miniiSED® Automated Erythrocyte Sedimentation Rate Analyzer

PCB and Reading cell Kit replacement Procedure, 1017-28-006 Rev. 0

Purpose

The purpose of this procedure is to calibrate and assemble the miniiSED PCB and Reading Cell Spare part Kit for *miniiSED*® ESR Analyzer.

Scope

This applies to all *miniiSED*® instruments that have operation and/or calibration issues related to Main Board, Reading Cell or Analog Wire Assembly.

Required

1. All necessary Personal Protective Equipment.
2. Biohazard Disposal
3. PCB and Reading Cell Replacement Kit (1017-13-012)

Supporting Documentation

4. 112-24-043 – Analog Cable Sub Assembly Procedure
5. 112-08-064 – Reading Cell Type 1 Sub Assembly
6. 1017-08-009 – Piercing Module Sub Assembly
7. 222-09-011 – iSED/iSED Elite Test Credit Transfer Procedure

Necessary Tools

8. 8 mm Wrench (included with kit)
9. Phillips Screwdriver # 2
10. Wire cutters
11. 5.5mm Nut Driver

iSED (SN<5000) PCB and Reading Cell Replacement Kit BOM

Part number	Quantity	Description
		Reading Cell
000032	2	Washer, Lock, M3
000053	2	Screw, M3x25 Pan Head Phillips
000149	4	Nylon Washer, M3 black
000180	2	Nut M3, tooth washer hex
112-08-064	1	Reading Cell Type 1 Sub Assembly
100-10-010	1	Antistatic Bag 4" x 6"
		Main Board
1017-02-001	1	miniiSED Main Board
100-10-009	1	8 x 10 inch Reclosable Static Shielding Bags
000253	1	SOM Module
		Tubing, Analog Cable, and Tools
112-13-023	1	Tube, Needle to Reading Cell Type 1 Sub Assembly
100-15-054	1	8mm Open-End Wrench
112-13-030	1	Spare Part, Reading Cell to Primary Pump Tube (Type 1)
112-08-054	1	Analog Cable Sub Assembly
100-10-012	1	Ziploc Bag 7" x 9"
222-13-003	1	Pump Tubing Replacement Kit for iSED Elite and miniSED
		Final Packaging
100-10-011	3	Desiccant Bag 5 gram 58x43mm
100-09-060	1	Spare Part Label
100-10-008	1	Anti-static foam lined box, 12" x 8" x 2 3/4"
112-50505	1	iTest Transfer Card

Procedure

Notes: 1. It's advisable to read the procedure before proceeding with the parts replacement.

2. make sure that all ESD precautions are taken to avoid damage

3. For devices/original PCBs that cannot be powered on and settings cannot be retrieved, contact ALCOR Technical Service for configuration settings.

1. **Retrieve data from the Main Board to be replaced and load transfer card with tests. Ensure external printer, Thermal Printer, Omniprint (100-02-002), is attached to USB connection of miniiSED device:**

Note: If the device isn't operational, skip step 1 and proceed with Step 2. Step 4.3 will assist in mechanically calibrating the unit.

1.1. Navigate to Menu>Settings>Advanced Settings>Export Config per Figure 1.

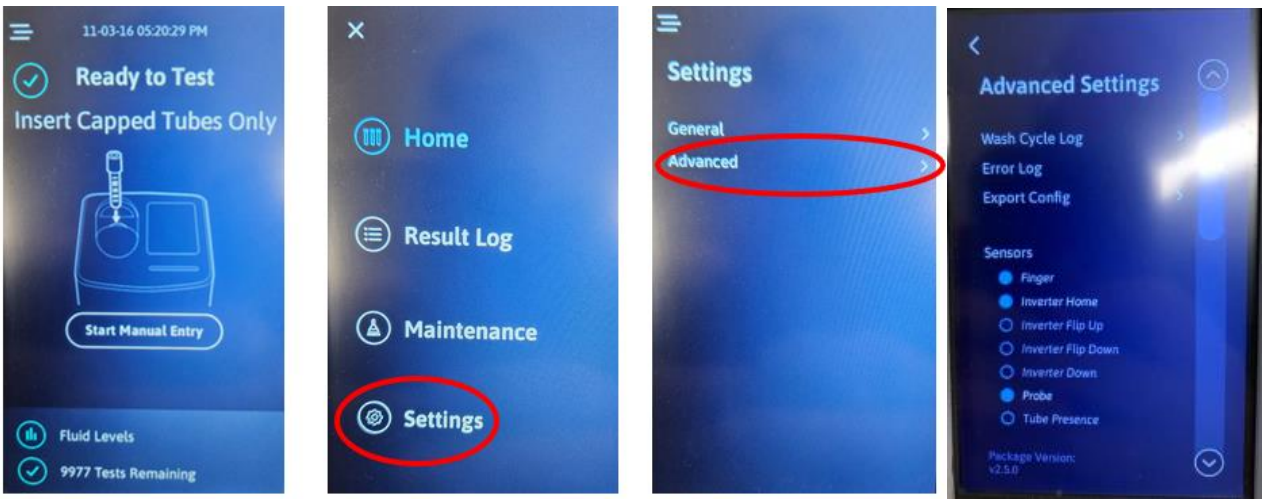

Figure 1

1.2. Select Print radial button and select Continue per Figure 2. Store printout for use on step 10.3.

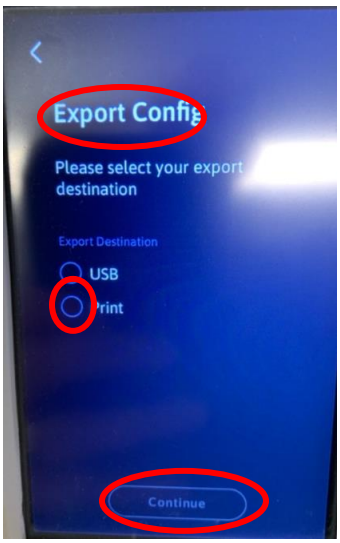

Figure 2

Note: Important settings to be imported to the new main board are Loading Offset, Piercing Depth, Language, Date/Time, Network and LIS Configuration.

1.3. Select arrow back button 2x, select Menu button and Home to return to the Home screen.

1.4. Insert the Transfer card PN 112-50505 in the Smart card slot, so current available tests on the unit can be transferred to the card. Refer to instructions on 1017-09-021 – miniiSED Test Credit Transfer Procedure.

2. Remove Main board and Analog Cable from Device

2.1. Make sure the instrument is Powered off.

2.2. Disconnect the rapid connect tubing attached to the Waste and Wash containers and remove these containers from the *miniiSED*®. Figure 3.

Figure 3

2.3. Remove the back enclosure by unscrewing the 2 Phillips screws and rotate Housing forward. Figure 4.

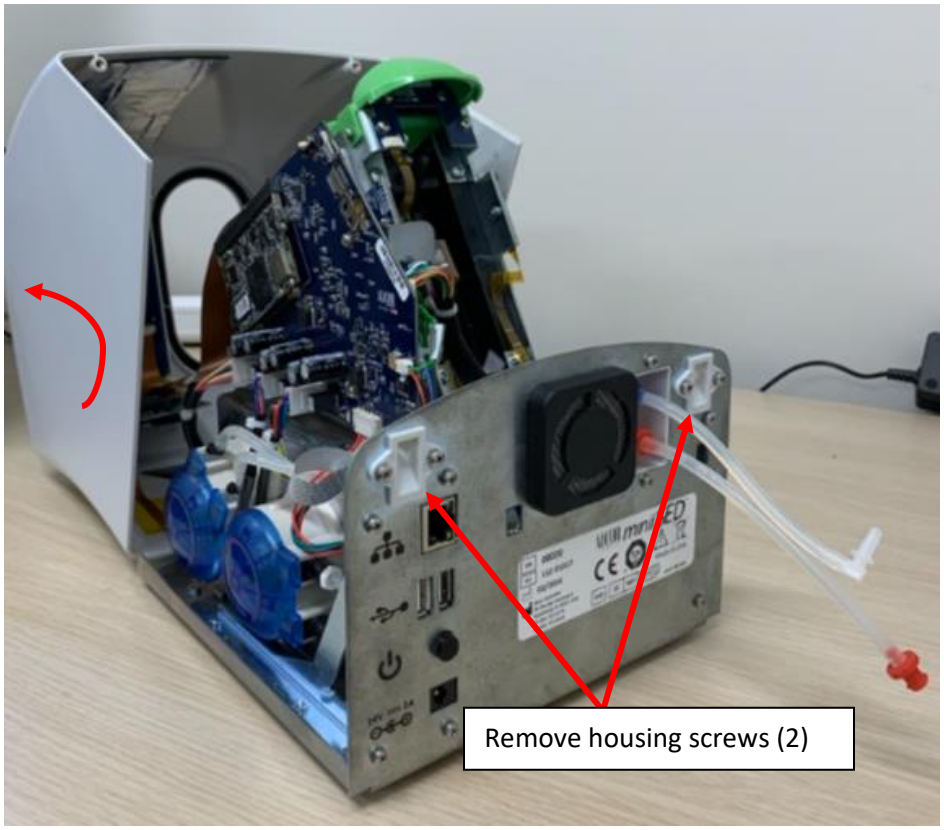

Figure 4

2.4. Remove Display and Card Reader connections by pulling out fastener to release the cable for each per Figure 5. This is a necessary step prior to removing the front bezel from the device to not damage the wires that are connected to the cover.

