



Robotics & Automation Technology Contest Information

by Mitchell Thomas — last modified February 28th, 2023

Written testing for most contests will be held ON-LINE through your schools' Testing Liaison. Testing will be open beginning Monday, March 15th.

Students will receive an email from National Skills USA for testing.

The deadline for taking the on-line tests is Friday, April 7th.

No provisions are being made for make-up testing on-site.

NO Substitutions will be allowed this year after April 7th

See the State SkillsUSA Director's Memo for the policy on substitutions and late registrations.

Print the General Instructions for each of your competitors and have them become acquainted with the competition BEFORE arriving at the conference.

Each contestant will be required to bring his or her printed resume. It will be presented to the judges upon entry to the contest area. A deduction will be applied to your overall score if you do not have a resume.

For additional information about state contest, please contact Mitchell Thomas at 405-743-5424 or Mitchell.Thomas@careertech.ok.gov

NOTE: This is a team competition. Teams must be composed of two secondary members or two postsecondary members.

PLEASE NOTE: Contestants will need to move in to the Conference Hall at 2 p.m. Sunday to set up equipment and allow maximum time for the contest on Monday. No guarantee of equipment safety can be made, but a security guard will be on hand all night with orders to allow no one in Monday until state staff arrive.

Present this memo to security or state staff as your pass to accompany your contestants to the Robotics and Automation Technology contest area only.

ALL software/programming on computer or PLC written by students or school must be removed to prevent the appearance of any team having an unfair advantage. No pre-written documentation of safety or operation may be left on the computer. The intent of the contest is to start the design from scratch. Software programs, drivers, buffers, etc., that need to be left on the PLC or computer MUST be pre-approved by the Technical Committee.

INDUSTRY AWARDS

As agreed at Summer Conference each instructor is requested to secure a minimum of \$50 in prizes for each student that you bring to the State SkillsUSA Championships. Please contact your [Awards Chairman](#) for details and to let him/her know of industry awards you have secured. I know many of you have already been hard at work securing the awards. These awards should be labeled with the name, address and contact person for the donating industry so that the contestant they are awarded to can send an appropriate expression of his or her appreciation.

TOOLS, EQUIPMENT and SUPPLIES

Rather than require exact equipment (some suggestions are presented below), the Technical Committee will specify a list of capabilities and functions the teams may be required to demonstrate. This list should remain consistent from year to year and represent typical process to be performed and general capabilities and let each participant bring sufficient equipment to complete the process to given specifications. Exact performance required at the competition will vary yearly but will be drawn from the capabilities specified.

SUPPLIED BY THE TECHNICAL COMMITTEE

- 2 - 6' x 2 1/2" folding tables
- Manufacturer's specifications for the process to be performed



PROCESS SPECIFICATIONS

Parts will be delivered to parts feeder without regard to orientation (cell must manipulate part as necessary to determine orientation).

Parts will be manipulated by servo robot and conveyor. Robot may be used to manipulate parts more than once (i.e., may be used to simulate the presence of more than one robot). Robot and conveyor should be capable of being configured such that the robot can reach BOTH ends of the conveyor (i.e., able to place parts on one end, then pick them up when they reach the other end).

Parts will be inspected, manipulated and sorted based on variables stated in specifications (not all variables may be used each year, but variables used will be drawn from this list).

The cell must be able to distinguish between metallic and non-metallic parts, and parts with no holes. The cell must be able to detect when a part has been placed by the parts feeder and when a part has reached the limits of travel on the conveyor.

Parts will ultimately be delivered to numbered bin(s). Contents of each bin will be specified at the competition.

Two non-assigned on-off outputs, in addition to those specified or implied above for use by the conveyor or other device, shall be available for processes yet to be determined, and their status (on or off) will be indicated by clearly visible industrial lamps supplied by ATC.

Two non-assigned on-off inputs, in addition to those specified or implied above for use by sensors, proximity switches, part-in-place switches or other device, shall be available for processes yet to be determined, and their state will be determined by readily accessible industrial switches supplied by ATC.

SUPPLIED BY CONTESTANT TEAMS:

Equipment sufficient to fulfill the manufacturer's requirements. Required equipment will vary with the individual abilities of specific equipment, but a suggested list is presented below.

- 1 Servo Robot with controller and programming software
- 1 Mini conveyor with travel switch to sense when part has reached its destination
- 1 Platform for mounting equipment. Use of slotted metal material which allows for flexible placement of fixturing is strongly advised.
- ~ Programmed and Emergency Stop buttons
- 3 Parts bins labeled 0-2
- 1 Inductive proximity sensor to sort plastic and metal parts
- ~ Assorted mounting hardware, fasteners
- ~ Interface cables & equipment for signaling between controllers
- ~ Appropriate tools
 - VOLT-OHM-MILLIMETER (VOM OR DMM)
 - MANUALS FOR EQUIPMENT
 - EYE PROTECTION WITH SIDE SHIELDS
 - #2 LEAD PENCILS

CONTEST DESCRIPTION AND SCORING

The contest will consist of an online SkillsUSA (PDP) knowledge test, online written test covering knowledge of manufacturing processes and robotics. Contestants will be given a manufacturing function to be performed. The contestant will be required to implement the best available solution to the assignment presented

The contestant will be graded on the following: 10% - Written Test score; 87.5% - execution of skill component.

Operation includes:

- proper initialization
- correct flow of materials
- successful testing of properties of materials
- successful detection of the presence of completed
- sorting of parts dependent upon features described above
- notification of external processes when workcell process is complete
- correct action based on input from external processes
- decisions required of the cell
- programmed safety features
- time taken to prove operation

The SkillsUSA (PDP) knowledge test 2.5% to the total score only, which is consistent with the National SkillsUSA competition.