

# VARIO Air to Water Heat Pump

## Domestic Hot Water Production Systems

### TECHNICAL SALES GUIDE capacity 6kW-16kW



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## 1 MODELS LIST

### 1.1 Air to water heat pump

Nominal Capacity	Model		Power Supply
Btu/h	Refrigerant	Model Name	V,Ph,Hz
20427	R410A	DHW-CQ6.0Pd/Na-K	220~240V-1Ph-50Hz
27296		DHW-CQ8.0Pd/Na-K	
34120		DHW-CQ10Pd/Na-K	
40944		DHW-CQ12Pd/Na-K	
47768		DHW-CQ14Pd/Na-K	
54592		DHW-CQ16Pd/Na-K	
40944	R410A	DHW-CQ12Pd/Na-M	380~415V-3Ph-50Hz
47768		DHW-CQ14Pd/Na-M	
54592		DHW-CQ16Pd/Na-M	

### 1.2 Water Tank

Model	Litre	Remarks
Model Name	L	Inner coil
AT200LCJ/A-K	200	Only an inner coil connected to master unit;
AT200LCJ2/A-K		An inner coil connected to master unit; another connected to other heat source;
AT300LCJ/A-K	300	Only an inner coil connected to master unit;
AT300LCJ2/A-K		An inner coil connected to master unit; another connected to other heat source;
AT200LCJ/A-M	200	Only an inner coil connected to master unit;
AT200LCJ2/A-M		An inner coil connected to master unit; another connected to other heat source;
AT300LCJ/A-M	300	Only an inner coil connected to master unit;
AT300LCJ2/A-M		An inner coil connected to master unit; another connected to other heat source;

## 2 NOMENCLATURE

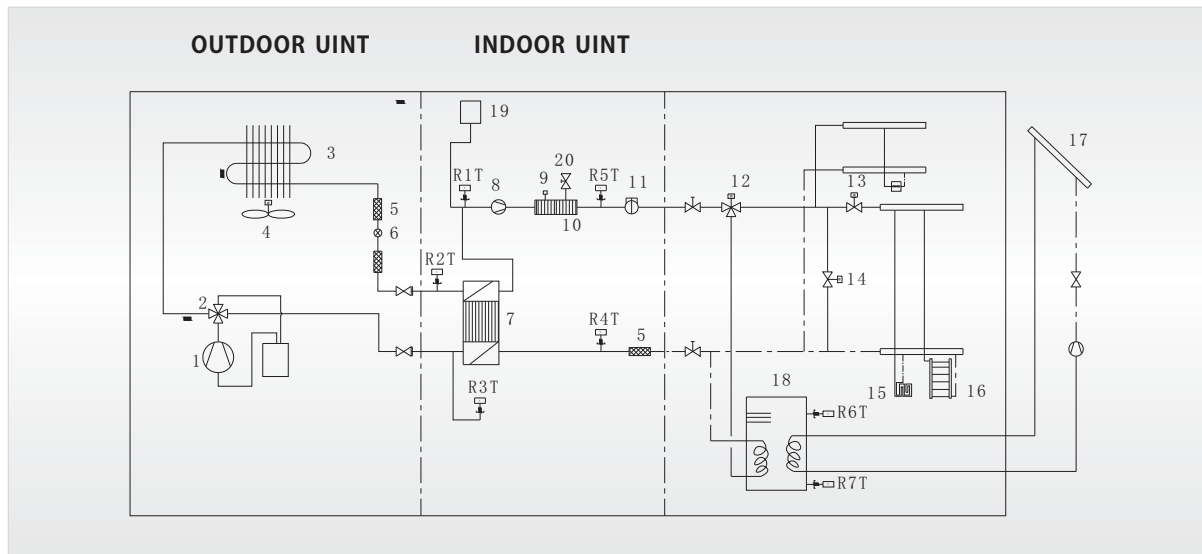
	DHW	-	C	Q	16	Pd	/	Na	-	K	(O)
	1		2	3	4	5		6		7	8

NO.	Description	Options
1	INVENTOR Heat Pump Water Heater	DHW
2	Heating Mode	S= Static ,C =Circulating
3	Function	Q= Multi-function,Omit= single- function
4	Nominal Heating capacity	6=6.0kw      10=10.0kw      14=14.0kw 8=8.0kw      12=12.0kw      16=16.0kw
5	Compressor style	Pd= DC Inverter ,Omit= on/off
6	refrigerant	Na=R410A
7	Power Supply	K=220~240V-1Ph-50Hz,M=380~415V-3Ph-50Hz
8	Indoor and outdoor unit code	I=Indoor unit O=Outdoor unit

SX	V	D	300	L	C	J2	/	A	-	K
1	2	3	4	5	6	7		8		9

NO.	Description	Options
1	Symbol of heat pump water tank	SX
2	Tank type	Omit-common heat pump water tank; V- heat pump water tank for multi VRF system
3	Function code	Omit-no electric heating function; D- electric heating function available
4	Nominal water tank volume	300=300L
5	Structure type	B-Wall Mounted Type; L-Floor Standing Type
6	Bearing	Omit-non-bearing water tank; C-bearing water tank
7	Type of heat exchange tube	Omit-no heat exchanger; J-inner coil static heating (J-single coil, J2--double coils); JW-outer coil static heating; D-heating coil with floor (D-single coil; D2-double coils)
8	Serial number	A、 B、 C……
9	Power Supply	K=220~240V-1Ph-50Hz,M=380~415V-3Ph-50Hz

### 3 WORKING PRINCIPLES



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 underfloor 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

## Operating Principle of the Unit

DC inverter air to water heat pump is composed of outdoor unit, hydro box (indoor-unit ) and inner 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 heating mode;

### 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 be 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 outflow temperature in a certain range, so as to prevent water system of the unit from freezing or protect certain indoor articles from freezing damage. (This mode requires installing indoor temperature sensor). 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;

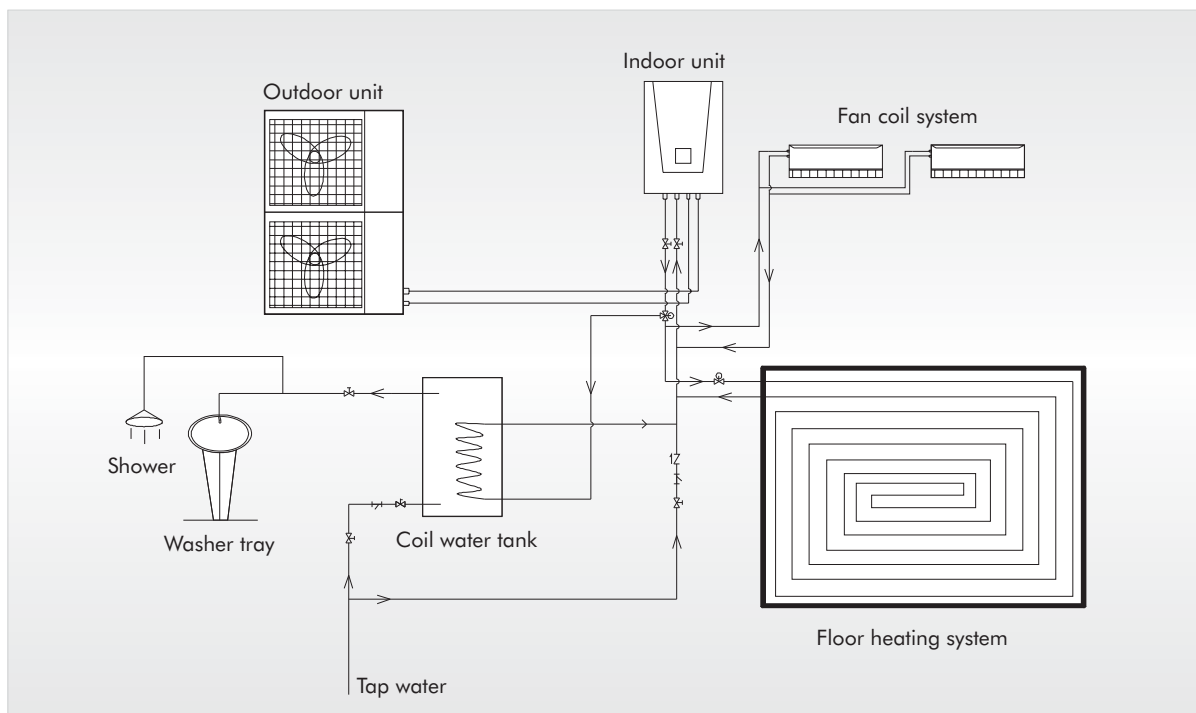
#### Weather-dependent heating mode

This mode is only available for heating. In auto mode, the indoor temperature is detected and controlled automatically;

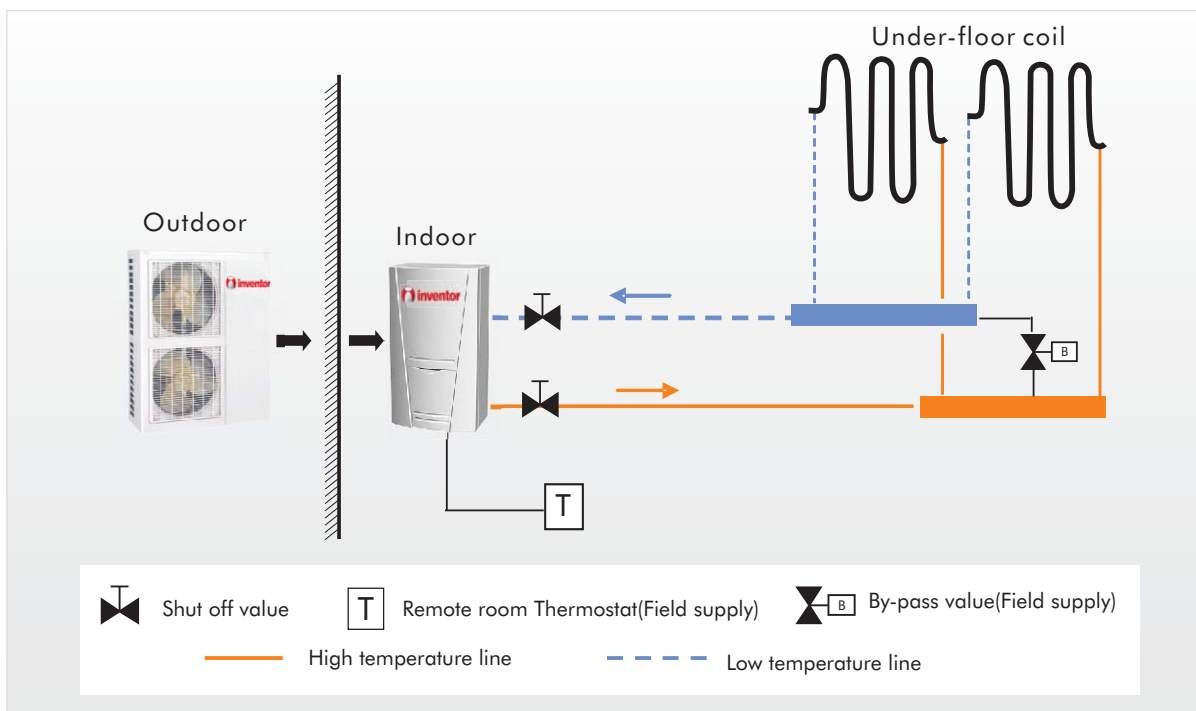
#### Silent mode

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;

