

## H-01: Reset Motor Overloads and Replace Fuses

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Locking out the supply power may be necessary before investigating overload breaker problems or possible line or ground shorts in the motor starter or motor.
- Use appropriate insulating gloves when working with high voltage equipment.

### EQUIPMENT

- DVM or other meter capable of reading resistance
- megohmmeter
- arc chute/fuse puller

### RESOURCES

- motor and motor starter specifications



## Reset Motor Overloads and Replace Fuses

1. Inspect the reported non-operating motor.
  - Verify that the operating control is set to AUTO and the manual disconnect handle is ON (up), at the motor starter. See the figure below.



Manual  
Disconnect  
Handle is "ON"

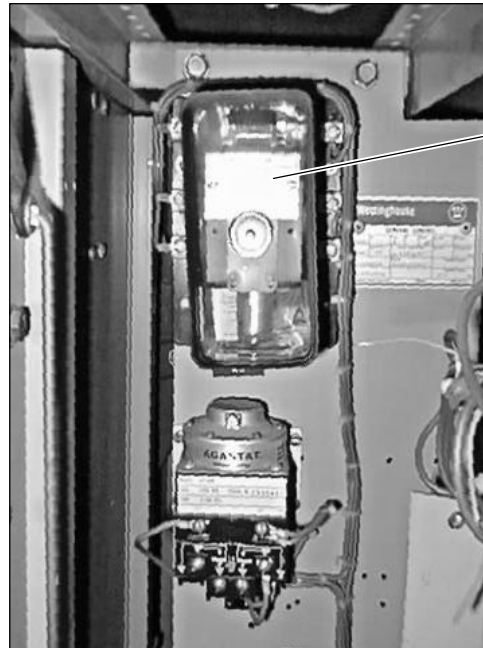


Operator Control  
Set to "AUTO"

## Motor Starter and Controls

- Verify that current to the motor is zero in all three phases.
  - Check the electrical prints to verify what circuit feeds the motor.
  - Check the main system disconnect to verify normal supply voltage on all three phases.
2. De-energize the motor starter panel, if conditions are as indicated in step 1.
    - Set the manual disconnect handle OFF (down).
    - Rotate the manual disconnect handle 90 degrees counterclockwise.
    - Loosen the hand screw above the ammeter and open the right panel.

3. Check to see if the red indicator flag is set in the overload relay. See the figure below.

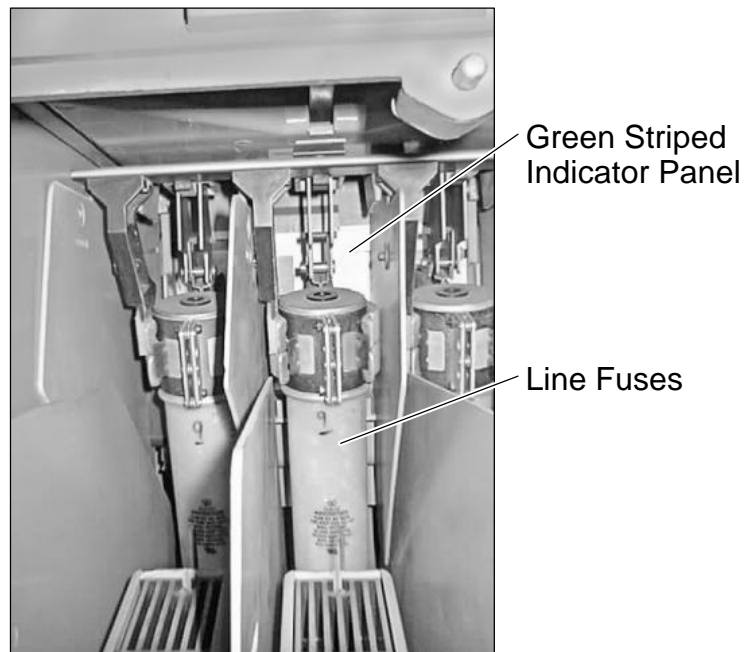


Red Indicator Flag

#### Overload Relay

4. Check the motor windings for shorts to ground, if the overload relay is tripped.
5. Inspect the motor for overheating, burned insulation, burned windings, and arcing.
6. Look for mechanical conditions that could increase motor current, if the motor and driven equipment appear normal.
  - Check for defective bearings in the motor or in the driven equipment.
  - Check for binding, misalignment, or excessive wear in the driven equipment.
  - Check for lack of lubrication in the motor bearings or in the driven equipment.
  - Check for overloaded driven equipment.
  - Consult with a Maintenance Mechanic if necessary.
7. Correct any conditions that could have caused the overload to trip.

8. Push in the button on the overload relay to reset the overload.
9. Open the left panel.
10. Verify that the bus shutters are closed (green stripes behind the line fuses).
11. Check the three line fuses, if the overload was not tripped. See the figure below.



