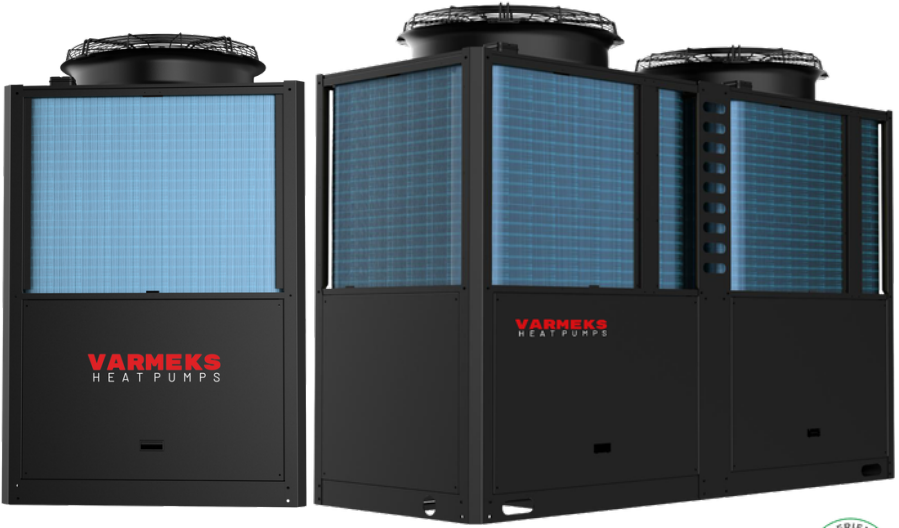


VARMEKS
HEAT PUMPS

COMMERCIAL DUO SERIES

USER MANUAL

50 – 100 kW



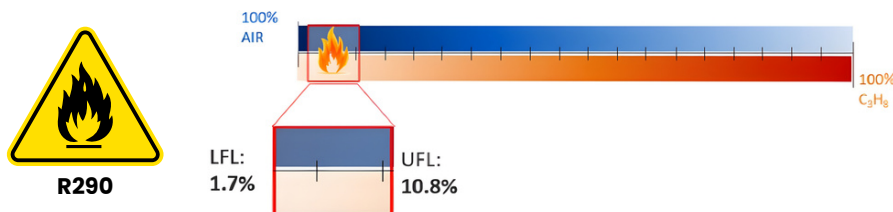
IMPORTANT SAFETY INSTRUCTIONS READ ALL INSTRUCTIONS
AND FOLLOW THEM. KEEP THESE INSTRUCTIONS.

www.varmeks.com.tr

IMPORTANT SAFETY PRECAUTIONS

1. Safety Precautions for R290 Refrigerant

⚠ WARNING – The refrigerant R290 (Propane) is flammable and it must be handled only by competent and responsible operators, under the conditions specified in the safety regulations in force. Combustion occurs when an HC is mixed with air in the ratio between approximately 1.7% (Low Flammable Limit) and 10.8% (Upper Flammable Limit)



1.1 The heat pump unit contains a flammable refrigerant and belongs to the A3 safety group according to ISO 817 and ANSI/ASHRAE Standard 34.

It contains the flammable refrigerant R290 (propane, C₃H₈). If a leak occurs, the escaping refrigerant may create a flammable or explosive atmosphere in the ambient air. Define a safe area around the outdoor unit with special requirements for equipment maintenance.

1.2 Hazard of Explosion

The leaking refrigerant may create a flammable or explosive atmosphere in the ambient air. Take the following measures to prevent fire and explosion in the safe area:

1.2.1 Keep away from ignition sources

Keep the unit away from ignition sources such as naked flames, high-temperature surfaces, electrical equipment without ignition protection, and mobile devices with integrated batteries (e.g., mobile phones, smartwatches, etc.).

1.2.2 Allowed tools

All tools used in safe areas must comply with the standards and regulations applicable to A2L and A3 safety-group refrigerants – such as brushless machinery (wireless screwdrivers), pumping equipment, waste containers, installation auxiliary tools, vacuum pumps, conductive hoses, and mechanical tools made of non-spark-generating materials. Ensure that the tools are suitable for the working pressure range and are in good condition.

1.2.3 The electrical equipment must meet the requirements of the explosion risk area.

1.2.4. Do not use flammable materials, such as sprays or other flammable gases.

1.2.5 Discharge static electricity: before starting work, safely touch grounded objects, such as ground wire or metal water pipe.

1.2.6 Do not remove, block, or bridge the safety equipment.

1.2.7 Prohibit to made any change of the heat pump inlet/outlet pipe, electrical connection or cable

1.2.8 No components or seals shall be removed.

1.3 R290 refrigerant (propane) is a colorless, tasteless, flammable gas, which forms an explosive mixture with air. During handling, air must be emptied and the discharged refrigerant is properly handled by an authorized contractor.

1.4 Treatment method of refrigerant leakage

DANGER! A refrigerant leak can cause fire and explosion and cause very serious injury or death. If inhaled, there is a risk of suffocation.

- Make sure that the ground area of the outdoor unit is very well ventilated.
- NO SMOKING ! Prevent bare fires and sparks. Never turn on or off the lights or electrical equipment.
- Evacuate the personnel from the dangerous area.
- Cut off the power supply to all the system components from a safe position.
- Remove the ignition source from the dangerous area.
- Notify user don't introduce the ignition source into the danger area during the maintenance period.
- Maintenance work must be carried out by an authorized contractor.
- The system can only be restarted after the system repair is completed.
- Prevent direct contact with liquid and gas refrigerants.
- Do not inhale the refrigerant vapor.

DANGER! Direct exposure to liquids and gas refrigerants can cause serious harm to health, such as frostbite and / or burns. Inhalation may cause a risk of suffocation.

2.Important Notice:

This guide provides installation and operation instructions for the DC Inverter Air Source Heat Pump. Consult the seller with any questions regarding this equipment.

Attention Installer: This guide contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this equipment after installation or left on or near the heat pump.

Attention User: This manual contains important information that will help you in operating and maintaining this heat pump. Please retain it for future reference.

⚠ WARNING – Before installing this product, read and follow all warning notices and instructions which are included. Failure to follow safety warnings and instructions can result in severe injury, death, or property damage.

3. Codes and Standards

The DC Inverter Air Source Heat Pump must be installed in accordance with the local building and installation codes as per the utility or authority having jurisdiction. All local codes take precedence over national codes. In the absence of local codes, refer to the latest edition of the National Electric Code (NEC) in the local government Electric Code (CEC) for installation.



— Risk of electrical shock or electrocution.



The electrical supply to this product must be installed by a licensed or certified electrician in accordance with the National Electrical Code and all applicable local codes and ordinances. Improper installation will create an electrical hazard which could result in death or serious injury to heat pump users, installers, or others due to electrical shock, and may also cause damage to property. Read and follow the specific instructions inside this guide.

⚠ WARNING – To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

4. Consumer Information and Safety

⚠ WARNING – 1. Unqualified parties are not allowed to install the equipment by themselves, and a qualified installer is a must. The consequences (safety accidents and use effect) caused by Unqualified parties shall be borne by the users themselves.
2. Except for the guidance of professional personnel, non-professional party shall not remove the machine or machine parts without authorization, otherwise accidents or machine damage may occur.

The DC Inverter Air Source Heat Pumps are designed and manufactured to provide years of safe and reliable service when installed, operated and maintained according to the information in this manual and the installation codes referred to in later sections. Throughout the manual, safety warnings and cautions are identified by the “⚠” symbol. Be sure to read and comply with all of the warnings and cautions.

3. Do not use towels, paint, gasoline, alcohol and other flammable items while near this machine, as this could cause a fire.
4. The main power switch of the unit should be placed in a place out of reach of children to prevent children from contacting the power switch and causing potential safety risks.
5. In thunderstorm, please cut off the main power switch of the unit, otherwise it may cause damage to the unit.
6. The unit shall adopt independent power switch to avoid sharing the same circuit with other electrical appliances, and choose the power circuit and circuit breaker (with leakage protection function) that matches the current to supply power to the unit.
7. The unit must be installed with a specified cross-section grounding wire. Do not connect the ground wire to the ground wire for gas lines, pipes, lightning lines or telephone. At the same time, it must be reliably grounded to avoid accidents.
8. Do not forcibly cut off the power supply when the unit is running to avoid accidents.
9. When the unit is not in use for a long time, please discharge the water in the pipe, close the water pipe valve, and disconnect the main power supply switch to avoid accidents.
10. The unit shall use a special power supply, and the power supply voltage shall meet the rated voltage standard.
11. When the power cord is damaged, it is necessary to use the power cord specified by the manufacturer and replaced by professional maintenance personnel.

⚠ WARNING - 1. Do not put your hand or foreign body into the air outlet, because the high-speed fan may endanger personal safety.

2. Do not remove the air guide net cover of the unit, otherwise the high-speed operation of the fan may cause personnel injury.
3. Lightning and other electromagnetic radiation sources may affect the device. If this happens, turn off the power supply and turn it on again.
4. When in use, make sure that the air in the pipe is completely discharged, and then open the replenishment valve to replenish water to the system.
5. Before operating the machine, read carefully about all the warnings and precautions.
6. "Warning" and "precautions" list various important safety-related matters, please strictly implement them.
7. The working environment of the unit should be far away from the fire source. In case of fire caused by line problems, immediately close the main switch and use a dry powder fire extinguisher to extinguish the fire.
8. Power supply must be cut off before repairing the unit.
9. It is forbidden to place objects on top of the device to avoid accidents caused by falling objects while the machine is running.

5.Heat Pump Energy Saving Tips

If you do not plan to use hot water for a prolonged period, then you might choose to turn the heat pump off or decrease the temp. setting of the control several degrees to minimize energy consumption. We offer the following recommendations to help conserve energy and minimize the cost of operating your heat pump without sacrificing comfort.

1. A maximum water temp. of 60°C is recommended.
2. It is recommended to turn off the heat pump when ambient air temp. is less than -20°C or if on vacation for longer than a week.
3. To save energy, it is recommended that the heat pump is operated during daytime when the ambient temp. is higher.
4. Try to install the heat pump at the ventilated places outdoor, where possible, shelter the heat pump from prevailing winds, rain and snow. Suggest use a shelter when practical, which will reduce the possibility of frosting and icing.

6.Transport, storage and handling warning

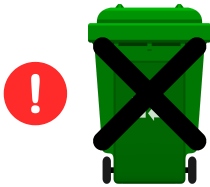
1. The heat pump must be transported, handled and stored vertically. Tipping the machine may cause the compressor or other components damage.



2. Do not twist, loosen or pull the external electric cables of the heat pump. Do not insert any sharp objects through the fan grille or into the fan itself.
3. Do not wash the interior of the heat pump with water as this may result in electric shock or fire. For any cleaning and /or maintenance operations, disconnect the main power supply.

7. Unit recycling and scrapping warning

This label indicates that the product should not be disposed of together with other household waste throughout the EU region. To prevent the potential harm of uncontrolled waste disposal to the environment or human health, material resources should be responsibly recycled and utilized. To return the device you have used, please use a recycling and collection system or contact the retailer who purchased the product. They can use this product for environmentally friendly and safe recycling.



Section 1 Introduction

1.1 Product Overview

DC Inverter Air Source Heat Pumps transfer heat from the ambient air to water, providing high-temp. hot water up to 78°C. The unique high-temp. heat pump is widely used for house warming. With innovative & advanced technology, the heat pump can operate very well at -25°C ambient temp. with high output temps up to 65 °C, which ensures the compatibility with normal sized radiator based systems without supplementation. Compared with traditional oil/LPG boilers, DC Inverter heat pump produces up to 50% less CO₂ whilst saves 80% running cost. Our heat pumps are not only highly efficient, but also easy and safe to operate.

1.2 General Features

1. Low running costs and high efficiency
 - A high coefficient of performance (COP) of up to 5 results in lower running costs compared with traditional ASHP technology.
 - No immersion heater supplement is required.
2. Reduced Capital Costs
 - Simple installation
3. High Comfort Levels
 - High storage temp. results in increased hot water availability.
4. No potential danger of any inflammable, gas poisoning, explosion, fire, electrical shock which are associated with other heating systems.
5. A digital controller is incorporated to maintain the desired water temp..
6. Long-life and corrosion resistant composite cabinet stands up to severe climates.
7. HIGHLY compressor ensures outstanding performance, ultra energy efficiency, durability and quiet operation.
8. Self-diagnostic control panel monitors and troubleshoots heat pump operations to ensure safe and reliable operation.
9. Intelligent digital controller with friendly user interface and blue LED back light.
10. Separate isolated electrical compartment prevents internal corrosion and extends heat pump life.
11. The heat pump can operate down to ambient air temp. of -25°C.

Section 2 Installation

The following general information describes how to install the DC Inverter Air Source Heat Pump.

Note: Before installing this product, read and follow all warning notices and instructions. Only a qualified service person should install the heat pump.

