



Installer's Manual

Original Instructions 
Air Conditioners

Versati Air-to-water Split Heat Pump

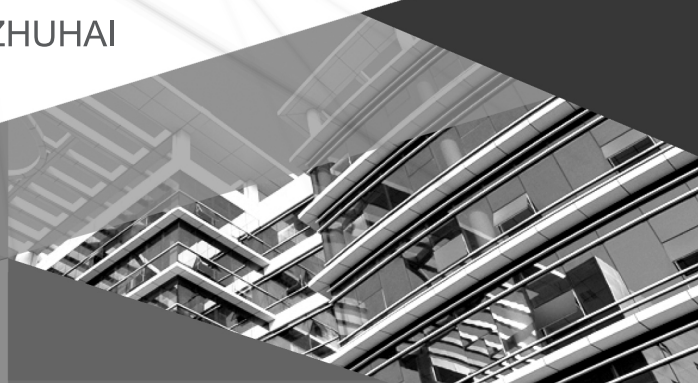
Models:

GRS-CQ4.0PdG/NhH3-E	GRS-CQ16PdG/NhH3-E1
GRS-CQ6.0PdG/NhH3-E	GRS-CQ8.0PdG/NhH3-M
GRS-CQ8.0PdG/NhH3-E	GRS-CQ10PdG/NhH3-M
GRS-CQ10PdG/NhH3-E	GRS-CQ12PdG/NhH3-M
GRS-CQ12PdG/NhH3-E	GRS-CQ14PdG/NhH3-M
GRS-CQ14PdG/NhH3-E	GRS-CQ12PdG/NhH3-M1
GRS-CQ12PdG/NhH3-E1	GRS-CQ14PdG/NhH3-M1
GRS-CQ14PdG/NhH3-E1	GRS-CQ16PdG/NhH3-M1

Thank you for choosing GREE air conditioners. 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 responsible 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 our designated dealer or local service center for professional support if necessary.
- (3) When the product is faulted and cannot be operated, please contact our designated dealer or local service 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).
- (4) 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 without further notice.


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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.

NOTE

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.

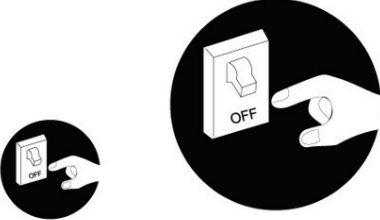



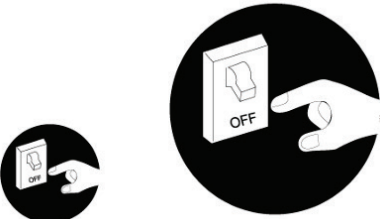

This product is a kind of comfort air conditioning, and is not allowed to be installed where there are corrosive, explosive and inflammable substances or smog; otherwise it would lead to operation failure, shortened service life, five hazard or even severe injuries. Special air conditions are required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




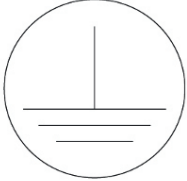
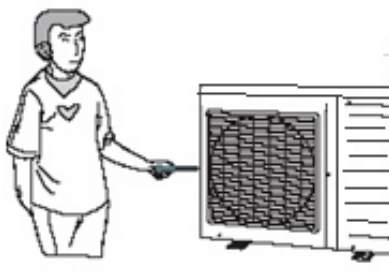







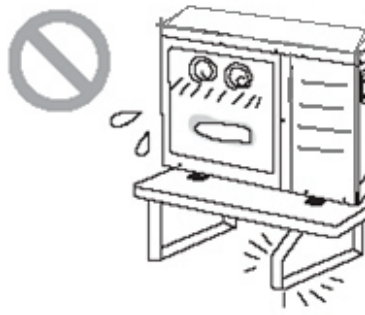
Correct Disposure

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

⚠ WARNING		
<p>Once abnormality like burning smell occurs, please cut off the power supply immediately and then contact with service center.</p>  <p>If the abnormality still exists, the unit may be damaged and electric shock or fire may result.</p>	<p>Don't operate the unit with wet hand.</p>  <p>Otherwise, it may cause electric shock.</p>	<p>Before installation, please see if the voltage of local place accords with that on nameplate of unit and capacity of power supply, power cord or socket is suitable for input power of this unit.</p> 
<p>Special circuit must be adopted for power supply to prevent fire.</p>  <p>Do not use octopus multipurpose plug or mobile terminal board for wire connection.</p>	<p>Be sure to pull out the power plug and drain the indoor unit and water tank when unit is not in use for a long time.</p>  <p>Otherwise, the accumulated dust may cause overheating, fire or freeze of water tank or coaxial heater exchanger in winter.</p>	<p>Never damage the electric wire or use the one which is not specified.</p>  <p>Otherwise, it may cause overheating or fire.</p>

<p>Before cleaning please cut off the power supply.</p>   <p>Otherwise, it may cause electric shock or damage.</p>	<p>The power supply must adopt special circuit with leakage switch and enough capacity.</p>	<p>User can not change power cord socket without prior consent. Wiring working must be done by professionals. Ensure good earthing and don't change earthing mode of unit.</p>
<p>Earthing: the unit must be earthed reliably ! The earthing wire should connect with special device of buildings.</p>   <p>If not, please ask the qualified personnel to install. Furthermore, don't connect earth wire to gas pipe, water pipe, drainage pipe or any other improper places which professional does not recognize.</p>	<p>Never insert any foreign matter into outdoor unit to avoid damage . And never insert your hands into the air outlet of outdoor unit.</p> 	<p>Don't attempt to repair the unit by yourself.</p>   <p>Improper repair may cause electric shock or fire, so you should contact the service center to repair.</p>

<p>Don't step on the top of the unit or place anything on it.</p>  <p>There is the danger of fall of things or people.</p>	<p>Never block the air inlet and outlet of unit.</p>  <p>It may reduce efficiency or cause stop of the unit and even fire.</p>	<p>Keep pressurized spray, gas holder and so on away from the unit above 1m .</p>  <p>It may cause fire or explosion.</p>
<p>Please note whether the installation stand is firm enough or not.</p>  <p>If damaged, it may cause fall of the unit and injury of people.</p>	<p>Unit should be installed at the place with good ventilation to save energy.</p>	<p>When there is not water in water tank, never power the unit on to run.</p>

⚠ WARNING

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 centre. 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 odour. 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.

⚠ NOTE

	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.
	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 used refrigerant is the fluoride R32, which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can lead 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 ozone layer. 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.

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 eradicant. 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 authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.

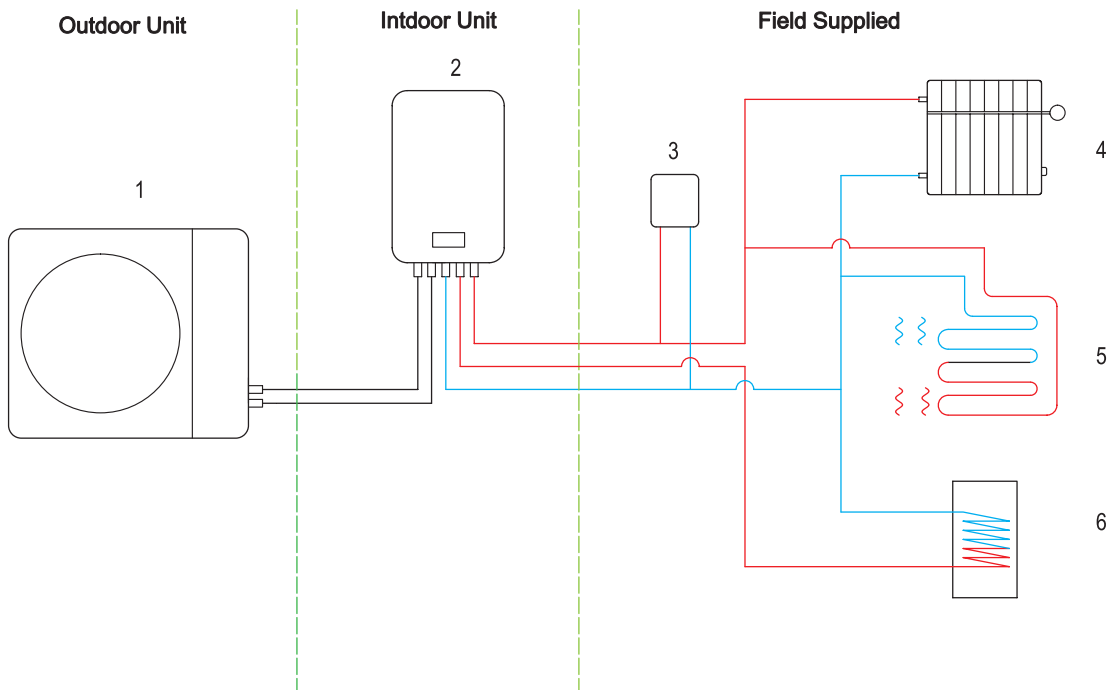
Service shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

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 connected by a hose-set.

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

1. Operating Principle



No.	Name	No.	Name
1	Outdoor unit	4	Radiator
2	Indoor unit	5	Underfloor coils
3	Other thermal	6	Water tank

Notes

(a) Water mixing accessories are optional parts. When they are required, please contact the manufacturer. The diagram above is just for reference and actual installation depends on the project's field.

2. Product Data

2.1 Main Unit

2.1.1 Nomenclature

G	RS	-	C	Q	10	Pd	G	/	Nh	H3	-	E	(O)
1	2		3	4	5	6	7		8	9		10	11

No.	Description	Options
1	GREE	G-GREE
2	Air to Water Heat Pump	RS
3	Heating Mode	S= Static; C=Circulating
4	Function	Q=Multi-function; Omit=Single-function
5	Nominal Heating Capacity	10=10kW; 12=12kW;.....
6	Compressor Style	Pd=DC Inverter; Omit=On/Off
7	Water tank model	G=190L
8	Refrigerant	Nh=R32
9	Design Serial Number	H3: generation
10	Power Supply and Fan Type	E/M=230/400V,~50Hz; E1/M1=230/400V,~50Hz (dual fan)
11	Indoor and Outdoor Unit Code	I=Indoor unit; O=Outdoor unit

2.1.2 Operation Range

Temperature Range		
Mode	Heat Source Side Temperature (°C)	User Side Temperature (°C)
Heating	-30~35	20~65
Cooling	-15~48	5~25
Water Heating	-30~45	40~80

Maximum and Minimum Water Operating Temperatures		
Item	Minimum water operating temperatures(°C)	Maximum water operating temperatures (°C)
Cooling	5°C	25°C
Heating	20°C	65°C
Water heating	40°C	80°C

Maximum and Minimum Water Operating Pressures		
Item	Minimum water operating pressures(MPa)	Maximum water operating pressures(MPa)
Cooling	0.05	0.25
Heating		
Water heating		

Maximum and Minimum Entering Water Pressures		
Item	Minimum entering water pressures(MPa)	Maximum entering water pressures(MPa)
Cooling	0.05	0.25
Heating		
Water heating		

2.2 Ciculation Water

2.2.1 Temperature Sensor Parameter

Displayed Name	Range	Nominal working datas			Remark
		Cooling	Heating	Hot water	
T-outdoor	-40~150	8~50	-35~37	-27~45	temperature sensor resistance 15K
T-suction	-40~150	5~30	-35~20	-25~30	temperature sensor resistance 20K
T-discharge	-30~150	30~102	35~102	35~102	temperature sensor resistance 50K
T-defrost	-40~150	20~57	-35~30	-25~40	temperature sensor resistance 20K
T-water in PE	-30~150	10~30	20~65	20~55	temperature sensor resistance 20K
T-water out PE	-30~150	5~25	25~60	25~60	temperature sensor resistance 20K
T-optional water Sen.	-30~150	5~25	25~60	25~60	temperature sensor resistance 50K
T-tank ctrl.	-30~150	/	/	10~80	temperature sensor resistance 50K
T-floor debug	-30~150	/	25~45	/	/
Debug time	-0~100	/	12~72	/	/
T-liquid pipe	-30~150	5~25	20~57	20~57	temperature sensor resistance 20K
T-gas pipe	-30~150	30~102	35~102	35~102	temperature sensor resistance 20K
T-economizer in	-30~150	no EVI under cooling	-20~55	-20~55	temperature sensor resistance 20K
T-economizer out	-30~150	no EVI under cooling	-20~55	-20~55	temperature sensor resistance 20K
T-remote room	-30~150	18~30	18~30	18~30	/
Dis. Pressure	-40~70	25~60	25~62	25~62	/
T-weather depend	-30~150	7~25	25~60	/	based on calculation

2.2.2 Calculation of Unit Load for Floor Heating

Empirical Values of Floor Heating Load Per Square Meter

House W/m ²	
Dining Room	100~120
Master Room	100~110
Guest Room	110~130
Study Room	90~110
Villa W/m ²	
Dining Room	110~140
Master Room	100~120
Guest Room	100~130
Study Room	100~120

Notes:

- Villas whose load is generally larger than the houses should take the value between the middle and the maximum empirical values listed above.
- The top layer whose load is generally larger than the middle or bottom layer should take the maximum empirical value.
- The guest room whose load is generally much larger should take the value between the intermediate and the maximum empirical values listed above.
- For those whose external walls or glass areas are large, it is recommended to take the load calculation.
- The heating load for the bathroom is generally 500W/room.
- The load listed above are just for referece.

3. Installation

3.1 Safety Precautions

NOTE

- When units are delivered check whether any damage occurred during shipment. If there is damage to the surface or outside of a unit, submit a written report to the shipping company.
- Check that the model, specifications and quantity of the units delivered are as ordered.
- Check that all accessories ordered have been included. Retain the Owner's Manual for future reference.
- Do not remove any packaging before hoisting. If units are not packaged or if the packaging is damaged, use suitable boards or packing material to protect the units.
- Hoist one unit at a time, using two ropes to ensure stability.
- Keep units upright during hoisting the outdoor unit, ensuring that the angle to the vertical does not exceed 30°.
- Installation of the unit must be in accordance with national and local safety codes.
- 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.
- Do not connect to power until all installation work is completed.

WARNING

- Installation should be performed by GREE appointed servicemen, or improper installation would lead to unusual operation, water leakage, electric shock or fire hazard.
- The unit should be installed on the foundation which is capable of supporting the unit, or the unit would fall off or even lead to personal injury.
- All electric installation should be done by electrician in accordance with local laws and regulations, as well as the User's Manual and this Service Manual. Besides, the special power lines should be used, as any improper line would lead to electric shock or fire hazard.
- All electric lines should be safe and secured reliably. Be sure the terminal board and electric lines will not be affected by any external force, or it would lead to fire hazard.
- The electric lines should run properly to make the cover of the electric box secured tightly, or it would cause the terminal board overheated or cause electric shock or fire hazard.
- Cut off the power supply before touching any electric element.

CAUTION

- The unit should be grounded properly and the ground line is not allowed to connect with the gas line, water line, lightning rod or phone line.
- The breaker should be installed, or it would lead to electric shock.
- The drain pipe should be installed to ensure free drainage, and the drain pipe should be insulated against condensation. Once the drain pipe is installed improperly, it would lead to water leak which then will damp the ceiling and furniture.
- Do not place the unit where there is oil fog, like kitchen, or the plastic would be aged, broken off or the polluted evaporator would lead to water leak and poor performance.
- Do not place the unit where there is corrosive gas (like sulfur dioxide), or the corroded copper tubes or welded joint would lead to refrigerant leakage.
- Do not place the unit where there is inflammable gas, carbon fiber, inflammable dust or volatile combustible, as they would lead to fire hazard.

⚠ SAFETY

- Always use safety outfits at the construction site.
- No smoking and no drunken operation are allowed at the construction site.
- Wear no gloves and tighten the cuff when operating the machinery and electrical equipment. Do not maintain it during operation.
- Use the abrasive-disk cutter and stand at the side of the rotating abrasive disk.
- Clean the opening when installing the riser pipe, and then cover it tightly. Do not throw down any material.
- The use of the electric and gas welders should be approved firstly. Once used, a fire extinguisher should be prepared and a service man should be there always. There should be no inflammable and explosive substances around the welding site.
- A platform should be set up when working high above the ground.

3.2 Requirements on Installation Location

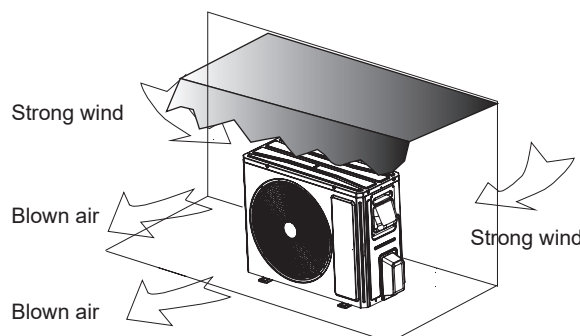
3.2.1 Installation Location Selection for Outdoor Units

- (1) Outdoor unit must be installed on a firm and solid support.
- (2) Outdoor unit shall be installed close to the indoor unit, hence to minimize the length and bends of cooling pipe.
- (3) Avoid placing the outdoor unit under window or between two constructions, hence to prevent normal operating noise from entering the room.
- (4) Air flow at inlet and outlet shall not be blocked.
- (5) Install at a well-ventilated place, so that the machine can absorb and discharge sufficient air.
- (6) 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) Placement of the outdoor unit should take account of the following considerations:
 - Outdoor units should not be exposed to direct radiation from a high-temperature heat source.
 - Outdoor units should not be installed in positions where dust or dirt may affect heat exchangers.
 - Outdoor units should not be installed in locations where exposure to oil or to corrosive or harmful gases, such as acidic or alkaline gases, may occur.
 - Outdoor units should not be installed in locations where exposure to salinity may occur.
 - Outdoor units should be installed in well-drained, well-ventilated positions.
 - Outdoor units should be installed in locations where the noise from the unit will not disturb neighbors.

4.2.2 Strong Wind Installation

Wind of 5m/s or more blowing against an outdoor unit's air outlet blocks the flow of air through the unit, leading to deterioration in unit capacity, accelerated frost accumulation when in heating mode or domestic hot water mode, and potential disruption to operation due to increased pressure in the refrigerant circuit. Exposure to very strong wind can also cause the fan to rotate excessively fast, potentially leading to damage to the fan. In locations where exposure to high winds may occur should take account of the following considerations:

For installation of the outdoor unit in a place where the wind direction can be foreseen. Set the outlet side at a right angle to the direction of the wind, refer to the figure below.



If turn the air outlet side toward the building's wall, fence or screen. Make sure there is enough room to do the installation.

3.2.3 Cold Climate Installation

In cold climate locations installation should take account of the following considerations:

- (1) Never install the unit at a site where the suction side may be exposed directly to wind.
- (2) To prevent exposure to wind, install a baffle plate on the air discharge side of the unit.
- (3) To prevent exposure to wind, install the unit with its suction side facing the wall.
- (4) In areas of heavy snowfall, a canopy should be installed to prevent snow entering the unit.
- (5) Additionally, the height of the base structure should be increased so as to raise the unit further off the ground, and should be no less than 20cm in the areas with possible heavy snowfall.

3.2.4 Hot Climate Installation

As the outdoor temperature is measured via the outdoor unit air thermistor, make sure to install the outdoor unit in the shade or a canopy should be constructed to avoid direct sunlight, so that it is not influenced by the sun's heat, otherwise protection may be possible to the unit.

3.2.5 Installation Location for Indoor Units

- (1) Avoid direct sunshine.
- (2) Ensure the hanger rod, ceiling and building structure have sufficient strength to support the weight of air conditioner unit.
- (3) Drainage pipe is easy to connect out.
- (4) Indoor and outdoor connection pipes are easy to go outdoors.
- (5) Do not install at a place where inflammable or explosive goods exist or inflammable or explosive gas may leak.
- (6) Do not install at a place subject to corrosive gas, severe dust, salty fog, smoke or heavy moisture.

3.3 Field Supplied Pipes, Valves and Service Tools

(1) Field Supplied Pipes and Valves

Name	Usage
Water Filter	It is used to remove foreign matters in the waterway.
2-way Valve	It is used to switch waterways between underfloor system and the FCU.
3-way Valve	It is used to switch waterways of hot water inside the water tank and circulation water inside the main unit.
Bypass Valve	It is used to balance the water pressure.
Water manifold	It is used to distribute water.
Pipe and Pipe Joint	It is used to connect the water pipes.
Cut-off Valve	It is used to cut off or get through the waterway.

(2) Service Tools

The commonly used service tools include the spanner, the screw driver, pliers, tube tongs and the tube expander. The required service tools depend on the actual condition of the installation field.

3.4 Precautions for Installation

3.4.1 Precautions for Installation of Outdoor Units

- (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°C below to prevent center of the unit from moving.
- (2) Adopt M12 bolts components to tighten feet and under frame when installing.
- (3) Outdoor unit should be installed on concrete base that is 20cm height.
- (4) Requirements on installation space dimension of unit's bodies are shown in following drawing.
- (5) Outdoor 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.
- (6) Note that when release and refix the screw of the clasper, your hand should support the panel. And then, after connected power cable, please ensure using the elastic trip of accessory to tighten with the pipe.

3.4.2 Precautions for Installation of Indoor Units

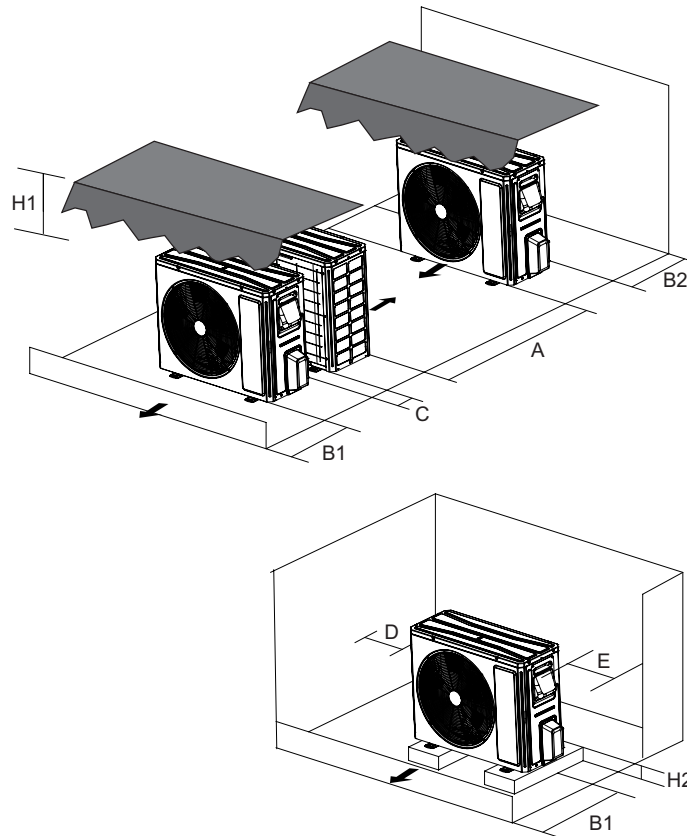
- (1) Indoor unit shall be vertically mounted on the wall of the room with expansion bolt.
- (2) Keep the indoor unit away from heat sources like heat sink and so on in the room as much as possible.
- (3) Keep the indoor unit as close as possible to outdoor unit. Level distance between connection pipes cannot exceed 20m(4.0~6.0kW) or 30m (8.0~16kW) and vertical distance cannot exceed 15m (4~16kW).

