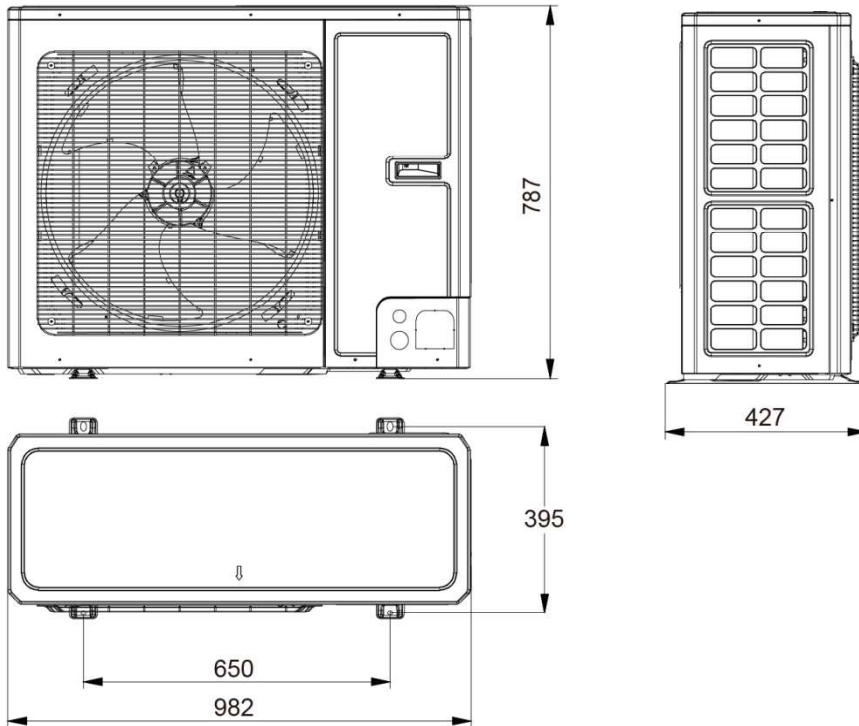


Air-to-water Heat Pump Split Unitherm

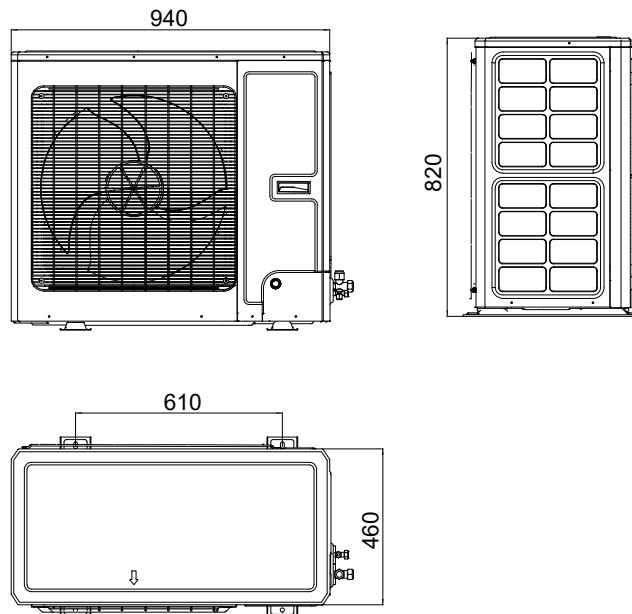
(2) CH-HP8.0SIRK4(O), CH-HP10SIRK4(O)

Unit:mm



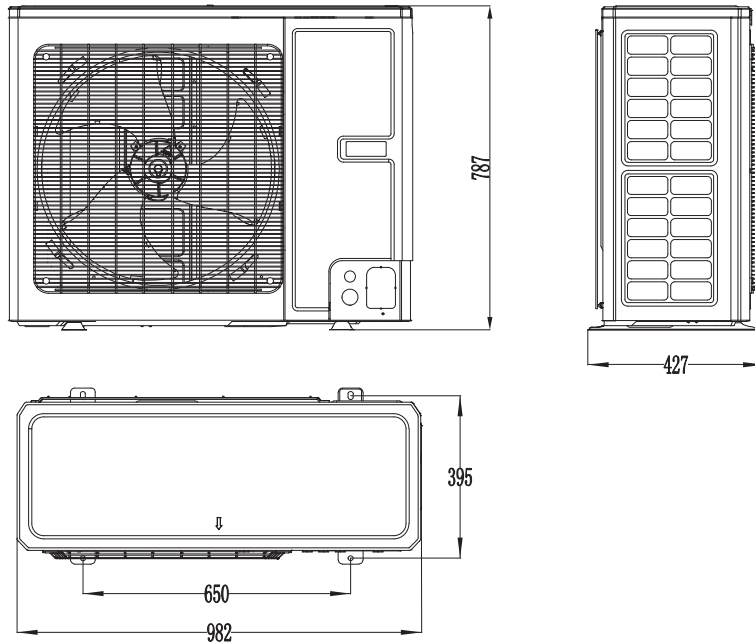
(3) CH-HP12SIRM4(O) , CH-HP14SIRM4(O), CH-HP16SIRM4(O), CH-HP12SIRK4(O) , CH-HP14SIRK4(O), CH-HP16SIRK4(O)

Unit:mm



(4) CH-HP8.0SIRM4(O), CH-HP10SIRM4(O)

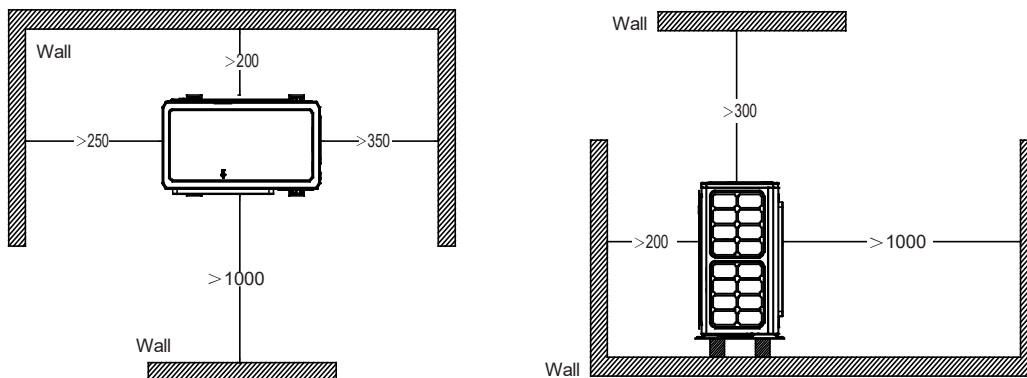
Unit:mm



Description:

No.	Name	Remarks	
1	Liquid-side Service Valve	1/4	CH-HP4.0SIRK4, CH-HP6.0SIRK4 CH-HP8.0SIRK4, CH-HP10SIRK4 CH-HP12SIRK4, CH-HP14SIRK4, CH-HP16SIRK4, CH-HP8.0SIRM4, CH-HP10SIRM4, CH-HP12SIRM4, CH-HP14SIRM4, CH-HP16SIRM4
2	Gas-side Service Valve	1/2	CH-HP4.0SIRK4, CH-HP6.0SIRK4 CH-HP8.0SIRK4, CH-HP10SIRK4 CH-HP8.0SIRM4, CH-HP10SIRM4
3	Gas-side Service Valve	5/8	CH-HP12SIRM4, CH-HP14SIRM4, CH-HP16SIRM4, CH-HP12SIRK4, CH-HP14SIRK4, CH-HP16SIRK4

**4.4.4 Space requirements for installation**



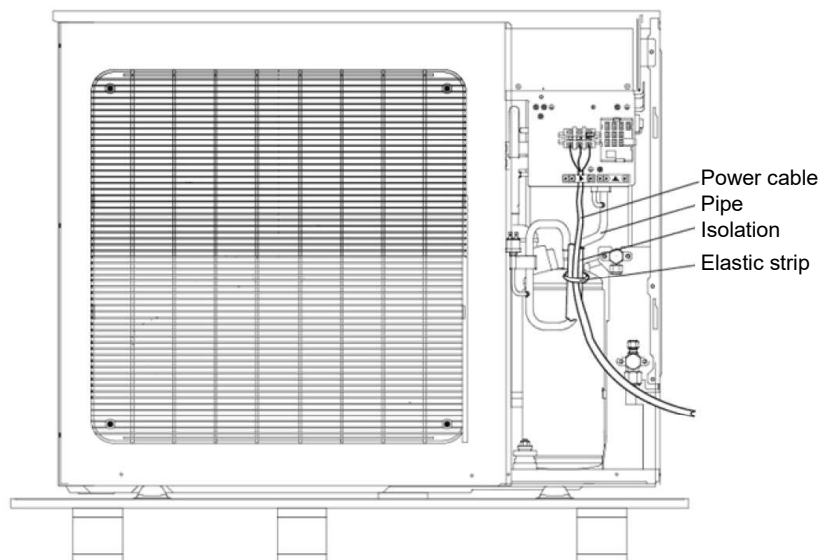
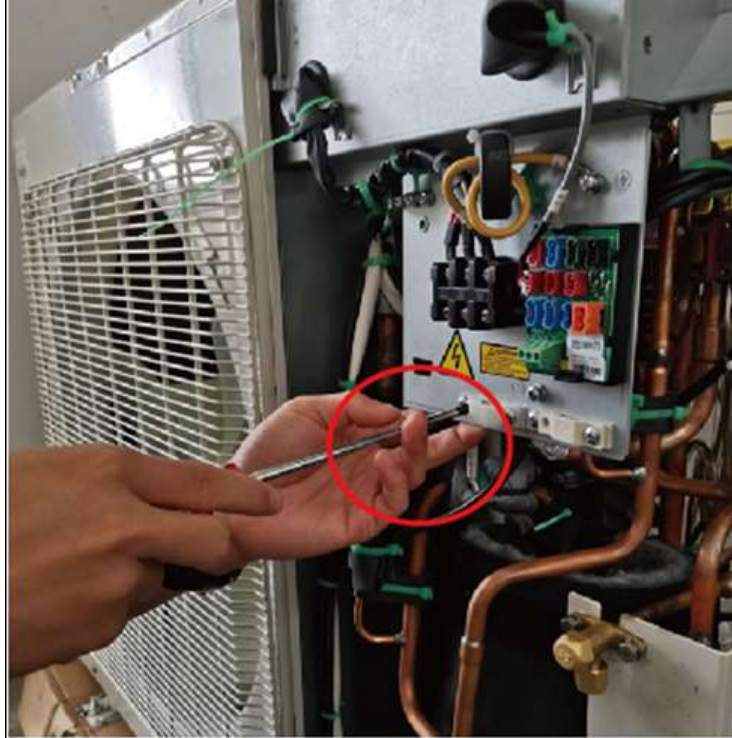
**4.4.5 Precautions on installation of outdoor unit**

- (1) 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°C below to prevent center of the unit from moving.
- (2) Adopt M12 bolts components to tighten feet and under frame when installing.

## Air-to-water Heat Pump Split Unitherm

- (3) Outdoor unit should be installed on concrete base that is 10cm height.
- (4) Requirements on installation space dimension of unit's bodies are shown in following drawing.
- (5) 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.

Note: when release and refix the screw of the clasper, should use your hand to support the panel. And then, after connected power cable, please ensure using the elastic trip of accessory to tighten with the pipe.



### 4.4.6 Safety operation of flammable refrigerant

- ◆ Qualification requirement for installation and maintenance man

All the work personnel who are engaging in the refrigeration system should have got the valid certification awarded by the authoritative organization and the qualification for dealing with the refrigeration system recognized by this industry.

If it needs other technician to maintain and repair the appliance, they should be supervised by the person who bears the qualification for using the flammable refrigerant. It can only be repaired by the method suggested by the equipment's manufacturer.

◆ Installation notes

The unit is not allowed to use in a room that has running fire (such as fire source, working coal gas ware, operating heater).

It is not allowed to drill hole or burn the connection pipe.

The unit must be installed in a room that is larger than the minimum room area. The minimum room area is shown on the nameplate or following table.

Leak test is a must after installation.

Minimum room area (m <sup>2</sup> )	Charge amount(kg)	≤1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4	2.5
	floor location	/	14.5	16.8	19.3	22	24.8	27.8	31	34.3	37.8	41.5	45.4	49.4	53.6
	window mounted	/	5.2	6.1	7	7.9	8.9	10	11.2	12.4	13.6	15	16.3	17.8	19.3
	wall mounted	/	1.6	1.9	2.1	2.4	2.8	3.1	3.4	3.8	4.2	4.6	5	5.5	6
	ceiling mounted	/	1.1	1.3	1.4	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.7	4

Maintenance notes

(1) Check whether the maintenance area or the room area meet the requirement.

- It's only allowed to be operated in the rooms that meet the requirement.

(2) Check whether the maintenance area is well-ventilated.

- The continuous ventilation status should be kept during the operation process.

(3) Check whether there is fire source or potential fire source in the maintenance area.

- The naked flame is prohibited in the maintenance area; and the "no smoking" warning board should be hanged.

(4) Check whether the appliance mark is in good condition.

- Replace the vague or damaged warning mark.

◆ Welding

If you should cut or weld the refrigerant system pipes in the process of maintaining, please follow the steps as below:

(a) Shut down the unit and cut off power supply

(b) Recover the refrigerant

(c) Vacuuming

(d) Clean it with N<sub>2</sub> gas

(e) Cutting or welding

(f) Carry back to the service spot for welding

The refrigerant should be recycled into the specialized storage tank.

Make sure that there isn't any naked flame near the outlet of the vacuum pump and it's well-ventilated.

◆ Filling the refrigerant

(1) Use the refrigerant filling appliances specialized for R32. Make sure that different kinds of refrigerant won't contaminate with each other.

(2) The refrigerant tank should be kept upright at the time of charging refrigerant.

(3) Stick the label on the system after filling is finished (or haven't finished).

(4) Don't overfilling.

(5) After filling is finished, please do the leakage detection before trial run; another time of leak detection should be done when it's removed.

◆ Safety instructions for transportation and storage

(1) Please use the flammable gas detector to check before unload and open the container.

(2) No fire source and smoking.

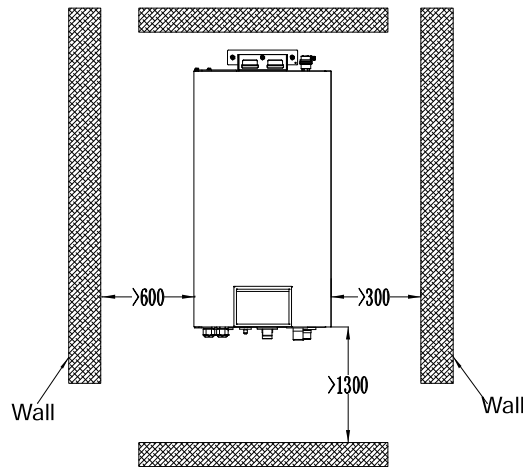
(3) Comply with the local rules and laws.

## 4.5 Installation of Indoor Unit

### 4.5.1 Select installation location of indoor unit

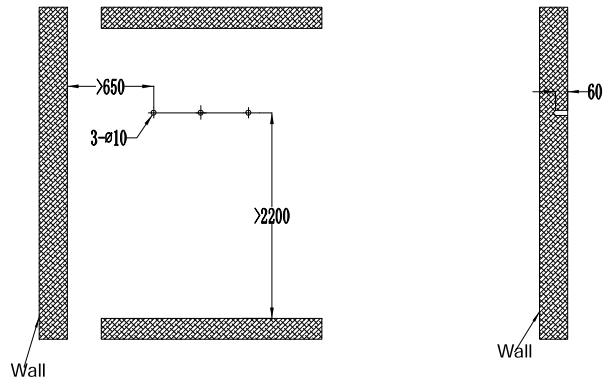
- (1) Avoid direct sunshine.
- (2) Ensure the hanger rod, ceiling and building structure have sufficient strength to support the weight of air conditioner unit.
- (3) Drainage pipe is easy to connect out.
- (4) Indoor and outdoor connection pipes are easy to go outdoors.
- (5) Do not install at a place where inflammable or explosive goods exist or inflammable or explosive gas might leak.
- (6) Do not install at a place subject to corrosive gas, severe dust, salty fog, smoke or heavy moisture.

### 4.5.2 Space requirements for installation

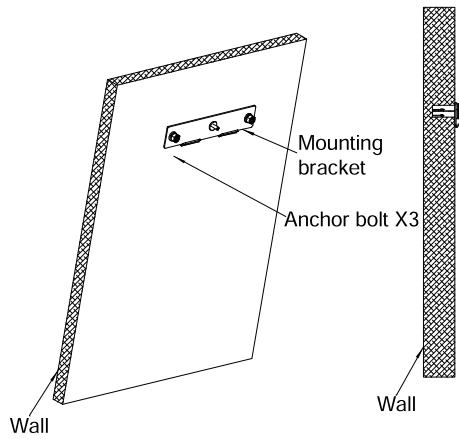


### 4.5.3 Install process of indoor unit

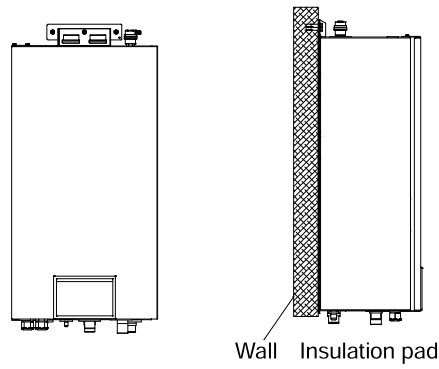
Step1:Drill holes on the wall in the following drawing.



Step2: Install expansion bolts and forecasted panel.



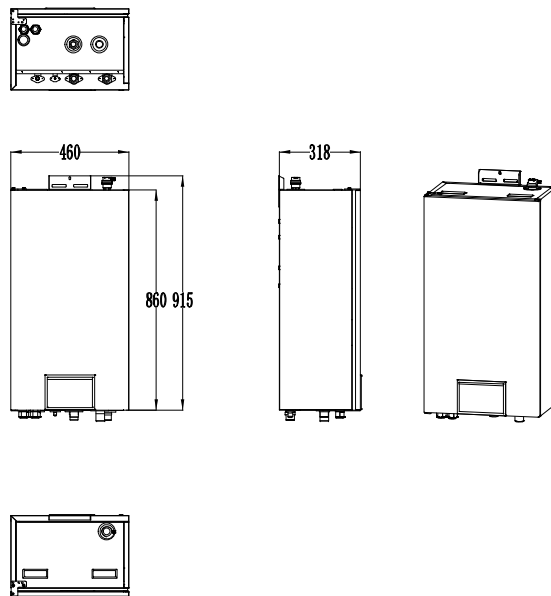
Step3: Attaching indoor unit to the wall.



**Notes**

- (a) While lifting the indoor unit, at least two persons should be joined. Weight of the indoor unit is more than 50kg.
- (b) The indoor unit must be installed vertically to the ground and fastened securely.
- (c) Before commissioning, the dust-proof cap of the automatic relief valve must be loosened, other than entirely being removed away, and it can be tightened in case that it leaks.

