EN

TECHNICAL MANUAL

01 |30 - 08 - 2024

HEAT PUMP WATER HEATER

R290

SWH-80P
SWH-100P
SWH-150P

sinclair
HEAT PUMPS

IMPORTANT NOTE:

Read this manual carefully before installing or operating your new heat pump.
Make sure to save this manual for future reference.

Content

Part 1 General information

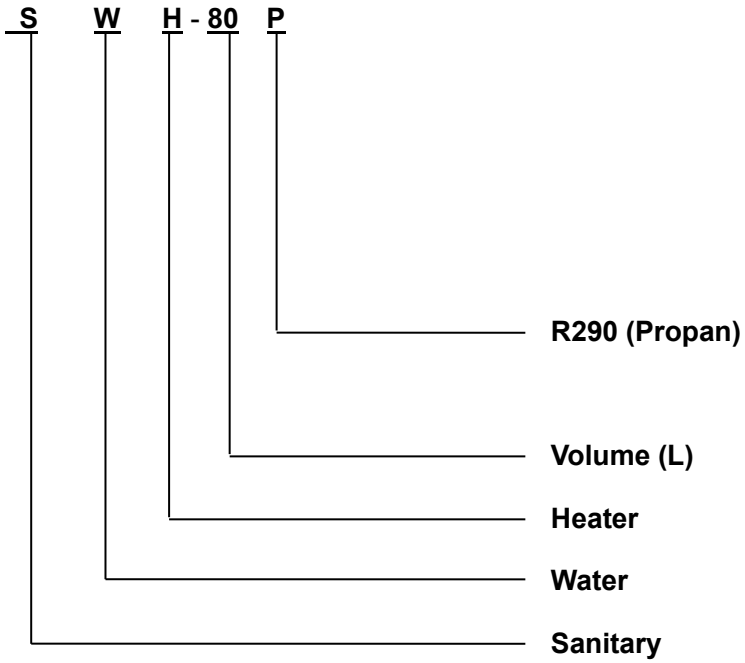
1. Measurements

Model	Net/Gross weight (kg)	Dimension (mm, D×WxH)	Power Supply
SWH-80P	62/56	Φ500×548×1195	220-240V~, 50Hz, 1Ph
SWH-100P	78,5/62	Φ500×548×1357	
SWH-150P	97,5/80	Φ500×548×1707	

2. External appearance

SWH-80P SWH-100P SWH-150P

3. Nomenclature

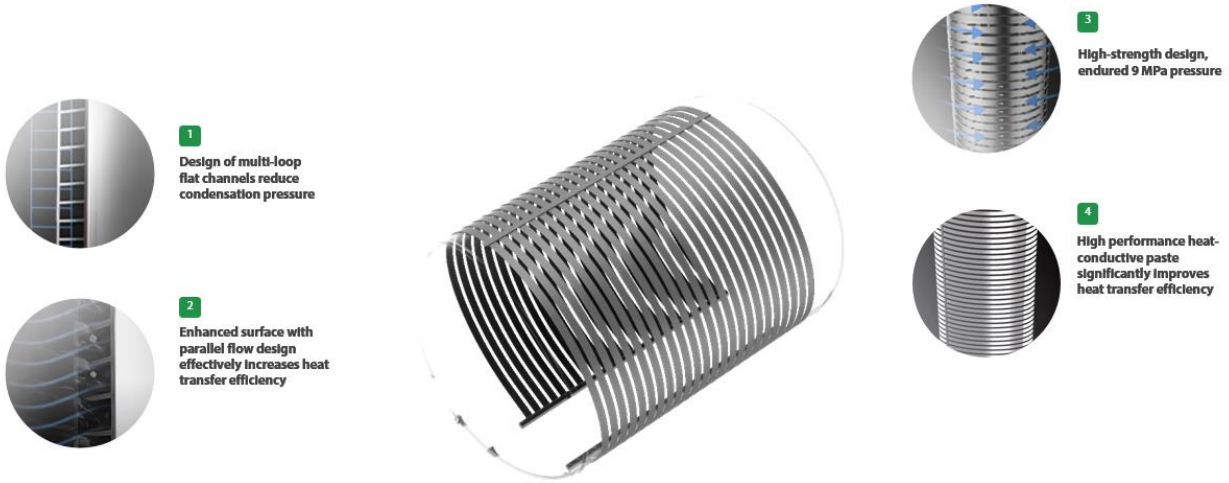


Part 2 Performance

1. Features

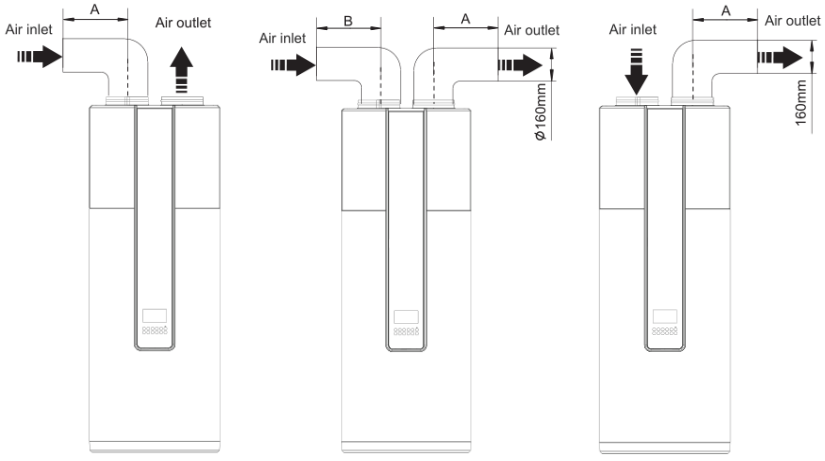
✧ Microchannel heat transfer technology

1. Design of multi-loop flat channels reduce condensation pressure
2. Enhanced surface with parallel flow design effectively increases heat transfer efficiency
3. High-strength design, endured 9 MPa pressure
4. High performance heat-conductive paste significantly improves heat transfer efficiency



✧ The maximum outlet water temperature: 70°C. The system makes the water be heated stably and quickly with innovative heating methods of combination the electric heating and heat pump heating properly.

✧ Flexible installation achieves by long air inlet and outlet duct enables ducted length up to 5 meters.



Note: A≤5m or A+B≤5m

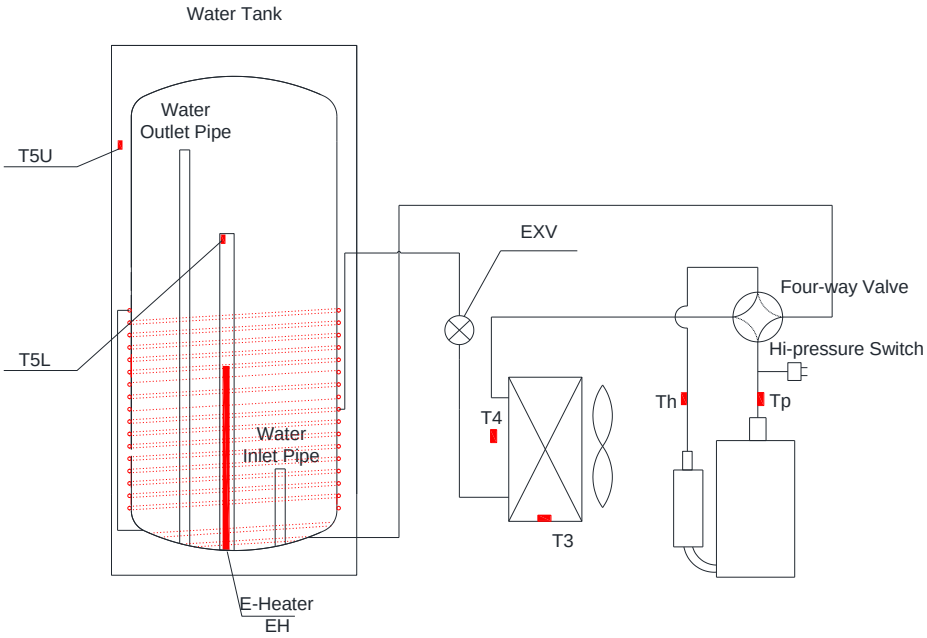
✧ Automatic startup and shutdown, automatic defrosting by revising refrigerant cycle to save the extra operation.

✧ According to the heat pump principle, the unit absorbs heat from outdoor air and produce heat water; thermal efficiency can be up to 3.8(Under the condition A15/12 W15/45).

✧ CE, LVD, RED, keymark, ERP& NF certification.

✧ Within the temperature range from -20 °C to 45 °C, the unit will not be affected by night, cloudy sky, rain even snow weather.

2. Refrigerant circuit



Compressor: RDSN58V11TZL(80L&100L) &RDSN89V11TZL(150L), R290 high efficiency compressor, supplied by GMCC.

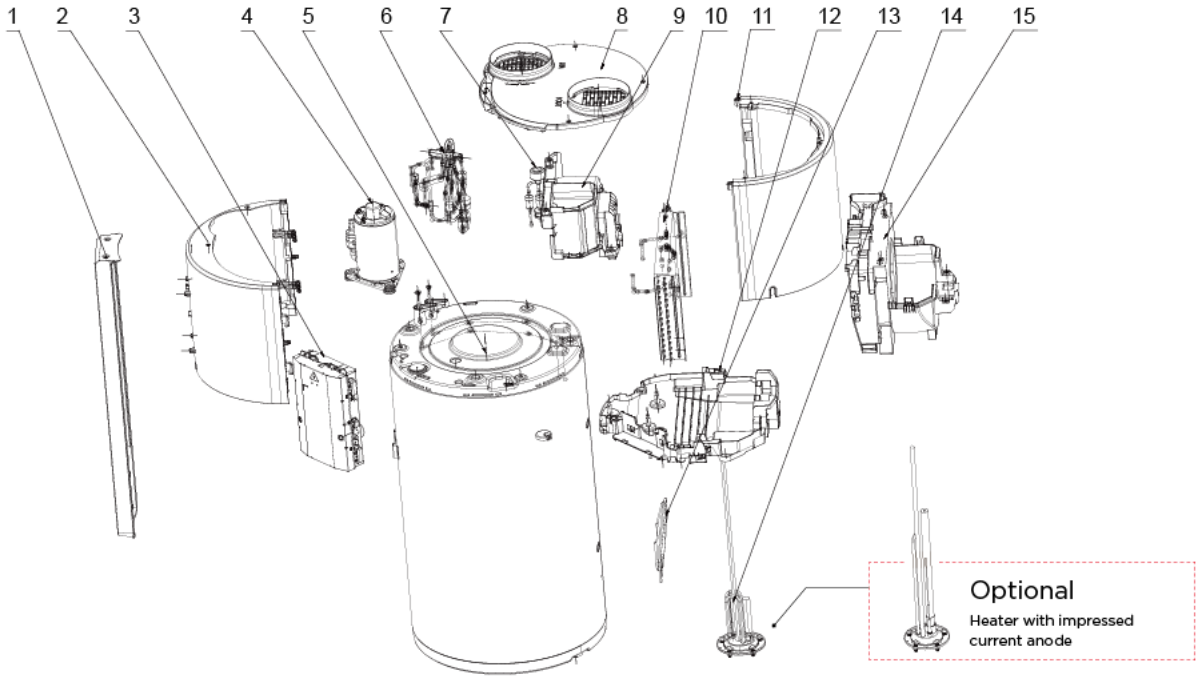
Evaporator: copper tube and aluminum fin type heat exchanger.

EXV: electronic expansion valve, the opening is regulated according to the discharge air temperature of compressor.

Fan: centrifugal fan. The motor is supplied by Welling or Green-Intelligence.

TCO (Temperature Switch): If the water temperature is higher than 95 °C, the TCO will automatically shut off the compressor and E-heater's power supply, it must turn on by manual.

3. Unit structure



1:Front plate	4:Compressor	7:Electronic expansion valve	10:Evaporator	13:Mount bracket
2:Front cover plate	5:Water tank	8:Top plate	11:Black Cover plate	14:Heater
3:Control box	6:4-Way valve	9:Upper cabinet	12:Drain pan	15:Lower cabinet

4. Specifications

Model			SWH-80P	
Running mode			Heat pump	E-heater
Running ambient temperature		℃	0～43 -7～43for models with air inlet duct	0～43 -20～45for models with air inlet duct
Output water temperature		℃	Default 50℃,38℃～65℃(70)	
Power supply		Ph, V, Hz	1, 220-240~, 50	
Storage size		Ltr	78	
Water heating	Capacity	kW	0.95	1.50
	η		112%	/
	scf		0.1	/
	energy class		A+	
	Max. current	A	9.0	
Unit	Dimension (D×H)	mm	Φ500×548×1196	
	Packing (W×H×D)	mm	620×1295×585	
	Net/gross weight	kg	57/63	
Sound power level		dB(A)	54	
Sound power level(with duct)		dB(A)	TBD(11.30)	
Refrigerant type/quantity		kg	R290/0.15	
Refrigerant design pressure		MPa	3.0/1.2	
Throttling type		/	Electric expansion valve	
System protection		/	TCO, safety valve, automatic defrosting, over-load protector, etc.	
Air flow		m³/h	190	
Compressor	Model	/	RDSN58V11TZL	
	Type	/	Rotary	
	Brand	/	GMCC	
	Capacity	W	1135	
	Input	W	280	
	Rated current(RLA)	A	1.3	
	Locked rotor Amp(LRA)	A	10	
	Thermal protector	/	URP-189-78 HPA-211	
	Capacitor	/	15μF/450V	
	Refrigerant oil	ml	XS-601C1 / 140ml	
Evaporator coil	Number of rows	/	2	
	Tube pitch(a)x row pitch(b)	mm	18×17.3	
	Fin spacing	mm	1.3	
	Fin type (code)	/	Hydrophilic aluminum	
	Tube outside dia. and type	mm	Φ5 Inner groove copper tube	
	Coil length x height	mm	350×288	

	Number of circuits	/	2
Fan motor	Model	/	ZKFP-34-10-1(DC)
	Brand	/	welling/Green-Intelligence
	Input	W	14
	Speed	r/min	620
	Output	W	-
	Locked rotor Amp(LRA)	A	-
	Capacitor	/	-
Water pipeline	Water inlet pipe	/	DN15
	Water outlet pipe	/	DN15
	Drainage pipe	/	DN12
	PT valve joint	/	-
	Max. operating pressure	MPa	0.80
Heat exchanger			Microchannel heat exchanger
E-heater		kW	1.5×1
Mixed water at 40℃ V40		L	85
Loading Quantity （Without pallet）	20'/40'/40H	Pcs	30/60/120
Loading Quantity （With pallet）	20'/40'/40H	Pcs	30/60/60

Notes:

1. The test conditions: outdoor temperature 15/12°C (DB/WB), inlet water temperature 15°C, outlet water temperature 45°C.
2. The specification may be changed for product improvement, please refer to the nameplate.

Model			SWH-100P	
Running mode			Heat pump	E-heater
Running ambient temperature		°C	0～43 -7～43for models with air inlet duct	0～43 -20～45for models with air inlet duct
Output water temperature		°C	Default 50℃,38℃～65℃(70)	
Power supply		Ph, V, Hz	1, 220-240~, 50	
Storage size		Ltr	98	
Water heating	Capacity	kW	0.98	1.50
	η		111%	/
	scf		0.1	/
	energy class		A+	
	Max. current	A	9.0	
Unit	Dimension (D×H)	mm	Φ500×548×1360	
	Packing (W×H×D)	mm	620×1575×585	
	Net/gross weight	kg	62/78,5	
Sound power level		dB(A)	54	
Sound power level(with duct)		dB(A)	TBD(11.30)	
Refrigerant type/quantity		kg	R290/0.15	
Refrigerant design pressure		MPa	3.0/1.2	
Throttling type		/	Electric expansion valve	
System protection		/	TCO, safety valve, automatic defrosting, over-load protector, etc.	
Air flow		m^3/h	200	
Compressor	Model	/	RDSN58V11TZL	
	Type	/	Rotary	
	Brand	/	GMCC	
	Capacity	W	1135	
	Input	W	280	
	Rated current(RLA)	A	1.3	
	Locked rotor Amp(LRA)	A	10	
	Thermal protector	/	URP-189-78 HPA-211	
	Capacitor	/	15μF/450V	
	Refrigerant oil	ml	XS-601C1 / 140ml	
Evaporator coil	Number of rows	/	2	
	Tube pitch(a)x row pitch(b)	mm	18×17.3	
	Fin spacing	mm	1.3	
	Fin type (code)	/	Hydrophilic aluminum	
	Tube outside dia. and type	mm	Φ5 Inner groove copper tube	
	Coil length x height	mm	350×288	
	Number of circuits	/	2	
Fan motor	Model	/	ZKFP-34-10-1(DC)	

	Brand		/	welling/Green-Intelligence
	Input		W	15
	Speed		r/min	650
	Output		W	-
	Locked rotor Amp(LRA)		A	-
	Capacitor		/	-
Water pipeline	Water inlet pipe		/	DN15
	Water outlet pipe		/	DN15
	Drainage pipe		/	DN12
	PT valve joint		/	-
	Max. operating pressure		MPa	0.80
Heat exchanger				Microchannel heat exchanger
E-heater			kW	1.5×1
Mixed water at 40℃ V40			L	110
Loading Quantity （Without pallet）		20'/40'/40H	Pcs	30/60/60
Loading Quantity （With pallet）		20'/40'/40H	Pcs	30/60/60

Notes:

1. The test conditions: outdoor temperature 15/12°C (DB/WB), inlet water temperature 15°C, outlet water temperature 45°C.
2. The specification may be changed for product improvement, please refer to the nameplate.

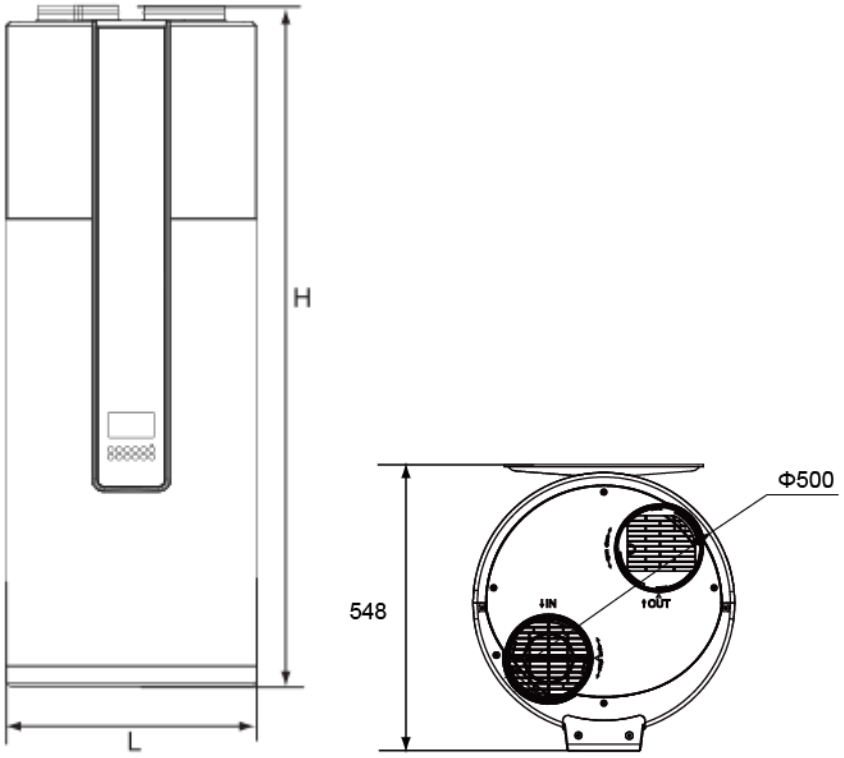
Model			SWH-150P	
Running mode			Heat pump	E-heater
Running ambient temperature		°C	0～43 -7～43for models with air inlet duct	0～43 -20～45for models with air inlet duct
Output water temperature		°C	Default 50℃,38℃～65℃(70)	
Power supply		Ph, V, Hz	1, 220-240~, 50	
Storage size		Ltr	145	
Water heating	Capacity	kW	1.30	1.50
	η		122%	/
	scf		0.09	/
	energy class		A+	
	Max. current	A	10.5	
Unit	Dimension (D×H)	mm	Φ500×548×1707	
	Packing (W×H×D)	mm	620×1910×585	
	Net/gross weight	kg	80/97,5	
Sound power level		dB(A)	56	
Sound power level(with duct)		dB(A)	TBD(11.30)	
Refrigerant type/quantity		kg	R290/0.15	
Refrigerant design pressure		MPa	3.0/1.2	
Throttling type		/	Electric expansion valve	
System protection		/	TCO, safety valve, automatic defrosting, over-load protector, etc.	
Air flow		m^3/h	240	
Compressor	Model	/	RDSN89V11TZL	
	Type	/	Rotary	
	Brand	/	GMCC	
	Capacity	W	1710	
	Input	W	415	
	Rated current(RLA)	A	1.88	
	Locked rotor Amp(LRA)	A	10	
	Thermal protector	/	URP-267-XX HPA-315	
	Capacitor	/	15μF/450V	
	Refrigerant oil	ml	XS-601C1 / 140ml	
Evaporator coil	Number of rows	/	2	
	Tube pitch(a)x row pitch(b)	mm	18×17.3	
	Fin spacing	mm	1.3	
	Fin type (code)	/	Hydrophilic aluminum	
	Tube outside dia. and type	mm	Φ5 Inner groove copper tube	
	Coil length x height	mm	350×288	
	Number of circuits	/	2	
Fan motor	Model	/	ZKFP-34-10-1(DC)	

	Brand		/	welling/Green-Intelligence
	Input		W	25
	Speed		r/min	800
	Output		W	-
	Locked rotor Amp(LRA)		A	-
	Capacitor		/	-
Water pipeline	Water inlet pipe		/	DN15
	Water outlet pipe		/	DN15
	Drainage pipe		/	DN12
	PT valve joint		/	-
	Max. operating pressure		MPa	0.80
Heat exchanger				Microchannel heat exchanger
E-heater			kW	1.5×1
Mixed water at 40℃ V40			L	160
Loading Quantity （Without pallet）		20'/40'/40H	Pcs	30/60/60
Loading Quantity （With pallet）		20'/40'/40H	Pcs	30/60/60

Notes:

1. The test conditions: outdoor temperature 15/12°C (DB/WB), inlet water temperature 15°C, outlet water temperature 45°C.
2. The specification may be changed for product improvement, please refer to the nameplate.

5. Dimension (Unit: mm)



Model	L	H
SWH-80P	500	1199
SWH-100P	500	1365
SWH-150P	500	1707

6. Performance diagram

Heat source will be automatically selected by unit. But manually E-Heater operation is available.

Operation range

Setting water temperature target range: 38~65°C.