## 4 BASIC SYSTEM CONFIGURATION



### CASE 1: Connecting Under-floor coil for heating and cooling

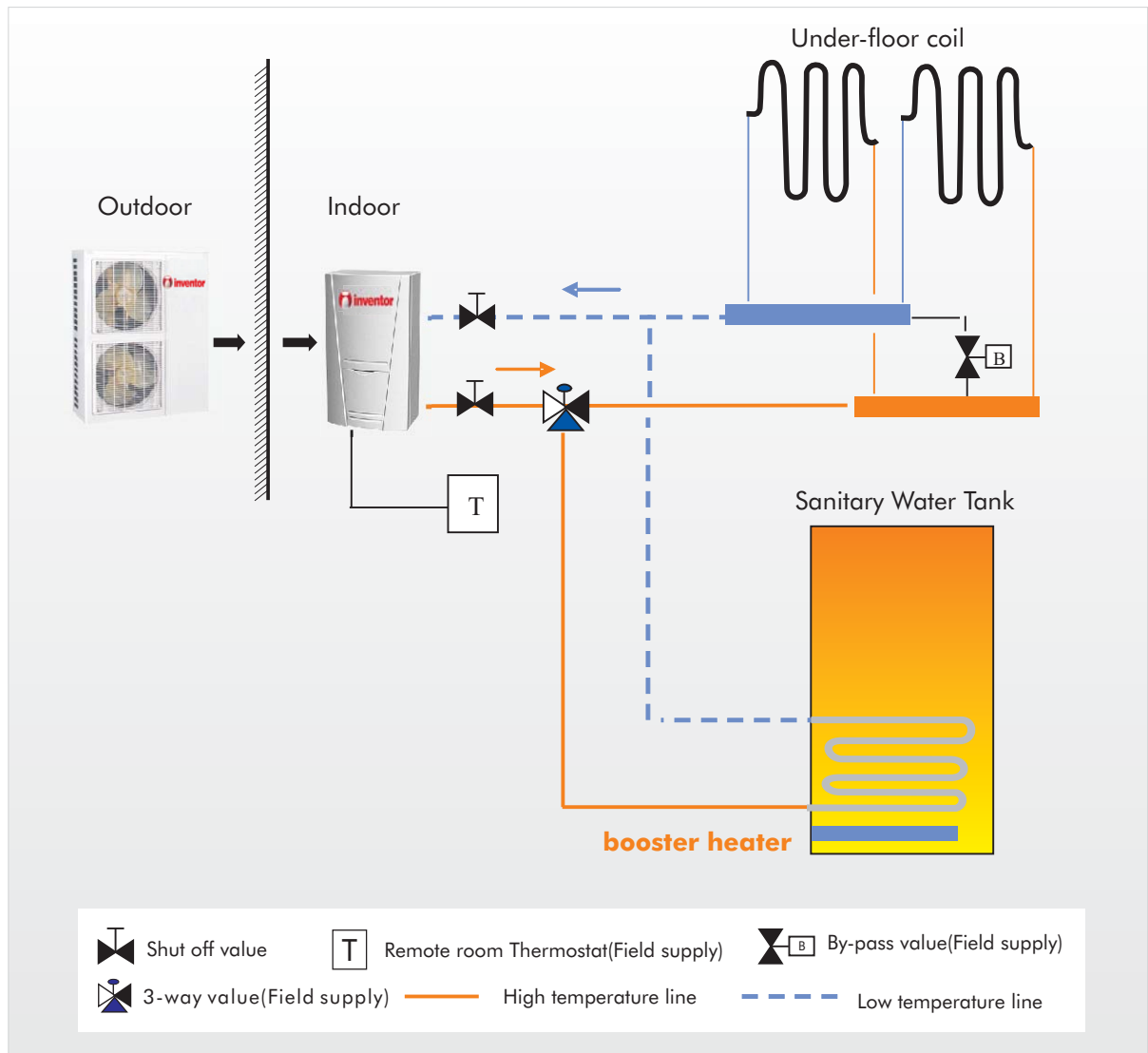


**Note**

- 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**



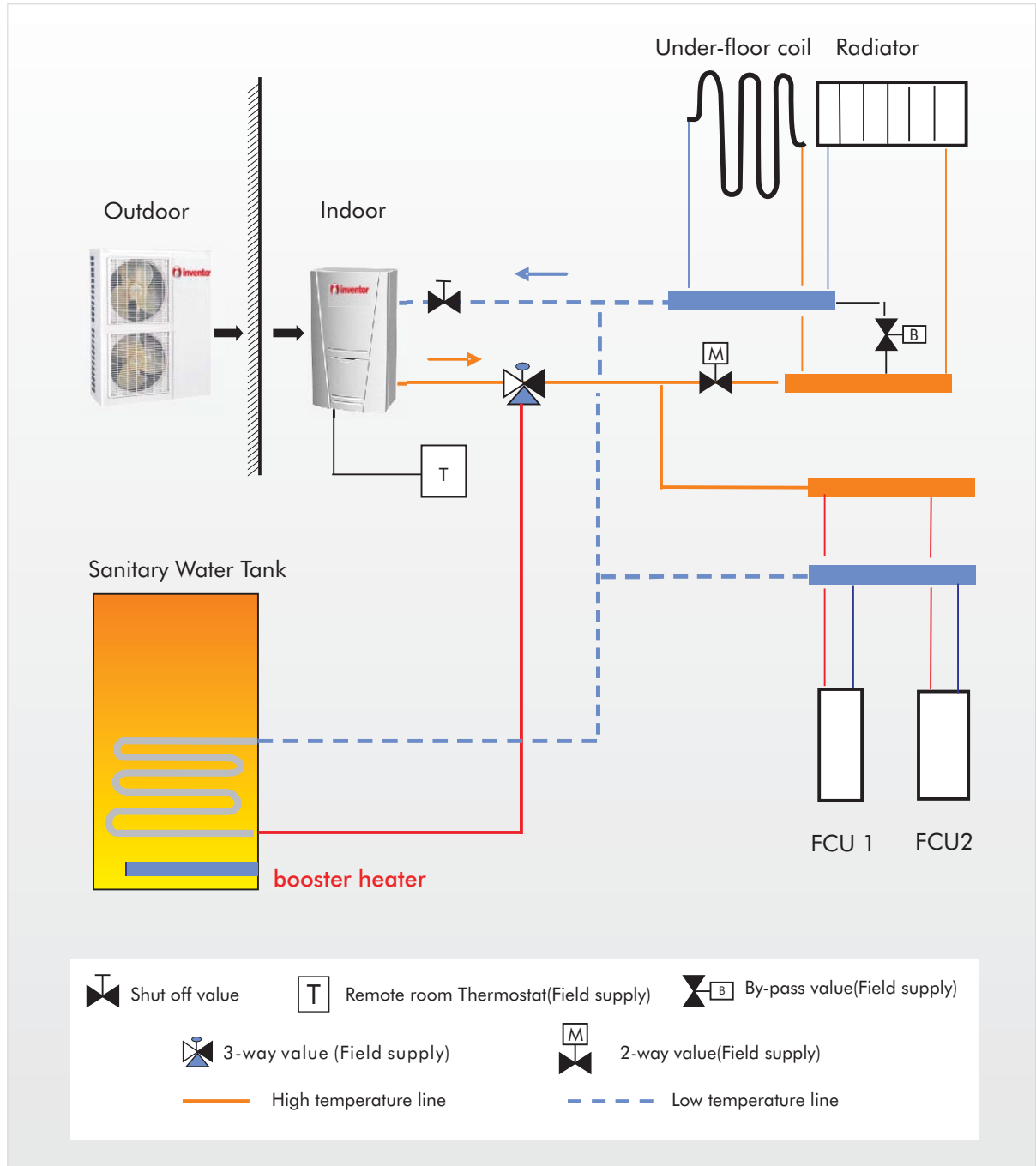
**Note**

- 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 secure enough heat energy in the very cold days;





## CASE 3: Connecting Sanitary Water Tank and Heat Emitters for heating and Cooling



### Note

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

## 5 FEATURES



### 5.1 Outdoor unit

#### **Inverter Control**

BLDC Fan Motor Control;  
DC inverter compressor;  
Soft operation by sine wave;  
PFC step-up Technology;

#### **High Efficiency fan & Grille**

High Volume Axial Fan makes powerful cooling and Maintains system stable;

#### **Deluxe Controller and Smart Control**

Emergency Operation Mode;  
Central control;  
Weekly Programmable;  
Quick water heating Mode;  
Disinfection Operation;  
Holiday Mode;  
Silent Mode;  
Forced Operation Mode;  
Weather-Dependent Operation;

#### **Energy-saving and High efficiency**

#### **New refrigerant and friendly to earth**



### 5.2 Indoor unit

Compact Sizes : 900×500×324mm(W×D×H);  
Deluxe Design;  
High COP Plate Heat Exchanger;  
High Efficient pump;



### 5.2 Sanitary Water Tank

Installation in water heating system;  
Rapid storage and continuous delivery;  
High efficiency for low running costs;  
CFC free insulation;  
Stainless steel tank and coil;  
Magnesium anode;  
Complete, easy to use and maintain;  
Double coil and double temperature sensor design;

