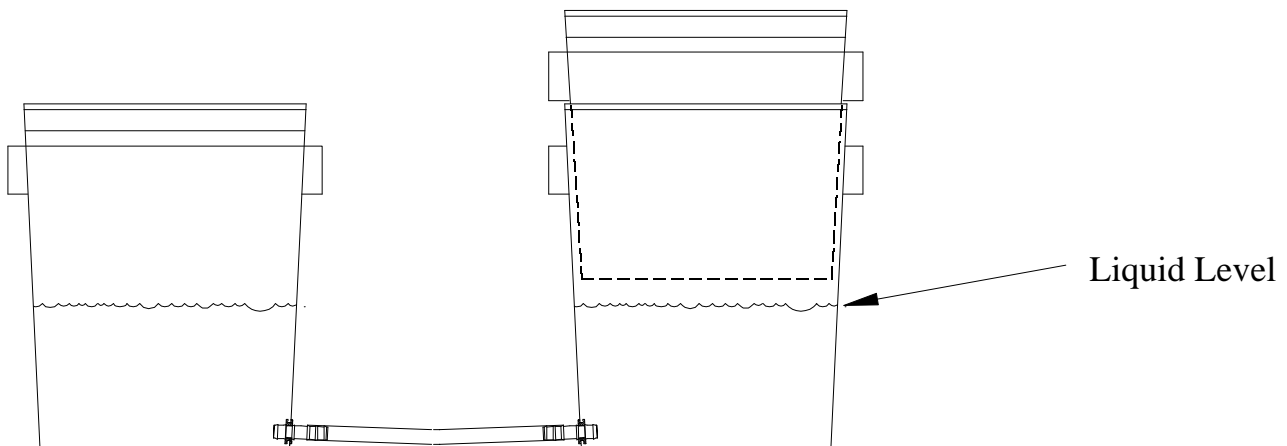


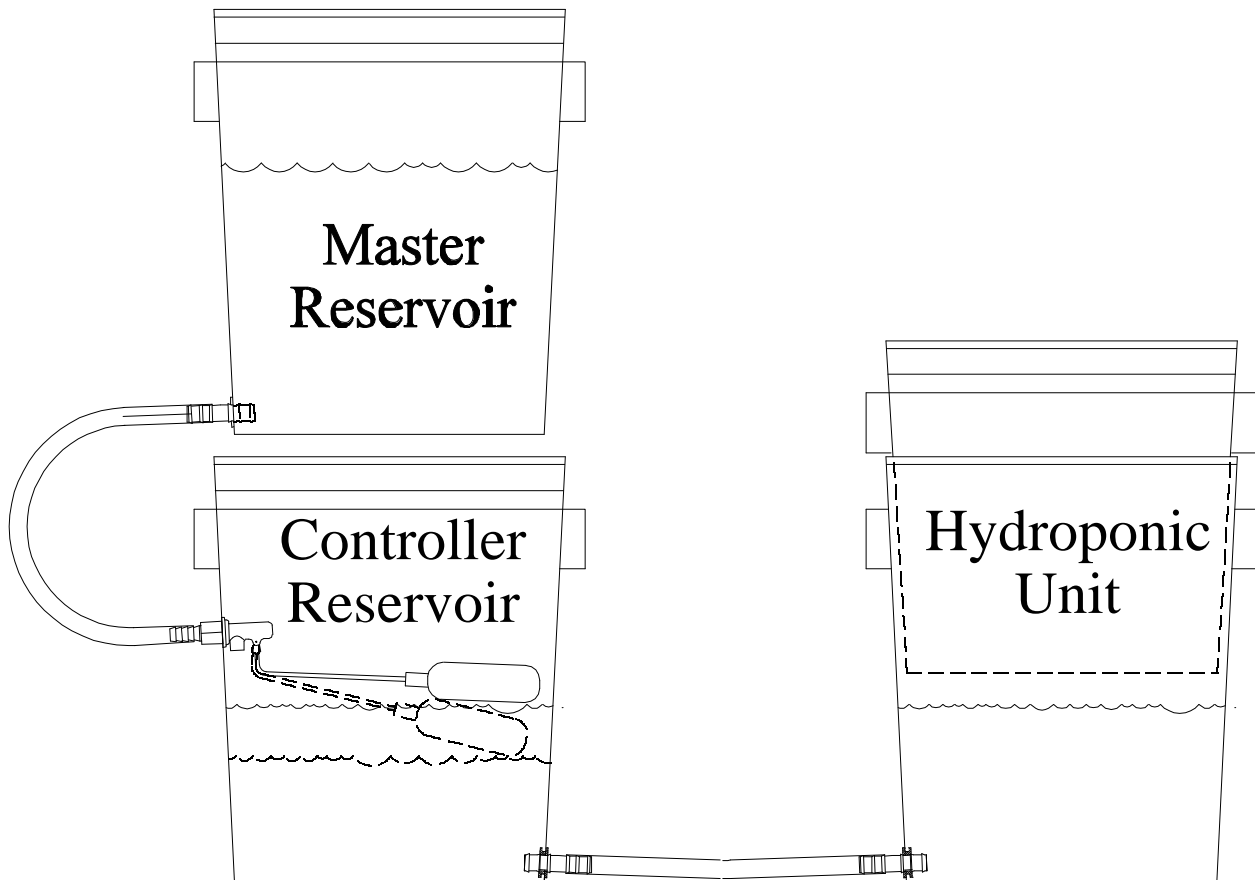
Introduction

This simple reservoir system automatically replenishes the nutrient solution in your "Aquafarm" type systems. This allows you to connect several modules and create an automatic garden that can remain unattended for several days. The reservoir system consists of two containers - a master reservoir and a controller reservoir.

This principle behind the operation of this unit is extremely simple. As you can see from the drawing below, if you connect two containers of liquid, the level of liquid will adjust itself to be the same height in both containers. Therefore, to control the liquid level in one container (namely our hydroponic unit) we need only to control the level of liquid in the other container. This second container will be our controller reservoir.



To make the system automatic, we need to have some way to add more nutrient to the system (from a third container) when the level of nutrient in our controller drops. We accomplish this by adding a simple float valve to the controller reservoir and connecting the controller unit to a master reservoir. This master reservoir may be another 5-gallon bucket (which stacks neatly on top of the controller), or it may be a larger container such as a plastic garbage can. When the level of nutrient drops in our hydroponic unit, this causes a level drop in the controller. In turn, the level drop in the controller causes the float valve to open and let more nutrient into the system, through this simple process the nutrient level is automatically maintained at the proper levels.