Min. temperature of room of installation		0°C
Max. temperature of room of installation		43°C
Minimum air inlet temperature(a)	Heat pump	-7°C
	E-heater	-20°C
Maximum air inlet temperature(a	Heat pump	43°C
	E-heater	45°C

Water temperature limits

Unit: °C

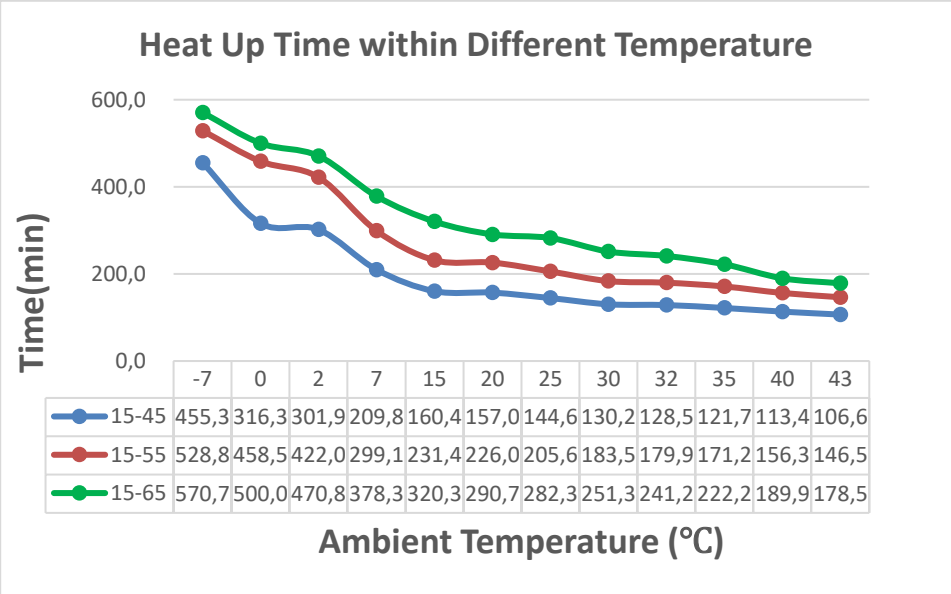
Ambient temperature (T4)	T4<-7	-7≤T4<-2	-2≤T4<2	2≤T4<35	35≤T4<43	43≤T4
Max. temperature (Heat pump)	--	45	55	65	60(80L/100L) 58(150L)	--
Max. temperature (E-heater)	70(The maximum outlet temperature is set to 65˚C by default.)					

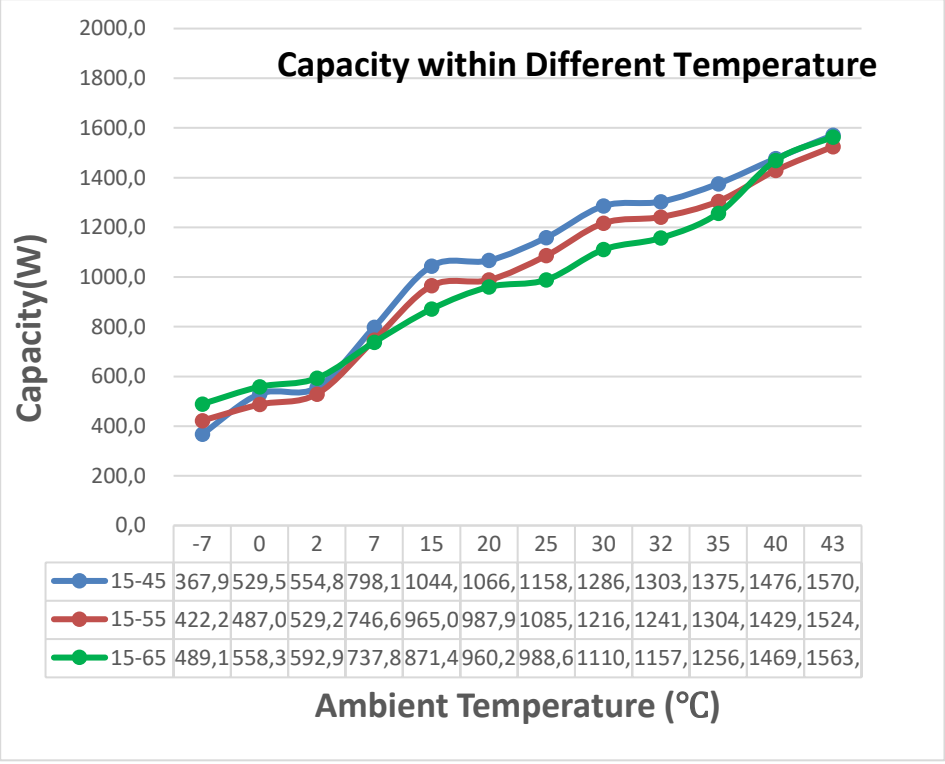
Heat-up Time

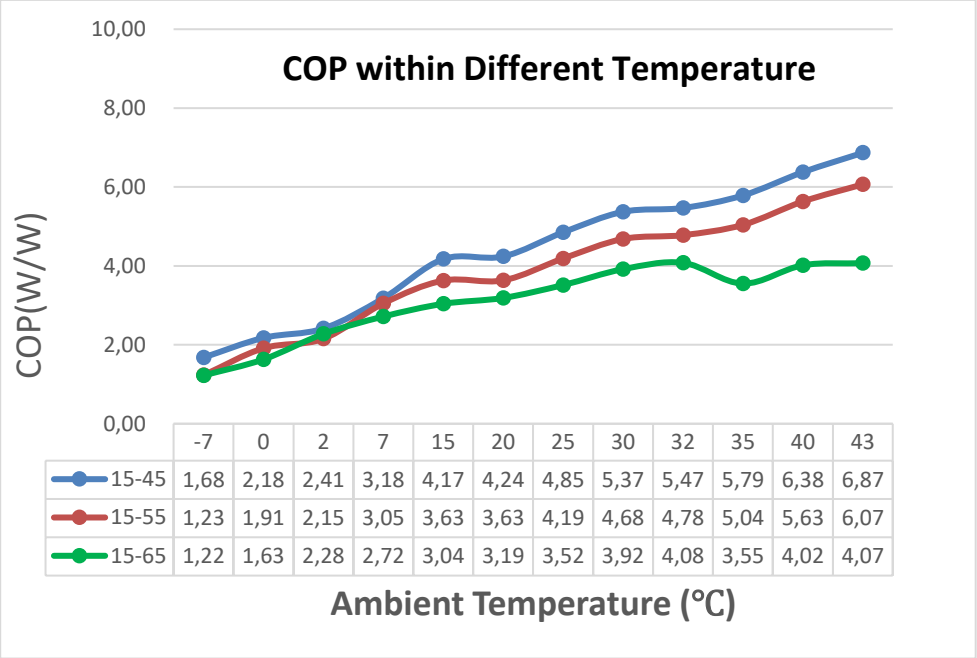
There are different heat-up times in different ambient temperature. Normally lower ambient temperature result longer heat-up time because of lower effective performance.

In the ECO mode, the heating time please refer to the curve below. Time difference may occur due to different installation scenarios. This is normal.

SWH-80P

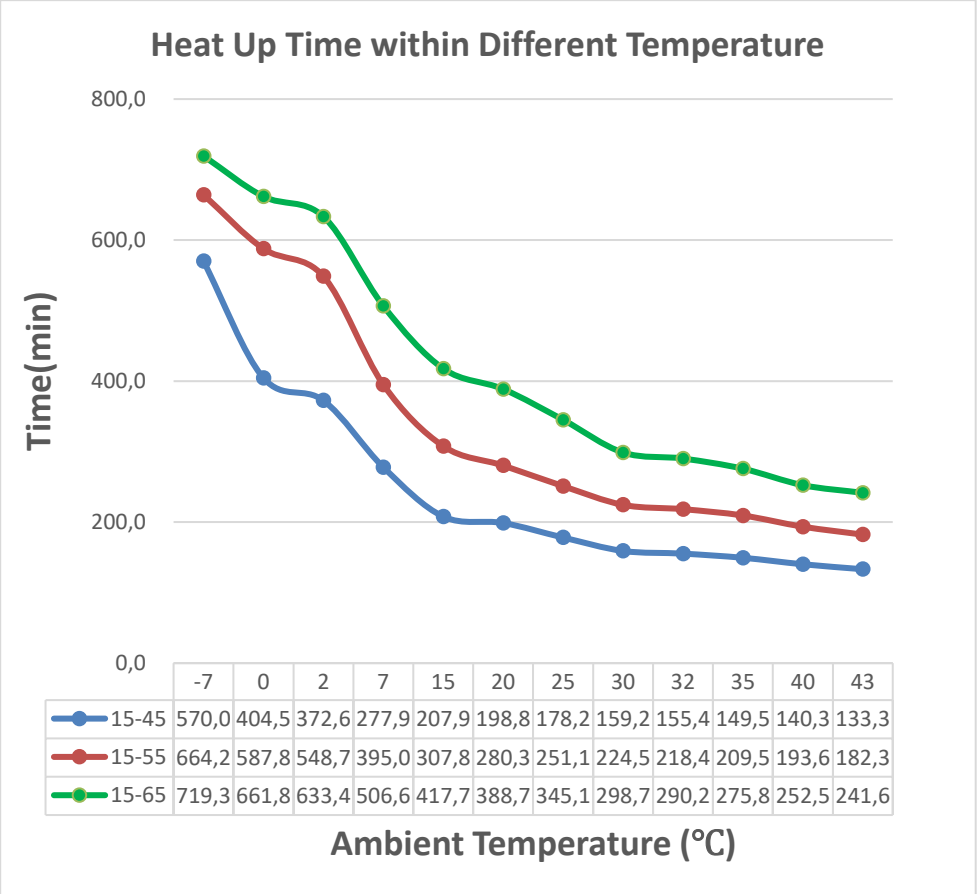




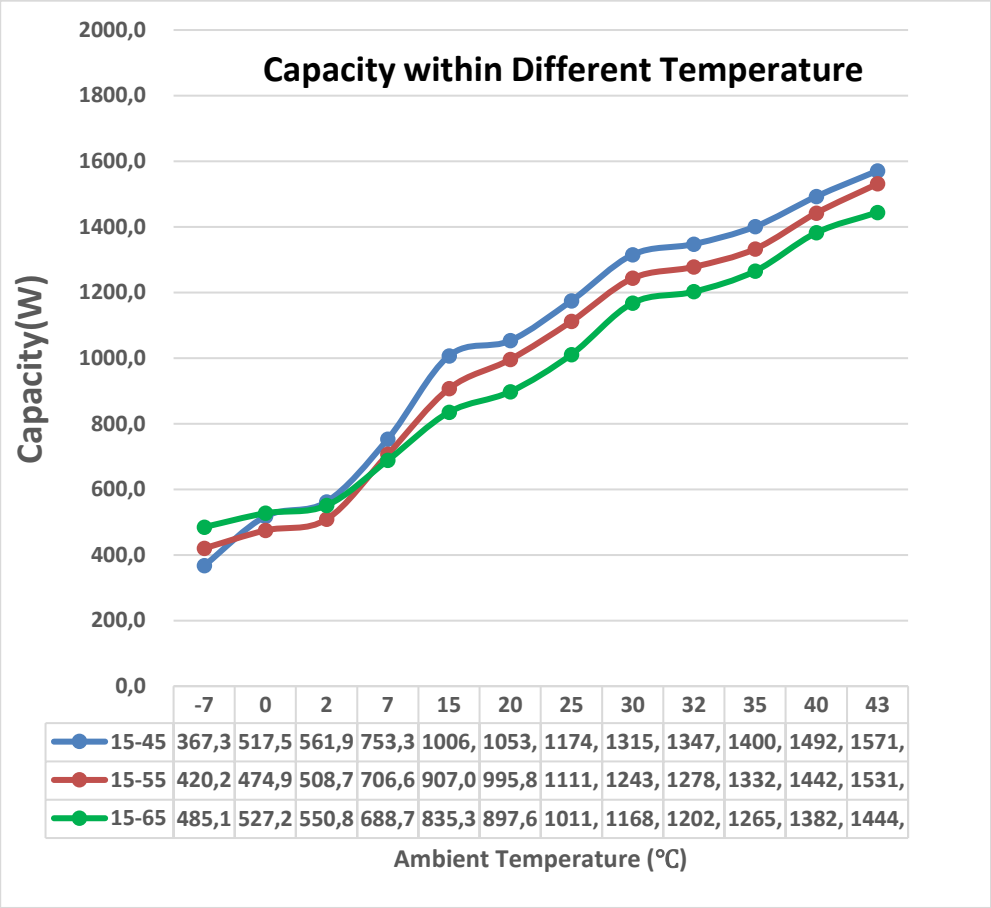


	-7	0	2	7	15	20	25	30	32	35	40	43
15-45	1,68	2,18	2,41	3,18	4,17	4,24	4,85	5,37	5,47	5,79	6,38	6,87
15-55	1,23	1,91	2,15	3,05	3,63	3,63	4,19	4,68	4,78	5,04	5,63	6,07
15-65	1,22	1,63	2,28	2,72	3,04	3,19	3,52	3,92	4,08	3,55	4,02	4,07

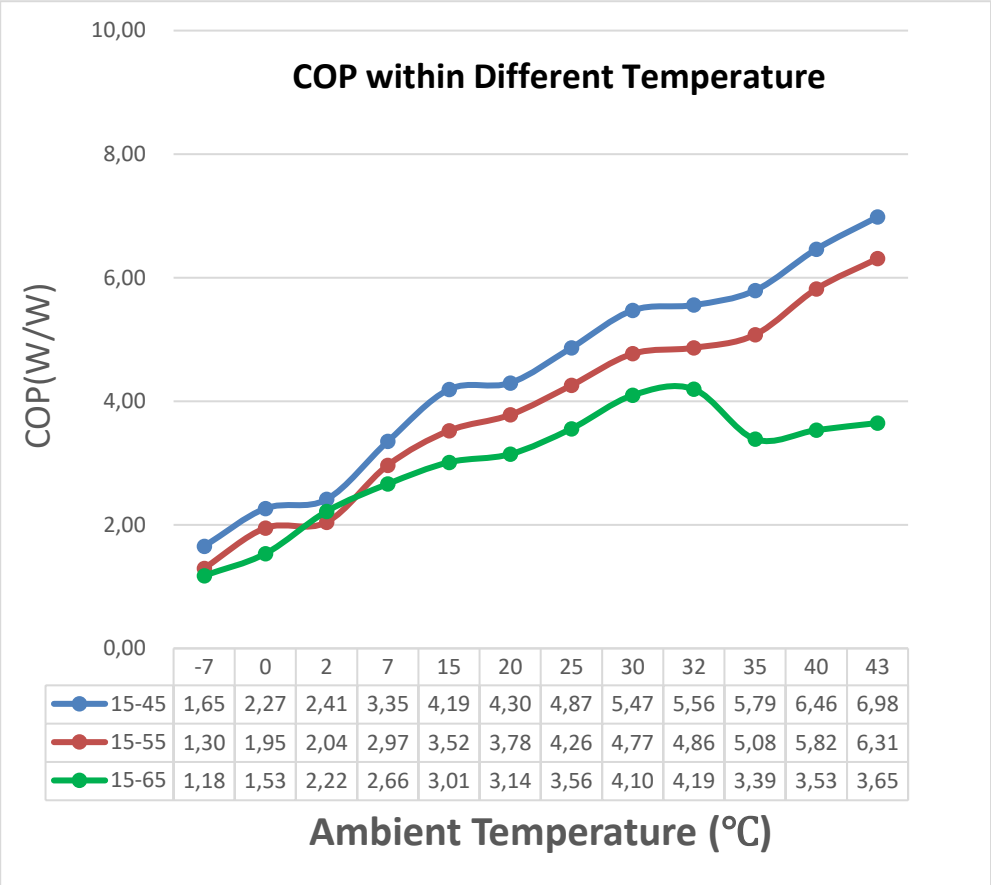
SWH-100P



	-7	0	2	7	15	20	25	30	32	35	40	43
15-45	570,0	404,5	372,6	277,9	207,9	198,8	178,2	159,2	155,4	149,5	140,3	133,3
15-55	664,2	587,8	548,7	395,0	307,8	280,3	251,1	224,5	218,4	209,5	193,6	182,3
15-65	719,3	661,8	633,4	506,6	417,7	388,7	345,1	298,7	290,2	275,8	252,5	241,6

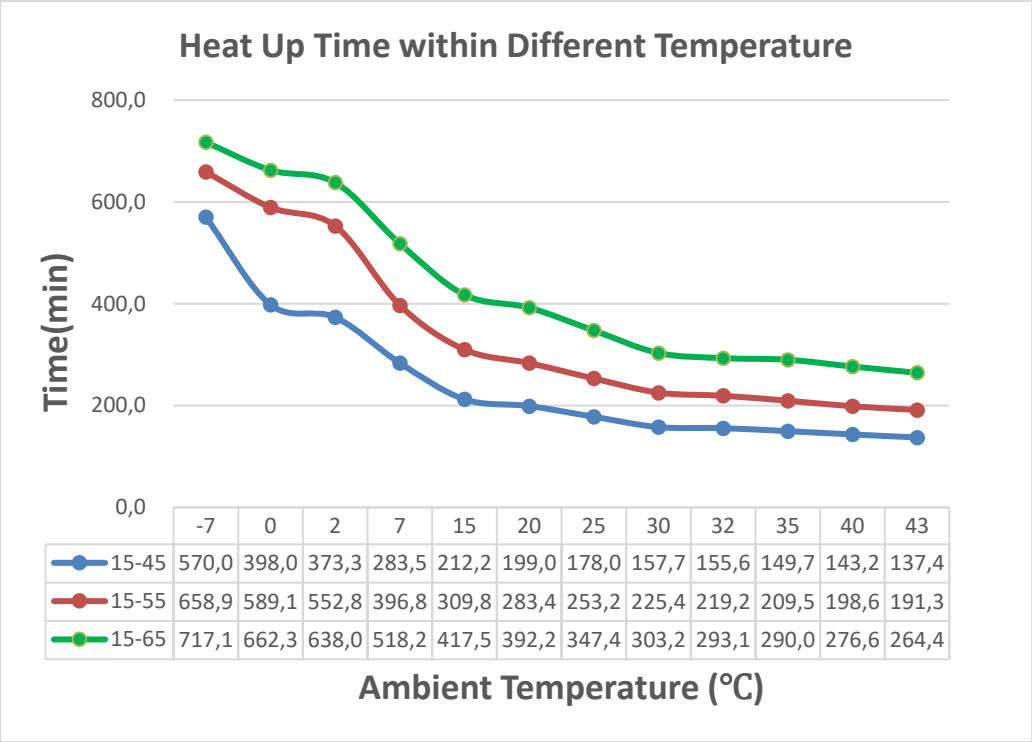


	-7	0	2	7	15	20	25	30	32	35	40	43
15-45	367,3	517,5	561,9	753,3	1006,	1053,	1174,	1315,	1347,	1400,	1492,	1571,
15-55	420,2	474,9	508,7	706,6	907,0	995,8	1111,	1243,	1278,	1332,	1442,	1531,
15-65	485,1	527,2	550,8	688,7	835,3	897,6	1011,	1168,	1202,	1265,	1382,	1444,

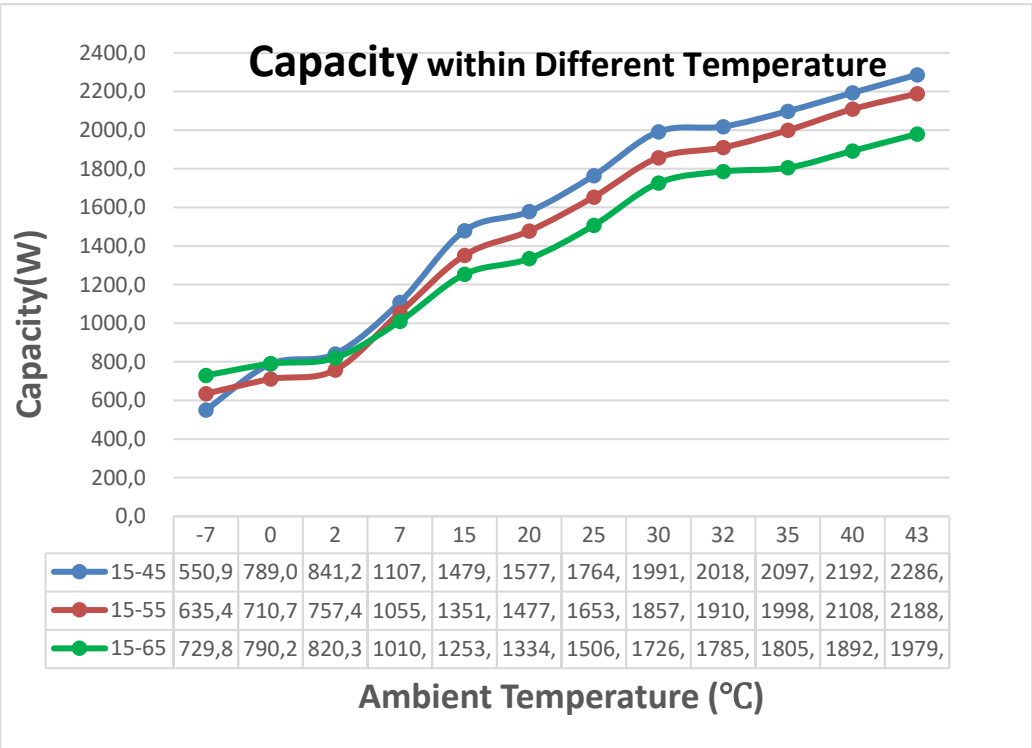


	-7	0	2	7	15	20	25	30	32	35	40	43
15-45	1,65	2,27	2,41	3,35	4,19	4,30	4,87	5,47	5,56	5,79	6,46	6,98
15-55	1,30	1,95	2,04	2,97	3,52	3,78	4,26	4,77	4,86	5,08	5,82	6,31
15-65	1,18	1,53	2,22	2,66	3,01	3,14	3,56	4,10	4,19	3,39	3,53	3,65

