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AIR SOURCE HEAT PUMPS

INSTALLATION AND USER

MANUAL

ESP HT 9KW

ESP HT 12KW

ESP HT 15KW

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WARNING !

READ THIS BEFORE INSTALLING THE UNIT.

*The installation of all un-vented water heating systems above 15 litres (this includes the ESP Hot Water ASHPs) **MUST** comply with local area Building Regulations. It is a legal requirement that the local Building Control Officer be notified of any proposed installation.*

UK regulations require an appropriately sized expansion vessel (internal or external) to be incorporated, safety devices to prevent the stored water exceeding 100°C, and pipe work to convey discharged hot water safely away from the safety devices.

*Furthermore, the installation must be carried out in accordance with this manual and by an engineer who has successfully completed a recognised course in the installation of un-vented heating systems such as CITB. The guidance contained in the Good Practice Guide should be followed. **Failure to fit the unit correctly and in accordance with regulations may affect its safety, efficiency and WILL invalidate any guarantee.***

THE UNIT MUST BE INSTALLED, COMMISSIONED AND MAINTAINED BY A COMPETENT INSTALLER IN ACCORDANCE WITH BUILDING REGULATION G3 (ENGLAND AND WALES), TECHNICAL STANDARD P3 (SCOTLAND) OR BUILDING REGULATION P5 (NORTHERN IRELAND) AND THE WATER FITTING REGULATIONS (ENGLAND AND WALES) OR WATER BYELAWS (SCOTLAND). FOLLOWING INSTALLATION AND COMMISSIONING, THE OPERATION OF THE UNIT SHOULD BE EXPLAINED TO THE USER AND THESE INSTRUCTIONS LEFT WITH THEM FOR FUTURE REFERENCE.

1.0 Preface

Congratulations on purchasing your ESP air source heat pump (ASHP). It will give you years of trouble free heating and help reduce your carbon footprint. ESP ASHP units are built using the highest quality components and the latest design and technology.

Please read this manual:

It is important that you read this manual and familiarise yourself with the technology and controls so that you can get the best out of your unit. You should keep this manual safe and ensure that it is available to engineers that perform any installation works or maintenance.

Installation:

Please make sure that your ASHP is only installed by a suitably qualified engineer and in accordance with this manual. If this is not done, it may invalidate your warranty.

Warranty:

All ESP ASHPs are covered by the warranty contained in the *ESP Terms and conditions of Business* a copy of which will have been provided to you prior to your purchase.

YOUR INSTALLATION ENGINEER MUST COMPLETE THE TABLE IN APPENDIX 2 – PLEASE ENSURE THAT THIS IS DONE AND THAT CONTACT DETAILS ARE CORRECT AND CLEAR.

YOUR INSTALLATION ENGINEER SHOULD ALSO COMPLETE AND SIGN APPENDIX 3 AND THIS INSTALLATION AND COMMISSIONING CERTIFICATE SHOULD BE PROVIDED BY THE INSTALLATION ENGINEER AS PART OF THE HANDOVER PACKAGE. THE CERTIFICATE SHOULD BE KEPT WITH THE UNIT DOCUMENTATION AND ALWAYS HANDED TO ANY NEW OWNER OR OCCUPIER OF THE INSTALLATION ADDRESS.

Pictures and Drawing:

The pictures and drawings in this manual are for information only. The manufacturer reserves the right to make modifications to the product without prior notification to the end users.

Children:

You should not let children operate the unit or play close to it when in operation. The unit has a fast moving fan and, whilst every effort has been made to ensure that it is not accessible, children may try to put objects in to it – this can cause injury and seriously damage the unit.

Check on delivery:

On taking delivery of your ASHP, please check for any signs of damage. If you are not happy with the condition of the unit on delivery, please advise Earth Save Products (ESP) immediately and point out any damage to the delivery driver and request that he take notes of your concerns.

Storage:

If put in to storage, the unit must be covered to keep it free from dust build up and away from direct sunlight.

2.0 System Overview

2.1 General Information

Air source heat pumps are similar in operation to ground source heat pumps, except that heat is extracted from the **air** rather than the ground. Air source heat pumps are classified as either air to air or air to water depending on whether the heat distribution system in the building uses air or water. The main advantage of air source heat pumps over ground source heat pumps is their lower installation cost. A ground **source heat pump** requires a network of underground coils that is used to extract heat from the ground. By comparison, air source heat pumps extract the heat directly from outside air and so avoid these potential problems.

Benefits of **air source heat pumps** over conventional boilers include the fact there is no combustion and no explosive gases within the building, no need for flues or ventilation, no local pollution, long life expectancy with minimal / no annual maintenance, simple engineering/fitting and lower running costs.

Depending on the comparison fuel and heating system being compared to the ASHP, savings can be up to 75% and the units are designed to have a life span of 20 years with no substantial annual required or recommended maintenance.

Component parts of ESP ASHP units are from industry leading manufacturers such as the Danfoss heat exchanger, Wilo water pump, **Copeland** compressor and Carel controller, so reliability and longevity is ensured.

2.2 Specification Table.

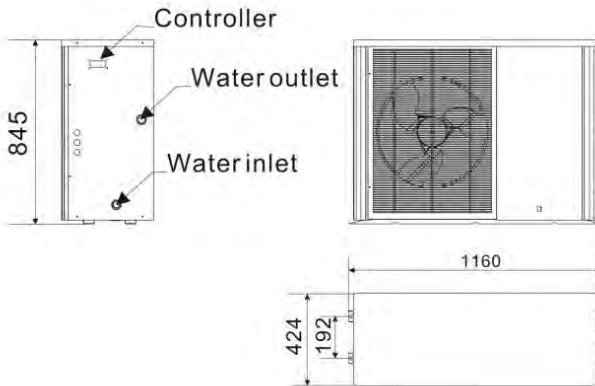
	Units	9kW	12kW	15kW
Heating Capacity ¹	kW	9.2	12.0	14.5
	BTU/h	31409	40968	49503
COP ¹	W/W	3.58	3.6	3.6
Heating Capacity ²	kW	9.5	12.9	15.0
	BTU/h	32300	43800	51000
COP ²	W/W	2.4	2.6	2.6
Power Supply	V/Ph/Hz	230/1/50	230/1/50	230/1/50
Electrical Heater	kW	1.5	3.0	3.0
Electrical Heater Running Current	A	6.8	13	13.5
Max Running Current	A	27	42.9	45.2
Number of Compressors		1	1	1
Compressor Type		Scroll	Scroll	Scroll
Number of Fans		1	2	2
Fan power input	W	120	2X120	2X120
Fan Direction		Horizontal	Horizontal	Horizontal
Water Pump Power	kW	0.2	0.6	0.6
Water Head	M	8	22	22
Water Connection	Inch	1	1	1
Water Flow Rate	m ³ /h	1.5	2.1	2.6
Water Pressure Drop	kPa	17	34	34
Noise	dB(A)	46	48	50
Net Dimensions		See Diagrams Below		
Shipping Dimensions		See Shipping Label		

Notes:

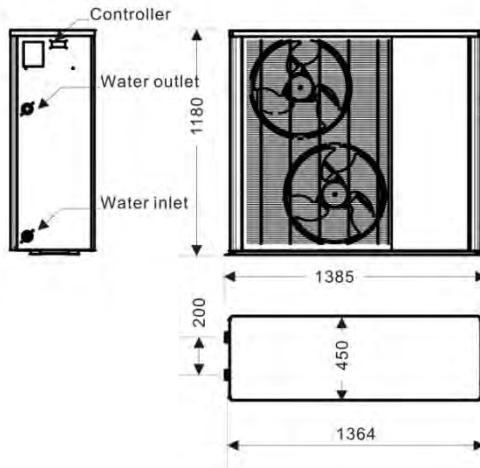
1. Flow temp 45°C, return temp 40°C
2. Flow temp 60°C, return temp 55°C

Dimensions and Scale

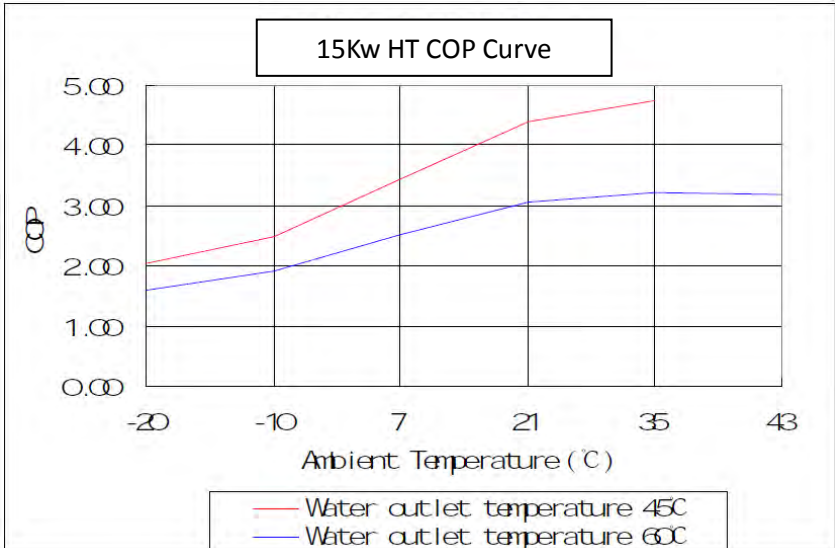
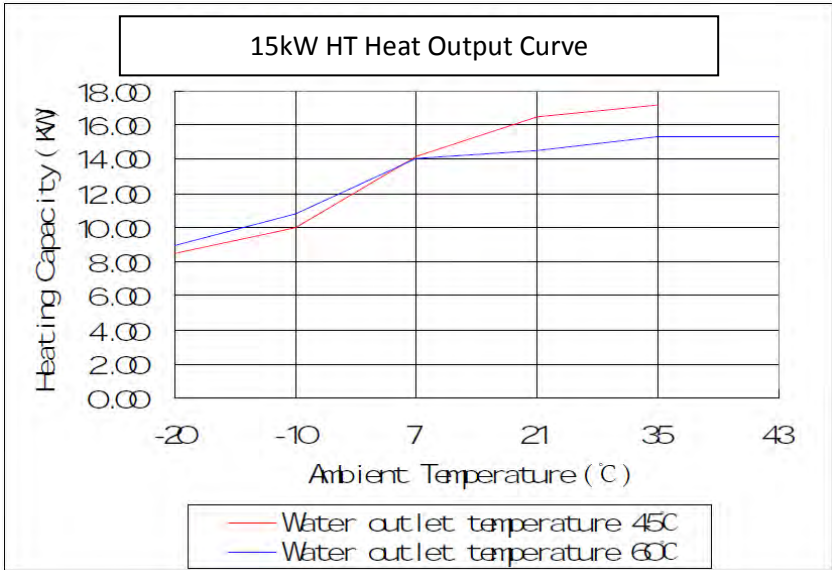
ESP HT 9KW

