Technology leads Intelligent life

Technical & Service Manual

ARV Outdoor Unit

ARV 7 All DC Inverter T1

ARV-H250/SR1MV
ARV-H280/SR1MV
ARV-H330/SR1MV
ARV-H400/SR1MV
ARV-H450/SR1MV
ARV-H500/SR1MV
ARV-H560/SR1MV
ARV-H610/SR1MV
ARV-H680/SR1MV
ARV-H730/SR1MV
ARV-H785/SR1MV
ARV-H850/SR1MV
ARV-H900/SR1MV
ARV-H950/SR1MV
ARV-H1010/SR1MV

2023.04 Version 1

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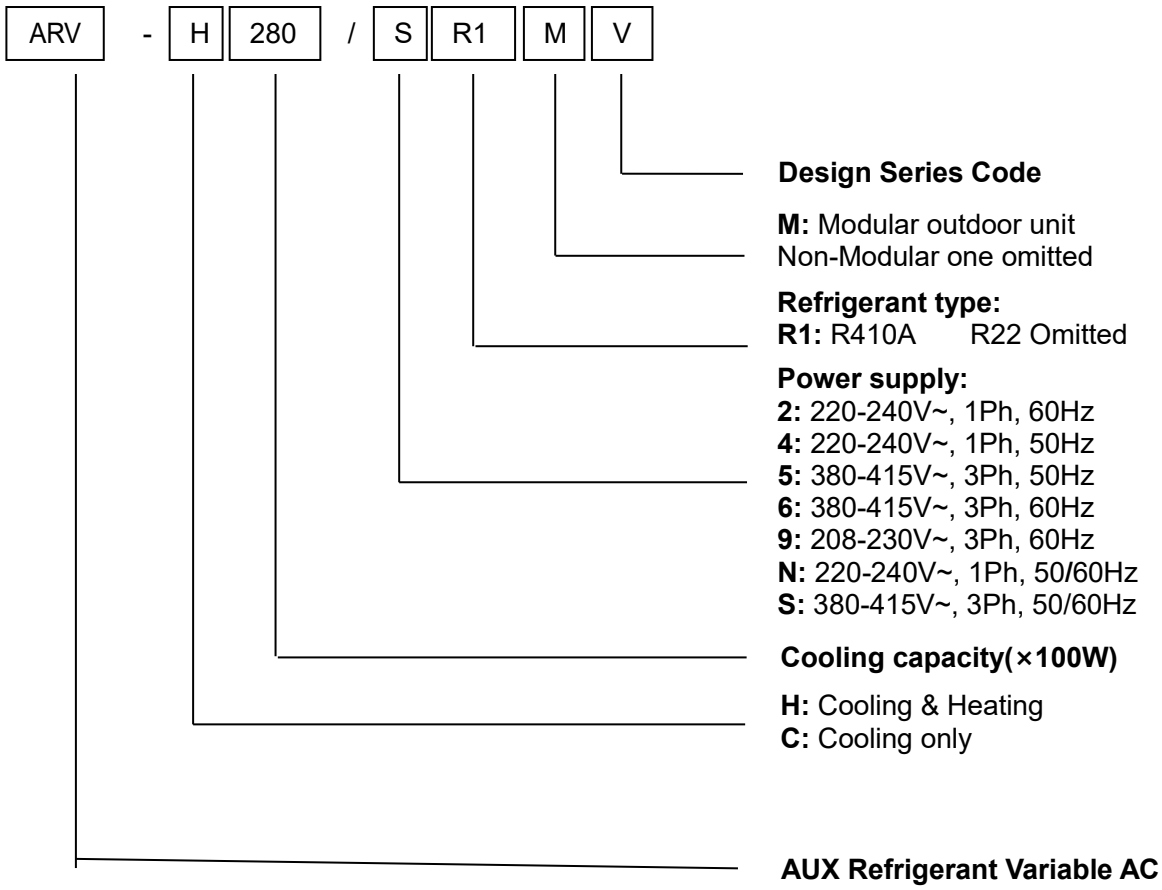
Part1 General Information

1. Nomenclatures

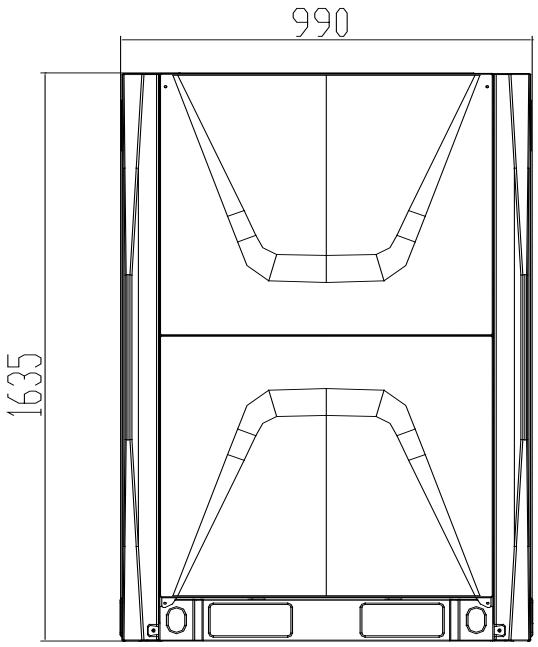


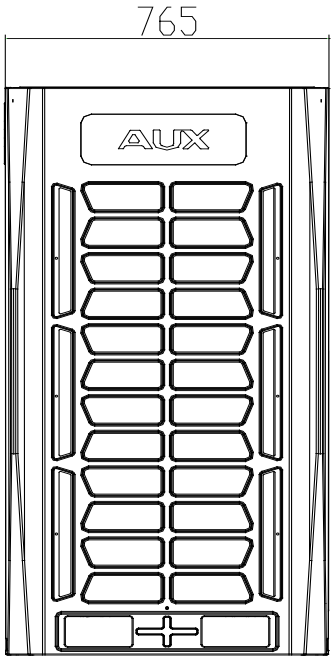
2. Product Line-up (ODU)

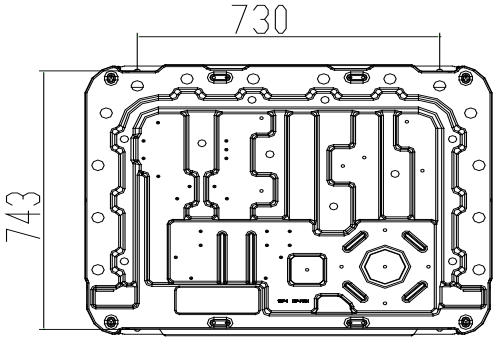
Appearance	Capacity（HP / kW）	Model
	8 / 25.2	ARV-H250/SR1MV
	10 / 28.0	ARV-H280/SR1MV
	12 / 33.5	ARV-H330/SR1MV
	14 / 40.0	ARV-H400/SR1MV
	16 / 45.0	ARV-H450/SR1MV
	18 / 50.4	ARV-H500/SR1MV
	20 / 56.0	ARV-H560/SR1MV
	22 / 61.5	ARV-H610/SR1MV
	24 / 68.0	ARV-H680/SR1MV
	26 / 73.0	ARV-H730/SR1MV
	28 / 78.5	ARV-H785/SR1MV
	30 / 85.0	ARV-H850/SR1MV
	32 / 90.0	ARV-H900/SR1MV
	34 / 95.2	ARV-H950/SR1MV
	36 / 101.0	ARV-H1010/SR1MV

3. Dimensions

ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV (Unit: mm)

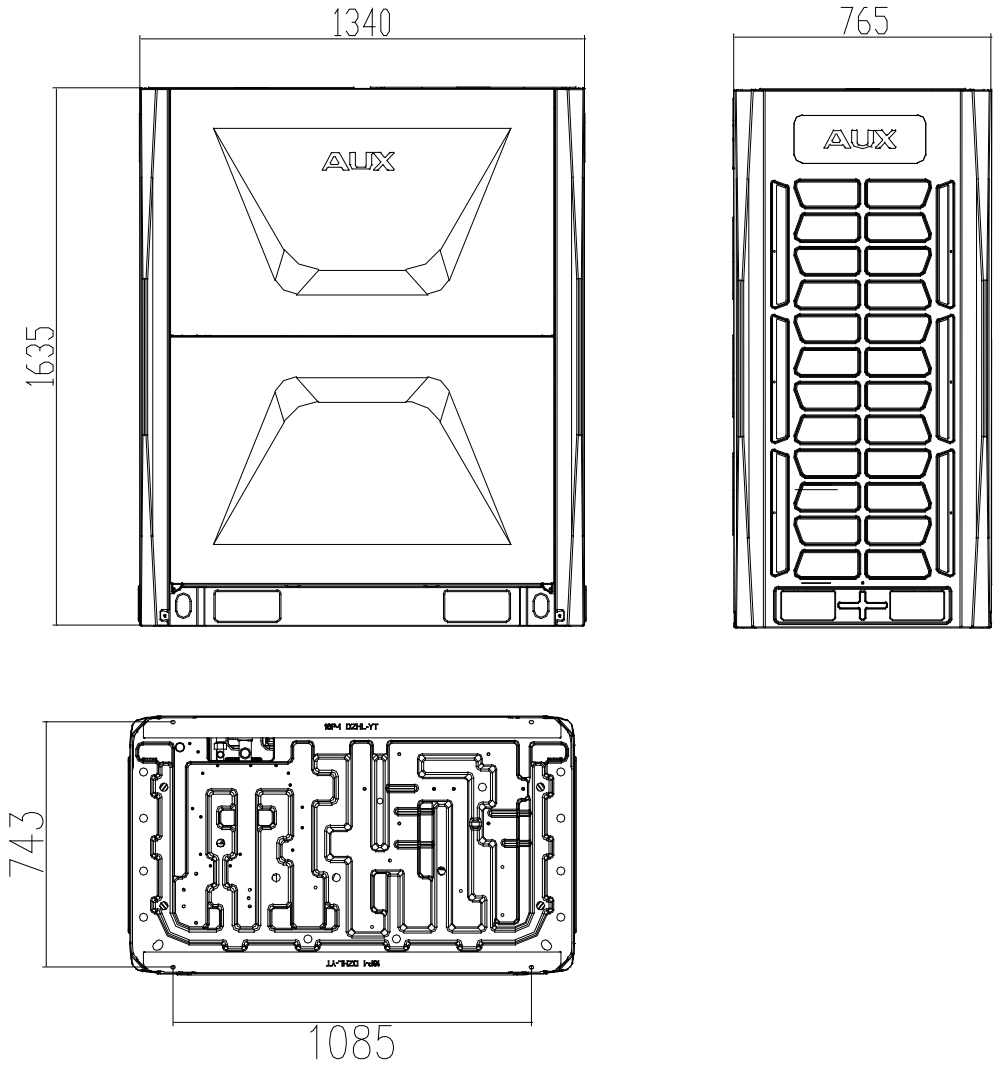




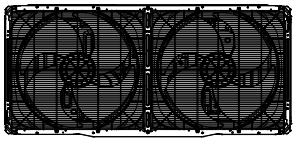


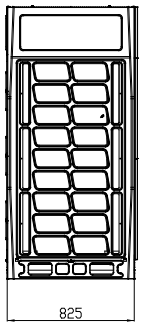
ARV-H400/SR1MV, ARV-H450/SR1MV

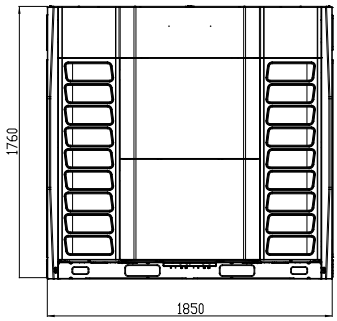
ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV (Unit: mm)

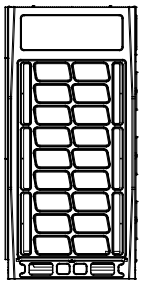


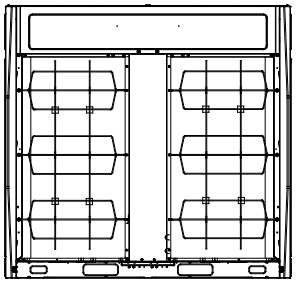
ARV-H680/SR1MV、ARV-H730/SR1MV、ARV-H785/SR1MV、ARV-H850/SR1MV、ARV-H900/SR1MV、ARV-H950/SR1MV、ARV-H1010/SR1MV

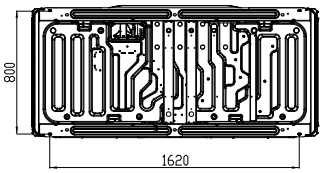












4. Combination

kW	HP	8 HP	10 HP	12 HP	14 HP	16 HP	18 HP	20 HP	22 HP	24 HP	26 HP	28 HP	30 HP	32 HP	34 HP	36 HP
25.2	8	●														
28	10		●													
33.5	12			●												
40	14				●											
45	16					●										
50.4	18						●									
56	20							●								
61.5	22								●							
67	24									●						
73	26										●					
78.5	28											●				
84	30												●			
89.5	32													●		
95	34														●	
101.5	36															●
106.5	38				●					●						
111.9	40				●						●					
117.5	42					●					●					
123	44						●				●					
128.5	46							●			●					
134.5	48								●		●					
140	50									●	●					
145.5	52										●●					
151	54						●									●
156.5	56							●								●
163	58								●							●
168	60									●						●
173.4	62										●					●
179	64											●				●
184.5	66												●			●
190	68													●		●
196	70														●	●
201.5	72															●●
207	74				●					●						●
212.5	76				●						●					●

218	78					●					●					●
224.5	80						●				●					●
229.5	82							●			●					●
234.9	84								●		●					●
240.5	86									●	●					●
246	88										●●					●
253.4	90						●									●●
259	92							●								●●
264.5	94								●							●●
270	96									●						●●
276	98										●					●●
281.5	100											●				●●
287	102												●			●●
292.5	104													●		●●
298	106														●	●●
304.5	108															●●●
308.5	110										●●●			●		
314	112										●●	●		●		
319.5	114										●●		●	●		
325	116										●●			●●		
330.5	118										●	●		●●		
336	120										●		●	●●		
341.5	122										●			●●●		
347	124											●		●●●		
352.5	126												●	●●●		
358	128													●●● ●		
366	130								●							●●●
371.5	132									●						●●●
377.5	134										●					●●●
383	136											●				●●●
388.5	138												●			●●●
394	140													●		●●●
399.5	142														●	●●●
406	144															●●●●

5. Connection ratio

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

Connection ratio is 50~200%

Note

1) 50%~130% is standard for factory setting.

2) Max connection ratio can up to 200%, if the project is needed over 130%, parameter should be set on outdoor unit's PCB, please contact with technical engineer at first.

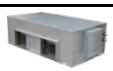
3) When Fresh air processor units are connected, the connection ratio must be within 50% to 100%.

4) When Fresh air processor units are connected, the total indoor unit’s capacity must not exceed 30% of the outdoor unit.

6. Product features and benefits

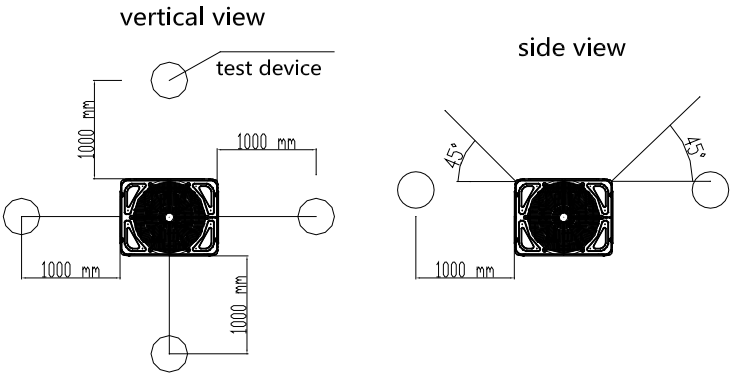
Refer to the product presentation or ARV7 catalog

7. Product Line-up (IDU)

Type	Picture	Capacity: kW																
		2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0	10.0	11.2	12.5	14.0	15.0	22.4	28.0	45.0	56.0
cassette compact (DC)			●	●	●	●												
22.cassette (AC&DC)			●	●	●	●	●	●	●	●	●	●	●					
Ceiling & Floor (DC)					●	●	●	●	●		●	●						
Wall mounted (DC)		●	●	●	●	●	●											
Slim Duct (AC&DC)		●	●	●	●	●	●											
Mid ESP Duct (50/80 Pa AC&DC)					●	●	●	●	●	●	●	●	●	●				
High ESP Duct (196Pa AC)											●	●	●	●				
High ESP Duct (170Pa DC)															●	●		
Fresh Air Unit (AC)															●	●	●	●
Heat Recovery Ventilator (AC)		Air Volume (m³/h): 200~5000																

Part2 Performance Parameter

1. Sound level



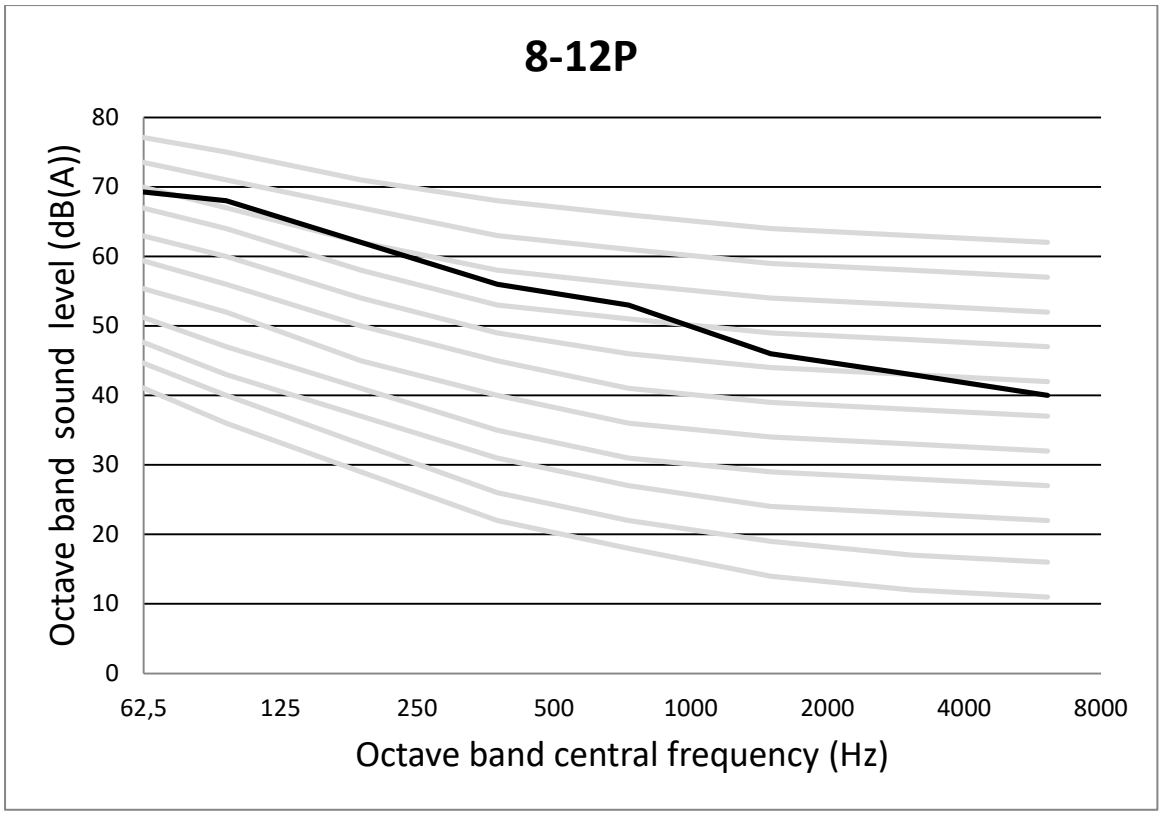
Model	Sound (dB)
ARV-H250/SR1MV	43-58
ARV-H280/SR1MV	43-58
ARV-H330/SR1MV	43-58
ARV-H400/SR1MV	43-61
ARV-H450/SR1MV	43-61
ARV-H500/SR1MV	43-63
ARV-H560/SR1MV	43-63
ARV-H610/SR1MV	43-63
ARV-H680/SR1MV	43-62
ARV-H730/SR1MV	43-62
ARV-H785/SR1MV	43-63
ARV-H850/SR1MV	43-64
ARV-H900/SR1MV	43-64
ARV-H950/SR1MV	43-66
ARV-H1010/SR1MV	43-66

Note:

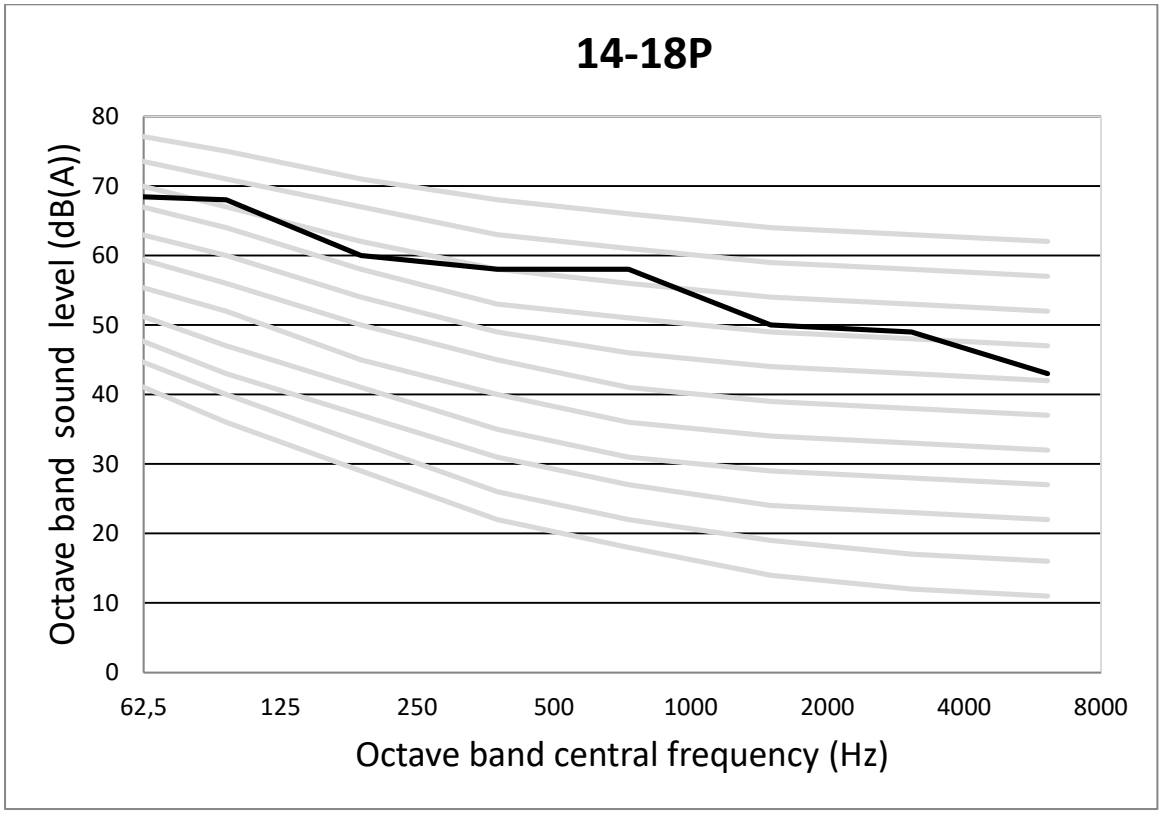
1. The operating condition are assumed to be standard(JIS Condition).
2. These operating values were obtained in a dead room (conversion values).
   Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of the particular room in which the equipment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

Noise spectrogram

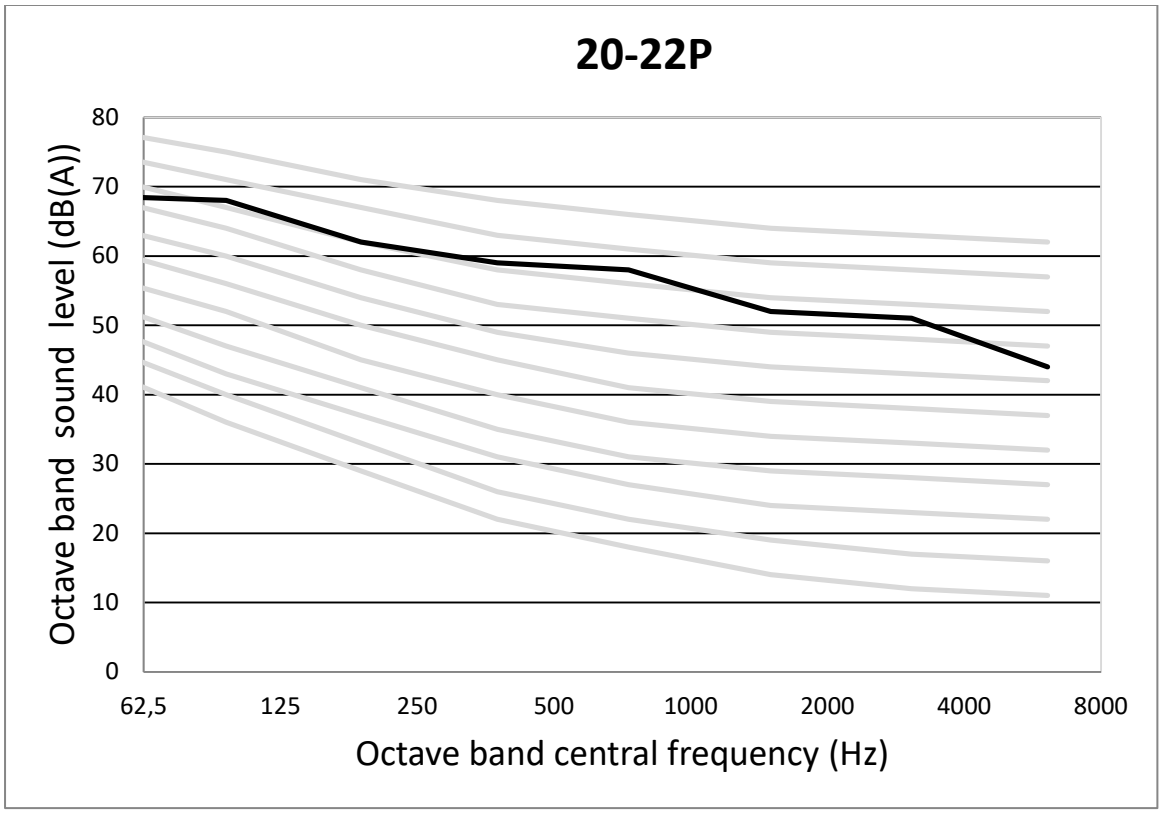
ARV-H250/SR1MV、ARV-H280/SR1MV、ARV-H330/SR1MV



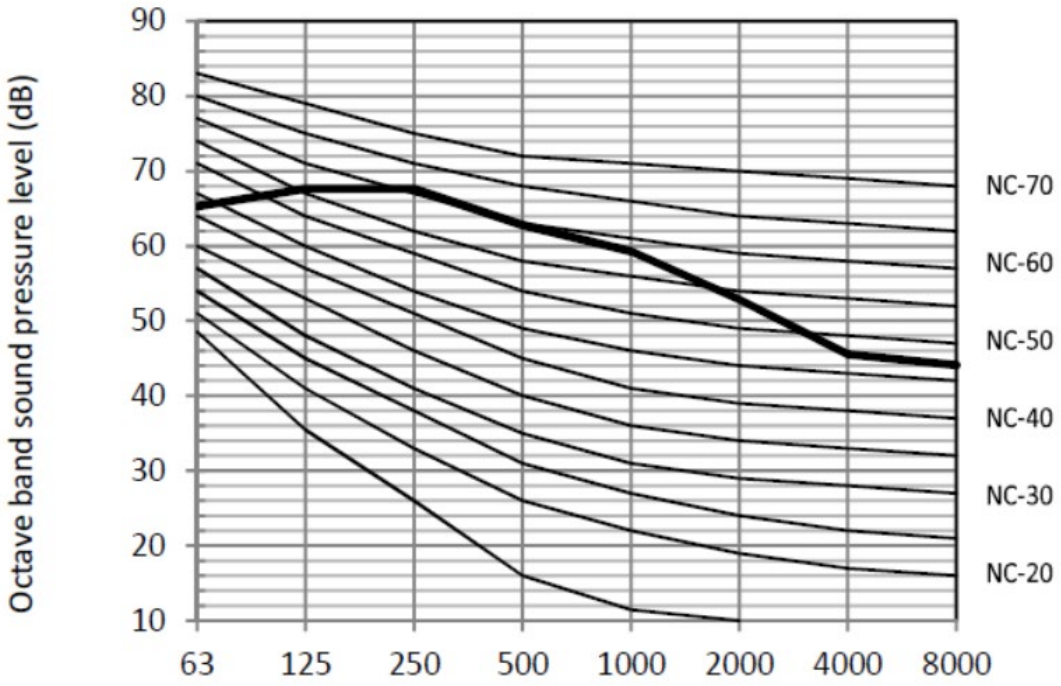
ARV-H400/SR1MV、ARV-H450/SR1MV、ARV-H500/SR1MV



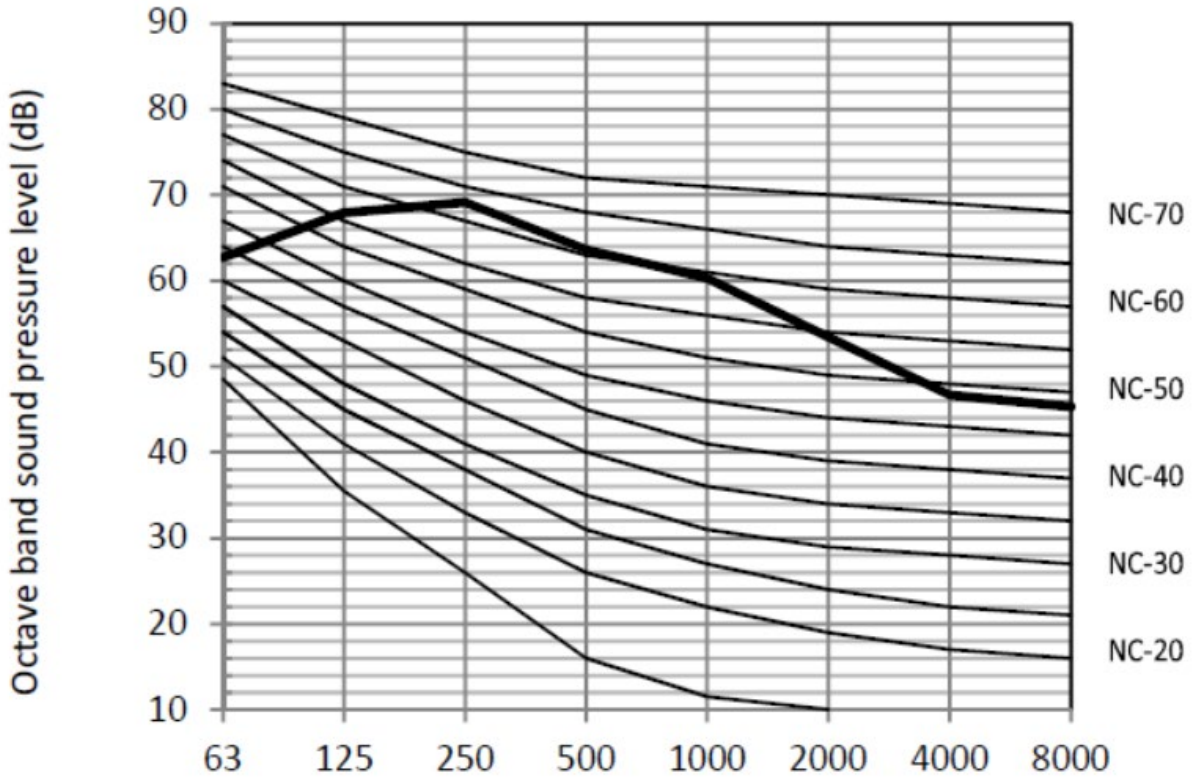
ARV-H560/SR1MV、ARV-H610/SR1MV



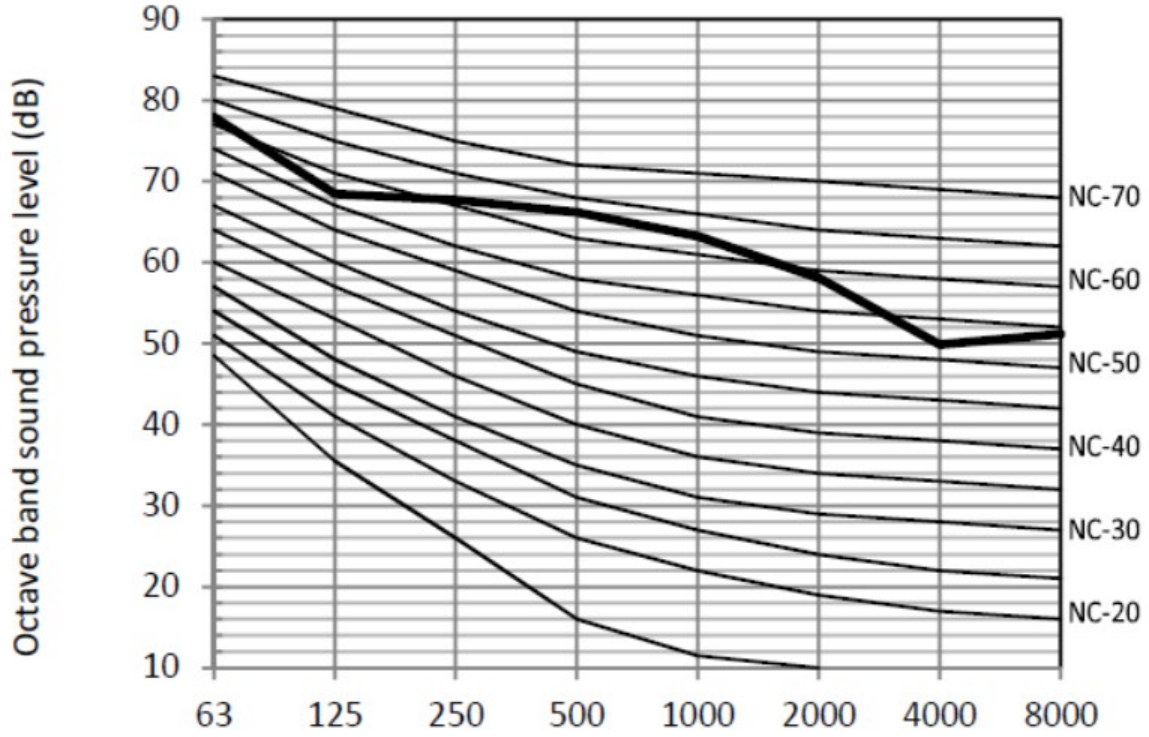
ARV-H680/SR1MV



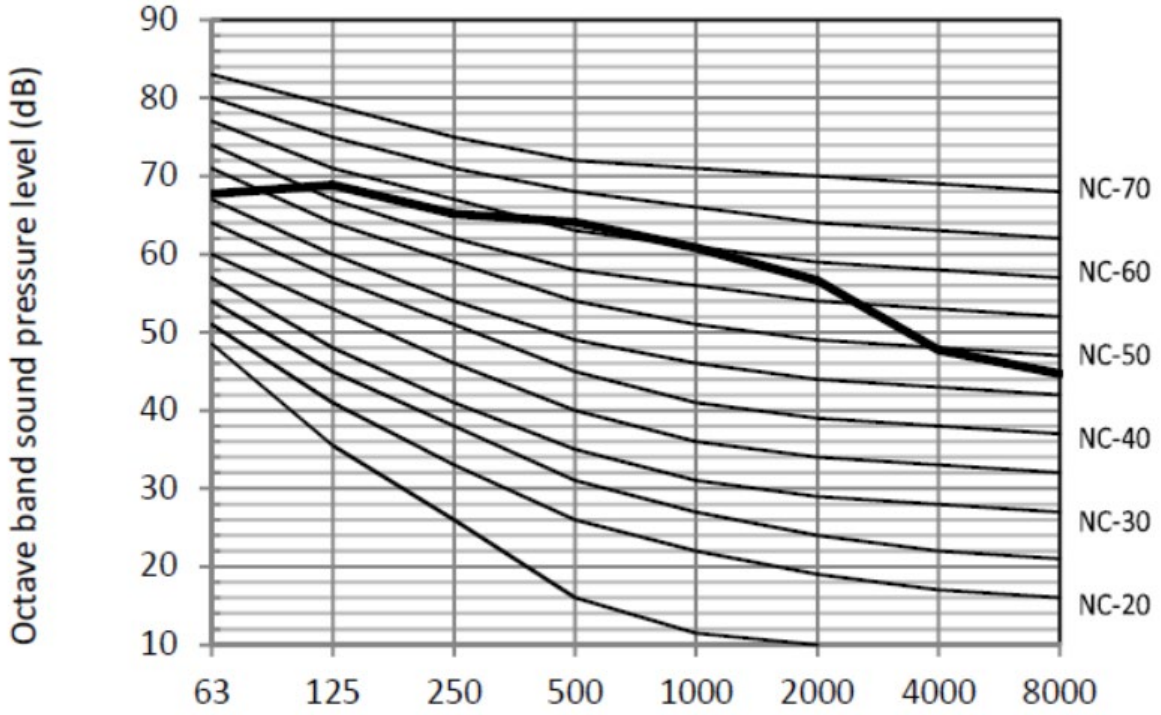
ARV-H730/SR1MV



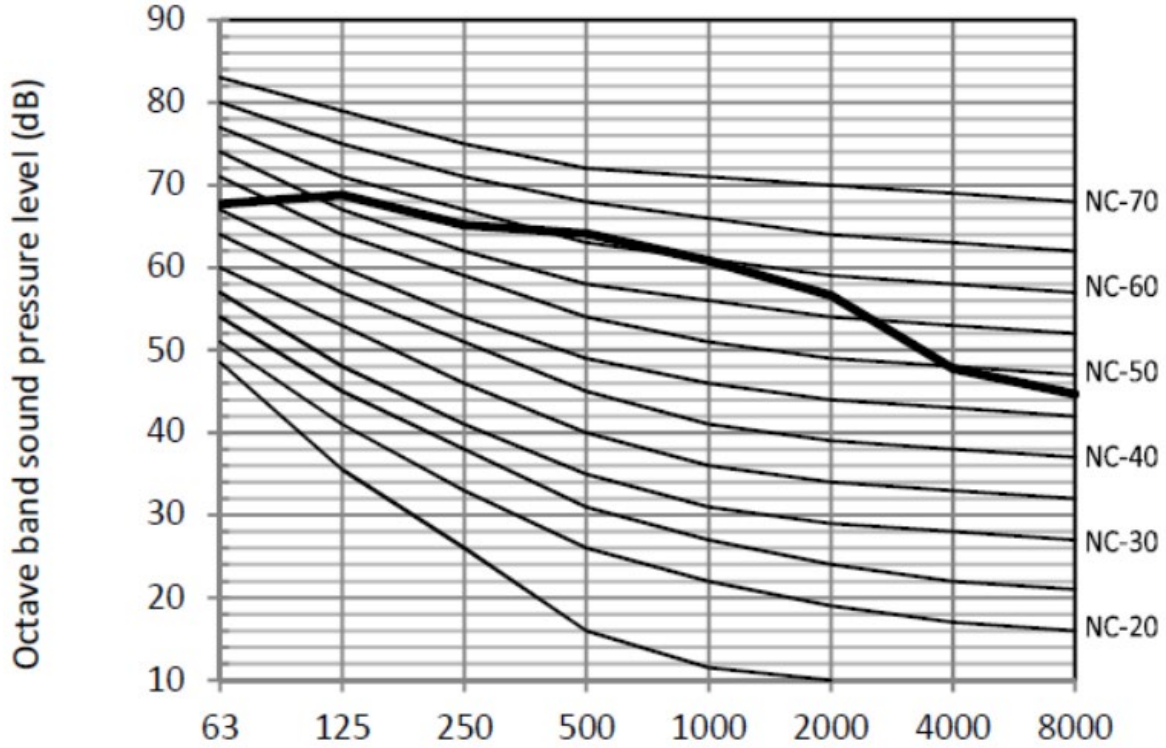
ARV-H785/SR1MV



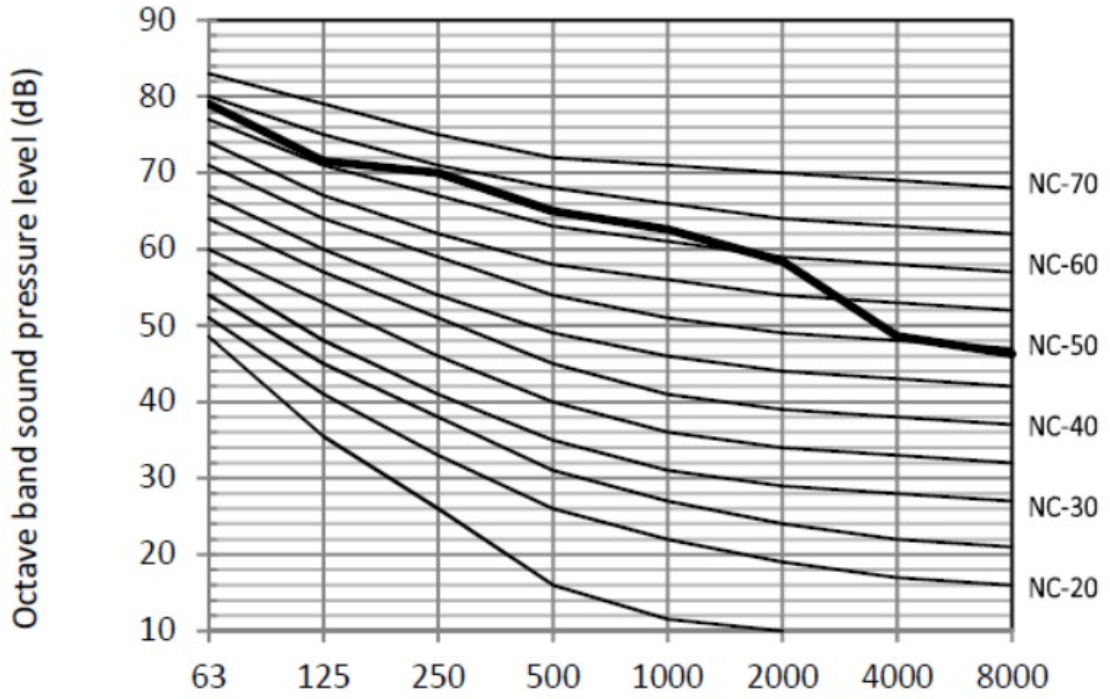
ARV-H850/SR1MV



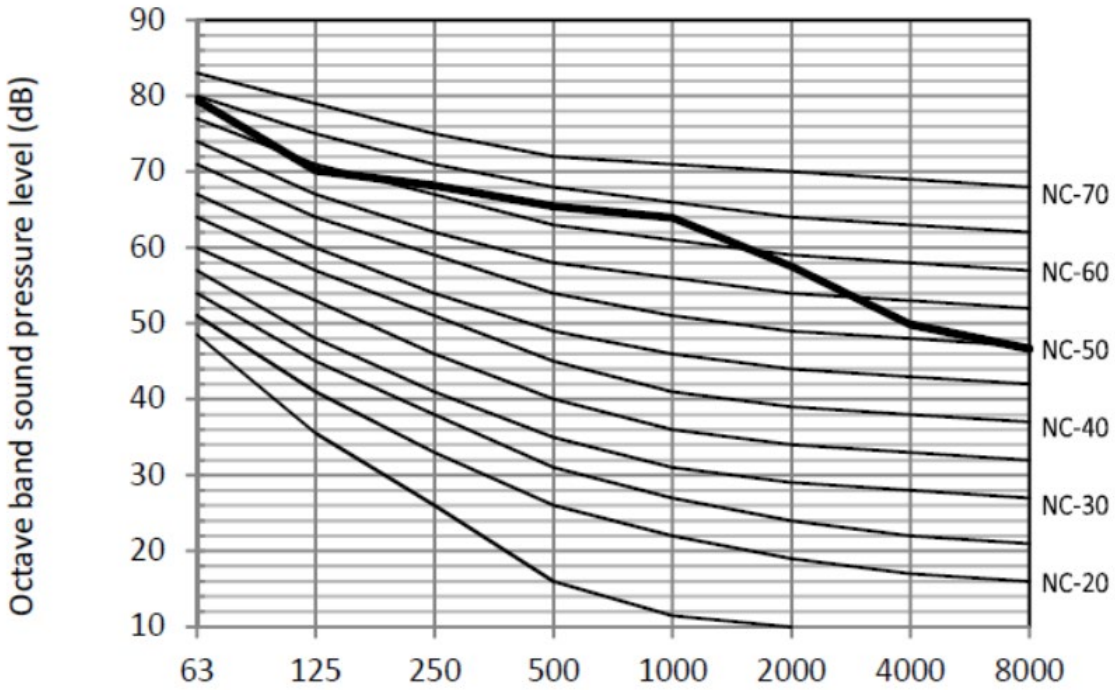
ARV-H900/SR1MV



ARV-H950/SR1MV



ARV-H1010/SR1MV



2. Specifications

Refer to the specification of EXCEL version

3. Capacity table

ARV-H250/SR1MV

ARV-H280/SR1MV

ARV-H330/SR1MV

ARV-H400/SR1MV

ARV-H450/SR1MV

ARV-H500/SR1MV

ARV-H560/SR1MV

ARV-H610/SR1MV

ARV-H680/SR1MV

ARV-H730/SR1MV

ARV-H785/SR1MV

ARV-H850/SR1MV

ARV-H900/SR1MV

ARV-H950/SR1MV

ARV-H1010/SR1MV

※ Cooling and Heating capacity table see another handbook in detail

※ The specifications are subject to change without prior notice. Final specifications please refer to technical specification provided by sales representative

