

2021 MICHIGAN SKILLSUSA CHAMPIONSHIPS

TASK & MATERIALS LIST

SKILL OR LEADERSHIP AREA: INDUSTRIAL MOTOR CONTROL

CONTEST LOCATION:

Virtual

Students Must Submit:

-RESUME:

Each student must submit a one-page printed resume before the contest start.

Failure to do so will result in a 10-point penalty.

-SKILLSUSA LIABILITY FORM

CONTEST INFO:

- *Please refer to the National Technical Standards for detailed information related to this contest.*
- How to access SkillsUSA National Technical Standards:
https://www.youtube.com/watch?v=aR9Jet0PRP8&feature=emb_logo
- National Contest Updates are located:
<https://www.skillsusa.org/competitions/skillsusa-championships/contest-updates/>

CLOTHING REQUIREMENT (if different from National contest):

- Clothing must be appropriate and safe for the work environment
- Leather work boots or shoes (no athletic shoes)
- No logos, no names, all identifying information must be covered
- 2021 only – no deductions will be made if official dress is not available

STUDENTS MUST SUPPLY:

- Resume – 1 page
- Calculator
- Standard State Industrial Tools:
 - Hammer
 - Conduit reamer
 - Screwdrivers (Regular and Phillips) and screw tips
 - Needle nose pliers
 - Wire strippers
 - Pump pliers
 - Electrical tape
 - Crimp tool
 - Diagonal wire cutters
 - Electrical side cutting pliers
 - Tool pouch and belt
 - 6' rule or tape measure
 - Knife
 - Safety glasses with side shields or goggles
 - ½" EMT conduit hand bender (thin wall)
 - Pocket level
 - Hack saw frame & blade with extra blade
 - National Electrical Code book (no handbook)
 - Supplies for drawing a ladder diagram
 - Multimeter
 - Wire number for wire labeling

- Six foot extension cord with 3 conductors, 14 or 12 AWG
- State Standard Contest Parts:
 - 1-3 pole motor starter with memory contact, overload block, and auxiliary contact block containing one NO and one NC contact. 120 volt coil. Din rail mountable
 - Contactor – sc-eo2
 - Overload Block = tk-eo2
 - Auxiliary Contact Block (2 n.o./ 2 n.c. contacts) sz-a22/t
 - 1- Reversing starters, 120-volt coil, with N.C. interlock contacts and N.O. memory contacts. Din rail mountable.
 - Contactor – sc-eo2 Need two of these
 - Overload Block = tk-eo2
 - Auxiliary Contact Block (2 n.o./ 2 n.c. contacts) sz-a22/t
 - Mechanical Interlock = SZ-RM
 - Line side jumpers = SZ-ERW1A
 - Load side jumpers = SZ-ERW1D
 - 1-Selector Switch (on-off-on) 22 or 30 mm 2 N.O. contacts. GCX3320-22
 - 2- Limit switches, NO and NC contacts ½ threaded hub and offset nipple installed. ABP2H41Z11
 - 2- Timers and bases, din rail mount, (Ice Cubes) on-delay, 120 volt operation. N.O. -CN.C. contacts x2 MS4SM-AP-ADC and TP411X
 - 2- Ice cube relay 120 volt coil, N.O – C – N.C. contacts x2 QL2N1-A120 and SQL08D
 - 2- Pilot Lights 22 or 30 mm 120 volt operation ECX1051-120
 - 1- Push to test pilot light 22 or 30 mm GCX3202-120
 - 1-push button enclosure three hole, 22 or 30 mm with offset nipple installed SA107-40SL
 - 1-push button enclosure two hole, 22 or 30 mm with offset nipple installed SA105-40SL
 - 25 wire terminals din rail mount. KN-T12GRY
 - 2 Din rail mounted fuse holder. KN-F10L110AC-10 with 5x20mm, 5amp fuses (multiple fuses)
 - 4 Grounding terminal block. KN-G12SP-10
 - 1- 6' cordset, 120 volt with ½" connector. Skills USA Industrial Motor Control Competition Parts list
 - Screws #10 by 1"
 - Assortment of crimp connectors: spade, ring, and fork.
 - #16 TFFN Red, Black, Green, White
 - 1- 4" square deep electrical box with ½ ko
 - 5 – ½" offset nipples with locknuts
 - 1-10' piece ½" EMT conduit
 - 4- ½" EMT connectors
 - 2- 1/2" EMT couplings
 - 3- 1/2" minis
 - 4- 2 – Red Momentary Pushbuttons with normally open and normally closed contact blocks
 - 5- 2- Green Momentary Pushbuttons with normally open and normally closed contact blocks
 - All part numbers are from www.automationdirect.com
 - Equivalent parts are acceptable.

PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of industrial motor controls.

SCOPE OF THE CONTEST

1. Mount electrical equipment (excluding electrical motors) and electrical conductors according to NFPA70.
2. Bend and mount conduit and junction boxes as per the drawing.
3. Provide the control wiring and schematics as per the written description.
4. Written test
5. Oral assessment
6. Provide resume (written)

CONTEST REQUIREMENTS:

Contestant scores from each part of the contest will be used to evaluate contestants overall score. The highest overall score (minus any penalty points) will be chosen as the national qualifying contestant.

1) Day 1 – ORIENTATION AND TECHNICAL ASSESSMENT

Contestants will meet in the morning for a brief informational meeting followed by a timed test and will also need to provide a current resume.

- Student will complete the technical assessment on the Conference LMS.
- Technical assessments are created to reflect national technical assessments
- There are no study guides
- 50 questions
- 60 minutes
- Refer to the national technical standards for information regarding this contests required skills and competencies.

2) Day 2 - TECHNICAL COMPETITION

- Contestants will be given an electrical scenario to build and wire using a supplied list of components equivalent to previous years. Upon receiving the competition task the contestant will have 4 hours to build and wire the project. At the completion of 4 hours, the contestant will have 15 minutes to document the project with pictures showing the entire project and close-up views of all wiring points. The contestant will then have an additional 20 minutes to submit a video presenting the project to the judges as well as explaining the operation of the project. During the contest, an internet cam will need to be positioned on the contestant and connected to zoom for judge observation. “

IMC Hands-on Contest Rubric

Industrial Motor Controls Scoring Sheet													
	Exceeds industry standards and quality.			Meets industry standards and quality			Acceptable performance			Unacceptable performance			
Safety	100		80	70		60	50		40	30		0	Score
	Works at a deliberate pace, aware of others around them and their safety, follows all safety requirements.			Follows safety requirements is unaware of others in the area.			Follows most safety requirements, has an occasional lapse in safe working procedures.			Unsafe working practices, is a danger to self or others in the immediate area.			
	100		80	70		60	50		40	30		0	Score

Ladder diagram	Diagram is correct, all symbols drawn correctly, lines are straight and connected at both ends, all lettering is neat with correct spelling.			Diagram may exhibit one of the following faults. Generally correct but not accurate, poor penmanship/symbol representation, lines not straight and at right angles, some words spelled incorrectly.			Diagram may exhibit two or three of the following faults. Generally correct but not accurate, poor penmanship/symbol representation, lines not straight and at right angles, some words spelled incorrectly.			Diagram is illegible, circuit will not work, symbols drawn incorrectly. Contestant shows no grasp of ladder diagram procedures.			
Wiring application	100		80	70		60	50		40	30		0	Score
	Proper size conductors, proper color code, all connections tight. Proper connection to components, contestant understands the circuit and component operation.			One of the following conditions present; conductors may not be correct size or color, more than two wires per terminal, wire nuts improperly utilized. Contestant requires guidance to connect component.			Two or three of the following conditions; conductors may not be correct size or color, more than two wires per terminal, wire nuts improperly utilized. Contestant requires guidance to connect component.			Several of the following conditions; conductors may not be correct size or color, more than two wires per terminal, wire nuts improperly utilized. Contestant requires guidance to connect component.			
Workmanship	100		80	70		60	50		40	30		0	Score
	Components mounted level, secure and in proper location, wires neat and orderly with proper bends, wires secured and wrapped, all terminations numbered and orderly.			One of the following conditions; components mounted level, secure and in proper location, wires neat and orderly with proper bends, wires secured and wrapped, all terminations numbered and orderly.			Two or three of the following conditions; components mounted level, secure and in proper location, wires neat and orderly with proper bends, wires secured and wrapped, all terminations numbered and orderly.			Multiple errors exist; components mounted level, secure and in proper location, wires neat and orderly with proper bends, wires secured and wrapped, all terminations numbered and orderly.			
NEC/written test	100		80	70		60	50		40	30		0	Score
	Entire project meets code compliance, no violations/wrong answers.			One code violation/two wrong answers.			Two or three code violations/3-4 wrong answers.			Multiple code violations/more than 4 wrong answers.			

