

AIR CONDITIONING SYSTEMS

Models:

DHW-CQ6.0Pd/Na-K

DHW-CQ10Pd/Na-K

DHW-CQ14Pd/Na-K

DHW-CQ12Pd/Na-M

DHW-CQ16Pd/Na-M

DHW-CQ8.0Pd/Na-K

DHW-CQ12Pd/Na-K

DHW-CQ16Pd/Na-K

DHW-CQ14Pd/Na-M

VARIO

Air-to-water Heat Pump Systems

Service Manual

Service Manual



Your-conditions

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1. Instruction to Users

Thank you for choosing our Air to water Heat Pump. Please read this manual carefully before installation and use the unit correctly according to the following procedure.

- ✚ After receipt of the unit, check it for appearance, unit model compared with your desire and attachments.
- ✚ For proper installation and future maintenance please read this Instruction and keep it carefully.
- ✚ Design and installation work of the unit must be performed by authorized personnel according to applicable laws and regulations and this Instruction.
- ✚ After installation work, the unit can not be energized unless there is not any problem in check.
- ✚ Ensure periodical clean and maintenance of the unit after normal operation of the unit for longer life and reliable operation.
- ✚ For improvement of products, there should be not additional notice of amendment of the contents.
- ✚ This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- ✚ Children should be supervised to ensure that they do not play with the appliance.



Notice!



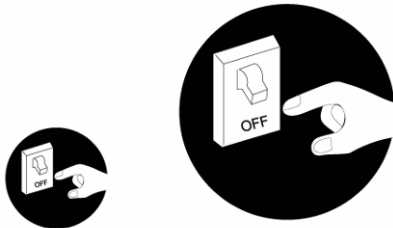
This product must not be disposed together with the domestic waste. This product has to be disposed at an authorized place for recycling of electrical and electronic appliances.

2. Safety Considerations

Please read the following contents carefully before operating.

WARNING

★ Once abnormality like burning smell occurs, please cut off the power supply immediately and then contact with service center.



If the abnormality still exists, the unit may be damaged and electric shock or fire may result.

★ Don't operate the unit with wet hand.



Otherwise, it may cause electric shock.

★ Before installation, please see if the voltage of local place accords with that on nameplate of unit and capacity of power supply, power cord or socket is suitable for input power of this unit.

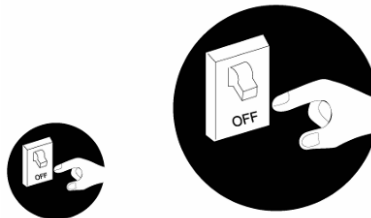


★ Special circuit must be adopted for power supply to prevent fire.



Do not use octopus multipurpose plug or mobile terminal board for wire connection.

★ Be sure to pull out the power plug and drain the indoor unit and water tank when unit is not in use for a long time.




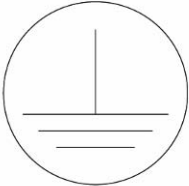
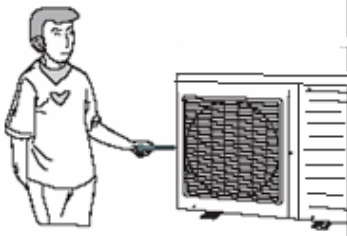


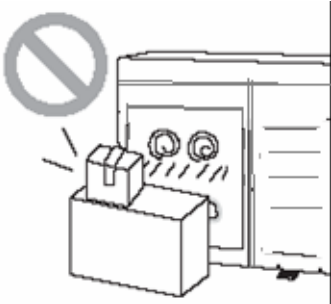



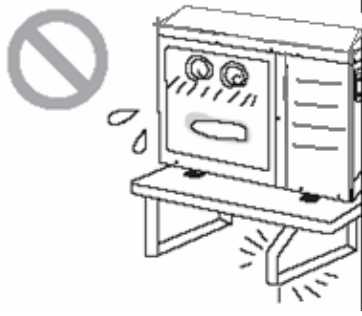
Otherwise, the accumulated dust may cause overheating, fire or freeze of water tank or coaxial heater exchanger in winter.

★ Never damage the electric wire or use the one which is not specified.



Otherwise, it may cause overheating or fire.

<p>★ Before cleaning please cut off the power supply.</p>   <p>Otherwise, it may cause electric shock or damage.</p>	<p>★ The power supply must adopt special circuit with leakage switch and enough capacity.</p>	<p>★ User can not change power cord socket without prior consent. Wiring working must be done by professionals. Ensure good earthing and don't change earthing mode of unit.</p>
<p>★ Earthing: the unit must be earthed reliably ! The earthing wire should connect with special device of buildings.</p>   <p>If not, please ask the qualified personnel to install. Furthermore, don't connect earth wire to gas pipe, water pipe, drainage pipe or any other improper places which professional does not recognize.</p>	<p>★ Never insert any foreign matter into unit to avoid damage . And never insert your hands into the air outlet of outdoor unit.</p> 	<p>★ Don't attempt to repair the unit by yourself.</p>  <p>Improper repair may cause electric shock or fire, so you should contact the service center to repair.</p>
<p>★ Don't step on the top of the unit or place anything on it.</p>  <p>There is the danger of fall of things or people.</p>	<p>★ Never block the air inlet and outlet of unit.</p>  <p>It may reduce efficiency or cause stop of the unit and even fire.</p>	<p>★ Keep pressurized spray ,gas holder and so on away from the unit above 1m .</p>  <p>It may cause fire or explosion.</p>

<p>★ Please note whether the installation stand is firm enough or not.</p>  <p>If damaged, it may cause fall of the unit and injury of people.</p>	<p>★ unit should be installed at the place with good ventilation to save energy.</p>	<p>★ When there is not water in water tank, never power the unit on to run.</p>
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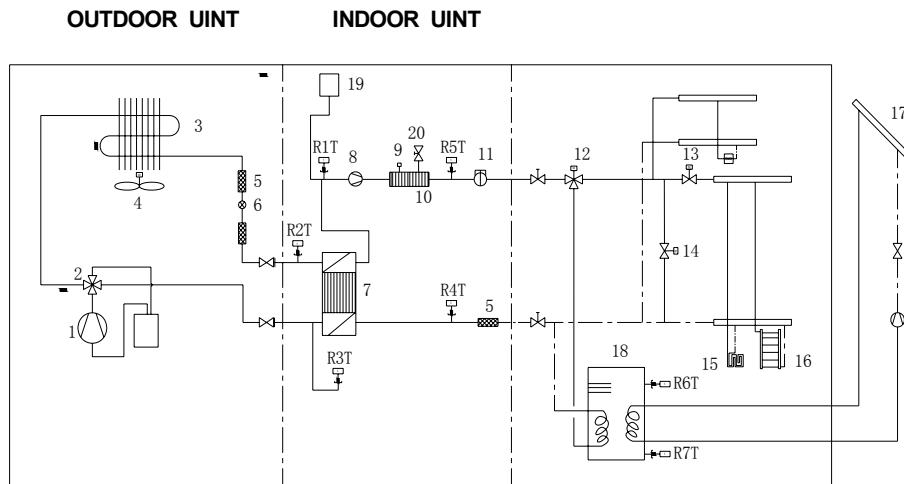


Notice!

- 1、 Before installation, please check if the adopted power is accordance with that listed on nameplate, and check the safety of power.
- 2、 Before using, please check and confirm if wires and water pipes are connected correctly to avoid water leakage, electric shock or fire etc.
- 3、 Don't operate the unit with wet hand, and don't allow children to operate the unit.
- 4、 The On/off in the instruction is for the operation to on and off button of PCB for users; cut off power means to stop supplying power to the unit.
- 5、 Don't directly expose the unit under the corrosive ambient with water or dampness.
- 6、 Don't operate the unit without water in water tank .The air outlet/inlet of unit can not be blocked by other objects.
- 7、 The water in unit and pipeline should be discharged if the unit is not in use, to prevent the water tank, pipe line and water pump from frost-cracking.
- 8、 Never press the button with sharp objects to protect manual controller. Never use other wires instead of special communication line of the unit to protect control elements. Never clean the manual controller with benzene, thinner or chemical cloth to avoid fading of surface and failure of elements. Clean the unit with the cloth soaked in neutral eradicator .Slightly clean the display screen and connecting parts to avoid fading.
- 9、 The power cord must be separated with the communication line.

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

3. Diagram of the Operating Principle



- | | | |
|------------------------------|-------------------------|--|
| 1 compressor | 10 electric heater | 19 expansion tank |
| 2 four-way valve | 11 flow switch | 20 safety valve |
| 3 finned coil exchanger | 12 3-way valve | R1T plate outlet temperature sensor |
| 4 fan motor | 13 2-way valve | R2T Liquid line temperature sensor |
| 5 filter | 14 by-pass valve | R3T gas line temperature sensor |
| 6 electronic expansion valve | 15 under-floor heating | R4T returning water temperature sensor |
| 7 plate heat exchanger | 16 radiator | R5T leaving water temperature sensor |
| 8 pump | 17 other thermal system | R6T water tank temperature sensor 1 |
| 9 air-vent valve | 18 water tank | R7T water tank temperature sensor 2 |

4. Operating Principle of the Unit

DC Inverter Air to Water Heat Pump is composed of outdoor unit, indoor unit and internal-fan coil water tank. Operation functions:

1. Cooling;
2. Heating;
3. Water heating;
4. Cooling +water heating;
5. Heating+ water heating;
6. Emergency mode;
7. Quick water heating;
8. Holiday mode;
9. Forced Operation Mode;
10. Silent mode;
11. Disinfection mode;
12. Weather-dependent Operation;

Cooling: in cooling mode: the refrigerant is condensed in the outdoor unit and evaporated in the indoor unit. Via the heat exchange with water in the indoor unit, the

temperature of water decrease and it releases heat while the refrigerant absorbs heat and evaporates. With the help of wired controller, the outflow temperature can meet the user's requirement. Through the control of valve, the low-temperature water in the system is connected with indoor fan coil and underground pipe, and exchanges heat with the indoor air so that the indoor temperature decreases to the required range.

Heating: in heating mode: the refrigerant evaporates in the outdoor unit and is condensed in the indoor unit. Via the heat exchange with water in the indoor unit, the water absorbs heat and its temperature increase while the refrigerant releases heat and is condensed. With the help of wired controller, the outflow temperature can meet the user's requirement. Through the control of valve, the high-temperature water in the system is connected with indoor fan coil and underground pipe, and exchanges heat with the indoor air so that the indoor temperature increases to the required range;

Water heating: in water heating mode, the refrigerant evaporates in the outdoor unit and is condensed in the indoor unit. Via the heat exchange with water in the indoor unit, the water absorbs heat and its temperature increase while the refrigerant releases heat and is condensed. With the help of wired controller, the outflow temperature can meet the user's requirement. Through the control of valve, the high-temperature water in the system is connected with the coil pipe of bearing water tank, and exchanges heat with the water in the water tank so that the temperature of water tank increases to the required range;

Cooling +water heating: when cooling mode exists together with the water heating mode, the user can set the priority of these two modes based on the needs. The default priority is heat pump. That is under the default setting, if cooling mode exists together with the water heating mode, the heat pump gives priority to cooling. In that case, water heating can only realized with e-heater of the water tank. Inversely, the heat pump gives priority to water heating and switches to cooling after finishing water heating;

Heating+ water heating: when heating mode exists together with the water heating mode, the user can set the priority of these two modes based on the needs. The default priority is heat pump. That is under the default setting, if heating mode exists together with the water heating mode, the heat pump gives priority to heating. In that case, water heating can only realized with e-heater of the water tank. Inversely, the heat pump gives priority to water heating and switches to heating after finishing water heating;

Emergency mode: this mode is only available for heating and water heating. When the outdoor unit stops due to malfunction, enter the corresponding emergency mode; as to heating mode, after entering the emergency mode, heating can only be realized through e-heater of the indoor unit. When the setting outflow temperature or indoor temperature is reached, the e-heater of indoor unit will stop running; as to water heating mode, the e-heater of indoor unit stops while the e-heater of water tank runs. When the setting temperature or water tank is reached, the e-heater will stop running;

Quick water heating: in quick water heating mode, the unit runs according to the water heating control of heat pump and the e-heater of water tank runs at the same time;

Forced Operation Mode: this mode is only used for refrigerant recovery and debugging for the unit;

Holiday mode: this mode is only available for heating mode. This mode is set to keep indoor temperature or leaving water temperature in a certain range, so as to prevent water system of the unit from freezing or protect certain indoor articles from freezing damage. When the outdoor unit stops due to malfunction, the two e-heaters of the unit will run.

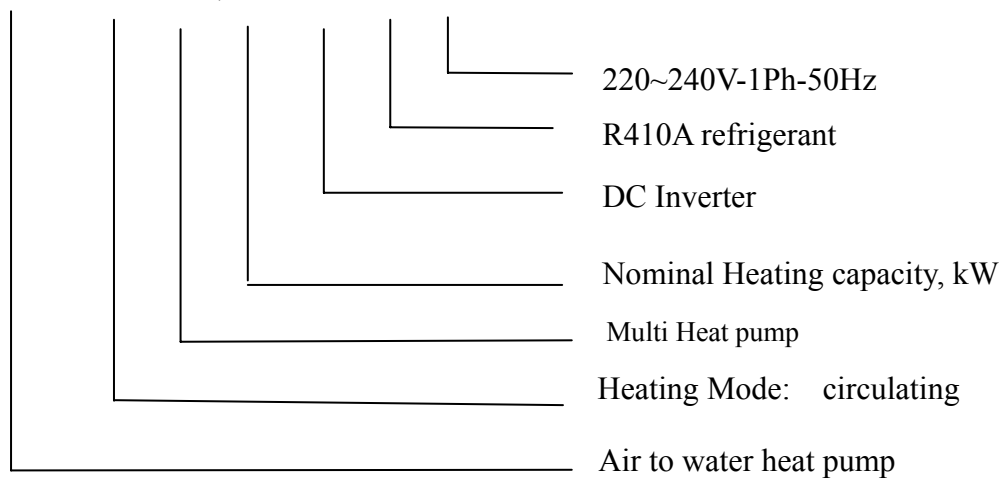
Disinfection mode: in this mode, the water heating system can be disinfected. When starting up the disinfection function and setting corresponding time to meet the requirement of disinfection mode, the function will start. After the setting temperature is reached, this mode will terminate.

Weather-dependent Operation: this mode is only available for space heating. In Weather-dependent mode, the setting value (remote room air temperature or leaving water temperature) is detected and controlled automatically when the outdoor air temperature is changed.

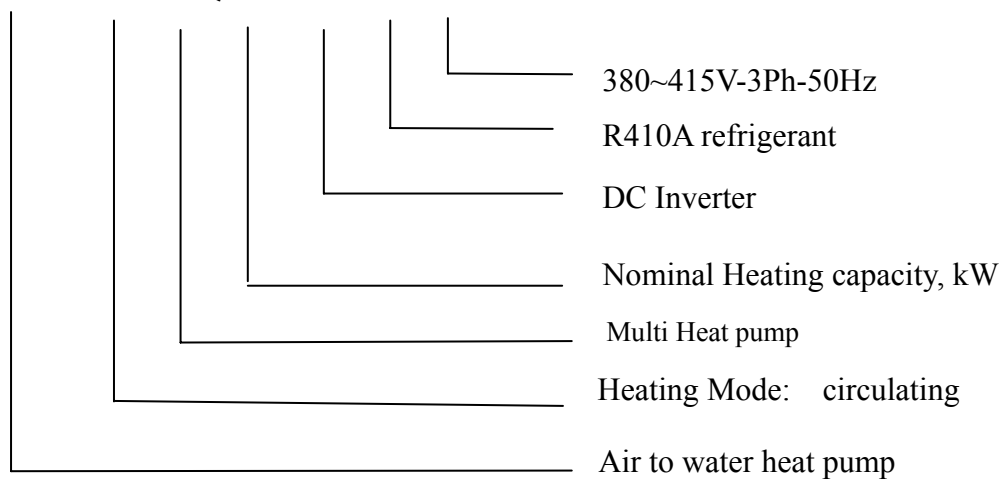
Silent mode: Silent mode is available in cooling, heating and water heating mode. In silent mode, the outdoor unit will reduce the running noise via automatic control.

5. Nomenclature

DHW C Q 16 Pd /Na-K



DHW C Q 16 Pd /Na-M



Model Line-Up

Model Name	Capacity		Power supply
	Heating, KW	Cooling, KW	
DHW-CQ16Pd/Na-K	16 ¹	15.5 ²	220-240V 1Ph~ 50Hz
DHW-CQ14Pd/Na-K	14	15	
DHW-CQ12Pd/Na-K	12	14	
DHW-CQ10Pd/Na-K	10	10.5	
DHW-CQ8.0Pd/Na-K	8.5	9.0	
DHW-CQ6.0Pd/Na-K	6.2	5.5	
DHW-CQ16Pd/Na-M	15 ¹	15.5 ²	380-415V 3Ph~ 50Hz
DHW-CQ14Pd/Na-M	14	15	
DHW-CQ12Pd/Na-M	12	14	

Note:

¹ Capacities and power inputs are based on the following conditions:

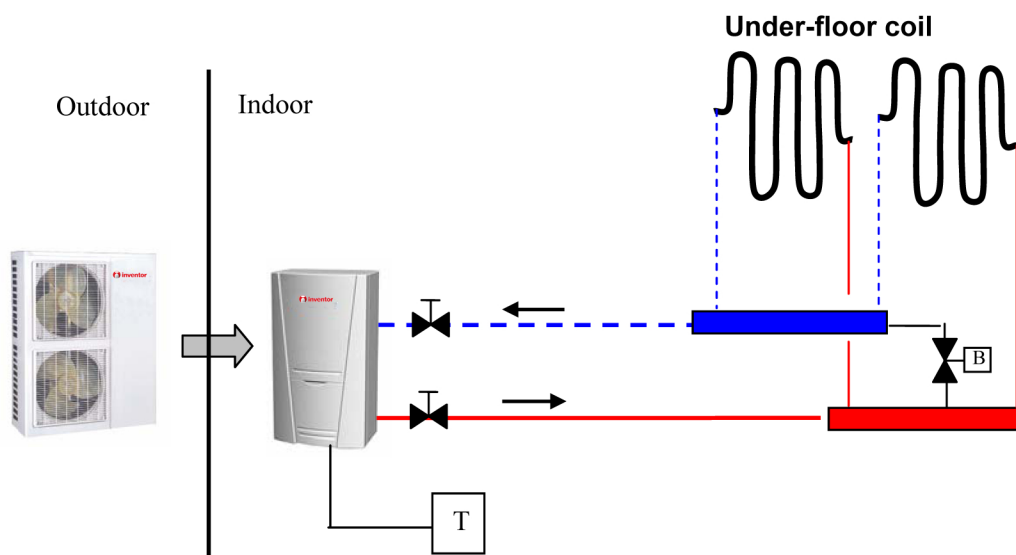
Indoor Water Temperature 30°C/35°C, Outdoor Air Temperature 7°CDB/6°CWB;

² Capacities and power inputs are based on the following conditions:






