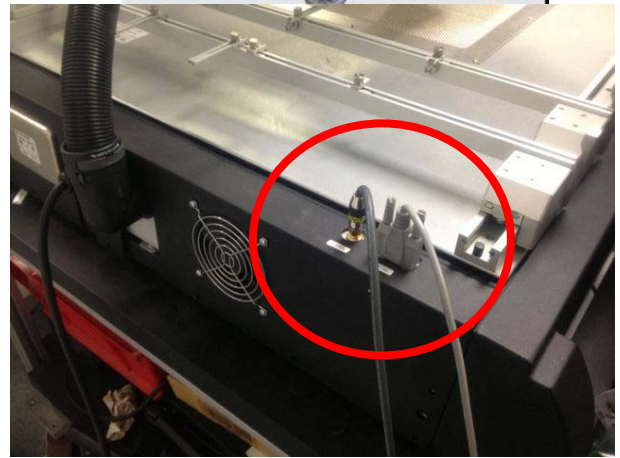
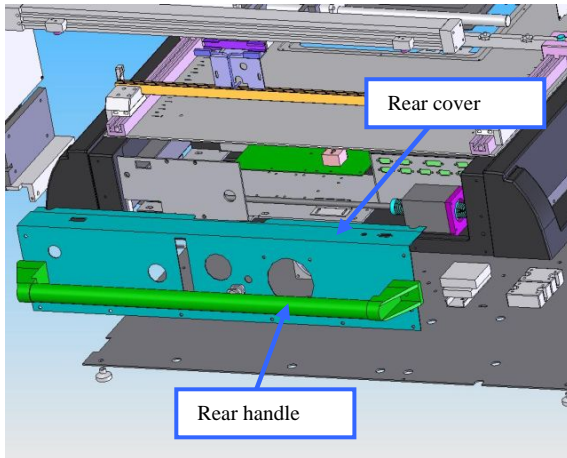
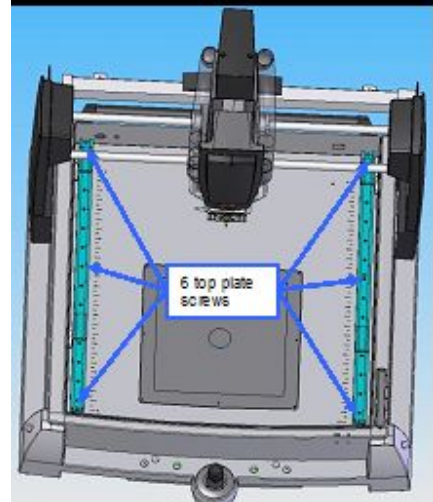


APR-XL VP1 (tube) vacuum pump replacement

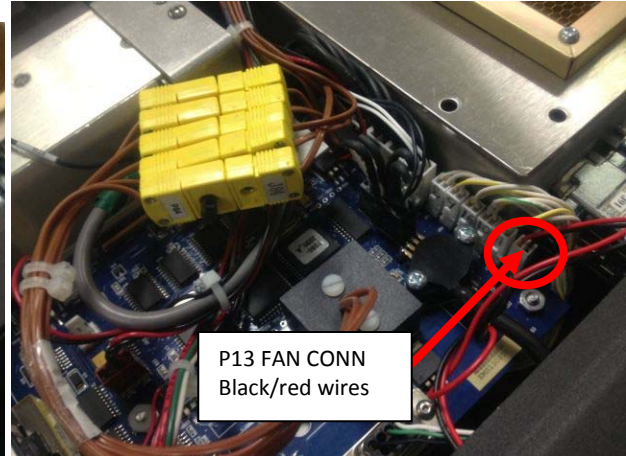
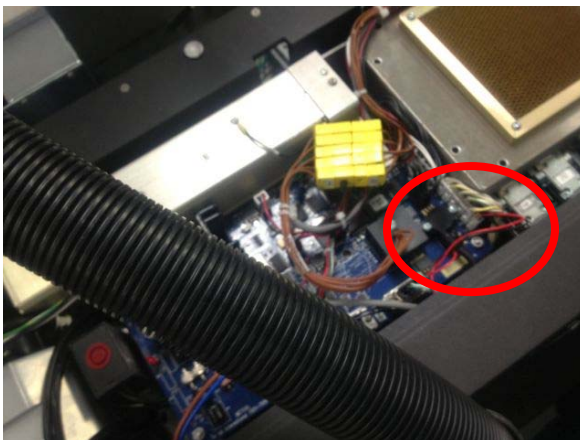
Required Tools:

