# Water Battery Charging Station

Water can behave like a battery. It is able to store a significant amount of charge, maintain the charge separation for extended length of time, and actively regenerating the charge possibly through some thermal or photo electric effect.

This station is to investigate this rather unexpected characteristic of water.

* The station is to support multiple channels
* Current and voltage measurements during the various cycles
* The channels are to be controlled independently
* The measurement interval is not lower than 1 per second.
* The measurements can be done in series, i.e. one measurement instrument to multiplex between the various channels is sufficient. You can consider using a commercial digital multi-meter with a RS232 interface for this purpose.
* Charging current can go up to 20mA. 0.01 mA resolution is good enough. But for ultra pure lab water the charging current can be in the uA range as well.
* Discharge current can be as high as 2mA, but I need 0.1uA resolution. I have seen sustained current draw of 0.2 uA.
* All in all I believe we need two shunt resistors for the two different ranges of measurements. The software can adaptively switch between the two as required.
* There are 3 phase in a cycle: Charging phase, wait phase, discharge phase. Each station is to be isolated from each other.
* Charging phase – connect to power source direct, measures current
* Wait phase – disconnected from power source. Measures voltage.
* Discharge phase – discharge via a shut resistor. Measures both voltage and current.
* Optional extra: Finding the sustainable current draw. The purpose is to limit the discharge current to establish how fast the water can regenerate the charges. Please give me a proposal on how to slot in a potentiometer that can be controlled by software. You can do this on a per channel basis, and I can make the software configurable to know about the existent of the potentiometer.