AquaCore Mk1: Assembly Guide

Tools: Phillips screwdriver, hex keys, wire cutters/strippers, soldering iron, isopropyl alcohol, cloth.

### Preparation

* Clean all metal contact surfaces (both heatsinks, Peltiers) with isopropyl alcohol. Let dry.

### Building the Thermal Stack

1. Apply a thin layer of thermal paste to the base of the Hot Side Heatsink (100mm tall, 40mm wide, horizontal fins).
2. Place the first Peltier module (40x40mm) onto the paste.
3. Apply paste to the top of the first Peltier.
4. Place the second Peltier module directly on top of the first, aligning perfectly.
5. Apply paste to the top of the second Peltier.
6. Seat the Cold Side Heatsink (100mm tall, 40mm wide, vertical fins) on top of the stack.

### Mechanical Assembly

1. Secure the entire stack (Hot Sink + 2x Peltiers + Cold Sink) using long screws, nuts, and washers.
2. Tighten the nuts evenly in a cross pattern until snug. Do not over-tighten to avoid cracking the ceramic Peltiers.

### Electrical Wiring

1. Connect the two Peltier modules in SERIES:
   * Connect the POSITIVE (+) wire from the power supply to the POSITIVE (+) lead of the first Peltier.
   * Connect the NEGATIVE (-) lead of the first Peltier to the POSITIVE (+) lead of the second Peltier.
   * Connect the NEGATIVE (-) lead of the second Peltier to the NEGATIVE (-) wire from the power supply.
2. Insulate all wire connections with electrical tape or heat shrink tubing.

### Insulation & Final Setup

1. Wrap the sides and back of the Cold Side Heatsink (vertical fins) with closed-cell foam insulation. Leave the vertical fin faces completely exposed to air.
2. Place the collection cup directly underneath the exposed vertical fins of the cold-side heatsink.
3. Position the unit in a stable, well-ventilated location.
4. Connect the 12V, 10A power supply and switch it on.

### Initial Test & Validation

* The hot side heatsink should become warm, and its fan (if attached) should spin.
* The cold side heatsink's vertical fins should become noticeably cold to the touch within 60 seconds.
* In a humid environment, visible condensation (water droplets) should form on the cold vertical fins within a few minutes and drip into the collection cup.