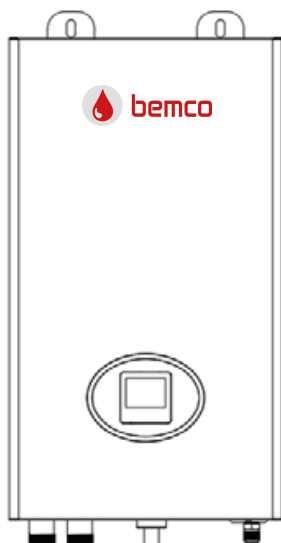
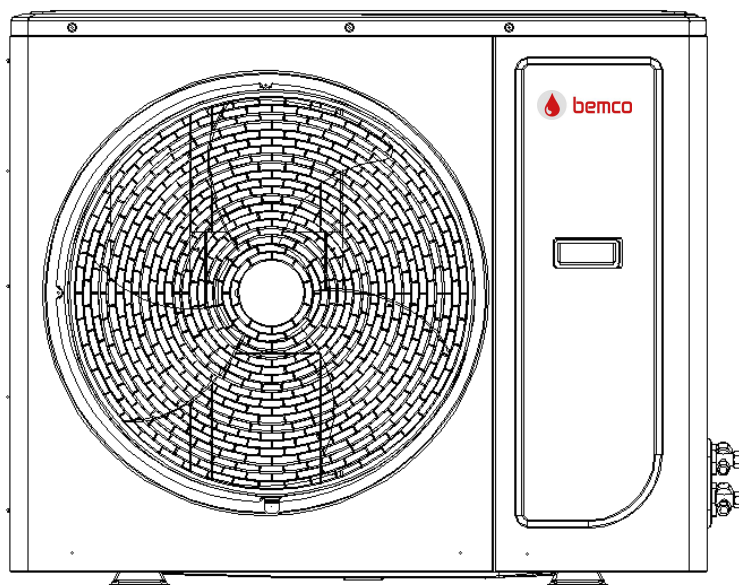


INSTALLATION & USER MANUAL

SPLIT AIR/WATER HEAT PUMP



Indoor Unit



Outdoor Unit

Models :


BEPACS230V06, BEPACS230V08,
BEPACS230V10, BEPACS230V12,
BEPACS400V12


Content

1 Manual	01
Outline	01
Items in product packaging box	01
Tools to install the unit	02
2 Safety instructions	03
Materials required for installation of split heat pump	09
System principle and installation diagram	10
3 General introductions	11
4 Equipment Overview	13
4.1 Indoor unit	13
4.2 Outdoor unit	15
5 Electrical wiring diagram	20
5.1 Electrical wiring diagram of the outdoor unit: 4-6kW	20
5.2 Electrical wiring diagram of the outdoor unit: 8-12kW	21
5.3 Electrical wiring diagram of the outdoor unit: 14-16kW	22
5.4 Electrical wiring diagram of Outdoor unit: 10-16kW (3-phase)	23
5.5 Electrical wiring diagram of indoor unit: 4-16kW (1-phase)	24
5.6 Electrical wiring diagram of indoor unit: 10-16kW (3-phase)	25
6 Electronic control box	26
6.1 Main control board of hydraulic module	26
6.2 1-phase for 4-16kW units	27
6.3 3-phase for 10-16kW units	31
7 Field wiring	33
7.1 Precautions on electrical wiring work	33
7.2 Wiring overview	33
7.3 Field wiring guidelines	33
7.4 Precautions on wiring of power supply	35
7.5 Schematic diagram of power input connection	35
7.6 Remove the switch box cover	37
8 Connection for other components	38
8.1 For solar energy input signal:	40
8.2 For 3-way valve SV1、SV2 and SV3:	40
8.3 For remote shut down	40
8.4 For Pump and DHW pipe pump:	41
8.5 For room thermostat:	41
8.6 For additional heat source control:	43
8.7 For outside circulation pump P_o:	44
8.8 For smart grid:	44
9 Indoor unit installation	45
9.1 Selecting installation location	45
9.2 Installation space	45
9.3 Plumbing engineering	46

10 The installation of the outdoor unit	49
10.1 Precautions for choosing the installation location.....	49
10.2 Installation space	49
10.3 Outdoor unit installation	50
10.4 Refrigerant piping project	51
10.5 Refill the refrigerant	55
11 Pre operation inspection	56
11.1 Inspection before initial startup	56
11.2 Introduction of the pump	57
11.3 Failure diagnosis at first installation	58
11.4 Pump down operation	58
12 Test run and final checks	59
13 Maintenance and service	59
14 Trouble shooting	60
15 Information servicing	63
16 Appendix	67
16.1 Breakdown and protection	67
16.2 Run parameter query	72

NOTE:

 Please read the instructions carefully before installation and do not discard them and keep the instructions for future reference.

 Before operating the machine, make sure it is installed by professionals. If in doubt, please contact your dealer for advice and information.

1 Manual

This manual contains important information of the machine. Please read the manual carefully before installation

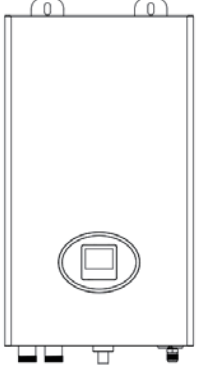
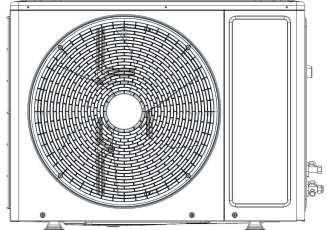
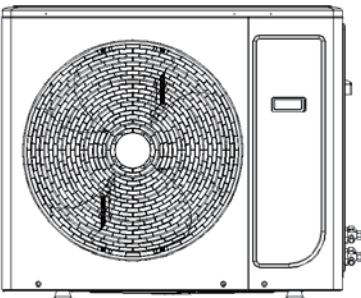
Outline

The split system consists of two parts: indoor unit and outdoor unit, which are connected by copper pipes. The indoor unit is the indoor part of the air source heat pump, which is used for heating (heating water) or refrigeration. The inner unit can be connected with fan coil, underground heating equipment, low-temperature radiator and domestic hot water tank.

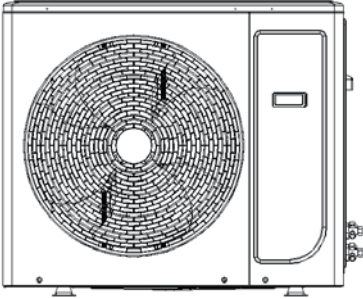
The system is equipped with auxiliary heater to assist heating at low temperature. The auxiliary heater can also be used as standby in case of outdoor unit failure.

Items in product packaging box

- Please make sure that all items are in the carton before installation.
- At delivery, the unit must be checked and any damage must be reported immediately to the carrier claims agent.
- Bring the unit as close as possible to the final installation position in its original package in order to prevent damage during transport.

Indoor Unit Carton			
Item		Image	Quantity
Indoor unit	4-16kW		One
Outdoor Unit Carton			
Item		Image	Quantity
Outdoor unit	4/6/8kW		One
	10/12kW		One

And on the next page.....

Outdoor Unit Carton			
Item		Image	Quantity
Outdoor unit	14/16kW		One

Tools to install the unit

NO.	Name	NO.	Name
1	Percussion drill	10	Sleeve set
2	Gradienter	11	bolt driver
3	Copper pipe bending equipment	12	Wire stripper
4	Water pipe bending equipment	13	Vacuum pump
5	Gas welding gun	14	Pressure gauge
6	Flaring tool	15	Electronic scale
7	Tape measure	16	Adjustable wrench
8	Hexagon wrench	17	Protective equipment, such as gloves, glasses
9	Pipe cutter		

2 Safety instructions

The precautions listed here are divided into the following types. They are quite important, so be sure to follow them carefully. Meanings of **DANGER**, **WARNING**, **CAUTION** and **NOTE** symbols.

INFORMATION

- Read these instructions carefully before installation. Keep this manual in a handy for future reference.
- Improper installation of equipment or accessories may result in electric shock, short-circuit, leakage, fire or other damage to the equipment. Be sure to only use accessories made by the supplier, which are specifically designed for the equipment and make sure to get installation done by a professional.
- All the activities described in this manual must be carried out by a licensed technician. Be sure to wear adequate personal protection equipment such as gloves and safety glasses while installing the unit or carrying out maintenance activities.
- Contact your dealer for any further assistance.



Caution: Risk of fire/
flammable materials

WARNING

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

DANGER

Indicates an imminently hazardous situation which if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which if not avoided, could result in death or serious injury.





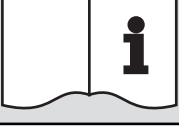
CAUTION

Indicates a potentially hazardous situation which if not avoided, may result in minor or moderate injury. It is also used to alert against unsafe practices.

CAUTION

Indicates situations that could only result in accidental equipment or property damage.

Explanation of symbols display on the unit.

	WARNING	This symbol shows that this appliance used a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	CAUTION	This symbol shows that the operation manual should be read carefully.
	CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	This symbol shows that information is available such as the operating manual or installation manual.

DANGER

- Before touching electric terminal parts, turn off power switch.
- When service panels are removed, live parts can be easily touched by accident.
- Never leave the unit unattended during installation or servicing when the service panel is removed.
- Do not touch water pipes during and immediately after operation as the pipes may be hot and could burn your hands. To avoid injury, give the piping time to return to normal temperature or be sure to wear protective gloves.
- Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock.
- Before touching electrical parts, turn off all applicable power to the unit.

WARNING

- All the activities described in this manual must be carried out by a licensed technician. Be sure to wear adequate personal protection equipment such as gloves and safety glasses while installation the unit or carrying out maintenance activities.
- Ensure that the installation of Indoor and outdoor unit is safe and reliable. If the machine is not installed firmly or not properly, it will cause damage. The minimum support weight required for installation is 20g/mm², and full consideration should be given to strong winds, hurricanes or earthquakes. When installing the machine in a closed area or limited space, please consider the size and ventilation of the room to prevent suffocation due to refrigerant leakage.
- 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.
- Tear apart and throw away plastic packaging bags so that children will not play with them. Children playing with plastic bags face danger of death by suffocation.
- Safely dispose of packing materials such as nails and other metal or wood parts that could cause injuries.

- Ask your dealer or qualified personnel to perform installation work in accordance with this manual. Do not install the unit yourself. Improper installation could result in water leakage, electric shocks or fire.
- Be sure to use only specified accessories and parts for installation work. Failure to use specified parts may result in water leakage, electric shocks, fire, or the unit falling from its mount.
- Install the unit on a foundation that can withstand its weight. Insufficient physical strength may cause the equipment to fall and possible injury.
- Perform specified installation work with full consideration of strong wind, hurricanes, or earthquakes. Improper installation work may result in accidents due to equipment falling.
- Make certain that all electrical work is carried out by qualified personnel according to the local laws and regulations and this manual using a separate circuit. Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.
- Be sure to install a ground fault circuit interrupter according to local laws and regulations. Failure to install a ground fault circuit interrupter may cause electric shocks and fire.
- Make sure all wiring is secure. Use the specified wires and ensure that terminal connections or wires are protected from water and other adverse external forces. Incomplete connection or affixing may cause a fire.
- When wiring the power supply, form the wires so that the front panel can be securely fastened. If the front panel is not in place there could be overheating of the terminals, electric shocks or fire.
- After completing the installation work, check to make sure that there is no refrigerant leakage. Never directly touch any leaking refrigerant as it could cause severe frostbite. Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor and other refrigerant cycle parts. Burns or frostbite are possible if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation. Touching the internal parts can cause burns. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- If the unit is not used for a long time, it is recommended not to turn off the power supply. If the power is turned off, the protection devices of some products (such as water pump anti-lock and anti-freezing device) will not be available.
- Improper installation of equipment or accessories may result in electric shock, short-circuit, leakage, fire or other damage to the equipment. Be sure to only use accessories made by the supplier, which are specifically designed for the equipment and make sure to get installation done by a professional.
- During installation or repair of the unit, please do not unplug or plug in the power supply, and do not leave the unit unattended (It may cause fire or electric shock).
- After completing the installation work, check to make sure that there is no refrigerant leakage.
- Never directly touch any leaking refrigerant and the refrigerant pipes. It could cause severe frostbite. During and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor and other refrigerant cycle parts. Burns or frostbite are possible if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation. Touching the internal parts can cause burns. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Do not place heaters or other electrical appliances near the power cord (It may cause fire or electric shock)
- Please note that water cannot be poured directly from the unit. Do not let water enter electrical components. (It may cause fire or electric shock)
- That the appliance shall be disconnected from its power source during service and when replacing parts and, if that the removal of the plug is foreseen, it shall be clearly indicated that the removal of the plug has to be such that an operator can check from any of the points to which he has access that the plug remains removed. If this is not possible, due to the construction of the appliance or its installation, a disconnection with a locking system in the isolated position shall be provided.
- If the unit is not used for a long time, it is recommended not to turn off the power supply. If the power is turned off, the protection devices of some products (such as water pump anti-lock and anti-freezing device) will not be available.

CAUTION

- Ground the unit.
- Grounding resistance should be according to local laws and regulations.
- Do not connect the ground wire to gas or water pipes, lightning conductors or telephone ground wires.
- Incomplete grounding may cause electric shocks.
 - Gas pipes: Fire or an explosion might occur if the gas leaks.
 - Water pipes: Hard vinyl tubes are not effective grounds.
 - Lightning conductors or telephone ground wires: Electrical threshold may rise abnormally if struck by a lightning bolt.
- Install the power wire at least 3 feet (1 meter) away from televisions or radios to prevent interference or noise. (Depending on the radio waves, a distance of 3 feet (1 meter) may not be sufficient to eliminate the noise.)
- Do not wash the unit. This may cause electric shocks or fire. The appliance must be installed in accordance with national wiring regulations. 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.
- Do not install the unit in the following places:
 - Where there is mist of mineral oil, oil spray or vapors. Plastic parts may deteriorate, and cause them to come loose or water to leak.
 - Where corrosive gases (such as sulphurous acid gas) are produced. Where corrosion of copper pipes or soldered parts may cause refrigerant to leak.
 - Where there is machinery which emits electromagnetic waves. Electromagnetic waves can disturb the control system and cause equipment malfunction.
 - Where flammable gases may leak, where carbon fibre or ignitable dust is suspended in the air or where volatile flammables such as paint thinner or gasoline are handled. These types of gases might cause a fire.
 - Where the air contains high levels of salt such as near the ocean.
 - Where voltage fluctuates a lot, such as in factories.
 - In vehicles or vessels.
 - Where acidic or alkaline vapors are present.

This appliance can be used by children 8 years old and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they are supervised or given instruction on using the unit in a safe manner and understand the hazards involved. Children should not play with the unit. Cleaning and user maintenance

should not be done by children without supervision.

- Children should be supervised to ensure that they do not play with the appliance.
- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person.
- This marking indicates that this product should not be disposed with other household wastes through out 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.
- **DISPOSAL:** Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary. Do not dispose of electrical appliances as municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substance can leak into the groundwater and get into the food chain, damaging your health and well-being.
- 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.
- The wiring must be performed by professional technicians in accordance with national wiring regulation and this circuit diagram. An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating not exceeding 30mA shall be incorporated in the fixed wiring



according to the national rule.

- Confirm the safety of the installation area (walls, floors, etc.) without hidden dangers such as water, electricity, and gas. Before wiring/pipes.
- Before installation, check whether the user's power supply meets the electrical installation requirements of unit (including reliable grounding, leakage, and wire diameter electrical load, etc.). If the electrical installation requirements of the product are not met, the installation of the product is prohibited until the product is rectified.
- When installing multiple air conditioners in a centralized manner, please confirm the load balance of the three-phase power supply, and multiple units are prevented from being assembled into the same phase of the three-phase power supply.
- Product installation should be fixed firmly. Take reinforcement measures, when necessary.
- Please carry out drainage system and the pipeline work according to the instructions. If the drainage system or pipeline is defective, water leakage may occur, and it should be dealt with immediately to avoid getting other household products wet and damaged.
- Please do not clean the unit when the power is on. When cleaning the unit, please turn off the power after shutting down. Otherwise, you may be injured by a high-speed fan or electric shock.
Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- When the unit has problems or peculiar smell, please do not continue to operate the unit. Turn off the power immediately and stop the machine. Otherwise, electric shock or fire may be caused.
- Do not put your fingers into the fan and evaporator. High speed fans can cause serious injury.
- In order to avoid the danger of inadvertently resetting the thermal breaker, the equipment cannot use external switching devices, such as timers, or be connected to a circuit that is often open or closed.
- This device is not designed for people with weak physical or mental behavior ability (including children), as well as people who have no use experience and do not understand the heating system. Unless it is used under the safety guidance and supervision of the person in charge, or has received training on the use of this equipment. Children should use the equipment under the supervision of adults to ensure their safe use of the equipment.



NOTE

● About Fluorinated Gasses

- This heat pump unit contains fluorinated gasses. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself. Compliance with national gas regulations shall be observed.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Product uninstallation and recycling must be performed by a certified technician.
- If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months. When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

● Frequency of Refrigerant Leakage Checks

- For unit that contains fluoridated greenhouse gases in quantities of 5 tons of CO₂ equivalents or more, but of less than 50 tons of CO₂ equivalent, at least every 12 months, or where a leakage detection system is installed, at least every 24 months.
- For unit that contains fluoridated greenhouse gases in quantities of 50 tons of CO₂ equivalents or more, but of less than 500 tons of CO₂ equivalent at least every six months, or where a leakage detection system is installed, at least every 12 months.
- For unit that contains fluoridated greenhouse gases in quantities of 500 tons of CO₂ equivalents or more, at least every three months, or where a leakage detection system is installed, at least every six months.
- This heat pump unit is a hermetically sealed equipment that contains fluoridated greenhouse gases.
- Only certificated person is allowed to do installation, operation and maintenance.

● Special requirements for R32

- Do not have refrigerant leakage and open flame.

- Be aware that the R32 refrigerant does not contain an odor.
- The appliance shall be stored so as to prevent mechanical damage and in a well-ventilated room without continuously operating ignition sources (example: open flames, an operating gas appliance) and the room size corresponds to the room area as specified for operation.
- Do not re-use joints which have been used already.
- Joints made in installation between parts of refrigerant system shall be accessible for maintenance purposes.-Make sure installation, servicing, maintenance and repair comply with instructions and with applicable legislation (for example national gas regulation) and are executed only by authorized persons.
- Pipework should be protected from physical damage.
- Installation of pipework shall be kept to a minimum.


The machine shall be installed in a well-ventilated room without continuous fire source, and the room area during installation shall not be less than the datum in the following table:

Model	Min. room area
40/60	8m ²
80	10m ²
100	11m ²
120	12m ²
140/160	14m ²

Materials required for installation of split heat pump

Note:

1. Be sure to confirm the model name and the serial number of the unit.

2.  Must be hard wired, plug is not allowed. Must comply with standard 60245 IEC57.

Wires specifications

Model	Outdoor Unit Separate power supply wires	Indoor Unit Separate power supply wires	Signal connecting wires
4/6kW	$\geq 3 \times 4\text{mm}^2$	$\geq 3 \times 4\text{mm}^2$	$\geq 2 \times 0.5\text{mm}^2$ (Twisted pair shielded wire)
8/10kW	$\geq 3 \times 4\text{mm}^2$	$\geq 3 \times 4\text{mm}^2$	
12/14/16kW	$\geq 3 \times 6\text{mm}^2$	$\geq 3 \times 4\text{mm}^2$	
10/12/14/16kW (3-phase)	$\geq 5 \times 4\text{mm}^2$	$\geq 5 \times 6\text{mm}^2$	

Notes:

The distance between power supply wires and signal wires should be kept at least 300mm.

Water pipe specifications

Model	Entering/leaving water pipe (External thread)	Water pipe	Drain outlet
4/6kW	1"	$\geq 1"$	$\varnothing 25\text{mm}$
8/10kW	1"	$\geq 1"$	$\varnothing 25\text{mm}$
12/14/16kW	1"	$\geq 1"$	$\varnothing 25\text{mm}$

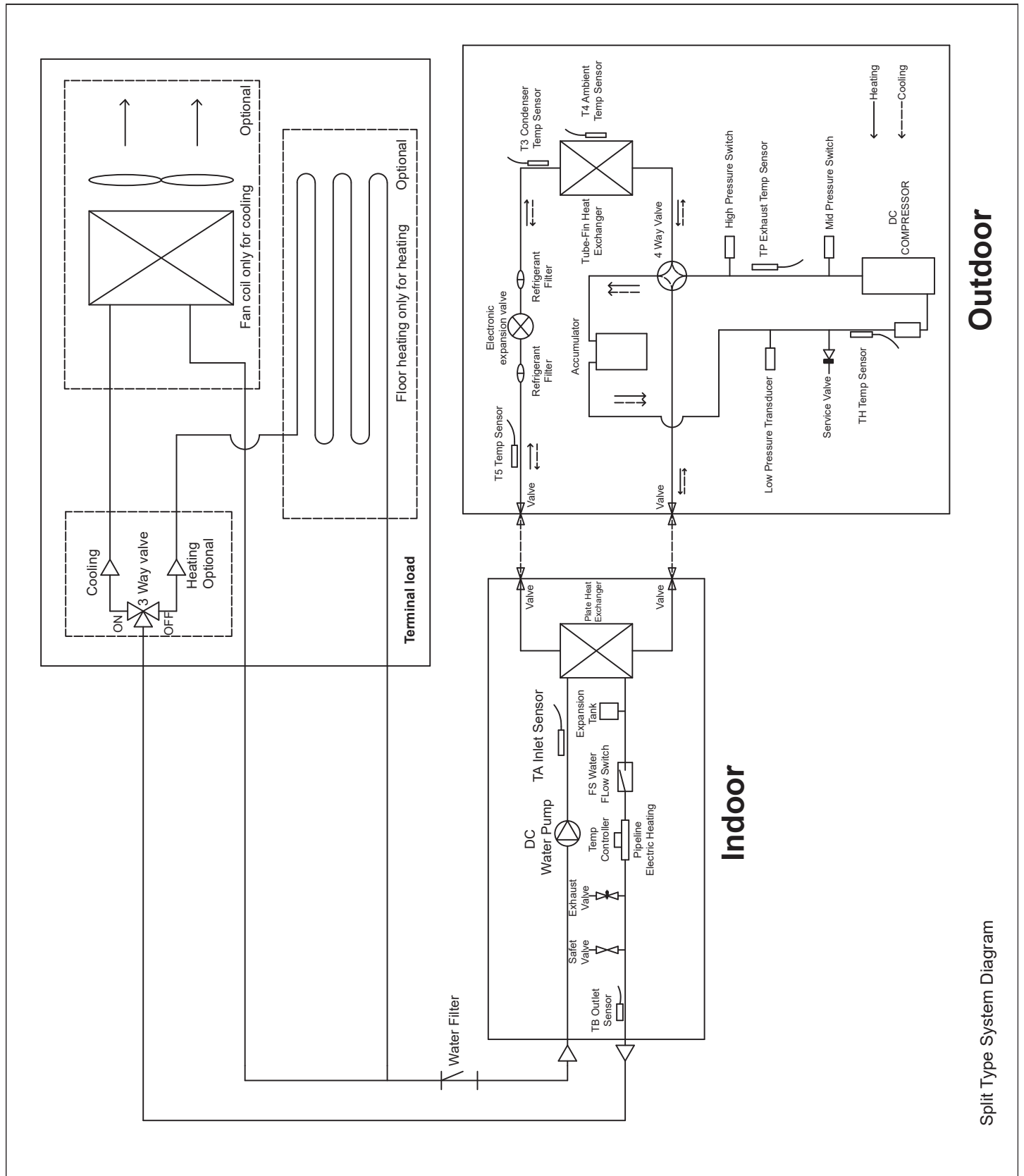
Two way valve (district heating)

Note: each district heating needs a two-way valve

Connection of fluorine pipeline

Model	Liquid pipe	Gas pipe
4/6kW	1/4"	5/8"
8/10kW	3/8"	5/8"
12/14/16kW	3/8"	5/8"

System principle and installation diagram



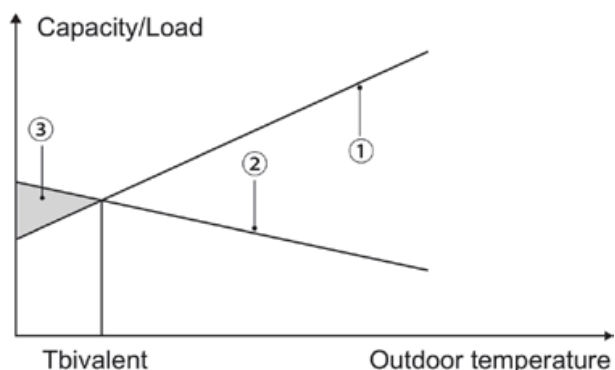
Outdoor

Indoor

Split Type System Diagram

3 General introductions

- These units are used for both heating and cooling applications and domestic hot water tanks. They can be combined with fan coil units, floor heating applications, low temperature high efficiency radiators, domestic hot water tanks (field supply) and solar kits (field supply).
- A wired controller is supplied with the unit.
- If you choose the built-in backup heater unit, the backup heater can increase the heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning and for frozen protection of the outside water piping during winter time.

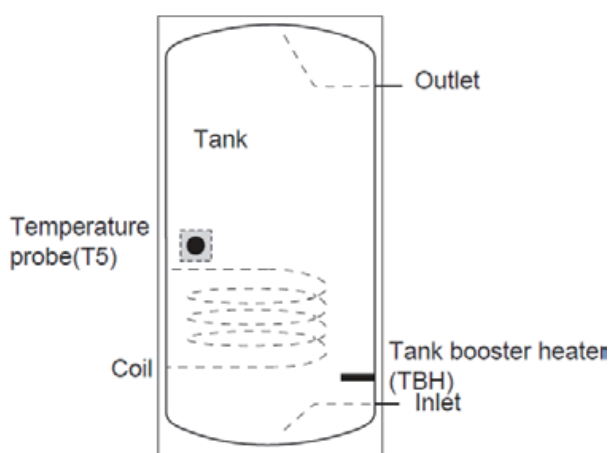


- ① Heat pump capacity.
- ② Required heating capacity (site dependent).
- ③ Additional heating capacity provided by backup heater.

Domestic hot water tank (field supply)

A domestic hot water tank(with or without booster heater) can be connected to the unit.

The requirement of the tank is different for different unit and material of heat exchanger.



The booster heater should be installed below the temperature probe (T5).

The heat exchanger (coil) should be installed below the temperature probe.

Indoor Unit		4-6kW	8-10kW	12-16kW
Volume of tank (L)	Recommended	100~250	150~300	200~500
Heat exchange area/m ² (Stainless steel coil)	Minimum	1.4	1.4	1.6
Heat exchange area/m ² (Enamel coil)	Minimum	2.0	2.0	2.5

Room thermostat(field supply)

Room thermostat can be connected to the unit (room thermostat should be kept away from heating source when selecting the installation place).

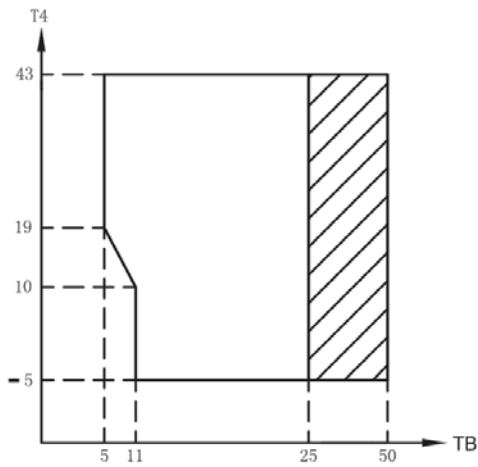
Solar kit for domestic hot water tank(field supply)


An optional solar kit can be connected to the unit.

Operation range		
Indoor Unit	Inlet water (Heating mode)	7°C to 60°C
	Inlet water (Cooling mode)	10°C to 35°C
	Outlet water (Heating mode)	12°C to 65°C
	Outlet water (Cooling mode)	5°C to 30°C
	Domestic hot water	10°C to 60°C
	Ambient temperature	5°C to 35°C
Outdoor Unit	Ambient temperature(Heating mode)	-25°C to 35°C
	Ambient temperature(Cooling mode)	-5°C to 43°C
Water Pressure		0.1-0.3MPa
Water flow	40/60	0.60-1.50m ³ /h
	80/100	0.60-2.10m ³ /h
	120/140/160	0.60-3.00m ³ /h

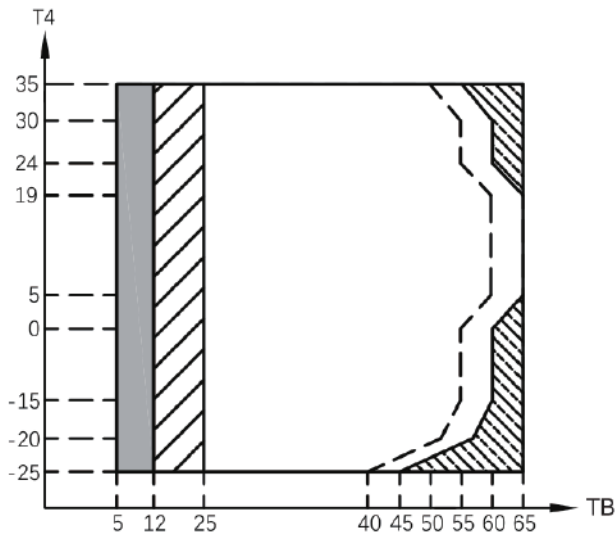
The unit have a freeze prevention function that uses the heat pump or backup heater to keep the water system safe from freezing in all conditions. Since a power failure may happen when the unit is unattended, It's suggested to use anti-freezing flow switch in the water system.


