Hisense

Operation Installation & Maintenance Manual

HEAT PUMP

- INDOOR UNIT -

Series	Water Module	
Hi Aqua Smart	AHM-070UXCSAPA3	
	AHM-160UXCSAPA3	
Multi-Function	AFM-54EX4SA	
3-Pipe Heat	AHM-080FJFAA	
Recovery	AHM-160FJFAA	

IMPORTANT:

READ AND UNDERSTAND THIS MANUAL BEFORE USING THIS HEAT-PUMP AIR CONDITIONERS. KEEP THIS MANUAL FOR FUTURE REFERENCE.



ORIGINAL INSTRUCTIONS

Declaration of Conformity
(Manufacturer's Declaration)

Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd. Add: 218, Qianwangang Road, Economic & Technical Development Zone, Qingdao, P.R. China declares under its sole responsibility that the air conditioning models to which this declaration relates:

AHM-070UXCSAPA3,AHM-160UXCSAPA3,AFM-54EX4SA,AHM-080FJFAA,AHM-160FJFAA

are in conformity with the following standard(s) or other normative document(s), provided that these are used in accordance with our instructions:

> EN 60335-1 EN 60335-2-40 EN 62233 EN 55014-1 EN 61000-3-2 EN 61000-3-3 EN 55014-2

following the provisions of:

CE

2006/42/EC 2014/30/EU 2012/19/EU 2011/65/EU 1907/2006/EC 94/62/EC

Directives, as amended.

Manufacturing number and manufacturing year: refer to model Nameplate. Notes:

This declaration becomes invalid, if technical or operational modifications are introduced without the manufacturers consent.

Hisense Italia S.r.l. is authorised to Compile the Technical Construction File. Ad. : Via Montefeltro 6A, 20156 Milano.



Name, Surname	:	Sun	l.	C

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CE

Position/ Title : Director

: October 22, 2019 Date

IMPORTANT NOTICE

- Hisense pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Hisense cannot anticipate every possible circumstance that might involve a potential hazard.
- This air conditioner is designed for several uses only, such as room cooling and heating, and domestic hot water.
- Do not use this water module for other purposes, such as drying clothes, refrigerating foods, or for other cooling or heating process.
- No part of this manual may be reproduced without written permission.
- Install water module in the indoor places, such as basement, balcony, equipment room and water closet etc.
- Do not install water module in following places that easily cause fire, mechanical deformation or failure. *Where there is splashing oil (including engine oil).
 - *Where there are sulfurous gases (such as hot spring).

*Where there are flammable gases.

- *Coastal places with salts, strong acids and alkali which are corrosive to the module.
- *Where there is splashing water.
- Pay attention to the following points when the unit is installed in hospital or other facilities where there are strong electromagnetic waves from medical equipment.

*Do not install the unit where the electromagnetic wave is directly radiated to the electrical box, wiring, remote controller and adapter.

*At least 3 meters from strong electromagnetic wave radiators, such as radio equipment.

- Installation and service must conform to local standards, laws and regulations.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.

Useful information for operation and/or maintenance.

🛦 DANGER 💠	Immediate hazards which WILL result in severe personal injury or death.
AWARNING	Hazards or unsafe practices which COULD result in severe personal injury or death [.]
A CAUTION :	Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

NOTE

- If you have any questions, contact your dealer or service center of Hisense
- Water module must be installed indoors and designed for the temperatures in the table below. Use it in this temperature range.

Temperature

(°C)	
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		Min.	Max.
	Cooling Operation	10 DB	43(48 ¹) DB
Outdoor Unit	Floor Heating	-25 WB*	16.5 WB
	Domestic Hot Water	-25 WB*	35(43 ¹) DB
Water Module	Cooling Operation	10	25
Inlet Water	Floor Heating	10	54
Temperature	Domestic Hot Water	10	54

DB: dry bulb temperature WB: wet bulb temperature.

:

*: -20°C WB ~ -25°C WB, Operation Control Range.

1: Operation range only for 3-pipe heat recovery water module.

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

IMPORTANT NOTICE



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

The standard utilization of the unit shall be explained in these instructions. Therefore, the utilization of the unit other than those indicated in these instructions is not recommended.

Please contact your local agent, as the occasion arises.

Hisense's liability shall not cover defects arising from the alteration performed by a customer without Hisense 's consent in a written form.

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1. Safety Summary

\Lambda DANGER

- Do not perform installation work, refrigerant piping work, water piping work and electrical wiring connection without referring to the installation manual. If the instructions are not followed, it may result in water leakage, electric shock or fire.
- Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing leakage test or air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.
- Do not pour water into water module. These products are equipped with electrical parts. If poured, it will cause a serious electrical shock.
- Do not open the service cover or electrical box of water module without turning OFF the main power supply.
- Do not touch or adjust safety devices inside the units. If these devices are touched or readjusted, it may cause serious accident.
- Refrigerant leakage can cause difficulty with breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your local dealer, if refrigerant leakage occurs.
- Air-tight test
 - The refrigerant (fluorocarbon) for the units is nonflammable, nonpoisonous and inodorous. Leaked refrigerant meeting naked flame can generate poisonous gases. The refrigerant gas is heavier than air. If there is full of refrigerant gas near ground, it may cause asphyxia.
- The construction and operational system shall secure safety against refrigerant leakage according to local regulations and standards.
- Use an ELB (Electrical Leakage Breaker) with medium sensing speed or above, with the acting time 0.1s or less. If not used, it will cause an electric shock or a fire
- Connect refrigerant piping securely before the compressor starts running. The refrigerant piping for repair should only be moved, handled and removed after compressor stops.
- Do not short circuit the protective devices when the unit is running. If so, it may result in serious accident such as fire.

- Do not use sprays, such as insecticide, lacquer, hair spray or other flammable gases. within approximately one (1) meter from the units.
- If circuit breaker or fuse is often activated, stop system and contact your local dealer.
- Check that the ground wire is securely connected. If the unit isn't correctly grounded, it leads to electric shock. Do not connect the ground wiring to gas piping, tap water piping, lightning conductor or ground wiring for telephone.
- Connect a fuse of specified capacity.
- Before performing any brazing work, check to ensure that there is no flammable material around. When using refrigerant, be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and which could lead to a fire.
- Use specified cable between units. If not, it may lead to electrical failure or a fire.
- Fix the cables securely and ensure that the terminals are tightened by the specified torque. External forces on the terminals could lead to loosening and a fire or electrical failure.
- Install the wall-hung part of water module on a place firm enough indoor. If not, water module may drop and cause personal injury or machine damage.
- Water pump sound of water module and refrigerant flow sound should be taken into account while selecting installation position.
- Do not install water module below freezing point.
- Install water module where the wired remote controller can easily operate.
- Do not install the unit where there are oil, steam gas, organic solvent and corrosive gases (ammonia, sulfide and acid etc), because corrosion may cause refrigerant leakage, electrical failure, performance degradation and machine damage.
- Install specified accessories and parts. If not, it may cause water leakage, electric shock, fire or malfunctioning of water module.
- The installation manual and all relevant rules and criteria should be followed for the electrical installations. If not, it may lead to electrical failure or a fire due to insufficient capacity or nonconformance.

- 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, it service agent or similary qualified persons in order to aviod a hazard
- The appliance shall be installed in accordance with national wiring regulations.
- Make sure that all field supplied components installed in the piping circuit can withstand the water pressure and the water temperature range in which the unit can operate.

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- Do not put any foreign material on the unit.
- Do not put additional materials in the unit.
- Provide a strong and correct foundation so that: A.Water module is not on an incline.
 B.Abnormal sound does not occur.
- Use the tap water and make sure that it is not hard water. If hard water is used, the plate type heat exchanger, electrical heating and various valves will have a decrease in their service life. Do not heat too hard underground water, spring water and well water. If so, the service life of the product can't be guaranteed.
- Do not use galvanized parts in the water circuit because they may cause corrosion.
- Do not cut off power supply of water module when it is not used in winter. When shut down and certain conditions are met, the unit may automatically antifreeze.
- Circulating water must be drained if power cuts off when it is not used for a long period of time. If the circulating water is not drained, system will be damaged by freezing.
- If the time interval from commissioning to use by user is longer than one month, drain the circulating water in system.
- Do not install the water module, remote controller and cable within approximately 3 meters from strong electromagnetic wave radiators, such as medical equipment.
- Water module can't function normally under the following circumstances:
 - *The electric power of the power transformer for electricity supply is the same as that of water module.
 - *Power source of large power electrical equipment is too close to the power cord of water module.

Equipment: such as elevator, container crane, electrical railway rectifier, power inverter,

electric arc furnace, electric furnace, large induction motor and large relay, which consume much electricity.

Under the above circumstances, due to rapid change in electric power consumption and switch action, power cord of water module will generate very large inductive surge voltage. Therefore, for protecting power supply to water module, before electrical installation, carefully examine the criteria and specification for field installation.

• The A-weighted emission sound pressure level at work stations is not exceeds 70dB(A).

2. Introduction

The air conditioner provides the functions of air conditioning cooling, heating, floor heating, and domestic hot water by air-refrigerant and refrigerant-water heat pump circulation. These functions are controlled by wired remote controller. (For the use of air conditioner, refer to the user's manual of outdoor unit and indoor unit of air conditioner).

The air conditioner can be used together with the floor heating circuit and DHW tank(*).

*DHW: the abbreviation of domestic hot water.

2.1 Inspection Prior to Startup

- Ensure that the pressure on the water pressure gauge is above 0.1 MPa, the DHW tank is full of water and the tap water inlet valve is open.
- The outdoor unit, indoor unit and water module must be energized. If not, the air conditioner cannot start.

2.2 Precautions for Heat Recovery Running

NOTE

Heat recovery function can be enabled only for multi-function and 3-pipe heat recovery series.

 If a DHW tank is installed when cooling, the wired remote controller is used to set (5.1.7 In-situ Settings E8") heat recovery function as active, system will automatically enter heat recovery running state. Indoor unit refrigerates and uses the heat produced during condensation to heat

the hot water in the DHW tank. But when there are only a few air conditioners for refrigerating, the recovered heat is few and the heating capacity of the DHW tank might be insufficient.

• For heat recovery during cooling, when the water temperature rises in the DHW tank, the refrigerating capacity of indoor units may be decreased. If indoor units are kept from being affected, the upper limit of temperature in heat recovery can be set by 5.1.7 In-situ Settings "J8") or set heat recovery function as inactive (5.1.7 In-situ Settings "E8").

- If the 7-day timing sets the DHW tank heating, heat recovery function should be set as inactive.
- For running in the refrigerating season, if heat recovery function is set as active, the lowest water temperature guarantee function of the DHW tank 5.1.7 In-situ Settings "F2") is recommended as inactive, because this may save electricity fee.

NOTE

For Multi-Function water module, if heating capacity of heat recovery is insufficient, the heating capacity can be increased by adding running indoor units or closing all indoor units and starting the DHW tank heating.

NOTE

For 3-pipe heat recovery water module, if heating capacity of heat recovery is insufficient, run the water module in heating mode directly.

2.3 Precautions for Floor Heating

- In order to prevent damage by too rapid temperature rise, when the floor heating is first-time used, make the floor drying, see details in 5.1.3.2. At this moment, do not use indoor air conditioner for heating.
- Because the thermal inertia of water is large, when floor heating is started, room temperature may not rise quickly due to different in-situ installation conditions.
- When the outdoor environmental temperature is very low, or the load in the room is large and the electric heating of water module is set as active (5.1.7 In-situ Settings "d1"), system will automatically run and the electric heater of water module will produce additional heat. At the moment, the unit energy consumption will increase. If the energy consumption is wished to be reduced, the electric heating of water module may be set as inactive, but the room temperature will not reach the set value.

2.4 Precautions for Domestic Hot Water Run

- Domestic hot water may be heated by heat pump and electric heating. When water temperature in the DHW tank rises to a certain temperature, electric heating is used for heating. In view of electricity saving, the set temperature of domestic hot water should not be too high, at most 55°C. This can reduce the possibility of starting electric heating and save electricity fee.
- Use of wired remote controller can shut down electric heating for DHW tank (5.1.7 In-situ Settings "d8"), and hence hot water is heated by the heat pump. The electricity may be saved, but hot water heating will take a longer time and the highest temperature the DHW tank can be heated may be lower and possibly not reach the set temperature.
- Quick heating can satisfy emergent use of domestic hot water and reduce the heating time. However, if indoor air conditioner is heating and user selects quick heating, the unit heating takes precedence

over heating by indoor air conditioner. Therefore, for quick heating, manually shut down indoor air conditioner heating.

- Wired remote controller is used to set the lowest watertemperature guarantee function of DHW tank (5.1.7 In-situ Settings "E3" and "F2") and maintain the water temperature in DHW tank above the set lowest temperature (5.1.7 In-situ Settings "F5").
- DHW tank should be set pursuant to its capacity. If the capacity of DHW tank is large, it is necessary to prolong the 7-day timing set time period or advance the starting time of electric heating for DHW tank (5.1.7 In-situ Settings "J7").
- If the 7-day timing is set for domestic hot water, do not use it when the air conditioner heating is being used.

2.5 Precautions for simultaneous running

NOTE

This function can be enabled only for multi-function and 3-pipe heat recovery series.

- If air conditioner heating simultaneously runs with floor heating or domestic hot water, because the outdoor unit has a fixed heating capacity, the heating effect of air conditioner and water module heating is not as good as heating solely by air conditioner or by water module. Simultaneous running is not recommended.
- During simultaneous running, if the heating capacity by DHW tank or floor heating is insufficient, the electric heating of DHW tank or water module will be automatically started to generate additional heat (when the electric heating setting is active in the insitu settings), but this may cause increase of energy consumption, and all indoor units of air conditioner may be shut down to reduce energy consumption.

NOTE

For simultaneous running of air conditioner heating and floor heating, or air conditioner heating and DHW tank heating, particular for 3-pipe heat recovery water module, the air conditioner heating and water module heating have balanced performance (default setting). The air conditioner heating can take precedence in system by option setting on the outdoor unit (refering to technical catalog for outdooor unit).

2.6 Precautions for Test Run

NOTE

For multi-function and 3-pipe heat recovery series, during cooling test run, the unit will not proceed to heat recovery running.

For multi-function and 3-pipe heat recovery series, if the hot water heating by water module is started when indoor unit of air conditioner is heating test run, it will turn to simultaneous heating by indoor unit and water module, so do not start water module for heating hot water during heating test run.

2.7 Other Precautions

- If machine is stopped for a long period of time in winter, drain out water in water module and water pipes to prevent freezing.
- If outdoor unit fails, wired remote controller is used to set emergent mode (5.1.7 In-situ Settings "G4"). At the floor heating mode, the electric heating only by water module can provide heat; at the domestic hot water mode, the electric heating by DHW tank may heat the water.
- Keep the water module power on and water system unblocked to prevent water freezing, otherwise an alarm may occur.
- (*)When hot water heating by water module is running, the wired remote controller of indoor unit is used to start the cooling. If the air conditioner priority setting (5.1.7 In-situ Settings "J3") is active, the hot water heating will be stopped and turned to the air conditioner cooling; if the air conditioner priority setting is inactive, the heating continues. If indoor unit is cooling and the hot water heating by water module is started by the wired remote controller, cooling continues; if the hot water heating is wished to be immediately active, manually stop cooling by indoor unit.
- (*)When the air conditioner priority setting (5.1.7 Insitu Settings "J3") is inactive and water module is heating hot water, if wired remote controller of indoor unit is set to cooling or air blowing, cooling is not running, but air blowing is normally and hot air will be blown out. Then wired remote controller being set to cooling or air blowing is not recommended.
- (*): Especially for Multi-Function Water Module.

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Even if the water module is stopped in the system, the water pump may run under some circumstances:

- When the anti-freezing function is triggered.
- When outdoor unit starts.
- When outdoor unit defrosts, etc.

If the water system is blocked, an alarm of water flow switch will occur to stop the whole system.

3. Wired Remote Controller (See Fig.3.1.)

The wired remote controller comprises two major parts. The upper part is LCD screen and the lower part includes functional keys.

Fig.3.1 indicates the LCD displays and operation keys of water module.

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Press keys only by finger and use of other objects may damage the keys. Do not touch "CHECK" key because it is only intended for technical service personnel. If press this key by accident, press again to recover.

