ORIGINAL MANUAL

Kaysun

OWNER'S & INSTALLATION MANUAL

Hydraulic Module Integrated

KHKF-190 DR

KHKF-240 DR

IMPORTANT NOTE:

Thank you very much for purchasing our product,
Before using your unit, please read this manual carefully and keep it for future reference.

CONTENTS

1 SAFETY PRECAUTIONS

The precautions listed here are divided into the following types. They are quite important, so be sure to follow them carefully. Read these instructions carefully before installation. Keep this manual in a handy for future preference.

Meanings of DANGER, WARNING, CAUTION and NOTE symbols.

⚠ DANGER

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

⚠ WARNING

Indicates a potentially hazardous situation which if not avoided, could result in 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.

NOTE

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

⚠ WARNING

- 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.
- This appliance which connect 1-phase 3KW backup heater can be connected only to a supply with system impedance no more than 0.458932Ω. In case necessary, please consult your supply authority for system impedance information.

The application uses R32 refrigerant.

Caution: Risk of fire

(for IEC/EN 60335-2-40
except IEC 60335-2-40: 2018)

Caution: Risk of fire

(for IEC 60335-2-40: 2018 only)

⚠ 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.

Special requirements for R32

⚠ WARNING

- Refrigerant leakage and open flame are not allowed.
- Be aware that the R32 refrigerant does NOT contain an odour.

⚠ WARNING

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 have a room size as specified below.

NOTE

- Do NOT re-use joints which have been used already.
- Joints made in installation among parts of refrigerant system shall be accessible for maintenance purposes.

⚠ WARNING

Make sure installation, servicing, maintenance and repair comply with instractions and with applicable legislation (for example national gas regulation) and are executed only by authorised persons.

NOTE

- Pipework should be protected from physical damage.
- Installation of pipework should be kept to a minimum.

For the corresponding space requirements of R32 refrigerant, please refer to the installation & operation manual of the All DC Inverter ATOM T Series VRF Outdoor Unit.

⚠ 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 if you must touch them.
- 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

- Tear apart and throw away plastic packaging bags so that children will not play with them. Children playing with plastic bags face danger 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 by 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, 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.

⚠ 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.

⚠ CAUTION

- 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 fiber 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 manufaturer or its service agent or a similarly qualified person.
- DISPOSAL: Do not dispose this product as unsorted municipal waste. Collection of such waste seperatelly for special treatment is necessary. Do not dispose of electrical appliances as municipal waste, use seperate collection facilities. Contact your local goverment for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substance can leak into the groudwater and get into the food chain, damaging your health and well-being.
- 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 seperation distance in all pole and a residualcurrent 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.
- Product installation should be fixed firmly, Take reinforcement measures, when necessary.

NOTE

- About Fluorinated Gases

  - This air-conditioning unit contains fluorinated gases. 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.

WIFI information
WIFI transmit frequency range: 2.400~2.4835 GHz EIRP not more than 20dbm;
Hereby, We declares that this equipment is in compliance with the essential requirements and other relevant provisions of RE Directive 2014/53/EU. A copy of the full DoC is attached.

2 GENERAL INTRODUCTION

- These units are used for both heating and domestic hot water tanks. They can be combined with 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.

NOTE

- Maximum length of communication wirings between the hydraulic module and the controller is 50m.
- Power cords and communication wiring must be laid out separately, they can not be placed in the same conduit. Otherwise, it may lead to electromagnetic interference. Power cords and communication wirings should not come in contact with the refrigerant pipe so as to prevent the high temperature pipe from damaging wirings.
- Communication wirings must use shielded lines. Including hydraulic module to outdoor unit PQE line, hydraulic module to controller ABXYE line.

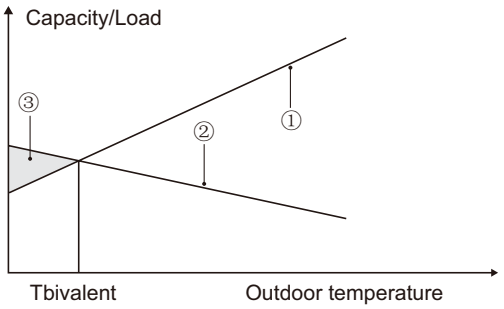


Fig.2-1

① Heat pump capacity.

② Required heating capacity (site dependent).

③ Additional heating capacity provided by backup heater.

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.

2.1 Operation range

Operationg range of hydraulic module	
Outlet water (Heating mode)	+25 ~ +60°C
Domestic hot water	+25~+60°C
Am bient tern perature	+5~+35°C
Water pressure	0.1~0.3MPa
Water flow	0.60~3.00m³/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 heating mode, the water flowing temperature (TW_out) range in different outdoor temperature (T4) is listed below:

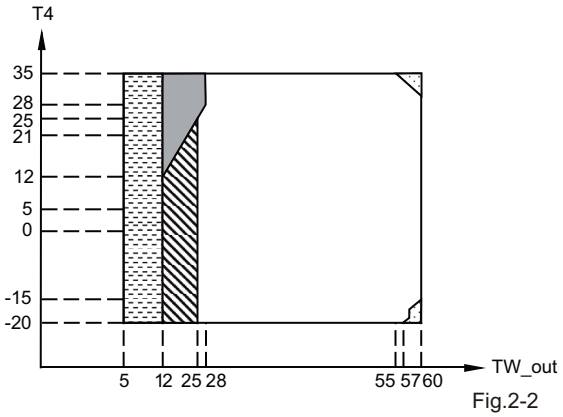


Fig.2-2

If IBH/AHS setting is valid, IBH/CCC turns on.
(IBH: Internal backup heater)
(AHS: Auxiliary heat source)

Operation range by heat pump with possible limitation and protection.

If IBH/AHS setting is valid, IBH/AHS maybe turns on.

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

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

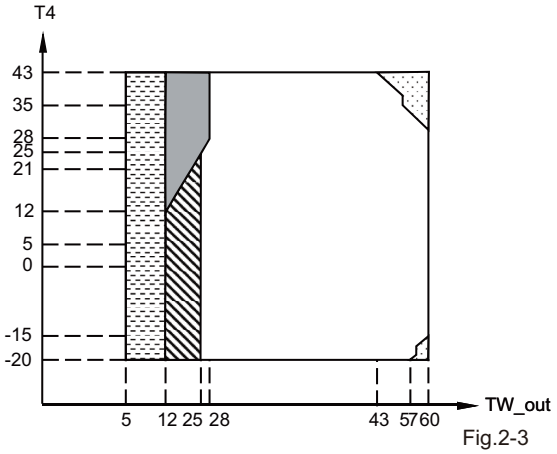


Fig.2-3

If IBH/AHS setting is valid, IBH/AHS turns on.

Operation range by heat pump with possible limitation and protection.

If IBH/AHS setting is valid, IBH/AHS maybe turns on.

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

2.2 Main components

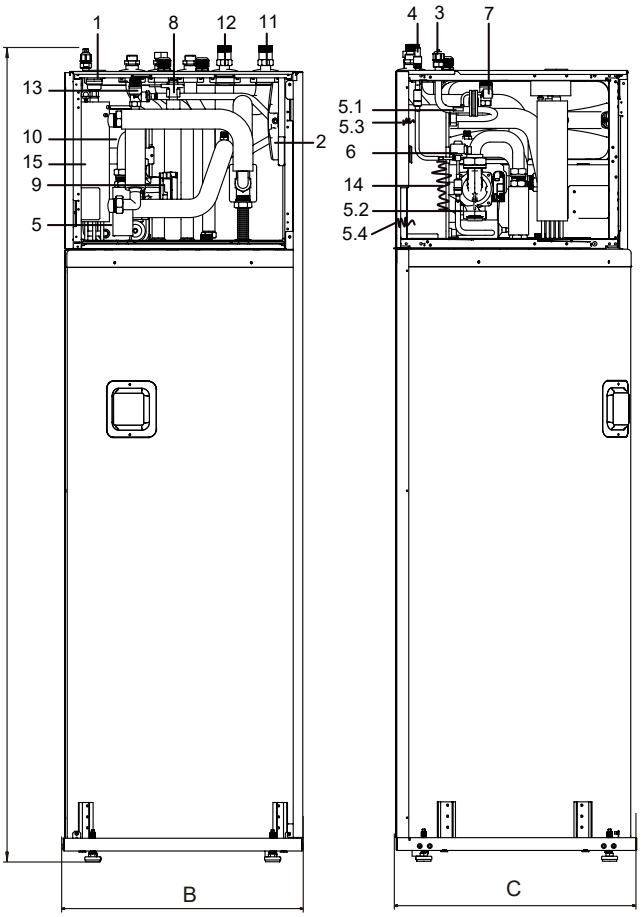


Fig.2-4

	A	B	C
100/190 3kW heater	1683	600	600
160/240 3kW heater	1943	600	600

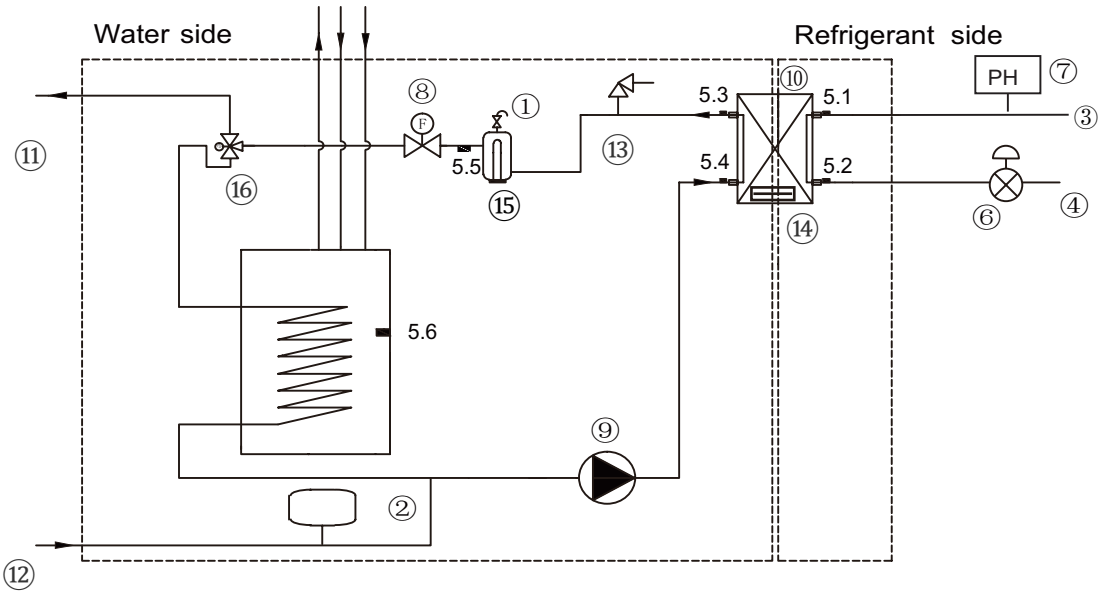


Fig.2-6

Code	Assembly unit	Explain ation
1	Automatic air purge valve	Remaining air in the water circuit will be automatically removed via the automatic air purge valve.
2	Expansion vessel (8 L)	/
3	Refrigerant gas pipe	/
4	Refrigerant liquid pipe	/
5	Temperature sensors	Four temperature sensors determine the water and refrigerant temperature at various points. 5.1-T2B; 5.2-T2; 5.3-Tw_out; 5.4-Tw_in; 5.5-T1; 5.6-T5
6	Electronic expansion valve (EEVA)	/
7	High pressure sensor	/
8	Flow switch	If water flow is below 0.6 m^3/h, the flow switch open, then when the water flow reach 0.66 m^3/h, the flow switch close.
9	Pump_i	The pump circulates the water in the water circuit.
10	Plate heat exchanger	Heat exchanging between water and refrigerant.
11	Water outlet pipe	/
12	Water inlet pipe	/
13	Pressure relief valve	The pressure relief valve prevents excessive water pressure in the water circuit by opening at 43.5psi(g)/0.3MPa(g) and discharging some water.
14	Electrical heating belt	They are for preventing frozen.
15	Internal backup heater	The backup heater consists of an electrical heating element that will provide additional heating capacity to the water circuit if the heating capacity of the unit is insufficient due to low outdoor temperatures, it also protects the external water piping from freezing during cold periods.
16	3 way value	/

2.3 Electronic control box

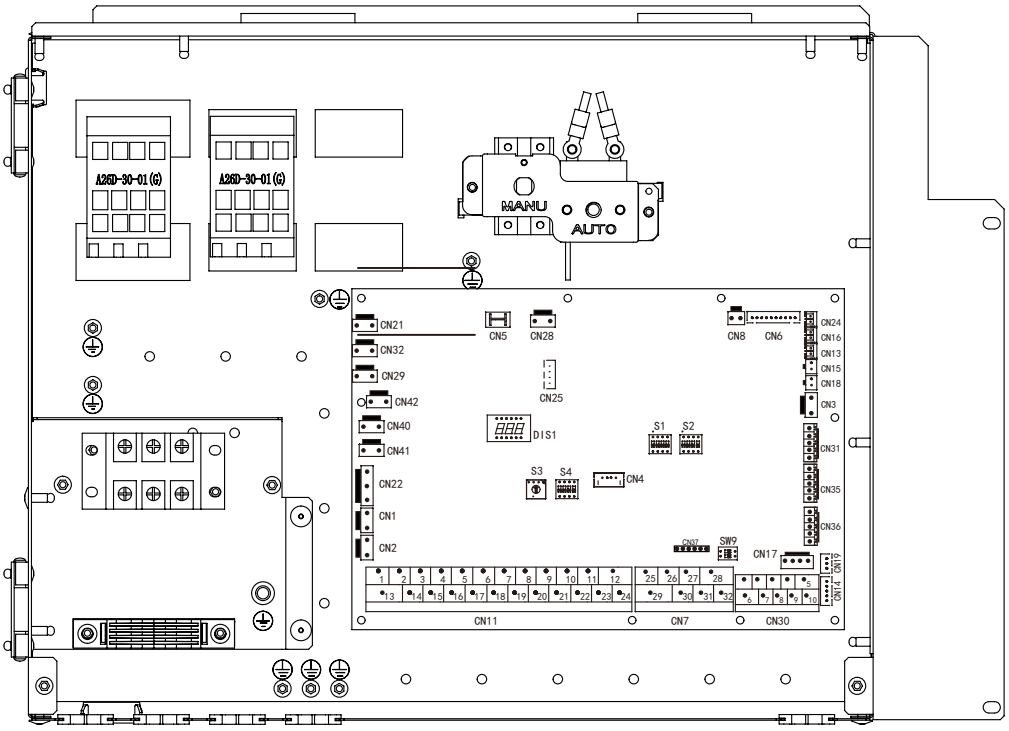


Fig.2-7

NOTE

The picture is only for reference, please refer to the actual product.

2.3.1 Main control board of hydraulic module

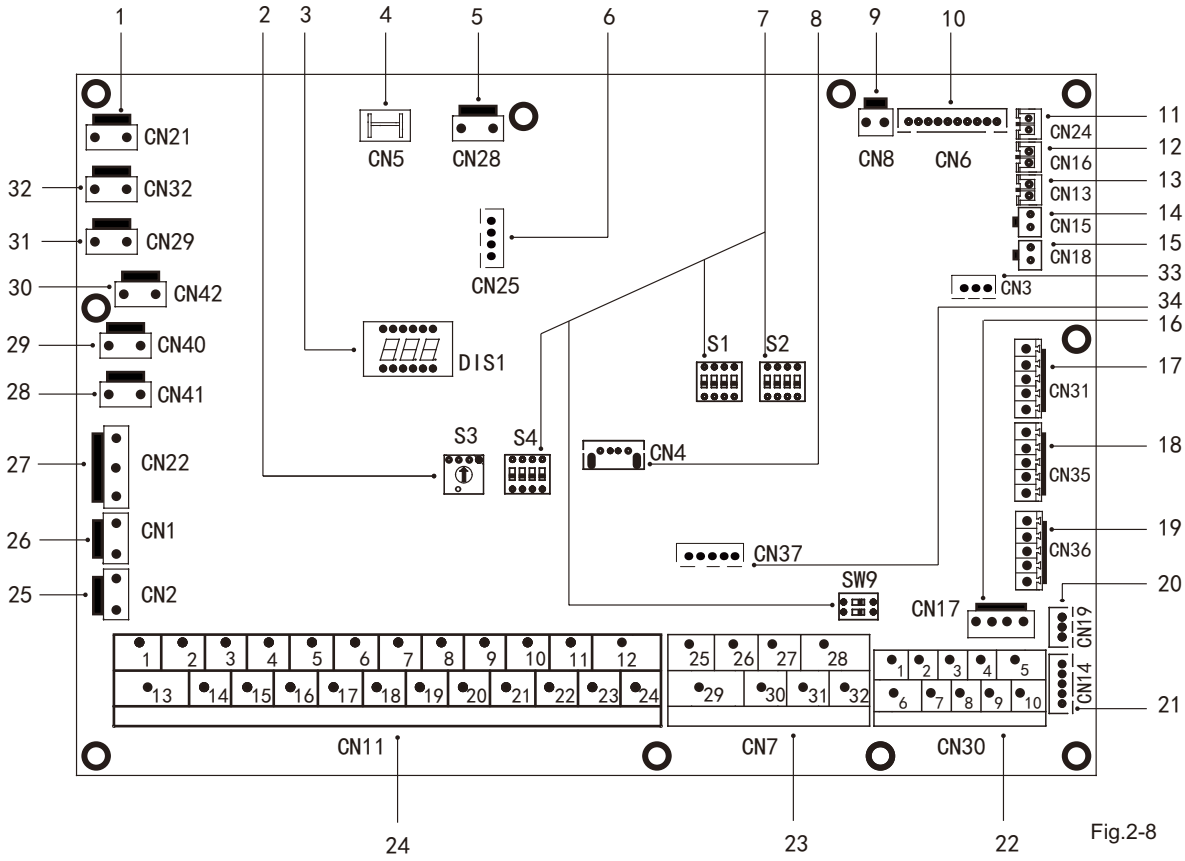


Fig.2-8

Order	Port	Code	Assembly unit
	CN21	POWER	Port for power supply
2	S3	/	Rotary dip switch
3	DIS1	/	Digital display
4	CN5	GND	Port for ground
5	CN28	PUMP	Port for variable speed pump power input
6	CN25	DEBUG	Port for IC programming
7	S1,S2,S4,SW9	/	Dip switch
8	CN4	USB	Port for USB programming
9	CN8	FS	Port for flow switch
10	CN6	T2	Port for temperature sensor of refrigerant liquid side temperature of hydraulic module
		T2B	Port for temperature sensor of refrigerant gas side temperature of hydraulic module
		TW_in	Port for temperature sensor of inlet water temperature of plate heat exchanger
		TW_out	Port for temperature sensor of outlet water temperature of plate heat exchanger
		T1	Port for temperature sensor of final outlet water temperature of hydraulic module
11	CN24	Tbt1	Port for upper temp. sensor of balance tank
12	CN16	Tbt2	Port for lower temp. sensor of balance tank
13	CN13	T5	Port for domestic hot water tank temp. sensor
14	CN15	Tw2	Port for zone 2 temp. sensor of outlet water
15	CN18	Tsolar	Port for solar panel temp. sensor
16	CN17	PUMP_BP	Port for variable speed pump communication
17	CN31	HT	Control port for room thermostat (heating mode)
		COM	Power port for room thermostat
18	CN35	SG	Port for smart grid (grid signal)
		EVU	Port for smart grid (photovoltaic signal)
19	CN36	M1 M2	Port for remote switch
		T1 T2	Port for thermostat transfer board