## 6 SPECIFICATION



### 6.1 Performance

Air to Water Heat Pump						
Model			DHW-CQ6.0 Pd/Na-K	DHW-CQ8.0 Pd/Na-K	DHW-CQ10 Pd/Na-K	DHW-CQ12 Pd/Na-K
Capacity <sup>1</sup>	Heating(floor heating)	kW	6.2	8.5	10	12
	Cooling(floor cooling)	kW	5.5	9.0	10.5	14
Power Input <sup>1</sup>	Heating(floor heating)	kW	1.5	2.1	2.50	2.67
	Cooling(floor cooling)	kW	1.6	2.5	3.14	3.68
EER <sup>1</sup>	Cooling(floor cooling)	-	3.4	3.6	3.35	3.8
COP <sup>1</sup>	Heating(Floor heating)	-	4.1	4.0	4.00	4.5
Capacity <sup>2</sup>	Heating(Fan coil or Radiator)	kW	5.5	8.0	9.0	11.5
	Cooling(for Fan coil)	kW	4.0	6.5	8.0	10
Power Input <sup>2</sup>	Heating(Fan coil or Radiator)	kW	1.80	2.65	2.90	3.35
	Cooling(for Fan coil)	kW	1.53	2.50	3.08	3.45
EER <sup>2</sup>	Cooling(for Fan coil)	-	2.6	2.6	2.6	2.9
COP <sup>2</sup>	Heating(Fan coil or Radiator)	-	3.00	3.00	3.1	3.40
Refrigerant	Type	-	R410A	R410A	R410A	R410A
	Charge	g	1700	2000	2000	3300
Sanitary water Temperature		°C	40-80	40-80	40-80	40-80
Sound Pressure Level		dB(A)	≤59	≤59	≤59	≤59
Gas Piping Connection		mm	12.7	15.9	15.9	15.9
Liquid Piping Connection		mm	6.35	9.52	9.52	9.52
Outline dimension (W×D×H)		mm	921×427×791	921×427×791	921×427×791	950×412×1253

### Air to Water Heat Pump

Model			DHW- CQ14 Pd/Na-K	DHW- CQ16 Pd/Na-K	DHW- CQ12 Pd/Na-M	DHW- CQ14 Pd/Na-M	DHW-CQ16 Pd/Na-M
Capacity <sup>1</sup>	Heating(floor heating)	kW	14	16	12	14	15
	Cooling(floor cooling)	kW	15	15.5	14	15	15.5
Power Input <sup>1</sup>	Heating(floor heating)	kW	3.33	3.90	2.80	3.33	3.9
	Cooling(floor cooling)	kW	4.28	4.62	3.80	4.28	4.4
EER <sup>1</sup>	Cooling(floor cooling)	-	3.5	3.35	3.80	3.5	3.5
COP <sup>1</sup>	Heating(Floor heating)	-	4.20	4.00	4.50	4.2	4.0
Capacity <sup>2</sup>	Heating(Fan coil or Radiator)	kW	13	14	11	12	14
	Cooling(for Fan coil)	kW	11	11.5	10	10.5	11
Power Input <sup>2</sup>	Heating(Fan coil or Radiator)	kW	3.88	4.59	3.35	3.8	4.2
	Cooling(for Fan coil)	kW	3.93	4.20	3.45	3.6	4.0
EER <sup>2</sup>	Cooling(for Fan coil)	-	2.80	2.50	2.9	2.8	2.7
COP <sup>2</sup>	Heating(Fan coil or Radiator)	-	3.35	3.05	3.4	3.35	3.20
Refrigerant	Type	-	R410A	R410A	R410A	R410A	R410A
	Charge	g	3300	3300	3500	3500	3500
Sanitary water Temperature		°C	40-80	40-80	40-80	40-80	40-80
Sound Pressure Level		dB(A)	≤59	≤62	≤59	≤59	≤62
Gas Piping Connection		mm	15.9	15.9	15.9	15.9	15.9
Liquid Piping Connection		mm	9.52	9.52	9.52	9.52	9.52
Outline dimension (W×D×H)		mm	950×412 ×1253	950×412 ×1253	950×412 ×1253	950×412 ×1253	950×412 ×1253

#### Note

<sup>1</sup>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

<sup>2</sup>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

# VARIO Series of Air to Water Heat Pump Technical Sales Guide



## 6.2 Indoor unit

Indoor unit						
Model		DHW-CQ6.0 Pd/Na-K(l)	DHW-CQ8.0 Pd/Na-K(l)	DHW-CQ10 Pd/Na-K(l)	DHW-CQ12 Pd/Na-K(l)	DHW-CQ14 Pd/Na-K(l)
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 (Fan coil unit)	°C	7-25			
	Cooling (Floor cooling )	°C	18-25			
	Heating (Fan coil unit)	°C	25-55 (High Temperature Cycle )			
	Heating (Floor heating)	°C	25-45 (Low Temperature Cycle )			
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 Combination	kW	1.5+1.5	3+3		
Heat Exchanger	Power input	Ph/V/Hz	1/230/50			
	Type	-	Brazed Plate HEX			
	Quantity	-	1			
Dimensions	Outline dimension (W×D×H)	mm	900x500x324			
	Packaged dimension(W×D×H)	mm	1040x605x380			
Weigh	Net weight	kg	52		53	
	Gross weight	kg	62		63	

Indoor unit					
Model		DHW-CQ16 Pd/Na-K(I)	DHW-CQ12 Pd/Na-M(I)	DHW-CQ14 Pd/Na-M(I)	DHW-CQ16 Pd/Na-M(I)
Power Supply		V/Ph/Hz	220~240/1/50	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 (Fan coil unit)	°C	7-25		
	Cooling (Floor cooling )	°C	18-25		
	Heating (Fan coil unit)	°C	25-55 (High Temperature Cycle )		
	Heating (Floor heating)	°C	25-45 (Low Temperature Cycle )		
Pump	Type	–	Water-cooled		
	Nr. of speed	–	3		
	Power input	W	200		
	Water flow limit	LPM	7.5		
Expan- sion 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	1	
	Capacity Combination	kW	3+3	6	
Heat Excha- nger	Type	–	Brazed Plate HEX		
	Quantity	–	1		
Dimensions	Outline dimension (W×D×H)	mm	900x500x324		
	Packaged dimension(W×D×H)	mm	1040x605x380		
Weigh	Net weight	kg	53		
	Gross weight	kg	63		



### 6.3 water Tank

Model		AT200LC_/A-K		AT300LC_/A-K		AT200LC_/A-M		AT300LC_/A-M		
		J	J2	J	J2	J	J2	J	J2	
Water Tank Volume		L	200	300	200	300				
Electric Heater Power		W	3000				3000			
Connection Pipe	Cool Water Inlet	Inch	1/2" Female BSP			1/2" Female BSP				
	Hot Water Outlet	Inch	1/2" Female BSP			1/2" Female BSP				
	Circulation Water Inlet	Inch	3/4" Female BSP			3/4" Female BSP				
	Circulation Water Outlet	Inch	3/4" Female BSP			3/4" Female BSP				
Outline dimension (ΦDXH)		mm	540X1595	620X1620	540X1595	620X1620				
Packaged dimension	Height	mm	630	710	630	710				
	Width	mm	1620	1645	1620	1645				
	Depth	mm	625	705	625	705				
Net/Gross Weight		kg	68/77	71/80	82/92	87/97	68/77	71/80	82/92	87/97

## 7 PERFORMANCE CORRECTION

### ➔ 7.1 Correction of Temperature

#### Cooling Capacity Correction

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;

Performance correction					
Leaving Chilled Water °C (°F)	Ambient Temperature °C (°F)				
	25(77)	30(86)	35(95)	40(104)	45(113)
5(41.0)	0.995	0.955	0.905	0.855	0.805
6(42.8)	1.045	1.005	0.955	0.905	0.855
7(44.6)	1.090	1.050	1.000	0.950	0.900
8(46.4)	1.145	1.102	1.052	1.000	0.950
9(48.2)	1.190	1.150	1.100	1.050	1.002
10(50.0)	1.245	1.200	1.150	1.100	1.050
11(51.8)	1.290	1.250	1.202	1.152	1.102
12(53.6)	1.340	1.300	1.252	1.200	1.152
13(55.4)	1.390	1.350	1.302	1.252	1.202
14(57.2)	1.442	1.402	1.350	1.302	1.252
15(59.0)	1.490	1.450	1.400	1.350	1.302
18(64.4)	1.539	1.502	1.451	1.402	1.350

Computer of actual cooling capacity:

Actual cooling capacity = nominal cooling capacity × cooling capacity correction coefficient.

#### Heating Capacity Correction

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;

Performance correction									
Outflow Heated Water °C (°F)	Ambient Temperature °C (°F)								
	-15(5)	-10(14)	-5(23)	0(32)	5(41.0)	10(50.0)	15(59.0)	20(68.4)	25(77.4)
30(86)	0.81	0.91	1.00	1.10	1.18	1.26	1.35	1.41	1.45
35(95)	0.74	0.84	0.93	1.03	1.11	1.19	1.28	1.36	1.41
40(104)	0.67	0.77	0.87	0.96	1.04	1.12	1.20	1.25	1.31
45(113)	0.60	0.70	0.80	0.89	0.97	1.05	1.13	1.19	1.25
50(122)	0.53	0.63	0.73	0.82	0.90	0.98	1.06	1.11	1.18
55(131)	0.46	0.56	0.66	0.74	0.83	0.90	0.98	1.05	1.10

Computer of actual heating capacity:

Actual heating capacity = nominal heating capacity × heating capacity correction coefficient.



