

A decorative graphic element consisting of a dark gray triangle pointing downwards, partially overlapping a lighter gray triangle pointing upwards.

Owner's Manual

Air Source Heat Pump Water Heater

Models:

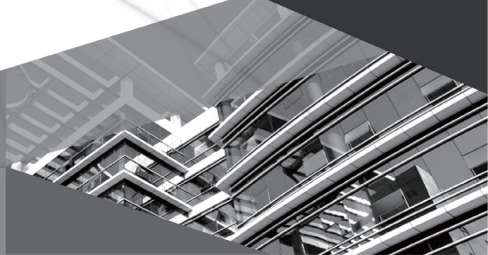
GRS-2.3Pd/TD200ANpH-K

GRS-2.3Pd/TD270ANpH-K

Thank you for choosing this product. Please read this Owner's Manual carefully before operation and retain it for future reference.

If you have lost the Owner's Manual, please contact the local agent or visit www.gree.com or send an email to global@cn.gree.com for the electronic version.

GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI



To Users

Thank you for selecting Gree product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:

- (1) This appliance is not intended for use 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 concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance (For IEC Standard).
- (2) In order to ensure reliability of product, the product may consume some power under stand-by status for maintaining normal communication of system and preheating refrigerant and lubricant. If the product is not to be used for long, cut off the power supply; please energize and preheat the unit in advance before reusing it.
- (3) Please properly select the model according to actual using environment; otherwise it may impact the using convenience.
- (4) If the product needs to be installed, moved or maintained, please contact our designated dealer or local service center for professional support. Users should not disassemble or maintain the unit by themselves, otherwise it may cause relative damage, and our company will bear no responsibilities.
- (5) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. If there is adjustment in the product, please subject to actual product.
- (6) 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.

Exception Clauses

Manufacturer will bear no responsibilities when personal injury or property loss is caused by the following reasons:

- (1) Damage the product due to improper use or misuse of the product;
- (2) Alter, change, maintain or use the product with other equipment without abiding by the instruction manual of manufacturer;
- (3) After verification, the defect of product is directly caused by corrosive gas;
- (4) After verification, defects are due to improper operation during transportation of product;
- (5) Operate, repair, maintain the unit without abiding by instruction manual or related regulations;
- (6) After verification, the problem or dispute is caused by the quality specification or performance of parts and components that produced by other manufacturers;
- (7) The damage is caused by natural calamities, bad using environment or force majeure.

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1 Safety Notices (Please be sure to abide)



WARNING: If not abide them strictly, it may cause severe damage to the unit or the people.



NOTICE: If not abide them strictly, it may cause slight or medium damage to the unit or the people.



This sign indicates that the items must be prohibited. Improper operation may cause severe damage or death to people.



This sign indicates that the items must be observed. Improper operation may cause damage to people or property.



WARNING! The R290 Refrigerant

- To realize the function of the unit, a special refrigerant circulates in the system. The used refrigerant is the fluoride R290, which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can lead to explosion under certain conditions.
- Compared to common refrigerants, R290 is a nonpolluting refrigerant with no harm to the ozonosphere. The influence upon the green house effect is also lower. R290 has got very good thermodynamic features which lead to a really high energy efficiency. The units therefore need a less filling.
- 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.).
- The appliance shall be stored so as to prevent mechanical damage from occurring.
- The appliance shall be stored outdoor.
- This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing
- Ducts connected to an appliance shall not contain an ignition source.
- Keep any required ventilation openings clear of obstruction.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- Servicing shall be performed only as recommended by the manufacturer.
- Should repair be necessary, contact your nearest authorized Service Centre. Any repairs carried out by unqualified personnel may be dangerous.
- Compliance with national gas regulations shall be observed.
- Read specialist's manual.



**WARNING**

This unit requires reliable earthing before usage, otherwise this may result in injury or death.

- If you can't ensure that the property's power supply is correctly earthed, please don't install the unit.
- The unit must be installed by a licensed trade person and in accordance with:
 - ① This Installation & Maintenance Guide.
 - ② AS/NZS 3500.4 - "National Plumbing and Drainage Code Hot Water Supply Systems-Acceptable Solutions".
 - ③ AS/NZS 3000-Wiring Rules.
 - ④ Local authority regulations.
 - ⑤ Building Codes of Australia.
 - ⑥ Local Occupational Health and Safety (OH&S) Regulations.
- 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.
- For continued safety of this appliance it must be installed, operated and maintained in accordance with the manufacturer's instructions.
- 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.)
- Keep any required ventilation openings clear of obstruction;
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.
- This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for the above special places, please adopt special product with anti-corrosive or anti-explosion function.
- Air source heat pump water heater is a thermal storage water heater. The user shall open the cold water valve first, then adjusting cold and hot water flow to proper water temperature gradually to avoid scald injury. If not using the unit in winter in short time, please ensure that it is energized for the whole 24h, if not unit using the unit for a long period, discharge water in water tank and pipeline to avoid the system frosting. If you think the discharge operation is inconvenient, please directly contact our designated dealer or local service center, we will appoint special staff to provide inspection, debug, cleaning and maintenance services.
- This manual is the installation manual for integral air source heat pump water heater. Usage method for controller shall refer to the attached Owner's Manual (Controller).
- Hot water burns! As a safety precaution, young children should always be supervised around hot water fixtures.
- Heat pump water heater can store water at temperature that can cause scalding. Water temperature over 50°C can scald and care needs to be taken to ensure that injuries do not occur through incorrect use of your water heater.
- As heat pump water heater can generate water temperature in excess of 50°C, regulations



WARNING

require that a thermostatic mixer tap be fitted to the heater to prevent water temperature going to the home exceeding a pre-set safe maximum. A thermostatic mixer tap must be connected to the hot water outlet line from the water heater. The valve must be fitted by an authorized plumber at the time of installation or in retrofitting to existing systems.

- Care should be taken to avoid coming into contact with any pipe work or fixtures associated with the water heater pipe lines. Under NO circumstances should any “home handy man” type modifications be attempted.

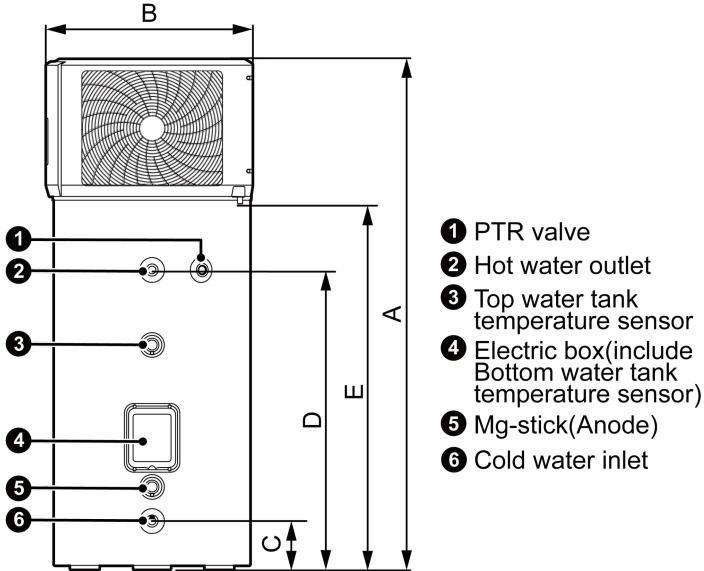
DANGER: Failure to operate the relief valve easing gear at least once every six months may result in the water heater exploding. Continuous leakage of water from the valve may indicate a problem with the water heater.

