



Owner's Manual

Original Instructions

Heat Pump Pool Heater

Models:

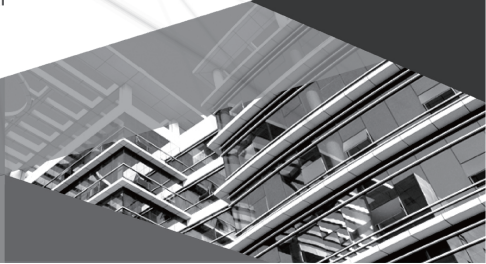
GRS-CP11Pd/NhA-D

GRS-CP18Pd/NhA-D

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.
- (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 the 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.

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 Them)

SPECIAL WARNING:

- (1) Be sure to comply with national gas regulations.
- (2) Do not pierce or burn.
- (3) Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- (4) Be aware that refrigerants may not contain an odour.
- (5) 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).

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

WARNING

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 unit with anti-corrosive or anti-explosion function.

CAUTION

Elevated water temperature can be hazardous, The U.S. Consumer Product Safety Commission has these guidelines:

- (1) Spa water temperatures should never exceed 104°F(40°C). A temperature of 100°F(38°C) is considered safe for a healthy adult. Special caution is suggested for young children.
- (2) Drinking of alcoholic beverages before or during spa or hot tub use can cause drowsiness which could lead to unconsciousness and subsequently result in drowning.

- (3) Pregnant Women Beware! Soaking in water over 102°F(39°C) can cause fetal damage during the first three months of pregnancy resulting in the birth of a brain-damaged or deformed child.
- (4) Before entering the spa or hot tub, users should check the water temperature with an accurate thermometer; spa or hot tub thermostats, may err in regulating water temperatures by as much as 4°F(2.2°C).
- (5) Persons with a medical history of heart disease, circulator problems, diabetes, or blood pressure problem should obtain a physician's advice before using pools or hot tubs.
- (6) Persons taking medications which induce drowsiness, such as tranquilizers, antihistamines, or anticoagulants, should not use spas or hot tubs.

Please read this operating manual carefully before operating the unit.



A2L The unit is charged with inflammable refrigerant R32 (GWP: 675).



Before using the unit, please read the instruction manual.



Before installing the unit, please read the instruction manual.



Before repairing the unit, please read the instruction manual.

The figures in this manual may be different with the material objects, please refer to the material objects for reference.

CAUTION

- | | |
|-----|--|
| (1) | The unit should be grounded to avoid electric shock. Do not connect the ground wire to gas pipe, water pipe, lightning arrester or telephone wire. |
| (2) | It is forbidden to change the power cord, socket or grounding mode without authorization. |
| (3) | Please cut off the power supply immediately in case of abnormal conditions (such as burning smell). |
| (4) | The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation. |
| (5) | This unit is not suitable for use in places with strong magnetic field, high salinity, high acidity and extremely unstable voltage. |
| (6) | The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater). |
| (7) | According to federal/state/local laws and regulations, all packages and transportation materials, including nails, metal or wooden parts, and plastic packing material, must be treated in a safe way. |
| (8) | The power supply voltage of the unit must be between 180V and 264V. Otherwise, the unit may fail to operate normally. |
| (9) | Please do not place hands into the outlet of the swimming pool heater, and do not remove the heater screen at any time. |

WARNING

- | | |
|------|---|
| (1) | Please install according to the instructions. The installation work must be carried out by professional installation personnel. |
| (2) | 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 authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment specification. |
| (3) | 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. |
| (4) | Please cut off the power supply during maintenance. |
| (5) | The appliance shall be installed in accordance with national wiring regulations. |
| (6) | The fixed wires connecting to the appliance must be configured with all-pole disconnection device under voltage grade III according to wiring rules. |
| (7) | The unit should be stored with protective measures against mechanical damage caused by accident. |
| (8) | It is forbidden to stand or place articles on the unit. |
| (9) | If the installation space for unit pipe is too small, adopt a protective measure to prevent the pipe from physical damage. |
| (10) | During installation, use the specialized accessories and components, otherwise water leakage, electric shock or fire hazard may occur. |
| (11) | Please install the unit in a secure place that can withstand the weight of unit. Insecure installation may cause the unit falling down and lead to injury. |
| (12) | Be sure to adopt independent power circuit. If the power cord is damaged, it must be repaired by the manufacturer, service agent or other professional agents. |
| (13) | The unit can be cleaned only after it is turned off and power-disconnected, otherwise electric shock may occur. |
| (14) | The unit is not intended to be cleaned or maintained by children without supervision. |
| (15) | Do not alter the setting of pressure sensor or other protective devices. If the protective devices are short-circuited or changed against rules, fire hazard or even explosion may occur. |
| (16) | Do not operate the unit with wet hands. Do not wash or sprinkle water on the unit, otherwise malfunction or electric shock will occur. |
| (17) | If the unit is to be installed in a small space, please adopt protective measures to prevent the concentration of refrigerant from exceeding the allowable safety limit; Excessive refrigerant leakage may lead to explosion. |
| (18) | When installing or re-installing the unit, please keep the refrigerant circuit away from substances other than the specified refrigerant, such as air. Any presence of foreign substances will cause abnormal pressure change or even explosion, resulting in injury. |
| (19) | Only professionals are allowed to carry on daily maintenance. |
| (20) | Before contacting any wire, make sure power is cut off. |
| (21) | Do not let any inflammable objects near the unit. |
| (22) | Do not use organic solvent to clean the unit. |
| (23) | If you need to replace a component, please ask a professional to repair with a component supplied by the original manufacturer so as to ensure the unit's quality. |

⚠ WARNING

- (24) Improper operation may get the unit broken, hit by electric shock or cause fire.
- (25) Do not make the unit wet or electric shock may be lead, ensure that the unit will not be cleaned by water rinsing under any circumstance.
- (26) Once the unit is started, it must be operated for at least 6 minutes before shutdown, otherwise the service life of the unit will be affected. Do not manually start and stop the unit frequently.
- (27) When using this product in winter (the temperature may be lower than 0°C), please ensure that the unit is always powered on; If it is not used in winter or the unit fails to use due to failure, please be sure to drain the water in the unit and pipeline immediately after power failure to prevent the system from freezing and cracking.
- (28) Keep ventilation openings clear of obstruction.
- (29) The inlet and outlet pipes connected to the unit must be made of insulation, and the length must be $\geq 1.5\text{m}$.
- (30) Protection devices ,piping ,and fittings shall be protected as far as possible against adverse environmental effects ,for example ,the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris .
- (31) Steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation.
- (32) Flexible pipe elements shall be protected against mechanical damage excessive stress by torsion ,or other forces ,and that they should be checked for mechanical damage annually.
- (33) Precautions shall be taken to avoid excessive vibration or pulsation.
- (34) This unit is designed for outdoor installation. It is NOT certified for indoor installation. DO NOT install it in an enclosed area such as a shed or garage, or under a porch or deck.



