



# Service Manual

**GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI**



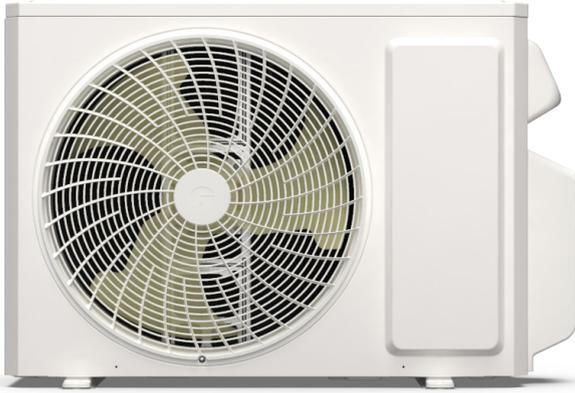
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# 1. Summary

## Outdoor Unit:

GWHD(18)NK6PO



GWHD(24)NK6PO GWHD(28)NK6PO



GWHD(36)NK6PO GWHD(42)NK6PO



## Model list:

No.	Model	Product code
1	GWHD(18)NK6PO	CB228W18600
2	GWHD(24)NK6PO	CB228W18700
3		CB228W18701
4	GWHD(28)NK6PO	CB228W18300
5		CB228W18301
6	GWHD(36)NK6PO	CB228W18900
7		CB228W18901
8	GWHD(42)NK6PO	CB228W18800
9		CB228W18801

## 2. Specifications

Model	-	GWHD(18)NK6PO
Product Code	-	CB228W18600
Rated Voltage	V~	220-240
Rated Frequency	Hz	50
Phases	--	1
Cooling Capacity	kW	5.3
Heating Capacity	kW	5.65
Cooling Power Input	kW	1.38
Heating Power Input	kW	1.27
Cooling Current Input	A	6.12
Heating Current Input	A	5.63
Rated Power Input	kW	2.5
Rated Current	A	11
EER	W/W	3.84
COP	W/W	4.45
Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.
Compressor Model	-	QXF-A139zH170A
Compressor Refrigerant Oil Type	-	FW68DA
Compressor Type	-	Inverter Rotary
Compressor Locked Rotor Amp	A	25
Compressor Rated Load Amp	A	/
Compressor Power Input	W	1295
Compressor Thermal Protector	-	KSD115°C HPC115/95U1
Throttling Method	-	Electron expansion valve
Cooling Operation Ambient Temperature Range	°C	-15~52
Heating Operation Ambient Temperature Range	°C	-22~24
Condenser Material	-	Aluminum Fin-copper Tube
Condenser Pipe Diameter	mm	Φ7
Condenser Number of Rows-Fin Pitch	mm	2-1.4
Condenser (L×H×W)	mm	834×528×38.1
Fan Motor Speed	rpm	Cooling: 800 / Heating: 860
Fan Motor Power Output	W	30
Motor Full Load Amp	A	0.4
Fan Motor Capacitor	μF	/
Air Flow Volume	m <sup>3</sup> /h	2300
Fan Type	-	Axial-flow
Fan Diameter-Height	mm	Φ420-131.1
Defrosting Method	-	Automatic Defrosting
Climate Type	-	T1
Isolation	-	I
Moisture Protection	-	IPX4
Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3
Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5
Dimension of Outline (W×H×D)	mm	822×550×352
Dimension of Carton Box (L×W×H)	mm	869×395×594
Dimension of Package (L×W×H)	mm	872×398×620
Net Weight	kg	34
Gross Weight	kg	36.5
Refrigerant	-	R32
Refrigerant Charge	kg	0.9

## 2. Specifications

Cross-sectional Area of Power Cable Conductor	mm <sup>2</sup>	1.5
Recommended Power Cable	N	3
Connection Pipe Connection Method	-	Flare Connection
Not Additional Gas Connection Pipe Length	m	40
Connection Pipe Gas Additional Charge	g/m	20
Outer Diameter of Liquid Pipe1	inch	1/4
Outer Diameter of Gas Pipe1	inch	3/8
Outer Diameter of Liquid Pipe2	inch	1/4
Outer Diameter of Gas Pipe2	inch	3/8
Outer Diameter of Liquid Pipe3	inch	/
Outer Diameter of Gas Pipe3	inch	/
Outer Diameter of Liquid Pipe4	inch	/
Outer Diameter of Gas Pipe4	inch	/
Outer Diameter of Liquid Pipe5	inch	/
Outer Diameter of Gas Pipe5	inch	/
Connection Pipe Max. Height Distance (Indoor and Indoor)	m	15
Connection Pipe Max. Height Distance (Indoor and outdoor, indoor higher)	m	15
Connection Pipe Max. Height Distance (Indoor and outdoor, outdoor higher)	m	15
Max. equivalent connection pipe length	m	30
Connection Pipe Max. Length Distance (total length)	m	50

The above data is subject to change without notice; please refer to the nameplate of the unit.

## 2. Specifications

Model	-	GWHD(24)NK6PO	
Product Code	-	CB228W18700	CB228W18701
Rated Voltage	V~	220-240	
Rated Frequency	Hz	50	
Phases	--	1	
Cooling Capacity	kW	7.3	
Heating Capacity	kW	8.3	
Cooling Power Input	kW	1.96	
Heating Power Input	kW	2	
Cooling Current Input	A	8.7	
Heating Current Input	A	8.87	
Rated Power Input	kW	Cooling: 3.4 / Heating: 3.0	
Rated Current	A	Cooling: 15 / Heating: 14.6	
EER	W/W	3.72	
COP	W/W	4.15	
Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.	
Compressor Model	-	QXFS-M180zX170	
Compressor Refrigerant Oil Type	-	FW68DA or equivalent	
Compressor Type	-	Twin Rotary	
Compressor Locked Rotor Amp	A	24	
Compressor Rated Load Amp	A	/	
Compressor Power Input	W	1480	
Compressor Thermal Protector	-	HPC115/95/KSD115°C	
Throttling Method	-	Electron expansion valve	
Cooling Operation Ambient Temperature Range	°C	-15~52	
Heating Operation Ambient Temperature Range	°C	-22~24	
Condenser Material	-	Aluminum Fin-copper Tube	
Condenser Pipe Diameter	mm	Φ7	
Condenser Number of Rows-Fin Pitch	mm	2-1.4	
Condenser (L×H×W)	mm	851×616×38.1	
Fan Motor Speed	rpm	Cooling: 850 / Heating: 800	
Fan Motor Power Output	W	60	
Motor Full Load Amp	A	0.426	
Fan Motor Capacitor	μF	/	
Air Flow Volume	m <sup>3</sup> /h	3800	
Fan Type	-	Axial-flow	
Fan Diameter-Height	mm	Φ520-154	
Defrosting Method	-	Automatic Defrosting	
Climate Type	-	T1	
Isolation	-	I	
Moisture Protection	-	IPX4	
Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	
Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	
Dimension of Outline (W×H×D)	mm	964×660×402	
Dimension of Carton Box (L×W×H)	mm	1029×453×715	1029×453×700
Dimension of Package (L×W×H)	mm	1032×456×737	1040×463×805
Net Weight	kg	47.5	
Gross Weight	kg	52	60
Refrigerant	-	R32	
Refrigerant Charge	kg	1.7	

## 2. Specifications

Cross-sectional Area of Power Cable Conductor	mm <sup>2</sup>	2.5
Recommended Power Cable	N	3
Connection Pipe Connection Method	-	Flare Connection
Not Additional Gas Connection Pipe Length	m	40
Connection Pipe Gas Additional Charge	g/m	20
Outer Diameter of Liquid Pipe1	inch	1/4
Outer Diameter of Gas Pipe1	inch	3/8
Outer Diameter of Liquid Pipe2	inch	1/4
Outer Diameter of Gas Pipe2	inch	3/8
Outer Diameter of Liquid Pipe3	inch	1/4
Outer Diameter of Gas Pipe3	inch	3/8
Outer Diameter of Liquid Pipe4	inch	/
Outer Diameter of Gas Pipe4	inch	/
Outer Diameter of Liquid Pipe5	inch	/
Outer Diameter of Gas Pipe5	inch	/
Connection Pipe Max. Height Distance (Indoor and Indoor)	m	15
Connection Pipe Max. Height Distance (Indoor and outdoor, indoor higher)	m	15
Connection Pipe Max. Height Distance (Indoor and outdoor, outdoor higher)	m	15
Max. equivalent connection pipe length	m	30
Connection Pipe Max. Length Distance (total length)	m	60

The above data is subject to change without notice; please refer to the nameplate of the unit.

## 2. Specifications

Model	-	GWHD(28)NK6PO	
Product Code	-	CB228W18300	CB228W18301
Rated Voltage	V~	220-240	
Rated Frequency	Hz	50	
Phases	--	1	
Cooling Capacity	kW	8.2	
Heating Capacity	kW	8.8	
Cooling Power Input	kW	1.88	
Heating Power Input	kW	2.12	
Cooling Current Input	A	8.34	
Heating Current Input	A	9.41	
Rated Power Input	kW	3.6	
Rated Current	A	15.97	
EER	W/W	4.36	
COP	W/W	4.15	
Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.	
Compressor Model	-	QXFS-B212zX070	
Compressor Refrigerant Oil Type	-	FW68DA or equivalent	
Compressor Type	-	Twin Rotary	
Compressor Locked Rotor Amp	A	35	
Compressor Rated Load Amp	A	/	
Compressor Power Input	W	1887	
Compressor Thermal Protector	-	KSD115°C HPC115/95U1	
Throttling Method	-	Electron expansion valve	
Cooling Operation Ambient Temperature Range	°C	-15~52	
Heating Operation Ambient Temperature Range	°C	-22~24	
Condenser Material	-	Aluminum Fin-copper Tube	
Condenser Pipe Diameter	mm	Φ7.94	
Condenser Number of Rows-Fin Pitch	mm	2-1.4	
Condenser (L×H×W)	mm	851×616×38.1	
Fan Motor Speed	rpm	Cooling: 850 / Heating: 800	
Fan Motor Power Output	W	60	
Motor Full Load Amp	A	0.426	
Fan Motor Capacitor	μF	/	
Air Flow Volume	m <sup>3</sup> /h	3800	
Fan Type	-	Axial-flow	
Fan Diameter-Height	mm	Φ520-154	
Defrosting Method	-	Automatic Defrosting	
Climate Type	-	T1	
Isolation	-	I	
Moisture Protection	-	IPX4	
Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	
Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	
Dimension of Outline (W×H×D)	mm	964×660×402	
Dimension of Carton Box (L×W×H)	mm	1029×453×715	1029×453×700
Dimension of Package (L×W×H)	mm	1032×456×737	1040×463×805
Net Weight	kg	51	
Gross Weight	kg	55.5	63.5
Refrigerant	-	R32	
Refrigerant Charge	kg	1.8	

## 2. Specifications

Cross-sectional Area of Power Cable Conductor	mm <sup>2</sup>	2.5
Recommended Power Cable	N	3
Connection Pipe Connection Method	-	Flare Connection
Not Additional Gas Connection Pipe Length	m	40
Connection Pipe Gas Additional Charge	g/m	20
Outer Diameter of Liquid Pipe1	inch	1/4
Outer Diameter of Gas Pipe1	inch	3/8
Outer Diameter of Liquid Pipe2	inch	1/4
Outer Diameter of Gas Pipe2	inch	3/8
Outer Diameter of Liquid Pipe3	inch	1/4
Outer Diameter of Gas Pipe3	inch	3/8
Outer Diameter of Liquid Pipe4	inch	1/4
Outer Diameter of Gas Pipe4	inch	3/8
Outer Diameter of Liquid Pipe5	inch	/
Outer Diameter of Gas Pipe5	inch	/
Connection Pipe Max. Height Distance (Indoor and Indoor)	m	15
Connection Pipe Max. Height Distance (Indoor and outdoor, indoor higher)	m	15
Connection Pipe Max. Height Distance (Indoor and outdoor, outdoor higher)	m	15
Max. equivalent connection pipe length	m	30
Connection Pipe Max. Length Distance (total length)	m	70

The above data is subject to change without notice; please refer to the nameplate of the unit.

## 2. Specifications

Model	-	GWHD(36)NK6PO	
Product Code	-	CB228W18900	CB228W18901
Rated Voltage	V~	220-240	
Rated Frequency	Hz	50	
Phases	--	1	
Cooling Capacity	kW	10.6	
Heating Capacity	kW	11.4	
Cooling Power Input	kW	2.65	
Heating Power Input	kW	2.85	
Cooling Current Input	A	11.76	
Heating Current Input	A	12.64	
Rated Power Input	kW	Cooling: 4.6 / Heating: 5.0	
Rated Current	A	Cooling: 20.41 / Heating: 21.74	
EER	W/W	4	
COP	W/W	4	
Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.	
Compressor Model	-	QXFS-D280zX070C	
Compressor Refrigerant Oil Type	-	FW68DA or equivalent	
Compressor Type	-	Twin Rotary	
Compressor Locked Rotor Amp	A	40	
Compressor Rated Load Amp	A	/	
Compressor Power Input	W	2294	
Compressor Thermal Protector	-	KSD115°C HPC115/95U1	
Throttling Method	-	Electron expansion valve	
Cooling Operation Ambient Temperature Range	°C	-15~52	
Heating Operation Ambient Temperature Range	°C	-22~24	
Condenser Material	-	Aluminum Fin-copper Tube	
Condenser Pipe Diameter	mm	Φ7.94	
Condenser Number of Rows-Fin Pitch	mm	2-1.4	
Condenser (L×H×W)	mm	1066×792×38.1	
Fan Motor Speed	rpm	Cooling: 860 / Heating: 860	
Fan Motor Power Output	W	130	
Motor Full Load Amp	A	/	
Fan Motor Capacitor	μF	/	
Air Flow Volume	m³/h	5800	
Fan Type	-	Axial-flow	
Fan Diameter-Height	mm	Φ550-205	
Defrosting Method	-	Automatic Defrosting	
Climate Type	-	T1	
Isolation	-	I	
Moisture Protection	-	IPX4	
Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	
Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	
Dimension of Outline (W×H×D)	mm	1020×826×427	
Dimension of Carton Box (L×W×H)	mm	1090×494×870	1090×494×850
Dimension of Package (L×W×H)	mm	1093×497×885	1095×500×955
Net Weight	kg	72	
Gross Weight	kg	79	85
Refrigerant	-	R32	
Refrigerant Charge	kg	2.4	

## 2. Specifications

Cross-sectional Area of Power Cable Conductor	mm <sup>2</sup>	4
Recommended Power Cable	N	3
Connection Pipe Connection Method	-	Flare Connection
Not Additional Gas Connection Pipe Length	m	40
Connection Pipe Gas Additional Charge	g/m	20
Outer Diameter of Liquid Pipe1	inch	1/4
Outer Diameter of Gas Pipe1	inch	3/8
Outer Diameter of Liquid Pipe2	inch	1/4
Outer Diameter of Gas Pipe2	inch	3/8
Outer Diameter of Liquid Pipe3	inch	1/4
Outer Diameter of Gas Pipe3	inch	3/8
Outer Diameter of Liquid Pipe4	inch	1/4
Outer Diameter of Gas Pipe4	inch	3/8
Outer Diameter of Liquid Pipe5	inch	/
Outer Diameter of Gas Pipe5	inch	/
Connection Pipe Max. Height Distance (Indoor and Indoor)	m	25
Connection Pipe Max. Height Distance (Indoor and outdoor, indoor higher)	m	25
Connection Pipe Max. Height Distance (Indoor and outdoor, outdoor higher)	m	25
Max. equivalent connection pipe length	m	30
Connection Pipe Max. Length Distance (total length)	m	80

The above data is subject to change without notice; please refer to the nameplate of the unit.

## 2. Specifications

Model	-	GWHD(42)NK6PO	
Product Code	-	CB228W18800	CB228W18801
Rated Voltage	V~	220-240	
Rated Frequency	Hz	50	
Phases	--	1	
Cooling Capacity	kW	12.3	
Heating Capacity	kW	12.6	
Cooling Power Input	kW	3.1	
Heating Power Input	kW	3.2	
Cooling Current Input	A	13.75	
Heating Current Input	A	14.2	
Rated Power Input	kW	Cooling: 4.6 / Heating: 5.0	
Rated Current	A	Cooling: 20.41 / heating: 21.74	
EER	W/W	3.97	
COP	W/W	3.94	
Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.	
Compressor Model	-	QXFS-D280zX070C	
Compressor Refrigerant Oil Type	-	FW68DA or equivalent	
Compressor Type	-	Twin Rotary	
Compressor Locked Rotor Amp	A	40	
Compressor Rated Load Amp	A	/	
Compressor Power Input	W	2294	
Compressor Thermal Protector	-	KSD115°C HPC115/95U1	
Throttling Method	-	Electron expansion valve	
Cooling Operation Ambient Temperature Range	°C	-15~52	
Heating Operation Ambient Temperature Range	°C	-22~24	
Condenser Material	-	Aluminum Fin-copper Tube	
Condenser Pipe Diameter	mm	Φ7.94	
Condenser Number of Rows-Fin Pitch	mm	2-1.4	
Condenser (L×H×W)	mm	1066×792×38.1	
Fan Motor Speed	rpm	Cooling: 860 / Heating: 860	
Fan Motor Power Output	W	130	
Motor Full Load Amp	A	/	
Fan Motor Capacitor	μF	/	
Air Flow Volume	m <sup>3</sup> /h	5800	
Fan Type	-	Axial-flow	
Fan Diameter-Height	mm	Φ550-205	
Defrosting Method	-	Automatic Defrosting	
Climate Type	-	T1	
Isolation	-	I	
Moisture Protection	-	IPX4	
Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	
Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	
Dimension of Outline (W×H×D)	mm	1020×826×427	
Dimension of Carton Box (L×W×H)	mm	1090×494×870	1090×494×850
Dimension of Package (L×W×H)	mm	1093×497×885	1093×500×955
Net Weight	kg	73	
Gross Weight	kg	80	86
Refrigerant	-	R32	
Refrigerant Charge	kg	2.4	

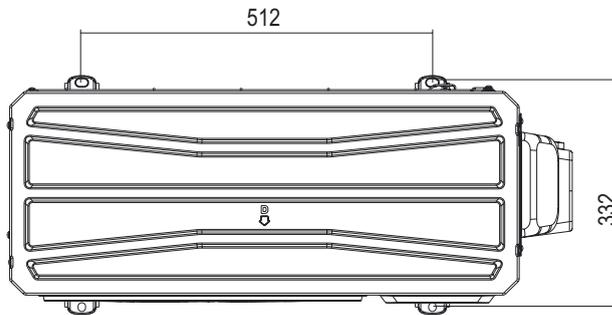
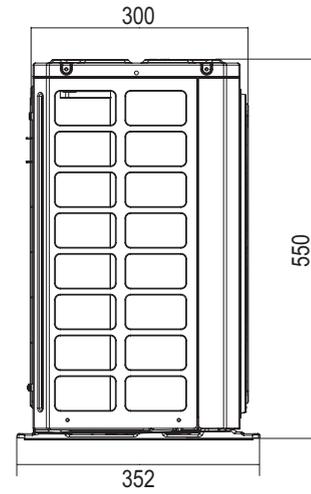
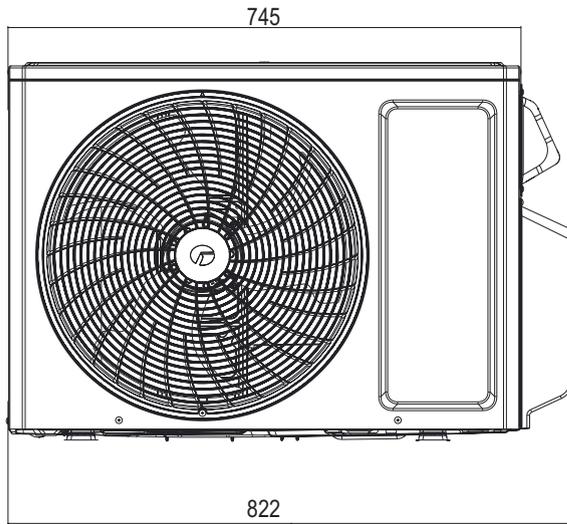
## 2. Specifications

Cross-sectional Area of Power Cable Conductor	mm <sup>2</sup>	4
Recommended Power Cable	N	3
Connection Pipe Connection Method	-	Flare Connection
Not Additional Gas Connection Pipe Length	m	50
Connection Pipe Gas Additional Charge	g/m	20
Outer Diameter of Liquid Pipe1	inch	1/4
Outer Diameter of Gas Pipe1	inch	3/8
Outer Diameter of Liquid Pipe2	inch	1/4
Outer Diameter of Gas Pipe2	inch	3/8
Outer Diameter of Liquid Pipe3	inch	1/4
Outer Diameter of Gas Pipe3	inch	3/8
Outer Diameter of Liquid Pipe4	inch	1/4
Outer Diameter of Gas Pipe4	inch	3/8
Outer Diameter of Liquid Pipe5	inch	1/4
Outer Diameter of Gas Pipe5	inch	3/8
Connection Pipe Max. Height Distance (Indoor and Indoor)	m	25
Connection Pipe Max. Height Distance (Indoor and outdoor, indoor higher)	m	25
Connection Pipe Max. Height Distance (Indoor and outdoor, outdoor higher)	m	25
Max. equivalent connection pipe length	m	30
Connection Pipe Max. Length Distance (total length)	m	100

The above data is subject to change without notice; please refer to the nameplate of the unit.

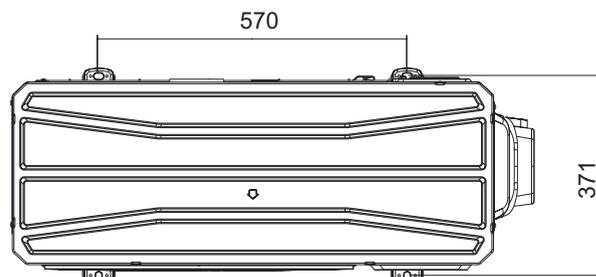
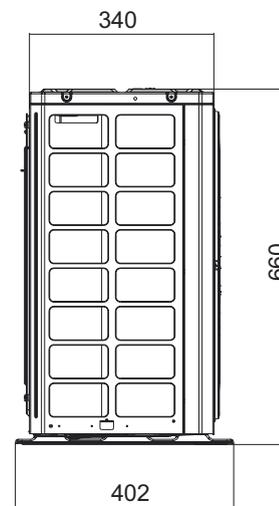
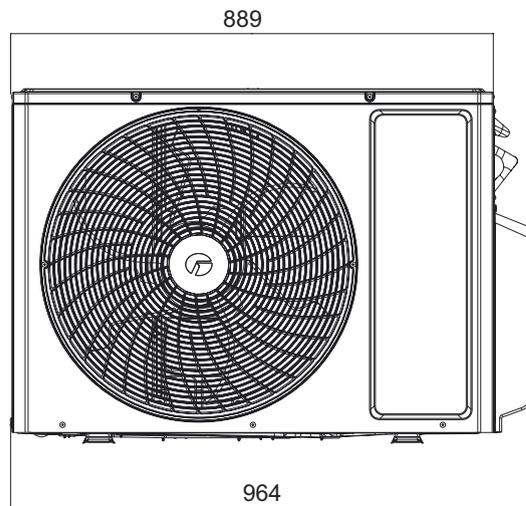
# 3. Outline Dimension Diagram