Order	Port	Code	Assembly unit
20	CN19	P Q	Communicate port between indoor unit and outdoor unit
21	CN14	A B X Y E	Port for communication with the wired controller
22	CN30	1 2 3 4 5	Port for communication with the wired controller
		6 7	Communicate port between indoor unit and outdoor unit
		9 10	Port for Internal machine Parallel
23	CN7	25 29	Port for antifreeze E-heating tape(external)
		27 28	Port for additional heat source
24	CN11	1 2	Input port for solar energy
		3 4 15	Port for room thermostat
		5 6 16	Port for SV1(3-way valve)
		9 21	Port for zone 2 pump
		10 22	Port for outside circulation pump
		11 23	Port for solar energy pump
		12 24	Port for DHW pipe pump
		13 16	Control port for tank booster heater
		14 17	Control port for internal backup heater 1
		18 19 20	Port for SV3(3-way valve)
25	CN2	TBH_FB	Feedback port for external temperature switch(shorted in default)
26	CN1	IBH1/2_FB	Feedback port for temperature switch (shorted in default)
27	CN22	IBH1	Control port for internal backup heater 1
		IBH2	Reserved
		TBH	Control port for tank booster heater
28	CN41	HEAT8	Port for anti-freeze electric heating tape (internal)
29	CN40	HEAT7	Port for anti-freeze electric heating tape (internal)
30	CN42	HEAT6	Port for anti-freeze electric heating tape (internal)
31	CN29	HEAT5	Port for anti-freeze electric heating tape (internal)
32	CN32	IBH0	Port for backup heater
33	CN3	H-sen	High pressure sensor
34	CN37	EEVA	Electronic expansion valve

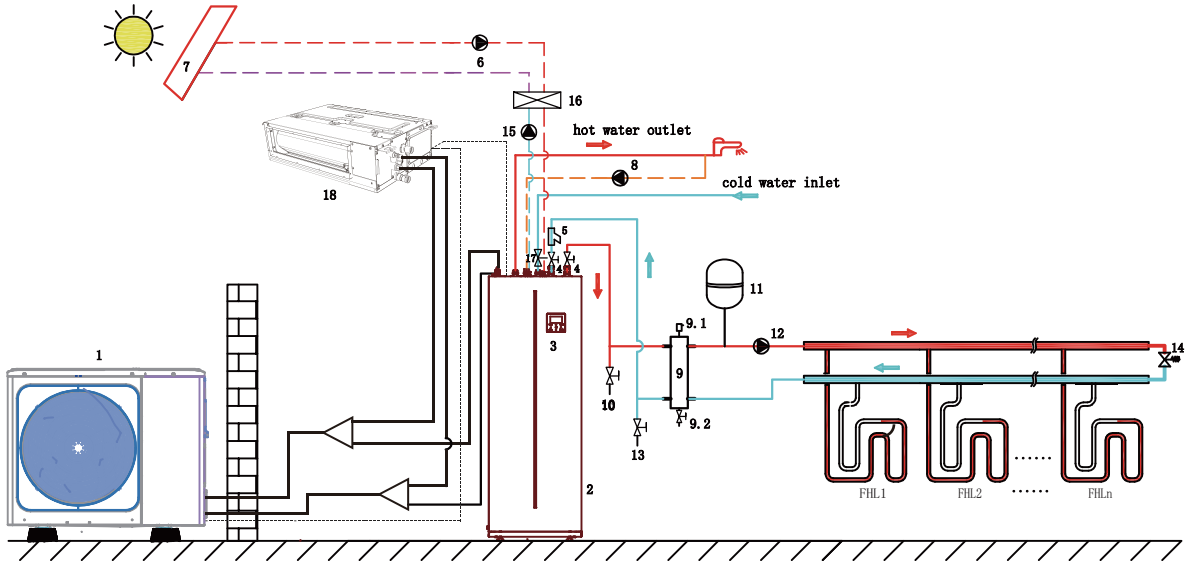
3 TECHNICAL SPECIFICATIONS

Indoor unit model	100/190 3kW heater		160/240 3kW heater		
Matching outdoor unit model	8kW	10kW	12kW	14kW	16kW
Power supply	220-240V~50Hz				
Rated input	3100W				
Rated Current	13.5A				
Norminal capacity	Refer to the technical data				
Dimensions (W×H×D)[mm]	600*1683*600		600*1943*600		
Packing (W×H×D)[mm]	730*1920*730		730*2180*730		
Heat exchanger	Plate heat exchanger				
Electric heater	3000W				
Internal water volume	13.5L				
Rated water pressure	0.3MPa				
Filter mesh	60				
Min. water flow	10L/min	10L/min	10L/min	13L/min	15L/min
Pump					
Type	DC inverter				
Max. head	9m				
Power input	5~90W				
Expanssion vessel					
Volume	8L				
Max. operating pressure	0.3MPa(g)				
Pre-charge pressure	0.10MPa(g)				
Weight					
Net weight	143kg		160kg		
Gross weight	164kg		181kg		
Connections					
Refrigerant gas/liquid side	Φ15.9/Φ9.52				
Water inlet/outlet	R1"				
Drain connection	Φ25				
Operation range					
Outlet water(heating model)	25~60℃				
Domestic hot water	25~60℃				
Space heating water inlet water pressure	0.1~0.25MPa				
Domestic cold water pressure	0.15~0.3MPa				

4 TYPICAL APPLICATIONS

The application examples given below are for illustration only.

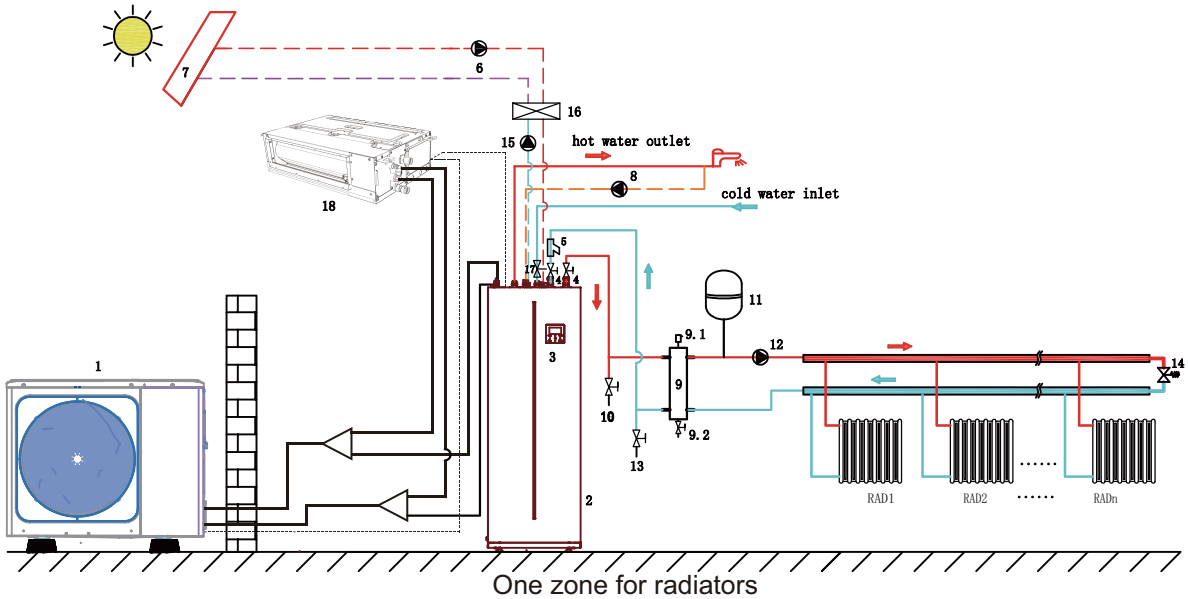
4.1 Application 1



One zone for floor heating loops

Fig.4-1

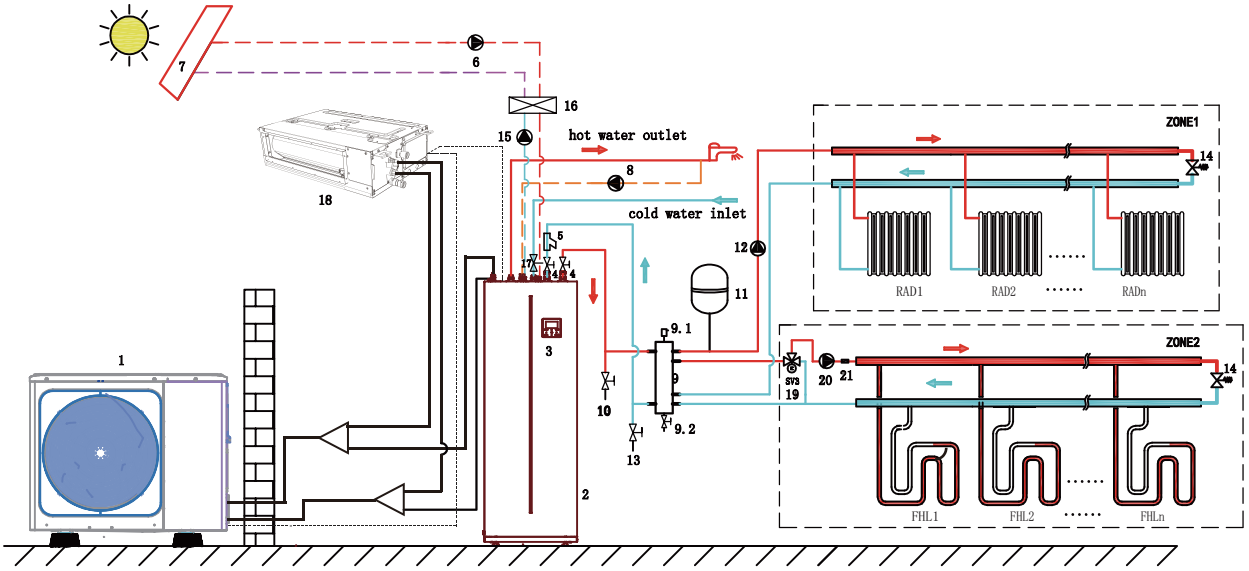
4.2 Application 2



One zone for radiators

Fig.4-2

4.3 Application 3



Double zones for floor heating loops and radiators

Fig.4-3

Code	Assembly unit	Code	Assembly unit
1	Outdoor unit	11	Expansion vessel (Field supply)
2	Hydraulic Module with tank	12	P_o: Outside circulation pump (Field supply)
3	User interface	13	Filling valve (Field supply)
4	Shut-off valve (Field supply)	14	Bypass valve (Field supply)
5	Filter (Accessory)	15	P_s: solar pump (Field supply)
6	Solar pannel pump (Field supply)	16	Plate heat exchanger (Field supply)
7	Solar pannel (Field supply)	17	Pressure relief valve (Field supply)
8	P_d: DHW circulation pump (Field supply)	18	VRF indoor unit
9	Buffer tank (Field supply)	19	SV3: 3 -way valve (Field supply)
9.1	Automatic air purge valve	20	P_c: zone2 circulation pump (Field supply)
9.2	Drainage valve	21	Tw2: zone 2 temperature sensor (optional)
10	Drainage valve (Field supply)		

Space heating

One zone application
1) When the unit is ON, P_o keeps running, if unit is OFF, P_o stops running

Double zone application
When zone 1 is ON, P_o keeps running, if zone 1 is OFF, P_o stops running
When zone 2 is ON, P_c keeps running, SV3 switches between ON and OFF according to the Tw2 sensor, if zone 2 is OFF, SV3 keeps OFF, P_c stops running.

The floor heating loops require a lower water temperature in heating mode compared to Radiators or fan coil. To achieve these two set points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The radiators are directly connected to the unit water circuit and the floor heating loops are after the mixing station. The mixing station includes SV3,P_c and Tw2, can be controlled by hydraulic module.

Domestic water heating
The ON/OFF signal and target tank water temperature (T5S) are set on the user interface.
P_o/P_c stops running as long as the unit is ON for domestic water heating.

Solar energy control
Hydraulic Module recognizes solar energy signal by judging Tsolar or receiving SL1SL2 signal.
The control method can be set via "FOR SERVICEMAN>>INPUT DEFINE>>SOLAR INPUT "on the user interface.
1) When Tsolar control is set to be valid
P_s starts running, if Tsolar is higher enough than T5.
P_s stops running, if Tsolar is lower than T5.
2) When SL1SL2 control is set to be valid
P_s starts running, if SL1SL2 receives a closed signal.
P_s stops running, if SL1SL2 receives a open signal.

NOTE

1. Install air purge valves at all local high points
2. Drainage valve must be installed at the lowest position of the piping system.
3. A pressure relief valve with an opening pressure of maximum 10 bar (= 1 MPa) must be installed on the domestic cold water inlet connection in accordance with the applicable legislation.

5 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.

5.1 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!

NOTE

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.

5.2 General symptoms

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

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the parameters. T4HMAX, T4HMIN in heat mode. T4DHWMAX, T4DHWMIN in DHW mode.
The water flow is too low.	• 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>1 bar (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 "2.4.2 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).	In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (12°C). • 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.	• Check on the manometer that there is sufficient water pressure. The water pressure must be > 1 bar (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 "2.4.2 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 "2.4.2 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.	Check for correct operation of the pressure relief valve by turning the red 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.

Symptom 6: Space heating capacity shortage at low outdoor temperatures

POSSIBLE CAUSES	CORRECTIVE ACTION
Backup heater operation is not activated.	Check that the "OTHER HEATING SOURCE/ BACKUP HEATER" is enabled, see"12.5 Field settings" Check whether or not the thermal protector of the backup heater has been activated (refer to "Controls parts for backup heater(IBH)"). Check if booster heater is running, the backup heater and booster heater can’t operate simultaneously.
Too much heat pump capacity is used for heating domestic hot water (applies only to installations with a domestic hot water tank).	Check that the "t_DHWHP_MAX" and "t_DHWHP_RESTRICT" are configured appropriately: • Make sure that the "DHW PRIORITY" in the user interface is disabled. • Enable the "T4_TBH_ON" in the user interface/FOR SERVICEMAN to activate the booster heater for domestic water heating.

Symptom 7: Heat mode can’t change to DHW mode immediately

POSSIBLE CAUSES	CORRECTIVE ACTION
Volume of tank is too small and the location of water temperature probe not high enough	• Set "dT1S5" to maximum value, and set "t_DHWHP_RESTRICT" to minimum value. • Set dT1SH to 2°C. • Enable TBH, and TBH should be controled by the outdoor unit. • If AHS is available, turn on first, if requirement for turn heat pump on is fullfilled, the heat pump will turn on. • If both TBH and AHS are not available, try to change the postion of T5 probe(refer to 2 "General introduction").

Symptom 8: DHW mode can’t change to Heat mode immediately

POSSIBLE CAUSES	CORRECTIVE ACTION
Heat exchanger for space heating not big enough	• Set "t_DHWHP_MAX" to minimum value, the suggested value is 60min. • If circulating pump out of unit is not controlled by unit, try to connect it to the unit. • Add 3-way valve at the inlet of fan coil to ensure enough water flow.
Space heating load is small	Normal, no need for heating
Disinfect function is enabled but without TBH	• Disable disinfect function • add TBH or AHS for DHW mode
Manual turn on the FAST WATER function, after the hot water meets the requirements, the heat pump fails to switch to the air-conditioning mode in time when the air conditioner is in demand	Manual turn off the FAST WATER function
When the ambient temperature is low, the hot water is not enough and the AHS is not operated or operated late	• Set "T4DHWMIN", the suggested value is > -5°C • Set "T4_TBH_ON", the suggested value is > 5°C
DHW mode priority	If there is AHS or IBH connect to the unit, when the outdoor unit failed, the hydraulic module must run DHW mode till the water temperature reach the setting temperature before change to heating mode.

Symptom 9: DHW mode heat pump stop work but setpoint not reached, space heating require heat but unit stay in DHW mode

POSSIBLE CAUSES	CORRECTIVE ACTION
Surface of coil in the tank not large enough	The same solution for Symptom 7
TBH or AHS not available	Heat pump will stay in DHW mode untill "t_DHWHP_MAX" reached or setpoint is reached. Add TBH or AHS for DHW mode, TBH and AHS should be controlled by the unit.

6 Error codes

When a safety device is activated, an error code will be displayed on the user interface.

A list of all errors and corrective actions can be found in the table below.

Reset the safety by turning the unit OFF and back ON.