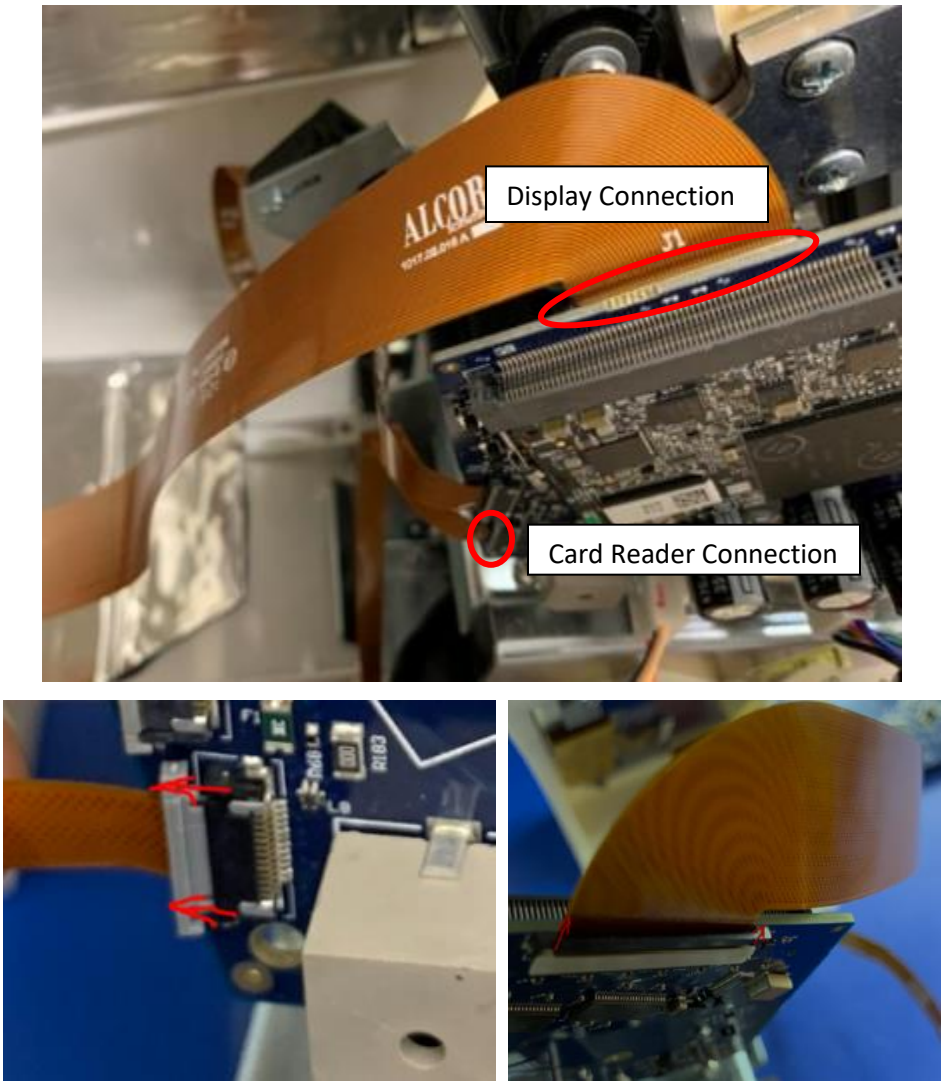

Figure 5

2.5. Remove 2 housing screws in front bezel to remove the cover from the device. Figure 6.

Figure 6

2.6. Remove all other connections (Barcode Scanner [1], Inverter Motor [2], Wash Pump Motor [3], Primary Pump Motor [4], Power Cable Connector [5], FFC Cable [6], Pinch Valve [7] by releasing tabs and pulling cable from each connection per Figure 7.

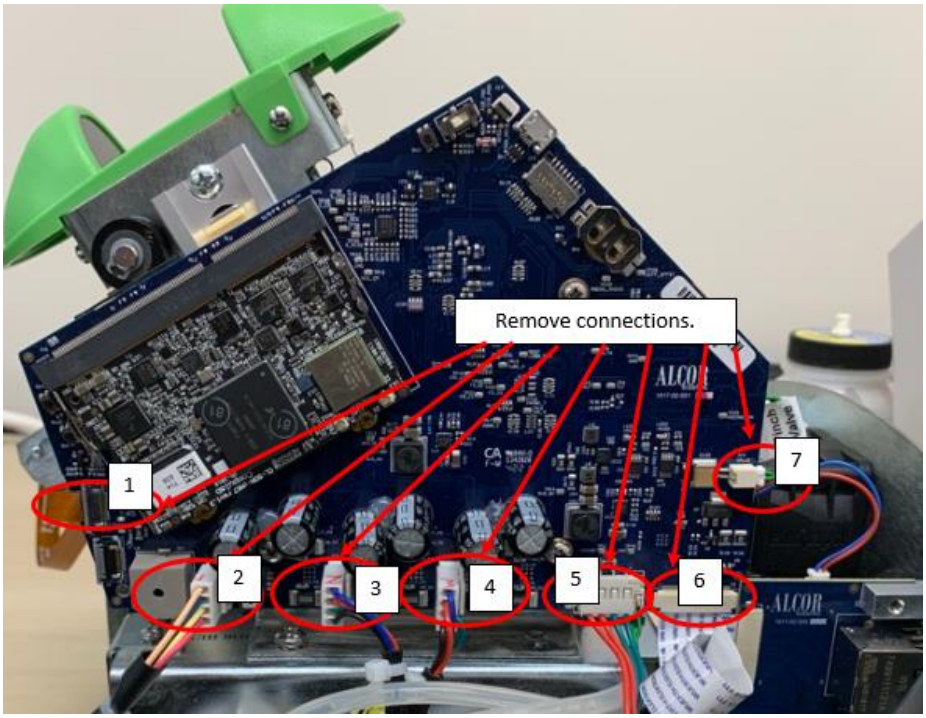

Figure 7

2.7. Remove the Robotics Cable [9] and Analog Cable [10] from the back side of the main board by releasing tabs and pulling cable from each connection per Figure 8.

