

immersUN

Water heating for your PV system



Installation and user guide

v1.3



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1. Overview

Thank you for choosing immerSUN. This intelligent device is a sensible and practical addition to your PV or Wind microgeneration system.

Water is heated via your existing immersion heater, using surplus power that would otherwise have been exported to the grid.

Please read and follow this guide to ensure many years of trouble-free operation and savings!

Key features

- Heats water from your PV system or Wind Turbine
- Effectively adjusts power levels to the immersion heater, keeping the exported power at virtually zero
- The consumer no longer needs to be at home to use the free electricity, whatever the weather
- No need to change the immersion heater
- Suitable for all electrical microgeneration systems
- Built-in hot water boost timer
- Manual hot water boost function
- Back-lit LCD display shows energy saved, output power and operating mode
- Dual immersion heater control option
- Internal multi-function relay in-addition to the modulated power output
- Up to 4 devices can be daisy-chained for master / slave operation
- MODBUS RS485 interface for system expansion and external data logging
- Internal thermal protection
- 3 year product warranty

2. Technical Specifications

Electrical Specifications

Description	Minimum	Nominal	Maximum
Supply Voltage (VAC)	198	230	264
Supply Frequency (Hz)	-	50Hz	-
Load Current (A)	-	13	16
Load Size (W)	250	3000	3200
Relay Contact Voltage (VAC)	-	-	250
Relay Contact Current (A)	-	-	16
Clamp Current (A)	-	-	100
Recommend PV System Size (kW)	2	-	15

Dimensions and weight

Width (mm)	150	Depth (mm)	64
Height (mm)	140	Weight (g)	935

3. Installation

3.1 Mounting

Often, the most suitable location for the immerSUN is near to the consumer unit. Usually all the connections required are available here.

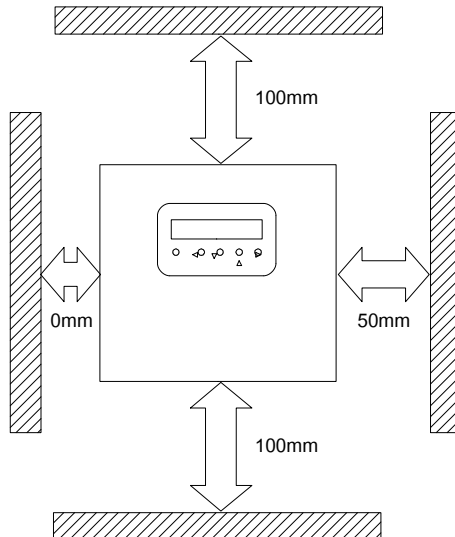
The following should be considered when deciding upon the most suitable location:

- Close to the main incoming mains electrical supply of the property
- Access to immersion heater supply cable (this is usually at the consumer unit)
- Access to suitable supply via 16A MCB or 13A fused outlet
- User access to immerSUN controls and visibility of LCD screen
- Adequate ventilation – keeps vents clear and provide airflow around the unit
- Cable access point – through the rear or bottom of the unit

Use the 3 screws and wall plugs provided to mount the immerSUN at the chosen location.

Remove LCD protective cover after mounting the unit.

DO NOT BLOCK VENTS! The enclosure may get hot, always keep vents clear of obstruction and allow sufficient clearance from walls, ceilings and other objects. Observe minimum clearances as shown below.



3.2 Electrical Connections

Electrical connections should be made only by a competent person. Do not attempt to install this unit if you are not a qualified or an experienced electrician. Installation may involve alterations to fixed wiring and opening the consumer unit, there is risk of death by electrocution.

Choose the most suitable cable entry points (rear or bottom) and make the electrical connections to the unit according to the appropriate wiring diagram (see section 3.4). Use the blanking plugs provided for unused cable entry points.

Alternative loads

In some cases it may be desired to control the power to a load other than an immersion heater. The load **MUST** be a simple resistive load, e.g. an electric towel radiator, storage heater etc.

The load must not exceed 3.2kW and must not include digital or analogue timers, as they may be damaged by the proportional output control of the immerSUN.

IMPORTANT!

Be sure to fully tighten terminals, checking the cables are securely clamped by the terminals and the cord grips. Failure to ensure good connection could result in fire or permanent damage to the unit.

NOTE: The screw terminals are 'rising clamp' type.

TERMINALS

MAINS

L	LIVE FEED	240V supply input, should be from 16A MCB or 13A fused outlet
LH	LIVE OUTPUT	Live output to immersion heater, maximum load 13A or 3kW
N	NEUTRAL (x2)	Mains Neutral terminals (All Neutral terminals are internally connected)
E	EARTH (x2)	Mains Earth terminals (All Earth terminals are internally connected) IMPORTANT! Earth MUST be connected

RELAY (used for some additional functions, see wiring diagrams in section 3.4)

NO	NORMALLY OPEN	Volt-free normally open relay contact (max. current 13A)
C	COMMON	Volt-free common relay contact (max. current 13A)
NC	NORMALLY CLOSED	Volt-free normally closed relay contact (max. current 13A)

CLAMP

CT	CURRENT TRANSFORMER	AC current transformer clamp terminals
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COMMUNICATIONS

A	RS485 A	RS485 communication terminal A (D+)
B	RS485 B	RS485 communication terminal B (D-)
GD	DIGITAL GND	Ground connection for future use
5V	5V OUTPUT	5-volt output connection for future use

3.3 Clamp Installation

Correct positioning of the current sensor clamp is vital to the operation and efficiency of the immerSUN. Incorrect installation may result in increased electrical costs to the user.

The clamp should be located at the **main incoming grid supply** to the building. This will be the supply from the main electric meter (NOT the PV generation meter). Close the clamp around one of the cables (Live or Neutral) from the meter, this can be at the meter location or inside the consumer unit.

