

IGBT CARD REPLACEMENT PROCEDURE FOR RACK MOUNTED QPA's ONLYIntroduction:

1. This procedure will show you how to replace IGBT cards in a QPA model number 03. You can check the model number of the QPA by looking at the metal tag on the top cover of the QPA when you pull the QPA out of the rack.
2. If you have a different model number QPA you will have a different number of IGBT cards and they may also be located in a different location in the QPA. You can still use this procedure to replace the IGBT cards. Table I gives the model number of the QPA and the number of IGBT Cards in each. When you pull a QPA out to replace the IGBT cards you must replace ALL of the IGBT cards. This table tells you how many to replace.

QPA Model Number	Number of IGBT Cards
QP02	1
QP03	2
QP04	None
QP05	None
QP06	1
QP07	1
QP08	1
QP09	2
QP10	2
QP11	4

3. If the QPA is for a power supply that has a "tq" in the sitewide name then the only 208VAC disconnect that has to be locked out is the one for the rack you are working on. An example of a "tq" in the sitewide name would be something like yi2-tq4-ps for the power supply and yi2-tq4-qp for the qpa.

4. If the sitewide name has anything other than "tq" in the sitewide name you will have to lock out the main power supplies in 1004B as well as the 208VAC power to the rack you are working on **IF** you are going to touch the DC busses of the QPA. You must contact someone from the collider electrical power supply group about this lockout procedure. However, if you can slide the QPA partway out of the rack and replace the IGBT cards without touching the DC busses then you do not need to lock out the main power supplies in 1004B.

## Procedure

1. Figure 1 shows you what a replacement IGBT card looks like. Notice the yellow LED's towards the front left hand side. The old IGBT's have Red LED's towards the front left hand side. You should also notice that there are 3 moxex connectors where connections are made on this board.