**4.5.4 Outline dimension of indoor unit**



Unit: inch

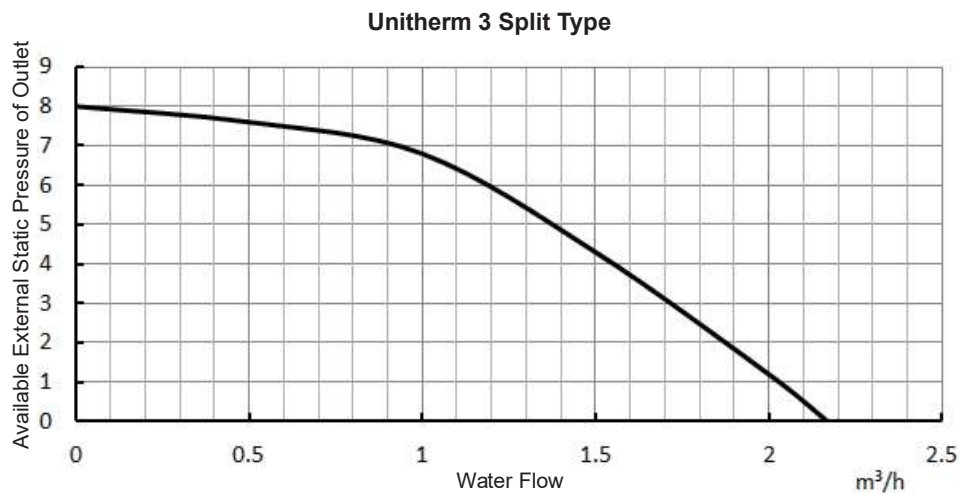
## Air-to-water Heat Pump Split Unitherm

No.	Name	Remark	
1	Leaving Water Pipe	1"Male BSP	
2	Returning Water Pipe	1"Male BSP	
3	Liquid-side Pipe	1/4	CH-HP4.0SIRK4(I), CH-HP6.0SIRK4(I) CH-HP8.0SIRK4(I), CH-HP10SIRK4(I) CH-HP8.0SIRM4(I), CH-HP10SIRM4(I)
4	Gas-side Pipe	1/2	CH-HP4.0SIRK4(I), CH-HP6.0SIRK4(I) CH-HP8.0SIRK4(I), CH-HP10SIRK4(I) CH-HP8.0SIRM4(I), CH-HP10SIRM4(I)
5	Gas-side Pipe	5/8	CH-HP12SIRM4(I), CH-HP14SIRM4(I), CH-HP16SIRM4(I),CH-HP12SIRK4(I), CH-HP14SIRK4(I), CH-HP16SIRK4(I)

### 4.5.5 Precautions on installation of indoor unit

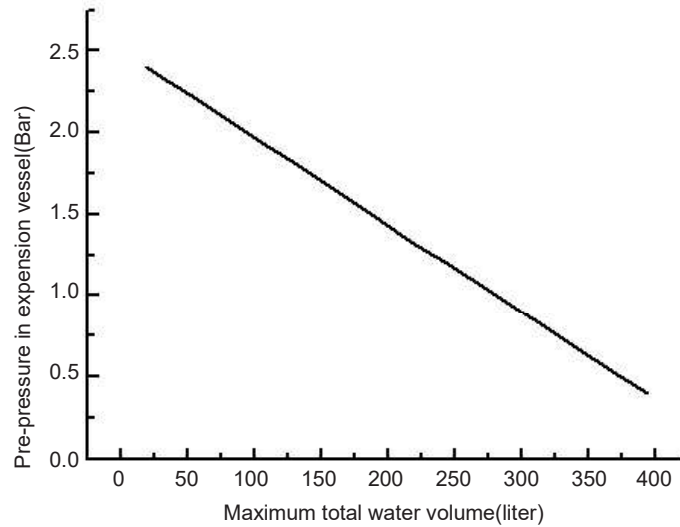
- (1) Indoor unit shall be vertically mounted on the wall of the room with expansion bolt.
- (2) Keep the indoor unit away from heat sources like heat sink and so on in the room as much as possible.
- (3) Keep the indoor unit as close as possible to outdoor unit. Level distance between connection pipes cannot exceed 20m(4.0~6.0kW) or 25m (8.0~10kW) and vertical distance cannot exceed 15m.

### 4.5.6 Available External Static Pressure of Outlet



Note: see the curve above for the maximum external static pressure. The water pump is of variable frequency. And during operation, the water pump will adjust its output based on the actual load.

**4.5.7 Water volume and expansion vessel pressure**



**Notes**

- (a) The expansion vessel is 10 liter and 1bar pre-pressurized;
- (b) Total water volume of 230 liter is default; if total water is changed because of installation condition, the prepressure should be adjusted to secure proper operation. If the indoor unit is located at the highest position, adjustment is not required;
- (c) Minimum total water volume is 20 liter;
- (d) To adjust pre-pressure, use nitrogen gas by certificated installer.
- (e) For the reliability of system defrosting, the minimum water capacity requirement is 5L/kW, that is, the 10kW unit has a minimum water capacity of 50L.

**4.5.8 The method of calculating the charging pressure of expansion vessel**

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:

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

(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 <sup>1</sup> difference	Water volume	
	≤230L	>230L
<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. Please install additional expansion vessel at the external water circuit.

**Notes**

- (a) 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 10kW unit is installed 5m below the highest spot of water system and the total volume of the water system is 230L.



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

**Example 2:** The unit is installed on the highest spot of the water system and the total water volume is 300L.

(b) As the volume of water system is higher than 230L, it is necessary to adjust the pressure of the expansion vessel be lower.

(c) The formula of calculating pressure:  $P_g = (H/10 + 0.3) = (6/10 + 0.3) = 0.9 \text{ Bar}$

(d) The maximum volume of the water system is about 300L. As the actual volume of the water system is 300L, the expansion vessel meets the installing requirement.

(e) Adjust the pre-set pressure of the expansion vessel from 1.0Bar to 0.9Bar.

**4.5.9 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

P1--- Pre-set pressure of expansion vessel

P2-- The highest pressure during running of the system (that is the action pressure of safety valve.)

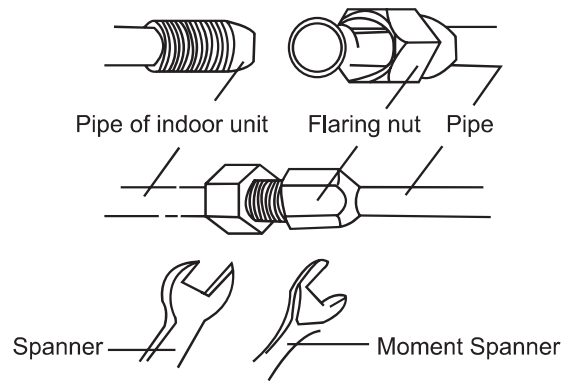
e---The expansion factor of water (the difference between the expansion factor of the original water temperature and that of highest water temperature.)

Water expansion factor in different temperature	
Temperature	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

**4.6 Connection of Pipeline**

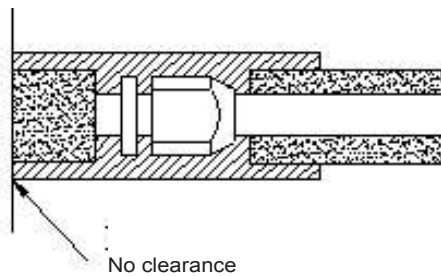
**4.6.1 Connection of outlet pipe for indoor & outdoor unit**

- (1) Align the expansion end of copper pipe with the center of threaded joint. Tighten the flaring nuts with your hands.
- (2) Tighten the flaring nuts with torque wrench until you hear a “cli ck”.
- (3) Bend of fitting pipe shall not be too low; otherwise the fitting pipe might crack. Please use pipe bender when bending the fitting pipe.
- (4) 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.
- (5) Connecting pipe shall be supported by a rack without transmitting its weight to other units.

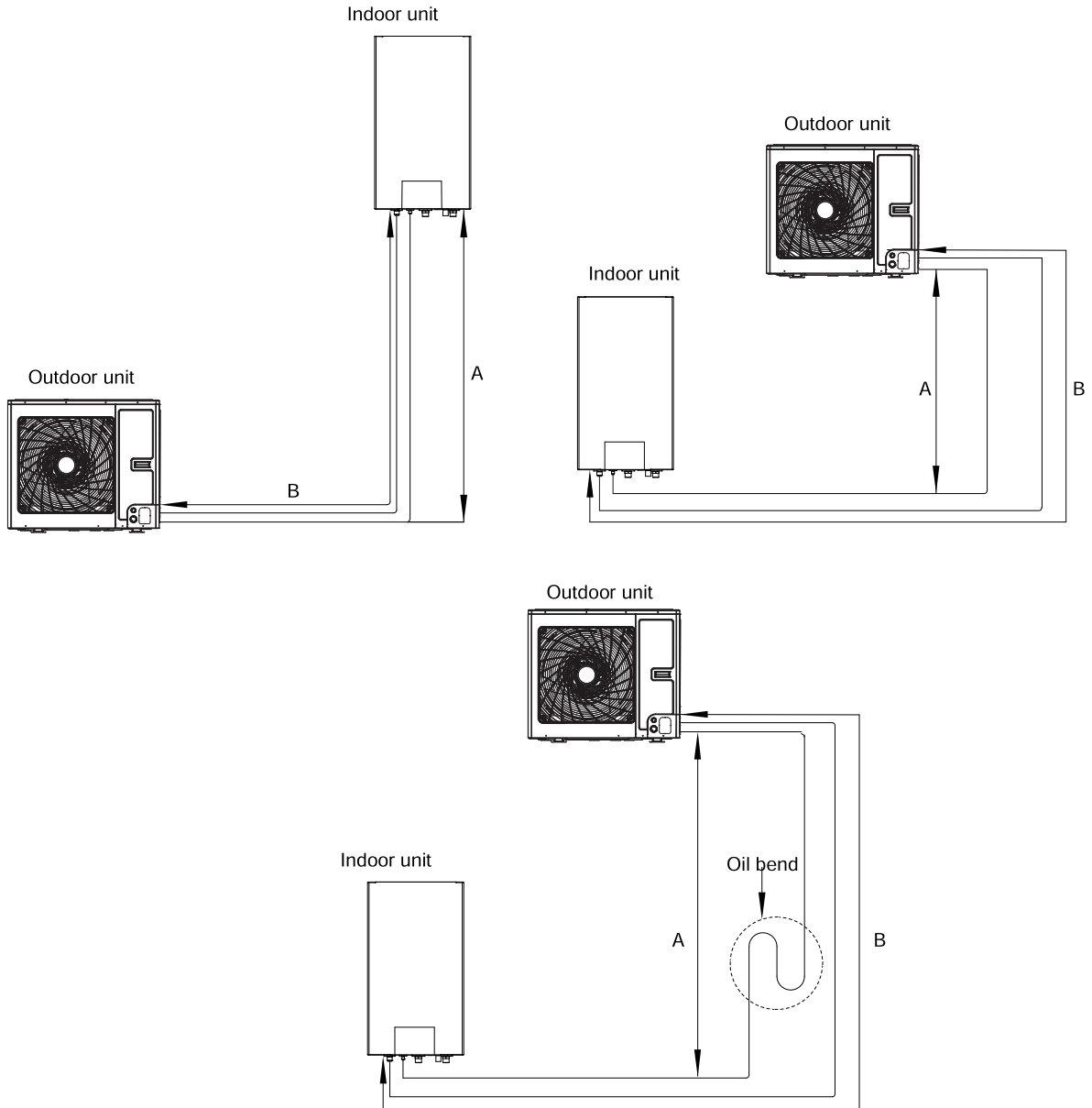


#### 4.6.2 Installation of protective layer on connection pipe

- (1) 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.
- (2) 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.
- (3) Wrap the pipe with tapes.
  - 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.
  - Wrap the heat preservation tape so that each ring of tape shall press half of the previous ring.
  - Fix the wrapped pipe onto the wall with pipe clamp.
  - Do not wrap the protective tape too tightly, as this will decrease the heat insulation performance.
  - After completing the protection work and wrapping the pipe properly, close the wall holes with sealing materials.



# Air-to-water Heat Pump Split Unitherm



Model	Pipe size (Diameter:Φ)		Length B		Elevation A		Additional refrigerant
	gas	Liquid	Standard	Additional	Standard	Max.	
CH-HP4.0SIRK4	1/2"	1/4"	5m	20m	0m	15m	16g/m
CH-HP6.0SIRK4	1/2"	1/4"	5m	20m	0m	15m	16g/m
CH-HP8.0SIRK4	1/2"	1/4"	5m	25m	0m	15m	16g/m
CH-HP10SIRK4	1/2"	1/4"	5m	25m	0m	15m	16g/m
CH-HP8.0SIRM4	1/2"	1/4"	5m	15m	0m	15m	0g/m
CH-HP10SIRM4	1/2"	1/4"	5m	15m	0m	15m	0g/m
CH-HP12SIRM4	5/8"	1/4"	5m	15m	0m	15m	0g/m
CH-HP14SIRM4	5/8"	1/4"	5m	15m	0m	15m	0g/m
CH-HP16SIRM4	5/8"	1/4"	5m	15m	0m	15m	0g/m
CH-HP12SIRK4	5/8"	1/4"	5m	15m	0m	15m	0g/m
CH-HP14SIRK4	5/8"	1/4"	5m	15m	0m	15m	0g/m
CH-HP16SIRK4	5/8"	1/4"	5m	15m	0m	15m	0g/m

**Notes**

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

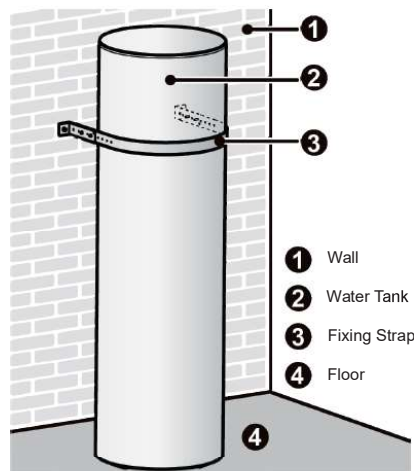
(b) Example: If 10kW model is installed at a distance of 25m,  $(25-10) \times 16 = 240\text{g}$  refrigerant should be added. Rated capacity is based on standard pipe length and maximum allowable length is based on the product reliability in the operation. Oil trap should be installed every 5-7 meters when the location of outdoor unit is higher than indoor unit.

(c) Each  $90^\circ$  elbow is approximately equal to a tube length of 0.5 meters.

**4.7 Installation of Water Tank****4.7.1 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.

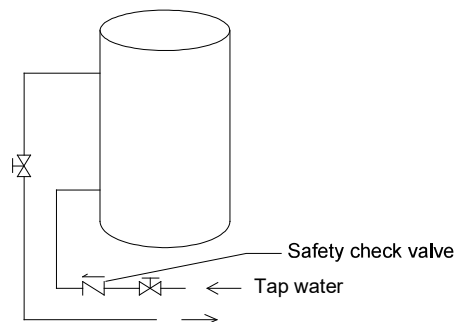
Standing water tank must be installed vertically with the bottom on the ground, never suspended. Installation place must be firm enough and the water tank should be fixed on the wall with bolts to avoid vibration, as shown in the following figure. Weight capacity of water tank during installation should also be considered.



The minimum clearance from the water tank to combustibile 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 (with the arrow on it pointing at the 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.

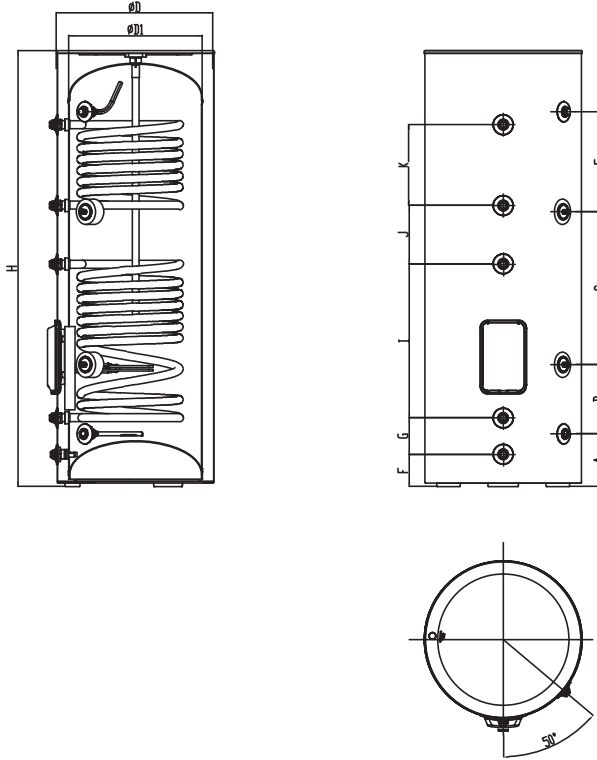


Note: for safe use of water, water outlet/inlet of water tank must connect with a certain length of PPR pipe,  $L \geq 70 \times R2$  (cm, R is inside radius of the pipe). Moreover, heat preservation should be conducted and metal pipe cannot be used. For the first use, water tank must be full of water before the power is on.

**4.7.2 Outline dimension and parameter of water tank**

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.

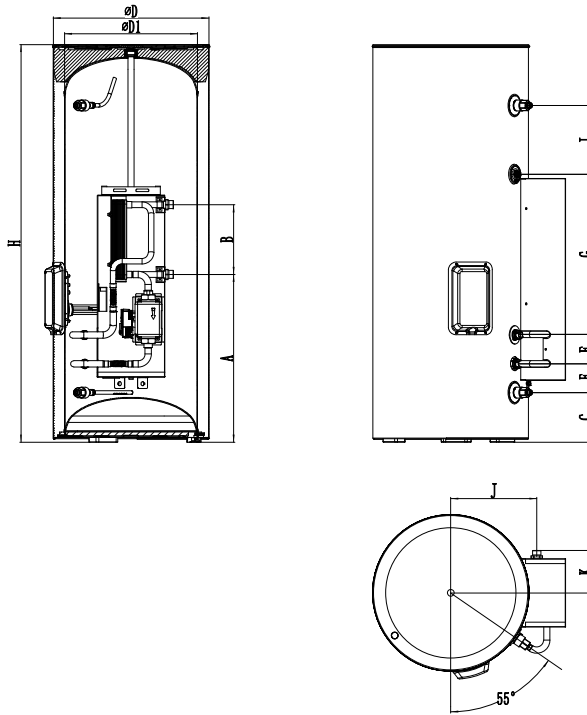
(1) CH-HP4SIRK4, CH-HP6SIRK4, CH-HP8SIRK4, CH-HP10SIRK4



Model		SWT300C3EK
Litre		300
Coil specification		Enamel
Coil length	M	8.7m
	N	12.4m
D(mm)		620
D1(mm)		530
H(mm)		1725
A(mm)		209
B(mm)		273
C(mm)		605
E(mm)		396
F(mm)		127
G(mm)		145
I(mm)		608
J(mm)		232
K(mm)		320
Outline (Diameter×H) (mm)		Φ620×1725
Package(WDH)		738×870×1843
Net weight	kg	135
Gross weight	kg	163

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

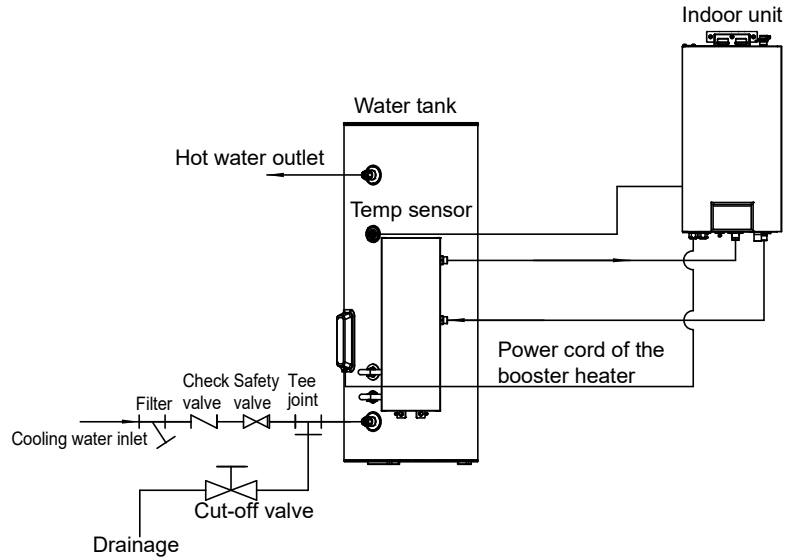
(2) CH-HP12SIRK4, CH-HP14SIRK4, CH-HP16SIRK4, CH-HP8.0SIRM4, CH-HP12SIRM4, CH-HP14SIRM4, CH-HP16SIRM4