This marking indicates that this product should not be disposed with other household wastes throughout the U.S. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

NOTICE

- (1) Do not put a finger or other objects into the air inlet or air return grill.
- (2) Please adopt safety protection measures before touching the refrigerant pipe, otherwise your hands may be hurt.
- (3) Please arrange the drain pipe according to the instruction manual.
- (4) Never stop the unit by directly cutting off the power.
- (5) Never install the unit in the following places:
 - 1) Places with oil smoke or volatile liquid: plastic parts may deteriorate and fall off or even cause water leakage.
 - 2) Places with corrosive gas: copper pipe or the welding parts may be corroded and cause refrigerant leakage.
- (6) Adopt proper measures to protect the outdoor unit from small animals because they may damage the electric components and cause malfunction of the unit.
- (7) Do not replace accessories on your own. It is recommended to conduct regular inspection and maintenance every year. Please contact the local after-sales maintenance personnel, who will provide you with paid services.

NOTICE

- | | |
|------|---|
| (8) | After the warranty period of the product, it is necessary to maintain or replace the power cord, heat exchanger and other key parts. It is not recommended to use it for a long time. Otherwise, our company may not be able to assume the relevant legal liability for all losses incurred. |
| (9) | This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision. |
| (10) | Only use soft dry cloth or slightly wet cloth with neutral detergent to clean the casing of the unit. |

Water Chemistry

Chemical imbalance can cause severe damage to your heater and associated equipment. If the mineral content and dissolved solids in the water become too high, scale forms inside the heat exchanger tubes, reducing heater efficiency and damaging the heater. If the pH drops below 7.2, this will cause corrosion of the heat exchanger and severely damage the heater. Heat exchanger damage resulting from corrosive water will not be covered by the warranty.

For your health and the protection of your pool equipment, it is essential that your water be chemically balanced. The following levels must be used as a guide for balanced water.

- (1) Occasional chemical shock dosing of the pool water should not damage the heater providing the water is balanced.
- (2) Automatic chemical dosing devices and salt chlorinators are usually more efficient in heated water. Unless controlled, they can lead to excessively high chlorine levels which can damage your heater.
- (3) Further advice should be obtained from your pool or spa builder, accredited pool shop, or chemical supplier for the correct levels needed for your pool.

FCC WARNING

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC STATEMENT

This product contains FCC ID: 2ADAP-GRJWB05J5 and IC: 12478A-GRJWB05J5
CAN ICES-003(B)/NMB-003(B).

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.
- (2) NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - 1) Reorient or relocate the receiving antenna.
 - 2) Increase the separation between the equipment and receiver.
 - 3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - 4) Consult the dealer or an experienced radio/TV technician for help.

2 Product Introduction

2.1 Working Principle and Characteristics

The pool heat pump heater is a new, efficient, energy-saving and environmentally friendly product. It uses the principle of heat pump to drive the compressor with electric energy. Through the thermal cycle, the heat absorbed in the air is transferred to the water-side heat exchanger for water supply (hot water), or the heat absorbed by the water-side heat exchanger (cold water) is released into the air through the thermal cycle.

This series of units adopts environmental protection refrigerant R32, DC variable frequency compressor, DC fan, electronic expansion valve (EEV), corrosion-resistant titanium tube heat exchanger, high weather-resistant coating shell, gold corrosion-resistant radiator-fan, realizing adjustable load during operation, energy saving and efficiency.

The product has obtained CE certification and meets Rohs requirements. It has heating, cooling, automatic mode and humanized functions such as fast, intelligent, energy-saving, timing, WiFi for users to choose from.