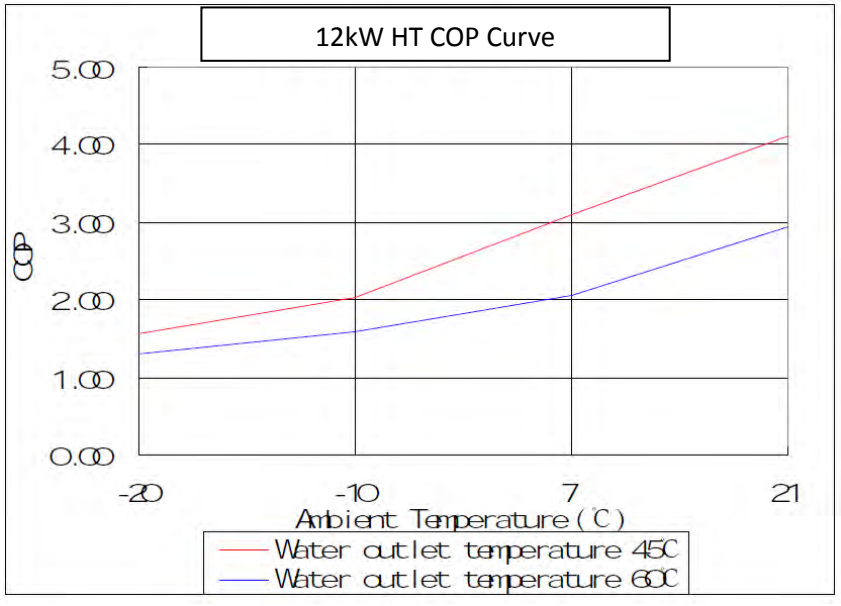
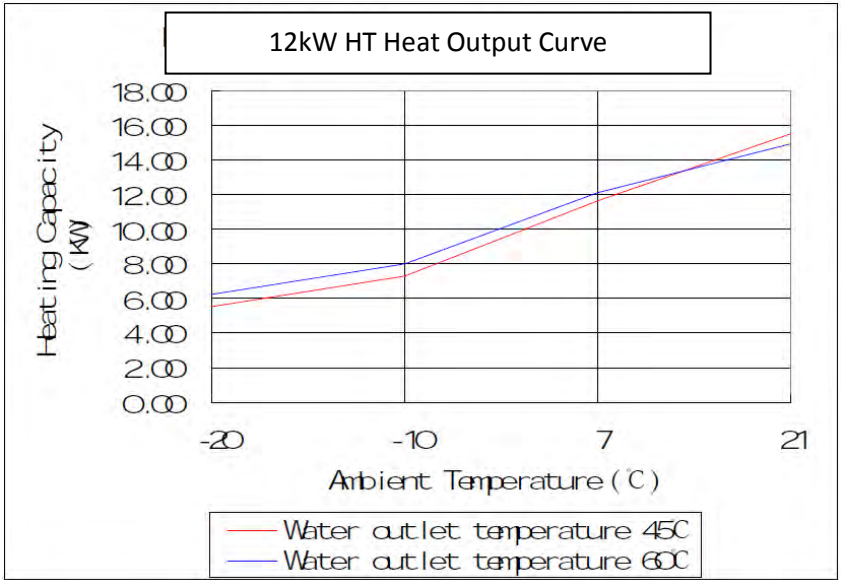


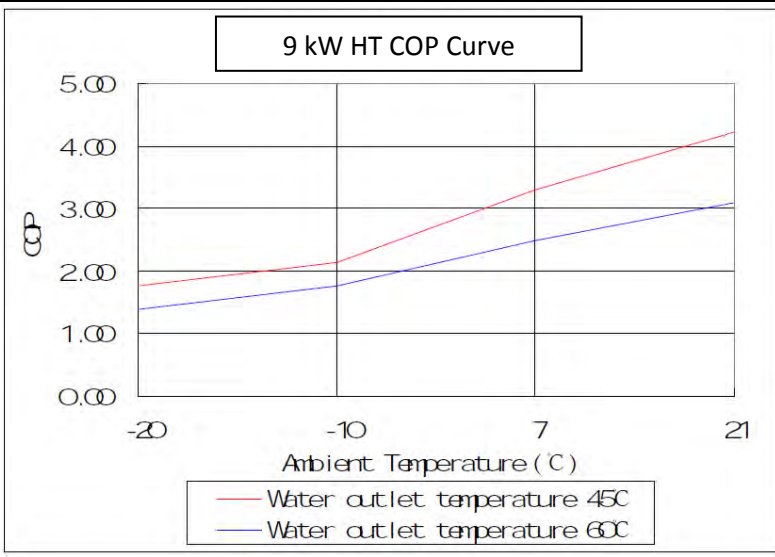
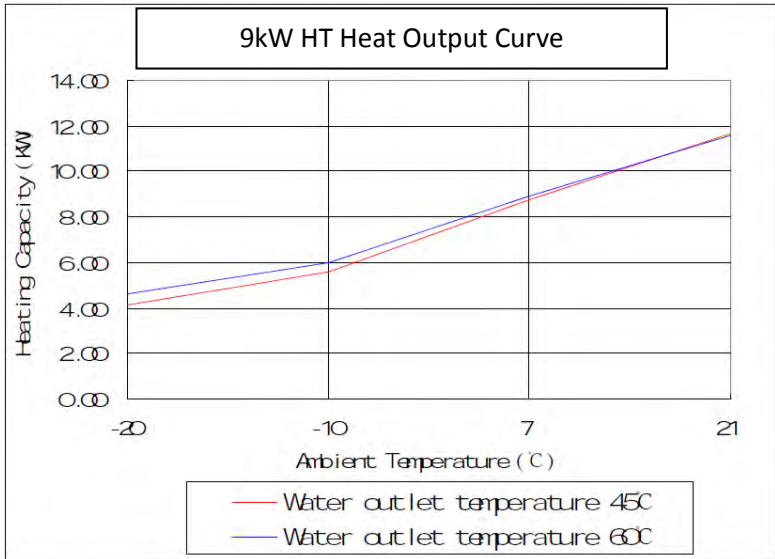
ESP HT 12KW/15KW



2.4 Performance Graphs







3.0 Installation and Maintenance

3.1 Cautions and Warnings.

It is of the highest importance that you read and understand this manual and that the unit is installed in accordance with it. The manual is here to help with installation and to ensure that damage to people or property is avoided.

INCORRECT INSTALLATION WILL INVALIDATE ANY GUARANTEE.

THE UNIT MUST BE INSTALLED, COMMISSIONED AND MAINTAINED BY A COMPETENT INSTALLER/ENGINEER IN ACCORDANCE WITH LOCAL REGULATIONS AND BY-LAWS. FOLLOWING INSTALLATION AND COMMISSIONING, THE OPERATION OF THE UNIT SHOULD BE EXPLAINED TO THE END USER BY THE INSTALLER/ENGINEER AND THESE INSTRUCTIONS LEFT WITH THEM FOR FUTURE REFERENCE.

All plumbing works and electrical works must be carried out by a suitably qualified plumber and electrician respectively. This is mandated by English law and there are severe penalties if works are carried out by unqualified, or not suitably qualified, engineers and tradesmen.

IMPORTANT NOTES:

Below you will find information that is critical for the safe and proper installation and use of the unit. Please make sure that you understand the contents as it is written to help avoid injury to end users, installer and the unit itself.

Professional installer is required	The heat pump <i>must</i> be installed by a suitably qualified engineer. Failure to ensure this can cause damage to the unit and may cause serious injury. The unit's warranty will also be invalidated if a suitably qualified engineer is not engaged to install it.
Earthing required	Please make sure that the unit and power supply are soundly earthed.

