Kensa Heat Pumps
A KENSA GROUP COMPANY

Q80 Series Heat Pumps
Installation and Commissioning Manual

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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.

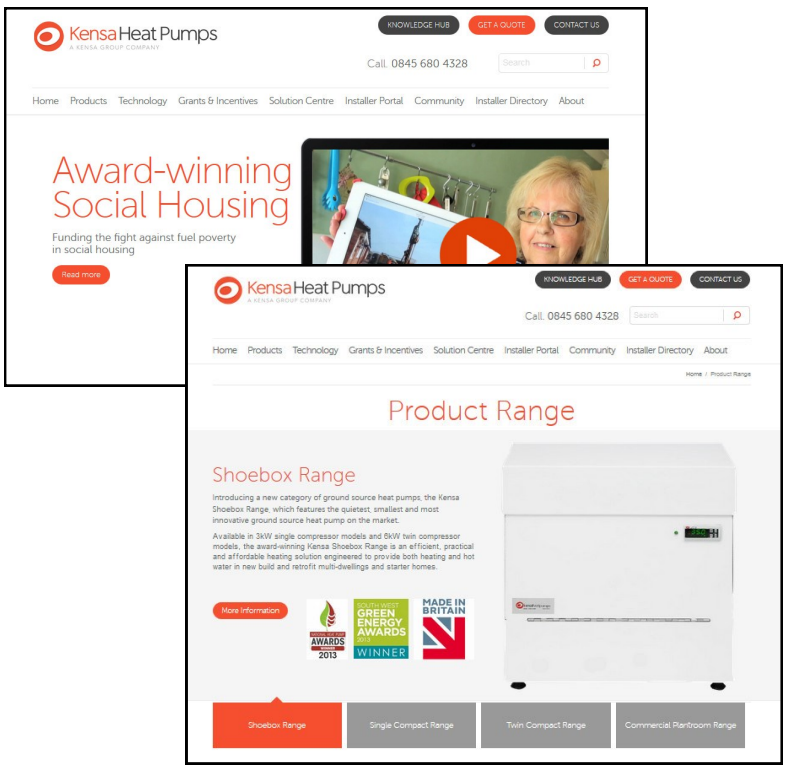
Critical instructions to ensure you do not experience any difficulties are highlighted in the 'Golden Rules' in the installation section.

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 warranted if it is properly installed and commissioned in compliance with the manufacturer's requirements. 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 Commissioning Instructions, could damage the product, will invalidate the warranty, and may cause injury or fatality to personnel.

2.1 Access and Egress

Ensure safe access and egress before attempting to work on the product. Arrange suitable lifting gear if required.

2.2 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

2.3 Tools and consumables

Before starting work ensure that you have suitable tools and / or consumables available.

2.4 Handling

Manual handling of large and /or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

2.5 Residual hazards

Many products are not self-draining. Take due care when dismantling or removing the product from an installation.

2.6 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

2.7 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 available on request.

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

3. General Product Information

This manual explains how to install a Kensa ground source Q80 Series heat pump.

The Kensa Q80 Series Heat Pump is designed to provide a low cost renewable heat source for a buildings heating system. Heat pumps can provide lower running costs and will generate significantly lower carbon emissions compared with traditional fossil fuels.

The Kensa Q80 Series Heat Pump is designed for straightforward installation and integration into a buildings heating system. The installation must conform to all relevant construction and electrical codes.

3.1 Equipment delivery and handling.

Factory shipment
Prior to shipment, the Kensa Q80 Series Heat Pump is tested, calibrated and inspected to ensure proper operation.

Receipt of shipment
Each pallet should be inspected at the time of delivery for possible external damage. Any visible damage should be recorded immediately on the carrier's copy of the delivery slip.
Each pallet should be unpacked carefully and its contents checked for damage.
If it is found that some items have been damaged or are missing, notify Kensa immediately and provide full details. In addition, damage must be reported to the carrier with a request for their on-site inspection of the damaged item and its shipping pallet. The Q80 Series Heat Pump should be moved indoors immediately when received as the unit is not rated for external conditions and storage.

Storage
If a Kensa Heat Pump is to be stored prior to installation, the environmental storage conditions should be at a temperature between 0°C and 50°C (32°F and 122°F), and between 10% and 80% relative humidity (non-condensing). The Q80 Series Heat Pump should be moved indoors immediately when received as the unit is not rated for external conditions and storage.

Fig 1. Q80 Series Heat Pump

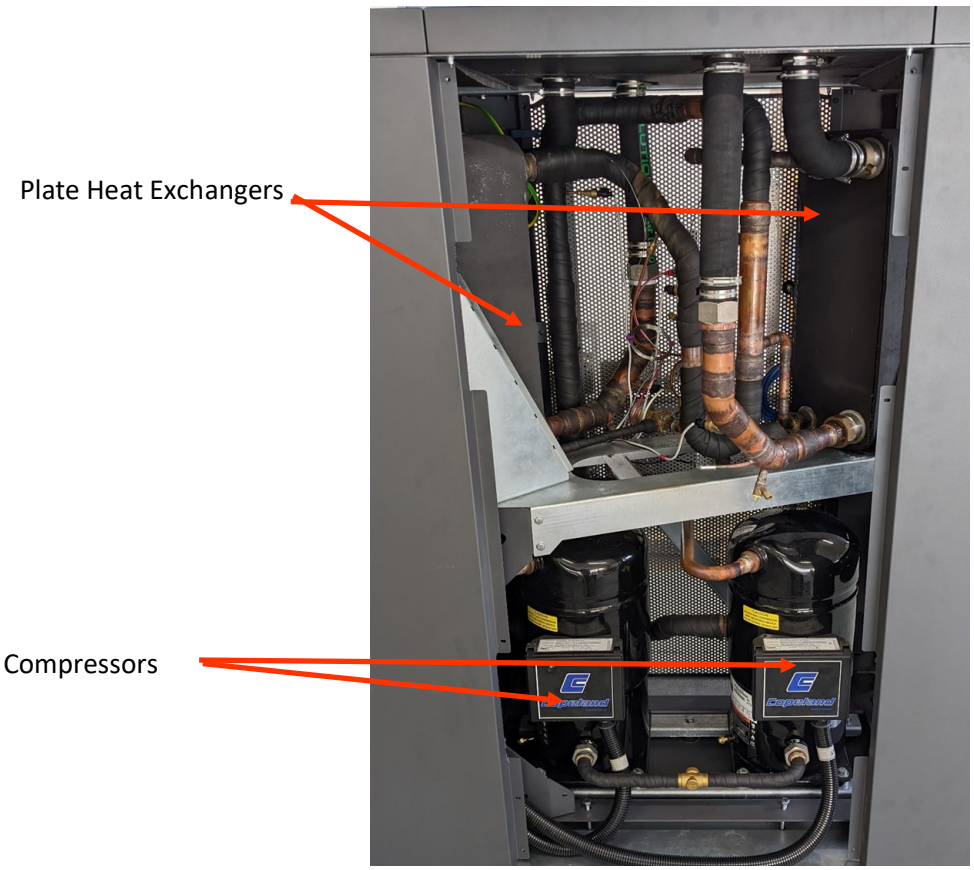


Fig 2. The internals of a heat pump (side view)

Fig 3. The internals of a heat pump. (door open)

