

**Universalab**

**PRINT WASHER**

***Assembly and use of your new print washer is extremely simple, and shouldn't take but a half hour. The parts list may be long, but there is nothing complicated in it. We have included drawings in the back to clarify the text - also note that I.D. = inside diameter, O.D. = outside diameter, and GPM = gallons per minute. The following is the complete list of parts included with your washer. In some cases we have included extras of some of the small items in case of accidents.***

- 1 polyethylene tank with grommets installed
- 15 separator panels (white styrene)
- 12 no.8 stainless steel nuts
- 12 no.8 stainless steel washers (large hole)
- 8 no.4 stainless steel washers (small hole)
- 68 3/4" long nylon spacers
- 16 5/8" long nylon spacers
- 4 lengths 1/8 polyethylene rod
- 1 3/8" I.D. hose-to-garden-hose-thread (GHT) adapter
- 2 white plastic clamps
- 3 small black silicone rubber plugs
- 1 plastic ratchet clamp
- 1 plastic elbow fitting - 1/4 NPT to 3/8 I.D. tubing
- 3 6" lengths of 3/8" I.D. PVC hose
- 1 6' length of 3/8" I.D. PVC hose - INLET HOSE
- 1 26" length of 1/2" I.D. PVC hose - SIPHON HOSE
- 1 2" length of 1/2" I.D. PVC hose
  
- 1 5" length of 1/2 O.D. rigid PVC tubing with one hole - SIPHON BREAK TUBE
- 1 14" length of 3/8" O.D. rigid PVC tubing with a series of holes - SPRAY BAR
- 4 long no.8 stainless steel studs
- 2 shorter no.8 stainless steel studs
- 3 3/4" square x11+" long gray plastic bars (print weights)

**WASH**

The first job is to wash all the components. Most of the parts have manufacturing lubricants on them that should be washed off so as to not contaminate your print wash water. We suggest you wash all the parts thoroughly with hot detergent water. If you wish, use the tank as the wash basin. Don't mix up the short nylon spacers with the longer ones and try to keep the separator panels in the same order that they were packed.

**PRINT BASKET ASSEMBLY**

***The quick story***

The finished print basket consists of 15 white plastic separator panels fastened together by stainless steel studs. The panels are held apart, creating the 14 slots for prints, by the nylon spacers. At the bottom are thin plastic rods which support the prints. The separator panels are smoothed on the top edge and have a hole at the upper corner for orientation purposes.

***Note:*** In order to make the washer pleasant to use and safer for your prints, we have rounded the top edge of the separators. Sometimes we aren't perfect. Please to make sure that this was done adequately. A quick dab with even a fingernail file will do it. Using a sharp edged tool is fine also, providing you use it as a scraper since sharp edges dig into the soft plastic.

## **PRINT BASKET ASSEMBLY cont'd**

### **detail**

You will be building up the print basket by stacking things together on a table top or work surface. Prepare the studs by placing a no.8 washer (large hole) and then a nut right at one end of each of them. Take one of the panels and place it on the work top with the indicator hole (see drawing) at the upper right and the long side with the four holes nearest you. Put one stud up through each of the six side holes of this panel - place the two short studs in the lower holes on each side (see drawings on the last page). The panel should now be laying flat with the studs sticking up through the holes. Put one short spacer on each stud and then put another panel over the studs. Keep the panels oriented as they came packaged with the indicator hole corners all in a line. Again put one short spacer on each stud, and another separator panel. After that put one long spacer over each stud, and then add another panel over the studs. Keep building the print basket in the same fashion with a long spacer over each stud until only two panels have not been assembled. Now place a short spacer over the two short studs and a long spacer over the four long studs. Put the next to last panel on. Repeat - put one short spacer on each of the two short studs, and one long spacer over each of the other four long studs. Put on the last panel.

Now put a no.8 washer and a nut on each stud and tighten the nuts. Set the basket upright so that the panels are vertical and sitting on their long side. This is how it will sit in the tank. Tighten the nuts firmly enough that the basket moves and feels like a single unit, but not so tight that something is stressed.