- The installation must comply with the requirements of AS/NZS 3500.4, AS/NZS 3000, and all local codes and regulatory authority requirements. In New Zealand, the installation must conform to the New Zealand Building Code G12.
- The power supply must be protected by an individual circuit breaker at the main electrical supply switchboard and rated to suit the size of the element. The supply to the heat pump water heater can be operated directly from the switchboard or via a remotely mounted switch as requested by the customer. The heater must be provided with a suitable means for disconnecting the power supply.
- This appliance does not have engineering installed supplementary heater. Supplementary heater is available as a component. The minimum clearance from the appliance to combustible surfaces must be at least 1.5m.

2 Product Information

2.1 Product Schematics

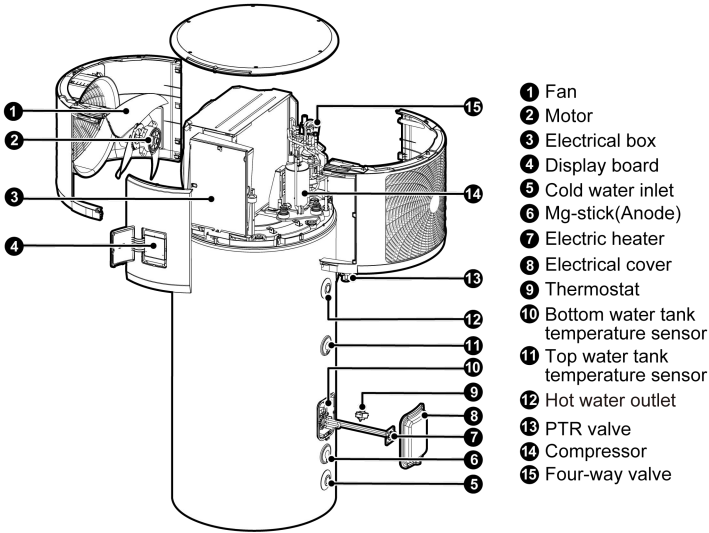
Unit: mm



- ❶ PTR valve
- ❷ Hot water outlet
- ❸ Top water tank temperature sensor
- ❹ Electric box(include Bottom water tank temperature sensor)
- ❺ Mg-stick(Anode)
- ❻ Cold water inlet

Parameter \ Model	GRS-2.3Pd/TD200ANpH-K	GRS-2.3Pd/TD270ANpH-K
A	1643	1924
B	663	663
C	156	156
D	964	1235
E	1177	1458

2.2 Product Parts



2.3 Product Specifications

Model	GRS-2.3Pd/TD200ANpH-K	GRS-2.3Pd/TD270ANpH-K
Rated water storage capacity	206L	270L
Heat pump heating capacity	2300W	2300W
Rated input power	426W	426W
Electric heater power	2000W	2000W
Maximum input power	830W+2000W(Electric heater)	830W+2000W(Electric heater)
Power supply	220-240V ~ 50Hz	220-240V ~ 50Hz
Water outlet temperature	35°C~70°C	35°C~70°C
Heat pump operating range	-7~45°C	-7~45°C
Inlet/Outlet connector diameter	DN15	DN15
Water-proof grade	IPX4	IPX4
Refrigerant	R290 (330g)	R290 (330g)
Sound pressure level	44dB(A)	44dB(A)
Dimension (W×D×H)	663mm×670mm×1643mm	663mm×670mm×1924mm
Net weight	97kg	109kg

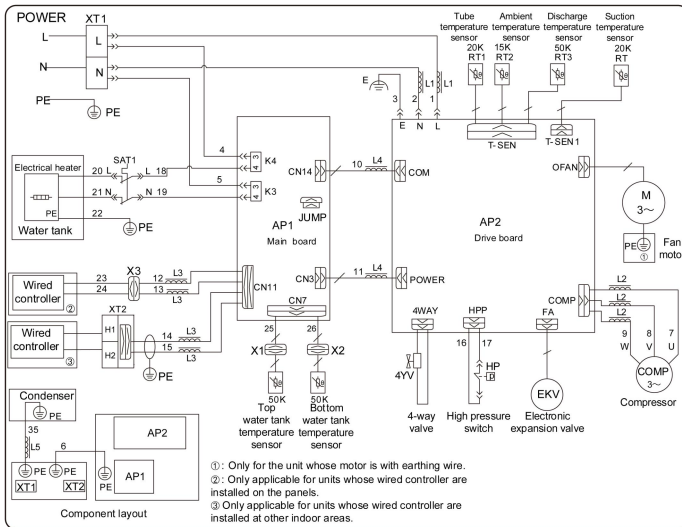
NOTES:

- ① Product conforms to AS 3498:2020 and AS/NZS 2712:2007.

- ② Test conditions: Outdoor ambient temperature 20/15 °C (DB/WB); Water temperature from 10 °C up to 55 °C.
- ③ Under BOOST Mode, electric heater helps to heat water.
- ④ Please refer to the nameplate for the exact data as this table is subject to change.

2.4 Electrical Schematic Diagram

If the electrical schematic diagram changes with product upgrading, please refer to the electrical schematic diagram which is affixed on the unit.



3 Safety Information

Please read thoroughly all of the instructions before installing & operating the unit.

The following safety warnings are very important, always read and obey all safety symbols:



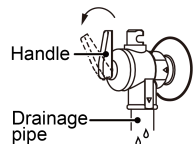
WARNING

- The unit must be earthed effectively.
- A residual current device (RCD) breaker must be installed adjacent to the power supply.
- Do not remove, cover or deface any permanent instructions or labels from either the outside or inside of the unit panels.
- Only qualified persons should install the unit in accordance with local and national regulations and this guide.
- Improper installation may result in water leakage, electric shock or fire.
- All electrical connections should comply with the regulations of the local power company, local electric utility and this guide.
- Never use an incorrectly rated fuse, otherwise the unit may break down and cause an electrical fire.
- Do not insert fingers, rods or other objects into the air inlet or outlet. The fan is rotating at high speed, and may cause injury.
- Never use a flammable spray such as hair spray or lacquer paint near the unit. It may cause a fire.
- This appliance is not intended for use 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 concerning use of the unit by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

- **DISPOSAL:** Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available.



- The PTR Valve should be operated every 6 months to make sure that there is no restriction of the valve. Please beware of hot water being expelled from the valve. The drainage pipe should be well insulated in order to prevent water inside pipe from freezing in cold weather.



- If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater causing health concerns.
- The unit must be securely fixed, otherwise, noise and vibration may result.
- Make sure that there are no obstacle around the unit.
- If the unit is to be installed in an area that is subject to lengthy periods of direct sunlight, additional UV protection for the display screen is advised.
- In places where there are strong winds, fix the unit in an area protected from the wind.

