GREE
Change for life

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 Gree product. Please read this Owner's Manual before operation and keep it for future reference.

If you lose this Owner's Manual, please contact your local agent, or visit www.greeac.co.nz and/or email hello@greeac.co.nz for the digital version.

GREE ELECTRIC APPLIANCES,INC.OF ZHUHAI

To Users

Thank you for trusting Gree with your latest product purchase. Please read this instruction manual carefully before installation and use to ensure both your safety in the process and correct usage of our product. To guide you through the correct installation process and use of our product as to achieve its full expected operation performance, we have provided you with the following guidelines:

(1) This appliance is not intended for use by people (including children) with a lack of relevant experience and knowledge, unless they are under the supervision of or have been given instruction concerning use of the appliance by a sufficiently qualified professional responsible for their safety. Children should be supervised to ensure that they do not play with the appliance (in accordance with the IEC Standard).

(2) To ensure its continued reliability, the appliance may consume some power under standby status to maintain the normal communications of the system, and to preheat refrigerant and lubricant. If the product is not to be used for a long period of time, and/or you cut off the power supply, please energise and preheat the unit in advance before resuming use.

(3) Please properly select the right model in accordance with considerations of the environmental conditions it will be used in, otherwise its expected performance may be impacted.

(4) If the appliance needs to be installed, moved, or maintained, please contact our designated dealer or local service centre for professional support. Users should not disassemble or maintain the unit by themselves, otherwise they may cause relative damage. Our company bears no responsibility in instances of irresponsible user errors.

(5) All the illustrations and information in this instruction manual are for reference only. To continue to provide the best products possible, we regularly put effort into improvement and innovation. If there is an adjustment made to the appliance, please subject the appliance to said adjustment/s for continued performance excellence.

(6) If the power cable is damaged, it must be replaced by the service agent or a similarly qualified person to avoid hazards.

Exception Clauses

Manufacturers bear no responsibility when personal injury, property loss, or a product defect is caused by the following reasons:

(1) The product is damaged due to improper use or misuse.

(2) The product is altered, changed, maintained, or used with other equipment without abiding by the guidelines and safety considerations outlined in the instruction manual issued by the manufacturer.

(3) After verification, product defects are caused by corrosive gas.

(4) After verification, product defects are due to improper operation and/or handling during the transportation process.

(5) The product is operated, repaired, or maintained without following the instruction manual or related regulations.

(6) After verification, the problem or defect is caused by the quality specifications or performance of parts and components that are produced by other manufacturers.

(7) The damage has been caused by naturally occurring weather, a poor choice in and/or harsh environment for the placement of the product, or force majeure.

Contents

1 Safety Notices (Please Be Sure to Follow)

WARNING: If not strictly followed, this may cause severe damage to the unit or users/persons involved.

NOTICE: If not strictly followed, this may cause slight to medium damage to the unit or users/persons involved.

This sign indicates that the item must be prohibited. Improper operation may cause severe damage or death to users/persons involved.

This sign indicates that the item must be observed. Improper operation may cause damage to property or users/persons involved.

WARNING! The R290 Refrigerant

- For the unit to operate as expected, it requires the use of R290 refrigerant, a natural refrigerant which has been through a specialised cleaning process. The refrigerant is flammable and inodorous and can lead to explosions under certain conditions.
- When compared to more common refrigerants, R290 is a non-polluting refrigerant option that causes no additional harm to the ozonosphere. Its impact on global warming is also low (GWP 3). R290 has excellent thermodynamic features, which also lead to higher energy efficiency, meaning that the unit requires a smaller charge of refrigerant.
- The appliance is required to be stored in a place without continuously operating ignition sources: for example, open flames, an operating gas appliance, or an operating electric heater).
- The appliance is required to be stored in a manner that prevents mechanical damage from occurring.
- The appliance is required to be stored outdoors.
- The unit is equipped with electrically powered safety measures. To operate effectively, the unit must always be electrically powered after installation, except when being serviced.
- Ducts connected to the appliance must not contain an ignition source.
- Keep any required ventilation openings clear from obstruction.
- Do not pierce or burn.
- Be aware that refrigerants may not have an odour.
- Do not use any alternate means to accelerate the defrosting process or to clean the unit, other than those recommended by the manufacturer.
- Servicing must be performed only as recommended by the manufacturer.
- Should repairs be necessary, contact your nearest authorised service centre. Any repairs carried out by unqualified personnel may be dangerous.
- Compliance with national gas regulations must be observed.
- Read specialist's manual.




WARNING

The unit requires reliable earthing before usage. If the earthing is otherwise inadequate, injury or death may occur.

- If you cannot ensure that the property's power supply is correctly earthed, please do not install the unit.
- The unit must be installed by a licensed trade person and in accordance with:
  ① This Installation and 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 Building Codes of New Zealand.
  Local Occupational Health and Safety (OH&S) Regulations.
- The appliance may deliver water at high temperatures. 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, the appliance must be installed, operated, and maintained in accordance with the manufacturer's instructions.
- Do not use any alternate means to accelerate the defrosting process or to clean the unit, other than those recommended by the manufacturer.
- The appliance shall be stored in a place without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)
- Keep any required ventilation openings clear from obstruction.
- Do not pierce or burn.
- Be aware that refrigerants may not have an odour.
- The appliance cannot be installed in a corrosive, inflammable, or explosive environment, or a place with special requirements. If the appliance is installed in such an environment or place it will affect the normal operation and/or shorten the service life of the unit, or even potentially cause fire hazards or serious injury. As for the special places mentioned above, please acquire and use special products with anti-corrosive or anti-explosion functions.
- The air source heat pump water heater is a thermal storage water heater. The user must open the cold water valve first, and then gradually adjust both the cold water and hot water flow to the proper water temperature as to avoid scalding injuries. If you do not use the unit in winter for only a short period of time, please ensure that it is energised for the entirety of that time (24 hours). If you do not use the unit for a longer, extended period of time, discharge the water in the water tank and the pipelines to avoid the system freezing. If you find that the discharge process is too difficult and/or inconvenient, please contact our designated dealer or your local service centre directly, and we will appoint special staff to provide you with inspection, debugging, cleaning, and maintenance services.
- This manual is the installation manual for the integral air source heat pump water heater. For the usage method for controllers, users 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 heaters can store water at temperatures that can cause scalding. Water temperatures over 50℃ can scald, and great care needs to be taken to ensure that injuries do not occur due to incorrect use of your water heater.
- As the heat pump water heater can generate water temperature more than 50℃, regulations

