

 Air-to-water Heat Pump Monobloc Versati 

Test Operation & Troubleshooting & Maintenance

CONTENTS

1 Trial Run	1
1.1 Check for Wiring.....	1
1.2 Check for the Water System	1
1.3 Check for the Communication System.....	1
1.4 Trial Run.....	1
2 Error Code List.....	1
3 Flow Chart Of Troubleshooting	3
3.1 Comp High-pressure Protection E1	3
3.2 Comp Low- pressure Protection E3	4
3.3 Comp Discharge Temp Protection E4	4
3.4 Overload Protection of Compressor or Driver Error	5
3.5 DC Fan Error EF	5
3.6 Temperature Sensor Error.....	6
3.7 Communication Malfunction E6	6
3.8 Capacity Switch Error (Code:"C5").....	7
4 Diagnosis of Driving.....	7
4.1 Diagnosis Flowchart of Driving of Single-phase Unit and Three-phase Unit.....	7
5 Daily Maintenance and Repair	11
5.1 Daily Maintenance.....	11
5.2 Troubleshooting.....	12
5.3 Repair.....	12

1 Trial Run

1.1 Check for Wiring

WARNING!

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.

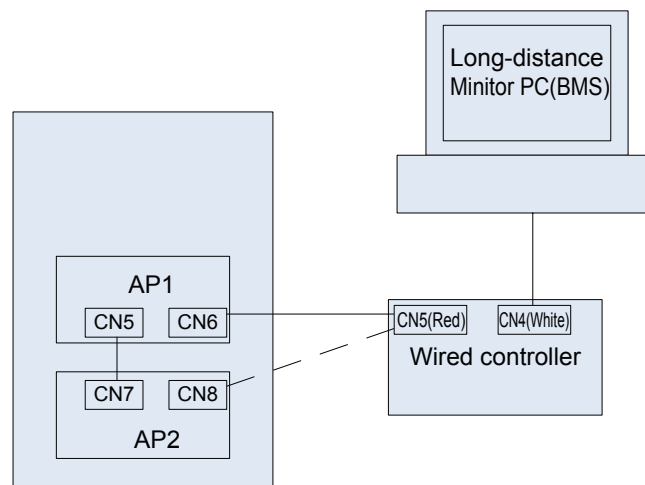
- ◆ Are sizes of connection lines and the air switch proper?
- ◆ Does wiring comply with relative standards and electric codes?
- ◆ Is there any incorrect wiring?
- ◆ Does each contact work properly?
- ◆ Is the power supply and insulation proper?
- ◆ Are initial set points of control and protective elements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

1.2 Check for the Water System

- ◆ Are water inlet and outlet directions correct?
- ◆ Is the water piping cleaned? Are there foreign matters at the pipe joints? Is the water quality satisfied?
- ◆ Is insulation of water pipes in good condition?
- ◆ Does exhaust valve of the water system work properly?

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 GREE sales agent.

2 Error Code List

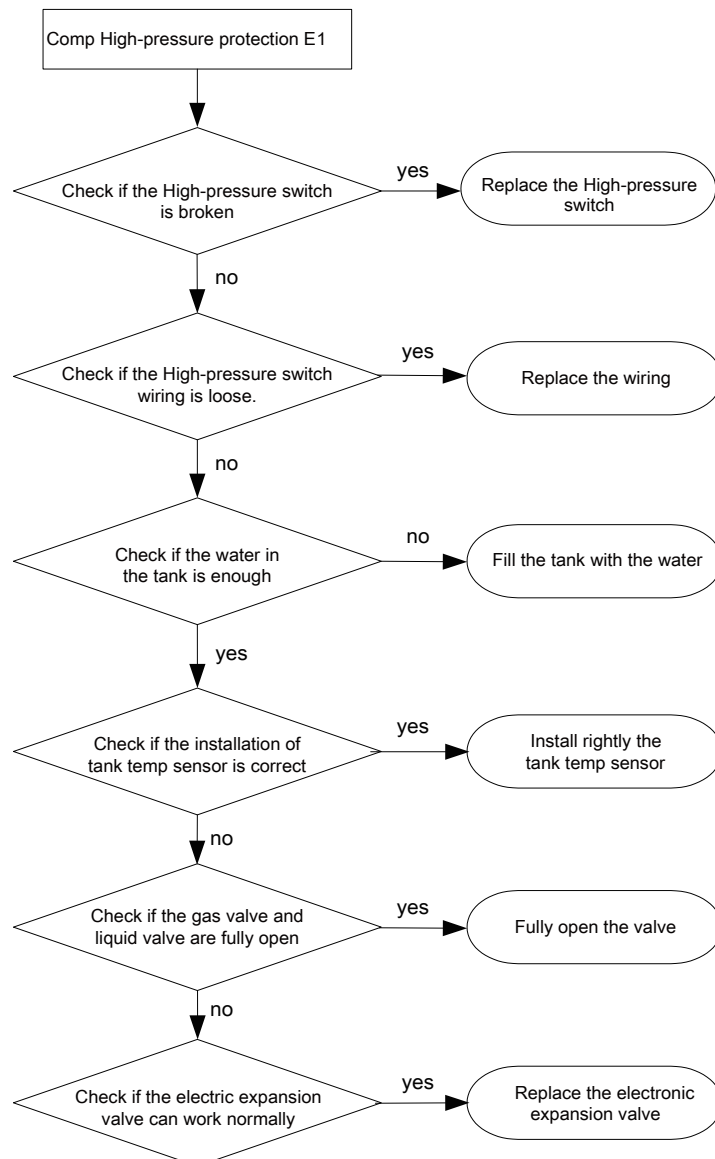
No.	Full Name	Displayed Name	Error Code
1	Ambient temperature sensor error	Ambient sensor	F4
2	Defrost temperature sensor error	Defro. sensor	d6
3	Discharge temperature sensor error	Disch. sensor	F7
4	Suction temperature sensor error	Suction sensor	F5
5	Outdoor fan error	Outdoor fan	EF
6	Compressor internal overload protection	Comp. overload	H3

