

## **Troubleshooting voltage loss on AQX**

A voltage loss problem could be due to a board loading down the power supply or problems within the power supply itself. So to start check the fuses on the AQX rack. On a 20 slot chassis the fuses are in the front. On a 9 slot chassis the fuses are in the back near the power cord. If that is not the problem then unseat all the boards from your AQX rack and then turn the rack back on.

(A) If with all the boards unseated from the AQX rack you do not lose your voltage(s) then the problem could be with one (or more) of your boards. In that case you would add one board back in at a time until you come upon the board that is causing the loss of your voltage(s) or until the full compliment of boards are all back in.

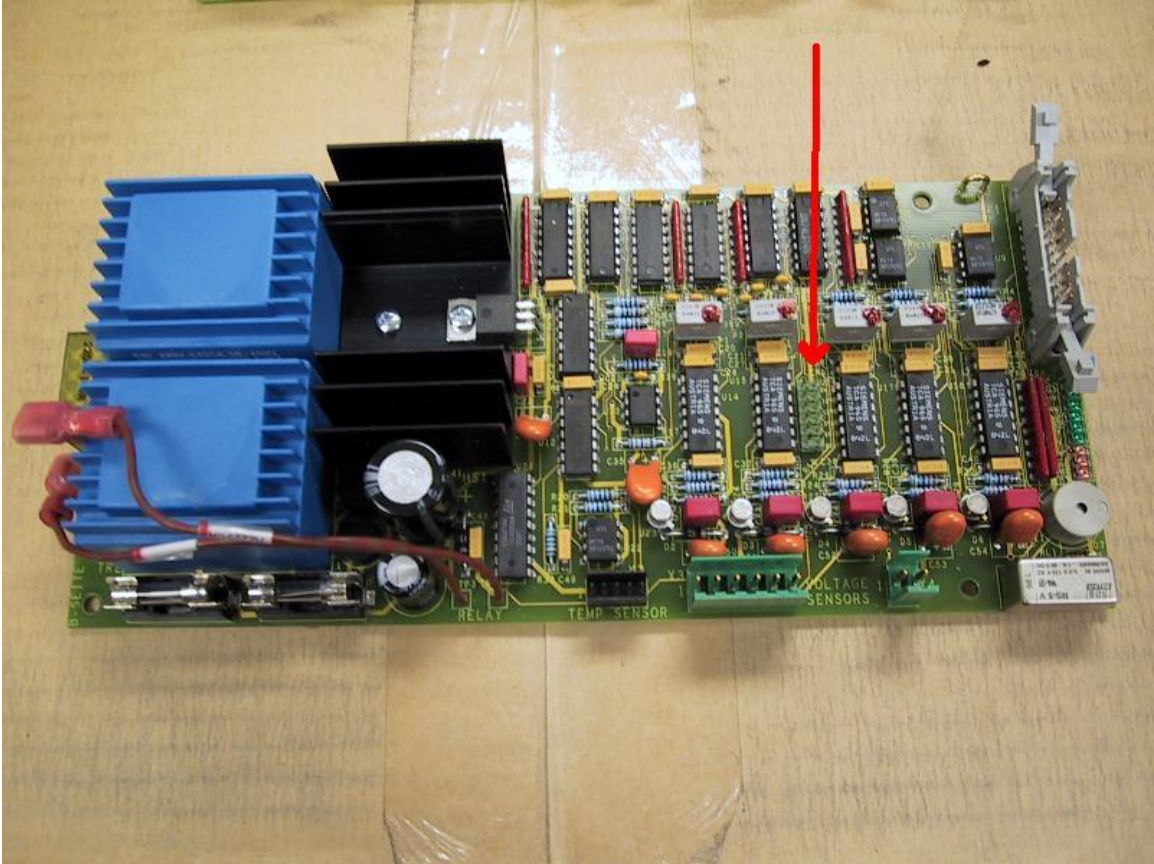
(A1) If you are losing voltage(s) at a certain board it could be that board is bad or it could be the number of boards is causing a draw/load on the power supply. To test this further you can unseat the suspect board and put in another board. If you are still losing the voltage(s) than it would seem to indicate that the number of boards in the chassis is the problem. If you are not losing the voltage(s) then the problem is most likely the suspect board.