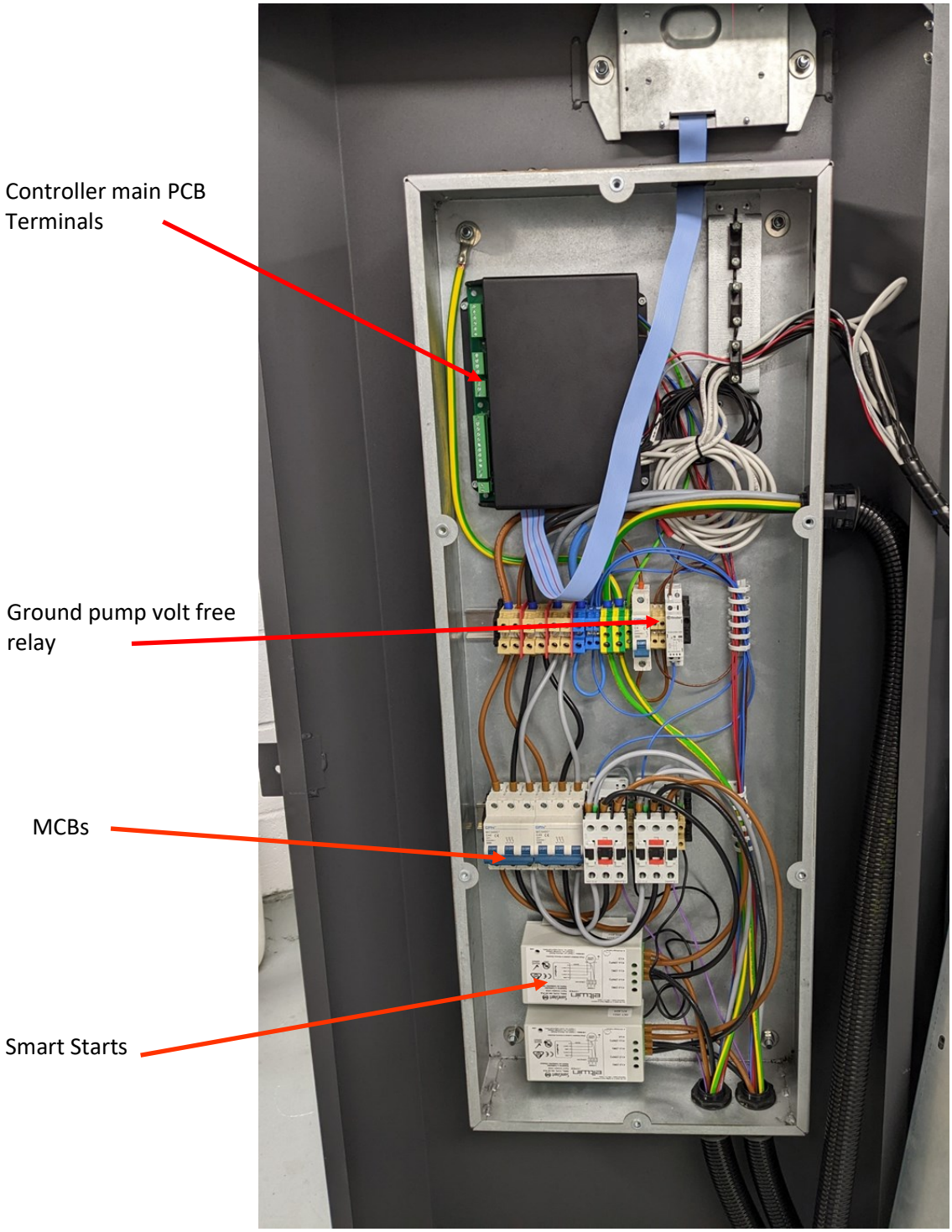


Fig 4. Contoller Wiring Enclosure (cover removed)

3.2 Kensa Q80 Series Technical Details— Compressor—3 Phase 400 Volts Only											
Nominal Thermal Output	Ground Design Flow Rate	Ground Design Flow Rate	Ground Design Flow Rate	Ground pressure drop at design	Output Design Flow Rate	Output Design Flow Rate	Output Design Flow Rate	Output pressure drop at design	Sound Power Level	Max rated current	Design flowrates are based on ground temperatures of 0°C in and –4°C out of the heat pump and 30°C and 35°C for the load side.
kW	l/s	l/m	m^3/h	kPa	l/s	l/m	m^3/h	kPa	dB A	Amp	
83	5.98	359	21.53	46.3	4	240	14.4	27.6	72.3	64	

The figures above are based on a rating to BS EN14511, 0 deg C from the ground, 35 deg C flow to underfloor.

For clarification of starting currents and details on how these figures are calculated please contact Kensa.

4. Installation

Note: Before actioning any installation observe the 'Safety information' in Section 2.

It is essential that the following installation guidelines are followed carefully.

Any electrical work required to install or maintain this appliance should be carried out by a suitably qualified electrician in accordance with current IEE regulations.
Any plumbing work should be carried out to local water authority and WRC regulations.

Kensa Q80 Series heat pumps do not come with any water circulating pumps for either the load or ground side. These should be specified by the M and E consultant and will depend on site conditions.

Important
The following section includes typical schematics of how a heat pump can be connected. It is important to note that the schematics are only general arrangements and hence do not illustrate all required valves or fittings. System designs are also very site specific and should be provided by the M and E consultant. The following is a guide only.

4.1 The golden rules of installing a Q80 Series heat pump

1. A 'D' Type MCB should be used for the heat pumps power supply.
2. All pipe connections to the heat pump must be vibration isolated using bellows or equivalent.
3. Use a suitably sized purge pump for purging the ground arrays and heat pump.
4. Pipe lengths to the ground arrays should be kept equal to maintain equal flow and connected reverse return.
5. Flow switches should be installed to prevent operation in non-flow situations.
6. Read this manual fully before commencing installation

4.2 Q80 Series heating schematics

The key to obtaining low CO2 emissions and running costs for any heat pump is to maintain the flow output at as low a temperature as possible. Any increase in outlet temperature will result in a drop in efficiency and systems should be designed to reflect this.

The following schematic details how a heating system for a Q80 Series property can be designed.

The modular design of Kensa Q80 Series heat pumps enables the system to closely match the required heating load. Each unit should be configured via the BMS to operate sequentially to allow part operation to match the heat demand of the building. The multiple unit approach also offers a degree of redundancy in the unlikely event of a problem with one if the units.

Depending on the system design it might be necessary to incorporate a buffer vessel to avoid short cycling problems and it is recommended, to improve overall efficiency of the system, that this is a twin connection buffer vessel. The vessel should be sized for 10 litres per kW of the smallest heat pump module. For example as the twin compressors are run in tandam, for a 120kW heating load using 2 x 80kW heat pumps the buffer vessel should be approx 80 (compressor size) x 10 = 800 litres.

Kensa heat pumps can work equally as well with horizontal, vertical or lake arrays as the energy source. Although for large Q80 Series projects it can be more usual to use a borehole field design due to space considerations.