**NOTICE**

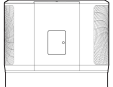
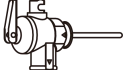



- The earthing pole must be well earthed. Make sure that any power supply socket and plug are dry and connected tightly.
- Before cleaning, be sure to stop the operation and isolate the unit (i.e. turn the isolating switch or breaker off). Otherwise, an electric shock and injury may be caused.
- Water temperature over 50 °C can cause severe burns or even death from scalds. Children, disabled and elderly are at highest risk of being scalded. Feel water before bathing or showering. Water temperature limiting valves are required as per AS 3500.
- Do not operate the unit with a wet hand as an electric shock may occur.
- A non-return valve must be installed on the water inlet side, as well as a suitable isolation valve.
- It is normal for some water to be released from the PTR valve during operation. But, if there is a large volume of water, call our service team for further advice. After long term use, check the unit base and fittings. If damaged, the unit may sink, resulting in injury. Arrange the drain pipe to ensure effective draining. Improper drainage may cause water damage to surrounding areas such as buildings, furniture etc. Do not touch the inner parts of the controller or remove the front panel. Some parts inside are dangerous to touch, and may cause damage.
- Do not turn off the power supply except for service and maintenance purposes. A continuous power supply for water heating is necessary.
- 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.
- The instructions for closed water heaters incorporating a heat exchanger shall give details on the installation of control devices and the temperature settings that are necessary to prevent operation of the thermal cut-out caused by the heat from the exchanger.



4 Before Installation

4.1 Unpacking

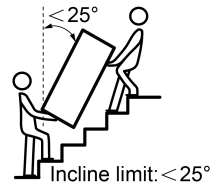
When unpacking ensure the following items are included:

	<p>Main Unit The Main unit including the heat pump & storage tank.</p>
	<p>PTR Valve Pressure Temperature Relief Valve (May be pre-fitted)</p>
	<p>Condensation Tube Used for draining condensation from the unit</p>
	<p>Owner's manual In-depth installation & maintenance detail on the product</p>
	<p>Owner's manual (Controller) In-depth control descriptions detail on the product</p>

4.2 Transporting

The following should be adhered to when transporting the unit:

- (1) Don't incline the unit more than 25° from vertical when moving, and keep it vertical when installing.
- (2) Avoid scratching or damaging the unit by using protective coverings where applicable.
- (3) As this unit is heavy it needs to be carried by two or more persons, to avoid injury and/or damage.



4.3 Location Requirements

The following considerations should be addressed when finding a suitable location:

- (1) The unit should be installed in a place with rain and sun shading devices. If it is installed outdoors or in a place where it can't be sheltered from rain, it must be equipped with a weather shed to avoid being drenched by rain, and avoid installing it in low-lying places where water is easy to accumulate.
- (2) Ensure enough space for installation and future maintenance is allowed.
- (3) Both the air inlet & outlet should be free from obstacles & strong wind.

- (4) The base surface should be flat (i.e. no more than a 2° incline) and be able to bear four times of the weight of the unit after the unit being filled with water whilst ensuring no issue will arise in regards to increased noise and/or vibration.
- (5) Operating noise & air flow expelled should not affect others.
- (6) Ensure no flammable gas is nearby.
- (7) Positioning should be convenient for plumbing and wiring.
- (8) Installing indoors may cause indoor temperature fluctuations and excessive noise.
- (9) If the unit has to be installed on a metal part of the building, make sure the electrical insulation meets the relevant local standard.
- (10) Securely fixing the unit will assist in avoiding unwanted noise and/or vibration.



NOTICE

- Consideration must also be made in regards to the ambient air temperature. Heat pump operates between ambient air temperatures of -7°C and 45°C. Temperatures below this range will rely purely on the electric heater and the heat pump economy mode will not operate.
- The unit should be located in an area not subject to freezing temperatures. A unit located in unconditioned spaces (i.e. garages, basements, etc.) may require the condensate tubing, and drain piping to be insulated against freezing.

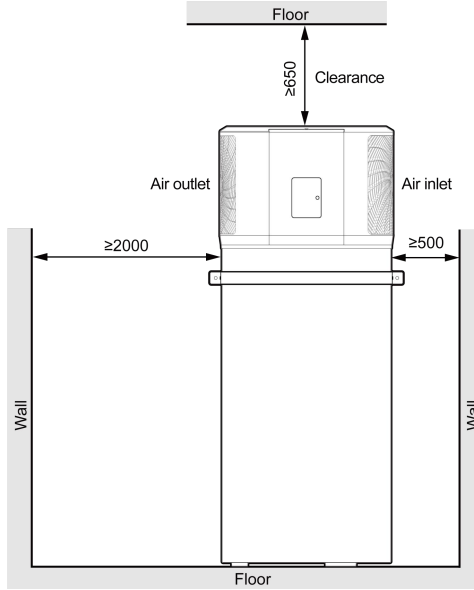
Installing the unit in any of the following places may lead to malfunction or shorter life span:

- (1) Places with direct sunlight, strong wind and/or other high heat sources (If there's no way to avoid these, a cover may be required).
- (2) Site contains mineral oils (e.g. lubricant of cutting machines).
- (3) Hot spring areas where corrosive gases exist (e.g. sulphide).
- (4) Factories where the power voltage fluctuates dramatically.
- (5) Areas where oil may permeate the system (e.g. Kitchens).
- (6) Areas where strong electromagnetic fields exist.
- (7) Areas where acidic or alkaline gases exist.
- (8) Areas where flammable gases or materials exist. (The minimum distance from flammable materials is recommended to be 1m.)
- (9) Other special environments.

4.4 Installation Space Requirements

If the unit is installed in an enclosed space, the area must have unrestricted air flow. The installation space should satisfy the installation space requirements.

Unit: mm



5 Product Installation

5.1 System Installation Diagram

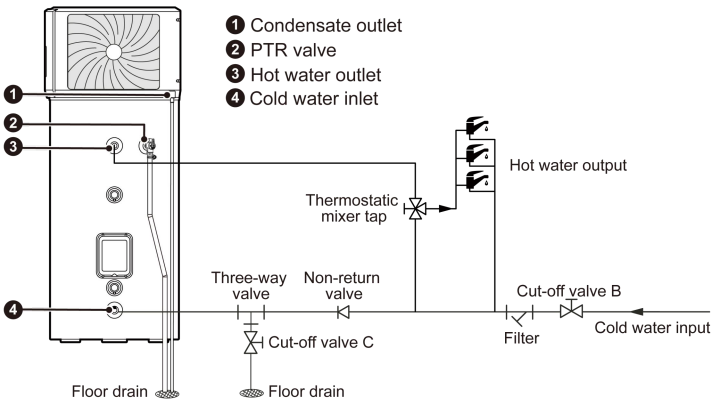


Fig. 5.1-1 System Installation Diagram

**NOTICE**

- Systems must be plumbed as per the above figure.
- The cold water inlet and hot water outlet are 1/2" (15mm) male (external thread) connections.
- The PTR valve outlet is a 3/4" (20mm) female (internal thread) connection.
- All hot water plumbing must be insulated for safety & heat retention.
- If the water supply pressure exceeds the rated pressure, a reduction valve should be installed in the water inlet line. The inlet water pressure range is recommended to be 0.2~0.5MPa. The inlet water temperature range is recommended to be 6~55°C.
- If the inlet water pressure is less than 0.2MPa, a pump should be installed at the water inlet.
- To guarantee the safe usage of tank, a reduction valve should be installed in the water inlet line if the water pressure exceeds 0.5MPa.
- Water pipes are allowed to be routed only after the unit has been installed properly. Note that don't let dust or other foreign matters enter the pipe system.
- When all pipes have been in place, take a leak test and then insulate all pipes. Special attention shall be drawn to the valves and joints. The insulation material shall be at least 15mm thick.
- Pipes must be heat-resistant and durable.

