# iSED® Automated Erythrocyte Sedimentation Rate Analyzer (SN<5000)

## 30,000 Test Aspiration Maintenance Procedure, 112-28-013, Rev. 1

### Purpose

The purpose of this procedure is to guide the customer in performing the required preventative maintenance on the iSED®  ESR Analyzer (serial number less than 05000).

### Scope

This applies to all iSED® instruments that have reached 30,000 aspirations. This procedure must be performed after every 30,000 tests. The iSED will alert the user when this number has been reached. The items to be replaced are Needle-to-Reading Cell tubing, Probe Tube, and Needle Spring, Needle tip, Peristaltic Pump Sub Assembly Tubing and the Wash Pump Sub Assembly Tubing.

### Required Materials

1. All necessary Personal Protective Equipment.
2. Biohazard Disposal
3. 30000 Test Maintenance Kit (Part # 112-13-019)
    - 8mm Open-End Wrench
    - Needle Spring
    - Needle Tip
    - Needle-to-Reading Cell Tubing
    - Probe Tube
    - Tie, Nylon Cable 2.3mm W, Black
    - Tube, Peristaltic Pump Sub Assembly
    - Tube, Wash Pump Sub Assembly

### Preparation

1. Power on iSED®
2. Run a Wash Cycle by pressing the Wash Cycle Icon.
3. Power off instrument.

## Procedure – Replacing Piercing System Parts

Note: If you are only replacing the needle tip only follow steps 1 through 7 and steps 13 through 19.

If you are only replacing the Peristaltic Sub Assembly Tubing and the Wash Pump Sub Assembly Tubing only follow steps 20 through 43.

1. Remove the Needle Door from the rear bezel by turning the locking screw counterclockwise. (Figure 1)

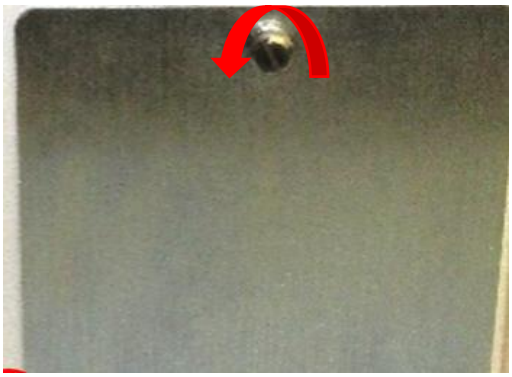


**Figure 1**

2. Remove the Wash Pump Tubing from the top of the Probe Tube. (Figure 2)

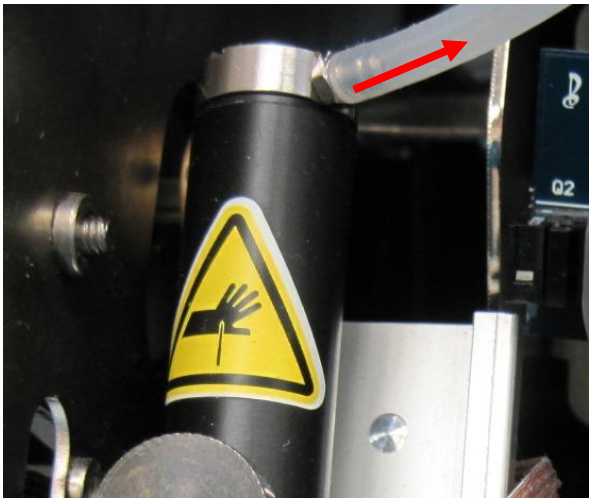



**Figure 2**

3. Unclip the black wire clip and remove the Probe Wire**.** Be careful to not damage the probe wire. (Figure 3)

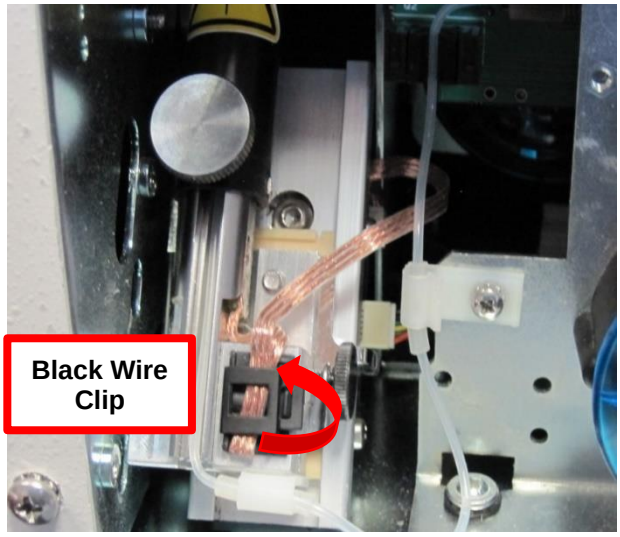



**Figure 3**

4. Loosen the **black** Thumb Screw **on the side** of the piercing system to allow the Probe Tube to be moved forward. Only loosen the Thumbscrew until the Probe Tube can be pivoted out. Do not remove Thumbscrew from the piercing system. (Figure 4)