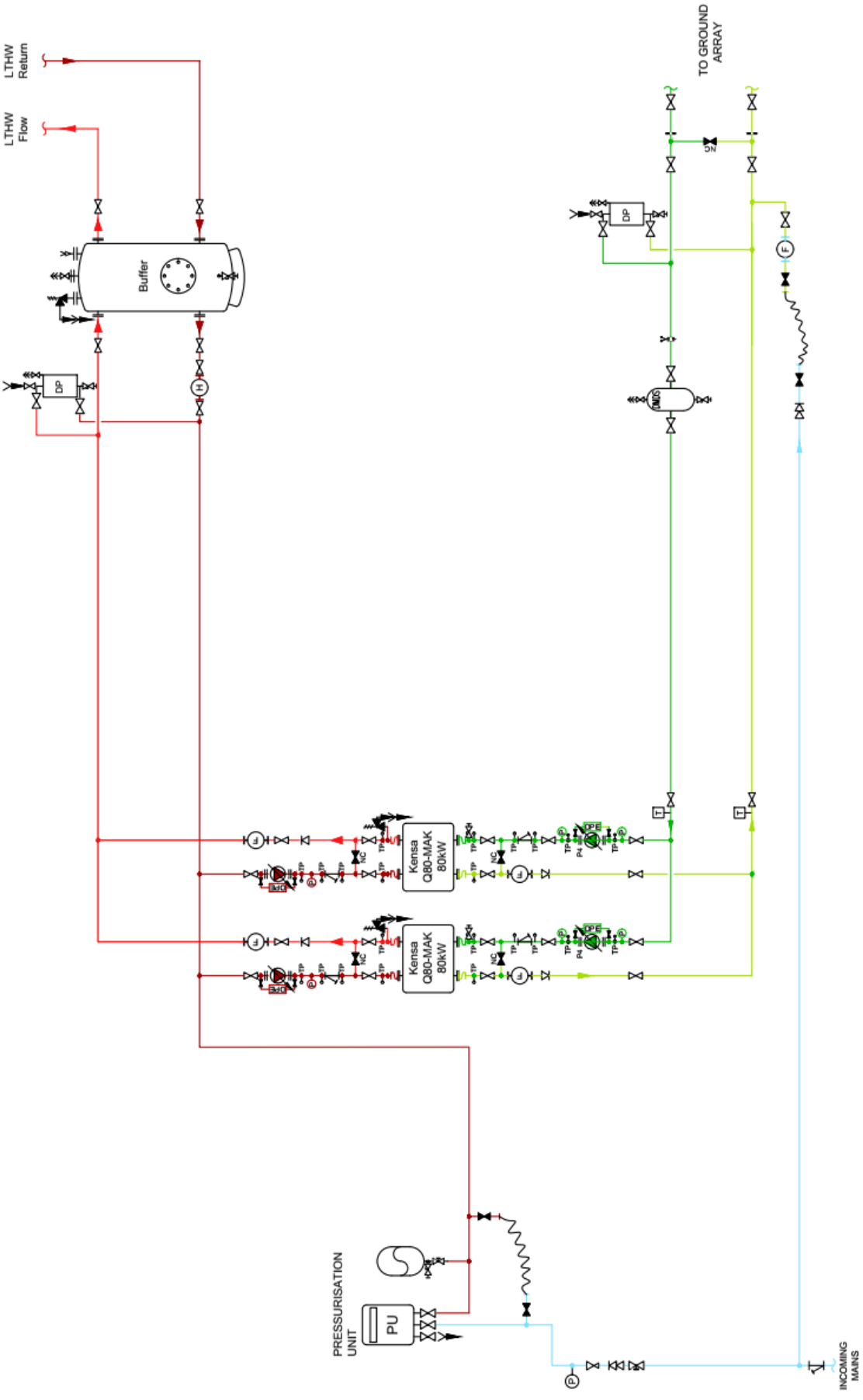


Fig 5 Typical Q80 Series heating only schematic

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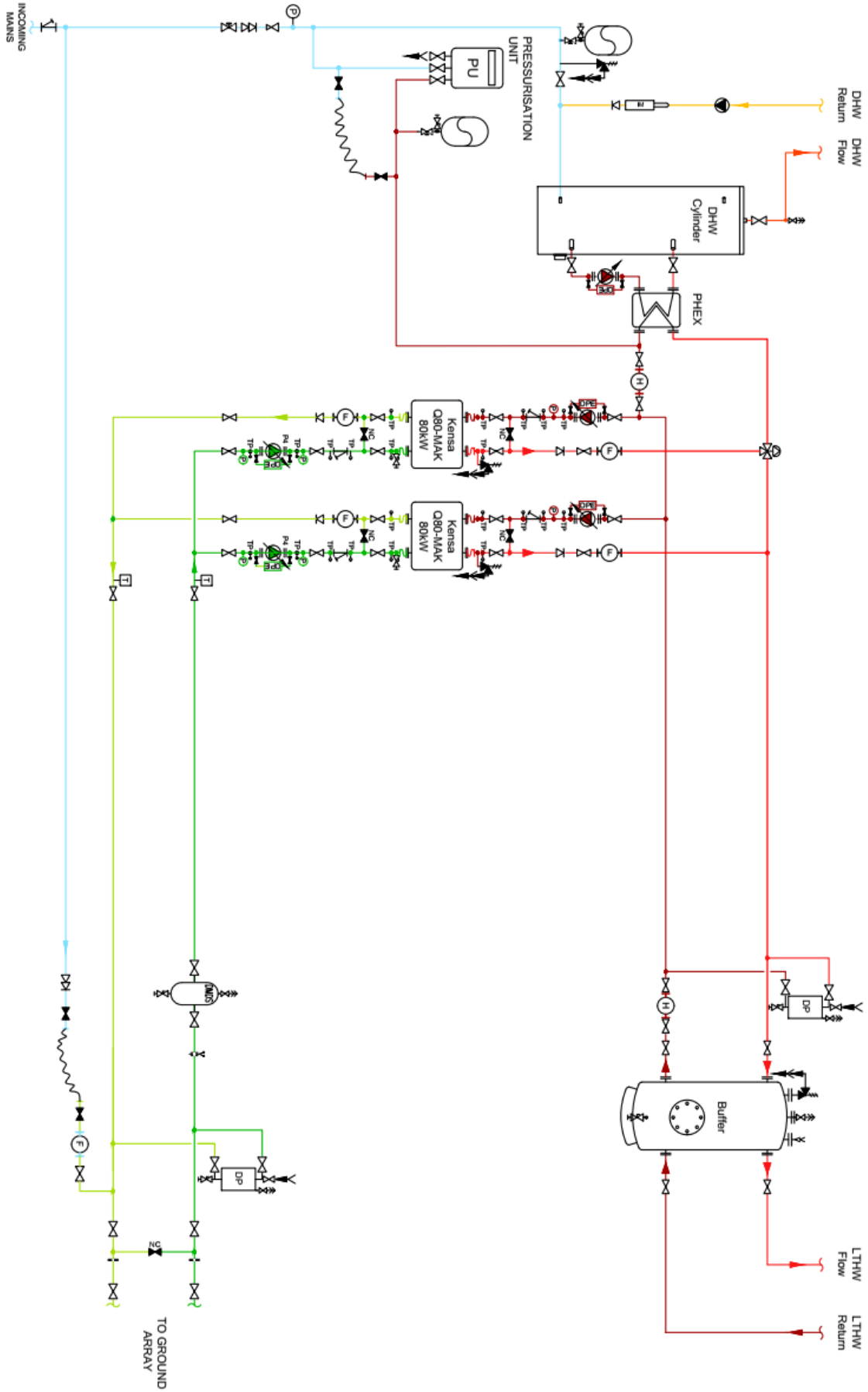

Fig 6 Typical Q80 Series DHW heating only schematic

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4.3 Q80 Series heating and cooling schematics

In many modern Q80 Series buildings, with the improvement in energy saving measures such as Insulation, the requirement for cooling is now almost as great (if not greater) than the requirement for heating. This cooling requirement is generally being driven by the use of heat emitting devices such as computers and printers and even the staff themselves.

When ground source heat pumps run they always produce heat and cold, just like other heat pumps such as refrigerators or air conditioners. This means it is simple to use a ground source heat pump for cooling. The steady temperature of a ground array gives a ground source heat pump even more potential for cooling.

Kensa's Q80 Series range of heat pumps can provide cooling externally. This has the advantage of a lower cost system, higher efficiency and can be installed at a later date by the M&E contractor. Kensa's approach is to maintain stored volumes of hot and cold fluid to be used by the building when and where its needed, if there is a large cooling load the system will dump the excess heat to the boreholes via an HEX and vice versa.

4.3.1 Active and passive cooling

At the end of a heating season the ground temperature is at its lowest—typically 0-5°C. This temperature is cool enough without modification to be used in various cooling distributions to provide cost effective passive cooling. During passive cooling the fluid from the ground array provides cooling without the compressor needing to run. Only a small amount of energy is used by the water pumps.

For a heat pump to actively cool, the compressor does run and the hot and cold side inputs are simply switched. The ground source heat pump is now actively pumping heat from inside the room to the ground, thus cooling the room (and heating the ground). Active cooling has wider applications than passive cooling and can be used more effectively with higher ground temperatures but also has a higher running cost.

It is important that a sufficient quantity of glycol antifreeze (minimum 22%, Refractive index 1.356) is added to the cooling and heating circuit fluid to avoid freezing of the fluid in cooling mode. Failure to do this will invalidate the warranty.

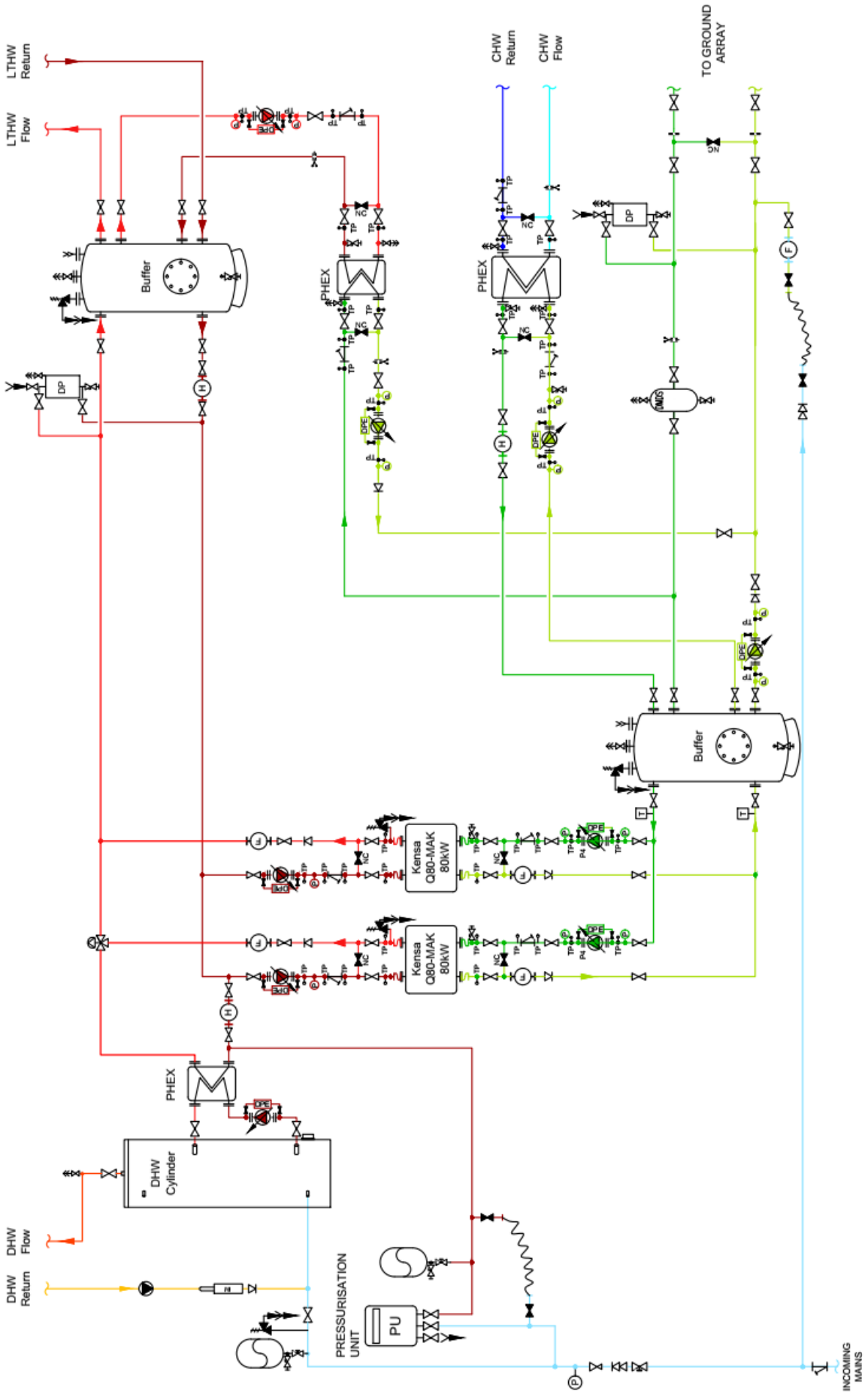

Fig 7 Typical Q80 Series heating, DHW and cooling schematic

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4.4 Secondary boiler back up systems (bivalent alternative systems) Fig 8

This type of system can be used where the heat emitters require a higher temperature than the heat pump can output, when it is cold outside. This set up would require thermostatic control on the boiler as well as external bivalent controls to switch between the heat pumps and the boiler.