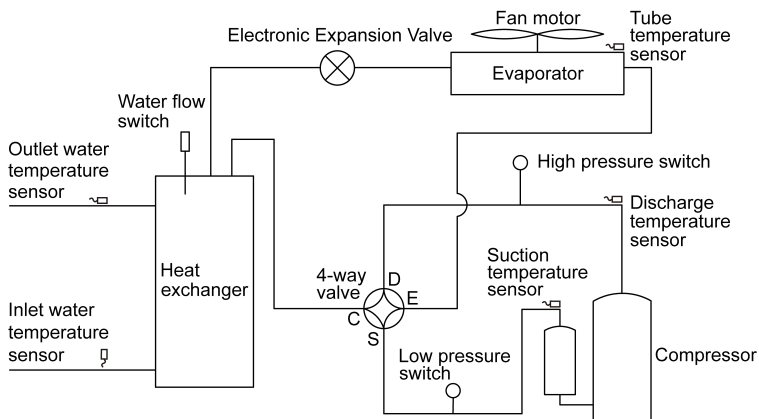


Fig. 2.1-1 System schematic diagram

2.2 Parameters

2.2.1 Heat Pump Technical Data

Model			GRS-CP11Pd/NhA-D	GRS-CP18Pd/NhA-D
High Air Temperature - Mid Humidity(63%RH) Water Temperature: 80.0°F	Heating Capacity	Btu/h	38000	60000
	Energy Efficiency	—	5.2	5.0
High Air Temperature - High Humidity(80%RH) Water Temperature: 80.0°F	Heating Capacity	Btu/h	40500	63000
	Energy Efficiency	—	5.5	5.2
Low Air Temperature - Mid Humidity(63%RH) Water Temperature: 80.0°F	Heating Capacity	Btu/h	22000	40000
	Energy Efficiency	—	4.4	3.9
Cooling Air Temperature: 95°F/- Water Temperature: 86.0°F	Cooling Capacity	Btu/h	16500	26000
	Energy Efficiency	—	3.9	3.9
Maximum Power ①		kW	2.5	3.55
Maximum Current ①		A	13	16.5
Water Flow		gpm	13.6-20.4	22.8-34.3
Water Resistance		psi	0.725	1.74
Noise②		dB(A)	52	56
Dimension(W×D×H)		in. (mm)	39.3×14.8×21.8 (998×376×554)	42.7×15.8×25.9 (1085×402×657)
Weight		lbs	97.0	120
Hydraulic Connection		in. (mm)	1-1/2"PVC (50mm)	
Compressor		—	Hermetic Rotary DC Inverter Compressor	
Fan Motor		—	DC Fan Motor	
Refrigerant③		—	R32	
Refrigerant Mass		oz	18.3	25.8
Electricity Supply		—	Single phase 208/230V ~ 60Hz	
Protection		—	IPX4	
Mode		—	Heating/Cooling/Automatic	

NOTICE

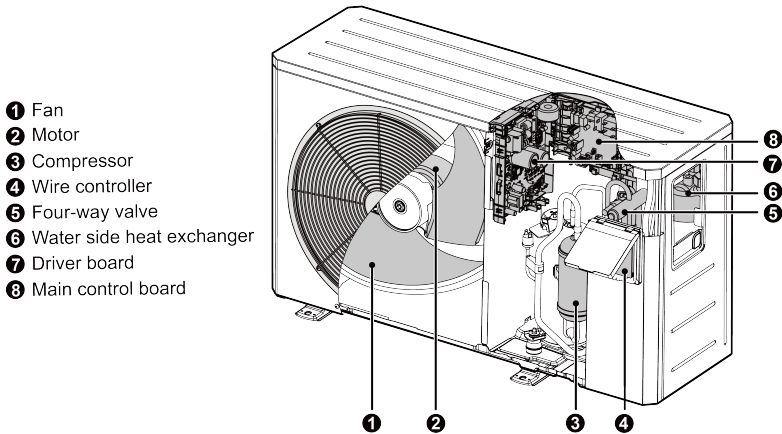
- ① The above maximum power or maximum current don't include the power or current of external engineering water pump.
- ② The noise data is the average sound pressure value measured under high temperature and mid humidity heating conditions (Dry air 80.6°F -Relative humidity 63% - Water inlet temperature 80°F) with a distance of 1m away from the unit.
- ③ This parametric is the maximum refrigerant charge amount of the unit.
- ④ The recommended maximum pool volume is based on the ideal heating condition that the pool is well shaded; the filtration system runs for 15h per day, water temperature is maintained at 80°F, and ambient temperature $\geq 82.4^{\circ}\text{F}$.

2.2.2 Operating Range

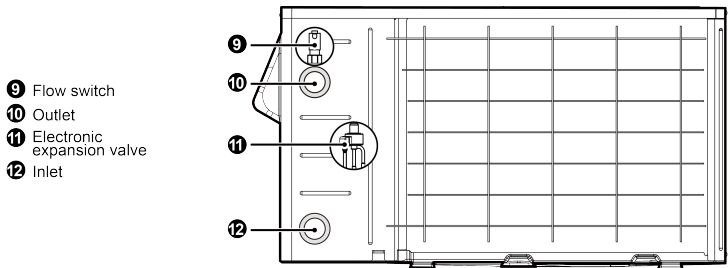
Use the swimming pool heat pump unit within the following ranges of temperature and water pressure to ensure safe and efficient operation.

—	Heating Mode	Cooling Mode
Outside temperature	5°F ~ 113°F (-15°C ~ 45°C)	60.8°F ~ 113°F (16°C ~ 45°C)
Water temperature	50°F ~ 100.4°F (10°C ~ 38°C)	50°F ~ 104°F (10°C ~ 40°C)
Setting range from the set point	59°F ~ 104°F (15°C ~ 40°C)	50°F ~ 104°F (10°C ~ 40°C)
Water pressure	0.1 ~ 0.5MPa	0.1 ~ 0.5MPa

2.3 Introduction of Components



(a)



(b)

Fig. 2.3-1 Unit components

2.4 Dimensions

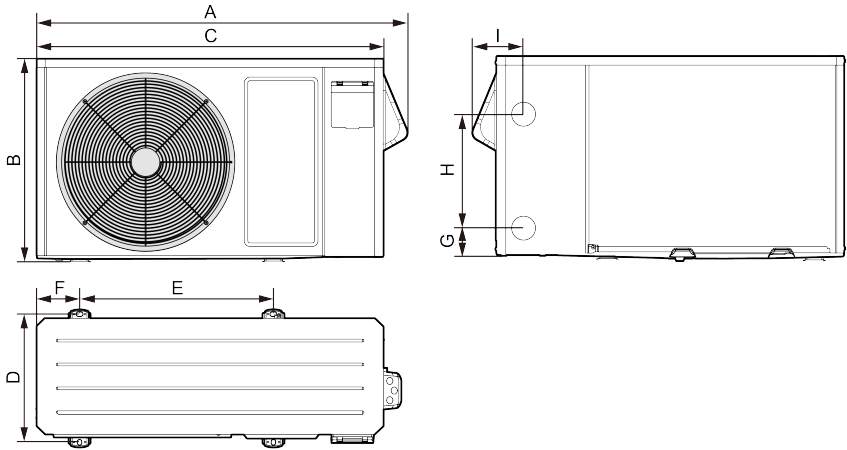


Fig. 2.4-1 Dimensions


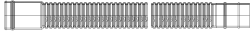

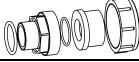


Unit: in.(mm)

Model	GRS-CP11Pd/NhA-D	GRS-CP18Pd/NhA-D
A	39.3(998)	43.8(1112)
B	21.8(554)	25.9(657)
C	37.2(945)	41.7(1060)
D	13.6(346)	14.6(371)
E	20.8(528)	22.4(570)
F	4.6(117)	6.3(160)
G	2.8(72)	3.2(82)
H	12.2(310)	13.4(340)
I	4.9(125)	5.5(140)

2.5 List of Accessories

The standard accessories are as follows. In the installation diagram, the engineering loads or consumables such as valves and pipes shall be purchased separately according to the actual use needs.