## 7.1 Correction of Connection Piping (Applied to Combined Unit)

Total Piping Length(Actual Length)			Correction Factor					
			7.5m	10m	15m	20m	25m	30m
Height between Indoor and Outdoor Unit	The Indoor Unit below the Outdoor Unit	0m	1.0	0.98	0.96	0.94	0.92	0.9
		5m	1.0	0.97	0.95	0.93	0.91	0.89
		10m	-	0.96	0.94	0.92	0.90	0.88
		15m	-	-	0.93	0.91	0.89	0.87
		20m	-	-	-	0.90	0.88	0.86
		25m	-	-	-	-	0.87	0.85
	The Outdoor Unit below the Indoor Unit	0m	1.0	0.98	0.96	0.94	0.92	0.9
		5m	1.0	0.98	0.96	0.94	0.92	0.9
		10m	-	0.98	0.96	0.94	0.92	0.9
		15m	-	-	0.96	0.94	0.92	0.9
		20m	-	-	-	0.94	0.92	0.9
		25m	-	-	-	-	0.92	0.9

## 8 ELECTRICAL DATA

Model	Power Supply	Leakage Switch	Minimum Sectional Area of Earth Wire	Minimum Sectional Area of Power Supply Wire	
	V Ph Hz	A	mm <sup>2</sup>	mm <sup>2</sup>	
DHW-CQ6Pd/Na-K(I)	220~240V-1Ph -50Hz	32	6	3×6	
DHW-CQ8Pd/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-CQ6Pd/Na-K(O)		32	6	3×6	
DHW-CQ8Pd/Na-K(O)		32	6	3×10	
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	

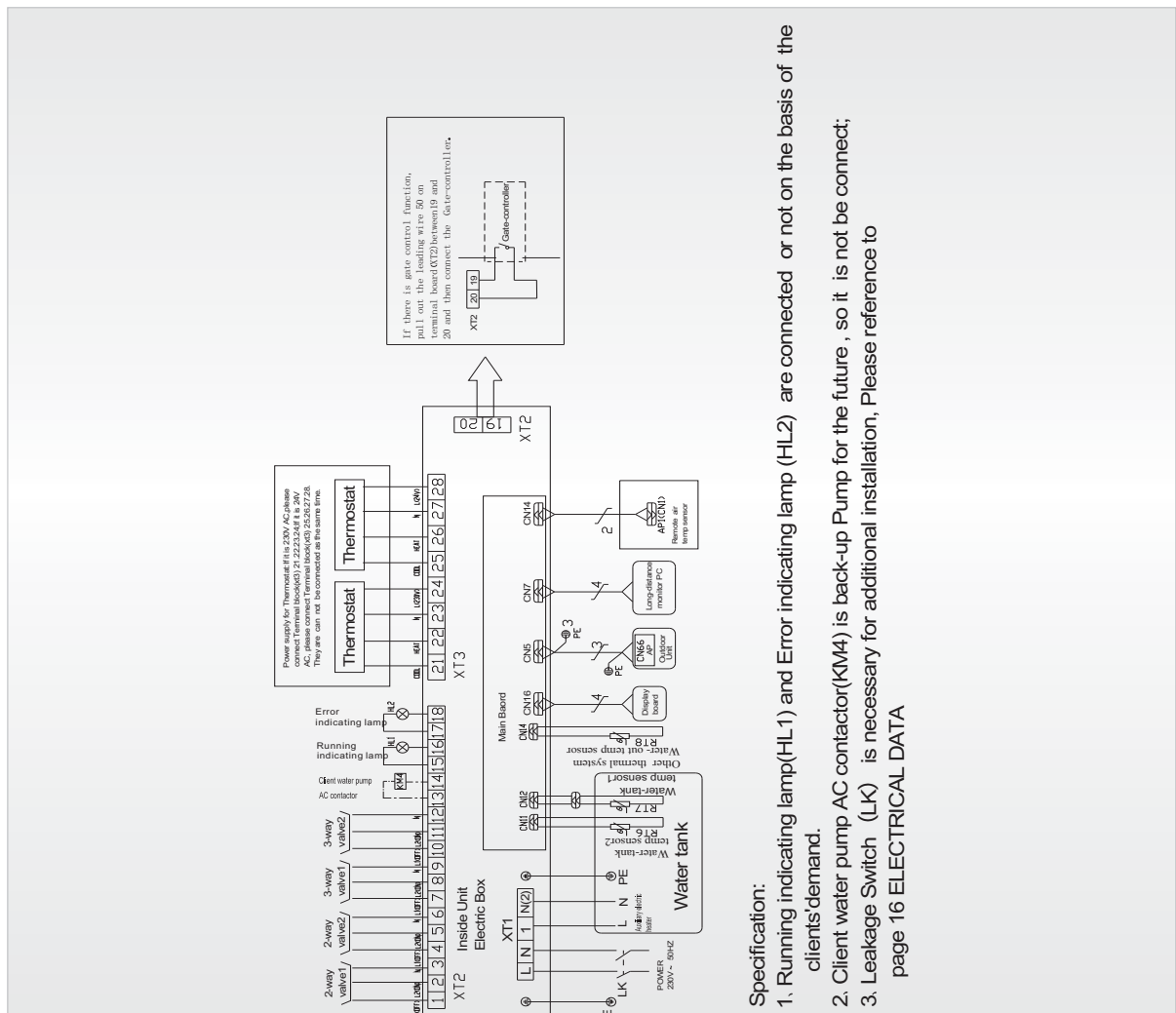


## Note

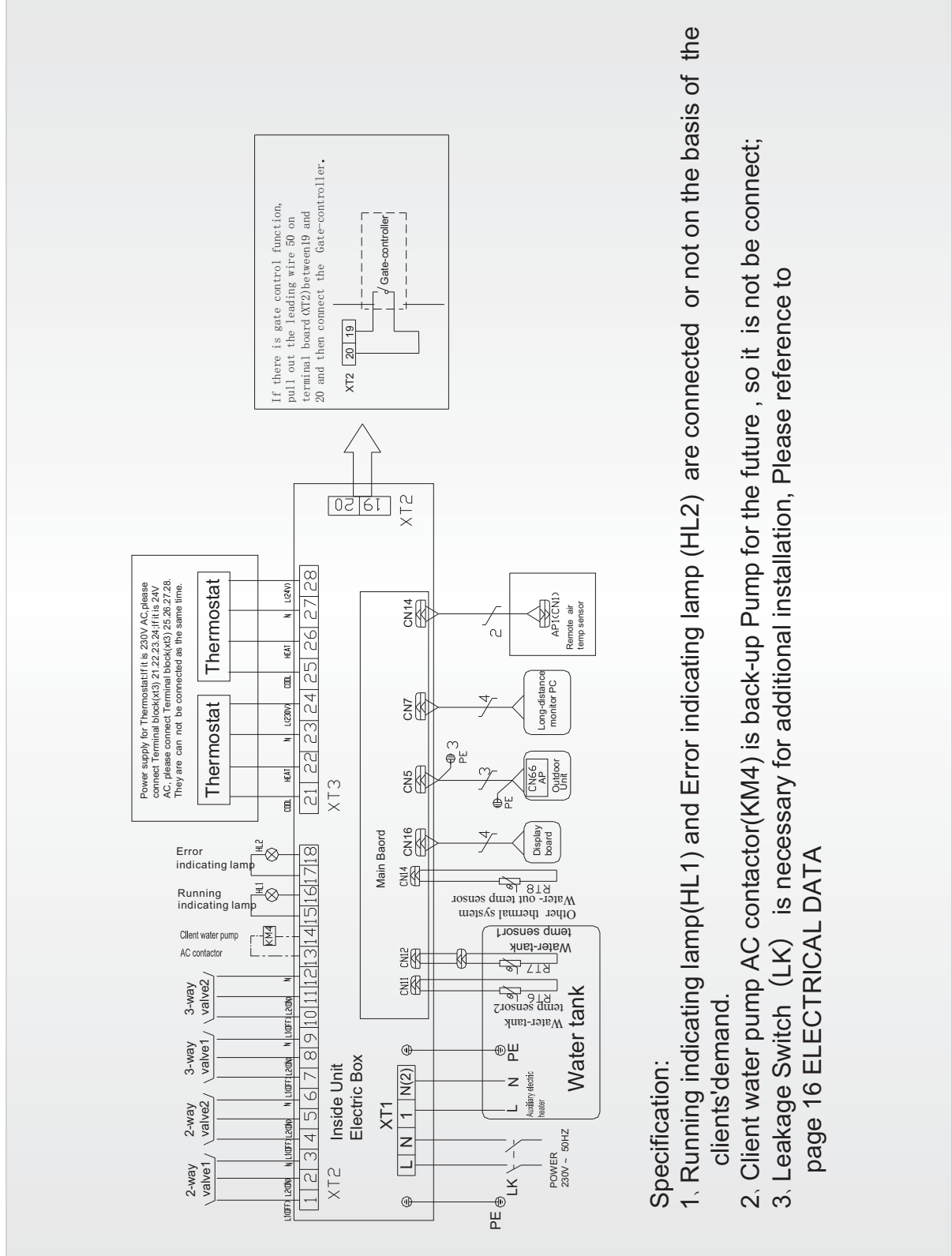
1. Power cables are copper core cable and copper connectors must be used for power cable connection.
2. Leakage Switch is necessary for additional installation. If circuit breakers with leakage protection are in use, action response time must be less than 0.1 second, leakage circuit must be 30mA.
3. 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.
4. Indoor/outdoor supply cable should be H05RN-F or above.
5. The power supply must be of rated voltage of the unit and special electrical line for air-conditioning.
6. All electrical installation shall be carried out by professional technicians in accordance with the local laws and regulations.
7. 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.

## 9 FIELD WIRING DIAGRAM

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:



