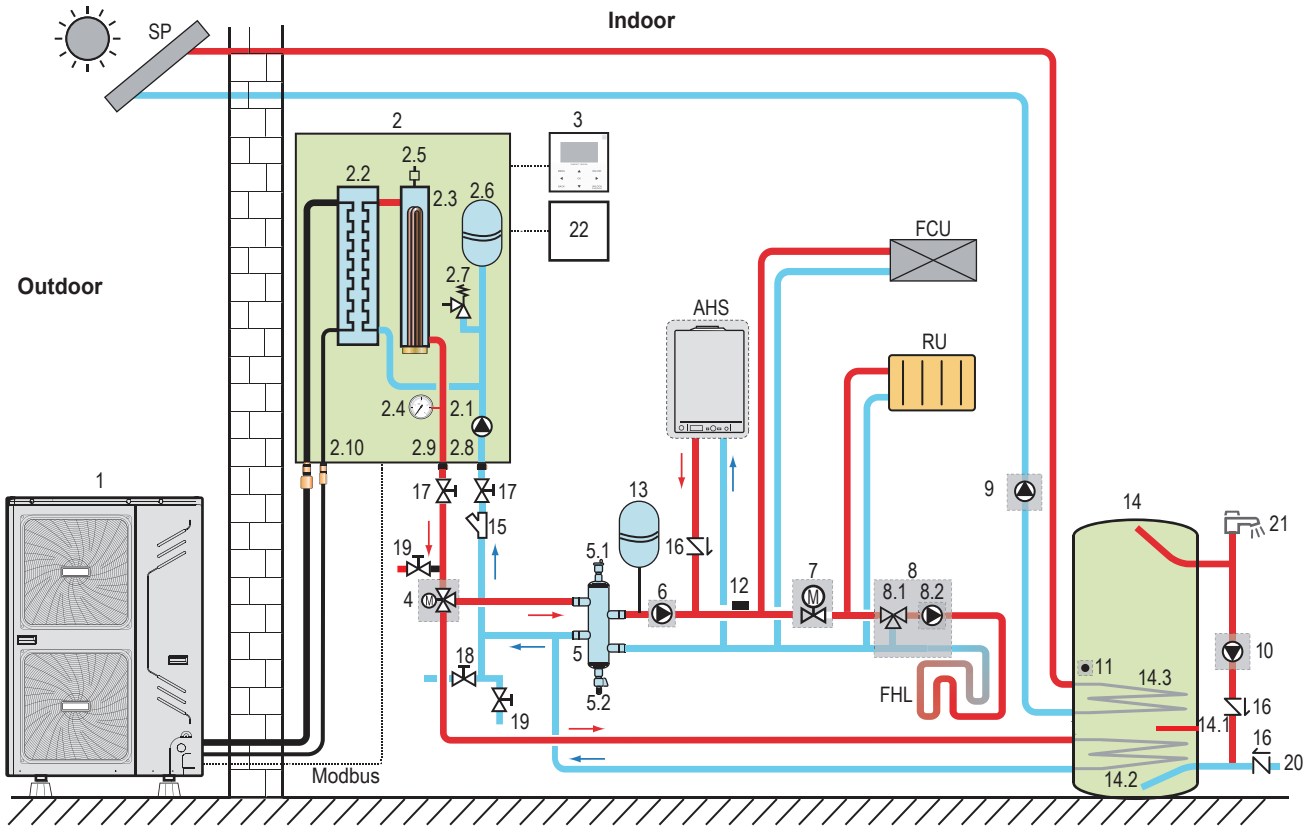
INSTALLATION & OWNER'S MANUAL

INDOOR UNIT

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



1 Outdoor unit
2 Indoor unit
2.1 PUMP_I (built-in circulating pump)
2.2 Plate heat exchanger (air to water heat exchanger)
2.3 IBH (built-in backup heater)
2.4 Manometer (built-in)
2.5 Air vent valve (built-in)
2.6 Expansion vessel (built-in)
2.7 Safety valve (built-in pressure relief)
2.8 Water inlet
2.9 Water outlet
2.10 Refrigerant connections
3 User interface (accessory)
4 SV1: Motorized 3-way valve (field supply)
5 Balance tank (field supply)
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8 Mixing station (field supply)
8.1 Mixing valve(field supply)
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13 Expansion vessel (field supply)
14 Domestic hot water tank (field supply)
14.1 TBH: Domestic hot water tank booster heater
14.2 Coil heat exchanger for heat pump
14.3 Coil heat exchanger for solar
15 Filter (accessory)
16 Non return valve (field supply)
17 Shut-off valve (field supply)
18 Fill valve (field supply)
19 Drain valve (field supply)
20 Tap water inlet pipe (field supply)
21 Hot water tap (field supply)
22 Room thermostat (field supply)
SP Solar plate (field supply)
AHS Additional heat source (field supply)
FCU Fan coil unit (field supply)
RU Radiator unit (field supply)
FHL Floor heating loop (field supply)

NOTE

If domestic hot water tank is connected into the system, 11 (T5, accessory) must be installed into the domestic hot water tank and connected to indoor unit.

If AHS is connected into the system, 12 (T1B, optional accessory) must be installed at the final water outlet pipe and connected to indoor unit.

Components 4, 6, 7, 8.2, 9, 10, AHS are needed to be connected to indoor unit and be controlled by indoor unit.

CONTENTS PAGE

READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION. KEEP THIS MANUAL IN A HANDY PLACE FOR FUTURE REFERENCE.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY THE SUPPLIER WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

ALL ACTIVITIES DESCRIBED IN THIS MANUAL SHALL BE CARRIED OUT BY A LICENSED TECHNICIAN.

BE SURE TO WEAR ADEQUATE PERSONEL PROTECTION EQUIPMENT (PROTECTION GLOVES, SAFETY GLASSES,) WHEN PERFORMING INSTALLATION, MAINTENANCE OR SERVICE TO THE UNIT.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DEALER FOR ADVICE AND INFORMATION.

1 SAFETY CONSIDERATIONS

The precautions listed here are divided into the following two types. Both cover very important topics, so be sure to follow them carefully.

Meanings of **DANGER**, **WARNING**, **CAUTION** and **NOTE** symbols.

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

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

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

NOTE
Indicates situations that may result in equipment or property-damage accidents only.

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. Your hand may suffer burns. To avoid injury, give the piping time to return to normal temperature or be sure to wear proper gloves.**
- **Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock.**
- **Before touching electrical parts, turn off all applicable power supply.**

WARNING

- **Tear apart and throw away plastic packaging bags so that children will not play with them.Children playing with plastic bags face danger of death by suffocation.**
- **Safely dispose of packing materials. Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.**
- **Ask your dealer or qualified personnel to carry out installation work.Do not install the machine by yourself. Improper installation may result in water leakage, electric shocks or fire.**
- **Perform installation work in accordance with this installation manual.Improper installation may lead to water leakage, electric shocks or fire.**
- **Be sure to use only the specified accessories and parts for installation work.Failure to use the specified parts may result in water leakage, electric shocks, fire, or the unit falling.**
- **Install the unit on a foundation that can withstand its weight.**
- **Insufficient strength may result in the fall of equipment and causing injury.**
- **Carry out the specified installation work in consideration of strong winds, hurricanes, or earthquakes.Improper installation work may result in accidents due to fall of equipment.**
- **Make certain that all electrical work is carried out by**

qualified personnel according to the local laws and regulations and this Installation & owner's 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 that all wiring is secure, using the specified wires and ensuring that external forces do not act on the terminal connections or wires.Incomplete connection or fixing may cause a fire.
- When wiring the power supply, form the wires so that the frontside panel can be securely fastened.If the frontside panel is not in place, overheat of the terminals, electric shocks or a fire may be caused.
- After completing the installation work, check to make sure that there is no leakage of refrigerant gas.
- Never directly touch any accidental leaking refrigerant. This could result in severe wounds caused by 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. Your hands may suffer burns or frostbite 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 proper gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation.Your hands may suffer burns if you touch the internal parts. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- 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.
- If an appliance is intender to be permanently connected to the water mains and not connected by hose-set, this shall be stated.
- The appliance shall be installed in accordance with national wiring regulations.

⚠ CAUTION

- For use of units in applications with temperature alarm settings it is advised to foresee a delay of 10 minutes for signalling the alarm in case the alarm temperature is exceeded. The unit may stop for several minutes during normal operation for "defrosting of the unit" or when in "thermostat-stop" operation.
- 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 conductor or telephone ground wire.Incomplete grounding may cause electric shocks.

a) Gas pipe.
   Ignition or explosion may occur if the gas leaks.

b) Water pipe.
   Hard vinyl tubes are not effective grounds.

c) Lightning conductor or telephone ground wire.
   Electric potential may rise abnormally if struck by a lightning bolt.

- Install the power wire at least 3 feet (1 meter) away from televisions or radios to prevent image 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 rinse the unit. This may cause electric shocks or fire.The appliance shall 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 places such as the following:

a) Where there is mist of mineral oil, oil spray or vapour. Plastic parts may deteriorate, and cause them to fall out or water to leak.

b) Where corrosive gas, such as sulphurous acid gas, is produced. Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.

c) Where there is machinery which emits electromagnetic waves. Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.

d) Where flammable gases may leak, where carbon fibre or ignitable dust is suspended in the air or where olatile flammables, such as thinner or gasoline, are handled. Such gases may cause a fire.

e) Where the air contains high levels of salt such as that near the ocean.

f) Where voltage fluctuates a lot, such as that in factories.

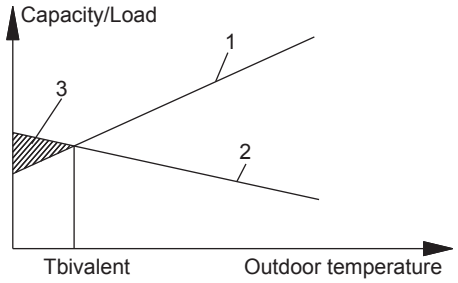
g) In vehicles or vessels.

h) Where acidic or alkaline vapour is present.

2 INTRODUCTION

2.1 General information

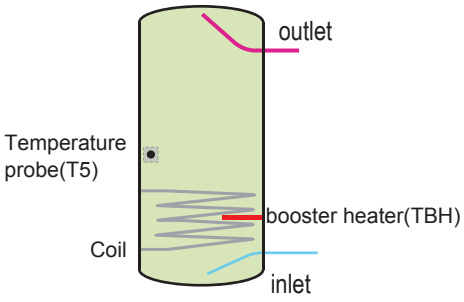
- These units are used for both heating and cooling applications. The units can be combined with fan coil units, floor heating applications, low temperature high efficiency radiators, domestic hot water tank (option) and solar kit (field supply).
- A wired remote controller is standard supplied with the unit to control your installation.
- The unit is delivered with an integrated backup heater for additional heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning of the unit and for freeze protection of the outside water piping during winter time. The capacity of backup heater for different unit listed below.



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

Power supply	1-phase							3-phase		
Indoor unit model	80			160				160S		
Capacity of outdoor unit [kW]	4	6	8	10	12	14	16	12	14	16
Capacity of backup heater	3.0kW							4.5kW		

- **Domestic hot water tank (option)**
  An optional domestic hot water tank can be connected to the unit.



If the tank volume is greater than 240L, the temperature probe (T5) should be installed at the position which higher than half of the height of tank.
If the tank volume is less than 240L, the temperature probe should be installed at the position which higher than 2/3 of tank's height.

The booster heater should be installed below the temperature probe.
The heating exchanger (coil) should be installed below the temperature probe.
The distance between the outdoor unit and tank should less than 5 meters.

Unit			4~8kW	10~16kW
Volume of tank/L		minimun	100	200
		suggestion	200	300
Heating exchanger (Stainless steel coil)	heat exchange area/m^2	minimum	1.4	1.75
		suggestion	2.5	4
	Volume/L	minimum	12	14
		suggestion	20	32
Heating exchanger (Enamel coil)	heat exchange area/m^2	minimum	1.7	2.5
		suggestion	3	5.6
	Volume/L	minimum	14	20
		suggestion	24	45

- **Room thermostat (field supply)**
  An optional room thermostat can be connected to the unit(room thermostat should 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.
- **Remote alarm kit (field supply)**
  A remote alarm kit can be connect to the unit.

CAUTION

To Disconnect the Appliance from Main Power Supply.

This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm.The installation fuse must be used for the power supply line of this heat pump.

- **No heat pump operation, backup heater or boiler only.**

(*) The models have a frozen prevention function using the heat pump and back up heater to keep the water system safe from freezing in all conditions. In case accidental or intentional power shutdown is likely to happen, we recommend to use glycol(Refer to 5.6 Water pipework caution: **"Use of glycol"**).

- **Capacity test**
  If want to do the capacity test, please contact the manufacturer.

2.2 Scope of this manual

This installation & owner's manual describes the procedures for installing and connecting all monobloc outdoor unit models.

2.3 Operating range

Operationg range of indoor unit	
Outlet water (Heating mode)	+25 ~ +60℃
Outlet water (Cooling mode)	+5 ~ +25℃
Domestic hot water	+40 ~ +60℃
Ambient temperature	-20 ~ +46℃
Water pressure	0.03~0.3MPa(g)

In cooling mode,The minimum leaving water flow temperature(T1stopc) that the unit can reach in different outdoor temperature(T4) is listed below:

T4	≤10	11	12	13
T1stopc	10	9	9	8
T4	14	15	16	17
T1stopc	8	7	7	6
T4	18	19	≥20	
T1stopc	6	6	5	

When refrigerant pipe is short(DIP switch OFF,refer to **6.2 DIP switch settings overview**) the maximum leaving water flow temperature(T1stoph) that heat pump can reach in different outdoor temperature(T4) is listed below(Heating mode):

T4	-20	-19	-18	-17
T1stoph	40	41	41	42
T4	-16	-15	-14	-13
T1stoph	43	44	45	46
T4	-12	-11	-10	-9
T1stoph	47	48	49	51
T4	-8	-7	-6	-5
T1stoph	53	55	55	55
T4	-4	-3	-2	-1~29
T1stoph	56	58	60	60
T4	30	31	32	33
T1stoph	60	59	58	57
T4	34	35	36	37
T1stoph	56	55	55	55
T4	38	39	40	41
T1stoph	55	54	53	52
T4	42	43		
T1stoph	51	50		

When refrigerant pipe is long(DIP switch ON, refer to **6.2 DIP switch settings overview**) the maximum leaving water flow temperature(T1stoph) that heat pump can reach in different outdoor temperature(T4) is listed below(Heating mode):

T4	-20	-19	-18	-17
T1stoph	38	39	39	40
T4	-16	-15	-14	-13
T1stoph	41	42	43	44
T4	-12	-11	-10	-9
T1stoph	45	46	47	48
T4	-8	-7	-6	-5
T1stoph	49	51	53	54
T4	-4	-3	-2	-1~29
T1stoph	54	56	58	60
T4	30	31	32	33
T1stoph	60	59	58	57
T4	34	35	36	37
T1stoph	56	55	55	55
T4	38	39	40	41
T1stoph	55	54	53	52
T4	42	43		
T1stoph	51	50		

In DHW mode, the maximum domestic hot water temperature(T5stop) that heat pump can reach in different ambien temperature(T4) is listed below:

T4		-20~-16	-15~-11	-10~-4	-5~-1
T5stop	4~8kW	40	45	48	52
	10~16kW	40	45	48	50
T4		0~4	5~9	10~14	15~19
T5stop	4~8kW	55	55	55	55
	10~16kW	53	55	55	53
T4		20~24	25~29	30~34	35~39
T5stop	4~8kW	52	50	50	48
	10~16kW	50	50	48	48
T4		40~43			
T5stop	4~8kW	45			
	10~16kW	45			

3 ACCESSORIES

	Name	Shape	Quantity
Installation fittings	1. Indoor unit installation & owner's manual (This book)		1
	2. Y-shape filter		1
	3. Mounting bracket		1
	4.User interface kit (digital remote controller)		1
	5. M8 expansion screws		5
	6.temperature sensor for domestic hot water tank T5 or additional heating source T1B*		1
	7.Copper nut	—	1
	8. User interface installation & owner's manual		1

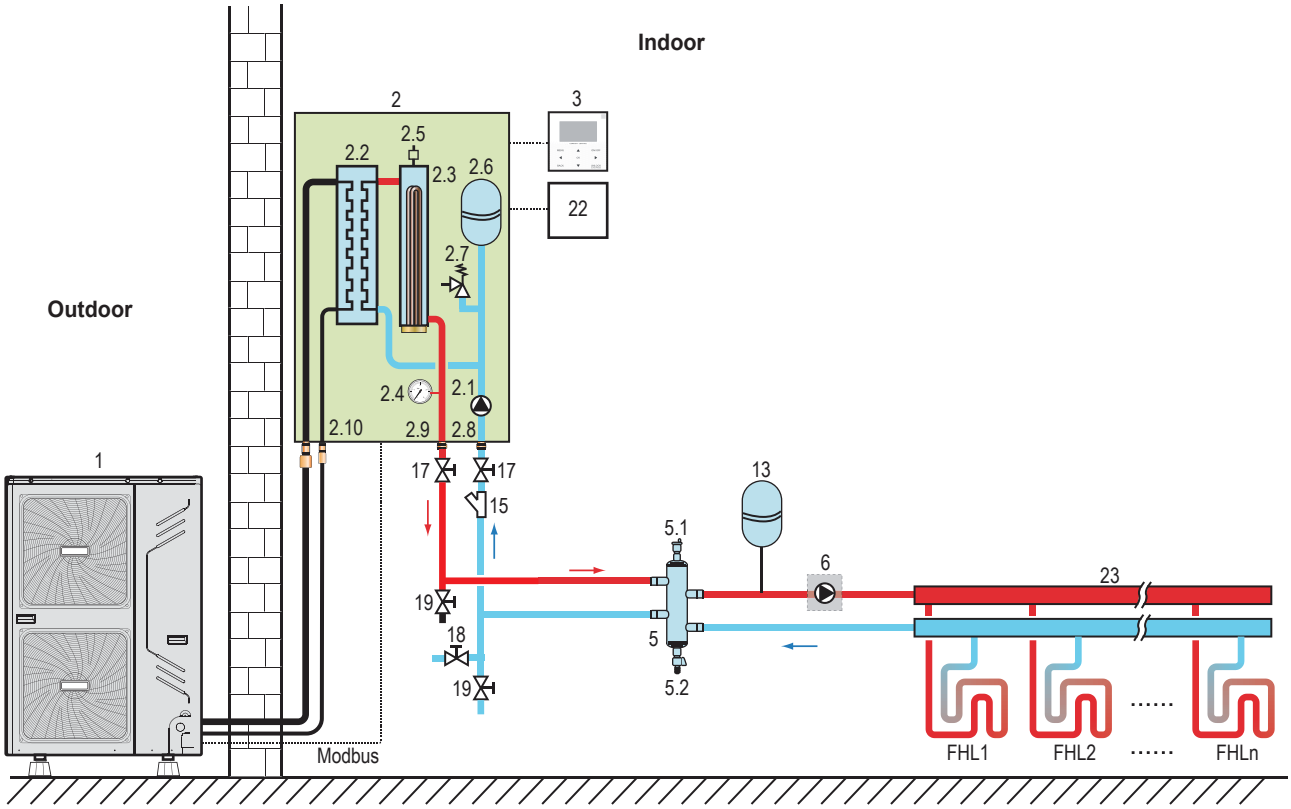
* The thermistor can be used to detect temperature of water, if domestic hot water tank installed only, the thermistor can work as T5, if boiler installed only, the thermistor can worke as T1B, if both unit is installed, an addtional thermistor is needed(please contact the supplier). The thermistor should connect to the corresponding port in the main control board of hydraulic.(refer to **5.9.2.3 Main control board of hydraulic module**).

4 TYPICAL APPLICATION EXAMPLES

The application examples given below are for illustration purposes only.

4.1 Application 1

Space heating only application with a room thermostat connected to the unit.



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2.3 IBH (built-in backup heater)
2.4 Manometer (built-in)
2.5 Air vent valve (built-in)
2.6 Expansion vessel (built-in)
2.7 Safety valve (built-in pressure relief)
2.8 Water inlet
2.9 Water outlet
2.10 Refrigerant connections
3 User interface (accessory)
5 Balance tank (field supply)
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6 P_o: Outside circulating pump (field supply)
13 Expansion vessel (field supply)
15 Filter (accessory)
17 Shut-off valve (field supply)
18 Fill valve (field supply)
19 Drain valve (field supply)
22 Room thermostat (field supply)
23 Collector (field supply)
FHL1…n Floor heating loop (field supply)

NOTE

The volume of balance tank(5) should be greater than 40L(for 4~8kW unit, greater than 20L) The drain valve (19) should be installed at the lowest positon of the system.

Unit operation and space heating

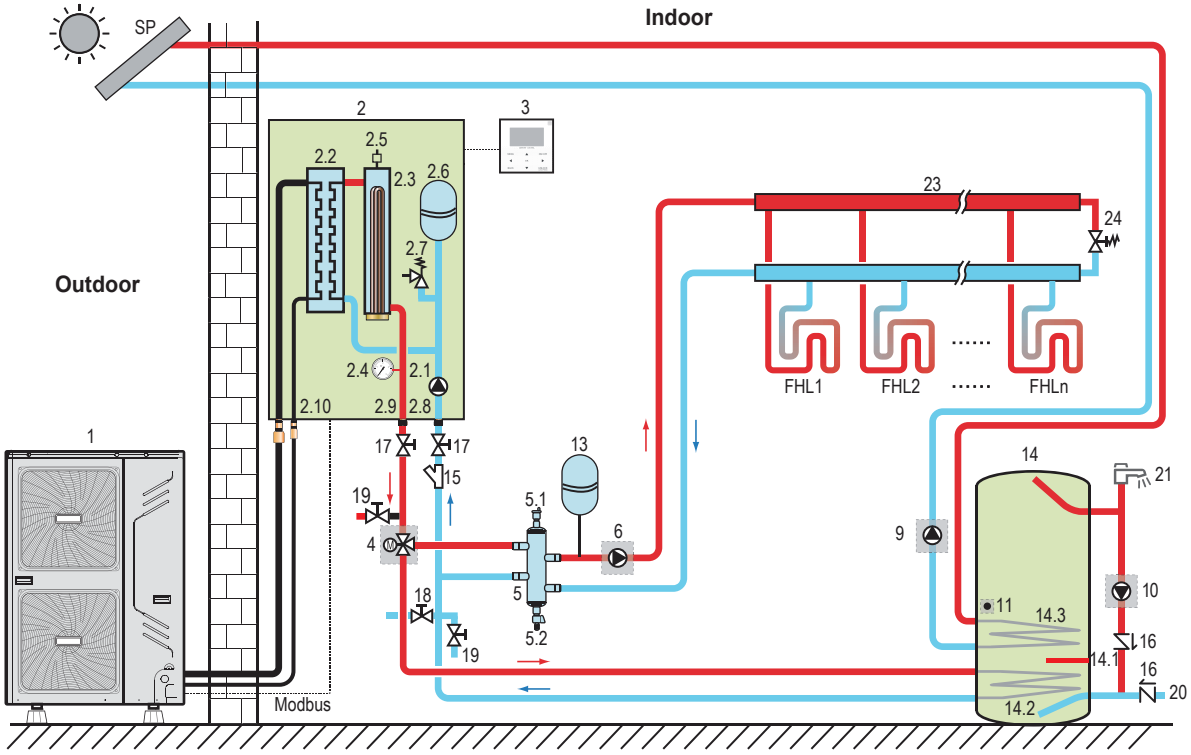
When a room thermostat is connected to the unit and when there is a heating request from the room thermostat, the unit will start operating to achieve the target water flow temperature as set on the user interface. When the room temperature is above the thermostat set point in heating mode, the unit (1) and (2) will stop operating, the circulating pump(2.1) and (6) will stop running also, the room thermostat uesd as a switch here.

NOTE

Make sure to connect the thermostat wires to the correct terminals, method B should be selected (see **"For room thermostat"** on **"Connection for other components"**) and to configure the ROOM THERMOSTAT in the FOR SERVICEMAN correctly (see **"6.13 ROOM THERMOSTAT"**)

4.2 Application 2

Space heating only application without room thermostat connected to the unit. Domestic hot water is provided through the domestic hot water tank which is connected to the unit.



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10 P_d: DHW pipe pump (field supply)
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13 Expansion vessel (field supply)
14 Domestic hot water tank (field supply)
14.1 TBH: Domestic hot water tank booster heater
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14.3 Coil heat exchanger for solar
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18 Fill valve (field supply)
19 Drain valve (field supply)
20 Tap water inlet pipe (field supply)
21 Hot water tap (field supply)
23 Collector (field supply)
24 Bypass valve (field supply)
SP Solar plate (field supply)
FHL1…n Floor heating loop (field supply)
M1…n Motorized valve (field supply)
T1…n Room thermostat (field supply)

NOTE

The volume of balance tank(5) should be greater than 40L(for 4~8kW unit, greater than 20L) The drain valve (19) should be installed at the lowest positon of the system.

■ **Circulated pump operation**

With no room thermostat connected to the indoor unit (2), the circulating pump (2.1) and (6) will operate as long as the unit is on for space heating. The circulating pump (2.1) will operate as long as the unit is on for heating domestic hot water(DHW).

■ **Space heating**

The unit (1) and (2) will operate to achieve the target water flow temperature as set on the user interface.

