



Owner's Manual

Original Instructions

Air-to-water Heat Pump

Model: GRS-Cm18PdRe/NhA-M

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's 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 equipment should be installed, operated or maintained by the qualified servicemen who have had specific training. During operation, all safety issues covered in the labels, User's Manual and other literature should be followed strictly. This equipment 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 responsibility for their safety. Children should be supervised to ensure that they do not play with the appliance.
- (2) This product has gone through strict inspection and operational test before leaving the factory. In order to avoid damage due to improper disassembly and inspection, which may impact the normal operation of unit, please do not disassemble the unit by yourself. You can contact with the special maintenance center of our company if necessary.
- (3) For personal injury or property loss and damage caused by improper operation such as improper installation and debugging, unnecessary maintenance, violation of related national laws and rules and industrial standard, and violation of this instruction manual, etc., we will bear no liability.
- (4) When the product is faulted and cannot be operated, please contact with our maintenance center as soon as possible by providing the following information.
 - Contents of nameplate of product (model, cooling/heating capacity, product No., ex-factory date).
 - Malfunction status(specify the situations before and after the error occurs).
- (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. We have the right to make necessary revision to the product from time to time due to the reason of sales or production, and reserve the right to revise the contents without further notice.
- (6) The final right to interpret for this instruction manual belongs to Gree Electric Appliances Inc. of Zhuhai.

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1 Safety Notices (Please be sure to abide)

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



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

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

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

After receipt of the unit, check it for appearance, unit model compared with your desire and attachments.

Design and installation work of the unit must be performed by authorized personnel according to applicable laws and regulations and this Instruction.

After installation work, the unit cannot be energized unless there is not any problem in check.

Ensure periodical clean and maintenance of the unit after normal operation of the unit for longer life and reliable operation.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

The appliance shall be installed in accordance with national wiring regulations.

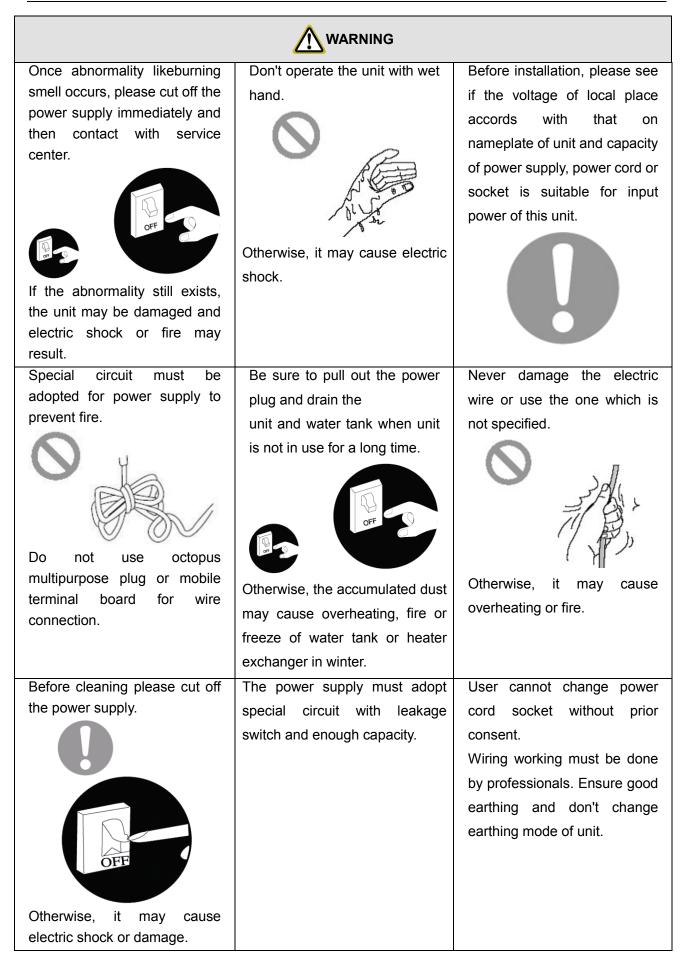
This product is a kind of comfort air conditioning, and is not allowed to be installed where there are corrosive, explosive and inflammable substances or smog; otherwise it would lead to operation failure, shortened service life, five hazard or even severe injuries. Special air conditions are required for where mentioned above.

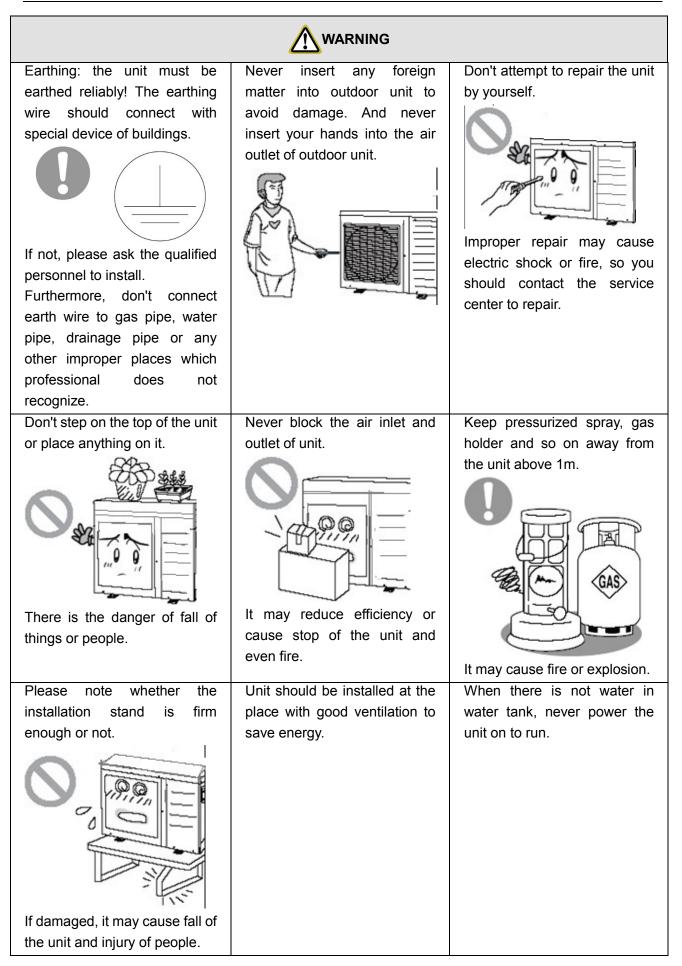
Correct Disposure



This marking indicates that this product should not be disposed with other household wastes throughout the EU. 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.