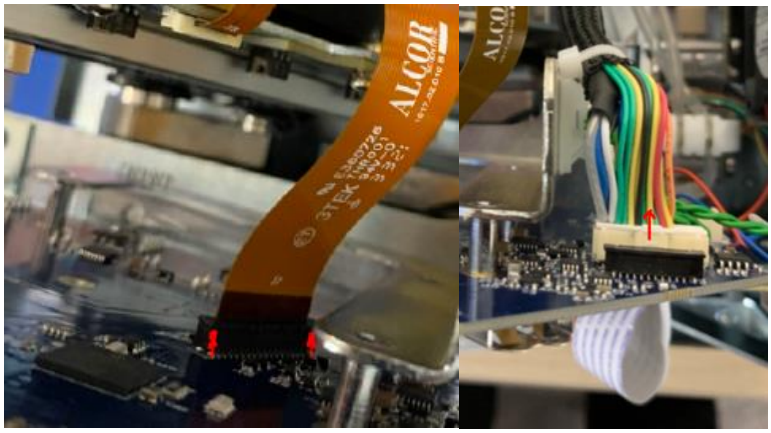

Figure 8

2.8. Remove the Main board by removing the 3 screws shown in Figure 9.

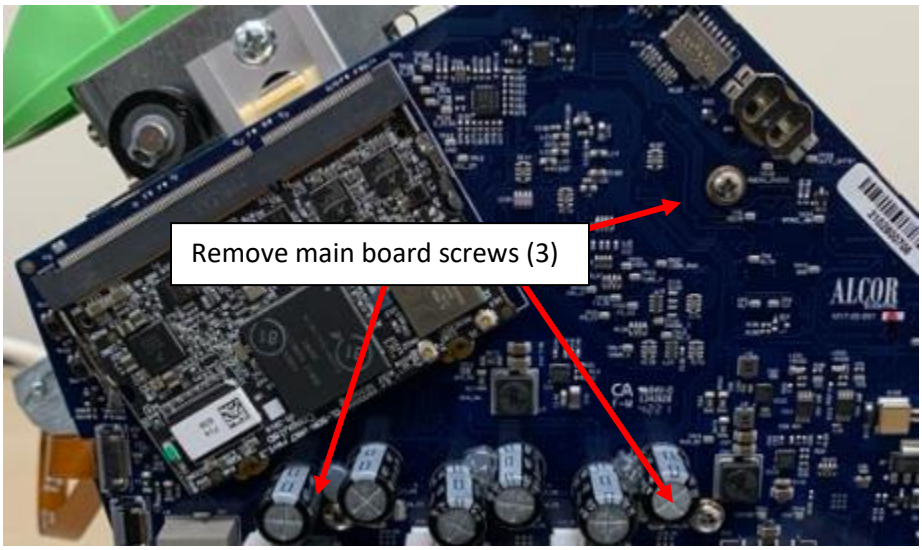

Figure 9

2.9. Remove 4 screws from Rear Panel. Figure 10.

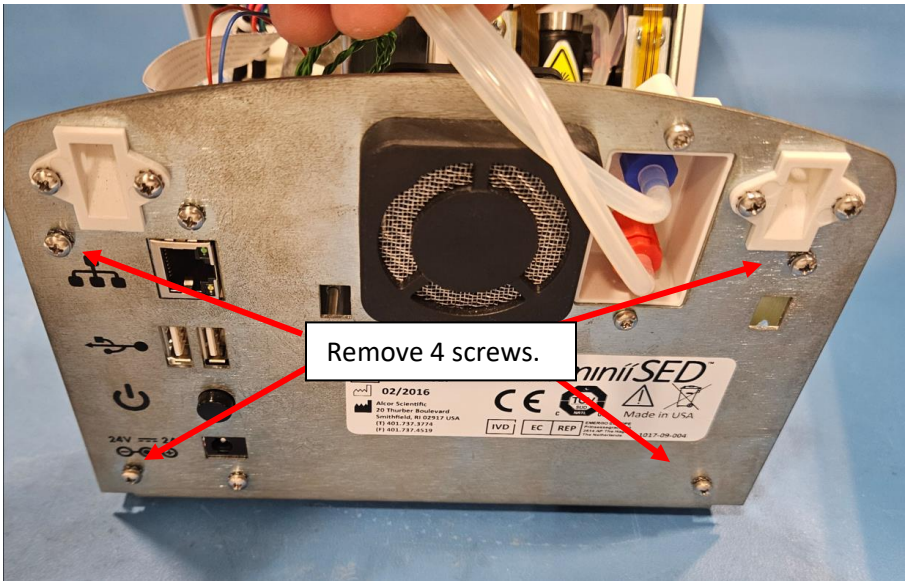

Figure 10

2.10. Remove 2 screws from the Hydraulic Recess Panel. Figure 11.

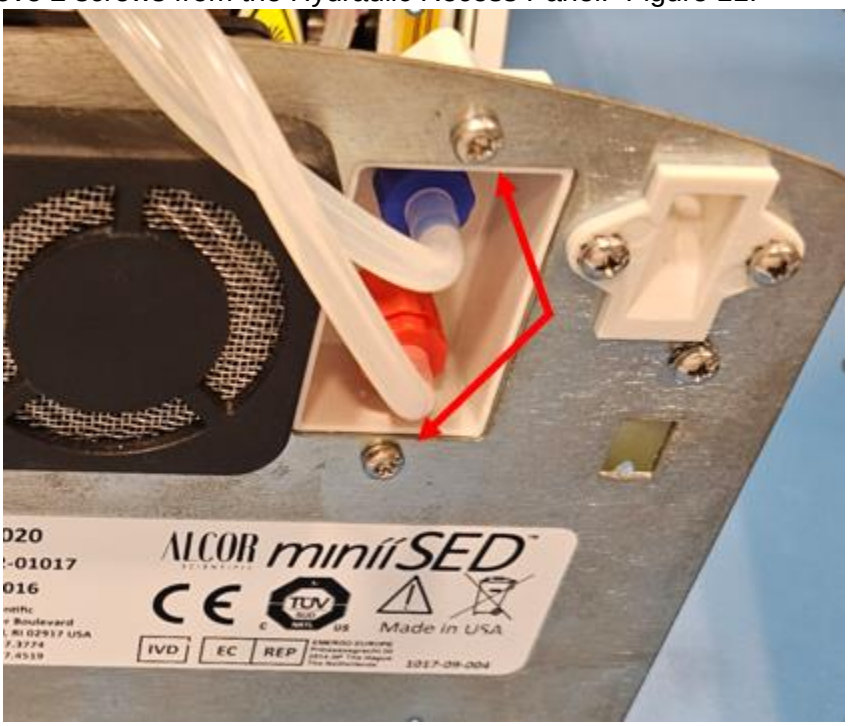

Figure 11

2.11. Remove Hydraulic Recess Panel and set aside (tubing is still attached). Figure 12.

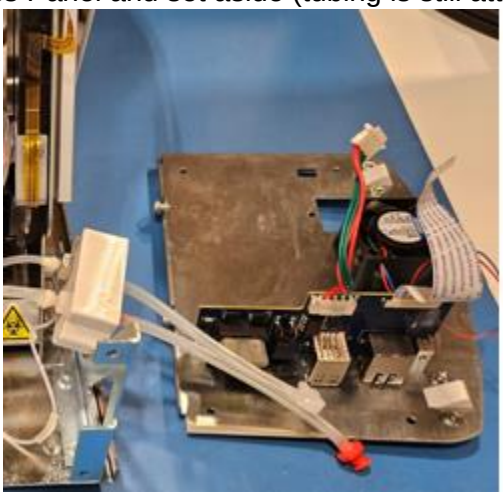

Figure 12

2.12. Remove the Reading Cell to Primary Tubing from Primary Pump by turning brown tube connector counterclockwise. Figure 13.

Figure 13

2.13. Remove the Reading Cell from the mounting plate by removing 4 screws and washers. Figure 14. Note the location of the screw with no rubber washer.

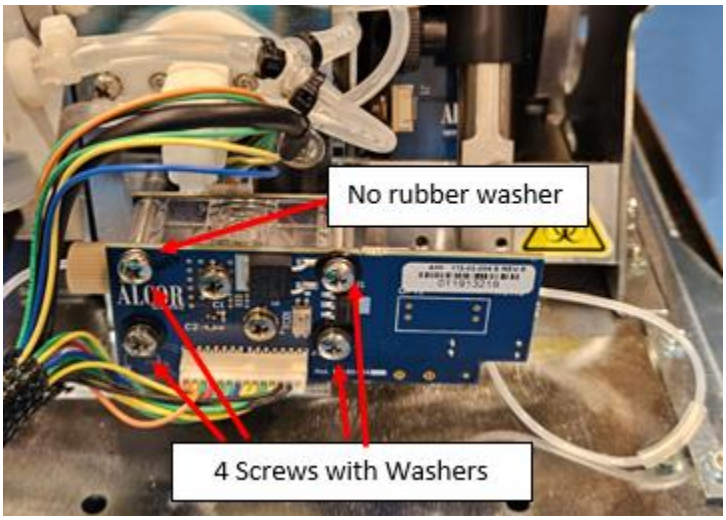

Figure 14

2.14. Disconnect Analog Cable connections from the Reading Cell connectors to remove cable.

3. Remove Needle to reading cell tubing, Needle tip and Reading Cell.

3.1. Remove Waste Tubing from retention clip Tube. Figure 15.

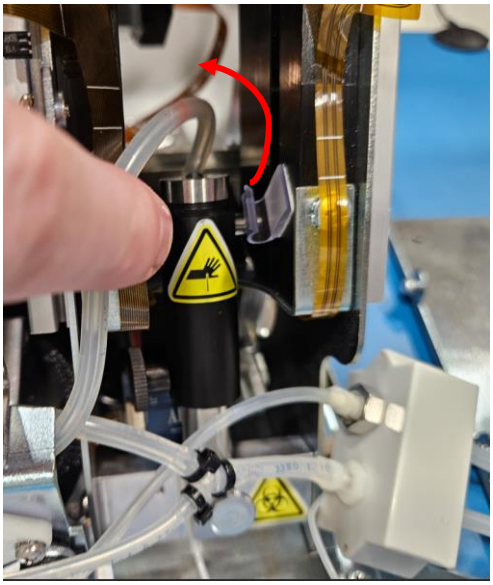

Figure 15

3.2. Unscrew/Remove silver thumbscrew and lock washer from Piercing Mount and remove Piercing module. Figure 16.

Figure 16

Caution: The next step will expose the needle and could cause potential injury!

