

VP 177AD-1 SERIES DISPENSING MANIFOLD CARE AND USE

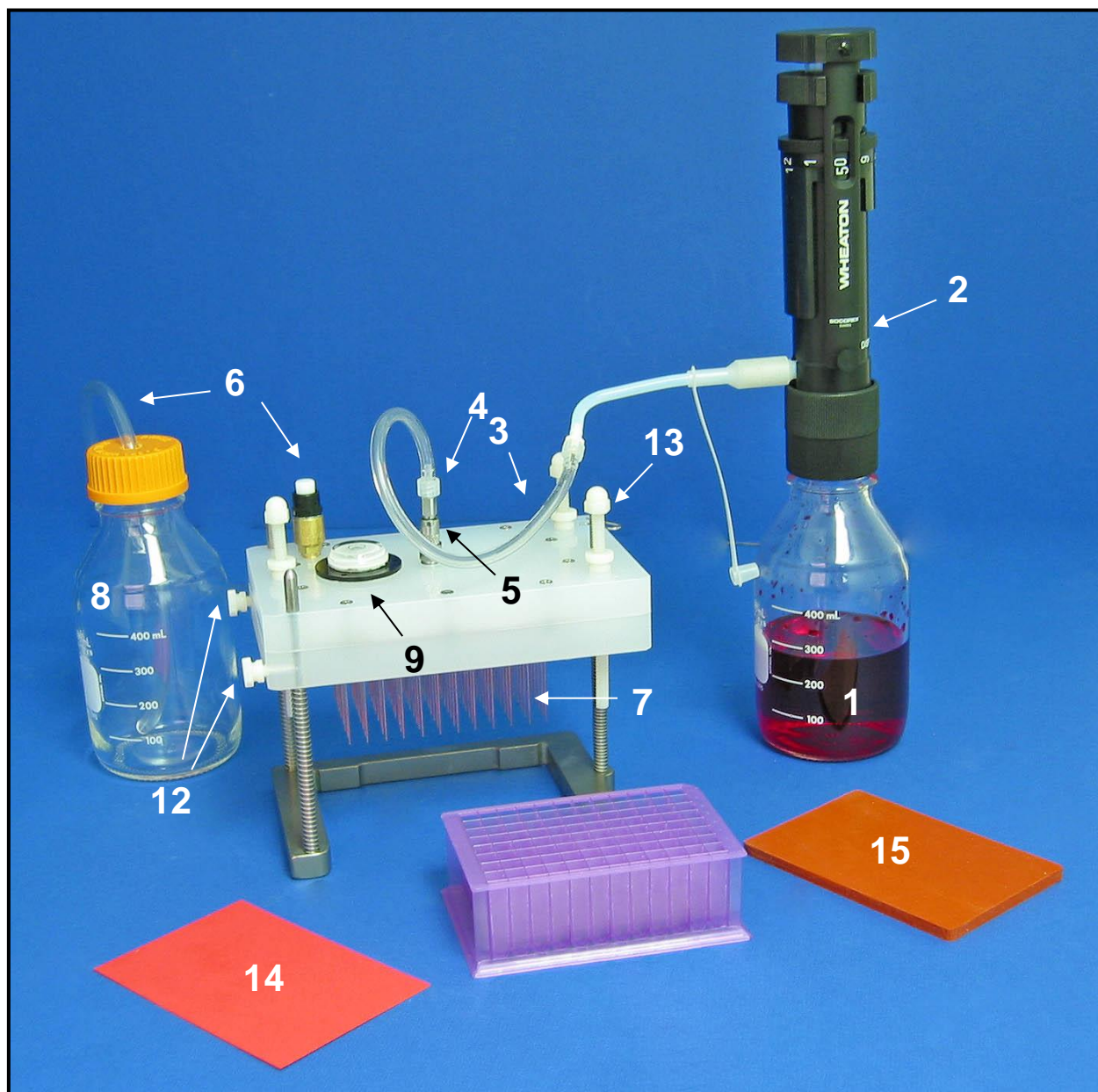
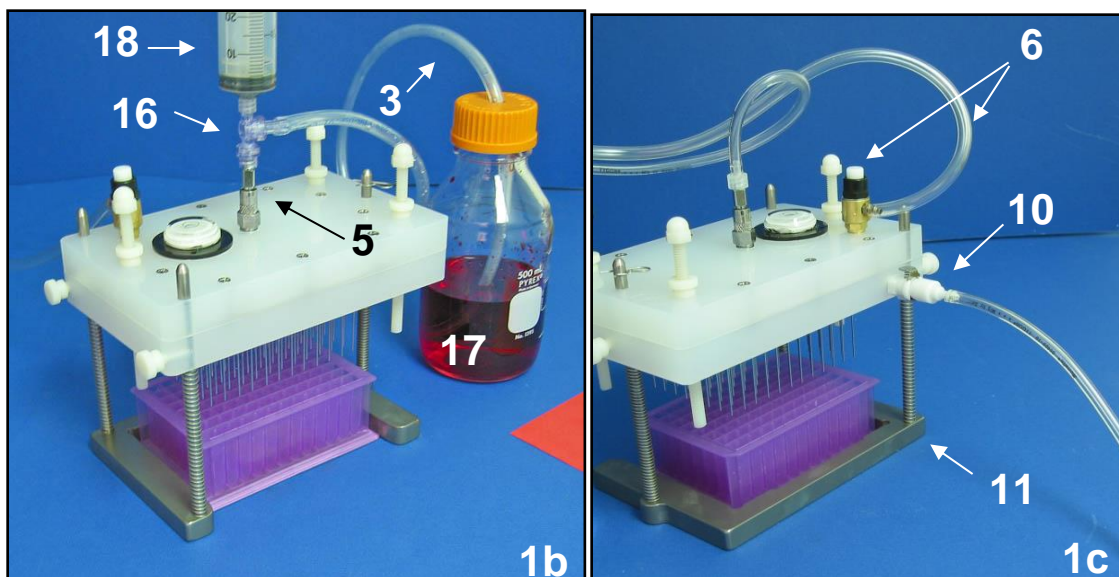