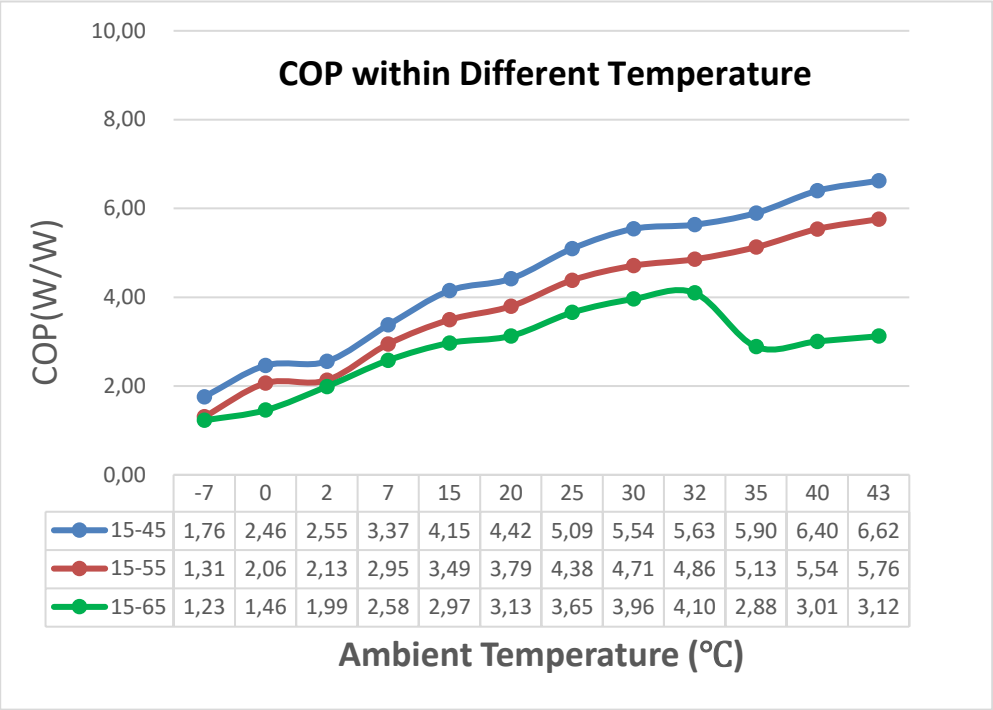
SWH-150P



	-7	0	2	7	15	20	25	30	32	35	40	43
15-45	570,0	398,0	373,3	283,5	212,2	199,0	178,0	157,7	155,6	149,7	143,2	137,4
15-55	658,9	589,1	552,8	396,8	309,8	283,4	253,2	225,4	219,2	209,5	198,6	191,3
15-65	717,1	662,3	638,0	518,2	417,5	392,2	347,4	303,2	293,1	290,0	276,6	264,4

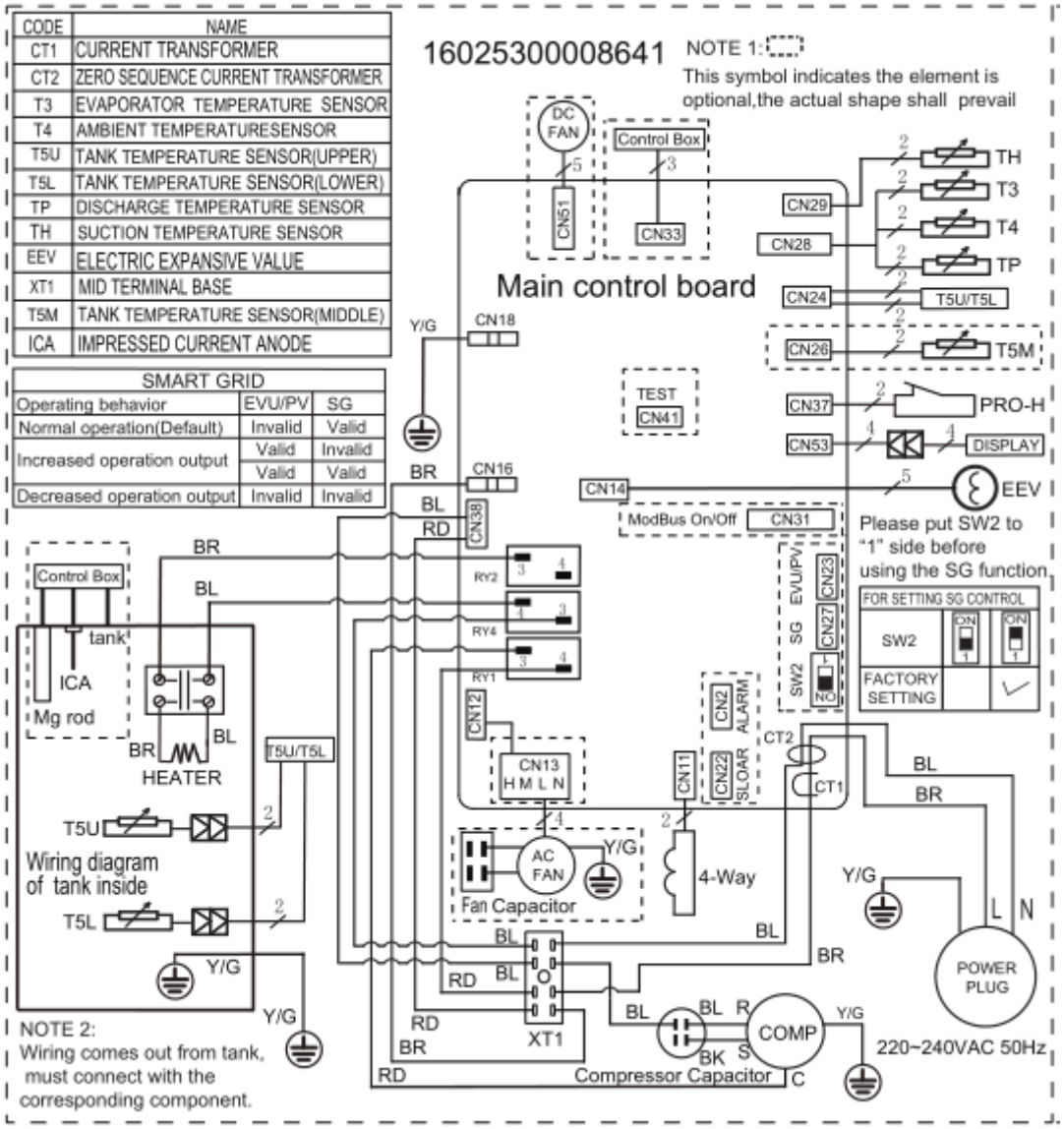


	-7	0	2	7	15	20	25	30	32	35	40	43
15-45	550,9	789,0	841,2	1107,	1479,	1577,	1764,	1991,	2018,	2097,	2192,	2286,
15-55	635,4	710,7	757,4	1055,	1351,	1477,	1653,	1857,	1910,	1998,	2108,	2188,
15-65	729,8	790,2	820,3	1010,	1253,	1334,	1506,	1726,	1785,	1805,	1892,	1979,



	-7	0	2	7	15	20	25	30	32	35	40	43
15-45	1,76	2,46	2,55	3,37	4,15	4,42	5,09	5,54	5,63	5,90	6,40	6,62
15-55	1,31	2,06	2,13	2,95	3,49	3,79	4,38	4,71	4,86	5,13	5,54	5,76
15-65	1,23	1,46	1,99	2,58	2,97	3,13	3,65	3,96	4,10	2,88	3,01	3,12

7. Wiring diagram



8. Installation

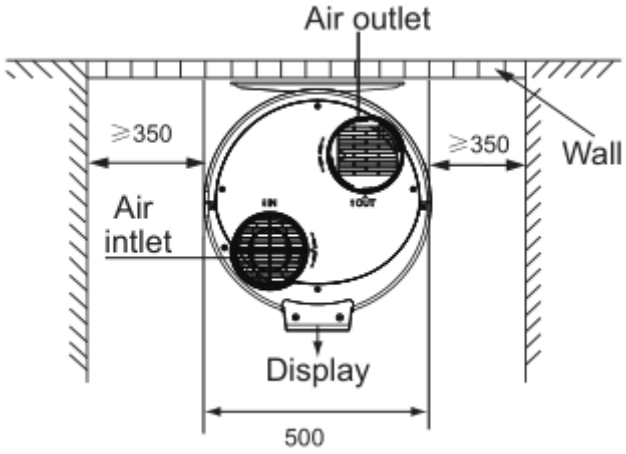
Transport

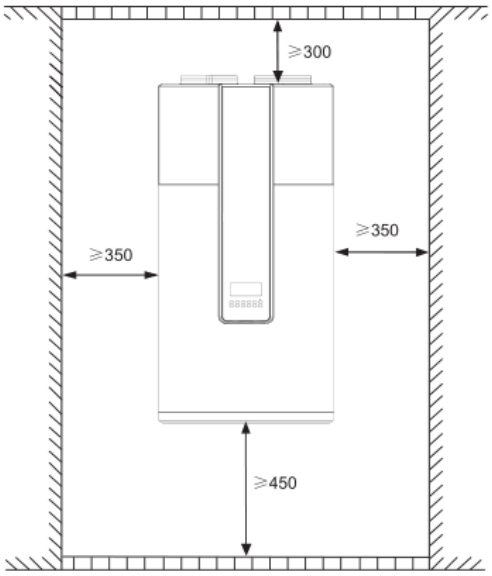
- ✧ In order to avoid scratch or deformation of the unit surface, apply guard boards to the contacting surface. No contact of fingers and other things with the vanes. Don't incline the unit more than 75° in moving, and keep it vertical when installing.
- ✧ The unit is so heavy that it should be carried by two or more persons. Otherwise, it might cause injury and damage.

Location of installation

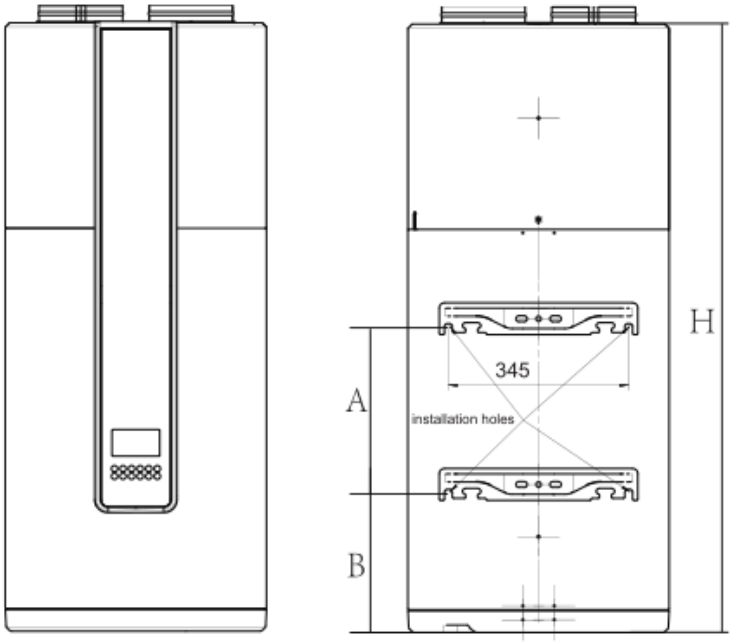
- ✧ Enough space for installation and maintenance shall be preserved.
- ✧ The air inlet and outlet should be free from obstacles and strong wind.
- ✧ The wall surface should be flat, surface should be inclined no more than 2°and able to bear the weight of the unit and suitable for installing the unit without increasing noise or vibration.
- ✧ The operation noise and air flow expelled shall not affect neighbors.
- ✧ No flammable gas is leaked nearby.
- ✧ It is convenient for piping and wiring.
- ✧ If it is installed in indoor space, it might cause indoor temp decreased and noise. Please take preventive measures for this.
- ✧ If the unit has to be installed on a metal part of building, make sure the well electric insulation which should meet the relevant local electric standard.

Maintenance space (Unit: mm)





Mounting dimension



Model	A	B	H
SWH-80P	317	270	1167
SWH-100P	415	277	1333
SWH-150P	558	475	1675

Place the water heater in a room protected from frost.

Place it as close as possible to important points of use.

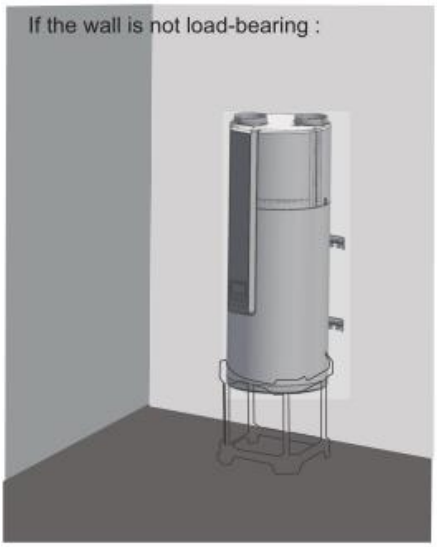
Make sure that the support element is sufficient to receive the weight of the water heater full of water.

It is mandatory to install a retention basin below the water heater if installed above a living area.
A drain connected to the sewer is required.

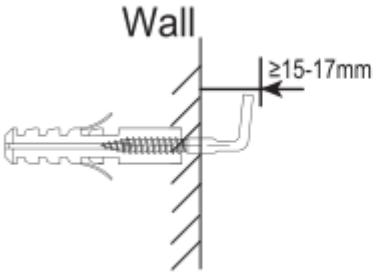
If the wall is load-bearing (concrete, stone, brick):

Mark the wall with reference to the requirements of the installation size (size drawing). Proceed to the bolting of bolts Ø 10mm. The wall must hold a minimum load of 300 kg.

If the wall is not load-bearing :



It is mandatory to install the water heater on a support . Place the water heater on the bracket to mark the fixing points.
Make the holes and then reinstall the water heater in its place. The anti-tilting fixing by the upper bracket is obligatory (fixing Ø 10mm minimum adapted to the wall).



The hole size for hanging the wall should refer to the corresponding hole size in Figure 3-1 (two racks for each water tank, a total of four expansion bolts need to be fixed).

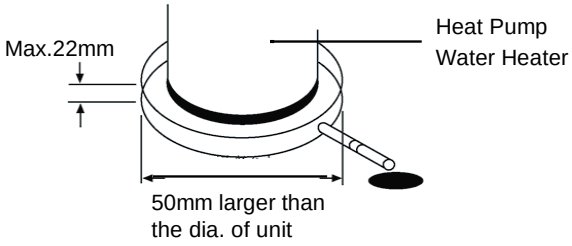
After the expansion bolt is tightened, the distance between the inner side of the bolt and the wall surface should be controlled within 15mm-17mm, as shown in the figure.

1) Installation of the Safety Valve: The spec of the One Way Valve thread in accessories is G1/2”. It is used to prevent water from flowing backwards and prevent tank overpressure

2) After water system piping work, turn on the cold water inlet valve and hot water outlet valve and start effusing the tank. When water flow smoothly out from water outlet pipe (tap water outlet), the tank is full, turn off all valves and check pipeline to make sure there is no any leakage.

3) If the inlet water pressure is less than 0.15MPa, a pump should be installed at the water inlet.
For guarantee the safety usage of tank at the condition of water supply pressure higher than 0.5MPa, a reducing valve should be installed at the water inlet pipe.

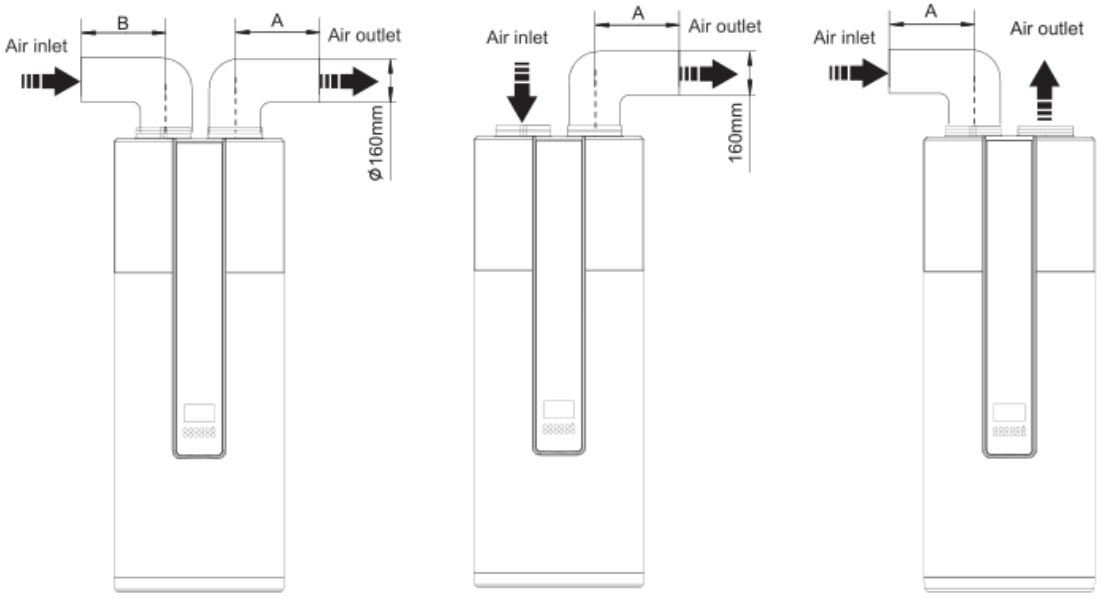
4) Condensate may be leaked from unit if drainage pipe is blocked or unit operates in high humidity environment, a drainage pan is recommended as shown as following figure:



The water heater must be located in a space >15m³, and must have unrestricted air flow. As an example, a room that has an 2.5 tall ceiling and is 3 meter long by 2 meter wide would contain 15m³.

Water inlet or outlet pipes: The spec of the water inlet or outlet thread is G1/2" (external thread). Pipes must be heat-insulated well.

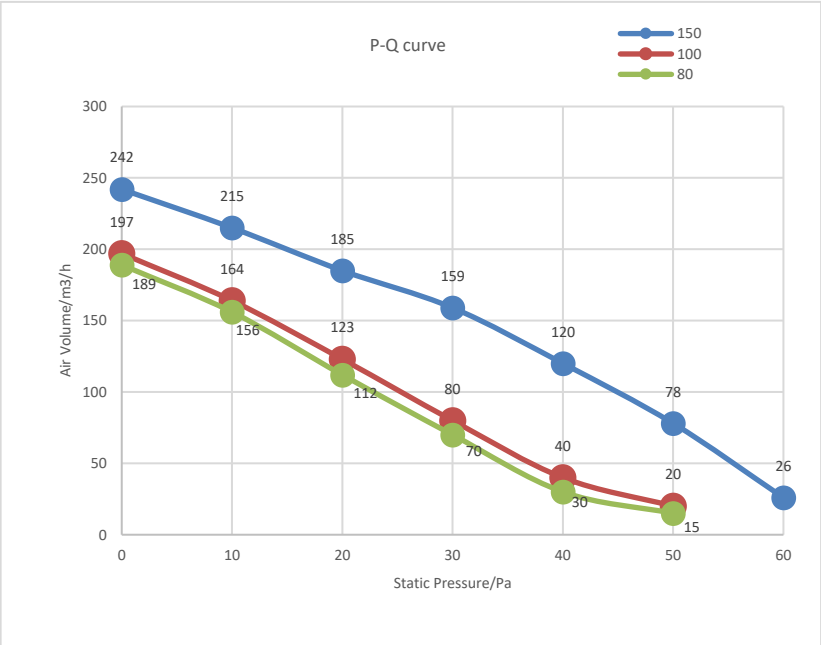
Air duct connection



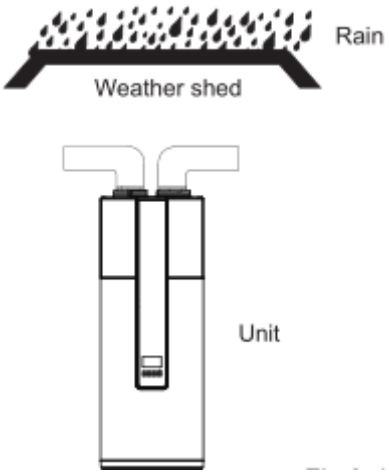
① ② ③

①	Air inlet and outlet with duct	A+B≤5m	
②	Only air outlet with duct	A≤5m	It is recommended to install unit by this way in winter, where there is other heat source in the room.
③	Only air inlet with duct	A≤5m	It is recommended to install unit by this way in summer that could charge fresh air into room.

Duct description	Round duct	Rectangle duct
Dimension (mm)	Φ160	160×160
Straight-line pressure drop (Pa/m)	≤2	≤2
Straight-line length (m)	≤5	≤5
Bent pressure drop (Pa)	≤2	≤2
Bent's quantity	≤5	≤5



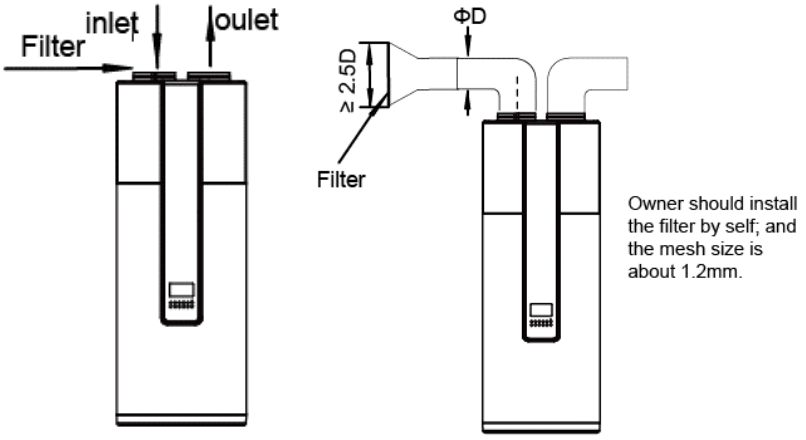
- ✧ The duct's resistance will decrease air-flow-rate, and capacity of unit will be decreased.
- ✧ For the case of unit with duct, the duct total length should be no more than 5m or the maximal static pressure should be within 20Pa(80/100L)/30Pa(150L), and the quantity of bending should be no more than 3.
- ✧ For unit air outlet with duct, when unit operating, condensate will be generated around outside of duct. Please pay attention to the drainage work, we suggest to wrap the thermal insulated layer around outside of the duct.
- ✧ Must be install the unit in the indoor space, it is not allow to install the unit at the rainy space.



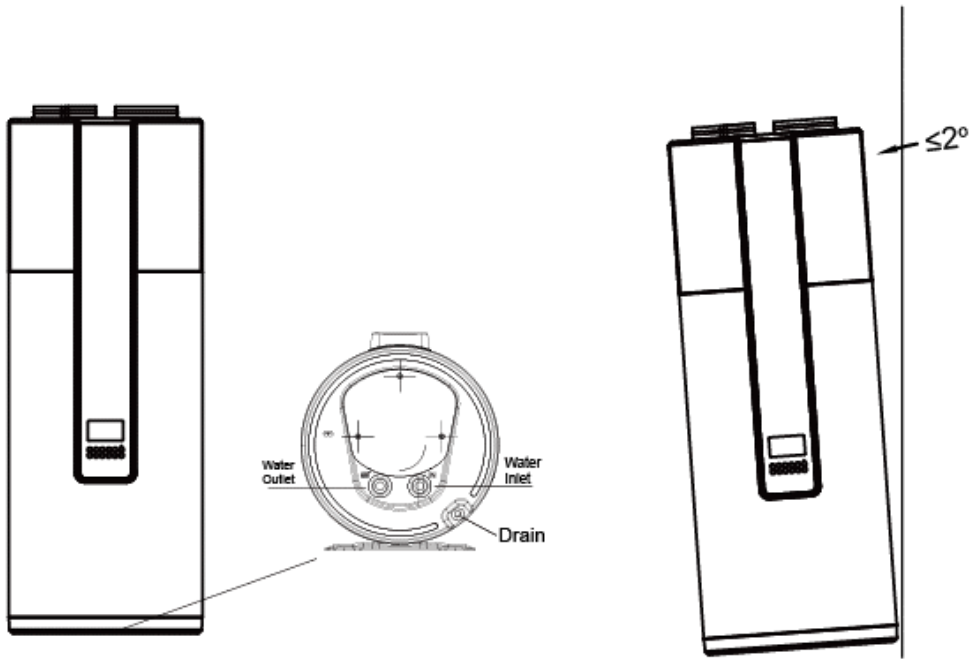
Warning

- ✧ **I**n case of rain entering to internal components of the unit, the component might be damaged or causing physical danger.
- ✧ In terms of the unit connect with duct reaching to outdoor, and then a reliable water-resistant measure must be conduct on the duct, to prevent water from dropping into internal of the unit.

