SS Power supplies

Induction Power Supply Troubleshooting Guide

I) Power Up Problems (12.5,kW 25kW, 40kW)

a) Nothing happens when small breaker is turned on. The wires from the top of this breaker should connect to two phases on the input of the large circuit breaker. With all power to the unit disconnected, check that those wires are properly attached.

b) When the small breaker is turned on, you can hear the fans start up, but nothing lights on the front panel. This could be that the 50-pin flat cable is unplugged, or that connector 1 to the control board is unplugged.

c) The Large Circuit breaker will not stay up.

1) The E-Stop button is depressed. Turn the E-Stop counter-clockwise to release.

2) The 24VAC interlock loop has an open connection. This circuit runs from the TRAN1077 transformer to the undervoltage release in the back of the 100A circuit breaker, from the UVR to pin 1 of the E-Stop switch, (white 14ga wire), from pin 2 of the E-Stop to the common of the Door Switch, and from the NO contact of the door switch back to the transformer. Make sure all those lines have continuity.

3) This could be a shorted inverter assy. Check the continuity between the positive and negative outputs of the diode bridge. If this shows a short, then do not try and set the breaker again.

4) The Diode Bridge is shorted. Check continuity between the inputs of the Diode Bridge. If this shows a short, then one of the diode modules is blown.

Power Up Problems

a) The circuit breaker will not stay up: The E-Stop button is depressed. Turn the E-Stop button counter-clockwise to release. The door switch is not closed. Check that the door is securely closed.

b) When the breaker is engaged, you can hear the fans start up, but nothing lights on the front panel. This could be connector CN1 is unplugged at the control board. Also, the input or output connector of the power supply mounted on the front inside wall of the cabinet may be unplugged or improperly attached.

c) The flow LED is lit: Check that water connections are not reversed. Check that there is sufficient water pressure; 30PSI differential pressure is needed.

II) Fault Diagnosis

a) Immediate Frequency Trip

1) Connector CN2 is not plugged into the Control Board.

2) 20-pin flat cable is not plugged in on one end.

3) Heatsink assys not plugged into the buffer board.

4) The load frequency is above the operating point of the unit. Increase the number of resonant capacitors

5) The start frequency is adjusted to a lower frequency. This may result in trying to run below resonance.

6) A FET could be shorted. This can be checked by measuring the voltage between the output buss of heatsink assy, and one of the screws to the standoffs between the divider cap board and a snubber board. You should see about 165VDC for a 240VAC unit, 330VDC for a 480VAC unit. If you measure 0 or full voltage, then a FET is shorted. To do this, the power must be up, and the door switch interlock must be bypassed. Be very careful of High Voltage inside the cabinet. (see picture below)

7) The fuse above the diode bridge could be open.

8) Bad 12V power supply or missing voltage

Run-Time Problems

a) Current Trip and Frequency Trip Simultaneously. This is a sign of a blown FET. Check the voltage between the top of the main fuse and the inverter output bus plate. You should see 165VDC for a 240VAC unit, 330VDC for a 480VAC unit. If you see 0 or full voltage then a FET is blown. (see picture below)

b) Intermittent Frequency Trips

1) Loose connections on capacitors (screws not tightened down), output blocks or output coils loose.
2) Load shorting on output coil,
3) Windings on output coil shorting to each other.
4) Overheated capacitors, loose transformer cables or loose connection on series inductor.
5) Loose plugs to control board or power supply.
6) 12V power supplies missing one 12v or below 12.00v
7) One leg of the main buss circuit breaker is open
8) Electrical noise can be getting back to the circuits if proper grounding is not done
9) Open leg on main buss circuit breaker.
10) Power plug may be wired incorrectly or loose connections

b) Intermittent Current Trips

1) Possible loose connection on three phase input power, check plug connections
2) If unit is running in current limit and a sudden change in line voltage occurs this can cause a current trip.
3) Turning unit on in high current condition (power knob full on) without setting the start frequency correctly.
   Unit operating in high frequency and high current condition can cause switching noise which can cause intermittent current trips (move the tap bar up to decrease current) optimal operating current @50%.
4) Current trip will occur if start frequency is set at or below operating frequency. Common practice is to set start frequency at top limit, turn on the unit and note the idle frequency. Set the start frequency 5-10% above idle frequency.
5) Goes to current limit at low power, sometimes trips. Possible open leg on main buss circuit breaker
6) Bad ct or wiring to inverter ct.
7) Open leg on the main buss circuit breaker

c) Tips for dependable Operation

1) Make sure that the resonant load capacitors are securely tightened to the capacitor rails. Loose capacitors can overheat and fail.
2) Whenever possible place the resonant capacitors in opposition on the capacitor rails. In other words, a capacitor directly below another.
3)Placing the capacitors towards the center of the capacitor rail will increase their life as well.
4) Running the unit near frequency limit results in lower currents, less heating of components, and more efficient operation. It will also prolong the life of the resonant capacitors. Running the unit at or near current limit can overheat the inverter modules or resonate capacitors.
5) Follow capacitor manufacturer's recommendations for operating parameters

Measure divided voltage between top of fuse and center of inverter, if zero volts or full voltage, MOSFETs shorted