⚠ NOTE

• For appliances with SUPPLEMENTARY HEATERS, the minimum CLEARANCE from the appliance to combustible surfaces is 500mm.

3.5 Installaiton Space

(1) Installation Space for Outdoor Units



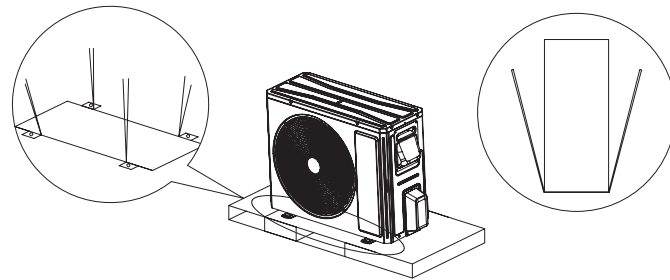
Unit	A(mm)	B1(mm)	B2(mm)	C(mm)	H1(mm)	H2(mm)	D(mm)	E(mm)
4~16kW	>2000	>1000	>200	>400	>500	>200	>200	>500

Notes:

- (a) For areas with frequent snowfall, please clean up the snow in time to avoid covering unit.
- (b) The unit is installed in areas expecting snow are suggested to be raised with support frames.
- (c) If possible, avoid locations that are likely to accumulate snow. If not possible, a snow guard should be installed on the unit to prevent accumulation of snow on the top of the unit.
- (d) Height of the installation foundation should be higher than the height of the annual average snowfall.
- (e) Snow and other litters shall be removed within at least one meter distance from the unit so as to keep the unit in normal operation.

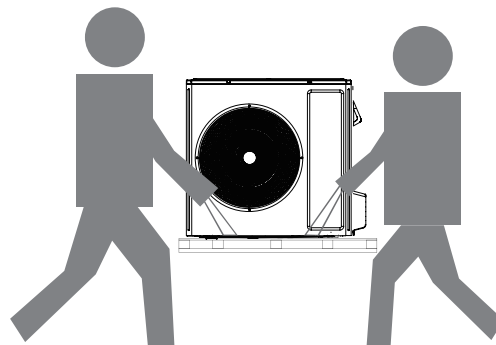
(2) Handling

Step 1: pass the sling through the inside of the unit support. Pull up both sides of the sling at the same time to prevent disclination of the sling from the unit.



Step 2: While handling the unit

The manual handling picture is for reference only. The number of handling personnel should be configured based on the weight of unit and national regulation. Please pay attention to the center of gravity during the handling process, and adjust the handling angle & height accordingly.



Step 3: After mounting the unit, remove the sling.

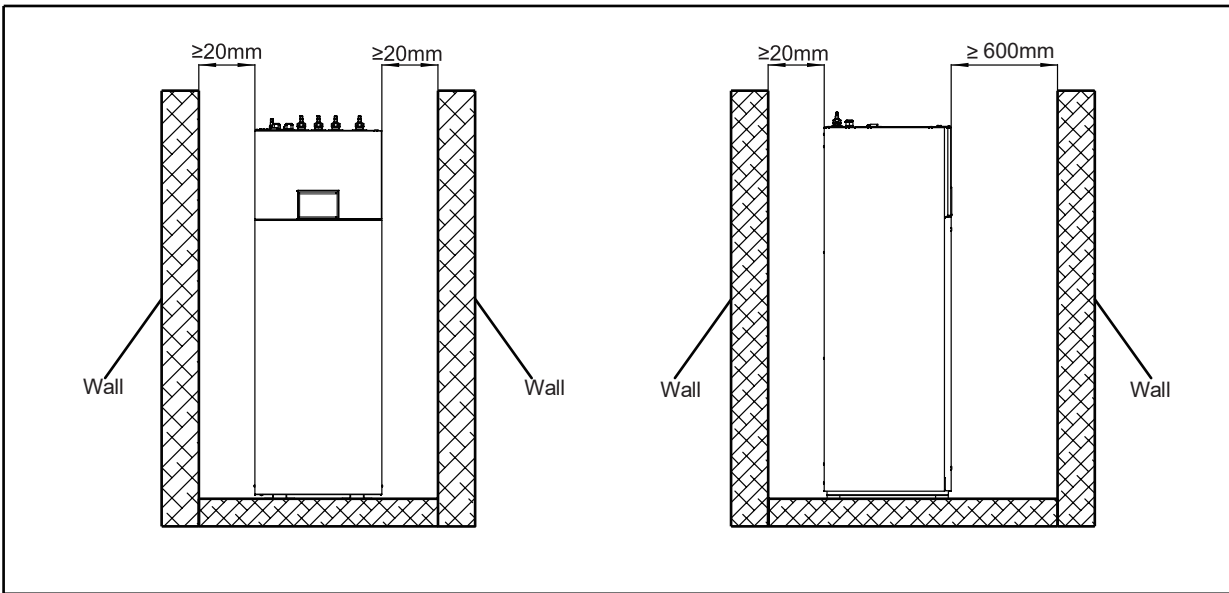
CAUTION

- To avoid injury, do not touch the air inlet and aluminum fins of the unit.
- Do not use the grips in the fan grills to avoid damage.
- The unit is top heavy! Prevent the unit from falling due to improper inclination during handling.

WARNING

- 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. This point is unavailable for 4kW and 6 kW units.

3.5.2 Installation Space for Indoor Units



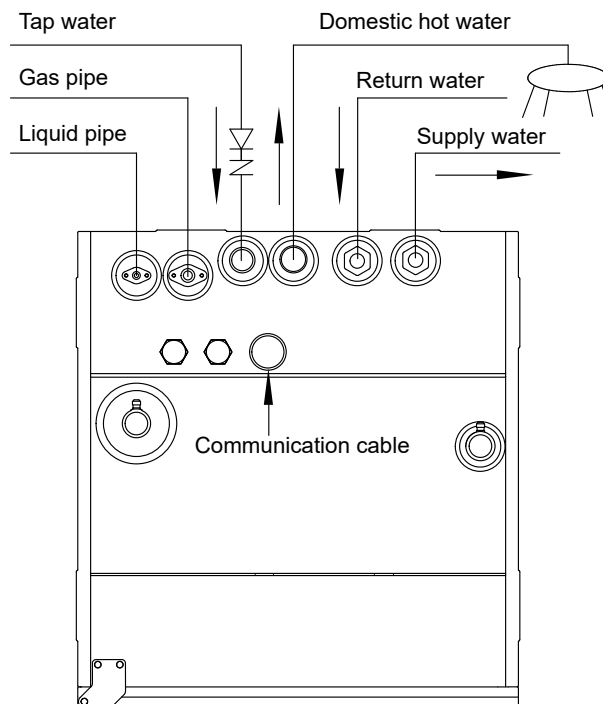
Service Space

NOTE

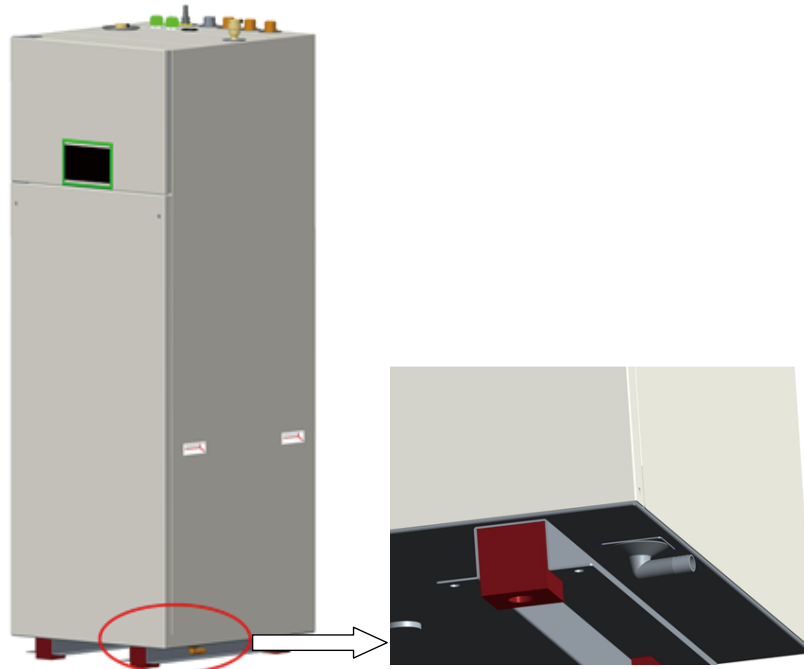
- While lifting the indoor unit, at least two persons should be joined. Weight of the indoor unit is more than 50kg.
- The indoor unit must be installed vertically to the ground and fastened securely.
- Before commissioning, the dust-proof cap of the automatic relief valve must be loosened, other than entirely being removed away, and it can be tightened in case that it leaks.

3.5.3 Precautions on installation of indoor unit

- (1) Keep the indoor unit away from heat sources like heat sink and so on in the room as much as possible.
- (2) Keep the indoor unit as close as possible to outdoor unit. Level distance between connection pipes cannot exceed 20m(4.0~6.0kW) or 25m (8.0~10kW) and vertical distance cannot exceed 15m (4~10kW).
- (3) A safety valve and a check valve are necessary at the inlet and outlet of domestic water pipes; otherwise it would affect adversely the normal use of the unit.



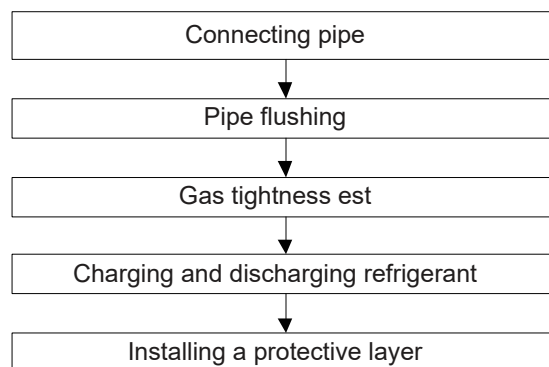
(4) As shown in the figure below, the drain connector is located at the right lower side of the unit. The user is needed to connect the drain pipe to the drain connector for guiding water out.



3.6 Connection of the Refrigerant System

3.6.1 Installation Procedures

Installation of the refrigerant piping system should proceed in the following order:



Pipe flushing should be performed once the brazed connections have been completed with the exception of the final connections to the indoor units. That is, flushing should be performed once the outdoor units have been connected but before the indoor units are connected

mechanical connections made in accordance with following:

A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe and/or any uncharged refrigerating system part.

Reusable mechanical connectors and flared joints are not allowed indoors.

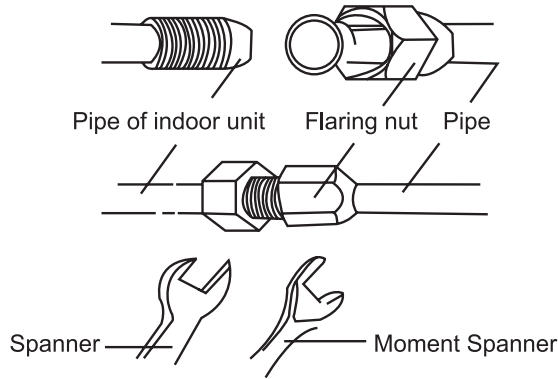
Refrigerant tubing shall be protected or enclosed to avoid damage.

Mechanical connections shall be accessible for maintenance purposes.

3.6.2 Connection of outlet pipe for indoor & outdoor unit

(1) Align the expansion end of copper pipe with the center of threaded joint. Tighten the flaring nuts with your hands.

- (2) Tighten the flaring nuts with torque wrench until you hear a “click”.
- (3) Bend of fitting pipe shall not be too low; otherwise the fitting pipe might crack. Please use pipe bender when bending the fitting pipe.
- (4) When connecting outdoor and indoor unit, never pull the big and small joint of indoor unit with force, so as to prevent the tubes of indoor unit from cracking and causing leakage.
- (5) Connecting pipe shall be supported by a rack without transmitting its weight to other units. (Two spanners should be used at the same time.)



NOTE

- The installation of pipe-work shall be kept to a minimum.

3.6.3 Pipe Flushing

(1) Purpose

To remove dust, other particles and moisture, which could cause compressor malfunction if not flushed out before the system is run, the refrigerant piping should be flushed using nitrogen. flushing should be performed once the outdoor unit have been connected but before the water tank is connected.

(2) Procedure

WARNING

- Only use nitrogen for flushing. Using carbon dioxide risks leaving condensation in the piping. Oxygen, air, refrigerant, flammable gases and toxic gases must not be used for flushing. Use of such gases may result in fire or explosion.

The liquid and gas sides can be flushed simultaneously; alternatively, one side can be flushed first and then Steps 1 to 6 repeated, for the other side. The flushing procedure is as follows:

- 1) Attach a pressure reducing valve to a nitrogen cylinder.
- 2) Connect the pressure reducing valve outlet to the inlet on the liquid (or gas) side of the outdoor unit.
- 3) Start to open the nitrogen cylinder valve and gradually increase the pressure to 0.5MPa.
- 4) Allow time for nitrogen to flow as far as the opening at water tank.
- 5) Flush the opening:
 - a) Using suitable material, such as a bag or cloth, press firmly against the opening at water tank.
 - b) When the pressure becomes too high to block with your hand, suddenly remove your hand allowing gas to rush out.
 - c) Repeatedly flush in this manner until no further dirt or moisture is emitted from the piping. Use a clean cloth to check for dirt or moisture being emitted. Seal the opening once it has been flushed.
- 6) Once flushing is complete, seal the opening to prevent dust and moisture from entering.

3.6.4 Gas tightness Test

(1) Purpose

To prevent faults caused by refrigerant leakage, a gastightness test should be performed before system commissioning.

WARNING

- Only dry nitrogen should be used for gastightness testing. Oxygen, air, flammable gases and toxic gases must not be used for gastightness testing. Use of such gases may result in fire or explosion.

(2) Procedure

The gastightness test procedure is as follows:

Step 1

- Once the piping system is complete and the hydronic box and outdoor unit have been connected, vacuum the piping to -0.1MPa.

Step 2

- Charge the piping with nitrogen at 0.3MPa and leave for at least 3 minutes to check large leakage, then 1.5MPa leave for at least 3 minutes to check small leakage, finally 4.3MPa leave for at least 24 hours to check micro leakage.
- After the test period of at least 24 hours, observe the pressure in the piping and assess whether or not the observed pressure indicates the presence of a leak. Allow for any change in ambient temperature over the test period by adjusting the reference pressure by 0.01MPa per 1°C of temperature difference. Adjusted reference pressure = Pressure at pressurization + (temperature at observation – temperature at pressurization) x 0.01MPa.
- Compare the observed pressure with the adjusted reference pressure. If they are the same, the piping has passed the gastightness test.
- If the observed pressure is lower than the adjusted reference pressure, the piping has failed the test. Refer to Part “Leak detection”. Once the leak has been found and fixed, the gastightness test should be repeated.

Step 3

- If not continuing straight to vacuum drying (see Part “Vacuum Drying”) once the gastightness test is complete, reduce the system pressure to 0.5-0.8MPa and leave the system pressurized until ready to carry out vacuum drying procedure.

(3) Leak detection

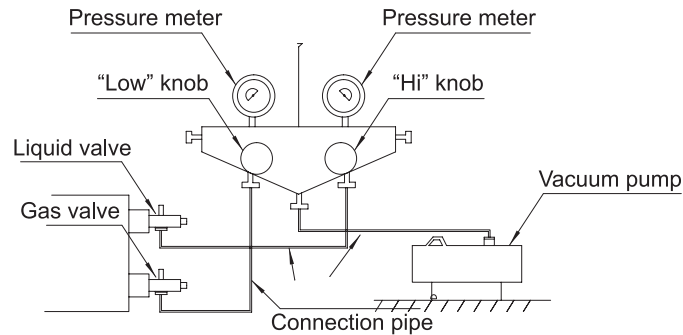
The general methods for identifying the source of a leak are as follows:

- Audio detection: relatively large leaks are audible.
- Touch detection: place your hand at joints to feel for escaping gas.
- Soapy water detection: small leaks can be detected by the formation of bubbles when soapy water is applied to a joint.
- Refrigerant leak detection: for leaks that are difficult to detect, refrigerant leak detection may be used as follows:
 - _ Pressurize the piping with nitrogen at 0.3MPa.
 - _ Add refrigerant into the piping until the pressure reaches 0.5MPa.
 - _ Use a halogen refrigerant detector to find the leak.
 - _ If the leak source cannot be found, continuing charging with refrigerant to a pressure of 4.3 MPa and then search again.
 - _ Add refrigerant into the piping until the pressure reaches 0.5MPa.
 - _ Use a halogen refrigerant detector to find the leak.
 - _ If the leak source cannot be found, continuing charging with refrigerant to a pressure of 4.3 MPa and then search again.

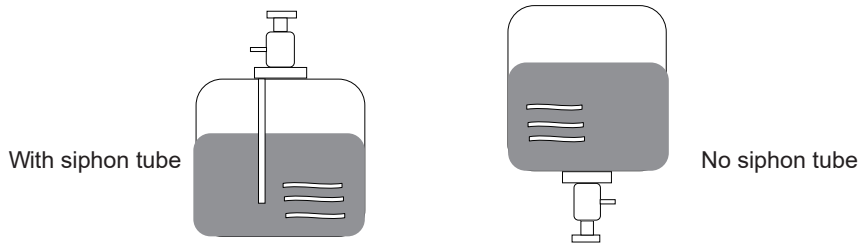
3.6.5 Charging and Discharging of Refrigerant

- (1) Before shipped out from manufacturer, the outdoor unit has been filled with refrigerant. Additional refrigerant may be filled when carrying out site connection of pipelines.

- (2) Check the liquid valve and the gas valve of the outdoor unit. The valves shall be completely shut off.
- (3) Connect a vacuum pump to the liquid valve and the gas valve of the outdoor unit to remove air from the inside of the indoor unit and the connecting pipe. Refer to the following figure:



- (4) After confirming that there is no leakage from the system, when the compressor is not in operation, charge additional R32 working fluid with specified amount to the unit through the filling opening of the liquid pipe valve of the outdoor unit.
 - Be sure to charge the specified amount of refrigerant in liquid state to the liquid pipe. Since this refrigerant is a mixed refrigerant, adding it in gas form may cause the refrigerant composition to change, preventing normal operation.
 - Before charging, check whether the refrigerant cylinder is equipped with a siphon tube or not.



⚠ WARNING

- When charging is interrupted or finished, reinspect the unit but do not let the compressor run into operation.

⚠ NOTE

- Do not use mixture of refrigerant vapor and air or oxygen for pressurizing for fear of explosion.
- 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.

(5) Precautions for removal and evacuation

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

- remove refrigerant;
- purge the circuit with inert gas;
- evacuate;
- purge again with inert gas;
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.

Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipework are to take place.

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

(6) Precautions for charging

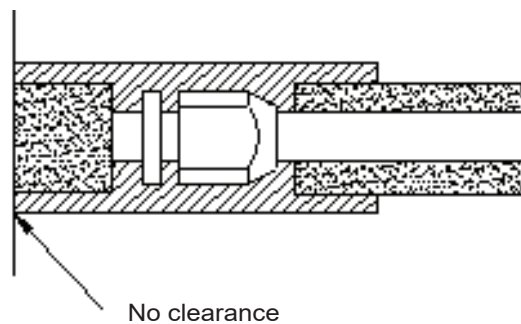
In addition to conventional charging procedures, the following requirements shall be followed.

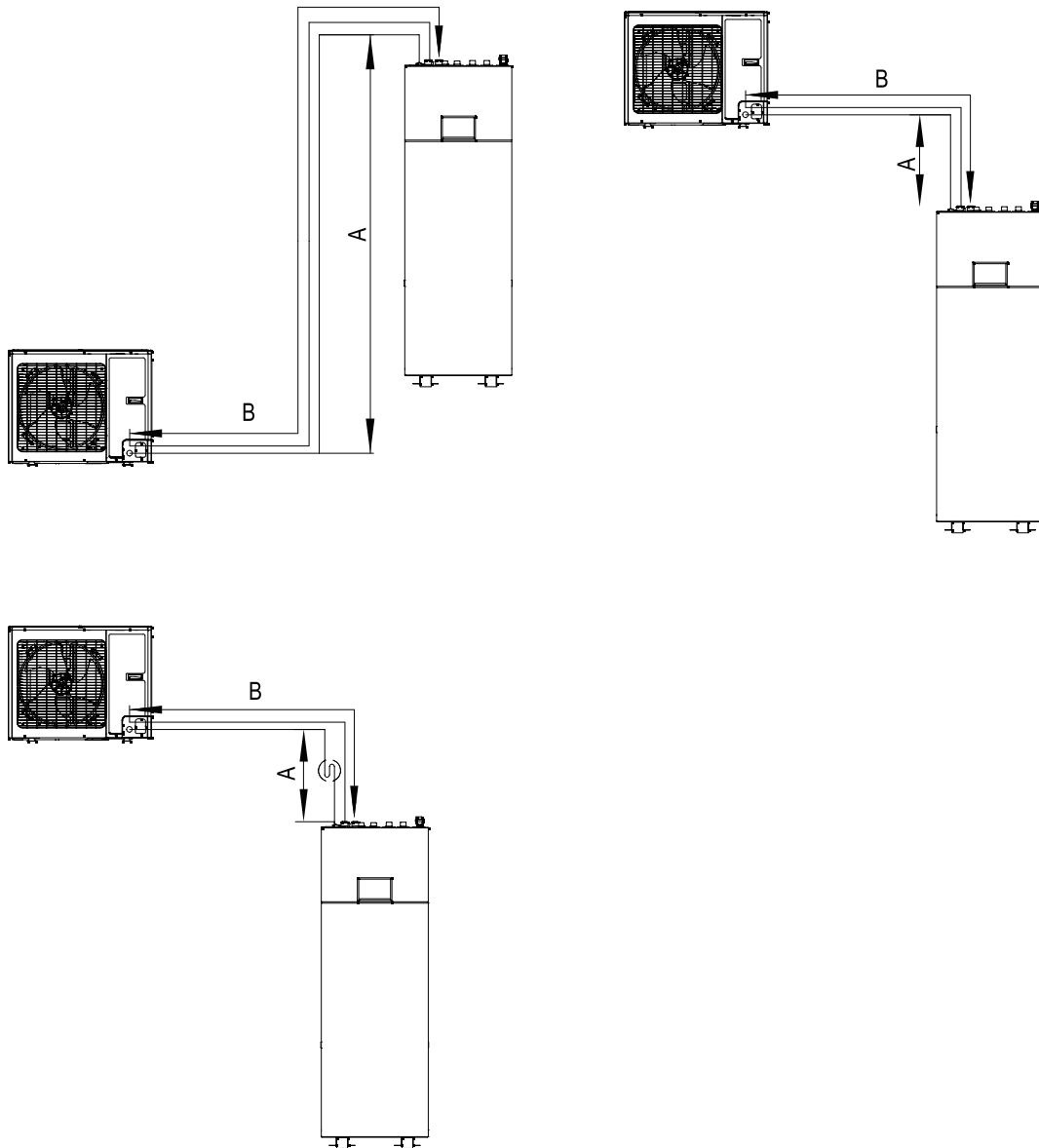
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the 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.

