

## Plunger Seal Replacement (20ul, 125ul, and 250ul Units)

### *Disassembly:*

#### NOTE:

- These instructions refer to the Standard (Right-Hand) Unit. Exceptions for the Left-Hand LCD Location are noted as required.
- Some photographs may show different parts than those in your unit.

#### IMPORTANT:

- **The PCB is sensitive to static electricity damage. This procedure must be carried out at an Electro Static Discharge (ESD) workstation.**
- **Be careful not to introduce any fibers or particles into the pipette. Any such debris may cause the pipette seals to leak.**
- **Before proceeding, make sure the unit is ready to aspirate as shown by the up arrow on the display.**

1. Loosen the Base Screw and carefully remove the bottom of the unit. There are two electrical cables between the parts. **Note: Some Base Screws are captive and some are not.**
2. Disconnect the two electrical cables from the PC board:
  - Lift the Connector Lock and then remove the Trigger/Flex Circuit Connector.
  - Pull out the Motor Connector.

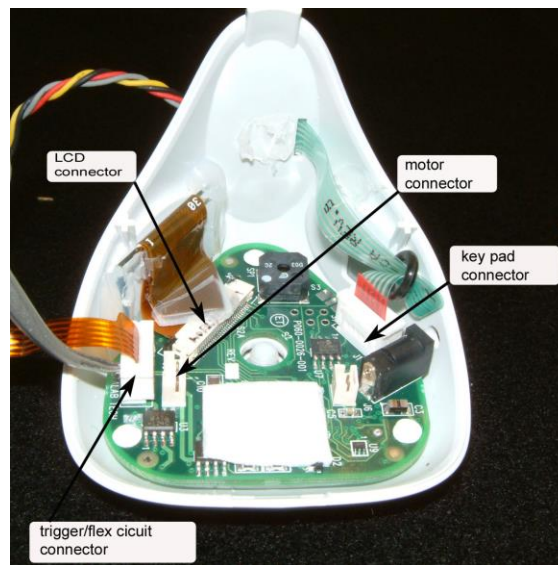
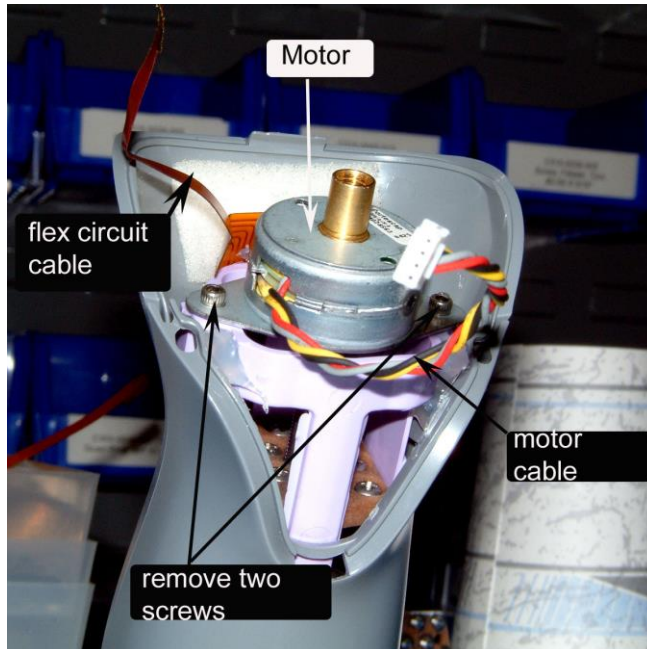