■ **Domestic water heating**

1) When domestic water heating mode is enabled (either manually by the user, or automatically through a schedule) the target domestic hot water temperature will be achieved by a combination of the heat exchanger coil and the electrical booster heater (when the booster heater in the tank is configured YES).
2) When the domestic hot water temperature is below the user configured set point, the 3-way valve(4) will be activated to heat the domestic water by means of the heat pump. In case of large domestic hot water demand or a high domestic hot water temperature setting, the booster heater (14.1) can provide additional heating.

■ **DHW pipe pump operation**

1) The DHW pipe pump(10) is used to circulate the domestic hot water through the hot tap water pipes for keeping the water in the hot tap water pipes in order to make the hot water coming quickly when user open the tap.
2) The DHW pipe pump(10) will operate for a period of time when the time reaches the set timers which have be set by user interface. More details refer to the manual of user interface.

CAUTION

Make sure to fit the 3-way valve correctly. For more details, refer to "**Connection for other components/For 3-way valve SV1 "**

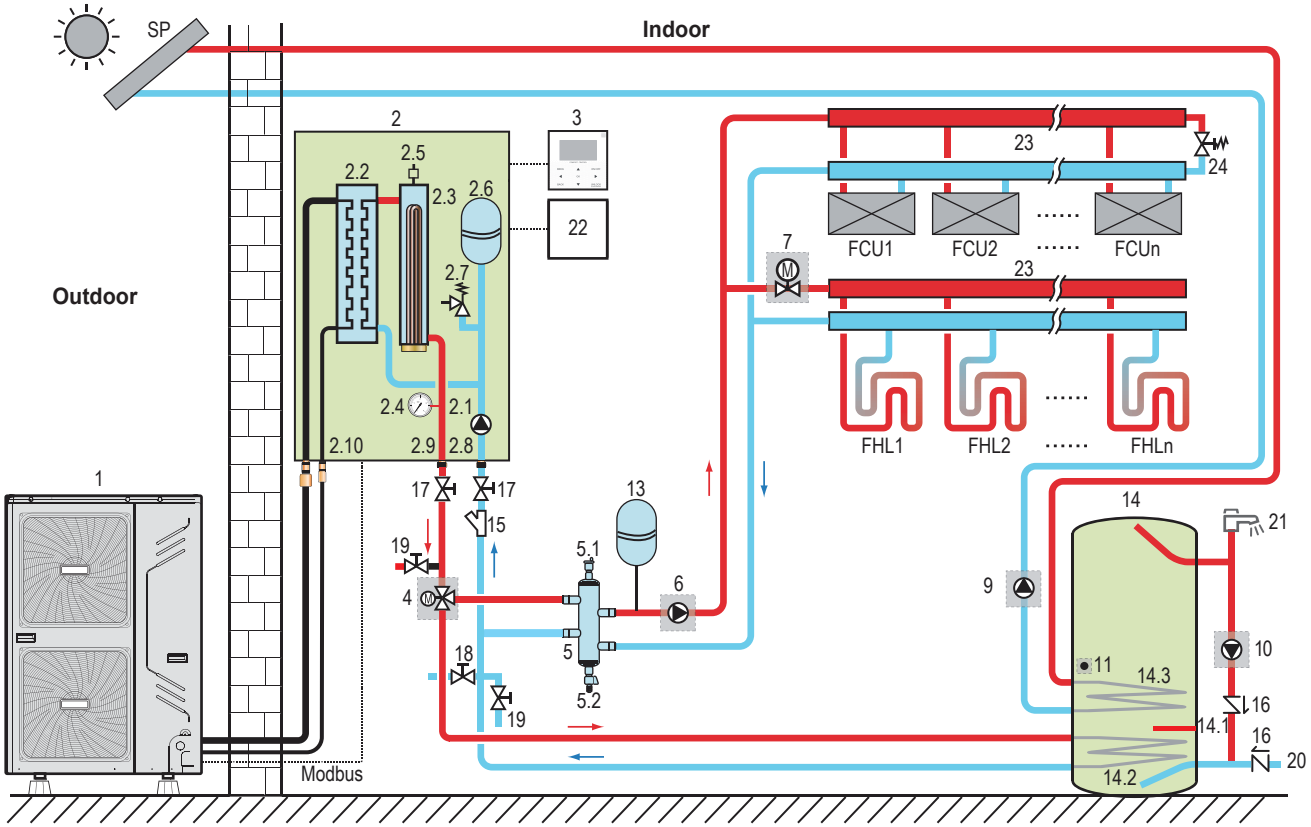
NOTE

The unit can be configured so that at low outdoor temperatures the domestic water is exclusively heated by the booster heater. This assures that the full capacity of the heat pump is available for space heating.

Details on domestic hot water tank configuration for low outdoor temperature (T4DHWMIN) can be found under "**6.8 DHW control** "

4.3 Application 3

Space cooling and heating application with a room thermostat suitable for heating/cooling changeover connected to the unit. Heating is provided through floor heating loops and fan coil units. Cooling is provided through the fan coil units only. Domestic hot water is provided through the domestic hot water tank which is connected to the unit.



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FHL1…n Floor heating loop (field supply)
FCU1…n Fan coil unit (field supply)

NOTE

The volume of balance tank(5) should be greater than 40L(for 4~8kW unit, greater than 20L) The drain valve (19) should be installed at the lowest positon of the system.

■Pump operation and space heating/cooling
The unit will switch to either heating or cooling mode according to the setting of room thermostate.

Wiring of room thermostat should follow **method A** as described in**"Connection for other components/For room thermostat".**
When space heating/cooling is requested by the room thermostat (22), the circulating pump(2.1) and (6) will start operating and the unit (1) and (2) will switch to "heating mode"/"cooling mode". The unit (1) and (2) will start operating to achieve the target leaving cold/hot water temperature.
In case of cooling mode, the motorized 2-way valve (7) will close as to prevent cold water running through the floor heating loops (FHL).

CAUTION

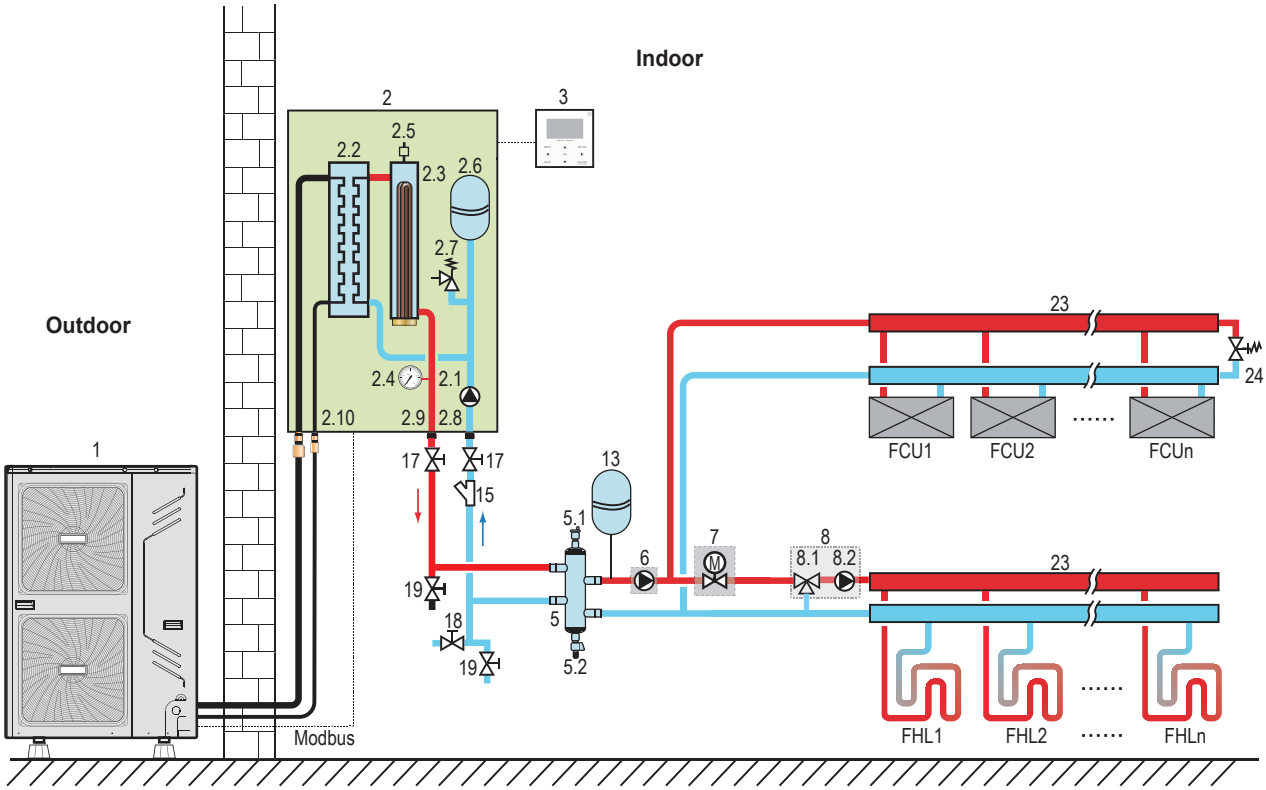
- Make sure to connect the thermostat wires to the correct terminals (see **"For room thermostat"** on **"Connection for other components"**) and to configure the ROOM THERMOSTAT in the user interface correctly (see **"Field settings/ROOM THERMOSTAT"**).
- Wiring of the 2-way valve (7) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

The ON/OFF setting of the heating/cooling operation can't be done on the user interface.

■ Domestic water heating and DHW pipe pump operating
Domestic water heating and DHW pipe pump operatiing are as described in **"Application 2".**

4.4 Application 4

Space cooling and heating application without a room thermostat connected to the unit, the temperature sensor **Ta** attached in the user interface is used to control the ON/OFF of the unit. Heating is provided through floor heating loops and fan coil units. Cooling is provided through fan coil units only.



1 Outdoor unit
2 Indoor unit
2.1 PUMP_I (built-in circulating pump)
2.2 Plate heat exchanger (air to water heat exchanger)
2.3 IBH (built-in backup heater)
2.4 Manometer (built-in)
2.5 Air vent valve (built-in)
2.6 Expansion vessel (built-in)
2.7 Safety valve (built-in pressure relief)
2.8 Water inlet
2.9 Water outlet
2.10 Refrigerant connections
3 User interface (accessory)
5 Balance tank (field supply)
5.1 Air vent valve
5.2 Drain valve
6 P_o: Outside circulating pump (field supply)
7 SV2: Motorized 2-way valve (field supply)
8 Mixing station (field supply)
8.1 Mixing valve
8.2 P_c: Mixing pump
13 Expansion vessel (field supply)
15 Filter (accessory)
16 Non return valve (field supply)
17 Shut-off valve (field supply)
18 Fill valve (field supply)
19 Drain valve (field supply)
23 Collector (field supply)
24 Bypass valve (field supply)
SP Solar plate (field supply)
Th Heating only room thermostat for floor heating loop (field supply)
Thc Heating/Cooling room thermostat for fan coil unit (field supply)
FHL1…n Floor heating loop (field supply)
FCU1…n Fan coil unit (field supply)

NOTE

The volume of balance tank(5) should be greater than 40L(for 4~8kW unit, greater than 20L) The drain valve (19) should be installed at the lowest positon of the system.

Pump operation

With no room thermostat connected to the indoor unit(2) , the circulated pump (2.1) and (6) will operate as long as the unit is on for space heating/ cooling.

NOTE

As the temperature sensor is used to detect the room temperature, the user interface (4) should be placed in the room where floor heating loops and fan coil units is installed and away from the heating source. Correct configuration should be applied in the user interface (refer to **6.12 TEMP. TYPE SETTING**). The target room temperature can be set on the main page of user interface, the target outlet water temperature will be calculated from climate related curves, the unit will turn off when the room temperature reaches the target temperature.

Space heating and cooling

According to the season, the user will select cooling or heating through the user interface.
The unit (1) and (2) will operate in cooling mode or heating mode to achieve the target room temperature.
In heating mode, the 2-way valve(7) is open. Hot water is provided to both the fan coil units and the floor heating loops.
In cooling mode, the 2-way valve(7) is closed to prevent cold water running through the floor heating loops(FHL).

CAUTION

Wiring of the 2-way valve(7) is different for a NC (normal closed) valve and a NO (normal open) valve，the NO valve is unavailable to this unit! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

The ON/OFF setting of the heating/cooling operation is done by the user interface.

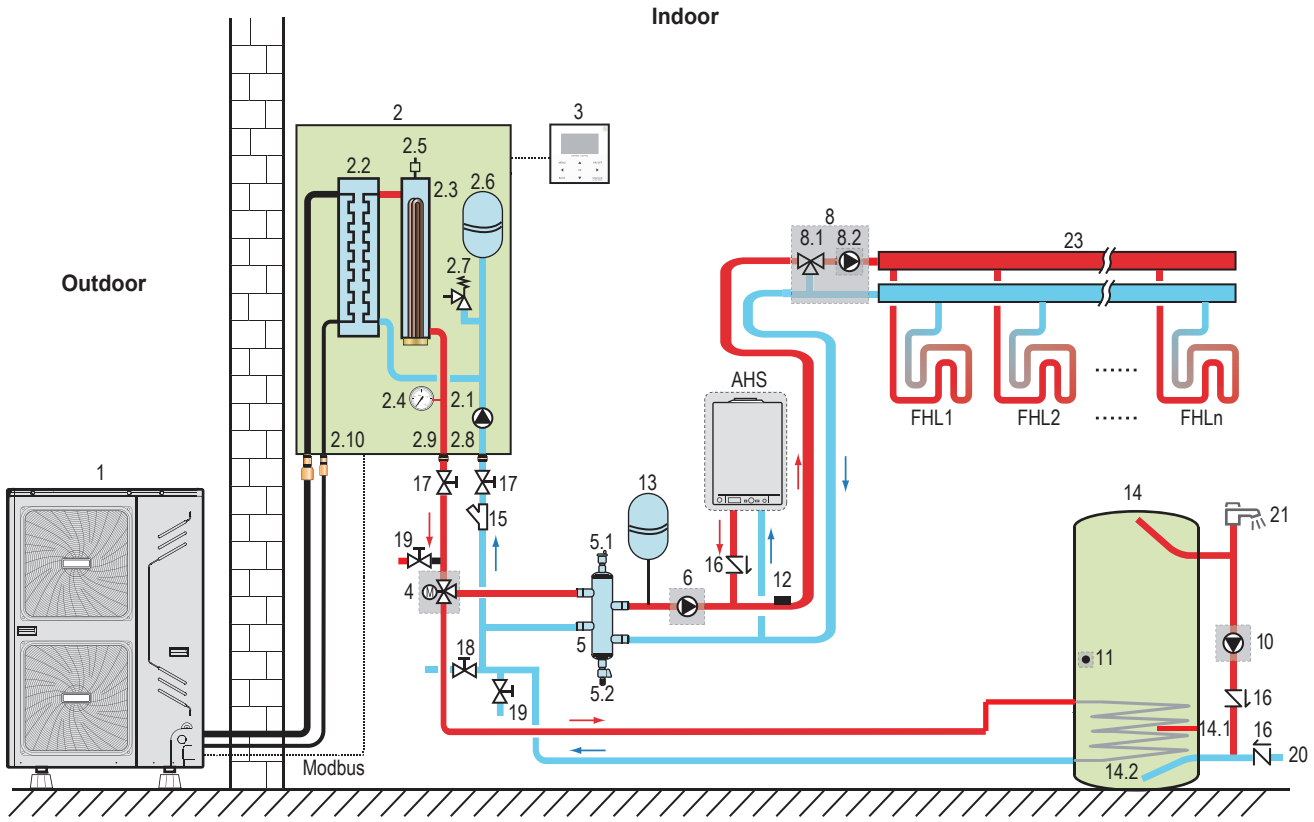
4.5 Application 5

Space heating with an auxiliary boiler (alternating operation).
Space heating application by either the unit or by an auxiliary boiler connected in the system.
■ The unit controlled contact (also called 'permission signal for the auxiliary boiler") is determined by the outdoor temperature (thermistor located at the outdoor unit). See **10.7 Field settings/OTHER HEATING SOURCE**
■ Bivalent operation is possible for both space heating operation and domestic water heating operation.
■ If the auxiliary boiler only provides heat for space heating, the boiler must be integrated in the piping work and in the field wiring according to the illustration for **application a**.
■ If the auxiliary boiler is also providing heat for domestic hot water, the boiler can be integrated in the piping work and in the field wiring according to the illustration for **application b**. In this condition, the unit can sent ON/OFF signal to boiler in heating mode, but the boiler control itself in DHW mode.
■ If the auxiliary boiler only provides heat for domestic water heating, the boiler must be integrated in the piping work and in the field wiring according to the illustration for **application c**.

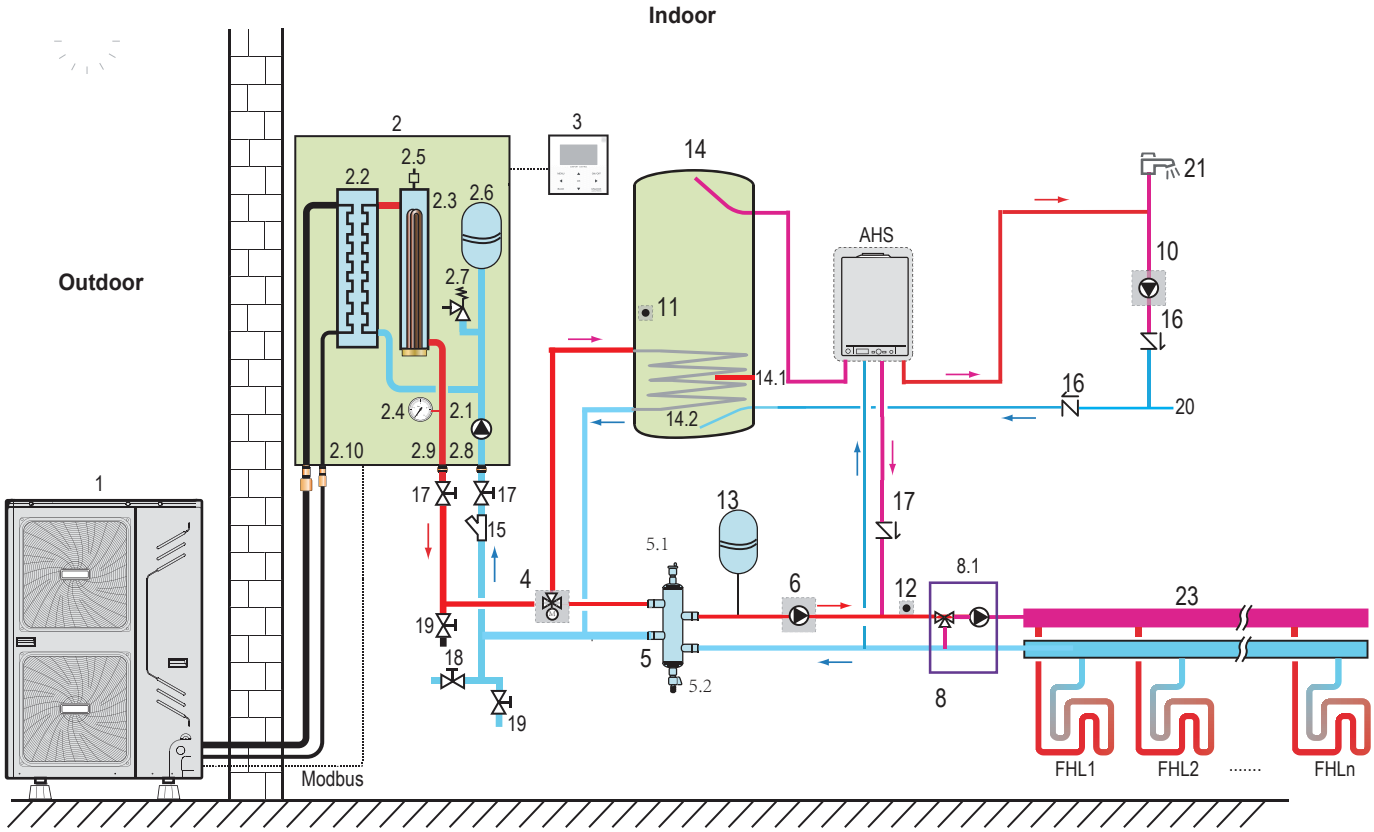
CAUTION

Be sure that the boiler and the integration of the boiler in the system is in accordance with relevant local laws and regulations.

Application A
Boiler provide heat for space heating only

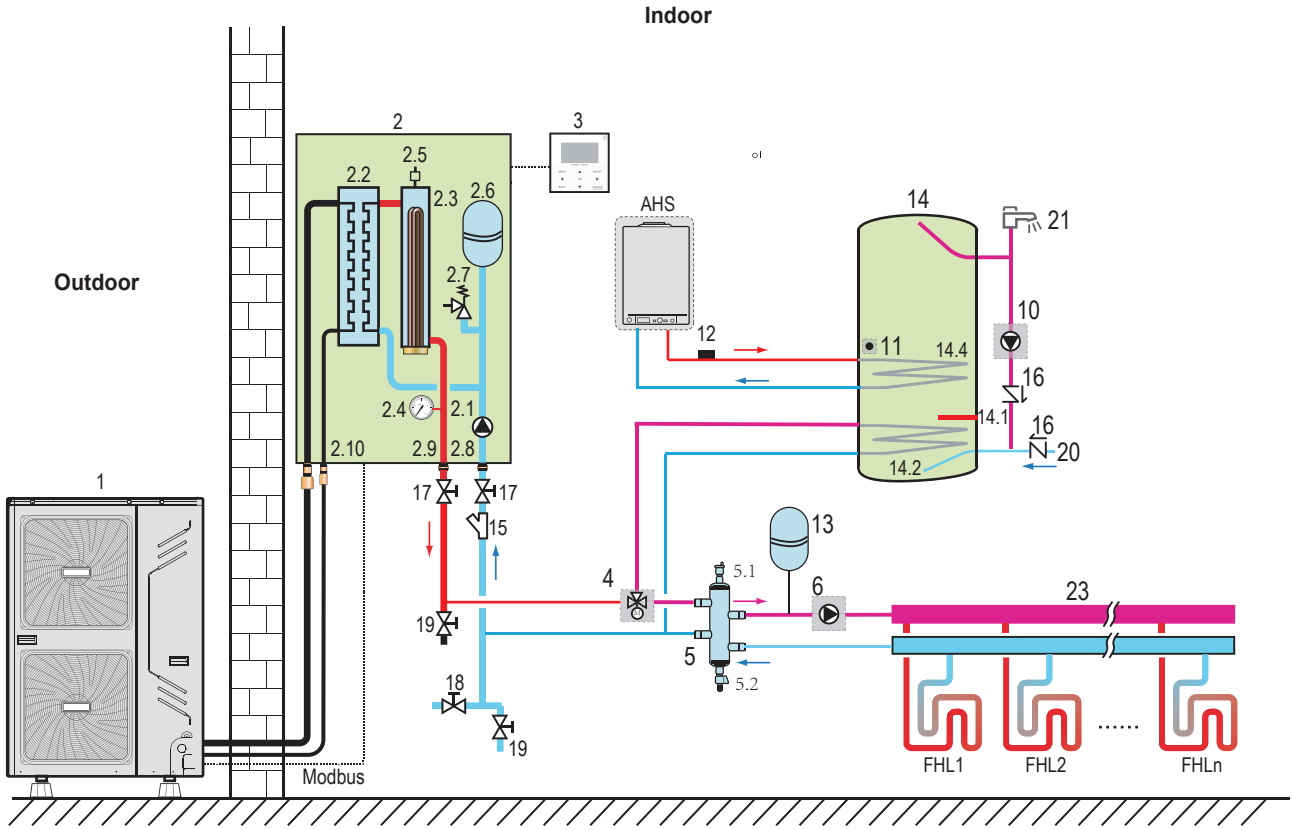


Application B
Boiler provide heat for space heating and domestic water heating, the ON/OFF of boiler is controlled by itself for domestic water heating.



Application c

Boiler provide heat for space heating and domestic water heating. the ON/OFF of boiler controled by unit.



1 Outdoor unit
2 Indoor unit
2.1 PUMP_I (built-in circulating pump)
2.2 Plate heat exchanger (air to water heat exchanger)
2.3 IBH (built-in backup heater)
2.4 Manometer (built-in)
2.5 Air vent valve (built-in)
2.6 Expansion vessel (built-in)
2.7 Safety valve (built-in pressure relief)
2.8 Water inlet
2.9 Water outlet
2.10 Refrigerant connections
3 User interface (accessory)
4 SV1: Motorized 3-way valve (field supply)
5 Balance tank (field supply)
5.1 Air vent valve
5.2 Drain valve
6 P_o: Outside circulating pump (field supply)
8 Mixing station (field supply)
8.1 Mixing valve
8.2 P_c: Mixing pump
10 P_d: DHW pipe pump (field supply)
11 T5: Domestic water tank temperature sensor (accessory)
12 T1B: Confluent outlet water temperature sensor (optional)
13 Expansion vessel (field supply)
14 Domestic hot water tank (field supply)
14.1 TBH: Domestic hot water tank booster heater
14.2 Coil heat exchanger for heat pump
14.4 Coil heat exchanger for boiler
15 Filter (accessory)
16 Non return valve (field supply)
17 Shut-off valve (field supply)
18 Fill valve (field supply)
19 Drain valve (field supply)
20 Tap water inlet pipe (field supply)
21 Hot water tap (field supply)
23 Collector (field supply)
FHL1…n Floor heating loop (field supply)
AHS Additional heating source such as boiler (field supply)

NOTE

The volume of balance tank(5) should be greater than 40L(for 4~8kW unit, greater than 20L) The drain valve (19) should be installed at the lowest positon of the system.