In cooling mode, the lowest outlet water temperature (TB_out) that the unit can reach in different outdoor temperature (T4) is listed below:





 Operation range by heat pump with possible limitation and protection.


In heating mode, the water flowing temperature (TB_out) range in different outdoor temperature (T4) is listed below:



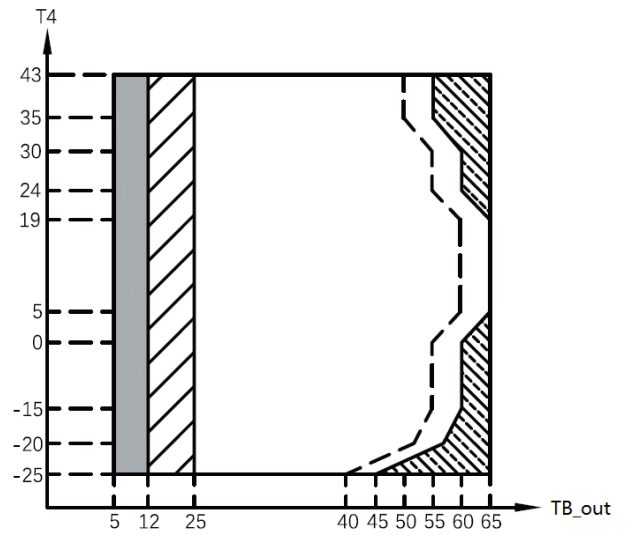
 If IBH/AHS setting is valid, only IBH/AHS turns on;
If IBH/AHS setting is invalid, only heat pump turns on;
limitation and protection may occur during heat pump operation.


 operation range by heat pump with possible limitation and protection.


 Heat pump turns off, only IBH/AHS turns on.


 Maximum inlet water temperature line for heat pump operation.


In DHW mode, the water flowing temperature (TB_out) range in different outdoor temperature (T4) is listed below:



 If IBH/AHS setting is valid, only IBH/AHS turns on;
If IBH/AHS setting is invalid, only heat pump turns on;
limitation and protection may occur during heat pump operation.

 operation range by heat pump with possible limitation and protection.

 Heat pump turns off, only IBH/AHS turns on.

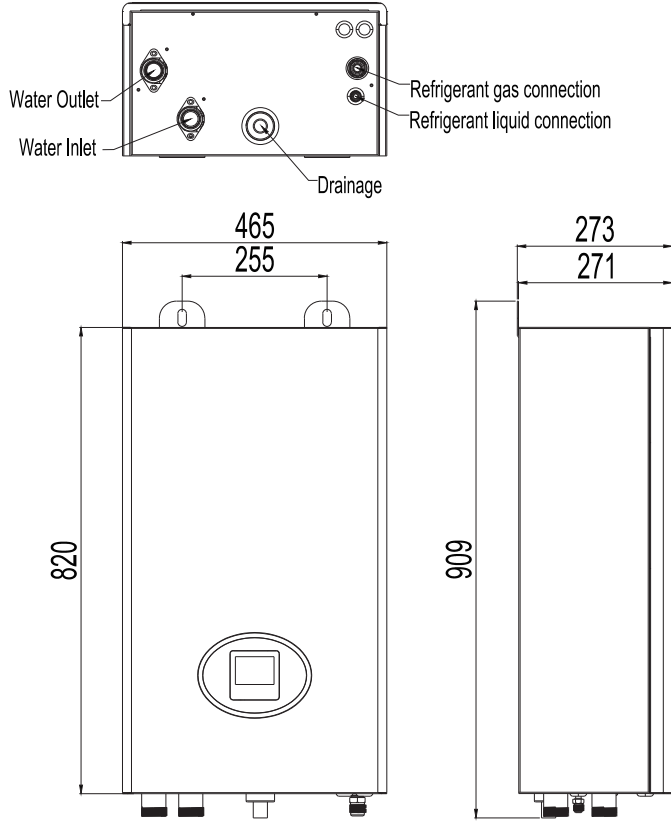
 Maximum inlet water temperature line for heat pump operation.

4 Equipment Overview

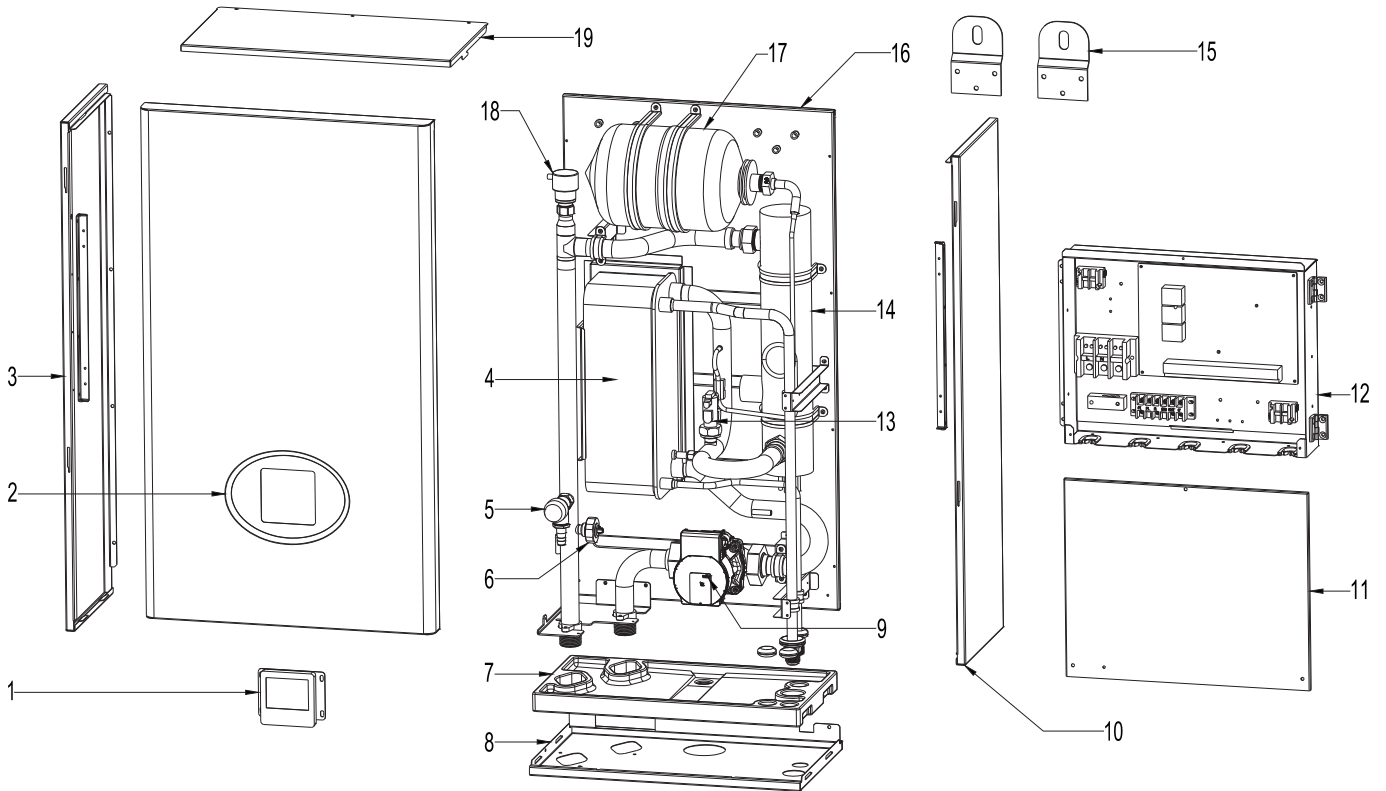
Split variable frequency heat pump consists of two parts: indoor and outdoor unit

4.1 Indoor unit

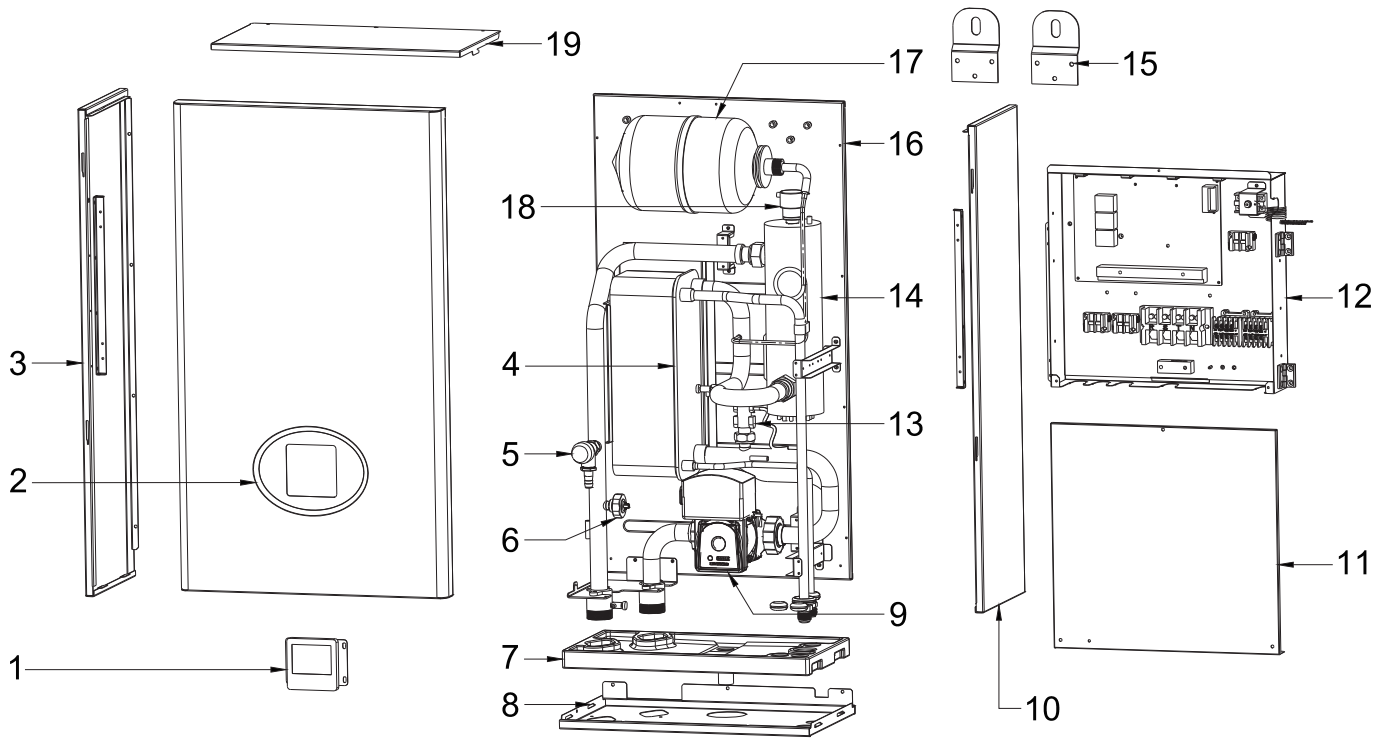
Outline drawing of indoor unit: 4-16kW



Internal structure diagram of indoor unit: 4-16kW



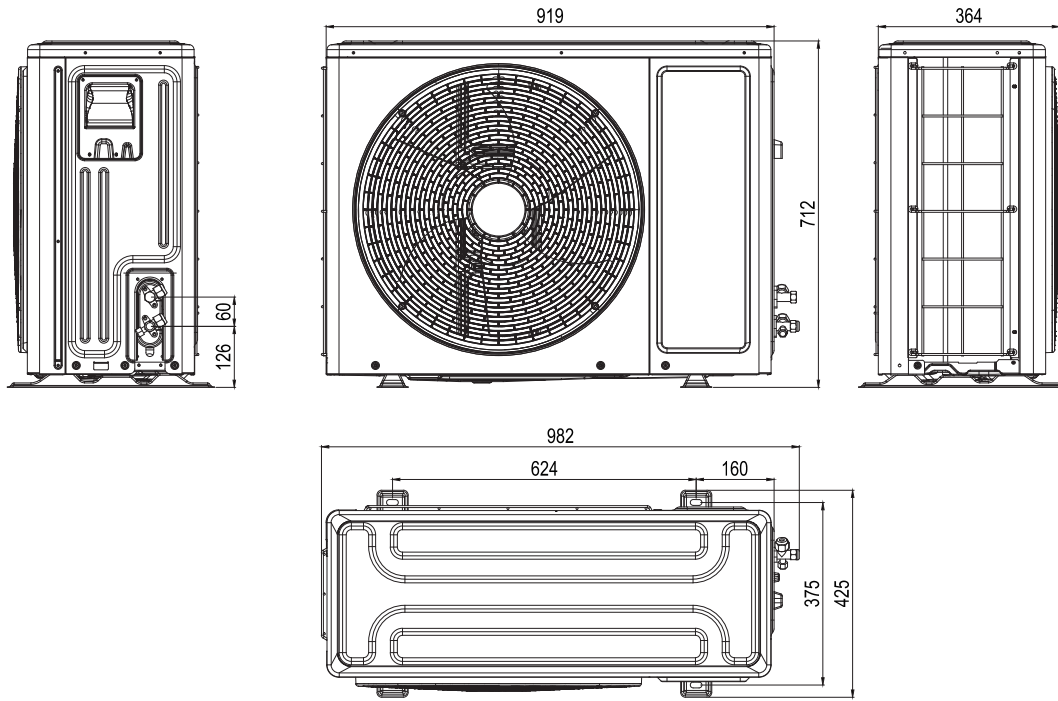
Internal structure diagram of indoor unit: 10-16kW (3-phase)



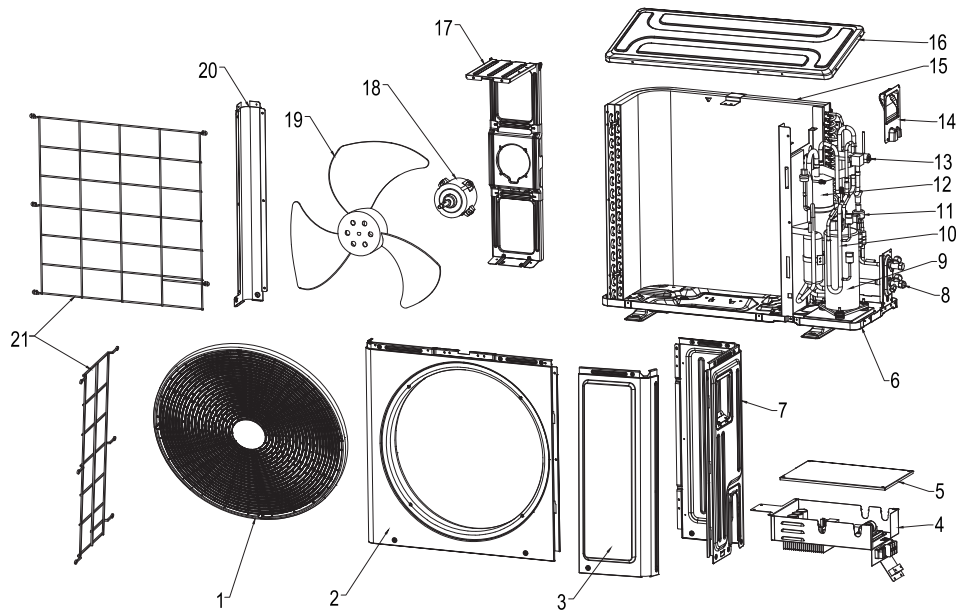
NO.	Name	NO.	Name	NO.	Name
1	Touch screen wire controller	8	Bottom panel	15	Wall panel
2	Front panel	9	Water pump	16	Rear panel assembly
3	Left side panel	10	Right side panel	17	Expansion tank
4	Plate heat exchanger	11	Electric control box cover	18	Automatic exhaust valve
5	Safety valve	12	Electronic control assembly	19	Cover
6	Water pressure sensor	13	Water flow switch		
7	Water tray	14	Electric heating assembly		

4.2 Outdoor unit

Outdoor unit outline drawing: 4-8kW

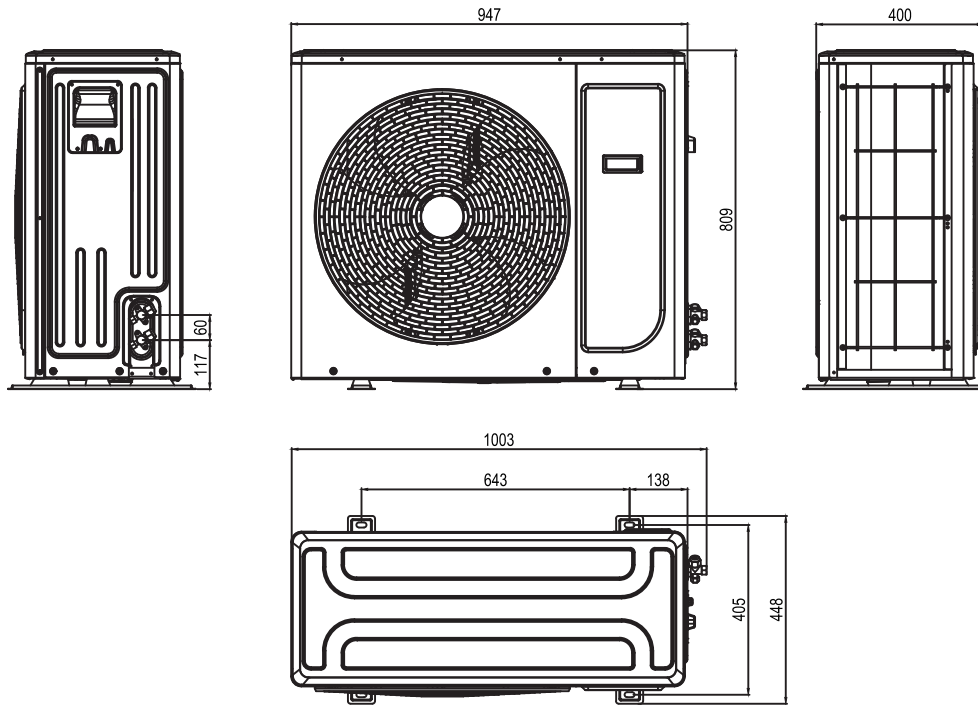


Internal structure diagram of outdoor unit: 4-8kW

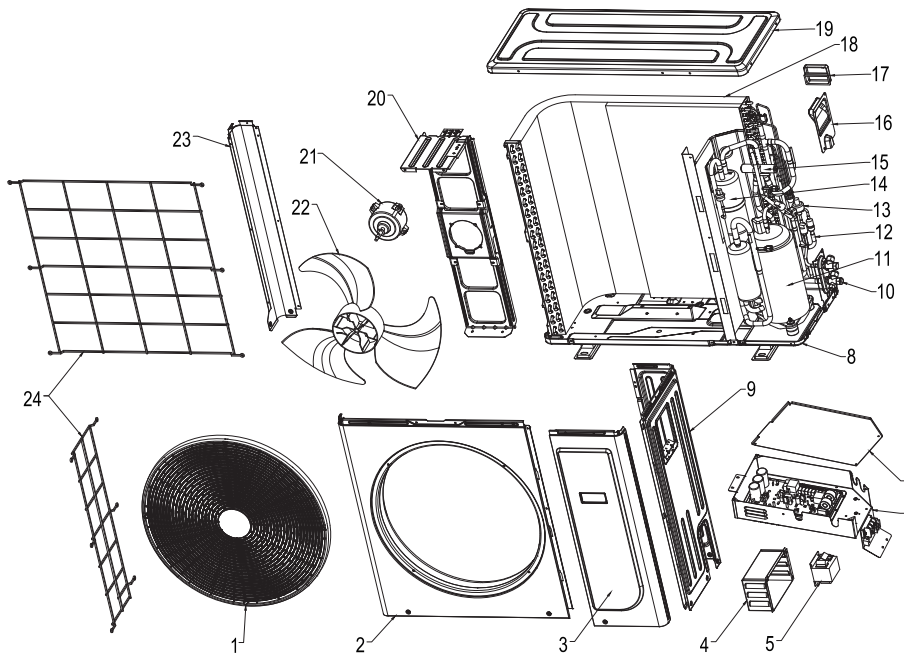


NO.	Name	NO.	Name	NO.	Name
1	Air outlet grille	8	Globe valve	15	Condenser/Evaporator
2	Front panel	9	Compressor	16	Top Cover
3	Right front panel	10	Pipe assembly	17	Motor bracket
4	Electric control box assembly	11	Electronic expansion valve	18	Motor
5	Cover of Electric box	12	Vapor-liquid separator	19	Axial flow blade
6	Chassis	13	Four way valve	20	Left rear pillar
7	Right rear quarter panel	14	Right Handle	21	Barbed wire cover

Outline drawing of outdoor unit: 10-12kW

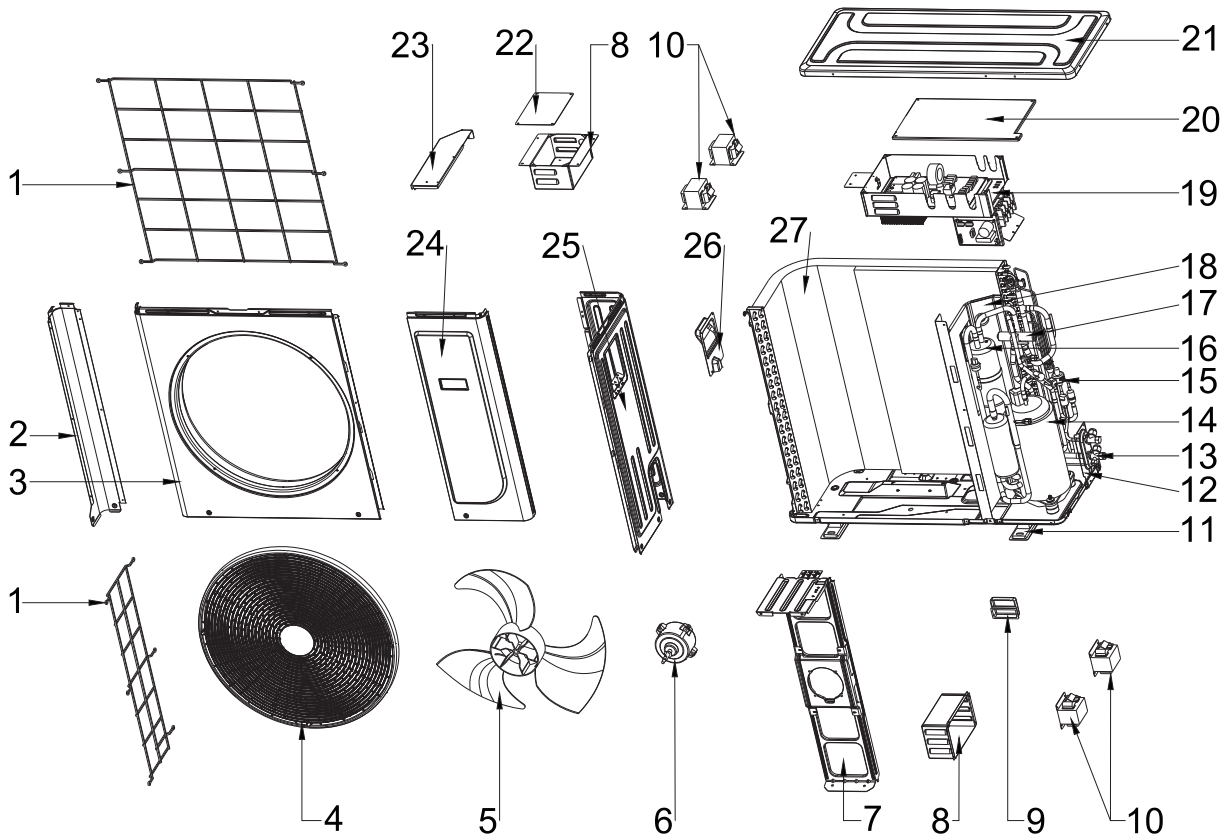


Internal structure diagram of outdoor unit: 10-12kW (1-phase)



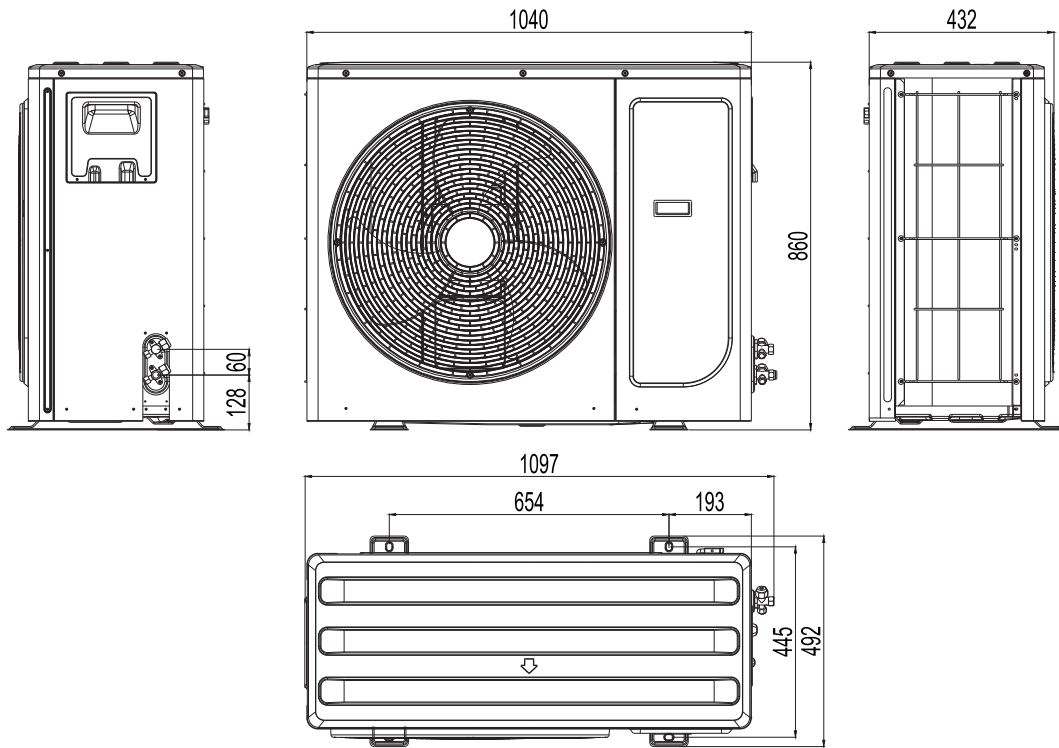
NO.	Name	NO.	Name	NO.	Name
1	Air outlet grille	9	Right rear quarter panel	17	Handle
2	Front panel	10	Globe valve	18	Condenser/Evaporator
3	Right front panel	11	Compressor	19	Top Cover
4	Reactance waterproof box	12	Pipe assembly	20	Motor bracket
5	Reactor	13	Electronic expansion valve	21	Motor
6	Electric control box assembly	14	Vapor-liquid separator	22	Axial flow blade
7	Cover of Electric box	15	Four way valve	23	Left rear pillar
8	Chassis	16	Right Handle	24	Barbed wire cover

Internal structure diagram of outdoor unit: 10-12kW (3-phase)