Filter should be installed at the unit inlet, In terms of the unit with duct, filter in there must be put on the position of duct inlet.



To smoothly drain condensate from unit, please install the unit at a horizontal floor. Otherwise, please ensuring the drain vent is at the lowest place. Recommending the inclination angle of unit to the ground should be no more than 2°.



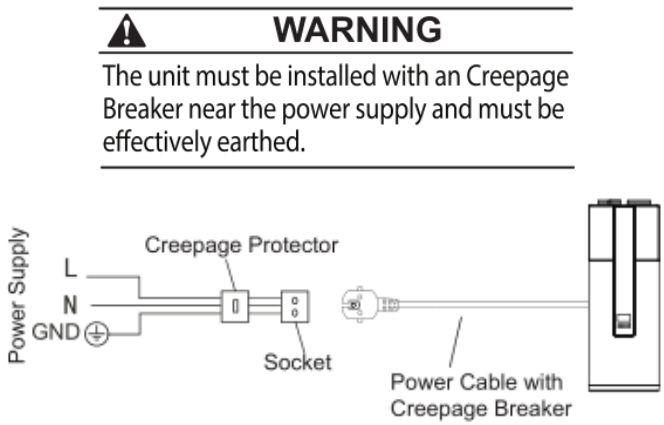
Electric connection

- ✧ The power supply should be an independent circuit with rated voltage.
- ✧ Power supply circuit should be earthed effectively.
- ✧ The wiring must be performed by professional technicians in accordance with national wiring regulations and this circuit diagram.
- ✧ An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule.
- ✧ Set the electric leakage protector according to the relevant electric technical standards of the local.
- ✧ The power cord and the signal cord shall be laid out neatly and properly without mutual interference or contacting the connection pipe or valve.
- ✧ After wire connection, check it again and make sure the correctness before power on.

Specifications of power supply

Model name	SWH-80P SWH-100P SWH-150P
Power supply	220-240V~, 50Hz, 1Ph
Min. diameter of power supply cord (mm^2)	⩾1.5
Earth cord (mm^2)	⩾1.5

- ✧ Please choosing the power cord according to above table, and it should comply with local electric standard.
- ✧ The power cord model, recommended power cord mode is H05RN-F.
- ✧ When wiring the power supply, please add additional insulation sheath at the place without rubber insulation layer.

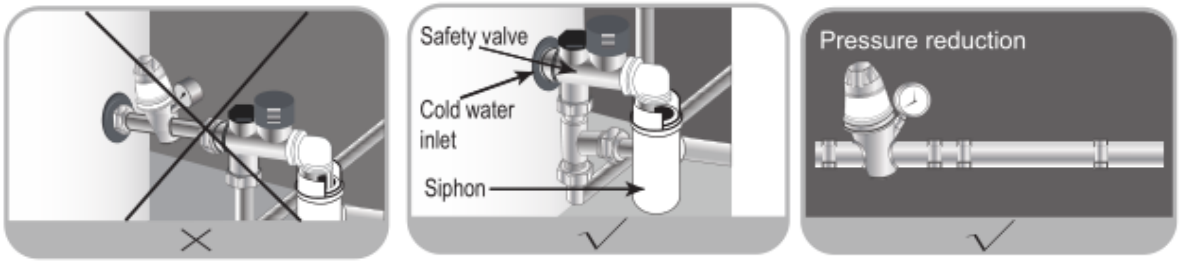


Cold water connection

Before connection check that the piping is clean without any particles from installation.
The installation has to include a new safety valve set to 7 bar (0,75 MPa), compliant to EN 1487 and connected directly on the cold water inlet.

No hydraulic device (stop valve, pressure reduction, flexible...) is allowed between the safety valve and the cold water inlet of the water heater.

As water can flow from the safety valve the drain should be kept in open air. In any type of installation there should be a cold water stop valve, before the safety valve.
The overflow of the safety valve has to be connected to the used water evacuation through a siphon. Installation has to be in a frost-free environment. The safety valve has to be operated regularly to check the working condition (1 - 2 times per month).
The installation should be equipped with a pressure reduction if the main water supply pressure is higher than 5 bar (0,5 MPa). The pressure reducing device has to be installed at the beginning of the distribution network (before the safety valve). We recommend a supply pressure of 3 - 4 bar (0,3 to 0,4 MPa.
The appliance cannot connected by a hose-set.



CAUTION:

For regions with a lot of scale (Th>20°f), we recommend to treat the water. The hardness after softener has to be higher than 15°f. The use of a softener does not influence the warranty if the softener is approved for the country of installation and set to the rules of art, with regular checking and maintenance. Local criteria of drinking water quality have to be respected.

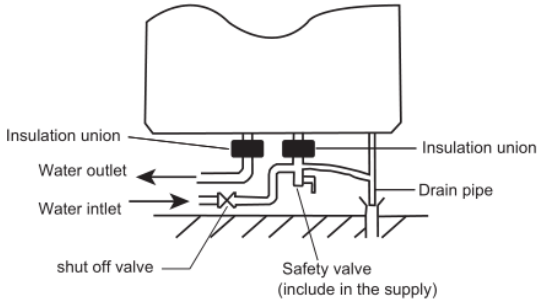
Hot water connection

Do not connect copper tubes directly on the tank connection. You have to fit the supplied insulation union (not included in the supply). In case that the tank connection is corroded without this protection the warranty will not apply.

If the installation is made with synthetic pipes (e.g. : PER, multi-layer…), install mandatory a thermostatic control valve at the connection pipes of the water heater. The setting should be done in relation with the specification of the installed piping.

Condensate evacuation

The temperature drop of the air passing through the exchanger forms condensation from humidity in the air. The condensed water is evacuated on the rear of the tank using the supplied plastic tube.



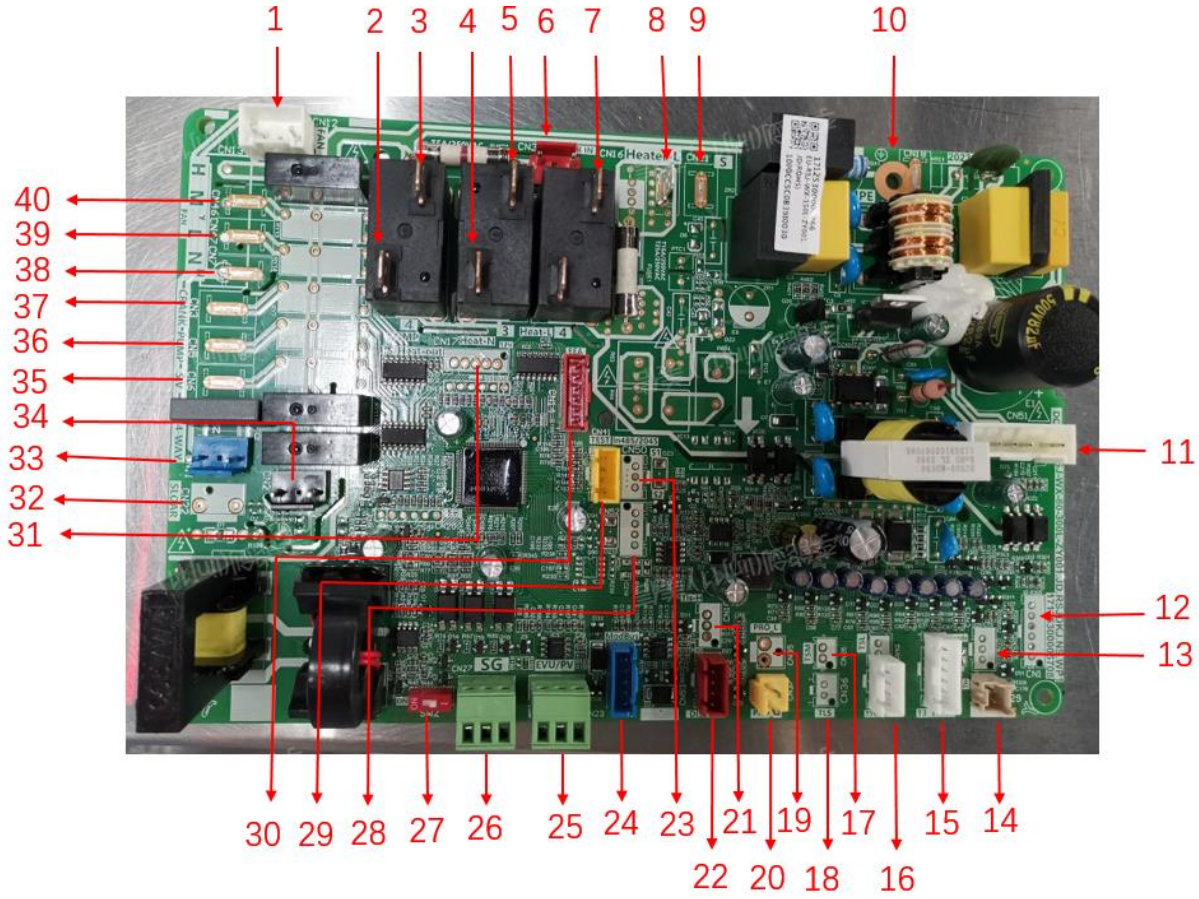
Depending on the degree of humidity in the air you can get up to 0,25l/h of condensation. The evacuation of condensate should not been made directly to sew water because of possible corrosive gasses damaging the exchanger fins and water heater parts.

WARNING

EXPLOSION

Do not block off the safety valve drainage pipe.
It will cause explosion and injury, if do not comply with the above instruction.

PCB I/O Ports description



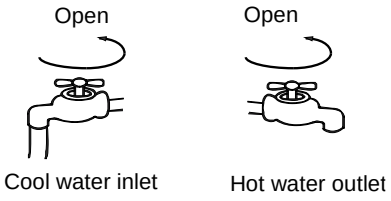
No.	Name	CN#	Meaning	No.	Name	CN#	Meaning
1	FAN-H	CN12	The outer Fan	21	TLS-H	CN10	Water level switch for water leakage detection in the water tray
2	Comp out	RY1-4	Comp output	22	DISPLAY	CN53	DISPLAY
3	Comp in	RY1-3	Comp input	23	in485/2045	CN50	North American 2045 port
4	E-heat-N-in	RY4-3	Heat-N input	24	Modbus	CN31	Modbus and The remote switch On/Off
5	E-heat-N-out	RY4-4	Heat-N output	25	EVU/PV	CN23	Photovoltaic signal
6	POWER-in	CN38	Board power supply	26	SG	CN27	Smart Grid
7	E-heat-L-out	RY2-3	Heat-L output	27	Switch	SW2	Factory Setting
8	E-heat-L-in	CN16	Heat-L input	28	LM-det	CN52	Refrigerant detection reserved port
9	S	CN21	S-signal	29	TEST	CN41	Test Port
10	PE	CN18	Earth GND	30	EEA	CN34	Electronic Expansion Valve
11	DC FAN	CN51	DC FAN	31	2 x E-heat	CN17	Outlet E-heat control
12	Auto inlet water Valve	CN1	Auto inlet water Valve	32	Solar Input	CN22	Solar Input（strong current ）
13	Anode	CN33	E-MG	33	4-Way	CN11	4-Way Valve
14	Th	CN29	Comp Suction Temp Sensor	34	Alarm	CN2	Alarm
15	T3/T4/Tp	CN28	T3:Evaporator Inlet Temp T4:Ambient Temp	35	S.V	CN6	Electromagnetic valve

			Sensor TP:Comp Discharge Temp Sensor				
16	T5U/T5L	CN24	T5U:Upper Tank Water Temp Sensor T5L:Lower Tank Water Temp Sensor	36	PUMP	CN5	Solar Pump
17	T5M	CN26	Middle Tank Water Temp Sensor	37	Crank	CN3	Crank Heater
18	TLS	CN36	Chassis leak detection	38	N	CN7	N output
19	PRO-L	CN35	LOW Pressure Switch	39	L	CN47	Low Fan output
20	PRO-H	CN37	High Pressure Switch	40	M	CN46	Middle Fan output

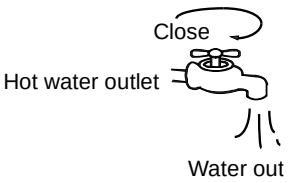
8. Water affusion and effusion

Water affusion: If the unit is used for the first time or used again after emptying the tank, please make sure that the tank is full of water before turning on the power.

✧ Open the cool water inlet valve and the hot water outlet valve.

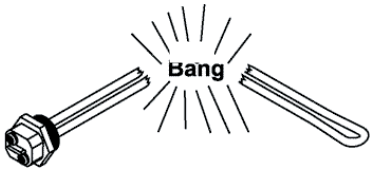


✧ When water flows out from the water outlet, the tank is full. Turn off the hot water outlet valve and water affusion is finished.



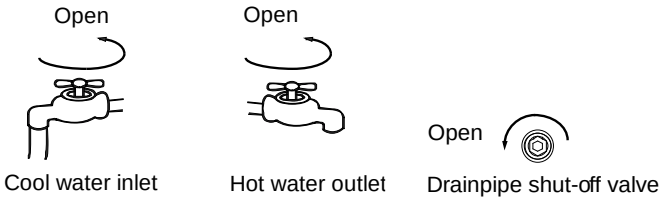
Caution:

Operation without water in water tank may result in the damage of auxiliary E-heater. Due to such damage, manufacturer will not be liable for any damages caused by this issue.



Water effusion: If the unit needs cleaning, moving etc, the tank should be emptied.

- ✧ Switch off the unit, and close the cool water inlet valve, open the hot water outlet valve and open drainpipe.



- ✧ After emptying, the nut of drainpipe should be replaced and closed.

Drainpipe shut-off valve

9. Trial run

Checking list before trial- running:

- ✧ Correct installation of the system.
- ✧ Correct connection of water/air piping and wiring.
- ✧ Condensate draining smoothly well insulation work for all hydraulic part.
- ✧ Correct power supply.
- ✧ No air in the water pipeline and all valves opened.
- ✧ Effective electric leakage protector installation.
- ✧ Sufficient inlet water pressure (between 0.15MPa~0.5Mpa).

Water temperature display

- ✧ The temperature shown on the display depends on the maximum of the upper sensor and the lower sensor.

Heat source shift

- ✧ The default heating source is heat pump.
  If ambient is range out of heat pump, heat pump will stop running, the unit will shift automatically to activate E-heater, then if the ambient temperature goes into the running range of heat pump again, it will stop E-heater and shift automatically to heat pump again.
- ✧ If the target setting water temperature is higher than Max. temp(Heat pump), the unit will activate heat pump firstly to the Max. temperature, then stop heat pump, activate E-heater to continually heat water to the target temperature.
- ✧ If manually activate the E-heater running when heat pump running, E-heater and heat pump will work together until the water temperature gets to target temperature. So if want to heat quickly, please manually activate E-heater.
- ✧ If system occurs some malfunctions, error code "EHHP" and ⓘ will be shown on the display, then heat pump will stop running, and the unit will activate automatically E-heater as the backup heat source, but the code "EHHP" and ⓘ will be shown until the heat pump retry run and normal stop on the next heating or power off.

10. Maintenance

Recommended regular maintenance table

Checking item	Checking content	Checking frequency	Action
1	Air filter (inlet/outlet)	Every month	Clean the filter.
2	Anode rod	Every half year	Replaced if it has been used out.
3	Inner tank	Every half year	Clean the tank.
4	E-heater	Every half year	Clean the E-heater.
5	Safety valve	Every month	Check for blockage.

1) Check the connection between power supply plug and socket and ground wiring regularly.

2) In some cold area (Below 0°C), if the system will be stopped for a long time, all the water should be released in case of freezing of inner tank and damage of E-heater.

3) It is recommended to clean the inner tank and E-heater every half year to keep an efficient performance.

4) Check the anode rod every half year and change it if it has been used out. For more details, please contact the supplier or the after-sale service.

5) It is recommended to set a lower temperature to decrease the heat release, prevent scale and save energy if the outlet water volume is sufficient.

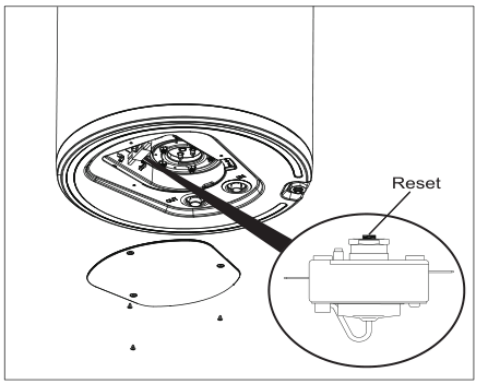
6) Clean the air filter every month in case of any inefficiency on the heating performance.

In terms of the filter set in air inlet directly (namely, air inlet without connect with duct), the method of dismantle the filter is: anti-clockwise unscrew the air inlet ring, take out the filter and clean it completely, finally, remount it to the unit.

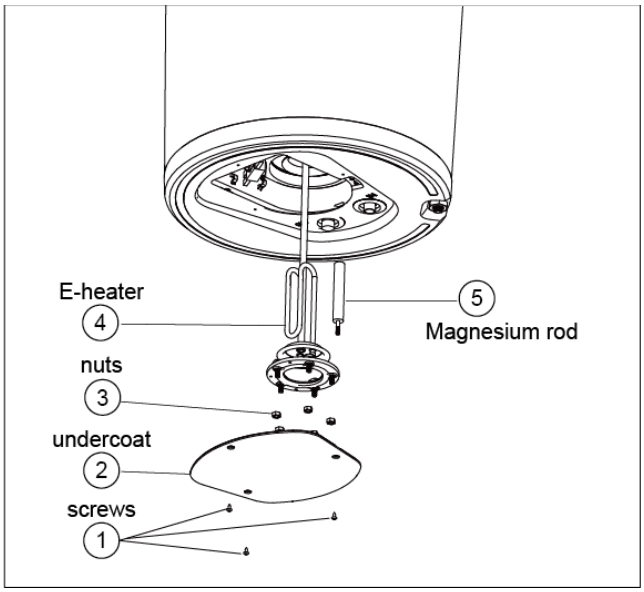
7) If the unit is going to be stop for an extended period of time (>2 months), please power of the unit, empty the tank, and close all valves. Check whether the parts are in good condition before use it again.

8) Reset the safety temperature limiter. For more details, please contact the supplier or the after-sale service.

- Before resetting the back-up temperature limiter, ensure that the operation has not been interrupted by activating a energy-saving contact ora time schedule.
- Check whether the safety temperature limiter of the additional electric heating has been set due to overheating (> 85 °C) or if it was triggered by a fault.
- Loosen the screws on the undercoat.
- Remove the undercoat.
- Press the key to reset the safety temperature limiter.



9) Checking of protective anodes. For more details, please contact the supplier or the after-sale service.



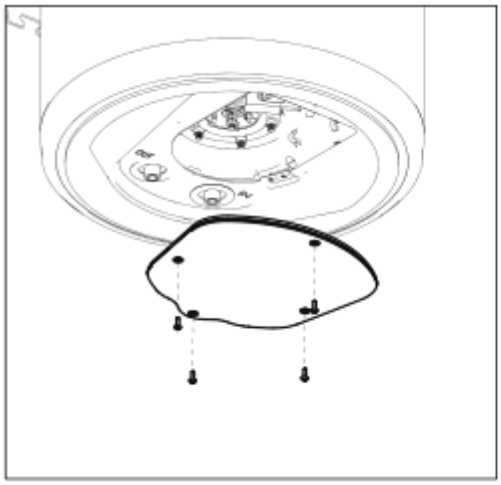
- ✧ Empty the tank (please aware that there is small amount of water left in the bottom of the tank after drain out from inlet water pipe)
- ✧ Loosen the screws on the undercoat
- ✧ Remove the undercoat.
- ✧ Remove the cable from the electrical immersion resistance.
- ✧ Remove the nuts.
- ✧ Extract the group with the electrical resistance to immersion and the anode, the protective anode and the seal.
- ✧ Unscrew the protective anode and remove it from the hot water heater.
- ✧ Remove the protective anode and check the following point.
- ✧ Diameter (whole length): > 16 mm uniform wear of the protective anode.
- ✧ Check whether there are deposits of limestone on the immersion resistance.
- ✧ Check the anode of electrical resistance under immersion.
- ✧ If the protective anode is worn out, it shall be replaced by the same procedure as the immersion electric resistance anode.
- ✧ Replace the lining.

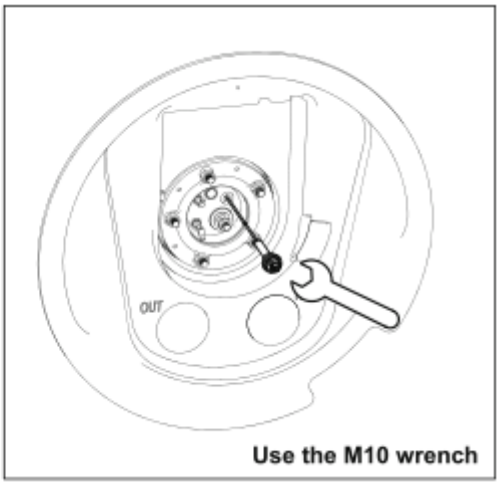
Restart after a long term stop

When the unit is restarted after a long term stop (trail running included), it is normal that outlet water is unclean. Keep the tap on and the water will be clean soon.

If an impressed current anode is present in your unit

When the impressed current anode need maintenance, please unmount it by a M10 wrench.





The back cover can be removed follow step 1 to 3.