GWHD(18)NK6PO



Unit: mm

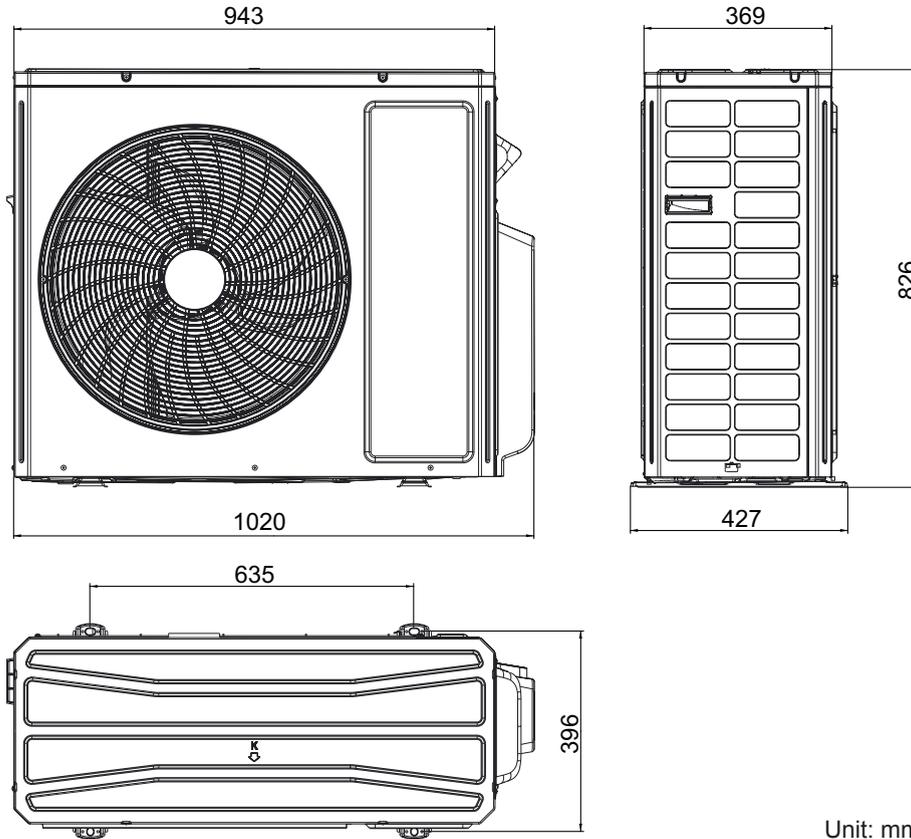
GWHD(24)NK6PO GWHD(28)NK6PO



Unit: mm

# 3. Outline Dimension Diagram

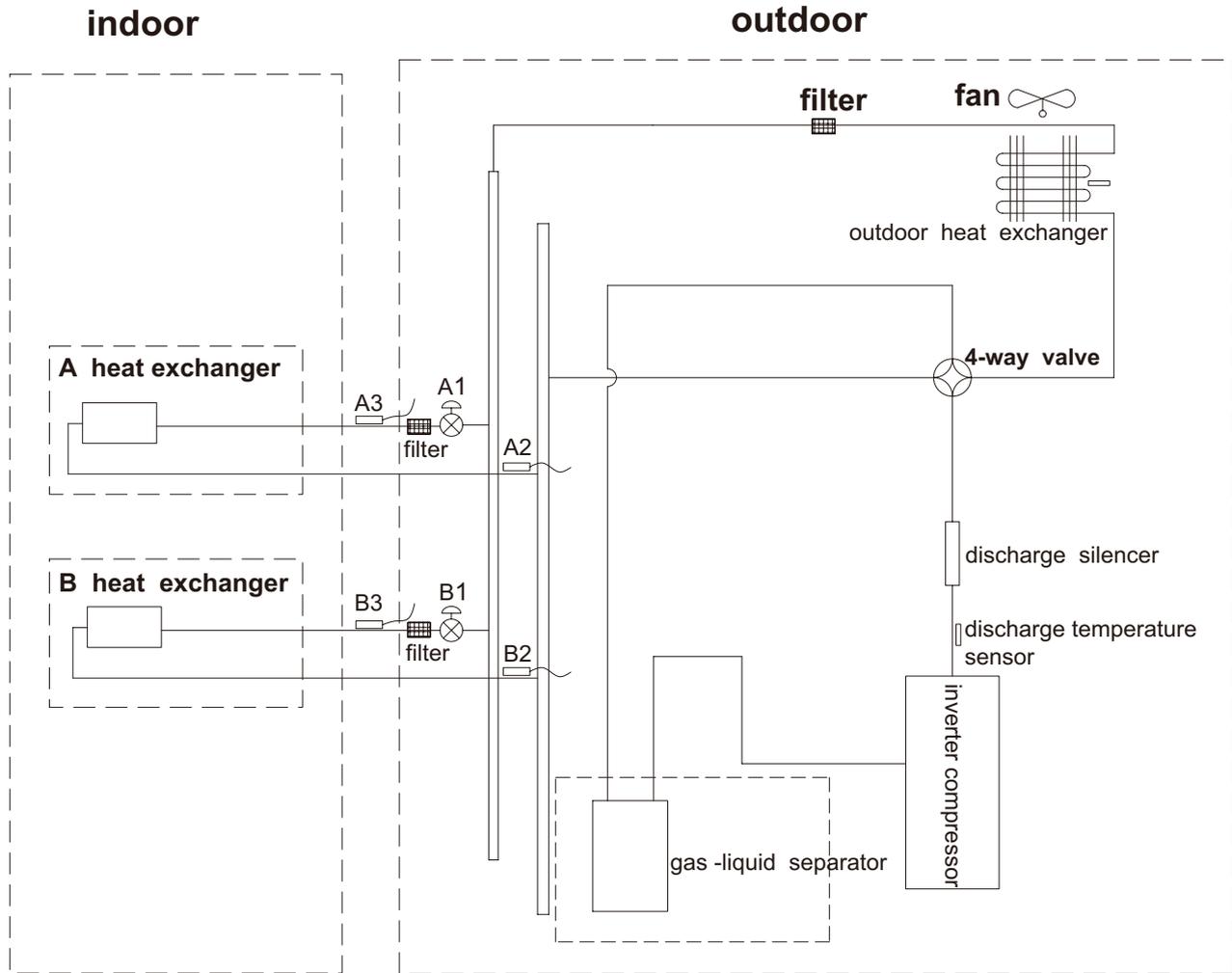
GWHD(36)NK6PO GWHD(42)NK6PO



Unit: mm

# 4. Refrigerant System Diagram

GWHD(18)NK6PO



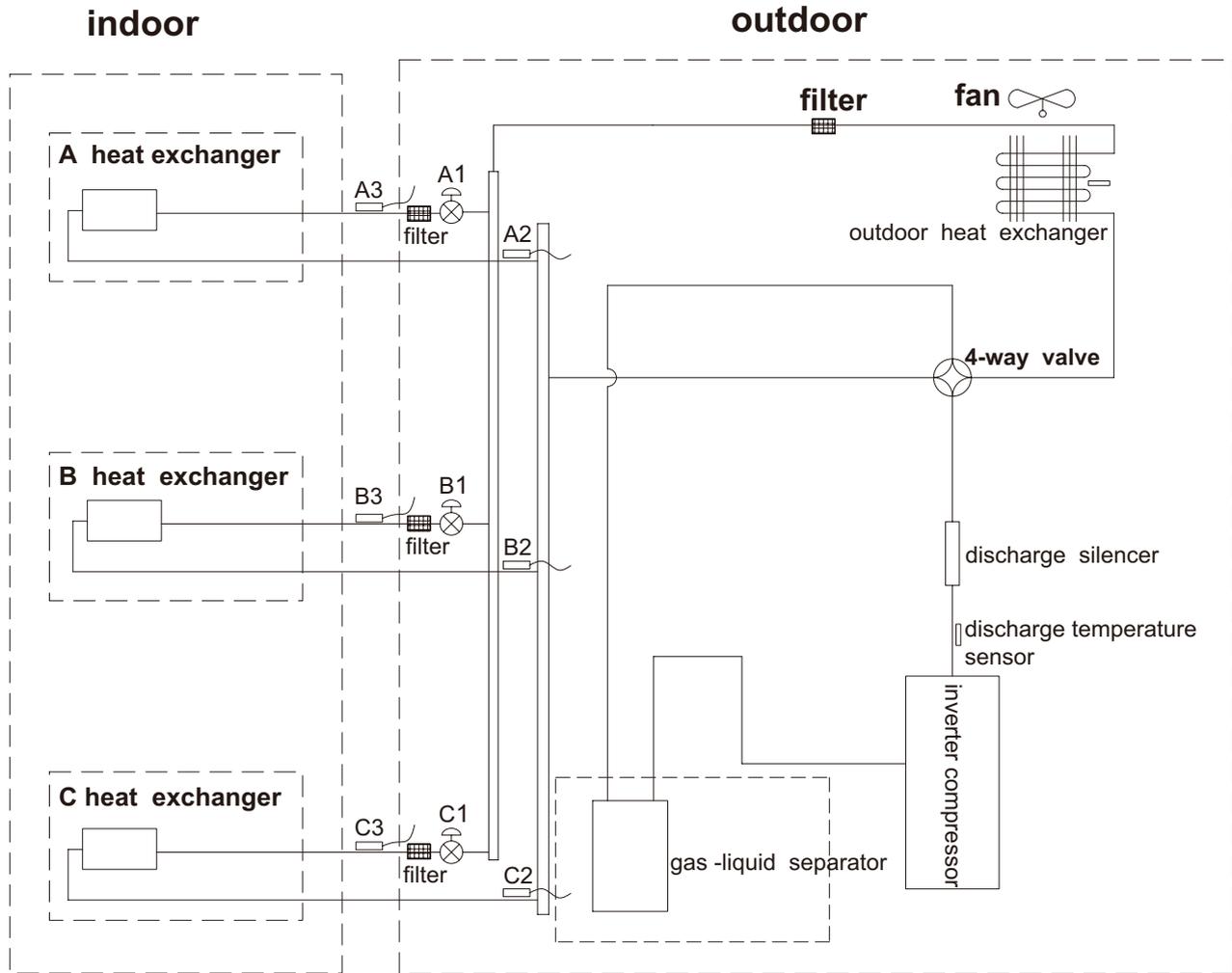
A1: A-unit electronic expansion valve  
 B1: B-unit electronic expansion valve

A2: A-unit gas pipe temperature sensor  
 B2: B-unit gas pipe temperature sensor

A3: A-unit liquid pipe temperature sensor  
 B3: B-unit liquid pipe temperature sensor

# 4. Refrigerant System Diagram

GWHD(24)NK6PO



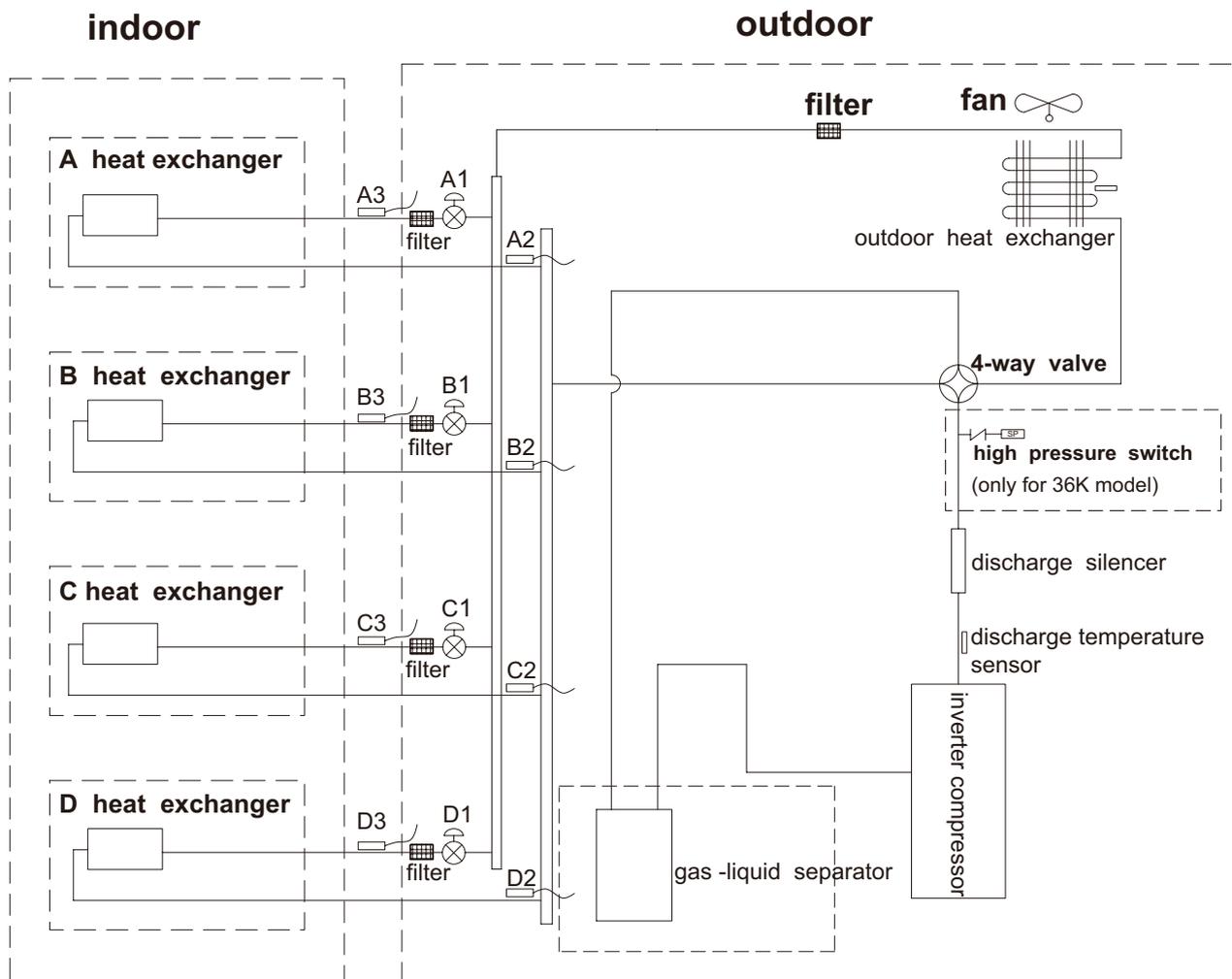
A1: A-unit electronic expansion valve  
 B1: B-unit electronic expansion valve  
 C1: C-unit electronic expansion valve

A2: A-unit gas pipe temperature sensor  
 B2: B-unit gas pipe temperature sensor  
 C2: C-unit gas pipe temperature sensor

A3: A-unit liquid pipe temperature sensor  
 B3: B-unit liquid pipe temperature sensor  
 C3: C-unit liquid pipe temperature sensor

# 4. Refrigerant System Diagram

GWHD(28)NK6PO GWHD(36)NK6PO



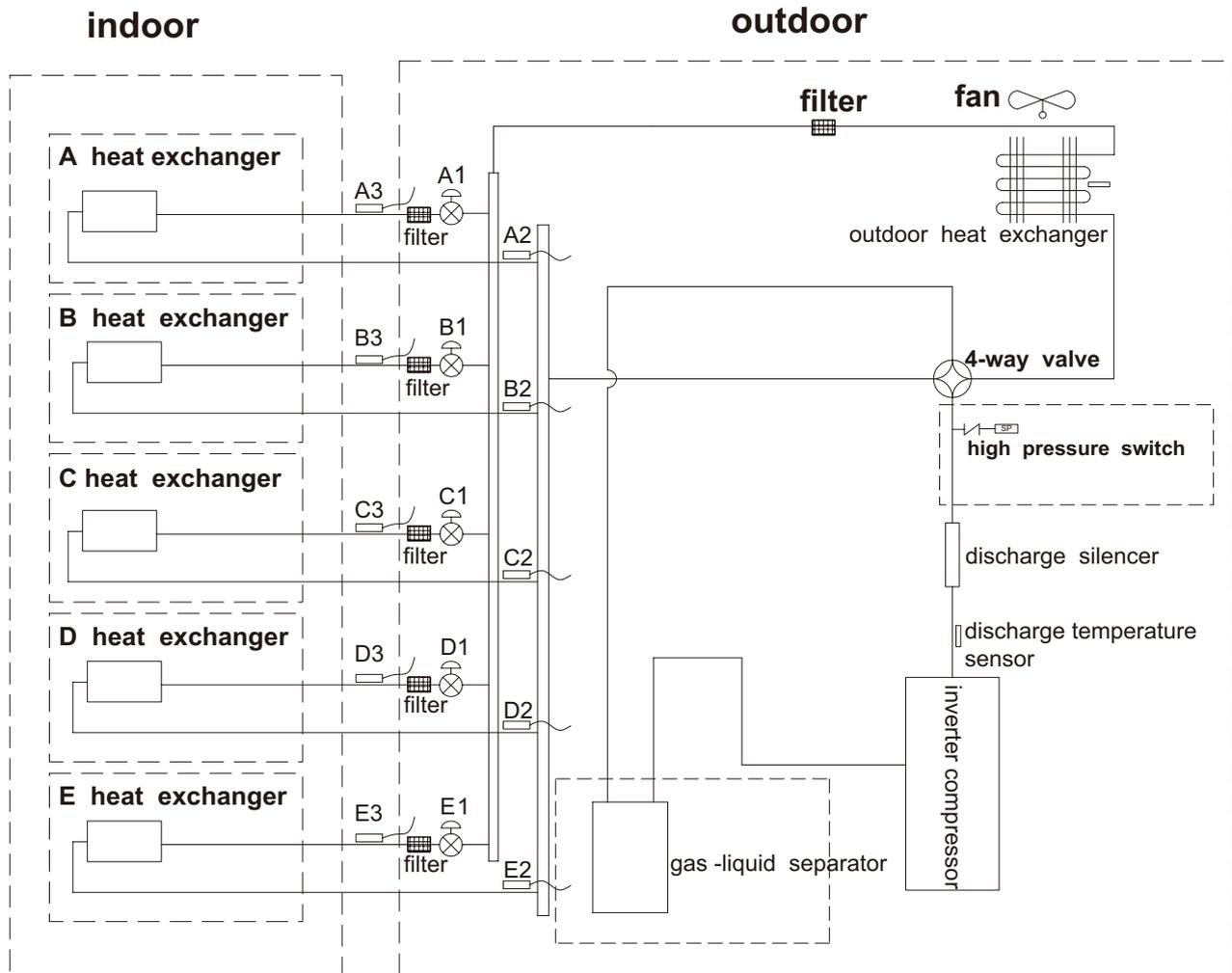
A1: A-unit electronic expansion valve  
 B1: B-unit electronic expansion valve  
 C1: C-unit electronic expansion valve  
 D1: D-unit electronic expansion valve

A2: A-unit gas pipe temperature sensor  
 B2: B-unit gas pipe temperature sensor  
 C2: C-unit gas pipe temperature sensor  
 D2: D-unit gas pipe temperature sensor

A3: A-unit liquid pipe temperature sensor  
 B3: B-unit liquid pipe temperature sensor  
 C3: C-unit liquid pipe temperature sensor  
 D3: D-unit liquid pipe temperature sensor

# 4. Refrigerant System Diagram

GWHD(42)NK6PO



A1: A-unit electronic expansion valve  
 B1: B-unit electronic expansion valve  
 C1: C-unit electronic expansion valve  
 D1: D-unit electronic expansion valve  
 E1: E-unit electronic expansion valve

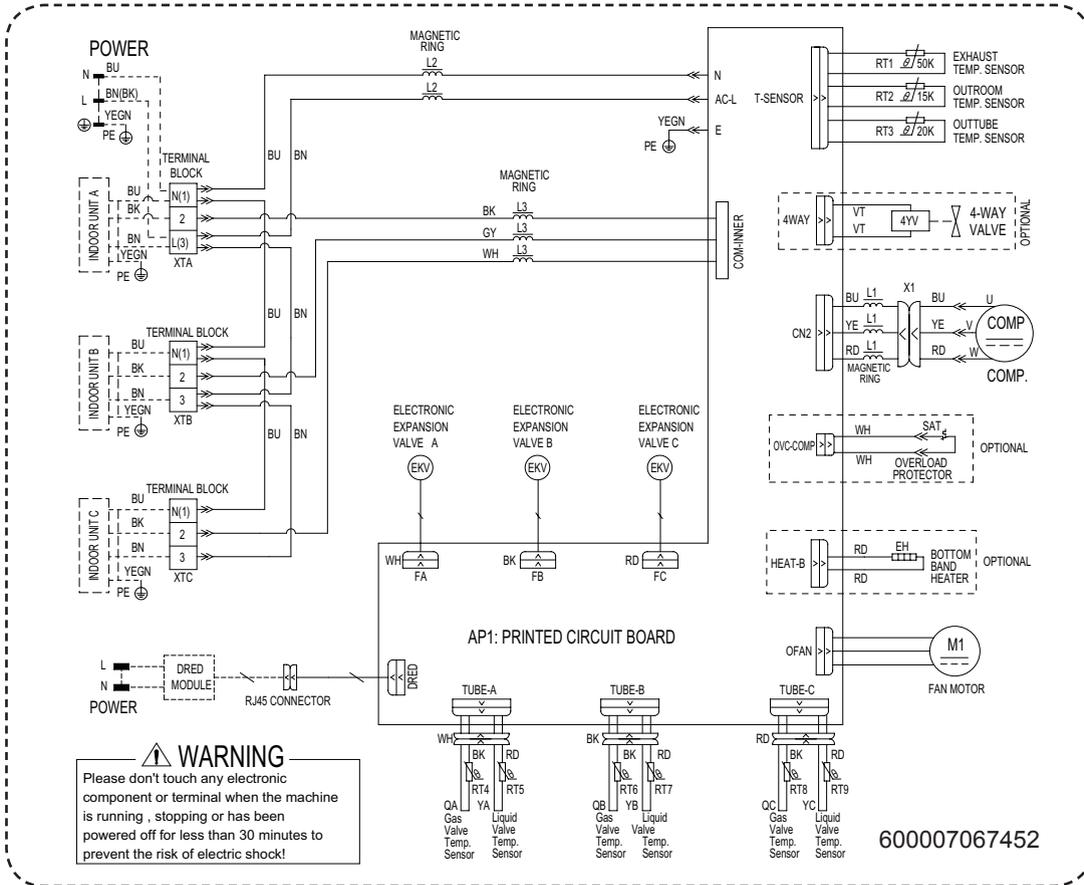
A2: A-unit gas pipe temperature sensor  
 B2: B-unit gas pipe temperature sensor  
 C2: C-unit gas pipe temperature sensor  
 D2: D-unit gas pipe temperature sensor  
 E2: E-unit gas pipe temperature sensor

A3: A-unit liquid pipe temperature sensor  
 B3: B-unit liquid pipe temperature sensor  
 C3: C-unit liquid pipe temperature sensor  
 D3: D-unit liquid pipe temperature sensor  
 E3: E-unit liquid pipe temperature sensor

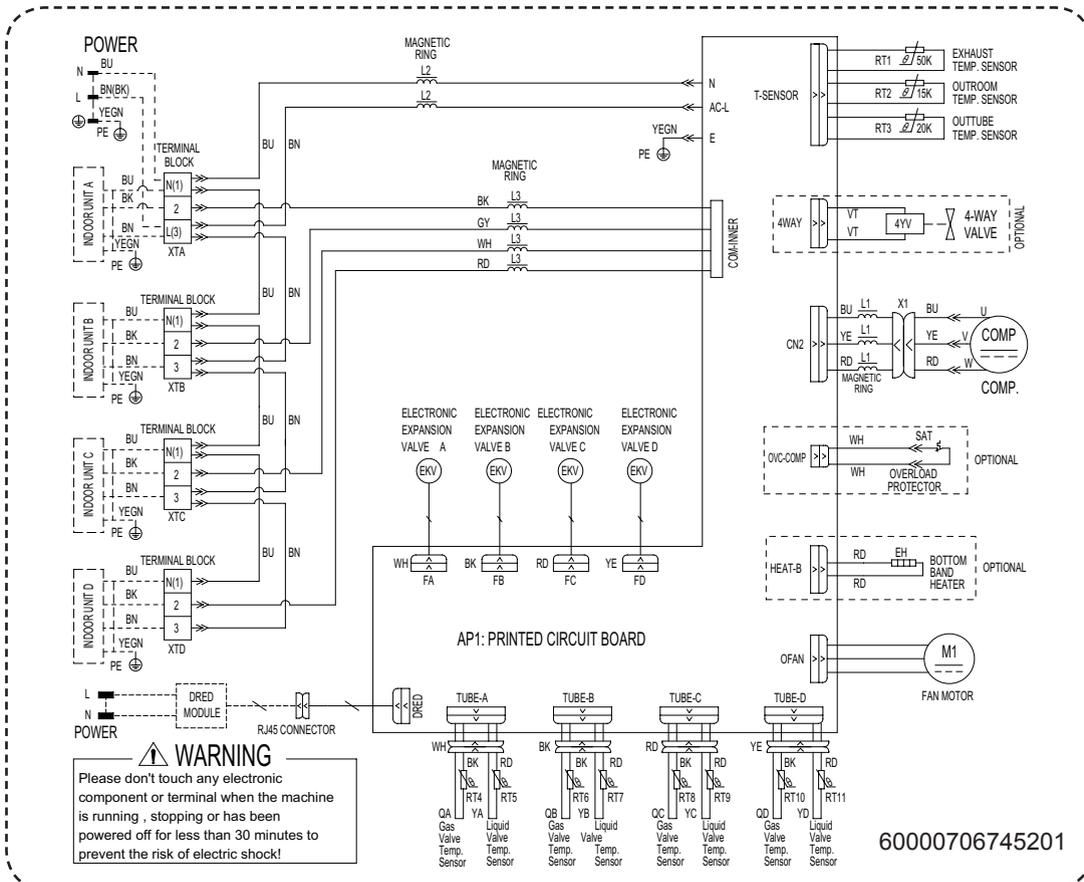


# 5. Electrical Part

GWHD(24)NK6PO

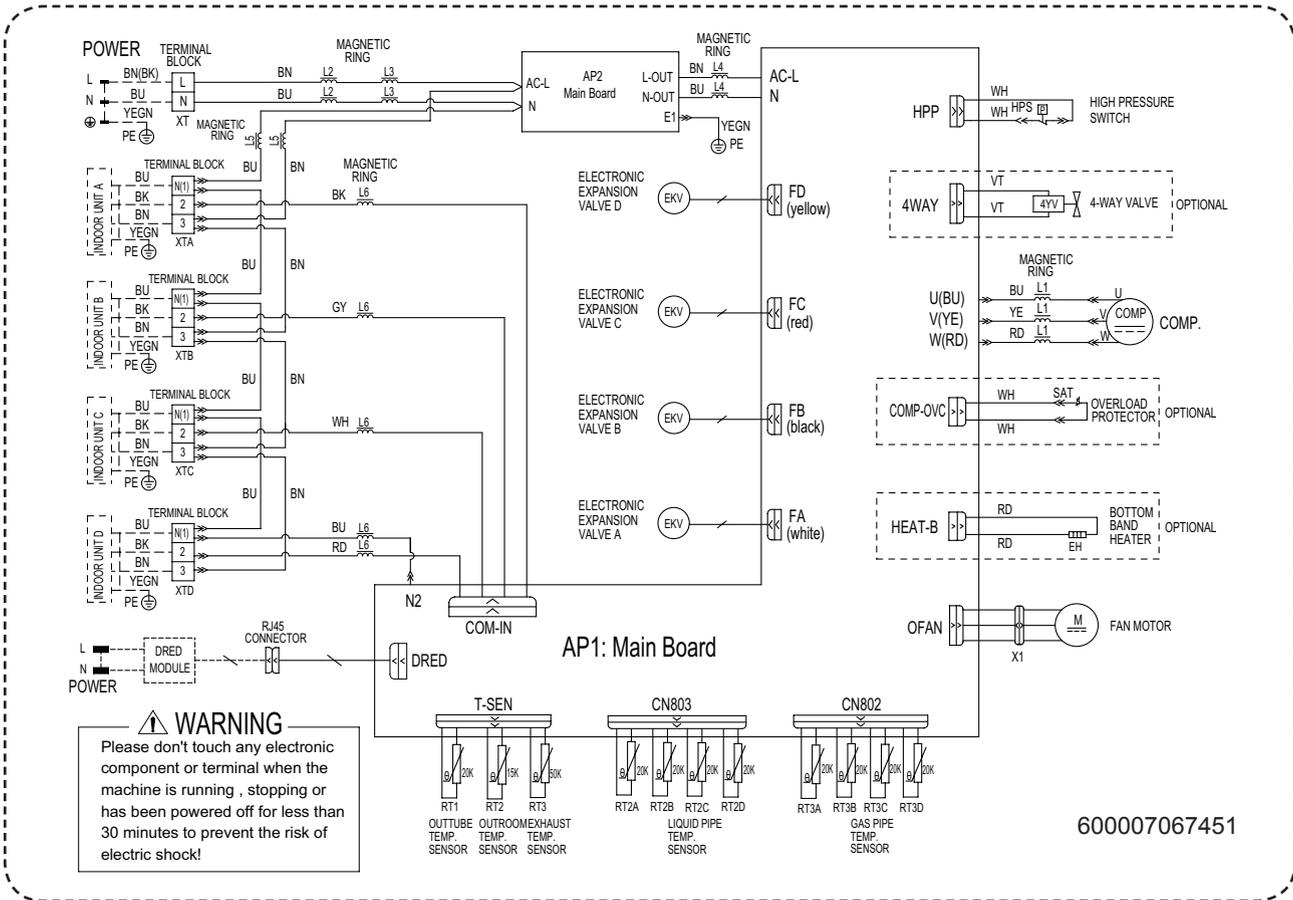


GWHD(28)NK6PO

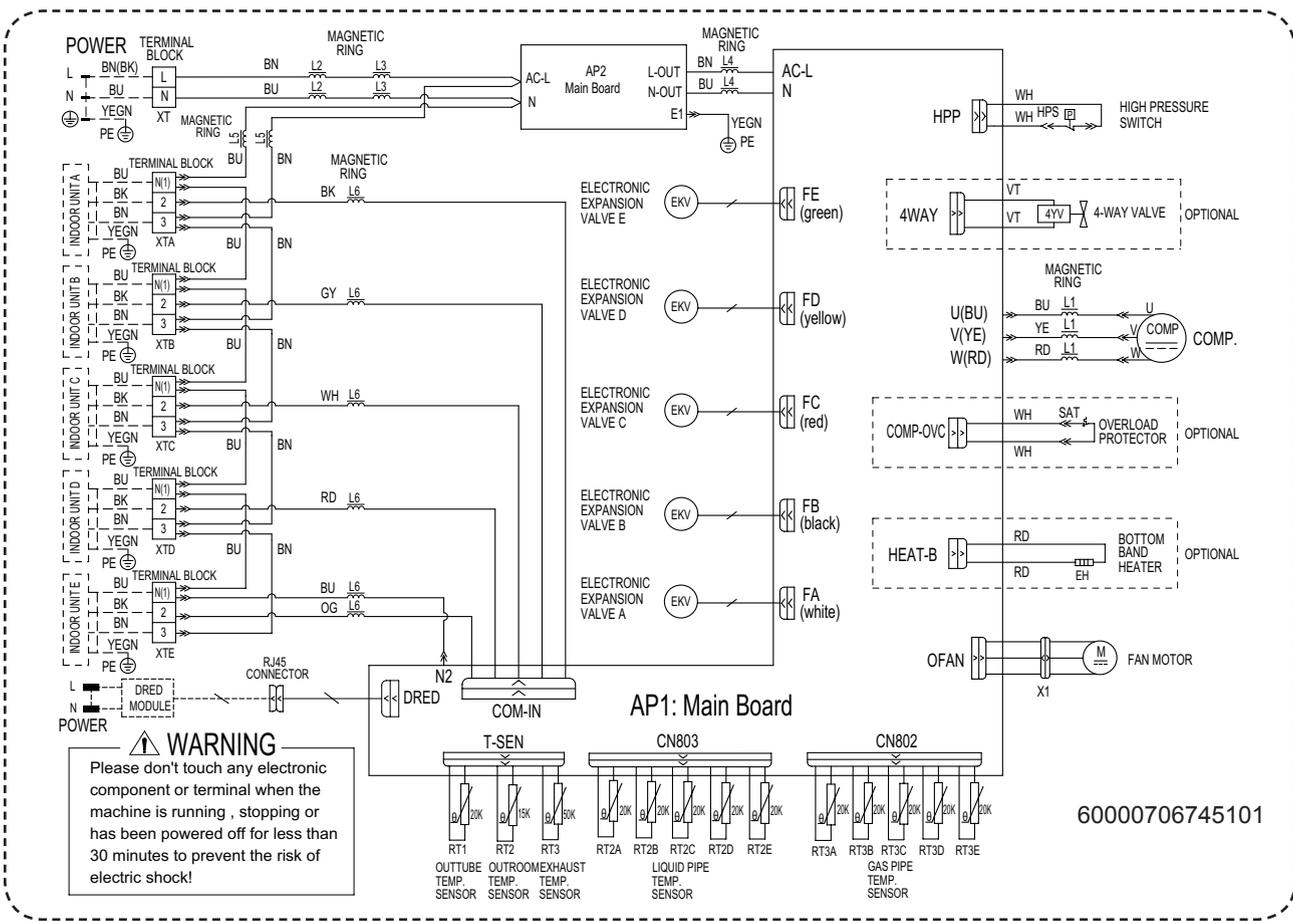


# 5. Electrical Part

GWHD(36)NK6PO



GWHD(42)NK6PO

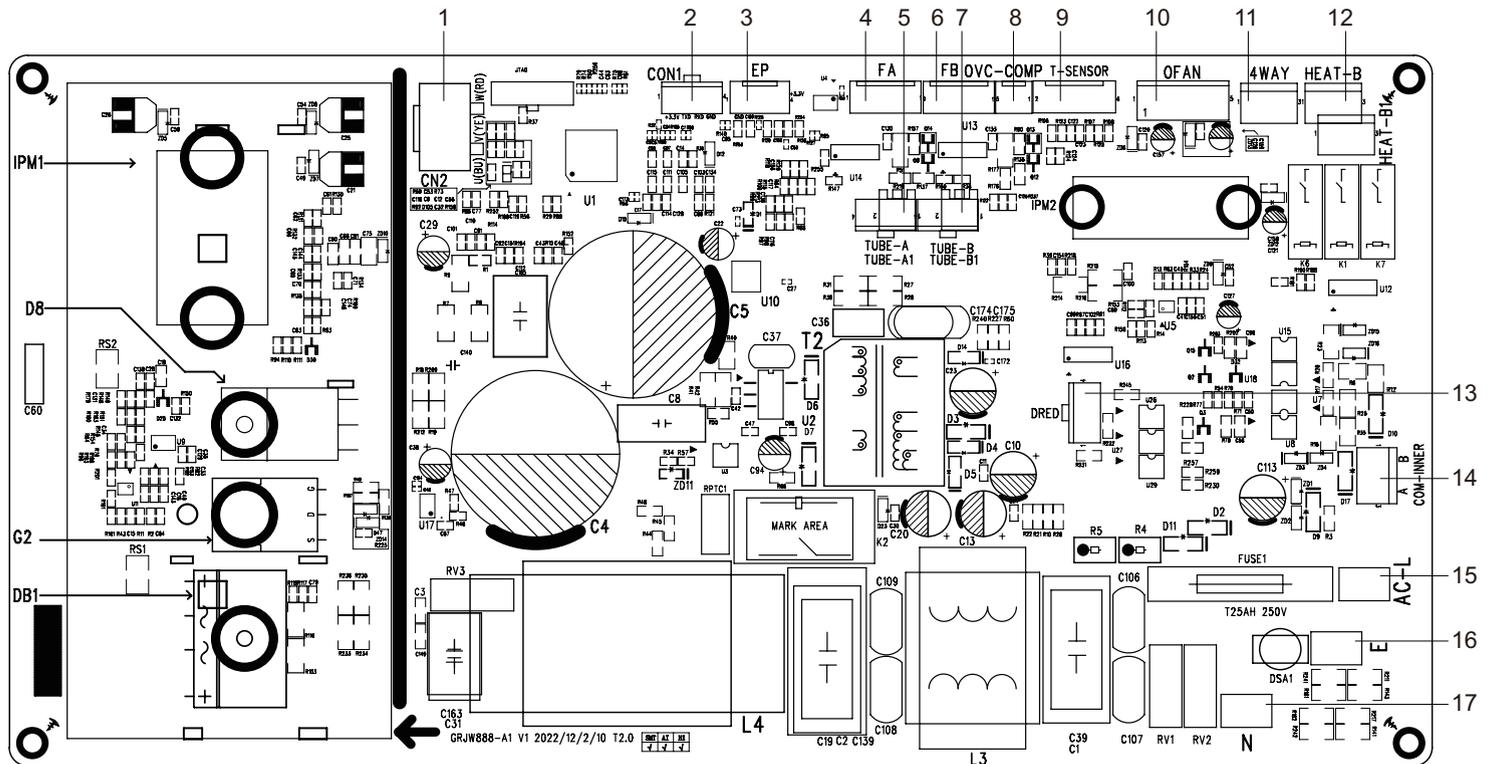


These wiring diagrams are subject to change without notice; please refer to the one supplied with the unit.