Allen hex key wrenches, standard set
Socket set/ratchet wrench/extension, standard set
Philips cross-tip screwdriver
Needle-nose pliers

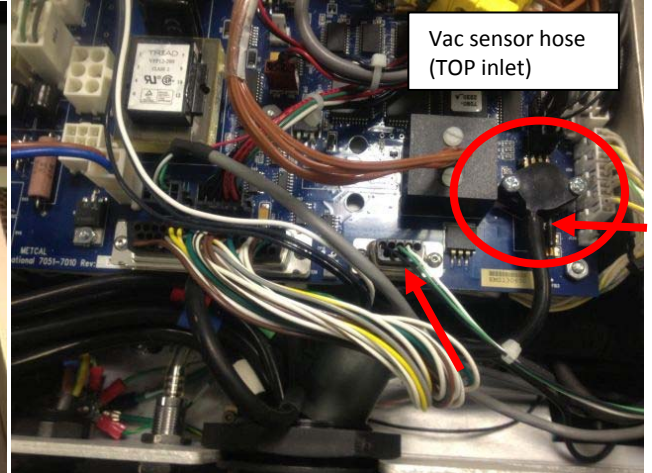
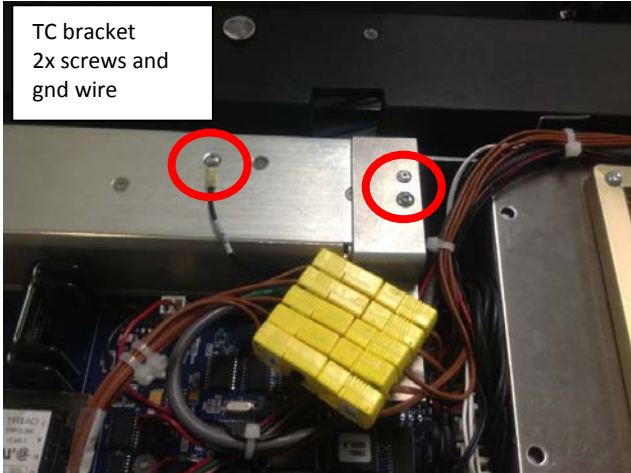
1. Machine is OFF
2. Remove XL top cover, 6x screws (3x each side rail)
3. Remove XL rear panel
 - a. Remove serial cable and video cable
 - b. Remove handle (2x screws)
 - c. Remove 11x rear panel screws



