Kensa Heat Pumps
A KENSA GROUP COMPANY

Genesis Commissioning and User Manual

Kensa Heat Pumps
A KENSA GROUP COMPANY

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1. Introduction—a message from the CEO

Kensa Heat Pumps has been manufacturing Ground Source Heat Pumps since 1999. Our mission is to enable mass decarbonisation of heat using our award-winning heat pumps.

A key part of the Kensa heat pump's design is simplifying the installation process to allow any competent plumber to perform the work rather than needing specialist skills. The purpose of this manual is to guide you through the installation process, and we've worked to ensure all the required information has been provided to allow you to connect the heat pump.

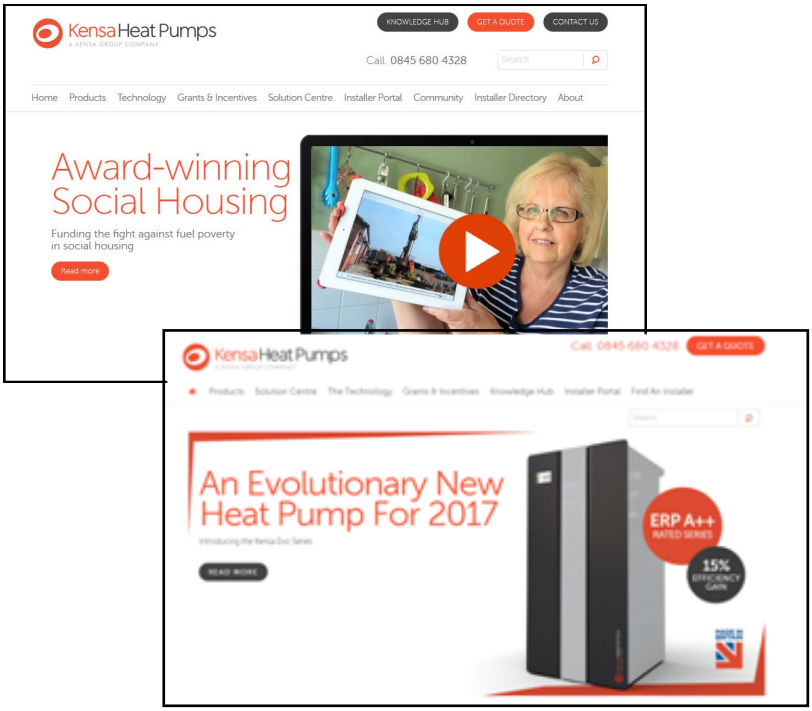
Critical instructions to ensure you do not experience any difficulties are highlighted in the 'Golden Rules' in the installation section.

Please speak to the Technical Support Team on 0345 222 4328 to receive our free-of-charge 'online commissioning' service. Opening hours are 8.00 am to 5.00 pm.

Finally, we'd love to hear from you if you have any questions, wish to consider ground source heat pumps for any future projects, or even just to share your experiences of using ground source heat

Tamsin Lishman

CEO
Kensa Group Ltd



For further information on ground source heat pumps and their application, please refer to www.kensaheatpumps.com

2. Safety information

Safe operation of this unit can only be guaranteed if it is properly installed and commissioned in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

Manufacturer:-
Kensa Heat Pumps
Mount Wellington
Chacewater
Truro
Cornwall
TR4 8RJ
Tel 01872 862140
www.kensaheatpumps.com

The product is designed and constructed to withstand the forces encountered during normal use. Use of the product for any other purpose, or failure to install the product in accordance with these Installation and Operation Instructions, could cause damage to the product, will invalidate the warranty, and may cause injury or fatality to personnel.

2.1 Disposal/Decommissioning

Kensa offer a life time decommissioning service for this product. This is available on a return to base basis (carriage at users cost).
Disposal of any antifreeze water mix should follow the disposal instructions as laid out on the COSH Safety Data Sheet in the Installation Manual.

This symbol on the product indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the company where this product was purchased.

2.2 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Kensa Heat Pumps they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

3. General Product Information

This manual explains how to install, commission and operate a Kensa ground source heat pump.

3.1 Kensa Heat Pumps

Kensa Heat Pumps is the leading UK manufacturer of a full range of ground source heat pumps. Kensa provides exceptional levels of expertise and advice on the use, design and application of heat pumps. Kensa have been active in the heat pump market since 1999 and remains a well-respected company, not only in the industry but also with all our customers and stakeholders.

Since 1999 the company has manufactured and installed over four thousand heat pumps of various types throughout Europe and manufacture ranges suitable for the domestic market and specifically designed for commercial applications.

Kensa are ISO9001 approved for the design and manufacture of heat pumps and hold an unique status as being accredited by Microgeneration Certification Scheme for both the manufacture and installation of ground source heat pumps. Kensa were also a founding member of the Ground Source Heat Pump Association and play a major role in helping to raise the profile of heat pumps and formulate Industry Standards.

Kensa's aim has always been to take the mystery and complexity out of heat pumps, designing systems that can be easily installed without any specialist training, making the product available to a larger market and helping to reduce CO2 emissions while reducing client's energy bills.

3.2 Product description

Heat pumps basically extract solar energy stored in the ground, water courses and in the air and convert this to a higher temperature to use in a building's heating distribution system. They work in a similar manner to a fridge in reverse, where the inside of the fridge is the heat source and the grill at the back of the fridge is the heating system.

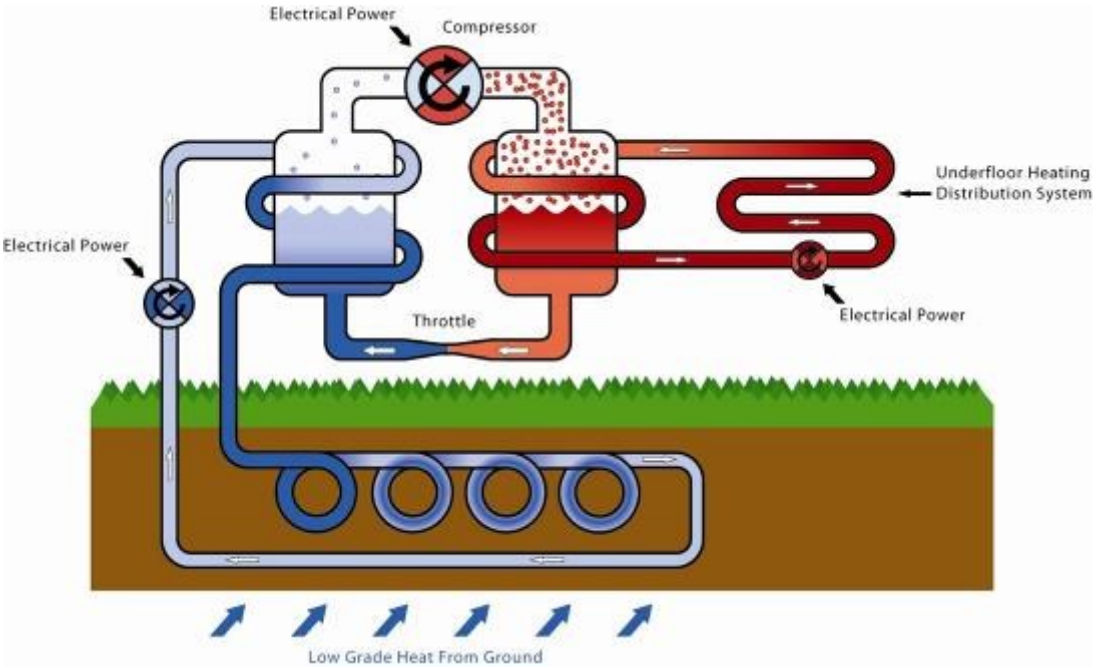


Fig 1. Heat pump Schematic

A ground source heat pump (GSHP) extracts heat from the ground by circulating a cold solution of water and antifreeze (brine) around pipes horizontally buried in the ground, or boreholes. The horiontal pipes are buried below 1m in depth and the boreholes around 200m. The temperature of the ground remains pretty constant (8 to 10^{o}C), and heat is absorbed from the ground into the fluid (approximately 5^{o}C). This brine is then passed through one side of a heat exchanger (called the evaporator) and a refrigerant through the other. The refrigerant has a very low boiling point and by absorbing the energy in the brine this causes the refrigerant to evaporate.

The refrigerant gas is then passed through a compressor where its pressure is increased which in turn increases its temperature. This high pressure hot gas then flows around a second heat exchanger (called a condenser) with the heating distribution fluid passing through the other side of the heat exchanger. Energy is then transferred from the refrigerant into the heating distribution system; this in turn causes the refrigerant to condense.

This high pressure cold refrigerant is then passed through an expansion valve (or throttle) and the pressure is reduced. The whole cycle is then repeated.

GSHPs are an extremely energy efficient technology, with every unit of electricity used (to drive the pumps and compressor) producing between 3 and 4 units of heat.

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4. Operational Instructions

Always ensure that individuals using the appliance have read and fully understood the Operation instructions of the heat pump.

Do not operate the appliance with the cover removed.
Do not operate the appliance in anything other than dry conditions.
Do not exert any strain on electrical or pipe connections to the appliance.
Do not put any foreign object into the appliance.
Do not spill water or any other substance onto the appliance.

4.1 Controller

The heat pump controller fitted to the heat pump has been especially designed for the application. It uses clear and concise language to indicate faults and uses a logical and intuitive menu structure providing trouble free commissioning. For the Evo heat pump the controller and heat pump settings are accessed via the display on the Evo, for the shoebox it is via an application for android or IOS devices downloadable using the QR code below.

Shoebox installation manual

Shoebox Operational manual

Kensa Heat Pump App

Evo installation manual

Evo operational manual

Shoebox NX operational manual

Shoebox NX instruction manual

4.2 Location of Shoebox AP button.

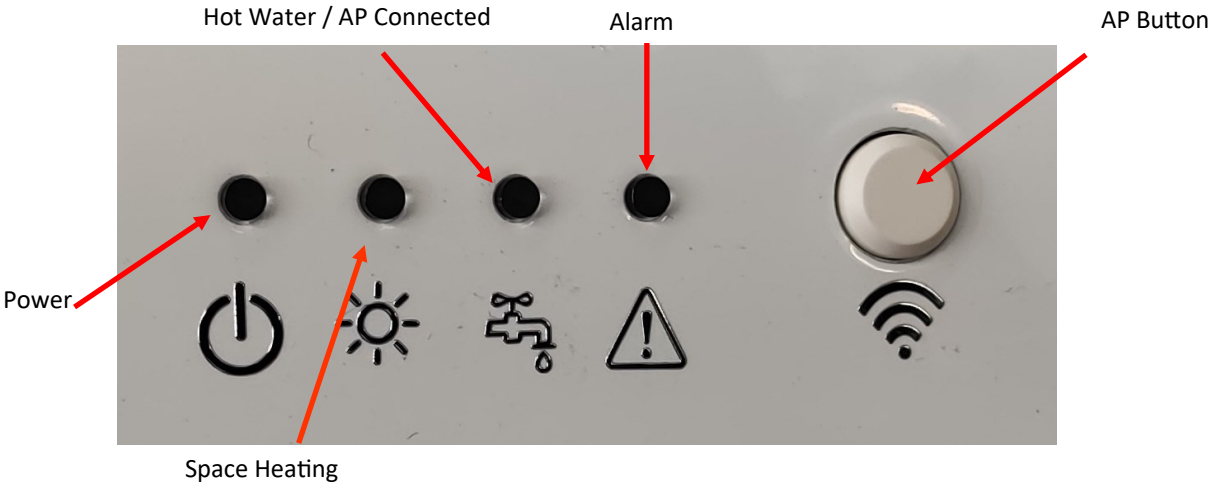

Fig 2 Location of the Shoebox AP button.

Setting the shoebox communication link up.

I. Download the app to your chosen android or IOS device and open it.
II. Press the AP button (Access point) button on the front of the shoebox.
III. The hot water LED on the front of the shoebox should flash blue confirming that the shoebox is in AP mode.
IV. On the app, select the network name [kensa…] of the heat pump you wish to connect to.
V. If the desired network is not showing, press the AP button on the front of the heat pump again.