IMPORTANT! Ensure the clamp is securely closed around the cable.

Connect the clamp wire to the CT terminals inside the immerSUN. Don't worry about polarity as the immerSUN will figure it out during setup.

PV connected via Henley Block

If the PV system is connected via a 'Henley Block' then the clamp should be installed on the grid side of the block, i.e. between the meter and Henley block.

More than one consumer unit

Where there is more than one consumer unit, the clamp should be installed at the primary incoming supply (i.e. before it splits).

Three phase supply

One immerSUN will only work on one of the phases, the clamp **MUST** be installed on the **SAME PHASE** that is wired to the immerSUN, the inverter **MUST** be on the **SAME PHASE** also.

If the inverter is 3-phase, then the immerSUN will only 'see' the import/export on that phase, therefore not all of the export power can be utilised.

Extending the clamp cable

The clamp wire can be extended if required, however due to the small signal from the clamp, twisted-pair cable should be used to help eliminate possible interference. The maximum cable length is 50m. Most types of twisted-pair cable can be used, e.g. Beldon cable, Cat.5, telephone cable etc.

3.4 Wiring Diagrams

Single heater wiring

Most installations will be a single immerSUN connected to a single heater. This is shown in the diagram below.

Alternative wiring method

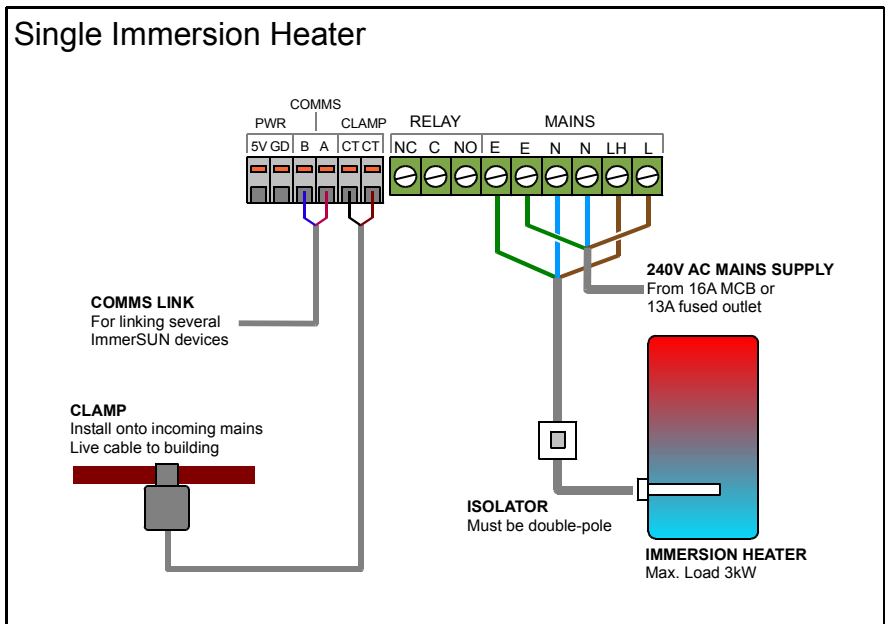
If the immerSUN is located close to the consumer unit, it may be simpler to use the alternative wiring option using 4-core cable or singles. As the Earth and Neutral terminals are each common, the alternative option shows that the heater earth and neutral need not be directly connected to the immerSUN. The alternative wiring method can also be used for all of the additional wiring options.

Using the multifunction relay

When wiring one of the options involving the relay contacts, the relay function must be selected. This is done via the Relay Function option in the Installer Menu. See section 4.3. The relay can be set to perform only one of the functions.

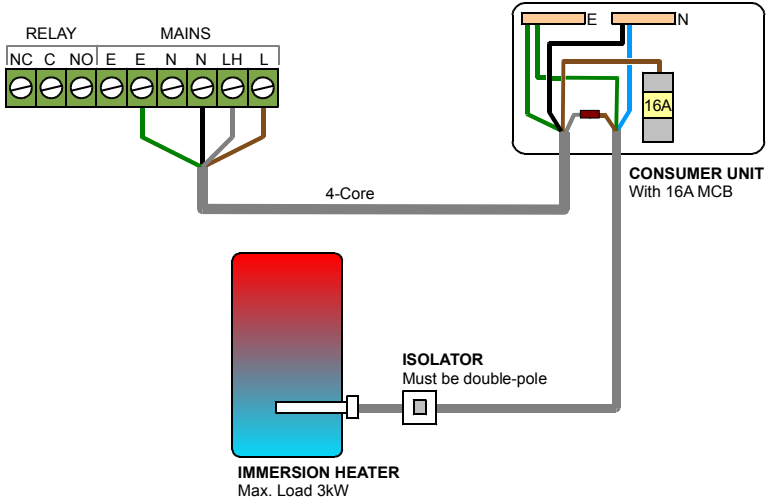
Linking several immerSUN units (Cascading)

Up to four immerSUN units can be linked together. This allows up to 12kW (3kW for each immerSUN) of surplus power to be utilised on one phase. This is known as Cascading as the first immerSUN will consume the first available 3kW, the second unit in the chain will then consume the next available 3kW and so on. When using cascade mode, each immerSUN must have its own 3kW (maximum) load. The immerSUNs should be linked in a 'daisy-chain' fashion with twisted-pair signal cable using the COMMS terminals A and B. Cascade mode needs to be selected in the Installer Menu. See section 4.3