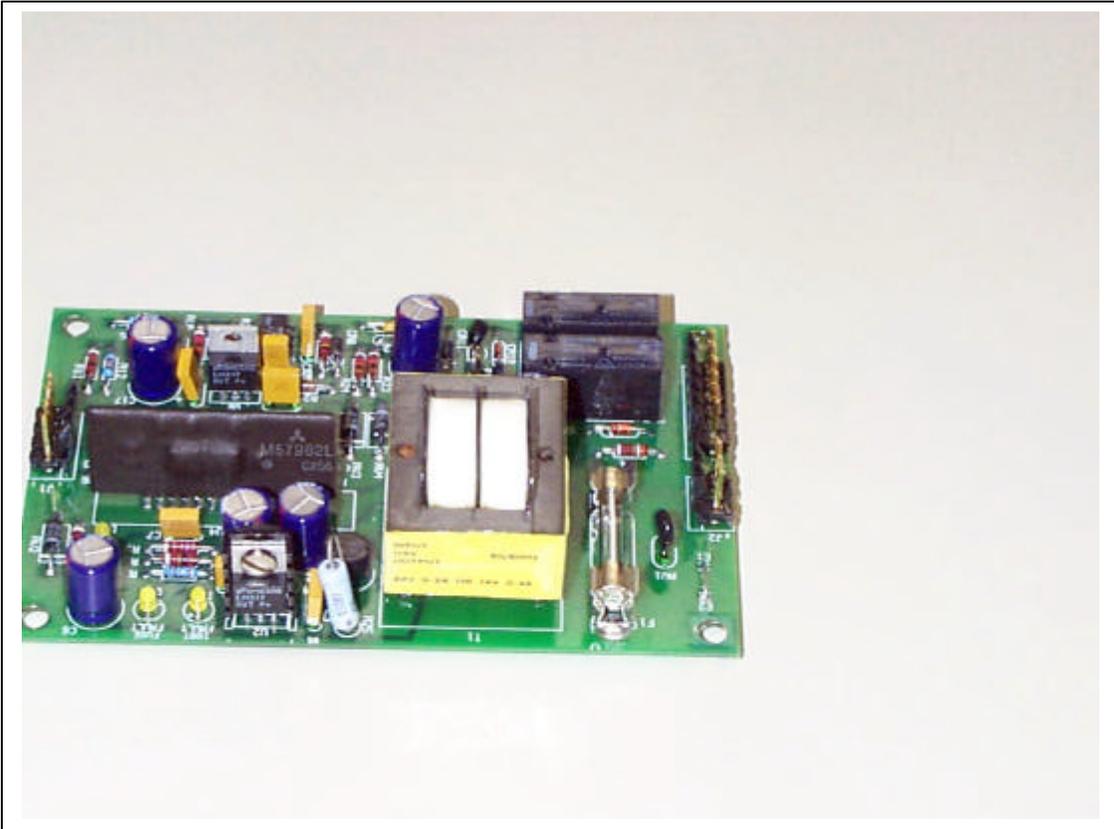


Figure 1

You can find the spare IGBT cards in the spares locker in service building 1004B on the south wall where the RHIC power supplies are located. This is how to get to the spares locker in 1004B. If you enter the service building and go into the air-conditioned control room first then you should walk towards the rear of the building and exit the control room by the door which is on the southern most part of the control room leading you into the part of the building that has the power supplies in it. After you enter this part of the building you will see beige locker on you right hand side that has the spare IGBT boards in it. It should have a sign on it calling it a spares locker.

2. Figure 2 shows you what a QPA looks like that is sitting on top of a power supply in a rack. The red box is a power supply, it says SUNCRAFT ELECTRONICS and the QPA is the beige box sitting on top of it with the green LED's on the right hand side. It says APS on it. There are some power supplies mad by Dynapower that are blue.

