Quantum III Blown fuses
Possible Causes & Remedies

Background

Quantum III drives have mutable fuses throughout the drive. The number of fuses can range from as few as 8 to as many as 44!!! So it would be understandable that some one would like to know what fuses blew, for what reason, part number and possibly the MOV’s (Metal Oxide Varistor) part number as well.

Due to the number of fuses as well as the number of different drives, we have used hyperlinks inside this document to help focus your search. Click on the size drive that you are working with then click on where the blown fuses are.

Quantum III
Size1 Quantum III Drive

![Image of Quantum III Drive with labeled fuses: Line Fuses, Armature Fuse, Isolation Transformer Fuses, SMPS Fuses]
Line Fuses

- You would normally see:
  - **SL** Trip (middle fuse blown) **CTTG 120**
  - **AOC** Trip
  - No display

- What caused this to happen?
  - An Overload condition. Check for free movement in the
    - Gear box
    - Ball Barings
    - Belts
    - Product up to temperature
    - Brake
  - Motor Issues
    - Armature Resistance (normally 1Ω or less)
    - Field Resistance (80-120 Ω, check motor nameplate)
    - Megger the Motor **CTTN 121**
  - Shorted SCR
    - **AOC** Trip **CTTG 105**
  - Low field current
    - A low field current will cause the armature current to produce more.
  - Current loop tuning of the Drive
    - **CTTN 135**
  - Feedback loss
    - Run the drive in Armature Voltage Feedback (AVF)
  - Drive is wired improperly
  - Inversion Fault
    - **CTAN 223**

- What else could be wrong?
  - MOVs (Metal Oxide Varistor) have been known to blow in this type of situation. These devices can be located on the power board Pictured to the right.

- Part Numbers & How to **Order**

<table>
<thead>
<tr>
<th>Model</th>
<th>Part</th>
<th>Part Number</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>9500-8X02</td>
<td>Line Fuse</td>
<td>3701-505500</td>
<td>3</td>
</tr>
<tr>
<td>9500-8X03</td>
<td>Line Fuse</td>
<td>3701-508000</td>
<td>3</td>
</tr>
<tr>
<td>9500-8X05</td>
<td>Line Fuse</td>
<td>3701-522500</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MOV</td>
<td>2482-2951</td>
<td>3</td>
</tr>
<tr>
<td>9500-8X06</td>
<td>Line Fuse</td>
<td>3701-525000</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MOV</td>
<td>2482-2951</td>
<td>3</td>
</tr>
</tbody>
</table>
Transformer Fuses

You would normally see:
- $E_b$ Trip CTTG 117

What caused this to happen?
- A PLC connection could pull excessive current from the transformer and the 120Vac supply could be low. (FU7 blown)
- Improper Wiring (FU7 blown)
  - This is normally common on new or reinstallation. Wires can get crossed and misplaced then connected to ground.
- Blown MOV on the AC Interface Board (FU7 blown)
  - This is an uncommon failure but it has been seen that the MOV on the AC Interface shorted out after it has been blown. This can occur with noise on the line or a phase imbalance. Measure and verify that this is the case and replace blown component.

This MOV should read OPEN.

- Shorted transformer, normally on the primary side (FU5 or FU6 is blown).
  - X-former 8X02/03 set for 480V = 43.5Ω Primary : 3.4Ω Secondary
  - X-former 8X02/03 set for 240V = 13.2Ω Primary
  - X-former 8X05/06 set for 480V = 88Ω Primary : 6.7Ω Secondary
  - X-former 8X05/06 set for 240V = 18Ω Primary