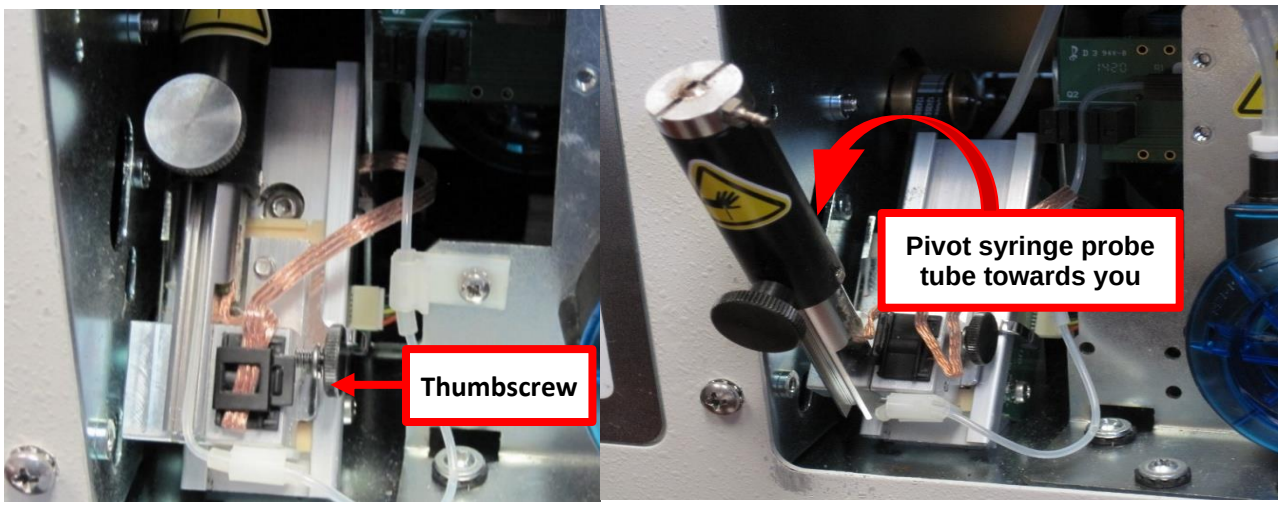



**Figure 4**

5. Remove the large Thumbscrew from the front of the Probe Tube. (Figure 5)

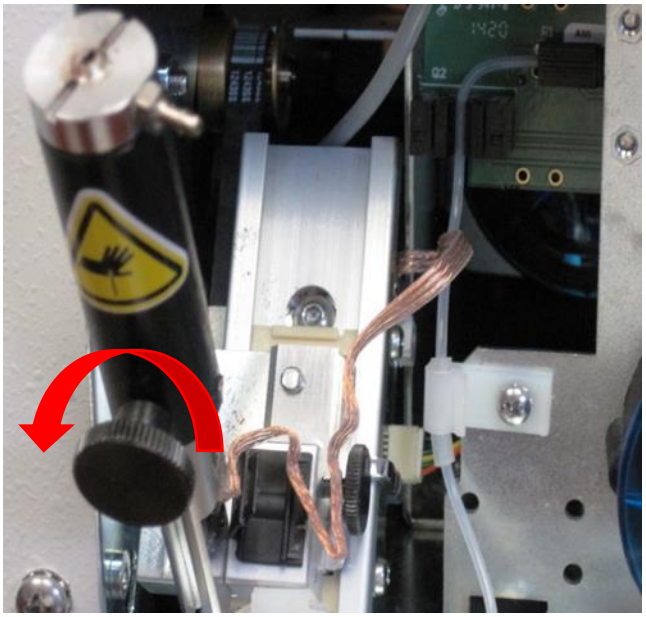


**Figure 5**

6. After removing the Thumb Screw, the Probe Tube assembly and the Needle Spring can be removed from the Needle Tip. (Figure 6)

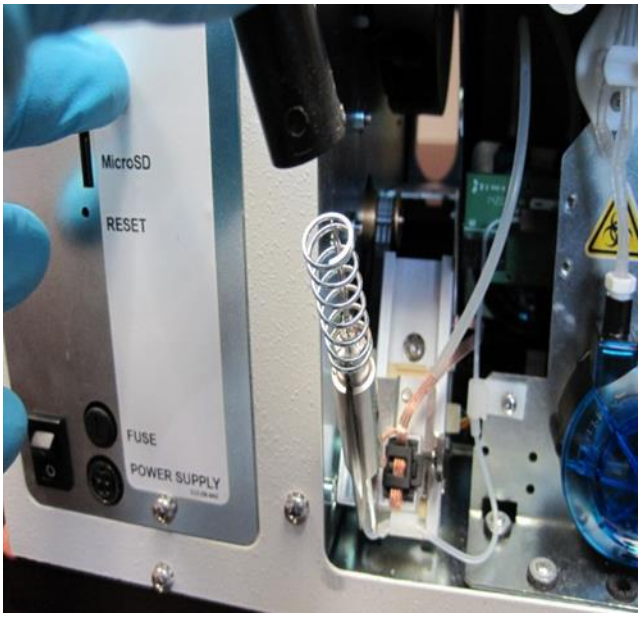



**Figure 6**

**Caution: This will expose the needle and could cause potential injury!**

7. Use the Open-End Wrench to unscrew the old Needle Tip Assembly (counter- clockwise) from Needle Piston Assembly. Discard the Needle Tip Assembly into a proper Biohazard disposal. (Figure 7)

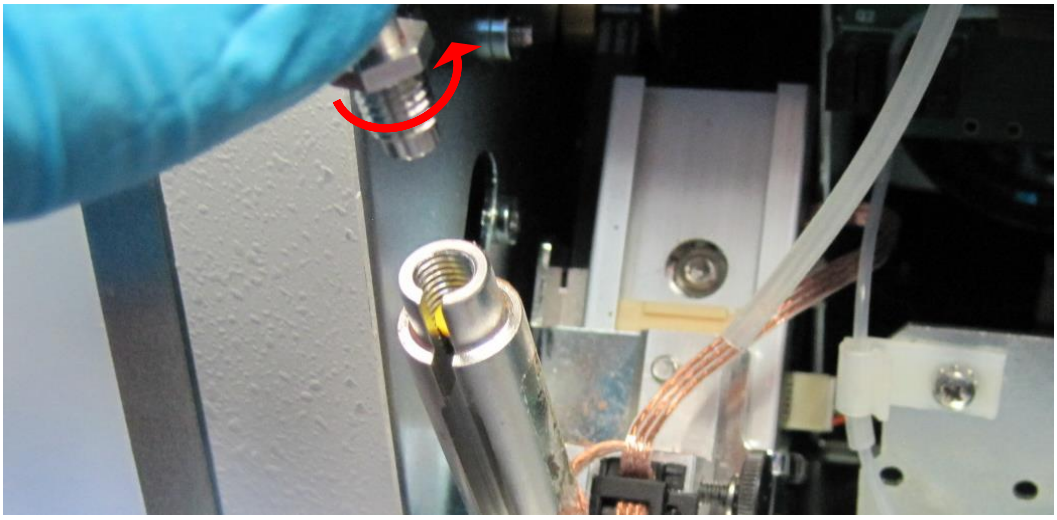


**Figure 7**

8. Remove the old Needle-to-Reading Cell Tubing by removing the tubing from the Retention Clips, the Tail Sensor, and the Reading Cell. The tubing at the Reading Cell is removed by turning the brown connector in a counter-clockwise direction. (Figure 8)

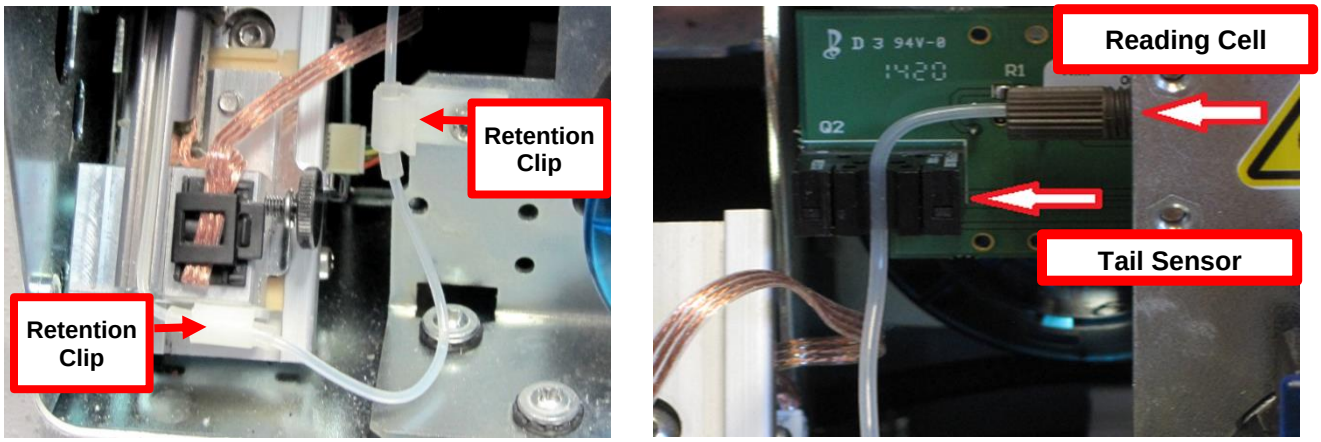



**Figure 8**

| Note: If you plan to remove the Peristaltic Sub Assembly Tubing and the Wash Pump Sub Assembly Tubing as well please follow steps 30 through 40. |
|---|