Care must be taken when setting up the BMS, as it may take some time for the system to come up to temperature.

4.5 Secondary boiler back up systems (bivalent parallel systems) Fig 9

Bivalent Parallel systems can be when the heat pump output cannot meet the full building load in cold climates. This can be controlled either externally or by the heat pumps. The boiler will require a blending valve to match the target flow temperature to the buffer tank. Please contact Kensa for further information.

Again care must be taken when setting up the BMS, as it may take some time for the system to come up to temperature.

For all systems it is recommended that the BMS/Instrumentation Engineer contact Kensa if unsure on any aspects of the control of the system, i.e. Regarding:-

- Time delays
- Expected temperatures
- Compressor run-times
- Compressor starts per hour.
- etc

Bivalent Alternative

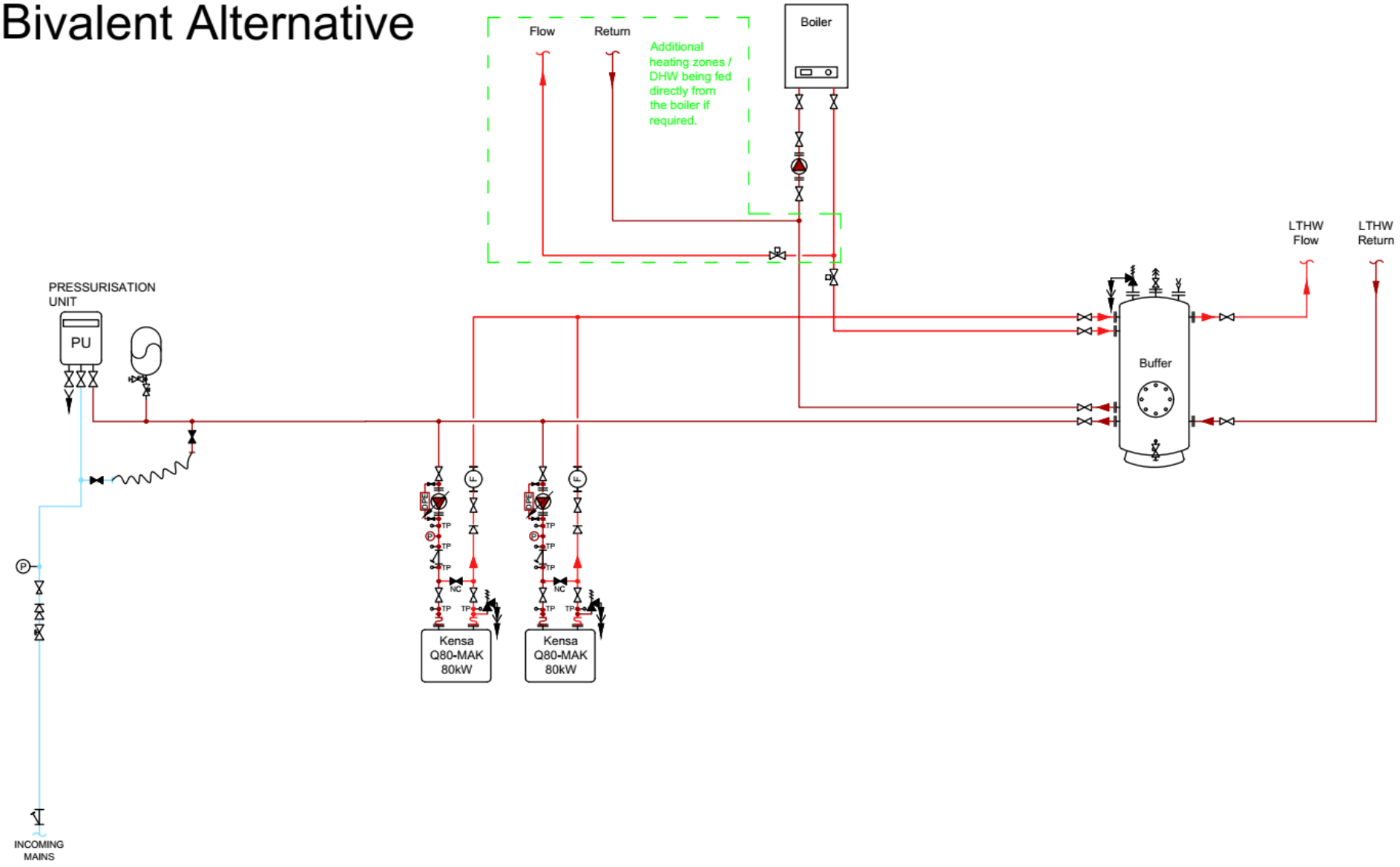


Fig 8 Secondary boiler back up (bivalent alternative)

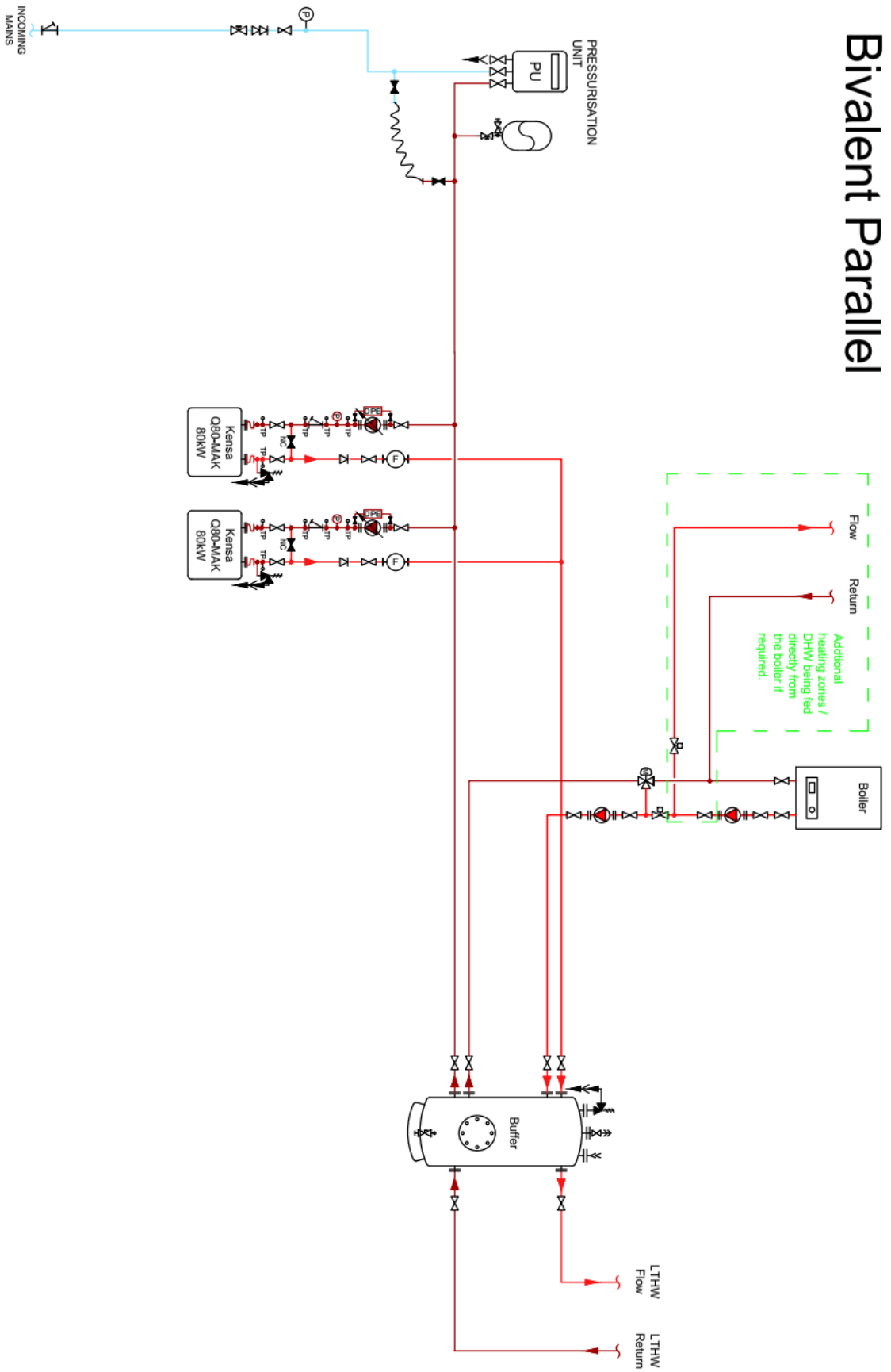


Fig 9 Secondary boiler back up (bivalent parallel)

4.6 Mechanical Installation

4.6.1 Locating the heat pump

Decide on a suitable location for the Heat Pump. This should be in a plant room which isolates any occupied spaces from the noise and vibration of the heat pumps. It should not be placed near, under, or above, any inhabited space. Take into account the "Recommended Clearances" when finalising the location and future requirements for access and removal. It is important that anti-vibration mountings or "bellows" are used.

