



Technical & Service Manual

T1 Modular MINI ARV

ARV-H252/SR1DCMA

ARV-H280/SR1DCMA

ARV-H335/SR1DCMA

V1

2023.11.22

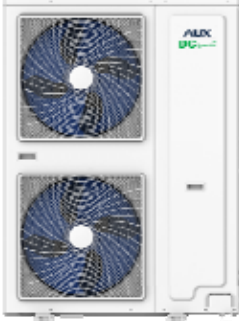
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Part1 General Information

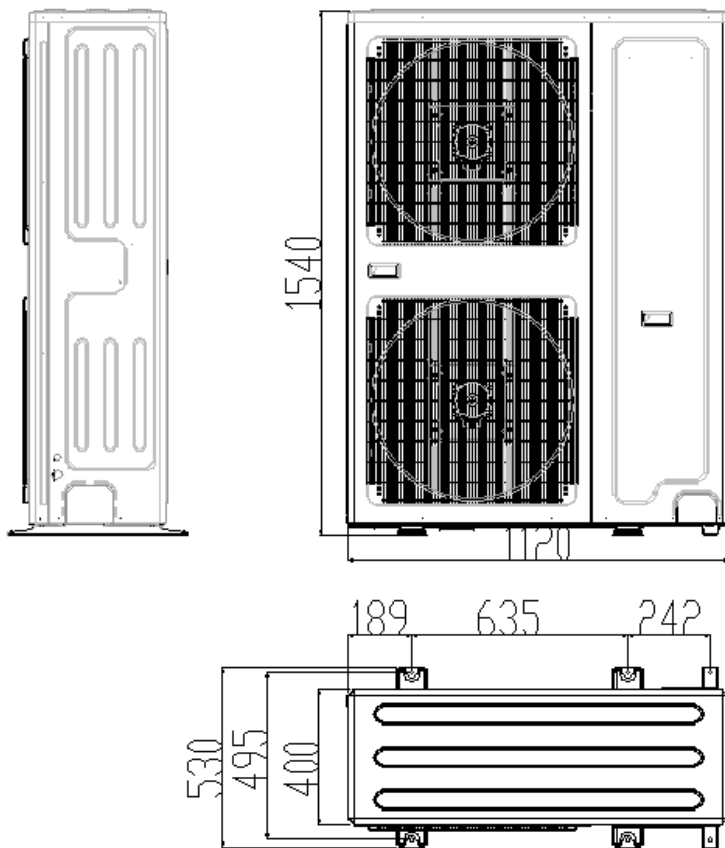
1. Product lineup

1.1 Outdoor unit

Appearance	Capacity (cooling / heating)	Power	Model
	25.2/27 kW	380-415V 3N ~ 50HZ	ARV-H252/SR1DCMA
	28.5/31.5 kW		ARV-H280/SR1DCMA
	33.5/37.5 kW		ARV-H335/SR1DCMA

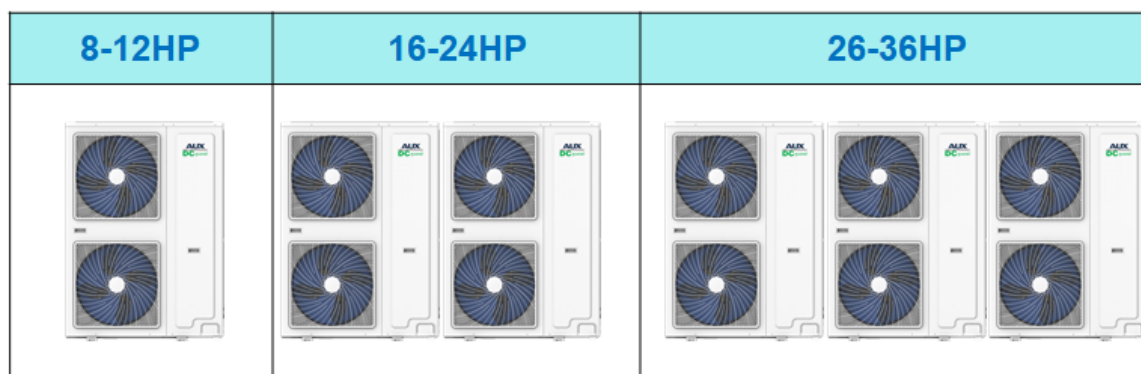
1.2 Dimension

ARV-H252/SR1DCMA ARV-H280/SR1DCMA ARV-H335/SR1DCMA



1.3 Combination

kW	HP	8HP	10HP	12HP
25.2	8	•		
28	10		•	
33.5	12			•
50.4	16	••		
53.2	18	•	•	
56	20		••	
61.5	22		•	•
67	24			••
78.4	26	••	•	
81.2	28	•	••	
84	30		•••	
89.5	32		••	•
95	34		•	••
100.5	36			•••



1.4 Connection ratio

$$\frac{\sum \text{Total capacity of indoor units (one system)}}{\sum \text{Total capacity of outdoor units (one system)}} = \text{Connection ratio}$$

Connection ratio is 50~130%

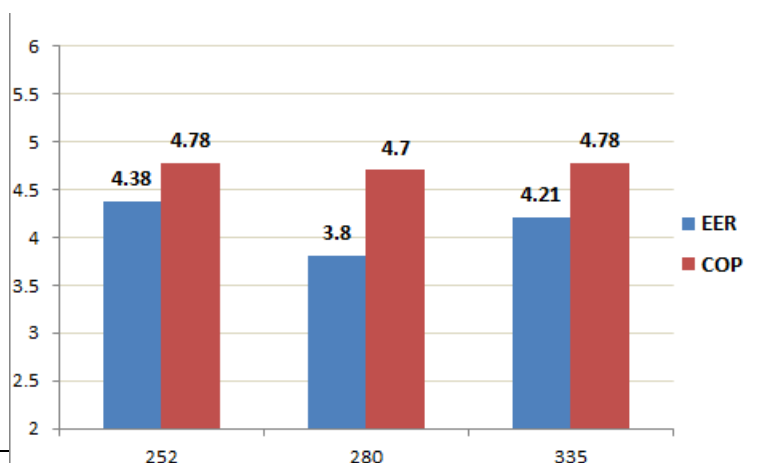
⚠ Note

- 1) 50%~130% is standard for factory setting.
- 2) When Fresh air processor units are connected, the connection ratio must be within 50% to 100%.
- 3) When Fresh air processor units are connected, the total indoor unit's capacity must not exceed 30% of the outdoor unit.

2. Product features and benefits

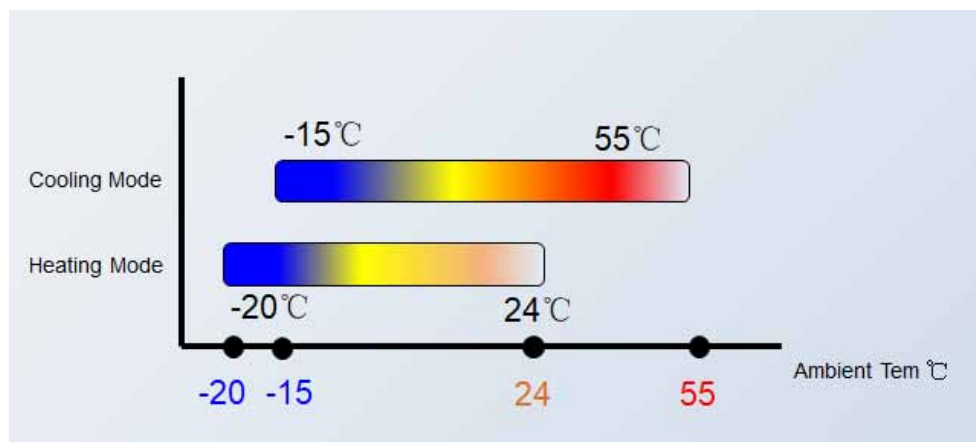
2.1 High EER/COP energy saving

High EER/COP means the same capacity but the lower power input, Lower power consumption, lower cost.



2.2 Wide operation range

Operates stably under extreme conditions ranging from – 15 to 55

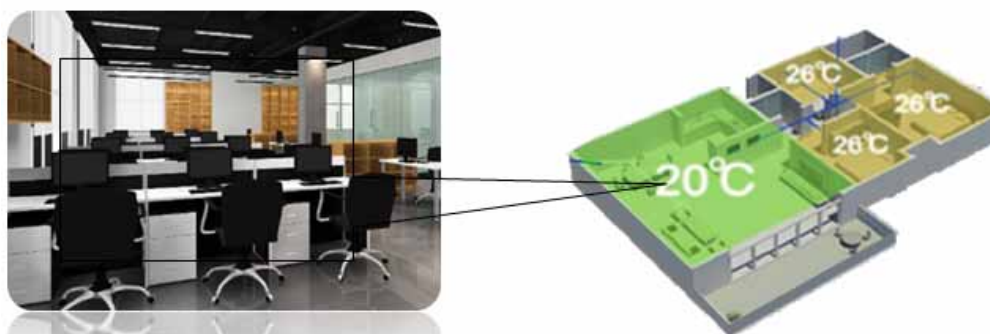


2.3 Economic locking

Through outdoor PCB switch setting. The setting temperature will be locked, and all indoor units will run as energy saving mode state.

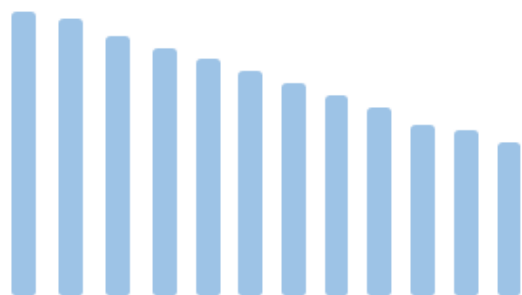
Lowest cooling set temperature will keep in **26**

Highest heating set temperature keep **20**



2.4 Silent Mode-ODU

12 steps silent mode provide more comfortable environment to match the customer needs



12 steps silent modes
(6steps daytime +6 night mode)

2.5 Seven-levels power limit

Module Mini ARV has the function of energy saving and power limiting (40% - 100% output power limit). The system optimizes the output based on changes in ambient temperature, improving the comprehensive operating energy efficiency of the unit



2.6 Refrigerant cooling

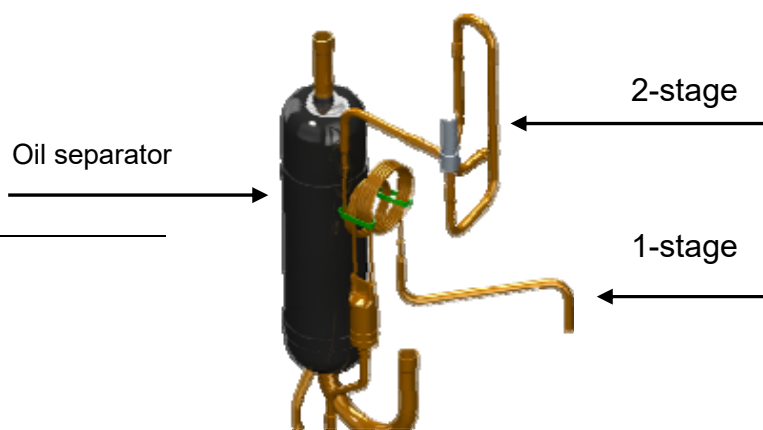
Resulted in reduce air flow resistance and ensures stability of PCB temperature.



2.7 Multiple -stage oil return

1-stage capillary oil return: Normal environment high efficiency and low consumption.

2-stage solenoid valve oil return: Poor environment Guarantee oil return, high efficiency and reliability.



2.8 Auxiliary heating belt

Auxiliary heating belt can increase compressor oil temperature in the winter, make sure oil not freeze to protect compressor



2.9 Intelligent defrosting

AUX intelligent defrosting technology, extend the heating operation and decrease the frequency of defrosting. Result in stable room temperature, offer comfort life

2.10 Diversification of installation

A various of indoor units can be connected together, 2~9 indoor units can be freely combined together in one systems. So Mini VRF is the best choose for some place which had 2 ~ 9 rooms.

2.11 Automatic address setting

After install indoor and outdoor unit , Power on the system , can set SW2 -2 to ON , means you had chosen the auto addressing function ,then the system will auto distribute the indoor address instead of manual setting , more convenient for commissioning .

