TIMEGUARD®	PV1000	PV BOOST IMMERSION HEATER CONTROLLER

Features

- The Controller will optimise the use of photovoltaic-generated electricity for powering an immersion heater when sufficient power is available and will use power from the grid at other times.
- Three programmable on/off times per day and Manual Boost function.
- LCD display for programming settings, displaying energy saving information and if energy is being exported to the grid.
- Dual 3kW immersion heater outputs (alternating).
- The PV Boost Controller can be installed to control an existing immersion heater and tank.

Safety Instructions

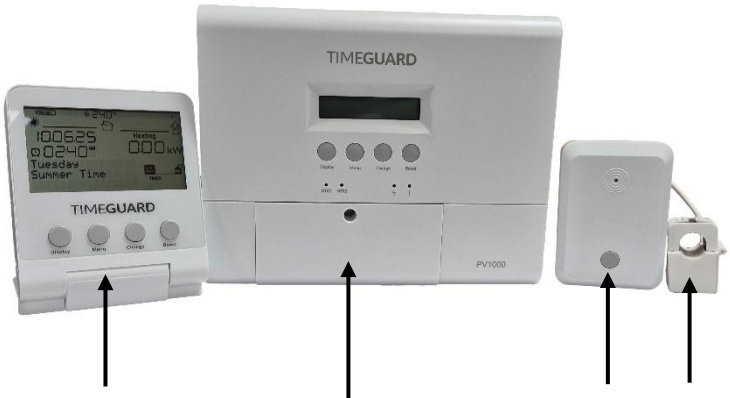
1. These instructions should be read carefully and retained after installation for future reference and maintenance.
2. Ensure that the mains power is isolated before carrying out installation or maintenance.
3. Check that the total load on the circuit including this unit does not exceed the rating of the circuit cable, fuse or circuit breaker.
4. This product must be installed in accordance with the latest edition of the IET Wiring Regulations (BS7671) and current Building Regulations.
5. Ensure adequate ventilation space around the PV Boost Controller and vents will not be blocked.
6. The electrical installation of this device must only be undertaken by a suitably trained and qualified electrician; all local safety standards must be observed. The immersion heaters must be connected directly to the PV Boost Controller without any other devices in between.

Environmental Instructions

This product may contain substances that can be hazardous to the environment if not disposed of properly. Electrical and electronic equipment should never be disposed of with general household waste but must be separated for its correct treatment and recovery. Where possible recycle your packaging.

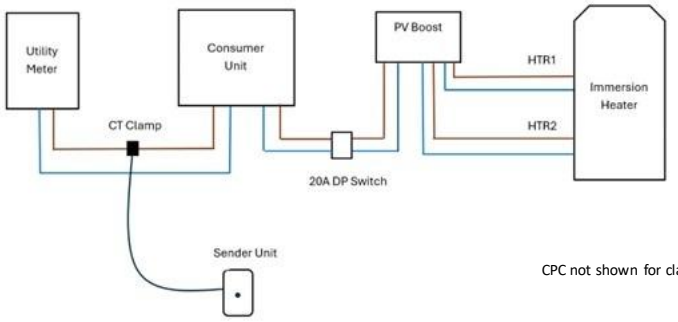
Installation Instructions

In the box



PV Monitor | PV Boost Controller | Sender & CT Clamp

General Layout



CPC not shown for clarity

- The PV Boost Controller should be located close to the hot water tank and it should be fed from a 16A radial circuit. Try to keep the cable run from the controller to the immersion heater to a minimum (3 meters or less).
- Leave at least 100mm all around the unit, do not block the airflow around the PV Boost Controller.
- Secure the unit to the wall with the screws provided, or using suitable fixings for the surface type. There are 2 hanging brackets provided on the rear of the unit and 2 fixing screw point under the terminal cover. The unit must be fitted vertical on the wall.