• Temperature setting

Press "Temperature Adjustment" key once, the set water outlet temperature will increase or decrease 1°C. During floor heating, the lowest set temperature is 20°C and the highest set temperature is 55°C; during domestic hot water running, the lowest set temperature is 35°C and the highest set temperature is 75°C.

- Set temperature and actual temperature "Set Temperature" is the target water outlet temperature of water module. Due to error of wate routlet temperature sensor, the measured temperature may have a deviation from the actual temperature.
- Contact keys

The keys on the remote controller are contact type which only needs being pressed by finger. The running status may be confirmed on the LCD screen.

- LCD indications disappear If all indications disappear during system running, this is because of communication signal distortion by electromagnetic interference. In this case, cut of the power and energize again, the communication failure may be eliminated.
- External mounting of wired remote controller If water module is installed at a position inconvenient for operation, remove the wired remote controller, power off and then use the shielded twisted pair to lead out and mount. The wiring path should not cause short circuit or circuit break of communication lines. The longest leadingout line is 500 meters long.

NOTE

For convenience of understanding, Fig.3.1 shows anything that can be displayed. In normal running, only part of icons will display on the LCD screen.

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Although the LCD display includes the icons of swimming pool water and boiler etc, this water module does not have these functions.



Fig.3.1 Wired Remote Controller

(19)

20)

(21)

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23)

24)

A. Operation Keys

- 1 STER (Sterilization)
- 2 HOT (Domestic Hot Water)
- 3 Temperature Setting
- (4) CHECK
- 5 RESET
- 6 FUNC (Function Selection)
- (7) MODE (Run Mode Selection)
- (8) "ON/OFF" (LED lamp)
- (9) PROG (Time Schedule)
- 10 TIMER
- (1) Time Setting
- B. LCD Displays
- 12 Date
- 13 System ON/OFF ON / OFF
- 14 Clock S
- 15 Time
- (16) " SERV. " Service
- 17 Service Code
- 18 " TIMER " Timer Timing

- Alarm ៉ Icon
 - " NO FUNC Function Not Available"
 - " CENTRAL Centralized Control"
 - "CHECK CHECK"
- " ster Sterilization"
- " OPERATION LINIT Run Restricted"
- 25 Defrosting 💥 /Automatic Antifreezing 🖄
- 26 Cooling**╬**/Heating**≌**Run Mode
- 27 Automatic 🗳
- 28 7-Day Timing (7) Mode
- 29 Temperature Code
- 30 Set Temperature
- (31) Floor Heating (回) /Domestic Hot Water 小 /Swimming Pool
 Water 證 / Fan Coil (印)
- 32 Boiler 🎃 / Solar Energy 💥
- 33 Water Pump Run ►/ Energy Saving
- 34 Locked 🖶
- 35 Test Run 🖤
- 36 Electric Heater (212

4. Before Running

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- The machine not used for a long time should energize over 12 hours before starting. Do not start it immediately after power on, so as to prevent damage of compressor because the lubricating oil is not sufficiently preheated.
- Check whether the outdoor unit is covered by snow. If so, remove the snow by lukewarm water lower than 50°C to prevent damage to plastic parts.
- Do not cut off power supply of water module even if in use. If it will not be used for long, drain out circulating water in system and carry out electrical expansion valve zero reset procedure before power cutting off referring chapter 7. If the power is cut off without draining out circulating water, system will be damaged because of water freezing.
- Domestic hot water function is an optional function that needs setting (5.1.7 In-situ Settings "d3") in the in-situ settings.
- These functions can be used only after being set in the in-situ settings, such as heat recovery function 5.1.7 In-situ Settings "E8", sterilization function 5.1.7 In-situ Settings "C7", automatic adjustment function of floor heating water outlet temperature 5.1.7 In-situ Settings "b9".
- "Floor Drying" must be run before floor heating in each heating season, or else the temperature rises too quickly and it may damage the floor without preheating, see details in 5.1.3.2.

5.1 Starting Operation Steps

5.1.1 Standard Time Setting

Step 1

Power on, four straight lines and the default state of wired remote controller will appear on the LCD screen. The function run previously may also appear.



Step 2

Press the timing key (10) for 3 seconds and go to the standard time setting. The current day in this week and the current time are flashing. Press the temperature adjustment key (3) to adjust the day in the week. Press right or left key of time setting (11) to adjust the time; and press once, minute increases or decreases 1; press it long, the minute increases or decreases 10. Press the time schedule key (9) to quit from the standard time setting, or without operation for continuous 15 seconds, it quits from the standard time setting.

NOTE

Time setting must be conducted at the standby state. It is unable to set the time after starting.

5. Run Modes



NOTE

- After the main power supply on, restart the machine and the previously set functions will appear on the LCD screen.
- When the fan coil is available, the cooling mode can be used
- The cooling mode of water module is only for Hi-Aqua smart and 3-pipe heat recovery series.

5.1.2.1 Cooling test run

Step 1

At the standby state, press simultaneously the mode key $\widehat{(1)}$ and the CHECK key $\widehat{(4)}$ for 3 seconds, and start the hot water test run function, seen below:



Step 2

Press the ON/ OFF 8 , the LED lamp on, and the machine begins running, meanwhile 2 hours' countdown starts.



Step 3

Countdown ends and quit from the hot water test run.

5.1.2.2 Cooling

Step 1

Power on, the default state of wired remote controller will appear, and previously running function may appear on the LCD screen. Press the function key ⑦, Cooling appears on the LCD screen; The cooling terminal only include fan coil.



Step 2

If the water outlet set temperature is increased, press " \land " of the temperature setting key ③; if it is reduced, press " \lor ". For cooling, the highest water outlet set temperature is 20°C, and the lowest set temperature is 5°C.



Step 3

Press the ON/ OFF B , the LED lamp on, and the machine begins running.



5.1.3 Heating

NOTE

- After the main power supply on, restart the machine and the previously set functions will appear on the LCD screen.
- Heating functions comprise: floor heating , DHW tank heating - A.
- Heating functions must be selected according to actually mounted terminals. If the terminals aren't mounted, set in the in-situ settings (5.1.7 In-situ Settings "d3", "d4").

5.1.3.1 Hot Water Test Run

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- Hot water test run should be carried out (default as 2 hours) after the equipment is installed (see details in the installation manual and the in-situ setting operation steps).
- Test run should be selected according to actually mounted terminals. During test run period, all corresponding terminals must be test run, including floor heating and DHW tank, etc.

Step 1

At the standby state, press simultaneously the mode key (7) and the CHECK key (4) for 3 seconds, and start the hot water test run function, seen below:



Step 2

Press the function key 6, switch to the floor heating or DHW tank function.

Step 3

Press the ON/ OFF $\,(8)\,$, the LED lamp on, and the machine begins running, meanwhile 2 hours' countdown starts.



Countdown Starts

Step 4

Countdown ends and quit from the hot water test run.

NOTE

- Press the time setting key 1 to adjust the time; press right key once to add 30 minutes, and press left key to minus 30 minutes, and the default time is 2 hours.
- The default set temperature for test run is 55°C (target value of water outlet temperature),
- Test run is counting down and the clock minuses once every 30 minutes. After countdown, it automatically quit from test run.
- Test run is used for machine commissioning and ensures normal running of refrigerant system and water system. After normal running, press ON/OFF key [®] to quit from the hot water test run in advance.

5.1.3.2 Floor Drying

Step 1

At the standby state, press simultaneously the reset key (5) and the hot water key (2) for 3 seconds, go to floor drying.



Test Run flashes at 1 Hz

Step 2

Heating for 7 days at this mode, and the water outlet temperature automatically follow the requirements.



- Water outlet temperature is set as 25°C running for 72 hours
- Water outlet temperature is set as 35°C running for 48 hours
- Water outlet temperature is set as 40°C running for 48 hours

Step 3

After the floor drying runs for 7 days, the water outlet temperature of water module returns to the set value. If there isn't a set value, it returns to the default value.

ACAUTION

- Before each heating season, user must run the floor heating to prevent damage to the floor from the very quick temperature rise.
- Water must be replenished in the water system (reconfirm that the vent valve is open) before floor heating, and confirm that the water pressure is within a normal range.
- At the floor drying mode, the wired remote controller only responds to the startup/shutdown requests, but not to other modes, functions and temperature adjustment, etc.
- 7 days are the accumulated time for floor drying. If the machine is shutdown halfway, after startup next time, it will continue the floor drying. The run icon flashes at 1 Hz.
- If instantaneous power failure occurs while running, it continues floor drying after power connection. In case of power on after long-time power off, it goes to the off state of floor drying. Press the ON/OFF key (8), go to the floor drying again (running time accumulates for 7 days).

ACAUTION

• Press simultaneously the reset key (5) and the hot water key (2) for 3 seconds, quit from the floor drying in advance. Be careful, quitting from the floor drying in advance may cause damage to the user's floor.

5.1.3.3 Floor heating Step 1

Power on, wired remote controller will run at the default state, and previously running function may appear on the LCD screen. According to the actually mounted terminals, refer to "5.1.7 In-situ Settings" for the settings; press the function key

(6), floor heating appears on the LCD screen; continuously press the function key (6), the icon will change between floor heating (and DHW tank -, until the floor heating is selected.



Step 2

If the water outlet set temperature is increased, press " \land " of the temperature setting key ③; if it is reduced, press " \lor ". For heating, the highest water outlet set temperature is 55°C, and the lowest set temperature is 20°C.

NOTE

 In the in-situ settings of the wired remote controller, it may also set the automatic regulation mode of water outlet temperature. After setting, the water outlet temperature can be automatically regulated according to change in outdoor environmental temperature (OTC), see details in "5.1.7 In-situ Settings". The settings include automatic regulation function active/inactive

("b9"), beginning and ending time each day ("C1" "C2"), lowest and highest environmental temperatures ("C3", "C4") and the set water temperatures corresponding to the highest and lowest environmental temperatures ("C5", "C6").

 OTC (outlet temperature control) function. Under this function, system water outlet temperature will be automatically controlled between Lo_Ta and Hi_Ta according to change in the environmental temperature. See the details about temperature control below.



Lo_Two: Low Environmental Temperature Set Value (C5) Hi_Two: High Environmental Temperature Set Value (C6)

Lo_Ta: Low Environmental Temperature (C3) Hi_Ta: High Environmental Temperature (C4) Two: Set Water Outlet Temperature Ta: Outdoor Environmental Temperature

 When the machine is at the automatic water outlet temperature control state, the set water outlet temperature is automatically calculated by the wired remote controller. User may adjust ±8°C based on the calculation result, but if the adjusting range exceeds the upper and lower limits of temperature settings, the upper and lower limits should prevail.

Set Temperature



Outdoor Environmental Temperature

 When OTC starts, the automatic run icon will display to indicate the OTC function. After the timing ends, automatic run icon will disappear.

Appear During / Automatic Run



Step 3

Press the ON/OFF key (8), the LED lamp on, and the machine begins running.



5.1.3.4 Domestic Hot Water Running Step 1

Power on, the default state of wired remote controller will appear, and previously running function may appear on the LCD screen. According to the actual mounting (refer to 5.1.7 In-situ

Settings "d3"), press function key 6 to show domestic hot water ; continuously press function

key 6 to shift the icon between floor heating and domestic hot water until the domestic hot water is selected.



5.1.3.5 Powerful Water Storage Running Step 1

Before powerful water storage, go to "5.1.7 In-situ Settings", set the target temperature for powerful water storage of DHW tank ("F6"), and also set the "Electric Heating of DHW Tank" ("d8") as active. Step 2

At the standby state, press the hot water key 2 for 3 seconds, and go to powerful water storage.



Electric Heater of DHW Tank

Step 2

To increase DHW tank temperature, press " \land " of the temperature setting key ③; if it is reduced, press " \lor ". For domestic hot water, the highest water outlet set temperature is 75°C, and the lowest set temperature is 35°C.



Step 3

Press ON/OFF key (8), the LED lamp on, and the machine begins running.



Step 3

After going to powerful water storage, the domestic hot water \xrightarrow{I} and electric heater $\bigcirc I$ at 1 Hz. This means powerful water storage is running.

Step 4

After powerful water storage starts, quit from the powerful water storage under the following 3 conditions

- (1) At powerful water storage mode, press the domestic hot water key 2 for 3 seconds.
- (2) When the DHW tank temperature reaches the set water temperature for powerful water storage (5.1.7 In-situ Settings "F6").
- (3) Press ON/OFF key (8), the machine stops running.

5.1.3.6 Heat Recovery (for multi-function and 3-pipe heat recovery water modules) Step 1

At the standby state, set "Heat Recovery" function as active (5.1.7 In-situ Settings "E8=1") and the DHW tank mode active (5.1.7 In-situ Settings "d3=1"). At the indoor air conditioner cooling mode, it automatically turns to heat recovery function.



Water flashes at 1 Hz

Step 2

After going to heat recovery, the wired remote controller maintains the original state, the heating icon and the domestic hot water icon flash at 1 Hz. This means the machine is at the state of heat recovery.

Step 3

After heat recovery starts, under the following conditions, quit from heat recovery run

- (1) All indoor units stop cooling and standby.
- (2) The DHW tank temperature reaches the upper limit set for heat recovery (default upper limit of temperature is 40°C, 5.1.7 In-situ Settings "J8").
- 5.1.3.7 Sterilization

Step 1

2 methods for going to the sterilization:

Method 1: Automatic run each week

Before sterilization, go to 5.1.7 In-situ Settings "C7" and activate "Sterilization" and set as follows

- (1) Beginning time ("C8").
- (2) On which day of each week ("C9").
- (3) Continuous running time ("CA").

(4) Highest temperature default as 70°C ("Cb").

After setting, the machine sterilize once each week, without the need of manual operation.

Method 2: Manual operation

- At the standby state, press the sterilization key
- ① for 3 seconds, and go to sterilization.



Step 2

After going to sterilization function, sterilization icon ③ lights up, electric heating of DHW tank starts, electric heating icon **③** I flashes at 1 Hz. This

means high temperature sterilization is running.

Step 3

After sterilization starts, by different ways of going to sterilization function, there are 2 ways of quitting.

Method 1: Automatic quit

Heat the water in the DHW tank to the set temperature for sterilization (5.1.7 In-situ Settings "Cb" set value) and maintain the set time (5.1.7 In-situ Settings "CA" set value), and then automatically quit from sterilization.

Method 2: Manual quit

- (1) Press the sterilization key ① for 3 seconds under "Sterilization" function.
- (2) Press the ON/OFF key (8) , the machine stops running.

NOTE

Either automaticlly or manually entered into the sterilization, after reaching the automatic quit, it can manually quit.

5.1.4 Miscellaneous Running

- 5.1.4.1 Water Pump Anticorrosion Running
- When the machine is not used for long, to prevent rusting of circulating parts of water pump, the machine automatically starts water pump at a fixed time interval.
- Conditions for startup At the standby state, the automatic startup is already set during ex-factory. This function may be stopped, but it is not recommended to stop (5.1.7 In-situ Settings "G1").



Water Pump Running

- The default time for automatic running of anticorrosion is 0:00 (5.1.7 In-situ Settings "G2") of each Saturday (5.1.7 In-situ Settings "G3"). Anticorrosion continues for 1 minute and then automatically quit to shutdown state.
- After anticorrosion is started, under the following 3 conditions, quit from the water pump anticorrosion
- (1) Running time is 1 minute.
- (2) Timed function starts.
- (3) With manual operation for interference.

ACAUTION

Emergency mode is an emergent work mode using the electrical heating to produce heat, for meeting the heating need of user and after setting as the emergency mode by 5.1.7 In-situ Settings "G4=1", during the maintenance period of outdoor unit when it fails to work. According to work mode and state, when the electric heating work at this state, the electric heating icon **Geor Geor** flashes at 1s.

• When the floor heating starts, the electric heating icon flashes at the frequency 1 Hz to remind the user of the outdoor unit's failure and that only electric heating functions



Electric Heater

• When the domestic hot water function starts, the electric heater icon ③ I flashes at the frequency 1 Hz to remind the user of the outdoor unit's failure and that only electric heater functions.



Electric Heater

• At the emergency mode, press the ON/OFF key (8), the machine stops running.



After the outdoor unit is recovered to normal state, quit from the emergency mode (5.1.7 In-situ Settings "G4=0").

5.1.4.3 One-key Lock

NOTE

- After system goes to one-key lock, stop time-related functions that can automatically start the machine, including 7-day timing, timer, sterilization, automatic water storage, and lowest water temperature guarantee.
- If the user leaves room long, start the one-key lock to avoid start of timing function of in-situ settings.