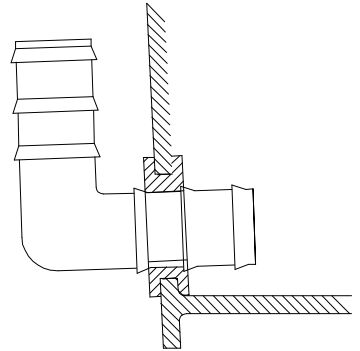


Parts list to make an automatic nutrient reservoir

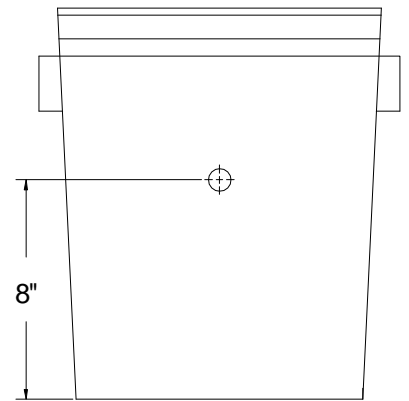
Item	Cost	Notes
2 ea. 5 gallon buckets	\$4.00 ea	Just a plain old ordinary five gallon bucket as used in the "Aquafarm"
2 ea ½" rubber grommets	\$0.69 ea.	You'll find this item in the electrical supply part of your hardware store. The ½" measurement refers to the inside diameter of the rubber grommet. See the detail drawings.
2 ea. ½" Raindrip barbed Elbows	\$0.55 ea.	Raindrip is a popular brand of drip irrigation product. You should be able to find this in the sprinkler section of your local hardware store. If you cannot find this part you can order, it from one of the suppliers that I have listed. Also you may study the detail drawing that I have provided and make a substitution.
1 ea brass float valve	\$7.00	This is the key to the reservoir. The only place that I have found this valve is McMaster Carr Supply Company. Specifications are as follows: Inlet size - 3/8" MPT, Outlet 1/8" FPT. Item Number 4607K42.
1 ea. 3/8" NPT to ½" Barbed		This is another McMaster Carr Specialty Item. Item Number 5346K23 .
Optionally: 1ea Completed valve assembly	\$14.00	You can get the completed float assembly (in lieu of the above two items) from General Hydroponics or Greenfire.
½" I.D. vinyl tubing		You'll need several feet of this to connect your reservoir system together. Plus extra tubing to connect each additional hydroponic unit. See text for more detail.
½" Raindrip Barbed tee's		If you are going to connect more than one unit to the reservoir, you will need one tee for each unit past the first.

