

## I-05: Repair/Replace Starter

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Never reset an overload while standing directly in front of it. There is the potential for dangerous projectile (explosion) upon resetting overloads.

### EQUIPMENT

- basic Electrician hand tools
- amp meter
- digital voltmeter (DVM)
- Allen wrench
- nut driver/socket set
- wire markers

### RESOURCES

- motor nameplate amperage data
- manufacturer's specifications
- electrical print



## Repair/Replace Starter

**Note:** These steps describe the procedure for an Allen-Bradley motor control. The steps for other brands may differ.



### Replace Starter

1. **Lockout/tagout the motor control cabinet power.**
2. **Remove the line voltage fuses.**



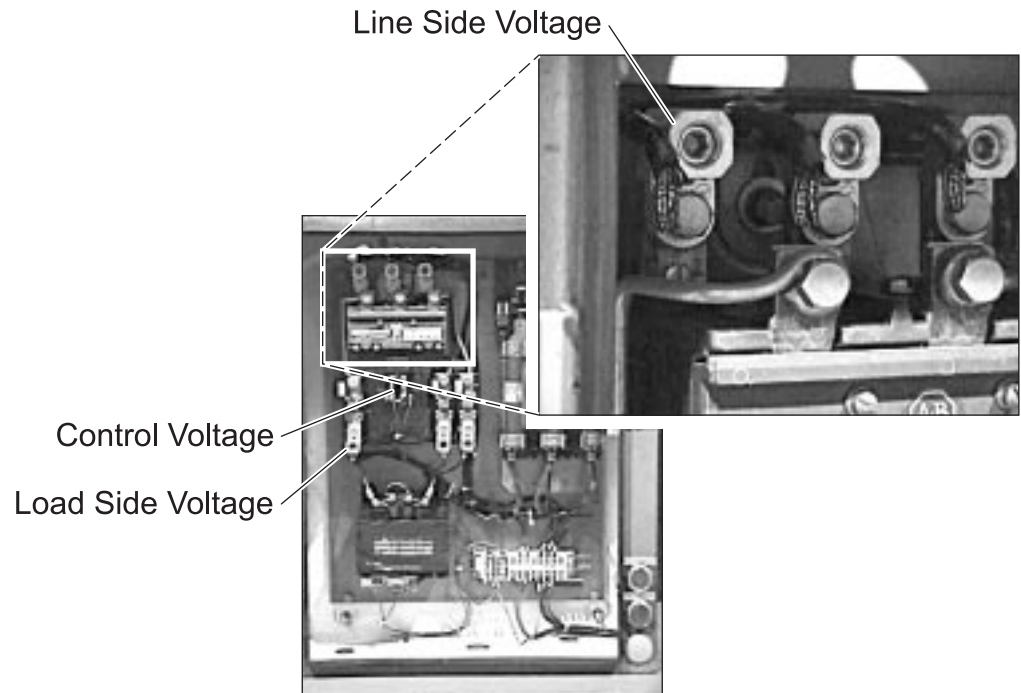
Remove the Fuses

### Line Voltage Fuse Location

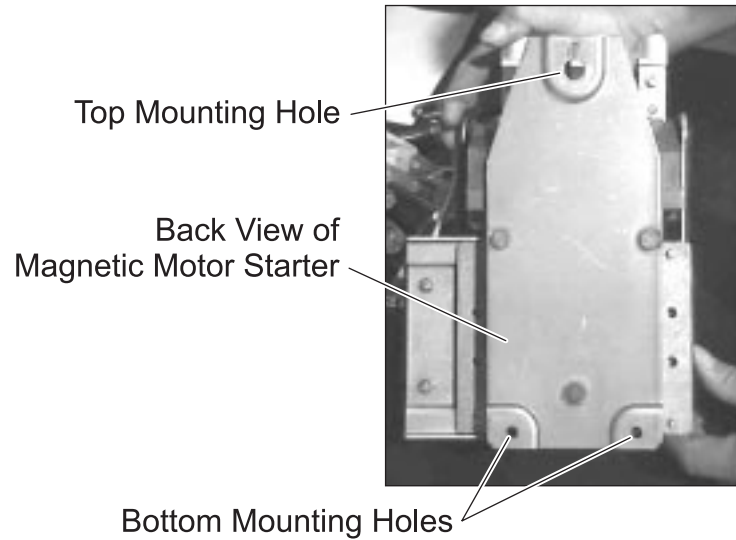
- Set the fuses to the side.
  - Removing the fuses guarantees all potential sources of voltage are removed.
3. **Verify that the wiring is clearly marked.**
    - Mark any wires not clearly marked in accordance with the electrical print.