Figure 1a. Parts of the VP 177AD-1 Dispensing Manifold with VP 195K Bottle Top Dispenser (sold separately)



Figures 1b and 1c. Parts of the VP 177AD-1 Dispensing Manifold with Syringe setup (1b is viewed from front; 1c is viewed from back)

PARTS GUIDE

1 – Source Bottle (500ml) shown with Bottle Top Dispenser	8 – Collection Bottle (500ml) with Cap for Bleed Tubing	15 – Rubber Pad
2 – Bottle Top Dispenser [Sold Separately]	9 – Bubble Level	16 – Two-Way Valve for Syringe
3 – Manifold Source Tubing	10 – Quick Connect Fitting with Tubing to Vacuum Trap	17 - Source Bottle (500 ml) with Cap, shown with Syringe
4 – Luer Lock Tubing Fitting (Male)	11 – Manifold Base with Spring-Loaded Guide Rods	18 – Syringe (20ml) [included]
5 – Luer Lock Fitting (Male with Female Adapter)	12 – Thumb Screws for holding Manifold body in position	19 – Rapier (not shown)
6 – Bleed Valve and Tubing	13 – Z Height Set Screws with Lock Nuts	20 – Krytox Grease in snap cap tube (not shown)
7 – Dispensing Tubes	14 – Spacer	

IMPORTANT NOTE:

