

## T-07b: PM Drive (DC Full Range)

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Inspection of cooling fans requires opening the electrical cabinet without removing power. An electrical hazard exists anytime a machine is worked on when power is not locked out and tagged.

### EQUIPMENT

- basic Electrician hand tools

### RESOURCES

- GE Valutrol Adjustable Speed Drive Operator's Manual

## PM Drive (DC Full Range)

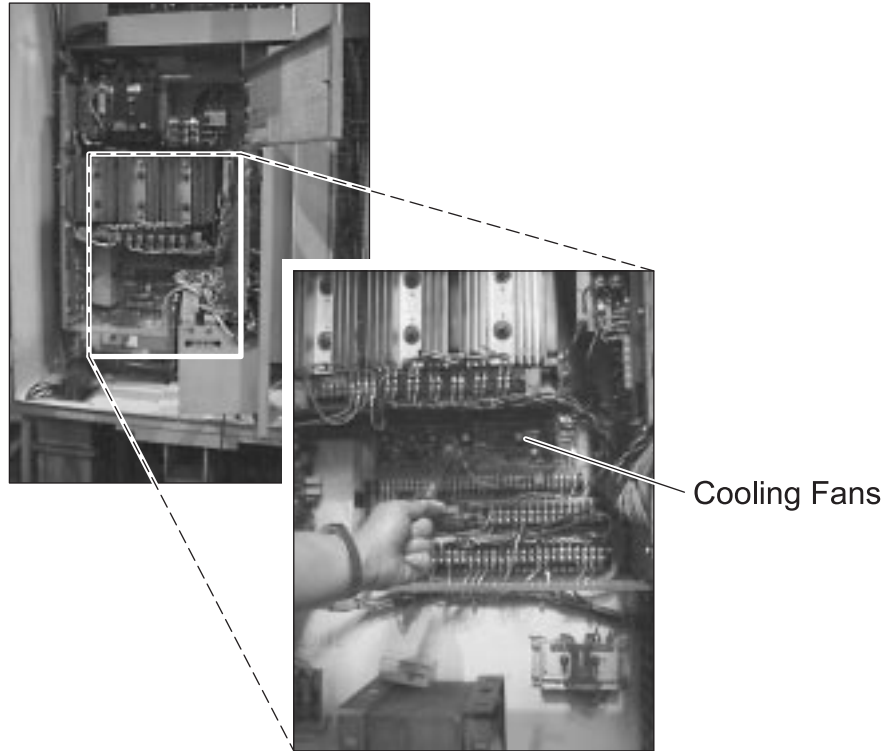


Valutrol DC Drive

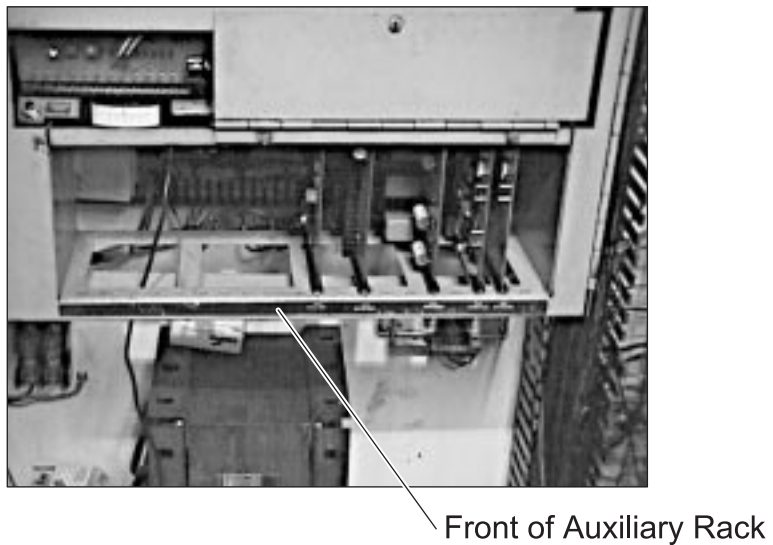
**WARNING:** Opening an electrical cabinet without lockout/tagout can result in injury or death to personnel. Perform steps 1 and 2 only if the DC drive has cooling fans installed.

1. Carefully open the electrical cabinet without turning off the power.

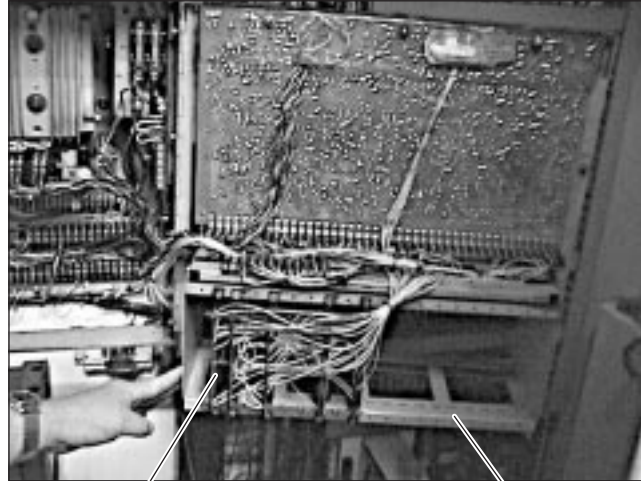
**WARNING:** Be careful not to touch the heat sink modules above the cooling fans. High voltage is present.