Indoor Water Temperature 23°C/18°C, Outdoor Air Temperature 35°CDB/24°CWB

6. Installation Example

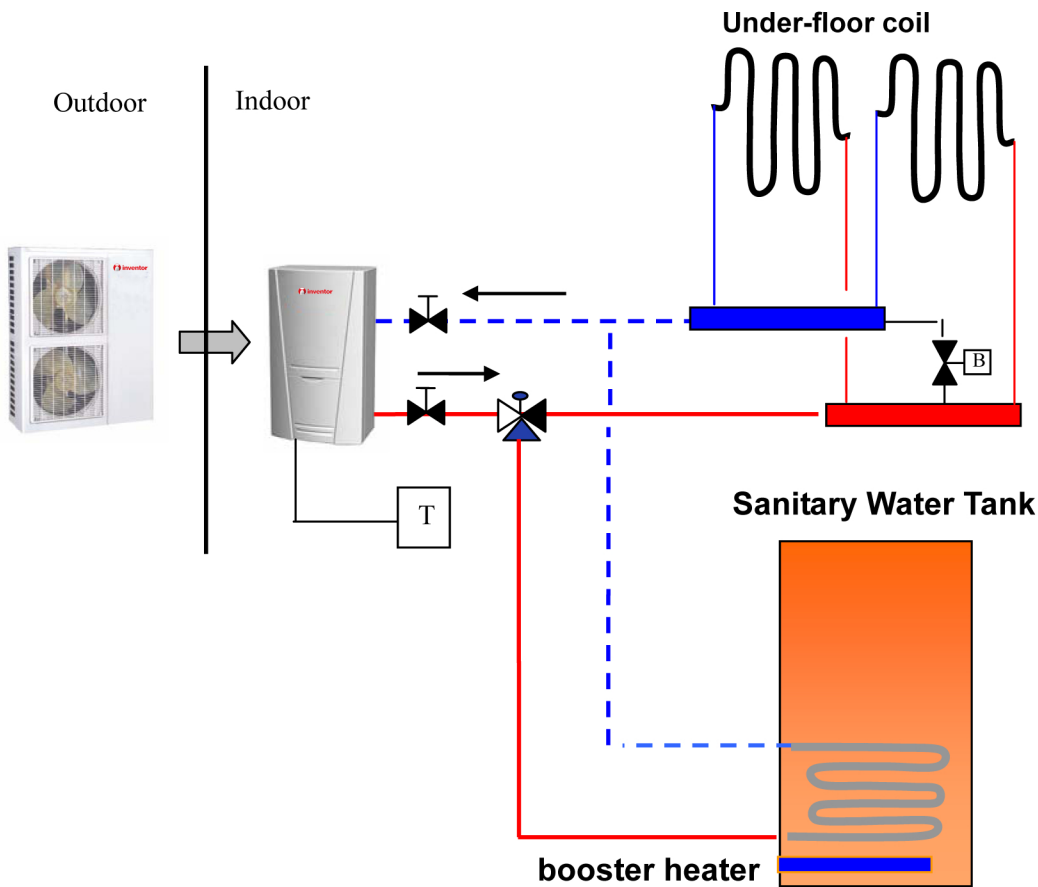
CASE 1: connecting Under-floor coil for heating and cooling



NOTE:

- | | | | |
|---|------------------------------|---|---------------------------------------|
|  | Shut off Valve |  | Remote room Thermostat (Field supply) |
|  | By-pass valve (Field supply) |  | High temperature line |
| | |  | Low temperature line |

1. Type of thermostat and specification should be complied with installation of this manual;
2. By pass valve must be installed to secure enough water flow rate, and by pass valve should be installed at the collector;

CASE 2: connecting Sanitary Water Tank**NOTE:**

Shut off Valve



Remote room Thermostat (Field supply)



By-pass valve (Field supply)



three-way valve (Field supply)



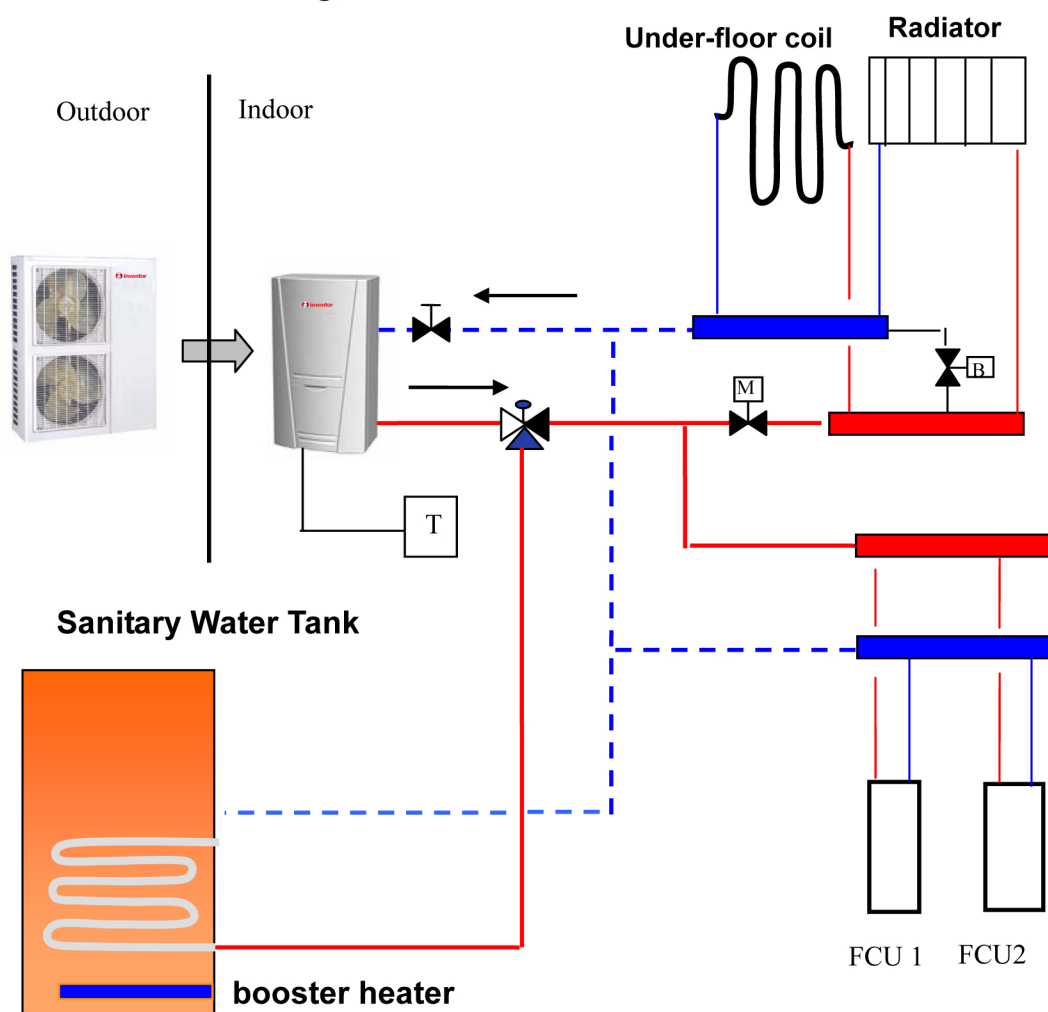
High temperature line










Low temperature line

1. In this case, three-way valve should be installed and should be complied with installation of this manual;
2. Sanitary water tank should be equipped with internal electric heater to to secure enough heat energy in the very cold days;

CASE 3 : connecting Sanitary Water Tank and Heat Emitters for heating and Cooling;



NOTE:

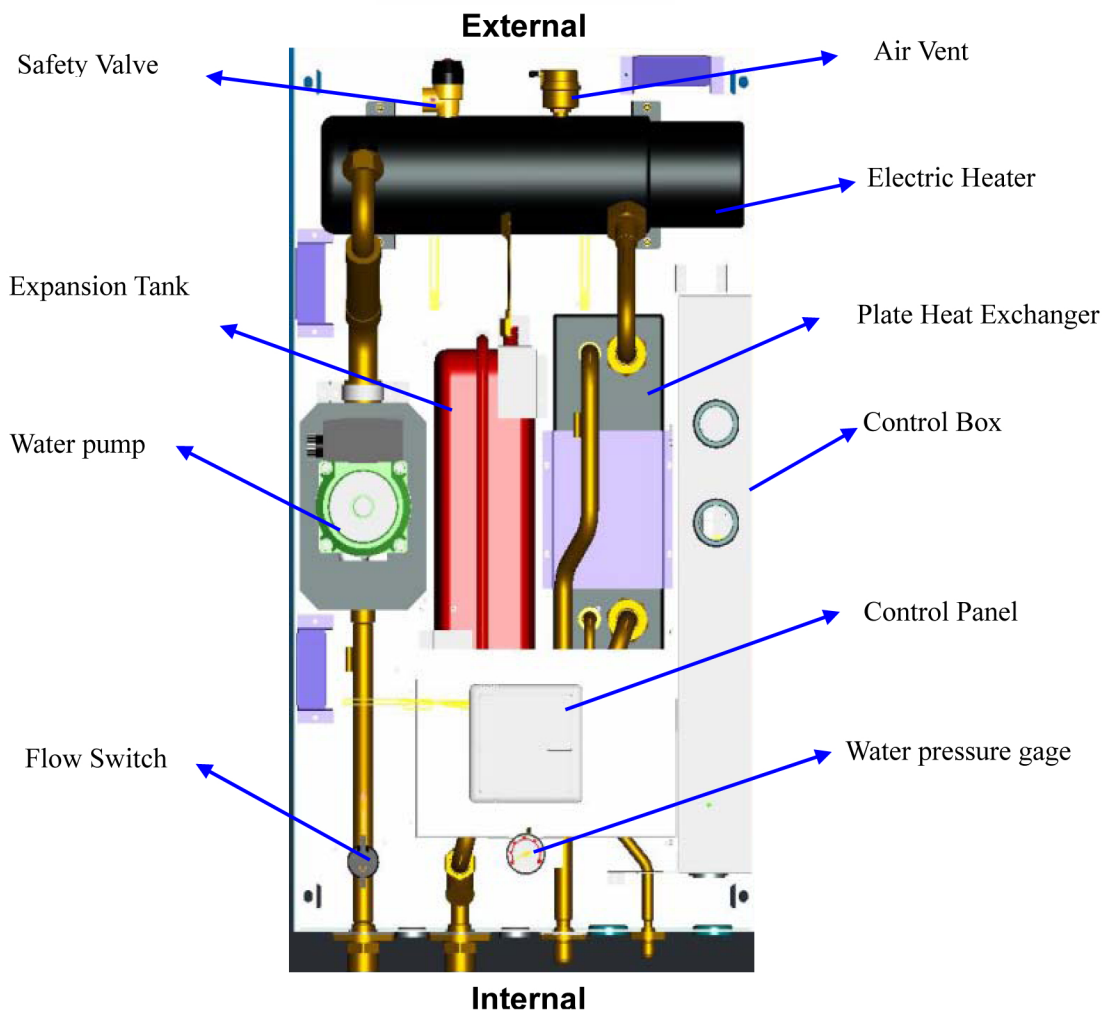
- | | |
|--|---|
|  Shut off Valve |  Remote room Thermostat (Field supply) |
|  By-pass valve (Field supply) |  three-way valve (Field supply) |
|  two-way valve (Field supply) |  High temperature line |
| |  Low temperature line |

Two-way valve is very important to prevent dew condensation on the floor and Radiator while cooling mode.

7. Main components

7.1 Indoor units

DHW-CQ6.0Pd/Na-K(I)、DHW-CQ8.0Pd/Na-K(I)、DHW-CQ10Pd/Na-K(I)
 DHW-CQ12Pd/Na-K(I)、DHW-CQ14Pd/Na-K(I)、DHW-CQ16Pd/Na-K(I)
 DHW-CQ12Pd/Na-M(I)、DHW-CQ14Pd/Na-M(I)、DHW-CQ16Pd/Na-M(I)

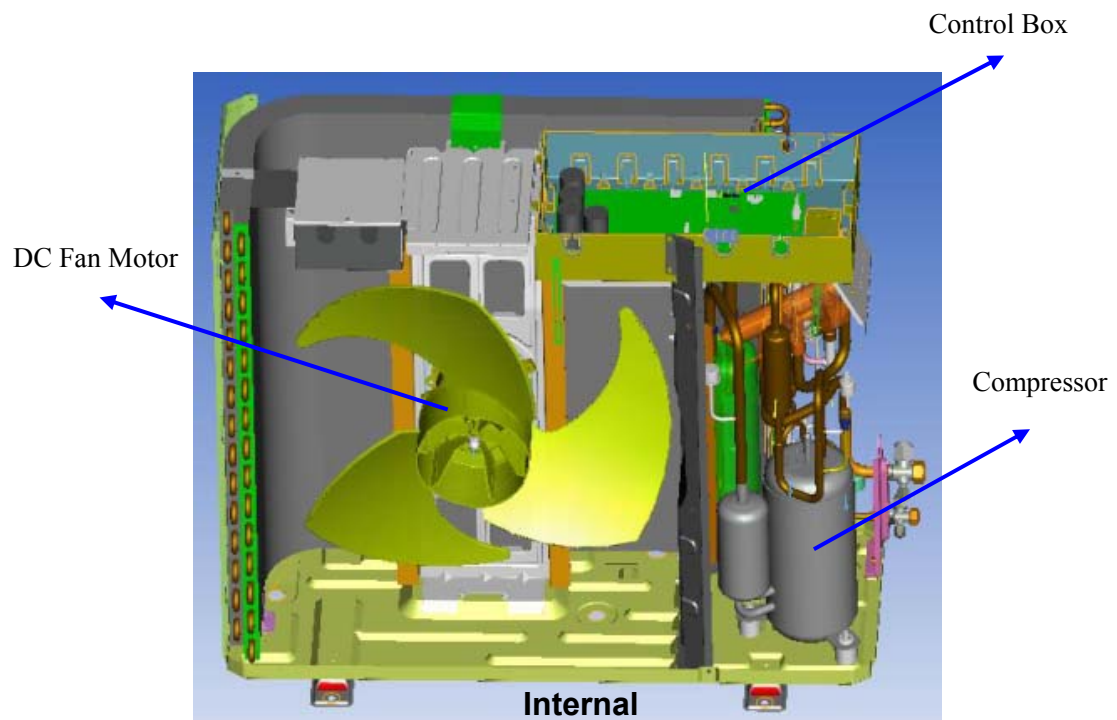


7.2. Outdoor unit

7.2.1 DHW-CQ6.0Pd/Na-K (O)、DHW-CQ8.0Pd/Na-K(O)、DWH-CQ10Pd/Na-K(O)



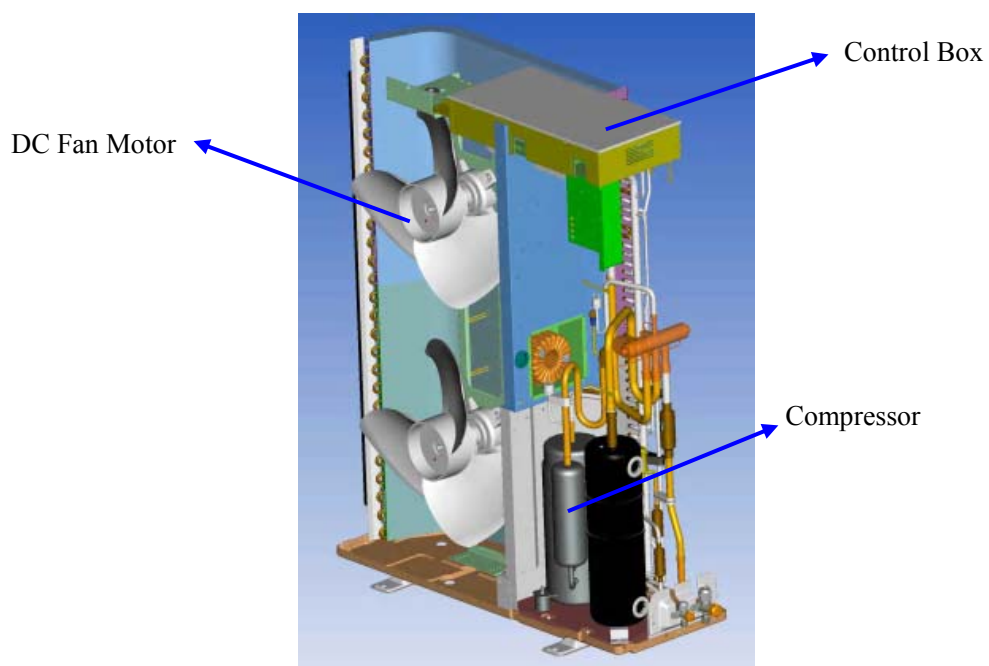
External



7.2.2 DHW-CQ12Pd/Na-K(O)、DHW-CQ14Pd/Na-K(O)、DHW-CQ16Pd/Na-K(O)
DHW-CQ12Pd/Na-M(O)、DHW-CQ14Pd/Na-M(O)、DHW-CQ16Pd/Na-M(O)



External



Internal

8. Installation Guideline of the unit

8.1 Instruction to installation

- ✚ The installation of unit must be in accordance with national and local safety codes.
- ✚ Installation quality will directly affect the normal use of air conditioner unit. The user is prohibited from installation by himself. Please contact your dealer after buying this machine. Professional installation workers will provide installation and test services according to installation manual.
- ✚ Do not connect to power until all installation work is completed.

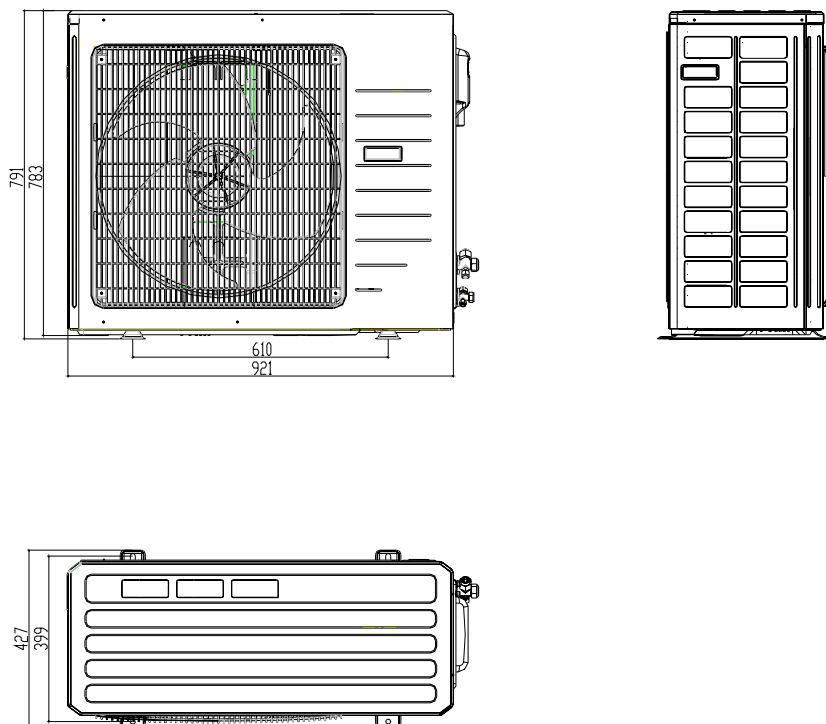
8.2 Installation of Outdoor Unit

8.2.1 Select Installation Location of Outdoor Unit

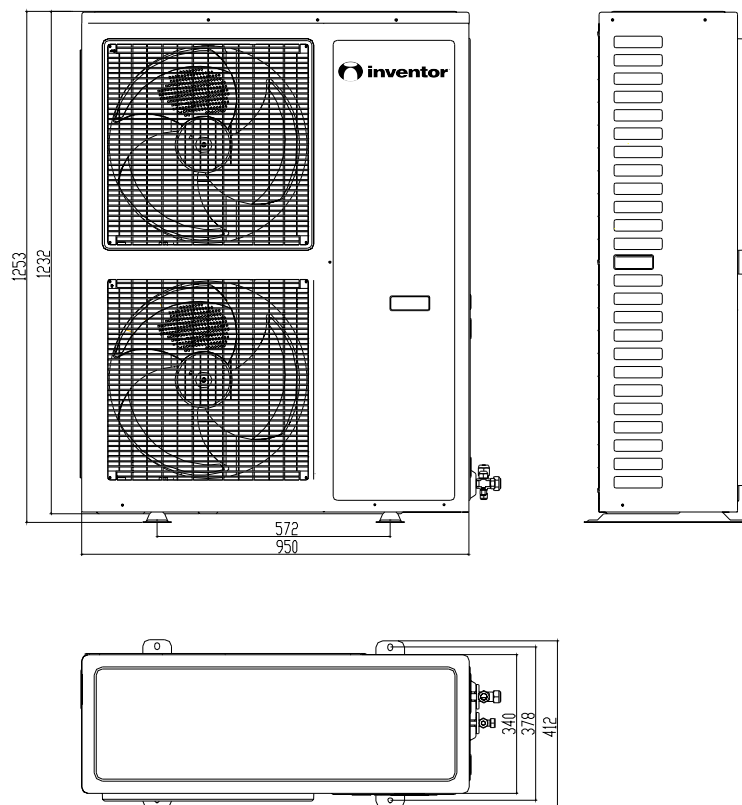
- ✚ Outdoor unit must be installed on a firm and solid support.
- ✚ Outdoor unit shall be installed close to the indoor unit, hence to minimize the length and bends of cooling pipe.
- ✚ Avoid placing the outdoor unit under window or between two constructions, hence to prevent normal operating noise from entering the room.
- ✚ Air flow at inlet and outlet shall not be blocked.
- ✚ Install at a well-ventilated place, so that the machine can absorb and discharge sufficient air.
- ✚ Do not install at a place where flammable or explosive goods exist or a place subject to severe dust, salty fog and polluted air.