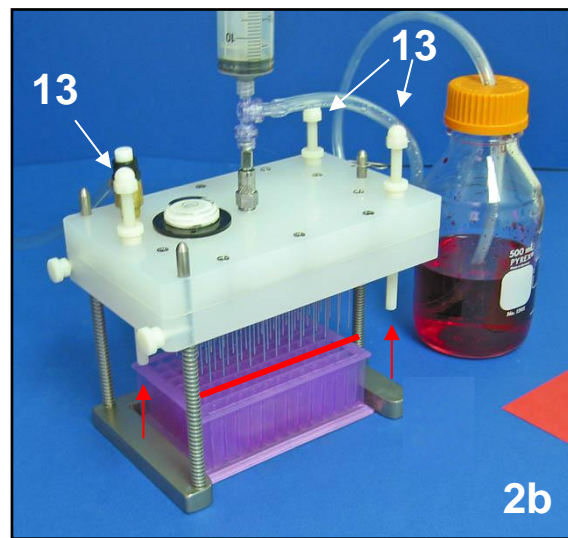
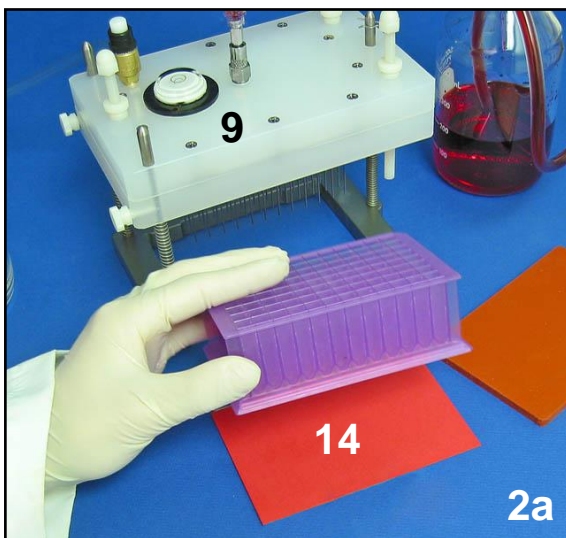
The Dispensing Manifold is chemically resistant to some common laboratory solvents (such as ethanol, methanol, isopropanol and DMSO) but not all (acetone or chloroform, for example). Please contact V&P Scientific if there are questions regarding chemical resistance of the Manifold to the liquid to be dispensed.

In some manifolds designed to be chemically resistant, the fittings, such as the bleed valve, inlet port, or quick disconnect to vacuum trap may be substituted for other fittings. Operation and priming of manifold.

SETUP: PART 1

Setting the Space between Dispensing Tubes and Bottom of Microplate Wells

1. Place the Spacer (14) under a microplate (Figure 2a). Slide the Spacer and microplate under the VP 177AD-1 as in Figure 2b. Note: the spacer can be any height depending on the desired distance between the bottom of the Dispensing Tubes and the bottom of the wells. Make sure the three Z Height Set Screws (13) are set so the exposed length below the Manifold body is shorter than the Dispensing Tubes (7) (Figure 2b, red line and arrows).
2. Loosen the three Thumb Screws (12) (Figure 2c) and slide the Manifold body down on the three Guide Rods on the Manifold Base (11) until the Dispensing Tubes rest on the bottom of the microplate wells. Tighten the Thumb Screws to lock the Manifold body into place (Figure 2d). Use the provided Bubble Level (9) to determine if the Manifold body is level and adjust if necessary.
3. With the Manifold body in the down position, screw the Z Height Set Screws (13) until the bottom of each Screw touches the Manifold base (11) (Figure 2d, red circle). Check the Bubble Level again and adjust if necessary. Lock the Z Height Set Screws into position by turning the Lock Nut on each Screw until it contacts the top surface of the Manifold body.
4. Loosen the three Thumb Screws (12), allow the Manifold Body to spring back to its starting position above the microplate, and remove the microplate and Spacer. The VP 177AD-1 is now configured so the Dispensing Tubes will be about 0.5 millimeters (mm) above the bottom of the wells when dispensing. For a greater separation, use a thicker spacer.