Be sure to use protective glove.

3.3. Unscrew/Remove black thumb screw from Needle Tube and remove Needle Tube and Spring from Piercing Module. Figure 17.

Figure 17

3.4. Using an 8mm wrench unscrew the Needle Tip from the Piston. A second tool may be needed to turn both Piston and the Needle. Figure 18.

Figure 18

3.5. Remove Needle to Reading Cell Tubing from the Needle Piston. Figure 19.

Figure 19

3.6. Remove Reading Cell to Needle Piston Tubing from Needle Tube by lifting tube up and away from slot of the piston. Figure 20.

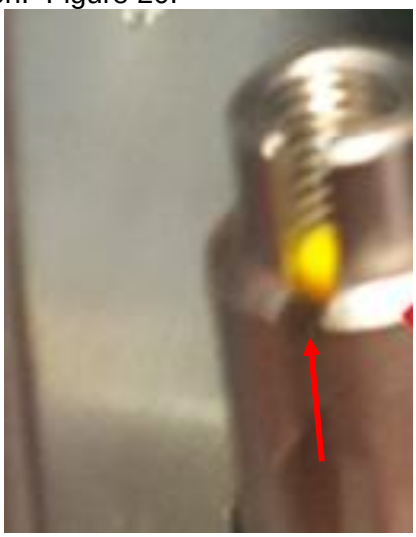

Figure 20

3.7. Reading Cell is completely removed from the device. Figure 21.

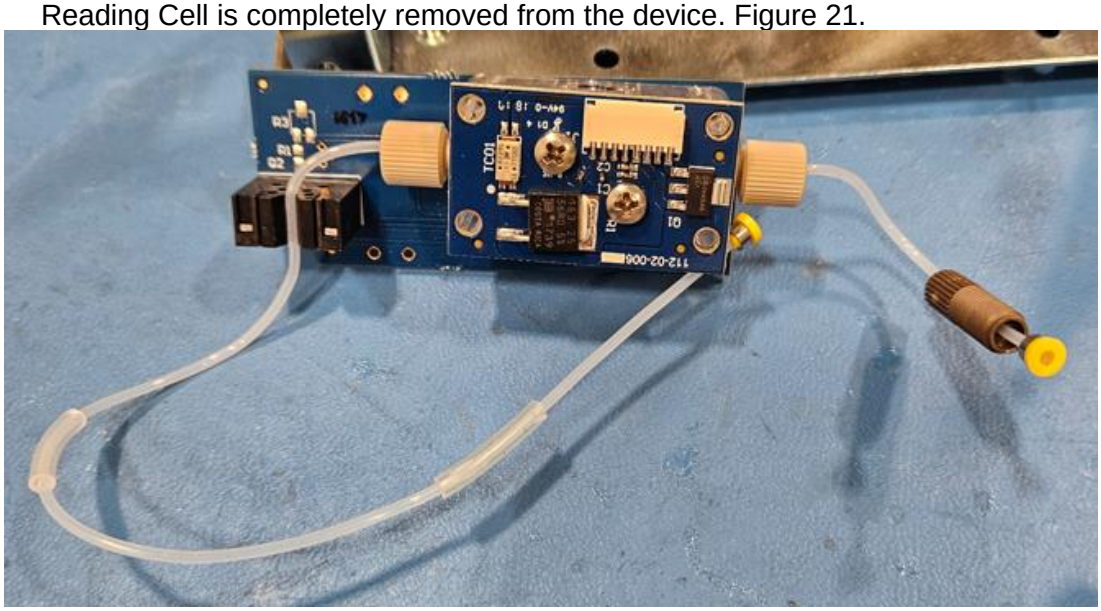

Figure 21

4. Remove the Wash and Waste Pump Tubing

4.1. Remove the blue cover from the Wash Pump by turning the cover counterclockwise and gently pulling it towards you. Figure 22.

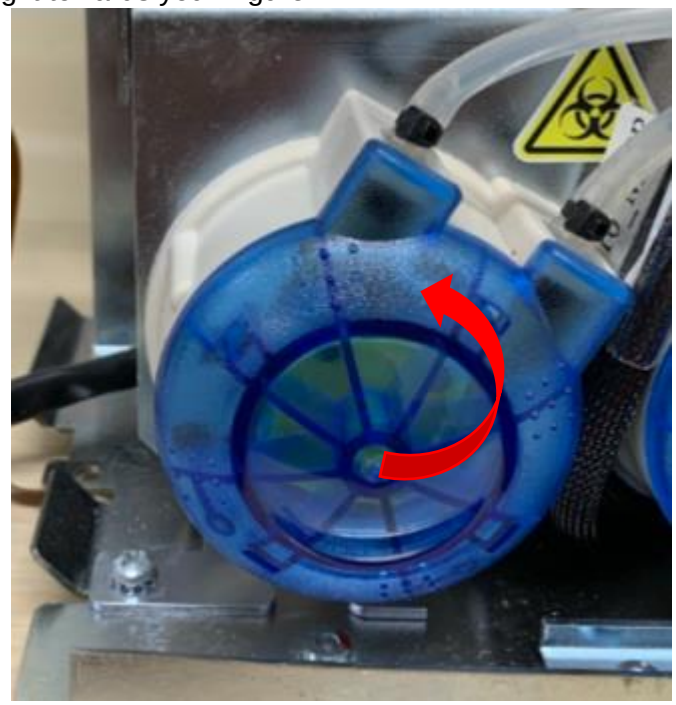

Figure 22

4.2. Remove the old tubing from the Wash Pump by gently pulling on the tubing through the alignment tabs within the pump housing. Rotate rotor to assist in removal. Figure 23.

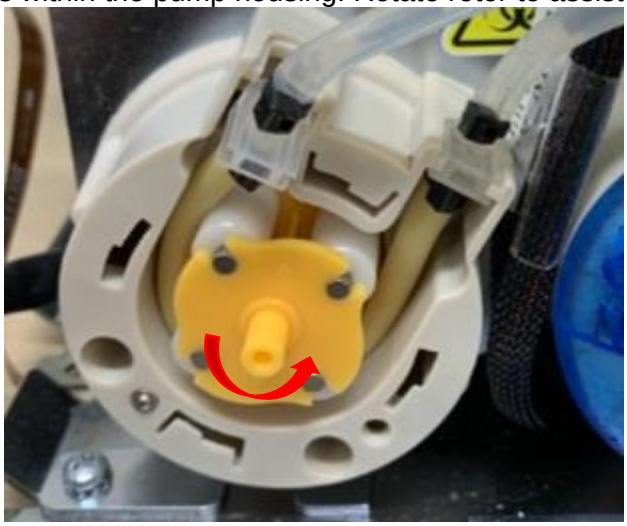

Figure 23

4.3. With wire cutters snip each wire tie at the end of the clear tubes for removal below. Pull each tube off from their respective connection and dispose of the pump tubing in proper waste disposal. Figure 24.