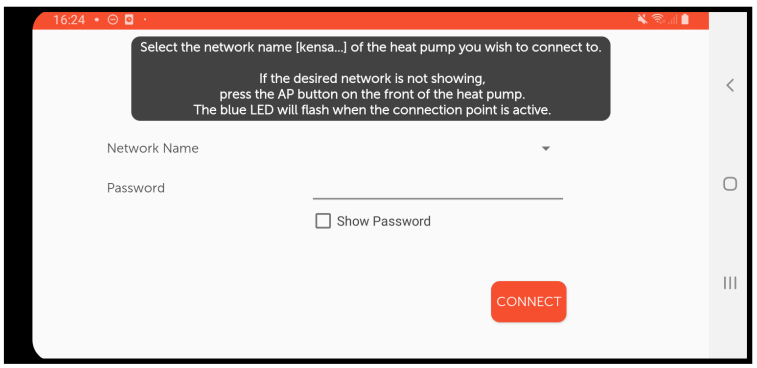

Fig 3 AP connection screen on the android or IOS device

4.3 On Start up

On initial start up the following screen is displayed.

Fig 5 Start up screen

If there is no activity the screen will automatically dim after 10 minutes. This is settable within the controller.

The following screens are based on the Evo heat pump and will be similar for the shoebox app. Where there are major differences this will be indicated.

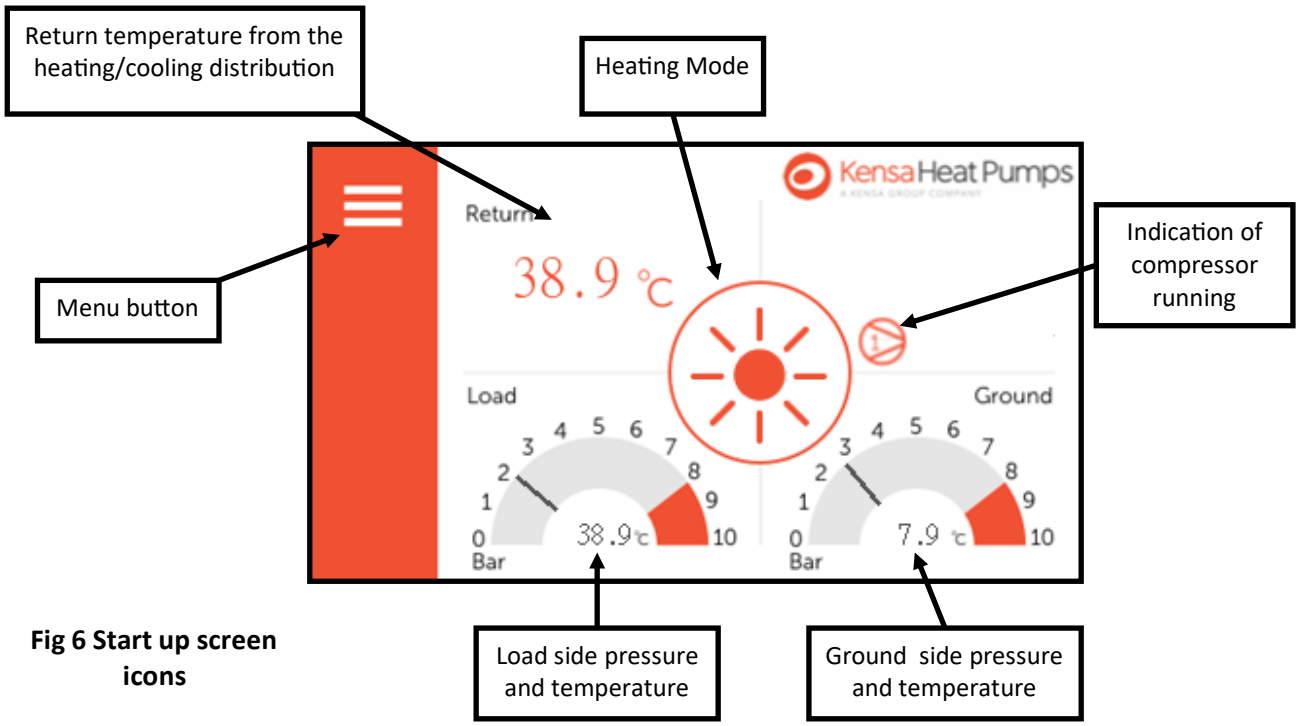

Fig 6 Start up screen icons

4.4 Guide to Home Screen icons

Menu Button—This provides access to the lower menus

Compressor Icon—This is lit when the compressor is running. If the icon is flashing, it indicates there is a call on the compressor, however the compressor has not had the required minimum stop period (6 minutes) since it was last operational.

Unit is in heating mode

Unit is in heating mode operating the second temperature set point.

Unit is in domestic hot water heating mode

Unit is in cooling mode

Unit is in passive cooling mode

Weather compensation is enabled

A warning has occurred. Pressing this icon will display the type of warning, possible reason and solution.

A fault has occurred. Pressing this icon will display the type of fault, possible reason and solution.

4.5 Main Menu

Pressing the menu button on the home screen provides access to the main menu.

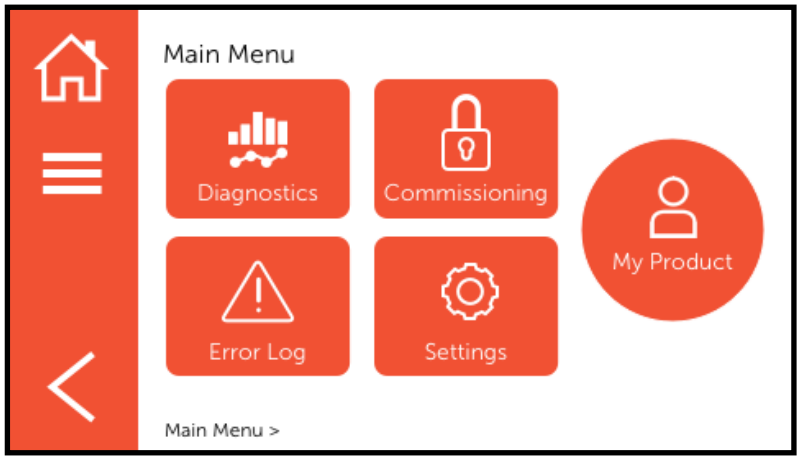

Fig 7 Main menu

4.5.1 Main Menu Icons

Home Icon—This will return the user to the home screen.

Back Button– Returns the user back to the previous screen.

Diagnostics—Enters the diagnostics menu displaying various readings such as temperatures and pressures to aid fault finding.

Commissioning— Enters the commissioning menu.

Error Log—Logs every warning and fault that occurs and logs when they are cleared.

Settings— Enters the settings menu where the date, time, display and sound can be changed.

My Product—Contains details of product such as serial number, capacity, etc.

4.6 Diagnostics Menu

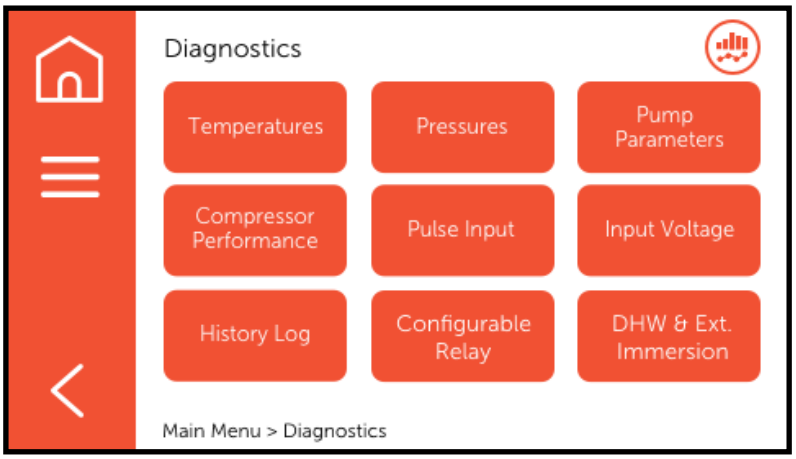

Fig 8 Diagnostics Menu

4.6.1 Diagnostics—Temperatures

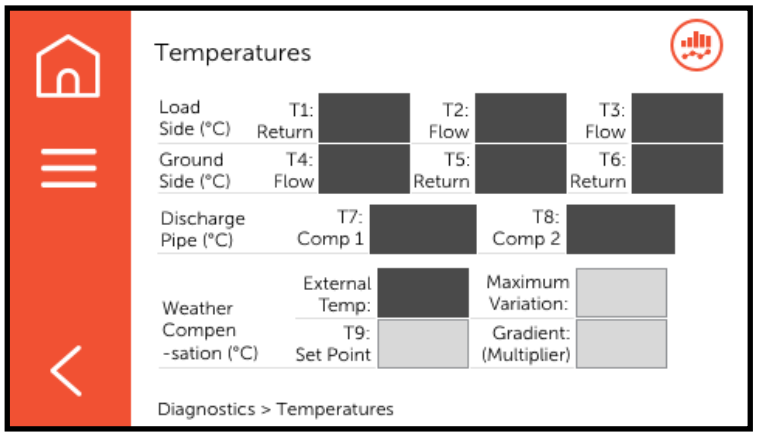

Fig 9 Diagnostics—Temperature Menu

The temperature screen shows the current temperature measured within the system.

Load side

- T1—Temperature of the heating/cooling distribution fluid returning to the heat pump.
- T2—Temperature of the heating/cooling distribution fluid leaving the heat pump.

Ground side

- T4—Temperature of the thermal transfer fluid returning to the heat pump from the ground.
- T5—Temperature of the thermal transfer fluid leaving the heat pump to the ground.

Discharge Pipe

- T7—Temperature of the refrigerant in the discharge pipe of the compressor.

Weather Compensation

- T9—Weather compensation set point, i.e. the external temperature at which the weather compensation starts to operate.
- Multiplier—This is the multiplier of the number of degrees that the water set point rises for each degree change sensed in the outdoor temperature. Ideally this should be a value between 1.0 and

1.5 which would suit most properties.

- Maximum Variation—This is the maximum amount of positive deviation that is allowed by the weather compensation.

4.6.2 Diagnostics—Pressures

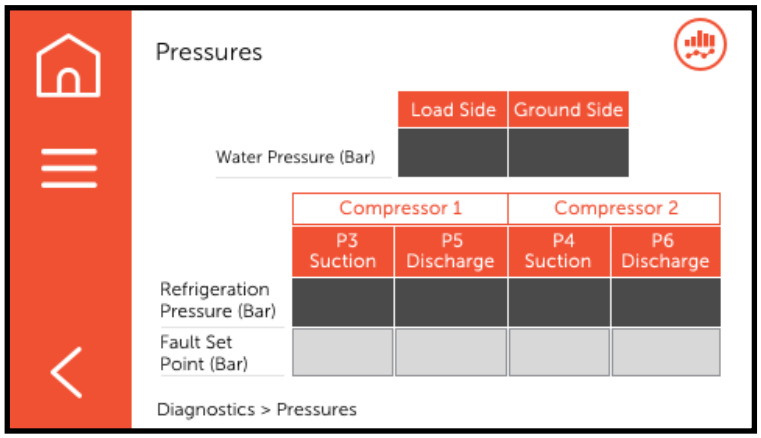

Fig 10 Diagnostics—Pressure Menu

The pressure screen shows the current pressures measured within the system.

- Load Current Pressure—pressure in the heating system.
- Ground Current Pressure—pressure within the ground arrays.

- Suction LP P3—Current pressure measured within the suction pipe of the single compressor model. The fault set point is shown below.
- Discharge HP P5—Current pressure measured within the discharge pipe of the single compressor model. The fault set point is shown below.

4.6.3 Diagnostics—Pumps Parameters

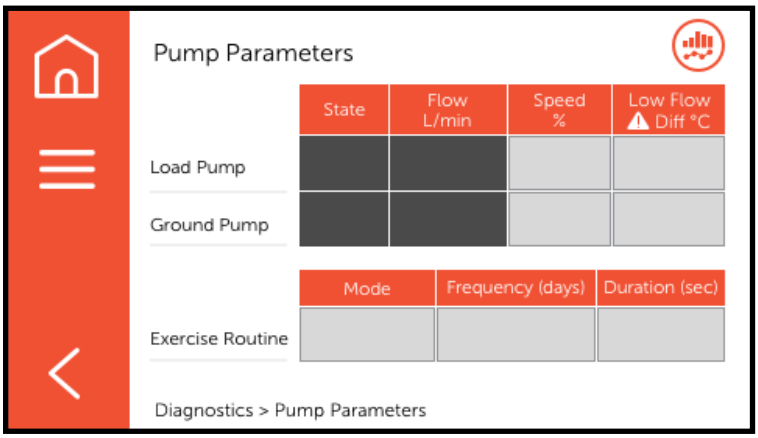

Fig 11 Diagnostics—Pump Parameters Menu

The pumps parameter screen shows the current information of the water pumps within the heat pump.