7	High pressure protection	High pressure	E1
8	Low pressure protection	Low pressure	E3
9	High discharge protection	Hi-discharge	E4
10	Refrigerant loss protection	Refri-loss	P2
11	Heat pump-water pump protection	HP-pump	E0
12	Solar kit-water pump protection	SL-pump	EL
13	Swimming pool-water pump protection	Swimming-pump	
14	Incorrect capacity DIP switch setting	Capacity DIP	c5
15	Communication error between indoor and outdoor unit	ODU-IDU Com.	E6
16	Drive communication error	Drive com.	
17	High pressure sensor error	HI-pre. sens.	Fc
18	Enthalpy-enhancing sensor error	En. senser	F8
19	Low pressure sensor error	LOW-pre. Sens.	dL
20	Heat exchanger-leaving water temperature sensor error	Temp-HELW	F9
21	Auxiliary heater-leaving water temperature sensor error	Temp-AHLW	dH
22	Heat exchanger-entering water temperature sensor error	Temp-HEEW	
23	Water tank water temperature sensor 1 error	Tank sens. 1	FE
24	Water tank water temperature sensor 2 error	Tank sens. 2	
25	Solar kit-entering water temp sensor	T-SL water out	
26	Solar kit-leaving water temp sensor	T-SL water in	FH
27	Solar kit- temp sensor	T-Solar pannel	FF
28	Swimming pool-entering water temp sensor	T-Swimming in	
29	Swimming pool-leaving water temp sensor	T-Swimming out	
30	Swimming pool-water temp sensor	T-Swimming	
31	Remote room sensor 1	T-Remote Air1	F3
32	Remote room sensor 2	T-Remote Air2	
33	Heat pump-water flow switch	HP-Water SW	Ec
34	Solar kit-water flow switch	SL-Water SW	F2
35	Swimming pool-water flow switch	SW-Water SW	F1
36	Welding protection of the auxiliary heater 1	Auxi. heater 1	EH
37	Welding protection of the auxiliary heater 2	Auxi. heater 2	EH
38	Welding protection of the water tank heater	Auxi. -WTH	EH
39	Under-voltage DC bus or voltage drop error	DC under-vol.	PL
40	Over-voltage DC bus	DC over-vol.	PH
41	AC current protection (input side)	AC curr. pro.	PA
42	IPM defective	IPM defective	H5
43	PFC defective	FPC defective	Hc
44	Start failure	Start failure	Lc
45	Phase loss	Phase loss	LD
46	Drive module resetting	Driver reset	P6
47	Compressor over-current	Com. over-cur.	P0
48	Overspeed	Overspeed	P5
49	Sensing circuit error or current sensor error	Current sen.	LF

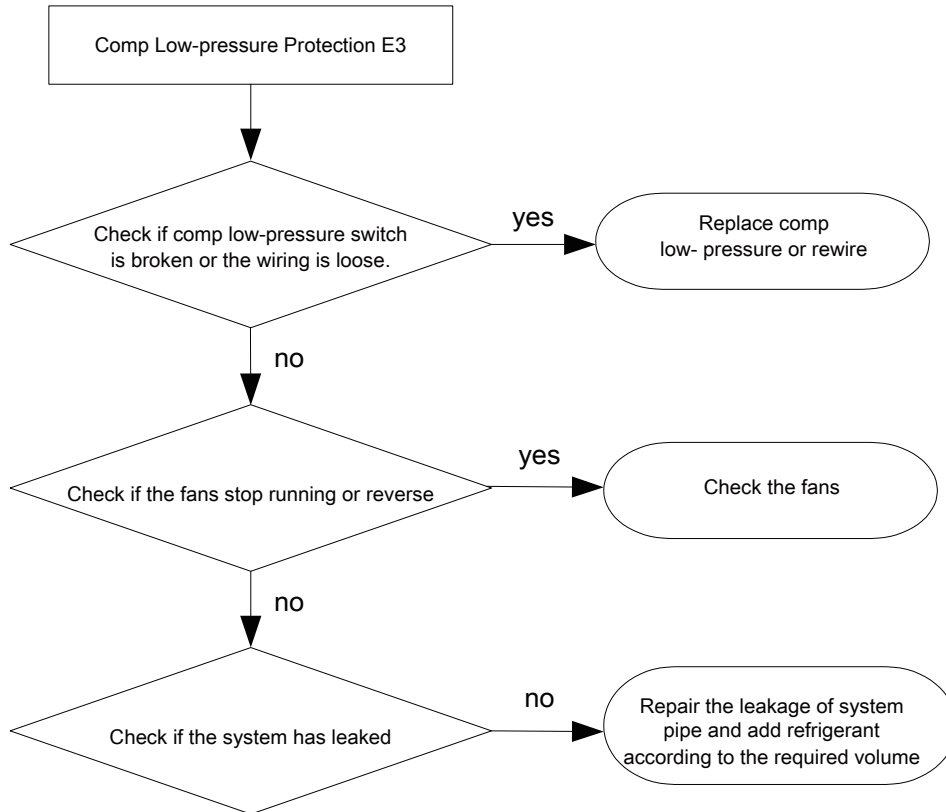
50	Desynchronizing	Desynchronize	Pc
51	Compressor stalling	Comp. stalling	H7
52	Communication error	drive-main com.	LE
53	Radiator or IPM or PFC module overtemperature	Overtemp.-mod.	P8
54	Radiator or IPM or PFC module temperature sensor error	T-mod. sensor	P7
55	Charging circuit error	Charge circuit	Pu
56	Incorrect AC voltage input	AC voltage	PP
57	Drive board temperature sensor error	Temp-driver	PF
58	AC contactor protection or input zero crossing error	AC contactor	P9
59	Temperature drift protection	Temp. drift	PE
60	Current sensor connection protection (current sensor not connected to phase U/V)	Sensor con.	PD
61	Communication error to the outdoor unit	ODU Com.	E6
62	Communication error to the indoor unit	IDU Com.	E6
63	Communication error to the drive	Driver Com.	E6
64	Solar kit-superheating	Solarsuperheat	F6