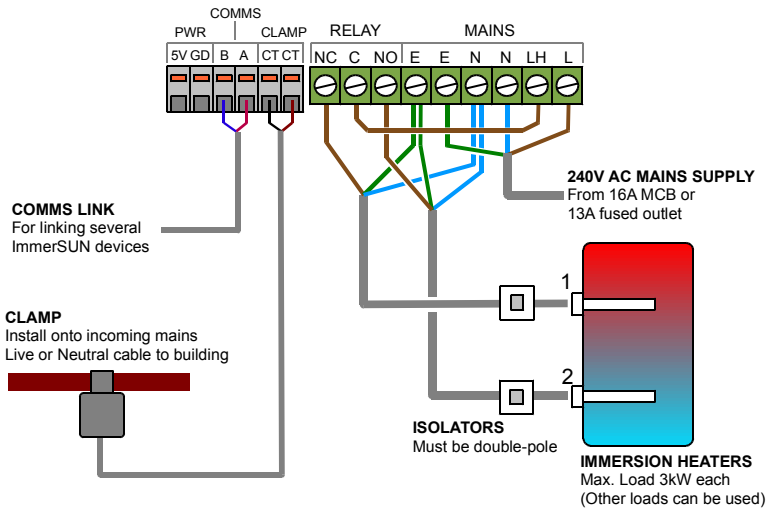
For simple single heater control, relay connections not required, comms connections (A&B) are used only when several immerSUN devices are to be linked. (Also see Alternative Mains Wiring diagram).

Alternative Mains Wiring



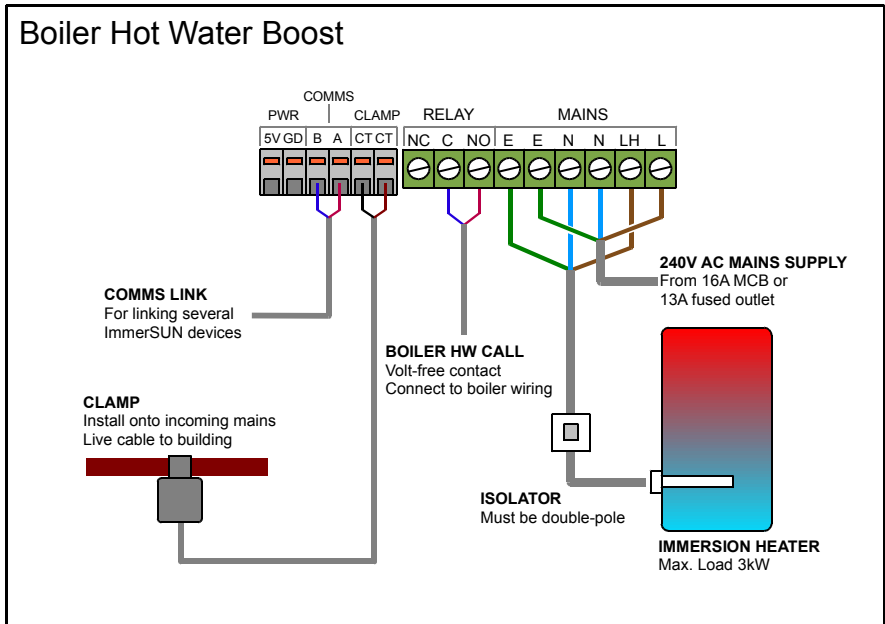
As an alternative to using two flex cables, one 4-core cable may be used for the mains wiring.

Two Heaters



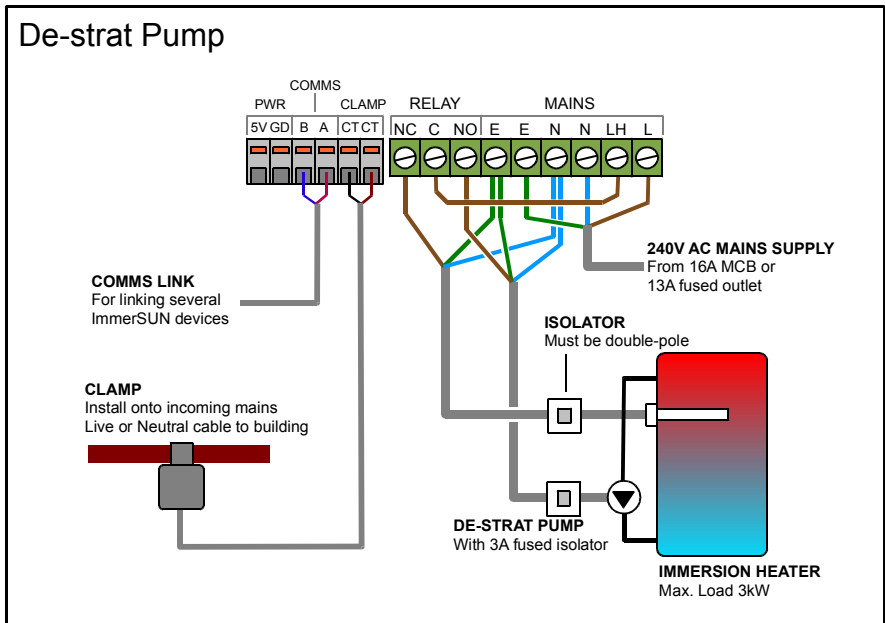
Two heaters can be controlled by using the multi-function relay. The heaters need not be in the same cylinder. Heater no. 1 has priority.

