Industrial Maintenance

Electrical Power Distribution

Courseware Sample

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By the staff of Festo Didactic

Internet: www.festo-didactic.com
e-mail: did@de.festo.com

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Safety and Common Symbols

The following safety and common symbols may be used in this manual and on the Lab-Volt equipment:

Symbol	Description
⚠ DANGER	**DANGER** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ WARNING	**WARNING** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ CAUTION	**CAUTION** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
CAUTION	**CAUTION** used without the *Caution, risk of danger* sign ⚠, indicates a hazard with a potentially hazardous situation which, if not avoided, may result in property damage.
	Caution, risk of electric shock
	Caution, hot surface
	Caution, risk of danger
	Caution, lifting hazard
	Caution, hand entanglement hazard
	Direct current
	Alternating current
	Both direct and alternating current
	Three-phase alternating current
	Earth (ground) terminal

Safety and Common Symbols

	Protective conductor terminal
	Frame or chassis terminal
	Equipotentiality
	On (supply)
	Off (supply)
	Equipment protected throughout by double insulation or reinforced insulation
	In position of a bi-stable push control
	Out position of a bi-stable push control

We invite readers of this manual to send us their tips, feedback, and suggestions for improving the book.

Please send these to did@de.festo.com.

The authors and Festo Didactic look forward to your comments.

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Preface

The Industrial Wiring Training System, Model 46102, faithfully reproduces an industrial environment where students can develop their skills in the installation and wiring of industrial electrical equipment, in compliance with the National Electrical Code® (NEC®). The system can also be used to teach how to adjust and maintain industrial electrical equipment as well as enforce the safety rules to be followed when working at industrial sites.

Due to its modular design, the Industrial Wiring Training System can be configured to fit various training needs. A versatile, mobile workstation is the basis of the system. The following equipment packages, tool packages, and industrial application packages are available to adjust the curriculum to various training levels:

- Enclosures and Conduits
- Electrical Power Distribution
- Three-Phase Power Bus
- Electrical Wiring
- Electrical Wiring Tools
- Three-Phase Motor with Forward Starter and Soft Starter
- AC Motor Drive with Inverter Duty Motor
- PWM DC Motor Drive with Permanent Magnet DC Motor
- Inertia Load Application
- Blower Application
- Power Quality Analyzer

All of the above packages consist of industrial-type equipment and tools for realistic training.

We hope that your learning experience with the Industrial Wiring Training System will be the first step of a successful career as an electrician.

We invite readers of this manual to send us their tips, feedback, and suggestions for improving the book.

Please send these to did@de.festo.com.

The authors and Festo Didactic look forward to your comments.

About This Manual

The job sheets in this manual provide a systematic and realistic means of learning how to install electrical enclosures and conduits. When you have completed these job sheets, you will be able to interconnect electrical enclosures and boxes with various types of conduit.

Safety considerations

Safety symbols that may be used in this manual and on the equipment are listed in the Safety Symbols table at the beginning of the manual.

Safety procedures related to the tasks that you will be asked to perform are indicated in each exercise.

Make sure that you are wearing appropriate protective equipment when performing the tasks. You should never perform a task if you have any reason to think that a manipulation could be dangerous for you or your teammates.

It is recommended to complete the safety checklist in Appendix C of this manual at the beginning of any job sheet.

Reference material

Refer to the *Electrical Level One – Trainee Guide* and the *Electrical Level Two – Trainee Guide* from the National Center for Construction Education and Research (NCCER).

Also refer to the articles of the National Electrical Code® (NEC®) that are mentioned in the various modules of the NCCER's manuals listed above.

Appendices

Appendix A, *Equipment Utilization Chart*, indicates the components, specialized tools, and consumable goods (conduits, conductors, cable ties, etc.) that are required to complete each of the job sheets in this manual. The chart also provides the part number of each component, specialized tool, and consumable good.

Appendix B, *Basic Tools Required*, lists the basic tools that are recommended to perform the job sheets in this manual. These tools should normally be provided by the student.

Appendix C, *Basic Safety Procedures*, lists the basic safety procedures to be performed before you begin any of the job sheets in this manual.

Appendix D, *Reference Material*, lists references to sections and modules of the Electrical Trainee Guide from the NCCER. These references provide the information and theory necessary to perform the job sheets in this manual.

About This Manual

Systems of units

Units are expressed using the U.S. customary system of units followed by the units expressed in the International System of Units (SI) (between parentheses).

Photographs in the job sheets

Photographs in the job sheets show several electrical components used for electrical power distribution as well as the installation of electrical power distribution equipment at various stages. Most of these photographs were taken at the time the electrical power distribution package was designed. Although every effort is made to keep these pictures up to date, you may notice some differences between what is shown in the pictures and the components you received. This is normal and reflects our commitment toward continuous product improvement.

To the Instructor

You will find in this Instructor Guide all the elements included in the Student Manual together with the answers to all questions, results of measurements, graphs, explanations, suggestions, and, in some cases, instructions to help you guide the students through their learning process. All the information that applies to you is placed between markers and appears in red.

Accuracy of measurements

The numerical results of the hands-on exercises may differ from one student to another. For this reason, the results and answers given in this manual should be considered as a guide. Students who correctly performed the exercises should expect to demonstrate the principles involved and make observations and measurements similar to those given as answers.

Instructions

- Before a student begins a job sheet, make sure that the equipment is in good condition and does not represent any risk when used.
- When a student has to complete a setup that is partially mounted, ensure that the setup corresponds to the task requested in the job sheet.
- Whenever a lockout/tagout is required, make sure that each student working on the Industrial Wiring Training System has and installs a padlock on the safety switch handle of the system's service entrance.
- Before a student begins a job sheet, make sure that he or she has read the relevant sections of the reference material and understands the objectives of the job to be done.
- This guide provides you with the list of points that should be checked to assess the student's work. The guide also provides notes that contain complementary information on how to perform the job sheets.

Sample Job Sheet

Extracted from

Electrical Power Distribution

Wiring of the Main Distribution Panelboard

OBJECTIVE

To connect the service-entrance conductors. To ground the main distribution panelboard (MDP). To wire a branch circuit supplying a three-phase receptacle. To apply the required identification labels on the MDP.

PROCEDURE

1. Perform the basic safety procedures listed in Appendix C of this manual.

2. Read Article 312.6 in the NEC® and references 6 and 7 (see Appendix D).

3. Strip the end of each service-entrance conductor using a cutter and cut the insulation as shown in Figure 16.

Figure 16. Strip the end of the service-entrance conductors.

4. Unscrew the three setscrews located on the terminals of the main circuit breaker (MCB).

5. Connect the three service-entrance conductors L1 (red), L2 (black) and L3 (blue) to the MCB terminals, and the neutral (white) conductor to the main neutral terminal as indicated in the electrical power distribution interconnection diagram, Part I and Figure 17.

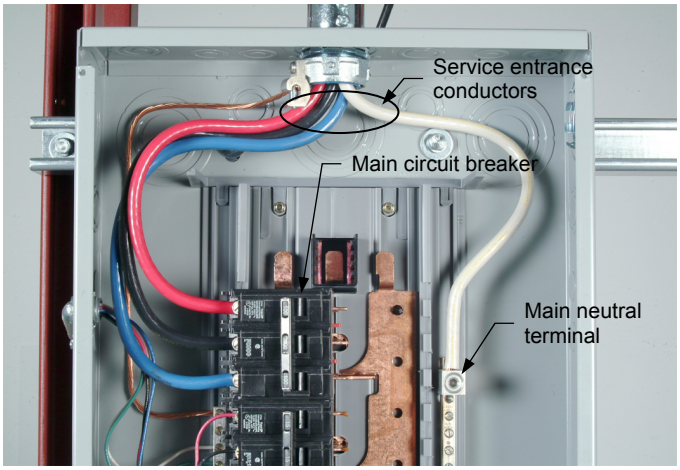

Figure 17. Connections of the service-entrance conductors in the MDP.