9. Connect the new Needle-to-Reading Cell Tubing to the Reading Cell by tightening the brown thumbscrew on the end of the Reading Cell Tubing into the Reading Cell ensuring that it remains straight and not cross-threaded. (Figure 9)

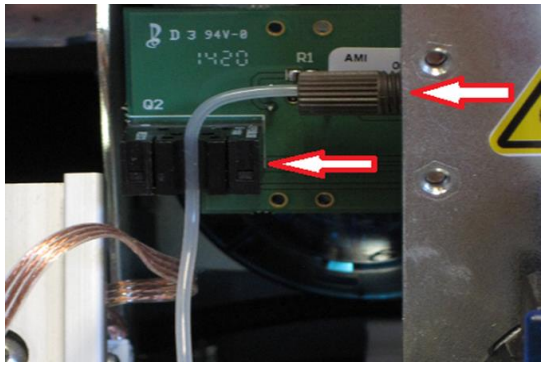



**Figure 9**

10. Insert the new Needle-to-Reading Cell Tubing into the Needle Piston Assembly by ensuring that the tubing is resting on the lowest possible "ledge" of the interior of the Needle Piston. Figure 10

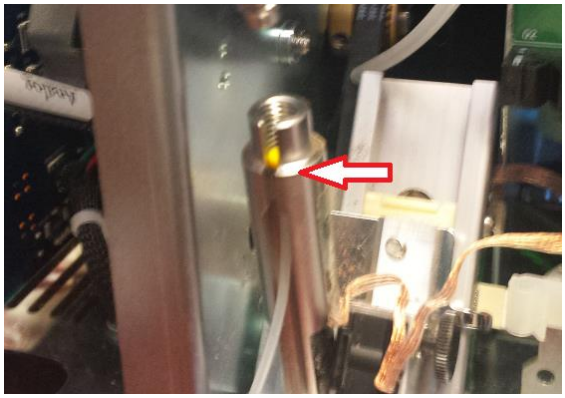


**Figure 10**

11. Insert Needle-to-Reading Cell Tubing into the Tail Sensor while verifying a nearly 90° angle from the reading cell through the tail sensor. See figure 9 as a reference.

**Note:** Tubing must be seated in this way to ensure the correct amount of sample is withdrawn.

12. Re-Insert Needle-to-Reading Cell Tubing back into retention clips. Figure 11

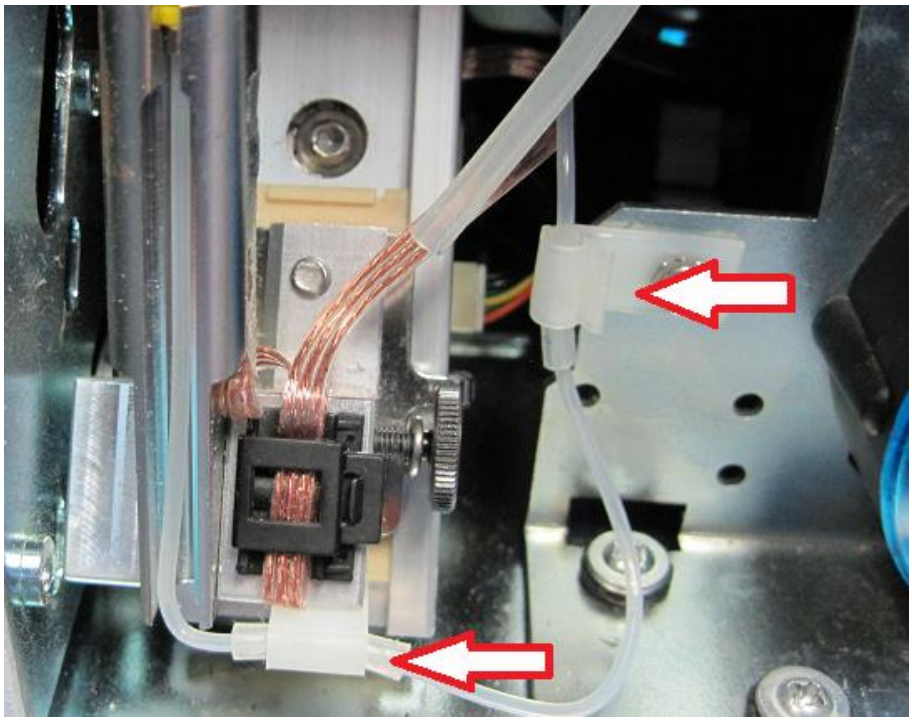


**Figure 11**

13. Screw the replacement Needle Tip into the Needle Piston Assembly. Tighten as much as possible by hand. Tighten another ½ turn with the Open-End Wrench. Figure 12

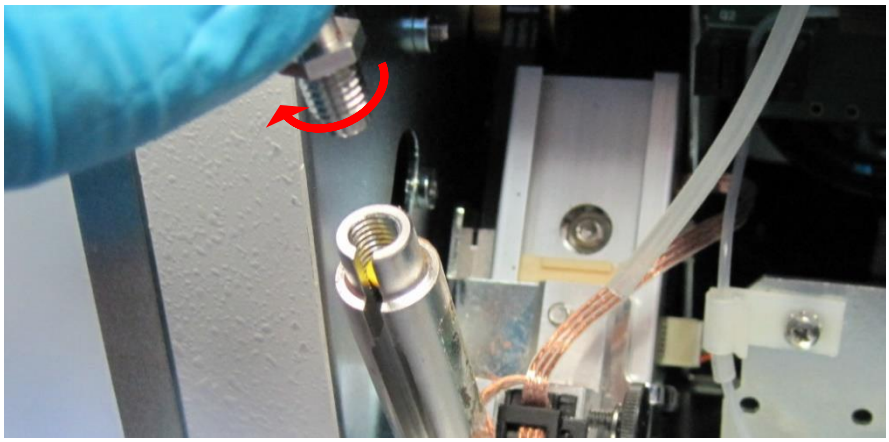


**Figure 12**

14. Replace the Needle Spring and Probe Tube with new parts provided. The Probe Tube should be placed onto the Needle Spring with the yellow warning label and the Thumbscrew hole directly facing you as it was when it was removed. Figure 13

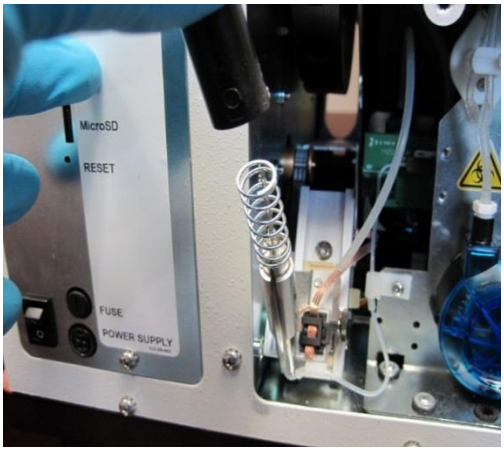



**Figure 13**

15. Place the large Probe Tube Thumbscrew onto the Probe Tube immediately under the yellow warning label. **Reminder**, the Probe Tube is placed on the Piercing System with the yellow warning label and the Thumbscrew facing outward. (**NOT** to the side. This will damage the iSED and a result in a return of the iSED to ALCOR for service.)