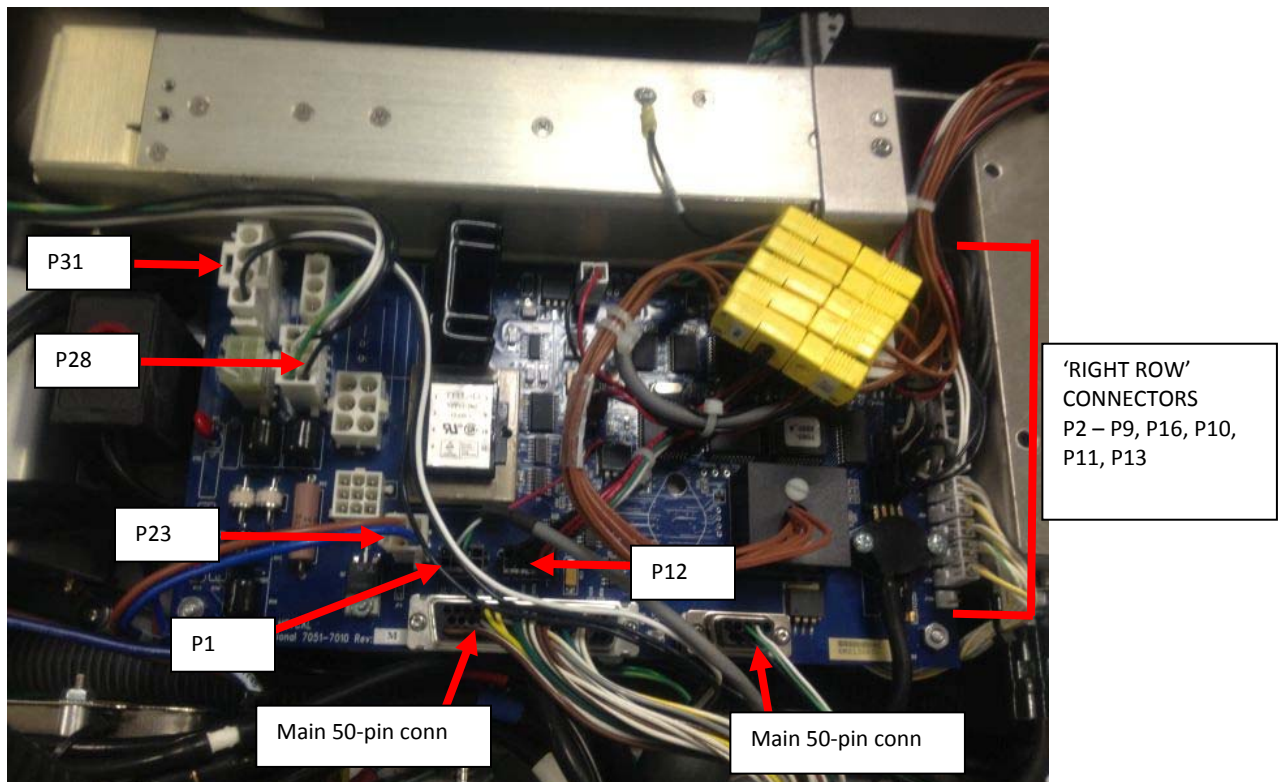
- d. Remove N2 nitrogen fitting (only if necessary to remove rear panel); press down tab to remove
- e. Remove P13 chassis fan connection from main pcba (connector on end of right connector row; black/red wires)
- f. Remove rear panel