R32:675





Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. Should repair be necessary, contact your nearest authorized service center. Any repairs carried out by unqualified personnel may be dangerous. The appliance shall be stored in a room without continuous operating ignition sources. (For example: open flames, an operating gas appliance or an operating electric heater.) Do not pierce or burn.

Appliance shall be installed, operated and stored in a room with a floor area larger than Xm.(Please refer to table "a" in section of "Safety Operation of Inflammable Refrigerant" for space X.)

Appliance filled with flammable gas R32. For repairs, strictly follow manufacturer's instructions only. Be aware that refrigerants not contain odor. Read specialist's manual.

If a stationary appliance is not fitted with a supply cord and a plug, or with other means for disconnection from the supply mains having a contact separation in all poles that provides full disconnection under overvoltage category III conditions, the instructions shall state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

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.

The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.

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). The appliance shall be stored so as to prevent mechanical damage from occurring.

ΝΟΤΕ						
	Appliance filled with flammable gas R32.					
	Before use the appliance, read the owner's manual first.					
	Before install the appliance, read the installation manual first.					
r	Before repair the appliance, read the service manual first.					
To realize	the function of the air conditioner unit a special refrigerant circulates in the system. The					

Io realize the function of the air conditioner unit, a special refrigerant circulates in the system. The used refrigerant is the fluoride R32, which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can leads to explosion under certain conditions. But the flammability of the refrigerant is very low. It can be ignited only by fire.

Compared to common refrigerants, R32 is a nonpolluting refrigerant with no harm to the

ozonosphere. The influence upon the greenhouse effect is also lower. R32 has got very good thermodynamic features which lead to a really high energy efficiency. The units therefore need a less filling.

Before installation, please check if the adopted power is accordance with that listed on nameplate, and check the safety of power.

The unit shall contact with the supply mains by a full disconnection device under overvoltage category III.

Before using, please check and confirm if wires and water pipes are connected correctly to avoid water leakage, electric shock or fire etc.

Don't operate the unit with wet hand, and don't allow children to operate the unit.

The On/off in the instruction is for the operation to on and off button of PCB for users; cut off power means to stop supplying power to the unit.

Don't directly expose the unit under the corrosive ambient with water or dampness.

Don't operate the unit without water in water tank. The air outlet/inlet of unit cannot be blocked by other objects.

The water in unit and pipeline should be discharged if the unit is not in use, to prevent the water tank, pipe line and water pump from frost-cracking.

Never press the button with sharp objects to protect manual controller. Never use other wires instead of special communication line of the unit to protect control elements. Never clean the manual controller with benzene, thinner or chemical cloth to avoid fading of surface and failure of elements. Clean the unit with the cloth soaked in neutral eradicator. Slightly clean the display screen and connecting parts to avoid fading.

The power cord must be separated with the communication line.

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.

Item	Minimum water operating temperatures	Maximum water operating temperatures
Cooling	5°C	25°C
Heating	25°C	60°C
Hot water	30°C	55°C

Maximum and minimum water operating temperatures

Item	Minimum water operating pressures	Maximum water operating		
		pressures		
Cooling				
Heating	0.05MPa	0.25MPa		
Hot water				

Maximum and minimum water operating pressures

Maximum and minimum entering water pressures.

Item	Minimum entering water pressures	Maximum entering water pressures
Cooling		
Heating	0.05MPa	0.25MPa
Hot water		

The range of external static pressures at which the appliance was tested (add-on heat pumps, and appliances with supplementary heaters, only); If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

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

If there is any question, please contact with local dealer, authorized service center, agencies or our company directly.



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 CO_2 fire extinguisher adjacent to the charging area.

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

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

The charge size is in accordance with the room size within which the refrigerant containing parts are installed;

The ventilation machinery and outlets are operating adequately and are not obstructed;

If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

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.

Repair and maintenance to electrical components shall include initial safety checks and component

inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include: that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking; that no live electrical components and wiring are exposed while charging, recovering or purging the system; that there is continuity of earth bonding.

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

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

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.

NOTE: 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.

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.

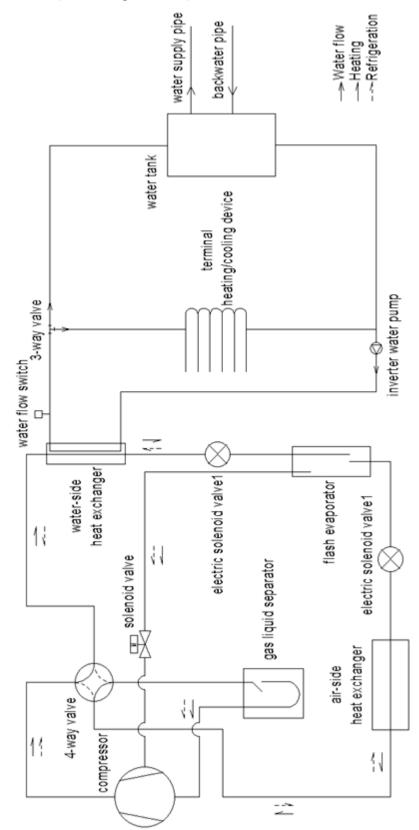
Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

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.

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.

Equipment shall be labeled 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.

2 Diagram of the Operating Principle



NOTE: In actual engineering, terminals heating/cooling device are selected by the user.