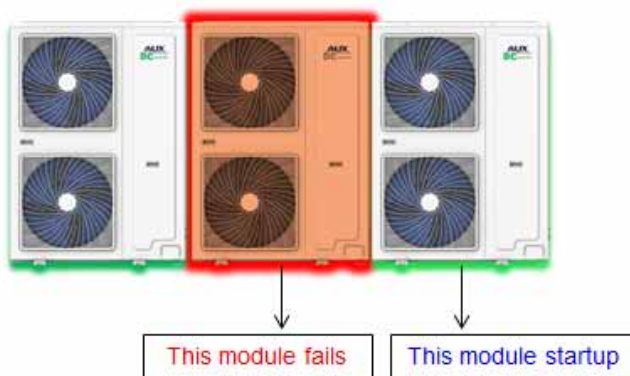
2.12 Automatic dust removal

The outdoor fan can rotate opposite direction to remove dust on heat exchanger to ensure the heat exchanger-performance



2.13 ODU emergency

Will shield all fault of abnormal ODU, the outdoor unit will work normally before after-sales maintenance (recommended to repair within 48h)



Part2 Outdoor Engineering Data

1. Specifications

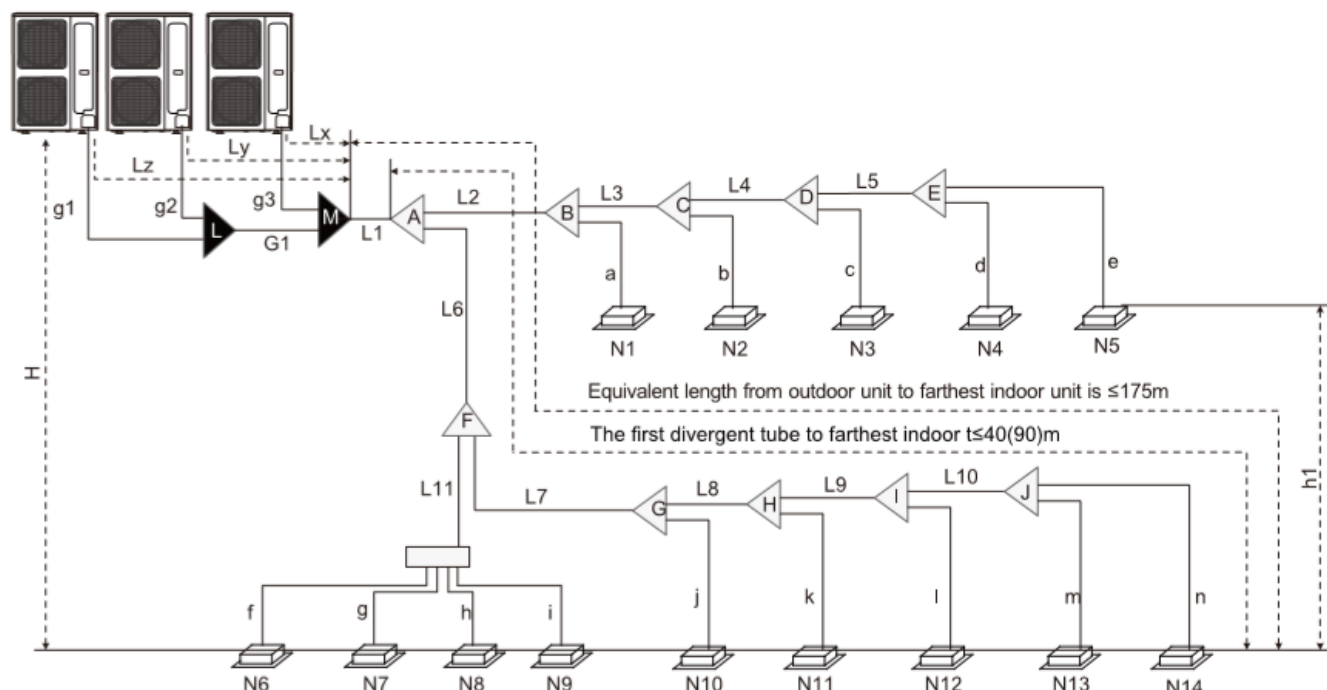
※ Please refer to EXCEL

2. Capacity table

ARV-H252/SR1DCMA、 ARV-H280/SR1DCMA、 ARV-H335/SR1DCMA

Please refer to a separate table

3. Long Piping Length



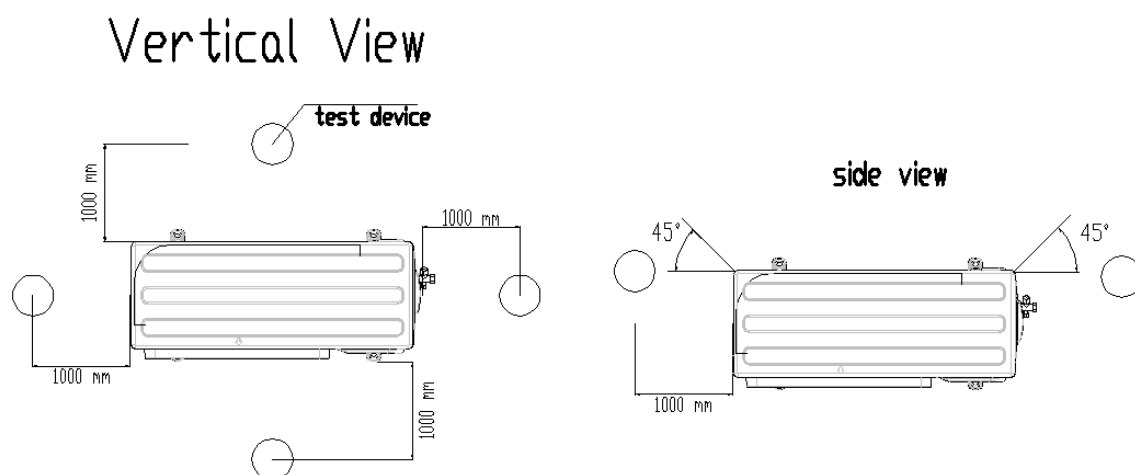
category		Allowed values	Piping example
Total piping length (total extension)		≤560m	$L1+L2+L3+L4+L5+L6+L7+L8+...+L11+a+b+c+d+e+f+g+h+i+...+m+n$
Length of outdoor unit to furthest indoor unit	Actual length	≤150m	$L1+L2+L3+L4+L5+e$
	Equivalent length	≤175m	$L1+L6+L7+L8+L9+L10+n$
The distance from the first indoor split tube to the farthest indoor unit		≤40m	$L2+L3+L4+L5+e$ $L6+L7+L8+L9+L10+n$
The longest piping length between the outer units		≤10m	Lx, Ly, Lz
The height difference between indoor unit and outdoor unit	The outdoor unit is on top	≤50m	H
	The outdoor unit is below	≤40m	
Indoor unit - height difference between indoor unit		<30m	h1

4. Sound level

1. The operating condition are assumed to be standard (JIS Condition).
2. These operating values were obtained in a dead room (conversion values).

Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of the particular room in which the equipment installed.

3. The result is the biggest one of four testing device.
4. Test height (Unit height + 1)/2m, horizontal distance: 1m.



Model	Sound (dB)
ARV-H252/SR1DCMA	57
ARV-H280/SR1DCMA	57
ARV-H335/SR1DCMA	58

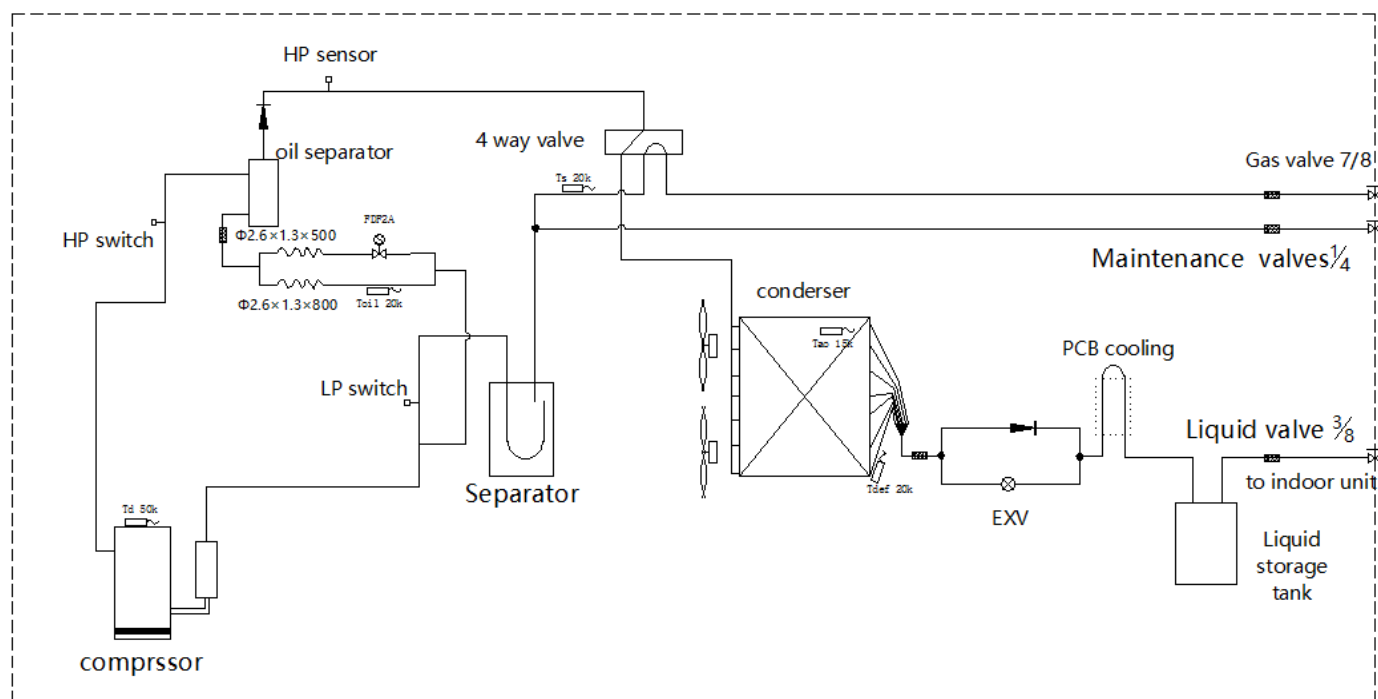
Note:

1. The operating condition is assumed to be standard (JIS Condition).
2. These operating values were obtained in a dead room (conversion values).
3. Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of the particular room in which the equipment installed.
4. The result is the biggest one of four testing device.
5. Test height (Unit height +1)/2m, horizontal distance: 1m.

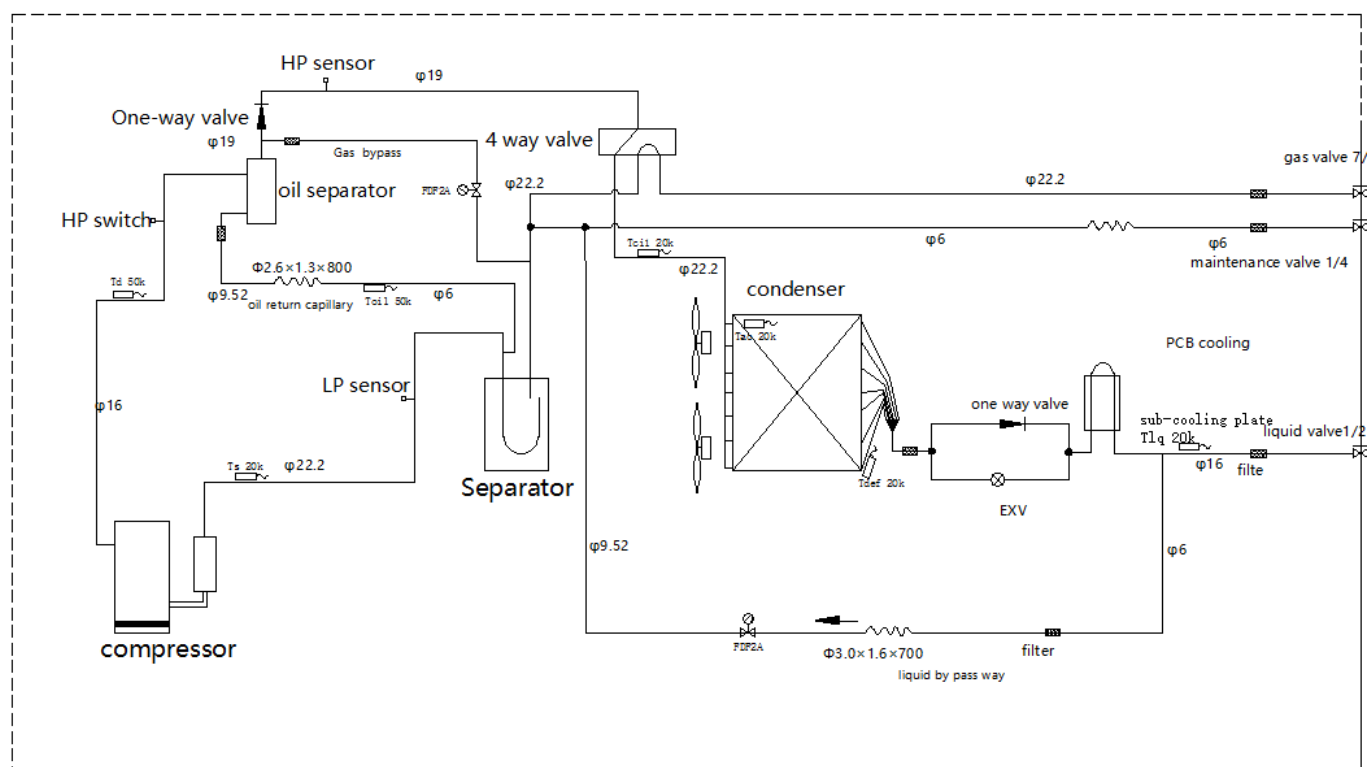
Part3 Refrigerant Circuit

1. Piping diagrams

ARV-H252/SR1DCMA、 ARV-H280/SR1DCMA



ARV-H335/SR1DCMA



Comp.	Component description	Comp.	Component description
Td	Exhaust temperature sensor	LGS	Gas-liquid separator
HPS	High pressure switch	Ts	Suction temperature sensor
OS	Oil separator	EXV	Electronic expansion valve

HP	High pressure sensor	Tdef	Defrost temperature sensor
SV2	Oil return valve	Tao	Outside environment temperature sensor
Tci	Oil temperature sensor	LPS	Low pressure switch

Part4 Installation

Please refer to the installation & operation manual

Part5 Commissioning

1. Preparatory work

1.1 Inspection and confirmation before commissioning

✧ Confirm that refrigeration piping and communication wire of indoor and outdoor units have been connected to the same refrigeration system in order to avoid unnecessary malfunctions.

✧ Confirm power voltage is within $\pm 10\%$ rated voltage.

✧ Confirm that the power wire and control wire are correctly connected, the power phase sequence of outdoor unit is corrected, and the outdoor unit can detect each indoor unit.

✧ Confirm wired controller is properly connected.

✧ Confirm all units have passed nitrogen pressure-keeping test for 24 hours.

✧ Confirm the system has been carried out vacuum drying and charged with refrigeration as required.

1.2 Preparation before start up

✧ Turn on power switches of outdoor unit in advance, and keep connected for a minimum of 8 hours to ensure refrigerant oil is sufficiently heated.

✧ Turn on all valves. If valves are not fully open unit may be damaged.

✧ All dial switches of indoor / outdoor units have been set according to the technical requirements.

1.3 Commissioning

Inspection list of trial run:

✧ Confirm the fan impeller is rotating according to its intended route and turns smoothly.

✧ Check for abnormal noise during operation of refrigerant system and compressor.

✧ Confirm drainage is smooth and its lift pump is operational.

✧ Confirm operating current is within the allowed range.

✧ Confirm each operating parameter is within the range permitted by the equipment.

Note: Separately test cooling mode and heating mode to judge the stability and reliability of the system.

1.4 Refrigerant leakage caution

This air conditioner adopts R410A as refrigerant, which is safe and noncombustible.

R410A critical thickness: 0.3kg/m³ (Critical thickness: the max thickness of Freon without any harm to person).

Calculate the critical thickness through following steps, and take necessary actions.