Refrigerant	Please give full consideration to adequate ventilation being available in the event of a refrigerant leak- this unit must be installed outdoors.
Installation Site	Do not install the unit near to a gas installation.
Anchor the Unit	Make sure that the unit is secured a base that is capable of taking the weight of the unit.
Circuit Breaker	Make sure that the unit is connected to the power supply via a suitably sized type C MCB.
Unit Upright	The unit <u>must</u> be installed level across the whole width. See section 3.4 for further details.

OPERATING NOTES:

Do NOT	Do not push anything through the grills protecting the unit, or into the fan blades when they are running and make sure that children cannot access the unit or play close to the unit.
Shut off the power supply	If there is an unusual sound or smell coming from the unit, immediately shut off the power supply and call your installation engineer.

MOVE AND REPAIR NOTES:

Suitably qualified engineer	The unit should only be moved and/or repaired by a suitably qualified engineer.
Do NOT	Do NOT try to install, move or repair the unit yourself – it is NOT worthwhile running the risk of injury.
Transporting the Unit	The unit must be transported in the vertical position.

OPERATION NOTES:

Where to site the unit	The unit must only be installed outdoors – the unit is not designed, nor suitable for, installation <u>ANYWHERE</u> inside the house. The Unit needs to be sited where it can receive and expel large volumes of ambient air and condensate from the unit must be drained away to a suitable point to avoid water running from the unit on to walkways where ice may form. If the unit is to be left unused for any significant period of time, it should be drained
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	down. Make sure that the flow and return pipework from/to the unit have a full flow level valve fitted in-line so that the unit may be isolated from the complete system before draining it down – this avoids the waste of glycol if the whole system were to be drained down. Make sure that pipework outside is properly lagged so that it will not freeze in cold weather when the unit is not in use.
Shut off the power	When cleaning or working on the unit, shut off the power supply.
You MUST	You must use a suitable power supply that is appropriately fused.

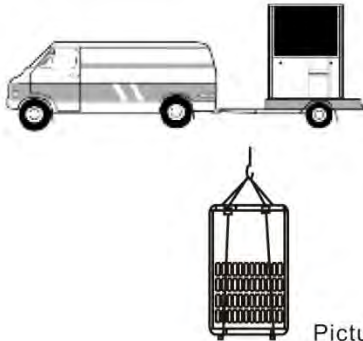
IMPORTANT SAFETY INFORMATION FOR THE END USER

- Installation of the heat pump must only be carried out by persons with suitable engineering qualifications and experience.
- Do not attempt to modify, repair or service the heat pump yourself, unless you have been appropriately trained and are suitably qualified.
- Do not insert body parts or any other items into the air inlet or air outlet; the fans are provided with a guard for good reason!
- Save in emergencies, do not start or stop the unit by switching the power to the unit on or off; always use the controls provided on the unit/controller. Starting/stopping the heat pump using mains power is dangerous for you and may damage the unit.
- Ensure that the heat pump is protected from prolonged exposure to large quantities of water (e.g. leaking gutters). Failure to do so may damage the unit.
- Do not operate the unit or the programmer with wet hands/fingers.
- Upon replacement of any fuse in any part of the power feed to the unit, ensure a correct replacement is used. Do not, under any circumstances, use a fuse that is too large or bridge the fuse with silver paper, nails, wire, or anything similar.
- Keep the programmer for the unit out of reach of children.

- The electrical supply must be isolated during a heightened risk of lightning strikes.
- Do not attempt to move the appliance once installed; this must be carried out by a qualified engineer.
- Isolate the electrical supply to the appliance if you detect an odor from the unit, or scorching is detected anywhere in or on the unit.
- Only use the unit for the purpose intended and in accordance with this manual.
- Ensure the area around the unit is clean, well-ventilated and kept free of all obstructions.
- Do not keep items on top of the unit or use it to support other appliances.
- Do not under any circumstances stand on the unit - it is dangerous for you and will damage the unit.
- Isolate the electrical supply to the unit if it is to be switched off for a period of more than a week.
- Drain the water from the water circuit if power to the unit is to be switched off during very cold weather.
- Periodically check the condition of any supports or wall brackets for deterioration - have these replaced immediately if any deterioration is evident.
- Do not wash the unit with water, alcohol, benzene, thinners, glass cleaner, polish or powders.
- Before cleaning, isolate the electrical supply to the unit. If cleaning of any internal part of the unit is required, this should only be done by an appropriately qualified engineer.
- If you have any questions about the operation and maintenance of the unit that are not addressed in this manual, or if you feel that something in the manual is unclear, please call the seller, distributor or ESP.

3.2 Transit

The unit must be kept upright during transit and securely fastened so that it does not rock, slide or fall over.



Picture 1

Ensure suitable lifting equipment is available to move the unit around the site and into position, whilst maintaining a vertical position. Using unsuitable lifting gear or equipment to move the unit around can cause significant damage to the unit externally and internally.

When using lifting gear, an 8m cable is needed and the cable should not touch the surface of the unit – use soft packing between the lifting gear and the unit to prevent damage to the unit.

3.3 Installation Position

Please note the following important points:

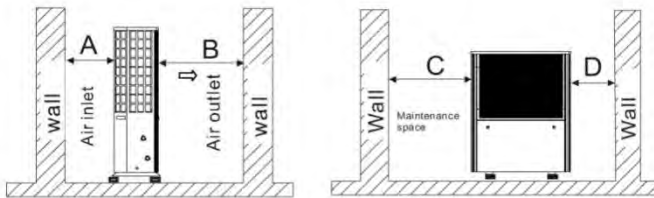
- The unit can be installed in any outside location that can support heavy machinery i.e. balcony, roof terrace or on the ground.
- If possible, the unit should be sited on a south facing wall to maximise solar gain.
- Circulation of air around the unit must not be impeded and the minimum recommended clearances are shown in the diagram below.

However, PLEASE NOTE that the unit should be positioned away from strong winds blowing directly on to/through the unit as this can also impair unit performance.

- The unit must be kept a good distance from other heat sources and any fuel storage.
- A cover is needed in the winter to protect the unit from heavy snowfall.



- The unit should be positioned so that it is easily accessible for maintenance and servicing.
- The unit needs to be sited near a water drainage facility to allow the safe drainage of condensing water that is produced during normal unit operation.



3.4 Securing the Unit

The unit must be placed upon a level and firm base that is suitable to carry the weight of the unit e.g. a 100mm concrete base. The base must provide for the unit to be sitting at least 150mm above the surrounding ground. Allow for a slight tilt of the unit (3mm across the width running from right to left as

you face the fan(s)) to allow rain water run-off and any water entering the unit to drain through the holes in the bottom of the unit.

The unit must be secured to its base using suitable fixings through the unit feet. The rubber feet supplied with the unit *must* be used. Alternatively, there are proprietary unit fixings available that include an adjustable steel frame and legs with rubber mounting pads. Please consult ESP if you have any questions on the use of such fixing methods; failure to comply with these instructions will mean that the unit will not meet certification requirements.

The unit must be fixed, stable and kept vertical during operation.

3.5 Water Loop Connection

Please pay special attention to the following points when installing the unit:

- I. Keep pipework as free from bends as possible to keep back pressure in the system to a minimum. Make sure that fittings, manifolds, water pumps and valves in the system are designed for full flow as restrictions in the system from these can materially and adversely impact upon the performance of the unit and effectiveness of the overall heating system.
- II. The piping must be clear and free from debris. Leak testing the heat distribution system must be carried out **before** connecting the unit to the system and repairs made where required.
- III. Pressure testing of the distribution and emitter system must be done **BEFORE** the unit is connected to the system. If the unit is connected while pressure testing is carried out, it will damage the unit.
- IV. An expansion vessel must be installed where the heating system is unvented/pressurised. If installing the unit in an unpressurised system, feed and expansion tanks must be provided and they should be positioned at least 0.5 metre higher than the highest point in the heat distribution system.

V. **The unit is fitted with a water flow switch that will pause the unit operation if water flow is not continuous (this includes where there is air in the system). The flow switch is there to protect the unit and the setting should not be altered. You should check that the switch is working properly before running the unit for any sustained period. If the flow of water is insufficient, an error code of “Flow Level” will be displayed on the controller.**

VI. The final connection to the heat pump flow and return must be made with suitable flexible pipes to prevent vibration in to the system pipework. Please ensure that two wrenches are employed to take up the torque created in tightening the fittings to avoid damage to both fittings and heat pump.



VII. These flexible hoses are available from ESP as part of an Installation Pack or individually.

VIII. Make sure that you **fit automatic air vents** at high points in the system. **The unit will shut down if air is in the system because the water flow switch will recognise air in the system as no water flow and a system alarm/protection code will appear on the unit controller. The Error Message “Flow Level” will appear on the controller display.**

IX. You must fit a pressure gauge and suitable blow off valve at the unit inlet/outlet where it can be seen from the unit.

X. The unit is supplied with a bung below the flow/return pipes. This bung must be removed and replaced with a drain-off- cock (DOC). There must also be a DOC at any lower point in the system, to allow for effective drain-down of the system as and when required. Please note that, if the system is to be left idle for a long period in winter, the system should be drained down. You should fit full flow lever valves on the flow and return to

the unit so that the unit can be quickly and effectively drained down where required for maintenance.

XI. You must fit a Y-strainer on in-line on the return pipe to the unit. This is normally fitted in an external location and must have a full flow lever valve side either side of the strainer to minimise glycol loss during maintenance. Due to the mix of metals on many systems it is both advisable and preferable to install a Spirotrap Magnabooster 2 ® rather than the minimum standard Y strainer. Failure to fit a good quality strainer in the return flow to the unit will invalidate the warranty on the unit.

