Reclaim Heat-Pump Controller V1.1

www.reclaimenergy.com.au

OVERVIEW

This controller is designed to work only with the Reclaim CO2 domestic hot water heat pump. The key difference between V1 and V1.1 controller is the introduction of Option 6 which is a remote option control in V1.1. All functionalities between controllers are the same so for more information on how the controller works, please refer to the heat pump installation manual.

V1 controller	V1.1 Controller
Times at which temperature mode is enabled Option 1: 24/7 Option 2: 10 pm- 7 am Option 3: Midnight -6 am Option 4: 10 am- 4 pm Option 5: two cycles – first must set for a minimum of 6 hours and second can be set as little as 0 hours! One shot boost: this activates the heat pump if temperature is less than 59 and heating up until 59 at sensor level is achieved.	All options are same as V1 with additional of option 6 as below Option 6: One shot boost is activated by a dry contact signal from home management or PV inverters or dry contact smart switches This is called “Remote” option

The controller measures the tank temperature and compares that to set points that it has stored in memory. These set points can be dependant on time of day depending on the option set. Once the lower temperature is reached the controller signals the heat pump to start heating via the RJ45 cable. Once an upper temperature is attained the controller signal the heat pump to stop heating. The controller automatically manages Legionella safety, heating once a day if the Legionella safe temperature has not been attained during the day.

The 7 segment display defaults to time of day but can also show the measured temperature. 3 status LEDs show additional information as shown on page 5

The onboard Real Time Clock is maintained by a Super Capacitor on the main circuit board. This will keep the time running for 3 weeks with no power applied but itself should last for the lifetime of the controller.

The controller is prewired to be ‘plug n play’ and there is usually no need to remove the cover on installation. The enclosure is water resistant (to rain) and is UV resistant. The case is made of non-burning tough polycarbonate.

Before You Begin Installation

Case tools required	Philips1 screwdriver for lid screws (if required to remove cover) Pozi 2 screwdriver for mounting screws

READ THESE SAFETY PRECAUTIONS and LIMIT OF LIABILITY BEFORE YOU BEGIN

The following pages contain instructions for qualified personnel only. They involve potentially hazardous adjustments and high voltage mains wiring information.

General Safety Precautions	The installation to be checked at least annually for damage or malfunction. All servicing to be carried out by qualified personnel only. All aspects of the installation must comply with local electrical and plumbing regulations
Installation Precautions	Make sure the controller is installed out of direct sunlight, flammable liquids or radiant heat sources. Power leads must face directly down. Ensure controller is in a safe environment for users to inspect display panel. Sensor leads should be kept 300mm (12 inches) away from mains and comms cables if run parallel to those cables. A readily accessible power disconnect device is required
Warning	**These products are not designed for use in, and should not be used for, applications which are in conjunction with items that are critical to any person's health (e.g. life support systems). In any critical installation, independent fail-safe back-up systems must always be implemented**

CAUTION:
Dangerous Voltages may be present. No user serviceable parts. Protective enclosure must only be opened by qualified personnel.

Remove ALL power sources before removing protective cover. The Reclaim Controller must be installed by a qualified person.

Ensure suitable over-current protection and RCD protection for the Reclaim Controller is in place.

INSTALLING THE RECLAIM CONTROLLER

Mounting

Follow these steps:

1. Allow for the enclosure dropping 5mm (1/5 inch) from screw centres once mounted (keyhole mounting).
2. Place the printed drill guide template (that ships with the controller) against the wall, checking for level alignment. All four mounting holes should be used with at least two firmly secured into wood or masonry.
3. Mark and drill/screw as appropriate leaving the heads of the screws above the surface by approximately 3mm (1/8 inch).
4. Place the unit over the four screw heads. The unit should slide down 5mm into the 'key' slots and become secured to the wall. You might need to adjust the screw height to obtain a secure fit.

Sensor Mounting

WARNING: It is critical the sensor is mounted correctly for accurate readings, safe and efficient operation of the system, durability of the sensors

The sensor should be fitted into a dry metal immersion 'pocket' in the hot water cylinder. Apply plenty of heat transfer compound (available from your distributor) between the sensor and the lining of the 'pocket' then seal against water ingress where the cable exists the cylinder with neutral cure silicon.