3.6.6 Installation of protective layer on connection pipe

- (1) To avoid condensate dew or water leakage on connecting pipe, the air pipe and liquid pipe must be wrapped with heat preservation material and adhesive pipe for insulation from the air.
- (2) The joints on indoor unit and outdoor unit must be wrapped with heat preservation materials and have no clearance against the wall surface of indoor unit and outdoor unit.
- (3) Wrap the pipe with tapes.
 - Use the adhesive tape to wrap the connecting pipe and cable into one bundle. To prevent condensate water from overflowing out of the drainpipe, the drainpipe shall be separated from connecting pipe and cable.
 - Wrap the heat preservation tape so that each ring of tape shall press half of the previous ring.
 - Fix the wrapped pipe onto the wall with pipe clamp.
 - Do not wrap the protective tape too tightly, as this will decrease the heat insulation performance.
 - After completing the protection work and wrapping the pipe properly, close the wall holes with sealing materials.



3.6.7 Size of Connection Pipes and Additional Refrigerant Required


Model	Pipe size (Diameter:Φ)		Length B		Elevation A		Additional refrigerant (g/m)
	gas	Liquid	Standard	Max.	Standard	Max.	
GRS-CQ4.0PdG/NhH3-E	1/2	1/4	5m	20m	0m	15m	50
GRS-CQ6.0PdG/NhH3-E	1/2	1/4	5m	20m	0m	15m	50
GRS-CQ8.0PdG/NhH3-E	5/8	3/8	5m	30m	0m	15m	50
GRS-CQ10PdG/NhH3-E	5/8	3/8	5m	30m	0m	15m	50
GRS-CQ12PdG/NhH3-E	5/8	3/8	5m	30m	0m	15m	50
GRS-CQ14PdG/NhH3-E	5/8	3/8	5m	30m	0m	15m	50
GRS-CQ12PdG/NhH3-E1	5/8	3/8	5m	30m	0m	15m	50
GRS-CQ14PdG/NhH3-E1	5/8	3/8	5m	30m	0m	15m	50
GRS-CQ16PdG/NhH3-E1	5/8	3/8	5m	30m	0m	15m	50

Notes

- (a) No additional charge of the refrigerant is need when the pipe length is less than 10m, if the pipe length is longer than 10m, additional charge of the refrigerant is needed according to the table.
- (b) For 4kW and 6kW units, the size of the liquid line is defaulted to be 1/4, if the distance between the indoor and outdoor unit is or larger than 10m, the liquid line should be sized up to 3/8 and additional 50g/m refrigerant is required.
- (c) Additional refrigerant listed in the table above are just for reference and should comply with local regulations.
- (d) Compliance with national gas regulations shall be observed.
- (e) The refrigerant charge for the all model is as high as 1.84kg. It is the allowed maximum charge for the split type unit. If more charge is required, the indoor ventilation equipment must be equipped.

3.6.8 Refrigerant Charge Amount for the Minimum Installation Room Area

Minimum installation room area (m ²)				
Charge amount(Kg)	Floor location	Window mounted	Wall mounted	Ceiling mounted
≤1.20	/	/	/	/
1.30	14.0	5.0	1.6	1.1
1.35	15.5	5.6	1.7	1.2
1.40	16.7	6.0	1.9	1.2
1.45	17.9	6.4	2.0	1.3
1.50	19.1	6.9	2.1	1.4
1.55	20.4	7.4	2.3	1.5
1.60	21.8	7.8	2.4	1.6
1.65	23.2	8.3	2.6	1.7
1.70	24.6	8.9	2.7	1.8
1.75	26.1	9.4	2.9	1.9
1.80	27.6	9.9	3.1	2.1
1.85	29.1	10.5	3.2	2.2
1.90	30.7	11.1	3.4	2.3
1.95	32.4	11.7	3.6	2.4
2.00	34.0	12.3	3.8	2.5
2.05	35.8	12.9	4.0	2.7
2.10	37.5	13.5	4.2	2.8
2.15	39.3	14.2	4.4	2.9
2.20	41.2	14.8	4.6	3.1
2.25	43.1	15.5	4.8	3.2

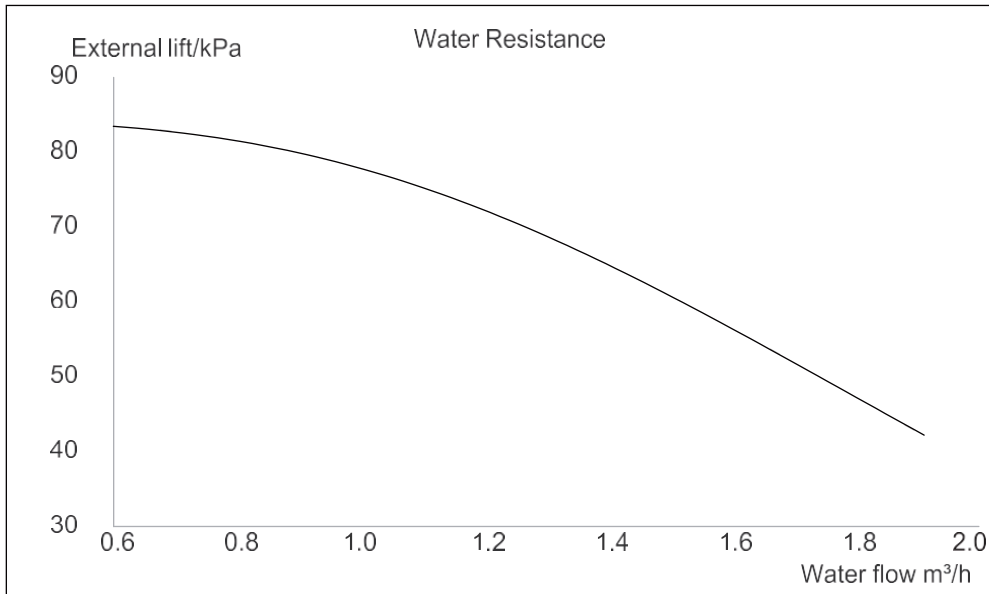
Minimum installation room area (m ²)				
Charge amount(Kg)	Floor location	Window mounted	Wall mounted	Ceiling mounted
2.30	45.0	16.2	5.0	3.3
2.35	47.0	16.9	5.2	3.5
2.40	49.0	17.6	5.4	3.6
2.45	51.1	18.4	5.7	3.8
2.50	53.2	19.1	5.9	4.0
2.55	55.3	19.9	6.1	4.1
2.60	57.5	20.7	6.4	4.3
2.65	59.8	21.5	6.6	4.4
2.70	62.0	22.3	6.9	4.6
2.75	64.4	23.2	7.2	4.8
2.80	66.7	24.0	7.4	5.0
2.85	69.1	24.9	7.7	5.1
2.90	71.6	25.8	8.0	5.3
2.95	74.1	26.7	8.2	5.5
3.00	76.6	27.6	8.5	5.7
3.05	79.2	28.5	8.8	5.9
3.10	81.8	29.4	9.1	6.1
3.15	84.4	30.4	9.4	6.3
3.20	87.2	31.4	9.7	6.5
3.25	89.9	32.4	10.0	6.7
3.30	92.7	33.4	10.3	6.9

Note: Minimum installation room areas listed above are just for reference and should comply with local relevant laws and regulation.

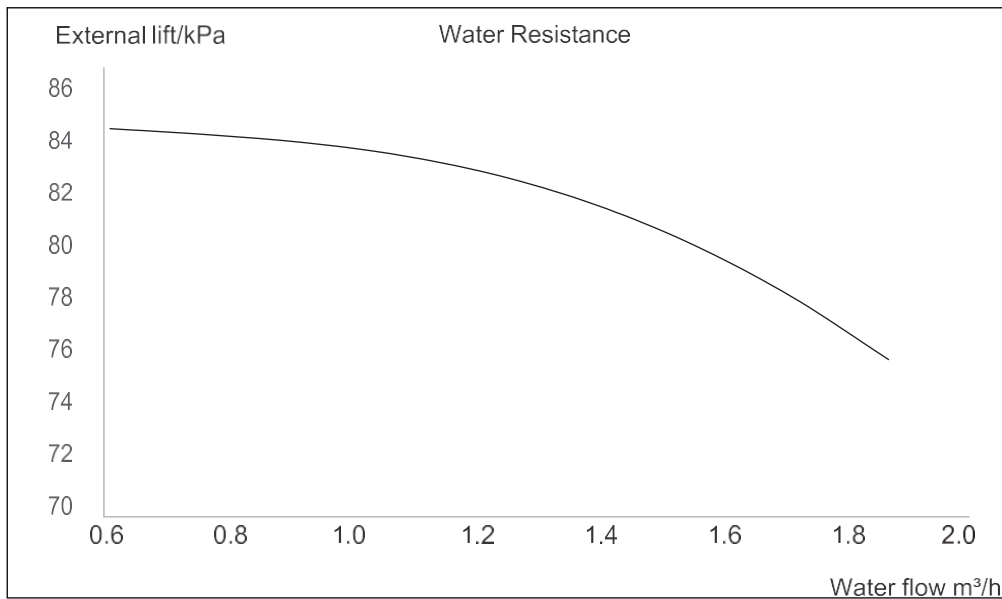
3.7 Curves and Data for the Water Pump and Expansion Vessel

3.7.1 External lift curves of water pumps

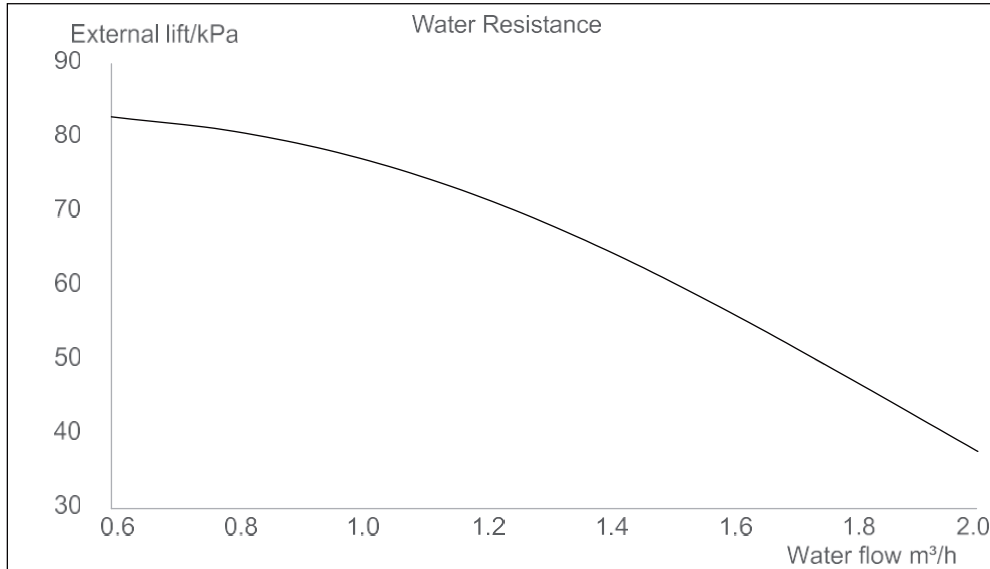
(1) Single-phase 4kW and 6kW units with the Wilo water pump



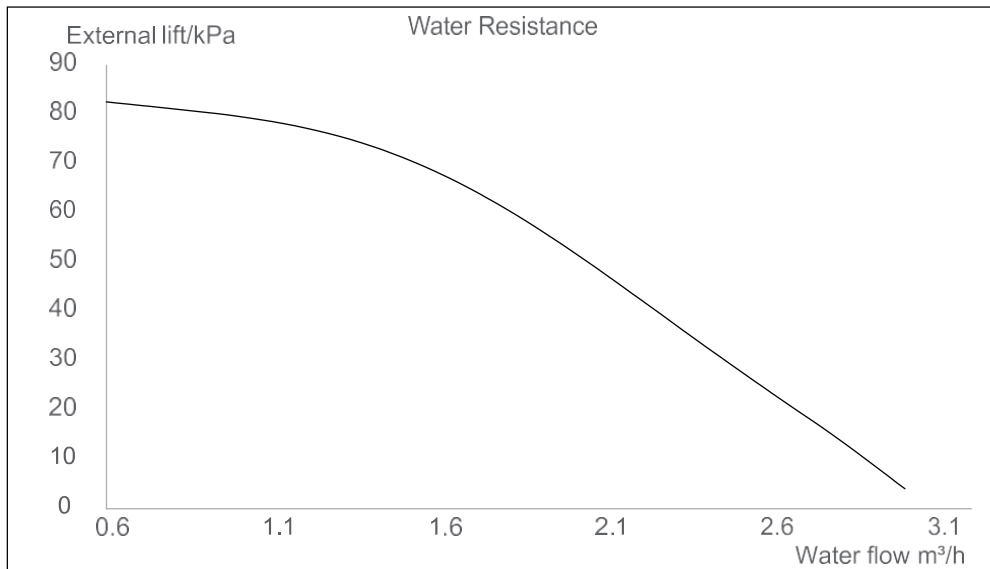
(2) Single-phase 4kW and 6kW units with the Shinwoo water pump



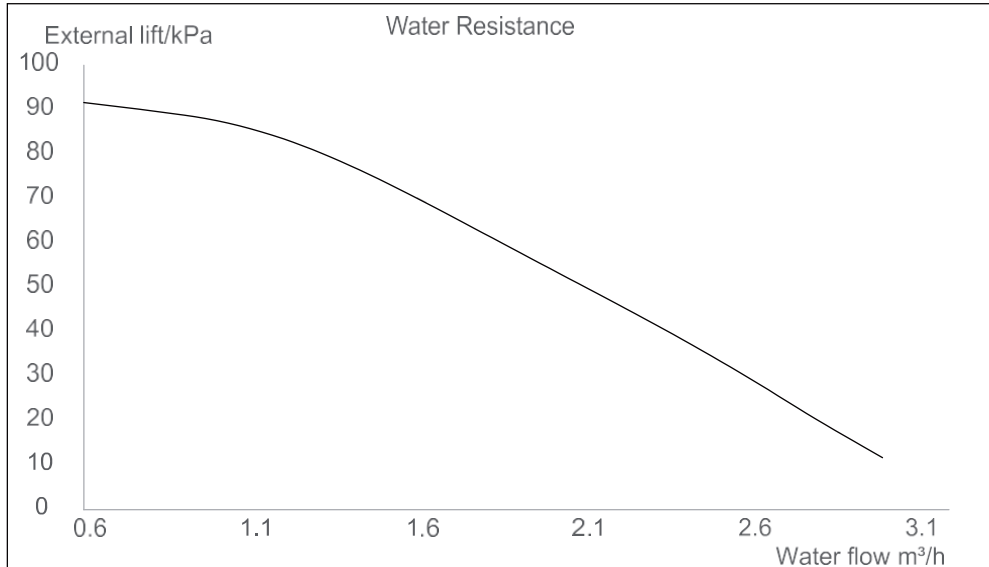
(3) Single-fan 8kW and 10kW units with the Wilo Pump



(4) 12kW and 14kW units with the Wilo Pump



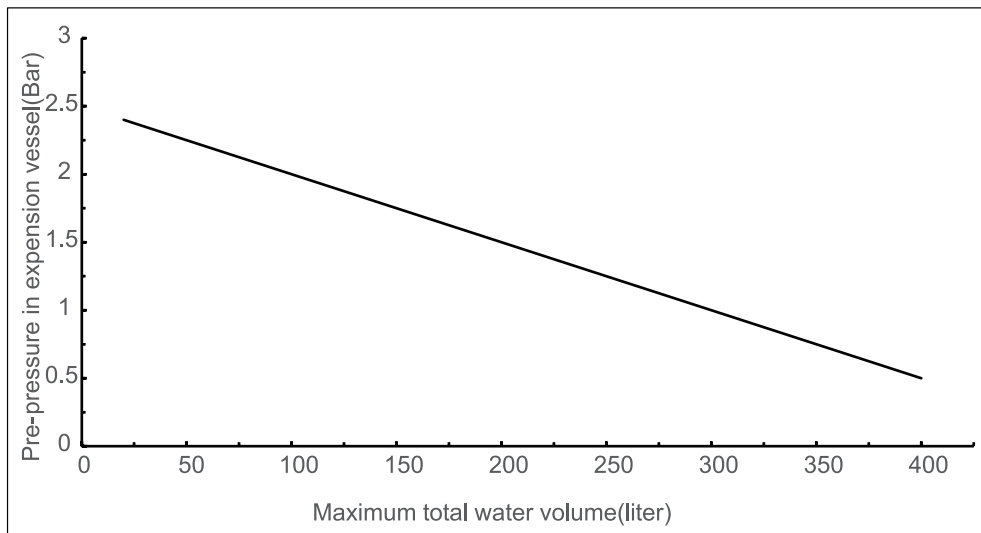
(5) 8kW, 10kW, 12kW, 14kW and 16kW units with the Shinhoo Pump



Note

See the curve above for the maximum external static pressure. The water pump is of variable frequency. And during operation, the water pump will adjust its output based on the actual load.

3.7.2 Water volume and expansion vessel pressure



Notes

- (a) The expansion vessel is 10 liter and 1bar pre-pressurized;
- (b) Total water volume of 280 liter is default; if total water is changed because of installation condition, the pre-pressure should be adjusted to secure proper operation. If the indoor unit is located at the highest position, adjustment is not required;
- (c) Buffer tank specifications should be calculated based on 8-10L/KW;
- (d) To adjust pre-pressure, use nitrogen gas by certificated installer.

3.7.3 Selection of expansion vessel

Formula:

$$V = \frac{C \cdot e}{1 - \frac{1 + p_1}{1 + p_2}}$$

V--- Volume of expansion vessel

C--- Total water volume

P₁--- Pre-set pressure of expansion vessel

P₂-- The highest pressure during running of the system (that is the action pressure of safety valve.)

e---The expansion factor of water (the difference between the expansion factor of the original water temperature and that of highest water temperature.)

Water expansion factor in different temperature	
Temperature(°C)	Expansion factor e
0	0.00013
4	0
10	0.00027
20	0.00177
30	0.00435
40	0.00782
45	0.0099
50	0.0121
55	0.0145
60	0.0171
65	0.0198
70	0.0227
75	0.0258
80	0.029
85	0.0324
90	0.0359
95	0.0396
100	0.0434

 **WARNING**

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

3.8 Electric Wiring Work

3.8.1 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) Only copper wires are allowed to be used.
- (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.

3.8.2 Specification of power supply wire and leakage switch

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

Model	Power supply	Leakage switch	Minimum sectional area of earth wire	Minimum sectional area of power supply wire
	V,Ph,HZ	(A)	(mm ²)	(mm ²)
GRS-CQ8.0PdG/NhH3-M(O)	400V,3N~50Hz	16	2.5	2.5
GRS-CQ10PdG/NhH3-M(O)		16	2.5	2.5
GRS-CQ8.0PdG/NhH3-M(I)		20	4.0	4.0
GRS-CQ10PdG/NhH3-M(I)		20	4.0	4.0
GRS-CQ12PdG/NhH3-M(O)		16	2.5	2.5
GRS-CQ14PdG/NhH3-M(O)		16	2.5	2.5
GRS-CQ16PdG/NhH3-M(O)		16	2.5	2.5
GRS-CQ12PdG/NhH3-M(I)		20	4.0	4.0
GRS-CQ14PdG/NhH3-M(I)		20	4.0	4.0
GRS-CQ16PdG/NhH3-M(I)		20	4.0	4.0
GRS-CQ4.0PdG/NhH3-E(O)		230V,~50Hz	16	1.5
GRS-CQ6.0PdG/NhH3-E(O)	16		1.5	1.5
GRS-CQ8.0PdG/NhH3-E(O)	25		6.0	6.0
GRS-CQ10PdG/NhH3-E(O)	25		6.0	6.0
GRS-CQ12PdG/NhH3-E(O)	40		6.0	6.0
GRS-CQ14PdG/NhH3-E(O)	40		6.0	6.0
GRS-CQ16PdG/NhH3-E(O)	40		6.0	6.0
GRS-CQ4.0PdG/NhH3-E(I)	20		6.0	6.0
GRS-CQ6.0PdG/NhH3-E(I)	20		6.0	6.0
GRS-CQ8.0PdG/NhH3-E(I)	40		6.0	6.0
GRS-CQ10PdG/NhH3-E(I)	40		6.0	6.0
GRS-CQ12PdG/NhH3-E(I)	40		6.0	6.0
GRS-CQ14PdG/NhH3-E(I)	40		6.0	6.0
GRS-CQ16PdG/NhH3-E(I)	40		6.0	6.0

Notes

- (a) 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.
- (b) 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.
- (c) The power supply must be of rated voltage of the unit and special electrical line for air-conditioning.
- (d) All electrical installation shall be carried out by professional technicians in accordance with the local laws and regulations.
- (e) 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.
- (f) 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.
- (g) 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.
- (h) 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.
- (i) A circuit breaker must be added to the fixed line. The circuit breaker is all-pole disconnected and the breaking distance of the contact is at least 3mm.
- (j) Selected power cables should comply with relevant CE standards.
- (k) 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.