Make the necessary connections and install the required bonding jumpers to ensure effective grounding of the MDP and related components (enclosure, conduits, fittings, etc.). To do so:

6. Read the sections dealing with bonding jumpers and grounding electrode conductors (GEC) in Article 250 of the NEC® and in references 8 and 9 (see Appendix D).

7. Connect the GEC to the MDP neutral/ground bus, as shown in Figure 18 and tighten the setscrew.

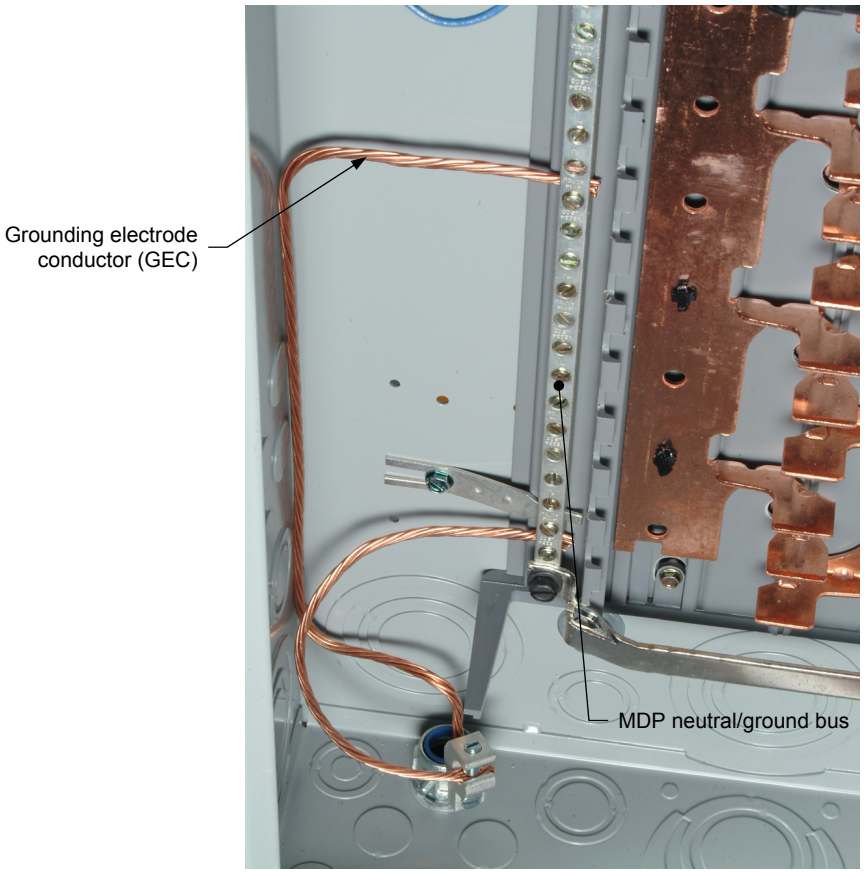

Figure 18. GEC connected to the MDP neutral/ground bus.

8. Connect the MDP enclosure to the neutral/ground bus. Depending on the MDP enclosure, the connection to the neutral/ground bus can be done using a main bonding jumper (MBJ) or a bonding screw (see Figure 19).

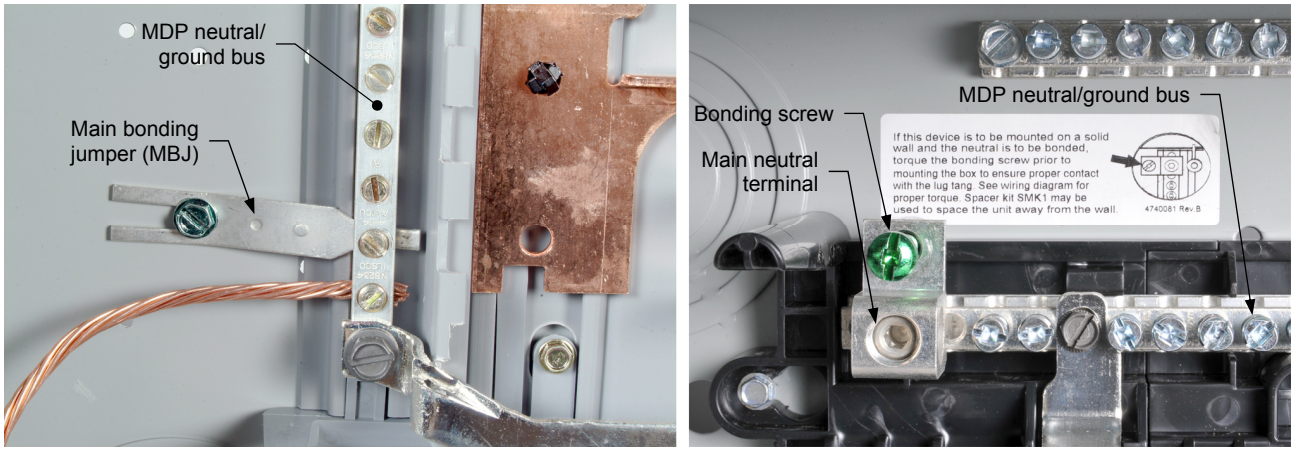

Figure 19. MDP enclosures connected to the neutral/ground bus using either a MBJ or a bonding screw.

9. Connect the two bushings with a bonding jumper terminal to the MDP neutral/ground bus with bare, stranded copper wire of size No. 8 AWG, as shown in Figure 20.

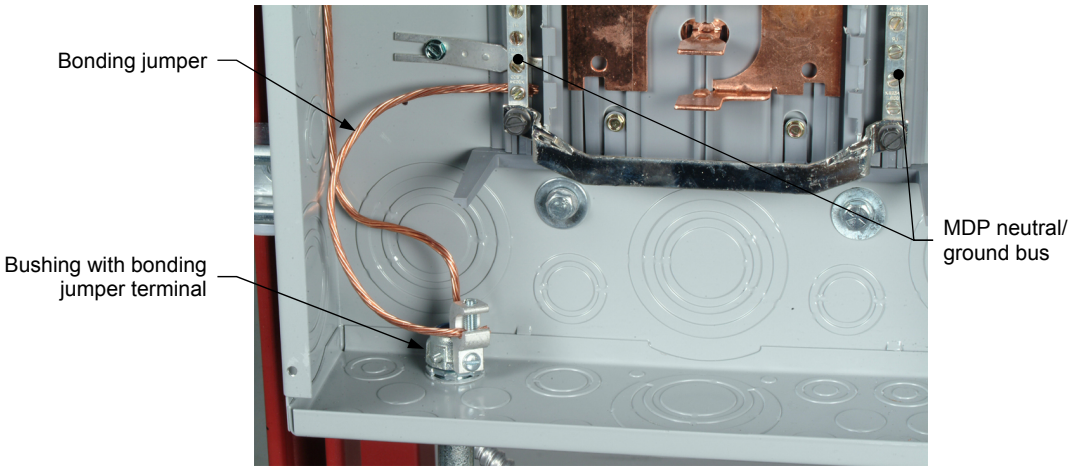

Figure 20. Bushing with a bonding jumper terminal connected to the MDP neutral/ground bus.

10. Make sure the setscrews on the bushing terminal and MDP neutral/ground bus are well-tightened.

This ensures effective bonding of the corresponding conduit with the MDP, and thus, a reliable current path to ground should a fault occur.

11. Read reference 10 (see Appendix D).

12. Identify the three-pole circuit breaker required to protect the branch circuit supplying the three-phase receptacle (installed later in this job sheet) shown in the electrical power distribution interconnection diagram, Part I and Figure 21.