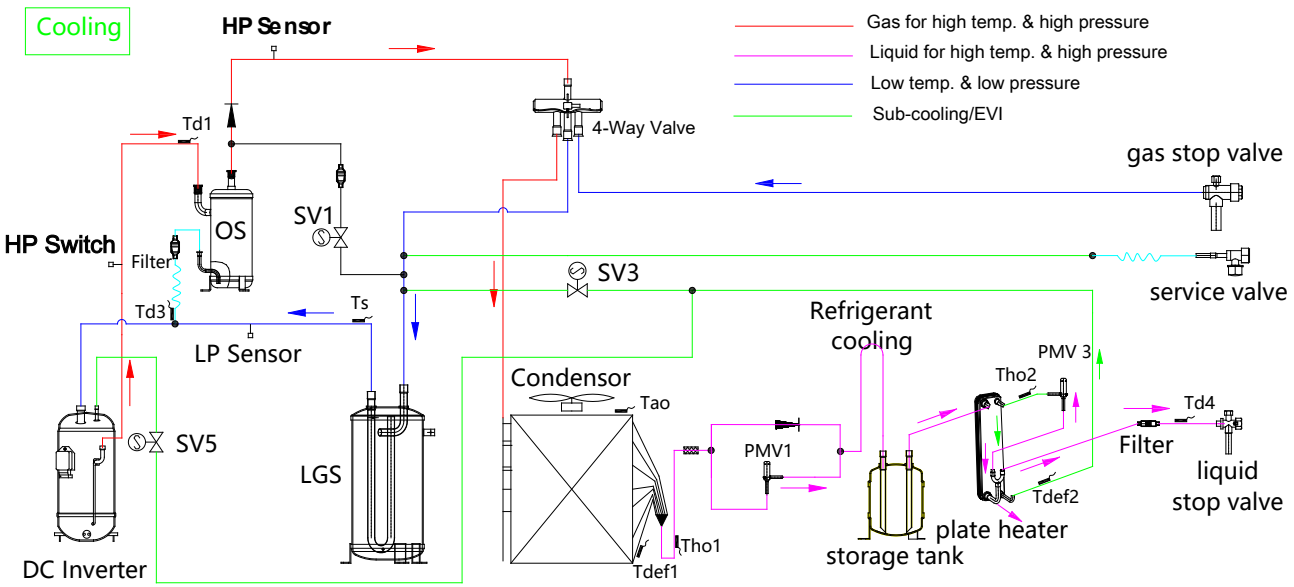
Part3 Refrigerant Circuit

8-22HP

Cooling

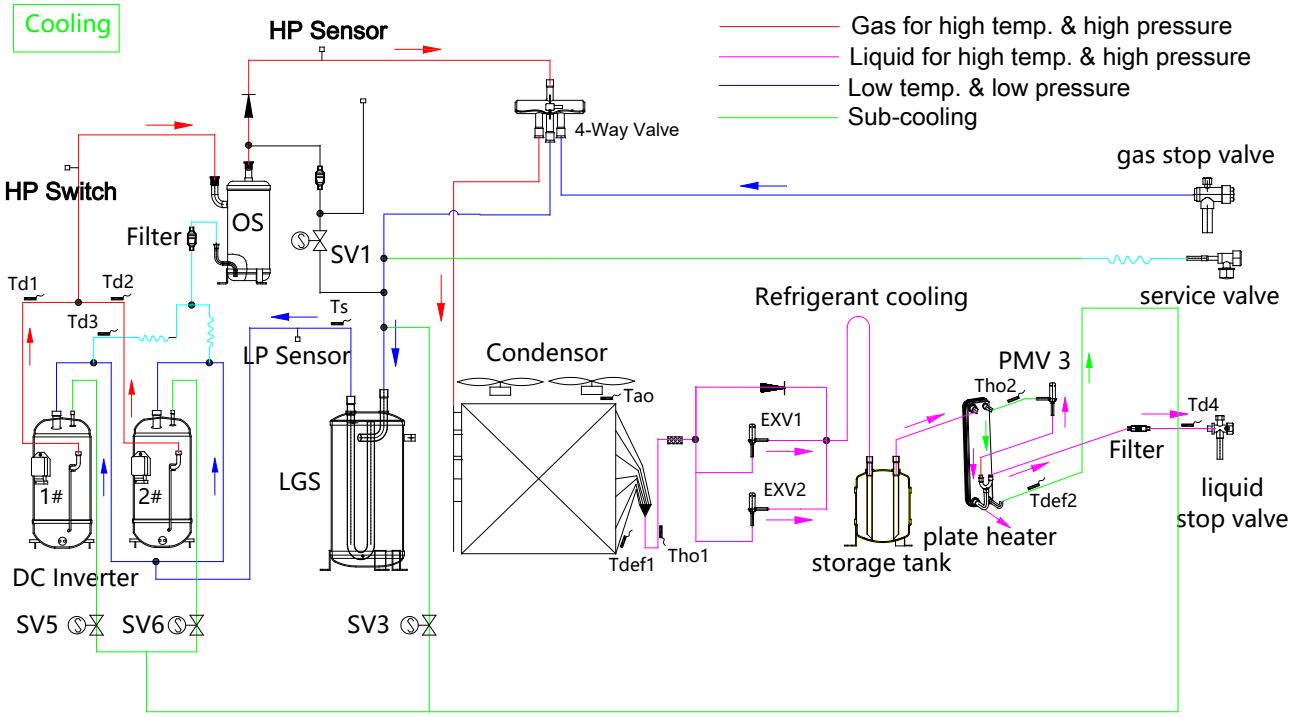
ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV

ARV-H400/SR1MV, ARV-H450/SR1MV



NO.	Component (Sensors)	Full name
1	T_{ho2}	Outlet temperature of PMV3
2	T_{def2}	Outlet temperature of sub-cooler
3	T_{ao}	Environment temperature
4	T_s	Gas-liquid separator outlet/Suction temperature
5	T_{ho1}	Condenser outlet temperature
6	T_{def1}	Defrost temperature
7	T_{d1}	Discharge of compressor 1#
8	T_{d3}	Oil temperature
9	T_{d4}	Liquid piping temperature of ODU

ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV



NO.	Component (Sensors)	Full name
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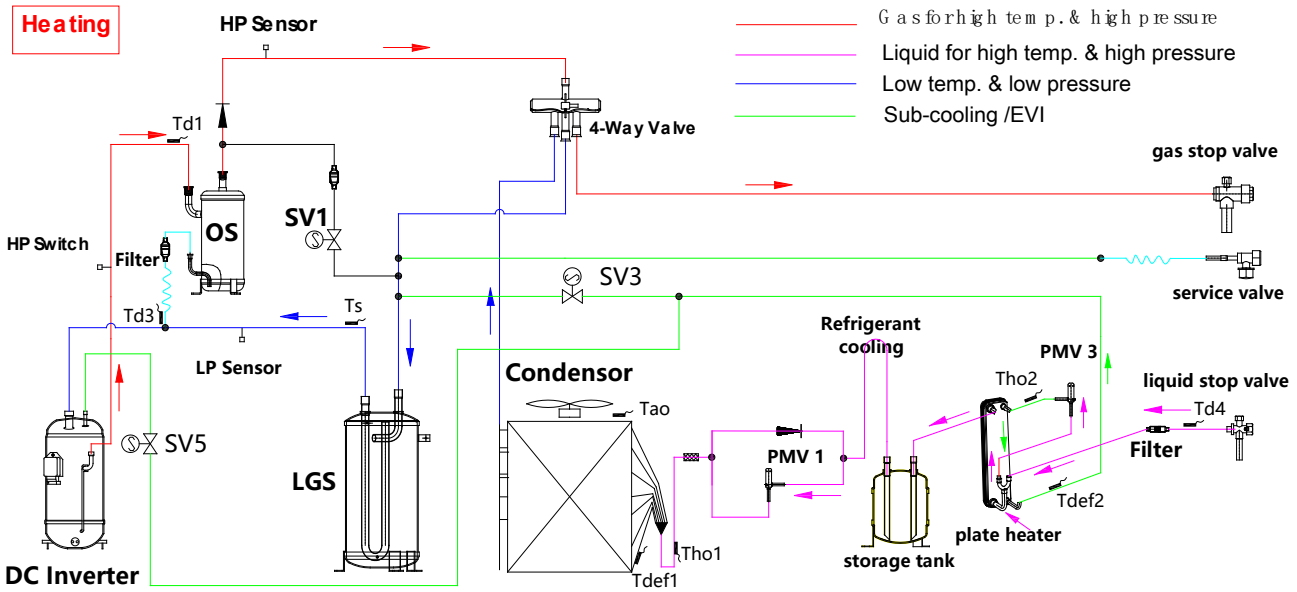
3	T_{ao}	Environment temperature
4	T_s	Gas-liquid separator outlet/Suction temperature
5	T_{ho1}	Condenser outlet temperature
6	T_{def1}	Defrost temperature
7	T_{d1}	Discharge of compressor 1#
8	T_{d3}	Oil temperature
9	T_{d4}	Liquid piping temperature of ODU
10	T_{d2}	Discharge of compressor 2#

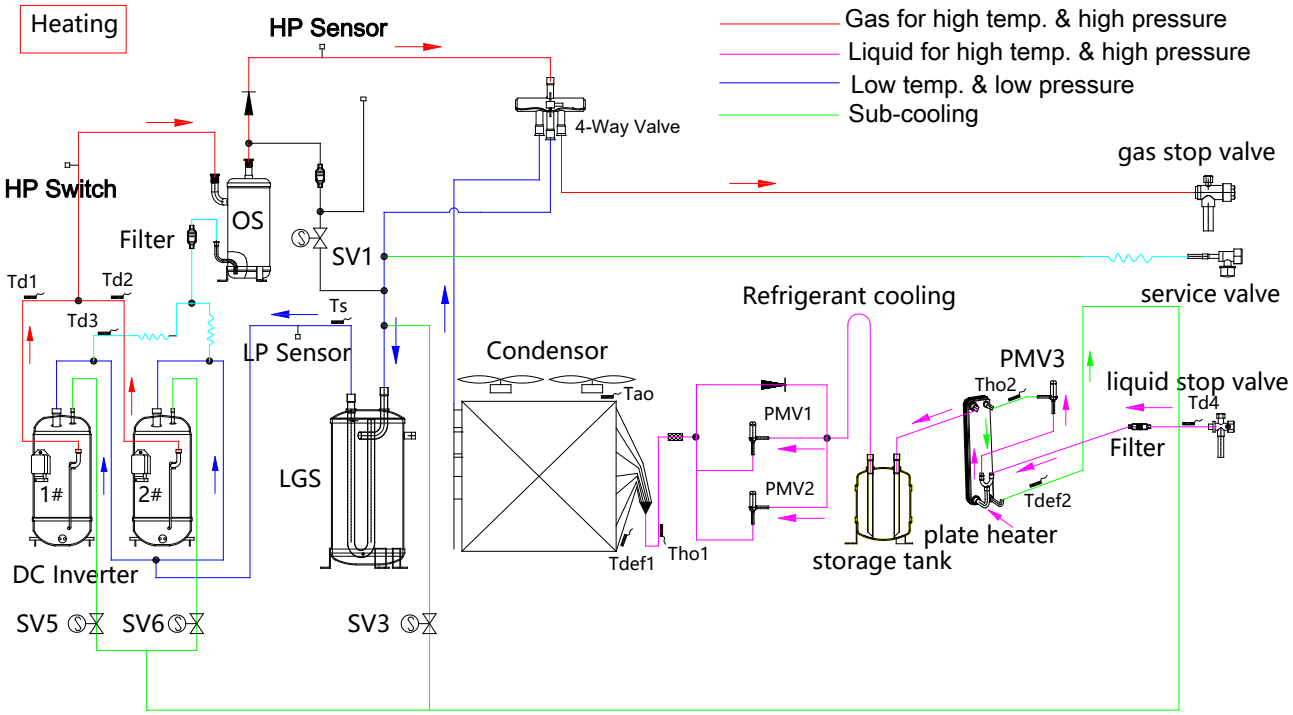
Heating Operation

ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MVARV-H400/SR1MV, ARV-H450/SR1MV



NO.	Component (Sensors)	Full name
1	T_{ho2}	Outlet temperature of PMV3
2	T_{def2}	Outlet temperature of sub-cooler
3	T_{ao}	Environment temperature
4	T_s	Gas-liquid separator outlet/Suction temperature
5	T_{ho1}	Condenser outlet temperature
6	T_{def1}	Defrost temperature
7	T_{d1}	Discharge of compressor 1#
8	T_{d3}	Oil temperature
9	T_{d4}	Liquid piping temperature of ODU

ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV



NO.	Component (Sensors)	Full name
1	T_{ho2}	Outlet temperature of PMV3
2	T_{def2}	Outlet temperature of sub-cooler
3	T_{ao}	Environment temperature
4	T_s	Gas-liquid separator outlet/Suction temperature
5	T_{ho1}	Condenser outlet temperature
6	T_{def1}	Defrost temperature
7	T_{d1}	Discharge of compressor 1#
8	T_{d3}	Oil temperature
9	T_{d4}	Liquid piping temperature of ODU
10	T_{d2}	Discharge of compressor 2#

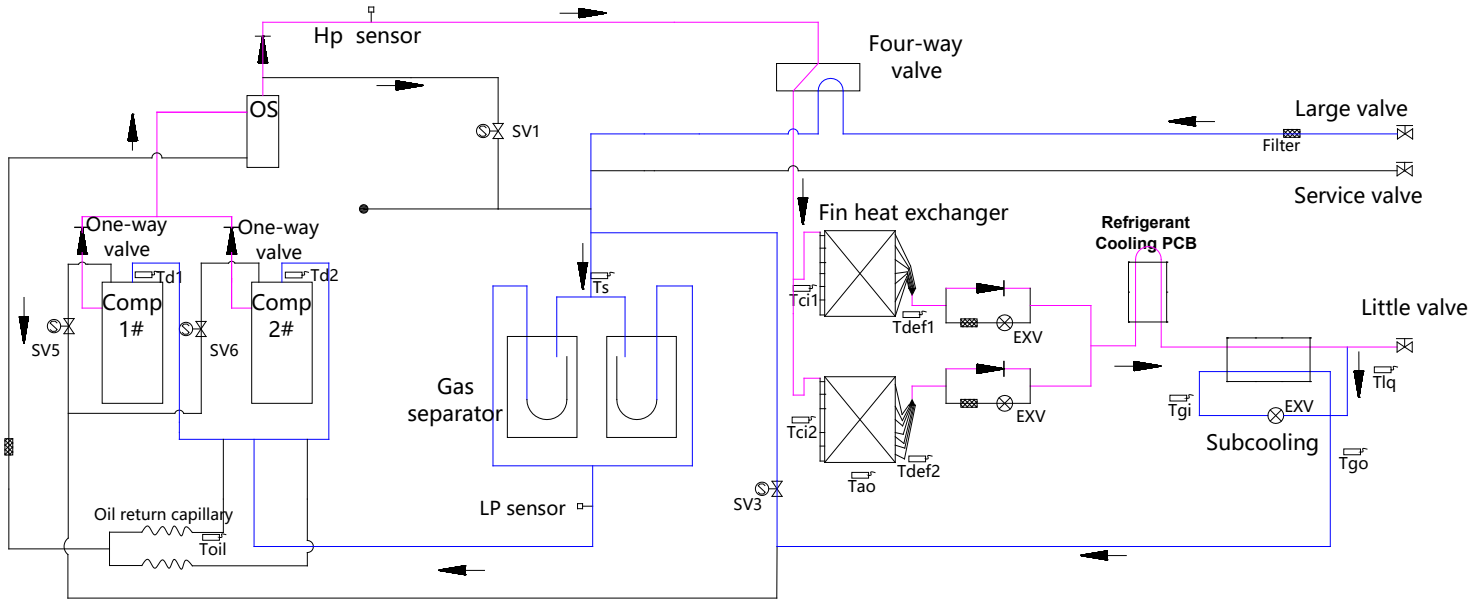
Component introduce

Component name	Main function
DC Inverter	**DC inverter compressor:** Compressor work frequency range is 20~120 Hz.
HP Switch	**High Pressure Switch:** When refrigerant high-pressure value over the target pressure value, switch valve is disconnected, signal is interrupted, then stop running to protect the refrigerant system
OS	**Oil Separator:** To separate refrigeration oil and high-pressure refrigerant
Filter	Filter impurities to avoid blockage of electronic expansion valve
SV1	**Unload Valve**
SV5/ SV6	**Enhance vapor injection Valve**
HP sensor	**High Pressure Sensor:** Detecting refrigerant system high pressure value
4-way valve	Change the refrigerant flow direction to achieve cooling or heating mode
Plate Heater	**Sub-cooler:** 5.5℃ sub-cooling by plate heat exchanger make sure liquid refrigerant flow into evaporator Instead of gas-liquid refrigerant flow into evaporator , reduce Airflow noise and temperature fluctuation and support long piping length
SV3	**Sub-cooling Valve**
Refrigerant Cooling	Well cooled by refrigerant, ensuring the long life time of the PCB
PMV	**EXV:** throttling and reducing refrigerant pressure
LGS	**Liquid-gas separator:** To separate gas refrigerant and liquid refrigerant
LP Sensor	**Low Pressure Sensor:** Detecting refrigerant system low pressure value

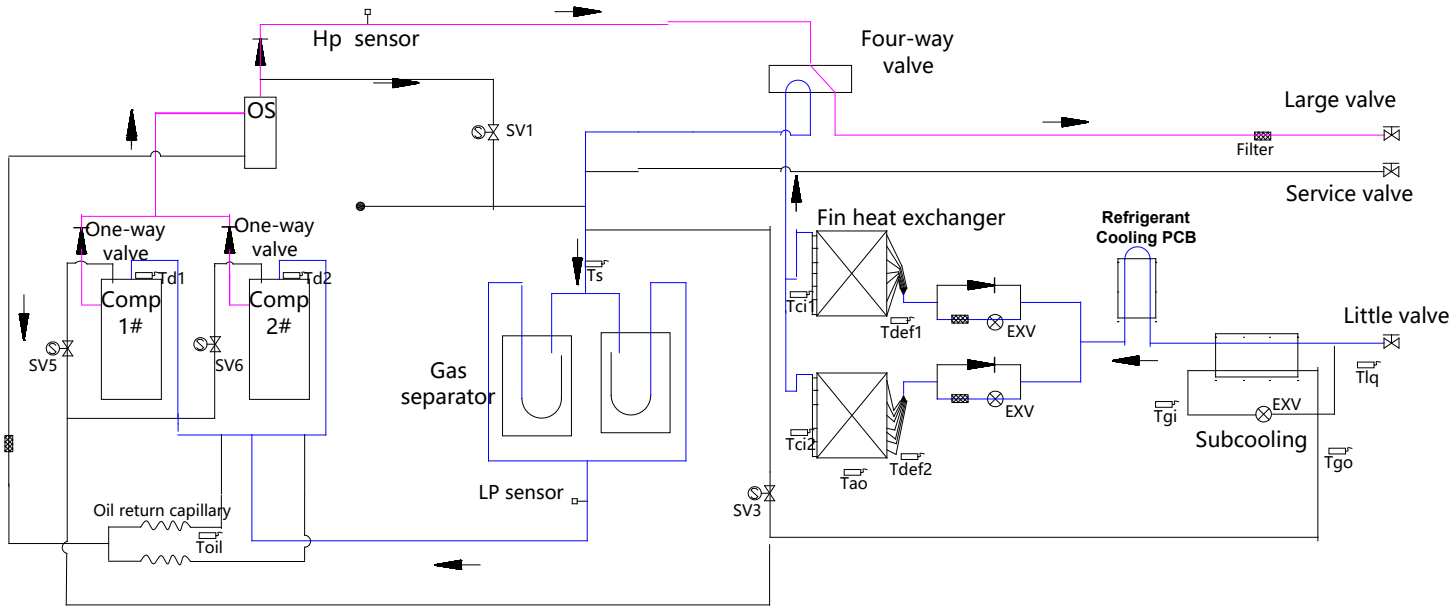
24-36 HP

ARV-H680/SR1MV、ARV-H730/SR1MV、ARV-H785/SR1MV、ARV-H850/SR1MV、ARV-H900/SR1MV、ARV-H950/SR1MV、ARV-H1010/SR1MV

Cooling operation



Heating operation



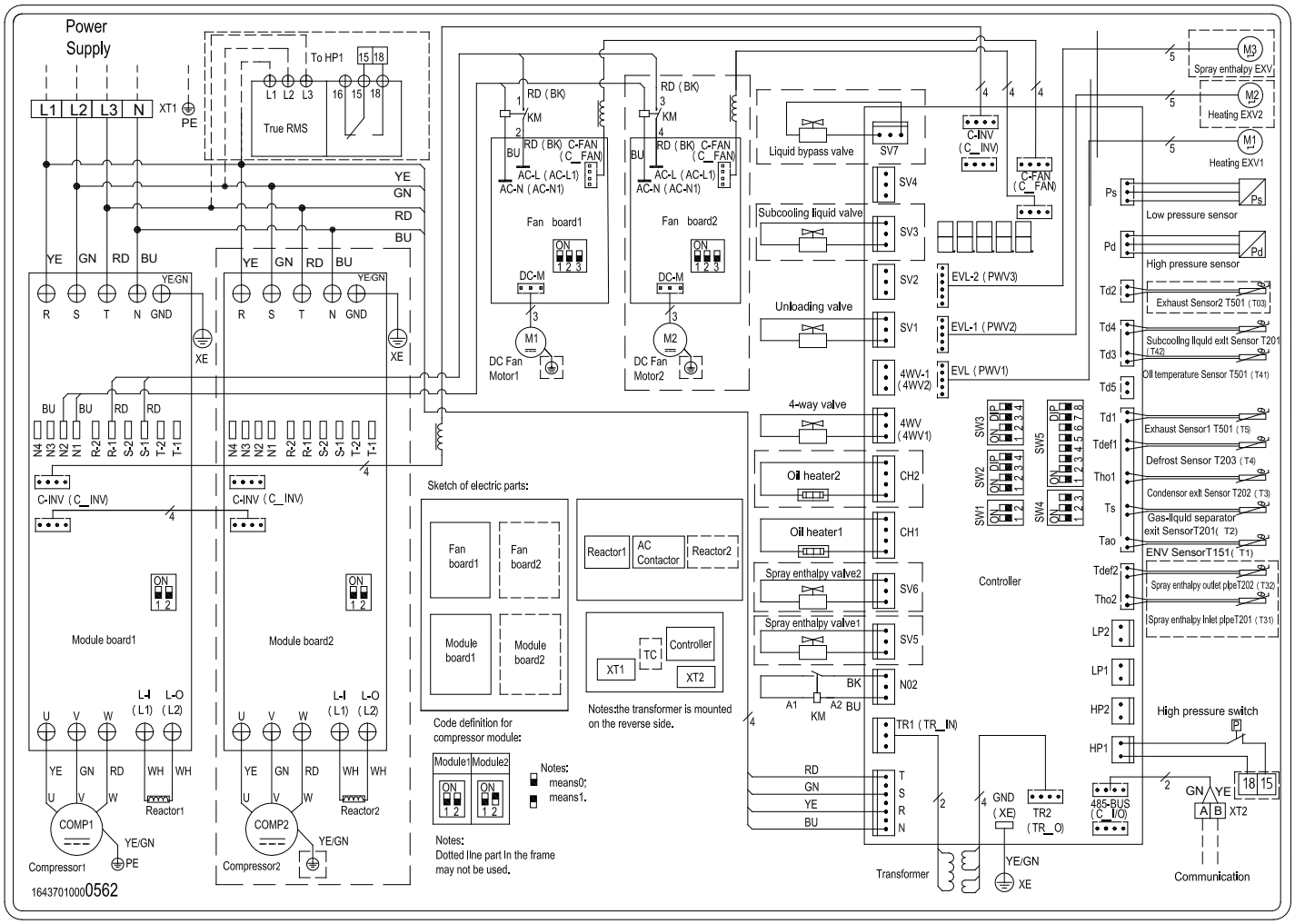
Component introduces

Component name	Main function
Comp 1# / Comp 2#	**DC inverter Compressor:** Compressor work frequency range is **15~110 Hz.**
OS	**Oil Separator:** To separate refrigeration oil and high pressure refrigerant **Spec:** Ø127*300
Filter	Filter impurities to avoid blockage of electronic expansion valve
SV1	**Unload Valve:** When low pressure ≤0.231MPa in cooling mode or ≤0.12MPa in heating mode, SV1 will be turned on to balance pressure.
SV3	**Solenoid valve:** subcooling
SV5	**Solenoid valve:** Enthalpy of injection
SV6	**Solenoid valve:** Enthalpy of injection
HP sensor	**High Pressure Sensor:** Detecting refrigerant system high pressure value
4-way valve	Change the refrigerant flow direction to achieve cooling or heating mode
Refrigerant Cooling PCB	Well cooled by refrigerant, ensuring the long life time of the PCB
EXV	**EXV:** throttling and reducing refrigerant pressure
LP Sensor	**Low Pressure Sensor:** Detecting refrigerant system low pressure value
Tao	Environment temperature sensor
Ts	Gas-liquid separator outlet temperature sensor
Tci1/Tci2	Condenser outlet temperature sensor
Tdef1/Tdef2	Defrost temperature sensor
Td1	Discharge temperature sensor of compressor 1#
Td2	Discharge temperature sensor of compressor 2#
Tiol	Oil temperature sensor
Tgi	Spray Enthalpy Inlet pipe temperature sensor
Tgo	Spray Enthalpy Outlet pipe temperature sensor
Tlq	Subcooling liquid exit temperature sensor

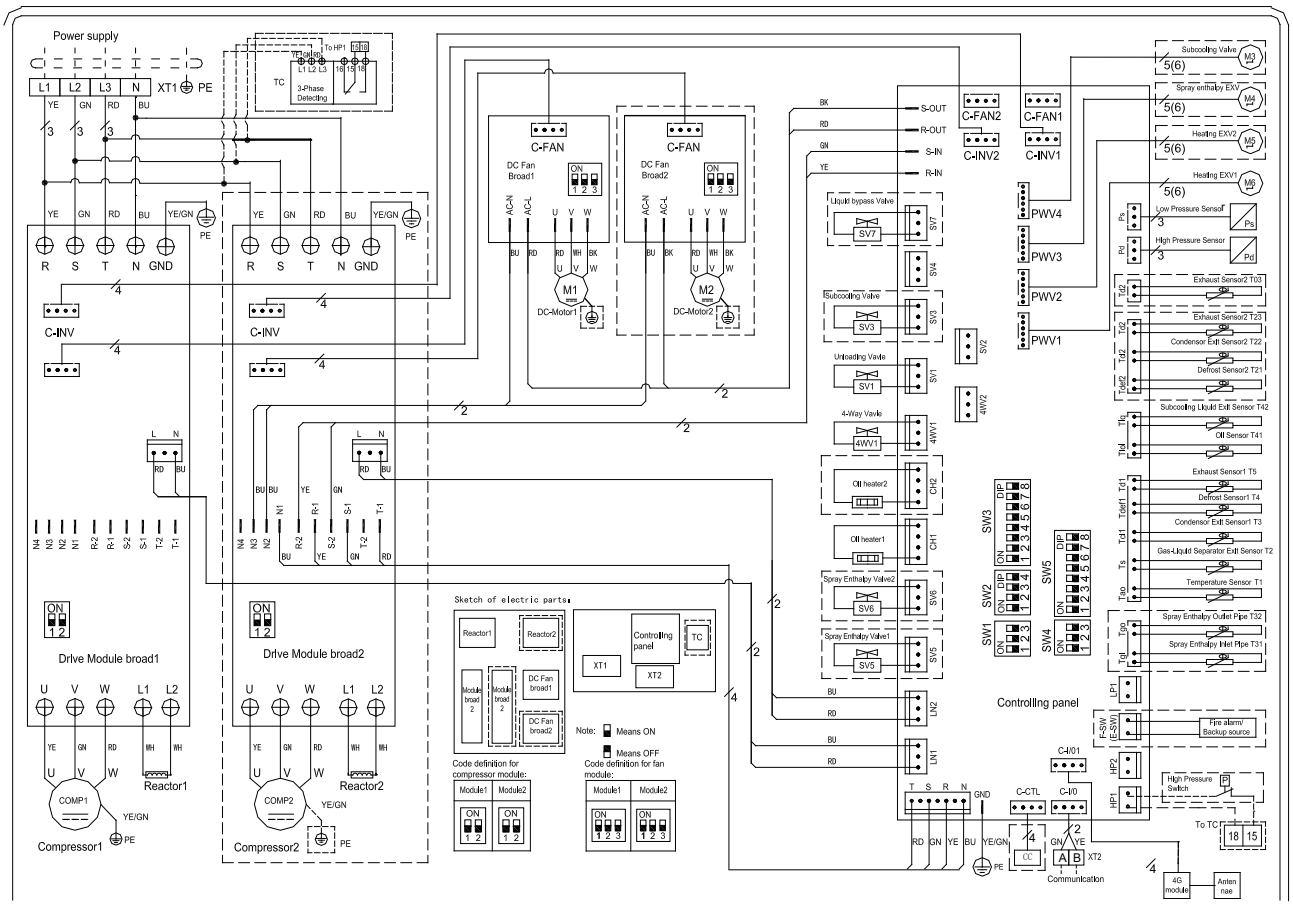
Part4 Electrical Principle Diagram

1. Electrical Principle Diagram

ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV， ARV-H400/SR1MV, ARV-H450/SR1MV，ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV



ARV-H680/SR1MV、ARV-H730/SR1MV、ARV-H785/SR1MV、ARV-H850/SR1MV、ARV-H900/SR1MV、ARV-H950/SR1MV、ARV-H1010/SR1MV



2. DIP Switch

ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV， ARV-H400/SR1MV, ARV-H450/SR1MV，ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV

SW1:Master slave selection

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

SW2:Refrigerating capacity selection

ON	Spare
ON	8HP(22.4KW)
ON	9HP(25.2KW)
ON	10HP(28KW)
ON	12HP(33.5KW)
ON	14HP(40KW)
ON	16HP(45KW)
ON	18HP(50.4KW)
ON	20HP(56KW)
ON	22HP(61.5KW)
ON	24HP(67KW)
ON	26HP(73KW)
ON	28HP(78.5KW)
ON	30HP(85KW)
ON	32HP(90KW)
ON	Spare

SW3:Model selection

ON	T1
ON	T3
ON	X7-I
ON	X7(A)
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare

Notes:

" ■ "means OFF

" ■ "means ON

SW4:Function selection

ON	Compressor emergency	No compressor emergency (Default)
ON		1# compressor emergency
ON		2# compressor emergency
ON		3# compressor emergency
ON	Mudule emergency	No mudule emergency(Default)
ON		Mudule emergency

SW5:Special function selection

Quiet mode	ON	No quiet mode (Default)
	ON	Quiet in night
	ON	Ordinary quiet mode
	ON	Strong mode
Running mode	ON	Automatic priority (Default)
	ON	First match wins
	ON	Cooling priority
	ON	Majority rule
Static pressure selection	ON	Normal(Default)
	ON	20pa
	ON	50pa
	ON	80pa
No.7	ON	Spare
	ON	Spare
No.8	ON	Spare
	ON	Spare

ARV-H680/SR1MV、ARV-H730/SR1MV、ARV-H785/SR1MV、ARV-H850/SR1MV、
ARV-H900/SR1MV、ARV-H950/SR1MV、ARV-H1010/SR1MV

Code definition for 36HP series:

SW1:
External machine address selection

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

SW3:
Model selection

ON	X7-T1
ON	X7-T3
ON	X7-I
ON	X7 (A)
ON	X7-IN
ON	X7 (A)-IN
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
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	16HP/450
ON	18HP/504
ON	20HP/560
ON	22HP/615
ON	24HP/670
ON	26HP/730
ON	28HP/785
ON	30HP/850
ON	32HP/900
ON	34HP/950
ON	36HP/1015
ON	38HP/1065
ON	40HP/1120
ON	42HP/1170
ON	45HP/1200
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare

SW3:
Capacity selection

ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Spare
ON	Invalid

Code for SW4:
Function selection

No.1 to No.2	Compressor emergency	ON	No compressor emergency (Default)
		ON	1# compressor emergency
		ON	2# compressor emergency
		ON	Spare
No.3	Module emergency	ON	No module emergency (default)
		ON	Module emergency

Notes:

1、 means OFF means ON

2. Some main control boards are not have Code (SW2、SW3), they are used for after-sales guidance

1643701000 0642

Code for SW5:
Function selection

No.1 to No.4	Quiet/ Strong mode	ON	Normal (default)
		ON	Quiet1
		ON	Quiet2
		ON	Quiet3
		ON	Quiet4
		ON	Quiet5
		ON	Quiet6
		ON	Quiet in night1
		ON	Quiet in night2
		ON	Quiet in night3
		ON	Quiet in night4
		ON	Quiet in night5
		ON	Quiet in night6
		ON	Strong1
		ON	Strong2
		ON	Strong3
No.5 to No.6	Mode priority	ON	Automatic priority (default)
		ON	First match wins (Default)
		ON	Cooling priority
		ON	Majority rule
No.7 to No.8	Static pressure selection	ON	Normal (default)
		ON	Low static pressure
		ON	Middle static pressure
		ON	High static pressure

Note:
Some models have no content inside dashed frame

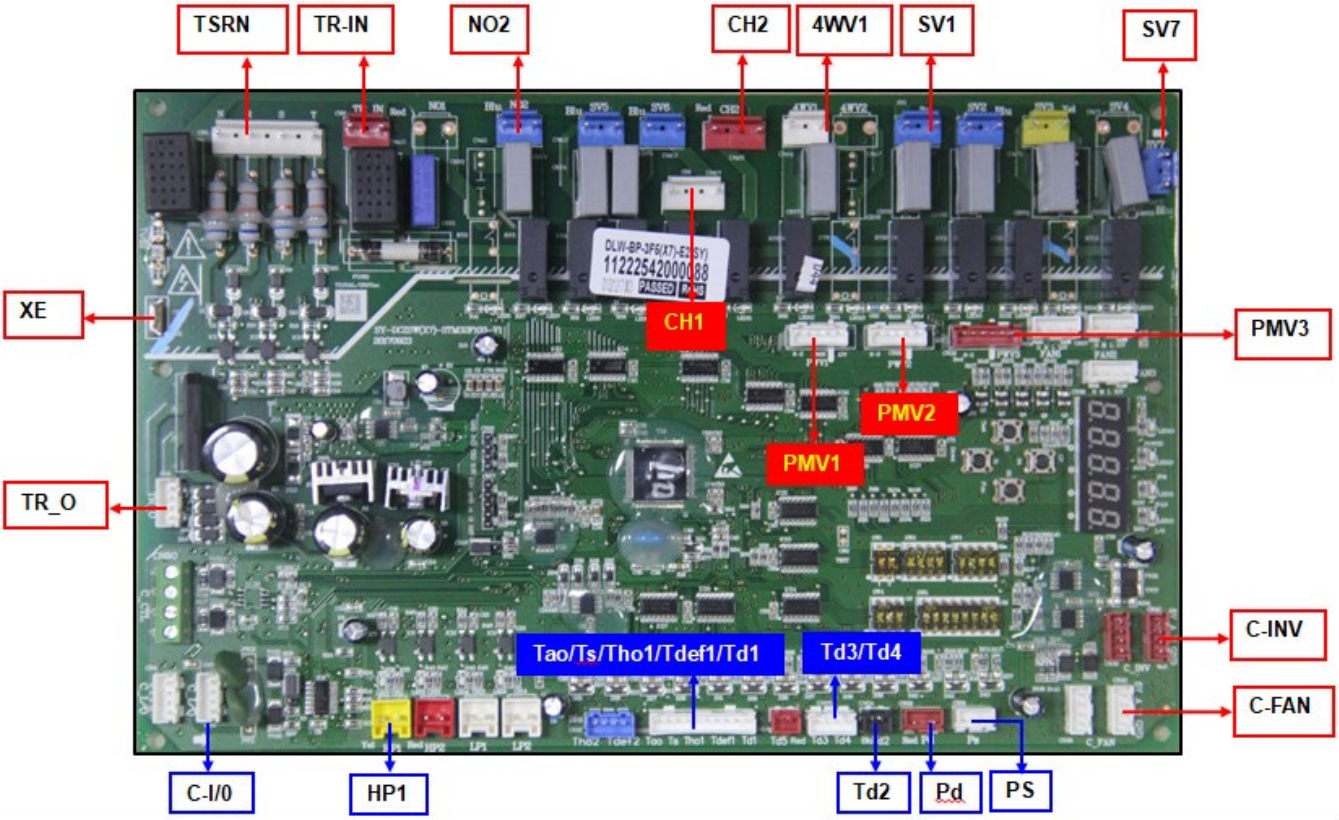
Part5 Control System

1. Main PCB

ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV，ARV-H400/SR1MV,

ARV-H450/SR1MV，ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV

11222542000139 CJ 控制板 DLW-BP-3F5(X7)-E7(SY)

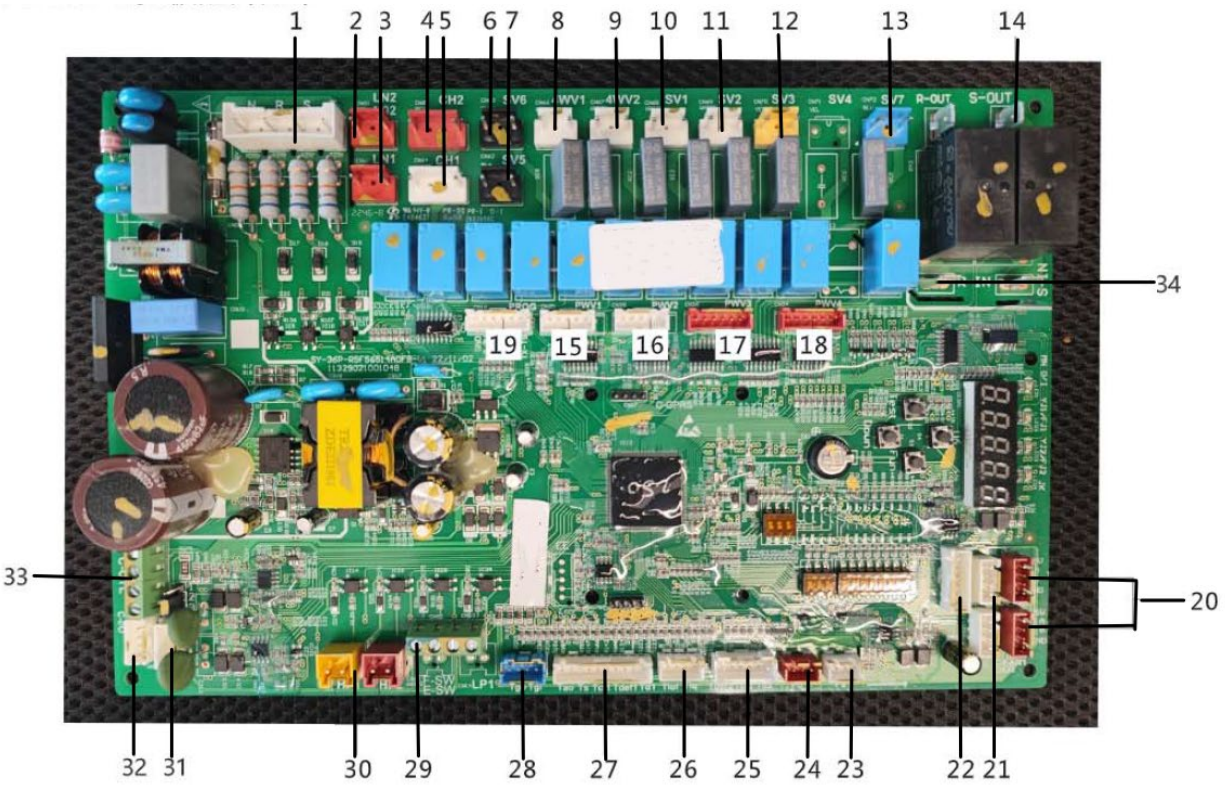


Definition of ports

Symbol Abbreviation	Detailed information
N R S T	Power input
TR_IN	Transform input
N02	AC contact
CH1	1# Compressor preheating
CH2	2# Compressor preheating
4WV1	4-way valve
SV1	Unloading valve
SV7	By-pass valve
PWV1	1# Heating EXV
PWV2	2# Heating EXV
PWV3	Electronic expansion valve of Vapor injection
C_INV	Drive modular of compressor
C_FAN	Drive modular of fan motor
C_I/O	Communication Ports
HP1	High pressure switch
Tao	Environment temperature
Ts	Gas-liquid separator outlet
Tho1	Condenser outlet
Tdef1	Defrost
Td1	Discharge of compressor 1#
Td3	Oil temperature
Td2	Discharge of compressor 2#
Pd	High pressure sensor
Ps	Low pressure sensor
TR_O	Transform output
XE	Ground wire

ARV-H680/SR1MV、ARV-H730/SR1MV、ARV-H785/SR1MV、ARV-H850/SR1MV、ARV-H900/SR1MV、ARV-H950/SR1MV、ARV-H1010/SR1MV

11222542000159 CJ 控制板 DLW-BP-3F536P 涡旋-E7(SY)

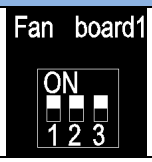
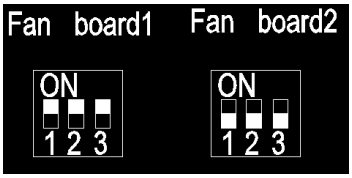
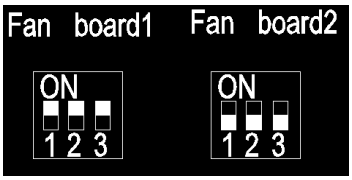


Definition of ports

No.	Port name	Function
1	NRST	Power input
2	Tran in	Transform input
3	Tran in	Transform input
4	CH2	2# Compressor preheating
5	CH1	1# Compressor preheating
6	SV6	reserve
7	SV5	reserve
8	4WV1	4-way valve
9	4WV2	4-way valve
10	SV1	Solenoid valve (unloading valve)
11	SV2	reserve
12	SV3	reserve
13	SV7	reserve
14	R/S-OUT	Fan drive board fire line out
15	PWV1	Heating electronic expansion valve 1#
16	PWV2	Heating electronic expansion valve 2#
17	PWV3	Subcooling electronic

		expansion valve
18	PWV4	Reserve
19		Main program burning port
20		DC fan signal
21		INV COMP signal
22		USB interface
23	Ps	Low pressure sensor
24	Pd	High pressure sensor
25	Tdef2	Defrosting temperature sensor 2#
	Tci2	Heat exchanger outlet pipe temperature sensor 2#
	Td2	Discharge of compressor 2#
26	Toil	Oil temperature sensor
	Tlq	Subcooled liquid outlet pipe temperature sensor
27	Tao	Environment temperature
	Ts	Gas-liquid separator outlet
	Tci1	Heat exchanger outlet pipe temperature sensor 1#
	Tdef1	Defrosting temperature sensor 1#
	Td1	Discharge of compressor 1#
28	Tgl	Enhanced vapor injection inlet pipe temperature sensor
	Tgo	Enhanced vapor injection outlet pipe temperature sensor
29	LP1(Obligate)	Reserve
30	HP1(HP2 Obligate)	Reserve
31	C-I/01	4G module communication
32	In/out BUS、A1B1A2B2	Communication Port
33	C-CTL	Centralized control communication
34	R/S-IN	Fan drive board fire line in