3 Operating Principle of the Unit

The DC inverter air source heat pump system comprises the ODU, water tank, and user terminals. Operation functions:

- (1) Hot water;
- (2) Heating;
- (3) Cooling;
- (4) Hot water+ Heating;
- (5) Heating+ water heating;
- (6) Mute function;

Hot water: In hot water mode, through heat pump circulation, the unit absorbs heat from the low-grade energy (low-temperature air) in the surrounding environment and exchanges the heat with water through the water-side heat exchanger. By controlling the engineering water valve, the water in the engineering water tank enters the water-side heat exchanger to absorb heat. It is heated circularly to reach the set value of water tank temperature and meet the user's hot water demand. Hot water mode includes: standard hot water, energy-saving hot water and fast hot water.

Heating: In heating mode, through heat pump circulation, the unit absorbs heat from the low-grade energy (low-temperature air) in the surrounding environment and exchanges the heat with water through the water-side heat exchanger. By controlling the engineering water valve, the water in user terminals enters the water-side heat exchanger to absorb heat. It is heated circularly to reach the set value of leaving water temperature and meet the user's heating demand.

Cooling: In cooling mode, through refrigeration circulation, the unit absorbs heat from the cool water in the water-side heat exchanger and releases the heat to the low-grade energy (high-temperature heat source) in the surrounding environment. By controlling the engineering water valve, the water in user terminals enters the water-side heat exchanger to release heat. It is cooled circularly to reach the set value of leaving water temperature and meet the user's cooling demand.

Hot water+ Heating: In the mode of hot water + heating, hot water mode is given priority. In other words, the unit will not switch to heating mode until the water tank temperature reaches the set value. When in heating mode, if the water tank temperature is not satisfied, the unit will immediately switch to hot water mode.

Hot water+ Cooling: In the mode of hot water + cooling, hot water mode is given priority. In other words, the unit will not switch to cooling mode until the water tank temperature reaches the set value. When in cooling mode, if the water tank temperature is not satisfied, the unit will immediately switch to hot water mode.

Mute function: When mute function is enabled, the unit will automatically control and lower its operating noise. This function is available in all kinds of running modes.

4 Nomenclature

GRS	-								/			-	
1		2	3	4	5	6	7	8		9	10		11

SN	Description	Options
1	Product code	GRS—Heat pump water heater
2	Heating method	D—Direct heating; C—Circulating heating; S—Static heating; Dm-Direct heating modular; Cm- Circulating modular
3	Functions	Q—Multifunctional; Null for single function
4	Heating capacity code	Nominal heating capacity(Unit:kW)
5	Inverter system	Pd—DC inverter; Null for fixed speed
6	type of heat pump	Re—Low-temperature heat pump; Null for Normal-temperature heat pump
7	Water tank mode	E—100L;F—150L;G—200L;H—250L;Null in case of no water tank
8	Climate condition	Null for T1;T2-Low temp;T3-High temp
9	Refrigerant	R22—Default;R407c—N;R410A—Na;R134a—Nb;R32—Nh;R417A—Ne
10	Design number	A,B,Cor A1,A2,B1,B2
11	Power supply	Refer to QJ/GD23.00.004

Model Line-Up

Madel News	Сар	acity	Dewerewerk
Model Name	Heating1, kW	Heating2, kW	Power supply
GRS-Cm18PdRe/NhA-M	18.1	16.1	380-415V 3N~ 50Hz

NOTES:

- 1Capacities and power inputs are based on the following conditions: Indoor Water Temperature 30°C/35°C, Outdoor Air Temperature 7°C DB/6°C WB
- (2) 2Capacities and power inputs are based on the following conditions:

Indoor Water Temperature 23°C/18°C, Outdoor Air Temperature 35°C DB/24°C WB

Operation Range

Mode	Heat Source Side Temperature (°C)	User Side Temperature (°C)
Hot water	-30~45	30~55
Heating	-30~35	25~60
Cooling	-10~48	5~25

5 Installation Example

CASE 1: Connecting Under-floor Coil for Heating and Cooling

NOTES:

- (1) In this diagram, under-floor coil represents the user's heating/cooling terminal. In actual engineering, terminals are selected by the user.
- (2) By pass valve must be installed to secure enough water flow rate, and by pass valve should be installed at the collector.

CASE 2: Connecting Sanitary Water Tank and Under-floor Coil

Under-floor coil

Shut off value T Remote room T

3-way value(Field supply)

Remote room Thermostat(Field supply)

B By-pass value(Field supply)

Low temperature line

NOTES:

(1) In this diagram, under-floor coil represents the user's heating/cooling terminal. In actual engineering, terminals are selected by the user.

High temperature line

(2) In this case, three-way valve should be installed and should be complied with installation of this manual.



- The 3-way valve should select under floor loop when electric power is supplied to wire (ON) and wire (N).
- The 3-way valve should select water tank loop when electric power is supplied to wire (OFF) and wire (N).
- (ON): Live signal (Heating/Cooling system) from the main board to the 3-way valve.
- (OFF): Live signal (Water tank loop) from the main board to the 3-way valve.
- (N): Neutral signal from the main board to the 3-way valve.

6 Appearance

GRS-Cm18PdRe/NhA-M



7 Installation Guideline of Monobloc Unit

7.1 Instruction to installation

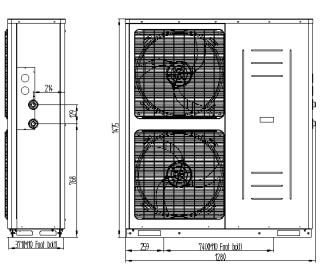
- (1) Installation of the unit must be in accordance with national and local safety codes.
- (2) Installation quality will directly affect the normal use of the air conditioner unit. The user is prohibited from installation. Please contact your dealer after buying this machine. Professional installation workers will provide installation and test services according to installation manual.
- (3) Do not connect to power until all installation work is completed.
- (4) The foot brackets of the compressor is used to reduce vibration during transport. Before commissioning, they must be removed, otherwise it would lead to unnecessary faults. When foot brackets have been removed, the fastening screws must be tightened so as to prevent the compressor from jumping out during operation.