Step 1

Press the reset key (5) for 3 seconds, go to one-key lock and water module is directly shut down. The lock icon flashes at 1 Hz.



Step 2

Press the reset key (5) for 3 seconds, quit from the one-key lock, and water module is at the shutdown state. All timed functions before lock are cancelled. The user needs to press the time schedule key (9) or timing key (10) to start needed timed functions.

ACAUTION

Be cautious, the one-key lock function may cancel the set time schedules and timing function!

5.1.4.4 Lock of Wired Remote Controller's Keyboard Step 1

When the wired remote controller is energized, press

"<" and ">" of the time setting key (1) for 3 seconds and go to the lock of wired remote controller's keyboard.



Step 2

Press "<" and ">" of the time setting key (1) for 3 seconds, and quit from the locked state.

NOTE

- After the keyboard of wired remote controller is locked, it will give no response to key acting and prevent wrong operation by children.
- Keyboard lock does not affect the run state of the machine.

5.1.5 Timer Operations

NOTE

- At the timed running state, system will run or stop at the set time.
- When the timing function is set, the timer setting after instantaneous power failure will maintain; after long-time power off, the timing function will be automatically cancelled.

5.1.5.1 Set Floor Heating Timer Step 1

Power on, four straight lines will appear on the display screen. The function run previously may also appear.



Step 2

Press the function selection key 6, and the floor heating icon appears on the LCD screen.

Step 3

Press " \land " of the temperature control key ③ to increase the water outlet set temperature; press " \lor " to reduce it. For floor heating, the highest water outlet set temperature is 55°C and the lowest set temperature is 20°C.



Step 4

If press the timing key ① at the stop state, the indications " or " and " TIMER " will appear. If press the timing key ① at the run state, the indications "orf" and " TIMER " will appear.



Press ">" of the time setting key (1), the set time will increase; press "<" key, the set time will decrease. The set time may be between 30 minutes to 24 hours and adjusted at the interval of 30 minutes. At the timed run state, system will run or stop after the set time.

For example, if the set time is "09: 30", the machine will run or stop 9.5 hours later.

5.1.5.2 Set Domestic Hot Water Timer

The domestic hot water timer has the same setting as the floor heating timer. Select the domestic hot water function, and operate as per Step 4 of 5.1.5.1.

5.1.5.3 Cancel Timing

Press the timing key 0 again, the timer indication disappears and the timing function is cancelled.



5.1.6 7-Day Timing Operations

5.1.6.1 Entry and Exit from 7-day Timing Mode Press the time schedule key (9) to go to and quit from 7-day timing mode. At the 7-day timing mode, the machine starts and stops as scheduled procedures. At this mode, it is able to manually start/stop, adjust water temperature, change the running function and start the timer. If instantaneous power failure or longtime power off occurs at 7-day timing mode, after reenergizing, it still runs as per the requirement for 7day timing. If two settings appear at the same time point, the later setting will prevail. During 7-day timing setting, the ON/OFF time points are not necessarily occur in pairs.

NOTE

After long-time power off, reenergizing needs to check whether the data and time are correct. If the time needs to be adjusted, refer to 5.1.1 standard time setting.



5.1.6.2 Schedule Setting

At the shutdown state (it can't turn to schedule setting when the machine is on), press the time schedule key (9) for 3 seconds, start or stop the schedule setting function. At this mode, through using 8 keys, time schedule key (9), ">", "<" of time setting key (1), " $^{"}$ " " $^{"}$ " of temperature control key (3), cancel, sterilization key (1), run mode selection (7) and function selection (6), the timing function at time periods each day can be realized and also set the functions and parameters such as water outlet temperature at each time period.

Step 1

Press the time schedule key (9) for 3 seconds, go to the setting of day in the week, and the icon " Mon" flashes. Through " \land ", " \lor " of the temperature control key (3), the day in the week is selected.



Step 2

Press the time schedule key (9), go to the time period setting state each day. The time period [01] flashes at 1 Hz. Press ">", "<" of the time setting key (1), and selected the time periods to be set, from time period 1 to 8.



If the time period is not set and only the number of time periods is flashing, as shown above.

NOTE

- There are two indication states after time period is set.
- Type one: timed startup indication.



The time period above is 01. The machine starts at 6:00 in the morning of Monday for floor heating, the controlled water outlet temperature is 40°C, and floor heating code is P1.

• Type two: timed shut down indication.



In the Fig above, the time period for timing is 02, and the machine executes the order of shutdown at 8:30 in the morning of Monday.

Step 3

Press the time schedule key (9), and then through pressing ">", "<" of the time setting key (1), select the timed on (" on " flashes at 1 Hz), timed off (" off " flashes at 1 Hz) and cancel timing (" on / off " flashes at 1 Hz).

(1) If the timed on ("on" flashes at 1 Hz) is selected, press the time schedule key (9) to indicate the time, set mode, set function and target water outlet temperature of the timed startup. And the timed startup icon flashes at 1 Hz.



Timed ON flashes at 1 Hz

- (a) Press time schedule key (9), and go to time setting 06:00. Now press ">", "<" of time setting key (1), clock increases or decreases by 15 minutes, and press ">", "<" for long, clock increases or decreases by 1 hour.
- (b) Press time schedule key 9, and go to the mode setting. Now press ">", "<" of time setting key 1 to select. Because this model only has the heating function, the cooling mode can not be selected.
- (c) Press time schedule key (9), and go to function selection setting. Now press ">", "<" of time setting key (1), and according to actually mounted terminals, set by referring to "5.1.7 In-situ Settings". The floor heating or domestic hot water function is selected, and P1 floor heating or P6 domestic hot water on the LCD screen will change according to the function selected.
- (d) Press time schedule key ⑨, and go to the temperature control. Through "∧", "∨" of the temperature regulation key ③, the target temperature of water outlet is set. For floor heating, the lowest set temperature is 20°C and the highest set temperature is 55°C; for domestic hot water running, the lowest set temperature is 35°C and the highest set temperature is 75°C.
- (2) If the timed off ("OFF" flashes at 1 Hz) is selected, press the time schedule key (9) to indicate the time of the timed shutdown, and the timed shutdown icon flashes at 1 Hz.



Press the time schedule key (9), and go to time setting 08:30. Now press ">", "< " of time setting key (1), clock increases or decreases by 15 minutes, and press ">", "< " for long, clock increases or decreases by 1 hour.

(3) If select the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing (" I defend of the sterilization key ① to cancel timing displays as follows



Press the time schedule key (9), cancel the timing for this time period and return to the time period selection state.

Step 4

Return to the time period selection state, set other time periods. After the time periods for the date are set, press the sterilization key ① for canceling, and return to the week selection state. Implement the similar settings for other days in the week. At the selection state of day in the week, press the cancel key (sterilization key ①), and quit from the time schedule setting state.

NOTE

- At each kind of setting state, press the cancel key (sterilization key ①) to return the upper level setting state, until quit from the time schedule setting.
- In a same day if the time settings for time periods are the same, the later settings should prevail and the previous settings will be automatically cancelled.

Step 5

When " Tue" flashes at 1 Hz, press the hot water key ② for 3s, copy the settings of the previous day (Monday) to the current day (Tuesday), and "Tue" is changed to be " Wee" and flashes at 1 Hz. If press the hot water key ② for 3s again, the settings can be copied from Tuesday to Wednesday. This function can copy the settings of the previous day. 7 days are finished in order, and the 7-day timing function can be quickly set.



Step 6

After setting, repeat Step 4 and quit from the time schedule setting. After all settings for the 7-day timing, fill the details of settings in "Table 7.2 7-Day Timing Running Schedule" for inquiry.

5.1.7 In-situ Settings

(functions of wired remote controller) With the wired remote controller, the user can set different terminals in the in-situ settings according to the installation of terminals. Functional change of the wired remote controller can be selected only when this function is effective, see details in Step 4. User may select whether to start the floor heating, outlet temperature control function (OTC), electric heater of water module, electric heater of DHW tank and the outdoor environmental temperature of electric heating.

NOTE

- When the machine is on, it is unable to go to the in-situ settings of wired remote controller.
- During selection of set mode, press "∧", "∨" of the temperature regulation key ③, and select the cooling system number and address for in-situ settings. If system and address selection is unnecessary, follow the default settings of system.
- In the in-situ setting state, if no operations within 2 hours, wired remote controller automatically returns to the usual state.
- After going to the in-situ setting state, when it is reenergized after power off, either instant or long-time, the wired remote controller will return to the usual state.

Step 1

At the OFF state, press simultaneously the

CHECK key ④ and the reset key ⑤ for 3 seconds, and go to the in-situ settings. The service function number flashes at 1 Hz. The wired remote controller displays below.



Step 2

Press CHECK key ④ on the interface above, and go to in-situ setting mode.



Step 3

Press the CHECK key ④ again and go to the in-situ function setting state.



Step 4

Press ">", "<" of time setting key ① to change the items to be set; press the sterilization key ① and the CHECK key ④ to change the set value. If these functions need being used, such as floor heating, domestic hot water and fan coil of the wired remote controller, the floor heating is set as the default value as the relevant options of in-situ settings and already set before ex-factory. Only this function is active, it may make selection, see details below.

Function	In-situ Setting		
Floor Heating	d4		
Domestic Hot Water	d3		
Fan coil*	d2		

*: Only for Hi-Aqua Smart and 3-pipe heat recovery series.

Step 5 Continuously press ">", "<" of the time setting key (1), and the user may check the set codes and content for

commonly used items of in-situ settings, see details below:

No.	Code	Settings	Default Value	Range	Minimum Adjusting Unit	Unit	Explanation to Functions	Remarks
1	69	automatic temperaure adjustment	inactive	inactive/active	/	/	OTC function inactive/active	00 inactive, 01 active
2	۲ ٦	beginning time of automatic temperature adjustment	23:00	0:00-23:00	1	h	beginning time of OTC	value indicates 24 hours per day
3	53	ending time of automatic temperature adjustment	5:00	0:00-23:00	1	h	ending time of OTC	value indicates 24 hours per day
4	EB	low environmental temperature	-20	-20~5	1	°C		value indicates temperature range
5	[4	high environmental temperature	20	6~25	1	°C		value indicates temperature range
6	٢٢	set water temperature of low environmental temperature	44	20~55	1	°C	determine the OTC temperature curve	value indicates temperature range
7	63	set water temperature of high environmental temperature	25	25~55	1	°C		value indicates temperature range
8	[7	sterilization selection	inactive	inactive/active	/	/	sterilization inactive/active	00 inactive, 01active
9	63	sterilization run time	0:00	0:00-23:00	1	h	beginning time of sterilization	value indicates 24 hours per day
10	ĒŠ	sterilization run date	06	01~07	1	day	default run time is each Saturday	value indicates 7 days per week
11	[8]	sterilization lasting time	10	10~60	1	min	sterilization lasting time	value indicates range of minutes
12	ЕЪ	sterilization temperature setting	70	50~70	1	°C	sterilization temperature	value indicates temperature
13	41	electric heating of water module	active	active/inactive	/	/	electric heating of water module	00 inactive, 01 active
14	69	domestic hot water	inactive	inactive/active	/	/	DHW tank function inactive/active	00 inactive, 01 active
15	dŸ	floor heating	active	active/inactive	/	/	Floor heating active/inactive	00 inactive, 01 active
16	48	electric heating of DHW tank	inactive	inactive/active	/	/		00 inactive, 01 active
17	49	electric heating work mode of DHW tank	ordinary	ordinary/advanced	/	1	Advanced mode will increase frequency of using electric heating of DHW tank and accelerate water heating speed, but this will increase electricity consumption.	00 inactive, 01 active
18	63	DHW tank lowest water temperature guarantee during floor heating	inactive	inactive/active	/	1	After the setting is active, during floor heating, start the electric heating of DHW tank and ensure that the DHW tank is not lower than the temperature set by F5.	00 inactive, 01 active
19	٢3	auxiliary funcition	00	00~03	/	/	Auxiliary function inactive/active	00:no auxiliary function 01:solar function 02:boiler function 03:solar&boiler function
20	83	heat recovery	inactive	inactive/active	/	/	When the DHW tank is installed and the function is active, during air conditioner cooling, water module can conduct heat recovery running.	00 inactive, 01 active
21	83	starting outdoor environmental temperature of electric heating of water module	4	-20~10	1	°C	the outdoor environmental temperature is higher than the set value, and electric heating of water module can't start.	value indicates temperature range
22	F2	lowest water temperature guarantee of DHW tank during standby	inactive	inactive/active	/	1	After the setting is active, the wired remote controller at off state can start the electric heating of DHW tank to keep the DHW tank is not lower than the temperature set by F5.	00 inactive, 01 active
23	۶S	lowest water temperature guarantee of DHW tank	35	35~65	1	°C	When the lowest water temperature guarantee of DHW tank is active, the DHW tank temperature is lower than the set value, and start the electric heating to guarantee the DHW tank temperature.	value indicates temperature range
24	F6	water temperature set value of powerful water storage	45	35~75	1	°C	After power water storage is running and reaches the "DHW tank storage water temperature", system quits.	value indicates temperature range

No.	Code	Settings	Default Value	Range	Minimum Adjusting Unit	Unit	Explanation to Functions	Remarks	
25	F8	forced run of water pump	inactive	inactive/active	1	1	During commissioning, forced start the water pump for water pipe vents, or else the air in the circulating pipe can't be vented. After commissioning, set it as inactive again, or else the water pump will continuously run.	00 inactive, 01 active	
26	۱٦	use of DHW tank heat for defrosting	inactive	inactive/active	1	1	This function will shorten the defrosting time and improve defrosting effect, but it will reduce the water temperature in DHW tank.	00 inactive, 01 active	
27	75	standby time of water module electric heating	30	1~99	1	min	After the electric heating of water module satisfies the conditions, it needs being started with delayed time, for the purpose of preventing frequent startup by electric heating and reduce energy consumption.	value indicates range of minutes	
28	5L	air conditioner priority	active	inactive/active	/	/	Whether to activate the air conditioner priority function.	00 inactive, 01 active	
29	<u>ال</u>	water module electric heating during defrosting	inactive	inactive/active	/	/	This function can shorten the defrosting time but increase electricity consumption.	00 inactive, 01 active	
30	٦٦	standby time of DHW tank electric heating	45	01~60	1	min	When the outdoor unit has insufficient capacity, the DHW tank electric heating needs delaying the set time for startup, for the purpose of preventing frequent starting and reducing energy consumption.	value indicates range of minutes	
31	8ل	upper limit of heat recovery water temperature	40	27~52	1	°C	When heat recovery is active and reaches the temperature, quit from DHW tank heat recovery	value indicates temperature range	
32	61	water pump anticorrosion	inactive	inactive/active	1	/	If not running long, start the water pump for short-time run to prevent rusting.	00 inactive, 01 active	
33	53	water pump anticorrosion running time	0:00	0: 00-23: 00	1	h	Water pump anticorrosion startup time	value indicates 24 hours per day	
34	63	water pump anticorrosion running period	6	01~07	1	day	Default run time is each Saturday	value indicates 7 days per week	
35	្រ។	Emergency moide	inactive	inactive/active	1	/	When the outdoor unit fails to work, only the electric heating runs, but this may increase electricity consumption (for repair).	00 inactive, 01 active	
36	65	Use of floor heating for defrosting	inactive	inactive/active	/	/	This function can shorten the defrosting time and improve defrosting effect, but it will reduce the floor heating water temperature.	osting t, but it 00 inactive, 01 active	
37	68	Longest continuous running time of DHW tank	06	02~20	10	min	The longest running time of heat pump under DHW tank function.	set value × 10 = actual running minutes ,20 means infinity	
38	63	Control method selection for solar function	00	00/01	/	/	Solar function can be operated in different control mode, refer to Chapter 5 of Part III.	00:input control 01:solar sensor control	
39	68	Operating time of the solar function	01	00~07	30	min	The longest running time of heat pump under solar function.	00:30min 05:180min 01:60min 06:210min 02:90min 07:240min 03:120min 04:150min	
40	նե	Longest continuous running time of floor heating or fan coil in Auto-shift function	00	00~08	30	min	In Auto-shift function,the longest operating time of floor heating or fan coil function can be set, refer to Chapter 6 of Part III.	00:0min 05:150min 01:30min 06:180min 02:60min 07:210min 03:90min 08:240min 04:120min	
41	60	Offset temperature of DHW tank in Auto-shift function	04	00~14	1	°C	In Auto-shift function, the setting data influence the Auto-shift condition when shifting from floor heating or fan coil to DHW tank, refer to Chapter 6 of Part III.	00: 6°C 08: 14°C 01: 7°C 09: 15°C 02: 8°C 10: 16°C 03: 9°C 11: 17°C 04: 10°C 12: 18°C 05: 11°C 13: 19°C 06: 12°C 14: 20°C 07: 13°C	
42	۶J	Auto-shift function	00	00/01	1	/	The Auto-shift function can be active when the domestic hot water is needed under floor heating or fan coil function.	00 inactive, 01 active	
43	65	Offset temperature of DHW tank in DHW function	05	01~10	1	°C	In DHW function, when the tem- perature of the DHW tank is less than or equal to difference between the setting temperature of DHW tank and the offset temperature, it is possible to start to heat up the DHW tank.	01: 5°C 06: 6°C 02: 2°C 07: 7°C 03: 3°C 08: 8°C 04: 4°C 09: 9°C 05: 5°C 10: 10°C	

Step 6

When the user makes the in-situ settings, some items that needn't being set may be wrongfully set. The following items must be the default value. Setting error may result in inability of normal run of water module.