**4. Remove all wiring.**

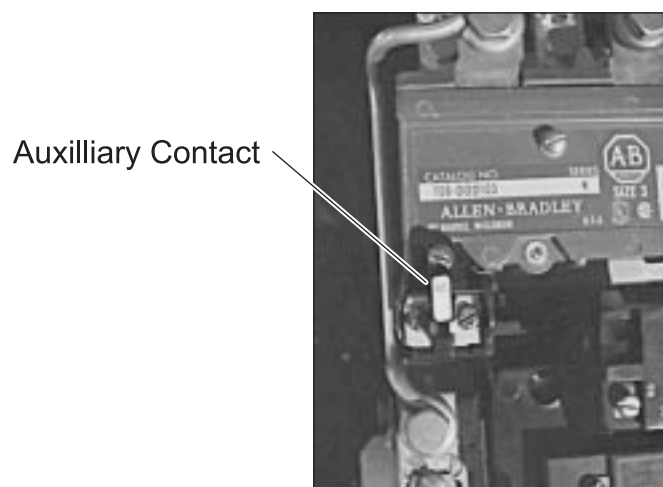
- Remove the line and load side leads, using a hex-head ball driver.



- Remove the control voltage lines with the blade screwdriver.

**5. Remove the starter.****Starter Mounting Plate**

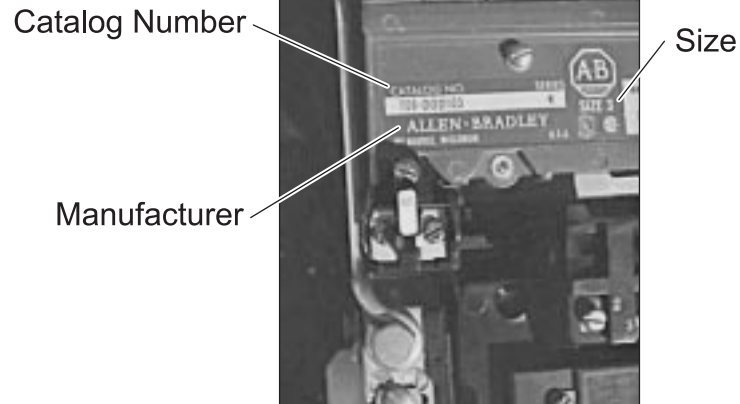
- Loosen the top mounting bolt.
- Remove the two bottom mounting bolts.
- Lift up on the starter and slide it off the top mounting bolt.

**6. Remove the auxiliary contacts.**

- Remove the contact mounting screws.

**7. Replace the starter with an identical starter from the crib.**

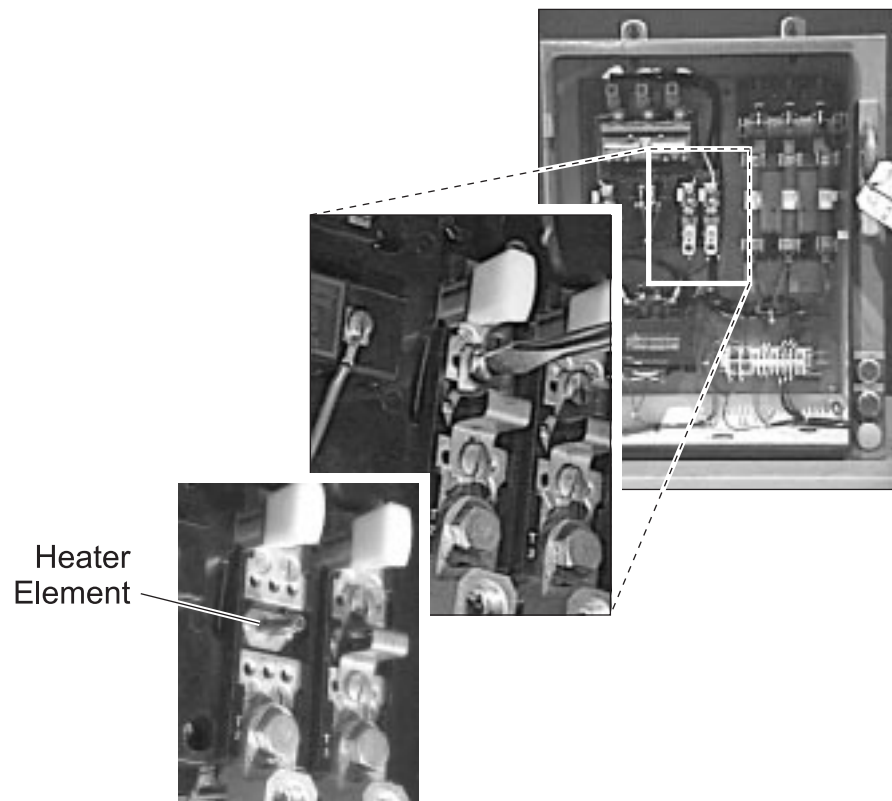
- Note the manufacturer, catalog number, and size of the starter.