7.2 Installation of monobloc unit

- 7.2.1 Selection of installation location of monobloc unit
 - (1) Monobloc unit must be installed on a firm and solid support.
 - (2) Avoid placing the monobloc unit under window or between two constructions, hence to prevent normal operating noise from entering the room.
 - (3) Air flow at inlet and outlet shall not be blocked.
 - (4) Install at a well-ventilated place, so that the machine can absorb and discharge sufficient air.
 - (5) Do not install at a place where flammable or explosive goods exist or a place subject to severe dust, salty fog and polluted air.

7.2.2 Outline dimension of monobloc unit

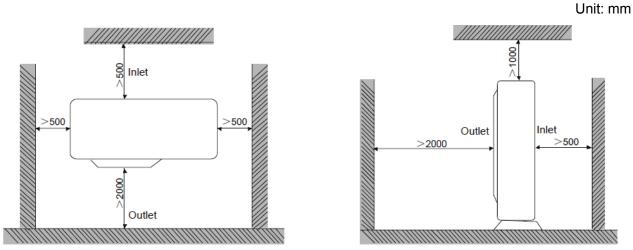
GRS-Cm18PdRe/NhA-M





Unit: mm

7.2.3 Space requirements for installation

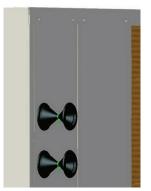


NOTE: In confederation of space restriction, for the left-handed figure, except the outlet side, distance between the unit and the nearest barrier at other three sides are allowed to be no less than 500mm; for the right-handed figure, distance between the inlet side and the nearest barrier is allowed to be no less than 500mm.

7.2.4 Precautions on installation of monobloc unit

- (1) When moving outdoor unit, it is necessary to adopt 2 pieces of long enough rope to hand the unit from 4 directions. Included angle between the rope when hanging and moving must be 40° below to prevent center of the unit from moving.
- (2) Adopt bolts components to tighten feet and under frame when installing.
- (3) Monobloc unit should be installed on concrete base that is 10cm height.
- (4) Requirements on installation space dimension of unit's bodies are shown in following drawing.
- (5) Monobloc unit must be lifted by using designated lifting hole. Take care to protect the unit during lift. To avoid rusting, do not knock the metal parts.

7.2.5 Usage of rubber rings



- (1) Wires installed by field supply get through the rubber rings, such as 3-way valve, power cable and so on. Be careful of separating electrical wire and light current wire.
- (2) Tie the rubber rings after finishing wire connection.

7.2.6 Safety operation of flammable refrigerant

(1) Qualification requirement for installation and maintenance man7 Installation of Hydraulic Unit

All the work men who are engaging in the refrigeration system should bear the valid certification awarded by the authoritative organization and the qualification for dealing with the refrigeration system recognized by this industry. If it needs other technician to maintain and repair the appliance, they should be supervised by the person who bears the qualification for using the flammable refrigerant.

It can only be repaired by the method suggested by the equipment's manufacturer.

(2) Installation notes

The unit is not allowed to use in a room that has running fire (such as fire source, working coal gas ware, operating heater).

It is not allowed to drill hole or burn the connection pipe.

The unit must be installed in a room that is larger than the minimum room area.

	Charge amount(kg)	≤1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4	2.5
	floor location	/	14.5	16.8	19.3	22	24.8	27.8	31	34.3	37.8	41.5	45.4	49.4	53.6
Minimum room area	window mounted	/	5.2	6.1	7	7.9	8.9	10	11.2	12.4	13.6	15	16.3	17.8	19.3
(m ²)	wall mounted	/	1.6	1.9	2.1	2.4	2.8	3.1	3.4	3.8	4.2	4.6	5	5.5	6
	ceiling mounted	/	1.1	1.3	1.4	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.7	4

Leak test is a must after installation.

(3) Maintenance notes

Check whether the maintenance area or the room area meet the requirement.

It's only allowed to be operated in the rooms that meet the requirement.

Check whether the maintenance area is well-ventilated.

The continuous ventilation status should be kept during the operation process.

Check whether there is fire source or potential fire source in the maintenance area.

The naked flame is prohibited in the maintenance area; and the "no smoking" warning board should be hanged, nameplate.

Check whether the appliance mark is in good condition.

Replace the vague or damaged warning mark.

(4) Welding

If you should cut or weld the refrigerant system pipes in the process of maintaining, please follow the steps as below:

- 1) Shut down the unit and cut power supply
- 2) Eliminate the refrigerant
- 3) Vacuuming
- 4) Clean it with N₂ gas
- 5) Cutting or welding
- 6) Carry back to the service spot for welding

The refrigerant should be recycled into the specialized storage tank.

Make sure that there isn't any naked flame near the outlet of the vacuum pump and it's well-ventilated.

(5) Filling the refrigerant

Use the refrigerant filling appliances specialized for R32. Make sure that different kinds of refrigerant won't contaminate with each other.

The refrigerant tank should be kept upright at the time of filling refrigerant.

Stick the label on the system after filling is finished (or haven't finished).

Don't overfilling.

After filling is finished, please do the leakage detection before test running; another time of leak detection should be done when it's removed.

(6) Safety instructions for transportation and storage

Please use the flammable gas detector to check before unload and open the container.

No fire source and smoking. According to the local rules and law

8 Optional Electric Heater

Optional electric heater is allowed for the equipment and controlled in such a way when outdoor temperature is lower than the set point for startup of the optional electric heater.

Step 1. Optional electric heater installation

Optional electric heater should be installed with monobloc unit in series. The optional electric heater could be 1group or 2 group, and only works of space heating.