Operation

When heating required, either the unit or the boiler starts operating, depending on the outdoor temperature (refer to **"Field setting/ OTHER HEATING SOURCE"**).

- As the outdoor temperature is measured via the outdoor unit ambient temperature sensor, make sure to install the outdoor unit in the shade, so that it is not influenced by the sun.
- Frequent switching may cause corrosion of the boiler in an early stage. Contact the manufacturer of the boiler.
- During heating operation of the unit, the unit will operate so as to achieve the target water flow temperature as set on the user interface. When weather dependent operation is active, the water temperature is determined automatically depending on the outdoor temperature.

- During heating operation of the boiler, the boiler will operate so as to achieve the target water flow temperature as set on the user interface.
- Never set the target water flow temperature set point on the user interface above (60°C).

The domestic water heating and DHW pipe pump operationg are as described in **"Application 2".**

NOTE

Make sure to configure the FOR SERVICEMAN in the user interface correctly. Refer to "**6.14 OTHER HEATING SOURCE**".

CAUTION

- Make sure that return water to the heat exchanger never exceeds 60°C. Never put the target water flow temperature set point on the user interface above 60°C.
- Make sure that the non-return valves (field supply) are correctly installed in the system.
- The supplier shall not be held liable for any damage resulting from failure to observe this rule.

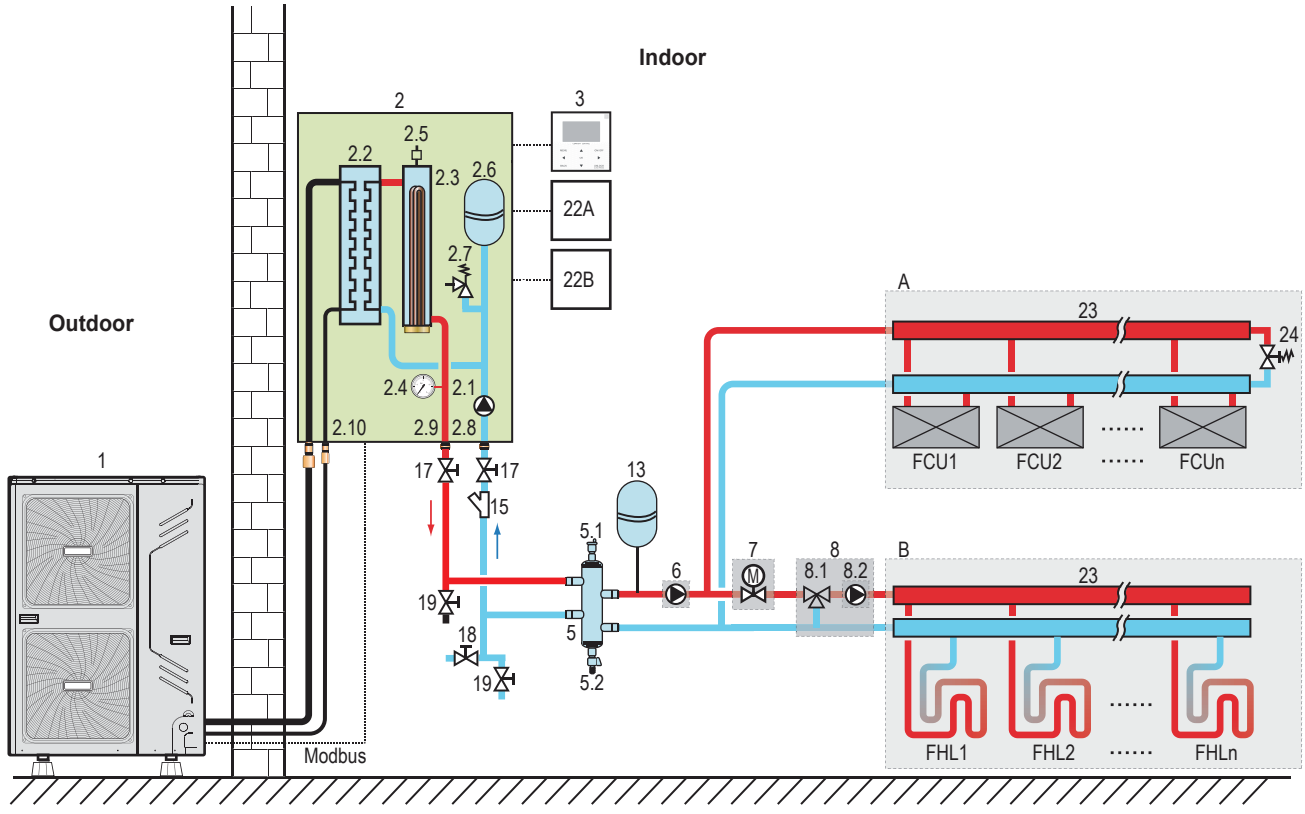
4.6 Application 6

Dual setpoint function application with two room thermostat connect to the outdoor unit.

- Space heating with two room thermostat application through floor heating loops and fan coil units. The floor heating loops and fan coil units require different operating water temperatures.
- The floor heating loops require a lower water temperature in heating mode compared to fan coil units. 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 fan coil units are directly connected to the unit water circuit and the floor heating loops are after the mixing station. Control of this mixing station is not done by the unit.
- The operation and configuration of the field water circuit is the responsibility of the installer.
- We only offer a dual set point control function. This function allows two set points to be generated. Depending on the required water temperature (floor heating loops and/or fan coil units are required) the first set point(set on the user interface) or second set point(calculate from climate related curves) can be activated. More details refer to **6.13 ROOM THERMOSTAT**.

NOTE

The wiring of room thermostat 5A(for fan coil units) and 5B(for floor eating loops) should follow '**method C**' as described in **6.13 For room thermostat**, and the thermostat which connect to port 'C' (in the outdoor unit) should be placed on the zone where floor heating loops is installed(zone B), the other one connect to port 'H' should be placed on the zone where fan coil units is installed(zone A).



1 Outdoor unit
2 Indoor unit
2.1 PUMP_I (built-in circulating pump)
2.2 Plate heat exchanger (air to water heat exchanger)
2.3 IBH (built-in backup heater)
2.4 Manometer (built-in)
2.5 Air vent valve (built-in)
2.6 Expansion vessel (built-in)
2.7 Safety valve (built-in pressure relief)
2.8 Water inlet
2.9 Water outlet
2.10 Refrigerant connections
3 User interface (accessory)
5 Balance tank (field supply)
5.1 Air vent valve
5.2 Drain valve
6 P_o: Outside circulating pump (field supply)
7 SV2: Motorized 2-way valve (field supply)
8 Mixing station (field supply)
8.1 Mixing valve
8.2 P_c: Mixing pump
13 Expansion vessel (field supply)
15 Filter (accessory)
17 Shut-off valve (field supply)
18 Fill valve (field supply)
19 Drain valve (field supply)
22A Room thermostat for zone A (field supply)
22B Room thermostat for zone B (field supply)
23 Collector (field supply)
24 Bypass valve (field supply)
A Zone A
B Zone B
FHL1…n Floor heating loop (field supply)
FCU1…n Fan coil unit (field supply)

NOTE

The volume of balance tank(5) should be greater than 40L(for 4~8kW unit, greater than 20L) The drain valve (19) should be installed at the lowest positon of the system.

The advantage of the dual set point control is that the heat pump will/can operate at the lowest required water flow temperature when only floor heating is required. Higher water flow temperatures are only required in case fan coil units are operating. This results in a better performance of the heat pump.

Pump operation and space heating

The pump (2.1) and (6) will operate when there is a request for heating from A and/or B. The unit(1) and (2) will start operating to achieve the target water flow temperature. The target leaving water temperature depends on which room thermostat is requesting heating.

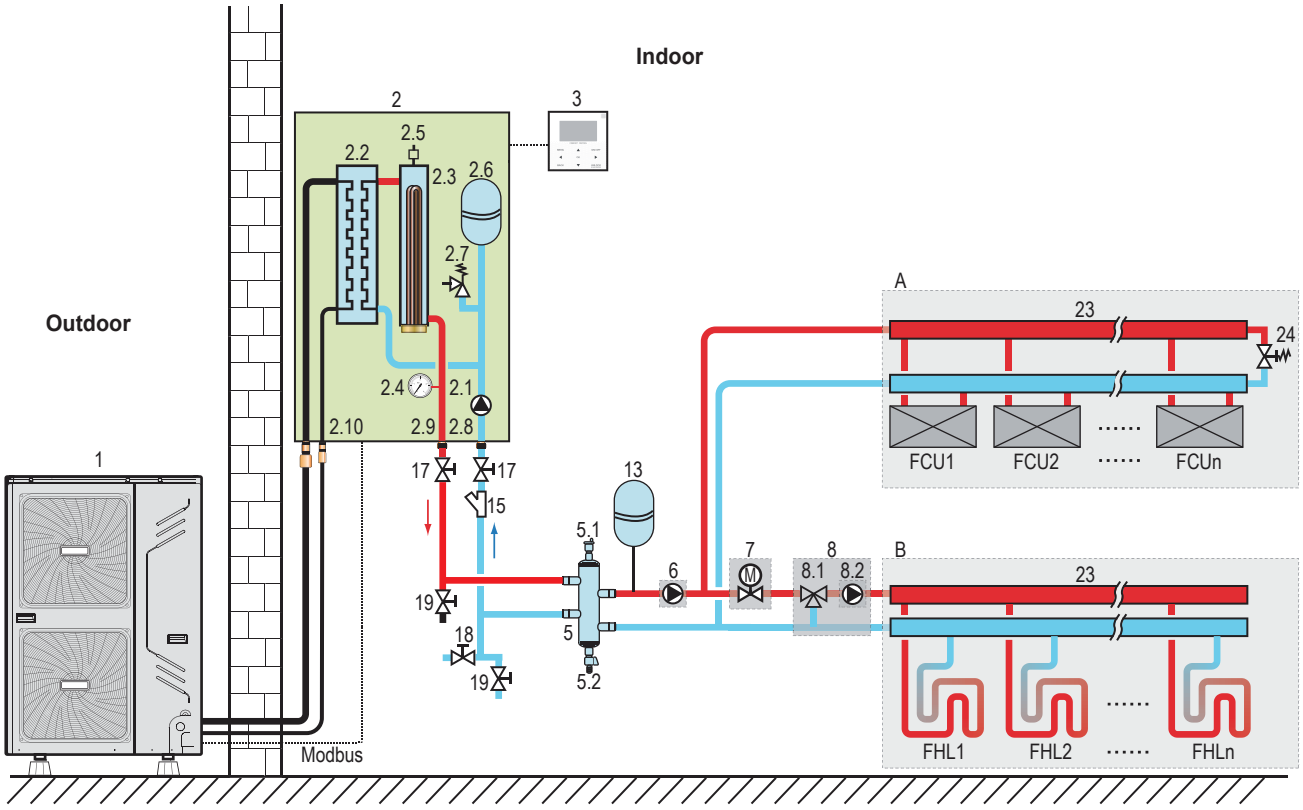
When the room temperature of both zones is above the thermostat set point, the units and pumps will stop operating.

NOTE

- Make sure to configure the room thermostat installation on the user interface correctly. Refer to "**6.13 ROOM THERMOSTAT**".
- It is the installers' responsibility to ensure that no unwanted situations can occur (e.g. extremely high temperature water going towards floor heating loops, etc.)
- The supplier does not offer any type of mixing station. Dual set point control only provides the possibility to use two set points.
- When only zone A requests heating, zone B will be fed with water at a temperature equal to the first set point. This can lead to unwanted heating in zone B.
- When only zone B requests heating, the mixing station will be fed with water at a temperature equal to the second set point. Depending on the control of the mixing station, the floor heating loop can still receive water at a temperature equal to the set point of the mixing station.
- Be aware that the actual water temperature through the floor heating loops depends on the control and setting of the mixing station.

4.7 Application 7

Space cooling and heating application without a room thermostat connected to the unit, but the temperature sensor attached in the user interface is used to control the ON/OFF of the unit. Heating is provided through floor heating loops. Cooling is provided through the fan coil units. A 3-way valve is used to change the direction of water flow when the operation mode changed.



1 Outdoor unit
2 Indoor unit
2.1 PUMP_I (built-in circulating pump)
2.2 Plate heat exchanger (air to water heat exchanger)
2.3 IBH (built-in backup heater)
2.4 Manometer (built-in)
2.5 Air vent valve (built-in)
2.6 Expansion vessel (built-in)
2.7 Safety valve (built-in pressure relief)
2.8 Water inlet
2.9 Water outlet
2.10 Refrigerant connections
3 User interface (accessory)
5 Buffer tank (field supply)
6 Balance tank (field supply)
6.1 Air vent valve
6.2 Drain valve
7 P_o Outside circulating pump (field supply)
14 Expansion vessel (field supply)
16 Filter (accessory)
19 Shut-off valve (field supply)
20 Fill valve (field supply)
21 Drain valve (field supply)
25 Collector (field supply)
26 Bypass valve (field supply)
29 Motorized 3-way valve (field supply)
FHL1…n Floor heating loop (field supply)
FCU1…n Fan coil unit (field supply)

NOTE

The volume of balance tank(5) should be greater than 40L(for 4~8kW unit, greater than 20L) The drain valve (19) should be installed at the lowest positon of the system.
As the temperature sensor attached in the user interface is used to detect the room temperature, the user interface (4) should be placed in the room where floor heating loops and fan coil units is installed and away from the heating source. Correct configuration should be applied in the user interface (refer to **6.12 TEMP. TYPE SETTING**). The first setpoint is water temperature which can be set on the main page of user interface, the second setpoint is calculated from climate related curves, the target outlet water temperature is the higher one of these two setpoint. the unit will turn off when the room temperature reaches the target temperature.

5. INSTALLATION OF THE INDOOR UNIT

CAUTION

The indoor unit should be installed in a water proof place, or the safety of the unit and the operator cannot be ensured.

5.1 Selecting an installation location

- **The indoor unit is to be wall 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, see figure 5-3.**
- **The space around the unit allows for sufficient air circulation.**
- **There is a provision for condensate drain and pressure relief valve blow-off.**

CAUTION

When the unit running in the cooling mode, Condensate may drop from the water inlet and water outlet pipes. Please make sure the dropping condensate will not result in damage of your furniture and other devices.

- **The installation surface is a flat and vertical non-combustible wall, capable of supporting the operation weight of the unit.**
- **There is no danger of fire due to leakage of inflammable gas.**
- **All piping lengths and distance have been taken into consideration.**

Table. 5-1

Requirement	Volume
Maximum allowable piping length between the 3-way valve SV1 and the indoor unit (only for installations with domestic hot water tank)	3m
Maximum allowable piping length between the domestic hot water tank and the indoor unit (only for installations with domestic hot water tank). The temperature sensor cable supplied with the indoor unit is 10 m in length.	8m
Maximum allowable piping length between the T1B and the indoor unit. The temperature sensor a cable of T1B supplied with the indoor unit is 10m in length.	8m

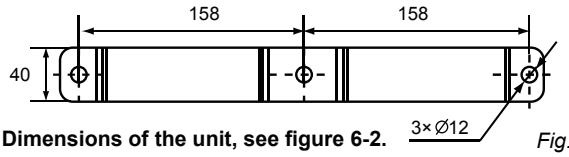
- **The equipment is not intended for use in a potentially explosive atmosphere.**

NOTE

If the installation is equipped with a domestic hot water tank (optional), please refer to the domestic hot water installation manual.

5.2 Dimensions and service space

- **Unit of measurement: mm**
  Dimensions of the wall bracket:



- **Dimensions of the unit, see figure 6-2.**

Fig.5-1

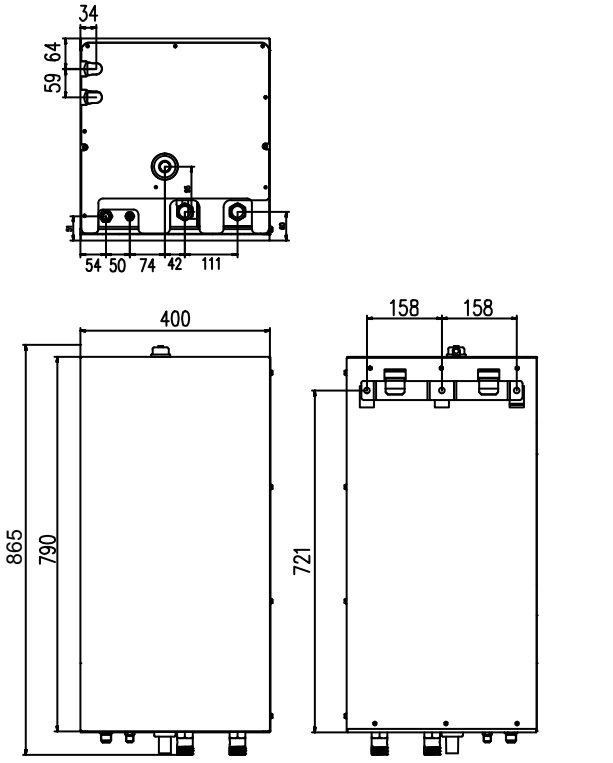


Fig.5-2

NO.	NAME
1	Refrigerant gas connection 5/8"-14UNF
2	Refrigerant liquid connection 3/8"-14UNF
3	Drainage Ø 25
4	Water Inlet R1"
5	Water Outlet R1"

- Required service space, see figure 5-3.

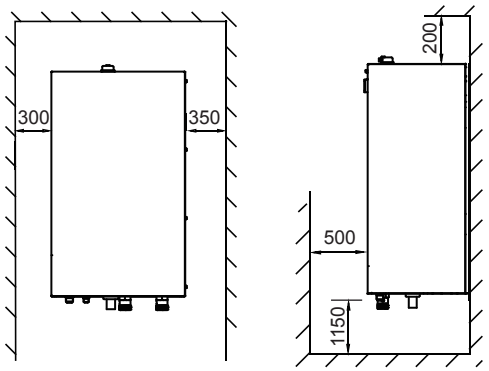


Fig.5-3

5.3 Inspecting, handling and unpacking the unit

- **The indoor unit is packed in a box.**
- **At delivery, the unit must be checked and any damage must be reported immediately to the carrier claims agent.**
- **Check if all indoor unit 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.**
- **The indoor unit weights approximately 60kg and should be lifted by two persons using the two lifting bars provided.**

WARNING

Do not grasp the control box or piping to lift the unit! Two lifting bars are provided to lift the unit.

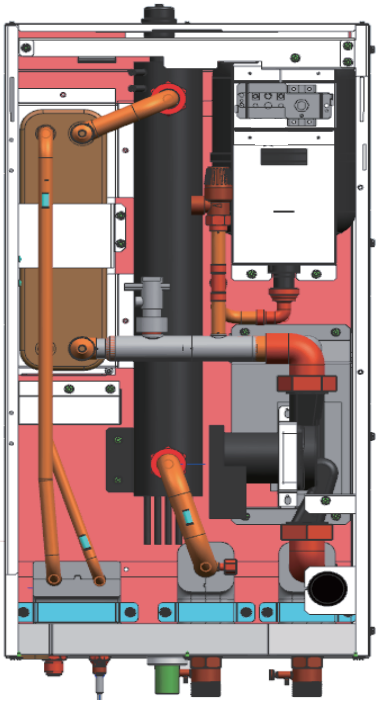


Fig.5-4

5.4 Mounting the indoor unit

WARNING

The weight of the indoor unit is approximately 60kg. Two persons are required to mount the unit.

- Fix the wall mounting bracket to the wall using appropriate plugs and screws.
- Make sure the wall mounting bracket is completely level. When the unit is not installed level, air might get trapped in the water circuit resulting in malfunctioning of the unit.
- Pay special attention to this when installing an indoor unit to prevent overflow of the drain pan
- Hang the indoor unit on the wall mounting bracket.
- Fix the indoor unit at the bottom inside using appropriate plugs and screws. To do so, the unit is equipped with 2 holes at the bottom outer edges of the frame.

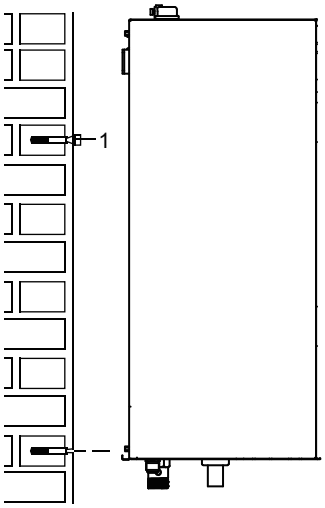


Fig.5-5

5.5 Refrigerant pipework

For all guidelines, instructions and specifications regarding refrigerant pipework between the indoor unit and outdoor unit, please refer to the outdoor unit installation and owner's manual.
The location of the gas pipe and liquid pipe on the indoor unit is shown under **"Indoor unit components"**.

Table. 5-2

Refrigerant piping specifications	Indoor unit	Outdoor unit
Gas pipe connection	φ15.9mm (5/8 inch)	φ15.9mm (5/8 inch)
Liquid pipe connectio	φ9.52mm (3/8 inch)	φ9.52mm (3/8 inch)

WARNING

When connecting the refrigerant pipes, always use two wrenches/spanners for tightening or loosening nuts! Failure to do so can result in damaged piping connections and leaks.

NOTE

- **The appliance contains fluorinated greenhouse gases.**

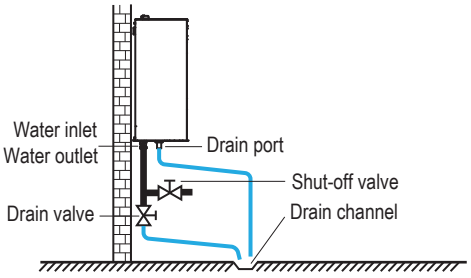
  Chemical name of the gas: R410a
- **Fluorinated greenhouse gases are contained in hermetically sealed equipment.**
- **An electrical switchgear has a tested leakage rate of less than 0.1 % per year as set out in the technical specification of the manufacturer.**

5.6 Water pipework

All piping lengths and distances have been taken into consideration. Refer to table. 5-1.

NOTE

- If the installation is equipped with a domestic hot water tank (optional), please refer to the domestic hot water tank Installation & owner's manual.
- If no glycol is in the system, in case of a power supply failure or pump operating failure, drain the system (as suggested in the figure below).



When water is at standstill inside the system, freezing is very likely to happen and damaging the system in the process.

Checking the water circuit

The units are equipped with a water inlet and water outlet for connection to a water circuit. This circuit must be provided by a licensed technician and must comply with local laws and regulations.

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.

Before continuing the installation of the unit, check the following points:

- The maximum water pressure = 0.3 MPa(g).
- The maximum water temperature is 70°C according to safety device setting.
- Always use materials which are compatible with the water used in the system and with the materials used in the unit.
- Take care that the components installed in the field piping can withstand the water pressure and temperature.
- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit during maintenance.
- Air vents must be provided at all high points of the system. The vents should be located at points which are easily accessible for servicing. An automatic air purge is provided inside the unit. Check that this air purge valve is not tightened too much so that automatic release of air in the water circuit remains possible.

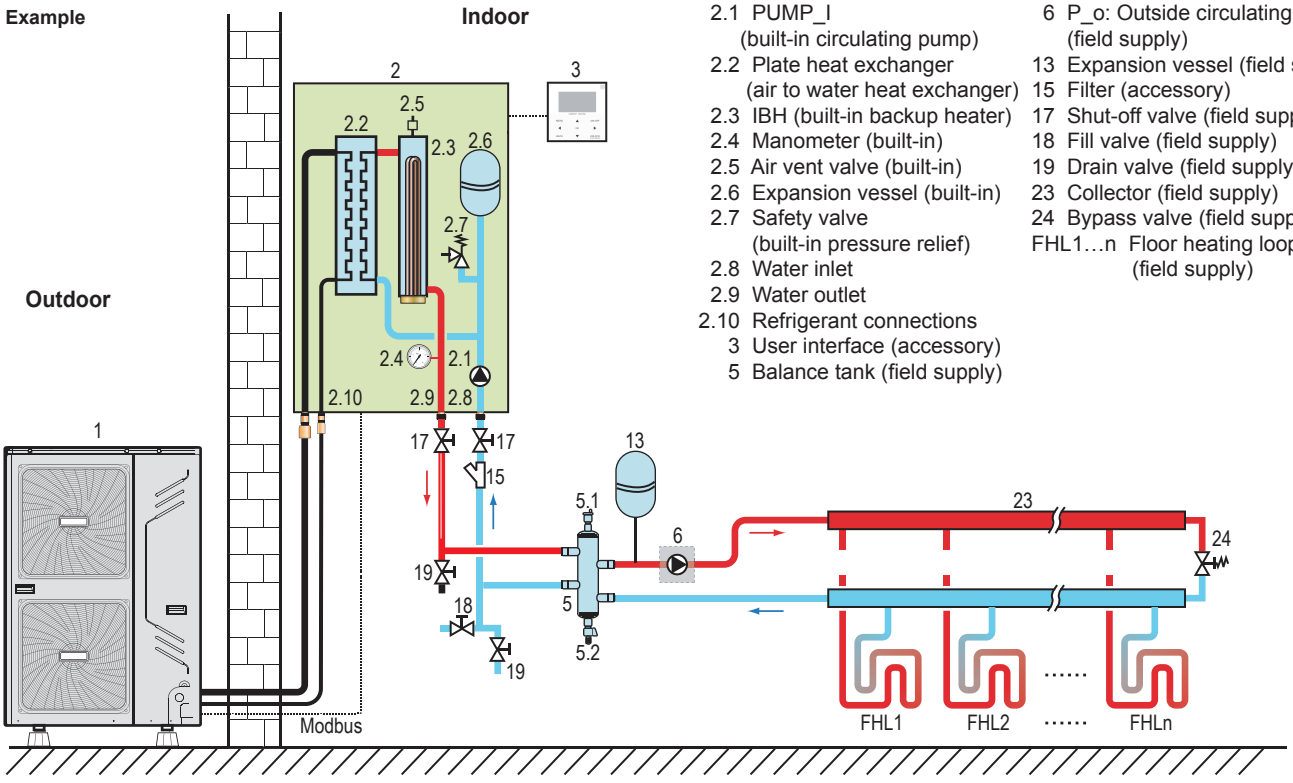
Checking the water volume and expansion vessel pre-pressure

The unit is equipped with an expansion vessel of 5 litre which has a default pre-pressure of 0.15 MPa(g).
To assure proper operation of the unit, the pre-pressure of the expansion vessel might need to be adjusted and the minimum and maximum water volume must be checked.

