

1. **EXTREMELY IMPORTANT:** This project should NOT be attempted by amateurs because of the dangerously high electrical voltages and currents. Only someone with a solid electrical background and experience should build the battery backup system described in this article.

2. Here are the instructions for building the battery backup system. The instructions listed below are for a ½ HP sump pump. Do not connect any sump pump **larger** than ½ HP to this battery backup system. Now, purchase the following items:

- AC DPDT Relay (Magnecraft – P/N W199AX-14 or equiv.)
- Marine 12V “Deep Cycle” battery (Do NOT use car batteries – they have a very low duty cycle)
- DC to AC Inverter (Cobra 1550W or equiv.)
- “Trickle” Battery Charger for a 12V marine battery – A good one is the BatteryMinder. It’s a Charger/Maintainer/Desulfator. Look for the 1.3 Amp, 12 Volt, Model# 12117 (Do NOT use any kind of car battery charger)
- One (1) AC electrical power cord (6ft long)

3. **IMPORTANT:** Do NOT, at any time, connect any part of this project to any electrical system in your house. In other words, do not plug any part of this battery backup project into any electrical wall outlet until you have completed and triple checked the assembly.

4. Note that the drawing does not show the battery charger. The battery charger wires are just connected across the backup battery terminals (watch polarity). The charger itself is then plugged into an electrical wall outlet. Note that the battery charger used in this project is known as a “trickle” battery charger. Do NOT use any kind of car battery charger. The trickle battery charger described here just keeps the backup battery from dipping below a certain voltage level while it is not in use. It will not charge up a dead battery.

5. Assemble all the parts as shown in the diagram. Connect the AC relay, DC to AC inverter, ½ HP sump pump, and marine battery together - according to the manufactures documentation or schematics. (NOTE: For safety reasons, secure the relay and wire connections in a water tight plastic enclosure. Also, make sure ALL parts of this system are protected against any water splashing in the sump pump area.)

6. Connect the 6ft electrical AC power cord to the relay as shown in the diagram. That’s where the 110VAC (electrical outlet) connects to the relay. Later you will see that this plugs into your electrical wall outlet.

7. This step is extremely important. Triple check your connections before you apply any AC electrical power to your battery backup system.

8. If you connected the DC to AC inverter and relay correctly (according to the manufactures instructions) then the electrical power (120V) for your sump pump should now flow from the electrical wall outlet through the relay and then to your sump pump. This is the normal operating mode when your house has electrical power. Now, disconnect this AC electrical power cord from the wall outlet (This is to simulate a power failure in your home). The relay should now flip (connect) to battery backup mode. Finally, take a couple of buckets of water (or hose) and fill up the hole where your sump pump is located. When the water level raises the sump pump float to its tripping point, the sump pump should turn on and pump the water out of the well. Notice here, that the sump pump is now working off of the battery backup system and not relying on the electrical power grid in your house. Now, plug the power cord back into your wall outlet so the sump pump is working off of the electrical power running through your house. Now, when you lose power throughout your house, the battery backup system will kick in and keep your sump pump working.

9. Finished.