Note: It is recommended that a 20A DP switch is installed between the PV Boost Controller and the Consumer Unit

Electrical Connections

Terminate the supply and immersion heater cable(s).
See Fig. 1 above. If you have 1 immersion heater use HTR1, if you have 2 immersion heaters, use both HTR1 & HTR2 outputs.

E EARTH (Green/Yellow)
N NEUTRAL OUT (Blue)
L LIVE OUT (Brown)

Sender and CT Clamp Connection

- Connect the cable from the CT Clamp to the Sender unit
- Insert 3 AAA batteries on the rear of the sender unit

Pairing the Sender unit with PV Boost Controller

- Briefly press and hold both the Display and Change buttons on the PV Boost Controller, the display on the main unit will show 'Pairing to sender'
- Briefly press the pairing button on the sender unit. The display on the controller will show 'Pairing success' or if the sender is out of range it will show 'Pairing failed'.
- If you are out of range, move the sender closer to the main unit and try again.

If the sender does not pair with the controller, reset the PV Boost Controller by pressing the Reset button (located next to the Supply Terminals).

CT Clamp Installation on Meter Tails

- Use the keyhole slots on the rear of the Sender to fix it to the wall.
- The correct installation and positioning of the CT Clamp is very important for the efficient operation of the PV Boost Controller.
- Install the CT Clamp at the main incoming meter tails to the consumer unit, which is normally from the utility meter (not the PV generation meter).
- Close the CT Clamp around the Live cable from the meter, observing the correct orientation as shown by the arrows on the CT Clamp. See Fig. 2.

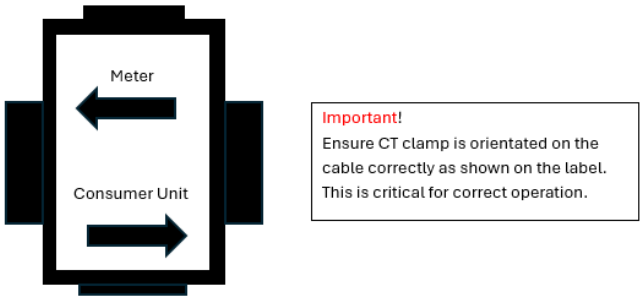


Fig. 2

Testing the System

If the hot water tank is up to temperature, the display on the PV Boost Controller should display "Water Tank Hot". Run off some hot water and ensure the display shows "Heating by Solar" and the arrow will point to the grid tower, if there is enough export energy. If not enough PV energy, the arrow will point from the grid tower to the house.

Programming PV Boost Controller Functions

Note – all programming is completed by the PV Boost Controller, not the Monitor.
Press the MENU button to:

Adjust time and date settings

- To adjust the current Time & Date, press the MENU button four times from the default screen until 'Set time' appears.
- To modify the settings, press the CHANGE button, causing the first digit (hour) to flash. Press the CHANGE button to increment the value by 1, repeating the process until the desired digit is selected.
- Press the MENU button once to confirm and proceed to set the next digit.
- Repeat the steps above to set the minutes, then proceed to configure the year, month and day.
- Clock on the PV Boost and PV Monitor to be set separately.

Daily Programmable Option

The PV Boost Controller has 3 independent ON/OFF periods available for programming, which will repeat daily. To program an ON/OFF time period:

- Briefly press the MENU button to display 'Boost Time 1.'
- To make changes, press the CHANGE button to adjust the flashing value. The first digit (hour) of the ON time will begin flashing.
- Press the CHANGE button to increase the value by 1. Continue pressing CHANGE until desired digit is reached.
- Use the Menu button to confirm the selection and proceed to set the next digit. If no further adjustments are needed, press the MENU button again to skip to the next digit.
- Continue setting the remaining digits until the desired ON/OFF times are set.
- Ensure that any digits in any unused programs are all set to zeros (00:00).

Repeat above steps for 'Programming Time 2 & 3' if required.

Note: The electricity is drawn directly from the grid during the programs and heat only HTR1.