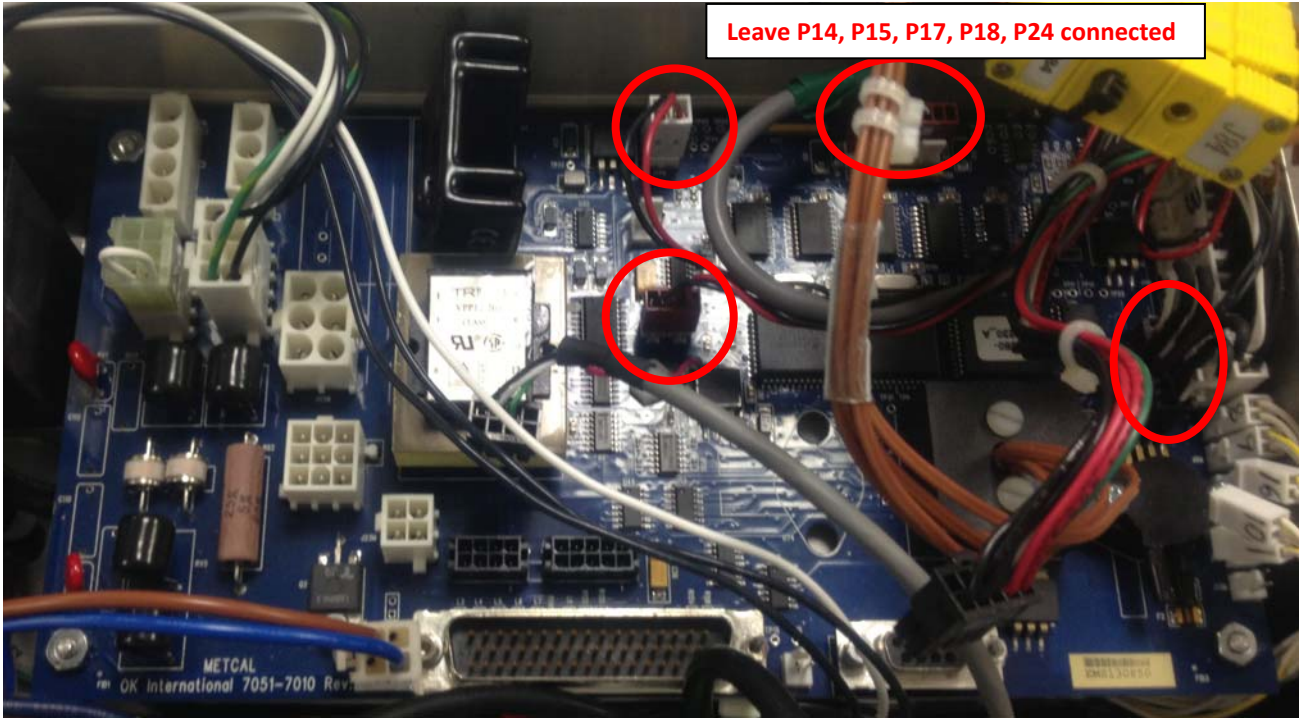


4. Remove XL main pcba control board
 - a. Remove TC bracket 2x screws and ground wire 1x screw from DC power supply
 - b. Remove main 50-pin connector and serial comm connector from main pcba
 - c. Remove vacuum hose from vacuum sensor on main pcba (hose goes to TOP sensor fitting)

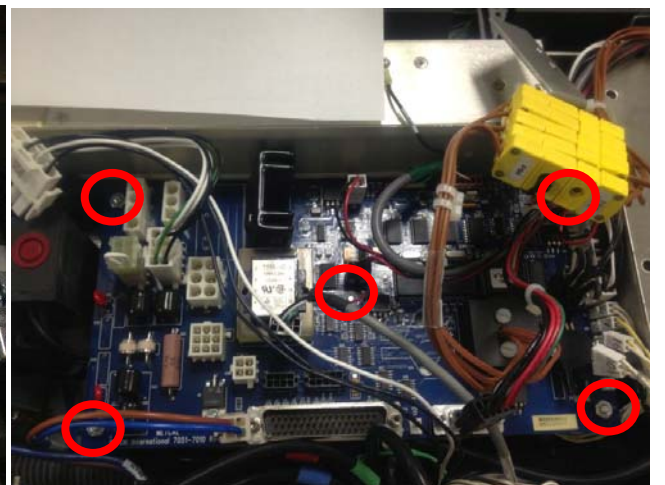
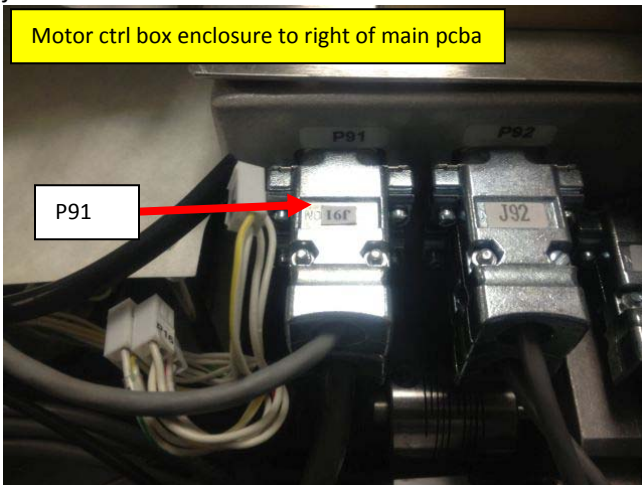


- d. Remove P28, P31, connectors from main pcba
- e. Remove all 'right row' connectors P2-P9, P16, P10, P11, P13 – from main pcba
IMPORTANT: check that each connector removed is labeled with # for correct reinstallation
- f. Leave 'TC black box' and all other connections connected to main pcba
Leave P14, P15, P17, P18, P24 connected. **IMPORTANT: LEAVE P18 CONNECTED**