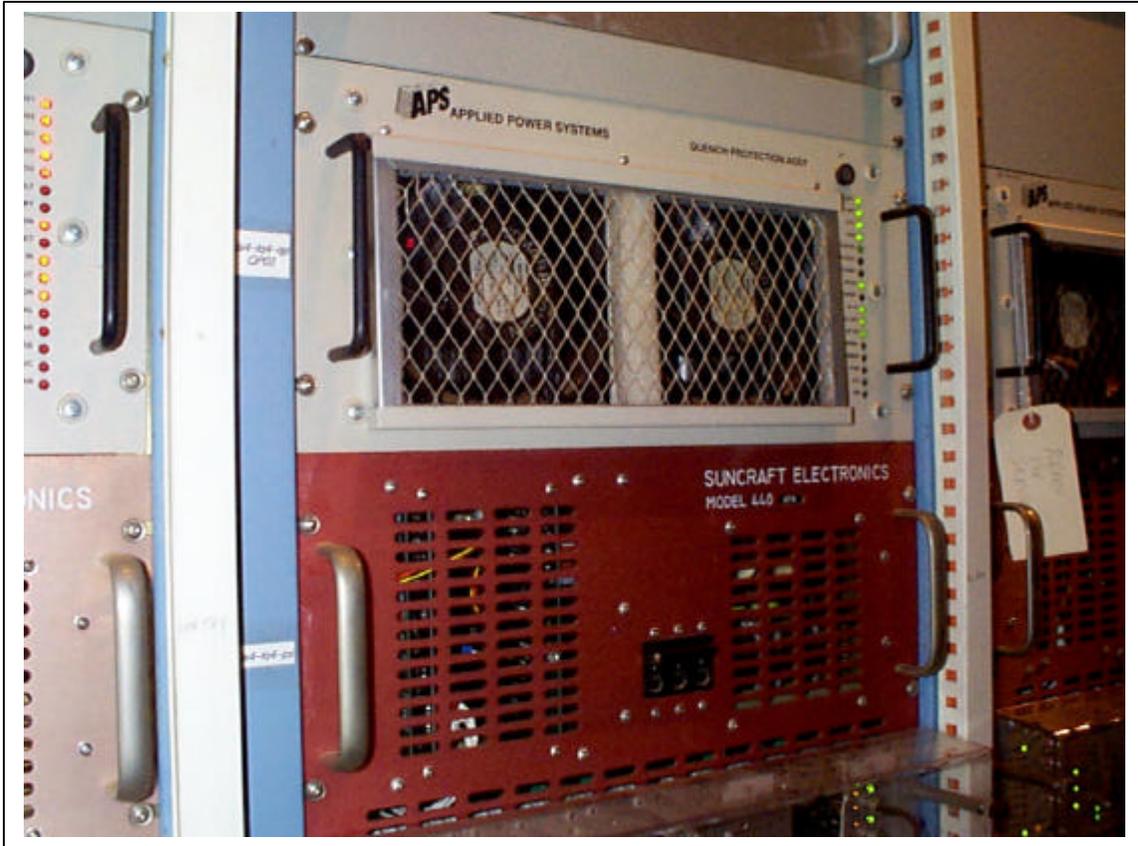


Figure 2

3. The first thing you should do is put all of the power supplies in the rack in the STANDBY state and then in the OFF state. Next you should turn off the circuit breakers on the front of all of the power supplies in the rack you will be working in. Next lock out the AC 208VAC disconnect for the rack you will be working in.

4. Next, open up the rear door of the rack and unplug the 110VAC cord that goes to the QPA.

5. Next, if you are working on a QPA that has a “tq” in the sitewide name **you should label all of the DC cables that go to the DC terminals on the rear of the QPA.** If you are working on a QPA that does not have a “tq” in the sitewide name then you should determine if you can rack out the QPA and remove the cover without touching the DC terminals of the QPA. If you can then you do not need to lock out the main power supplies but you cannot disconnect the DC cables from the QPA and you must replace

the IGBT cards while sliding the QPA only partway out of the rack AND you must not touch the DC terminals while doing this.

**6.** Now., assuming the sitewide name has a “tq” in it, disconnect the DC cables that go to the rear DC terminals of the QPA and pull the QPA out of the rack. Figure 3 is a front view of what the QPA (model 03) looks like in when it is out of the rack.