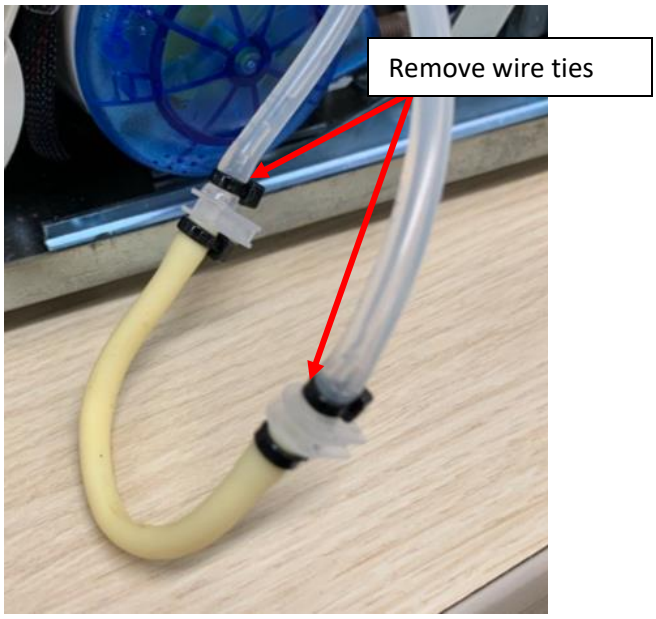

Figure 24

4.4. Repeat step 4.1 to remove blue cover from the Primary Pump. Remove the old tubing from the Primary Pump by gently pulling on the tubing through the alignment tabs within the pump housing. Rotate rotor to assist in removal. Figure 25.

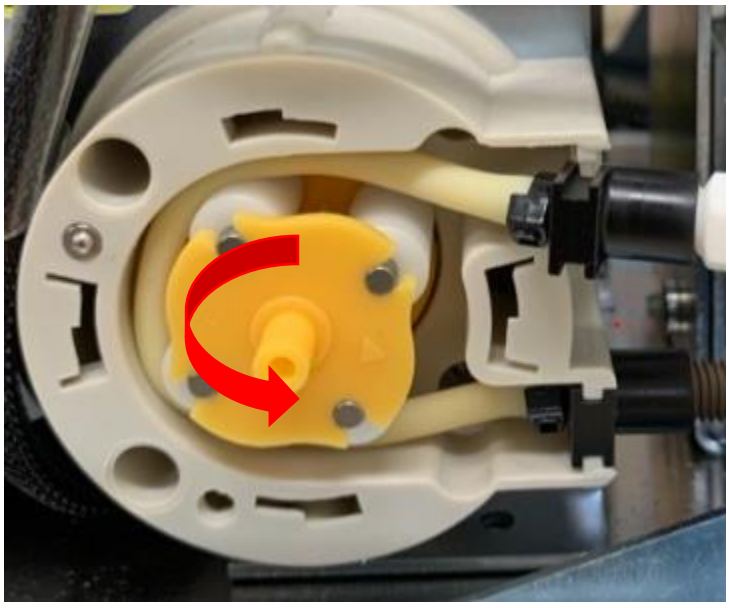

Figure 25

4.5. Disconnect the connector tubing by rotating white connector in a counterclockwise direction. Dispose of the old pump tubing is proper waste disposal. Figure 26.

Figure 26

5. Install Wash tubing

5.1. Prior to installing Wash Pump tubing, insert tubing and attach zip ties. Figure 27.

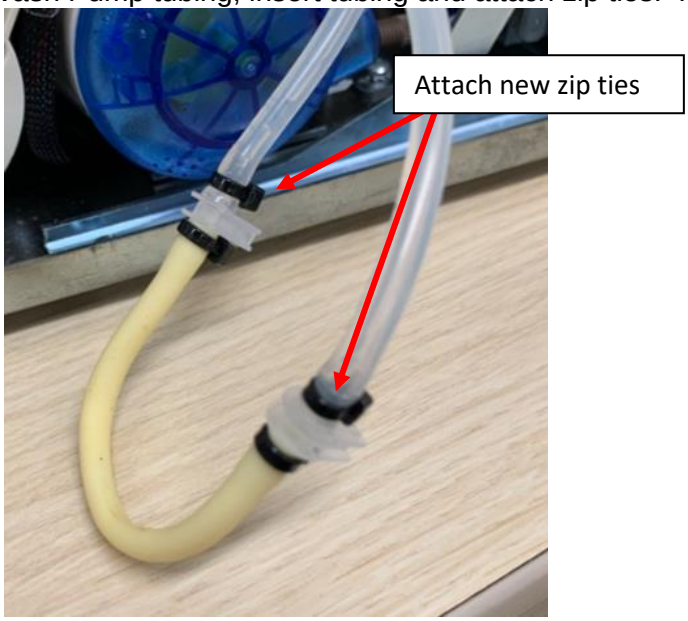

Figure 27

5.2. 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 counterclockwise direction. Spin rotor by hand if needed to help install tubing. 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 28 shows correct placement for tubing.

Note: The tube to the Needle Probe 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.

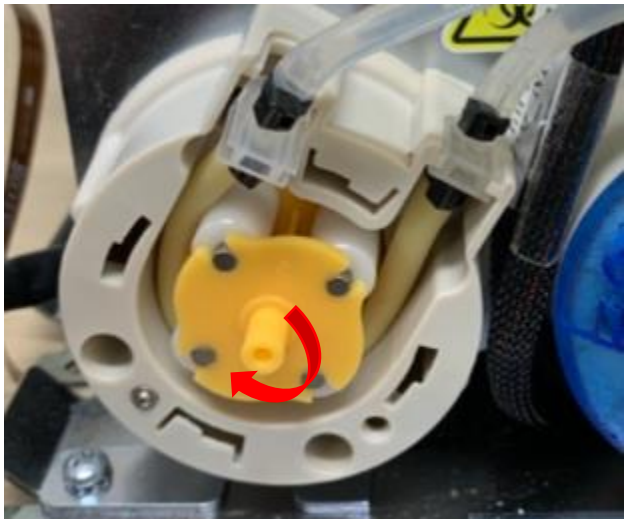

Figure 28

5.3. Once completed, return the blue cap turning clockwise to lock in place.

6. Install Reading Cell Assembly with Analog Wire

6.1. Connect Primary Pump tubing to Reading Cell tubing and Needle to Reading Cell tubing by tightening connectors in the clockwise direction in Figure 29. Install new analog wire connectors into Reading Cell.

