# Solamiser


# H1 User Manual

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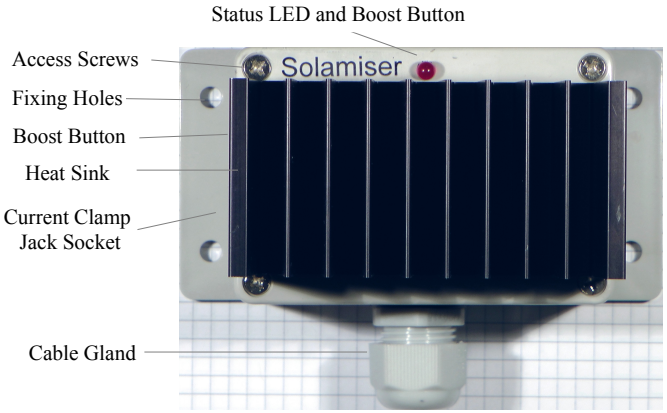
# INSTALLATION INSTRUCTIONS

**Warning: Danger of electric shock. Solamiser H1 is connected directly to the mains consumer unit and should be installed by a Part P registered competent person in accordance with IEE wiring regulations.**



# MOUNTING SOLAMISER H1

a) Mount Solamiser H1 where the ambient temperature will not exceed 30° C. The black heat sink on the front of the unit must not be obstructed. This is to allow free airflow through its fins to prevent power devices from overheating.

b) Using the 4 Fixing holes and screws provided, Install Solamiser H1 on a vertical surface as close as possible to the mains consumer unit.

c) Ensure that there is at least 150 mm of clearance both above and below Solamiser H1 and 50 mm of clearance to the left of Solamiser H1 to facilitate plugging in the current sensor and access to operate the boost button if necessary.

# CONNECTING SOLAMISER H1

**WARNING!**

**Before making any connections check that the immersion heaters' element resistance between L and N is not less than 17 Ohms. Also check that the resistance between the L and E immersion heater connections is greater than 1M Ohm.**

**To provide protection for Solamiser H1's power triac it is advisable to connect the immersion circuit to the RCD side of a split load consumer unit.**

A single four core 1.5 mm² flex should be used to connect your Solamiser H1 to the Consumer Unit (CU).

Using ferrules, connect the above flex cores to Solamiser H1's Internal Terminals as follows:

| | |
|---|---|
| Blue | N |
| Yellow and green | E |
| Black | H |
| Brown | L |

With its main switch turned OFF remove the front cover of the consumer unit. Refer to the diagram below.

a) Identify and disconnect the immersion heater's L cable from its circuit breaker.

   **WARNING**: **Solamiser H1 does not have an internal fuse or circuit breaker, circuit protection is provided by the consumer unit's immersion heater circuit breaker. The rating of this circuit breaker should not exceed 16 A.**

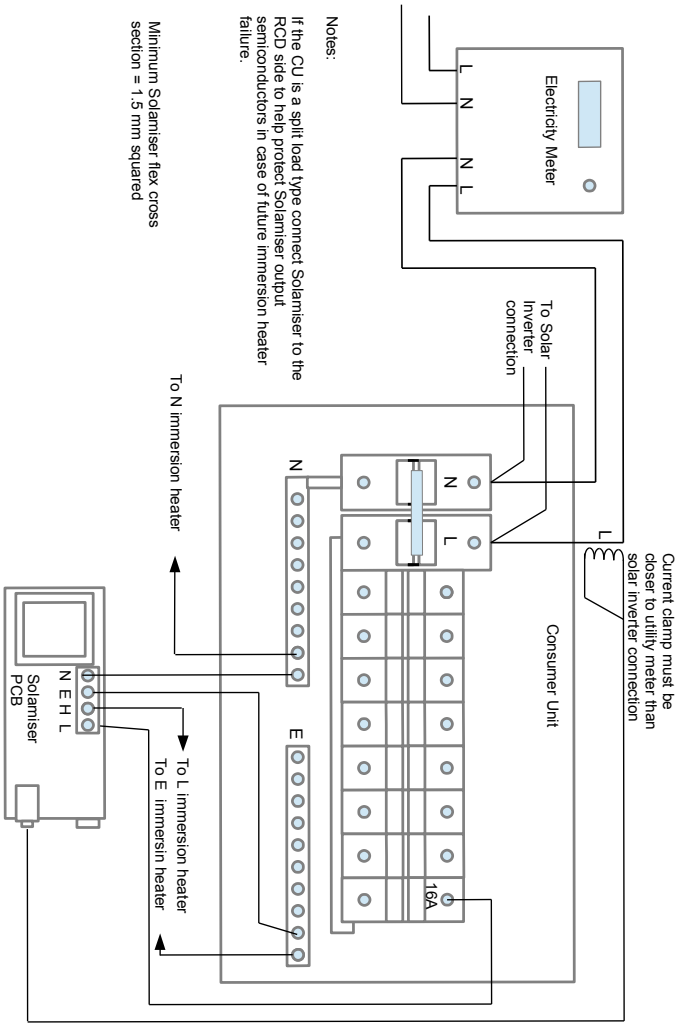
b) Connect the brown core of the 4 core flex to the consumer unit immersion heater circuit breaker output.