Step 2. Electric wiring work

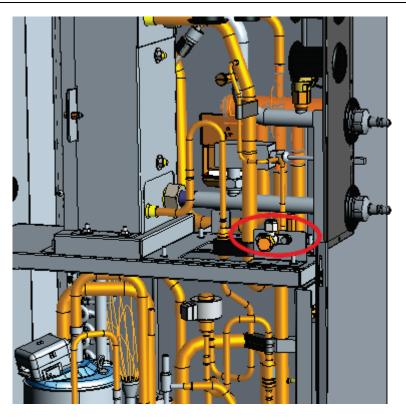
AC contactor should be installed to XT2 KM1(1 group electric heater) or KM1 and KM2(2 group electric heater).

Step 3. Wired controller setting

Optional electric heater should be selected "1/2" group if necessary from COMMISION \rightarrow FUNCTION, then set switch on (outdoor)temperature and control logic(1/2).

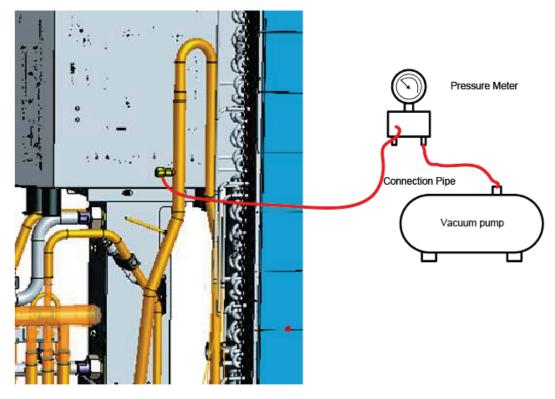
9 Charging and Discharging of Refrigerant

The unit has been charged with refrigerant before delivery. Overcharging or undercharging will cause the compressor to run improperly or be damaged. When refrigerant is required to be charged or discharged for installation, maintenance and other reasons, please follow steps below and nominal charged volume on the nameplate. Discharging: remove metal sheets of the outer casing, connect a hose to the charging valve and then discharge refrigerant.



NOTES:

- (1) Discharge is allowed unless the unit has been stopped. (Cut off the power and repower it 1 minutes later)
- (2) Protective measures should be taken during discharging to avoid frost bites.
- (3) When discharging is finished, if vacuuming cannot be done immediately, remove the hose to avoid air or foreign matters entering the unit.
- (4) Vacuuming: when discharging is finished, use hoses to connect the charging valve, manometer and vacuum pump to vacuum the unit.



NOTE:

When vacuuming is finished, pressure inside the unit should be kept lower than 80Pa for at least 30 minutes to make sure there is no leak. Either charging valve 1 or charging valve 2 can be used for vacuuming.

Charging: when vacuuming is finished and it is certain that there is no leak, charging can be done.

Leak Detection Methods:

- (1) The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.
- (2) Electronic leak detector shall be used to detect flammable refrigerant, but the sensitivity may not be adequate, or may need re-calibration (Detection equipment shall be calibrated in a refrigerant-free area).
- (3) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
- (4) 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.
- (5) Leak detection fluids are suitable for us with most refrigerant but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
- (6) 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.

NOTE:

Before and during operation, use an appropriate refrigerant leak detector to monitor the operation area and make sure the technicians can be well aware of any potential or actual leakage of inflammable gas. Make sure the leak detecting device is applicable to inflammable refrigerant. For example, it should be free of sparks, completely sealed and safe in nature.

10 Installation of Insulated Water Tank

10.1 Selection of Water Pipe

Inlet and outlet water pipe diameter of the unit shall be determined by the rated flow of the unit and the recommended flow speed velocity. Flow speed of hot water pipeline shall refer to the following table.

Nominal diameter(mm)	15~20	25~40	≥50
Flow velocity(m/s)	≤0.8	≤1.0	≤1.2

Inner diameter(mm)	Corresponding heating capacity of directly-heated inlet pipe(kW)	Corresponding heating capacity of outlet water pipe and circulating inlet pipe(kW)
15	0~12	0~3
20	12~21	3~5
25	21~41	5~10
32	41~67	10~16
40	67~105	16~26
50	105~197	26~49
65	197~333	49~83
80	333~504	83~126
100	504~788	126~197
125	788~1232	197~308
150	1232~1774	308~443
200	1774~3154	443~788
250	3154~4929	788~1232

NOTICE: Directly-heated inlet pipe diameter is calculated according to the double of nominal water yield of the unit and the recommended flow speed.

10.2 Model Selection of Water Pump

The highest temperature of water pump on medium shall not below 70°C.

Model selection of circulating pump:

Rated lift of circulating water pump

Water resistance+ Σ Local resistance+ Resistance coefficient ×L+Z

L: Total length of circulating water pipeline; Z: Height difference of circulating inlet and outlet of water

tank; Resistance coefficient can be 0.05 in estimate, pressure of the water column of 5 meters.

Flow of circulating water pump: Circulating water flow of a single unit ×quantity

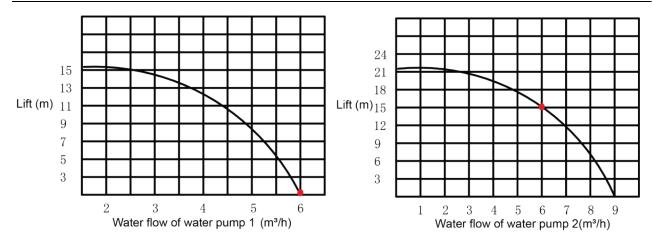
Model	Circulating water resistance(kPa)	Circulating water resistance(m)
GRS-Cm18PdRe/NhA-M	27	2.7
NATIOE		•

NOTICE:

The required water pump parameter is the rated value, not the max .value, when selecting model for water pump, please pay attention to the nominal flow and lift of water pump on the nameplate.

For example, when installing a unit, based on the above calculation, circulating water flow is 6.2m³ /h and the lift is 15m. There are two sets of water pump for selection, in the end, water pump 2 is selected because of its qualified flow and lift.