Check the appliance for transport damage. Under no circumstances should a damaged appliance be operated or installed without prior agreement.

Position the appliance on a firm, level and substantial concrete base that will absorb vibration well away from any occupied rooms

Ensure all pipes and wires are adequately supported where necessary, pipes are properly insulated and concentrations of inhibitor/antifreeze (where added) are correct. Connections should be vibration isolated by the use of bellows and have appropriate air vents and isolation valves. The appliance and any metal pipes should also be properly earthed.

A water treatment device should be provided in hard water areas.

Do not use the appliance as a shelf.

4.6.2 Recommend clearances

Remember to consider any future maintenance or removal requirements as a return to base might be required if an on -site repair is not feasible.

Refer to fig 10 or section 3.2 for dimensions of the unit

If multiple units are used then these should have a clearance of approximately 675 mm between them to enable access.

If a concrete pad is used in front of the unit, ensure that this is extended by 1450mm forwards to allow complete removal of the heat pump. If access to the whole of the unit is via withdrawing the unit the clearance between the units can be 30-50mm

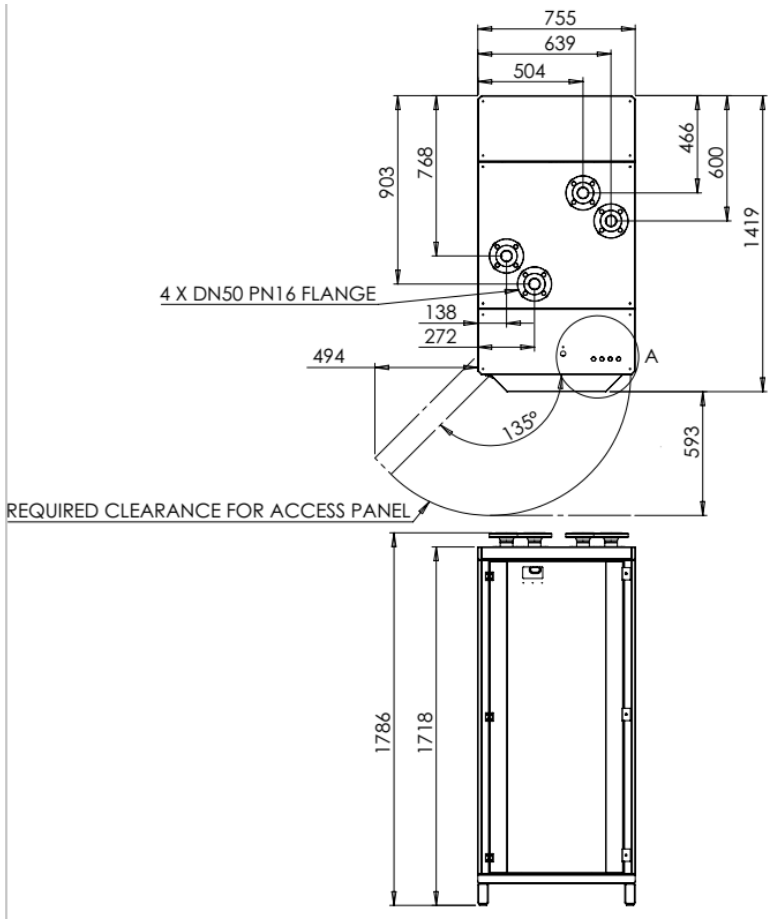


Fig 10 Heat Pump clearances

4.6.3 Installation of the heat pump

The heat pump is designed for internal use only. Ideally the heat pump should be placed next to an external wall allowing easy access to the externally mounted ground array manifold. Any pipes internal to the building must be insulated with vapour barrier insulation such as Armaflex. It is not recommended that the ground or header array manifold is installed within a building due to condensation and difficulty in lagging the manifold to overcome this.

It is possible to place manifolds in underground chambers and Kensa can supply suitable chambers on request. If an underground manifold is used all joints must be electro-fusion type.

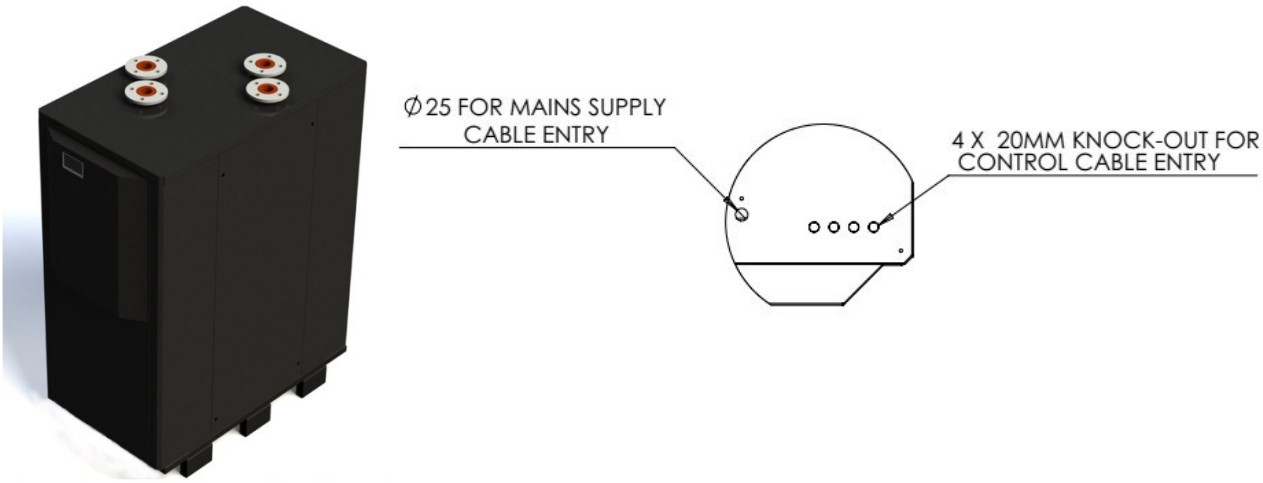
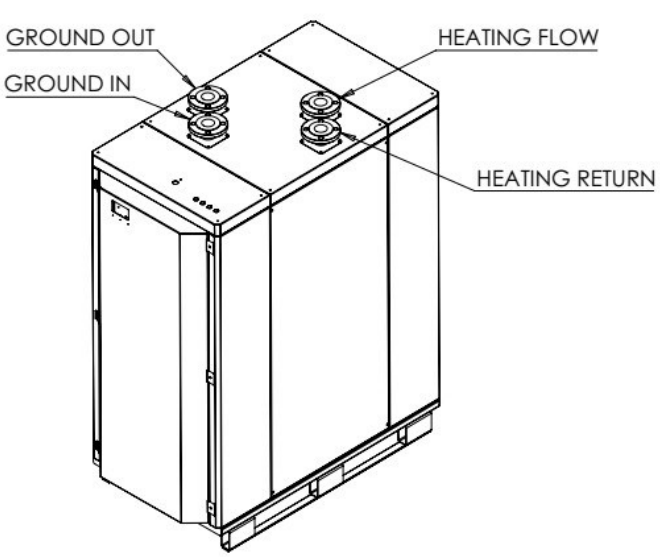
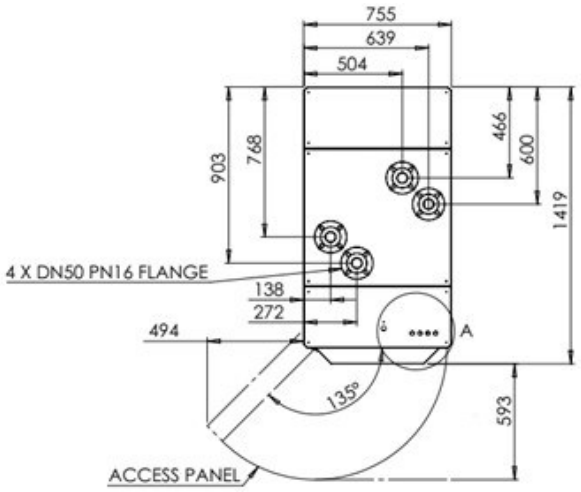


Fig 11 Q80 Series heat pumps

i. Using specialist lifting equipment, place the Heat Pump into position.
ii. Ensure the heating distribution system has been thoroughly purged of any debris and any filters are clean.
iii. All pipe connections to the heat pump must be vibration isolated using bellows or equivalent. Connect the ground feed & return pipes from the ground array/header manifold, and the feed and return pipes from the heating distribution manifold (which must be connected the correct way round), according to Fig 12. The reason for using flexible connections is that the heat pump is suspended on anti-vibration mounts, so the connections must also be flexible. For multiple plant room modules the flows and returns should be manifolded together and balanced ideally in a reverse return arrangement if possible.
iv. Open the access panel.
v. Using the correct knock outs in the top of the unit, thread the power supply and BMS wires from external to the unit into the control box and connect them to the terminals required, (see electrical installation section).
vi. Check and rectify any leaks that may be in the plumbing system. It is advisable that a pressure test is carried out to ensure the system is leak free.
vii. The appliance should be left for 12 hours after installation before it is turned on, to allow the refrigerant to settle. The area where the heat pump is installed must be dry and rodent free.
viii. Phone Kensa to arrange for the commissioning of the unit. Do not switch the unit on without talking to Kensa first.