WARNING

require that a thermostatic mixer tap be fitted to the heater to prevent the temperature of the water going to the home from exceeding the 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 authorised plumber at the time of installation, or in retrofitting to existing systems.

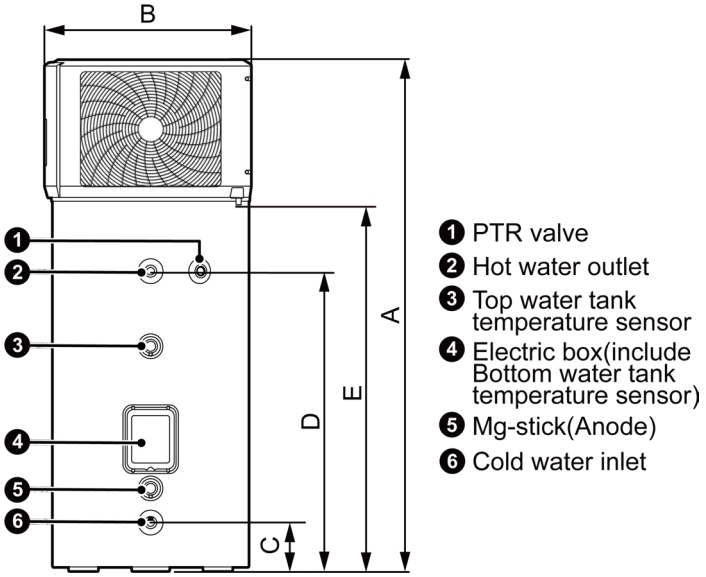
- Care should be taken to avoid coming into contact with any pipework or fixtures associated with the water heater pipelines. Under NO circumstances should any 'home handyman'-type modifications be attempted.

  DANGER: Failure to operate the relief valve easing gear at least once every 6 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 of the appliance 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.
- The appliance does not have an engineering installed supplementary heater. A supplementary heater is available as an additional component. The minimum clearance from the appliance to combustible surfaces must be at least 1.5m.

2 Product Information

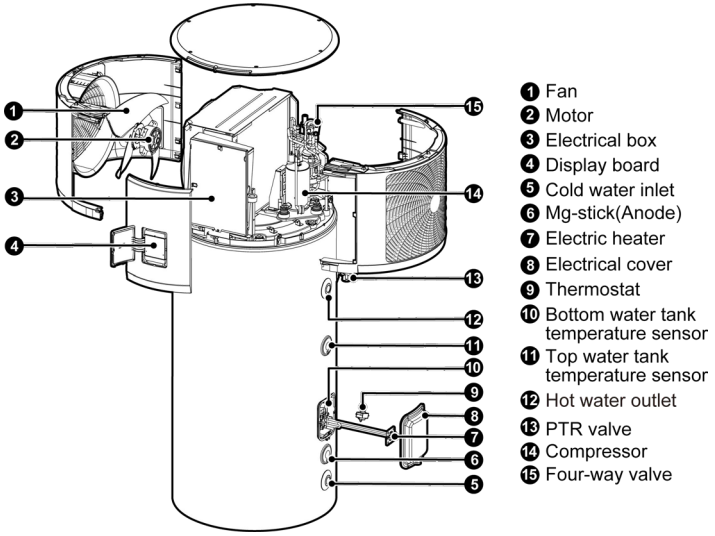
2.1 Product Schematics

Unit: mm



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℃~70℃	35℃~70℃
Heat pump operating range	-7~45℃	-7~45℃
Inlet/Outlet connector diameter	DN15	DN15
Waterproof 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:

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

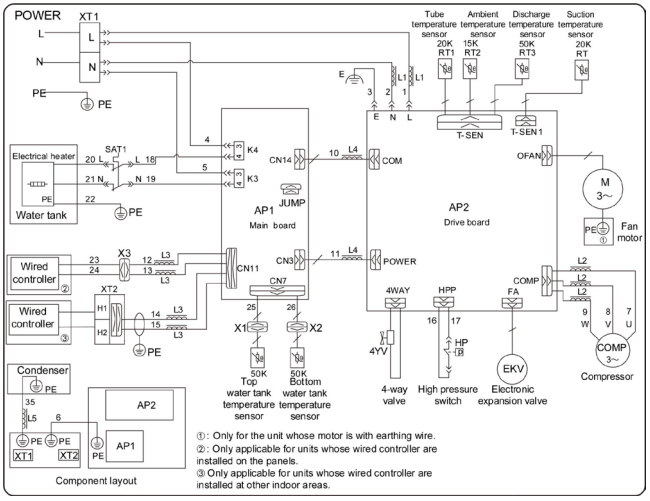
②Test conditions: Outdoor ambient temperature 20/15℃ (DB/WB); water temperature from 10℃ up to 55℃.

③Under BOOST mode, the electric heater helps to heat water.

④Please 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 upgrades, please refer to the electrical schematic diagram which is affixed on the unit.



3 Safety Information

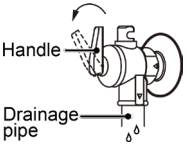
Please thoroughly read all of the instructions before installing and operating the unit.