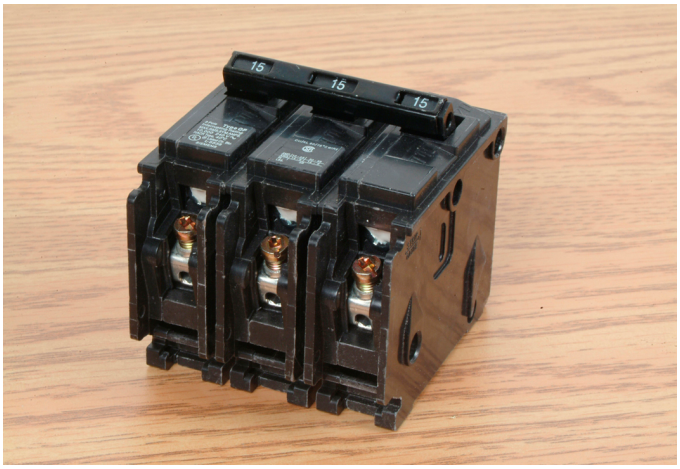

Figure 21. A three-pole circuit breaker.

13. Install the circuit breaker in the top-left circuit breaker space of the MDP just below the MCB as shown in Figure 22.

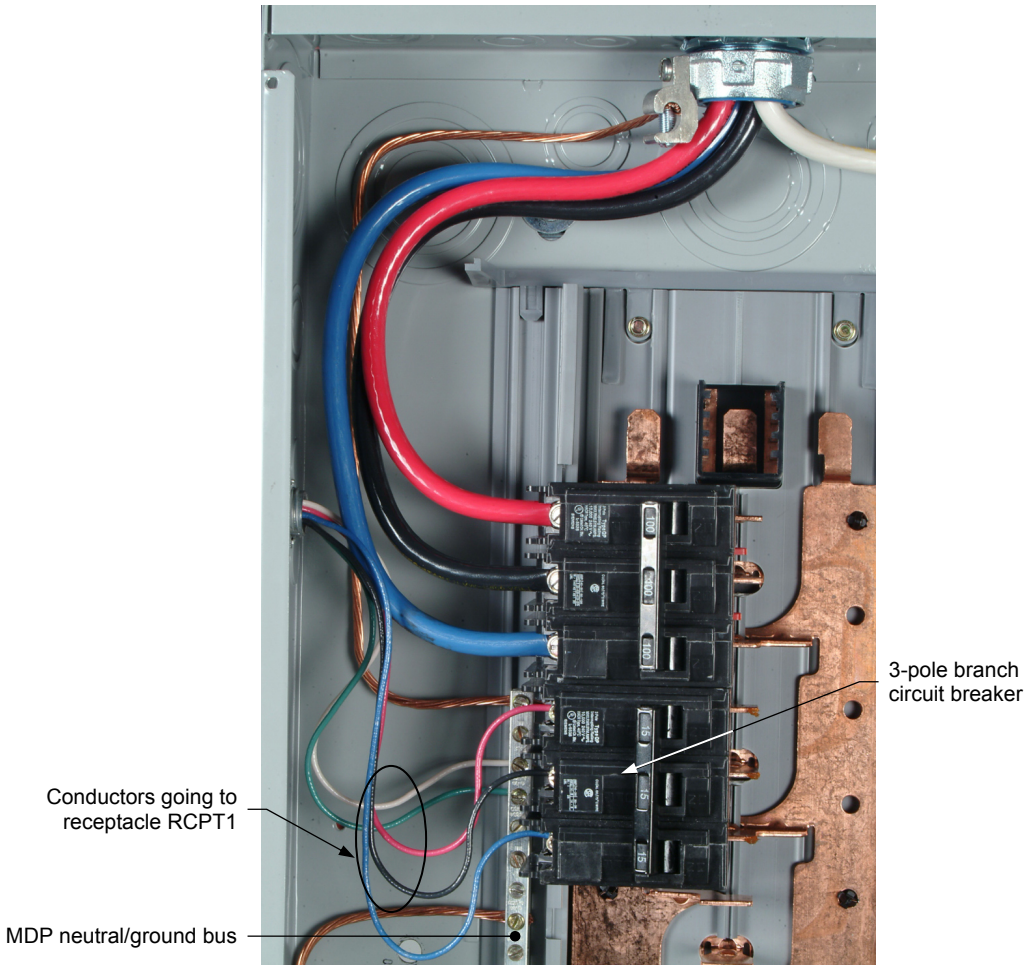

Figure 22. The three-pole circuit breaker installed below the MCB.

Refer to the electrical power distribution interconnection diagram, Part I and make the electrical connections required to wire the branch circuit supplying power to the three-phase receptacle. To do so:

14. Identify the three-phase receptacle requested in the electrical power distribution interconnection diagram, Part I. Figure 23 shows a three-phase receptacle.

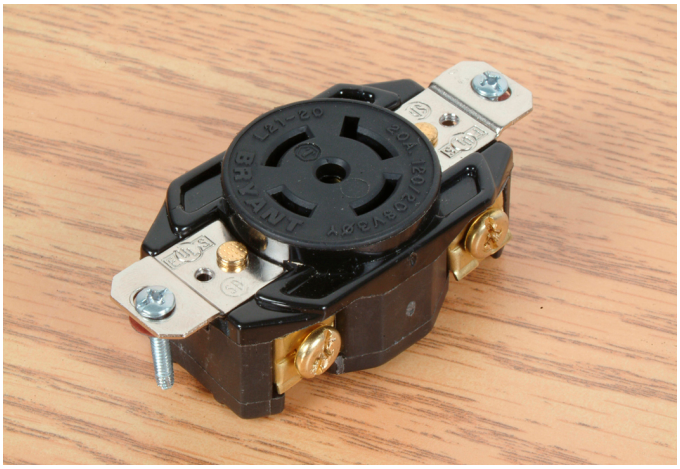

Figure 23. A three-phase receptacle.

15. Read reference 6 (see Appendix D).

16. Use a wire stripper to remove the insulation from the wires with red, black, and blue insulation from the type MC cable.

Work slowly and carefully to avoid damaging the conductors.

17. Connect the three wires of the previous step to the terminals of the three-pole, branch circuit breaker (refer to Figure 22).

18. Strip the wires with white and green insulation from the type MC cable and connect them to the MDP neutral/ground bus (refer to Figure 22).

19. Install the adaptor cover for the three-phase receptacle on the metal outlet box as shown in Figure 24.

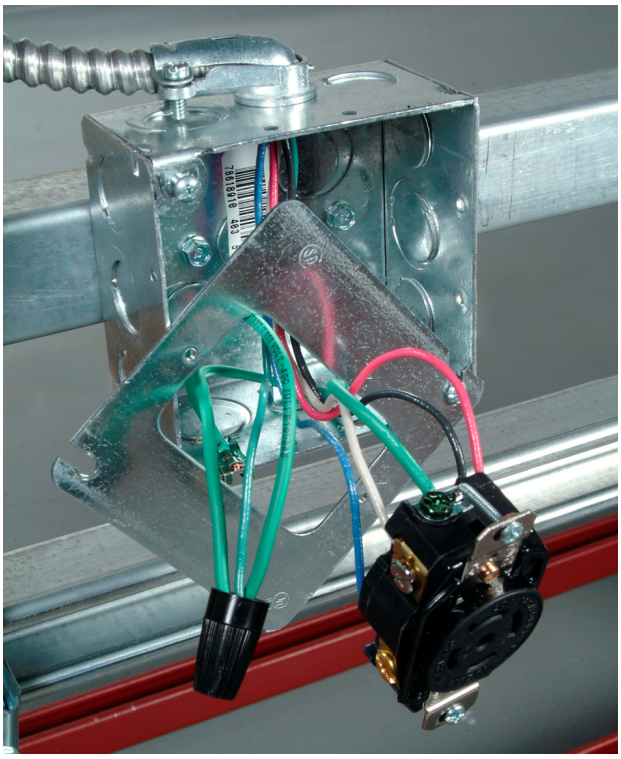

Figure 24. Connections at the three-phase receptacle.