# 5. Electrical Part

## 5.2 PCB Printed Diagram

GWHD(18)NK6PO

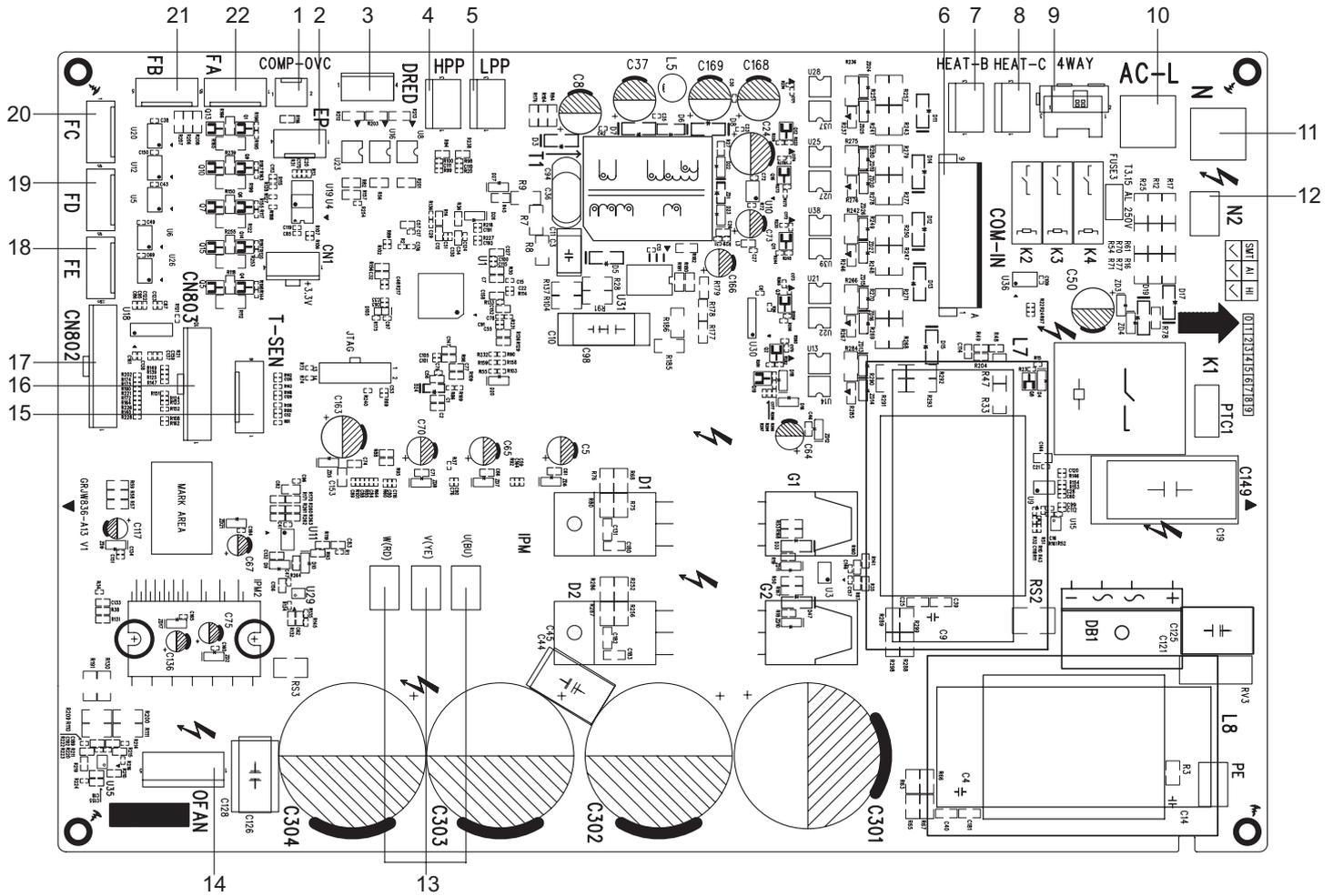


No.	Name	No.	Name
1	Compressor Needle Stand	10	Outdoor Fan Needle Stand
2	Computer Monitor Needle Stand	11	Four-way Valve Needle Stand
3	EEP Flash Drive Needle Stand	12	Chassis Electric Heating Belt Needle Stand
4	Electronic Expansion Valve Needle Stand A	13	DRED Needle Stand
5	Gas-Liquid Valve Temperature Sensor Needle Stand A	14	Communication Wire Insertion
6	Electronic Expansion Valve Needle Stand B	15	Live Wire Insertion
7	Gas-Liquid Valve Temperature Sensor Needle Stand B	16	Earthing Wire Insertion
8	Compressor Overload Needle Stand	17	Neutral Wire Insertion
9	Temperature Sensor Needle Stand		



# 5. Electrical Part

GWHD(36)NK6PO GWHD(42)NK6PO



No.	Name	No.	Name
1	Compressor Overload Needle Stand	12	Communication Neutral Wire Insertion
2	EEP Flash Drive Needle Stand	13	Compressor Needle Stand
3	DRED Needle Stand	14	Outdoor Fan Needle Stand
4	High Pressure Protection Needle Stand	15	Temperature Sensor Needle Stand
5	Low Pressure Protection Needle Stand	16	Liquid Valve Temperature Sensor Needle Stand
6	Communication Wire Insertion	17	Gas Valve Temperature Sensor Needle Stand
7	Chassis Electric Heating Belt Needle Stand	18	Electronic Expansion Valve Needle Stand E
8	Compressor Electric Heating Needle Stand	19	Electronic Expansion Valve Needle Stand D
9	Four-way Valve Needle Stand	20	Electronic Expansion Valve Needle Stand C
10	Live Wire Insertion	21	Electronic Expansion Valve Needle Stand B
11	Neutral Wire Insertion	22	Electronic Expansion Valve Needle Stand A

# 6. Function and Control

## 1 Basic functions of the system

### 1.1 Cooling Mode

#### 1.1.1 Cooling conditions and process:

If the compressor is in stop status and start the unit for cooling operation, when one of the indoor units reaches the cooling operation condition, the unit start cooling operation; in this case, the electronic expansion valve, the outdoor fan and the compressor start operation.

#### 1.1.2 Stop in cooling operation

##### 1.1.2.1 Compressor stops

The compressor stops immediately, the outdoor fan stops after 1min.

##### 1.1.2.2 Some of the indoor units reach the stop condition (the compressor does not stop)

The compressor operates immediately according to the required frequency. For the indoor unit with no requirement, the corresponding electronic expansion valve is closed to OP.

##### 1.1.3 Cooling mode transfers to heating mode

When the unit transfers to heating mode, the 4-way valve is energized after the compressor stops for 2min. The other disposals are the same as stopping in cooling mode.

##### 1.1.4 4-way valve: in this mode, the 4-way valve is closed.

##### 1.1.5 Outdoor fan control in cooling mode

The outdoor fan starts before 5s of the starting of compressor. The outdoor fan will run in high speed for 3min after starting and then it will run in set speed. The fan shall run at every speed for at least 80s. (When the quantity of running indoor unit is changed, the unit will enter the control described in 1.3.5.1 and 1.3.5.2);

When the compressor stops, the outdoor fan runs at present speed and stops after 1min.

### 1.2 Dry Mode

#### 1.2.1 The dry conditions and process are the same as those in cooling mode;

#### 1.2.2 The status of 4-way valve: closed;

#### 1.2.3 The temperature setting range: 16 ~ 30°C;

#### 1.2.4 Protection function: the same as those in cooling mode;

#### 1.2.5 In dry mode, the maximum value A of the capacity requirement percentage of single unit is 90% of that in cooling mode.

The open condition of the electronic expansion valve, outdoor fan and compressor is the same as those in cooling mode.

### 1.3 Heating Mode

#### 1.3.1 Heating conditions and process:

When one of the indoor units reaches the heating operation condition, the unit starts heating operation.

#### 1.3.2 Stop in heating operation:

##### 1.3.2.1 When all the indoor units reach the stop condition, the compressor stops and the outdoor fan stops after 1min;

##### 1.3.2.2 Some of the indoor units reach the stop condition

The compressor reduces the frequency immediately and operates according to the required frequency;

##### 1.3.2.3 Heating mode transfers to cooling mode(dry mode), fan mode

a. The compressor stops; b. the power of 4-way valve is cut off after 2min; c. the outdoor fan stops after 1min; d. the status of 4-way valve: energized;

#### 1.3.3 Outdoor fan control in heating mode

The outdoor fan starts before 5s of the starting of compressor and then it will run in high speed for 40s;

The fan shall run at every speed for at least 80s;

When the compressor stops, the outdoor fan stops after 1min.

#### 1.3.4 Defrosting function

When the defrosting condition is met, the compressor stops; the electronic expansion valve of all indoor units open in big angle; the outdoor fan stops after 40s of the stop of compressor, meanwhile, the 4-way valve reverses the direction; after the 4-way valve reverses the direction, the compressor starts; then begin to calculate the time of defrosting, the frequency of the compressor rises to reach the defrosting frequency.

#### 1.3.5 Oil-returned control in heating mode

##### 1.3.5.1 Oil-returned condition

The whole unit is operating in low frequency for a long time.

##### 1.3.5.2 Oil-returned process in heating mode

The indoor unit displays "H1".

##### 1.3.5.3 Oil-returned finished condition in heating mode

The duration reaches 5min.

### 1.4 Fan Mode

The compressor, the outdoor fan and the 4-way valve are closed; temperature setting range is 16 ~ 30°C.

## 2 Protection Function

### 2.1 Mode Conflict Protection of indoor unit

When the setting mode is different of different indoor unit, the unit runs in below status:

a. The mode of the first operating indoor unit is the basic mode, then compare the mode of the other indoor units to see if there is a conflict. Cooling mode (dry mode) is in conflict with heating

# 6. Function and Control

mode.

b. Fan mode is in conflict with heating mode and the heating mode is the basic mode. No matter which indoor unit operates first, the unit will run in heating mode.

## 2.2 Overload protection function

When the tube temperature is a little low, the compressor raises the operation frequency; when the tube temperature is a little high, the compressor frequency is restricted or lows down the operation frequency; when the tube temperature is too high, the compressor protection stops running.

If the discharge temperature protection continuously appears for 6 times, the compressor can't resume running. The compressor can resume running after cutting off the power and then putting through the power. (if the running time of the compressor is longer than 7min, the protection times record will be cleared)

## 2.3 Discharge Protection Function

When the discharge temperature is a little low, the compressor raises the operation frequency; when the discharge temperature is a little high, the compressor frequency is restricted or lows down the operation frequency; when the discharge temperature is too high, the compressor protection stops running.

If the discharge temperature protection continuously appears for 6 times, the compressor can't resume running. The compressor can resume running after cutting off the power and then putting through the power. (if the running time of the compressor is longer than 7min, the protection times record will be cleared.)

## 2.4 Communication malfunction

Detection of the quantity of installed indoor units:

After 3min of energizing, if the outdoor unit does not receive the communication data of certain indoor unit, the outdoor unit will judge that indoor unit is not installed and will treat it as it is not installed. If the outdoor unit receives the communication data of that indoor unit later, the outdoor unit will treat that unit as it is installed.

## 2.5 Overcurrent Protection

a. Overcurrent protection of complete unit; b. phase wire current protection; c. compressor phase current protection

## 2.6 Compressor high-pressure protection

2.6.1 When the high-pressure switch is detected cut off for 3s continuously, the compressor will enter high-pressure protection as it stops when reaching set temperature. Meanwhile, the outdoor unit will send the signal of "high-pressure protection" to the indoor units;

2.6.2 After the appearance of high-pressure protection, when the high-pressure switch is detected closed for 6s continuously, the compressor can resume running only after cutting off the power

and then putting through the power.

## 2.7 Compressor overload protection

If the compressor overload switch is detected having movement, the indoor unit will display the corresponding malfunction as it stops when the indoor temperature reaching set temperature. When the compressor stops for more than 3min and the compressor overload switch is reset, the unit will resume operation status automatically. If the protection appears for more than 6 times (if the running time of the compressor is longer than 30min, the protection times record will be cleared), the unit can not resume operation status automatically, but can resume running only after cutting off the power and then putting through the power.

## 2.8 Compressor Phase-lacking Protection

When the compressor starts, if one of the three phases is detected open, the compressor will enter phase-lacking protection. The malfunction will be cleared after 1min, the unit will restart and then detect if there is still has phase-lacking protection. If the phase-lacking protection is detected for 6 times continuously, the compressor will not restart but can resume running only after cutting off the power and then putting through the power. If the running time of the compressor is longer than 7min, the protection times record will be cleared.

## 2.9 IPM Protection

2.9.1 When the IPM module protection is detected, the unit will stop as the indoor temperature reaching set temperature, PFC is closed, display IPM protection malfunction. After the compressor stops for 3min, the unit will resume operation status automatically; if the IPM protection is detected for more than 6 times continuously (If the running time of the compressor is longer than 7min, the protection times record will be cleared), the system will stop and send the signal of module protection to indoor unit. The unit can not resume operation status automatically, but can resume running only after cutting off the power and then putting through the power.

2.9.2 IPM module overheating protection

2.9.2.1 When  $TIPM > 85^{\circ}\text{C}$ , prohibit to raise frequency;

2.9.2.2 When  $TIPM \geq 90^{\circ}\text{C}$ , the operation frequency of compressor lows down by 15% every 90s according to the present capacity requirement of the complete unit. It will keep 90s after lowing down the frequency. After lowing down the frequency, if  $TIPM \geq 90^{\circ}\text{C}$ , the unit will circulate the above movement until reaching the minimum frequency; if  $85^{\circ}\text{C} < TIPM < 90^{\circ}\text{C}$ , the unit will run at this frequency; when  $TIPM = 85^{\circ}\text{C}$ , the unit will run at the frequency according to the capacity requirement;

2.9.2.3 When  $TIPM \geq 95^{\circ}\text{C}$ , the compressor stops. After the compressor stops for 3min, if  $TIPM < 85^{\circ}\text{C}$ , the compressor and the outdoor fan will resume operation.

# 7. Notes for Installation and Maintenance

## Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.

The following contents are very important for installation and maintenance.

Please follow the instructions below.

- The installation or maintenance must accord with the instructions.
- Comply with all national electrical codes and local electrical codes.
- Pay attention to the warnings and cautions in this manual.
- All installation and maintenance shall be performed by distributor or qualified person.
- All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.
- Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.

## WARNINGS

### Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.
2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.
3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.
4. Make sure each wiring terminal is connected firmly during installation and maintenance.
5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.
6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
8. The power cord and power connection wires can't be pressed by hard objects.
9. If power cord or connection wire is broken, it must be replaced by a qualified person.
10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire

by yourself.

11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.
12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.
13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.
14. Replace the fuse with a new one of the same specification if it is burnt down; Don't replace it with a cooper wire or conducting wire.
15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

### Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual. (See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Ware safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

### Refrigerant Safety Precautions:

1. When refrigerant leaks or requires discharge during installation, maintenance, or disassembly, it should be handled by certified professionals or otherwise in compliance with local laws and regulations.
2. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
3. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
4. Make sure no refrigerant gas is leaking out when installation is completed.
5. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.
6. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

Improper installation may lead to fire hazard, explosion, electric shock or injury.

# 7. Notes for Installation and Maintenance

## Safety Precautions for Installing and Relocating the Unit:

To ensure safety, please be mindful of the following precautions.

### WARNINGS

**1. When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.**

Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.

**2. When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.**

Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.

**3. When refrigerant needs to be recovered during relocating or repairing the unit, be sure that the unit is running in cooling mode. Then, fully close the valve at high pressure side (liquid valve). About 30~40 seconds later, fully close the valve at low pressure side (gas valve), immediately stop the unit and disconnect power. Please note that the time for refrigerant recovery should not exceed 1 minute.**

If refrigerant recovery takes too much time, air may be sucked in and cause pressure rise or compressor rupture, resulting in injury.

**4. During refrigerant recovery, make sure that liquid valve and gas valve are fully closed and power is disconnected before detaching the connection pipe.**

If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.

**5. When installing the unit, make sure that connection pipe is securely connected before the compressor starts running.**

If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.

**6. Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.**

If there leaked gas around the unit, it may cause explosion and other accidents.

**7. Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.**

Poor connections may lead to electric shock or fire.

**8. Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.**

Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.

# 7. Notes for Installation and Maintenance

## Safety Precautions for Refrigerant

• To realize the function of the air conditioner unit, a special refrigerant circulates in the system. The used refrigerant is the fluoride R32, which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can lead to explosion under certain conditions. But the flammability of the refrigerant is very low. It can be ignited only by fire.

• Compared to common refrigerants, R32 is a nonpolluting refrigerant with no harm to the ozoneosphere. The influence upon the greenhouse effect is also lower. R32 has got very good thermodynamic features which lead to a really high energy efficiency. The units therefore need a less filling.

### WARNING:

• Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

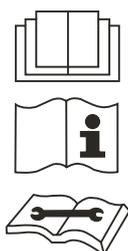
Should repair be necessary, contact your nearest authorized Service Centre. Any repairs carried out by unqualified personnel may be dangerous. The appliance shall be stored in a room without continuously operating ignition sources. (For example: open flames, an operating gas appliance or an operating electric heater.)

• Do not pierce or burn.

• Appliance shall be installed, operated and stored in a room with a floor area larger than  $Xm^2$ .

• Appliance filled with flammable gas R32. For repairs, strictly follow manufacturers instructions only. Be aware that refrigerants not contain odour.

• Read specialists manual.



## Safety Operation of Flammable Refrigerant

### Qualification requirement for installation and maintenance man

• All the work men who are engaging in the refrigeration system should bear the valid certification awarded by the authoritative organization and the qualification for dealing with the refrigeration system recognized by this industry. If it needs other technician to maintain and repair the appliance, they should be supervised by the person who bears the qualification for using the flammable refrigerant.

• It can only be repaired by the method suggested by the equipments manufacturer.

### Installation notes

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

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

• The air conditioner must be installed in a room that is larger than the minimum room area.

The minimum room area is shown on the nameplate or following table a.

• Leak test is a must after installation.

table a - Minimum room area (  $m^2$  )

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

### Maintenance notes

• Check whether the maintenance area or the room area meet the requirement of the nameplate.

— Its only allowed to be operated in the rooms that meet the requirement of the nameplate.

• Check whether the maintenance area is well-ventilated.

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

• Check whether there is fire source or potential fire source in the maintenance area.

— The naked flame is prohibited in the maintenance area; and the “no smoking” warning board should be hanged.

# 7. Notes for Installation and Maintenance

- Check whether the appliance mark is in good condition.
- Replace the vague or damaged warning mark.

## Welding

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

- a. Shut down the unit and cut power supply
  - b. Eliminate the refrigerant
  - c. Vacuuming
  - d. Clean it with N<sub>2</sub> gas
  - e. Cutting or welding
  - f. Carry back to the service spot for welding
- Make sure that there isn't any naked flame near the outlet of the vacuum pump and its well-ventilated.
  - The refrigerant should be recycled into the specialized storage tank.

## Filling the refrigerant

- Use the refrigerant filling appliances specialized for R32. Make sure that different kinds of refrigerant won't contaminate with each other.
- The refrigerant tank should be kept upright at the time of filling refrigerant.
- Stick the label on the system after filling is finished (or haven't finished).
- Don't overfilling.
- After filling is finished, please do the leakage detection before test running; another time of leak detection should be done when its removed.

## Safety instructions for transportation and storage

- Please use the flammable gas detector to check before unload and open the container.
- No fire source and smoking.
- According to the local rules and laws.

## Specialist's manual

• The following checks shall be applied to installations using flammable refrigerants:

- the charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;

– if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

– marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

– refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

• Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

• Initial safety checks shall include:

– that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

– that no live electrical components and wiring are exposed while charging, recovering or purging the system;

– that there is continuity of earth bonding.

• Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, DD.4.3 to DD.4.7 shall be completed prior to conducting work on the system.

• Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

• General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

• Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure

# 7. Notes for Installation and Maintenance

that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

## ● Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO<sub>2</sub> fire extinguisher adjacent to the charging area.

## ● Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

## ● Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:

- the actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

## ● Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the

circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

## ● No ignition sources

No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space.

Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

## ● Repairs to sealed components

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

- Ensure that the apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

● **NOTE:** The use of silicon sealant can inhibit the

# 7. Notes for Installation and Maintenance

effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

## • Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

## • Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

## • Leak detection methods

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

## • Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant

and corrode the copper pipe-work.

NOTE: Examples of leak detection fluids are

- bubble method,
- fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/ extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to clause DD.9.

## • Removal and evacuation

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:

- remove refrigerant;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- purge with inert gas (optional for A2L);
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants other than A2L refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, other than A2L refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

## • Charging procedures

# 7. Notes for Installation and Maintenance

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

## • Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- a) Become familiar with the equipment and its operation.
- b) Isolate system electrically.
- c) Before attempting the procedure, ensure that:
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with manufacturer's instructions.

h) Do not overfill cylinders. (No more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

## • Labelling

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

## • Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult

# 7. Notes for Installation and Maintenance

manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only

electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

## • General

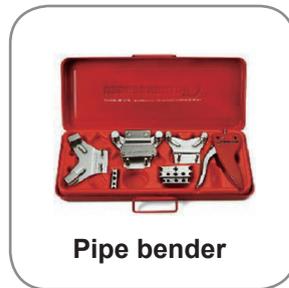
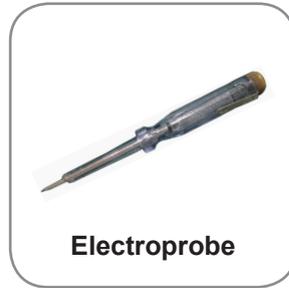
That the installation of pipe-work shall be kept to a minimum.

That compliance with national gas regulations shall be observed.

That mechanical connections made in accordance with 22.118 shall be accessible for maintenance purposes.

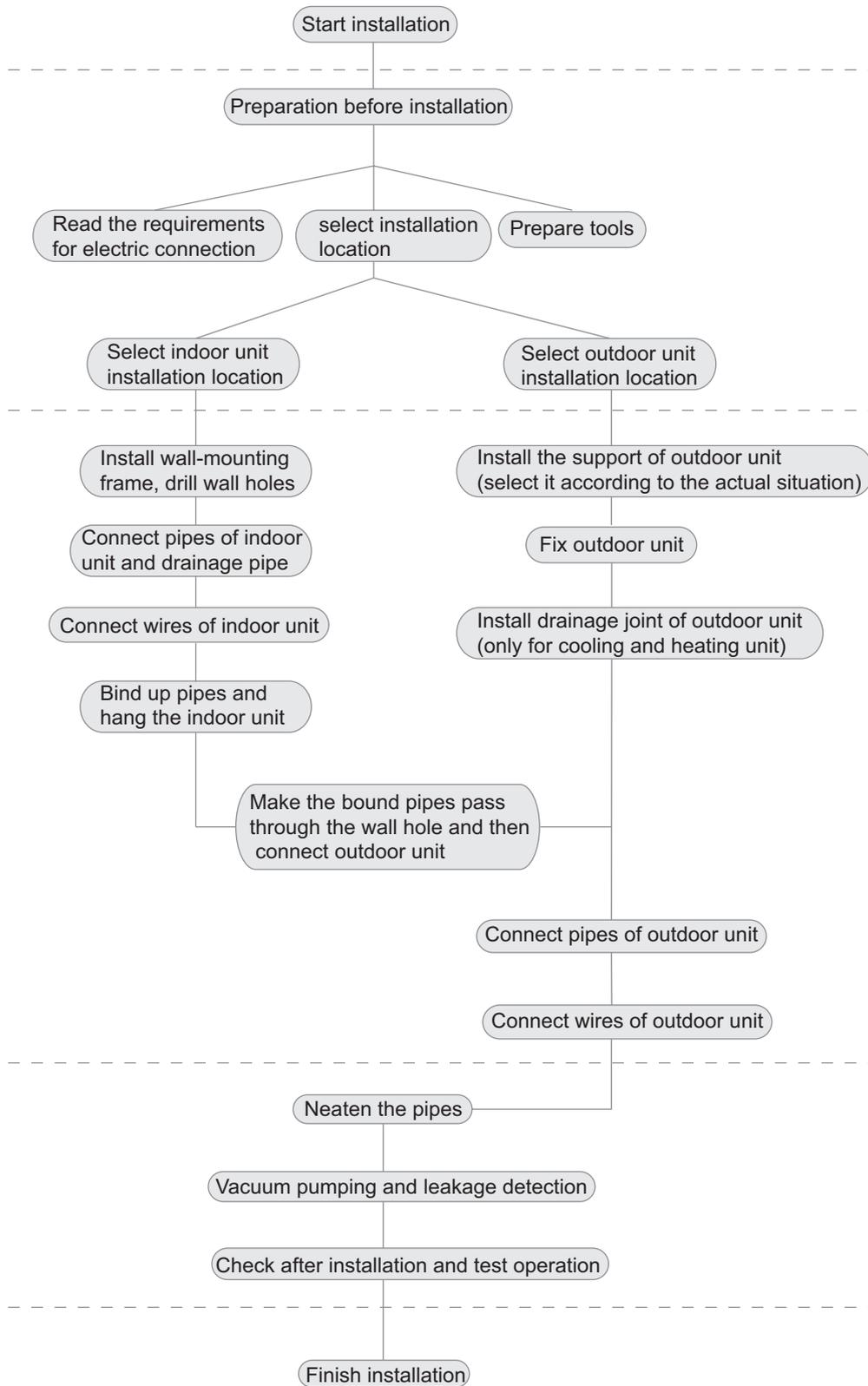
# 7. Notes for Installation and Maintenance

## Main Tools for Installation and Maintenance



# 8. Installation

## Installation Procedures



Note: this flow is only for reference; please find the more detailed installation steps in this section.

