

This do-it-yourself project involves household 120 volt electricity, which, if mishandled can cause shock or death by electrocution. If you are not comfortable working with electricity, do not assemble this kit. Proceed at your own risk.

How your finished system will work: The lower float switch is the main switch. The main switch turns on a relay when the water level drops by about 1/8". When the relay turns on, it allows household current to flow to your pump (the relay keeps this powerful current out of your switches). The pump moves water from your reservoir into your sump/tank. As the water level rises, the float on the main float switch lifts and shuts off the relay, which in turn shuts off the pump. The upper switch acts as a backup to shut off the relay if the main switch should ever stick in the "on" position. The system goes on every time your water level decreases by about 1/8", so your sump/tank should stay pleasantly stable and full. **See the photo on page 4 of the sample set-up before you begin assembly.**

Your kit includes:



You need to purchase separately:

- 1) a water pump appropriate for your reservoir/tank/sump
- 2) an extension cord long enough to go from your outlet to your tank/sump*
- 3) tubing to run from your reservoir pump to your tank/sump
- 4) a water reservoir (tub, bucket or other)

* If you will not be plugging your system into a GFCI outlet, we strongly suggest using an extension cord with a GFCI plug on its end for safety (available at aquahub.com).

1. Create a switch mount using your Mold-a-Holder™

The steps below are an illustration. Use Mold-a-Holder as you please to mount your switches. Just be sure that your backup switch is mounted a bit higher than the main switch and out of reach of snails or other critters.

1a 1/4" drill bit or hobby knife

Make switch mounting holes.

1b

1c

3" slit up center.

1d

Trim 1/4" from hole.

1e

Submerge in hot, not simmering water.

1f

Turns soft and translucent.

1g

5 minutes working time.

Hint: Use lotion on hands to prevent sticking

1h

Shape small 1 1/4" platforms.

1i

Hold in place until cool/rigid.

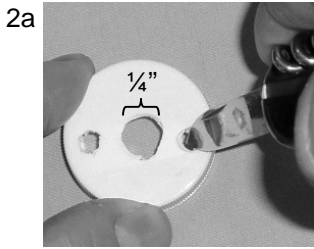
1j

Reheat end & mold to tank.

1k

Remove finished piece.

2. Prepare slosh & snail guard and mount switches in the completed Mold-a-Holder.



2a Cut 3 holes in top – 1 for the float switch threading and **2 for venting**. Discard the plastic liner inside the cap.

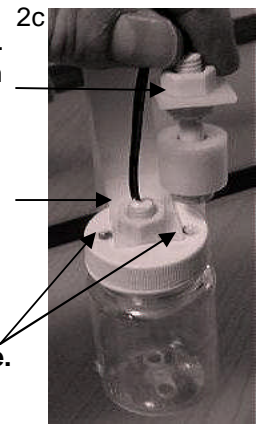


2b Add 4 or 5 holes in sides and bottom.

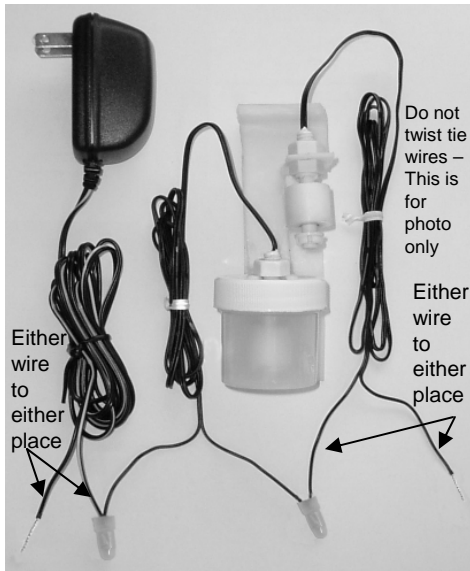
2c Discard silicon washers (if any). Thread upper switch wires through upper Mold-a-Holder platform and fasten with switch nut (no slosh guard required for upper switch).

Thread lower switch wires through slosh & snail guard cap and lower platform. Fasten with switch nut.

Important: air must be able to escape here.