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 people should install the unit, and they must do so in accordance with local and national regulations, as well as this guide.
- Improper installation may result in water leakages, electric shocks, or fires.
- All electrical connections should comply with the regulations of your local power company, local electric utility company, 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 a high speed and can cause injuries.
- Never use a flammable spray such as hair spray or lacquer paint near the unit. It can cause a fire.
- This appliance is not intended for use by people (including children) with a lack of relevant experience and knowledge, unless they are under the supervision of or given instruction concerning use of the unit by a sufficiently qualified 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. Instead, please 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 to prevent water inside the pipe from freezing in cold weather.



- If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and cause serious health concerns.
- The unit must be securely fixed, otherwise to prevent unnecessary noise and vibration from occurring.
- Ensure that there are no obstructions around the unit.
- In places where there are strong winds, fix the unit in an area that is protected from the wind.

NOTICE

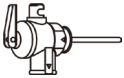
- The earthing pole must be well earthed. Make sure that any power supply socket and plug are dry and connected tightly.
- Before cleaning, be sure to stop all operation and isolate the unit (i.e. turn off the isolation switch or the breaker), otherwise an electric shock and/or injury may occur.
- Water temperatures over 50 ℃ can cause serious burns, and even death from severe scalds. Always feel the 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. However, if there is a large volume of water present, call our service team immediately for further advice. After long term use, check the unit base and fittings. If damaged, the unit may sink, resulting in injury. Arrange the drainpipe 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 and/or harm.
- Do not turn off the power supply except for service and maintenance purposes. A continuous power supply is necessary for water heating.
- 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 is likely that it will make an unusual sound due to the air escaping.
- The instructions for closed water heaters incorporating a heat exchanger will 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 that the following items are included:

	**Main Unit** The main unit, including the heat pump and storage tank.
	**PTR Valve** Pressure temperature relief valve (may be pre-fitted).
	**Condensation Tube** Used for draining condensation from the unit.
	**Owner's Manual** In-depth installation and maintenance details on the appliance.
	**Owner's Manual (Controller)** In-depth control descriptions and details on the appliance.

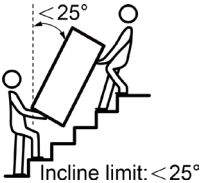
4.2 Transporting

The following should be adhered to when transporting the unit:

(1) Do not incline the unit more than 25° from a vertical position when moving and keep it vertical when installing.

(2) Avoid scratching or damaging the unit by using protective coverings where applicable.

(3) As the unit is heavy, it needs to be carried by two or more people to avoid injury and/or damage.



4.3 Location Requirements

The following considerations should be addressed when deciding on a suitable location:

(1) The unit is required to be installed outside. It is IPX4 rated, ensuring protection against water splashes from any direction, and the ABS plastic is UV stabilised for protection against direct sunlight. If possible, installation under a sheltered area such as in a carport or under the eaves of the building will provide extra protection from temperamental weather conditions. Additionally, avoiding installation in low lying places where water may accumulate will further

guarantee protection of the unit.

(2) Ensure that there is enough space for both installation and any future maintenance.

(3) Both the air inlet and outlet should be free from any obstacles.

(4) The base surface should be level, stable, and impervious (i.e. have no more than a 2° incline; be designed and located to avoid ponding) and comply with local building and plumbing codes to assure that no issues will arise regarding increased noise and/or vibration.

(5) The base surface must: be made of bonded brick or concrete cast situ with a thickness of no less than 75mm; or pre-cast concrete with a thickness of no less than 50mm; on a platform of timber or other suitable/no less durable material (in accordance with AS/NZS 3500.4:2025).

(6)

(7) Operating noise and expelled air flow should not affect others.

(8) Ensure that no flammable gas is nearby.

(9) Positioning should be convenient for plumbing and wiring.

(10) The unit must be installed outside. Do not, under any circumstances, install the unit inside.

(11) If the unit needs to be installed on a metal part of the building, make sure that the electrical insulation meets the relevant local standard.

(12) Securely fixing the unit will assist in avoiding unwanted noise and/or vibration.

NOTICE

- Consideration must also be made in regard to the ambient air temperature. Heat pump operates between ambient air temperatures of -7℃ and 45℃. Temperatures below this range will rely purely on the electric heater and the heat pump economy mode will not operate.

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

(1) Places with strong wind and/or other high heat sources (if there is no way to avoid these, a cover may be required).

(2) Sites that contain mineral oils (e.g. lubricants 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.

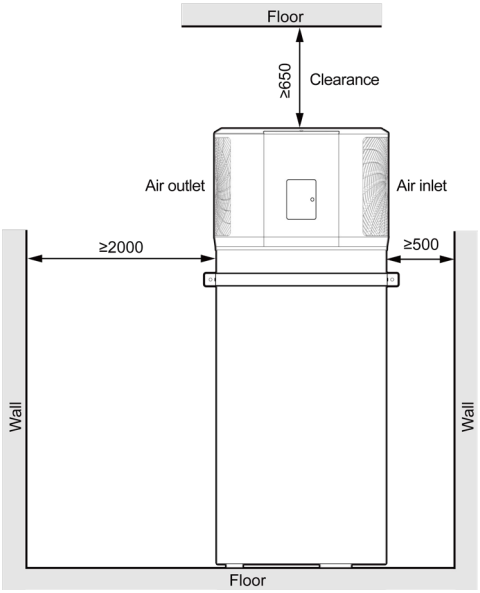
(8) Areas where flammable gases or materials exist. (The recommended minimum distance from flammable materials is 1.5m.)