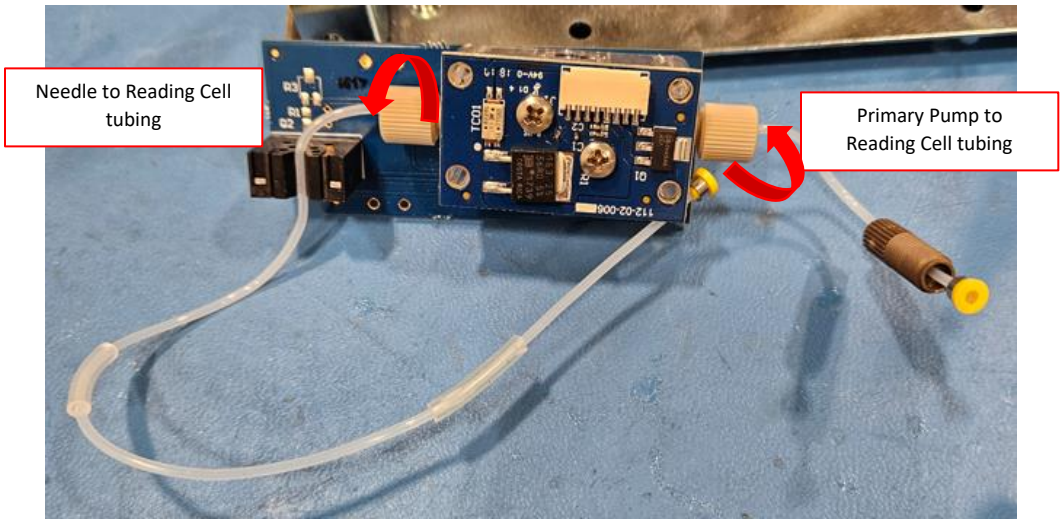

Figure 29

6.2. Connect Analog wire to the connectors shown in Figure 30.

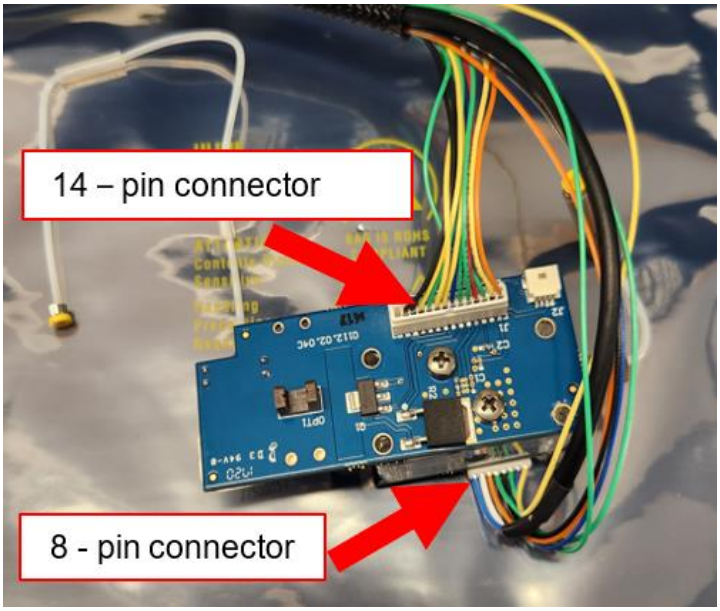

Figure 30

6.3. Install the Reading cell assembly on Reading Cell bracket by using the parts noted in Figure 31.

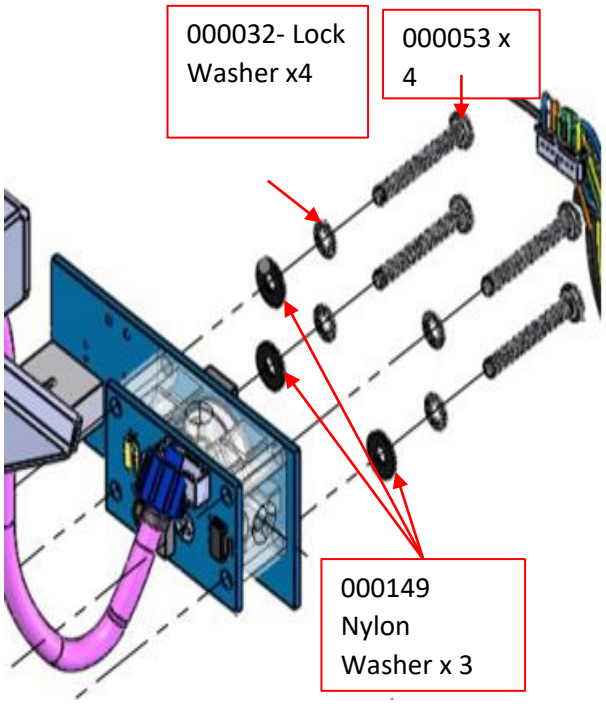

Figure 31

7. Install Primary Pump Tubing and Reading Cell to Primary Pump Tubing

7.1. Replace the new Primary Pump tubing by tightening the white connector in clockwise direction. See Step, 4.5, Figure 26.

7.2. Replace the Primary pump tubing by first inserting the lower side of the primary pump, then inserting the grooves of the new tubing into the slot on the pump. Slowly work the tubing in the pump (rotate rotor by hand if needed). Once the tubing is in place, insert the grooves of the new tubing into the slot on the top side of the pump. See Figure 32 for correct placement.

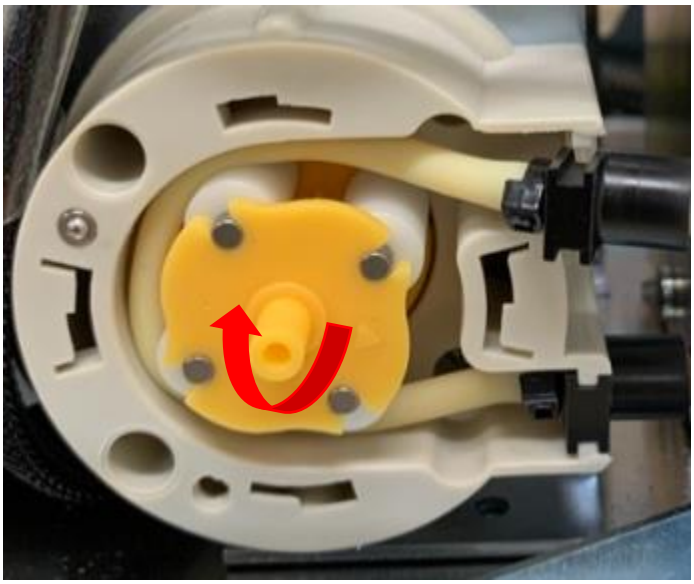

Figure 32

7.3. Tighten the Reading cell to Primary Pump tubing brown connector by hand in clockwise direction. Figure 33.

Figure 33

7.4. Once completed, return the blue cap by turning clockwise to lock it in place.

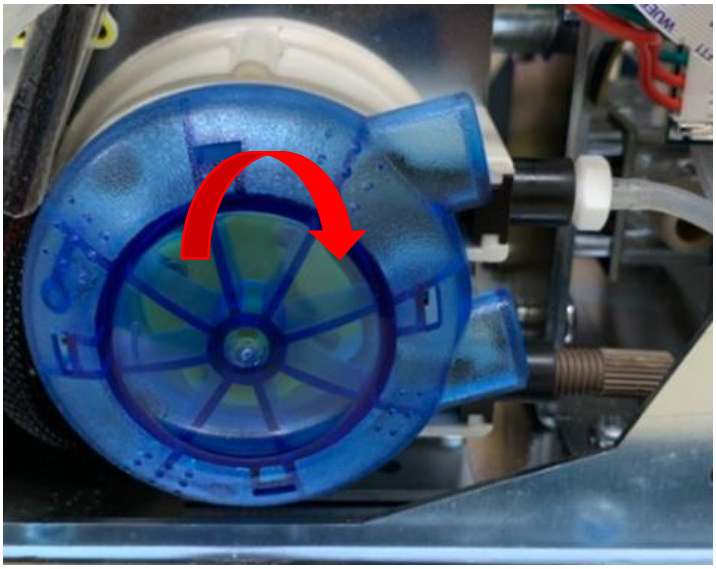

Figure 34

8. Install Needle to Reading Cell Tubing and Needle Tip

8.1. Install the new Needle to Reading Cell Tubing in the tail sensor's slot and make sure that the tube is pushed in the slot and tube makes nearly 90° angle from the reading cell through the tail sensor. Figure 35.

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

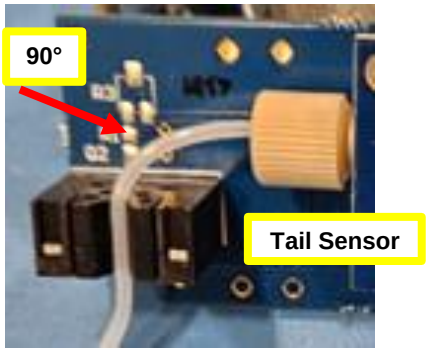

Figure 35

8.2. 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 36.

Figure 36

8.3. Screw the replacement Needle Tip into the Needle Piston Assembly. Tighten as much as possible by hand then tighten another ½ turn with the Open-End Wrench or 8mm wrench. Figure 37.

Figure 37

Caution: The next step will expose the needle and could cause potential injury!

Be sure to use protective glove.

8.4. Install the Needle Spring and Probe Tube by pressing down slightly on the Probe Tube to expose the needle tip. Ensure thumb screw is in the slot of needle piston in Figure 38 below and tighten thumb screw.

Figure 38

8.5. Install the Piercing Module onto the Piercing Mount using the silver thumbscrew and lock washer and insert the Waste Tubing into the retaining clip. Tighten thumb screw upon completion. Figure 39.

Figure 39

9. Install Main Board and Enclosure.

9.1. Install the new Main board (1017-02-001). See Steps 2.6-2.9 of this procedure for detail. For ribbon cables fasten cables by releasing connectors, inserting cable and secure cable by fastening each side of the connector to the cable. Example of how ribbon cables are fastened can be seen in Step 9.4.

9.2. Reattach Hydraulic Recess panel and Back Panel per Figures 11 and 12.

9.3. Reattach front bezel screws for front cover per Figure 6.

Caution: In the next step if the Display Cable is not seated correctly and not secure to the connector, it could result in damage to components of the Main Board upon power up.