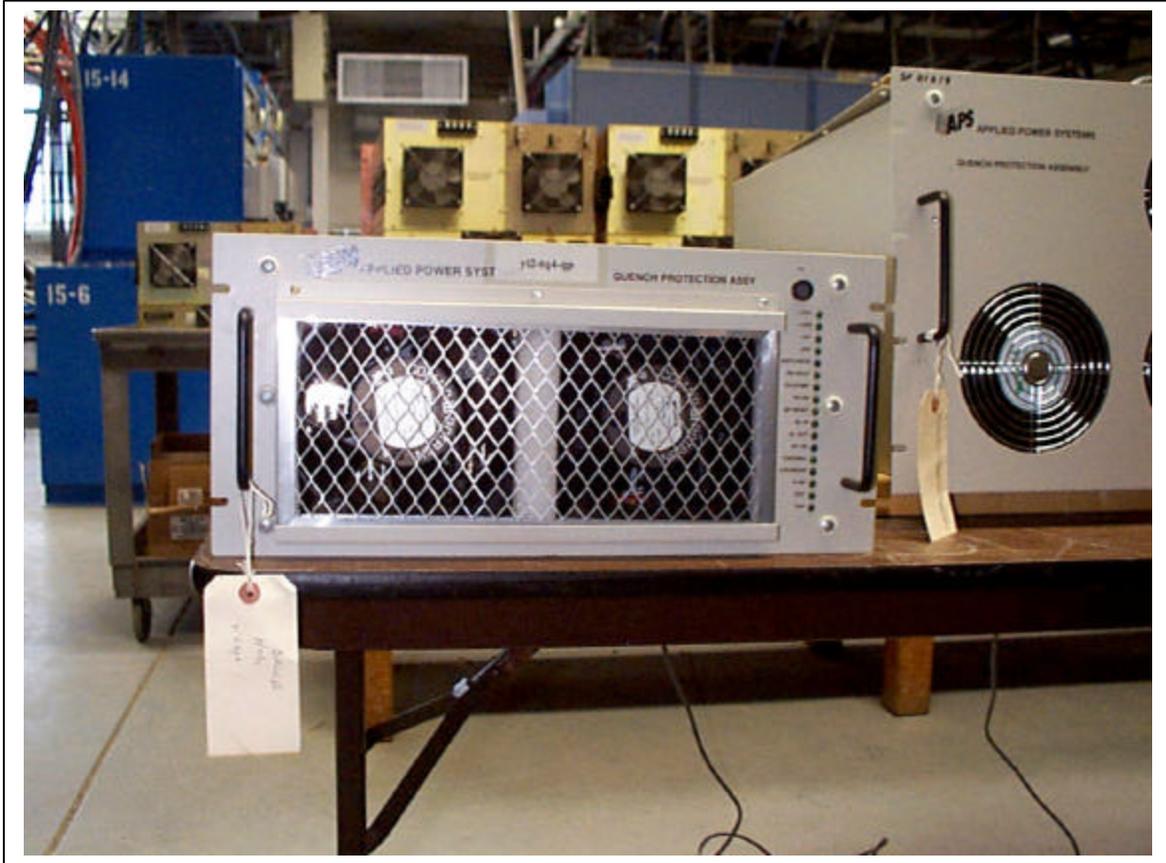


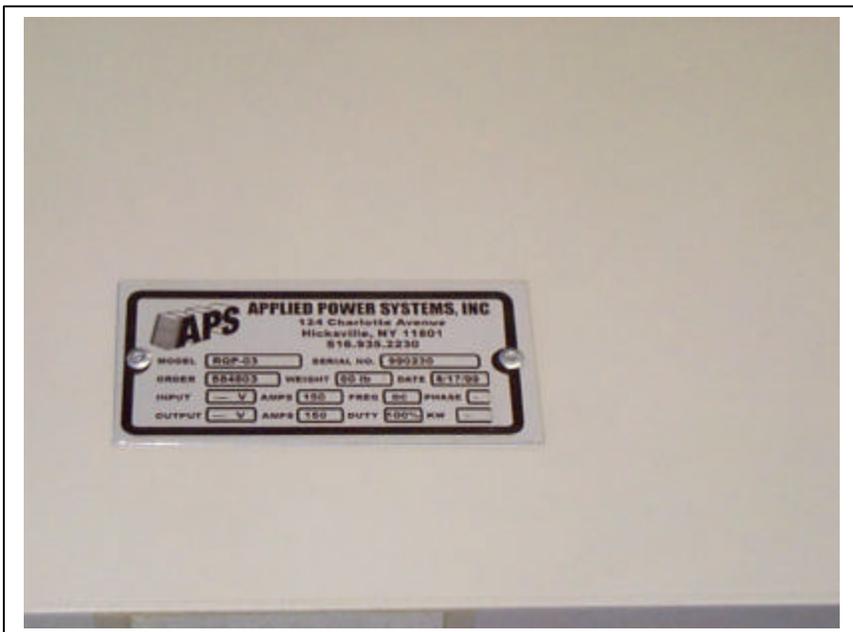
Figure 3

7. Figure 4 is the top of the QPA with the cover still on. Note the silver metal plate. This tells you what model QPA you are working with. Use this along with table 1 to tell you how many IGBT cards you must replace. Since this is a model 03 you must replace 2 IGBT cards.



Figure 4

8. Figure 5 is a close up of the silver metal nameplate. The Model is an RQP-03 here. This means you must replace 2 IGBT cards if you look at Table 1.



←Figure 5

9. Next, you should remove the cover of the QPA. Figure 6 is a view of the top of the model 03 QPA with the cover removed. If you don't have a model 3 then it may look a little different. For a model 3 the 2 IGBT cards are located towards the front left hand side of the QPA.