(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

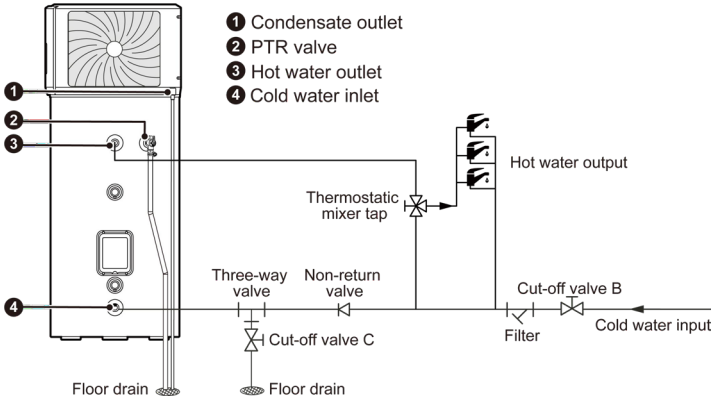


Figure 5.1-1 System Installation Diagram

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 and heat retention.
- If the water supply pressure exceeds the rated pressure, a reduction valve should be installed in the water inlet line. The recommended inlet water pressure range is 0.2~0.5MPa. The recommended inlet water temperature range is 6~55℃.
- If the water pressure is less than 0.2MPa, a pump should be installed at the water inlet.
- If the water pressure exceeds 0.5MPa, a reduction valve should be installed in the water inlet line to guarantee the safe usage of tanks.
- Water pipes are allowed to be routed only after the unit has been installed properly. Ensure that dust or other foreign matter does not enter the pipe system.
- When all the pipes have been placed, carry out a leak test and then insulate them. Special attention should be paid to the valves and joints. The insulation material must 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 an explosion and/or injury.
- The valve or drain valve outlet pipe must not be sealed or blocked.
- To ensure water safety, the use of insulated plastic pipes such as PPR pipes is recommended. The PPR pipe length at the water inlet and outlet is determined as per the formula: $L \geq 70 \times R^2$, wherein L indicates the pipe length, and R indicates the inner diameter of the pipe (unit: cm). The pipes should be insulated properly.


EXPLOSION

5.2 Installation Requirements

(1) The unit must be installed upright on the appropriate base surface described in section 4.3 Location Requirements. Do not point the air outlet in an upwind direction.

(2) It is highly recommended to install the unit in places with average temperatures above 0℃. Hot water outlets must not be located too far from hot water use sites. Arrange the pipeline together and conduct thermal insulation treatment to the hot water pipeline to decrease heat capacity loss. If the unit is installed in places with average temperatures below 0℃, conduct thermal insulation treatment to the water inlet and outlet to prevent the water pipe and the PTR valve from getting frozen under low temperatures, which will result in malfunction.

(3) If a weather shed is set up to provide additional protection for the unit, be sure that heat release and heat absorption by the heat exchanger will not be affected.

(4) There should be water sources and a floor drain near the unit so that the process of filling and draining the water tank is easier.

(5) Be sure that the condensate pipe and the pressure relief device drainpipe are tightly and reliably connected, and lead to the floor drain.

1) The pressure relief device must be connected to the PTR valve inlet.
2) Water may drip from the discharge pipe of the pressure relief device; 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) The discharge pipe connected to the pressure relief device is to be installed in a continuously downward direction, in a frost-free environment.

(6) If the unit is to be installed in a small space, subsequent measures must be taken to prevent refrigerant concentration in the space from exceeding the limit value due to refrigerant leakage, which can result in anoxia or suffocation.

NOTICE

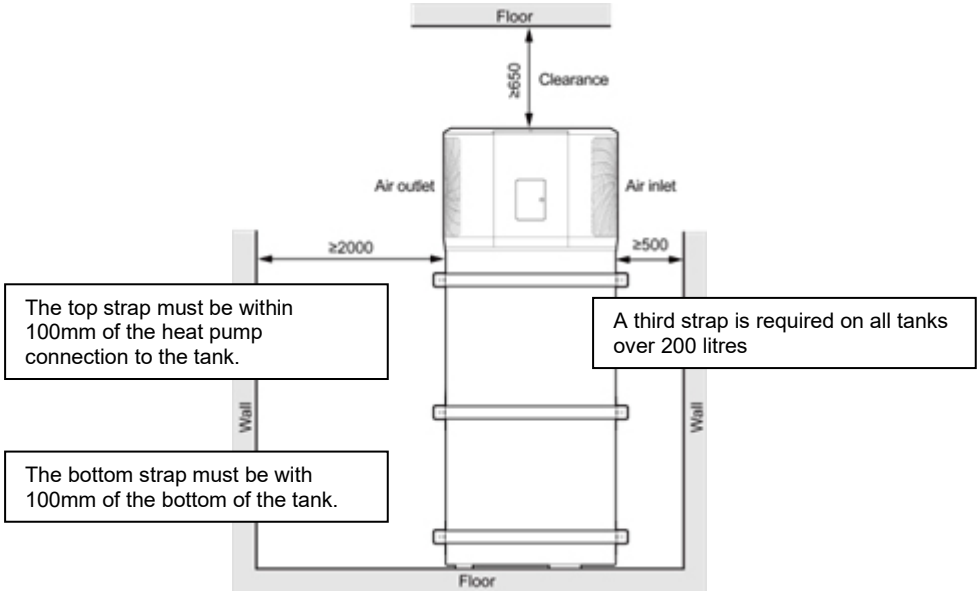
- The unit also shall be fixed to wall with clamping bands in case of tilt in some unusual occasions like earthquakes.
- If water supply is of high salinity or inferior quality, please add proper filtering as necessary.
- The water quality for the air source water heater should comply with the local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

pH (25℃)	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)	17.5~120	Nitrate (calculated in N)/(mg/L)	<10
Conductivity (25℃)/(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 Codes of Australia and New Zealand.
- 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.

(7) In accordance with the requirements of the New Zealand Building Code, the unit must be properly restrained against seismic forces/movement.