# 8. Installation

## 8.1 Electrical Connections

1. Remove the handle at the right side plate of the outdoor unit (one screw).
2. Remove the cable clamp, connect the power connection cable with the terminal at the row of connection and fix the connection. The fitting line distributing must be consistent with the indoor unit terminal of line bank. Wiring should meet that of indoor unit.
3. Fix power connection wire by wire clamp.
4. Ensure wire has been fixed well.
5. Install the handle.

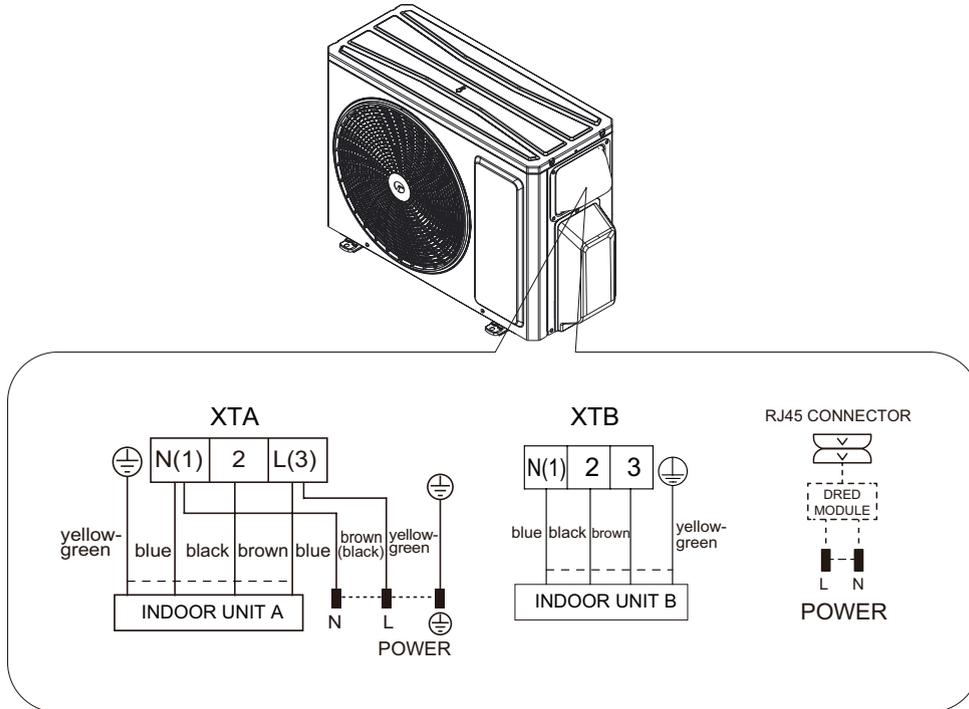
△ Including an air switch with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only for protect the circuit)

Air-conditioner	Air switch capacity
GWHD(18)NK6PO	16A
GWHD(24)NK6PO GWHD(28)NK6PO	25A
GWHD(36)NK6PO GWHD(42)NK6PO	32A

- △ An all-pole disconnection switch having a contact separation of at least 3mm in all pole should be connected in fixed wiring.
- △ Wrong wire connection may cause malfunction of some electric components. After fixing cable, ensure that leads between connection to fixed point have some space.
- △ For 18K, the connection pipes and the connecting wirings of the unit A, unit B must be corresponding to each other respective.
- △ For 24K, the connection pipes and the connecting wirings of the unit A, unit B, unit C must be corresponding to each other respective.
- △ For 28K/36K, the connection pipes and the connecting wirings of the unit A, unit B, unit C, unit D must be corresponding to each other respective.
- △ For 42K, the connection pipes and the connecting wirings of the unit A, unit B, unit C, unit D, unit E must be corresponding to each other respective.
- △ The appliance shall be installed in accordance with national wiring regulations.

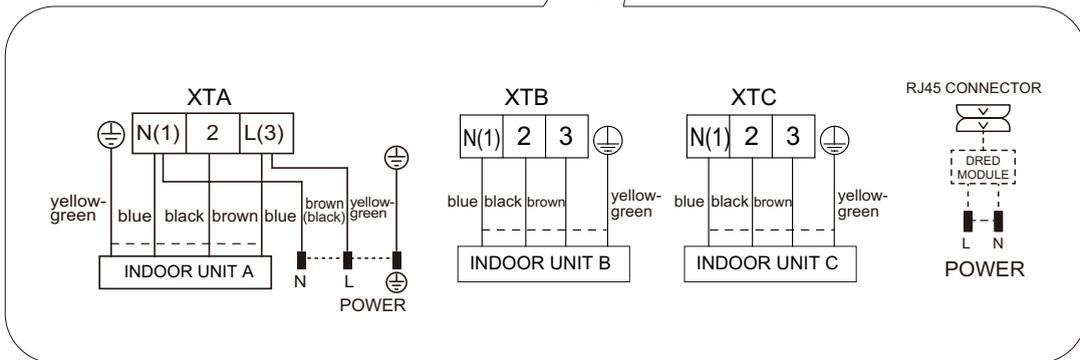
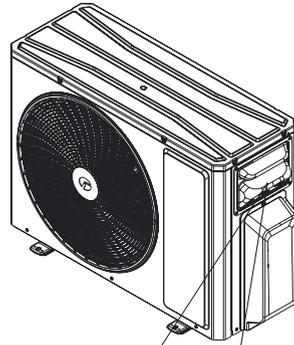
Note: the above figures are only intended to be a simple diagram of the appliance and may not correspond to the appearance of the units that have been purchased.

18K

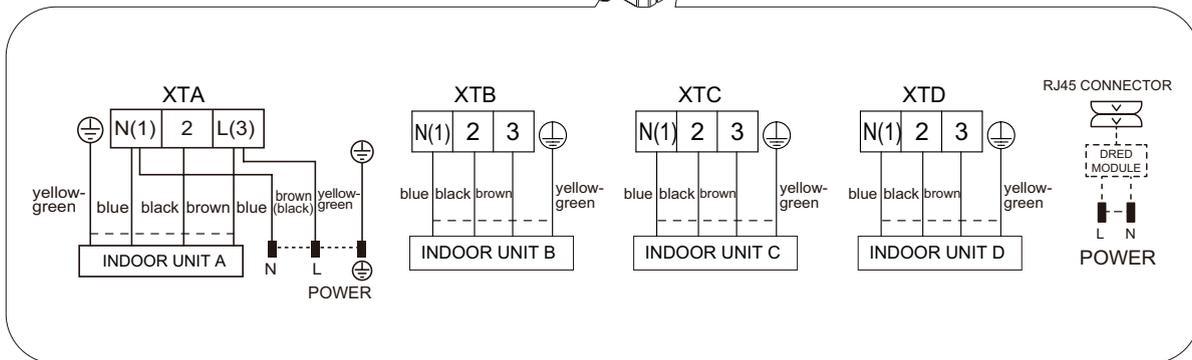
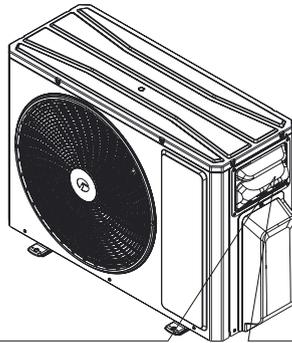


# 8. Installation

24K

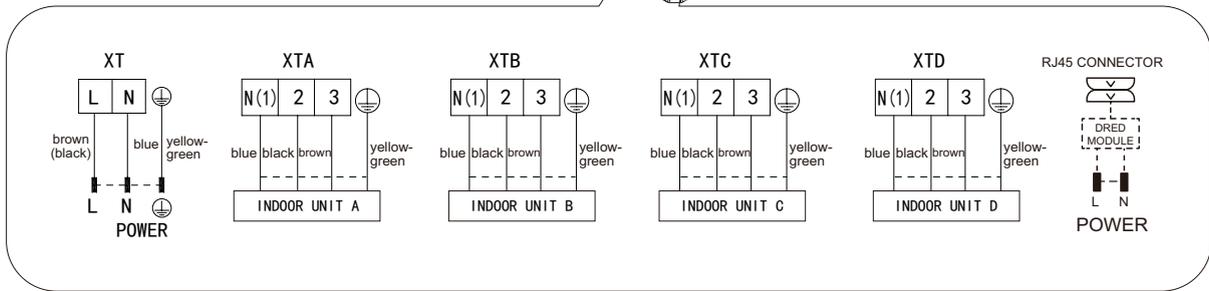
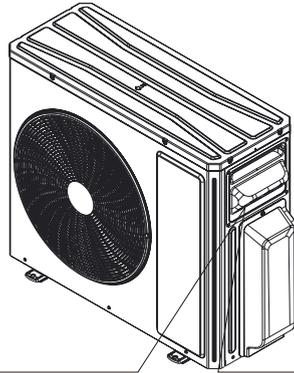


28K

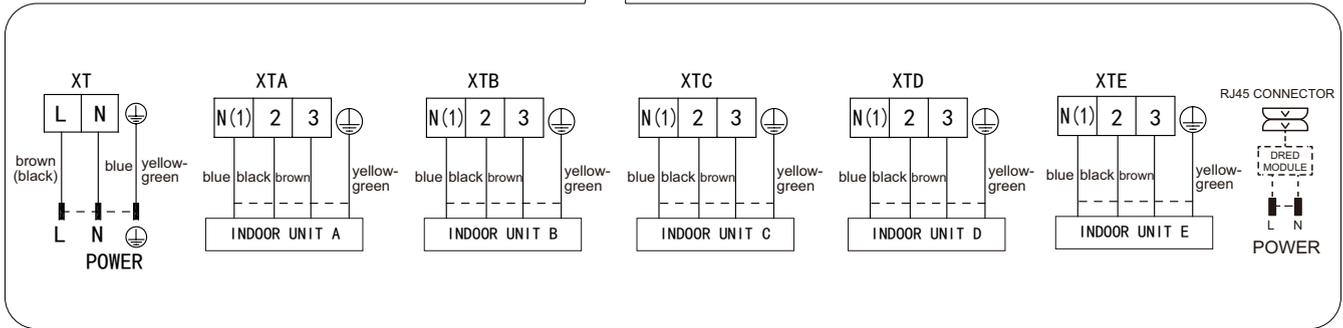
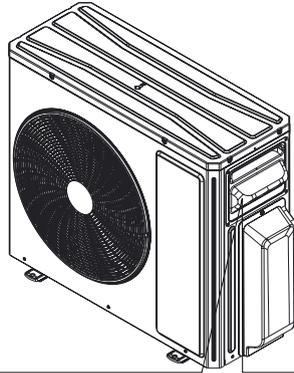


# 8. Installation

36K



42K



# 8. Installation

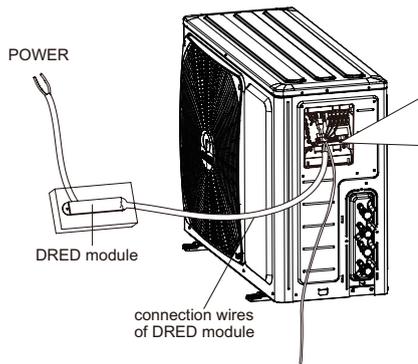
## 8.2 Installation connection wires of DRED module

• For the connection wire and power cord of DRED module, it's suggested to use rubber cord that is pursuant to IEC 57 of IEC 60245. If the power cord and connection wire use H05VV-F or other conducting wires that are unsuitable for outdoors, we suggest user should install the power cord and connection wire in wire-leading ducts that are separated from rain and violet ray.

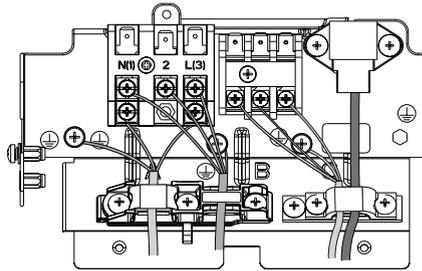
• DRED module should be installed indoors or inside an enclosed space that can prevent rain and violet ray.

• The connection wires for DRED module, indoor unit and outdoor unit should use the same wire clamp. Other clamp wires are used for power cord and connection wires of other indoor unit and outdoor unit. (as picture shows).

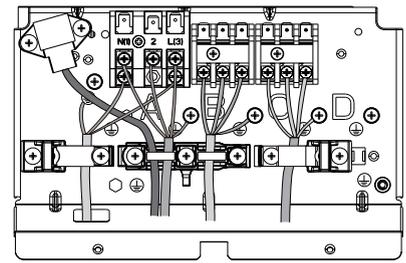
NOTE: Below picture is for reference. Please refer to actual products.



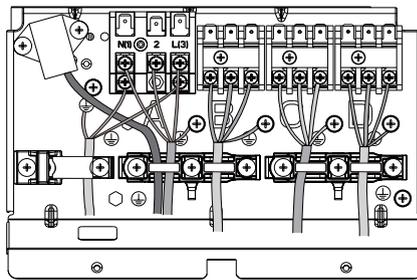
GWHD(18)NK6PO



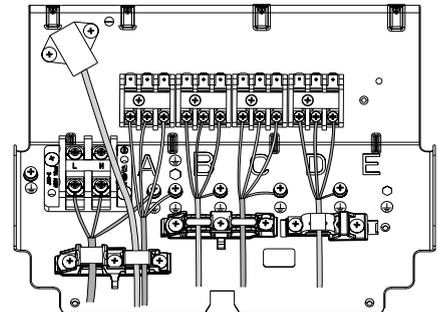
GWHD(24)NK6PO



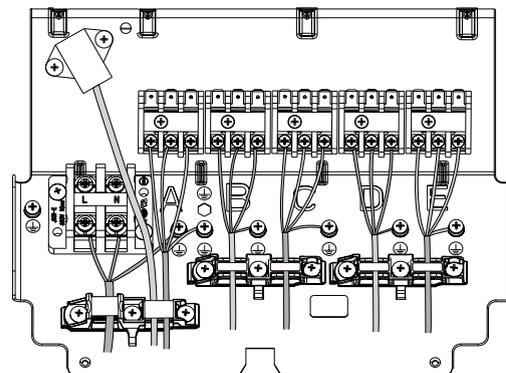
GWHD(28)NK6PO



GWHD(36)NK6PO



GWHD(42)NK6PO



NOTE:  
The above figures are only intended to a simple diagram of the appliance and may not correspond to the appearance of the units that have been purchased.

# 8. Installation

## 8.3 Installing the Outdoor Unit

▲ Use bolts to secure the unit to a flat, solid floor.

When mounting the unit on a wall or the roof, make sure the support is firmly secured so that it cannot move in the event of intense vibrations or a strong wind.

▲ Do not install the outdoor unit in pits or air vents.

### Installing the pipes

▲ Use suitable connecting pipes and equipment for the refrigerant R32.

Models(m)	18Kx2	24Kx3	28Kx4	36Kx4	42Kx5
Max. connection pipe length	50	60	70	80	100
Max. connection pipe length (Simple one indoor unit)	30	30	30	30	30

The sum of the capacity codes of the indoor units should be among 50%-150% of that of the outdoor unit.

▲ The refrigerant pipes must not exceed the maximum heights 15m (18K~28K) or 25m (36K~42K).

▲ Wrap all the refrigerant pipes and joints.

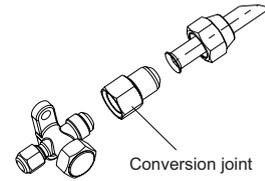
▲ Tighten the connections using two wrenches working in opposite directions.

Humid air left inside the refrigerant circuit can cause compressor malfunction. After having connected the indoor and outdoor units, bleed the air and humidity from the refrigerant circuit using a vacuum pump.

- (1) Unscrew and remove the caps from the 2-way and 3-way valves.
- (2) Unscrew and remove the cap from the service valve.
- (3) Connect the vacuum pump hose to the service valve.
- (4) Operate the vacuum pump for 10-15 minutes until an absolute vacuum of 10 mm Hg has been reached.
- (5) With the vacuum pump still in operation, close the low-pressure knob on the vacuum pump coupling. Stop the vacuum pump.
- (6) Open the 2-way valve by 1/4" turn and then close it after 10 seconds. Check all the joints for leaks using liquid soap or an electronic leak device.
- (7) Turn the body of the 2-way and 3-way valves. Disconnect the vacuum pump hose.
- (8) Replace and tighten all the caps on the valves.

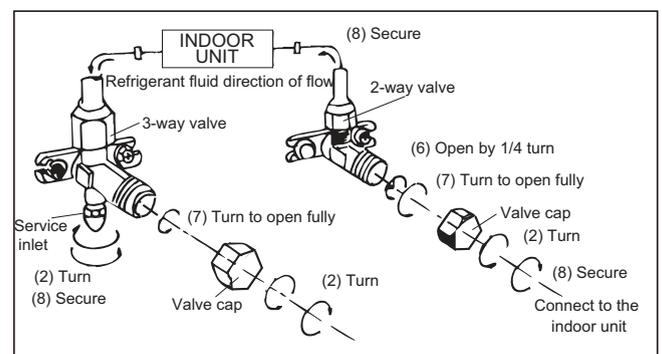
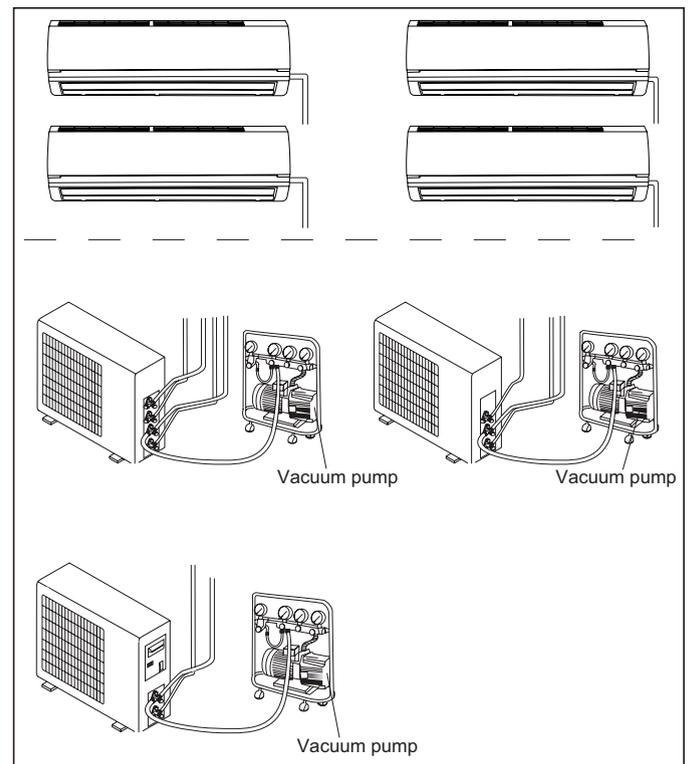
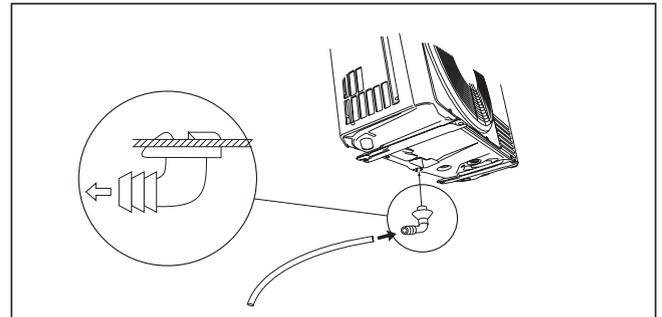
Piping size (inch)	Twisting moment (N·m)
Φ1/4	15-20
Φ3/8	35-40
Φ1/2	60-65
Φ5/8	45-50
Φ3/4	70-75

(9) If the specification of the outdoor unit's valve is unsuitable for the specification of the indoor unit, a conversion joint is needed to match the outdoor unit's valve and connection pipe, as shown in following.



### Install the drain fitting and the drain hose (for model with heat pump only)

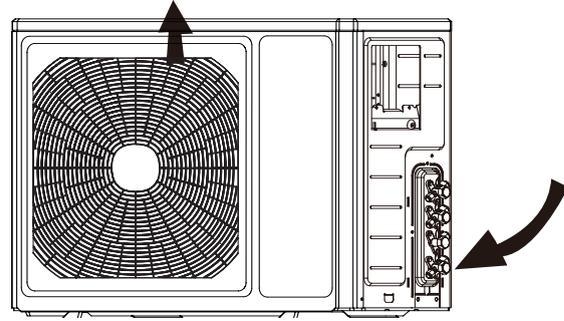
Condensation is produced and flows from the outdoor unit when the appliance is operating in the heating mode. In order not to disturb neighbours and to respect the environment, install a drain fitting and a drain hose to channel the condensate water. Install the drain fitting and rubber washer on the outdoor unit chassis and connect a drain hose to it as shown in the figure.



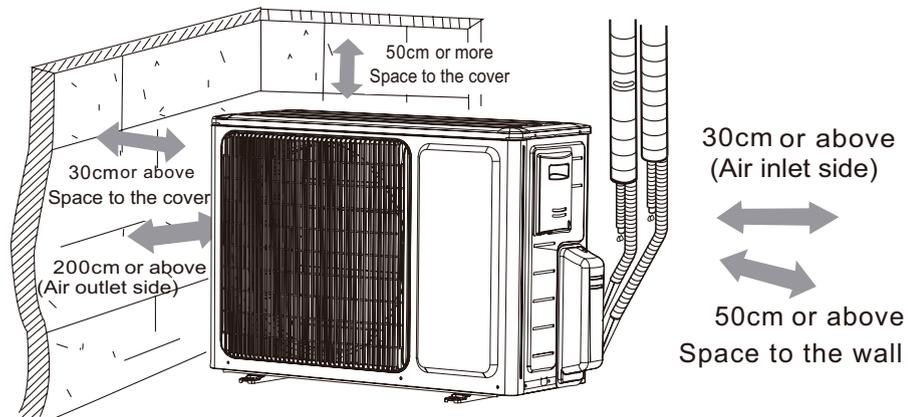
# 8. Installation

## 8.4 Installation Dimension Diagram

- ⚠ Use suitable instruments for the refrigerant R32.
- ⚠ Do not use any other refrigerant than R32.
- ⚠ Do not use mineral oils to clean the unit.



- ⚠ The installation must be done by trained and qualified service personnel with reliability according to this manual.
- ⚠ Contact service center before installation to avoid the malfunction due to unprofessional installation.
- ⚠ When picking up and moving the units, you must be guided by trained and qualified person.
- ⚠ Ensure that the recommended space is left around the appliance.



# 8. Installation

## 8.5 Check after Installation

Check Items	Problems Owing to Improper Installation
Is the installation reliable?	The unit may drop, vibrate or make noises
Has the gas leakage been checked?	May cause unsatisfactory cooling (heating) effect
Is the thermal insulation of the unit sufficient?	May cause condensation and water dropping
Is the drainage smooth?	May cause condensation and water dropping
Does the power supply voltage accord with the rated voltage specified on the nameplate?	The unit may bread down or the components may be burned out
Are the lines and pipelines correctly installed?	The unit may bread down or the components may be burned out
Has the unit been safely grounded?	Risk of electrical leakage
Are the models of lines in conformity with requirements?	The unit may bread down or the components may be burned out
Are there any obstacles near the air inlet and outlet of the indoor and outdoor units?	The unit may bread down or the components may be burned out
Have the length of refrigerating pipe and refrigerant charge amount been recorded?	It is not easy to decide the charge amount of refrigerant.

# 9. Maintenance

## 9.1 Precautions before Performing Inspection or Repair

There are high-capacity electrolytic capacitors on the outdoor mainboard. Thus, even the power is cut off, there is high voltage inside the capacitors and it needs more than 20min to reduce the voltage to safety value. Touching the electrolytic capacitor within 20min after cutting the power will cause electric shock. If maintenance is needed, follow the steps below to discharge electricity of electrolytic capacitor after power off.

(1) Open the top cover of outdoor unit and then remove the cover of electric box cover.

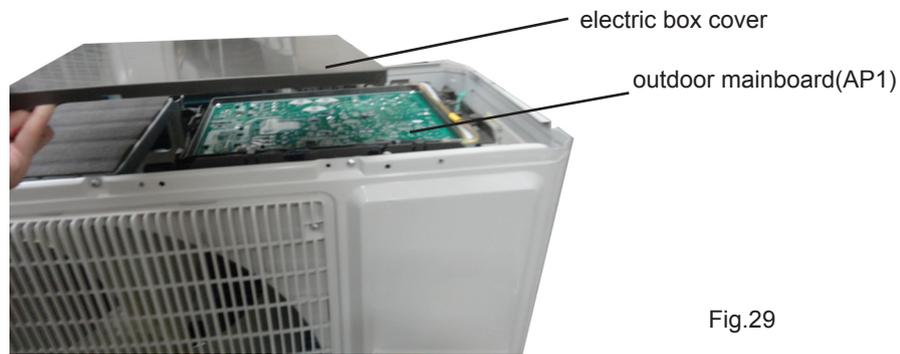


Fig.29

(2) As shown in the fig below, connect the plug of discharge resistance (about 100ohm, 20W) (if there is no discharge resistance, you can use the plug of soldering iron) to point A and B of electrolytic capacitor. There will be sparks when touching them. Press them forcibly for 30s to discharge electricity of electrolytic capacitor.

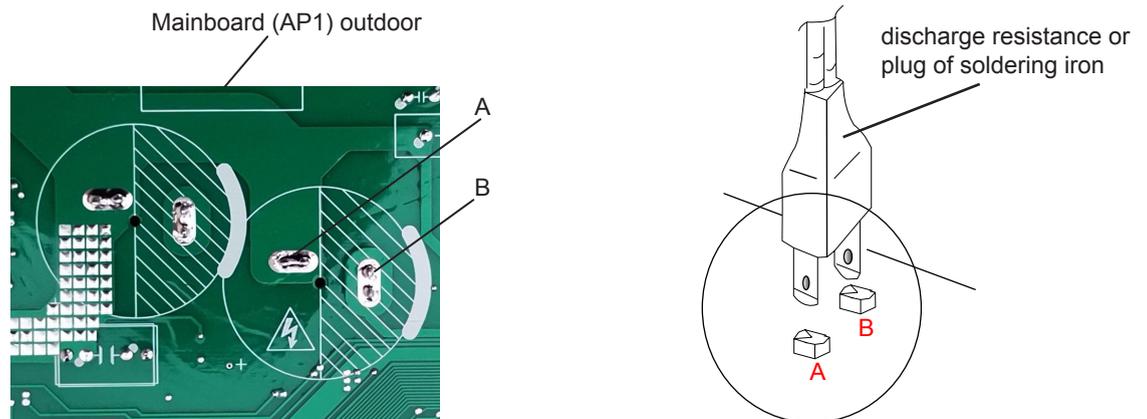


Fig.30

(3) After finish discharging electricity, measure the voltage between point A and B with universal meter to make sure if electricity discharging is completed, in order to prevent electric shock. If the voltage between the two points is below 20V, you can perform maintenance safely.

# 9. Maintenance

## 9.2 Flashing LED of Indoor/Outdoor Unit and Primary Judgement

### 1. Requirement of malfunction display

When several malfunctions happen at the same time, malfunction codes will be displayed circularly.

### 2. Malfunction display method

(1) Hardware malfunction: it will be displayed immediately, please refer to “Malfunction status sheet”;

(2) Operation status: it will be displayed immediately, please refer to “Malfunction status sheet”;

(3) Other malfunction: It will be displayed after the compressor has been stopped for 200s, please refer to “Malfunction status sheet”.

(Note: when the compressor starts up again, malfunction display waiting time (200s) will be cleared.)

### 3. Malfunction display control

Indoor unit displays malfunction code as shown in the sheet below. ODU communication light will be off for 1s and then blink for 1s circularly.