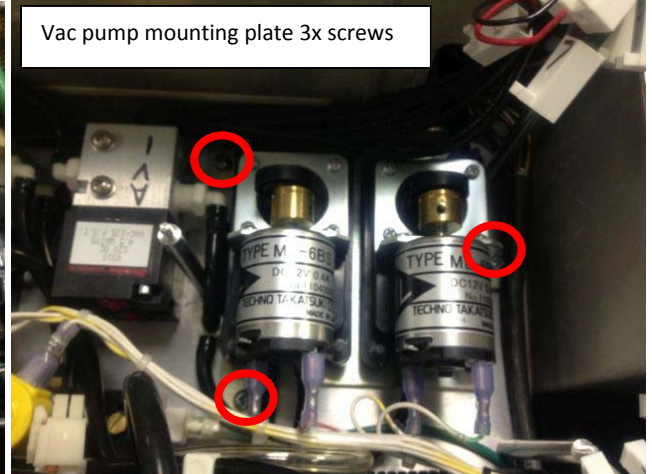
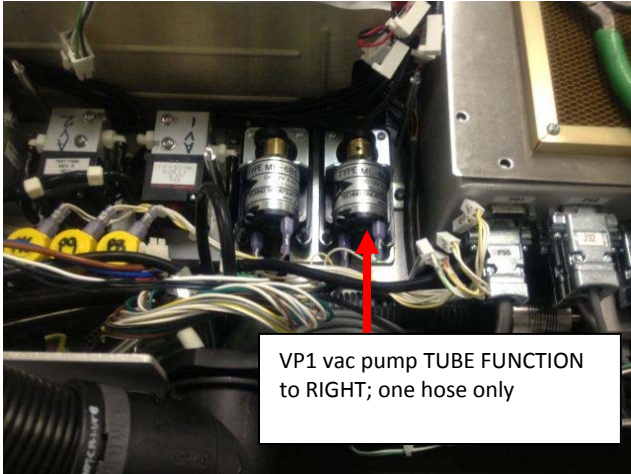


- g. Remove P91 from motor control box enclosure
- h. Remove 5x holding nuts from main pcba; 4x corners and 1x center
- i. Carefully remove main pcba (with connections) and the insulation paper underneath and place on top of a piece of insulated paper on top of DC power supply, base to access the vacuum pumps underneath.
- j.

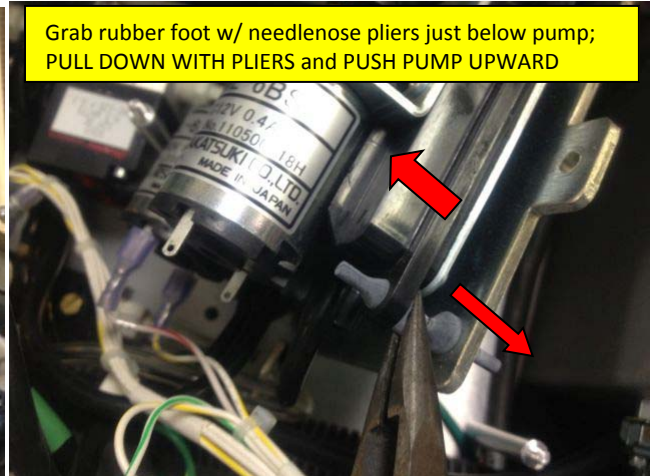
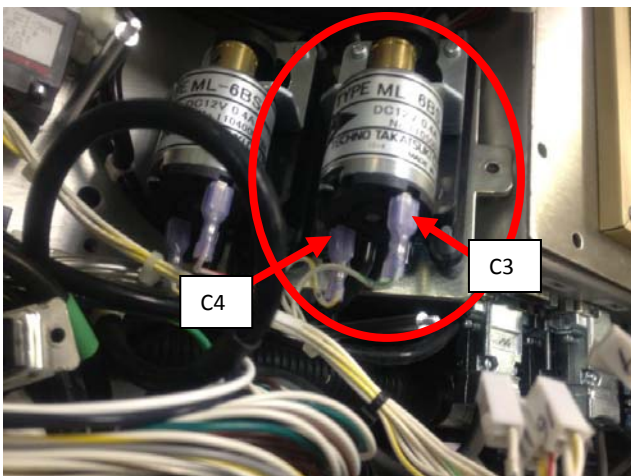


5. Remove/Replace VP1 vacuum pump (TUBE FUNCTION)

- a. Although it may be possible to remove/replace vacuum pump without doing so, the task will be easier if the vacuum pump mounting plate is removed; remove 3x screws (Phillips) for mounting plate
- b. Carefully lift up mounting plate (vacuum pumps still connected) to better access
- c. VP1 vacuum pump for VACUUM TUBE FUNCTION is located on the RIGHT (view from rear of machine); there is only 1 hose connected for VP1 vac pump for tube function.