Assembly Instructions

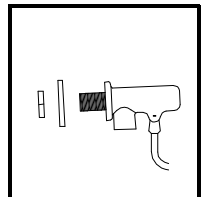
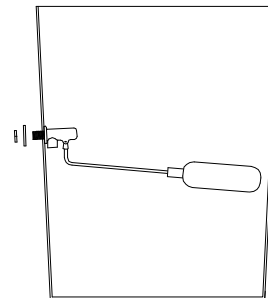
1. Install a grommet and elbow into both 5 gallon buckets. Start by drilling the grommet hole in the side of the five gallon bucket. Drill this hole on the side of the bucket as close to the bottom as possible. Be careful not to pierce the bottom web of the bucket. Unfortunately I can't give you the exact size of the hole to drill because there are several types of rubber grommets which vary slightly in size. You will need to measure your grommet and determine what size hole to drill (this should be in the ballpark of 3/4" or 13/16"). I suggest that you drill a test hole in something other than your bucket and check the fit of the grommet. Second, fit the grommet into its hole. It is important that the grommet forms a water tight seal with the bucket, so you may have to remove any burrs from the drilling process with a utility knife. Finally, insert the elbow into the rubber grommet. When you press the elbow into the grommet hold your hand on the grommets' back side to keep it from pushing through into the bucket. Insert the elbow about half way into the grommet so that it still has room to swivel. The diagram at right shows the 5 gallon bucket with the hole drilled, the rubber grommet fitted and the elbow pressed into place.



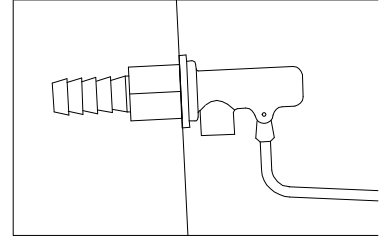
2. Drill hole for the float valve. We will be installing the float valve in only one of the buckets. This bucket will become our controller unit. The proper level for the nutrient solution in an "Aquafarm" is 7", measuring from the bottom of the bucket. In order to allow room for the valve body and adjustment, we will drill the float valve hole 8" from the bottom of the bucket. So, drill a hole just big enough to fit the valve through in the side of one bucket. Remember to drill this hole eight inches from the bottom of the bucket. The orientation is not important.



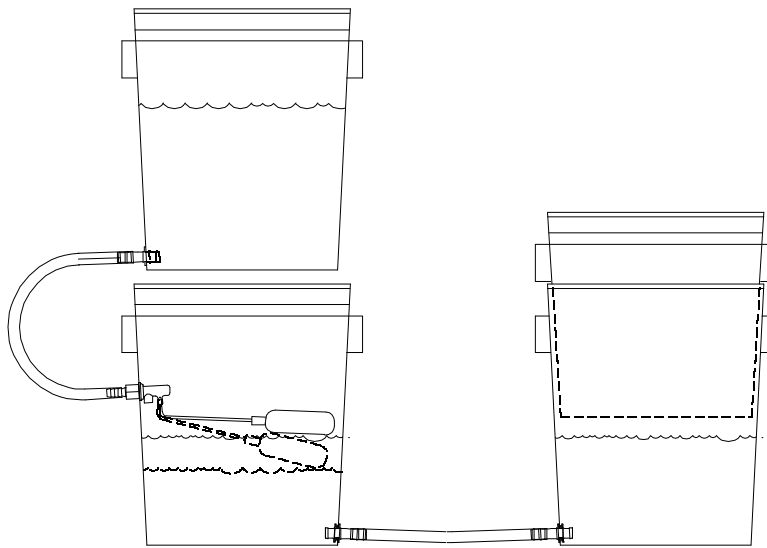
3. Install the float valve. Install the valve so the float and mechanism are on the inside of the bucket. Press the end of the valve through the hole and screw the locking nut down into place. Be sure the valve is oriented correctly. The "out" side should be pointing down into the bucket. Now, fully tighten the nut down with a wrench.



4. Screw on the Barbed fitting. Attach the barbed fitting to the male connector part of the valve the protrudes through the bucket.



5. Plumb the system. Attach the ½" tubing as shown, connecting the master reservoir to the controller and the controller to the Aquafarm.



How to use your reservoir system.

This reservoir system is extremely simple to use. Connect the reservoir system to your hydroponic unit as diagrams on the previous page. For proper operation the controller must be placed at the same level as the hydro unit and the master reservoir must be above the controller reservoir. Once you have connected the reservoir to the hydroponic unit(s) all you need to do is fill the master reservoir with nutrient. The system will automatically adjust the nutrient level! Furthermore, all you need to do to maintain the automatic garden you have just created is to periodically add more nutrient to the master reservoir.

Tuning your controller reservoir.

Upon your initial use, you will need to adjust the float valve so that it regulates the nutrient level to 7" deep in the controller reservoir. In order to do this you must fill the system with nutrient and wait for it to equalize (this will take several minutes). Once the system is full measure the level of the liquid in the controller reservoir. This is best done by simply sticking a ruler into reservoir. The proper level for the nutrient is 7" deep, measuring from the bottom of the bucket. If necessary, adjust this level by bending the brass arm on the float. Bail a few cups of liquid out of the controller reservoir, let it equalize and check the level again. Repeat this process until the controller level fills to 7".

Connecting more than one hydroponic unit.

You may use this reservoir system to replenish more than one hydroponic unit. I have seen up to nine "Aquafarms" connected to one reservoir. To accomplish this, replace the elbows in the "Aquafarms" with tee's and chain the units together.