16. Compress the Needle Spring and Probe Tube housing (pressing down) until the Needle Tip is slightly exposed through the silver portion on top of the Probe Tube. Turn the large Thumbscrew in a clockwise direction until the Thumbscrew is secured by hand. Do not overly tighten the Thumbscrew. Release the tension on the Probe Tube and allow the Needle Tip to return to a safe position within the Probe Tube. Figure 14

**Figure 14**

**CAUTION!**

**Compressing the assembly will expose the needle and could cause potential injury!**

17. Pivot the Needle Piston Assembly back into the operational position. Replace the Washing Tube back onto the Barb Connector of the Probe Tube. Figure 15 and 16

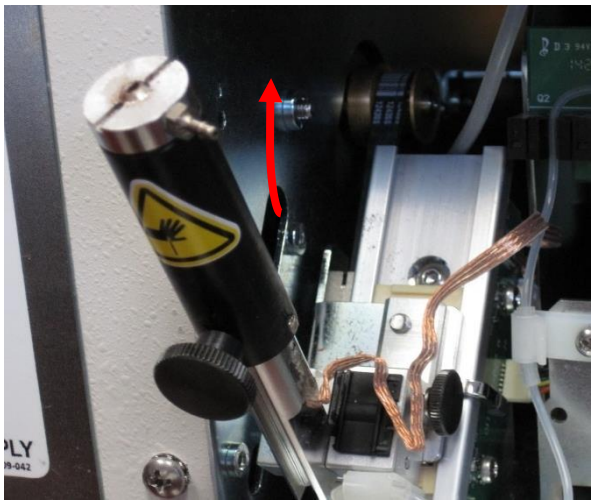


**Figure 15**


**Figure 16**

18. Retighten the long **black** Thumbscrew **on the side** of the Piercing System. Tighten the Thumbscrew completely. Verify the Needle Piston Assembly is locked in position and cannot pivot outwards. Figure 17

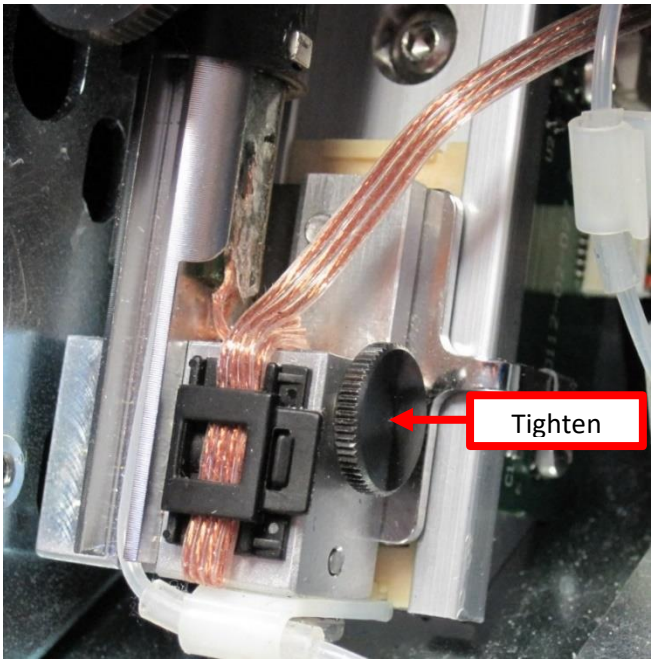



**Figure 17**

19. Replace the Probe Wire into the black Wire Clip. Figure 18

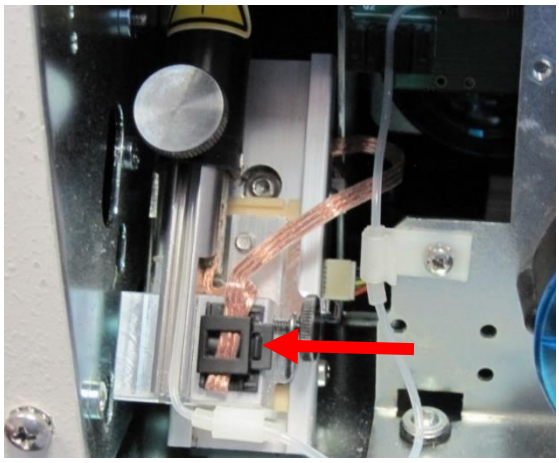


**Figure 18**

## Procedure - Remove Rear Enclosure

20. Power off instrument.
21. Disconnect the rapid connect tubing attached to the Waste and Wash containers and remove these containers from the *iSED*®. Figure 19


**Figure 19**

22. Remove the back enclosure by unscrewing the screws indicated in Figure 20 & 21.

**Figure 20**

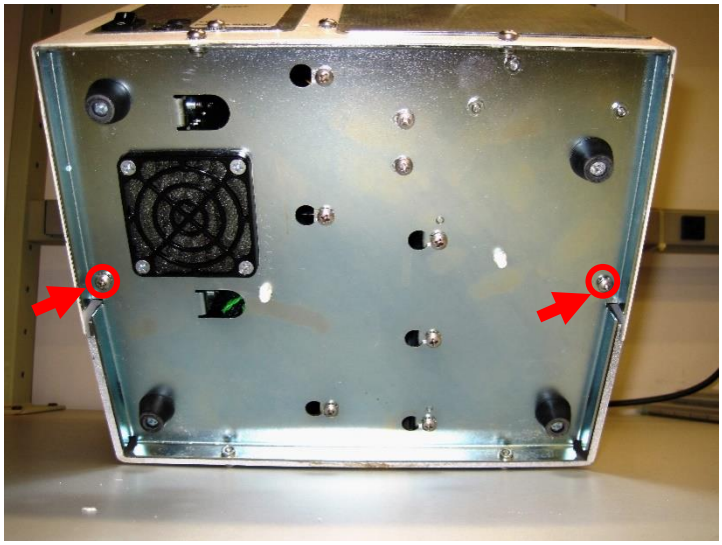


**Figure 21**

23. Once these screws are removed, slowly split the back portion from the front as depicted below in Figure 22 but do NOT fully remove the enclosure yet.