In case this procedure for resetting the safety is not successful, contact your local dealer.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
E0	Water flow falut (after 3 times E8)	1. The wire circuit is short connected or open. Reconnect the wire correctly. 2. Water flow rate is too low. 3. Water flow switch is failed, switch is open or close continuously, change the water flow switch.
E2	Communication fault between controller and hydraulic module	1. Wire doesn't connect between wired controller and unit. connect the wire. 2. Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place.
E3	Final outlet water temp.-sensor(T1) fault	1. Check the resistance of the sensor 2. The T1 sensor connector is loosen. Reconnect it. 3. The T1 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive. 4. The T1 sensor failure, change a new sensor.
E4	water tank temp.sensor (T5) fault	1. Check the resistance of the sensor 2. The T5 sensor connector is loosen. Reconnect it. 3. The T5 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The T5 sensor failure, change a new sensor. 5. If you want to close the domestic water heating when T5 sensor do not connected to the system, then T5 sensor can not be detected, refer to 7.1 "DHW MODE SETTING"
E8	Water flow failure	Check that all shut off valves of the water circuit are completely open. 1. Check if the water filter needs cleaning. 2. Refer to "10.9 Filling water" 3. Make sure there is no air in the system (purge air). 4. Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar. 5. Check that the pump speed setting is on the highest speed. 6. Make sure that the expansion vessel is not broken. 7. Check that the resistance in the water circuit is not too high for the pump (refer to "12.1 Setting the pump"). 8. If this error occurs at defrost operation (during space heating or domestic water heating), make sure that the backup heater power supply is wired correctly and that fuses are not blown. 9. Check that the pump fuse and PCB fuse are not blown.
Ed	Inlet water temp.sensor (Tw_in) malfunction	1. Check the resistance of the sensor 2. The Tw_in sensor connector is loosen. Re connect it. 3. The Tw_in sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The Tw_in sensor failure, change a new sensor.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
EE	Hydraulic Module EEprom failure	1. The EEprom parameter is error, rewrite the EEprom data. 2. EEprom chip part is broken, change a new EEprom chip part. 3. main control board of hydraulic module is broken, change a new PCB.
H0	Communication fault between hydraulic module and outdoor unit	1. wire doesn't connect between outdoor unit and main control board of hydraulic module. connect the wire. 2. Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place.
H2	Refrigerant liquid temp.-sensor(T2) fault	1. Check the resistance of the sensor 2. The T2 sensor connector is loosen. Re connect it. 3. The T2 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The T2 sensor failure, change a new sensor.
H3	Refrigerant gas temp.sen-sor(T2B) fault	1. Check the resistance of the sensor 2. The T2B sensor connector is loosen. Reconnect it. 3. The T2B sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The T2B sensor failure, change a new sensor.
H5	Room temp.sensor(Ta) fault	1. Check the resistance of the sensor 2. The Ta senor is in the interface; 3. The Ta sensor failure, change a new sensor or change a new interface, or reset the Ta, connect a new Ta from the hydraulic module PCB
H9	Outlet water for zone 2 temp. sensor (Tw2) fault	1. Check the resistance of the sensor 2. The T1B sensor connector is loosen. Reconnect it. 3. The T1B sensor connector is wet or there is water in. Remove the water, make the connector dry. add waterproof adhesive 4. The T1B sensor failure, change a new sensor.
HA	Outlet water temp.sen-sor(Tw_out) fault	1. The TW_out sensor connector is loosen. Reconnect it. 2. The TW_out sensor connector is wet or there is water in. remove the water, make the connector dry. add waterproof adhesive 3. The TW_out sensor failure, change a new sensor.
P5	|Tw_out - Tw_in| value too big protection	1. Check that all shut off valves of the water circuit are completely open. 2. Check if the water filter needs cleaning. 3. Refer to "10.9 Filling water" 4. Make sure there is no air in the system (purge air). 5. Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar(water is cold). 6. Check that the pump speed setting is on the highest speed. 7. Make sure that the expansion vessel is not broken. 8. Check that the resistance in the water circuit is not too high for the pump. (refer to "12.1 Setting the pump").
Pb	Anti-freeze mode	Unit will return to the normal operation automatically.
PP	Tw_out - Tw_in unusual protection	1. Check the resistance of the two sensor 2. Check the two sensors locations 3. The water inlet/outlet sensor wire connector is loosen. Reconnect it. 4. The water inlet/outlet (TW_in /TW_out) sensor is broken, Change a new sensor. 5. Four-way valve is blocked. Restart the unit again to let the valve change the direction. 6. Four-way valve is broken, change a new valve.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
Hb	Three times "PP" protection and Tw_out<7°C	The same to "PP".
E7	Buffer tank up temp.sensor(Tbt1) fault	1. Check the resistance of the sensor. 2. The Tbt1 sensor connector is loosen, reconnect it. 3. The Tbt1 sensor connector is wet or there is water in, remove the water, make the connector dry. Add waterproof adhesive. 4. The Tbt1 sensor failure, change a new sensor."
Eb	Solar temp.sensor(Tsolar) fault	1. Check the resistance of the sensor. 2. The Tsolar sensor connector is loosen, reconnect it. 3. The Tsolar sensor connector is wet or there is water in, remove the water, make the connector dry. Add waterproof adhesive. 4. The Tsolar sensor failure, change a new sensor."
Ec	Buffer tank low temp.sensor(Tbt2) fault	1. Check the resistance of the sensor. 2. The Tbt2 sensor connector is loosen, reconnect it. 3. The Tbt2 sensor connector is wet or there is water in, remove the water, make the connector dry. Add waterproof adhesive. 4. The Tbt2 sensor failure, change a new sensor.
HE	Communication error between main board and thermostat transferboard	RT/Ta PCB is set to be valid on user interface but the thermostat transfer board is not connected or the communi cation between thermostat transfer board and main board is not effectively connected. If the thermostat transfer board is not needed, set the RT/Ta PCB to invalid. If the thermostat transfer board is needed, please connect it to the main board and make sure the communication wire is connected well and there is no strong electricity or strong magnetic interference.
HC	IBH fault	1. Check the resistance of the IBH. 2. The IBH connector is loosen, reconnect it. 3. The IBH failure, change a new IBH. 4. The AC contactor is failure. change a new AC contactor.
H8	High pressure sensor fault	1. Check the resistance of the sensor. 2. The high pressure sensor connector is loosen. Re connect it. 3. The high pressure failure, change a new sensor.
C0	Address code not detected	1. Set up an address code for the hydraulic module.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
C1	Duplicate IDU address code	1. The hydraulic module address code is the same as the address code of other VRF indoor unit. Reset the hydraulic module address code.
AS	ODU fault	1. The ODU is faulty. Check the ODU fault code and handle the fault according to the ODU troubleshooting.
F6	Electronic expansion valve (EEV) coil fault	1. Check the resistance of the sensor. 2. The EEV coil connector is loosen. Re connect it. 3. The EEV coil failure, change a new sensor.
A1	R32 refrigerant leakage	1.R32 refrigerant leakage.
A2	R32 refrigerant leakage sensor error	1.Check the R32 refrigerant leakage sensor . 2.The R32 refrigerant leakage sensor is loosen. Re connect it. 3.The R32 refrigerant leakage sensor failure, change a new sensor.

⚠ CAUTION

- In winter, if the unit has E0 and Hb failure and the unit is not repaired in time, the water pump and pipeline system may be damaged by freezing, so E0 and Hb failure must be repaired in time.
- If the unit has H0 failure and the unit is not repaired in time, the a ir conditioning system may be damaged, so H0 failure must be repaired in time.

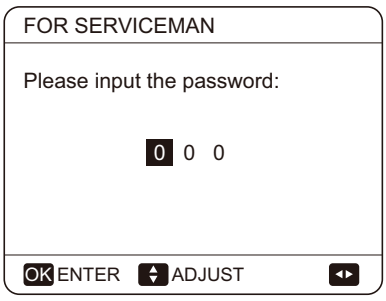
7 ABOUT FOR SERVICEMAN

"FOR SERVICEMAN" is designed for the installer to set the parameters.

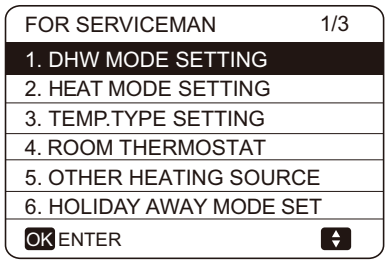
- Setting the composition of equipment.
- Setting the parameters.

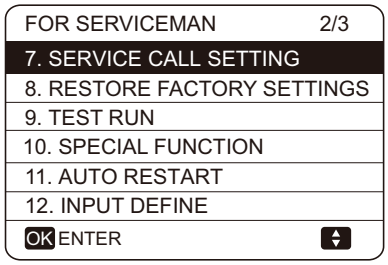
How to go to FOR SERVICEMAN

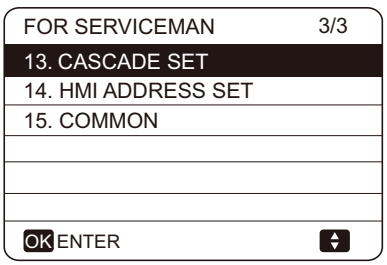
Go to MENU> FOR SERVICEMAN. Press OK:



Press ◄ ► to navigate and press ▼ ▲ to adjust the numerical value. Press OK. The password is 234, the following pages will be displayed after putting the password:







Press ▼ ▲ to scroll and use "OK" to enter submenu.

7.1 DHW Mode Setting

DHW = domestic hot water

Go to MENU> FOR SERVICEMAN> 1.DHW MODE SETTING. Press OK. The following pages will be displayed:

1 DHW MODE SETTING	1/5
1.1 DHW MODE	YES
1.2 DISINFECT	YES
1.3 DHW PRIORITY	YES
1.4 PUMP_D	YES
1.5 DHW PRIORITY TIME SET	NON
ADJUST	

1 DHW MODE SETTING	2/5
1.6 dT5_ON	5 °C
1.7 dT1S5	10°C
1.8 T4DHWMAX	43°C
1.9 T4DHWMIN	-10°C
1.10 dT5_TBH_OFF	5°C
ADJUST	

1 DHW MODE SETTING	3/5
1.11 T4_TBH_ON	5 °C
1.12 t_TBH_DELAY	30 MIN
1.13 T5S_DI	65°C
1.14 t_DI HIGHTEMP.	15MIN
1.15 t_DI_MAX	210MIN
ADJUST	

1 DHW MODE SETTING	4/5
1.16 t_DHWHP_RESTRICT	30 MIN
1.17 t_DHWHP_MAX	120 MIN
1.18 PUMP_D TIMER	YES
1.19 PUMP_D RUNNING TIME	5MIN
1.20 PUMP_D DI RUN	NON
ADJUST	

1 DHW MODE SETTING	5/5
1.21 ACS FUNCTION	NON
1.22 T_ANTILOCK	5S
ADJUST	

7.2 Heat mode setting

Go to MENU>FOR SERVICEMAN> 2.HEAT MODE SETTING. Press OK. The following pages will displayed:

2 HEAT MODE SETTING	1/3
2.1 HEAT MODE	
2.2 t_T4_FRESH_H	2.0HRS
2.3 T4HMAX	16°C
2.4 T4HMIN	-15°C
2.5 dT1SH	5°C
ADJUST	

2 HEAT MODE SETTING	2/3
2.6 dTSH	2°C
2.7 T1SetH1	35°C
2.8 T1SetH2	28°C
2.9 T4H1	-5°C
2.10 T4H2	7°C
ADJUST	

2 HEAT MODE SETTING	3/3
2.11 ZONE1 H-EMISSION	RAD
2.12 ZONE2 H-EMISSION	FLH
ADJUST	

7.3 Temp. type setting

About TEMP. TYPE SETTING

The TEMP. TYPE SETTING is used for selecting whether the water flow temperature or room temperature is used to control the ON/OFF of the heat pump.

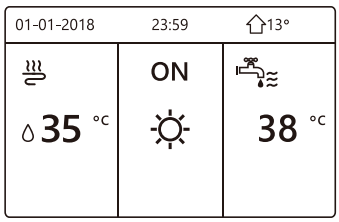
When ROOM TEMP. is enabled, the target water flow temperature will be calculated from climate-related curves.

How to enter the TEMP. TYPE SETTING

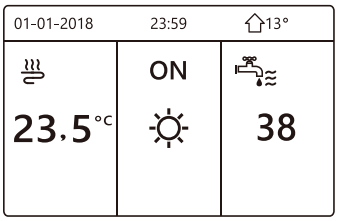
Go to MENU> FOR SERVICEMAN> 3.TEMP. TYPE SETTING. Press OK. The following page will be displayed:

3 TEMP. TYPE SETTING	
3.1 WATER FLOW TEMP.	
3.2 ROOM TEMP.	NON
3.3 DOUBLE ZONE	NON
ADJUST	

If you only set WATER FLOW TEMP. to YES, or only set ROOM TEMP. to YES, The following pages will be displayed.

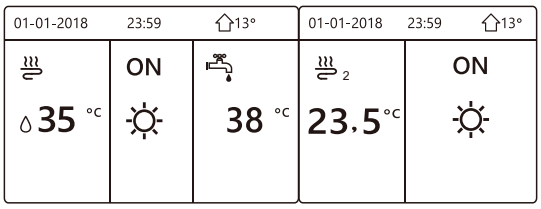


only WATER FLOW TEMP. YES



only ROOM TEMP. YES

If you set WATER FLOW TEMP. and ROOM TEMP. to YES, meanwhile set DOUBLE ZONE to NON or YES, the following pages will be displayed.

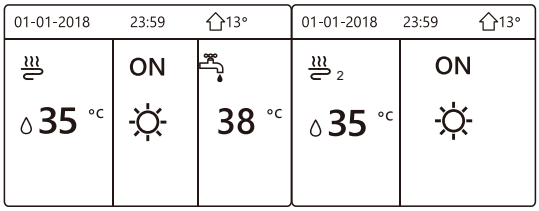


Homepage (zone 1) Addition page (zone 2)

(Double zone is effective)

In this case, the setting value of zone 1 is T1S, the setting value of zone 2 is T1S2(The corresponding TIS2 is calculated according to the climate related curves.)

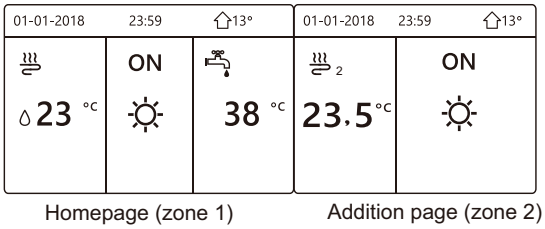
If you set DOUBLE ZONE to YES and set ROOM TEMP. to NON, meanwhile set WATER FLOW TEMP. to YES or NON, the following pages will be displayed.



Homepage (zone 1) Addition page (zone 2)

In this case, the setting value of zone 1 is T1S, the setting value of zone 2 is T1S2.

If you set DOUBLE ZONE and ROOM TEMP. to YES, meanwhile set WATER FLOW TEMP. to YES or NON, the following page will be displayed.



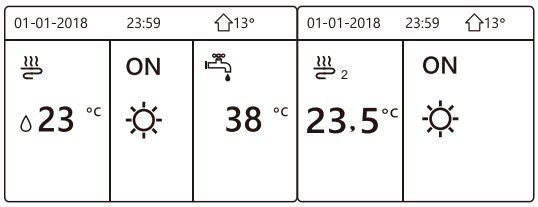
Homepage (zone 1) Addition page (zone 2)

(Double zone is effective)

In this case, the setting value of zone 1 is T1S, the setting value of zone 2 is T1S2 (The corresponding TIS2 is calculated according to the climate related curves.)

In this case, the setting value of zone 1 is T1S, the setting value of zone 2 is T1S2.

If you set DOUBLE ZONE and ROOM TEMP. to YES, meanwhile set WATER FLOW TEMP. to YES or NON, the following page will be displayed.



Homepage (zone 1) Addition page (zone 2)

(Double zone is effective)

In this case, the setting value of zone 1 is T1S, the setting value of zone 2 is T1S2 (The corresponding TIS2 is calculated according to the climate related curves.)

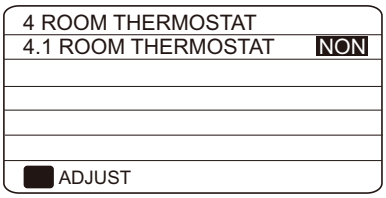
7.4 Room thermostat

About ROOM THERMOSTAT

The ROOM THERMOSTAT is used to set whether the room thermostat is available.

How to set the ROOM THERMOSTAT

Go to MENU> FOR SERVICEMAN> 4.ROOM THERMOSTAT. Press OK. The following page will be displayed:



NOTE

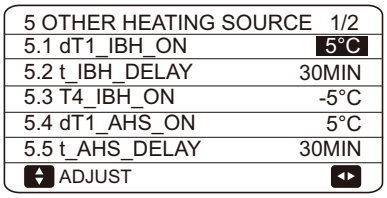
ROOM THERMOSTAT = NON, no room thermostat.

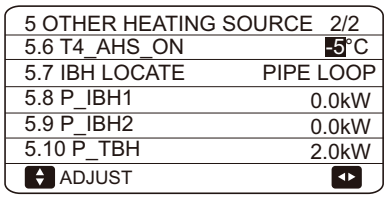
ROOM THERMOSTAT = MODE SET, (refer to 11.6 "Connecting for other components/For room thermostat")

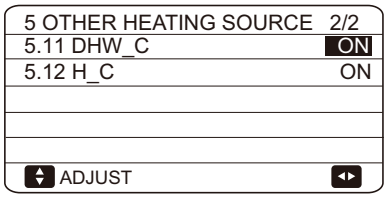
7.5 Other heating aource

The OTHER HEATING SOURCE is used to set the parameters of the backup heater, additional heating sources.

Go to MENU> FOR SERVICEMAN> 5.OTHER HEATING SOURCE, Press OK. The following page will be dispayed:



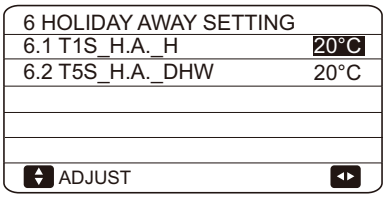




7.6 Holiday away settings

The HOLIDAY AWAY SETTING is used to set the outlet water temperature to prevent freezing when away for holiday.

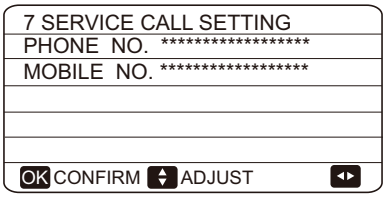
Go to MENU> FOR SERVICEMAN> 6.HOLIDAY AWAY SETTING. Press OK. The following page will be displayed:



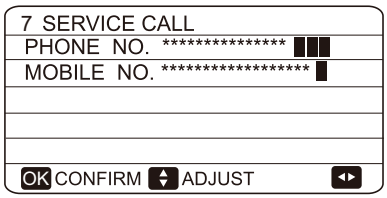
7.7 Sercice call setting

The installers can set the phone number of the local dealer in SERVICE CALL SETTING. If the unit doesn't work properly, call this number for help.

Go to MENU> FOR SERVICEMAN>SERVICE CALL. Press OK. The following page will be displayed:



Press ▼ ▲ to scroll and set the phone number. The maximum length of the phone number is 13 digits, if the length of phone number is short than 12, please input ■, as shown below:

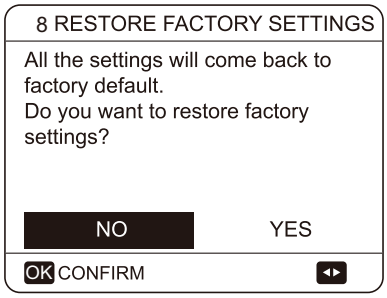


The number displayed on the user interface is the phone number of your local dealer.

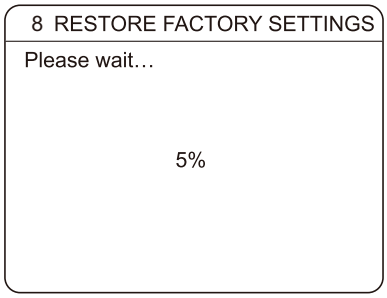
7.8 RESTORE FACTORY SETTINGS

The RESTORE FACTORY SETTINGS is used to restore all the parameters set in the user interface to the default setting.