(B) If with all the boards unseated from the AQX rack you still lose your voltage(s) then that would point to the power supply as the problem. To check this you will have to access the back of the AQX rack where the power supply resides. To do this you will need a multimeter and access the back of your console. BEWARE OF SHOCK.

### **To measure/check voltages:**

Once you have removed the back of your console and the air handler you can see the 2 screws on the back of the AQX rack holding the back panel. There is one screw in each of the upper corners. They do not have to be removed, just untightened (half turn counter clockwise). Then fold the back panel with the power supply down towards you. In a 20 slot AQX chassis a power supply module with a power supervisor board on top or on the side will be on the left and on the right will be another power supply module on its own. In a 9 slot AQX chassis there will be only 1 power supply module with a power supervisor board on top or on the side. We need to determine now if the problem is with the power supervisor board or the power supply module(s) or possible AC ripple (more on this later). In a 20 slot AQX chassis the module responsible for the +5 is the one on the right by itself. The power supply module on the left handles all the other voltages. In a 9 slot AQX chassis all voltages are handled by the single power supply module.

On the supervisor board locate a bank of jumper pins. They are a bit off centered towards the end without the blue transformers and are a set of 10 pins with each set of 2 pins corresponding to a marked voltage. See red arrow in following figure for jumper location.



With the supervisor board positioned with the 2 blue transformers on the left (as shown above) the bank of jumpers, about an inch long, run vertically on a green base. The markings are as follows (top to bottom):

- .. **0V**
- .. **-12V**
- .. **+12V**
- .. **-5VA**
- .. **+5V**
- .. **+5VA**

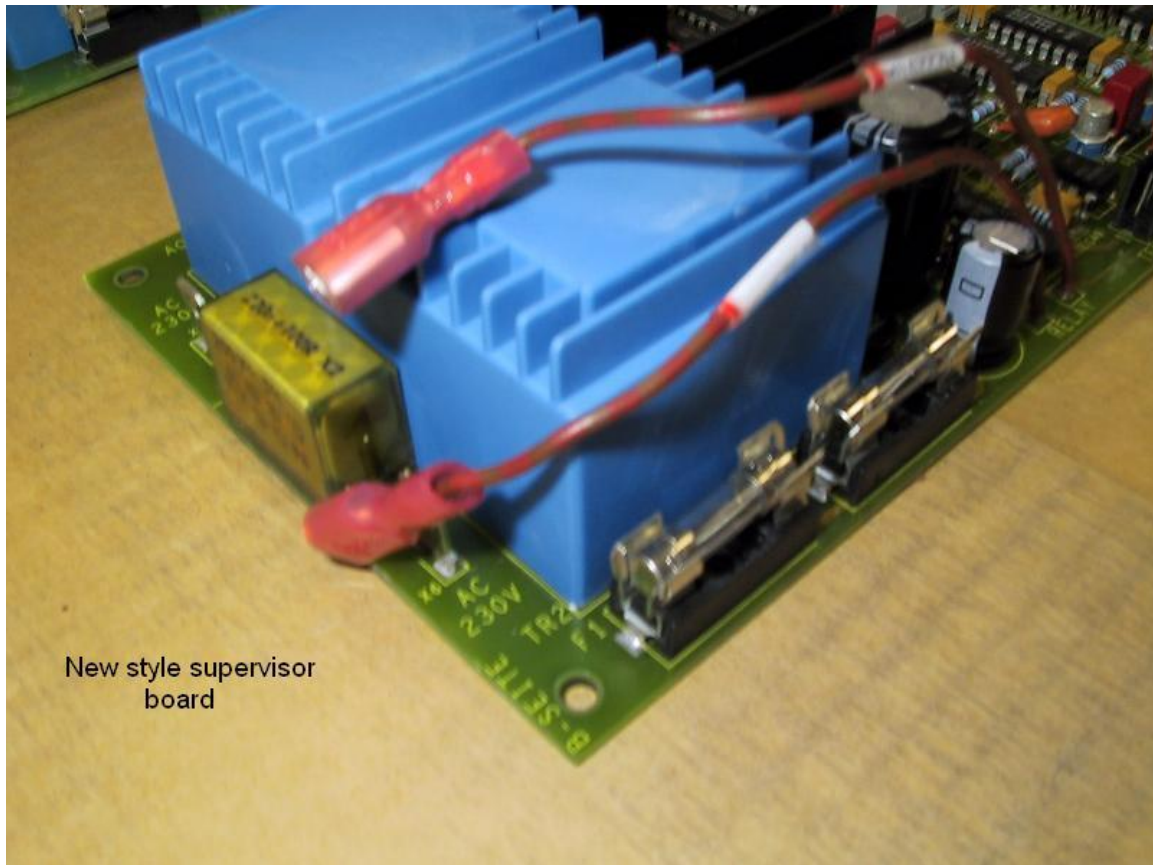
Place a jumper across the suspect voltage(s) and then measure for the voltage(s) on the backplane inside the AQX. There are also some green lights on the right of the supervisor board by the ribbon cable connector that might give you an indication of which voltage(s) may be causing a problem and which set of voltage pins you need to jumper. As positioned above and disregarding the top light (it does not light up) the voltages are -5VA, +5VA, -12V, +12V and +5V. There are also 3 red lights for TW (TEMP WARNING), 0V (OVER HEATING) and POWER FAIL.