Figure 1 Flex Cable Connection and Captive Screw

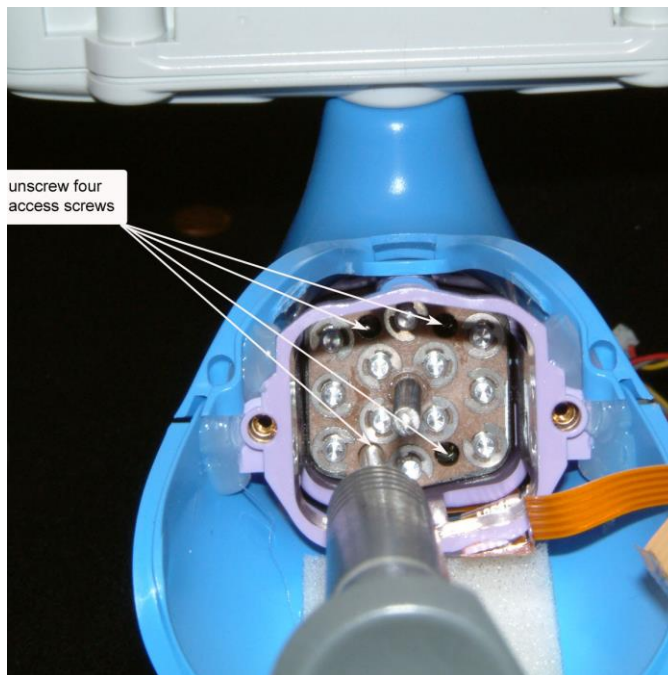
3. Unplug the Motor Cable and the Flex Circuit Cable.

4. Use a hex driver to unscrew the two screws on the motor and set aside.



**Figure 2 Remove cables and unscrew Motor**

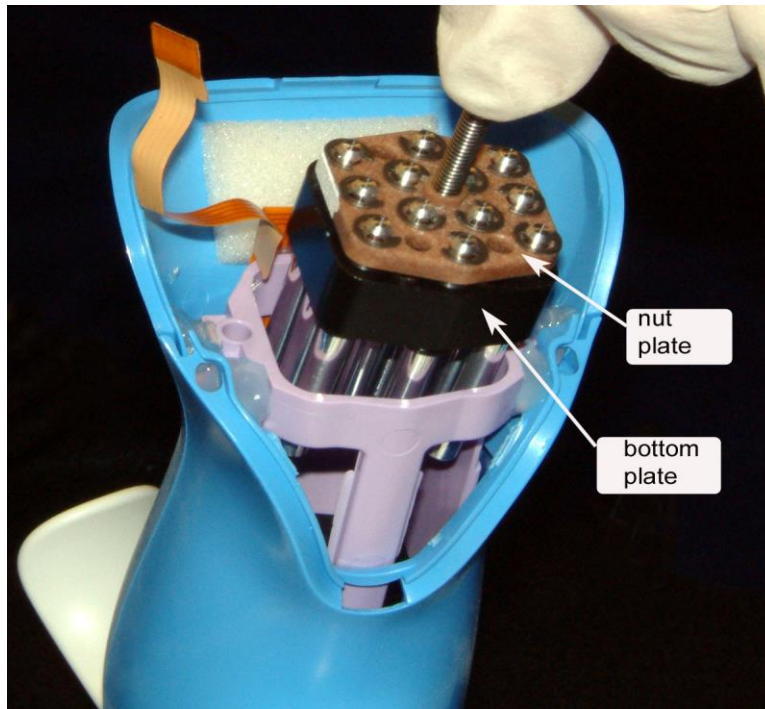
5. Insert a #1 Phillips head through four access holes in the nut plate to fully loosen the screws in the bottom plate.



**Figure 3 Unscrew four access screws**

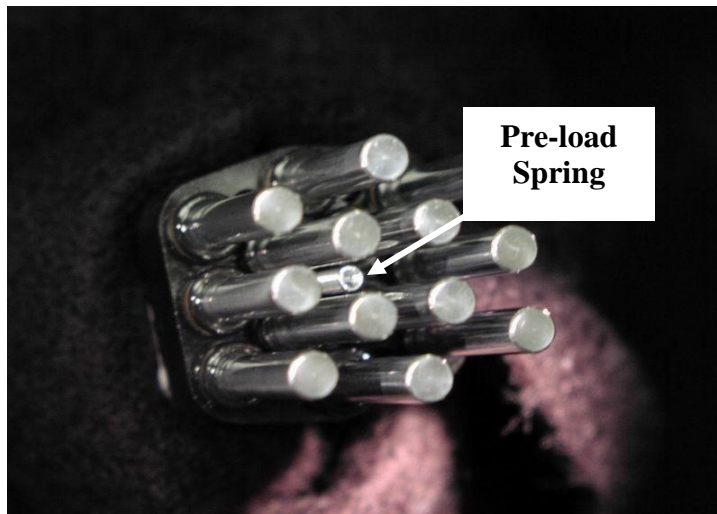
6. Pull out the Nut Plate with Plungers and the Bottom Plate together.