c) Connect the blue core of the four core flex to the consumer unit (N) neutral busbar.

d) Connect the yellow and green core of the four core flex to the consumer unit's (E) earth busbar.

e) Connect the black core of the four core flex H to the previously disconnected immersion heater feed cable inside of the consumer unit. This can be done with the in-line crimp connector or similar.

f) The current clamp can usually be mounted on the mains incoming cable (L meter tail) inside the consumer unit.


Electricity Meter
L N
N L
To Solar Inverter connection
Current clamp must be closer to utility meter than solar inverter connection
L
Consumer Unit
N
L
16A
N
E
To N immersion heater
To L immersion heater
To E immersin heater
N E H L
Solamiser PCB
Notes:
If the CU is a split load type connect Solamiser to the RCD side to help protect Solamiser output semiconductors in case of future immersion heater failure.
Minimum Solamiser flex cross section = 1.5 mm squared

# COMMISSIONING SOLAMISER H1

Solamiser H1 senses the current flowing through the house's main incoming power cable at a point between the main electricity meter and the consumer unit. This is accomplished with a non invasive current clamp. There is no need to disconnect the 'sealed' mains cable.

In addition to sensing the amount of current passing between the main electricity meter and the consumer unit the current clamp also senses the direction of the current. It is therefore important that the current clamp is mounted the right way round on main incoming cable otherwise the sensing direction will be reversed and will result in excessive energy use.

Check where the solar microgeneration system connects to the mains power system. This is usually at the 'hot' side of the consumer unit's main isolator switch as shown on the diagram above. The current clamp must be placed around the L meter tail nearer to the main electricity meter than the solar connection point to ensure solar current has already been algebraically summed with mains incoming current at the current clamp's point of measurement.

To get the current clamp the right way round proceed as follows:

a) Plug the current clamp's 3.5mm Jack plug into the Jack socket on the left hand side of Solamiser. It is safer to plug in the current clamp before clipping round the mains cable.

b) Clip the current clamp on the L meter tail between the consumer unit and the electricity meter. At this stage it doesn't matter which way round, just mount it and close the clip fully and note the orientation.

c) Turn off any appliances which may be operating in the house at this time i.e. all consumer unit MCBs then turn on the consumer unit's main switch.

d) Turn on the consumer unit immersion heater circuit breaker and ensure that any other switches in the immersion heater circuit are also switched on.

e) The LED at the top of Solamiser H1 should start to blink.

f) If the LED is flashing short pulses (0.1 sec ON time, variable OFF time) then Solamiser H1 is balancing the energy from the solar panels minus the energy being consumed by the rest of the

house, with the energy consumed by the immersion heater. Each pulse represents approximately 1 Wh of energy being diverted to the immersion heater (3kW immersion). If the LED is pulsing, say once every two second, then the power to the immersion heater at that moment is approx 1.8 kW i.e. 1800 pulses per hour.

g) If the LED is ON for half a second and then OFF for half a second, Solamiser H1 'thinks' the house is importing energy from the mains. There is not enough solar energy to supply the house. The immersion heater is turned off to avoid using mains power.

h) If the LED is ON for two seconds then OFF for two seconds, Solamiser H1 'thinks' the microgeneration system is exporting energy to the national grid. This should only happen if the energy used by the house and immersion heater is less than the energy produced by the solar panels. This can happen on very sunny days or when the immersion heater thermostat has turned off or the immersion heater has been switched off by the user.

i) If you are doing this installation work during daylight hours and all other electrical appliances in the house besides the immersion heater are turned off, then you would expect Solamiser H1 to be in a balanced state and the LED should be producing 0.1 second pulses as described in f) above.

j) If this is not the case then switch off, remove and replace the current clamp the other way round, then switch on again and observe the LED a second time.

k) If Solamiser's LED is now flashing as described in f) above it is most likely that the current clamp is now in the correct orientation.

l) Check the electricity meter and observe the rate of energy flow. This should be close to zero with a small amount of export energy about -30W.

m) If you are installing after dark there is no solar energy available so you would expect the LED to flash once per second (on for half a second then off for half a second) indicating energy import. If it flashes once every 2 seconds then the current clamp should be reversed.

n) Solamiser H1 is now correctly commissioned.

# USING SOLAMISER H1

Solamiser H1 is a 'fit and forget' device.

It is useful to occasionally look at the flashing LED to check that the device is continuing to function correctly.