20. Strip the wires with red, black, and blue insulation from the type MC cable and connect them to terminals X, Y, and Z (brass-colored screw terminals) of the three-phase receptacle, respectively (see Figure 24).

21. Strip the wire with white insulation from the type MC cable and connect it to terminal W (silver-colored screw terminal) of the three-phase receptacle.

22. The two following connections require a splice, made with a #35 solderless connector (wire nut) and two short lengths of No.14 AWG copper wire with green insulation, as shown in Figure 24.

    Connect the wire with green insulation (equipment grounding conductor) from the type MC cable to the ground terminal (green screw terminal) of the three-phase receptacle and the metal outlet box.

Attach the equipment grounding conductor (green insulation wire) to the metal outlet box using a grounding clip. Figure 25 shows a grounding clip used to attach a wire to a metal outlet box.

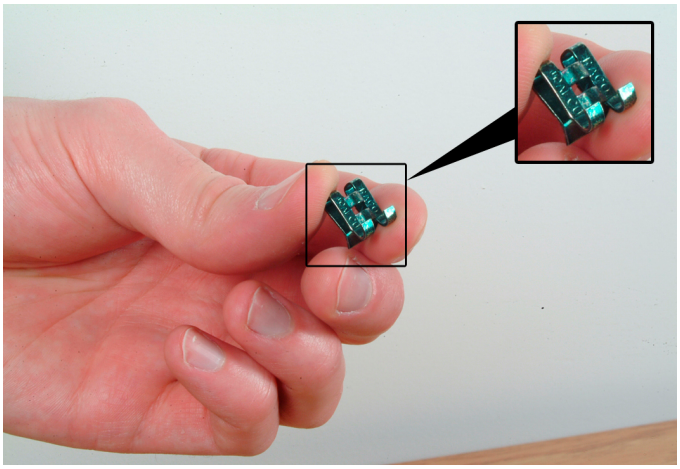

Figure 25. Grounding clip used to attach a wire to a metal outlet box.

To make the splice, strip the wires using a wire stripper and screw the wire nut over ends as shown in Figure 26.

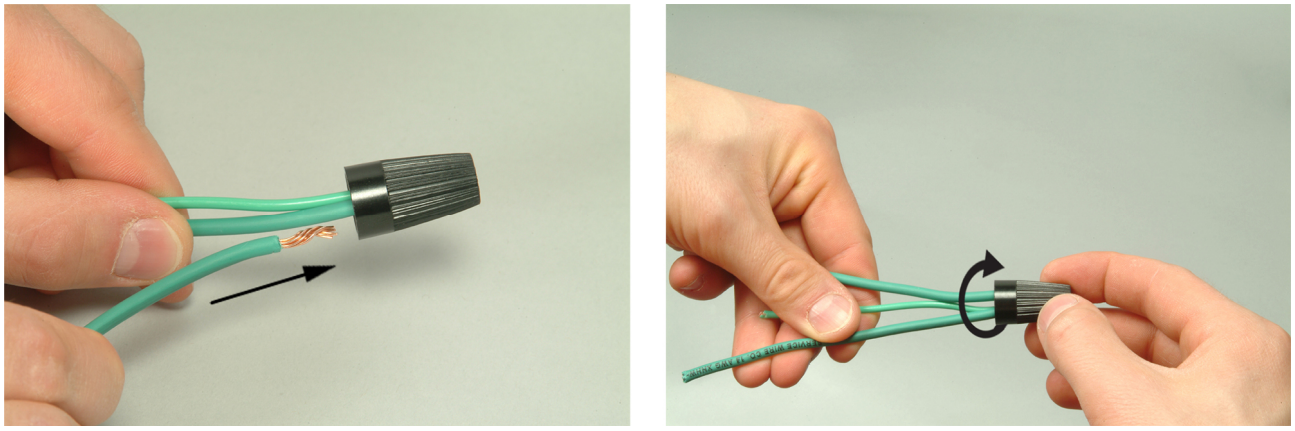

Figure 26. Making a splice.

23. Make sure the setscrews on all terminals of the three-phase receptacle and MDP are well-tightened to ensure solid connections.

Install the MDP front panel and apply the required identification labels. To do so:

24. Refer to Figure 27 and make an opening at the proper location in the MDP front panel for the three-pole, branch circuit breaker installed in the MDP.

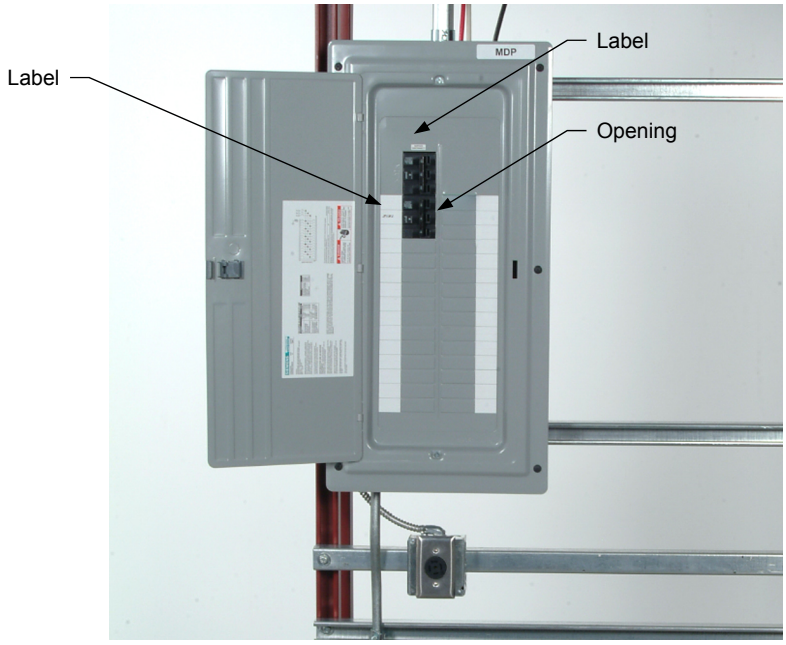

Figure 27. Make an opening on the MDP and apply the required labels.

25. Refer to Figure 27 and apply a label marked "service disconnect" on the MDP front panel, just beside the main circuit breaker.

26. Apply a label on the MDP front panel to identify the branch circuit breaker (BCB1) installed in this job sheet. This label should be located just beside the branch circuit breaker.

27. Apply a label marked "MDP" at the top of the MDP front panel.

28. Make sure the front panel is securely fastened to the MDP with the provided screws.

29. Install a faceplate on the three-phase receptacle as shown in Figure 28.

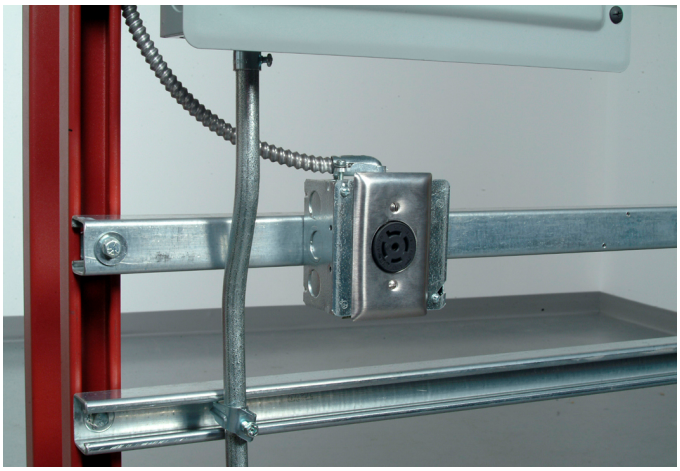

Figure 28. Three-phase receptacle with faceplate installed.

