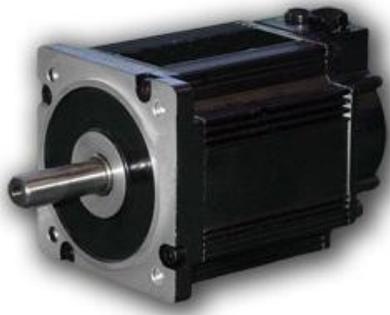


RockyHydro

Generator Kit Info Packet



RockyHydro sells a wide degree of micro-hydro components for various kits. Our customers enjoy the benefit of being able to carefully match a turbine and generator to their site, so they can confidently proceed knowing their system will be extremely efficient. Our main service is providing that crucial match of components; we let the customers build the system themselves. This drastically reduces the cost of our products. This business model works great for our customers and for our company. We hope you enjoy the simple process of putting together your kit as further described in this info packet.

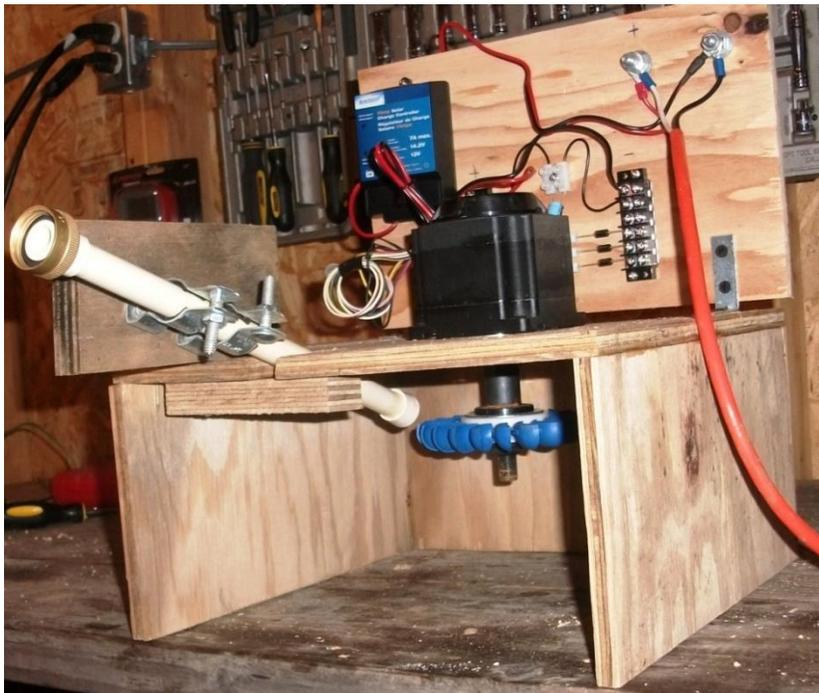
Congratulations on your purchase of a RockyHydro micro-hydroelectric generator kit. Please read these directions completely, including the important note below, before starting.

**ALMOST ALL ROCKYHYDRO KITS ARE CAPABLE OF PRODUCING
LETHAL AMOUNTS OF ELECTRICITY!**

Please Note- Working with hydroelectric systems can be very dangerous due to the possible exposure to high pressure water, fast moving parts, power tools, and electricity. By beginning construction of the generator kit, the user releases RockyHydro, Father Son Projects LLC, and all other distributors from all liability associated with this kit or the hydroelectric project in general.

STEP ONE - BUILD A BOX

The first step is to build a box for your generator. Making a plywood box then painting it with a fiberglass epoxy or other suitable waterproof coating is easiest. A box made of aluminum will work also. Simply make the box big enough to easily house the turgo with enough room to attach the water nozzle(s). The top should not be thicker than 1/2". Now drill a hole in the center of the top just large enough for the shaft of the motor to fit through. There should be just a hairline of clearance around the motor shaft as it passes through the top of the box. The less clearance the better because this means



less moisture is making its way to the motor. If you are planning on running your system 24/7 you can place an additional bearing in the top of the box to create a water barrier between the turgo and the motor. This bearing will have to be purchased separately. It is also a good idea to use a router or chisels to dig a small channel across the top of the box so air will be able to get under the motor once it is mounted. This will help to prevent moisture from building up. Before continuing, make sure your box is adequately waterproofed.