Boiler Hot Water Boost



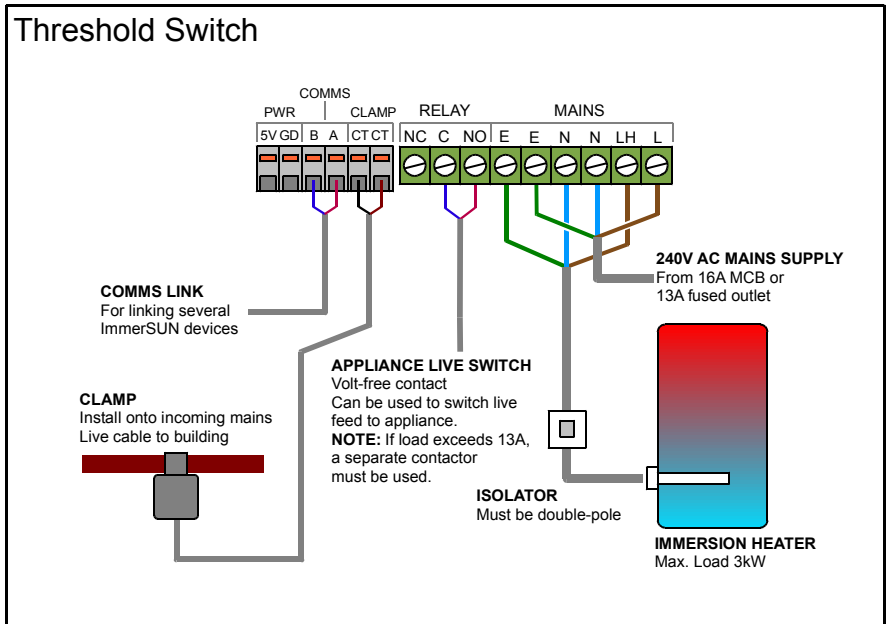
Rather than using the immersion heater to boost hot water, an external heat source e.g. a boiler can be used by making use of the multi-function relay wired to the boiler hot water controls.

De-strat Pump



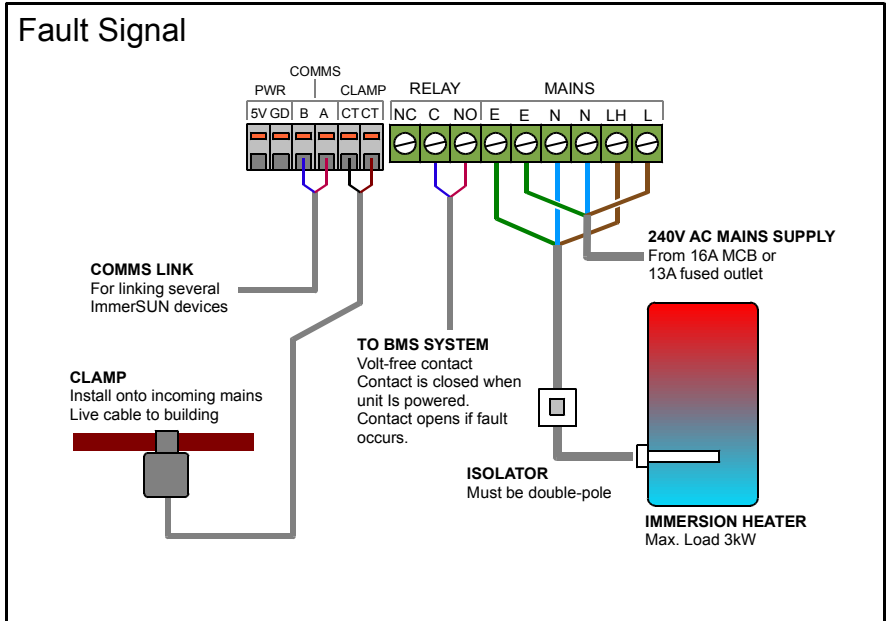
It may be desirable to use a de-stratification pump to mix the cooler water at the bottom of the cylinder with the hotter water at the top, this allows a top mounted immersion heater to heat all of the water in the cylinder.

Threshold Switch



The multi-function relay can be used to switch any load on for a set duration, once an export threshold has been reached. The maximum relay current should not be exceeded (an additional contactor may be used for larger loads).

Fault Signal



If a fault signal for a BMS system is required, the multi-function relay can be set to de-activated when a fault occurs.

3.5 Using the immerSUN with a dual-rate electrical supply

There are 2 common ways that a dual-rate electrical supply can be configured...

1. A single dual-rate meter feeding the whole house

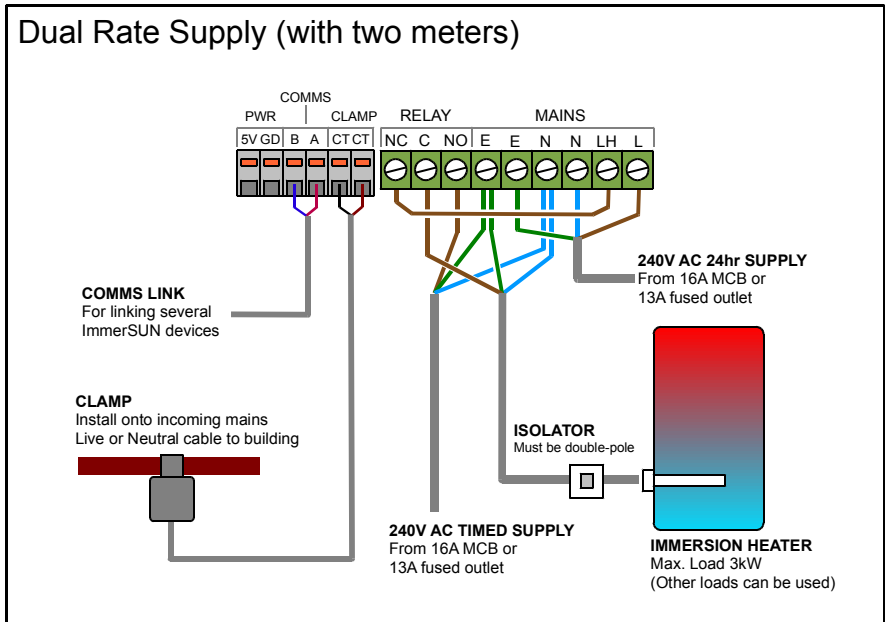
This is the most common configuration.