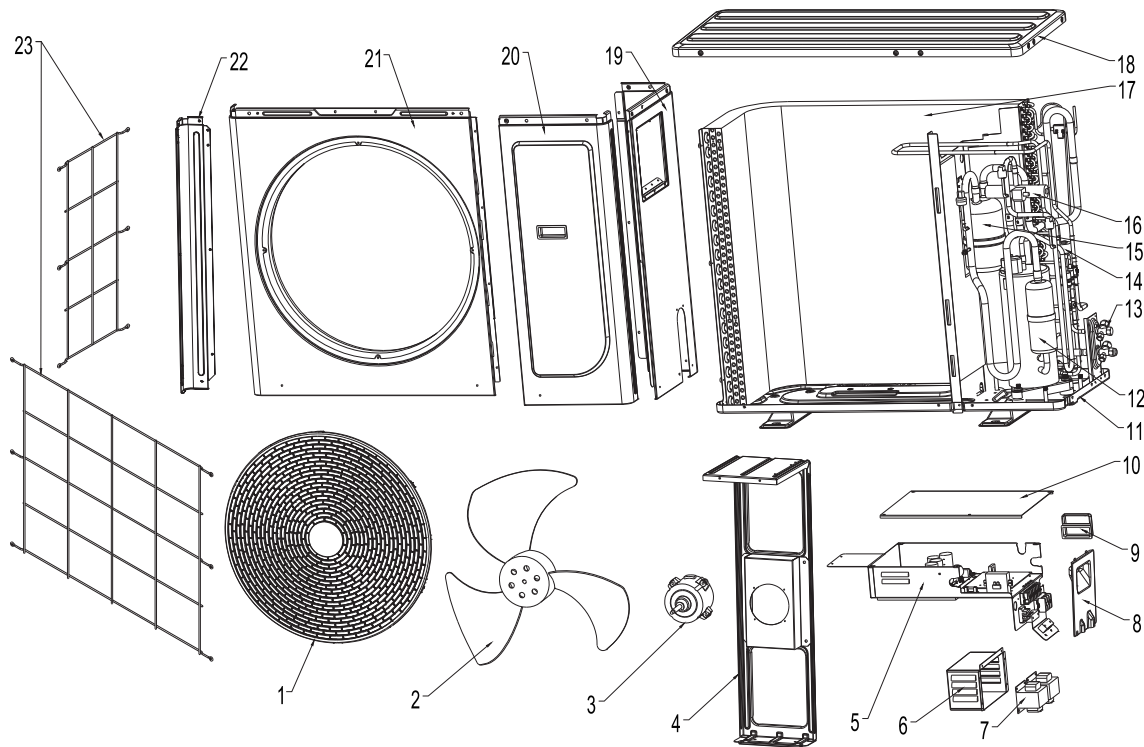


NO.	Name	NO.	Name	NO.	Name
1	Barbed wire cover	10	Reactor	19	Electric control components
2	Left rear pillar	11	Chassis	20	Electric control box cover
3	Front panel	12	Valve plate	21	Top Cover
4	Air outlet grille	13	Globe valve	22	Reactance waterproof box Cover
5	Axial flow blade	14	Compressor	23	Reactance fixing plate
6	Motor	15	Electronic expansion valve	24	Right front panel
7	Motor bracket	16	Vapor-liquid separator	25	Right rear quarter panel
8	Reactance waterproof box assembly	17	4-way valve	26	Right Handle
9	Handle	18	Middle diaphragm	27	Finned heat exchanger

Outline drawing of outdoor unit: 14-16kW

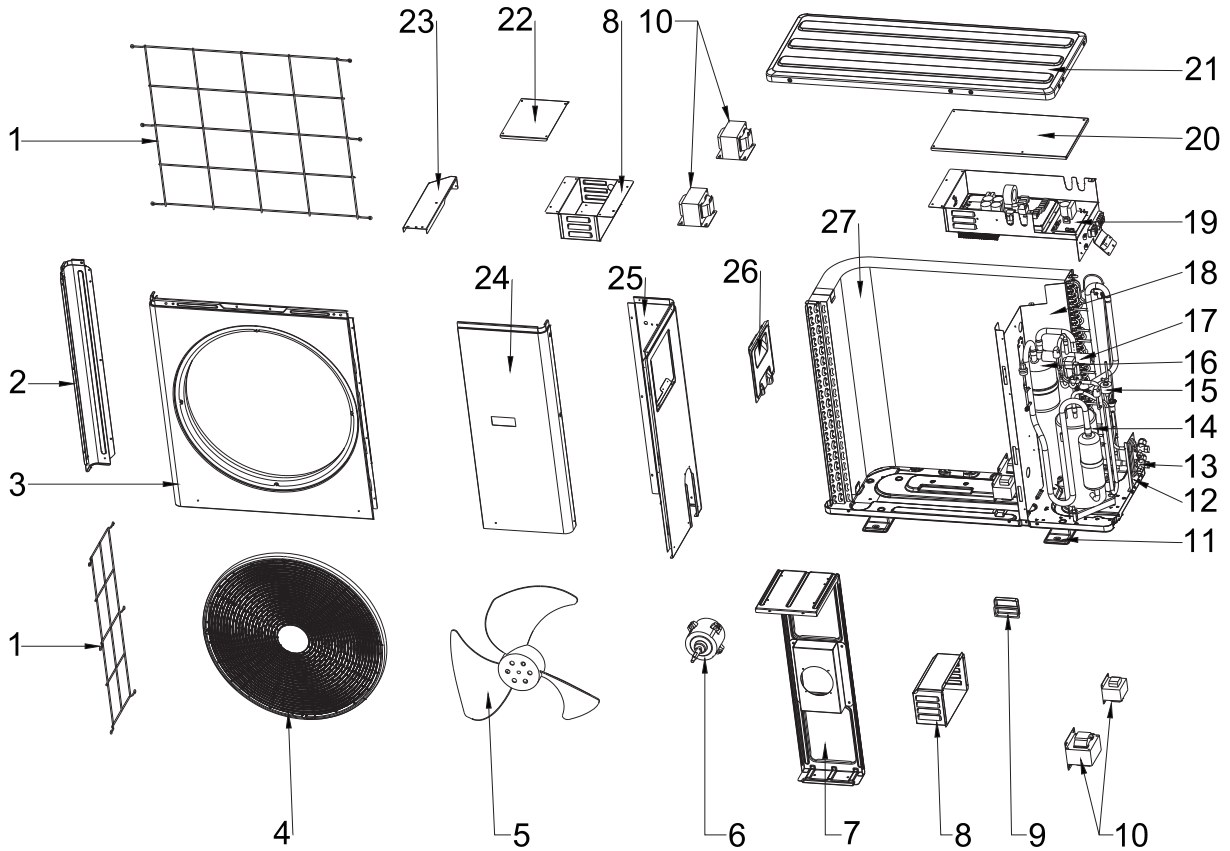


Internal structure diagram of outdoor unit: 14-16kW (1-phase)



NO.	Name	NO.	Name	NO.	Name
1	Air outlet grille	9	Handle	17	Condenser/Evaporator
2	Axial flow blade	10	Cover of Electric box	18	Top Cover
3	Motor	11	Chassis	19	Right rear quarter panel
4	Motor bracket	12	Compressor	20	Right front panel
5	Electric control box assembly	13	Globe valve	21	Front panel
6	Reactance waterproof box	14	Electronic expansion valve	22	Left rear pillar
7	Reactor	15	Vapor-liquid separator	23	Barbed wire cover
8	Right Handle	16	Four way valve		

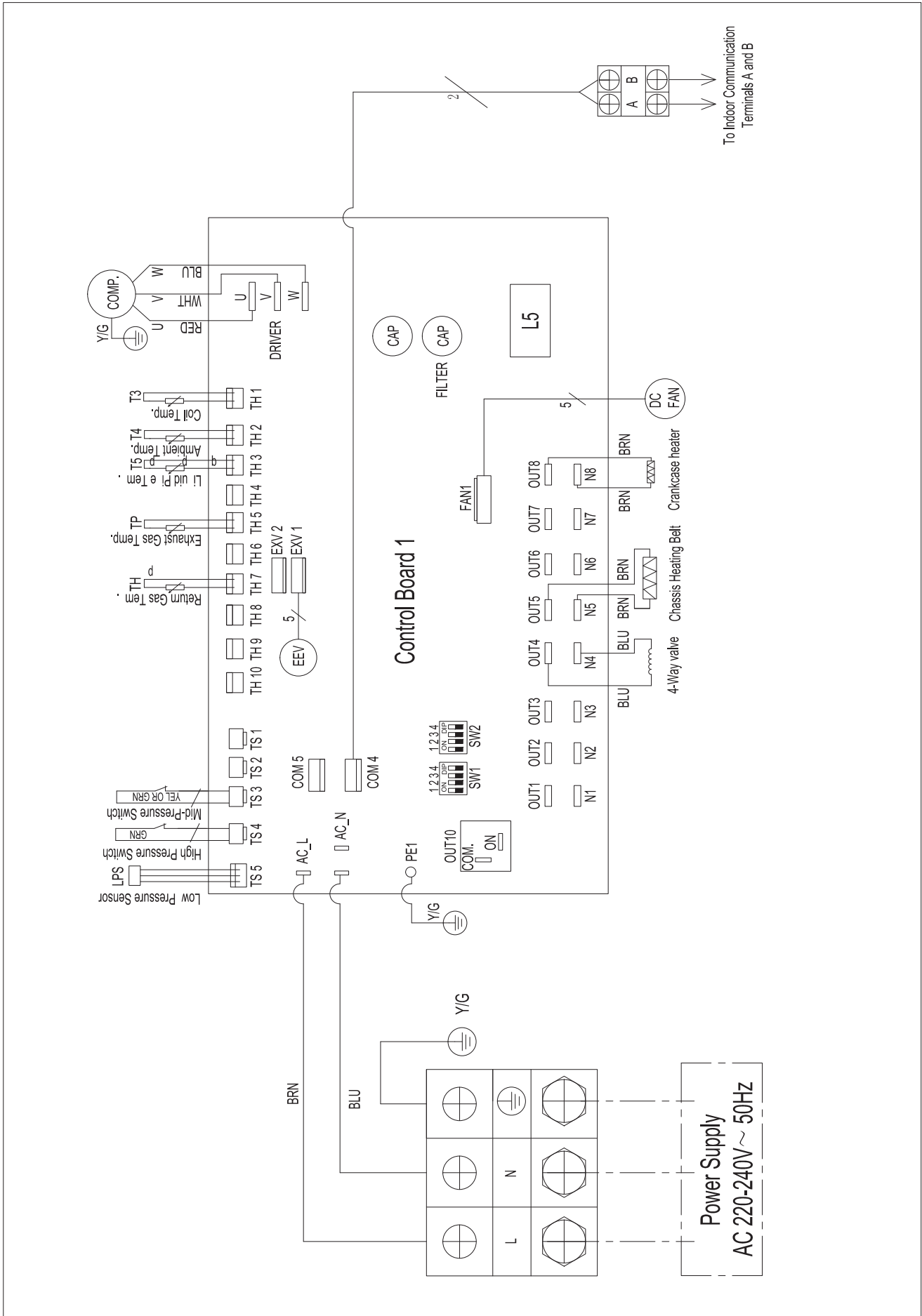
Internal structure diagram of outdoor unit: 14-16kW (3-phase)



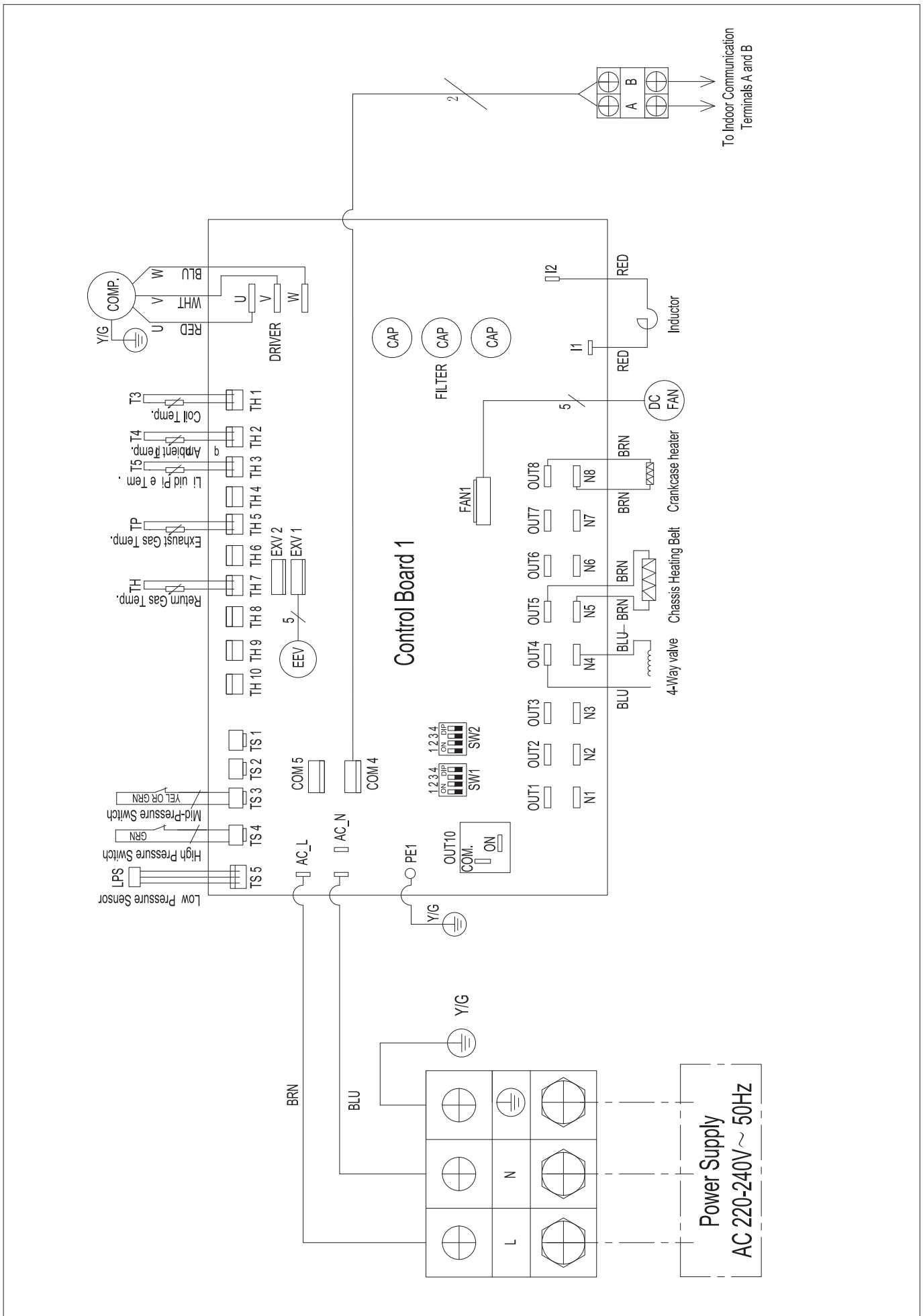
NO.	Name	NO.	Name	NO.	Name
1	Barbed wire cover	10	Reactor	19	Electric control components
2	Left rear pillar	11	Chassis	20	Electric control box cover
3	Front panel	12	Valve plate	21	Top Cover
4	Air outlet grille	13	Globe valve	22	Reactance waterproof box Cover
5	Axial flow blade	14	Compressor	23	Reactance fixing plate
6	Motor	15	Electronic expansion valve	24	Right front panel
7	Motor bracket	16	Vapor-liquid separator	25	Right rear quarter panel
8	Reactance waterproof box assembly	17	4-way valve	26	Right Handle
9	Handle	18	Middle diaphragm	27	Finned heat exchanger

5 Electrical wiring diagram

5.1 Electrical wiring diagram of the outdoor unit: 4-6kW

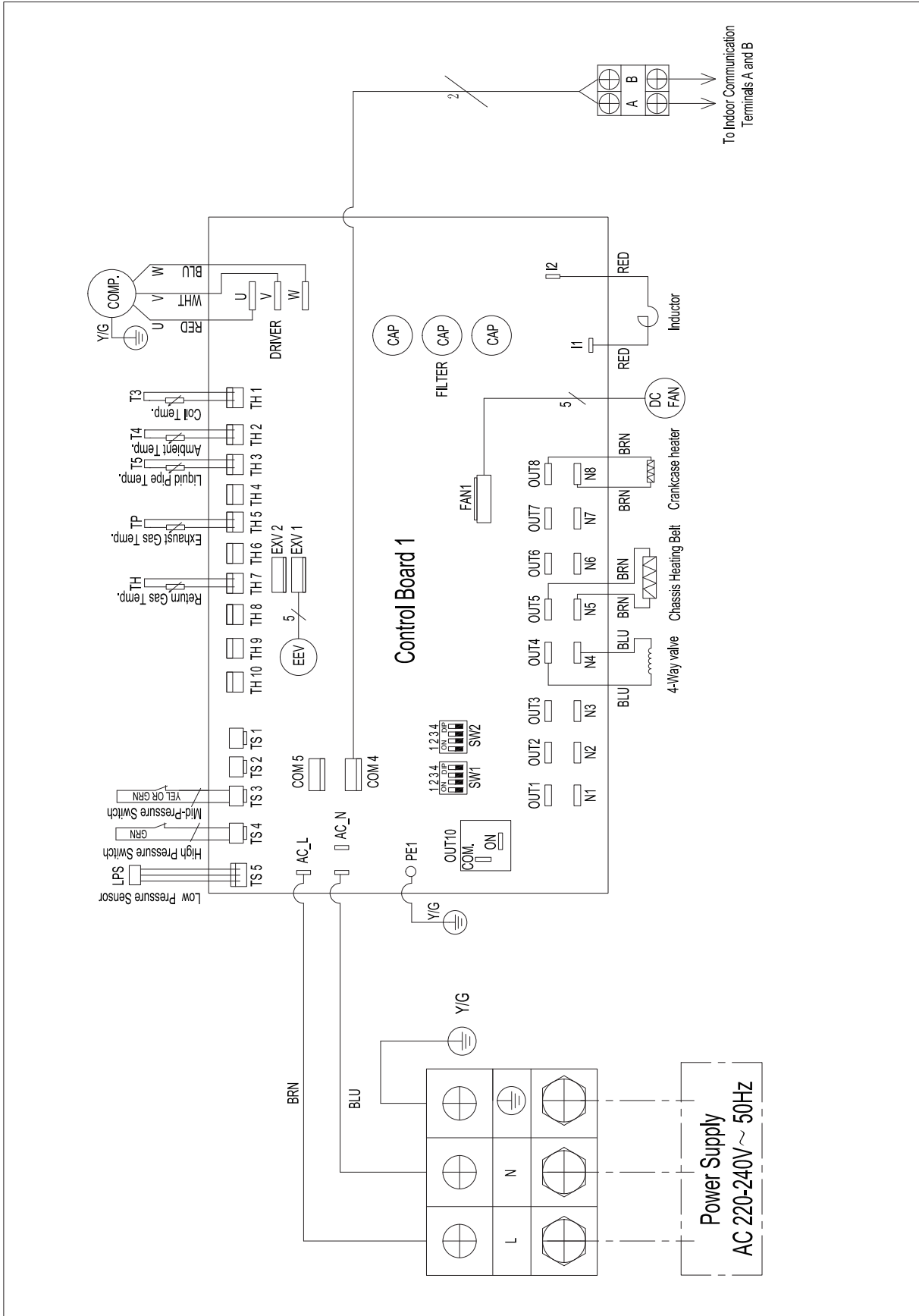


5.2 Electrical wiring diagram of the outdoor unit: 8-12kW

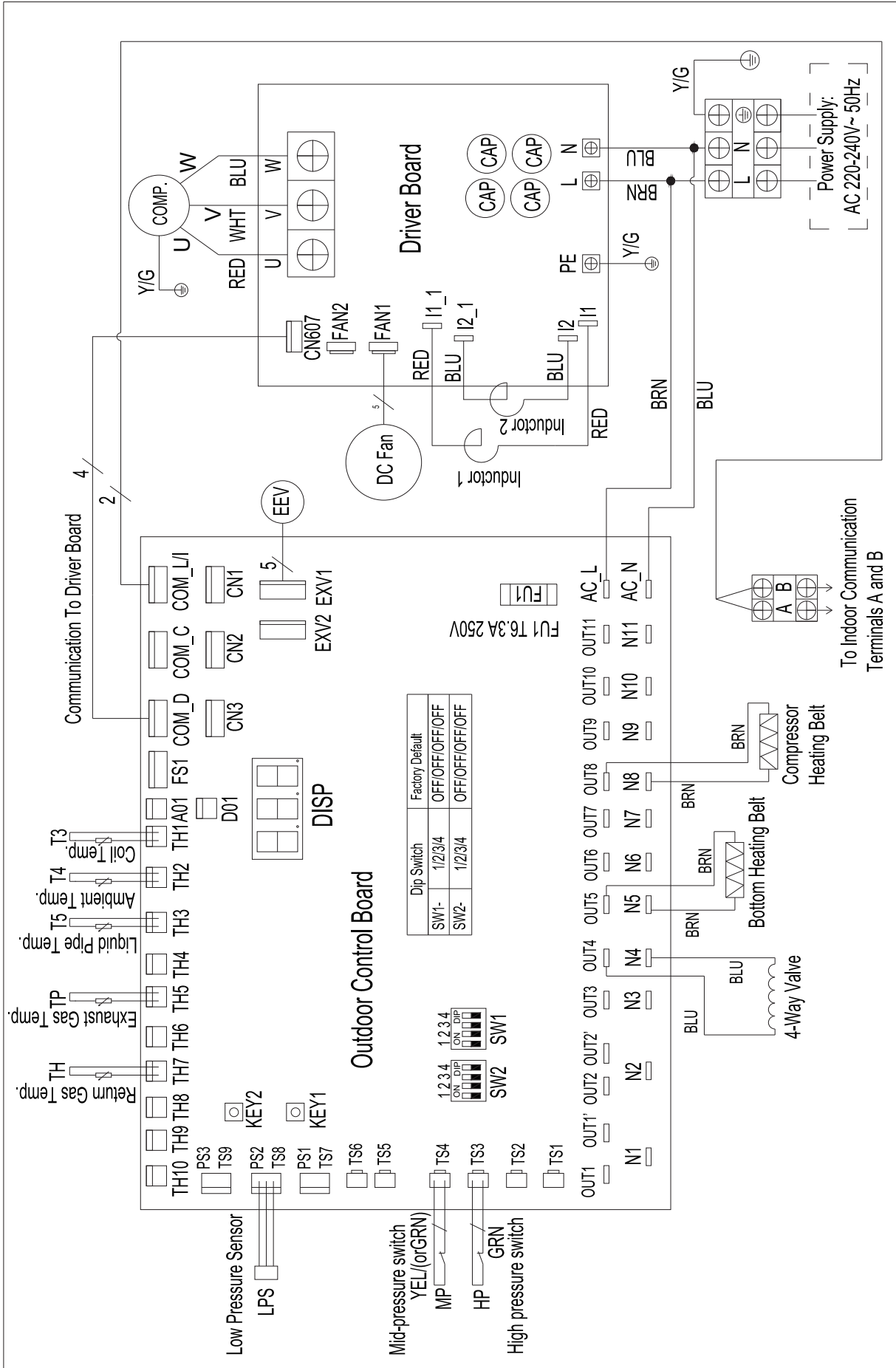


To Indoor Communication
Terminals A and B

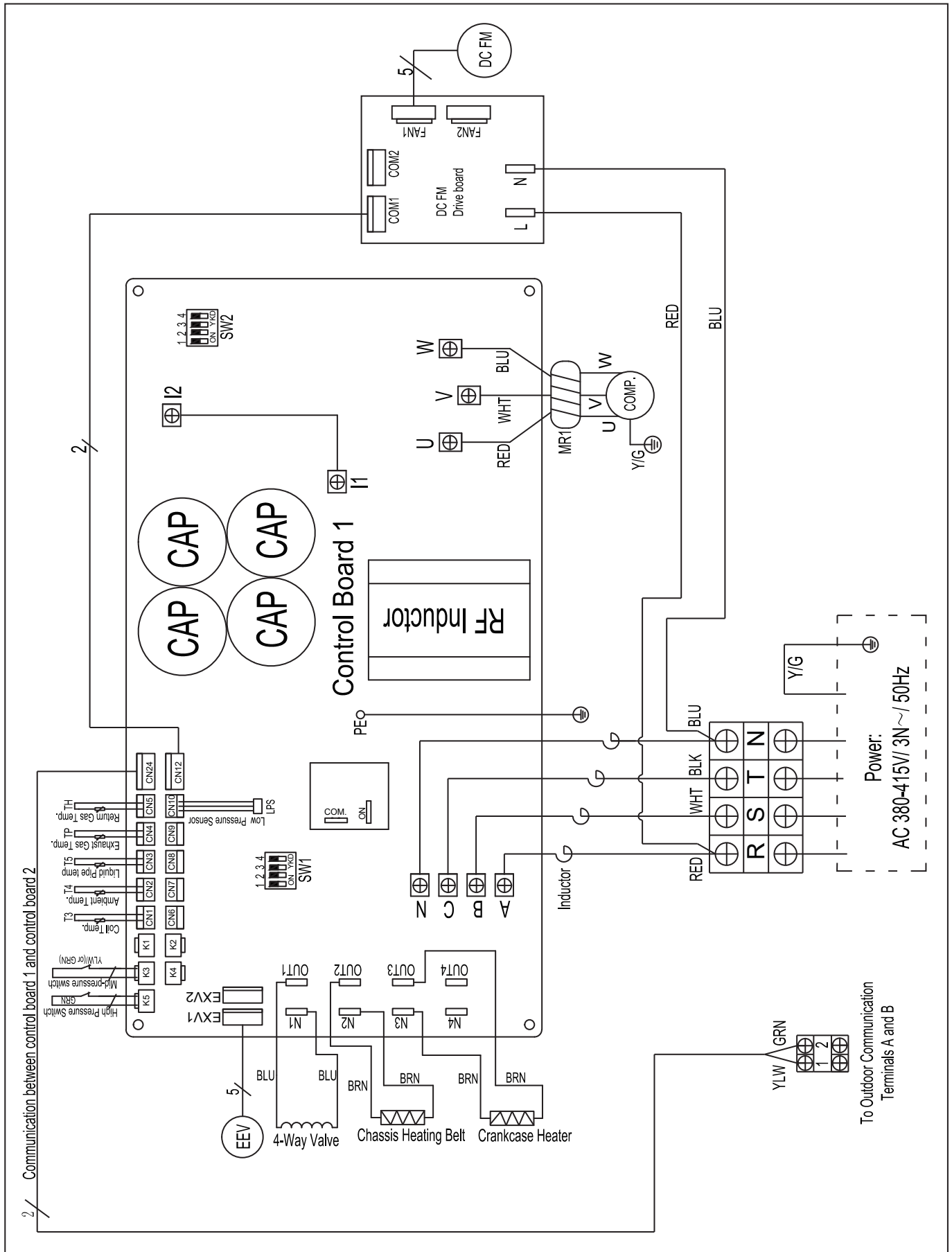
5.2 Electrical wiring diagram of the outdoor unit: 8-12kW



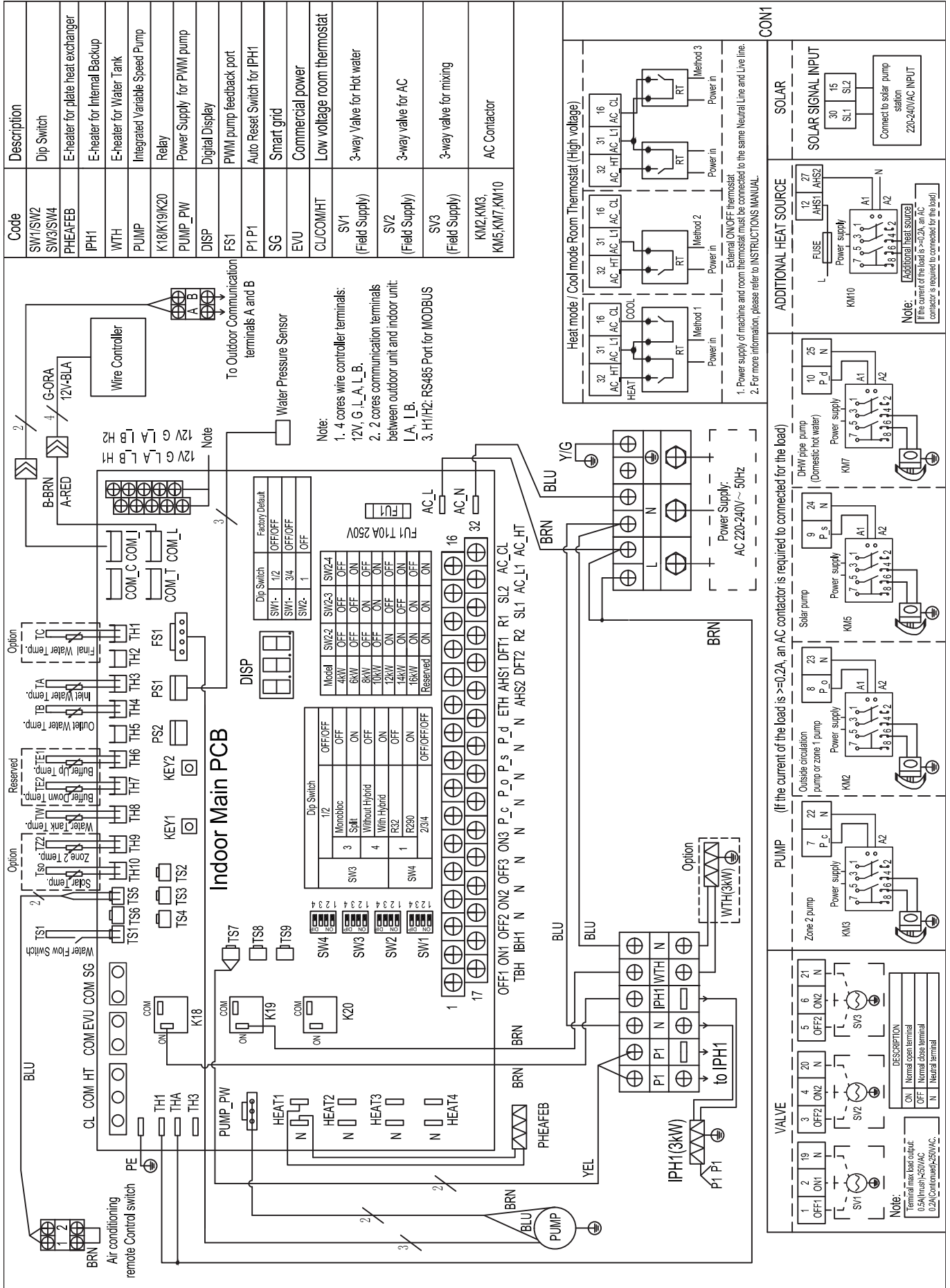
5.3 Electrical wiring diagram of the outdoor unit: 14-16kW