Tab. 2.5-1 Standard accessories

Name	Number	Specification or Diagram
Drainage pipe connection	1	
Drainage pipe	1	
Tapping Screw	1	
Quick connector assembly	2	
Chassis rubber plug(for GRS-CP11Pd/NhA-D)	2	
Chassis rubber plug(for GRS-CP18Pd/NhA-D)	4	

3 Installation

3.1 Installation Safety Precautions

Please read the instructions for use, installation and maintenance carefully before use.



A2L



- (1) For the product to be installed, moved and repaired, please contact the local technical service personnel and seek the support of professional institutions. Otherwise, our company may not be able to assume the relevant legal liability in case of any damage.
- (2) If the user uses self-prepared installation materials for installation, resulting in pipeline leakage, crash, and bad installation affecting the normal operation and use of the product, our company may not be able to assume the relevant legal liability.

- (3) The unit adopts environment-friendly, colorless, odorless and flammable R32 refrigerant.
- (4) The room area for installation, operation and storage of combustible refrigerant unit shall be larger than the specified space area.
- (5) Do not puncture or ignite the unit.
- (6) The relevant gas regulations of the country or region where the installation is carried out shall be observed.
- (7) Avoid installing the unit in a narrow room to prevent the concentration of refrigerant in the room from exceeding the limit value in case of refrigerant leakage, resulting in hypoxia or suffocation.
- (8) Unless specially recommended by the manufacturer, do not use any method to accelerate the defrosting process or clean the frosted part.
- (9) The unit shall be stored to prevent mechanical damage caused by accidents.
- (10) The unit shall be stored in a room without continuous fire source (such as open fire, ignited gas appliance, and open electric heater).
- (11) Before maintenance or repair of heat pump unit using combustible refrigerant, safety inspection must be carried out to ensure that the risk of fire is minimized.
- (12) When installation:
 - 1) Be sure to use special accessories and parts;
 - 2) It is forbidden to violate the nitrogen filling welding process;
 - 3) It is forbidden to short circuit or cancel the pressure switch;
 - 4) The unit controlled by the wire controller must be connected to the wire controller before being powered on.
- (13) Before installation, please check the safety of the power supply used and whether it is consistent with the power supply required on the nameplate. After the power cord is connected, be sure to install the electrical box cover.
- (14) The heat pump unit shall use a special power cord with proper power capacity, and the wiring sectional area shall not be less than the specification requirements of the power cord in the Manual.
- (15) The unit shall use special circuit and socket, and be equipped with appropriate leakage protection switch and circuit breaker (air switch). The circuit breaker shall be full-pole open, with the contact breaking distance of at least 3 mm.
- (16) According to the relevant laws, regulations and electrical standards, special

branch leakage devices shall be installed.

- (17) The connection method of the unit and the power cord and the interconnection method of each independent component shall be subject to the circuit diagram attached to the unit body.
- (18) All wiring must use crimping terminals or single-core wires. The direct connection of multi-stranded wires with the terminal block may cause a spark.
- (19) Do not change the internal wiring of the unit at will, otherwise, our company may not assume relevant legal responsibilities in case of relevant losses.
- (20) The model and rating of the fuse shall be subject to the silk screen identification on the corresponding controller or fuse sleeve.
- (21) Communication cables should be laid out through cabling through, conduit tube or cable channel.

3.2 Unit Installation Diagram

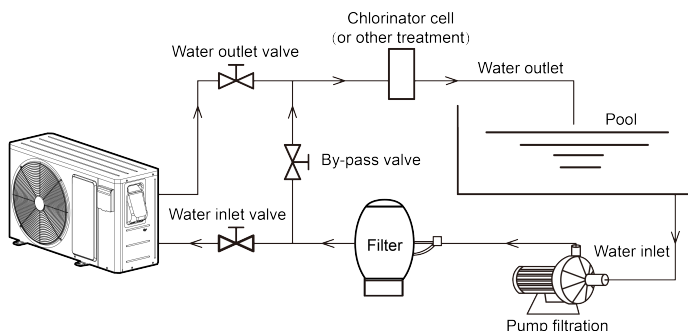


Fig. 3.2-1 Unit installation diagram

3.3 Dimensional Requirements of Installation Space

- (1) The dimensional requirements of installation space of the unit are shown in the figure below.
- (2) The installation distance of the unit from the swimming pool shall not exceed 15 m.
- (3) The heat pump must be installed at a minimum distance from the pool in compliance with NFC15-100 (3.5 m from the water for France) or in compliance with installation standards applicable in other countries.

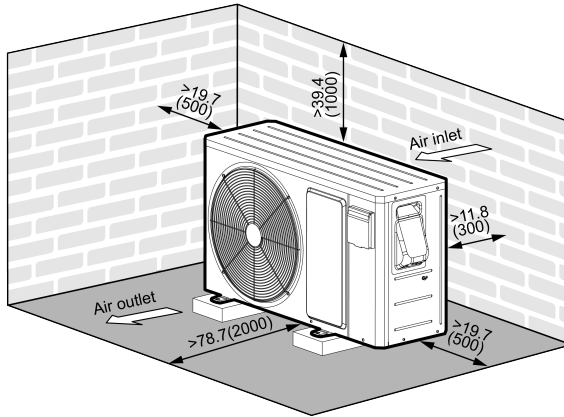


Fig. 3.3-1 Dimensions of unit installation space

3.4 Unit Installation Requirements

- (1) Ensure that the sound and air flow of unit operation will not affect others or animals and plants.
- (2) Ensure that the unit has good ventilation. If a canopy is installed to protect the unit, the heat dissipation and absorption shall not be affected.
- (3) The unit shall be installed at a place with a solid foundation. The unit shall be installed vertically more than 15 cm above the horizontal ground, and shall be fully firmly installed with the impact of strong wind, typhoon and earthquake fully considered.
- (4) The wooden base with the unit should be removed when conducting installation.
- (5) We recommend sheltering the unit to avoid the possibility that snow accumulates and damages the evaporator.
- (6) Drainage ditch should be reserved next to the unit for condensate discharging as well as evacuating water for disuse in winter.
- (7) If the unit is installed in a place that does not require drainage, it is recommended that all drainage holes be unblocked. Special attention should be paid to: at this time, the water discharge from the drainage holes are easy to freeze in the temperature below 0°C, please set up warning signs or isolation fences at the unit install site to avoid unnecessary injuries such as sliding.