- State—Indicates whether the pump is running or not.
- % - Real time feedback from the pump indicating power consumption of the pump and its electrical performance
- Exercise Mode— Whether the pump exercise mode is enabled. This mode spins the pumps at a defined frequency and is used to avoid the water pumps 'sticking' in times of non-operation.
- Exercise Frequency—The frequency of the exercise mode in days.

4.6.4 Diagnostics—Compressor Performance

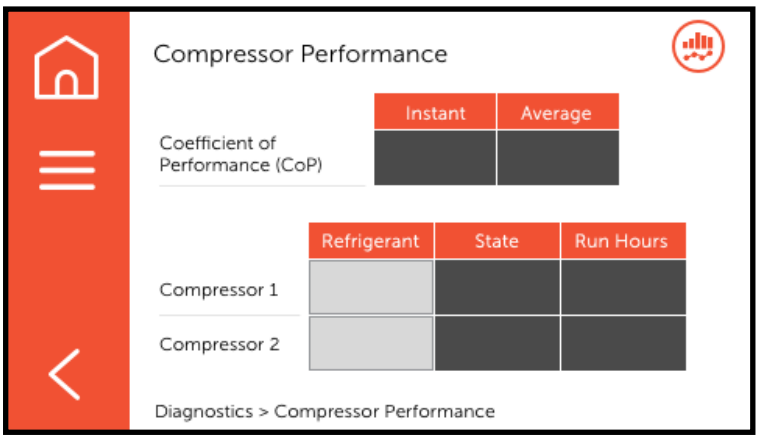

Fig 12 Diagnostics—Compressor Performance Menu

The Compressor Performance screen provides information on how the compressor is operating.

- Coefficient of Performance—This provides an indication of the COP of the compressor only. It is not the system or heat pump COP, SCoP or SPF, but should provide a good indication into how the compressor is performing. For an accurate COP, electrical meters and heat meters need to be fitted to the heat pump.

Both the instant and average value are shown.

- Refrigerant— Type of refrigerant used in the compressor. State— Indicates whether the compressor is running or not.
- Run hours—The number of hours the compressor has run. This is not resettable.

4.6.5 Diagnostics—Pulse Input

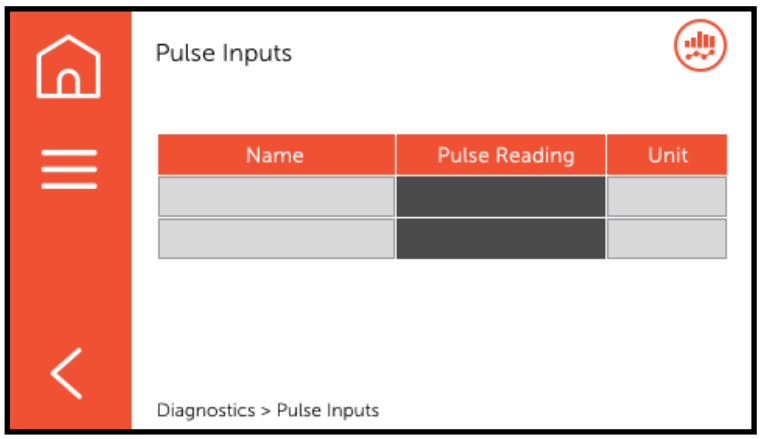

Fig 13 Diagnostics—Pulse Input Menu

The Pulse Input screen displays the number of pulses detected of any device connected to the heat pump. Devices such as electricity meters, heat meters, etc. The display only shows the number of pulses detected, for example if a single pulse was an indication of 100 units, it would only register 1 pulse and to get the true reading the number of pulses needs to be multiplied by 100 (or whatever the single pulse is meant to represent).

4.6.6 Diagnostics—Input Voltage

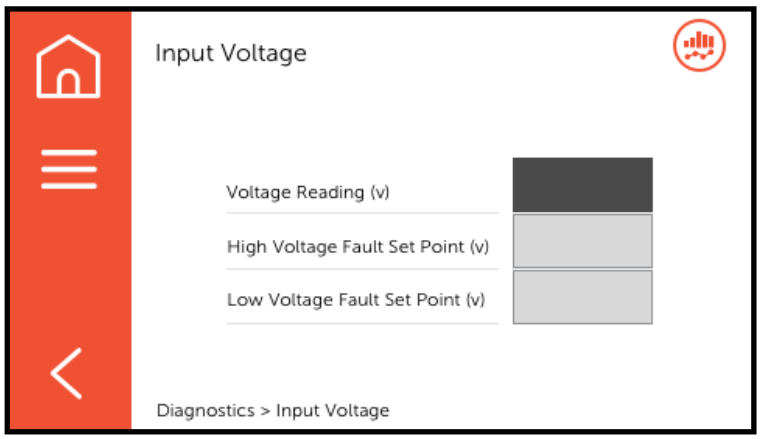

Fig 14 Diagnostics—Input Voltage Menu

This screen indicates the measured voltage connected to the heat pump. It is an indication of the approximate voltage with a tolerance of +/- 10%. It also indicates the voltage at which a fault is indicated and registered.

4.6.7 Diagnostics—History Log

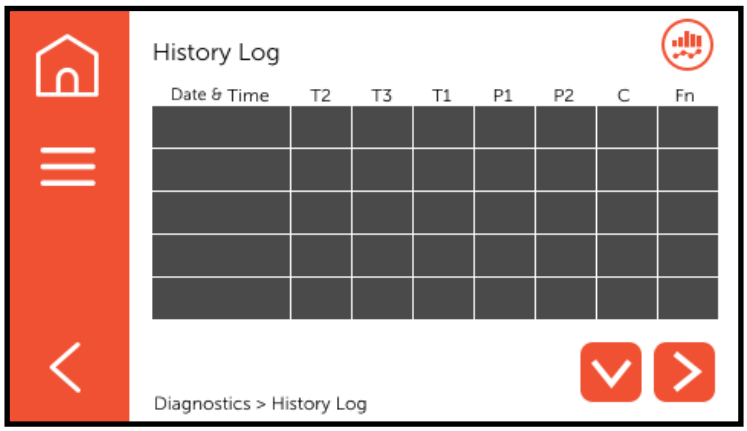

Fig 15 Diagnostics—History Log Menu

The history log records various readings from the heat pump every 15 minutes. It stores data over the last 37hours and is a useful tool to help with intermittent fault finding. The unit itself holds data further back which can be accessed only by a Kensa Engineer.

The readings recorded are:-

- T2—Temperature of the heating/cooling distribution fluid leaving the heat pump.
- T1—Temperature of the heating/cooling distribution fluid returning to the heat pump.
- P1—Pressure of the heating/cooling distribution fluid circuit.
- P2—Pressure of the ground loop circuit.
- C— Compressor
- Fn—Heat pump function, ie. Secondary heating, DHW, etc

Using the arrows further information can be interrogated or early periods of time.

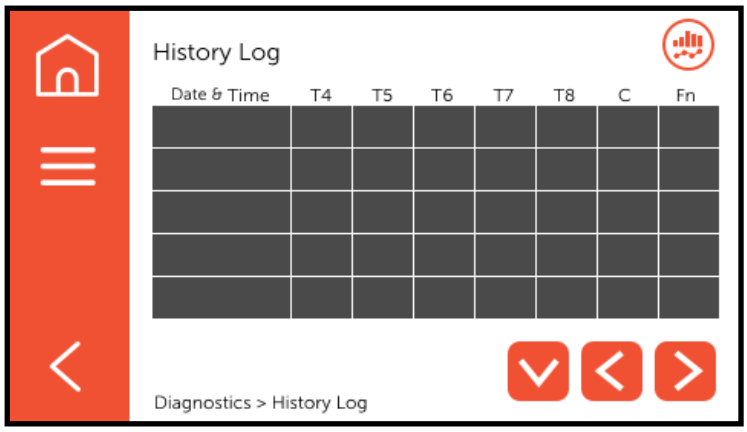

Fig 16 Diagnostics—History Log Menu 2nd page

- T4—Temperature of the thermal transfer fluid returning to the heat pump from the ground.
- T5—Temperature of the thermal transfer fluid leaving the heat pump to the ground.

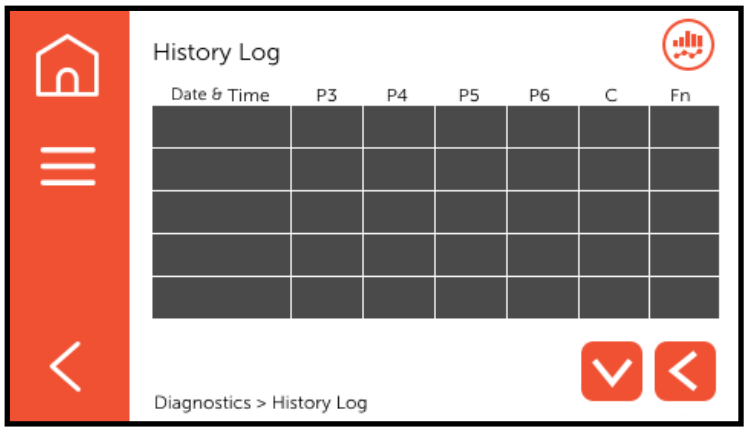

Fig 17 Diagnostics—History Log Menu 3rd page

- P3—Current pressure measured within the suction pipe of the single compressor model.
- P5—Current pressure measured within the discharge pipe of the single compressor model.

4.6.8 Diagnostics—DHW and External Immersion

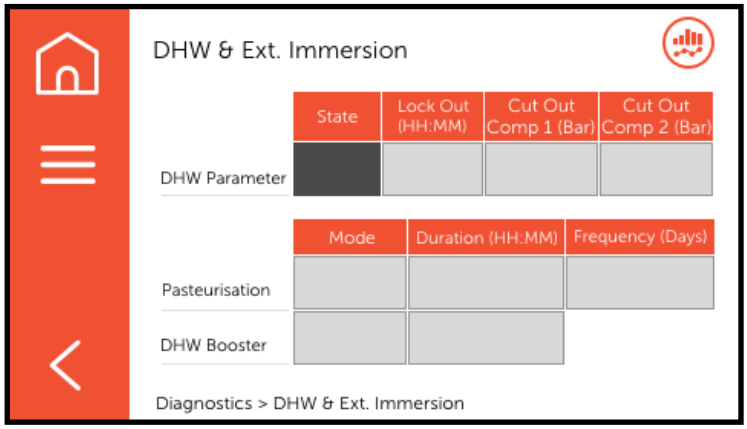

Fig 18 Diagnostics—DHW and external immersion menu

DHW

- State— Whether the DHW cycle is currently running..
- Lock Out (HH,MM) - Amount of time before a second DHW cycle is allowed to restart following a completed DHW cycle.

- Cut Out (bar) - Comp 1—The pressure at which the pressure transducer switch terminates the DHW cycle on a single compressor model .

Ext. Immersion

- Mode—This indicates whether a pasteurisation cycle is enabled on the controller or not. During a pasteurisation a call signal is sent to an external relay to operate the immersion heater on a separate supply voltage.
- Duration (HH,MM) - Duration of the pasteurisation cycle.
- Frequency (Days) - How often the controller calls for a pasteurisation cycle.

4.6.9 Diagnostics—Configurable Relay

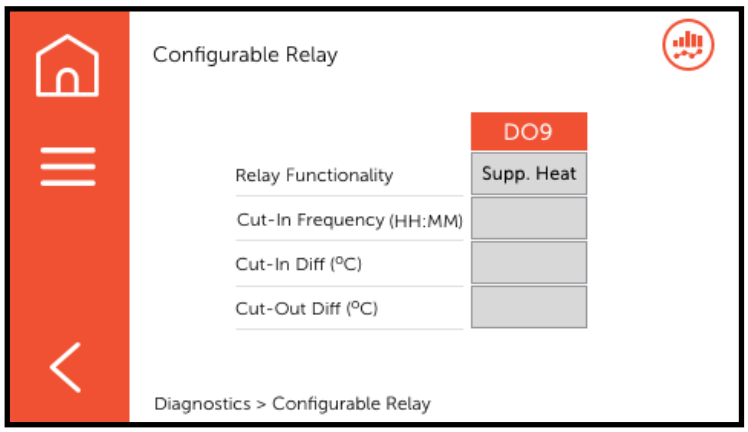

Fig 19 Diagnostics—Configurable Relay Menu (Supplementary Heating)

Supplementary heat provides a signal to a secondary heat source when the heat pump detects it cannot maintain or reach target temperatures. It does not monitor the external ambient temperature, but monitors the heat pump return temperature from the heating system. If it detects that the return temperature is not increasing above a settable differential for a settable period of time it activates a relay to activate a supplementary heat source on a separate supply voltage. The call for supplementary heating will cancel once the return temperature increases to within the settable cut out differential.