No	Codo	Default	Pomorko
INU.	Code	Value	Remains
1	b4	inactive	00 inactive, 01 active
2	b6	inactive	00 inactive, 01 active
3	b7	inactive	00 inactive, 01 active
4	d2	inactive	00 inactive, 01 active
5	E1	inactive	00 inactive, 01 active
6	F3	inactive	00 inactive, 01~24active
7	F9	inactive	00 inactive, 01active
8	H2	inactive	00 inactive, 01active
9	H9	inactive	00 inactive , 01active
10	J4	inactive	00 inactive , 01active
11	J5	inactive	00 inactive , 01active

Step 7

Press the reset key (5), and quit from in-situ settings.

NOTE

- When the lowest water temperature guarantee function is set as active, the electricity consumption will increase.
- This table does not contain all wired remote controller set functions. If functional setting not covered in the table is needed, consult local dealer.

5.2 Stop Operation

Press the ON/OFF key $\circledast,$ system stops running, and the LED lamp will also be off.

5.3 Other Indications

Abnormal "alarm" indication appears in case of abnormality

If the abnormal situations occur to protective device and " ON/OFF" indication lamp, the "alarm" icon will appear on the LCD screen. Then detect the cause of abnormality and make adjustment. Press the ON/OFF key (8) or reset key (5) once, the alarm on the wired remote controller is canceled. When the "alarm" appears on the LCD screen, the cause of abnormality and number of abnormal machine will appear on the temperature indication zone of the screen. In this case, consult your local dealer.



"Defrosting" icon When the heating turns to the defrosting, the "defrosting" icon appears on the screen.



Defrosting

 "Function Not Available" icon The wired remote controller is a universal component. If any function not available for water module is operated, "Function Not Available" will display on the screen and flashes for 5 times.



"Function Not Available" flashes 5 times

 "Automatic Antifreezing" icon This unit includes the function of antifreezing. when the function is started, the "Automatic Antifreezing" icon is displayed on the LCD screen.



NOTE

If the action icon disappear in the operation of the system, this is caused by the influence of the electromagnetic interference, please restart the system

5.4 CHECK

CHECK modes include [CHECK Mode 1] and [CHECK Mode 2]:

- CHECK Mode 1: It displays the sensor data updated every 30 seconds.
- CHECK Mode 2: It displays data prior to alarm and stored in EEPROM.

5.4.1 CHECK Mode 1

Step 1 Press the CHECK key ④ for 3 seconds and go to water module selection state of the CHECK mode.



Step 2

Press the CHECK key ④ or wait for 7 seconds and go to the communication of [Required Data Format for CHECK 1], and to the data display state of the CHECK 1.



Step 3

Continuously press the temperature regulation key(3) " \land ", " \lor ", and the circulating display of CHECK items are shown the right. The set temperature display area displays Check item code.

[Temperature Control] Key.

See the table below for "CHECK Mode 1" data.



No.	Items for CHECK	Code	Unit	Example	Notes to Parameters
1	target water temperature		°C	45	set temperature for wired remote controller
2	water module water inlet temperature		°C	30	actually measured temperature
3	water module water outlet temperature		°C	35	actually measured temperature
4	water module liquid pipe		°C	34	actually measured temperature
5	heat exchanger water outlet temperature	μ	°C	40	actually measured temperature
6	environmental temperature	55	°C	25	actually measured temperature
7	water module gas pipe temperature	57	°C	60	actually measured temperature
8	DHW tank water temperature	χġ	°C	53	DHW tank test temperature
9	outdoor unit evaporation temperature	20	°C	6	actually measured temperature
10	top vont tomporature of comproseer	-03-	°C	70	actually measured temperature
10				10	actually measured temperature
11	thermally sensitive resistance temperature	55	°C	30	standby (actually measured room temperature)
10	of wired remote controller		*0		
12	set water temperature of DHW tank		°C	55	-
13	standby	þ <u>þ</u>	°C	30	-
14	standby	מל	°C	30	-
15	environmental temperature (average)	LC	°C	25	Average calculated value of environmental
		U			temperature
					b1: temperature control input state b2
		E I		0	b2:forced temperature control stop input b 3 b 1 b 7
16	water module input/output state	LI		ĸ	b3 water module water pump run state
				<u> </u>	b4 water module electric heating state
					b5 electric heating state of DHW tank
17	versen for storning	ا ہے		10	display the reason for previous stop, see details
				10	in technical information II
18	occurrences of abnormalities	<u> </u>	times	5	-
10	occurrences of instantaneous power failure of	C 2	timor	6	-
19	indoor unit	CC	umes	0	
20	occurrences of errors of communication between	67	timoo	7	-
20	wired remote controller and water module	63	umes	1	
01	occurrences of abnormalities of frequency	C.L.	timese		-
21	inverter	54	umes	ð	
22	air vent pressure	HI	MPa	29	outdoor unit pressure 10 times value
23	air suction pressure	H2	MPa	6	outdoor unit pressure 10 times value
24	target vent pressure	RA	MPa	23	outdoor unit pressure 10 times value
25	running frequency of compressor	ЯŸ	Hz	80	-
26	water module capacity			140	automatically identified by machine type
27	outdoor unit number	خن		WP01	-
28	refrigerant system number			0	
20		01		0	-
					floor booting temporature control ON 4 OFF
29	running state	.15		0	
					2 Fan coil temperature control ON 3 OFF 4
					DHW tank temperature control ON 5 OFF 6
30	wirea remote controller number of water module	עט_		V11	-
31	expansion valve opening of water module	Ļļ		30	according to maximum opening percentage
32	expansion valve opening of outdoor unit	<u> لط</u>		20	according to maximum opening percentage
33	expansion valve opening of outdoor unit	13		20	according to maximum opening percentage
34	expansion valve opening of outdoor unit	LY		20	according to maximum opening percentage
35	working current of compressor	Ρİ		12	-

5.4.2 CHECK Mode 2 Step 1 Go to CHECK mode 1 before proceeding to the CHECK mode 2. In the CHECK mode 1, press the CHECK key ④ for 3 seconds to water module selection state.



Step 2

Press CHECK key ④ or wait for 7 seconds, and go to communication of [Required Data Format for CHECK 2], and to data display state of CHECK 2.



(CHECK Item Code)

Step 3

At CHECK data display state, press temperature regulation key ③ "√" and "∧", and switch CHECK display items. Display zone ③ of set temperature will display CHECK item code.

Step 4

In CHECK mode 2, press CHECK key ④, quit from CHECK. Or in CHECK mode 1 or 2, without any operations in 2 hours, it automatically quits from the CHECK.

according to maximum opening

percentage



water module

compressor

working current of

14

15

expansion valve opening of

98

٩F

% 10

A 5

6. Automatic Control

- Three-minute stop protection In order to protect the compressor, when the compressor stops, it can not run in at least 3 minutes. 3 minutes later, the compressor automatically runs.
- Three-minute running protection The compressor should run for at least 3 minutes. If less than 3 minutes, even though water module water outlet temperature reaches the set temperature, the compressor will stop still after 3 minutes. But if the compressor runs less than 3 minutes, the wired remote controller is used to stop it and the compressor will be stopped.
- Automatic defrosting function Press the "ON/OFF" key to stop the heating. The outdoor unit will automatically detect the frost and conduct at most 10 minutes' defrosting.
- Automatic anti-freezing function
 In winter, for preventing water pipes and pump
 from being broken by freezing, in the shutdown
 state, when the water temperature in the water
 system is low, system will automatically start the
 water pump or electric heating for preventing water
 system freezing.
- 7. Trouble Shooting

ACAUTION

- When water module leaks water, stop using it and contact local dealer.
- When odorous smell is smelt or white smoke emits from the machine, immediately contact local dealer.

7.1 If Problems Not Solved

If the problems aren't solved after inspecting the following items, contact your local dealer and provide the following information.

- (1) Model and name
- (2) Failure description
- (3) Failure code on the LCD screen

7.2 Water Module Not Running

- (1) Check whether the water set temperature is correct.
- (2) Check whether the water system fully vents air. The dial switch DSW3-2 is dialed to ON and it can control water pump running, commissioning and venting air. After commissioning, dial it to OFF, or else the water pump will continue running.

7.3 Heating Capacity Insufficient

- (1) Check whether doors and windows are open.
- (2) Check whether the environmental temperature s within the running range.

7.4 Solution of Non-failures

- (1) After long-time use, dampness bacteria will grow around water module and affected with mildew. Clean often and keep good ventilation.
- (2) When the machine is running or stopping, it is normal to hear the refrigerant flow sound.

7.5 Solution of Failures

Table 7.1 can help user and installation and commissioning personnel to solve some problems. If the problems cannot be solved, contact your local dealer.

7.6 Electrical expansion valve zero reset

(Only for 3-pipe heat recovery water module)

If the water module not be used for long, drain out circulating water and carry out electrical expansion valve zero reset procedure before power off. Follow the below step to carry out electrical expansion valve zero reset procedure.

(1)Press PSW2 and PSW3 button on main PCB of water module for three seconds.

(2)The 7-segment will display "EV0000" after finishing electrical expansion valve zero reset.

Press PSW2 and PSW3 button on main PCB of water module for three seconds again to cancel the electrical expansion valve zero reset and displaying "EV0000" on the 7-segment will disappear.

Table 7	7.1
---------	-----

No.	Failures	Inspection	Trouble shooting		
1	no indication, no	1. check power supply for main board	1. re-supply of power		
	response of key	2. check wired remote controller and main board wiring	2. replacement of communication cable		
2	no indication,	inspect whether the wired remote controller's circuit	eliminate moisture and dusts by hot air		
	response of key	board polluted by dust or moisturized	blower or electric dryer		
3	indication, no	1. check whether the communication cable is the specific	change the shielded cable		
	response of key	shielded cable of the company			
		2. check whether the wired remote controller and the			
		main board wiring terminal are loose			
4	unclear indication	1. open the bottom cover of wired remote controller to	1. clean dusts		
		check whether there is dust pollution in the circuit	2. blow by hot air blower or electric dryer		
		board 2. open the bottom cover of wired remote			
		controller to check whether the circuit board is			
5	backlight not	open the bottom cover of wired remote controller and	reconnection		
	shining	remove the circuit board to check whether there is broken			
		wires in the backlight power cable			
6	"03" alarm	check whether the wired remote controller and main	change a new communication cable		
		board wires loose or broken			

Time Period	ON/OFF	[hh:mm]	Function	[°C]	Remarks			
Monday								
1		:						
2		:						
3		:						
4		:						
5		:						
6		:						
7		:						
8		:						
			Tuesday					
1		:						
2		:						
3		:						
4		:						
5		:						
6		:						
1		:						
8		:						
4			vvednesday	1				
2		:						
2		•						
3		•						
5		•						
6		· ·						
7		•						
8								
0		· ·	Thursday	1				
1		•	Indioday					
2		· ·						
3		:						
4		:						
5		:						
6		:						
7		:						
8		:						
			Friday					
1		:						
2		:						
3		:						
4		:						
5		:						
6								
/		· · ·						
0		•	Saturday	1				
1			Caturday					
2		· ·						
3		· ·						
4								
5								
6								
7		:						
8		:						
			Sunday		· · · · · · · · · · · · · · · · · · ·			
1		:						
2		:						
3		:						
4		:						
5		:						
6		:						
7		:						
8		:						

Table 7.27-Day Timing Running Schedule

Part II. Water Module Installation and Maintenance

1. Introduction

Read this installation manual carefully before installing the module and follow the instructions for installation. After installation, conduct test run to confirm normal running of the machine. Water module must be installed indoor with the environmental temperature between 0-35°C.

🗚 W A R N I N G

- Without reading the installation manual, do not carry out refrigerant piping connection, water pipe connection and wiring connection.
- Check whether the ground wire connection is correct and firm.
- Connect to the fuse of specified capacity.
- The user should not replace the power cord and this must be conducted by professional repair personnel.

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• Water module, wired remote controller and wires should not be installed 3m from the strong electromagnetic wave radiation source, such as medical appliances.

2. Special Precautions

- Water module uses R410A refrigerant. Pipe system must be kept clean, dry and sealed.
- Because R410A is a mixed refrigerant, it must be added in liquid state. If the added refrigerant is gaseous, the composition will change and the air conditioning system may not work normally.
- Design pressure at the refrigerant side is 4.15MPa and that at water side is 0.3 MPa. Select corresponding copper pipes and water pipes according to the design pressure.

3. Introduction to the Machine

3.1 General

Water module is a system mounted on the wall and can be connected to floor heating, DHW tank and fan coil. When the outdoor temperature is too low or the indoor load is large, water module will start the electric heater to generate additional heat. If the outdoor unit fails to work, the backup heater can independently provide heat.

3.2 Examples of Application

3.2.1 Application of Hi-Aqua Smart and 3-pipe heat recovery water module

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Do not use water module for another heat source series (such as gas furnace), If this requirement is not met, our company will not take any responsibility for damage caused.

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When each independent floor heating has an independent remote control valve, a pressure differential bypass valve must be installed to avoid too large or too small water flow in the heating loop.

•A warning to assure that partial units shall only be connected to an appliance suitable for the same refrigerant.

• This water module is a partial unit air conditioner, complying with partial unit requirements of this International Standard, and must only be connected to other units that have been confirmed as complying to corresponding partial unit requirements of this International Standard.

•The applications of Hi-Aqua Smart water module, Multi-Function water module and 3-pipe heat recovery water module are similar, which shown in Fig.3.1.

- 1. Water Module
- 2. Plate Heat Exchanger
- 3. Water Pump
- 4. Ball Valve
- 5. Ball Valve
- 6. Water Pump(Field-Supplied) (The selection method is detailed in the section 12"Install External Water Pump")
- 7.3-way Valve(Field-Supplied) (The installation method is detailed in the section 11"Install 3-way Valve")
- 8. Water Separator(Field-Supplied)
- 9. Water Accumulator(Field-Supplied)
- 10. Bypass Valve(Field-Supplied) FCU1...3 Fan Coil Unit(Field-Supplied) FHL1...3 Flooring Heating Circuit (Field-Supplied) T1...3 Temperature Controller for Separated Room using Floor Heating(Field-Supplied) M1...3 Separated Remote Controlling Valve(Field-Supplied) 11. DHW Tank



Fig.3.1 Application of 3-pipe heat recovery water module

4. Necessary Tools and Instrument List for Installation

No.	Tool	No.	Tool	No.	Tool	No.	Tool
1	Handsaw	6	Pipe Bender	11	Spanner	16	Leveller
2	Screwdriver	7	Pliers	12	Charging Cylinder	17	Clamper for Solderless Terminals
3	Vacuum Pump	8	Pipe Cutter	13	Gauge Manifold	18	Hoist (for Indoor Unit)
4	Refrigerant Gas Hose	9	Brazing Kit	14	Cutter for Wires	19	Ammeter
5	Megohmmeter	10	Hexagon Wrench	15	Gas Leak Detector	20	Voltage Meter

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About vacuum pump, refrigerant gas hose, charging cylinder and multifunctional measuring instruments, use suitable equipments for R410A respectively. Do not mix other refrigerant.