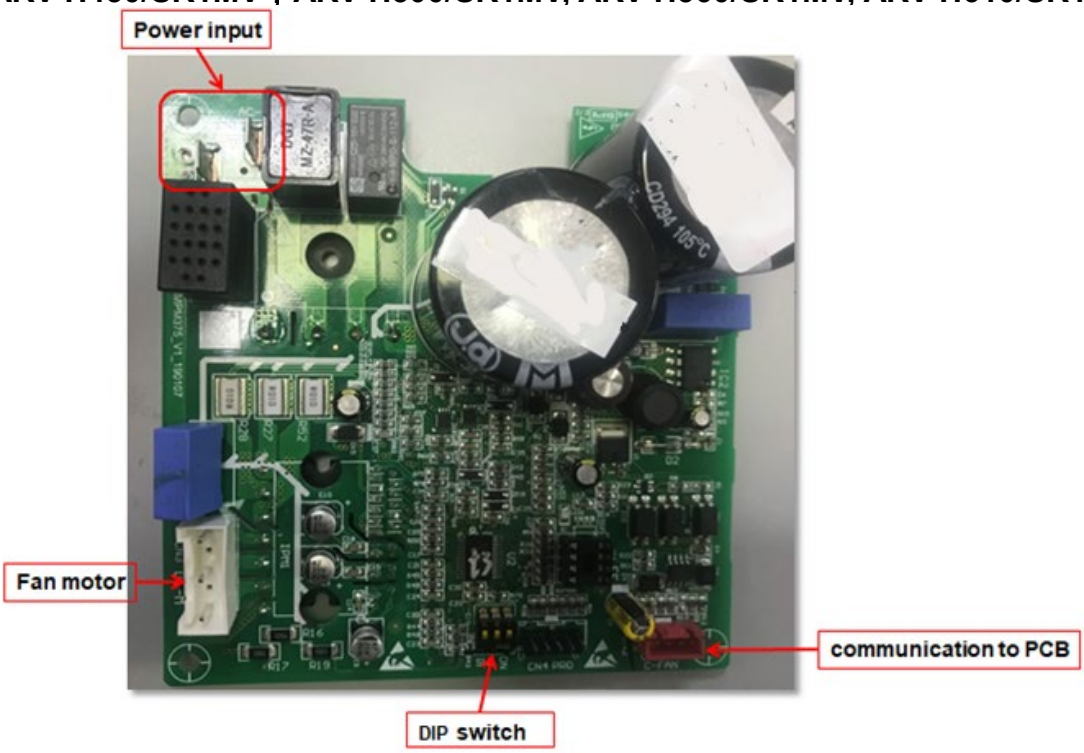
2. Fan drive module PCB

ODU MODEL	FAN DRIVE PCB		QTY	DIP switch
ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV	11222543000037	CJ module board QD-12121F750 W fan drive-1 (SY)	1	
ARV-H400/SR1MV, ARVH450/SR1MV, ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV	11222543000039	CJ module board QD-12121F450 W fan drive-1 (SY)	2	
ARV-H680/SR1MV ARV-H730/SR1MV ARV-H785/SR1MV ARV-H850/SR1MV ARV-H900/SR1MV ARV-H950/SR1MV ARV-H1010/SR1MV	11222030000049	CJ module board QD-12122F100 0W 风机驱动 -E1(SY	2	

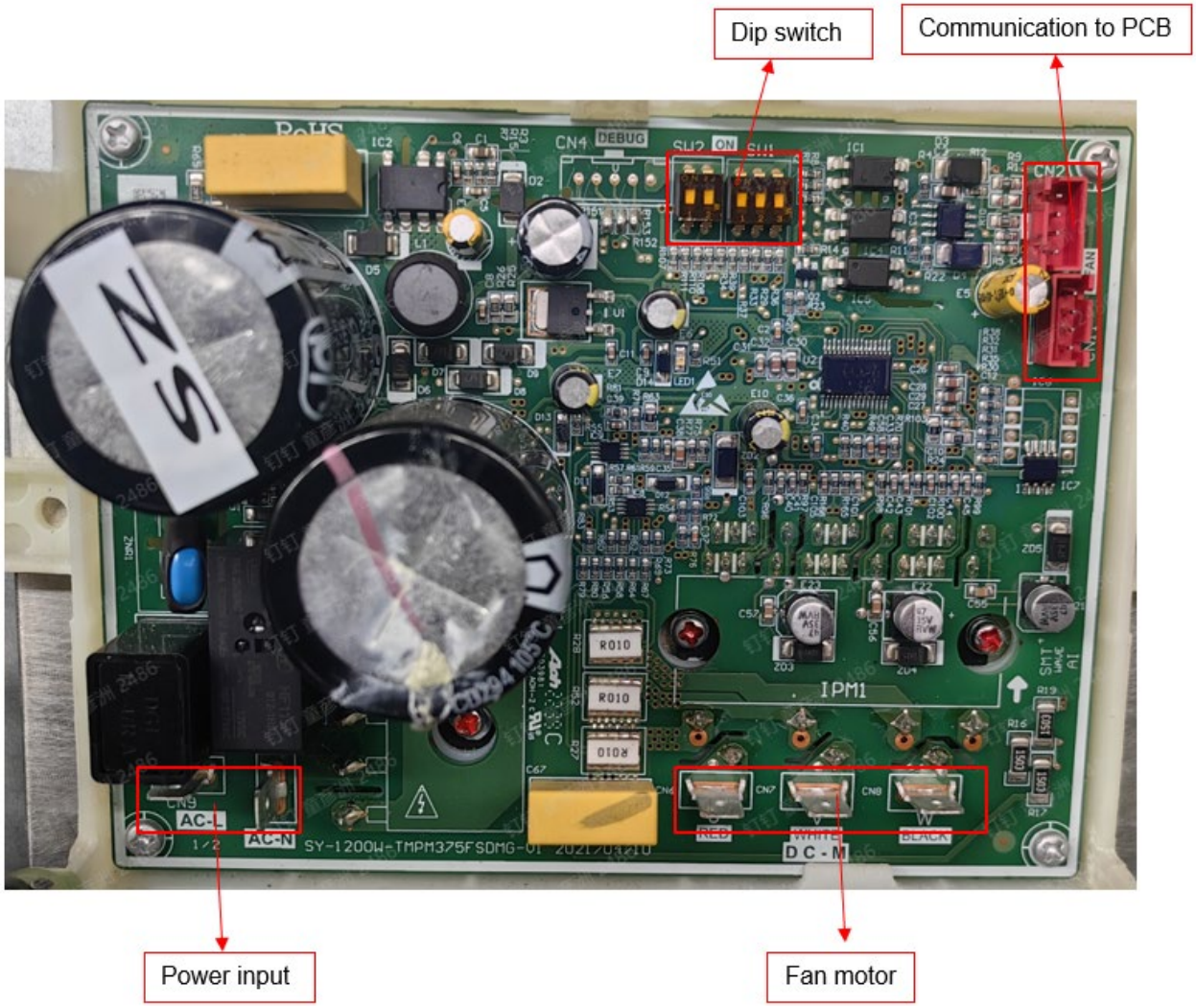
Same PCB Instruction of above fan drive module PCB

ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV，ARV-H400/SR1MV,

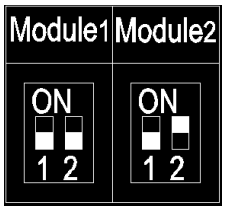
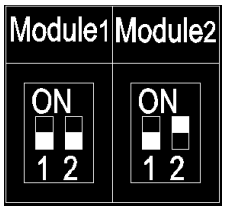
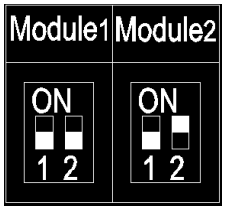
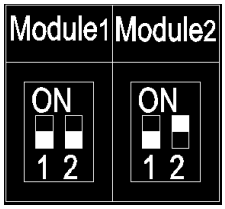
ARV-H450/SR1MV，ARV-H500/SR1MV, ARV-H560/SR1MV, ARV-H610/SR1MV



ARV-H680/SR1MV、ARV-H730/SR1MV、ARV-H785/SR1MV、ARV-H850/SR1MV、ARV-H900/SR1MV、ARV-H950/SR1MV、ARV-H1010/SR1MV

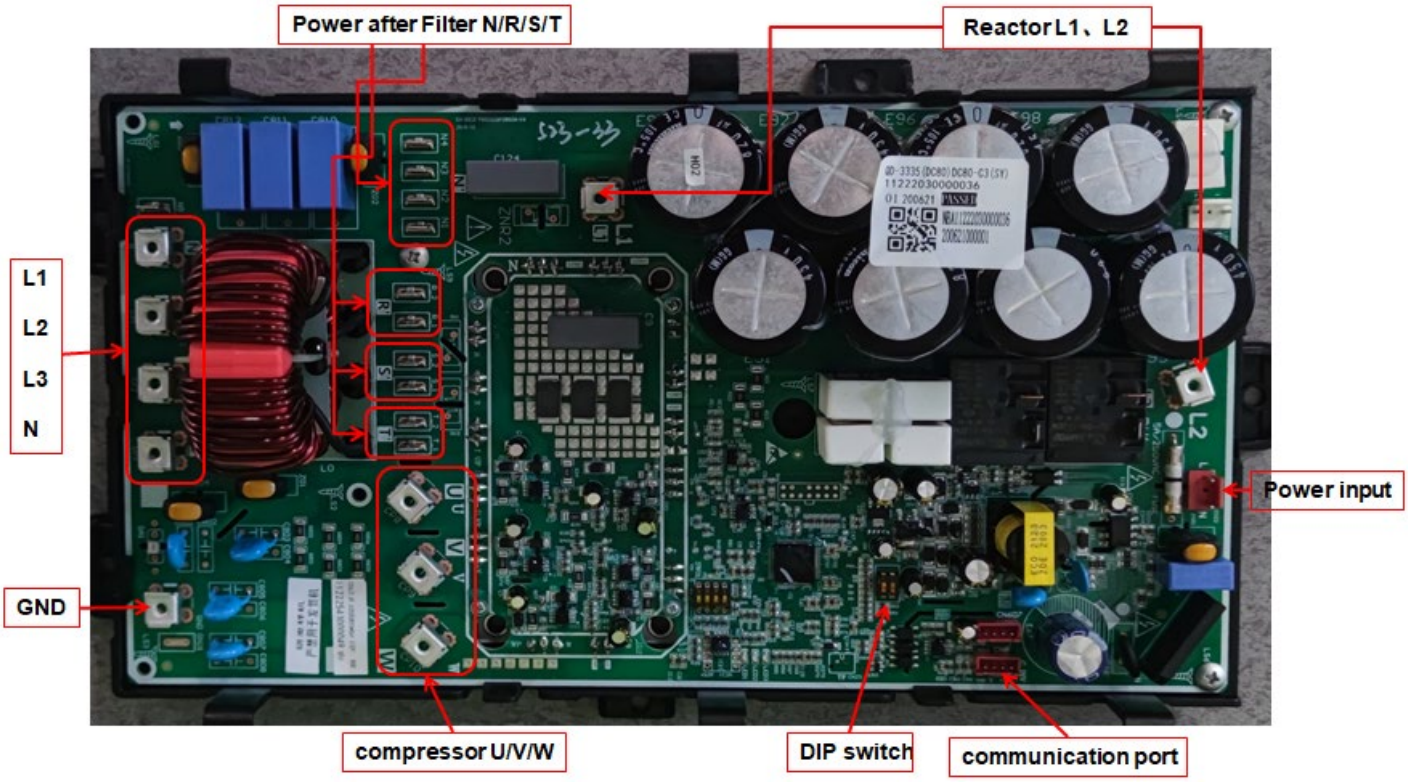


3. Compressor drive module PCB assembly

ODU MODEL	compressor DRIVE PCB		QTY	Dip switch
ARV-H250/SR1MV, ARV-H280/SR1MV, ARV-H330/SR1MV ARV-H400/SR1MV, ARV-H450/SR1MV, ARV-H500/SR1MV,	11222030000042	散热器模块组件 QD-3330(海立 ATE848SKTQ9)-C1(SY)	1	
ARV-H560/SR1MV, ARV-H610/SR1MV	11222030000041	散热器模块组件 QD-3330(海立 ATE650SKTQ9)-C1(SY)	2	
ARV-H680/SR1MV ARV-H730/SR1MV ARV-H785/SR1MV	11222030000037	散热器模块组件 QD-3330(日立 AA55) 改压机-C3(SY)	2	
ARV-H850/SR1MV ARV-H900/SR1MV	11222030000036	散热器模块组件 QD-3335(日立 DC80)DC80 改压机 -C3(SY)	1	
	11222030000037	散热器模块组件 QD-3330(日立 AA55) 改压机-C3(SY)	1	
ARV-H950/SR1MV ARV-H1010/SR1MV	11222030000049	散热器模块组件 QD-12122F1000W 风机驱动-E1(SY)	1	
	11222030000036	散热器模块组件 QD-3335(日立 DC80)DC80 改压机 -C3(SY)	1	

Same PCB Instruction of above compressor drive module PCB

8-36HP

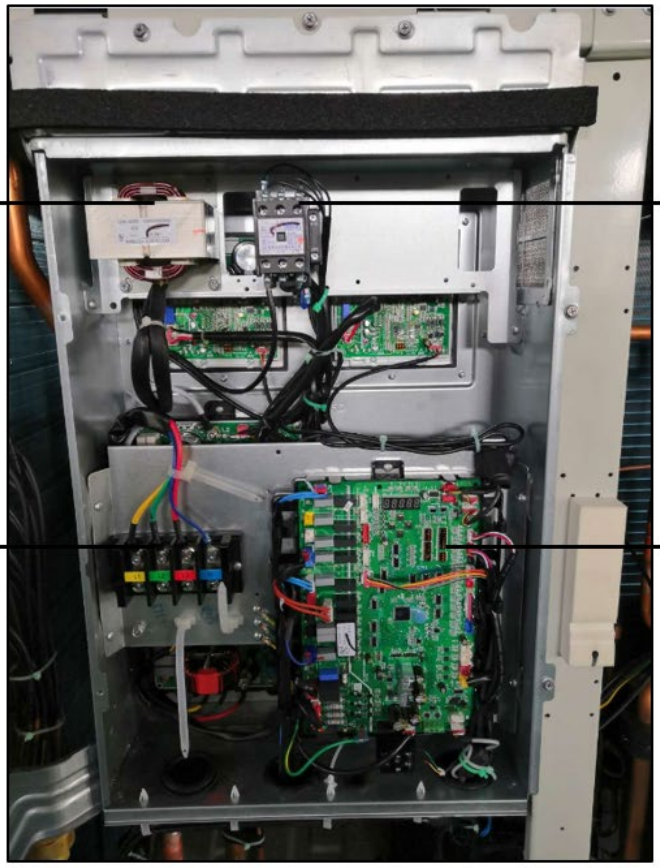

Power after Filter N/R/S/T
Reactor L1、L2
L1
L2
L3
N
GND
Power input
compressor U/V/W
DIP switch
communication port

4 .The overall introduction of the control panel

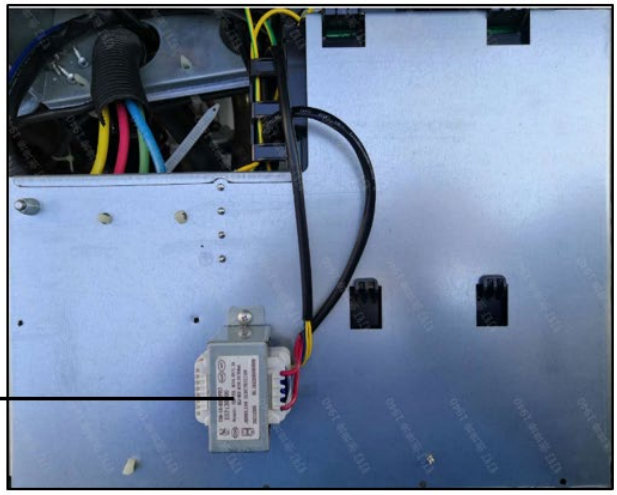
8-22HP

4.1 **Outdoor electrical control box layout**

Top layer of electric control box



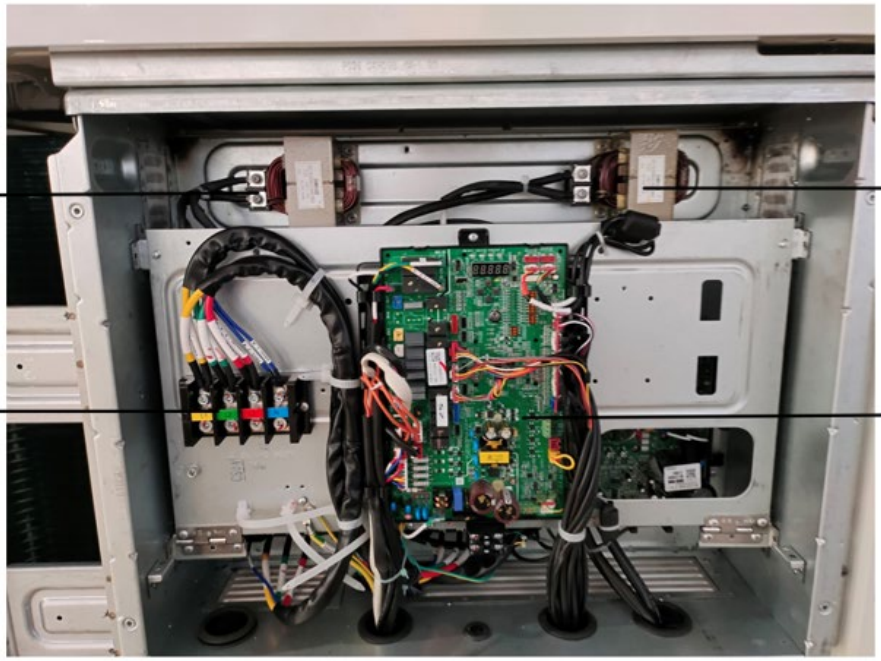
4.2 **The top back of the electric control box**



4.3 Bottom layout of electric control box

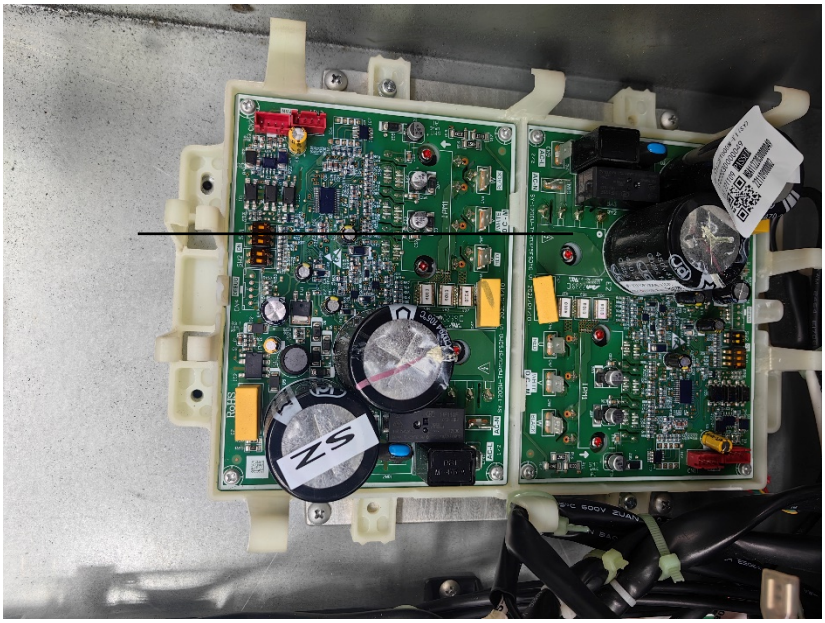
24~36HP

Outdoor electrical control box layout



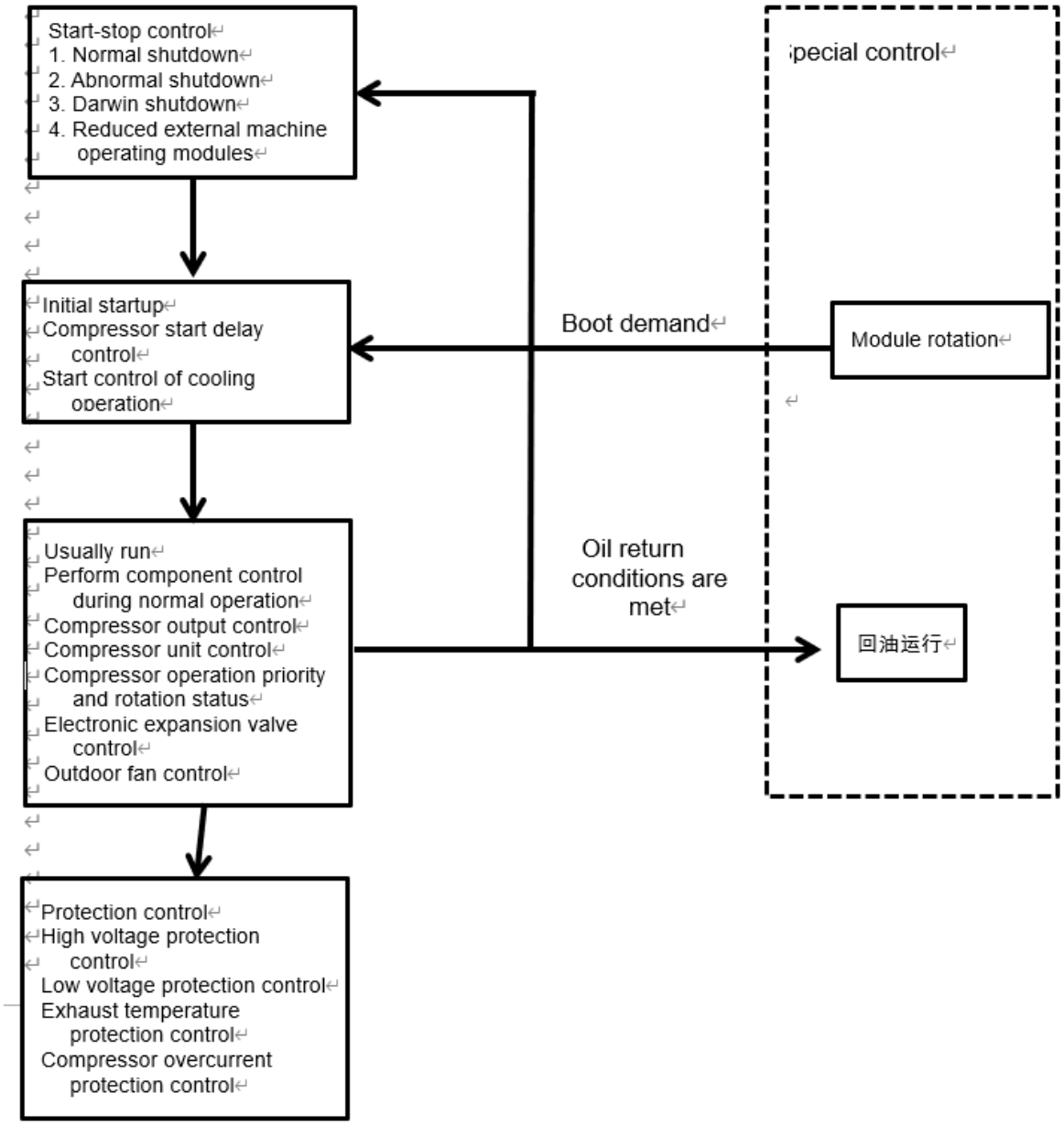
Bottom layout of electric control box

Left fan drive board



Right fan drive board

5 . Flow chart of overall control flow



6 . Start-stop control

6.1 Normal shutdown: the indoor unit is turned on and off according to the instructions of the remote control according to the actual needs of the user.

6.2 Abnormal shutdown: In order to protect the system, if an abnormal state occurs, the system will automatically turn off the temperature control and display an error code on the digital display of the indoor and outdoor units.

6.3 When an internal machine reaches the set temperature, this internal machine stops running. When all the internal machines of the system reach the set temperature, the system stops running.

6.4 When the indoor unit load demand drops, the number of outdoor units in operation may decrease.

7 . Initial startup

7.1 Compressor delay start control

During the restart process (except for oil return operation), the compressor start is delayed, and the compressor stops for at least 3 minutes, in order to prevent frequent compressor switches and balance high and low pressures.

7.2 Cooling operation start control

part	8-12HP	14-18HP	20-22HP	24-36Hp	control
1#Inverter compressor	●	●	●	●	According to the internal machine load demand control, frequency control 1Hz/1s or 1Hz/2s, rise to the frequency platform for a while
2#Inverter compressor			●	●	
1#fan	●	●	●	●	Determine the initial speed according to the outer ring temperature and load rate
2#fan		●	●	●	
1#Electronic expansion valve	●	●	●	●	Full open 480pls
2#Electronic expansion valve			●	●	
Unloading solenoid valve SV1	●	●	●	●	Turn on before the compressor is successfully started
Liquid bypass solenoid valve SV7	●	●	●		Normal control

8 . Normal operation control

Component control during normal cooling operation

part	8-12HP	14-18HP	20-22HP	24-36Hp	control
1#Inverter compressor	●	●	●	●	According to internal machine load demand control
2#Inverter compressor			●	●	
1#fan	●	●	●	●	According to exhaust pressure control
2#fan		●	●	●	
1#Electronic expansion valve	●	●	●	●	Full cooling
2#Electronic expansion valve			●	●	
Unloading solenoid valve SV1	●	●	●	●	According to high and low pressure control
Liquid bypass solenoid valve SV7	●	●	●		According to exhaust temperature control

8.1 Compressor output control

The speed of the press is controlled according to the actual load demand of the internal machine. The initial state calculates the total demand of the internal machine based on the nominal capacity of the internal machine and the internal and external ambient temperature

Then during the operation process, the frequency of the press is adjusted according to the low pressure of the outer machine and the temperature of the inner machine tube. In the actual operation process, if an external

Start, only one outside machine will start. If multiple external machines are required to start, the proportional weighted average actual load requirements will be sent to each module

Each module operates according to this distributed load requirement.

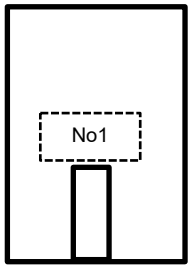
For a single press module, the press runs according to the actual load allocated by the module. For the dual-compressor module, if the load allocated by the module requires 2 compressors to run, the weighted average actual load is required to be sent to each compressor, and the compressor of this module runs according to the allocated load; if the allocated load requires 1 compressor to run , Then any compressor runs according to the actual load allocated by the module

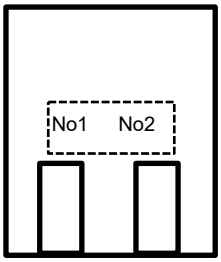
8.2 Compressor revolution control

According to the current frequency, determine the compressor frequency rise and fall speed 1Hz/1s or 1Hz/2s

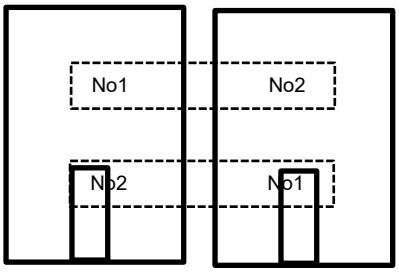
8.3 Compressor operation priority and rotation

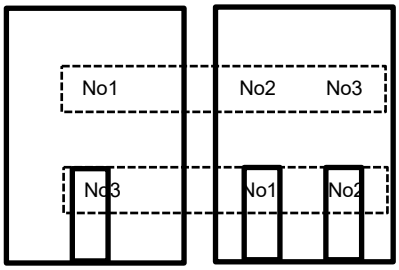
Single module

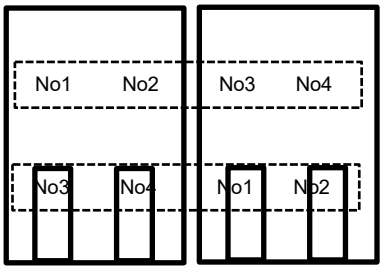




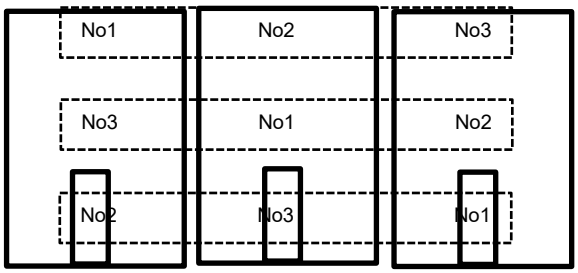
Two machines in parallel

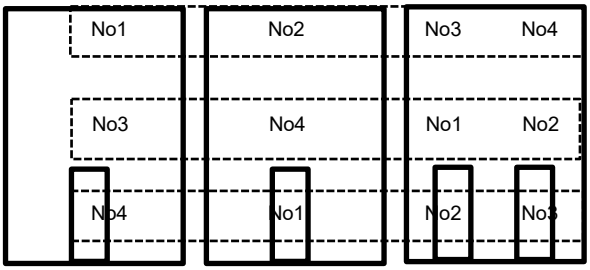




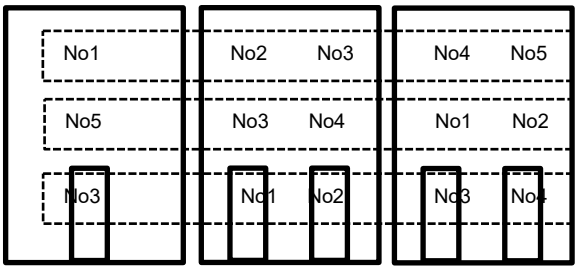


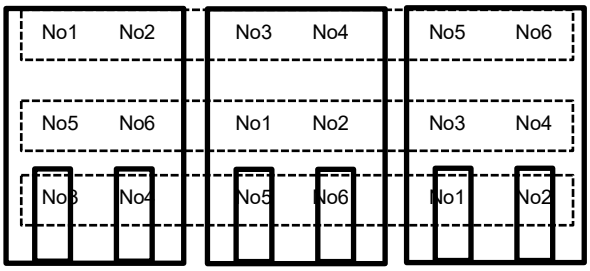
Three machines in parallel





Four machines in parallel refer to three machines in parallel





8.4 Electronic expansion valve control

The number of control steps of the electronic expansion valve ranges from 0-480, in the cooling mode:

When all outdoor units are in standby mode:

All electronic expansion valves are at 0 (step)

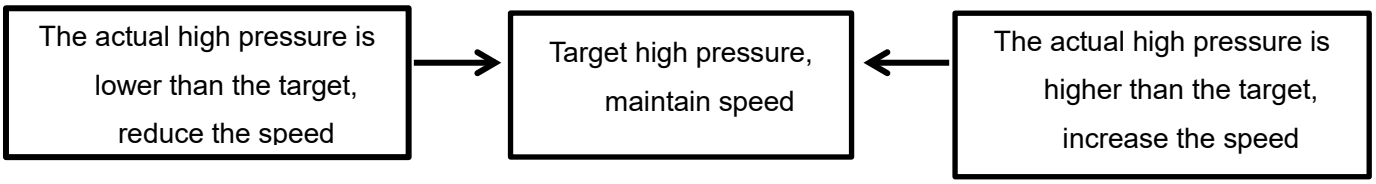
When some outdoor units are running and some outdoor units are in standby mode:

Expansion valve is fully open in operation, fully closed in standby

8.5 Outdoor fan control

The outdoor fan is controlled according to the high pressure. If the high pressure is high, the fan speed will increase, and if the high pressure is low, the fan speed will decrease. High pressure

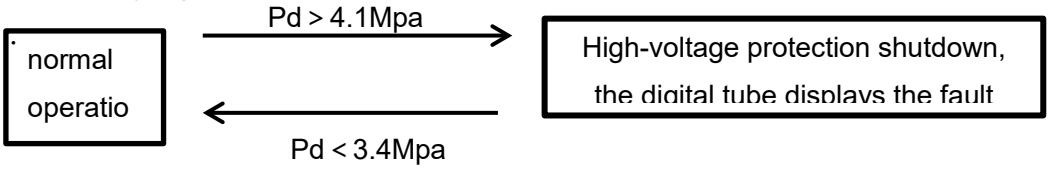
Reasonable target value, by continuously adjusting the fan to make the actual high pressure close to the target high pressure



9 . Protection control

9.1 High voltage protection control

This kind of control protects the system and compressor from shutdown in time when the system is abnormally high pressure



After normal operation,

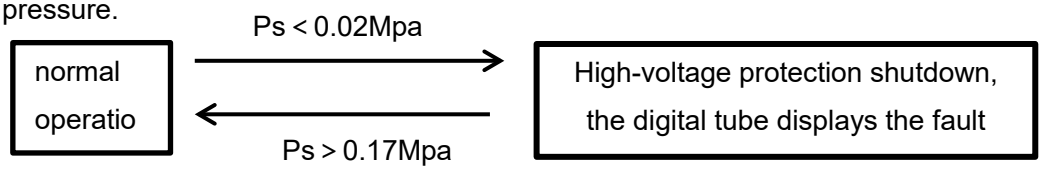
If the exhaust pressure>4.1MPa, high pressure protection will be issued, error code F3

If the exhaust pressure is less than 3.4MPa, resume normal operation

Note: When F3 protection occurs 3 times within 60 minutes, the fault cannot be self-recovered, and the system needs to be powered off and restarted to resume operation

9.2 Low voltage protection control

This kind of control protects the system and compressor in time when the system is abnormally low pressure.



After normal operation,

If the suction pressure is less than 0.02MPa, low pressure protection will be issued, error code F6

If the suction pressure> 0.17MPa, normal operation will be resumed

Note: When F6 protection occurs 3 times within 60 minutes, the fault cannot be self-recovered, and the system needs to be powered off and restarted to resume operation

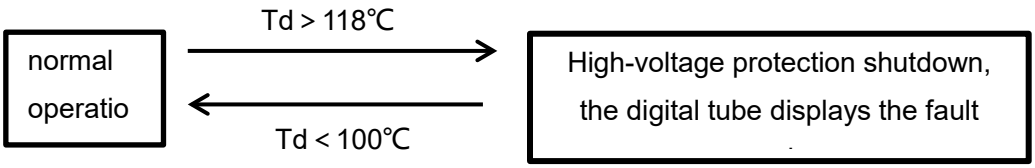
9.3 Exhaust temperature protection control

This kind of control protects the system and the compressor in time when the exhaust temperature is abnormally high. The protection value is the highest exhaust value of the system compressor.

If the exhaust temperature is greater than 118℃, the exhaust temperature is too high protection, error code E3/E4 will be issued

If the exhaust temperature is less than 100°C, resume normal operation

Note: When E3/E4 protection occurs 3 times within 60 minutes, the fault cannot be recovered by itself, and the system needs to be powered off and restarted to resume operation



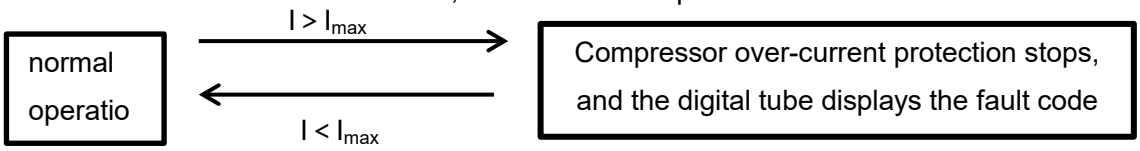
9.4 Compressor overcurrent protection control

This kind of control protects the system and the compressor in time when the system current is abnormal, and the protection value takes the highest current value of the system compressor.

After normal operation,

If current > maximum current, current protection will be issued, error code 35/55

If the current <the maximum current, resume normal operation



10. Special control

10.1 Module rotation

Purpose: During actual operation, the external machine periodically rotates the oil level between the balance modules

Rotation conditions:

① Long module running time

② After the oil return is over

③ Protections such as high pressure, low pressure, high exhaust temperature, etc.

Schematic diagram of rotation (four modules in parallel as an example)

Priority 1 Priority 2 Priority 3 Priority 4 Meet the rotation conditions Priority 4 Priority 1 Priority 2 Priority 3

10.2 Oil return operation

In order to prevent the compressor from being damaged due to lack of oil, the refrigerating oil scattered in the system is periodically recovered. All modules are turned on during the oil return process, including the standby module. During the oil return process, the control of each component of the outdoor machine is as follows:

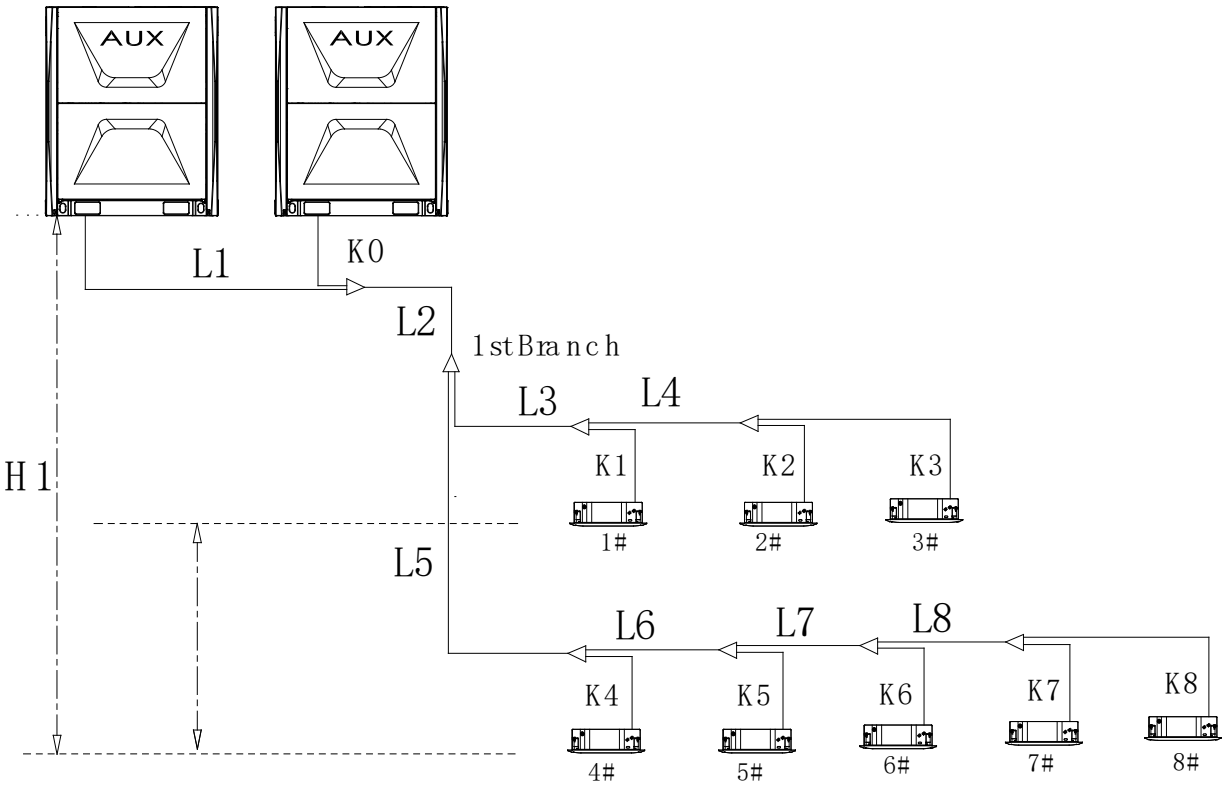
part	8-12HP	14-18HP	20-22HP	34-36HP	control
1#Inverter compressor	●	●	●	●	Fixed frequency
2#Inverter compressor			●	●	
1#fan	●	●	●	●	According to exhaust pressure control
2#fan		●	●	●	
1#Electronic expansion valve	●	●	●	●	Full open 480pls
2#Electronic expansion valve			●	●	
Unloading solenoid valve SV1	●	●	●	●	Normal control
Liquid bypass solenoid valve SV7	●	●	●		Normal control

The control of each component of the internal machine is as follows

part	Internal machine status	control
Fan	run	Remote control settings
	Standby	close
	Shut down	close
Electronic expansion valve	run	Normal control
	Standby	Fixed opening
	Standby	

Part6 Refrigerant Piping Design

1. Long Piping Length



		Allowable value	Part of pipe
Piping Length	Max. Total piping length	1000m	L1+L2+L3+L4+L5+L6+L7+L8+k0+ k1+ k2+ k3+ k4+ k5+ k6+ k7+ k8≤1100m
	Length between ODU and farthest indoor unit	200m	L1+L2+L5+L6+L7+L8+ k8≤ 200m
	Max. Equivalent length between outdoor unit and farthest indoor unit	/	For each branch pipe, the equivalent length of elbow to 0.5m
	Max. piping length from 1st indoor unit branch to the farthest indoor unit	40m	L5+L6+L7+L8+ k8≤40m
		90m*	L5+L6+L7+L8+ k8≤90m & (L5+L6+L7+L8+ k8) - (L3+K1) ≤40m

	Max. piping length between 1st ODU branch and the farthest outdoor unit		10m	
	Max. piping length between IDU Branch and Indoor unit		40m	
Level difference	Level difference Between ODU & IDU	ODU is up	110m	H1≤110m
		ODU is down	130m	H1≤130m
	Level difference among indoor units		30m	H2≤30m

Note:

✧ It is necessary to increase the pipes size of the liquid and gas piping if the equivalent length between indoor unit and the first Y branch pipe is over 40m.

✧ Equivalent length refers to conversion length of parts such as elbow after considering pressure loss.

✧ Equivalent length: actual length of pipe + quantity of elbow equivalent length of each elbow + quantity of oil trap equivalent length of each oil trap.

Elbow and oil trap recommend dimension list

Type Diameter of pipe(mm)	90° elbow(m)	Oil trap(m)
9.52	0.18	1.3
12.7	0.20	1.5
15.88	0.25	2.0
19.05	0.35	2.4
22.2	0.40	3.0
25.4	0.45	3.4
28.6	0.50	3.7
31.8	0.55	4.0
34.93	0.58	4.2
41.3	0.63	4.6
44.5	0.66	5.0

Example:

When actual length of 22HP outdoor unit is 80m, diameter of pipe is 34.93mm and 12 elbows & 2 oil traps are used, the equivalent length should be calculated:

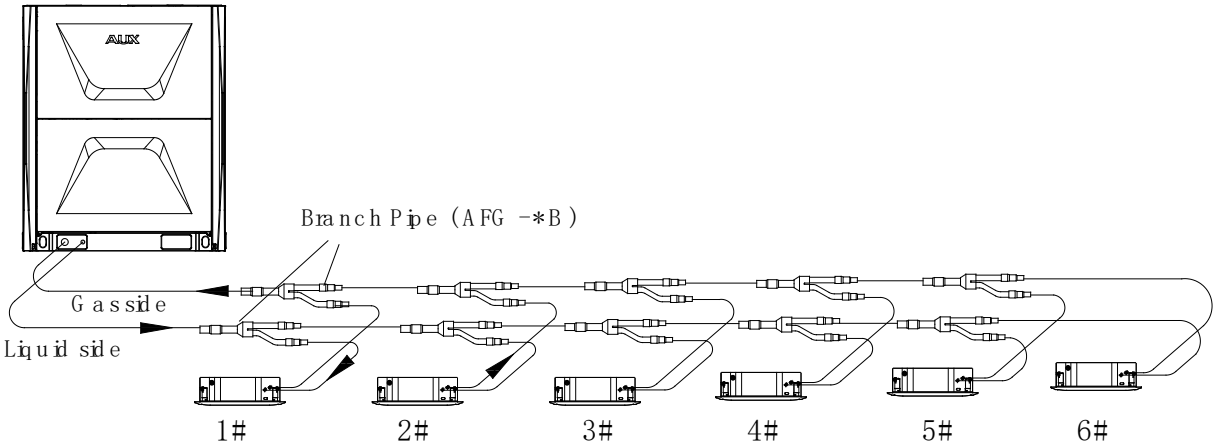
80+0.58×12+4.2×2=95.36m

Note:

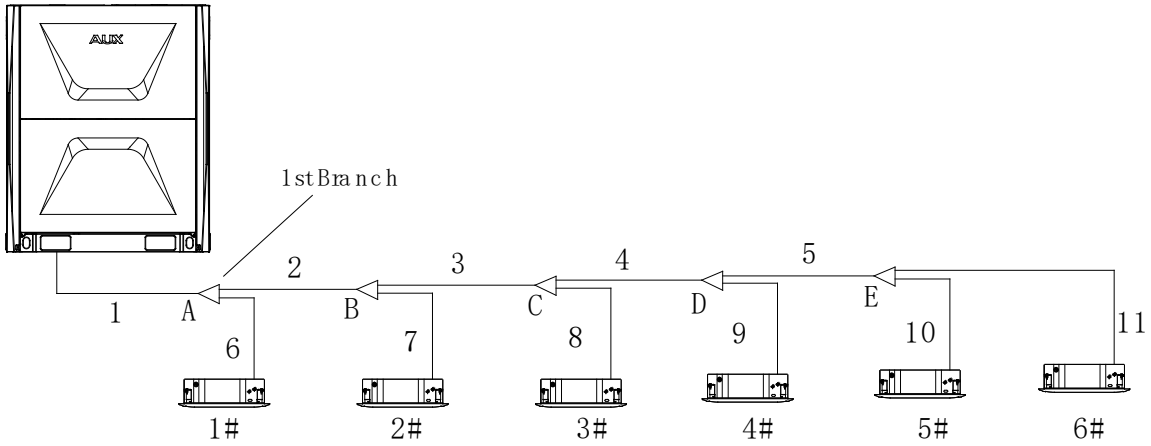
If there is relatively level difference of indoor and outdoor unit, S-shaped **oil trap** must be installed **every 8~10m for vertical pipe**.