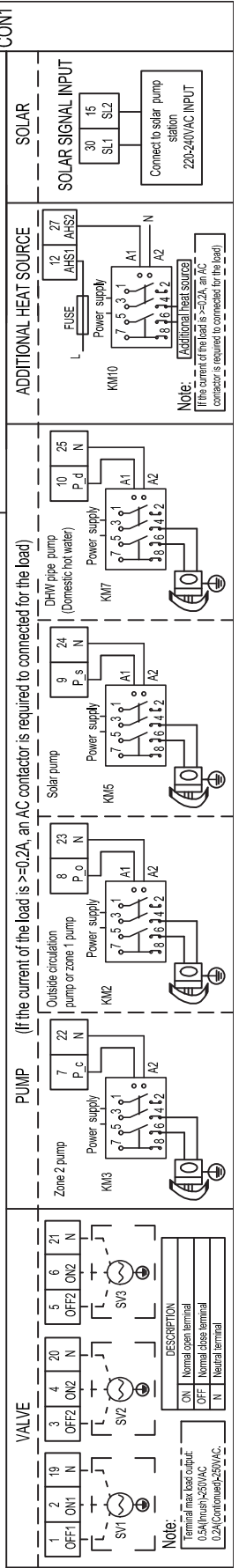
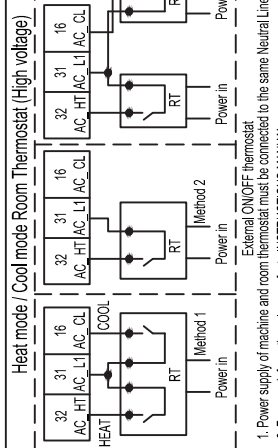
5.4 Electrical wiring diagram of Outdoor unit: 10-16kW (3-phase)



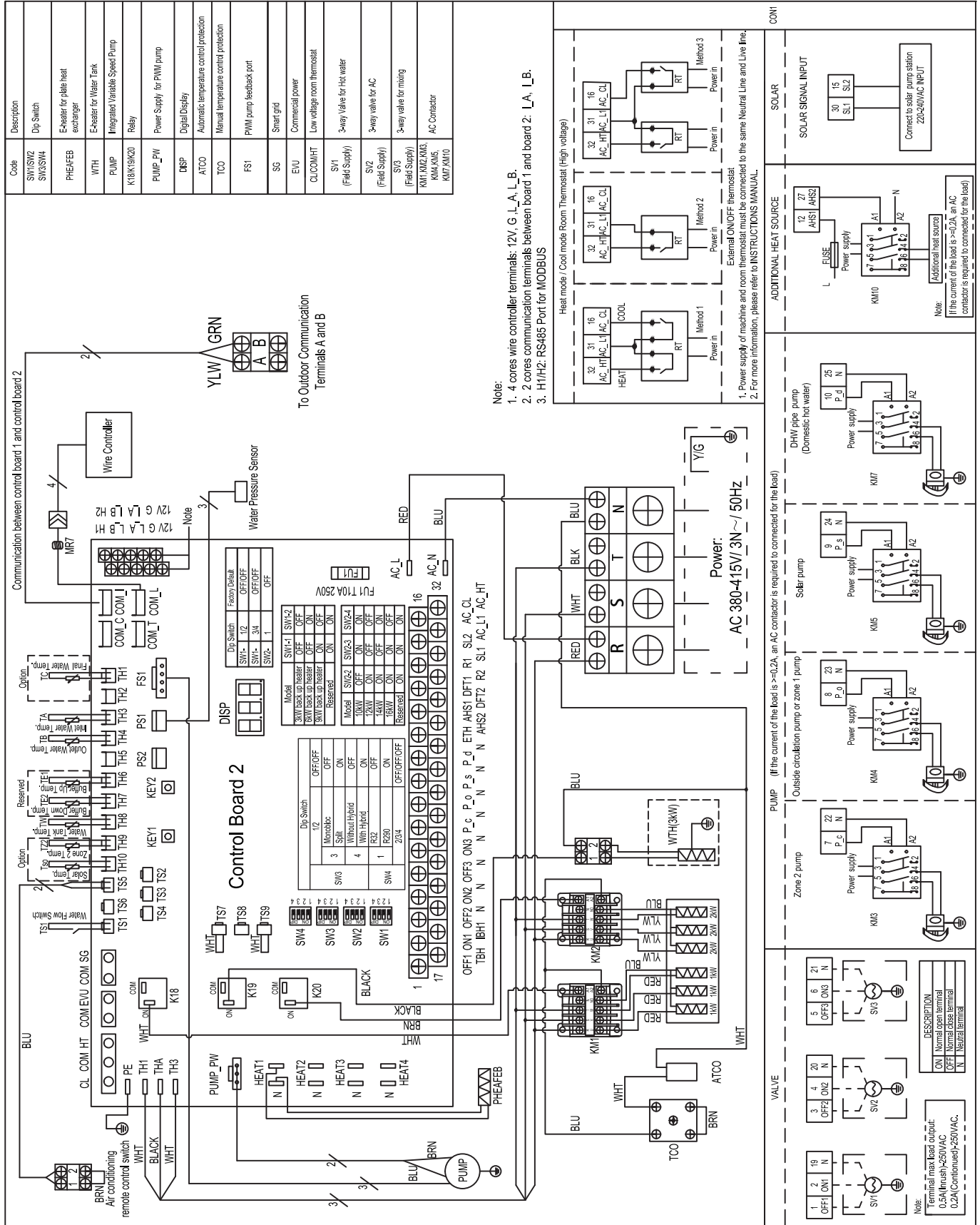
5.5 Electrical wiring diagram of indoor unit: 4-16kW (1-phase)



Code	Description
SW1/SW2	Dip Switch
SW3/SW4	E-heater for plate heat exchanger
PHEAFEB	E-heater for Internal Backup
IPH1	E-heater for Water Tank
WTH	Integrated Variable Speed Pump
PUMP	Relay
K18/K19/K20	Power Supply for PWM pump
PUMP_PW	Digital Display
DISP	PWM pump feedback port
FS1	Auto Reset Switch for IPH1
P1 P11	Smart grid
SG	Commercial power
EVU	Low voltage room thermostat
CL/COM/HT	3-way Valve for Hot water
SV1 (Field Supply)	3-way valve for AC
SV2 (Field Supply)	3-way valve for mixing
SV3 (Field Supply)	AC Contactor
KM2, KM3, KM5, KM7, KM10	

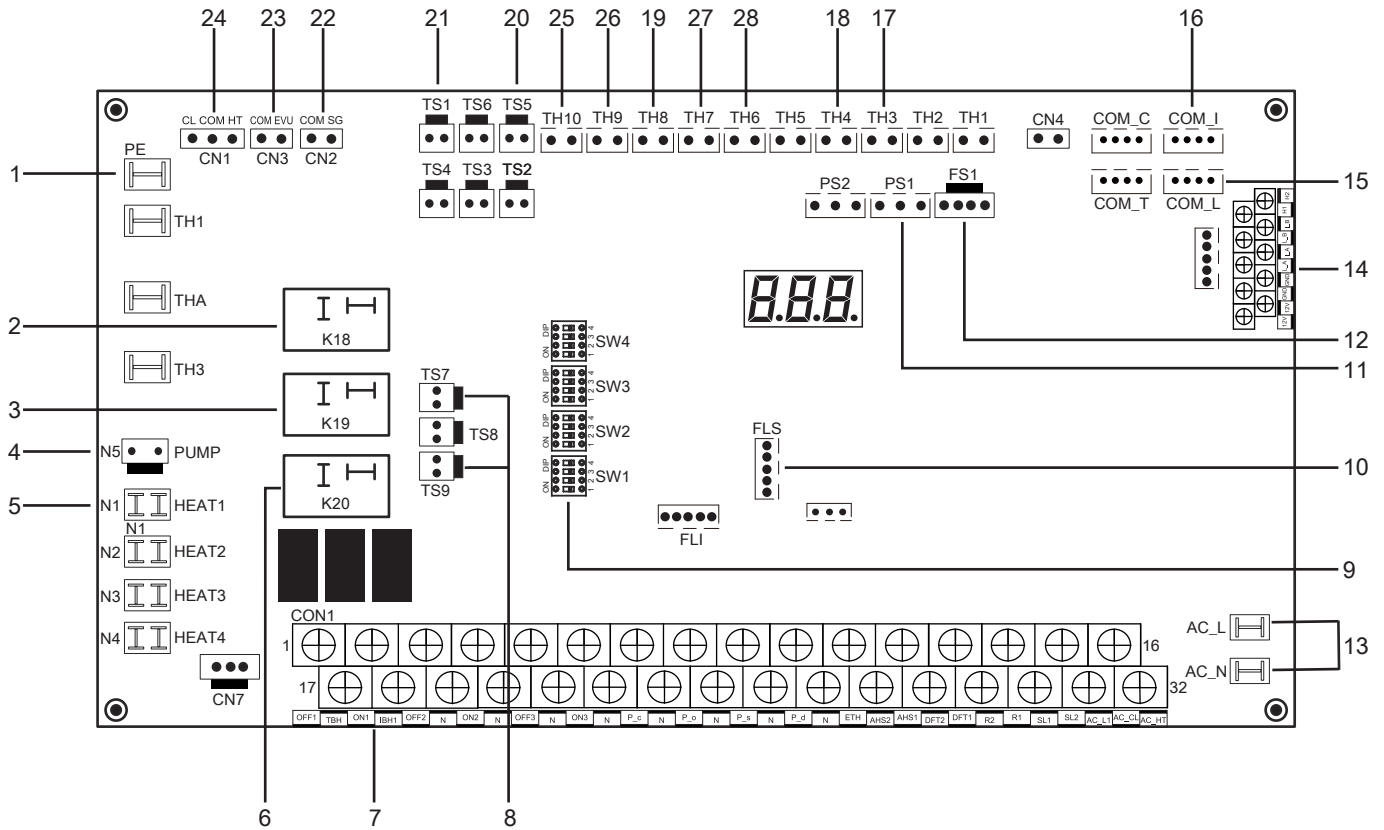


5.6 Electrical wiring diagram of indoor unit: 10-16kW (3-phase)



6 Electronic control box

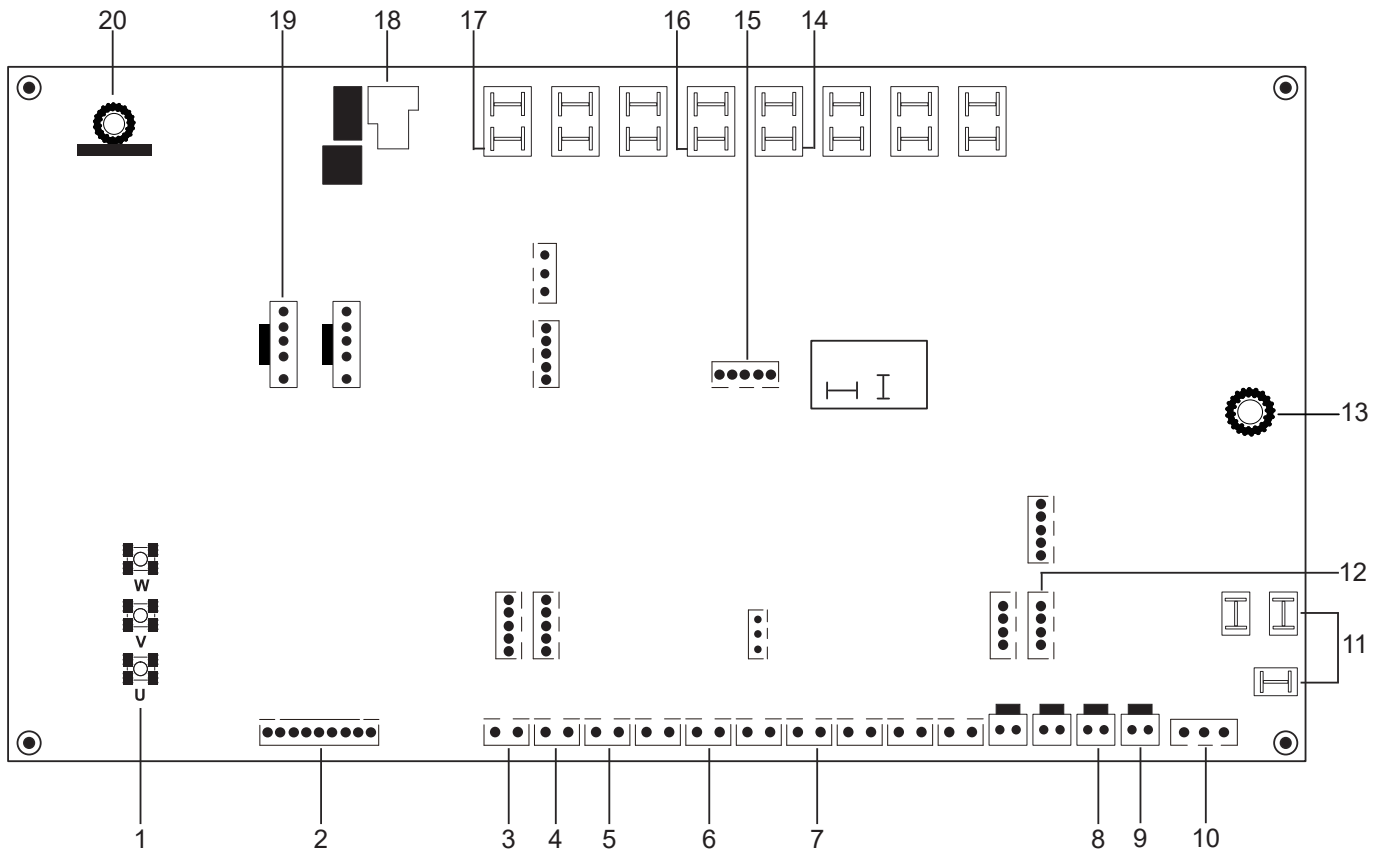
6.1 Main control board of hydraulic module



Items	Port label	function	Items	Port label	function
1	PE	Port for ground	15	COM_L	Wired controller
2	K18	Relay for internal backup heater (IBH, 3kW)	16	COM_I	Communication port
3	K19	Relay for domestic water tank heater (3kW)	17	TH3	Inlet water temperature
4	Pump	Power supply of internal pump	18	TH4	Outlet water temperature
5	HEAT 1	Plate heat exchange anti-freezing heater	19	TH8	Domestic water tank temperature
6	K20	Relay (Reserved, 3kW)	20	TS5	Remote switch
7	CON1	Terminals (Reserved)	21	TS1	Water flow switch
8	TS7	High temperature protection switch for IBH	22	SG	Smart Grid
9	SW1/2/3/4	Dip switch	23	EVU	Commercial power
10	FLS	Program update	24	CN1	Low Voltage thermostat
11	PS1	Water pressure sensor	25	Tso	Solar temperature
12	FS1	Internal pump speed feedback	26	TZ2	Zone 2 temperature
13	AC	Power supply	27	TE2	Reserved
14	U19	Communication ports	28	TE1	Reserved

6.2 1-phase for 4-16kW units

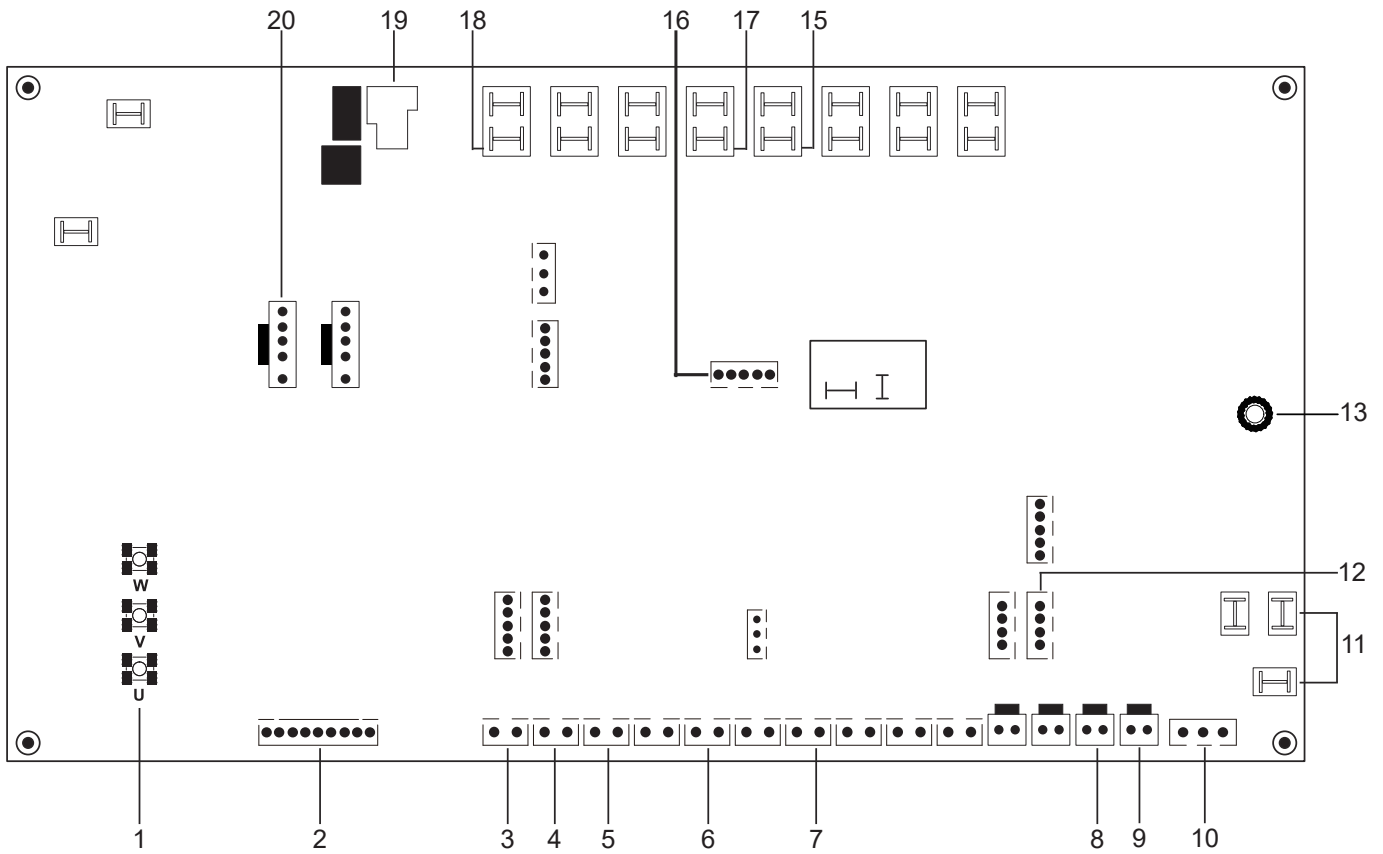
1) PCB A, 4-6kW, Drive and refrigerant system PCB



Items	Port label	function	Items	Port label	function
1	U/V/W	Compressor output	11	AC	Power supply
2	JTAG	Drive program update	12	COM4	Communication with hydraulic module PCB
3	TH1	Coil temperature sensor	13	PE1	Port for ground
4	TH2	Outdoor ambient temperature sensor	14	OUT4	Filter components
5	TH3	Refrigerant liquid temperature sensor	15	FLS	PCB Program update
6	TH5	Discharge temperature sensor	16	OUT5	Chassis heater
7	TH7	Suction temperature sensor	17	OUT8	Crankcase heater
8	TS3	HP2: Middle pressure switch	18	K9	Relay for PFC
9	TS4	HP1: High pressure switch	19	FAN1	DC Fan
10	TS5	LPS: Low pressure sensor	20	/	Common mode inductance

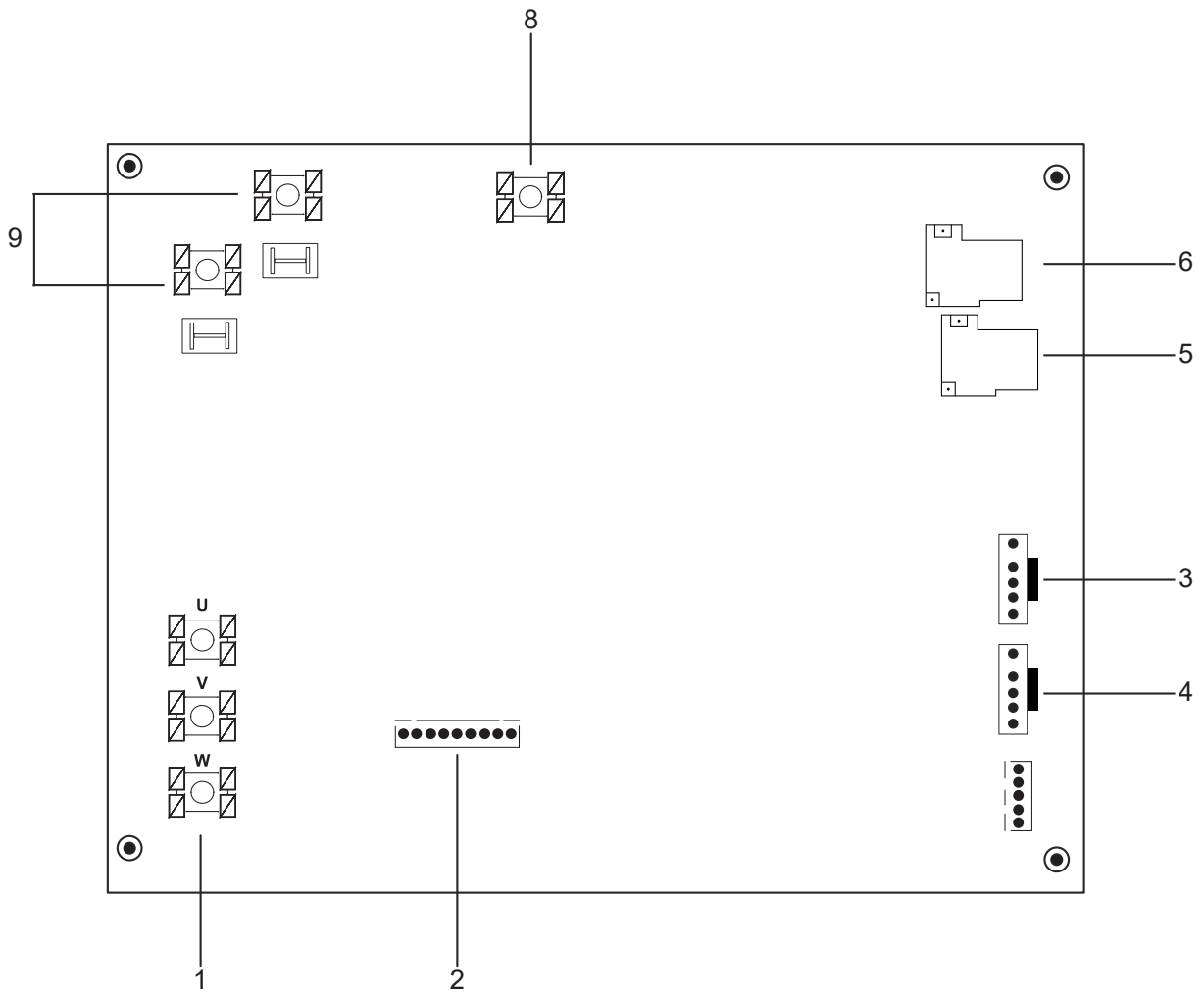
2) PCB A, 8-10-12kW, Drive and refrigerant system PCB

Notification: 8kw and 10-12kw models has different PCB A but same connect ports



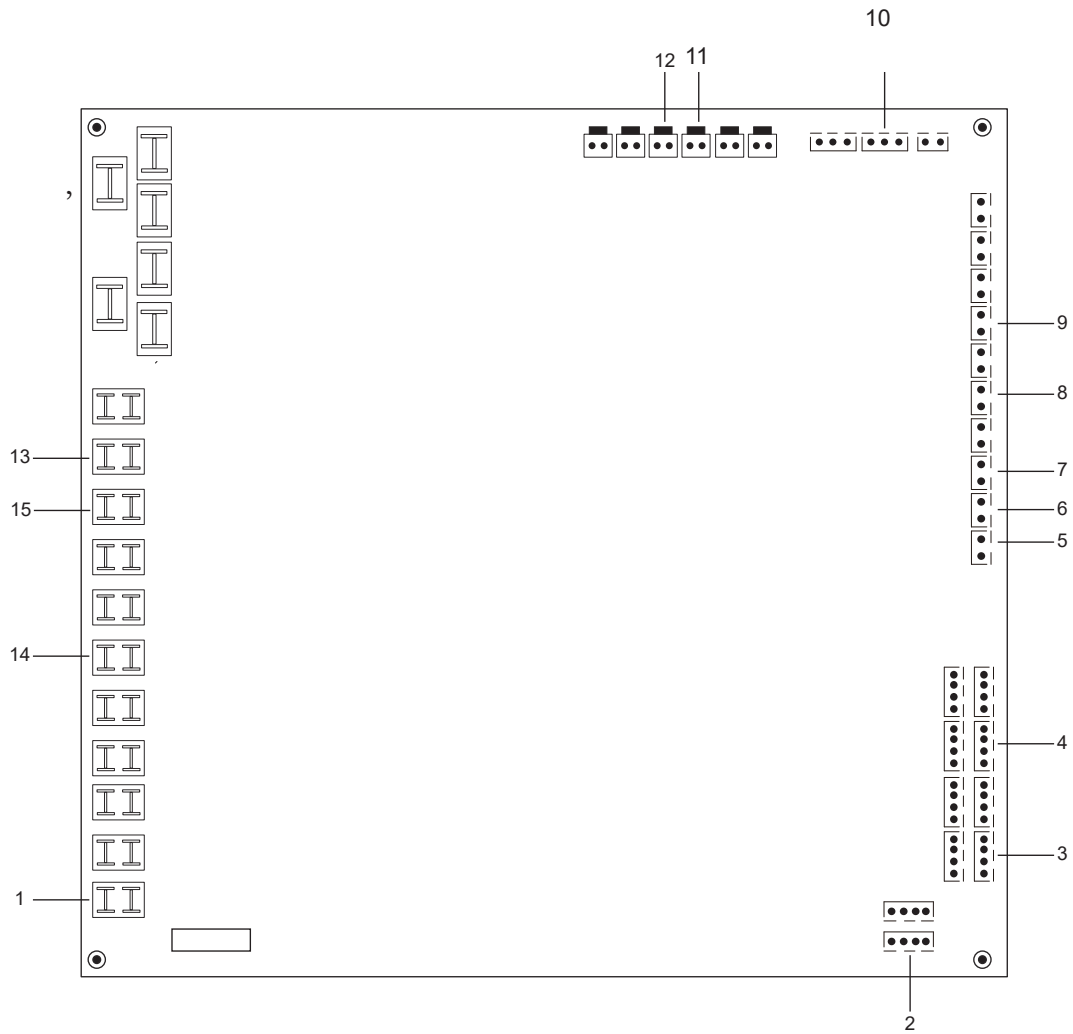
Items	Port label	function	Items	Port label	function
1	U/V/W	Compressor output	12	COM4	Communication with hydraulic module PCB
2	JTAG	Drive program update	13	PE1	Port for ground
3	TH1	Coil temperature sensor	14	/	Filter components
4	TH2	Outdoor ambient temperature sensor	15	OUT4	Filter components
5	TH3	Refrigerant liquid temperature sensor	16	FLS	PCB Program update
6	TH5	Discharge temperature sensor	17	OUT5	Chassis heater
7	TH7	Suction temperature sensor	18	OUT8	Crankcase heater
8	TS3	HP2: Middle pressure switch	19	K9	Relay for PFC
9	TS4	HP1: High pressure switch	20	FAN1	DC Fan
10	TS5	LPS: Low pressure sensor	21	/	Common mode inductance
11	AC	Power supply			

3) PCB A, 14-16kW, Drive PCB



Items	Port label	Function
1	U/V/W	Compressor output
2	JTAG	Drive program update
3	FAN1	DC fan
4	FAN2	Reserved
5	K2	Relay for PFC
6	K1	Relay for PFC
7	/	Filter components
8	PE	Port for ground
9	AC	Power supply
10	/	Drive components