A DANGER

Foreign matters such as moisture, oxidation scale and grease easily affect the performance of refrigerant, so the moisture, dusts and oil in the refrigerating system must be removed. If not use the specified materials and tools, it may lead to an explosion, personal injury, refrigerant leakage, electrical failure or a fire.

5. Transportation and Handling

5.1 Transportation

- Transport water module in the packing boxes.
- Unpack the product only before installation for avoiding damage during transportation.
- Transport the product as close to the installation location as practical before unpacking.

5.2 Handling

- Water module is about 74kg and needs two or more persons for moving and handling.
- Take protection measures during handling (wear gloves etc.)
- Do not remove wood base during handling by hand.
- Take surface protection measures and be careful not to damage the face panel on the unit's surface during handling.
- Do not grasp the pipes and face panel during handling.
- Pay attention to the placement of water module, see the Fig right, avoid falling.

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Do not step on the cardboard of the external package or put any materials on the air conditioner. Four layers are allowed for stacking during transportation.


6. Introduction to Water Module

6.1 Accessories and Optional Parts

Table 6.1 are packed and transported with water module.Check to ensure that the accessories listed in. Table 6.2 are optional parts if it was neccessary during the installation

ACAUTION

If any of these accessories are not packed and transported with the water module, contact your local dealer.

Before installation and commissioning, do not put any irrelevant materials in water module. Ensure that there are no foreign materials into the unit. Otherwise, a fire or an accident may occur.

Table 6.1 Accessories

(1) Hi-Aqua Smart and 3-pipe heat recovery water module

No.	Name	Quantity	Picture	Remarks
1	Wall Hanging Board	1	0 0 0	Temporarily fix water module on the wall; for actual fixing, the expansion bolts must be used to securely fix water module on the wall.
2	Instruction Manual	1		
3	Ball Valve	2		Connect at the water inlet/outlet of water module, for connecting/disconnecting water pipe, drain and filling.
4	Rubber Gasket	2	\bigcirc	Used for sealing the connections between water module and ball valves.
5	Cord Clamp	3	CICCUMPTED IN	
6	Stainless Steel Screw	4		
7	Clamp	1		
8	Clamp	1	\mathbb{R}	
9	Drain Pipe	1		Used for drain hose connection.
10	DHW Tank Sensor	1		Used when system is connected to the DHW tank. Detect the DHW tank temperature.

(2) Multi-Function water module

No.	Name	Quantity	Picture	Remarks
1	Wall Hanging Board	1	0 0 0	Temporarily fix water module on the wall; for actual fixing, the expansion bolts must be used to securely fix water module on the wall.
2	Instruction Manual	1		
3	Ball Valve	2		Connect at the water inlet/outlet of water module, for connecting/disconnecting water pipe, drain and filling.
4	Rubber Gasket	2	\bigcirc	Used for sealing the connections between water module and ball valves.
5	Liquid Pipe Manifold	1	a c b	It is used for the first manifold of liquid pipe of the refrigerating system. Opening a connects liquid pipe of outdoor unit; opening b connects liquid pipe of water module, and opening c connects the liquid pipe of indoor unit.
6	Cord Clamp	3	and the second sec	
7	Stainless Steel Screw	4		
8	DHW Tank Sensor	1		Used when system is connected to the DHW tank. Detect the DHW tank temperature.

Table 6.2 Optional Parts

1	3-way valve	1	Used only when two or more are mounted among floor heating, fan coil and DHW tank. Switch water pipes according to the

6.2 Main Parts of Water Module



① Electric Heating Temperature Switch in Water Module

With built-in electric heating temperature switch, water module heater is turned off at too high temperature, avoiding burnout. If burnout occurs, the unit stops. After temperature reduces, temperature switch will automatically restore.

② Safety Valve

Ensure hydraulic pressure not too high in water cycle when water system pressure is below 3 bar. If the hydraulic pressure is too high, drain some water. Lead drainage pipe of safety valve to building downcomer.

- ③ Automatic Vent Valve Remove residual air in water system through automatic vent valve.
- ④ Electrical Heater in Water Module Supply extra energy to the unit when the heat pump lacks capacity.
- ⑤ Plate Heat Exchanger Refrigerant and water performs heat exchange in plate heat exchanger.
- 0 Electrical Box
- ⑦ Wired Remote Controller User can set up and operate water module through wired remote controller.



- 8 Electronic Expansion Valve Restricting element in heat pump system.
- (9) Pressure Gage Read pressure in water circulating system.(10) Filter

Prevent impurities in filter system from flowing into plate heat exchanger and blocking heat transport channel. Regularly remove and clean filter net.

- Water Flow Switch Water flow channel disconnects and the unit stops when water flow is too low.
- Expansion Tank
 Absorb volume change caused by temperature changes in water circulating system.
- Water Pump Feed power to water circulating system.
- Low Water Temperature Switch It trips and the unit stops when pressure in water circulating system is too low.
- Temperature Fuse in Water Module Heater Temperature fuse disconnects and electrical heater cuts off at too high temperature. It can not automatically restore.

(6) Water Inlet

I Ball Valve

Isolate water circulation after ball valve in water inlet and outlet are closed. Water make-up inlet in ball valve supplements water to water circulating system.

- 18 Water Outlet
- ① Liquid pipe
- ²⁰ Gas pipe

6.3 System Cycle Diagram



7. Installation of Water Module

7.1 Initial Check

• See dimension of water module in Fig.7.1 (unit: mm).



Fig.7.1a Dimension of Water Module



Fig.7.1b Dimension of Water Module

 Install water module to a place where it is easy to operation and maintenance, seen in Fig.7.2.



Fig.7.2a Installation and Maintenance Space



Fig.7.2b Installation and Maintenance Space

Means maintenance space.

Selection of installation location:

- Indoor installation is made in selected special machine room, closed balcony, basement, corridor, equipment room or other indoor area with sufficient space.
- Installation surface must be flat, vertical and nonflammable wall and bear running weight of unit.
- Installation location is free from freezing.

- Water module is installed in cool place, avoiding exposure to sunshine, high temperature or radiation by heat source.
- Temperature of place where water module is installed should be within 0-35°C, and relative humidity is no more than 80%.
- Water module should be put in a place free from corrosive acid and alkaline gas.
- Do not install water module in places with high greasy dirt, fibre, dust and volatile flammable gas such as gasoline and paint solvent.
- Do not install water module in a place where the electromagnetic wave can directly radiate electric box.
- Keep 3m away from electromagnetic wave radiation at least.
- Noise of water module should not affect people's daily life and working.

7.2 Install Water Module

7.2.1 Inspect and Open Water Module

• Take out "wall hanging board" provided together with the unit from packing crate and the dimension of wall hanging board is seen below: (unit: mm)



- Mount wall hanging board to the wall using three M8 expansion bolts.
- Open the lower cover plate in front plate of water module, you can see the pressure gage, wired remote controller and cover plate are fixed by magnets.





• Remove four screws in both sides and lift external housing upward and remove it.



• As shown below, remove four screws on wood base and separate the unit from packing base and wood base.



- 7.2.2 Install Water Module
- Mounting wall must bear running weight of water module;
- a. Water module does not tilt;
- b. Water module does not have abnormal vibration and noise when running;
- Hang water module to wall board.



8. Refrigerant and Water Pipe

R410A refrigerant is adopted. When leakage and air tight test are made, do not mix with oxygen, acetylene, inflammable gas and poisonous gas. They are very dangerous and may cause explosion. Recommend using compressed air, nitrogen or refrigerant.

8.1 Refrigerant Pipeline and Piping

- (1) Copper pipe are prepared on site.
- (2) Pipe dimension are selected as follows. Unit (mm)

Туре	Gas pipe	Liquid pipe
AHM-070/160UXCSAPA3	ሰ 15 88	Φ 0.53
AHM-080/160FJFAA	Ψ 15.00	Ψ 9.55
AFM-54EX4SA	Φ 12.7	Φ 9.53

(3) Select copper pipe without dust and moisture. Blow dust and impurity in pipeline with nitrogen or dry air before pipeline is mounted.

8.2 Connect Refrigerant Pipeline

(1) Confirm stop valve is closed. Gas and liquid pipe are located as shown in Fig.8.1:



Inlet Outlet Pipe Pipe

Fig.8.1 Location of Refrigerant and Water Pipeline (2) As shown in Fig.8.2, screw up nut cap. Refer to the torque required below:

Pipe Diameter	Torque(N•m)
φ 9.53	40
φ 12.7	60
φ 15.88	80



Fig.8.2 Screw up Nut Cap

(3) Heat preservation of refrigerant pipe

After pipe is connected, heat preservation material on site should be used to keep gas pipe, liquid pipe and connecting nut warm, and wrap the pipe with adhesive tape, avoiding heat dissipation condensation on surface of pipeline.

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- When the pipe passes through holes, pipe head should be sealed by sealing cap.
- Seal the pipe end with sealing cap or adhesive tape. Do not directly put pipe down on the ground.



(4) Charging and discharging of refrigerant Operate according to installation and maintenance manual of outdoor unit.

8.3 Connect Water Pipeline

- (1) The connecting location of water pipeline is seen in Fig.8.1.
- (2) Install ball valve

There are two ball valves provided with the unit. For convenience of repair and maintenance, install the ball valves on water inlet and outlet pipes of water module. Installation location refers to the section 6.2 Main Parts.

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- When ball valve is mounted, rubber gasket must be mounted (accompanied with the unit), otherwise water leakage may be caused.
- Note the location of ball valve, and the direction of ball valve and drain valve, which are essential to maintenance.
- Screw up ball valve by using two wrenches.

(3) Additional water strainer



 Provide a 50 mesh or more water strainer at the water inlet side of water piping. Otherwise, damage to the plate heat exchanger may occur. In the plate heat exchanger, water flows through a narrow space between the plates. Therefore, there is a possibility that freezing or corrosion may occur if foreign particles or dust clog the flow of water between the plates.

This is not required when cooling mode is not used. Water Strainer

(50 mesh or more recommended)



NOTE:

Be sure to install the water strainer horizontally on the water inlet side. In case the water flow downwards, vertical installation is allowed.

(4) Notes for connecting water pipe

- A small amount of water may exist in water module. Note that when sealing cap is opened.
- Pay attention to connection location of pipe. Do not connect water inlet and water outlet pipe inversely.
- Use water pipe conforming to specification. Dimension of water pipe is equal to or above interface dimension in machine (G1-1/4"). For main connecting pipeline, recommend using DN40 water pipe to reduce pressure loss in pipeline.
- The maximum piping length depends on the maximum pressure availability in the water outlet pipe.
- Properly keep water pipe thermal insulated and avoid pipeline freezing.
- Regularly clean water filter.

(5) Basic requirements for operating water pipe:

- Let the end of pipe face downward when deburring, avoiding foreign matter invading into pipe.
- Thoroughly flush all water pipelines before installation, ensure no foreign matter before use. Note that do not flush any foreign material into plate heat exchanger.
- Apply good sealant to seal joint and the joint must bear pressure and temperature of system.
- If water pipes of different material are used, ensure they are isolated, preventing electrical conduction and corrosion.
- Galvanized parts that may cause corrosion in water system are prohibited.

- Water pipe and pipe joint must be supported independently on water module.
- Pipe and pipe joint in water module should be easy to remove and convenient to operate and clean.
- Flexible joint should be used between water module interface and on-site pipeline, avoiding vibration propagation and pipeline breakage.
- Arrange drainage interface at low positions in water system, make water in water module and pipeline smoothly drained out. Arrange air exhaust device at high positions. Do not treat air vent valve and drainage interface thermally for repair convenience.
- (6) Water treatment and water quality control
- Confirm with water treatment company that antifreezing solution, scale inhibitor, corrosion remover that are used in water treatment do not corrode stainless steel and copper products before use. When system links with DHW tank, to avoid domestic hot water contaminated by coil leakage, anti-freezing solution, scale inhibitor, corrosion remover are not allowed to use.
- Water quality control methods and reference refer to water quality requirements issued by Japan Refrigeration and Air Conditioning Industry Association (JRA-GL-02-1994). Medium and low water temperature reference values of water module unit are seen in table 8.1.

	litere	Medium and Temperature	Tendency		
	nem	Circulation water 20°C <t<60 td="" °c<=""><td>Make-up water</td><td>Corrosin</td><td>Scale</td></t<60>	Make-up water	Corrosin	Scale
	PH (25 °C)	7.0 to 8.0	7.0 to 8.0	\checkmark	\checkmark
	Electroconductibility(mS/m) (25 °C)	<30	<30	\checkmark	\checkmark
	Chloridion(mgCl ⁻ /L)	<50	<50	\checkmark	
Standard	Sulfion (mgSO ₄ ⁻²⁻ /L)	<50	<50	\checkmark	
Items	Acid consumption(PH4.8)(mgCaCO ₃ /L)	<50	<50		\checkmark
	Total hardness (mgCaCO ₃ /L)	<70	<70		\checkmark
	Calcium hardness (mgCaCO ₃ /L)	<50	<50		\checkmark
	lonic state silicon(mgCaSiO ₂ /L)	<30	<30		\checkmark
	Iron (mgFe/L)	<1.0	< 0.3	\checkmark	\checkmark
	Copper (mgCu/L)	<1.0	<0.1	\checkmark	
Deference	Sulfion (mgS ²⁻ /L)	Undetermined	Undetermined	\checkmark	
Items	Ammonia ion mgNH₄⁺/L)	< 0.3	<1.0	\checkmark	
	Chlorine residue (mgCl/L)	< 0.25	< 0.3	\checkmark	
	Free carbon dioxide (mgCO ₂ /L)	<0.4	<4.0	\checkmark	
	Stability index	-	-	\checkmark	\checkmark

Table 8.1 Benchmark of Medium and Low Water Temperature and Make-up Water Quality (Reference Value)

9. Water Circulation

Check water pipe is correctly connected, if not, the unit can not work normally.

9.1 Check Water Circulation

- (1) Water module is connected to water circulation system through water inlet and outlet. This water circulation system must be installed by qualified plumber in accordance with relevant national regulations.
- (2) Water module is only applicable to closed water system. When applied to opened water system, water pipe may be corroded.
- (3) Check before water module installation:
- The maximal water pressure in system is no more than 0.3Mpa. If make-up water pressure on site is more than 0.3Mpa, recommend reducing valve or automatic make-up valve is mounted on site.
- Outfall should be the lowest point of system, drain all circulated water from system when system is maintained.
- Ensure safety valve can drain water normally, avoiding water flowing into electrical parts.
- Air exhaust device should be arranged at highest point of system. Check automatic vent valve in water module discharges air normally and whether the sound of quick venting occurs. If vent valve leaks water or is damaged, contact local dealer.
- For heating floor system, the air should be purged by means of an external pump and an open circuit to avoid air bags.
- An additional special water filter is highly recommended to be installed on the space heating (field installation), in order to remove possible particles remaining from brazing.

9.2 Check Water Capacity and Initial Pressure of Expansion Tank

- (1) The unit has a built-in 8L expansion tank, and default initial pressure is 0.1MPa.
- (2) To ensure the unit works normally, the initial pressure of expansion tank should be adjusted according to the circulated water capacity.
- Check the total capacity of water in circulation system is 16L at least. In most cases, this minimal capacity will be appropriate.
- Use water capacity checklist 9.1 to decide whether initial pressure of expansion tank needs to be adjusted.
- Use water capacity checklist 9.1 to confirm the total capacity of water in installation system is below the allowed maximal water capacity.
- Installation height difference: It is the height difference between highest point of water circulation and water module. If water module is mounted at the highest point, above all water pipes, the installation height is deemed to be 0 m.

(3) Calculate initial pressure of expansion tank Decide initial pressure (Pg) according to the maximal installation height difference (H), seen below:

Pg=H/10+0.3 Unit: H(m), Pg(bar)

Note: 0.3 is the minimal initial pressure of expansion tank set outside the factory.

- (4) Confirm allowed maximal water capacity The process of calculating allowed maximal water capacity in whole circulation is:
- Calculate maximal water capacity corresponding to initial pressure Pg by using maximal water capacity curve graph 9.2.
- ② Confirm the total maximal water capacity in water circulation is smaller than above value. If not, the expansion tank in water module is smaller for system.