Go to MENU> FOR SERVICEMAN> 8.RESTORE FACTORY SETTINGS. Press OK. The following page will be displayed:



Press ◄ ► to scroll the cursor to YES and press OK. The following page will be displayed:

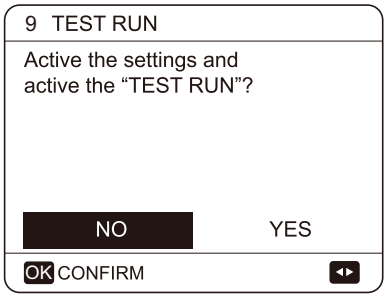


After a few seconds, all the parameters set in the user interface will be restored to factory settings.

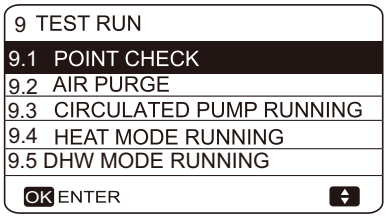
7.9 Test run

TEST RUN is used to check normal operation of the valves, air purge, circulation pump operation, heating and domestic water heating.

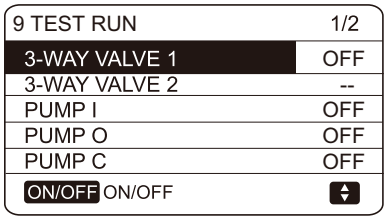
Go to MENU> FOR SERVICEMAN> 9. TEST RUN. Press OK. The following page will be displayed:

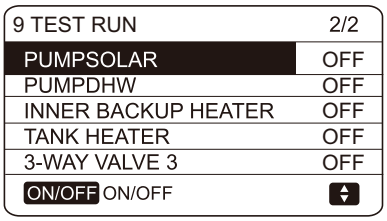


If YES is selected, the following pages will be displayed:



If POINT CHECK is selected, the following pages will bedisplayed:



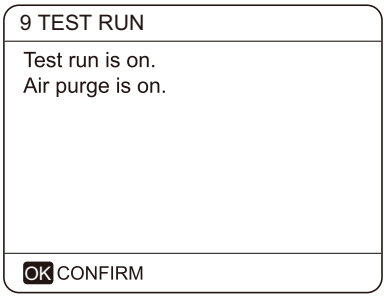


Press ▼▲ to scroll to the components you want to check and press ON/OFF. For example, when 3-way valve is selected and ON/OFF is pressed, if the 3-way valve is open/close, then the operation of 3-way valve is normal, and so are other components.

⚠ CAUTION

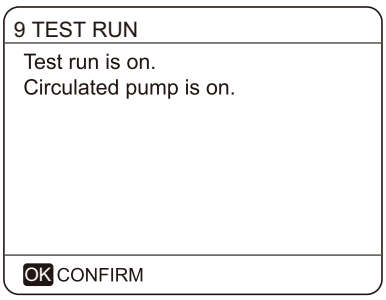
Before the point check, make sure the tank and the water system is filled with water, and air is expelled, otherwise it may cause the pump or backup heater burn out.

If you select AIR PURGE and press "OK", the follow ingpage will be displayed :



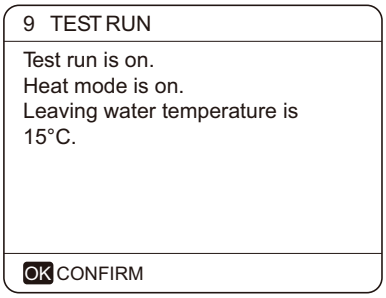
When in air purge mode, SV1 will open. 60s later the pump in the unit (PUMPI) will operate for 10min during which the flow switch will not work. After the pump stops, the SV1 will close. 60s later both the PUMPI and PUMPO will operate until the next command is received.

When CIRCULATION PUMP RUNNING is selected, the following page will be displayed:



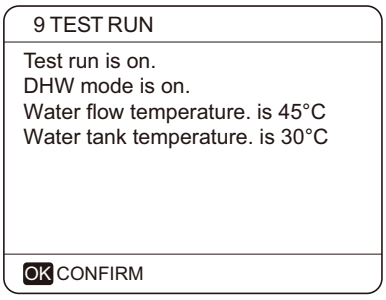
When circulation pump running is turned on, all running components will stop. 60 seconds later, the SV1 will open, 60 seconds later PUMPI will operate. 30s later, if the flow switch checked normal flow, PUMPI will operate for 3min, after the pump stops 60 seconds, the sv1 will close 60s later the both PUMPI and PUMPO will operate, 2 mins later, the flow switch will check the water flow. If the flow switch closes for 15s, PUMPI and PUMPO will operate until the next command is received.

When the HEATMODE RUNNING is selected, the following page will be displayed:



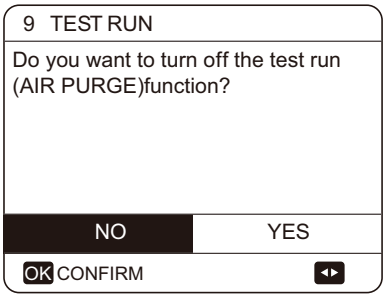
During HEAT MODE test running, the default target outlet water temperature is 35°C. The IBH (internal backup heater) will turn on after the compressor runs for 10 min. After the IBH runs for 3 minutes, the IBH will turn off, the heat pump will operate until the water temperature increase to a certain value or the next command is received.

When the DHW MODE RUNNING is selected, the following page will be displayed:



During DHW MODE test running, the default target temperature of the domestic water is 55°C. The TBH (tank boost heater) will turn on after the compressor runs for 10min. The TBH will turn off 3 minutes later, the heat pump will operate until the water temperature increase to a certain value or the next command is received.

During test run, all buttons except OK are invalid. If you want to turn off the test run, please press OK. For example, when the unit is in air purge mode, after you press OK, the following page will be displayed:

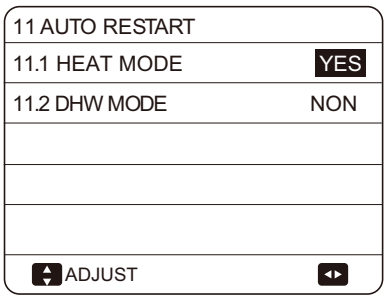


Press ◄ ►to scroll the cursor to YES and press OK. The test run will turn off.

7.10 Auto restart

The AUTO RESTART function is used to select whether the unit reapplies the user interface settings at the time when power returns after a power supply failure.

Go to MENU> FOR SERVICEMAN>11.AUTO RESTART

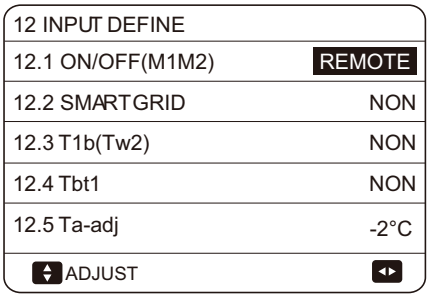


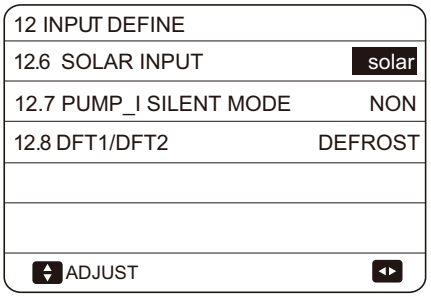
The AUTO RESTART function reapplies the user interface settings at the time of the powe r supply failure. If this function is disabled, when power returns after a power supply failure, the unit won't auto restart.

7.11 Input define

How to set the INPUT DEFINE

Go to MENU> FOR SERVICEMAN> 12. INPUT DEFIN





7.12 Setting parameters

Order number	Code	State	Default	Minumum	Maximum	Settinginterval	Unit
1.1	DHW MODE	Enable or disable the DHW mode:0=NON,1=YES	1	0	1	1	/
1.2	DISINFECT	Enable or disable the disinfect mode:0=NON,1=YES	1	0	1	1	/
1.3	DHW PRIORITY	Enable or disable the DHW priority mode:0=NON,1=YES	1	0	1	1	/
1.4	PUMP_D	Enable or disable the DHW pump mode:0=NON,1=YES	0	0	1	1	/
1.5	DHW PRIORITY TIME SET	Enable or disable the DHW priority time set:0=NON,1=YES	0	0	1	1	/
1.6	dT5_ON	The temperature difference for starting the heat pump	10	1	30	1	°C
1.7	dT1S5	The difference value between Twout and T5 in DHW mode	10	5	40	1	°C
1.8	T4DHWMAX	The maximum ambient temperature that the heat pump can operate at for domestic water heating	43	35	43	1	°C
1.9	T4DHWMIN	The minimum ambient temperature that the heat pump can operate for domestic water heating	-10	-20	30	1	°C
1.10	dT5_TBH_ OFF	the temperature difference between T5 and T5S that turns the booster heater off.	5	0	10	1	°C
1.11	T4_TBH_ON	the highest outdoor temperature the TBH can operate.	5	-5	50	1	°C
1.12	t_TBH_DELAY	the time that the compressor has run before starting the booster heater	30	0	240	5	MIN
1.13	T5S_DISINFE CT	the target temperature of water in the domestic hot water tank in the DISINFECT function.	65	60	70	1	°C
1.14	t_DI_HIGHTE MP.	the time that the highest temperature of water in the domestic hot water tank in the DISINFECT function will last	15	5	60	5	MIN
1.15	t_DI_MAX	the maximum time that disinfection will last	210	90	300	5	MIN
1.16	t_DHWHP_RE STRICT	The operation time for the space heating/cooling operation.	30	10	600	5	MIN
1.17	t_DHWHP_M AX	the maximum continuous working period of the heat pump in DHW PRIORITY mode.	90	10	600	5	MIN
1.18	PUMP_D TIMER	Enable or disable the DHW pump run as timed and keeps running for PUMP RUNNING TIME:0=NON,1=YES	1	0	1	1	MIN
1.19	PUMP_D RUNNING TIME	the certain time that the DHW pump will keep running for	5	5	120	1	/
1.20	PUMP_D DISINFECT RUN	Enable or disable the DHW pump operate when the unit is in disinfect mode and T5> T5S_DI-2:0=NON,1=YES	1	0	1	1	/

Order number	Code	State	Default	Minumum	Maximum	Settinginterval	Unit
2.1	HEAT MODE	Enable or disable the heating mode	1	0	1	1	/
2.2	t_T4_ FRESH_H	The refresh time of climate related curves for heating mode	0.5	0.5	6	0.5	hours
2.3	T4HMAX	The maximum ambient operating temperature for heating mode	25	20	35	1	°C
2.4	T4HMIN	The minimum ambient operating temperature for heating mode	-15	-20	30	1	°C
2.5	dT1SH	The temperature difference for starting the unit (T1)	5	2	20	1	°C
2.6	dTSH	The temperature difference for starting the unit (Ta)	2	1	10	1	°C
2.7	T1SetH1	The setting temperature 1 of climate related curves for heating mode	35	25	60	1	°C
2.8	T1SetH2	The setting temperature 2 of climate related curves for heating mode	28	25	60	1	°C
2.9	T4H1	The ambient temperature 1 of climate related curves for heating mode	-5	-20	35	1	°C
2.10	T4H2	The ambient temperature 2 of climate related curves for heating mode	7	-20	35	1	°C
2.11	ZONE1 H-EMISSION	The type of zone1 end for heating mode : 1=RAD.(radiator), 2=FLH(floor heating)	1	0	2	1	/
2.12	ZONE2 H-EMISSION	The type of zone2 end for heating mode : 1=RAD.(radiator), 2=FLH(floor heating)	2	0	2	1	/
3.1	WATER FLOW TEMP.	Enable or disable the WATER FLOW TEMP.:0=NON, 1=YES	1	0	1		/
3.2	ROOM TEMP.	Enable or disable the ROOM TEMP.:0=NON, 1=YES	0	0	1	1	/
3.3	DOUBLE ZONE	Enable or disable the ROOM THERMOSTAT DOUBLE ZONE:0=NON, 1=YES	0	0	1	1	/
4.1	ROOM THERMOSTAT	The style of room thermostat: 0=NON, 1=MODE SET, 2=ONE ZONE, 3=DOUBLE ZONE	0	0	3	1	/
5.1	dT1_IBH_ON	The temperature difference betw een T1S and T1 for starting the backup heater.	5	2	10	1	°C
5.2	t_IBH_DELAY	The time that the compressor has run before the first backup heater turns on. Including the interval time between two backup heater operating, If IBH is in two-step control,	30	15	120	5	MIN
5.3	T4_IBH_ON	The ambient temperature for starting the backup heater	-5	-15	30	1	°C
5.4	dT1_AHS_ON	The temperature difference betw een T1S and T1 for turning the additional heating source on	5	2	20	1	°C
5.5	t_AHS_DELAY	The time that the compressor has run before starting the additional heating source	30	5	120	5	MIN
5.6	T4_AHS_ON	The ambient temperature for starting the additional heating source	-5	-15	30	1	°C
5.7	IBH_LOCATE	IBH/AHS installation location PIPE LOOP=0;	0	0	0	0	/

Order number	Code	State	Default	Minumum	Maximum	Settinginterval	Unit
5.8	P_IBH1	Power input of IBH1	0	0	20	0.5	kW
5.9	P_IBH2	Power input of IBH2	0	0	20	0.5	kW
5.10	P_TBH	Power input of TBH	2	0	20	0.5	kW
5.11	DHW _C	Allow to turn on IBH to make hot water While the outdoor unit is operating in cooling mode, 0=OFF, 1=ON	1	0	1	1	/
5.12	H_C	Allow to turn on IBH to heating While the outdoor unit is operating in cooling mode, 0=OFF, 1=ON	1	0	1	1	/
6.1	T1S_H.A_H	The target outlet water temperature for space heating when in holiday away mode	25	20	25	1	°C
6.2	T5S_H.A_DHW	The target outlet water temperature for domestic hot water heating when in holiday away mode	25	20	25	1	°C
10.1	PREHEATING FOR FLOOR T1S	The setting temperature of outlet w ater during first preheating for floor	25	25	35	1	°C
10.3	t_FIRSTFH	The time last for preheating floor	72	48	96	12	HOUR
10.4	t_DRYUP	The day for w arming up during floor drying up	8	4	15	1	DAY
10.5	t_HIGHPEAK	The continue days in high temperature during floor drying up	5	3	7	1	DAY
10.6	t_DRYD	The day of dropping temperature during floor drying up	5	4	15	1	DAY
10.7	T_DRYPEAK	The target peak temperature of w ater flow during floor drying up	45	30	55	1	°C
10.8	START TIME	The start time of floor drying up	Hour: the present time(not on the hour +1, on the hour +2) Minute:00	0:00	23:30	1/30	h/min
10.9	START DATE	The start date of floor drying up	The present date	1/1/2000	31/12/2099	1/1/1	d/m/y
11.1	AUTO RESTART HEAT MODE	Enable or disable the auto restart heating mode. 0=NON,1=YES	1	0	1	1	/
11.2	AUTO RESTART HEAT MODE	Enable or disable the auto restart DHW mode. 0=NON,1=YES	1	0	1	1	/
12.1	M1 M2	Define the function of the M1M2 sw itch; 0= REMOTE ON/OFF,1= TBH ON/OFF,2= AHS ON/OFF	0	0	2	1	/
12.2	SMART GRID	Enable or disable the SMART GRID; 0=NON,1=YES0	0	0	1	1	/
12.3	Tw 2	Enable or disable the Tbt1; 0=NON,1=YES	0	0	1	1	/
12.5	Ta-adj	The corrected value of Ta on wired controller	-2	-10	10	1	°C
12.6	SOLAR INPUT	Choose the SOLAR INPUT; 0=NON,1=CN18Tsolar,2=CN11SL1 SL2	0	0	2	1	/

Order number	Code	State	Default	Minumum	Maximum	Settinginterval	Unit
12.7	PUMP_I SILENT MODE	Enable or disable PUMPI SILENT MODE 0=NON, 1=YES	0	0	1	1	/
12.8	DFT1/DFT2	DFT1/DFT2 port function:0=DEFROST 1=ALARM	0	0	1	1	/
12.9	CL/HT	0-ROOM THERMOSTAT, 1- R32 refrigerant leakage	0	0	1	1	/
13.1	ADDRESS RESET	Reset the address code of the unit	FF	0	15	1	/
14.1	HMI SET	Choose the HMI; 0=MASTER,1=SLAVE	0	0	1	1	/
14.2	HMI ADDRESS FOR BMS	Set the HMI address code for BMS	1	1	255	1	/
14.3	STOP BIT	HMI stop bit	1	1	2	1	/
15.1	t_DELAY PUMP	The delay time for water pump to stop after the compressor stops	2	0.5	20	0.5	MIN
15.2	t1_ANTILOCK PUMP	The interval time for water pump to prevents locking	24	5	48	1	h
15.3	t2_ANTILOCK PUMP RUN	The operate time for water pump to prevents locking	60	0	300	30	s
15.4	t1-ANTILOCK SV	The interval time for valve to prevents locking	24	5	48	1	h
15.5	t2-ANTILOCK SV RUN	The operate time for valve to prevents locking	30	0	120	10	s
15.6	PUMP_I SILENT OUTPUT	PUMPI Mute Mode Maximum Limited Out	100	50	100	5	%
15.7	A1 FAULT RESET	0=NON;1=YES	0	0	1	1	/
15.6	RESTORE ENERGY ANALYSIS	0=NON;1=YES	0	0	1	1	/

8 BEFORE INSTALLATION

- **Before installation**
  Be sure to confirm the model name and the serial number of the unit.

⚠ CAUTION

Frequency of Refrigerant Leakage Checks

- For unit that contains fluorinated greenhouse gases in quantities of 5 tonnes of CO50 tonnes of CO_2 equivalent, at least every 12 months, or where a leakage detection system is installed, at least every 24 months.

- For unit that contains fluorinated greenhouse gases in quantities of 50 tonnes of COthan 500 tonnes of CO_2equivalentat least every six months, or where a leakage detection system is installed, at least every 12 months.

- For unit that contains fluorinated greenhouse gases in quantities of 500 tonnes of COthree months, or where a leakage detection system is installed, at least every six months.

- This air-conditioning unit is a hermetically sealed equipment that contains fluorinated greenhouse gases.

- Only certificated person is allowed to do installation, operation and maintenance.

