

2016-2017 FFA/GEMC Speech/Demonstration Topic

PROBLEM: The contestant will be expected to thoroughly explain the operating principles and installation of a motor control circuit consisting of one, 30 amp definite purpose contactor with a 120V coil and a normally open push button station. The circuit will control a single phase, 3 HP, 230V motor on a feed auger. Conductors will run in PVC conduit. The source and load conductors will be #10 AWG, stranded, THHN insulated (individual) conductors; the control circuit conductors will be #14 AWG, stranded, THHN insulated (individual) conductors. Block fork terminal and/or female disconnect terminals will be connected to the ends of each conductor; each conductor that runs in conduit between devices will be identified on both ends with Tyvek wire markers. A double pole, 30 amp circuit breaker will be installed in the service entrance panel and all connections in the service panel will be made.

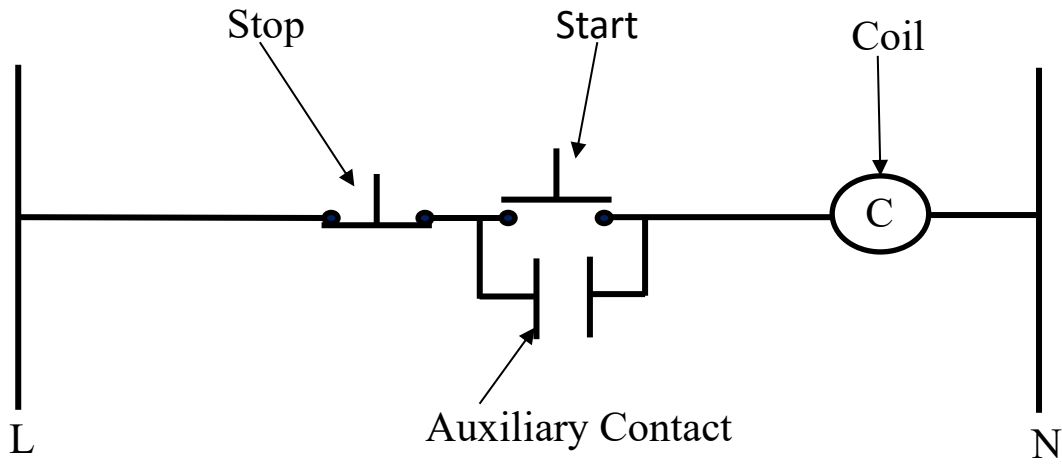
Materials List:

The following list of materials will either be attached to the demo frame or laid out for the contestant to use as they explain the installation of the circuit.

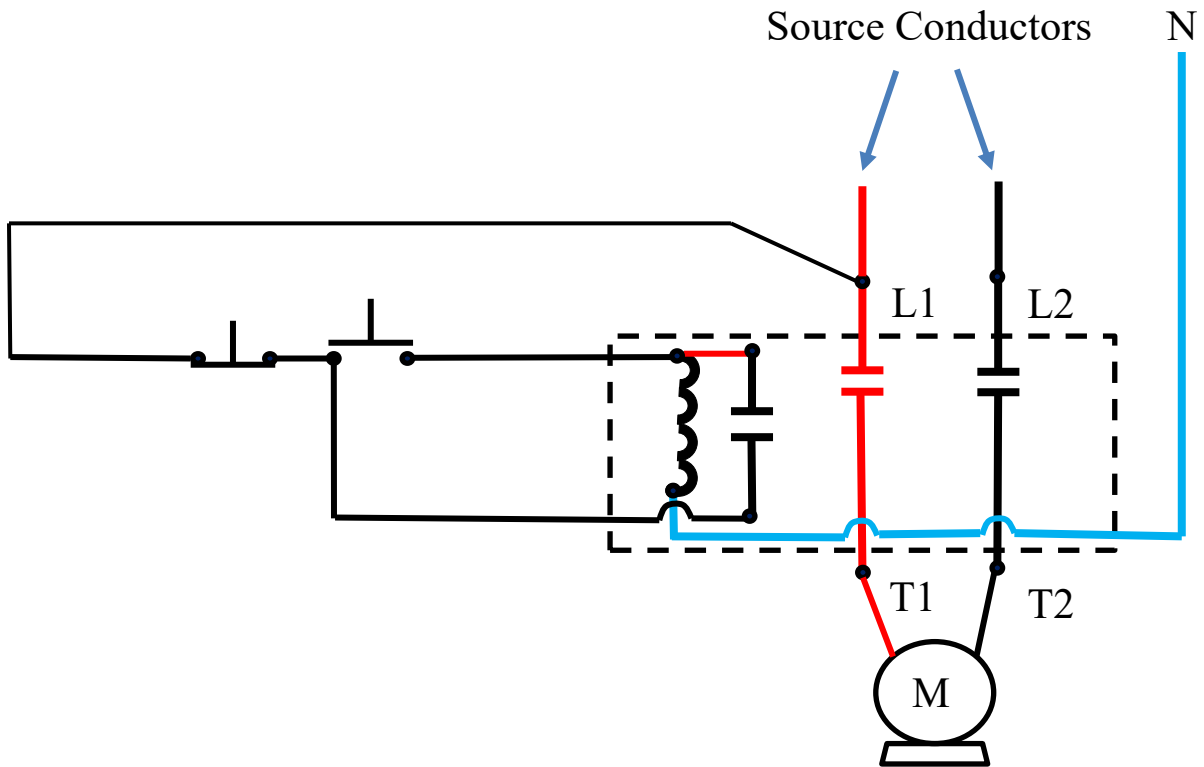
- 1 - 100A Main Breaker Type, Eaton Service Entrance Panel
- 1 - #2 Aluminum, Service Entrance Conductor
- 1 - #6, soft drawn bare copper grounding conductor
- 1 - 30 amp double pole circuit breaker
- 1 - Metal enclosure for definite purpose contactor - #9991DPG1
- 2 - Definite purpose contactor - 2 pole - open type, 30 FLA, 600V Max, W/120Vcoil
#8910DPA32V02 (one mounted, one available for demonstration)
- 2 - Auxiliary Contactor - # 9999DD10 (one mounted, one available for demonstration)
- 2 - Push Button Station - # 9001BG201 (one mounted, one available for demonstration)
½" PVC Conduit, Schedule 40
- 4 - ½" PVC 90° sweeps
- 5 - ½" PVC male threaded couplings w/lock rings
- 4 - ½" PVC straps
- 1 - Red solderless connector
- 1 - Red, #14 AWG, THHN insulated jumper w/female disconnect terminals
- 1 - Green, #10 AWG, THHN insulated grounding jumper w/Block fork terminal (installed)
- 1 ea. - Block fork terminals for 10 AWG Str. Cu conductor (yellow), 14 AWG Str. Cu conductor (blue)
- 1 - Female disconnect terminal for 14 AWG Str. Cu conductor (blue)
- 1 - Book, Tyvek wire markers
- 1 - Wire Crimping Tool