The LED can indicate one of four operating modes as follows:

**MODE 1 - IMPORT**

When the LED flashes ON for half a second then OFF for half a second, Solamiser H1 is detecting import energy. This typically occur after dark. When you are consuming electricity from the grid. The immersion heater is always switched off in MODE 1.

**MODE 2 - EXPORT**

When the LED flashes ON for two seconds then OFF for two seconds, Solamiser H1 is detecting export energy. This means that excess energy from your solar panels is being sent back to the grid. This will occur when your immersion heater is switched off or your solar panels are producing more energy than you are consuming even with your immersion heater switched on.

## MODE 3 – DIVERTING TO IMMERSION HEATER

When producing single pulses Solamiser H1 is detecting that virtually no energy is flowing back to the grid. Nearly all excess electricity being generated by your solar panels is being used by both your house and your immersion heater.

Variable amounts of energy are diverted to your immersion heater to maintain this balanced state. For example, if you turn on the TV, the amount of energy going to the immersion heater will reduce by the amount used by the TV. If the sun goes behind a cloud Solamiser H1 will reduce power to the immersion heater to maintain balance.

The pulse rate of the LED in MODE 3 reflects the amount of energy being diverted to the immersion heater i.e. approximately 1 pulse per Wh for a 3kW immersion heater. Pulse rate will vary for different loads e.g. a 1kW immersion will produce 3 pulses per Wh.

**MODE 4 – BOOSTING HOT WATER**

Solamiser H1 has a single control which allows hot water to be produced in winter when no solar energy is available.

The LED flashes 3 short pulses every second all the time the boost function is active. Once activated the boost timer heats water for 30 minutes or until the immersion heater thermostat is satisfied.

To switch ON the boost function press the boost button located on the left of Solamiser H1 above the current clamp jack socket.

To switch OFF the boost function press the boost button located on the left of Solamiser H1 above the current clamp jack socket. The LED should then revert to another flashing mode.

Note: The boost function will operate at any time overriding solar energy diversion.

# Important Information

## 1) Legionares

To avoid Legionares disease, hot water should reach 60 Deg C at least once per week. If the thermostat of the immersion heater is set above 60 deg C and it opens at least once per week there should be no legionares risk .

## 2) Integral Safe Thermostat

To prevent overheating of water, Solamiser H1 must only be used with an immersion heater which has its own integral safe thermostat.

## 3) Immersion heater power indicator lights.

If your immersion heater has a neon light that indicates when it is ON you will notice that when Solamiser H1 is diverting to the immersion heater the light will pulse and vary in brightness depending on how much solar energy is available. This is caused by the action of Solamiser's controller regulating the power to the immersion heater. Once the immersion heater is up to temperature its thermostat will open and the neon will stop pulsing and remain ON full indicating that the immersion heater is switched ON and is up to temperature with its thermostat open not drawing current. Solamiser H1 produces just enough power for the immersion heater's neon indicator even when it is switched off. Power to the neon is supplied by the output triac's snubber capacitor when the triac is switched off. This means that the output is never completely off. When the thermostat starts calling again in the evening the neon light will go out.

**To avoid possible electric shock, always switch off Solamiser's power supply MCB at the consumer unit before connecting or disconnecting a heater.**

# TROUBLESHOOTING

If the LED flashes in MODE 1 only at all times you may have a faulty immersion heater. Check the resistance of the immersion heater element as described earlier.

Also check that the current transformer is connected properly. The 3.5mm jack plug may require plugging in and out. Also make sure that the jack plug is fully home in its socket at the side of Solamiser.

Also make sure that the current clamp clip is fully closed around the mains cable to ensure that its ferrite core makes a good magnetic circuit for accurate current measurement.

If the LED flashes in MODE 2 only at all times Solamiser H1 is either incorrectly installed or faulty and your immersion may be consuming import energy at a cost.

If the LED remains ON continously or OFF continuously the microprocessor may require a reset. Turn off the power at the Solamiser's Consumer Unit MCB for 15 seconds then turn on again. Solamiser should reset and start working again normally.

# SPECIFICATIONS

Rated Voltage 240V a.c.
Rated Frequency 50 Hz.
Rated Standby Power 0.5W
Maximum Mains Cable Current Clamp: 100A rms.
Maximum Load Current 16A rms.
Continuous Load Current 13A rms.
Maximum Ambient Temperature 40 Deg C.

Power balance point is fixed at 1% i.e. exporting approx 36W to avoid import when solar energy is available.

Boost Button – Supplies full current from mains to immersion heater for 30 mins can be used at any time or when no solar energy is available.

Heater Output - Proportional power regulation.

Dimensions
Width 132mm x Height 68mm x Depth 100mm
Weight 700g

To be installed in accordance with IEE wiring regulations.