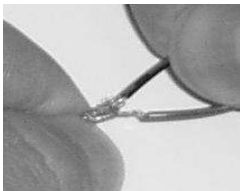
3. Prepare float switch and transformer wire ends for attachment to the relay as shown.



3a Strip 1/2" of insulation off of all 6 wires.

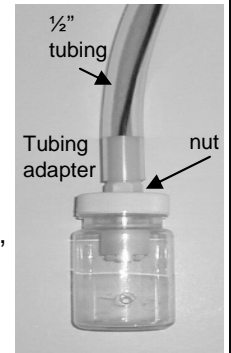
3b Create the connections in the photo by twisting the wire pairs together.

3c Add crimp caps to the twisted pairs and crimp very firmly with pliers.



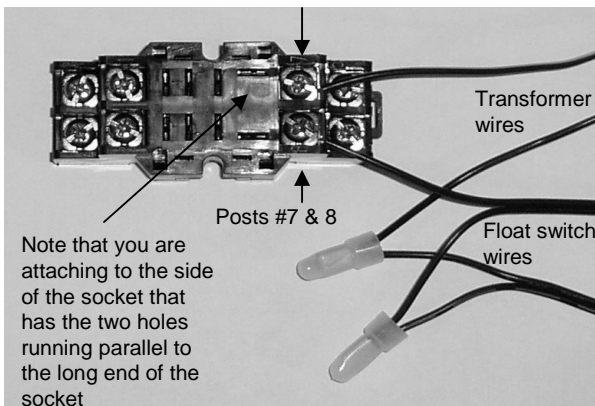
Important: If water changes or other factors specific to your aquarium are ever going to cause the tops of the float switches (where the wires come out of the stem) to be submerged in water, use the tubing adapters provided and 1/2" tubing to prevent submersion. **Submersion of the float switch wires can lead to internal corrosion of the switch and switch failure.**

Using Tubing Adapters: Thread the float switch wires through the i-float tubing adapter with the threaded end of the adapter down. Screw the adapter onto the top of the switch stem above the nut. Thread wires through 1/2" tubing and fit tubing onto adapter, trimming tubing so that its length is just greater than the highest water level. Use silicon sealant in the end of the tubing and at other connections. Allow silicon to dry and test the seal to make sure that water cannot get to the top of your switch. Inspect the seal periodically.



If you use a tubing adapter on the lower switch, make sure that you alter the Mold-a-Holder appropriately if the tubing will interfere with the operation of the upper float switch – usually bending the mount slightly to one side (reheat if necessary) will take care of this issue. If tubing section(s) are longer than 6-7", it may be necessary to support the tubing at the top to prevent twisting of the Mold-a-Holder.

4. Attach float switch assembly connectors from step 3 to the relay socket as shown.



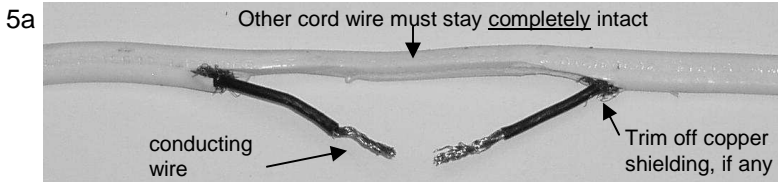
The two bare wires from step 3 (one from the float switches and the other from the transformer) connect to the posts on the relay socket with the tiny "7" and "8" next to them. These posts are on the end of the socket closest to the slots that run parallel to its long end.

Loosen the screws, insert the wire end **under the plate** and re-tighten the screw firmly.

5. Prepare extension cord to power your pump via the relay.

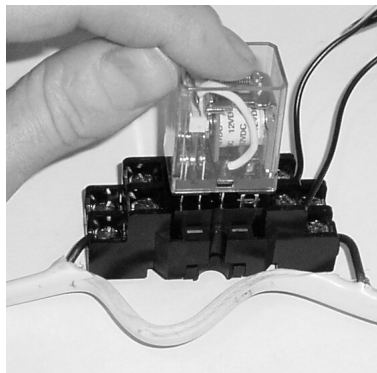
Wiring the extension cord can be very dangerous. **Always plug your system into a GFCI outlet or use an extension cord with a GFCI end to prevent electrocution in case of a wiring error or short-circuit. WE CANNOT BE RESPONSIBLE IF YOU SHOCK OR ELECTROCUTE YOURSELF OR YOUR FISH.**