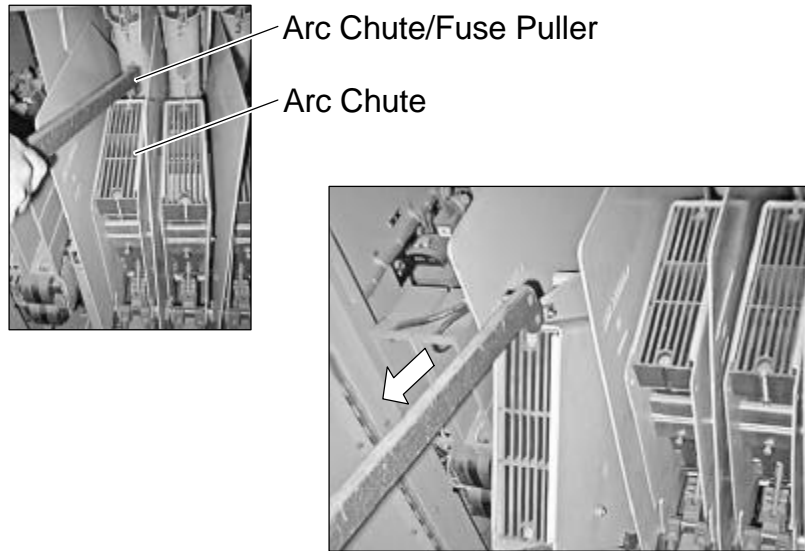
Line Fuses

**Note:** If the indicator on the end of any of the three line fuses is popped out, that fuse is blown.

- Troubleshoot the motor circuits electrically to identify the ground fault, line fault, or other problem that caused the fuse to blow.

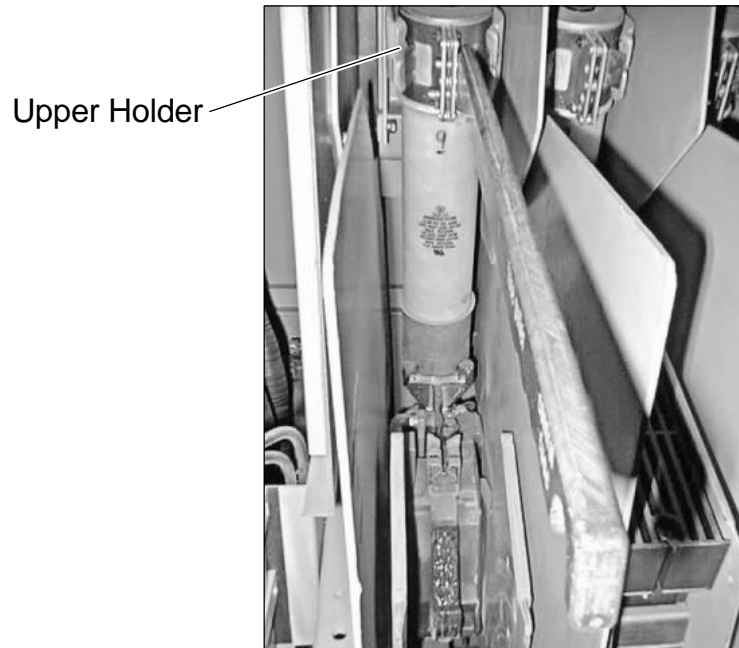
12. Remove the blown fuse.

- Rotate the arc chute in front of the blown fuse out of the way, using the arc chute/fuse puller. See the figure below.



#### Rotating the Arc Chute

- Pull the line fuse out of the upper holder. See the figure below.



#### Pulling a Line Fuse



13. Troubleshoot the fuse and the fuse holder assembly.
14. Identify the problem that caused the fuse to blow and correct it.
15. Replace the fuse.
  - Ensure the specifications of the replacement fuse is identical to those of the blown fuse.
  - Check equipment specifications if there is any indication that the blown fuse may have been an incorrect type.
  - Ensure the fuse lower end is seated in the fuse holder before pushing in the top end of the fuse.
  - Ensure that the new fuse fits tightly in the fuse holder.
16. Check all three fuses with an ohmmeter to verify continuity through them even if none of the indicators in the line fuses are popped out.
17. Check the two primary side control circuit fuses for continuity if the line fuses are not blown.
18. If one of the primary side control circuit fuses is blown, remove it, using an arc chute/fuse puller. See the figure below.

Arc Chute/Fuse Puller



Removing a Primary Side Control Circuit Fuse



19. Troubleshoot the control transformer, the blown fuse, and the fuse holder assembly.
20. Identify the problem that caused the fuse to blow and correct it.
21. Replace the fuse.
  - Ensure the specifications of the replacement fuse is identical to those of the blown fuse.
  - Check equipment specifications if there is any indication that the blown fuse may have been an incorrect type.
  - Ensure the fuse lower end is seated in the fuse holder before pushing in the top end of the fuse.
22. Check the single secondary control circuit fuse for continuity, if neither the line fuses nor the primary side control fuses are blown. See the figure below.



Control Fuses

#### Secondary Control Circuit Fuse

23. Remove the secondary control circuit fuse if it is blown.
24. Troubleshoot the control circuits, looking for ground and line faults.



25. Identify the problem that caused the fuse to blow and correct it.
26. Replace the fuse.
  - Ensure the specifications of the replacement fuse is identical to those of the blown fuse.
  - Check equipment specifications if there is any indication that the blown fuse may have been an incorrect type.
  - Ensure the fuse lower end is seated in the fuse holder before pushing in the top end of the fuse.
27. Close the motor starter panel and secure it with the hand screw.
28. Rotate the manual disconnect handle vertical and set it ON (up).
29. Step to the side and set the operating control to AUTO.
30. Verify that the supply voltage on all three phases remains normal as the motor comes up to speed, after the motor starter contacts energize.
31. Verify that currents to all three motor phases are normal and equal.
32. Monitor the motor during operation.