XII. Where standard steel radiators are to be fitted, careful consideration should be given before fitting Thermostatic Radiator Valves (TRVs) because they are not designed to be used with low temperature systems. If the decision is taken to use TRVs, one must not be fitted in the same room as a room thermostat.

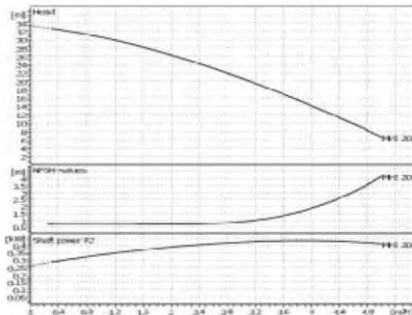
3.6 Water Pump

If using a buffer tank in the system, you will need to fit a suitably sized water pump on the water distribution side of the system. This water pump will need to be wired to receive an appropriate signal from the heating system.

The ASHP-fitted water pump performance parameters are as follows:

High pressure centrifugal pump

Pump data	
Make	WILD
Type	MHI 205 30
Pressure type	Single head pump
Pressure rating	PN 16
Max. fluid temperature	130
Max. fluid temperature	130



3.7 Power Supply Connections

Before starting to wire in the power supply to the unit, please check that the power supply is suitable for the unit (e.g. single or three phase, correct size cable, MCB etc. is available) having taken into account the requirements of the entire site.

The unit power specification is stated on a label on the side of the unit.

We recommend the use of a dedicated Type C MCB of appropriate rating (See below) for connection of the power supply via the consumer unit.

9 kW HT	40amp
12 kW HT	40amp
15kW HT	50amp

Important:

All electrical work **MUST** be carried out by a suitably qualified electrician.

The heat pump **MUST** be installed with an isolation switch adjacent to the unit and suitably positioned for general and emergency use. The isolation switch must be suitable for the unit electrical duty and comply with applicable Regulations.

The connection to the electrical consumer unit in the property must comply with current electrical standards and Regulations and be done via a fused supply/breaker that corresponds to the unit electrical capacity. Failure to do this correctly can result in fire and/or permanent damage to the unit. If the unit is not appropriately wired in to a suitable supply, the warranty on the unit will be voided.

IMPORTANT! We know that suitably qualified electricians charge professional level fees for work that they carry out, but it is better to pay a professional/fully qualified electrician to connect your unit in to an

appropriate power supply in the correct way, than for you to die trying or as a result of a fire in your property caused by inappropriate or incorrect electrical works. Also, it is law that only qualified electricians should install, repair or maintain electrical connections and, if you do not kill yourself installing the unit, you run the risk of prosecution if you do not comply with the law. It is not an exaggeration to say that, if you install/connect your unit to a power supply and that installation/connection causes injury to, or death of someone (even years after installation), you can be prosecuted under criminal law for murder, manslaughter or bodily harm and spend many years in prison as a result. **IT IS NOT WORTHWHILE RUNNING THIS RISK.**

SO, GET YOUR UNIT WIRED IN BY A PROFESSIONALLY QUALIFIED ELECTRICIAN IF YOU DO NOT KNOW SOMEBODY THAT IS QUALIFIED TO DO THE WORK, FIND SOMEONE AND DO NOT BREAK THE LAW BY DOING THE WORK YOURSELF.

The unit must be connected to the power supply through a two port rotary isolation switch, fixed in close proximity to the unit and as required by relevant Regulations.

The following points should be noted in relation to power supply wiring and system components:

- Open the front and side panels to access the power supply terminal.
- The power supply must go through the protective wire accesses and be connected to the terminals in the control box.
- Connect the 3 core signal wire plugs into the main controller terminals.
- If an additional water pump is being used (e.g. on the heating system side of a buffer tank) the additional water pump will need to be connected to the same power supply as the water pump located inside the unit so that they operate at the same time.

In the Appendices to this manual you will find wiring diagrams for the units. Please use these diagrams when introducing power or other wiring into the

unit. You should also use these diagrams to check the installation through before starting it up.

3.8 Power Cable and Switch

- The unit must have its own independent power supply from the consumer board. This power supply must be equipped with a suitable ampere rated MCB.
- The power supply must be equipped with a two port rotary isolation switch that has at least a 3mm contact separation at all poles.
- The wiring must be completed by a suitably qualified and accredited electrician
- All wiring should be routed neatly, be kept as far away as possible from the units water pipes and valves and comply with relevant Regulations. High voltage and low voltage wiring should be clearly separated.
- Part L2 of The Building Regulations requires that the heating system be fitted with a 7 day programmer. However, the most efficient way of running an ASHP system is to program is to ALWAYS On. An L2 compliant programmer may be used but it is **very IMPORTANT** that any signal going back to the heat pump from the heating system thermostat and/or programmer must be **VOLT FREE !** The heating system thermostat/ programmer controller is wired to terminals 25&26 inside the heat pump (these connections are not polarized) – see appendices. If you do not use a *volt free* programmer you WILL damage the ASHP unit.

3.9 Normal Heating Water Flow Temperatures

The heat pump should be installed with a buffer tank of suitable size (consult your supplier). The buffer tank will store water at a constant temperature and the stored water may be used for heating or cooling. Typically, for under floor heating the water flow temperature should be 35 °C, for Thermovec (fan coil) units 45-50 °C and for radiators 35-50 °C. For under floor heating, you must consider and take account of the floor finish/covering to be used as this

may impact upon the performance of the system and the transfer of heat in to the area to be heated. Guidance on emitter systems can be found at www.microgenerationcertification.org/admin/documents/MIS%203005%20Supplementary%20Information%202%20-%20Heat%20Emitter%20Guide%20v2.0.pdf where guidance can be found on pipe spacing for under floor heating and sizing fan coil units (such as the ESP Thermovec unit) and wet radiators. It should be noted that TRVs (Thermostatic Radiator Valves) are not designed for use with low temperature systems and, if the decision is taken to use them, one should not be fitted in any room where a room thermostat is fitted.

Simple heating and hot water system configuration:

Since the heat pump can comfortably heat the system water to 60 deg C, it is capable of supplying hot water by way of a suitable hot water cylinder (to taps, showers, etc). However, ESP strongly recommends that the Space Heating and Domestic Hot Water (DHW) systems are kept separate; the space heating to be provided by an ASHP and the DHW to be provided by an Ecocent to achieve maximum efficiency and economy.

Because water composition can vary greatly, **it is not ESP's policy to issue recommendations relating to water treatment.** The user or the owner is responsible for contacting a specialised water treatment company to obtain water treatment advice appropriate to your location. Appropriate water treatment processes/devices must be fitted to ensure the longevity of the unit and its proper operation.

The unit system must have a water glycol mix in it to protect the unit/system in cold weather - the mix is stated on the label on the side of the unit. Units in certain colder locations may need more glycol in the mix and you should consult your installation engineer or ESP to ensure that you use an appropriate mix. **WARNING!! - GLYCOL CAN BE POISONOUS - PLEASE BE SURE TO USE A NON-TOXIC BRAND AS VERY LITTLE GLYCOL NEEDS TO BE INGESTED TO BE FATAL.** ESP/YOUR INSTALLATION ENGINEER CAN SUPPLY NON-TOXIC GLYCOL UPON REQUEST.

3.10 Unit Commissioning Checks

Please carry out the checks noted below before commissioning and starting up the unit. These checks are not exhaustive & should be used as a starting-point; your installer will use experience and *Best Practice* when commissioning the unit:

- Make sure that the fan(s) rotate freely.
- Check the buffer tank, manifolds, under floor heating system, radiators, fan coils (as appropriate) and make sure that the pipe work is securely connected and the relevant valves are open and that there are no leaks. Also, make sure that fittings that have operating flow directions are, indeed, fitted so that the water flows in the right direction.
- Check that there is adequate water in the system and that it is clean.
- Make sure that you have vented all air from the system – air in the system will cause the unit to shut down shortly after starting up as air passing the flow switch in the unit will be recognised by the flow switch as a flow problem.
- Check that the system is pressurised to the correct level (0.2MPa).
- Check the wiring to make sure that the system wiring conforms to the diagrams and Regulations and that it is properly and securely earthed. Also, make sure that electrical connections are tight.
- Visually inspect the heat pump to make sure there are no loose parts.
- When the power is first turned on to the unit, immediately inspect the controller to make sure there are no error messages or warnings showing. Because it can be difficult to purge a system of air immediately, it is not uncommon to see an error message of “FL” (meaning Flow Level) on the controller display indicating residual air in the system.

- Once you have turned on the heat pump, check the water pressure gauge and it should be running at 0.2 MPa when the water pump is running.
- After the water pump has been running for approx. 1 minute, the compressor will start. When the compressor starts up, listen carefully for any strange or abnormal noises coming from the unit. If you hear anything that is unusual, switch off the unit immediately and consult your supplier.
- Check whether the power input and running current is in line with the information in this manual.
- When using under floor heating, adjust the actuators on the water loops to make sure that the water supply to each valve is operating and that the water is heating and cooling, as required.
- Once the system has reached its required running temperature, check that the output temperature is stable.

PLEASE NOTE – Control settings are factory set for UK conditions and will NOT need alteration– PLEASE DO NOT TRY TO CHANGE THE CONTROL SETTINGS. If you are having control issues, check with the unit supplier or ESP.