- 1) Calculate the refrigerant charge volume A, A= factory charge volume + additional charge volume
- 2) Calculate the indoor area volume (B) (as the minimum volume)
- 3) Calculate the refrigerant thickness, $A/B \leq \text{critical thickness } 0.3\text{kg/m}^3$.

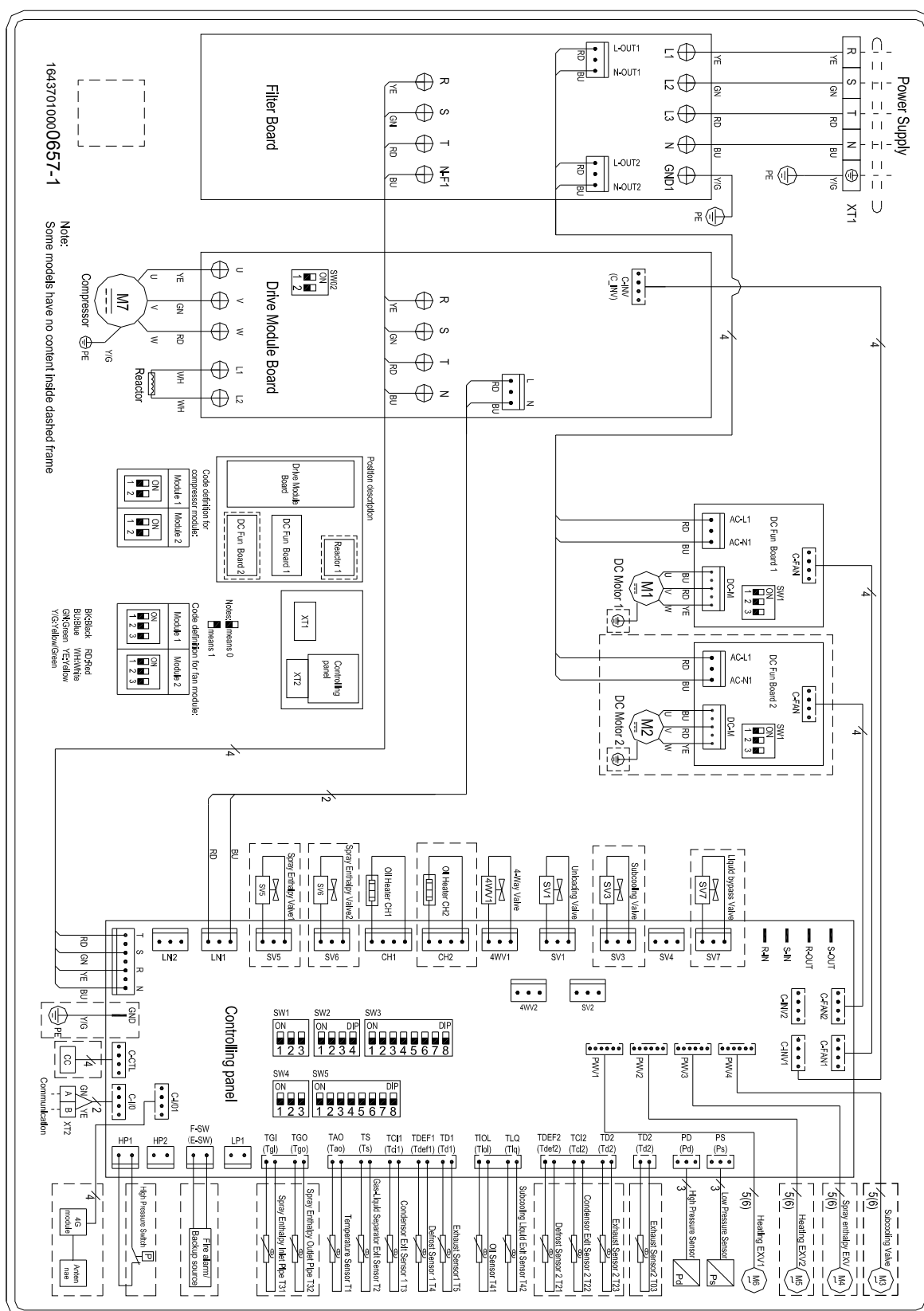
Note:

In winter, supply power 6 hours in advance for initial operation so that crankshaft case can be preheated in advance.

In winter, after main power supply is interrupted for 6 hours, conduct trial operation again only after 2.5 hours of power-on.

2. Electrical schematic diagram

ARV-H252/SR1DCMA、ARV-H280/SR1DCMA、ARV-H335/SR1DCMA



Code definition for 12HP series:

SW1:

External machine address selection

ON	Master(Default)
ON	Spare 1
ON	Spare 2
ON	Spare 3
ON	Spare
ON	Spare
ON	Spare

SW3:

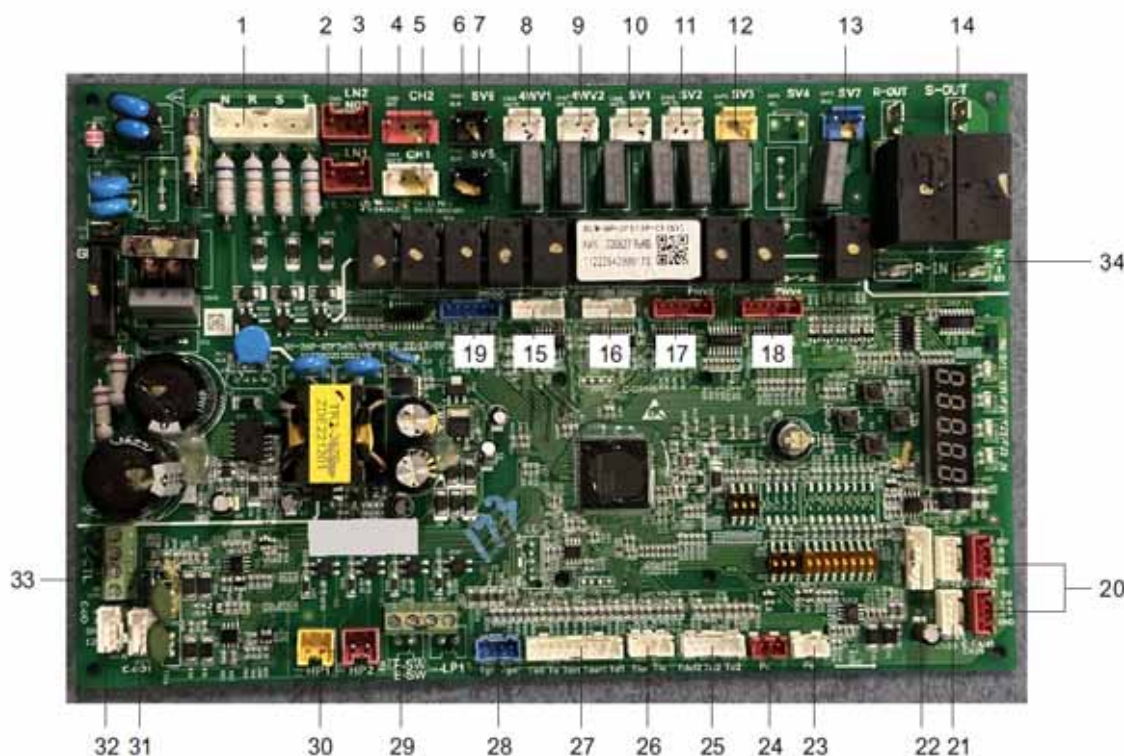
Capacity selection

ON	Invalid
ON	8HP/ 224
ON	9HP/ 252
ON	10HP/ 280
ON	12HP/ 335
ON	14HP/ 400
ON	14HP/ 450
ON	18HP/ 554
ON	20HP/ 560
ON	22HP/ 615
ON	24HP/ 670
ON	24HP/ 730
ON	28HP/ 785
ON	30HP/ 850
ON	32HP/ 900
ON	34HP/ 950
ON	34HP/ 1015
ON	38HP/ 1065
ON	40HP/ 1120
ON	42HP/ 1170
ON	45HP/ 1200
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare

3 Control PCB port

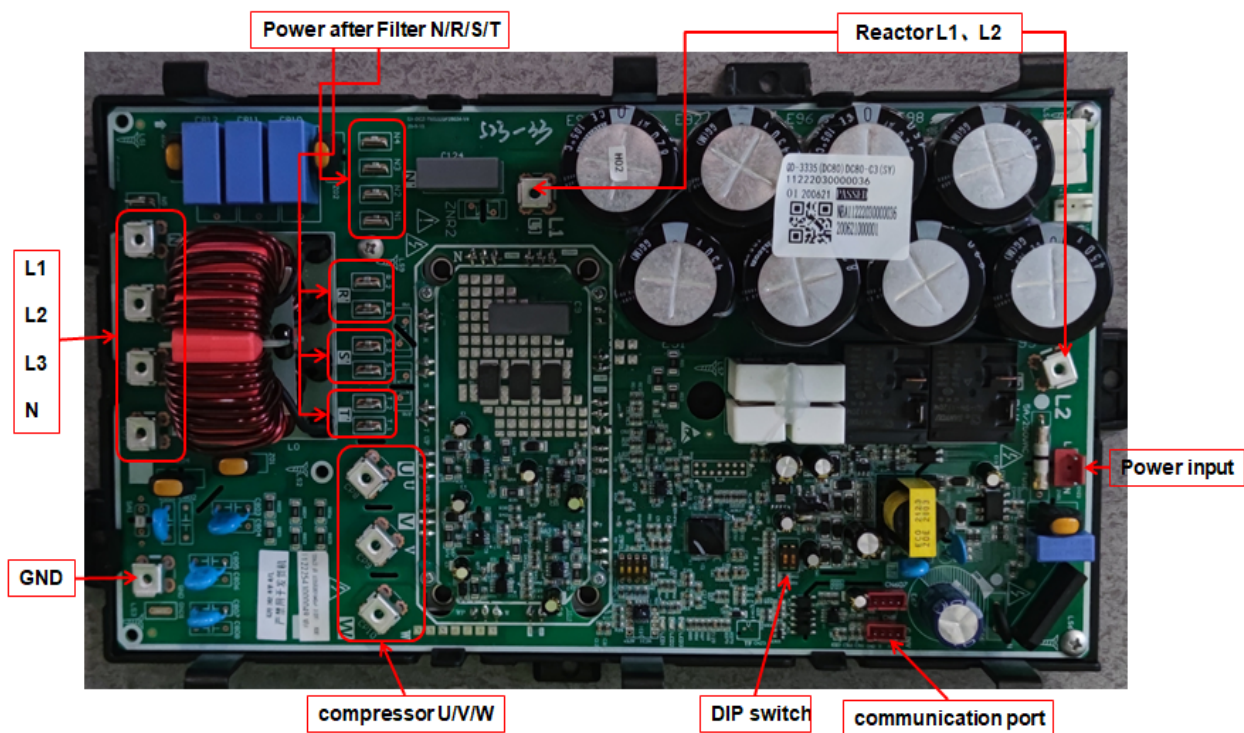
ARV-H252/SR1DCMA, ARV-H280/SR1DCMA, ARV-H335/SR1DCMA

- Main PCB

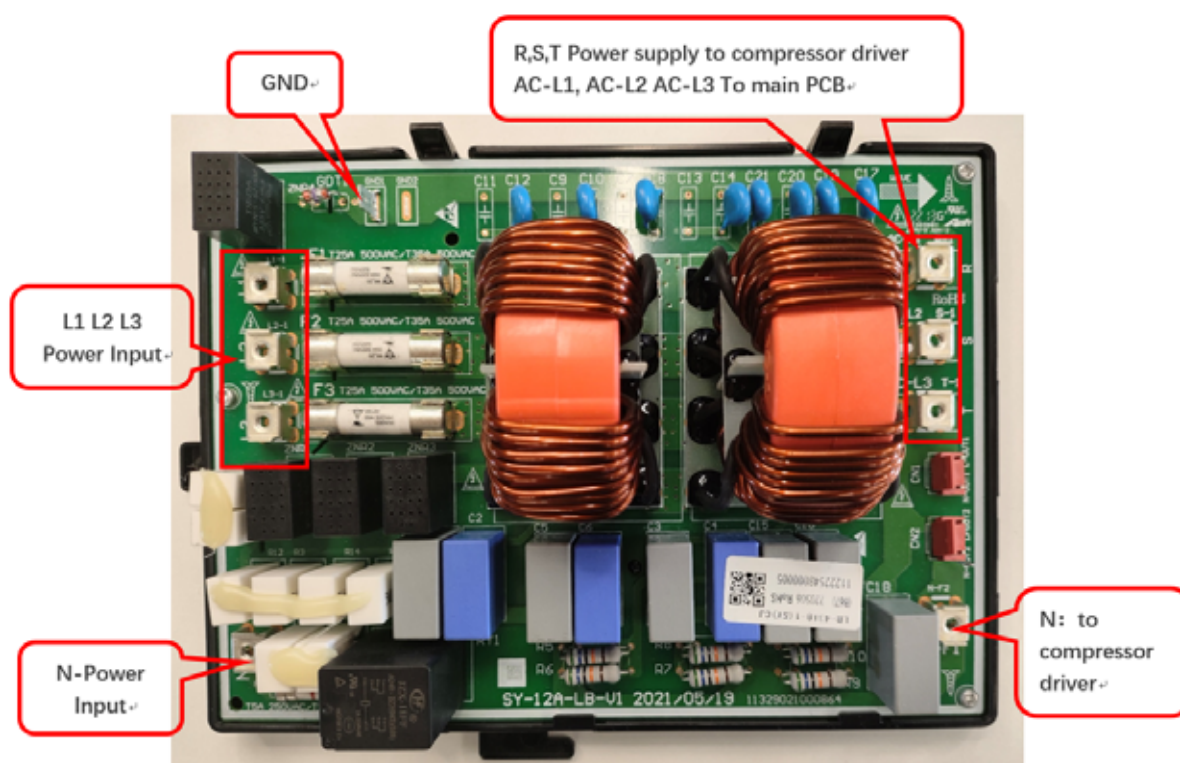


1	Three-phase power supply detection	22	After-sale USB interface
2	Press power supply	23	Low pressure sensor Ps
3	Press power supply	24	High pressure sensor Pd
4	Oil temperature heating zone 2 CH2	25	Frosting temperature sensor 2T21 (Tdef2)
5	Oil temperature heating zone 2 CH1		Heat exchanger outlet temperature sensor 2T22(Tci2)
6	Enthalpy valve 1 SV6		Exhaust temperature sensor 2T03 (Td2)
7	Enthalpy valve 2 SV7	26	Oil temperature sensor(Tioi)
8	Four-way valve 14WV1		Supercool liquid outlet temperature sensor(Tiq)
9	Four-way valve 24WV2		Ambient temperature sensor TI (Tao)
10	Unloading valve SV1	27	Gas separation tube temperature sensor T2 (Ts)
11	Unloading valve SV2		Heat exchanger outlet temperature sensor T3(Tci1)
12	Undercooled valve SV3		Frosting temperature sensor T4(Tdef1)
13	Spray valve SV7	28	Exhaust temperature transfer Sensor T5(Td1)
14	Fan 1/2 power supply(R/S-out)		Injection enthalpy inlet temperature sensor 32(Tgl)
15	Electronic expansion valve 1 PWV1		Injection enthalpy outlet temperature sensor T31(Tgo)
16	Electronic expansion valve 2 PWV2	29	Fire / backup power supply(LP1 reserved)
17	Injection enthalpy electronic expansion valve PWV3	30	High voltage switch HPI(HP2 reserved)
18	Supercool electronic expansion valve PWV4	31	4G module
19	main program burning port	32	Internal and external machine communication
20	Fan communication	33	Centralized control C-CTL
21	Press communication	34	Fan 1 / 2 power supply feed(R/S-IN)