Water pump model	Max. flow(m³/h) Max. lift(m) The lif		Confirm flow curve The lift when water flow is 6.2m ³ /h	Qualified
Water pump 1	6.2	15	0	No
Water pump 2	9	21	15	Yes



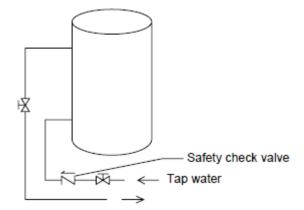
10.3 Installation measure

Standing water tank must be installed vertically with the bottom on the ground, never suspended. Installation place must be firm enough and the water tank should be fixed on the wall with bolts to avoid vibration, as shown in the following figure. Weight capacity of water tank during installation should also be considered.

The minimum clearance from the water tank to combustible surface must be 500mm.

There should be water pipe, hot water joint and floor drain near the water tank in favor of water replenishment, hot water supply and drainage of water tank.

Connection of inlet/outlet waterway: Connect the safety check valve attached with the unit (with the arrow on it pointing at the water tank) with the water inlet of water tank with PPR pipe according to the following figure, sealing with unsintered tape. The other end of the safety check valve should connect with tap water joint. Connect the hot water pipe and water outlet of water tank with PPR pipe.



NOTES:

- (1) For safe use of water, water outlet/inlet of water tank must connect with a certain length of PPR pipe, L ≥70×R2(cm, R is inside radius of the pipe). Moreover, heat preservation should be conducted and metal pipe cannot be used. For the first use, water tank must be full of water before the power is on.
- (2) The water may drip from the discharge pipe of the pressure-relief device and that this pipe must be left open to the atmosphere.
- (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 and in a frost-free environment.

- (5) The appliance is intended to be permanently connected to the water mains and not connected by a hose-set.
- (6) The type of the pressure-relief device is A3J, and this device shall be installed with threaded connection.
- (7) The replenishing water pressure in water tank shall be beyond 0.2MPa and below 0.7MPa.
- (8) The method of water drainage must be operated strictly abide by the instruction on the label of the water tank.

10.4 Connection of waterway system

- (1) Preparation of pipelines: Circulating water outlet/inlet pipe must be hot water pipe, PPR pipe with nominal out diameter of dn25 and S2.5 series (wall thickness of 4.2mm) being recommended. Cooling water inlet pipe and hot water outlet pipe of water tank should also be hot water pipe, PPR pipe with nominal out diameter of dn20 and S2.5 series (wall thickness of 3.4mm) being recommended. If other insulating pipes are used, please check relevant information for the proper pipe size and wall thickness.
- (2) Installation of circulating water inlet/outlet pipes: connect the water inlet of the unit with circulating outlet of water tank and water outlet of unit with circulating inlet of water tank.
- (3) Installation of water inlet/outlet pipes of the water tank: safety check valve, filter and cut-off valve must be installed for the water inlet pipe according to the installation sketch of the unit. At least a cut-off valve is needed for the water outlet pipe.
- (4) Installation of blow-off pipes at the bottom of water tank: connect a piece of PPR pipe with drainage outlet to floor drain. A cut-off valve must be installed in the middle of the drainage pipe and at the place where it is easy to be operated by the users.
- (5) After connection of all waterway pipelines, perform the leakage test firstly. After that, bind up the water pipes, water temp sensor and wires with wrapping tapes attached with the unit.
- (6) Refer to Installation Sketch of the Unit for details.

NOTES:

- (1) Waterway pipelines can't be installed until water heater unit is fixed. Do not let dust and other sundries enter into pipeline system during installation of connection pipes.
- (2) After connection of all waterway pipelines, perform leakage test firstly. After that, perform heat preservation of waterway system; meanwhile, pay more attention to valves and pipe joints. Ensure enough thickness of insulated cotton. If necessary, install heating device for pipeline to prevent the pipeline from freezing.
- (3) Hot water supplied from insulated water tank depends on pressure of water tap, so there must be supply of tap water.
- (4) During using, the cut-off valve of cooling water inlet of water tank should be kept normally on.

10.5 Requirements on water quality

Paramete	Parametric value	Unit
pH(25°C)	6.8~8.0	—
Cloudy	< 1	NTU
Chloride	< 50	mg/L
Fluoride	< 1	mg/L
Iron	< 0.3	mg/L
Sulphate	< 50	mg/L
SiO ₂	<30	mg/L
Hardness(count CaCO ₃)	< 70	mg/L
Nitrate(count N)	< 10	mg/L
Conductance(25°C)	< 300	μs/cm
Ammonia (count N)	< 0.5	mg/L
Alkalinity(count CaCO ₃)	< 50	mg/L
Sulfid	Cannot be detected	mg/L
Oxygen consumption	< 3	mg/L
Natrium	< 150	mg/L

10.6 Electric wiring work

10.6.1 Wiring principle

General principles

- (1) Wires, equipment and connectors supplied for use on the site must be in compliance with provisions of regulations and engineering requirements.
- (2) Only electricians holding qualification are allowed to perform wire connection on the site.
- (3) Before connection work is started, the power supply must be shut off.
- (4) Installer shall be responsible for any damage due to incorrect connection of the external circuit.
- (5) Caution --- MUST use copper wires.
- (6) Connection of power cable to the electric cabinet of the unit
- (7) Power cables should be laid out through cabling trough, conduit tube or cable channel.
- (8) Power cables to be connected into the electric cabinet must be protected with rubber or plastic to prevent scratch by edge of metal plate.
- (9) Power cables close to the electric cabinet of the unit must be fixed reliably to make the power terminal in the cabinet free from an external force.
- (10) Power cable must be grounded reliably.

10.6.2 Specification of power supply wire and leakage switch

Power cable specifications and Leakage switch types in the following list are recommended.

Model	Power Supply	Air Break Switch	Minimum Section Area of Earth Wire	Minimum Section Area of Power Wire
	V, Ph, Hz	А	mm ²	mm²
GRS-Cm18PdRe/NhA-M	380-415V 3N~ 50Hz	20	2.5	2.5
NOTES				

NOTES:

Leakage Switch is necessary for additional installation. If circuit breakers with leakage protection are in use, action response time must be less than 0.1 second, leakage circuit must be 30mA.