- Relay—Whether the supplementary heat function is enabled or disabled.
- Time Delay (HH:MM) - The period of time in hours that the return temperature stays below the set point temperature minus the cut in differential. i.e. If the cut in differential is 10°C and the set point is 45°C, the amount of continuous compressor run time while the return temperature is below 35°C before the supplementary heat is called for.
- Cut-In Diff (°C) - The set difference between the return temperature from the heating distribution system and the point where the period of continuous compressor operation (Time Delay) is measured.
- Cut-Out Diff (°C) - The set difference between the return temperature from the heating distribution system and the point at where the supplementary heat call is cancelled.

Open Loop

The configurable relay can also be set for an Open Loop system. In this mode the relay will close simultaneously with the ground pump's relay.

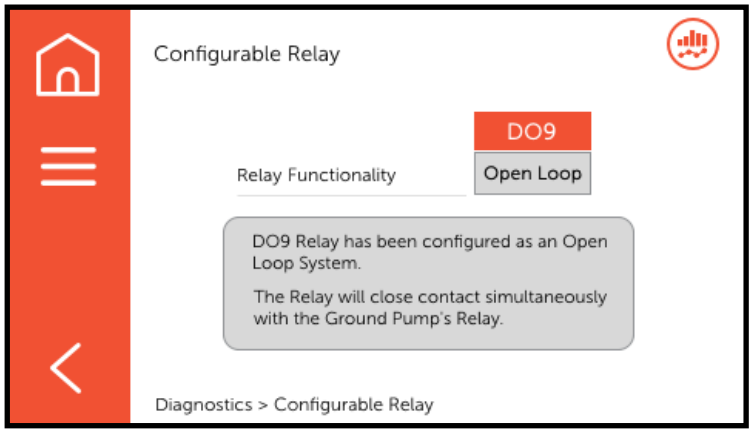

Fig 20 Diagnostics—Configurable Relay Menu (Open Loop)

4.7 Commissioning Menu

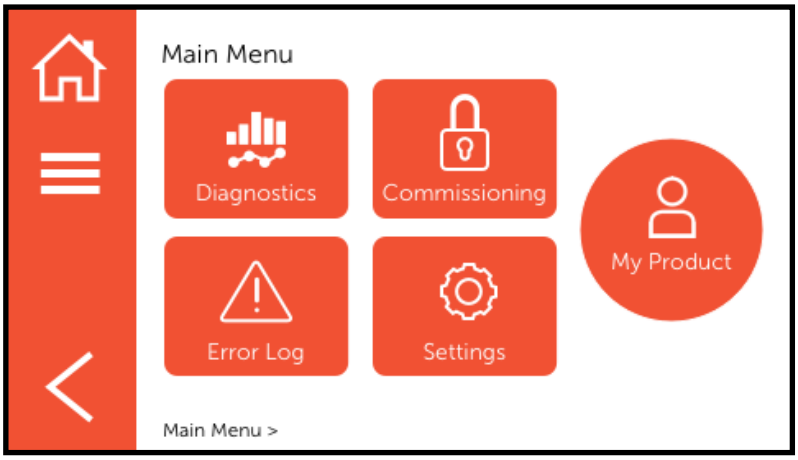

Fig 21 Main Menu screen

From the main menu, press commissioning:-

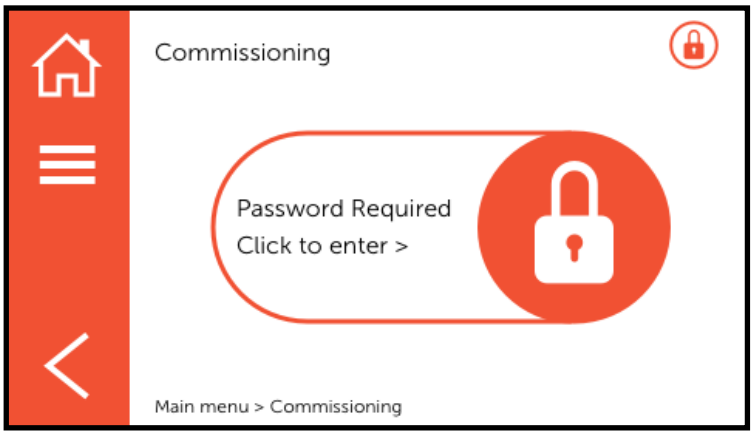

Fig 22 Commissioning — Password page

Click to enter and enter the commissioning menu password ‘11’ using the Number Pad.

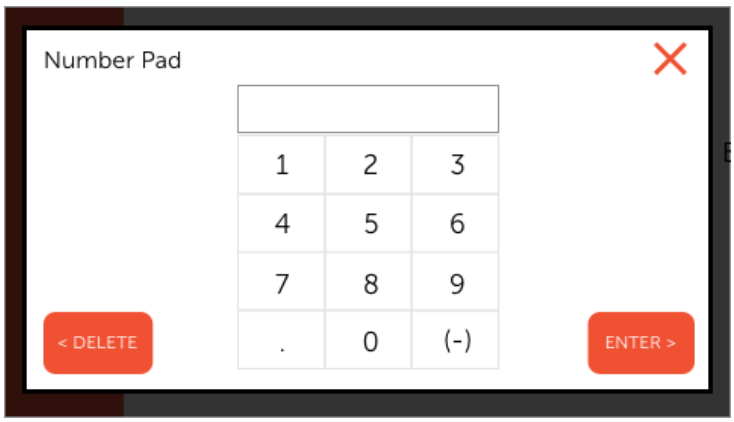

Fig 23 Commissioning — Number Pad

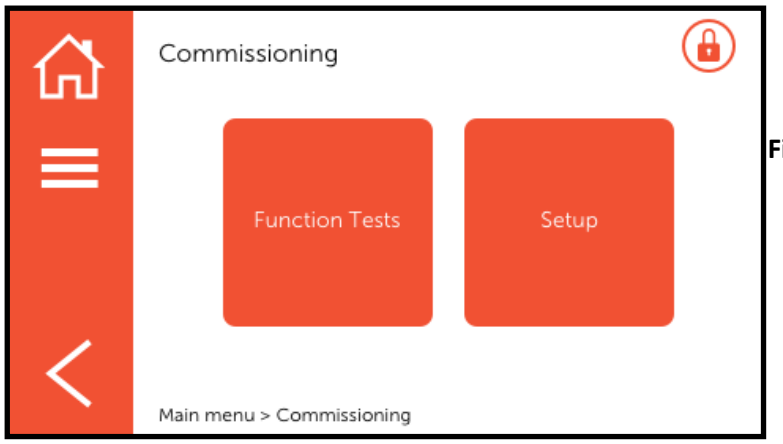

Fig 24 Commissioning —main menu

The controller then provides a choice either to perform a Function Test or to Setup the heat pump. It is advisable to initially perform a function test as this provides a check that the wiring is correct and specific functions of the system are operational.

4.7.1. Commissioning—Function tests

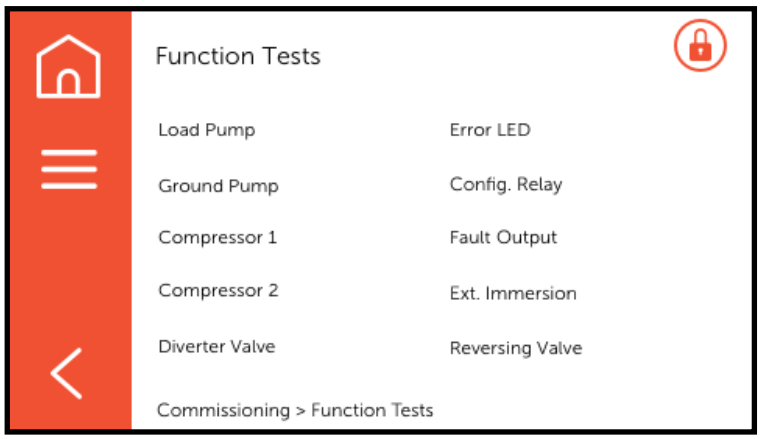

Fig 25 Commissioning — Function tests menu

The function test provides a means of enabling a call signal or appropriate response to test that the item connected or internal to the heat pump operates correctly.

The screen above allows the load pump, ground pump, compressor and DHW diverter valve to be operated.
In order for the compressor (s) to be function tested, both water pumps need to be on. The compressor will then run for about 5 seconds before turning off. The compressor will not start again until 6 minutes have passed preserving the minimum run time of the compressor.

If the screen is left all function tests will be cancelled.

This page allows the Error Sound, Error LED, Configurable relay, Fault Output and External Immersion Heater to be tested (if wired to the heat pump). The Error Sound will reset itself after less than a second. The other Function Tests will cancel themselves once the page is navigated from.

Pressing the 'Back' button will return to the Commissioning menu.

4.7.2 Commissioning

Press Setup to commission the heat pump

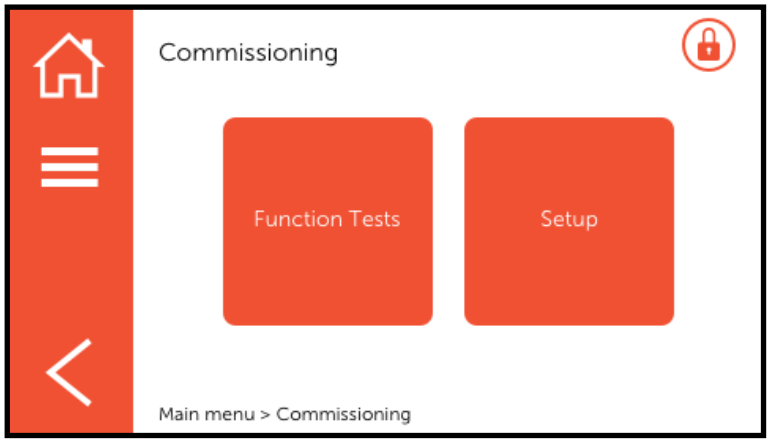

Fig 26 Commissioning Main Menu

4.7.2.1 Commissioning—Set up

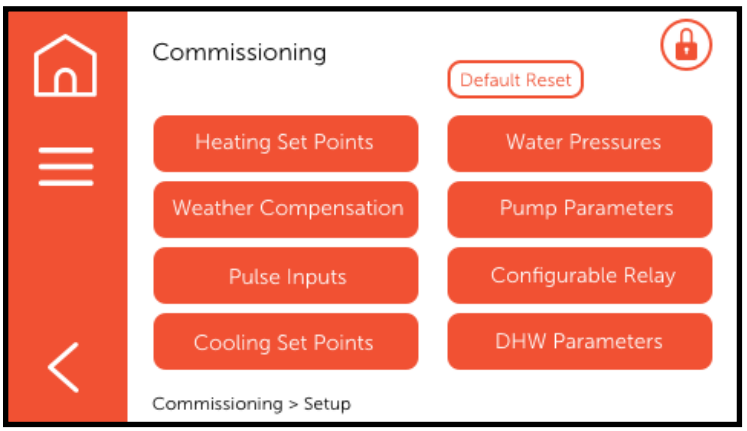

Fig 27 Commissioning —Set up menu

4.7.2.2 Commissioning- Heating Set Points

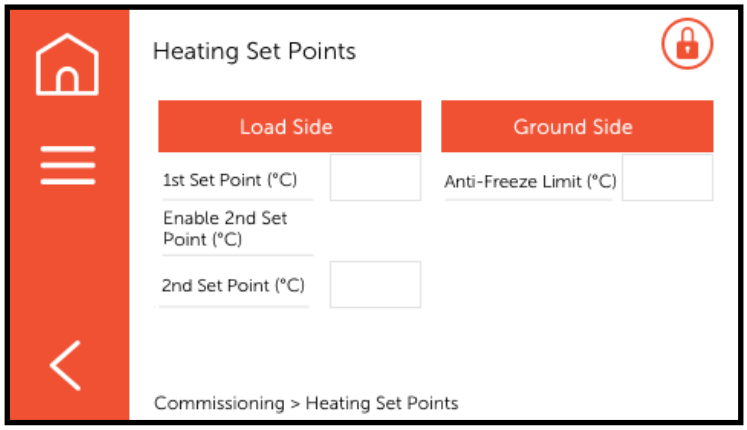

Fig 28 Commissioning —Set up– Heating Set Points menu

Load

- Heating S.P. (°C) - This is the return temperature set point of the heating distribution fluid returning to the heat pump. Generally for underfloor it would be set to approximately 30°C and for radiators 40°C. This means the temperature of the water leaving the heat pump would be approximately 5°C hotter.
  The lower this temperature the more efficient the heat pump operates, however it is important that the heat emitters are designed for heat pump flow temperature.
  For heat pumps using R407C there is an upper limit for the return temperature of 55°C and for R134a 60°C