- (8) If the unit is installed in the designated place with drainage requirements, choose the drain pipe mounting hole as shown in the following figure to clamp into the drainage joint to guide the drainage, other drainage holes are sealed with drain caps.

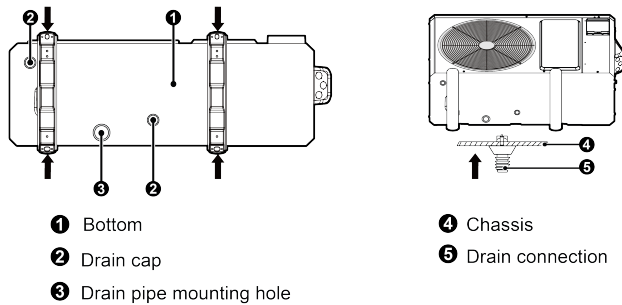


Fig. 3.4-1 Drainage pipe connection

3.5 Water System Connection

3.5.1 Installation Requirements of Water System Piping

- (1) The design and construction of the water system must meet the requirements of the local plumbing design specifications and relevant standards.
- (2) For an appliance intended to be permanently connected to the water mains and not connected by a hose set.
- (3) The water pipe connecting parts must be sealed with raw tape to prevent water leakage.
- (4) The water inlet and outlet connection parts of each pipeline shall be pasted with water inlet and outlet signs to avoid connection errors.
- (5) The water pipe installation shall be arranged horizontally and vertically, and the pipe layout shall be reasonable to minimize bending, reducing the resistance loss of the water system.
- (6) All valves must be installed strictly, and the installation sequence must be consistent with the unit installation diagram.
- (7) The pipeline shall be arranged in a centralized way. The water outlet of the unit shall not be too far from the hot water use point, and there shall be a drainage floor drain nearby.
- (8) There are inevitably some impurities in the water system. A filter must be installed before the water pump to prevent the blockage of the water-side heat

exchanger of the unit, and shall be cleaned regularly.

- (9) All water system pipelines, valves and pipe joints must be laid with insulation layer to reduce heat loss. Common insulation materials include soft polyethylene foam (PEF), glass wool, rubber insulation cotton, and the thickness of insulation layer shall be $\geq 30\text{mm}$.

3.5.2 Water Supply Pipeline Connection

The heat pump unit is equipped with two pipe joints (PVC $\Phi 50\text{ mm}$), which are used to connect the pipeline from the filter pump and the water outlet pipeline, and connect to the circulating hot water system of the swimming pool.

To guarantee the safe usage of unit, a reduction valve should be installed in the water inlet pipe if the water inlet pressure exceeds 0.5MPa .

Note: The water entering the unit must be the water passing through the swimming pool filter to prevent the impurities from blocking the heat exchanger of the heat pump unit, and the swimming pool disinfection device must be installed at the downstream of the water outlet pipeline of the heat pump unit to prevent the chemical composition of the disinfection device from affecting the heat exchanger of the unit.

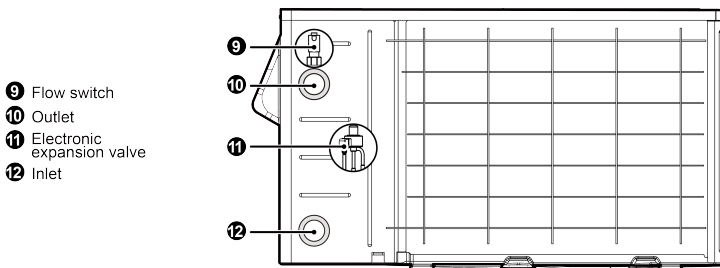


Fig.3.5-1 Water outlet and water inlet pipe connection

3.6 Electrical Installation

WARNING

- The heat pump pool heater is a class I electrical appliance. Please be sure it is installed by professional personnel according to the relevant standards of the region or country where it is installed. All wiring must be in accordance with the National Electrical Code, NFPA No.70, latest edition, and all applicable state and local codes.
- Only the power specifications indicated on the nameplate can be used. Before installation, make sure the power supply and the carrying capacity of the power cord and socket meet the requirements.
- The fixed circuit must be equipped with a ground-fault circuit interrupter (GFCI) and circuit breaker that have sufficient capacity and can be completely disconnected from the power supply. The ground-fault circuit interrupter (GFCI) and circuit breaker should be directly connected to the power terminal, and the contact distance on all poles is fully interrupted under Class III over-voltage category conditions. The ground-fault circuit interrupter (GFCI) and circuit breaker must be in accordance with the National Electrical Code, NFPA No.70, latest edition, and all applicable state and local codes.
- The unit must be grounded reliably! The grounding wire should connect with special device of buildings.
- Do not connect socket converters, extension cords, or terminal blocks to the power cord of this unit. Do not use other power cords to adapt to the home power supply. This unit should be wired separately. Do not share the circuit with other electrical appliances.
- If the power cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid danger. Never use extension cords.