Connect to Heat Pump

Plug RJ45 cable into the heat pump

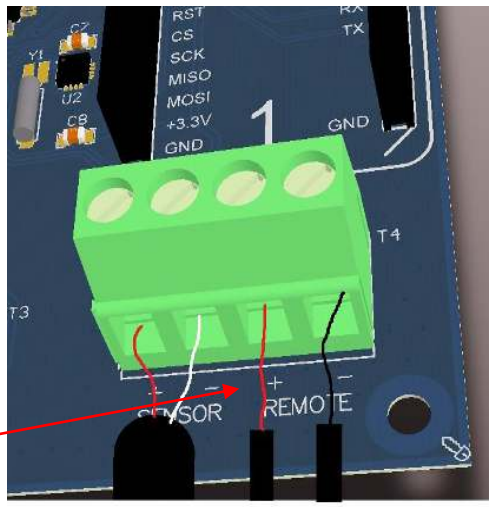
Connect PV Remote wires (only if applicable)

A 'clean set of contacts' (passive only) is expected for this input. If not, then the controller could be damaged

The remote input is accessible by removing the cover. Ensure mains power is isolated during this work

Loosen the cable gland and thread the cable next to the sensor cable.

Wire in as indicated

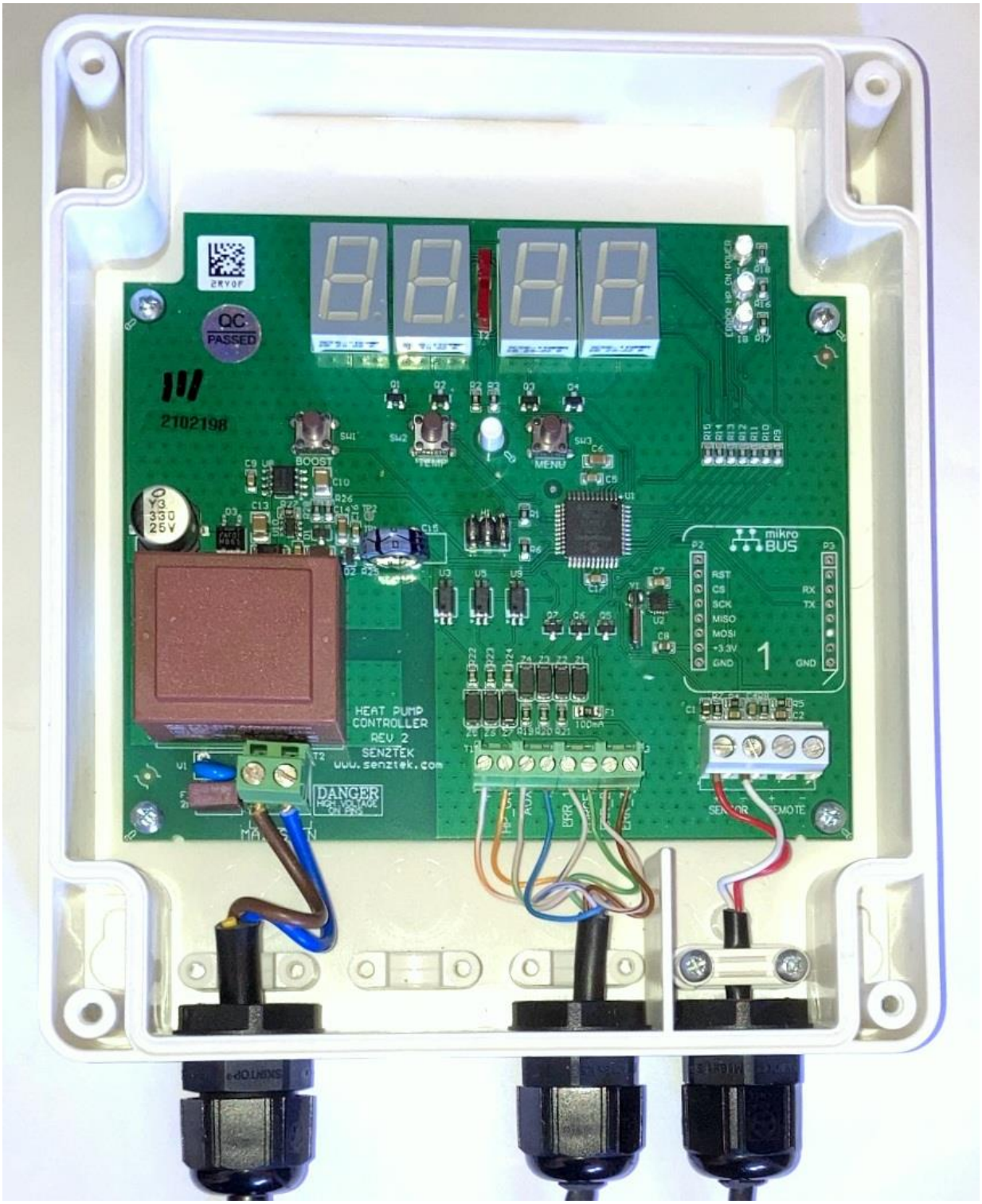


Plug in the controller to the power source

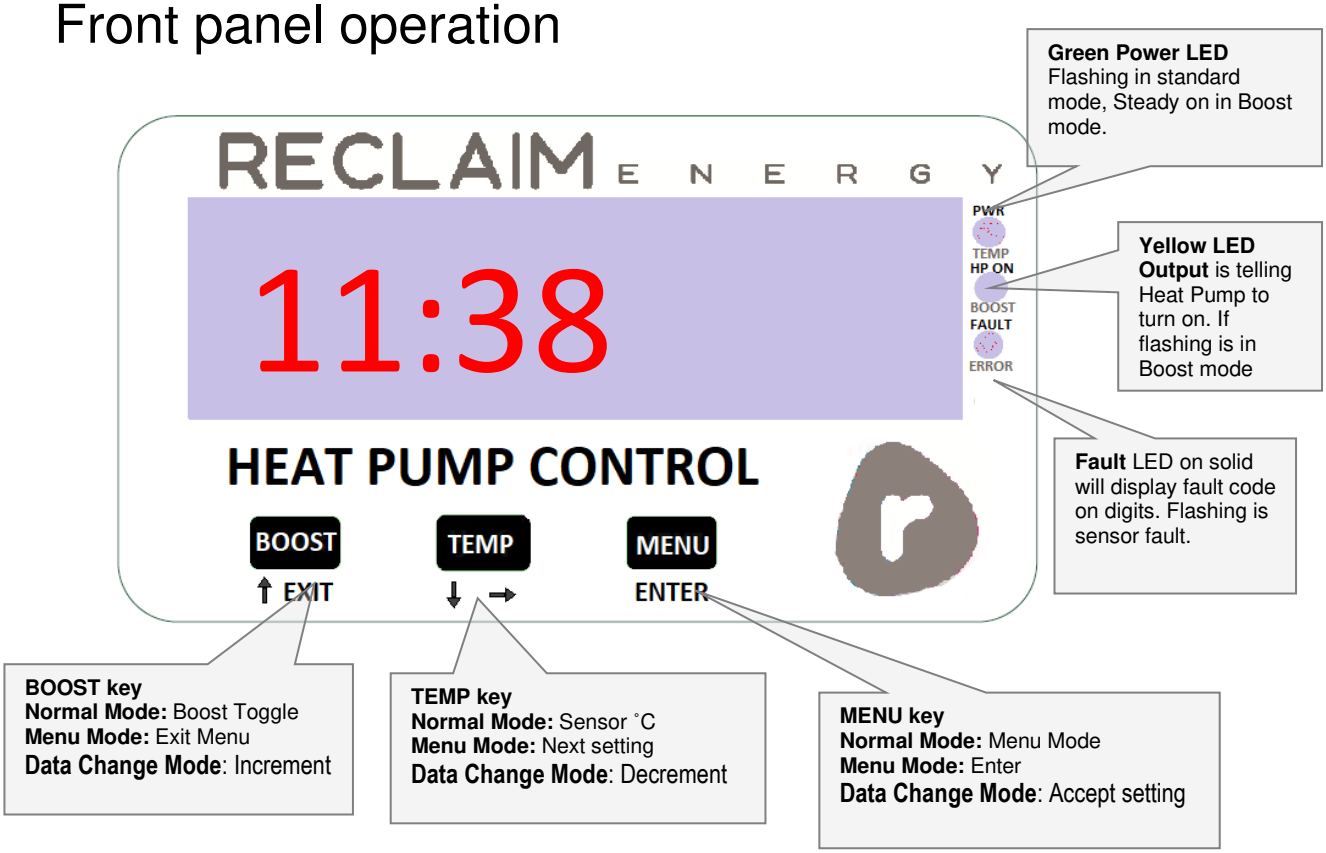
Before power up read all safety instructions, warnings and liability statements