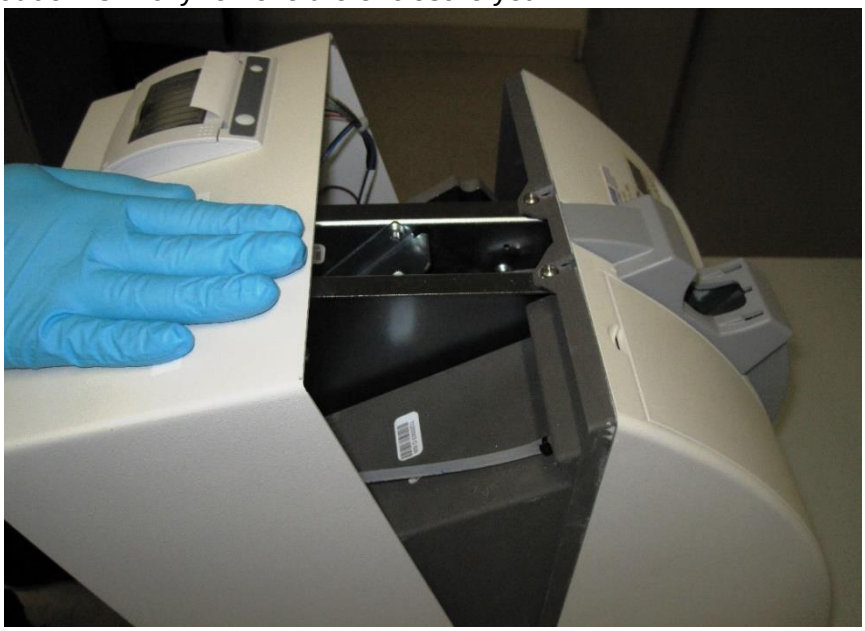


**Figure 22**

24. Once you have the back and front enclosures split as shown above, you will see two sets of wires leading from the printer to the main electronics board. Disconnect these two wire sets from the top of the main board. Figure 23

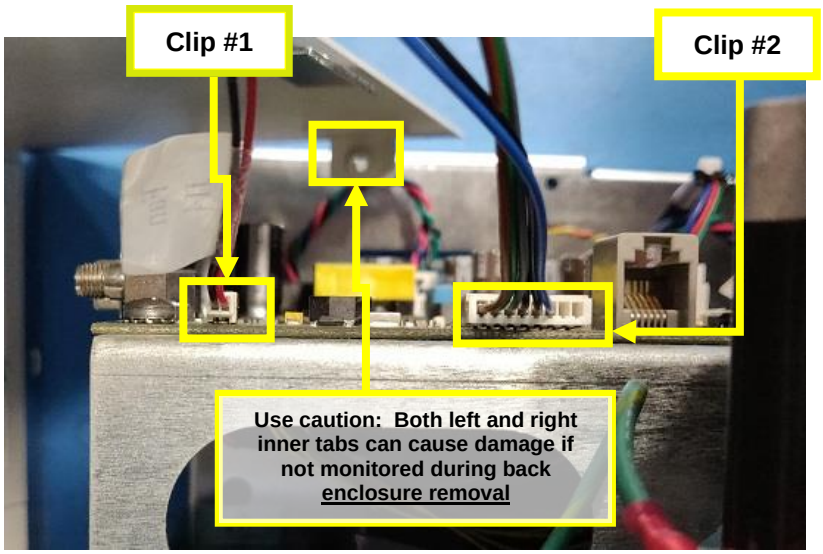



**Figure 23**

25. Two additional wires must be disconnected before the analyzer can be separated. These wires lead from the power switch to the main electronics board. Disconnect these wires from the main electronics board. Figure 24

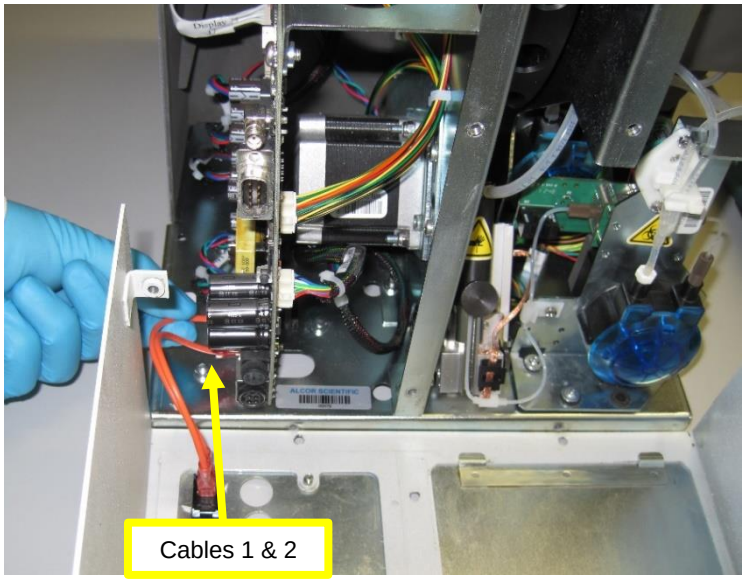



**Figure 24**

26. After disconnecting these wires, the back enclosure will be able to be completely removed. Carefully separate the back enclosure from the front while watching to ensure both the right and left interior parts of the back enclosure clear the other mechanics without damage.

## Procedure - Replace Wash Pump Tubing

27. Remove tubing from the left side of the reading cell and tail sensor by turning the brown thumbscrew counterclockwise. Figure 25