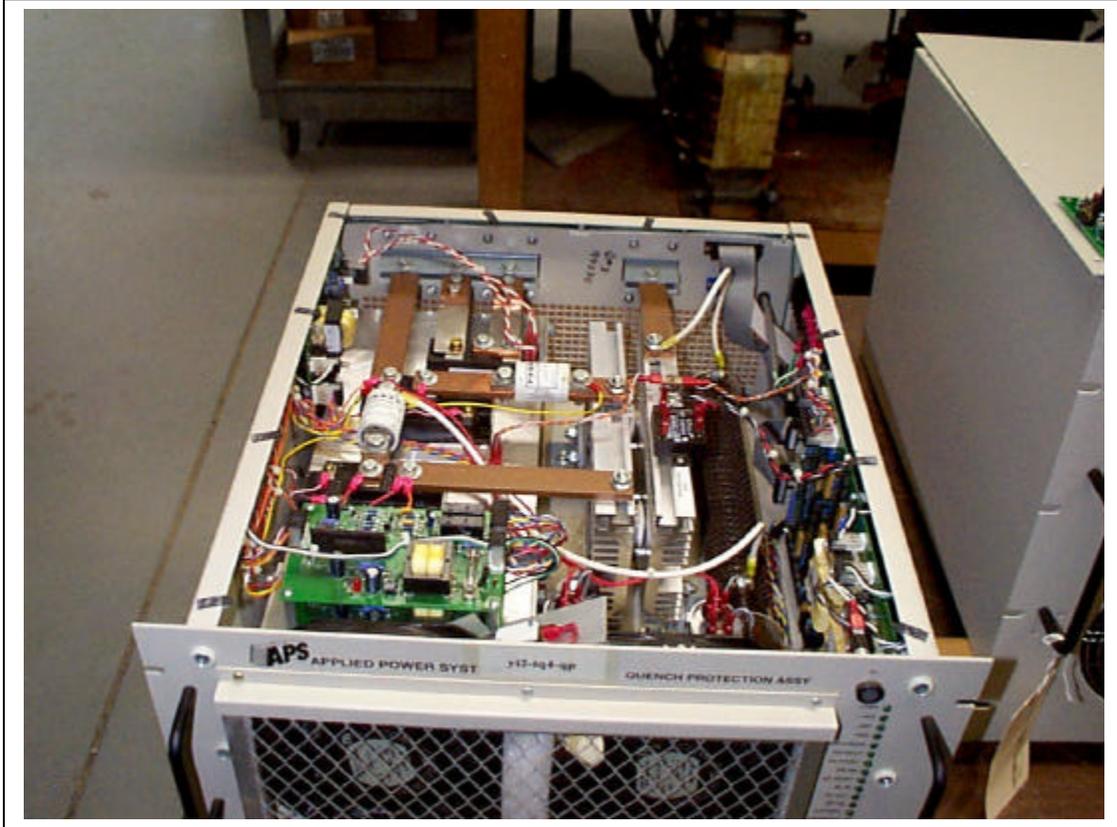


Figure 6

10. Figure 7 is a closeup of the IGBT cards that need to be replaced. Notice the old cards have RED LED's towards the front left hand side of the boards.