PV Monitor

Connect the USB cable supplied to a suitable 5V USB supply. The PV Monitor should pair automatically with the PV Boost Controller. If not, press Display and Change simultaneously.

Specification			
Operating Voltage	230VAC 50Hz	Operating Radio Frequency	868 MHz
Control Type	1B. Pulse width modulation	Power consumption	1-3W
Maximum Permissible Loads	13A Resistive (max 3kW immersion)	IP Rating	IP20
Number of Load Connections	2 (alternating)	Cooling Fan	Thermostatically controlled
Operating temperature	0°C to +40°C	Cable Entry Points	Bottom & Rear of unit
Electrical and Safety Compliance	EN60730-2-7, EN301 489-3, EN301 489-1, EN300 220, EN60335-1, EN55014-1 EN55014-2	Interface & User Controls	Backlit LCD, Push buttons for programming, Wireless connection to Monitor, Warning Red LED, Blue Operating LED

User Instructions – PV Boost Controller

Normal Operation

During normal operation, the PV Boost Controller unit will display one of the following:

Heating By Solar 01.45kW HTR1	The PV Boost Controller is redirecting energy to the hot water tank. The amount of power being diverted is displayed, along with an indication of which immersion heater is being supplied. If two heaters are connected, the display will alternate between Heater 1 and Heater 2.
Water Tank HOT	This is displayed when the unit is trying to divert energy to the immersion heater, but the tank has reached its maximum temperature and has turned off.
Water Heating OFF	There is no excess energy available for the PV Boost Controller to divert to the hot water tank. Or if PV array is shut down, the display will change to "Water Heating OFF." To reinstate the PV array, switch on the Isolator.

Energy Savings

The energy savings display cycle enables the user to view the energy savings generated by the PV Boost Controller. Each press of the Display button will cycle through the following sequence:

Saved Today 04.55kWh	Energy diverted for the current day
Saved Yesterday 11.60kWh	Energy diverted on the previous day
Saved Last 7 Days 30.05kWh	Total energy diverted to the immersion heater in the past 7 days
Saved Last 28 Days 69.53kWh	Total energy diverted to the immersion heater in the past 28 days
Saved Amount 396.30kWh	Total value of energy diverted to the immersion heater since the PV Boost Controller was installed
Time & Date - 14:25 01/04/25	Current time (24hr format) and date

Boost Button (Manual Boost)

The Boost button activates power to the immersion heater(s) for the selected time period. *Please note that electricity will be drawn from the grid and it will only heat HTR1.*

1. Each press of the Boost button adds 15 minutes to the boost time, with a maximum of 2 hours. The monitor displays the remaining time.
2. To cancel the boost, press the Boost button repeatedly until "Enhance Boost OFF" is displayed.

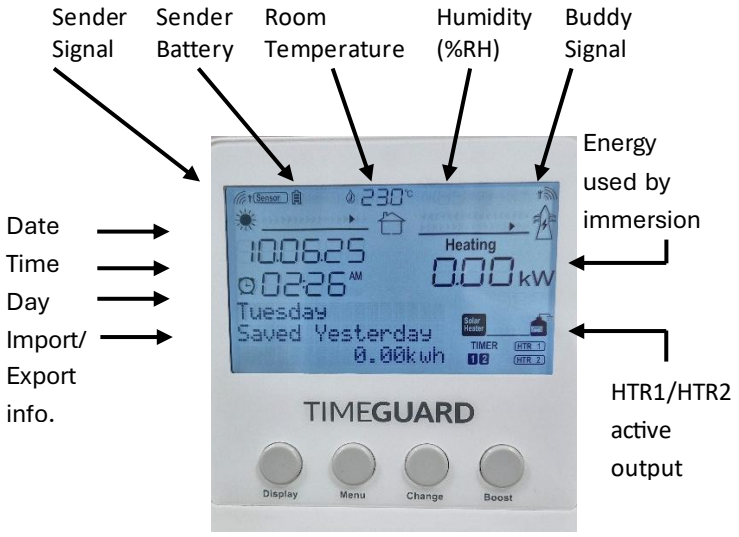
Troubleshooting

The PV Boost Controller's internal diagnostics will warn the user if any issues arise within the system. When a problem is detected, the red warning triangle on the front of the unit will illuminate. A message on the display will indicate the specific problem.