9.4. Connect Display and Card Reader Cables from the front bezel to the Main Board. For the display connector pull black tabs out and fasten the cable by pushing on both sides of the connector at the same time. Ensure cable is secure and straight (not crooked) to the connector of the board (pull cable to test) and black tab is flush to the white connector resembling last screen shot below in Figure 40.

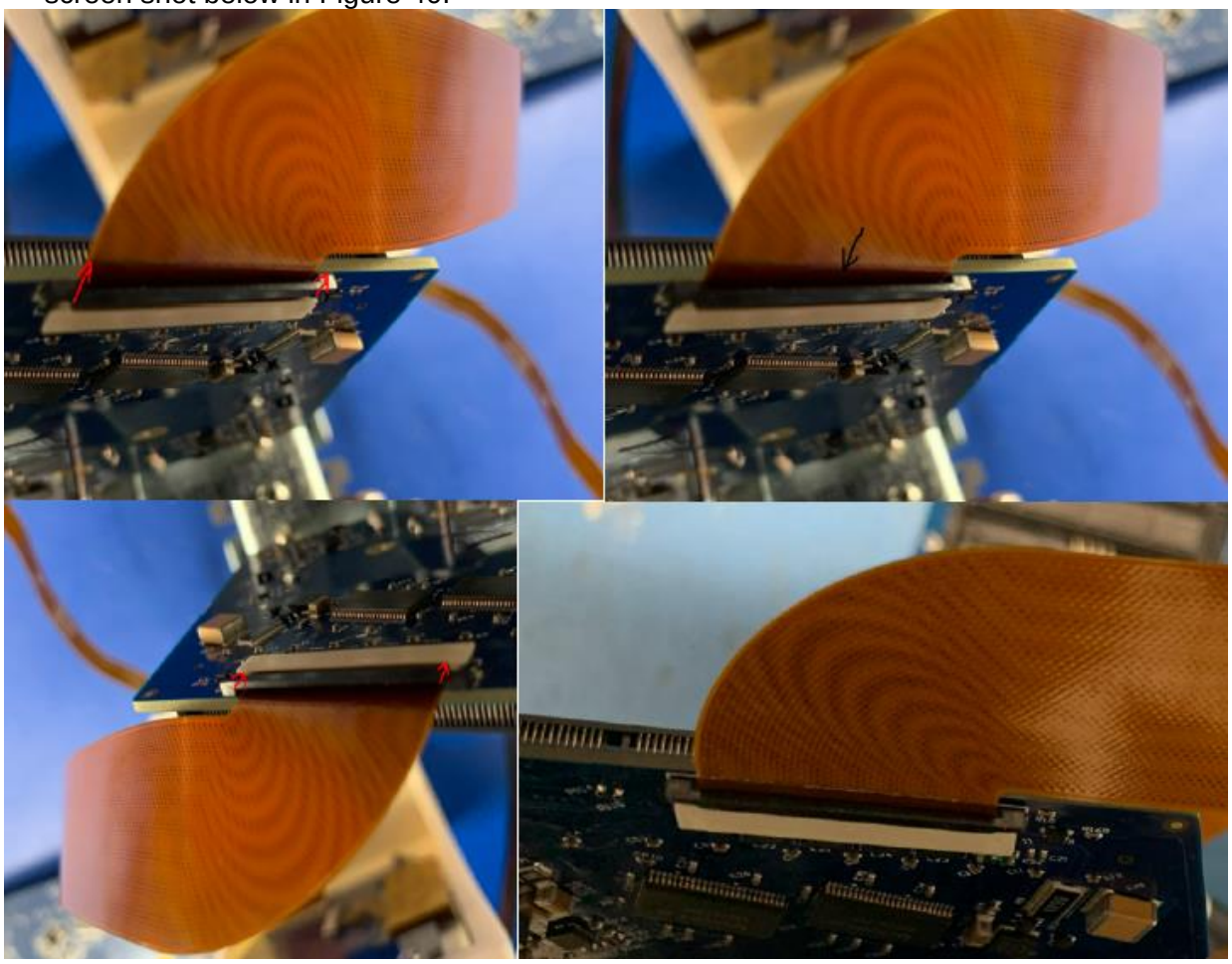

Figure 40

9.5. Rotate front bezel and fasten 2 screws to the back panel. See step 2.3 for details.

9.6. Install the new wash and waste bottles.

9.7. Turn the instrument on.

9.8. Perform 3 wash cycles by selecting Quick Clean “Run” button 3x and check for leaks. Figure 41.

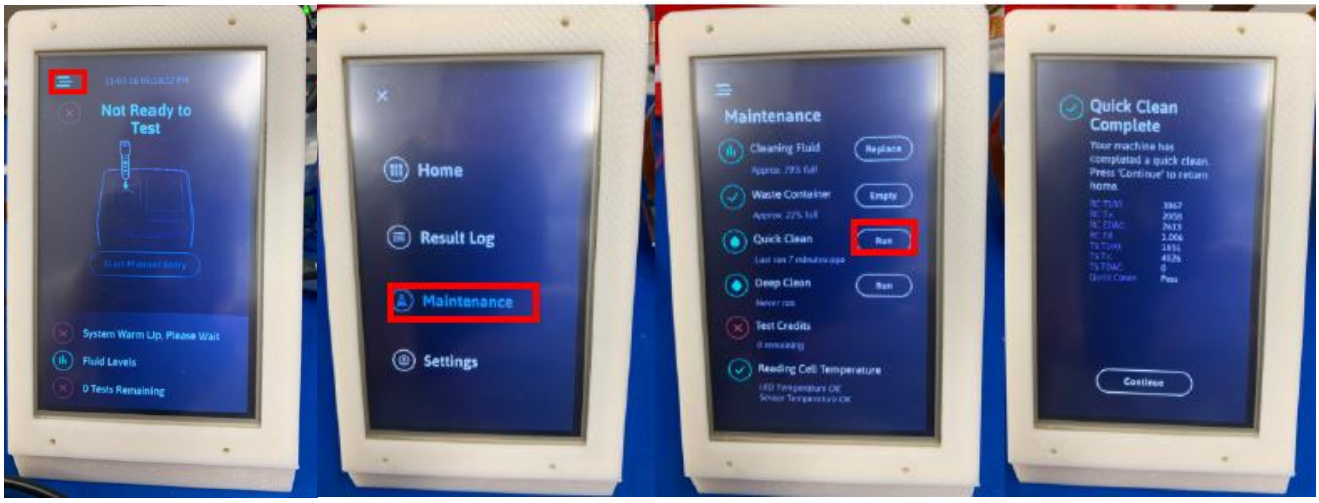

Figure 41

9.9. If wash is successful and there is no leak, proceed with next steps. If not, it’s advisable to check connections of tubing and main board wiring before contacting Alcor.

10. Update settings.

10.1. Select the Menu button under Maintenance screen and Home button to return to the Home screen. Figure 42.

Figure 42

10.2. At the Home screen follow screen shots and enter the code “41281” when prompted for the Instrument Setup and Robotic Controls screen. Select Continue button per last screenshot in Figure 43.

