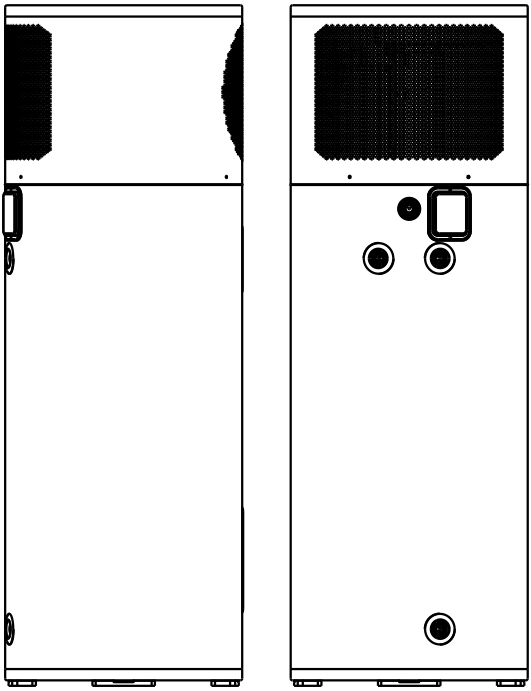
OMNI X
TECHNOLOGIES

Original instructions & User Manual

DC INVERTER HOT WATER HEAT PUMP



Models:
OMNIXHPGL-210-R290
OMNIXHPGL-270-R290
OMNIXHPGL-320-R290

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1. SAFETY PRECAUTIONS

To prevent injury to the user, other people, or property damage, the following instructions must be followed. Incorrect operation due to ignoring of instructions may cause harm or damage.
Install the unit only when it complies with local regulations, by-laws and standards. Check the main voltage and frequency. This unit is only suitable for earthed sockets and outdoor use, connection voltage 220-240 V~/ 50Hz.
The following safety precautions should always be taken into account:
- be sure to read the following WARNING before installing the unit;
- be sure to observe the cautions specified here as they include important items related to safety;
- after reading these instructions, be sure to keep it in a handy place for future reference.

⚠ WARNING

The unit must be securely fixed to avoid noise and shaking: when insufficiently installed, the unit could fall causing injury. The bearing surface should be flat to bear the weight of the unit and suitable for installing the unit without increasing noise or vibrations.
When installing the unit in a small room, please take measures (like sufficient ventilation) to prevent the asphyxia caused by the leakage of refrigerant.
Be sure to use the provided or specified parts for the installation work: the use of defective parts could cause an injury due to possible fire, electric shocks, the unit falling etc.
Do not tear off the labels on the unit: the labels are for the purpose of warning or reminding, keeping them can ensure your safe operations.
To prevent water immersion: Install the unit on a stable, well-draining base. The base should be above the annual average water level.
The installation place without direct sunlight and other heat supplies is recommended: if no way to avoid these, please install a covering.
Make sure that there's no obstacles around the unit.
This appliance must only be installed in accordance with the acceptable plumbing configurations specified in these instructions. Failure to do so may result in conditions where delivery temperature control is inadequate.

⚠ CAUTIONS

⚠	**Do not install the unit in a place where there is a chance of flammable gas leaks:** if there is a gas leak and gas accumulates in the area surrounding the unit, it could cause an explosion.
	Do not clean the unit when the power is 'ON': always shut 'OFF' the power when cleaning or servicing the unit. If not, it could cause an injury due to the high speed running fan or an electrical shock.
	Disconnect the appliance from the power supply by removing the plug from the socket or, by turning off the main switch if installed upstream of the unit.
	Never remove the plug from the socket by pulling out the power cord.

	Do not perform cleaning operations of the machine before turning off the unit, unplugging it or turning off the external switch.
	In case the unit is used without air ejection duct, verify that the installation room has got a volume not less than 10m³, with adequate ventilation. Please note that the temperature of the expelled air is 5-10°C lower than the inlet air, therefore if not channeled it can cause a significant lowering of the temperature of the installation room.
	Do not continue to run the unit when there is something wrong or there is a strange smell: the power supply needs to be shut 'OFF' to stop the unit; otherwise this may cause an electrical shock or fire. The unit will start the sterilization function automatically at 12:00 PM once every day and the 45% sensor has a 61°C set point with 1K dead band.
	Inside the unit, there are some moving parts. Be especially careful when working near them, even if the unit is off.
	Do not insert fingers or other objects into the fan and evaporator.
	The temperatures of heads and exhaust piping of the compressor are usually high. Therefore be careful when working near condensing coils.
	The aluminum fins are very sharp and can cause serious injuries.

2. INSTALLATION PRECAUTIONS

⚠ WARNING

All the operations described below must be carried out only by QUALIFIED PERSONNEL. Prior to any work on the unit, make sure that the power supply is disconnected.

When installing or servicing the unit, it is necessary to strictly follow the rules listed in this manual, to conform to all the specifications of the labels stuck on the unit, and to take any possible precautions. Not observing the rules reported on this manual can create dangerous situations.

	After receiving the unit, immediately check its integrity. The unit left the factory in perfect condition; any eventual damage has to be questioned to the carrier and recorded on the Delivery Note before signing it.
	Do not insert fingers or other objects into the fan and evaporator.
	The sanitary device is mainly used for personal hygiene purposes. In order to prevent scald when users use hot water, the user needs to use the product with a constant temperature water mixing valve device to control the maximum outlet temperature not exceeding 50 degrees.

3. INSTALLATION

All Goodheat heat pumps must be installed by a licensed plumber in compliance with the guidelines specified in AS/NZS3500.2, which pertains to the "National Plumbing and Drainage Code for Hot Water Supply Systems -Acceptable Solutions."

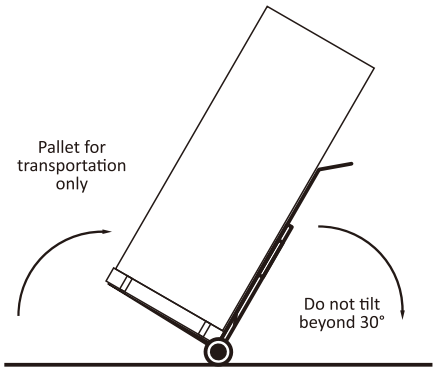
CHOOSE A SUITABLE LOCATION

1. Ideally, the Heat Pump should be installed outdoors. However, for indoor installations, please ensure that the chosen location complies with the requirements outlined in AS/NZS 5149.
2. Make sure there is ample space for installation and maintenance with a recommended minimum vertical distance of 300mm.
3. The product must be installed in a dry environment free from humidity.
4. Ensure that the supporting surface is level (with a horizontal angle not exceeding 2°) and capable of bearing the weight of the heat pump when filled with water. Refer to the technical data for the heat pump's weight.
5. Choose a suitable outdoor location for the exhaust air vent, and be sure to insulate the exhaust air duct to prevent condensation when the system is in operation.
6. Ensure there is easy access to the system for maintenance purposes.
7. Always provide extra space for pipe connections and power cables.
8.Avoid installing the product on a surface with loose coverings as it may produce excess noise during operation.
9. Avoid installing the product in areas with toxic gases or mineral oils, as these locations are not suitable.
10. When installing near a coastline within 500 meters, be mindful that extra maintenance may be necessary, Insufficient shelter from coastal conditions can shorten the system's service life and potentially void the warranty.

> If you install the product in an environment prone to frost, take all necessary precautions to ensure proper insulation of all pipework.

TRANSPORTING THE HEAT PUMP

1. To ensure the warranty remains valid, it's crucial to store and transport the pumps in an almost upright position with a tilt angle of no more than 30°, Storing or transporting the unit horizontally will void the warranty.
2. Always transport the system while it's inside it's packaging.
3. The packaged system weighs 126KG for models 210L, and 150KG for models 270L, and 166KG for models 320L. For safe handling and to prevent damage, it's necessary to have two people carry the system at all times.
4. Please be aware that the external casing of the unit is prone to denting and damage. When moving the unit, exercise care and caution, as any marks caused by improper handling are not considered defects and are not covered under the warranty.



MINIMUM INDOOR INSTALLATIONREQUIREMENTS

1. The indoor area for heat pump installation should exceed the following sizes:
For a 210L unit, the area should be at least 35㎡.
For a 270L unit, the area should be at least 55㎡.
For a 320L unit, the area should be at least 75㎡.
2. If the heat pump must be installed in a smaller indoor space but is connected to an adjacent room, there must be a fixed open door connecting the rooms. A fixed open door cannot be closed under any circumstances.
3. Place heat pumps a safe distance away from potential ignition sources or corrosive environments to prevent the risk of fire or damage.
4. Consider the serviceability of the heat pump during installation. ensuring there is enough space for maintenance and repair tasks.
5. Follow all relevant electrical and safety standards during.
6. Regularly perform maintenance and inspections on both the heat pump and the ventilation system to ensure safe and efficient operation.

Always remember installers must diligently adhere to all Australian standards. Our guidelines should be viewed as supplementary information and do not override established standards.

VENTILATION GUIDELINES:

These guidelines pertain to the proper operation of the heat pump and are not related to the storage of flammable refrigerants. It's important to ensure that the location complies with AS/NZS 5149requirements.
Ideally, the heat pump should be installed outdoors. However, for indoor installations, it's crucial to be aware of potential issues and take preventive measures.
One significant concern with indoor installations is the risk of air stagnation. In confined spaces, the air temperature can gradually decrease, leading to a decrease in the heat pump's efficiency and in some cases, even failure.
To prevent this, make sure the ambient air temperature doesn't drop below 5°C. Continuously monitor the air temperature within the space to ensure adequate ventilation throughout the heat pump's lifetime.