**WARNING**

- Do not dismantle the PTR Valve.
- Do not block off the Drainage pipe, it may cause explosion and/or injury.
- The valve or drain valve outlet pipe must not be sealed or blocked
- To ensure water safety, Insulation plastic pipes such as PPR pipes are recommended to be used. The PPR pipe length at the water inlet and outlet is determined as per the formula: $L \geq 70 \times R^2$, wherein L indicate the pipe length, and R indicates the inner diameter of the pipe (unit: cm). The pipes should be insulated properly. No metal pipe is allowed.



5.2 Installation Requirements

- (1) The unit shall be installed upright on the strong enough balcony or floor. Do not point the air outlet at the upwind direction.
- (2) The unit is suggested to be installed in places with the temperature of above 0°C. Hot water outlet shall not be too far from hot water use site. Arrange the pipeline together, and conduct thermal insulation treatment to hot water pipeline to decrease heat capacity loss. If the unit is installed in places with the temperature of below 0°C, conduct thermal insulation treatment to water inlet/outlet to prevent water pipe and PTR valve getting frozen under low temperature, thus resulting in malfunction of water tank.

- (3) When a weather shed is set up to protect the unit, be sure heat release and heat absorption by the heat exchange will not be affected.
- (4) There should be water sources and floor drain near the unit so that it will be easy to fill water for the water tank and drain it.
- (5) Be sure the condensate pipe and the pressure-relief device drainpipe are reliably and tightly connected and then led to the floor drain.
 - 1) Must connect the pressure-relief device to the PTR valve inlet.
 - 2) The water may drip from the discharge pipe of the pressure-relief device and this pipe must be left open;
 - 3) The pressure-relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked;
 - 4) A discharge pipe connected to the pressure-relief device is to be installed in a continuously downward direction and in a frost-free environment.
- (6) When installing in small room, corresponding measures must be taken to prevent refrigerant concentration in the room exceeding limit value due to refrigerant leakage, resulting in anoxia or suffocation.



NOTICE

- The unit also shall be fixed to wall with clamping bands in case of tilt in some unusual occasions.
- If water supply is of high salinity or inferior quality, proper filtering or deperation is necessary.
- The water quality for the air source water heater should comply with the local sanitation standard for the domestic drinking water and refer to the following water quality requirements.

pH (25°C)	6.8~8.0	Turbidity (scattering turbidity unit)/NTU	<1
Chloride/(mg/L)	<50	Iron/(mg/L)	<0.3
Sulfate/(mg/L)	<50	Silica (SiO ₂)/(mg/L)	<30
Total hardness (calculated in CaCO ₃)/(mg/L)	<70	Nitrate (calculated in N)/(mg/L)	<10
Conductivity (25°C)/(μs/cm)	<300	Ammonia nitrogen (calculated in N)/(mg/L)	<1.0
Total alkalinity (calculated in CaCO ₃)/(mg/L)	<50	Sulfide/(mg/L)	Shall not to be detected

- The installation shall conform to the Plumbing Code of Australia (PCA).
- As unit operation will generate cold air, certain noise will occur, do not install it in places with frequent activity by the user. Any harmful effect due to improper installation location, our company will bear no responsibilities.

5.3 Water Pipe Connections

5.3.1 Pipe Preparation

The appliance is intended to be permanently connected to the water mains and not connected by a hose-set.

5.3.2 Water Inlet and Outlet Connections

Connect the cold water pipe to the cold water inlet position, ensuring a suitable isolation and non-return valve is included inline.

Connect the hot water pipe to the hot water outlet position.



NOTICE

- The isolation and non-return valve need to be purchased by yourself. The connection specification is 1/2" (15mm) male, which must conform to AS1628.

5.3.3 PTR Valve Connection

Connect the pressure temperature relief valve (PTR) and suitably drain to legal point of discharge. After installation, it must be confirmed that the drainpipe outlet has a suitable air gap.

5.3.4 Thermostatic Mixer Tap Connections

Plumb a suitable thermostatic mixer tap between the hot water outlet and the hot water pipe to the home.

5.3.5 Drainpipe Connection

As installation diagram shown, add a tee joint in cold water inlet pipe, then connect the drainpipe, meanwhile the drainpipe and floor drain shall be lower than water tank bottom, otherwise, water can't be discharged completely. An isolation valve must be installed in drainpipe, and the isolation valve must be installed in places where the user is accessible.



NOTICE

- To ensure safety and reliability, special accessory equipped with this unit must be adopted. Don't use the accessory of any third party and replace the accessory by yourself, any losses thereof for normal operation and usage of heat pump water heater result from personal injury and improper installation, our company will bear no responsibilities.

5.4 Electric Connection

5.4.1 Electrical Wire Layout

- (1) This unit is the Class I equipment and shall be earthed reliably to the special earthing device by the skilled personnel.
- (2) Ensure that a switch for all-pole disconnection is available for the fixed lines and is directly connected to wiring terminals of the power supply. Ensure that contactor opening distance on all poles meets the disconnection requirements under overvoltage category III conditions.
- (3) The circuit breaker of enough capacity shall be used in the fixed circuit.
- (4) Please take reliable earthing measures. earthing shall be set in special earthing devices of architecture.
- (5) The power supply shall comply with the nameplate and only special power circuit for air-to-water heat pump water heater is allowed.
- (6) Do not pull the power lines by force.
- (7) Wiring shall be performed in accordance with the national rules.
- (8) If the power cable is damaged, it shall be replaced by professional staff of manufacturer, its maintenance or similar department.

Table 5.4-1 Power configuration table

Model	Power supply	Minimum sectional area (mm ²) of power cord			Circuit breaker (A)	Fuse capacity (A)
		L	N	PE		
GRS-2.3Pd/TD200ANpH-K	220-240V~ 50Hz	1.5	1.5	1.5	16	16
GRS-2.3Pd/TD270ANpH-K						



NOTICE

- The unit must be installed with a residual current device (RCD) near the power supply and must be effectively earthed.
- The appliance shall be installed in accordance with national wiring regulations, and installation of the unit must be done by qualified personnel.
- Set the residual current device (RCD) according to the relevant electric technical standards of local regulations.
- All electrical works shall be properly run using suitable conduit / insulation without contacting any of the piping or valves.
- Only copper power cable is acceptable, and the working temperature shall not exceed the specified set point.
- When the power cable is longer than 15m, its sectional area shall be enlarged in case of accidents caused by overload.

**NOTICE**

- The specifications of the power cable listed above is for the BV single-wire (2~4 pieces) cable used at 40 °C . The specification of the circuit breaker listed above is for the type D circuit breaker used at 40°C.
- The unit circuit must be at least 1.5m away from any inflammable surface.

5.4.2 Wiring Diagram

- (1) The external wiring diagram of the unit is as follows. For the internal wiring diagram, please refer to the circuit diagram attached on the machine.
- (2) The following two installation methods can be used for the display board (wire controller).

If the wire controller needs to be installed in an indoor area other than the unit's panel, its wiring method should be in accordance with method I in the figure.