Malfunction status sheet		
Malfunction name	Malfunction type	Nixie tube
Zero cross detection circuit malfunction	Hardware malfunction	U8
Malfunction protection of jumper cap	Hardware malfunction	C5
Feedback of without IDU motor	Hardware malfunction	H6
Indoor ambient temperature sensor is open/short circuited	Hardware malfunction	F1
Indoor evaporator temperature sensor is open/short circuited	Hardware malfunction	F2
Liquid valve temperature sensor is open/short circuited	Hardware malfunction	b5
Gas valve temperature sensor is open/short circuited	Hardware malfunction	b7
Modular temperature sensor is open/short circuited	Hardware malfunction	P7
Outdoor ambient temperature sensor is open/short circuited	Hardware malfunction	F3
Outdoor condenser middle pipe temperature sensor is open/short circuited	Hardware malfunction	F4
Outdoor discharge temperature sensor is open/short circuited	Hardware malfunction	F5
Communication malfunction	Hardware malfunction	E6
Malfunction of phase current detection circuit for compressor	Hardware malfunction	U1
Compressor demagnetization protection	Viewing malfunction code through remote controller within 200s; displayed directly on nixietube after 200s	HE
Malfunction of voltage dropping for DC bus-bar		U3
Module high temperature protection		P8
Refrigerant lacking or blockage protection of system (not available for residential ODU)		F0
Charging malfunction of capacitor	Hardware malfunction	PU
High pressure protection of system	Hardware malfunction	E1
Low pressure protection of system (reserved)	Hardware malfunction	E3

# 9. Maintenance

Compressor overload protection	Viewing malfunction code through remote controller within 200s; displayed directly on nixietube after 200s	H3
Indoor unit and outdoor unit do not match	Hardware malfunction	LP
Malfunction of memory chip	Hardware malfunction	EE
Wrong connection of communication wire or malfunction of electronic expansion valve	Hardware malfunction	dn
Malfunction of complete units current detection	Hardware malfunction	U5
Malfunction protection of outdoor fan 1	Hardware malfunction	L3
Detection status of wrong connection of communication wire or malfunction of electronic expansion valve	Operation status	dd
Mode conflict	Operation status	E7
Refrigerant recycling mode	Operation status	Fo
X-fan	Operation status	AL
Defrosting or oil return in heating mode	Operation status	H1
Start failure of compressor	Viewing malfunction code through remote controller within 200s; displayed directly on nixietube after 200s	Lc
High discharge temperature protection of compressor		E4
Overload protection		E8
Whole unit overcurrent protection		E5
Compressor phase current protection		P5
Compressor desynchronizing		H7
Compressor phase-lacking/phase-inverse protection		Ld
IPM modular protection		H5
DC bus-bar low voltage protection		PL
DC bus-bar high voltage protection		PH
PFC protection		HC
The four-way valve is abnormal		U7

## 9.3 Malfunction Checking and Elimination

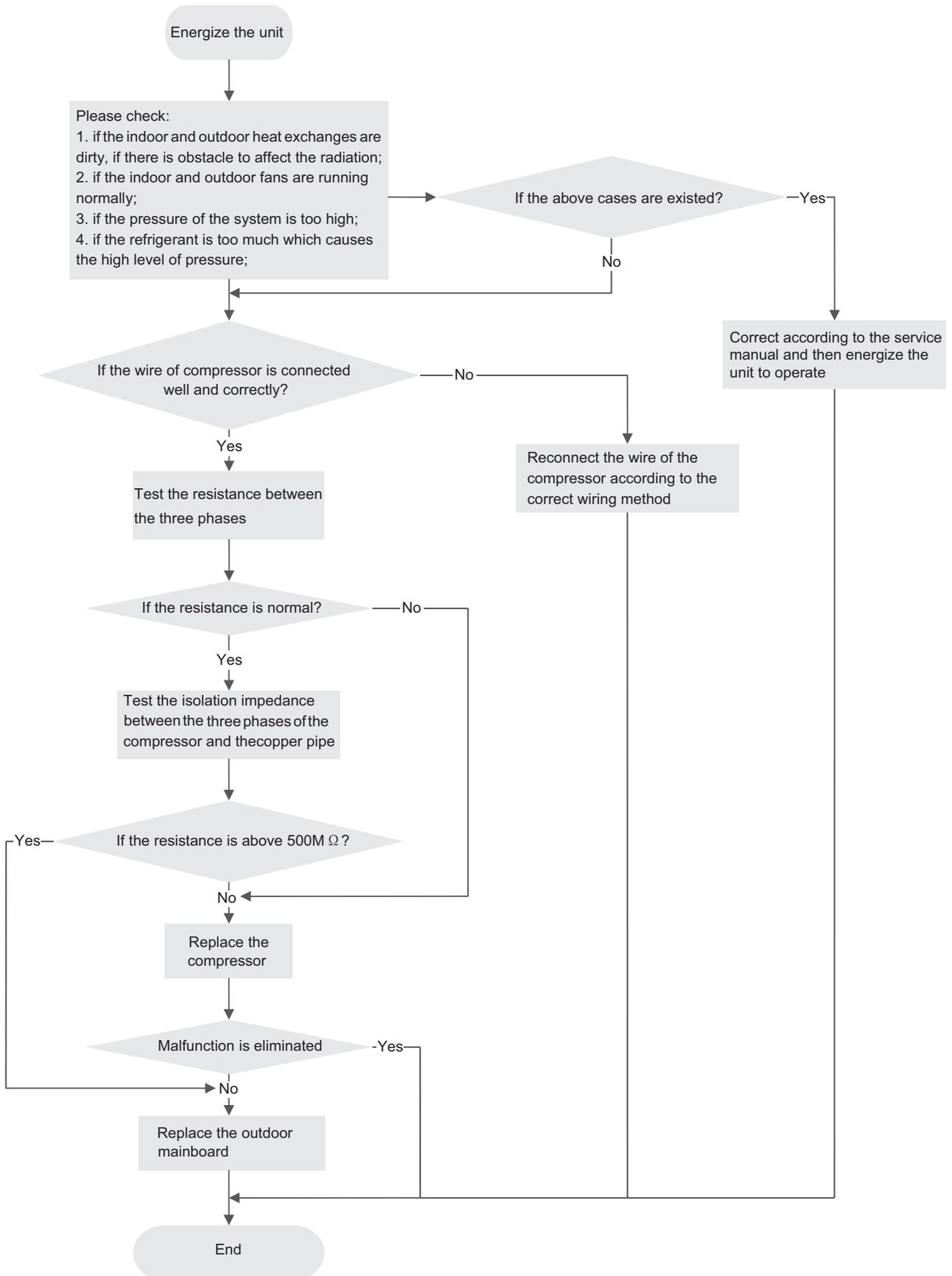
1 IPM protection malfunction:

Main checking point:

- If the input voltage of the unit is within normal range?
- If the connection wire of compressor is connected well? Is it loose? If the connection sequence is correct?
- If the resistance of compressor coil is normal? If the isolation of compressor coil with copper pipe is good?
- If the unit is overloaded? If the heat radiation of the unit is good?
- If the refrigerant charge is suitable?

Flow chart:

# 9. Maintenance



# 9. Maintenance

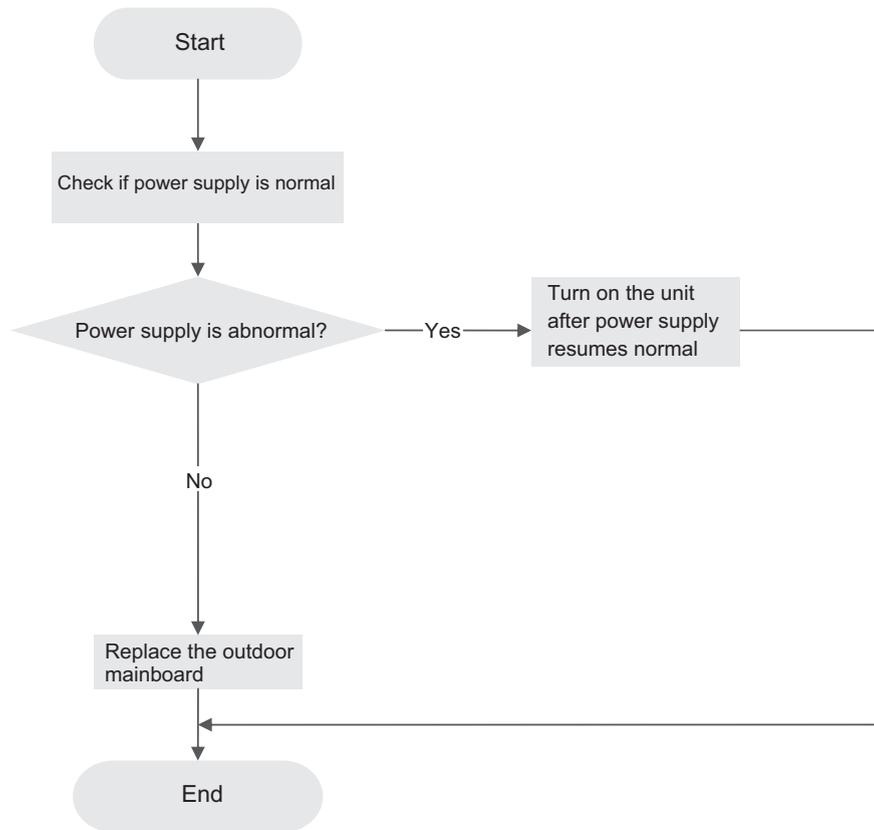
2. PFC protection malfunction, capacity charging malfunction

Main checking points:

- If the wiring of the induction is connected well and if the induction is broken;
- If the mainboard is broken;

Flow chart:

For some models



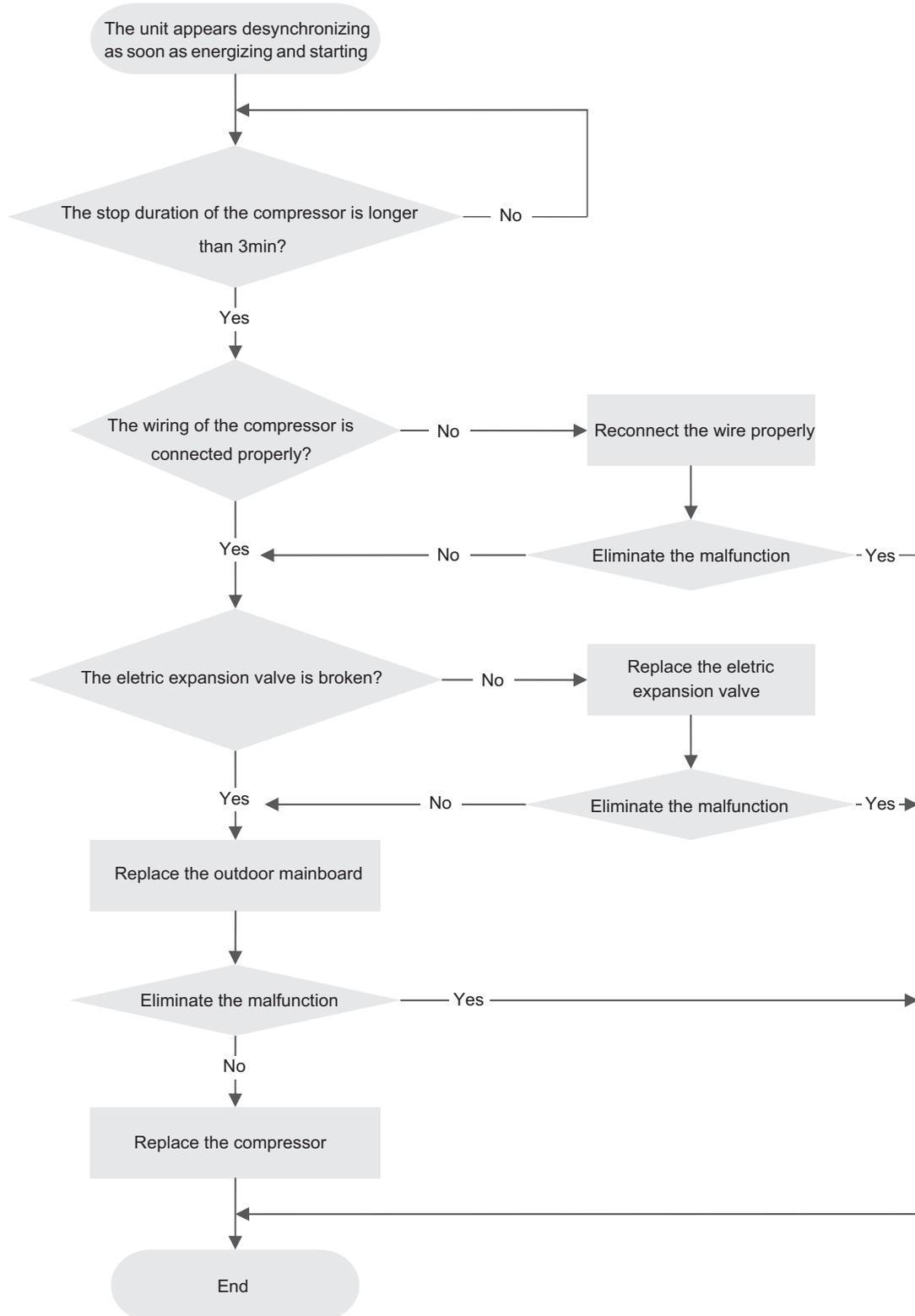
# 9. Maintenance

## 3. Compressor desynchronizing malfunction

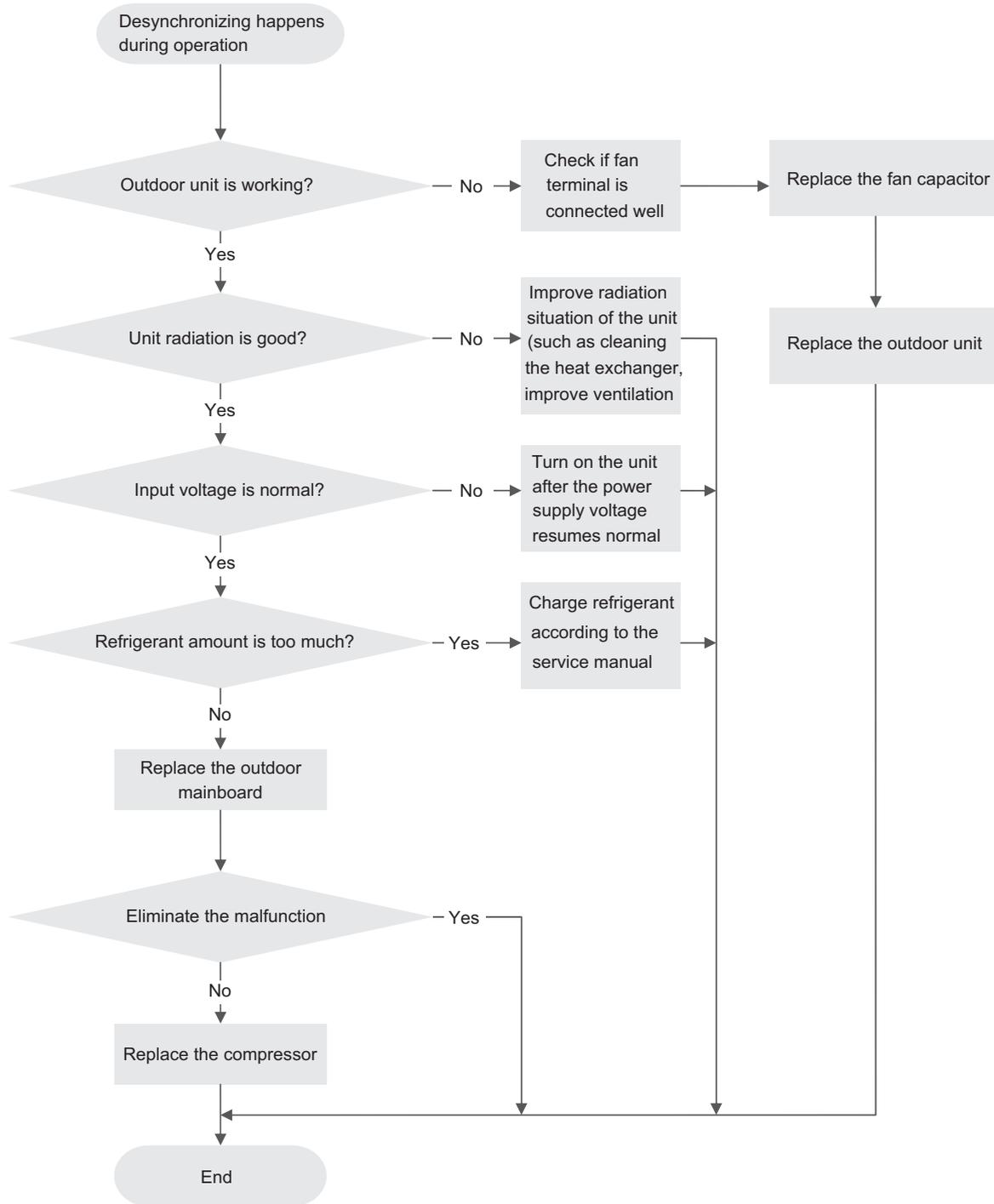
Main checking points:

- If the pressure of the system is too high;
- If the electric expansion valve is working normally or it is broken;
- If the radiation of the unit is good;

Flow chart:



# 9. Maintenance



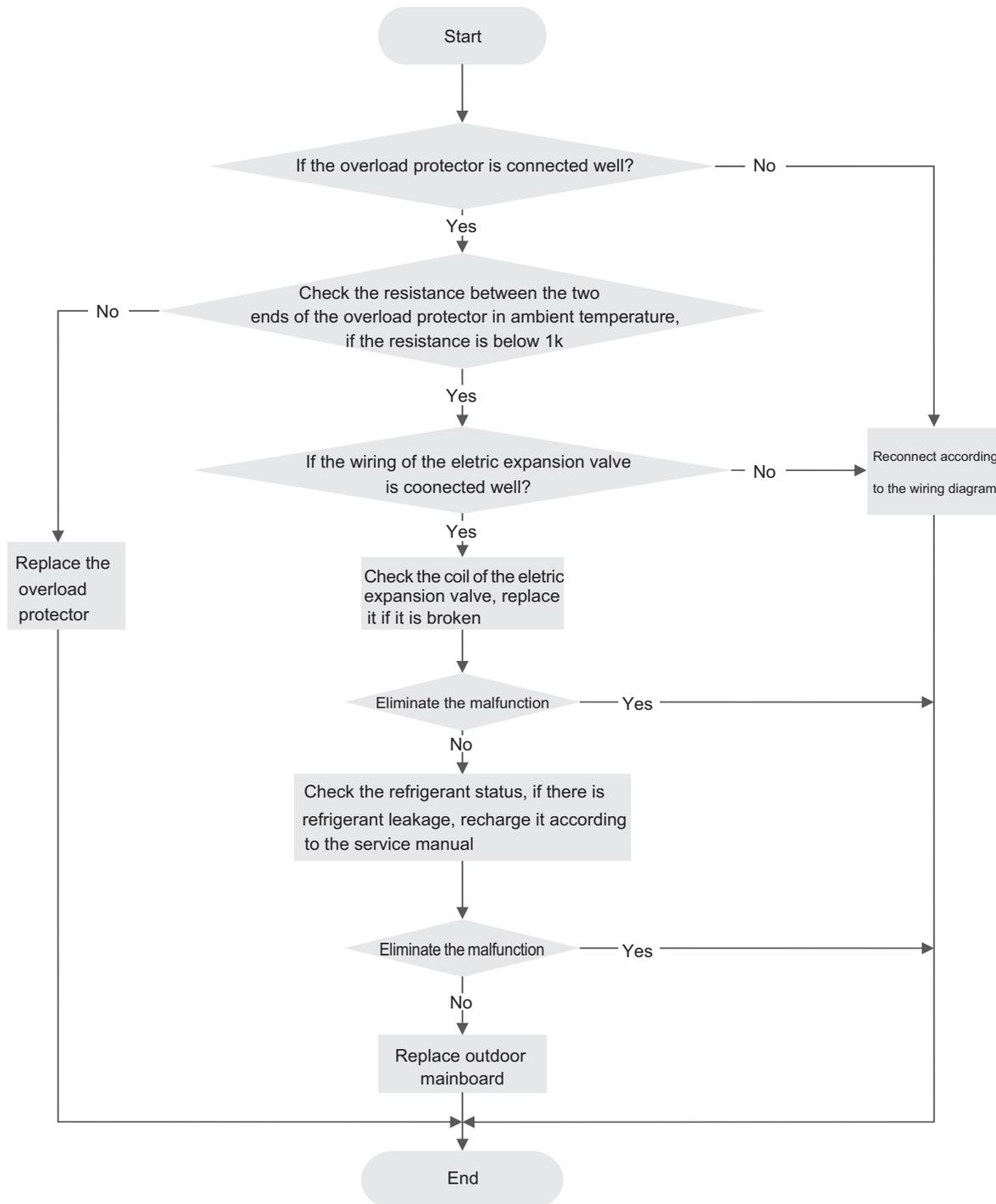
# 9. Maintenance

## 4. Compressor overload, discharge protection malfunction

Main checking points:

- If the electric expansion valve is connected well or it is broken;
- If there is refrigerant leakage;
- If the overload protector is broken;

Flow chart:



Note: the detection method of the coil of the electric expansion valve: there is five pieces of coil of the electric expansion valve, the resistance of one of them (the leftmost or the rightmost one) is almost the same as the resistance of other terminal (within  $100\ \Omega$ ). Judge the condition of the electronic expansion valve through detecting these resistance.

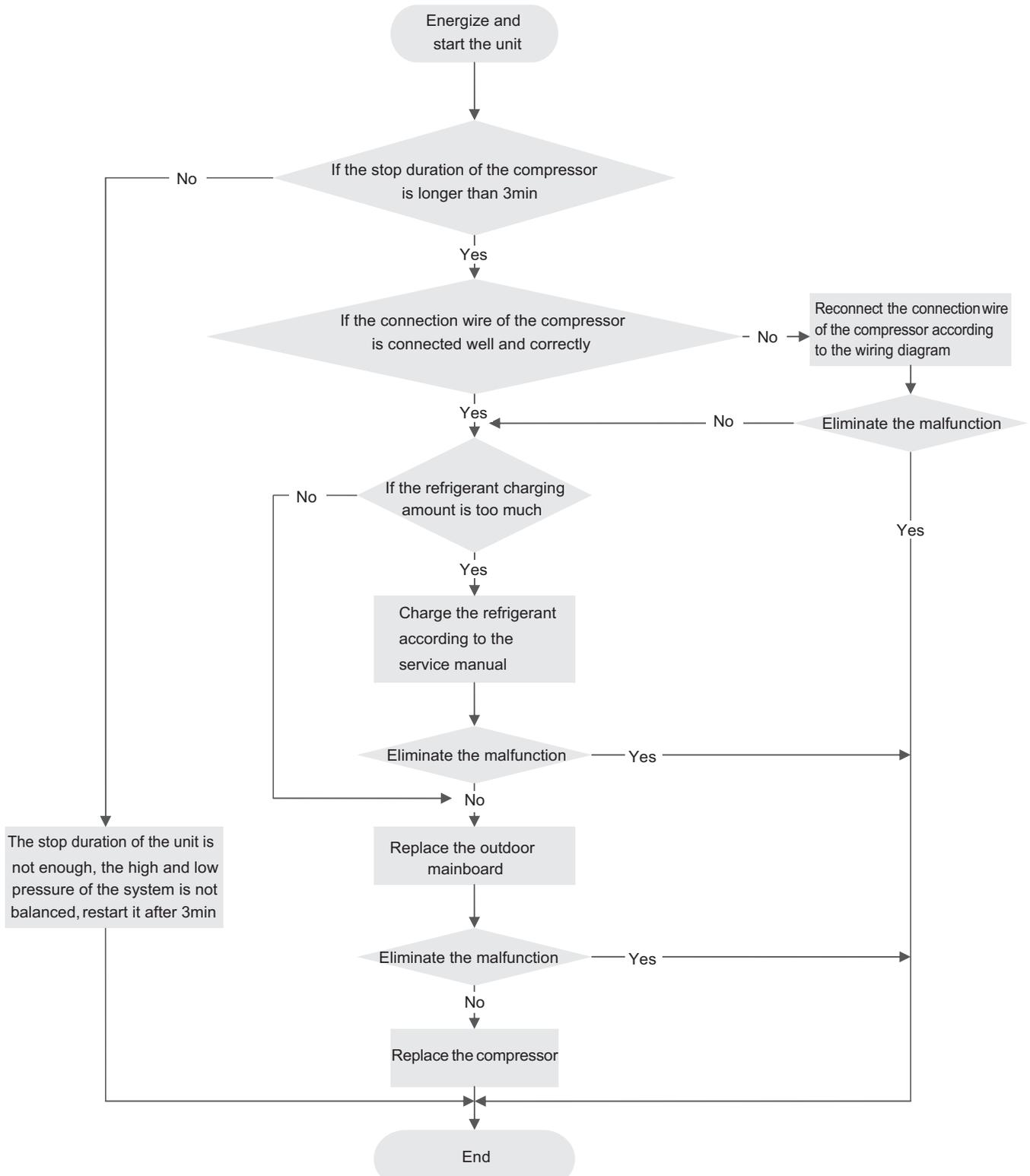
# 9. Maintenance

## 5. Start failure/malfunction

Main checking points:

- If the connection wire of the compressor is connected properly;
- If the stop duration of the compressor is sufficient;
- If the compressor is broken;
- If the refrigerant charging amount is too much;

Flow chart:



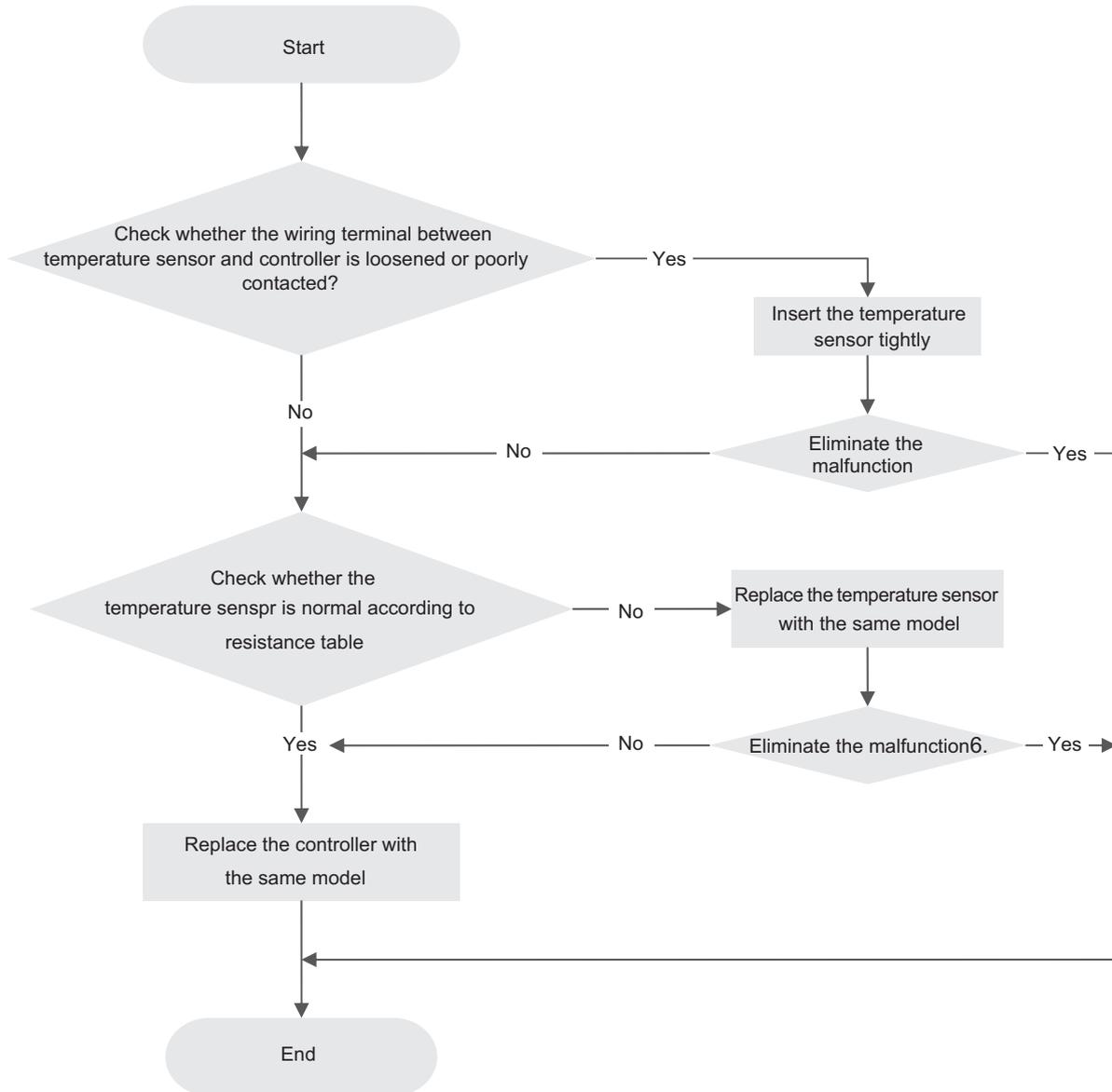
# 9. Maintenance

## 6. Temperature sensor malfunction

Main checking points:

- If the temperature sensor is damaged or broken
- If the terminal of the temperature sensor is loosened or not connected;
- If the mainboard is broken;

Flow chart:



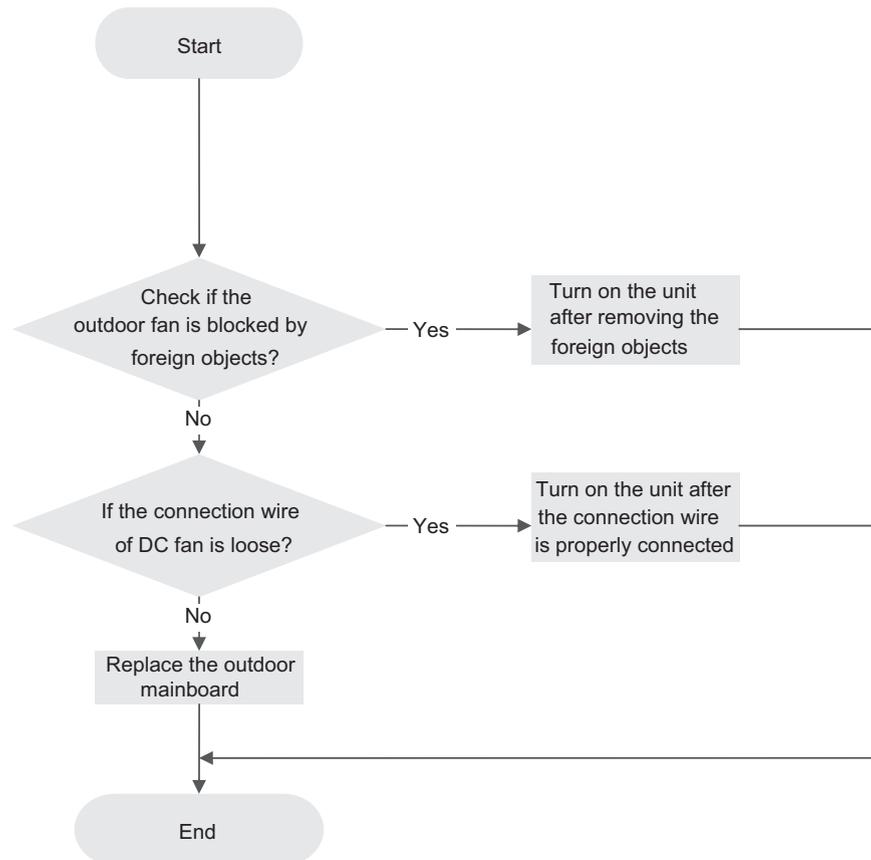
# 9. Maintenance

## 7. DC fan malfunction

Main checking points:

- If the outdoor fan is blocked by foreign objects;
- The connection wire of DC fan is connected reliably? If it is loose?