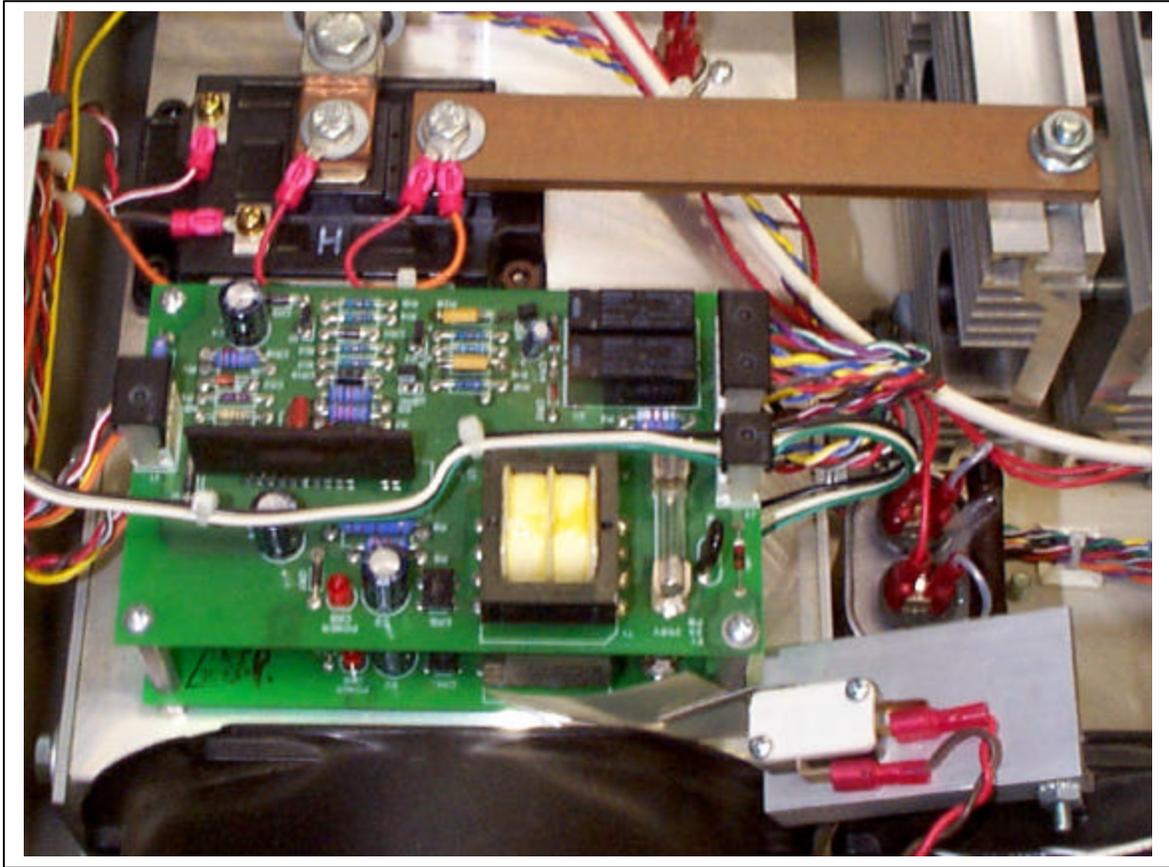


Figure 7

11. Next, you should remove the connectors from the top IGBT card and then unscrew the 4 screws on the 4 corners of the IGBT card. Lift the top IGBT card and it should look like Figure 8. **Make sure you remember where the connectors go on each board!!!**