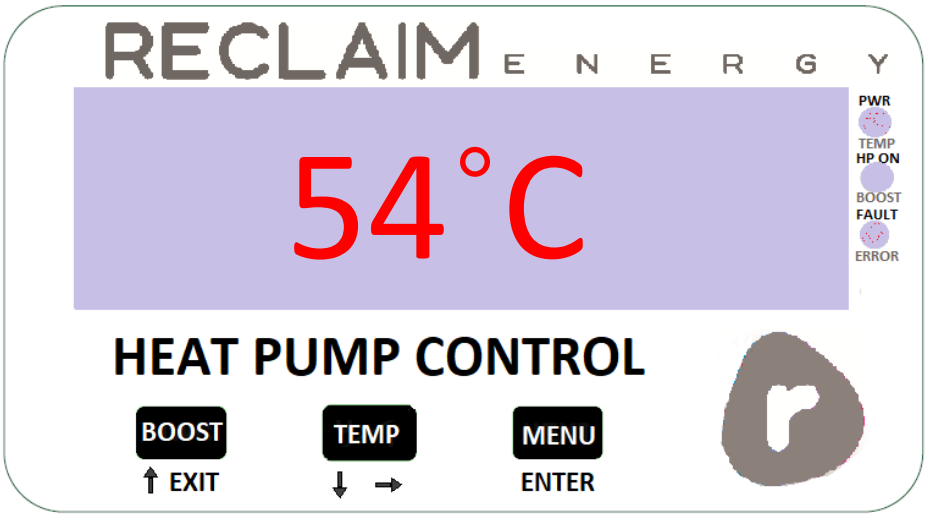
Controller will run through start up checks including lighting all LEDs. Then first display will be the time of day the controller thinks it is. Page 7 has details on how to adjust the time.

Reclaim controller with the cover removed.



Front panel operation





Modes of operation

Time control Mode:

Temperature control mode can be enabled and disabled during certain periods within the 24 hour period, as set in the options page.
On entering the start time of an option, there will be a boost cycle initiated, then once at target temperature, will continue to reheat when the tank temperature falls below 'Ton'.
The user can select between permanent enable, four preset time periods, a remote input option or two user selectable fully adjustable time periods.
When the Time Control Mode is active the Power ON LED flashes.

Temperature Control Mode:

On first start, the heat pump is turned on if the temperature is less than 59˚C (default).
On subsequent starts the heat pump is turned on when the temperature in the tank drops to the T-on setting (37˚C -default) and turns off when the temperature reaches the T-off setting (59˚C - default). Both switch points have a fixed time delay of 3 seconds.
This mode is disabled if a faulty temperature sensor is detected (Eg-8 and Eg-9), although the boost mode is still operational.

There is an additional inbuilt time delay for the T-OFF temperature, called T-OFF Maintain time. The default is 0 minutes, but if set to 1 minute, then the T-OFF temperature must stay at the T-OFF value or greater for one minute (plus the 3 seconds), before the heat pump is turned off.

Option1:

Temperature only control mode.

Option2:

Temperature control starting at 22:00 and remain enabled for 9 hours.

Option3:

Temperature control starting at 00:00 (midnight) and remain enabled for 6 hours.

Option4:

Temperature control starting at 10:00 and remain enabled for 6 hours.

Option5:

User Settable for two operational windows. The first must be at least 6 hours and the second can be set for 0 hours or more.

Option6:

Temperature control starting on contact closure on REMOTE input and remain enabled for duration of contact closure. Once contact is open, heating cycle will finish.