To maintain a stable air temperature, consider the following recommendations:

1. For indoor installations, choose spaces with an air volume greater than 53m³.
2. If the area is smaller than 53m³, ensure cross ventilation. Cross ventilation can be achieved either naturally or mechanically.
3. Natural ventilation occurs when there are appropriately sized openings on opposite ends of the enclosure, facilitating cross airflow.
4. When using mechanical ventilation through a supply or extract fan. ensure a minimum air volume of 1000 m³/h (278 L/s).
5. In mechanically ventilated areas, establish a make-up air pathway. This can take the form of grilles, undercut doors, open doors, open windows, etc.
6. To achieve effective cross ventilation, position the make-up air pathway on the opposite side of the enclosure from the fan.

INSTALLATION OF THE HEAT PUMP BASE

1. BASE

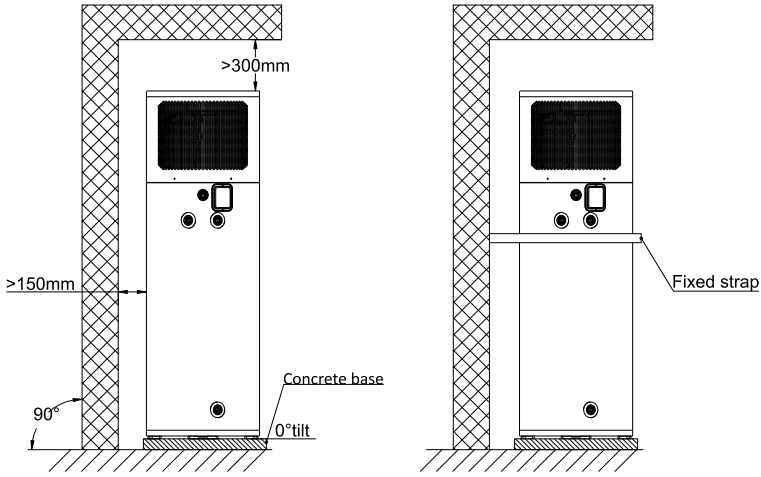
The unit must be installed on a concrete plinth or a stable structure capable of supporting weights exceeding 400kg. it's crucial that the supporting structure remains stable over time and does not shift, especially due to factors like water drainage. You'll need a concrete base that's at least 5Omm thick or a well-seasoned hardwood slat with a minimum thickness of 25mm. If you're using concrete base pavers, make sure they have a minimum dimension of 650mm x 650mm.

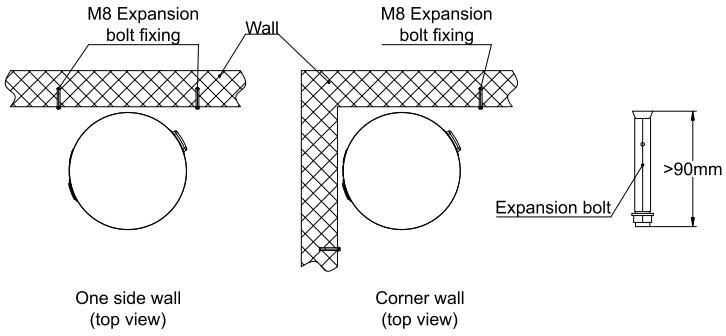
Make sure all four feet of the unit are supported by the base you are using to avoid any potential warranty issues.

Ensure proper drainage is in place to handle any potential overflow.

During installation, it's essential to position the unit completely vertically and level to facilitate proper condensate drainage. If the system is installed with a tilt exceeding 3°it could void the warranty.

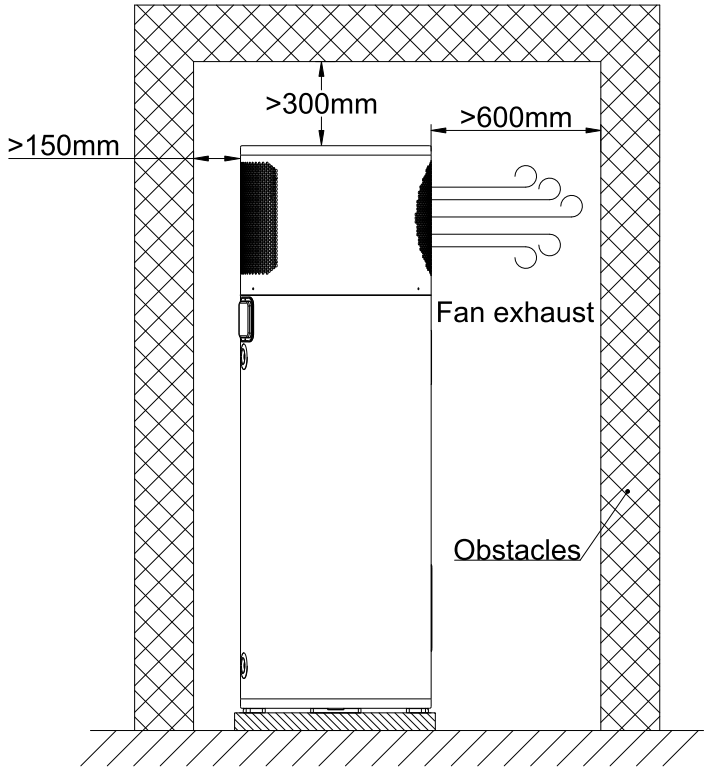
The fixing strap is recommended as shown as following figures:





2. AIR FLOW

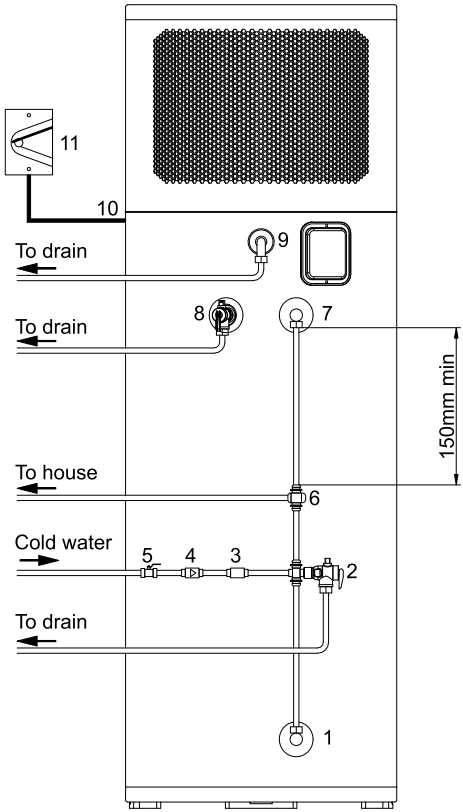
· Do not install the unit in areas where there is a risk of falling debris, such as leaves, as this could block air vents or cause damage to the unit.
· Avoid placing the system in locations with multiple walls or structures.
· When installing the unit under fixtures or home eaves, follow these clearance requirements:
-Maintain a minimum clearance of 300mm above the unit-Provide a 600mm clearance to the right side of the system (when facing it).
-Allow for a 150mm clearance to the left side of the system(when facing it).
-Position the unit at least 150mm away from your home's wall to ensure full access for servicing and to prevent cold air circulation.
· Install the unit to ensure that the control interface is easily accessible for users. There should be clear access to the electrical panel located at the back of the system. Improper installation could result in voiding the warranty or require additional charges to rectify the system's compliance.



⚠ WARNING

· A minimum of 20m³ of unobstructed space surrounding the unit.
· For indoor installations the ensure that the location complies with the requirements of AS/NZS 5149.
· The electrical access point and display panel should always be accessible.

4. PLUMBING CONNECTIONS



1	Cold water supply outlet (G3/4" female thread)
2	Expansion control valve (ECV)
3	Pressure reduction valve (500k Pa)
4	Non-return valve (DN20)
5	Isolation valve (DN20)
6	Tempering valve (high performance recommended)
7	Hot water outlet (G3/4"female thread)
8	P&T Relief Valve* (G3/4" female 700k Pa)
9	Condensing drainage Elbow (DN20)*
10	Electrical cable*
11	Isolation switch (hardwired into 10 amp circuit)
* Supplied with system	

*AS 1357.1 certified non-return valve shall be installed in supply water inlet connection.

*Watermark certified ball valve must be installed in supply water inlet connection.

*AS 4032.2 certified tempering valve(setting:50C) shall be installed in outlet connection of heat pump water heater for personal hygiene purposes.

⚠ NOTE

TEMPERATURE CONTROL VALVE IS REQUIRED AS PER AS/NZS 3500.4.
SERVICING IS TO BE CARRIED OUT ONLY BY THE MANUFACTURER"S AUTHORIZED AGENT.
COLLECT FLUID FOR APPROPRIATE DISPOSAL.

The installation shall conform to the Plumbing Code of Australia (PCA). All pipe installations must comply with the relevant provisions of Australian Standard AS 3500.4 or NZBC G12. Pipe materials should only be used that are considered acceptable in the AS/NZS 3500.4 or NZBC G12 guidelines.

⚠ WARNING

IF THE HOT WATER SYSTEM IS NOT USED FOR TWO WEEKS OR MORE, A QUANTITY OF HIGHLY FLAMMABLE HYDROGEN GAS MAY ACCUMULATE IN THE WATER HEATER. TO DISSIPATE THIS GAS SAFELY, IT IS RECOMMENDED THAT A HOT TAP BE TURNED ON FOR SEVERAL MINUTES OR UNTIL DISCHARGE OF GAS CEASES. USE A SINK, BASIN, OR BATH OUTLET, BUT NOT A DISHWASHER, CLOTHES WASHER, OR OTHER APPLIANCE. DURING THIS PROCEDURE, THERE MUST BE NO SMOKING, OPEN FLAME, OR ANY ELECTRICAL APPLIANCE OPERATING NEARBY. IF HYDROGEN IS DISCHARGED THROUGH THE TAP, IT WILL PROBABLY MAKE AN UNUSUAL SOUND AS WITH AIR ESCAPING.