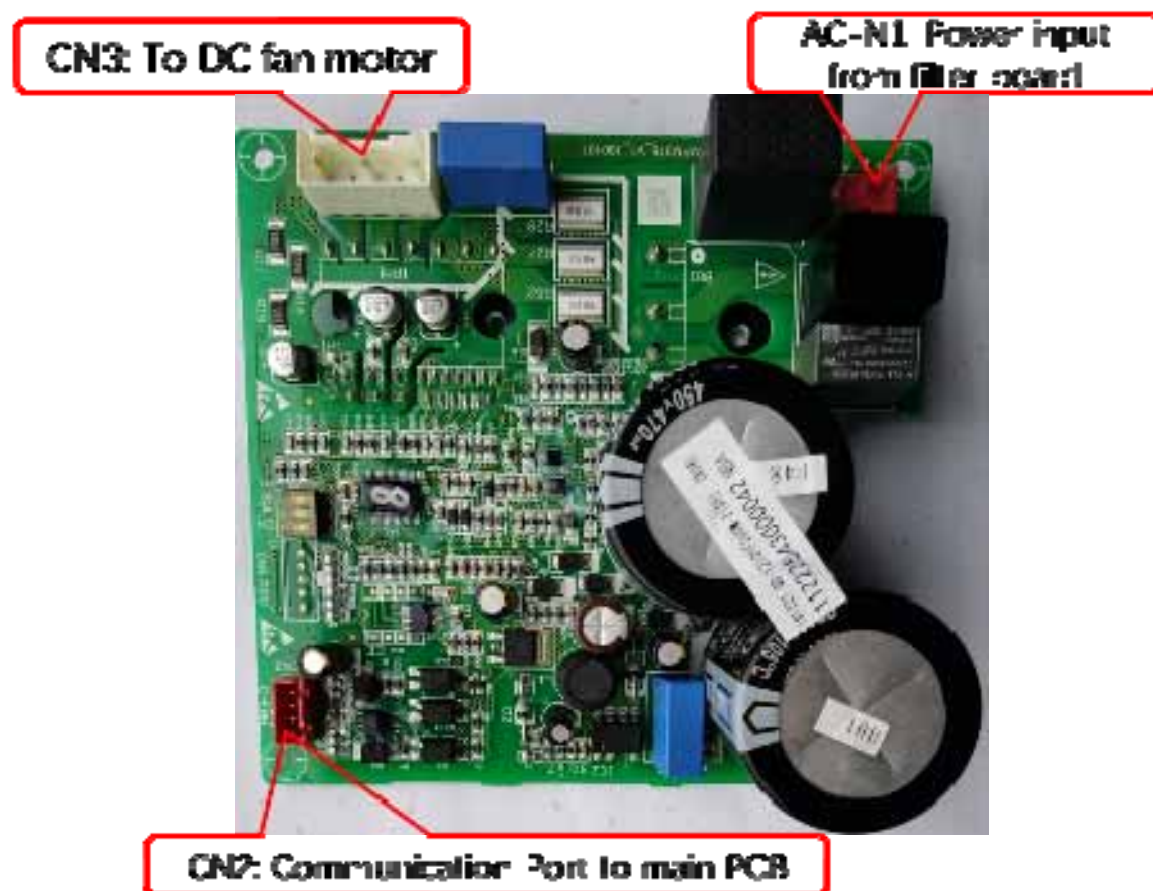
- Driver PCB



Filter board

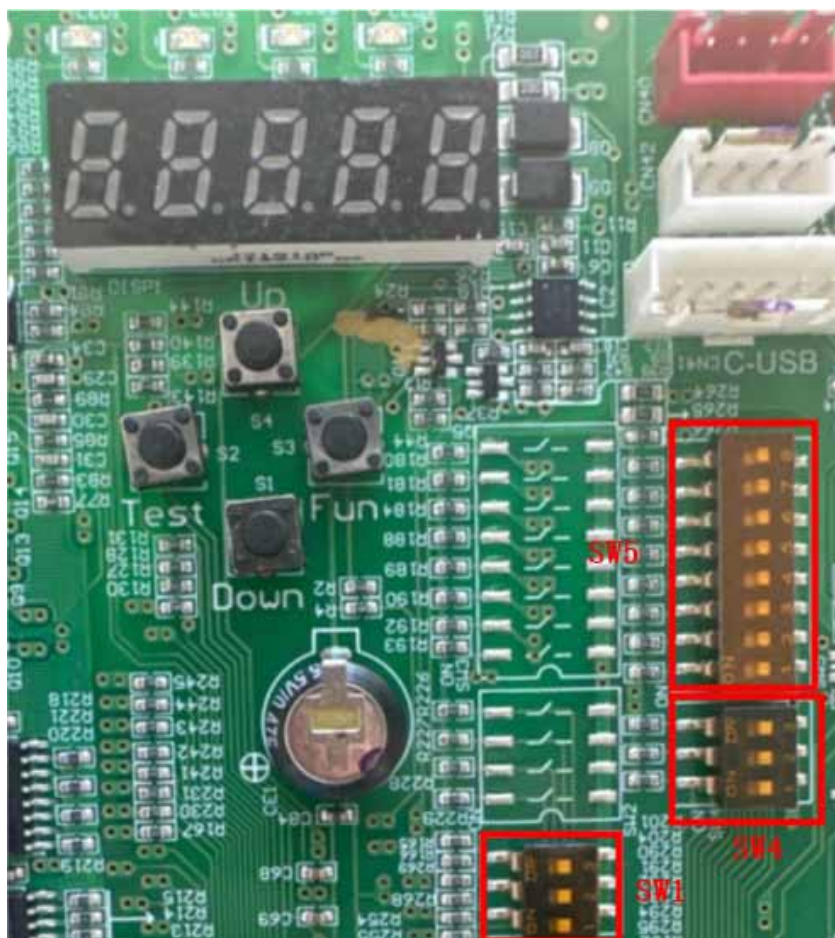


Fan motor drive PCB



4. DIP switch

ARV-H252/SR1DCMA、 ARV-H280/SR1DCMA、 ARV-H335/SR1DCMA



compressor emergency			Pattern priority			Outdoor static pressure			Pattern emergency	
SW4-1	SW4-2	functional definition	SW5-5	SW5-6	functional definition	SW5-7	SW5-8	functional definition	SW4-3	functional definition
OFF	OFF	No compressor emergency	OFF	OFF	Automatic priority	OFF	OFF	No static pressure	OFF	No module emergency
OFF	ON	1 # compressor emergency	OFF	ON	First turn on first	OFF	ON	Low static pressure	ON	Emergency response of this module
ON	OFF	2 # compressor emergency	ON	OFF	Refrigeration priority	ON	OFF	Medium static pressure		
ON	ON	Reservation	ON	ON	The ON minority obeys the majority	ON	ON	High static pressure		

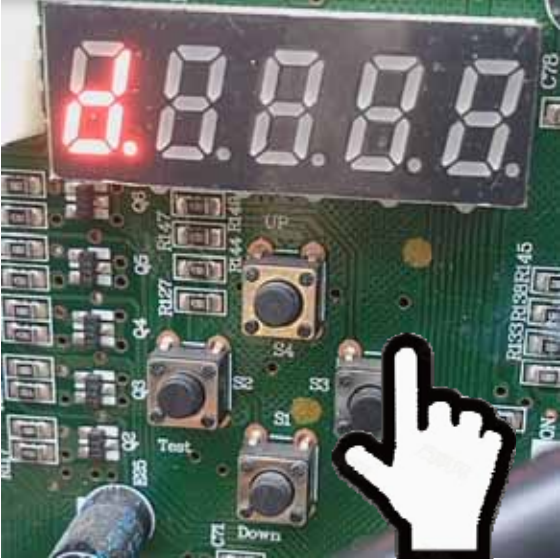
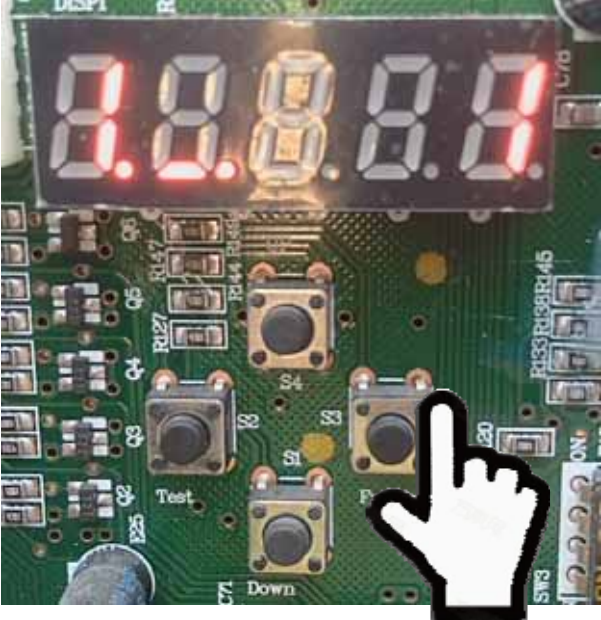
Silent mode setting

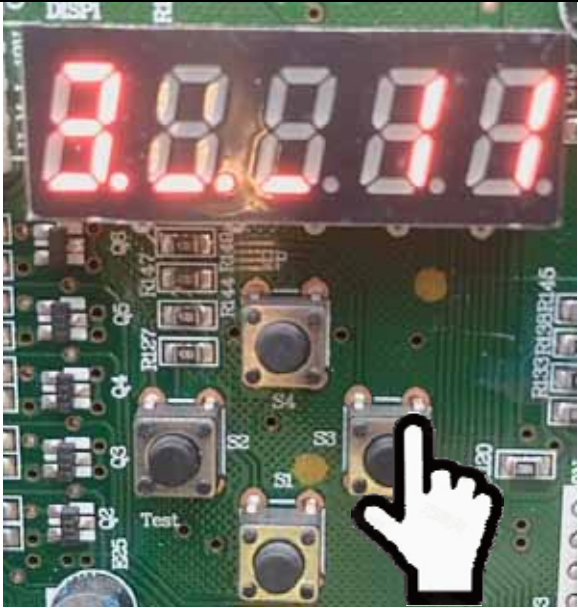
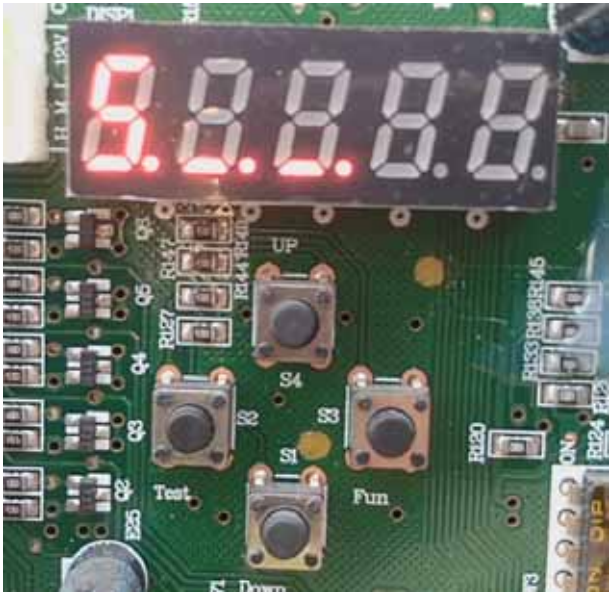
Silent and powerful functions				
SW5-1	SW5-2	SW5-3	SW5-4	functional definition
OFF	OFF	OFF	OFF	Normal
OFF	OFF	OFF	ON	Silent 1
OFF	OFF	ON	OFF	Silent 2
OFF	OFF	ON	ON	Silent 3
OFF	ON	OFF	OFF	Silent 4
OFF	ON	OFF	ON	Silent 5
OFF	ON	ON	OFF	Silent 6
OFF	ON	ON	ON	Silent at night 1
ON	OFF	OFF	OFF	Silent at night 2
ON	OFF	OFF	ON	Silent at night 3
ON	OFF	ON	OFF	Silent at night 4
ON	OFF	ON	ON	Silent at night 5
ON	ON	OFF	OFF	Silent at night 6
ON	ON	OFF	ON	Powerful 1
ON	ON	ON	OFF	Powerful 2
ON	ON	ON	ON	Powerful 3

5. Commissioning

Before all steps of setting , keep the system power on and standby , after setting , restart the whole system

1. More details for step 1 to 11, see below with photograph

	
d. 1. “d.” means waiting for commissioning 2. Long Press Fun for more than 5s, Enter First step	Step 1 1. “1._0” means First step now 2. Press UP for 1s to change 0 number to 1
	
Step 1 1. “1._.1” means IDU address setting (Auto) 2. Press Fun for 1s to confirm and enter Second step	Step 2 1. “2._.2” means Second step now, 2 ODUs were detected 2. Press Fun for 1s to confirm and enter Third step