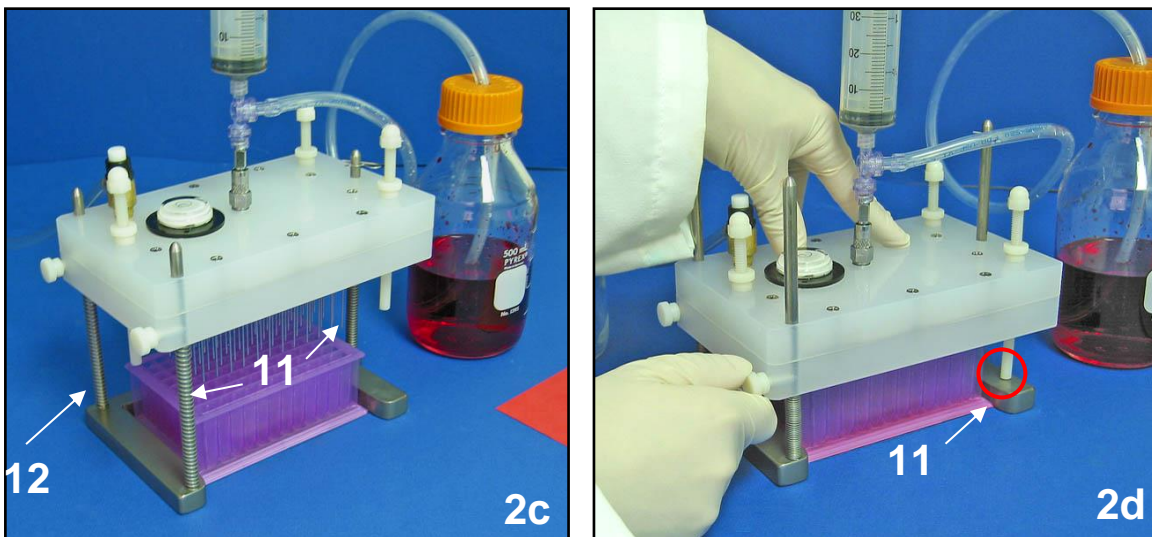


Figure 2. Use of Spacer in Manifold Setup, Part 1

SETUP: PART 2

Bleeding Air from Manifold

1. Make sure Quick Connect Fitting (10) is *disconnected* before bleeding air from the system (Figure 1c shows it connected to back of Manifold body). To disconnect, press on the metal tab on the Quick Connect Fitting part that is screwed into the Manifold body and pull on the part with the tubing attached. Once separated a valve in the part on the Manifold body is closed.
2. Attachment of dispenser, either Syringe (18) or Bottle Top Dispenser (2), to Manifold:
 - a. Syringe setup (Figure 1b): Attach the Two-Way Valve (16) to the Female Adapter of the Luer Lock Fitting (5) on the top of the Manifold body. To the Two-Way Valve (16), attach the Syringe (18) and the Manifold Source Tubing (3). If unable to read the volume markings on the Syringe, remove the Syringe, rotate it and reattach it to the Two-Way Valve. Insert the other end of the Manifold Source Tubing (3) into the hole in the Source Bottle Cap and down into the Source Bottle (17). If the Source Tubing does not fit loosely in the hole, unscrew the Cap slightly so a vacuum does not form in the Source Bottle. Note: when operating, make sure the liquid level does not fall below the bottom of the Dispensing Tubes or air will enter the system.
 - b. Bottle Top Dispenser setup (Figure 1a): Assemble Dispenser according to manufacturer's instructions. Attach the Manifold Source Tubing to both the Luer Lock Tubing Fitting (4) and the Bottle Top Dispenser's dispensing tubing. The Two-Way Valve (16) is not needed. Note: when operating, make sure the liquid level does not fall below the bottom of the Dispensing Tubes or air will enter the system.
3. Place the Collection Bottle (8) beside the Manifold (Figure 1a). Connect one end of the Bleed Tubing to the Bleed Valve (6) and insert the other into the hole in the Collection Bottle Cap and into the Collection Bottle (8).