Model	SWT300P3EM	
Litre	300L	
D(mm)	620	
D1(mm)	530	
H(mm)	1585	
A(mm)	669	
B(mm)	278	
C(mm)	198	
E(mm)	115	
F(mm)	117	
G(mm)	639	
I(mm)	274	
J(mm)	343	
K(mm)	169	
Outline (Diameter×H) (mm)	Φ620×1585	
Package (W×D×H)(mm)	740×940×1705	
Net weight	kg	103
Gross weight	kg	131

# Air-to-water Heat Pump Split Unitherm

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

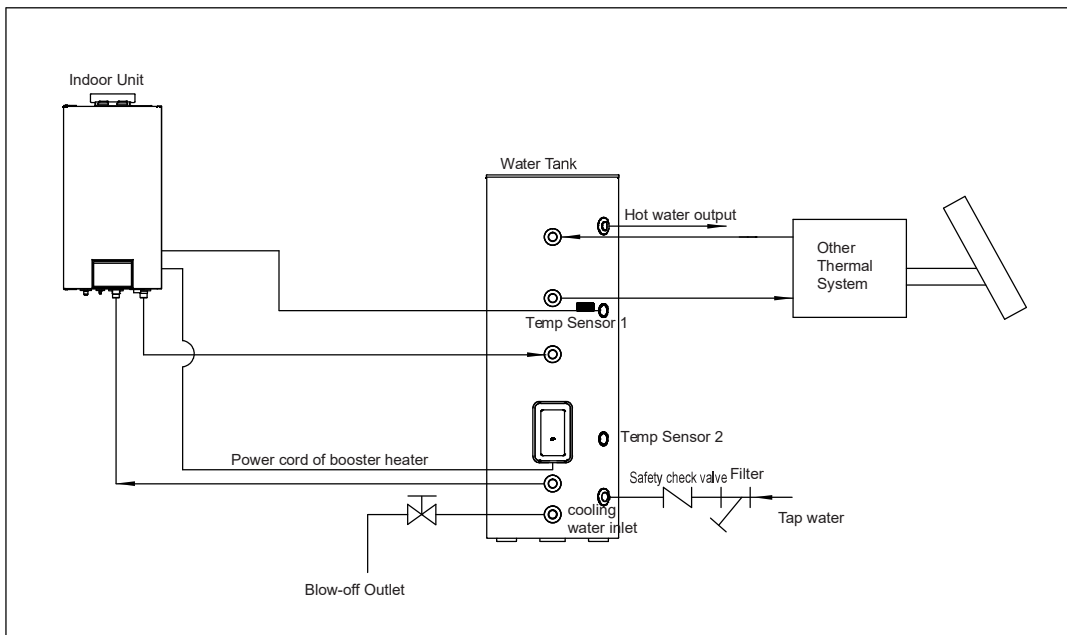


Description	Joint pipe thread
Circulating water inlet/outlet of main unit	1" Male BSP
Cooling water inlet of water tank	3/4" Female BSP
Circulating water inlet/outlet of water tank	3/4" Female BSP
Hot water outlet of water tank	3/4" Female BSP

Code	Name	QTY.	Function
01842800004P01	Retaining Plate Sub-Assy	2	Fix the water tank to the wall
70210087	Bolt M6X16	4	/
70110066	Swell Screw M8X60	2	/
0738280101	Relief Valve 1/2	1	/
035033000012	Water Pipe Connector	1	Connect the water pipe and Water inlet pipe sub-assy
06332800003	Nut	1	Install on the 3way connector
75042805	Gasket	2	Sealing function, see below blue circle
030059000120	Water inlet pipe sub-assy	2	/
05332800002	Drainage Pipe(Rubber)	1	The drainage pipe using for the relief valve to drainage the water
70814016	Pipe Hoop φ13	1	Fix the drainage pipe
2690280000502	Extruded strip	1	Fix the water tank and avoid the damage appearance of the water tank
0184280000502P	Fixing strap	1	Fix the water tank to the wall

**4.7.3 Connection of waterway system**

- (1) If connection between water tank and indoor unit should be through the wall, drill a hole  $\phi 70$  for pass of circulating water pipe. It is unnecessary if the hole is not needed.
- (2) 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.
- (3) Installation of circulating water inlet/outlet pipes: connect the water inlet of the unit with circulating outlet of water tank and water outlet of unit with circulating inlet of water tank.
- (4) Installation of water inlet/outlet pipes of the water tank: safety check valve, filter and cut-off valve must be installed for the water inlet pipe according to the installation sketch of the unit. At least a cut-off valve is needed for the water outlet pipe.
- (5) Installation of blow-off pipes 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.
- (6) After connection of all waterway pipelines, perform the leakage test firstly. After that, bind up the water pipes, water temp sensor and wires with wrapping tapes attached with the unit.
- (7) Refer to Installation Sketch of the Unit for details.



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

**Notes**

- (a) 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.
- (b) 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.
- (c) 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.



(d) 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.

(e) Hot water supplied from insulated water tank depends on pressure of water tap, so there must be supply of tap water.

(f) During using, the cut-off valve of cooling water inlet of water tank should be kept normally on.

◆ Packing accessories list

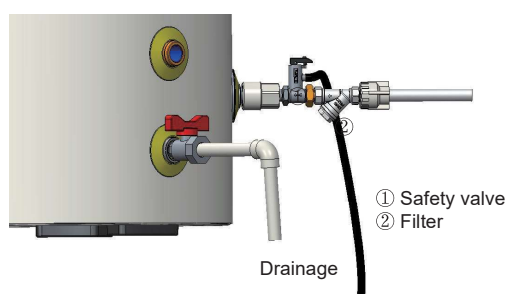
Code	Name	QTY.	Function
0184280004P01	Retaining Plate Sub-Assy	2	Fix the water tank to the wall
70210087	Bolt M6X16	4	/
70110066	Swell Screw M8X60	2	/
0738280101	Relief Valve 1/2	1	/
035033000012	Water Pipe Connector	1	Connect the water pipe and Water inlet pipe sub-assy
06332800003	Nut	1	Install on the 3way connector
75042805	Gasket	2	Sealing function, see below blue circle
030059000120	Water inlet pipe sub-assy	2	/
05332800002	Drainage Pipe(Rubber)	1	The drainage pipe using for the relief valve to drainage the water.
70814016	Pipe Hoop φ13	1	Fix the drainage pipe
2690280000502	Extruded strip	1	Fix the water tank and avoid the damage appearance of the water tank
0184280000502P	Fixing strap	1	Fix the water tank to the wall

◆ Installation of the Water Tank Safety Valve

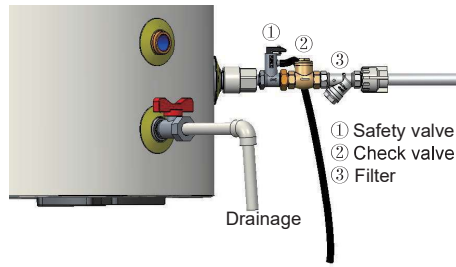
Pressure of the water tank will gradually increase during heating and a safety valve is required to discharge some water for pressure relief. If not or installed incorrectly, it would make the water tank to expand, to be deformed, to be damaged or even lead to personal injury. The arrow → of the water tank safety valve shall point toward the water tank. No cut-off valve or check valve is required between the safety valve and the water tank, as the safety valve would fail to work. The safety valve requires the drain hose for installation and should be securely fastened. The drain hose should be led naturally downward into the floor drain without any convex bow, intertwist or fold. Extra length of the drain hose inside the floor drain should be cut away in case of poor drainage or water freeze under low atmospheric temperature. The recommended action pressure for the safety valve is 0.7Mpa, the same as that for the water tank. Do comply with this requirement for section of the safety valve; otherwise the water tank would fail to work normally.

The drain pipe should go downwards and be connected with the floor drain. Its outlet should be lower than the bottom of the water tank. A cutoff valve is required for the drain pipe and should be installed where it is convenient for operation.

(1) CH-HP4SIRK4, CH-HP6SIRK4, CH-HP8SIRK4, CH-HP10SIRK4

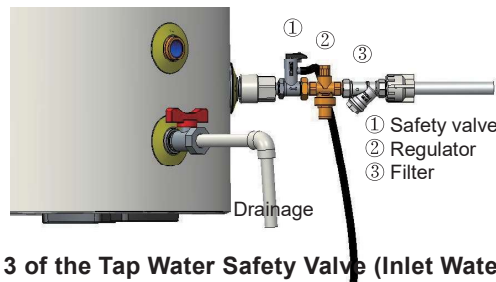


**Installation Mode 1 of the Tap Water Safety Valve (Inlet Water Pressure =0.1~0.5MPa)**



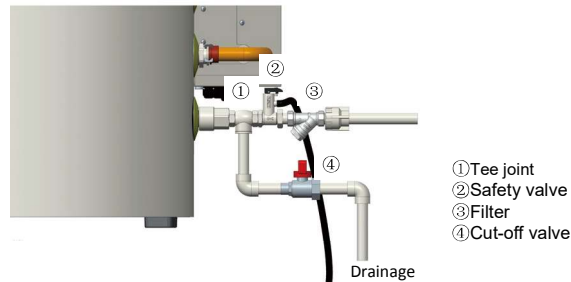
**Installation Mode 2 of the Tap Water Valve (Inlet Water Pressure $< 0.1\text{MPa}$ )**

The safety valve is bypass installed in the installation mode 2. A check valve is required at the tap water pipe and installed horizontally with the valve cap vertically upwards and the arrow direction at the valve body the same as the water flow.

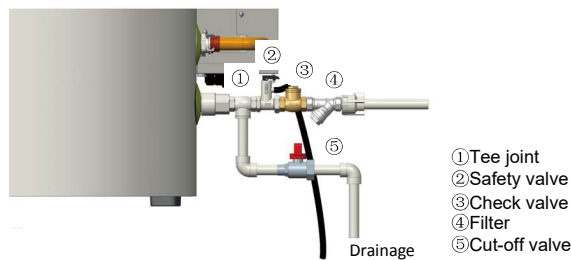


**Installation Mode 3 of the Tap Water Safety Valve (Inlet Water Pressure $> 0.5\text{MPa}$ )**

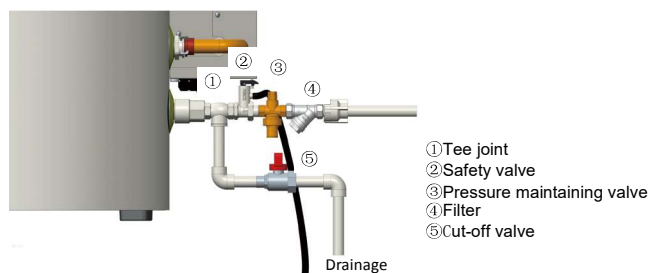
(2) CH-HP12SIRK4, CH-HP14SIRK4, CH-HP16SIRK4, CH-HP8.0SIRM4, CH-HP10SIRM4, CH-HP12SIRM4, CH-HP14SIRM4, CH-HP16SIRM4



**Installation Mode 1 of the Tap Water Safety Valve (Inlet Water Pressure  $= 0.1\sim 0.5\text{MPa}$ )**



**Installation Mode 2 of the Tap Water Valve (Inlet Water Pressure $< 0.1\text{MPa}$ )**



**Installation Mode 3 of the Tap Water Safety Valve (Inlet Water Pressure $> 0.5\text{MPa}$ )**

# Air-to-water Heat Pump Split Unitherm

A pressure maintaining valve is required in the installation mode 3 to make sure the water tank pressure keep within 0.3~0.5MPa. The arrow direction of the pressure maintaining valve should be the same as the water flow.

Note: the filter, safety valve, check valve, pressure maintaining valve, cut-off valve and hose for installation are not delivered with the main unit and should be prepared by the client.

## 4.8 Requirements on water quality

Item	Parametric value	Unit
pH( 25°C)	6.8~8.0	/
Cloudy	< 1	NTU
Chloride	< 50	mg/L
Fluoride	< 1	mg/L
Iron	< 0.3	mg/L
Sulphate	< 50	mg/L
SiO <sub>2</sub>	< 30	mg/L
Hardness(count CaCO <sub>3</sub> )	< 70	mg/L
Nitrate(count N)	< 10	mg/L
Conductance(25°C)	< 300	µs/cm
Ammonia (count N)	< 0.5	mg/L
Alkalinity(count CaCO <sub>3</sub> )	< 50	mg/L
Sulfid	Undetectable	mg/L
Oxygen consumption	< 3	mg/L
Natrium	< 150	mg/L

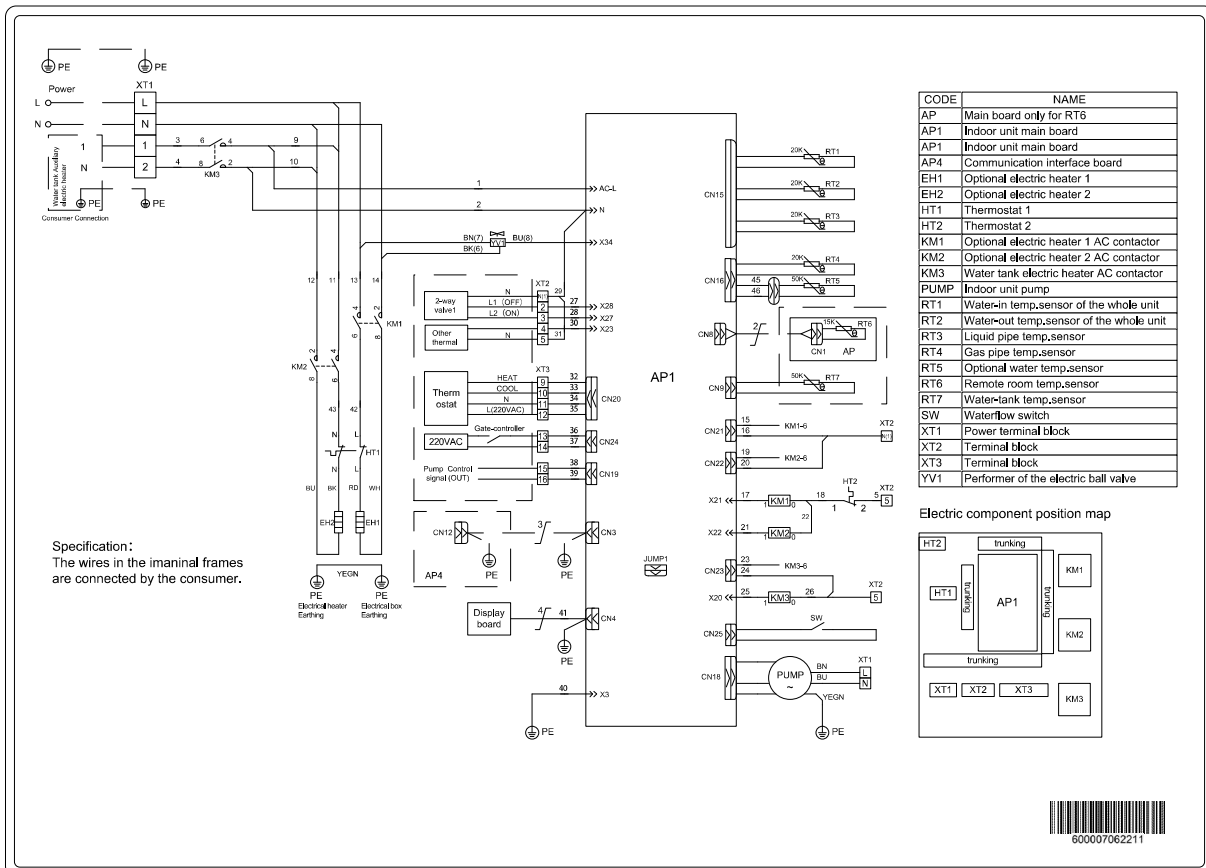
Note: when circulation water fails to meet requirements listed in the table above, please add anti-scale composition to keep the unit always in normal operation.

## 4.9 Electric Wiring

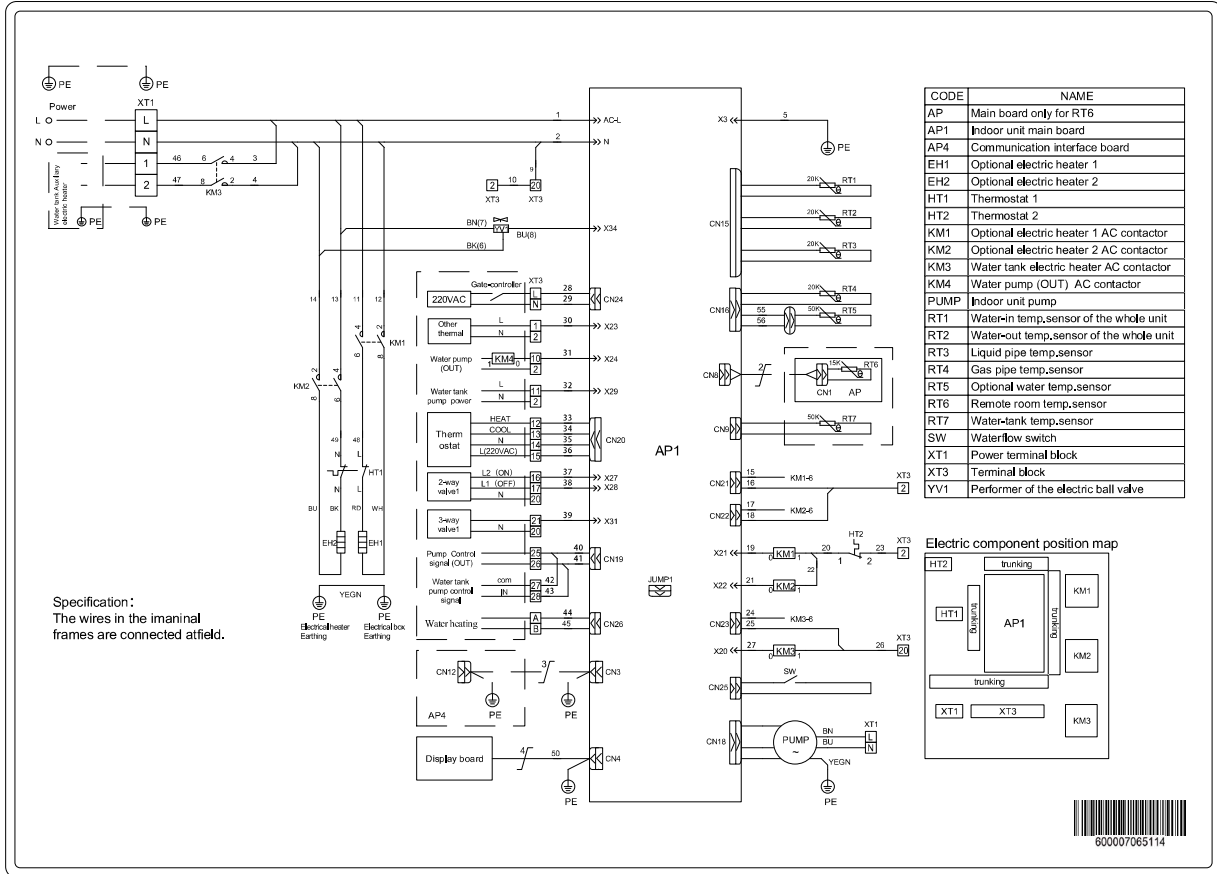
(1) Wiring diagram

Wiring diagrams stuck to the unit always prevails.

