judges shall be removed.
- Proper shop attire is to be worn (no loose straps, baggy sleeves). Any attire that is deemed unsafe by competition judges will not be permitted.

Competitors will not be permitted to compete until they have the needed safety equipment. Competition judges will have final authority on matters of safety. Competitors must show competence in the use of tools and/or equipment outlined in this scope and can be removed at the discretion of the judges and technical chairs if he/she does not display tool and/or equipment competency.

SPECIAL CONDITIONS / ADDITIONAL INFORMATION

THE IMPORTANCE OF SKILLS FOR SUCCESS FOR CAREERS IN THE SKILLED TRADES:

In response to the evolving labour market and changing skill needs, the Government of Canada has launched the new Skills for Success (former Essential Skills) model defining nine key skills needed by Canadians to participate in work, in education and training, and in modern society more broadly. SCC is currently working with Employment and Social Development Canada (ESDC) to bring awareness of the importance of these skills that are absolutely crucial for success in Trade and Technology careers. Part of this ongoing initiative requires the integration and identification of the Skills for Success in contest descriptions, projects, and project documents. The following 9 skills have been identified and validated as key skills for success for the workplace: 1.Numeracy, 2.Communication, 3.Collaboration, 4.Adaptability, 5.Reading, 6.Writing, 7.Problem Solving, 8.Creativity and Innovation, 9.Digital

FOR MORE INFORMATION CONTACT TECHNICAL COMMITTEE MEMBER:

Technical Chair:

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