



## Industrial Motor Control Contest Information

Tentative -Information is subject to change check back often

by Mitchell Thomas — last modified February 15, 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.

Contestant fee for EMT and Box Lunch is included in conference registration.

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](mailto:Mitchell.Thomas@careertech.ok.gov)**

### TOOLS AND SUPPLIES

Contestants will need to bring the following tools and materials, build the ELECTRO-MECHANICAL CHASSIS described in the attached specifications.

- Standard wiring or "pouch" tools including needle-nose pliers, side cutters, diagonal pliers, conduit reamer, assorted screwdrivers, both slotted and Phillips, wire and strippers.
- Hacksaw
- ½ EMT bender
- 6' folding rule or tape measure
- 60'-14 or 16 AWG THHN solid or stranded in various colors
- 4-3A Fuses for above (ONLY 4, no extras)
- Straight-edge and/or symbol template for drawing ladder and flow chart
- Graph paper
- Volt-Ohm-Milliammeter (VOM or DMM)
- Currently adopted (by the state of Oklahoma) NEC Book
- Eye protection with side shields
- #2 lead Pencils
- Snacks/Bottled Water



## Industrial Motor Control Contest Information

### INDUSTRY AWARDS

As agreed at August Conference each instructor is requested to secure a minimum of \$50.00 in prizes for each student that you bring to the State SkillsUSA Championships. Please contact for details and to let [Matthew.Maynard@francistuttle.edu](mailto:Matthew.Maynard@francistuttle.edu) 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.

### CONTEST DESCRIPTION AND SCORING

The contest will consist of an online SkillsUSA (PDP) knowledge test, online written test covering knowledge of NEC article 430, 310-16, 240, and other motor, wiring, and control related problems, and a skill test. For the electro-mechanical component of the contest, the contestants will be given a word problem, required to draw the ladder diagram of a solution, and wire the solution on the electro-mechanical assembly. If contestants are unable to complete the diagram, a correct schematic will be provided to test their ability to make connections from a blueprint. Scoring for this part of the contest will be based on accuracy and neatness of the ladder diagram, neatness of wiring, and efficiency of operation. The contestants will also be given a drawing of a conduit installation problem, for which they will have to perform several bends. These will then be checked on jigs supplied by the technical committee for fit and neatness.

#### Specific scores:

Design Documentation	70 pts
Wiring/Function	100 pts
Conduit Bending	30 pts
Written Test	50 pts

The SkillsUSA PDP is 2.5% of the contest score.

The written knowledge test is 10% of the contest score.

The technical skills portion of the contest is 87.5% of the contest score.

The above scoring is consistent with the national SkillsUSA competition.

### ASSEMBLY DESCRIPTION

A clean piece of plywood, at least 1/2" nominal thickness, suitably sized with the components list on the following page neatly mounted. Unit must have approved power cord feed, properly strain-relieved into an enclosure, and must include 3 amp (maximum) fusing and a disconnecting means (power switch, so that it is not necessary to unplug the power cord to remove power from all devices) on the board. You may build from existing stock, but try to follow layout as closely



## Industrial Motor Control Contest Information

as possible to simplify troubleshooting for the judges and to allow for instructions contestants will receive at the contest to follow the physical construction of their board.

The Appliance cord may be prewired to the fuse block and switch, and conductors may extend from the fuse block ready for termination to devices on the board, but no additional rewiring will be allowed. Contestants will be asked to remove any rewiring before they are allowed to begin the project. This includes conductors from limit switches. Wiring to limit switches **MUST** be made during the contest.