3.8.3 Control Boards

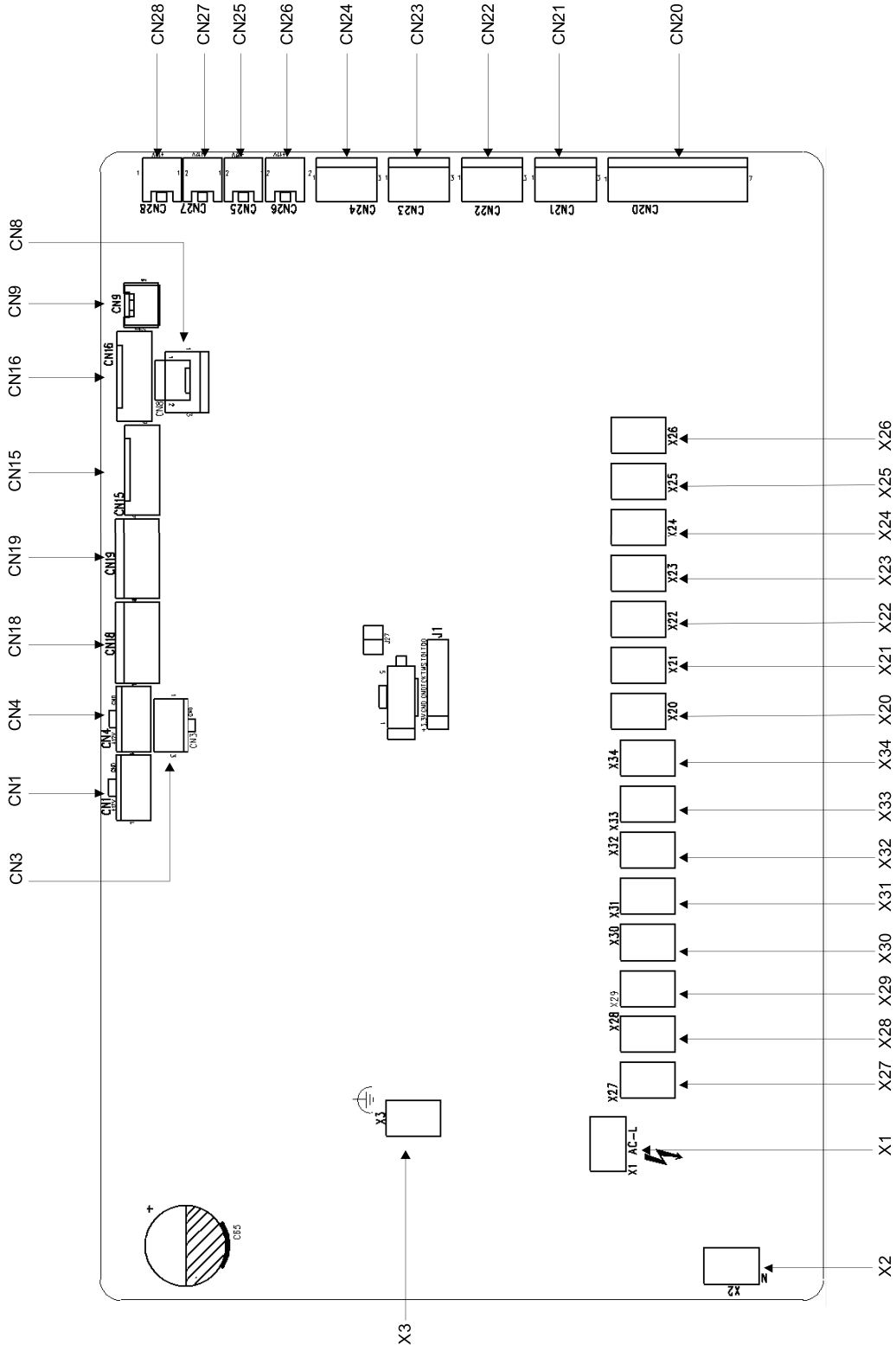
(1) Main board 1

GRS-CQ4.0PdG/NhH3-E
 GRS-CQ12PdG/NhH3-E
 GRS-CQ16PdG/NhH3-E1
 GRS-CQ14PdG/NhH3-M

GRS-CQ6.0PdG/NhH3-E
 GRS-CQ14PdG/NhH3-E
 GRS-CQ8.0PdG/NhH3-M
 GRS-CQ12PdG/NhH3-M1

GRS-CQ8.0PdG/NhH3-E
 GRS-CQ12PdG/NhH3-E1
 GRS-CQ10PdG/NhH3-M
 GRS-CQ14PdG/NhH3-M1

GRS-CQ10PdG/NhH3-E
 GRS-CQ14PdG/NhH3-E1
 GRS-CQ12PdG/NhH3-M
 GRS-CQ16PdG/NhH3-M1

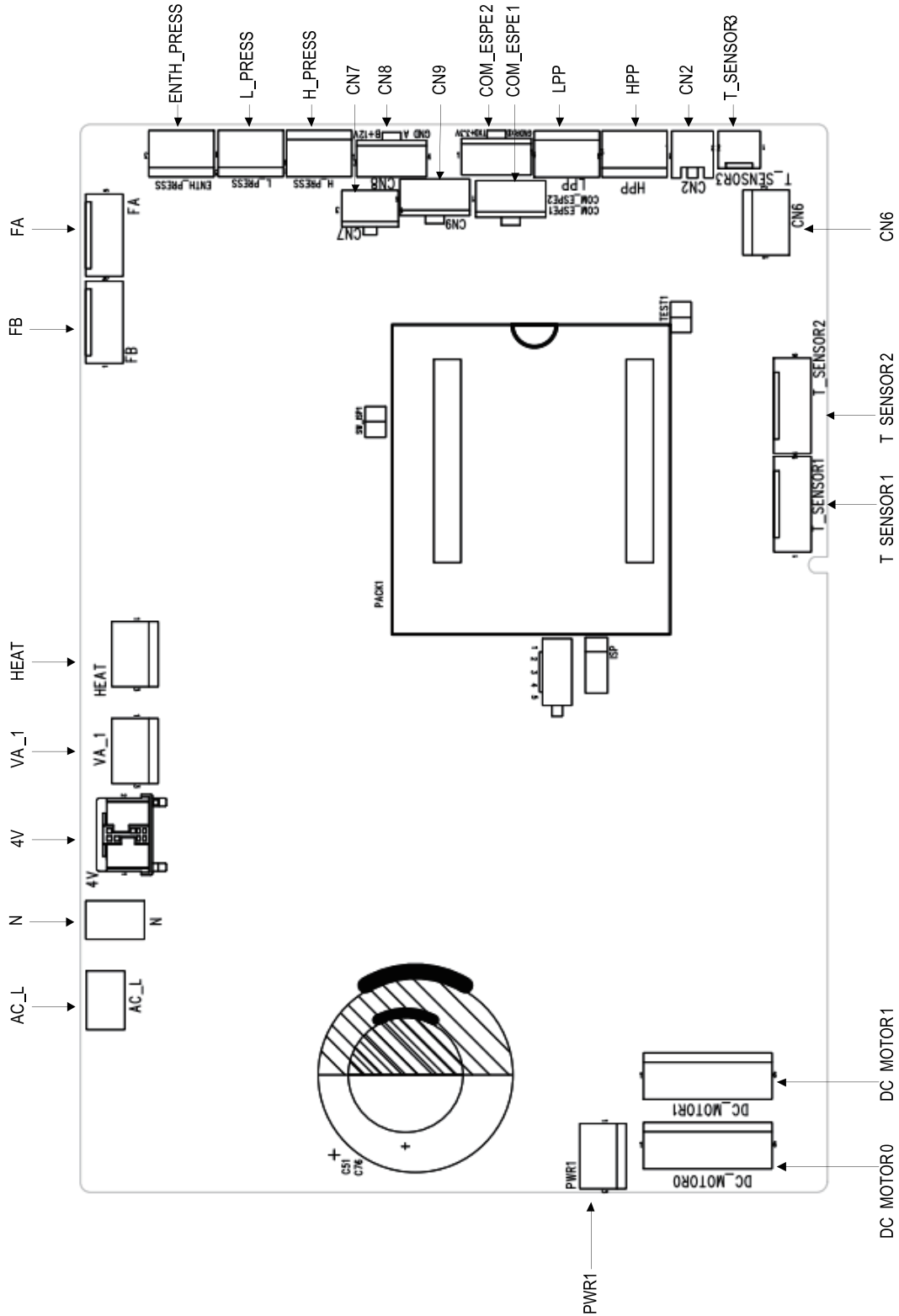


Silk Screen	Introduction
X1	Power supply
X2	Power supply

Silk Screen	Introduction
X3	To the ground
CN3	Communication with the unit
CN1	DC12V for Anode
CN4	Communication with control panel
CN18	Build-in water pump signal(PWM)
CN19	Back-up water pump signal(PWM)-field supply
CN15	20K temperature sensor (inlet water);20K temperature sensor (outlet water);20K temperature sensor (refrigerant liquid line)
CN16	20K temperature sensor (refrigerant vapor line);10K temperature sensor (leaving water for the optional electric heater)
CN9	Water tank temperature sensor
CN8	Remote room temperature sensor
CN28	SG signal
CN27	EVU signal
CN25	Flow switch
CN26	DHW signal
CN24	Gate-control detection
CN23	Detection to welding protection for the water tank electric heater
CN22	Detection to welding protection for the optional electric heater 2
CN21	Detection to welding protection for the optional electric heater 1
CN20	Thermostat
X26	Reserved
X25	Plate heat exchanger anti-freezing
X24	Field supplied water pump
X23	Other thermal by 230VAC
X22	E-heater 2
X21	E-heater 1
X20	E-heater of water tank
X34	Electric three-way valve 2 closed
X33	Electric three-way valve 2 open
X32	Reserved
X31	Field supplied 3-way valve 1
X30	Reserved
X29	Water pump of the water tank
X28	2-way valve 1 is normally closed
X27	2-way valve 1 is normally open

(2) Main board 2

GRS-CQ4.0PdG/NhH3-E	GRS-CQ6.0PdG/NhH3-E	GRS-CQ8.0PdG/NhH3-E	GRS-CQ10PdG/NhH3-E
GRS-CQ12PdG/NhH3-E	GRS-CQ14PdG/NhH3-E	GRS-CQ12PdG/NhH3-E1	GRS-CQ14PdG/NhH3-E1
GRS-CQ16PdG/NhH3-E1	GRS-CQ8.0PdG/NhH3-M	GRS-CQ10PdG/NhH3-M	GRS-CQ12PdG/NhH3-M
GRS-CQ14PdG/NhH3-M	GRS-CQ12PdG/NhH3-M1	GRS-CQ14PdG/NhH3-M1	GRS-CQ16PdG/NhH3-M1



Silk Screen	Introduction
AC-L	Power supply
N	Power supply
4V	4-way valve
VA-1	E-heater of chassis
HEAT	Electric heating tape
FB	1, 2, 3, 4 signals, 5 power supply to EXV2, pipe electronic expansion valve, 1-4 pin: driving impulse output; 5 pin: +12V
FA	1, 2, 3, 4 signals, 5 power supply to EXV1, pipe electronic expansion valve, 1-4 pin: driving impulse output; 5 pin: +12V
ENTH_PRESS	Reserve
L_PRESS	Reserve
H_PRESS	5V signal input of pressure sensor 1 pin: GND; 2 pin: signal input; 3 pin: +5V
CN7	Communication between AP1 and AP2; communication cable 2-pin: B, 3-pin: A;
CN8	1-pin: 12V, 2-pin: B, 3-pin: A, 4-pin: ground, To the control panel, communication cable;
CN9	1-pin: +12V, 2-pin: B; 3-pin: A, 4-pin: ground
COM_ESPE2	1-pin: +3.3V, 2-pin: TXD, 3-pin: RXD, 4-pin: ground
COM_ESPE1	1-pin: +3.3V, 2-pin: TXD, 3-pin: RXD, 4-pin: ground
LPP	1-pin: +12V, 3-pin: signal
HPP	1-pin: +12V, 3-pin: signal
CN2	1-pin: +12V, 2-pin: signal
T_SENSOR3	Reserve
CN6	Reserve
T_SENSOR2	1,2: environment; 3,4: discharge; 5,6: suction
T_SENSOR1	1,2: economizer inlet; 3,4: economizer outlet; 5,6: defrost
DC-MOTORO1	1-pin: fan power supply; 3-pin: fan GND; 4-pin: +15V; 5-pin: control signal; 6-pin: feedback signal
DC-MOTORO0	1-pin: fan power supply; 3-pin: fan GND; 4-pin: +15V; 5-pin: control signal; 6-pin: feedback signal
PWR1	310V Supply 310V DC power to the drive

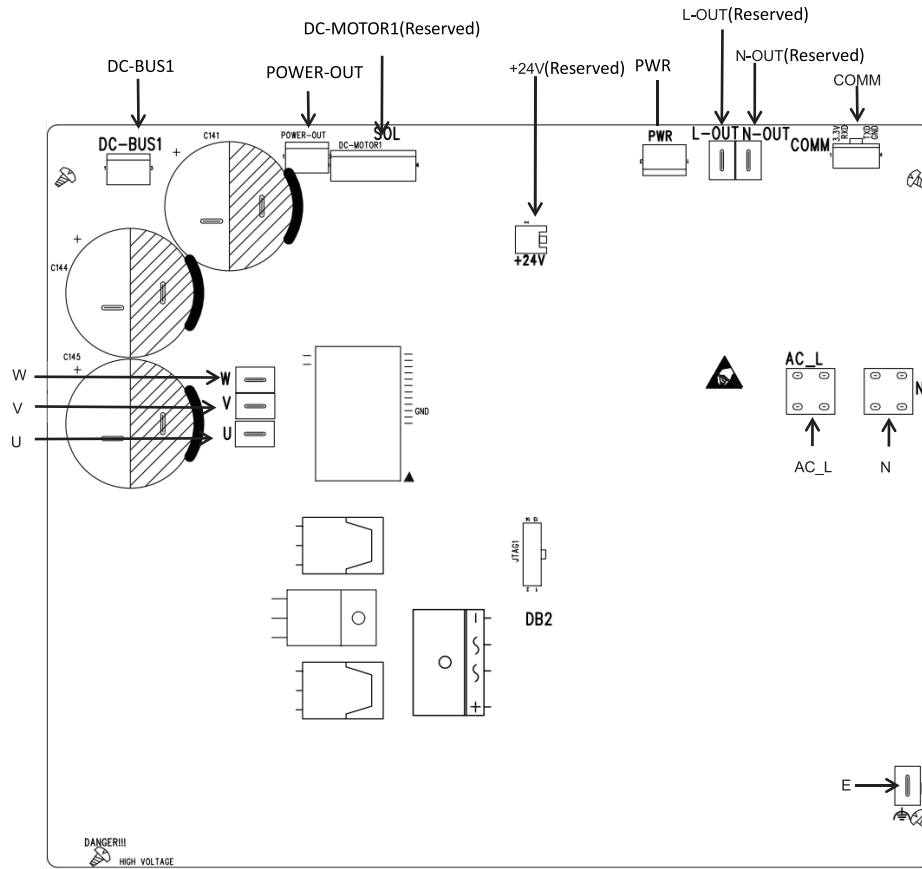
(3) Drive board

GRS-CQ4.0PdG/NhH3-E

GRS-CQ6.0PdG/NhH3-E

GRS-CQ8.0PdG/NhH3-E

GRS-CQ10PdG/NhH3-E



Silk Screen	Introduction
DC-BUS1	DC-BUS1 Pin for electric discharge of the high-voltage bar during test
POWER-OUT	Open DC link voltage
PWR	Power input of the drive board [1-310V,3-GND]
U	Connector to the compressor phase-U
V	Connector to the compressor phase-V
W	Connector to the compressor phase-W
AC_L	Live line input of the drive board
N	Neutral line input of the drive board
COMM	Communication interface[1-3.3V,2-RX,3-TX,4-GND]
E	Grounding line
DC-MOTOR1	Reserved,not used
+24V	Reserved,not used
L-OUT	Reserved,not used
N-OUT	Reserved,not used

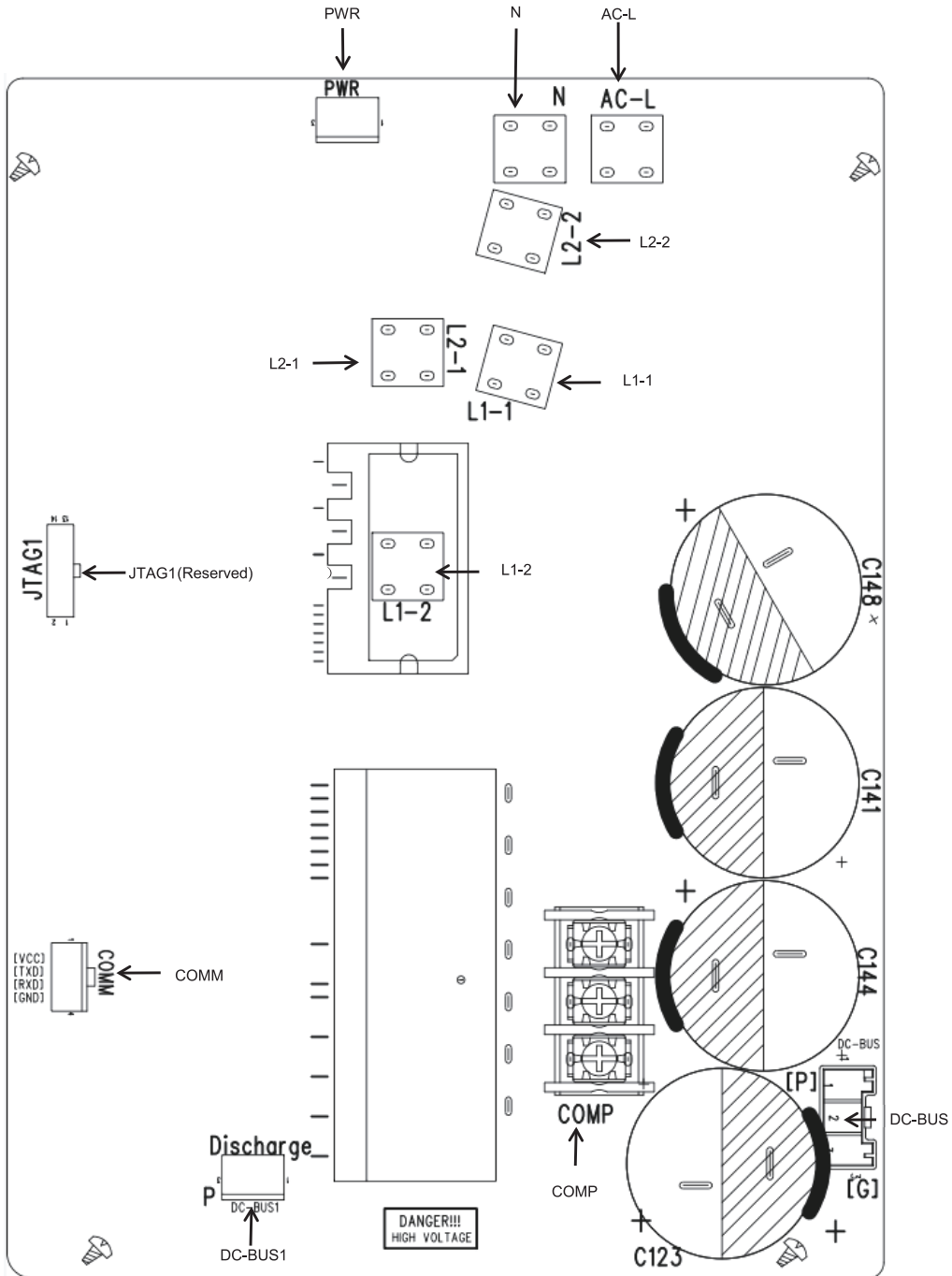
(4) Drive board

GRS-CQ12PdG/NhH3-E
GRS-CQ16PdG/NhH3-E1

GRS-CQ14PdG/NhH3-E

GRS-CQ12PdG/NhH3-E1

GRS-CQ14PdG/NhH3-E1

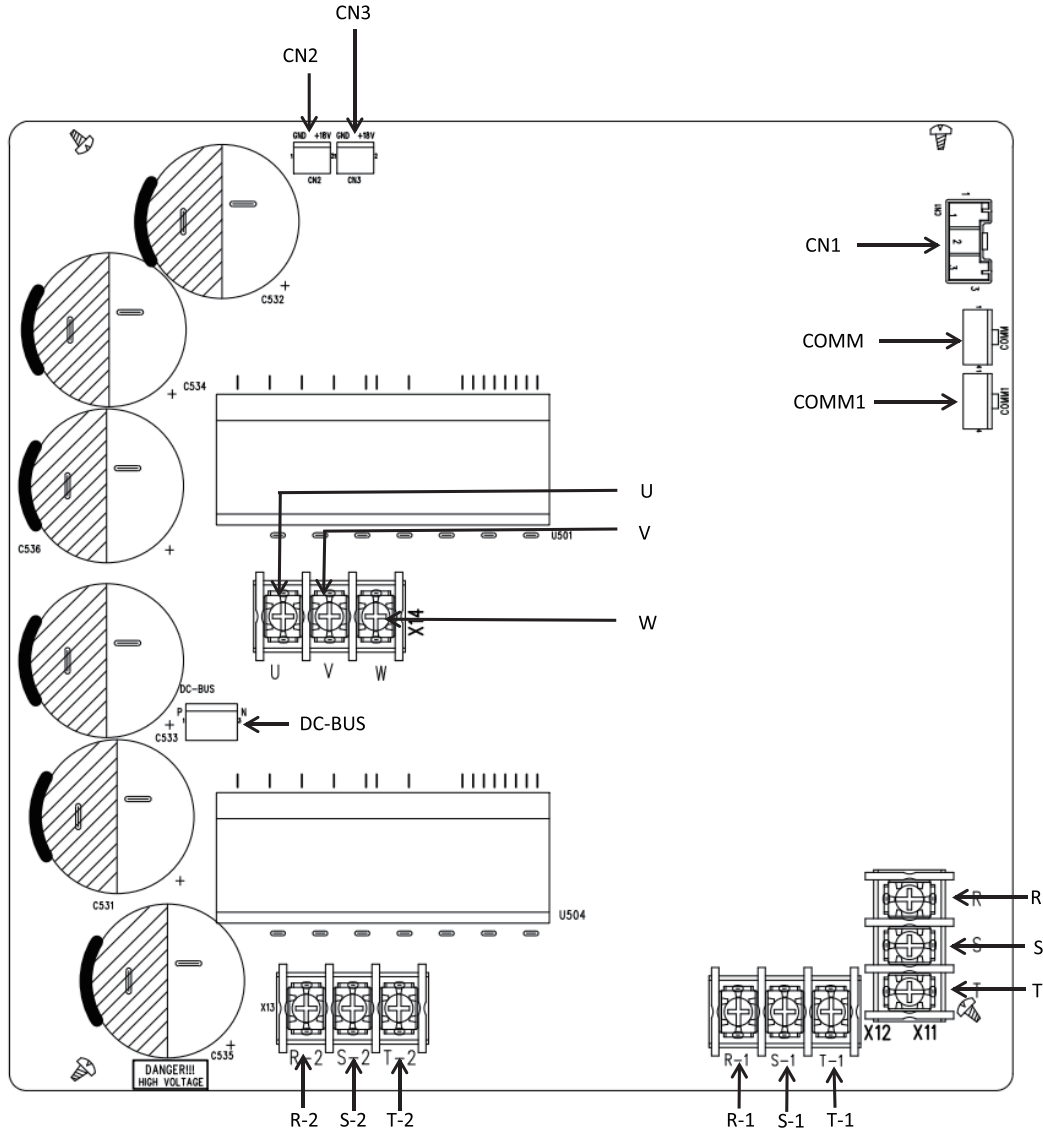


Silk Screen	Introduction
AC-L	Live line input of the drive board
N	Neutral line input of the drive board
L1-1	To PFC inductor brown line
L1-2	To PFC inductor white line
L2-1	To PFC inductor yellow line
L2-2	To PFC inductor blue line
COMP	Wiring board (3-pin)(DT-66BO1W-03)(variable-frequency)
COMM	Communication interface[1-3.3V,2-TX,3-RX,4-GND]

Silk Screen	Introduction
DC-BUS	the other end to the filter board
PWR	Power input of the drive board [1-310V,3-GND]
DC-BUS1	Pin for electric discharge of the high-voltage bar during test

(5) Drive board

GRS-CQ8.0PdG/NhH3-M GRS-CQ10PdG/NhH3-M GRS-CQ12PdG/NhH3-M GRS-CQ14PdG/NhH3-M
 GRS-CQ12PdG/NhH3-M1 GRS-CQ14PdG/NhH3-M1 GRS-CQ16PdG/NhH3-M1



Silk Screen	Introduction
W	Connector to the compressor phase-W
U	Connector to the compressor phase-U
V	Connector to the compressor phase-V
R-2	Connector to reactor (output)
S-2	
T-2	