If the wire controller needs to be installed on the unit's panel, its wiring method should be in accordance with method II in the figure.

(Note: Connect according to either method I or method II)

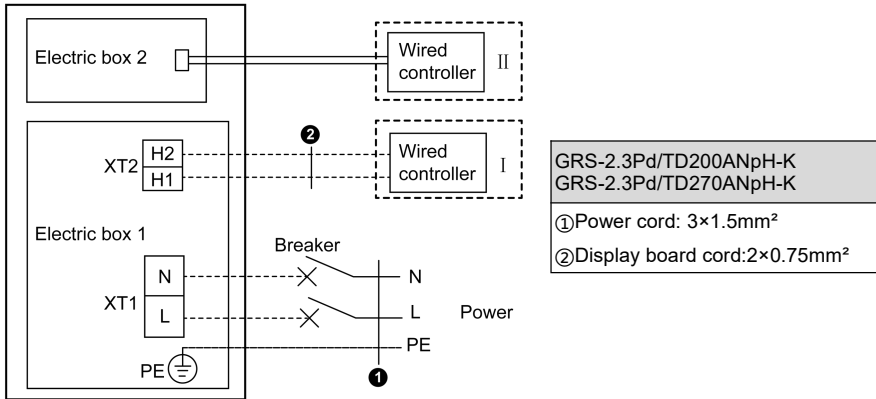


Fig.5.4-1 External wiring

5.4.3 Electrical Wiring and Connection Requirement

- (1) Ensure the proper power cable according to the power configuration table and then connect it to the main power.
- (2) Fix the power cable to the power supply device.
- (3) An all-pole disconnection device which has at least 3mm clearances in all poles, and have a leakage current that may exceed 10mA, the residual

current device (RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

- (4) Type parameter of fuse is T3.15AH 250V.
- (5) After completing wiring connection, the power cord and communication wires must be tightly pressed with a fixed wire clamp. The fixed wire clamp should be pressed on the outer sheath of the connection wire.
- (6) When arranging wiring connection for the external unit, the communication cord of wired controller shall be separated from the power cord. The minimum distance between the parallel wires shall be greater than 20cm. Otherwise, the communication of the unit might be abnormal. The strong and weak wires shall be covered separately with wire sleeves.

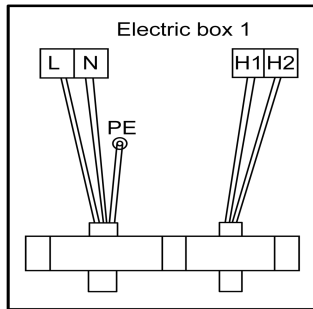


Fig.5.4-2 External wiring and fixing figure

5.4.4 Thermostat Reset Operation

When the thermostat of electric heater is disconnected, the reset button will be popped up. You need to remove the electric box cover, and press the reset button and reset the thermostat.

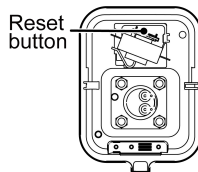


Figure 5.4-3 Thermostat Rreset Bbutton Ddiagram

5.4.5 Screen Protection

If the unit is to be installed in an area that is subject to lengthy periods of direct sunlight, additional UV protection for the display screen is advised.

5.4.6 Wired Controller Installation

The wire controller is installed on the front panel of the unit by default. When it needs to be adjusted to other places outside the unit, it is recommended that the length of the communication cable between the wired controller and the unit can't be more than 8m.

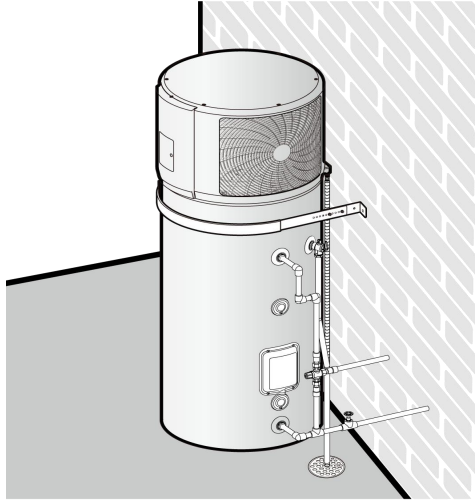
For detail installation method of wired controlled, please reference to the manual of the wired controller.

5.5 Installation Checklist

Location
<ul style="list-style-type: none"> ■ The flooring beneath the water heater is able to support the weight of the water heater when filled. ■ Sufficient room has been allowed to service the water heater. ■ Sufficient air is available for the heat pump to function (i.e. the unit is not fitted into any type of closet or small enclosure). ■ The location is free from any corrosive elements in the atmosphere such as sulphur, fluorine, and chlorine (i.e. elements found in aerosol sprays, detergents, bleaches, cleaning solvents, air fresheners, paint, varnish removers, refrigerants, and many other commercial and household products). ■ The location is free from any excessive dust (if so more frequent cleaning will be required by the user).
Water System Piping
<ul style="list-style-type: none"> ■ Pressure and temperature relief valve is properly installed with a discharge pipe plumbed to suitable drain. ■ All piping is properly installed and free of leaks. ■ The unit is completely filled with water. ■ The thermostatic mixer tap has been installed per manufacturer' s instructions. ■ The condensate drain line is installed and plumbed to suitable drain. ■ All hot water lines are appropriately insulated.
Electrical Connections
<ul style="list-style-type: none"> ■ The water heater is connected to 220~240 VAC. ■ All wiring sizes and connections comply with all local applicable codes and the requirements of this guide. ■ The water heater and electrical supply are properly earthed. ■ A correctly sized overload fuse or circuit breaker protection has been installed.

5.6 Final Installation

Below is an example of a satisfactory heat pump installation along with all plumbing and electrical connections.



6 Product Commissioning

6.1 Filling Tank Before Operation



NOTICE

- Operation without water in the tank may result in the damage of auxiliary electric heater. In case of such damage, the manufacturer will not be liable for any damages caused by this issue.
- Before using this unit, please follow the steps below.
 - ① Open the cold water inlet valve.
 - ② Fill the unit with water by opening a hot water tap inside the home.
 - ③ Once water flows from the hot water tap, ensure all air in the system is bled then close the hot water tap.



6.2 Powering on the Unit



NOTICE

- Ensure that the tank is full of water and all air has been bled before turning on the power to the unit.
 - ① Switch on the power to the water heater.
 - ② Turn heater on by pressing the On/Off button on the control panel.
 - ③ Heater should then start running.

The whole unit can be debugged only after the unit has passed the installation inspection. The debugging steps are as follows:

- (1) Water recharge of the unit: refer to the installation tips label on the water tank of the unit to perform water recharge. Ensure that there is no water leakage in the pipelines, joints, etc.
- (2) Energization of the whole unit: After the unit is energized, observe whether the display of wired controller is normal. If there is no fault, it is normal.
- (3) System time calibration of wired controller set the time according to the manual of the wired controller.
- (4) Operation of the whole unit: turn on the unit with the wired controller. When the wired controller displays “heating icon”, check whether the unit is operating normally. Normal judgement criterion: the fan is running normally, the whole unit is running stably without obvious vibration and abnormal noise. The unit can be delivered to the user after running for at least 20 minutes without abnormality.

6.3 Unit Performance

This heat pump unit has two kinds of heat sources: Heat Pump (compressor) and Electric heater.