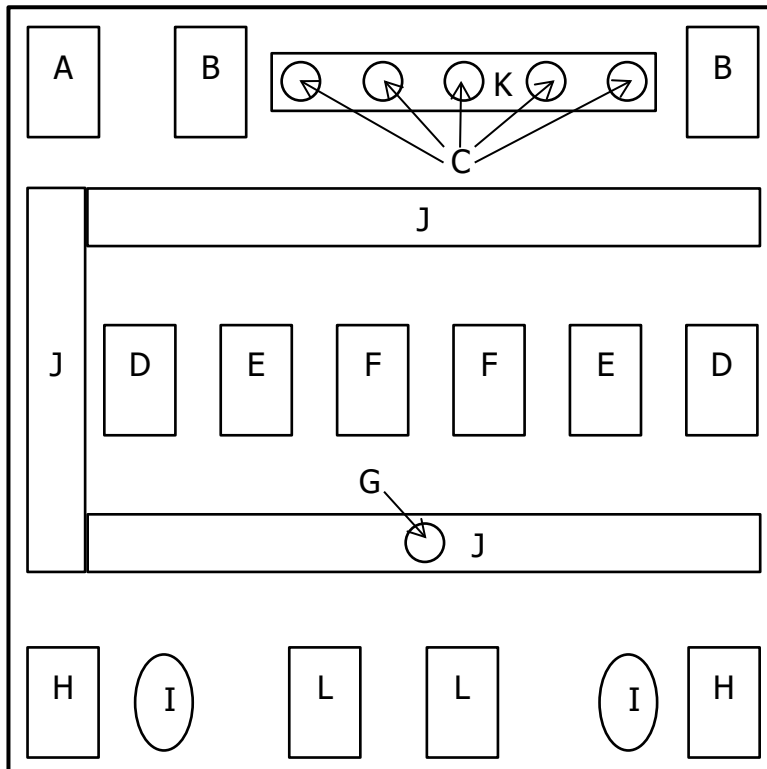
No terminal strips or barrier strips are allowed. Wiring must be installed from device to device during the competition.

### PARTS LIST FOR MOTOR CONTROLS CONTEST

<b>QTY DESCRIPTION</b>	<b>VENDOR*/PART NO.</b>
2 Contactors	GR/6B177 or equiv.
2 Aux contact blocks for above	GR/6B199 or equiv.
2 Start/Stop Station	GR/2EK13 or equiv.
1 Hand-Off-Auto Switch	GR/7A157 or equiv.
2 Limit Switches	GR/2W938 or equiv.
2 Time Delay Relays (On Delay)	GR/5X829 or equiv.
2 Time Delay Relays (Off Delay)	GR/6X154 or equiv.
2 Square Base Control Relay 3PDT	GR/5X841 or equiv.
2 Relay Base for CR	GR/5X853 or equiv.
2 Relay Base for TDR/On Delay	GR/5X852 or equiv.
2 Relay Base for TDR/Off Delay	GR/6X156 or equiv.
1 Panel Light-Red	HB/E22H2X10 or equiv.
1 Panel Light-Amber	HB/E22H9X10 or equiv.
1 Panel Light-Green	HB/E22H3X10 or equiv.
2 Panel Light-Blue	HB/E22H6X10 or equiv.
60' 14 or 16 AWG THHN solid or stranded	various colors
1 110 volt 3 cond. 3' to 6' appliance cord	~
1 Box Cover Unit (Switch & fuse in one)	GR/1DH49 or equiv.
1 Enclosure for Box Cover Unit above	Handy box will work
4 3A Fuses for above (ONLY 4, no extras)	~
~ "ScotchLok" type connectors, as required	~
~ Panduit raceway as required	NEW/78W316

\*Key to Vendors: HB=Hunzicker Bros., GR=Grainger, NEW=Newark

## Industrial Motor Control Contest Information



- A:** FUSE / SWITCH
- B:** CONTACTORS
- C:** INDICATORS  
B-G-A-R-B
- D:** CONT RELAYS
- E:** TD-ON RELAYS
- F:** TD-OFF RELAYS
- G:** H-O-A SWITCH
- H:** LIMIT SWITCHES
- I:** CAMS
- J:** PANDUIT
- K:** BRACKET OR  
PANDUIT
- L:** START/STOP