The settings are entered via the Number Pad

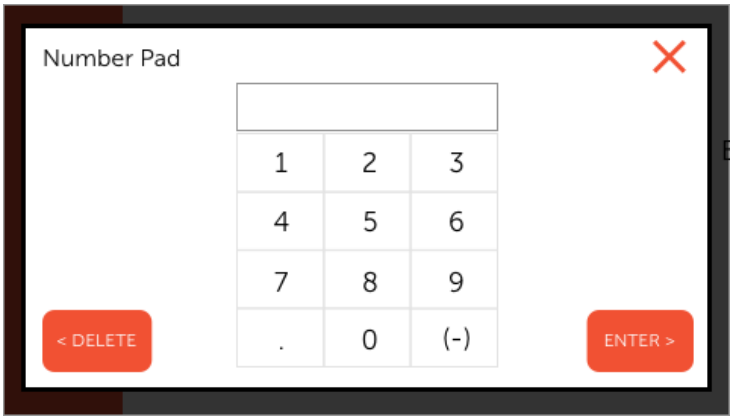

Fig 29 Commissioning —Set up– Number pad

- Enable 2nd Heating S.P.— This enables the 2nd Heating set point for systems . This allows a heating zone to be controlled which requires a different temperature than other zones. For example a zone of underfloor which requires a lower temperature (30°C)can be controlled by one timeclock and a zone of radiators requiring a higher temperature (40°C)by a second timeclock. If both call signals occur simultaneously the higher temperature will have priority. In this type of system architecture the underfloor manifolds must be fitted with thermostatic mixing valves.
- 2nd Heating S.P. (°C) - This is the return temperature set point for the 2nd heating zone. Generally for underfloor it would be set to approximately 30°C and for radiators 40°C. This means the temperature of the water leaving the heat pump would be approximately 5°C hotter.
- Cooling S.P. (°C) - This is the return temperature set point for the unit in cooling mode. This is only seen if the heat pump has been specified and available in cooling.

Ground

- Heating Mode Anti-freeze Limit (°C)—This is the temperature of the thermal transfer fluid below which the heat pump will go to alarm and stop operating. This is dependant on the amount of antifreeze added to the system and for MCS installations the amount of anti-freeze added should give protection to–10°C However due to the interaction between the antifreeze and the thermal transfer fluid Kensa recommend that this should not be set any lower than –5°C without prior agreement.
- Cooling Mode Upper Limit (°C) - This is the upper limit of the heating distribution fluid temperature when the heat pump is in cooling mode. Any temperature above this will activate an alarm and stop the heat pump from operating. This is only shown if the heat pump has been specified and available in cooling.

4.7.2.3 Commissioning—Pump Parameters

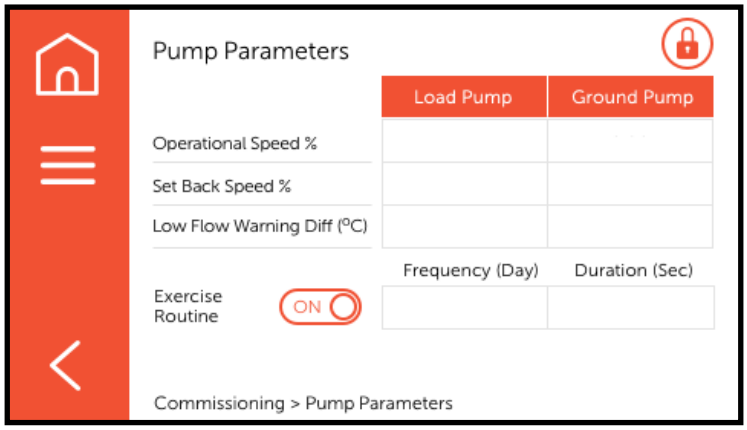

Fig 30 Commissioning —Set up– Pump Parameters menu

The pump exercise routine sets a frequency and duration of an exercise routine for the Load water pump and the Ground Water pump. It is designed so that in periods of long non-operation a signal is sent to the water pumps to spin the pumps to avoid them from sticking due to in-activity.
Load and ground pumps can be set independently. A time is scheduled in days (i.e. 7 for weekly, etc) and a duration of the call signal in seconds can be entered as well as whether the function is enabled or disabled.

Load Pump

- Operational Speed % - This is the operational speed in % of the internal load side water pump as a percentage of full load.
- Setback Speed % - This is the setback speed in % of the internal load side water pump that the water pump will drop to when the compressor is not operational. A flow on the load side is always required when the heat pump is operating as it enables the temperature of the heating distribution to be continually and accurately measured. This ensures that the heat pump reacts to any drops in temperature from the building. Having a setback speed maintains the flow but reduces the pump's speed to improve efficiency of the system.

Ground Pump

- Operational Speed % - This is the operational speed in % of the internal ground side water pump as a percentage of full load.
- Setback Speed % - This is the setback speed in % of the internal ground side water pump that the water pump will drop to when the compressor is not operational. A flow on the ground side is always required when the heat pump is operating as it enables the temperature of the thermal transfer fluid to be continually and accurately measured. Having a setback speed maintains the flow but reduces the pump's speed to improve efficiency of the system.

Pressing the back arrow returns to the commissioning set up page 1

4.7.2.4 Commissioning—Weather Compensation

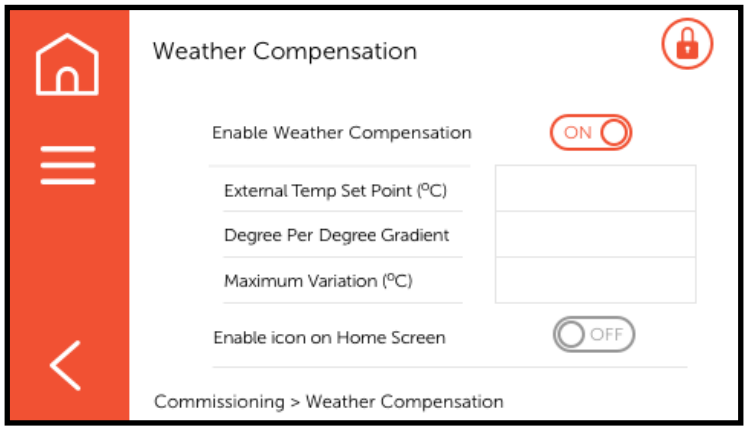

Fig 31 Commissioning —Set up– Weather Compensation menu

- Ext. Temp Set Point (°C)—Weather compensation set point, i.e. the external temperature at which the weather compensation starts to operate.
- Degree Per Degree Gradient—This is the multiplier of the number of degrees that the water set point changes for each degree change sensed in the outdoor temperature. Ideally this should be a value between 1.0 and 1.5 which would suit most properties. For example if the multiplier is set to 1.5 then for a 2 degree change in ambient temperature the heat pump output temperature changes by 3 degrees
- Maximum Variation (°C)—This is the maximum amount of positive deviation to the heat pump outlet temperature that is allowed by the weather compensation.

4.7.2.5 Commissioning—Water Pressures

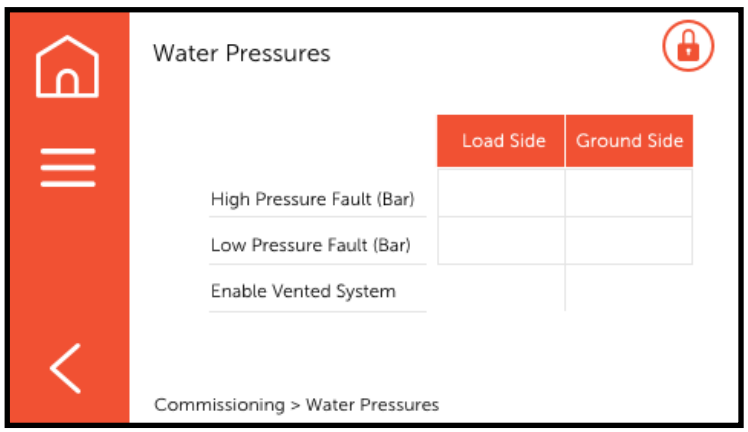

Fig 32 Commissioning —Set up– Water Pressures menu

The Water Pressure screen allows the pressures to be set at which the alarms will be activated.

Ground Side (Bar)
This allows the low and high pressure values to be set at which the fault alarms will be activated for the ground side.

Load Side (Bar)
This allows the low and high pressure values to be set at which the fault alarms will be activated for the load side.

4.7.2.6 Commissioning-Pulse Inputs

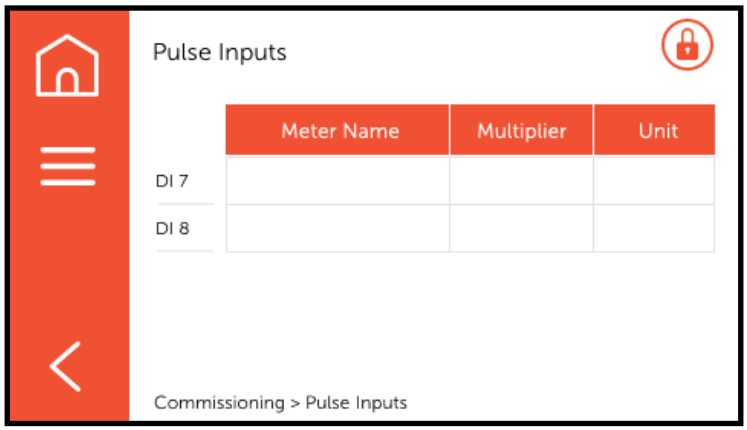

Fig 33 Commissioning —Set up– Pulse Outputs menu

This screen allows the pulse inputs to be identified.

It also allows a multiplier to be set, i.e. one pulse = 10 units of fluid being metered.

It also allows the units to be specified.

4.7.2.7 Commissioning—Configurable relay

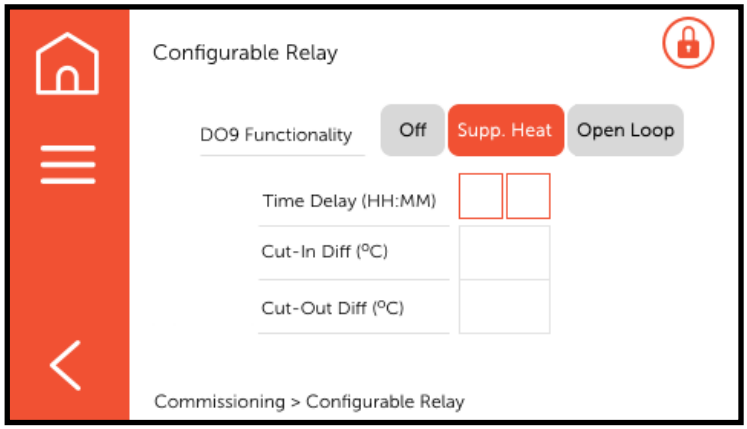

Fig 34 Commissioning —Set up– Configurable Relay menu

Configurable relay can provide a signal to a secondary heat source when the heat pump detects it cannot maintain or reach target temperatures. It does not monitor the external ambient temperature, but monitors the heat pump return temperature from the heating system. If it detects that the return temperature is not increasing above a settable differential for a settable period of time it activates a relay to activate a supplementary heat source. The call for supplementary heating will cancel once the return temperature increases to within the settable cut out differential.

- Time delay (HH:MM) - The period of time in hours that the return temperature stays below the set point temperature minus the cut in differential. i.e. If the cut in differential is 10°C and the set point is 45°C, the amount of continuous compressor run time while the return temperature is below 35°C before the supplementary heat is called for.
- Cut-In Diff (°C) - The set difference between the return temperature from the heating distribution system and the point where the period of continuous compressor operation (Time delay) is measured.
- Cut-Out Diff (°C) - The set difference between the return temperature from the heating distribution system and the point at where the supplementary heat call is cancelled.