**NOTE: Be sure to keep the Nut Plate and Bottom Plate together.**



**Figure 4 Remove Plunger Assembly**

7. Use caution to avoid losing pre-load spring if present.

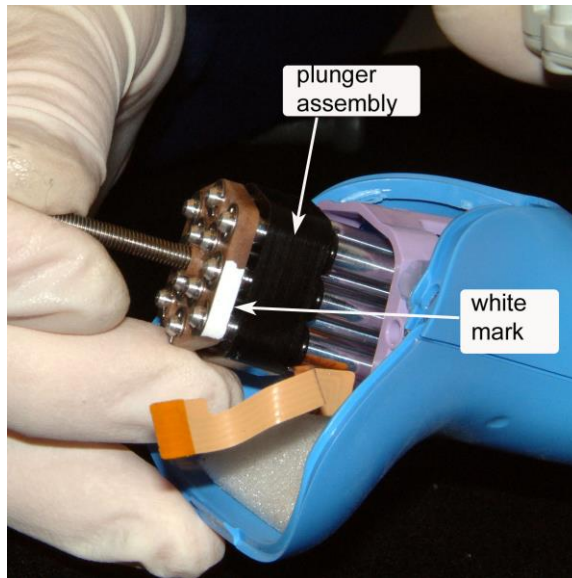


**Figure 4.1 Preload Spring in Correct Position**

8. Use curved tweezers to remove the O-Ring for each plunger.
9. Replace the O-Rings, locating them at the ends of the plungers. **NOTE: Do not use tweezers when handling new O-Rings.**

**Reassembly:**

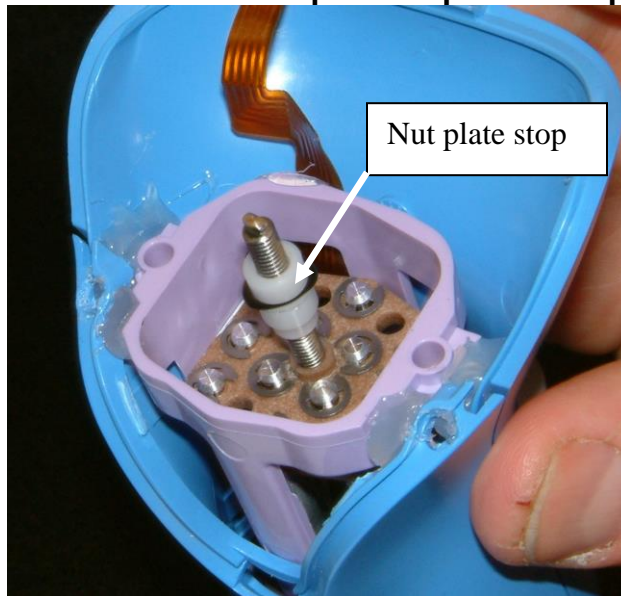
1. Push the O-Rings down against the bottom plate.
2. Be certain that the white mark is facing the Sensor as shown.