⚠ WARNING

THIS APPLIANCE MAY DELIVER WATER AT HIGH TEMPERATURE. REFER TO THE PLUMBING CODE OF AUSTRALIA (PCA), LOCAL REQUIREMENTS AND INSTALLATION INSTRUCTIONS TO DETERMINE IF ADDITIONAL DELIVERY TEMPERATURE CONTROL IS REQUIRED.

COLD WATER SUPPLY OUTLET

1. The cold water supply connection uses a G 3/4" female thread.
2. To connect the cold water supply, use a G 3/4" socket.
3. The cold water supply outlet can also serve as a drainage point for emptying the system.

HOT WATER CONNECTION

1. The hot water supply connection also uses a G 3/4" female thread.
2. Connect the hot water supply using a G 3/4" socket.
3. To ensure thermal efficiency, insulate all hot water lines and connections with a minimum 13mm closed-cell insulation.
4. All hot water supply components must be made of copper.

NON-RETURN VALVE AND ISOLATION VALVE

It is necessary to ensure a non-return isolation valve is installed directly in the cold-water supply line that feeds the system. Non-Return valve enables the isolation of the hot water system from the rest of the home's water supply. Simplifying maintenance, draining and unit replacement.
Do not use a hose-set to connect the system to the water supply.

CONDENSATE DRAIN

1. When heat is extracted from the atmosphere through evaporator coils, it generates condensation in the form of water, In places with higher humidity, this condensation occurs at a faster rate.
2. To collect the water by-product, a condensate tray is placed at the base of the heat pump. Any surplus water from this tray is channeled through the condensate drain.
3. The system comes with a pre-installed condensate drain connection elbow, it is essential to route the condensate into the nearest storm water drain using a drainage pipe. Failing to do so could lead to issues like termite attraction and the growth of algae and moss.
4. Ensure that the condensate line is free of kinks, and since the water relies on gravity for flow, it should only run downward to facilitate unobstructed water flow.

PRESSURE & TEMPERATURE RELIEF (PTR) VALVE

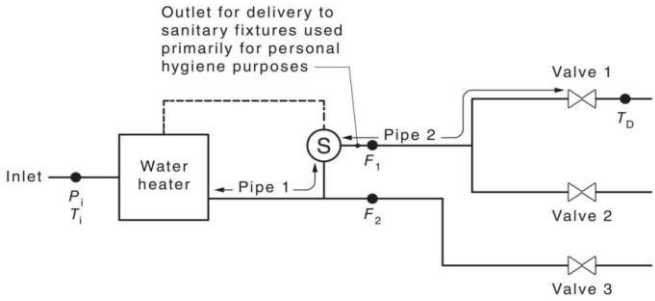
1. The system comes with a PTR (Pressure and Temperature Relief) valve that matches the water heater tank's pressure rating. If the PTR valve is missing, please get in touch with your supplier. The valve is rated with a capacity of 700kPa, 10kW, and a set temperature range of 93-99°C.
2. Install the provided PTR valve at Point 7, as indicated above.
3. Ensure that the PTR valve is insulated with a minimum 13mm closed-cell insulation to minimize heat loss.
4. The PTR should be positioned in a way that the drain line always points downward, and the discharge point remains open to the atmosphere.
5. When connecting a discharge pipe to the pressure relief valve. make sure it runs continuously downward and is placed in a frost-free environment. Do not connect any pressure relief device to the condensate drain pipe, as water may drip from the pressure relief device's discharge pipe. This pipe should always be left open to the atmosphere. Additionally, regularly operate the pressure relief device to remove lime deposits and confirm it is not blocked.

CHECKING THE TPR VALVE

(FREQUENCY: EVERY HALF YEAR - REPLACE IF REQUIRED)
To ensure the TPR valve functions correctly, perform the following steps every six months, and replace it if needed:
1. Locate the TPR valve on the left side of the unit.
2. Carefully use the force to release the valve, allowing some water to drain from the tank. Note that the expelled water may be very hot.
3. If water flows freely during this process, it indicates that the TPR valve is still in good working condition.
4. If water does not flow freely, it suggests that the TPR valve needs replacement.
5. In the case of a required replacement, please contact your partner or reach out to your service team for assistance.
6. A discharge pipe connected to the pressure relief device installed downwards direction and in a frost-free environment.

TEMPERING VALVE

1. The heat pumps are configured to generate hot water at temperatures exceeding 50°C. To comply with AS/NZS3500 regulations, it is imperative to have a Tempering Valve installed.
As shown in the figure, The length of Pipe 1 must be at least 150 mm, The length of Pipe 2 must be at least 1000 mm. It is recommended to use DN15 pipes for Pipe 1 and Pipe 2.



For shower, mix tap shall be used to adjust hot water temperature. It is recommended that 38-45°C for personal hygiene purposes.

⚠ WARNING

This appliance must only be installed in accordance with the acceptable plumbing configurations specified in the instructions. Failure to do so may result in conditions where delivery temperature control is inadequate.

2. We strongly advise using a high-performance or solar-rated tempering valve for more precise control of hot water delivery temperature.
3. If your previous hot water system did not have a tempering valve, you may notice a difference in the hot water temperature. This adjustment is both normal and legally mandated by new regulations. if you have any questions or concerns, please get in touch with your installer for assistance.

EXPANSION CONTROL VALVE

1. Please adhere to local regulations and requirements when considering the installation of an ECV. Note that this is optional with most councils.
2. When installing an ECV, make sure that the diameter of the connecting pipe does not exceed that of the safety valve.
3. Ensure that the drain is adequately sized to accommodate water runoff, even in situations where the safety valve has fully opened.
4. The drain outlet should always remain open to the atmosphere and should not have any closing function.
5. It is recommended that the ECV is rated at no more than 700kPa.

PRESSURE REDUCING VALVE

1. It is intended for direct connection to the mains water supply, provided that the water pressure does not exceed 850kPa.
2. If the pressure of the mains water supply fluctuates above this 850kPa it is advisable to install a pressure limiting device at the specified Connection Dimensions and Components location for water tank safety and protection.

MIN-MAX FILLING WATER PRESSURE

Permitted min-max filling water pressure: Min 200kPa - Max 650kPa.

NON-RETURN/REQUATING VALVE

It is necessary to install a non-return or isolation valve directly in the cold-water supply line that feeds the system. This valve enables the isolation of the hot water system from the rest of the home's water supply. Simplifying maintenance, draining and unit replacement. Do not use a hose-set to connect the system to the water supply.
The non-return or isolation valve can be used in combination with a PTR valve to create a dual valve system.

THE DEMANDED QUALITY OF WATER

1. Poor-quality and contains higher levels of scale and sand and should be filtered.
2. The water quality should be analyzed before operating the system to measure the pH value, conductivity, chloride ion concentration and sulphate ion concentration.
3. The acceptable water quality standard is showed as below table.

PH value	Total hardness	Conductivity	Sulphate ion	Chlorine ion	Ammonia ion
7~8.5	<50ppm	<200uV/cm (25℃)	None	<50ppm	None
Sulfate ion	Silicon	Iron content	Sodium	Ca	
<50ppm	<50ppm	<0.3ppm	No requirement	<50ppm	

4. It is suggested that the filter mesh be about 40 mesh.

DEFROSTING DURING WATER-HEATING

In heat pump running period, if the evaporator frosted in lower ambient temperature, the system will defrost automatically to keep effective performance (about 3-10min). At defrosting time, the fan motor will stop, but compressor will still run.

COP

COP varies at different ambient temperature, Normally lower ambient temperature result in longer heat-uptime because of lower effective performance.

When ambient temp below 2°C, heat pump and E-heater will take different portions of heating capacity generally the lower of ambient temperature, the lower portion of heat pump will contribute as well as the higher portion of E-heater will provide.

ABOUT TCO(THERMAL-CUTOFF)

If the water temperature is higher than 95°C, the TCO will automatically shut off the power of E-heater. After that it needs to be reset manually.

RESTART AFTER A LONG TERM STOP

When the unit is restarted after a long term stop (trail running included), it is normal that outlet water is unclean. Turn the tap on and the water will be flushed clean.

⚠ WARNING

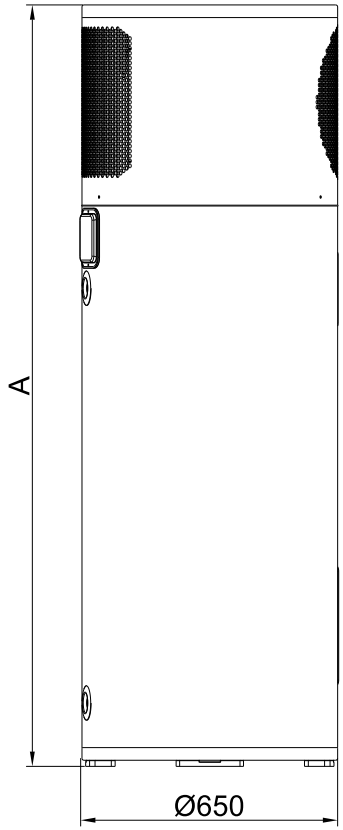
The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
Children being supervised not to play with the appliance.
If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
The water may drip from the discharge pipe of the pressure-relief device and that this pipe must be left open to the atmosphere.
The appliance installed in accordance with Australia wiring regulations.
The pressure-relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked.