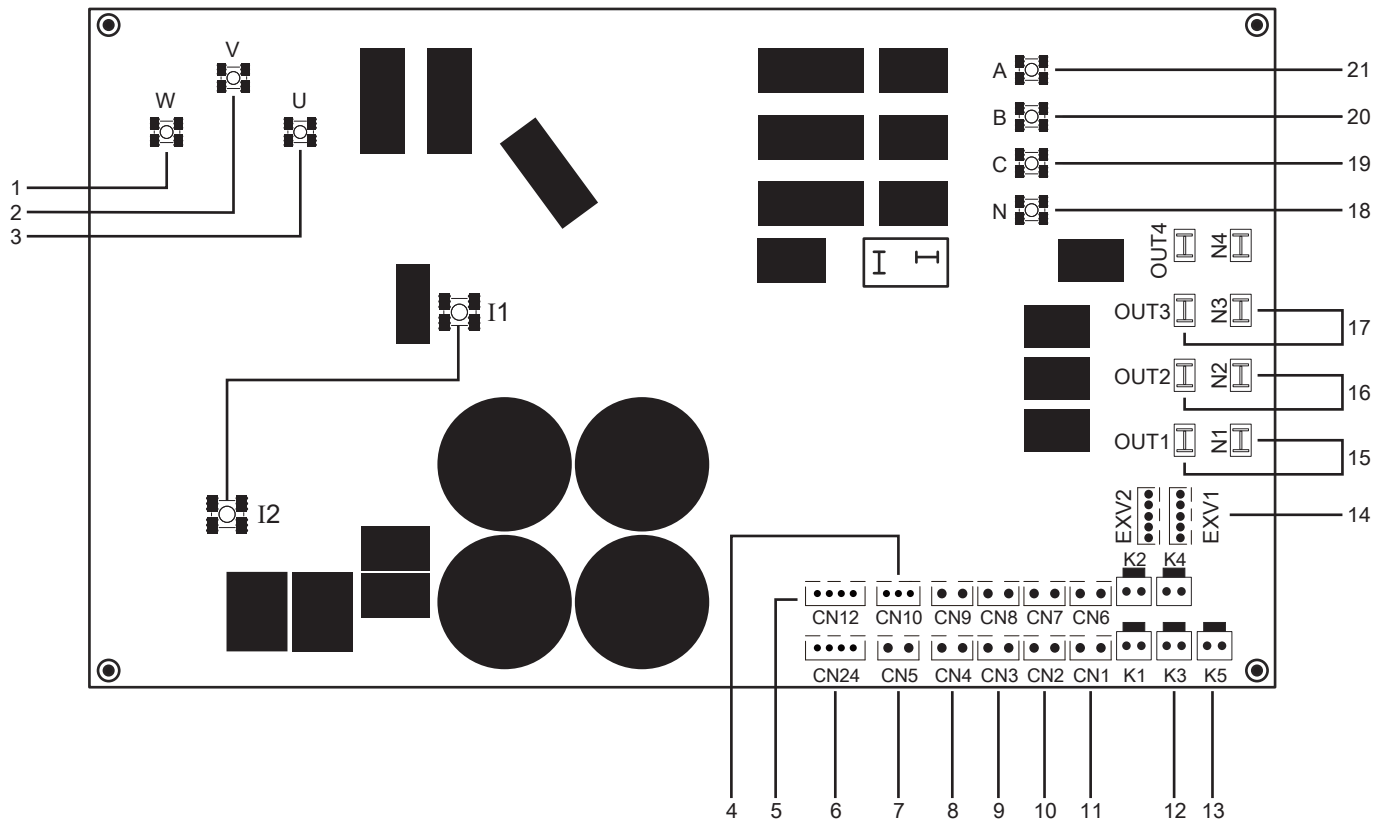
4) PCB B, 14-16kW, Refrigerant system PCB



Items	Port label	Function
1	AC (L/N)	Power supply
2	EXV1	Electric expansive valve
3	COM_L/I	Communication with hydraulic module PCB
4	COM_D	Communication with inverter module PCB
5	TH1	T3: Coil temperature sensor
6	TH2	T4: Outdoor ambient temperature sensor
7	TH3	T5: liquid temperature sensor
8	TH5	TP: Discharge temperature sensor
9	TH7	TH: Suction temperature sensor
10	TS8	LPS: Low pressure sensor
11	TS4	HP2: Middle pressure switch
12	TS3	HP1: High pressure switch
13	Output 4	4-way valve
14	Output 8	Crankcase heater
15	Output 5	Chassis heater

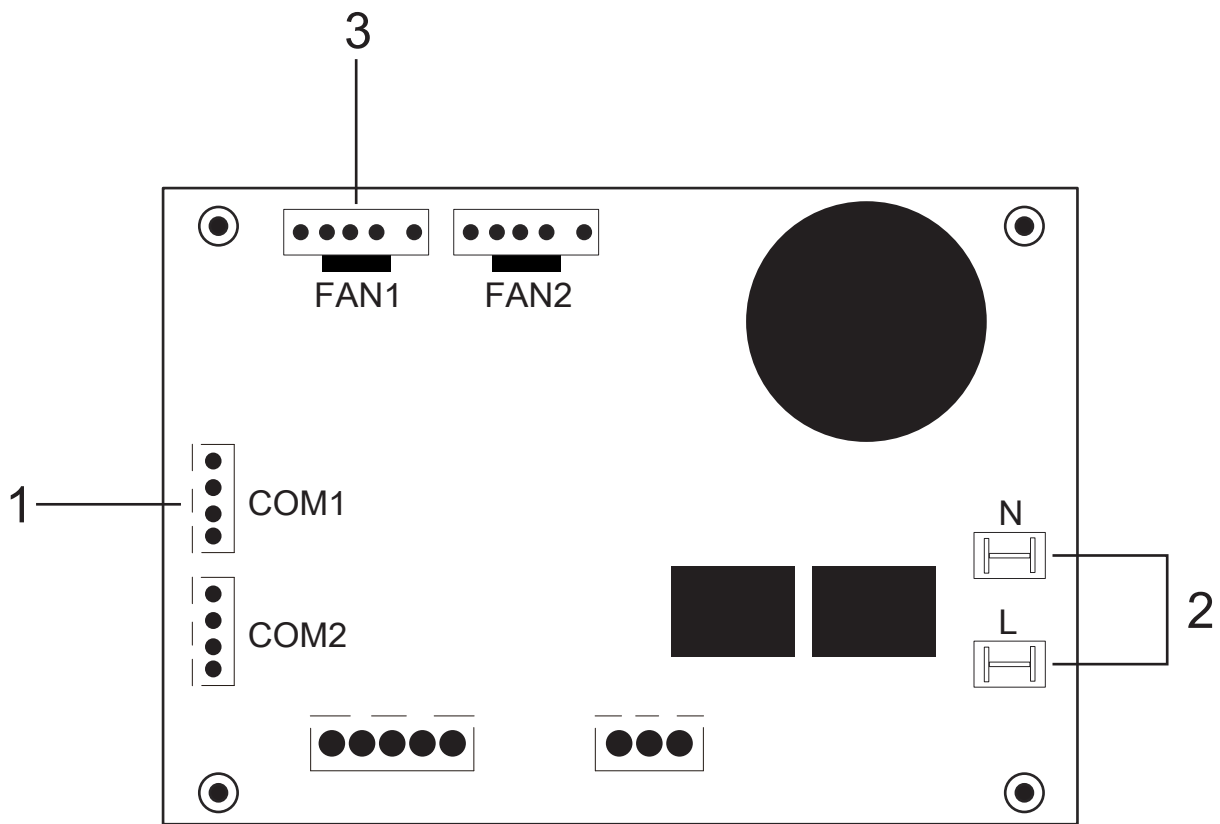
6.3 3-phase for 10-16kW units

1) PCB A, 3-phase for 10-16kW, Drive and refrigerant system PCB



Items	Port label	Function	Items	Port label	Function
1	u	Compressor connection port	12	K3	Medium pressure switch
2	v		13	K5	High pressure switch
3	w		14	EXV1	Electronic expansion valve
4	CN10	Low pressure sensor	15	OUT1,N1	Four way valve
5	CN12	Communication between PCB A and PCB B	16	OUT2,N2	Chassis heater
6	CN24	Communication between control board 1 and control board 2	17	OUT3,N3	Crankcase heater
7	CN5	Suction temperature	18	N	Power supply
8	CN4	Discharge temperature	19	C	
9	CN3	EEV Liquid temperature	20	B	
10	CN2	Ambient temperature	21	A	
11	CN1	Coil temperature			

2) PCB B, 3-phase for 10-16kW, DC Fan drive board



Items	Port label	Function
1	COM1	Communication between PCB A and PCB B
2	L, N	Power supply
3	FAN1	DC FAN

7 Field wiring

WARNING

- At least one leakage switch or other disconnecting device shall be installed, and contact spacing shall be set on all electrodes, which shall be included in the fixed wiring in accordance with relevant laws and regulations.
- Please turn off the power when wiring.
- All wiring and component installation work shall be completed by licensed electricians and comply with the laws and regulations of their country.
- Wiring shall be carried out in strict accordance with the circuit diagram and instructions of the unit.
- Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.
- Ground wires must be installed. Do not connect the machine to the ground wire of public pipeline, lightning arrester or telephone. The incomplete ground wire will cause electric shock.
- Be sure to install a ground fault circuit interrupter (30 mA). Failure to do so may cause electrical shock.
- Be sure to install the required fuses or circuit breakers.

7.1 Precautions on electrical wiring work

- Fix cables so that cables do not make contact with the pipes (especially on the high pressure side).
- Secure the electrical wiring with cable ties as shown in figure so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied to the terminal connectors.
- When installing the ground fault circuit interrupter make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the ground fault circuit interrupter.

NOTE

The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s).

- This unit is equipped with an inverter. Installing a phase advancing capacitor not only will reduce the power factor improvement effect, but also may cause abnormal heating of the capacitor due to high-frequency waves. Never install a phase advancing capacitor as it could lead to an accident.

7.2 Wiring overview

The illustration below gives an overview of the required field wiring between several parts of the installation.

NOTE

Please use H07RN-F for the power wire, all the cable are connect to high voltage except for thermistor cable and cable for user interface.

- Equipment must be grounded.
- All high-voltage external load, if it is metal or a grounded port, must be grounded.
- All external load current is needed less than 0.2A, if the single load current is greater than 0.2A, the load must be controlled through AC contactor.
- AHS1" "AHS2", "A1" "A2", wiring terminal ports provide only the switch signal.
Please refer to image of 9.7.6 to get the ports position in the unit.

7.3 Field wiring guidelines

Most field wiring on the unit is to be made on the terminal block inside the switch box. To gain access to the terminal block, remove the switch box service panel.

⚠ WARNING

Switch off all power including the unit power supply and backup heater and domestic hot water tank power supply (if applicable) before removing the switch box service panel.

- Fix all cables using cable ties.
- A dedicated power circuit is required for the backup heater.
- Installations equipped with a domestic hot water tank (field supply) require a dedicated power circuit for the booster heater. Please refer to the domestic hot water tank Installation & Owner's Manual. Secure the wiring in the order shown below.
- Lay out the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely.
- Follow the electric wiring diagram for electrical wiring works (the electrical wiring diagram is located on the back of the electric control box cover).
- Install the wires and fix the cover firmly so that the cover may be fit in properly.

The table below gives a wiring overview of required field wiring.

Table 6-1 Specification of single-phase power line

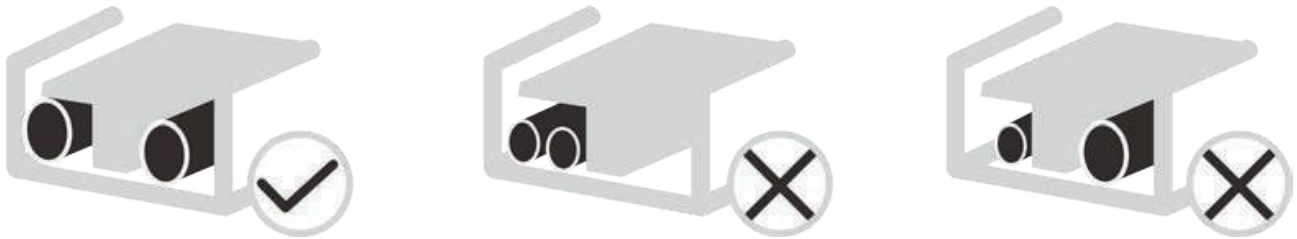
Model		4kW	6kW	8kW	10kW	12kW	14kW	16kW
United Power supply (outdoor power supply must fuse down the indoor power supply to 20 amps)		3x6mm ²	3x6mm ²	3x10mm ²	3x10mm ²	3x10mm ²	3x10mm ²	3x10mm ²
Separated Power Supply	Indoor	3x4mm ²	3x4mm ²	3x4mm ²	3x4mm ²	3x4mm ²	3x4mm ²	3x4mm ²
	Outdoor	3x4mm ²	3x4mm ²	3x4mm ²	3x4mm ²	3x6mm ²	3x6mm ²	3x6mm ²

Table 6-2 Specification of three-phase power line

Model		10kW	12kW	14kW	16kW
United Power supply (outdoor power supply must fuse down the indoor power supply to 20 amps)		5x6mm ²	5x6mm ²	5x6mm ²	5x6mm ²
Separated Power Supply	Indoor	5x6mm ²	5x6mm ²	5x6mm ²	5x6mm ²
	Outdoor	5x4mm ²	5x4mm ²	5x4mm ²	5x4mm ²

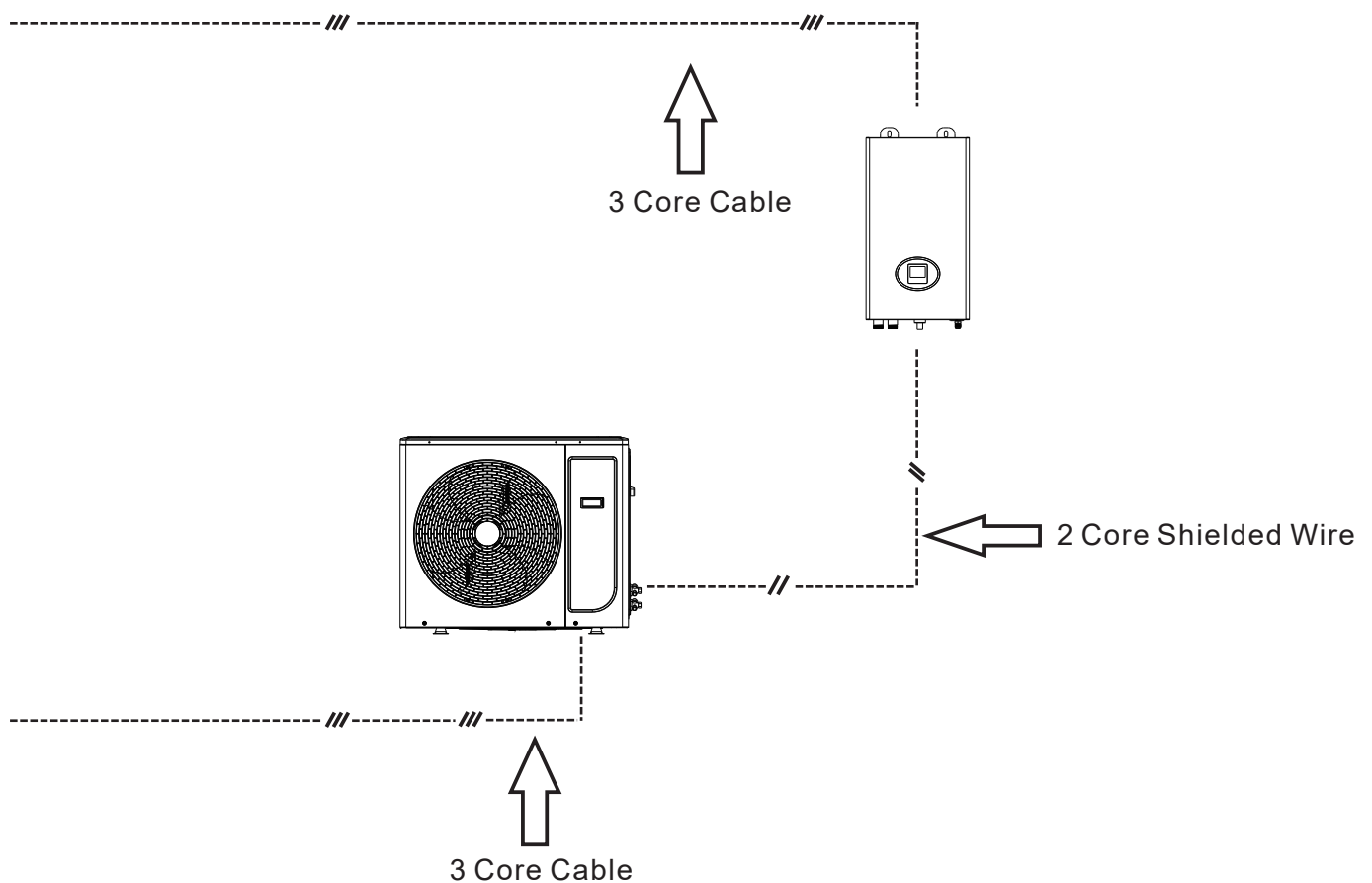
7.4 Precautions on wiring of power supply

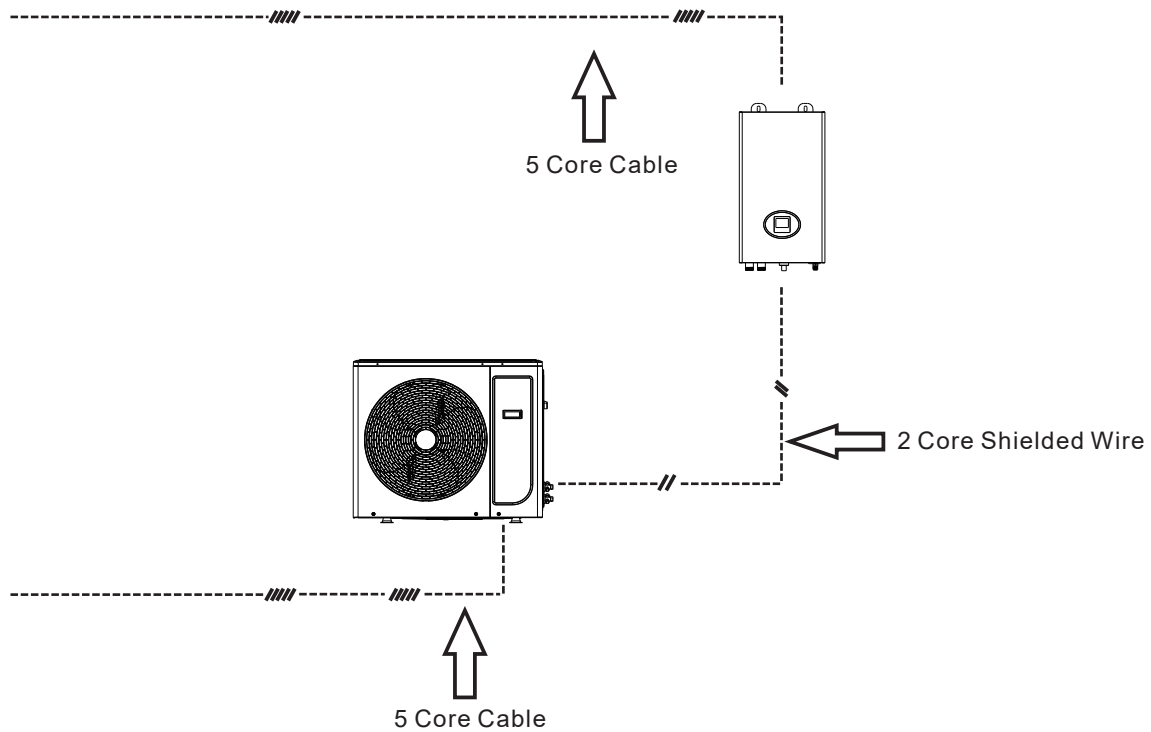
- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions.
 - Do not connect different gauge wires to the same power supply terminal. (Loose connections may cause overheating.)
 - When connecting wires of the same gauge, connect them according to the figure below.



- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- Attach a ground fault circuit interrupter and fuse to the power supply line.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside force cannot affect the terminals.

7.5 Schematic diagram of power input connection





Details of type and rating of fuses

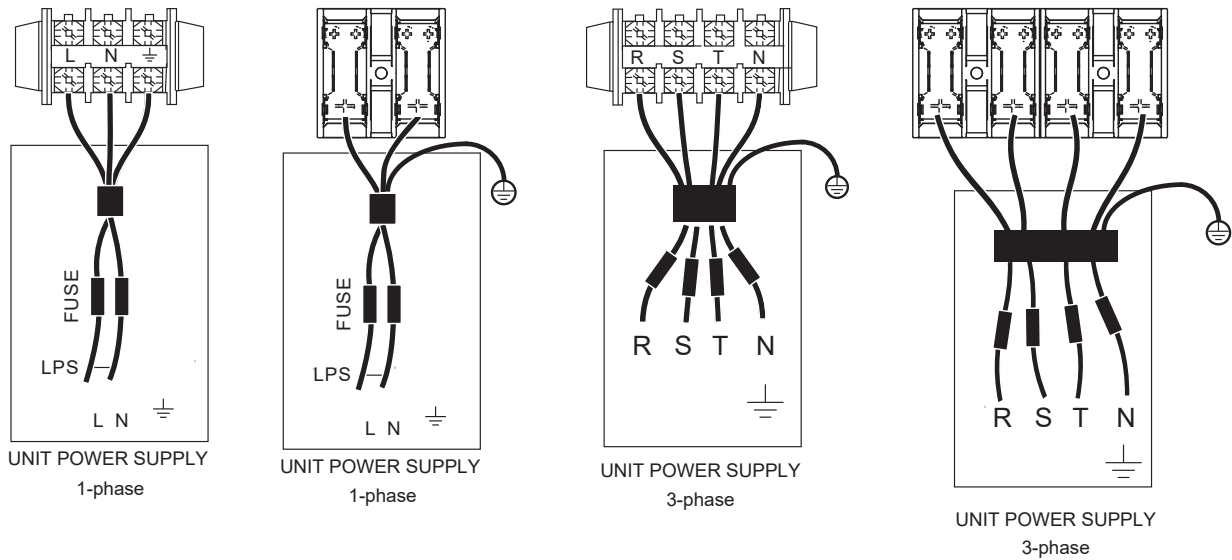
Model	Fuse type	Rating	Model	Fuse type	Rating
4kW	T30AH250V	30a 250V	10/12kW 3-Ph	T10AH250V	10a 250V
6kW	T30AH250V	30a 250V		T30AH250V	30a 250V
8kW	T30AH250V	30a 250V		T6.3AH250V	6.3a 250V
10kW	T30AH250V	30a 250V	14/16kW 3-Ph	T10AH250V	10a 250V
12kW	T30AH250V	30a 250V		T30AH250V	30a 250V
14kW	T30AH250V	30a 250V		T6.3AH250V	6.3a 250V
	T25AH250V	25a 250V			
	T6.3AL250V	6.3a 250V			
16kW	T30AH250V	30a 250V			
	T25AH250V	25a 250V			
	T6.3AL250V	6.3a 250V			

Table 6-3 NB cable entry either top or bottom of the indoor unit

Model	Rated Input Power/ Rated Current Outdoor Unit	Indoor Unit
4kW	1900W / 8.26A	95W(+ 3000W**) / 0.4A (+13.6 A **)
6kW	2900W / 12.6A	95W(+ 3000W**) / 0.4A (+13.6 A **)
8kW	3800W / 16.5A	95W(+ 3000W**) / 0.4A (+13.6 A **)
10kW	4500W / 19.6A	95W(+ 3000W**) / 0.4A (+13.6 A **)
12kW	5700W / 24.8A	95W(+ 3000W**) / 0.4A (+13.6 A **)
14kW	5900W / 25.6A	95W(+ 3000W**) / 0.4A (+13.6 A **)
16kW	6800W / 29.6A	95W(+ 3000W**) / 0.4A (+13.6 A **)
10kW 3-Ph	4500W / 6.7A	95W(+ 9000W**) / 0.4A (+13.6 A **)
12kW 3-Ph	5700W / 8.3A	95W(+ 9000W**) / 0.4A (+13.6 A **)
14kW 3-Ph	5900W / 8.6A	95W(+ 9000W**) / 0.4A (+13.6 A **)
16kW 3-Ph	7500W / 10.9A	95W(+ 9000W**) / 0.4A (+13.6 A **)

Remark ** related to the supplementary heater.

7.6 Remove the switch box cover



NOTE

The ground fault circuit interrupter must be 1 high-speed type of 30mA(<0.1s). Please use 3-core shielded wire. The default of backup heater is option 3 (for 9kW backup heater). Stated values are maximum values (see electrical data for exact values).

When connecting to the power supply terminal, use the circular wiring terminal with the insulation casing (see Figure 6.1). Use power cord that conforms to the specifications and connect the power cord firmly. To prevent the cord from being pulled out by external force, make sure it is fixed securely.

If circular wiring terminal with the insulation casing cannot be used, please make sure that:

- Do not connect two power cords with different diameters to the same power supply terminal (may cause overheating of wires due to loose wiring) (See Figure 6.2).

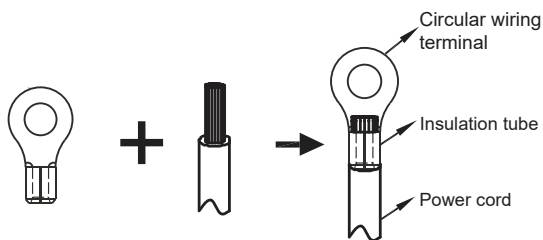


Figure 9.1

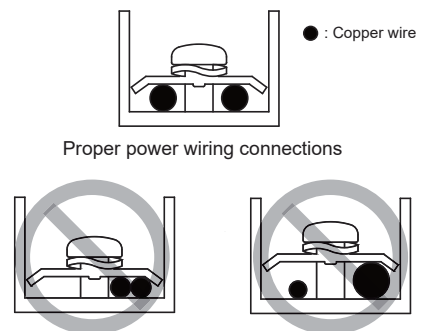
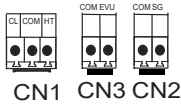


Figure 9.2

8 Connection for other components



K18(30A relay for internal pipe heater)



K19(30A relay for tank booster heater)



K20(30A relay for reserved)



U19

1	2	3	4	5
12V/GND	L_A	L_B	L_B	H1
6	7	8	9	10
12V	GND	I_A	I_B	H2

CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
OFF1	ON1	OFF2	ON2	OFF3	ON3	P_c	P_o	P_s	P_d	ETH	AHS1	DFT1	R1	SL2	AC_CL	
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	TBH	IBH1	N	N	N	N	N	N	N	N	AHS2	DFT2	R2	SL1	AC_L1	AC_HT



Code	Print		Connect to
	Code	Print	
①	1	OFF1	SV1(3-way valve)
	2	ON1	
	19	N	
②	3	OFF2	SV2(3-way valve)
	4	ON2	
	20	N	
③	5	OFF3	SV2(3-way valve)
	6	ON3	
	21	N	
④	7	P_c	Pump(zone 2 pump)
	22	N	
⑤	8	P_o	Outside circulation pump/zone 1 pump
	23	N	
⑥	9	P_s	Solar energy pump
	24	N	
⑦	10	P_d	DHW pipe pump
	25	N	
⑧	11	ETH	Reserved
	26	N	
⑨	12	AHS1	Additional heat source
	27	AHS2	
⑩	13	DFT1	Reserved
	28	DFT2	
⑪	14	R1	Reserved
	29	R2	
⑫	15	SL2	Solar energy input signal
	30	SL1	
⑬	16	AC_CL	Room thermostat input (high voltage)
	31	AC_L1	
	32	AC_HT	

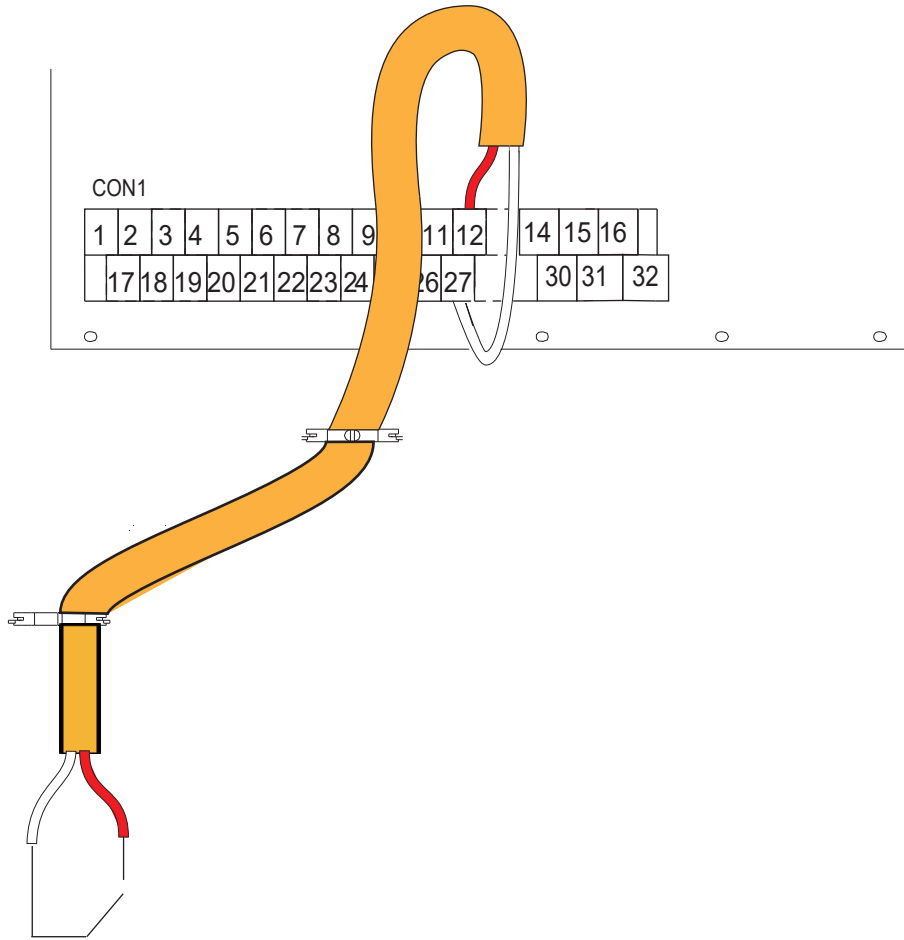
	Code	Print	Connect to
CN1	①	CL	Room thermostat input (Low voltage)
	②	COM	
	③	HT	
CN2	①	COM	SG
	②	SG	
CN3	①	COM	EVU
	②	EVU	

	Code	Print	Connect to	
U19	①	1	12V	Wired controller
		2	GND	
		3	L_A	
		4	L_B	
U19	②	6	12V	To outdoor unit
		7	GND	
		8	I_A	
		9	I_B	
		5	H1	
10	H2			

Port provide the control signal to the load. Two kind of control signal port:

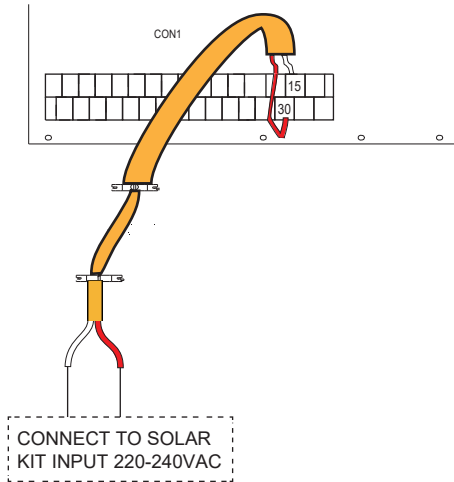
Type 1: Dry connector without voltage.