**Figure 6 Align Plunger Assembly**

3. Set the Plunger Assembly into place and tighten the Bottom Plate evenly with four screws.

**Note: Be sure that the nut plate stop is still in place on lead-screw.**



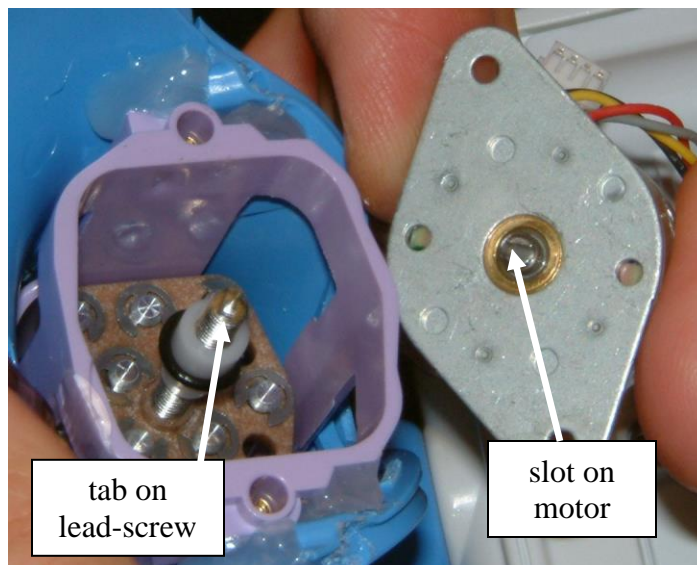
**Figure 7 Nut Plate Stop**

4. Remove the Nut Plate from the unit and insert the plungers into 3mm of silicone oil (provided with tool kit). Touch off excess on a lint-free paper towel



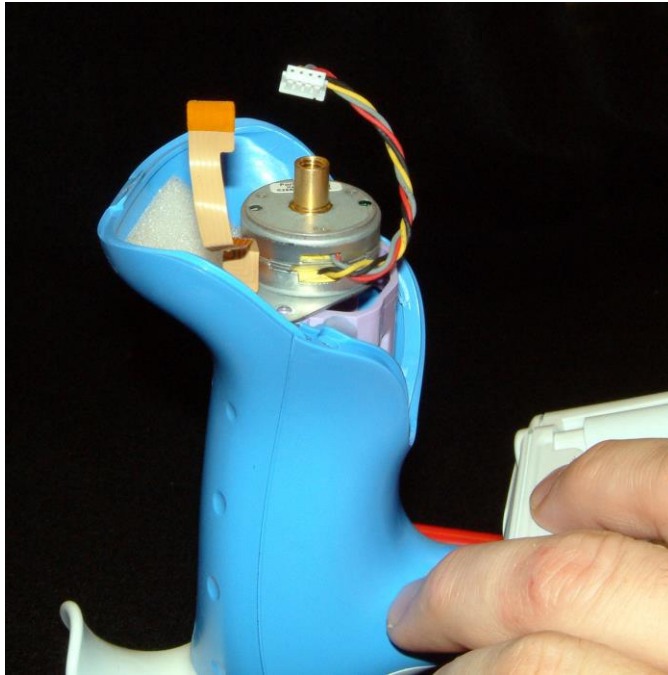
**Figure 7.1 Oiling Plungers**

5. Align the slot on the Motor coupling with the tab on the lead screw.



**Figure 8 Aligning slot on Motor with Tab on lead screw**

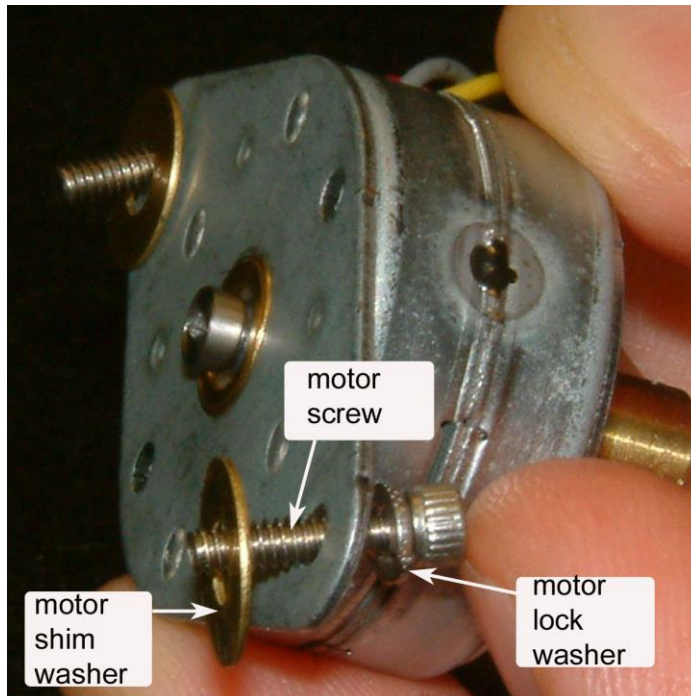
6. Align Motor Cable forward as shown.