Silk Screen	Introduction
R-1	Connector to reactor (input)
S-1	
T-1	
R	Connector to filter L1-F
S	Connector to filter L2-F
T	Connector to filter L3-F
COMM1	Reserved,not used
COMM	Communication interface[1-3.3V,2-RX,3-TX,4-GND]
CN1	Switch power input

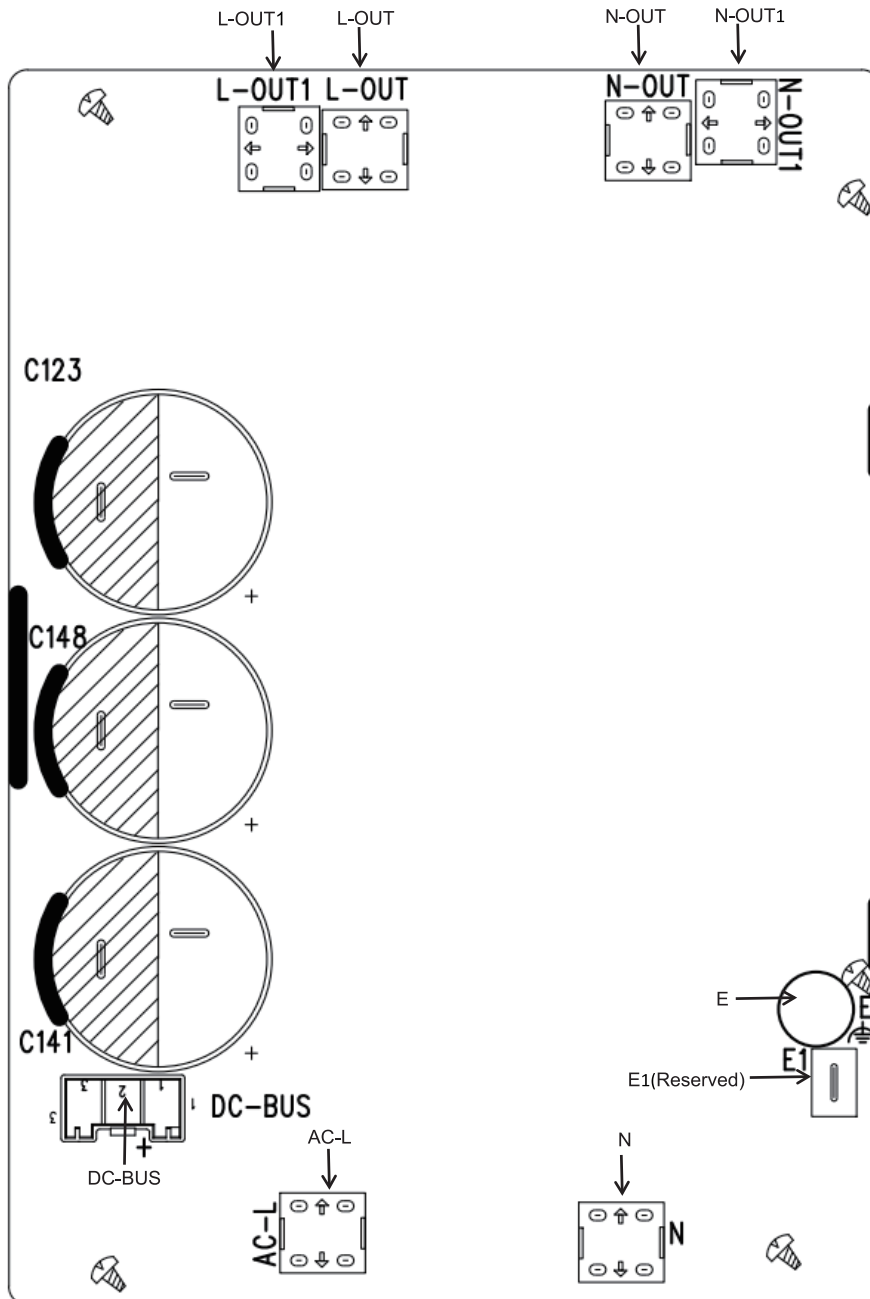
(6) Filter board

GRS-CQ12PdG/NhH3-E
GRS-CQ16PdG/NhH3-E1

GRS-CQ14PdG/NhH3-E

GRS-CQ12PdG/NhH3-E1

GRS-CQ14PdG/NhH3-E1



Silk Screen	Introduction
AC-L	Live line input of the main board
N	Neutral line of the power supply for the main board
L-OUT	Live line output of the filter board (to the drive and main boards)
N-OUT	Neutral line output of the filter board (to the drive board)
N-OUT1	Output neutral line
L-OUT1	Output live line
DC-BUS	DC-BUS, the other end to the drive board
E	Screw hole for grounding
E1	Grounding line, reserved

(7) Fiter board

GRS-CQ8.0PdG/NhH3-M

GRS-CQ10PdG/NhH3-M

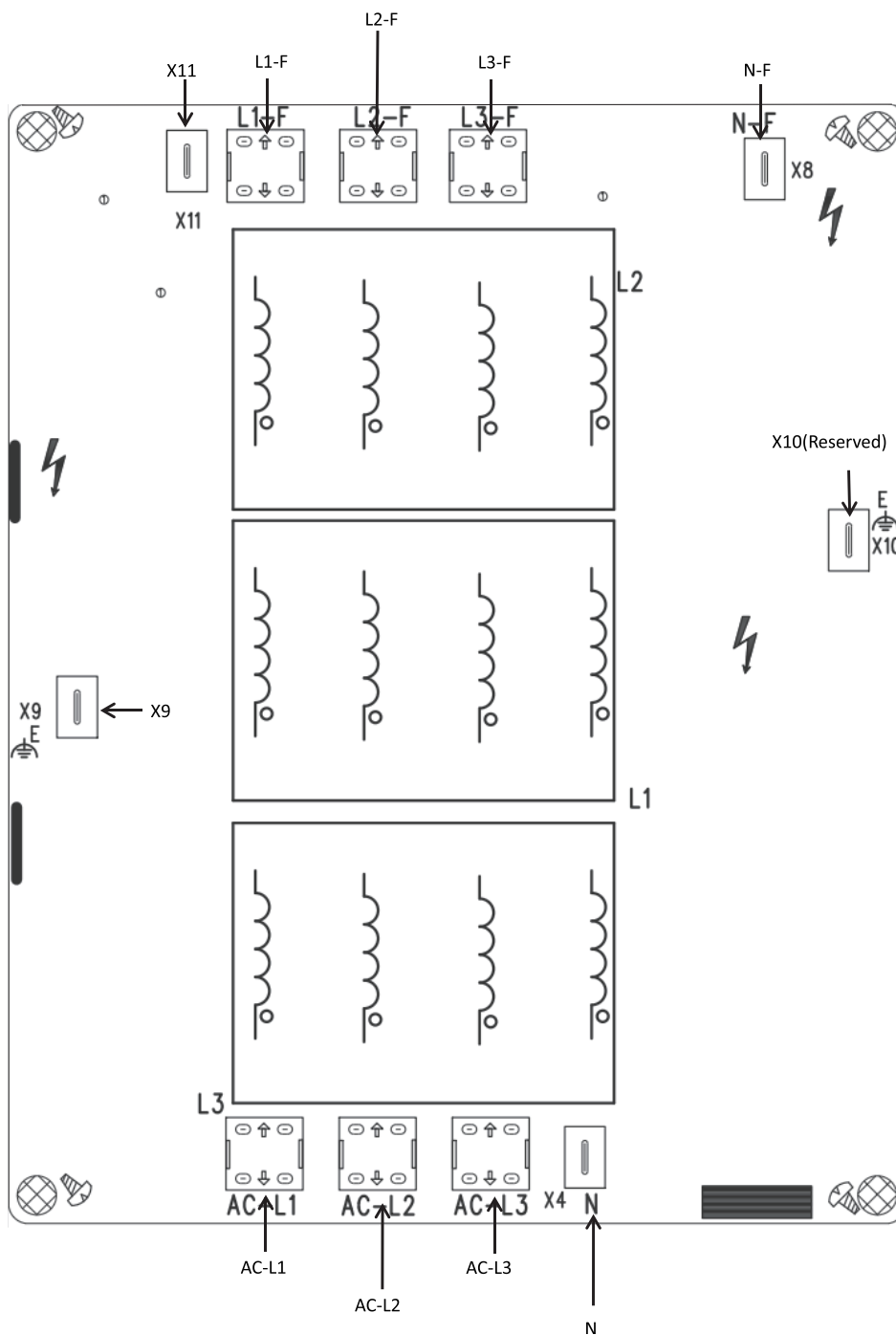
GRS-CQ12PdG/NhH3-M

GRS-CQ14PdG/NhH3-M

GRS-CQ12PdG/NhH3-M1

GRS-CQ14PdG/NhH3-M1

GRS-CQ16PdG/NhH3-M1

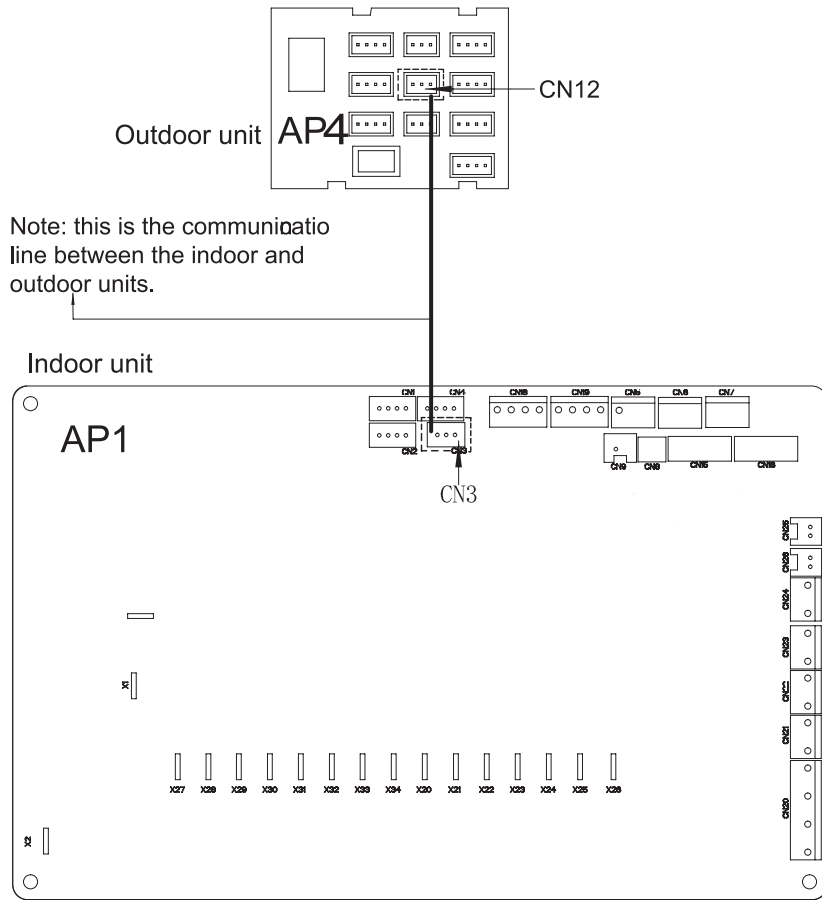
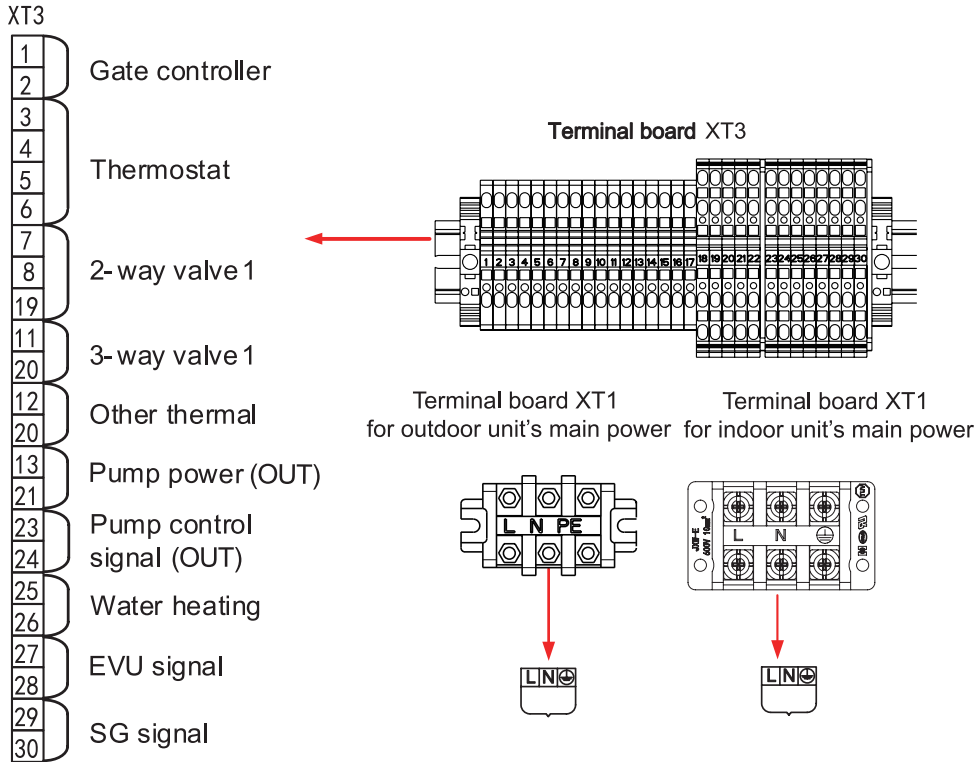


Silk Screen	Introduction
AC-L1	Input side phase L1 of the whole unit
AC-L2	Input side phase L2 of the whole unit
AC-L3	Input side phase L3 of the whole unit
N	Input side neutral line of the whole unit
L1-F	Connect to the power supply input of the drive board
L2-F	
L3-F	
N-F	Neutral line for power supply to the main control board
X11	Live line for power supply to the main control board
X10	
X9	Grounding line

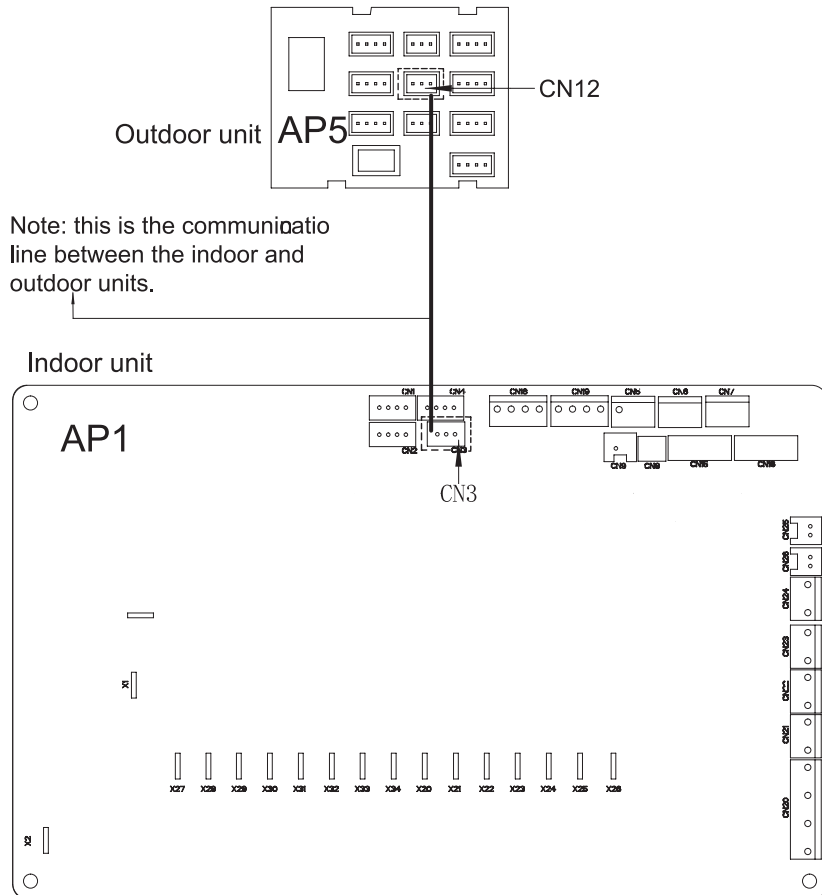
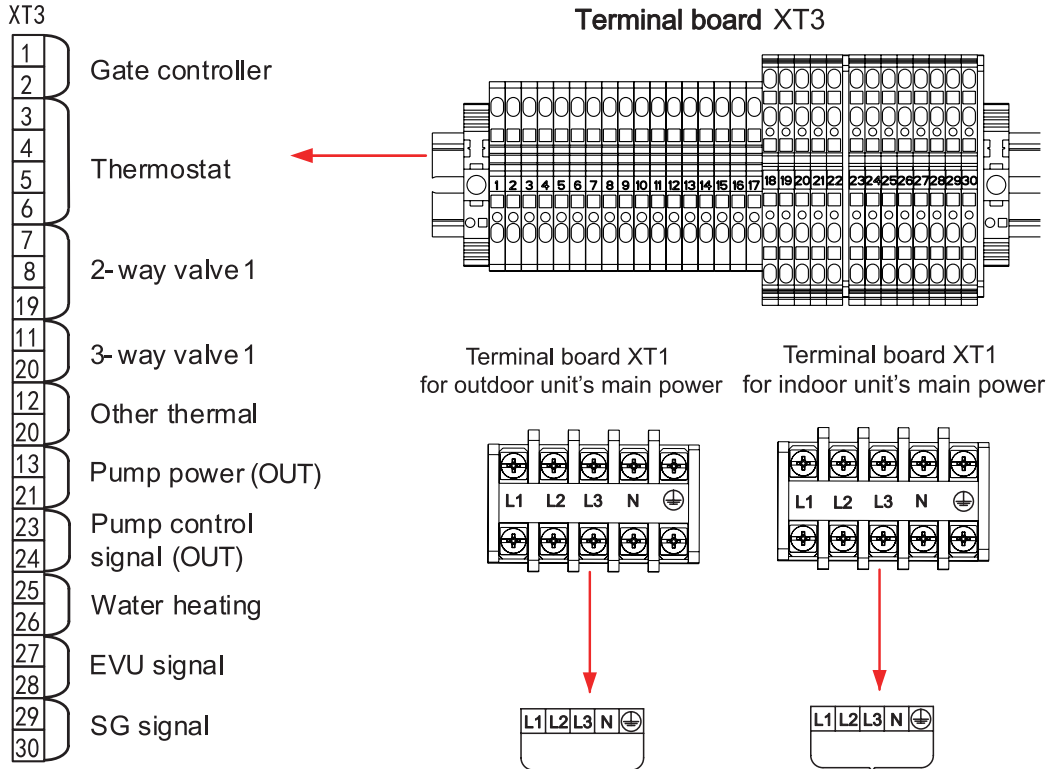
Note: these pictures are for reference only, and please refer to the actual ones.

3.8.4 Terminal Boards

(1) Single-phase units

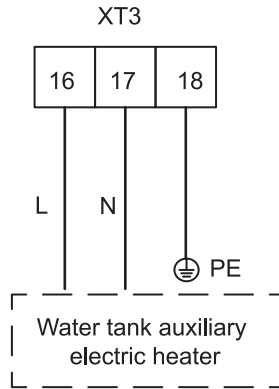


(2) 3-phase units



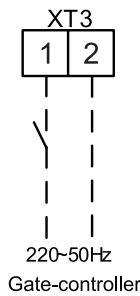
(3) Water tank auxiliary electric heater

It is used to heat the water tank when the heating capacity of the heat pump is poor.



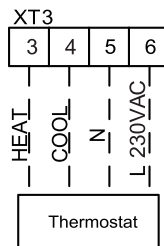
(4) Gate-controller

If there is gate control function, the gate-controller should be wired as shown in the figure below.



(5) Thermostat

Installation of the thermostat is very similar to that of the remote air temperature sensor.



How to Wire Thermostat

- (1) Uncover the front cover of indoor unit and open the control box;
- (2) Identify the power specification of the thermostat, if it is 220V, find terminal block XT3 as NO.3~6;
- (3) If it is the heating/cooling thermostat, please connect wire as per the figure above.

NOTE

- 220V power supply can be provided to the thermostat by the Versati III heat pump.
- Setting temperature by the thermostat(heating or cooling) should be within the temperature range of the product ;
- For other constrains, please refer to previous pages about the remote air temperature sensor;
- Do not connect external electric loads. Wire 220V AC should be used only for the electric thermostat;
- Never connect external electric loads such as valves, fan coil units, etc. If connected, the mainboard of the unit can be seriously damaged;
- Installation of the thermostat is very similar to that of the remote air temperature sensor.

(6) 2-Way Valve

The role of 2-way valve 1 is to control the water flow into the underfloor loop. When “Floor Config” is set to “With” for either cooling or heating operation, it will keep open. When “Floor Config” is set to “ Without”, it will keep closed.

General Information

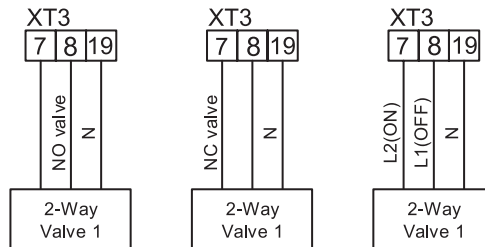
Type	Power	Operating Mode	Supported
NO 2-wire	230V 50Hz ~AC	Closing water flow	Yes
		Opening water flow	Yes
NC 2-wire	230V 50Hz ~AC	Closing water flow	Yes
		Opening water flow	Yes

- 1) Normal Open type. When electric power is NOT supplied, the valve is open. (When electric power is supplied, the valve is closed.)
- 2) Normal Closed type. When electric power is NOT supplied, the valve is closed. (When electric power is supplied, the valve is open.)
- 3) How to Wire 2-Way Valve:

Follow steps below to wire the 2-way valve.

Step 1. Uncover the front cover of the unit and open the control box.

Step 2. Find the terminal block and connect wires as below.



WARNING

- Normal Open type should be connected to wire (OFF) and wire (N) for valve closing in cooling mode.
- Normal Closed type should be connected to wire (ON) and wire (N) for valve closing in cooling mode.