- The immerSUN should be wired as normal. See wiring diagrams in section 3.4
- The immerSUN's Timed Boost should be set to operate at off-peak times.
- Remove any timers that are installed on the immersion heater circuit.

2. Two meters supplying two consumer units

With this configuration there is a separate timed off-peak supply.

- Wire the immerSUN as shown in the diagram below.
- Set the Relay Function to Water Boost and then set the Timed Boost to operate at off-peak times.
- Remove any timers that are installed on the immersion heater circuit.
- Label the immersion heater with a "Dual Supply" warning label.
- Please Note: It will not be possible to Boost outside of off-peak times.



4. Installer Settings

Once the unit is mounted and wired, the installer will need to set parameters as required for the particular installation. Before applying power to the unit the DIP switches will need to be set.

4.1 DIP Switch Settings

The default position of the DIP switches, is all four set to ON. For the majority of installations this will be the correct setting. However if several immerSUN devices are being cascaded, then the DIP switches will need to be set accordingly, see table below.

Default settings show in *Italics*

S1	S2	Cascade Position Select	Notes
OFF	OFF	1 st Slave	Clamp not used, control is via master
OFF	ON	2 nd Slave	Clamp not used, control is via master
ON	OFF	3 rd Slave	Clamp not used, control is via master
ON	ON	Master Unit	Clamp is required
S3		Termination Resistor Select	
ON		RS485 termination resistor ENABLED	Set to ON if this is at the end of the communication chain. If the unit is in the middle of the chain, set to OFF. Where there are only two devices connected, set both to ON.
OFF		RS485 termination resistor DISABLED	
S4		Clamp Burden Resistor Select	
ON		Internal burden resistor ENABLED	
OFF		Internal burden resistor DISABLED	Use external resistor (for supporting alternative clamps)

4.2 Installation Setup

At first switch on, the immerSUN will run through the installation setup process, follow the instructions on the display.

<p>Step 1</p>	<p>INSTALLATION SETUP - PRESS ></p>	<p>Press ► to start the installation setup process as instructed. Otherwise press ◀ to cancel.</p>
<p>Step 2</p>	<p>SELECT CLAMP <RADIO< >WIRED></p>	
<p>Step 3</p>	<p>TURN ON HEATER THEN PRESS ></p> <p>ERROR! HEATER NOT DETECTED</p>	<p>Ensure that the heater isolator is ON and that the thermostat is closed (i.e. the water in the cylinder is cold)</p> <p>An error will occur if no load is detected, the immersion heater may be switched off at the isolator, or the thermostat open because the water is hot already.</p> <p>Press ◀ to go back to step 1</p>
	<p>CHECKING HEATER...</p>	<p>The immerSUN will then perform a test to check the output and the heater.</p>
<p>Step 4 (master only)</p>	<p>TURN INVERTER OFF THEN PRESS ></p>	<p>You will be asked to switch off the inverter, this is so the immerSUN can detect import/export direction. Use the AC isolator of the PV system.</p>
<p>Step 5 (master only)</p>	<p>SETTING UP PLEASE WAIT...</p>	<p>Setting up will take several seconds.</p>
	<p>CLAMP CURRENT TOO LOW!</p>	<p>If the import power is too small, this could be because the inverter is still switched on, the heater thermostat is open circuit, or the clamp is at the wrong location.</p> <p>Press ◀ to go back to step 1</p>
<p>Step 6</p>	<p>INSTALLATION SETUP COMPLETE!</p>	<p>Once setup has finished this message will be displayed.</p>
<p>Step 7</p>		<p>Switch inverter back on again. Wait for inverter to start working, this usually takes 3 minutes. If export is high enough the immerSUN will start heating water, otherwise you will see the waiting screen.</p>

4.3 Installer Menu

Installer Menu Options (Press and hold ▼ AND ▲ for 5 seconds for installer menu)

Description	Menu Screen	Sub Menus
Installer Menu	INSTALLER MENU PRESS >	Press and hold ▼ AND ▲ for 5 seconds for installer menu, you will then see this screen, press ▶ to continue to installer menu.
View Readings	INSTALLER MENU View Readings	AC Volts Shows AC mains voltage at present. The display will update approximately every 2 seconds.
	View Readings AC Volts: 245V	Grid I Shows AC mains current at clamp. The display will update approximately every 2 seconds.
	View Readings Load I: 8.2A	Load I Shows AC mains current applied to load. The display will update approximately every 2 seconds.
	View Readings Temperature: 38C	Temperature Shows internal temperature on the immerSUN. The display will update approximately every 2 seconds.
Clamp	INSTALLER MENU Clamp (Wired)	Clamp Type The clamp type is shown, the clamp type can only be changed by resetting the unit.
Cascade	INSTALLER MENU Cascade (Off)	Cascade Mode When cascading several immerSUN's to control several loads, Cascade should be set to ON
Set Load The output can be set to a given percentage for testing purposes	INSTALLER MENU Set Load (Auto)	Auto (Normal mode) Set output to automatically track exported power.
	SET LOAD >100%<	Manual Manually set output power for testing purposes only.
Relay Function The internal multi-function relay can be set to operate as one of 8 different functions. (The currently enabled option is shown in brackets). See appropriate wiring diagram for chosen relay function	INSTALLER MENU Relay (OFF)	When Heating Relay is on when output is heating water.
	RELAY FUNCTION >When Heating<	Two Heaters (2 Heater) Use relay to switch load output between two heaters. Heater no.1 output takes priority (see wiring diagram). Heater no.2 output only heats when no.1 is fully heated. NB: When heating no.2, the output is switched back to heater no.1 every 15mins to check if more heat is required.
	RELAY FUNCTION >Two Heaters<	Water Boost (Boost) Relay controls boiler to heat water when in water boost mode, rather than using the immersion heater.
	RELAY FUNCTION >Water Boost<	De-stratification Pump (De-strat) Relay controls cylinder de-stratification pump. Pump is activated when immersion thermostat opens and runs until thermostat closes again. (The immersion thermostat is checked only once a minute so there may be a delay before the pump stops).
	RELAY FUNCTION >De-strat Pump<	