- Place Rubber Pad (15) on top of a microplate that is covered by a plastic lid (Figure 3a) and lower the Manifold body until the Dispensing Tubes (7) are pressed slightly into the pad. A flat-bottom microplate turned upside down also can be used.
- To hold Manifold body in position, tighten Thumb Screws (12) or continue to press down on Manifold body with moderate force. Maintain enough pressure on the Dispensing Tubes (7) to prevent liquid from coming out when bleeding air from the Manifold.

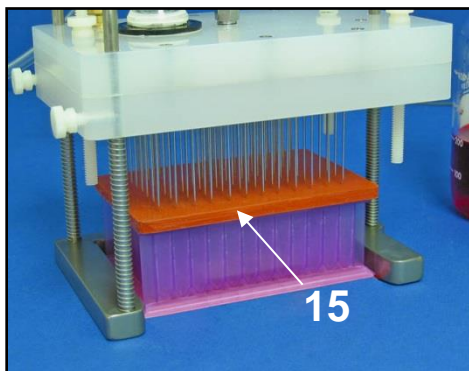


Figure 3. Use of Rubber Pad to Block Dispensing Tubes when Bleeding Air from Manifold

- Lift plunger of the Syringe or Bottle Top Dispenser to fill with liquid (Figure 4). Depress the top button of the Bleed Valve (6).



Figure 4. Bleeding Air from Manifold by Filling with Liquid using Syringe or Bottle Top Dispenser.

7. Depress the plunger of the Syringe or Bottle Top Dispenser in a steady stroke to dispense the liquid while releasing the Bleed Valve button (6) shortly before reaching the bottom of the stroke. Note that the bleed valve may be substituted with a quick disconnect and in this case, simply attaching the quick disconnect will open the valve and removing the quick disconnect will close the valve.
8. The Manifold has an approximate 150 ml dead volume, so repeat Steps 6-7 several times depending on the volume of the Syringe or Bottle Top Dispenser. Stop when a steady stream of liquid comes out of the Bleed Valve Tubing (6) into the Collection Bottle (8).
9. To rid the Dispensing Tubes of any trapped air, replace the Rubber Pad (15) and microplate with a tip box lid (or other suitable container). Depress the Syringe or Bottle Top Dispenser plunger vigorously in 10 ml increments (without pressing the Bleed Valve button) until streams of liquid are seen coming from all the Dispensing Tubes.

OPERATION

Dispensing Liquid into Microplates

1. Ensure the Manifold is set up for appropriate Dispensing Tube (7) Z height (Set-up, Part 1).
2. Place a 96 well microplate under Dispensing Tubes (7) of the Manifold.
3. Press down on the Manifold body with even pressure until the Z Height Set Screws (13) contact.
4. the Manifold Base (11). Either hold down with hand or tighten the Thumb Screws (12) to hold in place.
5. Draw the desired volume of liquid into the Syringe or Bottle Top Dispenser (volume to draw into dispenser = volume/well X 96 wells).
6. To dispense, depress plunger of Syringe or Bottle Top Dispenser in a rapid but steady motion.
7. After filling, allow the Manifold body to spring back to its starting position above the microplate.
8. Replace the microplate with the next microplate to be filled and repeat Steps 3-6 above.

IMPORTANT NOTE

Dipping the tips of the tubes into a reservoir containing the dispensing liquid will prevent liquid from dripping from the tubes. This is especially important when working with liquids with low surface tensions, such as alcohols and organic solvents. This may be required in between each dispense depending on the exact type of liquid to be dispensed.

