



Rush Copley Medical Center

Proc. #4840-BB-ECHO-14

TITLE: Echo Analyzer Monthly Maintenance

PRINCIPLE:

This procedure provides instructions for performing monthly maintenance, including decontamination, wiping down the probe block, washer residual volume test and washer dispense accuracy test

CLINICAL SIGNIFICANCE:

The purpose of decontamination is to prevent contamination of or to remove contamination from the Echo. A sequence of four maintenance items are used to first decontaminate then thoroughly remove all remnants of recommended cleaning solution from all areas of the Echo prior to the restart of routine assay procedures.

1. **Decontaminate instrument** pumps the recommended cleaning solution through all fluidics tubing and devices.
2. **Flush instrument** pumps enough volume of deionized water through the Echo to replace all fluid in the fluidics tubing and devices.
3. **Purge instrument** allows you to purge all liquid from the Echo. A small amount of residual fluid is normal.
4. **Wipe down** the probe block and bottom of the probe holder.
5. Remove and replace main manifold.
6. **Prime instrument** allows you to prime PBS throughout the Echo, in all fluidics tubing and devices.

PERSONNEL:

Medical Technologists

SPECIMEN COLLECTION/TREATMENT:

Not applicable

REAGENTS AND EQUIPMENT:

1. Echo Analyzer
2. Electronic balance (found in Histology)
3. Electronic calculator
4. Absorbent wiping material
5. Rely-On Multi-Purpose Disinfectant Cleaning Solution
6. De-ionized or distilled water
7. Two (2) Capture strips



QUALITY CONTROL:

None Indicated

STEPWISE PROCEDURE:

1. Decontamination

a. Decontaminate instrument:

- 1) Prepare 1L of 0.25% NaClO by diluting NaClO in deionized water. To determine the volume of CoA (certificates of analysis) required based on the concentration in the bottle, use the formula $(V1)(C1) = (V2)(C2) \rightarrow (V1) = (V2)(C2)/(C1)$, where
 - o V1 = volume of undiluted NaClO required
 - o V2 = volume of 0.25% NaClO desired (1000mL)
 - o C2 = concentration of desired (0.25%)
 - o C1 = concentration of NaClO indicated on the CoA

Volume required for typical NaClO			
C1 NaClO Concentration	DiH2O	V1 Volume of undiluted CaClO	Final Volume of 0.25% NaClO solution
8.25%	970mL (1000mL - 30mL)	30mL	1L (1000mL)

- 2) Empty the PBS out of the PBS supply bottle and replace it with at least 1 liter of working recommended cleaning solution.
- 3) Swirl the fluid inside the PBS supply container so that it comes into contact with all internal surfaces.
- 4) Connect the PBS supply bottle to the Echo.
- 5) Make sure that the tubing inside of the PBS supply bottle is fully extended to the bottom of the bottle and not hooked on the inside shelf.



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- 6) Empty the waste container.
- 7) Select **Tools**

Maintenance

Decontaminate instrument

Run

- 8) Press the **Start** button of the **Run** tab to begin the procedure.

- 9) Allow the working cleaning solution to soak for ten (10) minutes in the instrument after the procedure is complete.

b.Flush instrument:

- 1) Empty the remaining cleaning solution out of the PBS supply bottle and put it back in the brown jug. Replace it with at least 1 liter of de-ionized or distilled water swirling the water to get out all of the cleaning solution. Dump and refill PBS supply bottle with at least 1000ml of distilled or dionized water.
- 2) Connect the PBS supply bottle to the Echo.
- 3) Make sure that the tubing inside of the PBS supply bottle is fully extended to the bottom of the bottle and not hooked on the inside shelf.
- 4) Empty the waste container and rinse with cleaning solution

Select **Tools**

Maintenance

Flush instrument

Run

- 5) Press the **Start** button of the **Run** tab to begin the procedure.

c.Purge instrument:



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- 1) Empty the remaining de-ionized or distilled water out of the PBS supply bottle.
- 2) Connect the empty PBS supply bottle to the Echo.
- 3) Empty the waste container.
- 4) Select **Tools**

Maintenance

Purge instrument

Run.