The unit will automatically select the heat source to heat the stored water to the target temperature depending on the mode selected and the surrounding conditions.

6.3.1 Water Heating Capacity

There is different water output at different ambient temperatures. Normally lower ambient temperature result in longer heat-up times because of lower effective performance.

It will startup the auxiliary electric heater of 2,000W to heat with the heat pump when the ambient temperature under -15°C or in the “BOOST” function.

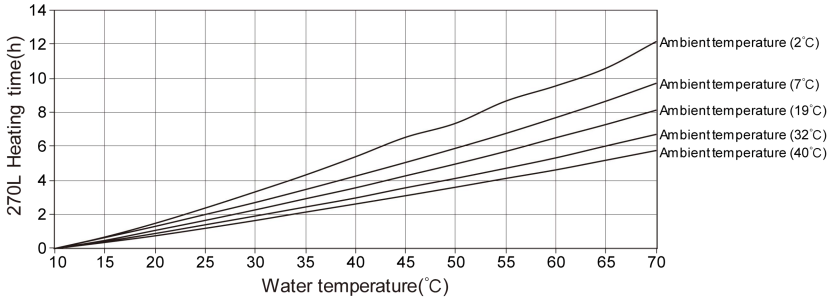


Fig. 6.3-1 GRS-2.3Pd/TD270ANpH-K heating time to different hot water target temperatures for different ambient temperatures (Only heat pump)

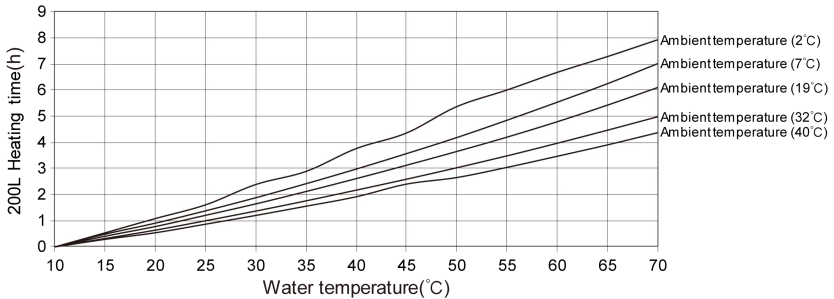


Fig. 6.3-1 GRS-2.3Pd/TD200ANpH-K heating time to different hot water target temperatures for different ambient temperatures (Only heat pump)

NOTES:

- ① The above curve data are fitted based on the test parameters of Gree Laboratory(The test conditions are: initial water temperature: 10°C, power supply: 230V ~ 50Hz; in a new unit with clean heat exchangers and in auto water heating mode). So there will be about 5% tolerance and the curves are for reference only.
- ② In BOOST mode, the electrical heater and heat pump will be together started to heating. The heating time of GRS-2.3Pd/TD270ANpH-K and GRS-2.3Pd/TD200ANpH-K will be decreased. On the other hand, COP will decrease and power consumption will increase.

6.3.2 Running Performance

(1) Defrost

- 1) The unit will automatically perform defrosting to improve the heating

efficiency.

- 2) During defrosting, the fan motor will stop.
- 3) If defrosting occurred under high temperature($>15^{\circ}\text{C}$) and the unit is abnormal, please submit for repair.

(2) Startup again after long-term shut down

When the unit which has not been used for a long period is started (including the first startup), dirty water will flow out from tap faucet, it is a normal phenomenon and will disappear a while later.

(3) Power failure

- 1) When power failure occurs during operation, the unit will stop.
- 2) The displayer has memory function.
- 3) Please switch off the power switch when the unit malfunctions occur because of the thunder and automobile radio. Then turn on the unit again.

(4) Memory function

Before power off, the displayer will automatically memorize ON/OFF status; when it is re-energized, controller will send ON/OFF signal to the unit according to the status memorized before power off, to ensure it keeps the original status set by the user.

6.4 Main Control Instructions

The unit has an adjustable water temperature range between 35 to 70°C . By default, the water temperature is set to 60°C . The unit includes a Boost function option, which is not activated by default. The operation of the electric heater differs based on whether the Boost function is enabled or not:

- (1) When the Boost function is not activated, the heat pump will stop operating when the top water tank temperature sensor reaches the set target temperature (200L:49% of volume above the sensor, 270L:47% of volume above the sensor). The heat pump will start operating again when the temperature difference meets the start-up condition between the top water tank temperature sensor and the set target temperature (200L:the default temperature dead-band is 13°C , 270L: the default temperature dead-band is 11°C).The electric heater will turn on when the ambient temperature is less than -7°C (For 200L unit, the electric heater will turn on when the top water tank

temperature sensor is 13°C below the set water temperature, and it will turn off when the top water tank temperature sensor reaches the set temperature. For 270L unit, the electric heater will turn on when the top water tank temperature sensor is 11°C below the set water temperature, and it will turn off when the top water tank temperature sensor reaches the set temperature).

- (2) When the Boost function is activated, both the heat pump and the electric heater will stop operating simultaneously when the top water tank temperature sensor reaches the set target temperature. They will start operating again simultaneously when the temperature difference meets the start-up condition between the top water tank temperature sensor and the set target temperature.
- (3) The higher the set water temperature, the greater the unit's energy consumption. When the Boost function is activated, the unit's operational energy consumption will increase.

If the ambient temperature range is out of heat pump operating range, the heat pump will stop running. Then if the ambient temperature increases back into the running range of heat pump again, the heat pump will restart running automatically.

The unit is equipped with a sterilization function, allowing users to freely set the sterilization cycle and duration. After the sterilization time is reached, the heat pump will heat the water to 70°C for sterilization (The water temperature above 45% of volume is higher than 60°C). In default mode, sterilization is achieved by heating upper 45% tank water to 60°C by heat pump each day. For detailed operating instructions, please refer to the controller manual.

The unit settings will automatically revert to the factory default state 24 hours after being changed by the user. It is recommended to use the factory default settings.

6.5 Automatic Functions

6.5.1 Defrosting During Water-Heating

During the heat pump running period, if the evaporator becomes frosted due to low ambient temperatures, the system will defrost automatically to keep effective performance (about 1~8min). During defrosting mode, the fan motor will stop, but the compressor will continue to run.

6.5.2 Protection Mode

- (1) When the self-protection mode activates, the system will be stopped and start a self-check. Once the error is resolved the unit will restart.
- (2) When the self-protection mode activates, an error code will be displayed on screen.
- (3) The unit may enter self-protection mode for a number of circumstances including but not limited to:
 - 1) A blocked air inlet or outlet;
 - 2) The evaporator is covered with too much dust;
 - 3) The unit is receiving incorrect power supply (exceeding the range of 220-240V).

6.5.3 Error Mode

- (1) In the case of a serious error, the unit will not start.
- (2) For some errors, the error icon will continue to be displayed on screen until the error is resolved.

7 Product Maintenance

In the process of produce maintenance, please contact our designated dealer or local service center when maintaining or replacing related components.

7.1 Checking/Replacing the Mg-Stick (Anode)

(Frequency: Every Half Year - Replace if required)

The Mg-stick (anode) protects the inner tank of water tank. When the Mg-stick become degraded the level of protection is diminished. It is recommended that Mg-stick is periodically checked for its level of degradation and gets replaced if required.