Open Loop

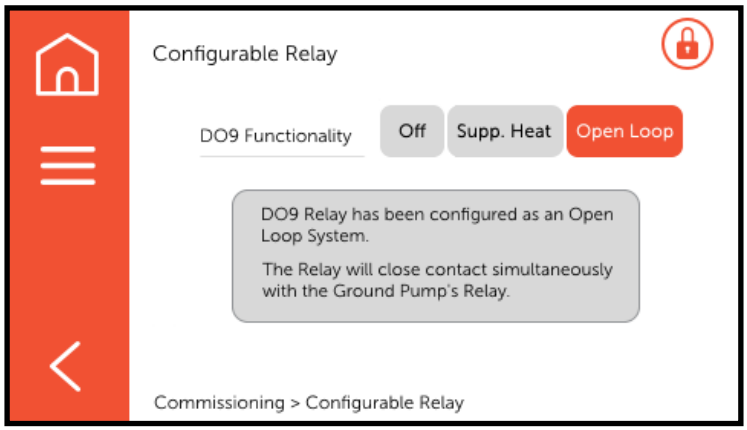

Fig 35 Commissioning —Set up– Configurable Relay Open Loop menu

If the open loop setting for D09 is set then the relay will close contact simultaneously with the ground pump's relay.

4.7.2.8 Commissioning—DHW Parameters

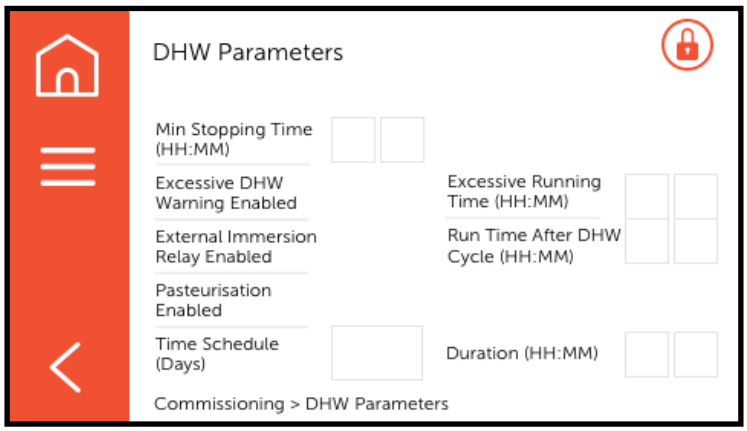

Fig 36 Commissioning —DHW Parameters menu

- Min Stopping Time (HH,MM) - Amount of time before a second DHW cycle is allowed to restart following a completed DHW cycle. During this period the heat pump can/will provide space heating if there is a call for this, but will not enter a second DHW cycle.
- Excessive Running Time (HH:MM) - If the Excessive DHW warning is enabled this sets the time of the DHW cycle where it is deemed to be excessive. This should be longer than the expected 'normal' DHW cycle time.
- Ext. Immersion Run Time After DHW Cycle (HH:MM) - If the External Immersion Relay is enabled, this sets the time of the immersion heater cycle that will occur after the DHW cycle. This function should only be enabled if a DHW temperature greater than the heat pump can provide is required by the client. Please note that running the immersion heater should be kept at a minimum to reduce running costs.
- Pasteurisation—If the Pasteurisation function is enabled, this sets the time schedule (Days) and the duration of the cycle (HH:MM) During a pasteurisation a call signal is sent to an external relay to operate the immersion heater.

4.7.2.9 Commissioning—Passive cooling

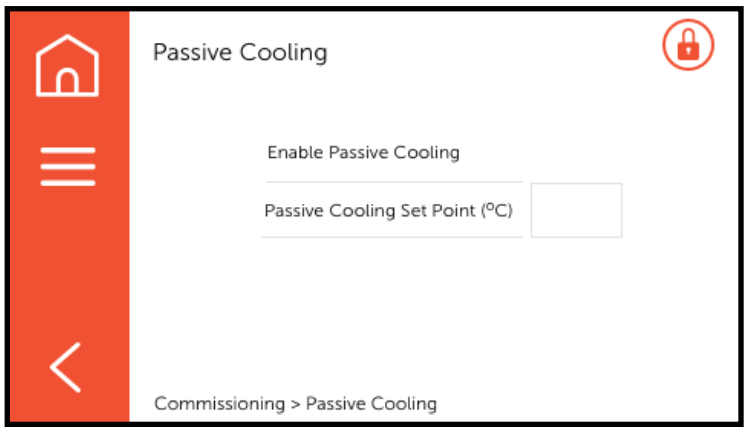

Fig 37 Commissioning — Passive Cooling menu

If passive cooling is enabled then a cooling set point must be entered.

This enables passive cooling in the heat pump which sets the speed of the ground pump to its set back speed. For passive cooling additional equipment and set up is required.
Please speak to Kensa Heat Pumps.

4.7.2.10 Commissioning—Active Cooling

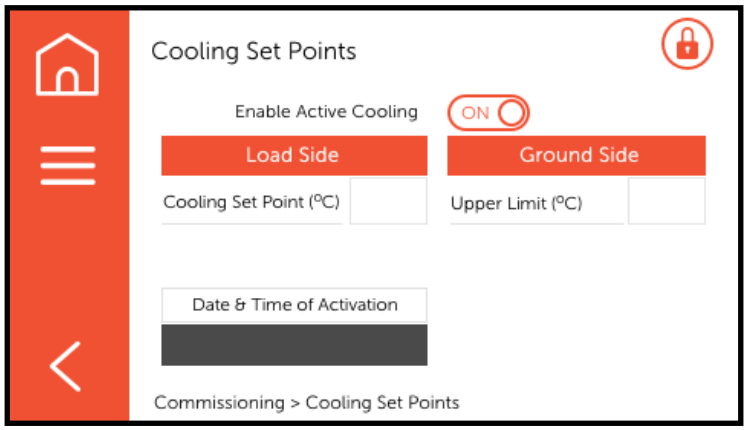

Fig 38 Commissioning — Active Cooling menu

This menu only appears if the heat pump is specified and available in cooling. Activating cooling results in the following warning screen:-

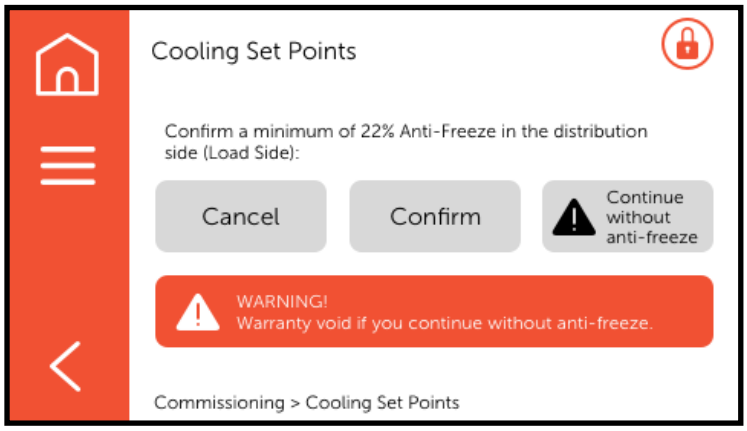

Fig 39 Commissioning — Active Cooling Set Points menu

Confirmation that the appropriate amount of antifreeze has been added to the distribution (load) side of the system is required before the cooling is activated. Antifreeze is required in the distribution side to avoid freezing occurring in the heat pumps heat exchanger and possible damage to the unit. If 'Continue without anti-freeze' is selected your heat pump warranty will be void.

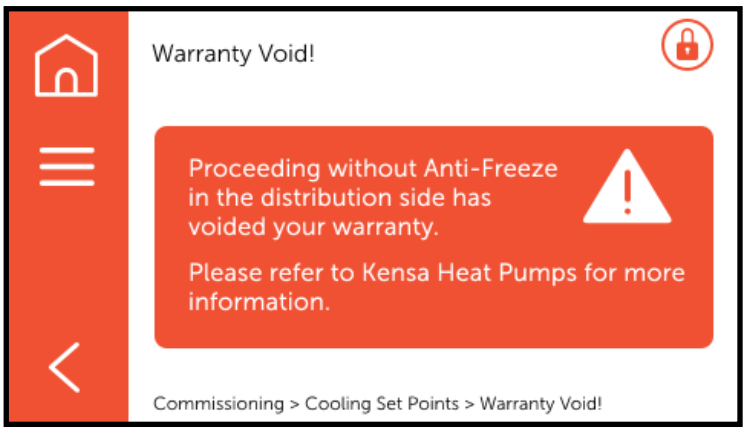

Fig 40 Commissioning — Active Cooling Warranty Void

4.8 Main Menu—Settings

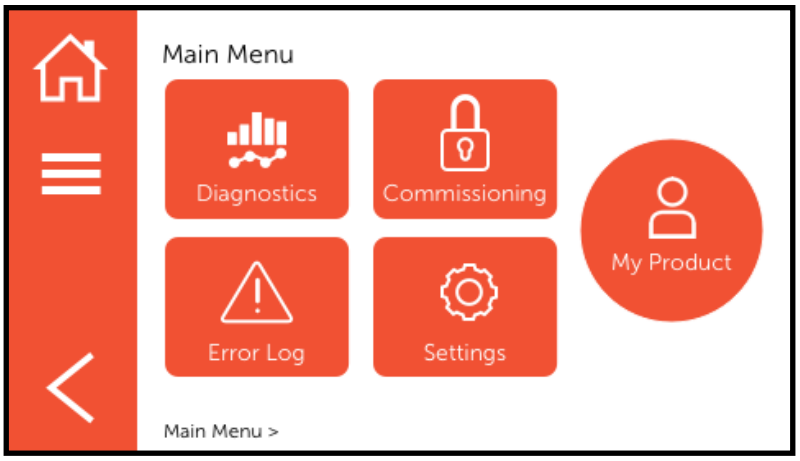

Fig 41 Main Menu

The settings menu allows the controllers standard functions to be set.

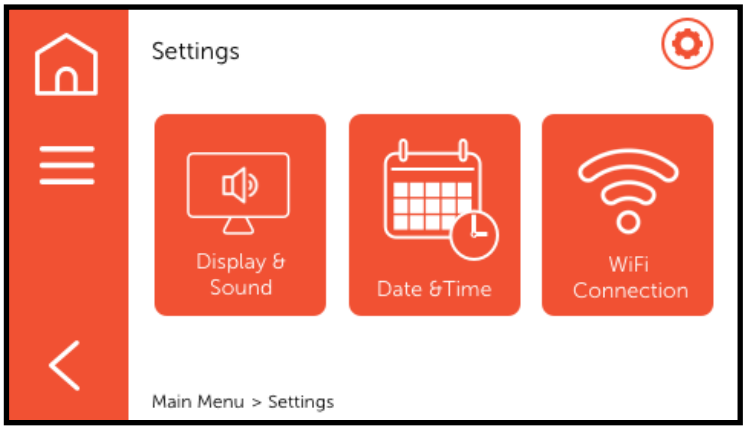

Fig 42 Main Menu—Settings

The settings screen allows some customisation of the controller. This includes the wi-fi set up and date and time. If the Wi-Fi symbol is not shown then the heat pump is not internet ready.

4.8.1 Display and Sound

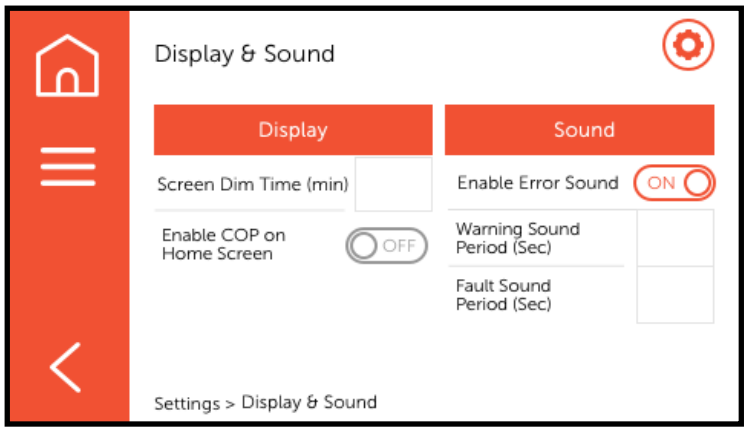

Fig 43 Settings— Display and sounds

The Display and Sound page selects whether the COP is displayed on the home page and whether the error sound is enabled. It also allows the duration of the warning and fault sound to be set to be able to distinguish between a warning and an actual fault.

This also allows the time taken for the screen to dim to be set in minutes.