Flow chart:



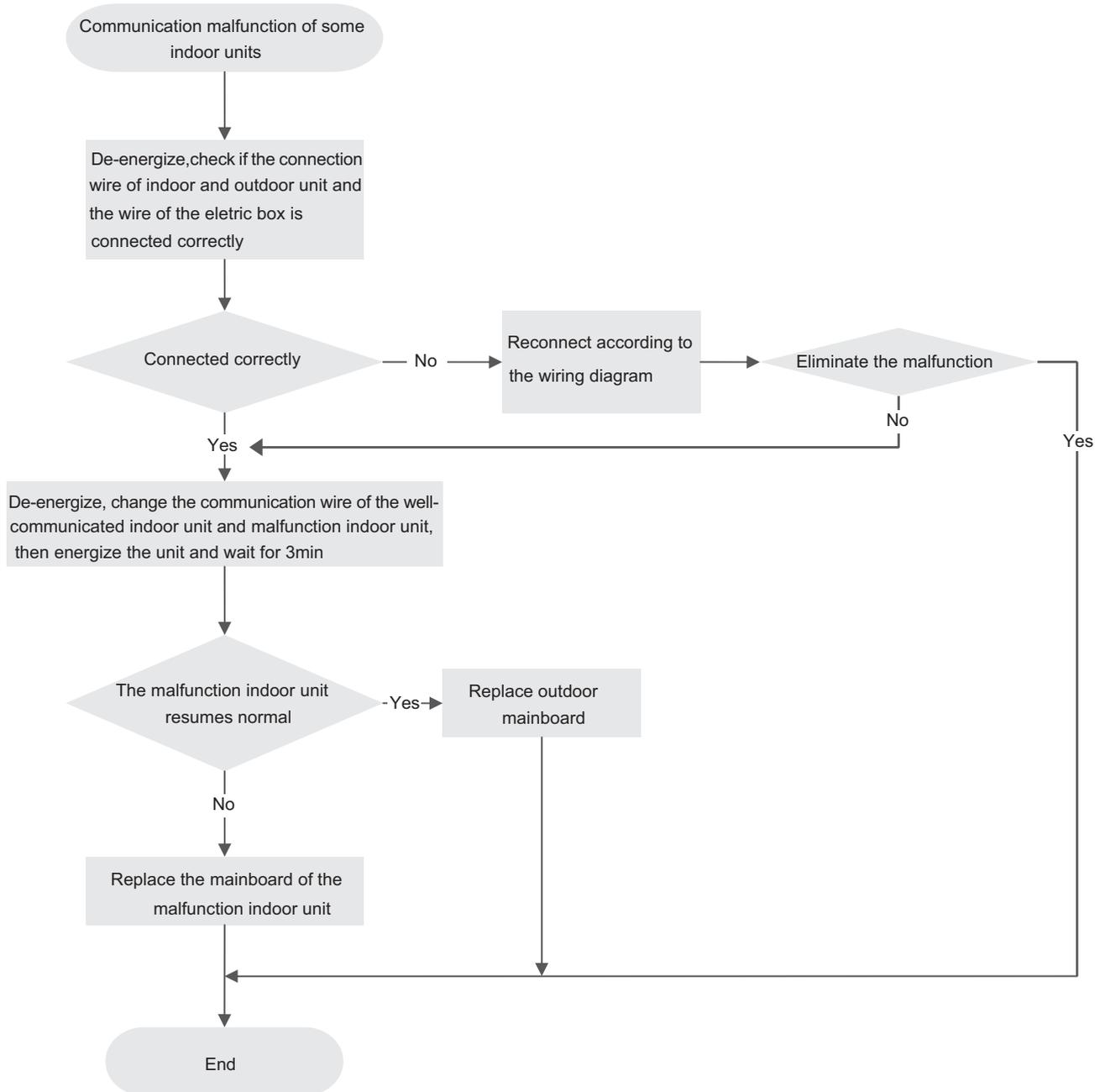
# 9. Maintenance

## 8. Communication malfunction

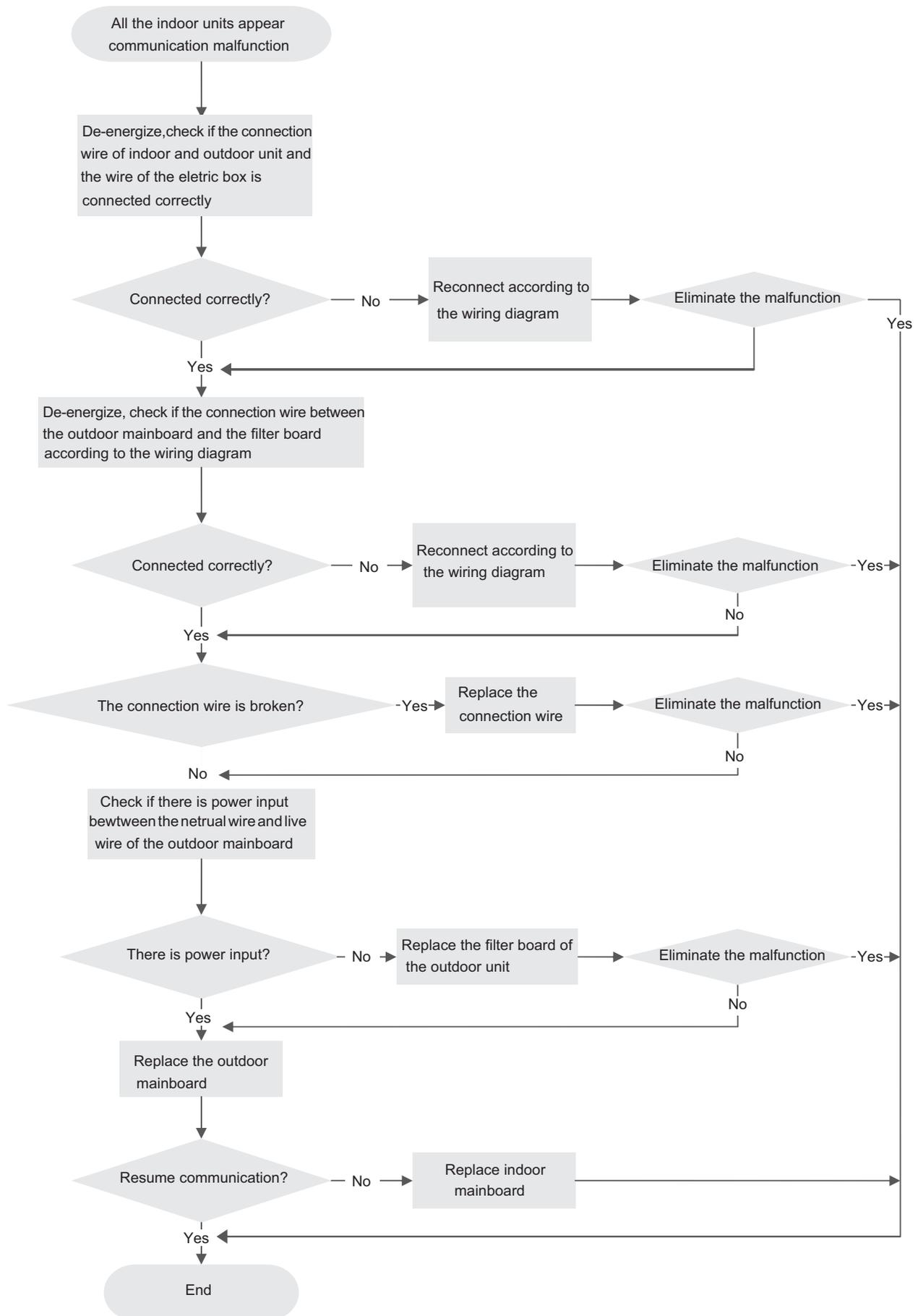
Main checking points:

- If the connection wire between the indoor unit and outdoor unit is connected well, if the wires inside the unit is connected well;
- If the indoor mainboard or outdoor main board is broken;

Flow chart:



# 9. Maintenance



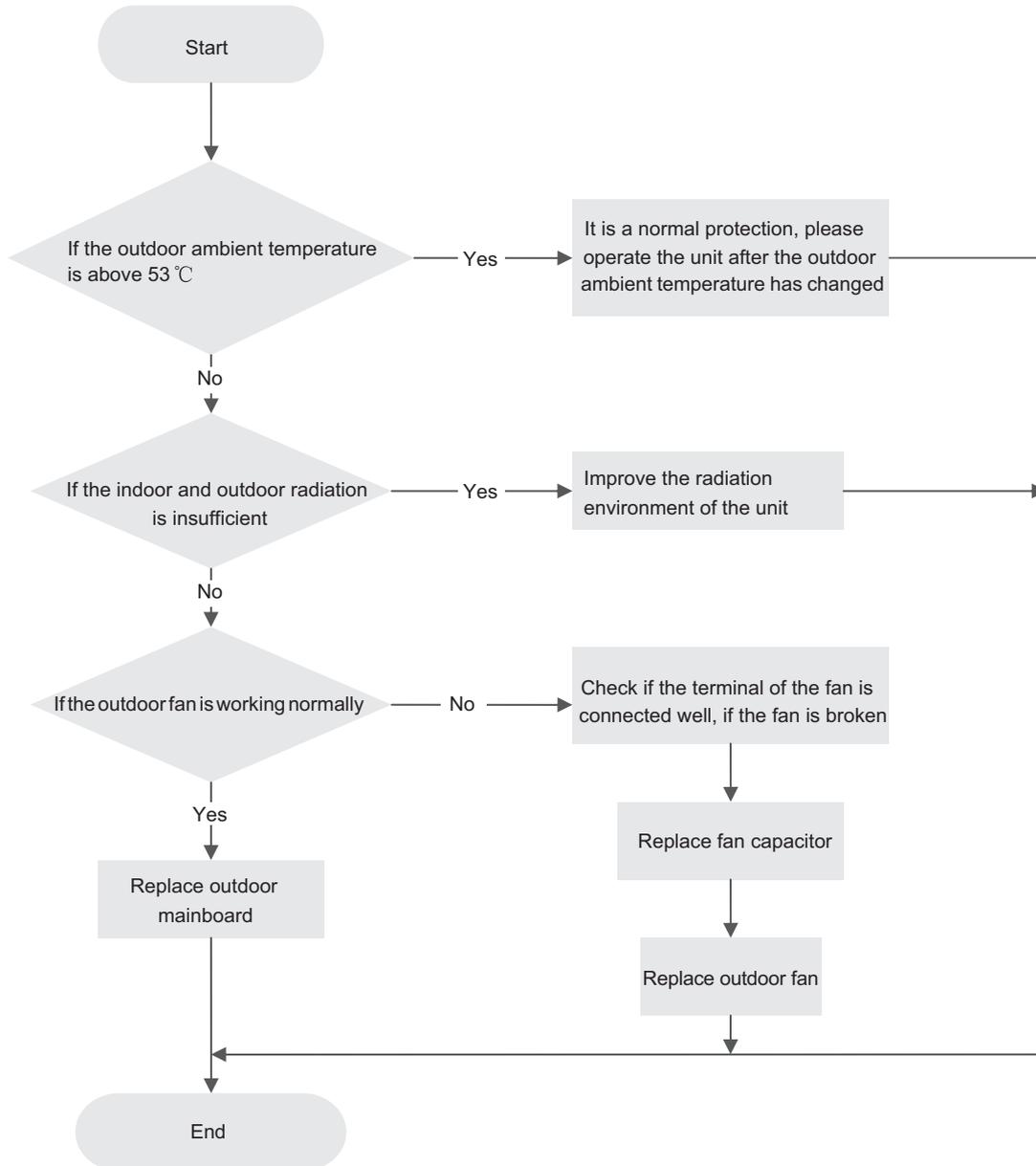
# 9. Maintenance

## 9. Anti-high temperature and overload malfunction

Main checking points:

- If the outdoor ambient temperature is within the normal range;
- If the indoor fan and outdoor fan are running normally;
- If the indoor and outdoor radiation environment is good;

Flow chart:



# 9. Maintenance

## 9.4 Troubleshooting for Normal Malfunction

### 1. Air Conditioner Can't be Started Up

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
No power supply, or poor connection for power plug	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether its due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals	Under normal power supply circumstances, operation indicator isn't bright after energization	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller Repair or replace remote controller

### 2. Poor Cooling (Heating) for Air Conditioner

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller	Adjust the set temperature
Rotation speed of the IDU fan motor is set too low	Small wind blow	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see its blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation position is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Units pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of 4-way valve	Blow cold wind during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

### 3. Horizontal Louver Can't Swing

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Stepping motor is damaged	Stepping motor can't operate	Repair or replace stepping motor
Main board is damaged	Others are all normal, while horizontal louver can't operate	Replace the main board with the same model

# 9. Maintenance

## 4. ODU Fan Motor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of the ODU fan motor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the capacity of fan
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Motor of outdoor unit is damaged	When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat.	Change compressor oil and refrigerant. If no better, replace the compressor with a new one

## 5. Compressor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of compressor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the compressor capacitor
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Coil of compressor is burnt out	Use universal meter to measure the resistance between compressor terminals and its 0	Repair or replace compressor
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor

## 6. Air Conditioner is Leaking

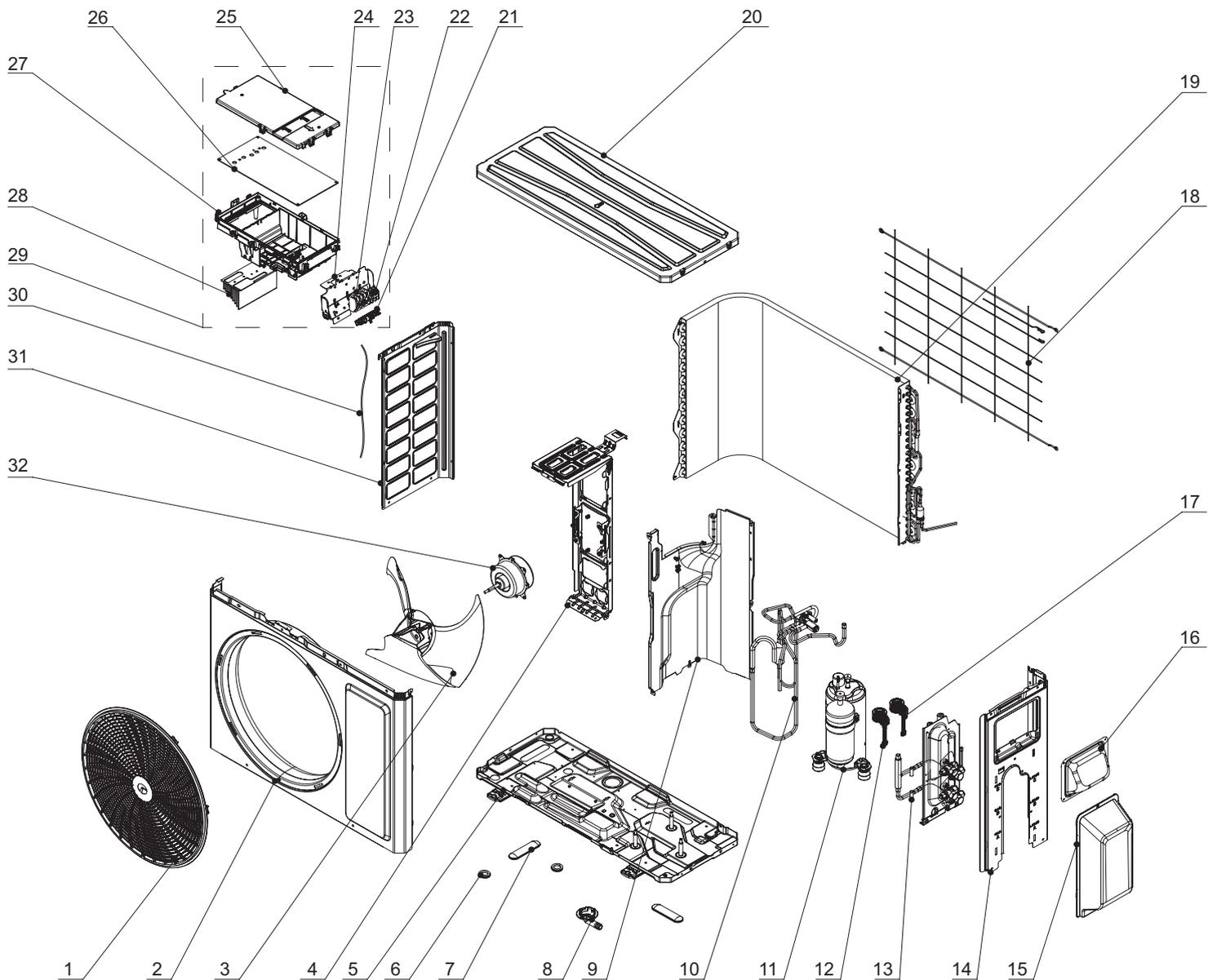
Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken	Water leaking from drain pipe	Replace drain pipe
Wrapping is not tight	Water leaking from the pipe connection place of indoor unit	Wrap it again and bundle it tightly

## 7. Abnormal Sound and Vibration

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and theres abnormal sound	Theres the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, theres abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or therere parts touching together inside the indoor unit	Theres abnormal sound fro indoor unit	Remove foreign objects. Adjust all parts position of indoor unit, tighten screws and stick damping plaster between connected parts
Foreign objects inside the outdoor unit or therere parts touching together inside the outdoor unit	Theres abnormal sound fro outdoor unit	Remove foreign objects. Adjust all parts position of outdoor unit, tighten screws and stick damping plaster between connected parts
Short circuit inside the magnetic coil	During heating, the way valve has abnormal electromagnetic sound	Replace magnetic coil
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

# 10. Exploded View and Parts List

GWHD(18)NK6PO



The component is only for reference; please refer to the actual product.

NO.	Description
1	Front Grill
2	Cabinet Assy
3	Axial Flow Fan
4	Motor Support Sub-Assy
5	Chassis Sub-assy
6	Drainage hole Cap
7	Drainage hole Cap
8	Drainage Connector
9	Clapboard
10	4-Way Valve Assy
11	Compressor and Fittings

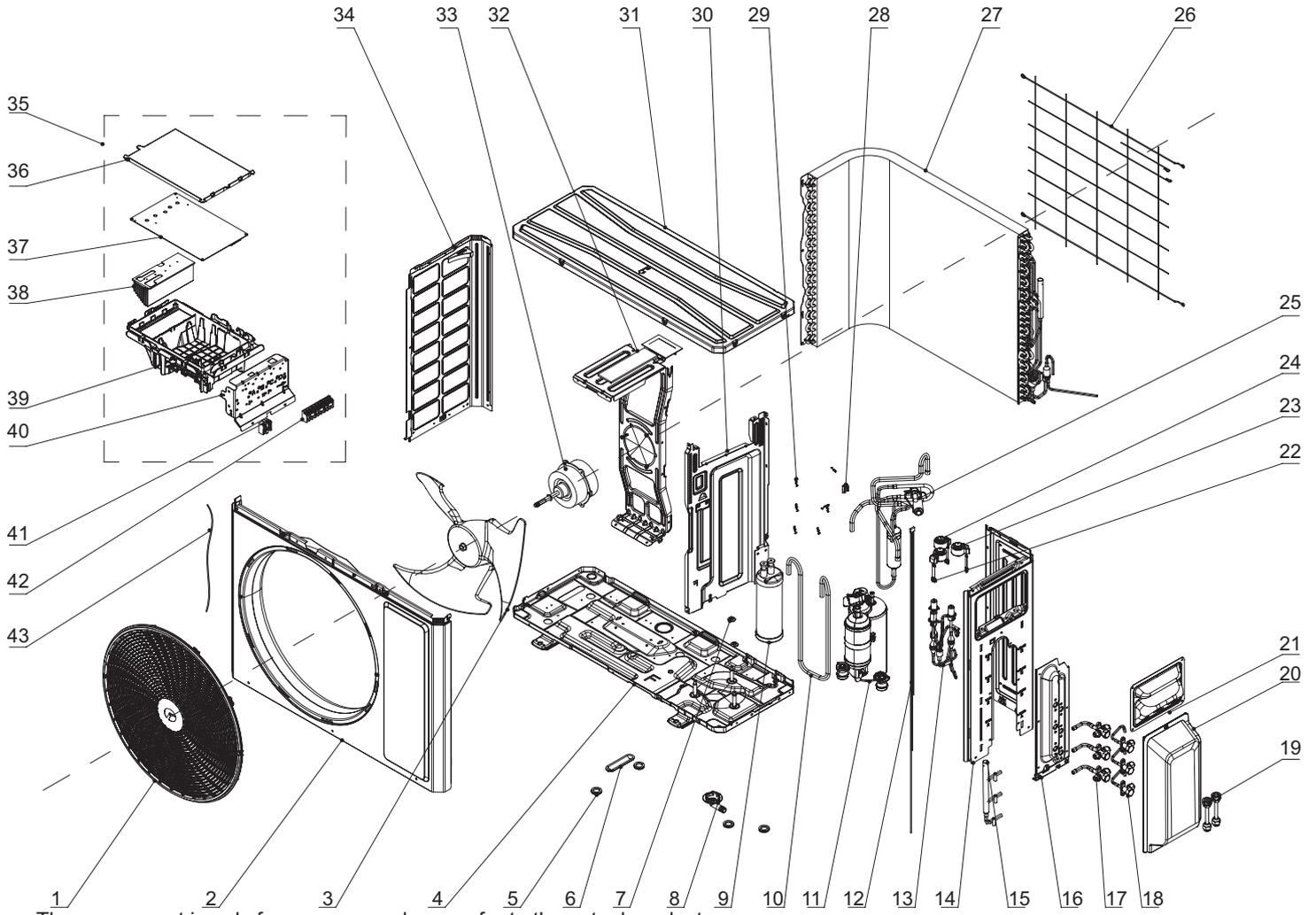
NO.	Description
12	Electric Expansion Valve Coil
13	Valve Support Assy
14	Right Side Plate
15	Valve Cover
16	Cable Cross Plate
17	Electric Expansion Valve Coil
18	Rear Grill
19	Condenser Assy
20	Top Cover Plate Assy
21	Wire Clamp
22	Terminal Board

NO.	Description
23	Terminal Board
24	Terminal Board Support Assy
25	Electric Box cover
26	Main Board
27	Electric Box
28	Radiator
29	Electric Box Assy
30	Connecting Cable
31	Left Side Plate
32	Fan Motor

Some models may not contain some parts, please refer to the actual product.

# 10. Exploded View and Parts List

GWHD(24)NK6PO



NO.	Description
1	Front Grill
2	Front Panel
3	Axial Flow Fan
4	Chassis Sub-assy
5	Drainage hole Cap
6	Drainage hole Cap
7	Compressor Gasket
8	Drainage Joint
9	Gas-liquid Separator
10	Inhalation Tube
11	Compressor and Fittings
12	Temperature Sensor
13	Electronic Expansion Valve Assy
14	Right Side Plate
15	Gas Separator Sub-assy

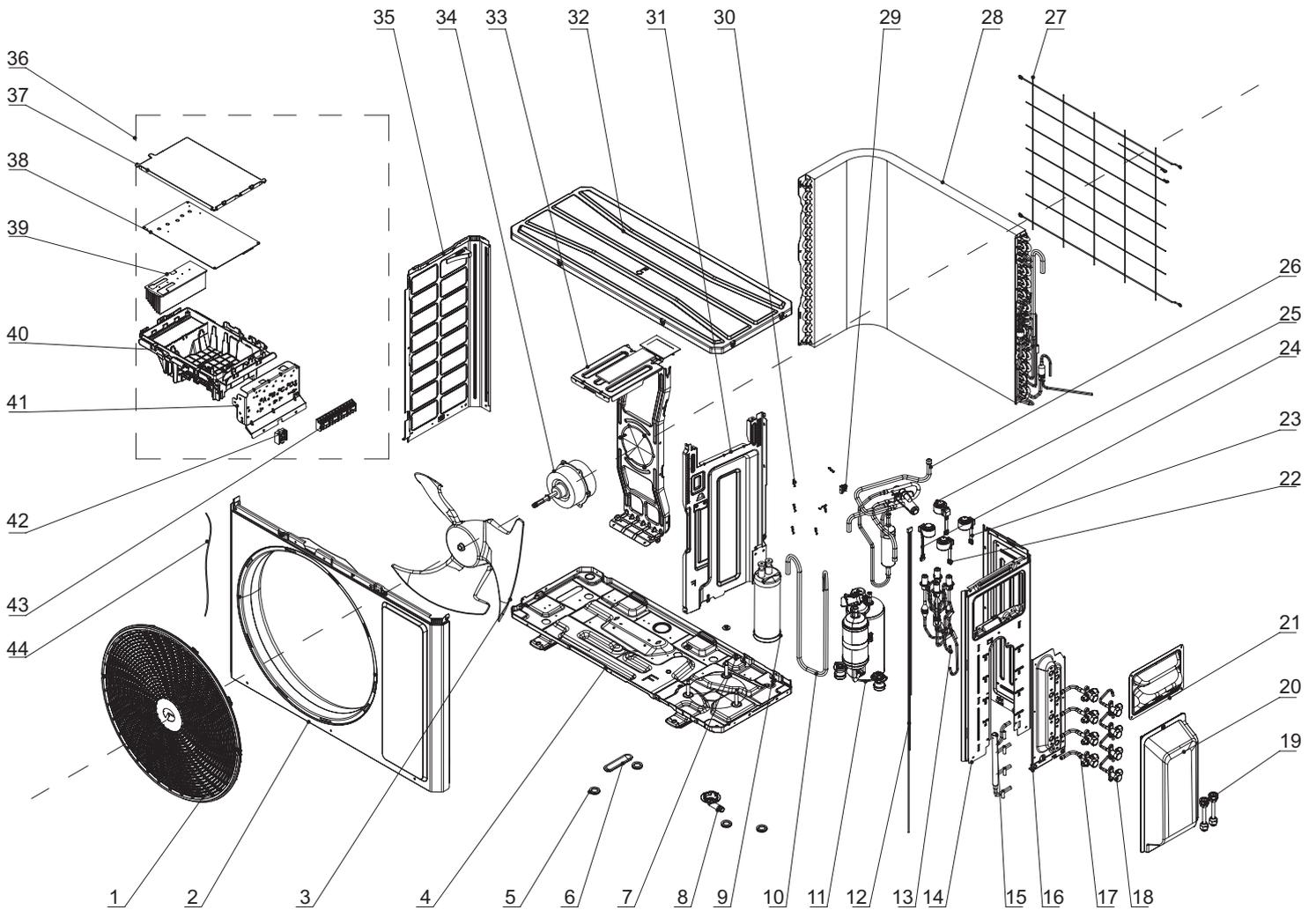
NO.	Description
16	Valve Support Assy
17	Cut-off valve Sub-assy
18	Cut-off valve Sub-assy
19	Tube Connector Sub-assy
20	Valve Cover
21	Cable Cross Plate
22	Electric Expansion Valve Coil
23	Electric Expansion Valve Coil
24	Electric Expansion Valve Coil
25	4-Way Valve Assy
26	Rear Grill
27	Condenser Assy
28	Sensor Clamp
29	Sensor Insert
30	Clapboard Sub-assy

NO.	Description
31	Top Cover Plate Assy
32	Motor Support Sub-Assy
33	Fan Motor
34	Left Side Plate
35	Electric Box Assy
36	Electric Box Cover
37	Main Board
38	Radiator
39	Electric Box
40	Terminal Board Support Assy
41	Terminal Board
42	Terminal Board
43	Connecting Cable

Some models may not contain some parts, please refer to the actual product.