30. Ask your instructor to check and approve your work.

31. Keep your equipment set up. You will use it in the next job sheet.

Student assessment

The following points should be checked to assess the student's work:

Step 6

- ❑ The service-entrance conductors with red, black, and blue insulations (ungrounded conductors) are connected to the main circuit breaker, as indicated in the electrical power distribution interconnection diagram, Part I. See Figure 17.
- ❑ The setscrews on the main circuit breaker terminals are well-tightened to ensure solid connections of the service entrance conductors.
- ❑ The service-entrance conductor with white insulation (neutral conductor) is connected to the main neutral terminal of the MDP neutral/ground bus. See Figure 17.
- ❑ The setscrew on the main neutral terminal is well-tightened to ensure a solid connection of the neutral (grounded) conductor.

Step 7 to 11

- ❑ The grounding electrode conductor (GEC) is connected to the MDP neutral/ground bus, as shown in Figure 18. The corresponding setscrew on the MDP neutral/ground bus is well-tightened to ensure a solid connection of the GEC.

- ❑ Depending on the MDP enclosure, either a bonding screw or a main bonding jumper (MBJ) interconnects the MDP enclosure and the neutral/ground bus (see Figure 19).

  If the MDP enclosure is equipped with a bonding screw, this one has a green finish and is well-tightened to ensure a solid connection.

  If the MDP enclosure is equipped with a MBJ, the screw that secures it to the MDP enclosure has a green finish and is well-tightened to ensure a solid connection. Also, the screw that retains the MBJ to the neutral/ground bus is well-tightened to ensure a solid connection.

- ❑ Each bushing with a bonding jumper terminal (if any installed) is connected to the MDP neutral/ground bus with bare, stranded copper wire of size No. 8 AWG, as shown in Figure 20. The setscrews on the bushing terminal and MDP neutral/ground bus are well-tightened to have solid connections at both ends of the bonding jumper. This ensures effective bonding of the corresponding conduit with the MDP, and thus, a reliable current path to ground should a fault occur.

Step 12 to 14

- ❑ The three-pole circuit breaker required to protect the branch circuit supplying the three-phase receptacle shown in the electrical power distribution interconnection diagram, Part I, is installed in the MDP. This circuit breaker should be located in the top-left circuit breaker space of the MDP.
- ❑ The current rating of the three-pole, branch circuit breaker installed in the MDP is as indicated in the electrical power distribution interconnection diagram, Part I.

Step 15 to 24

- ❑ The wires with red, black, and blue insulations from the type MC cable going to the three-phase receptacle are connected to the terminals of the three-pole, branch circuit breaker installed in the previous step, as indicated in the electrical power distribution interconnection diagram, Part I (see Figure 22).
- ❑ The setscrews on the branch circuit breaker terminals are well-tightened to ensure solid connections of the conductors from the type MC cable.
- ❑ The wire with white insulation from the type MC cable going to the three-phase receptacle is connected to the MDP neutral/ground bus (see Figure 22). The corresponding setscrew on the MDP neutral/ground bus is well-tightened to ensure a solid connection of this wire.
- ❑ The wire with green insulation (equipment grounding conductor) from the type MC cable going to the three-phase receptacle is connected to the MDP neutral/ground bus (see Figure 22). The corresponding setscrew on the MDP neutral/ground bus is well-tightened to ensure a solid connection of this wire.
- ❑ The three-phase receptacle is mounted on an adaptor cover that is attached to the metal outlet box with two screws (see Figure 24).
- ❑ The wires with red, black, and blue insulations from the type MC cable are connected to terminals X, Y, and Z (brass-colored screw terminals)

of the three-phase receptacle, respectively, as indicated in the electrical power distribution interconnection diagram, Part I (see Figure 24).

- ❑ The wire with white insulation from the type MC cable is connected to terminal W (silver-colored screw terminal) of the three-phase receptacle as indicated in the electrical power distribution interconnection diagram, Part I (see Figure 24).
- ❑ The wire with green insulation (equipment grounding conductor) from the type MC cable is connected to the ground terminal (green screw terminal) of the three-phase receptacle and the metal outlet box. This requires a splice, made with a #35 solderless connector (wire nut) and two short lengths of No.14 AWG copper wire with green insulation, as shown in Figure 24.
- ❑ The setscrews on all terminals of the three-phase receptacle are well-tightened to ensure solid connections.
- ❑ The equipment grounding conductor (green insulation wire) is attached to the metal outlet box using a grounding clip (see Figure 24).

To ensure phase sequence uniformity within the installation, all ungrounded conductors with red insulation should be connected to bus bar L1, all ungrounded wires with black insulation should be connected to bus bar L2, and all ungrounded wires with blue insulation should be connected to bus bar L3. Of course, the connections of all ungrounded conductors to the bus bars are made through circuit breakers.

Step 25 to 32

- ❑ An opening is made at the proper location in the MDP front panel for the three-pole, branch circuit breaker installed in the MDP (see Figure 27).
- ❑ A label marked "service disconnect" should be applied on the MDP front panel, just beside the main circuit breaker (see Figure 27).
- ❑ A label marked as indicated in the electrical power distribution interconnection diagram, Part I, should be applied on the MDP front panel to identify the branch circuit breaker installed in this job sheet. This label should be located just beside the branch circuit breaker (see Figure 27).
- ❑ A label marked "MDP" should be applied at the top of the MDP front panel (see Figure 27).
- ❑ The front panel is securely fastened to the MDP with the provided screws.
- ❑ A faceplate is securely fastened to the three-phase receptacle (see Figure 28) with the provided screws.

Name: _____ Date: _____

Instructor's approval: _____

Sample Work Order

Extracted from

Electrical Power Distribution

Wiring of the Main Distribution Panelboard

OBJECTIVE

To connect the service-entrance conductors. To ground the main distribution panelboard (MDP). To wire a branch circuit supplying a three-phase receptacle. To apply the required identification labels on the MDP.

PROCEDURE

1. Perform the basic safety procedures listed in Appendix C of this manual.

2. Connect the service-entrance conductors as indicated in the electrical power distribution interconnection diagram, Part I.

3. Make the necessary connections and install the required bonding jumpers to ensure effective grounding of the MDP and related components (enclosure, conduits, fittings, etc.).

4. Identify the circuit breaker required to protect the branch circuit supplying the three-phase receptacle shown in the electrical power distribution interconnection diagram, Part I. Install this circuit breaker in the MDP. Figure 10 shows a three-pole circuit breaker.

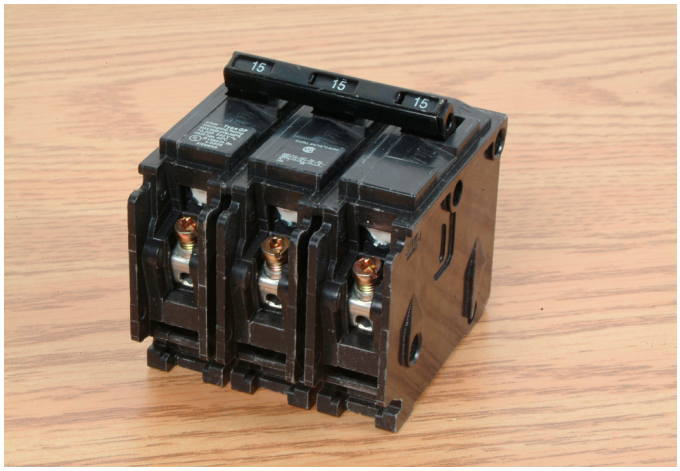

Figure 10. A three-pole circuit breaker.

