

2018-2019 FFA/GEMC Speech/Demonstration Topic

PROBLEM: The contestant will be expected to thoroughly explain the operating principles and installation of a manual transfer switch for an optional standby system. The manual transfer switch is located between the service entrance panel and a sub-panel. The system will provide standby power to feeder circuits that contain lighting outlets and an individual branch circuit for a freezer. In the event of a power outage the manual transfer switch will be able to switch power from the electrical utility to a portable generator rated at 7.5 kW. The generator will supply power through the manual transfer switch to the sub-panel by means of a flanged inlet connection located on the outside of the building.

6 AWG, THHN insulated, stranded copper conductors will be installed in 3/4" PVC conduit between the service entrance panel, manual transfer switch, and the sub-panel. 10 AWG, THHN insulated, stranded copper conductors will be installed between the manual transfer switch and the 30 amp flanged inlet. 12 AWG, THHN insulated, stranded copper conductors will be installed in 1/2" rigid PVC conduit to supply the feeder circuits. Each circuit in the sub-panel will be protected by 20 amp circuit breakers.

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 - 125 Amp Eaton Service Entrance Panel with 6 AWG bare copper grounding conductor installed and connected to an assumed driven ground
- 1 - 60 Amp Manual Transfer Switch, Reliance Exterior Panel
- 1 - 70 Amp Homeline Load Center (HOM2-4L70) with optional grounding bar installed
- 1 - 30 Amp Electrical box, flanged inlet
- 1 - 60 Amp double pole circuit breaker
- 2 - 20 amp single pole circuit breakers
- 8 - 6 AWG Copper THHN insulated conductors (2 black, 2 red, 2 white, 2 green)
- 4 - 10 AWG Copper THHN insulated conductors (1 black, 1 red, 1 white, 1 green)
- 6 - 12 AWG, Stranded, THHN insulated conductor (2 black, 2 white, 2 green)
- 1 - 10 AWG, 30 Amp, 125/250 Volt, Generac Generator Cord with L14-30 ends
- 3/4" Schedule 40 Rigid PVC Conduit
- 4 - 3/4" PVC threaded male adapter w/locking ring
- 1/2" PVC conduit, Schedule 40
- 1 - 1/2" PVC coupling, Schedule 40
- 1 - 1/2" PVC 90° sweep
- 3 - 1/2" PVC male threaded couplings w/lock rings
- 1 ea. - Separately Derived and Non- Separately Derived Identification Stickers

References:

- 2017 National Electrical Code
- AAVIM Electrical Wiring
- Agricultural Wiring Handbook – 17th Edition
- Student Guide to Wiring
- Poster Size Schematic Drawing

Optional Standby System