8.1 Accessories

8.1.1 Unpacking

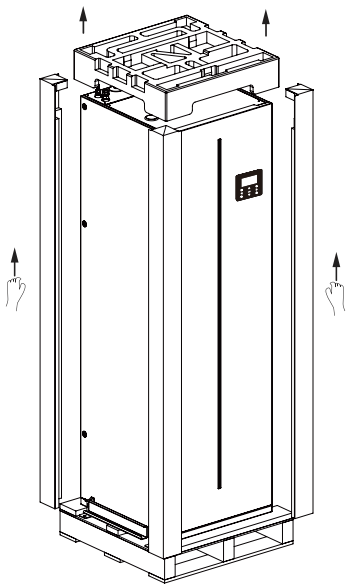


Fig.8-1

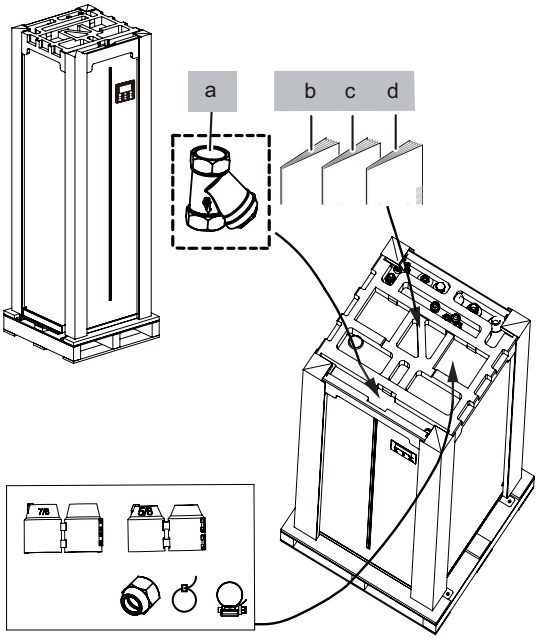


Fig.8-2

Installation Fittings		
Name	Shape	Quantity
Installation and operation manual (this book)		1
Operation manual		1
M16 Copper Nut Tamper Cap		1
M9 Copper Nut Tamper Cap		1
Belt L200		2
Throat bander		1
M16 Copper nut		1
M9 Copper nut		1
Y-shape filter		1
Operation manual (Wire controller)		1
Specifications		1

8.1.2 Remove the wooden base

Remove the 4 screws of the wooden base (Refer to Fig.8-3).

Four people hold the sheet metal lifting machine, one of them pull the wooden base (Refer to Fig.8-4).

Remove the 8 screws of the sheet metal and remove the sheet metal (Refer to Fig.8-5).

Take carefully when lifting machine and pull the wooden.

Care should be taken when transporting the heat pump unit that the casing is not damaged by impact. Do not remove the protective packaging unit heat pump unit has reached its final location. This will help protect the structure and control panel. The heat pump unit can be transported ONLY vertically.

Be careful with the Installation and Operation manual and with the factory-supplied accessories box located at the top of the unit.

Four people are required when lifting because of the heavy weight of the unit.

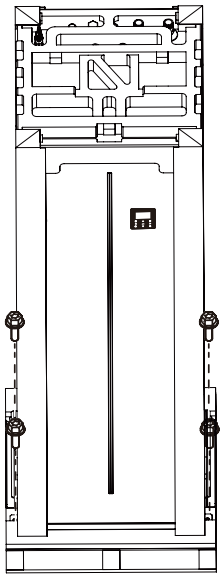


Fig.8-3

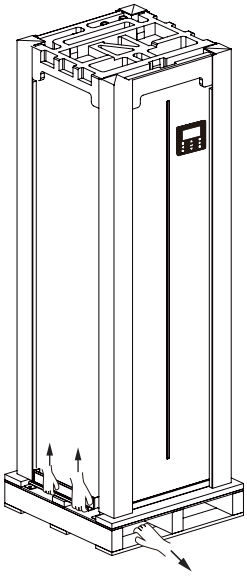


Fig.8-4

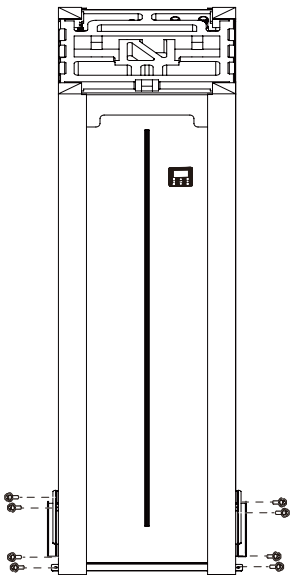


Fig.8-5

9 INSTALLATION SITE

⚠ WARNING

- Do not install the hydraulic module near a bedroom;
  Suggest install it in a garage, utility room, corridor, basement, or laundry room;
  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.
- Please connect the top pipe or fill the water tank immediately after removing the wooden frame, so as not to cause the machine to tip over.

- Select an installation site where the following conditions are satisfied and one that meets with your customer's approval.
  - Safe places which can bear the unit's weight and where the unit can be installed at an even level.
  - 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 servicing space can be well ensured.
  - Places where the units' piping and wiring lengths come within the allowable ranges.
  - 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 place s 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 refrig erant leakage according to relevant local laws and regulations.
  - Don’t install the unit near the sea or where there is corrosion gas.
- When installing the unit in a place exposed to strong wind, pay special attention to the following.

  In normal condition, refer to the figures below for installation of the unit:

⚠ CAUTION

The hydraulic module should be installed in an indoor water proof place.

The unit is to be floor mounted in an indoor location that meets the following requirements:

- The installation location is frost-free.
- The space around the unit is adequate for serving(Refer to Fig.4-2).
- There is a provision for condensate drain and pressure relief valve blow-off.

10 INSTALLATION

10.1 Dimensions of the unit:

Dimensions of the wall bracket:

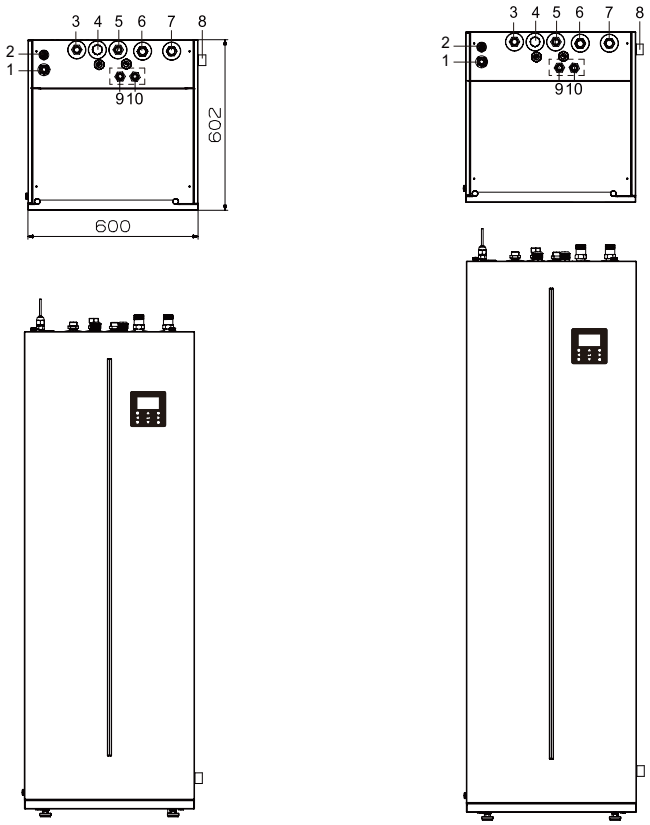


Fig.10-1

unit:mm

NO.	NAME	NO.	NAME
1	Refrigerant gas connection φ15.9	6	Space heating water inlet. R1"
2	Refrigerant liquid connection φ9.52	7	Space heating water outlet. R1"
3	Domestic hot water outlet R3/4"	8	Drainage Ø 25
4	Domestic hot water recirculation water inlet (Plugged by the nut).	9	Solar circulation outlet (customized)
5	Domestic cold water inlet	10	Solar circulation inlet (customized)

- The content in the dotted line area is for customized.

10.2 Installation requirements

- The hydraulic module is packed by the carton cap and corner.
- At delivery, the unit must be checked and any damage must be reported immediately to the carrier claims agent.
- Check if all hydraulic module accessories are enclosed.
- Bring the unit as close as possible to the final installation position in its original package in order to prevent damage during transport.
- When the water tank is free of water, the maximum net weight of hydraulic module with water tank shall reach about 158Kg, which needs to be lifted by special equipment.

10.3 Servicing space requirements

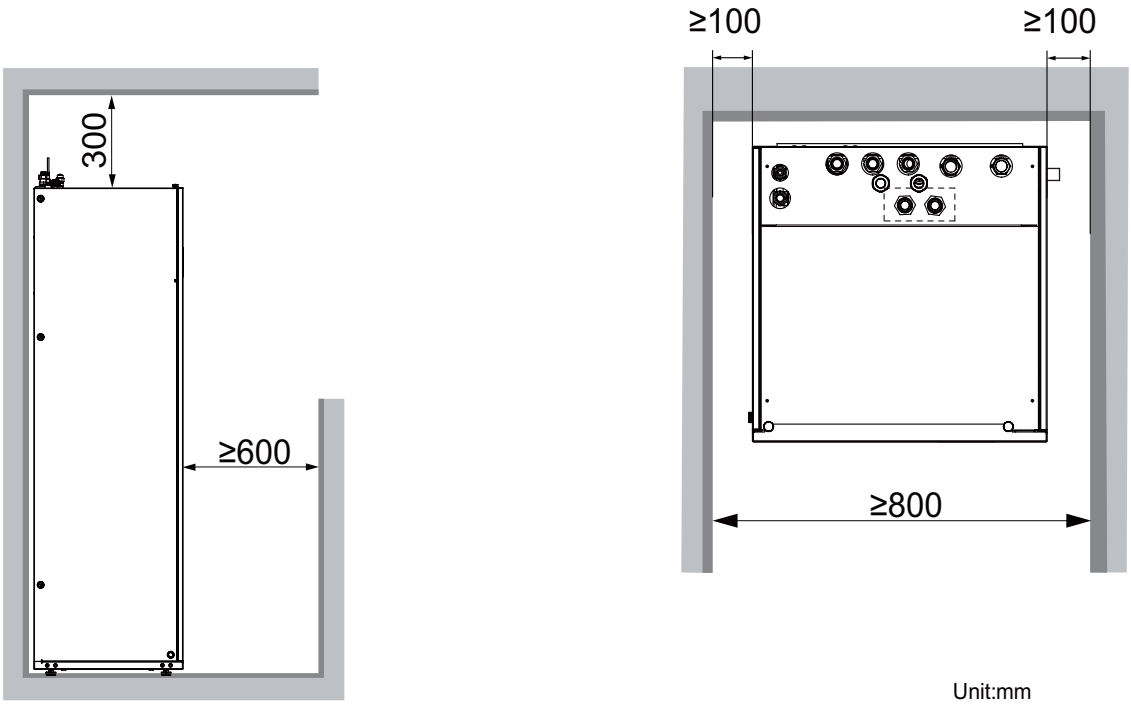


Fig.10-2

10.4 Mounting the hydraulic module

Lift the hydraulic module from the pallet and place it on the floor.

Slide the hydraulic module into position.

Adjust the height of the leveling feet (Refer to Fig.10-3) to compensate for floor irregularities. The maximum allowed deviation is 1° (Refer to Fig. 10-4)

Be specially careful with the mounting foot once the unit is on the floor. Avoid harsh handling of the unit, as it could cause damages to the foot.

Each mounting feet can be adjusted up to 30mm, but keep all them in the factory supplied position unit has been installed in its final position.

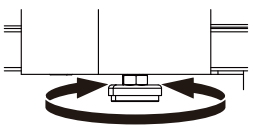


Fig.10-3

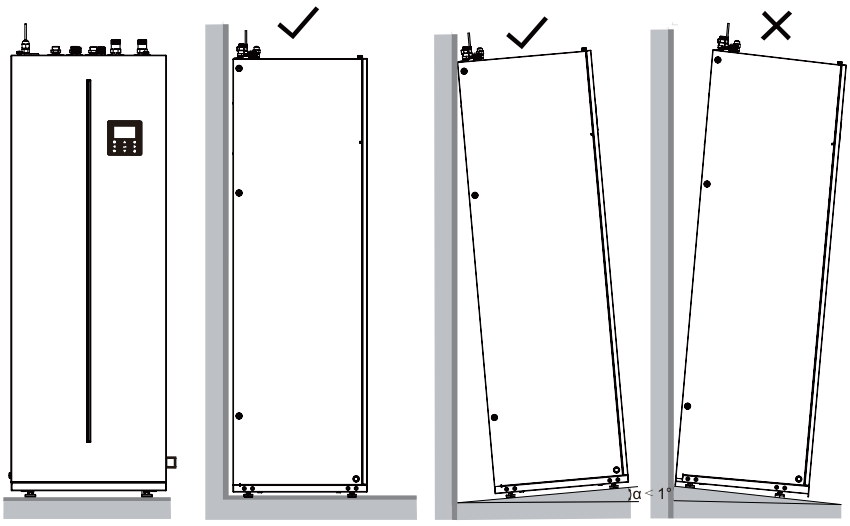


Fig.10-4

10.5 Refrigerant pipe connection

Align the center of the pipes.

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

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

Table 10-1

Outer diam.	Torque wrench(N·m)
Φ9.52	32.7-39.9(3.33-4.07kgf·m)
Φ15.9	61.8-75.4(6.30-7.70kgf·m)

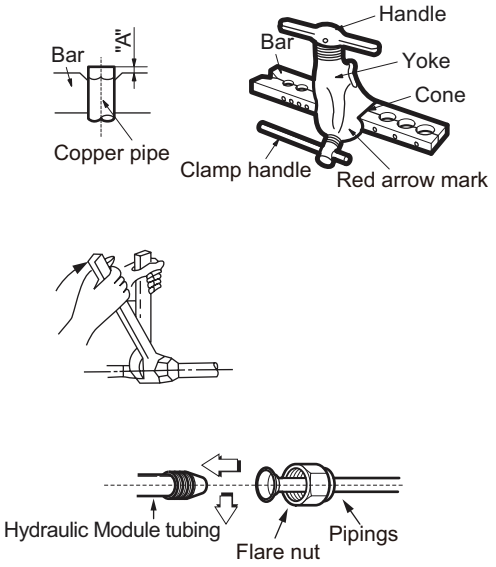


Fig.10-7

⚠ CAUTION

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

10.6 Connecting the water piping

10.6.1 Connecting the space heating water piping

To facilitate service and maintenance, two shut-off valves(field supply) and one overpressure bypass valve should be installed.

The two shut-off valves should be mounted on the space heatingwater inlet and outlet pipe of indoor unit.

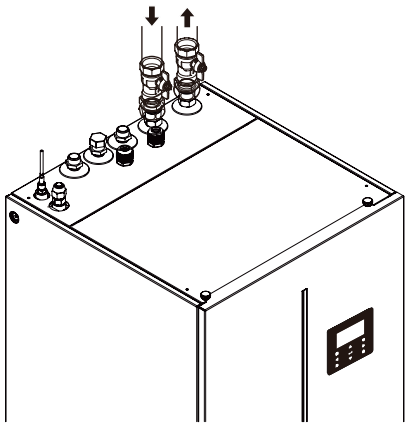


Fig.10-8

1. Connecting the shut-off valves to the hydraulic modules.
2. Connecting the shut-off valves to the space heating water pipes.

10.6.2 Connecting the domestic water piping

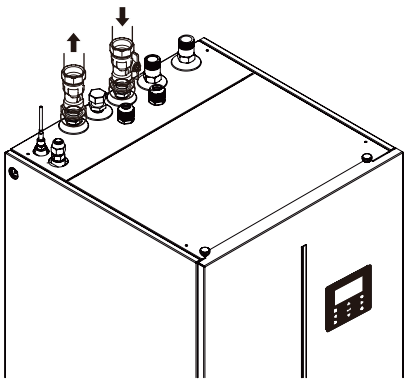


Fig.10-9

The shut-off valve should be mounted on the domestic cold water inlet.

1. Connect the shut-off valve to the cold water inlet of indoor unit.
2. Connect the cold water pipe to the shut-off valve.
3. Connect the domestic hot water pipe to the hot water outlet of indoor unit.

10.6.3 Connecting the recirculation water piping

If domestic hot water recirculation function is requested, the recirculation pipe should be connected.
1.Removing the nut of the recirculation on the hydraulic module.
2.Connecting the recirculation water pipe to the hydraulic module.

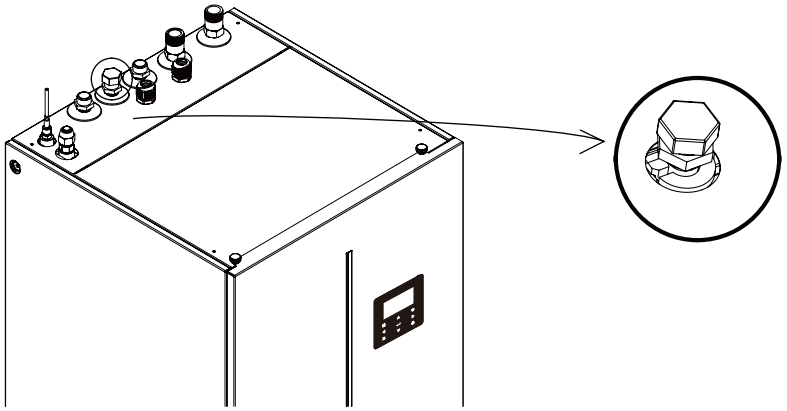


Fig.10-10

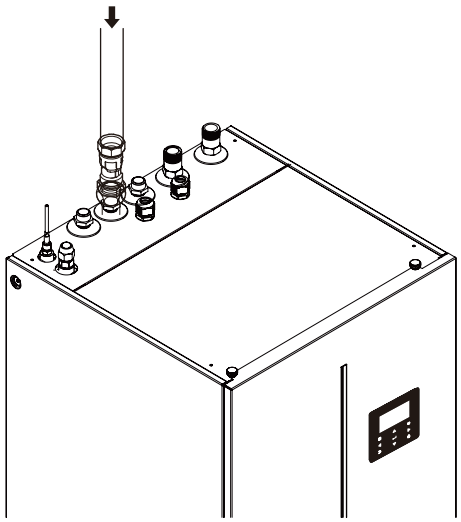


Fig.10-11

10.6.4 Connecting the drainage hose to the hydraulic module

The water coming from the pressure relief valve and the condensate water is collected in the drainage pan.
The drainage hose should be connected to the drainage pipe.
Connect the drainage pipe with a throat bander and insert the drainage pipe into the floor drain.