Correct operation	100		80	70		60	50		40	30		0	Score
	Project works correctly the first time. Or if not operational, component issues not the fault of the contestant will not deduct from score.			Project does not work correctly on the first power up, student troubleshoots the problem with no assistance.			Project requires two attempts to correct the problem, assistance may be utilized.			Contestant is unable to correct the problem, has no working knowledge of the circuit.			
Raceway	100		80	70		60	50		40	30		0	Score
	All raceways correct length to within 1/8 th inch, bends are to the correct angle, bends are at the correct placement in the raceway. No kinks or damage to the raceway.			Raceway may contain one of the following; correct length to within 1/8 th inch, bends are to the correct angle, bends are at the correct placement in the raceway. No kinks or damage to the raceway.			Raceway may contain two or three of the following; correct length to within 1/8 th inch, bends are to the correct angle, bends are at the correct placement in the raceway. No kinks or damage to the raceway.			Raceway may contain several of the following; correct length to within 1/8 th inch, bends are to the correct angle, bends are at the correct placement in the raceway. No kinks or damage to the raceway.			
Project presentation	100		80	70		60	50		40	30		0	Score
	Contestant is able to correctly describe how the project will work. Speaks directly and concisely to the judge, makes eye contact and answers questions effectively.			Contestant does not correctly describe the circuit or does not demonstrate the project with good eye contact and confident speech			Contestant neither correctly demonstrates the circuit or presentation of the project			Contestant is unaware of all surroundings.			
Resume	100		80	70		60	50		40	30		0	Score
	Purpose and format of the resume is strong and clear. Resume is professional in appearance, tone, and style. Proper writing mechanics present.			Purpose and format is present but could be stronger. Some Resume shows an appropriate appearance. Some inconsistencies remain. Writer follows most writing guidelines.			Purpose and format is less clear, and weak parts remain. Format is confusing. Major sections are missing. Resume shows a less professional appearance, multiple errors.			Purpose and format is not clear. Format is hard to see. Major sections are missing information. Numerous errors, document is unreadable			
Interview	100		80	70		60	50		40	30		0	Score

	No infraction to the following: Contestant introduced themselves with a firm handshake and eye contact, maintained posture, and grooming, has mature answers to all questions, has knowledge of position applied.			One to two infractions of the following: Contestant introduced themselves with a firm handshake and eye contact, maintained posture, and grooming, has mature answers to all questions, has knowledge of position applied.			Three to four infractions of : Contestant introduced themselves with a firm handshake and eye contact, maintained posture, and grooming, has mature answers to all questions, has knowledge of position applied.			Multiple infractions of: Contestant introduced themselves with a firm handshake and eye contact, maintained posture, and grooming, has mature answers to all questions, has knowledge of position applied.			
	100		80	70		60	50		40	30		0	Score
Total Score													

Michigan Skills USA industrial motor controls competition scoring rubric													
Contestant #	Exceeds industry standards and quality.			Meets industry standards and quality			Acceptable performance			Unacceptable performance			Score
Safety	100		80	70		60	50		40	30		0	
Ladder diagram	100		80	70		60	50		40	30		0	
Wiring application	100		80	70		60	50		40	30		0	
Workmanship	100		80	70		60	50		40	30		0	
NEC	100		80	70		60	50		40	30		0	
Correct operation	100		80	70		60	50		40	30		0	
Raceway	100		80	70		60	50		40	30		0	
Project presentation	100		80	70		60	50		40	30		0	
Dress	100		80	70		60	50		40	30		0	
Resume	100		80	70		60	50		40	30		0	
Interview	100		80	70		60	50		40	30		0	
Total													

Notes