3 Flow Chart Of Troubleshooting

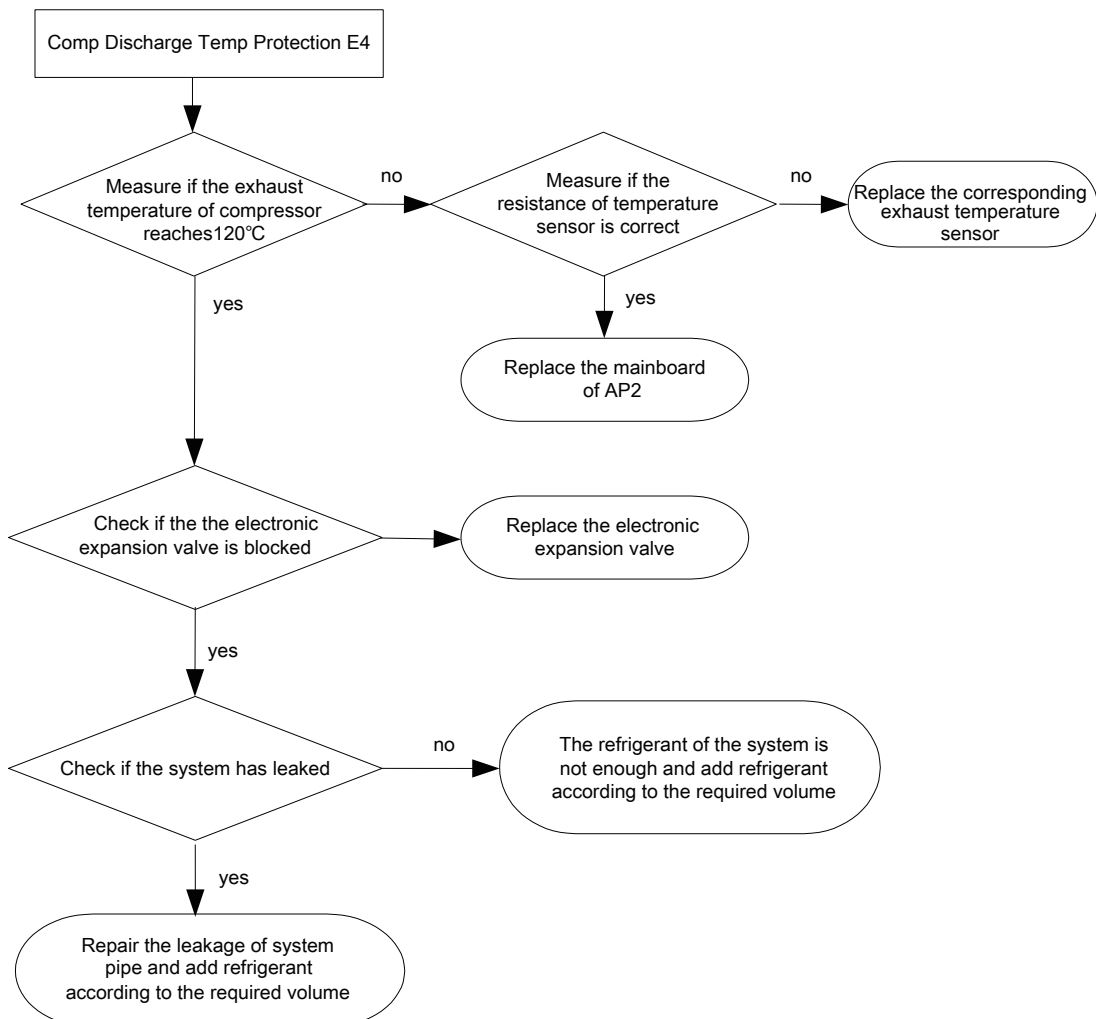
3.1 Comp High-pressure Protection E1



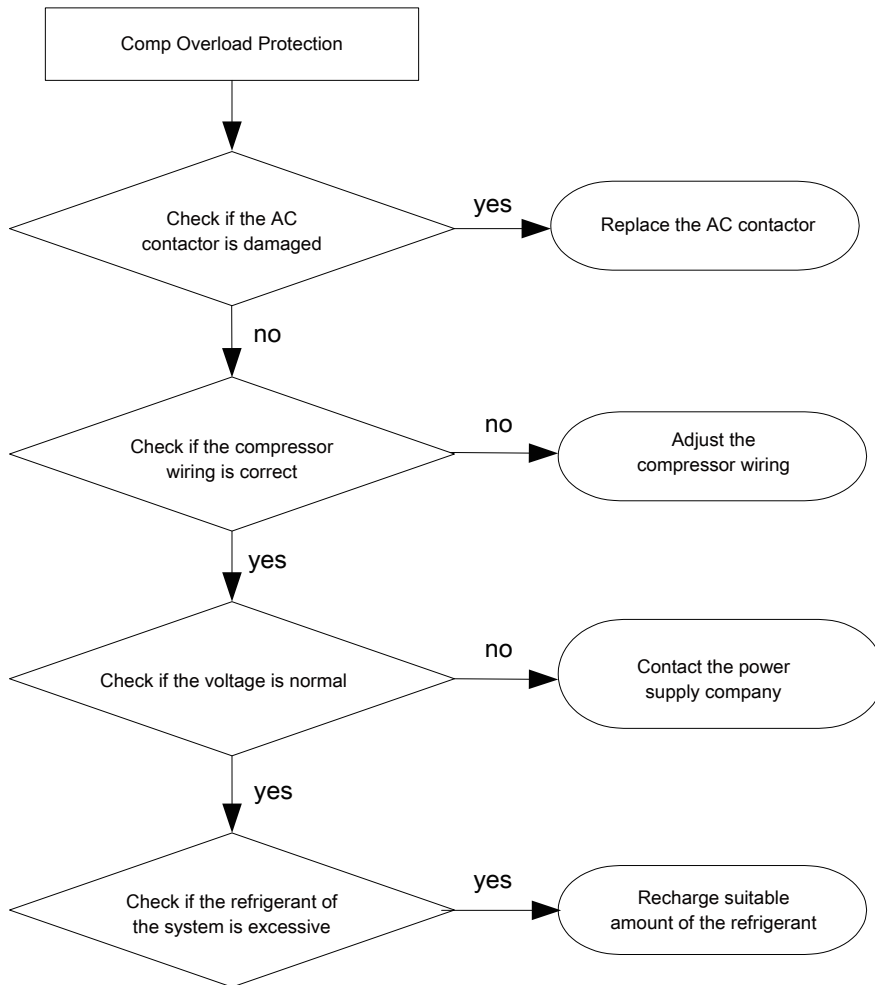
3.2 Comp Low-pressure Protection E3