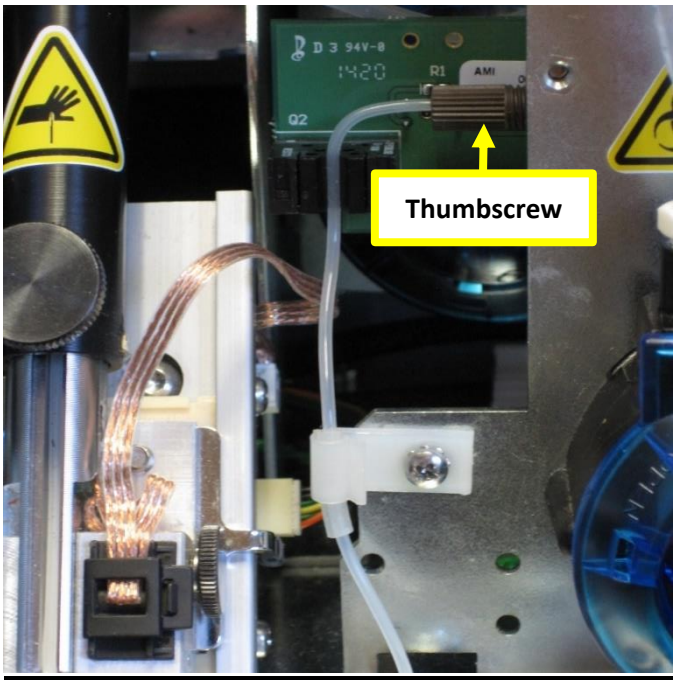



**Figure 25**

28. Remove the tube from the Washing Ring Barb connector**.** Figure 26

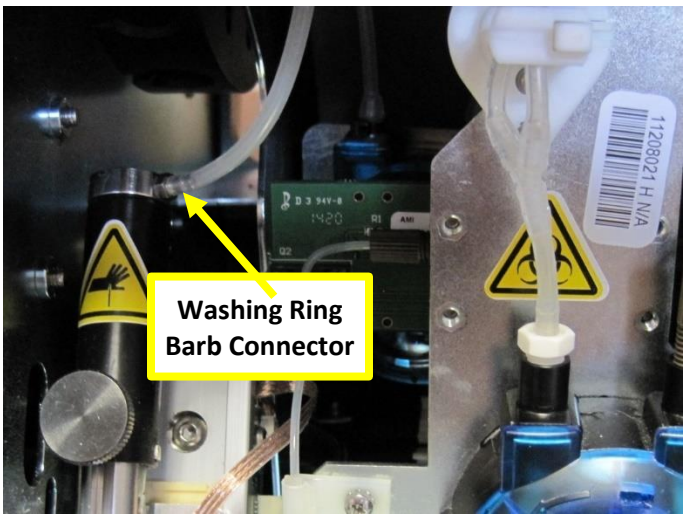



**Figure 26**

29. Remove the front screw on the peristaltic pump Figure 27 and set the entire sub-assembly aside.

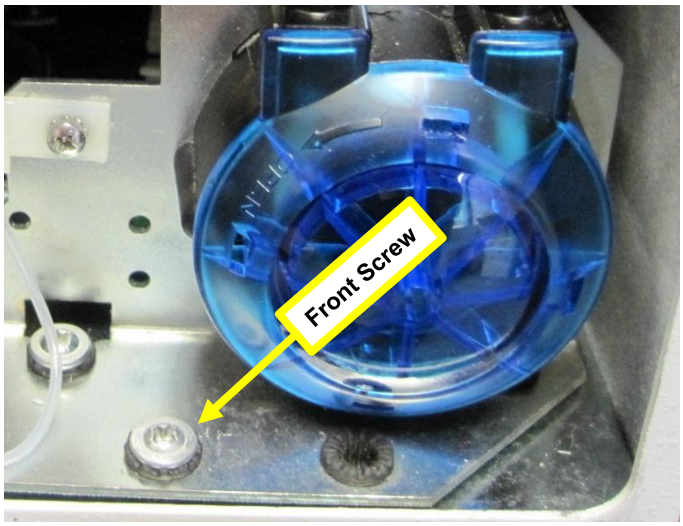



**Figure 27**

30. Disconnect the right side of wash pump tubing by removing it from the “Y” connector. Disconnect the tubing from the barb connector on the Probe Tube Figure 28

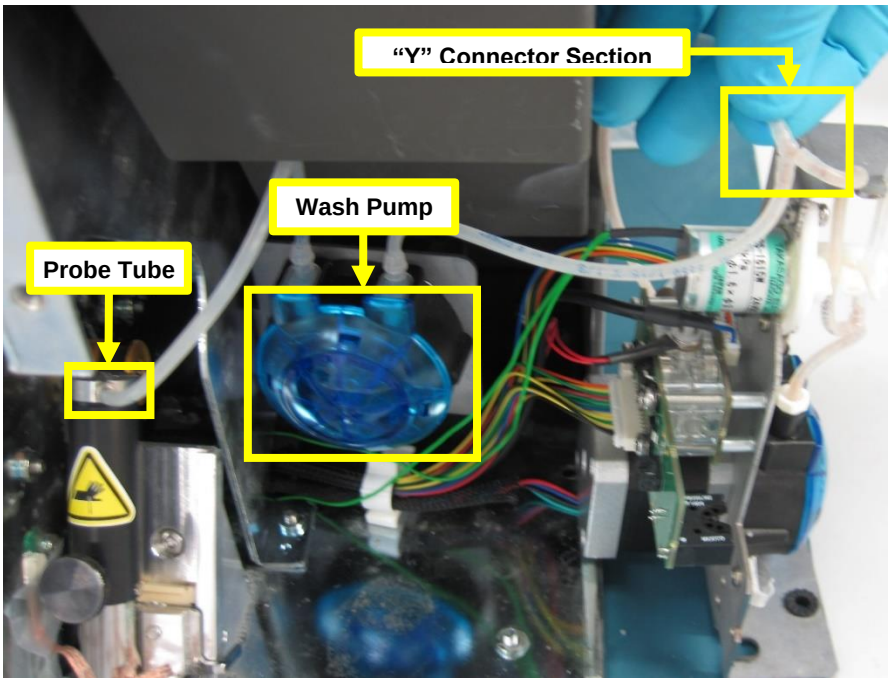



**Figure 28**

31. Remove the blue cover from the wash pump by turning slightly counterclockwise and gently pulling it towards you. Figure 29
32. Remove the old wash pump tubing sub-assembly. Be careful not to damage the roller as the old tubing is removed. Clean inside of black compartment (if necessary). Dispose of old tubing in Biohazard Waste containers.

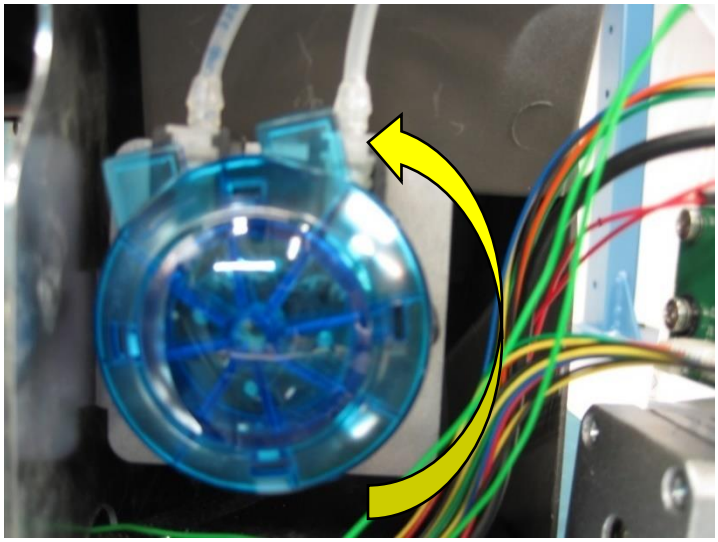


**Figure 29**

33. Starting on the left side of the wash pump, insert the grooves of the collar on the new tubing into the slot on the wash pump. Slowly work the tubing into the wash pump in a counter-clockwise direction. Once the tubing is in place, insert the grooves of the collar on the new tubing into the slot on the right side of the wash pump. Figure 30 shows correct placement for tubing.

**Note:** The longer portion of tubing should be on the left side of the wash pump. A blunt object can be used to help insert the new wash pump tubing into the wash pump. Be careful not to puncture the tubing.

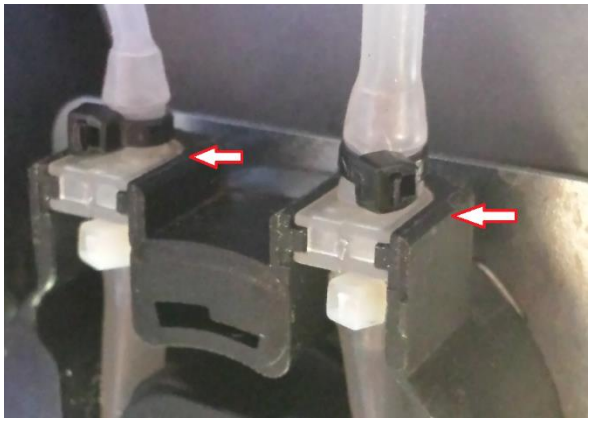


**Figure 30**

34. Once completed, return the blue cap as removed turning clockwise to lock in place. Attach the right side of the new wash pump tubing to the “Y” connector and secure with zip tie. Attached the left side of wash pump tubing to the barb on the right side of the syringe probe tube.