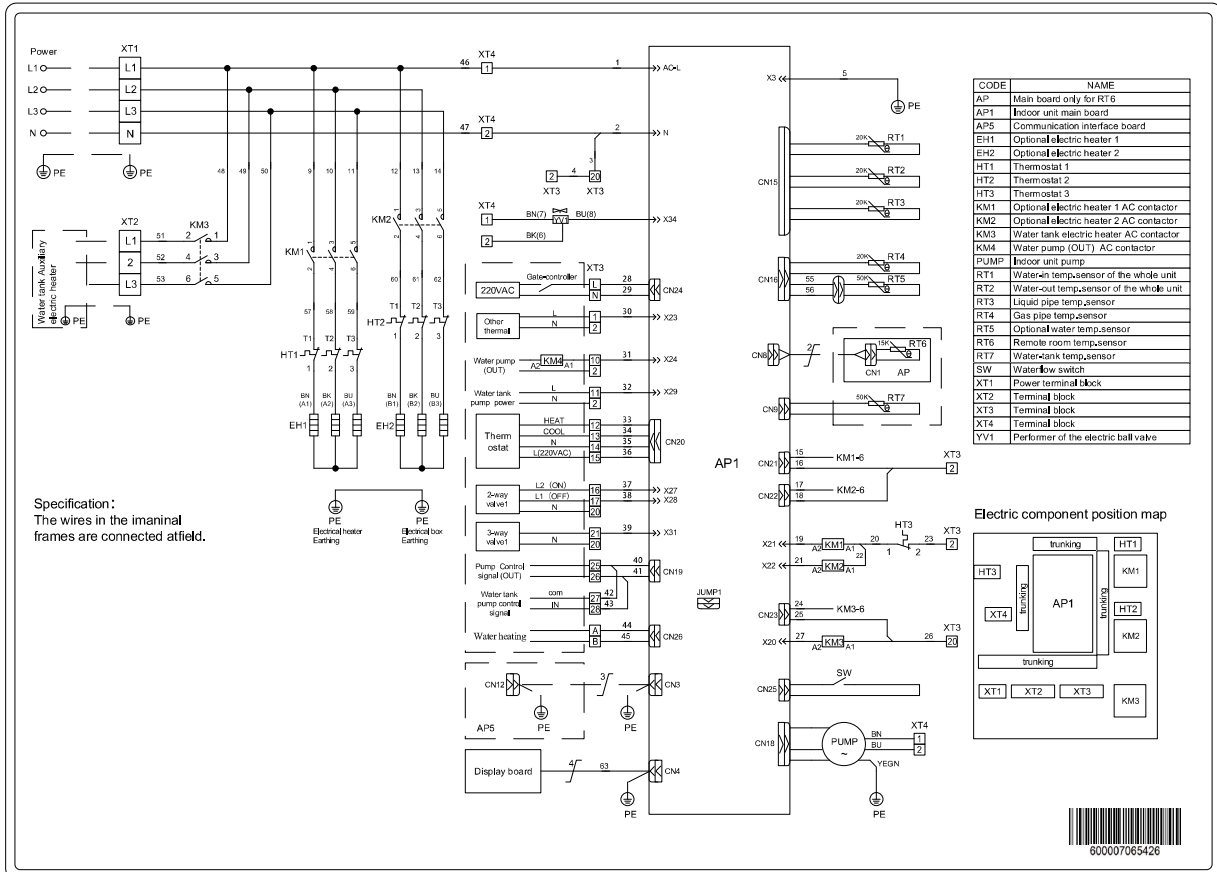
- ◆ CH-HP4.0SIRK4(I),CH-HP6.0SIRK4(I),CH-HP8.0SIRK4(I), CH-HP10SIRK4(I)



◆ CH-HP12SIRK4(I) , CH-HP14SIRK4(I), CH-HP16SIRK4(I)

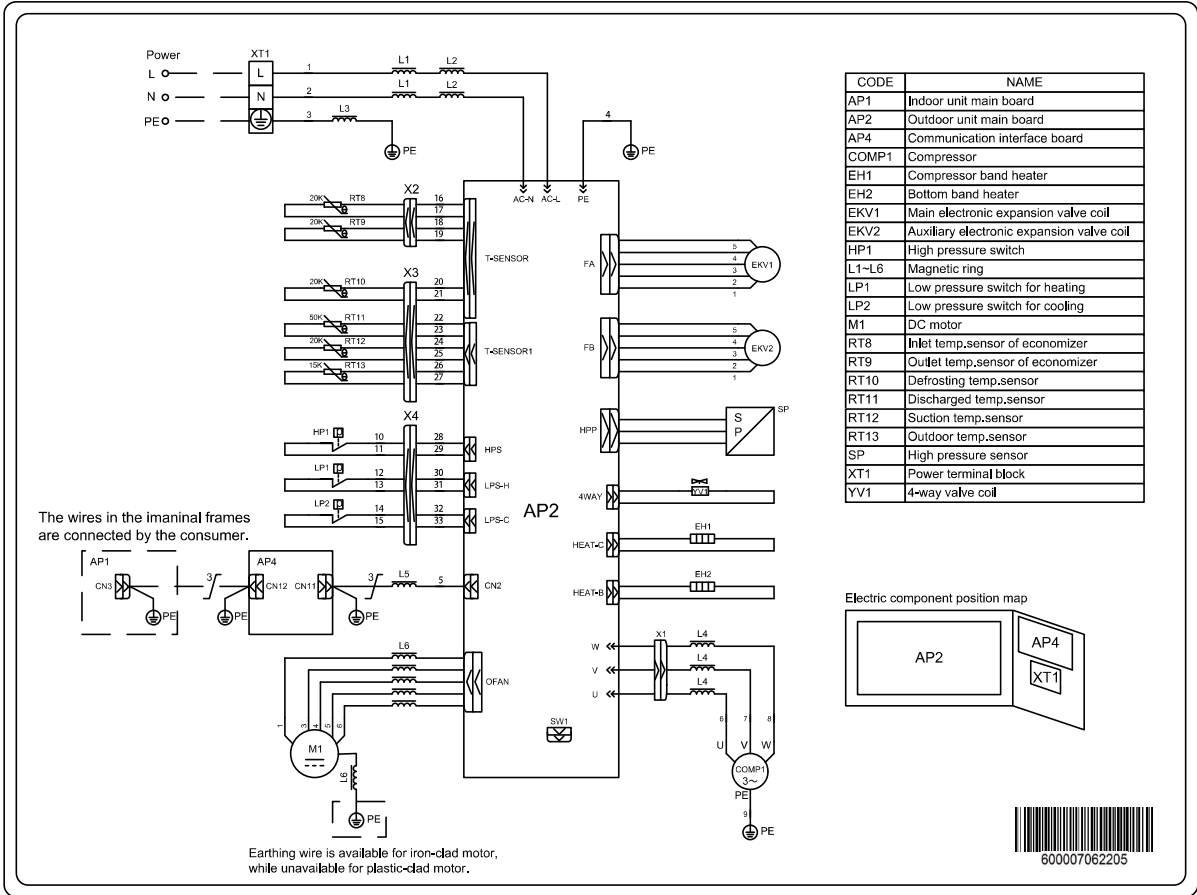


◆ CH-HP8.0SIRM4(I), CH-HP10SIRM4(I), CH-HP12SIRM4(I), CH-HP14SIRM4(I), CH-HP16SIRM4(I)

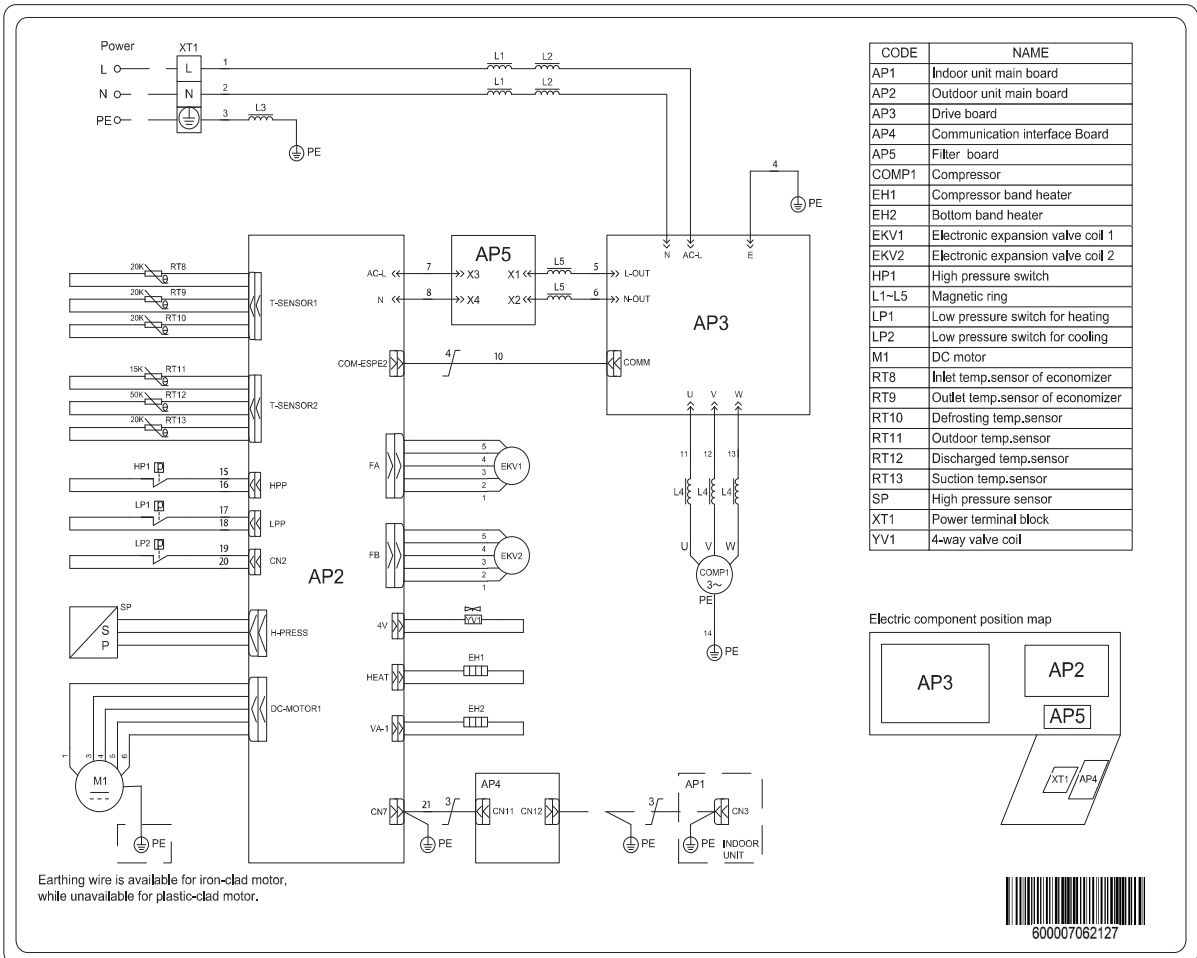


# Air-to-water Heat Pump Split Unitherm

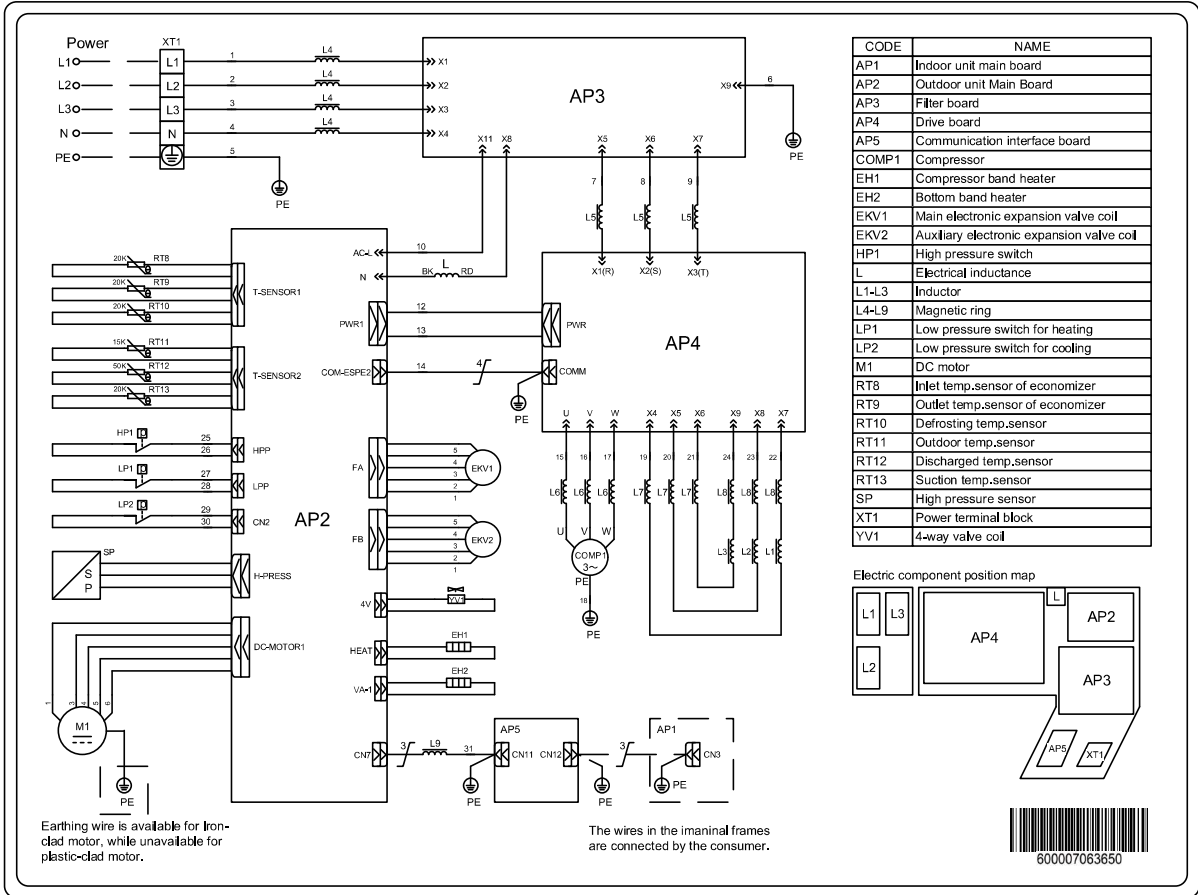
## ◆ CH-HP4.0SIRK4(O),CH-HP6.0SIRK4(O)



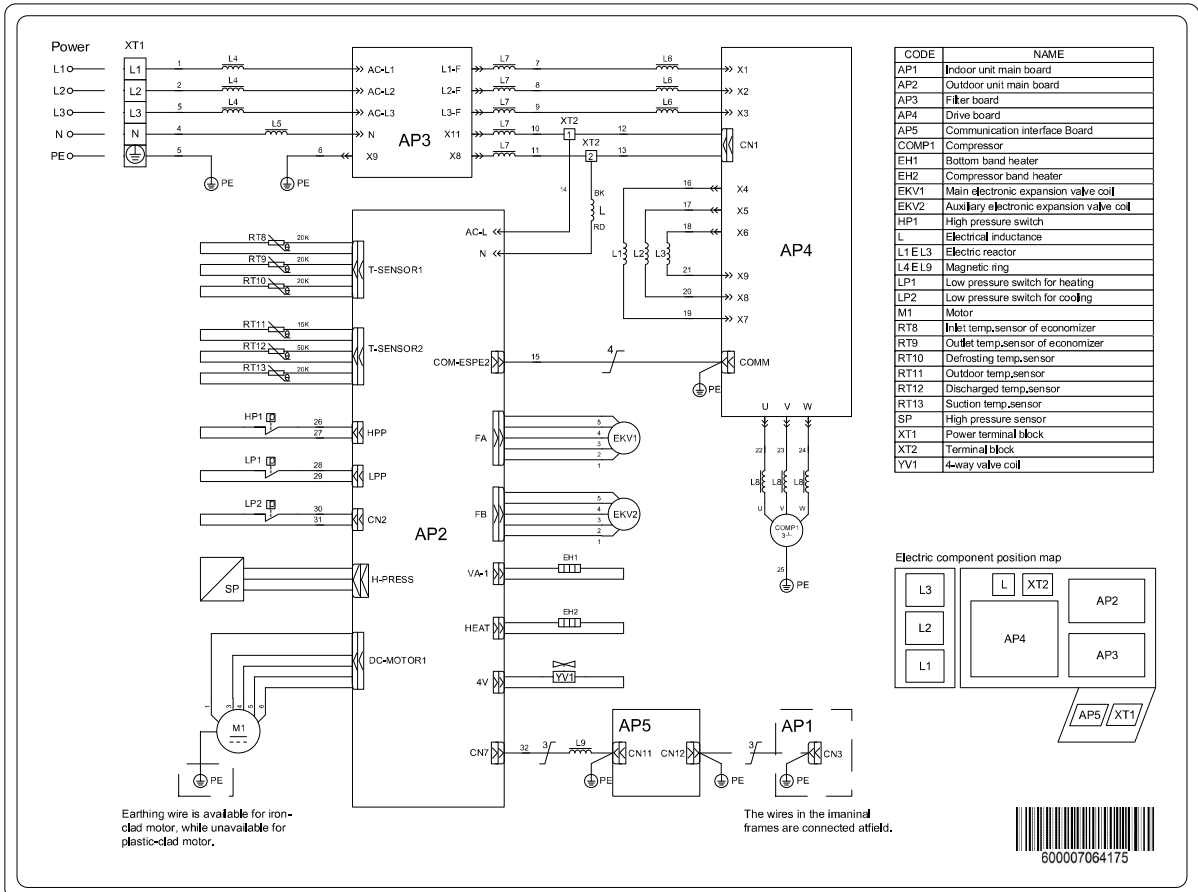
## ◆ CH-HP8.0SIRK4(O),CH-HP10SIRK4(O)



◆ CH-HP8.0SIRM4(O), CH-HP10SIRM4(O)

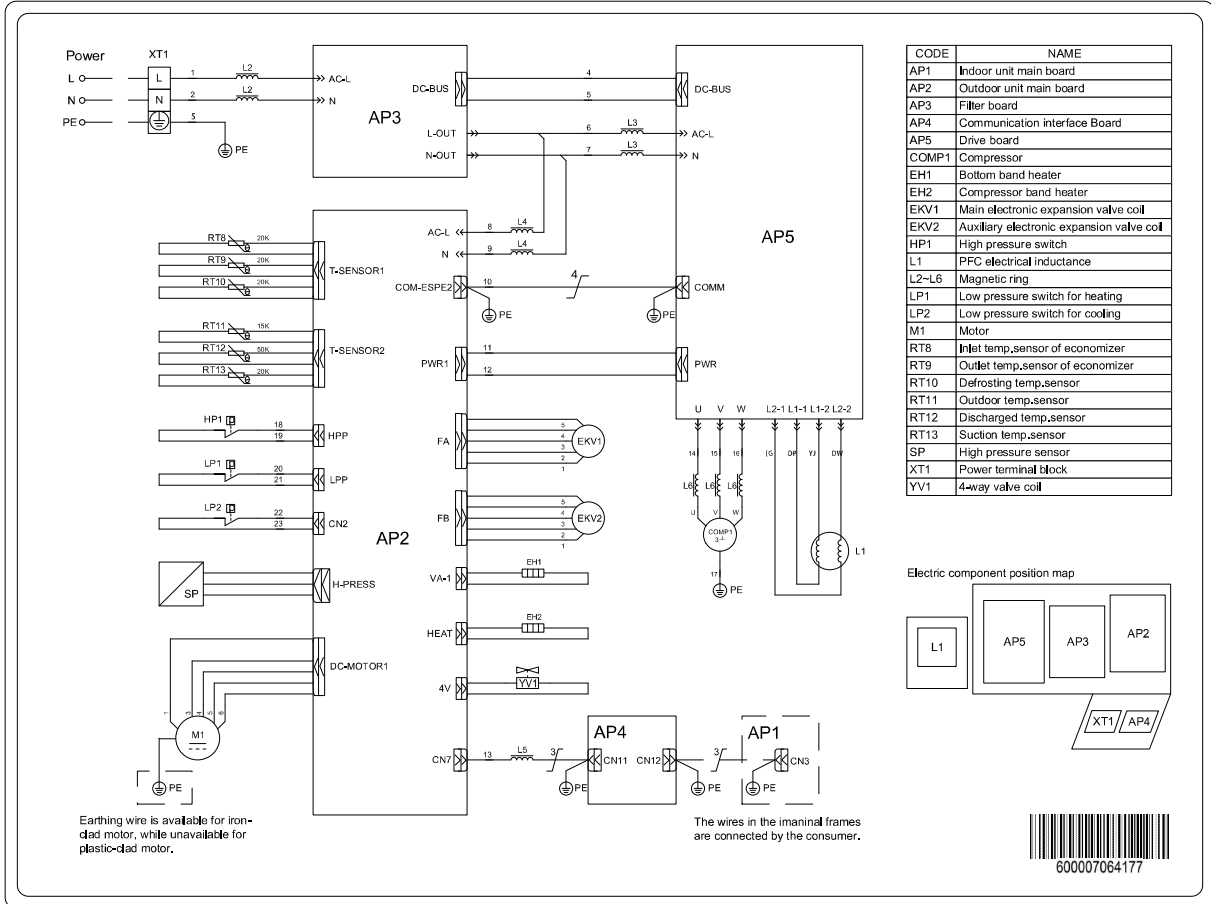


◆ CH-HP12SIRM4(O) , CH-HP14SIRM4(O), CH-HP16SIRM4(O)