3.6.1 Electrical Wiring

3.6.1.1 Selection of Power Cord Diameter & Circuit Breaker

Tab. 3.6-1 Unit power supply configuration

Model	Power Type	Maximum over-current protection (A)	Minimum circuit ampacity (A)
GRS-CP11Pd/NhA-D	208/230V ~ 60Hz	25A	17A
GRS-CP18Pd/NhA-D	208/230V ~ 60Hz	35A	22A

3.6.1.2 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 display board 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 display board 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)

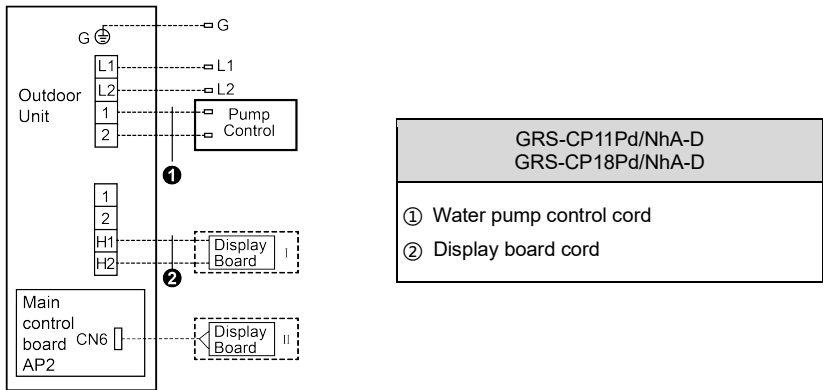


Fig.3.6-1 External wiring

3.6.2 Electrical Wiring & Connection Requirements

- (1) When the wires are connected, power cord, water pump control wire and the cable of display board come out from the wire outlet as shown in figure 3.6-2.
- (2) When wiring outside the unit, the display board (wire controller) cord should be separated from the power cord and the water pump power cord. The minimum distance between parallel wires should be greater than 20cm; otherwise, the unit communication may be abnormal. Strong and weak cords should be sheathed separately.

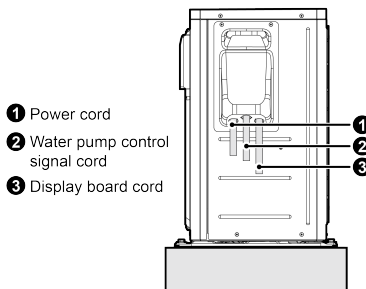


Fig.3.6-2 Installation diagram for power cord out from the outlet hole

- (3) The unit provides a terminal that is used to connect the external and equipotential bonding cord. Equipotential bonding must be in accordance with the National Electrical Code, NFPA No.70, latest edition, and all applicable state and local codes.

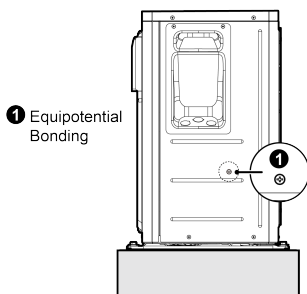


Fig.3.6-3 Equipotential Bonding

3.6.3 Engineering Load Installation

3.6.3.1 Water Pump Connection

The water supply of the pool machine is realized through the access of the engineering water pump, which can be installed according to the actual engineering needs.

- (1) This unit only provides the control signal for the water pump. The control signal is the passive signal. The external pump needs to be connected to the AC contactor with the built-in resistance absorber or the general AC contact absorber.
- (2) The requirement for the allowable connected AC contactor:
 - ① Weak current:12~24VDC(100mA~500mA);
 - ② Strong current:208~230VAC(100mA~1A).
- (3) When the power supply of the circulating water pump is not connected to the heat pump unit, it is necessary to ensure that the water pump is started in advance and reaches the water flow required by the heat pump unit before the heat pump unit is started, otherwise the heat pump unit will be started.

3.6.3.2 Wire Controller Connection

The wire controller (display board) is installed on the front panel of the unit by default. When it needs to be adjusted to other places outside the unit, to be in compliance EN 55014, the length of the communication cable between the wired controller and the unit can't be more than 8m. The following steps need to be followed:

- (1) Use a screwdriver to remove the fixing screw at the bottom of the wire controller mounting box on the front panel, and lift the cover.

- (2) Insert a screwdriver into the hole under the installation box, pry the wire controller out of the installation box, pull out the connecting line, pull out the docking terminal, and take out the wire controller.
- (3) Cover the mounting box cover and fix the screws.
- (4) Open the cover of the electrical box on the right board and connect the wire controller to the H1 & H2 terminals corresponding to the wiring board. See the manual of the wire controller for details.

4 Commissioning

WARNING

- Safety measures must be taken for outdoor operation. All commissioning personnel and maintenance personnel must master the building construction safety specifications and strictly follow the specifications.
- Refrigerators, electricians, welders and other special types of workers must hold special work permits, and it is prohibited to work in different types of work. When operating the equipment, the power supply of the whole unit must be cut off, and the operation must be carried out in strict accordance with the equipment safety requirements.
- All installation and maintenance operations must comply with the design requirements of this product and the safety specifications of the country or region where it is located. Illegal operations are strictly prohibited.

4.1 Inspection before Commissioning

After the heat pump unit, wire controller, water system and electrical wiring have been installed, be sure to check the unit according to the following table.

Tab. 4.1-1 Unit installation checklist

Items to be Checked	Possible Situation in Case of Improper Installation
Check whether the water pipeline system is complete.	System protection caused by pipeline leakage.
Check whether the power supply is consistent with the power supply required in this manual and the unit nameplate.	Abnormal unit or burnt-out parts.
Check whether the specification of the power supply line is consistent with that required in this Manual.	Abnormal unit, heated or even blown line.
Whether the unit is firmly installed.	The unit operation may produce noise or vibration, and even cause falling hazards.
Whether there are obstacles at the air outlet and air inlet of the unit.	Abnormal unit operation.

4.2 Commissioning

The whole unit can be commissioned only after the installation and inspection of the unit are qualified. The commissioning steps are as follows:

- (1) Keep the valve fully open first.
- (2) When the water supply pump of the unit is not connected to the heat pump unit, the water supply pump shall be connected and adjusted to the nominal flow of the unit before starting. If the water supply pump is controlled by the heat pump unit, the whole unit shall be powered on and the flow shall be adjusted to ensure that there is no water leakage in the pipes and joints.
- (3) When the whole unit is powered on, it is necessary to confirm that the leakage protection switch is in "ON" before starting and running. After the unit is powered on, observe whether the wire controller displays normally. If there is no fault, it is normal.
- (4) Time calibration of controller by wire controller system.
- (5) Refer to the manual of the wire controller for WiFi connection.
- (6) Start the wire controller and check whether the unit operates normally: Gradually adjust the bypass valve from fully-open to half-open, the fan operates normally, and the whole unit operates stably without obvious shaking or abnormal noise. After running for 10 min, the unit inlet and outlet wind energy feel obvious temperature difference. Adjust the inlet and outlet bypass valves, so that the heat pump water flow reaches the rated flow, and the unit inlet and outlet water temperature difference is about 2°C.
- (7) After commissioning or setting wire controller, close the lid of the box and fix it with the tapping screw that comes with the unit to avoid rain or misoperation.