MOUNT THE MOTOR

First, prepare the motor before you mount it to the box.

23, 34, 36, and 48 Series- These motors all include a hall sensor in them that can be removed. If there is a plastic cap on top of the motor remove it and pull out the sensor and the extra wires. Replace the cap. Some of the models don't have an easily removed cap to pull out the sensor. In this case, you can cut the wires back or just ignore them. Having the sensor there won't affect the motor's operation, but it is an extra part that is not needed for this application and in some models reduces the amount of wires that are hanging around. Having the sensor gone does clean things up a bit, but don't cut the wrong wires!

Every motor of the 23, 34, 36, and 48 series has 3 wires coming out of it, these are your power wires. The BLY34 series has an extra set of 3 wires that are striped. Strip the ends of the striped wires, and connect them all together with a bell cap so electricity can flow between all three wires. The other 3 solid colored wires are your power wires. Your power wires will later be attached to the rectifier.

Two bell caps are included for all kits using these motors. One for connecting the hall sensor wires to clean them up if they can't be removed, and the other is for connecting the 34 series striped wires together.

DC Series- All of the DC series motors have a built in rectifier, so they produce DC energy. The DC 520 and the DC 540 include a three phase power pigtail. The three phase AC power is better at traveling long distances, then can be attached to another rectifier before charging batteries. If the three phase pigtail is not used, then these three wires will need to be capped so the motor doesn't ground itself out.

The DC 500 and 512 include a cooling fan and pulley. These components can be used in different set-ups as determined by the design and engineering capability of the user. For basic installation where the turgo is attached directly to the motor shaft, please remove the cooling fan and pulley.

All Motors- Now take the motor and place the shaft through the hole in the top of the box. Center it very carefully in the hole, as there should be minimal clearance around the shaft. Screw or bolt down the generator, being careful to preserve your waterproof coating around the box. Lastly, coat the shaft that is sticking out into the inside of the box with an anti-seize compound for the next step.

MOUNT THE TURGO

Depending on the model, you may have a keyway or a flat on the motor shaft for mounting the turgo to. Go ahead and slide the turgo on, and attach it as it makes sense. You should have set screws in the turgo arbor to tighten down on the motor shaft to hold it in place. With some models, it may be a trick to get both set screws to fit up on the shaft; that is why your top of the box should only be 1/2" thick. You can always router down the top if you need it to be thinner near the motor shaft.

MOUNT THE NOZZLE(S)

This part can be a little trickier, and it is up to your design. You can see the above picture for a simple design using wire clamps to hold the nozzle in place. Your nozzle, by the way, can simply be a tube that is capped on one end, with a hole drilled through the cap. The hole needs to be very clean, with smooth edges, and centered in the pipe cap to create a nice smooth jet of water. A messy nozzle means loss of energy. It is always best to start with a smaller nozzle, and work your way up to larger ones, testing your energy output, and getting the most flow out of your system without creating too much friction if your penstock is a little small. (If you have a good sized penstock you won't have to worry about that.) You also don't want to have your nozzles so big that you are trying to use more water than you have available in your stream; if you do that, air will enter your penstock and the power output will go down dramatically.

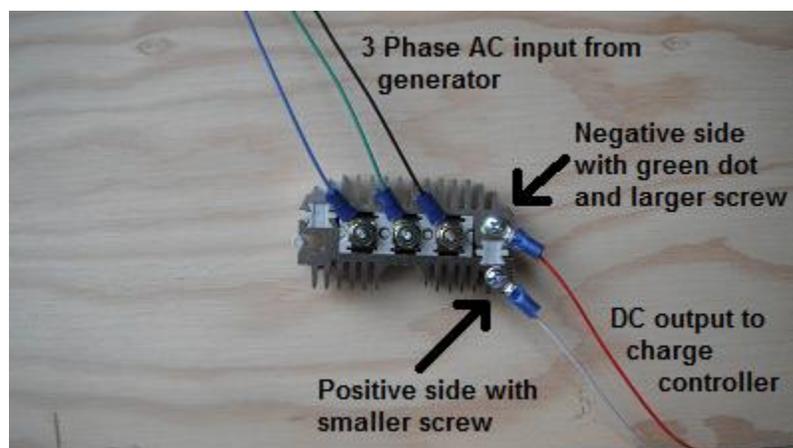
The size of the turgo limits the size of the nozzle, so some sites may require multiple nozzles.