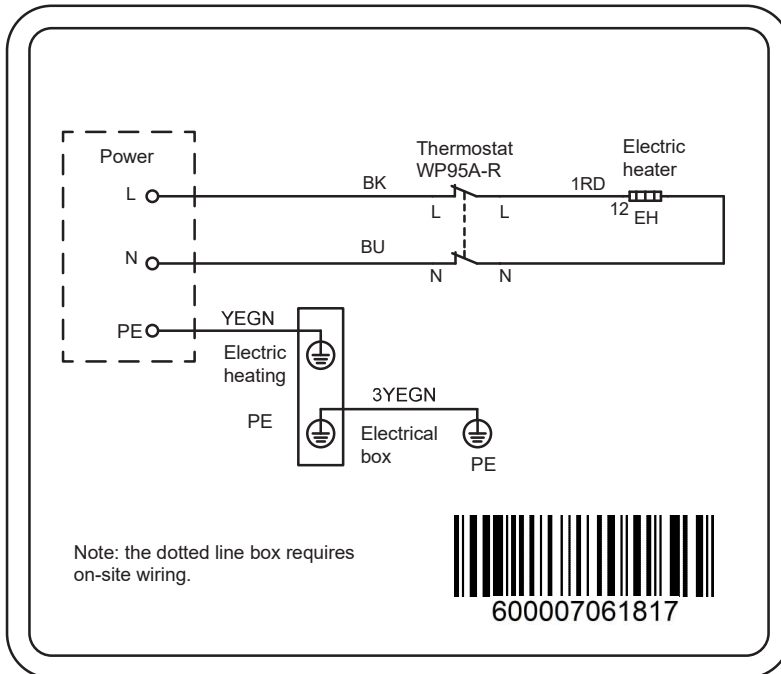


# Air-to-water Heat Pump Split Unitherm

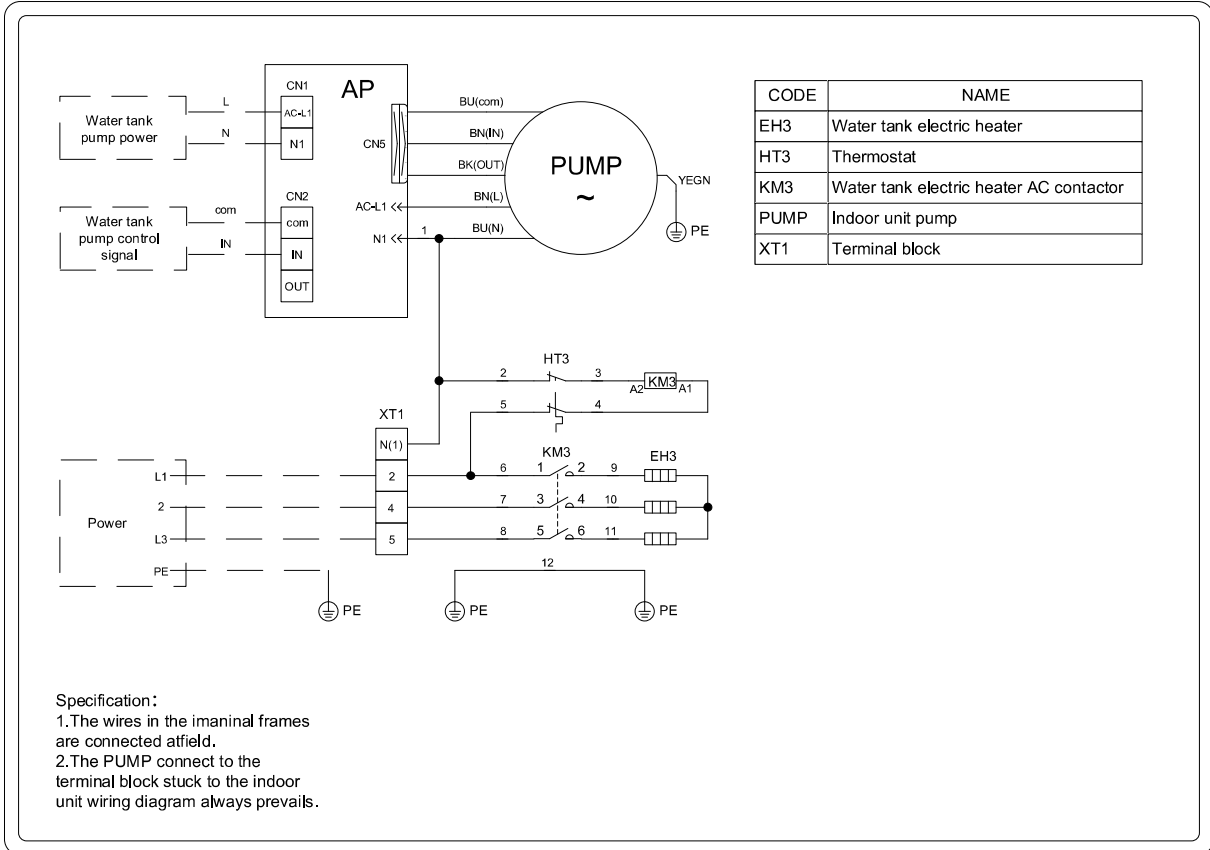
## ◆ CH-HP12SIRK4(O) , CH-HP14SIRK4(O), CH-HP16SIRK4(O)



## ◆ SWT300C3EK

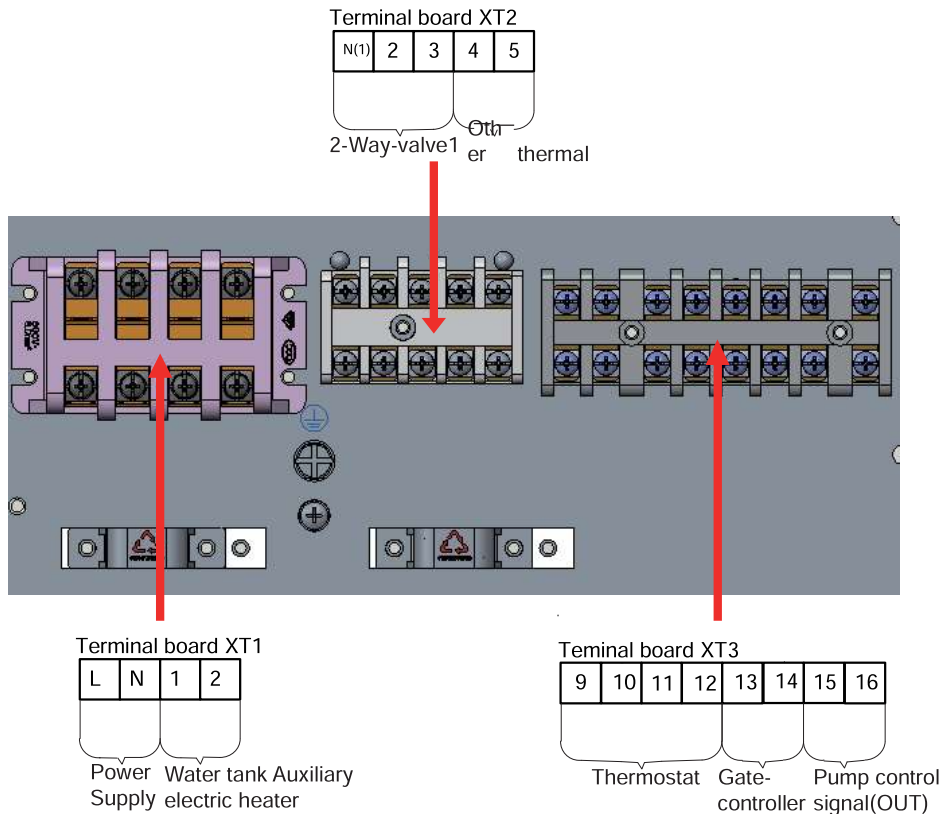


◆ SWT300P3EM



4.10 Wiring of the Terminal Board

◆ CH-HP4.0SIRK4(I),CH-HP6.0SIRK4(I),CH-HP8.0SIRK4(I), CH-HP10SIRK4(I)

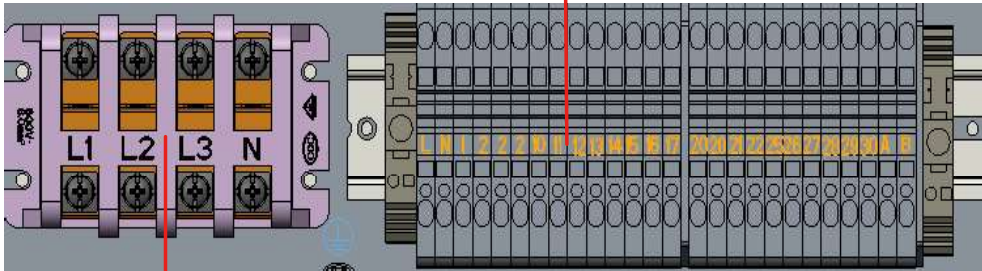
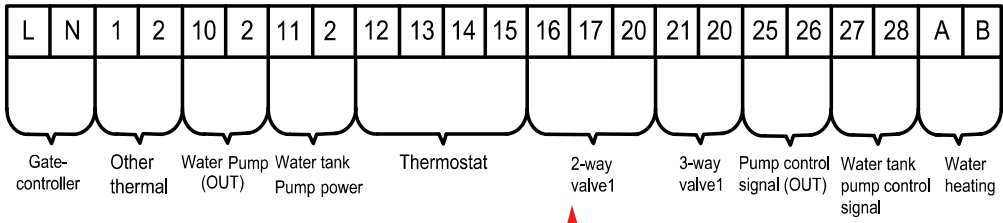




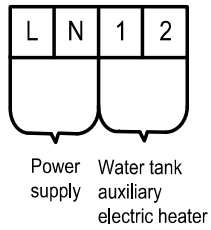
# Air-to-water Heat Pump Split Unitherm

- ◆ CH-HP12SIRK4(I) , CH-HP14SIRK4(I), CH-HP16SIRK4(I)

Terminal board XT3

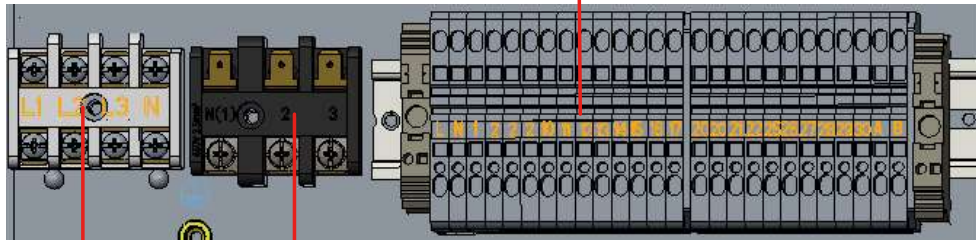
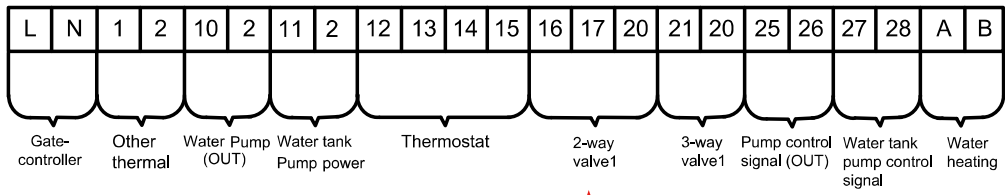


Terminal board XT1

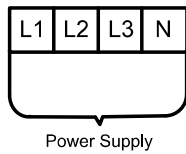


- ◆ CH-HP8.0SIRM4(I), CH-HP10SIRM4(I), CH-HP12SIRM4(I) , CH-HP14SIRM4(I),CH-HP16SIRM4(I)

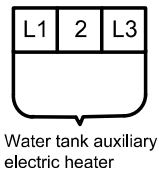
Terminal board XT3



Terminal board XT1



Terminal board XT2



### 4.11 Wiring of the 2-Way Valve

(1) CH-HP4SIRK4, CH-HP6SIRK4, CH-HP8SIRK4, CH-HP10SIRK4

The 2-way valve 1 is required to control water flow for cooling or heating operation. The role of 2-way valve 1 is to cut off water flow into the underfloor loop when the fan coil unit is equipped for cooling operation.

General Information

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

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

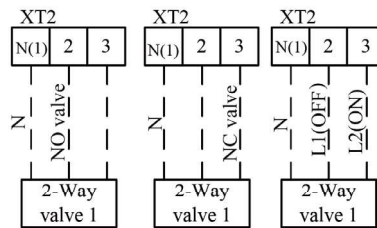
(2) Normally Closed type. When electric power is NOT supplied, the valve is closed. (When electric power is supplied, the valve is open.)

How to Wire 2-Way Valve:

Follow steps below to wire the 2-way valve.

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

Step 2. Find the terminal block and connect wires as below.



**⚠ WARNING**

(1) Normally Open type should be connected to wire (OFF) and wire (N) for valve closing in cooling mode.  
 (2) Normally Closed type should be connected to wire (ON) and wire (N) for valve closing in cooling mode.  
 (ON): Live signal (for Normally Open type) from PCB to 2-way valve  
 (OFF): Live signal (for Normally Closed type) from PCB to 2-way valve  
 (N): Neutral signal from PCB to 2-way valve

(2) CH-HP12SIRK4, CH-HP14SIRK4, CH-HP16SIRK4, CH-HP8.0SIRM4, CH-HP10SIRM4, CH-HP12SIRM4, CH-HP14SIRM4, CH-HP16SIRM4

The role of 2-way valve 1 is to control the water flow into the underfloor loop. When “Floor Config” is set to “With” for either cooling or heating operation, it will keep open. When “Floor Config” is set to “Without”, it will keep closed.

General Information

Type	Power	Operating Mode	Supported
		Closing water flow	Yes
		Opening water flow	Yes
NC 2-wire	230V 50Hz ~AC	Closing water flow	Yes
		Opening water flow	Yes

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

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

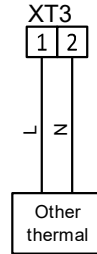
How to Wire 2-Way Valve:

Follow steps below to wire the 2-way valve.



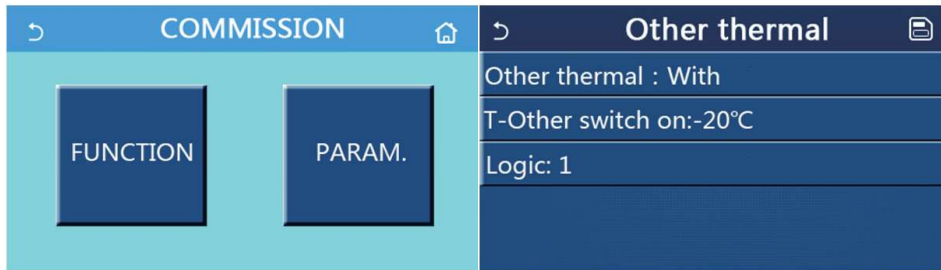


- ◆ CH-HP12SIRK4,CH-HP14SIRK4,CH-HP16SIRK4,CH-HP8.0SIRM4, CH-HP10SIRM4,  
CH-HP12SIRM4,CH-HP14SIRM4, CH-HP16SIRM4 (Water tank with the external plate-type heat exchanger)  
Other thermal L and N connect to XT3~1,2



Step 3. Wired controller setting

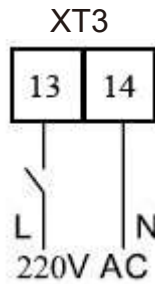
Other thermal should be selected "with" if necessarily from COMMISSION → FUNCTION, then set switch on (outdoor) temperature and control logic(1/2/3).



#### 4.13 Wiring of the Gate-Controller

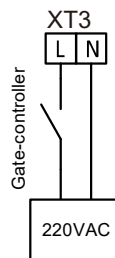
- (1) CH-HP4SIRK4,CH-HP6SIRK4, CH-HP8SIRK4, CH-HP10SIRK4

If there is gate control function, installation guide follow as:



- (2) CH-HP12SIRK4,CH-HP14SIRK4,CH-HP16SIRK4,CH-HP8.0SIRM4,  
CH-HP10SIRM4,CH-HP12SIRM4,CH-HP14SIRM4, CH-HP16SIRM4

If there is gate control function, installation guide follow as:



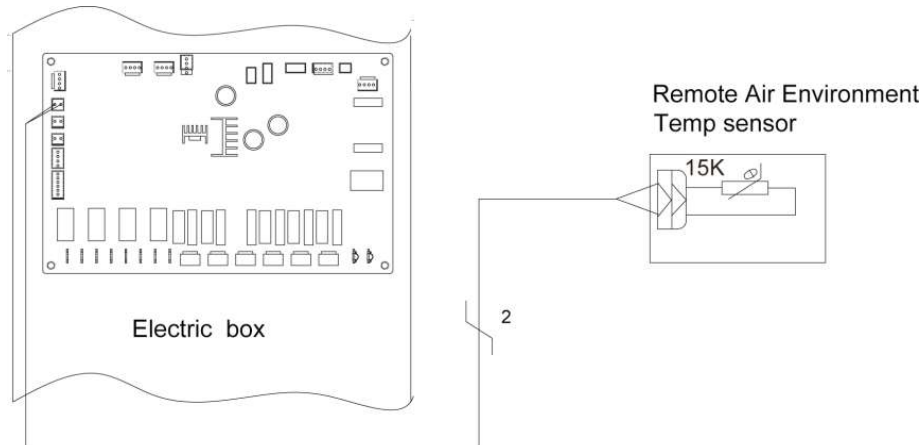
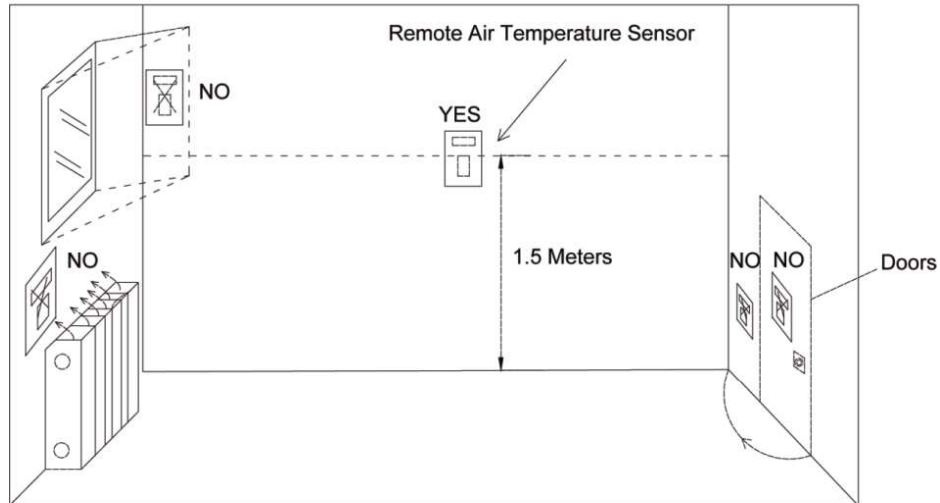
#### 4.14 Wiring of the Remote Air Temperature Sensor



Front side



Back side



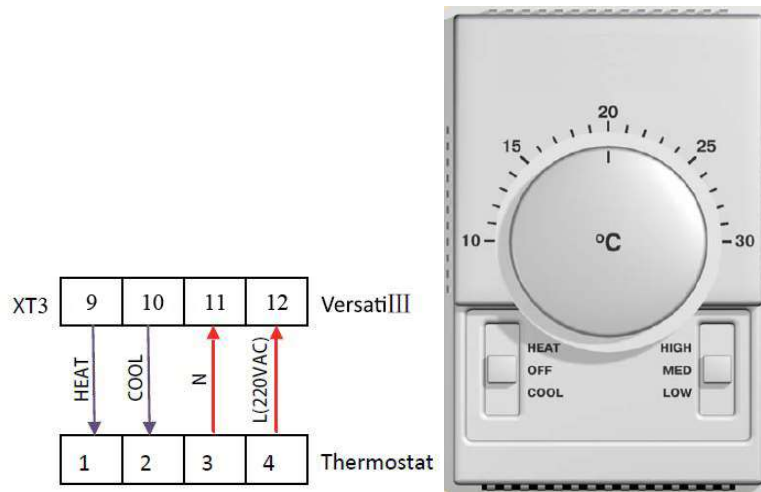
**Notes:**

- (a) Distance between the indoor unit and the remote air temperature sensor should be less than 15m due to length of the connection cable of remote air temperature sensor;
- (b) Height from floor is approximately 1.5m;
- (c) Remote air temperature sensor cannot be located where the area may be hidden when door is open;
- (d) Remote air temperature sensor cannot be located where external thermal influence may be applied;
- (e) Remote air temperature sensor should be installed where space heating is mainly applied;
- (f) After the remote air temperature sensor is installed, it should be set to “With” through the wired controller so as to set the remote air temperature to the control point.