You should now have a fairly rigid assembly that consists of 15 separator panels held together by the studs. Check that the nylon spacers are as the sketch - the first bay should have all short spacers, and the two last bays should have short spacers on the short studs. Changing things around is relatively easy at this point - a piece of straight wire or even the polyethylene rod can keep spacers in place while studs or spacers are moved.

Now turn the basket upside down so that the four holes are upper most. Put one of the polyethylene rods through the same hole in each of the separators (running parallel to the studs). Position them so that about the same amount sticks out each side of the basket. Place a no.4 washer over each of these ends. Squeeze the end of the rod with pliers quite hard. This should upset the end of the rods so that they do not pull back through the washers.

***Note:** In the following procedures, when fitting hose or tubing into the rubber grommets, you will want to use either water with a tiny bit of detergent or Windex as a lubricant to ease fitting.*

### **TANK INLET**

You have a choice which side of the tank the inlet water hose is to be on. Simply orient the open end of the spray bar on that side. Wet the inside of the grommets and the outside of the spray bar. Push the spray bar through both grommets so that the spray holes are facing down toward the center bottom of the tank (see drawing) and about evenly spaced side to side across the tank.

Wipe the lubricant from the open end of the spray bar so that the hose and clamp will grip firmly. Put a clamp onto the open end of the spray bar. Push one end of the 4' hose onto the spray bar about 3/4". Tighten the clamp by squeezing it with pliers. The little ratchet will hold very tightly. If you need to loosen a clamp, push the two parts of the ratchet assembly apart sideways but be careful -- the sharp edges of the clamp can hurt!

Push the other end of the hose (with a clamp) onto the garden hose thread adapter (easiest when the adapter is fastened to the faucet) and tighten the clamp.

### ***SIPHON and OVERFLOW***

There are three more holes in the tank. The one high up on the side away from the inlet with a large grommet in it is for the main siphon outlet. Another, nearby in the bottom of the top lip, is for the overflow hose. There is one at the bottom of the tank for the drain - see next section.

Wet the siphon break tube (5" length of 1/2 O.D. rigid PVC tubing with one hole) and the siphon grommet. Push the tube through the grommet from the inside until about 1" sticks outside the tank. Orient the siphon break tube so that the single hole in it will be inside the tank and facing upwards.

Push the short 2" length of flexible hose over the end of the tube that is sticking out of the tank. Push one of the 6' lengths of hose into that short length. The short tube should be over about one inch of each and gently join the two.

Push one end of the 20" (1/2" I.D.) long siphon hose onto the other end (inside the tank) of the siphon break tube about an inch. Orient the curvature of this hose so that it roughly makes a downward arc from the end of the siphon break tube, touches the inside of the other side of the tank and ends up near the center of the bottom of the tank against the end wall. The precise position of the end of this hose is not very critical to performance.

The overflow hose is a safety device for using the print washer outside a sink or bathtub. If you are using the washer in a sink or tub, I suggest that you don't bother to install this hose since it is an extra nuisance when moving and storing the washer. The hole suffices as an overflow.

To install the overflow hose it is best to turn the tank upside-down. Again, wet the hose and hole at the time of insertion. The hose is a very tight fit and will take some effort to install. There are two basic ways to get the hose into the hole, but in either the requirement is to force the hose to collapse into a "C" shape such as in the adjacent sketch. One way is to place the end of the hose over the hole and use a screwdriver to collapse the hose and force it into the hole. The second way is (either using your fingers or with the aid of needle-nose pliers) to force the hose into the "C" shape and hold it collapsed while pushing it into the hole. Once the hose is through the hole, with something like 1/8th inch showing through, use the screwdriver or needle-nose pliers inside the opening (end) of the hose to force the hose back to the round shape. All of this is easier if the hose is warm. You might want to run it under hot water. If you have damaged the end of the hose pull a bit more through the hole and trim the bad section off.