Upon completion of commissioning and when the unit is running correctly in a steady state, the installation engineer must complete an Installation and Commissioning certificate in the template found in Appendix 3.

3.11 General Maintenance

Whilst no formal maintenance is required, you should note the following:

- Monitor the air and water supply frequently to ensure it is clean – check and clean the in-line water filter periodically.
- Please note that the unit, when left idle, will automatically start up every 72 hours to carry out a short maintenance cycle to prevent the water pump sticking.
- Clean the evaporator to the rear of the unit as and when required – this will depend upon the site of the unit and may need cleaning as

often as once per month. Maintaining the evaporator will keep heat exchanging efficiently and will save you money. Do not power-wash the evaporator.

- Make regular checks of the system pressure. If the pressure drops significantly make sure the fault is diagnosed quickly and repaired accordingly – it is possible that the system has a leak and this must be found and repaired.
- If the pump is to be unused for any protracted period, it is important to drain down the unit. When fitting the unit, install a full flow lever valve on both the flow and return pipes so that the unit may be isolated from the rest of the system and drained down easily, without losing all water and glycol from the system. A water recharge and inspection will be necessary before restarting the unit.
- The unit and the water distribution system must be protected in the winter to avoid freezing – this means using glycol in the system and ensuring that water pipes are properly lagged with waterproof high grade lagging with a wall thickness of at least 30mm. See further notes below - these points must be observed to avoid the warranty being invalidated:

a. Do not shut of the power supply to the heat pump in the winter, when the air temperature is below 0°C. If the inlet water temperature is above 2°C and below 4°C, the water pump will automatically start to prevent the system from freezing. If the inlet water temperature is below 2°C the system will automatically heat the water to 2°C+.

b. Use anti-freeze (Glycol water) Follow the guidelines below to ensure you have the correct amount of anti-freeze in system:

- (1) Please do not shut off the power supply to the heat pump in winter. When the air temperature is below 0 °C, if the inlet water temperature is above 2 °C and below 4 °C, the water pump will start for freezing protect, if the inlet water is lower than 2 °C, the heat pump will run for heating.
- (2) Use anti-freezing liquid (glycol water)
 - 1) look for below table for the volume of the glycol water
 - 2) the glycol water can be added into the system from the expansion tank of the water loop.

Glycol percentage (%)	10	20	30	40	50
ambient temp. (°C)	-3	-8	-14	-22	-33
cooling/heating capacity fluctuation	0.991	0.982	0.972	0.961	0.946
power input fluctuation	0.996	0.992	0.986	0.976	0.966
water flow fluctuation	1.013	1.040	1.074	1.121	1.178
water drop fluctuation	1.070	1.129	1.181	1.263	1.308

Note: if the glycol water is too much, the water flow and water pump will be influenced and the heat exchange rate will be decreased. This table is for reference, please use anti-freezing water according to the real condition of the local climate.

Note: Too high a concentration of the anti-freeze will affect the performance of the heat pump.

PLEASE NOTE – ESP CAN PROVIDE AN ANNUAL INSPECTION/MAINTENANCE PACKAGE, IF REQUIRED.

3.12 Operating notes for the end user

WARNING!

Before doing any work on the heat pump you **MUST** switch off power to the unit at the twin port isolator switch (that should be installed next to the unit).

Servicing and maintenance of the unit must only be carried out by qualified technicians. ESP can provide a full inspection and maintenance service, if required.

Repeated triggering of safety and control devices must be thoroughly investigated and any fault causing the triggering corrected before further use of the unit. Please call your service engineer/installer should safety or control devices be triggered.

You should carry out some basic checks on your unit regularly to maintain it in optimum working order - these consist of standard checks (look at the operating temperature settings, checking water flow and temperatures, see if

there is scorching visible on the unit, make sure that the unit surroundings are free from debris and growth of foliage from plants) and should be carried out every 3 months and after the unit has been out of service for any prolonged periods.

The inline filter/strainer should be cleaned regularly for the first six months and at least once a year thereafter. It is recommended that you use a high performance filter/strainer such as the Spirotech Magna-booster 2 ® rather than a basic “Y” strainer/filter. Please discuss this with your installer.

WARNING!

The grills on the unit are intended to protect installation engineers from injury from the evaporator during handling and installation work.

However, the grills located over the evaporator can create a risk of clogging with a frost or ice during very cold weather. You may remove the grills over the evaporator during periods of very cold weather but, if you do this, you must make sure that the evaporator is not damaged while the grills are removed and it is therefore advisable to keep people and pets away from the unit. Please also note that the metal "fins" on the evaporator are sharp and you should not touch them and also prevent others touching them - they can cause serious cuts. The fins are also fragile and you should avoid bending them.

If in any doubt about what to do, please call your installation engineer or ESP.

WARNING!

Very important:

The 3 phase model has built-in set phase protection. If the phase sequence is wrong or there is a phase missing, the controller will

prevent the unit from starting up. Once the fault has been corrected, the unit will start.

Delivery:

The ESP range of high temperature ASHP units can provide domestic hot water and space heating by extracting heat energy from the surrounding air and transferring it in to the system water.

Please note, any ESP ASHP is fully checked before delivery to make sure that it is operating as it should. Any visible damage should be reported to your supplier immediately and noted on any delivery note – if you are able to photograph damage, please do so. The delivery driver should be informed and any damage shown to him. **Make sure that the delivery driver notes your concerns on the delivery record.**

The ESP Classic range of ASHP's is designed and built to give years of trouble-free service and the content of this manual is important to ensuring the maximum life span is achieved and performance delivered with the least difficulty and cost.

If you are seeking any **Government support** for the cost of purchase, installation and/or operating the ASHP, please ensure that you understand fully what is required to enable you to access that support. ESP accepts no responsibility or liability for any failure to obtain the support that you may be seeking and complying with any rules or requirements to obtain any such support is solely your responsibility.

Some Important Additional Information:

FROST PROTECTION

As the ASHP will be fitted externally to the property being heated, the water in the system could freeze up, if not protected. The unit should have glycol mixed with the system water to prevent freezing and the required mix of glycol/ water is stated on the label on the unit. Failure to use the correct mix for the environment will invalidate the warranty.

DEFROST MODE

If the temperature is cold enough for ice to develop on the evaporator at the rear of the unit and the unit has failed to reach the target system temperature within the pre-set period of time, the unit will automatically enter defrost mode. This will divert heat from the heating circuit back to the evaporator until the ice has melted. The DEFROST symbol will appear above the temperature display and will flash during the defrost operation. When defrosting, the unit can give off a lot of steam and this is normal.

SERVICING

While it is not necessary to carry out an annual service on the appliance like that for a gas/oil boiler, regular inspections are advisable. Remove leaves, debris, moss, etc. from the evaporator at the rear of the unit. Also, certain Government grant/support Schemes require that, for grant/support funding to be payable, the unit be inspected and that inspection recorded in a unit inspection log. It is **YOUR responsibility** to ensure that the rules of any such Scheme are complied with. **ESP offers a planned inspection service and, if required, you should enquire about this by calling us.**

COIL TEMPERATURE CUT OUT

Should the coil reach too high a temperature, the unit will automatically switch off until the temperature has reduced sufficiently. Please note that the unit may take several minutes to restart. This is normal.

COMPRESSOR OUTLET TEMPERATURE CUT-OUT

Should the compressor outlet reach too high a temperature, the unit will automatically switch off until the temperature has reduced. Please note that the unit may take several minutes to restart.

GOING ON HOLIDAY?

If power to the heat pump is to be shut down for a long period during very cold weather (and when the glycol in the system water will not offer adequate protection – NOTE - the system must have glycol in it to the required mix), it is advisable to completely drain the system. However, frequent draining of the system should be avoided, especially in hard water areas, as this can lead to the build-up of scale in the heating circuit. To avoid draining down the whole system, the flow and return pipework (to and from the unit) should have full flow lever valves fitted on each port so that minimum drain-down is needed to protect the unit. However, you should also have regard to protecting the pipework leading up to the unit and in the house. Suitable waterproof lagging and/or other protection should be installed.

FAILURE TO START UP

If the unit fails to start for no apparent reason, carry out the following checks before making changes to running parameters on the controller or calling in a service engineer:

The unit may be running through a process that deals with temporary out of specification operating conditions to clear an operating parameter. In most

cases, this will be cleared automatically within minutes. If it persists, check the programmer display to see if there is a fault/protection message showing. Refer to the guide in section 5 for basic fault finding and remedial actions.

2. Ensure there is a current 'heat demand' from the programmer (that the programmer is in a heating period and that the inside temperature is below the required temperature). Ensure that the programmer clock and timer controls (and any auxiliary room stat controller/programmer fitted) have been set in accordance with the instructions and that they are calling for heat from the system. If the house is not calling for heat, the unit will not be run.

3. Check for failure in the electrical supply. Please **do not attempt to deal with any electrical faults yourself** - call in a suitably qualified electrician.

4. Check for a blown fuse. If the fuse has blown and the replacement also fails, switch off the main electrical supply to the unit and contact your service engineer.

5. Check the circuit breaker. If this has "tripped out", reset and restart the unit. If the circuit breaker trips for a second time soon after, switch off the mains electrical supply to the unit and contact your service engineer.
Note: If the unit has been shut down due to a failure of the power supply, the programmer contains a battery backup which will maintain all settings while the battery is charged. Make sure that you do not leave the system water to freeze while the unit is switched off (you must have glycol in the system to protect the unit from frost at all times).