Type 2: Port provide the signal with 220V voltage. If the current of load is $<0.2A$, load can connect to the port directly. If the current of load is $\geq 0.2A$, the AC contactor is required to connected for the load.



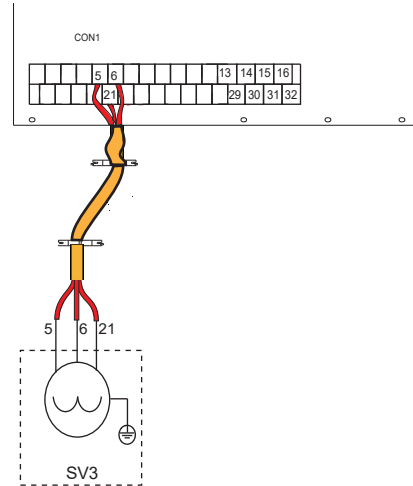
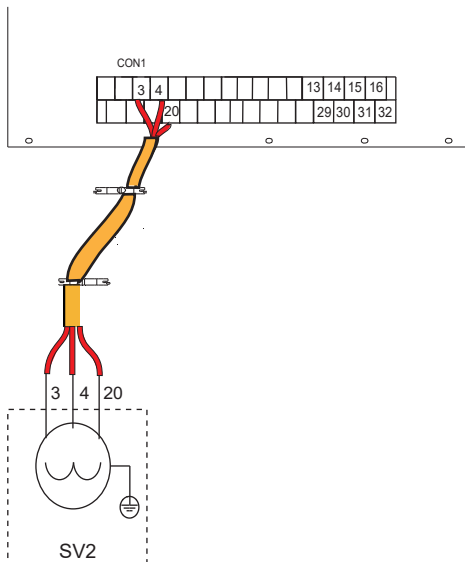
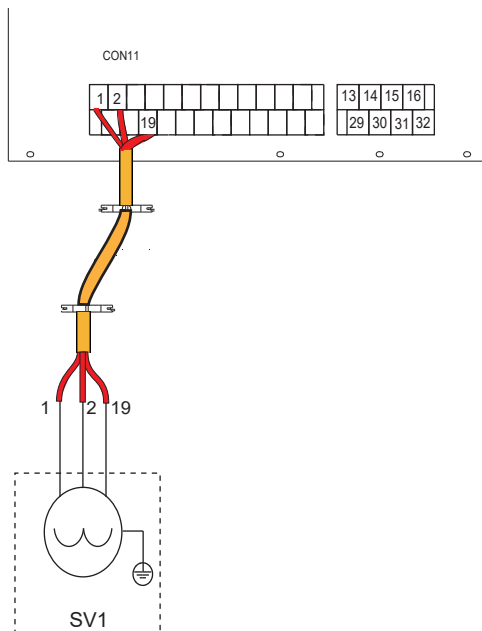
Type1 For additional heat source control

8.1 For solar energy input signal:



Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm ²)	0.75

8.2 For 3-way valve SV1, SV2 and SV3:

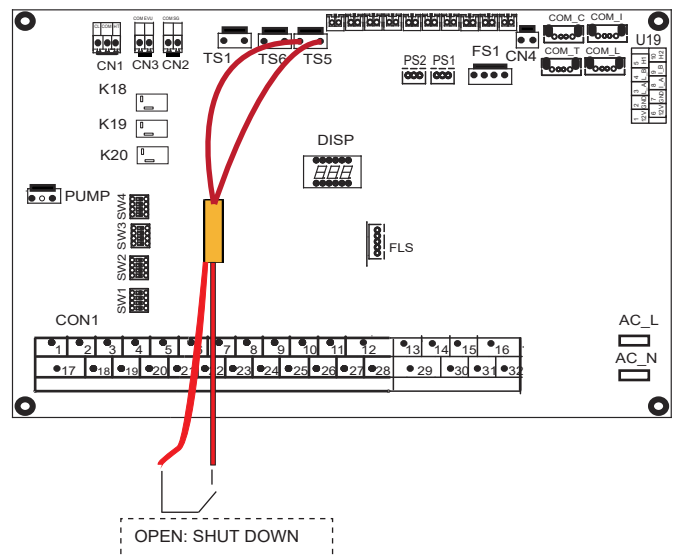


Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm ²)	0.75
Control port signal type	Type 2

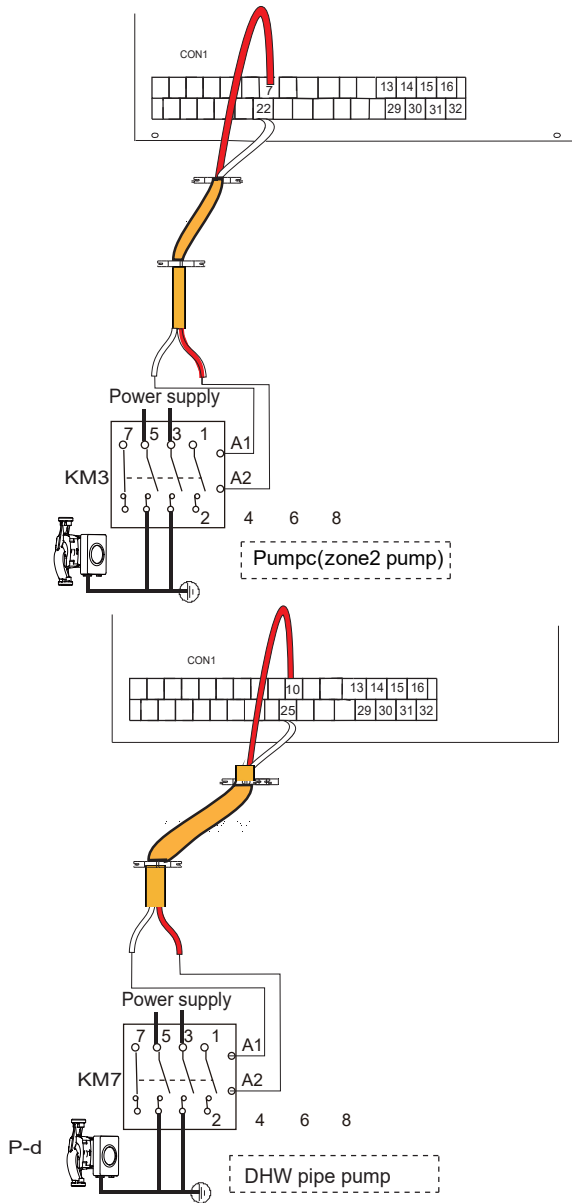
a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable reliably.

8.3 For remote shut down:



8.4 For Pump and DHW pipe pump:



Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm ²)	0.75
Control port signal type	Type 2

a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable reliably.

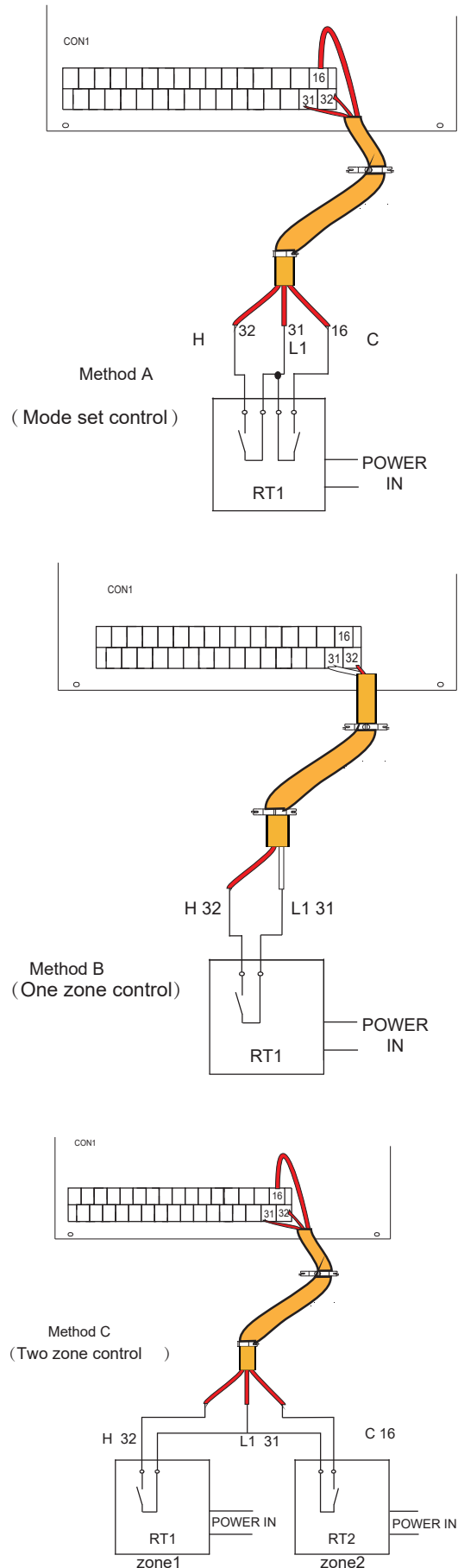
8.5 For room thermostat:

Room thermostat type 1(High voltage): "POWER IN" provide the working voltage to the RT, doesn't provide the voltage to the RT connector directly. Port "31 L1" provide the 220V voltage to the RT connector. Port "31 L1" connect from the unit main power supply port L of 1- phase power supply. Room thermostat type 2(Low voltage) : "POWER IN" provide the working voltage to the RT.

NOTE

There are two optional connect method depend on the room thermostat type.

Room thermostat type 1 (High voltage):



Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm ²)	0.75

There are three methods for connecting the thermostat cable (as described in the picture above) and it depends on the application.

●Method 1 (Mode set control)

RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the hydraulic module is connected with the external temperature controller, user interface set ROOM THERMOSTAT to MODE SET :

- 1.1 When unit detect voltage is 230VAC between CL and L1, the unit operates in the cooling mode.
- 1.2 When unit detect voltage is 230VAC between HT and L1, the unit operates in the heating mode.
- 1.3 When unit detect voltage is 0VAC for both side (CL-L1, HT-L1) the unit stop working for space heating or cooling.
- 1.4 When unit detect voltage is 230VAC for both side (CL-L1, HT-L1) the unit working in cooling mode.

●Method 2 (One zone control)

RT provide the switch signal to unit. User interface set ROOM THERMOSTAT to ONE ZONE :

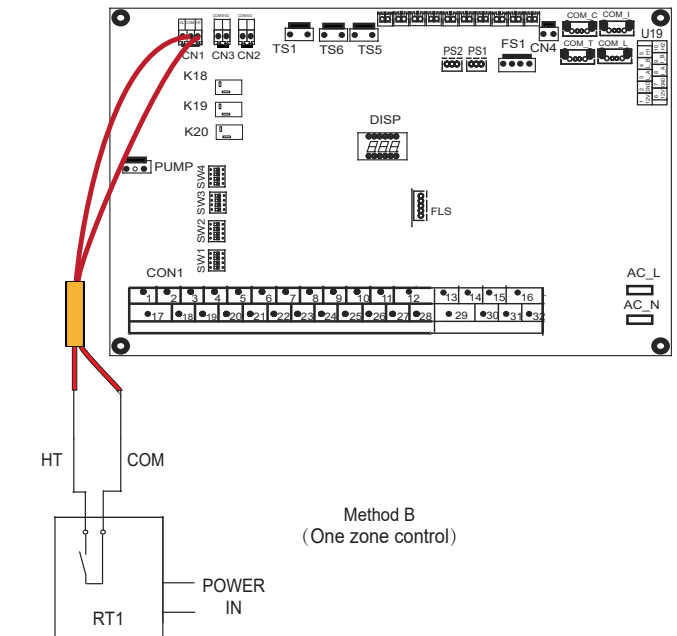
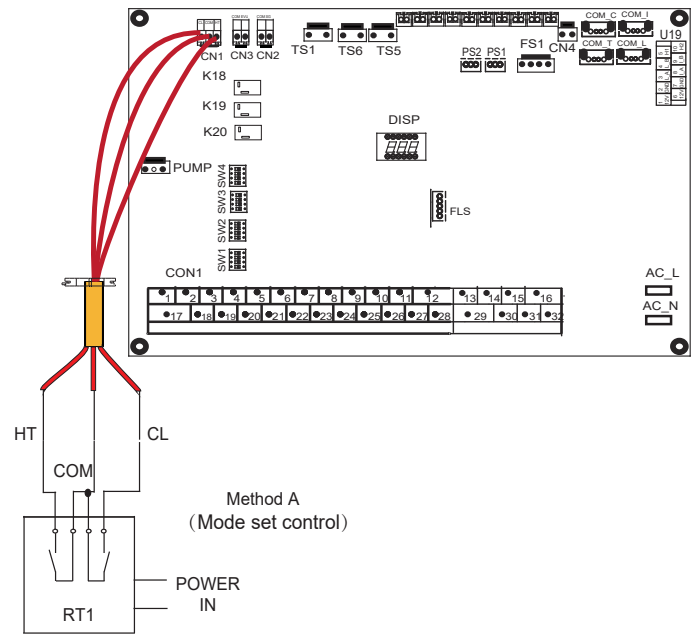
- 2.1 When unit detect voltage is 230VAC between HT and L1, unit turns on.
- 2.2 When unit detect voltage is 0VAC between HT and L1, unit turns off.

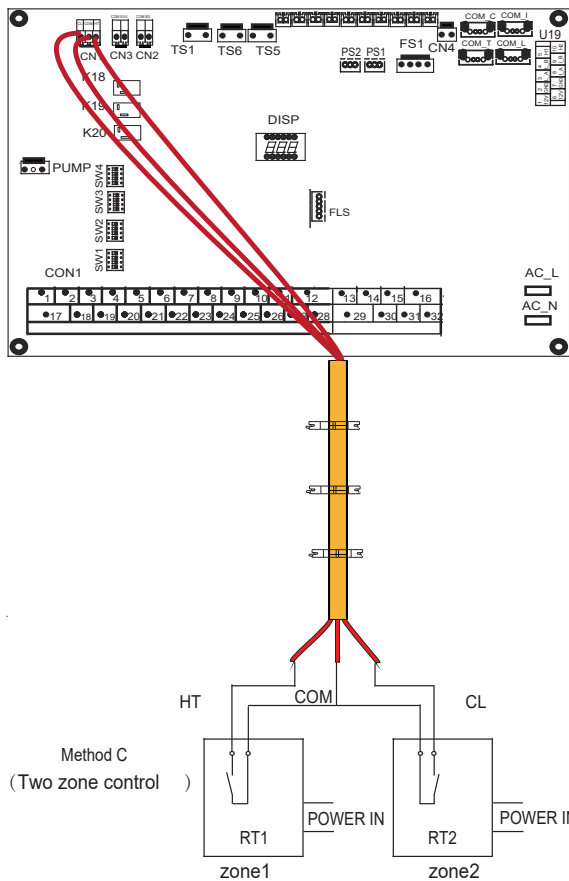
●Method 3 (Double zone control)

Hydraulic Module is connected with two room thermostat, while user interface set ROOM THERMOSTAT to ZONES:

- 3.1 When unit detect voltage is 230VAC between HT and L1, zone1 turns on. When unit detect voltage is 0VAC between HT and L1, zone1 turns off.
- 3.2 When unit detect voltage is 230VAC between CL and L1, zone2 turns on according to climate temp curve. When unit detect voltage is 0VAC between CL and L1, zone2 turns off.
- 3.3 When HT-L1 and CL-L1 are detected as 0VAC, unit turns off.
- 3.4 When HT-L1 and CL-L1 are detected as 230VAC, both zone1 and zone2 turn on.

Room thermostat type2 (Low voltage):





• Method C (Two zone control)

Hydraulic Module is connected with two room thermostat, while user interface set ROOM THERMOSTAT to ZONES:

C.1 When unit detect voltage is 12VDC between HT and COM, zone1 turn on. When unit detect voltage is 0VDC between HT and COM, zone1 turn off.

C.2 When unit detect voltage is 12VDC between CL and COM, zone2 turn on according to climate temp curve. When unit detect voltage is 0V between CL and COM, zone2 turn off.

C.3 When HT-COM and CL-COM are detected as 0VDC, unit turn off.

C.4 When HT-COM and CL-COM are detected as 12VDC, both zone1 and zone2 turn on.

NOTE

- The wiring of the thermostat should correspond to the settings of the user interface.
- Power supply of machine and room thermostat must be connected to the same Neutral Line.
- Zone 2 can only operate in heating mode, when cooling mode is set on user interface and zone1 is OFF, "CL" in zone2 closes, system still keeps 'OFF'. While installation, the wiring of thermostats for zone1 and zone2 must be correct.

There are three methods for connecting the thermostat cable (as described in the picture above) and it depends on the application.

• Method A (Mode set control)

RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the hydraulic module is connected with the external temperature controller, user interface set ROOM THERMOSTAT to MODE SET:

A.1 When unit detect voltage is 12VDC between CL and COM the unit operates in the cooling mode.

A.2 When unit detect voltage is 12VDC between HT and COM, the unit operates in the heating mode.

A.3 When unit detect voltage is 0VDC for both side (CL-COM, HT-COM) the unit stop working for space heating or cooling.

A.4 When unit detect voltage is 12VDC for both side (CL-COM, HT-COM) the unit working in cooling mode.

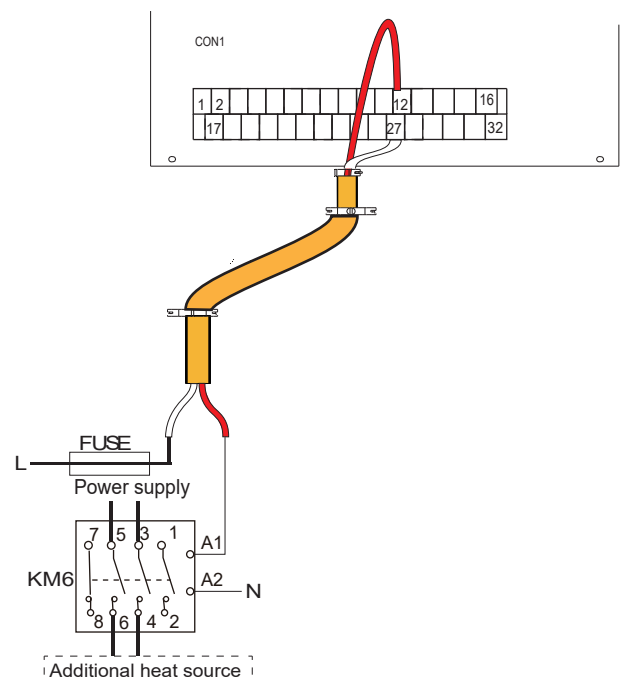
• Method B (One zone control)

RT provides the switch signal to unit. User interface set ROOM THERMOSTAT to ONE ZONE:

B.1 When unit detect voltage is 12VDC between HT and COM, unit turns on.

B.2 When unit detect voltage is 0VDC between HT and COM, unit turns off.

8.6 For additional heat source control:

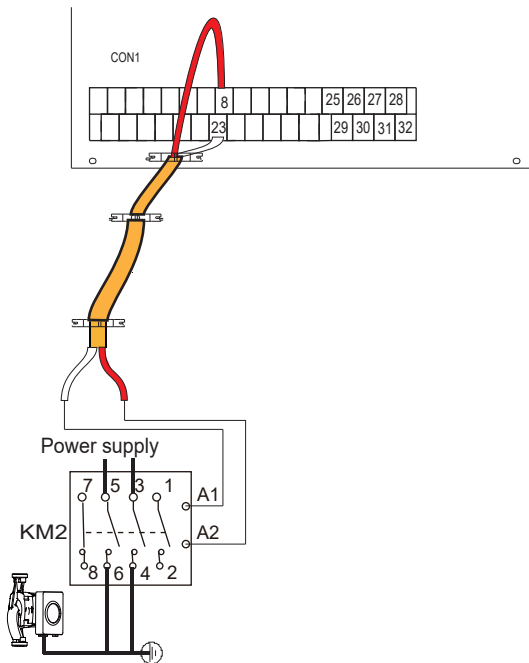


Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm ²)	0.75
Control port signal type	Type 2

⚠ WARNING

This part only applies to the unit without an interval backup heater. If there is an interval backup heater in the unit, the hydraulic module should not be connected to any additional heat source.

8.7 For outside circulation pump P_o:



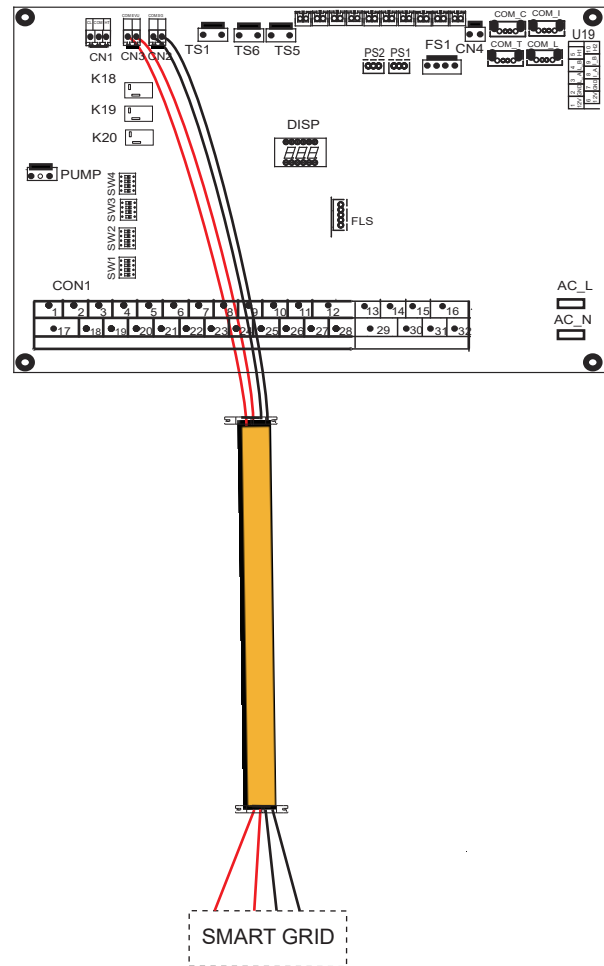
Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm ²)	0.75
Control port signal type	Type 2

a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable reliably.

8.8 For smart grid:

The unit has smart grid function, there are two ports on PCB to connect SG signal and EVU signal as following:



1. when EVU signal is on, the unit operate as below:

DHW mode turn on, the setting temperature will be changed to 70 °C automatically, and the WTH operate as below: TW < 69 °C, the WTH is on, TW ≥ 70 °C, the WTH is off. The unit operate in cooling/heating mode as the normal logic.

2. When EVU signal is off, and SG signal is on, the unit operate normally.

3. When EVU signal is off, SG signal is off, the DHW mode is off, and the TBH is invalid, disinfect function is invalid.

The max running time for cooling/ heating is "SG RUNNIN TIME", then unit will be off.

9 Indoor unit installation

⚠ WARNING

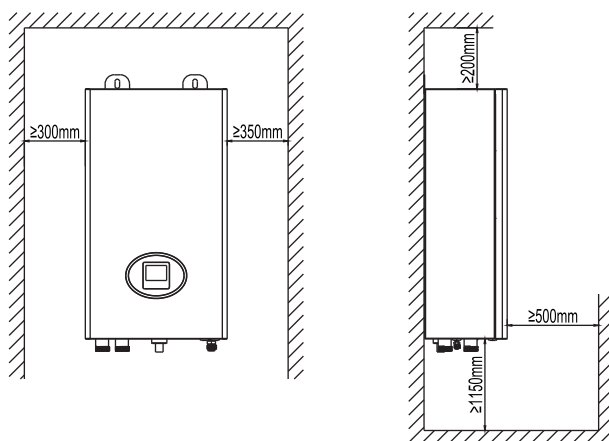
- There is flammable refrigerant in the unit and it should be installed in a well-ventilated site. If the unit is installed inside, an additional refrigerant detection device and ventilation equipment must be added in accordance with the standard EN378. Be sure to adopt adequate measures to prevent the unit from being used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunction, smoke or fire. Please instruct the customer to keep the area around the unit clean.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Do not grasp the control box or pipe to lift the unit.
- The indoor unit weight is approximately 50kg and should be lifted by two persons.

9.1 Selecting installation location

If the indoor unit is installed on the indoor wall, the installation location should meet the following conditions and be approved by the customer

- The installation location shall be the location with low air relative humidity and low heat transfer coefficient to reduce frosting.
- The space location can fully ensure that the maintenance space must meet the size requirements of the following figure.
- Provide condensate drainage and pressure relief valve exhaust.
- The wall of the selected installation location must be flat and strong, a safe location that can bear the total weight of the unit and vibration.
- The space around the unit allows sufficient air circulation, and there is no danger of suffocation or fire due to the leakage of flammable gas.
- Pay attention to the length and distance of all pipes, and meet the refrigerant pipe parameter table on page 56.
- When the unit running in the cooling mode, condensate may drop from the water inlet and water outlet pipes. Please make sure the dropping condensate will not result in damage of your furniture and other devices.
- Places where there is no possibility of flammable gas or product leak.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
- Do not install the unit in places often used as a work space. In case of construction work (e.g. grinding etc.) where a lot of dust is created, the unit must be covered.
- Do not place any object or equipment on top of the unit (top plate).
- Do not climb, sit or stand on top of the unit.
- Be sure that sufficient precautions are taken in case of refrigerant leakage according to relevant local laws and regulations.

9.2 Installation space



9.3 Plumbing engineering

Water volume and sizing expansion vessels

The units are equipped with an expansion vessel of 5L that has a default pre-pressure of 0.15MPa. To assure proper operation of the unit, the pre-pressure of the expansion vessel might need to be adjusted.