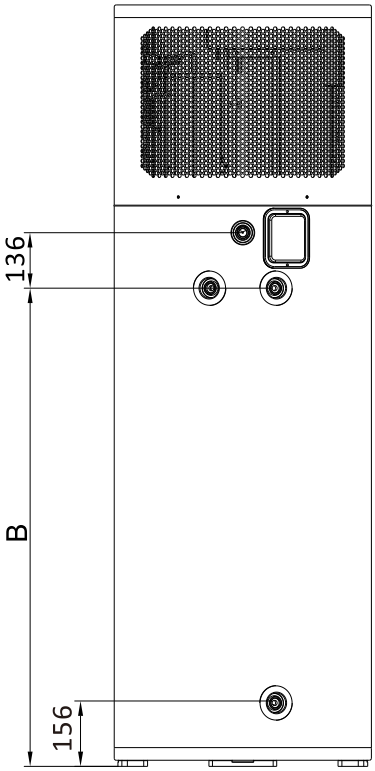
5. PARAMETER TABLE

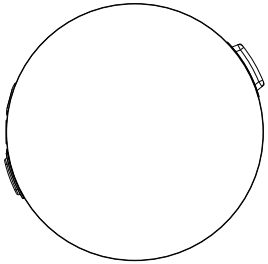
Model		OMNIXHPGL-210-R290	OMNIXHPGL-270-R290	OMNIXHPGL-320-R290
Power Supply		220-240V~/50Hz/60Hz		
Rated Heating Capacity (kW)		3	3	3
Rated Input Power (kW)		0.577	0.577	0.577
COP		5.2	5.2	5.2
Maximum Power Input(kW)		1.6		
Maximum Current Input(A)		10		
Water tank Volume(L)		210	270	320
Refrigerant		R290/410g		
Heat Exchanger		Microchannel		
Defrosting method		by 4-way valve		
Water Proof Level		IPX4		
Max Water Tank Pressure		0.85MPa		
Outer Casing / Shape		Metal		
Expansion Valve		Electronic		
Air Flow (m³/h)		1000m³/h		
Air Discharge		Horizontal		
Air Duct Diameter		Non-ducted		
Electric Heater	Back-up Heater (kW)	1.6		
	Rated Current(A)	7.1		
Default Water Temperature (℃)		60		
MAX Water Temperature (℃)		60		
Working Temperature Range (℃)		-7-46		
Noise (dB(A))		43		
Water Pipe Diameter (inch)		G3/4		
Net Weight (kg)		116	130	146
Gross Weight (kg)		126	150	166
Unpacked Dimension (L*W*H)(mm)		650*650*1650	650*650*1870	650*650*2090
Packed Dimension (L*W*H)(mm)		720*720*1785	720*720*2005	720*720*2225
Heating Capacity at Air 20℃/15℃, Water Temperature from 15℃ to 55℃				

Note: The data above is for reference only. Please refer to the nameplate on the unit if for more specific data.

6. SIZE DIAGRAM

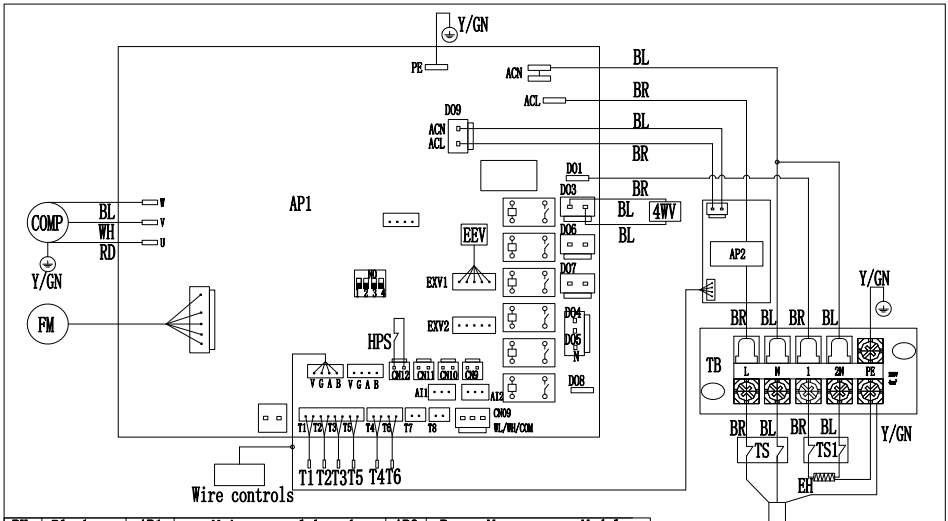






3	320L	2090	1393
2	270L	1870	1173
1	210L	1650	953
NO.	Model	A	B

7. WIRING DIAGRAM



BK	Black	AP1	Main control board	AP2	Power Measurement Module		
RD	Red	COMP	Compressor	TS	Temperature limiter(85℃)		
WH	White	FM	Fan motor	TS1	Electric heating temperature limiter		
BL	Blue	EEV	Electronic Expansion Valve	EH	Electric Heating		
BR	Brown	4WV	Four-way valve	T1	Coil temperature	T4	Temperature of lower part of water tank
GN	Green	HPS	High pressure switch	T2	Ambient temperature	T5	Suction temperature
Y	Yellow	PUMP	Water circulating pump	T3	Exhaust temperature	T6	Temperature of upper part of water tank

Note: The wiring diagram is for reference only. Please refer to the actual unit for details.

8. THE SIZE OF THE FUSE

Models	Power supply	Max-current	Cable diameter	Protection Thermal magnetic (D curve) Protection
OMNIXHPGL-210-R290	220-240V/50Hz	10A	H05RR-F 3G1.5mm²	10A
OMNIXHPGL-270-R290	220-240V/50Hz	10A	H05RR-F 3G1.5mm²	10A
OMNIXHPGL-320-R290	220-240V/50Hz	10A	H05RR-F 3G1.5mm²	10A

9. OPERATING INSTRUCTIONS FOR THE WIRE CONTROLLER

1.Wire controller key icon description

-- Switch the machine ON/OFF

-- Mode mode

--

-- Function

-- Query

Setting

10. WIRELESS CONTROLLER LCD DISPLAY

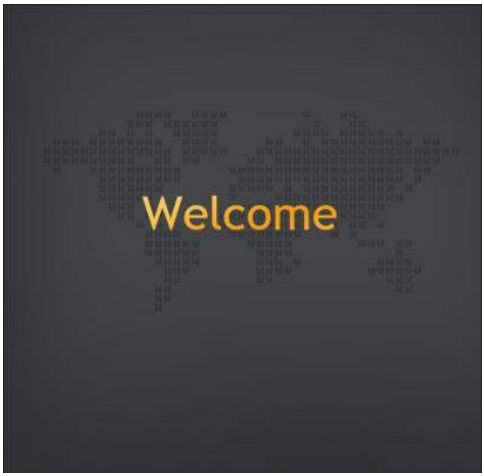
10.1. Power-on display as shown below.

After 3S, the normal page will be displayed. If the communication fails,

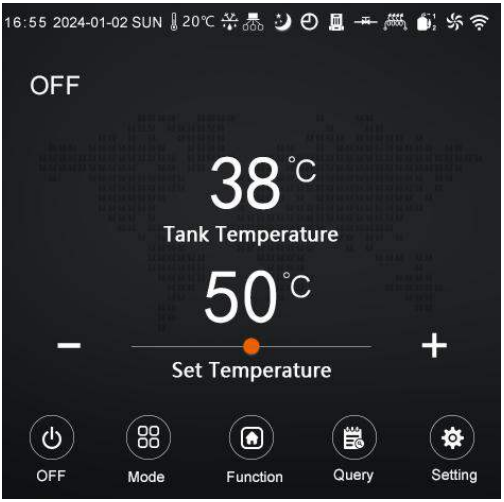
the page will be displayed all the time. When you touch the screen, a

key sound will be heard. If you do not touch the screen for 2 minutes,

the screen will automatically turn off. You can wake up the screen by tapping the screen.



10.2. Main interface display



10.2.1 icon description

The top of the main interface is displayed from left to right: Time, Day-month-year, week, defrosting, mute, time setting, electric heating, compressor, fan, WIFI;

Mode/Shutdown display: under startup state, the current operating mode is displayed on the upper left of the main interface; The running mode is not displayed when the machine is powered off:

	Quiet mode
	Standard mode
	Boost mode

Fault display: When there is a unit fault, "" flashing display, click the icon to enter the real-time fault/fault record view;

Defrosting display: when the unit enters defrosting, "" steady on display;

Silent mode display: when the unit enters the silent mode "", steady on display;

Timing display: when the timing function is enabled, "" steady on display;

Electric heating display: when the electric heating starts, "" steady on display;

When the electric heating is not started and the fast heating function is turned on, 1Hz flashing display; When the electric heating is not started and the sterilization function is turned on, 0.5Hz flashing display;

Compressor display: when the compressor starts, " " steady on display;

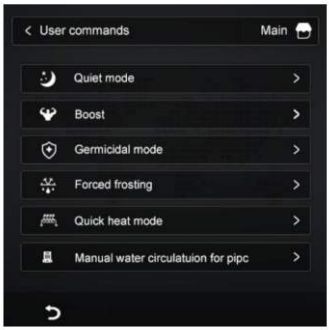
Fan display: when the fan starts, " " steady on display;

WIFi display: when the machine connects to WIFI successfully, "" steady on display;

11. OPERATION

11.1 Switch key: in the bright screen state, click the switch key " " to achieve startup/shutdown operation,
ON is displayed below the icon when startup, while the current mode display on the upper left corner;
OFF is displayed when shutdown, and the mode icon is off.