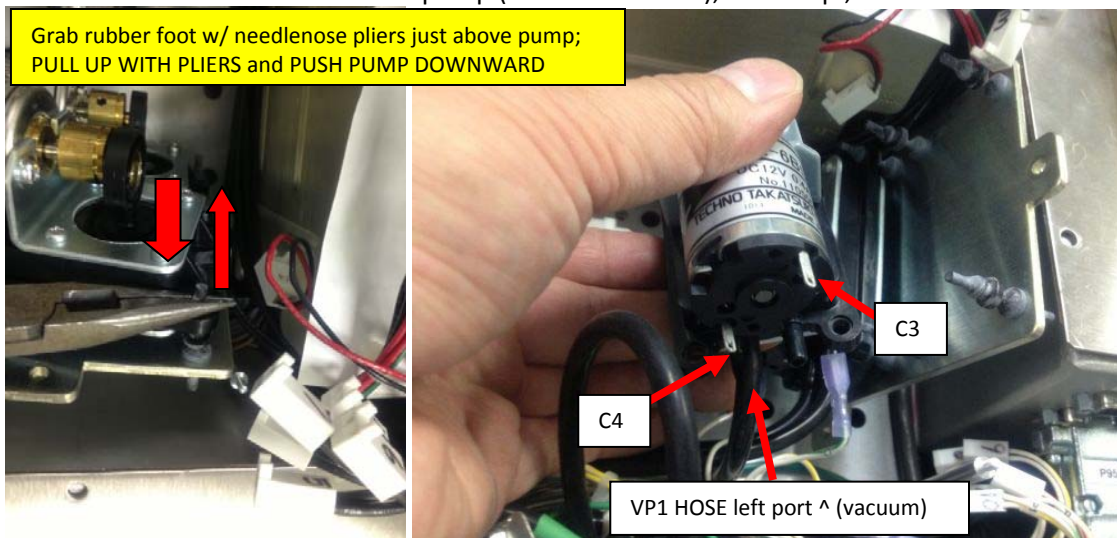


- d. Remove 2x wire connections to VP1 vac pump; note locations for correct reinstallation: C3 is 'top', C4 is 'bottom'
- e. Locate rubber 'feet' in each 4x corners of the vacuum pump
- f. Use a pair of needle-nose pliers and grab the rubber piece as close as possible just underneath the vacuum pump. Squeeze tightly and pull down with the pliers while at the same time pulling upward on the pump to remove the rubber 'foot'. Proceed with the remaining 3x rubber feet.
- g. Disconnect hose from VP1 vacuum pump and remove old pump



6. INSTALL new VP1 vacuum pump (TUBE FUNCTION)

- a. Check VP1 hose for tears or rips; cut end cleanly if necessary
- b. Install hose to VP1 vacuum pump left port (vacuum outlet, the arrow above port will be pointing AWAY)
- c. If the original rubber feet are still intact, there may be no need to replace; inspect each rubber foot. If needing replacing, pull out of mounting plate and insert new piece
- h. Insert pointed top of rubber foot into new vacuum pump corner mount hole. Use needle-nose pliers to grab the rubber foot as close as possible to the top of the pump hole and pull upward on the pliers while at the same time pushing downward on the pump to insert the rubber foot. Proceed with the remaining 3x rubber feet.
- d. Re-install vacuum pump mounting plate, 3x screws (Philips)
Install 2x wires to VP1 vacuum pump (TUBE FUNCTION); C3 is 'top', C4 is 'bottom'



7. RE-INSTALL MAIN PCBA

- a. Install insulation paper on 5x pcba mounting posts
- b. Install main pcba on 5x mounting posts
- c. Install 5x nuts for main pcba; 4x corners and 1x center (plastic nut in center); DO NOT OVERTIGHTEN
- d. Install ALL connectors to main pcba
- e. Install vacuum hose to vacuum sensor on main pcba 'right' (tube to TOP sensor inlet)
- f. Install P91 connector to motor control box enclosure
- k. Install TC bracket 2x screws and ground wire 1x screw to DC power supply

8. RE-INSTALL REAR PANEL

9. RE-INSTALL TOP COVER