# 10. Exploded View and Parts List

GWHD(28)NK6PO



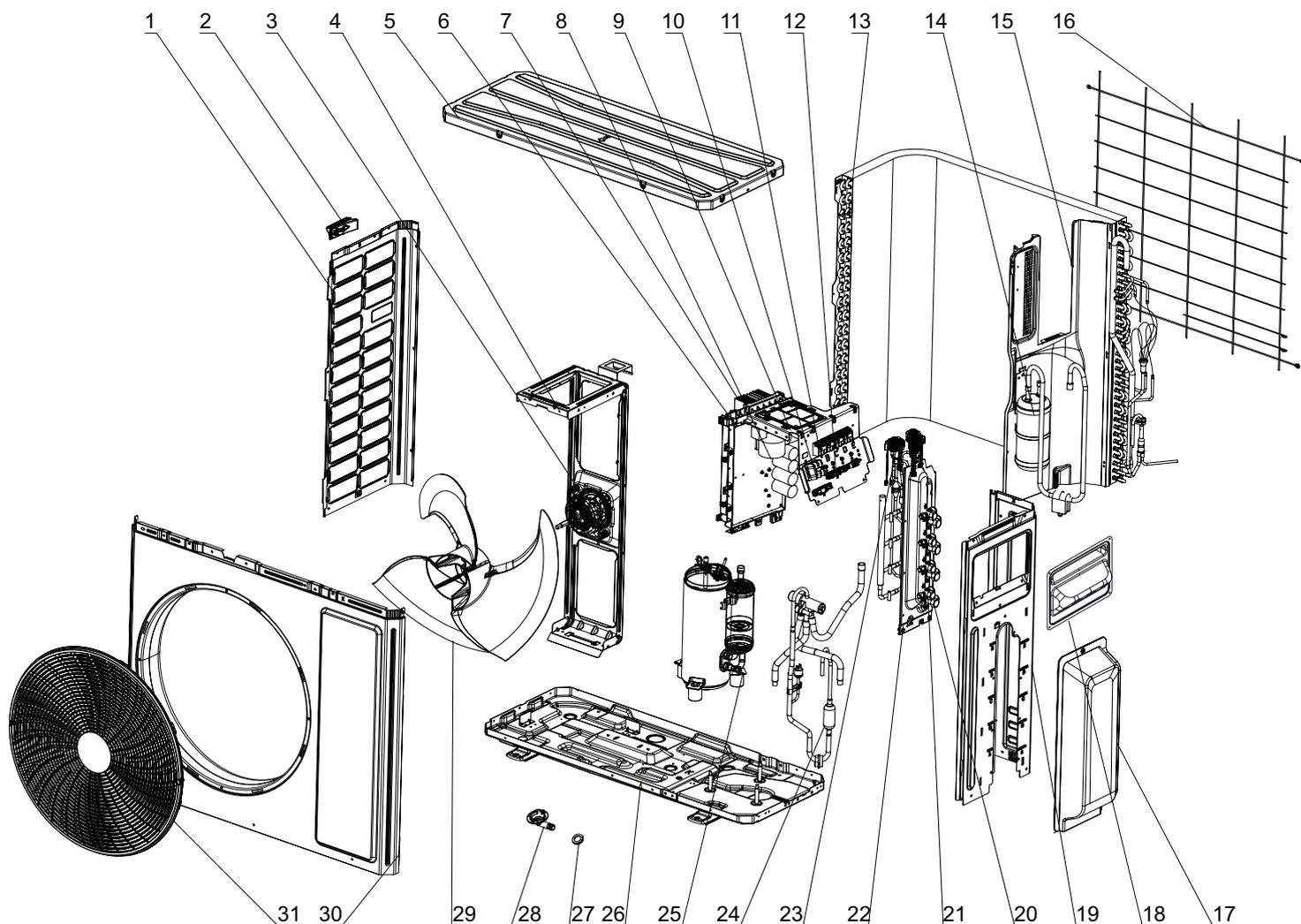
The component is only for reference; please refer to the actual product.

NO.	Description	NO.	Description	NO.	Description
1	Front Grill	16	Valve Support Assy	31	Clapboard Sub-assy
2	Front Panel	17	Cut-off valve Sub-assy	32	Top Cover Plate Assy
3	Axial Flow Fan	18	Cut-off valve Sub-assy	33	Motor Support Sub-Assy
4	Chassis Sub-assy	19	Tube Connector Sub-assy	34	Fan Motor
5	Drainage hole Cap	20	Valve Cover	35	Left Side Plate
6	Drainage hole Cap	21	Cable Cross Plate	36	Electric Box Assy
7	Compressor Gasket	22	Electric Expansion Valve Coil	37	Electric Box Cover
8	Drainage Joint	23	Electric Expansion Valve Coil	38	Main Board
9	Gas-liquid Separator	24	Electric Expansion Valve Coil	39	Radiator
10	Inhalation Tube	25	Electric Expansion Valve Coil	40	Electric Box
11	Compressor and Fittings	26	4-Way Valve Assy	41	Terminal Board Support Assy
12	Temperature Sensor	27	Rear Grill	42	Terminal Board
13	Electronic Expansion Valve Assy	28	Condenser Assy	43	Terminal Board
14	Right Side Plate	29	Sensor Clamp	44	Connecting Cable
15	Gas Separator Sub-assy	30	Sensor Insert		

Some models may not contain some parts, please refer to the actual product.

# 10. Exploded View and Parts List

GWHD(36)NK6PO



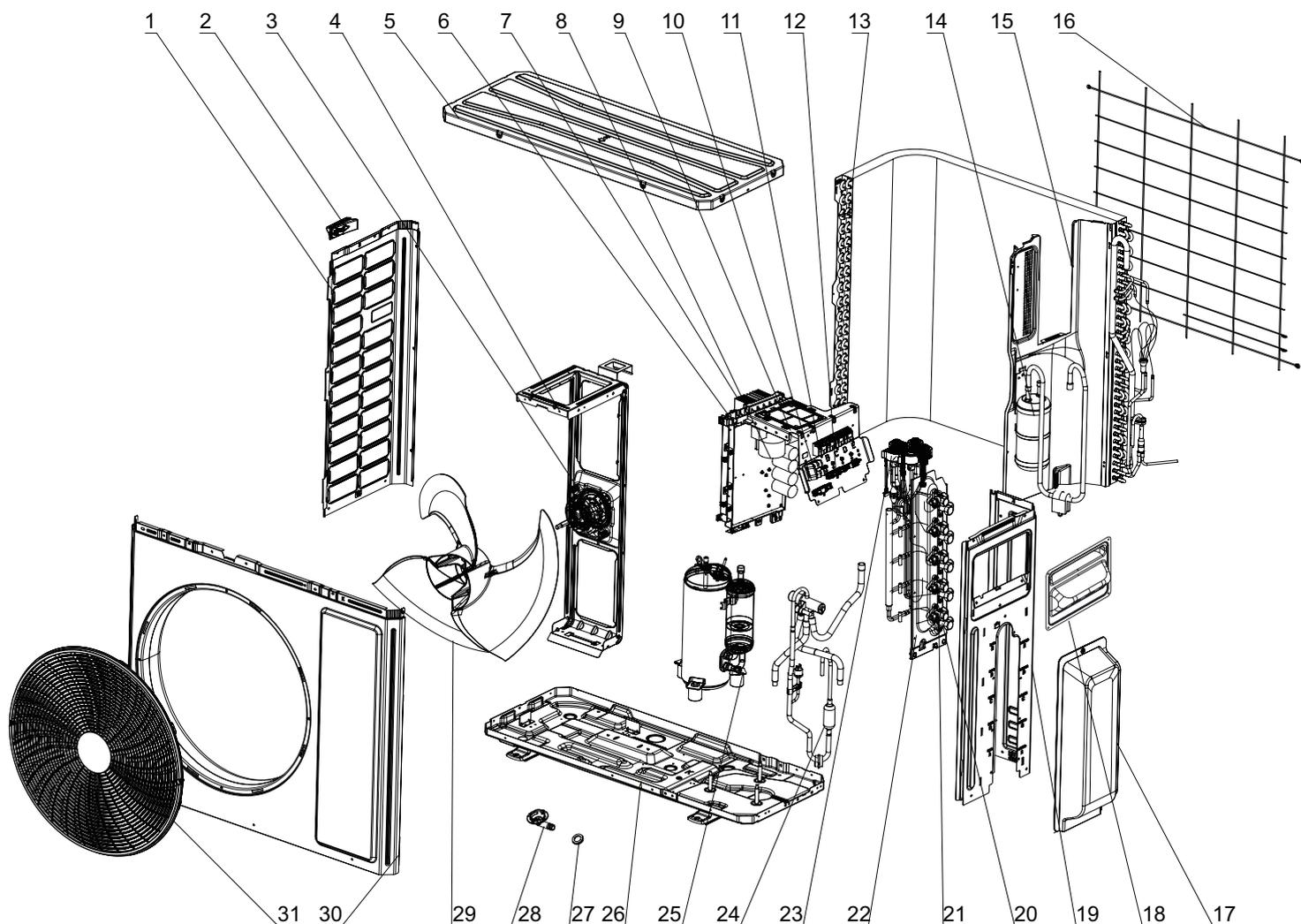
The component is only for reference; please refer to the actual product.

NO.	Description	NO.	Description	NO.	Description
1	Left Side Plate	12	Wire Clamp	23	Electronic Expansion Valve assy
2	Handle	13	Condenser Assy	24	4-Way Valve Assy
3	Brushless DC Motor	14	Gas-liquid Separator Assy	25	Compressor and Fittings
4	Motor Support Sub-Assy	15	Clapboard	26	Chassis Sub-assy
5	Top Cover Sub-Assy	16	Rear Grill	27	Drainage hole Cap
6	Electric Box Assy	17	Valve Cover	28	Drainage Joint
7	Radiator	18	Handle	29	Axial Flow Fan
8	Main Board	19	Right Side Plate	30	Cabinet
9	Filter Board	20	Cut off Valve Sub-Assy(1/4)	31	Front Grill
10	Terminal Board	21	Cut off Valve Sub-Assy(3/8)		
11	Terminal Board	22	Valve Support Sub-Assy		

Some models may not contain some parts, please refer to the actual product.

# 10. Exploded View and Parts List

GWHD(42)NK6PO



The component is only for reference; please refer to the actual product.

NO.	Description	NO.	Description	NO.	Description
1	Left Side Plate	12	Wire Clamp	23	Electronic Expansion Valve assy
2	Handle	13	Condenser Assy	24	4-Way Valve Assy
3	Brushless DC Motor	14	Gas-liquid Separator Assy	25	Compressor and Fittings
4	Motor Support Sub-Assy	15	Clapboard	26	Chassis Sub-assy
5	Top Cover Sub-Assy	16	Rear Grill	27	Drainage hole Cap
6	Electric Box Assy	17	Valve Cover	28	Drainage Joint
7	Radiator	18	Handle	29	Axial Flow Fan
8	Main Board	19	Right Side Plate	30	Cabinet
9	Filter Board	20	Cut off Valve Sub-Assy(1/4)	31	Front Grill
10	Terminal Board	21	Cut off Valve Sub-Assy(3/8)		
11	Terminal Board	22	Valve Support Sub-Assy		

Some models may not contain some parts, please refer to the actual product.

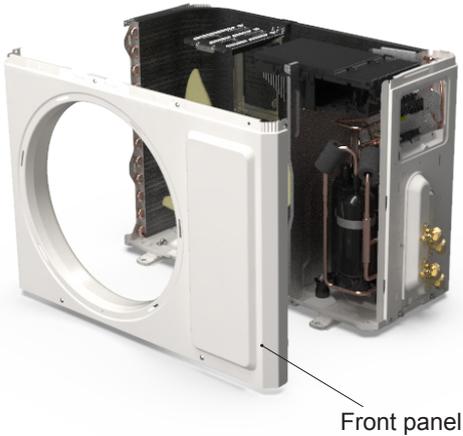
# 11. Removal Procedure

GWHD(18)NK6PO

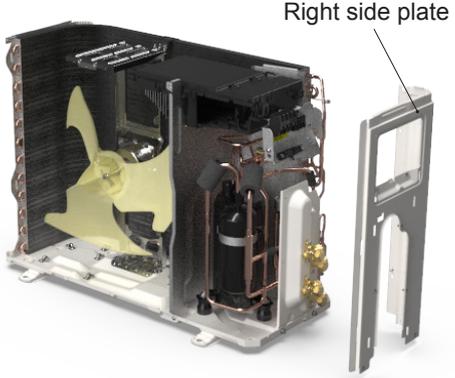
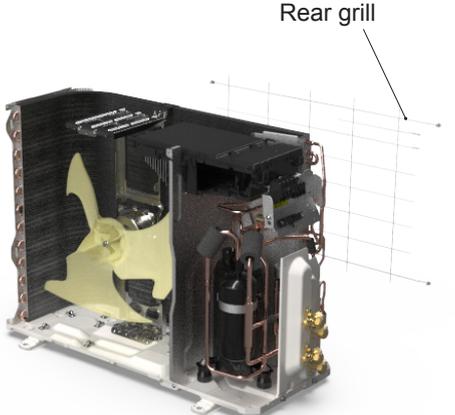
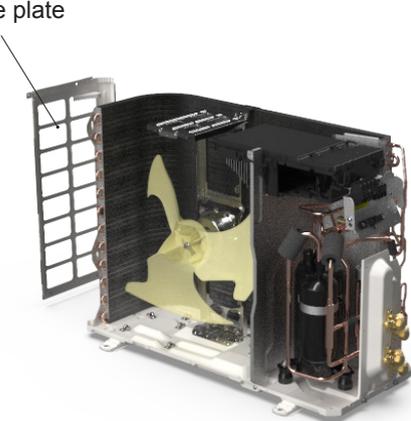
 **Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

Step	Procedure
<b>1. Before disassembly</b>	 <p>Complete axonometric drawing.</p>
<b>2. Remove valve cover</b>	 <p>Remove the connection screw fixing the valve cover and then remove the valve cover.</p> <p>valve cover</p>
<b>3. Remove handle</b>	 <p>Remove the connection screws fixing the handle and the right side plate, and then remove the handle.</p> <p>Handle</p>

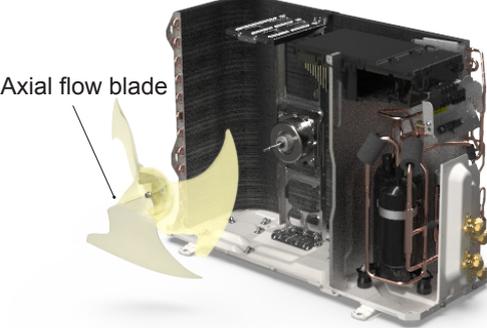
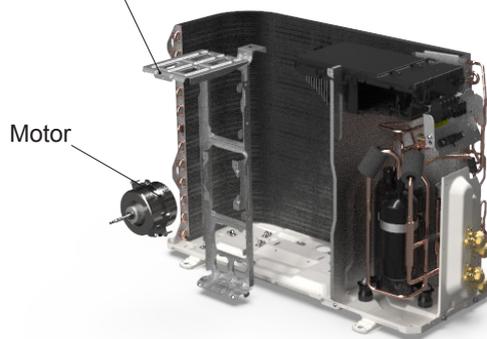
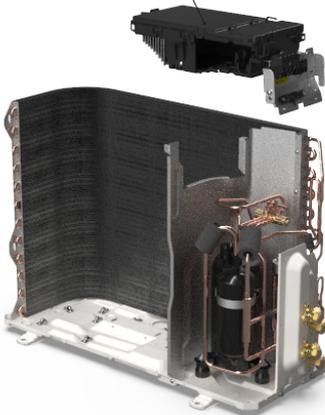
# 11. Removal Procedure

Step	Procedure
<b>4. Remove top panel</b>	<p>Remove the connection screws connecting the top panel and the front panel, and then remove the top panel.</p> 
<b>5. Remove front grille</b>	<p>Remove the connection screws connecting the front grille and the front panel, and then loosen the clasp to remove the front grille.</p> 
<b>6. Remove front panel</b>	<p>Remove the screws connecting the front panel and then remove the front panel.</p> 

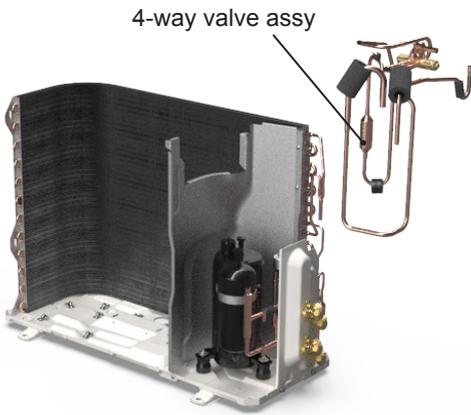
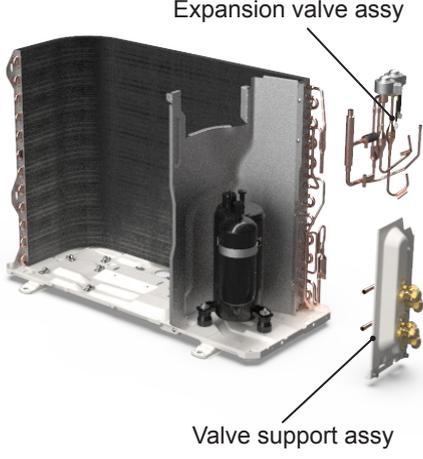
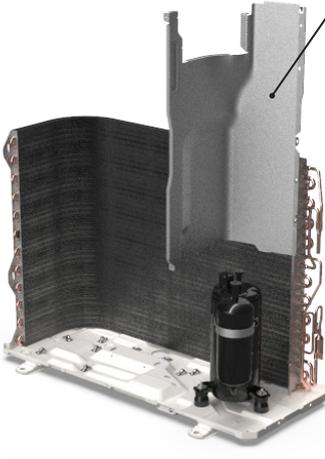
# 11. Removal Procedure

Step	Procedure
<b>7. Remove right side plate</b>	<p>Remove the screws connecting the right side plate with the chassis and the valve support. Then remove the right side plate.</p>  <p>The diagram shows a 3D perspective view of the unit's interior. A yellow fan is visible on the left. On the right, a metal side plate is being removed. A label 'Right side plate' with a line points to the detached plate.</p>
<b>8. Remove rear grill</b>	<p>Remove the screws connecting the rear grill and left side plate, and then remove the rear grill.</p>  <p>The diagram shows a 3D perspective view of the unit's interior. A yellow fan is visible on the left. On the right, a metal rear grill is being removed. A label 'Rear grill' with a line points to the detached grill.</p>
<b>9. Remove left side plate</b>	<p>Remove the screws fixing the left side plate with the chassis and the condenser support, and then remove the left side plate.</p>  <p>The diagram shows a 3D perspective view of the unit's interior. A yellow fan is visible on the left. On the right, a metal left side plate is being removed. A label 'Left side plate' with a line points to the detached plate.</p>

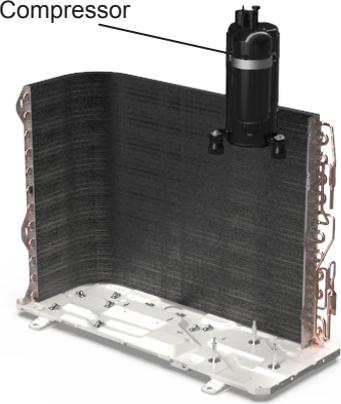
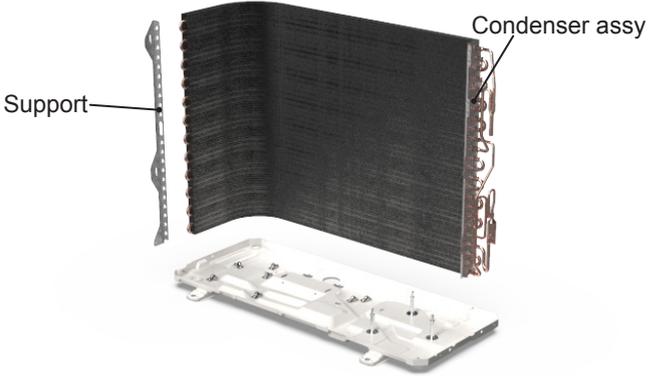
# 11. Removal Procedure

Step	Procedure
<b>10. Remove axial flow blade</b>	<p>Remove the nut on the blade and then remove the axial flow blade.</p>  <p>Axial flow blade</p>
<b>11. Remove motor and motor support</b>	<p>Remove the 4 tapping screws fixing the motor and disconnect the leading wire insert of the motor. Then remove the motor. Remove the 2 tapping screws fixing the motor support and chassis, and then lift the motor support to remove it.</p>  <p>Motor support</p> <p>Motor</p>
<b>12. Remove electric box assy</b>	<p>Remove the screws fixing the electric box assy and the middle isolation sheet, loosen the wire bundle, unplug the wiring terminals, and then lift the electric box assy to remove it.</p>  <p>Electric box assy</p>

# 11. Removal Procedure

Step	Procedure
<b>13. Remove 4-way valve assy</b>	<p>Remove screws fixing the electricbox; loosen the wire bundle; pull out the wiring terminals and then pull electric box upwards to remove it.</p>  <p>4-way valve assy</p>
<b>14. Remove valve support sub-assy and expansion valve assy</b>	<p>Remove the screw connecting the valve support and the chassis, and then remove the valve support assy. Unsolder the welding joint connecting the electronic expansion valve assy with the cut-off valve and the condenser connection pipe, and then remove the expansion valve assy.</p>  <p>Expansion valve assy</p> <p>Valve support assy</p>
<b>15. Remove middle isolation sheet</b>	<p>Remove the screws connecting the middle isolation sheet with the chassis assy and the condenser assy, and then remove the middle isolation sheet.</p>  <p>Middle isolation sheet</p>

# 11. Removal Procedure

Step	Procedure
<b>16. Remove compressor</b>	 <p>Remove the 3 foot nuts fixing the compressor and then remove the compressor.</p>
<b>17. Remove condenser assy</b>	 <p>Remove the screws fixing the condenser support and then remove the condenser support. Remove the screws connecting the condenser support and the chassis assy, and then remove the condenser assy.</p>

# 11. Removal Procedure

GWHD(24)NK6PO GWHD(28)NK6PO



**Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

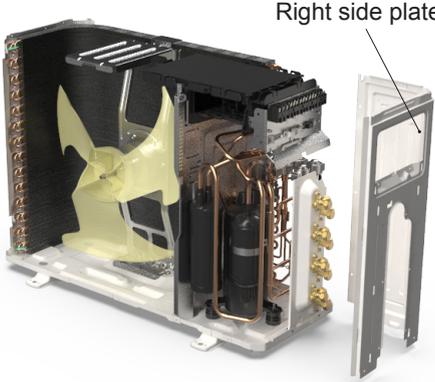
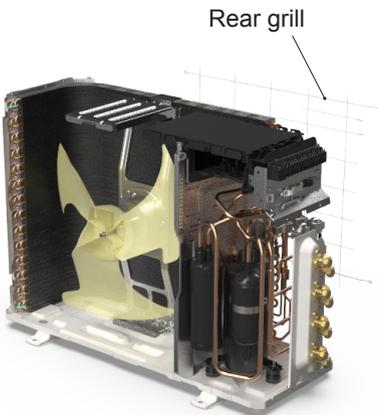
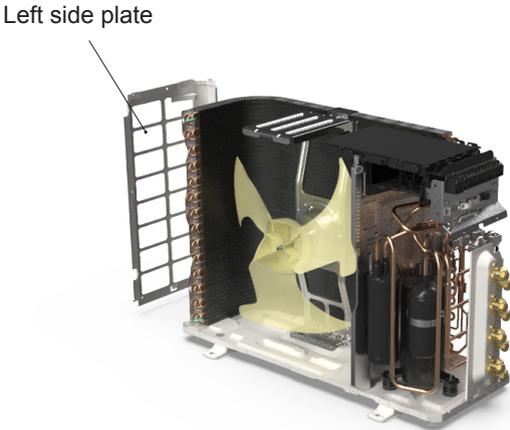
NOTE: Take 28K model for example.

