

It has been a while since the previous newsletter. We are doing many new things and it is time to mention a few of these. As usual, we are trying to do things that are not being done now so we fill an opening in the market. We now offer power meters so hydro sites can have a way to monitor their machines and have a better idea of what is going on with the system. We also make a thermostatically controlled water heating device that controls the temperature of the water passing through it so you always get water hot enough to use even if it is not much. Many of the parts for our machines are injection molded in ABS plastic which is a big upgrade. We will also be introducing a new type of generator that is very efficient and low cost although not tunable.

**In Hot Water**

This device is intended to act as a dump load for excess power diverted by your charge controller. It was featured in the previous newsletter as a proof of concept and it has now been upgraded to an actual product. First I want to explain the main reason to do it this way. If the water can be thermostatically controlled, then the water leaving the heater will always be hot. All other hot water heating that uses excess power has a major limitation. None of these control the temperature of the water and simply add the heat to the hot water system. This usually requires a separate tank and only supplies water at a variable temperature. The system we make only requires one tank that can double as a water heater if needed as that is what is usually used.



So why is this so good? With a thermostatically controlled output, the water leaving the heater is maintained at the temperature of the thermostat. This means that the varying heat

input will be matched by a varying hot water output, but always at the same temperature. This heated water then is delivered to the top of your water tank and is available as hot water and not warm water that is not hot enough to wash with. The usual thing to do is to heat water in a separate preheat tank with the extra power. This typically will give you a lot of warm water. Then the water is sent to a gas or electric heater to make up the difference. Note that this can be used with wood heat also as the issues are the same with these variable heat sources.

We are using automotive thermostats for this and these can be supplied with a rating of 160 F which is about 71 C. Yes this is a bit on the hot side, but it turns out that the water cools off fairly fast. So if you are using solar for this, it may have cooled considerably in the night and not be so warm in the morning. Higher temperature thermostats are available in 180 and 195 F. If you are concerned about the temperature of the water, there are automatic tempering valves available that mix cold water with the hot to keep the temperature down. I moved my hot water tank upstairs as once the cold weather came, the water in the tank in the unheated basement cooled much faster.



These devices can be supplied with any number of heating elements so can be matched to most any site. The shot shown here uses two 1200 watt elements in a 48 volt system. There could be as few as one element and if more are needed, these can be easily added with standard plumbing. We supply several types of both air and water heating elements to act as dump loads. A few are on our website and that should be upgraded soon to show more.

It appears that it is cheaper to use a standard electric water heater as your tank for this. They are insulated and have enough connections to be used with this type of system. And of course if you use an electric tank, you can always power it up that way if you have to. Look at the shot of this and you will see how the drain was used as the hot water supply line. So even with only the one fitting at the bottom, this can still be used. Then the heated line is configured to enter the top of your tank and in this way the water fills the tank from the top down and you can use what hot water there is, even if it is not much.

My installation diverts both solar and water power to this. In this situation, the hydro charge controller is set so that it is always lower than the solar setting(s) so that both are always diverted. The system can be set up so that only the hydro power is diverted. This may be

necessary if the solar output is too much for diversion or the hydro supplies enough hot water. In this case, the solar voltage(s) must be set below the hydro. Otherwise the solar will be dumping too and that may overpower the charge controller or the heating elements. Note that if you are diverting 100 watts continuously, this will make about 10 US gallons of water heated about 100 degrees F in 24 hours. So if the water comes in at 60 degrees it will be heated to 160 degrees.

Now what are we going to do if the water in the tank starts to overheat? This happens on most days that are sunny all day. At first I thought I needed to send the power to yet another load so it would be absorbed by something. The temperature relief valve that is installed in the water heater opens at 210 F or 99 C. So we already have an over temperature limiter. No other controls are needed. Simply arrange to have the water flow into your laundry sink or washing machine type standpipe.

### **Kevin's ten year anniversary**



**Kevin Rossiter**  
**Since June 2007**

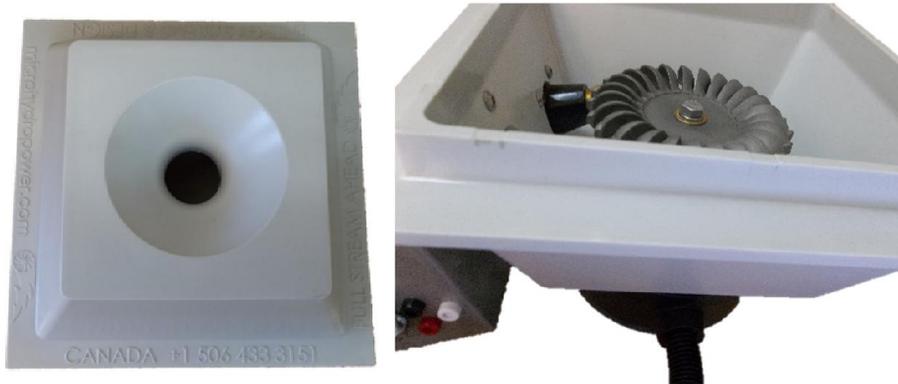
As of this year, Kevin Rossiter has worked for me for ten years. He is actually the main one that keeps us going. He does almost all of the assembly work, almost all of the IT work, keeps our computers running right, and he does much of the design work. He is also great company which is helpful if you spend ten years (and hopefully more) working with the same person.

## Nozzles



As noted in the previous newsletter, we started making our universal nozzles with injection molding using black ABS. They are much tougher than the original hand cast urethane. So we now can sell an improved version for \$15 each instead of \$35. We are now offering the nozzle holders for the low flow machine injection molded in ABS also. These are made to use our brass nozzle inserts that are made from 1/8" to 1/2". These are now 1/2" NPT pipe for the brass inserts. Before this, the tread on these was 7/8-14. This makes for a better fit as the tapered threads are self-sealing.

## Housings



Would you believe the housings are now made with injection molding. They are also ABS. I understand that is what is used to make car bumpers so these should withstand most assaults. These parts are immune from corrosion and close to indestructible. They also have a vertical lip on the bottom so that there is no need to use something to seal this. It does make the opening a bit larger if you wish to retrofit. The size opening required now is a square 10 inches on a side or 254 mm.

## Power Meters



We were making a 30 amp meter for use with hydro machines, or anything else. We now make a 50 amp model for \$99 and a 100 amp for \$119.

Note that the main function of this meter is to warn you of issues the machine might have. If the power level falls for any reason, it will show up here. If the bearings are failing or there is air in the water line, this will tell you. These meters read in amps, volts, watts, and watt hours. The most useful is watts. This tends to stay the same even when the voltage is going up and down.

These are now made in a larger flame retardant housing that includes a mounting flange so these can be wall mounted. Knockout openings have been increased in size from 1/2" to 3/4" which allows for larger wire. We are also planning a remote option.

## Tee Shirt Contest



In the previous newsletter, I mentioned that whoever sent the best shot of a machine at a site would receive a free tee shirt with the company art on it. The hands down winner is Carl Denis and you can see what he has done in the following shot. He has received a tee shirt. Of course you can also buy the shirts from us for \$20.

If you would like a chance to get a free tee shirt send us your pictures. Your shots could even be featured on the website.



*1 nozzle Stream Engine, High Current (HC) stator with stainless Low Flow (LF) wheel.  
90 psi, 24V, 50+ amps*

Season's Greetings and Happy New Year from:

Paul Cunningham - CEO

Kevin Rossiter – Production Manager

Christene Murray - Accounting

Andrew Gittens - Machining

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***Holiday Schedule - Dec 23 to Jan 2 closed. Limited tech support Dec 27-29.***