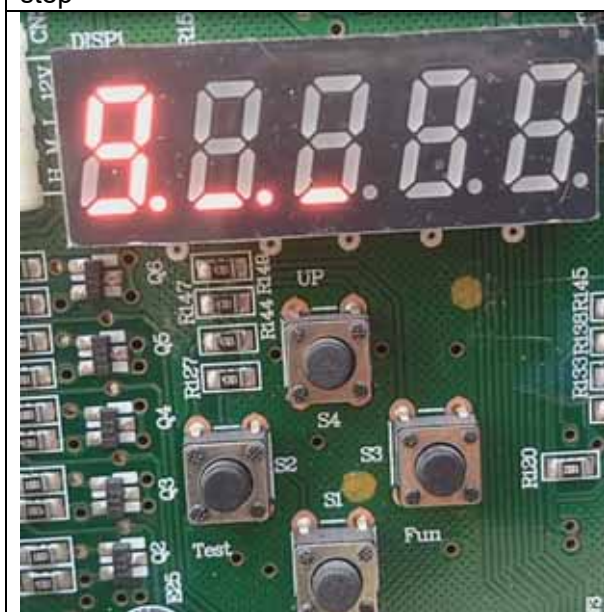
	
Step 3 1. “3.0.0.0.0” means Third step now, 11 IDUs were detected 2. Press Fun for 1s to confirm and enter Fourth step	Step 4 1. “4.0.0.0.0” means Fourth step now, Auto check communication of ODUs 2. Press Fun for 1s to confirm and enter Fifth step
	
Step 5 1. “5.0.0.0.0” means Fifth step now, Auto check components of ODUs , then enter sixth step	Step 6 1. “6.0.0.0.0” means Sixth step now, Auto check components of IDUs , then enter seventh step

**Step 7**

1. "**7.**" means **Seventh** step now, Auto check remaining time of preheating , then enter **eighth** step

**Step 8**

1. "**8.**" means **Eighth** step now, Auto check is there any leakage , then enter **ninth** step

**Step 9**

1. "**9.**" means **ninth** step now, Check the status of stop valve , then enter **tenth** step

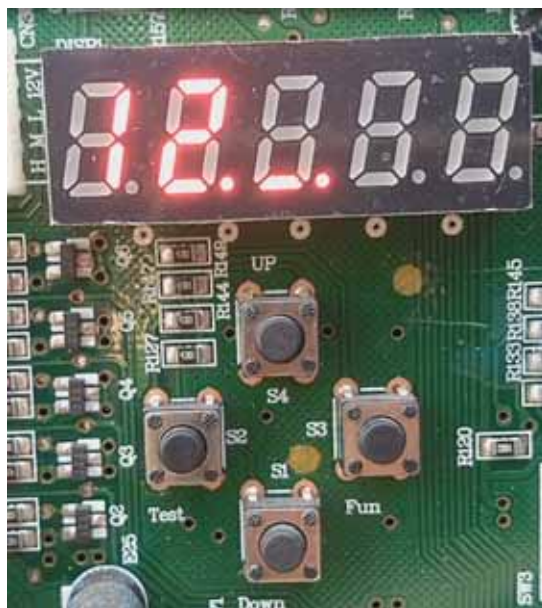
**Step 10**

1. "**10**" means **tenth** step now, Auto check outdoor environment temperature
2. Press **Fun** for 1s to confirm and enter **Eleventh** step

**Step 11**

If temperature ≥ 20

1. "11.00" means **cooling test mode**
2. Setting temp: **16°C**
3. Fan speed : **high**
4. If there is **no any fault**, 20min later, finish commissioning

**Step 11**

If temperature < 20

1. "12.00" means **heating test mode**
2. Setting temp: **32°C**
3. Fan speed : **high**
4. If there is **no any fault**, 20min later, finish commissioning

2. Parameter set by Key button

2.1 General introduce

After commissioning, the system is standing-by.

1st step--- Press "**Fun**" key for 5 s, the Main digital tube will displays as below:

1. 【Status Checking "**E**0000" (flash) 】 、
2. 【Function Setting "**P**0000" (flash) 】 、
3. 【Parameter Setting "**L**0000" (flash) 】 、
4. 【Commissioning "**d**0000" (flash) 】 、
5. 【Restore to factory setting "**r**0000" (flash) 】

2st step---Press "**Up**" or "**Down**" key to choose [**E**]or [**P**] or [**d**] or [**r**]

3st step---Press "**Fun**" to confirm

Sketch Map:

	1st: Press “Fun” 2 s	2st: ”Up” or ”Down” to choose below	3st : Press “Fun” to confirm	
				
Commissioning	Status	Checking	Parameter Checking	Restore to factory setting

2.2. Status Checking

Choose “E8.8.8.8” , press “Fun” key

1. Press “Up” or “Down” key to choose the number of function you want (1~15)
2. Then press “Fun” to display

For example : Digital tube displays like **1.64.0**, means **frequency of 1# comp is 64 rps**

Sketch Map:

					
1 means :					
Frequency of 1# comp					
64 means:					
1# compressor's running frequency is 64 rps					
To Check other statue information by					
Press “up”/”down”, display from 1~ 15					
No	parameter name	units	No	parameter name	units
1	Compressor 1 speed	rps	11	Temperature of outlet pipe 1 of heat exchanger	0.1
2	Compressor 2 speed	rps	12	Temperature of outlet pipe 2 of heat exchanger	0.1

3	Electronic expansion valve 1 step PMV1	pls	13	Defrosting 1 temperature	0.1
4	Electronic expansion valve 3 steps PMV2	pls	14	Defrosting 2 temperature	0.1
5	High pressure sensor saturation temperature	0.1	15	Plate ventilation inlet temperature	0.1
6	Low pressure sensor saturation temperature	0.1	16	Plate ventilation outlet temperature	0.1
7	Discharge temperature of compressor 1	0.1	17	Outlet temperature of plate liquid exchange	0.1
8	Discharge temperature of compressor 2	0.1	18	oil temperature	0.1
9	External ambient temperature	0.1	19	Firmware version	/
10	Inspiratory temperature	0.1			

2.3 Present Function Checking

Choose “P” , and press “Fun” key

1. Press “Up” or “Down” key to choose the number of function you want (1/3/4/6)

For example : Digital displays like “P” (P-light, 1-Flash)

2. Then press “Fun” to display

For example: display a parameter like “130”, means the present max capacity rate of IDU/ODU (No 1) is 130%

Serial Number	Function Name	Display
1	IDU/ODU capacity rate	130%
6	Economic locking (26)	0 or 1 [0 : without this function] [1 : lock 20/26]

2.4 Function Setting

Choose “”, short press “**Fun**” key

1. Press “**Up**” or “**Down**” key to choose the number of function you want (1~8)

For example : Digital displays “” (C-light, 1-flash)

2. Then **press “Fun” key to enter** the setting.
3. Change the setting by pressing “**Up**” or “**Down**” key
4. Short press “**Fun**” key to confirm

The function name and number show in the table below.

Function names	1 st step	2 nd step	3 rd step	Notice
	Main menu	Serial Number	Parameter Setting	
IDU/ODU capacity rate		1	1: IDU/ODU≤130%	1. Choose the number [1] 2. Short press [Fun] 3. Choose [130] Factory default when you change it , it will influence the comfort ,please consult our factory first.
Clean (Auto dust removal)		2	/	1. Choose the number [2] 2. Short press [Fun], 1 time effective Then outdoor fan will run immediately

Vacuum Pumping		5	/	1. Choose the number [5] 2. Short press [Fun], 1 time effective Then ODU will be ready for Vacuum pumping
Economic locking (26 °C)		6	0 : No this function 1 : lock 20/26	1. Choose number [6] 2. Short press [Fun] 3. choose [0] or [1] 0 is default, when you change it , the IDU setting temperature will be locked at 20 °C in heating mode and 26 °C in cooling mode
Refrigerant recycle		7	/	1. Choose the number [7] 2. Short press [Fun], 1 time effective Then Recycle refrigerant to ODU

Refrigerant charging		8	/	1. Choose the number [8] 2. Short press [Fun], 1 time effective Automatical ly determine whether the refrigerant is filled up(by detecting pressure)requires
Communication protocol		9	0: Centralized control 1: Modbus	Default : 0
Network address		10	1-255	Default : 1
Address setting		11	0 : Manual addressing 1 : Automatic addressing	Default : 0
Silent/ Strong model		12	0 : Normal 1-6 : silent 1-6 7-12 : Silent in night 1-6 13-15 : Strong1-3	Default : 0
Seven level power limit		13	0 : 100% (default); 1 : 90% ; 2 : 80%; 3 : 70% ; 4 : 60%; 5 : 50%; 6 : 40%	Limit power

Model priority		16	0 : Auto dominant priority 1 : First priority 2 : Cooling priority 3 : Few obey more	Default : 0
Fan emergency		18	0: Without emergency 1: Fan 1# emergency 2: Fan 2# emergency	It will take effect after power on again
ODU emergency		19	0: Without emergency 1: This ODU emergency	It will take effect after power on again

Note : The machine does not have all its functions

2.5 Restore to Factory Setting

Choose “”, short press “**Fun**” key

1. Press “**Up**” or “**Down**” key to choose the number of function you want **(1~3)**

[1]: Control parameter be restored to factory default

[2]: Control parameter, running storage parameter are restored to factory default

[3]: Control parameter, running storage parameter, commissioning storage parameter are restored to factory default

2. Press “**Fun**” key to confirm

Part6 Function and Control

1. Compressor control

1.1 Compressor type:

Rotary DC inverter compressor

1.2 Start-up control:

The minimum operation time of compressor is 6 minute, after compressor start to work, which means it cannot stop working immediately if the working time is less than 6 minute except shutdown by failure. Similarly, the compressor will not restart until more than 3 minute after stop operation

1.3 Operation control:

The compressor can auto-adjust its frequency according to the target evaporating temperature (on cooling mode) and target condensing temperature (on heating mode) to get the target value.

1.4 Protection adjustment control:

2.4.1 High pressure control (cooling mode) :

If the high pressure value $P_d < 25\text{bar}$, the compressor will regulate its frequency according to target evaporating temperature.

If the high pressure value $25\text{bar} \leq P_d < 40\text{bar}$, the compressor will regulate its frequency to match with target high pressure value 38bar, 10s as a adjustment cycles.

If the high pressure value $P_d \geq 40\text{ bar}$ and lasts 10s, the indoor and outdoor will stop running and display an error code which means high pressure value too high to protect

2.4.2 High pressure control (heating mode) :

If the high pressure value $P_d < 28\text{bar}$, the compressor will regulate its frequency according to target condensation temperature.

If the high pressure value $28\text{bar} \leq P_d < 39\text{bar}$, the compressor will regulate its frequency to match with target high pressure value 28bar, 10s as a adjustment cycles.

If the high pressure value $P_d \geq 39\text{ bar}$ and lasts 10s. Indoor and outdoor will stop running and display an error code which means high pressure value too high to protect

2. Fan motor control

2.1 Motor type:

The DC motor which with 10 kinds of motor speed mode

2.2 Control function:

Fan motor fault: if fan motor running speed out of range (normal range from 70% to 130%) and last for 120s, or fan motor speed lower than 200rpm and last for 120s, then whole system will stop running and display an error code which means fan motor fault. After 120s will recover normal running mode, if this error code display 6 times within 1 hour, then this error code will be locked.

When compressor stops running, fan motor will keep previous running statue for 1 minute then stop.

Cooling mode, fan motor's running speed will increase and reduce according to the detect high pressure value's increase and reduce .

Heating mode, fan motor's running speed will change according to the detect condenser's saturation temperature, when saturation temperature lower than normal value, fan motor's running speed will increase, when saturation temperature higher than normal value, fan motor's running speed will reduce.

3. Four-way valve Control

Four-way valve will be **OFF** when cooling and dehumidifying and it will be on when heating.

Heating mode: Four-way valve will be **NO** after compressor running about 30s

Shutdown in heating mode: four-way valve will keep **NO** When ambient temperature lower than 25 , four-way valve will be **OFF** after an hour when ambient temperature higher than 25

Four-way valve will be **OFF** when operation cooling / dehumidifying / defrosting / oil return mode

4. Compressor preheating control

When compressor in standby state and standby time over than 1 hour and less than 240h, then start up compressor preheating function

5. Defrost control

5.1 Defrosting condition

Heating mode: According to detect running time of compressor / defrost temperature of condenser / high pressure value to judge whether enter defrost

5.2 Defrosting

Heating mode → The preparation of defrosting (20Hz , 40S)→defrosting→ Complete defrosting (20Hz , 40S) → Heating mode

5.3 Exit condition

Defrosting will be finished if any requirements below are satisfied.

6.3.1 Defrost temperature of condenser higher than 10 and last for 1 minute, or higher than 12 and last for 30 s

6.3.2 High pressure value higher than 30 bar

6.3.3 Discharge temperature higher than 100

6.3.4 Total defrosting time more than 10 minutes

6. Oil return control

6.1 Oil return condition

Compressor running frequency lower than the setting frequency and last for 4 hours

6.2 Oil return

6.2.1 Cooling mode

Cooling mode → Oil return running (65Hz) → Cooling mode

6.2.2 Heating mode

Heating mode → The preparation of oil return (20Hz , 40S)→oil return running→

Complete oil return (20Hz , 40S) → Heating mode

6.3 Exit oil return

Oil return will be finished if any requirements below are satisfied.

6.3.1 After running 2 minutes, if discharge temperature higher than 100

6.3.2 After running 2 minutes, if high pressure value higher than 34 bar.

6.3.3 Oil return running last for 3 minutes

7. EXV control

7.1 Initialization: EXV will be initialized when turning on at the first time.

7.2 EXV will not be reset when turning on/off unless the downtime of it is more than 24h.

7.3 EXV Control info is as follows.

Mode	Status	Open degree	Instruction
Cooling	Operation	480	Unchanged
	Standby	0	Unchanged
Heating	Operation	65~480	Self-adjusting according to the degree of suction temperature superheat
	Standby	0	Unchanged

8. Protection control

8.1 Pressure switch protection

Disconnection pressure value of high pressure switch: 4.2MPa±0.05Mpa

Connection pressure value of high pressure switch: 3.3MPa±0.05Mpa

Disconnection pressure value of low pressure switch: 0.1MPa±0.05Mpa

Connection pressure value of low pressure switch: 0.15MPa±0.05Mpa

8.2 Discharge temperature too high control

When the discharge temperature lower than 80 , compressors will auto-adjust its frequency

When the discharge temperature is equal to or higher than 80 , but lower than 115 , The compressor will reduce its frequency immediately.