11.2 Mode key: in the bright screen state, press " " key to enter the unit mode selection function page, click the corresponding mode on the mode selection page to achieve mode switching operation, press" mode "in the upper left corner to return or" Main "in the upper right corner to return to the home page;



Quiet Mode: Reduces unit operating noise for low-noise operation. Default set temperature is 60℃ with a control differential of 5℃. The compressor and fan operate at the frequency for quiet mode. The system will automatically revert to standard mode 24 hours after entering quiet mode.

Boost Mode: Increases heating power to raise water temperature rapidly in a short time. Default set temperature is 60℃ with a control differential of 5℃. The compressor and fan run at the frequency for boost mode. It automatically returns to standard mode 24 hours after boost mode is activated.

Germicidal Mode: When the water heater is reconnected to power after a long power shutdown, users should first run the Germicidal mode. Heats water to a high temperature and maintains it for a period to effectively kill common bacteria, viruses and other microorganisms and ensure water hygiene. Water is heated and kept at Y℃ (default 61℃), and the mode exits automatically after 30 minutes. If the water temperature cannot reach Y℃, the unit runs continuously for 2 hours then exits forcibly. The germicidal function will not activate if the set water temperature is ≥ Y℃.

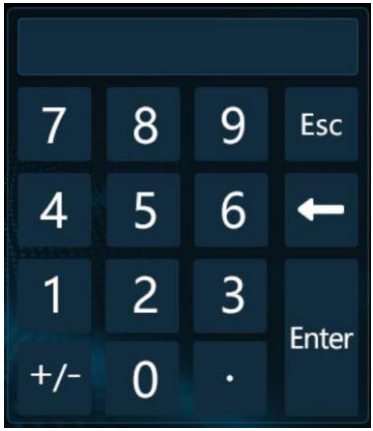
Forced frosting Mode: Solves the problem of reduced heating efficiency caused by fin frosting in low-temperature and high-humidity environments, and avoids incomplete automatic defrosting. When forced defrost is enabled and the unit enters manual defrost mode, the icon stays on steadily. During defrosting, the compressor operates at the default defrost frequency of 60 Hz, the electronic expansion valve opens to the defrost opening. The system turns off the fan and switches on the four-way valve to melt frost via high-temperature refrigerant. The mode exits after a maximum defrost duration of 6 minutes.

Quick Heat Mode: Boosts heating output in a short time to heat water to the target temperature quickly, shortening waiting time and improving water use efficiency. The icon remains steady when electric heating is on. it flashes at 1 Hz when quick heat is enabled without electric heating running. The quick heat function can be turned off by power cycling the unit.

Manual water circulation for pipe: This function fully drains residual water from the system including water tank, pipelines and heat exchange. It is commonly used for unit shutdown, maintenance and winter antifreeze protection.
When the system drain function is activated, the water pump starts and the icon stays on.
When the function is disabled on the control panel, the water pump stops and the icon turns off.

11.3 Temperature setting

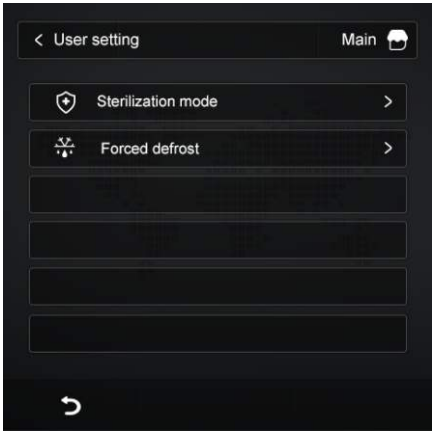
You can click "+" "-" to adjust the setting temperature of the current mode; Or swipe the slider to set the temperature of the current mode,Or click set temperature value, Enter set temperature in the pop-up keyboard and press "Enter" to confirm the modification;



Sterilization mode, forced defrost function:

When the main interface is lit up, click " " button to enter the function selection page;

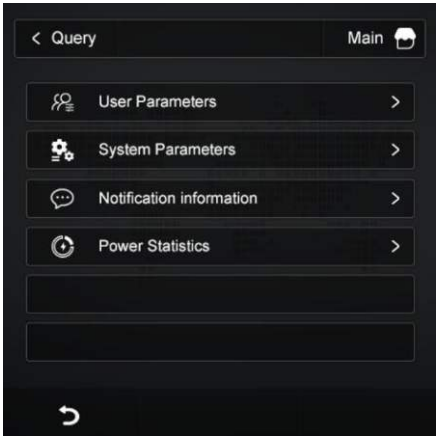
Then click "User setting" enter the user setting operation, from top to bottom are respectively sterilization mode, forced defrost; Click the corresponding button to start/close the corresponding function.



11.4 Running parameter query

11.4.1 Press the Query key " " to enter the machine information pages; "User Parameters ", "System Parameter", "Notification Information", "Power statistics".

11.4.2
User Parameters: View and adjust basic settings such as water temperature, mode, and timer.
System Parameter: Installer menu for system configuration and protection settings. Not for user adjustment.
Notification Information: Display current alarms, system messages, and fault history.
Power Statistics (Optional): Show power consumption and operating efficiency data.



11.5 Display fault:

When the unit experience a fault, the " " icon will flash, Once the fault is resolved, the icon will turn off.
(Refere to Page 12 for error codes)

Click the icon to enter the fault query page; You can set a maximum of 20 real-time faults and 50 historical faults.
00E03:00 for Main unit, E03 is the fault code
Click "Fault Record" to view the historical fault, click" Fault Information"to query the current fault, and click"Clear "to clear the historical fault;

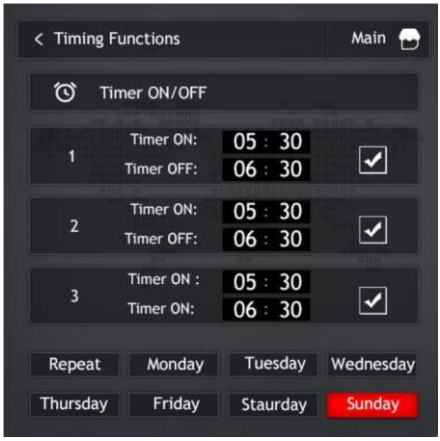
In the screen staying on, press " " to enter the query page, and then click"Notification Information "to enter the fault query

11.6 Clock setting:

In the screen staying on, press " " to Enter the setting page, then click" Date&Time"to enter the time setting page, click the corresponding year, month and date to enter the value through the keyboard, and finally press" Enter "to save the time.

11.7 Set the timing control on and off the machine

When the screen is lit up, click " " button to enter the function selection page; Then click "Timing Functions" to enter the on-off timing view page.If you need to enable weekly timing, click any button from Monday to Sunday to start weekly timing; Click time period to enter the time setting of this time period, enter the time through the keyboard, click the button " " to start/close the time period, press" Enter "to save the setting after completion;



11.8 WIFI distribution network

When the screen is lit up, click " " button to enter the function selection page;
Then click "WIFI Distribution" to enter the WIFI operation interface. Long press the button for more than 3S to release and enter the corresponding WIFi distribution mode, and the corresponding button will light up. The WIFI distribution time is 3mins, and the timeout exits

11.9 Power module parameter query (optional)

When the machine is equipped with a power module, in the state of bright screen, press " " to enter the query page, and then click"Power Statistics "to enter the unit electricity information query, you can query the total electricity consumption, current power, voltage, current parameters.

11.10 Brightness setting

In the bright screen state, press " " to enter the setting page, then click" " to enter the brightness setting interface, swipe the slider to set different brightness.

11.11 Restore factory Settings

When the screen is lit up, press " " to enter the setting page, then click" **Restore factory Settings**"to enter the factory Settings restoration page, and then click" √ "to restore factory Settings.

11.12 Program version view

When the screen is lit up, press " " to enter the Settings page, and then click"About "to view the program version number of the display and the main board.

12. USER PARAMETERS

Heat Pump Model	Default Operation Mode	Default Heat Pump Setting	Default Electric Element Setting	Legionella control
OMNIXHPGL-210-R290	Standard	60/14	60/5 when outside air temperature < -7°C	45% to 60°C daily boost at 12 PM
OMNIXHPGL-270-R290		60/11		
OMNIXHPGL-320-R290		60/9		

*The unit automatically reverts to the default operation mode within 24 hours of any user change to the operation mode.

13. ERROR CODE AND THE SOLUTION

Error code	Error	Possible reason	Solution
E05	High voltage Switch Protection	1. Disconnect the signal cable of the high voltage switch. 2. Too much refrigerant in the system. 3. Air intake or blockage in the fluorine system. 4. The temperature detection is inaccurate, and the actual water temperature is too high. 5. Water shortage in the tank.	1. Test the wiring of the high voltage switch. 2. Discharge to reduce the amount of refrigerant. 3. Discharge refrigerant , re-vacuum and fill new Refrigerant. 4. Check whether the water temperature probe is detached to ensure that the probe can reliably detect the temperature of the water tank. 5.Detect whether the water tank is short of water and refill it with Water.
E09	The communication between the controller and the main control board is faulty	1. Check the communication connection between the wire controller and the main board. 2. The communication port of the main control board is broken.	1. Check the communication cable connection. 2. Replace the main control board.
E12	High exhaust temperature protection	1. The fluorine system is blocked. 2. Lack of refrigerant or bad sensor in the fluorine system.	1. Check the sensor connection. 2. Replace the sensor.
E14	The tank temperature sensor is faulty	1. The sensor cable is disconnected or short-circuited. 2. The sensor is damaged.	1. Check the sensor connection. 2. Replace the sensor.
E15	The water inlet temperature sensor is faulty	1. The cable connecting the sensor is disconnected or short-circuited. 2. The sensor is damaged.	1. Check the sensor connection. 2. Replace the sensor.