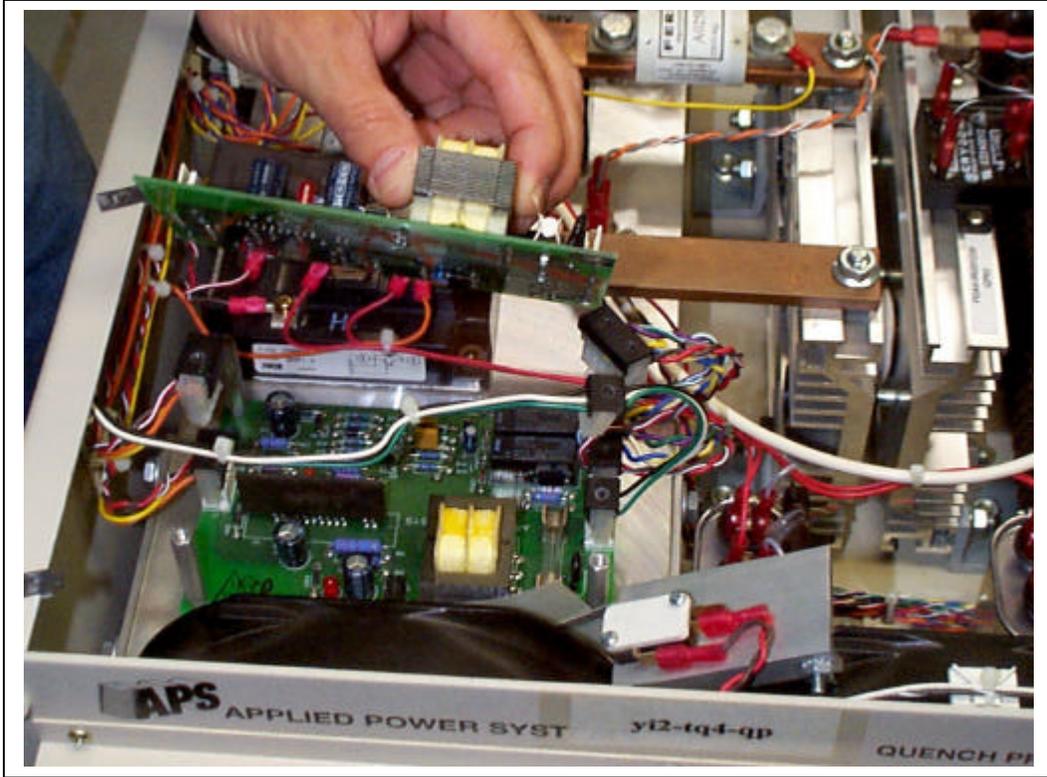


Figure 8

12. Now remove the 4 standoffs and the connections to the bottom IGBT board and then remove the bottom IGBT board. It should now look like Figure 9.

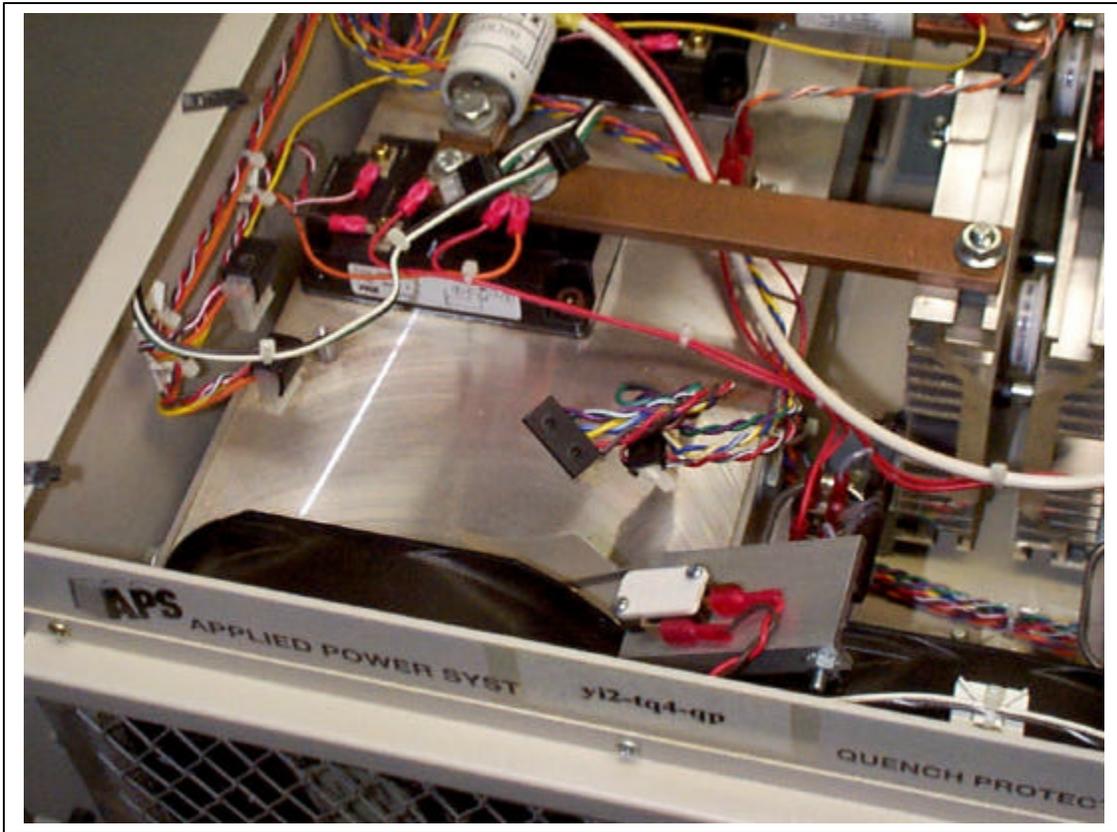


Figure 9

13. You can now replace both IGBT boards with the new IGBT boards. Make sure they have the yellow LED's on them. After you are done replacing them it should look like Figure 10.