8.2.2 Outline dimension of outdoor unit

DHW-CQ6.0Pd/Na-K(O)、DHW-CQ8.0Pd/Na-K(O)、DHW-CQ10Pd/Na-K(O):

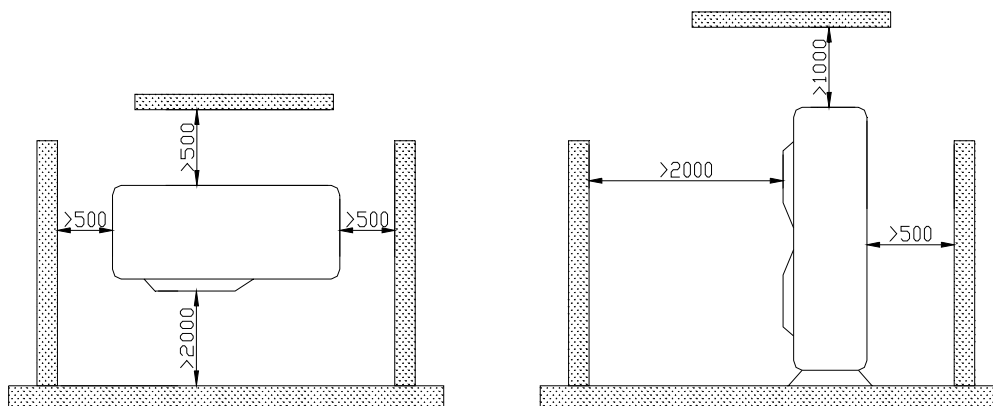


DHW-CQ12Pd/Na-K(O), DHW-CQ14Pd/Na-K(O), DHW-CQ16Pd/Na-K(O):
 DHW-CQ12Pd/Na-M(O), DHW-CQ14Pd/Na-M(O), DHW-CQ16Pd/Na-M(O):








Description		Unit: inch	
No	Name	Remarks	
1	Liquid-side Service Valve	3/8	DHW-CQ8.0/10/12/14/16Pd/Na-K
		1/4	DHW-CQ12/14/16Pd/Na-M
2	Gas-side Service Valve	5/8	DHW-CQ8.0/10/12/14/16Pd/Na-K
		1/2	DHW-CQ12/14/16Pd/Na-M
3	Handle	Used to cover or uncover the front case	
4	Air discharge Grill	/	

8.2.2 Space requirements for installation



8.2.3 Precautions on Installation of Outdoor Unit

-  When moving outdoor unit, it is necessary to adopt 2 pieces of long enough rope to hand the unit from 4 directions. Included angle between the rope when hanging and moving must be 40° below to prevent center of the unit from moving.
-  Adopt M12 bolts components to tighten feet and under frame when installing.
-  Outdoor unit should be installed on concrete base that is 10cm height.
-  Requirements on installation space dimension of unit's bodies are shown in following drawing.
-  Outdoor unit must be lifted by using designated lifting hole. Take care to protect the unit during lift. To avoid rusting, do not knock the metal parts.

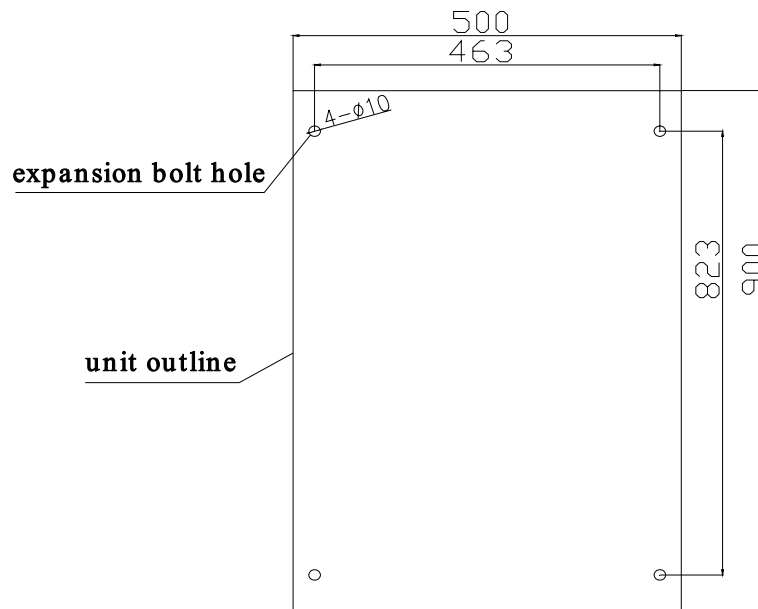
9. Installation of Indoor Unit

9.1 Select Installation Location of Indoor Unit

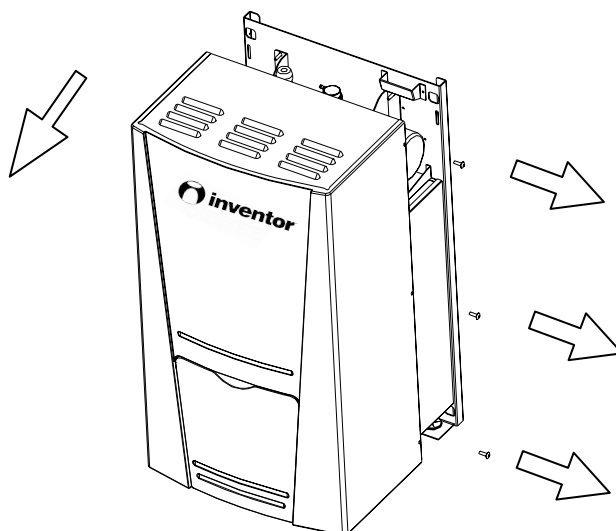
- ✚ Avoid direct sunshine.
- ✚ Ensure the hanger rod, ceiling and building structure have sufficient strength to support the weight of air conditioner unit.
- ✚ Drainage pipe is easy to connect out.
- ✚ Indoor and outdoor connection pipes are easy to go outdoors
- ✚ Do not install at a place where flammable or explosive goods exist or flammable or explosive gas might leak.
- ✚ Do not install at a place subject to corrosive gas, severe dust, salty fog, smoke or heavy moisture.
- ✚ Air flow at inlet and outlet air is not blocked.

9.2 Install process of indoor unit

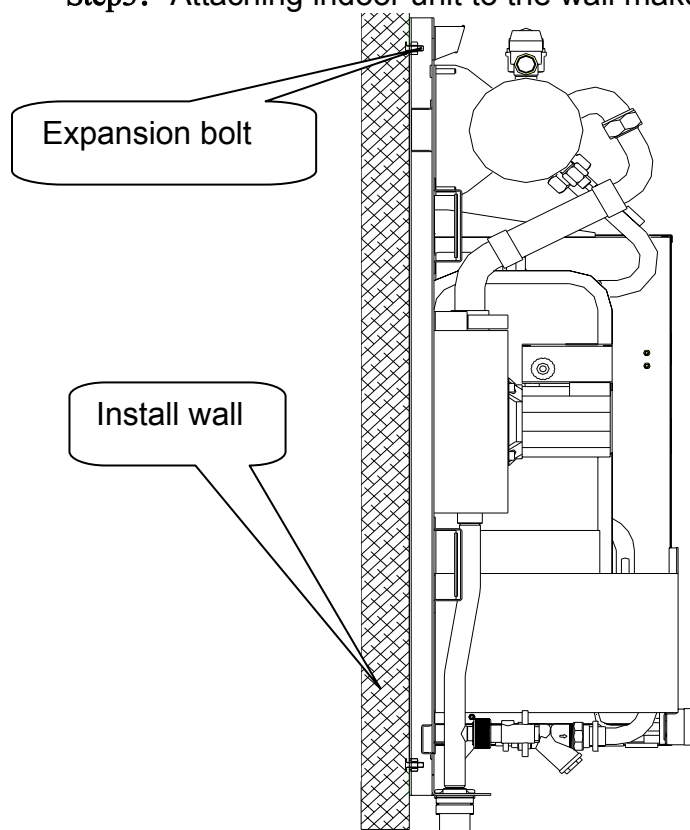
Step1: Drilling hole on the wall in the following draw



Step2: Releasing screws, detach front cover from the indoor unit.



Step3: Attaching indoor unit to the wall make use of accessory expansion bolt

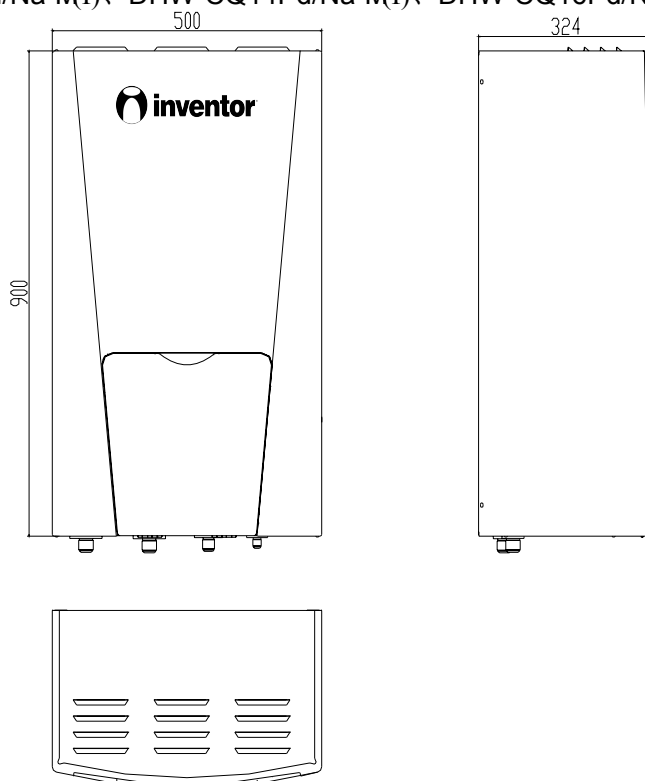


CAUTION!

While lifting the indoor unit, at least two persons should be joined. Weight of the indoor unit is almost 52kg.

9.3 Outline dimension of Indoor unit

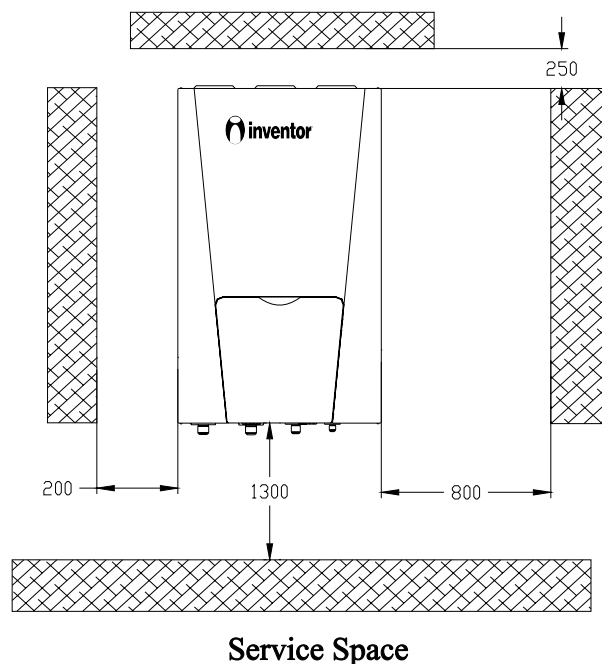
DHW-CQ6.0Pd/Na-K(I)、DHW-CQ8.0Pd/Na-K(I)、DHW-CQ10Pd/Na-K(I),
DHW-CQ12Pd/Na-K(I)、DHW-CQ14Pd/Na-K(I)、DHW-CQ16Pd/Na-K(I);
DHW-CQ12Pd/Na-M(I)、DHW-CQ14Pd/Na-M(I)、DHW-CQ16Pd/Na-M(I);



Description		Unit: inch	
No	Name	Remarks	
1	Leaving Water Pipe	1"Male BSP	
2	Returning Water Pipe	1"Male BSP	
3	Gas-side Pipe	5/8	DHW-CQ8.0/10/12/14/16Pd/Na-K
			DHW-CQ12/14/16Pd/Na-M
		1/2(DHW-CQ6.0Pd/Na-K)	
4	Liquid-side Pipe	3/8	DHW-CQ8.0/10/12/14/16Pd/Na-K
			DHW-CQ12/14/16Pd/Na-M
		1/4(DHW-CQ6.0Pd/Na-K)	

9.4 Space requirements for installation

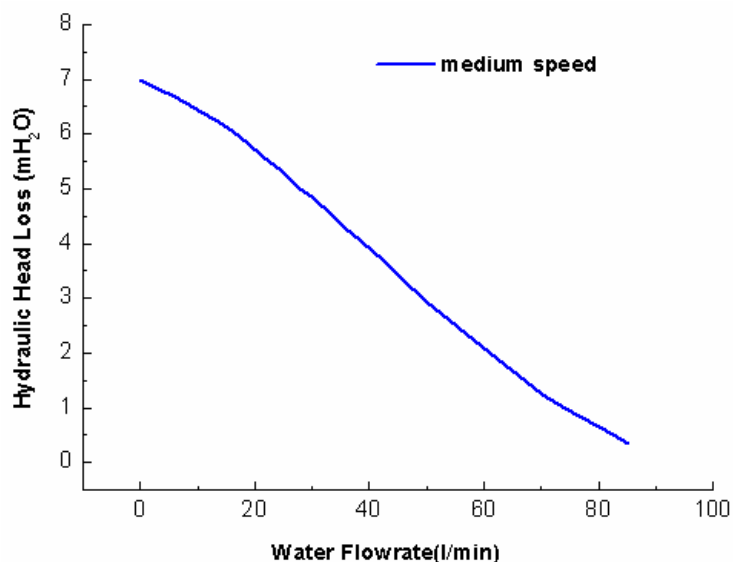
DHW-CQ6.0Pd/Na-K(I) DHW-CQ8.0Pd/Na-K(I) DHW-CQ10Pd/Na-K(I),
DHW-CQ12Pd/Na-K(I) DHW-CQ14Pd/Na-K(I) DHW-CQ16Pd/Na-K(I):
DHW-CQ12Pd/Na-M(I) DHW-CQ14Pd/Na-M(I) DHW-CQ16Pd/Na-M(I):

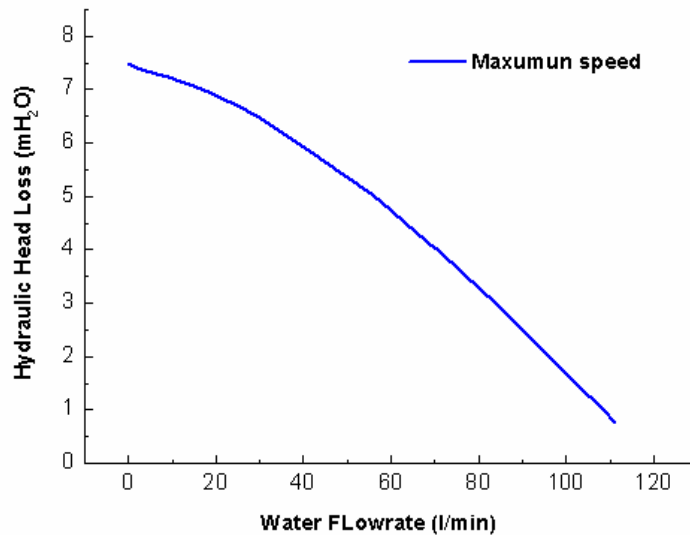


9.5 Precautions on Installation of indoor Unit

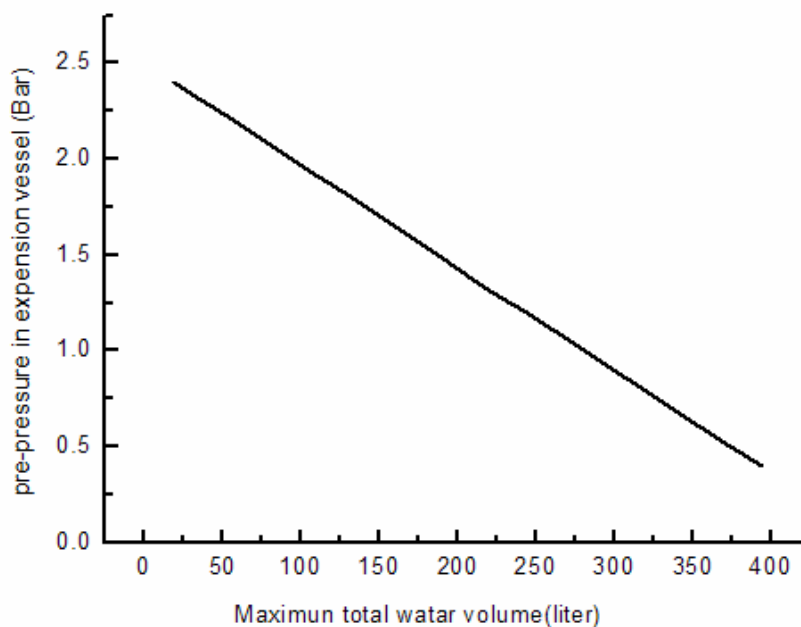
- 9.5.1 Indoor unit shall be vertically mounted on the wall of the room with expansion bolt.
- 9.5.2 Keep the indoor unit away from heat sources like heat sink and so on in the room as much as possible.
- 9.5.3 Keep the indoor unit as close as possible to outdoor unit. Level distance between connection pipes can not exceed 30m(8.0~16KW) or 20m(6.0kw) and vertical distance can not exceed 15m(8.0~16KW) or 10m(6.0kw).

9.6 Water Volume and Pump capacity



**Note:**

1. The water pump is three speed-adjustable(maximum/medium/minimum), In most case, we strongly recommended to set speed as maximum;
2. If the noise of the pump is not acceptable, we recommended change the default speed to medium speed, but to secure enough flow rate, do not set water speed as "Min", it can lead unexpected flow rate error "EC";

9.6 Water Volume and Expansion Vessel Pressure**Note:**

- Expansion vessel is included which 10 liter and 1bar pre-pressure.
- Total water volume of 280 liter is default; If total water is changed because of installation condition, the pre-pressure should be adjusted to secure proper operation. If the indoor unit is located at the highest position, adjustment is not required;
- Minimum total water volume is 20 liter;

✚ To adjust pre-pressure, use nitrogen gas by certificated installer.

9.7 The method of calculating the charging pressure of expansion vessel needed to be adjusted is as follows.

During installation, if the volume of water system has changed, please check if the pre-set pressure of the expansion vessel needs to be adjusted according to the following formula:

$$P_g = (H/10 + 0.3) \quad \text{Bar}$$

(H ---the difference between installing location of indoor unit and the highest spot of water system.)

Ensure that the volume of water system is lower than the maximum volume required in the above figure. If it exceeds the range, the expansion vessel does not meet the installing requirement.

Installation height ¹ difference	Water volume	
	<280L	>280L
<7 m	Adjustment is not necessary	1. Pre-set pressure needs to be adjusted according to the above formula. 2. Check if the water volume is lower than the maximum water volume. (with help of the above figure)
>7 m	1. Pre-set pressure needs to be adjusted according to the above formula. 2. Check if the water volume is lower than the maximum water volume. (with help of the above figure)	The expansion vessel is too small and adjustment is not available.