E16	The coil sensor is faulty	1. The sensor cable is disconnected or short-circuited. 2. The sensor is damaged.	1. Check the sensor connection. 2. Replace the sensor.
E18	Exhaust sensor failure	1. The cable connecting the sensor is disconnected or short-circuited. 2. The sensor is damaged.	1. Check the sensor connection. 2. Replace the sensor.
E21	Environmental sensor failure	1. The cable connecting the sensor is disconnected or short-circuited. 2. The sensor is damaged.	1. Check the sensor connection. 2. Replace the sensor.
E29	The return air sensor is faulty	1. The sensor cable is disconnected or short-circuited. 2. The sensor is damaged.	1. Check the sensor connection. 2. Replace the sensor.
E38	DC fan failure	1. The fan motor is improperly connected to the drive board. 2. Motor damage.	1. Check whether the fan motor is reliably connected to the drive board. 2. Detect whether the fan motor is damaged, if damaged , replace the motor.
E88	Inverter module 1 protection see attached table	Compressor or compressor driver board is bad.	1. Replace the driver plate. 2. Replace compressor.
E96	Inverter module 1 protection see attached table	1. The signal cable is in poor contact or broken. 2. The electronic components on the main control board are damaged or damp. 3. The electronic components on the press drive board are damaged or damp. 4. The power supply of the press drive board is not energized.	1. Check the wiring to ensure reliable connection. 2. Press the main control board. 3. Press the drive board more. 4. Test the power cord of the drive board.

14. E88 ERROR CODE AND SOLUTION

P1	Bit0: IPM current overflow /IPM module protection	The IPM over current F0 is faulty
P2	Bit1: Compressor drive failure/Abnormal software control/compressor out of step	Press stall, out of step, weak magnetic failure
P3	Bit2: Compressor current overflow	The press phase current exceeds 13.4A
P4	Bit3: Input voltage out of phase (single phase is not effective)	
P5	Bit4: IPM current sampling failure	The current sampling voltage is greater than 3V or less than 1.5V
P6	Bit5: Power components overheating shut down	IPM module temperature greater than 95 degrees
P7	Bit6: Pre-charge failed	
P8	Bit7: DC bus over voltage	The DC bus voltage exceeds 430V
P9	Bit8: DC bus under voltage	The DC bus voltage is below 135V
P10	Bit9: AC input under voltage	
P11	Bit10: AC input current overflow	The input current is greater than 11.5A
P12	Bit11: Input voltage sampling failure	
P13	Bit12: Communication failure between DSP and PFC	
P14	Bit13: Heat sink temperature sensor is faulty	
P15	Bit14: Communication failure between DSP and communication board	
P16	Bit15: Abnormal communication with the main control board	
P17	Bit0: compressor current overflow alarm	Phase current exceeds 13.4A
P18	Bit1: Compressor weak magnetic protection alarm	
P19	Bit2: PIM overheating alarm	
P20	Bit3: PFC overheating alarm	
P21	Bit4: AC input current overflow alarm	The input current is greater than 11.5A
P22	Bit5: EEPROM fault alarm (applicable to EE models without storing system parameters)	

P23	Bit6: NA	
P24	Bit7: EEPR OM refresh completed (can not be eliminated until restart)	
P25	Bit8: temperature sensing fault frequency limit	
P26	Bit9: AC under voltage frequency limiting protection alarm	
P27	Bit10: NA	
P28	Bit11: NA	
P29	Bit12: NA	
P30	Bit13: NA	
P31	Bit14: NA	
P32	Bit15 : NA	
P33	Bit0: 1PM module overheats and stops	The IPM module temperature is greater than 95 degrees
P34	Bit1: The compressor is out of phase	
P35	Bit2: Compressor overload	Phase current exceeds 13.4A
P36	Bit3: Input current sampling failure	
P37	Bit4: PIM supply voltage failure	
P38	Bit5: Pre-charge circuit voltage failure	
P39	Bit6: EEPROM fault (for EE storage system parameter models)	
P40	Bit7: AC input over voltage fault	
P41	Bit8: Microelectronic fault	
P42	Bit9: Compressor type code fault	
P43	Bit10: Current sampling signal current overflow (hardware current overflow) Bit11 to Bit15: NA	
P44	Bit11: NA	
P45	Bit12: NA	
P46	Bit13: NA	
P47	Bit14: NA	
P48	Bit15: NA	

15. WIFI FUNCTIONALITY MANUAL

15.1 Download APP and Registration:

Download "Smart Life" app from the app store, as shown in tthe below:

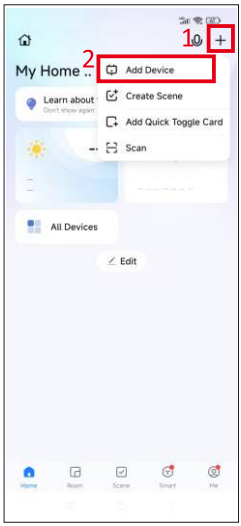
15.2 Enter Wi-Fi Configuration Mode on the Wired Controller

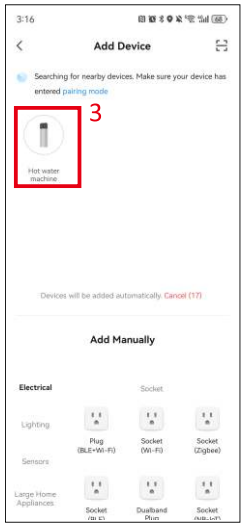
On the wired controller, press "Function" → "WIFI" to enter the Wi-Fi configuration interface. Then press the button for either Smart Mode Pairing or AP Mode Pairing to enable the controller's Wi-Fi pairing mode.

15.3 Enable Bluetooth and Add Device in the App

Turn on your phone's Bluetooth. Open the downloaded app, and tap the "+" icon in the top right corner of the home screen to add a device. The app will switch to the radar scanning interface.

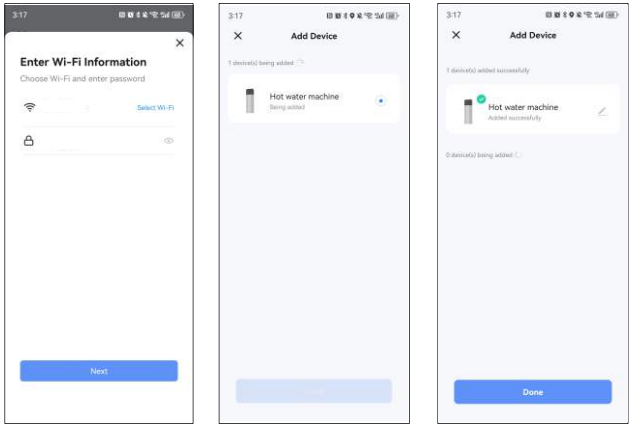
Once the device is found, it will display its model (e.g., Hot water machine). Tap the device icon to proceed.





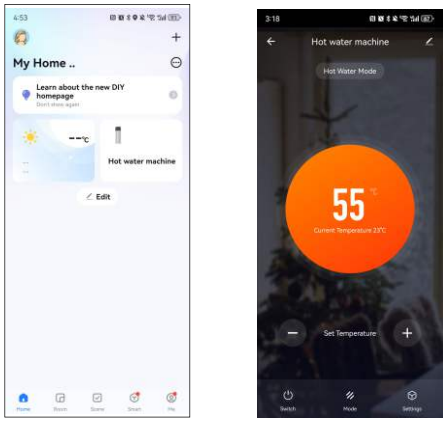
15.4 Enter Wi-Fi Information and Complete Device Addition

Input the Wi-Fi SSID and password of the router currently connected to your phone. The device will enter the addition process. Once successfully added, tap "Done" to finish.



15.5 Device Interface Access

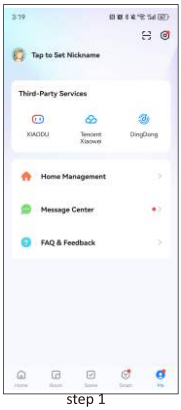
The newly connected Wi-Fi module will automatically appear in the home screen's device list. Tap the device to access the unit’s control interface.



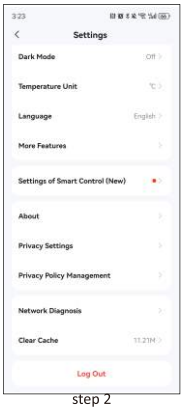
15.6 Refresh Interface (After App Update)

If the phone is already connected to the wired controller's Wi-Fi but the interface hasn't updated, you may need to clear cache data in the app and re-enter the interface to get the latest version.To do this:

1. On the app's home screen, tap "Me" in the bottom-right corner to enter account management.
2. Tap the gear icon (settings) in the top-right corner.
3. Scroll to the bottom and tap "Clear Cache" to refresh the interface.



step 1



step 2

step 3

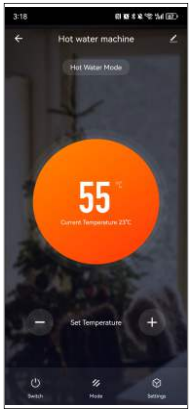
15.7 Unbind and Remove Device

To unbind a device from the phone:

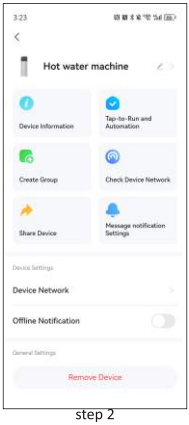
1. Enter the bound device's control interface.
2. Tap the device settings icon in the top-right corner.
3. Scroll down and tap "Remove Device".

Next, tap "Unbind and Clear Data", then confirm.