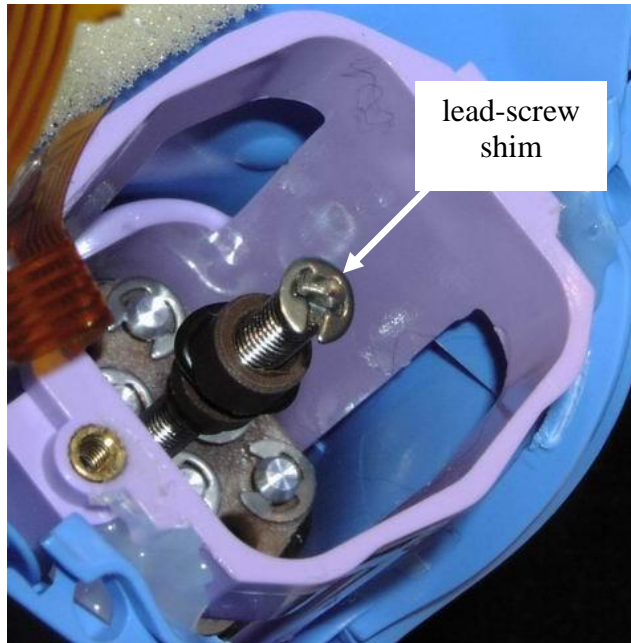
**Figure 9 Motor Cable forward**

7. If motor or lead-screw shims are present, replace the shims prior to reattaching the motor.

**Note: Only some units contain shim washers.**

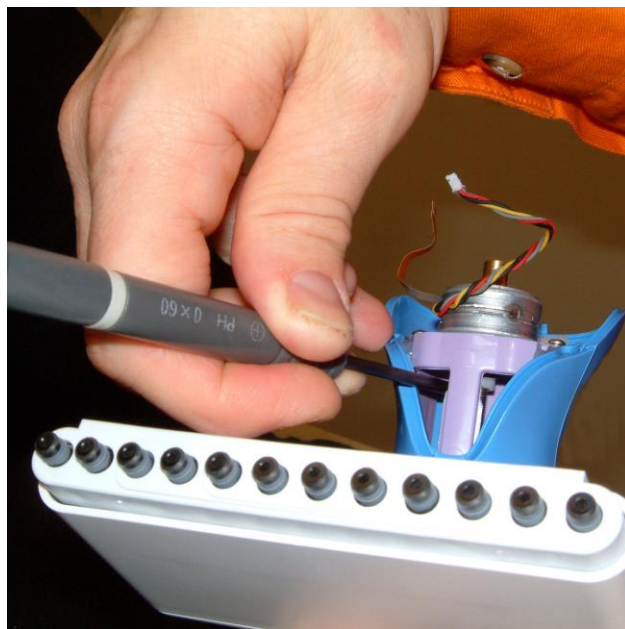


**Figure 10 Reattaching Motor Shim Washers (if present)**



**Figure 10.1 Re-installing lead-screw shim (if present)**

8. Reattach the motor with two screws.
9. Push the nut plate stop down against the top of the motor.

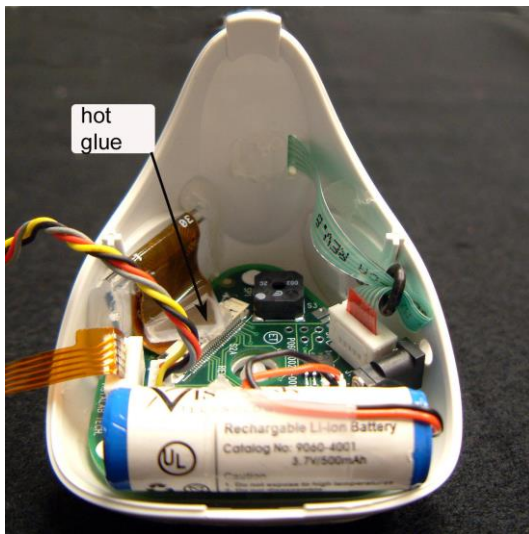


**Figure 11 Final seating of Nut Plate Stop**

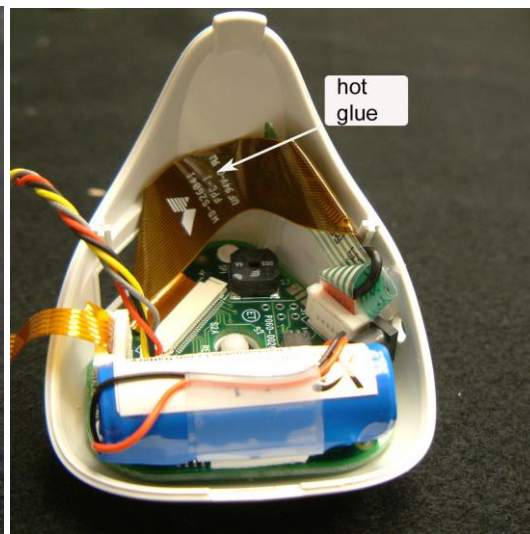
10. Connect the cables as shown in Figure 12 for a Standard Unit or in Figure 13 for a Left-Hand unit. Seat the connector locks as required. Install the battery and test.

- Check the three Key Pad buttons and verify that they are responding.
- If the display does not respond to the keypad, then the Key Pad Flex Cable may be installed backwards.
- Check the pipetting trigger to verify that the pipette aspirates normally.
- If the unit does not respond to pressing of the pipetting trigger or displays an error, then check for correct installation of the Trigger Flex Circuit.