If the unit is operating, but the system water temperature is not reaching the target operating temperature:

1. Check that all isolation valves are fully open.
2. Check the water temperature setting is not lower than you think it is set!

3. Check that the vents on the back of the unit and the evaporator have not become blocked, thereby impeding the air flow through the unit.

4. Check the unit has not entered in to defrost mode (the DEFROST symbol will appear above the temperature display and flash). Should this occur, the heat output from the unit will be diverted to the evaporator until any ice build up has been removed from the evaporator. When in defrost mode the system water temperature will fall and the lower system temperature will show on the unit controller.

5. If you hear water “gurgling” in the unit, most of the time this will not be a problem and is just the normal movement of refrigerant in the unit. In exceptional circumstances, it could mean that you have air in the water system that is likely to be cleared by the auto air-bleeding vents on the system pipework. If it persists, it could indicate that there is a leak in the water system that needs attention. Check the system pressure to see if it has fallen. If it has, call your service engineer/plumber.

6. If there is power to the unit and the programmer is calling for heat, but the unit is not running, it could be that one of the safety cut-out facilities has operated. This can take several minutes to clear before the unit restarts.

You can also refer to the table in section 5 for more detailed fault finding. If ever in doubt, or if you are concerned in any way, call your service engineer/plumber and discuss the problems that you are having. If you cannot contact your service engineer/plumber, please call ESP for assistance.

TIPS FOR LOWERING ENERGY USAGE

- 1) General unit maintenance can have a significant impact upon system performance and service life. Ensure regular inspections are carried out over the lifetime of the appliance. ESP offers a planned maintenance service, so please ask us about this, if required.
- 2) Dirty evaporators and fans reduce airflow through the system, resulting in decreased performance. Regular checks should be carried out to ensure that these are kept clean – **don't forget to turn the unit off when working on it.**
- 3) The unit should be protected from high winds as this can lead to reduced airflow and efficiency as well as out of specification running.
- 4) While the unit should be protected from high winds, avoid siting in areas where the airflow is restricted, resulting in recirculation of cold air over the evaporator.
- 5) Insulate the pipe work and fittings to and from the unit to avoid unwanted heat loss from the system. Use the highest quality waterproof insulation with a wall thickness of at least 30 mm – it will pay for itself very quickly – poor quality insulation will mean that you have a poor quality system performance and that you are wasting a lot of money. For new builds, the requirements of Part L of The Building Regulations (or better) for insulation will help ensure that the heat load of the dwelling is kept to a minimum. For existing buildings, insulation should be improved as much as possible to minimise the heat load.
- 6) Do not power wash the evaporator!
- 7) Set the room stat temperatures as low as you can.

8) Do not over fill the unit with glycol - see required water/glycol mix on the label on the unit - using too much glycol alters the thermal properties of the system water.

9) Ensure that the unit is properly installed! Poor quality, or inappropriate, installation of the unit can dramatically reduce the performance, life span and efficiency of the unit.

3.13 AFTER SALES SERVICE INFORMATION

A qualified service engineer is available to attend a breakdown or manufacturing fault occurring while the appliance is under guarantee.

Please note, upon attendance by an Earth Save Products Ltd. (ESP) service engineer, a charge may be applied for any service/site visit where:

- The service engineer finds no fault with the unit.
- The cause of a breakdown is due to components not supplied by ESP.
- The cause of the breakdown is due to incorrectly installed parts within the heating system.
- The unit has not been correctly installed (in accordance with this manual and good installation practice) by a suitably qualified engineer.
- The breakdown occurs outside the guarantee period.
- The unit has not been properly maintained.
- The breakdown occurs due to use of unit not for the purpose designed.
- The breakdown occurs as a result of unauthorized third-party work on the unit

TECHNICAL ASSISTANCE

Technical advisors are available to discuss any problem with the unit. In many cases the problem can be solved over the telephone, eliminating the need for a service visit.

HOW TO REPORT A FAULT

Contact your installer/supplier, who should thoroughly check the installation and/or all recent work before the attendance of an ESP service engineer is requested.

If your own installer/supplier is unavailable, contact ESP. Please be aware that a charge may be made for any visit not covered by the unit guarantee.

Before contacting ESP about a problem with the unit, it would help us if you have the following information ready:

- 1) Appliance serial number, account number or invoice number.
- 2) Description of fault, including any operating parameter code which may be displayed on the programmer.
- 3) Date of delivery/installation. Please note that the warranty starts from the date of delivery.
- 4) Name of the company that installed the unit and when it was installed.

4.0 Controls and Operation

4.1 The unit controller display








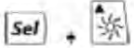

Please see below a picture of the unit controller with key controls and functions identified.



Symbol	Colour	Meaning	
		With LED ON	With LED flashing
1;2	Amber	Compressor 1 and/or 2 ON	Start up request
3;4	Amber	Compressor 3 and/or 4 ON	Start up request
A	Amber	At least one compressor ON	
B	Amber	Pump ON	Start up request
C	Amber	Condenser fan ON	
D	Amber	Defrost active	Defrost request
E	Amber	Heater ON	
F	Red	Alarm active	
G	Amber	Chiller mode	Chiller mode request
H	Amber	Heat pump mode	Heat pump mode request

4.2 Functions associated with the buttons



The following table gives a description of what each of the buttons on the unit controller will do. Please familiarise yourself with them as they are important to the operation of your unit. They are also important for the installer:

Button	Unit status	Button operation
	Switch off buzzer or alarm relay, if alarm active	Press once
	Manual reset of alarms that are no longer active	Press for 5 s
	Enter parameter programming mode after entering password	Press once
	Return to higher subgroup inside the programming environment until exiting, saving to EEPROM	Press once
	Select higher item inside the programming environment	Press once or hold
	Switch from standby to heat pump mode (P6= 1) and vice-versa	Press for 5 s
	Access direct parameters:selection (as for button on Uc2)	Press for 5 s
	Select item inside the programming environment and display direct parameter values/confirm the changes to the parameter	Press once
	Select lower item inside the programming environment	Press once or hold
	Switch from standby to chiller mode (P6= 1) and vice-versa	Press for 5 s
	Immediately reset the hour counter (inside the programming environment)	Press for 5 s
	Start manual defrost on both circuits	Press for 5 s
	Display the terminal Info screen	Press for 6 s



4.3 Saving Controller Parameters

(This example illustrates changing the “set point” or “flow” temperature)

[1] Start or stop unit


press “ or ” lasts 3 seconds to start or stop unit, the LED display as following:




If you press “” ,the unit will be heating mode;
If you press “” ,the unit will be cooling mode;

[2] Check the setting data and amend the setting






1) press “” to go into data setting.






2) press “” to go into parameter group.





3) use “” and “” to select the parameter group and then press “”.





4) use “” and “” to select the parameter and then press “”.



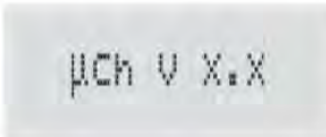
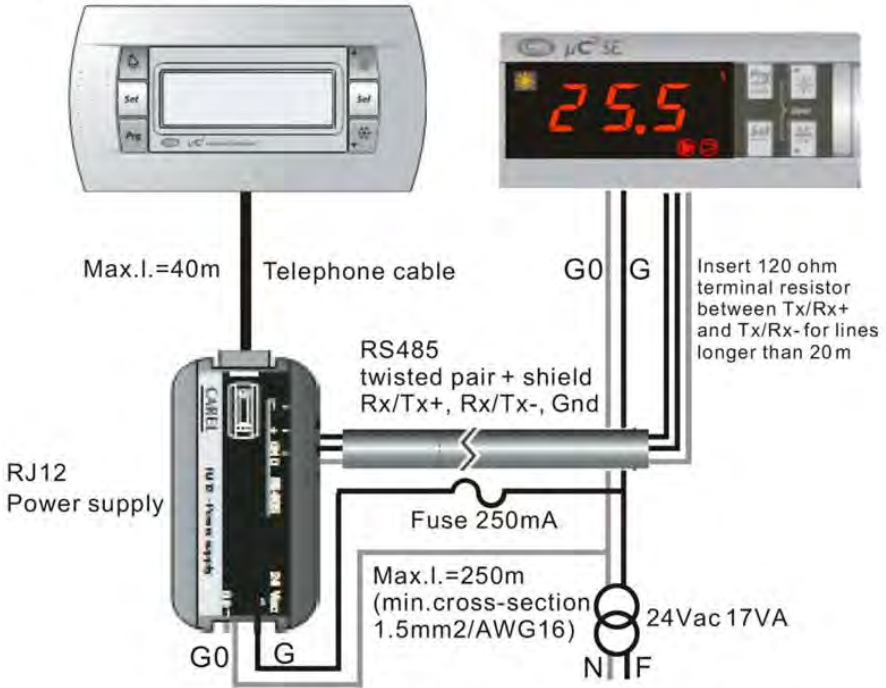
5) after making the changes to the parameter, press “” to confirm or “” to cancel the changes.



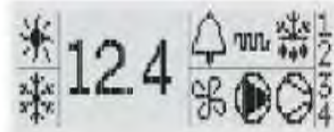
6) Press “” to return to the previous menu to save the modifications, press “” repeatedly until reaching the main menu

4.4 Installing a Remote Control

(1) Connection



To install the remote terminal, no configuration is required on the UC2, as the terminal works with any serial address set for parameter H10. Check, however, that is fitted with the serial interface the Uc2 FCSE00000. When first switched on the display will show the firmware version of the Uc2



After around 4 s the main screen will be displayed, with the symbols that represent he status of the Uc2.