Flange sizes are DN50 PN10/16.

Warning: This unit must not be run without a minimum of 22% glycol and inhibitor in the chilled water circuit or the warranty will be invalidated.

Fig 12 Q80 Series heat pump connections (from the front of the unit.)

4.7 Electrical installation

Any electrical connections must be in accordance with current IEE regulations and carried out by a suitably qualified person. Any cable used must be adequately sized for the load.

The Kensa Q80 Series heat pump range is available in three phase power supply versions only (415V 60 Hz).

Any electrical work required to install or maintain this appliance should be carried out by a suitably qualified electrician in accordance with current IEE regulations

To access the mains power wiring terminals :-

i. Open the access panel

ii. Remove the mains power cover by unscrewing the six cross head screws on the mains power enclosure.

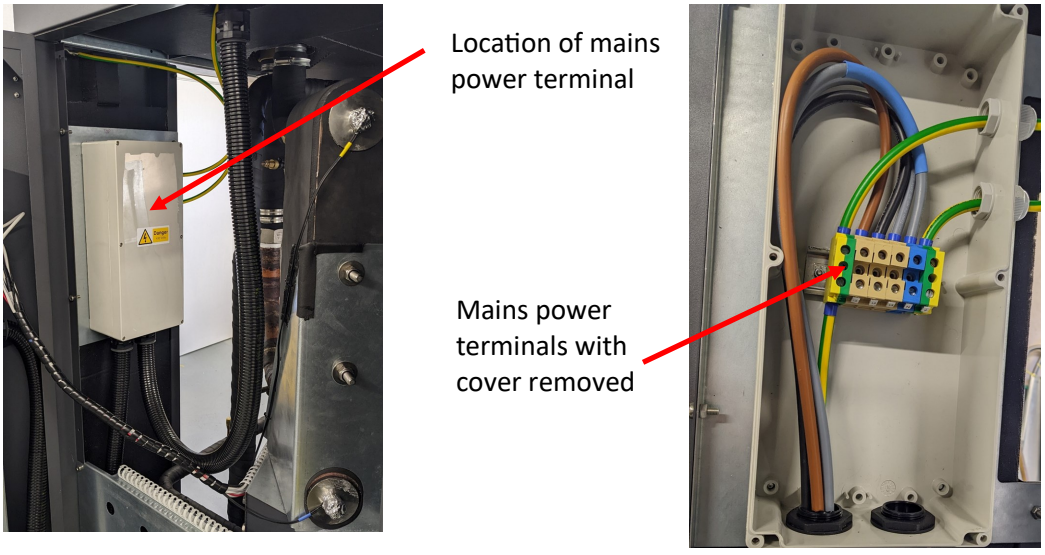


Fig 13 Position of the mains power enclosure

4.7.1 Three phase power supplies

The power should be connected via a junction box, connected to the supplied connected lead. The lead follows the ISO colour standards for three phase power supplies ie L1 - Brown, L2 - Black, L3 - Grey, Neutral - Blue + Earth - Green/Yellow.
If the phases are connected wrong the compressor will not start but no permeant damage is caused.

The supply must be connected to an isolator with all pole disconnections of minimum 3mm .

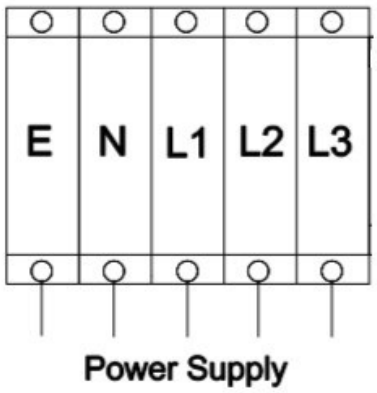


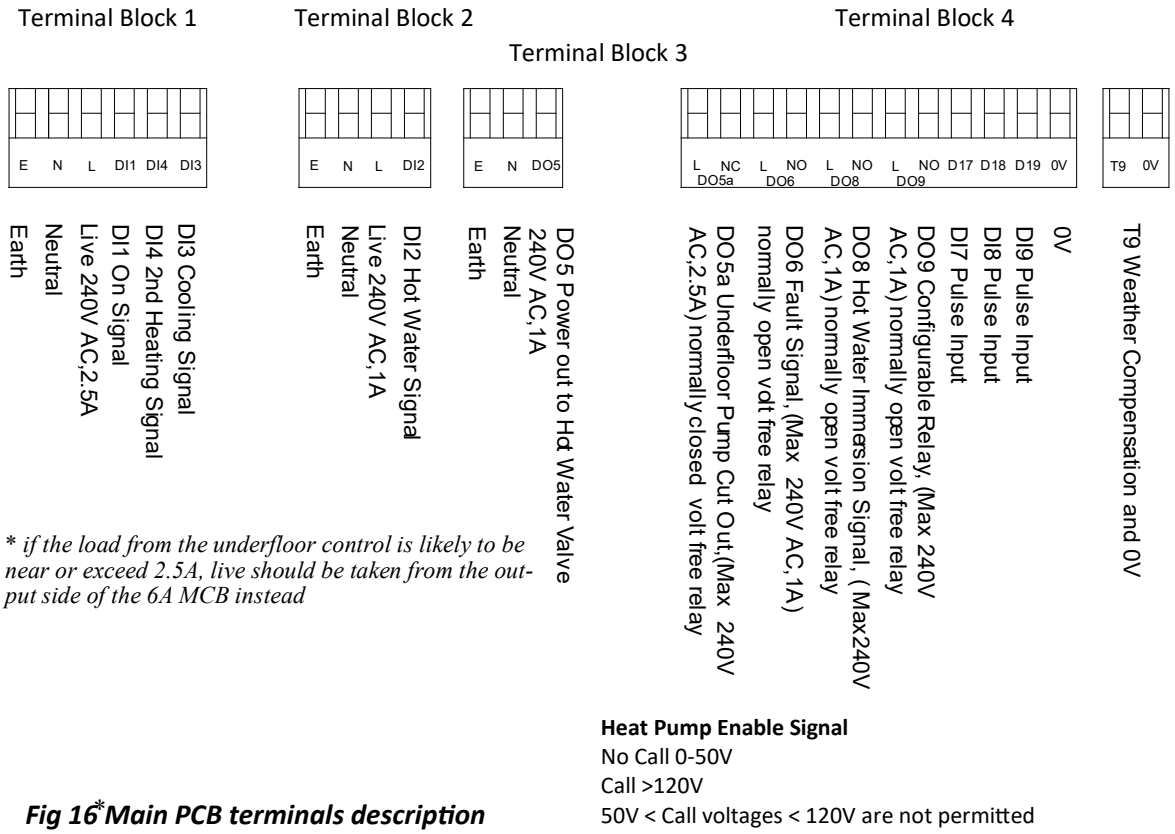
Fig 14 Heat pump wiring—Three phase power supplies

Cables should enter the unit from above using the knock out cable entry ports provided in the top of the unit. Suitable cable glands are supplied with the unit. An external isolation switch should be wired into the circuit to provide local isolation of the electrical supply as required.

The following sections detail the standard controller wiring connections. The heat pump should be set up in conjunction with the BMS on commissioning.

Fig 15 Location of main PCB terminals

4.7.2 Main PCB terminals description



** if the load from the underfloor control is likely to be near or exceed 2.5A, live should be taken from the output side of the 6A MCB instead*

Fig 16*Main PCB terminals description

Terminal Block 1—Space heating/Cooling

Earth—Earth connection for space heating timeclocks/ control devices connected and powered by the Heat Pump such as underfloor control units, heating timeclocks and thermostats.
Neutral—Neutral connection for space heating timeclocks/ control devices connected and powered by the Heat Pump such as underfloor control units, heating timeclocks and thermostats.
Live- 240V AC, 1A Live connection for space heating timeclocks/ control devices connected and powered by the Heat Pump such as underfloor control units, heating timeclocks and thermostats. If the load from the underfloor control is likely to be near or exceed 2.5A, live should be taken from the output side of the 6A MCB instead.
DI1—Live return 240V AC, 1A (On signal) call for heating returned from space heating timeclocks/ control devices connected to the Heat Pump.
DI4– 2nd Heating Signal—Live return 240V AC, 1A (On signal) call for a second heating set point returned from space heating timeclocks/ control devices connected to the heat pump. This allows a heating zone to be controlled which requires a higher temperature than other zones. For example a zone of underfloor which requires a lower flow temperature can be controlled by a timeclock connected to DI1 and DI4 can be used to control a zone of radiators requiring a higher flow temperature 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.
DI3—Cooling call signal 240V AC, 1A. This is the enable signal to the heat to provide cooling. The heat pump and heating distribution system needs to be configured / specified for cooling applications. Simultaneous calls for heating and cooling will result in the unit returning an error code. Cooling applications can also affect eligibility for grant schemes.