References:

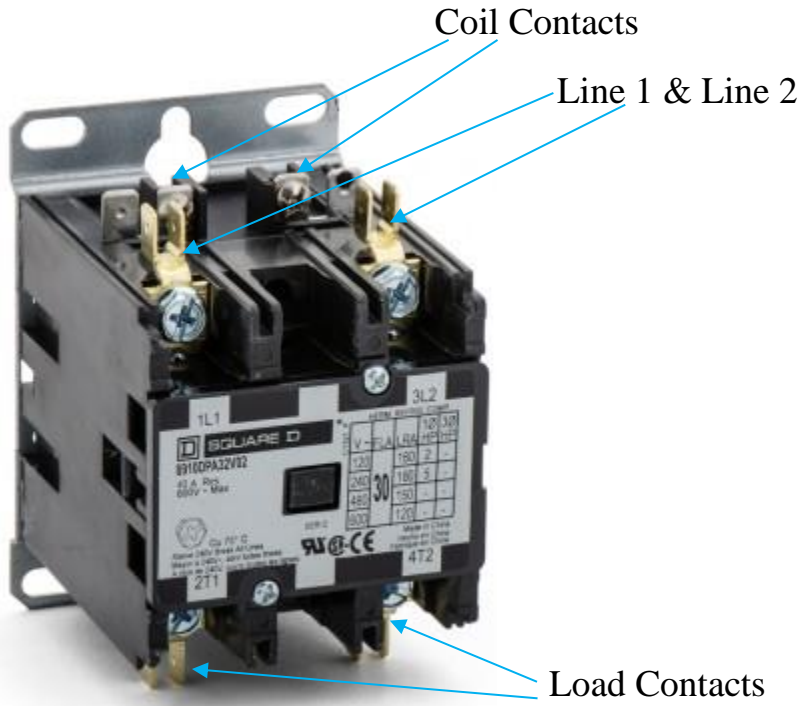
- 2014 National Electrical Code
- Agricultural Wiring Handbook – 17th Edition
- AAVIM Electrical Controls
- Student Guide to Wiring
- Poster Size Schematic Drawing



Ladder Diagram for Motor Control Circuit



Motor Control Circuit Wiring Diagram



Definite Purpose Contactor



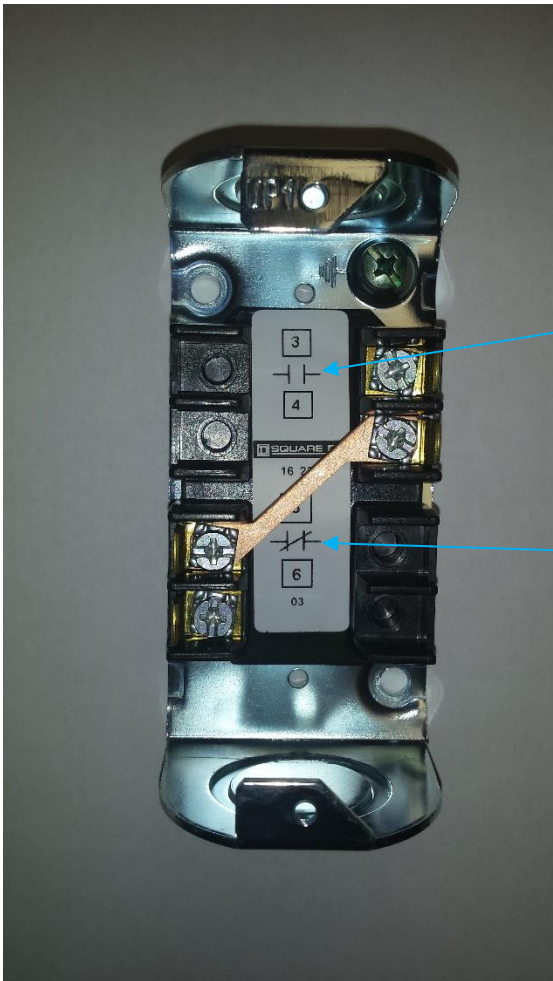
Auxiliary Contactor



Enclosure



Push Button Station



Start

Stop