Splicing and Terminating Conductors

Program: Electrician Technician

Course: EL160 – Low Voltage

Objectives: Under the supervision of your instructor, you should be able to do the following:

- Describe how to make a good conductor termination.
- Prepare cable ends for terminations and splices and connect using lugs or connectors.
- Understand the *National Electrical Code®* (*NEC®*) requirements for making cable terminations and splices.
- Demonstrate crimping techniques.
- Select the proper lug or connector for the job
- Terminate conductors using selected crimp-type and mechanical-type terminals and connectors.
- Terminate conductors on a terminal strip.
- Insulate selected types of wire splices and/or install a motor connection kit

Lab Equipment:

- One screw-type terminal strip with #8 terminal screws

Required Tools:

- 1 – Flat Head Screwdriver
- 1 – Pair of Wire cutters
- 1 – Pair of Wire strippers
- 1 – Heat gun
- 1 – Hand crimping tool

Materials:

- 10’ – 14 AWG THHN copper conductor
- 4 – Yellow
- 4 – Red wire nuts
- 1 - Heat shrink tubing kit
- 1 – kit of uninsulated crimp-type butt splice connectors for 14 AWG wire
- 1 – Kit of insulated crimp-type butt splice connectors for 14 AWG wire
- 1 – Kit of insulated crimp-type terminals (#8 screw, fork and ring) for 14 AWG wire

Safety (PPE):

- Safety glasses

Resources:

- You may add other types of terminals, connections, and splices to this project or modify the installations based on materials or tools available.
- Advise the trainees that heat guns generate extreme heat, especially near the end of the nozzle. Use extreme caution when using heat guns.
- When checking heat shrink tubing installations, make sure that no conductor insulation melted in the process.
- Test crimp-type connections by pulling on conductors while holding the connector.
- Do not allow trainees to use wire cutters or lineman pliers as crimping tools unless the tool is designed with integral crimping jaws.

Required Time: 180 Minutes

Shop Maintenance:

- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are student's responsibility

Procedures: (Eye protection must always be worn)

This performance project requires the trainee to prepare conductors, install termination connectors, make splices, and terminate conductors.

Task 1 – Installing an Insulated Crimp-Type Butt Splice Connector:

1. Select an insulated crimp-type butt splice connector sized for splicing two 14 AWG conductors together.
2. Cut two 6-inch pieces of 14 AWG THHN wire, and strip one end of each piece to properly fit into the butt splice connector.
3. Use the proper crimping tool to crimp the connector onto each conductor.
4. Pull on each conductor to check the splice.
5. Have your instructor check your work.

Task 2 – Installing an Insulated Crimp-Type Ring or Fork Connector:

1. Select one insulated crimp-type ring connector and one fork (spade) connector sized for 14 AWG conductors and #8 terminal screws.
2. Cut one 6-inch piece of 14 AWG THHN wire and strip both ends of it to properly fit into the ring and fork connectors.
3. Use the proper crimping tool to crimp the ring connector onto one end of the conductor and the fork connector onto the other end.
4. Have your instructor check your work.

Note

These connections will be used in a later task.

Task 3 – Installing Heat Shrink Tubing on an Uninsulated Splice Connector:

1. Select an uninsulated crimp-type butt splice connector sized for splicing two 14 AWG
1. conductors together.
2. Cut two 6-inch pieces of 14 AWG THHN wire, and strip one end of each piece to properly fit into the butt splice connector.
3. Use the proper crimping tool to crimp the connector onto each conductor.
4. Cut a small section of heat shrink tubing that is large enough to slide over the connector, and long enough to cover the uninsulated connector, extending beyond each end of the connector by approximately 3⁄16 inch.
5. Use a heat gun to shrink the tubing around the connector, sealing off each end.
6. Allow the heat shrink tubing to cool, then pull on each conductor to check the connection.
7. Have your instructor check your work.

Task 4 – Terminate Fork or Ring Terminals to a Terminal Block:

1. Use the conductor with the attached connectors from Task 2 for this task.
2. Select the correct size screwdriver that fits the terminal screw heads of the terminal strip provided.
3. Attach the ring and fork connectors to separate terminal screws, forming a jumper wire on the terminal strip.
4. Have your instructor check your work.

Task 5 – Make a Splice Using a Wire Nut:

1. Select a yellow wire nut.
2. Cut two 6-inch pieces of 14 AWG THHN and strip one end of each piece to properly fit into a yellow wire nut.
3. Hold the two stripped ends of the conductor evenly together and use your lineman pliers to twist the conductors four or five times, making sure the ends remain even with each other and the strands of the two conductors entwine with one another. Check for lost or wild strands.
4. Place a yellow wire nut over the twisted conductor ends and tighten the wire nut, completing the connection.
5. Pull on the conductors to check the connection.
6. Have your instructor check your work.

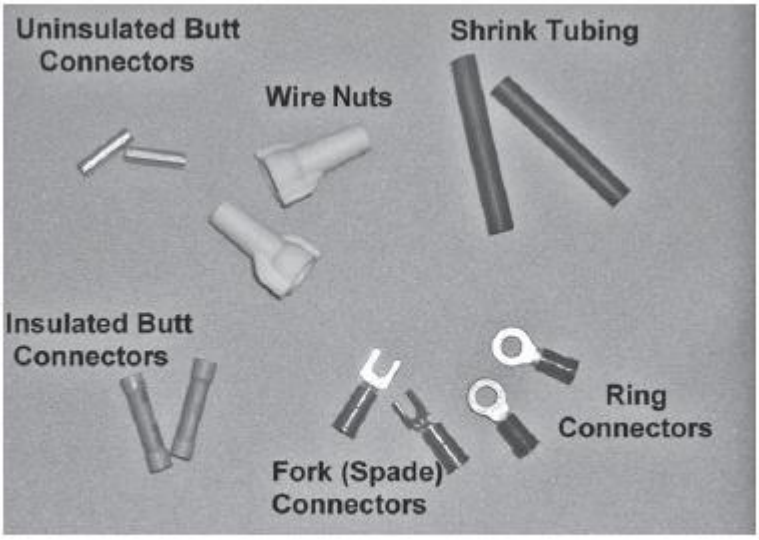

Figure 1 ■ An Assortment of Splices, Connectors, Wire Nuts, and Heat Shrink Tubing