Boost Mode:

The Boost mode can also be turned on and off via a momentary press of the boost button. When activated, temperature control mode is enabled, as above, allowing the heat pump to turn on. The heat pump will remain on until the temperature reaches 59˚C (plus 3 seconds), or the 6 hour period has elapsed, whichever occurs first. The On Call LED will start flashing, indicating the heat pump has been turned on via Boost Mode. If inadvertently pressed, boost mode can be turned off by pressing the Boost button again.

Note that if a faulty temperature sensor is detected (eg-8 or eg-9), the Boost function will still operate, and turn the heat pump on for 6 hours.

Heat Pump Faults:

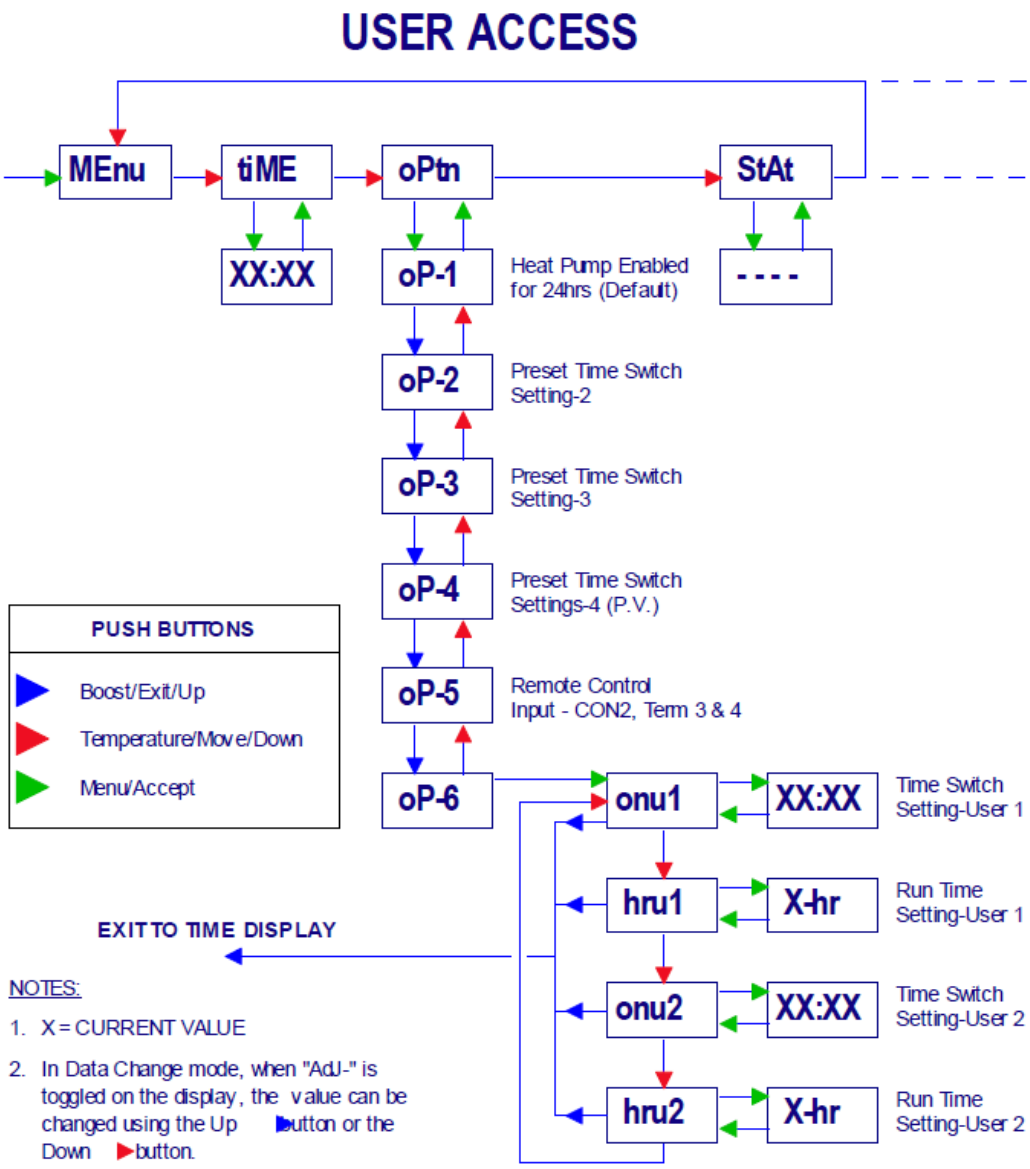
Should the heat pump unit go into fault, it will generate a fault code which this module will display.
The Fault LED will turn on, and one of the following error codes will be displayed.
Eg-1 Heat Pump Sensor error (not the controller sensor)
Eg-2 Compressor error or Refrigerant shortage
Eg-3 PCB error – heat pump PCB faulty
Eg-4 Circulation failure
Eg-5 Pump error
Eg-6 Fan Motor error
Eg-7 Discharge temperature error
Refer to heat pump manual for further information on the above.
Eg-8 Tank Temperature sensor not detected (open circuit)
Eg-9 Tank Temperature sensor fault (short circuit)
Note: Temperature control mode is disabled for Eg-8 and Eg-9 faults, however boost mode is still operational.