¹Note: Installation height difference : -the difference between installing location of indoor unit and the highest spot of water system; if the indoor unit is located at the highest point of the installation, the installation height difference is considered 0m;

Example 1: The indoor unit is installed 5m below the outdoor unit and the total volume of the water system is 100L.

Referring to the above figure, it is not necessary to adjust the pressure of the expansion vessel.

Example 2: The indoor unit is installed on the highest spot of the water system and the total water volume is 350L.

1. As the volume of water system is higher than 280L, it is necessary to adjust the pressure of the expansion vessel be lower.
2. The formula of calculating pressure

$$P_g = (H/10 + 0.3) = (0/10 + 0.3) = 0.3 \quad \text{Bar}$$

3. The maximum volume of the water system is about 410L. As the actual volume of the water system is 350L, the expansion vessel meets the installing requirement.
4. Adjust the pre-set pressure of the expansion vessel from 1.0Bar to 0.3Bar.

9.8 Selection of expansion vessel

Formula:

$$v = \frac{c \cdot e}{1 - \frac{1 + p_1}{1 + p_2}}$$

v --- Volume of expansion vessel

c --- Total water volume

p_1 --- Pre-set pressure of expansion vessel

p_2 -- The highest pressure during running of the system (that is the action pressure of safety valve.)

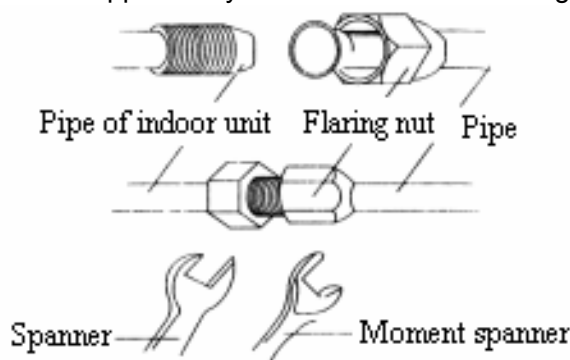
e --- The expansion factor of water (the difference between the expansion factor of the original water temperature and that of highest water temperature.)

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

10. Connection of pipeline

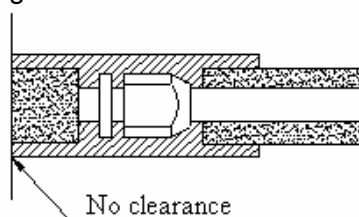
10.1 Connection of Outlet Pipe for Indoor & Outdoor Unit

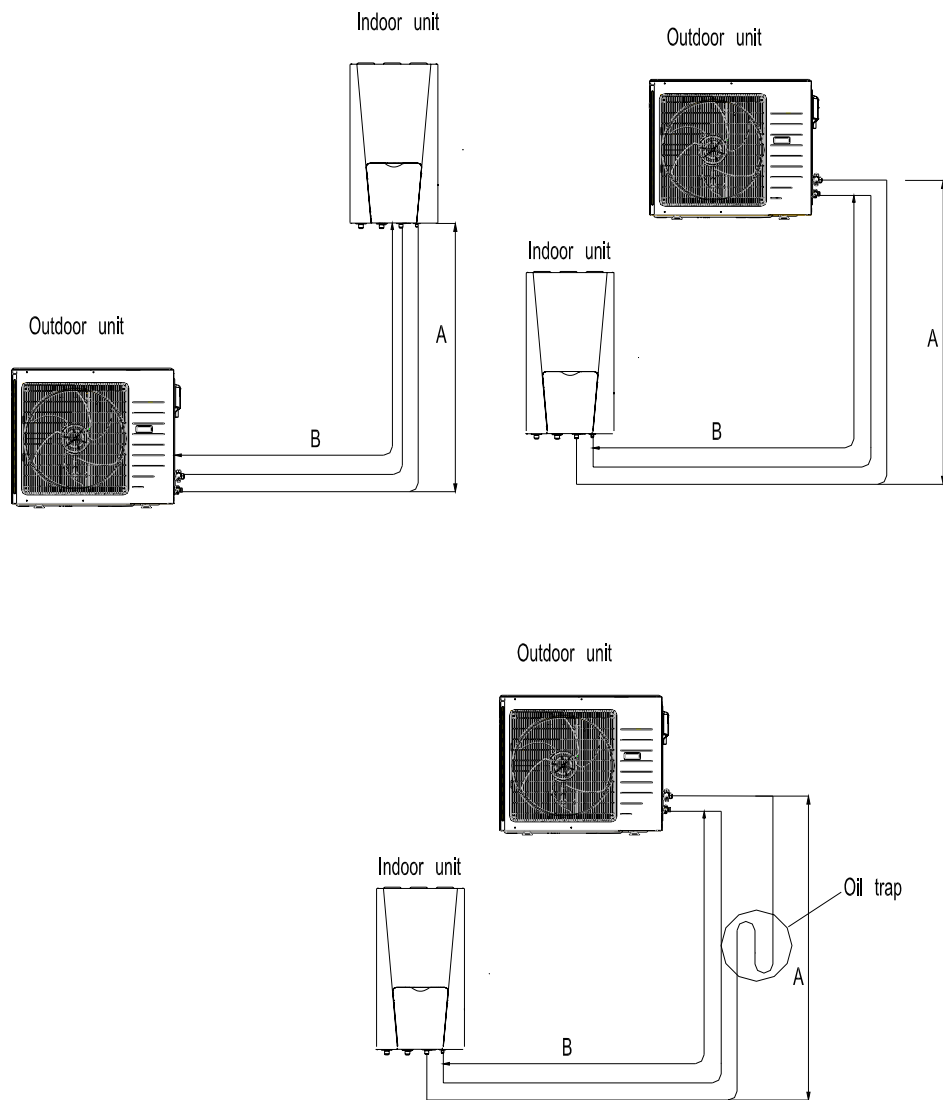
- ✚ Align the expansion end of copper pipe with the center of threaded joint. Tighten the flaring nuts with your hands.
- ✚ Tighten the flaring nuts with torque wrench until you hear a “click”.
- ✚ Bend of fitting pipe shall not be too low; otherwise the fitting pipe might crack. Please use pipe bender when bending the fitting pipe.
- ✚ When connecting outdoor and indoor unit, never pull the big and small joint of indoor unit with force, so as to prevent the tubes of indoor unit from cracking and causing leakage.
- ✚ Connecting pipe shall be supported by a rack without transmitting its weight to other units.



10.2 Installation of Protective Layer on Connection Pipe

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





model	Pipe size (Diameter: Φ)		Length B		Elevation A		Additional refrigerant
	gas	Liquid	Standard	Max.	Standard	Max.	
DHW-CQ6.0Pd/Na-K	1/2"	1/4"	5.0m	20m	0m	10m	20g/m
DHW-CQ8.0Pd/Na-K	5/8"	3/8"	7.5m	30m	0m	15m	50g/m
DHW-CQ10Pd/Na-K	5/8"	3/8"	7.5m	30m	0m	15m	50g/m
DHW-CQ12Pd/Na-K	5/8"	3/8"	7.5m	30m	0m	15m	50g/m
DHW-CQ14Pd/Na-K	5/8"	3/8"	7.5m	30m	0m	15m	50g/m
DHW-CQ16Pd/Na-K	5/8"	3/8"	7.5m	30m	0m	15m	50g/m
DHW-CQ12Pd/Na-M	5/8"	3/8"	7.5m	30m	0m	15m	50g/m
DHW-CQ14Pd/Na-M	5/8"	3/8"	7.5m	30m	0m	15m	50g/m
DHW-CQ16Pd/Na-M	5/8"	3/8"	7.5m	30m	0m	15m	50g/m

Note:

1. No additional charge of the refrigerant is need when the pipe length is less than 10 m, if the pipe length is longer than 10m,additional charge of the refrigerant is needed according to the table.

Example:

If 16kw model is installed at a distance of 25m, $(25-10)*50=750\text{g}$ refrigerant should be added;

2. Rated capacity is based on standard pipe length and maximum allowable length is base on the product reliability in the operation;
3. Oil trap should be installed every 5-7 meters when the location of outdoor unit is higher than indoor unit.

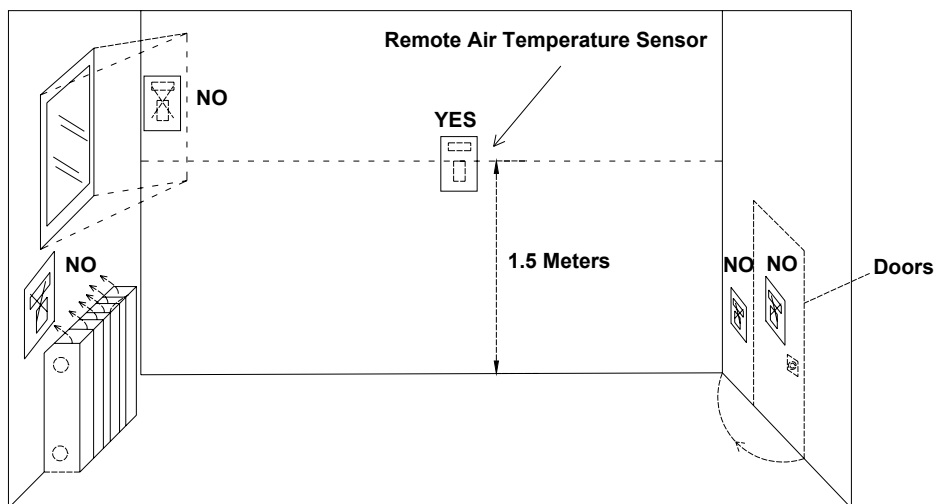
11. Remote Air Temperature Sensor



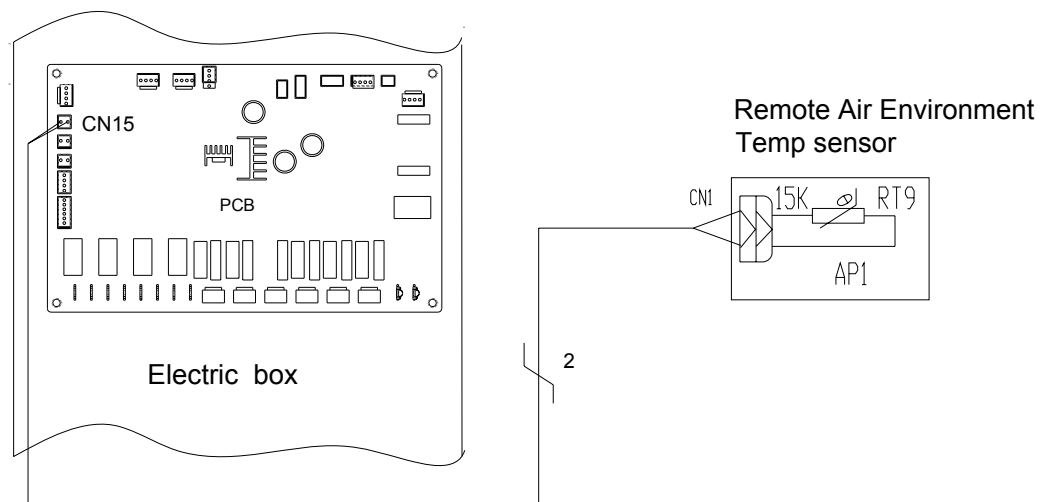
Front side



Back side



Installation Guide follow as:



Note:

1. Distance between the indoor unit and the remote air temperature sensor should be less

- than 15 meter due to length of the connection cable of remote air temperature sensor.
2. Height from floor is approximately 1.5 meter;
 3. Remote air temperature sensor can not be located where the area may be hidden
When door is open;
 4. Remote air temperature sensor can not be located where external thermal influence
may be applied;
 5. Remote air temperature sensor should be installed where space heating is mainly
applied;
 6. After the Remote air temperature sensor is installed, should be set the value form “0”
to “1” at the function code 1 in the control panel, so as to select remote air temperature
to the control point;

12. Thermostat

Installation of Thermostat is very similar to that of Remote air temperature sensor,

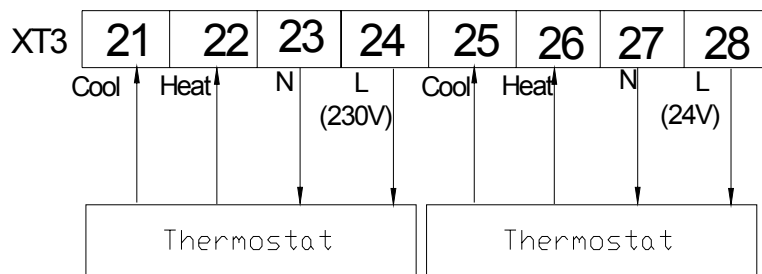


Fig .1

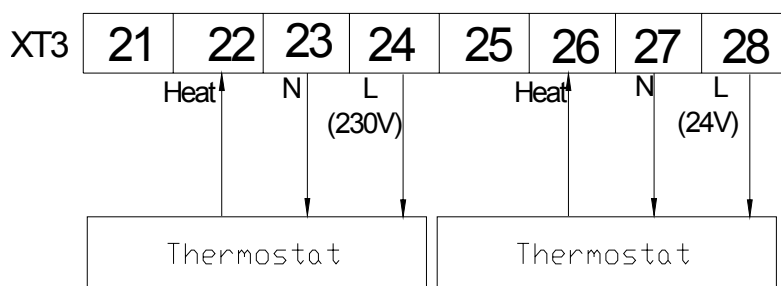


Fig.2

How to Wire Thermostat

- i. Uncover the front cover of the indoor unit and open the control box.
- ii. Identify the power specification of the thermostat, if it is 230V , find terminal block
- iii. XT3 as NO.21~24; Otherwise, if it is 24V, find terminal block XT3 as NO.25~28;
- iv. If it is Heating/Cooling thermostat , please connect wire as Fig 1 ;
- v. If it is Heating only thermostat , please connect wire as Fig 2 ;

⚠ CAUTION

1. NEVER USE 230V AC and 24V AC Thermostat at the same time, otherwise, it will cause short-circuit and power cut-off by circuit breaker;
2. Setting temperature by Thermostat(heating or cooling) should be chosen within the setting temperature range of the product ;
3. For other constrains, please refer to previous page where constrains about
4. Remote air temperature sensor
5. Do not connect external electric loads, Wire (L) and (N) should be used only for operation Electric type thermostat.
6. Never connect external electric loads such as valves, fan coil units, etc. If connected, PCB of the indoor unit can be seriously damaged.
7. Installation of Thermostat is very similar to that of Remote air temperature sensor,

13. 2-Ways Valve

2-way valve is required to control water flow while cooling operation. Role of 2-way valve is to cut off water flow into under floor loop in cooling mode when fan coil unit is equipped for cooling operation.

General Information

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

(1) : Normal Open type. When electric power is NOT supplied, the valve is open. (When electric power is supplied, the valve is closed.)

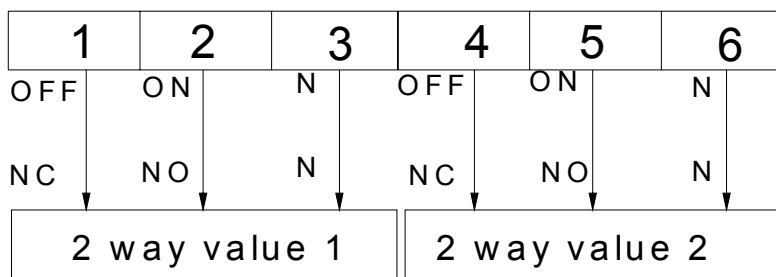
(2) : Normal Closed type. When electric power is NOT supplied, the valve is closed. (When electric power is supplied, the valve is open.)

How to Wire 2-Way Valve

Follow below procedures Step 1 ~ Step 2.

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

Step 2. Find terminal block and connect wire as below.



⚠ WARNING

- Normal Open type should be connected to wire (NO) and wire (N) for valve closing in cooling mode.
- Normal Closed type should be connected to wire (NC) and wire (N) for valve closing in cooling mode.

(NO) : Line signal (for Normal Open type) from PCB to 2-way valve

(NC) : Line signal (for Normal Closed type) from PCB to 2-way valve

(N) : Neutral signal from PCB to 2-way valve

14. 3-Way Valve

3-way valve is required to operate sanitary water tank. Role of 3-way valve is flow switching between under floor heating loop and water tank heating loop.

General Information

Type	Power	Operating Mode	Supported
SPDT 3-wire	230V 50Hz ~AC	Selecting "Flow A" between "Flow A" and "Flow B"	Yes
		Selecting "Flow B" between "Flow B" and "Flow A"	Yes

(1) : SPDT = Single Pole Double Throw. Three wires consist of Live1 (for selecting (for selecting Flow B), and Neutral (for common).

(2) : Flow A means 'water flow from the indoor unit to under floor water circuit.'

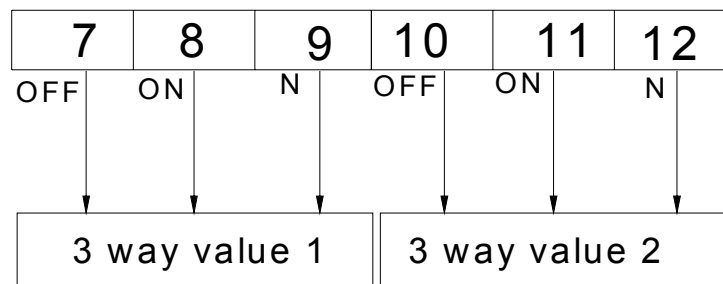
(3) : Flow B means 'water flow from the indoor unit to sanitary water tank.'

How to Wire 3-Way Valve

Follow below procedures Step 1 ~ Step 2.

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

Step 2. Find terminal block and connect wire as below.



⚠ WARNING

- 3-way valve should select water tank loop when electric power is supplied to wire (OFF) and wire (N).
- 3-way valve should select under floor loop when electric power is supplied to wire (ON) and wire (N).