1) Proper restraint of the unit includes the installation of a suitably sized vertical blocking (with minimum clearance of the unit from the wall in mind) that extends to the full height of the water heater, which is to be affixed to the wall framing. Make sure that the vertical blocking does not obstruct any crucial features (inlets, outlets, and controls; the concealment of visible drains and discharge points; and points of access for future maintenance).
2) The installation of three galvanised steel straps is also required to be securely fixed to the wall framing with a sufficient amount of tension. Take care to avoid causing damage to the casing of the unit and ensure that the location of each strap does not obstruct any crucial features as mentioned above. The three straps should be installed as follows:
    - The top strap: must be within 100mm of the heat pump connection to the water tank.
    - The bottom strap: must be within 100mm of the bottom of the water tank.
    - The middle strap: is required on all water tanks exceeding 200 litres, and should be installed at the midpoint between the top and bottom straps.
3) Should the specified strap distance from the top or bottom not be viable, straps can be installed within the top and bottom 25% of the water tank, with two additional evenly spaced straps for water tanks between 200-360 litres (only one additional strap is required for water tanks below 200 litres).
4) See the diagram below (Figure 5.2-1) and refer also to Figure 14 and Paragraph 6.11.4 of the NZBC Acceptable Solution G12/AS1 for further guidance.



5.3 Water Pipe Connections

5.3.1 Pipe Preparation

The unit is intended to be permanently connected to the water mains, and not to be 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 that a suitable isolation and non-return valve is included.

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

NOTICE

- The isolation and non-return valves 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 the 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 shown in the installation diagram, you must add a tee joint in the cold-water inlet pipe and then connect the drainpipe. The drainpipe and the floor drain must be lower than the bottom of the water tank, otherwise water will be prevented from being discharged completely. An isolation valve must be installed in the drainpipe, and in a place that is accessible to the user.

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) The unit falls under the category of Class I equipment, and as such must be earthed reliably to the special earthing device by skilled personnel only.

(2) Ensure that a switch for two-pole disconnection is available for the fixed lines, and that it is directly connected to wiring terminals of the power supply. Ensure that the contactor opening distance on all poles meets the disconnection requirements under overvoltage category III conditions.

(3) A circuit breaker with enough capacity should be used in the fixed circuit.

(4) Please take reliable measures when earthing. Earthing should be set in special earthing devices.

(5) The power supply must comply with the corresponding nameplate and be on a separate power circuit for an air-to-water heat pump which is compatible with water heaters.

(6) Do not pull the power lines by force.

(7) Wiring must be installed in accordance with the national rules.

(8) If the power cable is damaged, it must be replaced by a suitably qualified tradesperson according to local wiring standards.

Table 5.4.1-1 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 ℃ . The specification of the circuit breaker listed above is for the type D circuit breaker used at 40℃.
- 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 to 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.)

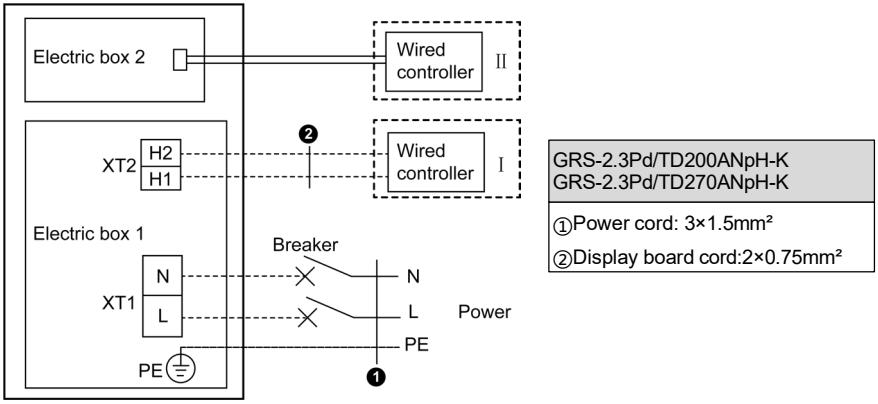


Figure 5.4-2 External Wiring

5.4.3 Electrical Wiring and Connection Requirement

(1) Check that you have the proper power cable according to the power configuration table and then connect it to the main power.

(2) Make sure that the power cable is fixed to the power supply device.

(3) Ensure that the two-pole disconnection device has at least 3mm clearances in all poles, with have a leakage current that may exceed 10mA; that the residual

current device (RCD) has a rated residual operating current not exceeding 30mA; and that the disconnection device is incorporated in the fixed wiring in accordance with local wiring rules.

(4) The type parameter of the fuse is T3.15AH 250V.

(5) After completing the 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 the wiring connection for the external unit, the communication cord of the wired controller should be separated from the power cord. The minimum distance between the parallel wires should be greater than 20cm. Otherwise, the communication of the unit might be abnormal. The strong and weak wires should be covered separately with wire sleeves.

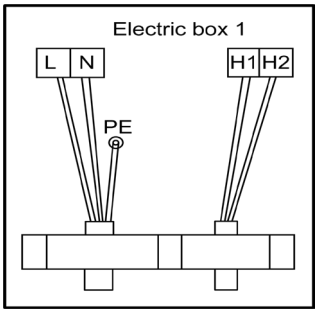


Figure 5.4-3 External Wiring and Fixing Figure

5.4.4 Thermostat Reset Operation

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

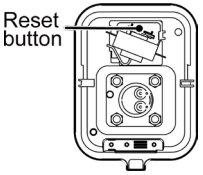


Figure 5.4-3 Thermostat Reset Button Diagram

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 wired 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 should not be more than 8m.