Most water heating industry professionals recommend inspecting the Mg-stick yearly. The coating of water tank is designed for normal quality water. When using more corrosive water, the Mg-stick is checked more frequently. When in doubt consult a local water heating professional.

To check the protective anode:

- (1) Cut off the power supply.
- (2) Close the cold water inlet valve & open a hot water tap.

- (3) Open the drainage pipe valve, and wait for discharging the water.
- (4) Remove the power wire if required.
- (5) Remove the top cover and external cover if required.
- (6) Unscrew the fixed nuts and joints of the main unit assembly, and remove the main unit assembly if required.
- (7) Remove the Mg-stick cover, and unscrew the Mg-stick, and extract it directly.
- (8) Check the Mg-stick, if Mg-stick is in an unsuitable condition, replace with a new one.
- (9) Restitute the unit and debug anew.



NOTICE

- Arrange for an authorised person to inspect the Mg-stick (anode) and replace it if required.

7.2 Cleaning the Inner Tank and Electric Heater

(Frequency: Every Half Year)

It is recommended to clean the inner tank and electric heater regularly to maintain efficient performance.

- (1) Turn off the power supply.
- (2) Close the cold water inlet valve & open a hot water tap.
- (3) Open the drainage pipe valve; drain out all the water in the inner tank. If it is needs, use water to wash the inner tank several times to clear the deposits.
- (4) Close the drainage pipe valve, re-fill the inner tank with water, and turn the power back on.

7.3 Operating the PTR Valve

(Frequency: Every Half Year - Replace if required)

It is recommended to operate the PTR valve periodically to ensure water flows freely. If water doesn't flow freely, the PTR valve will need to be replaced.

- (1) Locate the PTR valve on the left hand side of the unit.
- (2) Carefully release the valve using the lever & release some water from the tank.

NOTE: Water expelled may be extremely hot.

- (3) If water flows freely the PTR appears to still be in a suitable working condition.
- (4) If water does not flow freely it would appear the PTR valve is due for replacement.
- (5) If the PTR valve needs replacing, please apply for further assistance.

7.4 Water Input and Drainage

The water input and drainage of the unit shall be followed up throughout the whole process to avoid water leakage accidents caused by wrong operation. Please refer to the installation instruction mark on the water tank.

7.5 Safety Notices While Moving the Unit

- (1) Before starting the compressor, make sure water pipe is connected safely and the water tank is full, otherwise, malfunction might occur.
- (2) Unit wiring connection shall use the specified electric wire with correct connection; wiring terminal shall not be directly affected by external force and be reliably fixed. Improper connection or fixing might generate fire hazard.
- (3) No connection in intermediate electrical wire. If the length of electrical wire is not enough, please equip a specialized electrical wire with enough length.

7.6 Other Maintenance Checks

- (1) Regularly check the electrical wiring for any damage and apply for maintain if damage is evident.
- (2) In some cold areas (below 0°C), if the unit will be stopped for a long time, all the water in the tank should be released and the tank refilled prior to reuse in case freezing has occurred inside the inner tank. Failure to do this may result in severe damage to the heating element.

8 Operation Notices in Winter

- (1) Before starting the unit which has not been used for a long period or in quite low temperature in winter, energize it at least 8h ahead.
- (2) Do not disconnect the power supply when the outdoor temperature is quite low in winter, otherwise the automatic antifreeze protection will fail to work. Under low ambient temperature, anti-freezing operation function of the unit

will conduct heating for anti-freezing before water temperature of the water tank come near to freezing point, and it stops if water temperature of the water tank rises to safe temperature. But the auto anti-freezing operation function of the water tank is invalid for water inlet/outlet pipe of the water tank. If ambient temperature of unit installation location is below 0°C, pipeline anti-freezing tracing belt must be installed and ensure the aforementioned belt is energized. If the water tank is installed outdoor inevitably, shorten outdoor piping length as much as possible, including refrigerant connection pipe and water inlet pipe of the water tank, otherwise, heat dissipation loss of the unit is big, power consumptive and water system is easy to be frozen. Special attention shall be paid to thermal insulation blind spot on local valve connection location and water pipe curve, strengthen the thermal insulation, otherwise, local pipe will be frozen.

- (3) When the unit is not to be used for a long period, drain the water tank and pipe according to discharge operation, otherwise, water system will be damaged. After draining water and to reuse the unit again, pours water to the water tank fully before starting up. Please refer to water input and drainage operation of the water tank.

Warm hint
■ If it's not convenient for operation or there's hazard, please contact our designated dealer or local service center directly. We will appoint profession persons to check, debug and clean the unit.

9 Precautions for Safety Usage

- (1) For comfort usage, it's suggested to use hot water with flow rate of 6~7L/min.
- (2) User should have regular check and maintenance for heat pump water heater.
- (3) Cut off the power supply prior to any maintenance or services. An unprofessional personnel is not allowed to adjust or service the heat pump water heater.
- (4) Improper operation might cause scald due to hot water. Water heating without enough water might produce high-temperature steam or hot water, which might cause serious scald. Hence, guarantee the water tank is filled with water.

- (5) It is forbidden to block the exhaust hole of floor drain.
- (6) The water heater is equipped with PTR valve for reliable operation, please don't change its location and never block its outlet. The pipe should be directly connected to floor drain. PTR valve type: PTR 20 850; Characteristics: operating pressure 850kPa, operating temperature 93~99 °C ,rating power 45kW.
- (7) Never drink the water inside the water tank.
- (8) Children bath should be supervised by adults.

DANGER

- Failure to operate the PTR valve easing gear at least once every six months may result in the water heater exploding. Continuous leakage of water from the valve may indicate a problem with the water heater.

- (9) In order to prevent the hazard due to the invalidation if electric heating of water tank, the electric heating circuit is equipped with thermostat. If the water temperature is higher than 85°C, the thermostat will be activated to cut off the electric heating power. However, if the electric heating is abnormal, it needs to apply for maintain.

10 Detailed Maintenance Installation Instructions for Refrigeration System Precautions for Safety Usage

10.1 Safety Notices for Refrigeration System Reparation



WARNING!

- Appliance filled with flammable gas R290. Before repair the appliance, read the service manual first and in strict accordance with the requirement of manufacturer.
- This chapter mainly focuses on the special maintenance requirements of appliances using R290 refrigerant. For detailed maintenance operations, refer to the after-sales technical service manual.

10.2 Aptitude Requirement for Maintenance Man (Repairs Should Be Done Only Be Specialists).

- (1) Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle

refrigerants safely in accordance with an industry recognised assessment specification.

- (2) Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

10.3 Safety Preparation Work

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, the following precautions shall be complied with prior to conducting work on the system.

10.3.1 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.

10.3.2 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. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material

10.3.3 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.

10.3.4 Presence of Fire Extinguisher

If any hot work is to be conducted on the refrigeration 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.

10.3.5 No Ignition Sources

No person carrying out work in relation to a refrigeration 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.

10.3.6 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.

10.3.7 Checks to the Refrigeration 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 manufacturers' technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

- (1) The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
- (2) The ventilation machinery and outlets are operating adequately and are not obstructed.
- (3) If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- (4) Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- (5) Refrigeration 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.

10.3.8 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:

- (1) That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- (2) That no live electrical components and wiring are exposed while charging, recovering or purging the system;
- (3) That there is continuity of earth bonding.