(OFF) : Line signal (Water tank heating) from PCB to 3-way valve

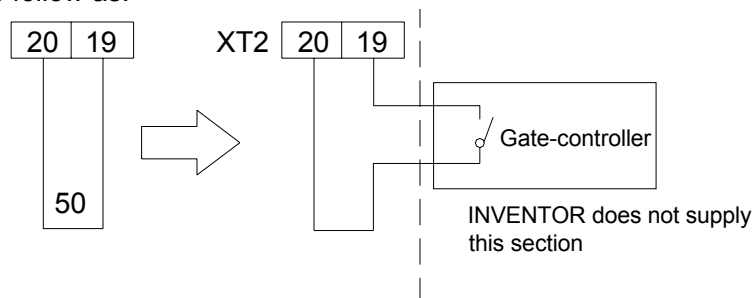
(ON) : Line signal (Under floor heating) from PCB to 3-way valve

(N) : Neutral signal from PCB to 3-way valve

15. Gate-controller

If there is gate control function, pull out the leading wire 50 on terminal board (XT2) between 19 and 20 and then connect the Gate-controller

Installation Guide follow as:



16. Filling of Refrigerant

- ✚ Before shipped out from manufacturer, the outdoor unit has been filled with refrigerant. Additional refrigerant may be filled when carrying out site connection of pipelines.
- ✚ Check the liquid valve and the gas valve of the outdoor unit. The valves shall be completely shut off.
- ✚ Connect a vacuum pump to the liquid valve and the gas valve of the outdoor unit to remove air from the inside of the indoor unit and the connecting pipe. Refer to the following figure:

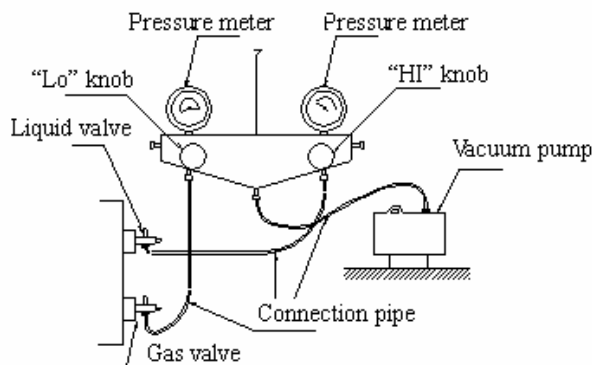
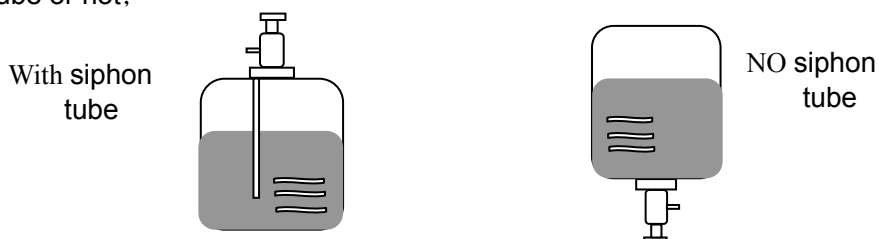


Fig.22

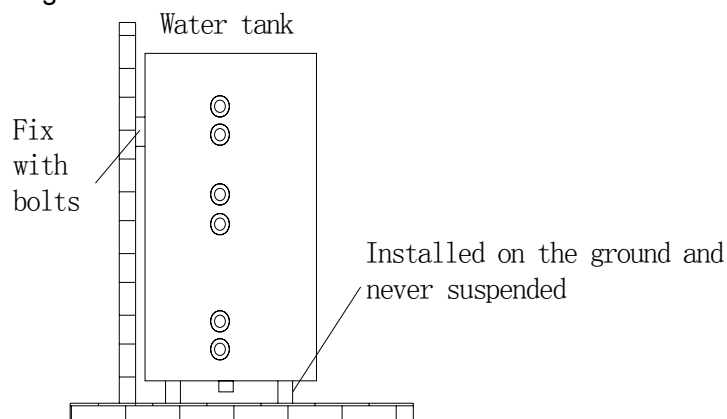
- ✚ After confirming that there is no leakage from the system, when the compressor is not in operation, charge additional R410A working fluid with specified amount to the unit through the filling opening of the liquid pipe valve of the outdoor unit.
 - Be sure to charge the specified amount of refrigerant in liquid state to the liquid pipe: Since this refrigerant is a mixed refrigerant, adding it in gas form may cause the refrigerant composition to change, preventing normal operation
 - Before charging, check whether the refrigerant cylinder is equipped with a siphon tube or not;



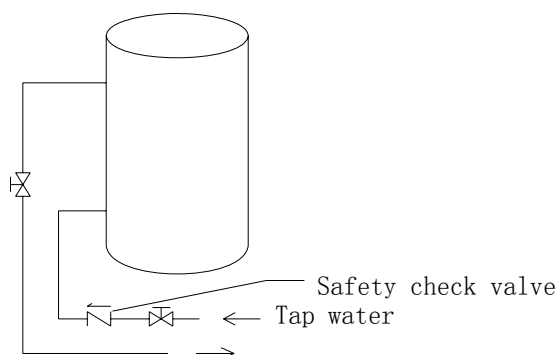
17. Installation of Insulated Water Tank

17.1 Installation measure

- The insulated water tank should be installed and keep levelly within 5m and vertically within 3m from the Indoor unit. It can be installed in the room.
- Standing water tank must be installed vertically with the bottom on the ground, never suspended. Installation place must be firm enough and the water tank should be fixed on the wall with bolts to avoid vibration, as shown in the following figure. Weight capacity of water tank during installation should also be considered.



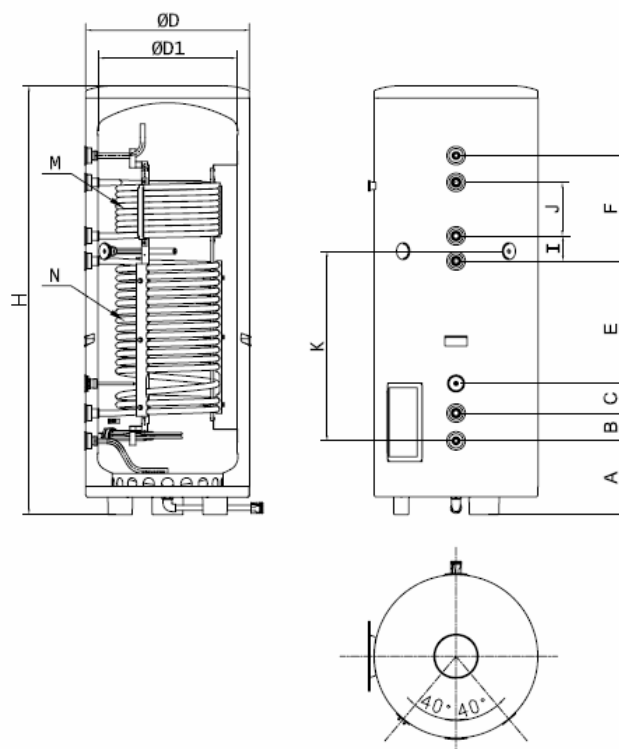
- The minimum clearance from the water tank to combustible surface must be 500mm.
- There should be water pipe, hot water joint and floor drain near the water tank in favor of water replenishment, hot water supply and drainage of water tank.
- Connection of inlet/outlet waterway: Connect the safety check valve attached with the unit (→ points at insulated water tank) with the water inlet of water tank with PPR pipe according to the following figure, sealing with unsintered tape. The other end of the safety check valve should connect with tap water joint. Connect the hot water pipe and water outlet of water tank with PPR pipe.



Note: For safe use of water, water outlet/inlet of water tank must connect with a certain length of PPR pipe, $L \geq 70 \times R^2$ (cm, R is inside radius of the pipe). Moreover, heat preservation should

be conducted and metal pipe can not be used. For the first use, water tank must be full of water before the power is on.

17.2 Outline dimension and parameter of water tank

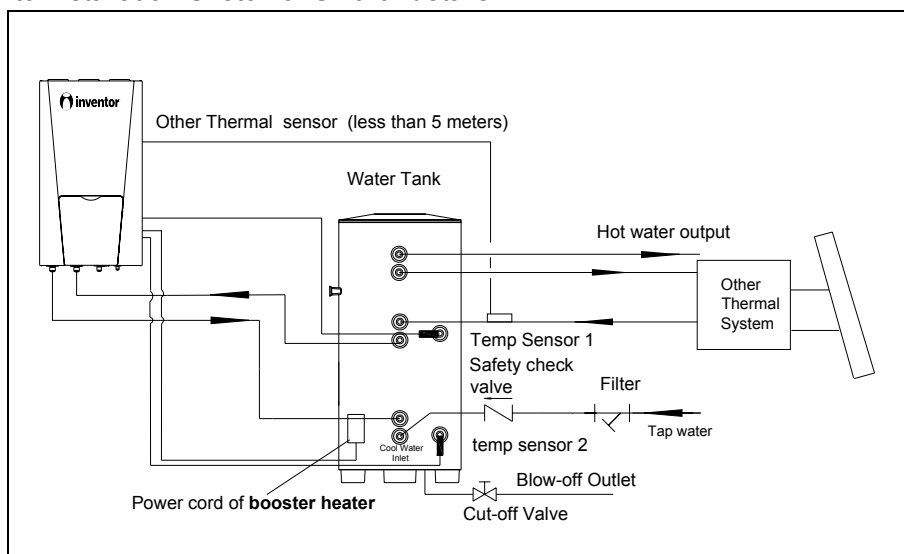


		AT200LCJ/A-K	AT200LCJ2/A-K	AT300LCJ/A-K	AT300LCJ2/A-K
		AT200LCJ/A-M	AT200LCJ2/A-MS	AT300LCJ/A-M	AT300LCJ2/A-M
Litre		200L	200L	300L	300L
coil specification		SUS304 Φ22X0.8			
coil length	M	\	10m	\	10m
	N	13m	13m	18.5m	18.5m
D(mm)		540		620	
D1(mm)		438		528	
H(mm)		1595		1620	
A(mm)		272		280	
B(mm)		105			
C(mm)		112			
E(mm)		432		464	
F(mm)		431		399	
I(mm)		\	80	\	95
J(mm)		\	247.5	\	202.5
K(mm)		739		718	
Outline (Diameter×H) (mm)		Φ540X1595		Φ620X1620	
Package (W*D*H) (mm)		1620X625X630		1645X705X710	
Net weight	kg	68	71	82	87
Gross weight	kg	77	80	92	97

Joints Dimension	
Description	Joint pipe thread
Hot water outlet of water tank	1/2" Female BSP
Circulating water inlet/outlet of water tank	3/4" Female BSP
Cooling water inlet of water tank	1/2" Female BSP
Pipe joint	3/4" Female BSP

17.3 Connection of Waterway System

- ✚ If connection between water tank and indoor unit should be through the wall, drill a hole $\varnothing 70$ for pass of circulating water pipe. It is unnecessary if the hole is not needed.
- ✚ **Preparation of pipelines:** Circulating water outlet/inlet pipe must be hot water pipe, PPR pipe with nominal out diameter of dn25 and S2.5 series (wall thickness of 4.2mm) being recommended. Cooling water inlet pipe and hot water outlet pipe of water tank should also be hot water pipe, PPR pipe with nominal out diameter of dn20 and S2.5 series (wall thickness of 3.4mm) being recommended. If other insulated pipes are adopted, refer to the above dimensions for out diameter and wall thickness.
- ✚ **Installation of circulating water inlet/outlet pipes:** Connect the water inlet of unit with circulating outlet of water tank and water outlet of unit with circulating inlet of water tank.
- ✚ **Installation of water inlet/outlet pipes of water tank:** Safety check valve (\rightarrow on the valve body points at water tank), filter and cut-off valve must be installed for water inlet pipe according to the installation sketch of unit. At least a cut-off valve is needed for the water outlet pipe.
- ✚ **Installation of blow-off pipe at the bottom of water tank:** Connect a piece of PPR pipe with drainage outlet to floor drain. A cut-off valve must be installed in the middle of the drainage pipe and at the place where it is easy to be operated by the users.
- ✚ After connection of all waterway pipelines, perform leakage test firstly (refer to debugging of the unit). After that, bind up the water pipes, water temp sensor and wires with wrapping tapes attached with the unit.
- ✚ Refer to Installation Sketch of Unit for details.



Joints Dimension	
Description	Joint pipe thread
Circulating water inlet/outlet of main unit	1 " Male BSP
Cooling water inlet of water tank	1/2 " Female BSP
Circulating water inlet/outlet of water tank	3/4 " Female BSP
Hot water outlet of water tank	1/2 " Female BSP

**Note:**

- ✚ Distance between indoor unit and water tank should not exceed 5m levelly and 3m vertically. If higher, please contact with us. Water tank on lower and main unit on higher side is recommended.
- ✚ Prepare the materials according to the above joints dimension. If cut-off valve is installed outside the room, PPR pipe is recommended to avoid freeze damage.
- ✚ Waterway pipelines can't be installed until water heater unit is fixed. Do not let dust and other sundries enter into pipeline system during installation of connection pipes.
- ✚ After connection of all waterway pipelines, perform leakage test firstly. After that, perform heat preservation of waterway system; meanwhile, pay more attention to valves and pipe joints. Ensure enough thickness of insulated cotton. If necessary, install heating device for pipeline to prevent the pipeline from freezing.
- ✚ Hot water supplied from insulated water tank depends on pressure of water tap, so there must be supply of tap water.
- ✚ During using, the cut-off valve of cooling water inlet of water tank should be kept normally on.

17.4 ELECTRIC WIRING WORK**17.4.1 Wiring Principle****General principles**

- ✚ Wires, equipment and connectors supplied for use on the site must be in compliance with provisions of regulations and engineering requirements.
- ✚ Only electricians holding qualification are allowed to perform wire connection on the site.
- ✚ Before connection work is started, the power supply must be shut off.
- ✚ Installer shall be responsible for any damage due to incorrect connection of the external circuit of the unit.
- ✚ Caution --- MUST use copper wires.

Connection of power cable to the electric cabinet of the unit

- ✚ Power cables should be laid out through cabling trough, conduit tube or cable channel.
- ✚ Power cables to be connected into the electric cabinet must be protected with rubber or plastic to prevent scratch by edge of metal plate.
- ✚ Power cables close to the electric cabinet of the unit must be fixed reliably to make the power terminal in the cabinet free from an external force.

✚ Power cable must be grounded reliably.

17.4.2 Specification of Power Supply Wire and Leakage Switch

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

Model	Power Supply	Leakage Switch	Minimum Sectional Area of Earth Wire	Minimum Sectional Area of Power Supply Wire
	V Ph Hz	(A)	(mm ²)	(mm ²)
DHW-CQ6.0Pd/Na-K(I)	220~ 240V-Ph-50Hz	32	6	3×6
DHW-CQ8.0Pd/Na-K(I)		50	10	3×10
DHW-CQ10Pd/Na-K(I)		50	10	3×10
DHW-CQ12Pd/Na-K(I)		50	10	3×10
DHW-CQ14Pd/Na-K(I)		50	10	3×10
DHW-CQ16Pd/Na-K(I)		50	10	3×10
DHW-CQ6.0Pd/Na-K(O)		32	6	3×6
DHW-CQ8.0Pd/Na-K(O)		32	6	3×6
DHW-CQ10Pd/Na-K(O)		32	6	3×6
DHW-CQ12Pd/Na-K(O)		40	10	3×10
DHW-CQ14Pd/Na-K(O)		40	10	3×10
DHW-CQ16Pd/Na-K(O)		40	10	3×10
DHW-CQ12Pd/Na-M(I)	380~ 415V-3Ph-50Hz	16	2.5	5×2.5
DHW-CQ14Pd/Na-M(I)		16	2.5	5×2.5
DHW-CQ16Pd/Na-M(I)		16	2.5	5×2.5
DHW-CQ12Pd/Na-M(O)		25	4.0	5×4.0
DHW-CQ14Pd/Na-M(O)		25	4.0	5×4.0
DHW-CQ16Pd/Na-M(O)		25	4.0	5×4.0

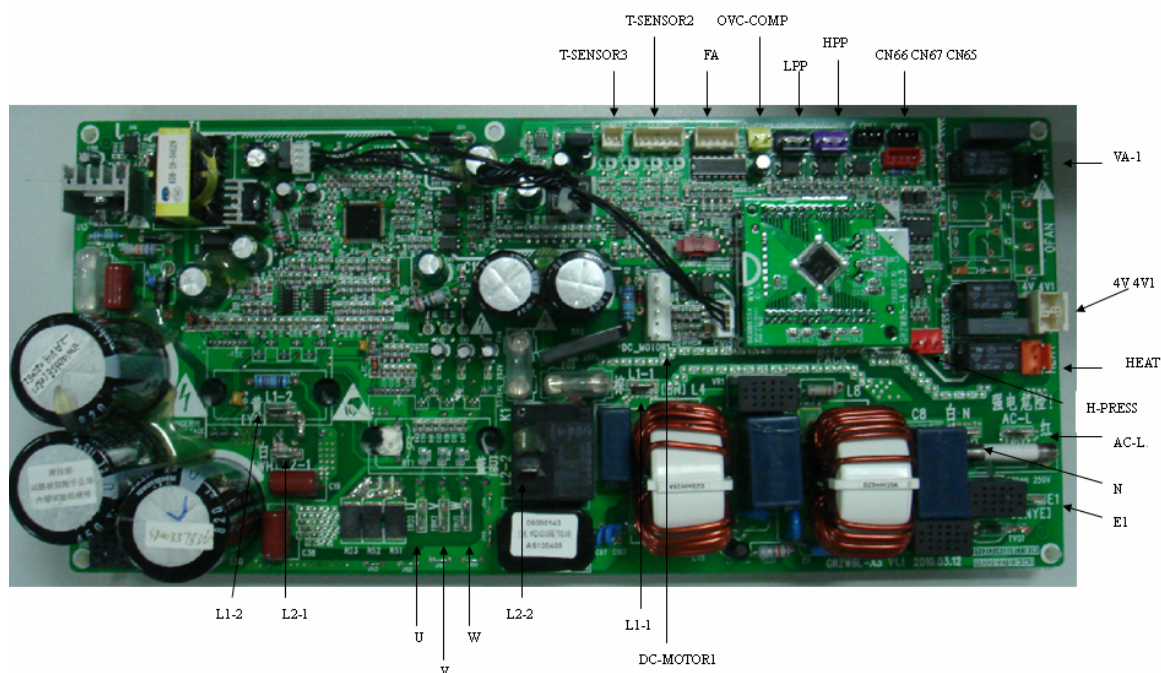
Note:

- I 、 Power cables are copper core cable and copper connectors must be used for power cable connection.
- II 、 Leakage Switch is necessary for additional installation. If circuit breakers with leakage protection are in use, action response time must be less than 0.1 second, leakage circuit must be 30mA.
- III、 The above selected power cable diameters are determined based on assumption of distance from the distribution cabinet to the unit less than 75m. If cables are laid out in a distance of 75m to 150m, diameter of power cable must be increased to a further grade.
- IV、 Indoor/outdoor supply cable should be H05RN-F or above.
- V、 The power supply must be of rated voltage of the unit and special electrical line for air-conditioning.
- VI、 All electrical installation shall be carried out by professional technicians in accordance with the local laws and regulations.
- VII、 Ensure safe grounding and the grounding wire shall be connected with the special grounding equipment of the building and must be installed by professional technicians.