5 Non-Fault Phenomenon

Phenomenon	Cause Analysis
Start up immediately after shutdown.	In order to protect the unit, start the unit immediately after shutdown, and the microcomputer control will delay its operation for about 5 min.
Unit frosting.	In heating mode, the outdoor ambient temperature is low and frosting is a normal operation process. The unit will defrost regularly to ensure reliable operation.
During operation, you will hear the sound of "rushing" or "hissing" like running water.	The sound of refrigerant flowing is normal.
The unit has condensate discharge.	Normal phenomenon during unit operation.

6 Maintenance

6.1 Daily Maintenance

- (1) In the use season of the pool heat pump unit, it is recommended to clean the filter every week.
- (2) In the use season of the swimming pool, check that the electrical connection of the heat pump unit is safe and reliable, the water system pipeline is smooth and free of water leakage, there are no obstacles around the unit that affect the heat exchange, and the radiator-fan heat exchanger is clean before use.
- (3) Thermal insulation: The water temperature of the swimming pool is affected by environmental temperature, surface wind speed, heat conduction of the pool materials and other factors. In order to avoid heat loss, the protective heat shield is usually used to cover the pool during the shutdown stage to avoid heat loss and reduce the energy consumption of the pool unit.

6.2 Maintenance in Winter

When using this product in winter (the temperature may be lower than 0°C), please ensure that the unit is always powered on, the water supply for the unit is continuous and the water pipe is wrapped with insulation layer; If it is not used in winter or the unit fails to use due to a fault, please be sure to drain the water in the water-side heat exchanger and connecting pipe of the unit immediately after the power failure to prevent the stored water from freezing and cracking the equipment and pipe.

After disconnecting the water inlet/outlet pipes, draining all of the water of heat exchanger and pipeline, seal the pipe inlet/outlet to prevent debris from entering and assure a normal use next time.

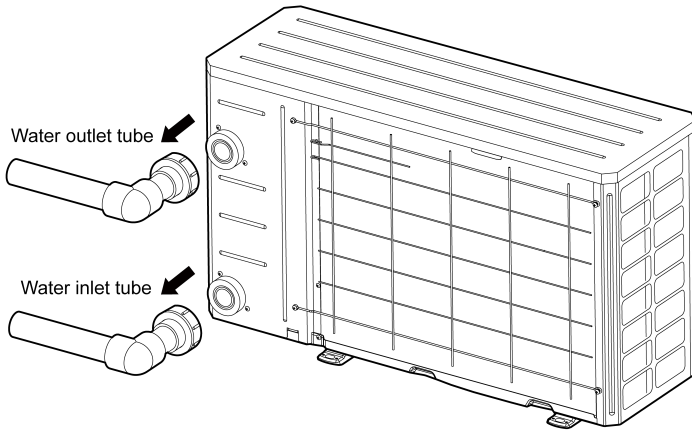
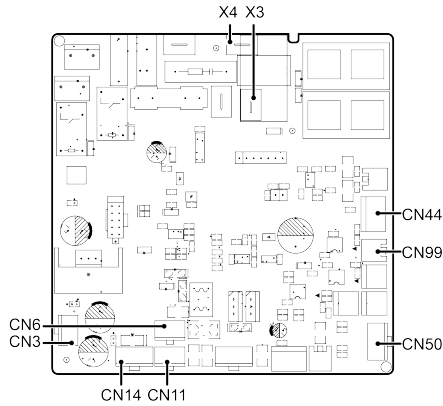


Fig. 6.2-1 Schematic diagram of removing the pipes of water outlet and water inlet for water drainage

6.3 Control Board Description & Fault Code

6.3.1 Main Control Board

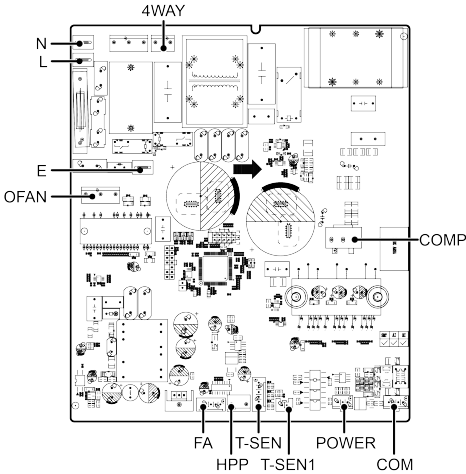


GRS-CP11Pd/NhA-D、GRS-CP18Pd/NhA-D

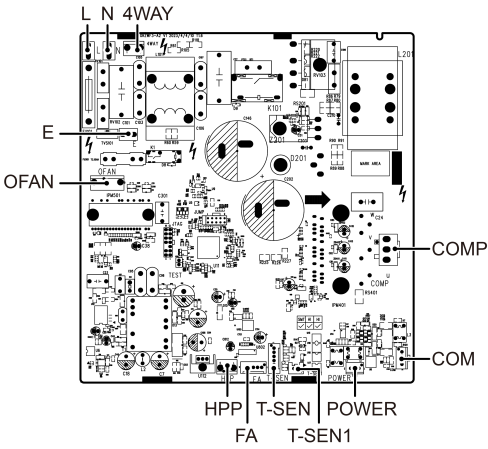
Silk Screen	Introduction
X3	Water pump control signal input
X4	Water pump control signal output
CN3	Power input
CN50	Water outlet , water inlet temperature sensor
CN99	Water flow switch

Silk Screen	Introduction
CN44	Low pressure switch
CN11	Communication interface of external wire controller
CN6	Communication interface of panel wire controller
CN14	Drive communication

6.3.2 Drive Control Board



(a) GRS-CP11Pd/NhA-D



(b) GRS-CP18Pd/NhA-D

Silk-Screen	Introduction
N	Power input zero line
L	Power input fire wire
E	Filter ground wire
OFAN	DC fan interface
FA	Electronic expansion valve interface
HPP	High-pressure switch interface
T-SEN	Ambient temperature, discharge and pipe temperature sensor
T-SEN1	Suction temperature sensor
POWER	Main control board power interface
COM	UART communication interface
COMP	Compressor interface
4WAY	Four-way valve interface