35. Slide the Peristaltic pump back into its original position between the two rubber grommets, Figure 31 and secure it with the screw removed in the earlier step.

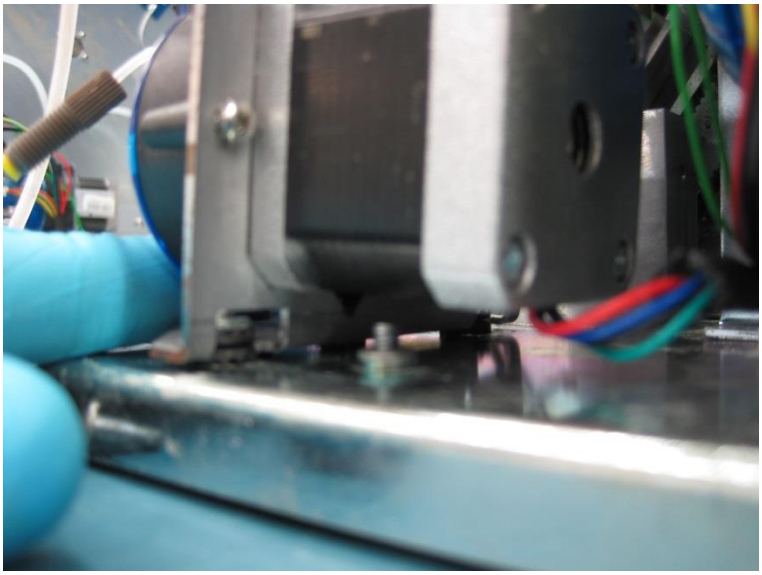


**Figure 31**

## Procedure - Replace Primary Pump Tubing

36. Remove the tubing from the white connector on the left side of the peristaltic pump and unscrew the brown thumbscrew on the right. **Figure 32**

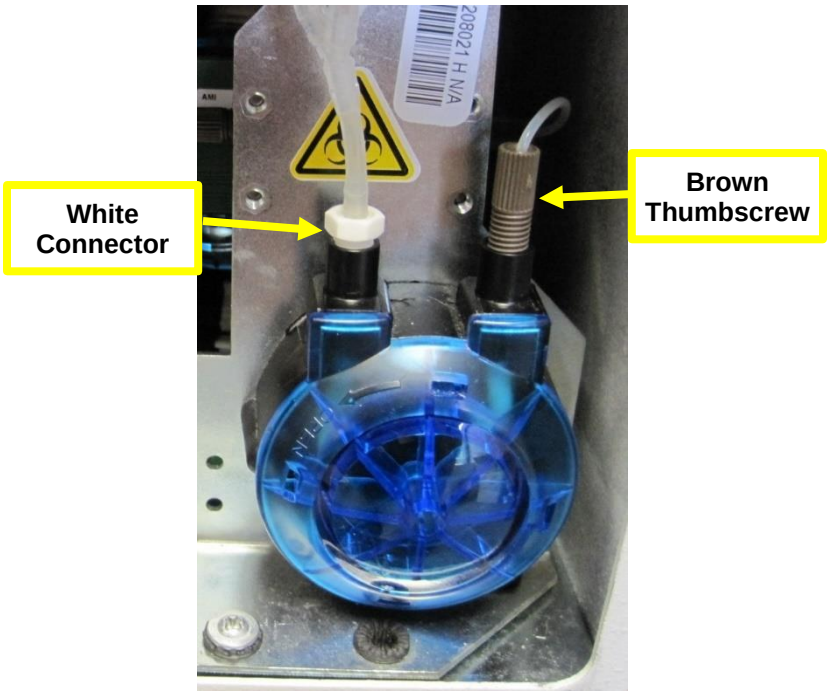



Figure 32

37. Loosen and remove the blue cap on the peristaltic pump in the same manner as the wash pump cover.

38. Remove the old primary pump tubing. Being careful not to damage the roller as the old tubing is removed. Clean inside of black compartment (if necessary). Dispose of old tubing in Biohazard Waste containers.
39. Starting on the left side of the primary pump, insert the groves of the new tubing into the slot on the pump. Slowly work the tubing in the pump. Once the tubing is in place, insert the groves of the new tubing into the slot on the right side of the pump. See Figure 33 for correct placement.

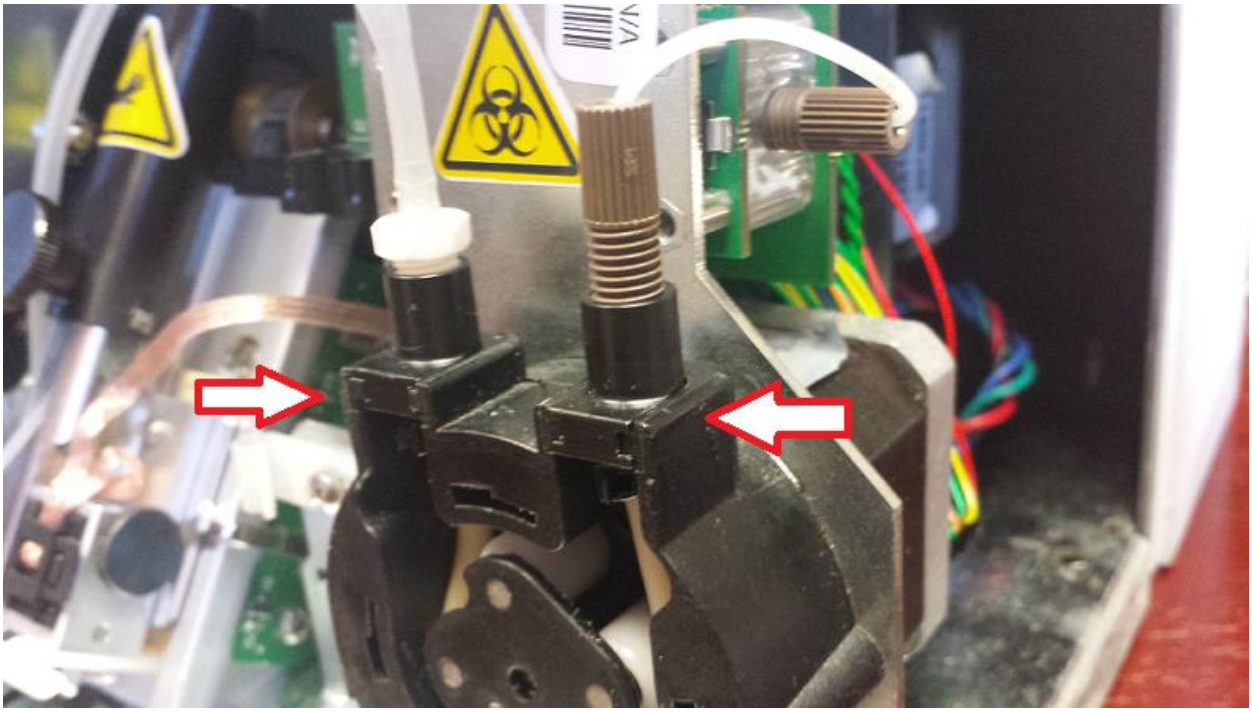


**Figure 33**

40. Once completed, return the blue cap as removed turning clockwise to lock in place. Reconnect the tubing to the white connector on the left and re-attach the brown thumbscrew to the right of the peristaltic pump.