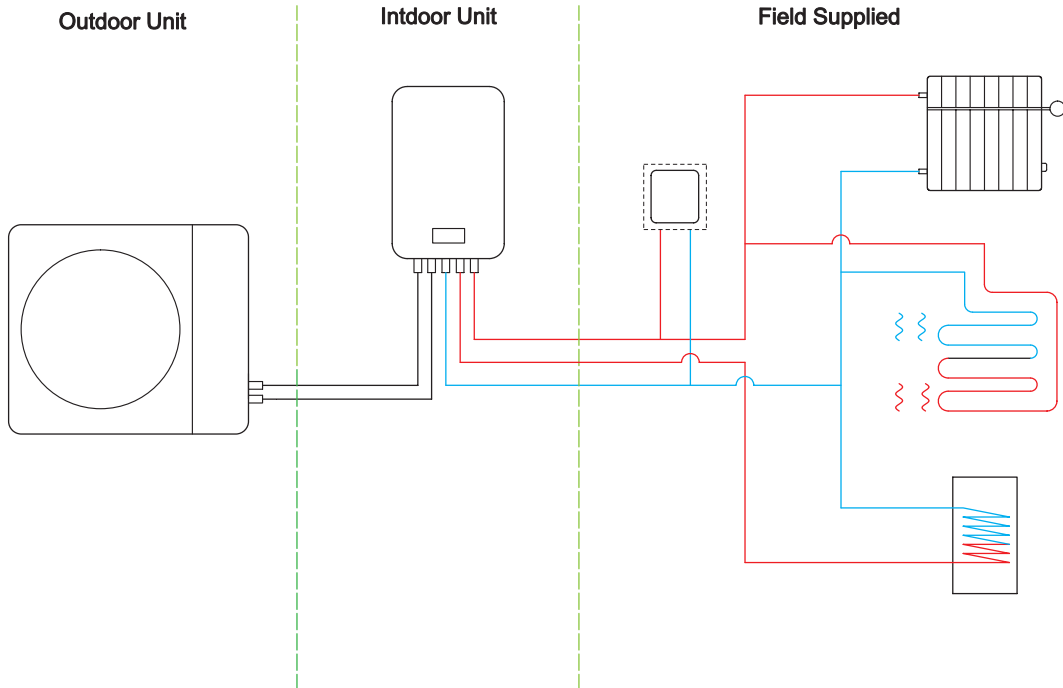
(OFF) : Line signal (for Normal Open type) from PCB to 2-way valve
 (ON) : Line signal (for Normal Closed type) from PCB to 2-way valve
 (N) : Neutral signal from PCB to 2-way valve

(7) Other Thermal

Other thermal is allowed for the equipment and controlled in such a way that the mainboard will output 230V when outdoor temperature is lower than the set point for startup of the aother thermaluxiliary heat source.

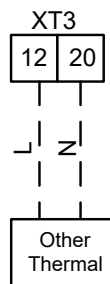
Note: Other thermal and Optional Electric Heater CANNOT be installed at the same time.

Step 1. Other thermal installation

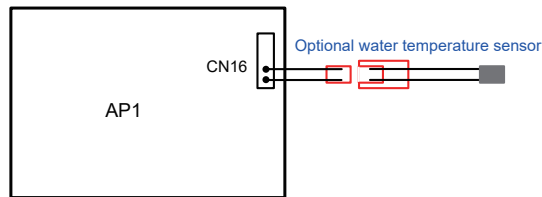


Step 2. Electric wiring work

Other thermal L and N connect to XT3~12,20.

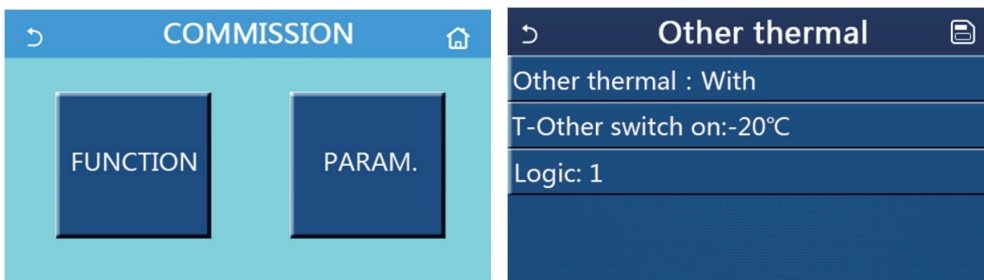


Optional water temperature sensor connect to AP1 CN16.



Step 3. Wired controller setting

Other thermal should be selected "with" if necessarily from COMMISSION → FUNCTION, then set switch on (outdoor)temperature and control logic(1/2/3).



(8) Pump 1 power (OUT)

This pump is field supplied and the actual installation depends on the project's field.

(9) Pump control signal (OUT)

It is for the signal line of the pump.

(10) Water heating

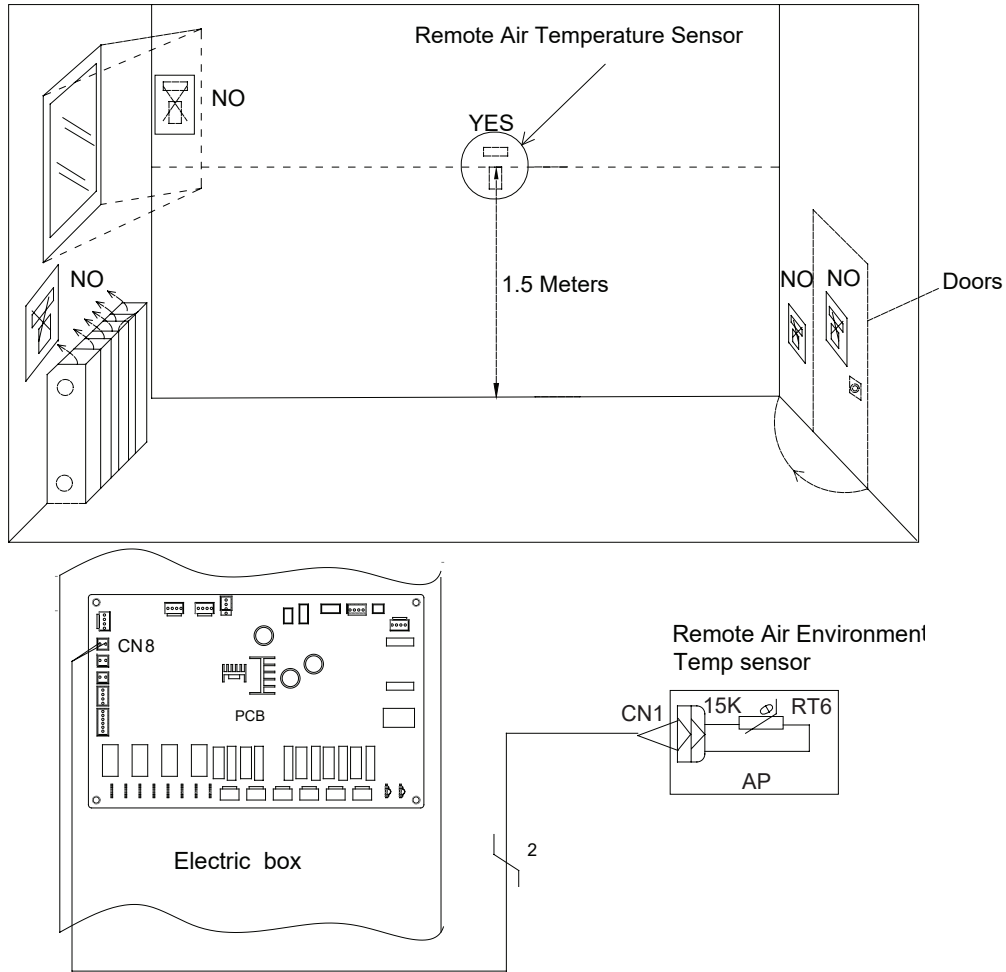
It is for the external hot water and works when the thermostat is set to “Air+Hot water 2”.

(11) SG (Smart grid)

SG function introduction: A heat pump with SG Ready function can be accessed by a smart grid through a defined interface for grid load management.

Wiring guidance: The SG wiring only needs to be connected to the SG signal and EVU signal, and the ports are 27-30 ports on the XT3 terminal block shown in the figure, without distinguishing between positive and negative poles. All models are the same.

(12) Remote air temperature sensor



Notes

- (a) Distance between the indoor unit and the remote air temperature sensor should be less than 15m due to length of the connection cable of remote temperature sensor;
- (b) Height from floor is approximately 1.5m;
- (c) Remote air temperature sensor cannot be located where the area may be hidden when door is open;
- (d) Remote air temperature sensor cannot be located where external thermal influence may be applied;
- (e) Remote air temperature sensor should be installed where space heating is mainly applied;
- (f) After the remote air temperature sensor is installed, it should be set to “With” through the wired controller so as to set the remote air temperature to the control point.

4. Commissioning

4.1 Check for the Communication System

When the unit is powered on, check for the communication system, including: communication between AP1 and AP2, between the wired controller and the main board. When there is unusual communication, this error will be displayed at the wired controller. Then, check out the cause according to the displayed error. See the figure below for wiring of the communication system.

4.2 Check for the Water System

- (1) Are water inlet and outlet directions correct?
- (2) Is the water piping cleaned? Are there foreign matters at the pipe joints? Is the water quality satisfied?
- (3) Is insulation of water pipes in good condition?
- (4) Does exhaust valve of the water system work properly?
- (5) Instructions for Water Makeup and Air Removal

Note: once the air vent cap has not been loosened before operation for removing air at top of the auxiliary electric heater, it would work without enough water.

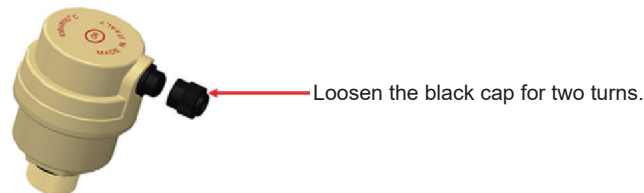
⚠ NOTE

- Once the air vent cap has not been loosened before operation for removing air at top of the auxiliary electric heater, it would work without enough water.

Air removal steps are stated below.

Step 1: connect water pipes and loosen the automatic relief valve.

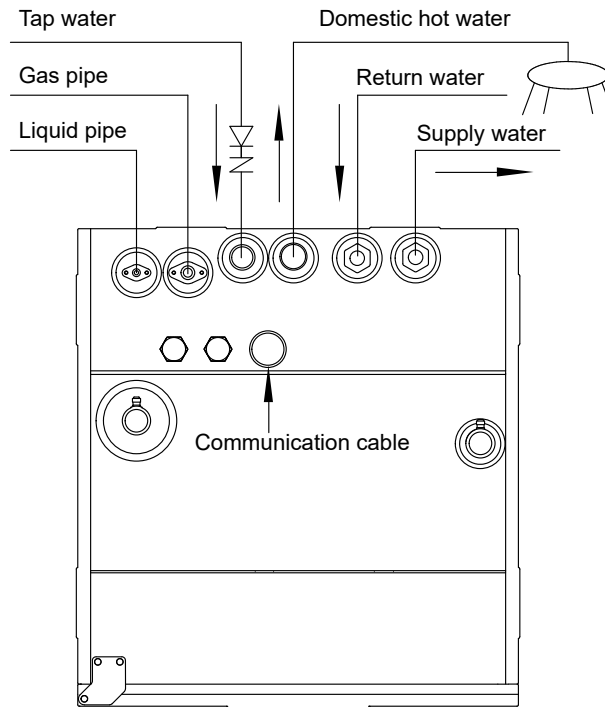
Step 2: open the cut-off valve at the water makeup pipe and make up water from the tap water pipe until the water pressure gage reads 2.0~2.5bar.



◆ Requirements for Water Makeup

Make up water from the tap water pipe to the return water pipe and meanwhile open the air vent cap until the water system is full and no air is trapped.

The gage pressure requirement for makeup water is 2.0~2.5bar. Do not let it exceed 3bar, as it would affect adversely pipes and pipe connectors and lead to water leak. Also do not let it too low, as water shortage would trigger protection for the flow switch and then the unit would fail to run normally. When water pressure is lower than 1.0bar, pressurize it to the required pressure.



4.3 Check for Wiring

⚠ NOTE

- Do not check for the power supply unless proper checkout equipment has prepared and preventive measures have been taken, otherwise it would lead to severe injury.

- (1) Are sizes of connection lines and the air switch proper?
- (2) Does wiring comply with relative standards and electric codes?
- (3) Is there any incorrect wiring?
- (4) Does each contact work properly?
- (5) Is the power supply and insulation proper?
- (6) Are initial set points of control and protective elements satisfied?

4.4 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.

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.

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.

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.

Checks to electrical devices

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

Repairs to sealed components

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

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

Cabling

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

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.

Leak detection methods

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.

Pressure Relief of the Water Tank

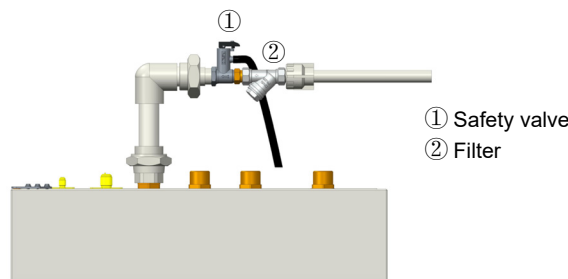
The water may drip from the discharge pipe of the pressure-relief device and that this pipe must be left open to the atmosphere.

The pressure-relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked

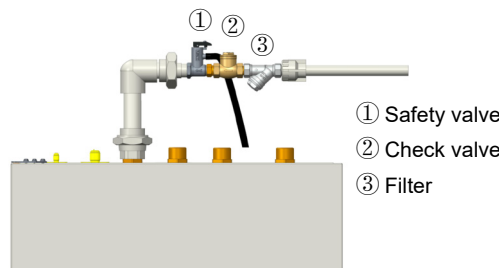
A discharge pipe connected to the pressure-relief device is to be installed in a continuously downward direction and in a frost-free environment.

Installation of the Water Tank Safety Valve

Pressure of the water tank will gradually increase during heating and a safety valve is required to discharge some water for pressure relief. If not or installed incorrectly, it would cause the water tank to expand, to be deformed, to be damaged or even lead to personal injury. The arrow → of the water tank safety valve shall point toward the water tank. No cut-off valve or check valve is required between the safety valve and the water tank, as the safety valve would fail to work. The safety valve requires the drain hose for installation and should be securely fastened. The drain hose should be led naturally downward into the floor drain without any convex bow, intertwist or fold. Extra length of the drain hose inside the floor drain should be cut away in case of poor drainage or water freeze under low atmospheric temperature. The recommended action pressure for the safety valve is 1.0Mpa, the same as that for the water tank. Do comply with this requirement for section of the safety valve; otherwise the water tank would fail to work normally.

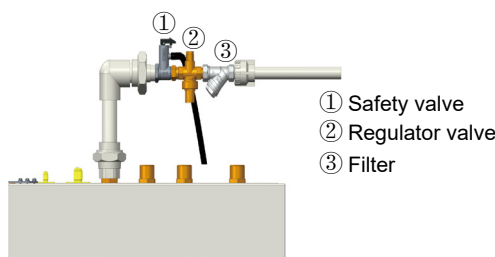


Installation Mode 1 of the Tap Water Safety Valve (Inlet Water Pressure =0.1~0.5MPa)



Installation Mode 2 of the Tap Water Valve (Inlet Water Pressure <0.1MPa)

The safety valve is bypass installed in the installation mode 2. A check valve is required at the tap water pipe and installed horizontally with the valve cap vertically upwards and the arrow direction at the valve body the same as the water flow.



Installation Mode 3 of the Tap Water Safety Valve (Inlet Water Pressure >0.5MPa)

A pressure maintaining valve is required in the installation mode 3 to make sure the water tank pressure keep within 0.3~0.5MPa. The arrow direction of the pressure maintaining valve should be the same as the water flow.

Note: the filter, safety valve, check valve, pressure maintaining valve and hose for installation are not delivered with the main unit and should be prepared by the user.

Thermostat of the Water Tank E-heater

Distance between the probe of the thermostat and heating pipe of the water tank E-heater is 1cm, far smaller than the distance between it and the coils. As the highest allowable temperature of the coils is lower than protective set point of the thermostat, the coils will trigger no action of the thermostat.

4.5 Test Run

4.5.1 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 following items shall be performed by qualified repair persons.		
Confirm together with the sales engineer, dealer, installing contractor and customers for the following items finished or to be finished.		
No.	Confirmation of Installation	√
1	If the contents of Application for Installation of this Unit by Installer are real. If not, commissioning will be refused.	<input type="checkbox"/>
2	Is there written notice in which items are shown in respect of unqualified installation?	<input type="checkbox"/>
3	Are Application for Installation and Debugging list filed together?	<input type="checkbox"/>
No.	Pre-check	√
1	Is appearance of the unit and internal pipeline system ok during conveying, carrying or installation?	<input type="checkbox"/>
2	Check the accessories attached with the unit for quantity, package and so on.	<input type="checkbox"/>
3	Make sure there is drawings in terms of electricity, control, design of pipeline and so on.	<input type="checkbox"/>
4	Check if installation of the unit is stable enough and there is enough space for operation and repair.	<input type="checkbox"/>
5	Completely test refrigerant pressure of each unit and perform leakage detection of the unit.	<input type="checkbox"/>
6	Is the water tank installed stably and are supports secure when the water tank is full?	<input type="checkbox"/>
7	Are heat insulating measures for the water tank, outlet/inlet pipes and water replenishing pipe proper?	<input type="checkbox"/>
8	Are the nilometer of water tank, water temperature indicator, controller, manometer, pressure relief valve and automatic discharge valve etc. installed and operated properly?	<input type="checkbox"/>
9	Does power supply accord with the nameplate? Do power cords conform to applicable requirements?	<input type="checkbox"/>
10	Is power supply and control wiring connected properly according to wiring diagram? Is earthing safe? Is each terminal stable?	<input type="checkbox"/>
11	Are connection pipe, water pump, manometer, thermometer, valve etc. are installed properly?	<input type="checkbox"/>
12	Is each valve in the system open or closed according to requirements?	<input type="checkbox"/>
13	Confirm that the customers and inspection personnel of Part A are at site.	<input type="checkbox"/>
14	Is Installation Check-up Table completed and signed by the installation contractor?	<input type="checkbox"/>
Attention: If there is any item marked with ×, please notify the contractor. Items listed above are just for reference.		
Confirmed Items after pre-checking	General Evaluation: Commissioning <input type="checkbox"/> Service <input type="checkbox"/>	
	Judge the following items (if no item has been pointed out, qualification will be regarded.)	
	a: Power supply and electric control system	b: Loading calculation
	c: Heating problems of Unit	d: Noise problem
	e: Pipeline problem	f: Others
	Normal commissioning 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 service report which should be signed after communication provided to installer?	
Yes () No ()		

4.5.2 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: 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	Check whether the phase sequence of the main power supply is correct. If not, correct the phase sequence firstly.
⚠Recheck the phase sequence before start-up to avoid reverse rotation of the compressor which may damage the unit.	
3	Apply the universal electric meter to measure the insulation resistance between each outdoor phase and earth as well as between phases.
⚠Caution: defective earthing may cause electric shock.	
No.	Ready to start
1	Cut off all temporary power supply, resume all the insurance and check the electricity for the last time.
	Check the power supply and voltage of the control circuit; _____V must be ±10% within the range of rated operating power.
No.	Start up the unit
1	Check all the conditions needed to start up the unit: operation mode, required load etc.
2	Start up the unit, and observe the operation of compressor, electric expanding valve, fan motor and water pump etc.
	Note: the unit will be damaged under abnormal running state. Do not operate the unit in states of high pressure and high current.
Others:	
Items for acceptance after commissioning	Estimation or suggestion on the general running situation: good, modify
	Identify the potential problem (nothing means the installation and commissioning are in accordance with the requirements.)
	a. problem of power supply and electric control system:
	b. problem of load calculation:
	c. outdoor refrigerant system:
	d. noise problem:
	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()	

4.6 Error Codes

No.	Full Name	Displayed Name	Error Code
1	Ambient temperature sensor error	Ambient sensor	F4
2	Defrosting temperature sensor error	Defrost sensor	d6
3	Discharge temperature sensor error	Discharge sensor	F7
4	Suction temperature sensor error	Suction sensor	F5
5	Economizer inlet temperature sensor	Econ. in sens.	F2
6	Economizer outlet temperature sensor	Econ. out sens.	F6
7	Fan error	Outdoor fan	EF
8	High pressure protection	High pressure	E1
9	Low pressure protection	Low pressure	E3
10	High discharge protection	Hi-discharge	E4
11	Capacity DIP switch error	Capacity DIP	c5
12	Communication error between the outdoor and indoor main boards	ODU-IDU Com.	E6
13	Communication error between the outdoor main board and the drive board	Drive-main com.	P6
14	Communication error between the display panel and indoor main board	IDU Com.	E6
15	High pressure sensor error	HI-pre. sens.	Fc
16	Leaving water temperature sensor error for the plate type heat exchanger of the heat pump	Temp-HELW	F9
17	Leaving water temperature sensor error for the auxiliary electric heat of the heat pump	Temp-AHLW	dH
18	Entering water temperature sensor error of the plate type heat exchanger of the heat pump	Temp-HEEW	No error code but displayed on control pannel
19	Water tank temperature sensor error ("NA" for mini chillers)	Tank sens.	FE
20	Remote room temperature sensor error	T-Remote Air	F3
21	Protection for the flow switch of the heat pump	HP-Water Switch	Ec
22	Welding protection to the auxiliary electric heater 1 of the heat pump	Auxi. heater 1	EH
23	Welding protection to the auxiliary electric heater 2 of the heat pump	Auxi. heater 2	EH
24	Welding protection to the water tank electric heater	Auxi. -WTH	EH
25	DC bus under-voltage or voltage drop error	DC under-vol.	PL
26	DC bus over-voltage	DC over-vol.	PH
27	AC current protection (input side)	AC curr. pro.	PA
28	IPM defective	IPM defective	H5
29	PFC defective	PFC defective	Hc
30	Start failure	Start failure	Lc
31	Phase loss	Phase loss	Ld
32	Jumper cap error	Jumper cap error	c5
33	Driver resetting	Driver reset	P0
34	Compressor overcurrent	Com. over-cur.	P5
35	Overspeed	Overspeed	LF
36	Current sensing circuit error or current sensor error	Current sen.	Pc
37	Desynchronization	Desynchronize	H7
38	Compressor stalling	Comp. stalling	LE

No.	Full Name	Displayed Name	Error Code
39	Radiator or IPM or PFC over-temperature	Overtemp.-mod.	P8
40	Radiator or IPM or PFC temperature sensor error	T-mod. sensor	P7
41	Charging circuit error	Charge circuit	Pu
42	AC input voltage error	AC voltage	PP
43	Ambient temperature sensor error at the drive board	Temp-driver	PF
44	AC contactor protection or input over-zero error	AC contactor	P9
45	Temperature drift protection	Temp. drift	PE
46	Sensor connection protection (the current sensor fails to be connected with the corresponding phase U and or phase V)	Sensor con.	Pd
47	Communication error between the display panel and the outdoor unit	ODU Com.	E6
48	Refrigerant vapor line temperature sensor error	Temp RGL	F0
49	Refrigerant liquid line temperature sensor error	Temp RLL	F1
50	4-way valve error	4-way valve	U7

4.7 Requirements on Water Quality

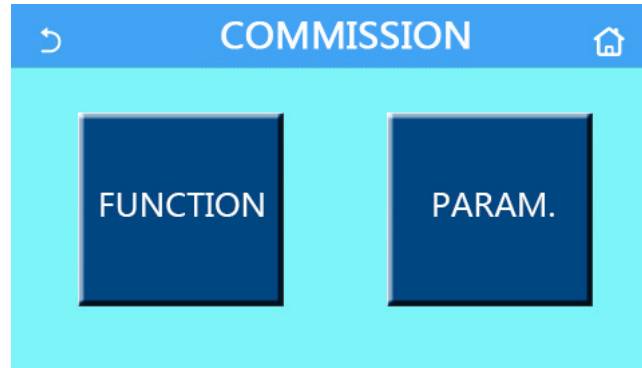
Item	Parametric value	Unit
pH(25°C)	6.8~8.0	/
Cloudy	< 1	NTU
Chloride	< 50	mg/L
Fluoride	< 1	mg/L
Iron	< 0.3	mg/L
Sulphate	< 50	mg/L
SiO ₂	< 30	mg/L
Hardness(count CaCO ₃)	< 70	mg/L
Nitrate(count N)	< 10	mg/L
Conductance(25°C)	< 300	µs/cm
Ammonia (count N)	< 0.5	mg/L
Alkalinity(count CaCO ₃)	< 50	mg/L
Sulfid	Undetectable	mg/L
Oxygen consumption	< 3	mg/L
Natrium	< 150	mg/L

Note: when circulation water fails to meet requirements listed in the table above, please add anti-scale composition to keep the unit always in normal operation.