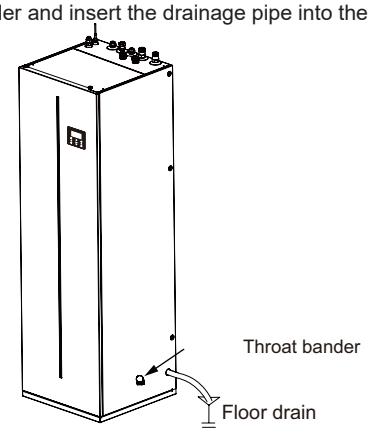


Fig.10-12

10.6.5 Connecting the solar circulation piping (if needed)

If the solar kit is designed in the system. The solar circulation water pipe should be connected to the inlet and outlet connector of hydraulic module.

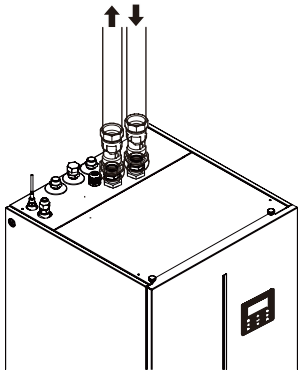


Fig.10-13

10.6.6 Water piping insulation

The insulation materials should be covered on the all piping in the water circuit piping system to prevent the capacity reduction and freezing of the outside water piping during winter. The insulation material should at least of B1 fire resistance rating and complies with all applicable legislation. The thickness of the sealing materials must be at least 13 mm with thermal conductivity 0.039 W/mK in order to prevent freezing on the outside water piping.

If the outside temperature is higher than 30°C and the humidity is higher than RH 80%, then the thickness of the insulationl materials should be at least 20 mm in order to avoid condensation on the surface of the insulation piping.

10.6.7 Water circuit anti-freeze protection

All hydronic parts inside of the unit are insulated to reduce the heat lose. Insulation materials must be added on the field water piping.

The unit program has special functions which use the heat pump and backup heater (if aviliable) to protect the entire system from freezing. When the temperature of the water flow in the system drops to a certain value, the unit will heat the water by using the heat pump or the electric heating tap or the backup heater. The anti-freeze protection function will turn off only when the temperature increases to a certain value.

When unit lose the power, the above function will not active to protect the unit from freezing.

⚠ CAUTION

When the unit is not running for a long time, make sure the unit is powered on all the time, If the unit should be cut off the power, make sure the water in the piping of the system should be drained completely to avoid the water pump and piping system being damaged by freezing. The power of the unit also needs to be cut off after water in the system is drained.

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

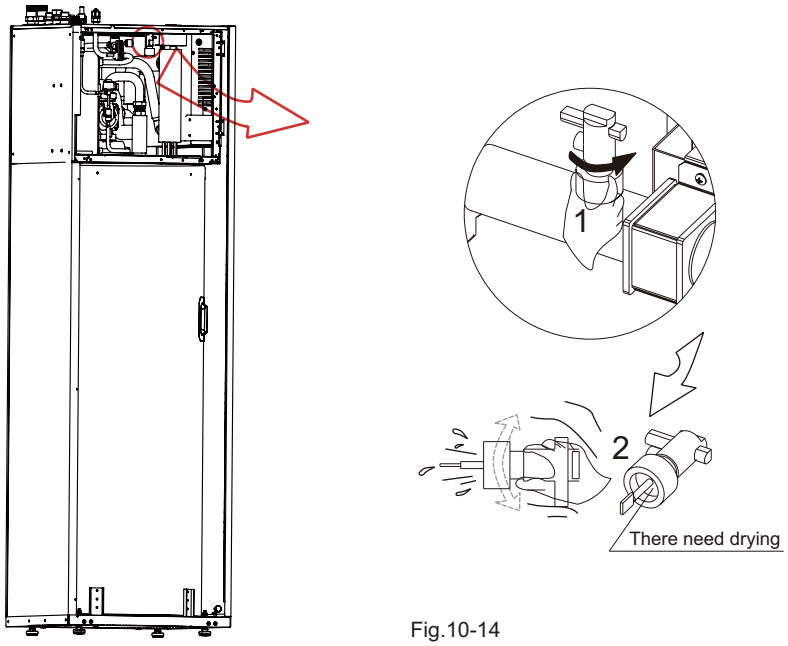


Fig.10-14

NOTE

1. Counterclockwise rotation, remove the flow switch.
2. Dry the flow switch completely.

⚠ CAUTION

Be careful not to deform the unit's piping by using excessive force when connecting the piping. Deforming the piping may lead to malfunction of VRF system.

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 piping, be sure to insulate two kind of 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.

10.6.8 Filling water

10.6.8.1 Filling the water circuit

- Connect the water supply to the filling valve and open the valve.
- Make sure all the automatic air purge valves are open (at least 2 turns).
- Filling with water until the manometer (field supply) indicates a pressure of approximately 2.0 bar. Remove air in the circuit as much as possible using the automatic air purge valves.

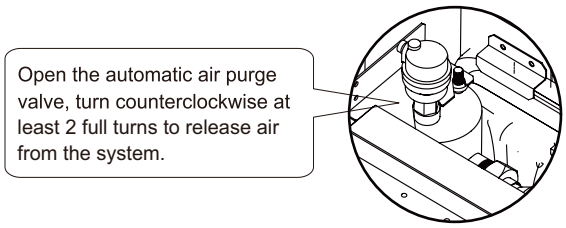


Fig.10-15

NOTE

During filling, it might not be possible to remove all air in the system. Remaining air will be removed through the automatic air purge valve during the first operating hours of the system. Topping up the water afterwards might be required.

- The water pressure indicated on the manometer will vary depending on the water temperature (higher pressure at higher water temperature). However, at all times water pressure should remain above 0.5 bar to avoid air entering the circuit.
- The unit might drain-off too much water through the pressure relief valve.
- Water quality should be complied with EN 98/83 EC Directives.
- Detailed water quality condition can be found in EN 98/83 EC Directives.

NOTE

- 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.
- if each space heating (cooling loop is controlled by the valves, the overpressure bypass valve(field supply) should be mounted between the heating(cooling) loops.

10.6.8.2 Filling the domestic hot water tank

1 Open every hot water tap in turn to purge air from the pipes of the system.
2 Open the cold water supply valve.
3 Close all water taps after all air is purged.
4 Check for water leakage.
5 Manually operate the field-installed pressure relief valve to ensure a free water flow through the discharge pipe

⚠ CAUTION

- Cold water inlet pressure should be less than 1.0MPa. Expansion vessel and safety valve (field supply, protection pressure is 1.0MPa) must be installed.
- Warming and Water Quality Directive and Groundwater: This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/IEU. The lifespan of the product is not guaranteed in the case of the use of groundwater, such as spring water or well water, the use of tap water when salt or other impurities are contained, nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibilty.

11 Field wiring

⚠ WARNING

A main switch or other means of disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local laws and regulations. Switch off the power supply before making any connections. Use only copper wires. Never squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections. All field wiring and components must be installed by a licensed electrician and must comply with relevant local laws and regulations.

The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.

Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.

Be sure to establish a ground. Do not ground the unit to a utility pipe, surge protector, or telephone ground. Incomplete grounding may cause electrical 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.

When there is VRF indoor unit in the system, the hydraulic module and VRF indoor unit need to be connected to the same power supply.

11.1 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).

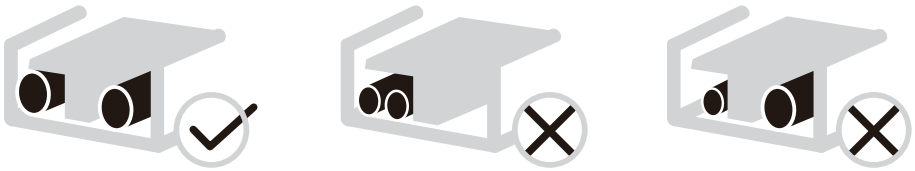
NOTE

- Maximum length of communication wirings is 50m.
- Power cords and communication wiring must be laid out separately, they can not be placed in the same conduit. Otherwise, it may lead to electromagnetic interference. Power cords and communication wirings should not come in contact with the refrigerant pipe so as to prevent the high temperature pipe from damaging the wires.
- Communication wirings must use shielded lines.Including hydraulic module to outdoor unit PQE line, hydraulic module to controller ABXYE line.

- 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.
- 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.

11.2 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.

11.3 Safety device requirements

1. Select the wire diameters(minimum value) individually for each unit based on the table below.
2. Select circuit breaker that having a contact separation in all poles not less than 3 mm providing full disconnection, where MFA is used to select the current circuit breakers and residual current operation breakers:

System			Power Current					IWPM	
		Hz	Voltage (V)	Min. (V)	Max. (V)	MCA (A)	MFA (A)	kW	FLA (A)
Standard	100/190(3kW heater)	50	220-240/1N	198	264	16.9	20	0.087	0.66
	160/240(3kW heater)	50	220-240/1N	198	264	16.9	20	0.087	0.66
Optional	100/190(6kW heater)	50	220-240/1N	198	264	33.1	40	0.087	0.66
	160/240(6kW heater)	50	220-240/1N	198	264	33.1	40	0.087	0.66

NOTE

MCA: Min. Circuit Amps. (A)
MFA: Max. Fuse Amps. (A)
IWPM: Indoor Water Pump Motor
FLA: Full Load Amps. (A)

11.4 Before connecting the wiring

1. Remove the bolt in the lower left corner of hydraulic module.
2. Open the front panel.
3. Remove the cover of the control box.

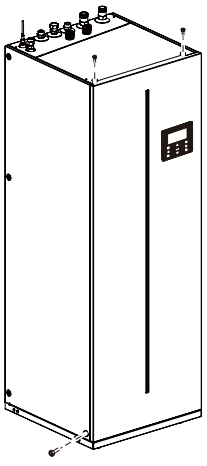


Fig.11-1

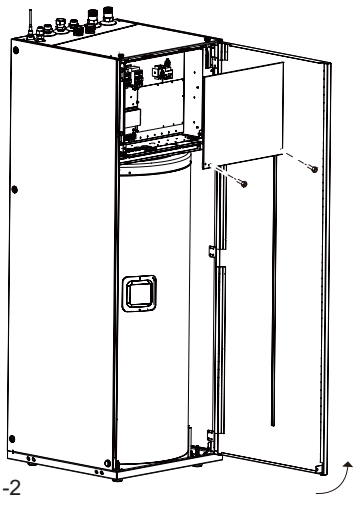


Fig.11-2

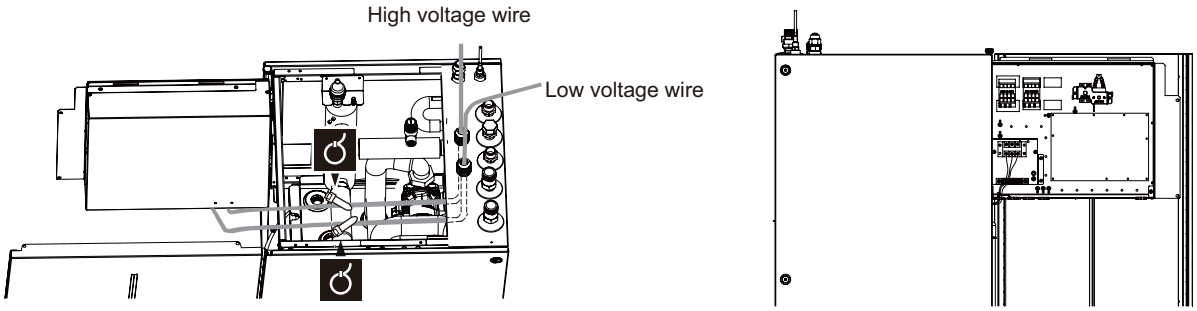
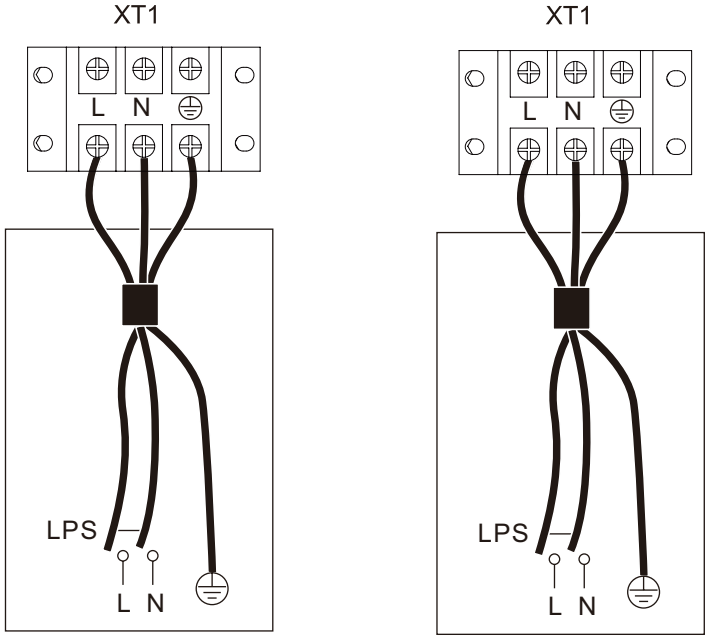


Fig.11-3

11.5 Connecting the main power supply

NOTE

Leakage Protection Switch must be installed to the Power Supply of the unit.



INDOOR UNIT
POWER SUPPLY
1-phase 3kW backup heater
standard

INDOOR UNIT
POWER SUPPLY
1-phase 6kW backup heater
optional

Fig.11-4

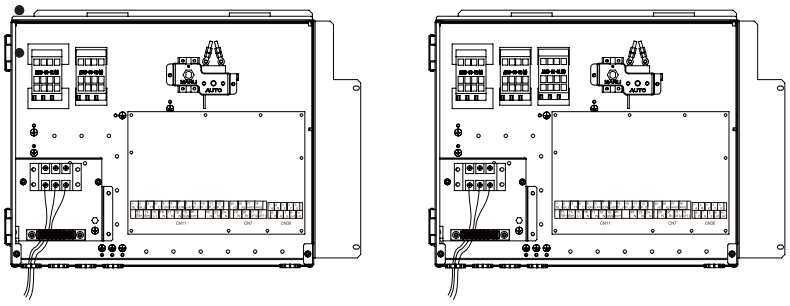


Fig.11-5

Rated current of appliance (A)	Nominal cross-sectional area (mm^2)	
	Flexible cords	Cable for fixed wiring
> 16 and ≤ 25	2.5 and 4	2.5 to 6
> 32 and ≤ 50	6 and 10	6 to 16

- Stated values are maximum values (see electrical data for exact values).

NOTE

The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s). Flexible cord must meet 60245IEC(H05VV-F) standards.

11.6 Connection for other components

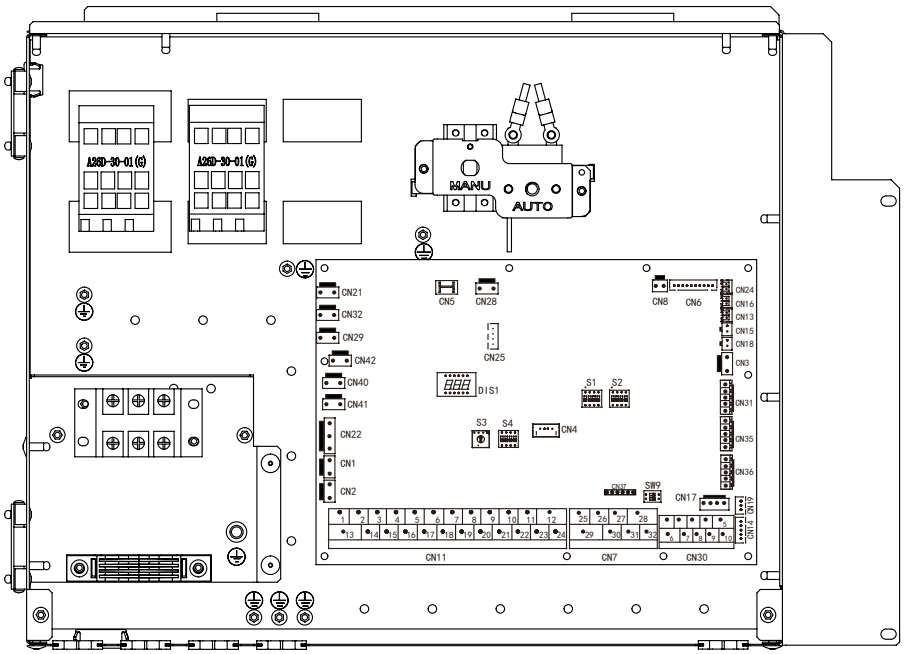


Fig.11-6

	Print		Connect to
CN11	1	SL1	Solar energy input signal
	2	SL2	
	3	H	Room thermostat input (high voltage)
	4	C	
	15	L1	
	5	1ON	SV1(3-way valve) (connected in factory)
	6	1OFF	
	16	N	
	9	P_c	Pumpc(zone2 pump)
	21	N	
	10	P_o	Outside circulation pump/zone1 pump
	22	N	
	11	P_s	Solar energy pump
	23	N	
	12	P_d	DHW pipe pump
	24	N	
	13	TBH	Unavailable
	16	N	
	14	IBH1	Internal backup heater 1
	17	N	
	18	N	SV3(3-way valve)
	19	3ON	
	20	3OFF	

	Print		Connect to
CN7	25	HT	Antifreeze E-heating tape(field supply)
	29	N	
	27	AHS1	Unavailable
	28	AHS2	

	Print		Connect to
CN30	1	A	Wired controller (connected in factory)
	2	B	
	3	X	
	4	Y	
	5	E	
	6	P	Outdoor unit
	7	Q	
	8	E	
	9	H1	Internal cascaded machine
	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 >=0.2A, the AC contactor is required to connected for the load.