**Specification:**

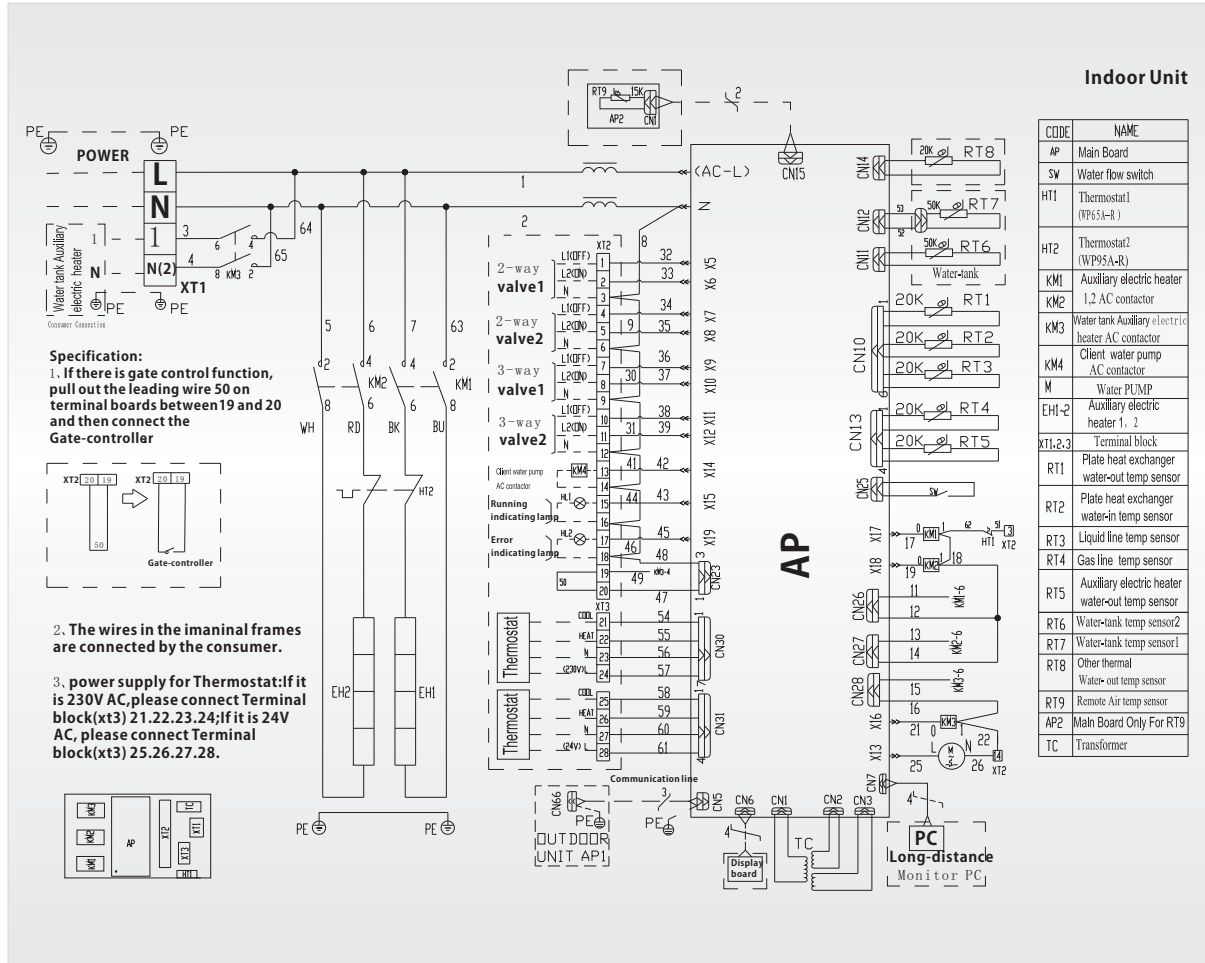
1. Running indicating lamp(HL1) and Error indicating lamp (HL2) are connected or not on the basis of the clients'demand.
2. Client water pump AC contactor(KM4) is back-up Pump for the future , so it is not be connect;
3. Leakage Switch (LK) is necessary for additional installation, Please reference to page 16 ELECTRICAL DATA

## 10 WIRING DIAGRAM

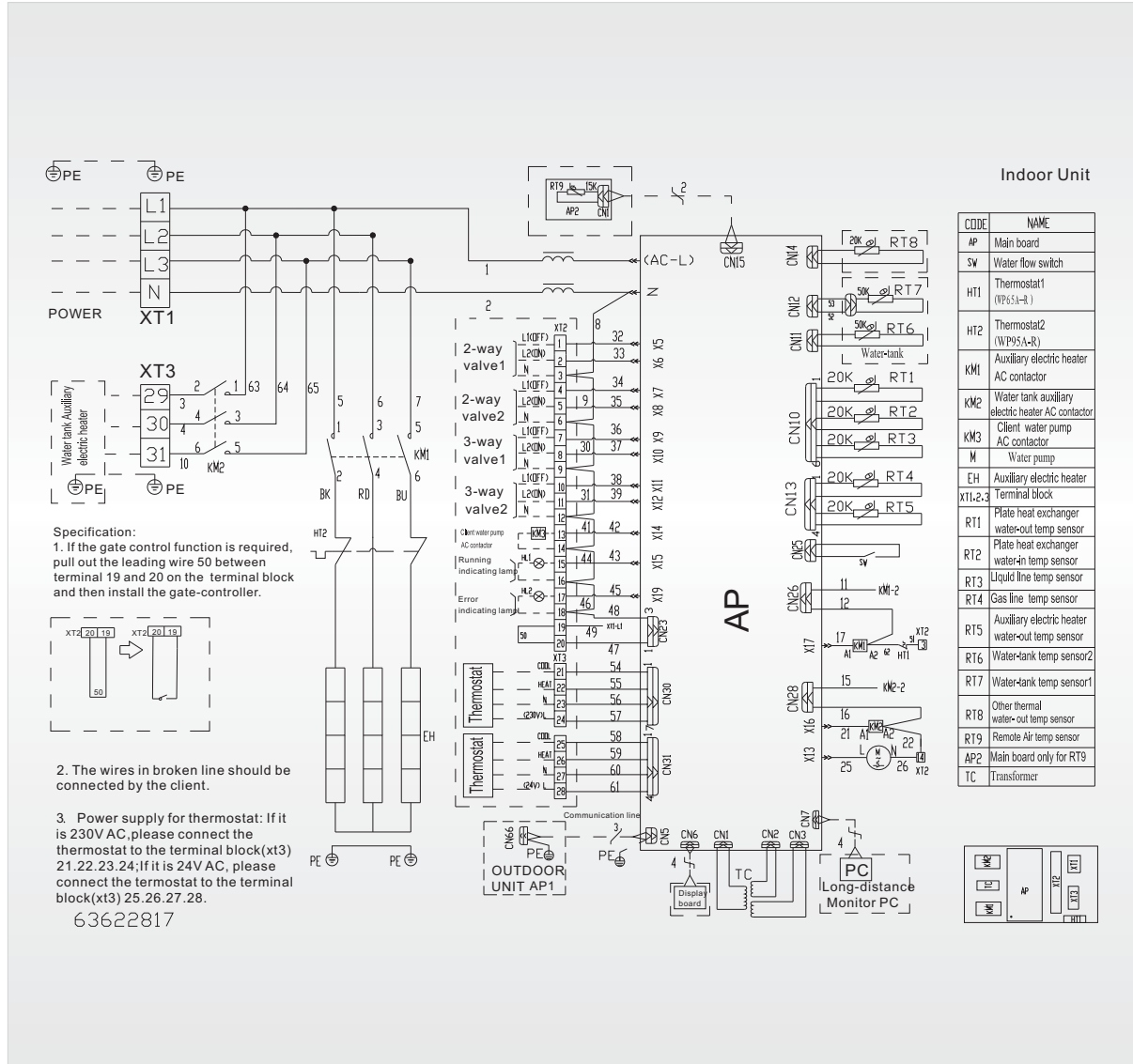


### 10.1 Indoor Unit

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):



**Remarks:**

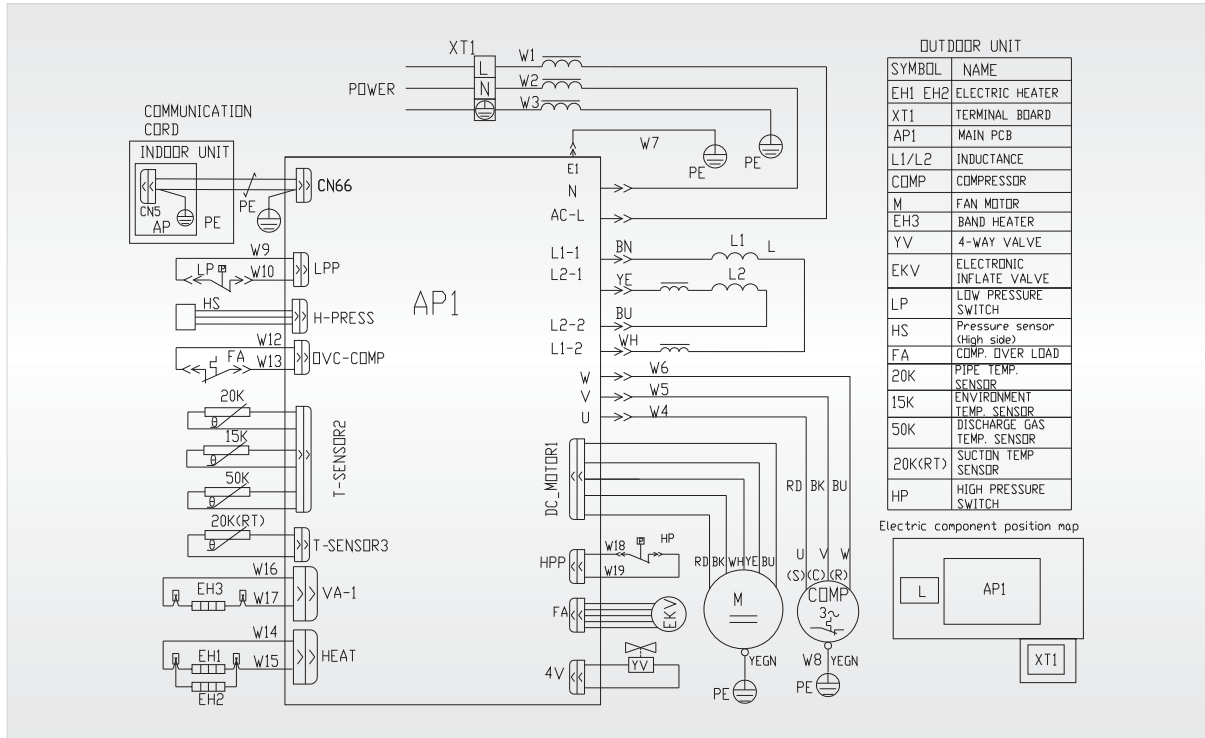
2-way valve 2 and 3-way valve 2 are the spare parts reserved for the user.