(1) The above selected power cable diameters are determined based on assumption of distance

from the distribution cabinet to the unit less than 75m. If cables are laid out in a distance of 75m to 150m, diameter of power cable must be increased to a further grade.

- (2) The power supply must be of rated voltage of the unit and special electrical line for air-conditioning.
- (3) All electrical installation shall be carried out by professional technicians in accordance with the local laws and regulations.
- (4) Ensure safe grounding and the grounding wire shall be connected with the special grounding equipment of the building and must be installed by professional technicians.
- (5) The specifications of the breaker and power cable listed in the table above are determined based on the maximum power (maximum amps) of the unit.
- (6) The specifications of the power cable listed in the table above are applied to the conduit-guarded multi-wire copper cable (like, YJV XLPE insulated power cable) used at 40°C and resistible to 90°C (see IEC 60364-5-52). If the working condition changes, they should be modified according to the related national standard.
- (7) The specifications of the breaker listed in the table above are applied to the breaker with the working temperature at 40°C. If the working condition changes, they should be modified according to the related national standard.

11 Wring Diagram

11.1 Control Board

GRS-Cm18PdRe/NhA-M





11.2 Electric Wiring

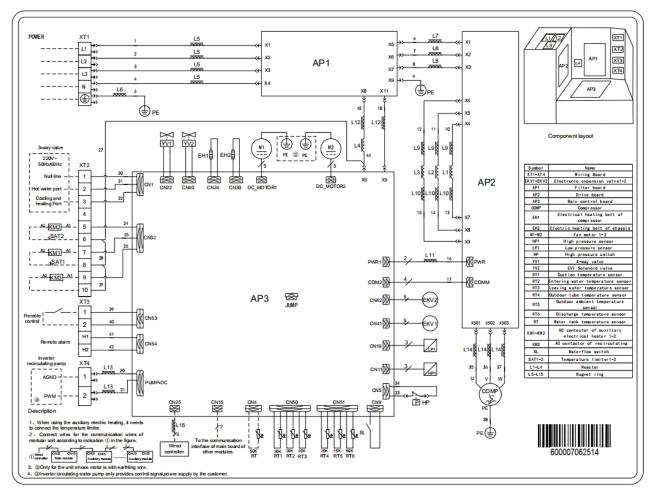
11.2.1 Wiring principle

Refer to Section 9.6.

11.2.2 Electric wiring

The wiring diagram stuck to the unit always prevails.

GRS-Cm18PdRe/NhA-M



12 Commissioning

12.1 Check before startup

For safety of users and unit, the unit must be started up for check before debugging. The procedures are as below:

The foll	The following items shall be performed by qualified repair persons.				
Confirm	Confirm together with the sales engineer, dealer, installing contractor and customers for the following items finished or tobe				
finisheo					
No.	Confirmation of Installation	\checkmark			
1	If the contents of Application for Installation of this Unit by Installer are real. If not, debugging will be refused.				
2	Is there written notice in which amendment items are shown in respect of unqualified installation?				
3	Are Application for Installation and Debugging list filed together?				
No.	Pre-check	\checkmark			
1	Is appearance of the unit and internal pipeline system ok during conveying, carrying or installation?				
2	Check the accessories attached with the unit for quantity, package and so on.				
3	Make sure there is drawings in terms of electricity, control, design of pipeline and so on.				
4	Check if installation of the unit is stable enough and there is enough space for operation and repair.				
5	Completely test refrigerant pressure of each unit and perform leakage detection of the unit.				

No.	Pre-check	\checkmark
6	Is the water tank installed stably and are supports secure when the water tank is full?	
7	Is heat insulating measures for the water tank, outlet/inlet pipes and water replenishing pipe proper?	
8	Are the nilometer of water tank, water temperature indicator, controller, manometer, pressure relief valve and automatic discharge valve etc. installed and operated properly?	
9	Does power supply accord with the nameplate? Do power cords conform to applicable requirements?	
10	Is power supply and control wiring connected properly according to wiring diagram? Is earthing safe? Is each terminal stable?	
11	Are connection pipe, water pump, manometer, thermometer, valve etc. are installed properly?	
12	Is each valve in the system open or closed according to requirements?	
13	Confirm that the customers and inspection personnel of Part A are at site.	
14	Is Installation Check-up Table completed and signed by the installation contractor?	

	General Evaluation: Debugging <pre>Debugging</pre>
	Judge the following items (if there is not any filling, qualification will be regarded.)
	a: Power supply and electric control system b: Loading calculation
	c: Heating problems of Unit d: Noise problem
Confirmed Items after pre-checking	e: Pipeline problem f: Others
	Normal debugging work can't be performed unless all installation items are qualified. If there is any problem, it must be solved firstly. The installer will be responsible for all costs for delay of debugging and re-debugging incurred by any problem which is not solved immediately.
	Submit schedule of amending reports to installer.
	Is the written amending report which should be signed after communication provided to installer?
	Yes ()No ()

12.2 Test run

Test run is testing whether the unit can run normally via preoperation. If the unit cannot run normally, find and solve problems until the test run is satisfactory. All inspections must meet the requirements before performing the test run. Test run should follow the content and steps of the table below:

	The following procedure should be executed by experience and qualified maintenance men.				
No.	Start up the pretest procedure				
NOTICE: be casualty.	NOTICE: before test, ensure that all power must be cut off, including the far- end power switch, otherwise, it may cause casualty.				
1	Ensure that the compressor of the unit is preheated for 8h.				
Caution: heat the lubricating oil at least 8h in advance to prevent refrigerant from mixing with the lubricating oil, which may cause damage to the compressor when starting up the unit.					
2	2 Check whether the oil temperature of the compressor is obviously higher than the outdoor ambient temperature.				
Caution: if the oil temperature of the compressor is obviously higher than the outdoor ambient temperature, it means that the heating tape of compressor is damaged. In that case, the compressor will be damaged easily. Therefore, repair the heating tape before using the unit.					