2. Refrigerant Piping Design

2.1 Schematic diagram



2.2 Pipe Definition



Type of pipe	Connecting parts	No.
Main pipe	between outdoor unit and the 1st. branch pipe	1
	between branch pipe and branch pipe	2,3,4,5
Branch pipe	between pipes	A,B,C,D,E

1. Diameter of pipe“1”depends on pipe specification of outdoor unit.

Length between 1st IDU branch and Farthest Outdoor unit < 90m

Model	Gas side(mm)	liquid side(mm)	The 1st Branch pipe
8HP	φ22.2	φ12.7	/
10HP	φ22.2	φ12.7	/
12HP T1	φ22.2	φ12.7	/
12HP T3	φ28.6	φ15.88	/
14HP	φ28.6	φ15.88	/
16HP	φ28.6	φ15.88	AFG-24B
18~22HP	φ28.6	φ15.88	AFG-24B
24~34HP	φ34.9	φ19.05	AFG-34B
36~48HP	φ38.1	φ19.05	AFG-50B
50~66HP	φ41.3	φ19.05	AFG-50B
68~88HP	φ44.5	φ22.2	AFG-64B
90~108HP	Φ47.6	Φ25.4	AFG-64B
110~128HP	Φ54.0	Φ28.6	AFG-144B
130~144HP	Φ57.2	Φ28.6	AFG-144B

Length between 1st IDU branch and Farthest Outdoor unit ≥90m

Model	Gas side(mm)	liquid side(mm)	The 1st Branch pipe
8HP	φ25.4	φ12.7	/
10HP	φ25.4	φ12.7	/
12HP T1	φ28.6	φ15.88	/
12HP T3	φ31.8	φ15.88	/
14HP	φ31.8	φ15.88	/
16HP	φ31.8	φ19.05	AFG-34B
18~22HP	φ31.8	φ19.05	AFG-34B
24~34HP	φ38.1	φ19.05	AFG-50B
36~48HP	φ41.3	φ19.05	AFG-50B
50~66HP	φ44.5	φ22.2	AFG-64B
68~88HP	φ47.9	φ22.2	AFG-64B
90~108HP	Φ54.0	Φ28.6	AFG-144B
110~128HP	Φ57.2	Φ38.1	AFG-144B

130~144HP	Φ57.2	Φ38.1	AFG-144B

2. Diameter of pipe “2” depends on the total capacity of indoor unit connected below.

Total capacity of indoor unit (kW)	Gas side(mm)	liquid side(mm)	selection of Branch pipe
0≤Q≤11.2	φ15.88	φ9.52	AFG-00B
11.2≤Q＜18	φ19.05	φ9.52	AFG-00B
18≤Q＜36	φ22.2	φ12.7	AFG-12B
36≤Q＜65	φ28.6	φ15.88	AFG-24B
65≤Q＜99	φ34.9	φ19.05	AFG-34B
99≤Q＜138	φ38.1	φ19.05	AFG-50B
138≤Q＜187	φ41.3	φ19.05	AFG-50B
187≤Q＜248	φ44.5	φ22.2	AFG-64B
248≤Q＜305	φ47.6	φ25.4	AFG-64B
305≤Q＜361	φ54.0	φ28.6	AFG-144B
361≤Q＜406	φ57.2	φ28.6	AFG-144B

Note:

✧ The 1st. Branch pipe should be based on the capacity of outdoor unit.
✧ Other branch pipes should not larger than the 1st Branch pipe.

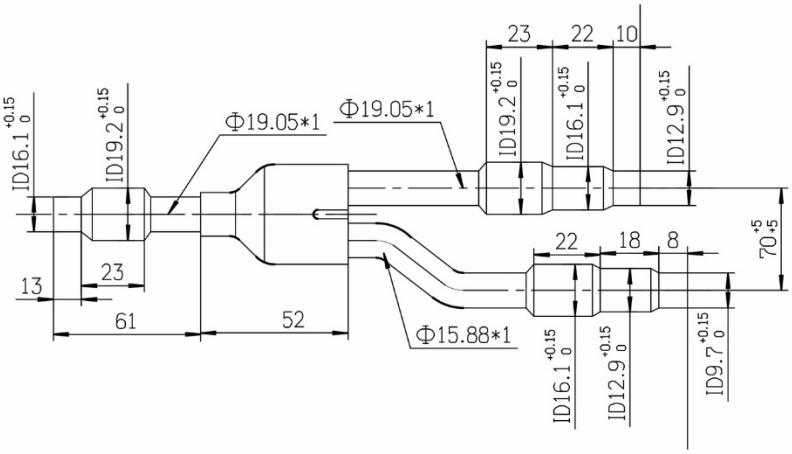
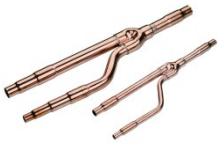
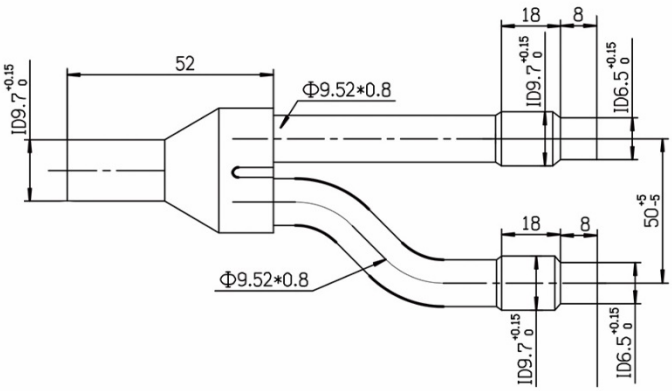
3. Diameter of pipe “6” depends on connected indoor unit capacity.

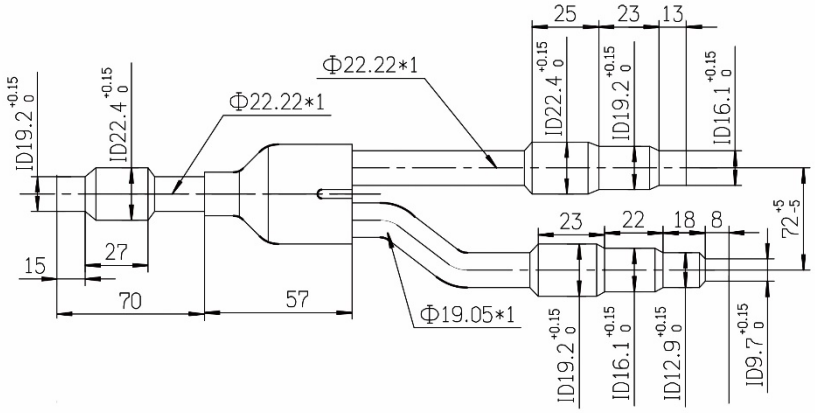
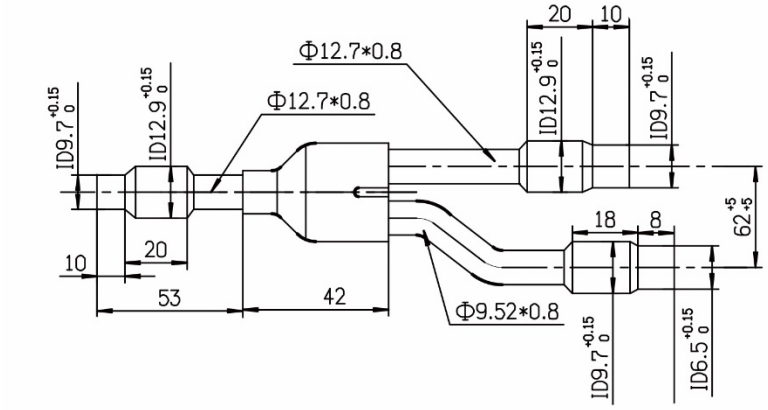
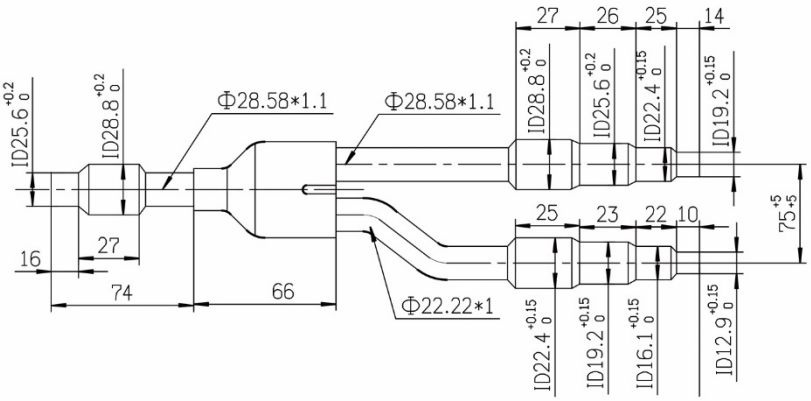
Cooling capacity of indoor unit(kW)	Gas pipe(mm)	Liquid pipe(mm)	Remark
2.2	φ9.52	φ6.35	
2.8	φ9.52	φ6.35	Cassette and Ceiling & Floor unit: 12.7/6.35
3.6	φ12.7	φ6.35	
4.5	φ12.7	φ6.35	
5.6	φ12.7	φ6.35	
7.1	φ15.88	φ9.52	
8.0	φ15.88	φ9.52	
9.0	φ15.88	φ9.52	
10.0	φ15.88	φ9.52	
11.2	φ19.05	φ9.52	
12.5	φ19.05	φ9.52	
14.0	φ19.05	φ9.52	
15.0	φ19.05	φ9.52	
22.0	φ22.2	φ12.7	

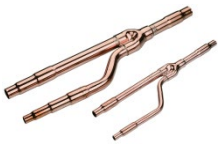
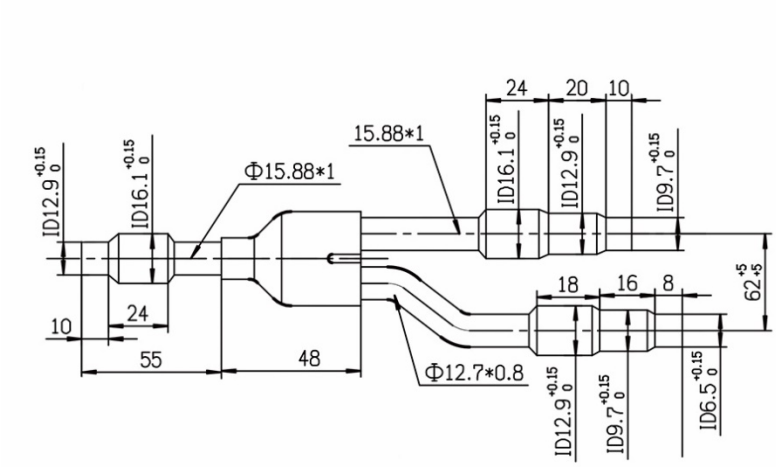
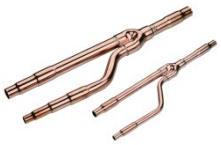
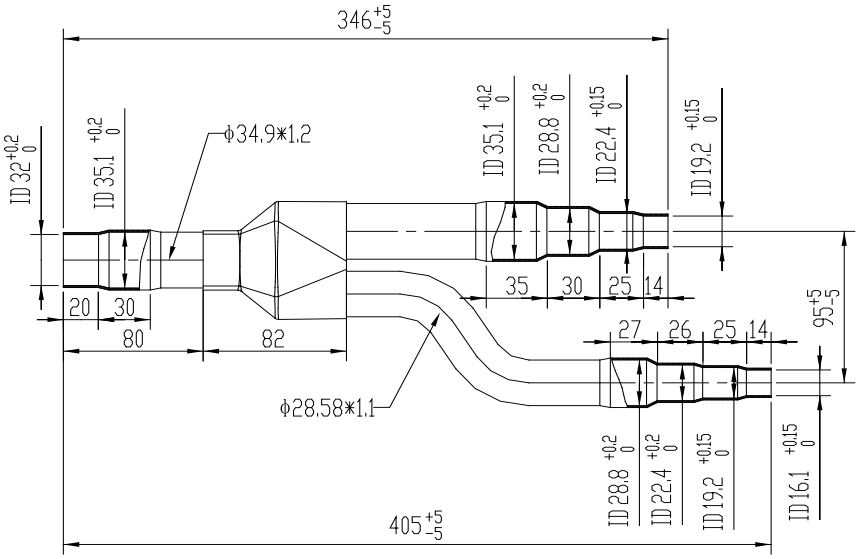
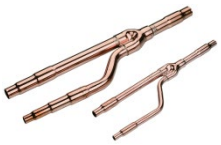
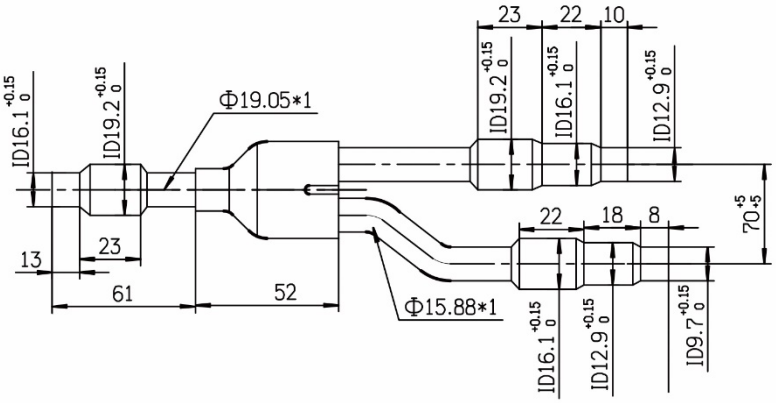
28.0	φ22.2	φ12.7	
45.0	φ22.2×2	φ12.7×2	
56.0	φ22.2×2	φ12.7×2	

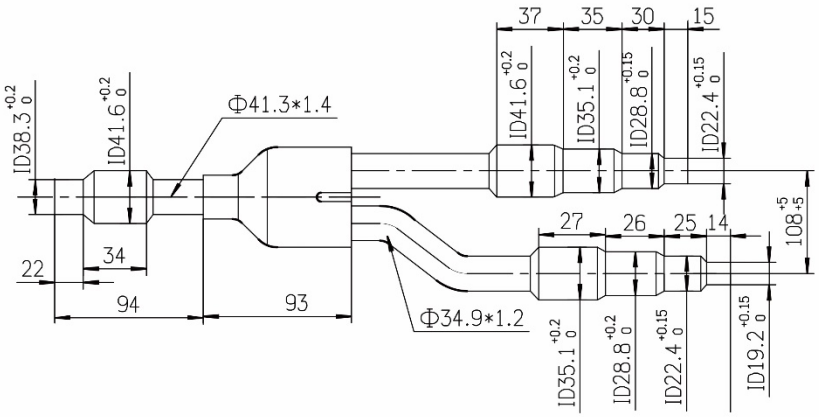
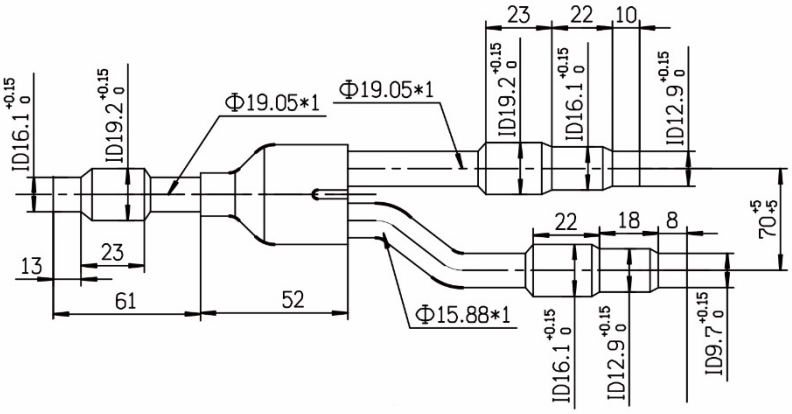
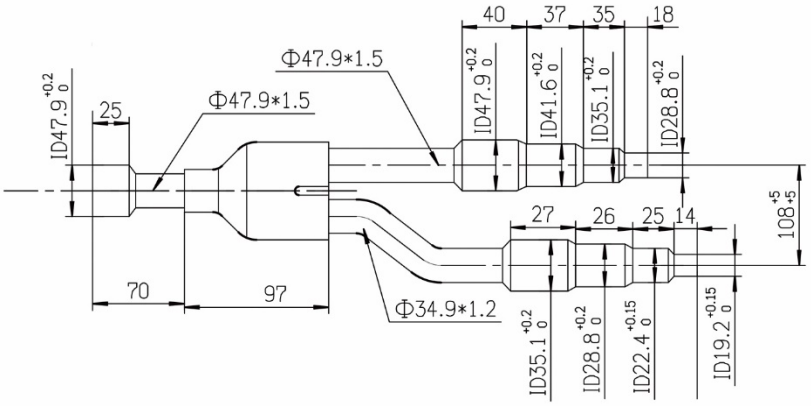
3. Selection of Separation Tube (branch pipe)

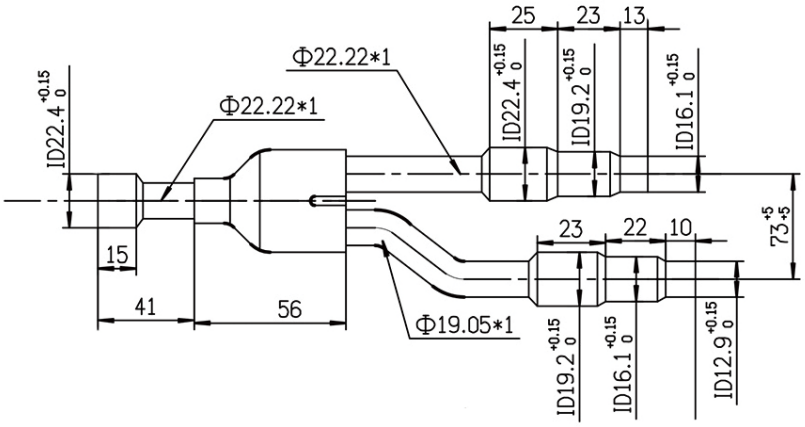
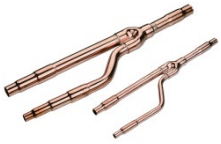
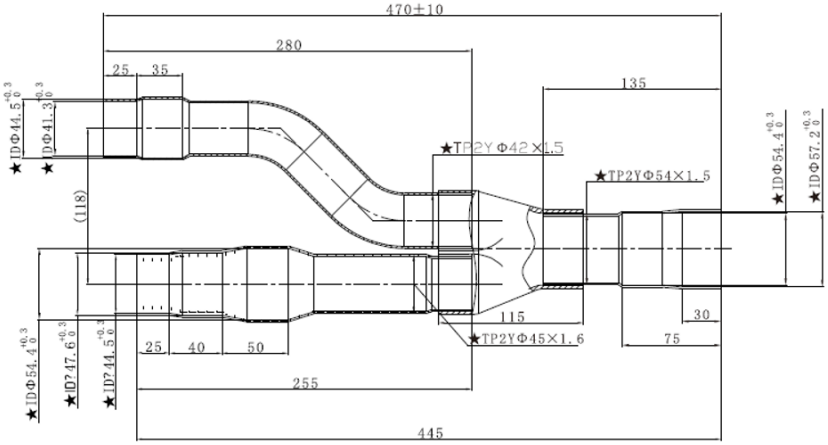
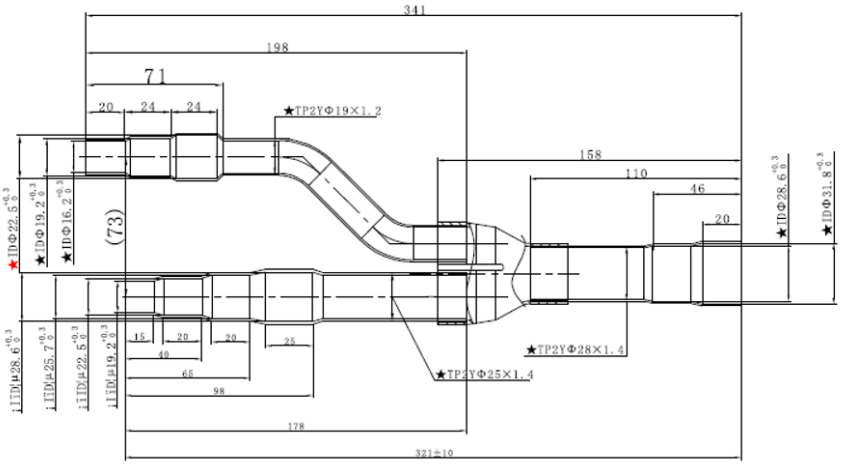
It's allowable to select branch pipe with similar specification as long as it meets pressure-proof requirement. It's required that no leakage at gas pressure of 4.5MPa and no distortion and leakage at hydraulic pressure of 6.3MPa.

Model	Appearance	Dimension
AFG-00B	Gas side joints	
	 Liquid side joints	

AFG-12B	 Gas side joints	
	 Liquid side joints	
AFG-24B	 Gas side joints	

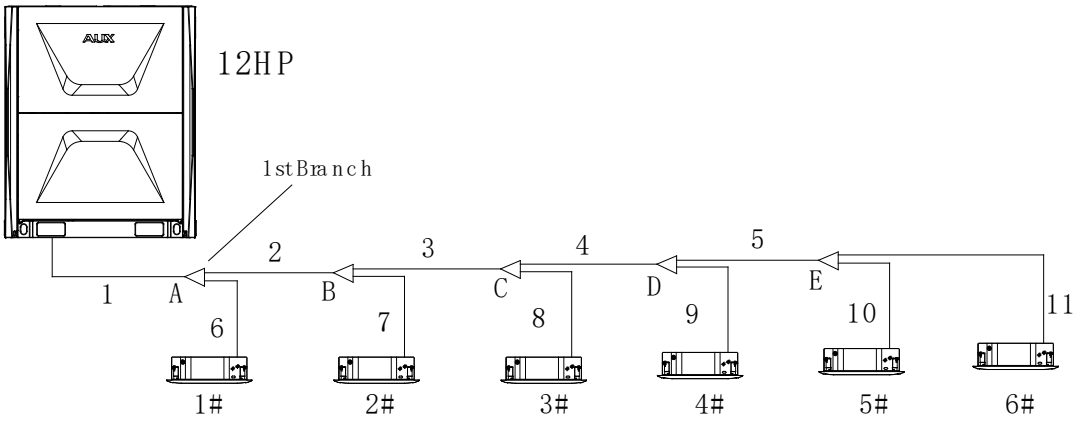
	 Liquid side joints	
AFG-34B	 Gas side joints	
	 Liquid side joints	

AFG-50B	 Gas side joints	
	 Liquid side joints	
AFG-64B	 Gas side joints	

	 Liquid side joints	
AFG-144B	 Gas side joints	
	 Liquid side joints	

4. Example of Piping Design

12HP is taken as the example to explain pipe selection.



No. of indoor unit	Indoor Unit Capacity（kW / HP）
1#	5.6 / 2
2#	5.6 / 2
3#	5.6 / 2
4#	5.6 / 2
5#	5.6 / 2
6#	5.6 / 2

For outdoor unit:

Pipe diameter of "**1**" depends on outdoor unit capacity, which is **Φ12.7/Φ22.2**, Y-type branch pipe should be **AFG-12B**.

For indoor side:

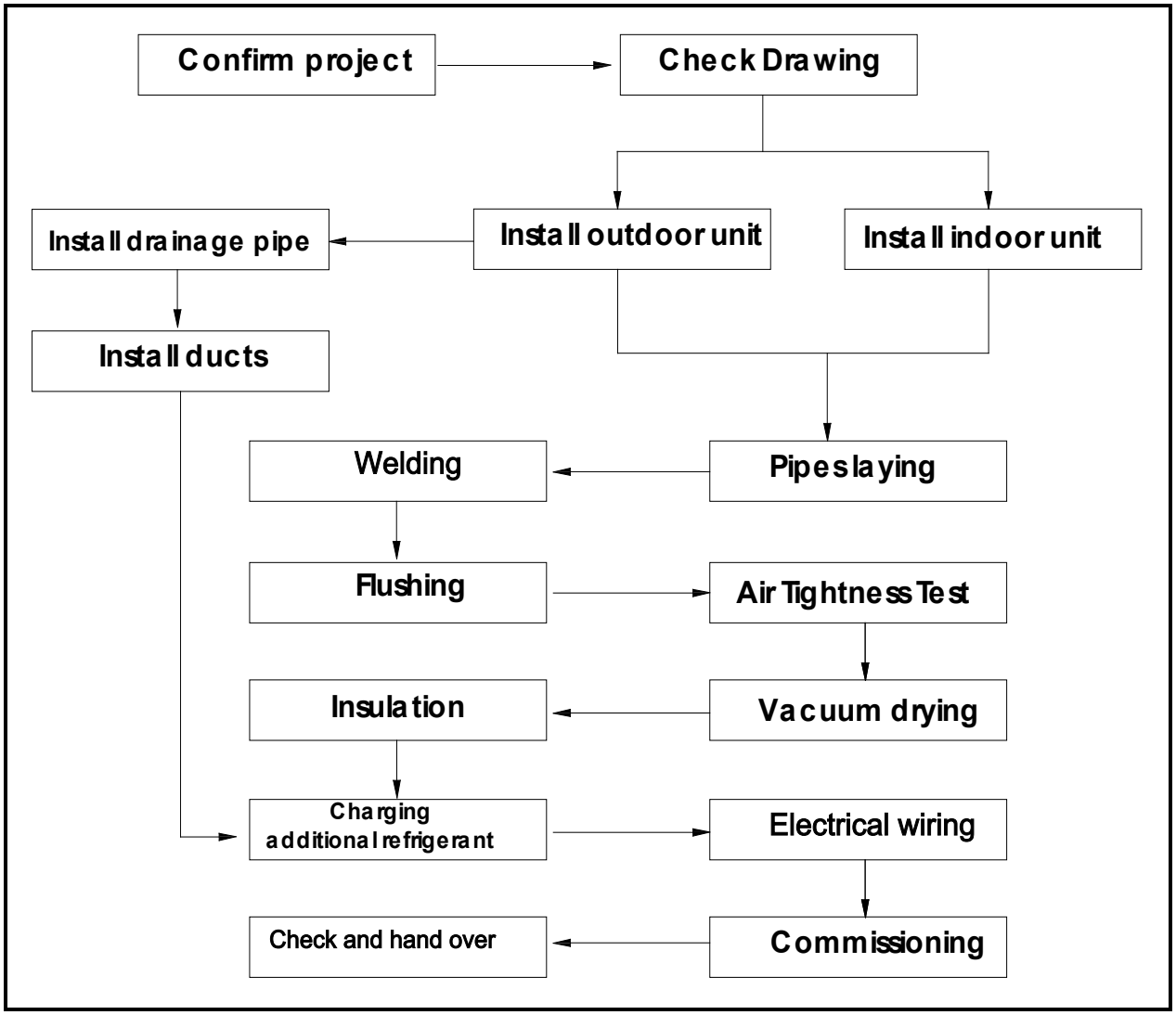
1. Downstream indoor units of main pipe "5" include 5#、6#. Its HP sum is "5.6×2=11.2kW". Dimension of pipe "**5**" is Φ**19.05/Φ9.52**. Branch pipe "**E**" should use **AFG-00B**.
2. Downstream indoor units of main pipe "4" include 4#~6#. Its HP sum is "5.6×3=16.8 kW". Dimension of pipe "**4**" isΦ**12.7/Φ22.2**. Branch pipe "**D**" should use **AFG-12B**.
3. Downstream indoor units of main pipe "3" include 3#~6#. Its HP sum is "5.6×4=22.4 kW". Dimension of pipe "**3**" isΦ**12.7/Φ22.2**. Branch pipe "**C**" should use **AFG-12B**.
4. Downstream indoor units of main pipe "2" include 2#~6#. Its HP sum is "5.6×5=28 kW". Dimension of pipe "**2**" isΦ**12.7/Φ22.2**. Branch pipe "**B**" should use **AFG-12B**.
5. Downstream indoor units of main pipe "1" include 1#~6#. Its HP sum is "5.6×6=33.6 kW". Dimension of pipe "**1**" is **Φ12.7/Φ22.2**. Branch pipe "**A**" should use **AFG-12B**.

Note:

Branch pipes must be placed horizontally; otherwise there will be distribution of refrigerant will be caused.

Part7 Installation

1. Preface of installation



Caution

- The proper design and installation is a critical element of ARV system, installation of piping and electrical works must be carried out by ***suitably qualified, certified professionals*** and in accordance with all applicable legislation.
- In this service manual, the term “applicable legislation” refers to all national, local and other laws, standard, codes, rules, regulations and other legislation that apply in a given situation.

2. Installation of Outdoor Unit

2.1 Installation Location and Foundation

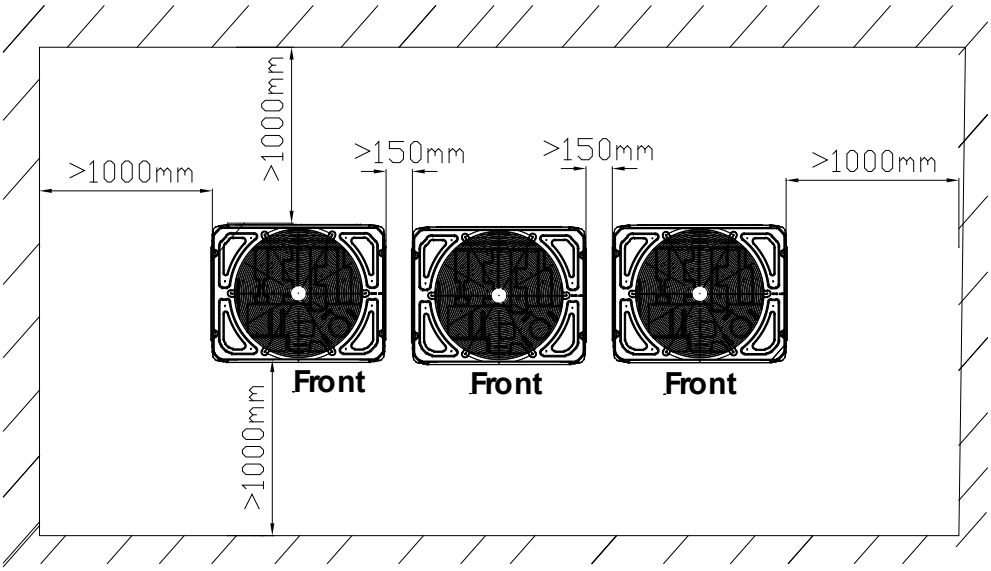
1. Ensure that the outdoor unit is installed in a dry, well-ventilated place.
2. Ensure that the noise and exhaust ventilation of the outdoor unit do not affect the neighbors of the property owner or any surrounding ventilation.
3. Ensure that the outdoor unit is installed in a cool place without direct sunlight exposure or direct radiation of a high-temp heat source.
4. The outdoor unit should be installed as close as possible to the indoor unit.
5. The installation location must be far from waste and oil mist.
6. The foundation should be strong enough to support the outdoor unit.
7. If there are 24~36 Hp ODU included, it must to select a 24~36 Hp ODU as the master ODU
8. As possible as to choose the larger capacity of the ODU as the master ODU

2.2 Pre tools

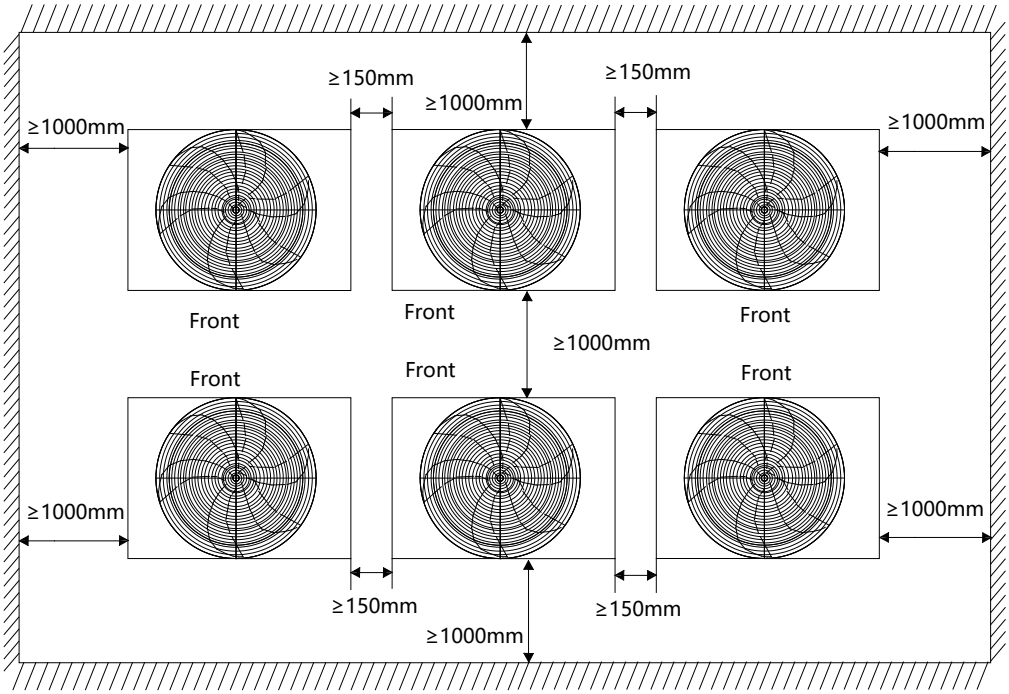
Tape measure	Spanner	Electric hammer
Screw driver	**Nut gasket**	**Level meter**

2.3 Maintenance and Ventilation Space

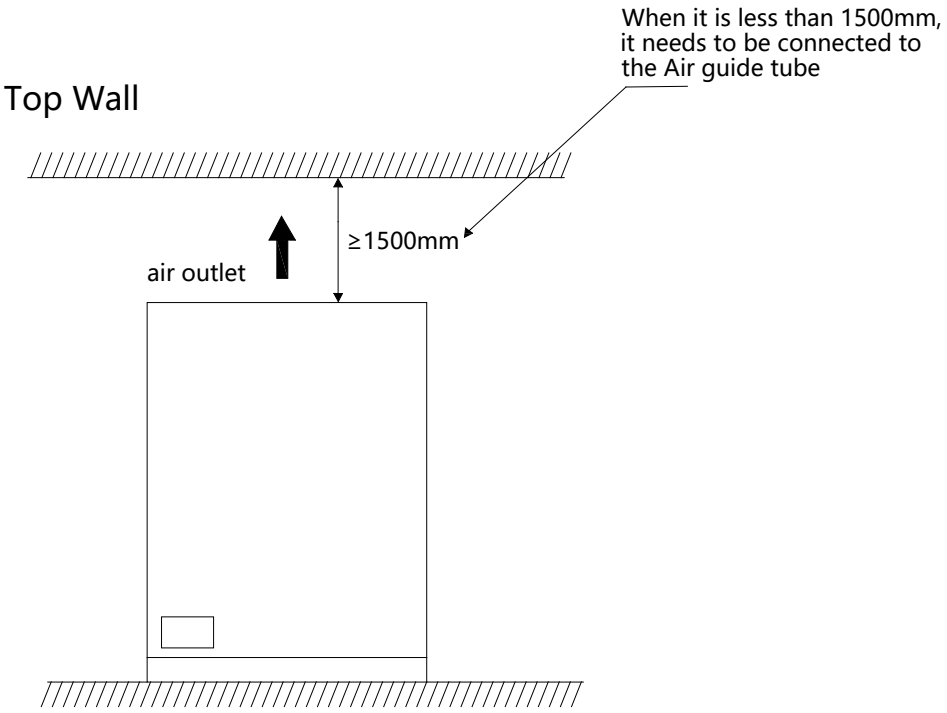
2.3.1 Ensure necessary installation and maintenance space.



2.3.2 If there are ***two rows of outdoor units***, we ***suggest face to face installation*** for easy maintenance, and avoid air short circuit.

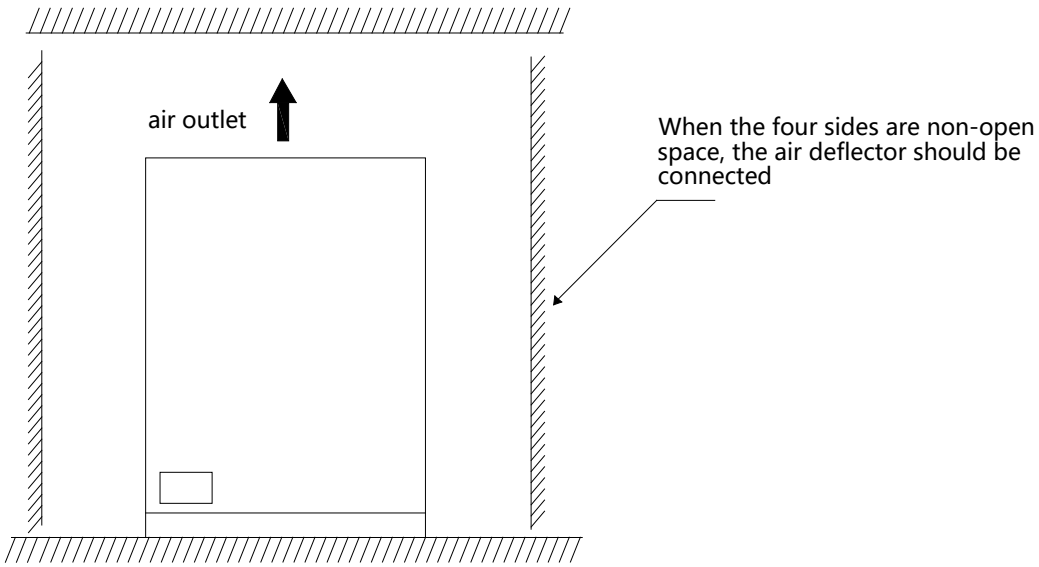


2.3.3 When it is less than 1500mm,it need to be connected to the air guide duct



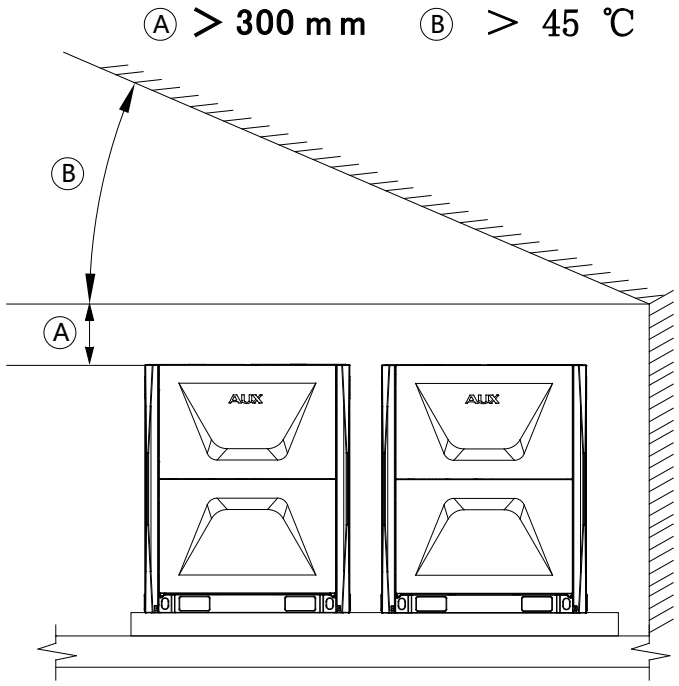
Open space on all sides

2.3.3 When the four sides are non-open space ,the air deflector should be connected



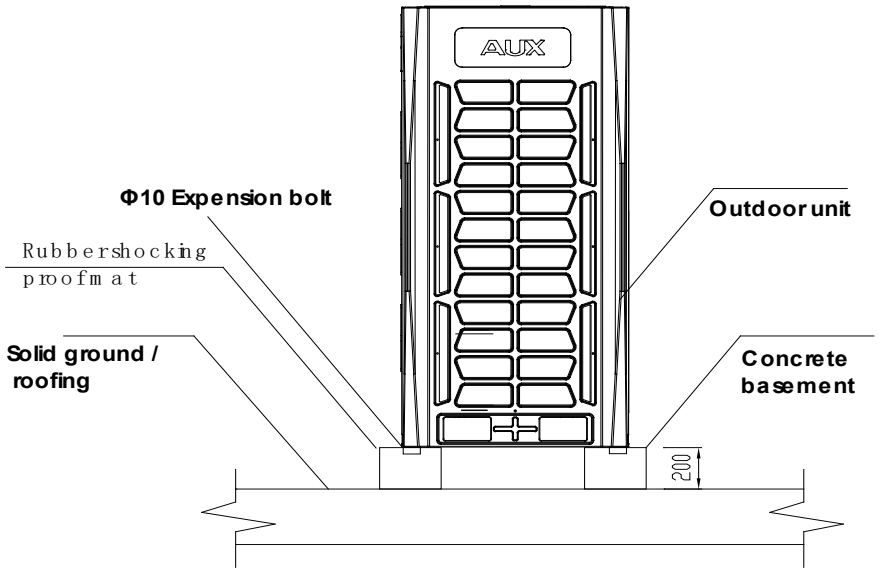
Four-side non-open space

2.3.3 When there is the barrier above the outdoor unit



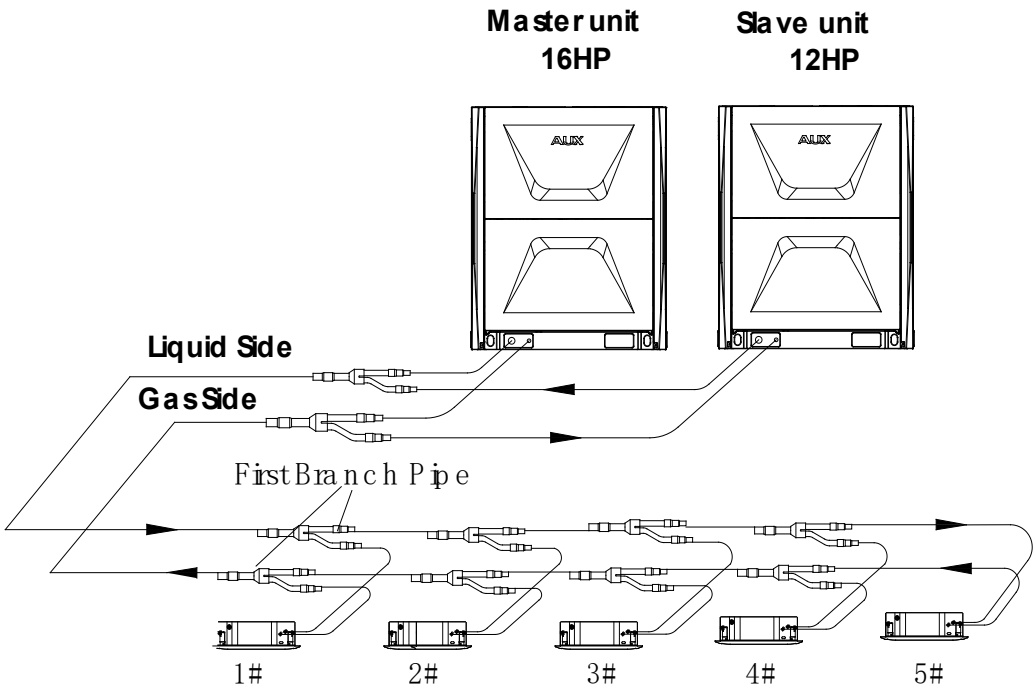
2.4 Installation of Outdoor Unit

2.4.1 Tighten outdoor unit on mounting support with ***M10*** bolt and nut, and keep it horizontal. The bolt should have a proper length of 20mm more than base surface.