5. Commissioning Parameter Setting

[Operation Instructions]

1. At the menu page, by touching "Commission" for 5 seconds, a window will pop up requiring to set the password, otherwise you are not allowed to enter the commissioning parameter page. The password then can be modified, but please remember it as several incorrect input will incur password protection for at most half an hour. At the commissioning parameter page the left side is for the function setting and the right side is for the parameter setting, as shown in the figure below. Commissioning parameters are allowed to be set only by qualified commissioning personnel.



[Notes]

- At the commissioning parameter setting page, when the state of any function changes, the system will automatically save this change and this change will remain upon power failure.
- Do not modify any commissioning parameter except the approved qualified servicemen, as it would give birth to adverse effects to the main unit.

Commissioning Function Setting

No.	Item	Range	Default	Description
1	Ctrl. state	T-water out/T-room	T-water out	When " Remote sensor " is set to " With ", it can be set to " T-room ".
2	2-Way valve	Cool 2-Way valve, On/Off	Off	It will decide the status of the 2-way valve under the " Cool " and " Cool + Hot water " modes. Under " Cool " or " Cool + Hot water " mode, the status of the 2-way valve depends on this setting. This setting is unavailable to heating only units.
		Heat 2-Way valve, On/Off	On	It will decide the status of the 2-way valve under the " Heat " and " Heat + Hot water " modes
3	Solar setting	With/Without	Without	When the water tank is unavailable, this setting will be reserved. When it is set to " With ", the solar kitting will work on its own. When it is set to " Without ", hot water by the solar kitting is unavailable.
4	Water tank	With/Without	Without	/
5	Thermostat	Without/Air/Air+ hot water/ Air+ hot water2	Without	This setting cannot be interchanged among " Air ", " Air+ hot water " and " Air+ hot water2 " directly but via " Without " this option.
		On/Off	Off	/
6	Other thermal	With/Without	Without	/
7	Optional E-Heater	Off/1/2	Off	/
8	Remote sensor	With/Without	Without	When it set to "Without", and the "Ctrl. state" will be defaulted to be "T-water out".
9	Air removal	On/Off	Off	/
10	Floor debug	On/Off	Off	/
11	Manual defrost	On/Off	Off	/
12	Force mode	Off/Force-cool/Force-heat	Off	"Force-cool" is unavailable to heating only units.

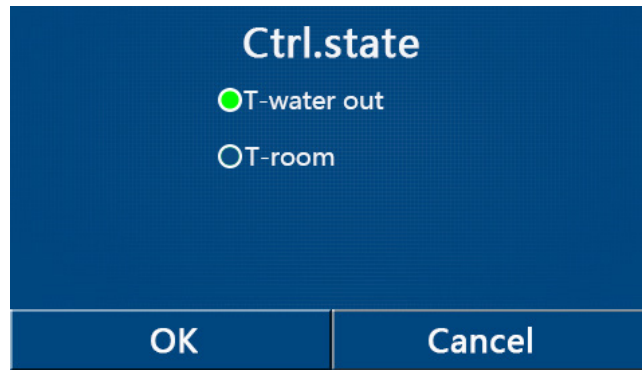
No.	Item	Range	Default	Description
13	Tank heater	Logic 1/Logic 2	Logic 1	This setting is allowed when the water tank is available and the control panel is OFF.
14	Gate-Ctrl.	On/Off	Off	/
15	C/P limit	Off/Current limit/Power limit	Off	<p>When it is set to “Current limit” or “Power limit”, sub-parameters stated as below can be set.</p> <ul style="list-style-type: none"> • “Value”: power or current limit value, which varies for different main units. • “ΔValue min”: 1~15%, 5% defaulted. • “Electric heater”: it can be set to “With” or “Without”, which determines if the power of electric heater should be taken into account for current/power limit. When other thermal source or the optional electric heater of the water tank is equipped, the corresponding electric heater can be set to “Standard” or “Field-supplied”. Once it is set to “Field-supplied”, power value can be adjusted. See Section 5.14 for more details.
16	Address	[1-125] [127-253]	1	/
17	Refri. recovery	On/Off	Off	/
18	Gate-Ctrl memory	On/Off	Off	/
19	3-Way valve1	Without/DHW/AIR	Without	/
20	Hot water control mode	On/Off	Off	It can be set only when the control panel is turned off.
21	SG	On/Off	Off	It can be set only when the control panel is turned off.
22	Cool control mode	On/Off	Off	It can be set only when the control panel is turned off.
23	Heat control mode	On/Off	Off	It can be set only when the control panel is turned off.
24	LSWP enable	On/Off	Off	Lowest speed enabled for the water pump. It can be set only when the control panel is turned off.
25	Water pump antistall	On/Off	Off	Water pump antistall interval: 1~12h, 2h defaulted; Water pump antistall duration: 10~100s, 30s defaulted.
26	Debug mode	On/Off	Off	3-way valve 2: On/Off 2-way valve: On/Off Fan: 0~9, 0 defaulted. HP-Pump: 0~10, 0 defaulted

5.1 Ctrl. state

[Operation Instructions]

The user is allowed to control the operation of the heat pump through taking either the leaving water temperature or the room temperature as the control target.

At the commissioning parameter setting page, by touching “**Ctrl. state**”, it can be set to “**T-water out**” or “**T-room**”.



[Notes]

•When “**Remote sensor**” is set to “**With**”, this setting can be set to “**T-water out**” or “**T-room**”. When “**Remote sensor**” is set to “**Without**”, this setting can only be set to “**T-water out**”.

- This setting will be memorized upon power failure.

5.2 2-Way valve

[Operation Instructions]

At the commissioning parameter setting page, by touching “**Cool 2-Way valve**” or “**Heat 2-Way valve**”, the control panel will go to the corresponding setting page.

It is optional. When the under-floor heating coils and radiators are used, it can be used to control the watercourse.

[Notes]

- This setting is unavailable to heating only units.
- Under “**Cool**”, or “**Cool + Hot water**” mode, “**Cool 2-Way valve**” will decide the status of the 2-way valve; while under “**Heat**” or “**Heat + Hot water**”, “**Heat 2-Way valve**” will decide the status of the 2-way valve.
- It will be memorized upon power failure.

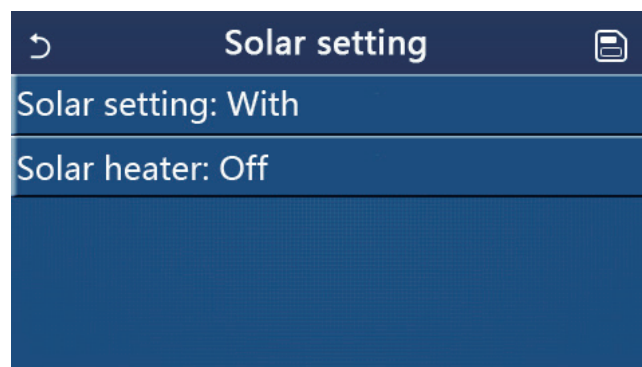
5.3 Solar setting (reserved)

[Operation Instructions]

1.At the commissioning parameter setting page, by touching “**Solar setting**”, the control panel will go to its submenu page.

2.At the submenu page, “**Solar setting**” can be set to “**With**” or “**Without**”.

3.At the submenu page, the “**Solar heater**” can be set to “**On**” or “**Off**”.



Solar Setting

[Notes]

- This setting can be done no matter if the control panel is turned on or off.
- This setting is allowed only when the water tank is available. When the water tank is unavailable, this setting will be reserved.
- It will be memorized upon power failure.

5.4 Water tank

[Operation Instructions]

At the commissioning parameter setting page, by touching “**Water tank**”, the control panel will go to the corresponding setting page, where “**Water tank**” can be set to “**With**” or “**Without**”.

When domestic hot water is required, “**Water tank**” shall be set to “**With**”.

[Notes]

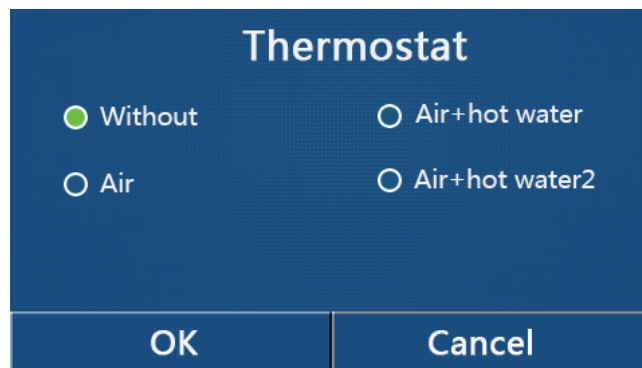
- This setting will be memorized upon power failure.
- This setting will become valid only when the control panel is turned off.

5.5 Thermostat

[Operation Instructions]

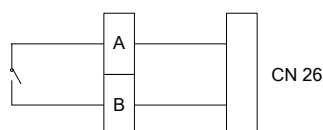
1.At the commissioning parameter setting page, by touching “**Thermostat**”, the control panel will go to the corresponding setting page.

2.At the “**Thermostat**” setting page, it can be set to “**Air**”, “**Without**”, “**Air + hot water**” and “**Air + hot water2**”. When it is set to “**Air**”, “**Air + hot water**” or “**Air + hot water2**”, the main unit will run based on the mode set by the thermostat; when it is set to “**Without**”, the main unit will run based on the mode set by the control panel.



[Notes]

- When “**Water tank**” is set to “**Without**”, the “**Air + hot water**” or “**Air + hot water2**” mode is unavailable.
- When “**Floor debug**” and “**Emergen.mode**” have activated, function of the thermostat will be invalid.
- When “**Thermostat**” is set to “**Air**”, “**Air + hot water**” or “**Air + hot water2**”, “**Temp.timer**” will be deactivated automatically and the main unit will run based on the mode set by the thermostat. Meanwhile, mode setting and On/Off operation by the control panel will be ineffective.
- When “**Thermostat**” is set to “**Air**”, the main unit will run based on the setting of the thermostat.
- When “**Thermostat**” is set to “**Air + hot water**”, when the thermostat is turned off, the main unit can still perform the “**Hot water**” mode. In this case, the ON/OFF icon at the homepage does not indicate the running status of the main unit. Running parameters are available at the parameter viewing pages.
- When “**Thermostat**” is set to “**Air + hot water**”, operation priority can be set by the control panel.
- When the “**Thermostat**” is set to “**Air + hot water2**”, there are two kinds of responses for the main units. For one, if CN26 receives the “**OFF**” signal (dry contact, 0Vac), the main unit will take the priority to “**Hot water**”. Once operation conditions for “**Hot water**” are ready, the main unit will run for “**Hot water**”. Then, when “**Hot water**” is satisfied, the main unit will run on the demands of the thermostat. For the other, if CN26 has not received the “**OFF**” signal, the main unit will run on the demands of the thermostat.



- The status of the thermostat can be changed only when the control panel is turned off.
- When it has been activated, “**Floor debug**”, “**Air removal**”, and “**Emergen.mode**” are not allowed to be activated.

- This setting will be memorized upon power failure.

Note: when the main unit is under the control of the thermostat, the operation mode set at the control panel varies with the thermostat, that is, the actual operation status of the main unit, as shown in the table below. Once the thermostat is disabled, restart the main unit after check if the operation mode set at the control panel is expected or not.

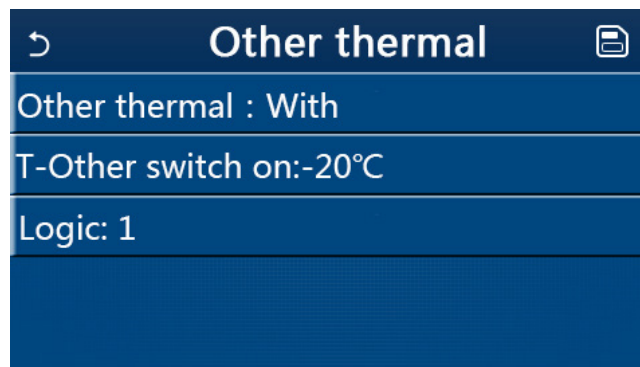
Thermostat setting	Thermostat status	Priority	Control panel	Main unit
Off	Off	/	/	/
Air	Heating	/	Heat	On for heating
	Cooling	/	Cool	On for cooling
	Off	/	Last operation mode	Off
Air+Hot water	Heating	Hot water	Hot water + heat	Frist water heating and then heating
		Heat/cool	Heat + hot water	On for heating; water heated by the water heater electric heater
	Cooling	Hot water	Hot water + cool	Frist water heating and then cooling
			Cool + Hot water	On for cooling; water heated by the water heater electric heater
	Off	/	Hot water	On for water heating
Air+Hot water2	Heating	/	Heat	On for heating
	Cooling	/	Cool	On for cooling
	Water heating	/	Hot water	On for water heating
	Heating + Water heating	Hot water	Hot water + heat	Frist water heating and then heating
		Heat/cool	Heat + hot water	On for heating; water heated by the water heater electric heater
	Cooling + water heating	Hot water	Hot water + cool	First water heating and then cooling
		Heat/cool	Cool + hot water	On for cooling; water heated by the water heater electric heater
	Off	/	Last operation mode	Off

5.6 Other thermal

[Operation Instructions]

1. At the commissioning parameter setting page, by touching “**Other thermal**”, the control panel will go to the corresponding setting page.

2. At the “**Other thermal**” setting page, “**Other thermal**” can be set to “**With**” or “**Without**”, “**T-Other switch on**” can be set to the desired value. When “**Other thermal**” is set to “**With**”, it is allowed to set the operating mode for the backup thermal source.



[Notes]

- This setting will be memorized upon power failure.
- There are three working logics for it.

Logic 1

1.The set point of other thermal should be equal to that of **“WOT-Heat”** in **“Heat”** mode and **“Heat + hot water”** mode; The set point should be the smaller one between **“T-Water tank”** +5°C and 60°C in **“Hot water”** mode.

2.The water pump for other thermal must be always active under the **“Heat”** mode.

3.Under the **“Heat”** mode, the 2-way valve will be controlled based on the setting of the control panel. During heating operation, the water pump of the heat pump unit will be stopped; however, during standby status, the water pump will start but the other thermal will stop.

Under the **“Hot water”** mode, the 3-way valve will switch to the water tank, the water pump of the heat pump will always stop but the other thermal will start.

Under the **“Heat + Hot water”** mode, the other thermal only works for space heating, and the electric heater of the water tank works for water heating. In this case, the 2-way valve is controlled based on the setting of the control panel, and the 3-way valve will always stop. During heating operation, the water pump of the heat pump unit will be stopped; however, during standby status, the water pump will start.

Logic 2

1.The set point of other thermal should be equal to that of **“WOT-Heat”** and both are or lower than 60°C in **“Heat”** mode and **“Heat + hot water”** mode; The set point should be the smaller one between **“T-Water tank”** +5°C and 60°C in **“Hot water”** mode.

2.The water pump for other thermal must be always active under the **“Heat”** mode.

3.Under the **“Heat”** mode, the 2-way valve will be controlled based on the setting of the control panel. During heating operation, the water pump of the heat pump unit will be stopped; however, during standby status, the water pump will start but the other thermal will stop.

Under the **“Hot water”** mode, the 3-way valve will switch to the water tank, the water pump of the heat pump will always stop but the other thermal will start.

Under the **“Heat + Hot water”** mode (**“Heat”** takes the priority), the other thermal only works for space heating, and the electric heater of the water tank works for water heating. In this case, the 2-way valve is controlled based on the setting of the control panel, and the 3-way valve will always stop. During heating operation, the water pump of the heat pump unit will be stopped; however, during standby status, the water pump will start.

Under the **“Heat + Hot water”** mode (**“Hot water”** takes the priority), the other thermal works for space heating and water heating. The other thermal will work for water heating firstly, after reached **“T-water tank”**, other thermal turns to space heating.

Logic 3

The heat pump will only send a signal to other thermal, but all the logic of control must be **“stand alone”**.

Other Thermal Control					
No.	Product	Mode	Remark		Required accessories
Logic 1	Monobloc	Heat	/	Available	RT5 temperature sensor
		Hot water	/	Available	Extra 3-way valve, water tank sensor
		Heat+Hot water	/	Available	RT5 temperature sensor, water tank sensor
	Split	Heat	/	Available	RT5 temperature sensor
		Hot water	/	Available	Extra 3-way valve, water tank sensor
		Heat+Hot water	/	Available	RT5 temperature sensor, water tank sensor
	All in One	Heat	/	Available	RT5 temperature sensor
		Hot water	/	Not available	/
		Heat+Hot water	/	Available	RT5 temperature sensor, water tank sensor

Other Thermal Control					
No.	Product	Mode	Remark		Required accessories
Logic 2	Monobloc	Heat	/	Available	RT5 temperature sensor
		Hot water	/	Available	Extra 3-way valve, water tank sensor
		Heat+Hot water	/	Available	Extra 3-way valve, RT5 temperature sensor, Water tank sensor
	Split	Heat	/	Available	RT5 temperature sensor
		Hot water	/	Available	Extra 3-way valve, water tank sensor
		Heat+Hot water	/	Available	Extra 3-way valve, RT5 temperature sensor, water tank sensor
	All in One	Heat	/	Available	RT5 temperature sensor
		Hot water	/	Not available	/
		Heat+Hot water	Priority=Heat	Available	RT5 temperature sensor
Priority=Hot water			Not available	/	
Logic 3	Monobloc	Heat	/	Available	/
		Hot water	/	Available	/
		Heat+Hot water	/	Available	/
	Split	Heat	/	Available	/
		Hot water	/	Available	/
		Heat+Hot water	/	Available	/
	All in One	Heat	/	Available	/
		Hot water	/	Available	/
		Heat+Hot water	/	Available	/

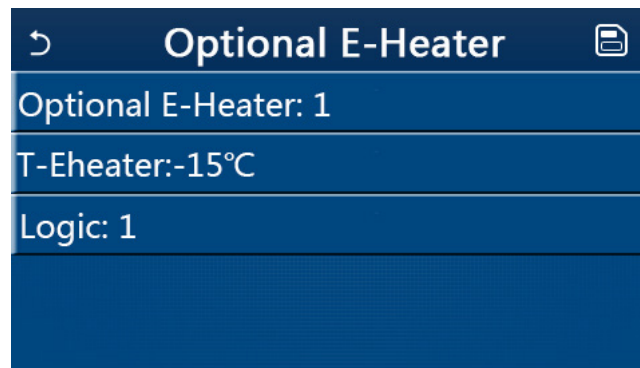
5.7 Optional E-Heater

[Operation Instructions]

1. At the commissioning parameter setting page, by touching “**Optional E-Heater**”, the control panel will go to the corresponding setting page.

2. At the “**Optional E-Heater**” setting page, it can be set to “1”, “2” or “Off”.

3. This setting is used to compare with the ambient temperature. Different comparison results are for different status of the optional electric heater.



[Notes]

- This setting will be memorized upon power failure.
- Neither “**Other thermal**” or “**Optional E-Heater**” can be activated at the same time.
- There are two working logics for “**Optional E-heater**”.

Logic 1: the heat pump and the optional electric heater cannot be started at the same time.

Logic 2: the heat pump and the optional electric heater can be started at the same time when the ambient temperature is lower than T-Eheater. There are two groups of auxiliary electric heater. Group 1 is 3kW and Group 2 is 6kW. Two combined groups can output 0kW, 3kW, 6kW, and 9kW.

- Optional E-Heater and water tank heater won't be started together.

5.8 Remote sensor

[Operation Instructions]

At the commissioning parameter setting page, by touching **“Remote sensor”**, the control panel will go to the corresponding setting page, where it can be set to **“With”** or **“Without”**.

[Notes]

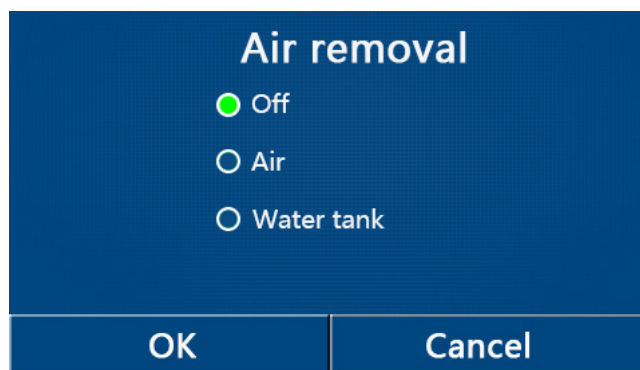
- This setting will be memorized upon power failure.
- Only when **“Remote sensor”** is set to **“With”**, the **“Ctrl. State”** can be set to **“T-room”**.

5.9 Air removal

[Operation Instructions]

At the commissioning parameter setting page, by touching **“Air removal”**, the control panel will go to the corresponding setting page, where it can be set to **“On”** or **“Off”**.

For field water makeup, activate this function to dispel air trapped inside the water system out.



[Notes]

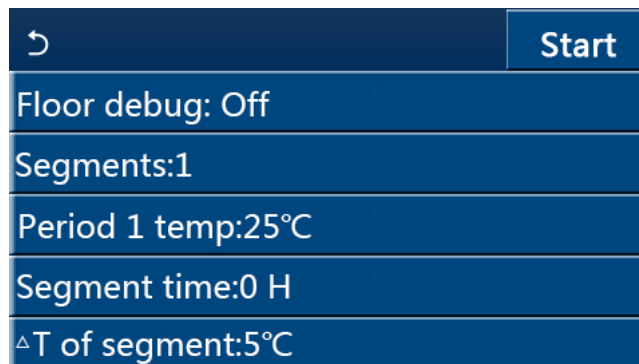
- This setting will be memorized upon power failure.
- This setting can be done only when the control panel is turned off. And when it is set to **“On”**, the main unit is not allowed to be turned on.

5.10 Floor debug

[Operation Instructions]

For initial commissioning, if floor heating is required, based on the ramped target temperature, this function will mildly evaporate water inside the floor which then would not be deformed and damaged.

1. At the commissioning parameter setting page, by touching **“Floor debug”**, the control panel will go to the corresponding setting page.



2. At the setting page, **“Floor debug”**, **“Segments”**, **“Period 1 temp”**, **“Segment time”**, and **“ΔT of segment”** can be set.