Part Numbers & How to Order

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Part Name</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9500-8X02 &amp; 8X03</td>
<td>FU 5 &amp; FU 6</td>
<td>3708-500040</td>
</tr>
<tr>
<td></td>
<td>FU 7</td>
<td>3708-500060</td>
</tr>
<tr>
<td></td>
<td>Transformer</td>
<td>3082-15903</td>
</tr>
<tr>
<td>9500-8X05 &amp; 8X06</td>
<td>FU 5 &amp; FU 6</td>
<td>3708-500080</td>
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<tr>
<td></td>
<td>FU 7</td>
<td>3708-500125</td>
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<tr>
<td></td>
<td>Transformer</td>
<td>3082-16463</td>
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<tr>
<td>All</td>
<td>AC Interface Board</td>
<td>9500-4025</td>
</tr>
</tbody>
</table>
SMPS Fuses

- Normally see:
  - No Display

- What caused this to happen?
  - Shorted Field on the motor
    - Power down the unit and remove the field wires from the drive. Replace blown fuses and reapply power to the drive. If fuses blow with now field attached the problem lies inside of the drive.
    - Measure the resistance of the field and compare to what the motor’s nameplate calls out for.
    - If no resistance is given Ohms law and common since will help give you an idea of what resistance value should be.
  - Bad MDA 3 field regulator board
    - With the power and the field removed you can examine the bridge rectifier using a DMM (Digital Multi Meter) with the diode check option.

<table>
<thead>
<tr>
<th>Black Lead</th>
<th>Red Lead</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>F2</td>
<td>(\approx 0.825)</td>
</tr>
<tr>
<td>F1</td>
<td>E3</td>
<td>(\approx 0.45)</td>
</tr>
<tr>
<td>E3</td>
<td>F2</td>
<td>(\approx 0.45)</td>
</tr>
</tbody>
</table>

- Bad SMPS (Switch Mode Power Supply)
  - With field wires removed and powered applied to the power board if the drive stills blows fuses then you have a drive issue.
  - There is a \(33 \Omega\) resistor labeled R73 that possibly is shorted.
  - If the power board is found to be faulty you can replace the power board.

- Part Numbers & How to Order

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Part Name</th>
<th>Part Number</th>
<th>CTRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>9500-8302 / 8303</td>
<td>MDA 75 Power Board</td>
<td>9200-0624</td>
<td>CTRI 204</td>
</tr>
<tr>
<td>9500-8602 / 8603</td>
<td>MDA 75R Power Board</td>
<td>9200-0620</td>
<td>CTRI 204</td>
</tr>
<tr>
<td>9500-8305 / 8306</td>
<td>MDA 210 Power Board</td>
<td>9200-0619</td>
<td>CTRI 209</td>
</tr>
<tr>
<td>9500-8605 / 8606</td>
<td>MDA 210R Power Board</td>
<td>9204-0555</td>
<td>CTRI 209</td>
</tr>
<tr>
<td>All</td>
<td>10 Amp. Fuses</td>
<td>3535-0010</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>MDA 3</td>
<td>9290-0059</td>
<td>CTRI 208</td>
</tr>
</tbody>
</table>
Armature Fuse

➢ Normally see
  o ROP Trip

➢ What caused this to happen?
  o Inversion Fault CTAN 223
  o Short in the motor CTTN 121
  o Open Contactor Under a loaded condition
    ▪ Check the Emergency Stop Circuitry / System Interlock Circuitry for failure.
  o Sudden “Jam” in the system
    ▪ Inspect the gear box, belts, product, ect.

➢ Part Numbers & How to Order

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<tr>
<th>Model</th>
<th>Part Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9500-8602</td>
<td>70A / 700V</td>
<td>3701-707000</td>
</tr>
<tr>
<td>9500-8603</td>
<td>100A / 700V</td>
<td>3701-710000</td>
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<tr>
<td>9500-8605</td>
<td>200A / 700V</td>
<td>3701-720000</td>
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<tr>
<td>9500-8606</td>
<td>300A / 700V</td>
<td>3701-730000</td>
</tr>
</tbody>
</table>

Ordering Parts

To order parts feel free to contact our parts department:

By Phone:
(800)367-8067

By Fax:
(716)774-8327

By Internet:
http://www.emersonct.com/support_usa/criticalComp.htm

Questions: Ask the author ??

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