When the discharge temperature higher than 115 and last for 10s, compressors will stop running and display an error code, after 3 minutes will recovery to the previous status. But if the error code display 3 times within 1 hour then this error code will be locked unless it is solved.

8.3 Discharge temperature too low control

When the superheat of discharge temperature lower than 3 and last for 15minutes, compressors will stop running and display an error code, after 3 minutes will recovery to the previous status. But if the error code display 3 times within 1 hour then this error code will be locked unless it is solved.

8.4 Communication fault between IDU and ODU

ODU cannot receive any signal from any indoor units within 1 minute, then will stop running and display an error code (Communication failure protection). It can recovery automatically when the communication between IDU and OUD is good.

8.5 Module failure protection

Units shut down immediately when IPM Module failure happened, which can be recovered.

8.6 Temperature of IPM too high protection

The units will stop working when the IPM temperature checked is higher than the setting value. It will recovery automatically after 3min.If this kind of situation happened 6 times within 1h, units will be locked and cannot work regularly unless it is solved.

8.7 Capacity ratio out of range

When the capacity ratio (total capacity of IDUs / capacity of ODU) over than 130% then will display an error code and be locked once happen.

Part7 Trouble shooting

1. Poor effect of cooling and heating

Some phenomenon in using process is similar to failures, which are not failures in fact. Therefore, when cooling performance isn't satisfactory, eliminate the following factors first:

Phenomenon	Cause Description
If there is high ambient temperature outside and more people in room, air conditioner works in full load and cool air is blown from outlet, but room temperature can't be lowered.	In case of high ambient temperature, infiltration heat from outside increases, which increases cooling load of air conditioner; if there are more people (e.g.10 people) in room, each people discharges 120W heat, 10 people discharge 1200W heat altogether, which consume half cooling capacity of air conditioner, therefore, cooling capacity of air conditioner seems not enough and room temperature can't be lowered. It's normal and not the fault of air conditioner.
Air conditioner is hard to start, stops after starting or fuse is blown due to under voltage of power supply.	It is not failure. It's necessary to check the cause of power supply. If it is caused by under voltage of power grid, user should install additional voltage stabilizer for power supply to enable voltage to reach 220V or 380V and use air conditioner normally.
When it operates under high air velocity, room temperature can't cool down and there is no much air flow volume at outlet.	Filth blockage of air filter makes cooling capacity can't be taken out by flowing air timely, causing insufficient cooling capacity that can be solved by removing and cleaning filtering net.
When it operates under high air velocity, unit vibrates and makes loud noise	It is normal that the unit vibrates and makes loud noise when it operates in maximum speed.
Temperature controller isn't properly adjusted and doesn't bring maximum function of cooling, so room temperature can't cool down.	Adjust temperature controller to solve the problem
Heat pump-type air conditioner has unsatisfactory heating effect	Minimum ambient temperature for starting heating function of

in cold winter, which is reasonable.	air conditioner is -15℃. So air conditioner can't effectively heat below this temperature.
Improper installation position of air conditioner can also result in uneven indoor temperature or poor cooling effect.	Readjust the installation position of air conditioner.
mist blown out from indoor unit	It is caused when cool airflow in air conditioner cools down the air in indoor unit.
noise	Air conditioner will make noise when stopping operation, because refrigerant in the unit flows to opposite direction;
	Air conditioner will expand or shrink due to air temperature change, causing harsh sound; sound of water flow is caused by refrigerant flowing in the unit.
odor in room sometimes	Air conditioner won't bring odor by itself, so it must be caused by odor accumulated in environment.
	Solution: clean air filtering net.
In case of heating, air isn't blown out immediately after starting the unit and "Operation" indicator flickers when wired controller is used.	The heating state is used to prevent blowing out cool air. Please wait for a moment.
	The unit has restart function upon power-on after power failure. Air conditioner will automatically start in case of power-on after power failure and operate according to the mode set before power failure.

2. ODU Fault code table

2.1 Communication failure

Code	Definition	Possible reason for error code
J1	Communication failure between outdoor units	1. The communication wire between outdoor units is disconnect, short circuit or incorrect 2. Outdoor unit's main PCB failure 3. Outdoor unit's main power failed
J2	Communication failure between outdoor and indoor units	1. The communication wire between indoor unit and outdoor unit disconnect, short circuit or incorrect

		2. Indoor unit's main power failed 3. Indoor unit's PCB failure 4. Outdoor unit's main PCB failure
J3	Communication failure between main PCB and compressor drive module	1. The connection between driving module and main PCB failure 2. The communication part of outdoor unit control PCB failure 3. Compressor driving module failure 4. Compressor failure 5. Main PCB failure
J4	Communication failure between main PCB and fan motor drive module	1. DC fan motor drive module failure 2. DC fan motor failure 3. Supply voltage exceed limit 4. Main PCB failure

2.2 Pressure sensor failure

Code	Definition	Possible reason for error code
F1	【P _d 】 High pressure sensor failure	1. High pressure sensor failure 2. High pressure sensor connection is incorrect 3. Outdoor unit's main PCB failure
F4	【P _s 】 Low pressure sensor failure	1. Low pressure sensor failure 2. The connection between sensor and outdoor PCB incorrect 3. Outdoor unit's main PCB failure

2.3 Pressure abnormal

Code	Definition	Possible reason for error code
F3	【P _d 】 High pressure too high	1. Exhaust pipe or condenser pipe block 2. Condenser dirty 3. Outdoor unit fan stop or low speed 4. Refrigerant overcharge
F6	【P _s 】 Low pressure too low	1. Indoor unit fan stop or low speed 2. Evaporator dirty

		3. Indoor EXV full open in cooling mode (Outdoor EXV full open in heating mode) 4. Lack refrigerant 5. The pipe between evaporator and suction port block
F8	Compression ratio too high protection	Compressor failure
F9	Compression ratio too low protection	Compressor failure

2.4 Temperature sensor failure

Code	Definition	Possible reason for error code
C1	【T _{ao} 】 ambient temp.	1. Temperature sensor failure 2. Test temperature exceed limit 3. Sensor connection is incorrect 4. Outdoor unit's main PCB failure
C2	【T _{def1} 】 Defrosting temp.	
C3	【T _{da} 】 discharge temp. of 1# comp.	
C4	【T _{db} 】 discharge temp. of 2# comp.	
C6	【T _s 】 Suction temp. of compressor	
C9	【T _{ho1} 】 Condenser outlet temp.	
CJ	【T _{d3} 】 Oil temperature	
CC	【T _{d4} 】 Liquid piping temp. of ODU	
CE	【T _{ho2} 】 Outlet temp. of PMV3	
CF	【T _{def2} 】 Outlet temp. of sub-cooler	

2.5 Temperature abnormal

Code	Definition	Possible reason for error code
E3	【 T _{da} 】 1# Compressor discharge temperature too high	1.System lack of refrigerant 2.DC inverter Compressor failure 3.Compressor air return filter block 4.EXV block 5.Gas stop valve was closed
E4	【 T _{db} 】 2# Compressor discharge temperature too high	6.Liquid stop valve was closed 7.dischagr sensor failure 8.Outdoor unit PCB failure

2.6 Comp. and drive failure

Code	Definition	Possible reason for error code
31	Drive Module IPM protection (F0)	1. Low supply voltage, excessive current 2. Supply voltage exceed limit 3. Outdoor fan stop or low speed 4. Drive module temp. too high
32	Drive Module hardware protection	
33	Drive Module software protection	
34	Drive module unconnected	1.The connect of driving module and DC inverter compressor incorrect 2.Driving module failure 3.Compressor failure
35	Drive module current overload	1. Compressor overload 2. Compressor coil disconnect 3. Inverter driving board failure 4. Compressor failure
36	Drive module DC bus voltage over-voltage or under-voltage failure	1. Supply voltage below level 2. Supply voltage exceed limit 3. Drive module failure
37	Temperature sensor of drive module heat fins failure	Drive module failure
38	Drive module high temperature limit	1. Driving module failure

	frequency failure	2. Compressor failure 3. Outdoor unit fan stop or low speed
39	Drive module high temperature shutdown protection	1. Driving module failure 2. Compressor failure 3. Temperature sensor failure
3E	Drive module AC Input over current protection	Drive module failure
3F	Drive Module PFC protection (F0)	Drive module failure
51	Drive Module IPM protection (F0)	1. Low supply voltage, excessive current 2. Supply voltage exceed limit 3. Outdoor fan stop or low speed 4. Drive module temp. too high
52	Drive Module hardware protection	
53	Drive Module software protection	
54	Drive module disconnected	1.The connect of driving module and DC inverter compressor incorrect 2.Driving module failure 3.Compressor failure
55	Drive module current overload	1. Compressor overload 2. Compressor coil disconnect 3. Inverter driving board failure 4. Compressor failure
56	Drive module DC bus voltage over-voltage or under-voltage failure	1. Supply voltage below level 2. Supply voltage exceed limit 3. Drive module failure
57	Temperature sensor of drive module heat fins failure	Drive module failure
58	Drive module high temperature limit frequency failure	1. Driving module failure 2. Compressor failure 3. Outdoor unit fan stop or low speed
59	Drive module high temperature shutdown protection	1. Driving module failure 2. Compressor failure 3. Temperature sensor failure
5E	Drive module AC Input over current protection	Drive module failure
5F	Drive Module PFC protection (F0)	Drive module failure

2.7 Fan motor and drive failure

Code	Definition	Possible reason for error code
3A	Drive module high temperature	1. DC fan motor abnormal 2. DC fan drive module abnormal
3C	Drive module over current	
3H	Drive module start failure or running out of step	
3J	Drive module over-voltage or under-voltage	
41	Drive module IPM alarm	
5A	Drive module high temperature	1. DC fan motor abnormal 2. DC fan drive module abnormal
5C	Drive module over current	
5H	Drive module start failure or running out of step	
5J	Drive module over-voltage or under-voltage	
49	Drive module IPM alarm	

2.8 Others failure

Co de	Definition	Possible reason for error code
H1 (B1)	【HP1】 High pressure switch failure	1. High pressure exceed high pressure switch limit. 2. High pressure switch failure 3. High pressure sensor failure 4. Instantaneous power-off 5. Stop valve closed 6. Outdoor unit fan stop 7. Outdoor unit air outlet block 8. In heating mode indoor unit fan stop 9. In heating mode indoor unit EXV block
H5	Refrigerant shortage fault	System leakage
HF	Oil shortage fault	Once confirm the unrecoverable
HJ	Main power failure	1. Supply power phase-reversal 2. Supply power phase lack 3. Outdoor unit PCB failure
J5	Parameter set incorrect	1. Outdoor unit dial switch incorrect 2. Main PCB failure
J7	Outdoor unit main control PCB ERROM module failure	Main PCB failure
JJ	Indoor unit total capacity exceeding	Indoor units' total capacity over 130% of the outdoor units' total capacity
47	Indoor unit loss failure	1. Communication wire between indoor units failure 2. Indoor PCB failure 3. Power supply of indoor units failure
E1	The 4-way valve is fault	
E9	Drive refrigerant cooling pipe low temperature protection	

3. Outdoor unit error code display

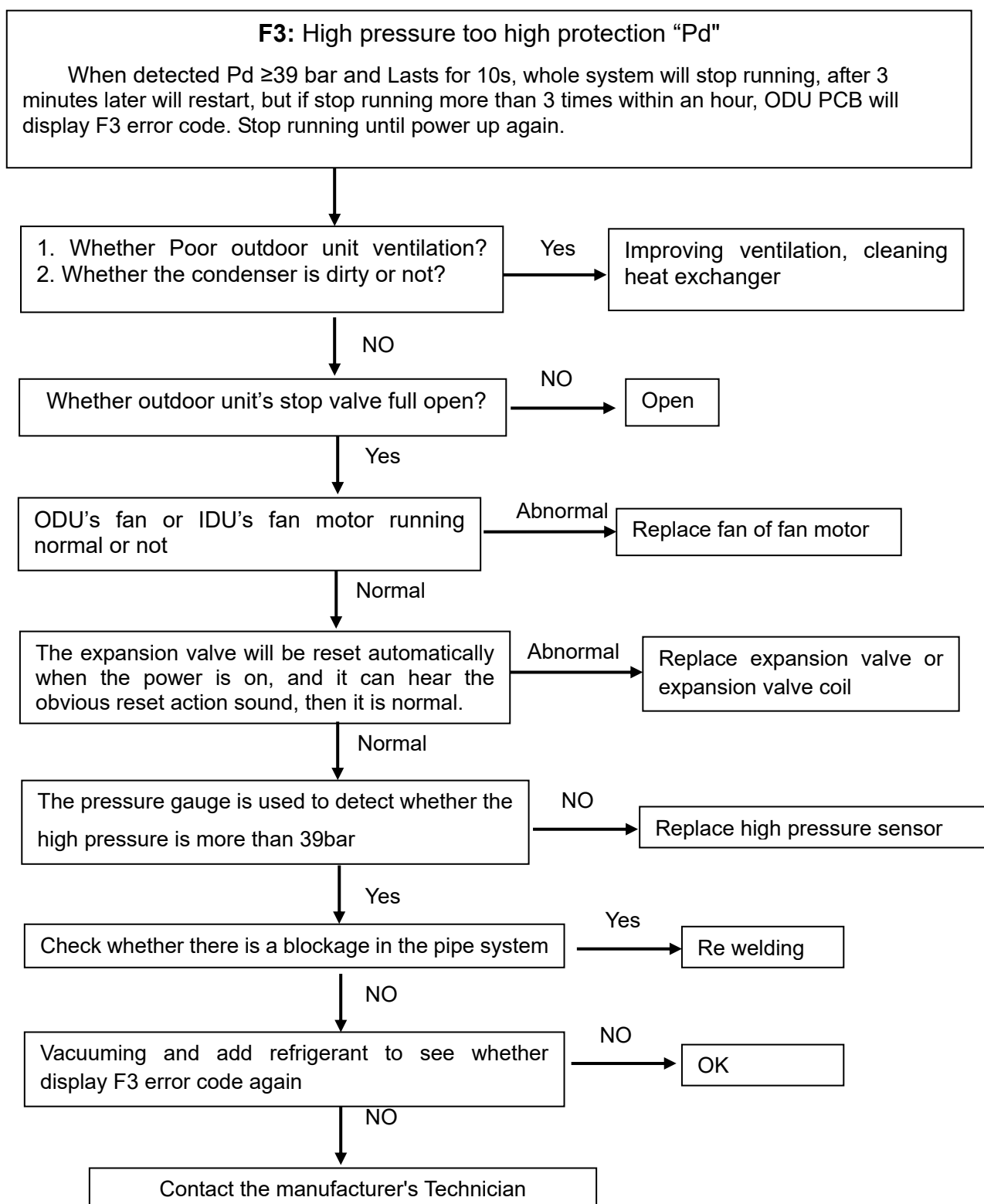
For outdoor units, the error code displays on the main PCB (Master unit).