4.8.2 Date and Time

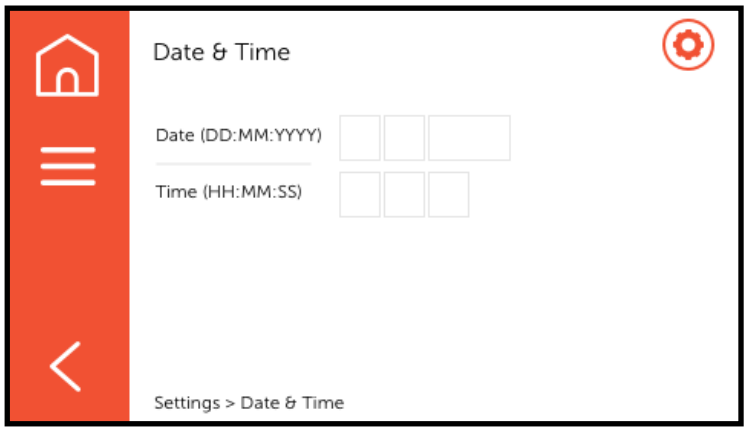

Fig 44 Settings— Date and Time

This screen allows the date and time to be set. The date and time will also be updated when/if the Wi-Fi connection is made.

4.8.3 **Wi-Fi Connection**

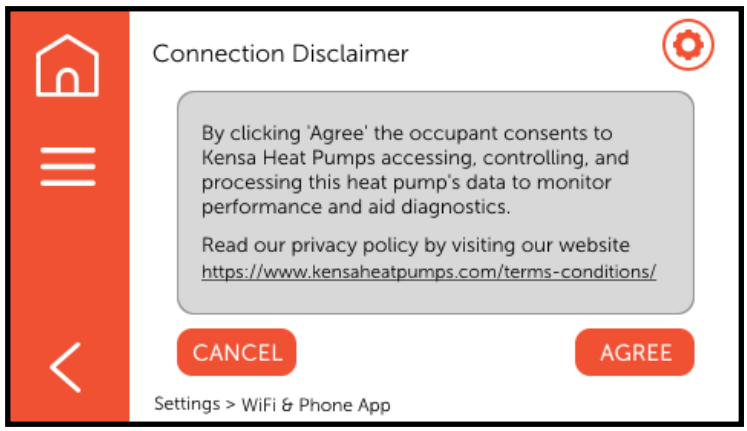

Fig 45 Settings— Wi-Fi and phone App disclaimer

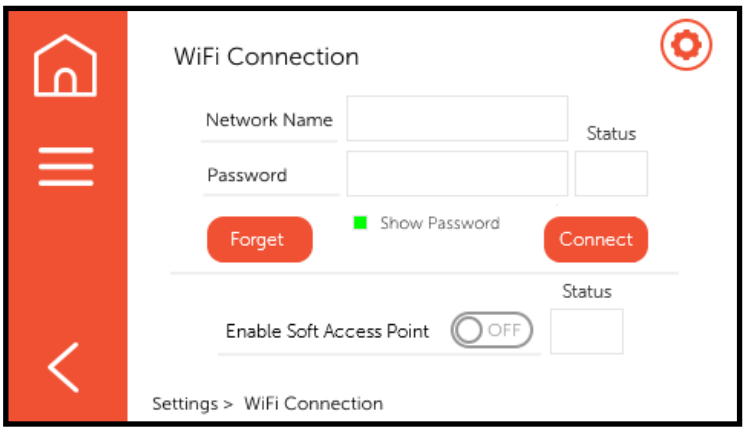

Fig 46 Settings—Wi-Fi and phone App connection

From this screen it is also possible to enable the access point (AP) where the unit will create its own Wi-Fi hot spot allowing connection of the unit to a mobile device (android or IOS).

5. Error Log

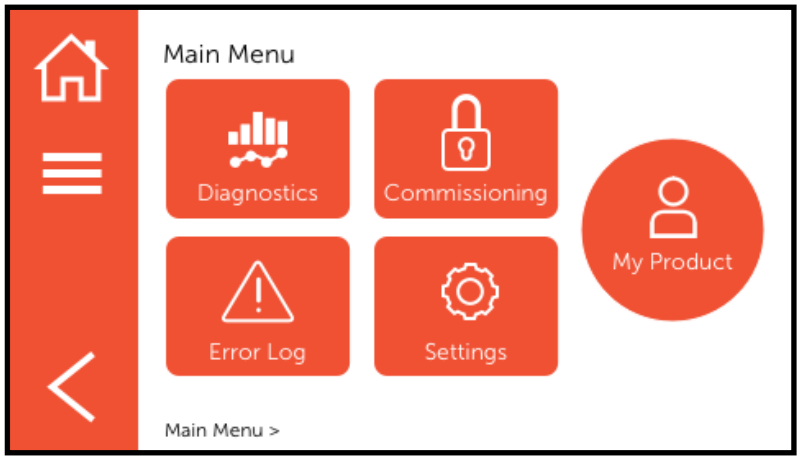

Fig 47 Main menu

The Error Log records all of the faults and Warnings that are activated by the unit.

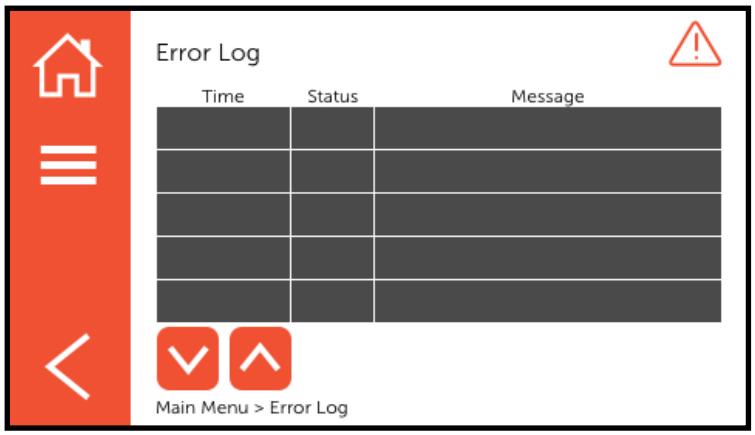

Fig 48 Error log menu

The time in chronological order from when the heat pump was turned on that the event occurred, the status (whether it was a warning or fault), error message and when the fault was cleared are recorded . The list can be navigated by using the up and down arrows.

Over a 1000 events can be recorded in the error log and displayed on screen with further errors recorded internally which can be accessed by a Kensa Engineer.

6. My Product

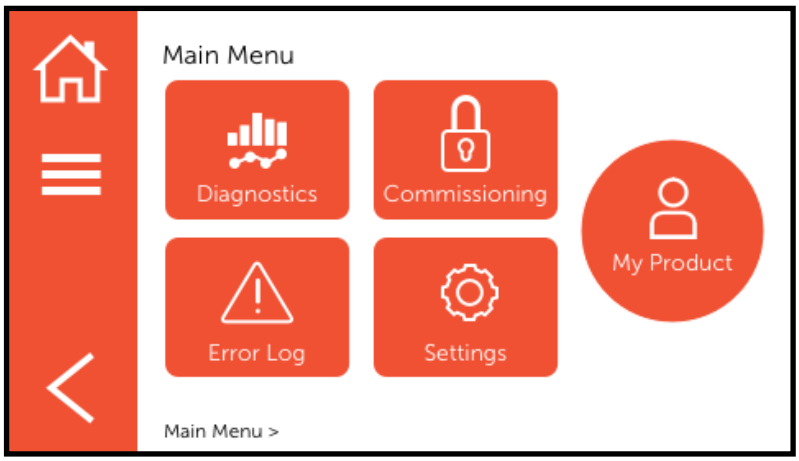

Fig 49 Main menu

My Product provides information regarding the unit.

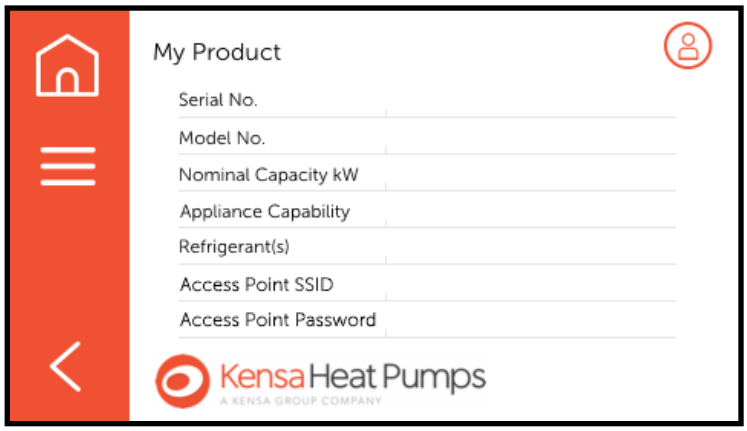

Fig 50 My product menu

7. Fault Finding

Error Code	Error Level	Error Message	Action
Blank display on software controller	No Error	No power supply	Check wall mounted electrical isolator switch or call electrician
		Controls MCB tripped	Call electrician to investigate cause
		There is no call from the time-clock or thermostat for heat pump operation	Programme time-clock according to manufacturer's instructions
		Dimmed display - No error	Display will wake up on touch
Compressor not running but display reading temperature near setpoint	No Error	Heat pump is up to temperature. T1 displayed is close to set point.	No fault
A1	Fault or Warning	Ground return temperature T5 is below the Heating Mode Anti-freeze Limit . For single or left hand compressors.	Check Ground Temperature settings - ensure adequate flow in ground side. Error maybe caused by ground pump failure. Check Antifreeze concentration. Compressor 1 will not operate until T5 rises above the lower limit and the fault has cleared to prevent heat exchanger damage.
A2	Fault or Warning	Ground return temperature T6 is below the Heating Mode Anti-freeze Limit For twin right hand compressors only.	Check Ground Temperature settings - ensure adequate flow in ground side. Error maybe caused by ground pump failure. Check Antifreeze concentration. Compressor 2 will not operate until T6 rises above the lower limit and the fault has cleared to prevent heat exchanger damage.
TPL:	Fault or Warning	Pressure in distribution side is below the low pressure load side limit. (P1)	Top up the load water pressure to clear error. Check water pressure setup, load side. The fault should clear by raising the pressure above 1.5 bar based on default values.
TPG	Fault or Warning	Pressure in ground side is below the low pressure ground side limit. (P2)	Top up the ground pressure to clear error. Check water pressure setup, ground side. The fault should clear by raising the pressure above 2 bar based on default values.
HP1	Fault	High refrigeration pressure in discharge gas pipe. (P5)	Check for flow restriction on load side - usually accompanied with FLH1 (FLC1 if in cooling). Fault maybe caused by load pump failure. Check for temperature probe failure E1
HP2	Fault	High refrigeration pressure in discharge gas pipe. (P6) Twin compressor only	Check for flow restriction on load side - usually accompanied with FLH2 (FLC2 if in cooling). Fault maybe caused by load pump failure. Check for temperature probe failure E1
DI5	Fault	High pressure Switch is open circuit.	Check for flow restriction on load side - usually accompanied with FLH1 (FLC1 if in cooling). Fault maybe caused by load pump failure. Check for temperature probe failure E1
DI6	Fault	High pressure Switch is open circuit. (Twin Compressor Only)	Check for flow restriction on load side - usually accompanied with FLH2 (FLC2 if in cooling). Fault maybe caused by load pump failure. Check for temperature probe failure E1
FLH1	Warning	Temperature differential T2-T1 (load temperature leaving the heat pump—low temperature entering the heat pump) is greater than low flow differential.	Check load pump speed Check load flow Check for flow restrictions in distribution system Check set low flow differentials
FLH2	Warning	Temperature differential T3-T1 (load temperature leaving the heat pump - load temperature entering the heat pump) is greater than low flow differential. (For twin compressors only)	Check load pump speed Check load flow Check for flow restrictions in distribution system Check set low flow differentials
FGH1	Warning	Temperature differential T4-T5 (Temperature of the thermal transfer fluid returning to the heat pump from the ground—Temperature of the thermal transfer fluid leaving the heat pump to the ground.) is greater than set point.	Check ground pump speed Check ground flow Check for flow restrictions on ground side Check set low flow differentials