2.1 Materials Needed for Installation

The following items are needed and are to be supplied by the installer for all heat pump installations:

1. Plumbing fittings.
2. Level surface for proper drainage.
3. Ensure that a suitable electrical supply line is provided. See the rating plate on the heat pump for electrical specifications. Please take a note of the specified current rating. No junction box is needed at the heat pump; Connections are made inside of the heat pump electrical compartment. Conduit may be attached directly to the heat pump jacket.
4. It is advised to use PPR/PVC conduit for the electrical supply line.
5. Use a booster pump for pumping water in case of low water pressure.
6. A filter on the water inlet is needed.
7. The plumbing should be insulated to reduce its heat loss.

Note: We recommend installing shut-off valves on the inlet and outlet water connections for ease of serviceability.

2.2 Technical Data

COMMERCIAL DUO SERIES TECHNICAL DATA			
Varmeks Model	50 kW		92 kW
	Heating Condition - Ambient Temp (DB/WB): 7/6°C, Water Temp (Inlet/Outlet): 30/35°C		
Heating Capacity Range (kW)	18.4-49.25		35.2-92
Heating Power Consumption (kW)	4.23-12.58		7.0-23.8
Heating COP Range	3.8-4.3		3.88-5.02
	Domestic Hot Water Condition - Ambient Temp (DB/WB): 20/15°C, Water Temp (Inlet/Outlet): 15/55°C		
Heating Capacity Range (kW)	23.9-68		40.0-120
Heating Power Consumption (kW)	4.23-15.46		9.0-29.5
DHW COP Range	4.46-5.62		4.06-5.5
Heated Water Output (L/H)	1482		2580
	Cooling Condition - Ambient Temp (DB/WB): 35/24°C, Water Temp (Inlet/Outlet): 12/7°C		
Cooling Capacity Range (kW)	13.8-34.5		25-66
Cooling Power Consumption (kW)	5.2-16.2		8.92-30.7
EER Range	2.1-2.65		2.15-2.8
Power Supply	380-415V/3P/50-60Hz		
Maximum Power Consumption (kW)	20		40
Maximum Current (A)	32		64
Fuse or Circuit Breaker (A)	40		80
Cable Section (mm ²)	10mm ²		22mm ²
Pipe Diameter (mm)	G1.5"		G2"
Sound Power Level (dB(A))	177		185
Sound Pressure Level (dB(A))	162		165
Maximum Water Flow (m ³ /h)	8.6		17.2
Maximum Water Pressure Drop (kPa)	8.0		12.0
Net Weight (kg)	370		745
Body Dimensions (W×D×H) (mm)	1195×980×1900		2510×979×1882
Packing Dimensions (W×D×H) (Plywood)	1275×1060×2100		2560×1030×2000
IP Rating (Protection Level)	IPX4		IPX4
Anti-Electric Shock Rate	I		I
Refrigerant	R290/4.0kg		R290/8.0kg
Compressor Brand	HIGHLY		
Operation Ambient Temperature (°C)	-25-43°C		
Operation Water Temp (°C) - DHW	20-78°C (DHW)		
Operation Water Temp (°C) - Heating	20-78°C (Heating)		
Operation Water Temp (°C) - Cooling	7-30°C (Cooling)		

Technical data are nominal values under standard test conditions. Actual performance may vary. Varmeks reserves the right to change specifications without notice.

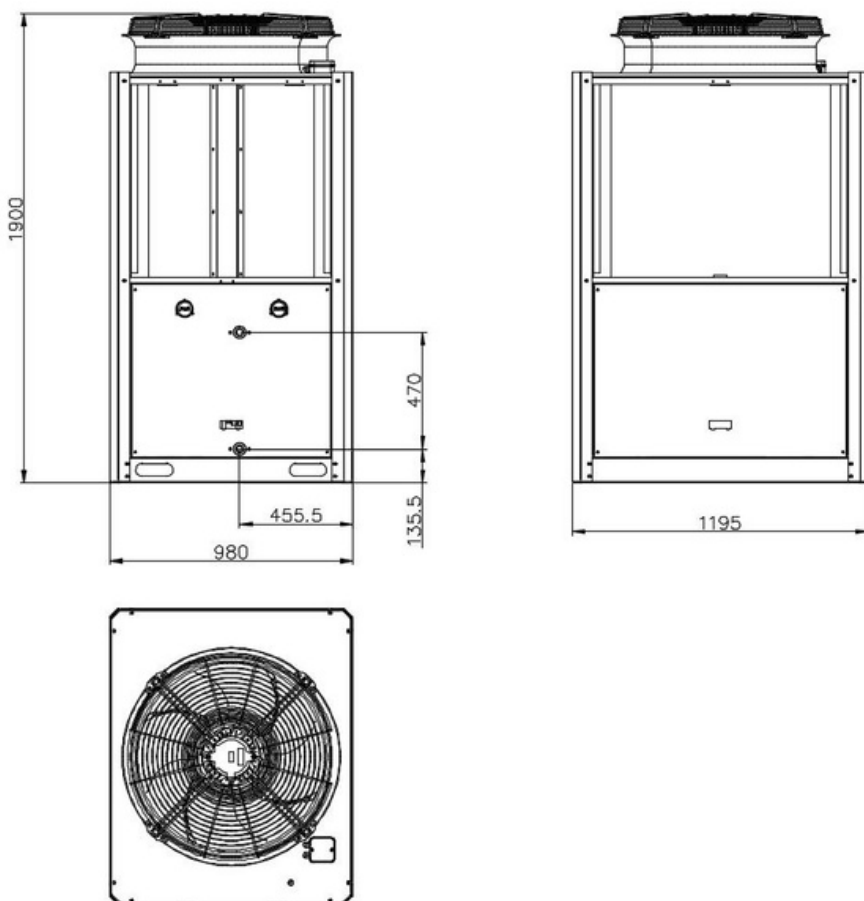
Note: The above design and specifications are subject to change without prior notice for product improvement. Detailed specifications of the units please refer to nameplate on the units. Correct installation is required to ensure safe operation. The requirements for heat pumps include the following:

1. Dimensions for critical connections.
2. Field assembly (if required).
3. Appropriate site location and clearances.
4. Proper electrical wiring.
5. Adequate water flow.

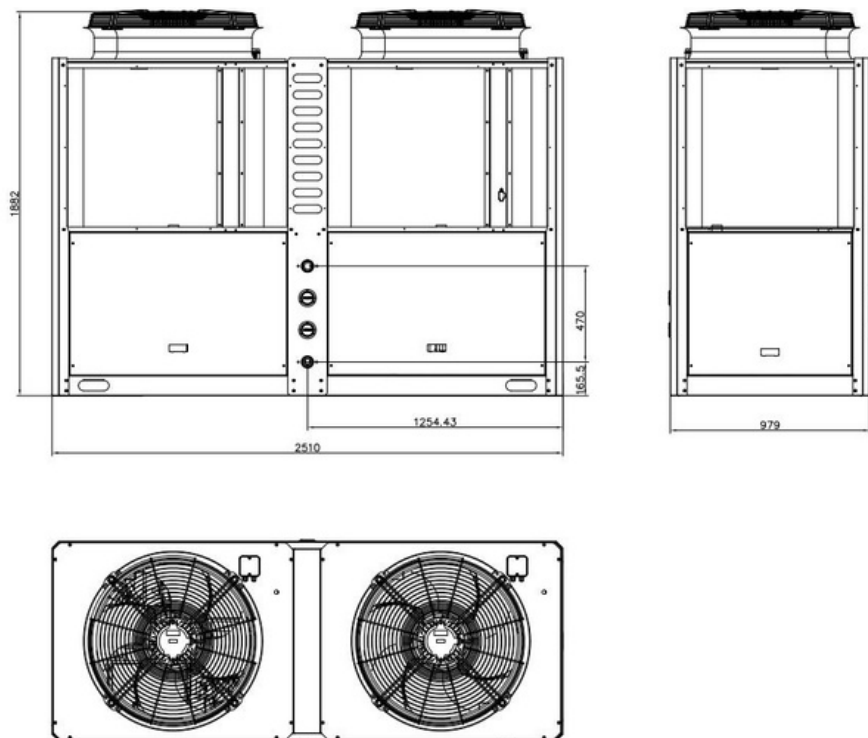
This manual provides the information needed to meet these requirements. Review all application and installation procedures completely before continuing the installation.

2.3 Dimension - Unit:mm

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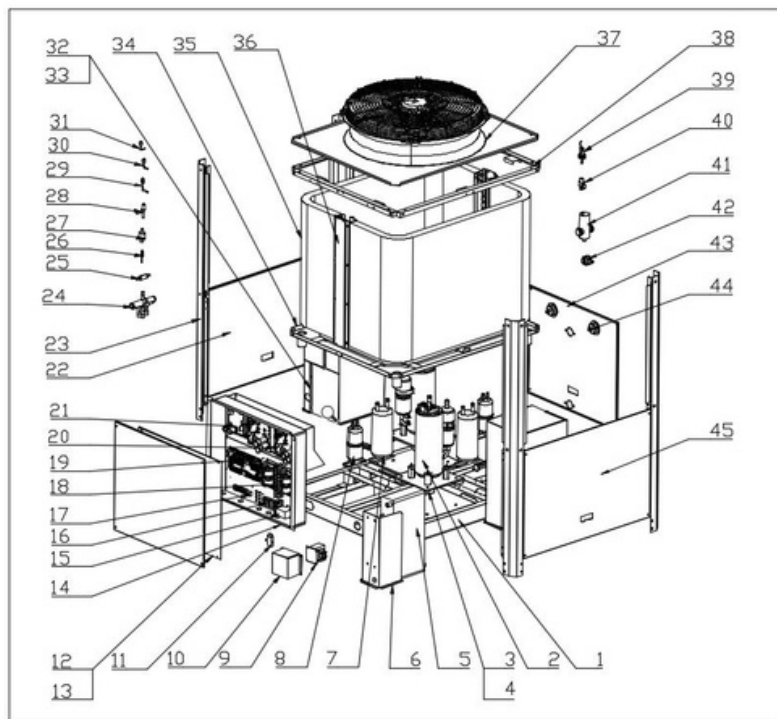


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2.4 Exploded view

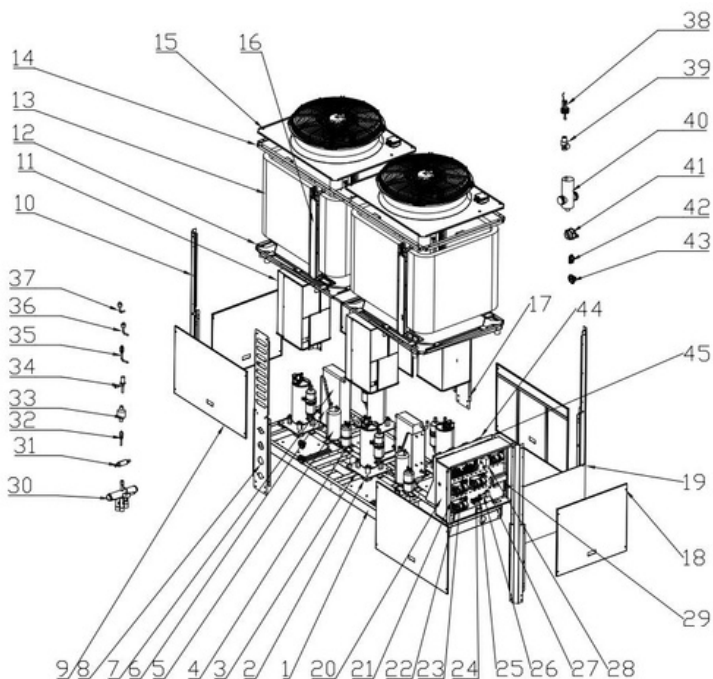
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NO	Spare parts	NO	Spare parts	NO	Spare parts
1	chassis	16	transfer terminal block	31	low voltage switch
2	compressor	17	terminal block	32	compressor cover-1
3	rubber pad	18	variable frequency drive board	33	compressor cover-2
4	compressor pad	19	control board	34	water pan
5	plate heat exchanger	20	compressor driver board	35	fin heat exchanger
6	sheet metal fixing plate	21	fan drive board	36	heat exchanger connecting plate
7	separator	22	left side panel	37	fan
8	liquid storage tank	23	pillar	38	top frame component
9	reactance	24	4-way valve	39	water flow switch
10	sheet metal cover	25	one-way valve	40	safety valve
11	refrigerant leakage monitoring sensor	26	needle valve	41	exhaust valve
12	electric box cover	27	filter	42	water pipe joint
13	front side panel	28	electronic expansion valve	43	rear side panel
14	electric box	29	needle valve	44	pressure gauge
15	relay	30	high voltage switch	45	left side panel