1. Check that the total water volume in the installation, excluding the internal water volume of the unit, is 25L minimum(for SMK-80/CD 30GN1-B, the minimum volume is 15L). Refer to "**TECHNICAL SPECIFICATIONS**" to know the internal water volume of the unit.

NOTE

- In most applications this minimum water volume will have a satisfying result.
- In critical processes or in rooms with a high heat load though, extra water volume 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.



1 Outdoor unit
2 Indoor unit
2.1 PUMP_I (built-in circulating pump)
2.2 Plate heat exchanger (air to water heat exchanger)
2.3 IBH (built-in backup heater)
2.4 Manometer (built-in)
2.5 Air vent valve (built-in)
2.6 Expansion vessel (built-in)
2.7 Safety valve (built-in pressure relief)
2.8 Water inlet
2.9 Water outlet
2.10 Refrigerant connections
3 User interface (accessory)
5 Balance tank (field supply)
5.1 Air vent valve
5.2 Drain valve
6 P_o: Outside circulating pump (field supply)
13 Expansion vessel (field supply)
15 Filter (accessory)
17 Shut-off valve (field supply)
18 Fill valve (field supply)
19 Drain valve (field supply)
23 Collector (field supply)
24 Bypass valve (field supply)
FHL1…n Floor heating loop (field supply)

2. Using the table below, determine if the expansion vessel pre- pressure requires adjustment.
3. Using the table and instructions below, determine if the total water volume in the installation is below the maximum allowed water volume.

Installation height difference[a]	Water volume ≤72 l	Water volume >72 l
≤12 m	No pre-pressure adjustment required.	Actions required: • pre-pressure must be decreased, calculate according to **"Calculating the pre-pressure of the expansion vessel"** • check if the water volume is lower than maximum allowed water volume (use graph below)
>12 m	Actions required: • pre-pressure must be increased, calculate according to "Calculating the pre-pressure of the expansion vessel" • check if the water volume is lower than maximum allowed water volume (use graph below)	Expansion vessel of the unit too small for the installation.

(a) Installation height difference: height difference (m) between the highest point of the water circuit and the unit. If the unit is located at the highest point of the installation, the installation height is considered 0 m.

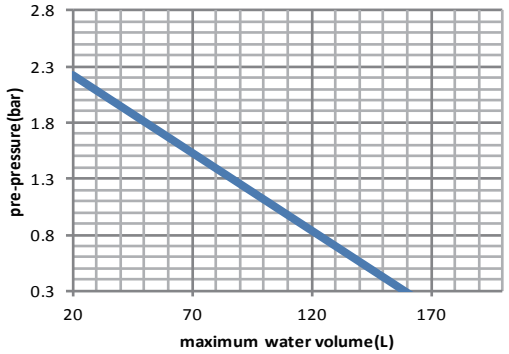
Calculating the pre-pressure of the expansion vessel

The pre-pressure (Pg) to be set depends on the maximum installation height difference (H) and is calculated as below:
Pg = H(m)/10 + 0.03 MPa(g)

Checking the maximum allowed water volume

To determine the maximum allowed water volume in the entire circuit, proceed as follows:
1. Determine for the calculated pre-pressure (Pg) the corresponding maximum water volume using the graph below.
2. Check that the total water volume in the entire water circuit is lower than this value.

If this is not the case, the expansion vessel inside the unit is too small for the installation.



pre-pressure = pre-pressure
maximum water volume = maximum water volume

Example 1
The unit is installed 10 m below the highest point in the water circuit. The total water volume in the water circuit is 50 L.
In this example, no action or adjustment is required.

Example 2
The unit is installed at the highest point in the water circuit. The total water volume in the water circuit is 150 L.
Result:
- Since 150 L is higher than 72 L, the pre-pressure must be decreased (see table above).
- The required pre-pressure is:
  Pg = H(m)/100+0.03 = 0/100+0.03 = 0.03 MPa(g)
- The corresponding maximum water volume can be read from the graph: approximately 160 L.
- Since the total water volume (150 L) is below the maximum water volume (160 L), the expansion vessel suffices for the installation.

Setting the pre-pressure of the expansion vessel

When it is required to change the default pre-pressure of the expansion vessel [0.15 MPa(g)], keep in mind the following guidelines:
- Use only dry nitrogen to set the expansion vessel pre-pressure.
- Inappropriate setting of the expansion vessel pre-pressure will lead to malfunction of the system. Therefore, the pre-pressure should only be adjusted by a licensed installer.

Selecting the additional expansion vessel
If the expansion vessel of the unit is too small for the installation, an additional expansion vessel is needed.
■calculate the pre-pressure of the expansion vessel:
Pg(bar)=(H(m)/10+0.3) bar
the expansion vessel equipped in the unit should adjust the pre-pressure also.
■calculate the volume needed of the additional expansion vessel:
V1=0.0693*Vwater/(2.5-Pg)-V0
Vwater is volume of water in the system, V0 is volume of expansion vessel which the unit is equipped(V0=5L).

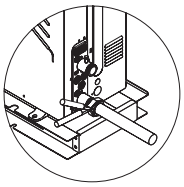
Connecting the water circuit

Water connections must be made in accordance with the outlook diagram delivered with the unit, respecting the water in- and outlet.

⚠ Be careful not to deform the unit piping by using excessive force when connecting the piping. Deformation of the piping can cause the unit to malfunction.

If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:
- Use clean pipes only.
- Hold the pipe end downwards when removing burrs
- Cover the pipe end when inserting it through a wall so that no dust and dirt enter.
- Use a good thread sealant for the sealing of the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-brass metallic piping,make sure to insulate both materials from each other to prevent galvanic corrosion.

■ Because brass is a soft material, use appropriate tooling for onnecting the water circuit.
Inappropriate tooling 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 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.

Protecting the water circuit against freezing

Frost can cause damage to the hydraulic system. As this unit is installed outdoors and thus the hydraulic system is exposed to freezing temperatures, care must be taken to prevent freezing of the system.

All hydraulic parts are insulated to reduce heat loss. Insulation must be foreseen on the field piping.

The unit is already equipped with several features to prevent freezing.

- The software contains special functions using heat pump to protect the complete system against freezing.
  when the temperature of the water flow in the system drop to a certain value, the software will take action to heat the water,either by the heat pump or the electric heating tap, or backup heater.
  The freeze protection function will turn off only when the temperature increase to a certain value.

However in case of power failure, above mentioned features can not protect the unit from freezing.
If power failure can happen at times the unit is unattended, the supplier recommends adding glycol to the water system. Refer to Caution: **"Use of glycol"**.
Depending on the expected lowest outdoor temperature, make sure the water system is filled with a weight concentration of glycol as mentioned in the table below.

When glycol is added to the system, the performance of the unit will be affected. The correction factor of the unit capacity, flow rate and pressure drop of the system is listed in the table below.

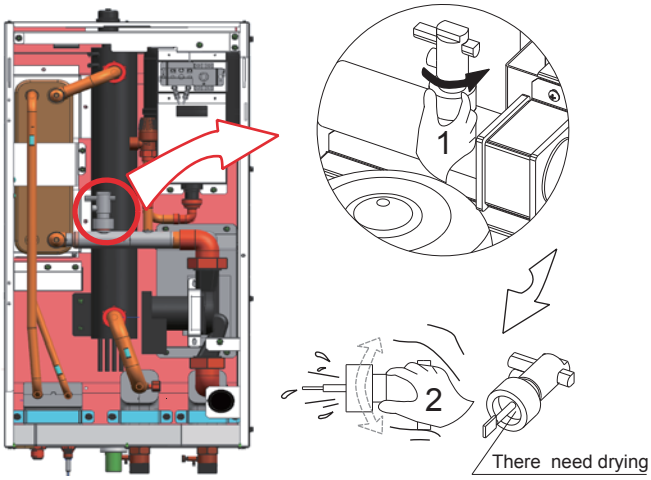
Ethylene Glycol

Quality of glycol/%	*Modification coefficient*				Freezing point/℃
	Cooling capacity modification	Power modification	Water resistance	Water flow modification	
0	1.000	1.000	1.000	1.000	0.000
10	0.984	0.998	1.118	1.019	−4.000
20	0.973	0.995	1.268	1.051	−9.000
30	0.965	0.992	1.482	1.092	−16.000
40	0.960	0.989	1.791	1.145	−23.000
50	0.950	0.983	2.100	1.200	−37.000

Propylene Glycol

Quality of glycol/%	*Modification coefficient*				Freezing point/℃
	Cooling capacity modification	Power modification	Water resistance	Water flow modification	
0	1.000	1.000	1.000	1.000	0.000
10	0.976	0.996	1.071	1.000	−3.000
20	0.961	0.992	1.189	1.016	−7.000
30	0.948	0.988	1.380	1.034	−13.000
40	0.938	0.984	1.728	1.078	−22.000
50	0.925	0.975	2.150	1.125	−35.000

If no glycol is added, the water must be drained out when there is a power failure.
Water may enter into the flow switch and cannot be drained out and may freeze when the temperature is low enough. The flow switch should be removed and dried, then can be reinstalled in the unit.



NOTE

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

WARNING

(a) ETHYLENE GLYCOL IS TOXIC
The concentrations mentioned in the table above will not prevent the medium from freezing, but prevent the hydraulics from bursting.

CAUTION

Use of glycol

- Use of glycol for installations with a domestic hot water tank:
  - Only propylene glycol having a toxicity rating or class of 1, as listed in "Clinical Toxicology of Commercial Products, 5th edition" may be used.
  The maximum allowed water volume is then reduced according to the figure "Maximum allowed water volume" Refer to the Installation.
- In case of over-pressure when using glycol, be sure to connect the safety valve to a drain pan in order to recover the glycol.

Corrosion of the system due to presence of glycol

Uninhibited glycol will turn acidic under the influence of oxygen. This process is accelerated by presence of copper and at higher temperatures. The acidic uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system.

It is therefore of extreme importance:

- That the water treatment is correctly executed by a qualified water specialist;
- That a glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols;
- That in case of an installation with a domestic hot water tank, only the use of propylene glycol is allowed. In other installations the use of ethylene glycol is permitted as well;
- That no automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates which can foul or plug the system;

■ That galvanized pipingis not used in glycol systems since its presence may lead to the precipitation of certain components in the glycol's corrosion inhibitor;
■ That it has to be made sure the glycol is compatible with the used \materials in the system.

NOTE

- Be aware of the hygroscopic property of glycol: it absorbs moisture from its environment.
- Leaving the cap off the glycol container causes the concentration of water to increase. The glycol concentration is then lower than assumed. And in consequence, freezing can happen after all.
- Preventive actions must be taken to ensure minimal exposure of the glycol to air.

Also refer to **"Pre-operation checks/Checks before initial start-up"**

5.7 Filling with water

1. Connect the water supply to the fill value and open the value.
2. Make sure the automatic air purge valve is open (at least 2 turns).
3. Fill with water until the manometer indicates a pressure of approximately 0.2 MPa(g). Remove air in the circuit as much as possible using the air purge valves. Air present in the water circuit might cause malfunctioning of the backup heater.

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 valves during first operating hours of the system. Additional filling with 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 0.03 MPa(g) to avoid air entering the circuit.
- The unit might dispose some excessive water through the pressure relief valve.
- Water quality must be according to "Safe Drinking water Act "

5.8 Piping insulation

The complete water circuit including all piping, must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter time. The thickness of the sealing materials must be at least 13 mm with λ= 0.039 W/mK in order to prevent freezing on the outside water piping.
If the temperature is higher than 30°C and the humidity is higher than RH 80%, then the thickness of the sealing materials should be at least 20 mm in order to avoid condensation on the surface of the sealing.

5.9 Field wiring

WARNING

- A main switch or other means for 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 that it does 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 absorber, or telephone ground.
  Incomplete ground 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.

5.9.1 Precautions on electrical wiring work

- Fix cables so that cables do not make contact with the pipes (especially on 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).

- As this unit is equipped with an inverter, installing a phase advancing capacitor not only will deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves. Therefore, never install a phase advancing capacitor.

5.9.2 Overview

The illustration below gives an overview of the required field wiring between several parts of the installation. Refer also to **"TYPICAL APPLICATION EXAMPLES"**.

5.9.2.1 Opening the indoor unit

■ **The front flap on the indoor unit cover gives access to the manometer and user interface.**

■ **The indoor unit cover can be removed by removing the 6 side screws and unhitching the cover.**

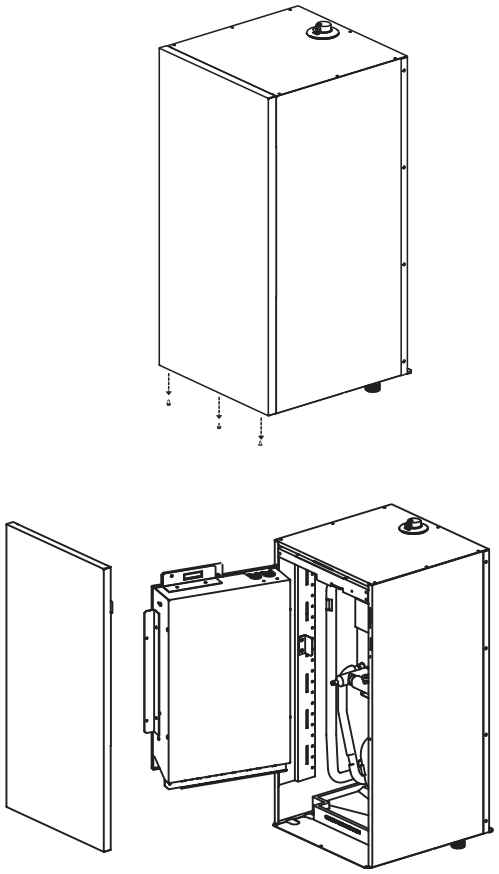


Fig.5-1

CAUTION

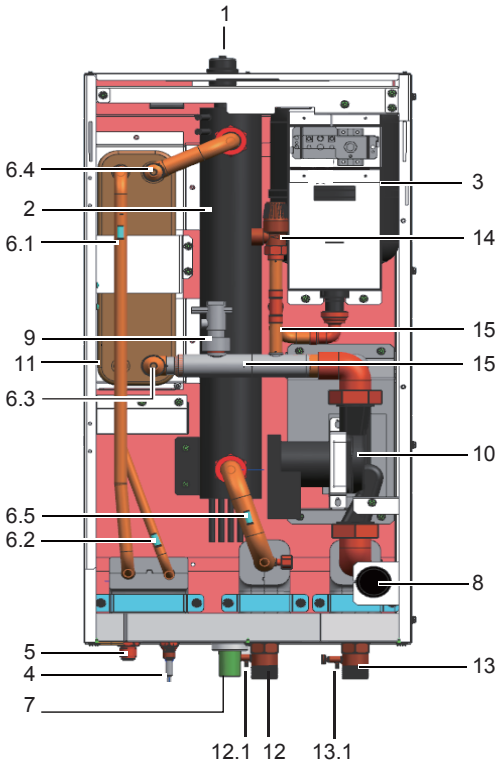
Make sure to fix the cover with the screws and nylon washers when installing the cover (screws are delivered as accessory) . Parts inside the unit can be hot.

■ **To gain access to the control box components – e.g. to connect the field wiring – the control box service panel can be removed. Thereto, loosen the front screws and unhitch the control box service panel.**

CAUTION

Switch off all power supply – i.e. outdoor unit power supply ,indoor unit power supply, electric heater and additional heater power supply before removing the control box service panel.

5.9.2.2 Indoor unit components



1. Air vent valve
   Remaining air in the water circuit will be automatically removed via the air vent valve.
2. 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.
3. Expansion vessel (1.32 gallons (5 L))
4. Refrigerant liquid connection
5. Refrigerant gas connection
6. temperature sensors
   Four temperature sensors determine the water and refrigerant temperature at various points in the water circuit.
   6.1-T2B; 6.2-T2; 6.3-TW_in; 6.4-TW_out; 6.5-T1
7. Drain port
8. Manometer
   The manometer allows readout of the water pressure in the water circuit.
9. Flow switch
   The flow switch checks the flow in the water circuit and protects the heat exchanger against freezing and the pump against damage.
10. Pump
    The pump circulates the water in the water circuit.
11. Heat exchanger
    The manometer allows readout of the water pressure in the water circuit.
12. Water outlet connection

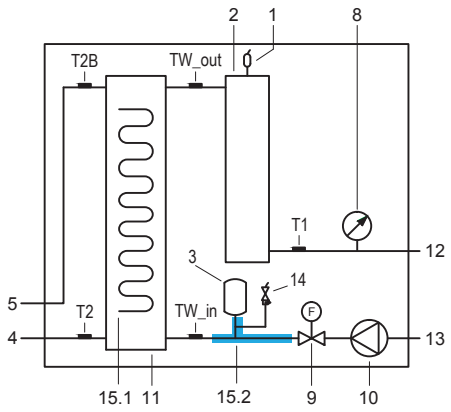
12.1 Air vent valve

13. Water inlet connection

13.1 Drain valve

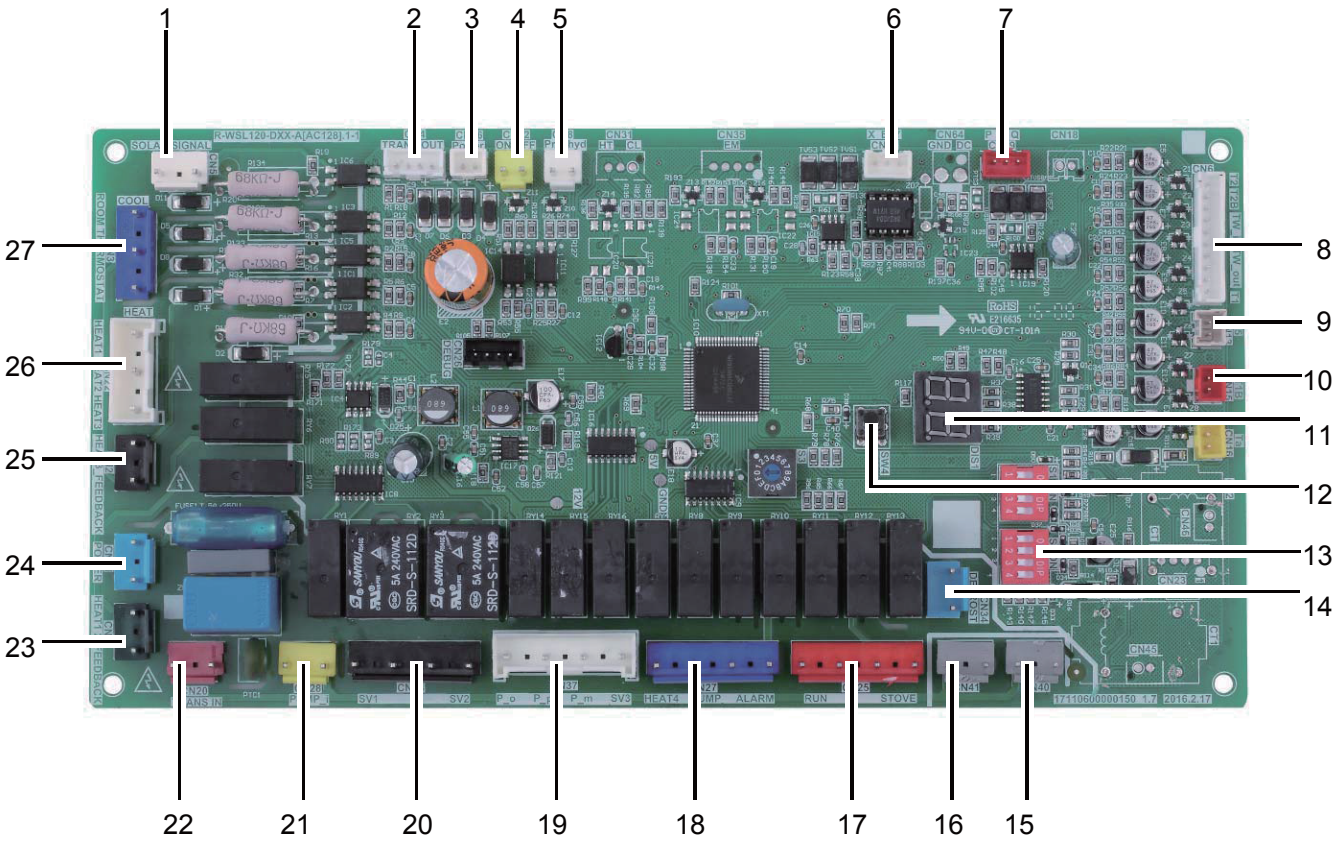
14. Safty valve
    The pressure relief valve prevents excessive water pressure inthe water circuit by opening at 43.5psi(g)/0.3MPa(g) and discharging some water.
15. Electrical heating tape(15.1-15.2)

Functional diagram of indoor unit components



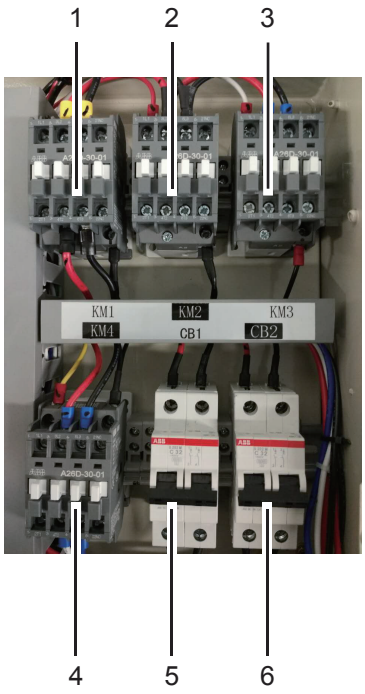
1 Air vent value
2 Backup heater vessel with backup heater
3 Expansion vessel
4 Refrigerant liquid connection
5 Refrigerant gas connection
8 Manometer
9 Flow switch
10 Circulated Pump
11 Heat exchanger
12 Water outlet connection
13 Water inlet connection
14 Safety valve
15.1 Electrical heating tape
15.2 Electrical heating tape
Temperature sensors: Tw_in, Tw_out, T1, T2, T2B

5.9.2.3 Main control board of hydraulic module

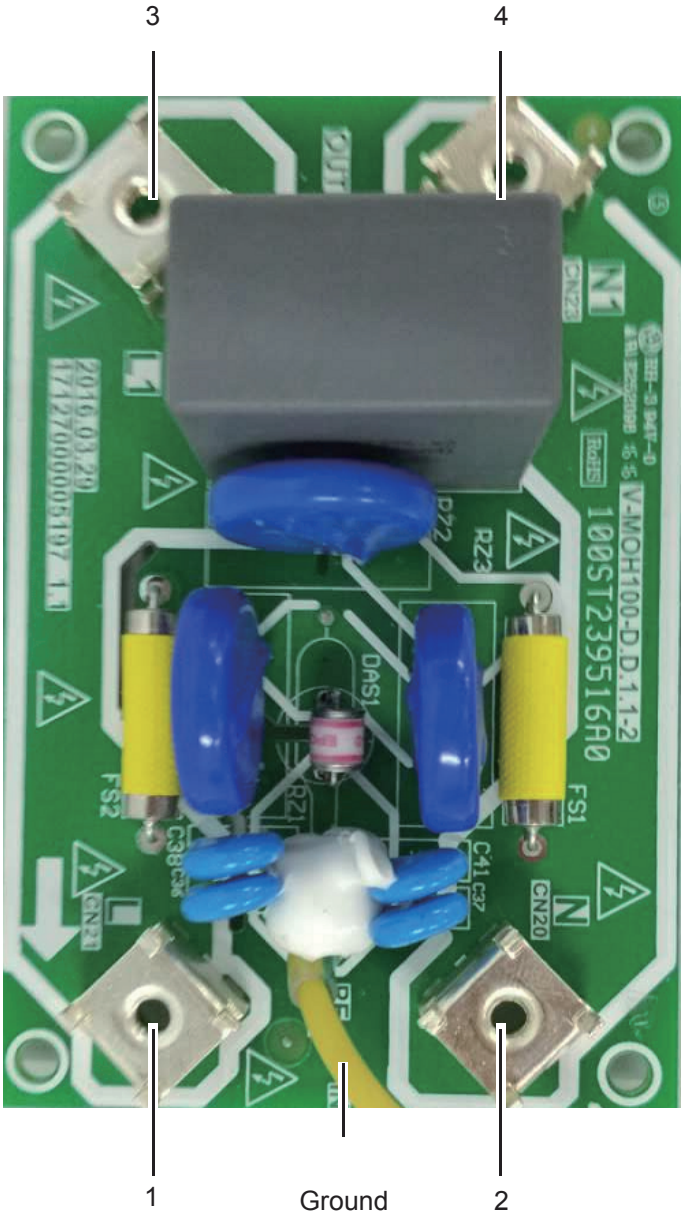


1 Input port for solar energy(CN5)
2 Output port for transformer(CN4)
3 Power supply port for user interface(CN36)
4 Port for remote switch(CN12)
5 Port for flow switch（CN8）
6 Communicate port between indoor PCB and user interface(CN19)
7 Communicate port between outdoor unit and door PCB(CN14)
8 Port for temperature sensors(Twout, Twin, T1, T2,T2B)(CN6)
9 Port for temperature sensor(CN13)(T5,Sanitary water temp.)
10 Port for temperature sensor(T1B, the final outlet temp.)(CN15)
11 Digital displays(DIS1)
12 Check button(SW4)
13 DIP switch(S1,S2)
14 output port for deforst(CN34)
15 Port for anti-freeze eletric heating tape (internal)(CN40)
16 Port for anti-freeze eletric heating tape (internal)(CN41)
17 Output port for external heating source / operation output port(CN25)
18 Port for anti-freeze eletric heating tape(external) /port for solar energy pump/output port for remote alarm(CN27)
19 Port for external circulted pump/pipe pump/mix pump/2-way valve SV2(CN37)
20 Port for SV1(3-way valve) and SV3(CN24)
21 Port for internal pump(CN28)
22 Input port for transformer(CN20)
23 Feedback port for temperature switch(CN1)
24 Port for power supply(CN21)
25 Feedback port for external temp. switch(shorted in default)(CN2)
26 Control port backup heater/booster heater(CN22)
27 Control port for room thermostat(CN3)

