CARE AND USE OF THE VP 177AD-1 ASPIRATION/DISPENSE MANIFOLD

Figure 1a. Parts of the VP 177AD-1 Aspiration and Dispensing Manifold
### PARTS GUIDE

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Source Bottle</td>
</tr>
<tr>
<td>2</td>
<td>Bottle Top Dispenser</td>
</tr>
<tr>
<td>3</td>
<td>Manifold Feed Tube</td>
</tr>
<tr>
<td>4</td>
<td>Luer Hose Fitting</td>
</tr>
<tr>
<td>5</td>
<td>Male Luer Fitting (with Female Adapter)</td>
</tr>
<tr>
<td>6</td>
<td>Bleed Valve</td>
</tr>
<tr>
<td>7</td>
<td>Bleed Tube</td>
</tr>
<tr>
<td>8</td>
<td>Collection Bottle and Cap</td>
</tr>
<tr>
<td>9</td>
<td>Bubble Level</td>
</tr>
<tr>
<td>10</td>
<td>Quick Connect Fitting</td>
</tr>
<tr>
<td>11</td>
<td>Tube to Vacuum Trap</td>
</tr>
<tr>
<td>12</td>
<td>Thumb Screws for Z Height Adjustment</td>
</tr>
<tr>
<td>13</td>
<td>Z Height Set Screws with Lock Nut</td>
</tr>
<tr>
<td>14</td>
<td>Spacer</td>
</tr>
<tr>
<td>15</td>
<td>Rubber Pad</td>
</tr>
<tr>
<td>16</td>
<td>Two-Way Valve</td>
</tr>
<tr>
<td>17</td>
<td>Source Bottle and Cap For Syringe</td>
</tr>
<tr>
<td>18</td>
<td>Rapier (not shown)</td>
</tr>
</tbody>
</table>

**Figure 1b and 1c. Parts of the VP 177AD-1 Aspiration and Dispensing Manifold**

**IMPORTANT NOTE:**
Aspiration/Dispense Manifolds are chemically resistant to some common laboratory solvents (such as ethyl alcohol, methyl alcohol, isopropanol, DMSO) but not all (acetone or chloroform, for example). Please contact V&P Scientific for more information if there is any question regarding the chemical resistance of the Manifold to the solution to be aspirated or dispensed.

**SETUP PART 1:**

**Setting Space between Manifold Tubes and Bottom of Plate (Figure 2)**

1. Make sure all tubes are clear by aspirating distilled water from a microplate. If any tubes are clogged use the rapier (provided) to clean them out. See “Cleanup” section for more details.

2. Place the Spacer (14) under a microplate (Figure 2a). Slide the Spacer and microplate, under the VP 177AD-1 as in Figure 2b.
3. Make sure that the three Z Height Set Screws (13) are not set longer than metal tubes of the Manifold.

4. Loosen the three Thumb Screws (12) and slide the Manifold down until the tubes rest on the bottom of the wells of the microplate. Tighten the Thumb Screws to lock the Manifold into place (Figure 2d). Use the provided Bubble Level (9) to ascertain that the Manifold is level.

5. While in this down position, move the Z Height Set Screws (13) so that the bottom of each screw touches the metal base. Check the Bubble Level again and make adjustments if necessary. Lock the Z Height Set Screws into position by turning the Lock Nut on each Screw so that they contact the top of the Manifold.

6. Loosen the three Thumb Screws (12) and remove the microplate and Spacer. The VP 177AD-1 is now configured such that the tubes will be about 0.5 millimeters 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 (Figures 3 and 4)

1. 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 connected to a vacuum source (Figure 3). It is recommended that a vacuum trap be placed between Manifold and vacuum source.

![Diagram of Manifold setup: Connection to Vacuum Source.]

2. Make sure all tubes are clear by aspirating distilled water from a microplate. If any tubes are clogged use the rapier (provided) to clean them out. See “Cleanup” section for more details.

3. Make sure Quick Connect Fitting is disconnected before bleeding air from the system. Once disconnected the fitting is closed.

4. Attachment of dispenser, either Syringe or Bottle Top Dispenser (2), to Manifold:
   a. Syringe method (Figure 1b): Attach the Two-Way Valve (16) to the Luer lock Fitting (5) on the top of the unit using the female adapter. Then attach a Luer lock Syringe and the Manifold Feed Tube (3) to the Two-Way Valve. If unable to read the volume markings on the syringe unscrew the syringe, rotate and screw the syringe back into the Two-Way Valve. Insert the Manifold Feed Tube (3) through the hole in the Source Bottle Cap and into the Source Bottle (18). If the Feed Tube does not fit loosely in the hole then the Cap will need to be unscrewed slightly so a vacuum does not form in the Source Bottle. Note: ensure that the level of liquid does not fall below the tube depth or air will enter into the system.
   b. Bottle Top Dispenser (Figure 1a): Assemble Dispenser according to manufacturer’s instructions. A Luer Hose Fitting (4) is used to connect the Bottle Top Dispenser’s dispensing tubing to the Manifold. The Two Way Valve (17) is not needed.