5. Identify the three-phase receptacle requested in the electrical power distribution interconnection diagram, Part I. Figure 11 shows a three-phase receptacle.

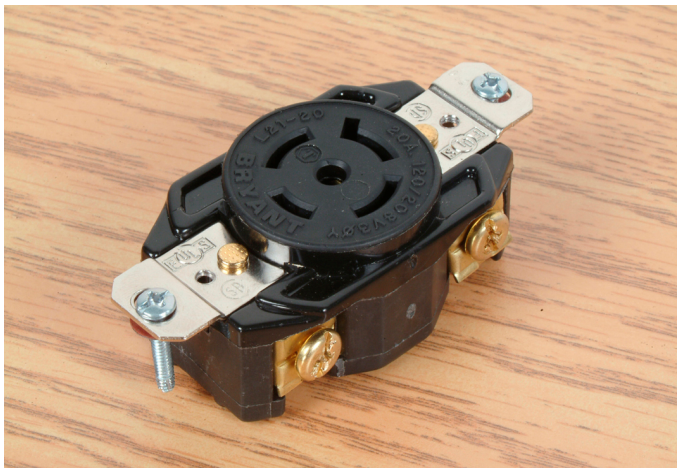

Figure 11. A three-phase receptacle.

6. Make the electrical connections required to wire the branch circuit supplying power to the three-phase receptacle. Figure 12 shows a grounding clip used to attach a wire to a metal outlet box.

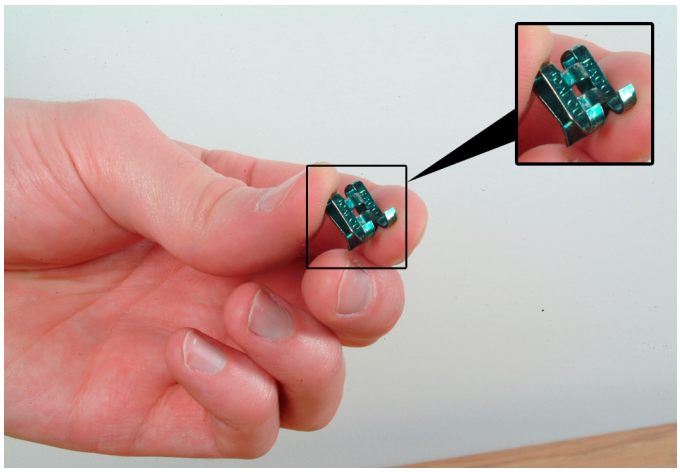

Figure 12. Grounding clip used to attach a wire to a metal outlet box.

7. Install the MDP front panel and apply the required identification labels.

8. Install a faceplate on the three-phase receptacle.

9. Ask your instructor to check and approve your work.

10. Keep your equipment setup. You will use it in the next work order.

Student assessment

The following points should be checked to assess the student's work:

Step 2

- ❑ The service-entrance conductors with red, black, and blue insulations (ungrounded conductors) are connected to the main circuit breaker, as indicated in the electrical power distribution interconnection diagram, Part I. See Figure A below.

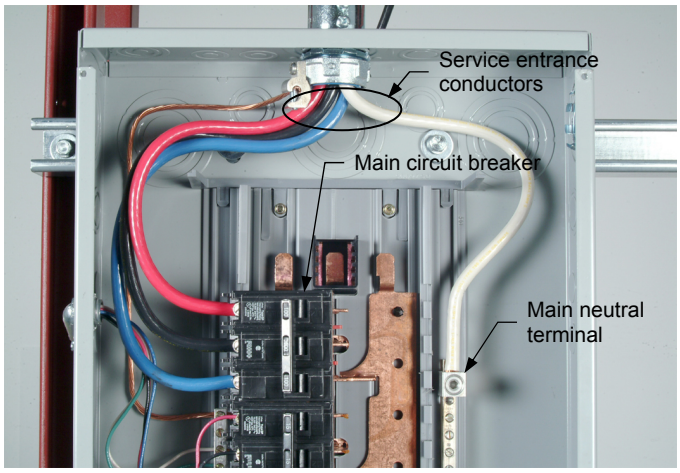

Figure A. Connections of the service entrance conductors in the MDP.

- ❑ The setscrews on the main circuit breaker terminals are well-tightened to ensure solid connections of the service entrance conductors.
- ❑ The service-entrance conductor with white insulation (neutral conductor) is connected to the main neutral terminal of the MDP neutral/ground bus. See Figure A above.
- ❑ The setscrew on the main neutral terminal is well-tightened to ensure a solid connection of the neutral (grounded) conductor.

Step 3

❑ The grounding electrode conductor (GEC) is connected to the MDP neutral/ground bus, as shown in Figure B below. The corresponding setscrew on the MDP neutral/ground bus is well-tightened to ensure a solid connection of the GEC.

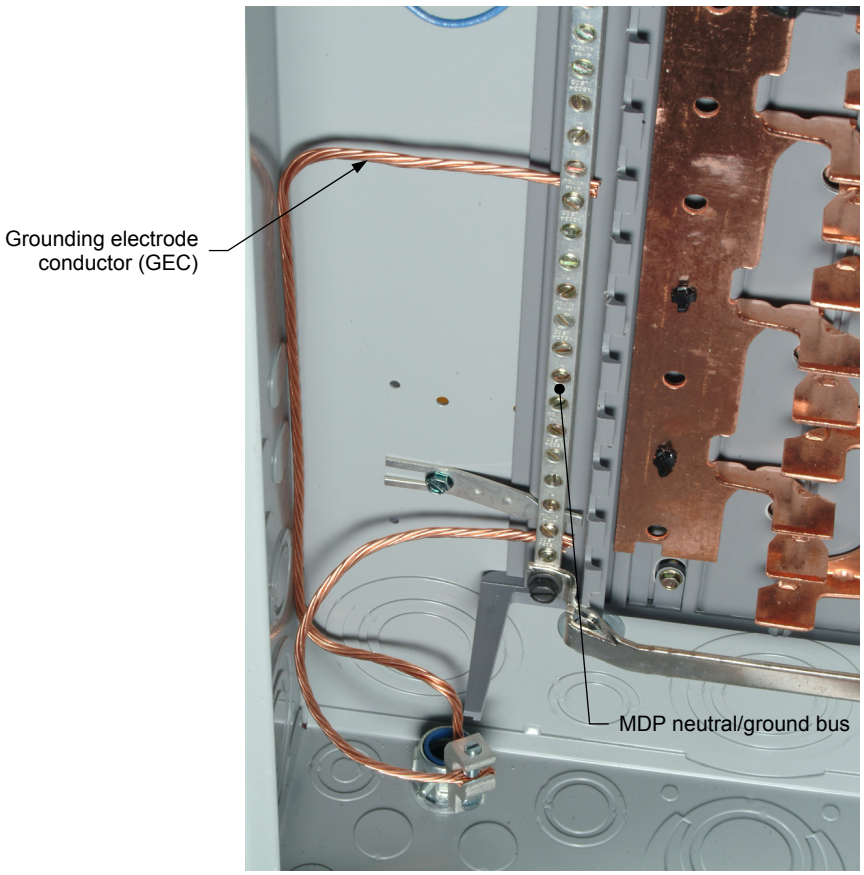

Figure B. Grounding electrode conductor (GEC) connected to the MDP neutral/ground bus.

- Depending on the MDP enclosure, either a bonding screw or a main bonding jumper (MBJ) interconnects the MDP enclosure and the neutral/ground bus (see Figure C below).