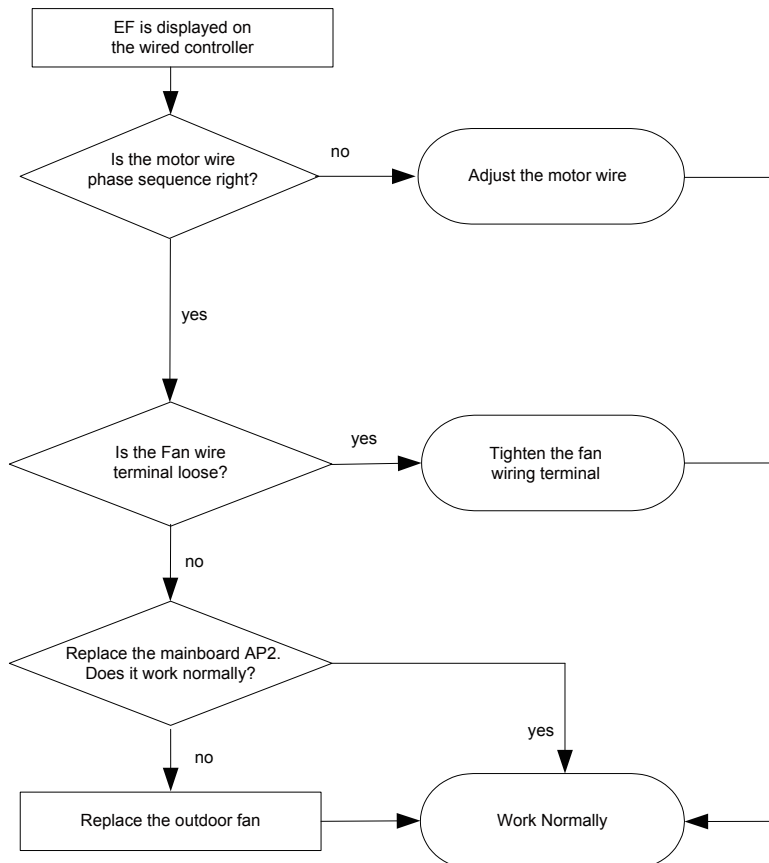
3.3 Comp Discharge Temp Protection E4



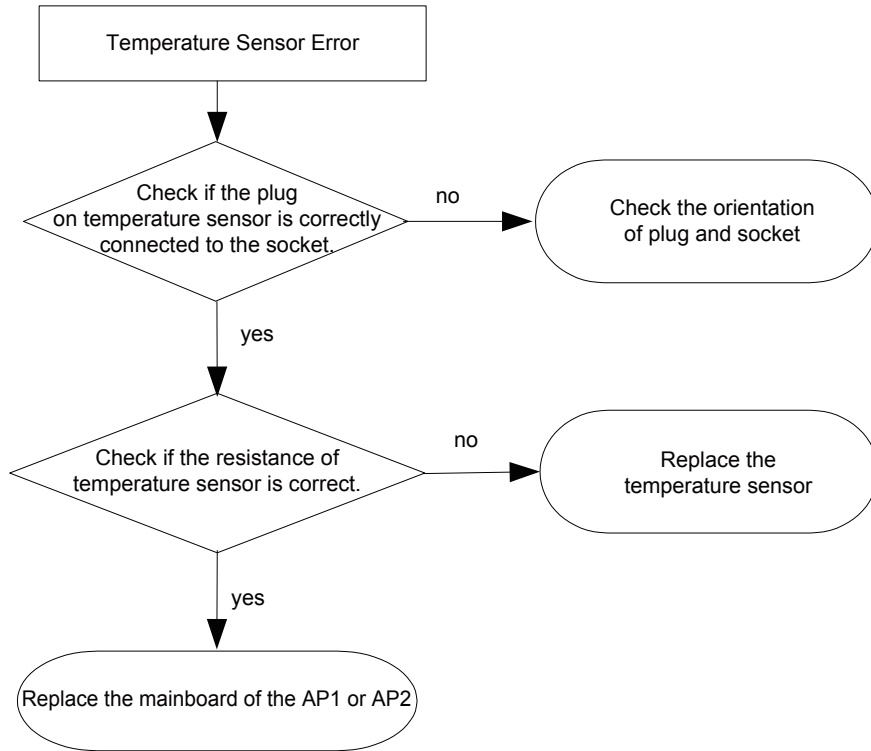
3.4 Overload Protection of Compressor or Driver Error