11. Trouble shooting

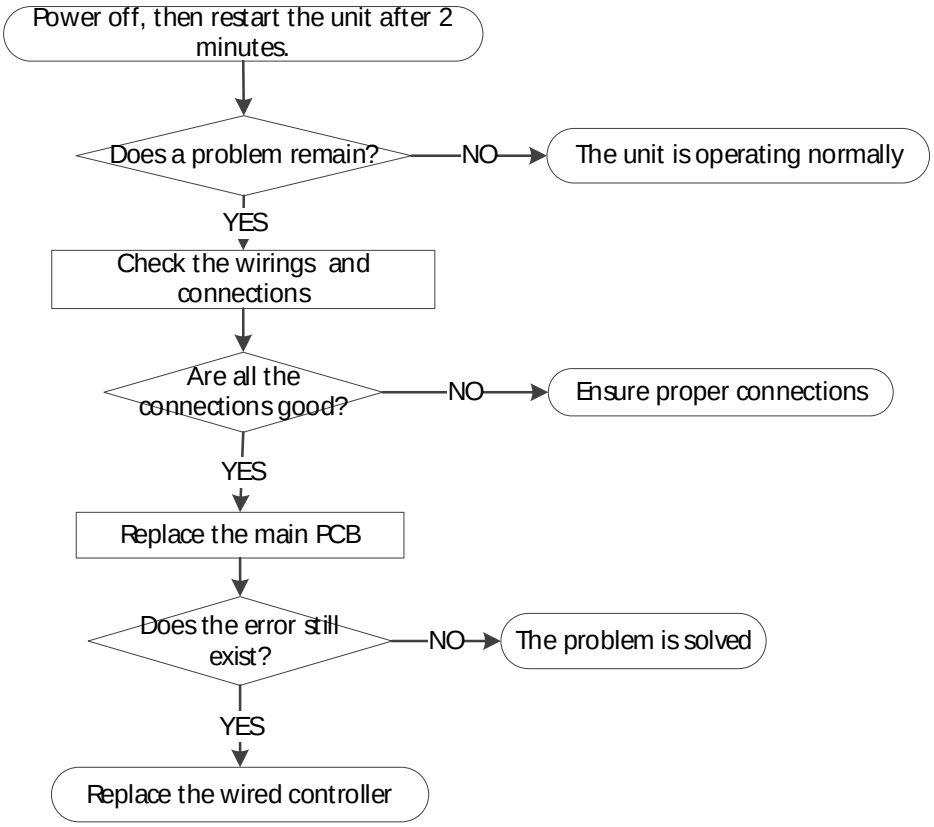
Error phenomenon shooting

Error phenomenon	Possible reason	Solution
Cold water tapped out and display screen extinguished.	Bad connection between power supply plug and socket	1. Plug in; 2. Setting water temp. higher; 3. Contact service center.
	Setting water temperature too low.	
	Temperature sensor broken. PCB of indicator broken.	
No hot water tapped out.	Public water supply ceased.	1. Waiting for water supply recover. 2. Waiting for the pressure increase. 3. Open water inlet valve.
	Cold water inlet pressure too low (<0.15 MPa).	
	Cold water inlet valve closed.	
Water leakage	Hydraulic pipeline joints are not sealed well.	Check and reseal all joints.

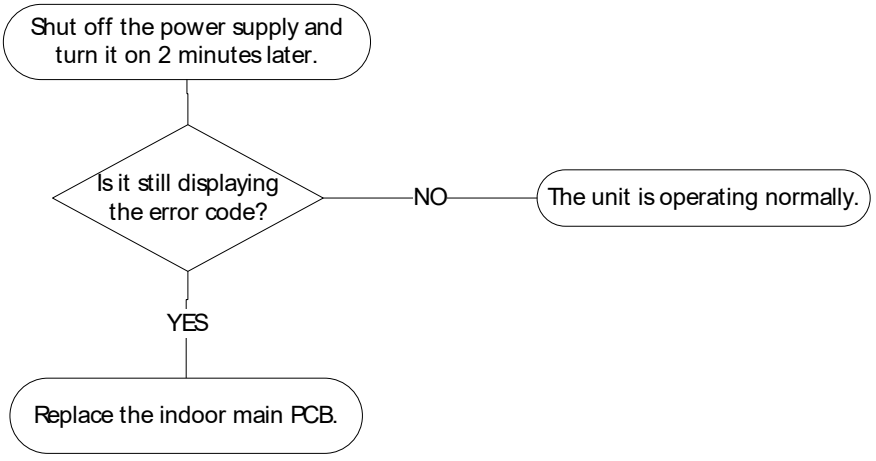
Malfunction and protection codes

Code	Content
EH0b	Tank and wired controller communication error.
EH00	EEPROM chip error
EH03	Dc fan fault
PH15	Electric leakage protection
EC54	Compressor discharge temperature sensor TP error.
EH5H	Compressor suction temperature sensor TH error
EC53	Ambient temperature sensor T4 error.
EC52	Evaporator temperature sensor T3 error.
EC5L	Error of sensor T5L (Lower water temperature sensor).
EC5U	Error of sensor T5U (Upper water temperature sensor).
EH5d	E-heater open-circuit error
EHLA	When the ambient temperature T4 is out of the compressor operating range, the compressor stops, and EHLA is displayed until T4 returns to the normal range. Only works on units without electric heaters. Devices with electric heaters will never display "EHLA" It is normal, and no necessary to repair.
EHHP	Heat pump system fault. When PH20, PH21, PC30, PC06 any protection appears 3 times or the protection lasts 1 hour.
EHEA	Impressed current anode default
PHdH	Dry burning protection
PH20	Compressor abnormally stopped protection
PH21	Compressor overloaded protection
PH24	Anti-freeze protection for low-temperature conditions T5L< 4°C and T4 < 7°C
PC30	System high pressure protection ≥3.0MPa active；≤2.4Mpa inactive
PC06	High discharge temperature protection.. Tp>110°C，Protection active. Tp<90°C，Protection inactive
PH9b	Over-temperature protection The current water temperature exceeds the target temperature by more than 5°C
PH91	Anti-freeze protection for refrigeration status T3<-30°C lasting for 10s，Protection active. T3≥-30°C，Protection inactive

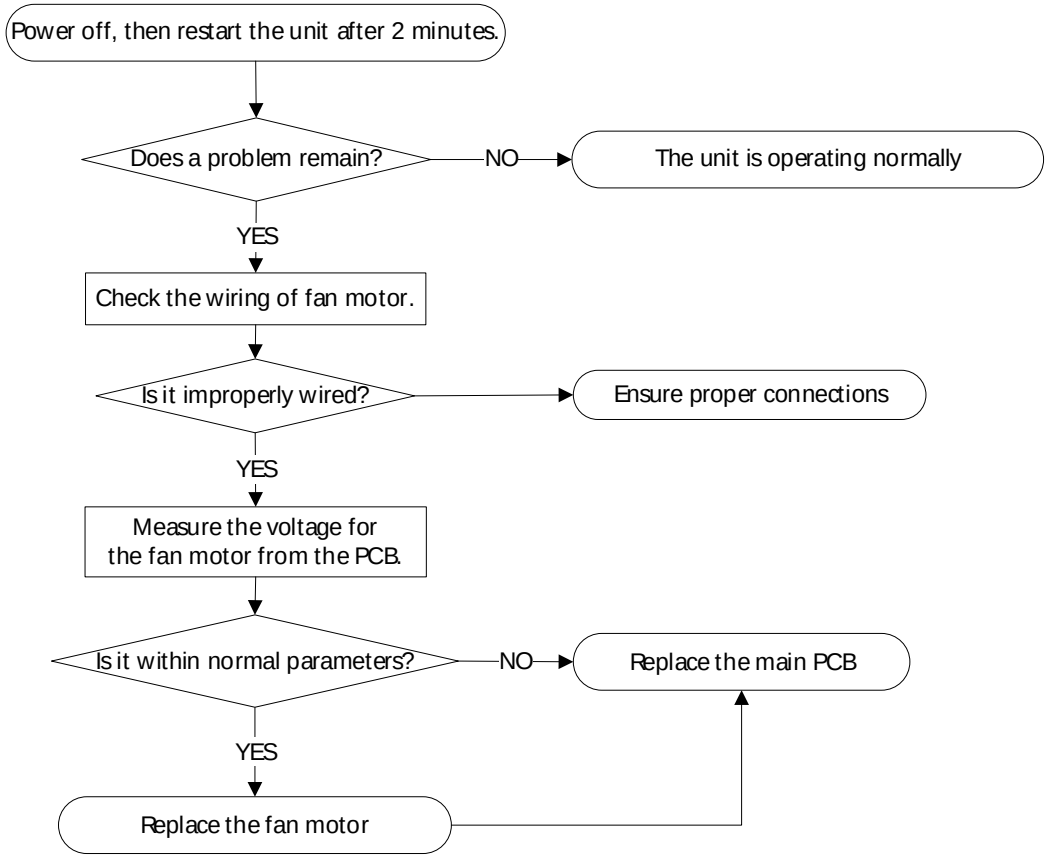
EH0b


Power off, then restart the unit after 2 minutes.
Does a problem remain?
NO
The unit is operating normally
YES
Check the wirings and connections
Are all the connections good?
NO
Ensure proper connections
YES
Replace the main PCB
Does the error still exist?
NO
The problem is solved
YES
Replace the wired controller

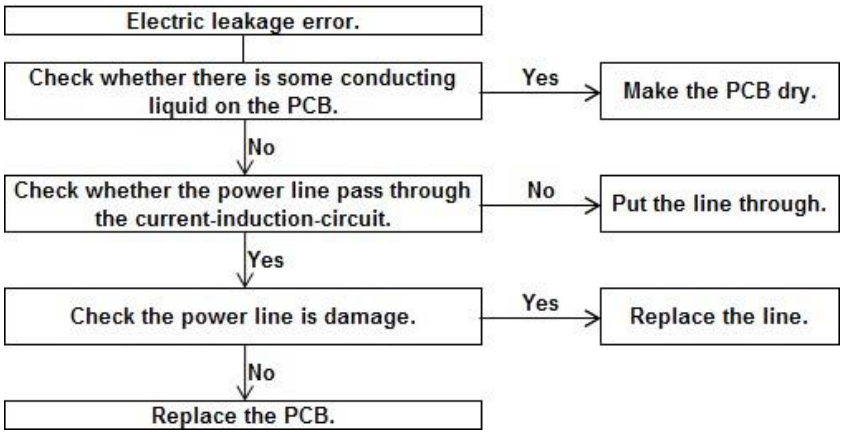
EH00


Shut off the power supply and turn it on 2 minutes later.
Is it still displaying the error code?
NO
The unit is operating normally.
YES
Replace the indoor main PCB.

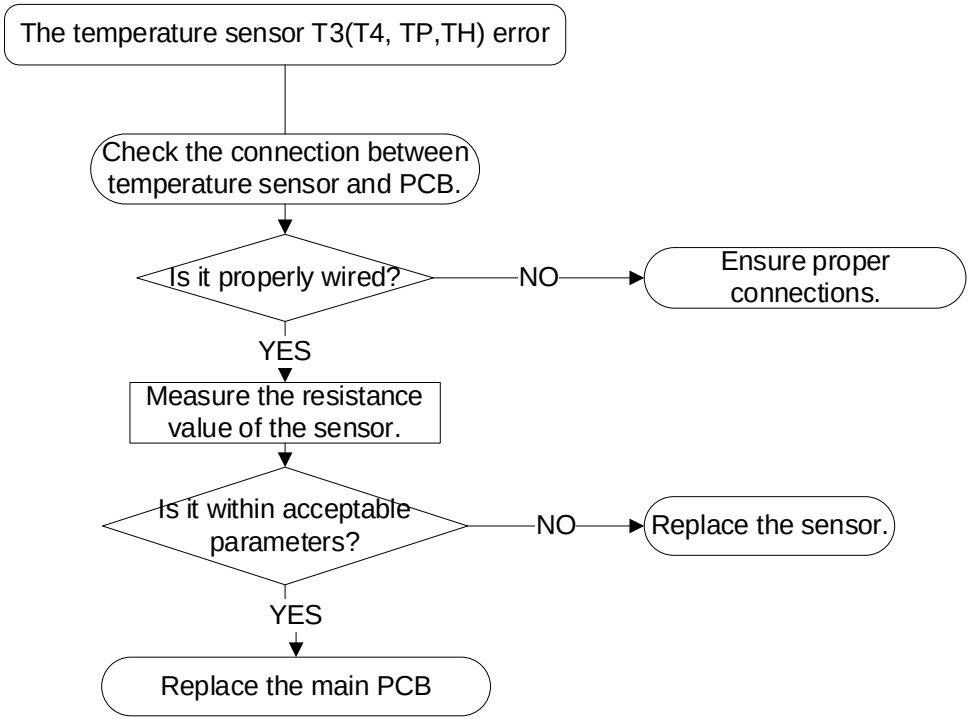
EH03


Power off, then restart the unit after 2 minutes.
Does a problem remain?
NO
The unit is operating normally
YES
Check the wiring of fan motor.
Is it improperly wired?
Ensure proper connections
YES
Measure the voltage for the fan motor from the PCB.
Is it within normal parameters?
NO
Replace the main PCB
YES
Replace the fan motor

PH15


Electric leakage error.
Check whether there is some conducting liquid on the PCB.
Yes
Make the PCB dry.
No
Check whether the power line pass through the current-induction-circuit.
No
Put the line through.
Yes
Check the power line is damage.
Yes
Replace the line.
No
Replace the PCB.

EC52, EC53, EC54, EH5H



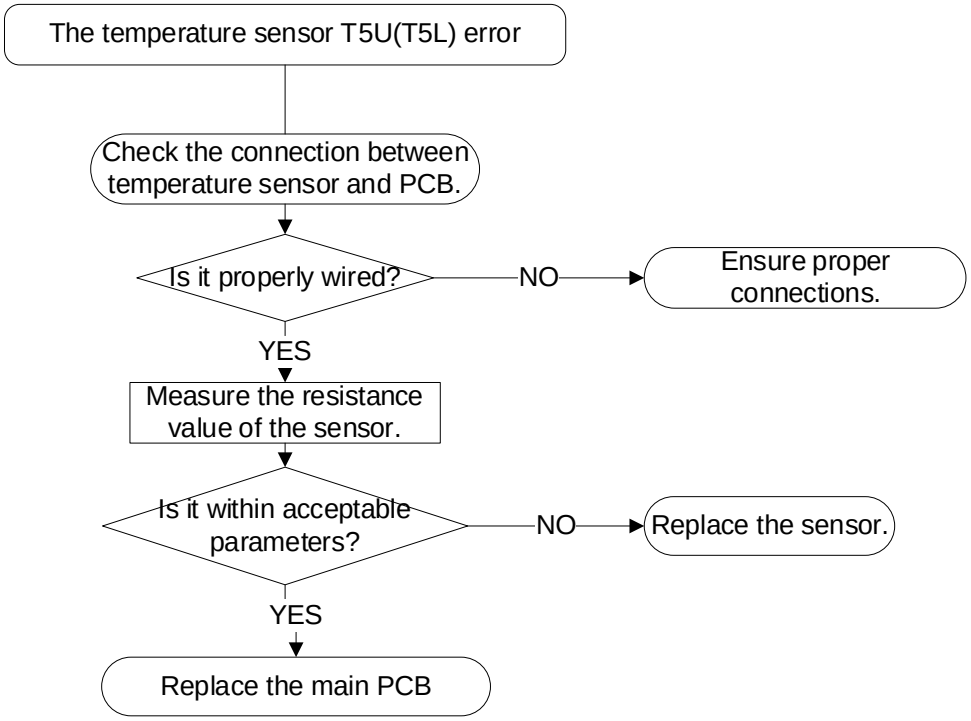
Notes: T3 is the evaporator temperature sensor.

T4 is the ambient temperature sensor.

TP is the compressor discharge temperature sensor.

TH is the compressor suction temperature sensor:

EH5U, EH5L

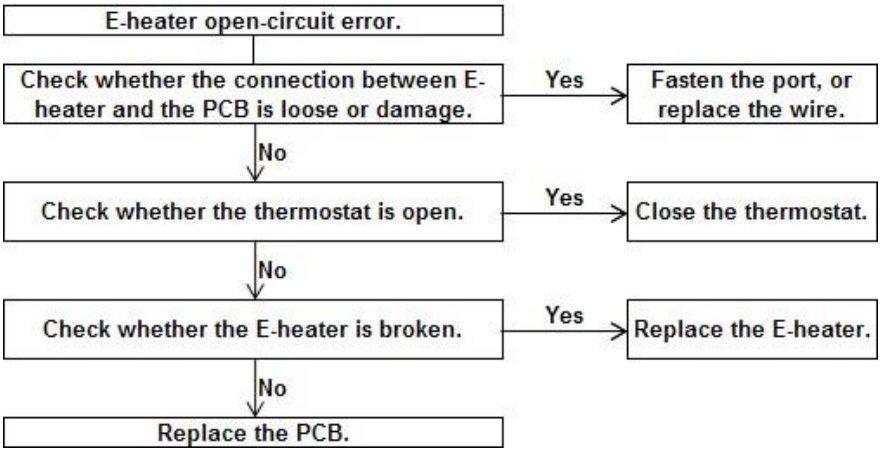


Notes:

T5U is the upper water temperature sensor.

T5L is the lower water temperature sensor.

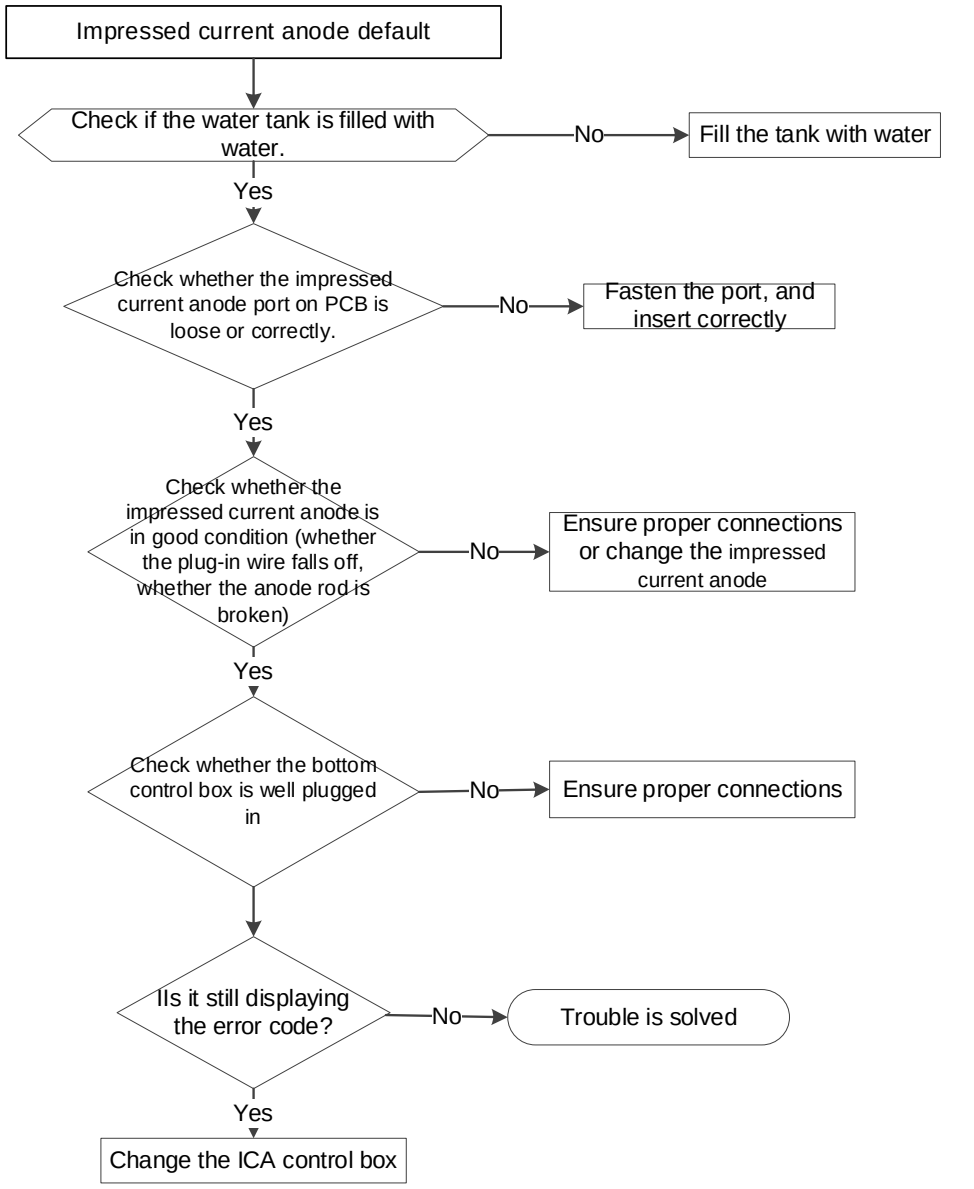
EH5d



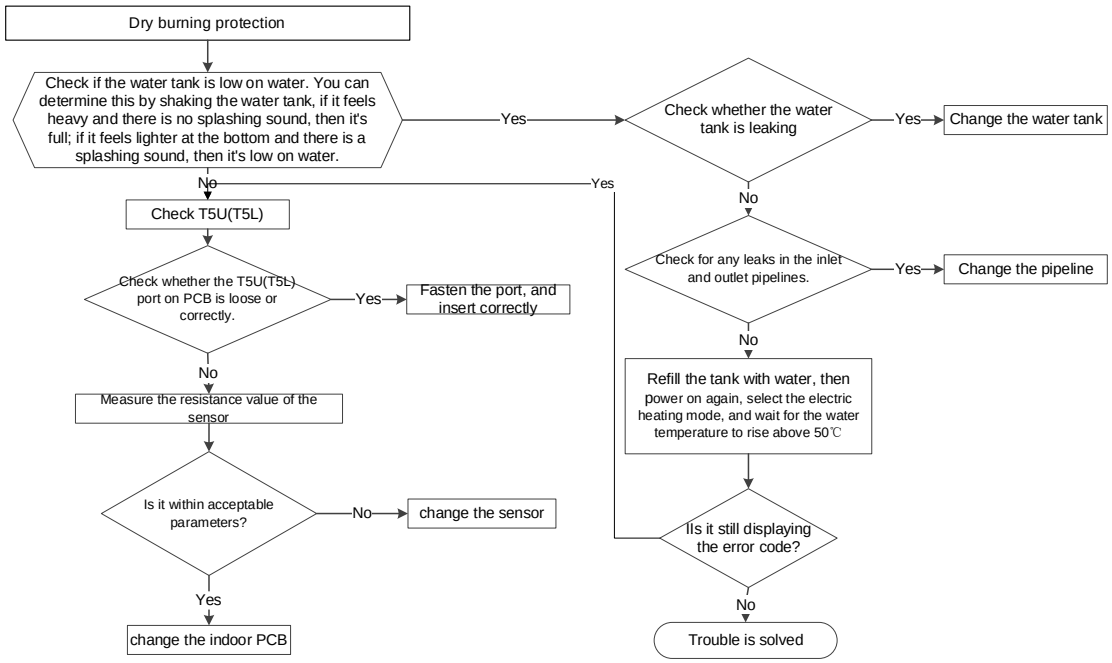
Notes:

E-heater open-circuit error means that IEH (Current difference E-heater on and off) <2A.