2.4 Exploded view

VM-0MC3402092



NO	Spare parts	NO	Spare parts	NO	Spare parts
1	Chassis	16	Fixed sheet metal for finned heat exchanger	31	One way valve
2	Shock pad	17	Rear middle pillar	32	Needle valve
3	Compressor fixed sheet metal	18	Left and right side panels	33	Filter
4	Liquid storage tank	19	Electric box cover plate	34	Electronic expansion valve
5	Separator	20	Electric control box sheet metal	35	Needle valve
6	Fixed sheet metal for heat exchanger	21	Electric control box lining plate	36	Low pressure switch
7	Plate heat exchanger	22	Inverter drive board	37	High pressure switch
8	Front middle pillar	23	Main control board	38	Water flow switch
9	Front and rear panels	24	Wire clip	39	Safety valve
10	Surrounding pillars	25	6-position terminal block	40	Exhaust valve
11	Anti noise speaker	26	Water pump terminal block	41	Hardware connector
12	Water receiving tray	27	Relay	42	Refrigerant leakage monitoring sensor
13	Fin heat exchanger	28	AC contactor	43	Pressure gauge
14	Fan bracket	29	5-position terminal block	44	Reactor
15	Fan	30	Four way valve	45	Fan hood sheet metal

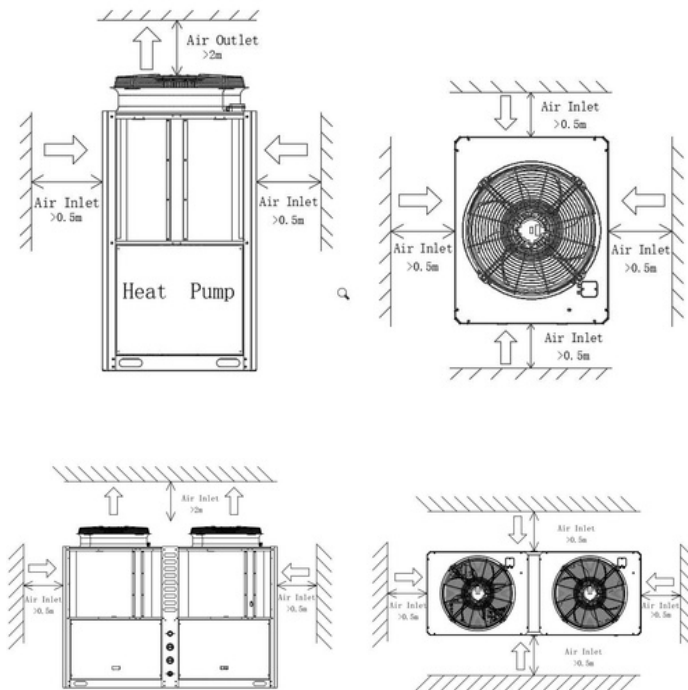
2.5 Preparation before installation

1. Make sure the site is large enough to hold all the equipment and has enough operation space.
2. Measure the hoisting path to ensure that the path to the installation site is unobstructed and prevent the equipment from reaching the site during Installation.
3. Confirm that the power meter capacity and the wire capacity are sufficient and the phase (three-phase, two-phase) meets the requirements.
4. Plan the layout of the equipment according to the customer's site. And strive to have the shortest and the straightest water pipe and enough space for operation and maintenance.
6. Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person and should be documented. If the heat pump is replaced, the installation must be inspected again. In the event of installation with closed heating systems, make sure the pipeline has an exhaust valve (an automatic air exhaust valve is included in the heat pump). If necessary, installation engineer may add additional air exhaust valves to the pipeline.
7. Installation requirements for the unit:
The height of the unit from the ground should be greater than 30CM, and in areas with severe ice and snow, it should be greater than 50CM.

2.6 Installation Location

CAUTION!

1. DO NOT install the heat pump near to hazardous materials and places
 2. DO NOT install the heat pump under deep sloping roofs without gutters which will allow rain water, mixed with debris, to be forced through the unit.
 3. Place the heat pump on a flat slightly pitched surface, such as concrete or fabricated slab. This will allow proper drainage of condensation and rain water from the base of the unit. If possible, the slab should be placed at the same level or slightly higher than the filter system/equipment.
- 2.6.1 Installation Details All criteria given in the following sections reflect minimum clearances. However, each installation must also be evaluated, taking into account the prevailing local conditions such as proximity and height of walls, and proximity to public access areas. The heat pump must be placed to provide clearances on all sides for maintenance and inspection.
1. The heat pump installation area must have good ventilation and the air inlet/outlet must not be hindered.
 2. The installation area must have good drainage and be built on a solid foundation.
 3. Do not install the unit in areas accumulated with pollution like aggressive gas (chlorine or acidic), dust, sand and leaves etc.
 4. For easier and better maintenance and troubleshooting, no obstacles around the unit should be closer than 1m. And no obstructions within 2m, vertically, from the unit for air ventilation. (See Figure 1)



5. The heat pump must be installed with shockproof bushes to prevent vibration and/or imbalance.

6. Even though the controller is waterproof, care should be taken to avoid direct sunlight and high temp.. In addition, the heat pump should be placed to ensure quality viewing of the controller.

7. The plumbing pipes must be installed with support to prevent possible damage due to vibration. Running water pressure should be kept over 196kpa. Otherwise, booster pump should be installed.

8. The acceptable operating voltage range should be within $\pm 10\%$ of the rated voltage.

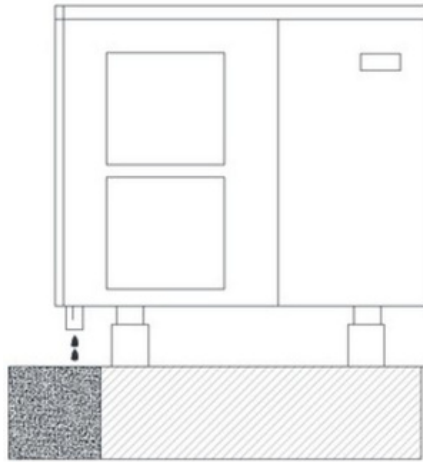
- The heat pump unit must be grounded /earthed for safety purposes.

2.7 Sitting the heat pump

1. The heat pump should be firmly fixed to a base, preferably a concrete base.

2. The installation height should be $\geq 300\text{mm}$. (It's up to the drain height and the snow height in local).

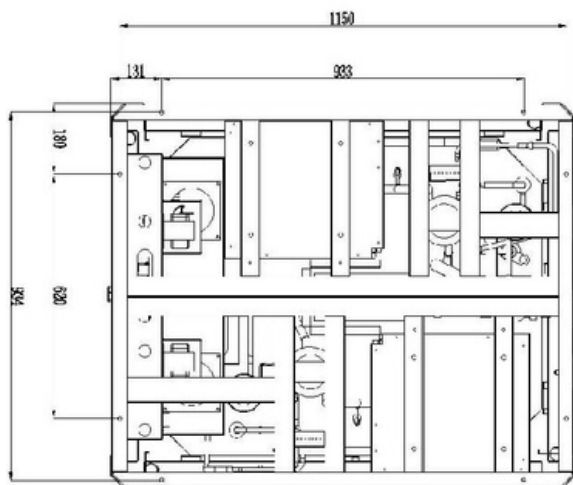
Technical drawing of the side view of the machine frame. The drawing shows the internal structure, including the motor, gears, and various mechanical components. Dimensions are indicated: 2080 (total length), 1188 (length of the main body), 446 (length of the motor housing), and 215 (width). The height is 934. The drawing is labeled with 'a' and 'b' at the bottom corners, indicating the mounting points for the machine.



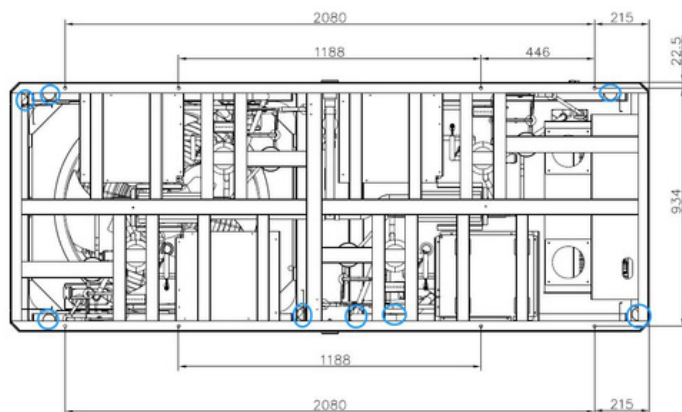
2.8 Drainage and Condensation

1. Condensation will occur from the evaporator when the unit is running and drain at a steady rate, depending upon ambient air temp. and humidity. The more humid the ambient conditions, the more condensation will occur. The bottom of the unit acts as a tray to catch rainwater and condensation.
2. Keep the drain holes, located on the bottom pan of the unit base, clear from debris at all times.
3. The chassis is designed with several drainage holes(Circled in purple and blue below), which can directly drain condensate water and prevent water accumulation from causing freezing.
4. Preferably install the device in a well-drained place. To do this, it is advisable to provide a bed of gravel, sand or similar materials below said hole. If the drain hole of the heat pump is covered by a mounting base or by the floor, lift the unit to leave a free space of at least 100mm below it.
5. If it is installed on a terrace or facade, the condensate outlet must be led to a drain to avoid inconvenience and/or damage caused by the dripping of condensate water. If the installation is carried out in a region where the temperature can be below 0°C for a long period of time, do not connect the drainage outlet to the centralized water pipe, but directly drain to prevent the water pipe from freezing.

VM-OMC3402050



VM-OMC3402092



2.9 Suggested Installation Methods

The DC Inverter Heat Pump is designed to provide heating, cooling, and domestic hot water (DHW).

- Floor heating loops and radiators are used for space heating.
- Fan coil units are used for space cooling.
- Domestic hot water is supplied from a DHW tank connected to the heat pump.

Heat pump units can optionally be equipped with circulating water pumps based on customer requirements.

When installing a circulating water pump, the installer must connect the heat pump to other system components, including:

- Buffer tank (for space heating/cooling)
- Storage water tank (for domestic hot water)

Additional external fittings are required:

- Safety valve
- Water charging valve
- Three-way valve

A temperature sensor must be installed inside the domestic hot water tank.

An additional electric heater may be installed in the DHW or buffer tank, which can receive a control signal from the heat pump.

Installation Notes

1.Refer to the system installation diagram (see figure below).

2.Three-way valve:

- Powers ON for domestic hot water mode.
- Powers OFF for heating or cooling modes.

3.When both heating/cooling and domestic hot water have not yet reached their set temperatures, domestic hot water mode has priority.

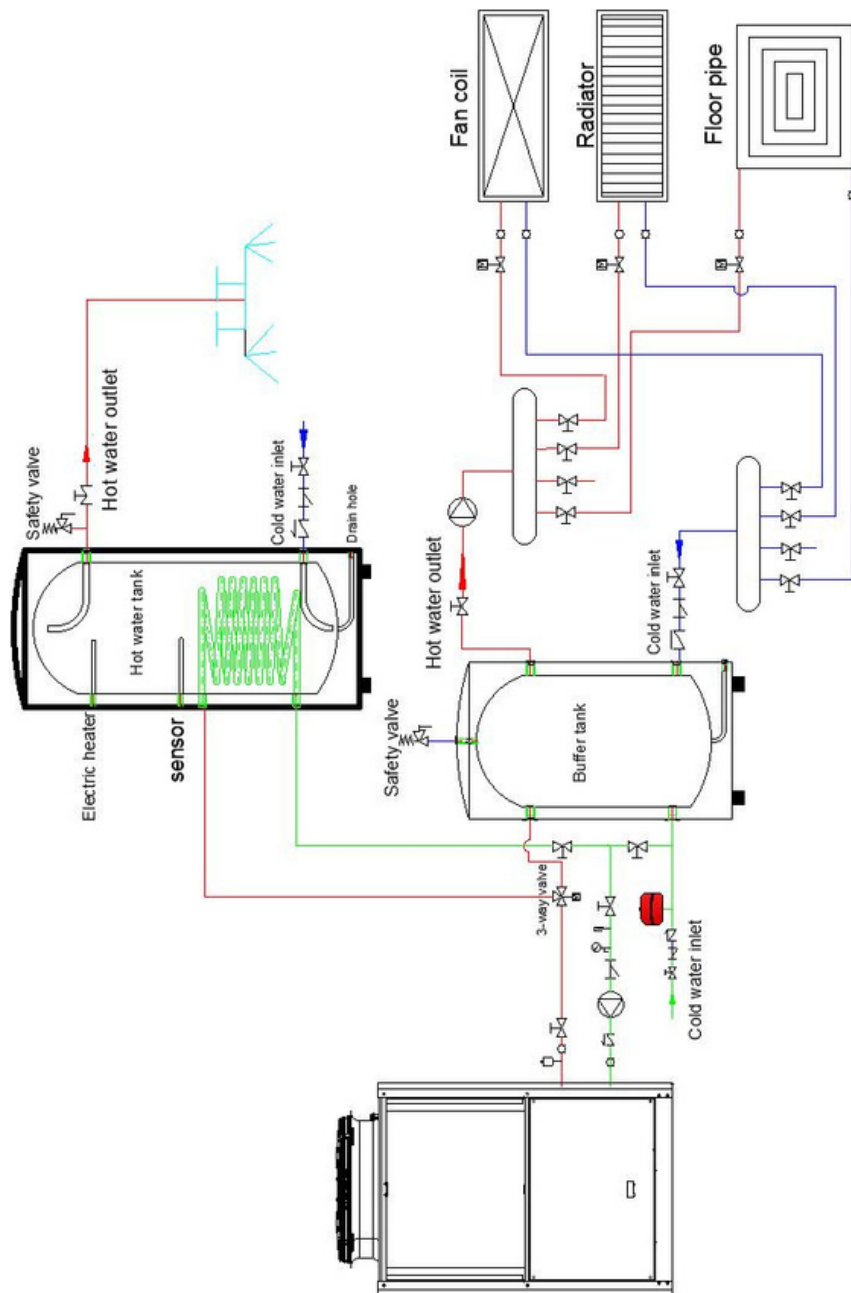
4.The domestic hot water tank with coil must be specially customized.