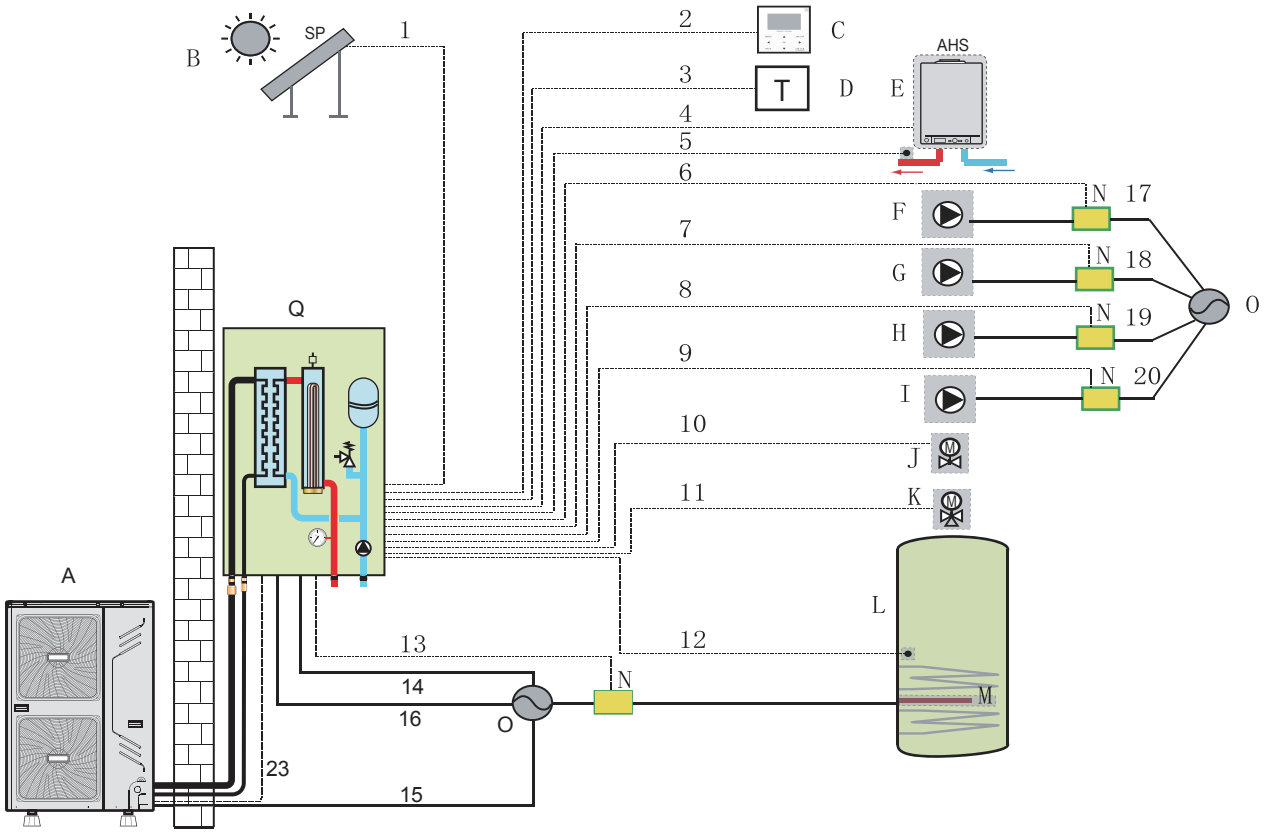
Control parts for backup heater(IBH)



1 IBH contactor KM1
2 IBH contactor KM2
3 IBH contactor KM3
4 TBH contactor KM4
5 IBH circuit breaker CB1
6 TBH circuit breaker CB2



1 Power supply L
2 Power supply N
3 Power supply for main control board L
4 Power supply for main control board N
5 Ground



A Outdoor unit
B Solar energy kit (field supply)
C User interface
D Room thermostat (field supply)
E Boiler (field supply)
F P_s: Solar pump (field supply)
G P_c: Mixing pump (field supply)
H P_o: Outside circulate pump (field supply)
I P_d: DHW pump (field supply)
J SV2: 2-way valve (field supply)
K SV1: 3-way valve for domestic hot water tank (field supply)
L Domestic hot water tank
M Booster heater
N Contactor
O Power supply
Q Indoor unit

Item	Description	AC/DC	Required number of conductors	Maximum running current
1	Solar energy kit signal cable	AC	2	200mA
2	User interface cable	AC	5	200mA
3	Room thermostat cable	AC	2 or 3	200mA(a)
4	Boiler control cable	/	2	200mA
5	Thermistor cable for T1B	DC	2	(b)
9	DHW pump control cable	AC	2	200mA(a)
10	2-way valve control cable	AC	2	200mA(a)
11	3-way valve control cable	AC	2 or 3	200mA(a)
12	Thermistor cable	DC	2	(b)
13	Booster heater control cable	AC	2	200mA(a)
15	Power supply cable for unit	AC	2+GND（1-phase） 3+GND（3-phase）	31A（1-phase） 15A（3-phase）
16	Power supply cable for backup heater	AC	2+GND（1-phase） 3+GND（3-phase）	14A（1-phase） 6A（3-phase）

(a) Minimum cable section AWG18 (0.75 mm²)

(b) The thermistor cable are delivered with the unit
*: if the current of the load is large, an AC contactor is needed.

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

Equipment must be grounded. All high-voltage external loads, if it is metal or a grounded port, must be grounded.
All external loads current is needed less than 1.5A, if the loads current is greater than 1.5A,Single external load current is needed less than 0.2A, if the single load current is greater than 0.2A, the load must be controlled through AC contactor.
"AHS1" "AHS2", "A1" "A2", "R1" "R1" and "DFT1" "DFT2" wiring terminal ports provide only the switch signal.

Field wiring guidelines

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

WARNING

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

- Fix all cables using cable ties.
- A dedicated power circuit is required for the backup heater.
- Installations equipped with a domestic hot water tank (optional), require a dedicated power circuit for the **booster heater**. Please refer to the domestic hot water tank Installation & owner's manual.
  Secure the wiring in the order shown below.
- Lay the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely (see figure).
- Follow the electric wiring diagram for electrical wiring works (the electric wiring diagrams are located on the rear side of cover.
- Form the wires and fix the cover firmly so that the cover may be fit in properly.

Precautions on wiring of power supply

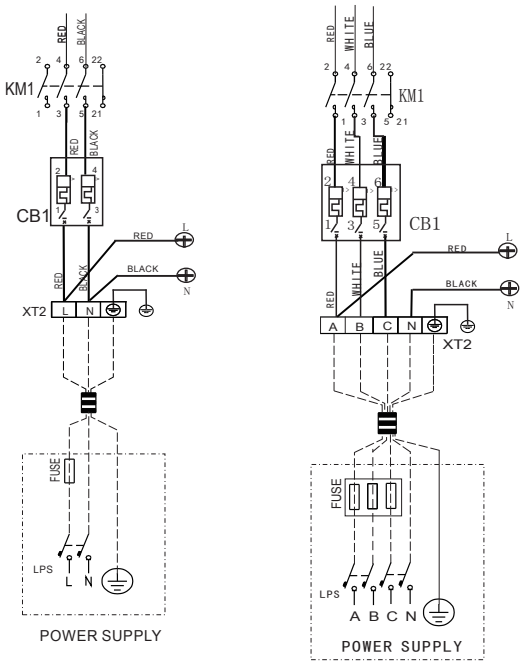
- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instruction.

- Do not connect wires of different gauge to the same power supply terminal. (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the below figure.

- 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 forces are not applied to the terminals.

5.9.3 Specifications of standard wiring components

Equipment main Power Supply Wiring



	1-phase	3-phase
Maximum overcurrent protector (MOP)	32	25
Wiring size	Wiring size must comply with the applicable local laws and regulations	

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

NOTE

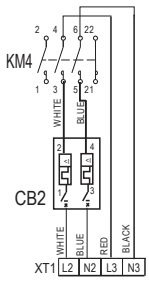
The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s).
Flexible cord must meet 60245IEC(H05VV-F) standards.

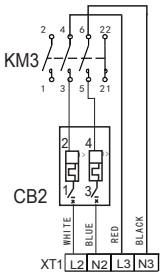
5.9.3.1 Connection of the backup heater power supply

Power circuit and cable requirements

- Be sure to use a dedicated power circuit for the backup heater. Never use a power circuit shared by another appliance.
- Use one and same dedicated power supply for the unit, backup heater and booster heater (domestic hot water tank).

This power circuit must be protected with the required safety devices according to local laws and regulations.
Select the power cable in accordance with relevant local laws and regulations. For the maximum running current of the backup heater, refer to the table below.





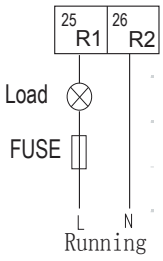
	Backup heater capacity	
	3kW 1-phase	4.5kW 3-phase
Backup heater nominal voltage	220-240VAC	380-415VAC
Minimum circuit amps (MCA)	14.3	6
Maximum overcurrent protector (MOP)	20A	10A
Wiring size	3.3mm^2	2.1mm^2

NOTE

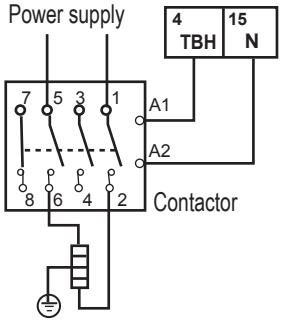
The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s).

5.9.3.2 Connection for other components

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 connector is required to connected for the load.

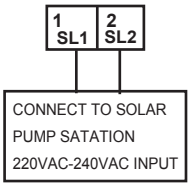


Type 1

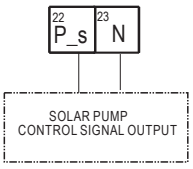


Type 2

- Control signal port of hydraulic part : The **XT4/XT5** contains terminals for solar energy, remote alarm, 2-way valve, 3-way valve, pump, booster heater and external heating source.
  The parts wiring is illustrated below:
- 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.
- "STV1" "STV2", "A1" "A2", "R1" "R1" and "DTF1" "DTF2" wiring terminal ports provide only the switch signal.
  TBH electric heating power is less than 3000W.



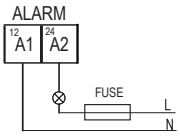
Voltage	220VAC-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2



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

For remote alarm:

REMOTE ALARM

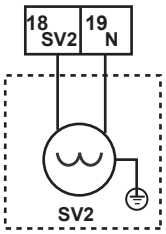


Voltage	Passive signal port
Maximum running current	0.2A
Wiring size	0.75mm^2
Control port signal type	Type 2

Procedure

1. Connect the cable to the appropriate terminals as shown on the diagram.
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

For 2-way valve SV2:



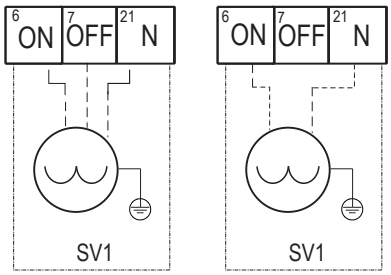
Voltage	220VAC-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2
Control port signal type	Type 2

NOTE: Only a normal closing valve is available for this unit

Procedures

1. Connect the valve cable to the appropriate terminals as shown in the picture
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For 3-way value SV1



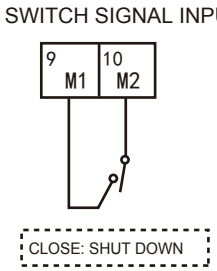
Voltage	220VAC-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2
Control port signal type	Type 2

NOTE: Wiring of the 3-way valve is different for NC (normal close) and NO (normal open). Before wiring, read the Installation & Owner's manual for the 3-way valve carefully and install the valve as shown in the picture. Make sure to connect it to the correct terminal numbers.

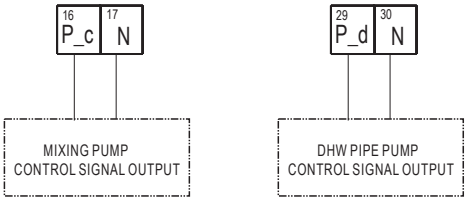
Procedure

1. Connect the cable to the appropriate terminals as shown in the picture
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

For remote shutdown:



For DHW pipe pump P_d and mixing pump P_c:

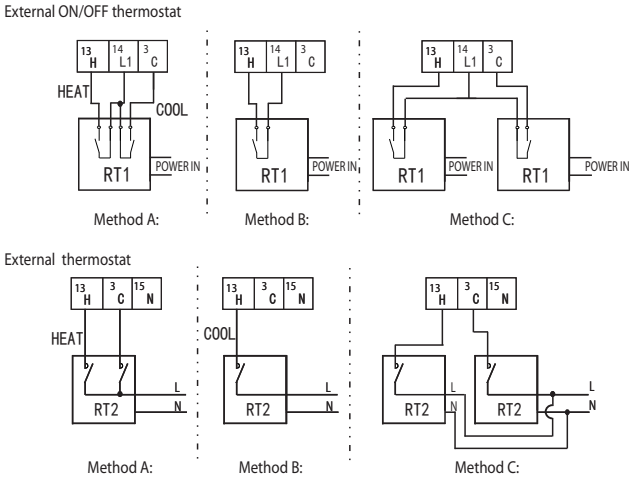


Voltage	220VAC-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2
Control port signal type	Type 2

Procedure

1. Connect the cable to the appropriate terminals as shown in the picture.
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

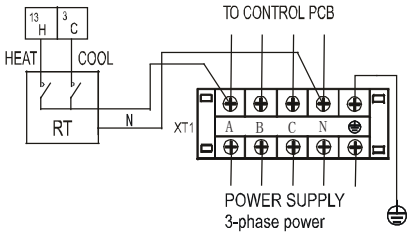
For room thermostat:

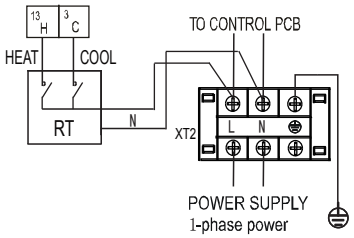


Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

Note:
there are two optional connect method depend on the room thermostat type.
1. Room thermostat type 1(RT1): “POWER IN” provide the working voltage to the RT, doesn’t provide the voltage to the RT connector directly. Port “14 L1” provide the 220V voltage to the RT connector. Port “14 L1” connect from the unit main power supply port L of 1-phase power supply, A of 3-phase power supply.

2. Room thermostat type 2(RT2)(Recommend wire connection method): L N provide the power supply to the RT connector directly. L connect from the unit main power supply port L of 1-phase power supply , A of 3-phase power supply.





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

Method A
RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the hydraulic module is connected with the external temperature controller, user interface FOR SERVICEMAN set THERMOSTAT and ROOM MODE SETTING to YES：
A.1 When unit detect voltage is 230VAC between C and N ,the unit operates in the cooling mode
A.2 When unit detect voltage is 230VAC between H and N, the unit operates in the heating mode.
A.3 When unit detect voltage is 0VAC for both side(L-N, H-N) the unit stop working for space heating or cooling.
A.4 When unit detect voltage is 230VAC for both side(L-N, H-N) the unit working in cooling mode.

Method B
RT provide the switch signal to unit. user interface FOR SERVICEMAN set ROOM THERMOSTAT and MODE SETTING to YES：
B.1 When unit detect voltage is 230VAC between H and N, unit turn on.
B.2 When unit detect voltage is 0VAC between H and N, unit turn off.
Note：When ROOM THERMOSTAT is set to YES, the indoor temperature sensor Ta can’t be set to valid, unit running only according to T1.

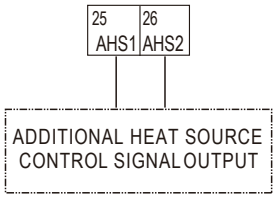
Method C
Hydraulic module is connected with two external temperature controllers, while user interface FOR SERVICEMAN set DUAL ROOM THERMOSTAT to YES,
C.1 When unit detect voltage is 230VAC between H and N ,the MAIN side turn on.When unit detect voltage is 0VAC between H and N, the MAIN side turn off.
C.2 When unit detect voltage is 230VAC between C and N, the ROOM side turn on according to climate temp curve. When unit detect voltage is 0V between C and N), the ROOM side turn off.
C.3 When H-N and C-N are detected as 0VAC, unit turn off.
C.4 when H-N and C-N are detected as 230VAC, both MAIN and ROOM side turn on.

NOTE:
1.The wiring of the thermostat should correspond to the settings of the user interface. Refer to **10.7 Field setting/Room Thermostat.**
2. Power supply of machine and room thermostat must be connected to the same Neutral Line and A Phase Line(for 3-phase unit only).

Procedure

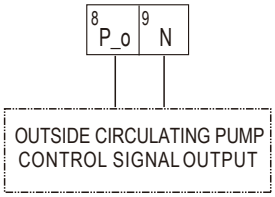
1. Connect the cable to the appropriate terminals as shown on the picture
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For boiler and outside circulating pump P_o:



NOTE
The unit only sends an ON/OFF signal to the boiler.

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



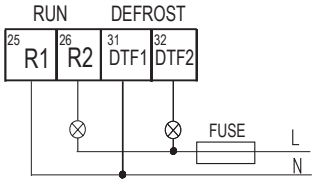
Voltage	220VAC-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2
Control port signal type	Type 2

External Wiring of Operation/ Fault

● The terminal will be conducted when the unit is running, and will be disconnected when the unit is turned off or stood by.

● The terminal 25 \26 and 31\30 will be conducted when there is a running fault, and be disconnected when the unit is running correctly.

● The connection is described.



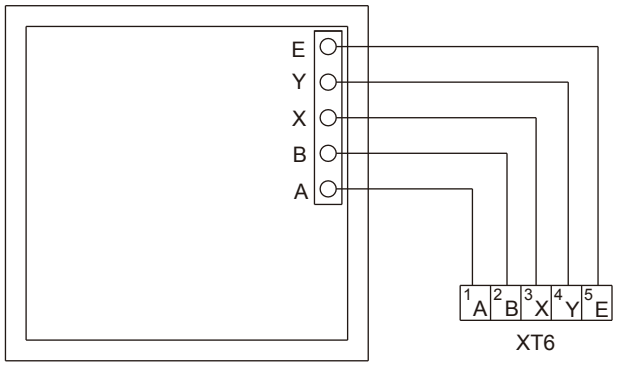
Voltage	220VAC-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2
Control port signal type	Type 1

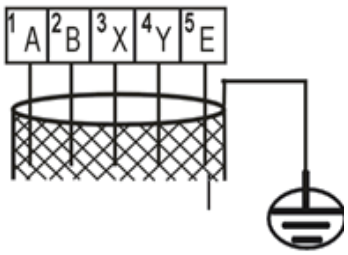
Procedure

1. Connect the cable to the appropriate terminals as shown on the picture
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

For user interface:

COMMUNICATION





"PLEASE USE SHIELDED WIRE AND EARTH THE WIRE."

Wire type	5 wire shielded cable
Wire section	AWG18-AWG16(0.75~1.25mm^2)
Maximum wire length	50m

NOTE

This equipment supports MODBUS RTU communication protocol.

As described above, during wiring, port A in the unit terminal XT6 corresponds to port A in the user interface. Port B corresponds to port B. Port X corresponds to port X. Port Y corresponds to port Y, and port E corresponds to port E..

Procedure

1. Remove the rear part of the user interface.
2. Connect the cable to the appropriate terminals as shown in the picture
3. Reattach the rear part of the user interface

6 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.

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

6.1 Climate related curves

The climate related curves can be selected in the user interface, the curves for heating mode and ECO heating mode are the same but the default curve is curve 4 in heating mode, while in ECO mode, the default curve is curve 6 (refer to the operation manual, **6.2.2 Weather Temperature set,** if ECO mode is enabled, please refer to the operation manual **6.2.3 ECO Mode**). Once the curve is selected, the target outlet water temperature is determined by the outdoor temperature. In each mode, you can select one curve from eight curves in the user interface. The relationship between outdoor temperature(T4/℃) and target water temperature(T1s/℃) is described in the table and picture in the next page.

The selection of the low/high temperature curve can be done in the user interface. In cool mode refer to **6.9 Field setting/COOL control/ How to set the COOL mode**. In heat mode refer to **6.10 Field setting/HEAT control/How to set the HEAT mode**.

Note: if dual room thermostat function is enabled, only curve 4 can be used, for customazition product, curve selection is possible even dual room thermalstat function is enabled.

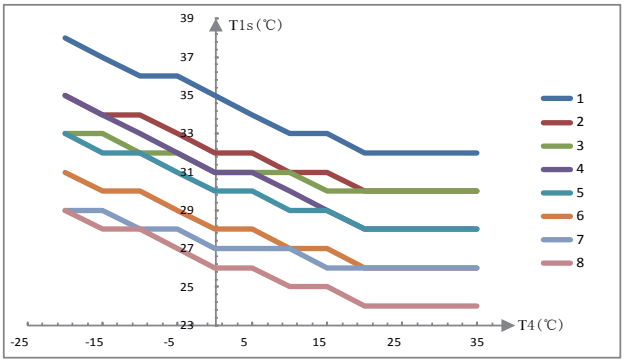
Temperature curves for heating mode and ECO heating mode

Application	T1s / Curve number	Outdoor Temperatures T4										
		-20	-15	-10	-5	0	5	10	15	20	25	35
Low temperature	1	38	37	36	36	35	34	33	33	32	32	32
	2	35	34	34	33	32	32	31	31	30	30	30
	3	33	33	32	32	31	31	31	30	30	30	30
	4	35	34	33	32	31	31	30	29	28	28	28
	5	33	32	32	31	30	30	29	29	28	28	28
	6	31	30	30	29	28	28	27	27	26	26	26
	7	29	29	28	28	27	27	27	26	26	26	26
	8	29	28	28	27	26	26	25	25	24	24	24
High temperature	1	55	54	54	53	52	52	51	51	50	50	50
	2	55	54	52	51	50	49	47	46	45	45	45
	3	55	53	51	49	47	45	44	42	40	40	40
	4	50	49	49	48	47	47	46	46	45	45	45
	5	50	49	47	46	45	44	42	41	40	40	40
	6	45	44	44	43	42	42	41	41	40	40	40
	7	45	44	42	41	40	39	37	36	35	35	35
	8	40	39	39	38	37	37	36	36	35	35	35

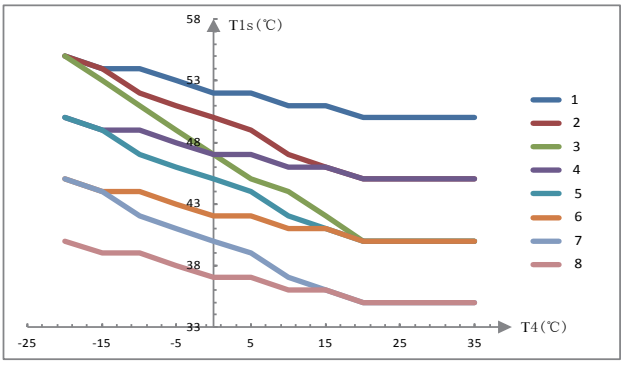
Temperature curves for Cooling mode

Application	T1s / Curve number	Outdoor Temperatures T4			
		-5~14	15~21	22~29	30~46
Low temperature	1	18	11	8	5
	2	17	12	9	6
	3	18	13	10	7
	4	19	14	11	8
	5	20	15	12	9
	6	21	16	13	10
	7	22	17	14	11
	8	23	18	15	12
High temperature	1	22	20	18	16
	2	20	19	18	17
	3	23	21	19	17
	4	21	20	19	18
	5	24	22	20	18
	6	22	21	20	19
	7	25	23	21	19
	8	23	22	21	20

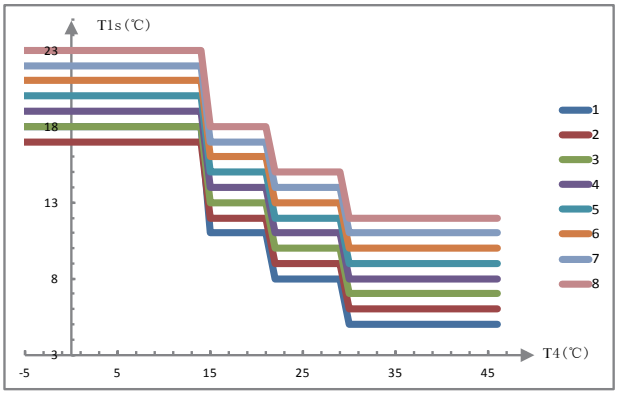
Low temperature curves for heating mode



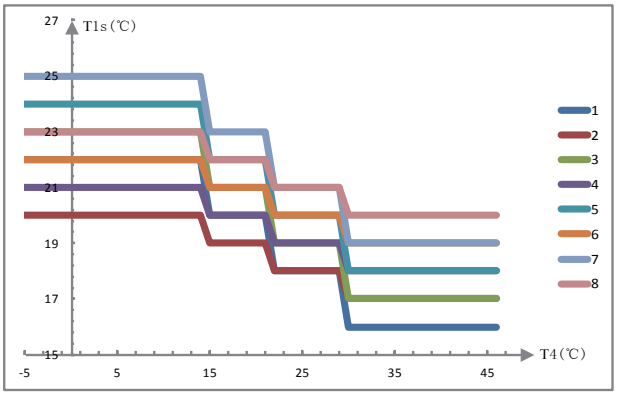
High temperature curves for heating mode



Low temperature curves for cooling mode



High temperature curves for cooling mode

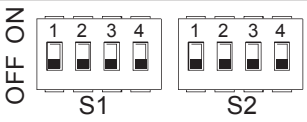


6.2 DIP switch settings overview

DIP switch 26 is located on the switch box PCB (see **"Indoor unit components/Switch box main components"**) and allows configuration of additional heating source temperature sensor installation, the second inner backup heater installlition, 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	Description	ON	OFF
S1-1	Selection of refrigerant pipe length	⩾60% of Max. Piping Length(*)	＜60% of Max. Piping Length(*)
S1-2	Backup heater outlet temperature T1 temperature sensor installation	installed	Installed
S1-3	The first inner backup heater IBH1 installation	Not installed	Installed
S1-4	The second inner backup heater IBH2 installation	Not installed	Installed
S2-1	Additional heating source outlet temperature T1B sensor installation	Installed	Not installed
S2-2	/	/	/
S2-3	/	/	/
S2-4	/	/	/

(*) Max. piping length: refer to the manual of outdoor unit.