**Starter Nameplate Data**

- Order the starter, if one is not available.
- 8. Install the auxiliary contacts onto the new starter.**
- 9. Install the new starter.**
- Place the starter on the top mounting bolt.
  - Install the bottom mounting bolts.
  - Secure the bolts.

**10. Replace the heating elements with identical elements.**

- Remove the existing elements from the old starter.

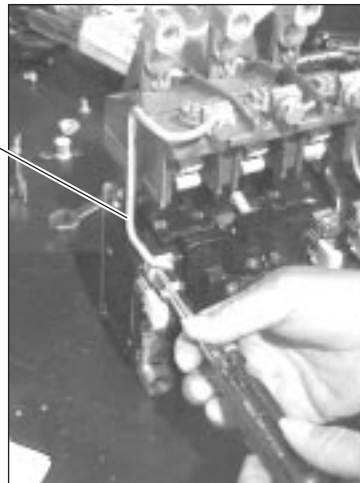
**Example of Heater Element Removal**

- Note the type and size of the elements. If unable to determine this information from the existing elements, use the motor nameplate FLA and the manufacturer's manual to determine the correct replacement elements.
  - Install the new elements onto the new starter.
- 11. Replace the fuses.**
- 12. Restore power.**
- 13. Test the starter.**
- Verify that the motor starts and operates according to manufacturer's specifications.

## Replace the Contacts

1. **Lockout/tagout the motor control cabinet power.**
2. **Obtain the contact replacements for the specific starter from the crib.**
3. **Remove the starter, if necessary.**
  - Contact replacement may be done with the starter installed in the cabinet.
4. **Remove the overload jumpers.**

Overload Jumper



5. **Remove the line lead lugs.**

**6. Remove the contact cover and auxiliary contacts.**

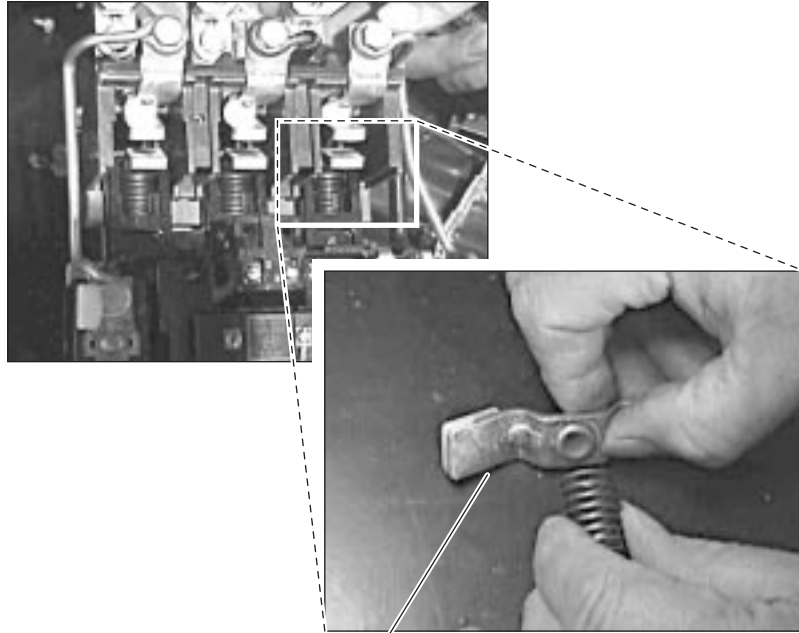
Contact Cover

**7. Remove the stationary contact assembly.**

- Remove the two screws holding the stationary contact assembly and remove the assembly.