5.The heat exchange capacity of the tank coil must be equal to or greater than the rated heating capacity of the heat pump.

6.The unit is factory pre-charged with R290 refrigerant and ready for operation.

7.R290 refrigerant is flammable and explosive — installation in areas with existing or potential ignition sources is strictly prohibited.

Schematic diagram of secondary cycle installation



2.10 Water Connections

2.10.1 Water Connections at the Heat Pump

- Quick-connect fittings are recommended for installation on the water inlet and outlet connections.
- It is advised to use stainless steel or PPR pipes for the plumbing system.
- The water inlet and outlet of the heat pump are compatible with stainless steel or PPR pipe fittings.

CAUTION:

Ensure that the flow requirements and tap water turnover rates are properly maintained, especially when installing multiple heat pumps or when additional plumbing restrictions are present.

2.10.2 Plumbing Installation Requirements

1. When water pressure exceeds 490 kPa, install a pressure reducing valve to lower it below 294 kPa.
2. Each connection to the unit must be made using a loose joint and fitted with an intermediate (isolation) valve.
3. Ensure that all plumbing connections are properly completed, then perform a leakage and pressure test.
4. All pipelines and fittings must be insulated to prevent heat loss.
5. Install a drain valve at the lowest point of the system to allow draining during freezing conditions (winterizing).
6. Install a check valve on the water outlet connection to prevent back siphoning when the water pump stops.
7. To reduce back pressure, install pipes horizontally wherever possible.
8. Minimize the use of elbows (90° bends). If higher flow is required, install a bypass valve.
9. Flush the pipes thoroughly before connecting the heat pump, to prevent contaminants from damaging internal components.
10. Connect the heating/cooling water inlet and outlet according to the direction markings on the heat pump.
11. A water filter must be installed in the heat pump water circuit to prevent blockage or narrowing caused by dirt:
 - The filter must be installed before filling the system with water.
 - It should be positioned in the return line to prevent dirty water from entering the heat exchanger (condenser).
 - Check and clean the filter at least once a year. For new installations, check it again after the first few months of operation.
12. All water circuit piping must be insulated to prevent condensation during cooling mode and reduction of the cooling and heating capacity, as well as to prevent freezing of outside pipes during winter. The minimum insulation thickness of the pipes should be 20mm, preferably comprising a closed cell insulation or vapour barrier. In outdoor areas exposed to the sun, the insulation must be protected from the effects of degradation.

13. The water circulation pump must at all times be operational (even if unit is not running) to prevent any possible damage due to freezing. Even when in standby mode, the circulation pump is controlled directly from the unit, which takes the outdoor temperature and temperature in pipe into consideration to decide whether to circulate water within the system.

14. **IMPORTANT:** Even though the unit has anti-freeze protection, if the circulation pump fails or there is a problem with the power supply, there is still a risk of damage due to freezing. During the installation Anti-freeze (Ethylene Glycol) is strongly recommended. If the air temp is ever lower than 0°C, it must use enough glycol.

2.11 Electrical Connections

 **WARNING** —Risk of electrical shock or electrocution.



Ensure that all high voltage circuits are disconnected before commencing heat pump installation. Contact with these circuits could result in death or serious injury to users, installers or others, due to electrical shock and may also cause damage to property.

 **CAUTION** — Label all wires prior to disconnection when servicing the heat pump. Wiring errors can cause improper and dangerous operation. Check and ensure proper operation after servicing.

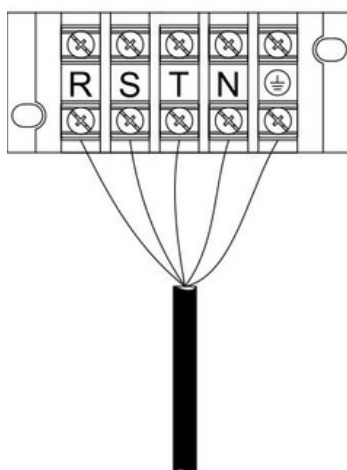
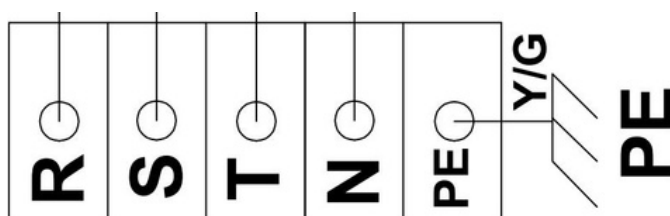
2.11.1 Power Supply

1. If the supply voltage is too low or too high, it can cause damage and/or result in unstable operation of the heat pump unit, due to high inrush currents on start up.

2. The minimum starting voltage should be above 90% of rated voltage. The acceptable operating voltage range should be within $\pm 10\%$ of the rated voltage.

3. Ensure the cable specifications meet the correct requirements for the specific installation. The distance between the installation site and mains power supply will affect the cable thickness. Follow the local electrical standards to select the cables, circuit breakers and isolation breakers. Ensure the cable specifications meet the correct requirements for the specific installation. The distance between the installation site and mains power supply will affect the cable thickness. Follow the local electrical standards to select the cables, circuit breakers and isolation breakers.

Model	Power supply	Max. current (A)	Fuse / circuit breaker (A)	Wire diameter
VM-0MC3402050	380V / 3Ph / 50–60Hz	32	40	10 mm ²
VM-0MC3402092	380V / 3Ph / 50–60Hz	64	80	22 mm ²



Three-phase power input

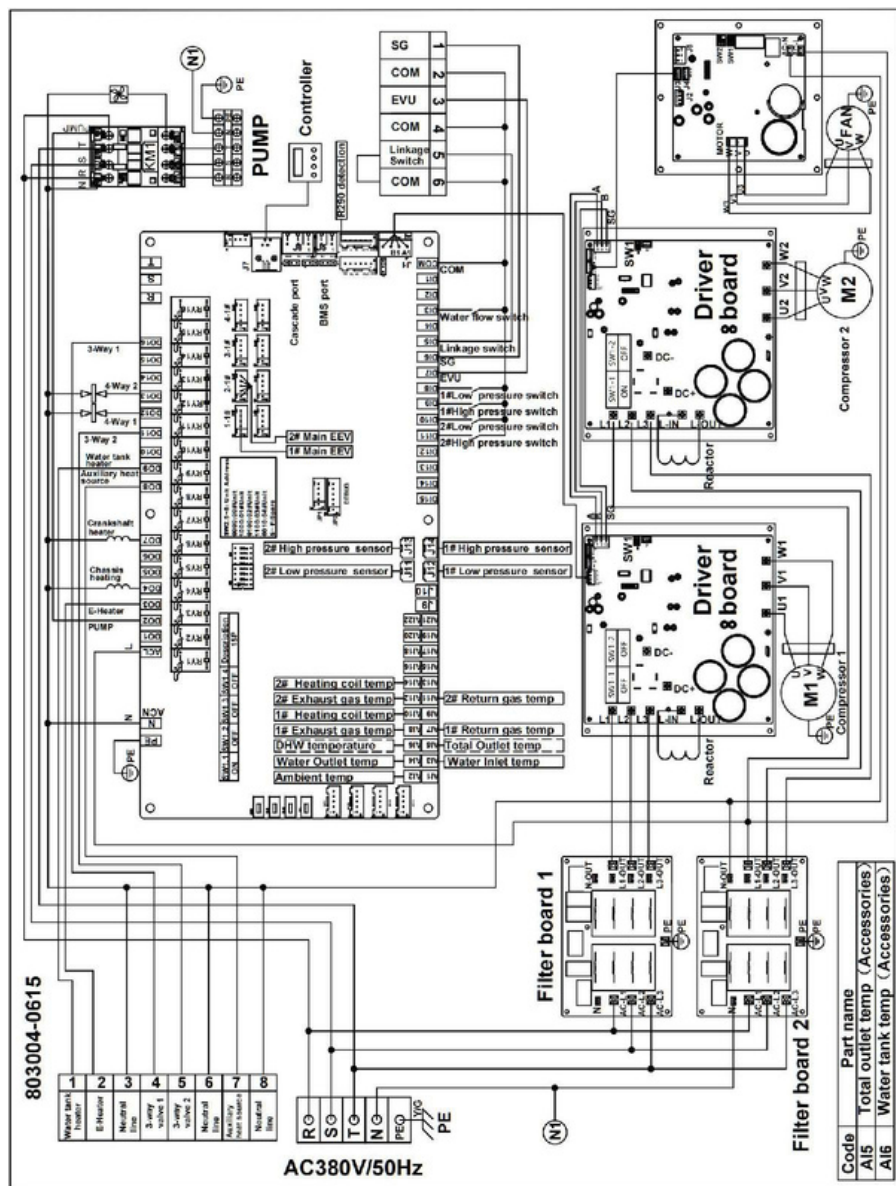
2.11.2 Grounding and Over Current Protection

In order to prevent electrical shock in case of leakage from unit, install the heat pump according to local electrical standard.

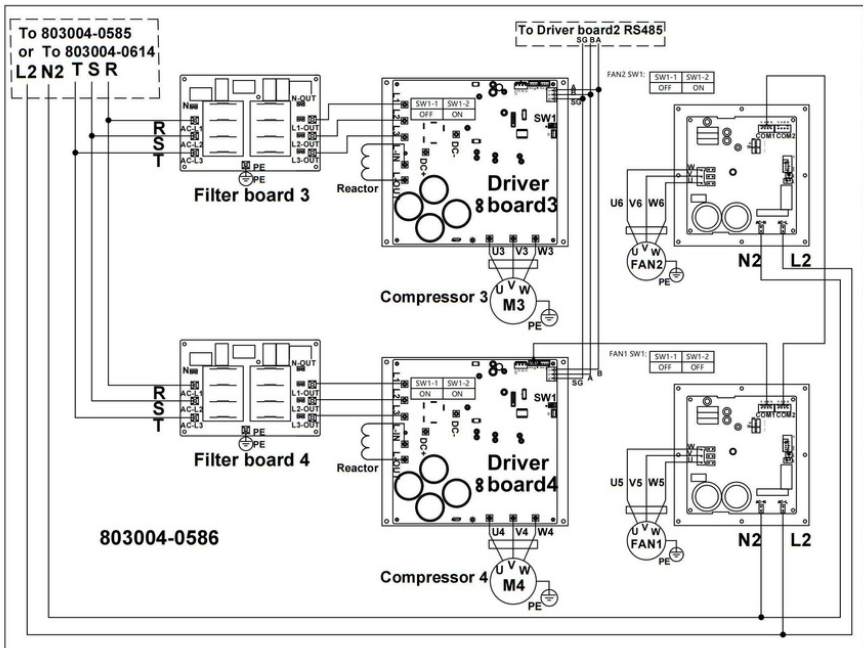
1. Do not interrupt the voltage supply to the heat pump frequently as this may result a shorter life expectancy of the heat pump.
2. When installing over current protection, ensure that the correct current rating is met for this specific installation.
3. If an additional auxiliary heater is need to be controlled by the heat pump controller, the relay (or power) of the aux-heater must be connected to the relevant output of the controller.

2.12 Electrical Wiring Diagram

1. Three phase system (VM-0MC3402050)



[illegible]



Section 3 Operating Heat Pump
3.1 Controller Panel



3.2 Display Icon

Icon	Meaning	Icon	Meaning
	Heating mode		Low power status
	Hot water mode		Peak electricity status
	Cooling mode		Free electricity status
	Automatic mode		WIFI regular work
	Lock screen		Timing
	Defrost		Error
	Disinfect		

Definition of Buttons

Button	Description	Function
	On / Off	Turn on or turn off the heat pump.
	Query	Query running parameters, current fault code, and software version. Return to the previous level.
	Set	Proceed to the next step when programming a schedule in the menu structure and confirm a selection to enter a sub-menu.
	Mode	Switch the operating mode of the heat pump.