6.4 Main Control Fault Information

Error Code	Error Name	Possible Causes	Solution
E1	High-pressure protection	Insufficient water flow; Poor contact caused by loose pressure switch wire; Abnormal pressure switch; Main board fault; Abnormal heat exchange of water-side heat exchanger; Over-high ambient temperature.	After the fault is repaired, power on again to recover.
E3	Low-pressure protection	Poor contact caused by loose pressure switch wire; Abnormal pressure switch.	
E4	Discharge protection	Abnormal resistance value of the exhaust temperature sensor; Unit refrigerant leakage or insufficient refrigerant.	
E6	Communication fault	Loose or damaged communication line wiring; Display board fault; Main board fault.	Automatic recovery after fault repair.
F3	Ambient temperature sensor fault	Damaged temperature sensor; Main board fault.	
F4	Discharge temperature sensor fault		
F6	Outdoor heat exchanger tube temperature sensor fault		
Fd	Suction temperature sensor fault		
F8	Water inlet temperature sensor fault		
F9	Water outlet temperature sensor fault		

Error Code	Error Name	Possible Causes	Solution
L6	Out of operating range	The ambient temperature exceeds the operating range of the unit.	—
Ec	Water flow switch protection	Insufficient water flow; Water flow switch fault; Loose water flow switch wire.	Automatic recovery after fault repair.
C5	Jumper cap fault	Wrong jumper cap; Poor contact of jumper cap.	

6.5 Fault Information Table (Drive Board)

S/N	Error Code	Error Name	S/N	Error Code	Error Name
1	EE	EPROM memory chip fault	21	AA	AC current protection (input side) of variable frequency external fan
2	H5	Drive IPM module protection of variable frequency compressor	22	AC	Start failing of variable frequency external fan
3	HC	Drive PFC protection of variable frequency compressor	23	Ad	Phase loss protection of variable frequency external fan
4	H7	Out-of-step protection of variable frequency compressor	24	AE	Drive current detection circuit fault of variable frequency external fan
5	Lc	Start failing of variable frequency compressor	25	Ar	Temperature sensor fault of variable frequency external fan drive electric box
6	Ld	Phase-loss protection of variable frequency compressor	26	AL	Low voltage protection/voltage drop fault of variable frequency external fan drive DC busbar
7	LF	Power protection of variable frequency compressor	27	AJ	Out-of-step protection of variable frequency external fan
8	PA	Drive AC current protection (input side) of variable frequency compressor	28	AH	Over-voltage protection of variable frequency external fan drive DC busbar
9	Pc	Drive current detection circuit fault of variable frequency compressor	29	AP	Abnormal drive AC input voltage protection of variable frequency external fan
10	PF	Temperature sensor fault of variable frequency compressor drive electric box	30	AU	Drive charging circuit fault of variable frequency external fan
11	PH	Over-voltage protection of variable frequency compressor drive DC busbar	31	A0	Drive module reset of variable frequency external fan

S/N	Error Code	Error Name	S/N	Error Code	Error Name
12	PL	Low voltage protection/voltage drop fault of variable frequency compressor drive DC busbar	32	A1	Drive IPM module protection of variable frequency external fan
13	PP	Abnormal drive AC input voltage protection of variable frequency compressor	33	A6	Drive communication fault of main control & variable frequency external fan
14	PU	Drive charging circuit fault of variable frequency compressor	34	A8	Over-temperature protection of variable frequency external fan drive module
15	P0	Drive module reset of variable frequency compressor	35	A9	Temperature sensor fault of variable frequency external fan drive module
16	P5	Overcurrent protection of variable frequency compressor	36	U9	Abnormal drive AC input zero-crossing protection of variable frequency external fan
17	P6	Drive communication fault of main control & variable frequency compressor	37	An	Drive memory chip fault of variable frequency external fan
18	P7	Temperature sensor fault of drive module of variable frequency compressor	38	AF	Drive PFC protection of variable frequency external fan
19	P8	Drive module over-temperature protection of variable frequency compressor	39	UL	Overcurrent protection of variable frequency external fan
20	P9	Abnormal drive AC input zero-crossing protection of variable frequency compressor	40	UP	Power protection of variable frequency fan

6.6 Notices on Maintenance

6.6.1 Information on Servicing

The manual shall contain specific information for service personnel who shall be instructed to undertake the following when servicing an appliance that employs a flammable refrigerant.

Aptitude requirement for maintenance man (repairs should be done only by specialists).

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 authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment specification.

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.

6.6.1.1 Checks to the Area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

6.6.1.2 Work Procedure

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

6.6.1.3 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.

6.6.1.4 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 flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

6.6.1.5 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.

6.6.1.6 No Ignition Sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant 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 flammable 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.

6.6.1.7 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.

6.6.1.8 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 manufacturer's technical department for assistance.

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

- (1) The charge size 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.

6.6.1.9 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) Those 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.

6.6.2 Repairs to Sealed Components

- (1) During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- (2) Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded such 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.

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

6.6.3 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.

6.6.4 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 ageing or continual vibration from sources such as compressors or fans.

6.6.5 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.

6.6.6 Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

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

Leak detection fluids are 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. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

6.6.7 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 be followed, since flammability is a consideration. The following procedure shall be adhered to:

- (1) Safely remove refrigerant following local and national regulations;
- (2) Evacuate;
- (3) Purge the circuit with inert gas (optional for A2L);
- (4) Evacuate (optional for A2L);
- (5) Continuously flush or purge with inert gas when using flame to open circuit;
- (6) Open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, system shall be vented down to atmospheric pressure to ensure work to take place.

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

6.6.8 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 minimize 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 OFN. 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.

6.6.9 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of 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 another refrigeration system unless it has been cleaned and checked.

6.6.10 Labelling

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

6.6.11 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).

Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of 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 Notice 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.

6.7 After-Sales Services

Any quality or other issues encountered in the purchased units, please contact the local Gree after-sales service department.



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