### 4.15 Wiring of the Thermostat

(1) CH-HP4SIRK4, CH-HP6SIRK4, CH-HP8SIRK4, CH-HP10SIRK4

Installation of the thermostat is very similar to that of the remote air temperature sensor.



#### How to Wire Thermostat

- (1) Uncover the front cover of indoor unit and open the control box ;
- (2) Identify the power specification of the thermostat, it is 230V, find terminal block XT4 as NO.23~26;
- (3) If it is the heating/cooling thermostat, please connect wire as per the figure above.

**⚠ CAUTION**

(g) 220V power supply can be provided to the thermostat by the Unitherm 3 heat pump.

(h) Setting temperature by the thermostat (heating or cooling) should be within the temperature range of the product ;

(i) For other constrains, please refer to previous pages about the remote air temperature sensor;

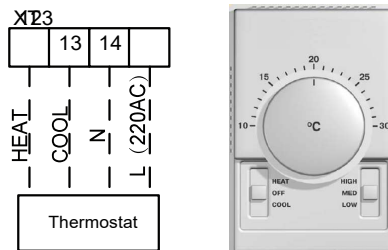
(j) Do not connect external electric loads. Wire 220V AC should be used only for the electric thermostat;

(k) Never connect external electric loads such as valves, fan coil units, etc. If connected, the mainboard of the unit can be seriously damaged;

(l) Installation of the thermostat is very similar to that of the remote air temperature sensor.

(2) CH-HP12SIRK4, CH-HP14SIRK4, CH-HP16SIRK4, CH-HP8.0SIRM4, CH-HP10SIRM4, CH-HP12SIRM4, CH-HP14SIRM4, CH-HP16SIRM4

Installation of the thermostat is very similar to that of the remote air temperature sensor.



#### How to Wire Thermostat

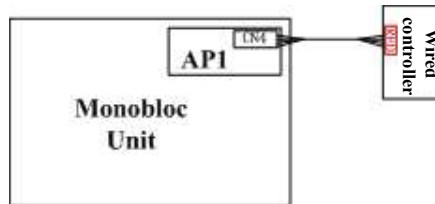
- Uncover the front cover of indoor unit and open the control box;
- Identify the power specification of the thermostat, if it is 220V, find terminal block XT3 as NO.12~15;
- If it is the heating/cooling thermostat, please connect wire as per the figure above.



**NOTE**

- 220V power supply can be provided to the thermostat by the Unitherm 3 heat pump.
- Setting temperature by the thermostat(heating or cooling) should be within the temperature range of the product ;
- For other constrains, please refer to previous pages about the remote air temperature sensor;
- Do not connect external electric loads. Wire 220V AC should be used only for the electric thermostat;
- Never connect external electric loads such as valves, fan coil units, etc. If connected, the mainboard of the unit can be seriously damaged;
- Installation of the thermostat is very similar to that of the remote air temperature sensor.

**4.16 Wiring of the Control**



Notes: the wired controller can be connected to the terminal of AP1 CN4 with the four-wire communication cable.

## 5 Commissioning and Trial Run

### 5.1 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 maintenance personnel.		
Confirm together with the sales engineer, dealer, installing contractor and users for the following items finished or to be finished.		
No.	Confirmation of Installation	√
1	Ensure the veracity of the contents . If not, commissioning will be refused.	<input type="checkbox"/>
2	Is there written notice in which service items are shown in respect of unqualified installation?	<input type="checkbox"/>
3	Are Application for Installation and Commissioning list filled together?	<input type="checkbox"/>
No.	Pre-check	√
1	Is appearance of the unit and internal pipeline system in good condition 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 service.	<input type="checkbox"/>
5	Completely test refrigerant pressure of each unit and perform leakage detection of the unit.	<input type="checkbox"/>
6	Is the water tank installed stably and supported securely when the water tank is full?	<input type="checkbox"/>
7	Are heat insulating measures for the water tank, outlet/inlet pipes and water replenishing pipe proper?	<input type="checkbox"/>
8	Are the nilometer of water tank, water temperature indicator, controller, manometer, pressure relief valve and automatic discharge valve etc. installed and operated properly?	<input type="checkbox"/>
9	Does power supply accord with the nameplate? Do power cords conform to applicable requirements?	<input type="checkbox"/>
10	Is power supply and control wiring connected properly according to wiring diagram? Is earthing safe? Is each terminal stable?	<input type="checkbox"/>
11	Are connection pipe, water pump, manometer, thermometer, valve etc. are installed properly?	<input type="checkbox"/>
12	Is each valve in the system open or closed according to requirements?	<input type="checkbox"/>
13	Confirm that the users and inspection personnel of Part A are at site.	<input type="checkbox"/>
14	Is Installation Check-up Table completed and signed by the installation contractor?	<input type="checkbox"/>
Attention: If there is any item marked with ×, please notify the contractor. Items listed above are just for reference.		
Confirmed Items after pre-checking	<b>General Evaluation: Commissioning</b> <input type="checkbox"/> <b>Service</b> <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 commissioning work can't be performed unless all installation items are qualified. If there is any problem, it must be solved firstly. The installer will be responsible for all costs for delay of commissioning and re-commissioning incurred by any problem which is not solved immediately.	
	Submit schedule of service reports to installer.	
	Is the written service report which should be signed after communication provided to installer?	
	Yes ( )      No ( )	

### 5.2 Trial run

Trial run is to test whether the unit can run normally via preoperation. If the unit cannot run normally, find and solve problems until the trial run is satisfactory. All inspections must meet the requirements before performing the trial run. Trial run should follow the content and steps of the table below:

The following procedure should be executed by experience and qualified maintenance personnel.	
No.	Start up the pretest procedure
Notice: before test, ensure that all power must be cut off, including the 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 refrigerant from mixing with the lubricating oil, which may cause damage to the compressor when starting up the unit.	
2	Check whether the phase sequence of the main power supply is correct. If not, correct the phase sequence firstly.
⚠ Recheck the phase sequence before start-up to avoid reverse rotation of the compressor which may damage the unit.	
3	Apply the 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 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 ±10% within the range of rated operating power.
No.	Start up the unit
1	Check all the conditions needed to start up the unit: operation mode, required load etc.
2	Start up the unit, and observe the operation of compressor, electric expanding valve, fan motor and water pump etc.
	Note: the unit will be damaged under abnormal running state. Do not operate the unit in states of high pressure and high current.
Others:	
<b>Items for acceptance after commissioning</b>	Estimation or suggestion on the general running situation: good, modify
	Identify the potential problem (When no problem has been pointed out, it indicates the unit is in good condition.)
	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.
	<b>Acceptance</b>
Is the user trained as required? Please sign. Yes( ) No( )	

## TEST OPERATION & TROUBLESHOOTING & MAINTENANCE

### 1 Precheck

#### 1.1 Check for Wiring

##### ⚠ NOTE

- Do not check for the power supply unless proper checkout equipment has prepared and preventive measures have been taken, otherwise it would lead to severe injury.

- (1) Are sizes of connection lines and the air switch proper?
- (2) Does wiring comply with relative standards and electric codes?
- (3) Is there any incorrect wiring?
- (4) Does each contact work properly?
- (5) Is the power supply and insulation proper?
- (6) Are initial set points of control and protective elements satisfied?

#### 1.2 Check for the Water System

- (1) Are water inlet and outlet directions correct?
- (2) Is the water piping cleaned? Are there foreign matters at the pipe joints? Is the water quality satisfied?
- (3) Is insulation of water pipes in good condition?
- (4) Does exhaust valve of the water system work properly?
- (5) Instructions for Water Makeup and Air Removal

Note: once the air vent cap has not been loosened before operation for removing air at top of the auxiliary electric heater, it would work without enough water.

##### ⚠ NOTE

- Once the air vent cap has not been loosened before operation for removing air at top of the auxiliary electric heater, it would work without enough water.

Air removal steps are stated below.

Step 1: connect water pipes and loosen the automatic relief valve.

Step 2: open the cut-off valve at the water makeup pipe and make up water from the tap water pipe until the water pressure gage reads 2.0~2.5bar.

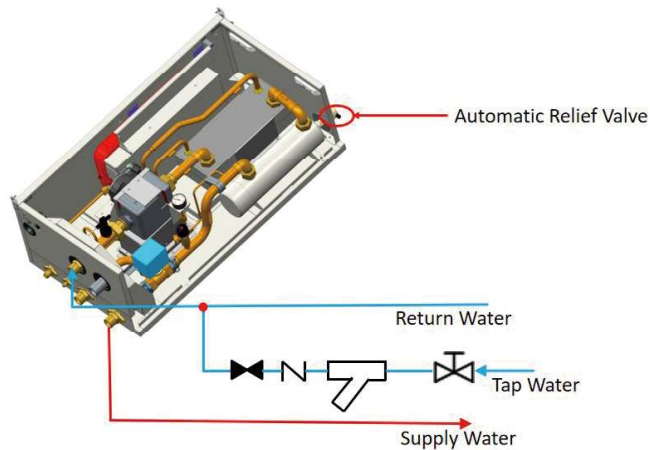


Loosen the black cap for two turns.

#### ◆ Requirements for Water Makeup

Make up water from the tap water pipe to the return water pipe and meanwhile open the air vent cap until the water system is full and no air is trapped.

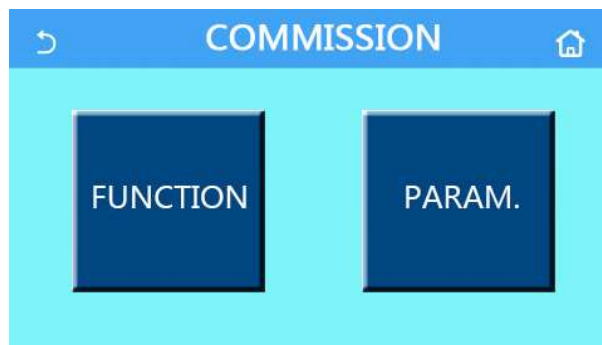
The gage pressure requirement for makeup water is 2.0~2.5bar. Do not let it exceed 3bar, as it would affect adversely pipes and pipe connectors and lead to water leak. Also do not let it too low, as water shortage would trigger protection for the flow switch and then the unit would fail to run normally. When water pressure is lower than 1.0bar, pressurize it to the required pressure.



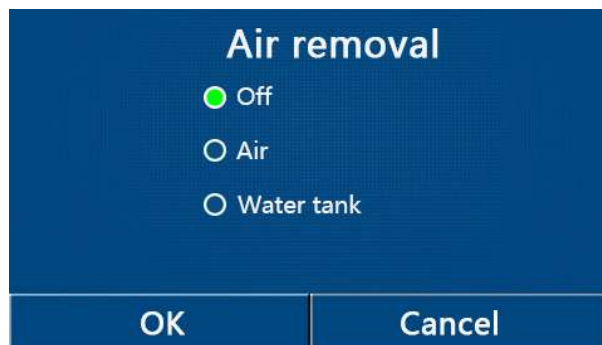
◆ Instructions for Air Removal through the Control Panel

The control panel allows air removal operation for the water system as stated below.

- (1) At the menu page, select "COMMISSION" and go to the setting as shown below, with option "FUNCTION" at left and "PARAM." at right.



- (2) At the "PARAM." page, select "Air removal" and go to the setting page as shown below, with options "Off", "Air" and "Water tank" available.



- (3) Check pipe connectors and welding spots for water leak during water making-up.
- (4) Please note that water pressure of makeup water should be higher than 2bar. Once the tapping water pressure is lower than this requirement, please use the booster pump to pressurize it.

### 1.3 Check for the Communication System

When the unit is powered on, check for the communication system, including: communication between AP1 and AP2, between the wired controller and the main board. When there is unusual communication, this error will be displayed at the wired controller. Then, check out the cause according to the displayed error. See the figure below for wiring of the communication system.

## 1.4 Trial Run

Start the unit when there is no any problem for wiring and piping. After startup, check for the electrostatic expansion valve, water pump, fan, and compressor to see if they work normally. When there is any error, solve it according to the troubleshooting flowchart covered in this manual. However, if the troubleshooting flowchart is still unhelpful, please contact C&H sales distributor.

## 2 Error Code List

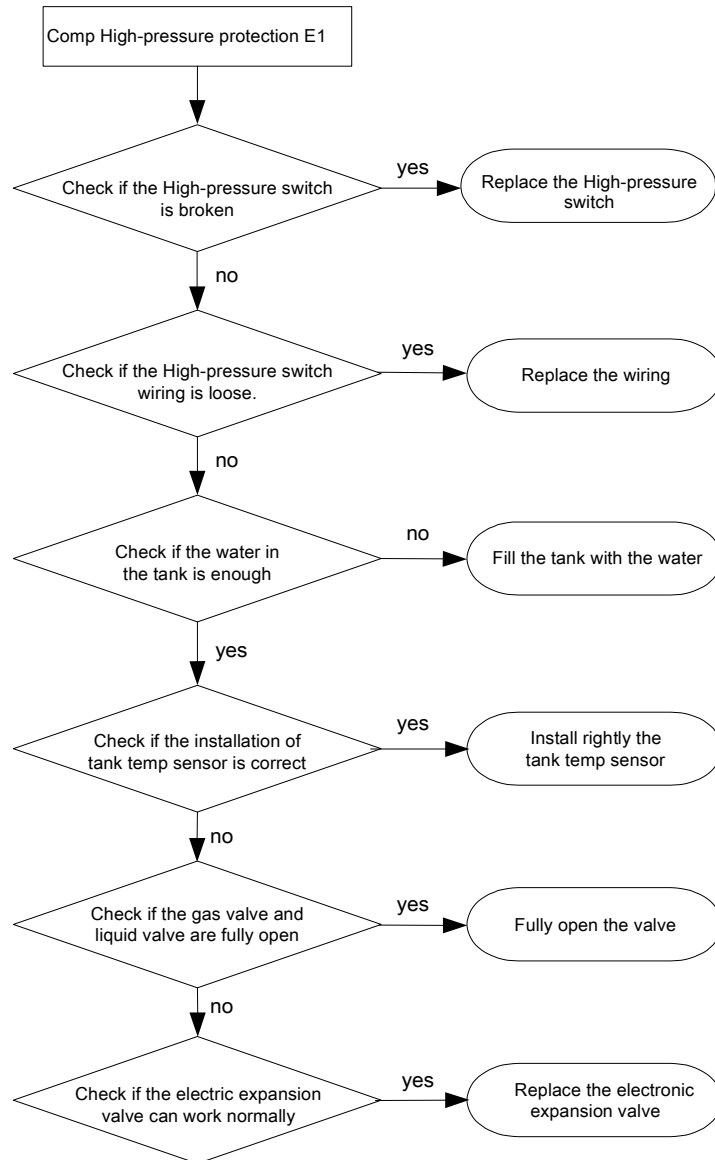
No.	Full Name	Displayed Name	Error Code
1	Ambient temperature sensor error	Ambient sensor	F4
2	Defrosting temperature sensor error	Defrost sensor	d6
3	Discharge temperature sensor error	Discharge sensor	F7
4	Suction temperature sensor error	Suction sensor	F5
5	Economizer inlet temperature sensor	Econ. in sens.	F2
6	Economizer outlet temperature sensor	Econ. out sens.	F6
7	Fan error	Outdoor fan	EF
8	High pressure protection	High pressure	E1
9	Low pressure protection	Low pressure	E3
10	High discharge protection	Hi-discharge	E4
11	Capacity DIP switch error	Capacity DIP	c5
12	Communication error between the outdoor and indoor main boards	ODU-IDU Com.	E6
13	Communication error between the outdoor main board and the drive board	Drive-main com.	P6
14	Communication error between the display panel and indoor main board	IDU Com.	E6
15	High pressure sensor error	HI-pre. sens.	Fc
16	Leaving water temperature sensor error for the plate type heat exchanger of the heat pump	Temp-HELW	F9
17	Leaving water temperature sensor error for the auxiliary electric heat of the heat pump	Temp-AHLW	dH
18	Entering water temperature sensor error of the plate type heat exchanger of the heat pump	Temp-HEEW	No error code but displayed on control pannel
19	Water tank temperature sensor error ("NA" for mini chillers)	Tank sens.	FE
20	Remote room temperature sensor error	T-Remote Air	F3
21	Protection for the flow switch of the heat pump	HP-Water Switch	Ec
22	Welding protection to the auxiliary electric heater 1 of the heat pump	Auxi. heater 1	EH
23	Welding protection to the auxiliary electric heater 2 of the heat pump	Auxi. heater 2	EH
24	Welding protection to the water tank electric heater	Auxi. -WTH	EH
25	DC bus under-voltage or voltage drop error	DC under-vol.	PL
26	DC bus over-voltage	DC over-vol.	PH
27	AC current protection (input side)	AC curr. pro.	PA
28	IPM defective	IPM defective	H5
29	PFC defective	PFC defective	Hc
30	Start failure	Start failure	Lc
31	Phase loss	Phase loss	Ld
32	Jumper cap error	Jumper cap error	c5
33	Driver resetting	Driver reset	P0