Make sure that your extension cord is unplugged. Use a knife to carefully separate the two conducting wires of the cord by making a slit in the cord length-wise down its center, without exposing the conducting wires. Do this at a spot in the cord that will allow your finished set-up to reach your wall outlet. Then, cut one wire in half, strip ½” of plastic insulation off of each end of the exposed conducting wire and push the wire shielding that surrounds the core conducting wire on each side (if any) back. The other wire of the extension cord should remain completely sealed and insulated – if you accidentally expose both conducting wires, buy another cord and start over.

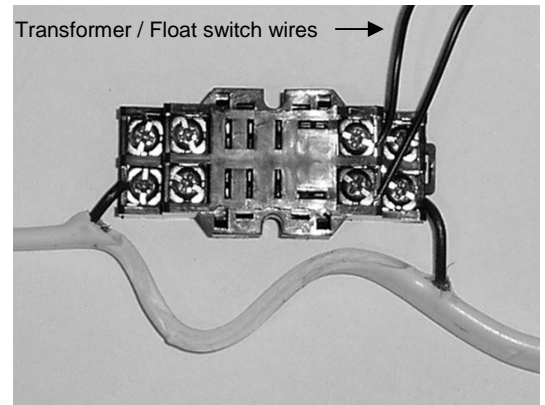


5b Attach extension cord wires to the relay socket posts with the tiny #4 and #6 next to them. Loosen the screws, insert the wire **under the plate** and re-tighten firmly.

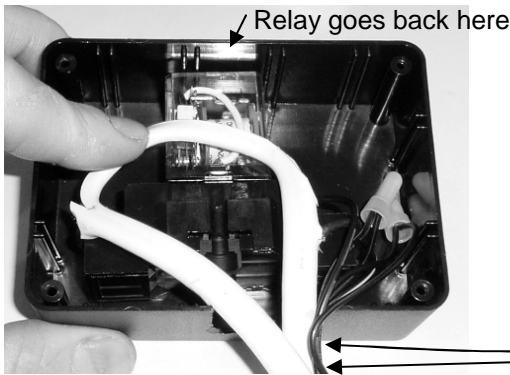
5c Insert the relay into the relay socket. Push it all the way down until the relay's prongs are no longer exposed.



Test your connections:
 i) **Make sure the floats on your float switches are both resting on their bottom clips.**
 ii) **Plug in your transformer and unplug it several times. The relay should make a clicking sound each time - if you do not hear this, re-check your connections. Do not leave the transformer plugged in at this point.**



6. Place relay assembly in project box and screw on the top.



Use a hobby knife to cut an opening in the side of the box for wires.

Note: Never expose this assembly or touch any part of the relay when the extension cord is plugged into a 120V wall outlet. The project box provides basic insulation and protection. **The assembly is not waterproof.**