In the event where the RS485 connection is not performed correctly or the controller is off, the terminal will clear the display and show the message “OFFLINE”













Pressing the “Up” + “Down” + “Sel” buttons together for more than 6 seconds displays the “INFO” screen containing information on the UC2 system and on the communication.

Pressing the “Prg” button returns to the main screen.

4.5 Symbol Meaning

Please note below the function(s) that each of the identified symbols performs:

Symbol	Meaning		Refrigerant circuit involved
	ON	Flashing	
1,2	Compressor 1 and/or 2 ON	Start request	1
3,4	Compressor 3 and/or 4 ON	Start request	2
	At least one compressor ON		1 and/or 2
	Pump ON	Start request	1 and/or 2
	Condenser fan ON	Start request	1 and/or 2
	Defrost active	defrost request	1 and/or 2
	Heater ON	Start request	1 and/or 2
Alarm button red LED	Alarm active		1 and/or 2
	Alarm active	EEPROM alarm	1 and/or 2
	Warning relay activated		
	Alarm relay active		
	Chiller mode (P6=1)	Season changeover reqes	1 and 2
	Heat pump mode (P6=1)	Season changeover reqes	1 and 2

4.6 Parameters

The operating parameters are set as follows and the advice of the ESP Technical team should be sought before changing them:

Setting	Description	Limits	Unit
A01	Antifreeze/low ambient temp. alarm set-point	2	°C
B01	Value read by probe B1	-	°C
B02	Value read by probe B2	-	°C
B03	Value read by probe B3	-	°C
B04	Value read by probe B4	-	°C
D03	Start defrosting temperature	4.2	bar
D04	End defrosting temperature	22	bar
D05	Min. time to start a defrosting cycle	120	S
D07	Max. duration of a defrosting cycle	10	MIN
D08	Delay between 2 defrosting cycle requests within the same circuit	50	MIN
H06	Cooling/heating digital input	1	
H12	Capacity-control logic(0-3)	0	
P09	Coniguration of digital inputs ID2	10	
R01	Cooling set-point	12	°C
R02	Cooling differential	2	°C
R03	Heating set-point	40	°C
R04	Heating differential	2	°C
R17	Compensate constant (cooling)	0	°C
R18	Maximum distance from the set point	0.3	°C
R19	Start compensation temperature in cooling mode	30	°C
R20	Start compensation temperature in heating mode	0	°C
R31	heating compensation constant	0	°C

4.7 Weather Compensation Data

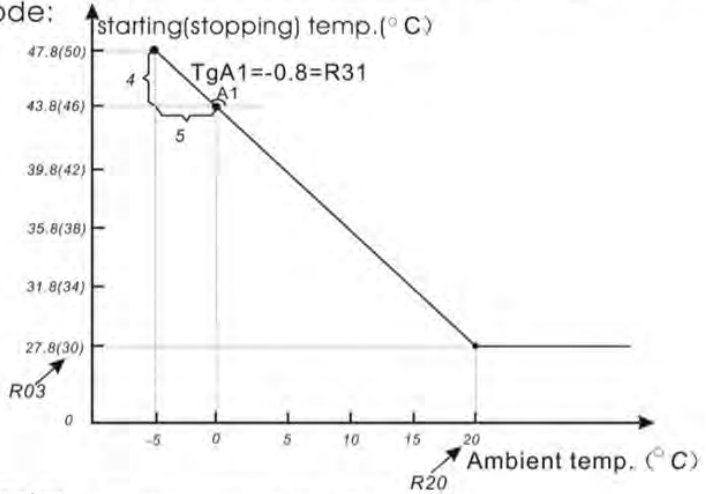
When the parameter set:

R01=20 R02=2 R03=30 R04=2

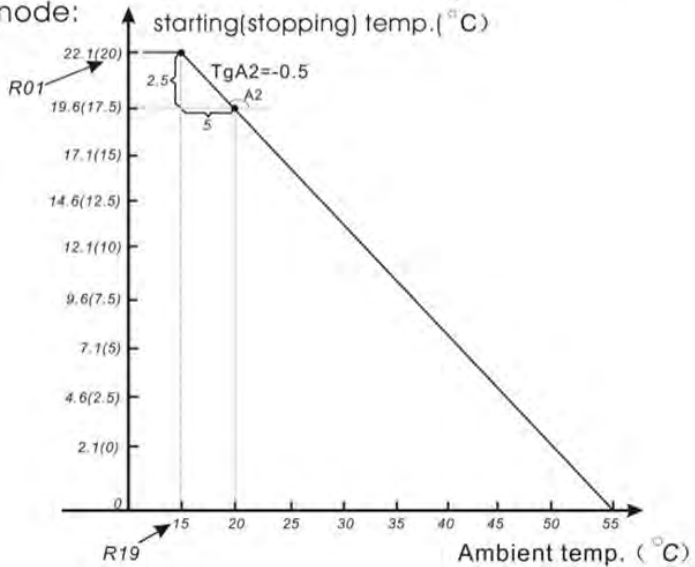
R17=-0.5 R18=20 R19=15 R20=20 R31=-0.8,

The compensate graphs in the heating and cooling mode are as follows:

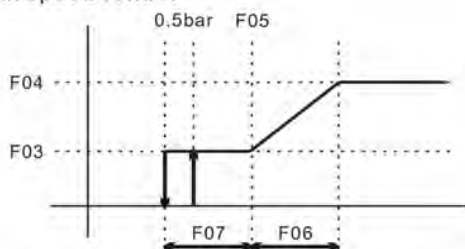
Heating mode:



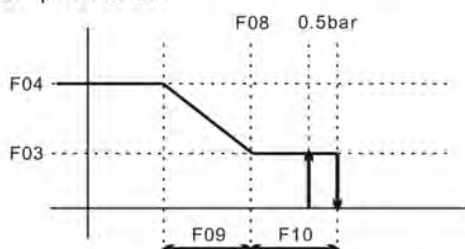
Cooling mode:



Cooling with speed control



Heating with speed control



With fan speed control modular MCHRTF04C0, the fan motor control curves is as the chart above and the related parameters are set as the following(R410a design):

Display indicat.	Parameter and description	min.	max.	U.O.M.	def.
/09	Min. Value voltage input	0	/10	0.01Vdc	50
/10	Max. Value voltage input	/09	500	0.01Vdc	450
/11	Pressure min. Value	0	/12	Bar	0
/12	Pressure max. Value	/11	99.9	Bar	400
D03	Start defrosting pressure	/11	D04	Bar	4.2
D04	End defrost pressure	D03	/12	Bar	22
F02	Fan operation mode 0=always ON 1=depending ON the compressor(in parallel operation mode) 2=depending ON the compressor in ON/OFF control 3=depending ON the compressor in speed control mode	0	3	Int	3
F03	Min. Voltage threshold for Tnac	0	F04	step	50
F04	Max. Voltage threshold for Tnac	F03	100	step	100
F05	Pressure value for min. Speed Cooling	/11	/12	Bar	24
F06	Pressure value for max. Speed Cooling	0	300	Bar	8
F07	Fan shut-down pressure in Cooling mode	0	F05	Bar	2
F08	Pressure value for min. speed in Heating	/11	/12	Bar	9
F09	Pressure value for max. speed in Heating	0	F05	Bar	3
F10	Pressure to turn OFF the fan in Heating	0	300	Bar	2
F13	Fan management in defrost mode 0=Fans deactivated 1=Fans in chiller mode 2=Maximum speed after defrost	0	2	Int	2

5.0 Frequently Asked Questions: Troubleshooting and Additional Information

Failure	Possible causes for the failure	Solutions
Heat pump cannot be started	<ol style="list-style-type: none"> 1 Wrong power supply 2 power supply cable loose 3 circuit breaker open 	<ol style="list-style-type: none"> 1 shut off the power and check power supply; 2 check power cable and make right connection 3 check for the cause and replace the fuse or circuit breaker
Water pump is running with high noise or without water	<ol style="list-style-type: none"> 1 lack of water in the piping 2 much air in the water loop 3 water vavies closed 4 dirt and block on the water filter 	<ol style="list-style-type: none"> 1 check the water supply and charge water to the piping; 2 discharge the air in the water loop; 3 open the valves in water loop; 4 clean the water filter.
Heat pump capacity is low, compressor do not stop	<ol style="list-style-type: none"> 1 lack of refrigerant; 2 bad insulation on water pipe; 3 low heat exchange rate on air side exchanger; 4 lack of water flow 	<ol style="list-style-type: none"> 1 check for the gas leakage and recharge the refrigerant; 2 make good insulation on water pipe; 3 clean the air side heat exchanger; 4 clean the water filter
High compressor exhaust	<ol style="list-style-type: none"> 1 too much refrigerant 2 low heat exchange rate on air side exchanger 	<ol style="list-style-type: none"> 1 discharge the redundant gas 2 clean the air side heat exchanger
Low pressure problem of the system	<ol style="list-style-type: none"> 1 lack of gas 2 block on filter or capillary 3 lack of water flow 	<ol style="list-style-type: none"> 1 check the gas leakage and recharge freon; 2 replace filter or capillary; 3 clean the water filter and discharge the air in water loop.
Compressor do not run	<ol style="list-style-type: none"> 1 power supply failure 2 compressor contactor broken 3 power cable loose 4 protection on compressor 5 wrong setting on return water temp. 6 lack of water flow 	<ol style="list-style-type: none"> 1 check off the power supply; 2 replace compressor contactor; 3 tighten the power cable; 4 check the compressor exhaust temp.; 5 reset the return water temp.; 6 clean the water filter and discharge the air in water loop.
High noise of compressor	<ol style="list-style-type: none"> 1 liquid refrigerant goes into compressor 2 compressor failure 	<ol style="list-style-type: none"> 1 bad evaporation, check the cause for bad evaporation and get rid of this; 2 use new compressor;
Fan do not run	<ol style="list-style-type: none"> 1 failure on fan relay 2 fan motor broken 	<ol style="list-style-type: none"> 1 replace the fan relay; 2 replace fan motor.
The compressor runs but heat pump has not heating or cooling capacity	<ol style="list-style-type: none"> 1 no gas in the heat pump; 2 heat exchanger broken; 3 compressor failure. 	<ol style="list-style-type: none"> 1 check system leakage and recharge refrigerant; 2 find out the cause and replace the heat exchanger; 3 replace compressor.
Low outlet water temperature	<ol style="list-style-type: none"> 1 low water flow rate; 2 low setting for the desired water temp.; 	<ol style="list-style-type: none"> 1 clean the water filter and discharge the air in water loop. 2 reset the desired water temperature.
Low water flow protection	<ol style="list-style-type: none"> 1 lack of water in the system; 2 failure on flow switch 	<ol style="list-style-type: none"> 1 clean the water filter and discharge the air in water loop. 2 replace the flow switch.