## Air-to-water Heat Pump Split Unitherm

No.	Full Name	Displayed Name	Error Code
34	Compressor overcurrent	Com. over-cur.	P5
35	Overspeed	Overspeed	LF
36	Current sensing circuit error or current sensor error	Current sen.	Pc
37	Desynchronization	Desynchronize	H7
38	Compressor stalling	Comp. stalling	LE
39	Radiator or IPM or PFC over-temperature	Overtemp.-mod.	P8
40	Radiator or IPM or PFC temperature sensor error	T-mod. sensor	P7
41	Charging circuit error	Charge circuit	Pu
42	AC input voltage error	AC voltage	PP
43	Ambient temperature sensor error at the drive board	Temp-driver	PF
44	AC contactor protection or input over-zero error	AC contactor	P9
45	Temperature drift protection	Temp. drift	PE
46	Sensor connection protection ( the current sensor fails to be connected with the corresponding phase U and or phase V)	Sensor con.	Pd
47	Communication error between the display panel and the outdoor unit	ODU Com.	E6
48	Refrigerant vapor line temperature sensor error	Temp RGL	F0
49	Refrigerant liquid line temperature sensor error	Temp RLL	F1
50	4-way valve error	4-way valve	U7

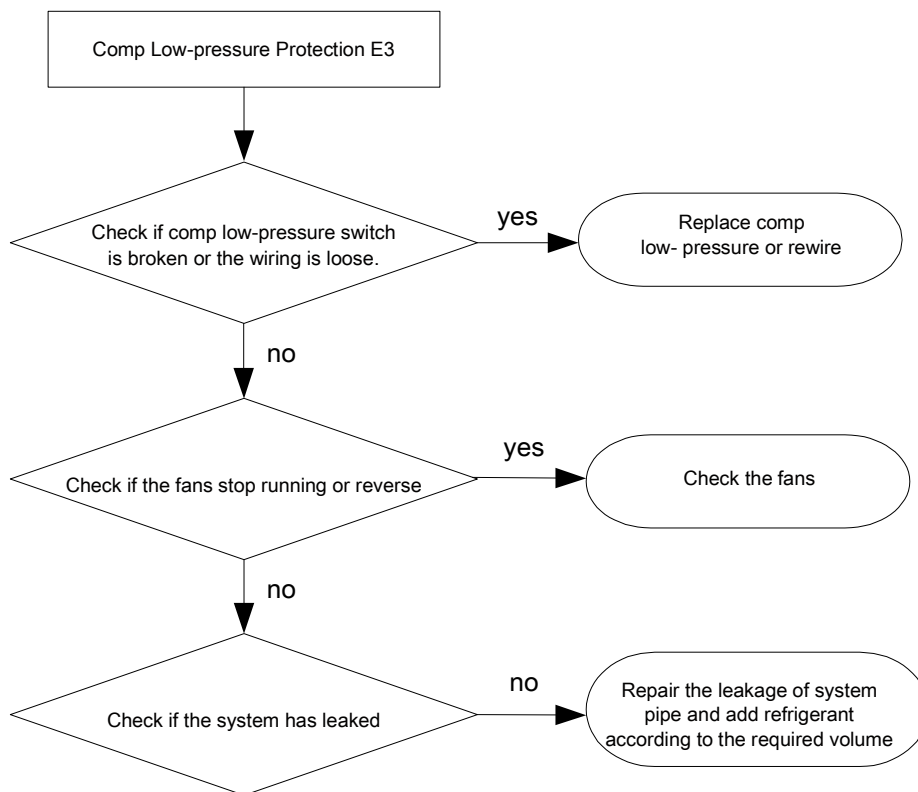
### 3 Flow Chart of Troubleshooting

#### 3.1 Compressor High-pressure Protection E1

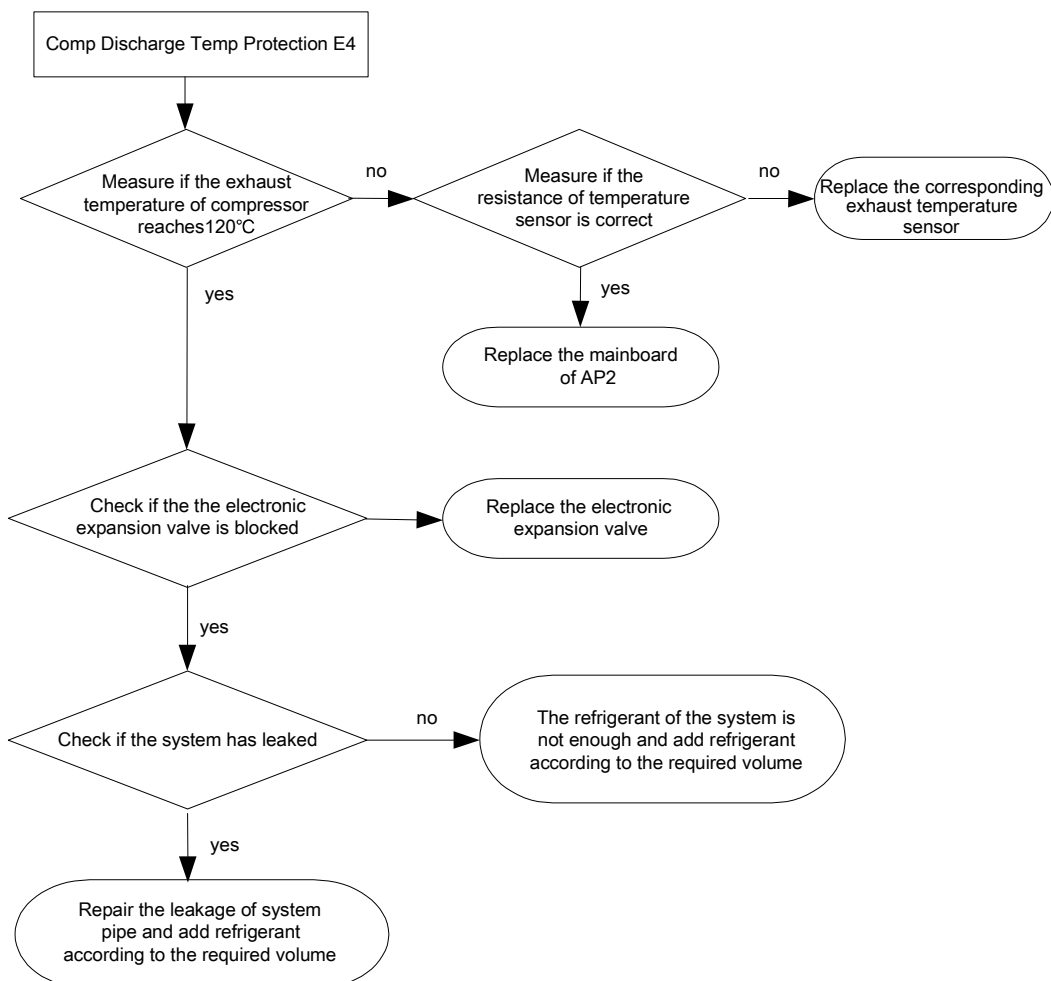




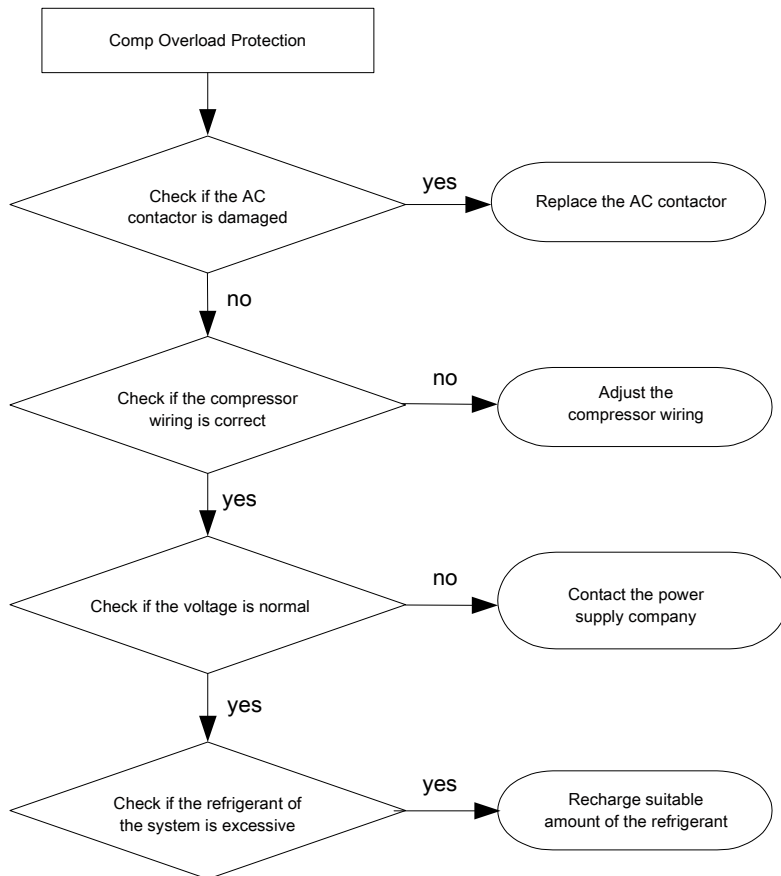
### 3.2 Compressor Low- pressure Protection E3



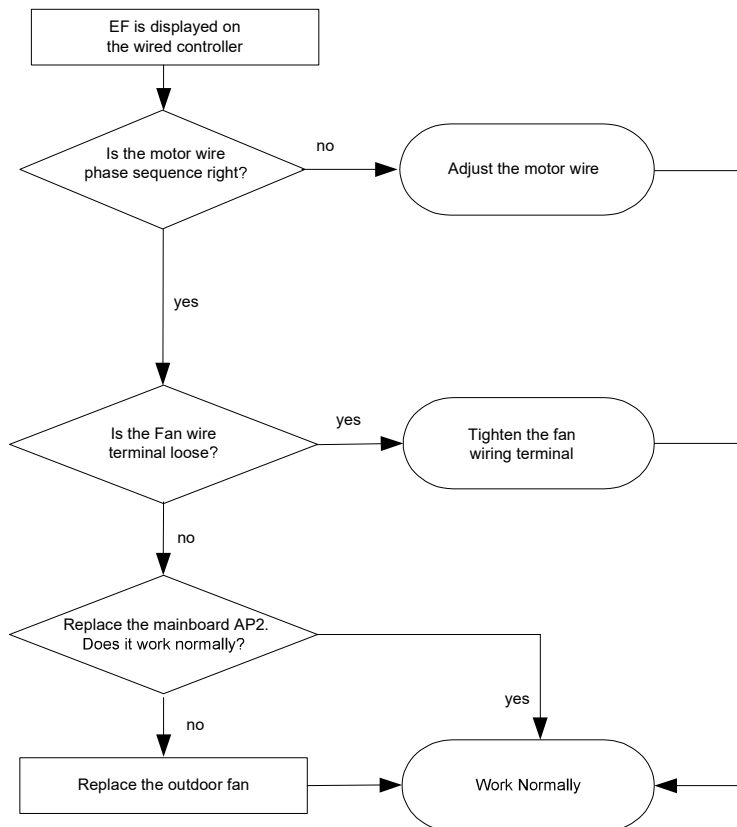
### 3.3 Compressor Discharge Temp Protection E4



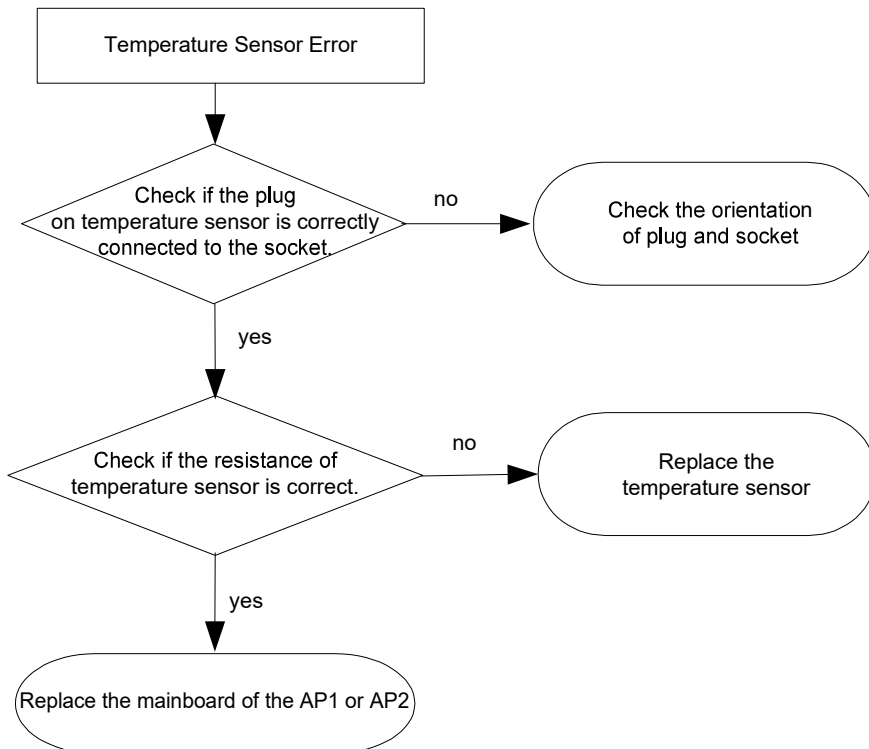
### 3.4 Overload Protection of Compressor or Driver Error



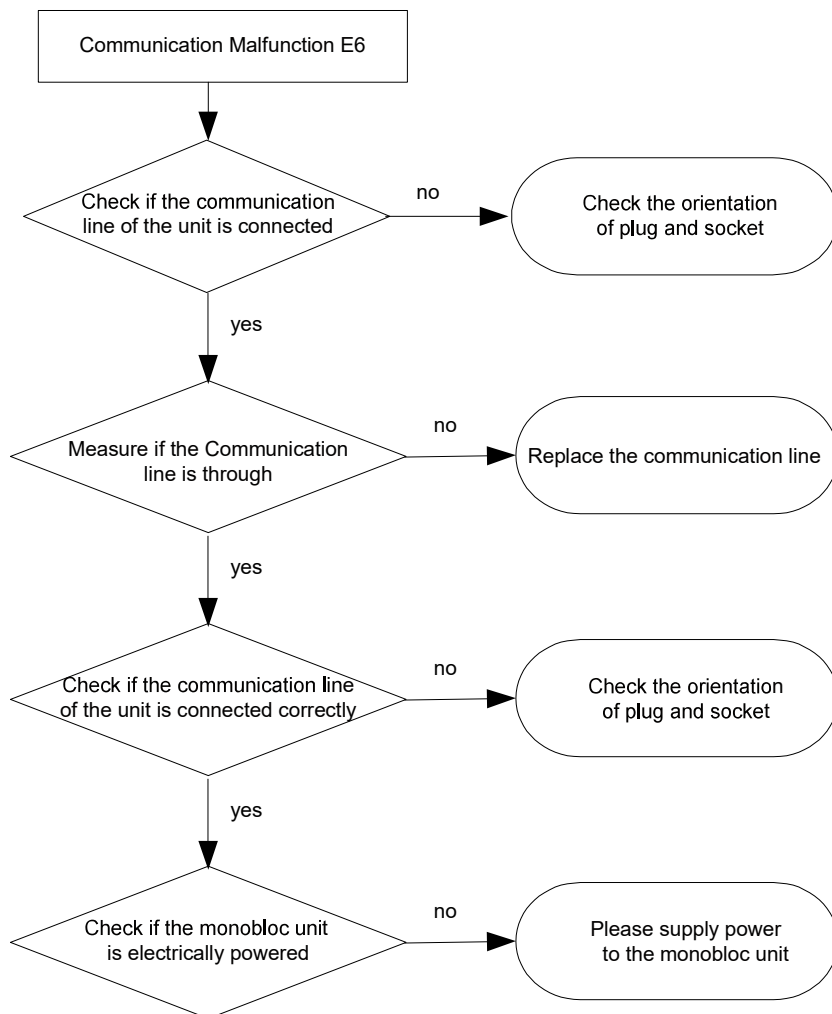
### 3.5 DC Fan Error EF



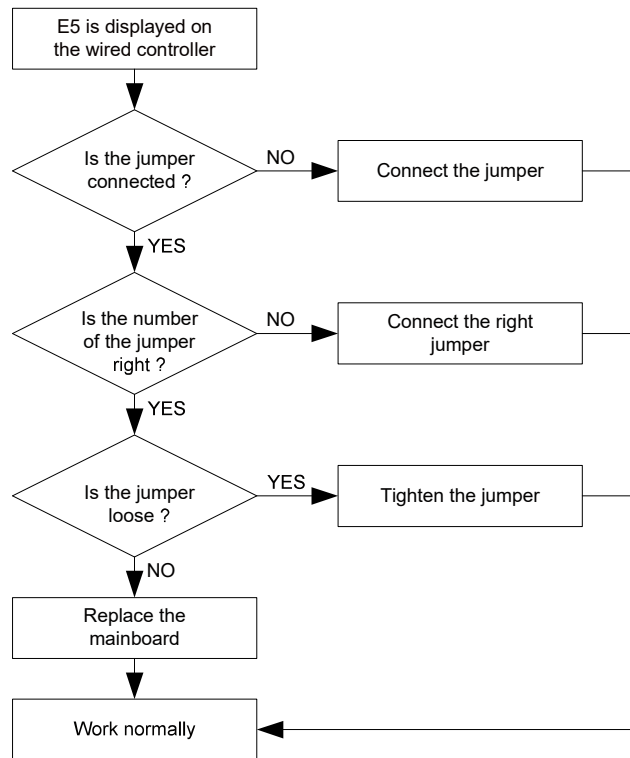
### 3.6 Temperature Sensor Error



### 3.7 Communication Malfunction E6



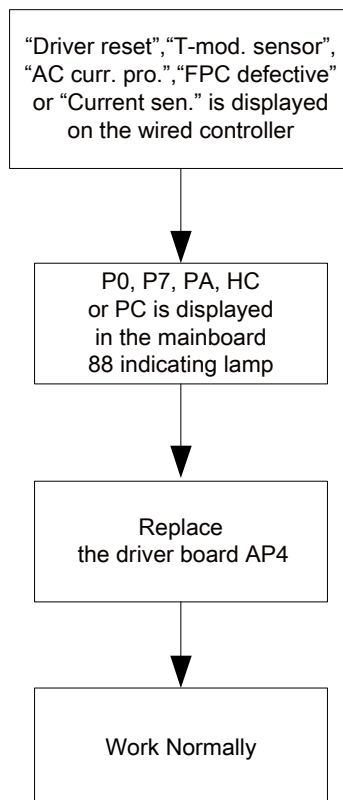
### 3.8 Capacity Switch Error (Code:"C5")