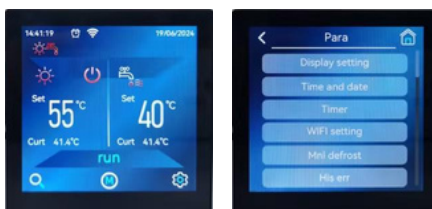
3.3 Menu Structure

3.3.1 About the menu structure

You can use the menu structure to read out and configure settings that are NOT meant for daily usage. What you can see and do in the menu structure is described where applicable.

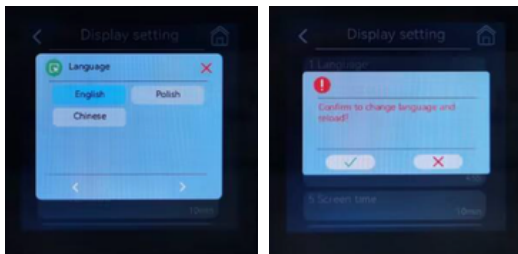
3.3.2 Setting

Click  on the main interface to enter the setting menu, you can set the wired controller parameters, time and date, timing, WIFI settings, manual defrost, historical fault settings, etc.



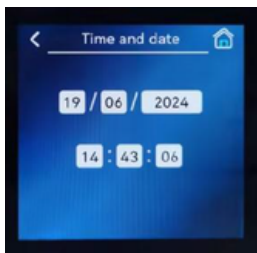
3.3.3 Language switch

Click  on the main interface to enter the user setting menu, click the first item **"Display setting"** to enter the display setting of the wired controller, and then click the first item "Language" to enter the language selection interface(Figure 1). After selecting the language, the prompt in Figure 2 will appear. After clicking "✓", the wired controller will restart, and the language switch will be successful after the restart.



3.3.4 System time and date setting

Click  on the main interface to enter the user setting menu, click the second item "Time and date" to enter the system time and date setting (as shown below), and click the displayed number to modify; After modification, click  to return to the main interface



3.3.5 Timing setting

Click  the main interface to enter the menu, select the third item "Timer" to enter the timing setting, you can set the timing on&off.

(1)Timing on&off setting:

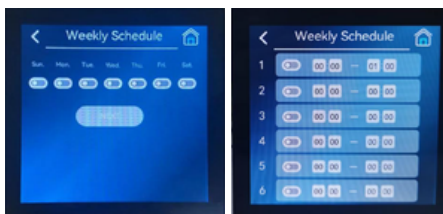
◎ Daily schedule:

Click to view each set of timing Settings and enter the group timing setting interface (Figure 4). Click "Start hour", "Start minute", "End hour", "End minute",click the corresponding window will pop up to set according to the range, click "√" to return to the timing page after setting.



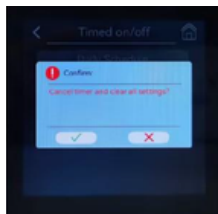
◎ Weekly schedule:

Select the second item in the on&off timing menu, click to enter the weekly timing interface (Figure 1 below), and click the weekly scale according to the actual situation; Click "NEXT" (Figure 1 below) to enter the weekly timing interface (Figure 2 below) to view the timing settings of each group. The remaining operations are consistent with the daily timing.



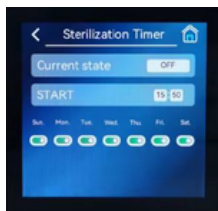
⦿ Cancel timing

Select the third item in the timing menu, click ⚙ the pop-up confirmation pop-up window (Figure 1 below), click ⚙ to confirm the clear timing and close the pop-up window, click ⏮ Cancel and close the pop-up window.



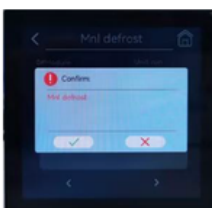
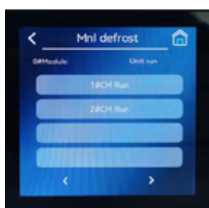
High temperature sterilization timing

Click the main interface to enter the menu, select the third "Timer" to enter the timing setting, click the second "sterilization timing" to enter the setting interface, according to the actual needs, set the start time, week day (the green button), start the sterilization timing function;



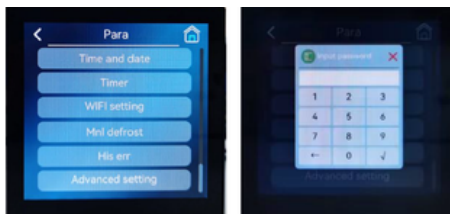
3.3.6 Manual defrost

Click the main interface to enter the menu, select the fifth item "Mnl defrost" to enter the manualdefrost interface, you can choose compressor 1 or compressor 2 to defrost alone.



3.37 User Parameter Settings

Click the main interface to enter the menu, select the last item, advanced parameters, enter the normal password(123), enter the user parameter setting;



Please refer to the following table for user parameters (Actual parameters are subject to the display of the wired controller) :

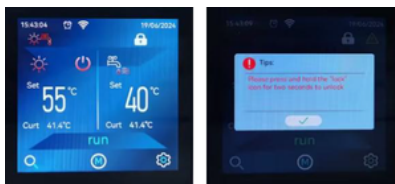
Code	Setting item	Setting range	Unit
1	Mode	Cooling mode Heating mode Auto mode Hot water mode Hot water & Cooling mode Hot water & Heating mode	/
2	Cooling setting temp	min...max	°C
3	Heating setting temp	min...max	°C
4	Hot water setting temp	min...max	°C
6	The power-on energy adjustment function	disable / available	/
8	Heating target compensation	disable / available	/
9	Heating compensation temp 1	min...max	°C
10	Heating compensation temp 2	min...max	°C
11	Heating compensation ambient temp1	min...max	°C
12	Heating compensation ambient temp 2	min...max	°C
13	Cooling target compensation	disable / available	/
14	Cooling compensation temp 1	min...max	°C
15	Cooling compensation temp 2	min...max	°C
16	Cooling compensation ambient temp1	min...max	°C
17	Cooling compensation ambient temp 2	min...max	°C

Code	Setting item	Setting range	Unit
18	Compensation update cycle	0–59	min
19	On-duty function	disable / available	/
20	Heating on-duty temp	min...max	°C
21	Cooling on-duty temp	min...max	°C
22	On-duty start hour	0–23	hour
23	On-duty start min	0–59	min
24	On-duty stop hour	0–23	hour
25	On-duty stop min	0–59	min
26	Alarm tone setting	mute Long ring Ring for 10s Ring period of 10s	/
27	Sterilization start week day	SundayMondayTuesday WednesdayThursdayFridaySaturday	/
28	Sterilization start hour	0–23	hour
29	Sterilization start min	0–59	min
30	Timed sterilization function	disable / available	/

3.4 Startup & Shutdown

3.4.1 Unlock

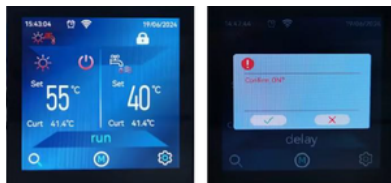
If the lock icon appears on the screen, the controller is locked. Display the following interface; Press anywhere on the screen, you will be prompted to long press the "lock" icon to unlock. Long press for two seconds, the lock icon will disappear, the interface can be controlled. If there is no action for a long time (about 90 seconds), the interface will be locked.



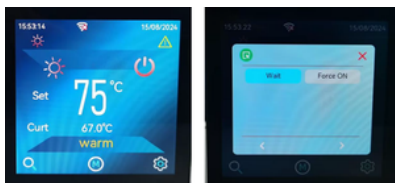
3.4.2 Startup & Shutdown

☉ Startup & Shutdown

Click in the main interface to pop up the "Confirm ON" box, and then click "✓" to confirm the start of heating, as shown below:

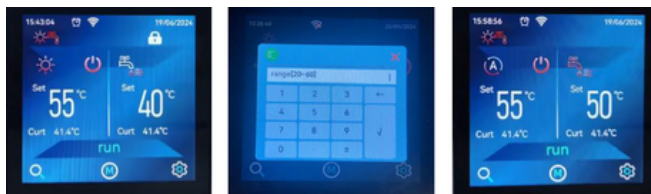


Remark: When the unit is at low temperature and power off for a long time, or when it is powered on for the first time, the unit will enter the preheating stage. During the preheating period, the unit is not allowed to start until the compressor oil heating is completed. When starting up, a pop-up window will appear with instructions to wait for preheating or continue starting up. In order to ensure reliable use of the compressor, it is recommended not to skip the unit preheating. Please waiting for the preheating time, after that you can start the unit normally.



◎ Target temperature setting

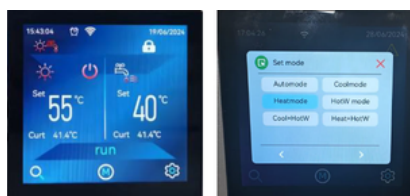
In the main interface, firstly click the temperature number (Figure 1 below), then pop up a window (Figure 2 below), input the setting value according to the demand, click "✓" to confirm, and directly return to the main interface to complete the temperature setting (Figure 3 below).



Mode Settings:

Click on the main interface (Figure 1 below), and a mode selection window (Figure 2 below) pops up. Click on the mode to select and return to the main interface directly.

There are auto, cooling, heating, hot water, cooling + hot water, heating + hot water 6 working modes to choose from; In the boot process can not change the working mode, if want to operate you need to shut down the unit;



3.5 Auxiliary heat source control

3.5.1 Set parameters for auxiliary heat source

In auxiliary heat source control, the following parameters should be set:

Code	Setting item	Setting range
22	Auxiliary heat source control	[0] Disable; [1] Only heating; [2] Hot water only; [3] Heating & Hot water
23	Delay time for auxiliary heat source activation	1...120
24	Water temperature difference when auxiliary heat source is turned on	2...10
25	Water temperature difference when auxiliary heat source is turned off	0...5
26	Ambient temperature when auxiliary heat source is turned on	-15...10

Advanced Settings>Parameter Settings>Compressor &Electric Heating Parameters

22 Auxiliary heat source: disable or select the mode to enable the auxiliary heat source function

23 Delay time for auxiliary heat source activation: the delay time for turning on the auxiliary heat source again after it has been turned off.

24 Water temperature difference when auxiliary heat source is turned on: When the total outlet temperature of the unit is $\leq$ the set temperature - "Water temperature difference when auxiliary heat source is turned on", the auxiliary heat source is turned on.

25 Water temperature difference when auxiliary heat source is turned off: When the total outlet temperature of the unit is $\geq$ the set temperature+"Water temperature difference when auxiliary heat source is turned off", the auxiliary heat source is turned off.

26 The ambient temperature when the auxiliary heat source is turned on: If the ambient temperature is higher than the "ambient temperature when the auxiliary heat source is turned on", the auxiliary heat source function will not be turned on. If the ambient temperature is lower than the "ambient temperature when the auxiliary heat source is turned on", the auxiliary heat source will be turned on.

3.5.2 Install the total outlet water temperature sensor

When installing an auxiliary heat source, it is necessary to install a total outlet temperature sensor and set the total outlet temperature probe to enabled before using the auxiliary heat source. The steps to enable the system's total outlet temperature are:

① In "Advanced Settings>Parameter Settings>Sensor Use", set "21 System Total Outlet Temperature" to enabled(TWout temp);

② Install the total outlet water temperature sensor at the corresponding position on the water system and mainboard.

③ Go to "Advanced Settings>Parameter Settings>User Parameter Settings" and set "25 Total Outlet Temperature Compensation" to adjust the difference between the displayed and actual values of the system's total outlet temperature.

Code	Setting item	Setting range
21	System Total Outlet Temperature (TWout temp)	[0] Disable; [1] Enable
25	Total Outlet Temperature Compensation	-10...10

3.5.3 Control Logic of Auxiliary Heat Source in Different Modes

(1) When the auxiliary heat source is set to Heating Only Mode:

When the compressor operates normally:

If the ambient temperature is lower than the "Ambient temperature when the auxiliary heat source is turned on", and the initial total outlet water temperature is too low or the target water temperature is too high, and the auxiliary heat source has been off for longer than the "Delay time for auxiliary heat source activation",

→ the auxiliary heat source will be turned on.

When the ambient temperature exceeds the activation threshold or the total outlet water temperature exceeds the target value,

→ the auxiliary heat source will be turned off.

When the compressor is abnormal:

If the initial total outlet water temperature is too low or the target temperature is too high, and the auxiliary heat source has been on or off for more than 5 minutes,

→ the auxiliary heat source will automatically operate.

When the total outlet water temperature exceeds the target temperature excessively,

→ the auxiliary heat source will be turned off.