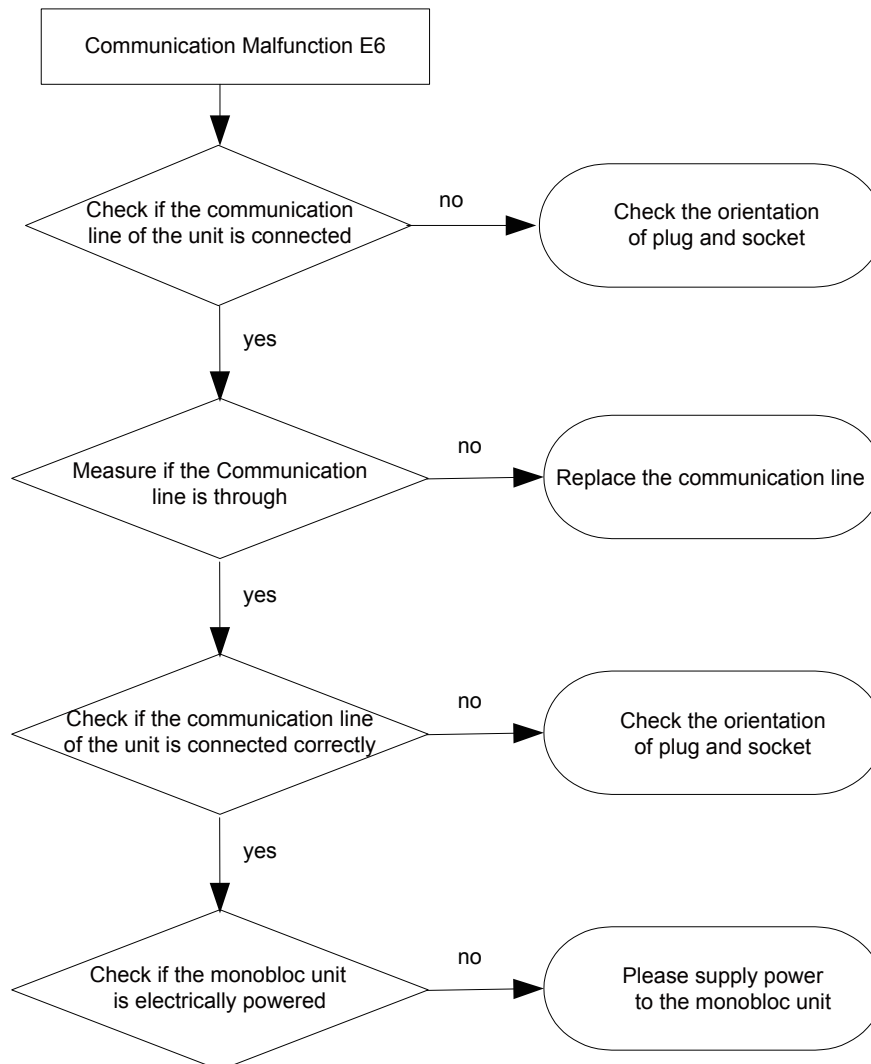
3.5 DC Fan Error EF



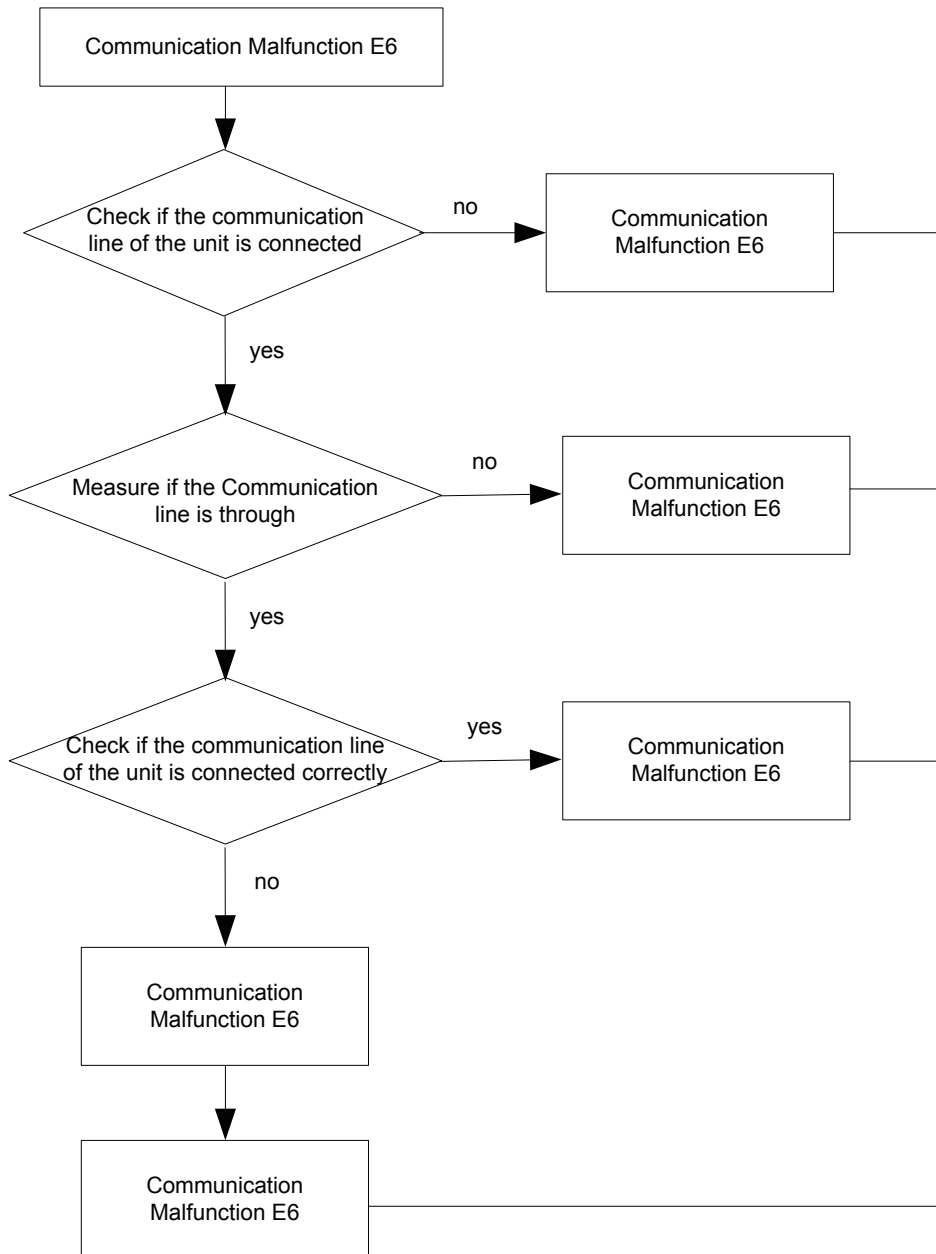
3.6 Temperature Sensor Error



3.7 Communication Malfunction E6



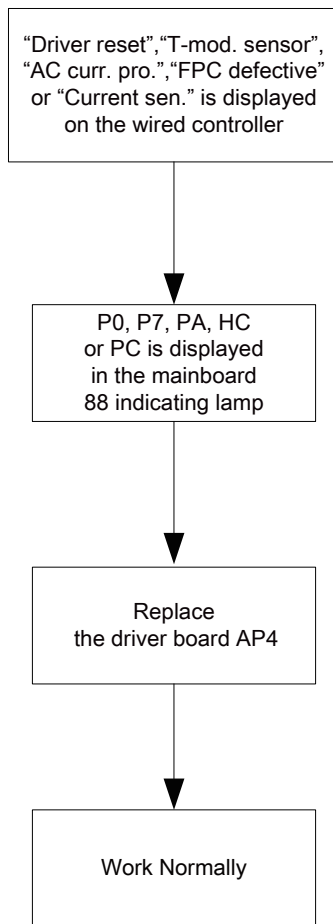
3.8 Capacity Switch Error (Code:"C5")