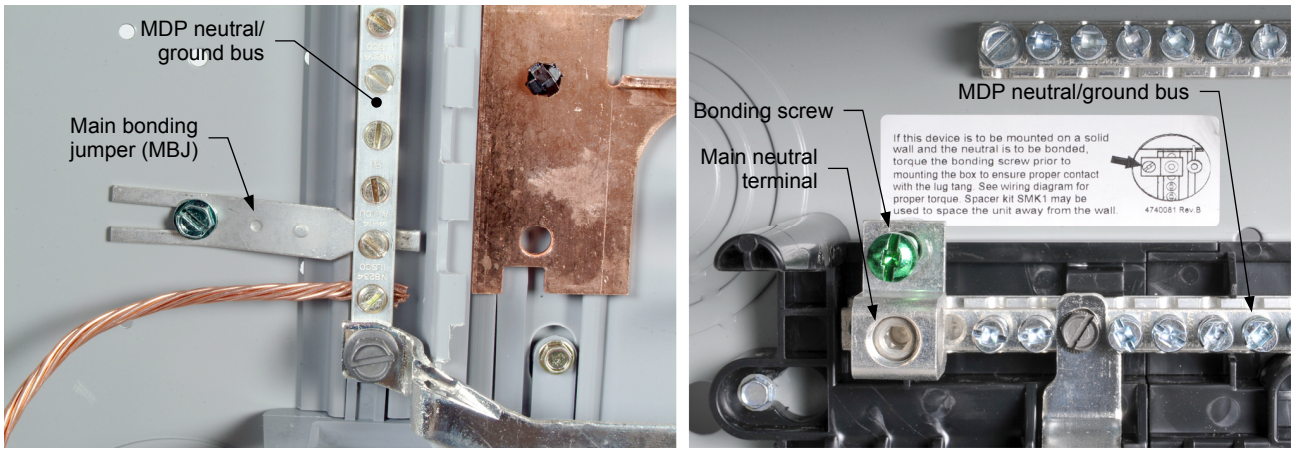

Figure C. MDP enclosures equipped with either a bonding screw or a main bonding jumper (MBJ).

If the MDP enclosure is equipped with a bonding screw, this one has a green finish and is well-tightened to ensure a solid connection.

If the MDP enclosure is equipped with a MBJ, the screw that secures it to the MDP enclosure has a green finish and is well-tightened to ensure a solid connection. Also, the screw that retains the MBJ to the neutral/ground bus is well-tightened to ensure a solid connection.

- Each bushing with a bonding jumper terminal (if any installed) is connected to the MDP neutral/ground bus with bare, stranded copper wire of size No. 8 AWG, as shown in Figure D below. The setscrews on the bushing terminal and MDP neutral/ground bus are well-tightened to have solid connections at both ends of the bonding jumper. This ensures effective bonding of the corresponding conduit with the MDP, and thus, a reliable current path to ground should a fault occur.

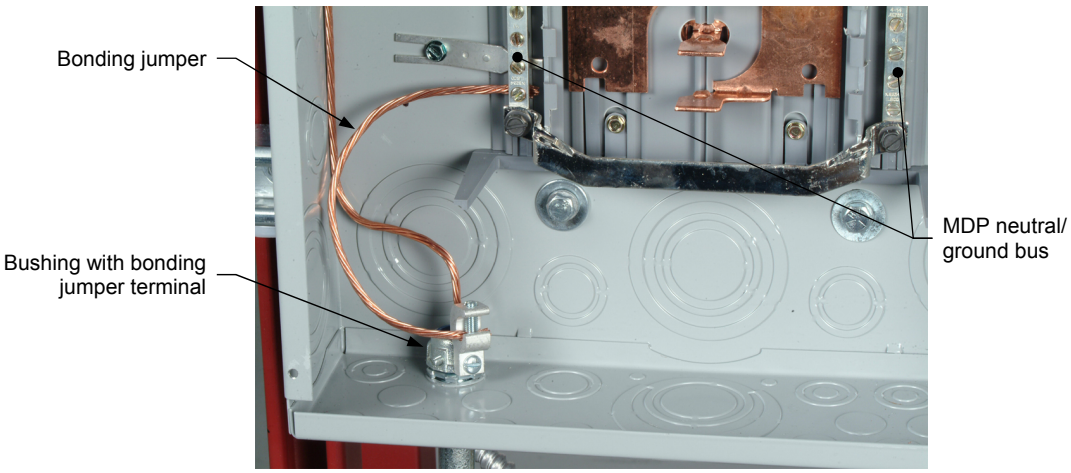

Figure D. Bushing with a bonding jumper terminal connected to the MDP neutral/ground bus.

Step 4

- ❑ The three-pole circuit breaker required to protect the branch circuit supplying the three-phase receptacle shown in the electrical power distribution interconnection diagram, Part I, is installed in the MDP. This circuit breaker should be located in the top-left circuit breaker space of the MDP.
- ❑ The current rating of the three-pole, branch circuit breaker installed in the MDP is as indicated in the electrical power distribution interconnection diagram, Part I.

Step 6

- ❑ The wires with red, black, and blue insulations from the type MC cable going to the three-phase receptacle are connected to the terminals of the three-pole, branch circuit breaker installed in the previous step, as indicated in the electrical power distribution interconnection diagram, Part I (see Figure E below).

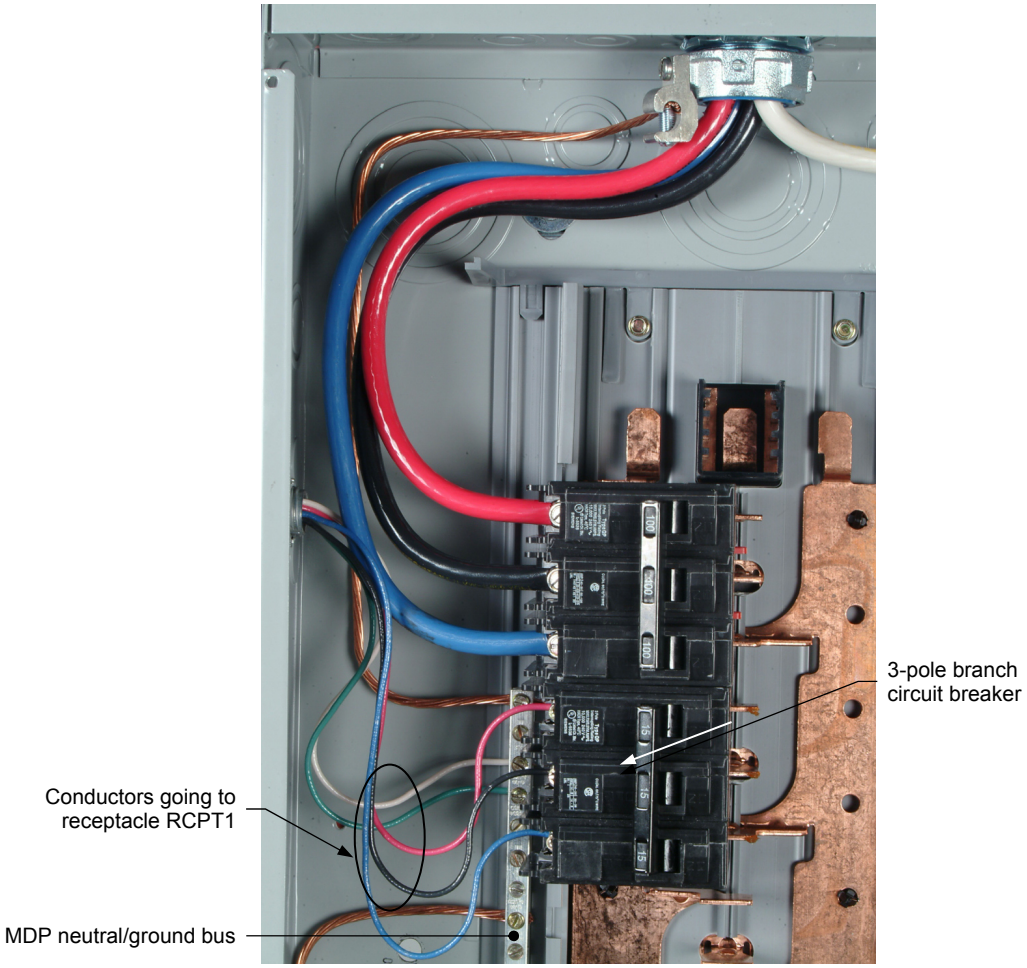

Figure E. Connections in the MDP of the wires from the type MC cable going to the three-phase receptacle.