### ***DRAIN***

The draining action of the siphon doesn't always drain the tall 16 x 20 tank completely. For this reason we now supply a drain connection. Carefully screw the plastic elbow into the threaded hole on the bottom of the end of the tank, being careful to avoid trapping bits of plastic burr in the threads. It should start quite easily. If it doesn't, unscrew it and find out why before chancing damaging the threads. Keep screwing the elbow in until firm - the threads are tapered and the effort to turn the elbow will continue to increase the more it is turned in. There should be about 1/4 to 5/16 of thread still showing when the elbow is in tight enough. Stop turning when the elbow points to the left.

The ratchet clamp is illustrated at right. You must open the ratchet and push the hose through the clamp - through the holes at each end - not easy. The clamp can be anywhere along the length of the hose.



If you are using the washer outside a sink leave the hose (3 1/2 feet 3/8 I.D.) full length. For in sink use I recommend cutting it shorter - such that it doesn't extend past the end of the tank. Once the clamp is in place, push the hose over the barbed fitting on the elbow.

## **FINAL**

Set the print basket into the tank with the polyethylene rods at the bottom (they keep the prints of the bottom of the washer tank). Make sure that the bottom end of the siphon pickup hose is between the end of the basket and the end wall of the tank and about in the center as per the drawing. Roughly center the holes in the spray bar in the gaps between the separator panels. Finished.

## **USE**

Place the washer on a convenient, level, sturdy surface. NOTE THAT THIS UNIT WEIGHS AROUND 200 LBS., IT IS HEAVY! Check that the drain clamp is closed. Check that the clamps on the inlet hose connections are tight. Hook up the water and turn it on gently at first. Check that the spray bar is directed roughly as per the previous instructions. You can run the water as hard as you want to fill the tank fast.

**Note:** *The washer is very carefully designed to be used inside or outside a sink. But we recommend caution whenever water is used outside a sink. Having nearly limitless quantities of pressurized water outside a drained area can have terrible consequences - even the 22 gallons of water in the tank will be very messy if the support for the washer collapses.*

As the water level gets near the top, slow down the flow to around 1 to 2 GPM or so. Observe that at about the time the water is a little over the siphon break tube, the siphon flow begins. It should flow with a completely full hose not a trickle. If it does not start automatically, the overflow hole will go to work keeping the level below the top edge of the tank (unless you are well over 2 GPM incoming flow).

If the siphon does not begin flowing fully automatically it is probably an air blockage in the hose. A quantity of water blocking the end of the hose, with air between it and the tank, may prevent automatic siphon start. Lift the hose, causing the air to bubble out the siphon break hole, and set the hose back down. Siphoning should start immediately.

**Note:** *There are several states of flow in both the siphon and overflow hoses. The first is no flow. The second is a trickle. Some water is moving out the hose but the hose is mostly filled with air. The third is a full hose. Water is moving out of the tank down hill fast.*

*The tank is designed to be operated between two conditions. In each of these conditions the siphon hose is full and flowing. It is intended to be the main output and therefore must flow the same amount as the input. The upper limit on tank flow rate relates to the amount that can flow through the overflow hose. The washer is safe to be used up to whatever flow rate the overflow hose can handle. If the water level rises above the overflow opening, you can no longer be sure whether the level may continue to rise and overflow the top of the tank. This isn't a problem in a sink. This shouldn't happen until well over 2 GPM.*

*Between .3 and 2.0 GPM is the design flow range. Roughly .5-1.0 GPM should be satisfactory in normal use. This lower flow rate causes the siphon break hole to make a little buzzing or purring sound as a little air is added through the hole to make up the flow. Somewhere around .3 GPM the siphon flow may stop because enough air was sucked in that it broke the siphon effect. The rising water level will usually start the siphon action up again automatically under these conditions allowing the washer to be used even at these very slow flow rates.*

*Outflow rates, generally the flow rate of the siphon drain hose, will affect the usable inflow rates. The above rates are based on having the ends of the overflow and siphon drain hoses at the same height as the bottom of the tank. If they are higher up they will flow less. If they are lower than the bottom of the tank, they will flow more. The length of the drain hoses also affects the flow rates. If you need to shorten the hoses you may, but it is best to leave the siphon drain uncut.*