- 5) Press the **Start** button of the **Run** tab to begin the procedure.

- d. Wiping down the probe block and bottom of the probe holder
 1. Power down the instrument and the computer.
 2. Remove the shroud (large outside cover).
 3. Using the absorbent wiping material, apply the working solution of the cleaning solution to the probe block.
 4. Allow the working solution of the cleaning solution to be in contact with the probe block for 10 minutes.
 5. Wipe the cleaning solution off the probe block
- e) Removing and replacing wash manifold

Note: The wash manifold consists of two sets of eight needles—the dispense and aspirate needles. The transport holder positions the micro-well strips below the manifold during the washing process. Sensor needles located above the manifold check for the leveling of the manifold.

1. Remove the shroud of the Echo.
2. The manifold can be removed by releasing the flathead screw in the center of the front of the manifold using the flathead screwdriver (as shown in the following diagram).

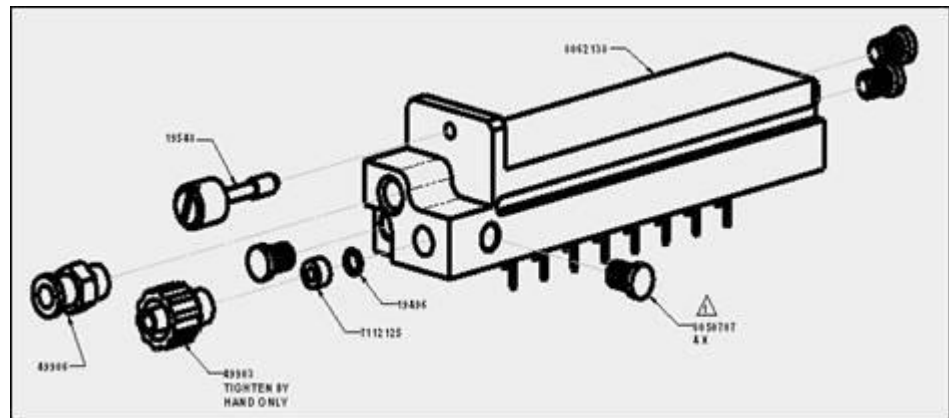
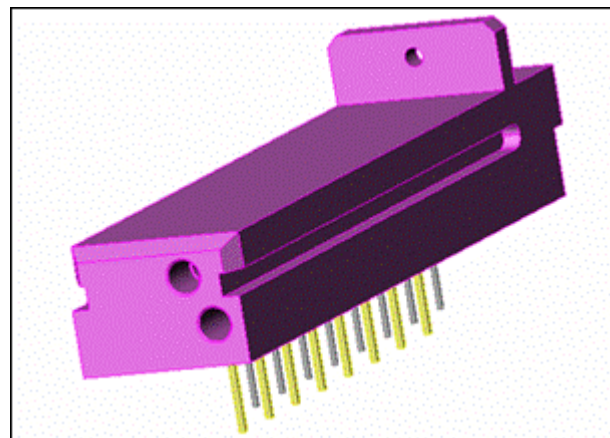


Diagram showing wash manifold connections



3. The manifold can now be pulled out. Remove the tubing by disconnecting the luer locks on the end of the manifold. Be careful to leave the connectors inside the wash manifold and make sure that they are tight.

Note: Do not remove the bumpers from the body of the manifold. There is a risk of loosing some associated washers, the function of which is to prevent leakage, if the bumpers are removed. Loss of one or more washers can result in manifold leakage.

4. Inspect the wash manifold. If necessary, use the two styluses provided to clean out all of the metal aspirating and dispensing probes.
The smaller diameter stylus is used for the relatively narrower dispensing probes. The larger diameter stylus is used for the wider aspirating probes.
You can soak the manifold in warm tap water for 20 minutes. After soaking, flush the manifold with warm tap water through the luer connection (using a syringe) and reinsert it back into the Echo. Following inspection (and cleaning, if necessary), the manifold



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can be reconnected to its tubing (as shown in the previous diagram). The two pieces of tubing can only be connected to their matching luer locks.