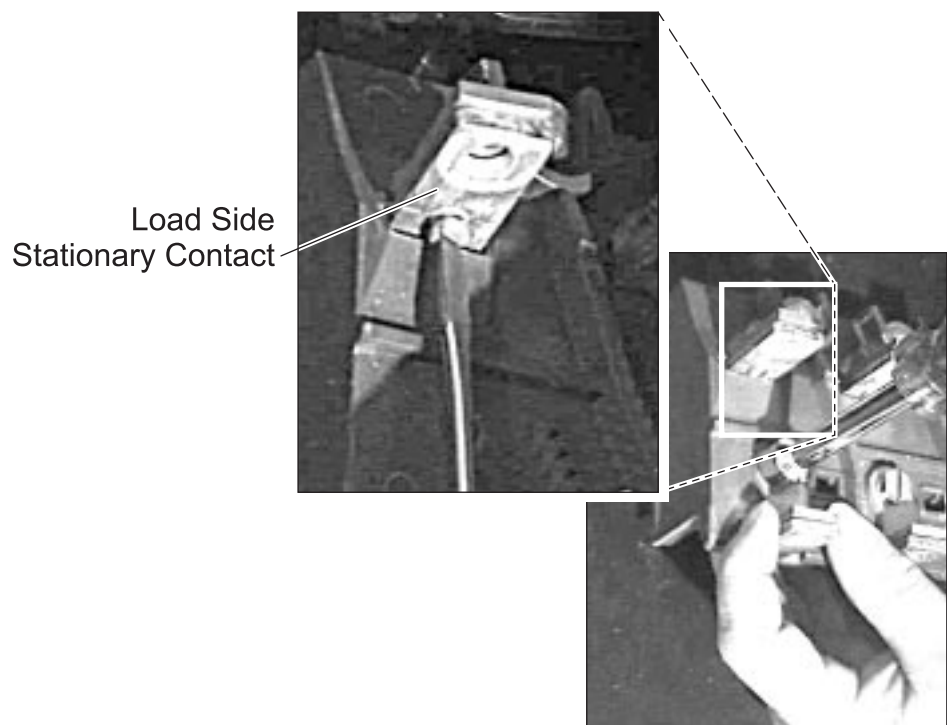
Contact  
Assembly  
ScrewsContact  
Assembly




**8. Replace the movable contact.**

Movable Contact

- Push down on the contact and contact spring.
- Slide the contact out away from the base assembly.
- Replace the contact, ensuring that the spring seats correctly to the base assembly and the contact.

**9. Replace the load-side stationary contacts.**Load Side  
Stationary Contact

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10. **Replace the line-side stationary contacts.**
  11. **Install the stationary contact assembly.**
  12. **Test the contacts.**
    - Manually manipulate the armature to open and close the contacts.
    - The contacts must open and close without catching, adjust them as required.
  13. **Replace the contact cover.**
  14. **Replace the overload jumpers.**
  15. **Replace the line lead lugs.**

## Replace the Coil

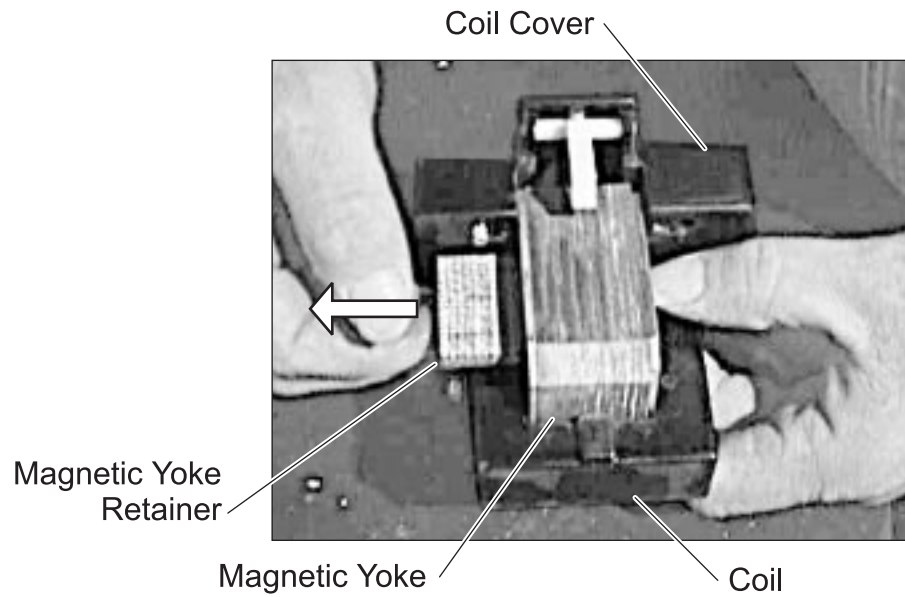
1. **Lockout/tagout the motor control cabinet power.**
2. **Remove the coil and auxiliary contact wiring.**
  - Verify the wires are clearly marked, marking them as required.
3. **Unscrew the four screws to remove the armature assembly from the starter.**