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- When initial pressure in expansion tank is set as 0.03MPa at minimum, the water quantity required by system is higher than limit value, it may consider replacing expansion tank with bigger capacity.
- The mismatch between big capacity expansion tank and water module structure may cause expansion tank unable to be mounted into water module.
- If big capacity expansion tank mismatches with water module structure, safety valve with higher action pressure can be selected, and do not vary capacity of expansion tank. Select safety valve with action value 0.5Mpa.

Table 9.1 Water Capacity Checklist

	Installation	Water Capacity	ter Capacity		
	height	≤220L >220L	>220L		
	(a)				
	≤7m	No need to adjust initial pressure of expansion tank Things need to do : Must reduce initial pressure. Must reduce initial pressure. on the section "initial pressure tank". Check water capacity allowed maximal water capa figures below).	Calculate it based re of expansion is lower than acity (using the		
Safety Valve (3bar)	>7m	Things need to do :Must increase initial pressure.The expansion tank is too sn needs proper expansion tankCalculate it based on the section "initial pressure of expansion tank". Check water capacity is lower than allowed maximal water capacity (using the figures below).The expansion tank is too sn needs proper expansion tank	mall to install. (It k or use safety essure that is		
	Installation	Water capacity			
	difference (a)	≤330L >330L			
	≤7m	No need to adjust initial pressure of expansion tank Things need to do : Must reduce initial pressure. Must reduce initial pressure. on the section "initial pressur tank". Check water capacity allowed maximal water capa figures below).	 Things need to do : Must reduce initial pressure. Calculate it based on the section "initial pressure of expansion tank". Check water capacity is lower than allowed maximal water capacity (using the figures below). The expansion tank is too small to install. (It needs proper expansion tank supplied from local place) 		
Safety Valve (5bar)	>7m	Things need to do :The expansion tank is too sn needs proper expansion tankMust increase initial pressure.needs proper expansion tankCalculate it based on the section "initial pressure of expansion tank". Check water capacity is lower than allowed maximal water capacity (using the figures below).The expansion tank is too sn needs proper expansion tank			
	5.0 4.8 4.6 4.4 4.2 4.0 3.8 3.6 3.4 2.4 2.0 1.8 1.4 1.2 1.0 0.8 0.6 0.4	^a ^b ^c ^c ^c ^c ^c ^c ^c ^c ^c ^c			

9.3 Adjust Initial Pressure of Expansion

Tank

- (1)Only use dry nitrogen to adjust default initial pressure of expansion tank when changed.
- (2) Improper adjustment of initial pressure will lead to system malfunction. Initial pressure must be only adjusted by professional service staff.



Rotate Cap in the Bottom in Anticlockwise Way, You Can See Thimble.

9.4 Inject Water

- (1) If system is mounted with water make-up inlet, you can directly supplement water through this inlet. If not mounted, you can supplement water through make-up port in ball valve (refer to the section 6.2 Main Parts).
- (2) Ensure automatic vent valve is opened (rotate two circles at least).
- (3) Supplement water until pressure in pressure gage is approx. 0.2MPa. The water pressure zone of unit working normally sees below. If pressure of tap water on site is lower than 0.2MPa, adopt booster pump to increase pressure up to 0.2MPa. Discharge air from system using vent valve as far as possible.
- (4) Open safety valve, check whether water is drained normally when water pressure is too high.



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- When injecting water, it can not discharge all of air from system. Residual air can be discharged through automatic vent valve in first running several hours of system. Extra water may be injected regarding water pressure attenuation.
- Water pressure in pressure gage varies with water temperature. However, water pressure should maintain above 0.1 MPa, avoiding air invasion. When lower than 0.2 MPa, manually supplement water into system.
- When water pressure is too high, the unit will drain some water through safety valve.

10. Wiring

🛦 W A R N I N G

- Cut off main power supply in water module and outdoor unit for more than 10 minutes before wiring or regular check.
- Ensure fan in outdoor unit stops before wiring or regular check.
- Protect wires, drainage pipe and electrical apparatus, avoiding damage by mouse and other animals. If they are not protected, the mouse may bit unprotected apparatus and lead to fire.
- Wrap electrical wire with adhesive tape and seal electrical connection, preventing condensation and insect invasion.
- Fasten electrical wire tightly of water module by string.
- Avoid electrical wire, refrigerant pipeline, metal plate edge and electrical component inside machine contacts each other, otherwise, it may damage electrical wire and lead to fire.
- Apply ELB with medium induction speed. If not used, it may lead to electric shock or fire.
- Tighten screws following the torques below:

Screw specification	Torque range
M4	1.0 to1.3 N ⋅m
M5	2.0 to 2.4 N ⋅m
M6	4.0 to5.0 N ⋅m
M7	9.0 to 11.0 N⋅m
M8	18.0 to 23.0 N ⋅m

10.1 General Check

(1) Ensure all electrical apparatus used on site

(power switch, cut-out switch, lead, conduit and terminal block) are selected according to technical manual and national electrician standard. Wiring must be made according to national specification.

- (2) Check voltage is within rated voltage ±6%. If too low, system will not start. If too high, electrical parts will be burnt out.
- (3) Check cable capacity. See specification of power line connected on site in table 10.1.
- (4) Confirm ground wire is connected.

Table 10.1 Electrical Parameters of Water Module and Electric Wire Specification

	Power	Rated	Power Source Cable Size	Transmtting Cable Size
Model	Source	Current	EN 60335-1	EN 60335-1
AHM-070/160 UXCSAPA3 AFM-54EX4SA	220V-240V ∼50Hz	16.9A	2.5mm ²	0.75mm ²
AHM-080/160 FJFAA	220V-240V ~50/60Hz			

NOTES:

- (1) Field wiring shall be in conformity to local laws and regulations, and all wiring operations must be performed by qualified professionals.
- (2) Refer to relevant standards for above-noted power cord size.
- (3) Where power cord is connected through junction box in series, be sure to determine the total current and choose wires based on the table below.
- (4) As a minimum, the chosen wires shall not be lighter than the polychloroprene sheathed flexible cord (code designation 60245 IEC 57).
- (5) Use a shielded cable for the transmitting circuit and connect the shield layer to ground.
- (6) Install a multi-pole main switch with a space of 3.0mm or more between each phase.
- (7) Power cord installation requires a longer ground wire than current-carrying wire.

Selection According to EN 60335-1

_	
Current i (A)	Wire Size (mm ²)
i≤6	2.5
6 <i≤10< td=""><td>2.5</td></i≤10<>	2.5
10 <i≤16< td=""><td>2.5</td></i≤16<>	2.5
16 <i≤25< td=""><td>4</td></i≤25<>	4
25 <i≤32< td=""><td>6</td></i≤32<>	6
32 <i≤40< td=""><td>10</td></i≤40<>	10
40 <i≤63< td=""><td>16</td></i≤63<>	16
63 <i< td=""><td>*1</td></i<>	*1

%1: In the case that current exceeds 63A, do not connect cables in series.

10.2 Wiring

10.2.1 Structure Diagram

(1) See holes linking electric wire in water module in Fig.10.1.



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Indoor and outdoor unit must adopt fixed wiring. Conduit must be hard and goes into machine. Tighten electric wire and communication cable with wire holder shown in Fig.10.2.







① PCB1

- 2 Transformer
- ③ Relay
- Used for electric heating in water module ④ Relay
 - Used in electrical heater in refrigerator
- (5) Terminal Block TB4
 - Used for small power control and adopt signal
- 6 Wire Holder
 - Fix external input power of TB4 terminal block
- 7 Wire Holder
 - Fix external input power of TB4 terminal block
- (8) Terminal Block TB3
 - Used for electric heating of water module and electric heating of DHW tank externally connected

- ④ Terminal Block TB1
 - Used for introducing 220V power cable externally connected
- 1 Wire Holder
 - Used for fixing 220V power cable externally connected
- (1) Wire Holder
 - Used for fixing communication cable of indoor and outdoor unit
- ① Terminal Block
 - Connect Communication cable and externally connected cable
- 13 Fuse
 - Used for electric heating in water module, 25A
- (14) Fuse
 - Used for electric heating in DHW tank, 25A
- 15 PCB2
- (6) Trunking

10.2.3 Electrical Connection DiagramHi-Aqua Smart water module(AHM-070UXCSAPA3 / AHM-160UXCSAPA3)





•3-pipe heat recovery water module(AHM-080FJFAA / AHM-160FJFAA)



Multi-Function water module(AFM-54EX4SA)



10.2.5 Connect Communication Cable



Communication cable between outdoor unit and water module is fixed with wiring harness.

10.2.6 Connect Power Line

- (1) Connect power line and earth wire to the terminal of electric box and fix with wiring harness, seen below.
- (2) Check and ensure live line and null line of terminal blocks in power supply are correctly linked. If connected inversely, some parts may be damaged.



11. Install 3-way Valve

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3-way valve is used only when two or more are mounted among floor heating, fan coil and DHW tank.

11.1 Valve Body Confirmation



The installation method of 3-way valve and connection direction of water pipe are exclusive.

Ensure the pattern on valve stem stays horizontal position as shown in the figure above before installation.

11.2 Install Actuator



Tighten coil and valve body. The actuator can be assembled in both two directions.

11.3 Connection Direction of WaterTube



 Flow direction identifications are provided on valve body. Link water module outlet pipe to "AB" position(water inlet), floor heating to "B" position and DHW tank or fan coil to "A" position.

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- When 3-way valve is energized(K), "A" position opens, "B" position closes. When signal line is de-energized, "B" position opens and "A" positon closes.
- Actuator can not be mounted horizontally downward.
- Do no apply brute force on actuator when installed.
- Threads connected to actuator must be national standard pipe thread (G1" external thread).
- Do not connect actuator with valve body by using taper thread.
- Installation of valve body and pipeline must keep clean.
- Ensure pipeline and valve body are thermally insulated. Do not wrap actuator into thermal insulation layer.

11.4 Wiring of 3-way Valve

11.4.1 Wiring Color



Black:null line (N) Brown:live line(L) Blue:signal line(K)

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Do not connect three color wires invesely, otherwise 3-way valve coil may be burnt out.

11.4.2 Wiring Diagram of Terminal Strip in

Water Module



Terminal 33, 34 and 35 are used for DHW tank 3-way valve, terminal 41, 42 and 43 are used for fan coil 3-way valve. Terminal 34 and 42 are live line, terminal 35 and 43 are null line. Terminal 33 and 41 are signal line that can be energized (220-240V) or de-energized when the functions are running in the table below.

Functions	Terminals			
FUNCTIONS	33	41		
DHW	energized	de-energized		
Fan Coil	de-energized	energized		
Floor heating	de-energized	de-energized		

11.5 Troubleshooting

No.	Abnormality	Cause	Solution	
1	On valve is inversely connected with Off valve.	Wiring error	Change the position of control line and live line.	
2	Actuator does not	Wiring error. Wire burnout.	Check power supply and circuit of actuator.	
	WORK.	Water flows into actuator or motor is damaged.	Replace actuator.	
	Thread connection	Connecting thread is not matched.		
3	cracks.	Installation is not conforming to specification or too strong force is applied.	Replace valve body.	
4	Valve is unable to be opened or closed fully.	Pipelines are blocked by impurities or water quality is too bad	Clean impurities or install pre-filter.	

12. Installation of External Water Pump

When the water module is installed, if water side flow is lower than 1.20m³/h due to too long connecting water pipe and large resistance at water side, an external water pump should be added in external pipeline system. The start/off control of external water pump will be synchronous with that of built-in water pump.

12.1 Installation Location

Install external water pump at water outlet pipe of water module, in front of floor heating, fan coil or DHW tank. If linked to floor heating, fan coil and DHW tank at same time, the external water pump should be installed in front of 3-way valve, seen below:



12.2 Type Selection Requirements of External Water Pump

Technical requirement for external water pump type

No	Specification	Linit	Reference
INO.	Specification	Unit	value
1	Rated voltage	V	220-240
2	Max. input power	W	≤280
3	Max. Current	А	≤2
4	Highest lift	m	≥6
5	Rated flow	M³/h	≥1.25
6	Inlet and outlet caliber	mm	25
7	Noise	dB	≤40

12.3 Recommended Type of External Water Pump

No.	Manufacturer	Туре
2	Grundfos	UPS-25-125
3	Wilo	RS25/8 RS25/6

12.4 External Water Pump Wiring Wiring is made to external water pump as shown below:

Water module



13. Setting of DIP Switch

Location of DIP switch



There are 9 DIP switches in water module. Set up these switches as required. Power off before setting. If power is not cut off, the setting contents will be invalid.

(1) Unit mode code setting (DSW1).

No setting is required.

Model	AHM-080FJFAA	M-080FJFAA AHM-160FJFAA	
Setting position	ON OFF 1 2	2 3 4	ON OFF 1 2 3 4

Model AHM-070UXCSAPA3 AHM-160UXCSAPA3

(2) Capacity code setting (DSW2) No setting is required.



 Model
 AHM-070UXCSAPA3
 AHM-160UXCSAPA3

 Setting position
 ON
 ON
 ON

 OFF
 1
 2
 3
 4

(3) Function setting (DSW3)

Setting	Factory Setting	Electrical heating	Water pump	
function		Enabled	forced ON*	
Setting position	ON OFF 1 2 3 4	ON OFF 1 2 3 4	ON C C C C C C C C C C	

* "Water pump forced ON" is used when water module is installed and commissioned.

(4) Function setting (DSW4)

No setting is required.

Model	AHM-080FJFAA AHM-160FJFAA	
Setting position	ON OFF 1 2 3 4 5 6 7 8	
Model	AFM-54EX4SA	
Setting position	ON OFF 1 2 3 4 5 6 7 8	
Model	AHM-070UXCSAPA3 AHM-160UXCSAPA3	
Setting position	ON OFF 1 2 3 4 5 6 7 8	

(5) Function setting (DSW5). No setting is required.



(6) Fuse reset (DSW 6) Factory Setting.



In the case of applying high voltage to the terminal 1,2 of TB2, the fuse on the PCB is cut. In such case, firstly cut off high voltage, connect communcation cable,and then turn on NO.1 pin.

ON OFF 1 2

(7) Function setting (DSW7). No setting is required.

Model	AHM-080FJFAA	AHM-160FJFAA	AFM-54EX4SA
Setting position	ON OFF 1	2 3 4	ON OFF 1 2 3 4

 Model
 AHM-070UXCSAPA3
 AHM-160UXCSAPA3

 Setting
 ON
 Image: Constraint of the set o

(8) Refrigeration system No. setting (DSW8) Setting is required.

Set with binary method and setting positions before shipment are all OFF.

ON OFF 1 2 3 4 5 6

Max No.63 are available to set when all the equipment to be connected are corresponding to H-NET.

Ex.) Set refrigeration system no. as 8.



(9) Water module No. setting (DSW9)

Setting is required.

Set with binary method and setting positions before shipment are all OFF.



Max No.63 are available to set when all the equipment to be connected are corresponding to H-NET.

For Multi-Function and Hi-Aqua Smart water module, DSW9 is not required to set up. System automatically sets water module address as 63#.

Ex.) Set refrigeration system no. as 10.

ON		Π					1
OFF	1	2	3	4	5	6	J

14. Test Run

Commissioning and test run is made as required by table 14.2 and make record in table 14.1.

14.1 Check BeforeTest Run

Power off before wiring. After the unit is mounted, Check before leakage protector starts:

1. On-site wiring

The wiring between outdoor unit and water module, water module and 3-way valve, water module and DHW tank (optional) are made according to the wiring diagram and national regulations.

2. Fuse or protection device

Check the dimension and type of fuse or protection device installed on site are conforming to technical specification in table 10.1. Confirm that the fuse and protection device are not bypassed.

- Earth wire ensure earth wire is connected and conforming to requirements.
- Inner wiring Check no loose connector or damaged electrical
 - component inside electrical box.
- 5. Fixation

Check the unit is fixed, avoiding abnormal noise and vibration when the unit is started.

- Damaged parts Check no damaged component or pressed pipe inside the unit.
- Refrigerant leakage Check no refrigerant leakage inside unit. If occurs, contact local dealer.
- Power voltage Check on-site power voltage that must be consistent with voltage value in unit name plate.
- 9. Vent valve Ensure vent valve is opened and screwed by two circles at least.
- 10. Safety valve Check system is fully injected with water. When safety valve is manually opened water rather

safety valve is manually opened, water rather than air is drained.

- Ball valve Ensure ball valve is correctly installed and fully opened. Closing valve running system will damage water pump.
- 12. 3-way valve

Ensure wiring method of 3-way valve and installation direction of valve body are conform to requirements.