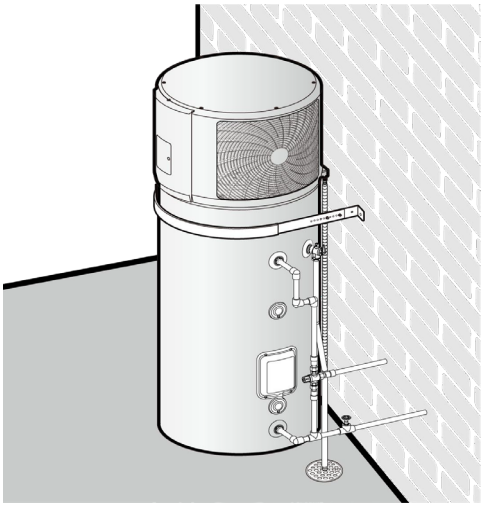
For the detailed installation method of the wired controller, please refer to the manual for the wired controller.

5.5 Installation Checklist

Location
■ The flooring beneath the water heater is able to support the weight of the water heater when filled (see section 4.3 Location Requirements for base surface guidelines). ■ 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
■ The pressure and temperature relief valve is properly installed with a discharge pipe plumbed to a suitable drain. ■ All piping is properly installed and free of leaks. ■ The unit is filled with water. ■ The thermostatic mixer tap has been installed per manufacturer’s instructions. ■ The condensate drain line is installed and plumbed to a suitable drain. ■ All hot water lines are appropriately insulated.
Electrical Connections
■ 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 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 damage to the auxiliary electric heater. In cases of such damage caused by this issue, the manufacturer will not be liable for any of said damage.

- 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 the air in the system is bled out, 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 a water recharge. Ensure that there is no water leakage in the pipelines, joints, etc.

(2) Energisation of the whole unit: after the unit is energised, observe whether the display of the wired controller is normal. If there is no fault, it is normal.

(3) System time calibration of the 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 criteria: 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: a heat pump (compressor) and an 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 results in longer heat-up times because of lower effective performance.

It will start up the auxiliary electric heater with 2,000W to heat alongside the heat pump when the ambient temperature is under -15℃， or when using the BOOST function.

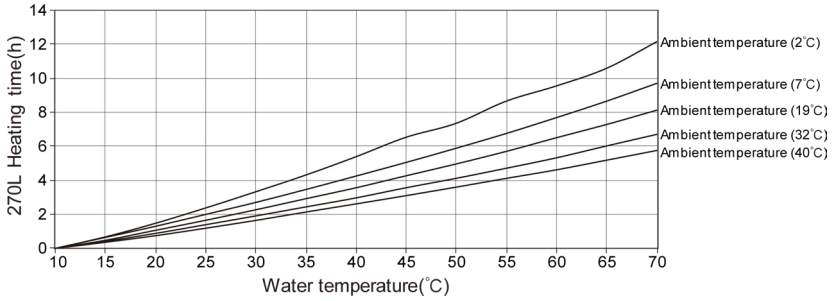
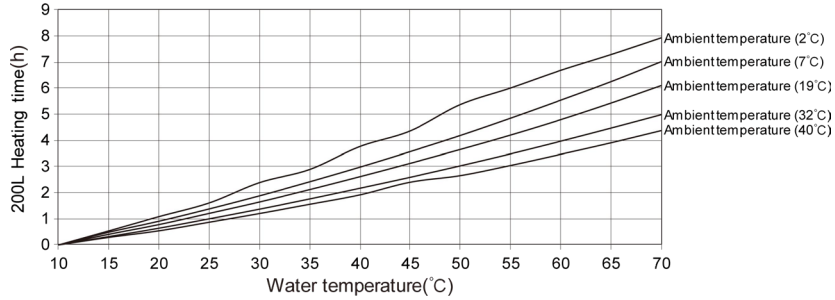


Figure 6.3-1 GRS-2.3Pd/TD270ANpH-K heating time to different hot water target temperatures for different ambient temperatures（heat pump only）



NOTES:

①The above curve data is fitted based on the test parameters of the Gree Laboratory. The test conditions are as follows: Initial water temperature: 10 ℃, power supply: 230V ~ 50Hz; in a new unit with clean heat exchangers and in auto water heating mode. There will be approximately a 5% tolerance.The curves are for reference only.

②In BOOST mode, the electrical heater and heat pump will operate together to provide heating. The heating time of GRS-2.3Pd/TD270ANpH-K and GRS-2.3Pd/TD200ANpH-K will be decreased. Likewise, the COP will decrease, but power consumption will increase.

6.3.2 Running Performance

(1) Defrost:

1) The unit will automatically perform defrosting to improve heating efficiency.
2) During defrosting, the fan motor will stop.
3) If defrosting occurred under a high temperature (>15℃) and the unit is functioning abnormally, please submit for inspection.

(2) Starting up again after long-term shutdown:

When the unit has not been used for a long period of time and is started up again (including the first startup), dirty water will flow out from tap faucet. This is a normal phenomenon and will disappear after a while.

(3) Power failure:

1) When power failure occurs during operation, the unit will stop.
2) The displayer has a memory function.
3) Please switch off the power when the unit malfunctions due to bad weather. Then turn on the unit again.

(4) Memory function:

Before powering off, the display will automatically memorise the ON/OFF status; when it is re-energised, the controller will send an ON/OFF signal to the unit according to the status memorised before the power went 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℃~70℃. By default, the water temperature is set to 60℃. 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 startup condition between the top water tank temperature sensor and the set target temperature (200L: the default temperature dead-band is 19℃; 270L: the default temperature dead-band is 16℃).

(2) When the BOOST function is activated, both the heat pump and the electric

heater will stop operating simultaneously once the top water tank temperature sensor reaches the set target temperature. They will start operating again simultaneously when the temperature difference meets the startup 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 the heat pump operating range, the heat pump will stop running. Then, if the ambient temperature increases back into the running range of the heat pump, the heat pump will restart running automatically. The unit is equipped with a sterilisation function, allowing users to freely set the sterilisation cycle and duration. After the sterilisation time is reached, the heat pump will heat the water to 70℃ for sterilisation (the water temperature above 45% of volume is higher than 60℃). In default mode, sterilisation is achieved by heating the upper 45% of the tank water to 60℃ via the heat pump each day. For detailed operation 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. Use of the factory default settings is recommended.