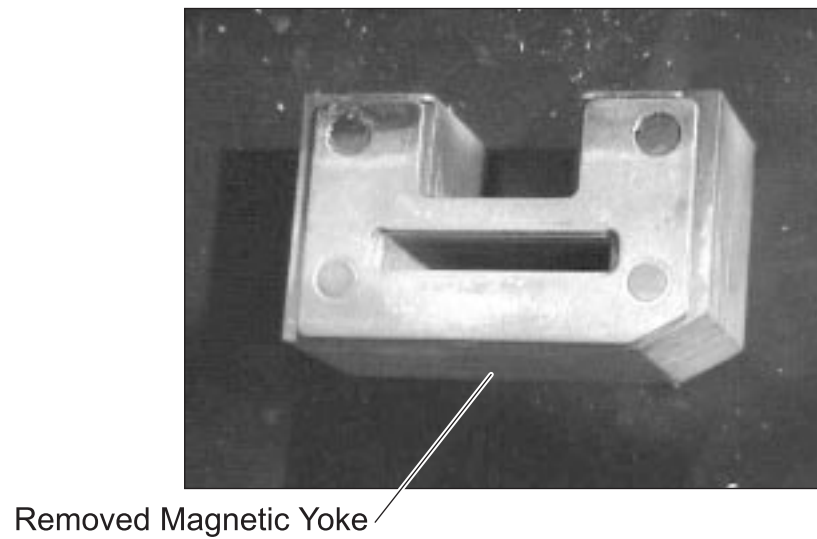
Armature Assembly



4. Remove the magnet yoke retainer from the magnetic yoke.

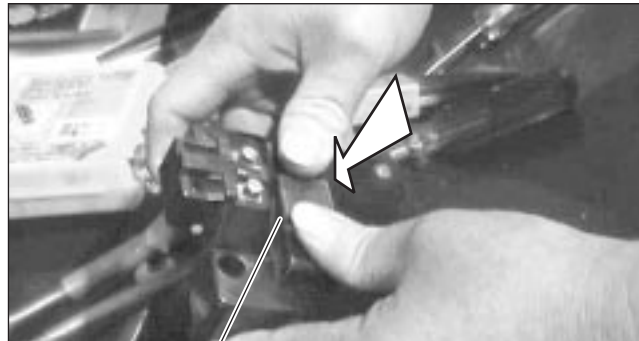


5. Remove the magnetic yoke from the operating coil.

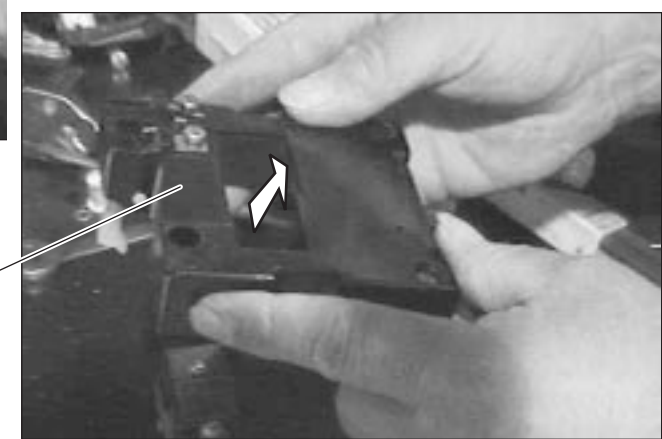


**6. Remove the coil from the coil cover.**

- Press the coil evenly out of the coil cover.