11.6.1 connecting the communication wire to outdoor unit

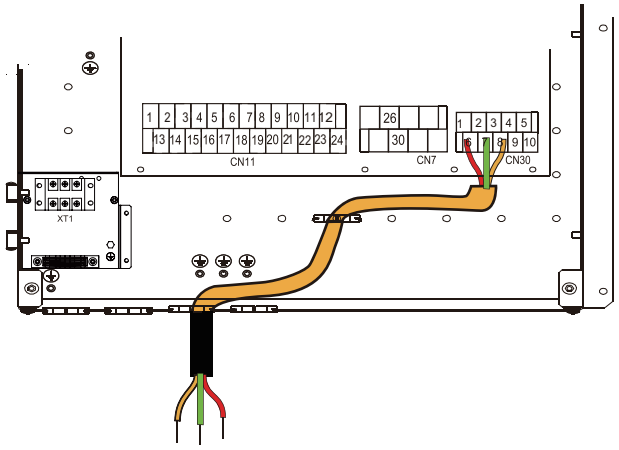


Fig.11-7

To outdoor unit

11.6.2 For remote shut down:

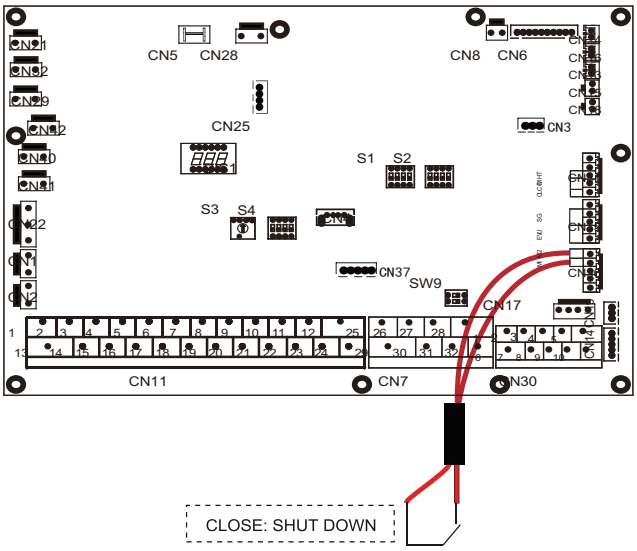


Fig.11-8

R32 refrigerant leakage sensor (Low voltage):

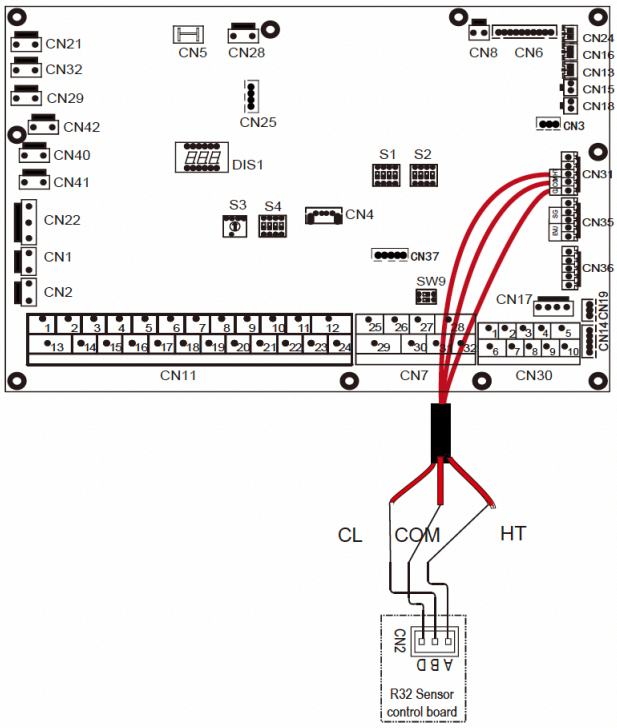


Fig.11-8

11.6.3 Room thermostat (Low voltage):

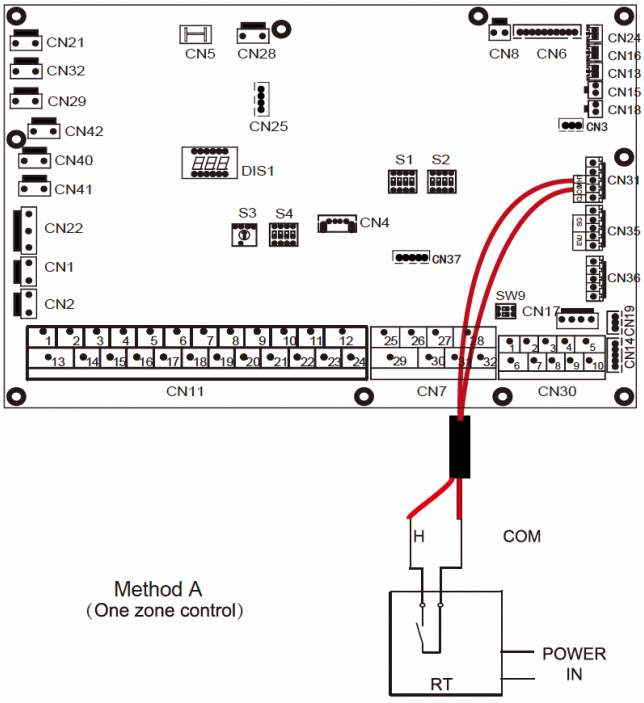


Fig.11-9

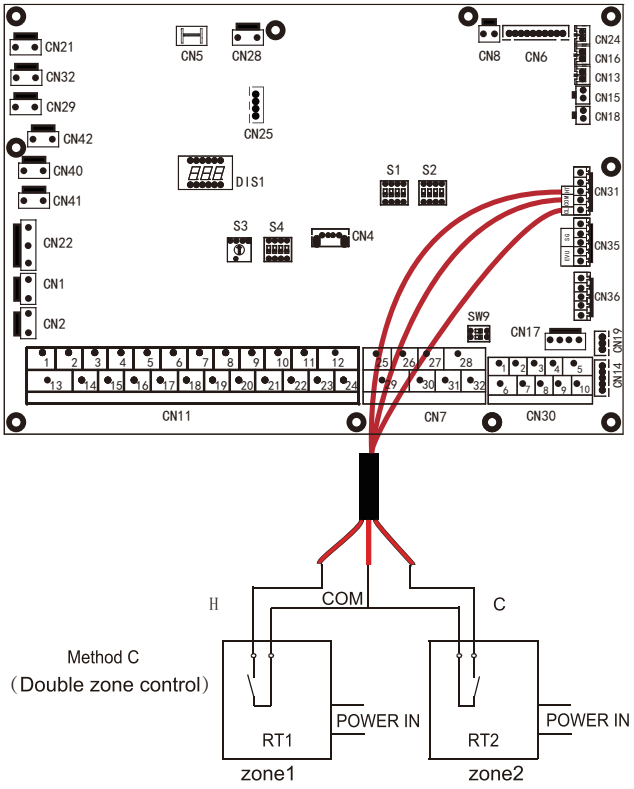


Fig.11-10

RT1=1# Room Thermostat
RT2=2# Room Thermostat

- **Method A** (One zone contro)

RT can control heating. When the indoor unit is connected with the external temperature controller, user interface FOR SERVICEMAN set ROOM THERMOSTAT to MODE SET:

A.1 When unit detect voltage is 12VDC between HT and COM, the unit operates in the heating mode.

A.2 When unit detect voltage is 0VDC between HT and COM, the unit stop working for space heating.

- **Method C** (Double zone control)

Hydraulic Module is connected with two room thermostat, while user interface FOR SERVICEMAN set ROOM THERMOSTAT to DOUBLE ZONE:

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.

The wiring of the thermostat should correspond to thesettings of the user interface. Refer to ROOMTHERMOSTAT.

Power supply of machine and room thermostat must beconnected to the same Neutral Line.

When ROOM THERMOSTAT is not set to NON, theindoor temperature sensor Ta can't be set to valid.

Zone 2 can only operate in heating mode. While installation, the wiring of thermostats for zone1 and zone2 must be correct.

a) Procedure

Connect the cable to the appropriate terminals as shown inthe picture.

Fix the cable with cable ties to the cable tie mountings toensure stress relief.

11.6.4 For smart grid:

The unit has smart grid function, there are two ports on PCB to connectSG signal and EVU signal as following(SG is municipal power, andEVU is free power):

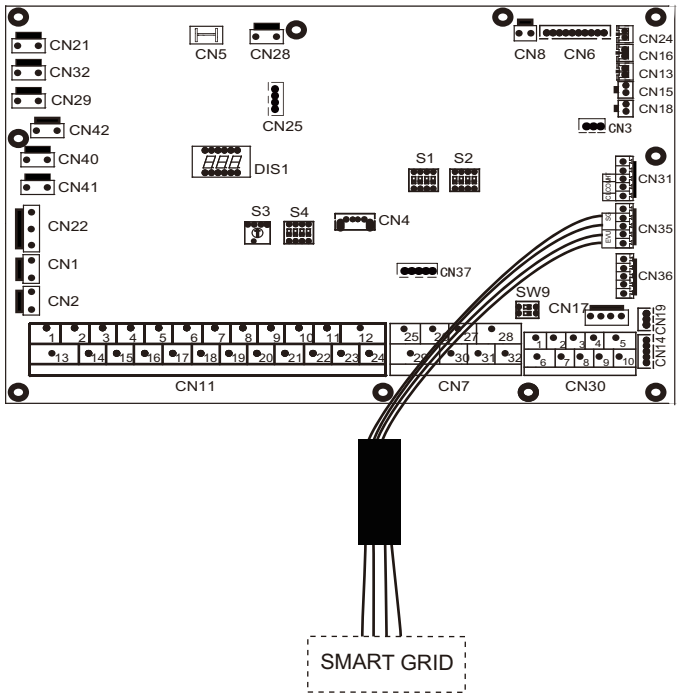


Fig.11-11

1. When EVU signal is on, and SG signalis on, as long as the DHW mode is set tobe valid, the VRF systam and IBH will operate in DHW mode at the same timeautomatically. When T5 rises to 60'C, the DHW mode will exit and switch to healing mode normally.

2. When EVU signal is on, and SG signal is off, as long as the DHW mode is set tobe valid and the mode is on, the VRF systom and IBH will operate In DHW mode atthe same time automatically. when T52Min(T5S+3,60), the DHW mode will exit and switch to heating mode normally.(T5S is the setfing temperature)

3. When EVU signal Is off, SG signal is on, the unit operates normally.

4. When EVU signal Is off, and SG signal is off, the unit operates as below: The unit will not operate DHW mode, and the IBH is invalid, disinfect function is invalid. Themax running time for heating is "SG RUNNING TIME", then unit will be off.

11.6.5 For P_o:

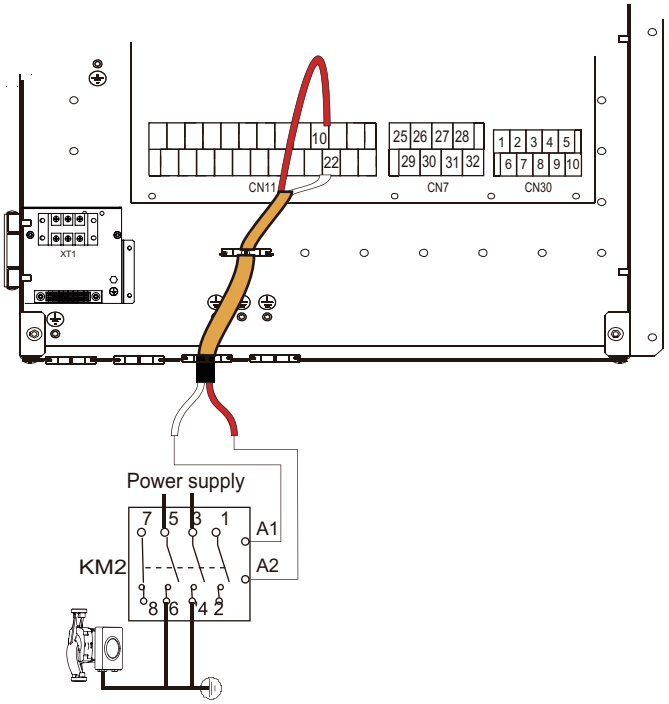


Fig.11-12

Voltage	220-240VAC
Maximum running current(A)	0.2
Minimum 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 with cable ties to the cable tie mountings toensure stress relief.

11.6.6 For P_c

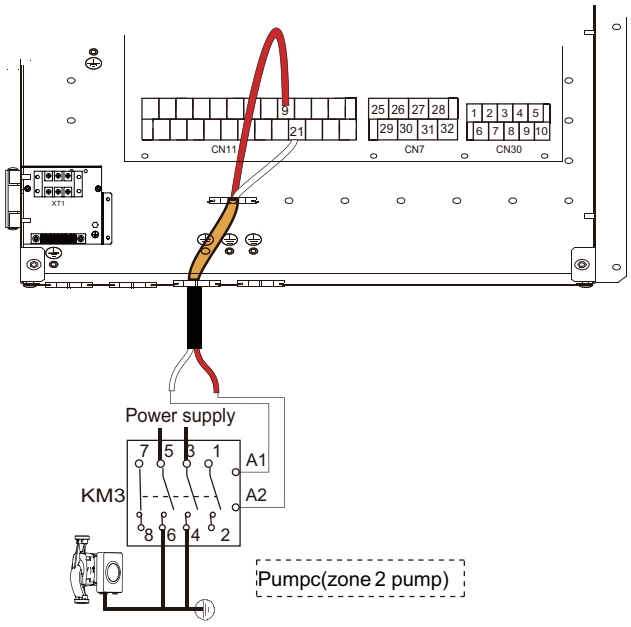


Fig.11-13

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

11.6.7 For P_d and P_s:

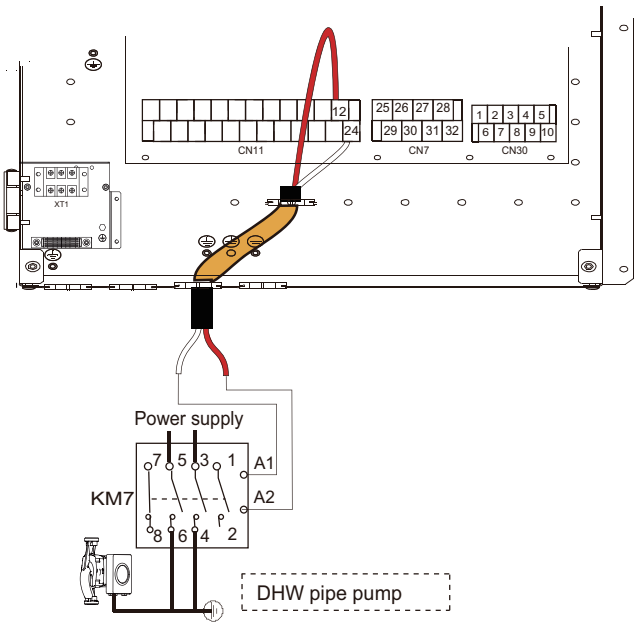
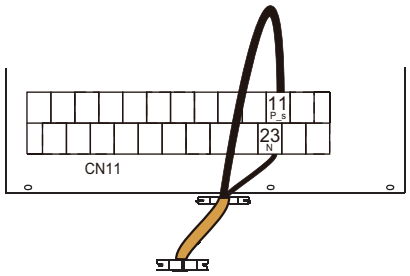


Fig.11-14

DHW circulation pump P_d



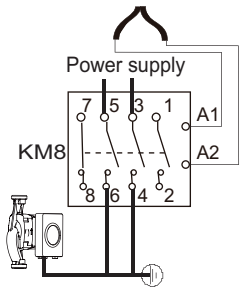


Fig.11-15

outside solar energy pump P_s

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

11.6.8 For 3-way valve SV3

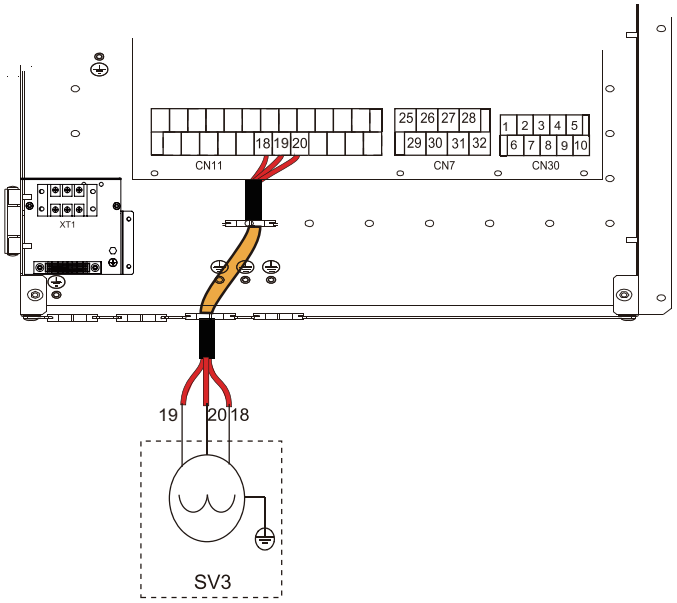


Fig.11-15

11.6.9 For defrosting signal output:

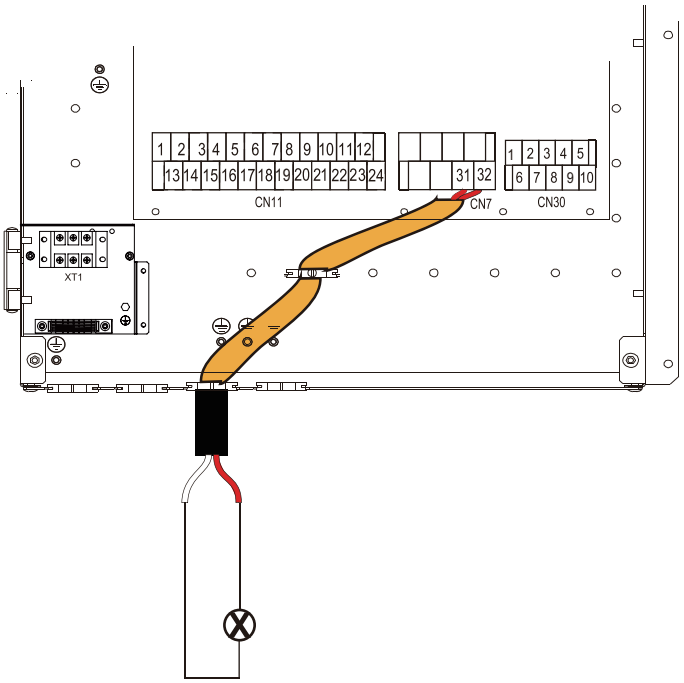


Fig.11-16

11.6.10 For unit operating status signal output

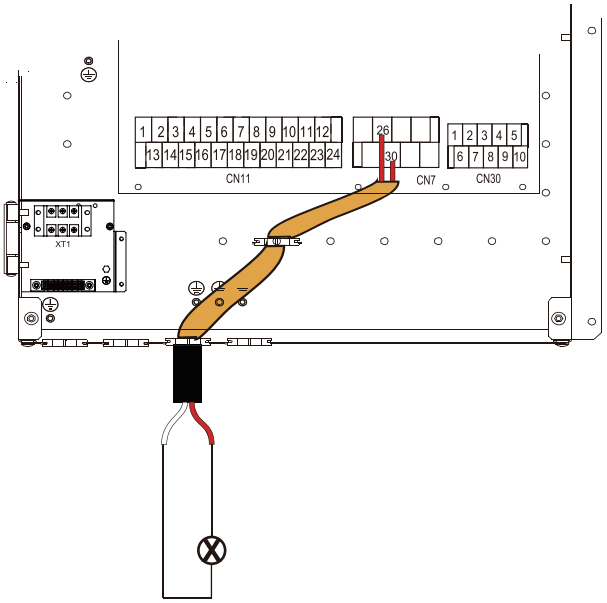


Fig.11-17

11.6.11 For room thermostat:

Room thermostat type 1(High voltago): "POWER IN" provide thewarking voltage to the RT, doesn't provide the voltage to the RTconnector. Port "15 L1" connect from the unit main power supplyport L of 1-phase power supply.