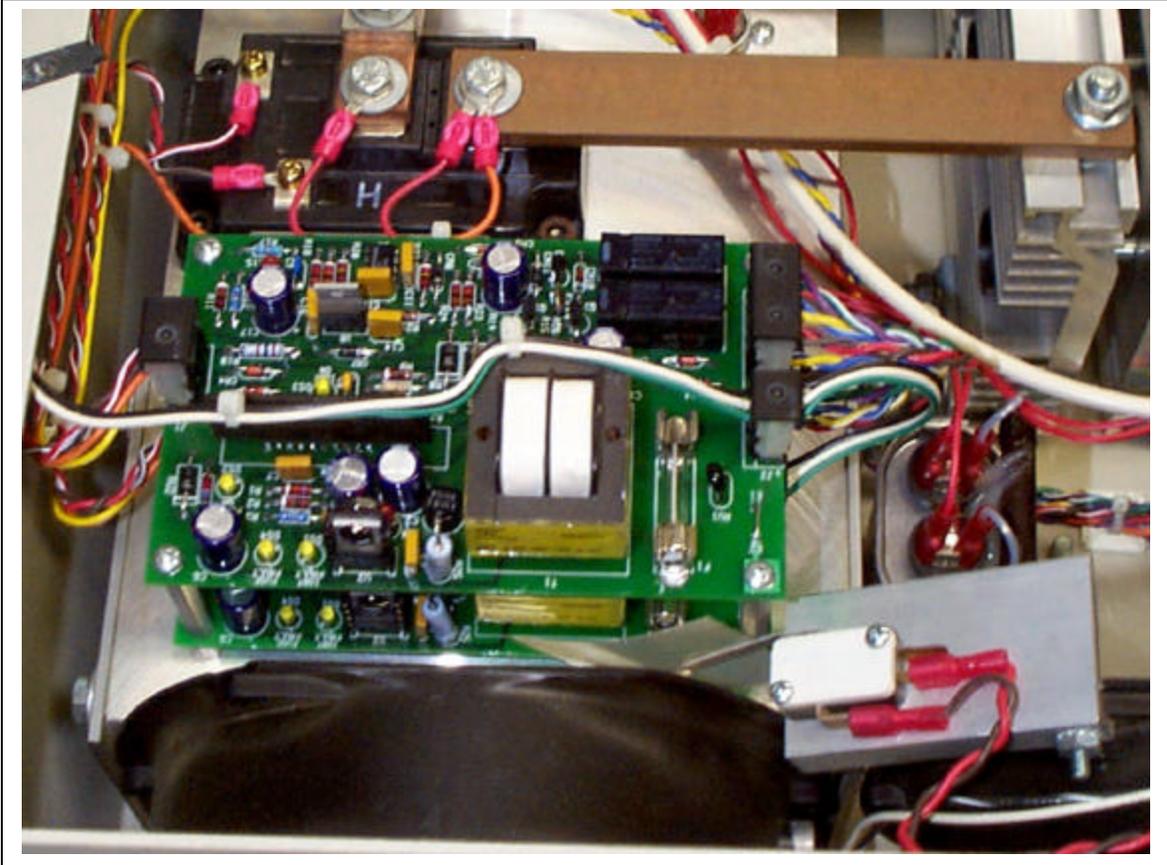


Figure 10

14. You can now put the cover back on the QPA and put the QPA back into the rack. Reconnect the DC cables, plug the QPA back into the surge suppressor and close up the rack

15. Unlock the 208VAC disconnect. Turn on the circuit breaker on the front of the p.s. and make sure all of the power supplies are in REMOTE and STANDBY.