RELAY FUNCTION >Threshold<	Threshold (Threshold) Relay operates when an export threshold is reached, relay remains activated for set period of time, even if export drops. Export threshold level and relay on duration can be set as shown below:		
	<table border="1"> <tr> <td>THRESHOLD SET Export: 500W</td> <td>THRESHOLD SET Duration: 1h30m</td> </tr> </table>	THRESHOLD SET Export: 500W	THRESHOLD SET Duration: 1h30m
THRESHOLD SET Export: 500W	THRESHOLD SET Duration: 1h30m		

RELAY FUNCTION >Fault Signal<	Fault Signal (Fault) Relay is deactivated if a fault condition occurs.
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RELAY FUNCTION >Always On<	Always On (ON) Relay is operated continuously. (This is for testing purposes only).
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RELAY FUNCTION >Always Off<	Always Off (OFF) Relay is disabled. (This is the default relay function).
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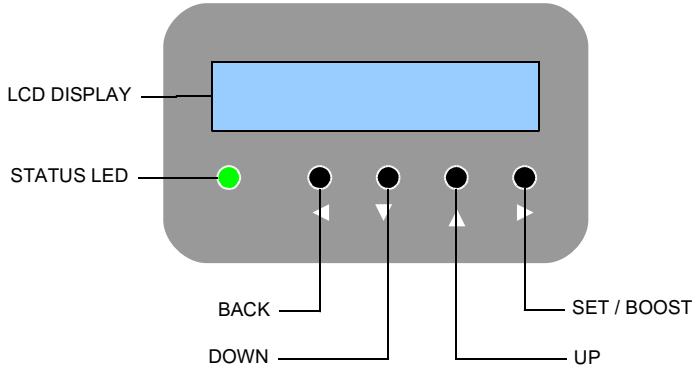
Nominal Voltage	INSTALLER MENU Nom Voltage 240V	NOMINAL VOLTAGE >240< Volts	Nominal Voltage The nominal mains operation voltage should be set. Default is 240V.
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Reset Settings	INSTALLER MENU Reset Settings	RESET SETTINGS CONFIRM Press >	Reset Settings Use to setup immerSUN after installation. (See section 4.2).
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Serial Number & Firmware Version	INSTALLER MENU S/N:123456 V1.10		Serial Number & Firmware Version The serial number and firmware version are displayed.
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5. User Operation

5.1 Controls and Display



Button	Operation	Alt. Operation	Description
◀	BACK	SCREEN CHANGE	Exit menu or change screen when not in menus
▼	DOWN	MENU	Go down through list or decrease value Enter Main Menu
▲	UP	MENU	Go up through list or increase value Enter Main Menu
▶	SET	BOOST	Set value or hold to boost hot water

5.2 Changing Values

To change values, navigate to value you wish to change and press ▶
 Arrows either side of the value to change will then be shown. Use the ▼ and ▲ buttons to change the value. Press ▶ again to store the new value. Pressing ◀ will exit edit mode, without changing the value.

Non-Edit Mode	SET TIME 16:01	Press ▶ to edit value.
Edit Mode	SET TIME 16>01<	Value to be edited is indicated by > < symbols.

5.3 Normal Operation Display

The table below summarises the operation of the immerSUN. There are four main modes of operation: Heating Water; Water Hot; Waiting and Hot Water Boost. The mode is shown on the LCD display, the LED allows the mode to be determined from a distance.

The display changes every two seconds, showing the mode with additional information, the time and date, and the savings in kWh.

Normal Operation

Mode & LED status	Mode Information	Time & Date	Savings	Description
Waiting... 	Waiting... 4eco immerSUN	Waiting... 10:52 16/02/12	Today: 12.562kWh Total: 5651kWh	Waiting for sufficient exported power to start heating water.
Heating Water 	Heating Water Output: 2925W	Heating Water 10:52 16/02/12	Today: 12.562kWh Total: 5651kWh	Heating water with power from PV system, no Grid power is being used. The current output power applied to load is shown.
Heating Water (Dual Heater Mode) 	Heating Water(2) Output: 2925W	Heating Water(2) 10:52 16/02/12	Today: 12.562kWh Total: 5651kWh	Heating water with power from PV system, no Grid power is being used. Current heater is show in brackets.
Water Hot 	Water Hot	Water Hot 10:52 16/02/12	Today: 12.562kWh Total: 5651kWh	The water is fully heated, the immersion thermostat is open.
Hot Water Boost 	Timed Boost for: 1h 15m 25s	Timed Boost 10:52 16/02/12	Today: 12.562kWh Total: 5651kWh	Heating water at full power, regardless of available export power.
Hot Water Boost (Dual Heater Mode) 	Timed Boost (2A) for: 1h 15m 25s	Timed Boost (2A) 10:52 16/02/12	Today: 12.562kWh Total: 5651kWh	Heating water at full power, regardless of available export power. Current heater is show in brackets.
Cascade Mode				
Slave Devices Status Screen	Status of Slaves HEAT WAIT ----	When Cascade Mode this screen will be shown giving the status of all the slave immerSUN devices in the system.		Status Abbreviations HEAT : Heating Water HOT : Water Hot WAIT : Waiting for sufficient export power BOOS : Timed Boost ---- : No device detected

5.4 Main Menu

Main Menu Options (Press ▼ OR ▲ for main menu)