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 automatically defrost 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 self-protection mode activates, the system will stop 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 several 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 event 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

During the process of unit maintenance, please contact our designated dealer or local service centre when maintaining or replacing related components.

7.1 Checking/Replacing the Mg-Stick (Anode)

(Frequency: every 12 months - replace if required.)

The Mg-stick (anode) protects the inner tank of the 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 the water tank is designed for normal quality water. When using more corrosive water, the Mg-stick should be 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 and open a hot water tap.

(3) Open the drainage pipe valve and wait for the water to be discharged.

(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, unscrew the Mg-stick, and extract it directly.

(8) Check the Mg-stick: if it is in an unsuitable condition, replace it with a new one.

(9) Restitute the unit and debug again.

NOTICE

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

7.2 Cleaning the Inner Tank and Electric Heater

(Frequency: every 12 months.)

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 and open a hot water tap.

(3) Open the drainage pipe valve and drain out all the water in the inner tank. If it is needed, use water to wash the inner tank several times to clear the deposits.

(4) Close the drainage pipe valve, refill 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 does not 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 and release some water from the tank.

NOTE: Water expelled may be extremely hot.

(3) If water flows freely, the PTR is still in a suitable working condition.

(4) If water does not flow freely, then the PTR valve is due for a replacement.

(5) If the PTR valve needs replacing, please request further assistance.

7.4 Water Input and Drainage

The water input and drainage of the unit should be followed up throughout the process to avoid water leakage accidents caused by incorrect operation. Please refer to the installation instructions marked on the water tank.

7.5 Safety Notices While Moving the Unit

(1) Before starting the compressor, make sure that the water pipe is safely connected and that the water tank is full, otherwise malfunction may occur.

(2) The unit's wiring connection must use the specified electric wire with the correct connection. The wiring terminal must not be directly affected by external forces and be reliably fixed. Improper connection or fixing may cause fire hazards.

(3) There must be no connection in the intermediate electrical wire. If the length of electrical wire is not enough, please equip a specialised electrical wire with enough length.

7.6 Other Maintenance Checks

(1) Regularly check the electrical wiring for any damage and request maintenance if damage is evident.

(2) If the unit is to be stopped for a long period of time in a cold area (below 0℃), all the water in the tank should be released, and then 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) If the unit has not been used for a long period of time, or at quite low temperatures during winter, energise it at least 8 hours ahead.

(2) Do not disconnect the power supply when the temperature outdoors is quite low during winter, otherwise the automatic antifreeze protection will fail to work. Under low ambient temperatures, the anti-freezing operation function of the unit will conduct heating for anti-freezing before the water temperature of the water tank comes near to freezing point and stops if the water temperature of the water tank rises to a safe temperature. However, the auto anti-freezing operation function of the water tank is invalid for the water inlet/outlet pipe of the water tank. If the ambient temperature of the unit's installation location is below 0℃, a pipeline anti-freezing tracing belt must be installed. Ensure that the belt is energised.

If the water tank is installed in a climate that reaches temperatures below 0℃, shorten the outdoor piping length as much as possible, including the water tank's refrigerant connection pipe and water inlet pipe, to reduce the unit's heat dissipation loss and to lessen the chances of the power consumption and the water system freezing. Special attention should be paid to the thermal insulation blind spots –located on the local valve connection and the water pipe curve.Strengthen the thermal insulation to prevent the local pipe from being frozen.

(3) When the unit is not going to be used for a long period of time, drain the water tank and the pipe according to the discharge operation, otherwise the water system could get damaged. After draining the water, when the unit is ready to be used again, ensure that the water tank is fully filled before starting it up. Please refer to the water input and drainage operation of the water tank.

Warm hint
■ If it's not convenient for operation or if there's a 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 user comfort, it is suggested to use hot water with a flow rate of 6~7L/min.

(2) Users should regularly check the unit and carry out routine maintenance .

(3) Make sure the power supply is cut off prior to any maintenance or services. Only qualified professionals are allowed to adjust or service the unit. Do not allow anyone who is not a professional carry out work on the unit.

(4) Improper operation can cause scalds due to contact with hot water. Water heating, when carried out without enough water, can produce high-temperature steam or hot water with the potential to cause serious scald injuries. Make sure the water tank is filled with water before operation to avoid this.

(5) It is forbidden to block the exhaust hole of the floor drain.

(6) The water heater is equipped with a PTR valve for reliable operation. Please do not change its location and never block its outlet. The pipe should be directly connected to a floor drain. PTR valve type: PTR 20 850; characteristics: operating pressure 850kPa, operating temperature 93~99 ℃, rating power 45kW.

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.

To prevent any hazards occurring due to invalidation of the electric heating of the water tank, the electric heating circuit is equipped with a thermostat. If the water temperature is higher than 85℃, the thermostat will be activated and will cut off the electric heating power. However, if the electric heating is abnormal, please put in a request for maintenance.

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 Requirements for Maintenance Persons (Repairs Should be Done Only by Qualified Trades People)

(1) Any person who is involved with working on or connecting 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 should only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel must be carried out under the supervision of a qualified professional competent in the handling 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 repairing the refrigeration system, the following precautions must be complied with prior to conducting any work.

10.3.1 Work Procedure

Work should be undertaken under a controlled procedure to minimise the risk of 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 should be instructed on the nature of work being carried out. Work in confined spaces must be avoided. The area around the workspace must be sectioned off. Ensure that the conditions within the area have been made safe by keeping control of any flammable material.