# VARIO Series of Air to Water Heat Pump Technical Sales Guide

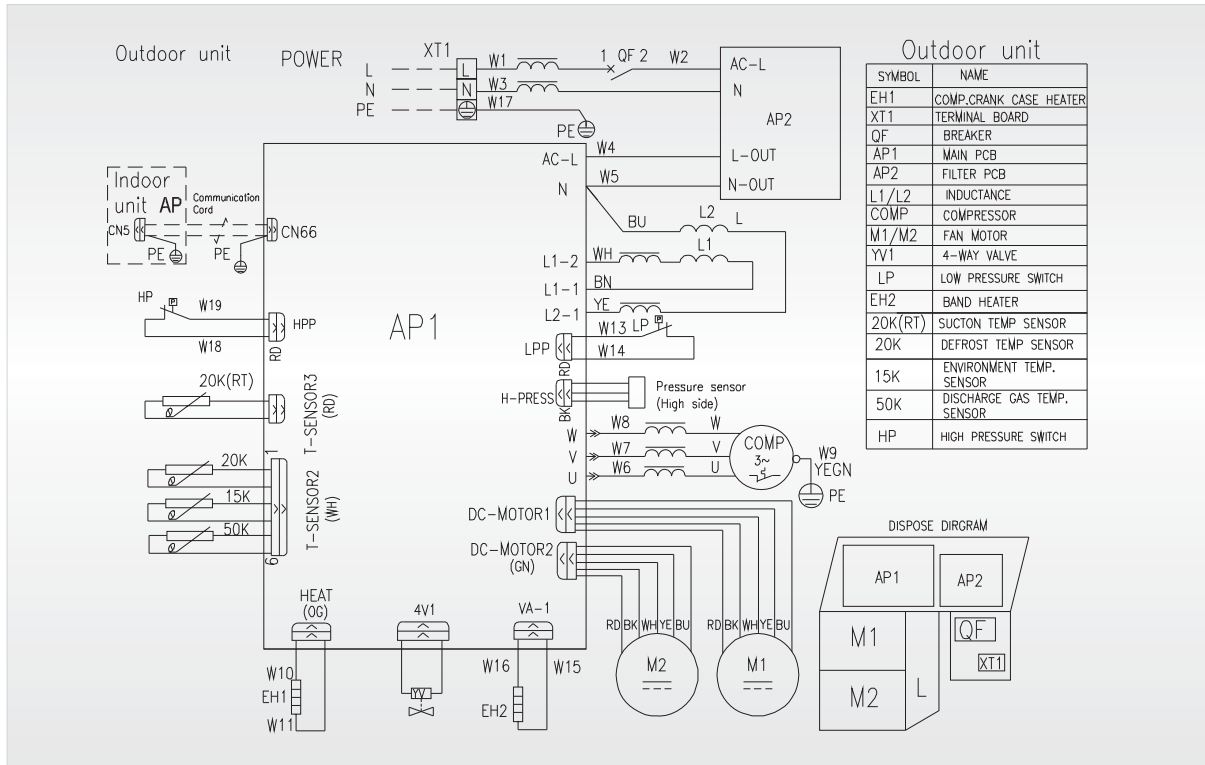


## 10.2 Outdoor Unit

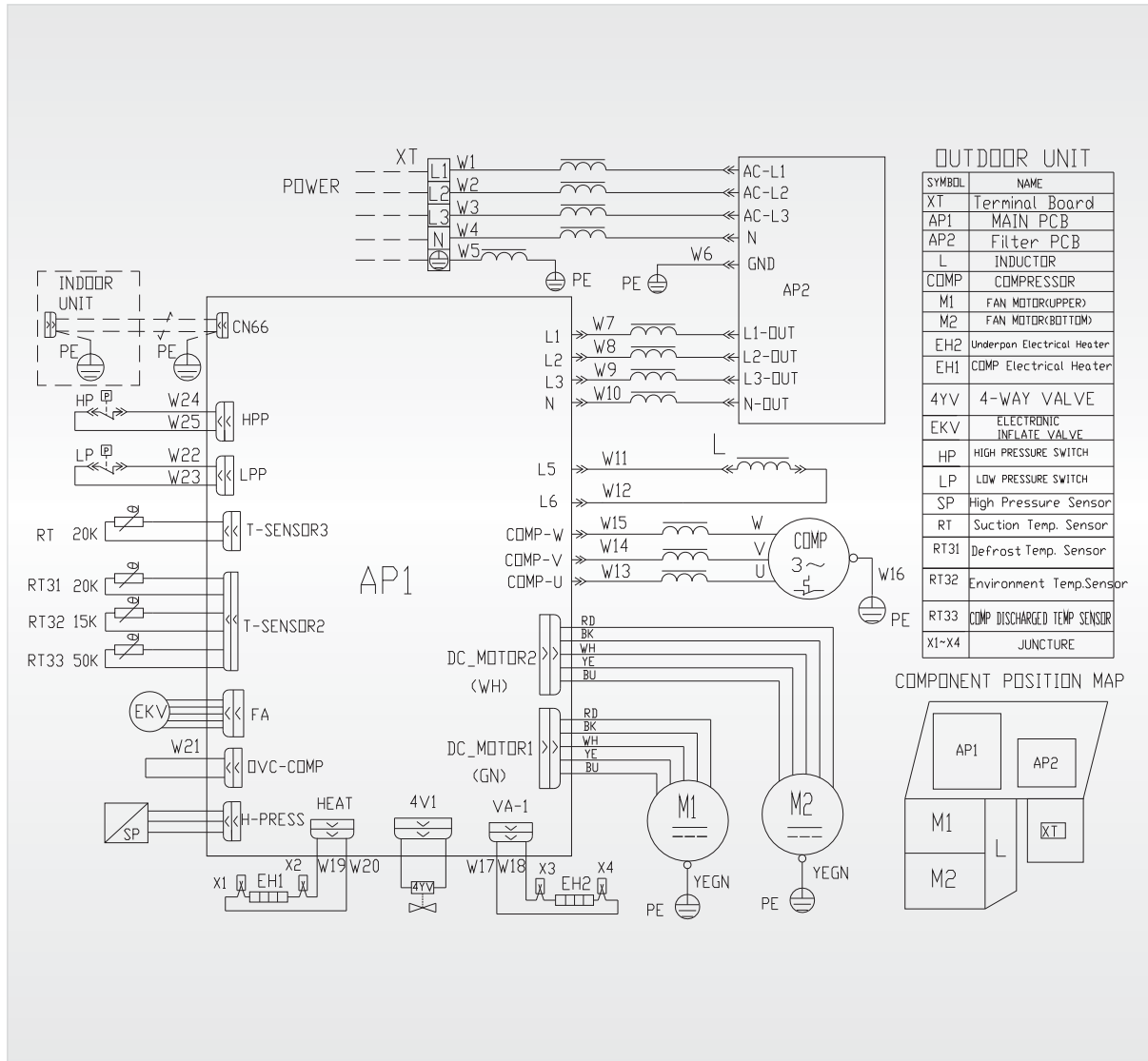
DHW-CQ6.0Pd/Na-K(O), DHW-CQ8.0Pd/Na-K(O), DHW-CQ10Pd/Na-K(O)



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



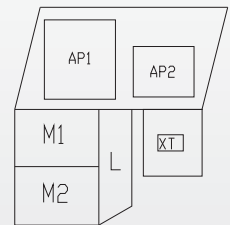
DHW-CQ12Pd/Na-M(O) ,DHW-CQ14Pd/Na-M(O),DHW-CQ16Pd/Na-M(O)



OUTDOOR UNIT

SYMBOL	NAME
XT	Terminal Board
AP1	MAIN PCB
AP2	Filter PCB
L	INDUCTOR
COMP	COMPRESSOR
M1	FAN MOTOR(UPPER)
M2	FAN MOTOR(BOTTOM)
EH2	Underpan Electrical Heater
EH1	COMP Electrical Heater
4YV	4-WAY VALVE
EKV	ELECTRONIC INFLATE VALVE
HP	HIGH PRESSURE SWITCH
LP	LOW PRESSURE SWITCH
SP	High Pressure Sensor
RT	Suction Temp. Sensor
RT31	Defrost Temp. Sensor
RT32	Environment Temp.Sensor
RT33	COMP DISCHARGED TEMP SENSOR
X1-X4	JUNCTURE