18. Wiring Diagram

18.1 PCB OUTLINE

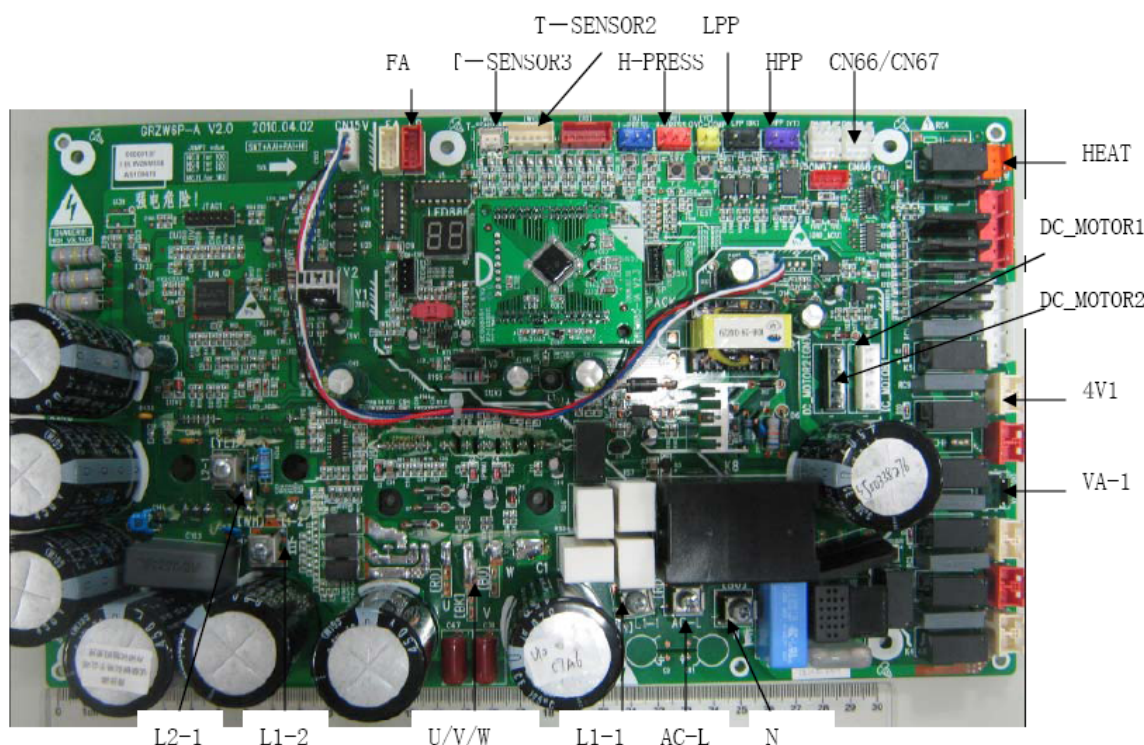
18.1.1 DHW-CQ6.0Pd/Na-K(O)、DHW-CQ8.0Pd/Na-K(O)、DHW-CQ10Pd/Na-K(O)



silk screen	Specification
AC-L	live wire input of power supply, red
N	zero wire input of power supply, white
E1	ground wire, yellow green
L2-2	PFC blue inductive wire
L1-1	PFC brown inductive wire
L2-1	PFC yellow inductive wire
L1-2	PFC white inductive wire
U	U-phase of compressor
V	V-phase of compressor
W	W-phase of compressor
DC_MOTOR1	DC fan 1 pin: strong power supply; 3 pin: fan GND; 4 pin: +15V; 5 pin: control signal; 6 pin: feedback signal;
4V 4V1	4-way valve
HEAT	electric heating tape
VA-1	e-heater of chassis
HPP	high pressure switch
LPP	low pressure switch
OVC-COMP	overload protection of compressor
T-SENSOR2	1, 2 hole: pipe temperature; 3, 4 hole: environment; 5, 6 hole: exhaust
T-SENSOR3	1 hole: +3.3V 2 hole: detection ; suction temperature sensor

CN66、CN67	communication cable 2 pin B, 3pinA
CN65	communication cable: 1 pin earthed, 2 pin B, 3 pin A, 4 pin+12power supply; It can not be used for communication between outdoor unit and indoor unit;
FA	pipe electric expansion valve 1-4 pin: driving impulse output; 5 pin: +12V;
H-PRESS	signal input of pressure sensor 1 pin: GND; 2 pin: signal input; 3 pin: +5V

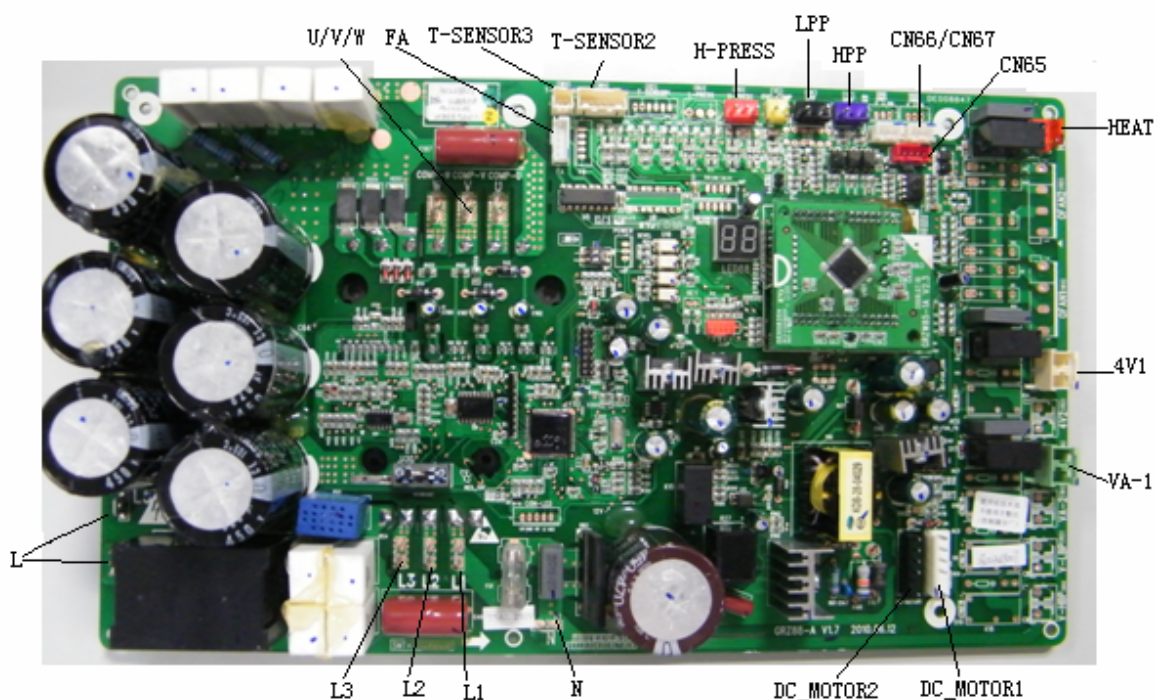
18.1.2 DHW-CQ12Pd/Na-K(O)、DHW-CQ14Pd/Na-K(O)、DHW-CQ16Pd/Na-K(O)



silk screen	specification
AC-L	live wire input of power supply, red
N	Neutral line input of power supply (PFC blue inductive wire) blue
L1-1	PFC brown inductive wire
L2-1	PFC yellow inductive wire
L1-2	PFC white inductive wire
U	U-phase of compressor
V	V-phase of compressor
W	W-phase of compressor
DC_MOTOR1	DC fan 1 pin: strong power supply; 3 pin: fan GND; 4 pin: +15V; 5 pin: control signal; 6 pin: feedback signal;
DC_MOTOR2	DC fan 1 pin: strong power supply; 3 pin: fan GND; 4 pin: +15V; 5 pin: control signal; 6 pin: feedback signal;
4V1	4-way valve

HEAT	electric heating tape
VA-1	e-heater of chassis
HPP	high pressure switch
LPP	low pressure switch
T-SENSOR2	1, 2hole: pipe temperature; 3, 4hole: environment; 5, 6hole: exhaust
T-SENSOR3	1 hole:+3.3V 2 hole: detection: suction temperature sensor
CN66、CN67	communication cable 2 pin B, 3 pin A
CN65	communication cable 1 pin earthed, 2 pin B, 3 pin A, 4 pin+12 power supply It can not be used for communication between outdoor unit and indoor unit.
FA	pipe electric expansion valve 1-4 pin: driving impulse output; 5 pin: +12V;
H-PRESS	signal input of pressure sensor 1 pin: GND; 2 pin: signal input; 3 pin: +5V

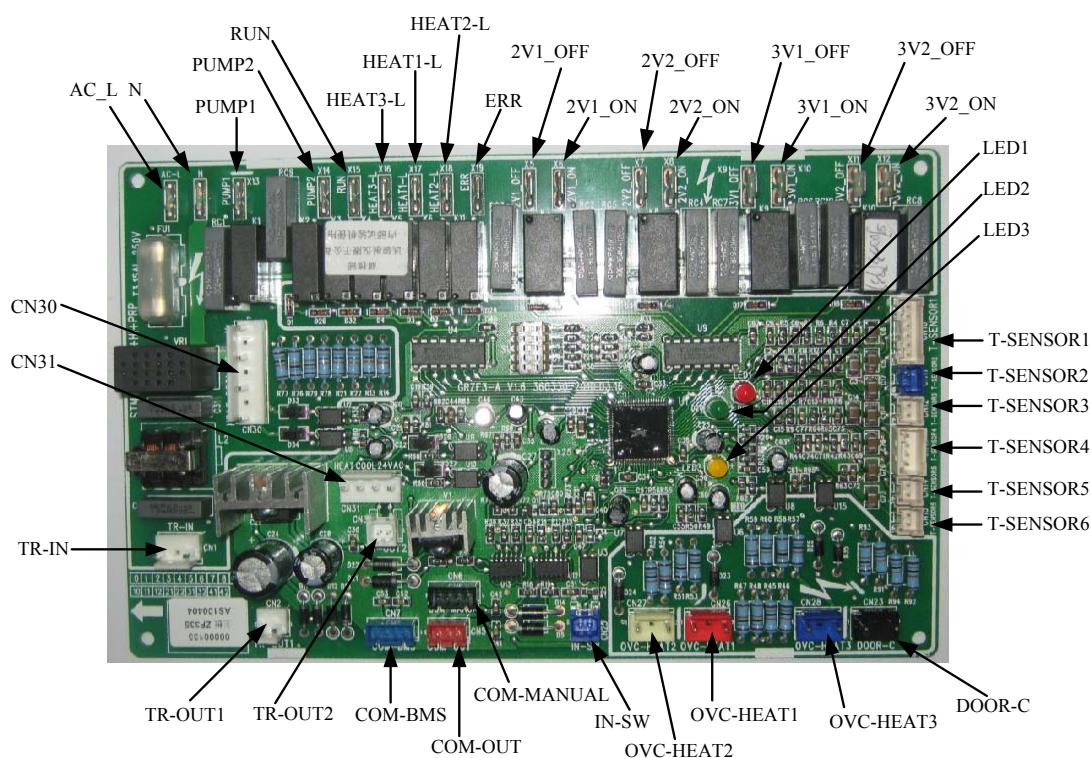
18.1.3 DHW-CQ12Pd/Na-M(O)、DHW-CQ14Pd/Na-M(O)、DHW-CQ16Pd/Na-M(O)



silk screen	specification
L1	live wire input of power supply
L2	
L3	
N	Neutral line input of power supply
L	Reactor red inductive wire
U	U-phase of compressor
V	V-phase of compressor
W	W-phase of compressor

DC_MOTOR1	DC fan 1 pin: strong power supply; 3 pin: fan GND; 4 pin: +15V; 5 pin: control signal; 6 pin: feedback signal;
DC_MOTOR2	DC fan 1 pin: strong power supply; 3 pin: fan GND; 4 pin: +15V; 5 pin: control signal; 6 pin: feedback signal;
4V1	4-way valve
HEAT	electric heating tape
VA-1	e-heater of chassis
HPP	high pressure switch
LPP	low pressure switch
T-SENSOR2	1, 2hole: pipe temperature; 3, 4hole: environment; 5, 6hole: exhaust
T-SENSOR3	1 hole:+3.3V 2 hole: detection: suction temperature sensor
CN66、CN67	communication cable 2 pin B, 3 pin A
CN65	communication cable 1 pin earthed, 2 pin B, 3 pin A, 4 pin+12 power supply It can not be used for communication between outdoor unit and indoor unit.
FA	pipe electric expansion valve 1-4 pin: driving impulse output; 5 pin: +12V;
H-PRESS	signal input of pressure sensor 1 pin: GND; 2 pin: signal input; 3 pin: +5V

18.1.4 DHW-CQ6.0Pd/Na-K(I)、DHW-CQ8.0Pd/Na-K(I)、DHW-CQ10Pd/Na-K(I)
DHW-CQ12Pd/Na-K(I)、DHW-CQ14Pd/Na-K(I)、DHW-CQ16Pd/Na-K(I)
DHW-CQ12Pd/Na-M(I)、DHW-CQ14Pd/Na-M(I)、DHW-CQ16Pd/Na-M(I)



silk screen	location	specification
AC-L	-	live wire of power supply
N	-	Neutral wire of power supply
PUMP1	X13	live wire of indoor water pump
PUMP2	X14	live wire of solar water pump
RUN	X15	running indicator
HEAT3-L	X16	e-heater of water tank
HEAT1-L	X17	e-heater of indoor unit 1
HEAT2-L	X18	e-heater of indoor unit 2
ERR	X19	error indicator
2V1_OFF	X5	Electric magnetic 2-way valve1 is normally closed.
2V1_ON	X6	Electric magnetic 2-way valve1 is normally open.
2V2_OFF	X7	Electric magnetic 2-way valve2 is normally closed.
2V2_ON	X8	Electric magnetic 2-way valve2 is normally open.
3V1_OFF	X9	Electric magnetic 3-way valve1 is normally closed.
3V1_ON	X10	Electric magnetic 3-way valve1 is normally open.
3V2_OFF	X11	Electric magnetic 3-way valve2 is normally closed.
3V2_ON	X12	Electric magnetic 3-way valve2 is normally open.
T-SENSOR1	CN10	terminal of temperature sensor1
T-SENSOR2	CN11	terminal of temperature sensor2
T-SENSOR3	CN12	terminal of temperature sensor3
T-SENSOR4	CN13	terminal of temperature sensor4
T-SENSOR5	CN14	terminal of temperature sensor5
T-SENSOR6	CN15	terminal of temperature sensor6
DOOR-C	CN23	Door detection input
OVC-HEAT3	CN28	e-heater of water tank adhesion-proof protection detector
OVC-HEAT1	CN26	e-heater of indoor unit1 adhesion-proof protection detector
OVC-HEAT2	CN27	e-heater of indoor unit2 adhesion-proof protection detector
IN-SW	CN25	detection input of water flow switch
COM-MANUAL	CN6	connect the wired controller
COM-OUT	CN5	connect to outdoor unit
COM-BMS	CN7	connect to remote controller
TR-OUT1	CN2	transformer output 1
TR-OUT2	CN3	transformer output 2
TR-IN	CN1	220V in put of transformer
CN30	CN30	heavy-current interface of end controller
CN31	CN31	heavy-current interface of end controller

18.2 ELECTRIC WIRING WORK

18.2.1 Wiring Principle

① General principles

- ◆ Wires, equipment and connectors supplied for use on the site must be in compliance with provisions of regulations and engineering requirements.
- ◆ Only electricians holding qualification are allowed to perform wire connection on the site.
- ◆ Before connection work is started, the power supply must be shut off.
- ◆ Installer shall be responsible for any damage due to incorrect connection of the external circuit of the unit.
- ◆ Caution --- MUST use copper wires.

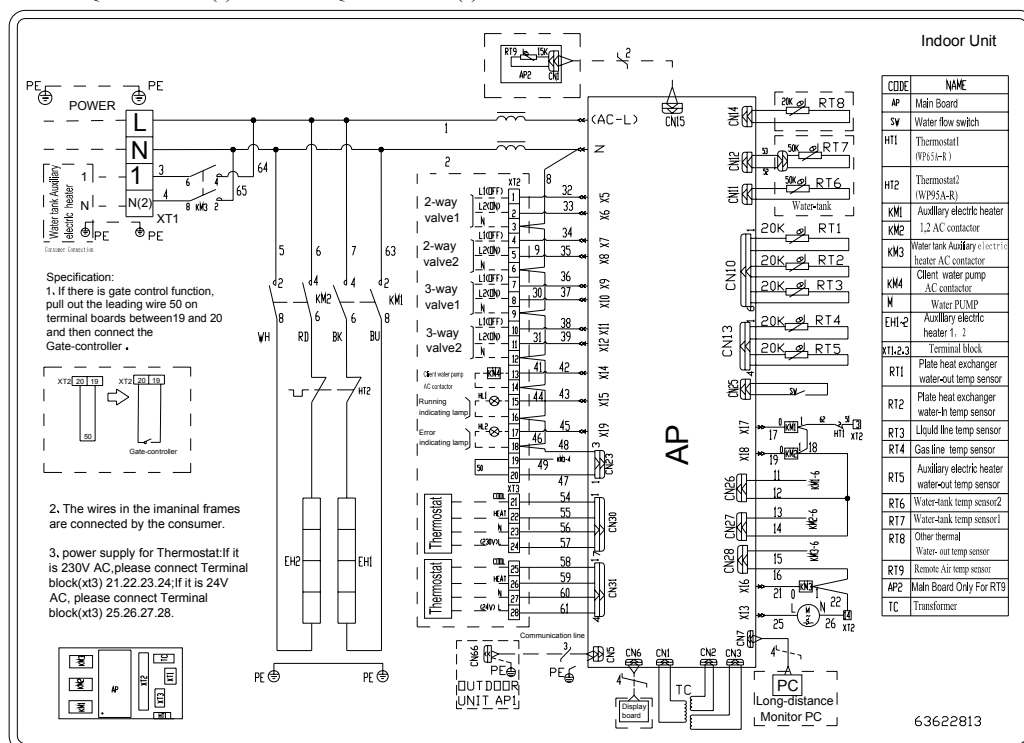
② Connection of power cable to the electric cabinet of the unit

- ◆ Power cables should be laid out through cabling trough, conduit tube or cable channel.
- ◆ Power cables to be connected into the electric cabinet must be protected with rubber or plastic to prevent scratch by edge of metal plate.
- ◆ Power cables close to the electric cabinet of the unit must be fixed reliably to make the power terminal in the cabinet free from an external force.
- ◆ Power cable must be grounded reliably.

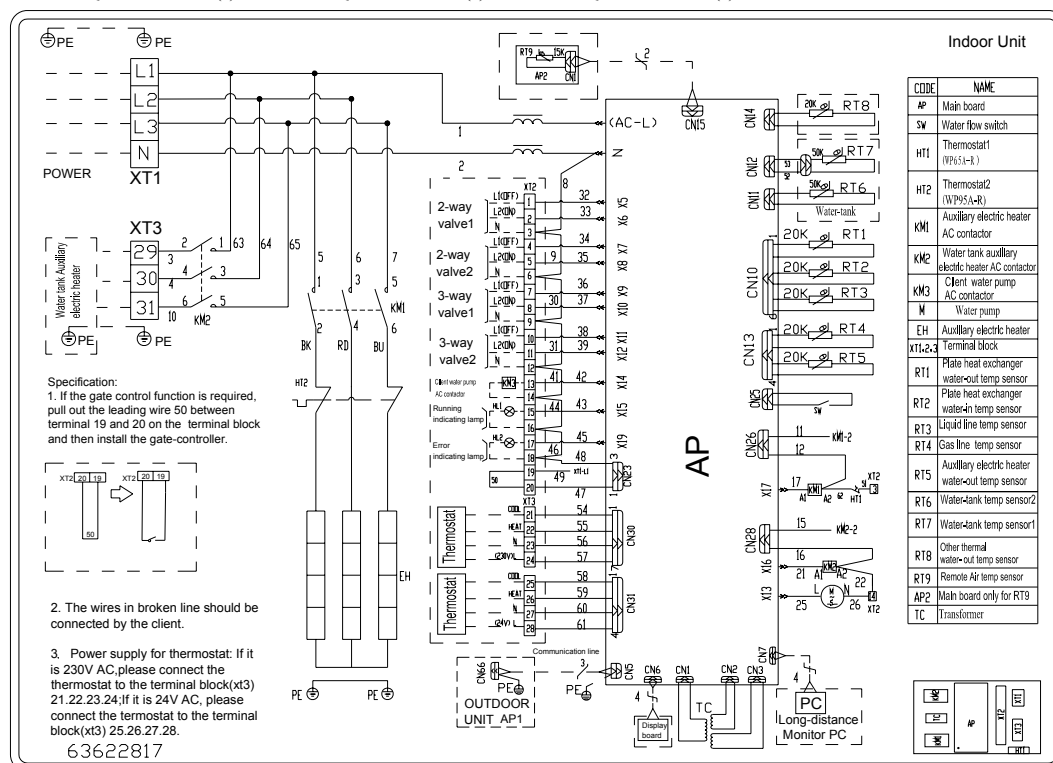
18.2.2 Electric Wiring Design

18.2.2.1 Wiring Diagram: Indoor Unit

DHW-CQ6.0Pd/Na-K(I) DHW-CQ8.0Pd/Na-K(I) DHW-CQ10Pd/Na-K(I) DHW-CQ12Pd/Na-K(I)
DHW-CQ14Pd/Na-K(I) DHW-CQ16Pd/Na-K(I)

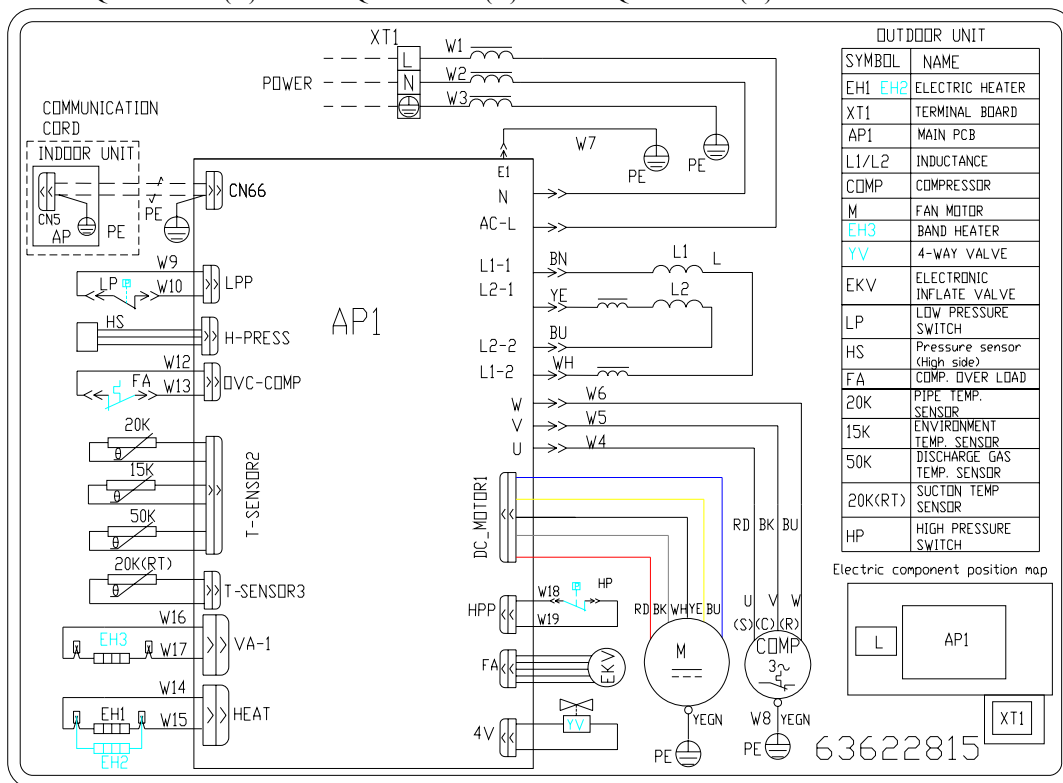


DHW-CQ12Pd/Na-M(I) DHW-CQ14Pd/Na-M(I) DHW-CQ16Pd/Na-M(I)