5. Slide the manifold back into the groove, and secure it with the flathead screw in the center of the front of the manifold.
6. Replace the shroud.
7. Power up the instrument and the computer.
8. Initialize the instrument.

Initialization will fail due to fluidics test.

9. Continue with Priming the instrument

10. Prime Instrument:

- 1) Fill the PBS supply bottle with PBS.
- 2) Make sure that the tubing inside of the PBS supply bottle is fully extended to the bottom of the bottle and not hooked on the inside shelf.
- 3) Empty the waste container.

- 4) Select **Tools**

Maintenance

Prime instrument

Run

- 5) Press the **Start** button of the **Run** tab to begin the procedure.
- 6) Prime a minimum of three times

- 2) Washer residual volume test
 - a. Record the serial number of the electronic balance, your initials, date of this task performance, facility name, and instrument serial number on the **Washer residual volume test** maintenance record..



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- b. Weigh two (2) Capture RS strips together and record the weight on the **Washer residual volume test** maintenance record.
 - c. Place the two (2) strips into a strip holder and then place the holder in position **1** of a strip tray.
 - d. Load the strip tray into strip tray position **1** of the strip tray-loading
- e. Select **Tools**

Maintenance

Washer residual volume test

Run

- f. Press the **Start** button on the **Run** tab to start the task.
- g. Reweigh the two (2) strips when the test is complete and record the weight on the **Washer residual volume test** maintenance record.
- h. Subtract the weight obtained in step **d** from the weight obtained in step
- i. and record that value on the **Washer residual volume test** maintenance record.
- j. Interpret the acceptability of the resulting value based on the acceptable range and record this conclusion on the **Washer residual volume test** maintenance record.
- k. Save strips and use them to replace the strips for daily washer residual volume test. Throw away current in use strips.

3. Washer dispense accuracy test

- a. Record the serial number of the electronic balance, your initials,



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date of this task performance, facility name, and instrument serial number on the **Washer dispense accuracy test** maintenance record.

b. Select **Washer dispense accuracy test** from the drop-down list on the **Run** tab of the **Maintenance** window.

c. Label two Capture Ready strips; 1 and 2

d. Weigh two (2) Capture strips separately and record the weight on the **Washer dispense accuracy test** maintenance record.

e. Place the two (2) strips into a strip holder and then place the holder in position **1** of a strip tray.

a. Load the strip tray into strip tray position **1** of the strip tray loading bay.

b. Press the **Start** button on the **Run** tab to start the task.

c. Reweigh the two (2) strips when the test is complete and record the weight on the **Washer dispense accuracy test** maintenance record.

d. Using the electronic calculator, subtract the weight obtained in step **c** from the weight obtained in step **g** and record that value on the **Washer dispense accuracy test** maintenance record.

e. Interpret the acceptability of the resulting value based on the acceptable range and record this conclusion on the **Washer dispense accuracy test** maintenance record.

REPORTING AND INTERPRETING RESULTS:

Expected Ranges:

1. Washer residual volume test:
 - a. Acceptable:
Weight is between 0.06 g and 0.16 g.
 - b. Unacceptable:
Weight is not between 0.06 g and 0.16 g.
2. Washer dispense accuracy test:
 - a. Acceptable:



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Weight is between 1.92 g and 2.08 g for each strip.

b. Unacceptable:

Weight is not between 1.92 g and 2.08 g for each strip.

PROCEDURAL NOTES:

1. **Flush instrument, Purge instrument and Prime instrument** can be run as stand-alone maintenance tasks when required, e.g. **Prime instrument** can be run when a peri-pump has been removed and replaced.
2. **Decontaminate instrument** and wiping down the probe block can be performed sequentially so that only one supply of working solution of the recommended cleaning solution needs to be prepared.
3. An alert message is displayed on the bottom of the screen signifying that the buffer container is low during **Decontaminate instrument, Flush instrument, and Purge instrument**. This alert message does not negatively impact these three maintenance tasks.

REFERENCE:

1. Immucor, Inc. (2017). *Echo Lumena Operator Manual*. ECL-003-100. Norcross, GA.