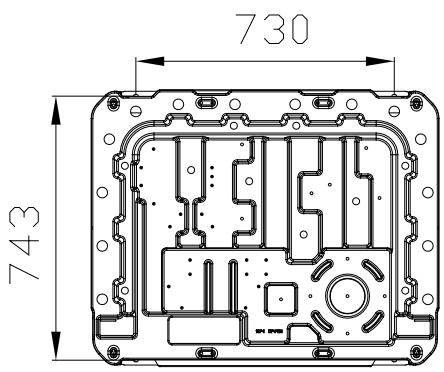


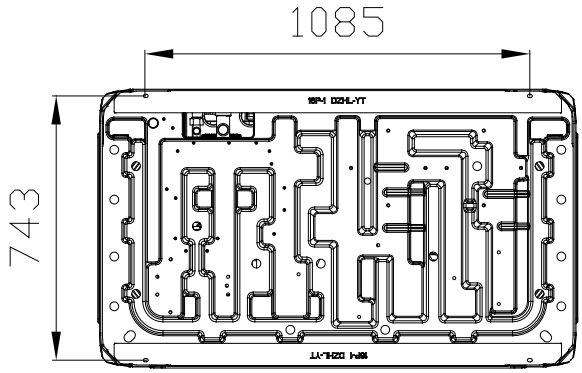
2.4.2 If the system has more than two outdoor units. The ***largest capacity*** unit should ***be set as the***

master unit, while the ***others should be set as slave*** units, as shown in the following example.

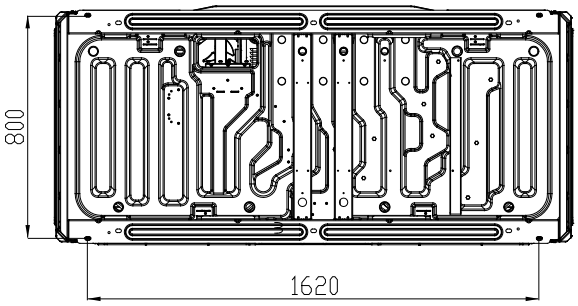


2.4.3 The installation space for a fixed bolt, please refer to the following drawing.





8HP,10HP,12HP 14HP,16HP,18HP,20HP,22HP



24HP, 26HP, 28HP, 30HP, 32HP, 34HP, 36HP

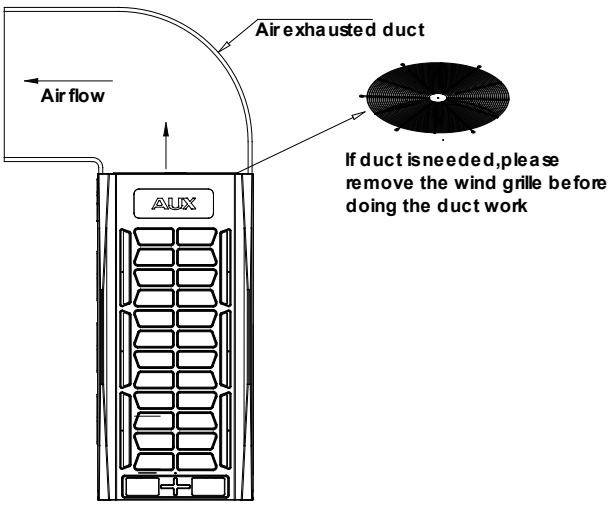
2.4.4 The foundation can be made of ***channel steel or concrete***. ***Reserve*** the space for ***discharging*** the condensate ***water*** from outdoor units.

2.4.5 Install drainage channels to ensure condensed ***water flow out*** smoothly.

2.4.6 ***Don't*** use ***four-square base*** to support outdoor unit.

2.4.7 ***Rubber anti-vibration pads*** are necessary to avoid ***vibration***.

2.4.8 If the outdoor unit need side air flow outlet by a ***duct***, it is necessary to ***remove*** out the wind ***grille***.



3. Pipes Laying

3.1 Pre tools

Tube expander	Spanner	Expander
Screw driver	**Electric hammer**	**Pipe bender**
Mounting bracket hanger	**Hoop**	**Expansive bolt**

3.2 Selection of copper pipe

3.2.1 Please use ***seamless red copper pipe***.

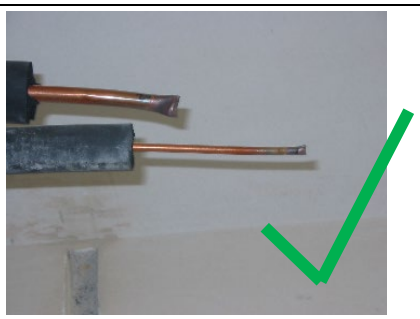
3.2.2 ***Specification*** of refrigerant pipe should be selected according to ***unit requirement***

- Too thick
  - abnormal air exhaust
  - difficult oil return（insufficient air velocity)
  - → blocked compressor
- Too long
  - abnormal air exhaust
  - difficult oil return
  - → blocked compressor

※ ***Thickness of copper tube***

Specifications		Thickness (mm)	Weight / length	
inch	mm		1m =* Kg	1Kg=* m
1/4	Φ 6.35	0.8	0.124	8.06
3/8	Φ 9.52	0.8	0.195	5.12
1/2	Φ 12.7	0.9	0.297	3.36
5/8	Φ 15.88	1.0	0.416	2.4
3/4	Φ 19.05	1.0	0.505	1.98
7/8	Φ 22.22	1.2	0.706	1.41
1	Φ 25.4	1.2	0.813	1.23
	Φ 28.6	1.2	0.92	1.08
	Φ 31.8	1.2	1.11	0.9
	Φ 34.9	1.3	1.223	0.817
	Φ 38.1	1.4	1.438	0.695
	Φ 41.3	1.5	1.671	0.598
	Φ 44.5	1.5	1.823	0.554

3.2.3 If ***pipes*** will be ***stored*** for a ***long time***, the pipes should be ***charged*** into ***0.2~0.5MPa N2*** and the ***nozzle*** should be ***sealed*** by welding.

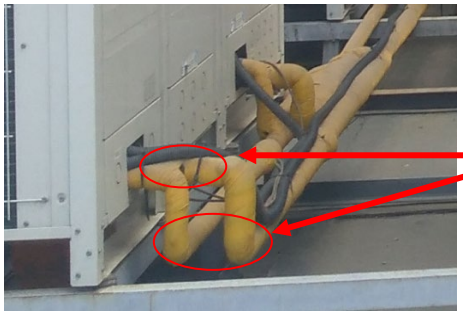


3.2.4 ***Don't let dust*** such as concrete fragment, sand and copper slag ingress ***into the system***;

3.2.5 ***Don't install pipe while raining to prevent water ingression;*** blocking capillary or expansion valve, generating acid Iron/copper erosion due to refrigerant hydrolysis, generating foreign matter crystal (cage compounds) due to reaction of refrigeration oil

3.4 Bending of copper tube

3.4.1 ***Do not*** right angle ***bending many times in a short distance***



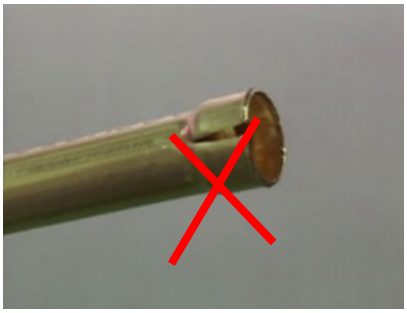
Larger flow resistance of refrigerant

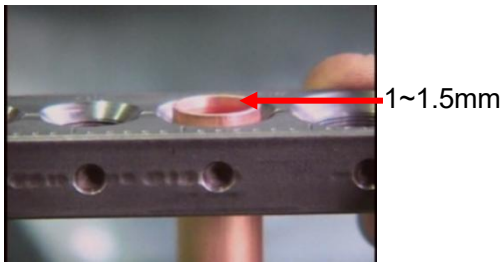
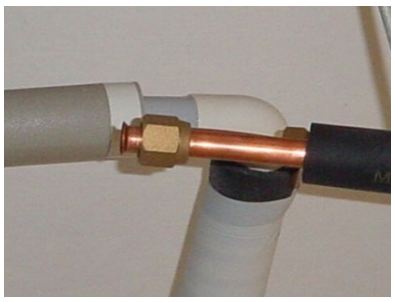
3.4.2 ***Pipe bender must be used*** for pipe bending. The curvature can't be too small, otherwise the pipe may be bent and shrunken, affecting refrigerant flow;

3.4.3 ***Don't repeat bending*** and unbending operation over three times on the same position of pipe (because pipe will be hardened in this way).

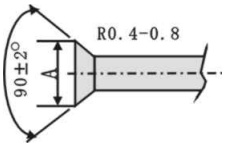
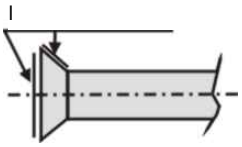
3.5 Flaring of copper tube

3.5.1 The ***burr*** of the copper tube ***should be removed*** before the copper tube is expanded

3.5.2 It is required to expand the inside diameter at connection area with ***Tube expander***		
		

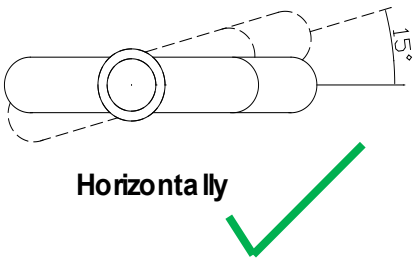
3.5.3 The copper pipe connected to the indoor units needs to be expanded by ***Expander***	
	
	

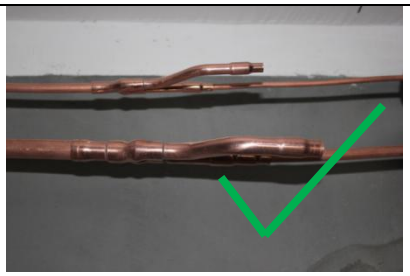
Flare pipe with ***Expander*** as per the dimensions of flaring opening in the following table.

Diameter of pipe	Tightening torque	Machining dimension of flared section (A)	Shape of flaring opening	Apply oil
1/4in(φ6.35mm)	15-19 (N·m)	8.8-9.1mm		
3/8in(φ9.52mm)	35-40 (N·m)	12.8-13.2mm		
1/2in(φ12.7mm)	50-60 (N·m)	16.2-16.6mm		
5/8in(φ15.88mm)	68-80 (N·m)	19.2-19.6mm		
3/4in(φ19.05mm)	100-120 (N·m)	23.6-24mm		

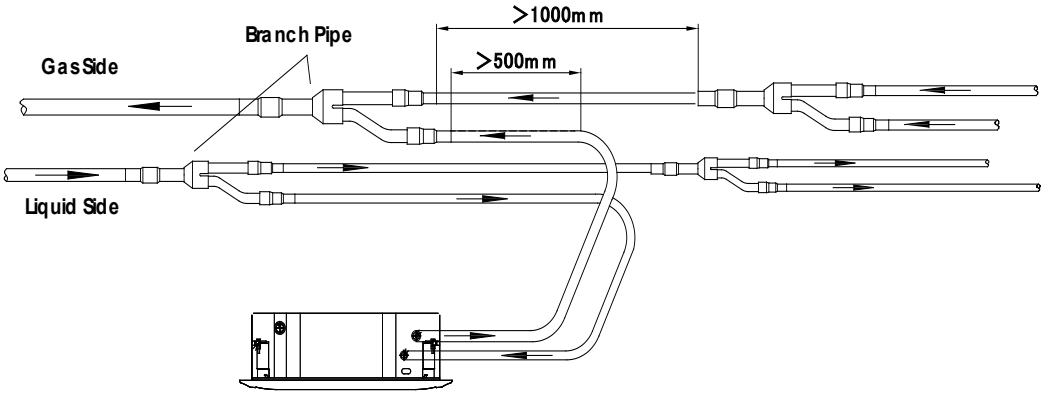
3.6 Separation Tube (branch joint)

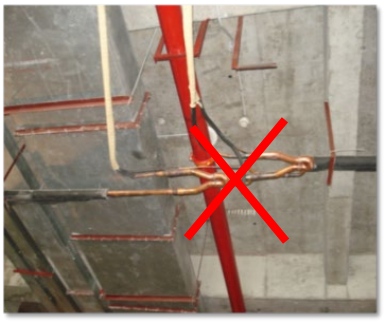
3.6.1 The ***branch*** joint must be installed ***horizontally*** and the lean ***angel*** should be ≤ 15°to avoid refrigerant distribution unbalance.

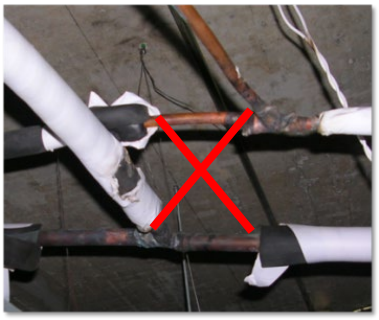




3.6.2 To ensure the refrigerant distribution is balance, pipe length which between two branch joints ≥1000mm, the straight pipe length after the branch pipe ≥500m

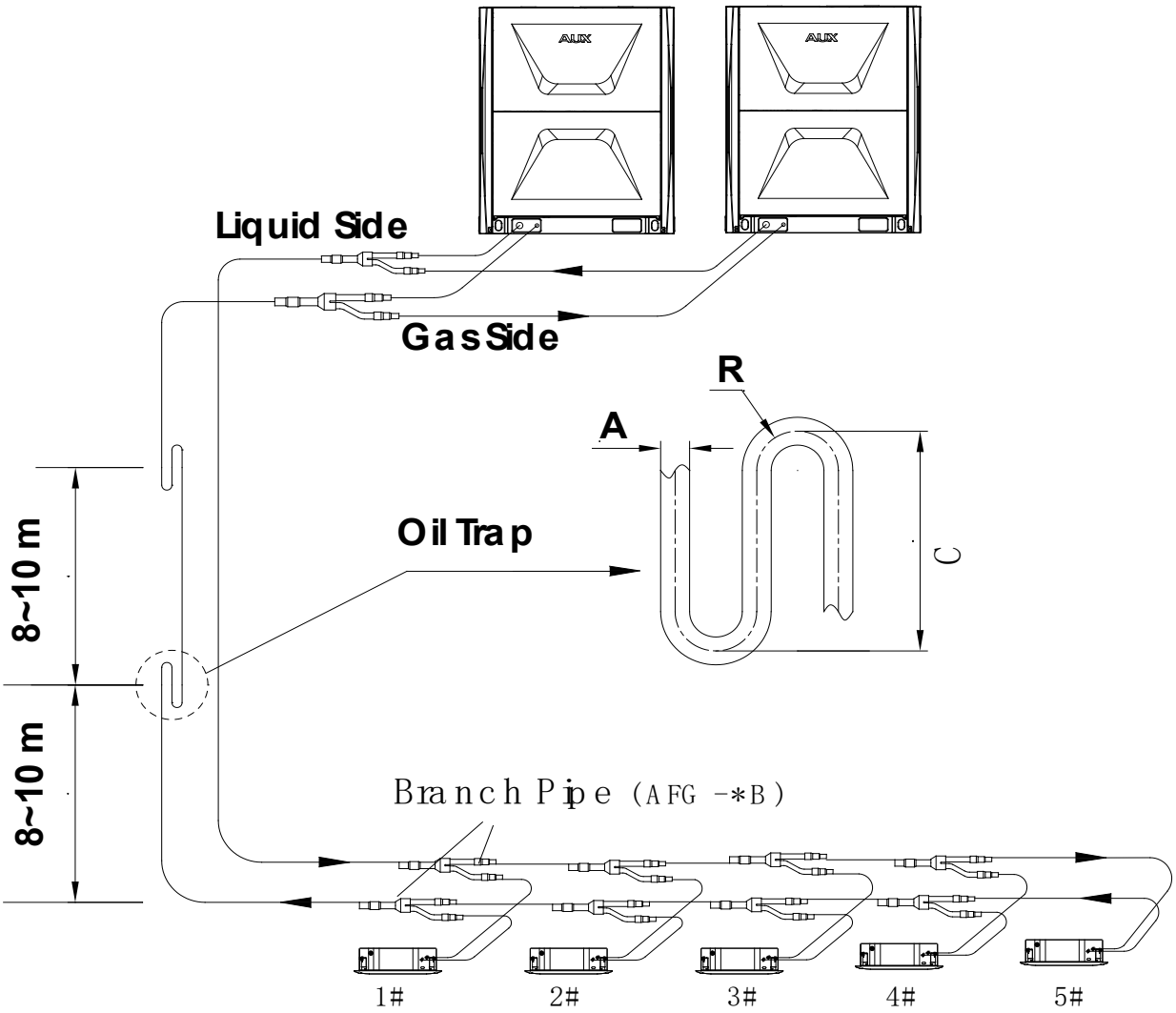






3.7 Oil Trap

When the Vertical ***height*** between indoor and outdoor units more than ***8 or 10 meters***, ensure the Refrigeration ***oil return to compressor*** smoothly, the ***oil trap is necessary***



A		R	C
mm	inch	mm	mm
Φ 19.05	3/4	≥ 31	≥ 105
Φ 22.22	7/8	≥ 31	≥ 150
Φ 25.4	1	≥ 45	≥ 150
Φ 28.6	9/8	≥ 45	≥ 150
Φ 34.9	11/8	≥ 60	≥ 250

3.8 Pipeline fixing

Refrigerant pipe should be fixed, when running, refrigerant pipe will sway, expand or shrink, if unfixed, load will concentrate on certain part, result fracture of refrigerant pipe. The pipe should be fixed ***every 1~2m***.

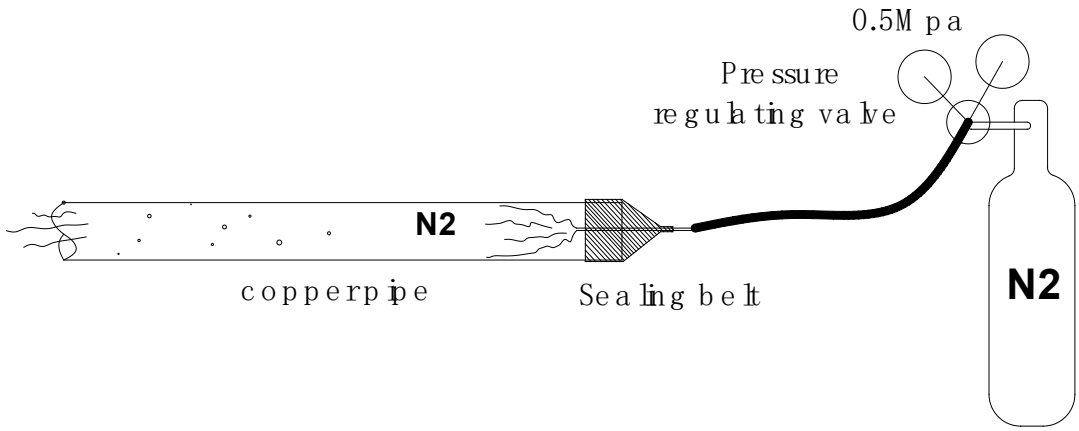
4. Welding

4.1 Pre tools

Nitrogen cylinder	Nitrogen pressure regulating valve	Nitrogen pressure gauge
Welding device	**Connection hose**	

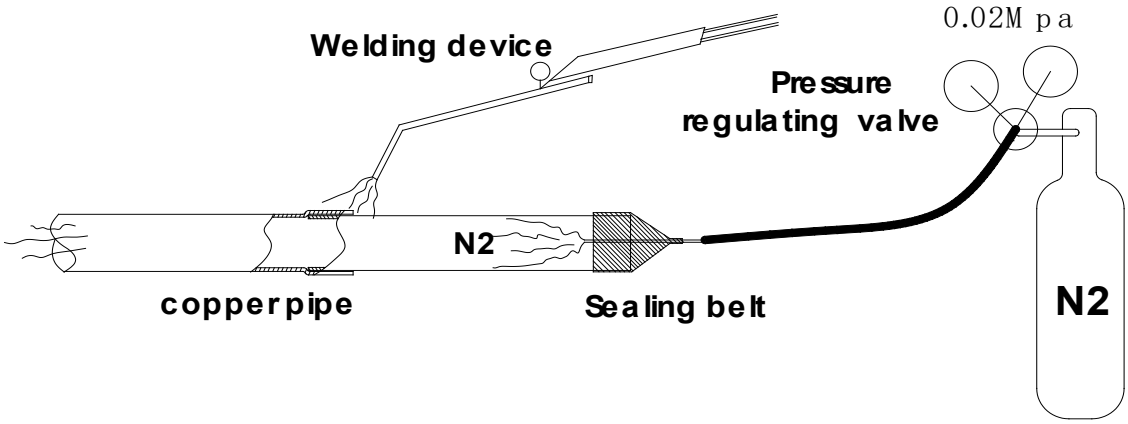
4.2 Flushing

Before connection use nitrogen(The pressure of the nitrogen is ***0.5 MPa***) or air to ***remove dust*** and ***moisture*** inside pipe.

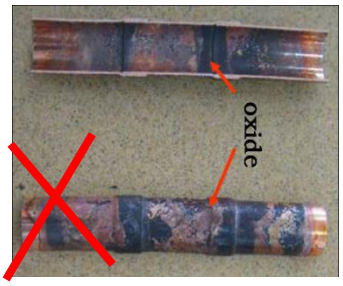


4.3 Fill nitrogen and welding

4.3.1 Ensure to fill nitrogen (The pressure of the nitrogen is ***0.02 MPa***) for protection when welding.



4.3.2 It's necessary to ***fill nitrogen to prevent*** oxidation layer ***(Cu_2O)*** formed in copper pipe when welding, otherwise substantial oxidation layers will cause blockage of capillary tube or expansion valve, abnormal discharge temperature, poor cooling or heating performance.

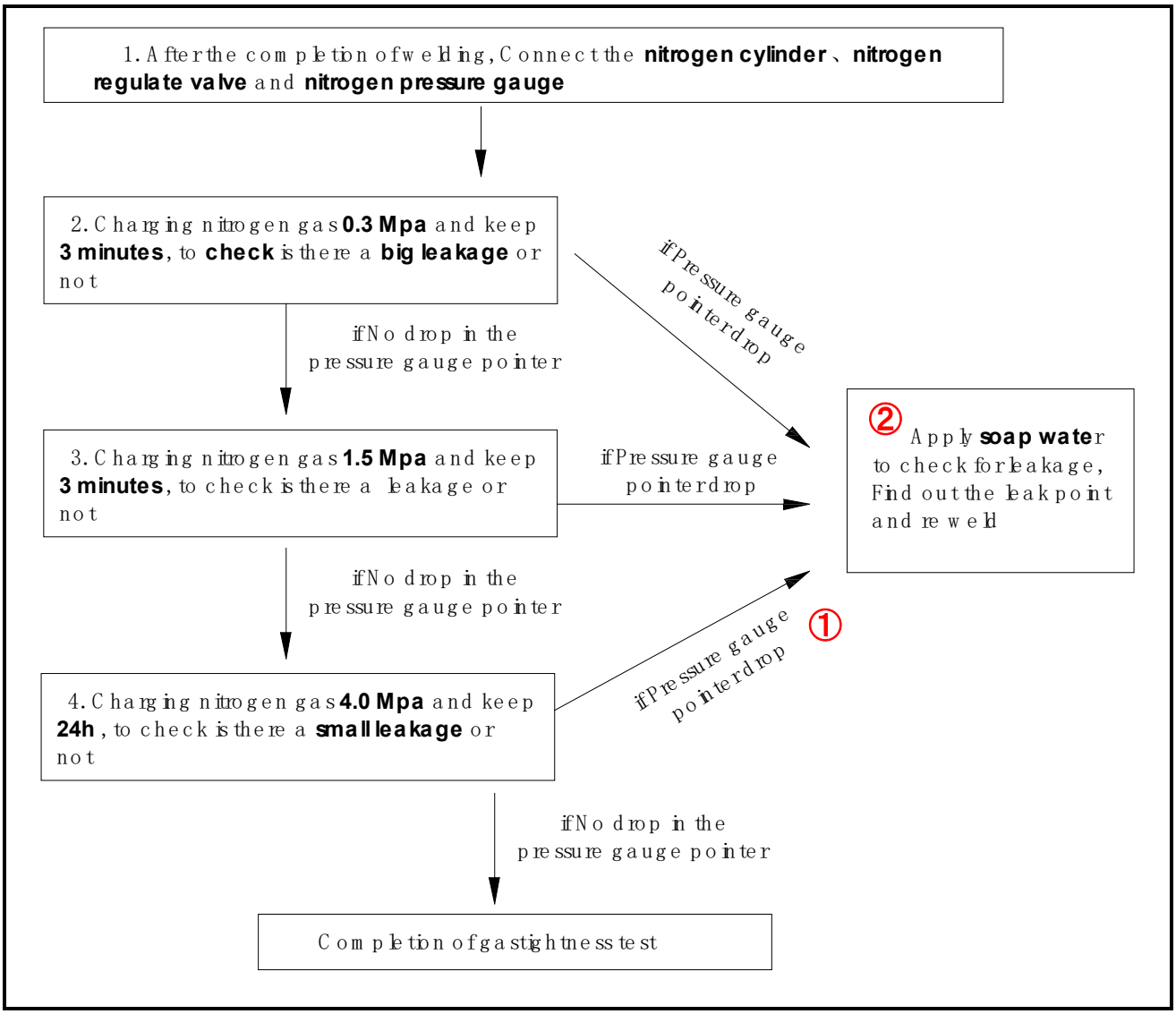
Charge N2 to the pipes	*NO N2 to the pipes*
	 *Cause blockage of EXV* *Cause Compressor wear* *Poor cooling/ heating performance*

4.3.3 If permitted, it's recommended to use ***less indoor units and shorter pipeline***

5. Gas Tightness Test

5.1 Purpose and Steps

To confirm whether there is leakage in pipe by using nitrogen, and the steps are as follows



① Observe pressure drops

It's necessary to correct if pressurized temperature is different from observed ambient temperature with difference of ***0.01MPa/1℃***.

Correction value = (Pressurized temperature - observed temperature) x 0.01

Example:

Pressure is 4.0 MPa and temperature is 25℃ in case of pressurization.

After 24 hours, if the pressure is 3.95MPa and temperature is 20℃, it is deemed qualified.

② Check leakage point.

If there is pressure drop but leakage point can't be found in pressure test:

1. Discharge nitrogen until the pressure is ***0.3MPa***.
2. Charge R410a refrigerant to ***0.5MPa*** (namely the mixed state of nitrogen and refrigerant).
3. Check with halogen lamp, butane gas (petroleum gas) detector and electric detector.
4. If leakage point can't be found, recheck by continuously pressurize up to ***2.8MPa***. (maximum pressure is 4.0MPa)

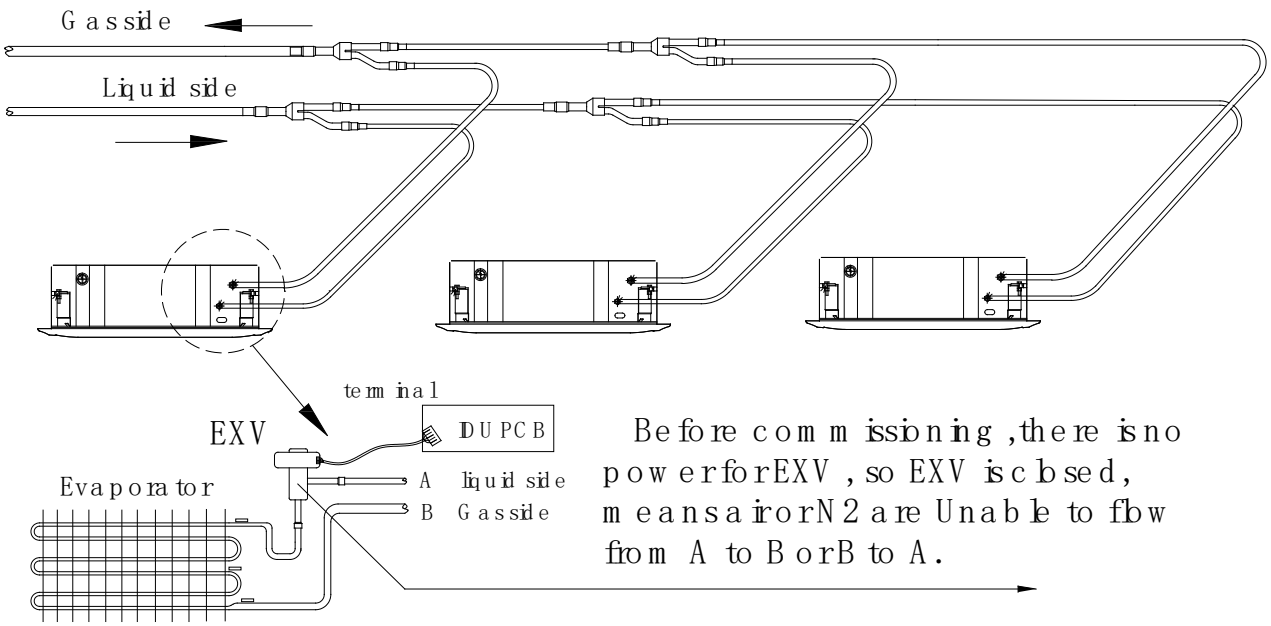
5.2 Pre Test tool

nitrogen cylinder	Nitrogen pressure regulating valve	Nitrogen pressure gauge
Soap water (Use of leakage)	Welding device (Use of leakage)	Connection hose

5.3 Caution

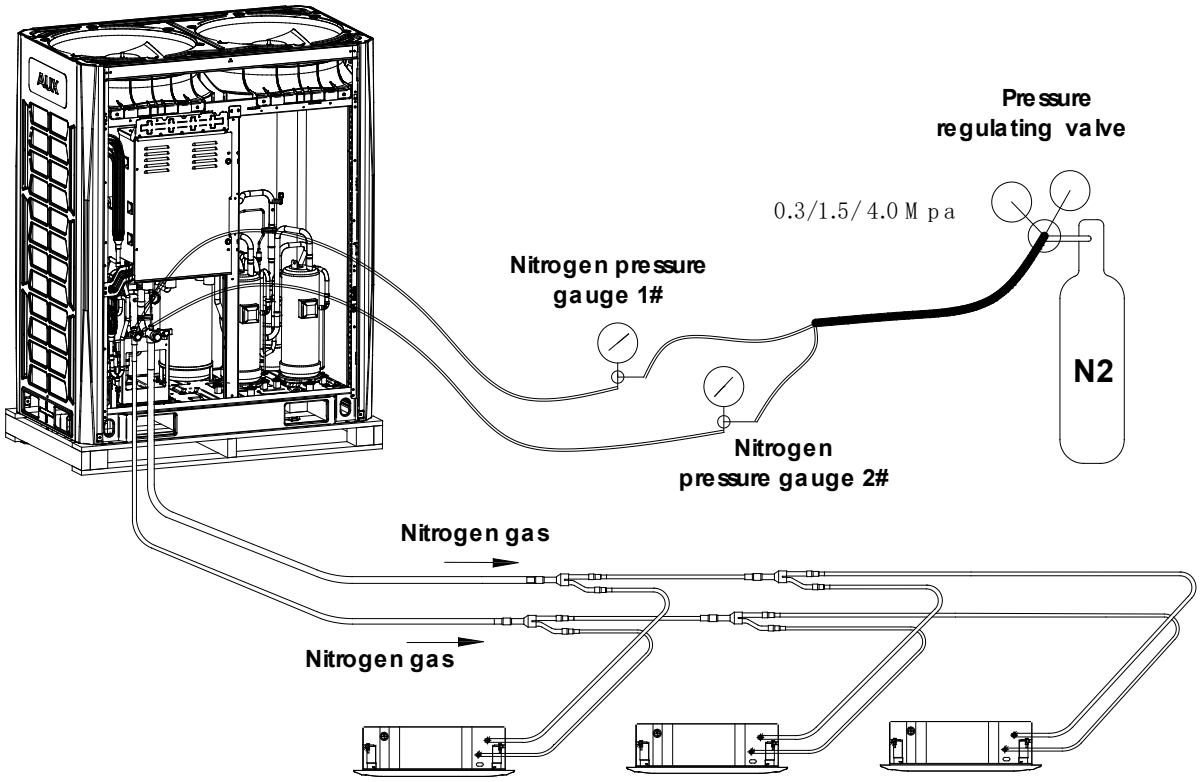
There is no power for indoor unit's EXV before commissioning, so the EXV is closed, the nitrogen gas unable to flow from A to B or B to A

So when charging the nitrogen gas, ***it should be charged from the both (liquid & gas) sides***

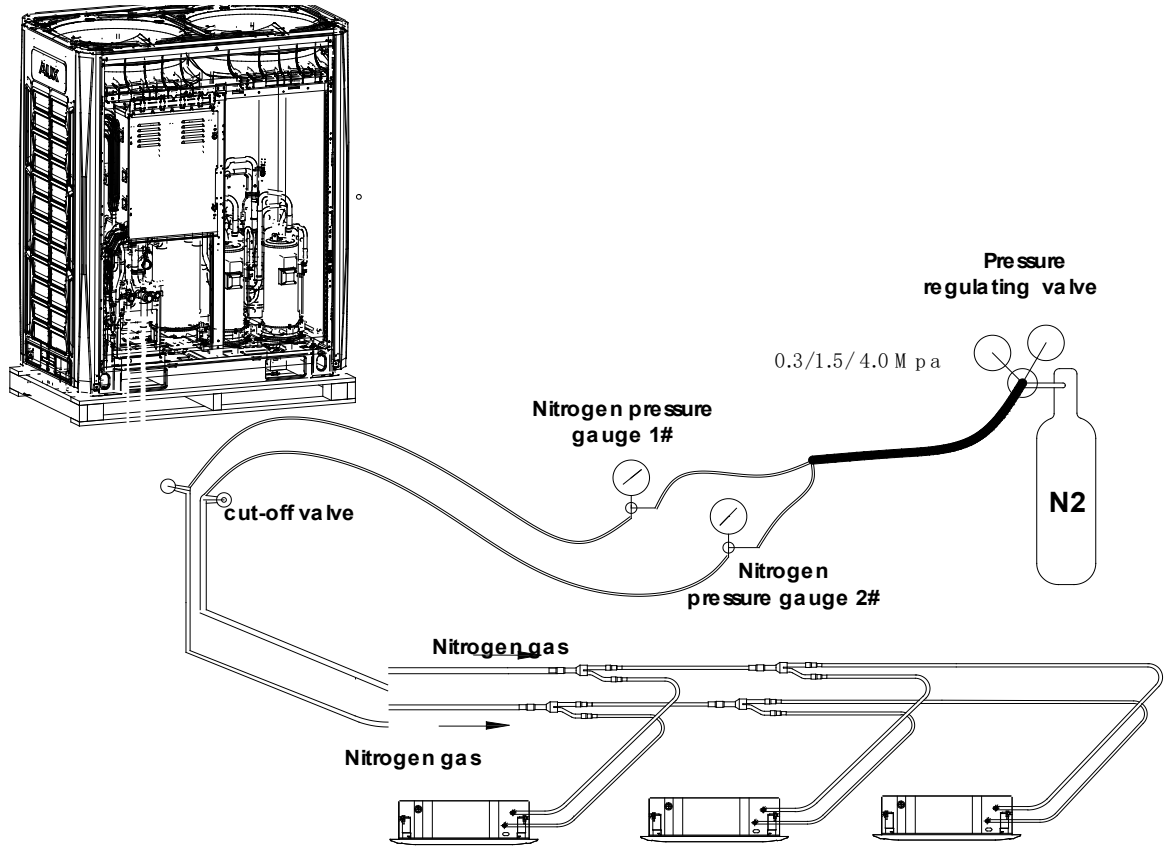


5.4 Schematic diagram

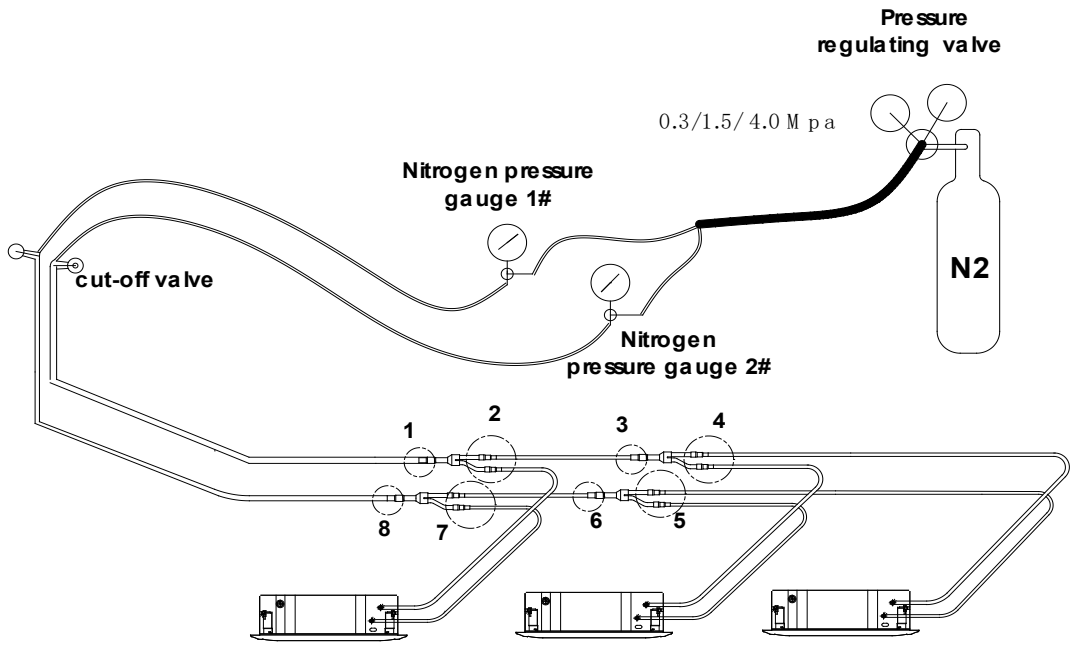
***Nitrogen filling mode 1**:* Connect to gas and liquid cut-off valve



***Nitrogen filling mode 2**:* Connect to main gas & liquid piping



If pressure gauge point drops, apply soap water (*Focus on inspection of welding points, such as 1~8 below*) to check for leakage, Find out the leak point and re weld



6. Vacuum Drying

6.1 Selection of vacuum pump

1. Vacuuming suction must be less than -14.6PSI (756mmHg).
2. The discharge of vacuum pump is over ***4L/s.***
3. The precision of vacuum pump is over 0.001ft.H_2O (0. 02mmHg)

Note:

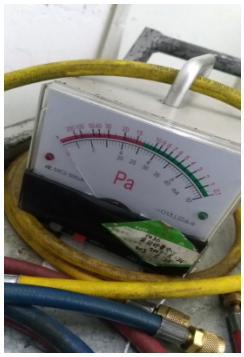
1. Under the normal air pressure, the boiling point of water (steam temperature) ***is 100*** ℃, but the pressure in vacuum pump pipe is near vacuum, this makes the boiling point lower to below the outside air temperature, and the water in the pipe is evaporated.

2. After the vacuuming process of R410A refrigerant circulation system is complete, vacuum pump will stop running. As a result of suction in the in the air conditioning system, vacuum pump lubricant will seep back into the system. This situation will also occur if vacuum pump suddenly stops during operation. It will cause different oils mix, leading to system malfunction, therefore it is recommended to use one-way valve to prevent reverse flow of oil in vacuum pump.

Water's boiling point (℃)	Pressure (mmHg)	Vacuum degree (mmHg)
40	55	-705
30	36	-724
26.7	25	-735
24.4	23	-737
22.2	20	-740
20.6	18	-742
17.8	15	-745
15.0	13	-747
11.7	10	-750
7.2	8	-752
0	5	-755

Example: When the ambient temperature is 7.2℃, vacuuming can be carried out under -752mmHg.