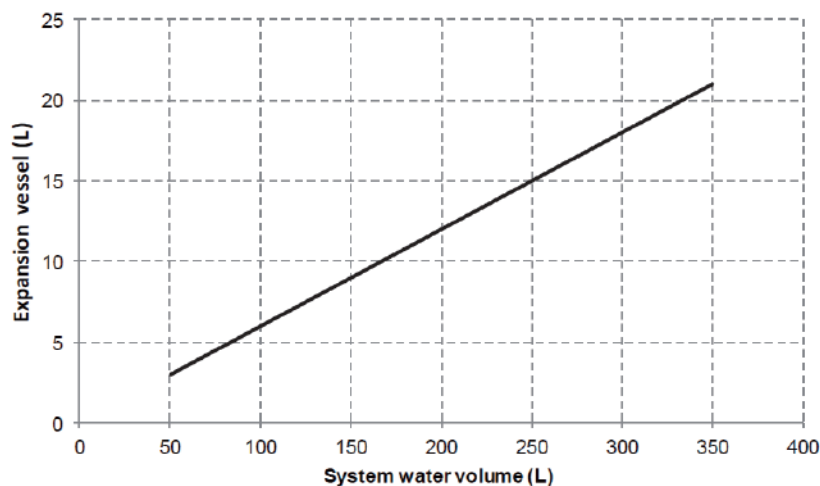
1) Check that the total water volume in the installation, excluding the internal water volume of the unit, is at least 40L.

- In most applications this minimum water volume will be satisfactory.
- In critical processes or in rooms with a high heat load though, extra water might be required.
- When circulation in each space heating loop is controlled by remotely controlled valves, it is important that this minimum water volume is kept even if all the valves are closed.

2) Expansion vessel volume must fit the total water system volume.

3) To size the expansion for the heating and cooling circuit.

The expansion vessel volume can follow the figure below:



Water circuit connection

Water connections must be made correctly in accordance with labels on the indoor unit, with respect to the water inlet and water outlet.

NOTE

Be careful not to deform the unit's piping by using excessive force when connecting the piping. Deforming the piping can cause the unit to malfunction.

If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs.
- Cover the pipe end when inserting it through a wall to prevent dust and dirt entering.
- Use a good thread sealant for sealing the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-copper metallic pipes, be sure to insulate two materials from each other to prevent galvanic corrosion.
- As copper is a soft material, use appropriate tools for connecting the water circuit. Inappropriate tools will cause damage to the pipes.

NOTE

The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping:

- Never use Zn-coated parts in the water circuit. Excessive corrosion of these parts may occur as copper piping is used in the unit's internal water circuit.
- When using a 3-way valve in the water circuit. Preferably choose a ball type 3-way valve to guarantee full separation between the domestic hot water and floor heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit. The recommended maximum changeover time of the valve should be less than 60 seconds.

Water circuit anti-freeze protection

All internal hydroponic parts are insulated to reduce heat loss. Insulation must also be added to the field piping.

The software contains special functions using the heat pump and backup heater (if it is available) to protect the entire system against freezing. When the temperature of the water flow in the system drops to a certain value, the unit will heat the water, either using the heat pump, the electric heating tap, or the backup heater. The freeze protection function will turn off only when the temperature increases to a certain value.

In event of a power failure, the above features would not protect the unit from freezing.

NOTE

When the unit is not running for a long time, make sure the unit is powered on all the time, if you want to cut off the power, the water in the system pipe needs to be drained clean, avoid the pump and pipeline system be damaged by freezing. Also the power of the unit needs to be cut off after water in the system is drained clean.

Water may enter into the flow switch and cannot be drained out and may freeze when the temperature is low enough. The flow switch should be removed and dried, then can be reinstalled in the unit.

- Counterclockwise rotation, remove the flow switch.
- Drying the flow switch completely.

Check the water circulation

Before proceeding with the installation, please check the following points:

1. The maximum water pressure is ≤ 0.3 MPa (Rated Water Pressure).
2. To facilitate service and maintenance, please install a shut-off valve at the inlet and outlet. Pay attention to the installation position of the shut-off valve.
3. It is recommended to install at least one drain valve in the lowest section of the water circulation system to drain the water cleanly during maintenance.
4. The indoor unit has an automatic exhaust valve. Do not tighten the automatic exhaust valve, so as not to affect the automatic exhaust function in the water circuit.
5. Pay attention to the parts in the piping to be able to withstand the maximum water pressure requirements of the system.

NOTE

- The Max Water Pressure of the system pipe is ≤ 1.0 MPa, otherwise it will cause rupture.
- A Y-type filter must be installed at the water inlet.

Water injection

1. Connect the water supply pipe to the inlet and outlet pipes of the system.
2. Make sure that the automatic exhaust valve has been opened (at least two turns).
3. Fill with water until the pressure shows close to 0.2 MPa.

Use the exhaust valve to exhaust the air in the waterway as much as possible in order to avoid the air going into the waterway which may cause the equipment to malfunction.

NOTE

- When filling water, the air in the system may not be completely exhausted. The remaining air will be automatically discharged by the automatic exhaust valve after the unit runs for one hour. Additional water may be added afterwards.
- The water pressure displayed on the remote controller's display largely depends on the water temperature (the higher the water temperature, the greater the water pressure).
- The water pressure must be kept >0.03MPa at all times to prevent air from entering the water circulation.

The unit may drain the excess water through the safety valve.

- Water quality should be complied with EN 98/83 EC Directives.
- The rated water flow must meet the requirements shown in the table below

Model	Water flow (m ³ /h)
4kW	0.69
6kW	1.03
8kW	1.38
10kW	1.72
12kW	2.06
14kW	2.41
16kW	2.75

10 The installation of the outdoor unit

10.1 Precautions for choosing the installation location

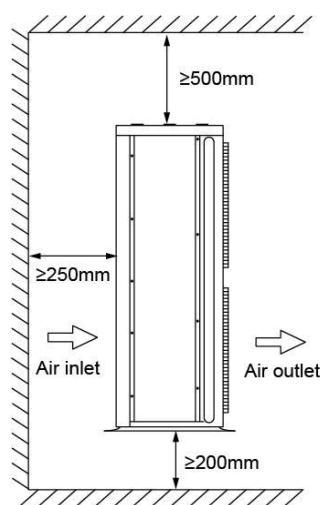
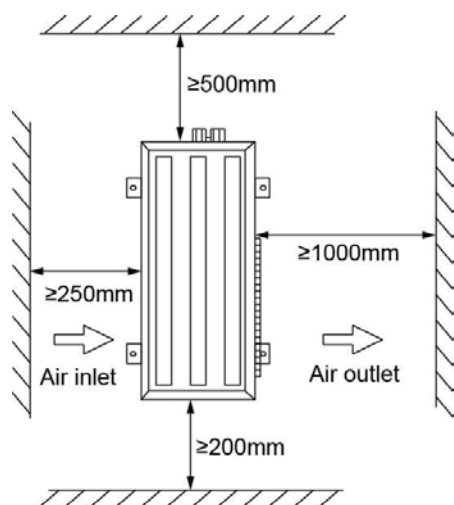
⚠ WARNING

Please take appropriate measures such as using a fine mesh fence to prevent the outdoor machine from being used as a habitat by some small animals.

Contact of small animals with electrical parts may cause the unit to malfunction, smoke or catch fire. Please keep the surrounding environment clean.

- Choose a place that is strong enough to support the weight and vibration of the unit.
- Choose a place with good ventilation and noise from the operation of the unit that will not cause trouble to neighbors or users.
- Avoid installing it close to the bedroom, as the noise of the unit will cause trouble.
- There must be enough space to facilitate installation and maintenance
- There must be enough space for ventilation, and there must be no obstacles within 1 meter in front of the air outlet of the unit
- No flammable gas leaks near the installation point.
- Install the unit, power cords and wires, and keep at least three meters away from the TV and other radio devices to avoid interference with picture quality and sound quality.
- There is an electromagnetic interference problem, the distance must be increased, and the electrical appliances must be shielded to ensure a good grounding.
- At the seaside or in places with high salinity, the corrosiveness is strong, which may shorten the service life of the unit.
- When the external machine is defrosted, more condensed water will be generated. Drainage facilities should be made to avoid affecting others.
- When installing the unit in a place exposed to strong wind, pay special attention to the following.
- Strong winds of 5m/sec or more blowing against the unit's air outlet causes a short circuit (suction of discharge air), and this may have the following consequences:
 - Deterioration of the operational capacity.
 - Frequent frost acceleration in heating operation.
 - Disruption of operation due to rise of high pressure.
 - When a strong wind blows continuously on the front of the unit, the fan can start rotating very fast until it breaks.
- Places where rain can be avoided as much as possible.

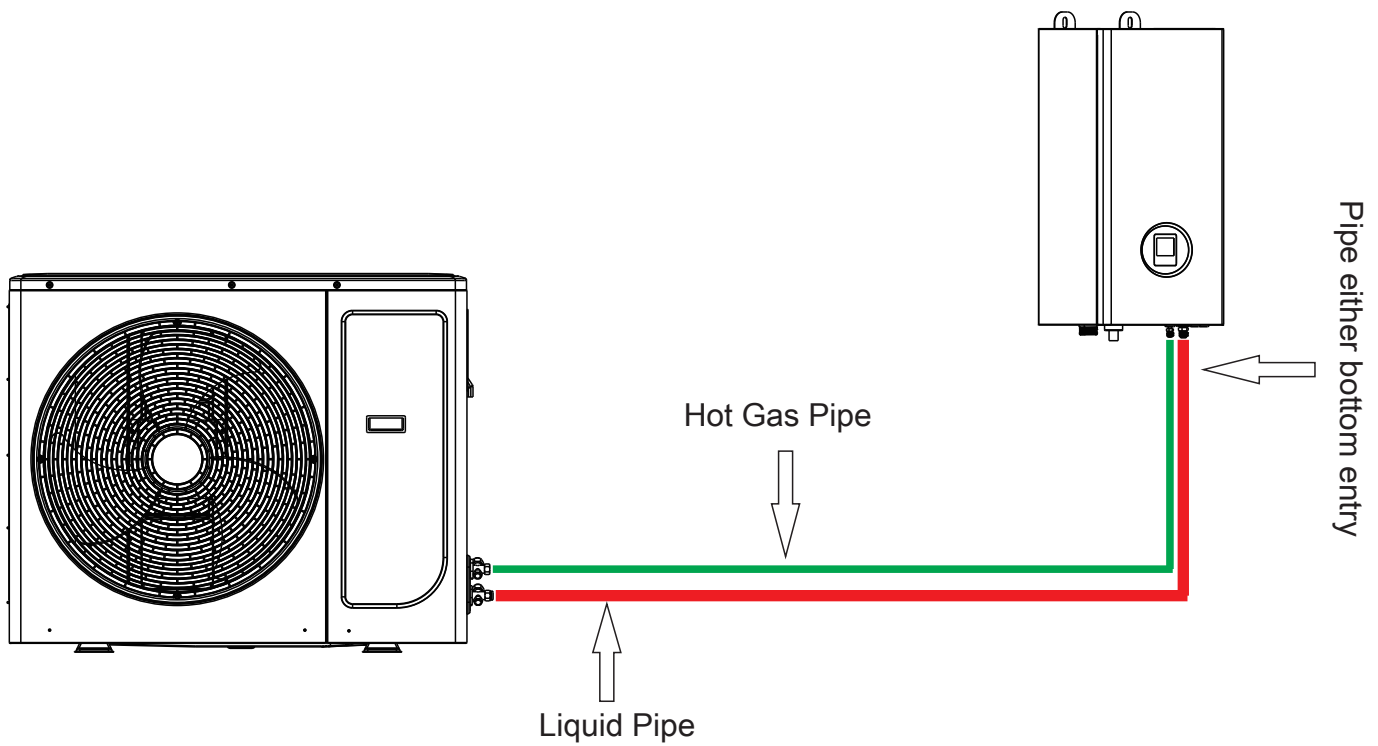
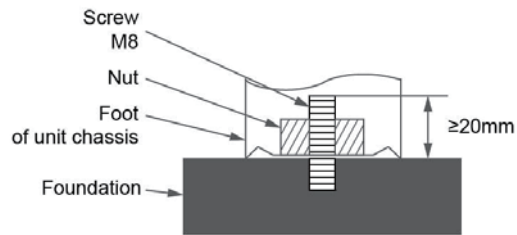
10.2 Installation space



10.3 Outdoor unit installation

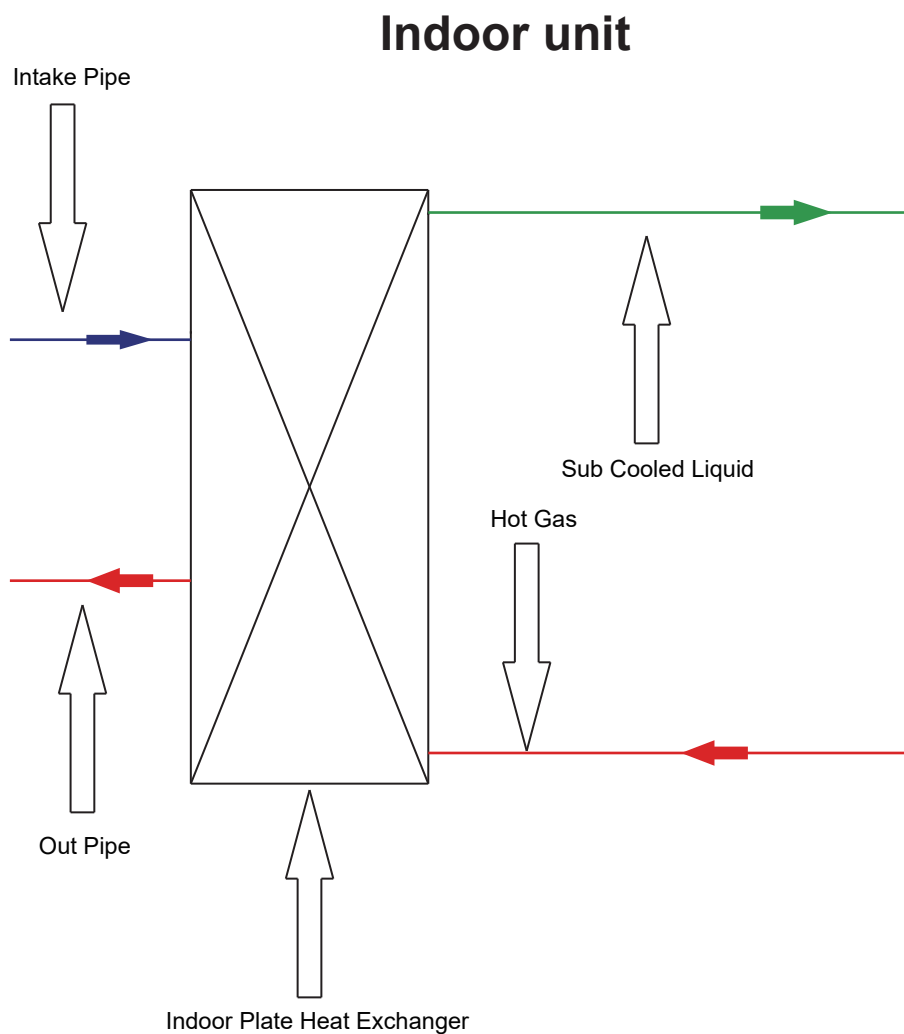
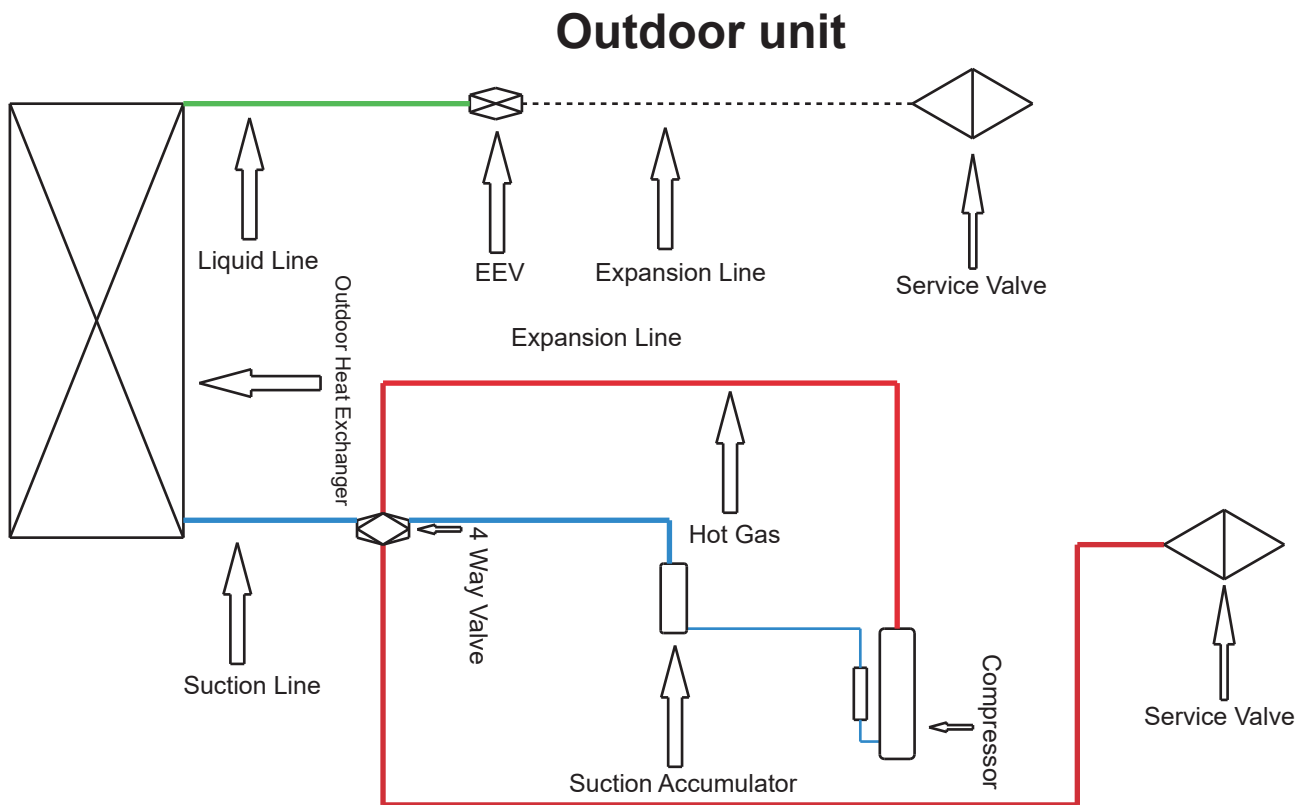
When installing the outdoor unit, please refer to the installation guide, and choose the installation location to meet the size requirements of the above figure

1. Confirm that the strength and levelness of the installation position meet the installation requirements, and the unit will not cause vibration or noise after installation.
2. Prepare four sets of basic M8 bolts, nuts, and shock-proof rubber pads. (Optional).
3. According to the foundation drawing, fix the machine with foundation bolts. It is better to screw it into the foundation bolt, leaving 20mm on the foundation surface.



10.4 Refrigerant piping project

Installation guide, description and technical parameters of the refrigerant pipes of the indoor and outdoor units. The location of the air pipe and water pipe of the unit has been shown in the equipment overview.



Connecting pipeline installation work

When connecting the fluorine gas pipe, use two wrenches to tighten or loosen the nut. Otherwise, it will damage the pipeline and cause leakage.

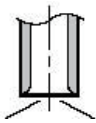
WARNING

The pipeline installation work must be installed by experienced refrigeration technicians and must comply with relevant local laws and regulations.

Pipe flaring

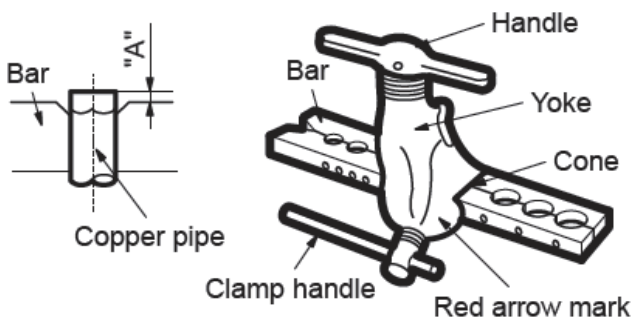
To expand each nozzle, follow the steps below:

1. Cut the pipe with a pipe cutting tool.
2. Remove burrs, and cut the surface downward to prevent debris from falling into the tube.



- | |
|------------------------|
| 1. Right angle cutting |
| 2. Deburring |

3. Remove the brass nut from the shut-off valve and put the nut on the pipe.
4. Expand the nozzle and place it in the position shown below.



Check the flaring

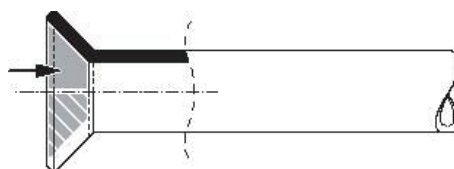
- | |
|--|
| 1. The internal surface of the flaring shall not have jagged burrs, cracks and other defects. |
| 2. Flaring must be complete |
| 3. Ensure that the nut is suitable, such as: the size of the flaring must be fitted to the inner cone of the nut; the fitting surface ratio is $\geq 90\%$. |

NOTE

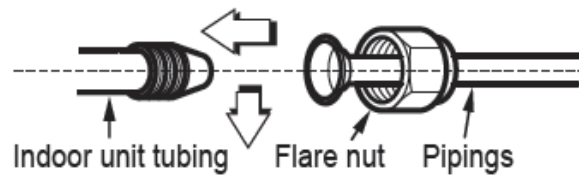
- Do not use mineral oil in the flaring. Mineral oil entering the system will shorten the service life of the machine.
- Do not use piping that has already been used.
- Do not install a dryer on the R32 machine to ensure its service life, the drying material may dissolve and damage the system.
- Flaring does not meet the above requirements, which may cause refrigerant gas leakage.

Refrigerant pipe connection

1. When connecting the nut, coat the inner surface of the nut with ether oil or ester oil, and tighten it by hand three or four turns before tightening.



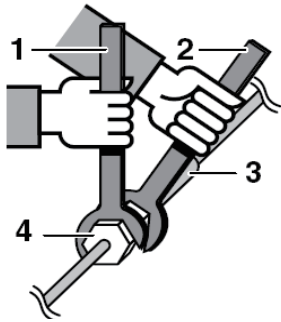
2. Align the center of the pipes.



3. Sufficiently tighten the flare nut with fingers, and then tighten it with a spanner and torque wrench.

4. The protective nut is a one-time part, it can't be reused. In case it is removed, it should be replaced with a new one.

5. When loosening the nut, use two wrenches at the same time. When connecting the pipe, use a wrench and a torque wrench to tighten the nut at the same time to prevent the nut from cracking or leaking.



- 1 Torque wrench
- 2 Spanner
- 3 Piping union
- 4 Flare nut

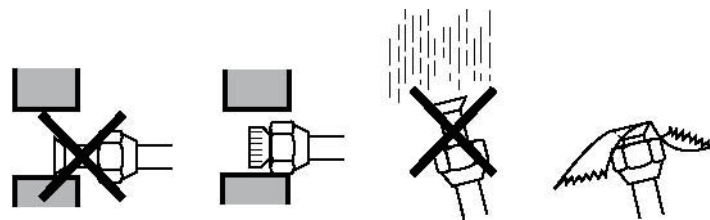
Outer diameter		Torque
mm	Inch	mm
6.35	1/4	6.35
9.52	3/8	9.52
12.7	1/2	12.7
15.88	5/8	15.88
19.05	3/4	19.05

NOTE

- Excessive torque can break nut on installation conditions.
- When flared joints are reused indoors, the flare part should be re-fabricated.

Piping operation guide

- Protect the nozzle to prevent moisture and dust.
- All piping elbows should be as gentle as possible and bend with a pipe bender.
- The bending radius must be $\geq 30\text{mm}$.

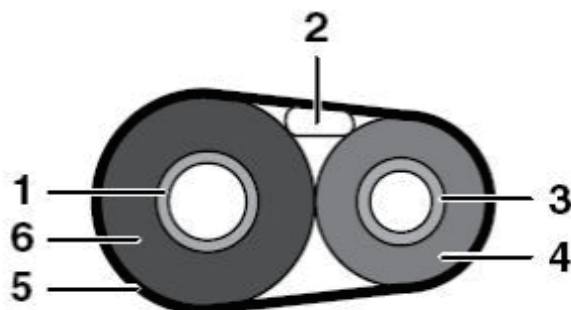


Selection of copper and insulation materials

When using commercial copper pipes and components, please refer to the following information

- Insulation material: polyethylene foam
 - Heat transfer rate: 0.041 to 0.052 W mK (0.035 to 0.045 kcal/mh°C)
 - The maximum surface temperature of fluorine gas pipe can reach 110 °C, select the insulation material that can withstand this temperature
- The fluorine gas pipe and the liquid pipe must be insulated, and the specifications of the insulation material are as follows:

Piping specification		Insulation pipe	
Outer diameter	thickness	Inner diameter	thickness
6.35 mm (1/4")	≥0.75 mm	7-9 mm	≥10 mm
9.52 mm (3/8")	≥0.75 mm	10-12 mm	≥10 mm
12.7 mm (1/2")	≥0.75 mm	10-12 mm	≥10 mm
15.88 mm (5/8")	≥1.0 mm	20-24 mm	≥13 mm
19.05 mm (7/8")	≥1.0 mm	20-24 mm	≥13 mm



- 1 Gas pipe
- 2 Inter-unit wiring
- 3 Liquid pipe
- 4 Liquid pipe insulation
- 5 Finishing tape
- 6 Gas pipe insulation

- separate insulation pipes shall be used for fluorine gas refrigerant pipes and liquid refrigerant pipes.

Check for gas leaks

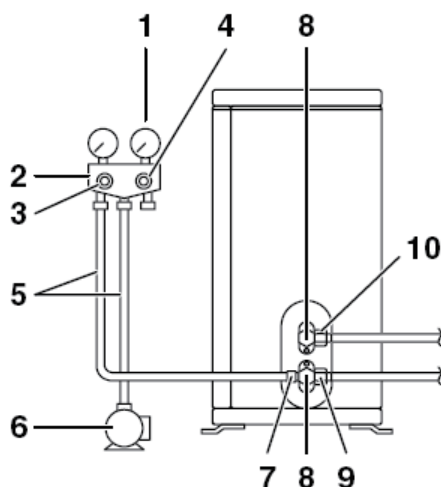
Connections are completed and the outdoor unit and indoor unit are connected, be sure to check whether the gas will leak.

⚠ WARNING

- Except for the specified refrigerant (R32), do not mix other substances into the refrigerant circulation pipe.
- When refrigerant leaks, ventilate the room as soon as possible.
- R32 refrigerant and other refrigerants cannot be directly discharged into the environment.

💡 NOTE

- Use R32 special vacuum pump. Using the same vacuum pump for different refrigerants may damage the vacuum pump or unit.
- Operate the stop valve stem with a hexagonal wrench (5mm).
- All refrigerant pipe interfaces shall be tightened to the specified torque with a torque wrench. Refer to the guide "connecting refrigerant pipe to external unit" for details.



- 1 Pressure meter
- 2 Gauge manifold
- 3 Low-pressure valve (Lo)
- 4 High-pressure valve (Hi)
- 5 Charging hoses
- 6 Vacuum pump
- 7 Service port
- 8 Valve lids
- 9 Gas stop valve
- 10 Liquid stop valve

10.5 Refill the refrigerant

If you need to refill the refrigerant, please refer to the nameplate of the unit, which describes the type of refrigerant and the required quantity.

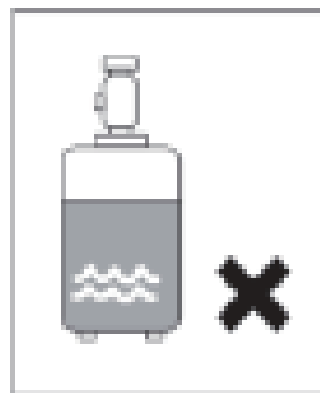
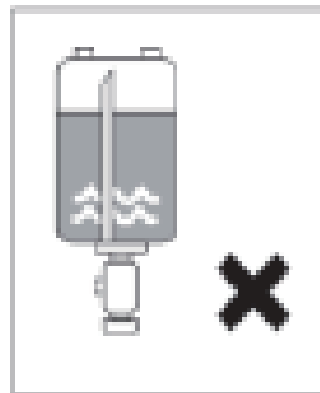
Add refrigerant

Refrigerant pipe parameters	4kW	6kW	8kW	10kW	12kW	14kW	16kW
maximum allowable length of the pipe between the inner machine and the outer machine	15m	15m	15m	15m	15m	15m	15m
Maximum allowable height difference between internal machine and external machine	8m	8m	8m	8m	8m	8m	8m
When adding refrigerant, the length of refrigerant pipe shall exceed 7.5m	20g/m	20g/m	38g/m	38g/m	38g/m	38g/m	38g/m
Gas tube	15.88mm(5/8")						
Liquid tube	6.35mm(1/4")		9.52mm (3/8")				

Add R32

NOTE

- Add the specified amount of refrigerant and inject it into the liquid pipe in liquid form. Because the refrigerant is a mixed refrigerant, injected into the tube in a gaseous state may change the composition of the refrigerant and make it unable to operate normally.
- Before injecting, please check whether the cylinder is equipped with a siphon.