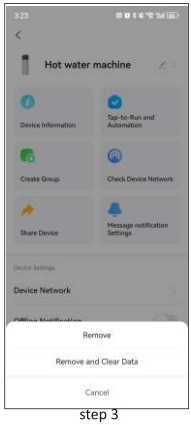
This will complete the unbinding process and return the controller to Wi-Fi pairing mode.



step 1



step 2



step 3

step 4

16. Maintenance

RECOMMENDED REGULAR MAINTENANCE TABLE

Checking Item	Checking content	Checking frequency	Action
1	anode	every half year	Replace it if it has been used out
2	inner tank	every half year	Clean the tank
3	E-heater	every half year	Clean E-heater
4	PTR valve	every year	Operate the hander of PTR valve to ensure that water ways are clear.
	If water doesn't flow freely when operating the hander, replace PTR valve with a new one.		

CHECKING THE ANODE & REPLACING IF REQUIRED

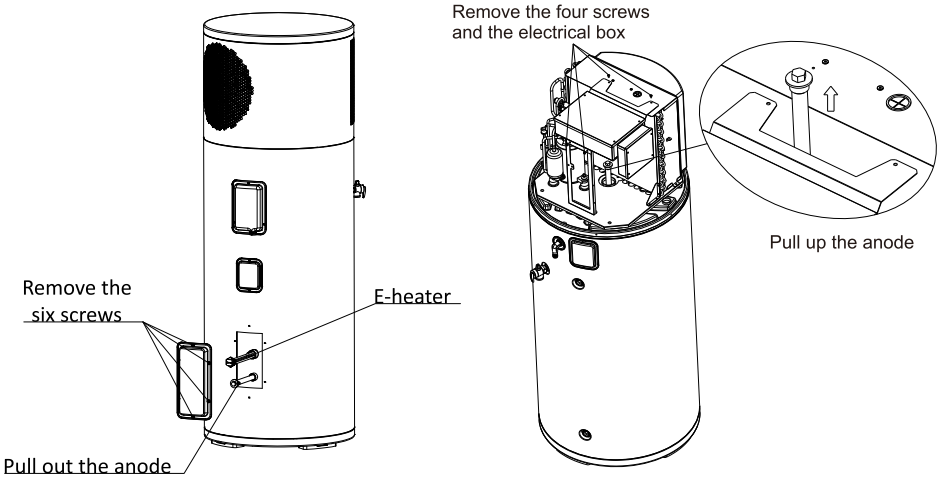
The anode is a crucial component that safeguards the inner lining off the hot water tank. Over time, it may degrade, reducing its protective capabilities. It is advisable to periodically inspect the anode for degradation and replace it if needed.

AS 2239 M2 protective anode shall be recommended for use. It should be replaced approximately every 2 years; however, the actual replacement interval may vary depending on water quality and the rate of anode mass loss. It is advisable to inspect the anode every six months. The inspection and replacement of the anode rod should be performed by a professional service provider and the material of the replacement anode rod must comply with the requirements of AS 2239 M2. The machine is equipped with one short anode rod on the side and long anode rod on the top. Detailed specifications are shown in the table below:

Model	Short anode rod	Long anode rod
210L	G3/4 male thread Length is 460 mm	NPT 3/4 male thread Length is 750 mm
270L	G3/4 male thread Length is 460 mm	NPT 3/4 male thread Length is 900 mm
320L	G3/4 male thread Length is 460 mm	NPT 3/4 male thread Length is 1150 mm

The replacement steps are as follows:
1. Turn off the power and shut off the cold water inlet valve.
2. Open a hot water tap to relieve pressure within the tank.
3. Locate the position of the anode.
4. Remove the anode cover by loosening the screws.
5. Unscrew the anode.
6. Examine it for signs of degradation.
7. If it is still in good condition, re-install it to ensure an effective seal.
8. If the anode is in unsatisfactory condition, replace it with a new one.

Falling to replace the anode when necessary will void the warranty for the water tank
1. Reopen the cold water inlet valve.
2. Open a hot water tap until hot water flows out, then turn off the tap.
3. Turn on the power to restart the unit.
4. You run it can now be used as usual.



CLEANING THE INNER TANK AND ELECTRIC HEATING ELEMENT

To keep your water heater running efficiently, it's crucial to perform regular maintenance on the inner tank and electric heating element. Follow these steps:

1. Switching off the power to the water heater.
2. Shut off the cold water inlet valve and open a hot water tap to release any built-up pressure.
3. Attach a flexible pipe to the drain outlet and connect it to a suitable sewage drain, Ensure that the drainpipe you use can withstand temperatures of at least 34°C. If the drain pipe doesn't meet this requirement, open the cold water inlet valve and hot water tap until the water temperature is safe for the drain pipe.
4. Open the drain outlet of the water heater and allow all the water inside the inner tank to empty out. If needed, use water to rinse the inner tank multiple times to eliminate any deposits.
5. After cleaning the tank, close the drain outlet.
6. Fill the inner tank with water and turn the power back on.

FILLING THE SYSTEM

Here are the steps to follow for filling and pressuring the system after it has been properly connected:

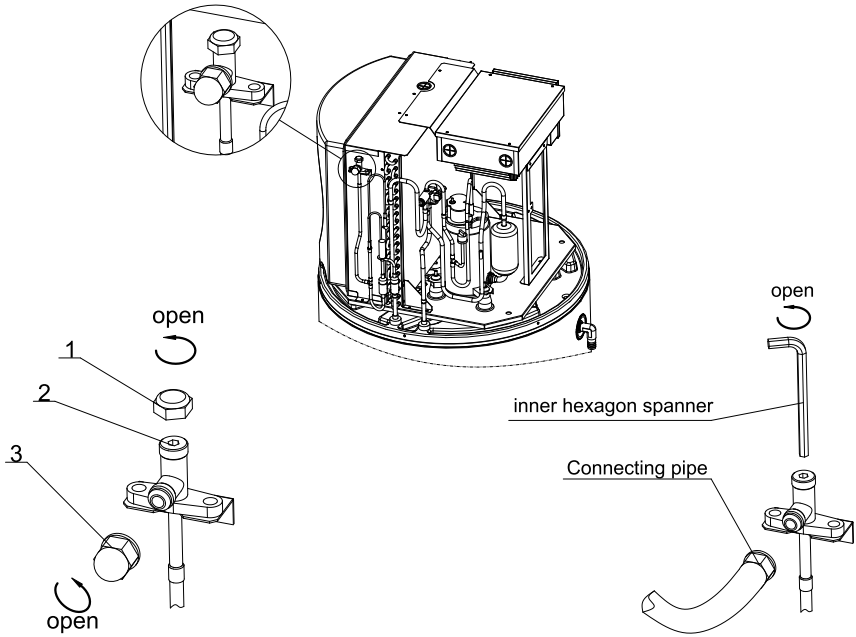
1. Once the system is correctly connected, proceed to fill and pressure the tank.
2. To start filling the water system, first, open the non-return valve on the cold-water inlet. Simultaneously, make sure at least one hot water tap inside the property is open. As the system fills with water, you'll hear air escaping from the open hot water tap. This process, called "bleeding the system," ensures that any trapped air is removed from the system. When you consistently see water flowing from the hot water tap, it means the system is fully bled, and you can then close the tap.
3. Always ensure that the tank is completely filled with water before connecting and activating the electricity supply.

REFRIGERANT FILLING

· Check the refrigerant filling status by reading the liquid level data on the display screen, as well as the air suction and exhaust pressure. if there is a refrigerant leakage or if components in the refrigeration circulation system need to be replaced, conduct an air tightness examination as the first step.

Preparations:

1. Please in a well-ventilated environment while charge refrigerant.
2. Keep away from open flames or potential sources of fire.
3. Disconnect the power supply of the heat pump.
4. Carefully check the nameplate of the heat pump and charge strictly according to the labeled amount.



The filling steps are as follows:

1. Locate the shut-off valve on the heat pump used for charging.
2. Unscrew protective cap 1 and protective cap 3 counterclockwise, and you will see valve 2.
3. Connect the charging hose with a 7/16 female thread to the shut-off valve and the vacuum pump. Insert a 5mm inner hexagon spanner into valve 2 and turn it counterclockwise to open.
4. Vacuumize the heat pump. keep vacuum pump running until the absolute pressure below 30Pa or operating time more than one hour.
5. Charge refrigerant. Keep the refrigerant in liquid state when charging and strictly according to the labeled amount.
6. Finish the charging, close the valve 2 and screw the cap 1 and cap 3.

· Detection of flammable refrigerants

Order no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halite torch(or any other detector using a naked flame)shall not be used.

The following leak detection methods are deemed acceptable for refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but., in the case Of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration.(Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used, Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas(25 % maximum)is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

NOTE Examples of leak detection fluids are

-bubble method,

-fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/extinguished.

17. HEAT PUMP MANUFACTURER -ER'S WARRANTY

This warranty is provided by the product supplier or brand owner. It applies to heat pump products installed and used in accordance with the applicable installation instructions and operating conditions specified for the product. The warranty terms become effective from the date of installation. The supplier may verify the installation date by requesting a copy of the installation or compliance certificate, where such documentation is required by local regulations. This warranty is provided in addition to any statutory rights that may apply under applicable consumer protection laws, which cannot be excluded or limited.

Warranty period:

Subject to the terms and conditions of this warranty, the following components are warranted to be free from defects in materials and workmanship for the periods specified below, commencing from the date of installation:

· Storage Tank- 5 years.

· Compressor- 5 years.

· Other components supplied by the manufacturer (including but not limited to valves, heating elements, thermostats and sacrificial anodes): 5 years

No warranty is provided for components not supplied by the manufacturer, such as tempering valves, cold water valve assemblies or other accessories installed by third parties.