CARE

Setup for Aspirating

1. The cleaning procedure for the Dispensing Manifold is to aspirate wash solutions through the Dispensing Tubes and out the Quick Connect Fitting (10). This procedure requires the use of a vacuum source such as a pump or a central or "house" vacuum system.
2. Attach one end of a vacuum hose to the nozzle Quick Connect Fitting (10) on the Manifold (Figure 1c) and other end to a shut-off valve (Figure 4). Place a vacuum trap to collect aspirated liquid between the shut-off valve and vacuum source.
3. Make sure Quick Connect Fitting (10) and Syringe or Bottle Top Dispenser are *connected* the Manifold before using for aspirating. Alternatively, attach a Luer Lock plug cap to Luer Lock Fitting (5) on top of Manifold.
4. Make sure all tubes are clear by aspirating distilled water from a microplate (see below). If any tubes are clogged use the rapier (provided) to clean them out. See "Cleanup" section for more details.

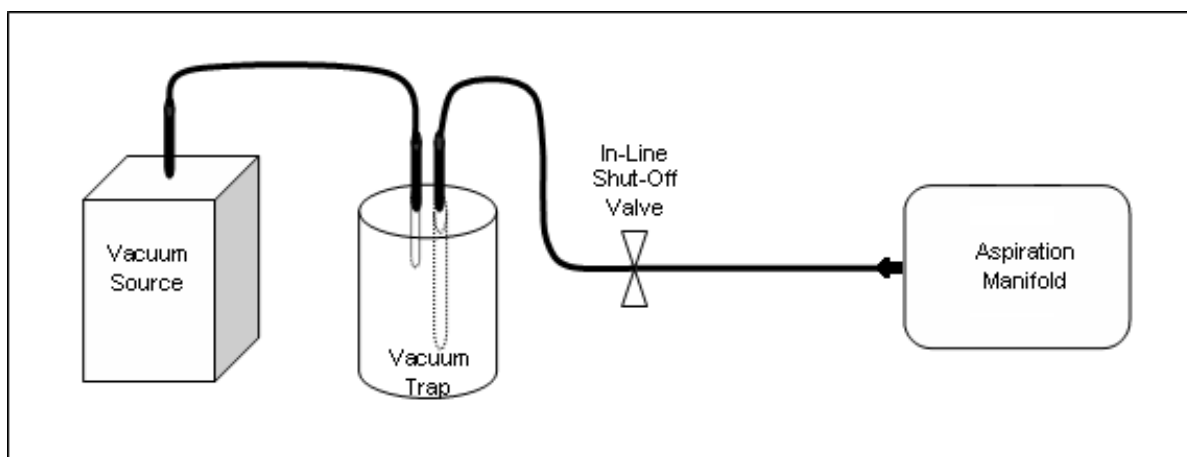


Figure 4. Manifold setup: Connection to Vacuum Source.

Cleaning the System by Aspirating

1. Remove liquid from inside manifold as follows:
 - a. Position a tip box lid under the Dispense Tubes (7).
 - b. Insert Bleed Tubing (6) in Collection Bottle (8).
 - c. Remove the Source Tubing (3) from liquid or replace Source Bottle with an empty one.
 - d. While depressing the Bleed Valve (6), use the Syringe or Bottle Top Dispenser to pump air into the system until the Bleed Tubing (7) is clear of liquid.
 - e. Liquid collected in Collection Bottle (8) and in tip box lid can be saved for re-use.
2. Set up Manifold as described in "Setup for Aspirating".

Position a tip lid box or other suitable container filled with wash solution (distilled water* first, then 100% alcohol, for example, isopropanol, ethanol, or methanol) under the Manifold.

***Always use distilled H₂O and not deionized H₂O in all Manifold procedures. Long term exposure to deionized H₂O will corrode the stainless-steel Dispensing Tubes.**

3. With vacuum shut-off valve in closed position, turn on vacuum. Press down on the Manifold with even pressure until the three pre-set Z height Set Screws (13) contact the base. Either hold with hand or tighten Thumb Screws (12) to hold in place. When sufficient vacuum has been created, open the shut off valve to allow the liquid to be aspirated through Manifold.
4. Tip the Manifold toward the Quick Connect Fitting (10) to ensure all wash solution is removed from the Manifold by the vacuum.
5. Use the vacuum to aspirate 2-4 ~100ml volumes of each wash liquid. After the last wash of alcohol, pull air through the Manifold for 1- 2 minutes by leaving the vacuum on and in-line shut off valve open.
6. It is also recommended that Syringe or Bottle Top Dispenser be rinsed by distilled water followed by alcohol.