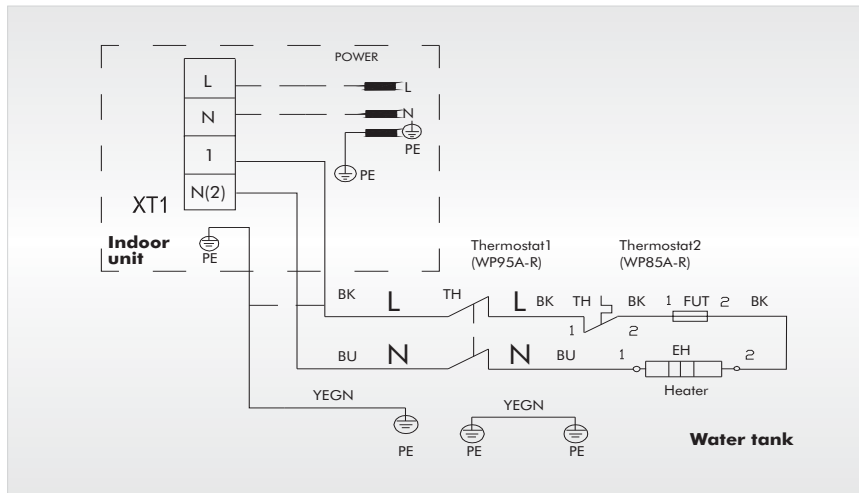
COMPONENT POSITION MAP



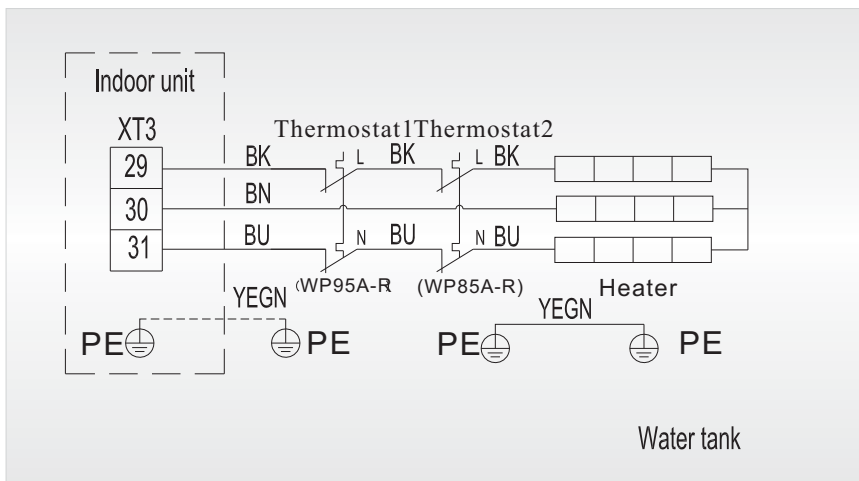


## 10.3 Water Tank

AT200LCJ/A-K ,AT200LCJ2/A-K ,AT300LCJ/A-K ,AT300LCJ2/A-K



AT200LCJ/A-M,AT200LCJ2/A-M ,AT300LCJ/A-M,AT300LCJ2/A-M



# 11 INSTALLATION



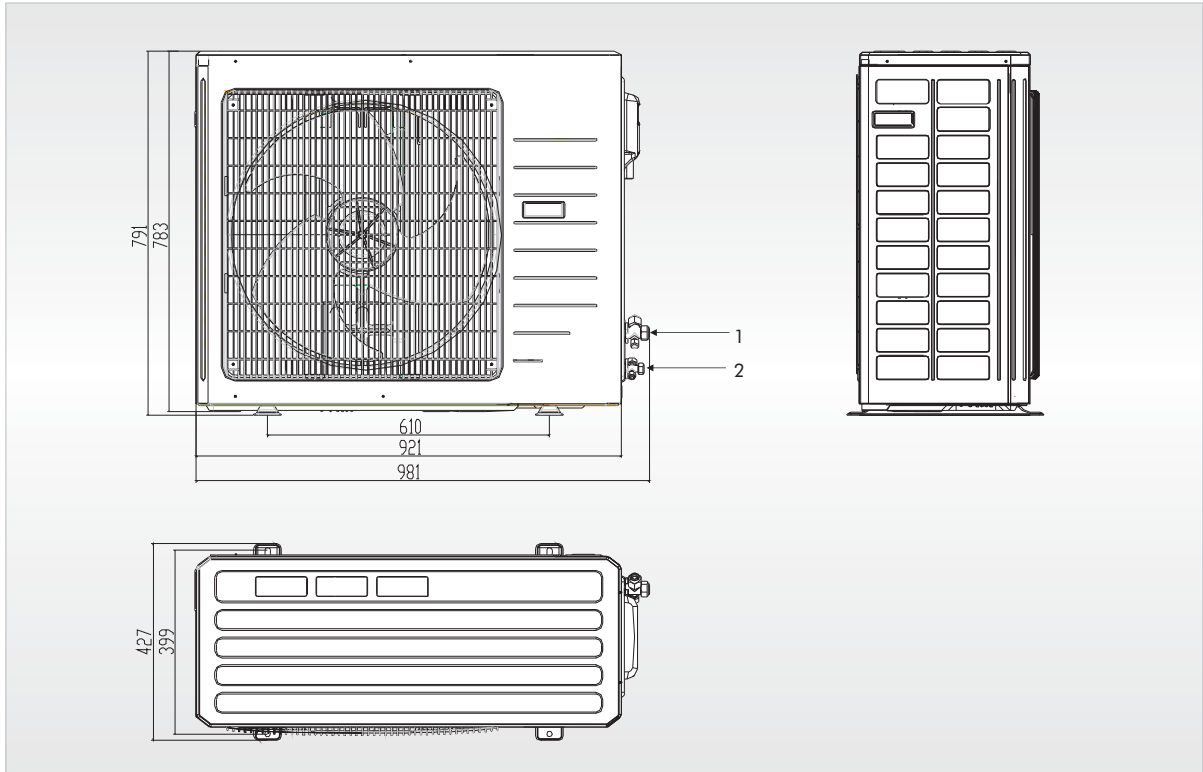
## 11.1 Installation of Outdoor Unit

### Select Installation Location of Outdoor Unit

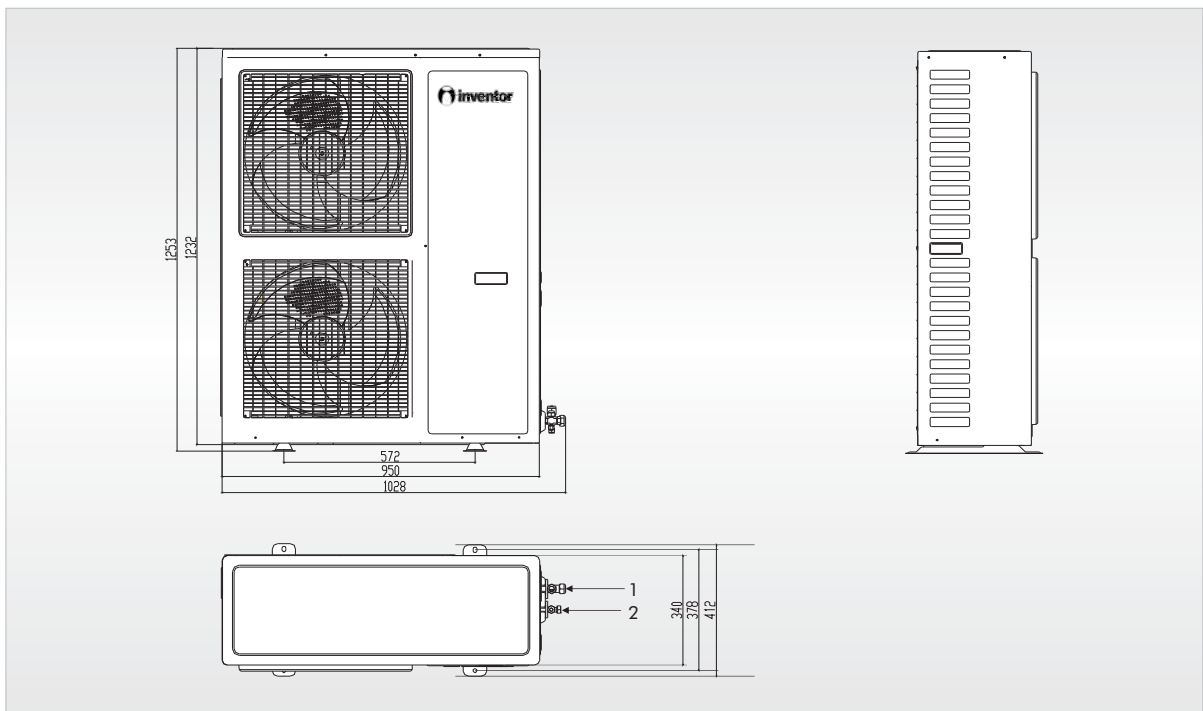
- ◆ Outdoor unit must be installed on a firm and solid support.
- ◆ Outdoor unit shall be installed close to the indoor unit, so as to minimize the length and bends of cooling pipe.
- ◆ Avoid placing the outdoor unit under window or between two constructions, so as to prevent normal operating noise from entering the room.
- ◆ Air 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.

### 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):





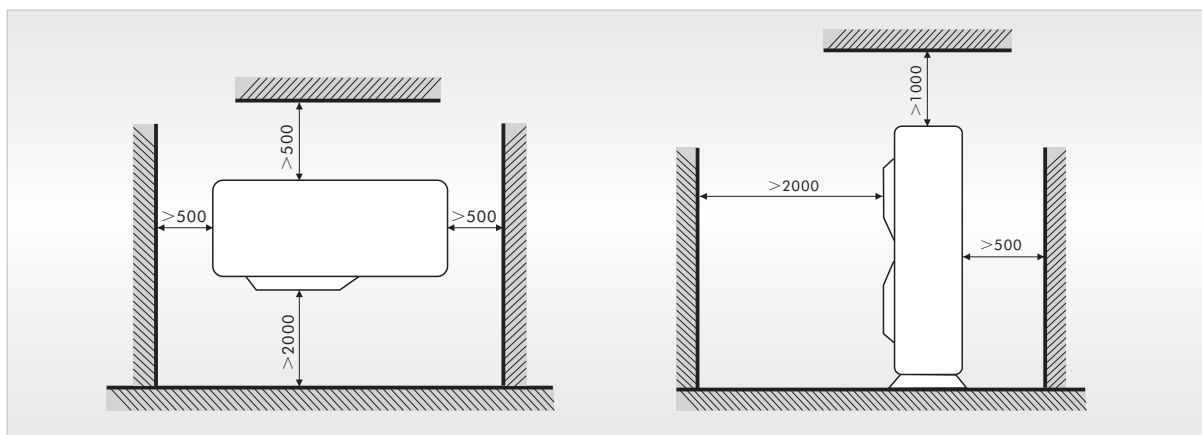
# VARIO Series of Air to Water Heat Pump Technical Sales Guide

Pipe connection

Unit: inch

No	Name	Remarks	
1	Liquid-side Service Valve	3/8	DHW-CQ8/10/12/14/16Pd/Na-K DHW-CQ12/14/16Pd/Na-M
		1/4	DHW-CQ6.0Pd/Na-k
2	Gas-side Service Valve	5/8	DHW-CQ8/10/12/14/16Pd/Na-K DHW-CQ12/14/16Pd/Na-M
		1/2	DHW-CQ6.0Pd/Na-k

## Space Requirements for Installation



## Installation Precautions of Outdoor Unit

- ◆ When moving the outdoor unit, it is necessary to adopt 2 pieces of long enough rope to carry 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 shifting.
- ◆ Adopt M12 bolts subassembly to tighten the feet and under the frame when installing.
- ◆ Outdoor unit should be installed on concrete base that is 10cm high.
- ◆ Requirements on installation space dimension of unit 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.



## 11.2 Installation of Indoor Unit

### 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 the air conditioner.
- ◆ Drainage pipe is easy to connect.
- ◆ Indoor and outdoor connecting 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 where there is corrosive gas, severe dust, salty fog, smoke or heavy moisture.
- ◆ Air inlet and outlet air is not blocked.

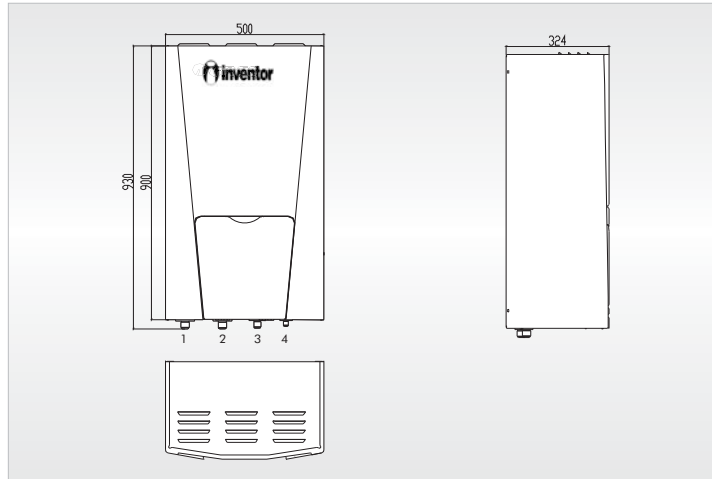
Note:

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.