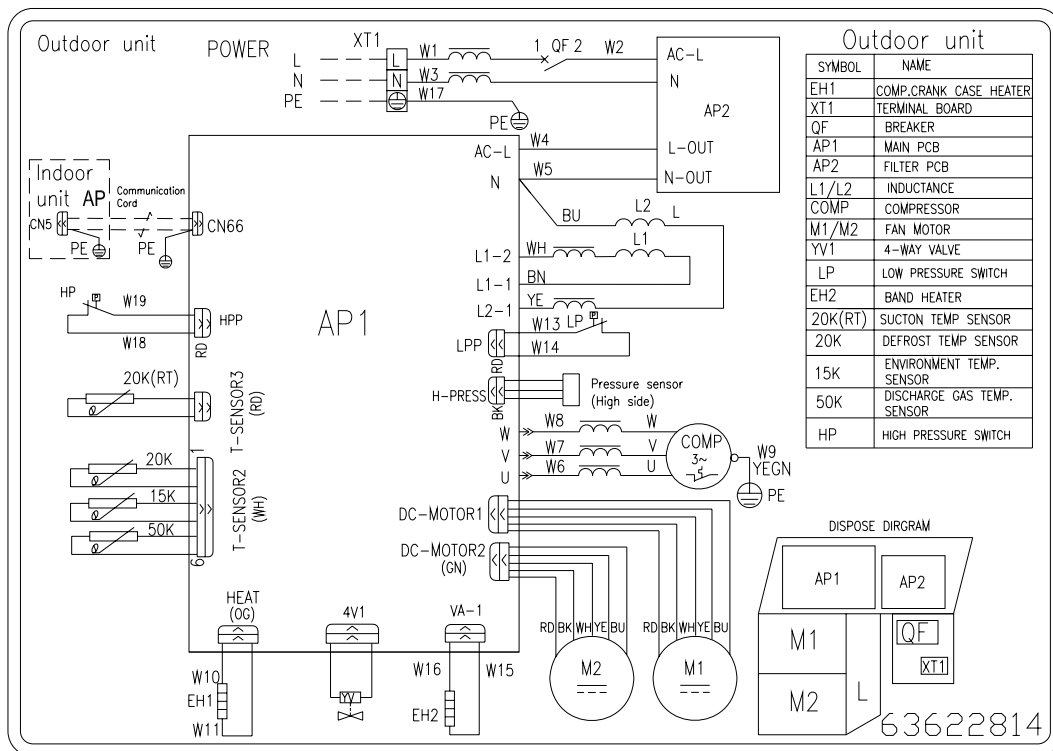


18.2.2.2 Wiring Diagram: Outdoor Unit

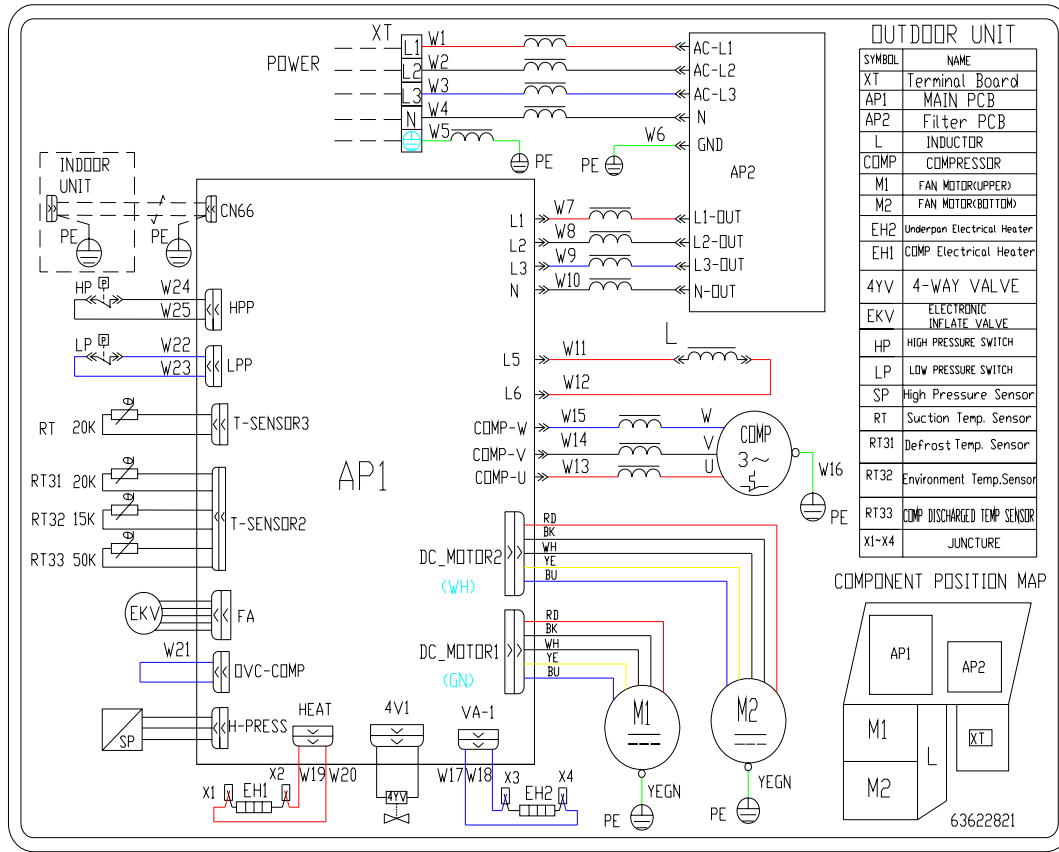
DHW-CQ6.0Pd/Na-K(O) DHW-CQ8.0Pd/Na-K(O) DHW-CQ10Pd/Na-K(O)



DHW-CQ12Pd/Na-K(O), DHW-CQ14Pd/Na-K(O), DHW-CQ16Pd/Na-K(O)

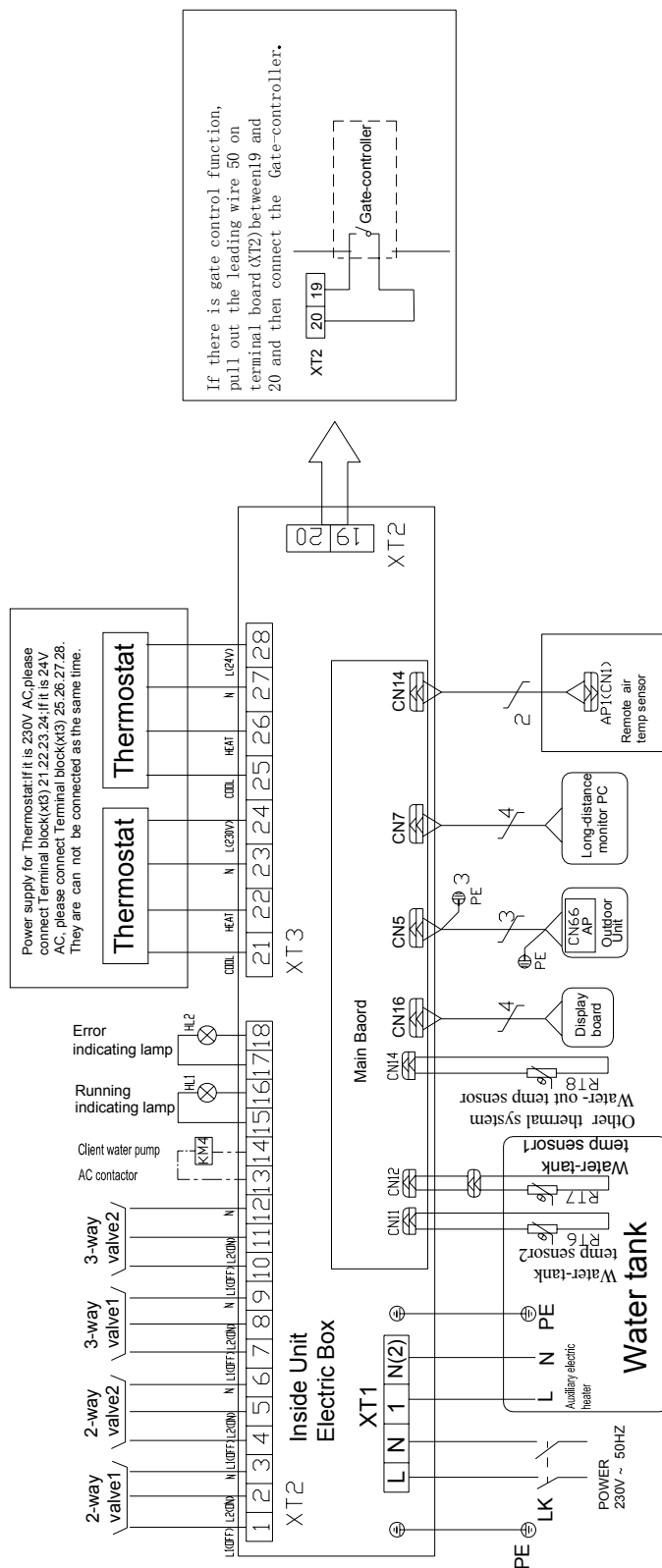


DHW-CQ12Pd/Na-M(O), DHW-CQ14Pd/Na-M(O), DHW-CQ16Pd/Na-M(O)



18.2.2.3 Wiring Diagram: Indoor AND Outdoor Unit(Including Field Wiring)

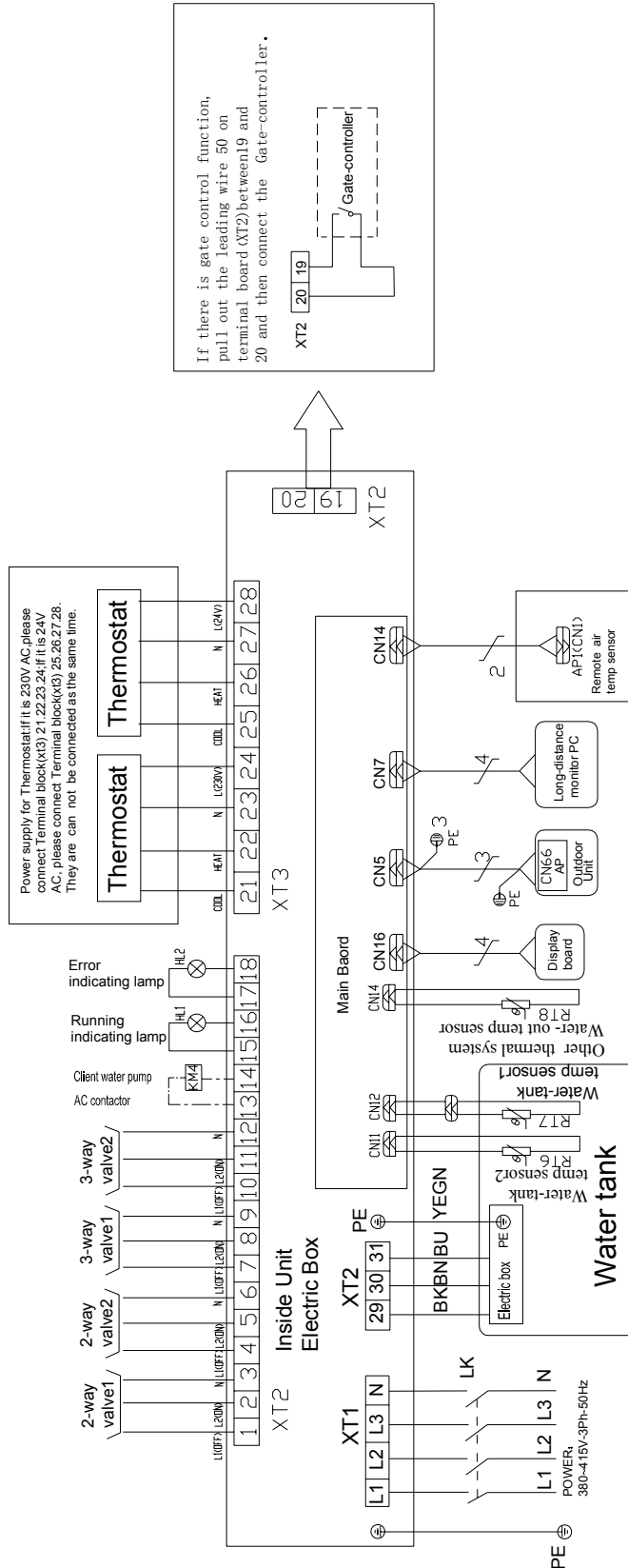
DHW-CQ6.0Pd/Na-K DHW-CQ8.0Pd/Na-K DHW-CQ10Pd/Na-K DHW-CQ12Pd/Na-K
DHW-CQ14Pd/Na-K DHW-CQ16Pd/Na-K



Specification:

1. Running indicating lamp(HL1) and Error indicating lamp (HL2) are connected or not on the basis of the clients'demand.
2. Client water pump AC contactor(KM4) is back-up Pump for the future , so it is not be connect;
3. Leakage Switch (LK) is necessary for additional installation, Please reference to page 37 17.4.2 Specification of Power Supply Wire and Leakage Switch.

DHW-CQ12Pd/Na-M, DHW-CQ14Pd/Na-M, DHW-CQ16Pd/Na-M

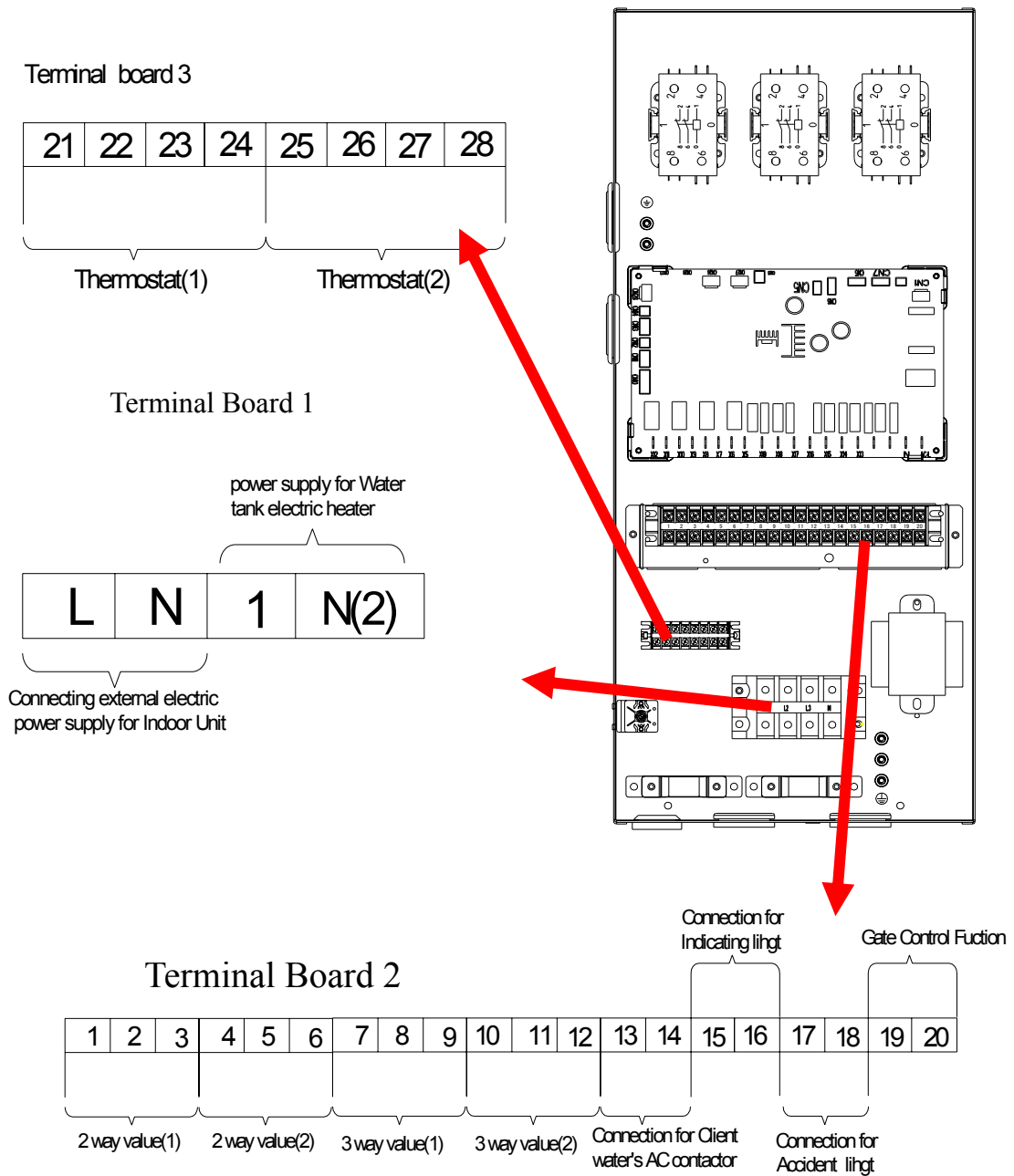


Specification:

1. Running indicating lamp(HL1) and Error indicating lamp (HL2) are connected or not on the basis of the clients'demand.
2. Client water pump AC contactor(KM4) is back-up Pump for the future , so it is not be connect;
3. Leakage Switch (LK) is necessary for additional installation, Please reference to page 37 17.4.2 Specification of Power Supply Wire and Leakage Switch.