10.3.3 Checking for Presence of Refrigerant

The area should be checked with an appropriate refrigerant detector prior to and during work to ensure the technician is aware of potentially toxic or flammable atmospheres. Make sure 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 a Fire Extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment must be available on hand. Have a dry powder or CO_2 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 pipework should use any sources of ignition in such a manner that may lead to the risk of fire and/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 must be displayed.

10.3.6 Ventilated Area

Ensure that the area is open, or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation should be continuous 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 of the Refrigeration Equipment

Where electrical components are being replaced, they should be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines must be followed. If in doubt, consult the manufacturers' technical department for assistance.

The following checks must be carried out during installations using flammable refrigerants:

(1) Check that the actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.

(2) Check that the ventilation machinery and outlets are operating adequately and are not obstructed.

(3) Check if an indirect refrigerating circuit is being used. If so, the secondary circuit must be checked for the presence of refrigerant.

(4) Check that marking to the equipment continues to be visible and legible. Markings and signs that are illegible must be corrected.

(5) Check that refrigeration pipes 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 must include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply should be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but is necessary to continue operation, an adequate temporary solution shall be used. This should be reported to the owner of the equipment, so all parties are properly informed.

Initial safety checks must include:

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

10.3.9 Repairs to Sealed Components

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

Particular attention should 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 offered is affected. This includes 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 must 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 in the presence of an actively flammable atmosphere. The test apparatus must be at the correct rating.

Only replace components 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. Consider also the effects of aging or continual vibration from sources such as compressors or fans.

10.3.12 Detection of Flammable Refrigerants

Under no circumstances should 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) must never 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 must 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 must be set at a percentage of the LFL of the refrigerant and must 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 should be avoided as the chlorine may react with the refrigerant and corrode the copper pipework.

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

If a leakage of refrigerant is found which requires brazing, all the refrigerants should 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) should 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 should be used. However, for flammable refrigerants, it is important that best practice is followed since flammability is a serious consideration. The following procedure must be adhered to:

(1) Remove the 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 should be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants, the system should be flushed with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen must 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 is vented to the atmosphere, and finally pulled down to a vacuum. This process should be repeated until no refrigerant is within the system. When the final OFN charge is used, the system should 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 must be followed:

(1) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines should be as short as possible to minimise the amount of refrigerant contained in them.
(2) Cylinders must 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 labelled).

(5) Extreme care should be taken not to overfill the refrigeration system.

Prior to recharging the system, it must be pressure tested with the appropriate purging gas.

The system must be leak tested on completion of charging but prior to commissioning. A follow up leak test should 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 details. It is both highly recommended and good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample should be taken in case analysis is required prior to reuse of reclaimed refrigerant. It is essential that electrical power is available before the task commences.

(1) Become familiar with the equipment and its operation.

(2) Isolate the 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 always supervised by a competent person.
   4) Recovery equipment and cylinders conform to the appropriate standards.

(4) If possible, pump down the refrigerant system.

(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 the 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 the 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 promptly removed from site, and all the isolation valves on the equipment are closed off.

(11) Recovered refrigerant must not be charged into another refrigeration system unless it has been cleaned and checked.

10.3.17 Labelling

Equipment must be labelled stating that it has been decommissioned and emptied of refrigerant. The label must 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 both highly recommended and good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, make sure 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 must be designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders should be complete with the pressure-relief valve and associated shut-off valves in good working order. Ensure that empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment should be in good working order with a set of instructions concerning the equipment on hand and must be suitable for the recovery of all appropriate refrigerants, including (when applicable) flammable refrigerants. In addition, a set of calibrated weighing scales should be available and in good working order. Hoses should 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. If in doubt, consult the manufacturer.

The recovered refrigerant should 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 guarantee that flammable refrigerant does not remain within the lubricant. The evacuation process must be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body should be employed to accelerate this process. When oil is drained from a system, it must be carried out safely.

11 Product Troubleshooting

Error code	Error name	Possible causes	Solution
E1	System high pressure protection	The temperature sensor of the water tank of the unit is not inserted in place; The unit is not filled with water; The wire of the pressure switch is loose; The charged refrigerant is too excessive; The pressure switch is faulted; The main board is faulted; The heat exchange of the unit's water tank is abnormal; There is too much dirt in the water tank of the unit and the water tank needs to be cleaned.	The unit will recover by re-energisation after troubleshooting.
E4	Exhaust protection	The resistance of exhaust temperature sensors is abnormal; The 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.	The unit 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 abnormal; Reversing of the 4-way valve is abnormal; The refrigerant of the unit leaks or the refrigerant is insufficient.	The unit will recover via re-energisation after troubleshooting.
C5	Malfunction of jumper cap	The jumper cap is wrong; The jumper is poorly connected.	

Attachment: Error Information Table

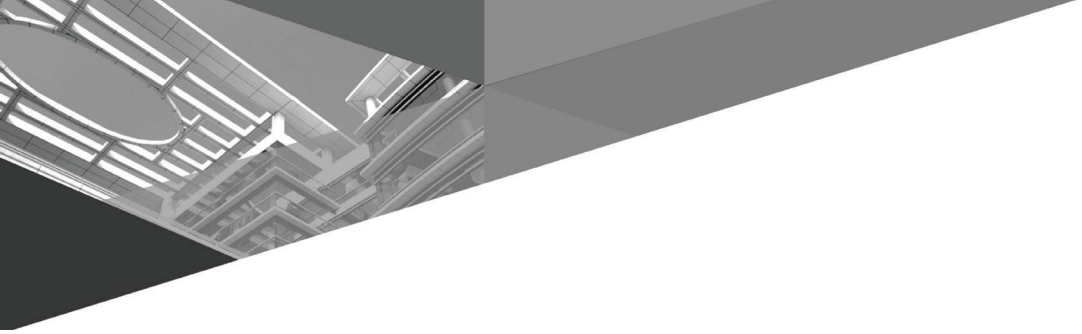
Appendix table 1-1 Common error information

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

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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