Error Code	Error Level	Error Message	Action
FGH2	Warning	Temperature differential T4-T6 (Temperature of the thermal transfer fluid returning to the heat pump from the ground—Temperature of the thermal transfer fluid leaving the heat pump to the ground.(2nd compressor)) is greater than set point. (For twin compressors only)	Check ground pump speed Check ground flow Check for flow restrictions on ground side Check set low flow differentials
LP1	Fault	Low refrigeration pressure in suction gas pipe P3.	Check for flow restriction on ground side - usually accompanied with FGH1 (FGC1 if in cooling). Check Ground Anti-freeze limit, if T5 reading bellow the setpoint, unit might be frozen - allow heat pump to defrost - add correct anti-freeze quantity. This fault could briefly trigger LPS1 fault. Fault may occur on first run or unit has not run for a long time. Fault maybe caused by ground pump failure.
LP2	Fault	Low refrigeration pressure in suction gas pipe P4. (For twin compressors only)	Check for flow restriction on ground side - usually accompanied with FGH2 (FGC2 if in cooling). Check Ground Anti-freeze limit, if T6 reading bellow the setpoint, unit might be frozen - allow heat pump to defrost - add correct anti-freeze quantity. This fault could briefly trigger LPS2 fault. Fault may occur on first run or unit has not run for a long time. Fault maybe caused by ground pump failure.
LPS1	Fault	Refrigeration pressure is too low. P3	Fault may occur on units stored in a cold environment before installation and first run. If accompanied with LP1 follow action in LP1 section. Potential loss of refrigerant, refer to Kensa Technical Support Department.
LPS2	Fault	Refrigeration pressure is too low. (For twin compressors only) P4	Fault may occur on units stored in a cold environment before installation and first run. If accompanied with LP2 follow action in LP2 section. Potential loss of refrigerant, refer to Kensa Technical Support Department.
HTPL	Fault	Pressure in distribution side exceeds the high pressure load side limit. P1	Release pressure to clear error– check Water Pressures in commissioning mode. (Load side)
HTPG	Fault	Pressure in ground side exceeds the high pressure ground side limit. P2	Release pressure to clear error– check Water Pressures in commissioning mode. (Ground side)
DHT1	Fault or Warning	Refrigerant temperature T7 in discharge gas pipe exceeds the allowable high limit (set at the factory)	Error may occur if compressor is over heating - accompanied with HP1. Evaporating temperature might be too high. Refer to Kensa Technical Support Department.
DHT2	Fault or Warning	Gas temperature T8 in discharge gas pipe exceeds the allowable high limit (set at the factory)	Error may occur if compressor is over heating - accompanied with HP2. Evaporating temperature might be too high. Refer to Kensa Technical Support Department.
HGT1	Fault or Warning	Ground return temperature T5 is higher than Cooling Mode Upper Limit.	Check Ground Cooling Mode Upper Limit settings. Ensure adequate flow in ground side. Error maybe caused by ground pump failure. Compressor 1 will not run until T5 falls below the upper limit and the fault has cleared.
HGT2	Fault or Warning	Ground return temperature T6 is higher than Cooling Mode Upper Limit. (Twin Compressor only)	Check Ground Cooling Mode Upper Limit settings. Ensure adequate flow in ground side. Error maybe caused by ground pump failure. Compressor 2 will not run until T6 falls below the upper limit and the fault has cleared.
FLC1	Warning	Temperature differential T1-T2 (load temperature entering the heat pump—load temperature leaving the heat pump) is greater than low flow differential. (Cooling applications only)	Check load pump speed Check load flow Check for flow restrictions in distribution system Check set low flow differentials (Cooling)
FLC2	Warning	Temperature differential T1-T3 (load temperature entering the heat pump—load temperature leaving the heat pump (2nd compressor)) is greater than low flow differential. (Cooling applications and twin compressors only)	Check load pump speed Check load flow Check for flow restrictions in distribution system Check set low flow differentials (Cooling)

Error Code	Error Level	Error Message	Action
FGC1	Warning	Temperature differential T5-T4 (Temperature of the thermal transfer fluid leaving the heat pump to the ground—Temperature of the thermal transfer fluid returning to the heat pump from the ground.) is greater than set point. (Cooling applications only)	Check ground pump speed Check ground flow Check for flow restrictions on ground side Check set low flow differentials (Cooling)
FGC2	Warning	Temperature differential T6-T4 (Temperature of the thermal transfer fluid leaving the heat pump to the ground—Temperature of the thermal transfer fluid returning to the heat pump from the ground.(2nd compressor) is greater than set point.(Cooling applications only)	Check ground pump speed Check ground flow Check for flow restrictions on ground side Check set low flow differentials
HV	Fault	Supplied voltage is greater than high voltage limit.	Call electrician to investigate cause
LV	Fault	Supplied voltage is less than low voltage limit.	Call electrician to investigate cause
DHWER	Warning	Heat pump has been operating in DHW mode for longer than designated time.	Hot water demand might be too high Check DHW Excessive running time setting in commissioning.
HCE	Fault	Simultaneous call for Heating and Cooling.	Check time clock operation on both cooling and heating systems. Refer to Kensa Technical department
SSFC	Fault	Soft Start Fault	Check soft start fault code list. Refer to Kensa Technical department
E1	Fault	T1 Temperature Probe Error	T1 (load return) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E2	Fault	T2 Temperature Probe Error	T2 (flow return) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E3	Fault	T3 Temperature Probe Error	T3 (flow twin return) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E4	Fault	T4 Temperature Probe Error	T4 (ground flow) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E5	Fault	T5 Temperature Probe Error	T5 (ground return) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E6	Fault	T6 Temperature Probe Error	T6 (ground twin return) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E7	Fault	T7 Temperature Probe Error	T7 (discharge pipe) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E8	Fault	T8 Temperature Probe Error	T8 (discharge twin pipe) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
E9	Fault	T9 Temperature Probe Error	T9 (weather compensation) temperature probe is faulty or disconnected. Refer to Kensa Technical Department.
S1	Fault	P1 Pressure Sensor Error.	P1 (load side) pressure sensor is faulty or disconnected. Refer to Kensa Technical Department.
S2	Fault	P2 Pressure Sensor Error.	P2 (ground side) pressure sensor is faulty or disconnected. Refer to Kensa Technical Support Department.
S3	Fault	P3 Pressure Sensor Error.	P3 (suction pipe) pressure sensor is faulty or disconnected. Refer to Kensa Technical Support Department.
S4	Fault	P4 Pressure Sensor Error. (Twin Compressor Only)	P4 (suction twin pipe) pressure sensor is faulty or disconnected. Refer to Kensa Technical Support Department.
S5	Fault	P5 Pressure Sensor Error.	P5 (discharge pipe) pressure sensor is faulty or disconnected. Refer to Kensa Technical Support Department.
S6	Fault	P6 Pressure Sensor Error. (Twin Compressor Only)	P6 (discharge twin pipe) pressure sensor is faulty or disconnected. Refer to Kensa Technical Support Department.

7.1 Fault Finding (shoebox LED Flashes)

Many faults which occur on commissioning are found to be due to incorrect wiring or setting up, therefore it is recommended that a thorough check is carried out should there be a problem.

The alarm LED will flash a number of times indicating what the issue is.

LED flash-es	Error	Action
0	Clear	None
1	A1: Antifreeze limit (Heating)	Check Ground Temperature settings - ensure adequate flow in ground side. Error maybe caused by ground pump failure. Check Antifreeze concentration. Compressor 1 will not operate until T5 rises above the lower limit
2	A2: Antifreeze limit (Heating)	Check Ground Temperature settings - ensure adequate flow in ground side. Error maybe caused by ground pump failure. Check Antifreeze concentration. Compressor 2 will not operate until T6 rises above the lower limit
3	TPG: Low Ground Pressure	Top up the ground pressure to clear error. Check water pressure set-up, ground side. The fault should clear by raising the pressure above 2 bar based on default values.
4	TPL: Low Load Pressure	Top up the load water pressure to clear error. Check water pressure setup, load side. The fault should clear by raising the pressure above 1.5 bar based on default values.
5	HP1: High Gas Pressure	Check for flow restriction on load side - usually accompanied with FLH1 (FLC1 if in cooling). Fault maybe caused by load pump failure. Check for temperature probe failure E1
6	HP2: High Gas Pressure	Check for flow restriction on load side - usually accompanied with FLH2 (FLC2 if in cooling). Fault maybe caused by load pump failure. Check for temperature probe failure E1
7	LP1: Low Gas Pressure	Check for flow restriction on ground side - usually accompanied with FGH1 (FGC1 if in cooling). Check Ground Anti-freeze limit, if T5 reading bellow the setpoint, unit might be frozen - allow heat pump to defrost - add correct anti-freeze quantity. This fault could briefly trigger LPS1 fault. Fault may occur on first run or unit has not run for a long time. Fault maybe caused by ground pump failure.
8	LP2: Low Gas Pressure	Check for flow restriction on ground side - usually accompanied with FGH2 (FGC2 if in cooling). Check Ground Anti-freeze limit, if T6 reading bellow the setpoint, unit might be frozen - allow heat pump to defrost - add correct anti-freeze quantity. This fault could briefly trigger LPS2 fault. Fault may occur on first run or unit has not run for a long time. Fault maybe caused by ground pump failure.
9	DHT1: High Discharge Temp	Error may occur if compressor is over heating - accompanied with HP1. Evaporating temperature might be too high. Refer to Kensa Technical Support Department.
10	DHT2: High Discharge Temp	Error may occur if compressor is over heating - accompanied with HP2. Evaporating temperature might be too high. Refer to Kensa Technical Support Department.

8. Warranty

The Kensa Ground Source heat pump is designed and built to the highest standard and as such is guaranteed for 5 years for parts from the date of commissioning or 5 ½ years from the date of manufacture (excluding the internal water pumps and electrical components), whichever is shorter. Internal water pumps (ground and load side) and electrical components are guaranteed for 2 years for parts from the date of commissioning or 2 ½ years from the date of manufacture, whichever is shorter.

8.1 Terms and Conditions.

8.1.1 Persons covered by the Warranty

The Warranty applies to the original purchaser and any subsequent owner of the item.

8.1.2 Validity period of the Warranty

The guarantee period (excluding the water pumps and electrical components) is five years calculated from the commissioning date stated on the commissioning certificate or 5 ½ years from the date of manufacture, whichever is shorter. For the water pumps and electrical components it is 2 years from the commissioning date stated on the commissioning certificate or 2 ½ years from the date of manufacture, whichever is shorter.

8.1.3 Scope

Kensa Heat Pumps Ltd warrants to the original purchaser ("Buyer") that all parts ("Parts") of the Kensa Ground Source Heat Pump, excluding accessories, shall be merchantable and free from defects in materials and workmanship appearing under normal working conditions.
Kensa Heat Pumps Ltd will, at its option and without charge to the Buyer, replace or repair any Parts which cause the Kensa Ground Source Heat Pump to be inoperable; however, if Kensa Heat Pumps Ltd elects to provide replacement Parts, it shall not be obligated to install such replacement Parts and the Buyer shall be responsible for all other costs, including, but not limited to, shipping fees and expenses.
The warranty applies to faults originating inside the item.

8.1.4 General exceptions

Compensation is not provided for:
- consequential losses
- damage caused by normal wear and tear, inadequate maintenance or care
- damage caused by freezing
- damage of the unit due to non-approved or incorrect quantities of antifreeze being used in the ground side, incorrect flowrates or air in the system
- damage caused by power surges, incorrect supply voltage or lightning strikes.
- cost of inspecting, adjusting or cleaning the item, unless this relates to damage that is eligible for compensation
-minor damage (e.g. scratches and marks) that does not affect the operation of the item
-damage covered by insurance
-indirect damage
-loss or damage caused by gross negligence or intent, misappropriation, fraud or similar crime against property, breach of trust or fraudulent conversion.
-products that have been: altered; subject to misuse, negligence, accidental damage, abnormal use or service; operated or installed in a manner contrary to Kensa Heat Pumps Ltd published or written instructions.
-products subjected to abrasion or corrosion

-products operated in connection with any liquid source that contains impurities which are corrosive to copper
-products operated in a temperature range inconsistent with Kensa Heat Pumps Ltd's published or written recommendations

8.1.5 Care of Duty

The product must be handled with normal care and attention to minimise the risk of damage or loss.

8.1.6 In the event of Damage

The installing contractor ("Contractor"),or, if the installing Contractor is not available, Kensa Heat Pumps Ltd must be notified of any damage immediately and no later than six months after you first became aware of the damage. The commissioning certificate received on installation should be appended to the claim. If a claim for compensation is made after the deadline specified above or if a commissioning certificate cannot be produced, the guarantee shall not apply.

8.1.7 Replacement Parts

Kensa Heat Pumps Ltd's warranty obligations with respect to replacement parts are identical to those with respect to original parts; provided, however, in no event shall the warranty term for such replacement parts extend beyond the term established by the commencement date (i.e. commissioning date) of the warranty under which Kensa Heat Pumps Ltd was obligated to provide such replacement parts. Kensa Heat Pumps Ltd shall have the right to retain possession or dispose of any parts replaced by it.