11 Pre operation inspection

11.1 Inspection before initial startup

WARNING

Switch off the power supply before making any connections.

1) Field wiring check

Check whether the specifications of the connecting wire and the connection conditions meet the requirements. Check whether the capacity of the air switch and related specifications meet the requirements.

2) Fuses or protection devices

Check that the fuses or the locally installed protection devices are of the size and type specified. Make sure that neither a fuse nor a protection device has been bypassed.

3) Ground wire

Connect the ground wire correctly and tighten the ground terminal.

4) Fixed

Check whether the unit is well fixed to avoid abnormal noise and vibration during startup.

5) Equipment

Check whether there are any damaged components inside the unit or the pipes are squeezed or deformed or flattened.

6) Refrigerant leak

Check the unit for refrigerant leakage. If there is a leakage, please contact your local dealer.

7) Voltage

Check and confirm the power supply voltage, which must be consistent with the requirements on the nameplate of the unit.

8) Auto exhaust valve

Make sure that the exhaust port of the exhaust valve is open (releasing at least 2 turns).

9) Pressure relief valve

Check if the backup heater vessel is completely filled with water by operating the pressure relief valve. It should purge water instead of air.

Note: OPERATING THE SYSTEM WITH THE BACKUP HEATER VESSEL NOT COMPLETELY FILLED WITH WATER WILL DAMAGE THE BACKUP HEATER!

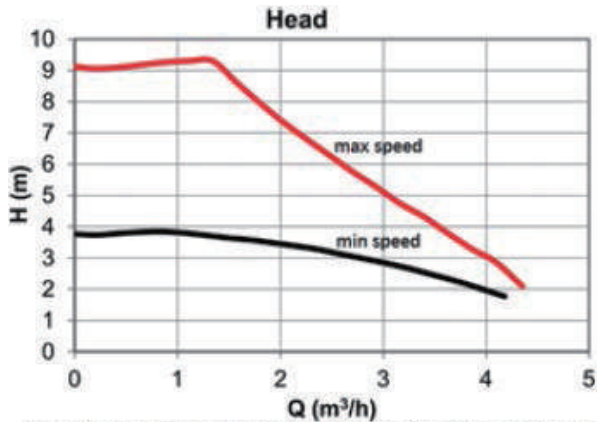
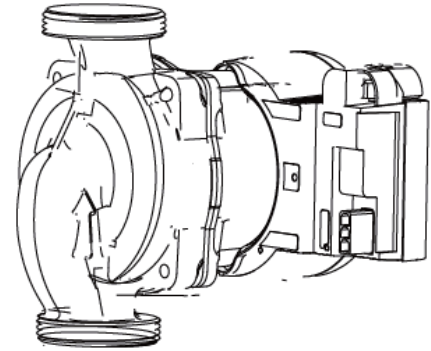
10) Waterway valve

Install each valve correctly and open it. Operating the system after closing the valve will damage the pump!

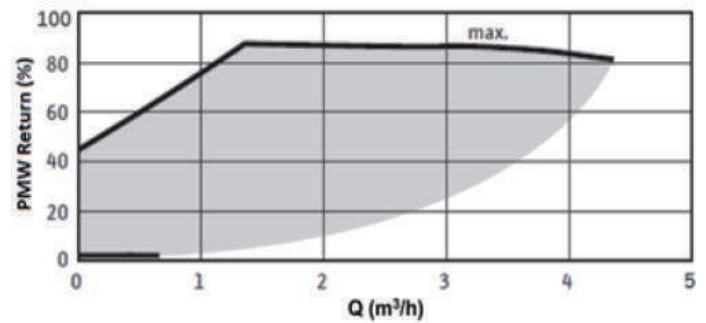
11.2 Introduction of the pump

The pump is controlled via a digital low-voltage pulse-width modulation signal which means that the speed of rotation depends on the input signal. The speed changes as a function of the input profile.

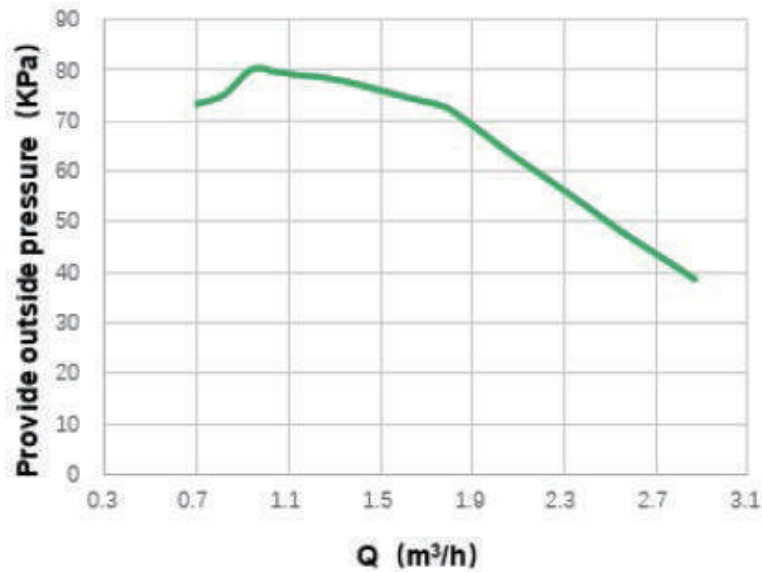
The relationships between the head and the water flow rated, the PMW Return and the water flow rated are shown in the graph below.



Area of regulation is included in between the max speed curve and the min speed curve.



The internal pump maintains maximum output, the indoor unit can provide the head and flow:



Available external static pressure VS Flow rate

⚠ WARNING

- If the valves are at the incorrect position, the circulation pump will be damaged.
- If it's necessary to check the running status of the pump when unit power on, please do not touch the internal electronic control box components to avoid electric shock.
- Normal operating voltage range of the pump is 198 ~ 253 V, beyond this range can lead to failure or damage to the pump.

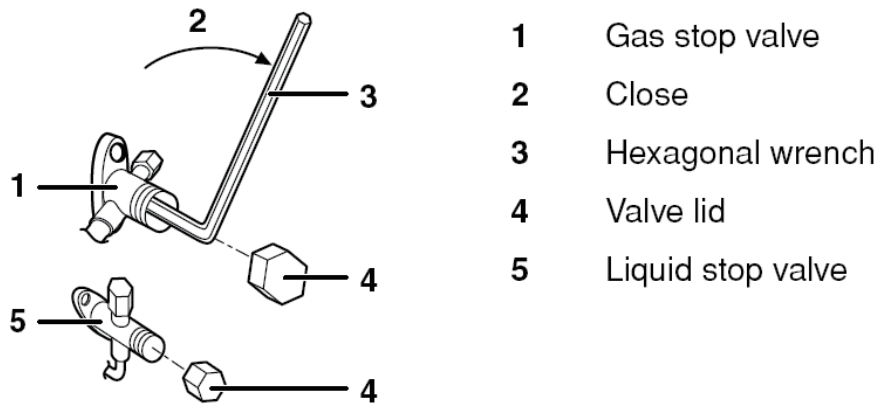
11.3 Failure diagnosis at first installation

- If nothing is displayed on the user interface, it is necessary to check for any of the following abnormalities before diagnosing possible error codes.
 - Disconnection or wiring error (between power supply and unit and between unit and user interface).
 - The fuse on the PCB may be broken.
 - If the user interface shows "P01" as an error code, there is a possibility that there is air in the system, or the water level in the system is less than the required minimum.
 - If the error code E01 is displayed on the user interface, check the wiring between the user interface and unit.
- More error codes and failure causes can be found in the appendix to the failure and protection table.

11.4 Pump down operation

In order to protect the environment, be sure to pump down when relocating or disposing of the unit. The pump down operation will extract all refrigerant from the piping into the outdoor unit.

1. Remove the valve lid from liquid stop valve and gas stop valve.
2. Carry out the forced cooling operation.
3. After 5 to 10 minutes (after only 1 or 2 minutes in case of very low ambient temperatures ($<-10^{\circ}\text{C}$)), close the liquid stop valve with a hexagonal wrench.
4. After 2-3 minutes, close the gas stop valve and stop cooling operation.



After the initial installation the system needs to be commissioned this document will explain & show how to set up and commission an air to water heat pump.

Stage 1: check that the system wiring is complete and connected properly before switching on the power to the indoor and outdoor unit.

Ensuring that the isolators are switched off at this point and all cables are secure and all terminals are tight and there are no bare ends exposed.

Stage 2: pipe work before commissioning the system and turning the power on you must ensure that the system has no leaks and that the correct charge is in the system if you are not the installation engineer please ensure that the pre-commissioning sheet is completed

Stage 3: switch On the power and set up the LCD controller on the indoor unit.


12 Test run and final checks

The installer is obliged to verify correct operation of unit after installation.

Final checks

Before switching on the unit, read following recommendations:

- When the complete installation and all necessary settings have been carried out, close all front panels of the unit and refit the unit cover.
- The service panel of the switch box may only be opened by a licensed electrician for maintenance purposes.

 That during the first running period of the unit, required power input may be higher than stated on the nameplate of the unit. This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.

13 Maintenance and service

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.

This maintenance needs to be carried out by your local technician.

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This maintenance has to be carried out by your local technician.

WARNING

ELECTRIC SHOCK

- Before carrying out any maintenance or repairing activity, must switch off the power supply on the supply panel.
- Do not touch any live part for 10 minutes after the power supply is turned off.
- The crank heater of compressor may operate even in standby.
- Please note that some sections of the electric component box are hot.
- Forbid touch any conductive parts.
- Forbid rinse the unit. It may cause electric shock or fire.
- Forbid leave the unit unattended when service panel is removed.

The following checks must be performed at least once a year by qualified person.

- Water pressure: Check the water pressure, if it is below 1 bar, fill water to the system.
- Water filter: Clean the water filter.
- Water pressure relief valve: Check for correct operation of the pressure relief valve by turning the black knob on the valve counter-clockwise:
 - If you do not hear a clacking sound, contact your local dealer.
 - In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.
- Pressure relief valve hose: Check that the pressure relief valve hose is positioned appropriately to drain the water.
- Backup heater vessel insulation cover: Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.

WARNING

- Domestic hot water tank pressure relief valve (field supply) Applies only to installations with a domestic hot water tank. Check for correct operation of the pressure relief valve on the domestic hot water tank.
- Domestic hot water tank booster heater: Applies only to installations with a domestic hot water tank. It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.

Unit switch box

- Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.
- Check for correct operation of contactors with an ohm meter. All contacts of these contactors must be in open position.
- Use of glycol (Refer to "Water circuit anti-freeze protection") Document the glycol concentration and the pH-value in the system at least once a year.
- A PH-value below 8.0 indicates that a significant portion of the inhibitor has been depleted and that more inhibitor needs to be added.
- When the PH-value is below 7.0 then oxidation of the glycol occurred, the system should be drained and flushed thoroughly before severe damage occurs.
- Make sure that the disposal of the glycol solution is done in accordance with relevant local laws and regulations.

14 Trouble shooting

This section provides useful information for diagnosing and correcting certain troubles which may occur in the unit. This troubleshooting and related corrective actions may only be carried out by your local technician.

General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

WARNING

- When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.
- When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances can safety devices be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local dealer.
- If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve to avoid water dripping out of the unit!

For problems related to the optional solar kit for domestic water heating, refer to the troubleshooting in the Installation and owner's manual for that kit.

General symptoms

Symptom 1: The unit is turned on but the unit is not heating or cooling as expected

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check parameters and running mode
The water flow is too low.	<ul style="list-style-type: none"> ● Check that all shut off valves of the water circuit are in the right position. ● Check if the water filter is plugged. ● Make sure there is no air in the water system. ● Check on the manometer that there is sufficient water pressure. The water pressure must be >0.1 MPa (water is cold). ● Make sure that the expansion vessel is not broken. ● Check that the resistance in the water circuit is not too high for the pump.
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to " Water volume and sizing expansion vessels ").

Symptom 2: The unit is turned on but the compressor is not starting (space heating or domestic water heating)

POSSIBLE CAUSES	CORRECTIVE ACTION
The unit maybe operate out of its operation range (the water temperature is too low).	<p>In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (12°C).</p> <ul style="list-style-type: none"> ● Check that the backup heater power supply is correct. ● Check that the backup heater thermal fuse is closed. ● Check that the backup heater thermal protector is not activated. ● Check that the backup heater contactors are not broken.

Symptom 3: Pump is making noise (cavitation)

POSSIBLE CAUSES	CORRECTIVE ACTION
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	<ul style="list-style-type: none"> ● Check on the manometer that there is sufficient water pressure. ● The water pressure must be > 0.1 MPa (water is cold). ● Check that the manometer is not broken. ● Check that the expansion vessel is not broken. ● Check that the setting of the pre- pressure of the expansion vessel is correct (refer to "Water volume and sizing expansion vessels").

Symptom 4: The water pressure relief valve opens

POSSIBLE CAUSES	CORRECTIVE ACTION
The expansion vessel is broken.	Replace the expansion vessel.
The filling water pressure in the installation is higher than 0.3MPa.	Make sure that the filling water pressure in the installation is about 0.10~0.20MPa (refer to " Water volume and sizing expansion vessels ").

Symptom 5: The water pressure relief valve leaks

POSSIBLE CAUSES	CORRECTIVE ACTION
Dirt is blocking the water pressure relief valve outlet.	<p>Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clockwise:</p> <ul style="list-style-type: none"> ● If you do not hear a clacking sound, contact your local dealer. <p>In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.</p>

15 Information servicing

1) Checks to the area

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

2) Work procedure

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

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 work space shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

4) Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. no sparking, adequately sealed or intrinsically safe.

5) Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry power or CO₂ fire extinguisher adjacent to the charging area.

6) No ignition sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. NO SMOKING signs shall be displayed.

7) Ventilated area

Ensure that the area is in the open or that it 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.

8) Checks to the refrigeration equipment

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

- The charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuits shall be checked for the presence of refrigerant; marking to the equipment continues to be visible and legible.
- Marking and signs that are illegible shall be corrected;
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

9) Checks to electrical devices

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

Initial safety checks shall include:

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


10) Repairs to sealed components

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

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected.

b) 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.

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

11) Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

12) 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.

13) Detection of flammable refrigerants

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

14) Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed or extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the

system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

15) 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 pipe-work are to take place.
- Ensure that the outlet for the vacuum pump is not closed to any ignition sources and there is ventilation available.

16) Charging procedures

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 minimize 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.

17) 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.

18) Labeling

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

19) Recovery

When removing refrigerant from a system, either for service 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 numbers of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.

Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order.

Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

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

20) Transportation, marking and storage for units

Transport of equipment containing flammable refrigerants Compliance with the transport regulations

Marking of equipment using signs Compliance with local regulations

Disposal of equipment using flammable refrigerants Compliance with national regulations

Storage of equipment/appliances

The storage of equipment should be in accordance with the manufacturer's instructions.

Storage of packed (unsold) equipment

Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

16 Appendix

16.1 Breakdown and protection

Fault number	Fault name	Failure analysis	Diagnosis method	Solution
P01	Water flow protection	<ol style="list-style-type: none"> 1. Lack of water in water system. 2. Water flow switch is fault. 3. Water system is blocked. 	<ol style="list-style-type: none"> 1. Check whether the valve of water replenishing is off. 2. Check whether the water flow switch is damage. 3. Check whether the Y shape filter is blocked. 	<ol style="list-style-type: none"> 1. Open the valve. 2. Change the water flow switch. 3. Clean or change the filter net.
P02	High pressure protection	<ol style="list-style-type: none"> 1. Water flow is over low. 2. High pressure switch is fault. 3. Refrigerant system is blocked. 4. EXV is locked. 	<ol style="list-style-type: none"> 1. Check whether there is water shortage or insufficient pump flow 2. Check whether the high pressure switch is damage. 3. Check whether the refrigerant system is blocked. 4. Check whether there is EXV reset sound when the unit is standby, and power on or off. 	<ol style="list-style-type: none"> 1. Refill water or Add an additional water pump. 2. Change high pressure switch. 3. Change the filter of refrigerant system. 4. Change the EXV.
P03	Low pressure protection	<ol style="list-style-type: none"> 1. Lack of refrigerant. 2. Refrigerant system is blocked. 3. The unit is not running in regulations operating condition. 	<ol style="list-style-type: none"> 1. Check whether the refrigerant system is leakage. 2. Check whether the filter in refrigerant system is blocked. 3. Check whether the outdoor ambient and the inlet water temperature is normal. 	<ol style="list-style-type: none"> 1. Repair the leakage point. 2. Change the filter of refrigerant system. 3. If the ambient temperature and water temperature is too high or low, the unit will stop
P04	Condenser temperature (T3) over-heat protection	<ol style="list-style-type: none"> 1. Airflow of outdoor fan is insufficient. 2. Condenser is too dirty. 3. The temperature sensor (T3) is fault. 	<ol style="list-style-type: none"> 1. Check whether there is any obstacle which is preventing the airflow. 2. Check whether the condenser is too dirty. 3. Check whether the condenser pipe temperature sensor (T3) is normal. 	<ol style="list-style-type: none"> 1. Clean the vents 2. Clean the condenser. 3. Replace the Temperature sensor.
P05	Discharge temperature protection	<ol style="list-style-type: none"> 1. Lack of refrigerant. 2. Discharge temperature sensor is fault. 	<ol style="list-style-type: none"> 1. Check whether the refrigerant system is leakage. 2. Check whether the discharge temperature sensor is normal. 	<ol style="list-style-type: none"> 1. Repair the leakage point. 2. Replace the temperature sensor
P06	Anti-freezing protection of leaving water	<ol style="list-style-type: none"> 1. Water flow is too low. 2. Heat-exchanger is blocked. 3. Y shape filter in water system is blocked. 4. Load is too low. 	<ol style="list-style-type: none"> 1. Check whether there is some air in water circuit system. 2. Check whether the heat-exchanger is blocked. 3. Check whether the Y shape filter is blocked. 4. Check whether the water circuit system is reasonable. 	<ol style="list-style-type: none"> 1. If there is a problem with the drain valve, replace it with a new one. 2. Blow the plate heat exchanger with water or high-pressure gas in the opposite direction for cleaning 3. Clean the filter. 4. The water circulation system must have a shunt.
P07	Anti-freezing protection of condenser pipe	<ol style="list-style-type: none"> 1. Lack of refrigerant. 2. Water circuit system is blocked. 3. Refrigerant system is blocked. 	<ol style="list-style-type: none"> 1. Check for leaks in the system. 2. Check whether Y shape filter is blocked. 3. Check whether filter in refrigerant system is blocked 	<ol style="list-style-type: none"> 1. Repair the leakage point. 2. Clean the filter. 3. Replace the filter.
P08	Medium pressure protection	Medium pressure switch off	Check whether the medium pressure switch is open circuit, when turn off the unit	Replace the medium pressure switch.

P10	Cooling low pressure protection	<ol style="list-style-type: none"> 1. Lack of refrigerant. 2. The refrigeration system is blocked 3. Exceeding the scope of system work. 	<ol style="list-style-type: none"> 1. Check whether the system is leaking 2. Check if the filter net is blocked. 3. Check whether the ambient temperature or water temperature exceeds the limit. 	<ol style="list-style-type: none"> 1. Repair the leak and refill the refrigerant 2. Replace the filter. 3. Exceed the system working limit, can't run
P11	DC fan 1 failure	<ol style="list-style-type: none"> 1. The fan is faulty or stuck 2. The main control board is faulty 	<ol style="list-style-type: none"> 1. Check whether the fan is stuck, or replace with a new fan 2. Replace the main control board 	<ol style="list-style-type: none"> 1. Check if the fan is stuck, or replace with a new fan 2. Replace the main control board
P12	Reserved	/	/	/
P13	4-way valve fault	<ol style="list-style-type: none"> 1. Entering/leaving water temperature sensors are reversely inserted. 2. 4-way valve is fault. 3. PCB is fault. 	<ol style="list-style-type: none"> 1. Check whether the entering and leaving temperature sensors are reversely inserted. 2. Check whether action of 4-way valve is normal. 3. Check whether the sample temperature of motherboard is accurate 	<ol style="list-style-type: none"> 1. Correct the wrong place. 2. Try to switch repeatedly to see if it works; if not, replace it. 3. If it is wrong, replace it.
P21	DC pump is abnormal	<ol style="list-style-type: none"> 1. The water pump is faulty or stuck. 2. The system lacks water and is blocked. 3. Power supply is abnormal. 4. Main control board failure. 	<ol style="list-style-type: none"> 1. Check whether the water pump is blocked, or replace with a new water pump. 2. Check whether the system is short of water; whether it is blocked, and whether the valve is closed 3. Check power supply. 4. Replace the main control board 	<ol style="list-style-type: none"> 1. Check if the water pump is blocked, or replace with a new water pump. 2. Refill water or clean or replace the filter net and open the valve. 3. Provide a correct power supply 4. Replace the main control board
P24	Reserved	/	/	/
P25	Outlet pressure sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short circuited 2. Sensor failure. 3. The main control board is faulty 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal. 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal. 3. Replace the main control board and confirm whether it is normal 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor 2. Replace the main control board
E01	Communication error of controller	<ol style="list-style-type: none"> 1. The communication cable is disconnected 2. The wire controller is faulty 3. The main control board is faulty 	<ol style="list-style-type: none"> 1. Check whether the communication cable is open or the plug is in poor contact 2. Confirm whether the wire controller is normal on a normal machine. 3. Use a normal wire controller to confirm whether it is normal on the faulty machine 	<ol style="list-style-type: none"> 1. Replace the communication cable or repair 2. Replace the line controller 3. Replace the main control board
E02	TP exhaust temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited 2. Sensor failure. 3. The main control board is faulty 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal. 3. Replace the main control board and confirm whether it is normal. 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor 2. Replace the main control board

E03	T3 coil temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. Main control board failure. 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal. 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor. 2. Replace the main control board.
E04	T4 Ambient temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. Main control board failure. 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor 2. Replace the main control board
E05	T5 liquid pipe temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. Main control board failure. 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor. 2. Replace the main control board.
E06	TH return air temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. Main control board failure. 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor. 2. Replace the main control board.
E07	TW water tank temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. Main control board failure. 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor. 2. Replace the main control board.
E08	TA Inlet water temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. Main control board failure. 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor. 2. Replace the main control board.
E09	TB outlet water temperature sensor failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. Main control board failure. 	<ol style="list-style-type: none"> 1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal 	<ol style="list-style-type: none"> 1. Repair the connecting wire and plug or replace the sensor. 2. Replace the main control board.

E10	Communication failure between main control board and drive board	<ol style="list-style-type: none"> 1. The communication cable is disconnected 2. The main control board is faulty. 3. The drive module is faulty. 	<ol style="list-style-type: none"> 1. Check whether the communication cable is open or the plug is in poor contact 2. Replace the main control board and confirm whether it is normal. 3. Replace the drive board and confirm whether it is normal. 	<ol style="list-style-type: none"> 1. Replace or repair the communication cable. 2. Replace the main control board 3. Replace the drive module.
E11	Reserved	/	/	/
E12	Reserved	/	/	/
E13	Communication failure between host and auxiliary	<ol style="list-style-type: none"> 1. The communication cable is disconnected. 2. The host control board is faulty. 3. Auxiliary machine control board failure. 	<ol style="list-style-type: none"> 1. Check whether the communication cable is open or the plug is in poor contact 2. Replace the main control board and confirm whether it is normal. 3. Replace the drive board and confirm whether it is normal. 	<ol style="list-style-type: none"> 1. Replace or repair the communication cable. 2. Replace the main control board 3. Replace the drive module.
E14	Low pressure sensor LPS failure	<ol style="list-style-type: none"> 1. The sensor connection line is open or short-circuited. 2. Sensor failure. 3. The main control board is faulty. 	<ol style="list-style-type: none"> 1. Check whether the communication cable is open or the plug is in poor contact 2. Replace the main control board and confirm whether it is normal. 3. Replace the drive board and confirm whether it is normal. 	<ol style="list-style-type: none"> 1. Replace or repair the communication cable. 2. Replace the main control board 3. Replace the drive module.
E15	DC bus voltage is too low	<p style="text-align: center;">Wiring error or IPM module failure. Check whether the wiring is wrong, reconnect the cable or replace the IPM module.</p>		
E16	DC bus voltage is too high			
E17	AC current protection (input current)			
E18	IPM module is abnormal			
E19	PFC abnormal			
E20	Compressor failed to start			
E21	Compressor phase loss			
E22	IPM Module reset			
E23	Compressor over-current			
E24	PFC module temperature is too high			
E25	Current detection circuit failure			
E26	Out of step			
E27	PFC module temperature sensor is abnormal			

E28	communication fail	<p style="text-align: center;">Wiring error or IPM module failure. Check whether the wiring is wrong, reconnect the cable or replace the IPM module.</p>
E29	IPM module temperature is too high	
E30	IPM module temperature sensor failure	
E31	Reserved	
E32	IPM debug data	
E33	IPM debug data	
E34	AC input voltage is abnormal	
E35	IPM adjustment data	
E36	Reserved	
E37	IPM module current frequency limit	
E38	IPM module voltage frequency limit	
E49	TC failure of the final water temperature sensor	
E50	Solar temperature sensor Tso failure	
E51	The built-in temperature sensor Tro of the wire controller is faulty	
E52	Zone 2 temperature sensor Tw2 failure	
E53	Top temp sensor of butter tank faulty	
E54	Bottom temp sensor of buffer tank faulty	
E55	Inlet water pressure sensor faulty	
E56	Outlet water pressure sensor faulty	

16.2 Run parameter query

NO.	Name	Status Description
1	Compressor operating frequency	Current frequency
2	Electronic expansion valve opening	Current opening
3	Ambient temperature	Current Temperature
4	Outlet temperature	Current Temperature
5	Exhaust temperature	Current Temperature
6	Suction temperature	Current Temperature
7	Coil temperature	Current Temperature
8	Expansion valve outlet temperature	Current Temperature
9	Pump status	0-off; 1-on
10	Four-way valve status	0-off; 1-on
11	Fan status	0-off; 1-low wind; 2-high wind
12	Solenoid three-way valve	0-off; 1-on
13	Solenoid two-way valve	0-off; 1-on
14	Pipe electric heating	0-off; 1-on
15	Electric water tank heating	0-off; 1-on
16	AC input current	Current
17	Input voltage	Current voltage
18	Oil return state	0-normal operation; 1-oil return operation
19	High pressure 2 state	0-off; 1-on
20	Chassis heating belt status	0-off; 1-on
21	DC bus voltage	Current value
22	Compressor current	The current value
23	PFC temperature	Current Temperature
24	IPM temperature	Current Temperature
25	DC fan speed-1	Current speed
26	DC fan speed-2	Current speed
27	Economizer inlet temperature	Current Temperature
28	Economizer outlet temperature	Current Temperature
29	Water tank temperature/indoor temperature	Current Temperature
30	Return water temperature	Current Temperature
31	EEV-2 opening	5 Current opening
32	DC pump output	Current output ratio%
33	Low pressure saturation temperature	The current value
34	Compressor heating belt status	0-off; 1-on
35	Plate heat exchanger heating belt status	0-off; 1-on
36	Water inlet pressure	Current pressure (bar)
37	Outlet pressure	Current pressure (bar)
38	Feedback flow	Current flow(m ³ /h)

39	Water pump Feedback PWM%	Current value (%)
40	Actual model (0-7)	0-4kW 1-6kW 2-8kW 3-10kW 4-12kW 5-14kW 6-16kW 7-18kW
41	SV3	0-off; 1-on
42	FINAL TEMP.TC	Current Temp.
43	SOLAR TEMP.Tso	Current Temp.
44	BUFFER TEMP.TE1	Current Temp.
45	BUFFER TEMP.TE2	Current Temp.
46	MIX IN TEMP.TZ2	Current Temp.
47	C-A CURVE TEMP	Current SET Temp.
48	H-A CURVE TEMP	Current SET Temp.
49	C-B CURVE TEMP	Current SET Temp.
50	H-B CURVE TEMP	Current SET Temp.
51	AHS	0-off; 1-on
52	P_d	0-off; 1-on
53	P_o	0-off; 1-on
54	B ZONE P_c	0-off; 1-on
55	P_s	0-off; 1-on
56	SG	OFF;PEAK;VALLEY;FREE
57	ROOM TEMP.Tro	Current Temp.

Note:

It is strictly forbidden to power off the unit during the heating season in winter to ensure the normal operation of the antifreeze function of the unit.

When the unit is not used for a long time, please drain the water in the system cleanly.

If the unit is not in use for a long time before putting it back into use, please check whether the water pump rotor can operate normally. If it can't rotate normally, or if the rotation is blocked or the rotation is not smooth, let the rotor run freely before starting the unit; if you have any questions, please promptly Call the after-sales service number.

The design specifications, performance and technical parameters of the product will be changed due to product improvement, and will not be notified at that time. Please refer to the product.