Room thermostat type 2(Low vollage): "POWER IN" provide theworking vottage to the RT

There are two optional connecting methods dependingon the room thermostat type.

Room thermostat type 1 (High voltage):

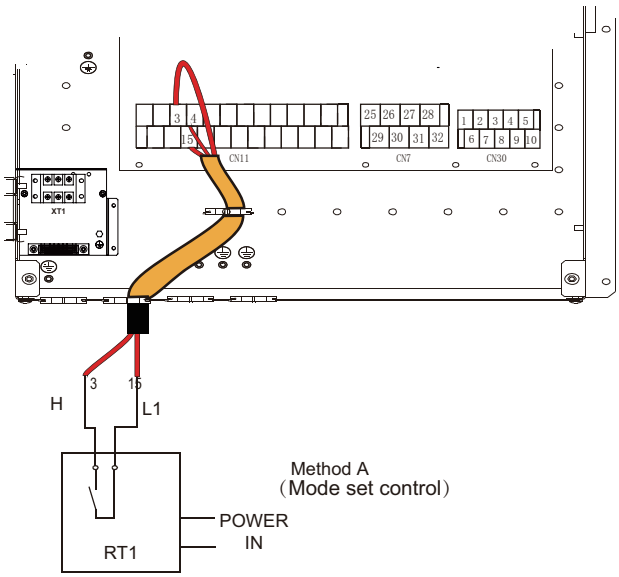


Fig.11-18

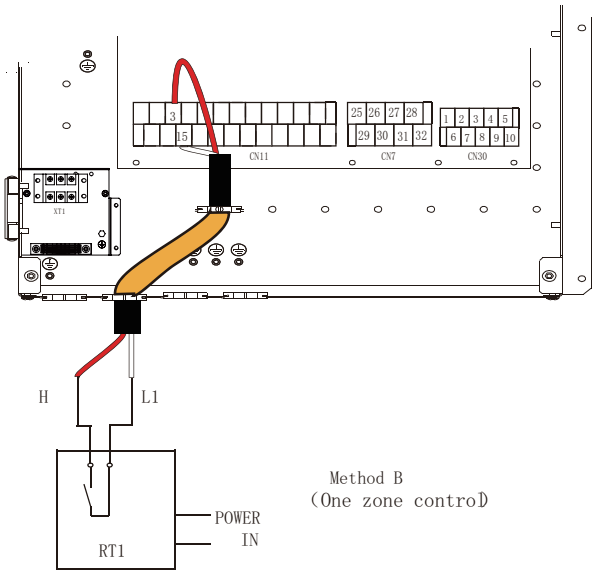


Fig.11-19

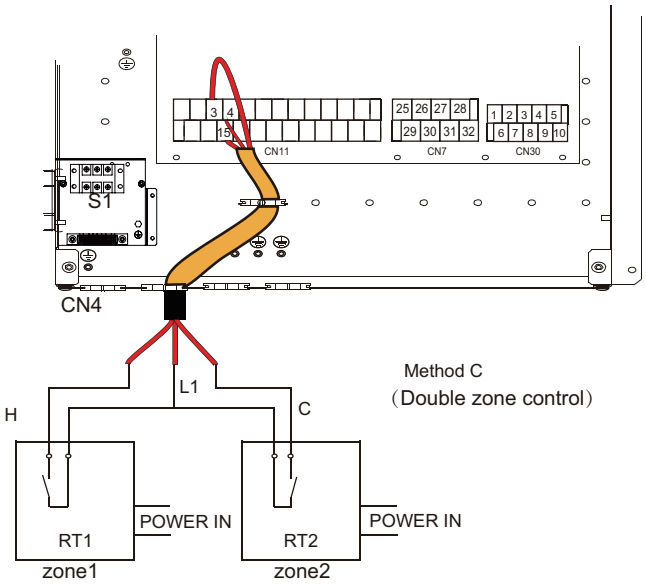


Fig.11-20

Voltage	220-240VAC
Maximum running current(A)	0.2
Minimum 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 A** (Mode set control)

RT can control heating. When the hydraulic module is connected, with the external temperature controller, user interface FOR SERVICEMAN set ROOM THERMOSTAT to MODE SET:

A.1 When unit detect voltage is 230VAC between H and N, the unit operates in the heating mode.

A.2 When unit detect voltage is 0VAC between H and N, the unit stop working for space heating.

- **Method B** (One zone control)

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

B.1 When unit detect voltage is 230VAC between H and N, unit turns on.

B.2 When unit detect voltage is 0VAC between H and N, unit turns off.

- **Method C** (Double zone control)

Hydraulic Module is connected with two room thermostat, while user interface FOR SERVICEMAN set ROOM THERMOSTAT to DOUBLE ZONE:

C.1 When unit detect voltage is 230VAC between H and N, zone1 turns on.When unit detect voltage is 0VAC between H and N, zone1 turns off.

C.2 When unit detect voltage is 230VAC between C and N, zone2 turns on according to climate temp curve. When unit detect voltage is 0V between C and N, zone2 turns off.

C.3 When H-N and C-N are detected as 0VAC, unit turns off.

C.4 when H-N and C-N are detected as 230VAC, both zone1 and zone2 turn on.

11.6.12 For solar energy input signal

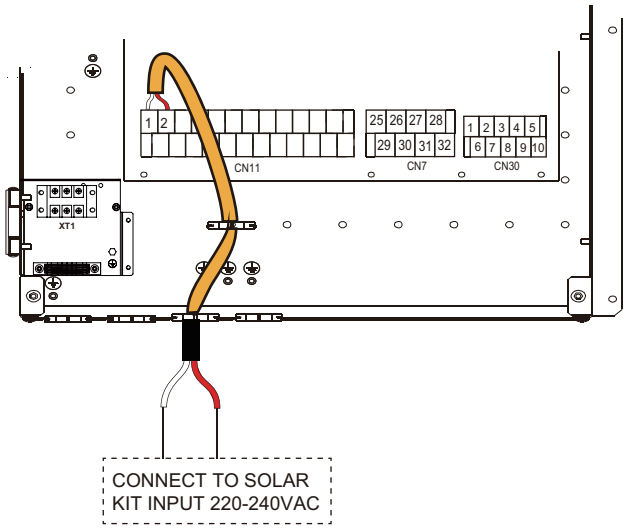


Fig.11-21

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

12 START-UP AND CONFIGURATION

The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

⚠ CAUTION

It is important that all information in this chapter is read sequentially by the installer and that the system is configured as applicable.

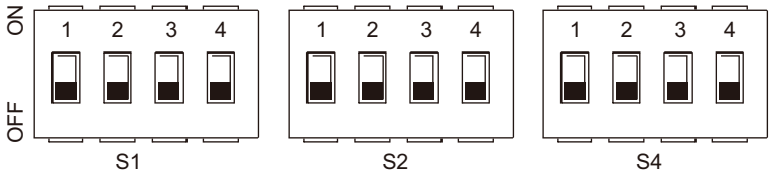
12.1 DIP switch settings overview

12.1.1 Function setting

DIP switch S1、S2 and S4 is located on the hydraulic module main control board (see "2.3.1 main control board of hydraulic module") and allows configuration of additional heating source thermistor installation, the second inner backup heater installation, etc.

⚠ WARNING

Switch off the power supply before opening the switch box service panel and making any changes to the DIP switch settings.



DIP switch		ON=1	OFF=0	Factory defaluts
S1	1/2	0/0=IBH(One-step control) 0/1=IBH(Two-step control) 1/1=IBH(Three-step control)		Refer to electrically controlled wiring diagram
	3/4	0/0=With IBH 1/0=Reserved 0/1=With AHS for heat mode 1/1=With AHS for heat mode and DHW mode		

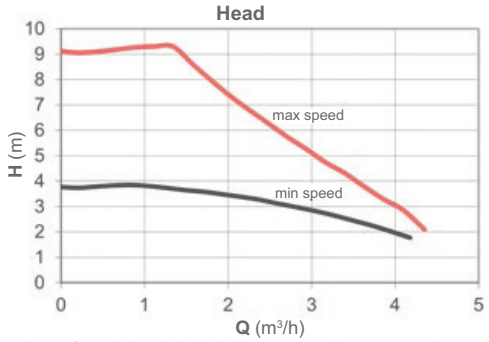
DIP switch	ON=1	OFF=0	Factory defaluts
1	Start pump after 24 hours will be invalid	Start pump after 24 hours will be valid	Refer to electrically controlled wiring diagram
2	with TBH	without TBH	
3/4	Reserved		

DIP switch		ON=1	OFF=0	Factory defaluts
S4	1	IBH for DHW =vaild	IBH for DHW =invaild	Refer to electrically controlled wiring diagram
	2/3/4	Reserved		

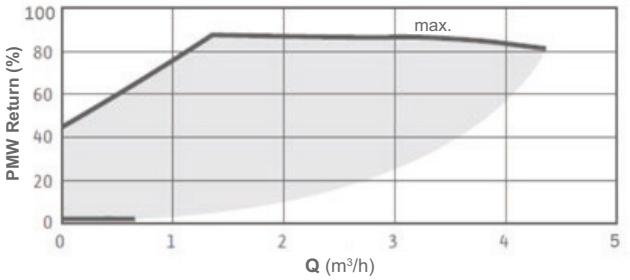
12.2 Setting the pump

The pump is contolled 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.

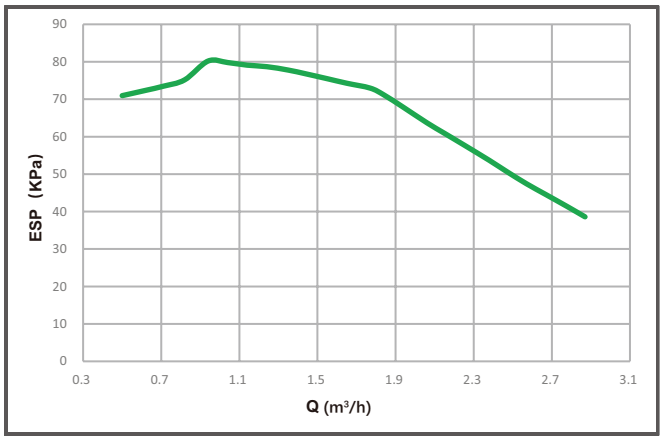


Area of regulation is included in between the max speed curve and the min speed curve.



The internal pump maintains maximum output, the hydraulic module can provide the head and flow:

Available external static pressure VS Flow rate



Hydraulic Module 160

⚠ CAUTION

- If the valves are at the incorrect position, the circulation pump will be damaged.

⚠ DANGER

- 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.

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 "E8" or "E0" 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 E2 is displayed on the user interface, check the wiring between the user interface and unit.

More error code and failure causes can be found in 6 "Error codes"

12.3 Initial start-up at low outdoor ambient temperature

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in concrete floors cracking due to rapid temperature change. Please contact the responsible cast concrete building contractor for further details.
To do so, the lowest water flow set temperature can be decreased to a value between 25°C and 35°C by adjusting the FOR SERVICEMAN.

12.4 Pre-operation checks

Checks before initial start-up

⚠ DANGER

Switch off the power supply before making any connections.

After the installation of the unit, check the following before switching on the circuit breaker:

- Field wiring: Make sure that the field wiring between the local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), unit and domestic hot water tank, and unit and backup heater kit have been connected according to the instructions described in the chapter, according to the wiring diagrams and to local laws and regulations.
- Fuses, circuit breakers, or protection devices Check that the fuses or the locally installed protection devices are of the size and type specified in. Make sure that no fuses or protection devices have been bypassed.
- Backup heater circuit breaker: Do not forget to turn on the backup heater circuit breaker in the switchbox (it depends on the backup heater type). Refer to the wiring diagram.
- Booster heater circuit breaker: Do not forget to turn on the booster heater circuit breaker (applies only to units with optional domestic hot water tank installed).
- Ground wiring: Make sure that the ground wires have been connected properly and that the ground terminals are tightened.
- Internal wiring: Visually check the switch box for loose connections or damaged electrical components.
- Mounting: Check that the unit is properly mounted, to avoid abnormal noises and vibrations when starting up the unit.
- Damaged equipment: Check the inside of the unit for damaged components or squeezed pipes.
- Refrigerant leak: Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your local dealer.
- Power supply voltage: Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.
- Air purge valve: Make sure the air purge valve is open (at least 2 turns).
- Shut-off valves: Make sure that the shut-off valves are fully open.

12.5 Field settings

The unit should be configured to match the installation environment (outdoor climate, installed options, etc.) and user demand. A number of field settings are available. These settings are accessible and programmable through "FOR SERVICEMAN" in user interface.

Powering on the unit

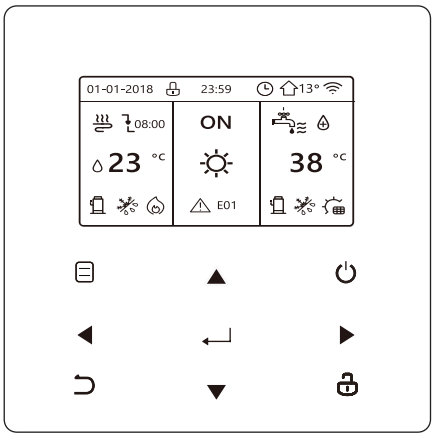
When power on the unit, "1%~99%" is displayed on the user interface during initialization. During this process the user interface cannot be operated.

Procedure

To change one or more field settings, proceed as follows.

NOTE

Temperature values displayed on the wired controller (user interface) are in °C.



Keys	Function
☰	• Go to the menu structure(on the home page)
◄►▼▲	• Navigate the cursor on the display • Navigate in the menu structure • Adjust settings
⏻	• Turn on/off the space heating operation or DHW mode • Turn on/or off functions in the menu structure
⮌	• Come back to the up level • Long press for unlock /lock the controller
🔓	• Unlock /lock some functions such as "DHW temperature adjusting"
↵	• Go to the next step when programming a schedule in the menu structure; and confirm a selection to enter in the submenu of the menu structure.

13 TEST RUN AND FINAL CHECKS

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

13.1 Final checks

Before switching on the unit, read following recommendations:

When the complete installatio n 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.

13.2 Test run operation (manually)

If required, the installer can perform a manual test run operation at any time to check correct operation of air purge, heating and domestic water heating, refer to 7.9 "TEST RUN".

14 MAINTENANCE AND SERVICE

In order to ensure optima l availabilit y of the unit, a number of checks and inspection s 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.

In order to ensure optima l availabilit y of the unit, a number of checks and inspection s on the unit and the field wiring have to be carried out at regular intervals.

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

DANGER

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.

Domestic hot water tank pressure relief valve (field supply).

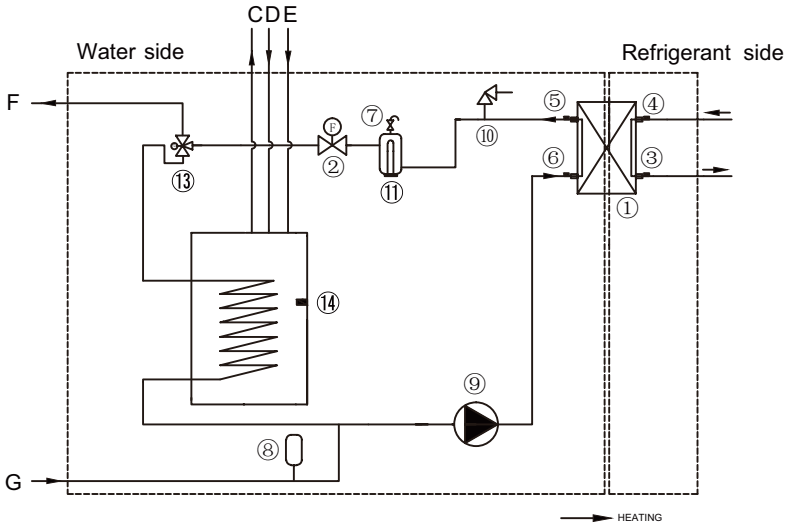
Check for correct operation of the pressure relief valve on the domestic hot water tank.

Unit switch box

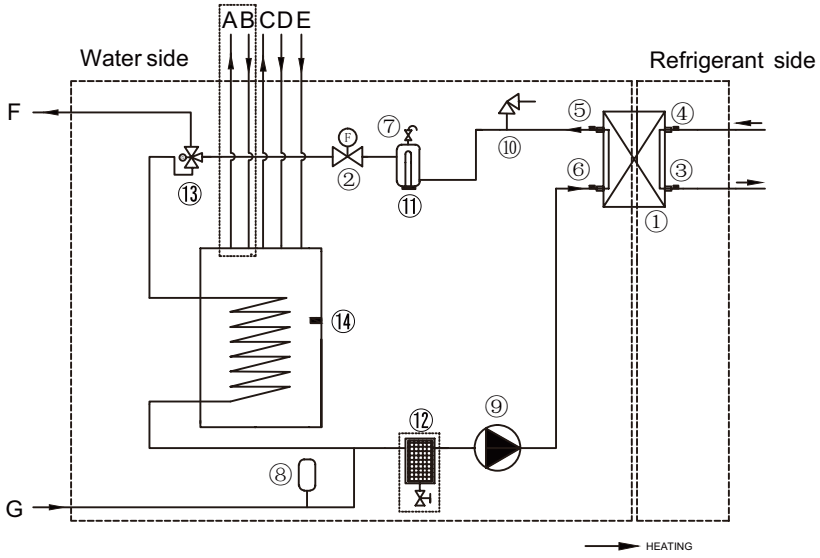
Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.

Check for correct operation of contactors with an ohm meter. All contacts of these contactors must be in open position.

ANNEX A: Refrigerant cycle



Standard Unit



Optional Unit

Item	Description	Item	Description
1	Water side heat exchanger (Plate heat exchange)	12	Magnetic separator (Optional)
2	Flow switch	13	3-Way valve
3	Refrigerant liquid line temperature sensor	14	Domestic water tank temperature sensor
4	Refrigerant gas line temperature sensor		
5	Water outlet temperature sensor	A	Solar circulation outlet (Optional)
6	Water inlet temperature sensor	B	Solar circulation inlet (Optional)
7	Automatic air purge valve	C	Domestic hot water outlet
8	Expansion vessel	D	Domestic hot water recirculation inlet
9	Circulated pump	E	Domestic cold water inlet
10	Pressure relief valve	F	Space heating water outlet
11	Backup heater	G	Space heating water inlet

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