Mounting the nozzle at the correct angle is also important. Ideally, the angle will be very shallow, and hit three tops of the turgo spoons at once. You can get an idea from the picture.

If you are testing your system trying to find a good nozzle size because your penstock is a little small, test it under load. You are looking for the most efficient flow rate which you will find at lower RPMs that occur under a load.

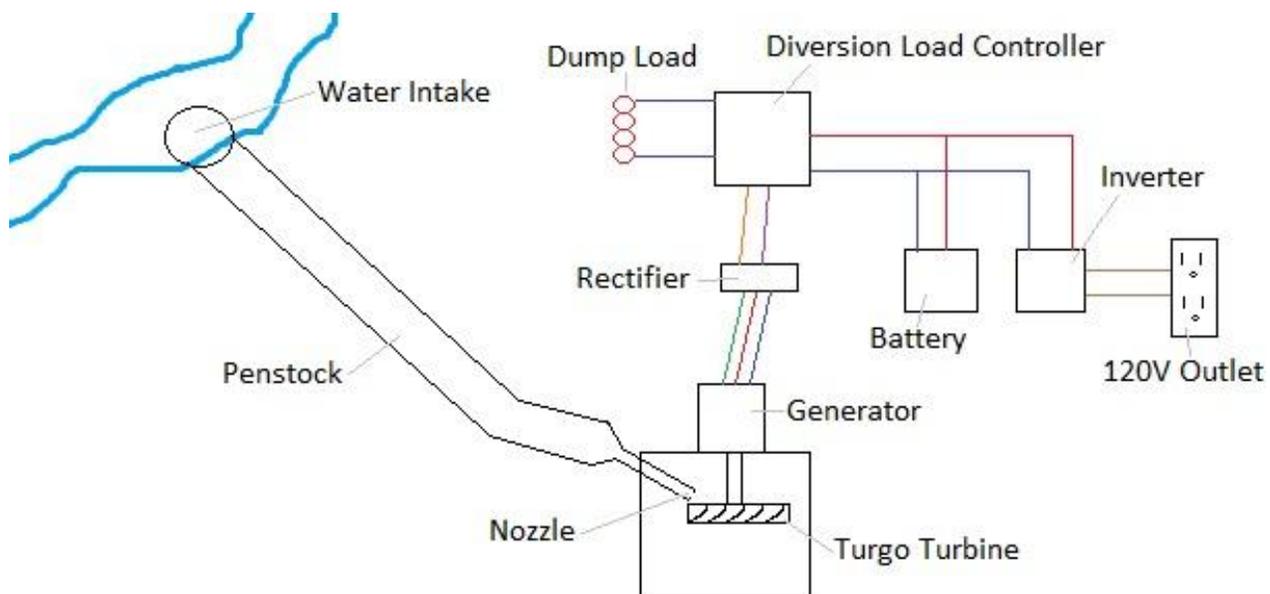
WIRING THE ELECTRONICS

All of the generators produce 3 phase AC power. This will need to be rectified to DC power before it is sent to a charge controller. The DC motor series include an internal rectifier. If you are not using the internal rectifier, see the below picture for rectifier hookup. The side of the rectifier with a green or yellow dot is the negative side. The 5 ground plugs and two screws in the picture are included with the rectifier.



From the rectifier the charge controller will be hooked up. Be sure to connect the negative side of the rectifier to the negative input on the charge controller, and the positive side of the rectifier to the positive input of the charge controller. Doing otherwise may damage the charge controller.

Please read the product manuals for more information on charge controller installation, and for the installation of the rest of your systems components such as batteries and an inverter. The following diagram is a good system guide however.



Good Luck! You'll be making electricity in no time!

**For more information on installing the water intake, penstock, or any other part of the system, please view our website or contact us at sales@rockyhydro.com