Step	Procedure
<b>1. Before disassembly</b>	 <p>Complete axonometric drawing.</p>
<b>2. Remove valve cover</b>	 <p>Remove the connection screw fixing the valve cover and then remove the valve cover.</p> <p>valve cover</p>
<b>3. Remove handle</b>	 <p>Remove the connection screws fixing the handle and the right side plate, and then remove the handle.</p> <p>Handle</p>

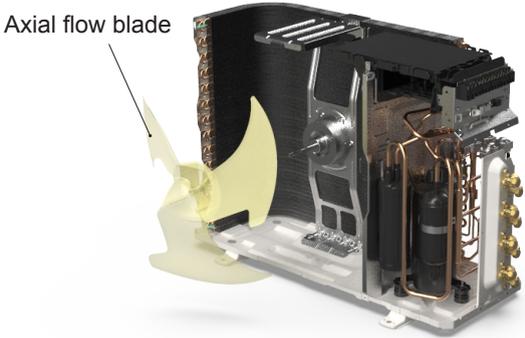
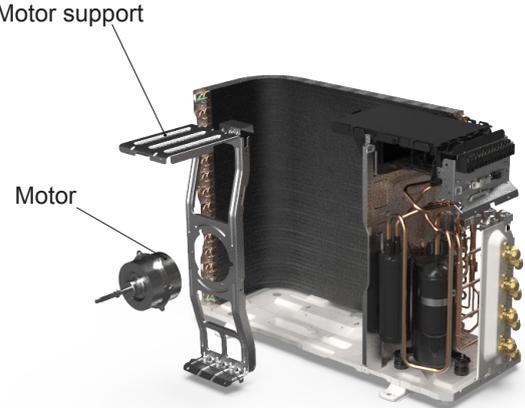
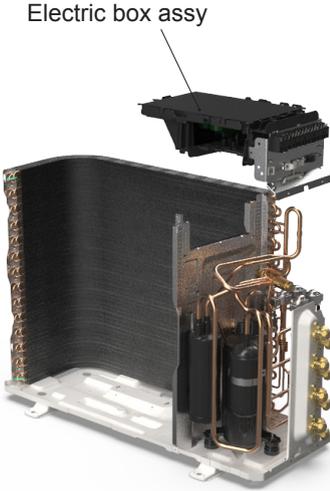
# 11. Removal Procedure

Step	Procedure
<b>4. Remove top panel</b>	<p>Remove the connection screws connecting the top panel and the front panel, and then remove the top panel.</p> 
<b>5. Remove front grille</b>	<p>Remove the connection screws connecting the front grille and the front panel, and then loosen the clasp to remove the front grille.</p> 
<b>6. Remove front panel</b>	<p>Remove the screws connecting the front panel and then remove the front panel.</p> 

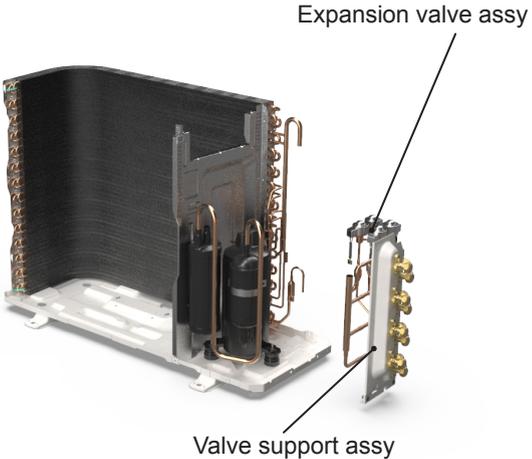
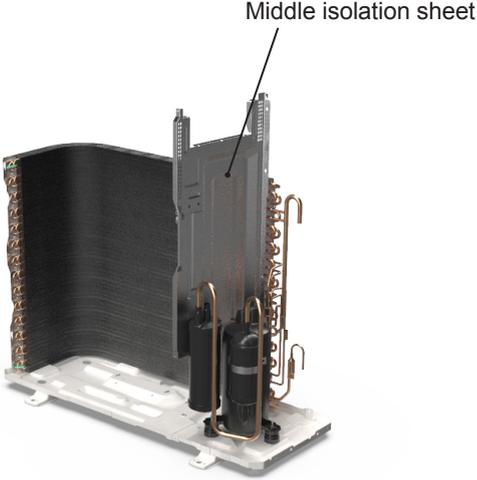
# 11. Removal Procedure

Step	Procedure
<b>7. Remove right side plate</b>	<p>Remove the screws connecting the right side plate with the chassis and the valve support. Then remove the right side plate.</p>  <p>The diagram shows a 3D cutaway view of the unit's internal components, including a yellow fan, a compressor, and various pipes. The right side plate is shown being detached from the chassis. A label 'Right side plate' with a pointer indicates the specific part being removed.</p>
<b>8. Remove rear grill</b>	<p>Remove the screws connecting the rear grill and left side plate, and then remove the rear grill.</p>  <p>The diagram shows a 3D cutaway view of the unit's internal components. The rear grill is shown being detached from the left side plate. A label 'Rear grill' with a pointer indicates the specific part being removed.</p>
<b>9. Remove left side plate</b>	<p>Remove the screws fixing the left side plate with the chassis and the condenser support, and then remove the left side plate.</p>  <p>The diagram shows a 3D cutaway view of the unit's internal components. The left side plate is shown being detached from the chassis. A label 'Left side plate' with a pointer indicates the specific part being removed.</p>

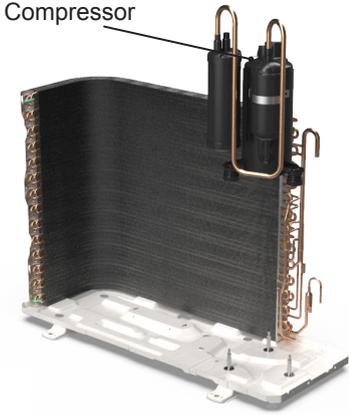
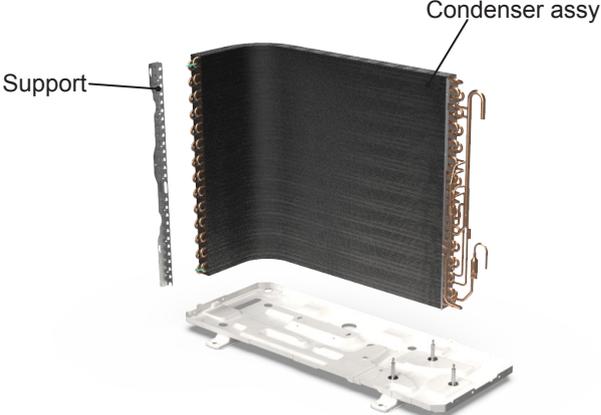
# 11. Removal Procedure

Step	Procedure
<b>10. Remove axial flow blade</b>	<p>Remove the nut on the blade and then remove the axial flow blade.</p>  <p>Axial flow blade</p>
<b>11. Remove motor and motor support</b>	<p>Remove the 4 tapping screws fixing the motor and disconnect the leading wire insert of the motor. Then remove the motor. Remove the 2 tapping screws fixing the motor support and chassis, and then lift the motor support to remove it.</p>  <p>Motor support</p> <p>Motor</p>
<b>12. Remove electric box assy</b>	<p>Remove the screws fixing the electric box assy and the middle isolation sheet, loosen the wire bundle, unplug the wiring terminals, and then lift the electric box assy to remove it.</p>  <p>Electric box assy</p>

# 11. Removal Procedure

Step	Procedure
<b>13. Remove 4-way valve assy</b>	<p>Remove screws fixing the electricbox; loosen the wire bundle; pull out the wiring terminals and then pull electric box upwards to remove it.</p>  <p>The diagram shows a 3D cutaway view of the unit's internal components. A label '4-way valve assy' points to a complex assembly of copper pipes and valves located at the top right of the unit's interior.</p>
<b>14. Remove valve support sub-assy and expansion valve assy</b>	<p>Remove the screw connecting the valve support and the chassis, and then remove the valve support assy. Unsolder the welding joint connecting the electronic expansion valve assy with the cut-off valve and the condenser connection pipe, and then remove the expansion valve assy.</p>  <p>The diagram shows a 3D cutaway view of the unit's internal components. Two labels point to specific parts: 'Expansion valve assy' points to a vertical component on the right side, and 'Valve support assy' points to a bracket-like structure below it.</p>
<b>15. Remove middle isolation sheet</b>	<p>Remove the screws connecting the middle isolation sheet with the chassis assy and the condenser assy, and then remove the middle isolation sheet.</p>  <p>The diagram shows a 3D cutaway view of the unit's internal components. A label 'Middle isolation sheet' points to a vertical metal plate located in the center of the unit's interior.</p>

# 11. Removal Procedure

Step	Procedure
<b>16. Remove compressor</b>	 <p>Remove the 3 foot nuts fixing the compressor and then remove the compressor.</p>
<b>17. Remove condenser assy</b>	 <p>Remove the screws fixing the condenser support and then remove the condenser support. Remove the screws connecting the condenser support and the chassis assy, and then remove the condenser assy.</p>

# 11. Removal Procedure

GWHD(36)NK6PO GWHD(42)NK6PO

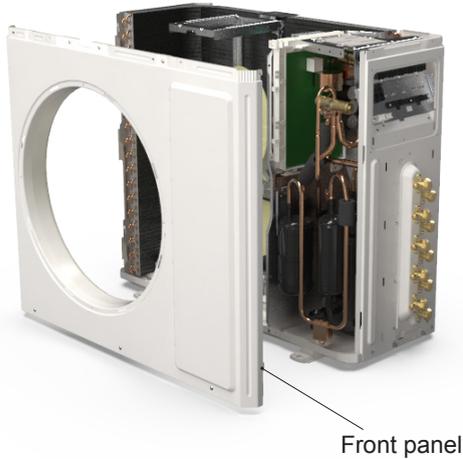


**Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

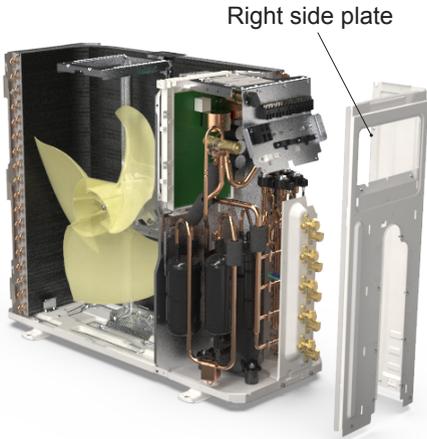
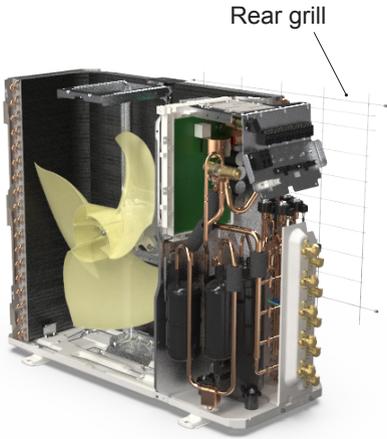
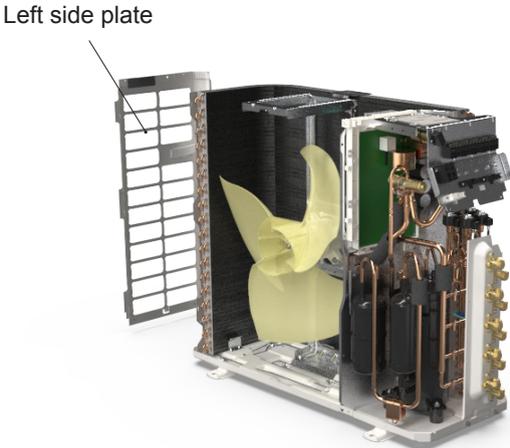
NOTE: Take 42K model for example.

Step	Procedure
<b>1. Before disassembly</b>	 <p>Complete axonometric drawing.</p>
<b>2. Remove valve cover</b>	 <p>Remove the connection screw fixing the valve cover and then remove the valve cover.</p> <p>valve cover</p>
<b>3. Remove handle</b>	 <p>Remove the connection screws fixing the handle and the right side plate, and then remove the handle.</p> <p>Handle</p>

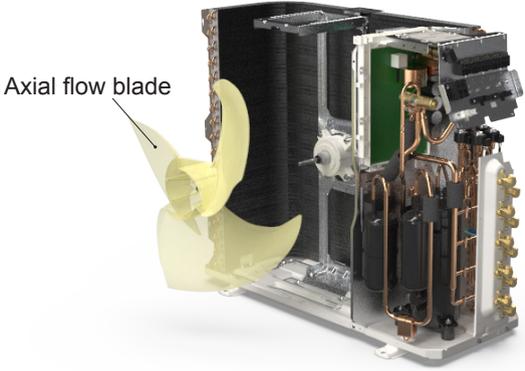
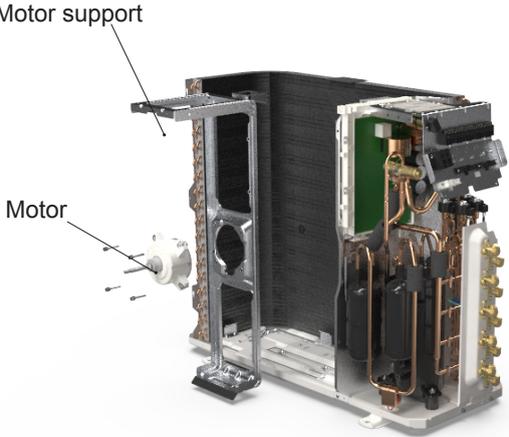
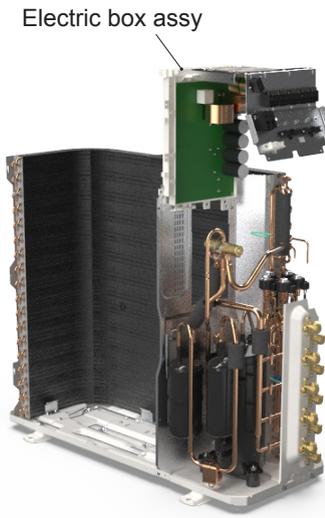
# 11. Removal Procedure

Step	Procedure
<b>4. Remove top panel</b>	<p>Remove the connection screws connecting the top panel and the front panel, and then remove the top panel.</p> 
<b>5. Remove front grille</b>	<p>Remove the connection screws connecting the front grille and the front panel, and then loosen the clasp to remove the front grille.</p> 
<b>6. Remove front panel</b>	<p>Remove the screws connecting the front panel and then remove the front panel.</p> 

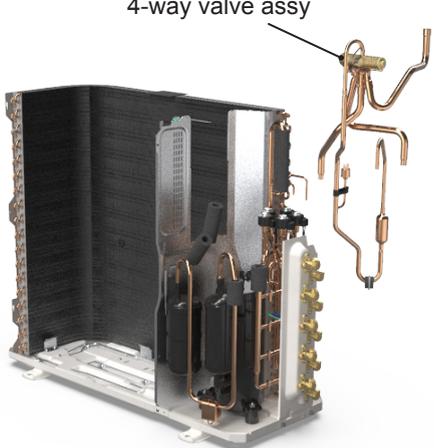
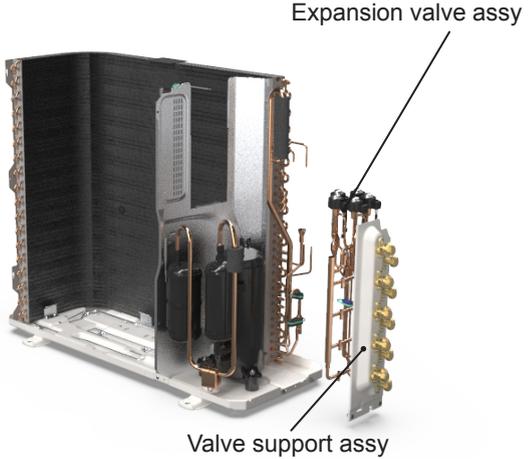
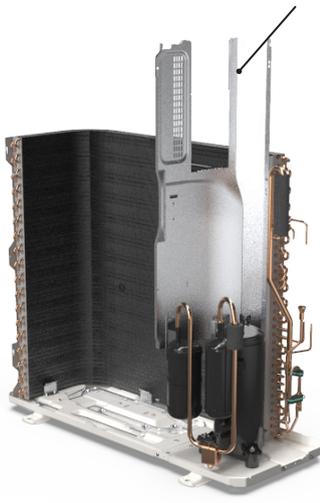
# 11. Removal Procedure

Step	Procedure
<b>7. Remove right side plate</b>	<p>Remove the screws connecting the right side plate with the chassis and the valve support. Then remove the right side plate.</p> 
<b>8. Remove rear grill</b>	<p>Remove the screws connecting the rear grill and left side plate, and then remove the rear grill.</p> 
<b>9. Remove left side plate</b>	<p>Remove the screws fixing the left side plate with the chassis and the condenser support, and then remove the left side plate.</p> 

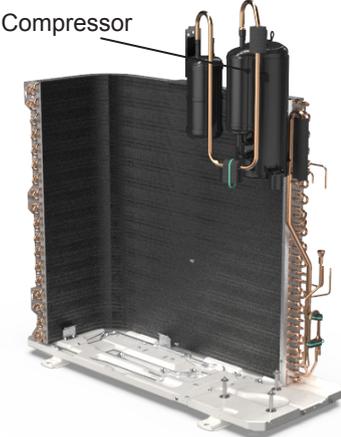
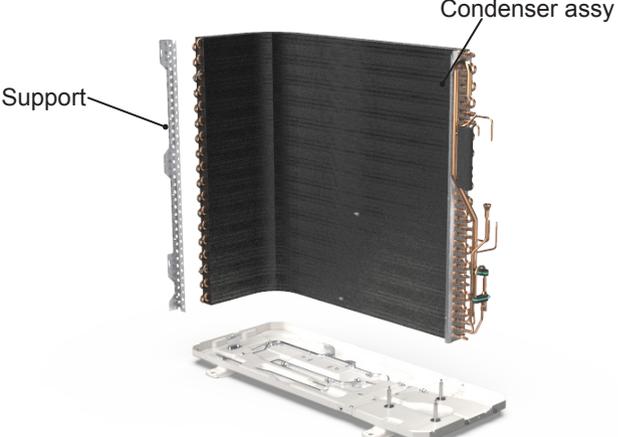
# 11. Removal Procedure

Step	Procedure
<b>10. Remove axial flow blade</b>	 <p>Axial flow blade</p> <p>Remove the nut on the blade and then remove the axial flow blade.</p>
<b>11. Remove motor and motor support</b>	 <p>Motor support</p> <p>Motor</p> <p>Remove the 4 tapping screws fixing the motor and disconnect the leading wire insert of the motor. Then remove the motor. Remove the 2 tapping screws fixing the motor support and chassis, and then lift the motor support to remove it.</p>
<b>12. Remove electric box assy</b>	 <p>Electric box assy</p> <p>Remove the screws fixing the electric box assy and the middle isolation sheet, loosen the wire bundle, unplug the wiring terminals, and then lift the electric box assy to remove it.</p>

# 11. Removal Procedure

Step	Procedure
<b>13. Remove 4-way valve assy</b>	<p>Remove screws fixing the electricbox; loosen the wire bundle; pull out the wiring terminals and then pull electric box upwards to remove it.</p>  <p>4-way valve assy</p>
<b>14. Remove valve support sub-assy and expansion valve assy</b>	<p>Remove the screw connecting the valve support and the chassis, and then remove the valve support assy. Unsolder the welding joint connecting the electronic expansion valve assy with the cut-off valve and the condenser connection pipe, and then remove the expansion valve assy.</p>  <p>Expansion valve assy</p> <p>Valve support assy</p>
<b>15. Remove middle isolation sheet</b>	<p>Remove the screws connecting the middle isolation sheet with the chassis assy and the condenser assy, and then remove the middle isolation sheet.</p>  <p>Middle isolation sheet</p>

# 11. Removal Procedure

Step	Procedure
<b>16. Remove compressor</b>	 <p>Remove the 3 foot nuts fixing the compressor and then remove the compressor.</p>
<b>17. Remove condenser assy</b>	 <p>Remove the screws fixing the condenser support and then remove the condenser support. Remove the screws connecting the condenser support and the chassis assy, and then remove the condenser assy.</p>

# Appendix

## Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree:  $T_f = T_c \times 1.8 + 32$

### Set temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
61	60.8	16
62/63	62.6	17
64/65	64.4	18
66/67	66.2	19
68	68	20

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
69/70	69.8	21
71/72	71.6	22
73/74	73.4	23
75/76	75.2	24
77	77	25

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
78/79	78.8	26
80/81	80.6	27
82/83	82.4	28
84/85	84.2	29
86	86	30

### Ambient temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
32/33	32	0
34/35	33.8	1
36	35.6	2
37/38	37.4	3
39/40	39.2	4
41/42	41	5
43/44	42.8	6
45	44.6	7
46/47	46.4	8
48/49	48.2	9
50/51	50	10
52/53	51.8	11
54	53.6	12

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
55/56	55.4	13
57/58	57.2	14
59/60	59	15
61/62	60.8	16
63	62.6	17
64/65	64.4	18
66/67	66.2	19
68/69	68	20
70/71	69.8	21
72	71.6	22
73/74	73.4	23
75/76	75.2	24
77/78	77	25

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
79/80	78.8	26
81	80.6	27
82/83	82.4	28
84/85	84.2	29
86/87	86	30
88/89	87.8	31
90	89.6	32
91/92	91.4	33
93/94	93.2	34
95/96	95	35
97/98	96.8	36
99	98.6	37

# Appendix

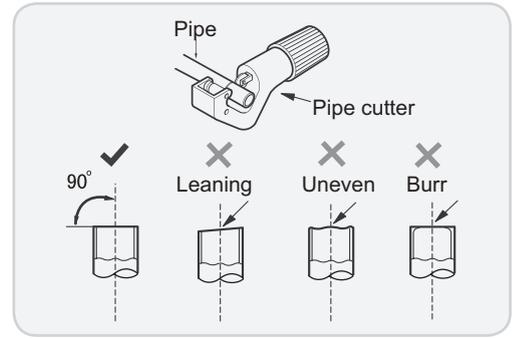
## Appendix 2: Pipe Expanding Method

### ⚠ Note:

Improper pipe expanding is the main cause of refrigerant leakage. Please expand the pipe according to the following steps:

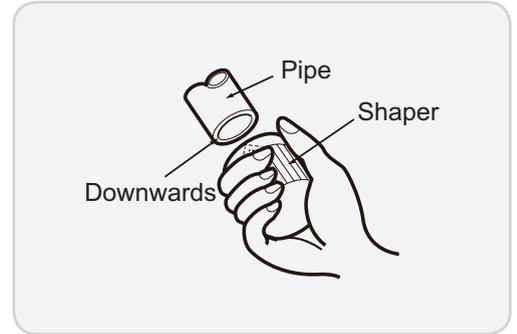
#### A: Cut the pipe

- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.



#### B: Remove the burrs

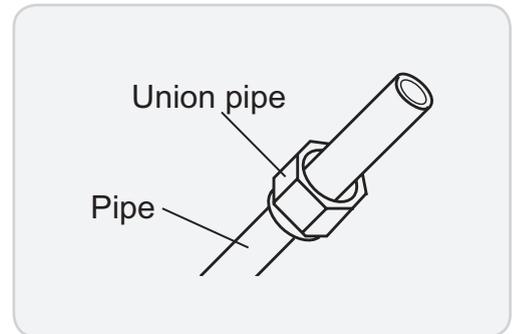
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.



#### C: Put on suitable insulating pipe.

#### D: Put on the union nut

- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



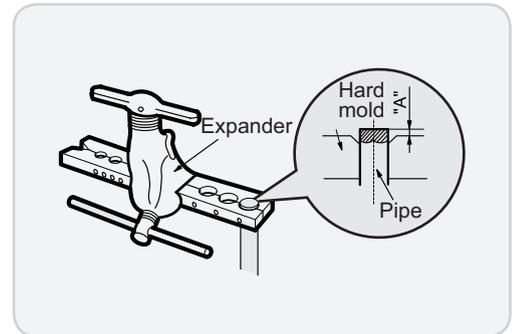
#### E: Expand the port

- Expand the port with expander.

### ⚠ Note:

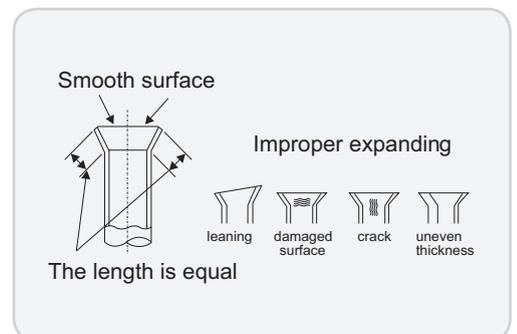
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(mm)	A(mm)	
	Max	Min
Φ6 - 6.35 (1/4")	1.3	0.7
Φ9 - Φ9.52 (3/8")	1.6	1.0
Φ12 - 12.70 (1/2")	1.8	1.0
Φ16 - 15.88 (5/8")	2.4	2.2



#### F: Inspection

- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



# Appendix

## Appendix 3: List of Resistance for Temperature Sensor

### Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units(15K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	138.1	20	18.75	59	3.848	98	1.071
-18	128.6	21	17.93	60	3.711	99	1.039
-17	121.6	22	17.14	61	3.579	100	1.009
-16	115	23	16.39	62	3.454	101	0.98
-15	108.7	24	15.68	63	3.333	102	0.952
-14	102.9	25	15	64	3.217	103	0.925
-13	97.4	26	14.36	65	3.105	104	0.898
-12	92.22	27	13.74	66	2.998	105	0.873
-11	87.35	28	13.16	67	2.896	106	0.848
-10	82.75	29	12.6	68	2.797	107	0.825
-9	78.43	30	12.07	69	2.702	108	0.802
-8	74.35	31	11.57	70	2.611	109	0.779
-7	70.5	32	11.09	71	2.523	110	0.758
-6	66.88	33	10.63	72	2.439	111	0.737
-5	63.46	34	10.2	73	2.358	112	0.717
-4	60.23	35	9.779	74	2.28	113	0.697
-3	57.18	36	9.382	75	2.206	114	0.678
-2	54.31	37	9.003	76	2.133	115	0.66
-1	51.59	38	8.642	77	2.064	116	0.642
0	49.02	39	8.297	78	1.997	117	0.625
1	46.6	40	7.967	79	1.933	118	0.608
2	44.31	41	7.653	80	1.871	119	0.592
3	42.14	42	7.352	81	1.811	120	0.577
4	40.09	43	7.065	82	1.754	121	0.561
5	38.15	44	6.791	83	1.699	122	0.547
6	36.32	45	6.529	84	1.645	123	0.532
7	34.58	46	6.278	85	1.594	124	0.519
8	32.94	47	6.038	86	1.544	125	0.505
9	31.38	48	5.809	87	1.497	126	0.492
10	29.9	49	5.589	88	1.451	127	0.48
11	28.51	50	5.379	89	1.408	128	0.467
12	27.18	51	5.197	90	1.363	129	0.456
13	25.92	52	4.986	91	1.322	130	0.444
14	24.73	53	4.802	92	1.282	131	0.433
15	23.6	54	4.625	93	1.244	132	0.422
16	22.53	55	4.456	94	1.207	133	0.412
17	21.51	56	4.294	95	1.171	134	0.401
18	20.54	57	4.139	96	1.136	135	0.391
19	19.63	58	3.99	97	1.103	136	0.382

# Appendix

Resistance Table of Tube Temperature Sensors for Indoor and Outdoor (20K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	181.4	20	25.01	59	5.13	98	1.427
-18	171.4	21	23.9	60	4.948	99	1.386
-17	162.1	22	22.85	61	4.773	100	1.346
-16	153.3	23	21.85	62	4.605	101	1.307
-15	145	24	20.9	63	4.443	102	1.269
-14	137.2	25	20	64	4.289	103	1.233
-13	129.9	26	19.14	65	4.14	104	1.198
-12	123	27	18.13	66	3.998	105	1.164
-11	116.5	28	17.55	67	3.861	106	1.131
-10	110.3	29	16.8	68	3.729	107	1.099
-9	104.6	30	16.1	69	3.603	108	1.069
-8	99.13	31	15.43	70	3.481	109	1.039
-7	94	32	14.79	71	3.364	110	1.01
-6	89.17	33	14.18	72	3.252	111	0.983
-5	84.61	34	13.59	73	3.144	112	0.956
-4	80.31	35	13.04	74	3.04	113	0.93
-3	76.24	36	12.51	75	2.94	114	0.904
-2	72.41	37	12	76	2.844	115	0.88
-1	68.79	38	11.52	77	2.752	116	0.856
0	65.37	39	11.06	78	2.663	117	0.833
1	62.13	40	10.62	79	2.577	118	0.811
2	59.08	41	10.2	80	2.495	119	0.77
3	56.19	42	9.803	81	2.415	120	0.769
4	53.46	43	9.42	82	2.339	121	0.746
5	50.87	44	9.054	83	2.265	122	0.729
6	48.42	45	8.705	84	2.194	123	0.71
7	46.11	46	8.37	85	2.125	124	0.692
8	43.92	47	8.051	86	2.059	125	0.674
9	41.84	48	7.745	87	1.996	126	0.658
10	39.87	49	7.453	88	1.934	127	0.64
11	38.01	50	7.173	89	1.875	128	0.623
12	36.24	51	6.905	90	1.818	129	0.607
13	34.57	52	6.648	91	1.736	130	0.592
14	32.98	53	6.403	92	1.71	131	0.577
15	31.47	54	6.167	93	1.658	132	0.563
16	30.04	55	5.942	94	1.609	133	0.549
17	28.68	56	5.726	95	1.561	134	0.535
18	27.39	57	5.519	96	1.515	135	0.521
19	26.17	58	5.32	97	1.47	136	0.509

# Appendix

Resistance Table of Discharge Temperature Sensor for Outdoor(50K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-29	853.5	10	98	49	18.34	88	4.75
-28	799.8	11	93.42	50	17.65	89	4.61
-27	750	12	89.07	51	16.99	90	4.47
-26	703.8	13	84.95	52	16.36	91	4.33
-25	660.8	14	81.05	53	15.75	92	4.20
-24	620.8	15	77.35	54	15.17	93	4.08
-23	580.6	16	73.83	55	14.62	94	3.96
-22	548.9	17	70.5	56	14.09	95	3.84
-21	516.6	18	67.34	57	13.58	96	3.73
-20	486.5	19	64.33	58	13.09	97	3.62
-19	458.3	20	61.48	59	12.62	98	3.51
-18	432	21	58.77	60	12.17	99	3.41
-17	407.4	22	56.19	61	11.74	100	3.32
-16	384.5	23	53.74	62	11.32	101	3.22
-15	362.9	24	51.41	63	10.93	102	3.13
-14	342.8	25	49.19	64	10.54	103	3.04
-13	323.9	26	47.08	65	10.18	104	2.96
-12	306.2	27	45.07	66	9.83	105	2.87
-11	289.6	28	43.16	67	9.49	106	2.79
-10	274	29	41.34	68	9.17	107	2.72
-9	259.3	30	39.61	69	8.85	108	2.64
-8	245.6	31	37.96	70	8.56	109	2.57
-7	232.6	32	36.38	71	8.27	110	2.50
-6	220.5	33	34.88	72	7.99	111	2.43
-5	209	34	33.45	73	7.73	112	2.37
-4	198.3	35	32.09	74	7.47	113	2.30
-3	199.1	36	30.79	75	7.22	114	2.24
-2	178.5	37	29.54	76	7.00	115	2.18
-1	169.5	38	28.36	77	6.76	116	2.12
0	161	39	27.23	78	6.54	117	2.07
1	153	40	26.15	79	6.33	118	2.02
2	145.4	41	25.11	80	6.13	119	1.96
3	138.3	42	24.13	81	5.93	120	1.91
4	131.5	43	23.19	82	5.75	121	1.86
5	125.1	44	22.29	83	5.57	122	1.82
6	119.1	45	21.43	84	5.39	123	1.77
7	113.4	46	20.6	85	5.22	124	1.73
8	108	47	19.81	86	5.06	125	1.68
9	102.8	48	19.06	87	4.90	126	1.64

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