Looking straight into the AQX you will see the backplane. Running along the middle are tabs marked with the various voltages. On the far left and far right are grounds with yellow leads/wires (depending on type of chassis there may be grounds towards the

middle of the backplane also). With the suspect voltage(s) jumpered out on the power supervisor board and your negative lead of your multimeter on the ground **nearest** the voltage you will be testing, measure for the suspect voltage(s) at the corresponding connector with a lead/wire connected.

If you get the correct/specified voltage(s) at this point then it is coming directly from the power supply module so the problem would seem to be with the power supervisor board. If you do not get the correct/specified voltage(s) then the problem would seem to be with the power supply module itself. The only exception is for the tab marked +15. It is mislabeled. You should get a measurement of +5.

If the power supervisor board is suspect ohm out the fuses first to see if any are blown. Also check the voltage LEDs on the board to see if that shows a voltage either lost or outside the tolerable range of the supervisor board. Once determined to be defective the supervisor board will need to be identified as old style or new style. The telltale indication is on the edge of the board by the 2 blue transformers. See below figures.



- Notice the module on the edge of the card next to the 2 blue transformers.



- Notice the two wires on the edge of the card next to the 2 blue transformers.

If either of the power supplies are suspect check for loose connections. Also check that the fan inside the power supply is working properly.

**To measure/check AC ripple and AC filter:**

It is possible that the DC voltage can be fine but not the AC. So part of your checking should include the power going into the console. You should have a clean 208 volts AC.

Then using an O-scope you can check for the AC ripple (make sure that the O-scope is set for AC). The voltages in the AQX are digital and need to be checked for DC and AC. And you have to use the correct ground point for each. That is, the ground clip needs to be attached to the nearest ground to the voltage that you are measuring. The AC ripple should be less than 10% of the DC value. As this is a switching power supply this will be a little glitchy, spikes are expected but a sine or saw tooth waveform is not.

The AC filter needs to be checked also to make sure that you can measure the AC voltage on both sides of the filter so you know it is getting through the filter. The filter is usually right behind where the power cord plugs in and is a small box sometimes silver in color.