6.3 Initial start-up at low outdoor ambient temperatures

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 cracking of concrete floors 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.
Refer to **"FOR SERVICEMAN/special function/preheating for floor"**.

6.4 Pre-operation checks

Checks before initial start-up

CAUTION

Switch off the power supply before making any connections.

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

1. Field wiring
   Make sure that the field wiring between 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 box have been carried out according to the instructions described in the chapter "**Field wiring**", according to the wiring diagrams and according to local laws and regulations.
2. Fuses, circuit breakers, or protection devices
   Check that the fuses or the locally installed protection devices are of the size and type specified in the chapter "**TECHNICAL SPECIFICATIONS**". Make sure that neither a fuse nor a protection device has been bypassed.
3. 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.
4. 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).
5. Ground wiring
   Make sure that the ground wires have been connected properly and that the ground terminals are tightened.
6. Internal wiring
   Visually check the switch box on loose connections or damaged electrical components.
7. Fixation
   Check that the unit is properly fixed, to avoid abnormal noises and vibrations when starting up the unit.
8. Damaged equipment
   Check the inside of the unit on damaged components or squeezed pipes.
9. Refrigerant leak
   Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, call your local dealer.
10. 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.
11. Air purge valve
    Make sure the air purge valve is open (at least 2 turns).
12. Shut-off valves
    Make sure that the shut-off valves are fully open

Operating the system with closed valves will damage the circulated pump!

6.5 Powering up the unit

When power supply to the unit is turned on, "1%~99%" is displayed on the user interface during its initialisation. During this process the user interface cannot be operated.

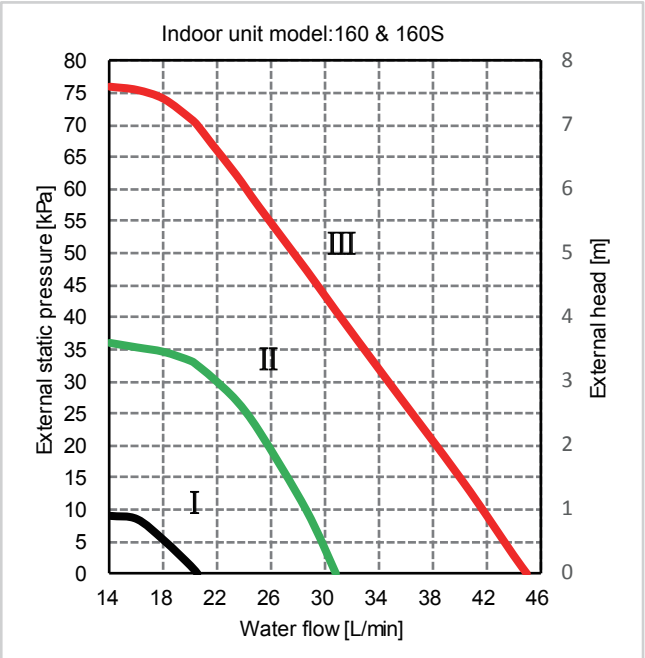
6.6 Setting the pump speed

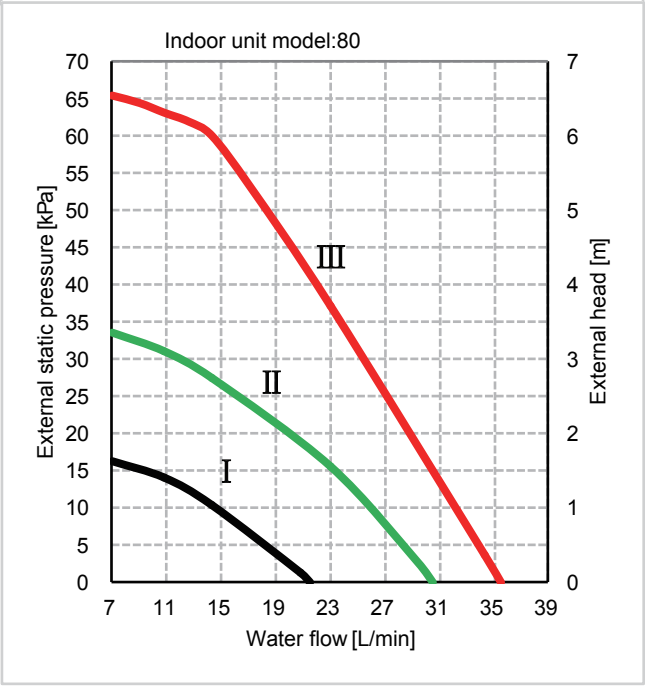
The pump speed can be selected by adjust the red nob on the pump, the place that notch point to indicate the speed of the pump.

The default setting is the highest speed (III). If the water flow in the system is too high, the speed can be set to low speed (I).

The available external static pressure in function of the water flow is shown in the graph below.

Constant speed Ⅰ Ⅱ Ⅲ





Pump LED diagnose and remedy

The pump have an LED operating status display, this makes it easy for the technician to search for the cause of a fault in the heating system.
1. If the LED display lights up continuously green, it means the pump is running normally.
2. If the LED display is flashing green, it means the pump is running venting routine. The pump runs during 10min in venting function, afterwards the installer has to adjust the targeted performance.
3. If the LED is flashing green/red, it means the pump has stopped operating due to an external reason. The pump will restart by itself after the abnormal situation disappeared. The probably reason to cause the problem is that the pump undervoltage or overvoltage (U<160V or U>280V), you should check the voltage supply. Another reason is the module overheating, and then you should check the water and ambient temperature.
4. If the LED is flashing red, it means the pump has stopped operating, some serious fault has happened(e.g. pump blocked), the pump cannot restart itself due to a permanent failure and the pump should be changed.
5. If the LED is not light up, it means no power supply to the pump, maybe the pump is not connected to power supply, you should check the cable connection. If the pump is still running, it means the LED is damaged. Or the electronics are damaged and the pump should be changed.

Failure diagnosis at the moment of first installation

- In case nothing is displayed on the user interface, check for any of the following abnormalities before you can diagnose possible malfunction codes.
  1) Disconnection or wiring error (between power supply and unit and between unit and user interface).
  2) The fuse on the PCB may have run out.
- If the user interface shows "E8"or"E0" as an error code, there is a possibility that air exist in the system, or the water volume in the system is less than the minmum volume.
- If the error code "E2" is displayed on the user interface, check for the wiring between user interface and unit.

More error code and failure cause can be found in **"Error codes"**.

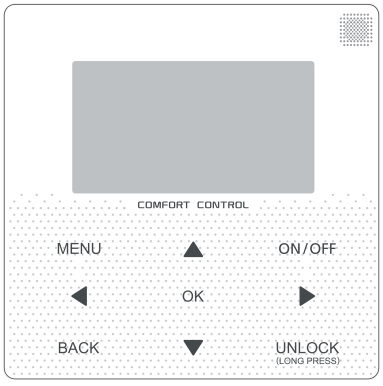
6.7 Field settings

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

Procedure

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

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



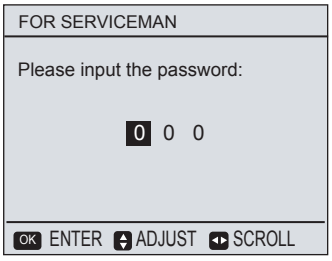
Keys	Function
MENU	• Go to the menu structure (on the home page)
◄► ▼ ▲	• Navigate the cursor on the display • Navigate in the menu structure • Adjust settings
ON/OFF	• Turn on or off the space heating/cooling operation mode or DHW mode • Turn on or off the function in the menu structure
BACK	• Come back to the up level
UNLOCK	• Long press for unlock /lock the controller • Unlock /lock some function such as "DHW temperature adjusting "
OK	• Go to the next step when you are programming a schedule in the menu structure confirms a selection enter a submenu in the menu structure

■ About FOR SERVICEMAN

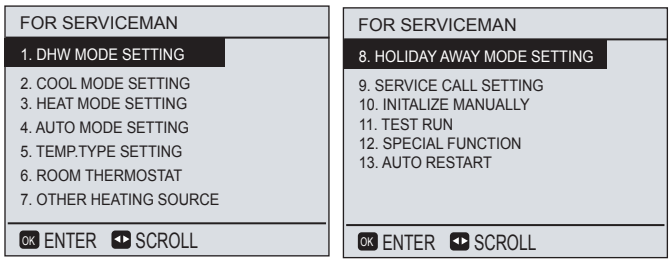
"FOR SERVICEMAN" is set up for installer when using to set the parameter.
1. Setting the composition of equipment.
2. Setting the parameter.

■ How to go to FOR SERVICEMAN

Go to MENU> FOR SERVICEMAN. Press OK



Use ◄ ► to navigate and use ▼ ▲ to adjust the numerical value. Press OK. if password is correct, The following page will appear:



Use ▼、▲ to scroll and use "ok" to enter submenu for setting the parameters.

6.8 DHW control

■ About DHW mode

DHW：domestic hot water
DHW MODE SETTING typically consists of the following :
1. DHW MODE: enable or disable the DHW mode
2. TANK HEATER： set whether the booster heater available or not
3. DISINFECT：set the parameters for disinfection
4. DHW PRIORITY：set the priority between domestic hot water heating and space operation
5 DHW PUMP：set the parameters for DHW pump operation

The above functions applies only to installations with a domestic hot water tank.

■ How to set the DHW mode

To determine whether the DHW mode is effective.
Go to MENU> FOR SERVICEMAN> DHW MODE SETTING .Press OK. The following page will appear.

1 DHW MODE SETTING	
1.1. DHW MODE	☑YES ☐NON
1.2. TANK HEATER	☑YES ☐NON
1.3. DISINFECT	☑YES ☐NON
1.4. DHW PRIORITY	☑YES ☐NON
1.5. DHW PUMP	☐YES ☑NON
OK ENTER ◀▶ SCROLL	

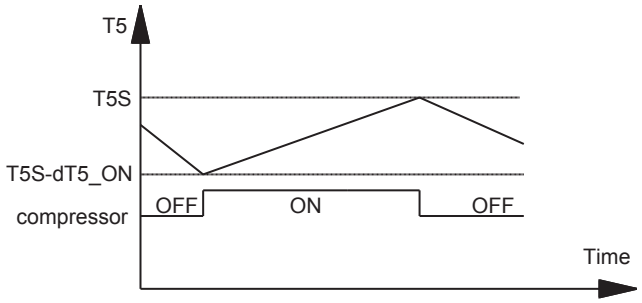
Using◄、► to scroll and use OK to enter，when the curson is on☐YES, press OK to set the DHW MODE effective.When the cursor is on☐NON,press OK to set the DHW MODE ineffective.

1. Go to MENU> FOR SERVICEMAN>DHW MODE SETTING>1.1 DHW MODE

1.1 DHW MODE	
dT5_ON	5°C
dT1S5	10°C
T4DHWMAX	43°C
T4DHWMIN	-10°C
t _INTERVAL_DHW	5 MIN
◀▶ ▲▼SCROLL	

Use ◄、►、▼、▲ to scroll and adjust parameters,use BACK to exit.

dT5_ON is the temperature difference for starting the heat pump, the picture below illustrate the function of dT5_ON.

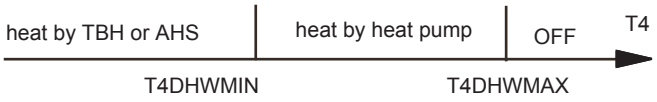


T5S is target temperature of domestic hot water. T5 is actual temperature of domestic hot water. When T5 drops to a certain temperature(T5<T5S-dT5_ON) , the heat pump will be available. dT1S5 is the correct value for the target outlet water temperature(T1S=T5+dT1S5)

Note: the default value of dT1S5 is 10, if surface area of coil in tank is not large enough, heat pump will stop even water temperature in the tank is far below the setpoint, it is suggested that set dT1S5 to 20. If water temperature probe located in the bottom of tank, it is possible that long time is needed to turn on the heat pump, in this condition please set dT1s5 to 20 and put the temperature probe to the upper part of the tank.

T4DHWMAX is the maximum ambient temperature that the heat pump can operate for domestic water heating, the unit will not operate if the ambient temperature is above it in DHW mode.

T4DHWMIN is the minimum ambient temperature that the heat pump can operate for domestic water heating, the heat pump will turn off if the ambient temperature drop below it in water heating mode. The relationship between operation of the unit and ambient temperature can be illustrated in the picture below:



t_INTERVAL_DHW is the start time interval of compressor in DHW mode. When the compressor stops running, the next time that the compressor turn on should be " t_INTERVAL_DHW " minute later at least.

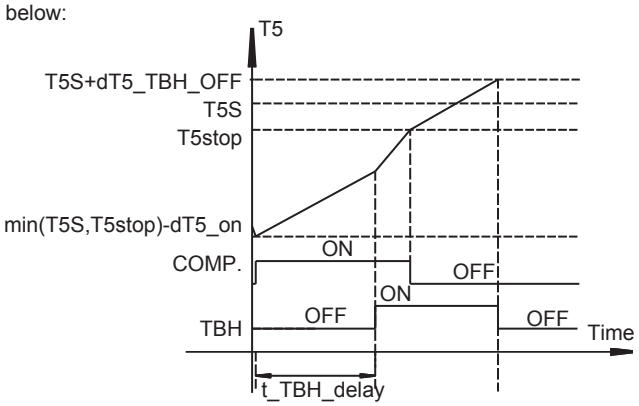
Go to FOR SERVICEMAN>DHW MODE SETTING>1.2 TANK HEATER

1.2 TANK HEATER	
dT5_TBH_OFF	5°C
T4_TBH_ON	20°C
t_TBH_DELAY	30 MIN
◀▶ ▲▼SCROLL	

Use ◄、►、▼、▲ to scroll and adjust parameters. Use BACK to exit.

dT5_TBH_OFF is the temperature difference between T5 and T5S that turn the booster heater off, the booster heater will turn off if T5≥T5S+dT_TBH_OFF, when the heat pump macfunction.

T4_TBH_ON is the temperature only when the ambient temperature lower than it the booster heater will be available.
t_TBH_DELAY is the time that the compressor has run before starting the booster heater(if T5＜min(T5S,T5stop)).
The operation of the unit during DHW mode described in the picture below:



In the picture, T5stop is a parameter relate to ambient temperature, which can't be changed in the user interface, when T5≥T5stop, the heat pump will turn off.

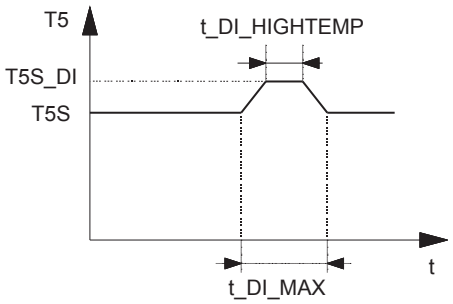
Note: the booster heater and backup heater can't operate simultaneously, if the booster heater has been on, the backup heater will be off.
If the booster heater is unavailable(1.2 TANK HEATER NON is selected),the dT5_ON can't be adjusted and fixed at 4.

3. Go to MENU> FOR SERVICEMAN>DHW MODE SETTING>1.3 DISINFECT

1.3 DISINFECT	
T5S_DI	5°C
t_DI_HIGHTMEP.	30 MIN
t_DI_MAX	120 MIN
◀▶ ▲▼SCROLL	

Use ◄、►、▼、▲ to scroll and adjust parameters. Use BACK to exit.
T5S_DI is the target temperature of water in the domestic hot water tank in DISINFECT function.
t_DI_HIGHTEMP. is the time that high temperature of water to be lasted.

t_DI_MAX is the time that disinfection to be lasted, the change of the domestic water temperature described in the picture below:



Be aware that the domestic hot water temperature at the hot water tap will be equal to the value selected in FOR SERVICEMAN "T5S_DI" after a disinfection operation.

Note: if booster heater is not available(refer to **6.14 Other heating source**), please disable DISINFECT, because the temperature of water from heat pump is not high enough, and the unit will stay in Disinfect mode for a long time, which will effect space heating.

WARNING

If this high domestic hot water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to local laws and regulations.

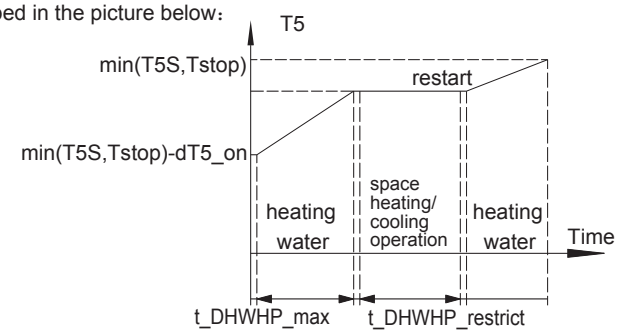
4. Go to SERVICEMAN>DHW MODE SETTING>1.4DHW PRIORITY:

1.4 DHW PRIORITY	
t_DHWHP_MAX	120MIN
t_DHWHP_RESTRICT	30MIN
◄► ▲▼SCROLL	

The function of the DHW PRIORITY is used to set the operation priority between domestic water heating and space (heating/ cooling)operation. You can use◄、►、▼、▲ to scroll and adjust parameters.Using BACK to exit.
t_DHWHP_MAX is the maximum continuous working period of heat pump in DHW PRIORITY mode.
t_DHWHP_RESTRICT is the operation time for space heating/ cooling operation.
Note: if ROOM TEMP is enabled(refer to **6.12 TEMP. TYPE SETTING**), it is suggested that set t_DHWHP_RESTRICT to 10min.
the suggested value of t_DHWHP_MAX is listed below:

Unit	volume of tank/L	t_DHWHP_MAX/min
10~16kW	300	90
	250	75
	200	60
4~8kW	200	90
	150	70
	100	50

If DHW PRIORITY is enabled, the operation of the unit can be described in the picture below：



If NON is selected in the DHW PRIORITY mode, when it is available and the space heating/cooling is OFF, the heat pump will heat the domestic water as required. If space heating/cooling is ON, the domestic water will be heated by booster heater(if booster heater is available).

1.5 DHW PRIORITY	
TIMER RUNNING	ON
DISINFECT	ON
PUMP RUNNING TIME	10MIN
ON/OFF ON/OFF ▲▼SCROLL	

Go to FOR SERVICEMAN>DHW MODE SETTING>1.5DHW PUMP You can use ◄、►、▼、▲ to scroll and adjust parameters. Using BACK to exit.

When the **TIMER RUNNING** is **ON**, the DHW pump will run as timed and keep running for an certain time t(as defined in **PUMP RUNNING TIME**).

When **DISINFECT** is **ON**, the DHW pump will operate when the unit is in disinfect mode and T5≥T5S_DI-2, the time that the pump keep running is **PUMP RUNNING TIME**+5min.

6.9 COOL MODE SETTING

■ **About COOL MODE SETTING**

COOL MODE SETTING typically consists of the following:
1. COOL MODE: Setting the COOL mode effctive or not
2. T1S RANGE: Selecting the range of target outlet water temperature
3. T4CMAX: Setting the maximum operation ambient temperature
4. T4CMIN: Setting the minimum operation ambient temperature
5. dT1SC: Setting the temperature difference for starting the heat pump

■ **How to set the COOL mode**

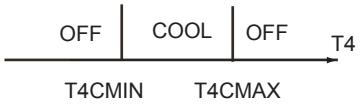
To determine whether the COOL mode is effective, go to MENU> FOR SERVICEMAN> COOL MODE SETTING. Press OK. The following page will be appear：

2 COOL MODE SETTING	
COOL MODE	☑YES ☐NO
T1S RANGE	☑LOW ☐HIGH
T4CMAX	43°C
T4CMIN	20°C
dT1SC	5°C
◄► ▲▼SCROLL	1/2

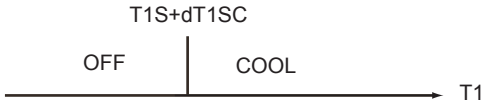
2 COOL MODE SETTING	
dTSC	2°C
t_INTERVAL_C	5MIN
◄► ▲▼SCROLL	2/2

When the cursor is on COOL MODE, Using ◄、► to select YES or NON, then press OK to enable or disable the cool mode, When the cursor is on T1S RANGE, Using ◄、►to select the range of target outlet water temperature. When **LOW** is selected, the minimum target temperature is 5°C， if climate related curve function (correspond to "weather temperature set" in the user interface)is enabled , the curve selected is low temperature curve. When **HIGH** is selected, the minimum target temperature is 18°C, if climate related curve function （correspond to "weather temperature set" in the user interface）is enabled , the curve selected is high temperature curve.

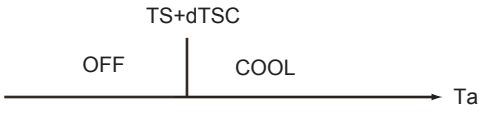
When the cursor is on T4CMAX、T4CMIN、dT1SC、dTSC or t_INTERVAL_C, Using ◄、►、▼、▲ to scroll and adjust the parameter.
T4CMAX is the maximum operation ambient temperature in COOL mode. The unit can't work if the ambient temperature above it.
T4CMIN is the minimum operation ambient temperature in COOL mode. the unit will turn off if the ambient temperature drop below it.
The relationship between the operation of the unit and ambient temperature can be illustrated in the picture below:



dT1SC is the temperature difference between T1(actual outlet water temperature) and T1S(target outlet water temperature) for starting the unit in cool mode, only when the T1 high enough will the unit turn on, and the unit will turn off if T1 drop to a certain value. It can be illustrated in the picture below:.



In the picture ΔT is a parameter relate to ambient temperature, it can't be changed in the user interface dTSC is the temperature difference between Ta(actual room temperature) and TS(target room temperature) for starting the unit when ROOM TEMP. is enabled in TEMP.TYPE SETTING（refer to field setting/ TEMP.TYPE SETTING）. Only when the Ta high enough will the unit turn on, and the unit will turn off if Ta drop to a certain value. It can be illustrated in the picture below(only when room thermostat is available will this function be available).



6.10 HEAT MODE SETTING

■ **About HEAT MODE SETTING**

HEAT MODE SETTING mode typically consists of the following:
1. HEAT MODE: Enable or disable the HEAT mode
2. T1S RANGE: Selecting the range of setting outlet water temperature
3. T4HMAX: Setting the maximum operation ambient temperature
4. T4HMIN: Setting the minimum operation ambient temperature
5. dTISH: Setting the temperature difference for starting the unit
6. t_INTERVAL_H: Setting the compressor start time interval

■ **How to set the Heat mode**

To determine whether the HEAT mode is effective, go to MENU> FOR SERVICEMAN> HEAT MODE SETTING. Press OK. The following page will appear

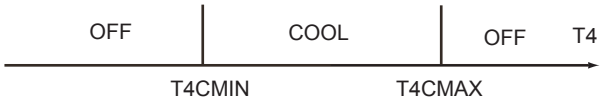
3 HEAT MODE SETTING	
HEAT MODE	☑YES ☐NO
T1S RANGE	☑LOW ☐HIGH
T4HMAX	25°C
T4HMIN	-15°C
dT1SH	5°C
◄► ▲▼SCROLL	

When the cursor is on HEAT MODE, Using ◄、► to scroll to YES or NON and press OK to enable or disable the heat mode, When the cursor is on T1S RANGE, Using ◄、►to scroll to YES or NON and press OK to select the range of target outlet water temperature. When **LOW** is selected, the maximum target temperature is 55℃，if climate related curve function （correspond to "weather temperature set" in the user interface）is enabled , the curve selected is low temperature curve. When **HIGH** is selected, the maximum target temperature is 60℃，if climate related curve function （correspond to "weather temperature set" in the user interface）is enabled , the curve selected is high temperature curve.