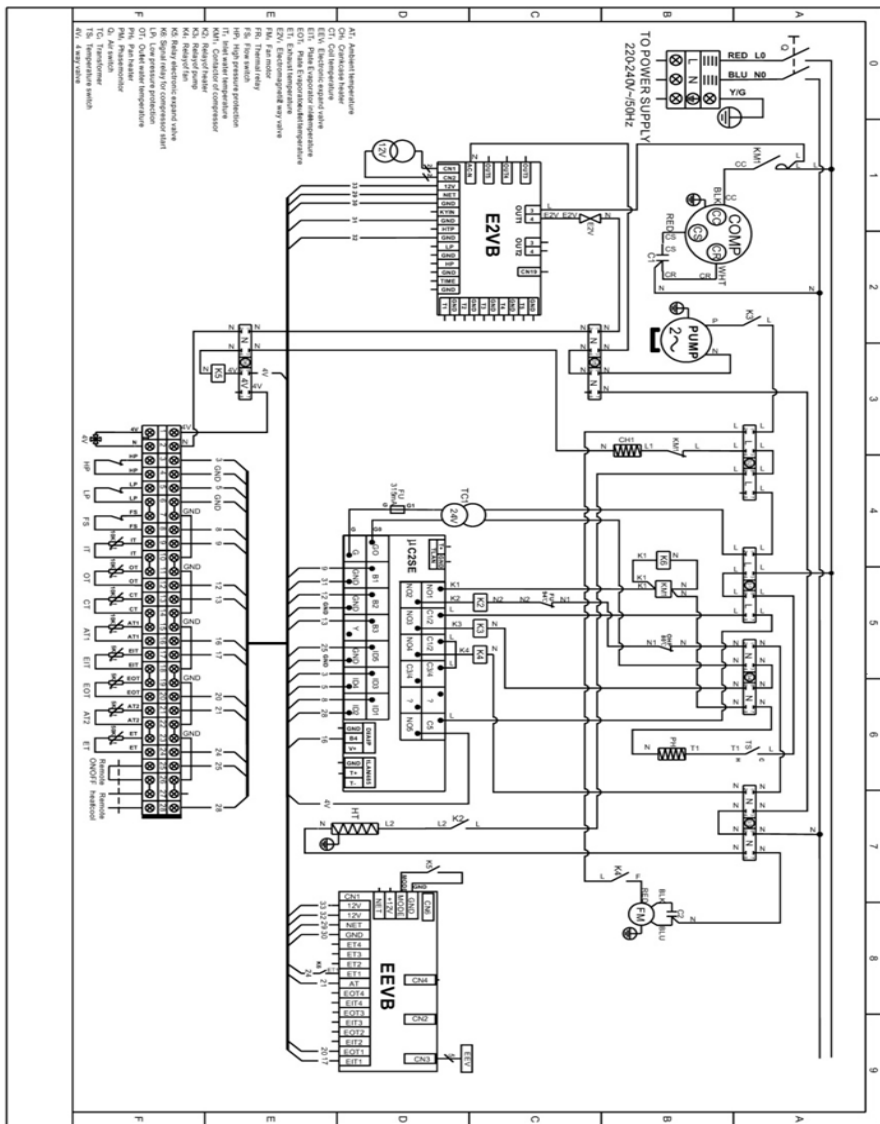
5.1 Support

If you have trouble with your ESP High Temp ASHP, the ESP technical team or your engineer will be willing to assist you.

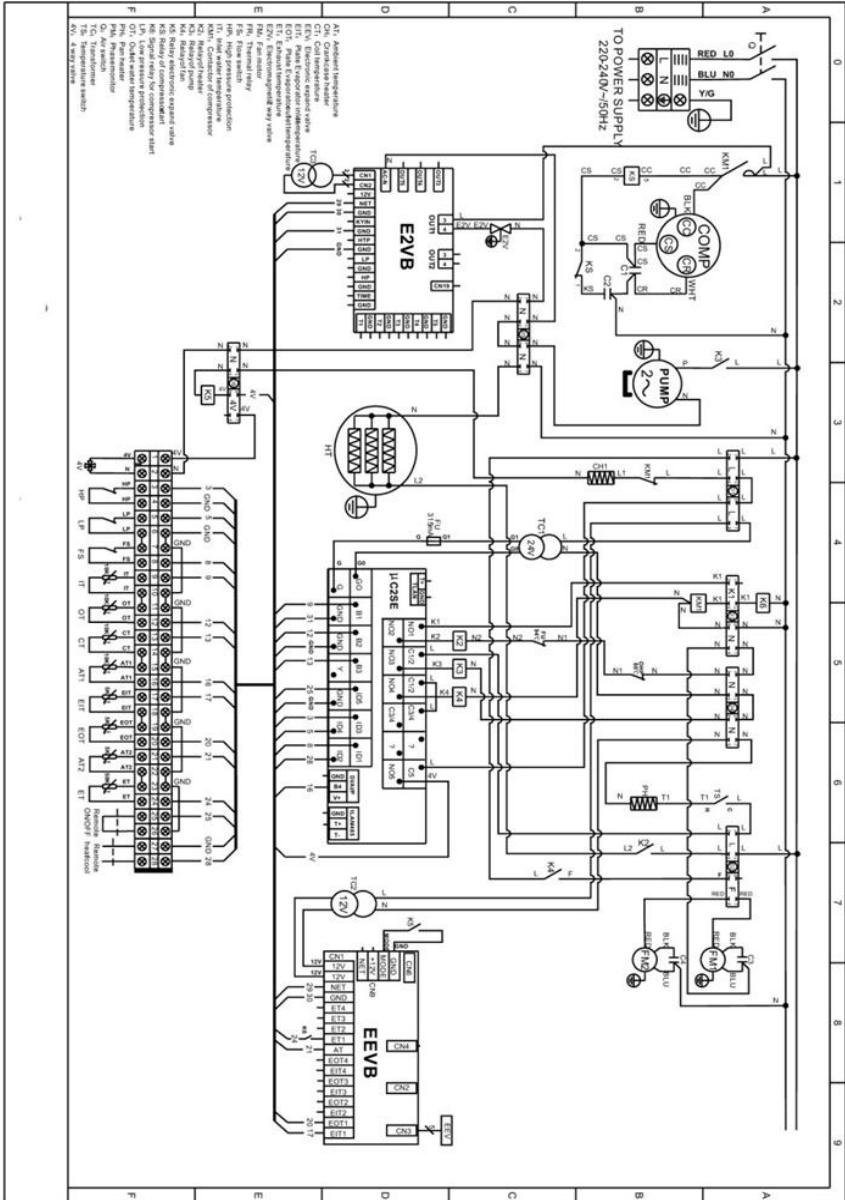
APPENDIX 1

WIRING DIAGRAMS

- ESP HT 9KW



ESP HT 12kW & 15kW



APPENDIX 2

INSTALLATION ENGINEER'S DETAILS

Installation engineer's signature	
Company Name (if applicable)	
Company address	
Company Tel No	
Email address	

APPENDIX 3

Installation and Commissioning Certificate

This should be completed in full and left with the customer.

Customer Details:

Name:
Correspondence Address:
Installation Postcode:

Installer Details:

Installer Company Name:
Accreditation no. (MCS)
Address:
Postcode:
Telephone:
Emergency Telephone (if different):
Email Address:
Website:
Installation carried out by: (if different from above)

System Details
Heat Pump Manufacturer: ESP
Unit size:
Heat Pump Model and Serial no:

We have inspected the installation of the Air Source Heat Pump and can advise that the unit has been correctly installed.

We have not inspected the system or reviewed its design.

I confirm that we are responsible for the installation, commissioning and handover of the above Air Source Heat Pump and the same has been carried out (so far as we are aware) in accordance with the manufacturer's Documentation and MCS requirements

Signed:_____ Print Name:_____.

Date (of commissioning):_____