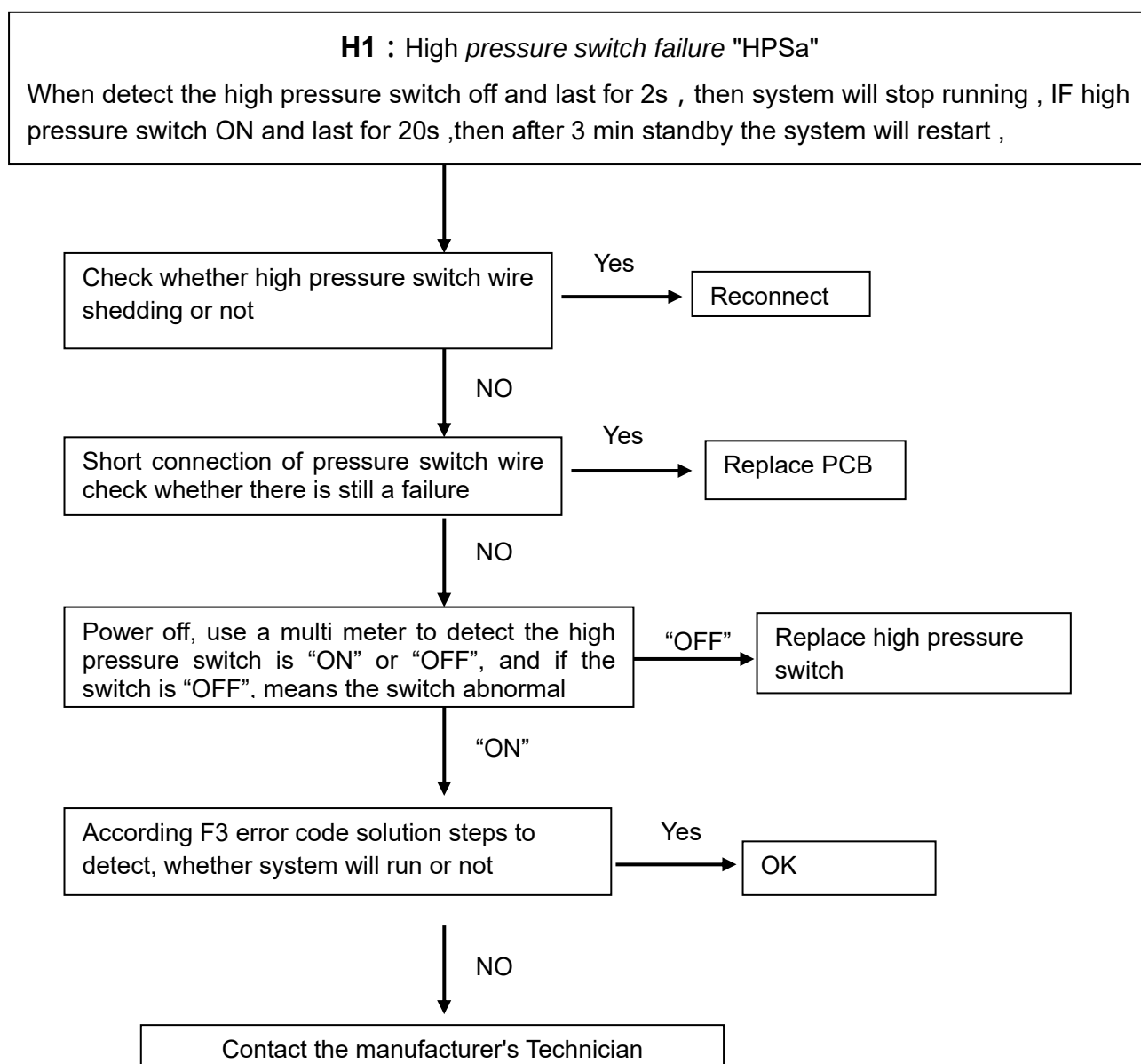
Error code “**H5**” .through the “**ODU Fault code table**” to check the definition: **Refrigerant shortage fault**