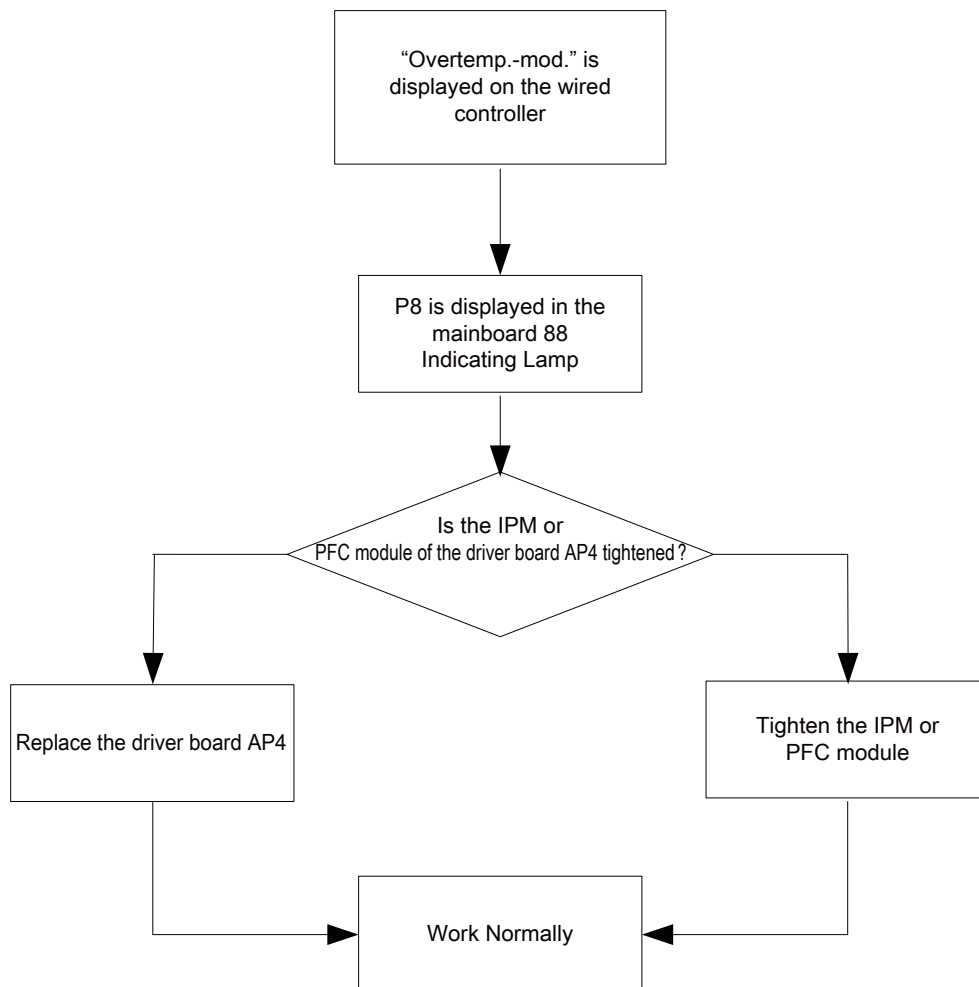
4 Diagnosis of Driving

4.1 Diagnosis Flowchart of Driving of Single-phase Unit and Three-phase Unit

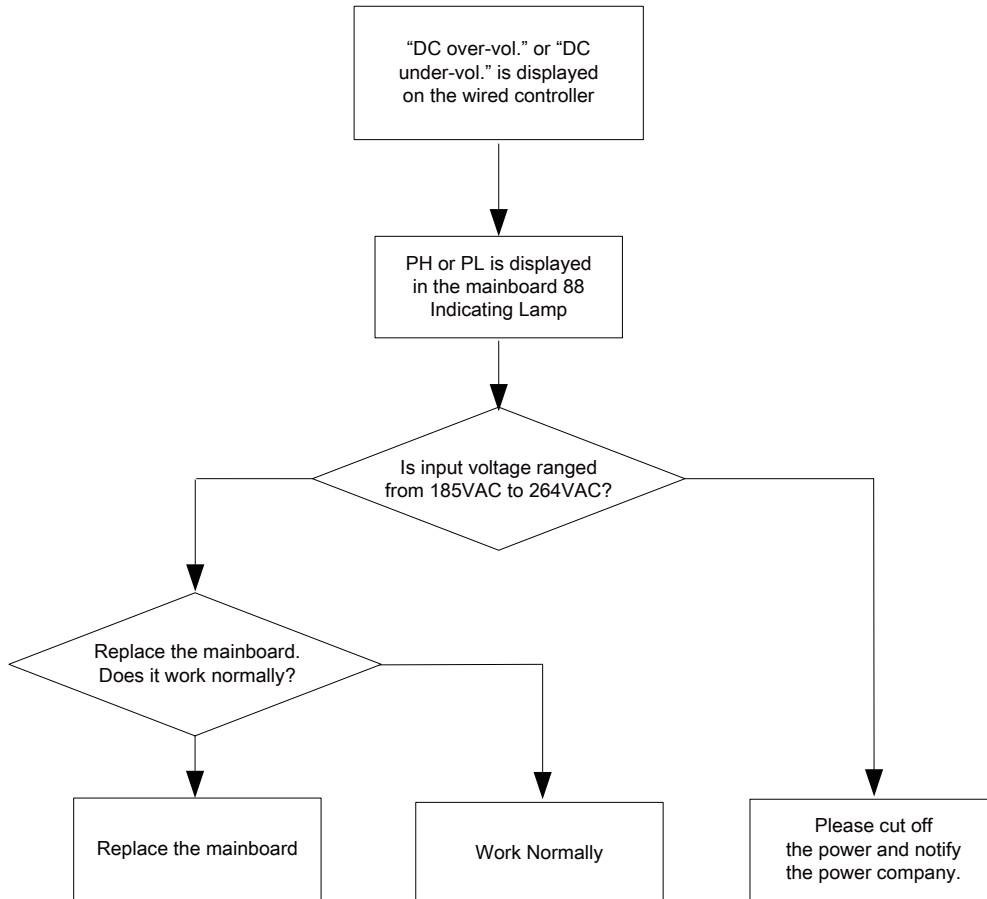
4.1.1 Drive Module Reset(Code:"P0") ; IPM or PFC Temperature Sensor Error(Code:"P7") ; AC Current Protection (Input Side)(Code:"PA"); Current Sense Circuit Error(code:"PC"); PFC Protection(Code:"HC")



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

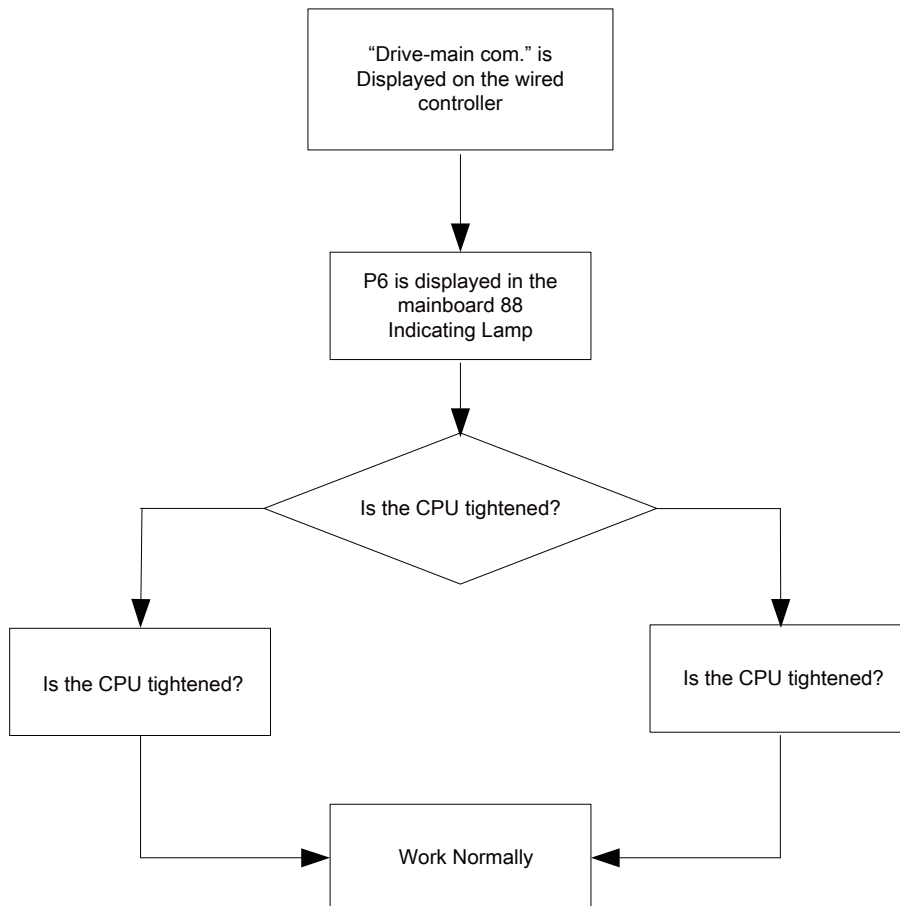


4.1.3 DC Busbar Over-voltage Protection(Code:"PH") ; DC Busbar Under-voltage Protection(Code:"PL")

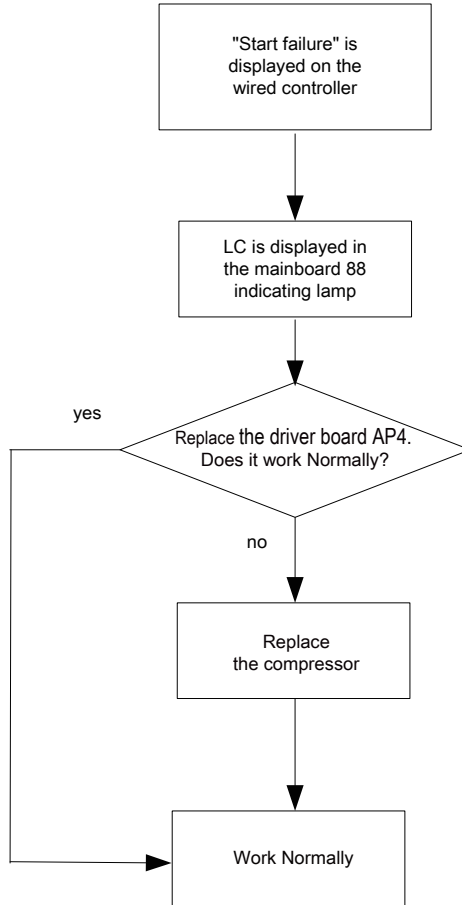


Note: three-phase input voltage is in the range from 320VAC to 475VAC.