**2. Verify that the cooling fans are operating.**

- Perform lockout/tagout and replace any fans, as needed.

**3. Inspect the auxiliary rack (board edge connectors) and S22 cards.**

- ❑ Pull each S22 card from the slot and inspect for grime, silver migration, or damaged components.
- ❑ Inspect and wipe each board edge connector with a clean shop towel if the level of grime is minimal. If further cleaning is required, go to step 4.



Board Edge Connector

Auxiliary Rack Rear

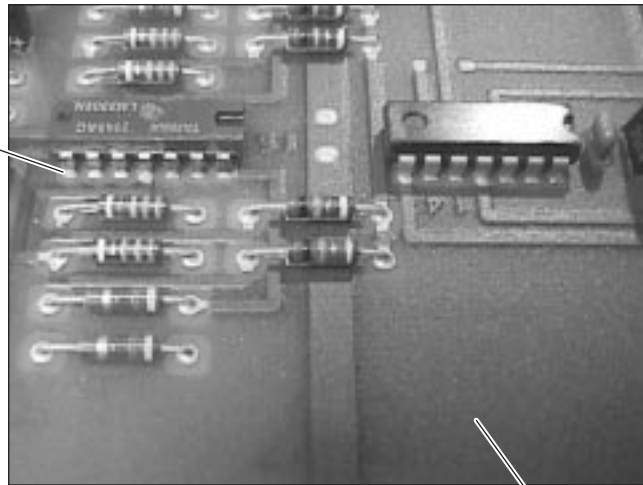
- ❑ If the rack and cards are clean, go to step 5.

#### **4. Remove and clean the S22 cards, if necessary.**

- ❑ Carefully remove each board, noting the board orientation and slot location.
- ❑ Inspect the S22 board edge connectors for grime. Clean the connectors as required with soap and water.
- ❑ Blow dry each board connector and clean with oil-less contact cleaner, verifying all moisture is displaced.
- ❑ Clean the S22 cards with soap and water.

- If silver migration is detected, clean the components on the card with silver cleaner; wash the board with soap and water again.

Silver Migration  
on Component

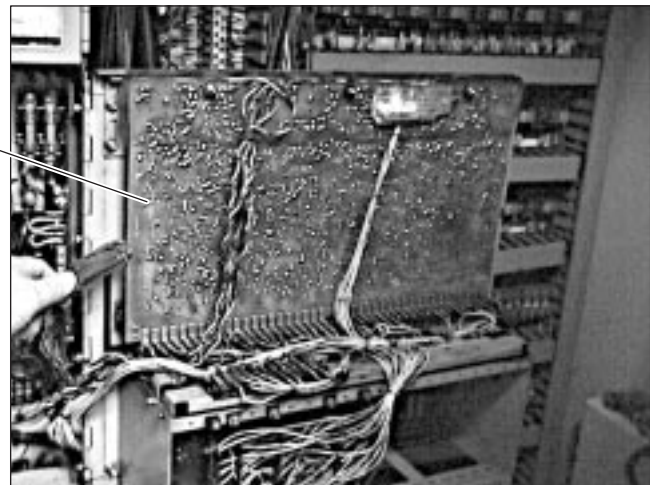


S22 Card

- Bake the boards in a drying oven for at least four hours before reinstalling.

#### 5. Inspect the main control card (MCC).

Main Control Card



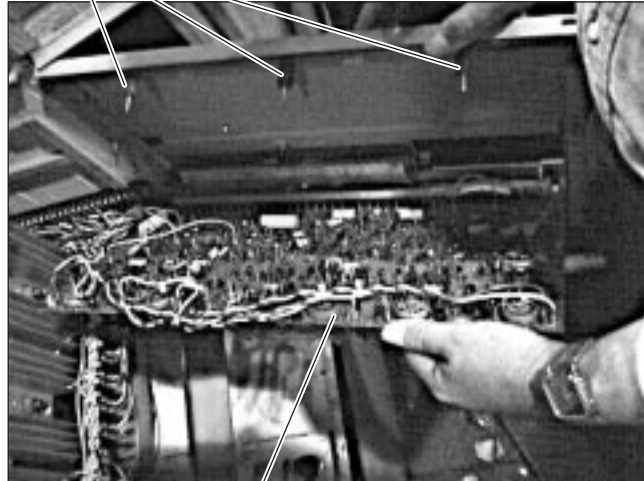
- Remove the high voltage shield.
- Remove all three of the top mounting stud nuts.