Coil



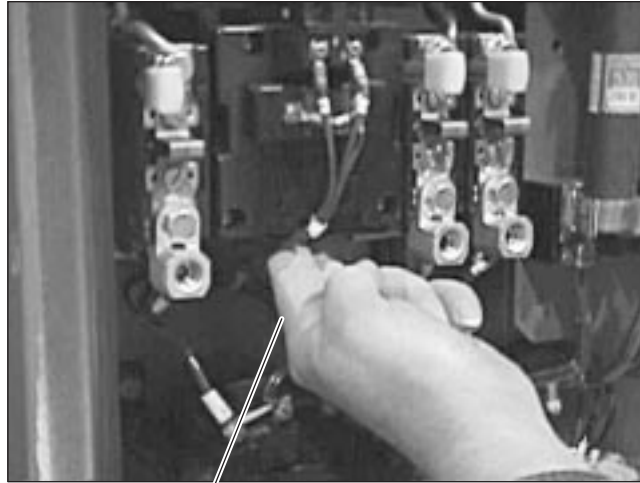
Coil Cover

**Coil Removal**

- 7. Replace the coil with the same type and size as the one removed.**
- 8. Reassemble the armature assembly.**
- 9. Attach the armature assembly to the starter.**

**10. Test the coil.**

- Manually manipulate the armature to open and close the contacts verifying the assembly mechanical operation.

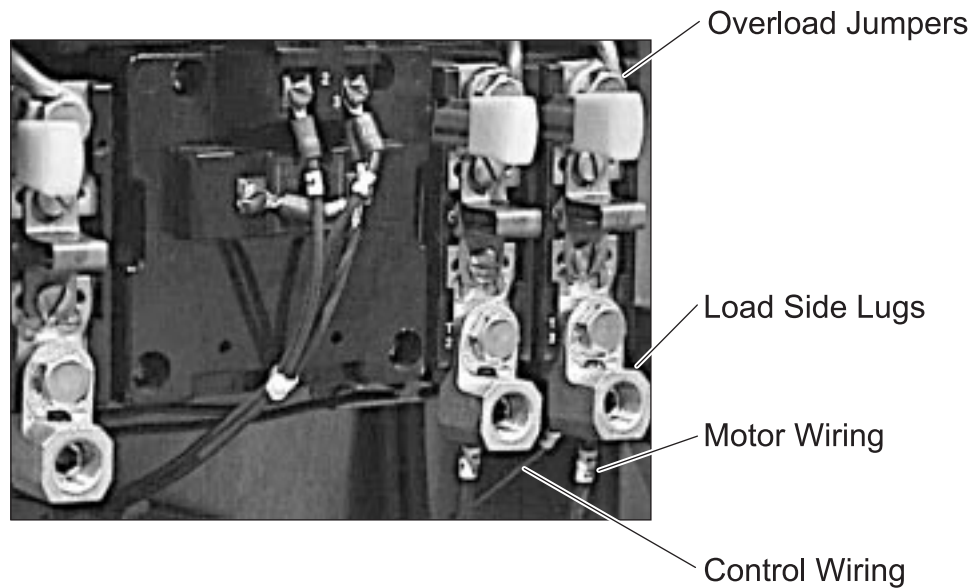


Manually Test the  
Armature Assembly

**11. Connect the coil and auxiliary contact wiring.**

## Replace an Overload

1. **Lockout/tagout the control panel power.**
2. **Remove the line voltage fuses.**
3. **Remove the overload wiring.**
  - Remove the load side lugs to allow access to the control wiring terminals.
  - Remove the control wiring.
  - Remove the overload jumpers.



**4. Loosen the overload mounting screws.**



Mounting Screw  
For T2

**Example of an Overload Mounting Screw**

**5. Remove the damaged overload.**



Damaged Overload


**Removed Overload**

**6. Remove the heater element.**

**7. Obtain a replacement overload.**

**8. Install the heater element onto the replacement overload.**



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9. **Install the overload.**
  10. **Attach the wiring.**
    - Reattach the load side lugs.
    - Reattach the control wiring.
    - Reattach the overload jumpers.
  11. **Replace the line voltage fuses.**
  12. **Restore power.**
  13. **Test the overloads.**