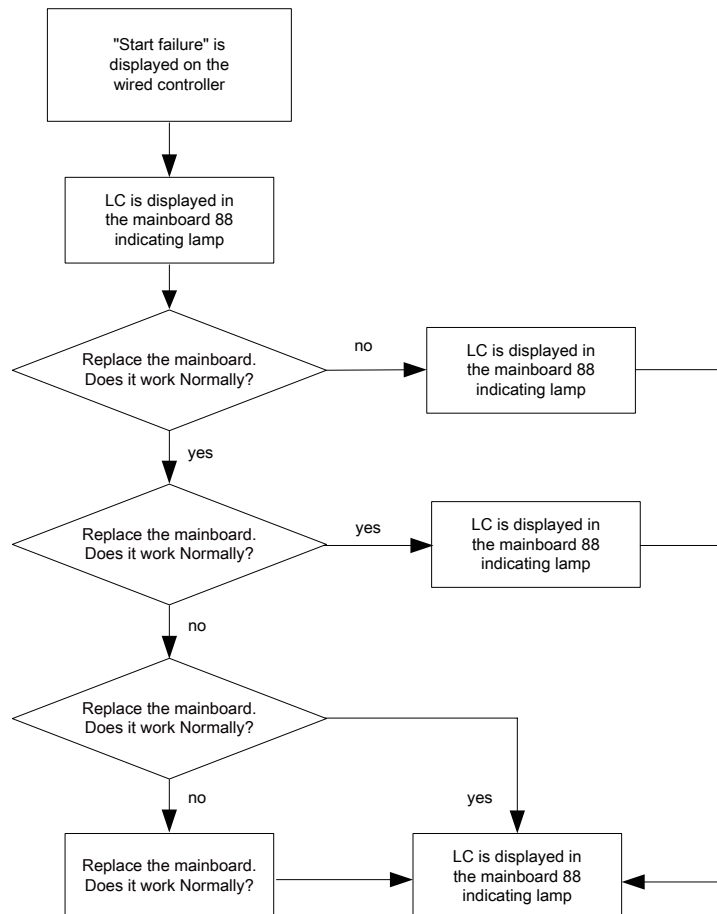
4.1.4 Drive-to-main-control Communication Error(Code:"P6")



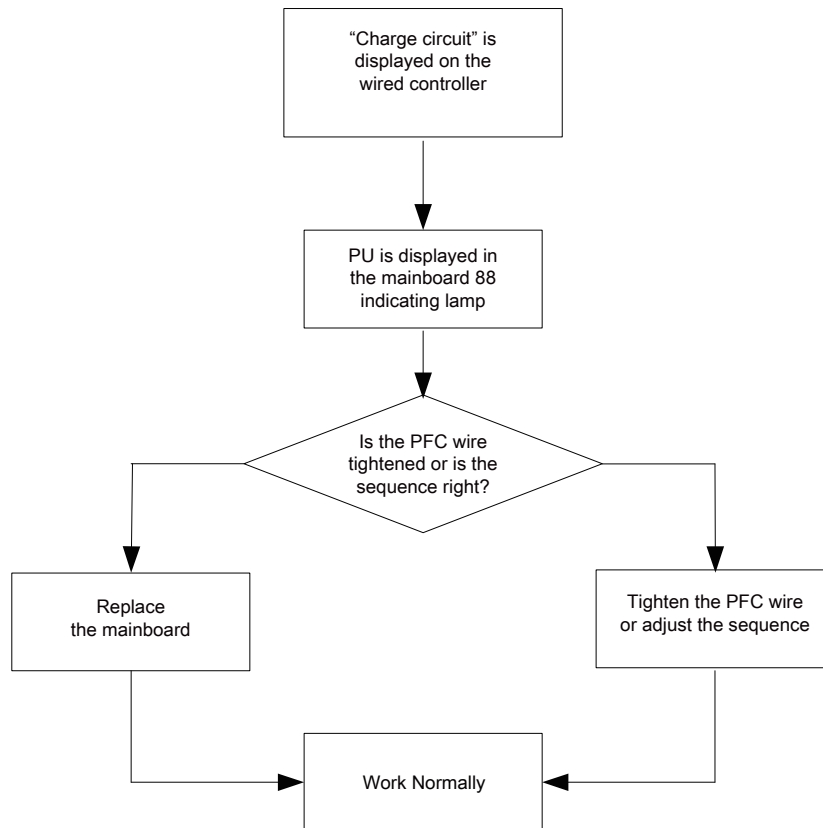
4.1.5 Compressor Startup Failure(code:"LC")



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



4.1.7 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 had been set before outgoing, so the user can never adjust or remove them.

For the first startup of the unit or next startup of unit after long-period stop (above 1 day)by cutting off the power, please electrify the unit in advance to preheat the unit for more than 8hr

Never put sundries on the unit and accessories. Keep dry, clean and ventilated around the unit.

Remove the dust accumulated on the condenser fin timely to ensure performance of unit and to avoid stop of unit for protection.

In order to avoid protection or damage of unit caused by blockage of water system, clean the filter in water system periodically and frequently check water replenishing device.

In order to ensure anti-freezing protection, never cut off the power if ambient temp. is below zero in winter.

In order to avoid frost crack of the unit, water in the unit and pipeline system not used for a long period should be drained. In addition, open the end cap of water tank for drainage.

Never frequently make the unit on/off and close manual valve of water system during operation of unit by users.

Ensure frequently check the working condition of each part to see if there is oil stain at pipeline joint and charge valve to avoid leakage of refrigerant.

If malfunction of the unit is out of control of users, please timely contact with authorized service center of company.

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

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


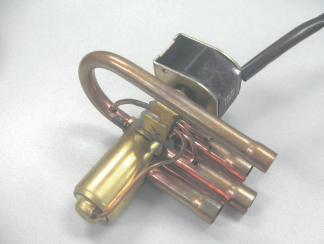



5.2 Troubleshooting

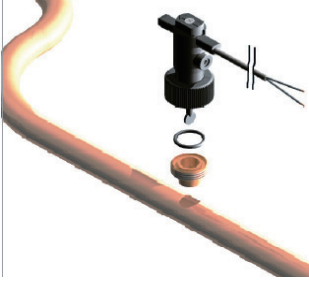
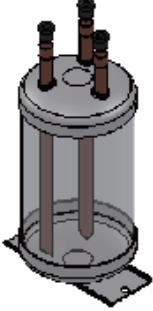


Malfunctions	Reasons	Troubleshooting
Compressor does not start up	<ul style="list-style-type: none"> ① Power supply has problem. ② Connection wire is loose. ③ Malfunction of mainboard. ④ Malfunction of compressor. 	<ul style="list-style-type: none"> ① Phase sequence is reverse. ② Check out and re-fix.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

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.
	Electrostatic 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.