- Tilt the MCC card backward, and inspect for cleanliness, damaged components, and silver migration.



High Voltage Shield  
Mounting Bolts

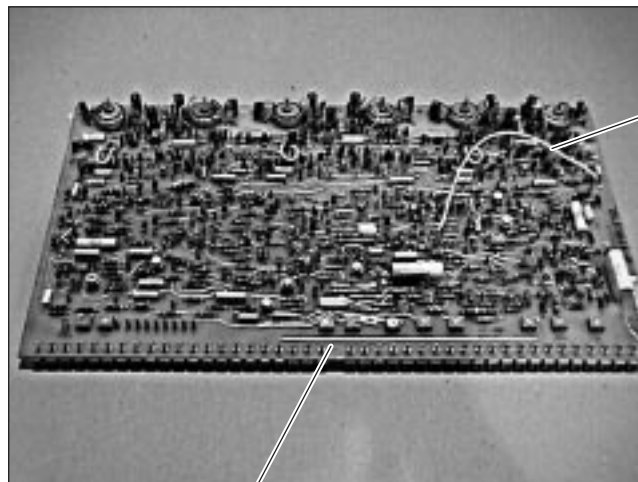


MCC (from Overhead View)  
Tilted Back

- If substantial amount of grime, silver migration or a damaged component is not detected, perform step 7.

**6. Remove and clean the MCC, if necessary.**

- Carefully remove any attached jumpers or wires, noting or marking the wires, as needed.

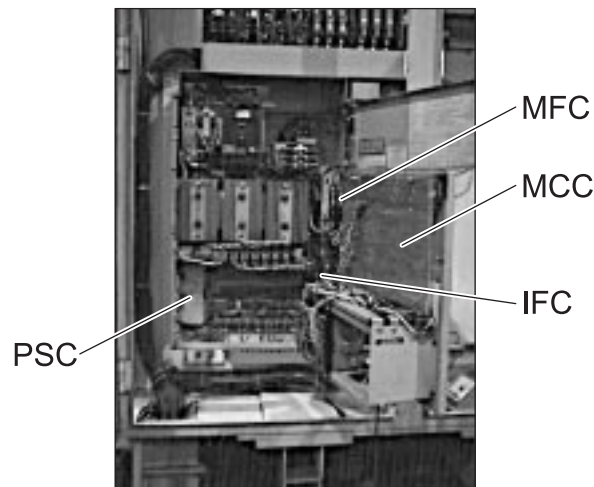


Jumper

Removed MCC

- Remove the MCC and clean with soap and water.
- If silver migration is detected, clean the components on the card with silver cleaner, and wash the card with soap and water again.
- Bake the boards in a drying oven for at least four hours before reinstalling.
- Reinstall the high voltage shield.

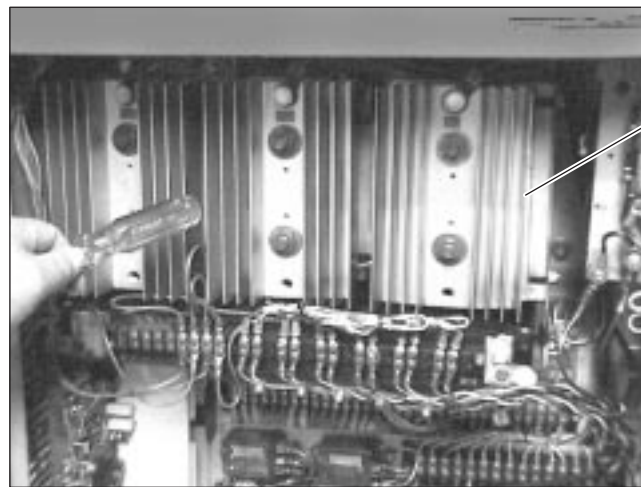
7. **Inspect the motor field control (MFC), interface card (IFC), and power supply card (PSC).**



- Inspect for cleanliness, damaged components, and silver migration.
- If a substantial amount of grime, silver migration or a damaged component is not detected, perform step 9.

8. **Remove and clean the MFC, IFC, and/or the PSC, if necessary.**

- Carefully remove any attached jumpers or wires, noting or marking the wires, as needed.
- Remove the required card and clean with soap and water.
- If silver migration is detected, clean the components on the card with silver cleaner, and wash the card with soap and water again.
- Bake the boards in a drying oven for at least four hours before reinstalling.

**9. Inspect and clean the heat sink module.**

Heat Sinks

- Inspect for cleanliness.
- Remove the heat sink.
- Wipe or wash the heat sink module.
- Bake the heat sinks in a drying oven for at least four hours before reinstalling.

**10. Carefully replace all clean and dry components.****11. Remove lockout/tagout and restore power after all components are dried and replaced.****12. Follow the procedure T-01: Set Up/Adjust Drive (DC Full Range).****13. Cycle the machine to verify proper operation.**