Description	Menu Screen	Sub Menus		
View Savings The immerSUN measures and records energy applied to immersion heater. As only the renewable energy is counted this is effectively saved energy.	MAIN MENU View Savings	Savings Today: 12.563kWh	Today Show savings made today in kWh.	
		Savings Month: 224kWh	Month (current month) Show savings made this month in kWh.	
		Savings MAR: 224kWh	Month (each month) Show savings made in the indicated month in kWh. Savings are stored for each month of the year.	
		Savings Year: 1791kWh	Year Show savings made this year in kWh.	
		Savings Total: 3215kWh	Total Shows total energy saved to date in kWh.	
View Event Log	MAIN MENU View Event Log	Power On 14:53 12/06/12	Code: 7 Value: 0	Log Details Every normal operation event is logged along with the time and date of the event. Code is the event code number. Value is the value associated with the event.
		POWER FAILED 14:53 12/06/12	Code: 105 Value: 0	Log Details Every change of status and any faults are recording in the log along with the time and date of the event. Code is the fault code number. Value is the value associated with the fault.
Settings	MAIN MENU Settings	SETTINGS Set Time	SET TIME 16:01	Set Time Time is used for Hot Water Boost and the event log. Time is maintained during power outages for at least 48 hours.
		SETTINGS Set Date	SET DATE 12/06/12	Set Date The date is used for the event log. Date is maintained during power outages for at least 48 hours.
		SETTINGS Set Contrast	SET CONTRAST >20%<	Set Display Contrast The display contrast can be adjusted if required.

cont..

Timed Boost

MAIN MENU
Timed Boost

TIMED BOOST (A)
06:30 - 0h 30m

Timed Boost A

The water heating can be boosted to ensure hot water by a given time. When heating water in boost mode, the immersion heater will be fully on regardless of available free power.

Set the on time and duration for timed hot water boost. If timed water heating boost is not required, set the duration to 0h 0m.

TIMED BOOST (B)
17:00 - 1h 15m

Timed Boost B

Water heating boost can be set for twice a day (A & B). Set the on time and duration for timed hot water boost. If timed water heating boost is not required, set the duration to 0h 0m.

Timed Boost

(Two Heater Mode)

When the relay function is set to Two Heaters, the timed boost can be independently set for both heaters.

MAIN MENU
Timed Boost (1)

TIMED BOOST (1A)
06:30 - 0h 30m

Timed Boost 1A

Set the on time and duration for timed hot water boost for heater no.1. If timed water heating boost is not required, set the duration to 0h 0m.

TIMED BOOST (1B)
17:00 - 1h 15m

Timed Boost 1B

Water heating boost can be set for twice a day (A & B). Set the on time and duration for timed hot water boost for heater no.1. If timed water heating boost is not required, set the duration to 0h 0m.

MAIN MENU
Timed Boost (2)

TIMED BOOST (2A)
06:30 - 0h 30m

Timed Boost 2A

Set the on time and duration for timed hot water boost for heater no.2. If timed water heating boost is not required, set the duration to 0h 0m.

TIMED BOOST (2B)
17:00 - 1h 15m

Timed Boost 2B

Water heating boost can be set for twice a day (A & B). Set the on time and duration for timed hot water boost for heater no.2. If timed water heating boost is not required, set the duration to 0h 0m.

5.5 Manual Hot Water Boost

In addition to the timed hot water boost option, the water heating can be boosted manually. You may wish to use this function if you have an unexpected hot water demand. See section 5.4 for Timed Boost option.

Manual Boost

Manual Boost
ON for: >1h 00m<


To manually boost the hot water, press and hold ► then use the ▼ and ▲ buttons if you want to change the boost time. Confirm boost by pressing ► again. The Hot Water Boost operation will then start. The water heating will then be boosted for the set duration, or until the water is hot, whichever is sooner.

Hot Water Boost
CANCELLED

To cancel boost mode, press and hold ◀ for 2 seconds.

5.6 Error Messages

If a fault condition occurs, an error message will be displayed and the LED will flash red. The error will be logged in the Fault Log. Normal operation will continue once the immerSUN is reset.

Error Messages 	UNIT TEMPERATURE TOO HOT	The internal temperature of the immerSUN is too high. Check vents are clear.	
	MAINS VOLTAGE TOO HIGH	MAINS VOLTAGE TOO LOW	AC supply voltage is outside of the operating parameters.
	ERROR CLAMP REVERSED	The clamp has been reversed, the settings will need to be reset to reconfigure the unit. (See section 4.3 <i>Reset Settings</i>)	
	ERROR OUTPUT OVERLOAD	The output of the unit is overloaded, the heater is larger than 3kW.	
	ERROR TRIAC FAILED	The power control has a fault, switch off the immersion heater immediately as power may be being drawn from the grid.	
Setup Errors	ERROR! HEATER NOT DETECTED	No load was detected during setup, the immersion heater may be switched off at the isolator, or the thermostat open because the water is hot already. Otherwise there may be a fault with the immersion heater.	
	CLAMP CURRENT TOO LOW!	If the import power is too small during setup, this message will be displayed. This could be because the inverter is still switched on (after request to be switched off), the heater thermostat is open, or the clamp is at the wrong location. The clamp needs to 'see' the exported power to the grid.	

6. Troubleshooting

Use the table below to help remedy the problem.

Any actions requiring opening the immerSUN and/or testing voltages should only be carried out by a competent person. Contact your installer if in doubt.