4. Outdoor unit trouble shooting

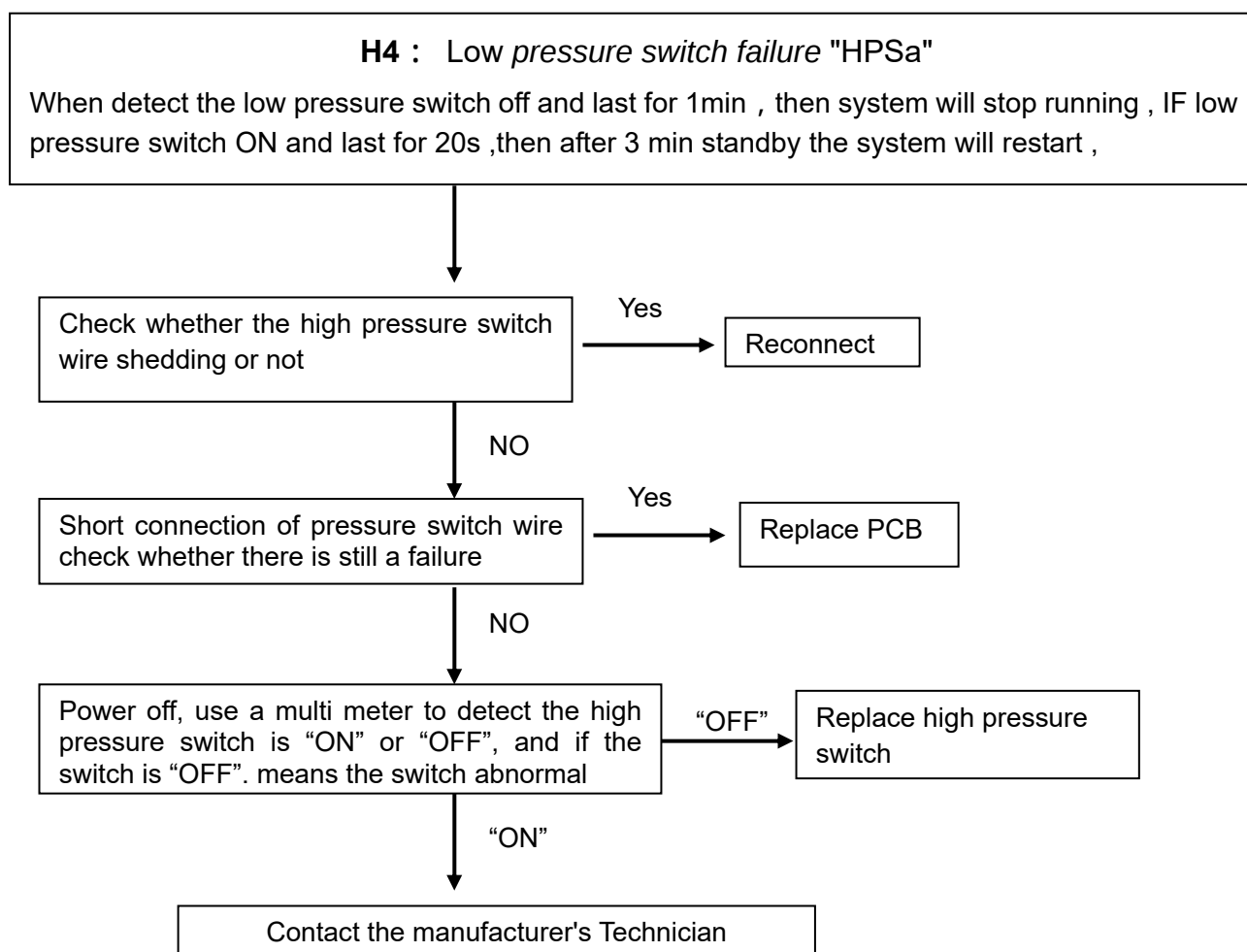
4.1 F3 Error Code



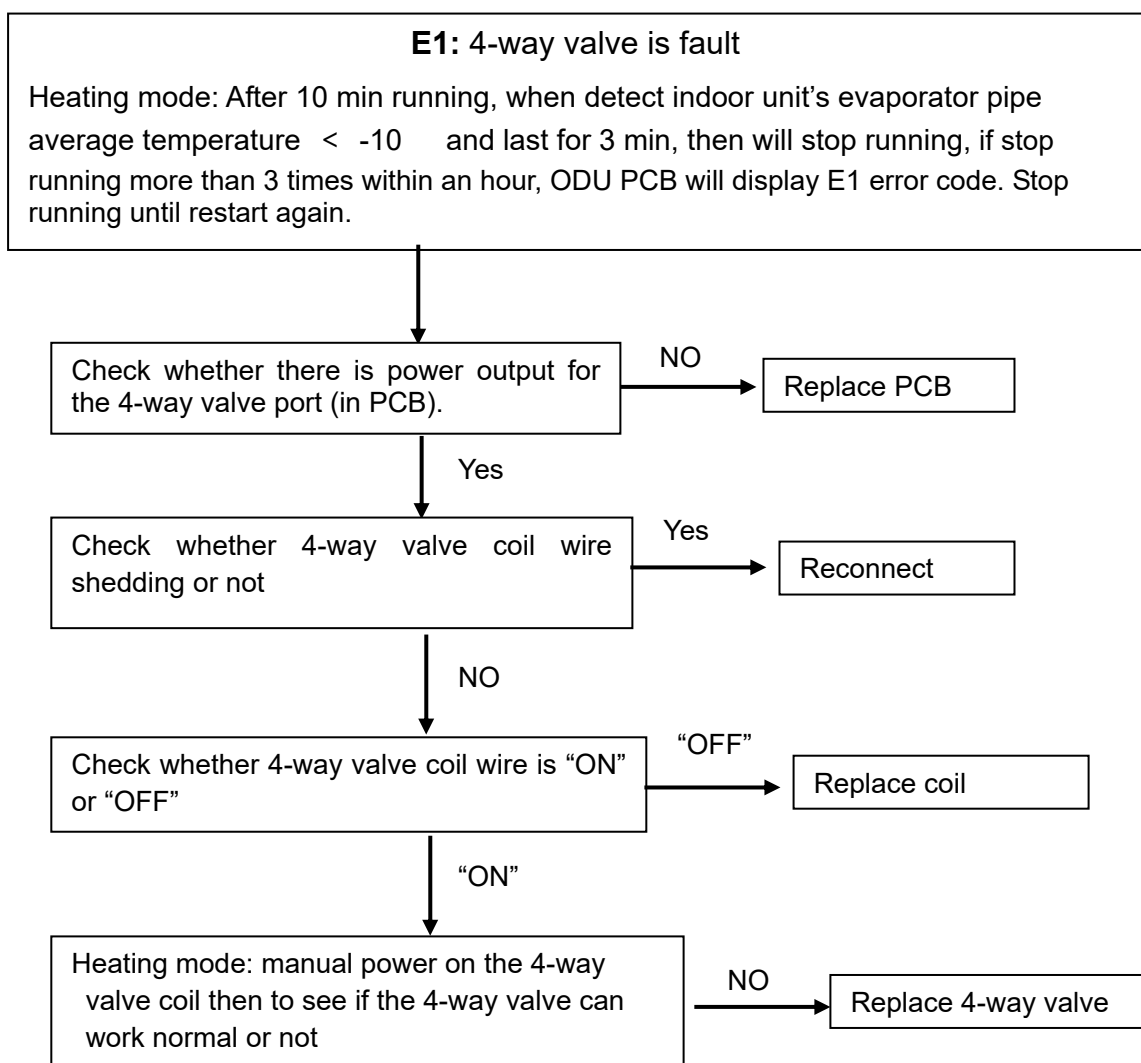
4.2 H1 Error code



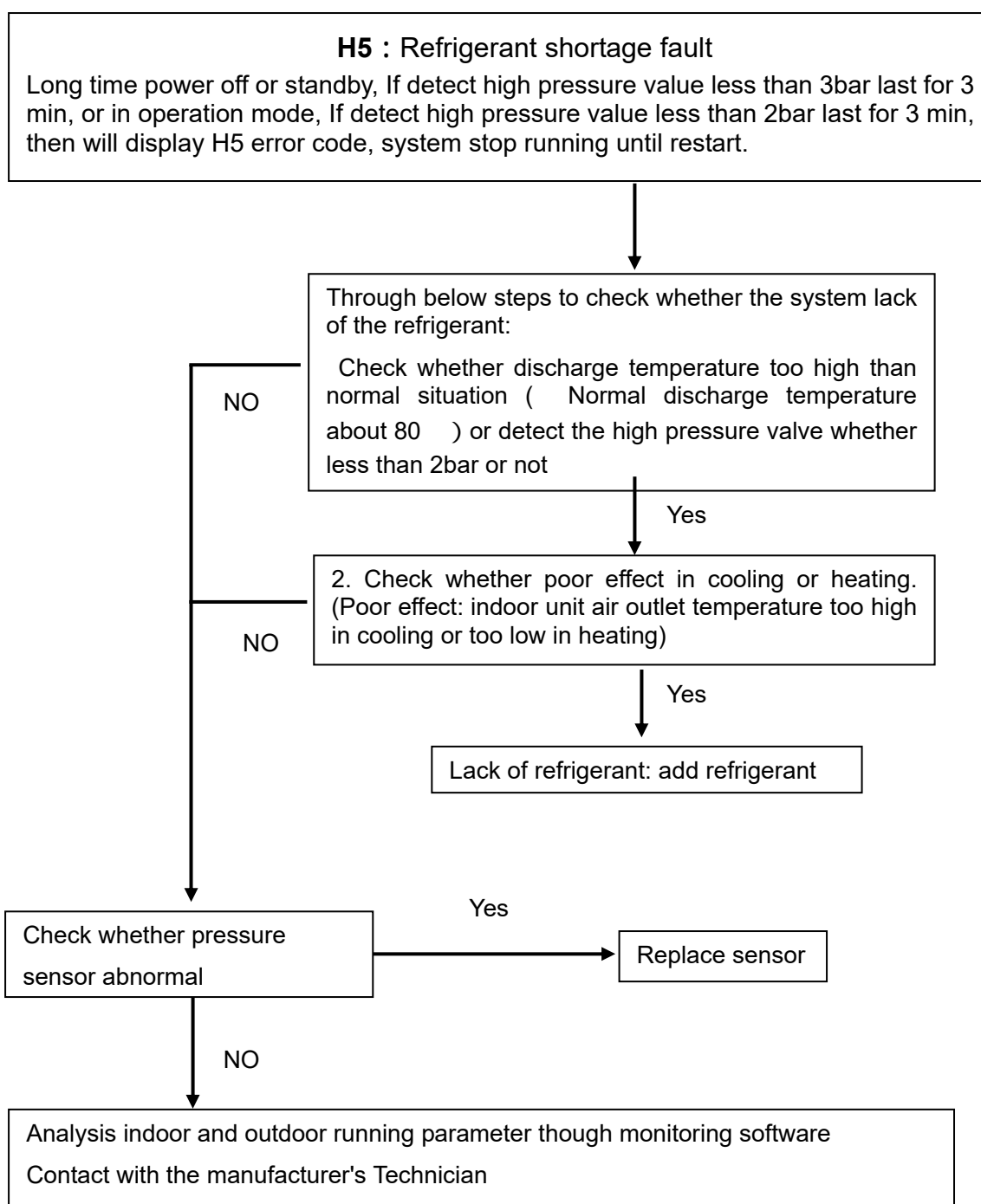
4.3 H4 Error code



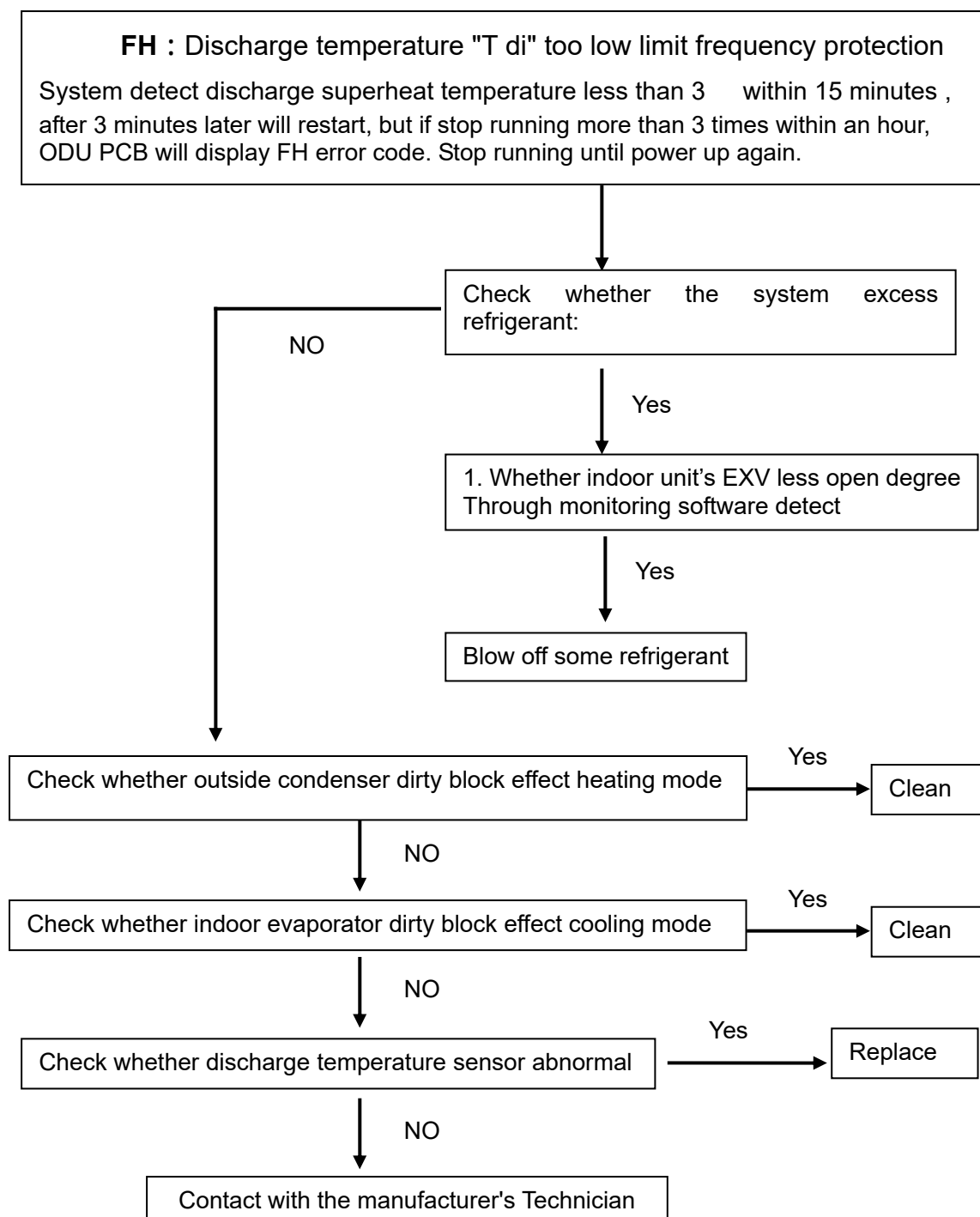
4.4 E1 Error code



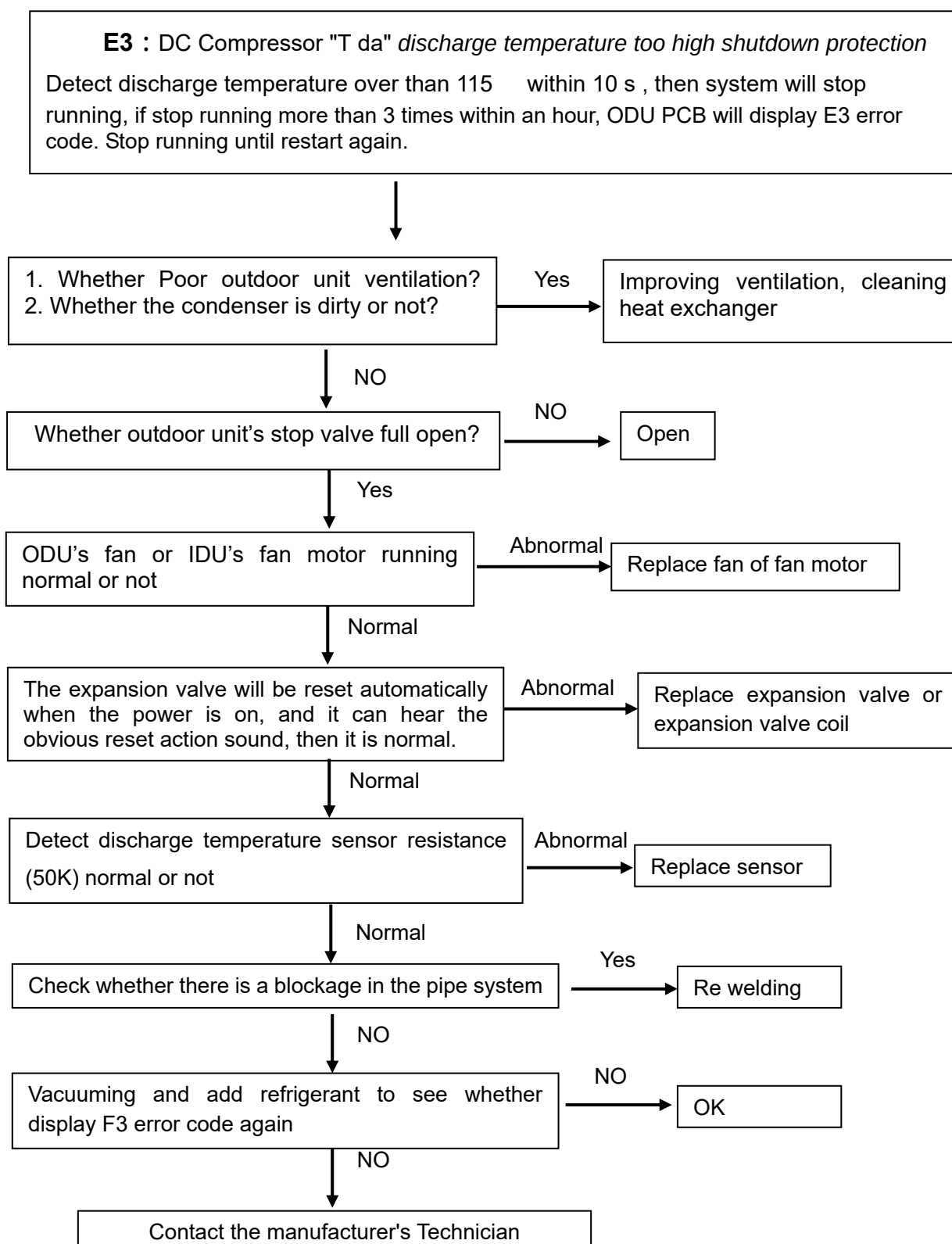
4.5 H5 Error code



4.6 FH Error code



4.7 E3 Error code



5. Appendix

Relation between temperature sensor of compressor and resistance

R25=50KΩ±1%			
B25/50=3950K ±1%			
T [°C]	R min [KΩ]	R nom [KΩ]	R max [KΩ]
-20	449.9	464.7	479.9
-19	425.7	439.5	453.6
-18	402.9	415.7	428.8
-17	381.5	393.4	405.6
-16	361.3	372.3	383.6
-15	342.2	352.5	363.0
-14	324.3	333.9	343.7
-13	307.5	316.4	325.5
-12	291.5	299.8	308.3
-11	276.6	284.3	292.2
-10	262.4	269.6	276.9
-9	249.0	255.7	262.5
-8	236.5	242.7	249.0
-7	224.5	230.3	236.2
-6	213.3	218.7	224.2
-5	202.7	207.7	212.8
-4	192.7	197.3	202.0
-3	183.2	187.5	191.9
-2	174.3	178.3	182.4
-1	165.8	169.5	173.3
0	157.7	161.2	164.7
1	150.2	153.4	156.7
2	142.9	145.9	148.9
3	136.1	138.9	141.7
4	129.7	132.3	134.93
5	123.6	126.0	128.4
6	117.8	120.0	122.3
7	112.2	114.3	116.4
8	107.1	109.0	111.0
9	102.1	103.9	105.7
10	97.42	99.08	100.8

11	92.97	94.51	96.06
12	88.74	90.17	91.61
13	84.73	86.05	87.38
14	80.92	82.14	83.37
15	77.29	78.42	79.56
16	73.84	74.89	75.95
17	70.57	71.54	72.51
18	67.46	68.35	69.25
19	64.49	65.32	66.15
20	61.68	62.44	63.20
21	59.00	59.70	60.40
22	56.44	57.09	57.74
23	54.02	54.61	55.20
24	51.70	52.25	52.80
25	49.50	50.00	50.50
26	47.37	47.87	48.37
27	45.34	45.84	46.34
28	43.41	43.91	44.41
29	41.59	42.08	42.57
30	39.84	40.33	40.82
31	38.18	38.66	39.15
32	36.59	37.07	37.55
33	35.07	35.55	36.03
34	33.64	34.11	34.58
35	32.27	32.73	33.20
36	30.95	31.41	31.87
37	29.70	30.15	30.61
38	28.50	28.95	29.40
39	27.37	27.81	28.25
40	26.29	26.72	27.16
41	25.24	25.67	26.10
42	24.25	24.67	25.09
43	23.31	23.72	24.14
44	22.41	22.81	23.22
45	21.53	21.93	22.33
46	20.71	21.10	21.50
47	19.92	20.30	20.69

48	19.16	19.54	19.92
49	18.44	18.81	19.18
50	17.75	18.11	18.48
51	17.08	17.44	17.80
52	16.44	16.79	17.14
53	15.84	16.18	16.53
54	15.26	15.59	15.93
55	14.69	15.02	15.35
56	14.16	14.48	14.81
57	13.65	13.96	14.28
58	13.15	13.46	13.77
59	12.69	12.99	13.30
60	12.23	12.53	12.83
61	11.80	12.09	12.39
62	11.39	11.67	11.96
63	10.98	11.26	11.54
64	10.60	10.87	11.15
65	10.23	10.50	10.77
66	9.880	10.14	10.41
67	9.537	9.792	10.05
68	9.211	9.460	9.715
69	8.897	9.141	9.391
70	8.595	8.834	9.078
71	8.306	8.539	8.778
72	8.028	8.256	8.490
73	7.759	7.983	8.212
74	7.501	7.720	7.944
75	7.254	7.468	7.687
76	7.016	7.225	7.440
77	6.786	6.991	7.201
78	6.565	6.765	6.971
79	6.352	6.548	6.749
80	6.147	6.339	6.536
81	5.950	6.138	6.331
82	5.761	5.944	6.133
83	5.578	5.757	5.942
84	5.401	5.577	5.758

85	5.231	5.403	5.580
86	5.069	5.237	5.410
87	4.912	5.076	5.245
88	4.760	4.921	5.087
89	4.615	4.772	4.934
90	4.474	4.628	4.787
91	4.338	4.489	4.645
92	4.207	4.354	4.506
93	4.081	4.225	4.374
94	3.958	4.099	4.245
95	3.840	3.978	4.121
96	3.726	3.861	4.001
97	3.616	3.748	3.885
98	3.509	3.639	3.773
99	3.407	3.534	3.665
100	3.308	3.432	3.560
101	3.212	3.333	3.459
102	3.119	3.238	3.361
103	3.030	3.146	3.267
104	2.942	3.056	3.174
105	2.858	2.970	3.086
106	2.778	2.887	3.000
107	2.699	2.806	2.917
108	2.623	2.728	2.837
109	2.549	2.652	2.758
110	2.479	2.579	2.683
111	2.410	2.508	2.610
112	2.343	2.439	2.539
113	2.279	2.373	2.471
114	2.216	2.308	2.404
115	2.156	2.246	2.340
116	2.097	2.186	2.278
117	2.040	2.127	2.217
118	1.985	2.070	2.158
119	1.932	2.015	2.102
120	1.880	1.962	2.047

更新记录表

No.	version	Updated	Update content
1	20231122 版	魏吉	新增版本 V1