(2) When the auxiliary heat source is set to Hot Water Only Mode:

When the compressor operates normally:

If the hot water tank temperature and the total outlet water temperature are too low, and the auxiliary heat source has been off for a time longer than the "Delay time for auxiliary heat source activation",

→ the auxiliary heat source will be automatically turned on.

When the hot water tank temperature exceeds the target temperature or the total outlet temperature is too high,

→ the auxiliary heat source will be turned off.

When the compressor is abnormal:

If both the hot water tank temperature and the total outlet temperature are too low, and the auxiliary heat source has been on or off for more than 5 minutes,

→ the auxiliary heat source will be turned on.

When the hot water tank temperature exceeds the target temperature or the total outlet temperature is too high,

→ the auxiliary heat source will be turned off.

(3) When the unit is in Defrosting Mode:

If the total outlet water temperature is below 16 °C,

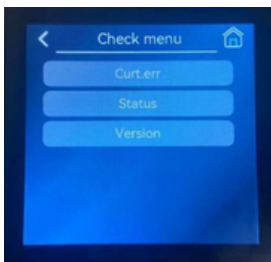
→ the auxiliary heat source will be turned on.

When the unit exits defrosting or the total outlet temperature exceeds 20 °C,

→ the auxiliary heat source will be turned off.

3.6 Operation Parameter Check

1. On the main interface, click the parameter check menu to query the current fault code of the unit, the state parameters of the unit, and the software version number.



©List of operation parameters

Code	Description	Remark
1	Envtemp (Ambient temp)	-30~99°C
2	Sys.evap.out T (System outlet water temp)	-30~99°C
3	Sys.evap.inlet (System inlet water temp)	-30~99°C
4	Sys.hottmp (System hot water temp)	-30~99°C
5	Sys.TWout (System Total outlet water temp)	-30~99°C
6	EHeater (Electric heater)	ON/OFF
7	AHS (Auxiliary heat source)	ON/OFF
8	TBH (Water tank heater)	ON/OFF
9	3PV1 (Three way valve 1)	ON/OFF
10	3PV2 (Three way valve 2)	ON/OFF
11	Alarm	ON/OFF
12	1#Outtmp (1# outlet water temp)	-30~99°C
13	Cellwaterin (1# inlet water temp)	-30~99°C
14	ECFan1Drv.temp (ECFan 1 drive temperature)	-30~99°C

Code	Description	Remark
15	ECFan1Setspeed (ECFan 1 set speed)	RPM
16	ECFan1cur.speed (ECFan 1 current speed)	RPM
17	ECFan1cur.curr (ECCurrent of fan 1)	A
18	1#CMruntime (1# Compressor running time)	h
19	1#M.EEVO%D (1# Current steps of main EEV)	st
20	1#Setspeed (1# Compressor target speed)	rps
21	1#Curspeed (1# Compressor actual speed)	rps
22	1#Current (1# Compressor current)	A
23	1#Invt.V.Out (Output voltage of variable frequency module #1)	V
24	1#Invt.temp (1# Variable frequency module temp)	-30~99°C
25	1#Suct.tmp (1# Suction temperature)	-30~99°C
26	1#Evap.in (1# Evaporator in temp)	-30~99°C
27	1#Invt.V.Bus (1# Variable frequency module DC bus voltage)	V
28	1#Coiltmp (1# Evaporator coil temp)	-30~99°C

Code	Description	Remark
29	1#Exh.tmp (1# Exhaust gas temp)	0~125°C
30	1#Cur.superH (1# Current superheat)	-30~99°C
31	1#Obj.superH (1# Target superheat)	-30~99°C
32	1#Invt.limit (1# Frequency limiting information of frequency conversion module)	
35	2#CMruntime (2# Compressor running time)	h
36	2#M.EEVO%D (2# Main EEV current steps)	st
37	2#Setspeed (2# Compressor target speed)	rps
38	2#Curspeed (2# Compressor actual speed)	rps
39	2#Current (2# Compressor current)	A
40	2#Invt.V.Out (2# Output voltage of variable frequency module #1)	V
41	2#Invt.temp (2# Variable frequency module temp)	-30~99°C
42	2#Suct.tmp (2# Suction temperature)	-30~99°C
43	2#Evap.in (2# Evaporator in temp)	-30~99°C
44	2#Invt.V.Bus (2# Variable frequency module DC bus voltage)	V

Code	Description	Remark
45	2#Coiltmp (2# Evaporator coil temp)	-30~99°C
46	2#Exh.tmp (2# Exhaust gas temp)	0~125°C
47	2#Cur.superH (2# Current superheat)	-30~99°C
48	2#Obj.superH (2# Target superheat)	-30~99°C
49	2#Invt.limit (2# Frequency limiting information of frequency conversion module)	
50	ACPump (AC Circulation pump)	ON/OFF
51	CrankH (Electric heating of crankshaft)	ON/OFF
52	BtHeat (Chassis electric heating)	ON/OFF
53	1#comp (1# Compressor)	ON/OFF
54	1#4WV (1# Four way valve)	ON/OFF
55	2#comp (2# Compressor)	ON/OFF
56	2#4WV (2# Four way valve)	ON/OFF

3.7 Unit software version query

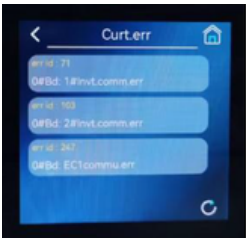
Click on the main interface to enter the check menu, select version check to enter, and slide up and down to view.



Section 4 Error Codes and Troubleshooting

4.1 Checking Error Code

Click on the main interface to enter the query menu. Then click on the main interface to enter the menu, select the sixth item "His err", enter the historical fault query, click on any fault to view the fault occurrence time, code, and fault details. Click the delete button to delete historical fault records.



4.2 Error Code List

The following common fault codes will be appeared on the controller if happened.

Reset method: Power On Reset, A = automatic reset; M = manual reset; A/M = limited automatic reset; refer to "Fault Reset Instructions" at below of table; Module XX indicates the module number of the cascade unit and n# indicates which compressor is on the same unit.

Error Code	Fault name	Reset mode	Alarm action	Solution suggestion
2	System Module: EEPROM data error fault	Power On Reset	Serious failure, stop the unit.	Initial all parameters and re-power up, if the fault cannot be eliminated, please contact us.
3	System Module: External Interlock Failure	M	Serious failure, stop the unit.	1. Check whether the corresponding "normally open and normally closed" settings of the inputs are consistent, and the inconsistency indicates a fault state. 2. If there is no problem with the "Normally open, normally closed" setting, check the cause of the unit abnormality.
9	System Module: Insufficient water flow	A/M	I When [insufficient water flow to open the pump] is used, stop all compressors and the water pump does not stop; I When [insufficient water flow to open the pump] is disable, stop all compressors, stop water pumps.	
178	Module xx: Insufficient water flow for unitary module	A/M	Stop module xx.	

177	System Module: Power supply failure	M	Serious faults, stop the unit (directly stop the compressor).	1. Check the three-phase power error phase detection J1, wiring is normal . 2. Check whether the corresponding "normally open and normally closed" settings of the inputs are consistent, and the inconsistency indicates a fault state. 3. If there is no problem with the "Normally open, normally closed" setting, check the cause of the abnormality.
1	Module xx: Power supply failure	M	Stop module xx.	
41	System Module: System outlet water temp is too low	A	Stop all compressors and fans.	1. Check if all the relevant set temperature parameters are in normal range. 2. Check that the outlet temp probe is mounted in the correct position or damaged. 3. Check what is causing the abnormality in the associated temperature.
200	Module xx: 1# Outlet water temp is too low	A	Stop module xx.	
40	System Module: System outlet water temp is too high	A	Stop all compressors and fans.	
196	Module xx: 1# Outlet water temp is too high	A	Stop module xx.	
204	Module xx: module outlet/inlet temp difference abnormal	M	Stop module xx.	1. Test whether the temperature probe position is in accordance with the correct. 2. Test whether the wiring is firm and reliable.

0	Module xx: Communication faulty	A	Stop module xx.	Check the communication cable between modules is connected properly and making good contact.
1#73、2#105	Module xx: n#Compressor protection		Stop the corresponding compressor and fan of module xx.	1. Check whether the corresponding "normally open and normally closed" settings of the inputs are consistent, and the inconsistency indicates a fault state; 2. If the "normally open and normally closed" setting is not in question, it is possible to set the "normally open and normally closed" setting. problem, check the cause of the unit abnormality.
1#49、2#81	Module xx: n#Compressor high pressure	A/M	Stop the corresponding compressor and fan of module xx.	
1#48、2#80	Module xx: n#Compressor low pressure	A/M	Stop the corresponding compressor and fans of module xx.	
1#66、2#98	Module xx: n#Compressor low pressure protection	A/M	Stop the corresponding compressor and fans of module xx.	
1#67、2#99	Module xx: n#Compressor high pressure protection	A/M	Stop the corresponding compressor and fan of module xx.	
1#58、2#90	Module xx: n# Fin coil temperature too high	A/M	Stop the corresponding compressor and fans of module xx.	1. Check the relevant set temperature parameter values for problems. 2. Check that the probe is mounted in the correct position. 3. Check what is causing the abnormality in the associated temperature.

1#59 2#91	Module xx: n#Exhaust gas temperature too high	A/M	Stop the corresponding compressor and fan of module xx.	1. Check the relevant set temperature parameter values for problems. 2. Check that the probe is mounted in the correct position. Check what is causing the abnormality in the associated temperature.
1#68 2#100	Module xx: n#Exhaust gas temperature too low	A/M	Stop the corresponding compressor and fans of module xx.	
1#72 2#104	Module xx: n#Frequency inverter failure	A/M	Stop the corresponding compressor of module xx.	Check the fault code of the faulty inverter in the status query, please contact us.
1#71 2#103	Module xx: n#Inverter module communication failure	A	Stop the corresponding compressor of module xx.	Test the [Inverter Base Address] setting. Check the communication address setting of the inverter.
1#248 2#250	Module xx: EC fan n fault	A/M	Stop the corresponding compressor and fans of module xx.	Check the fault code of the malfunctioning EC fan in the status query and refer to the EC fan manual to troubleshoot the problem.
1#247 2#249	Module xx: EC fan n communication failure	A	Stop the corresponding compressor and fans of module xx.	Detect the [EC Fan Base Address] setting. Detects the communication address setting of the EC fan.
1#70 2#102	Module xx: n# The temp difference between ambient temp and fin coil temp	M	Stop the corresponding compressor and fans of module xx.	Detect changes in stopping ring fin differential and allowable ring fin differential.

34	System Module: System outlet water temp failure	M	Emergency stop of all compressor during operation. Alarm only when anti-freeze.	1. Check that the sensor probe is connected properly; 2. Check that the unconnected probe has not been deactivated.
35	System Module: System inlet water temp failure			
45	System module: System total water outlet temp fault		Alarm only	
36	System module: Water tank temp fault		During operation, emergency stop all compressors.	
33	System Module: Ambient temp sensor failure		Serious failure, stop the unit.	
192	Module xx: 1# Outlet water temperature fault		Stop the module from working.	
1#56、2#88	Module xx: n# Exhaust temperature fault		Stop the appropriate presses and fans.	
1#55、2#87	Module xx: n# Fin coil temperature failure			
1#61、2#93	Module xx: n#Compressor low pressure failure			
1#62、2#94	Module xx: n#Compressor high pressure failure			

1#53、2#85	Module xx: n# Post-valve temperature failure	A	Stop the appropriate presses and fans.	1. Check that the sensor probe is connected properly; 2. Check that the unconnected probe has not been deactivated.
1#52、2#84	Module xx: n#Suction temperature fault			
213	Module xx: Condenser temp sensor failure	A	Alarm only, no shutdown	
208	R290 sensor failure	A	Alarm only, no shutdown	1. Check that the sensor probe is connected properly; 2. Check that the unconnected probe has not been deactivated.
210	Unit return water temp sensor failure	A	Alarm only, no shutdown	
209	R290 refrigerant leakage alarm	M	Stop all modules and run the fan at the lowest speed	Power off the unit immediately, ventilate, check the refrigerant leakage point of the unit, and repair it

4.3 Owner Inspection

We recommend the user to check the heat pump regularly, especially after abnormal weather conditions.

It is also recommended that you should follow the following basic guidelines to checking:

1. Ensure space is enough around the unit for maintenance or repair.
2. Keep the top and surrounding areas of the heat pump clean and good air flow.
3. Ensure no plants close to the unit which may has the risk of leaves/branches drop into the inside of the fan blade or evaporator coil.
4. Do not spray water on the unit when sprinkling plants to avoid corrosion and damage of the unit.
5. Keep the unit grounding well all the time.
6. Maintain the external filter regularly to ensure the cleanliness of the water to avoiding damage the internal components of the unit.
7. Check the wiring of the power supply and electrical components regularly to ensure their normal operation.
8. Do not change the settings by yourself after all safety guards have been installed. If any changes are required, please contact an authorized professional installer / agent.
9. If the unit is installed under a roof without a drain, please ensure that the necessary measures are taken to prevent excessive water from splashing directly or flowing into the unit.
10. If water flows into the unit and touches any electrical component, cut off the power supply and stop using the unit. Also, please contact an authorized professional installer / agent for inspection.
11. If power consumption from the unit increased too much not due to cold weather condition, Please get in touch with local authorized installer agent for checking.
12. When not in use for a long time, please close the unit, and cut off power supply to the unit.