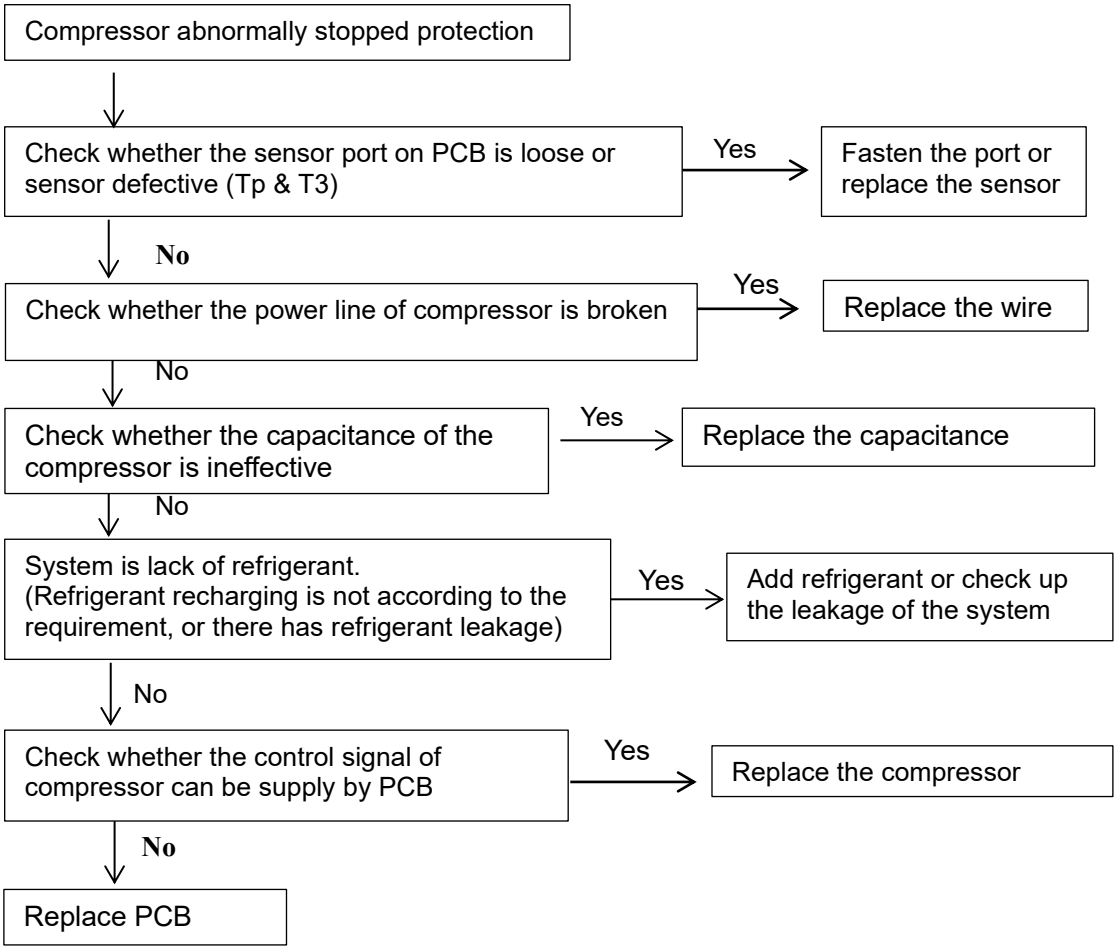
EHEA



PHdH


Dry burning protection
Check if the water tank is low on water. You can determine this by shaking the water tank, if it feels heavy and there is no splashing sound, then it's full; if it feels lighter at the bottom and there is a splashing sound, then it's low on water.
Yes
Check whether the water tank is leaking
Yes
Change the water tank
No
Yes
No
Check T5U(T5L)
Check for any leaks in the inlet and outlet pipelines.
Yes
Change the pipeline
Check whether the T5U(T5L) port on PCB is loose or correctly.
Yes
Fasten the port, and insert correctly
No
Refill the tank with water, then power on again, select the electric heating mode, and wait for the water temperature to rise above 50℃
No
Measure the resistance value of the sensor
Is it still displaying the error code?
Is it within acceptable parameters?
No
change the sensor
Yes
No
change the indoor PCB
Trouble is solved

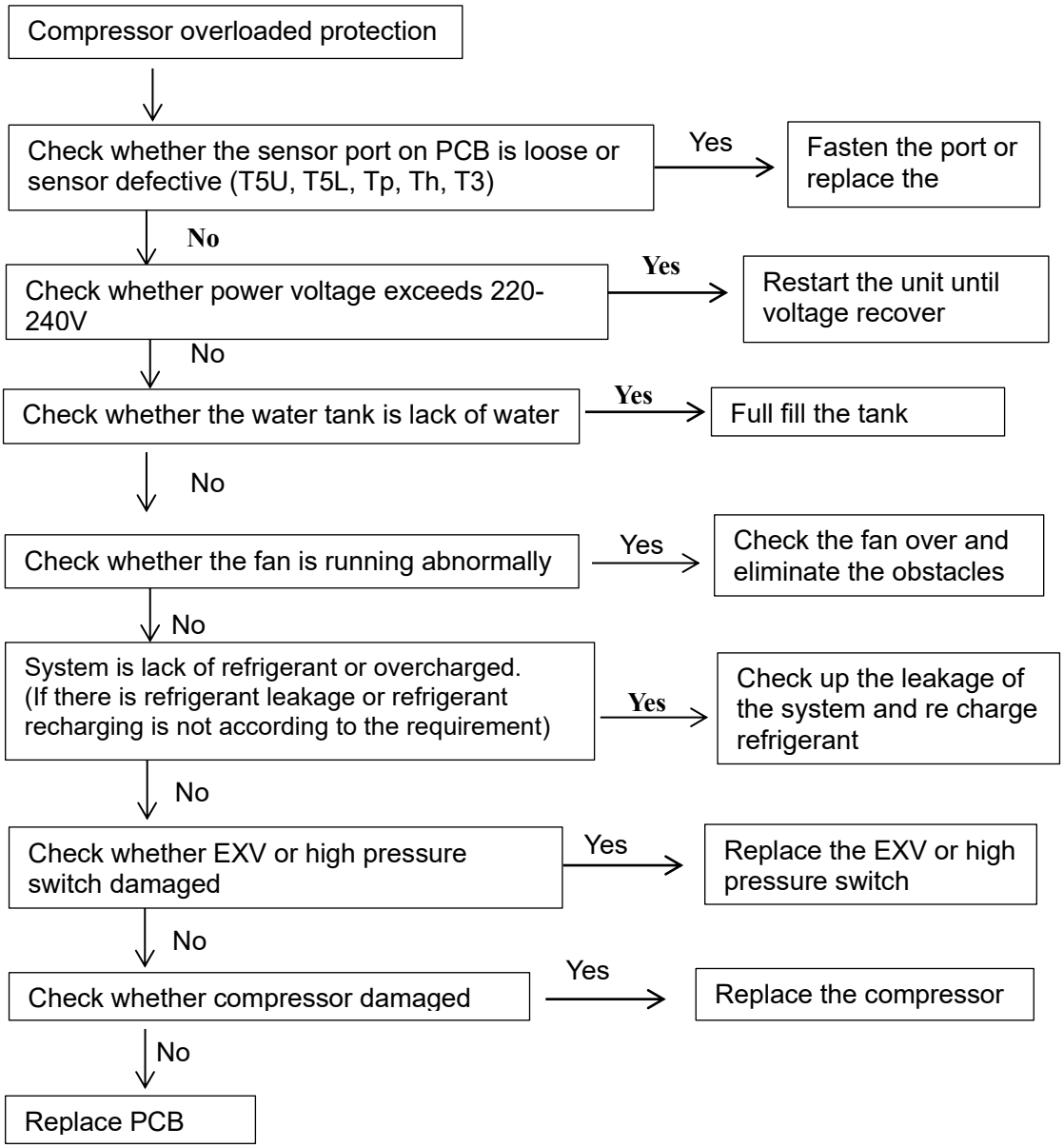
PH20



Notes:

The discharge temperature is not so higher than evaporator temperature after compressor running a term..

PH21



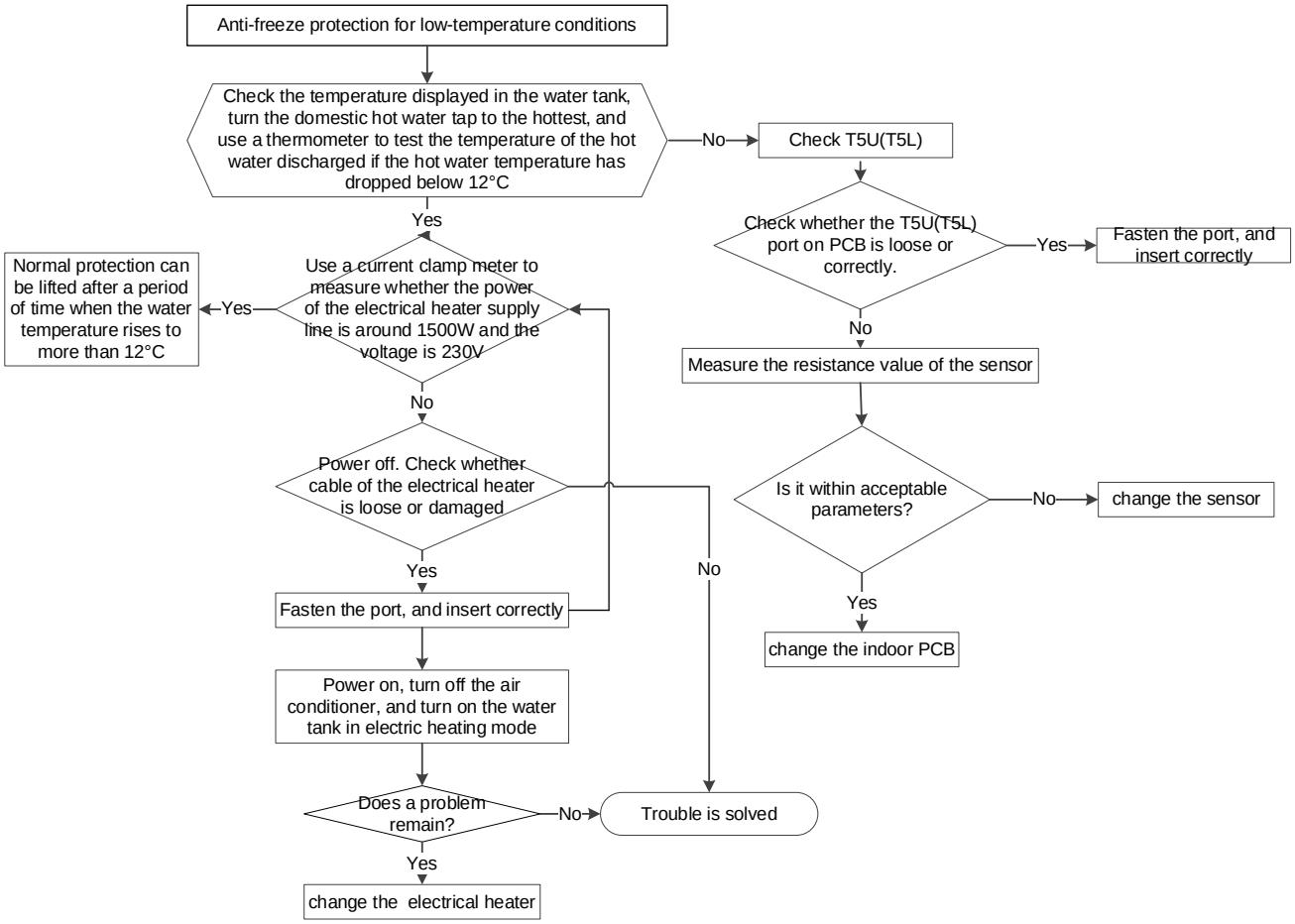
Notes:

10 s after compressor startup, current checking starts,

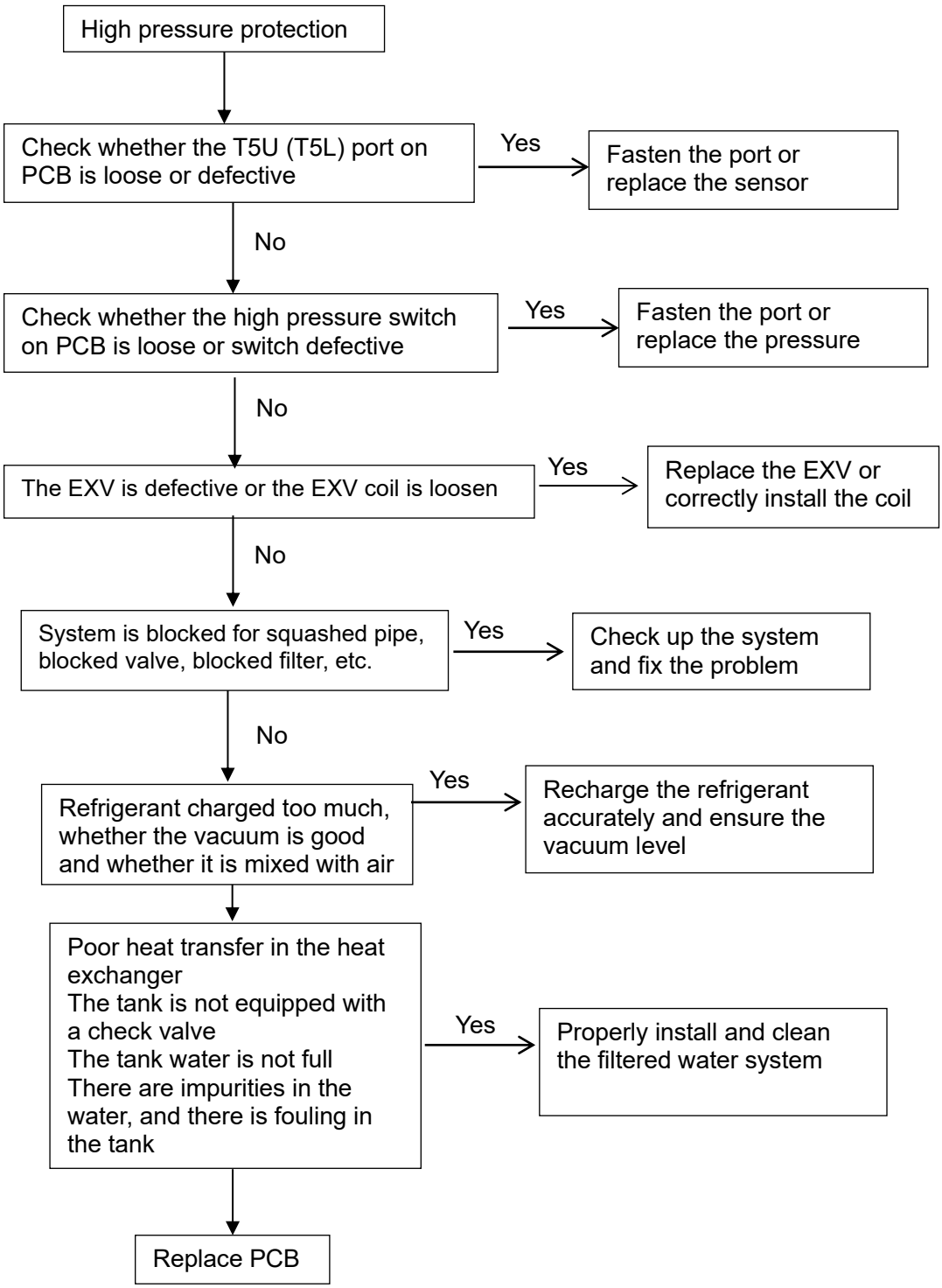
1) Only compressor running, if it is >6A, the compressor will be stopped and protected

2) Compressor and E-heater running at the same time, if it is >15A, the compressor will be stopped and protected.

PH24


Anti-freeze protection for low-temperature conditions
Check the temperature displayed in the water tank, turn the domestic hot water tap to the hottest, and use a thermometer to test the temperature of the hot water discharged if the hot water temperature has dropped below 12°C
No
Check T5U(T5L)
Yes
Check whether the T5U(T5L) port on PCB is loose or correctly.
Yes
Fasten the port, and insert correctly
No
Measure the resistance value of the sensor
Normal protection can be lifted after a period of time when the water temperature rises to more than 12°C
Yes
Use a current clamp meter to measure whether the power of the electrical heater supply line is around 1500W and the voltage is 230V
No
Power off. Check whether cable of the electrical heater is loose or damaged
Yes
Fasten the port, and insert correctly
No
Is it within acceptable parameters?
No
change the sensor
Yes
change the indoor PCB
Power on, turn off the air conditioner, and turn on the water tank in electric heating mode
Does a problem remain?
No
Trouble is solved
Yes
change the electrical heater

PC30

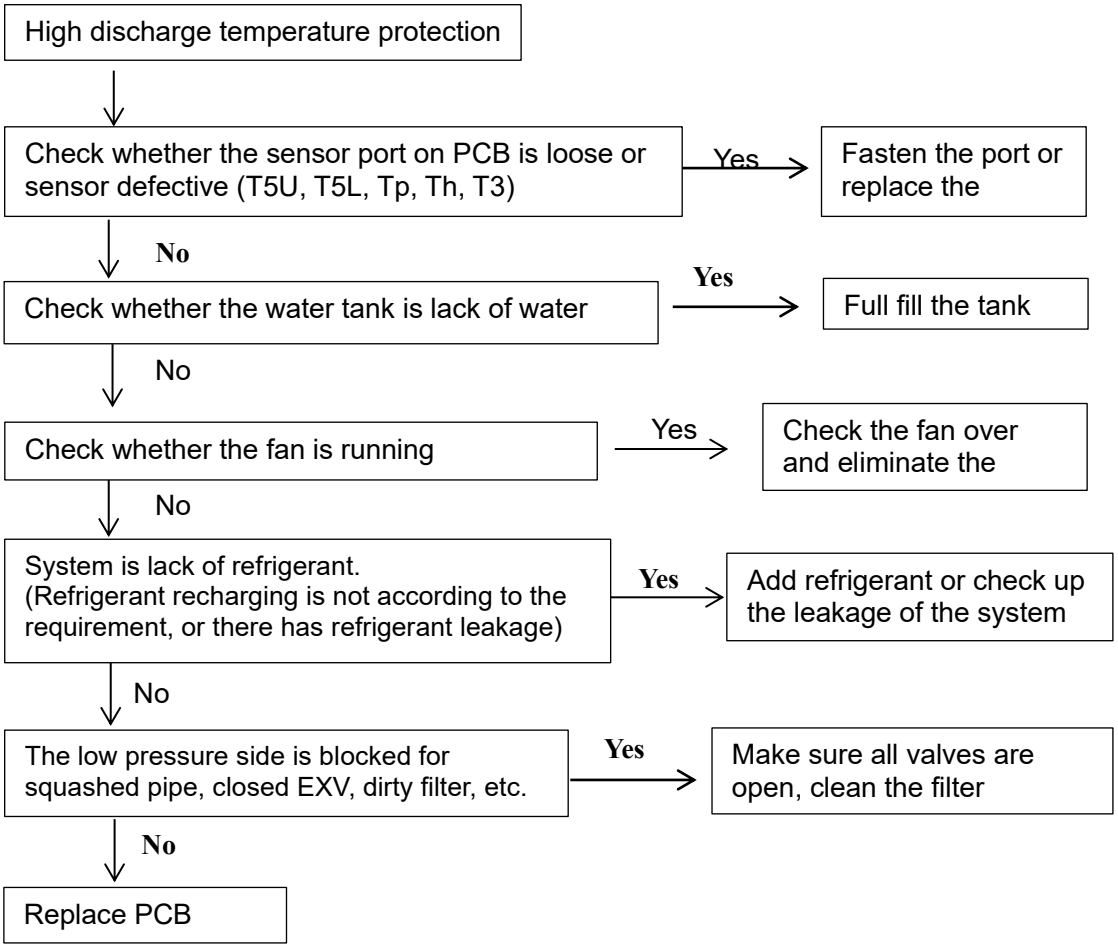


Notes:

When the discharge pressure of compressor is 3.0Mpa or higher, the protection switch will be triggered.

If the discharge pressure is down to 2.4MPa, the protection switch will be recovered.