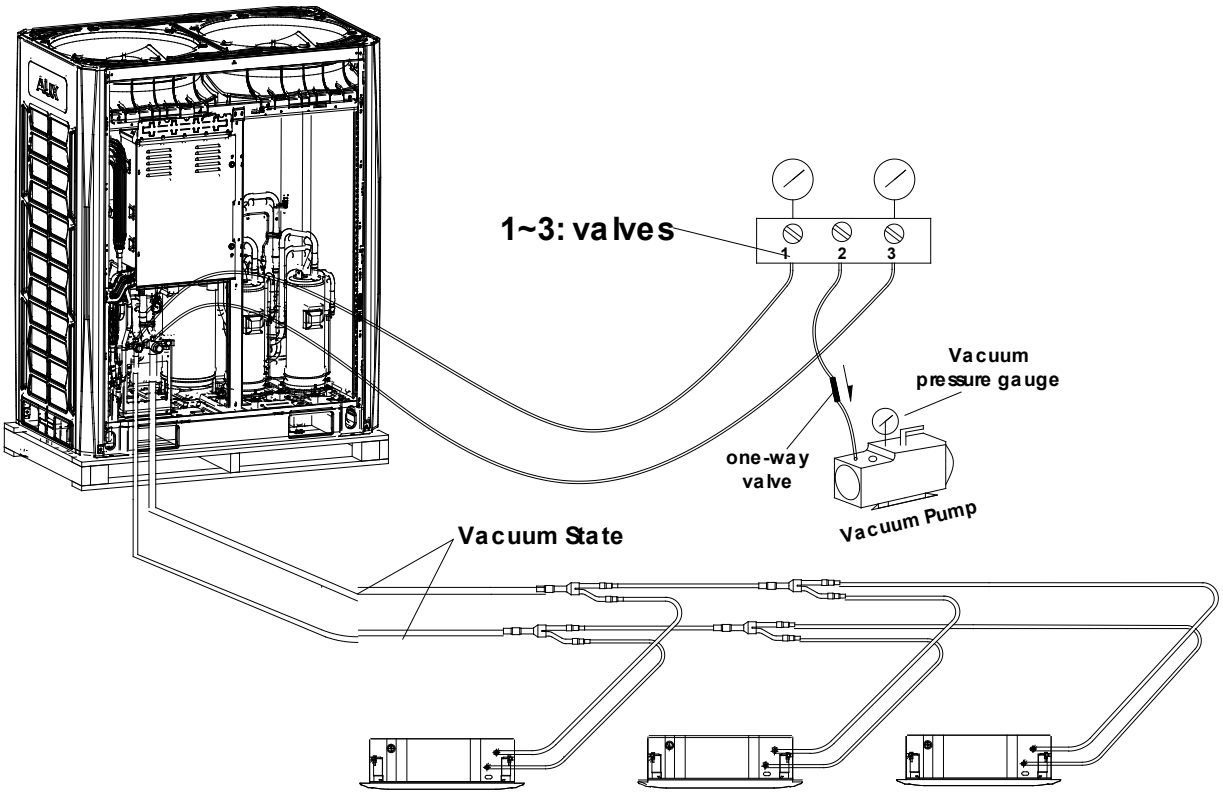
6.2 Pre tools

Vacuum pump (4L/s)	vacuum pressure gauge	Connection hose
		

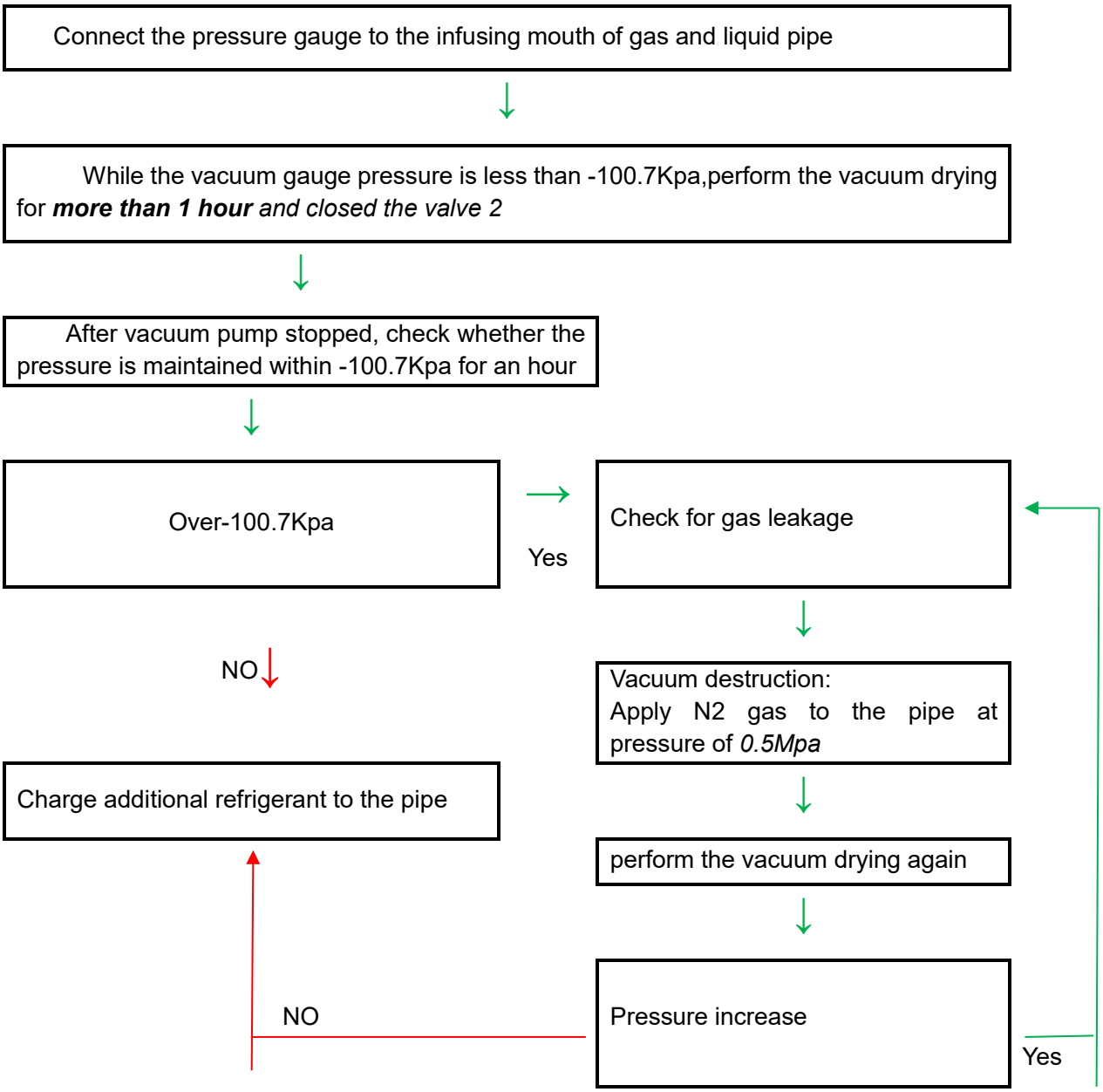
6.3 Schematic diagram

Gas and liquid stop valve must be closed, 1~3 valves should be opened

Vacuum pump with ***one-way valve*** to ***prevent pump oil*** from flowing backward while the vacuum pump is stopped



6.5 Vacuum drying



7. Insulation

7.1 Purpose of Insulation

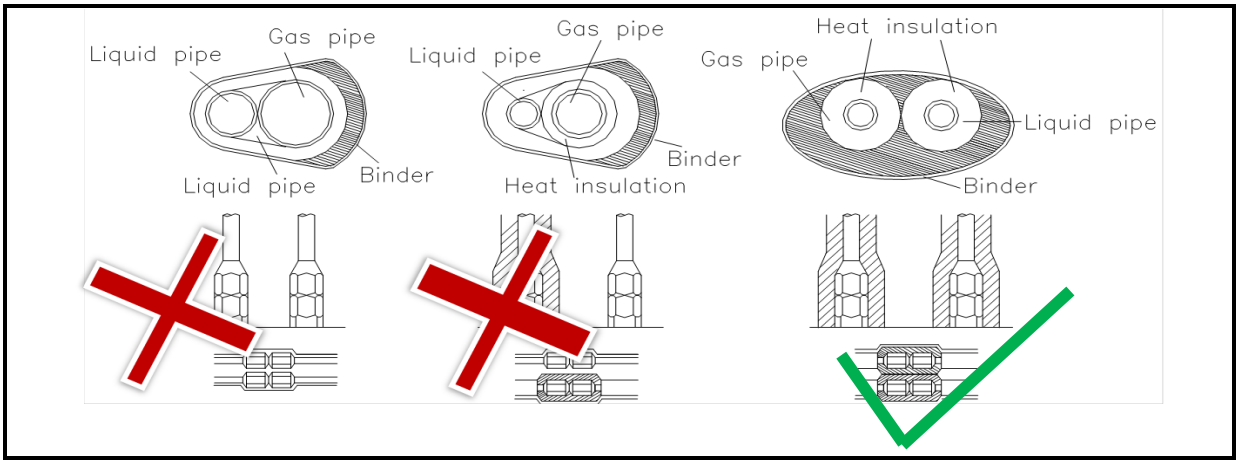
- Prevent condensate water adhere to the gas pipe
- Protect people from hurt of high temp.
- Avoid energy loss

7.2 Pre tools

Rubber and plastic insulation casing	Cutting knife	Air conditioning bandage

7.3 Caution

7.3.1 The insulation of liquid pipe and gas pipe must be separate



7.3.2 The insulation work must be done to every part of refrigerant pipes

7.3.3 Insulation material

Pipe diameter	Thickness
Φ6.4~15.9mm	≥15mm
Φ15.9~38.1mm	≥20mm
Φ38.1~54.1mm	≥25mm

7.3.4 Thermal insulation wrapping of pipe

Thermal insulation materials should be used for drainage pipe and refrigerant pipe to **prevent condensation or water leakage.**

Note:

✧ Wrap refrigerant pipe with thermal insulation materials of good insulation performance (> 120℃).

✧ Notice for high-humidity environment: the A/C system is verified by condensation conditions test. However, it may subject to dripping if working in high-humidity (condensation temperature > 23℃) environment for a long time. In this case, please add the following thermal insulation materials:

✧ The thermal insulation materials should be glass fiber thermal insulation materials with 10~20mm thickness.

7.3.5 Sealing of Wall Opening

After installing pipe and drainage pipe, it's necessary to ***seal the gap*** among wall opening, refrigerant pipe, ***drainage*** pipe and electric wire with ***mortar or putty*** to prevent capacity degradation or water leakage caused by rainwater or foreign matter from ingress into room and A/C system.

8. Additional refrigerant

8.1 Calculate refrigerant charge volume

Calculate the required refrigerant volume by the length of liquid pipe → recharge refrigerant.

Pipe size of liquid side (mm)	L1 Φ31.8	L2 Φ28.6	L3 Φ25.4	L4 Φ22.22	L5 Φ19.05	L6 Φ15.88	L7 Φ12.7	L8 Φ9.52	L9 Φ6.35
Additional refrigerant charge per meter (kg)	0.75	0.68	0.52	0.34	0.25	0.17	0.11	0.054	0.022

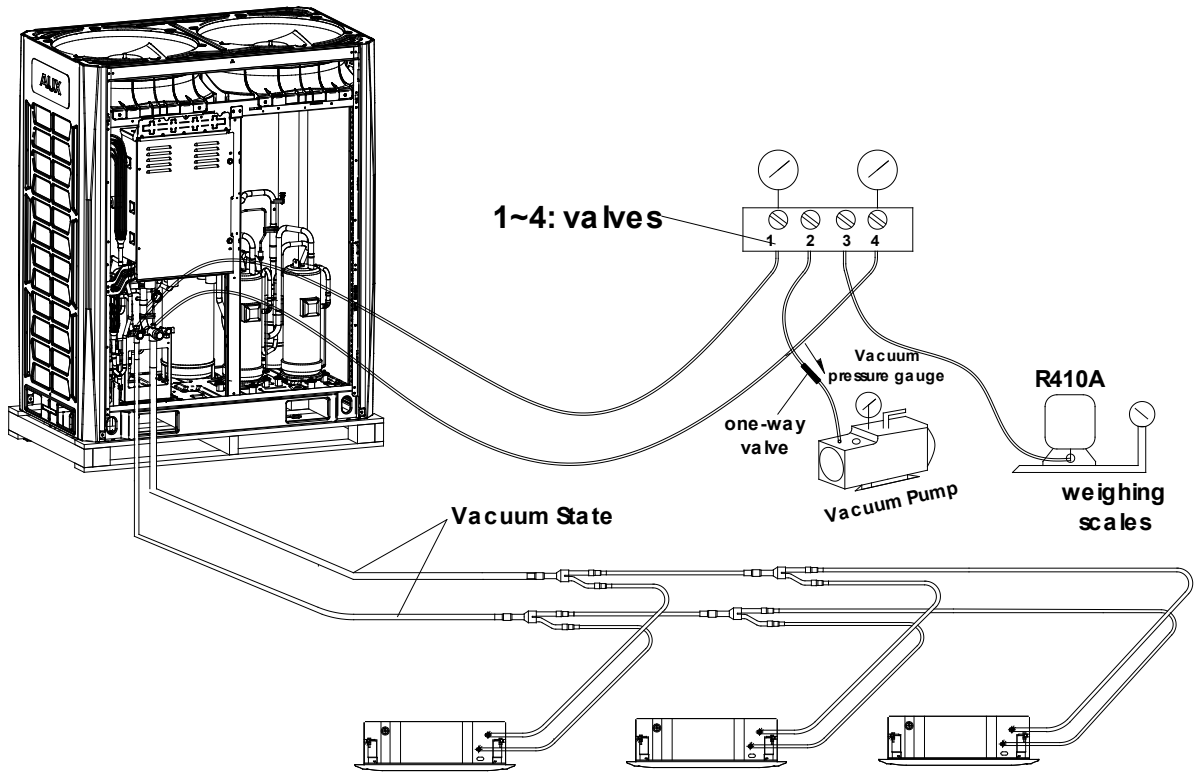
Additional refrigerant charge volume =(L1×0.75)+(L2×0.68)+ (L3×0.52) + (L4×0.34) + (L5×0.25) + (L6×0.17) + (L7×0.11) + (L8×0.054) + (L9×0.022)

8.2 Pre tools

Vacuum pump (4L/s)	Connection hose	electronic scale
R410A		

8.3 Schematic diagram

1. 1~4 # valves all are opened
2. 1#, 3#, 4# valves are opened, 2# valve are closed



8.4 Steps for recharging refrigerant

1. Make sure ***vacuum drying*** is qualified before recharging refrigerant.
2. ***Calculate the required refrigerant volume*** by the diameter and the length of liquid pipe.
3. Use ***electronic scale*** or fluid infusion apparatus to weigh the recharged refrigerant volume.
4. Use soft pipe to connect refrigerant cylinder, pressure gauge, and examine valve of outdoor unit. And recharge in liquid mode. Before recharging, clear the air in the soft pipe and pressure gauge's pipe.

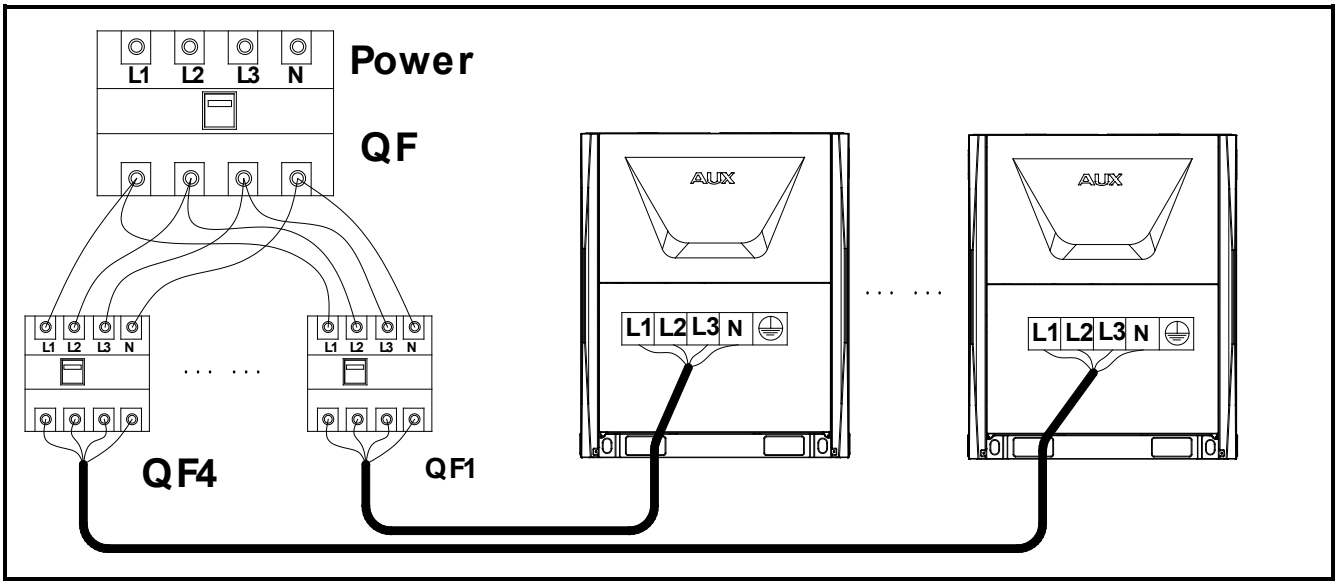
9. Electrical Wiring

9.1 Wiring Diagram of Indoor Unit and Outdoor Unit

Power line must be properly fixed; Outdoor unit must be grounded;

Each indoor unit must be grounded; Power wire must be thickened when it is overlong.

Wiring Diagram of Modular Outdoor Unit

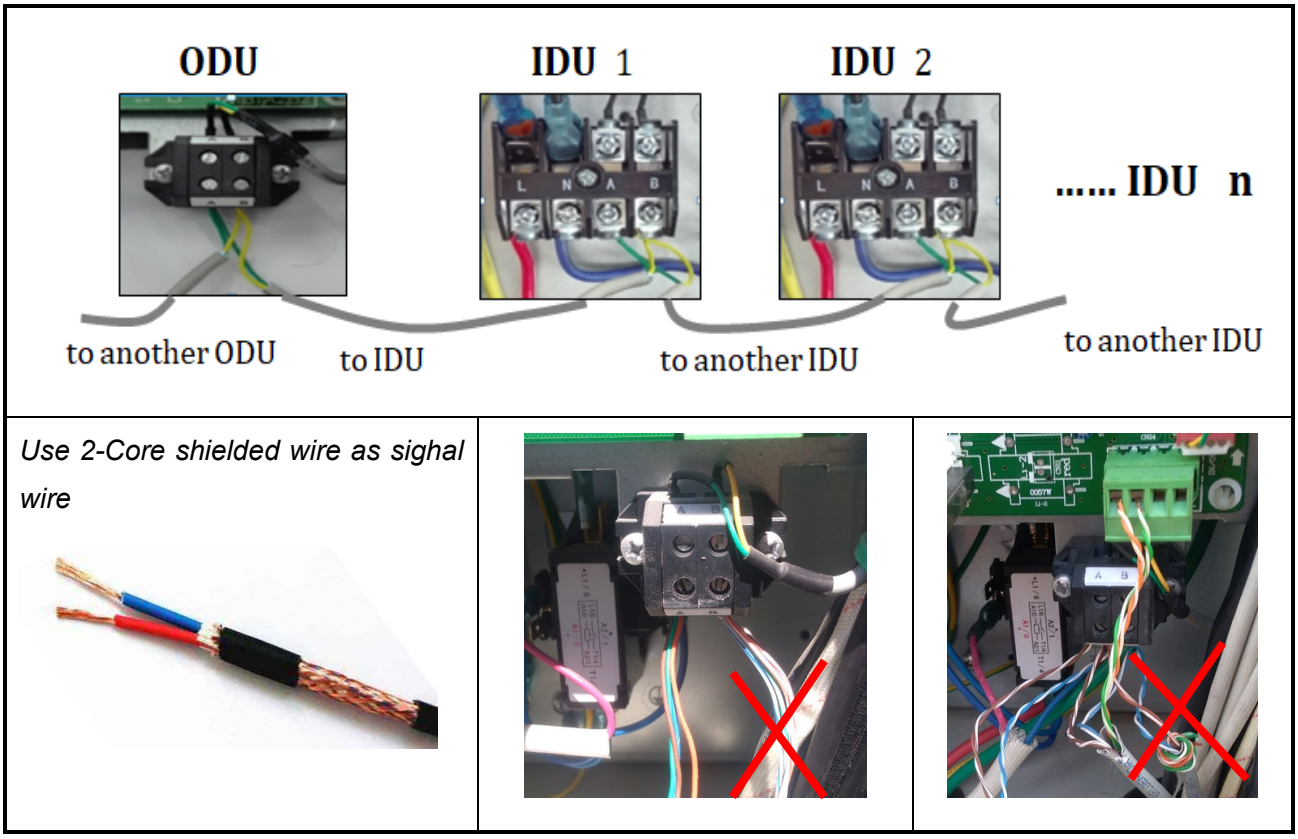


Recommended Specification for Power Line of Outdoor Unit (stand-alone power supply)

Item / Unit Type		Power supply	power line (mm^2)	breaker (A)	leakage current Operate time	ground wire(mm^2)
Separate power	ARV-H250/SR 1MV	380~415V 3Ph ~ 50/60Hz	4	32	30mA, < 0.1 sec.	4
	ARV-H280/SR 1MV		6	32	30mA, < 0.1 sec.	6
	ARV-H330/SR 1MV		6	40	30mA, < 0.1 sec.	6
	ARV-H400/SR 1MV		6	50	30mA, < 0.1 sec.	6
	ARV-H450/SR 1MV		6	50	30mA, < 0.1 sec.	6
	ARV-H500/SR 1MV		10	63	30mA, < 0.1 sec.	10
	ARV-H560/SR 1MV		10	63	30mA, < 0.1 sec.	10
	ARV-H610/SR 1MV		16	63	30mA, < 0.1 sec.	16
	ARV-H680/SR 1MV		16	63	30mA, < 0.1 sec.	16

	ARV-H730/SR 1MV		16	63	30mA, < 0.1 sec.	16
	ARV-H785/SR 1MV		16	63	30mA, < 0.1 sec.	16
	ARV-H850/SR 1MV		25	80	30mA, < 0.1 sec.	25
	ARV-H900/SR 1MV		25	80	30mA, < 0.1 sec.	25
	ARV-H950/SR 1MV		25	80	30mA, < 0.1 sec.	25
	ARV-H1010/SR1MV		25	80	30mA, < 0.1 sec.	25

9.2 Communication Wire Connection



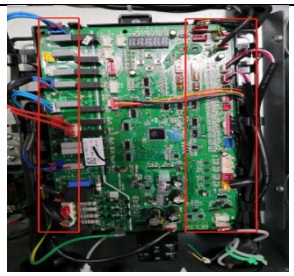
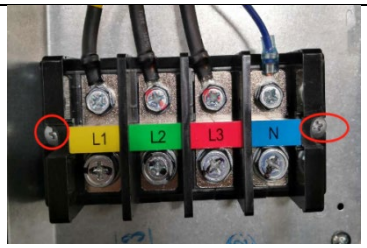
9.3 Wiring

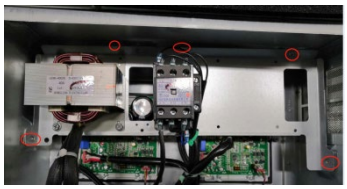
9.3.1 Open electric controlled ***box cover*** of indoor unit, wire according to ***electrical schematic diagram*** on electric controlled box cover, firmly press connecting wire on connecting terminal without loosening, ground wire must be ***connected at designated position***.

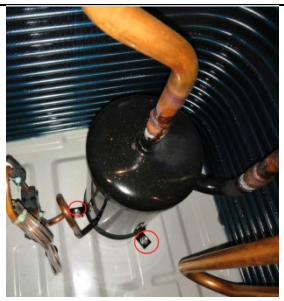
9.3.2 Open cover plate of electric appliance on right of outdoor unit and wire according to electrical schematic diagram on backside of electric appliance cover plate.

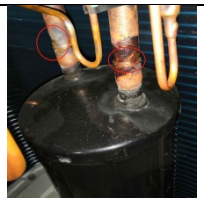
9.3.3 Make sure to thread connecting wire through tension disc and press firmly, wire end must be ***firmly pressed*** on connecting terminal without loosening and ***ground wire*** must be connected at designated position.

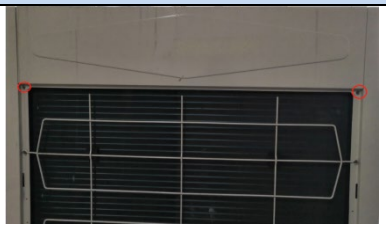
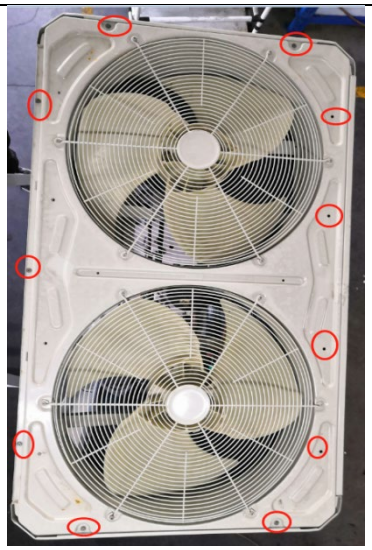
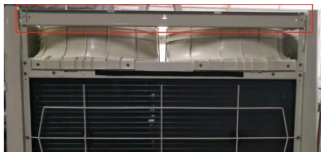
9.4 Disassembly report

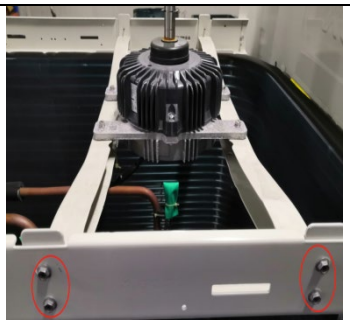
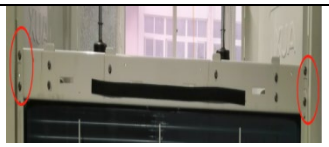
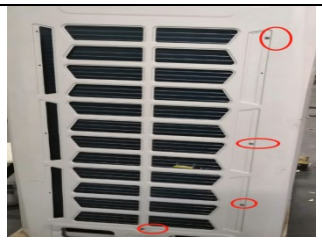
No	Parts	Procedure	Remark Photos
1	Main control board	1) Remove the screws on the lower panel	
1	Main control board	2) Remove the upper panel screws	
1	Main control board	3) Remove the screws on the cover of the electric control box	
1	Main control board	4) The main control board can be removed by removing the connectors and screws on the main control board	
2	Driver board	1) Remove the screws on the 2 ends of the terminal board	

2	Driver board	2）Remove the screws on the front side of the sheet metal, and the press and fan drive boards on the rear side can be removed	
2	Driver board	3）Remove the plug and screws of the fan drive board, and then take off the fan drive board	
2	Driver board	4）Remove the plug and screws of the press drive board, and then take off the press drive board	

No	Parts	Procedure	Remark Photos
3	compressor	1) Remove the compressor silencer cotton	
3	compressor	2) Remove the compressor heating belt and the bottom corner bolts	
3	compressor	3) Remove the power cord of the compressor	
3	compressor	4) The suction pipe and exhaust pipe of the compressor are welded, and the compressor can be removed	
4	Oil separator	1) Remove the bottom bolt of the oil separator	

4	Oil separator	2) The inlet pipe, outlet pipe and return pipe of the oil separator are welded, and the oil separator can be removed	
5	Gas-liquid separator	1) Remove the bottom bolt of the gas-liquid separator	
5	Gas-liquid separator	2) The inlet and outlet pipes of the gas-liquid separator are welded, and the gas-liquid separator can be removed	

No	Parts	Procedure	Remark Photos
6	Fan	1) Remove the 2 screws of the rear upper side plate and remove the upper side plate	
6	Fan	2) Remove the screws of the upper top plate and remove the upper top plate	
6	Fan	3) Remove the screws on the front and rear beams and remove the beams	
6	Fan	4) Remove the screws of the front and rear air guide rings, remove the air guide ring	
6	Fan	5) Remove the glue on the bolts of the blades, then remove the bolts, and remove the blades	

6	Fan	6) Remove the bolts on the fan motor, the motor can be removed	
7	*Heat Exchanger*	*1) Remove the screws on the front and back of the motor bracket*	
7	*Heat Exchanger*	*2) Remove the screws on the left and right of the front and rear lower beams*	
7	Heat Exchanger	3) Then remove the screws on the side plate and take out the side plate to get the condenser	

Part8 Commissioning

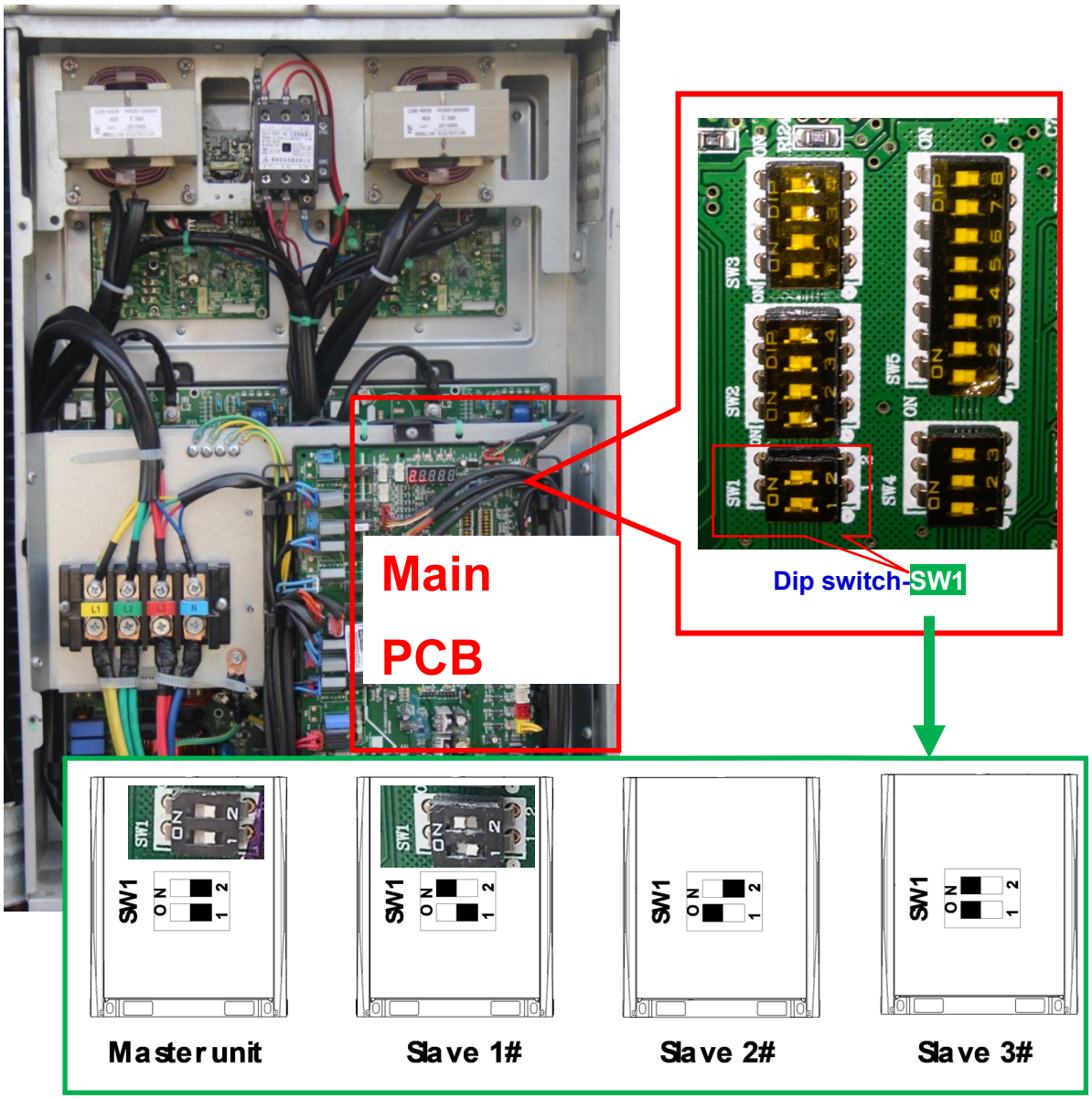
1. Commissioning

The outdoor unit is not allowed to power on before finish the installation (welding the connecting pipe, vacuum, adding refrigerant and opening the gas-liquid stop valve). Power on ODUs and keep in standby mode for more than **6 hours** which in order to preheat compressor oil, commissioning steps as below

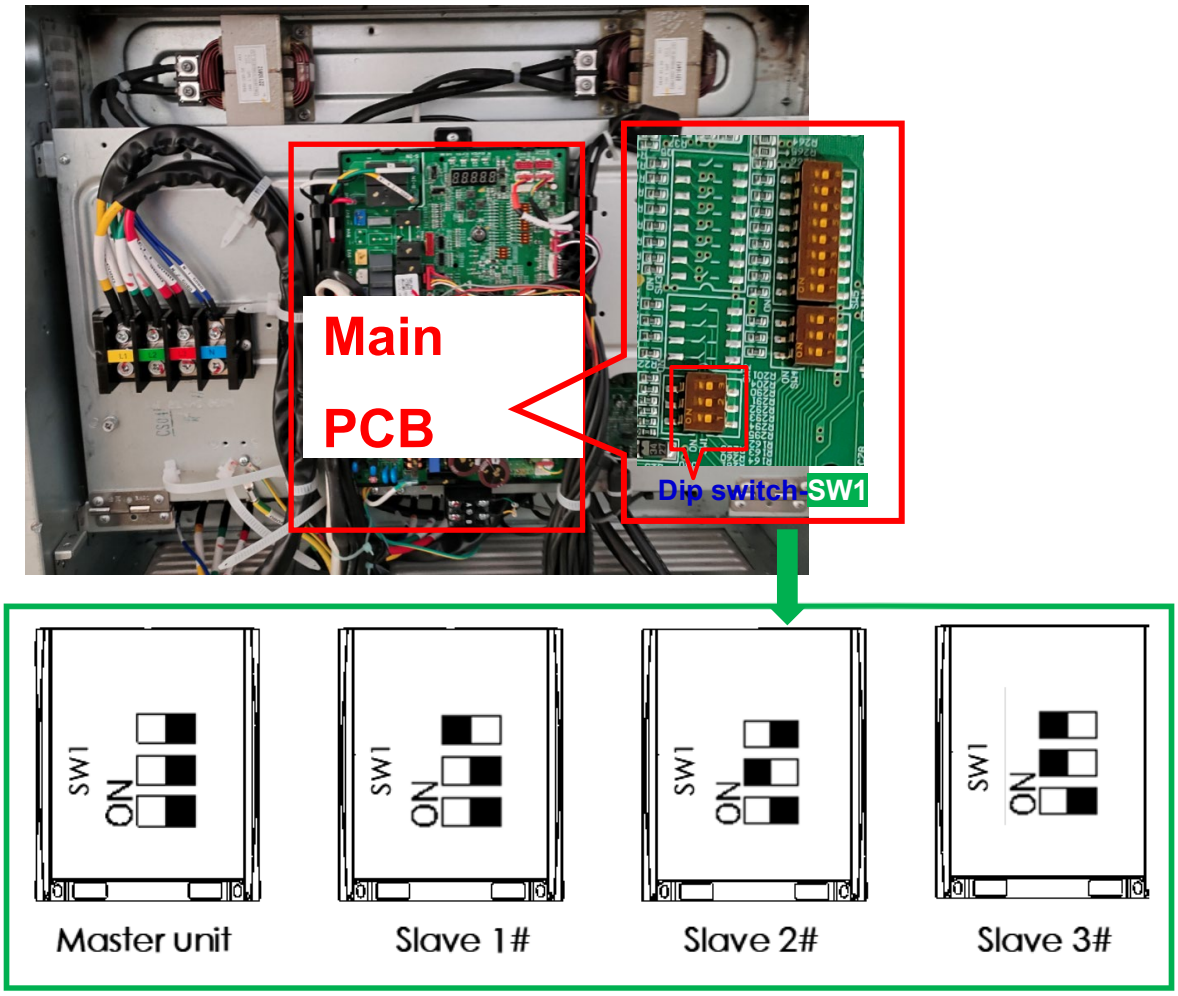
1.1. ODU address setting (Manual)

Through **Dip switch-SW1** of ODU **Main PCB**

8~22HP

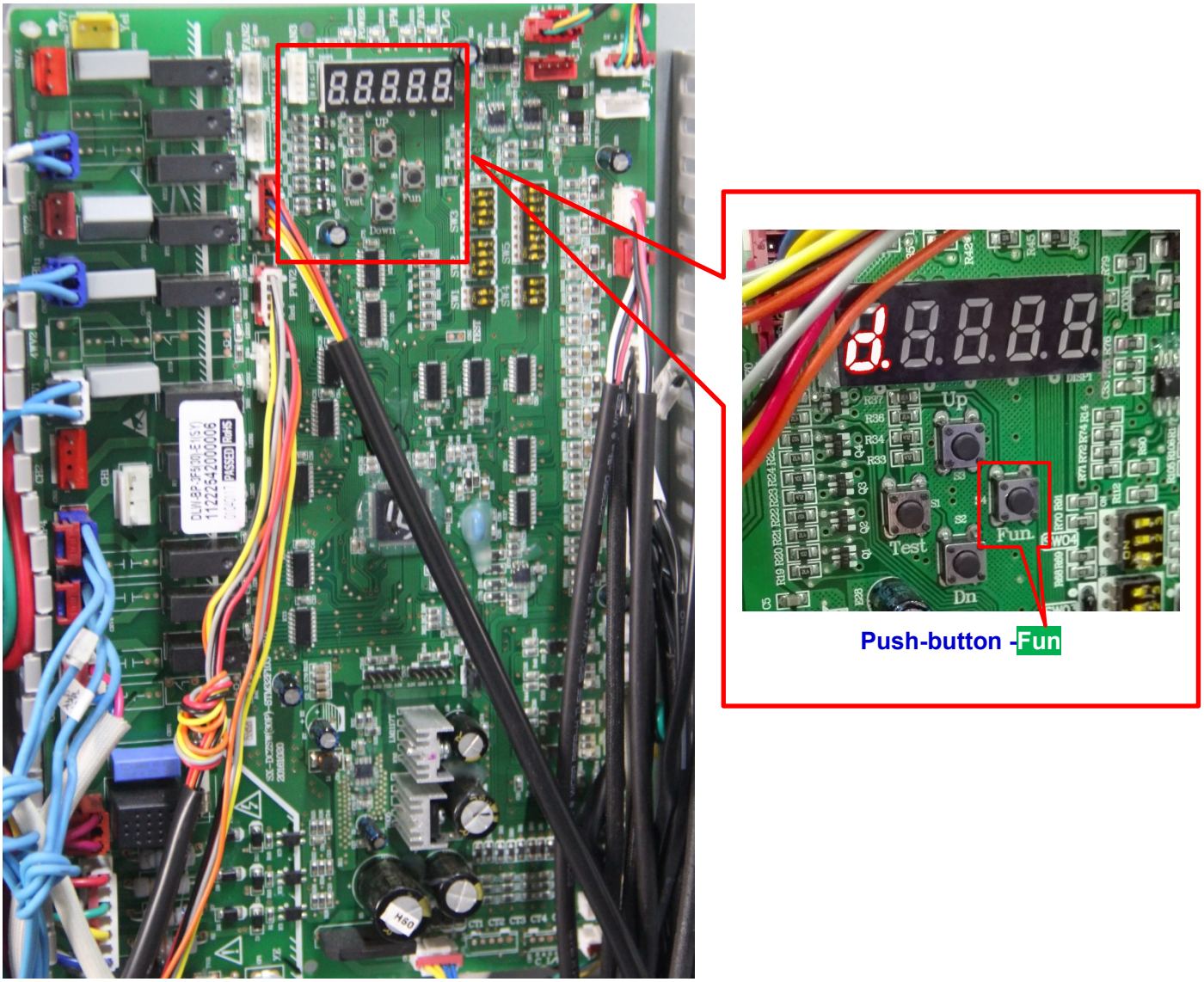


24~36HP

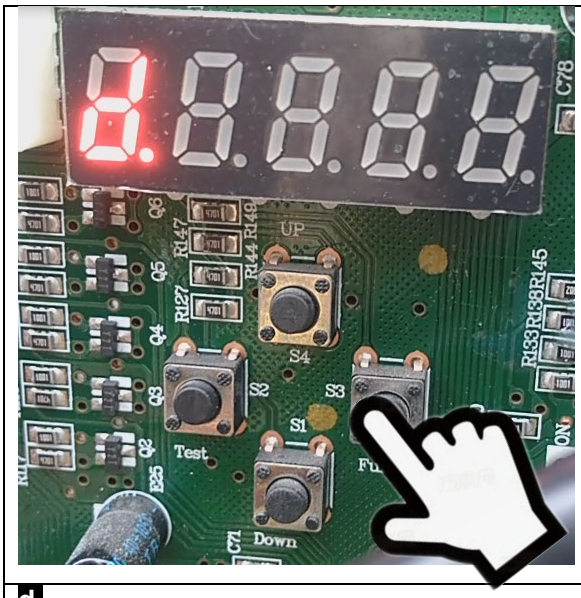
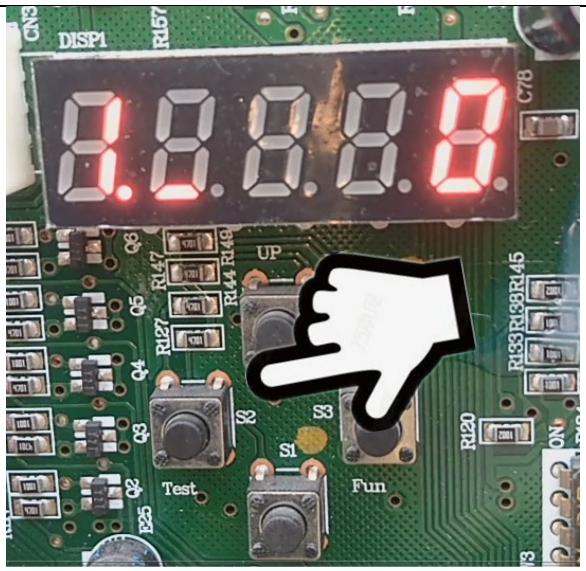
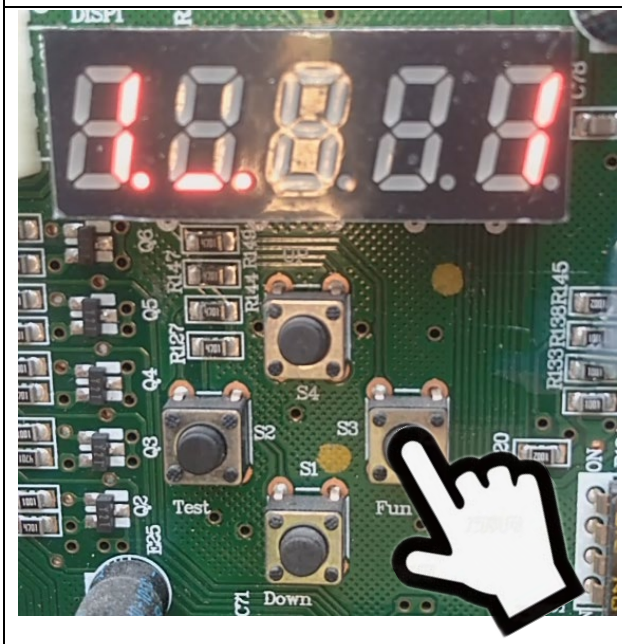
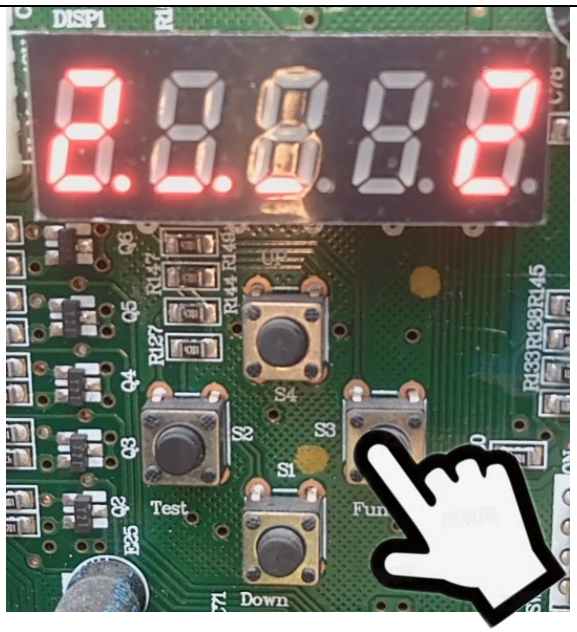

Main
PCB
Dip switch SW1
SW1
ON
Master unit
SW1
ON
Slave 1#
SW1
ON
Slave 2#
SW1
ON
Slave 3#

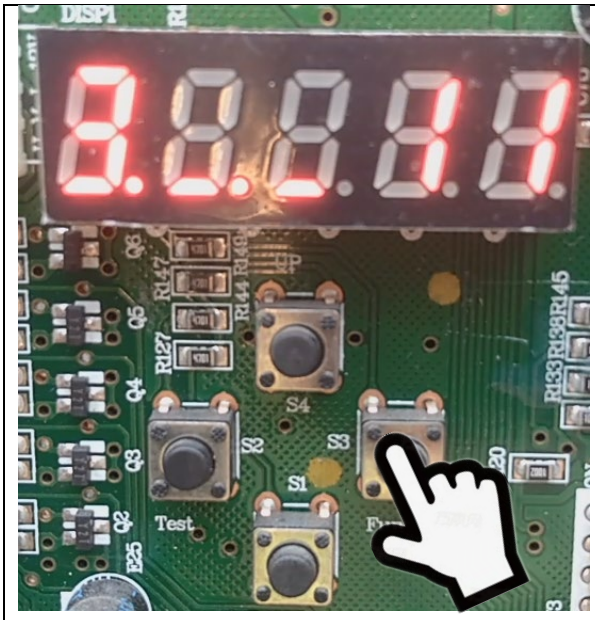
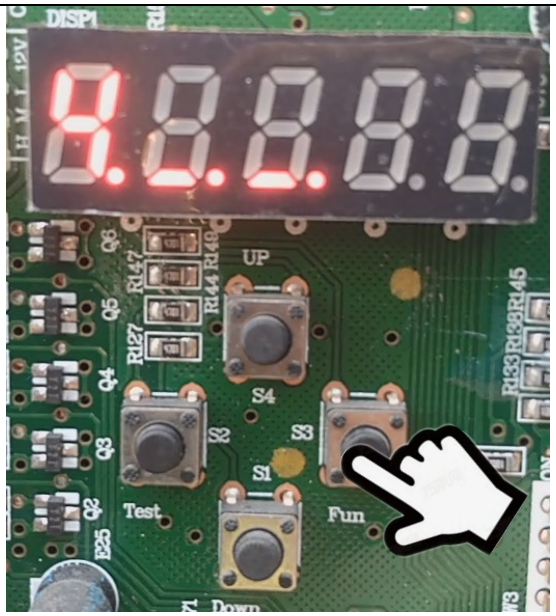
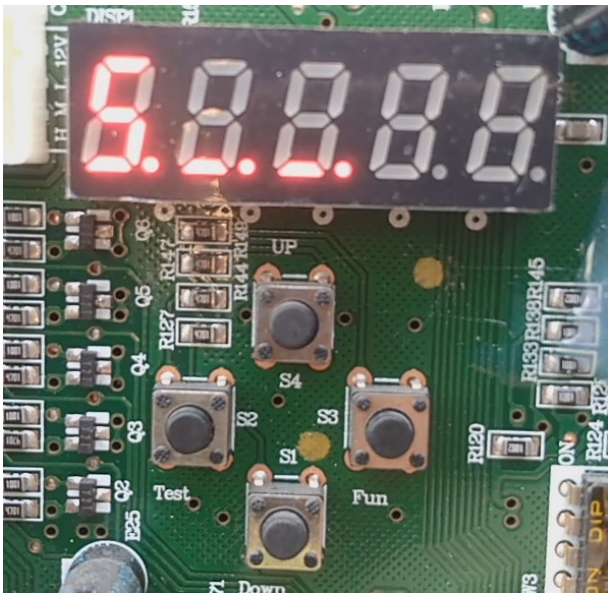
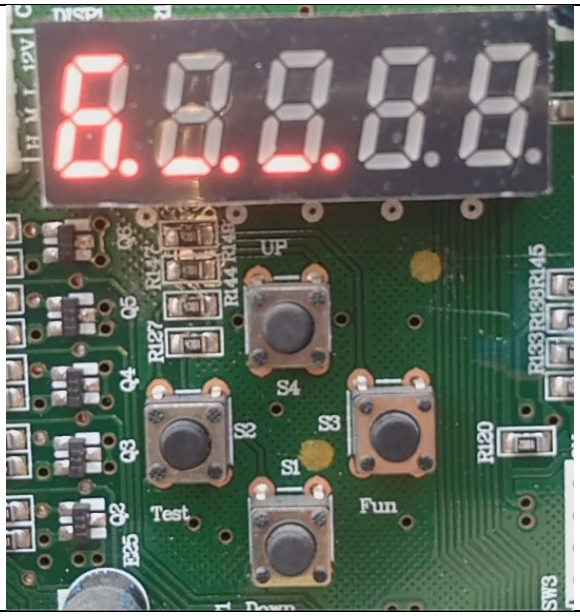
1.2. Commissioning steps