Heat Pump Purge Mode:

On occasion the heat pump needs to be purged of air in the system.
To activate Purge Mode, perform the following steps:-
1. Ensure the module is in the Normal Display mode, displaying either Time of day, or Temperature.
2. Press and hold down the Menu button, for approximately 5 seconds.
3. The Display will commence flashing Purg
4. The heat Pump output will be disabled.
5. The Purge output will be enabled.
6. Purge mode will remain active for 5 minutes.
7. All menu and display modes are disabled during Purge Mode.
8. After 5 minutes has elapsed, the purge output will turn off.
9. All control functionality will resume.

Note: Purge mode can be turned off at any time, by again pressing and holding the menu button for 5 seconds.

Purge mode is automatically turned off if the module is currently displaying a heat pump error code.



Example:

Setting the time

Note: There is a 12 second no button press timeout.

1. Press MENU ENTER button, MEMu appears on display
2. Press TEMP ↓ → button, t1me appears on display
3. Press MENU ENTER button, the time and ADJ alternatively flash on the display
4. Press BOOST ↑ EXIT to **increase** the time or TEMP ↓ → to **decrease** time
5. When finished press MENU ENTER t1me appears on display
6. Wait 12 seconds for menu timeout. New time will appear.

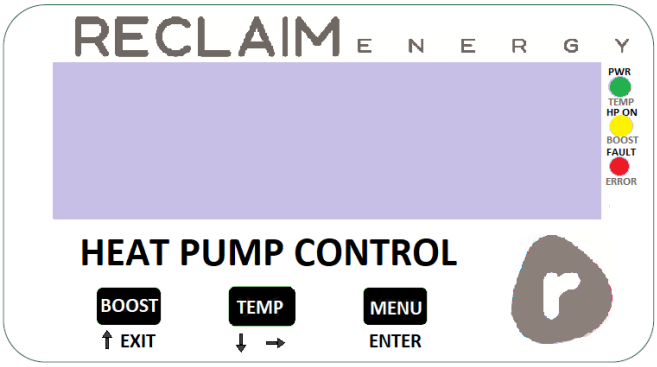
Example:

Changing an option – mode of operation

Note: There is a 12 second no button press timeout.

7. Press MENU ENTER button, MEMu appears on display
8. Press TEMP button, t1me appears on display
9. Press TEMP button, optn appears on display
10. Press MENU ENTER button, the option and ADJ alternatively flash on the display
11. Press BOOST EXIT to **increase** the option number or TEMP to **decrease** the option
12. When finished press MENU ENTER optn appears on display
13. Wait 12 seconds for menu timeout. New time will appear.

Status of operation LED and Button function summary



Controller Status LEDs		
LED	**LED ON Solid**	**LED ON Flashing**
🟢	Power On	Temperature mode
🟡	Heat command	Boost Mode
🔴	Fault on Heat Pump	Temperature Sensor fault

E.g during Options 2 – 6; When the heating is disabled due to the time period, the Green LED will be solid, when temperature mode is enabled due to the time, the Green LED will flash.

Button Functions			
Button	**Normal Mode**	**Menu Mode**	**Settings Change Mode**
BOOST EXIT	Boost On/Off	Menu Exit	Increment / Up
TEMP	Temperature Display	Next Value	Decrement / Down
MENU ENTER	Menu Mode	Enter	Accept