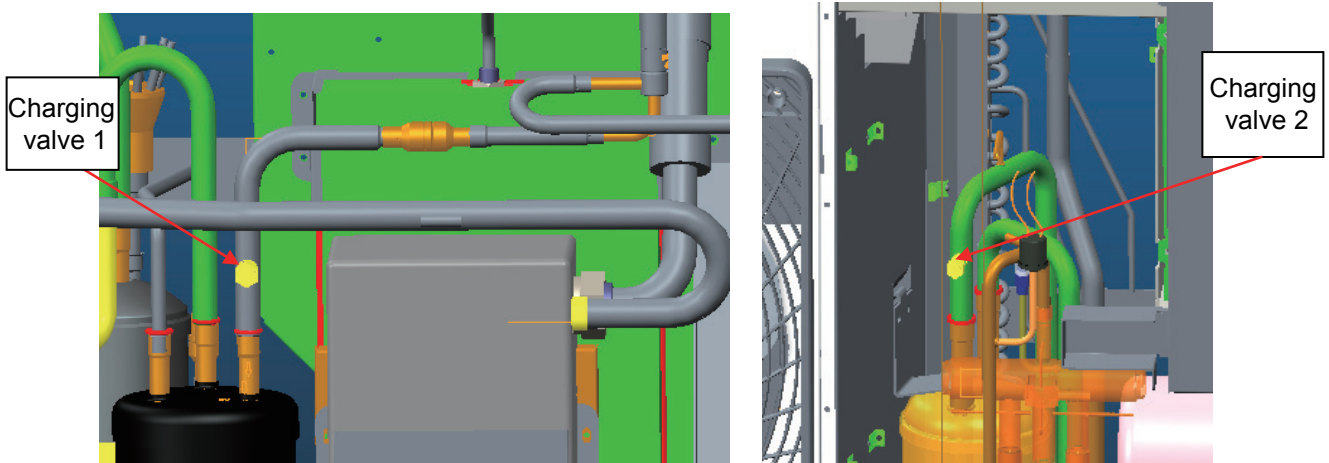
	<p>Vapor Liquid Separator</p>	<p>It is installed at the side of the suction line, and used to prevent liquid refrigerant entering the compressor, which if not avoided will lead to wet compression or even liquid slugging.</p>
	<p>4-way Valve</p>	<p>It is used the switch flow direction of refrigerant and then realize switchover between cooling and heating. It also can be used for defrosting through the counterflow.</p>
	<p>Plate Heat Exchanger</p>	<p>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.</p>
	<p>Water Pump</p>	<p>It is the power equipment for water circulation.</p>
	<p>Expansion Tank</p>	<p>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.</p>

	<p>Flow Switch</p>	<p>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.</p>
	<p>Three-pipe Liquid Receiver</p>	<p>Three pipes are connected to two electrostatic expansion valves and the enthalpy-adding port of the compressor respectively. It is mainly used to further reduce pressure of the refrigerant which has gone through the first-stage throttling and then vaporize some refrigerant. The vaporized refrigerant will be sucked in the compressor again so as to enhance the heating performance of the system.</p>
	<p>Safety Valve</p>	<p>It is used to prevent the pressure of circulation water from increasing unusually. When the pressure is larger than the set point (0.6MPa), this valve will open to relieve water pressure.</p>
	<p>Exhaust Valve</p>	<p>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.</p>

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.

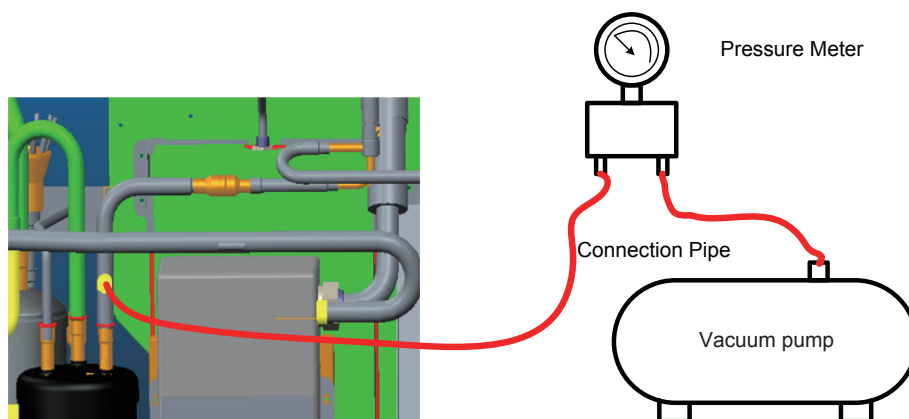
- (1) Discharging: remove metal sheets of the outer casing, connect a hose to the charging valve and then discharge refrigerant.



Notes

- ① Discharge is allowed unless the unit has been stopped. (Cut off the power and repower it 1 minutes later)
- ② Protective measures should be taken during discharging to avoid frost bites.
- ③ When discharging is finished, if vacuuming cannot be done immediately, remove the hose to avoid air or foreign matters entering the unit.

(2) Vacuuming: When discharging is finished, use hoses to connect the charging valve, manometer and vacuum pump to vacuum the unit.



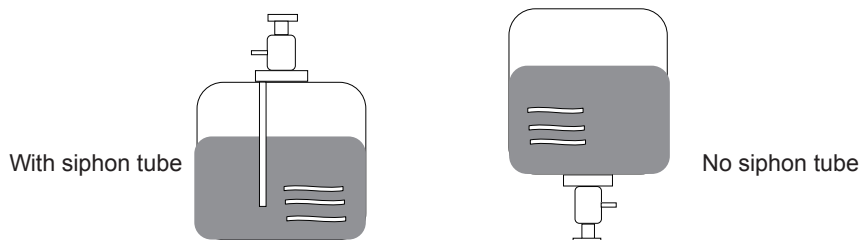
Note: when vacuuming is finished, pressure inside the unit should be kept lower than 80Pa for at least 30 minutes to make sure there is no leak. Either charging valve 1 or charging valve 2 can be used for vacuuming.

(3) Charging: when vacuuming is finished and it is certain that there is no leak, charging can be done.

- ◆ Be sure to charge the specified amount of refrigerant in liquid state.

Since this refrigerant is a mixed refrigerant, adding it in gas form may cause the refrigerant composition to change, preventing normal operation.

- ◆ Before charging, check whether the refrigerant cylinder is equipped with a siphon tube or not.



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