PC06

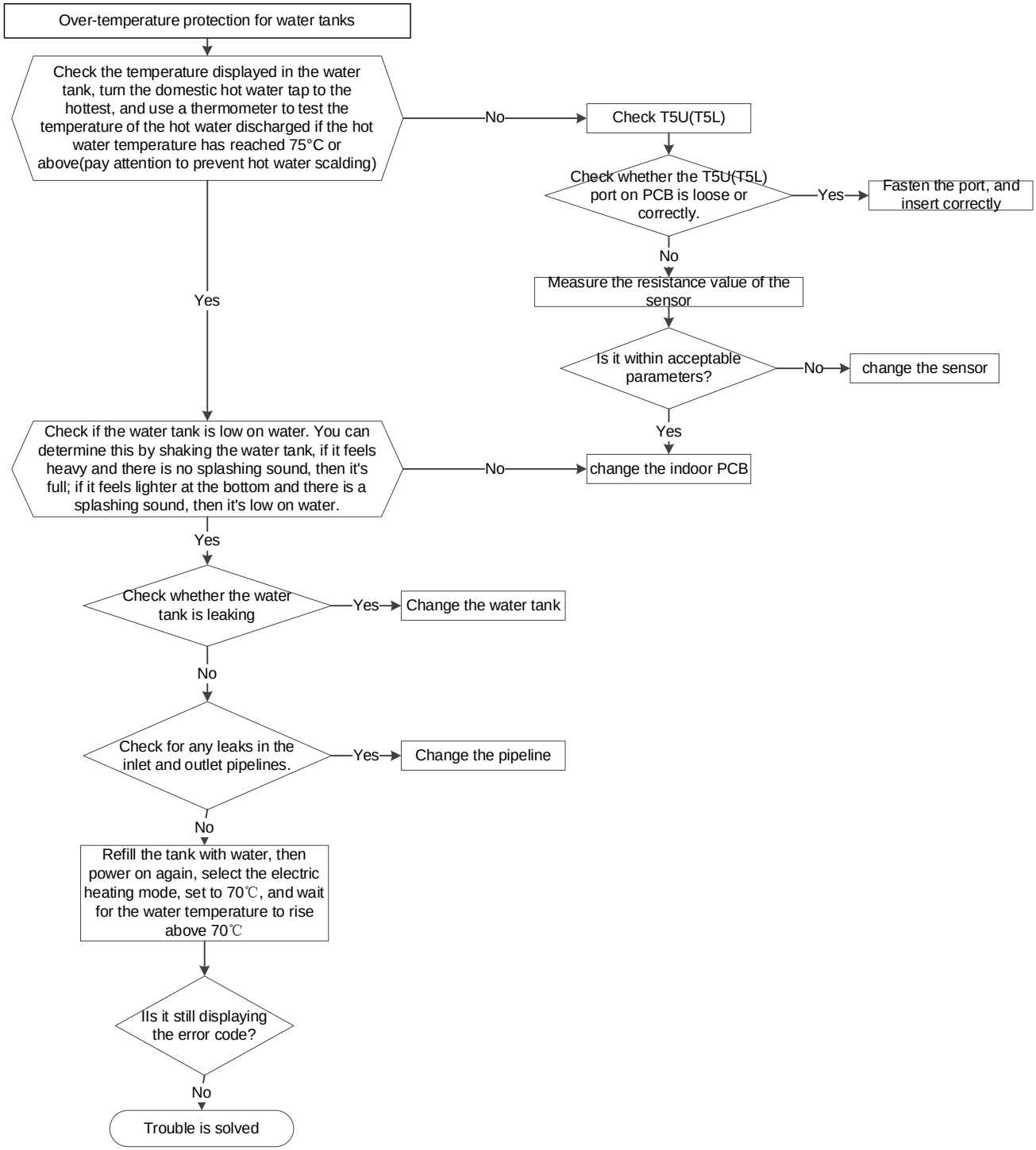


Notes:

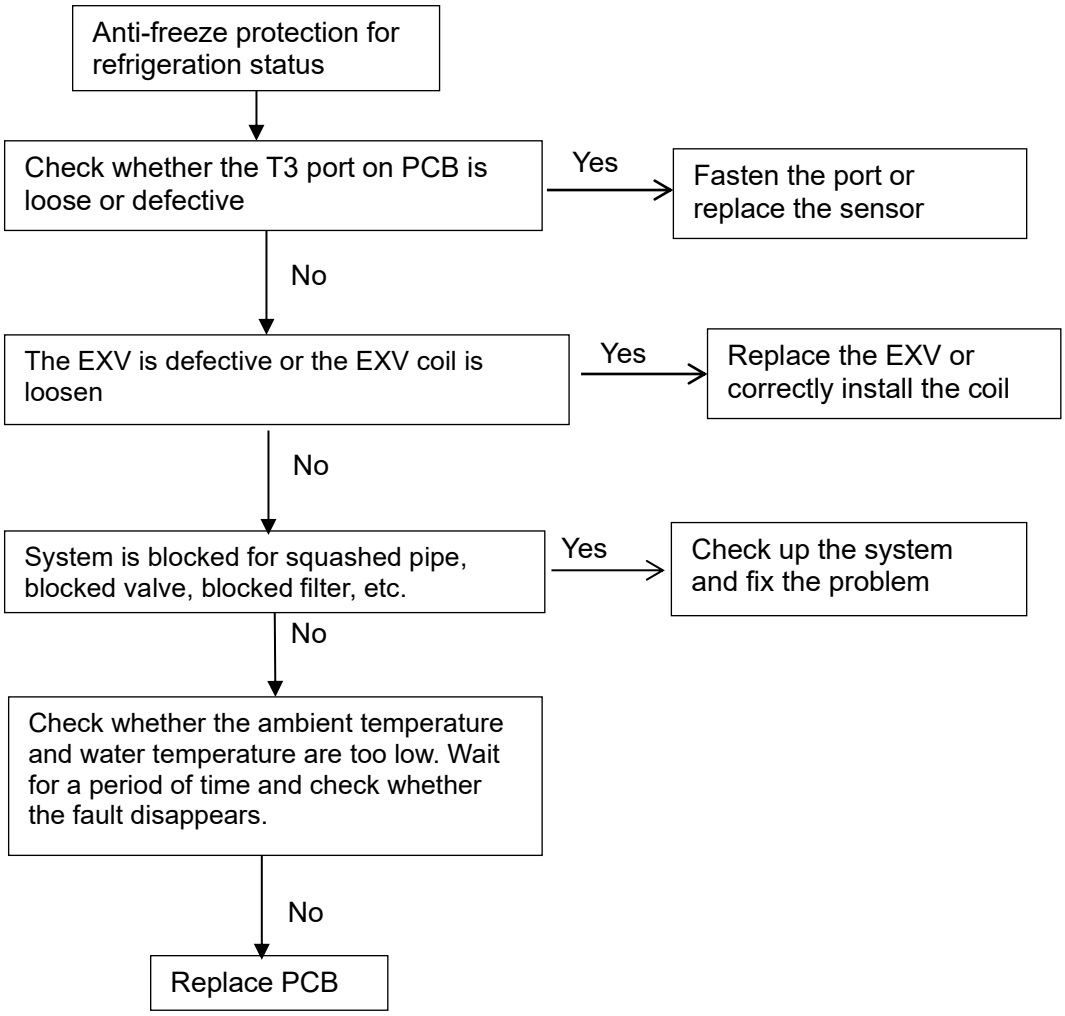
When Tp＞110℃, high discharge temperature protection P2 active.

When Tp＜90℃, high discharge temperature protection P2 inactive.

PH9b


Over-temperature protection for water tanks
Check the temperature displayed in the water tank, turn the domestic hot water tap to the hottest, and use a thermometer to test the temperature of the hot water discharged if the hot water temperature has reached 75°C or above(pay attention to prevent hot water scalding)
No
Check T5U(T5L)
Check whether the T5U(T5L) port on PCB is loose or correctly.
Yes
Fasten the port, and insert correctly
No
Measure the resistance value of the sensor
Is it within acceptable parameters?
No
change the sensor
Yes
Yes
Check if the water tank is low on water. You can determine this by shaking the water tank, if it feels heavy and there is no splashing sound, then it's full; if it feels lighter at the bottom and there is a splashing sound, then it's low on water.
No
change the indoor PCB
Yes
Check whether the water tank is leaking
Yes
Change the water tank
No
Check for any leaks in the inlet and outlet pipelines.
Yes
Change the pipeline
No
Refill the tank with water, then power on again, select the electric heating mode, set to 70℃, and wait for the water temperature to rise above 70℃
Ils it still displaying the error code?
No
Trouble is solved

PH91


Anti-freeze protection for refrigeration status
Check whether the T3 port on PCB is loose or defective
Yes
Fasten the port or replace the sensor
No
The EXV is defective or the EXV coil is loosen
Yes
Replace the EXV or correctly install the coil
No
System is blocked for squashed pipe, blocked valve, blocked filter, etc.
Yes
Check up the system and fix the problem
No
Check whether the ambient temperature and water temperature are too low. Wait for a period of time and check whether the fault disappears.
No
Replace PCB

12. Function

Weekly Disinfect

Under disinfection mode, the unit will immediately start to heat water up to 65°C to kill the potential legionella bacteria inside water tank. '  ' icon will light on the display screen during disinfection. Unit will quit disinfection mode if water temperature is higher than 65°C and extinguish '  ' icon.

Vacation function

After pressing '  ' button to select VACATION, unit will automatically heat water to 15°C for the purpose of energy saving during vacation days.

Remote shutdown function

Users can connect a switch. If the switch is closed, the unit will be stopped forcibly. If switch breaks, the unit can run normally according settings.

Query function

Pressing  for 1s then system running parameters will be shown one by one with following sequence by each pushing of  or button.

No.	Hour low bit	Min. high bit	Min. low bit	Unit	Explanation
1	T	5	U	Temp./ °C	T5U
2	T	5	L	Temp./ °C	T5L
3	T	5	1	Temp./ °C	---
4		T	5	Temp./ °C	Heat pump stop temp
5		T	3	Temp./ °C	T3
6		T	4	Temp./ °C	T4
7		T	P	Temp./ °C	TP
8		T	H	Temp./ °C	Th
9		o	n		---
10	T	F	r		---
11		T	T	Temp./ °C	Disinfect temperature
12		C	o	Current	Compressor and electric heating current
13		F	o	Wind speed range	Dc Fan: Real speed/10
14		E	o	Parameters check sum	0~255
15	E	E	r		Electronic expansion valve opening
16	E	E	C		Compression mechanism hot water demand

17	P	U	P		---
18		P	S		---
19		F	T		0：Ac Fan 1：Dc Fan
20		H	T		1(E-heater control type)
21		H	P		0(Compressor control type)
22	F	S	1		---
23	S	1	o		Tank capacity
24	P	4	P		Four-way valve status
25		U	U		0: Integral water heater
26		U	1	Version	Host software version
27		U	2	Version	LCD panel software version
28		U	3	Version	000
29		U	4	Electric heating code	0: One electric heater 1: Two electric heaters
30		U	T	machine code	3
31	1	E	r	Fault codes	Last error code
32	2	E	r	Fault codes	Previous 1st error or protection code
33	3	E	r	Fault codes	Previous 2nd error or protection cod
34	H	H	H	Maintenance Run Time	Maintenance time
35	T	L	F	Logic operation target temperature	Logic operation target temperature
36	E	n	d	---	END

Auto-restart function

If electricity power failed, unit can memorize all setting parameters, and unit will be back to the previous setting when power recovers.

Button auto-lock

When there is no operation of button for 1 minute, button will be locked except Unlock button + for 2s, unlock buttons.

Screen auto-lock

If there is no operation of button for 60s, screen will be locked (extinguished) except for error code and alarm light. Press any button will unlock the screen (lighten). Enter engineering mode 35 channel enable this function.

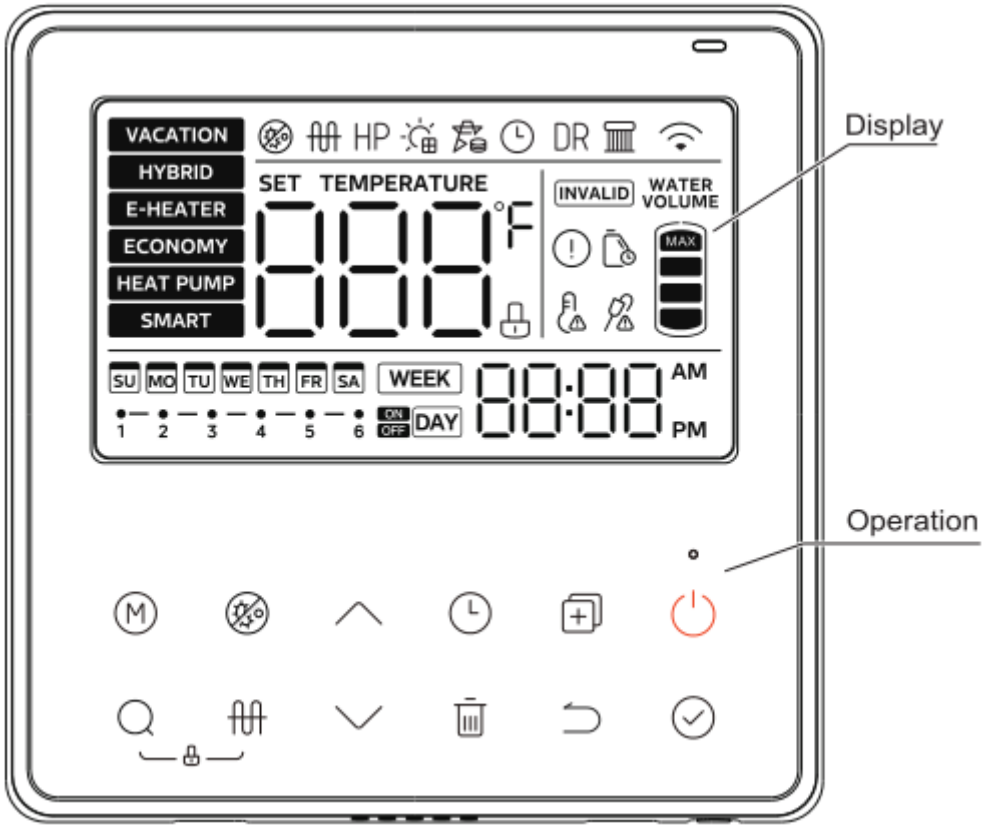
Parameter setting

In off state, press **COPY button for 3 seconds**, to enter the engineering mode and reset the parameters.

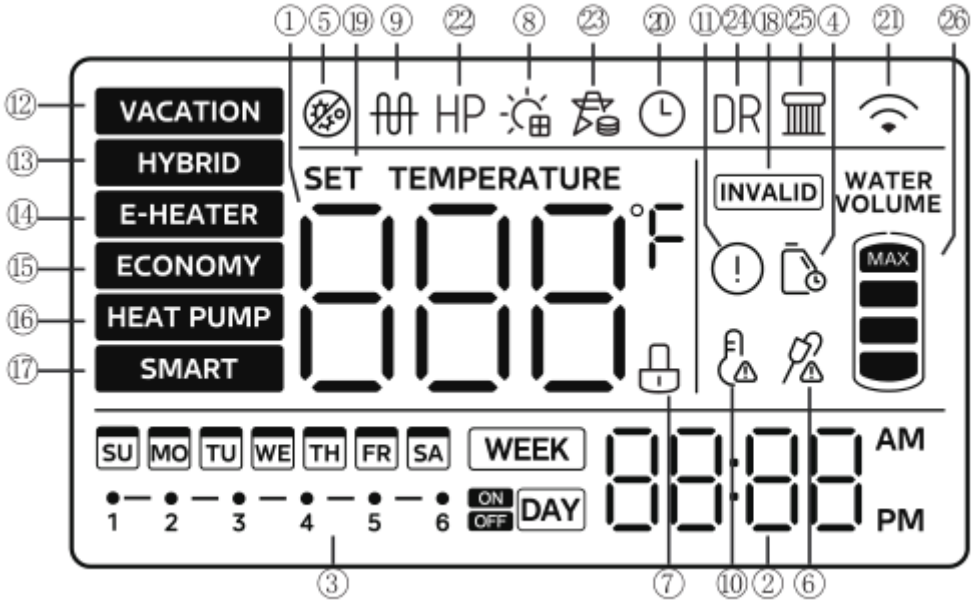
Code	Definition	Default	Setting instruction	Code	Definition	Default	Setting instruction
Channel 1	Unit conversion （APP does not have this function）	0	0-Centigrade；1-Fahrenheit	**Channel 17**	Set temp for auto-disinfection	65	Step size 1, (60-70) unit: ℃
Channel 2	Maintenance reminder function	1	0-Off；1-On	**Channel 18**	Set maximum temp upper limit	65	Step size 1, (65-70) unit: ℃
Channel 3	Set time for maintenance reminder	365	Step size 10 (long press), Step size 1,(short press) , Set range:30-365, unit: day	**Channel 19 Channel 20 Channel 22 Channel 24 Channel 25**	--	--	--
Channel 4	Clear time accumulation for maintenance reminder	/	0-not clear ； 1-clear	**Channel 21**	Set 485 communication address	1	Step size 1, Set range:1-20
Channel 5	Clear fault code	/	0-not clear ； 1-clear	**Channel 23**	Reset factory data	0	0-Off；1-On
Channel 6	the electric heater (for internal use only)	1	0-Off；1-On	**Channel 26**	Set time for auto-disinfection (min)	/	Step size 1, Set range:0-59, unit: min
Channel 7	Auto-disinfection	off	0-Off；1-On	**Channel 27**	Electric heater forced compensation (ECO mode)	0	0-Off；1-On
Channel 8	Set operating temp of the electric heater	5	80L&100L :Step size 1, (-5-5)， unit: ℃ 150L :Step size 1,(-15-5)， unit: ℃	**Channel 28 Channel 29**	--	--	--
Channel 9	Set start time for auto-disinfection (h)	23:00	Step size 1, Set range:0-23, unit: h	**Channel 30**	Automatic backlight	1	0-Off, (all the time) 1-On,nomal mode)
Channel 10	Smart mode (for internal use only)	0	0- With reference period 1- no reference period, mode 1 2- no reference period, mode 2	**Channel 31 Channel 32 Channel 33 Channel 37 Channel 38 Channel 39**	--	--	--
Channel 11	Set temp for vocation mode	15	Step size 1, (10-20) unit: ℃	**Channel 34**	Set keytone (buzz)	0	0-with buzz 1-no buzz
Channel 12	Set Ventilation mode(optional)）	0	0-off; 1-low fan speed, 2- middle fan speed, 3-high fan speed	**Channel 35**	Auto- child lock	0	Without button operation in 1 minute 0-Off；1-On
Channel 13	--	--	--	**Channel 36**	Set temp difference (if the difference between the temperature detected by lower temperature sensor T5L and setting temperature is bigger than this	80L：8 100L：6 150L：6	Step size 1, Set range:2-20, unit: ℃

					set value, the HP will operate)		
Channel 14	Set time for electric heater forced compensation	60	Step size 10, (10-300) unit: min	**Channel 40**	ESP setting (under developing)	0	0-0-10pa 1-10-20pa 2-20-40pa 3-40-60pa
Channel 15	Burned protection (for internal use only)	1	0-Off；1-On	**Channel 41** **Channel 42** **Channel 43**	--	--	--
Channel 16	Current detection function (for internal use only)	1	0-Off；1-On				

13. Operation



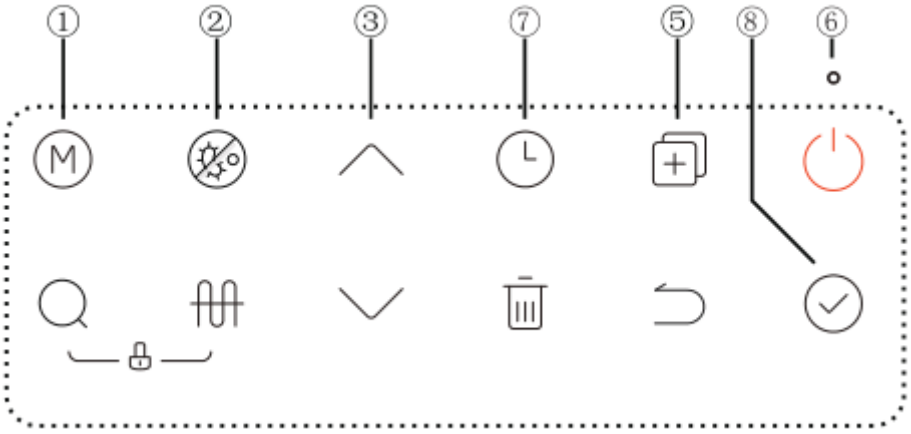
Display explanation



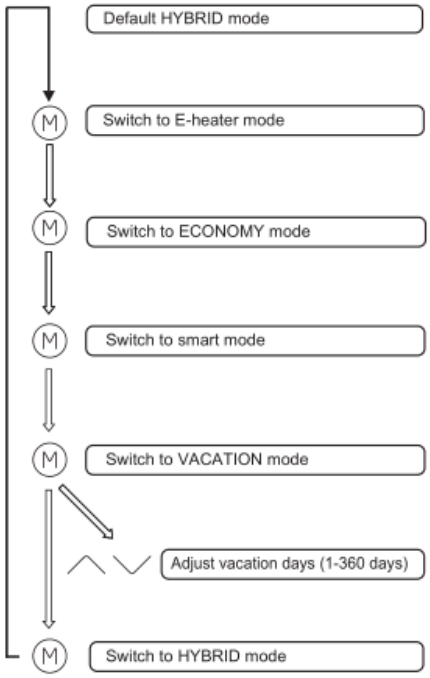
No	Icon	Description
①		888 will be lightened if screen is unlocked. It shows water temperature on normal; It shows remaining vacation days on vacation; It shows setting temperature on setting; It shows unit setting/running parameters, error/protection code on querying.
②		**Time and clock setting** 20:08 shows the clock. Whenever there is any setting for clock, **SET TIME** will be lightened.
③		There are daily or weekly TIMER icon. If anyone of them has been set, this icon will lighten the corresponding one when screen is unlocked; If there is none of timers has been set, it will keep extinguished. If timer is being set, this icon will flash the corresponding one with 2Hz frequency as well lighten the timer which has been set.
④		It flashes to remind the user to maintain the water tank.
⑤		It will be lightened when the machine is disinfecting.
⑥		**impressed current anode reminder (optional):** It will be lightened when the impressed current anode has a default.
⑦		**Lock:** If button is locked, the icon will be lightened, otherwise it will be extinguished.
⑧		**EVU:** When the photovoltaic effective signal is detected, this icon lights up, this time the target temperature of the machine is adjusted to the highest set temperature, and the machine makes hot water quickly. (some units)
⑨		**E-heater:** It will be lightened when E-heater is running, otherwise it will be extinguished. NOTE: When the operating conditions are not met to turn on this function, the corresponding icon on the wire controller lights up briefly and then goes out.

⑩		**High temp. Alarm** If water temp is higher than 50°C, it will be lightened, otherwise it will be extinguished.
⑪		**Error:** It will be lightened when unit is under protection/error.
⑫		**VACATION MODE:** For the outgoing vacation mode, the water tank is set at 15°C. Maintains low tank water temperature, preheats hot water and anti-freeze lines, while reducing on/off operation of the tank.
⑬		**HYBRID MODE:** Operating in heat pump mode, the electric heater and heat pump will heat up together when in extremely low ambient temperatures or when the heat pump has been running for a long time without reaching the set Temp.
⑭		**E-HEATER MODE:** Operate in accordance with the heat pump mode, the heat pump outdoor unit and the electric heater running at the same time.
⑮		**ECONOMY MODE:** In accordance with the heat pump mode of operation, the heat pump external unit heats up to the maximum water temperature before turning on the electric auxiliary heater for heating, the heat pump and the electric auxiliary heater will not be turned on at the same time. It is recommended to use this mode of operation when making hot water alone, which is more energy-saving.
⑯		**HEAT PUMP MODE:** It will be lightened when the machine is running in HEAT PUMP mode.（some units）
⑰		**SMART MODE:** Records the hot water usage habits of users over the past 7 days and turns on the heating in advance according to the user's peak water usage hours. All other unconventional hot water hours are in standby mode, without heating operation (it is recommended that users set this mode after 7 days of regular and normal operation of the water heater to avoid affecting the normal use of the water heater by failing to record the complete user habits.)（some units）
⑱	INVALID	When any key is invalid, this icon will flash 3 sec.
⑲	SET TEMP	The icon lights up when the water temperature is being set.
⑳		The icon lights up when the clock is being set.
㉑		**Wireless:** will be lightened when Wireless is connected; will be extinguished when Wireless is not connected; will flash with 2Hz frequency when setting Wireless.
㉒	HP	**HEAT PUMP ICON:** When the heat pump is operating and producing hot water, the icon lights up.
㉓		**Smart Grid ICON:** When the SG signal is invalid, this icon does not light up and the machine does not switch on normally.（some units）

Operation panel explanation



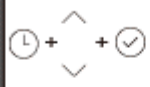
Notes: Any press of button is effective only under button and display unlocked state.