- ❑ The setscrews on the branch circuit breaker terminals are well-tightened to ensure solid connections of the conductors from the type MC cable.

- ❑ The wire with white insulation from the type MC cable going to the three-phase receptacle is connected to the MDP neutral/ground bus (see Figure E above). The corresponding setscrew on the MDP neutral/ground bus is well-tightened to ensure a solid connection of this wire.
- ❑ The wire with green insulation (equipment grounding conductor) from the type MC cable going to the three-phase receptacle is connected to the MDP neutral/ground bus (see Figure E above). The corresponding setscrew on the MDP neutral/ground bus is well-tightened to ensure a solid connection of this wire.
- ❑ The three-phase receptacle is mounted on an adaptor cover that is attached to the metal outlet box with two screws (see Figure F below).
- ❑ The wires with red, black, and blue insulations from the type MC cable are connected to terminals X, Y, and Z (brass-colored screw terminals) of the three-phase receptacle, respectively, as indicated in the electrical power distribution interconnection diagram, Part I (see Figure F below).

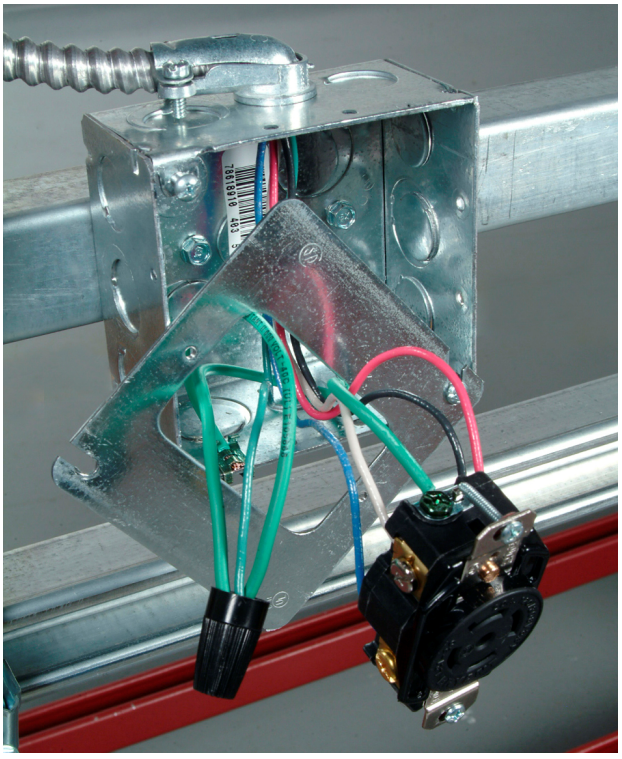

Figure F. Connections at the three-phase receptacle.

- ❑ The wire with white insulation from the type MC cable is connected to terminal W (silver-colored screw terminal) of the three-phase receptacle as indicated in the electrical power distribution interconnection diagram, Part I (see Figure F above).
- ❑ The wire with green insulation (equipment grounding conductor) from the type MC cable is connected to the ground terminal (green screw terminal) of the three-phase receptacle and the metal outlet box. This requires a splice, made with a #35 solderless connector (wire nut) and

two short lengths of No.14 AWG copper wire with green insulation, as shown in Figure F above.

- ❑ The setscrews on all terminals of the three-phase receptacle are well-tightened to ensure solid connections.
- ❑ The equipment grounding conductor (green insulation wire) is attached to the metal outlet box using a grounding clip (see Figure F above).

Notes to the instructor

- To ensure phase sequence uniformity within the installation, all ungrounded conductors with red insulation should be connected to bus bar L1, all ungrounded wires with black insulation should be connected to bus bar L2, and all ungrounded wires with blue insulation should be connected to bus bar L3. Of course, the connections of all ungrounded conductors to the bus bars are made through circuit breakers.

Step 7

- ❑ An opening is made at the proper location in the MDP front panel for the three-pole, branch circuit breaker installed in the MDP (see Figure G).

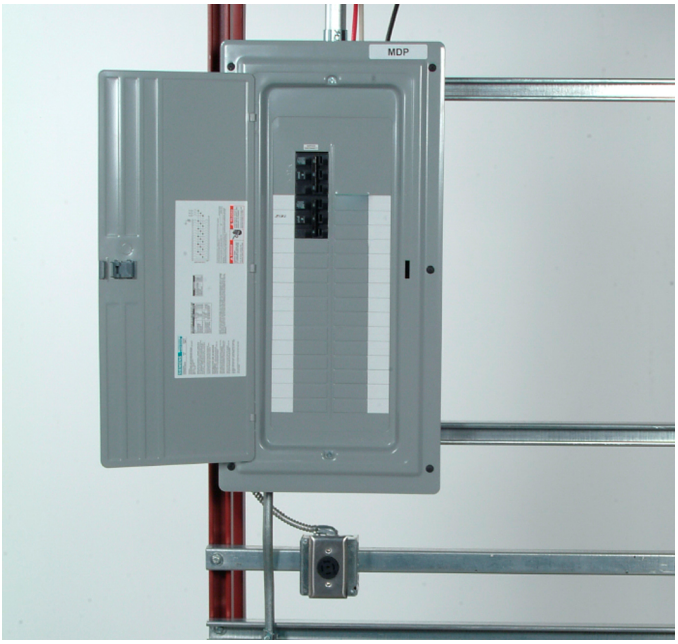

Figure G. MDP with the front panel installed and labels applied.

- ❑ A label marked "service disconnect" should be applied on the MDP front panel, just beside the main circuit breaker (see Figure G above).
- ❑ A label marked as indicated in the electrical power distribution interconnection diagram, Part I, should be applied on the MDP front panel to identify the branch circuit breaker installed in this work order. This label should be located just beside the branch circuit breaker (see Figure G above).

- ❑ A label marked "MDP" should be applied at the top of the MDP front panel (see Figure G above).
- ❑ The front panel is securely fastened to the MDP with the provided screws.

Step 8

- ❑ A faceplate is securely fastened to the three-phase receptacle (see Figure H below) with the provided screws.

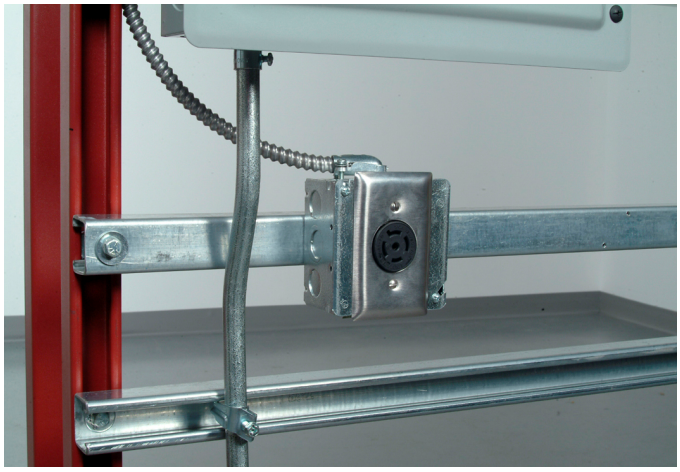

Figure H. Three-phase receptacle with faceplate installed.

Name: _____ Date: _____

Instructor's approval: _____