Symptom	Possible Cause	Action
Unit dead, no display	MCB Tripped	Check MCB is ON
	Wiring to IN and OUT terminals swapped	Check supply voltage on IN terminal
	Internal Fuse Blown	Test fuse inside immerSUN
Will not complete setup <i>Heater Not Detected</i>	No load was detected during setup	Check the immersion heater is switched on at the isolator, check the thermostat is closed (water may already be hot). Otherwise there may be a fault with the immersion heater element, check the resistance of the element.
Will not complete setup <i>Clamp Current Too Low</i>	Import power too low during setup	Check that the inverter is still switched off, check that the heater thermostat is closed, check the clamp correctly fitted, (the clamps needs to 'see' the exported power to the grid).
Showing <i>Water Hot</i> even though the water is cold	No load present on OUT terminal	Immersion heater isolator should be ON
		Check immersion heater thermostat is not open
		Immersion heater element could be open-circuit
Always showing <i>Waiting...</i>	PV system not generating sufficient power	Wait for PV system power increase or reduce demand by switching off appliances
	Problem with signal from clamp	Check clamp is fitted to correct cable
		Check clamp wire connections to terminals
Heating water at full output even when PV is not exporting	Clamp reversed	The clamp has been reversed, the settings will need to be reset to reconfigure the unit. (See section 4.3 <i>Reset Settings</i>)
Slave device status not showing on master display	Communication link wires not properly connected	Check continuity of communication wires to terminals A & B
	Address conflict	Check DIP switch positions
Slave status screen not showing when Cascade Mode is enabled	Cascade Mode not enabled on master	Check Cascade Mode is enabled in installer menu
	Address settings incorrect	Check DIP switch positions

7. Legionella and General Advice

7.1 Legionella

The legionella bacteria is present in all source water. The concentration, however is normally too low to be a risk to health. The growth of the bacteria and hence the concentration is dependent on stagnation time, temperature and nutrient availability.

A domestic hot water storage cylinder in the UK is unlikely to remain stagnant in the cylinder for much more than a day under normal occupation of the premises. In addition the mains cold water supply is very low in nutrients, as it is often treated with chlorine which remains in the water and is toxic to the bacteria.

Nevertheless, if the premises are unoccupied for any length of time, such as absence on holiday, it is good practice to sterilise the system using the immersion heater or an auxiliary heat source before using any hot water. This applies whether or not a solar water heating system is fitted.

It is strongly advised that the hot water boost function, or existing hot water boiler controls be set to ensure that the water is heated up to 60°C at least once a week.

7.2 Getting the most from your immerSUN

To get the most from your immerSUN there are a few things you will need to consider.

1. Set your boiler hot water timer (or the immerSUN boost function) to ensure that water is only boosted to full temperature after the water has been heated to the maximum extent possible by the immerSUN. This is likely to be after the sunset. When you use hot water during the evening and early morning, this will ensure that there is plenty of cold water in the cylinder for the sun to heat the next day. Using back-up heat in the morning means less opportunity for the immerSUN to contribute.
2. Adequate insulation of cylinder and pipes is vital. Systems with poorly insulated cylinders can suffer from inadequate hot water provision in the mornings.
3. Electric showers heat water themselves rather than using the solar-heated water, using them will reduce overall hot water use, meaning that you won't get maximum benefit from the immerSUN.
4. Allow the hot water temperature to vary. If you do not need high temperatures all the time, you will have less need for back-up heating, heat loss from the cylinder will also be less. However, it is important to make sure your cylinder reaches 60°C at least once a week to avoid risk of Legionella.

8. Warranty

Subject to the provisions described below, this product is protected for three (3) years against defects in material and workmanship.

Should this product fail to perform as described within the warranted period, it will be repaired or replaced with the same or functionally equivalent product by 4eco, at its discretion, free of charge provided you: (1) Return the failed product to 4eco with shipping charge prepaid, and (2) provide 4eco with proof of the original date of purchase. Returned or replacement products will be returned to you with shipping charges prepaid.

Replacement products may be refurbished or contain refurbished materials. If 4eco, by its sole determination, is unable to repair or replace the defective product, it will refund the depreciated purchase price of the product.

The warranty does not apply if, in the judgement of 4eco, the product fails due to damage from shipment, handling, storage, accident, abuse, misuse, or if it has been used or maintained in a manner not conforming to product manual instructions, has been modified in any way, or has had any serial number removed or defaced. Repair by anyone other than 4eco or an approved agent will void this warranty. The maximum liability of 4eco under this warranty is limited to the purchase price of the product covered by the warranty.

Prior to returning any defective product, the end customer or the reseller from whom the end customer originally purchased the product must obtain a Return Materials Authorisation (RMA) number from 4eco. All defective products should be returned to 4eco with shipping charges prepaid. 4eco will not accept collect shipments.

Except as specifically provided in this agreement or as required by law, the warranties and remedies stated above are exclusive and in lieu of all others, oral or written, express or implied. Any and all other warranties, including implied warranties or merchantability, fitness for a particular purpose and non-infringement of third party rights are expressly excluded. 4eco shall not under any circumstances be liable to any person for any special, incident, indirect or consequential damages, including without limitation, damages resulting from use or malfunction of the products, loss of profits or revenues or costs of replacement goods, even if 4eco is informed in advanced of the possibility of such damages.

9. Conformance

EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

We 4eco Ltd
of 3 Church View Business Centre
Binbrook, Lincolnshire, LN8 6BY, England

In accordance with the following Directives:

2006/95/EC The Low Voltage Directive
2004/108/EC The Electromagnetic Compatibility Directive

Hereby declare that:

Equipment Heater controller for microgeneration systems
Model immerSUN

Is in conformity with the applicable requirements of the following documents

Ref. No.	Title	Edition/Date
BS EN 61000-6-1	Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments	2007
BS EN 61000-6-3	Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments	2007

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.

Signed:



Name: Lee Sutton
Position: Technical Director
On: 12 July 2012

10. Commissioning Sheet

Model

Serial Number

Installation Company

Installer Name

Date of Installation

Legionella advice given?

See section 7
(tick when done)

Signed by Installer

immerSUN

immerSUN