

**B-01: Install Buss Duct****SAFETY FIRST**

- Follow all Caterpillar facility safety standards when performing this task.
- Lockout/tagout the substation breaker.
- An electrical hazard exists when working on the buss duct. Verify that the ground straps are installed to dissipate any remaining electrical capacitance.
- Be aware of an overhead hazard and wear a safety harness when using a crane and/or manlift.
- Buss duct weighs between 250 to 500 pounds, use caution when removing.

**EQUIPMENT**

- manlift
- crane
- megger
- torque wrench
- Electrician's hand tools

**RESOURCES**

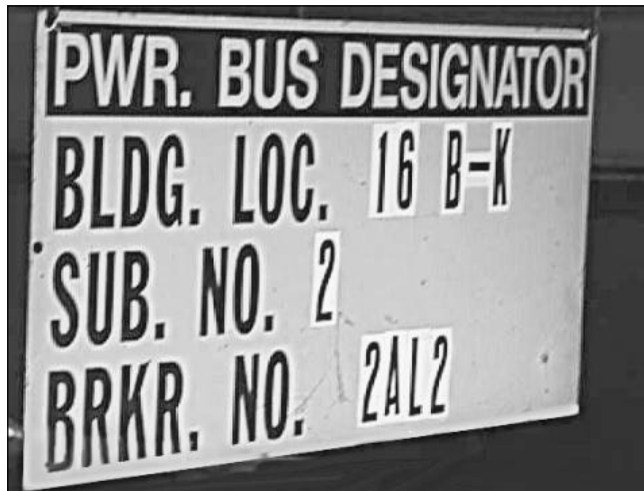
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## Install Buss Duct

Note: These steps are performed on a double buss duct system. Often the system will have only one tier of duct.

1. Plan for the buss duct removal and replacement.
  - Determine the substation breaker number for the duct section.



### Example Buss Duct Substation Breaker Location

- Verify that there is a new section of duct on hand to replace the damaged section.
- Acquire the required duct from inventory or from a vendor, as needed.

Note: The location of the duct you are replacing affects how this task is performed. A section of duct at the end of the buss duct requires loosening the components (i.e., buss plugs, conduit, and supports) in that section. A section of duct in the middle of a long line of duct needs to have all components loosened, allowing at least 5 inches of movement, to disconnect each end of the buss duct section.

2. Rack out the substation breaker.
  - Rack out and lockout/tagout the substation breaker shown in the power bus designator.
  - Follow the rack in/rack out procedure for substation breakers.



3. Verify power outage at the machine disconnect.
  - Make sure the disconnect is in the OFF position.
4. Attach ground straps to the top of the machine disconnect.
  - Ground straps discharge any buss duct capacitance.
  - Attach ground straps to the machine disconnects at each end of the buss duct, if the damaged section is located in the middle of the duct.
5. Prepare the area for buss duct removal.
  - Cover any sensitive equipment with plastic to protect from dust and debris.
  - Mark the area with red cones when operating manlifts and cranes.
6. Determine component requirements for buss duct removal.
  - Prepare to disconnect any buss plugs from the section of duct, and loosen any conduit to allow enough movement to swing the duct out at least five inches.
  - Carry materials (i.e., rope, chain), in the manlift, to support each loosened section of conduit as needed.

Note: Remove any buss plugs and/or sections of conduit no longer in use. When removing buss plugs make sure to reinstall cover plates.

7. Loosen, support, or remove the buss duct components.



Disconnect and Support Buss Plugs and Conduit

- Use an assistant during this task to assist in removing and replacing the buss duct.
- Use the manlift to access the various components on the bus duct.
- Tie off loosened conduit, with rope or chain, to a secured section.

8. Remove the buss duct section splice cover plates.

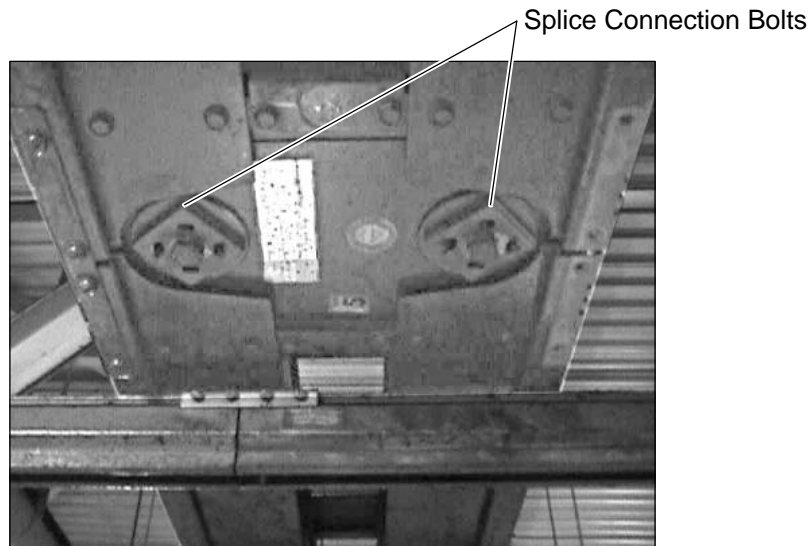


9. Support the buss duct section.

**Warning:** Double buss sections weigh over 500 pounds. A single section of buss duct weighs about 250 pounds. Use caution when removing them.

- Tie a strap in the center of the buss duct section, and attach the strap to the crane.

10. Loosen the buss duct splice connection.
  - Verify that all splice panels are removed. Place all bolts, nuts, and connectors in the bucket of the manlift to retain the hardware.
  - Loosen the splice bolts.



- Loosen the splice bolts at the other end of the section, if the duct is a middle section.
11. "Break" the damaged section of duct away at the splice connection.
    - Pull firmly to separate the duct at the splice, using an assistant to move the duct.

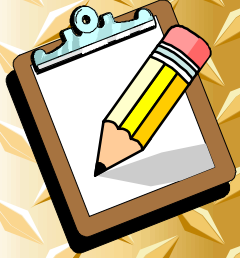


"Breaking" the Buss Bar Splice





- Pull firmly at the other end (if the section is in the middle) to remove the duct from the other splice connection.
- Remove any remaining duct supports to allow the section to be lowered.
12. Lower the damaged buss duct section.
  - Signal the Crane Operator to lower the section of bus duct, or lower the manlift to move the duct to the floor.
13. Prepare to replace the damaged section with the new section.
  - Verify that the sections are of equal length. Most sections are 10 foot lengths.
  - Attach the appropriate support to the new buss duct section, for lifting with a crane or manlift.
14. Splice the new buss duct section to the existing buss duct.
  - Ask your assistant to push one end of the existing section of buss duct away from the splice location.
  - Position the new section so that it will mesh with the existing section.
  - Splice the new section with one end of the existing section.
  - Verify that the buss bars and insulators evenly match and mesh.
  - Tighten the splice bolts to hold the splice together.
  - Repeat step 14 at the other end, if the replacement duct is a middle section.
15. Connect the duct supports to the new section of duct.
16. Replace the splice cover plates.
17. Tighten the splice connections according to the manufacturer's torque specifications.
18. Attach the buss plugs and conduit to the new section.
19. Tighten the previously loosened buss duct components.
  - Torque the splice bolts to the manufacturer's specifications.



20. Remove the ground straps.
21. Rack in the substation breaker.
  - Warn all affected personnel that you are restoring power.
  - Verify that all associated machines are turned off at the machine disconnect.
  - Remove lockout/tagout from the substation breaker.
  - Rack in the breaker.
22. Turn on the machine power and verify that the associated machines are functioning within normal working conditions.