10.3.9 Repairs to Sealed Components

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.

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.

- (1) Ensure that the apparatus is mounted securely.
- (2) 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.

Note: The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

10.3.10 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.

10.3.11 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.

10.3.12 Detection of Flammable Refrigerants

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

10.3.13 Leak Detection Methods

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 recalibration. (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 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.

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. For appliances containing flammable refrigerants, oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

10.3.14 Removal and Evacuation

When breaking into the refrigerant circuit to make repairs or for any other purpose conventional procedures 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:

- (1) remove refrigerant;
- (2) purge the circuit with inert gas; evacuate;
- (3) purge again with inert gas;
- (4) open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants, the system shall be “flushed” with OFN to render the unit safe. 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, flushing shall be achieved by breaking the vacuum in the system with OFN 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 OFN 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 pipework are to take place.

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

10.3.15 Charging Procedures

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

- (1) 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.
- (2) Cylinders shall be kept upright.
- (3) Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- (4) Label the system when charging is complete (if not already).
- (5) Extreme care shall be taken not to overfill the refrigeration 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.

10.3.16 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 reuse of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

- (1) Become familiar with the equipment and its operation.
- (2) Isolate system electrically.
- (3) Before attempting the procedure, ensure that:
 - 1) Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
 - 2) All personal protective equipment is available and being used correctly.
 - 3) The recovery process is supervised at all times by a competent person.
 - 4) Recovery equipment and cylinders conform to the appropriate standards.
- (4) Pump down refrigerant system, if possible.
- (5) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- (6) Make sure that cylinder is situated on the scales before recovery takes place.
- (7) Start the recovery machine and operate in accordance with manufacturer's instructions.
- (8) Do not overfill cylinders. (No more than 80% volume liquid charge).

- (9) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- (10) 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.
- (11) Recovered refrigerant shall not be charged into an- other refrigeration system unless it has been cleaned and checked.

10.3.17 Labelling

Equipment shall be labelled stating that it has been decommissioned 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.

10.3.18 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 are 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 scales 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 they 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.

11 Product Troubleshooting

Error code	Error name	Possible causes	Solution
E1	System high pressure protection	The temperature sensor of water tank of the unit is not inserted in place; The unit is not filled with water; The wire of pressure switch is loose; The charged refrigerant is too excessive; The pressure switch is faulted; The main board is faulted; The heat exchange of water tank of the unit is abnormal; There is too much dirt in the water tank of the unit and the water tank needs to be cleaned.	It will recover by re-energization after troubleshooting.
E4	Exhaust protection	The resistance of exhaust temperature sensor is abnormal; Refrigerant of the unit leaks or the refrigerant is insufficient.	
E6	Communication malfunction	The communication wire is loose or damaged; The display board is faulted; The mainboard is faulted.	It will recover automatically after troubleshooting.
F3	Malfunction of ambient temperature sensor	The temperature sensor is damaged; The mainboard is faulted.	
F4	Malfunction of discharge temperature sensor		
F6	Malfunction of heat exchanger pipe temperature sensor		
Fd	Malfunction of suction temperature sensor		
FE	Malfunction of temperature sensor 1		
FL	Malfunction of temperature sensor 2		
U7	Abnormal reversing of 4-way valve or insufficient refrigerant		The temperature sensors of the water tank are normal; Reversing of 4-way valve is abnormal; Refrigerant of the unit leaks or the refrigerant is insufficient.
C5	Malfunction of jumper cap	The jumper cap is wrong; The jumper is poorly connected.	

Attachment: Error Information Table

Appendix table 1-1 Common error information

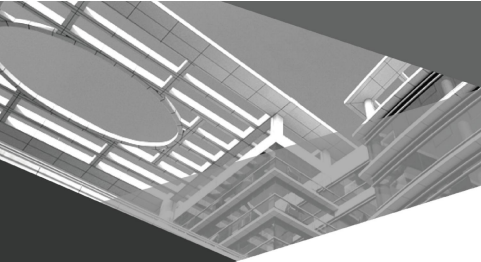
Error code	Error name	Error code	Error name
E1	System high-pressure protection	F4	Air discharge temperature sensor error
E3	System less refrigerant protection/ low-pressure protection	Fd	Suction temperature sensor error
E4	Air discharge protection	F6	Tube temperature sensor error
E5	Compressor overload protection	d5	Temperature sensor error of return pipe
E6	Communication error	FL	Bottom water temperature sensor error
E7	Communication error of backwater plate	FE	Upper water temperature sensor error
C5	Jumper cap error	EF	Blockage protection for air inlet
L7	Water flow (water pressure) switch error	d8	Temperature sensor error of water outlet of casing
E0	Water pump error protection (semi-direct heat type)	L6	Insufficient capacity, anti-high ambient temperature operation or operation protection for long period
U7	Abnormal protection for 4-way reversing valve or insufficient refrigerant	bH	Temperature sensor error of return pump
F3	Outdoor ambient temperature sensor error	—	—

Appendix table 1-2 Drive error information

Error code	Error name	Error code	Error name
EE	EPROM storage chip error	AA	Inverter outdoor fan AC protection (input side)
ee	Inverter compressor driver storage chip error	AC	Inverter outdoor fan startup failure
H5	Inverter compressor driver IPM module protection	Ad	Inverter outdoor fan less phase protection
HC	Inverter compressor driver PFC protection	AE	Inverter outdoor fan driver current detecting circuit error
H7	Inverter compressor out-of-step protection	Ar	Inverter outdoor fan driver electric box temperature sensor error
Lc	Inverter compressor startup failure	AL	Inverter outdoor fan driver DC bus low-voltage protection or voltage drop error
Ld	Inverter compressor de-fault phase protection	AJ	Inverter outdoor fan out-of-step protection
LF	Inverter compressor power protection	AH	Inverter outdoor fan driver DC bus high-voltage protection

Air Source Heat Pump Water Heater

Error code	Error name	Error code	Error name
PA	Inverter compressor driver AC protection (input side)	AP	Inverter outdoor fan driver AC
Pc	Inverter compressor driver current detecting circuit error	AU	Inverter outdoor fan driver charging loop error
PF	Inverter compressor driver electric box temperature sensor error	A0	Inverter outdoor fan driver module reset
PH	High voltage protection for drive DC bus of inverter compressor	A1	Drive IPM module protection for inverter outdoor fan
PL	Inverter compressor driver DC bus low-voltage protection or voltage drop error	A6	Master controller and inverter outdoor fan driver communication error
PP	Inverter compressor driver AC input voltage error protection	A8	Inverter outdoor fan driver module high-temperature protection
PU	Inverter compressor driver charging loop error	A9	Inverter outdoor fan driver module temperature sensor error
P0	Inverter compressor driver module reset	U9	Inverter outdoor fan driver AC input zero-sequence overcurrent protection
P5	Inverter compressor overcurrent protection	An	Inverter outdoor fan driver storage chip error
P6	Master controller and inverter compressor driver communication error	AF	Inverter outdoor fan driver PFC
P7	Inverter compressor driver module temperature sensor error	UL	Overload protection for inverter outdoor fan
P8	Inverter compressor driver module high-temperature protection	UP	Power protection for inverter fan
P9	Inverter compressor driver AC input zero-sequence overcurrent protection	—	—



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