

## **Immersion Heater Relay Unit**

We have designed this unit to work as simply as possible, to provide a long trouble free life.

The design brief was simple as it was apparent there are a whole load of people with PV systems who have simply installed timers onto their Immersion heaters that switch on for a few hours in the middle of the day in an attempt to capture as much 'free' electricity as possible.

However the flaw in this plan is a combination of system size and solar conditions at the time that timer is switched on. It does not take long to work out that if conditions are against you, such as cloud cover etc, there is a distinct possibility you will need to 'buy in' more power than is being generated. Coupled with this, a standard immersion heater is usually rated at 3kW, which will need a 4kW system in bright sunlight to power it.

### **Our solution is in two parts.**

- 1) The current sensing relay unit.

This unit will detect what your PV or Wind inverter is generating and when crossing over a set point (factory set at 1kW), will switch on the relay, thus powering the immersion heater.

- 2) Power reduction transformer

The more diligent reader will have realised switching your immersion heater on at the 1kW point will still mean your 3kW immersion'll have to 'buy in' another 2kW from the grid to operate. However, the second stage of this power saving operation will entail connecting a power reducing transformer to the immersion heater, enabling it to operate at 1Kw.

### **The Installation**

Ideally, the Immersion Unit will be installed adjacent to your Consumer unit, (or fusebox), as it gives you access directly to both dedicated power cables to both Immersion Heater and Solar PV inverter.

Looking at the attached connection diagram, you can see that all's needed is both Immersion and PV cables connected through, and that's it!. Although realistically each house wiring will be different, and you will need to adapt accordingly. This is where a qualified electrician comes in, as he will be able to adapt and install in a safe manner.

As you can see from the connection drawing the connections are broadly split between the two sides of the unit. Connections on one side of the unit will connect to your consumer unit, the other opposite side connections connect to your immersion heater/reduction transformer and the PV inverter.

### **Install Sequence:**

- a) Select a suitable location to install the Immersion Relay near to your consumer unit. In making the best choice, ensure you will have enough space to bring cables into the compression glands. You may find the use of 50mm trunking will conceal the cables if required.
- b) After fixing in place, you will need to switch the mains power off to continue.
- c) Remove the LNE from the Immersion heater circuit, and re-route to connection point (3) on the Unit. This will probably require cable extension. If connecting inside your consumer unit, you will be able to use connector blocks or crimps. If the connection is outside, then an enclosed junction box will be used.
- d) Install a new 2.5mm LNE cable from connection point (1) of the unit to your consumer unit, using the original LNE connection points disconnected during c)
- e) Remove the solar PV mains cable LNE connection from its termination in your consumer unit's 16A MCB and terminals. Note the connection points.
- f) Route this cable to connection point (4) on the Unit, and connect as indicated on the diagram. If the cable needs extending, see the notes on (c)
- g) From connection point (2) on the Unit, install a new 2.5mm cable to the vacant terminals disconnected in step (e).

Once the above has been carried out, check all electrical connections are secure before switching power back on.

### **Testing.**

The unit's relay will only operate when your PV system is generating more than 1kW of power, so a sunny day will be the best time to check operation.

### **Immersion Heater Power reduction.**

Most Immersion heaters are rated at 3kW. To use this unit at its most effectively, you will ideally need to replace your existing immersion heater with a 1kW type, or more simply install a power reduction transformer adjacent to the immersion heater itself. Simply disconnect the immersion heater mains flex from the adjacent isolate switch, and fit a 110v yellow plug. Remove the isolate switch and install a single 230v socket in its place. The 110v transformer will simply be plugged into this socket. We can supply either a replacement immersion heater or the 110v transformers.

Notes:

References to LNE indicates a 3 core conductor, connected to Live, Neutral & Earth.