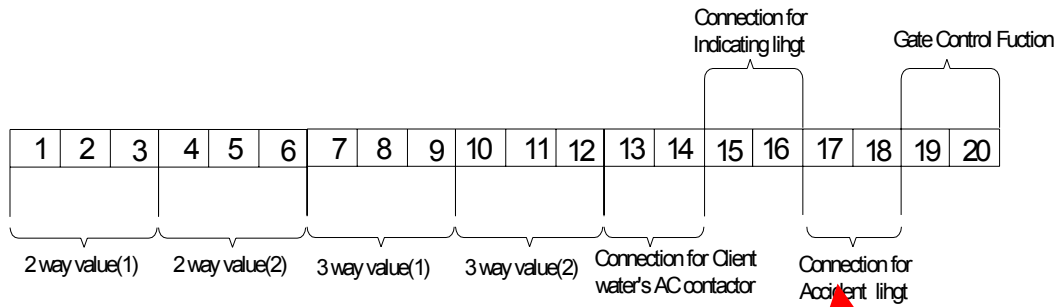
18.2.2.4 Terminal Board Information

DHW-CQ6.0Pd/Na-K DHW-CQ8.0Pd/Na-K DHW-CQ10Pd/Na-K DHW-CQ12Pd/Na-K
DHW-CQ14Pd/Na-K DHW-CQ16Pd/Na-K

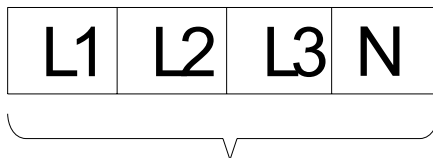


DHW-CQ12Pd/Na-M, DHW-CQ14Pd/Na-M, DHW-CQ16Pd/Na-M

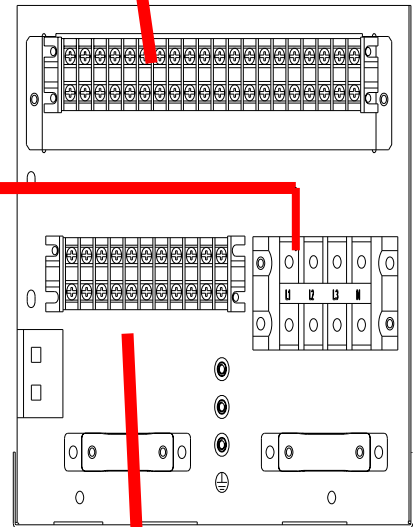
Terminal Board 2



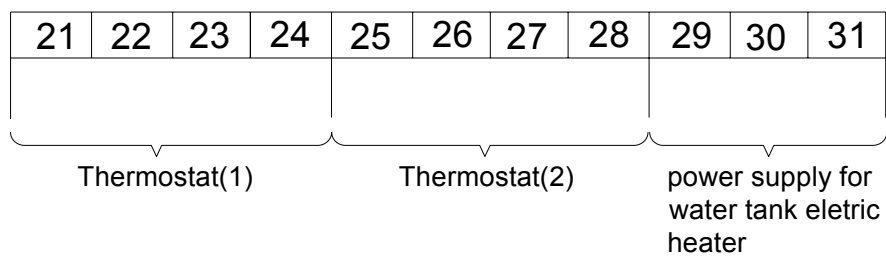
Terminal Board 1



Connecting external electric power supply for Indoor Unit



Terminal board 3



19. Debugging Operation of Unit

19.1 Check before Startup

For safety of users and unit, the unit must be started up for check before debugging. The procedures are as below:

The following items shall be performed by qualified repair persons.		
Confirm together with the sales engineer, dealer, installing contractor and customers for the following items having been finished or to be finished.		
No.	Confirmation of Installation	√
1	If the contents of Application for Installation of this Unit by Installer are real. If not, debugging will be refused.	<input type="checkbox"/>
2	If there is written notice in which amend project is shown to the installer in respect of unqualified installation.	<input type="checkbox"/>
3	If Application for Installation of unit by Installer and Debugging list are filed together.	<input type="checkbox"/>
No.	Pre-check	√
1	If appearance of the unit and internal pipeline system is ok during conveying, carrying or installation.	<input type="checkbox"/>
2	Check the accessories attached with the unit for quantity, package and so on.	<input type="checkbox"/>
3	Make sure there is drawings in terms of electricity, control, design of pipeline and so on.	<input type="checkbox"/>
4	Check if installation of the unit is stable enough and there is enough space for operation and repair.	<input type="checkbox"/>
5	Completely test refrigerant pressure of each unit and perform leakage detection of the unit.	<input type="checkbox"/>
6	Check if water tank is installed stably and its bearing is safe upon it is full.	<input type="checkbox"/>
7	Check if heat insulating measures for the water tank, outlet/inlet pipes and water replenishing pipe are proper.	<input type="checkbox"/>
8	Check if nilometer of water tank, water temperature indicator, controller, manometer, pressure relief valve and automatic discharge valve etc. are installed and operate properly.	<input type="checkbox"/>
9	Check if power supply accords with the nameplate and model of power cord conform to applicable requirements.	<input type="checkbox"/>
10	Check if power supply and control wiring is connect properly according to wiring diagram, earthing is safe and each terminal is stable.	<input type="checkbox"/>
11	Check if connection pipe, water pump, manometer, thermometer, valve etc. are installed properly.	<input type="checkbox"/>
12	Check if each valve in the system is open or closed according to requirements.	<input type="checkbox"/>
13	Confirm that the customers and inspection personnel of Part A are at site.	<input type="checkbox"/>
14	Installation Check-up Table is completed and ask installing contractor's signature for consent.	<input type="checkbox"/>
Attention: If the items with ×, please notify the contractor. The above items are recommended.		
Confirmed items after pre-checking	General Evaluation: Debugging <input type="checkbox"/> Amendment <input type="checkbox"/>	
	Judge the following items (if there is not any filling, qualification will be regarded.)	
	a: Power supply and electric control system	b Loading calculation
	c: Heating problems of Unit	d: Noise problem
	e: Pipeline problem	f: Others
	Normal debugging work can't be performed unless all installation items are qualified. If problem, it must be solved firstly. All costs will be installer's responsibility for delay of debugging and re-debugging incurred by any problem which is not solved immediately.	
	Submit schedule of amending reports to installer.	
	If provide written amending report to installer which should be signed after communication. Yes () No ()	










19.2 Test run

Test run is testing whether the unit can run normally via preoperation. If the unit can not run normally, find and solve the engineering or unit problem until the test run is satisfactory. All

inspection must meet the requirements before performing the test run. Test run should follow the content and steps of the table below:

The following procedure should be executed by experience and qualified maintenance man.	
No.	start up the pretest procedure
Notice: before test, ensure that all power must be cut off including far- end power switch. Otherwise, it may cause casualty.	
1	Ensure that the compressor of the unit is preheated for 8h.
Caution: heat the lubricating oil at least 8h in advance, to prevent the refrigerant from mixing with the lubricating oil, which may cause damage to the compressor when starting up the unit.	
2	Check whether the oil temperature of the compressor is obviously higher than the outdoor ambient temperature.
⚠ Caution: if the oil temperature of the compressor is obviously higher than the outdoor ambient temperature, it means that the heating tape of compressor is damaged. In that case, the compressor will be damaged easily. Therefore, repair the heating tape Before using the unit.	
3	Check whether the phase sequence of main power supply is correct. If not, correct the phase sequence according to specification.
⚠ Recheck the phase sequence before start-up to avoid inversion of the compressor which may damage the unit.	
4	Apply universal electric meter to measure the insulation resistance between each outdoor phase and earth as well as between phases.
⚠ Caution: defective earthing may cause electric shock.	
No.	Ready to start
1	Cut off all of temporary power supply, resume all the insurance and check the electricity for the last time.
	Check the power supply and voltage of the control circuit; _____ V must be $\pm 10\%$ within the range of rated operating power.
No.	Start up the unit
1	Check all the conditions needed to start up the unit: oil temperature, mode, required load ect.
2	Start up the unit, and observe the operation of compressor, electric expanding valve, fan motor and water pump ect.
	Note: the unit will be damaged under abnormal running state. Do not operate the unit in states of high pressure and high current.
affixed information:	
Items for acceptance after debugging	Estimation or suggestion on the general running situation: good, modify
	Identify the potential problem(no writing means the installation and debugging are in accordance with the requirements.)
	a. problem of power supply and electric control system:
	b. problem of load calculation:
	c. outdoor refrigerant system:
	d. noise problem:
	e. problem of indoor and piping system:
	h. other problems
During operation, it is needed to charge for the maintenance due to non-quality problems such as incorrect installation and maintenance.	
Acceptance situation:	
Is the user trained according to the specification? Please sign. Yes () No ()	

20. Daily Operation and Maintenance

-  In order to avoid damage of unit, all protecting devices in the unit had been set before outgoing, so the user can never adjust or remove them.
-  For the first startup of the unit or next startup of unit after long-period stop (above 1 day)by cutting off the power, please electrify the unit in advance to preheat the unit for more than 8hr
-  Never put sundries on the unit and accessories. Keep dry, clean and ventilated around the unit. Remove the dust accumulated on the condenser fin timely to ensure performance of unit and to avoid stop of unit for protection.
-  In order to avoid protection or damage of unit caused by blockage of water system, clean the filter in water system periodically and frequently check water replenishing device.
-  In order to ensure anti-freezing protection, never cut off the power if ambient temp. is below zero in winter.
-  In order to avoid frost crack of the unit, water in the unit and pipeline system not used for a long period should be drained. In addition, open the end cap of water tank for drainage.
-  Never frequently make the unit on/off and close manual valve of water system during operation of unit by users.
-  Ensure frequently check the working condition of each part to see if there is oil stain at pipeline joint and charge valve to avoid leakage of refrigerant.
-  If malfunction of the unit is out of control of users, please timely contact with authorized service center of company.

NOTE:

The water pressure gage is installed in returning water line in the indoor unit, Please adjust the hydraulics system pressure according to next item:

1. If the pressure is less than 0.5 bar, please recharge the water immediately;
2. when recharging, the hydraulics system pressure should be not more than 2.5Bar.

Troubleshooting

Malfunctions	Reasons	Troubleshooting
Compressor does not start up	A. Power supply has problem B. Connection wire is loose. C. Malfunction of mainboard D. Malfunction of compressor	<ul style="list-style-type: none"> ● Phase sequence is reverse ● Check out and re-fix ● Find out the reasons and repair. ● Replace compressor
High noise of fan	A. Fixing bolt of fan is loose B. Fan blade touches shell or grill C. Operation of fan is unreliable	<ul style="list-style-type: none"> ● Re-fix fixing bolt of fan ● Find out the reasons and adjust ● Replace fan
High noise of compressor	A. Liquid slugging happens when liquid refrigerant enters into compressor B. Internal parts in compressor are broken	<ul style="list-style-type: none"> ● Check if expansion valve is failure and temp. sensor is loose .If that, repair it. ● Replace compressor
Water pump does not run or runs abnormally	A. Malfunction of power supply or terminal B. Malfunction of relay C. There is air in water pipe	<ul style="list-style-type: none"> ● Find out the reasons and repair ● Replace relay ● Evacuate
Compressor starts or stops frequently	A. Poor or excess refrigerant B. Poor circulation of water system C. Low load	<ul style="list-style-type: none"> ● Discharge or add part of refrigerant ● Water system is blocked or there is air in it. Check water pump, valve and pipeline. Clean water filter or evacuate ● Adjust the load or add accumulating devices.
The unit does not heat although compressor is running	A. Leakage of refrigerant B. Malfunction of compressor	<ul style="list-style-type: none"> ● Repair by leakage detection and add refrigerant ● Replace compressor
Poor efficiency of hot water heating	A. Poor heat insulation of water system B. Poor heat exchange of evaporator C. Poor refrigerant of unit D. Blockage of heat exchanger at water side	<ul style="list-style-type: none"> ● Enhance heat insulation efficiency of the system ● Check if air in or out of unit is normal and clean evaporator of the unit ● Check if refrigerant of unit leaks ● Clean or replace heat exchanger.

The table of error code

Error code	Error description
F4	Malfunction of outdoor environment temperature sensor
F6	Malfunction of defrost temperature sensor
F7	Malfunction of discharge temperature sensor
F5	Malfunction of suction temperature sensor
EF	Malfunction of outdoor fan
E5	Overload protection of compressor or malfunction of driver
E1	High pressure protection of compressor
E3	Low pressure protection of compressor
E4	high-temperature protection of discharge
C5	Malfunction of indoor capacity switch
E6	Communications failure between outdoor and indoor mainboard
E6	Communications failure between outdoor mainboard and wired controller
E3	Malfunction of refrigerant lack
Fc	Malfunction of high pressure sensor
F9	Malfunction of outlet temperature sensor
dH	Malfunction of backup outlet temperature sensor
F1	Malfunction of liquid pipe temperature sensor inside refrigerant
F8	Malfunction of inlet temperature sensor
FE	Malfunction of the second sanitary water tank temperature sensor
FL	Malfunction of the first sanitary water tank temperature sensor
F3	Malfunction of gas pipe temperature sensor inside refrigerant
dF	Malfunction of solar outlet temperature sensor
F0	Malfunction of remote room temperature sensor
Ec	Malfunction of water switch
E2	Indoor anti-frozen protection
No display	Over temperature of sanitary water tank temperature
Ed	Over temperature of outlet temperature(No display on the screen)
No display	Over temperature of solar outlet temperature
EH	Malfunction of internal electric heater
EH	Malfunction of the first internal electric heater connection
EH	Malfunction of the second internal electric heater connection
EH	Malfunction of sanitary water tank electric heater connection
dU	Pull-out of the gate-controller

21. Parameter Lists

21.1 Product Data at Rated Condition

AIR TO WATER HEAT PUMP--PERFORMANCE								
Model			DHW-CQ6. 0Pd/Na-K	DHW-CQ8. 0Pd/Na-K	DHW-CQ1 0Pd/Na-K	DHW-CQ1 2Pd/Na-K	DHW-CQ1 4Pd/Na-K	DHW-CQ1 6Pd/Na-K
Capacity ¹	Heating (floor)	kW	6.2	8.5	10	12	14	16
	Cooling (floor)	kW	5.5	9.0	10.5	14	15	15.5
Power Input ¹	Heating (floor)	kW	1.5	2.1	2.50	2.67	3.33	3.9
	Cooling (floor)	kW	1.6	2.5	3.14	3.68	4.28	4.62
EER ¹	Cooling (floor)	-	3.4	3.6	3.35	3.8	3.5	3.35
COP ¹	Heating (floor)	-	4.1	4.0	4.0	4.5	4.2	4.0
Capacity ²	Heating (FCU)	kW	5.5	8.0	9.0	11.5	13	14
	Cooling (FCU)	kW	4	6.5	8.0	10	11	11.5
Power Input ²	Heating (FCU)	kW	1.8	2.65	2.9	3.35	3.88	4.59
	Cooling (FCU)	kW	1.53	2.5	3.08	3.45	3.93	4.2
EER ²	Cooling (FCU)	-	2.6	2.6	2.6	2.9	2.8	2.5
COP ²	Heating (FCU)	-	3.0	3.0	3.1	3.4	3.35	3.05
Power Supply		V/Ph/Hz	220~240/1/50					
Refrigerant	Type	-	R410A	R410A	R410A	R410A	R410A	R410A
	Charge	g	1700	2000	2000	3300	3300	3300
Sanitary water Temperature		°C	40-80	40-80	40-80	40-80	40-80	40-80
Sound Pressure Level		dB(A)	59	59	59	59	59	62
Gas Piping Connection		mm	12.7	15.9	15.9	15.9	15.9	15.9
Liquid Piping Connection		mm	6.35	9.52	9.52	9.52	9.52	9.52
Dimensions	Out door unit	Unit(W×D×H)	mm	921×427×791	921×427×791	921×427×791	950×412×1253	950×412×1253
		Packed unit(W×D×H)	mm	1065×485×840	1065×485×840	1065×485×840	1110×450×1385	1110×450×1385

AIR TO WATER HEAT PUMP--PERFORMANCE						
Model				DHW-CQ12Pd/Na-M	DHW-CQ14Pd/Na-M	DHW-CQ16Pd/Na-M
Capacity ¹	Heating（floor ）		kW	12	14	15
	Cooling（floor ）		kW	14	15	15.5
Power Input ¹	Heating（floor ）		kW	2.8	3.33	3.9
	Cooling（floor ）		kW	3.8	4.28	4.4
EER ¹	Cooling（floor ）		-	3.8	3.5	3.5
COP ¹	Heating（floor ）		-	4.5	4.2	4.0
Capacity ²	Heating（FCU）		kW	11	12	14
	Cooling（FCU）		kW	10	10.5	11
Power Input ²	Heating（FCU）		kW	3.35	3.8	4.2
	Cooling（FCU）		kW	3.45	3.6	4
EER ²	Cooling（FCU）		-	2.9	2.8	2.7
COP ²	Heating（FCU）		-	3.4	3.35	3.2
Power Supply			V/Ph/Hz	380~415/3/50		
Refrigerant	Type		-	R410A	R410A	R410A
	Charge		g	3500	3500	3500
Sanitary water Temperature			℃	40-80	40-80	40-80
Sound Pressure Level			dB(A)	59	59	62
Gas Piping Connection			mm	15.9	15.9	15.9
Liquid Piping Connection			mm	9.52	9.52	9.52
Dimensions	Out door unit	Unit(W×D× H)	mm	950×412×1253	950×412×1253	950×412×1253
		Packed unit(W×D× H)	mm	1110×450×1385	1110×450×1385	1110×450×1385

Note:

¹ Capacities and power inputs are based on the following conditions:

①. Cooling conditions –

Indoor Water Temperature 23°C/18°C;

Outdoor Air Temperature 35°CDB/24°CWB

②. Heating conditions

Indoor Water Temperature 30°C/35°C

Outdoor Air Temperature 7°CDB/6°CWB

③. Standard piping length 7.5m

² Capacities and power inputs are based on the following conditions:

①. Cooling conditions

Indoor Water Temperature 12°C/7°C;

Outdoor Air Temperature 35°CDB/24°CWB

②. Heating conditions –

Indoor Water Temperature 40°C/45°C;

Outdoor Air Temperature 7°CDB/6°CWB

③ Standard piping length 7.5m

INDOOR UNIT								
Model			DHW-CQ 6.0Pd/Na- K(I)	DHW-CQ 8.0Pd/Na -K(I)	DHW-CQ 10Pd/Na- K(I)	DHW-C Q12Pd/ Na-K(I)	DHW-C Q14Pd/ Na-K(I)	DHW-C Q16Pd/ Na-K(I)
Power Supply		V/Ph/Hz	220~240/1/50					
Rated input (indoor only)		W	3200	6200				
Liquid side diameter		mm (inch)	6.35(1/4)	9.52(3/8)				
Gas side diameter		mm (inch)	12.7(1/2)	15.9(5/8)				
Operation Range (Outflow water temp.)	Cooling (FCU)	℃	7-25					
	Cooling (Floor)	℃	18-25					
	Heating (FCU)	℃	25-55(High Temperature Cycle)					
	Heating (Floor)	℃	25-45(Low Temperature Cycle)					
Main comp onents	pump	Type	-	Water-cooled				
		Nr. of speed	-	3				
		Power input	W	200				
		Water flow limit	LPM	7.5				
	Expansion Vessel	Volume	Liter	10				
		Water Pressure (Max)	Bar	3				
		Water Pressure (Pre)	Bar	1				
	Electric Heater	Type	-	Sheath				
		Material	-	Stainless Steel				
		Operation	-	Automatic				
		Steps	-	2				
		Capacity	KW	3	6			
		Combination		1.5+1.5	3+3			
		Power input	Φ/V/Hz	1/230/50				
	Heat Exchanger	Type	-	Brazed Plate HEX				
		Quantity	-	1				
	Dime nsions	Unit(W×D× H)		mm	900×500×324			
Packed unit(W×D× H)		mm	1040×605×380					

INDOOR UNIT				
Model		DHW-CQ12Pd/Na-M(I)	DHW-CQ14Pd/Na-M(I)	DHW-CQ16Pd/Na-M(I)
Power Supply		V/Ph/Hz	380~415/3/50	
Rated input (indoor only)		W	6200	
Liquid side diameter		mm (inch)	9.52(3/8)	
Gas side diameter		mm (inch)	15.9(5/8)	
Operation Range (Outflow water temp.)	Cooling (FCU)	°C	7-25	
	Cooling (Floor)	°C	18-25	
	Heating (FCU)	°C	25-55(High Temperature Cycle)	
	Heating (Floor)	°C	25-45(Low Temperature Cycle)	
Main components	pump	Type	-	Water-cooled
		Nr. of speed	-	3
		Power input	W	200
		Water flow limit	LPM	7.5
	Expansion Vessel	Volume	Liter	10
		Water Pressure (Max)	Bar	3
		Water Pressure (Pre)	Bar	1
	Electric Heater	Type	-	Sheath
		Material	-	Stainless Steel
		Operation	-	Automatic
		Steps	-	1
		Capacity	KW	6
		Combination		6
		Power input	Φ/V/Hz	3/400/50
	Heat Exchanger	Type	-	Brazed Plate HEX
		Quantity	-	1
Dimensions	Unit(W×D× H)		mm	900×500×324
	Packed unit(W×D× H)		mm	1040×605×380

21.2 Operation Range

Mode	Range of Outdoor Temperature(°C)
Heating	-20~35
Cooling	10~48
Water heating	-20~45



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