Sender Battery LOW	The batteries in the sender unit are low – replace them as soon as possible. **Do not use rechargeable batteries.**
Lost Signal to Sender	The PV Boost Controller is no longer receiving messages from the sender unit. Possible causes include: 1. The batteries may be exhausted & need to be replaced. 2. The PV Boost Controller may be positioned too far from or too close to the sender. 3. The sender unit's pairing button may have been pressed accidentally outside of the pairing process (refer to Pairing the Sender Unit).
Unit Cooling Check vents	This is normal operation. The PV Boost Controller unit will cool for a short period if it overheats. It will automatically recover once the internal temperature has decreased. Always ensure the unit is free of obstructions and that there is adequate airflow around it.
Maximum Power Exceeded HTR1	The PV Boost Controller will monitor for overload during both initialisation and normal operation. If an overload is detected on either heating circuit, the output will be disabled and "Maximum power exceeded" will appear on the PV Boost controller. Ensure that the load of the immersion heater and the supply voltage are within the specified limits. The Controller will reset itself automatically when the load and supply voltage are within the specified limits. The Controller can also be reset by pressing the Reset button (located next to the Supply Terminals), but the load and voltage have to be within limits.
Over Voltage	The supply voltage to the PV Boost Controller unit is above its operating range. The unit will automatically recover once the voltage drops back to within the normal operating range.

User Instructions – PV Monitor

PV Monitor Display
During normal operation the PV monitor display alternates between the Imported and Exported power information.



To power the PV monitor, connect the USB cable supplied with the unit to a suitable 5V USB power supply.

Display button
The energy savings display enables the user to view the energy savings generated by the PV Boost master. Each press of the Display button will cycle through the following sequence:

Saved Today 04.55kWh	Energy diverted for the current day
Saved Yesterday 11.60kWh	Energy diverted on the previous day
Saved Last 7 Days 30.05kWh	Total energy diverted to the immersion heater in the past 7 days
Saved Last 28 Days 69.53kWh	Total energy diverted to the immersion heater in the past 28 days
Saved Amount 396.30kWh	Total value of energy diverted to the immersion heater since the PV Boost Master was installed
Storage OFF SET (100W default)	Displays the storage OFF SET

Boost Button (Manual Boost)
The Boost button activates power to the immersion heater(s) for the selected time period remotely.

1. Each press of the Boost button increases the boost time by 15 minutes, up to a maximum of 2 hours. The monitor displays the remaining time.
2. To cancel the boost, press the Boost button repeatedly until "Enhance Boost OFF" is displayed.

Note: The electricity is drawn directly from the grid during the selected time period and heat only HTR1.

Set LED Brightness:
To adjust the brightness level of the PV Monitor display, press the Menu button 4 times from the default screen, the display will show 'LED Brightness' the default setting is 10%. This can be increased to 100% in 10% increments by pressing the Change Button.

Reset:
- Hardware reset: Use the button near the supply terminal on the PV controller.
- Software reset: Press and hold the display and boost simultaneously for 5 seconds to clear the energy data, clock, date.

Important:
In any hot water storage system, it is important to avoid water stagnation and ensure the water is regularly heated to a minimum temperature of 55-60°C to reduce potential risks of Bacteria. It is therefore recommended that the hot water tank be heated to 55-60°C at least once per week either using Boost/program facility or through other heating controls.

Maintenance Instructions

- There are no serviceable parts with this product.
- Clean the external surfaces with a dry cloth, do not use aggressive cleaning products or solvents which may damage the product.
- This product should be recycled in the correct manner when it reaches the end of its life. Check local authorities for where facilities exist.

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