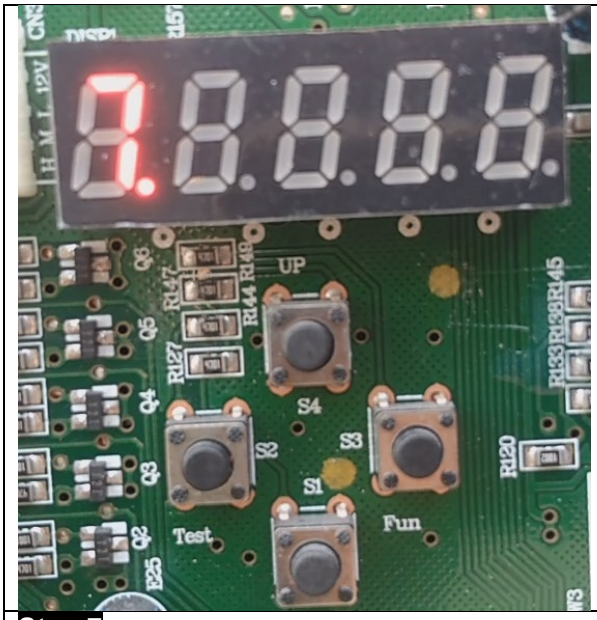
1.2.1 Through **Push-button -Fun** of ODU **Main PCB**



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

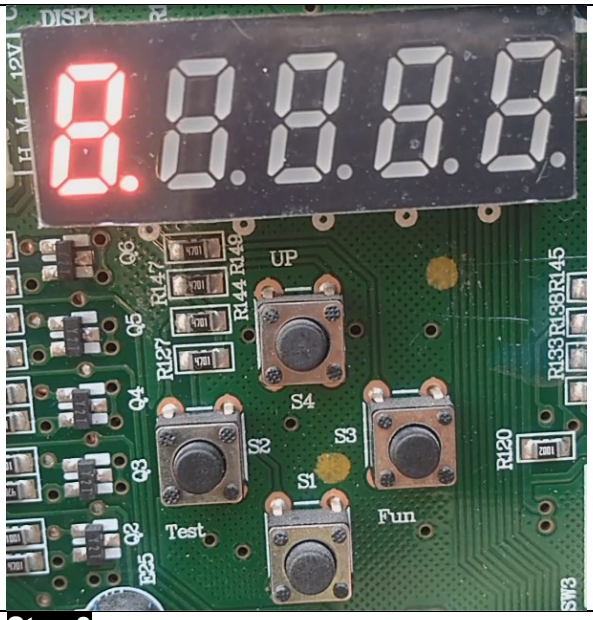
	
d. 1. "**d.** " means waiting for commissioning 2. Long Press **Fun** for more than **5s**, Enter **First** step	**Step 1** 1. "**1._ 0** " means **First** step now 2. Press **UP** for 1s to change **0** number to **1**
	
Step 1 1. "**1._. 1**" means IDU address setting (Auto) 2. Press **Fun** for 1s 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._._. 11**" means **Third** step now, **11** IDUs were detected 2. Press **Fun** for 1s to confirm and enter **Fourth** step	**Step 4** 1. "**4._._.**" means **Fourth** step now, Auto check communication of ODUs 2. Press **Fun** for 1s to confirm and enter **Fifth** step
	
Step 5 1. "**5._._.**" means **Fifth** step now, Auto check components of ODUs , then enter **sixth** step	**Step 6** 1. "**6._._.**" means **Sixth** step now, Auto check components of IDUs , then enter **seventh** step



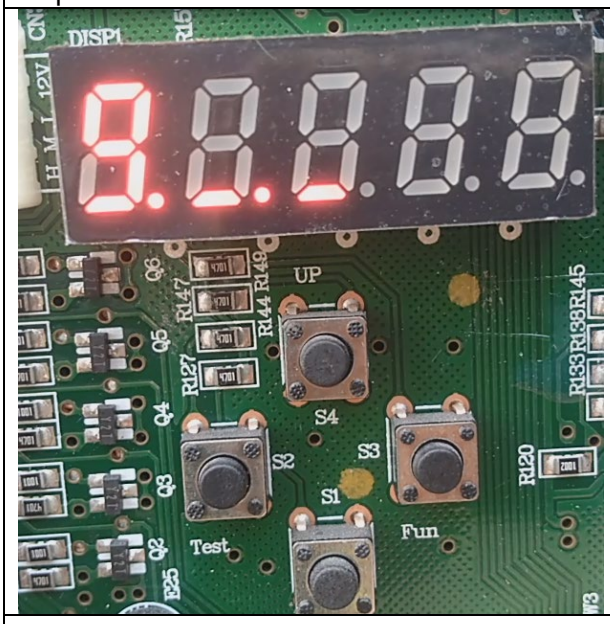
Step 7

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



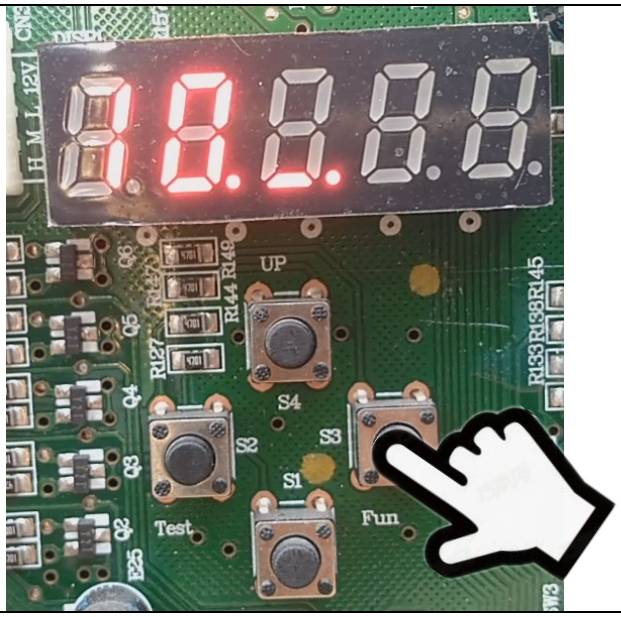
Step 8

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



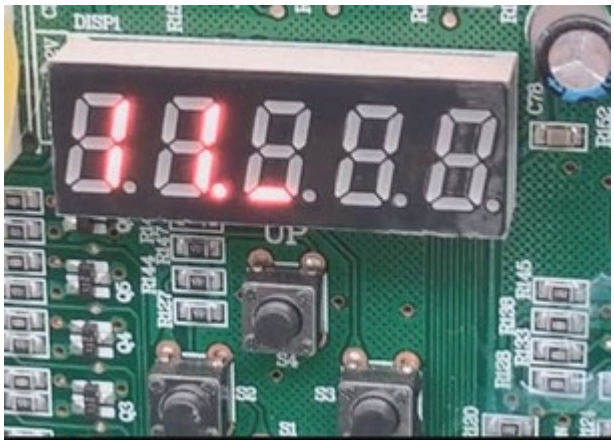
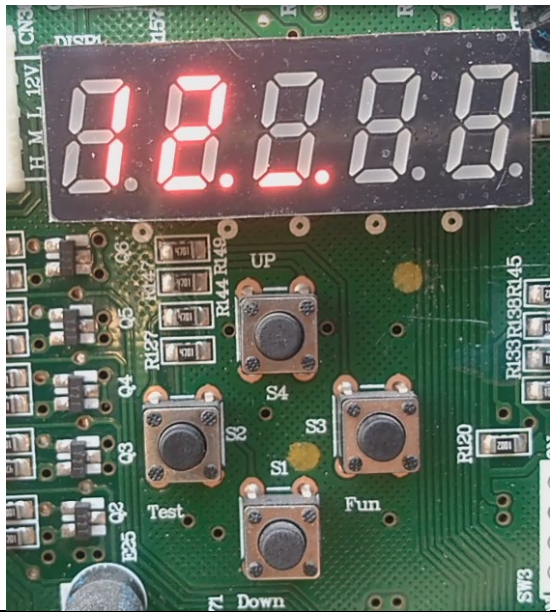
Step 9

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

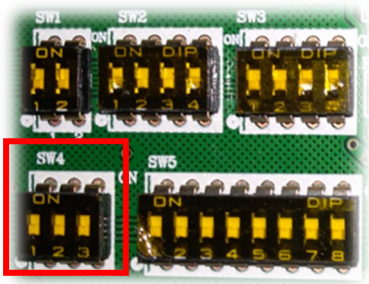
	
Step 11 If temperature **≥ 20** ℃ 1. "**11._.** " means **cooling test mode** 2. Setting temp: **16℃** 3. Fan speed : **high** 4. If there is ***no any fault***, 20min later, finish commissioning	**Step 11** If temperature **<20** ℃ 1. "**12._.** " means **heating test mode** 2. Setting temp: **32℃** 3. Fan speed : **high** 4. If there is ***no any fault***, 20min later, finish commissioning

2. Parameter Setting (Main PCB)

2.1 Functions set by switch

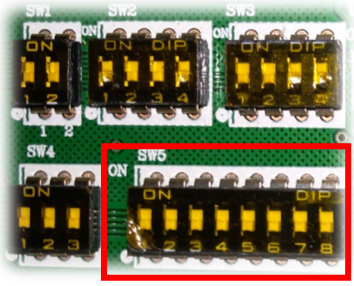
8~22HP

Function setting-SW4



1	2	Function	3	Function
OFF	OFF	Without Compressor emergency (Default)	OFF	Without Modular emergency (Default)
OFF	ON	1# Compressor emergency	ON	Modular emergency
ON	OFF	2# Compressor emergency		
ON	ON	/		

Function setting-SW5



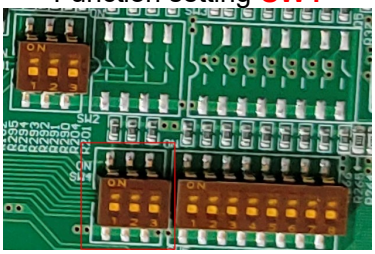
1	2	Function
OFF	OFF	Without quiet mode(Default)
OFF	ON	Quiet in night
ON	OFF	Quiet mode
ON	ON	Strong mode

3	4	Function	5	6	Function	7	8
OFF	OFF	Auto priority(Default)	OFF	OFF	static pressure 0 Pa(Default)	Reserve	
OFF	ON	First-on priority	OFF	ON	20 Pa		
ON	OFF	Cooling priority	ON	OFF	50 Pa		
ON	ON	Majority rule	ON	ON	80 Pa		

Note: For silent/strong mode setting, If dip switch(Part 8-2.1-DIP 1 2 3 4) and key button (Part 8-2.2.4-2nd step-No.12)) are set at the same time, setting by dip switch is prevail.

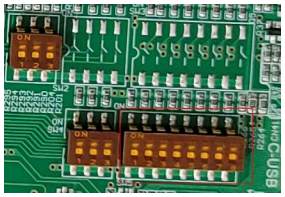
24~36HP

Function setting-**SW4**



1	2	Function	3	Function
OFF	OFF	Without Compressor emergency (Default)	OFF	Without Modular emergency (Default)
OFF	ON	1# Compressor emergency	ON	Modular emergency
ON	OFF	2# Compressor emergency		
ON	ON	/		

Function setting-**SW5**



1	2	3	4	Function
OFF	OFF	OFF	OFF	Normal (default)
OFF	OFF	OFF	ON	Quiet 1
OFF	OFF	ON	OFF	Quiet 2
OFF	OFF	ON	ON	Quiet 3
OFF	ON	OFF	OFF	Quiet 4
OFF	ON	OFF	ON	Quiet 5
OFF	ON	ON	OFF	Quiet 6
OFF	ON	ON	ON	Quiet in night 1
ON	OFF	OFF	OFF	Quiet in night 2
ON	OFF	OFF	ON	Quiet in night 3
ON	OFF	ON	OFF	Quiet in night 4
ON	OFF	ON	ON	Quiet in night 5
ON	OFF	ON	OFF	Quiet in night 6
ON	ON	OFF	ON	Strong 1
ON	ON	ON	OFF	Strong 2
ON	ON	ON	ON	Strong 3

5	6	Function
OFF	OFF	Automatic priority (Default)
OFF	ON	First match wins (Default)
ON	OFF	Cooling priority
ON	ON	Majority rule
7	8	**Function**
OFF	OFF	Normal static pressure (Default)
OFF	ON	Low static pressure
ON	OFF	Middle static pressure
ON	ON	High static pressure

Notice:

- In the table ***"OFF"*** means switch to down, ***"ON"*** means switch to up.
- When you want to change any set, please consult our factory first.
- When you set ***Compressor or modular emergency***, please close the Gas/Liquid valve of the ODU, and solve the problem ***within 24-48h***, because the emergency cannot work long time. After solved the problem, please cancel emergency setting, others the ODU cannot run.
- **Auto priority:** Outside ambient temperature ≥22°C, logic control is cooling priority ; outside ambient temperature < 14°C, logic control is Heating priority ,others temperature , logic control is majority rule

2.2 Parameter set by Key button

2.2.1 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.【Parameter Checking"E" (flash) 】、

2.【Function Setting "P" (flash) 】、

3.【Parameter Setting"C" (flash) 】、

4.【Commissioning "d" (flash) 】、

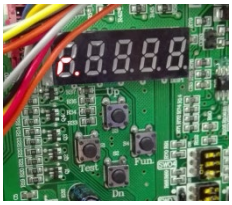
5.【Restore to factory setting"r" (flash) 】

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

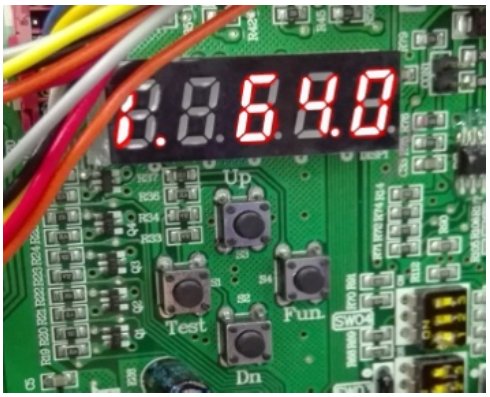
2.2.2 [E] Parameter Checking

Choose "E", 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	pls	**13**	Defrosting 1 temperature	0.1℃
4	Electronic expansion valve 3 steps	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℃			

2.2.3 [P] 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.1" (P-light, 1-Flash)

2. Then press ***"Fun"*** to display

   For example: display a parameter like"135", means the present max capacity rate of IDU/ODU (No 1) is ***135%***

Serial Number	Function Name	Display
1	IDU/ODU capacity rate	***135 or 200*** [135: Rate is135%] [200: Rate is200%]
3	VER (variable energy-efficiency regulation)	***0 or 1 or 2*** [0: basic mode] [1: high efficiency] [2: turbo mode]

4	Blow off snow (Auto snow-blowing)	***0 or 1 or 2 or 3 or 4*** [0: without this function] [1: 0.5h Cycle time] [2: 1h Cycle time] [3: 3h Cycle time] [4: 10h Cycle time]
6	Economic locking (26℃)	***0 or 1*** [0: without this function] [1: lock 20/26℃]

2.2.4 [C] Function Setting

Choose "C", short press ***"Fun"*** key

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

   For example: Digital displays "C1" (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	**1st step**	**2nd step**	**3rd step**	**Notice**
	Main menu	Serial Number	Parameter Setting	
IDU/ODU capacity rate	C1	1	135: IDU/ODU≤135% 200: IDU/ODU≤200%	1. Choose the **number [*1*]** 2. Short press **[Fun]** 3. Choose ***[135] or [200]*** ***135 is 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
VER (variable energy-efficiency regulation)		3	0：basic mode 1：high efficiency 2：turbo mode	1. Choose ***number [3]*** 2. Short press ***[Fun]*** 3. choose ***[0] or [1] or [2]*** 0 is default, when you change it ,it will influence the comfort or power consumption
Blow off snow (Auto snow blowing)		4	0：No this function 1：0.5h (cycle time) 2：1h (cycle time) 3：3h (cycle time) 4：10h (cycle time)	1. Choose the **number *[4]*** 2. Short press ***[Fun]*** 3. Choose ***[0] or [1] or [2] or [3] or [4]*** 0 is default, when you

				change it ,the outdoor fan will run to blowing off snow ***automatically and cycle by cycle***
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℃)		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℃ in heating mode*** and ***26℃ 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*** Automatically 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
Dry contact		14	0：Fire alarm signal(default) 1：insufficient power signal（90%） 2：insufficient power signal（80%） 3：insufficient power signal（70%） 4：insufficient power signal（60%） 5：insufficient power signal（50%） 6：insufficient power signal（40%）	Fire alarm or insufficient power signal (normally open signal)
Static pressure		15	0：Without pressure （default） 1：Low pressure 2：Mid pressure 3：High pressure	Static pressure level is set according to engineering needs
Model priority		16	0：Auto dominant priority 1：First priority 2：Cooling priority 3：Few obey more	Default：0
Comp emergency		17	0: Without emergency （default） 1: Comp 1# emergency 2: Comp 2# emergency	It will take effect after power on again
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: 1. From 9 to 19 only for 24~36HP

2.For silent/strong mode setting, If dip switch(Part 8-2.1--DIP 1 2 3 4) and key button (Part 8-2.2.4-2nd step-No.12)) are set at the same time, setting by dip switch is prevail.

2.2.5 [r] Restore to Factory Setting

Choose "r", 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

3. IDU Parameter setting by Controller

3.1 Parameter Setting Items

No.	Parameter Setting Items	Default value	Min. value	Max. value	Remark
1	communication address of indoor unit	1	1	64	
2	centralized address of indoor unit	1	1	64	
3	address of wired controller of indoor unit	1	1	16	
4	model of indoor unit	1	0	35	01 :50HZ Low ESP Duct (*Drain Pump)* 01 :Mid ESP Duct (*Drain Pump*) 02 :High ESP Duct (*Within 60K*) 02 :High ESP Duct *(2 Pipes systems, 22.28.45.54kw)* 10 :Cassette Unit C7 Type *(09-18K)* 10 :DC Cassette Unit E Type *(09-18K)* 11 :DC Cassette Unit (*24-48K,MB12*) 12 :DC Mid ESP Duct 13 :Ceiling & Floor Unit 22 :Fresh Air Processor (*1 pipe system, 22.28kw*) 23 :AHU 24 :Mid ESP duct (*Optional Drain Pump)* 24 :60HZ low ESP duct *(Drain Pump)* 24 :DC low ESP duct (*Drain Pump)*

					24 :AC low ESP duct *(Optional Drain Pump)* 26 :DC E type Low ESP Duct 28 :One way cassette 30 :Two way cassette 32 :Wall - Mounted (*L Type*) 34 :Fresh Air Processor (*2 Pipe system, 22.28kw*) 35 :High ESP Duct (*1 Pipe system, 22.28kw*)
5	capacity of indoor unit	8	1	100	280W/unit
6	priority of indoor unit	0	0	3	0--No priority 1--priority 1 2--priority 2 3--priority 3
7	selection of room silent mode	0	0	1	0--normal 1--silent mode
8	auto restart function of indoor unit	1	0	1	0—Available 1--not available
9	room card selection	0	0	1	0--invalid room card 1--valid room card
10	clearing time of filter net	5	1	5	500h/unit
11	operating mode displayed by wired controller	1	0	2	0--[auto][heating][dehumidification][cooling][ventilation] 1--[heating][dehumidification][cooling][ventilation] 2--[dehumidification][cooling][ventilation]
12	installation height of indoor unit	0	0	1	0-- installation height is lower than 2.7m 1--installation height is higher than 2.7m
13	switching between Celsius degree and Fahrenheit	0	0	1	0--Celsius degree 1--Fahrenheit
14	display of room temperature	0	0	1	0-- room temperature not to be displayed 1-- room temperature to be displayed
15	selection of room temperature	0	0	1	0-- temperature sensor of return air 1--temperature sensor of wired controller

3.2 Parameter setting by YK – L

3.2.1 Enter the setting interface

① Make sure the remote controller is ***off***

② Press the ***two white button*** at the down side simultaneously ***more than 10s*** to enter the address setting mode.

③ First, will display "***1***" , "***1***" ,

④ the above number means : Series parameter number, from ***1~15***

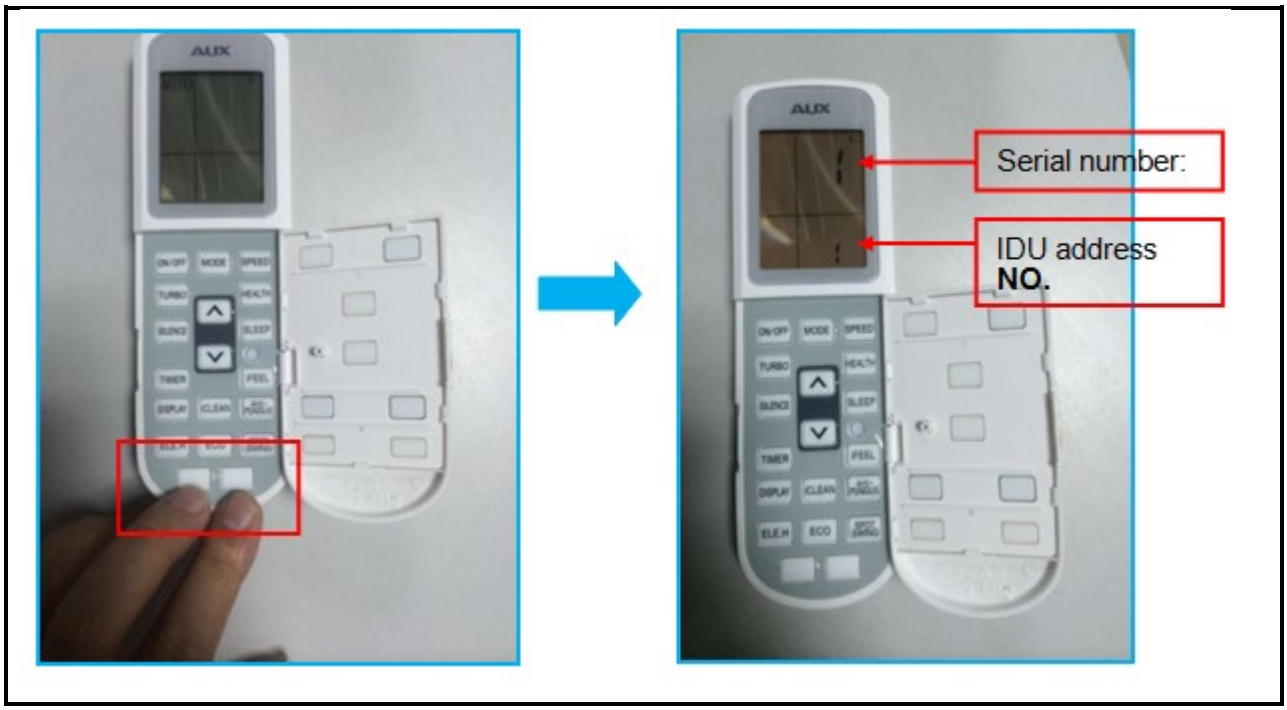
⑤ the below number means: Meaning of parameter correspondence

For example:

Check "***6.1 Parameter Setting Items***" for number of parameters and corresponding meaning.

"1" , "1" , the indoor unit's address is ***1#***

"4" , "32" , the indoor unit's type is ***Wall - Mounted (L Type)***

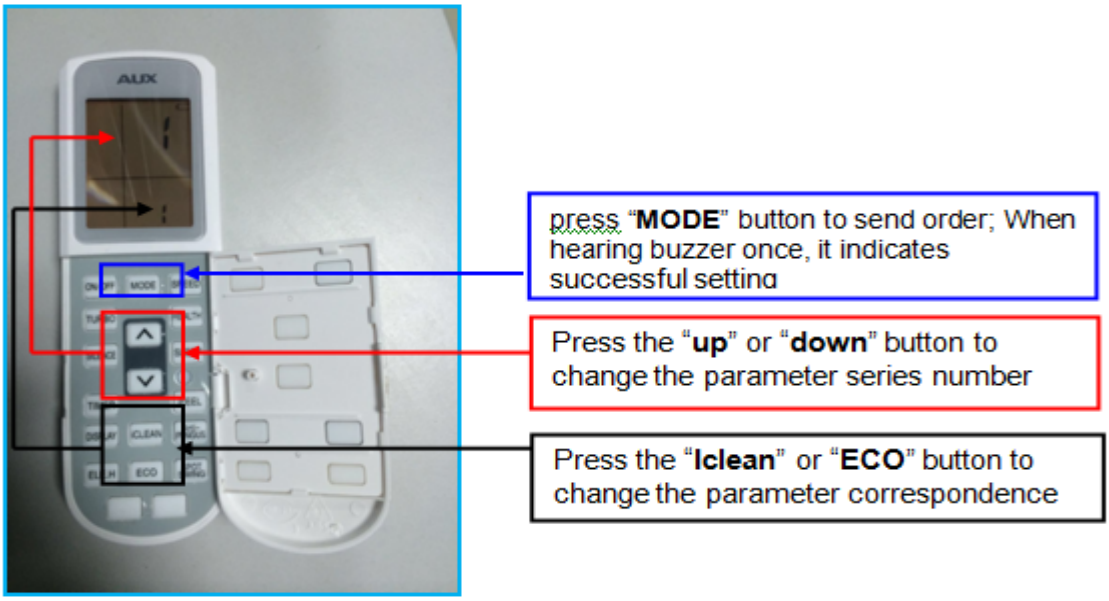


3.2.2 Parameter Setting

1. Press the **[∧]** or **[∨]** button to change the parameter series number

2. Press the **[IClean]** or **[ECO]** button to change the parameter correspondence

3. Press the **[MODE]** button to send order (Sent signal to display panels or receivers), Then can hearing buzzer once

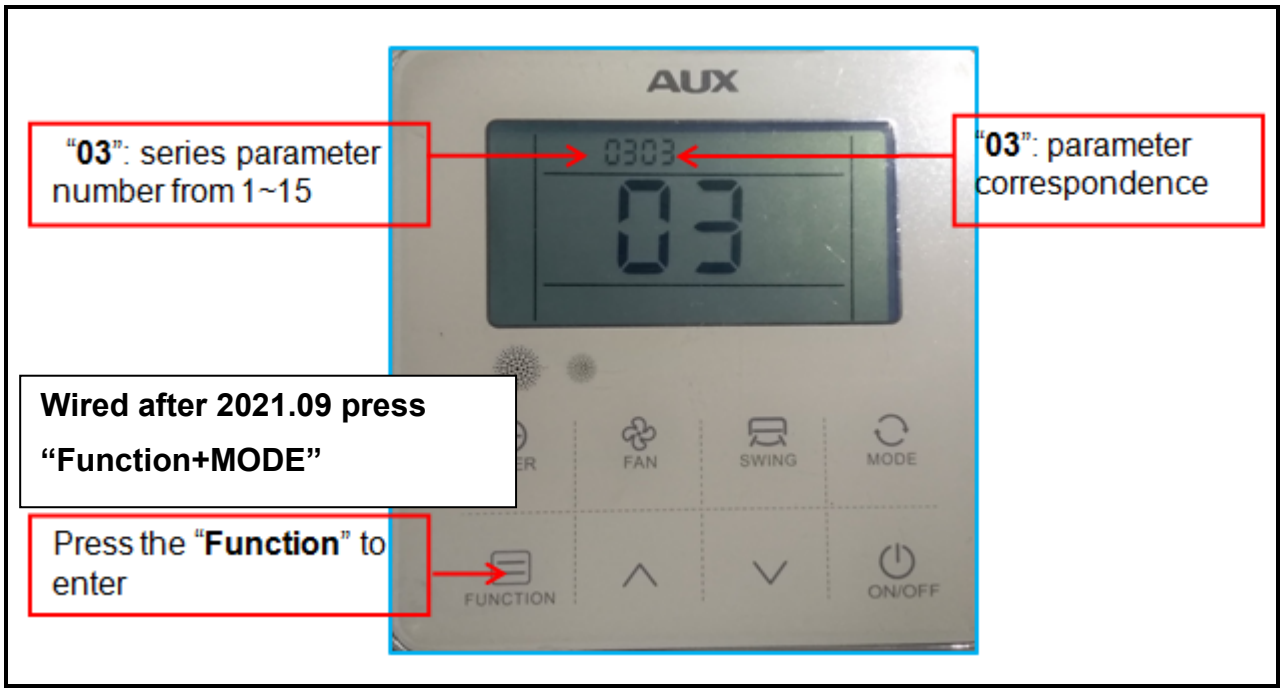


3.3 Parameter setting by XK-05A

3.3.1 Enter the setting interface

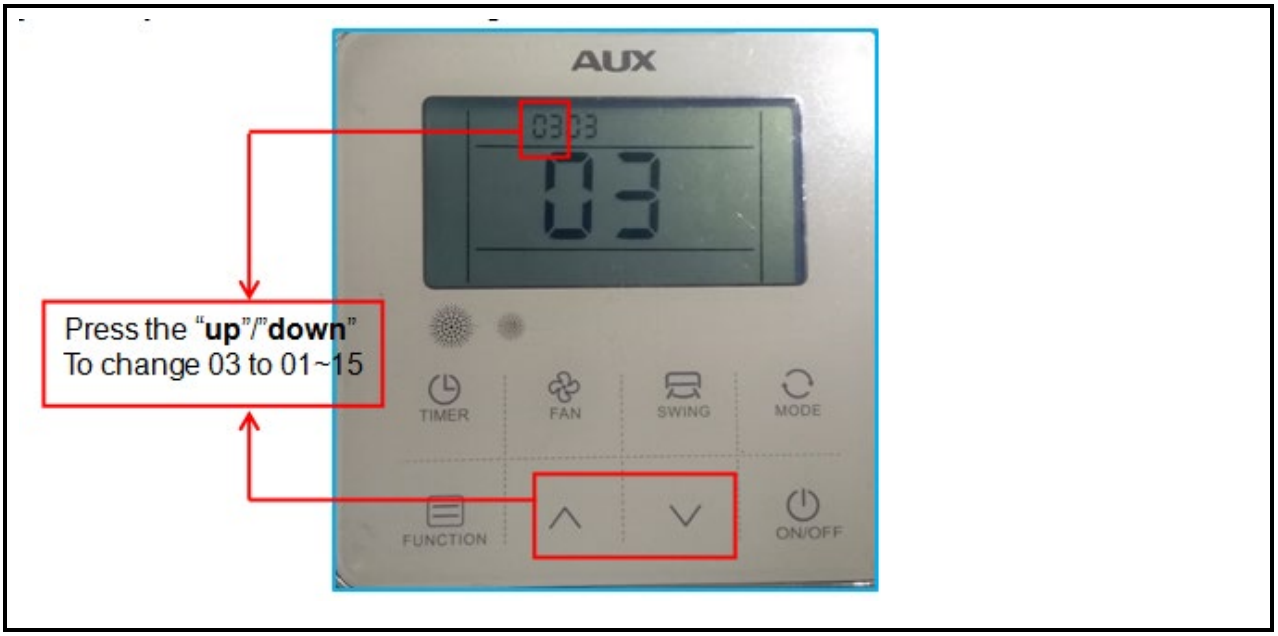
1. Press ***"Function"*** button for ***10s*** to enter the setting interface.

2. ***"0303"*** can check ***"6.1 Parameter Setting Items"*** for number of parameters and corresponding meaning.



3.3.2 Change series parameter number

Press ***"up" /"down"*** button to change the number (***1~15***), ***"0101" ~"1501"***

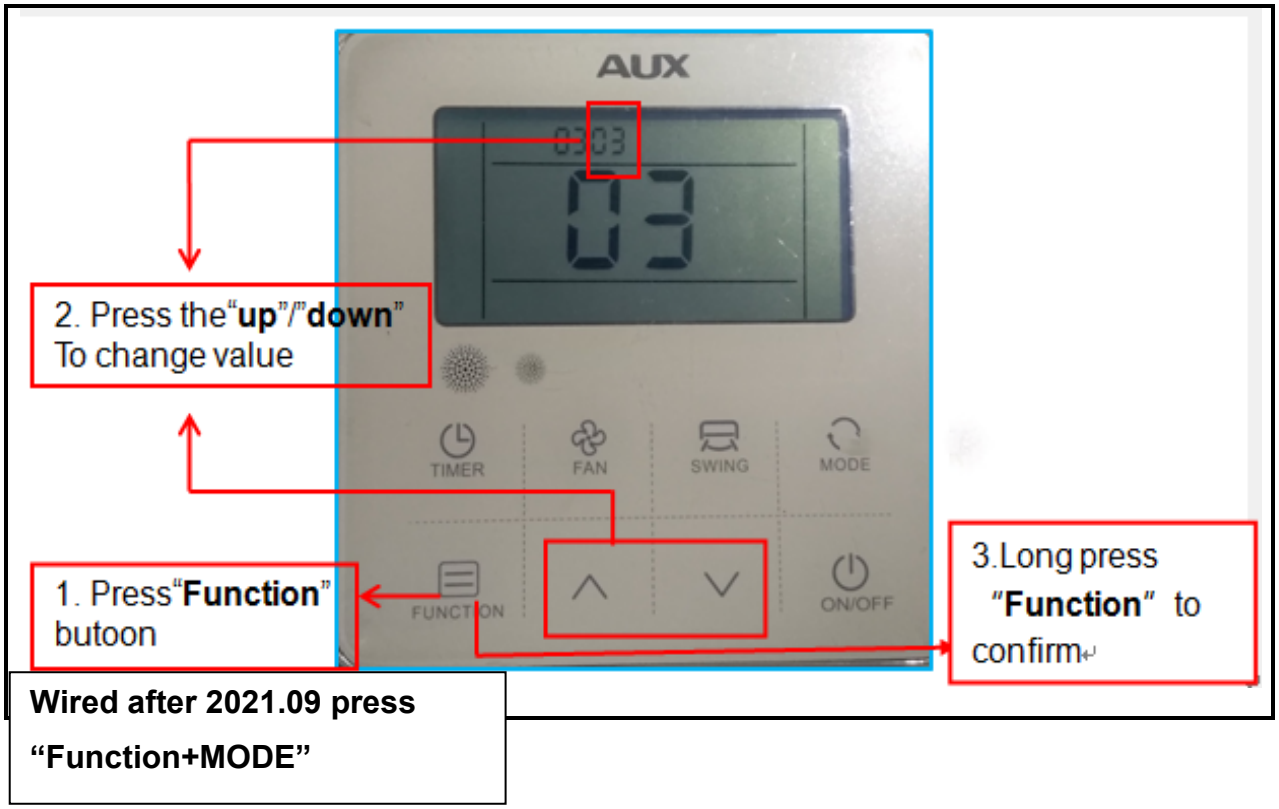


3.3.3 Parameter Correspondence Setting

1. Long press ***"Function"*** button for 5s, the second ***"0303" 03*** will flash

2. Press ***"up" /"down"*** button to change the number

3. Press [***Function Button***] to confirm



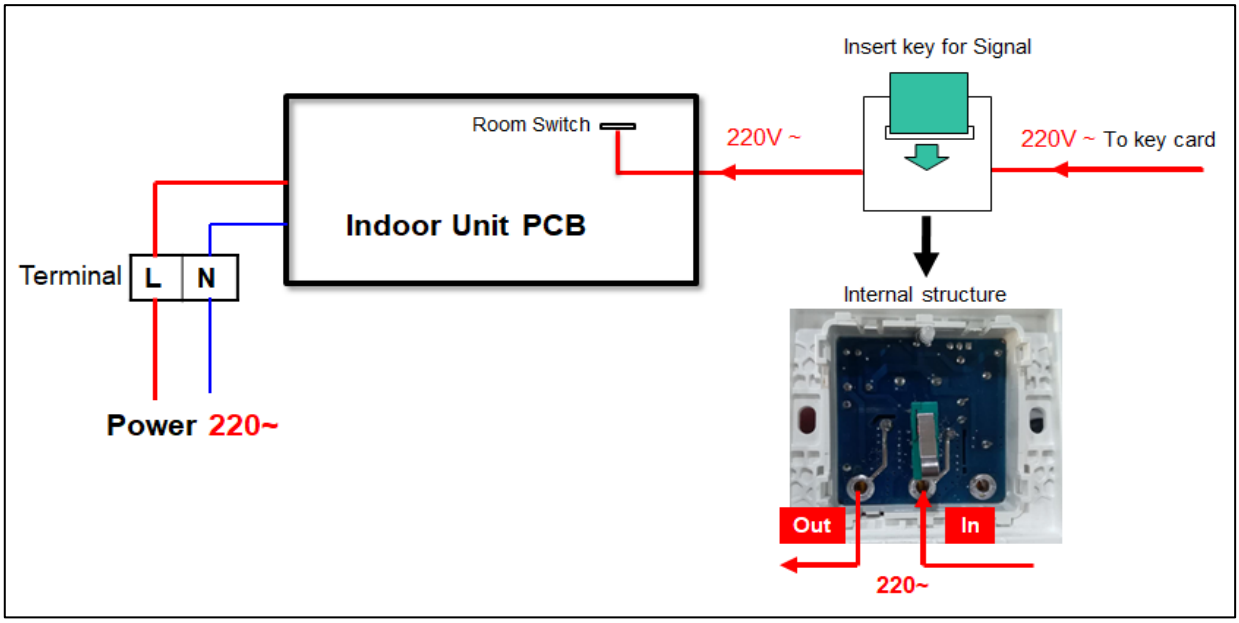
Wired after 2021.09 press "Function+MODE"

4. Room Card Function

4.1. Function

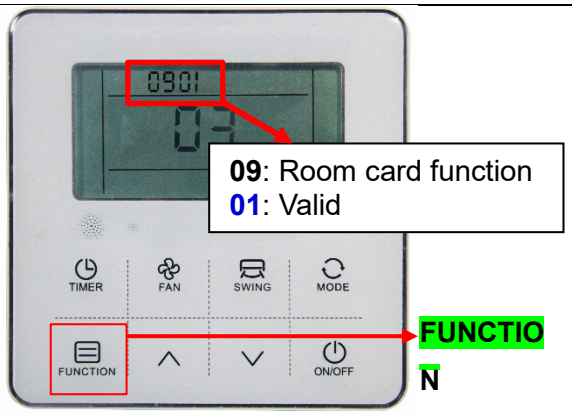
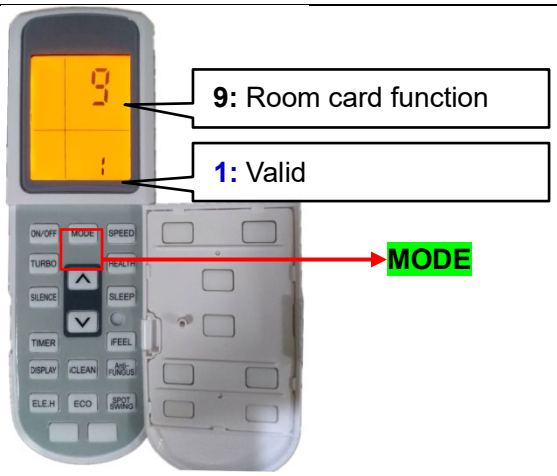
Parameter	Function	Insert key card	Remove key card
0901	Valid	Standby, IDU **can** be controlled	Standby, IDU **can't** be controlled

4.2. Wiring diagram

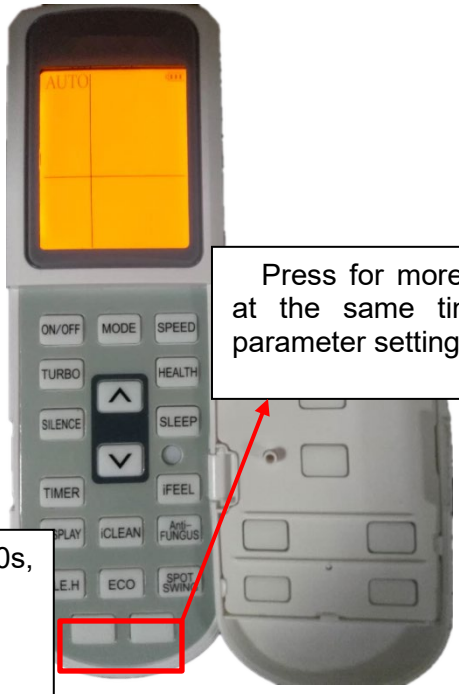
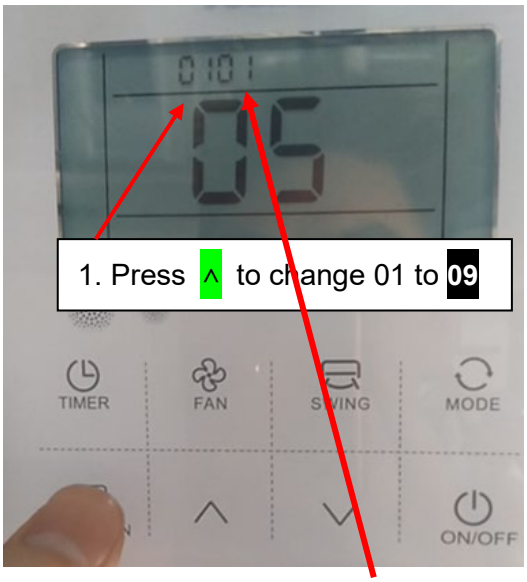
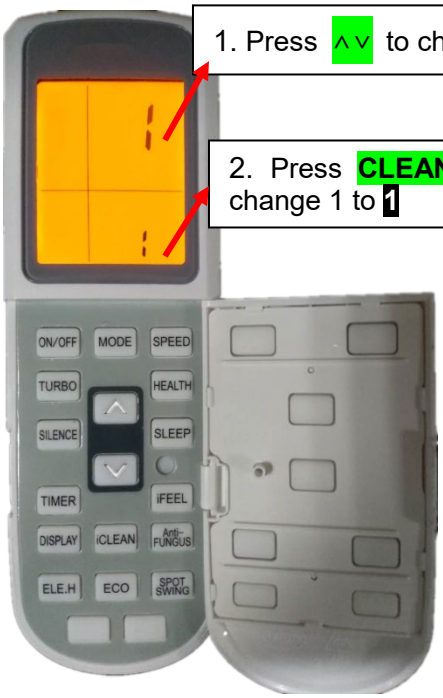


4.3. Parameter setting

4.3.1 Through **Wired controller** or **Remote controller** as below

Wired controller 1. Parameter setting as below 2. Press **FUNCTION** send the order	**Remote controller** 1. Parameter setting as below 2. Press **MODE** send the order to panel
	

4.3.2 Setting method

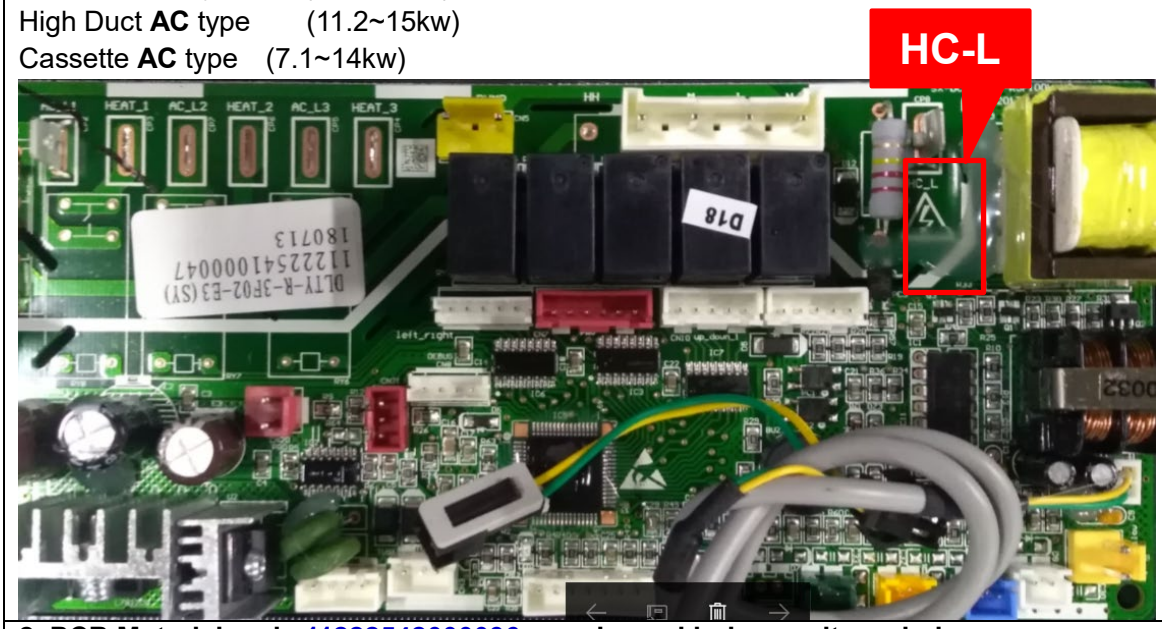
Wired controller	Remote controller
Step1 Press **FUNCTION** for more than 10s, Enter parameter setting **Wired after 2021.09 press "Function+MODE"**	**Step1**  Press for more than 10s at the same time, Enter parameter setting
Step2  1. Press ∧ to change 01 to **09** 2. Press **FUNCTION** for more than 5s, then **01** will flicker 3. then press ∧ to change 00 to **01**	**Step2**  1. Press ∧∨ to change1 to **9** 2. Press **CLEAN** or **ECO** to change 1 to **1**