## Procedure - Reassemble Rear Enclosure

41. Attach the two wires leading from the power switch to the main electronics board. Figure 34

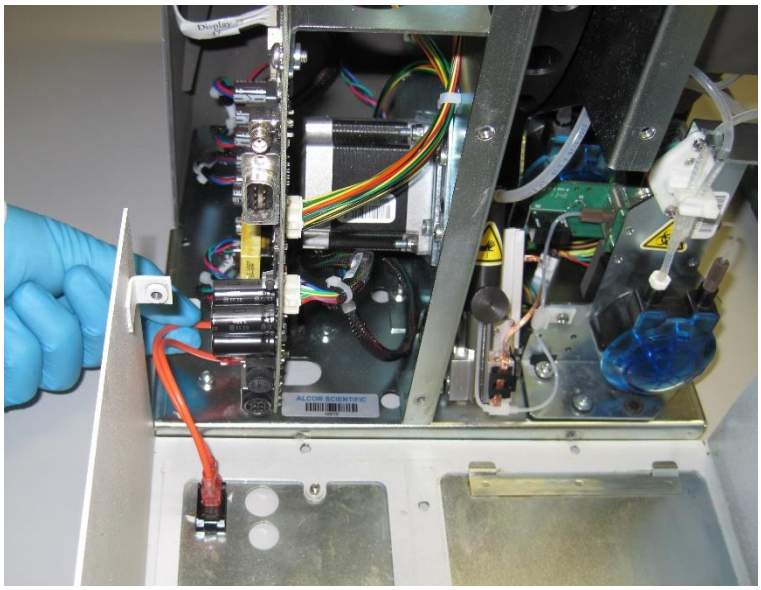
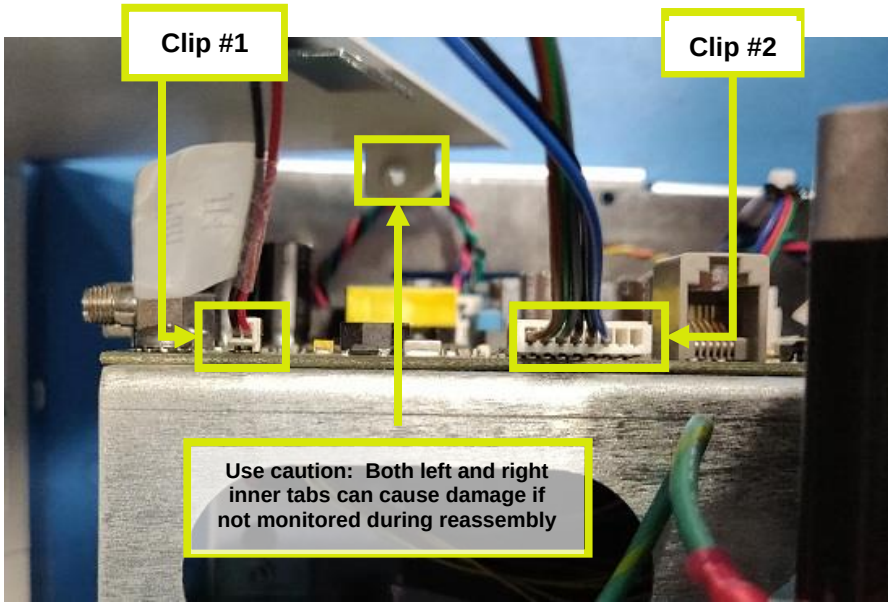


**Figure 34**

42. Attached the two cable wires leading from the printer to the main electronics board. Place the panel in a leaning manner to account for the inner tabs, avoid damaging any components inside the analyzer. Figure 35




**Figure**

43. Verifying everything is plugged back in and that the enclosure is tightly flush with the front molding, screw all ten screws on the back and underside of the analyzer. Reconnect wash and waste bottles. Perform 3 wash cycles and check for leaks. Refer to Figure 2 and Figure 3 for locations of screws.

## Procedure – Update Software

44. Turn on the iSED and allow the analyzer to boot up to the Main Menu.

45. Press the screwdriver and wrench icon on the main menu.

46. Enter the code “19912” and press the enter key to submit the code.

47. Press the right-hand pointing blue arrow at the lower right corner until screen #3 appears in the upper right corner.

48. Press the grey box next to the Toolbox icon as indicated below. This will reset the Maintenance Counter number inside that grey box to 0. Figure 19

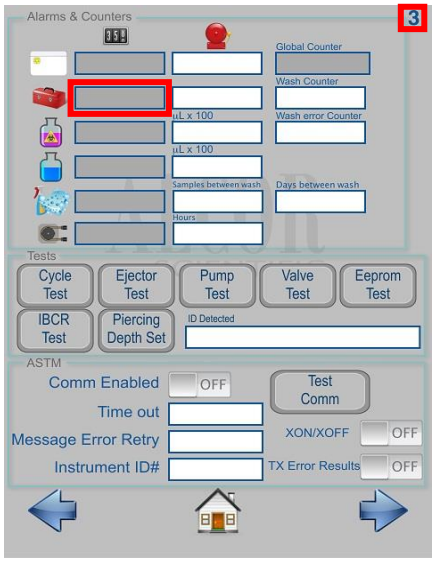



**Figure 19**

49. Press the Grey box next to the pump icon outlined in red in Figure 19. This will reset the Maintenance Counter number inside that grey box to 0.

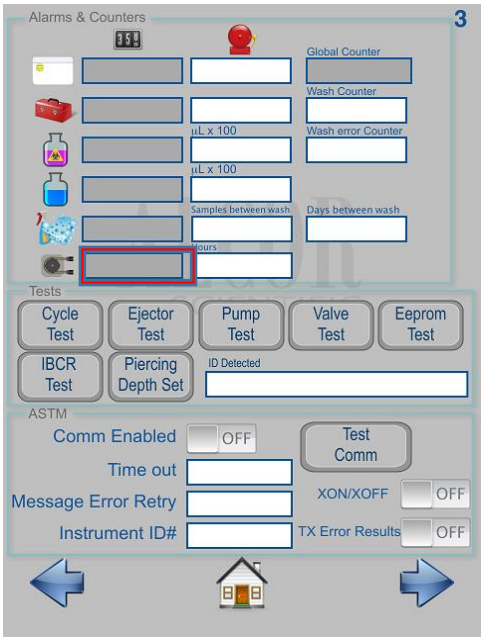



**Figure 20**

50. Press the Home button at the bottom of the screen to return to the Main screen.

## Procedure – Finalize

51. Select the ‘home’ icon to return to the Main Menu.
52. Perform a regular wash and ensure that there are no errors and no leaking.
53. Re-install the back Needle Door.

**Contact Technical Support @ (800) 495-5270 when completed.**