### 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):



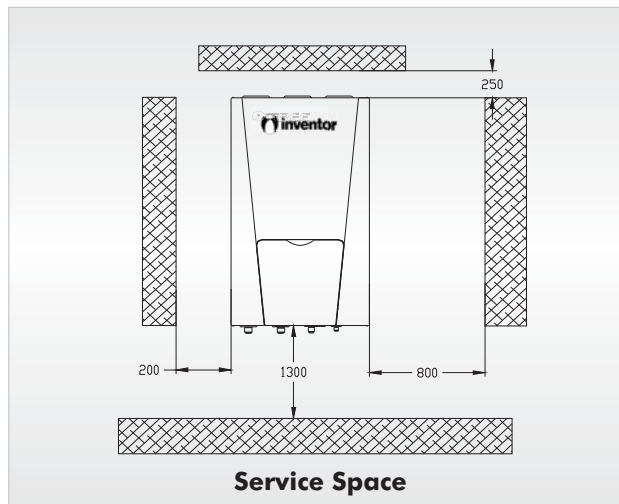
Pipe connection

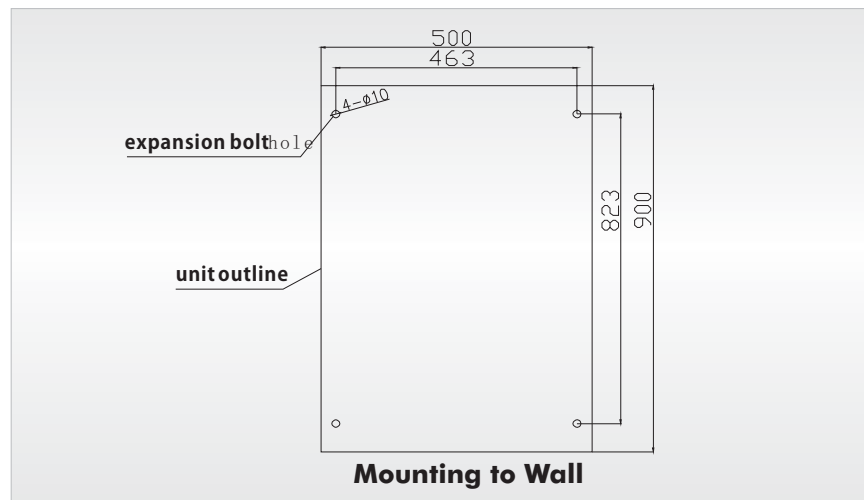
Unit: inch

No	Name		Remarks
1	Water Outlet Pipe		1" Male BSP
2	Water Inlet Pipe		1" Male BSP
3	Liquid-side Service Valve	3/8	DHW-CQ8/10/12/14/16Pd/Na-K DHW-CQ12/14/16Pd/Na-M
		1/4	DHW-CQ6.0Pd/Na-k
4	Gas-side Service Valve	5/8	DHW-CQ8/10/12/14/16Pd/Na-K DHW-CQ12/14/16Pd/Na-M
		1/2	DHW-CQ6.0Pd/Na-k

### Space Requirements of 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):





## Precautions on Installation of Indoor Unit

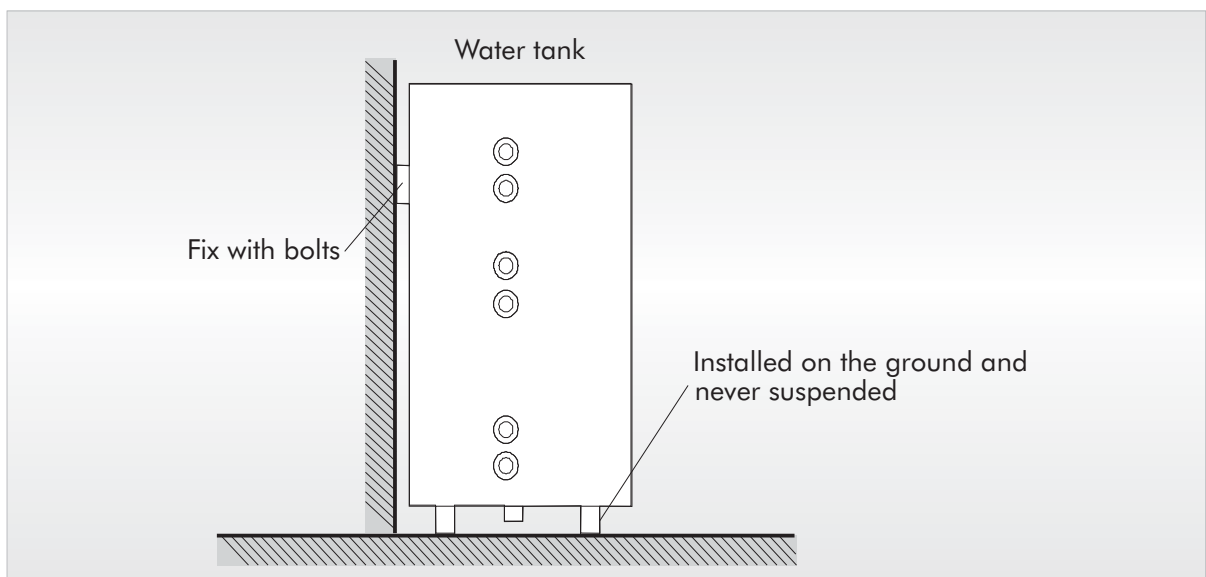
- ◆ Indoor unit shall be vertically mounted on the wall of the room with expansion bolt.
- ◆ Keep the indoor unit away from heat sources like heat sink and so on in the room as much as possible.
- ◆ Keep the indoor unit as close as possible to outdoor unit. Level distance between connection pipes can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



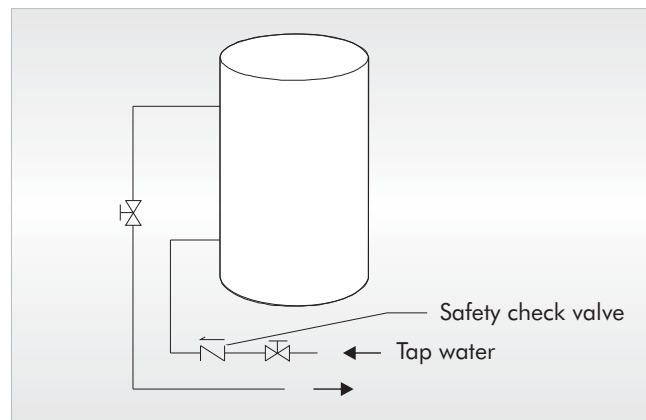
## 11.3 Installation of Insulated Water Tank

### Installation Measure

- ◆ The insulated water tank should be installed and kept 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.



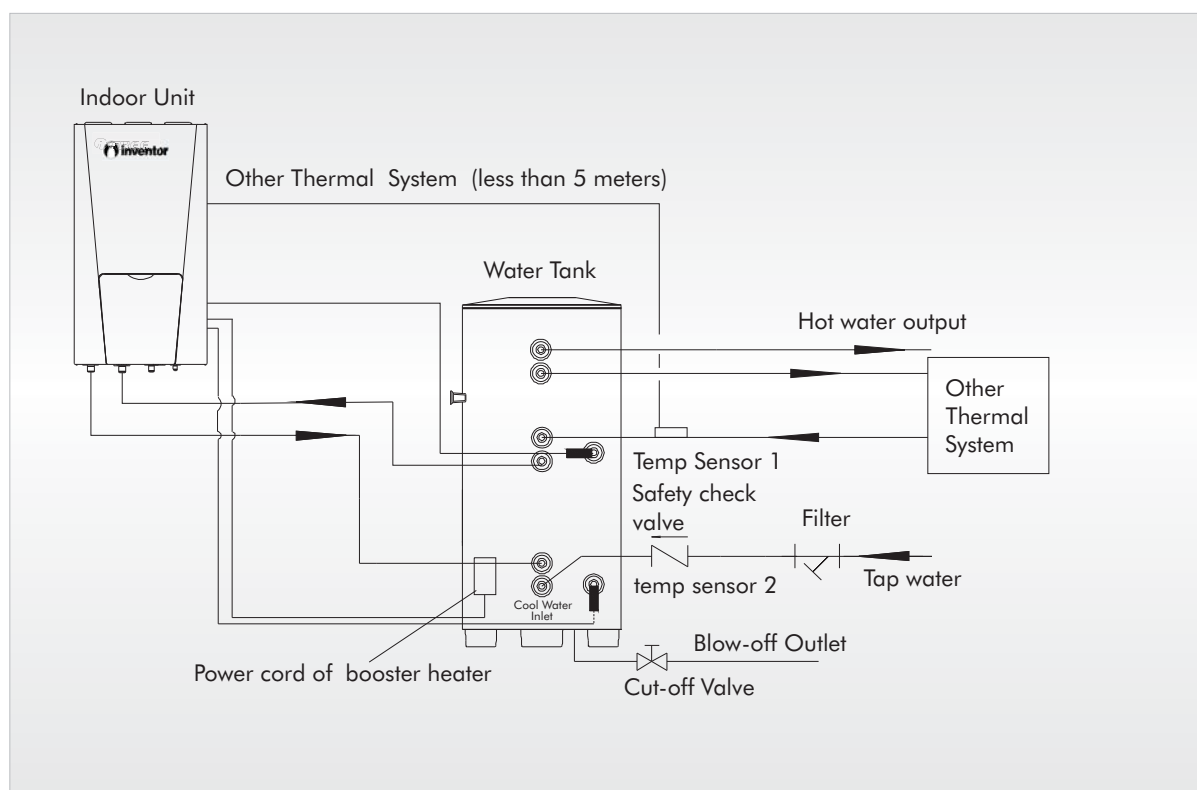
#### Note

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.

#### Connection of Waterway System

- ◆ If connection between water tank and indoor unit should be through the wall, drill a hole 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 outer diameter of dn25. S2.5 series (wall thickness of 4.2mm) is recommended. Cooling water inlet pipe and hot water outlet pipe of water tank should also be hot water pipe, PPR pipe with nominal outer diameter of dn20. S2.5 series (wall thickness of 3.4mm) is recommended. If other insulated pipes are adopted, refer to the above dimensions for outer 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 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 (→ 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.

# VARIO Series of Air to Water Heat Pump Technical Sales Guide



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

## Note

- ◆ Distance between main unit and insulated 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.

## 12 ACCESSORIES

Name	Standard	Optional	Field supplied
Owner's Manual	✓		
Control panel Manual	✓		
2-way valve			✓
3-way valve			✓
Remote Temperature Sensor	✓		
Wired controller	✓		
Communication cable	✓		
Water tank temp. Sensor	✓		
Expansion bolt	✓		
Water pressure gauge	✓		