5.4. Details for wiring

IDU Port of room card

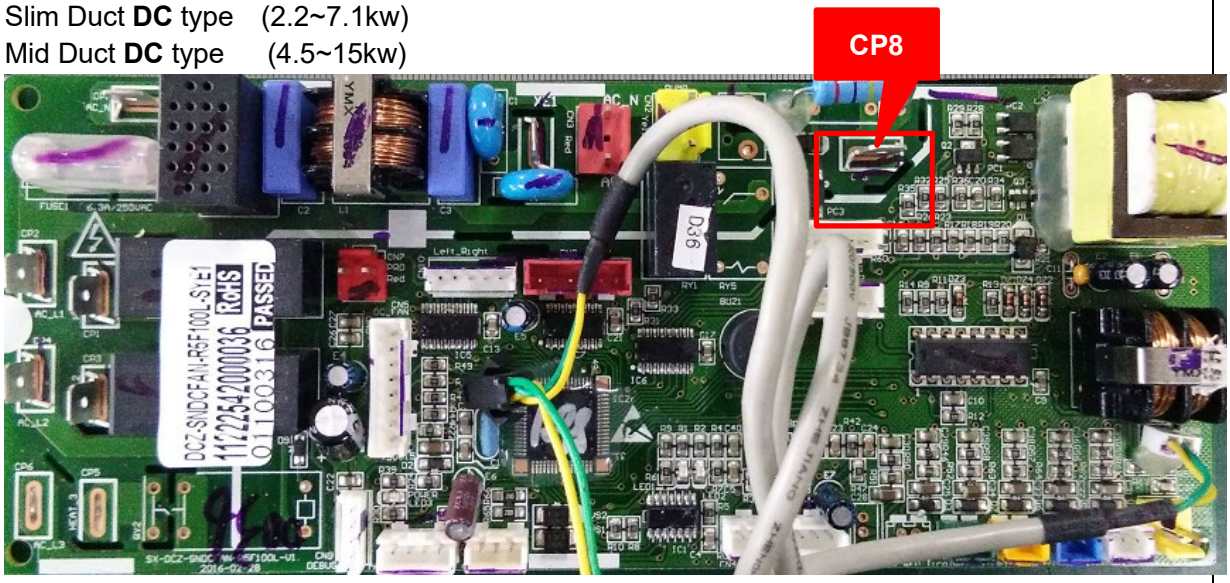
1. PCB Material code 11222541000047 universal indoor units as below

Mid Duct **AC** type (4.5~14kw)
Slim Duct **AC** type (2.2~7.1kw)
High Duct **AC** type (11.2~15kw)
Cassette **AC** type (7.1~14kw)



2. PCB Material code 11222542000036 universal indoor units as below

Cassette **DC** type (2.8~14kw)
Slim Duct **DC** type (2.2~7.1kw)
Mid Duct **DC** type (4.5~15kw)



Part9 Special Control

1. Oil Return Function

1.1. Oil Return Program

1.1.1 When to operate oil return program

- Auto operate oil return program every 4h (cooling mode) and 8h (heating mode)
- Operate oil return program while oil temperature abnormal
- Oil return operation last for 4~6 min

1.1.2 How to operate oil return program

Cooling mode

ODU Component						
Component	Wiring diagram label	8-12HP	14-18HP	20-22HP	24-36HP	Control functions and states
Compressor 1	COMP1	●	●	●	●	Frequency range 50~95HZ
Compressor 2	COMP2			●	●	
DC fan motor 1	FAN1	●	●	●	●	Controlled according to discharge pressure
DC fan motor 2	FAN2		●	●	●	
Four way valve	4-WV	●	●	●	●	OFF
EXV 1	EXV1	●	●	●	●	Fully open(480 pulse)
EXV 2	EXV2			●	●	
Unload valve	SV1	●	●	●	●	Normal control
By pass valve	SV7	●	●	●		Normal control

Cooling mode

IDU Component		
IDU State	Component	Control functions and states
ON	Fan	Normal control
	EXV	Normal control
Standby	Fan	Normal control
	EXV	100-250 (steps)

Heating mode

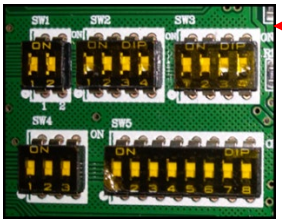
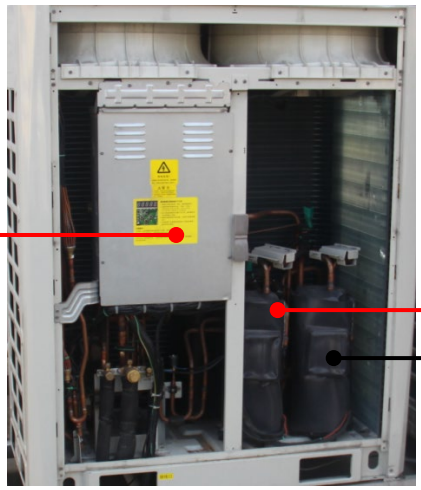
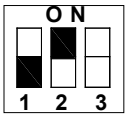
ODU Component						
Component	Wiring diagram label	8-12HP	14-18HP	20-22HP	24-36HP	Control functions and states
Compressor 1	COMP1	●	●	●	●	Frequency range 50~95HZ
Compressor 2	COMP2			●	●	
DC fan motor 1	FAN1	●	●	●	●	Controlled according to discharge pressure
DC fan motor 2	FAN2		●	●	●	
Four way valve	4-WV	●	●	●	●	OFF
EXV 1	EXV1	●	●	●	●	Fully open(480 pulse)
EXV 2	EXV2			●	●	
Unload valve	SV1	●	●	●	●	Normal control
By pass valve	SV7	●	●	●		Normal control

Heating mode

IDU Component		
IDU State	Component	Control functions and states
ON	Fan	OFF
	EXV	100-250 (steps)
Standby	Fan	OFF
	EXV	100-250 (steps)

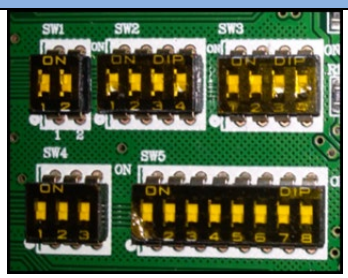
2. Compressor emergency

1. This function is used for twin compressor models (***18-22HP***)

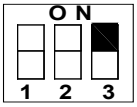
<table>
<tr><td>Dip Switch in
Main PCB</td><td></td><td>Compressor
Information</td></tr>
<tr><td>  </td><td>  </td><td>1# Comp. Abnormal
2# Comp. Normal</td></tr>
<tr><td colspan="3">2. When one of these compressors had a fault
For example : 1 # compressor abnormal</td></tr>
<tr><td colspan="2">3. Set emergency function for 1# compressor, as right diagram (Change according “Part 3 - 4.1 Functions set by switch”)
Then will shields all faults of 1# compressor.</td><td>1# Compressor emergency
SW4
OFF NO
1 2
 
</td></tr>
<tr><td colspan="3">4. The system will only run 2# compressor</td></tr>
</table>

3. Modular emergency（ODU）

1. This function should be used in **N**≥2 (N: A system's quantity of outdoor units)

<table>
<tr><td>Dip Switch in Main PCB
  </td><td>
</td></tr>
<tr><td colspan="2">2. When one of these outdoor units had a fault,

For example : Slave 2 # abnormal</td></tr>
<tr><td>3. Set emergency function for Slave 2 #, as right diagram (Change according “Part 3 - 4.1 Functions set by switch”)

Then will shields all faults of Slave2#</td><td>Modular emergency
SW4
NO 3
 
</td></tr>
<tr><td colspan="2">4. Close the liquid and gas stop valve of slave 2#</td></tr>
<tr><td colspan="2">5. Other outdoor units operate automatic, the outdoor unit (Slave 2#) which was choose emergency function will keep standby.</td></tr>
</table>

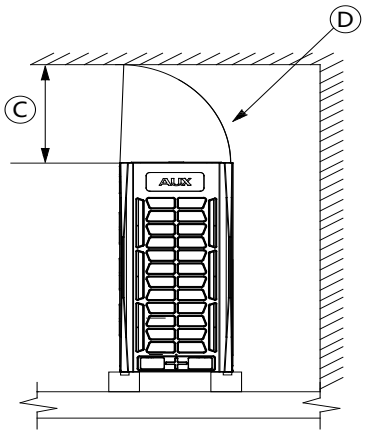
4. Quiet mode

Quiet in cooling mode
Max frequency of compressor 90HZ
Max frequency of fan motor 49HZ(single fan modular)
Max frequency of fan motor 58HZ(twin fan modular)
Quiet in heating mode
Max frequency of compressor 100HZ
Max frequency of fan motor 49HZ(single fan modular)
Max frequency of fan motor 60HZ (twin fan modular)

5. Operation Priority

First-ON:
The first “ON” indoor unit determines the running mode of the whole system until shutdown.
Heating priority:
When any indoor unit receives the heating command, the outdoor unit runs according to the heating mode until the heating mode is stopped.
Cooling priority:
When any indoor unit receives the cooling command, the outdoor unit runs according to the cooling mode until the cooling mode is stopped.
VIP:
Manual address set the indoor unit’s address to 64, the room get VIP authority and determines the running mode of the whole system until.

6. ODU static pressure control

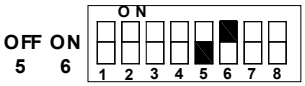
If the installation space the same as right diagram	Ⓒ < 1000 mm Ⓓ Airexhausting device
1. Air exhausting device is necessary to be added to improve the ventilation	
2. Outdoor unit's static pressure should be set to ***20 or 50 or 80Pa*** according the air exchausting device	

Before power on, outdoor unit's static pressure can be set to 20/50/80Pa according to project demand *(Change according "**Part 8 - 2.1**")*

8-22HP

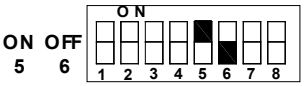
ODU static pressure **20 Pa**

SW5



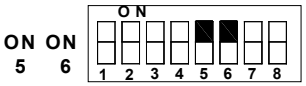
ODU static pressure **50 Pa**

SW5

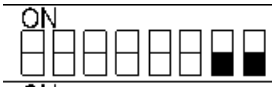


ODU static pressure **80 Pa**

SW5



24-36HP

	Normal (default)
	Low static pressure
	Micdle static pressure
	High static pressure

7. Clean (Auto dust removal)

Outdoor fan motor run as opposite direction for a period of time to blow away the dust 、

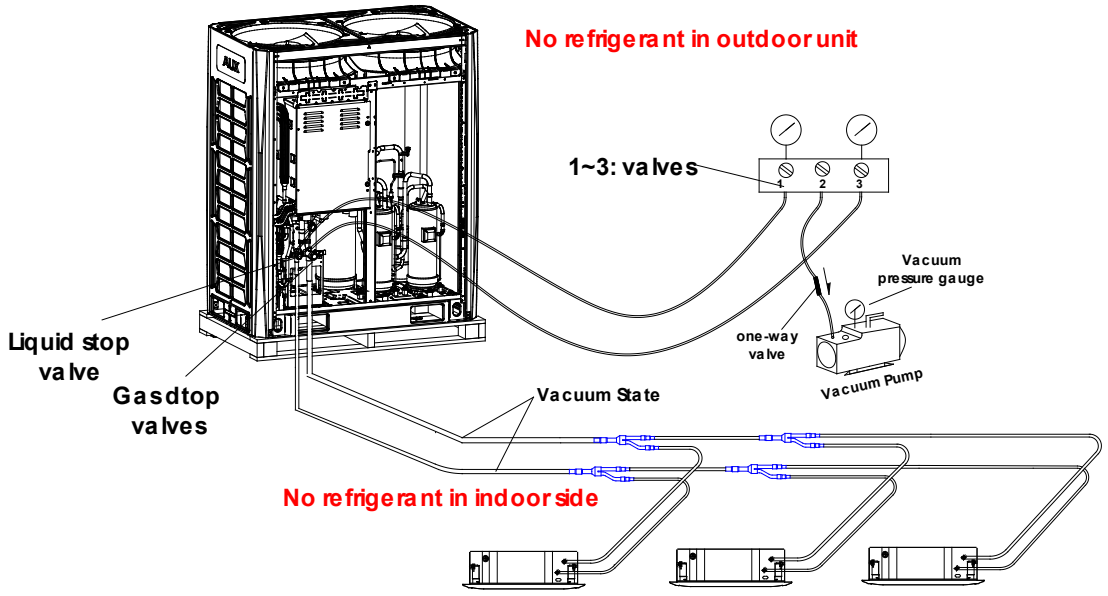
8. Blow off Snow (Auto snow-blowing)

The fan motor will run for a period of time to blow away the snow

※ System will respond this function only when the outdoor environment temperature [***Tao***] ≤ -5℃

9. Vacuum Pumping

For after-sale : If a system had a refrigerant leakage, should find out the leakage point and re-welding first, and there should be no any refrigerant in the system, so we can choose the **Vacuum pumping function** *(Choose the function according "**Part 3 – 4.2.4 [C] Function Setting** " – 【C….5】)* to do Vacuum



1. Connect the vacuum pump and vacuum pressure gauge as above diagram
2. Through Master unit to set vacuum pumping function
3. Then outdoor units keep standby state and all EXVs keep ON state

10. Economic locking (26℃)

Through Master unit to set the Economic locking function, all indoor units will run as energy saving mode state:

Cooling mode: indoor unit's set temperature **will be keep to 26**℃ (lowest set temperature)

Heating mode: indoor unit's set temperature **will be keep to 20**℃ (Highest set temperature)

11. Refrigerant Recycle

For after-sale: If one of the system's indoor unit must be replaced due to a refrigerant leakage point was find out in its evaporator Then we can choose the **Refrigerant recycle function** through master unit to recycle refrigerant to outdoor units.		
1. After choosing this function		
2. Outdoor units will run cooling mode		
3. Close ***liquid stop valve***		
4. When display error code ***F3:*** (high pressure protect) or ***F6:*** (low pressure protect) in digital tube, it means all refrigerant recycled to outdoor unit		
5. Close ***Gas stop valve***		
6. long press exit button [***Test***] 5s to exit this function	***Liquid stop valve***	***Gas stop valve***

※ If outdoor environment temperature ≤5℃, the system will not respond to outdoor unit's refrigerant recycle function.

12. Refrigerant Charging

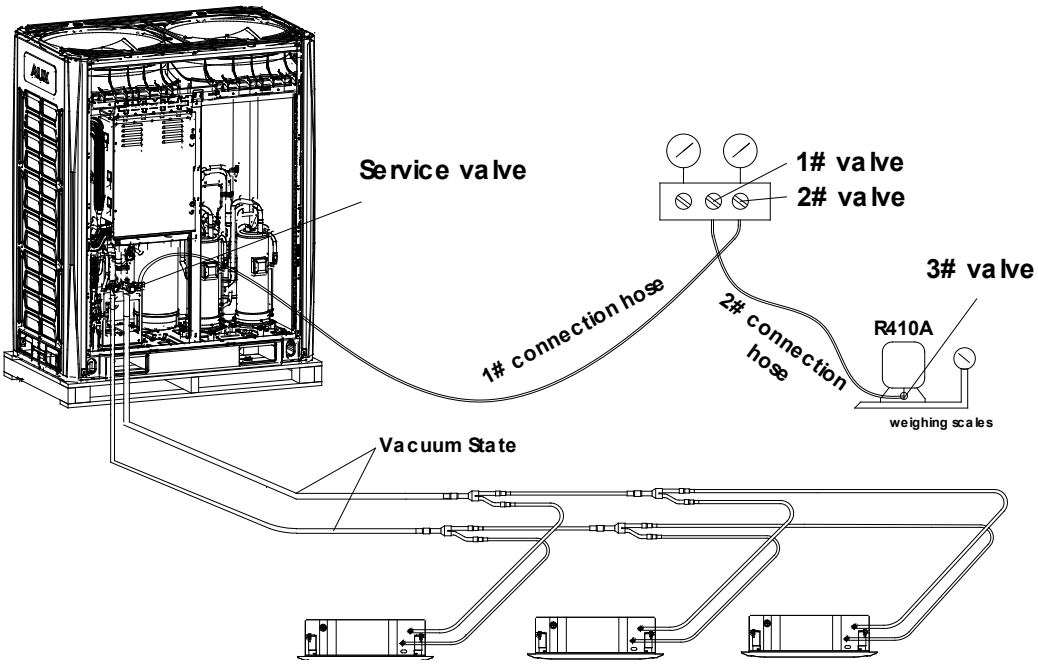
For after-sale: If a system lack of refrigerant , then we can choose the **Refrigerant Charging function** through master unit to add refrigerant
1. Choose the **Refrigerant Charging function** in Master unit's main PCB
2. Running cooling mode automatic, according running parameters, main PCB digital tube will display (*Refrigerant state*): ● 【F.....1】: ***Refrigerant is not enough***

- 【F.....2】: Refrigerant is enough
- 【F.....3】: Excess of refrigerant

3. If 【F.....1】was displayed in the tube, press 【**Fun**】to add refrigerant, system will run as following:

- **Cooling mode**
- Outdoor units' **output capacity ⩾ 75%**

4. prepare tools as below diagram in advance



5. Connect ***1# connection hose*** to ***Service valve***

6. Open ***1# valve*** and ***2# valve***

7. Then gas refrigerant will push out the air which inside of ***1# connection hose*** and ***2 # connection hose***

8. Open ***3# valve***

9. When 【**F.....2**】be displayed, means additional refrigerant will be enough

10. Then 【**F.....0**】will be displayed after 3 min, it means finish, system will stop running automatic , the ***service valve*** must be closed at the same time

Note:

※ System will respond refrigerant charging function only when meet the following 3 conditions at the same time:

1. Outdoor temperature ***"Tao"*** should ***15℃≤Tao≤40℃***,

2. Indoor temperature ***"Tai"*** should ***10℃≤Tai≤32℃***,

3. The quantity of indoor units which (***capacity ≤1.5HP***) should less than 70% of total quantity of indoor units

Part10 Trouble shooting

1. IDU Error code table (No.18)

1.1 Temperature sensor failure (4)

Code	Definition	Possible reason for error code
A1	Indoor ambient temperature	1. Indoor unit's PCB failure 2. The fuse of indoor PCB is broken 3. Temperature sensor failure , or exceed test limit
A2	Evaporator mid temperature sensor	
A3	Evaporator inlet temperature sensor	
A4	Evaporator outlet temperature sensor	

1.2 Communication failure (2)

Code	Definition	Possible reason for error code
A9	The communication between indoor unit and outdoor unit failed	1. The communication wire between indoor unit and outdoor unit is broken. 2. Indoor unit power failure 3. Indoor PCB failure
AA	The communication between indoor unit and wire controller failed	1. The communication wire between indoor unit and outdoor unit is broken. 2. Indoor unit power failure 3. Indoor PCB failure 4. Wire controller is broken

1.3 Others failure (12)

Code	Definition	Possible reason for error code
A5	Indoor water pump failure	1. Water pump no power 2. Water pump switch short-circuit or unconnected 3. Water pump is broken 4. Drain pipe block or up lean 5. Indoor PCB is broken
A6	Failure of indoor PG fan	1. Fan motor failure 2. Fan motor block 3. The connection between PCB and fan motor failure 4. Indoor fan block
A7	Failure of reversible synchronous motor	1. Step motor failure 2. The connection between PCB and step motor failure.
A8	Indoor unit ERRPROM module failure	1. Indoor unit PCB is broken 2. Error module is broken
AC	More than 2 indoor units' central control system address repeated	The central control address setting incorrect
AE	Operation mode conflict	The operation mode setting incorrect
AH	Two or more indoor unit refrigerant system address repeated	System address setting incorrect
AJ	Indoor unit total capacity exceeded	Stop some indoor units
AF	The EXV leakage	1. EXV is blocked 2. Evaporator inlet sensor failure. 3. Indoor unit's temp. sensor failure
A0	The EXV open failure	

2. ODU Error code table (No.65)

2.1 Communication failure (4)

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 (2)

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 (4)

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 (10)

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 (3)

Code	Definition	Possible reason for error code
	Discharge temperature too low	Compressor failure
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 6.Liquid stop valve was closed 7.dischargr sensor failure 8.Outdoor unit PCB failure
E4	【T_{db}】2# Compressor discharge temperature too high	

2.6 1# Comp. and drive failure (11)

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 frequency failure	1. Driving module 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

2.7 2# Comp. and drive failure (11)

Code	Definition	Possible reason for error code
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 unconnected	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

2.8 1# Fan motor and drive failure (5)

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	

2.9 2# Fan motor and drive failure (5)

Code	Definition	Possible reason for error code
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	

2.10 Others failure (10)

Code	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	Mail 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 Indoor unit error code display

3.1 Error code display by YK-05A

Press ***"Function" & "Up"*** button at the same time to enter the error code check

"E0A1"means the first error code ***"A1"*** ,through the ***"2.1 IDU Fault code table"*** to check error code definition,

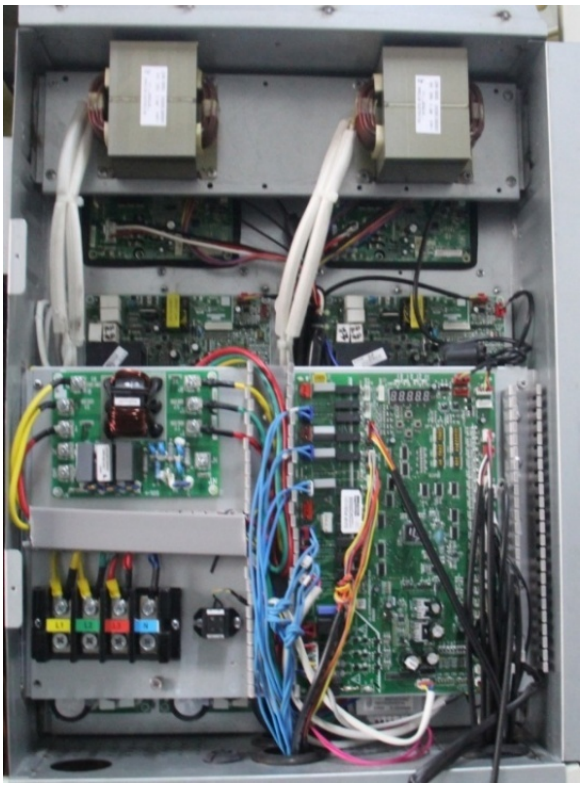
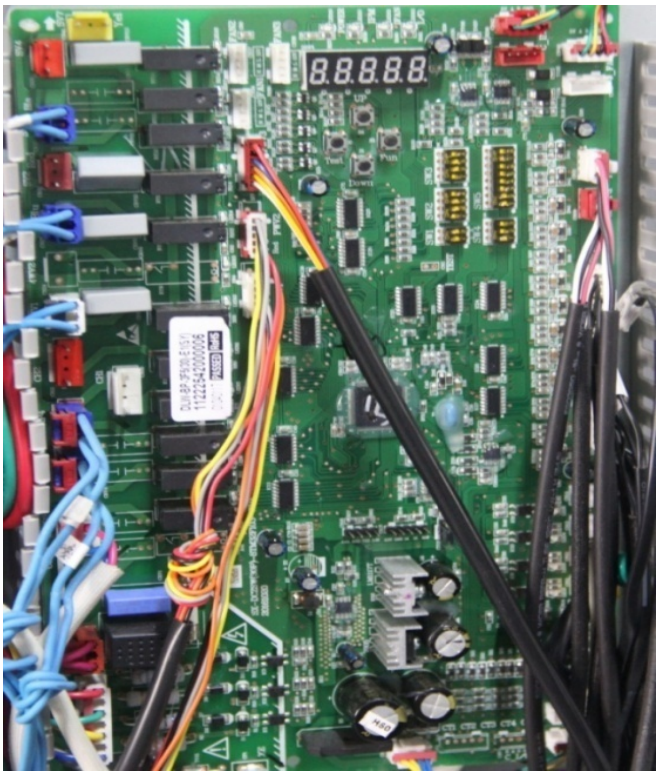
"E2A3" means the second error code is ***"A3"***

3.2 Error code display by display panel

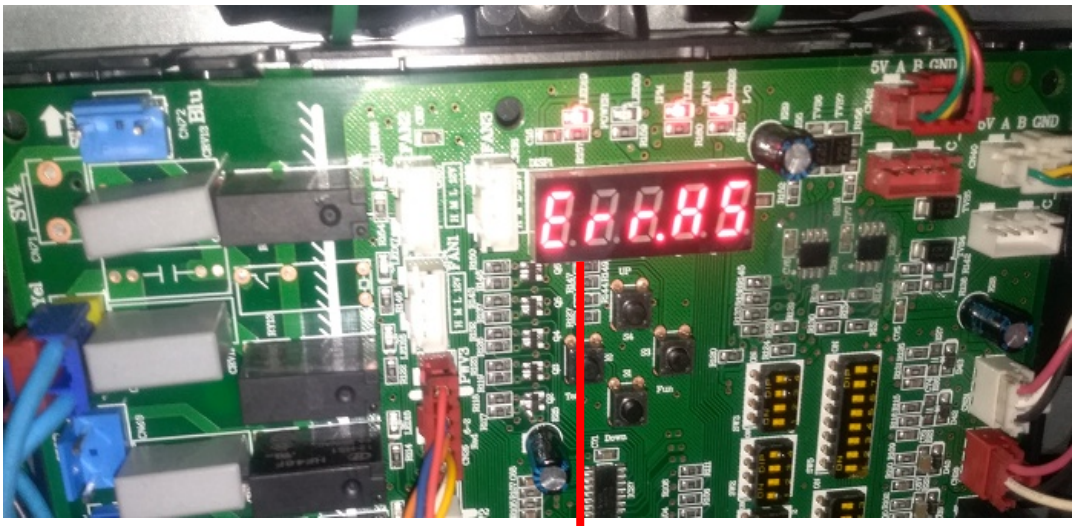
"E0" error code

4 Outdoor unit error code display

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

Outdoor unit control box	Outdoor unit main PCB
	

Digital tube in main PCB



Error code ***" H5 "***, through the ***"2.2 ODU Fault code table"*** to check the definition: system leakage

5 Outdoor unit trouble shooting

5.1 E3 E4 Error Code

E3 / E4 : Discharge temperature *"Tda" "Tdb"* too high

Compressor discharge temperature sensor detected *Td ≥120 ℃* and Lasts for *10s*, whole system will stop running, after 4 minutes later will restart, but if stop running more than *3 times within an hour*, ODU PCB will display E3 or E4 error code. Stop running until power up again.

↓

Check whether Lack of refrigerant

1. No additional refrigerant?
2. Low pressure is too low?
3. High temperature of IDU air outlet?

Yes → Add refrigerant

NO ↓

Check whether Lack of frozen oil

Through monitoring software to check is the system frequent to run the oil return mode

Yes → Add oil

NO ↓

Check whether high pressure too high

1. ODU fan running abnormal?
2. Condenser is dirty block?

Yes → 1. Replace fan or fan motor
2. Clean the condenser

NO ↓

Check whether refrigerant circuit is unblocked

1. IDU's coil of EXV is abnormal?
2. IDU's EXV is abnormal, through monitoring software to check the EXV's open degree
3. IDU's EXV is dirty block?

Yes → 1. Replace power coil of EXV
2. Replace EXV

↓

Contact the manufacturer's Technician

5.2 F8 Error Code

F8: *Compression ratio too high protection*

When detect the *pd / ps > 8* , then system begin to slow down the compressor running frequency . After the frequency was down to the lowest value and detected the *pd/ps > 8* all the time *within 400s*. Then will appear F8 Error code, whole system stop running. ※ pd: High pressure value ps: Low pressure value

↓

Stop valve is OFF?	→	Open stop valve

NO ↓

Condenser and evaporator dirty block?	→	Clean condenser

NO ↓

Pipe is flattened?	→	Re welding pipe

NO ↓

Heating EXV is abnormal? Through check the temperature is same or not which between inlet and outlet piping of the EXV.	→	Replace EXV

NO ↓

Pressure sensor is abnormal?	→	Replace sensor

NO ↓

System lack of refrigerants? Through check the discharge temperature 、high pressure value and so on to judge.	→	Add refrigerant

NO ↓

Contact the manufacturer's Technician

5.3 F9 Error Code

F9: *Compression ratio too low protection*

When detect the *pd / ps < 1.8*, then system begin to increase the compressor running frequency . every 40s later detect again , After 45 cycles and the *pd / ps < 1.8* remain the same . Then will appear F9 Error code, whole system stop running.

※ pd: High pressure value ps: Low pressure value

↓

4-way valve is abnormal? Through check the inlet temperature of the condenser → Adjust or replace 4-way valve

NO ↓

Condenser dirty block? → Clean condenser

NO ↓

Pressure sensor is abnormal? → Replace sensor

NO ↓

Discharge temperature and Driver modular temperature is too high?

Yes ↓

Lack of refrigerant? → Add refrigerant

NO ↓

Lack of frozen oil? → Add frozen oil

NO ↓

Contact the manufacturer's Technician

NO

5.4 HF Error Code

HF： *Oil shortage fault*

When detect the oil temperature is abnormal, low temperature near the environment temperature. In addition, discharge super-heat is normal. Then will appear HF Error code, whole system will stop running. Once confirm the unrecoverable

↓

Oil temperature sensor is abnormal? → Replace sensor

NO ↓

Oil return capillary is blocked? → Replace capillary

NO ↓

Through monitoring software to check is the system frequent to run the oil return mode? → Add oil

NO ↓

Contact the manufacturer's Technician

5.5 HJ Error Code

HJ: *Main power failure*

When detect incorrect phase sequence, Then will appear *HJ* Error code, whole system stop running.

↓

Power terminal board wiring loosening? → Tighten the wiring

NO ↓

Wrong phase sequence? → Change phase sequence

NO ↓

Main PCB is abnormal? → Replace PCB

NO ↓

Contact the manufacturer's Technician

5.6 H5 Error Code

H5: *Refrigerant shortage fault*

Long time power off or standby (over 4 hours), through detect high pressure value and compare with pressure value which under normal environment temperature, then judge whether lack of refrigerant and appear H5 Error code

↓

Through below steps to check whether the system lack of the refrigerant:

1. Discharge temperature too high than normal situation? (Normal discharge temperature about 80℃)

NO

↓

2. Poor effect in cooling or heating. (poor effect: indoor unit air outlet temperature too high in cooling or too low in heating)

NO

↓

Lack of refrigerant: add refrigerant

Pressure sensor abnormal? → Replace sensor

NO ↓

Analyse indoor and outdoor running parameter though monitoring software

Contact with the manufacturer's Technician

5.7 FH Error Code

FH: Discharge temperature "Tdi" too low limit frequency protection

System detect discharge superheat temperature less than 10℃ within 20 minutes , then will appear FH error code to protect

↓

Check whether the system excess refrigerant:

1. Already add excess refrigerant

NO

↓

2. Whether indoor unit's EXV less open degree

Through monitoring software detect

NO

↓

Blow off some refrigerant

Condenser dirty block effect heating mode → Clean

NO ↓

Evaporator dirty block effect cooling mode → Clean

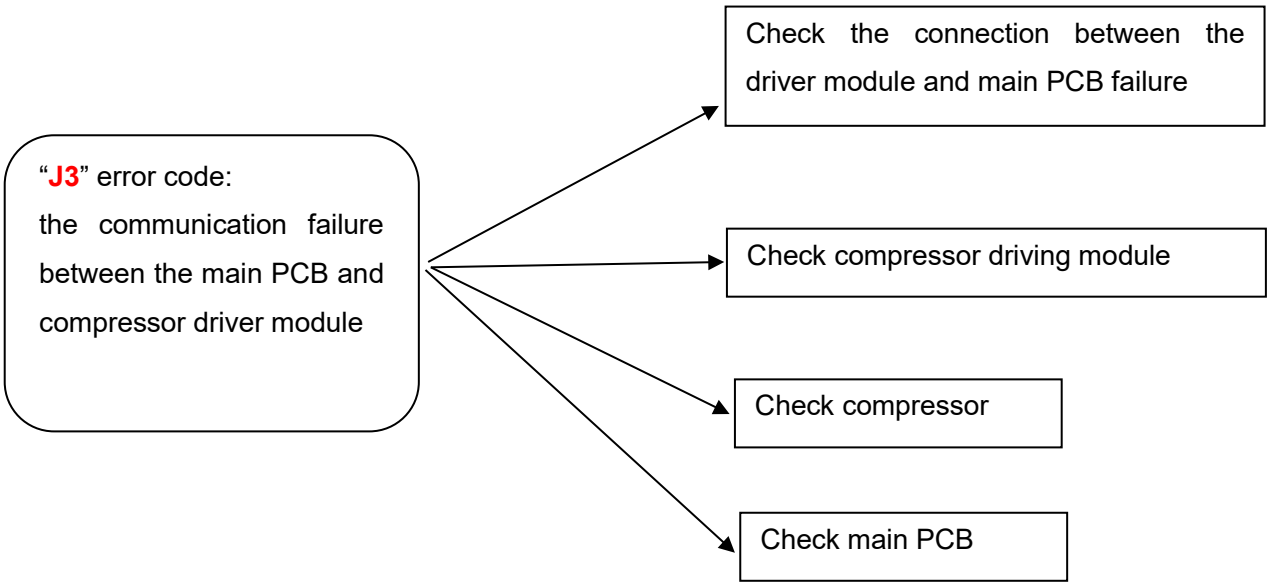
NO ↓

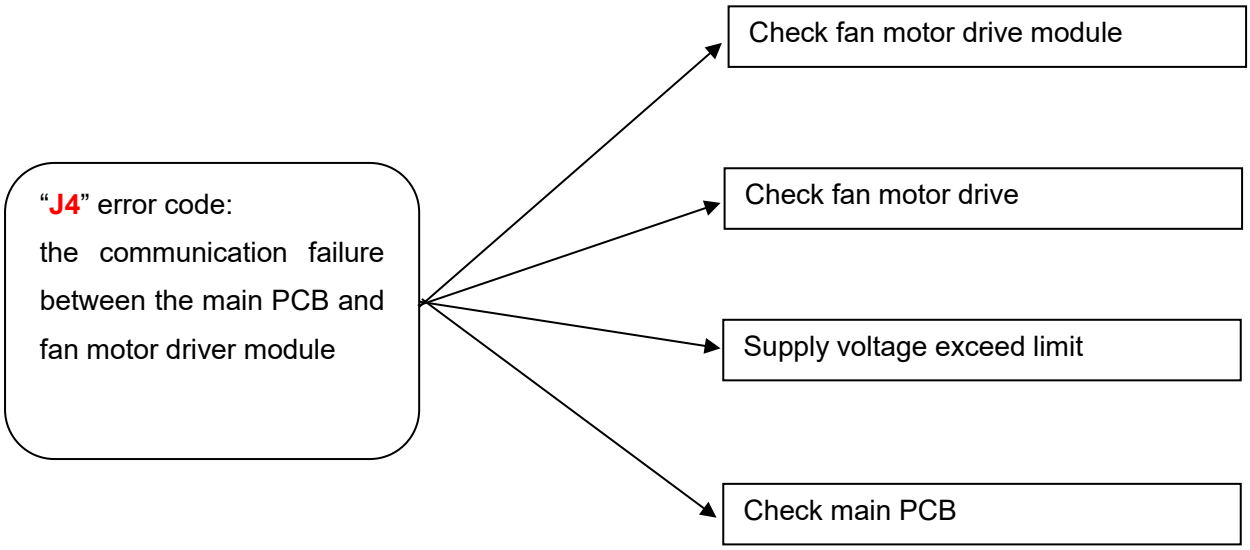
Discharge temperature sensor abnormal → Replace

NO ↓

Contact with the manufacturer's Technician

5.8 IPM Error Code





6 Unknown troubleshooting

1. Poor effect

1.1 Poor overall effect

a. Small load selection: According to the load calculation standard, check the selection. If the selection is too small, rectification is required.

b. Too much over-provisioning: internal control 120%, whether the ratio is more than 130%, if it needs to be rectified; whether the fresh air capacity is less than 30%, whether the fresh air mixed connection is more than 30%, if it needs to be rectified.

c. Poor heat dissipation of the external machine: the air intake is blocked, the gap is small, three sides: distance from the wall> 1m, the outer machine room> 0.15m; the second side: distance from the wall> 0.3m, the outer machine room> 0.15m; the top of the wind is blocked, the top > 1.5m, add a wind deflector to the blinds, if not satisfied, rectification is required.

d. Abnormal amount of refrigerant: If the amount of refrigerant is too little/too much, run automatic filling; or check the parameters of overcooling, valve opening and other parameters, add or put refrigerant to confirm whether the amount of refrigerant is appropriate, and rectify if it is not suitable.

e. The connecting pipe is abnormal: the pipe diameter is too small, the pipe is too long, the main pipe exceeds 90m, and the internal machine to the branch pipe exceeds 10m to increase the pipe diameter.

1.2 Part of the effect is poor

a. Small selection of the external machine: According to the load calculation standard, check the selection. If the selection is too small, rectification is required.

b. Short circuit of return air from the internal machine: the return air cannot be crossed, and the distance between the return air and the air outlet is more than 1.2m.

c. Dislocation of the internal air outlet: No obvious dislocation of the air outlet is allowed.

d. The air duct of the internal machine is blocked: the air duct supports and reduces the resistance of the air duct.

e. Differential diversion of the internal machine outlet style grille: The air guide door has a cooling level, and the heating is downward, and the width of the air guide door needs to be increased. If it does not meet the requirements, it will be rectified.

f. The internal machine system is blocked: the filter is dirty (large opening of the refrigeration valve; the heating fan does not open, and the pipe temperature is close to the ambient temperature), it is necessary to determine the position of the blockage and replace the relevant components.

g. Abnormal stop valve: the valve is out of control (the valve step changes, and the tube temperature does not change). It is necessary to check the valve wiring and whether the coil is loose; the valve is leaking (refrigeration shutdown state, the tube temperature is low), if the valve still leaks after resetting, then Need to change the valve.

2. Water leakage from the air duct machine

2.1. The insulation pipe at the valve plate is off, damaged or aging: replace the insulation sleeve, or use a sponge to keep it warm.

2.2. There is no insulation at the plug of the drain: ①The drain leaks and drips in the air: increase the insulation of the drain to avoid exposure. ②. The plug is not installed in place, and there is a gap, causing water seepage at the plug: Push the plug firmly to the end to avoid water seepage. ③The clamp at the drainage end of the project is not insulated, and the metal clamp is dripping with water: The clamp should be covered with sponge to avoid the clamp.

2.3. Connecting pipe: The connecting pipe of the internal and external machines needs to be wrapped with an insulation sleeve to wrap the copper nanotube and the joint. There are gaps on both sides of the loose package, and there is air contact with the copper nanotube and the joint, causing condensation and condensation on the joint. Water drips from the joint. At this time, you need to re-wrap the insulation sleeve to ensure that there is no gap between the middle and the two ends. Use a wire tie to tie the two ends of the insulation sleeve tightly to prevent air from entering.

2.4. Evaporator: ①The gap between the evaporators is large, without sealing, the wind is blown out directly without the fins, and the temperature difference between the cold and hot air in the air duct is large, which causes condensation in the air duct. In this case, you need to check whether there is any air leakage between the evaporators, seal them with glue or plug the gap with a sponge. ②The contact position of the evaporator and the water receiving pan is not sealed, causing air to blow out from the bottom, and the air will carry out the condensed water of the water receiving pan, causing water to blow. In this case, it is necessary to check the seal between the evaporator and the drain pan to confirm that there is no air leakage at the bottom.

2.5. Water receiving pan: The water receiving pan is responsible for collecting the condensate generated by the evaporator. Water leakage occurs in the water receiving pan, usually due to poor drainage or damaged water leakage. If this happens, you need to check the unit if the unit is not draining smoothly. Whether the installation is inclined to the drain side or whether the drain port of the drain pan is dirty or blocked. The installation of the unit is not inclined to the drain side, resulting in a large amount of water in the drain pan. The screw rod can be adjusted and installed to allow water to flow out along the drain. The drain port is dirty and blocked with foreign matter, remove the foreign matter to ensure smooth drainage. ② If the drain pan is damaged and leaks, replace the drain pan.

2.6. Water pump and float switch: For the air duct unit with water pump installed, the water pump is blocked, the float switch malfunctions, and the drain hose is not tightly sealed, which will cause the unit drainage problem and water leakage. In this case, you need to approach the unit ① On the drain side, listen to whether the water pump is running when the unit is cooling. The water pump is not running, check if the water pump has power supply. If the water pump is not powered, check whether the pump terminals are plugged in and whether the float switch is stuck or damaged. If the water pump is damaged, the water pump needs to be replaced. If the float switch is damaged, the float switch needs to be replaced. ②If the water pump has a sound, but there is no drainage, turn on the unit to check if the water pump port

is blocked. Then check whether the cable tie between the water pump and the hose is tightly tied, and whether there is water leakage between the pump and the hose. If there is water leakage, use the cable tie to re-tighten it.

3. The humming of the ceiling inside the machine

3.1 Internal machine levelness and hoisting position

a. Insufficient levelness of the internal machine (left and right, front and rear), the hoisting of the internal machine does not tilt horizontally, and the installation of the internal machine interferes with other objects. The levelness needs to be re-adjusted to ensure that the hoisting is level and cannot interfere with surrounding objects.

b. The hoisting position of the internal unit meets the requirements of the specification: ①The gap between the ceiling body and the surroundings>1500mm; ②The distance between the ceiling internal machine>50mm from the ceiling and 2500-3500mm from the ground; ③The distance between the ceiling unit>4000mm; ④The left side of the air duct ≥ 300mm, right side≥500mm; ⑤Internal machine and interference source>1m; In summary, if the following requirements are not met, contact the installer for rectification, and experience the noise again after the rectification meets the requirements. If the user accepts and approves the explanation, it is recommended not to adjust the internal machine.

3.2. Power quality of internal machine installation

a. Check the internal machine voltage, use a multimeter to measure the output voltage of the internal machine power supply MCB to ensure that the voltage is stable and no abnormal fluctuations. If there is a power supply undervoltage or lack of equality, confirm that the power supply is normal, and then confirm the noise situation.

3.3. Chassis

a. Due to the transportation or installation process, the chassis may be deformed and cause resonance. You can press different positions of the chassis from the outside with your hands to confirm the resonance position in combination with the buzzing situation. In combination with the engineering situation, the resonance position on the top of the chassis may be increased with a damping block as appropriate. After the damping block, there is still an obvious buzzing sound, and further investigation of the motor rubber pad problem is required.

3.4 Motor gasket

a. After the chassis is confirmed, there is still a humming sound, and the gasket needs to be checked. ① The motor needs to be removed, and a gasket (2mm thick) is added at the bottom of the bolt. Each of the 4 bolts is 1 piece. After the gasket is added, the unit is restored and the unit is powered on. Experience the buzzing sound; ②If there is a clear buzzing sound after adding the gasket, further investigation of the motor body problem is required.

3.5 Motor

a. After the chassis and gaskets are confirmed, there is still a buzzing sound. You need to confirm whether the motor is abnormal. If the motor is abnormal, replace the motor with a new one and experience the noise after power-on

7 Appendix

Relation between temperature sensor of compressor and resistance

R25=50KΩ±1%			
B25/50=3950K ±1%			
T [℃]	Rmin [KΩ]	Rnom [KΩ]	Rmax [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

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The above designs and specifications are subject to charge without prior notice.
Final specifications please refer to latest
technical specification provided by sales representative.

Technology leads Intelligent life

NINGBO AUX ELECTRIC CO., LTD

History

Version	Modification	Date	Remark
V 1	New Product	2023/04/19	