- 13. Check water circuit before test run
- (A)Confirm all water pipes are constructed in correct state before test run.
- (B)Inject water into water module. Confirm circulating water is fully injected into plate heat exchanger. Open water pump and vent valve to confirm air is discharged from the unit and pipeline.
- (C)Switch DSW3-2(details are seen below) to ON position to forcibly operate water pump. Check water pump is correctly mounted by reading pressure gage and confirming water switch action. After check, reset DSW3-2, otherwise, water pump will keep running.

υ	5	٧V	3
1	2	3	4
	1		

(D) After first test run, clean water filter and confirm no dirt in filter net.

- The unit starts only when all check points are cleared up.
- Pay attention when system is running:
- (A)Do not touch any part in exhaust end, because the housing of exhaust end in compressor and pipeline has more than 90°C temperature.
- (B)Do not press AC contactor button, otherwise serious accident may be caused.
- Do not touch any electrical component 10 minutes after main power supply is cut off.

14.2 Energize Water Module

After water module is energized, wired remote controller icon will be shown in initial state, which lasts 10 seconds. Displaying contents refer to the Fig.3.1 "wired remote controller".

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 It is normal that after water module is energized, it may directly enter anti-freezing running mode, and water pump automatically runs if outdoor temperature is very low.

14.3 On-site Setting

 Installation person can set up selected parameters based on installation environment and user's needs. Details refer to the section 5.1.7 in part I.

14.4 Test Run and Final Check After installation finishes, the installation person must check water module and outdoor unit are correctly installed.

- Test run of floor heating
- Test run of floor heating is made according to the section 5.1.3.3. After test lasts 2 hours or it reaches the set temperature, system will automatically stop. Also it may be stopped by pressing ON/OFF key. If there is error or failure, the wired remote controller screen will show error code. Error code refers to the table 14.3.
- Test run of domestic hot water Test run of domestic hot water is made according to the section 5.1.3.4. In general, when water temperature increase by 5 °C, the DHW tank heating will work normally.

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When test run of floor heating is made, higher temperature in water module (55 °C) will damage floors due to expansion and contraction. Recommend it is within 30 minutes.

Table 14.1 Test Run and Maintenance Record

Туре:	Series no.:	Compressor no.:	
Use Name and Address:		Date:	
 Does automatic vent v Does the reading of w Is water inlet and outle conducted with non-let Are accessories provi Does compressor sou Does system start for Check temperature in Inlet: °C, ou Check refrigerant tem Temperature in refrige Check pressure Air exhaust pressure: Air suction pressure: Nir suction pressure: Check voltage Rated voltage : 	valve discharge air normally? vater pressure gage reaches requet of water module correctly insta eakage test? ded with unit correctly installed? and abnormally? 20 minutes at least ? water inlet and outlet: utlet : °C perature erant liquid pipe: °C erant gas pipe: °C Mpa Mpa Npa	lired pressure (0.1-0.25MPa)? lled? Are all water pipes are	
Running voltage: Starting voltage: 11.Check input current in Input power: 12. Is there enough wate 13. Is refrigerant filled su 14. Does control device r 15. Does safety device (e 16. Is refrigerant system 17. Are all machine cover 18. Do all machine cover 19. Is water filter net clear 20. Is Water filter cleaned 21. Is stop valve fully ope 22. Is machine inside and 23. Does safety valve dra	V V compressor kW Running current:/ r flowing through plate heat exch fficiently? cun correctly? e.g. flow switch) work normally? leakage test and water system lears fixed? is sound abnormally? aned? d after first test run? ened? d outside cleaned? ainwater smoothly into downcome	A anger? eakage test performed? er?	

NOTE Heating Mode 03:08 Each independent refrigeration system must. Water Module Number 9 Operation steps in "test run" mode of wired remote controller: ① Energize the unit. Display of 2 Operation procedures in "test run mode" of wired Test Run remote controller Press "mode" button and "spot check" button for 3 sec above. If interface shown in wired remote controller is same to schematic diagram the line control is wired correctly. If no display or water module number is wrongly displayed, it is abnormal. (3) Display of wired remote controller Fault Check after power cut Outdoor unit is not energized. 1. Connection between connecting line of Wired remote controller is wired remote controller and indoor unit terminal strip No display wrongly wired. 2. Terminal block of wired remote controller Power line is wrongly connected 3. Wiring sequence of each terminal strip or loose. 4. Screw in each terminal strip is firmly fixed. Water module number is Water module is not energized. Communication cable between water module and outdoor unit is not connected. wrongly displayed. Return (1) after checks are done. ④ Select floor heating or fan coil mode by pressing functional key (floor heating and fan coil need perform test run) ⑤ Press " ON/OFF " button. Test run (the machine automatically shuts off after running for 2 hours) ►It is abnormal if air-conditioner is not started or indicating lamp in wired remote controller flashes. (6)Display in wired Fault Check after Power Cut Phenomenon remote controller

Table 14.2 Check Wiring in Test Run are Correct.

		Outdoor unit is not energized.	1. Correct wiring sequence in terminal strip:
		Communication cable is wrongly	Fuse in PCB will be turnt out due to wrong wiring.
		wired or loose.	(Restore once through DSW in PCB)
			Restore procedures of fuse burnout in
			communication cable
Running			1) Correctly connect terminal strip.
indicating lamp			2) Set up dial position as below
flashes (1	Water module does		
time/sec) and	not start.		Water module PCB
alarm no."03"			ON C
flashes.			OFF 1 2
			2. Wiring in terminal strip is firm.
			3. Wiring sequence of power line between outdoor
			unit and water module.
		Wired remote controller breaks or	Same to item 1,2,3 in ③.
Running		wiring is wrong.	
indicating lamp	Water module does	Wired remote controller is in bad	
flashes (1 time/ 2	not start.	contact.	
sec)		Wired remote controller is wrongly	
		wired.	
Other display or	Materia and the st	Joints in temperature sensor or	Check in comparison with fault code list 14.3.
flashing in	vvater module does	other connector is wrong.	
addition to above	not start or stops	Protection device action or other	
nhenomenon	atter starting once.	fault exist	

Table 14.3 Fault Code

Code	Abnormality	Cause
02	Communication is	Communication cable between water module and outdoor
03	abnormal.	unit or wired remote controller is abnormal.
11	Water temperature sensor	Temperature sensor is in short-circuit or open-circuit.
11	at inlet is abnormal.	
10	Water temperature sensor	Temperature sensor is in short-circuit or open-circuit.
12	at outlet is abnormal.	
12	Temperature sensor of	Temperature sensor is in short-circuit or open-circuit.
15	liquid pipe is abnormal.	
14	Temperature sensor of	Temperature sensor is in short-circuit or open-circuit.
14	gas pipe is abnormal.	
15	Temperature sensor of	Temperature sensor is in short-circuit or open-circuit.
15	solar is abnormal.	
16	Temperature sensor of	Temperature sensor is in short-circuit or open-circuit.
10	DHW tank is abnormal.	
	Temperature sensor at	Temperature sensor is in short-circuit or open-circuit.
17	outlet of plate heat	
	exchanger is abnormal.	
70	Water flow or pressure	Water system has insufficient pressure or water flow is very
70	is abnormal.	low.
71	DHW tank electric heating	Electric heating temperature protective switch in DHW tank
71	is abnormal.	cuts off.
72	Water module electric	Electric heating temperature protective switch in water module
12	heating is abnormal.	cuts off.
73	Water flow switch abnormal	Water flow switch is active when water pump is OFF.
76	Freezing protection.	Temperature of Plate heat exchanger is too low to freeze.
00	Communication is	Communication between wired remote controller and water
00	abnormal.	module is abnormal.
70	Communication is	Communication between air-conditioner indoor unit and
70	abnormal.	outdoor unit is abnormal.

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For multi-function and 3-pipe heat recovery water module, when indoor unit runs, if water module occurs alarm 70 or 76, alarm 7A may exist in indoor unit. For multi-function water module, if water module occurs alarm 7C, alarm 7B may exist in indoor unit. Alarm 7A or 7B in indoor unit disappear after fault is removed. If need to restart the unit, manually reset indoor unit that occurs alarm (press OFF key or reset key in wired remote controller).

15. Regular Maintenance of water module

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Regularly check water module as required in section 14.1 "Check Before Test Run".

Power off outdoor unit and water module before Regular Maintenance.

Check the followings once at least every year:

(1) Water pressure

Check water pressure before startup.

Supplement water if lower than 0.1MPa. (2) Filter

Clean water filter

(3) Safety valve

- ①Operate safety valve to check whether water flows out;
- ②If no water flows out, contact local dealer.
- ⁽³⁾If water continuously flows out, firstly close valve on water pipeline and contact local dealer.
- (4) Drainage hose in safety valve Check safety valve hose drains water smoothly.
- (5) Electrical box
 Check electrical box is loosened or not.
- (6) Water module heater
 Check heater is wrapped tightly by thermal material in water module heater.
- (7) Freezing of the plate heat exchanger Check the following items:
- ① The filter is not blocked.
- ② There is no air in the system.

③ The water flow is sufficient and the temperature is within the normal range, otherwise, the plate heat exchanger will be freezed.

Stop the operation of the water module if a freezing occurs inside the plate heat exchanger; do not restart the unit before the cause of the failure is fixed; because this will lead to a severer freezing, which will destroy the inner part of the heat exchanger, if so, the refrigerant will leak or mix with the water.

- (8) Blockage of the water circuit
- After a long time operation of the water module, the external particles, the dust, the calcium carbonate and other minerals will accumulate on the surface of plat heat exchanger; with the increasing of the deposit, more power will be consumed, this will lead to the freezing inside the heat exchanger and the deficiency of the refrigerant.
- ⁽²⁾ Clean the water filter regularly; without this, the strainer will be broken due to abnormal pressure, and the failure of the filter will occur.

Part III DHW Tank

Pay particular attention to the following items during installation. Check after installation.

No.	Check items	Check results		
1	If unit safely grounded?			
2	Can installation			
	ground bear weight of			
	DHW tank?			
3	Are heat preservation			
	measures taken for			
	preventing water pipe			
	freezing?			
	Are temperature			
	pressure valve drainage			
4	pipe and drain outlet pipe			
	introduced to			
	downcomer?			
5	If repair and maintenance			
	record is filled in?			

Installation must be performed by dealer or

- Installation must be performed by dealer or professional personnel. Improper installation will lead to water leakage, electricity shock or fire.
- Install according to this manual. Improper installation will lead to water leakage, electricity shock or fire.
- Use specified parts and accessories. Using undesignated parts will lead to water leakage, electricity shock, fire or abnormal running of DHW tank.

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- Read carefully this manual before install DHW tank. User should keep this manual properly.
- Power off before maintenance and repair. Non-professional personnel are not allowed to operate.
- Power supply in DHW tank must be grounded reliably.
- Power off before clean DHW tank.
- Do not put any articles above DHW tank. Falling or turning over will lead to injury. Do not block water inlet or outlet of DHW tank.
- Recommend installing this equipment to balcony or indoor at temperature from 0 to 43 °C.
- If not use for a long time, drain out the unit and water pipeline on site.
- Hot water may cause serious burns. Test water temperature with hands. Use after the water is mixed till proper temperature.
- A temperature pressure valve which fit with local national requirements should be installed together with DHW tank to avoid the excessive higher temperature and pressure.
- Use tap water that is not hard. If use hard water, DHW tank liner, heat exchanger coil, valves will

shorten their service lives. Do not use well water, underground water, spring water, otherwise, the service life of product can not be guaranteed.

- The water can not be drunk. If solids, discoloration, sludge and foreign taste occur, do not use and contact local dealer.
- Connecting of water pipe with tap water pipe should be operated by qualified staff using proper piping material according to local regulations and standards
- Do not use dechlorination device because it may cause bacteria proliferation in DHW tank.
- When water is treated by water purifying system, water quality problem may occur. Contact local dealer.
- Do not add bath agent into DHW tank, which may cause DHW tank and piping failure.

1. Introduction

1.1 Comprehensive Information

This section involves installation description of DHW tank in multi-function system. Read carefully before installation and strictly follow it.

Three capacities in DHW tank are: 150L, 200L and 300L. DHW tank must be mounted vertically on ground.

1.2 Scope

This section illustrates installation process and accessories and spare parts required by DHW tank installation.

2. Temperature pressure valve



3. DHW Tank Installation

- This DHW tank is designed for heat pump type heating system produced by our company. If other DHW tank, accessories or spare parts is used, we can not guarantee the good running and reliability of system. We will not be liable for any fault caused by above reasons.
- Temperature in DHW tank should be below 50 °C. If above 50°C, electric heating, magnesium rod and DHW tank liner will have service life reduced.
- DHW tank supplies hot water from tap water. Domestic hot water is only used when tap water is connected.

- When tap water pressure is more than 0.65MPa, reducing valve must be mounted to reduce DHW tank pressure.
- For safety, do not add ethylene glycol into water circulation. If added, water will be contaminated when heat exchanger coil leaks.
- When water hardness is more than 250-300 ppm, recommend using softened water to reduce DHW tank scale.
- Immediately flush DHW tank with fresh water after installation. Flush once every day in first five days of installation.
- Try to avoid long runs of water piping between the tank and the DHW installation in order to decrease possible temperature losses.
- If the domestic cold water entry pressure is higher than the DHW tank's design pressure, a pressure reducer must be fitted.
- After used for a while (depend on local water quality and use frequency), clean DHW tank and remove scales.
- a. Power off and close water inlet valve.
- b. Open water outlet valve and drainage valve to empty DHW tank.

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When scales are removed, temperature in DHW tank may be a little high, it should prevent burns or drainage equipment damaged.

- c. Close drainage valve after cleaning several minutes with water inlet valve opened. Ensure effluent water is closed after DHW tank is full of water. Power on and get back to work.
- Always check DHW tank and its surroundings has accumulated water or not. If leak, contact local dealer.
- Clean the housing with wet cloth. Do not use corrosive cleaning agent.
- If DHW tank is not used for more than 2 weeks, a certain amount of hydrogen will gather in DHW tank. Recommend open temperature pressure valve handle or water outlet faucet for several minutes to release hydrogen, however, do not open hot water faucet in dish-cleaning machine and washing machine, etc. When nitrogen is released, do not make open flame or operate other electrical apparatus. When gas is released, releasing sound will be heard.

3.1 Main Parts



Ref.	Name
1	Control panel
2	Storage tank
3	External covering
4	Top covering
5	Thermal insulation
6	Temperature pressure valve connection port
7	Electric heater
8	Coil inlet
9	Coil outlet
10	Water inlet
11	Water outlet
12	Sewage outlet
13	DHW tank sensor

3.2 Safety Device

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- Temperature pressure valve must be tightly connected with drainage pipe. Drainage pipe must be connected as shown below and introduced to building down comer (The water temperature in drainage pipe may be high, note burns).
- Temperature pressure valve in DHW tank can not be connected for other purposes.
- Check temperature pressure valve once half a year. When checking, open temperature pressure valve handle (seen below), temperature pressure valve will smoothly drain water out. The water temperature may be high, note burns. Reset after it is errorless. If drainage fails, contact local dealer for repair.
- Temperature pressure valve and its drainage pipe must keep smooth and not blocked.



temperature

pressure valve

- Do not install electric heating without protective device.
- Temperature protection device: DHW tank electric heating has temperature protection device. When temperature is high, temperature switch will power off . Power will restore automatically when temperature is lower than 75°C.
- Temperature protection device cuts off electric heating power at high temperature. After disconnected, open electrical box cover and press red button to reset temperature protection device. Location of red button is seen below:



- Electrical box cover must be opened by qualified electrician.
- Power off before open electrical box cover.
- Temperature pressure valve is used to prevent too high temperature in DHW tank (>94°C) and water pressure (>0.85MPa).

3.3 Installation Guide

Note when DHW tank is installed:

- Recommend installing this equipment to balcony or outdoor at temperature from 0°C to 43 °C .
- DHW tank is mounted near floor drain to connect temperature pressure valve drainage pipe.
- Do not install DHW tank in place with corrosive gas.
- Installation location is free from frosting.
- Installation location must bear weight of DHW tank containing water.
- Ensure dimension of water pipe is above 1 inch (recommend DN40 water pipe), provide enough capacity to pipeline and reduced resistance in pipeline system.
- DHW tank is located in a place that is convenient for repair and ensuring electrical box opened. Refer to Fig.3.1-2.
- No accumulated water around installation location.
- Arrange filter at water inlet pipe, preventing domestic water contaminated by impurities.
- Ensure DHW tank is full of water before energizing.