4.4 Trouble shooting

The following troubleshoot information is used to resolve the problems encountered in the unit use.

Warning-Risk of electric shock



Ensure that all high voltage circuits are disconnected before opening the unit to starting installation. Contact with these circuits may cause death or serious injury to the user, installer, or other person, and possible property damage.

Non-professionals, do not turn on the heat pump anywhere to avoid electric shock.

1. Keep your hands and hair away from the fan blades to avoid injury.
2. If you are not familiar with your heat pump:
 - A) Be sure to consult your authorized installer / agent before attempting to adjust or repair the equipment.
 - B) Read the complete installation and user guide before trying to operate or adjust the heat pump.

Important: The main power of the heat pump must be turned off before repair.

4.1 Common faults and debugging

If users have any problems in the process of work, they must hire professional maintenance personnel for maintenance. Maintenance personnel may refer to the chart for debugging.

Fault	Possible Reasons	Solutions
The heat pump is not running	1. Power failure 2. Loose wiring 3. blown fuse 4. Low pressure is too low	1. Turn off the power supply switch and check the power supply condition 2. Find out the cause and repair it 3. Replace the fuse 4. Test the voltage and the current
The water circulation pump is working but no water circulation or high noise of the water pump	1. Lack of water in the system 2. There is air in the water system 3. These valves are not all open 4. The water filter is very dirty and blocked	1. Check the system supplement device, and complete the system 2. Exhaust the air in the water system 3. Open the water supply system valve 4. Clean the water filter
Low heating capacity	1. Lack of refrigerant 2. Poor thermal insulation of the water system; 3. Dry filter is blocked 4. The air heat exchanger has poor heat dissipation 5. Water is insufficient	1. Leakage detection and charge sufficient refrigerant 2. Strengthen the thermal insulation of the water supply system 3. Replace dry filter 4. Clean the air heat exchanger 5. Clean the filter
The compressor does not work	1. Power supply failure 2. Compressor contactor is damaged; 3. The wiring is loose 4. Compressor overheat protection 5. Water outlet temperature is too high 6. Water flow is insufficient 7. Compressor overload protector has tripping operation	1. Find out the cause, and solve the power supply failure problem 2. Replace the compressor contactor 3. Find out the loose point and repair it 4. Check the unit pressure and the exhaust temperature. 5. Reset the water temperature 6. Clean the water filter and exhaust the air from the system 7. Check the running current and check if the overload protector is damaged

The compressor operating noise is too high	1. The liquid refrigerant enters into the compressor 2. Internal parts of the compressor are damaged 3. Power voltage is too low	1. Check if the expansion valve has failure 2. Replace the compressor 3. Check the power voltage
The fan does not work	1. The fastening screw of the fan motor is loose 2. The fan motor is damaged 3. Contractor is damaged	1. Fix the screw 2. Replace fan motor 3. Replace the contractor
The compressor is working, but the heat pump does not provide heating	1. All the refrigerant leaks completely 2. Compressor failure 3. Compressor reversal	1. Check the leakage and fill with refrigerant 2. Replace the compressor 3. Exchange the phase sequence of the compressor
Low water flow protection	1. Insufficient water flow in the system 2. Failure of water flow switch failure	1. Clean the water filter system and exhaust the air from the system 2. Check and replace the water flow switch

Section 5 General Maintenance

The R290 DC inverter air source heat pump unit is a highly automated device. Regular and effective maintenance on the unit will greatly improve the operation reliability and service life of the unit.

5.1 General Maintenance

During the maintenance process, pay more attention to the following important tips:

1. The water filter should be cleaned regularly to ensure that the water quality is clean and avoid the damage caused by the blockage of the filter element.
2. Users shall not change the internal structure or wiring of the equipment. All the safety protection devices have been set up before leaving the factory, and changes on them are strictly prohibited. We shall not assume any responsibility for the equipment damage caused by user adjustment.
3. The unit shall clean the surface of the evaporator regularly (every 1-2 months). If the unit is operating in a dirty or oily environment, professionals shall clean the evaporator with designated detergents to ensure the performance and efficiency of the unit.
4. Regularly check the feeding and exhaust device of the water system to prevent air from entering the system, leading to reduced water circulation or water circulation failure, and affecting the cooling and heating efficiency and working reliability of the unit.
5. The intelligent control system can automatically analyze various protection problems in daily use, and display the fault code on the controller. The unit can recover by itself. No maintenance is required for the piping within the unit under normal operating conditions.
6. The power supply and electrical wiring of the unit should be checked regularly to ensure that the wiring is firm and the electrical components are normal. If abnormal, it should be repaired or replaced, and the unit shall be reliably grounded.
7. During the operation of the unit, check all kinds of parts regularly. Check whether the working pressure of the refrigerant system is normal. Check the pipe joint and air injection valve for grease. Ensure that there is no refrigerant leakage in the refrigerant system.
8. Check whether the unit is firmly installed. Do not pile up any debris around the equipment to prevent the blockage of the air outlet. The environment around the unit shall be kept clean, dry and ventilated.
9. When the unit will not be used for a long time to rest after a period of operation, the water in the water system should be drained. And turn off the power supply, cover the equipment. When the unit needs to be used again, wait for the water system to fill the water, until the unit is thoroughly checked, start and preheat for at least 6 hours and restart the unit only after everything is OK.
10. No special repair or maintenance on the water system of the unit unless the water pump is damaged. It is recommended to clean or replace the water filter regularly when it is very dirty or blocked.

Precautions:

1. The unit shall be equipped with a specialized power supply. The voltage range shall be within $\pm 10\%$. The switch shall be an automatic air switch. The set current shall be 1.5 times of the operating current and equipped with no phase protection device. No knife switch is used in the unit.
2. It must be powered up for at least 12 hours before seasonal operation. If the machine does not work for a long time in winter, you must drain all the water in case the pipe and the unit are frozen and damaged. The controller shall be consistent with the unit. If the heating machine stops working in winter, no power shall be removed to avoid freezing and damage.
3. Heat pump switch can not be operated frequently, not more than 4 times within 1 hour. Electrical cabinet shall be protected from damp influence.
4. It is strictly prohibited to flush the DC inverter air source heat pump with water to avoid electric shock or other accidents.

5.2 Maintenance of anti-freeze



If heat pump is not running in the winter, it is necessary to keep power supply connected for Anti-freeze protection.

In cold weather ($\leq 0^{\circ}\text{C}$), if heat pump is no longer needed, do drain out all the water inside the system.

1. Keep powered on

Please do not turn off the power when the heat pump is temporarily out of use or when it is not in use, as the unit is equipped with anti freeze protection function. Only when the unit is running normally or the circulation pump is running normally, can the unit ensure that water does not freeze in cold weather. Therefore, the water temp can be appropriately lowered to save power. (It is recommended to set the water temp to 25-30 $^{\circ}\text{C}$ when not in use for a short period of time, which not only saves electricity but also prevents freezing.).

2. Pipeline insulation

Adequate insulation measures should be taken for the pipeline. Please pay attention to checking whether the insulation wrapping of the pipeline is in place to avoid freezing blockage of the pipeline. The pipeline insulation mainly uses insulation cotton and polyurethane foam. (Small pipes are generally insulated with insulation cotton, while large pipes are insulated with polyurethane foam.)

3. Shutdown precautions

If the user is not at home for a long time, the heat pump needs to be shut down for a long time, or if the power outage lasts for more than 15-30 minutes, the user must drain the water in the heat pump pipeline to prevent the water from freezing when the unit stops running. After thoroughly draining the water, the power should be turned off to prevent the unit from running incorrectly due to water shortage.

4. Precautions for antifreeze

For heat pump systems, it is recommended that users add antifreeze to protect the pipelines from freezing. It is recommended to pay attention to the following points when using antifreeze:

Choose high-quality antifreeze. Although counterfeit products are cheap, the quality cannot be guaranteed.

2. The amount of antifreeze used is equivalent to the water amount in the system, and a suitable antifreeze should be selected based on the local minimum temperature, the freezing point of antifreeze should be 5-10 degrees lower than the local minimum temperature. (such as ethylene glycol antifreeze -25 °C type, -30 °C type).

3. When preparing antifreeze, the ethylene glycol content should not exceed 68%, otherwise the freezing point will no longer decrease, and instead, it will cause an increase in the low-temperature viscosity of the antifreeze and a decrease in heat dissipation.

4. Different types of antifreeze should not be mixed to prevent chemical changes, precipitation, or corrosion.

5. Please regular inspect the pipeline antifreeze status, and it is recommended to replace the antifreeze every 2-3 years.

Section 6 WIFI Connection and Operation

4.1 Usage Notice

Dear Customer:

Thank you for choosing our products! For your convenience, please read the manual carefully and follow the steps in the manual.

4.2 APP Download

Research "smart life" in APP STORE or GOOGLE PLAY to install the APP.

4.3 Connect Your Phone to Wi-Fi

Make sure that the mobile phone and the device to be connected are in the same Wi-Fi environment. Select the 2.4GHz Wi-Fi network on the mobile phone and enter the password to connect the mobile phone to the network.

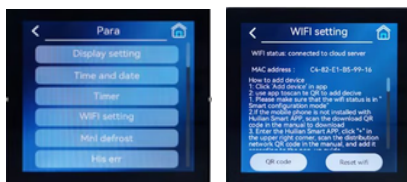
*Note: If the Wi-Fi in the current environment is 5GHz, please set the router to 2.4GHz first.

4.4 Check the device WIFI status

1. Enter the settings menu interface, select "WIFI setting".

2. Check if the message "Smart mode is being configured" is displayed in the interface, if other

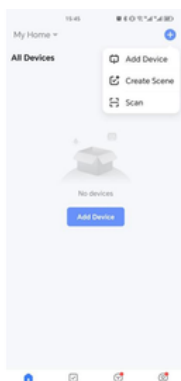
2. Check whether the message "Smart mode is being configured" appears on the interface. If a different message is displayed, press and hold the button to reset the WIFI connection.



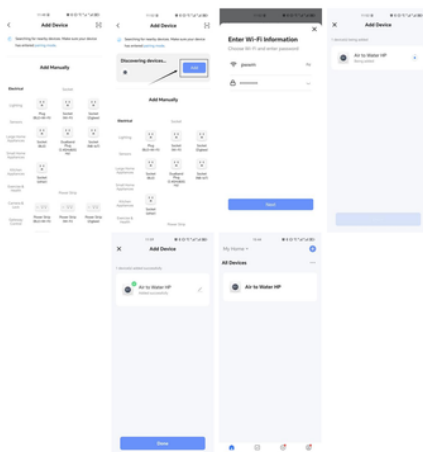
4.5 Add Device

- 1) Turn on the mobile phone Wi-Fi and Bluetooth.
- 2) Open the Smart Life APP on the mobile phone, and select "Home" in the bottom navigation bar;
- 3) Click the "+" button in the upper right corner of the home page, or click the "Add Device" button in the center of the home page to enter the device adding interface;
- 4) In the device adding interface, please try to add the device in one of the following ways:

A. Automatic device discovery



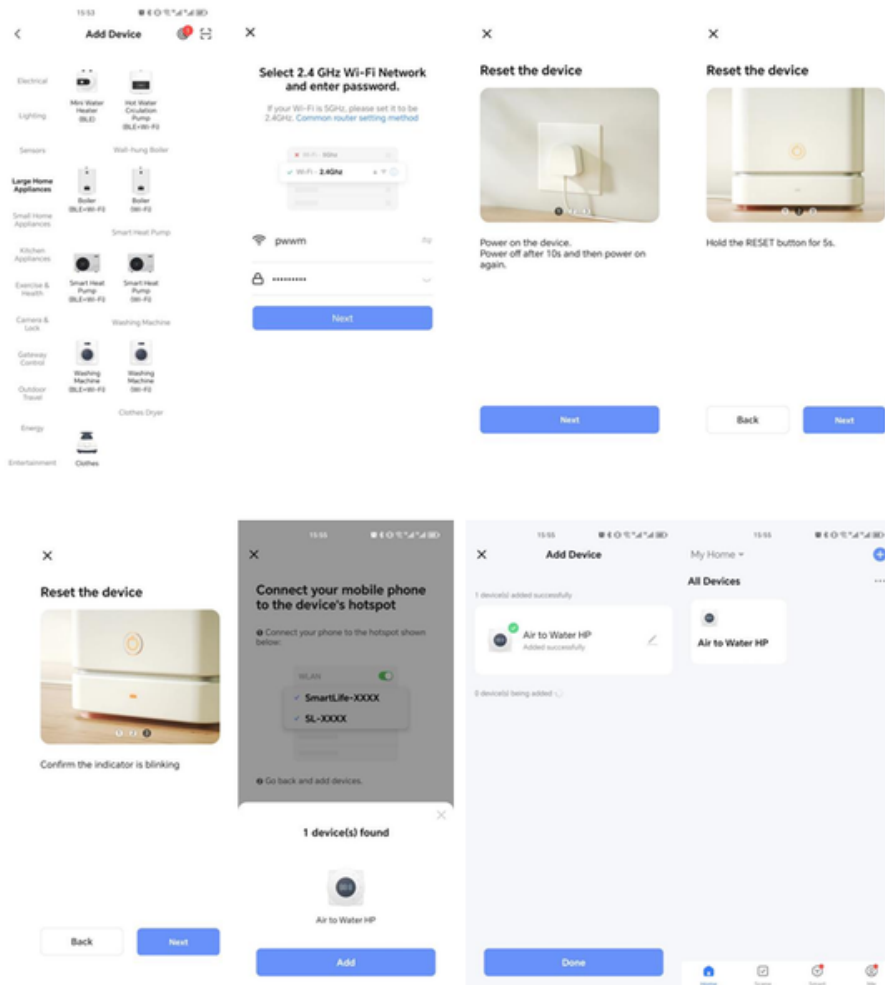
The phone will automatically discover available devices nearby. After discovering the device, follow the instructions in the figure below to complete the subsequent network configuration operations.