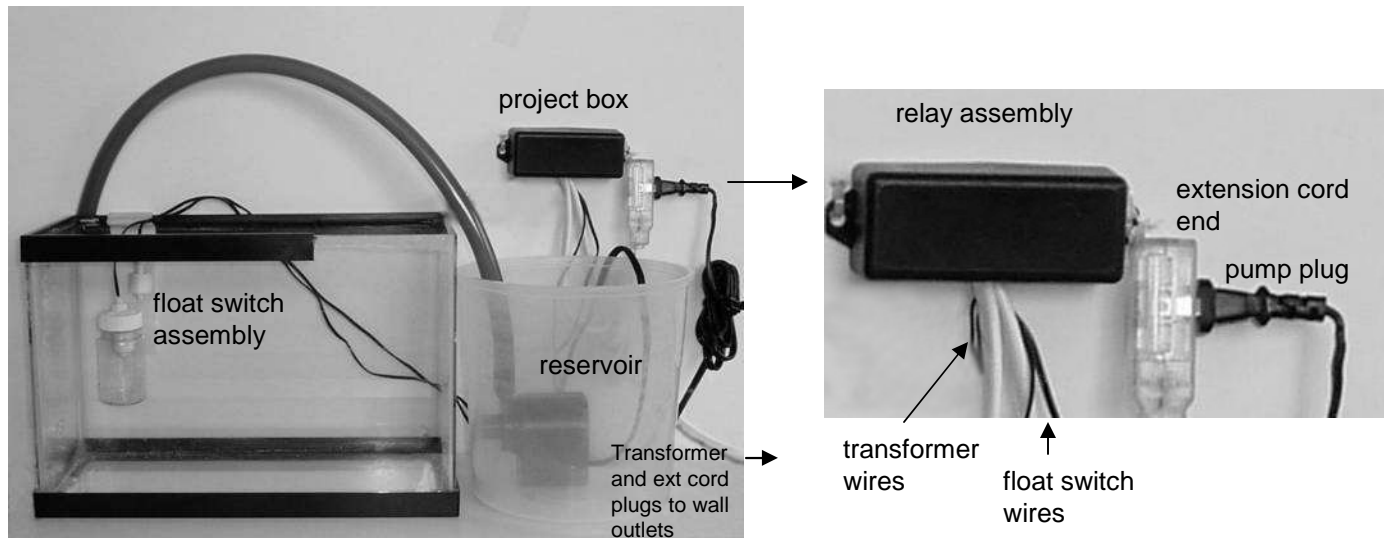
You can add a zip tie here to help secure wires

Your Top-it-Off Kit is complete! See Page 4 for a picture of a sample complete set-up.

- Make sure the extension cord is not plugged in.
- Mount your Mold-a-Holder / float switch assembly in the sump/tank.
- Set up your pump to draw water from your reservoir and run tubing into your sump/tank.*
- Mount the project box containing the relay assembly up, away and where it cannot fall into any water.
- Plug in the 12V wall transformer.
- Plug the pump into the extension cord end and the extension cord into a GFCI outlet (or use a GFCI ended cord).
- Your system is now functional – see Page 4 for important notes.
- Test your system often and remember to clean float switch stems with a soft cloth every month or so.
- **Size your reservoir so that an overflow is impossible** – you should still be able to get 3-4 days of top-off.
- Be sure to review **“How your finished system will work”** at the top of page 1 of these instructions.

* Tubing must be above the water level of sump/tank or reverse flow may draw water from sump/tank back into your reservoir. Your reservoir should be at or below the level of your sump/ tank to prevent a siphon effect (which can empty your reservoir even after your pump has shut off).

Sample set-up



Small set-up is for photographic purposes. This set-up works great with large sumps/tanks and reservoirs also.

Drip loops

Create drip loops with the cords to route any water droplets away from connections. Mount your relay assembly up and away from all water (it is close to the reservoir in the sample set-up for photographic purposes only).

Magnetic Fields

Don't place your float switches directly next to pumps, near several pumps in the same chamber or in strong magnetic fields. The float switches use magnetic reeds that can malfunction or cause relay buzzing if the magnets inside other devices are too close to the float switches. Normally the float switches need to be 4-5" away from pumps, but this can vary depending upon the size, power and number of pumps located in the chamber.

Maintain your system

Occasionally test the system by sticking a toothpick through a top vent hole on the sloop & snail guard and gently forcing the float down into the water. The pump should turn on. **If the lower switch has failed and the upper switch is controlling your system, immediately replace the lower switch** (available at aquahub.com).

Clean the lower switch float and stem with a soft cloth every month to keep build-up from interfering with the switch operation.

Don't use a 9V battery for the relay

Do not use a 9V battery in place of the transformer to power your relay. Use the 12V transformer in the kit as shown in these directions.

Troubleshooting & GCFI re-sets

If your system will not initially function, **try hitting the reset button on your GFCI outlet or GFCI extension cord.** Sometimes the button needs to be pushed once when the cord is new. Electrical spikes can cause a GFCI cord or outlet to occasionally trip. If your system stops working, try pressing the reset button on your GFCI first to see if that is the problem.

Make sure that air can easily escape from the top of your sloop & snail guard (see 2c). If the venting holes become blocked, this can prevent the main float switch from turning off your pump.

Questions or comments?

We always appreciate feedback. Email us at service@aquahub.com.

Thank you for purchasing your Top-it-Off Kit from aquahub.com