Aspirating Liquid from Microplate Wells

1. The Dispensing Manifold can also be used as an Aspirating Manifold. Aspirating from a microplate can be useful for cleaning as each Dispensing Tube will have a separate wash volume. And Dispensing Tubes that do not aspirate a well can be identified for cleaning with the wire Rapier (19).
2. Set up as described in "Setup for Aspirating".
3. Place 96-well plate under the tubes of the Manifold.
4. With vacuum shut-off valve in closed position, turn on vacuum. Press down on top of the Manifold body with even pressure until the three pre-set Z height Set Screws (13) contact the Manifold Base (11). Either hold with hand or tighten Thumb Screws (12) to hold in place. When sufficient vacuum has been created, open the shut off valve to allow the wells to be aspirated.
5. Remove the Manifold from the microplate after it has been aspirated by allowing it to spring back to starting position. Close the vacuum shut off valve.
6. Replace the microplate with the next microplate to be aspirated.

Storage

1. For short-term storage (for 1-2 hours depending on the volatility of the liquid), keep the tips of the stainless steel Dispensing Tubes (7) in the liquid being dispensed or distilled water (*not deionized water, see footnote on page 2). This will prevent the liquid from evaporating and leaving material behind that might clog the Dispensing Tubes (7).
2. For long-term storage (more than 2 hours) clean the Manifold as described above for "Cleaning by Aspirating".
3. After cleaning, store in a clean dry area.

Sterilization

1. The Manifold can be sterilized by autoclaving or by wiping with a cloth dampened by a dilute bleach solution, followed by a water wipe.
2. Do not autoclave Two-Way Valve (16) or Syringe (18).

Troubleshooting

PROBLEM: Manifold body does not move easily up and down on guide rods.

SOLUTION: Use Krytox Grease (supplied) to lubricate guide rods.

PROBLEM: Not all microplate wells are being filled evenly.

SOLUTIONS:

1. Use Rapier to clear tubes.
2. Ensure that air is not being introduced into the system by Syringe or Bottle Top Dispenser.
 - a. Check that the solution being dispensed does not have air bubbles.
 - b. Check that all fittings with tubing tight.
3. Clean system by aspirating as described in Care Section on page 6.

PROBLEM: Not all microplate wells are being aspirated evenly.

SOLUTIONS:

1. Use Rapier to clear tubes.
2. Create a greater vacuum.
3. Move the microplate around while aspirating. Sometimes the tubes may be touching the bottom of the wells, which leads to incorrect aspiration.
4. Clean system by aspirating as described in Care Section on page 6.

Technical Assistance

If technical assistance is required, contact: V&P Scientific, Inc. at 858-455-0643 or sales@vp-sci.com

WARRANTY

V&P Scientific, Inc. warrants this product to be free from defects in material and workmanship when used under normal laboratory conditions for one year. This warranty begins from the date of delivery by V&P Scientific.

In the event this product fails under normal laboratory conditions within the specified period of time because of a defect in material or workmanship, V&P Scientific will, at its option, repair or replace the product. Damage to the product caused by user negligence is not covered.

Please keep the special shipping carton in case the unit needs to be shipped back to V&P Scientific. Please contact V&P Scientific at the address above for return authorization and shipping instructions.

This warranty is made in lieu of other warranties expressed or implied including the warranties of merchantability and fitness for a particular purpose. V&P Scientific shall not be liable for loss or damages arising from the use of these products nor for consequential damages of any kind.