Warranty Coverage:

During the applicable warranty period, the supplier will, at its discretion and expense, repair or replace any defective component covered by this warranty within a reasonable time after the defect has been reported.

Warranty Registration:

To be eligible to make a claim under this warranty, the product owner may be required to complete and submit the warranty registration or installation report within a specified period after installation.

Warranty Claim Procedure:

· Upon discovering a suspected defect, the user should promptly report the issue:

- To the installer or supplier, if the defect is related to installation workmanship or components not covered by this warranty.
- To the product supplier or authorized service provider, if the defect relates to components covered by this warranty and occurs within the warranty period.

Warranty Exclusions:

· To the extent permitted by applicable law, this warranty does not cover:

1) If any component of the heat pump has been installed, repaired, re positioned or modified by a person other than an appropriately qualified person approved by Goodheat in accordance with Goodheat's installation and maintenance instructions and relevant local and statutory requirements

2) For loss or damage caused by a fault or defect in the installation of the heat pump;

3) If corrosion has occurred because the anode has not been changed in accordance with the owner's manual.

4) If a cold water expansion valve, check valve and strainer is not fitted in areas where mains pressure is likely to exceed 0.65MPa;

5) For any damage arising as a result of an accident, force majeure or other circumstances beyond Goodheat's control.

6) If the inner cylinder has collapsed as a result of an incorrect filling and/or commissioning procedure;

7) For components not supplied by Goodheat that are used in the installation of Goodheat heat pump water heaters e.g. tempering valves, cold water valve assemblies, etc.

8) For extended or implied warranties not formally provided by Goodheat;

9) For external labor or equipment costs (e.g. cranes and lifting devices) required for repairs;

10) For costs incurred for rectifying faults (or perceived faults) not directly attributed to the Goodheat heat pump water heater.

11) For travel costs of service agents that exceed 30 kilometers,

12) For all consequential loss or damage arising from defects that can lawfully be excluded.

Contact: Omni X Technologies
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18. SAFETY REQUIREMENTS APPENDIX DD

DD.2 Symbols

The symbols referred to in 7.6 (without colours is permitted) and the information of the warning marking shall be provided as follows:

⚠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example:open flames, an operating gas appliance or an operating electric heater.

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.

The manufacturer may provide other suitable examples or may provide additional information about the refrigerant odour.

DD.3 Information in manual

DD.3.1 General

The following information shall be specified in the manual where the information is needed for the function of the manual and as applicable to the appliance:

– information for spaces where refrigerant pipes are allowed, including statements:

• that the installation of pipe-work shall be kept to a minimum.

• that pipe-work shall be protected from physical damage and, in the case of flammable refrigerants, shall not be installed in an unventilated space, if that space is smaller than Amin in Annex GG, except for A3 refrigerants where the installed pipes comply with 22.116. In case of field charge, the effect on refrigerant charge caused by the different pipe length has to be quantified.

• that compliance with national gas regulations shall be observed.

• that mechanical connections made in accordance with 22.118 shall be accessible for maintenance purposes.

• that, for appliances containing flammable refrigerants, the minimum floor area of the room shall be mentioned in the form of a table or a single figure without reference to a formula.

– the maximum refrigerant charge (m_{max}).

– instructions how to determine the additional refrigerant charge and how to complete the refrigerant charge on the label provided by the manufacturer considering the requirements in 7.107;

– the minimum rated airflow, if required by Annex GG.

– information for handling, installation, cleaning, servicing and disposal of refrigerant.

– for appliances using flammable refrigerants, instructions shall include the minimum installed height h_{inst} (when required to calculate Amin), refrigerant charge mc and minimum room area of the space Amin or a minimum room area of conditioned space TA_{min} where applicable. Additional minimum room area data may be provided based on other installed heights and/or charge levels.

– detailed instructions on how to install the appliance to ensure that the release height h0 as determined in Clause GG.2 of the installed appliance is not lower than h0 used for the calculation of $A_{min.}$

– a warning to keep any required ventilation openings clear of obstruction.

– a notice that servicing shall be performed only as recommended by the manufacturer.

– a warning that ducts connected to an appliance shall not contain a potential ignition source.

– instructions for wiring to external zoning dampers and/or mechanical ventilation, if required to comply with Clause GG.9, to ensure that upon detection of a leak, the zoning dampers are driven fully open and additional mechanical ventilation is activated.
– for appliances relying on safety measures according to GG.8.3 instructions for wiring to external ventilation.
– when a remote located refrigerant sensor is specified by the manufacturer, the instructions shall state when it is required and how to install and connect the sensor.
– for appliances using A3 refrigerants, connected via an air duct system to one or more rooms, the supply and return air shall be directly ducted to the space. Open areas such as false ceilings shall not be used as a return air duct.
– the following information requirements apply for enhanced tightness refrigerating systems using A3 refrigerants:
• Equipment piping in the occupied space shall be installed in such a way to protect against accidental damage in operation and service.
• Precautions shall be taken to avoid excessive vibration or pulsation to refrigerating piping.
• Protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.
• Provision shall be made for expansion and contraction of long runs of piping.
• Piping in refrigerating systems shall be so designed and installed to minimize the likelihood hydraulic shock damaging the system.
• Solenoid valves shall be correctly positioned in the piping to avoid hydraulic shock.
• Solenoid valves shall not block in liquid refrigerant unless adequate relief is provided to the refrigerant system low pressure side.
• Steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation.
• Flexible pipe elements shall be protected against mechanical damage, excessive stress by torsion, or other forces. They should be checked for mechanical damage annually.
• The indoor equipment and pipes shall be securely mounted and guarded such that accidental rupture of equipment cannot occur from such events as moving furniture or reconstruction activities.
• Where safety shut off valves are specified, the minimum room area may be determined based on the maximum amount of refrigerant that can be leaked as determined in
GG.12.2.
• Where safety shut off valves are specified, the location of the valve in the refrigerating system relative to the occupied spaces shall be as described in GG.12.1.
• Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected.
– For mechanical ventilation as specified in GG.8.3, the air extraction opening from the room shall be located equal or below the refrigerant release point. For floor mounted units, it shall be as low as practicable. The air extraction openings shall be located in a sufficient distance from the air intake openings to prevent re-circulation to the space.

DD.3.2 Unventilated areas

For appliances containing more than m1 for any refrigerating circuit, the manual shall include a statement advising that an unventilated area where the appliance using flammable refrigerants is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard. This shall include:

– a warning that the non-fixed appliance shall be stored in an area where the room size corresponds to the room area as specified for operation.
– a warning that the non-fixed appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) or other potential ignition sources (for example an operating electric heater, hot surfaces);
– a warning that if appliances with A3 refrigerants connected via an air duct system to one or more rooms are installed in a room with an area less than Amin as determined in Clause GG.2, that room shall be without continuously operating open flames (for example an operating gas appliance) or other potential ignition sources (for example an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest;
– for appliances using A3 refrigerants connected via an air duct system to one or more rooms, a warning with the substance of the following: "Auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Examples of such potential ignition sources are hot surfaces with a temperature exceeding X°C and electric switching devices.
NOTE X is the maximum allowable surface temperature as defined in 22.117.
– for appliances using A3 refrigerants connected via an air duct system to one or more rooms, a warning that only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting duct work. The manufacturer can list in the instructions all approved auxiliary devices by the manufacturer and model number for use with the specific appliance, if those devices have a potential to become an ignition source.
The manufacturer should specify other potential continuously operating sources known to cause ignition of the refrigerant used.
The appliance shall be stored so as to prevent mechanical damage from occurring.

DD.3.3 Qualification of workers

The manual shall contain specific information about the required qualification of the working personnel for maintenance, service and repair operations. Every working procedure that affects safety means shall only be carried out by competent persons according to Annex HH.
Examples for such working procedures are:
• breaking into the refrigerating circuit.
• opening of sealed components.
• opening of ventilated enclosures.

DD.4 Information on servicing

DD.4.1 General

The manual shall contain specific information for service personnel according to DD.4.2 to DD.4.10.

DD.4.2 Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, DD.4.3 to DD.4.7 shall be completed prior to conducting work on the system.

DD.4.3 Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

DD.4.4 General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

DD.4.5 Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

DD.4.6 Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or Co2 fire extinguisher adjacent to the charging area.

DD.4.7 No ignition sources

No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

DD.4.8 Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

DD.4.9 Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance.
The following checks shall be applied to installations using flammable refrigerants:
– the actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
– the ventilation machinery and outlets are operating adequately and are not obstructed;
– if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
– marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
– refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

DD.4.10 Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
Initial safety checks shall include:
• that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
• that no live electrical components and wiring are exposed while charging, recovering or purging the system.
• that there is continuity of earth bonding.

DD.5 Repairs to sealed components

DD.5.1 During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

DD.5.2 Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
Ensure that the apparatus is mounted securely.
Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

DD.6 Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

DD.7 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

DD.8 Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the arching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked ame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

NOTE Examples of leak detection fluids are
-bubble method,
−fluorescent method agents.
If a leak is suspected, all naked flames shall be removed/extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Clause DD.9.

DD.9 Removal and evacuation

When breaking into the refrigerant circuit to make repairs-or for any other purpose-conventionalprocedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:

- remove refrigerant.
- purge the circuit with inert gas (optional for A3).
- evacuate (optional for A3) and purge with inert gas (optional for A3).
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants other than A3 refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, other than A3 refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-workare to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

DD.10 Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.
- Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas.
- The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

DD.11 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders.
- all personal protective equipment is available and being used correctly.
- the recovery process is supervised at all times by a competent person.
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f) Make sure that cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate in accordance with instructions.
h) Do not overfill cylinders (no more than 80 % volume liquid charge).
i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

DD.12 Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

DD.13 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scale shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that to hey have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.