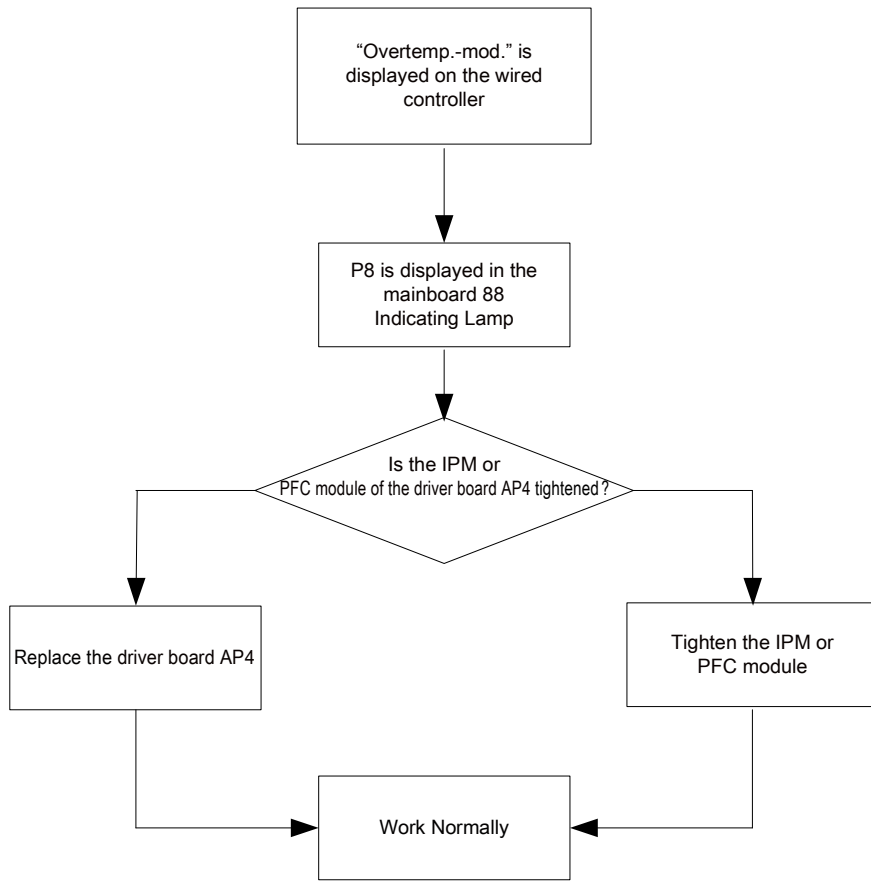
## 4 Diagnosis of Drive

### 4.1 Diagnosis Flowchart of Drive of Single-phase Unit and Three-phase Unit

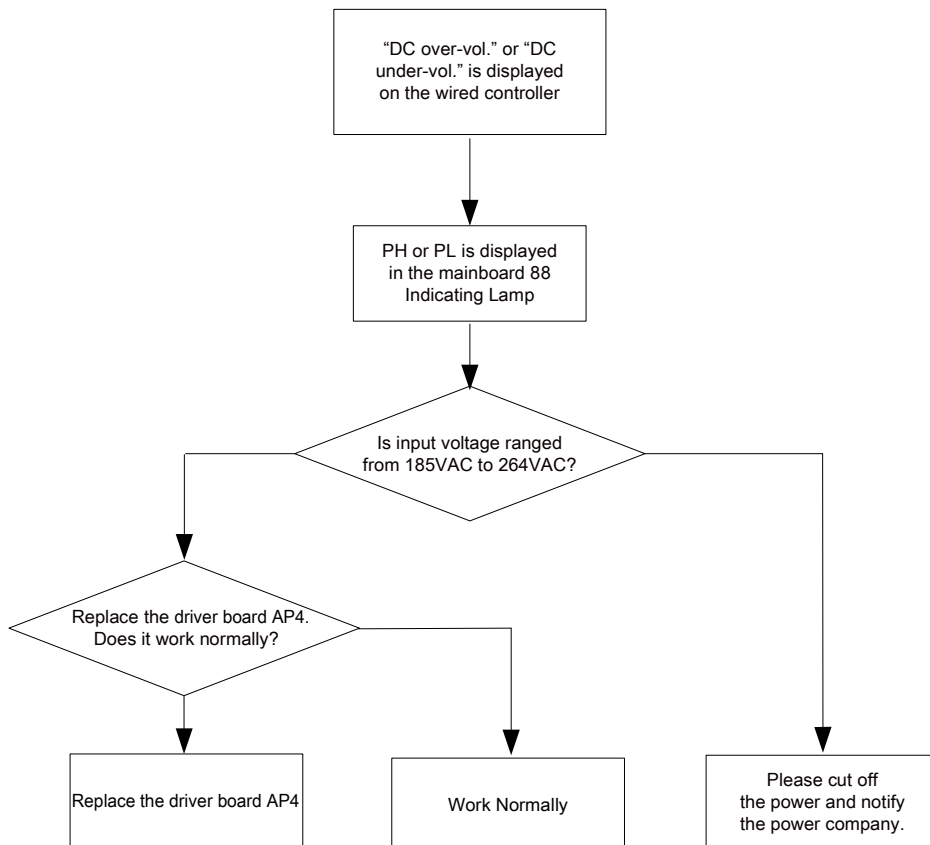
- ◆ Drive Module Reset(Code:"P0") ; IPM or PFC Temperature Sensor Error(Code:"P7") ; AC Current Protection (Input Side)(Code:"PA"); Current Sense Circuit Error(code:"PC"); PFC Protection(Code:"HC")



◆ IPM or PFC Over-temperature Protection(Code:"P8")

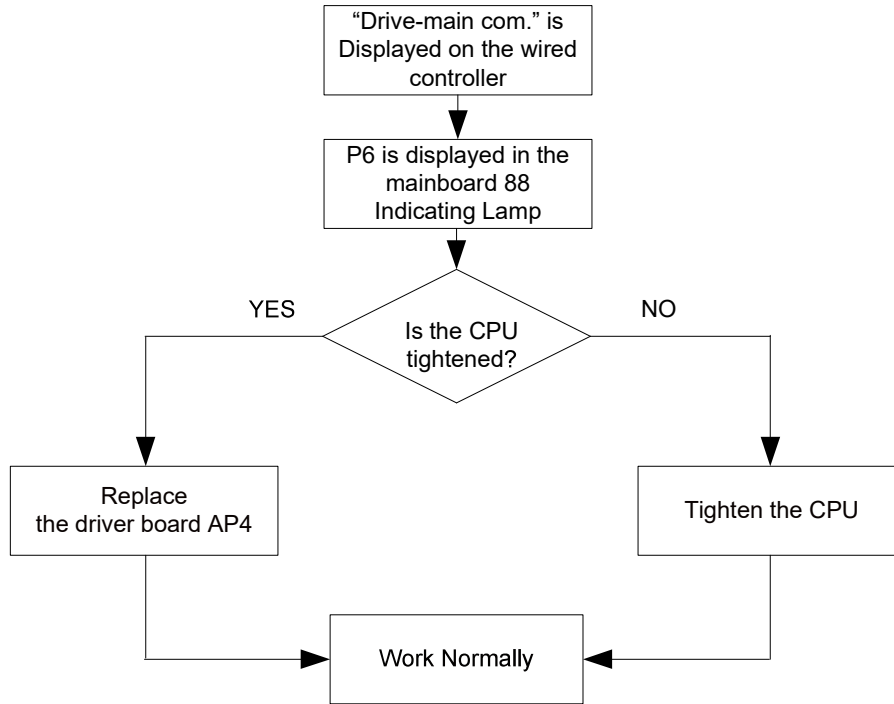


◆ DC Busbar Over-voltage Protection(Code:"PH") ; DC Busbar Under-voltage Protection (Code:"PL")

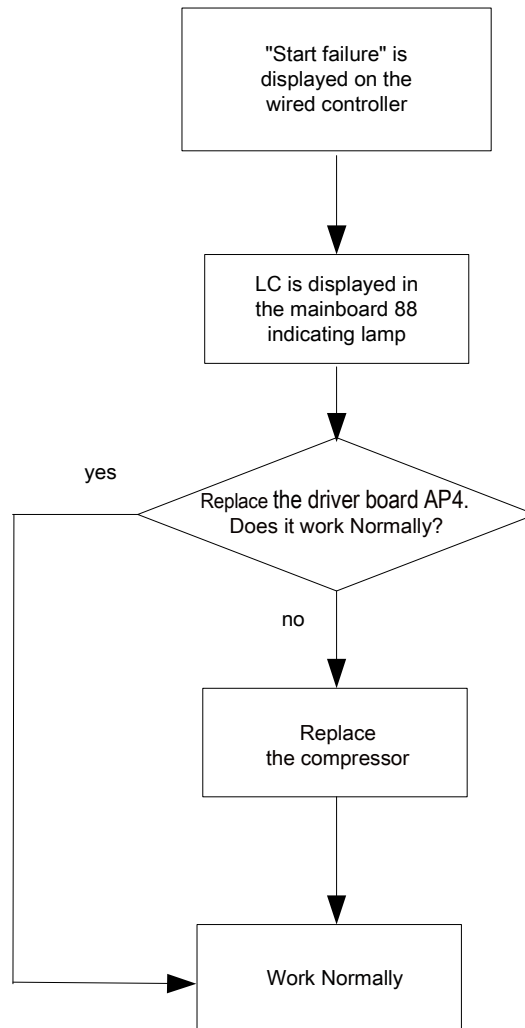


Note: three-phase input voltage is in the range from 320VAC to 475VAC.

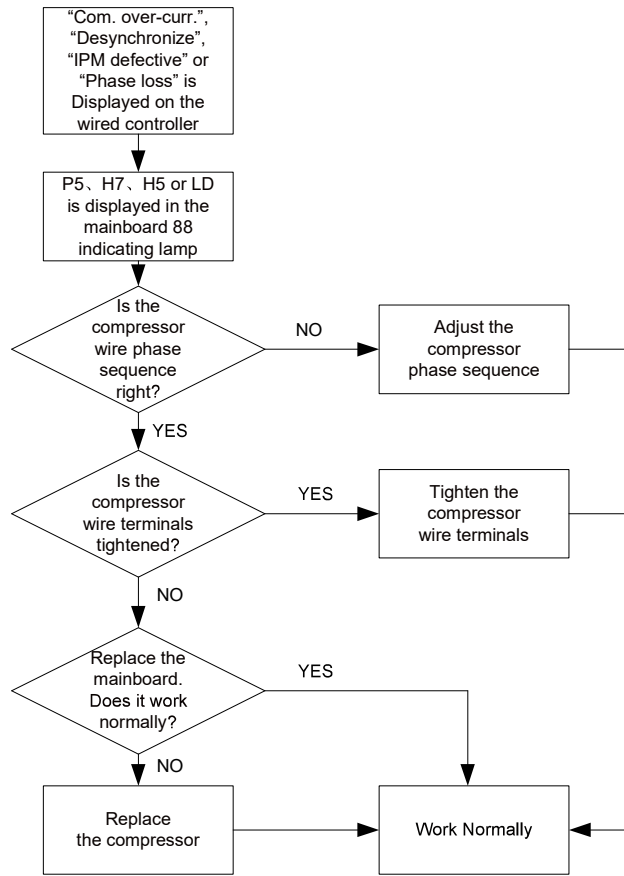
◆ Drive-to-main-control Communication Error(Code:"P6")



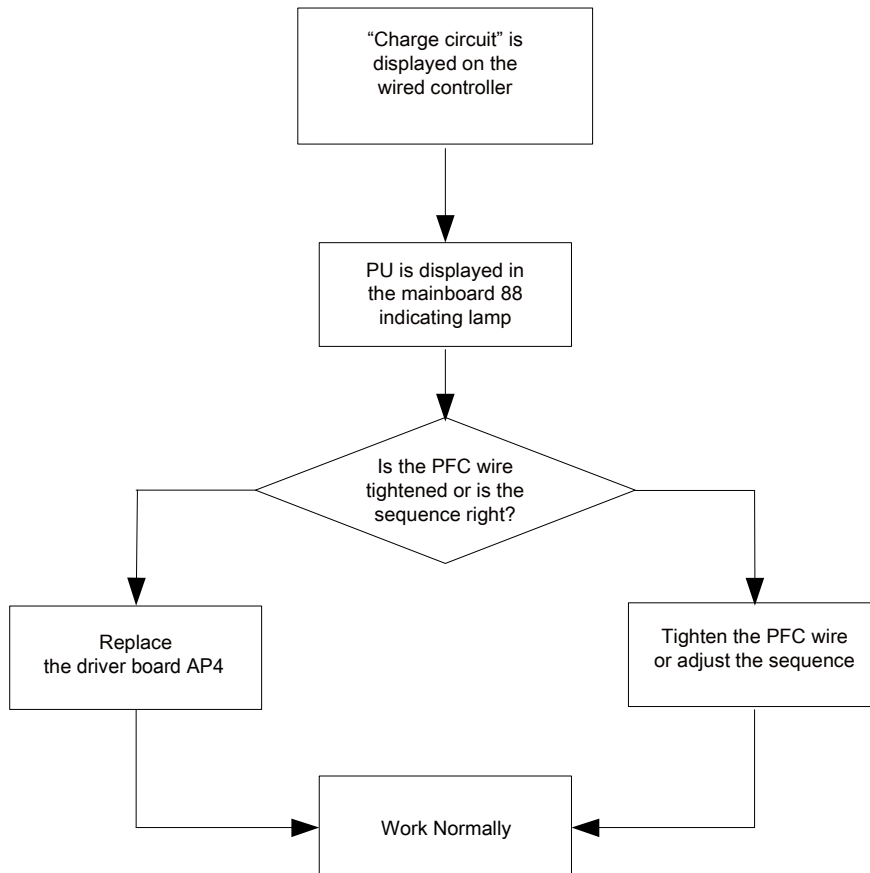
◆ Compressor Startup Failure(code:"LC")



- ◆ Compressor Current Protection (Code:"P5"); Compressor Motor Desynchronizing (Code:"H7"); IPM Protection (Code:"H5"); Phase Loss (Code:"LD")



- ◆ Charging Circuit Error(Code:"PU")



## 5 Daily Maintenance and Repair

### 5.1 Daily Maintenance

In order to avoid damage of unit, all protecting devices in the unit have been set before packaging and delivering. so the user should 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 temperature is below zero in winter.

In order to avoid frost crack of the unit, water in the unit and pipeline system should be drained regularly. 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 users are not able to handle the malfunction of the unit, 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 2.5 Bar.

### 5.2 Troubleshooting






Malfunctions	Reasons	Troubleshooting
Compressor does not start up	<ol style="list-style-type: none"> <li>1.Power supply has problem.</li> <li>2.Connection wire is loose.</li> <li>3.Malfunction of mainboard.</li> <li>4.Malfunction of compressor.</li> </ol>	<ol style="list-style-type: none"> <li>1.Phase sequence is reverse.</li> <li>2.Check out and re-fix.</li> <li>3.Find out the reasons and repair.</li> <li>4.Replace compressor.</li> </ol>
Heavy noise of fan	<ol style="list-style-type: none"> <li>1.Fixing bolt of fan is loose.</li> <li>2.Fan blade touches shell or grill.</li> <li>3.Operation of fan is unreliable.</li> </ol>	<ol style="list-style-type: none"> <li>1.Re-fix fixing bolt of fan.</li> <li>2.Find out the reasons and adjust.</li> <li>3.Replace fan.</li> </ol>
Heavy noise of compressor	<ol style="list-style-type: none"> <li>1.Liquid slugging happens when liquid refrigerant enters into compressor.</li> <li>2.Internal parts in compressor are broken.</li> </ol>	<ol style="list-style-type: none"> <li>1.Check if expansion valve is failure and temp. sensor is loose. If that, repair it.</li> <li>2.Replace compressor.</li> </ol>
Water pump does not run or runs abnormally	<ol style="list-style-type: none"> <li>1.Malfunction of power supply or terminal.</li> <li>2.Malfunction of relay.</li> <li>3.There is air in water pipe.</li> </ol>	<ol style="list-style-type: none"> <li>1.Find out the reasons and repair.</li> <li>2.Replace relay.</li> <li>3.Evacuate.</li> </ol>
Compressor starts or stops frequently	<ol style="list-style-type: none"> <li>1.Poor or excess refrigerant.</li> <li>2.Poor circulation of water system.</li> <li>3.Low load.</li> </ol>	<ol style="list-style-type: none"> <li>1.Discharge or add part of refrigerant.</li> <li>2.Water system is blocked or there is air in it. Check water pump, valve and pipeline. Clean water filter or evacuate.</li> <li>3.Adjust the load or add accumulating devices.</li> </ol>
The unit does not heat although compressor is running	<ol style="list-style-type: none"> <li>1.Leakage of refrigerant.</li> <li>2.Malfunction of compressor.</li> </ol>	<ol style="list-style-type: none"> <li>1.Repair by leakage detection and add refrigerant.</li> <li>2.Replace compressor.</li> </ol>







Malfunctions	Reasons	Troubleshooting
Poor efficiency of hot water heating	<ol style="list-style-type: none"> <li>Poor heat insulation of water system.</li> <li>Poor heat exchange of evaporator.</li> <li>Poor refrigerant of unit.</li> <li>ockage of heat exchanger at water side.</li> </ol>	<ol style="list-style-type: none"> <li>Enhance heat insulation efficiency of the system.</li> <li>Check if air in or out of unit is normal and clean evaporator of the unit.</li> <li>Check if refrigerant of unit leaks.</li> <li>Clean or replace heat exchanger.</li> </ol>

### 5.3 Repair

#### 5.3.1 Key Components

Picture	Name	Function
	Compressor	It is the heart of the cooling system, mainly used to turn the low-temperature, low-pressure refrigerant vapor to high-temperature high-pressure vapor and then discharge it to the evaporator. The two-stage enthalpy-adding compressor is adopted herein, which can improve the heating performance of the unit largely.
	Electronic Expansion Valve	It is one of four main components and used to turn the hi-pressure liquid refrigerant to low-temperature, low-pressure vapor-liquid mixture and adjust the refrigerant flow rate entering the evaporator.
	Gas-liquid Separator	It is installed at the side of the suction line, and used to prevent liquid refrigerant entering the compressor, otherwise, the wet compression or the liquid slugging may occur.
	4-way Valve	It is used to switch flow direction of refrigerant and then realize switchover between cooling and heating. It also can be used for defrosting through the counterflow.
	Plate Heat Exchanger	It is the water-refrigerant plate type heat exchanger, used to liquefy the high-temperature high-pressure vapor refrigerant or evaporate the low-temperature low pressure liquid refrigerant. Heat of condensation is taken away by circulation water and heat for evaporation is supplied also by circulation water.
	Water Pump	It is the power equipment for water circulation.
	Expansion Vessel	It is used to keep stable pressure of the water system. The tank is charged with a certain volume of nitrogen which is separated from the water side with a gasbag. When pressure of the water side exceeds the nitrogen pressure, the gasbag will expand and water enters into the tank so as to lower the pressure of the water system. In contract, when pressure of the water system goes down, nitrogen in the tank will expel water out to the water system.

Picture	Name	Function
	Flow Switch	It is used to prevent the heat exchanger from being frozen owing to reduced water flow rate. When the flow rate goes down to the point at which the flow switch will act, the switch will trip off and the unit will raise an alarm and shut down.
	Economizer	It is used in heating mode and water heating mode but NOT used in cooling mode. On one side, it can increase the subcooling before EXV, and on the other side it can improve efficiency in heating circuit.
	Safety Valve	It is used to prevent the pressure of circulation water from increasing unusually. When the pressure is larger than the set point (0.3MPa), this valve will open to relieve water pressure.
	Exhaust Valve	It is used to expel air trapped inside the water system to make sure normal operation of the system. It is usually installed at the highest point of the system.

### 5.3.2 Charging and Discharging of Refrigerant

The unit has been charged with refrigerant before delivery. Overcharging or undercharging will cause the compressor to run improperly or be damaged. When refrigerant is required to be charged or discharged for installation, maintenance and other reasons, please follow steps below and nominal charged volume on the nameplate.

Discharging: remove metal sheets of the outer casing, connect a hose to the check valve on outdoor unit and then discharge refrigerant:

#### NOTE

- Discharge is allowed unless the unit has been stopped. (Cut off the power and re-power it 1 minutes later)
- Protective measures should be taken during discharging to avoid frost bites.
- When discharging is finished, if vacuuming cannot be done immediately, remove the hose to avoid air or foreign matters entering the unit.
- Vacuuming: when discharging is finished, use hoses to connect the charging valve, manometer and vacuum pump to vacuum the unit.
- When vacuuming is finished, pressure inside the unit should be kept lower than 80Pa for at least 30 minutes to make sure there is no leak. Either charging valve 1 or charging valve 2 can be used for vacuuming.
- When vacuuming is finished and it is certain that there is no leak, charging can be done.

#### ◆ Leak Detection Methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

Electronic leak detector shall be used to detect flammable refrigerant, but the sensitivity may not be adequate, or may need re-calibration (Detection equipment shall be calibrated in a refrigerant-free area).

Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.

Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed.

Leak detection fluids are suitable for us with most refrigerant but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed / extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off

## Air-to-water Heat Pump Split Unitherm

valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

Note: before and during operation, use an appropriate refrigerant leak detector to monitor the operation area and make sure the technicians can be well aware of any potential or actual leakage of inflammable gas. Make sure the leak detecting device is applicable to inflammable refrigerant. For example, it should be free of sparks, completely sealed and safe in nature.