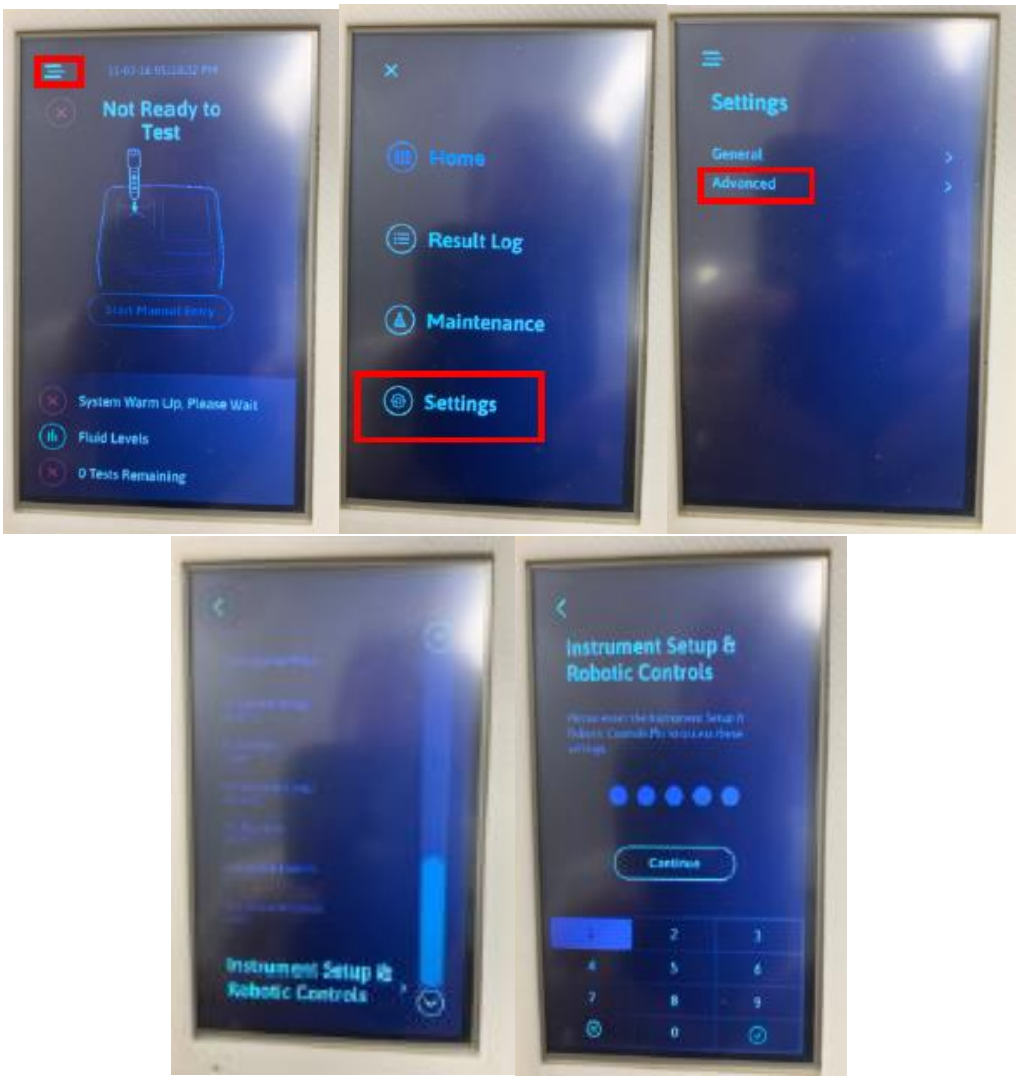

Figure 43

10.3. Update the settings for Loading Offset and Piercing Depth with the data gathered on step 1. Figure 44.

Figure 44

10.3.1. All manufacturing settings pre setup on the new main board should work properly. However, if data cannot be retrieved from the device, Tech Service can provide manufacturing settings for your specific device SN. Inquires can be sent through techservice@alcorscientific.com.

10.4. Select back arrow 2X to return to the Settings Menu and select General. Figure 45.

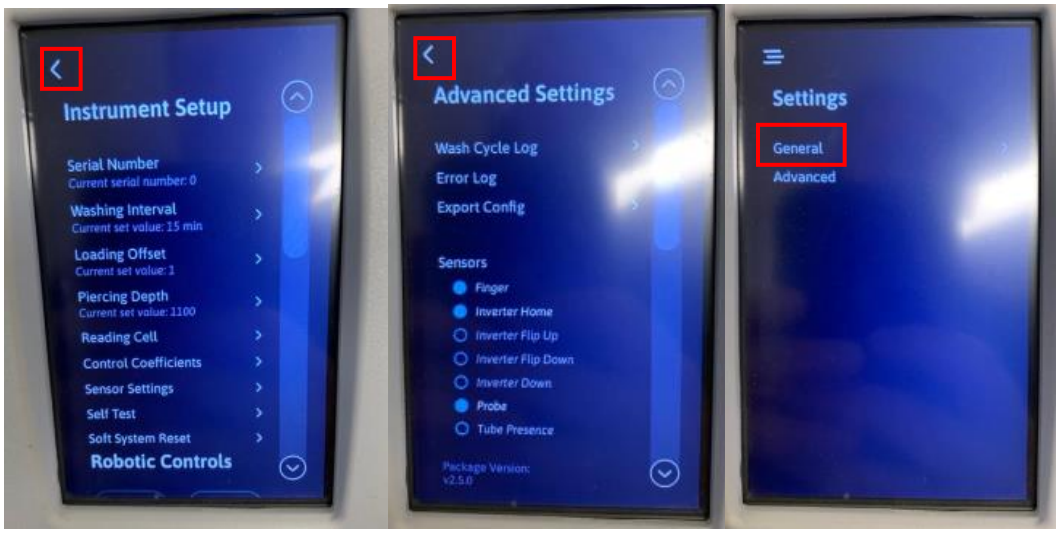

Figure 45

10.5. Update the Language, Date & Time and printing preferences from previous main board OR, if cannot turn unit on, based on Customer preference. See Figure 46.

Figure 46

10.6. Update the Network and LIS Configuration settings according to customer preferences. Figure 47.

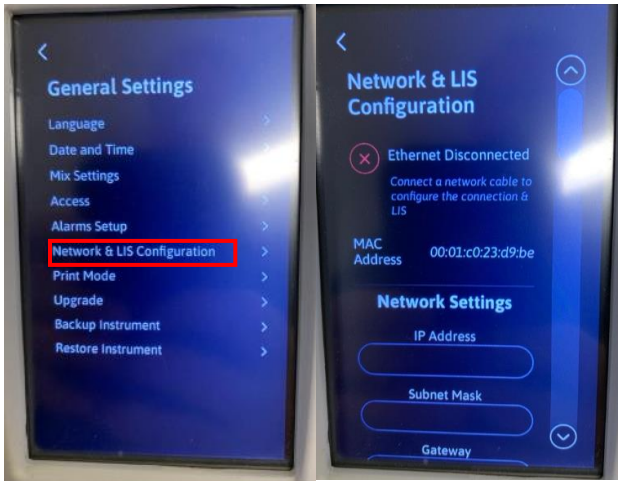

Figure 47

10.7. Select back arrow, Menu button, Maintenance and “Run” for Deep Clean to perform deep wash of the unit, follow instructions on the screen. Figure 48.

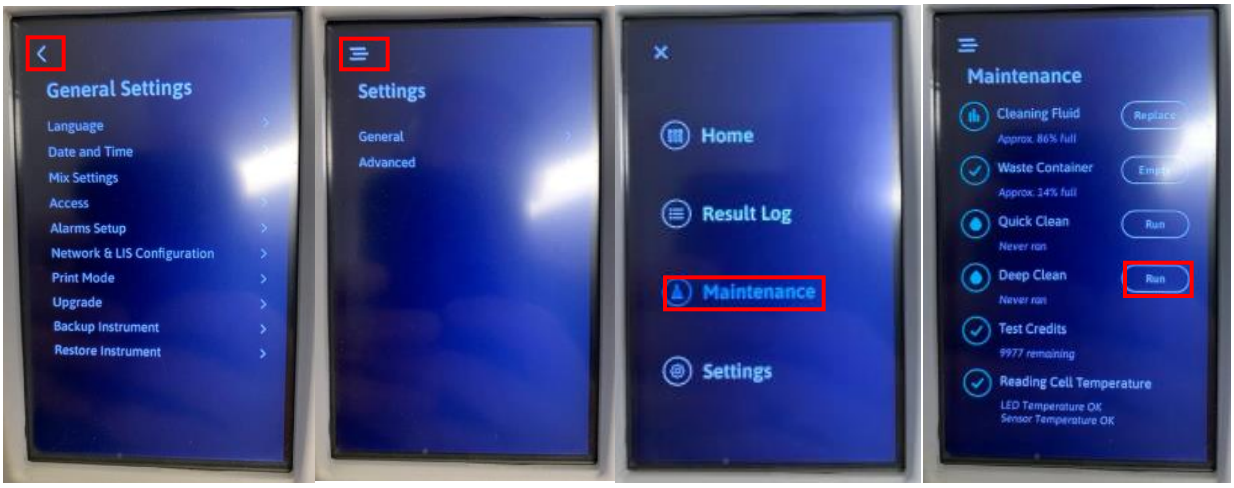

Figure 48

10.8. If the transfer card was used on step 1, proceed, and insert the transfer card on the Smart card slot to transfer the tests on the card. If not, proceed to the next step.

10.9. Follow steps in section 1 to print the current Configuration report.

Send the picture of the Configuration Report to techservice@alcorscientific.com.

Contact Technical Support @ (800)-495-5270 or +1 (401) 737-3774 for any assistance.