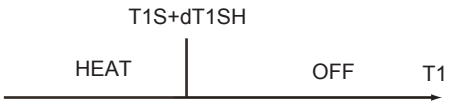
When the cursor is on **T4HMAX**、**T4HMIN**、**dT1SH**、**dTSH or t_INTERVAL_H**, Using ◄、►、▼、▲ to scroll and adjust the parameter.

T4HMAX is the maximum operation ambient temperature for heat mode. The unit can't work if the ambient temperature above it.

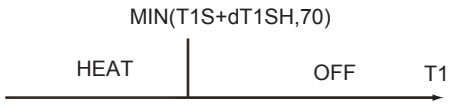
T4HMIN is the minimum operation ambient temperature for heat mode. the unit will turn off if the ambient temperature below it. The relationship between the operation of the unit and ambient temperature can be illustrated in the picture below:



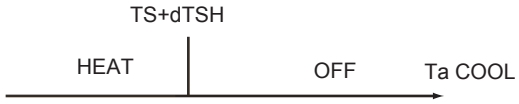
dT1SH is the temperature difference between T1 and T1S for starting the unit in heat mode.
When the target outlet water temperature T1S<47, the unit will on or off as described below(ΔT is a parameter relate to T1S, which can't be changed on the user interface):



When the target outlet water temperature T1S≥47, the unit will on or off as described below：



dTSH is the temperature difference between Ta(Ta is the room temperature) and TS for starting the unit when ROOM TEMP. is enabled in TEMP.TYPE SETTING（refer tofield setting/ TEMP.TYPE SETTING）. Only when Ta drop to a certain value will the unit turn on, and the unit will turn off if Ta high enough. It can be illustrated in the picture below(only when room thermostat is available will this function be available).



t_INTERVAL_H is the compressor start time interval in heat mode. When the compressor stops running, the next time that the compressor turn on should be " t_INTERVAL_H" minute later at least.

6.11 AUTO MODE SETTING

■ **About AUTO SETTING**

Controlling AUTO mode typically consists of the following：
1. T4AUTOCMIN：setting the minimum operating ambient temperature for cooling
2.T4AUTOHMAX: setting the maximum operating ambient temperature for heating

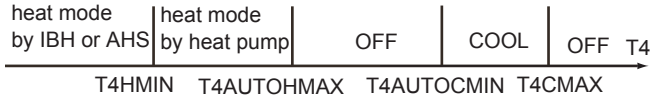
■ **How to set the AUTO mode**

To determine whether the AUTO mode is effective, go to MENU> FOR SERVICEMAN> AUTO MODE SETTING. Press OK. The following page will appear.

4 AUTO MODE SETTING	
T4AUTOCMIN	25°C
T4AUTOHMAX	17°C
◄► ▲▼SCROLL	

Using ◄、►、▼、▲ to scroll and adjust the parameter.

T4AUTOCMIN is the minimum operating ambient temperature for cooling in auto mode. The unit will turn off if ambient temperature lower than it when in space cooling operation.
T4AUTOHMAX is the maximum operating ambient temperature for heating in auto mode. The unit will turn off if ambient temperature higher than it when in space heating operation.
The relationship between operation of the heat pump and ambient temperature described in the picture below



In the picture，ASH is additional heating source，IBH is backup heater in the unit.

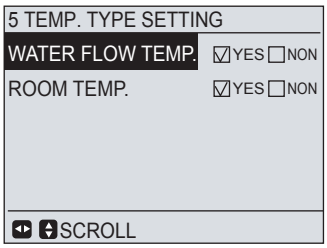
6.12 TEMP. TYPE SETTING

■ **About TEMP. TYPE SETTING**

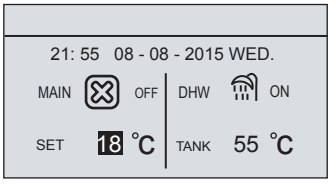
The TEMP. TYPE SETTING is used for selecting whether the water flow temperature or room temperature(detected by the temperature sensor attached in the user interface) is used to control the ON/OFF of the heat pump.
When ROOM TEMP. is enabled, the target outlet water temperature will be calculated from climate-related curves(refer to "**10.1 Climate related curves**").

■ **How to enter the TEMP. TYPE SETTING**

To enter the TEMP.TYPE SETTING, go to MENU> FOR SERVICEMAN> TEMP. TYPE SETTING. Press OK. The following page will appear:

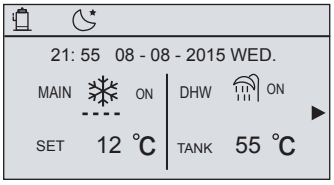


If you set WATER FLOW TEMP. to YES, and set ROOM TEMP. to NON, then the water flow temperature will display on the home page, and the water flow temperature will work as the target temperature.

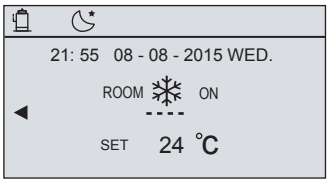


If application 7 is applied(refer to **4.7 Application 7**) please set WATER FLOW TEMP. to YES, and set ROOM TEMP. to YES, then the water temperature will be displayed on the home page. and water temperature setpoint and room temperature setpoint can be set in the main page.

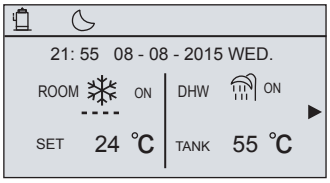
In this condition，the first target outlet water temperature can be set in the main page, the second one can be calculated from the climate related curves, in heat mode, the higher one will be the real target outlet temperature, while in cool mode, the lower one will be selected.



If ► pressed, the main page will display the room temperature:



If application 4(refer to **8.4 Application 4**) is applied, please set WATER FLOW TEMP. to NON, and set ROOM TEMP. to YES, then the room temperature will be displayed on the home page, and the room temperature will work as the target temperature. The target outlet water temperature can be calculated from the climate related curves.



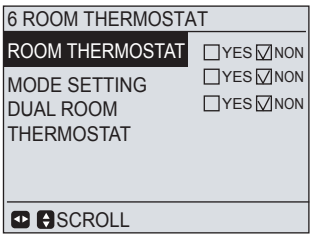
6.13 ROOM THERMOSTAT

■ **About ROOM THERMOSTAT**

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

■ **How to set the ROOM THERMOSTAT**

To set the ROOM THERMOSTAT, go to MENU> FOR SERVICEMAN> ROOM THERMOSTAT. Press OK. The following page will appear:



If room thermostat is available, please select YES and press OK.
In MODE SETTING, if YES is selected, the mode setting and on/off of the unit can't be done by the user interface, the timer function is unavailable; the running mode, on/off of the unit decided by the room thermostat, while the temperature setting can be done by the user interface. If NON is selected, the user interface can be used to set operation mode and target temperature, while the on/off of the unit is determined by room thermostat, the timer function is unavailable.
In DUAL ROOM THERMOSTAT, if YES is selected, the ROOM THERMOSTAT、MODE SETTING will turn to NON automatically, and the WATER FLOW TEMP. and ROOM TEMP. forcibly set to YES. The timer function in the user interface is unavailable; the setting of operation mode and target temperature can be done on the user interface.
The "DUAL ROOM THERMOSTA" function can be used only when application 6(refer to **"Application 6"**) is applied. If zone A requires heating/cooling (ON signal from room thermostat 5A), the unit will turn on, the operation mode and target temperature of outlet water should be set in the user interface. If zone B requires heating/cooling (ON signal from room thermostat 5B), the unit will turn on, the operation mode can be set in the user interface, the target temperature of outlet water will be decided by ambient temperature (target outlet water temperature is calculated from climate related curves, if no curves selected, the default curve will be curve 4). If no heating/cooling demanded for both zone A and zone B (OFF signal from thermostat 5A and 5heat by heat pump onlyB), the unit will turn off.

NOTE：The setting in the user interface should correspond to the wiring of thermostat. If YES is selected in ROOM THERMOSTAT and the MODE SETTING is NON, the wiring of thermostat should follow method A. If the MODE SETTING is YES, then the wiring should follow method B. If "DUAL ROOM THERMOSTAT" is selected, the wiring of room thermostat should follow "method C" . (refer to **"5.9.3.2 Connection for other components/For room thermostat"**)

6.14 OTHER HEATING SOURCE

■ **About OTHER HEATING SOURCE**

The OTHER HEATING SOURCE is used to set whether the backup heater、additional heating source like boiler、solar energy kit is available.

■ **How to set the OTHER HEATING SOURCE**

To set the OTHER HEATING SOURCE, go to MENU> FOR SERVICEMAN> OTHER HEATING SOURCE, Press OK. The following page will appear:

7 OTHER HEATING SOURCE	
7.1.BACKUP HEATER	☑YES ☐NON
7.2.AHS	☐YES ☑NON
7.3.SOLAR ENERGY	☐YES ☑NON
◄► ▲▼SCROLL	

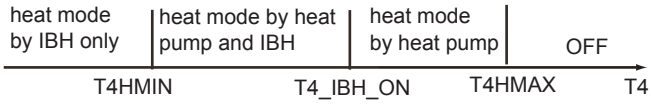
If backup heater is avilable, please select YES at BACKUP HEATER , then you press OK, the following page will appear:

7.1 BACKUP HEATER	
HEAT MODE	☑YES ☐NON
DHW MODE	☐YES ☑NON
T4_AHS_ON	-5°C
dT1_AHS_ON	5°C
t_IBH_DELAY	30MIN
t_IBH12_DELAY	5MIN
◄► ▲▼SCROLL	

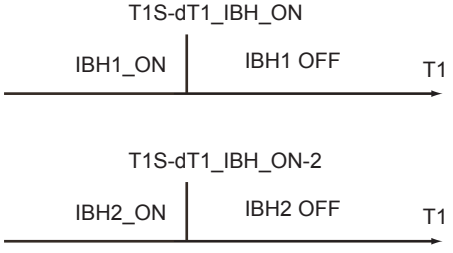
When the cursor is on HEAT MODE or DHW MODE, Using ◄、► to selet YES or NON, if YES is selected, the backup heater will be available in corresponding mode, otherwise it will be unavailable.

When the cursor is on T4_IBH_ON、dT1_IBH_ON、t_IBH_DELAY、or t_IBH12_DELAY, Using ◄、►、▼、▲ to scroll and adjust the parameter.

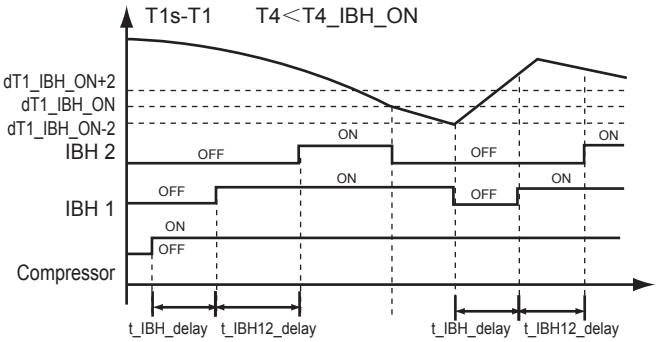
T4_IBH_ON is the ambient temperature for starting backup heater, the ambient temperature above which the backup heater will be unavailable, the relationship between operation of the backup heater and the ambient temperature can be described in the picture below.



dT1_IBH_ON is the temperature difference between T1S and T1 for starting the backup heater. only when T1<T1S-dT1_IBH_ON can the backup heater turn on. When the second backup heater is installed, if the temperature difference between T1S and T1 large than dT1_IBH_ON+2, the second backup heater will turn on. the relationship between operation of the backup heater and the temperature difference can be described in the picture below.



t_IBH_DELAY is the time that the compressor has run before the first backup heater turn on(if T1<T1S)..
t_IBH12_DELAY is the time that the first backup heater has run before the second backup heater turn on.



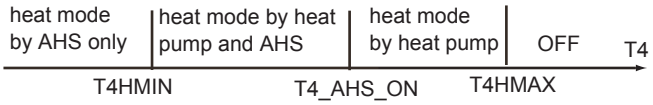
If additional heating source is avilable, please select YES at the corresponding position, then you press OK, the following page will appear:

7.2 ADDTIONAL HEATING SORUCE	
HEAT MODE	☑YES ☐NON
DHW MODE	☐YES ☑NON
T4_AHS_ON	-5°C
dT1_AHS_ON	5°C
dT1_AHS_OFF	0°C
t_AHS_DELAY	30MIN
◄► ▲▼SCROLL	

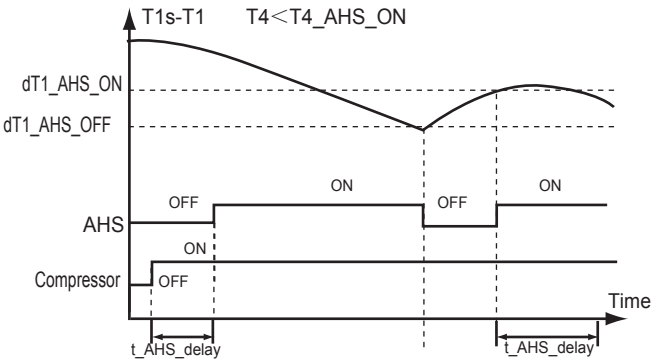
When the cursor is on HEAT MODE or DHW MODE, Using ◄、► to selet YES or NON, if YES is selected, the additional heating source will be available in corresponding mode, otherwise it will be unavailable.
NOTE: If YES selected in DHW MODE the installation of additional heating source should follow **"Application 5/Application A"**

When the cursor is on T4_AHS_ON、dT1_AHS_ON、dT1_AHS_OFF、or t_AHS_DELAY, Using ◄、►、▼、▲ to scroll and adjust the parameter.

T4_AHS_ON is the ambient temperature for starting the additional heating source, when the ambient temperature above which the additional heating source will be unavailable. The relationship between the operation of additional heating source and ambient temperature can be described in the picture below:



dT1_AHS_ON is the temperature difference between T1S and T1 for turning the additional heating source on(only when T1<T1S-dT1_AHS_ON)
dT1_AHS_OFF is the temperature difference between T1S and T1 for turning the additional heating source off (when T1≥T1S+dT1_AHS_OFF the additional heating source will turn off)
t_AHS_DELAY is the time that the circuit water has been heated by heat pump only before starting the additional heating source.
It should be shorter than the additional heating source's start time interval.
The operation of the heat pump and the additional heating source described in the picture below:



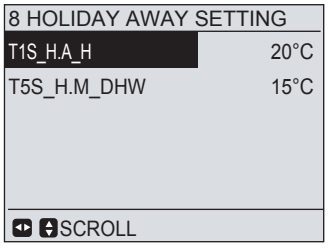
6.15 HOLIDAY AWAY SETTING

■ **About HOLIDAY AWAY SETTING**

The HOLIDAY AWAY SETTING is used to set the outlet water temperature when you are in holiday for prevention of freezing.

■ **How to enter the HOLIDAY AWAY SETTING**

To enter the HOLIDAY AWAY SETTING, go to MENU> FOR SERVICEMAN> HOLIDAY AWAY SETTING. Press OK. The following page will appear:



When the cursor is on T1S_H.A._H or T5S_H.M_DHW, Using◄、►、▼、▲ to scroll and adjust the parameter,
T1S_H.A._H is the target outlet water temperature for space heating when in holiday away mode.
T1S_H.M_DHW is the target outlet water temperature for water heating when in holiday away mode.

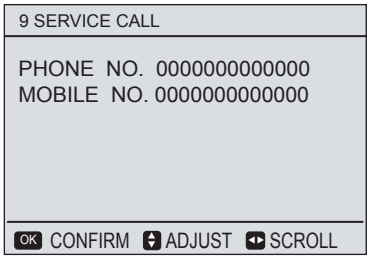
6.16 SERVICE CALL

■ **About SERVICE CALL**

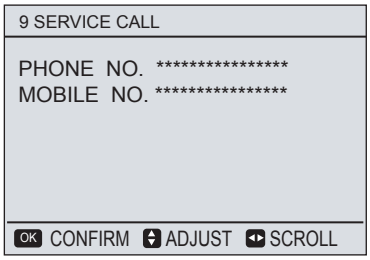
The installers can set the phone number of the local dealer in SERVICE CALL. If unit can't work, you can call this number for help.

■ **How to set the SERVICE CALL**

To set the SERVICE CALL, go to MENU> FOR SERVICEMAN> SERVICE CALL. Press OK. The following page will appear:



Using ▼、▲ to scroll and set the phone number, the maxmuim length of the phone number is 13, if the length of phone number short than 12, please input ■, as described in the picture below:



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

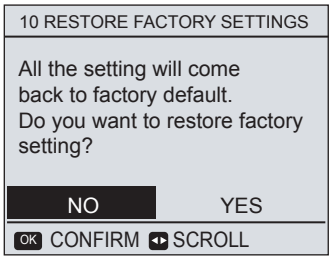
6.17 RESTORE FACTORY SETTINGS

■ **About RESTORE FACTORY SETTINGS**

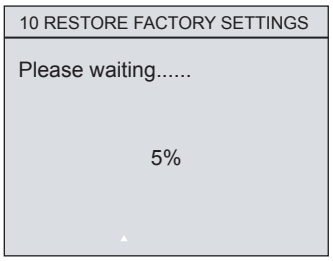
The RESTORE FACTORY SETTING is used to restore all the parameters set in the user interface to the factory setting.

■ **How to set the RESTORE FACTORY SETTINGS**

To restore factory settings, go to MENU> FOR SERVICEMAN> RESTORE FACTORY SETTINGS. Press OK. The following page will appear:



Using ◄、► to scroll the cursor to YES and press OK, the following page will disapper:



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

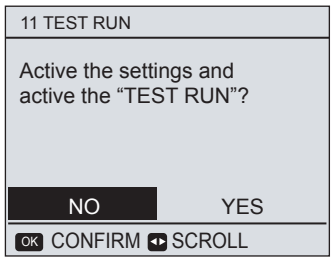
6.18 TEST RUN

■ **About TEST RUN**

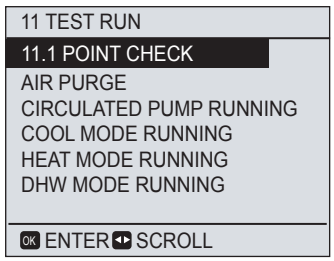
The TEST RUN is used to check correct operation of the values, air purge, circulted pump running,cooling, heating and domestic water heating

■ **How to enter the TEST RUN**

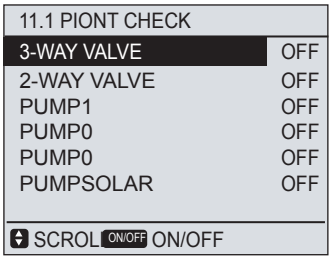
To enter the test run, go to MENU> FOR SERVICEMAN> TEST RUN. Press OK. The following page will appear:

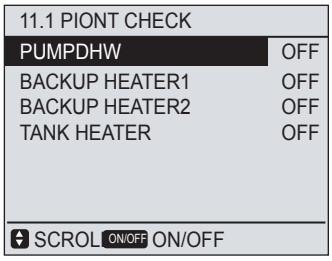


If YES is selected, the following page will appear:

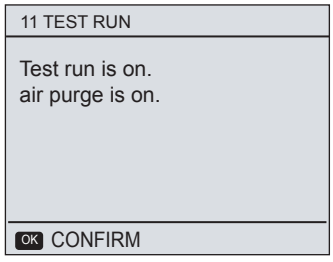


Using ▼、▲ to scroll to the mode you want to run and press OK, then the unit will run as you selected.
If 11.1 POINT CHECK is selected,the following page will disappear



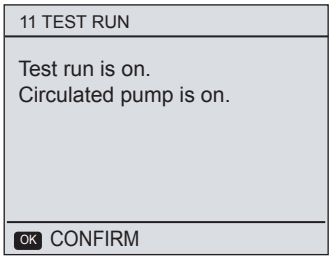


Using ▼、▲ to scroll to the components you want to check and press ON/OFF, for example, when 3-WAY VALUE is selected and ON/OFF pressed, if the 3-way value is open/close, then the operation of 3-way value is normal, so does other components.
If you select AIR PURGE and OK is pressed, the page will displayed as following:



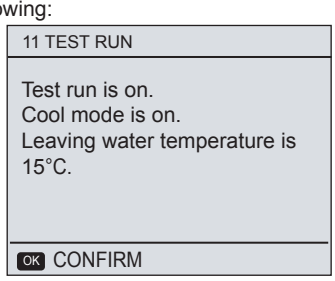
When in air purge mode, the 3-way value will open, the 2-way value will close, 60s later the pump in the unit(PUMPI) will operate for 10min, during which the flow switch will not work. after the pump stoped, the 3-way value will close and the 2-way value will open, 60s later both the PUMPI and PUMPO will operate until the next command recived.

When the CIRCULATED PUMP RUNNING is selected, the page will displayed as following:



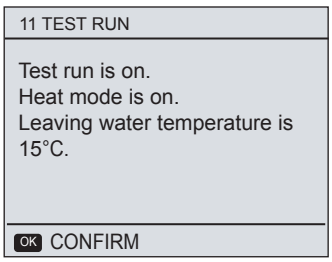
When circulated pump running is turned on, all the running components will stop, 60min later,the 3-way value will open, the 2-way value will close, 60s later PUMPI will operate , 30s later, if the flow switch checked normal flow,the PUMPI will operate for 3min, after the pump stoped, the 3-way value will close and the 2-way value will open, 60s later the both PUMPI and PUMPO will operate, 2min later, the flow switch will check the water flow , if the flow switch close for 15s, the PUMPI and PUMPO will operate until the next command recived.

When the COOL MODE RUNNING is selected, the page will displayed as following:



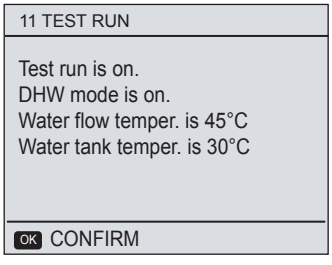
During COOL MODE test running, the default target outlet water temperature is 7°C, the unit will operate until the water temperature drop to a certain value or the next command recived.

When the HEAT MODE RUNNING is selected, the page will displayed as following:



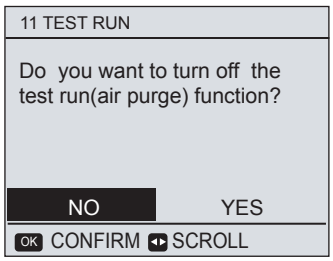
During HEAT MODE test running, the default target outlet water temperature is 35°C, the first backup heater will turn on after the compressor runned for 10min, 60s later the second backup heater will turn on. After the two backup heater runned for 3min, both backup heater will turn off, the heat pump will operate until the water temperature increase to a certain value or the next command recived.

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



During DHW MODE test running, the default target temperature of the domestic water is 55°C, the booster heater will turn on after the compressor runned for 10min, the booster heater will turn off 3min later, the heat pump will operate until the water temperature increase to a certain value or the next command recived.

During test run, all the buttons except OK is 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 page will displayed as following:



Using ◄、► to scroll the cursor to YES and press OK, the test run will turn off.

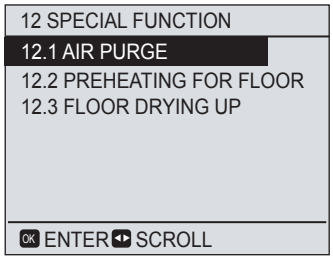
6.19 SPECIAL FUNCTION

■ **About SPECIAL FUNCTION**

The SPECIAL FUNCTION contains AIR PURGE, PREHEATING FOR FLOOR, FLOOR DRYING UP. It's used in some special conditions, for example: the initial start of the unit, initial running of floor heating.

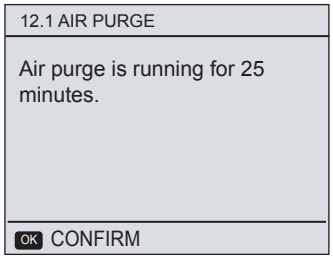
■ **How to enter the SPECIAL FUNCTION**

Go to MENU> FOR SERVICEMAN> SPECIAL FUNCTION.



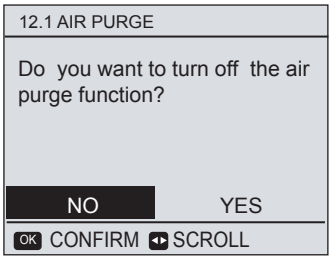
Use ▼、▲ to scroll and use OK to enter.
During first operation of the unit, air may remained in the system which can case malfunction during operation, so it is necessary to run air purge function to release the air(make sure the air purge value opened).