No.	Icon	Description
①	M	Use this key to switch mode 
②		Click the button to turn on the forced sterilization function. Icon will light up. then the unit will heat up water to 65°C at least for disinfection. When the machine is disinfected, press this button to cancel it. then the will be extinguished. This key is used to cancel all settings and exit the setting state. When Wireless connection is normal, long press the Cancel button for more than 8s to exit Wireless connection. NOTE: When the operating conditions are not met to turn on this function, the corresponding icon on the wire controller lights up briefly and then goes out.

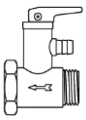
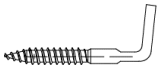
No	Icon	Description
③		**INCREASE AND DECREASE** If screen is unlocked, corresponding value will increase by pressing the button. ● When setting temperature, press more than 1s, temperature value will be increased continuously; ● When setting clock/timer, press more than 1s, clock/timer value will be increased continuously; ● When setting vacation days, press more than 1s, day value will be increased continuously; On querying, check items will page up by pressing it.
④		**Checking function** 1) In the main interface, press and hold the search key for 1 second to enter the spot check function, and use the up and down keys to switch the spot check channel, and the attribute value of the channel will be displayed when switching to the channel, and the specific channel can be found in the function book. 2) After 30 seconds from the last operation of the up and down keys, or by pressing the return key or the on/off key, you can directly exit the engineering mode; 3）Query mode can be entered in both power-on and power-off state.
⑤		**Engineering Mode** 1) In the main interface, press and hold the copy key for 3 seconds to enter the engineering mode; use the up and down keys to switch the inspection channel, and the attribute value of the channel will be displayed when switching to the channel. By up and down key, you can modify a parameter setting, after setting and adjusting, press confirm key to return to the main interface to make the setting effective (channel 2, 3, 4, 34, 35 will be effective immediately). Press the Return button to return to the previous interface (channel selection interface). After 30 seconds from the last operation of the up and down buttons, or by pressing the return button or the on/off button, you can directly exit the engineering mode. 2）Engineering mode can be accessed in both power-on and power-off state. It is strictly prohibited for the customer to change the parameter settings of other channels in the engineering mode without authorisation to avoid affecting the normal operation of the unit or causing damage to the prototype. 3) The current maximum set temperature is 65°C , if you need to use a higher temperature, you can enter the engineering mode 18 channel, raise the set temperature upper limit, set the temperature upper limit to 70°C. 4) If the ventilation function is configured, you can enter the engineering mode 12 channel to select the wind gear, 0 means off, 1 means low wind, 2 means middle wind, and 3 means high wind. When the ventilation function takes effect, the main interface displays "FAN".
⑥		**Power on/off button** Press the button to turn the device on or off.

No	Icon	Description
⑦		TIMER (Daily setting) 1) Press the TIMER button to the day timer icon DAY, press the confirmation button to enter the day timer setting interface, the day timer has a total of 6 time periods, each time period can be set to open the time, close the time, mode, set the temperature of the water; when set the first time period set the temperature of the water, press the confirmation button to enter the next time period of the set; when set the sixth time period set the temperature of the water, press the confirmation button to return to the main interface; during this period, you can press the return button Return to the previous setting or main interface; 2) When setting the on time and off time, press the delete button , the time can be restored to the default value, and displaying (-. --). 3) If there is a conflict between the set time periods, the time period set at the back will be the valid time period, and the time period in front will be the invalid time period; the invalid time period restores the default setting 4) You can enter the daily timer setting in both power-on and power-off state. TIMER (Weekly setting) 1) Press the TIMER button to the weekly timer icon WEEK, press the confirmation button to enter the weekly timer setting interface, weekly timer a total of 7 days, there are 6 time slots can be set each day, each time slot can be set to open the time, close the time, the mode, set the water temperature; when the first time slot set the water temperature, press the confirmation button to enter the next time slot settings; when the sixth time slot set the temperature, press the confirmation button to return to weekly After setting the water temperature for the 6th period, press the confirmation key to return to the selection of week; during this period, you can press the return key to return to the previous level of setting or the main interface; 2) When setting the on time and off time, press the delete button to restore the time, mode and set water temperature to the default value, and displaying (-. --). 3) If you adjust the timing time again after the setting is completed, then all the settings after the adjustment time period will be canceled. For example, if you adjust the timer on for time period 2, the timer off for time period 2, and the settings for time periods 3, 4, 5, and 6 will all be canceled to (-:---) after adjustment. Mode and setting water temperature become default values (Energy saving mode, 60°C) 4) In the weekly timer setting, in the weekly selection, use the copy button , you can locate the setting of a certain day to the base day, select other days, press the copy button to change the status of the day, the fast flashing is selected, the slow flashing is unselected, and after pressing on the confirmation button, you can copy the setting of the base day to the selected day; 5) You can enter the weekly timer setting in both power-on and power-off state.
⑧		**CONFIRM/UNLOCK** If screen and buttons are unlocked, press it to upload setting parameters after setting any parameter.

5.3 Combination button

No.	Icon	Description
Setting the date and clock		1) In the main interface, press and hold the timer button for 3 seconds to enter the date setting, press the up/down button to select the date, press the confirmation button to enter the clock setting, press the up/down button to modify the time, and press and hold to accelerate the increase/decrease of the time. After setting the clock, press the confirm button to return to the main interface to complete the setting of date and time. (2) After 30 seconds from the last operation of the up/down button or pressing the return button or the power on/off button, you can directly exit the date and time setting; 3) Setting can be done in both power-on and power-off state.
connecting the wireless function	 Press for 3 sec	1) In the main interface, long press the on/off key for 3 seconds to enter the AP wireless network mode, there will be a wireless icon in the upper right corner of the line controller. At this time, enter the APP, select the category of air water heater, choose the correct model, and then network according to the APP prompts, and after the network is completed, the wireless icon will be always on; (2) Wireless matching can last up to 8 minutes, after 8 minutes, if the matching is not successful, the wireless icon will go out; 3) Long press the delete button for 8 seconds in the main interface to reset the wireless function; 4) It can be set in both power on and power off state. NOTE: Please check the **5.4 Using the SmartHome App** for details.
Child lock function	 Press for 2 sec	1) In the main interface, long press the key combination for 2 seconds to enter the child lock state; (2) In the state of child lock, long press the key combination again for 2 seconds to release the child lock state; 3) In the locked state, there will be an icon next to the water temperature display.

14. Accessories

Name	Qty.	Sharp	Purpose
Owner’s and Installation Manual	1		Installation and use instruction.
Safety Valve (0.75MPa)	1		Prevent tank overpressure, prevent flowing backwards
Expansion screw	4		Fixed unit

15. Resistance characteristic of temperature sensor

- Resistance characteristic of ambient Temp., pipe Temp. and suction Temp. sensor.

Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)
-20	115.266	**20**	12.6431	**60**	2.35774	**100**	0.62973
-19	108.146	**21**	12.0561	**61**	2.27249	**101**	0.61148
-18	101.517	**22**	11.5	**62**	2.19073	**102**	0.59386
-17	96.3423	**23**	10.9731	**63**	2.11241	**103**	0.57683
-16	89.5865	**24**	10.4736	**64**	2.03732	**104**	0.56038
-15	84.219	**25**	10	**65**	1.96532	**105**	0.54448
-14	79.311	**26**	9.55074	**66**	1.89627	**106**	0.52912
-13	74.536	**27**	9.12445	**67**	1.83003	**107**	0.51426
-12	70.1698	**28**	8.71983	**68**	1.76647	**108**	0.49989
-11	66.0898	**29**	8.33566	**69**	1.70547	**109**	0.486
-10	62.2756	**30**	7.97078	**70**	1.64691	**110**	0.47256
-9	58.7079	**31**	7.62411	**71**	1.59068	**111**	0.45957
-8	56.3694	**32**	7.29464	**72**	1.53668	**112**	0.44699
-7	52.2438	**33**	6.98142	**73**	1.48481	**113**	0.43482
-6	49.3161	**34**	6.68355	**74**	1.43498	**114**	0.42304
-5	46.5725	**35**	6.40021	**75**	1.38703	**115**	0.41164
-4	44	**36**	6.13059	**76**	1.34105	**116**	0.4006
-3	41.5878	**37**	5.87359	**77**	1.29078	**117**	0.38991
-2	39.8239	**38**	5.62961	**78**	1.25423	**118**	0.37956
-1	37.1988	**39**	5.39689	**79**	1.2133	**119**	0.36954
0	35.2024	**40**	5.17519	**80**	1.17393	**120**	0.35982
1	33.3269	**41**	4.96392	**81**	1.13604	**121**	0.35042
2	31.5635	**42**	4.76253	**82**	1.09958	**122**	0.3413
3	29.9058	**43**	4.5705	**83**	1.06448	**123**	0.33246
4	28.3459	**44**	4.38736	**84**	1.03069	**124**	0.3239
5	26.8778	**45**	4.21263	**85**	0.99815	**125**	0.31559
6	25.4954	**46**	4.04589	**86**	0.96681	**126**	0.30754
7	24.1932	**47**	3.88673	**87**	0.93662	**127**	0.29974
8	22.5662	**48**	3.73476	**88**	0.90753	**128**	0.29216
9	21.8094	**49**	3.58962	**89**	0.8795	**129**	0.28482
10	20.7184	**50**	3.45097	**90**	0.85248	**130**	0.2777
11	19.6891	**51**	3.31847	**91**	0.82643	**131**	0.27078
12	18.7177	**52**	3.19183	**92**	0.80132	**132**	0.26408
13	17.8005	**53**	3.07075	**93**	0.77709	**133**	0.25757
14	16.9341	**54**	2.95896	**94**	0.75373	**134**	0.25125
15	16.1156	**55**	2.84421	**95**	0.73119	**135**	0.24512
16	15.3418	**56**	2.73823	**96**	0.70944	**136**	0.23916
17	14.6181	**57**	2.63682	**97**	0.68844	**137**	0.23338
18	13.918	**58**	2.53973	**98**	0.66818	**138**	0.22776
19	13.2631	**59**	2.44677	**99**	0.64862	**139**	0.22231

- Resistance characteristic of discharge temperature sensor

Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)
-20	542.7	**20**	68.66	**60**	13.59	**100**	3.702
-19	511.9	**21**	65.62	**61**	13.11	**101**	3.595
-18	483	**22**	62.73	**62**	12.65	**102**	3.492
-17	455.9	**23**	59.98	**63**	12.21	**103**	3.392
-16	430.5	**24**	57.37	**64**	11.79	**104**	3.296
-15	406.7	**25**	54.89	**65**	11.38	**105**	3.203
-14	384.3	**26**	52.53	**66**	10.99	**106**	3.113
-13	363.3	**27**	50.28	**67**	10.61	**107**	3.025
-12	343.6	**28**	48.14	**68**	10.25	**108**	2.941
-11	325.1	**29**	46.11	**69**	9.902	**109**	2.86
-10	307.7	**30**	44.17	**70**	9.569	**110**	2.781
-9	291.3	**31**	42.33	**71**	9.248	**111**	2.704
-8	275.9	**32**	40.57	**72**	8.94	**112**	2.63
-7	261.4	**33**	38.89	**73**	8.643	**113**	2.559
-6	247.8	**34**	37.3	**74**	8.358	**114**	2.489
-5	234.9	**35**	35.78	**75**	8.084	**115**	2.422
-4	222.8	**36**	34.32	**76**	7.82	**116**	2.357
-3	211.4	**37**	32.94	**77**	7.566	**117**	2.294
-2	200.7	**38**	31.62	**78**	7.321	**118**	2.233
-1	190.5	**39**	30.36	**79**	7.086	**119**	2.174
0	180.9	**40**	29.15	**80**	6.859	**120**	2.117
1	171.9	**41**	28	**81**	6.641	**121**	2.061
2	163.3	**42**	26.9	**82**	6.43	**122**	2.007
3	155.2	**43**	25.86	**83**	6.228	**123**	1.955
4	147.6	**44**	24.85	**84**	6.033	**124**	1.905
5	140.4	**45**	23.89	**85**	5.844	**125**	1.856
6	133.5	**46**	22.89	**86**	5.663	**126**	1.808
7	127.1	**47**	22.1	**87**	5.488	**127**	1.762
8	121	**48**	21.26	**88**	5.32	**128**	1.717
9	115.2	**49**	20.46	**89**	5.157	**129**	1.674
10	109.8	**50**	19.69	**90**	5	**130**	1.632
11	104.6	**51**	18.96	**91**	4.849		
12	99.69	**52**	18.26	**92**	4.703		
13	95.05	**53**	17.58	**93**	4.562		
14	90.66	**54**	16.94	**94**	4.426		
15	86.49	**55**	16.32	**95**	4.294	B(25/50)=3950K	
16	82.54	**56**	15.73	**96**	4.167		
17	78.79	**57**	15.16	**97**	4.045	R(90℃)=5KΩ+-3%	
18	75.24	**58**	14.62	**98**	3.927		
19	71.86	**59**	14.09	**99**	3.812		

- Resistance characteristic of water tank temperature sensor

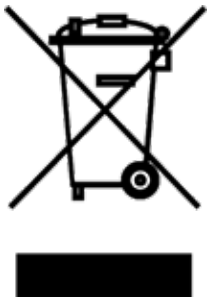
Temp. (°C)	Max. Resistance value (kΩ)	Normal Resistance value (kΩ)	Min. Resistance value (kΩ)	Temp. Tol. (°C)	
-30	965.72	867.29	778.18	-1.78	1.73
-29	907.28	815.80	732.88	-1.78	1.72
-28	852.73	767.68	690.49	-1.77	1.72
-27	801.77	722.68	650.80	-1.76	1.71
-26	754.12	680.54	613.59	-1.75	1.70
-25	709.53	641.07	578.70	-1.73	1.69
-24	667.79	604.08	545.95	-1.72	1.68
-23	628.70	569.39	515.21	-1.71	1.67
-22	592.07	536.85	486.34	-1.70	1.65
-21	557.76	506.33	459.22	-1.68	1.64
-20	525.60	477.69	433.75	-1.67	1.63
-19	495.45	450.81	409.82	-1.66	1.63
-18	467.19	425.59	387.34	-1.65	1.62
-17	440.70	401.91	366.21	-1.64	1.61
-16	415.86	379.69	346.36	-1.63	1.60
-15	392.57	358.83	327.70	-1.62	1.59
-14	370.72	339.24	310.16	-1.61	1.58
-13	350.23	320.85	293.66	-1.60	1.57
-12	331.00	303.56	278.16	-1.59	1.56
-11	312.95	287.33	263.57	-1.58	1.56
-10	296.00	272.06	249.84	-1.57	1.55
-9	280.08	257.71	236.92	-1.56	1.54
-8	265.12	244.21	224.75	-1.55	1.53
-7	251.06	231.51	213.28	-1.54	1.52
-6	237.84	219.55	202.48	-1.53	1.52
-5	225.40	208.28	192.29	-1.52	1.51
-4	213.69	197.67	182.69	-1.51	1.50
-3	202.66	187.66	173.62	-1.50	1.49
-2	192.27	178.22	165.05	-1.49	1.48
-1	182.47	168.31	156.96	-1.48	1.47
0	173.23	160.90	149.32	-1.47	1.46
1	164.51	152.96	142.09	-1.45	1.45
2	156.28	145.45	135.25	-1.44	1.44
3	148.50	138.35	128.78	-1.43	1.43
4	141.15	131.64	122.65	-1.42	1.41
5	134.21	125.28	116.85	-1.40	1.40
6	127.64	119.27	111.35	-1.39	1.39
7	121.43	113.58	106.14	-1.38	1.38
8	115.55	108.18	101.19	-1.37	1.37
9	109.98	103.07	96.507	-1.35	1.36

Temp. (°C)	Max. Resistance value (kΩ)	Normal Resistance value (kΩ)	Min. Resistance value (kΩ)	Temp. Tol. (°C)	
10	104.71	98.227	92.060	-1.34	1.34
11	99.722	93.634	87.839	-1.33	1.33
12	94.992	89.278	83.832	-1.31	1.32
13	90.510	85.146	80.028	-1.30	1.31
14	86.261	81.225	76.415	-1.28	1.29
15	82.232	77.504	72.983	-1.27	1.28
16	78.411	73.972	69.722	-1.26	1.27
17	74.787	70.619	66.623	-1.24	1.25
18	71.348	67.434	63.677	-1.23	1.24
19	68.085	64.409	60.876	-1.22	1.23
20	64.988	61.535	58.213	-1.20	1.22
21	62.047	58.804	55.680	-1.19	1.20
22	59.255	56.209	53.271	-1.17	1.19
23	56.604	53.742	50.978	-1.16	1.18
24	54.085	51.396	48.797	-1.15	1.17
25	51.691	49.165	46.720	-1.13	1.15
26	49.417	47.043	44.744	-1.12	1.14
27	47.255	45.025	42.861	-1.10	1.13
28	45.199	43.104	41.068	-1.09	1.11
29	43.245	41.276	39.361	-1.08	1.10
30	41.386	39.535	37.733	-1.06	1.09
31	39.617	37.878	36.183	-1.05	1.07
32	37.934	36.299	34.704	-1.04	1.06
33	36.331	34.796	33.295	-1.02	1.05
34	34.806	33.363	31.951	-1.01	1.03
35	33.353	31.977	30.668	-0.99	1.02
36	31.970	30.695	29.445	-0.98	1.01
37	30.651	29.453	28.277	-0.96	0.99
38	29.394	28.269	27.162	-0.95	0.98
39	28.196	27.139	26.098	-0.94	0.97
40	27.054	26.061	25.081	-0.92	0.95
41	25.964	25.031	24.110	-0.91	0.94
42	24.925	24.048	23.182	-0.89	0.92
43	23.933	23.109	22.294	-0.88	0.91
44	22.986	22.212	21.446	-0.86	0.89
45	22.081	21.355	20.635	-0.85	0.88
46	21.217	20.536	19.858	-0.83	0.86
47	20.392	19.752	19.116	-0.82	0.85
48	19.603	19.003	18.405	-0.80	0.83
49	18.849	18.286	17.724	-0.79	0.82

Temp. (°C)	Max. Resistance value (kΩ)	Normal Resistance value (kΩ)	Min. Resistance value (kΩ)	Temp. Tol. (°C)	
50	18.128	17.600	17.072	-0.77	0.80
51	17.465	16.943	16.423	-0.79	0.83
52	16.830	16.315	15.801	-0.82	0.85
53	16.221	15.713	15.207	-0.84	0.88
54	15.637	15.136	14.638	-0.87	0.90
55	15.077	14.583	14.093	-0.89	0.93
56	14.541	14.054	13.571	-0.92	0.95
57	14.026	13.546	13.071	-0.94	0.98
58	13.531	13.059	12.592	-0.97	1.00
59	13.057	12.592	12.133	-1.00	1.03
60	12.602	12.144	11.693	-1.02	1.05
61	12.165	11.715	11.271	-1.05	1.08
62	11.745	11.302	10.866	-1.07	1.10
63	11.342	10.906	10.478	-1.10	1.13
64	10.954	10.526	10.106	-1.13	1.15
65	10.582	10.161	9.7486	-1.15	1.18
66	10.224	9.8105	9.4056	-1.18	1.20
67	9.8794	9.4736	9.0762	-1.20	1.23
68	9.5484	9.1498	8.7600	-1.23	1.25
69	9.2301	8.8387	8.4562	-1.26	1.28
70	8.9239	8.5396	8.1645	-1.28	1.30
71	8.6293	8.2520	7.8841	-1.31	1.33
72	8.3458	7.9755	7.6147	-1.34	1.36
73	8.0729	7.7094	7.3557	-1.37	1.38
74	7.8102	7.4536	7.1068	-1.39	1.41
75	7.5573	7.2073	6.8674	-1.42	1.43
76	7.3137	6.9704	6.6372	-1.45	1.46
77	7.0791	6.7423	6.4157	-1.48	1.49
78	6.8532	6.5228	6.2027	-1.50	1.51
79	6.6354	6.3114	5.9977	-1.53	1.54
80	6.4256	6.1078	5.8005	-1.56	1.57
81	6.2234	5.9117	5.6106	-1.59	1.59
82	6.0285	5.7228	5.4278	-1.62	1.62
83	5.8405	5.5409	5.2518	-1.65	1.65
84	5.6593	5.3655	5.0823	-1.68	1.68
85	5.4846	5.1965	4.9191	-1.70	1.70
86	5.3160	5.0336	4.7618	-1.73	1.73
87	5.1534	4.8765	4.6103	-1.76	1.76
88	4.9965	4.7251	4.4643	-1.79	1.79
89	4.8451	4.5790	4.3236	-1.82	1.81

Temp. (°C)	Max. Resistance value (kΩ)	Normal Resistance value (kΩ)	Min. Resistance value (kΩ)	Temp. Tol. (°C)	
90	4.6990	4.4381	4.1880	-1.85	1.84
91	4.5579	4.3022	4.0572	-1.88	1.87
92	4.4218	4.1711	3.9312	-1.91	1.90
93	4.2903	4.0446	3.8096	-1.94	1.92
94	4.1633	3.9225	3.6923	-1.97	1.95
95	4.0407	3.8046	3.5791	-2.00	1.98
96	3.9222	3.6908	3.4700	-2.03	2.01
97	3.8077	3.5810	3.3647	-2.06	2.04
98	3.6971	3.4748	3.2630	-2.09	2.07
99	3.5902	3.3724	3.1649	-2.13	2.10
100	3.4869	3.2734	3.0701	-2.16	2.12
101	3.3870	3.1777	2.9786	-2.19	2.15
102	3.2905	3.0853	2.8903	-2.22	2.18
103	3.1971	2.9960	2.8050	-2.25	2.21
104	3.1068	2.9096	2.7226	-2.28	2.24
105	3.0194	2.8262	2.6429	-2.32	2.27
R50=17.6KΩ ± 3%					
B0/100=3,970K ± 2%					

NOTE CONCERNING PROTECTION OF ENVIRONMENT



This product must not be disposed of via normal household waste after its service life, but must be taken to a collection station for the recycling of electrical and electronic devices. The symbol on the product, the operating instructions or the packaging indicate such disposal procedures. The materials are recyclable in accordance with their respective symbols. By means of re-use, material recycling or any other form of recycling old appliances you are making an important contribution to the protection of our environment. Please ask your local council where your nearest disposal station is located.

INFORMATION CONCERNING USED REFRIGERANT MEDIUM

This unit is containing fluorinated gases included in the Kyoto protocol.
The maintenance and the liquidation must be carried out by qualified personnel.

Type of refrigerant: R290
The quantity of the refrigerant: Please see the unit label.
The value GWP: 3 (1 kg R290 = 0,003 t CO_2 eq)
GWP = Global Warming Potential

 Appliance filled with flammable gas R290.

In case of quality problem or other please contact your local supplier or authorized service center.
Emergency number: 112

PRODUCER

SINCLAIR CORPORATION Ltd.
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www.sinclair-world.com

This product was manufactured in China (Made in China).

REPRESENTATIVE

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CE

NOTES


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