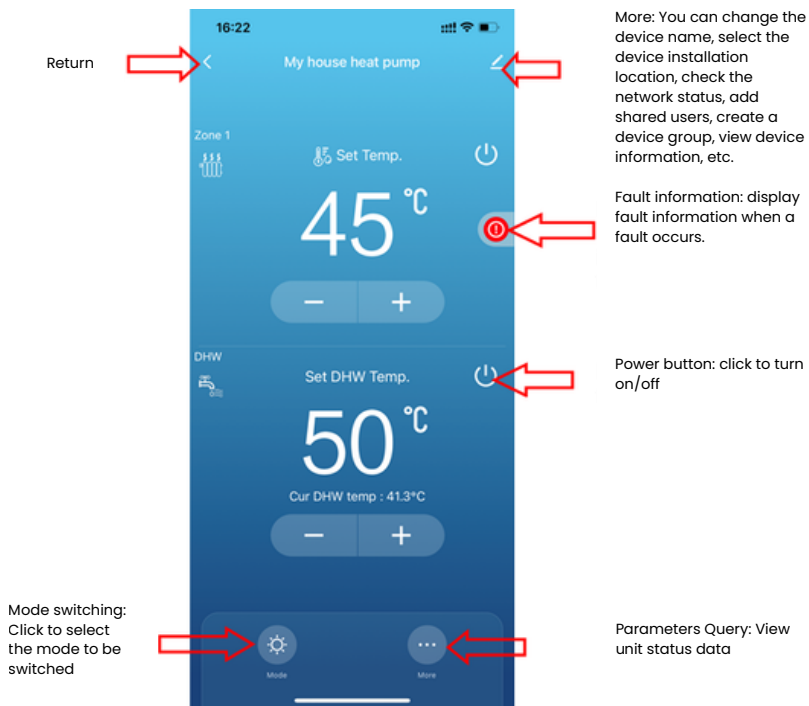
B. Manually adding devices

After entering the add device interface, go down and select "Intelligent Heat Pump" in your home appliance, and follow the steps in the following diagram to complete the operation.

***Note:** If you have checked and confirmed that the WIFI status of the device is correct, under the step of "Reset the device", please directly check "Confirm WIFI status" and click the "Next" button to directly configure the network without the need to reset the device.



4.6 Interface style

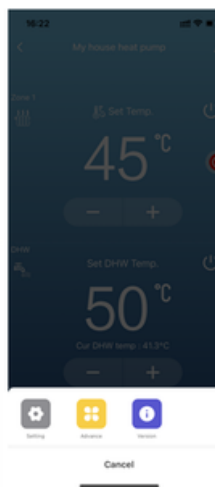




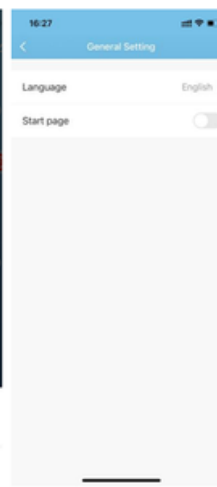
Main Interface



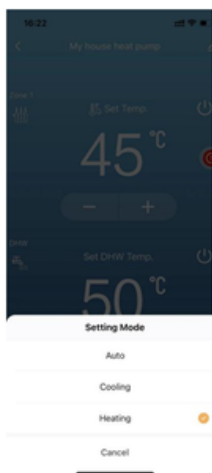
Status Inquiry Screen



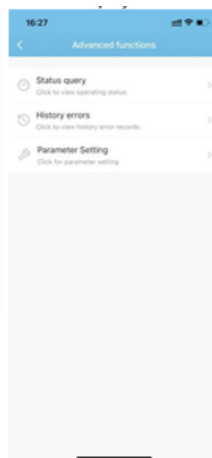
More menu bars



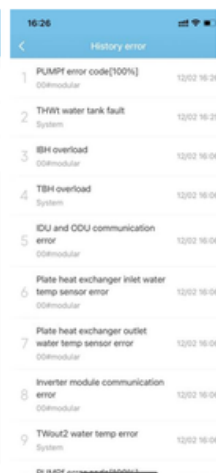
General setting interface



Mode selection interface



Advanced Function Interface



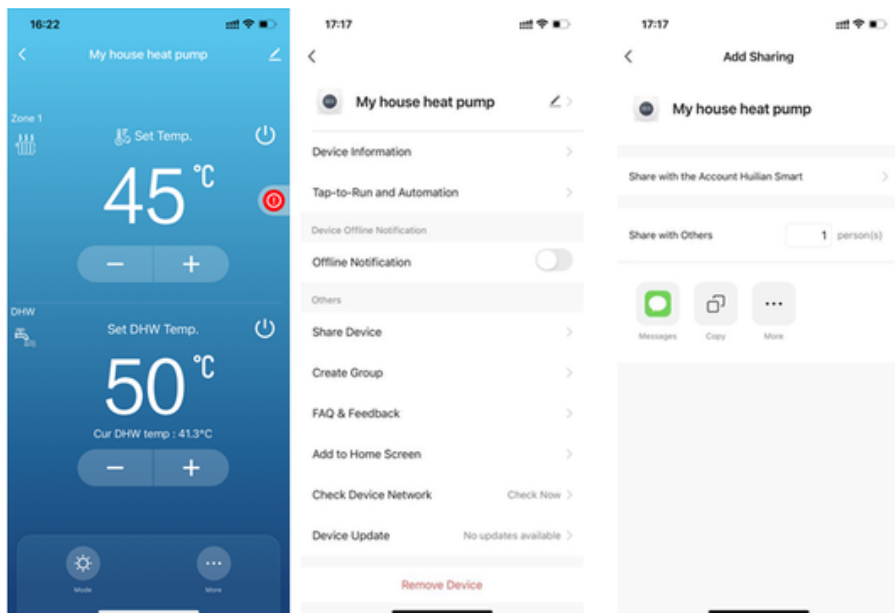
History error Screen



Parameter setting interface

4.7 Equipment sharing

- ① Share the bound device, the sharer operates in the following sequence.
- ② After successful sharing, the list will be increased and show the shared person.
- ③ To delete the shared person, long press the selected user, the delete interface will pop up, click "Delete".
- ④ The operation of the sharing interface is as follows:



- ⑤ Input the account of the shared person, click "Done", the shared success list will display the account of the newly-added shared person. The shared person showing the received shared device, click in to operate and control the device.

Exclusions from Warranty Coverage

The following situations are not covered by the warranty and do not entitle the manufacturer, importer, or seller to provide free repair or replacement:

1. Damage occurring after delivery: Malfunctions caused by external factors such as transportation, impact, collision, falling, breakage, scratching, or exposure to chemicals.
 - The delivery form is filled out to record the physical condition of the product at the time of delivery. If visible damage detected during delivery is not noted on the form, it is assumed that such external physical damage occurred after delivery.
2. Improper storage and unsuitable environmental conditions: Storage or failure to protect the device in unsuitable temperature, humidity, dust, or environmental conditions.
3. Electrical faults: Damage caused by high or low voltage, sudden fluctuations, incorrect wiring connections, and lack of grounding.
4. Water-related problems: Blockages and malfunctions caused by the water used in the device being excessively calcareous, sedimentary, or dirty.
5. Incorrect use: Pouring cold water into the device while it is hot or operating the device without water; also, malfunctions caused by use contrary to the user manual.
6. Installation deficiencies: Malfunctions caused by the absence of fuses or grounding in the electrical installation or the use of non-standard installations.
7. External factors: Natural disasters (earthquakes, floods, flash floods, lightning strikes), fire, or other force majeure events.
8. Unauthorized intervention: Malfunctions caused by repairs, gas refills, electrical connection changes, removal/installation, or interventions performed by unauthorized personnel.
9. Non-original parts: Damage caused by the use of spare parts, accessories, refrigerants, or chemicals not approved by the manufacturer.
10. Installation errors: Malfunctions caused by installation contrary to the manufacturer's instructions (incorrect piping, lack of insulation, drainage errors, incorrect positioning of the outdoor unit, etc.).
11. Failure to perform periodic maintenance: Performance decline or malfunctions resulting from failure to perform regular maintenance and cleaning as recommended by the manufacturer.
12. Unauthorized setting changes: Malfunctions resulting from changes to the control panel, mode, parameters, or software settings by persons other than authorized service personnel.
13. Use outside of limits: Operating the device outside of its design limits (heating at very low outdoor temperatures, cooling at excessively high temperatures, incorrect water flow or pressure).
14. Freezing-related malfunctions: Freezing and related damage resulting from shutting down the device during winter months or failing to drain the water circuit.

Important Points for Customers to Note Regarding Warranty

Please pay attention to the following points:

1. During installation and use of the device, ensure that you follow the instructions in the installation and user manual.
2. If you encounter any malfunction or problem, do not attempt to fix it yourself; contact our authorized service center directly.
3. Keep your warranty certificate, along with the service form issued by the service center when the device was first put into operation, and a copy of the device invoice in a safe place.

WARRANTY CERTIFICATE	
Manufacturer's Name: Address: Phone: Fax: Email: Authorized Signature: Company Seal:	Seller Company Name: Address: Phone: Fax: Email: Invoice Date and Number: Delivery Date and Location: Authorized Signature: Company Seal:
The Product	
Type: Brand: Model:	Warranty Period: Maximum Repair Period: Label and Serial Number:
Warranty Terms	
1. The warranty period begins on the date the goods are delivered to the consumer and applies for 2 years. The warranty certificate may be issued on paper or via a durable data storage medium. Upon the consumer's request, the certificate must be provided in writing on paper. 2. All parts of the goods are covered by the warranty without any distinction. 3. If the goods are found to be defective, the consumer may exercise one of the following options under Article 11 of Law No. 6502 on the Protection of Consumers: A) Withdrawal from the contract, B) Requesting a reduction in the sale price, C) Free repair, D) Replacement of the goods with non-defective goods. 4. When the consumer exercises their right to free repair, the seller is obligated to repair or have the goods repaired without charging for labor, parts, or any other fees. The consumer may exercise this right against the seller, manufacturer, or importer. These parties are jointly liable to the consumer and cannot transfer their liability to each other. 5. Even if the consumer exercises their right to free repair: • If the product malfunctions again within the warranty period, • The maximum time specified for repair is exceeded, • The authorized service center, seller, manufacturer, or importer reports that the product cannot be repaired, the consumer may request a refund, a price reduction proportional to the defect, or replacement of the product with a defect-free equivalent. The seller cannot refuse this request; the seller, manufacturer, and importer are responsible for fulfilling the request. 6. The maximum repair period for the goods is 20 business days. This period begins: • During the warranty period, on the date the defect is reported to the authorized service center or seller, • Outside the warranty period, on the date the goods are delivered to the authorized service center. If the defect cannot be repaired within 10 business days, the manufacturer or importer must provide the consumer with a similar product free of charge until the repair process is completed. For goods that malfunction within the warranty period, the repair period is added to the warranty period. 7. Defects resulting from use of the product contrary to the user manual are excluded from the warranty. 8. Products or parts replaced under warranty are covered only for the remaining warranty period of the purchased product. 9. Whether the defect is due to misuse is determined by an authorized service station or, if no authorized service station is available, by the seller, importer, or manufacturer, in that order, within the maximum repair period, based on a report. A copy of this report is provided to the consumer. 10. Consumers may submit their complaints and objections to consumer arbitration boards or consumer courts.	

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(Rev. 2026/01)