No.	Full Name	Displayed Name	Range	Default	Accuracy
1	Floor debug switch	Floor debug	On/Off	Off	/
2	Quantity of segments	Segments	1~10	1	1
3	Temperature of the first segment	Period 1 temp	25~35°C/ 77~95°F	25°C/ 77°F	1°C
4	Duration of each segment	Segment time	12~72 hours	0	12 hours
5	Temperature difference of each segment	ΔT of segment	2~10°C/ 36~50°F	5°C/ 41°F	1°C

3. When this setting is finished, by pressing **“Start”** this setting will be saved and start working, and by pressing **“Stop”** the function will halt.

[Notes]

- This function can be activated only when the control panel is turned off. When it is done with the control panel keeping **“On”**, a window will pop up, saying **“Please turn off the system first!”**.

- When this function has been activated, **“On/Off”** operation will be deactivated. By pressing On/Off, a window will pop up, saying **“Please disable the floor debug!”**.

- When **“Floor debug”** has been activated; **“Weekly timer”**, **“Clock Timer”**, **“Temp timer”** and **“Preset mode”** will be deactivated.

- **“Emergen. mode”**, **“Disinfection”**, **“Holiday mode”**, **“Manual defrost”**, **“Forced mode”** and **“Refri. recovery”** cannot be activated at the same time with **“Floor debug”**. If doing so, a window will pop up, saying **“Please disable the floor debug!”**.

- Upon power failure, **“Floor debug”** will back to **“Off”** and the runtime will be zeroed.

- When **“Floor debug”** has been activated, **“T-floor debug”** and **“Debug time”** can be viewed.

- When **“Floor debug”** has been activated and works normally; the corresponding icon will be displayed at the upper side of the menu page.

- Before activating **“Floor debug”**, make sure **“Segment time”** of each segment is not zero. If so, a window will pop up, saying **“Segment time wrong!”** In this case, **“Floor debug”** is allowed to be activated only when **“Segment time”** has changed.

5.11 Manual defrost

[Operation Instructions]

At the commissioning parameter setting page, by touching **“Manual defrost”**, the control panel will go to the corresponding setting page.

This function will let the heat pump directly go to the defrosting mode.

[Notes]

- This setting will not be memorized upon power failure.

- This setting can be set only when the control panel has turned off. When this function has been activated, ON operation is un-allowed.

- Defrosting will quit when the defrosting temperature goes to 20°C or the defrosting duration is equal to 10 minutes.

5.12 Force mode

[Operation Instructions]

1. At the commissioning parameter setting page, by touching **“Force mode”**, the control panel will go to the corresponding setting page.

2. This function will force the heat pump to operate for troubleshooting.

3. At the **“Force mode”** setting page, it can be set to **“Force-cool”**, **“Force-heat”**, and **“Off”**. When it is set to **“Force-cool”** or **“Force-heat”**, the control panel will directly go back to the menu page and response to any touching operation except the ON/OFF operation, with a window popping up, saying **“The force-mode is running!”**. In this case, by touching ON/OFF, **“Force mode”** will quit.

[Notes]

- This function is allowed only when the control panel has just repowered and not turned on. For the main unit which once has been put into operation, this function is unavailable, alerting “**Wrong operation!**”.
- It will not be memorized upon power failure.

5.13 Gate-Ctrl.

[Operation Instructions]

At the commissioning parameter setting page, by touching “**Gate-Ctrl.**”, the control panel will go to the corresponding setting page.

[Notes]

- When “**Gate-Ctrl.**” has been activated; the display panel will detect the card state. When the card has inserted, the main unit will run normally. When the card is drawn out, the control panel will turn off the main unit at once and back to the homepage. In this case, all touching operation become ineffective, and a prompt dialog box will pop up. The main unit will resume normal operation until the card has inserted back and the ON/OFF status of the control panel will resume to that before the card is drawn out.
- This setting will be memorized upon power failure.

5.14 C/P limit (Current Limit/ Power Limit)

[Operation Instructions]

1. This functions targets for user’s electric circuits with poor carrying capacity and unable to let the main unit operates under full load. When it has been activated, the user is allowed to set the current limit value based on the carrying capacity of their electric circuits. However, this value should be higher than 80% of the current for the maximum nominal input power for heating, which is necessary for normal functions (like oil return, defrosting, freeze protection etc.), otherwise it would lead to overcurrent, trip-off and other adverse consequences. If the electric circuit fails to meet this condition, its carrying capacity must be improved. During operation, when the current exceeds this value, the electric heater will first stop working and then frequency of the heat pump will be dropped until the current is less than the limit value. As there is a deviation for the detected current, it can be corrected through “**ΔValue min**”.

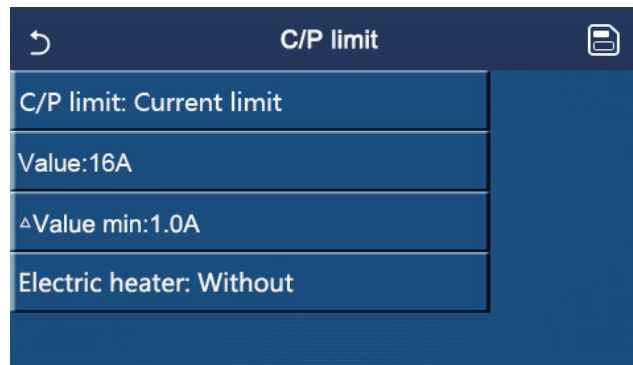
2. Current limit function will limit the action of the load, make heating/cooling/water heating slower, make output capacity much lower, and even limit some functions. Do not activate this function unless necessary. Once it has been activated, do not set it too low, otherwise the main unit’s capacity would be degraded and some functions would be limited.

Parameter	Description
C/P limit	There are three options available, “ Off ”, “ Current limit ” and “ Power limit ”.
Value	Power or current limit
ΔValue min	As there is a deviation for the detected current, it can be corrected through “ ΔValue min ”. When “ ΔValue min ” goes larger/smaller, it is more likely/hardly to trigger the current limit function. For example, when the current limit value is 32A, but the current limit function fails when the actual current exceeds (a clip-style ammeter can be used for current detection), raise “ ΔValue min ” as so to trigger the current limit function more likely.
Electric heater	There are two options available for the electric heater, “ With ” and “ Without ”, which determines if the electric heater should be taken into account for current/ power limit. Two power supplies are required, one for the main unit, and the other for the electric heater. (1) when they are separate, it can be set to “ Without ”. In this case, current/power limit works only for the heat pump. (2) when they are supplied together through an air switch, current/power limit works on both the heat pump and the electric heater.
AUX E-heater	(1) when a standard auxiliary electric heater is supplied by the manufacturer, the power is not required to be input but is automatically identified by the main board.
Tank heater	(2) when an auxiliary electric heater is field supplied, the user needs to set “ EH Power 1 ” and “ EH Power 2 ”.

Parameter	Description
Tank heater power	(1) when a water tank with a standard electric heater is supplied by the manufacturer, the power of the electric heater is not required to be input but is automatically identified by the main board. (2) when a water tank's electric heater is field supplied, the user needs to set its power and meanwhile shall make sure the correctness of the power setting.
EH Power 1	When "AUX E-heater" is set to "Field-supplied", the user needs to set "EH Power 1" and "EH Power 2". Then, once the electric heater works, the main unit is able to calculate the current value. In this case, the user shall make sure the correctness of the power settings.
EH Power 2	

2. When it is set it "Off", current limit and power limit both cannot be set. When it is set to "Current limit" or "Power limit", they can be set.

3. After that, this setting will be saved by touching the "Save" icon.



[Notes]

- This setting will be memorized upon power failure.

5.15 Address

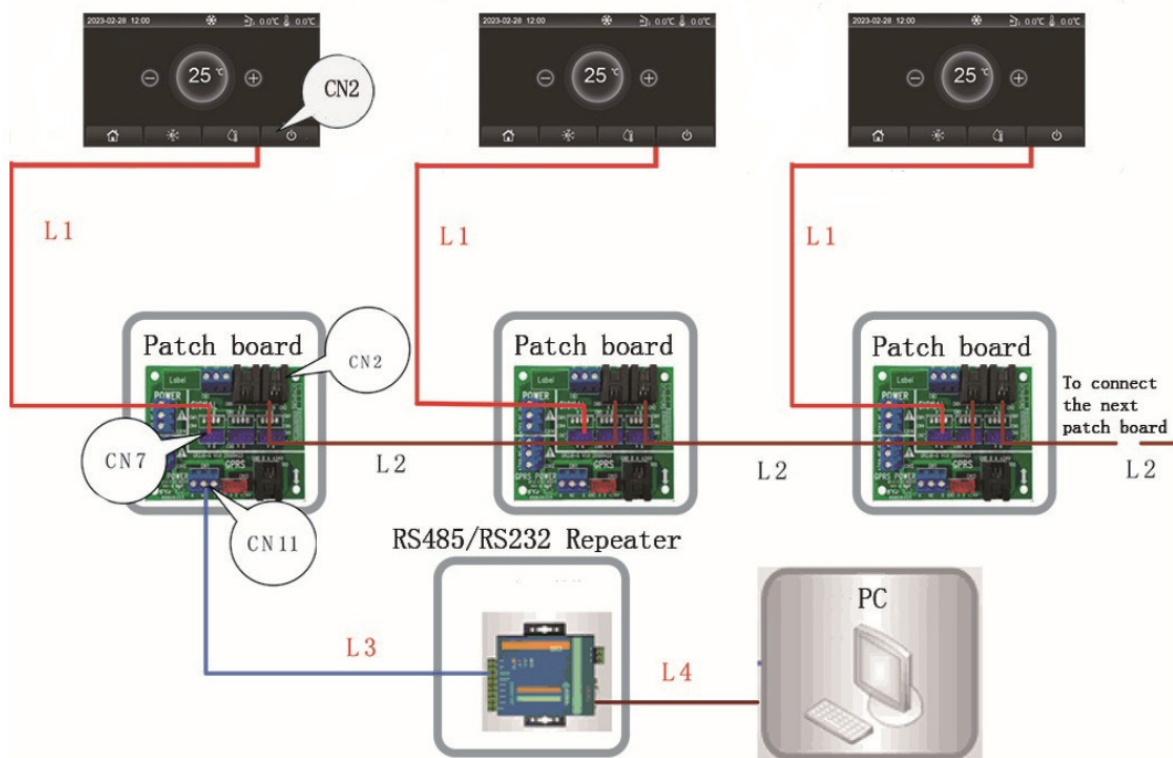
[Operation Instructions]

At the commissioning parameter setting page, by touching "Address", it can be set the address.

It shall be set when the heat pump is required to be Modbus controlled.

[Notes]

- It is used to set the address of the control panel for being integrated to the centralized control system.
- This setting will be memorized upon power failure.
- The setting range is 1~125 and 127~253.
- The defaulted address is 1 upon first power-on.
- The defaulted address is 1 upon first power-on.
- See the figure below for wiring the remote controller. Wherein, "L1", "L2", "L3", "Patch board", "RS485/RS232", and "Repeater" are optional parts and others with similar functions are allowed.



5.16 Refri. recovery (Refrigerant Recovery)

[Operation Instructions]

At the commissioning parameter setting page, by touching “**Refri. recovery**”, it will go to the refrigerant recovery page.

This function can be used for maintaining the heat pump.

When “**Refri. recovery**” is set to “**On**”, the control panel will go back to the home page. At this time, any touch operation except ON/OFF will get no response, with a prompt dialog box popping up, saying “**The refrigerant recovery is running!**” By touching ON/OFF, refrigerant recovery will quit.

[Notes]

- This function is allowed only when the main unit has just repowered and not turned on. For the main unit which once has been put into operation, this function is unavailable, alerting “**Wrong operation**”.
- This function will not be memorized upon power failure.

5.17 Tank heater

[Operation Instructions]

At the commissioning parameter setting page, by touching “**Tank heater**”, it will go to the setting page of control logic for the water tank heater.

[Notes]

- “Reserved” will be displayed when the water tank is unavailable.
- This setting can be done only when the control panel is off.
- This function can be memorized upon power failure.
- Logic 1: NEVER allowed the Unit’s Compressor and the Water Tank Electric Heater or the Optional Electric Heater to work at the same time.
- Logic 2: While Heating/ Cooling + Hot water mode (Hot Water priority) $T_{set} \geq T_{HPmax} + \Delta T_{hot\ water} + 2$, when water tank temperature reach THP_{max} , the water tank EH will be ON and start to do hot water, at the same time, the compressor will turn to heating/cooling mode, water tank EH and Compressor will be ON together.

5.18 Gate-Ctrl memory

[Operation Instructions]

At the commissioning parameter setting page, by touching "**Gate-Ctrl Memory**", it will go to the setting page.

[Notes]

- When it is enabled, "**Gate-Ctrl**" will be memorized upon power failure.
- When it is disabled, "**Gate-Ctrl**" will not be memorized upon power failure.

5.19 3-Way valve1

[Operation Instructions]

At the commissioning parameter setting page, by touching "**3-Way valve1**", it will go to the setting page.

[Notes]

- It will be memorized upon power failure.
- Three options are available, "**Without**", "**DHW**", and "**AIR**".When it is set to "**AIR**", it will be closed (230VAC) under the cooling/heating mode and opened under the DHW(Hot water) mode; when it is set to "**DHW**", it will be closed (230VAC) under the DHW(Hot water) mode and opened under the cooling/heating mode.
- This setting is allowed only when the control panel has been turned off.

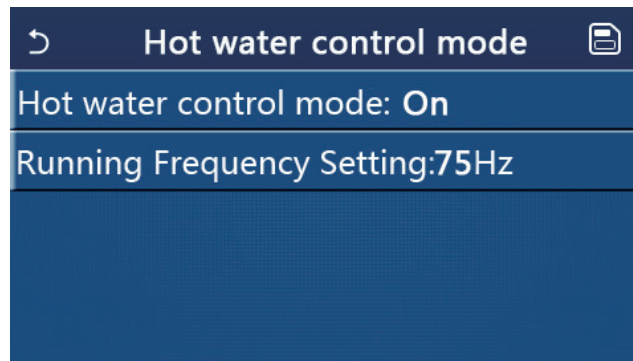
5.20 Hot water control mode

[Operation Instructions]

At the commissioning parameter setting page, by touching "**Hot water control mode**", it can be set to "**Off**" or "**On**".

When it is set to "**On**", "**Running Frequency Setting**" can be set, and the user could change the parameter to fix the frequency of the compressor in the "**Hot water**" mode, otherwise, the main unit will automatically run based on the original logic.

After that, this setting will be saved by touching the "**Save**" icon.



[Notes]

- This setting will be memorized upon power failure.

5.21 SG (Smart grid)

[Operation Instructions]

It is allowed to be activated only when the control panel is turned off.

When it has been activated, the operating main unit will receive and execute control commands from the smart grid, except when the control panel has been turned off. See the table below for the SG control commands.

SG smart grid	EVU Photovoltaic signal	Command	Remarks
1	0	Switch-off command	Switch-off command
0	0	Standard operation	Switch-on command
0	1	Switch-on signal	Switch-on signal
1	1	Switch-on command	Switch-on signal

5.22 Cool control mode

When it has been activated, it will limit the highest frequency of the compressor for cooling operation.

5.23 Heat control mode

When it has been activated, it will limit the highest frequency of the compressor for heating operation.

5.24 Lowest speed limit of the Water Pump (LSWP enable)

It functions to limit the lowest water pump speed to prevent the main unit from alarming for a flow switch fault. This limit value can be determined through a trial run of the water pump. It can be set only when the controller is turned off. This function does not work under the “Holiday” mode.

5.25 Water pump antistall

When it has been activated, it allows to set the antistall interval and antistall duration for the water pump. Once the main unit has been turned off, the water pump will run at the highest speed for antistall duration every antistall interval so as to prevent the water pump from being damaged.

5.26 Debug mode

[Operation Instructions]

It functions to test the specific load separately.

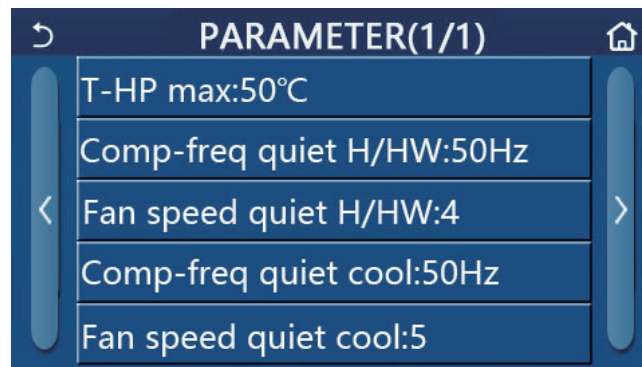
It is not allowed to be set when “On/Off”, “Disinfection”, “Holiday mode”, “Emergen. mode” and “Thermostat” have been activated.

It will not be memorized upon power failure.

5.27 Parameter setting

[Operation Instructions]

At the commissioning parameter setting page, by touching “PARAM.”, it will go to the pages as shown below.



Page of Commissioning Parameters

At this page, select the desired option and then go to the corresponding page.

After that, by pressing “OK”, this setting will be saved and then the main unit will run based on this setting; or by pressing “Cancel”, this setting will not be saved and quit.

No.	Full Name	Display Name	Range		Default
1	T-HP max	T-HP max	40~55°C	104~131°F	50°C/122°F It can be set when the water tank is available. See Section 5.17 for more details.
2	Compressor operating frequency at the Quiet mode for heat and hot water	Comp-freq quiet H/HW	35~120Hz		It varies for different models.
3	Fan speed at the Quiet mode for heat and hot water	Fan speed quiet H/HW	1~9		It varies for different models.

No.	Full Name	Display Name	Range	Default
4	Compressor operating frequency at the Quiet mode for cool	Comp-freq quiet cool	35~120Hz	It varies for different models.
5	Fan speed at the Quiet mode for cool	Fan speed quiet cool	1~9	It varies for different models.

[Notes]

- For parameters with different defaults at different conditions, once the current condition changes, the corresponding default also will change.
- All parameters at this page will be memorized upon power failure.

6. Information on servicing

6.1 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 minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

6.2 Work Procedure

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

6.3 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.

6.4 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.

6.5 Recovery

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

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

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

6.6 Decommissioning

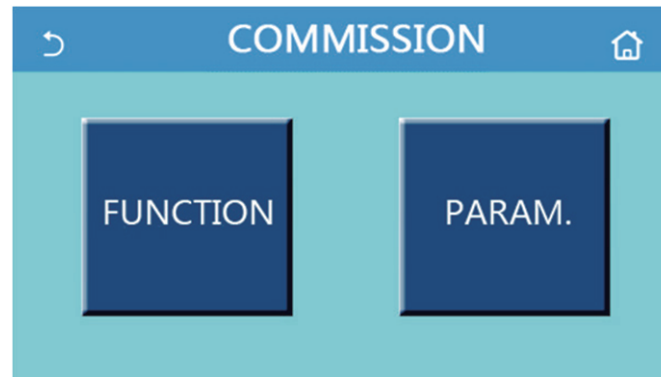
Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis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

- a) Become familiar with the equipment and its operation.
- b) Isolate system electrically.
- c) Before attempting the procedure ensure that: mechanical handling equipment is available, if required, for handling refrigerant cylinders; all personal protective equipment is available and being used correctly; the recovery process is supervised at all times by a competent person; recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with manufacturer's instructions.
- h) Do not overfill cylinders. (No more than 80 % volume liquid charge).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

6.7 Refrigerant Collecting

When relocating or disposing of the indoor/outdoor unit, pump down the system following the procedure below so that no refrigerant is released into the atmosphere.

- (1) Turn off the power supply (circuit breaker).
- (2) Connect the low-pressure valve on the gauge manifold to the charge plug (lowpressure side) on the outdoor unit.
- (3) Close the liquid stop valve completely.
- (4) Supply power (circuit breaker). Start-up of the indoor-outdoor communication takes about 3 minutes after the power (circuit breaker) is turned on. Start the pump-down operation 3 to 4 minutes after the power (circuit breaker) is turned on.
- (5) Perform the refrigerant collecting operation. At the commissioning parameter setting page, by touching "Refri. recovery", it will access to the refrigerant recovery page.



- (6) Fully close the ball valve on the gas pipe side of the outdoor unit when the pressure gauge on the gauge manifold shows 0.05 to 0 MPa [Gauge] (approx. 0.5 to 0 kgf/cm²) and quickly stop the air conditioner. When "Refri. recovery" is set to "On", the control panel will go back to the home page. At this time, any touch operation except ON/OFF will get no response, with a prompt dialog box popping up, saying "The refrigerant recovery is running!" By touching ON/OFF, refrigerant recovery will quit.
- (7) Turn off the power supply (circuit breaker), remove the gauge manifold, and then disconnect the refrigerant pipes.

⚠ WARNING

- When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes.
- If the refrigerant pipes are disconnected while the compressor is operating and the stop valve (ball valve) is open, the pressure in the refrigeration cycle could become extremely high if air is drawn in, causing the pipes to burst, personal injury, etc.

6.8 Handling of the Unit

During installing or moving the unit, other substances except refrigerant cannot get into the refrigerant pipe and there shall not be air remained in the pipe.

If air or other substance gets into the pipe, system pressure will increase and compressor will be damaged.

Do not charge refrigerant of other type into the unit during installing or moving. Otherwise, it may cause poor operation, malfunction, mechanical failure, or even serious safety accident.

If the refrigerant shall be recycled during moving or maintaining, pressure meter must be used. Set the unit in cooling mode and close the valve at high pressure side (liquid valve) completely. When the reading of pressure meter ranges 0~0.05MPa (about 30s~40s), close the valve at high pressure side (gas valve) completely, turn off the unit and cut off power supply.

If refrigerant recycle time is too long, air may get into the system. In this case, system pressure will increase and compressor will be damaged.

During recycling refrigerant, make sure the liquid valve and gas valve are closed completely, and the power supply is cut off before disassembling the connection pipe.

If connection pipe is disassembled when the compressor is still operating, air may get into the system. In this case, system pressure will increase and compressor will be damaged.

During installing the unit, make sure the connection pipe is connected properly before starting the compressor.

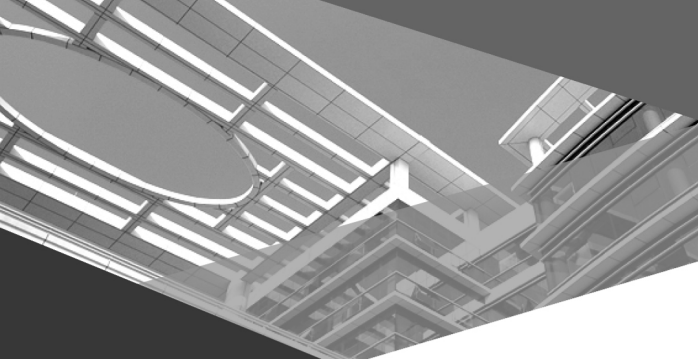
If the compressor is started before finishing connection of connection and when the cut-off valve is opened, air may get into the system. In this case, system pressure will increase and compressor will be damaged.

The indoor unit and outdoor unit shall be connected properly with required wire. The wiring terminal shall be secured properly without affecting by exterior force directly.

If the wire is not connected properly or the wiring terminal is not secured properly, fire hazard may be caused.

The wire cannot be refit or reconnected in the middle.

When the length of connection wire is not sufficient, please contact the appointed after-sales service center to purchase a specialized wire with sufficient length.



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