The following are Right-Hand and Left-Hand Ovation models.



**Figure 12 Final Wire Routing for Standard (Right-Hand) LCD Location**



**Figure 13 Final Wire Routing for Left-Hand LCD Location**



11. Reassemble the Base Assembly to the Upper Body.

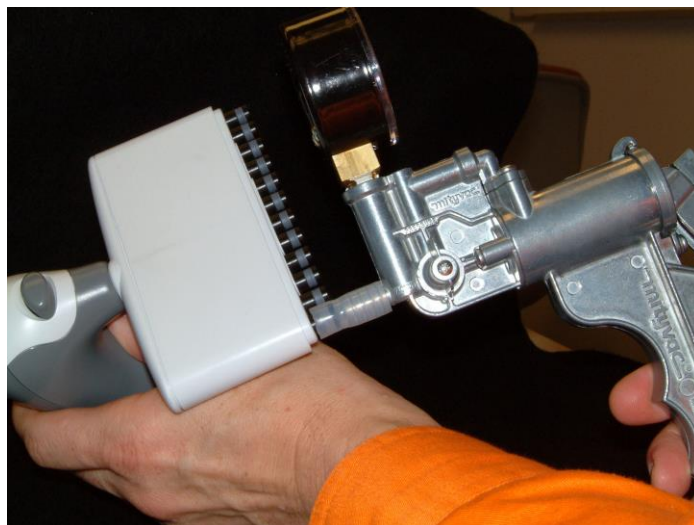
**Important: Be sure that the Flex and Motor Cables are routed correctly and are not pinched or protruding.**



**Figure 14 Reassembling Base to Upper Body**

12. Tighten the Captive Screw with a coin or screwdriver.
13. Check for leakage by performing the Pressure Test:

Connect each channel to the tubing on the Pressure Test Pump as shown.



**Figure 15 Check for leakage with pressure gauge**

Pump the pressure to 3 – 5 psi.

**NOTE: Never exceed 5 psi.**



**Figure 16 Pressure Pump at 4 psi**

Check the pipette through a full aspirate/dispense cycle. The pressure should return to its original reading of 3-5 psi at the end of the cycle and should remain steady for three seconds.

Check all channels.

If any channel leaks, remove the Plunger Assembly again. Check for dirt or fibers on the seals and then reseal the plunger seal by pulling the seal retainer down and then releasing it.

Reassemble and repeat the leak test until all channels pass.