Terminal Block 2—DHW

Earth—Earth connection for domestic hot water timeclock, powered by the Heat Pump.
Neutral—Neutral connection for domestic hot water timeclock, powered by the Heat Pump.
Live- 240V AC, 1A Live connection for domestic hot water timeclock, powered by the Heat Pump.
DI2—Live return 240V AC, 1A (On signal) call for domestic hot water heating returned from the domestic hot water heating timeclock connected to the Heat Pump.

Terminal Block 3 - DHW 3 Port valve connection

Earth—Earth connection for domestic hot water valve, powered by the Heat Pump.
Neutral—Neutral connection for domestic hot water valve, powered by the Heat Pump.
DO5- Live out to domestic hot water valve 240V AC 1A rated.

Terminal Block 4— Additional Inputs and Outputs

DO5a—Underfloor Pump Cut Out. Normally closed volt free relay (240V, 2.5A) which opens when the DHW valve operates. The relay can be wired directly to the supplementary underfloor manifold water pumps (up to a maximum of 2.5A). When the heat pump is producing domestic hot water if wired this relay will turn all the supplementary underfloor water pumps off increasing the systems efficiency. If the current is greater than 2.5A an external relay must be used.
DO6– Fault Signal. Normally open volt free relay (240V, 1A). Can be used as a general fault indication.
DO8– Hot water immersion heater signal. Volt free relay (240V, 1A). Can be used in conjunction with an external relay to operate the immersion heater (settable via the controller). The immersion heater must be powered by a separate external power supply.
DO9– Supplementary Heat Signal. Normally open volt free relay (240v, 1A). This relay can be used to signal to an external supplementary heat source to operate when the controller detects that the heat pump cannot maintain temperature. Configuration of this is via the controller. The supplementary heater must be powered by a separate external power supply.
DI7, DI8, DI9 and 0V– Digital inputs from devices such as electricity meters, heat meters, etc. The controller 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).

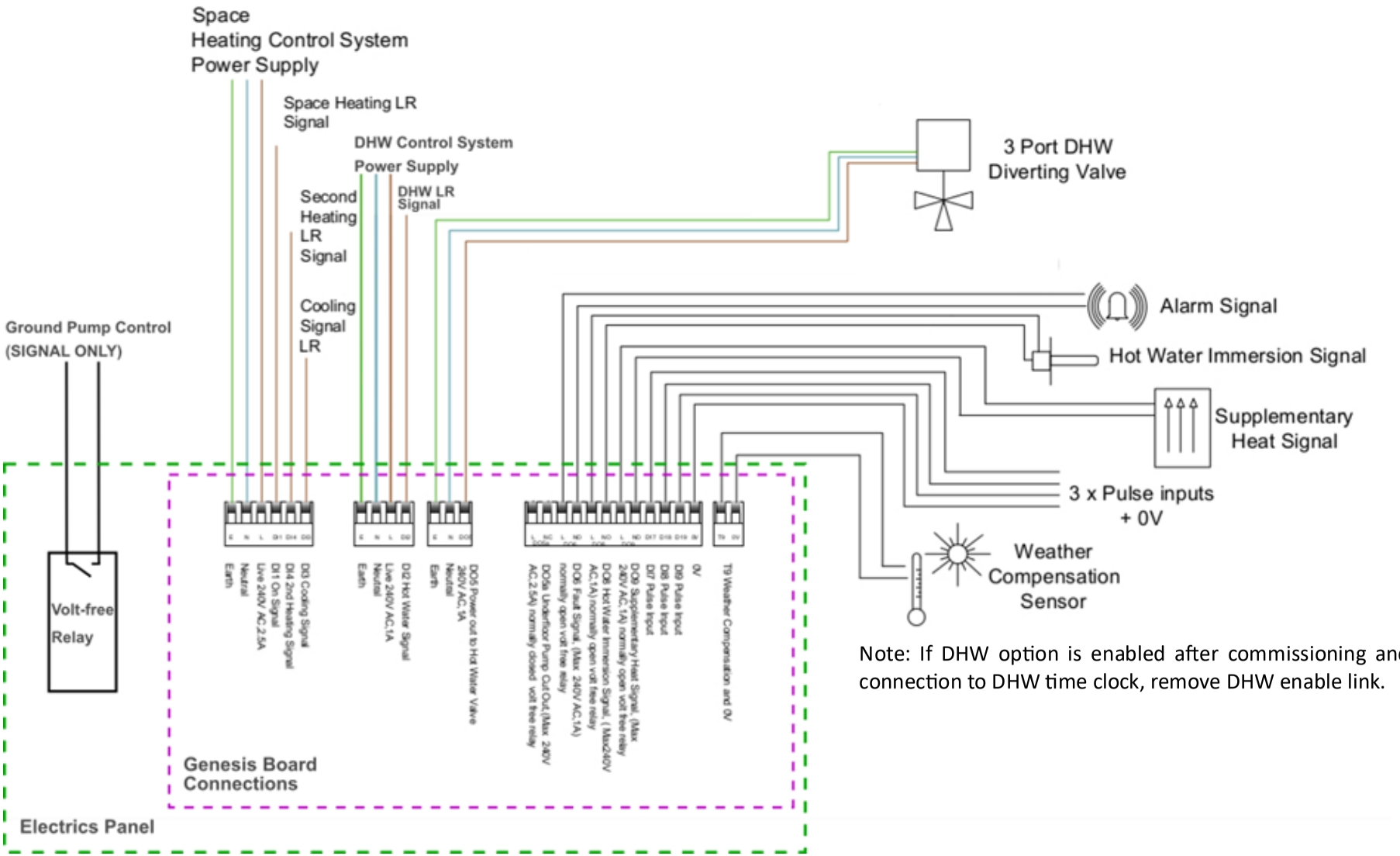
Terminal Block 5—Weather Compensation T9

All Kensa Heat Pumps are supplied with Weather Compensation as standard. This facility will reduce the return water set-point against a schedule of external ambient temperatures. In more simple terms, the temperature of water flowing into the building's radiators or underfloor heating is reduced in mild weather, which allows the heat pump to run more efficiently. This is particularly important with radiators, as much higher temperatures are required. In cold weather, many people already turn up the temperature of water flowing from their boiler by hand and are therefore weather compensating their heating system manually.

To enable weather compensation (if required) on your heat pump the sensor should be installed and weather compensation enabled within the controller .
This sensor is best fixed to a North-facing wall, and connected with 2 core 0.5 mm cable, unshielded, to the heat pump. The cable should be routed inside the heat pump case and connected to the main pcb terminals. The weather compensation should then be left disabled. If weather compensation is required this should then be enabled within the controller.

Note :- DI4, DO6, DO8, DO9, DI7,DI9 and T9 are all optional.

Fig 17 Generic Heat Pump Wiring Diagram



Note: If DHW option is enabled after commissioning and connection to DHW time clock, remove DHW enable link.

DI3 is only for use with cooling models
DI2, DO5 and DO5a only for use with DHW enabled models.

Ground Pump Control Relay

It is important that the ground pump is controlled via an external volt free relay due to the low current ratings of the relays on the pcb i.e. DO9. This external relay is provided within the controller wiring enclosure. (see Fig 4 and Fig 17 for location).

It is also important that there is an interlock on the ground pump flow linked to the run signal for the heat pump, particularly if the control of the unit is via a BMS system.
There are two common types of control to interlock the run enable signal to the ground pump flow:-

- A flow sensor, of which there are two common types the first being an internal sprung switch, and the second an ultrasonic sensor type.
- The differential between two pressure sensors, one before the ground circulation pump and one after.

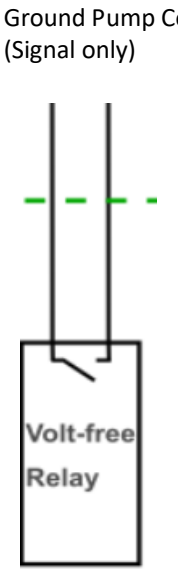


Fig 18 Ground Pump Control relay

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5. Setting to Work

After all mechanical and electrical work has been completed, the following instructions should be followed.

5.1 Purging the ground array of air.

It is important for correct operation that all the air is removed from the ground arrays including the header pipework.

For large systems a large pump maybe required and advice can be sought from Kensa. A suitable pump for most applications has the following specification, however it should be checked against the installation requirements.