	The foll	owing procedure should be executed by experience and qualified maintenance men.		
No.	Start up the pretest procedure			
3	Check whether the phase sequence of the main power supply is correct. If not, correct the phase sequence firstly.			
Recheo	ck the phase	e sequence before start-up to avoid reverse rotation of the compressor which may damage the unit.		
4		universal electric meter to measure the insulation resistance between each outdoor phase and earth between phases.		
A Caution	: defective e	earthing may cause electric shock.		
No.		Ready to start		
	Cut off all	temporary power supply, resume all the insurance and check the electricity for the last time.		
1	Check the operating	power supply and voltage of the control circuit;V must be ±10% within the range of rated power.		
No.		Start up the unit		
1	Check all t	the conditions needed to start up the unit: oil temperature, mode, required load etc.		
2	Start up th etc.	e unit, and observe the operation of compressor, electric expanding valve, fan motor and water pump		
	Note: the unit will be damaged under abnormal running state. Do not operate the unit in states of high pressure and high current.			
Others:				
		Estimation or suggestion on the general running situation: good, modify		
		Identify the potential problem (nothing means the installation and debugging are in accordance with the requirements.)		
		a. problem of power supply and electric control system:		
		b. problem of load calculation:		
Itoma for a	ocontanco	c. outdoor refrigerant system:		
Items for a after det		d. noise problem:		
	5499119	e. problem of indoor and piping system:		
		h. other problems:		
		During operation, it is needed to charge for the maintenance due to non-quality problems such as incorrect installation and maintenance.		
		Acceptance		
		Is the user trained as required? Please sign. Yes() No()		

13 Daily Operation and Maintenance

In order to avoid damage of the unit, all protecting devices in the unit had been set before delivery, so please do not adjust or remove them.

For the first startup of the unit or next startup of unit after long-period stop (above 1 day) by cutting off the power, please electrify the unit in advance to preheat the unit for more than 8 hours.

Never put sundries on the unit and accessories. Keep dry, clean and ventilated around the unit.

Remove the dust accumulated on the condenser fin timely to ensure performance of the unit and to avoid stop of the unit for protection.

In order to avoid protection or damage of the unit caused by blockage of the water system, clean the filter in water system periodically and frequently check water replenishing device.

In order to ensure anti-freezing protection, never cut off the power if ambient temperature is below zero in winter.

In order to avoid frost crack of the unit, water in the unit and pipeline system not used for a long period should be drained. In addition, open the end cap of the water tank for drainage.

When the water tank has been installed but the water tank is set to "Without", functions relative with the water tank will not work and the displayed water tank temperature will always be "-30". In this case, the water tank would suffer frostbite and even other severe influences under low temperature. Therefore, once the water tank has been installed, the water tank must be set to "With", otherwise GREE will not be responsible for this abnormal operation.

Never frequently make the unit on/off and close the manual valve of the water system during operation of the unit by users.

Ensure frequent check to the working condition of each part to see if there is oil stain at pipeline joint and charge valve to avoid leakage of refrigerant.

If malfunction of the unit is out of control of users, please timely contact with authorized service center.

Malfunctions	Reasons	Troubleshooting
Compressor does not start up	Power supply has problem. Connection wire is loose. Malfunction of mainboard. Malfunction of compressor.	Phase sequence is reverse. Check out and re-fix. Find out the reasons and repair. Replace compressor.
Heavy noise of fan	Fixing bolt of fan is loose. Fan blade touches shell or grill. Operation of fan is unreliable.	Re-fix fixing bolt of fan. Find out the reasons and adjust. Replace fan.
Heavy noise of compressor	Liquid slugging happens when liquid refrigerant enters into compressor. Internal parts in compressor are broken.	Check if expansion valve is failure and temp. sensor is loose. If that, repair it. Replace compressor.
Water pump does not run or runs abnormally	Malfunction of power supply or terminal. Malfunction of relay. There is air in water pipe.	Find out the reasons and repair. Replace relay. Evacuate.
Compressor starts or stops frequently	Poor or excess refrigerant. Poor circulation of water system. Low load.	Discharge or add part of refrigerant. Water system is blocked or there is air in it. Check water pump, valve and pipeline. Clean water filter or evacuate. Adjust the load or add accumulating devices.
The unit does not heat although compressor is running	Leakage of refrigerant. Malfunction of compressor.	Repair by leakage detection and add refrigerant. Replace compressor.
Poor efficiency of hot water heating	Poor heat insulation of water system. Poor heat exchange of evaporator. Poor refrigerant of unit. Blockage of heat exchanger at water side.	Enhance heat insulation efficiency of the system. Check if air in or out of unit is normal and clean evaporator of the unit. Check if refrigerant of unit leaks. Clean or replace heat exchanger.

13.1 Recovery

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

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labeled 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 Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

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

13.3 Safety consideration

Checking for presence of refrigerant

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

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.

13.4 Notice before Seasonal Use

- (1) Check whether air inlets and air outlets of units is blocked
- (2) Check whether ground connection is reliable or not
- (3) If unit starts up after not operating for a long time, it should be power on 8 hours before operation starts so as to preheat the outdoor compressor
- (4) Precautions for Freeze Protection in Winter

Under subzero climatic conditions in winter, anti-freeze fluid must be added into the water cycle and external water pipes should be properly insulated. Glycol solution is recommended as the anti-freeze fluid.

Concentration	Freezing Temp	Concentration	Freezing Temp	Concentration	Freezing Temp
%	°C	%	°C	%	°C
4.6	-2	19.8	-10	35	-21
8.4	-4	23.6	-13	38.8	-26
12.2	-5	27.4	-15	42.6	-29
16	-7	31.2	-17	46.4	-33

NOTE: "Concentration" listed in the table above indicates the mass concentration.



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