5. Place the Collection Bottle (8) beside the manifold. Place the Bleed Tube (7) in hole in the cap.

6. Place red Rubber Pad (15) on top of a microplate with a lid (Figure 4a) and lower the Manifold until the Dispense Tubes are pressed slightly into the pad (Figure 4b). To hold Manifold into position tighten Thumb Screws or press down with moderate force.
7. Lift Syringe/Dispenser plunger to fill with fluid (Figure 4c). Depress the Bleed Valve Button (6).

8. Compress the Syringe/Dispenser plunger in a steady stroke, and then release the Bleed Valve Button (6) shortly before reaching the bottom of the stroke.

9. The Manifold has an approximate 150 ml dead volume, so repeat the previous steps several times depending on the volume of the Syringe/Dispenser. Stop when a steady stream of liquid coming out of the Bleed Tube (7) into the Collection Bottle (8).

10. To ensure there is no air remaining in the metal dispense tubes, replace the Red Rubber Pad (15) with a tip box lid (or other suitable container) depress the Syringe/Dispenser plunger vigorously in 10ml increments (without pressing the Bleed Valve Button) until streams of liquid are seen coming from all of the metal dispense tubes.
OPERATION:

Dispensing liquid into microplate

1. Make sure Manifold is set up for the desired Z height position (see Set-up Part 1).
2. Place 96-well plate under the tubes of the Manifold.
3. Make sure Quick Connect Fitting (10) is disconnected (once disconnected the fitting is closed).
4. Press down on the Manifold with even pressure until the Z Height Set Screws (13) contact the base. Either hold with hand or tighten Thumb Screws (12) to hold in place.
5. Draw the desired volume of liquid into the Syringe or Bottle Top Dispenser (volume drawn into dispenser = volume/well X # of wells).
6. Compress Syringe or Dispenser plunger in a rapid but steady motion.
7. After filling remove the microplate by allowing the Manifold to spring back to its original position.

Aspirating liquid from a microplate

1. Connect the vacuum source through the Quick Connect Fitting (10) on the Manifold (Figures 1c and 3).
2. Place 96-well plate under the tubes of the Manifold.
3. Make sure Manifold is set up for the desired Z height position (see Set-up Part 1).
4. 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 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.

Cleaning the system by aspirating

1. Position a tip box lid under the Dispense Tubes. Insert Bleed Tube (7) in Liquid Collection Bottle (8) and remove the Source Tube (3) from liquid or replace Source Bottle with an empty one.
2. While depressing the Bleed Valve (6), use the Syringe or Bottle Top Dispenser to pump air into the system until the Bleed Tube (7) is clear of liquid.
3. Connect the vacuum source through the Quick Connect Fitting (10) on the Manifold (Figures 1c and 3).
4. 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 out of Manifold.

5. Use the vacuum to aspirate a wash liquid (distilled water first, then 100% alcohol) from a tip box lid through tubes of the Manifold.

6. It is also recommended that Syringe or Bottle Top Dispenser be rinsed by distilled water followed by alcohol. Insert the Source Tube into wash liquid and fill the Manifold as described previously. Then follow steps 1-4 above.

STORAGE

1. For short-term storage, keep the tips of the metal aspirate tubes in the liquid you are using in the plates or distilled water. This will prevent the liquid from drying and clogging the tubes.

2. For long-term storage, drain the Manifold and aspirate three separate 100 ml distilled water aliquots through the system. DO NOT USE DE-IONIZED WATER, as de-ionized water will corrode the stainless steel tubes.

3. Tip the system back and forth after each aliquot to ensure all water is aspirated from the Manifold on each rinse.

4. Aspirate two separate 100 ml aliquots of alcohol (methanol, ethanol or isopropyl alcohol) through the Manifold. Tip the system back and forth to ensure all the alcohol is removed.

5. Pull air through the Manifold for 1-2 minutes by leaving the vacuum on and shut off valve open.

6. Store in a clean dry area.

7. To autoclave, simply place the entire system into the autoclave. It is not necessary to remove any parts.

TROUBLESHOOTING

PROBLEM: Manifold does not move easily up and down on Guide Pins.

SOLUTION: Using Krytox (provided in 1.5ml tube) to lubricate Guide Pins.

PROBLEM: Not all wells being aspirated or not filling all wells evenly.

SOLUTIONS:
1. Use rapier to clear tubes.
2. Create a greater vacuum.
3. Wiggle the manifold while aspirating. Sometimes the tubes may be touching the bottom of the wells, which leads to incorrect aspiration.
4. Make sure that air is not introduced into system by Syringe or Bottle Top Dispenser.
5. If still not functioning properly, contact V&P Scientific for more technical assistance.