Go to FOR SERVICEMAN > 12 SPECIAL FUNCTION>12.1AIR PURGE：



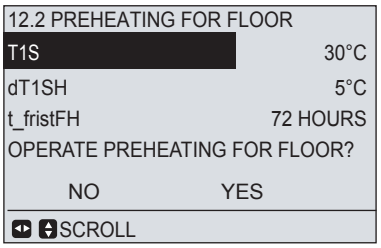
During air purge, the 3-way value will open, the 2-way value will close, 60seconds later the pump in the unit(PUMPI) will operate for 10min, during which the flow switch will not work. after the pump stoped, the 3-way value will close and the 2-way value will open, 60s later the both the PUMPI and PUMPO will operate until the stopping command recived

The number displayed on the page is the time that the air purge has running. During air purge, all the buttons except OK is invalid. If you want to turn off the air purge, please press OK, then the following page will appear:

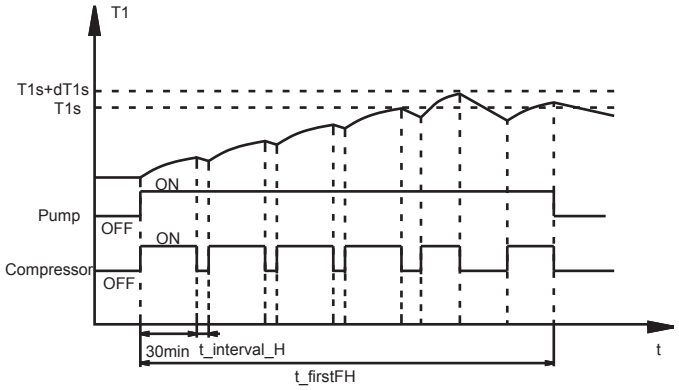


Use◄、► to scroll and use OK to confirm.

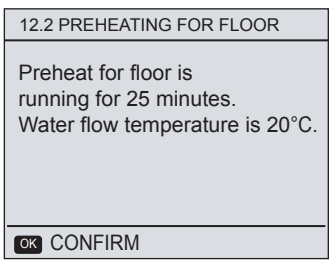
If PREHEATING FOR FLOOR is selected,after press OK ,the page will displayed as following:



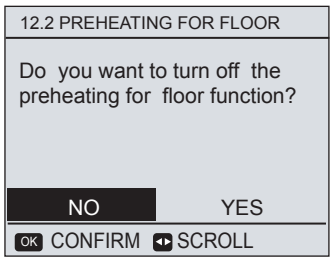
When the cursor is on T1S, dT1SH or t_fristFH, Using ◄、►、▼、▲ to scroll and adjust the parameter.
T1S is the target outlet water temperature in preheating for floor mode, the T1S set here should equal to the target outlet water temperature set in the main page.
dT1SH is the temperature difference for stopping the unit.(When T1≥T1S+dT1S the heat pump will turn off)
t_fristFH is the time last for preheating floor.
The operation of the unit during preheating for floor described in the picture below:



When the cursor is on OPERATE PREHEATING FOR FLOOR, Using ◄、►to scroll to YES and press OK, the page will be displayed as following:

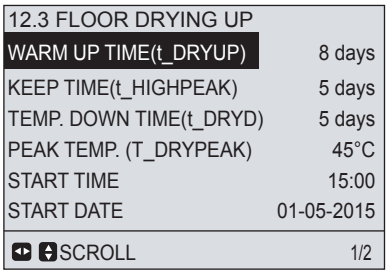


During preheating for floor, all the buttons except OK is invalid. If you want to turn off the preheating for floor, please press OK, then the page will displayed as following:



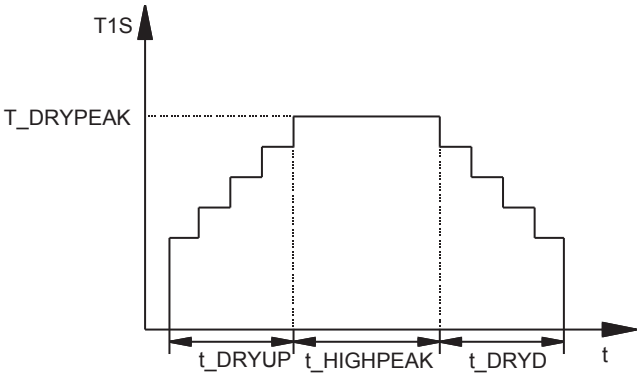
Using ◄、►to scroll the cursor to YES and press OK, the preheating for floor will turn off.

Before floor heating, if large amount of water remain in the floor, the floor may be deformed or even rupture during floor heating operation, in order to protect the floor, floor drying is necessary, during which the temperature of the floor should be increased gradually.
If FLOOR DRYING UP is selected, after press OK ,the page will displayed as following:



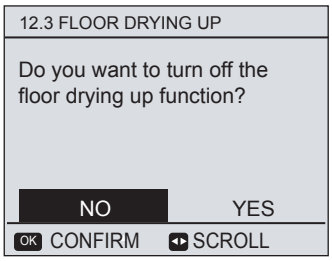
When the cursor is on **WARM UP TIME (t_DRYUP), KEEP TIME (t_HIGHPEAK), TEMP. DOWN TIME (t_DRYD), PEAK TEMP. (T_DRYPEAK), START TIME or START DATA**, Use ◄ ► and ▼ ▲ to scroll and adjust the parameter.
t_DRYUP is the day for warming up.
t_HIGHPEAK is the continue days in high temperature.
t_DRYD is the day of dropping temperature
T_DRYPEAK is the target peak temperature of water flow during floor drying up.

The target outlet water temperature during floor drying up described in the picture below:



When the cursor is on OPERATE FLOOR DRYING UP?, Using ◄、► to scroll to YES and press OK, the page will be displayed as following:

During floor drying up, all the buttons except OK is invalid. When the heat pump malfunction, the floor drying mode will turn off when the backup heater and additional heating source is unavailable. If you want to turn off the floor drying up, please press OK, then the page will displayed as following:



Using ◄、► to scroll the cursor to YES and press OK, the floor drying up will turn off.

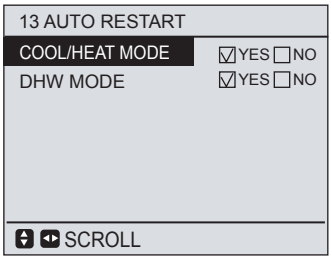
6.20 AUTO RESTART

■ **About AUTO RESTART**

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

■ **How to set the AUTO RESTART**

Go to MENU> FOR SERVICEMAN>AUTO RESTART.



Use ▼、▲、◄、► to scroll and use OK to select YES or NON to enable or disable the auto restart function. If the auto restart function is enabled, when power returns after a power supply failure, the AUTO RESTART function reapplies the user interface settings at the time of the power supply failure. If this function is disabled, when power returns after a power supply failure, the unit won't auto restart.

6.22 Nouns illutration

The nouns related to this unit illustrated in the table bellow

Parameter	Illustration
T1	Outlet water temperature of backup heater
T1B	Outlet water temperature of additional heating source
T1S	Target outlet water temperature
T2	Temperature of refrigerant at outlet / inlet of plate heat exchanger when in heat mode/cool mode
T2B	Temperature of refrigerant at inlet / outlet of plate heat exchanger when in heat mode/cool mode
T3	Temperature of tube at outlet/inlet of condenser when in cool/heat mode
T4	Ambienttemperature
T5	Temperature of domestic hot water
Th	Suction temperature
Tp	Discharge temperature
Tw_in	Inlet water temperature of plate heat exchanger
Tw_out	Outlet water temperature of plate heat exchanger
AHS	Additional heating source
IBH1	Thefirst backup heater
IBH 2	The second backup heater
TBH	Backup heater in the domestic hot water tank
Pe	Evaporate/condense pressure in cool/heat mode

7 TEST RUN AND FINAL CHECK

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

7.1 Final check

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

NOTE

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

7.2 Test run operation (manual)

If required, the installer can perform a manual test run operation at any time to check correct operation of air purge, heating, cooling and domestic water heating ,refer to "**6.18 TEST RUN**".

8 MAINTENANCE AND SERVICE

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.
This maintenance has to be carried out by your local technician
In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.
This maintenance has to be carried out by your local Midea technician.

DANGER

ELECTRIC SHOCK

- **Before carrying out any maintenance or repair activity, always switch off the circuit breaker on the supply panel, remove the fuses (or switch off the circuit breakers) or open protection devices of the unit.**
- **Make sure that before starting any maintenance or repair activity, also the power supply to the outdoor unit is switched off.**
- **Do not touch live parts for 10 minutes after the power supply is turned off because of high voltage risk.**
- **The heater of the compressor may operate even in stop mode.**
- **Please note that some sections of the electric component box are hot.**
- **Make sure you do not touch a conductive section.**
- **Do not rinse the unit. This may cause electric shocks or fire.**
- **When service panels are removed, live parts can be easily touched by accident.**
  Never leave the unit unattended during installation or servicing when service panel is removed.

The described checks must be executed at least once a year by qualified personnel.

1. Water pressure
   Check if the water pressure is above 0.1 MPa. If necessary add water.
2. Water filter
   Clean the water filter.
3. 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.
4. Pressure relief valve hose
   Check that the pressure relief valve hose is positioned appropriately to drain the water.
5. Backup heater vessel insulation cover
   Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.
6. Domestic hot water tank pressure relief valve (field supply)
   Applies only to installations with a domestic hot water tank.
   Check for correct operation of the pressure relief valve on the domestic hot water tank.
7. Domestic hot water tank booster heater
   Applies only to installations with a domestic hot water tank.
   It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.
8. 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 by use of an ohm meter. All contacts of these contactors must be in open position.
9. In case of use of glycol
   (Refer to Water pipework Caution: **"Use of glycol"**)
   Document the glycol concentration and the pH-value in the system at least once a year.
   - A pH-value below 8.0 indicates that a significant portion of the inhibitor has been depleted and that more inhibitor needs to be added.
   - When the pH-value is below 7.0 then oxidation of the glycol occurred, the system should be drained and flushed thoroughly before severe damage occurs.

   Make sure that the disposal of the glycol solution is done in accordance with relevant local laws and regulations.

9 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.

9.1 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.

CAUTION

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 safety devices may 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 & owner's manual of that kit.

9.2 General symptoms

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

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the controller set point. T4HMAX, T4HMIN in heat mode.T4CMAX,T4CMIN in cool mode. T4DHWMAX, T4DHWMIN in DHW mode.
The water flow is too low.	• Check that all shut off valves of the water circuit are completely open. • Check if the water filter needs cleaning. • Make sure there is no air in the system (purge air). • Check on the manometer that there is sufficient water pressure. The water pressure must be>0.1 MPa (water is cold). • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to **"Water pipework/Checking the water volume and expansion vessel pre-pressure"**).

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 must start up 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.
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 > 0.1 MPa (water is cold). • Check that the manometer is not broken. • Check that the expansion vessel is not broken. • Check that the setting of the pre- pressure of the expansion vessel is correct (refer to **"Water pipework/Checking the water volume and expansion vessel pre-pressure"**).

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 0.15~0.20MPa (refer to **"Water pipework/Checking the water volume and expansion vessel pre-pressure"**).

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 **"Field settings"** Check whether or not the thermal protector of the backup heater has been activated (refer to **"Switch box main components", "Backup heater thermal protector"** for location of the reset button). 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. • Raise 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 20, and set t_DHWHP_RESTRICT to minimum value • set dT1SH to 2 • enable TBH, and TBH should be controled by the outdoor unit • if AHS(boiler) is available, turn boiler 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 **1.1 General information/Domestic hot water tank**)

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

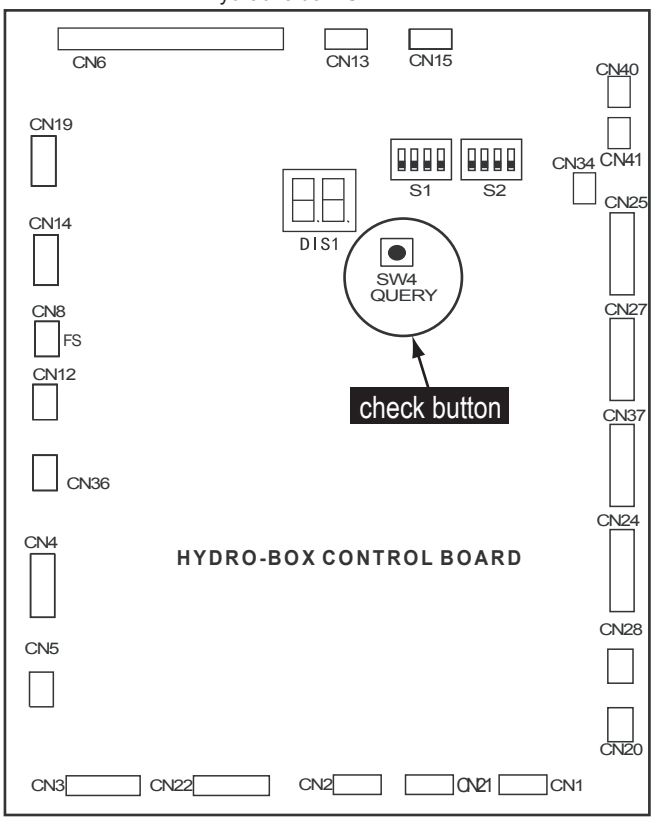
Symptom 9: DHW mode heat pump stop work but setpoint not reached, space heating require heat but unit stay in DHW mode

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

10 PARAMETERS CHECK IN THE UNIT

To check the parameters of hydraulic box, open the cover and you'll see the PCB like following, the digital display will show the temperature of outlet water in normal condition('0' will display if the unit is off or error code will display if error occurs). Long press the check button and the digital display will show the operating mode, and then press the check button in sequence, the digital display will show the value, the implication of the value illustrated in the table below:

hydraulic box SW4



Number	Implication
0	Temperature of outlet water when unit is on, when the unit is off, '0' will display
1	Operation mode(0—OFF，2—COOL，3—HEAT，5—Water heating)
2	Capacity requirement before correction
3	Capacity requirement after correction
4	Outlet water temperature of backup heater
5	Outlet water temperature of additional heating source
6	Target outlet water temperature calculated from climate related curves
7	Room temperature
8	Temperature of domestic hot water
9	Temperature of refrigerant at outlet /inlet of plate heat exchanger when in heat mode/cool mode
10	Temperature of refrigerant at inlet /outlet of plate heat exchanger when in heat mode/cool mode
11	Temperature of water at outlet of plate heat exchanger
12	Temperature of water at inlet of plate heat exchanger
13	Ambient temperature
14	Current of backup heater 1
15	Current of backup heater 2
16	Error/protection code for the last time,'—'will display if no error/protection occur
17	Error/protection code for the second last time,'—'will display if no error/protection occur
18	Error/protection code for the third last time,'—'will display if no error/protection occur
19	Version of software(hydraulic module)

10.1 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	Flow switch error (E8 displayed 3 times)	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.
E1	Phase sequence fault(only for three-phase unit)	1.Check the power supply cables should be connected stable, to avoid phase loss.
		2.Check the power supply cables sequence, change any two cables sequence of the three power supply cables.
E2	Communication error between user interface and main control board of 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	The backup heater exchanger outlet water temperature sensor（T1） error.	1. The T1 sensor connector is loosen. Reconnect it.
		2.The T1 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive.
		3.The T1 sensor failure, change a new sensor.
E4	The domestic hot water temperature sensor （T5） error.	1.The T5 sensor connector is loosen. Reconnect it.
		2.The T5 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive
		3.The T5 sensor failure, change a new sensor.
E5	The condenser outlet refrigerant temperature sensor (T3)error.	1. The T3 sensor connector is loosen. Reconnect it.
		2.The T3 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive
		3. The T3 sensor failure, change a new sensor.
E6	The ambient temperature sensor (T4) error.	1. The T4 sensor connector is loosen. Reconnect it.
		2.The T4 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive
		3. The T4 sensor failure, change a new sensor.
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 "9.4 Charging 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 "Setting the pump speed").
		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.

Error code	Malfunction or protection	Failure cause and Corrective action
E9	Suction temperature sensor(Th) error	1. The Th sensor connector is loosen. Re connect it. 2.The Th sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The Th sensor failure, change a new sensor.
EA	Discharge temperature sensor(Tp) error	1. The Tp sensor connector is loosen. Re connect it. 2.The Tp sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The Tp sensor failure, change a new sensor.
Ed	inlet water temperature sensor(Tw_in) error	1. The Tw_in sensor connector is loosen. Re connect it. 2.The Tw_in sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The Tw_in sensor failure, change a new sensor.
EE	The main control board of 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 error between main control board PCB B and main control board of hydraulic module	1.wire doesn't connect between main control board PCB B and main control board of hydraulic module. connect thewire. 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.
H1	Communication error between inverter module PCB A and main control board PCB B	1. Whether there is power connected to the PCB and driven board. Check the PCB indicator light is on or off. If Light is off, reconnect the power supply wire.

Error code	Malfunction or protection	Failure cause and Corrective action
H1	Communication error between inverter module PCB A and main control board PCB B	2.if light is on, check the wire connection between the main PCB and driven PCB, if the wire loosen or broken, reconnect the wire or change a new wire. 3. Replace a new main PCB and driven board in turn.
H2	The plate heat exchanger refrigerant inlet(liquid pipe) temperature sensor(T2) error.	1.The T2 sensor connector is loosen. Re connect it. 2.The T2 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T2 sensor failure, change a new sensor.
H3	The plate heat exchanger refrigerant outlet(gas pipe) temperature sensor (T2B) error.	1. The T2B sensor connector is loosen. Re connect it. 2.The T2B sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T2B sensor failure, change a new sensor.
H4	Three times P6 protect	Same to P6
H5	The indoor temperature sensor(Ta) error	1. The Ta senor is in the interface; 2. The Ta sensor failure, change a new sensor or change a new interface.
H6	The DC fan failure	1. Strong wind or typhoon below toward to the fan, to make the fan running in the opposite direction. Change the unit direction or make shelter to avoid typhoon below to the fan. 2.fan motor is broken, change a new fan motor.
H7	Main circuit voltage failure	1. Whether the power supply input is in the available range. 2. Power off and power on for several times rapidly in short time. Remain the unit power off for more than 3 minutes than power on. 3. the circuit defect part of Main control board is defective. Replace a new Main PCB.

Error code	Malfunction or protection	Failure cause and Corrective action
H8	Pressure sensor failure	1. Pressure sensor connector is loosen, reconnect it. 2. Pressure sensor failure. change a new sensor.
H9	The system outlet water temperature sensor T1B failure.	1. The T1B sensor connector is loosen. Reconnect it. 2.The T1B sensor connector is wet or there is water in. remove the water, make the connector dry. add waterproof adhesive 3. The T1B sensor failure, change a new sensor.
HA	The plate heat exchanger water outlet temperature sensor (TW_out) error.	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.
HE	The condenser refrigerant outlet temperature is too high in heating mode for more than 10 minutes.	The outside ambient temperature is too high(higher than 30℃, the unit still operate heat mode. close the heat mode when the ambient temperature is higher than 30℃
HF	The main control board PCB B 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 PCB is broken, change a new PCB.
HH	H6 displayed 10 times in 2 hours	Refer to H6
hl	PFC module fault	Contact your local dealer
hp	Low pressure protection（Pe<0.6）occured 3 times in an hour	Refer to P0
P0	Low pressure protection	1. System is lack of refrigerant volume. Charge the refrigerant in right volume. 2.When at heating mode or heat water mode, Heat exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction. 3. The water flow is low in cooling mode.

Error code	Malfunction or protection	Failure cause and Corrective action
P0	Low pressure protection	4. Electrical expansion valve locked or winding connector is loosen. Tap-tap the valve body and plug in/ plug off the connector for several times to make sure the valve is working correctly. And install the winding in the right location
P1	High pressure protection	Heating mode, DHW mode: 1. The water flow is low; water temp is high, whether there is air in the water system. Release the air. 2. Water pressure is lower than 0.1Mpa, charge the water to let the pressure in the range of 0.15~0.2Mpa. 3. Over charge the refrigerant volume. Recharge the refrigerant in right volume. 4. Electrical expansion valve locked or winding connector is loosen. Tap-tap the valve body and plug in/ plug off the connector for several times to make sure the valve is working correctly. And install the winding in the right location DHW mode: Water tank heat exchanger is smaller than the required 1.7m^2.(10-16kW unit)or 1.4m^2(5-9kW unit) Cooling mode: 1.Heat exchanger cover is not removed. Remove it. 2. Heat exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction.
P3	Compressor overcurrent protection.	1.The same reason to P1. 2. Power supply voltage of the unit is low, increase the power voltage to the required range.
P4	High discharge temperature protection.	1.The same reason to P1. 2. System is lack of refrigerant volume. Charge the refrigerant in right volume. 3.TW_out temp sensor is loosen Reconnect it.. 4. T1 temp sensor is loosen. Reconnect it. 5. T5 temp sensor is loosen. Reconnect it.

Error code	Malfunction or protection	Failure cause and Corrective action
P5	High Temperature difference protection between water inlet and water outlet of the plate heat exchanger.	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 "**9.4 Charging 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 "**10.6 Setting the pump speed**").
P6	Module protection	1. Power supply voltage of the unit is low, increase the power voltage to the required range.
		2. The space between the units is too narrow for heat exchange. Increase the space between the units.
		3. Heat exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction.
		4. Fan is not running. Fan motor or fan is broken, Change a new fan or fan motor.
		5. Over charge the refrigerant volume. Recharge the refrigerant in right volume.
		6. Water flow rate is low, there is air in system, or pump head is not enough. Release the air and reselect the pump.
		7. Water outlet temp sensor is loosen or broken, reconnect it or change a new one.
		8. Water tank heat exchanger is smaller than the required 1.7m2.(10-16kW unit)or 1.4m^2(4-8kW unit)

Error code	Malfunction or protection	Failure cause and Corrective action
P6	Module protection	9.Module wires or screws are loosen. Reconnect wires and screws. The Thermal Conductive Adhesive is dry or drop.Add some thermal conductive adhesive.
		10.The wire connection is loosen or drop. Reconnect the wire.
		11. Drive board is defective, replace a new one.
		12. if already confirm the control system has no problem, then compressor is defective, replace a new compressor.
P9	DC fan motor protect	Contact your local dealer
Pd	High temperature protection of refrigerant outlet temp of condenser.	1. Heat exchanger cover is not removed. Remove it.
		2. Heat exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction.
		3. There is no enough space around the unit for heat exchanging.
		4. fan motor is broken, replace a new one.
PL	Transducer module radiator temperature too high protect	Clean the fines. If the fin is clean, contact your local dealer
Pb	Anti-freeze mode protection.	Unit will return to the normal operation automatically.
PP	Water inlet temperature is higher than water outlet in heating mode	1.The water inlet/outlet sensor wire connector is loosen. Reconnect it.
		2.The water inlet/outlet (TW_in /TW_out) sensor is broken, Change a new sensor.
		3. Four-way valve is blocked. Restart the unit again to let the valve change the direction.
		4.Four-way valve is broken, change a new valve.
C7	Transducer module temperature too high protect	Contact your local dealer
C9	Operate frequency unusual protect	Contact your local dealer

11 TECHNICAL SPECIFICATIONS

Indoor unit model	80	160	160S
Power supply	220-240V~ 50Hz		380-415V 3N~50Hz
Rated power input	3.1kW	3.1kW	4.6kW
Rated current	13.5A	13.5A	6.7A
Norminal capacity	Refer to the technical data		
Dimensions (W×H×D)[mm]	400×865×427		
Packing (W×H×D)[mm]	495×1040×495		
Heat exchanger	Plate heat exchanger		
Electric heater	1.5kW×2	1.5kW×2	1.5kW×3
Internal water volume	5.0L	5.5L	5.5L
Safety pressure of water circuit	0.3MPa(g)	0.3MPa(g)	0.3MPa(g)
Filter mesh	80	80	80
Min. water flow (flow switch)	11L/min	16L/min	16L/min
Pump			
Type	DC inverter centrifugal water cooling pump		
Max. head	6m	7.5m	7.5m
Power input	3~45W	4~75W	4~75W
No. of speed	3	3	3
Expanssion vessel			
Volume	5L	5L	5L
Max. operating pressure	0.8MPa(g)	0.8MPa(g)	0.8MPa(g)
Pre-charge pressure	0.15MPa(g)	0.15MPa(g)	0.15MPa(g)
Weight			
Net weight	51kg	54kg	53kg
Gross weight	57kg	60kg	59kg
Connections			
Refrigerant gas/liquid side	φ15.9 / φ9.52		
Water inlet/outlet	R1"		
Drain connection	φ25		
Operation range			
Outlet water (Heating mode)	+25 ~ +60℃		
Outlet water (Cooling mode)	+5 ~ +25℃		
Domestic hot water	+40 ~ +60℃		
Ambient temperature	-20 ~ +46℃		
Water pressure	0.03~0.3MPa		

16125300001559 V1.0

说明书更改说明，A4，黑白印刷，双胶纸
M-thremal 水力模块说明书，在16125300000940的基础上更改内容。
1、 page 17 修改系统安装时对膨胀罐的要求
2、 page 25 增加不同信号端口接线方法描述
3、 page 26 增加对不同房间温控器接线的描述以及不同安装方式的使用方法描述
4、 page 27 修改线控器通讯线最大长度为50m
5、 page 16 修改最小水容积要求
6、 page 38 修改重叠位置
7、 page 42 修改缺失内容
8、 封底页 去掉图号、编码后增加版本号
9、 page1 修改目录，37-48页修改页码和增加内容