3.4 Install DHW Tank

- 1. Check DHW tank has complete accessories.
- When mounted on ground, ensure the bottom of DHW tank flat and vertically install DHW tank. If mounted in bath room where water exists, recommend installing on a foundation higher than ground, preventing the bottom soaked by water.
- 3. To ensure the measurement accuracy, the DHW tank sensor should be coated with thermal grease. The water proof cable gland(field supply) is recommended to secure the sensor firmly. The DHW tank sensor must be installed to reach the inner wall of the DHW tank and keep in good contact with it.



4. Because water pressure exists in DHW tank, when magnesium rod is replaced, first close water inlet valve and drain outlet for 10-20 sec, and then replace magnesium rod. After replacement, open water inlet valve. If water sprays from DHW tank through above measures taken, confirm water temperature in DHW tank, preventing burns. Besides, do not place electrical parts or electrical products near DHW tank, preventing electrical shock or fire due to electrical short-circuit.

3.5 Connect Water Module Refer to the section 3.2 "Examples of Application" in part II

3.6 On-site Wiring

A CAUTION

Electrical wiring must be performed by professional technician according to national regulations.

- (1) Correctly mount cable water proof head and electrical box cover, preventing short circuit caused by water intruding into electrical box.
- (2) Auxiliary electric heating is 3kW. Power line connection should give concern to live line and null line, and be grounded strictly. Detailed wiring diagram refers to wiring diagram and Fig.3.3.
- (3) Temperature sensor is weak electricity signal, preventing mixed with strong electricity signal.

3.7 Power Line Requirements

NOTE

- (1) Installation of on-site wire must be conforming to local regulations.
- (2)The above line % 1 is selected according to relevant international standard.
- (3) When power line is connected in series, total current value selects power line specification.

According to EN60335-1			
Current(A)	Wire Size(mm ²)		
i≤ 6	2.5		
6 <i≤10< td=""><td>2.5</td></i≤10<>	2.5		
10 <i≤16< td=""><td colspan="3">2.5</td></i≤16<>	2.5		
16 <i≤25< td=""><td>4</td></i≤25<>	4		
25 <i≤32< td=""><td>6</td></i≤32<>	6		
32 <i≤40< td=""><td>10</td></i≤40<>	10		
40 <i≤63< td=""><td colspan="2">16</td></i≤63<>	16		
63 <i< td=""><td>×1</td></i<>	×1		

×1: In the case that current exceeds 63A, do not connect cables in series.

3.8 Temperature Sensor Wiring Diagram



3.9 DHW Tank Power Line and Temperature Switch Wiring Diagram

Fig.3.3 Power Line and Temperature Switch Wiring Diagram

3.10 DHW Tank Pipeline Connection

Connect pipeline of DHW tank as shown in Fig.3.4. The size of connecting pipe thread of DHW tank is seen below.

No.	Name	Connecting pipe thread		
1	Cold water joint	Rp3/4"(male thread)		
2	Hot water joint	Rp3/4"(male thread)		
3	Coil inlet	G3/4"(male thread)		
4	Coil outlet	G3/4"(male thread)		
5	Drain outlet	Rp3/4"(male thread)		
6	Temperature pressure valve interface	G3/4"(male thread)		

Rp is British sealed cylinder female thread. G is British non-sealed cylinder thread.

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• Clean pipelines and fixed elbow connected on site and ensure no impurities inside piping before connected to DHW tank, otherwise, the equipment fails normal operation.

3.11 Pipeline Requirements

- All pipelines connected to faucet must be gradually lowered.
- Do not use electrical welding, cooper welding or other welding material to connect pipelines or weld pipelines.
- Outlet pipe, safety valve and drain valve must be mounted far from electrical apparatus.

- To ensure safe use, inlet and outlet pipe must be connected to PPR pipe of a certain length > 70*R2(R is pipe inner diameter). Do not use metal pipe.
- Drain pipe of temperature pressure safety valve must be connected to a safe location without hurting people.

- Water pipelines are installed after DHW tank is fixed.
- Do not make dust and other impurities invade into pipeline system when connection pipe are installed.
- Temperature pressure valve may spray hot water. To avoid hurting people, proper pipe joint must be connected to temperature pressure valve, and connect temperature pressure valve to stop valve of drain outlet through PPR pipe, seen in Fig.3.4.
- Drain pipe introduces water into building downcomer. A stop valve suitable for pipeline size must be mounted in drainage pipeline. Stop valve must be installed in a place that is
 convenient to the user.
- Inject water into DHW tank after all water pipelines are mounted. Ensure stop valve connecting drain pipe is closed.
- Check leakage in all water pipelines. Thermally treat all pipelines after ensuring no water leakage.

3.12 Discharge Water

- Inject water
 - Inject water into DHW tank:
- 1. Power off.
- 2. Open each hot water faucet and discharge air in system pipeline.
- 3. Open cold water supply valve.
- 4. Check no leakage.
- 5. Close all faucets after air is discharged.
- 6. Open temperature pressure valve to ensure water flows through effluent pipe (move ball type wrench to the left). The location of temperature pressure valve refers to Fig.3.4.
- Discharge water Discharge water from DHW tank as follows:
- 1. Power off.
- 2. Close cold water supply valve.
- 3. Open hot water faucet.
- 4. Open stop valve of drain port.
- Anti-freezing measures
- 1. If not use for long time, drain circulating water from the unit and on-site piping.
- 2. If the above operation fails, keep the unit connected to power supply, make water pump regularly automatically run to prevent water circuit freezing.

3.13 Maintenance and Repair

To ensure good operation in the unit, it should work with the local dealer tor regularly check the unit and on-site wiring.

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Power off water module and outdoor unit before maintenance and repair.

- Check the following items once every one:
- 1. DHW tank electric heating Recommend cleaning water scale in electrical heating rod to prolong service life, particularly when tap water is hard. Drain water from DHW tank and take electric heating rod and soak it into a bucket of solution mixed with descaling solution for 24 hours.
- Temperature pressure valve Check temperature pressure valve works normally. Move ball wrench to the left, and open temperature pressure valve to ensure water flows through effluent pipe.
- Electrical box in water module Thoroughly check electrical box, and seek for obvious negligence, e.g. loose connection or wrong wiring.

Check AC contactor works normally by using multimeter and all terminal blocks in AC contactor do not contact with other parts .

3.14 Troubleshooting

 Comprehensive guide Observe and thoroughly check electric box before solution and seek obvious negligence,

e.g. loose wiring or wrong wiring.

Carefully read this section before contact local dealer, which can save your money and time. Find out the opening of safety device when safety device is opened and unit stops. Safety device can not be beyond the setting value at factory. If reasons are not found, contact local dealer.

Comprehensive symptom

No.	Symptom	Possible	Solution		
1	No water flows from hot faucet.	Main water source is closed.	Check stop valve of all water circulation are opened.		
2	Water flowing from hot faucet is cold.	Water module does not work.	Refer to the manual. Check water module. If problem continues, contact local dealer.		
3	Water flows interruptively.	Temperature protection device fails	Power off water module. If no water flows from outlet pipe, it still fails, contact local dealer.		
4	Water continuously flows out.	Temperature pressure valve fails	Check temperature pressure valve.		
5	No water flows out.	Water inlet valve fails.	Open water inlet valve.		

Maintenance and Repair Record of DHW Tank

DHW tank type:

Use name and address:

Spot check items: ①magnesium rod spot check②electric heating rod cleaning③ liner cleaning Mark checked item in the following record as " $\sqrt{}$ " with an oily pen and write down the date, status and staff, etc.

Staf	f				
Date					
Status	1				
	2				
	3				
Staf	f				
Date	9				
Status	1				
	2				
	3				
Staf	f				
Date	9				
Status	1				
	2				
	3				
Staff					
Date)				
Status	1				
	2				
	3				
Staf	f				
Date					
Status	1				
	2				
	3				
Staff					
Installation date: Year month day					

4. DHW Tank Selection

4.1 Storage capacity

The storage capacity of the DHW tank depends on the daily water demand and the combination method. The daily water demand is estimated with the following calculation formula for consumption:

 $D_{i}(T) = D_{i}(60 \text{ °C}) \times (60 \text{ -} T_{i} / \text{ T-} T_{i})$

Where:

D _i (T):	Water demand at T temperature
D _i (60°C):	Domestic hot water demand at 60 °C
T:	Temperature of the DHW tank

Ti: Temperature of the inlet cold water

- Calculation of D₍60 °C):

The standard consumption, expressed in daily litres per person and determined by technical installation regulations of each country, is used to calculate the domestic hot water demand at 60 °C, $D_i(60 °C)$. This quantity is then multiplied by the expected number of users of the installation. In the following example, the domestic hot water demand at 60 °C has been considered as 30 litres per person, in a detached house with 4 residents.

- Calculation of T:

The temperature of the DHW tank refers to the temperature of the accumulated water inside the tank, prior to operation. This temperature is usually between 45 °C and 65 °C. It has been considered as 45 °C in this example.

- Calculation of Ti:

The temperature of the inlet cold water refers to the temperature of the water being supplied to the tank. Since this temperature is usually between 10 °C and 15 °C, it has been considered as 12 °C in this example.

- Example:

 $D_i(T)$ = 30 x 4 x (60-12/45-12) = 174.5 litres/day 174.5

x 2(*) = 349 litres/day approximate demand of hot

water

(*) It is recommended to multiply the calculated consumption by two, in case that the installation is in a detached house. This is done to ensure a steady supply of hot water. In the case of a multifamily installation, it is not necessary to increase the forecast of hot water demand, given the lower simultaneity factor.

4.2 Coil Face Area

The coil face area is a key parameter for DHW tank. To improve the heating efficiency, the coil face area should be adjusted according to the capacity. The coil face area should be no less than the values listed in the table below.

Storage Capacity(L)	100	150	200	250	300
Coil Face Area(m ²)	1.5	1.5	1.8	1.8	2.0

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Smaller coil face area will lead to worse heating efficiency. In that condition, the heat pump will start and stop frequently which causes more time and more power consumption to heat up the DHW tank.
4.3 Structural Drawings

The typical structure of the DHW tank is shown as below (only for example):



Ref.	Name	
1	Control panel	
2	Storage tank	
3	External covering	
4	Top covering	
5	Thermal insulation	
6	Temperature pressure valve connection port	
7	Electric heater	
8	Coil inlet	
9	Coil outlet	
10	Water inlet	
11	Water outlet	
12	Sewage outlet	
13	DHW tank sensor	

For different storage capacity, the structural design of the DHW tank may be different. The parameters of the typical structure shown in the left are recommended as follows:

Ref.	Recommended value(mm)*
А	Min.150

*please check and adjust according to the actual situation.

NOTE:

- (1) DHW tank sensor
- ①The DHW tank including the DHW sensor, the electrical heater and the coil must be designed and installed in accordance with the local regulation.
- ② The position of the DHW sensor is very important. The reasonable position will help to ensure the detection accuracy of the DHW temperature. It is related to the operation of the heat pump.

(2) Electric heater

- ① The electric heater is necessary to heat up the DHW tank in the following conditions:
- Supplement the heat pump to heat up the DHW tank when the heating capacity of the heat pump is insufficient in low ambient temperature.
- Heat up the DHW tank when the operating conditions exceed the limitation, see details in "IMPORTANT NOTICE"(page i)
- ②The capacity of the electric heater is related to the storage capacity of the DHW tank, and should be selected according to the demand.
- Larger capacity of the electric heater is beneficial to heat up the DHW tank, but will consume more power, while smaller capacity of the electric heater will cost more time to heat up the DHW tank.

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• The temperature pressure valve and the temperature protection device(covered by the control panel)must be installed according to local regulation and performed by qualified professionals referring to Part III 3.2.

5. Solar Function

The solar function makes it possible to heat up the DHW by means of the sun.

The function is enabled after setting $E_{1}=01$ through the wired remote controller. Hisense provides two different control methods (Input control & solar sensor control) to operate this function.

1.Input control

A solar controller(field supply) is applied. when the controller determines that the sun energy is high enough to heat up the DHW, the controller sends the "solar in" signal. The water module receive it and sends "solar out" signal to operate the external water pump.

a) Wired remote controller setting

Set [3=00.



b) Electrical wiring(TB4 terminal block)

• The external water pump is powered by the water module



2.Solar sensor control

The water module can operate the solar function by a solar sensor (optional) . If the temperature detected by the solar sensor is high enough, the water module sends "solar out" signal to run the external water pump.

a) Wired remote controller setting

Set **[3**=01.

b) Sensor connection

• Connect solar sensor to PCB1(THM6) ,referring to "10.2.3 Electrical Connection Diagram".



c) Electrical wiring(TB4 terminal block)

• The external water pump is powered by the water module



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- All wiring must be made according to national specification, and must be performed by gualified professionals, referring to Part II 10.1.
- An auxiliary relay must be connected in series with the external pump in case of high consumption.
- There is no solar panel overheat protection provided by Hisense product.

An auxiliary protection device is necessary to ensure the solar panel will not be damaged or explode when the water temperature is too high. The selection and the installation work must be performed according to the local regulation. Contact the solar panel suppliers for more information.

6. Auto-shift Function

This function is only performed when a DHW tank mounted. The installation must be done as shown in Part II. This function operates at floor heating or fan coil functions, which can shift back and forth between the floor heating or fan coil and DHW automatically.

To achieve the auto-shift function, the in-situ settings d] and [id must be set as 01, and [ib, [ib, [i] are relevant with this function. This function is achieved by the following conditions.

• Condition 6-1:

Floor heating or fan coil will shift to DHW if met all of the conditions below :

- ① TDHW ≤ TDHWS -offset temperature([[]
- ② T_{DHW} ≤ T_{max} -8°C
- ③ Target temperature of floor heating or fan coil reached and thermostat off, or the longest continuous running time of floor heating or fan coil (Lb) reached, or T_{DHW} decreases sharply.

• Condition 6-2:

DHW will shift to floor heating or fan coil if met one of the conditions below :

- ① T_{DHW}≥ T_{DHWS}
- 2 T_{DHW} reach the max heating temperature of heat pump.
- ③ DHW function runs over the setting of longest continuous running time of DHW tank (**[[]**)

Interpretation:

T_{DHW}: temperature of DHW tank

T_{DHWS}: setting temperature of DHW tank

 T_{max} : max heating temperature of heat pump

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- Condition 6-3: If there is an electric heater in DHW tank, dB can be set as 01. And there are two special control methods to energize the electric heater in DHW tank in auto-shift function:
- ① When DHW shift to floor heating or fan coil, and $T_{DHW} < T_{DHWS}$.
- ② Ambient temperature is over the limitation, see details in "IMPORTANT NOTICE"(page i), and $T_{DHW} < T_{DHWS} - 5^{\circ}$ C, in fan coil operation.
- **Lb** is related to the condition 6-2 ③. If setting of **Lb** is big, longer time it might take in DHW, so that temperature of floor heating or fan coil might not meet requirements. If setting of **Lb** is small, it might cause T_{DHW} far low from T_{DHWS} when shifting to floor heating or fan coil, with DHW electric heater energized, so that may cause a greater power consumption.

- Lib is related to the condition 6-1 ③ (the longest running time of floor heating or fan coil). If setting of Lib is big, it might take a long time in floor heating or fan coil, so that T_{DHW} might be low for a large period of time. If setting of Lib is small, temperature of floor heating or fan coil might not meet requirements.
- **L** is related to the condition 6-1 ①. If setting of **L** is big, T_{DHW} might drop to a very low temperature before shifting to DHW. If setting of **L** is small, it might cause shifting frequently.
- Recommended settings of **[6**, **[b**, **[**] are shown in the table below.

No.	Code	Recommended Settings
1	66	06: 60min
		07: 70min
		08: 80min
		09: 90min
		10: 100min
		11: 110min
		12: 120min
2	նե	01: 30min
		02: 60min
		03: 90min
		04: 120min
	60	00: 6°C
3		01: 7°C
		02: 8°C
		03: 9°C
		04: 10°C
		05: 11°C
		06: 12°C
		07: 13°C
		08: 14°C
		09: 15°C



• Auto-shift running schedule is shown below (use the floor heating as an example).



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