Fig 19 purge pump

Outlet size = 50mm
Max output (no lift) = 600l/min
Max suction lift = 8m
Max total lift = 27m
Fuel = unleaded

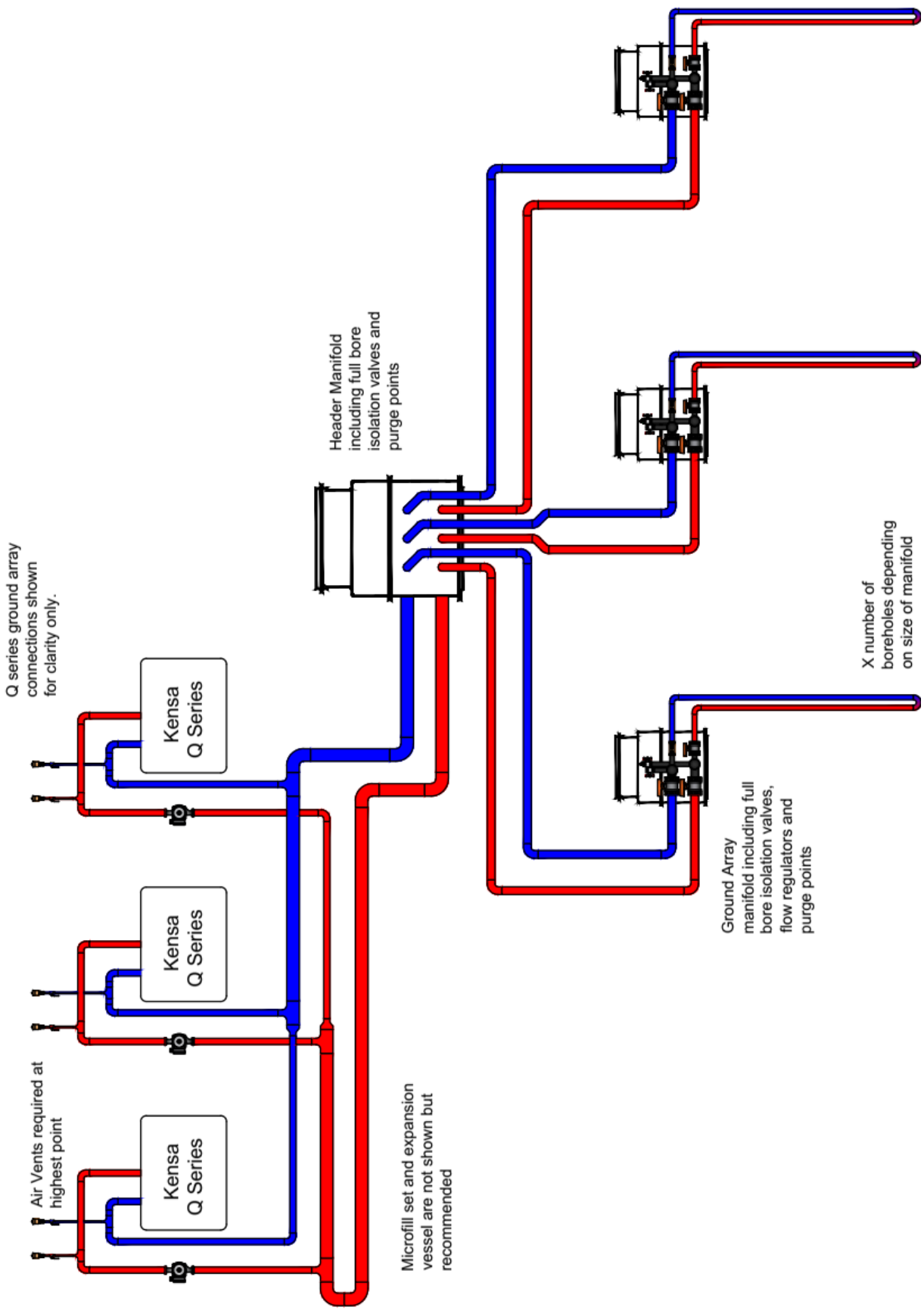
It is important that the right fittings are used on the pump (these will be extra to the pump), it is clean and all joints are air tight.

5.1.1 Purging procedure for ground arrays.

It is important that all the air is removed from the ground arrays and header pipework prior to commissioning. Failure to do this could result in damage to the units.

When purging good engineering procedures should be followed and all high points should have air bleed points installed.

Fig 20 Header Arrangement



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5.1.2 Purging the headers

Once the ground arrays have been purged of air it is important that the header pipe is also purged. This should be done by connecting the purge points together on each array manifold in turn using suitable pipe to create a loop. The purging should then be carried out from the header manifold following the same purging procedure as for the ground arrays.

To ensure all the air is removed it is advised that when the headers have been purged the ground arrays are purged again and automatic air vents are connected at high points where air can collect. After the air has been removed it is advisable that **before** the antifreeze is added the system is leak tested to BS805 Section 11.3.3.4. (See 5.1.3), if this didn't occur when the ground arrays were installed.

5.1.3 Adding antifreeze /inhibitors

The antifreeze provides protection to the heat pump (and contains an inhibitor and anti-bacterial agents) by preventing the circulating ground fluid from freezing in the heat exchanger. If not added in sufficient quantities the heat pump can freeze and cease working. All antifreeze provided with the order should be added and it is recommended that the quantity is roughly divided between the number of arrays. This amount of antifreeze is the minimum required for a standard system (at least 22% concentration by volume , Refractive index 1.356). If the heat pump and manifold are a distance apart and header manifolds are present this quantity of antifreeze provided may need to be increased. Please contact Kensa for further details.

It is very important to purge all the air from the system before adding the antifreeze as it is very difficult to remove the air with the antifreeze in the system due to the higher viscosity of the mixture.

Once the purging of all the air within the arrays and heat pump has been completed the antifreeze needs to be added.

Once added, to mix the antifreeze around the ground arrays thoroughly, it is advised that the ground array circulation pump is turned on before the compressor is turned on. This ground array circulation pump should be left running for two to three hours to ensure the antifreeze is mixed in all the ground arrays and the heat pump.

Water should not be left in the ground array without biocide or antifreeze.

5.1.4 Pressure Testing in accordance to BS805 Section 11.3.3.4

In accordance with the GSHPA guidance, leak tightness (pressure) testing has to follow the EN 805 prescriptions in section 11.3.3.4. This test should be carried out after the ground arrays have been purged but before the antifreeze is added. For polyethylene (PE) tubes, the pressure testing has to be carried out as a 'compression test'. An overpressure (inside-outside) is applied to the pipe over the whole length. This step inflates slightly the PE pipe over its whole length. Then a sudden pressure drop of around 10% of the testing pressure is applied. This pressure drop allows the pipe to compress again. If the pipe is tight, a pressure increase is measured. This test should only be carried out on the ground arrays with the heat pump isolated from the test.

5.1.5 Testing of antifreeze concentration

It is important that the concentration of the antifreeze within the ground arrays should be a minimum of 22% or a protection level of –10°C (Refractive index 1.356). Concentrations below this could cause an A1 alarm and the heat pump to cease operation during severe prolonged cold weather.

The antifreeze concentration should be tested with a refractometer. If required a sample can be sent to Kensa for testing.

The concentration of antifreeze is required for the commissioning certificate and it is advised that this figure is noted in the settings table.

The drain cocks on the heat exchangers can be used to obtain a sample of thermal transfer fluid.

6. 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 Q80 Series Q heat pump the controller and heat pump settings are accessed via the display on the Q80 Series Heat Pump .

For directions on how to commission the controller please refer to the Genesis Commissioning manual which is available using the QR code below or direct from Kensa.

QR Code for Genesis Commissioning Manual

QR Code for Q Operational Manual

Before attempting Commissioning please refer to the Genesis Commissioning Manual.

6.1 Linking the Q80 Series heat pump to an existing Wi-Fi network.

It is possible to link the heat pump to an existing Wi-Fi network enabling remote diagnostics with Kensa. The heat pump will periodically upload performance data to a Kensa server allowing Kensa to interrogate any issues.

I. Navigate to the Wi-Fi connection page (menu\settings\wifi)
II. Select the name of the network, from the drop down list, you wish the shoebox to connect to.
III. Enter the password for the wi-fi network chosen.
IV. The heat pump will automatically connect to the chosen network once .

See section 4.8.3 of the Genesis Commissioning Manual.

7. Fault Finding

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.

It is recommended the Genesis Installation Manual is consulted if there are any problems with the controller/display.

8 Warranty

The Kensa Q80 Series Ground Source heat pump is designed and built to the highest standard and as such is warranted for 5 years for parts from the date of commissioning or 5 ½ years from the date of manufacture (excluding the electrical components), whichever is shorter. Electrical components are warranted for 2 years for parts from the date of commissioning or 2 ½ years from the date of manufacturer, 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 warranty period (excluding 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 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 Q80 Series 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 Q80 Series 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.
Units installed not in line with the O&M required clearances are return to base repair only.

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 warranty 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.