GREE
Change for Life

Service Manual

Models: GWHD(36)NK3JO
GWHD(42)NK3JO
(Refrigerant:R410A)

GREE ELECTRIC APPLIANCES,INC.OF ZHUHAI

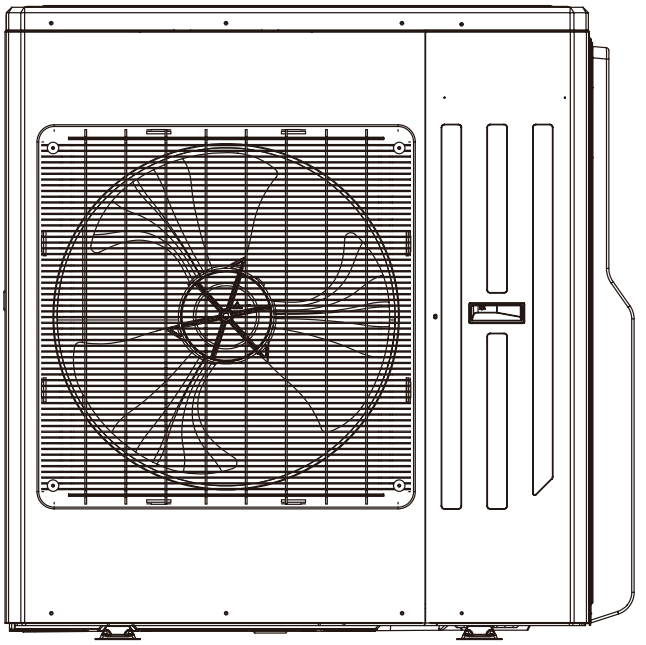
Table of Contents

Part Ⅰ: Technical Information

1. Summary

Outdoor Unit

GWHD(36)NK3JO
GWHD(42)NK3JO



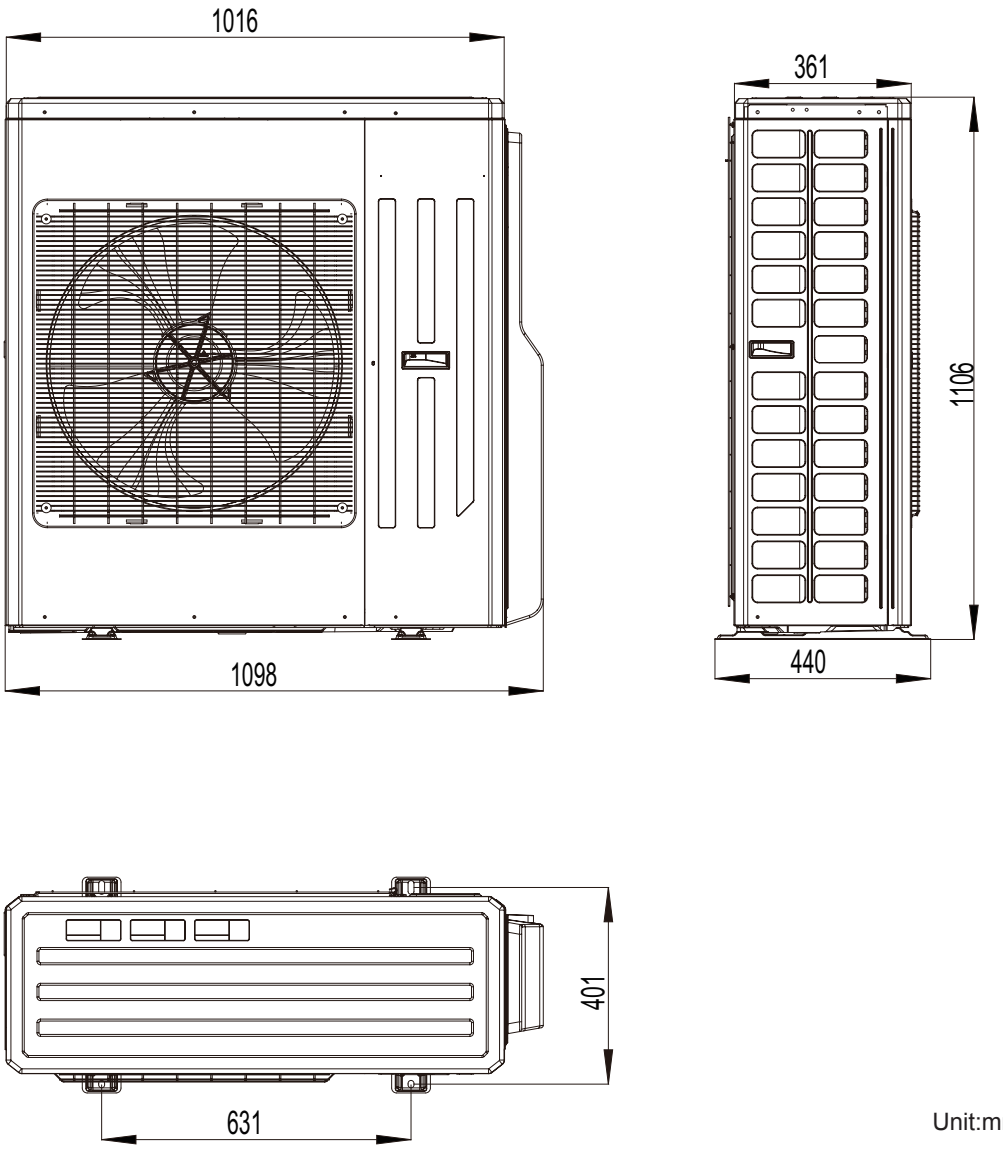
2. Specifications

Model			GWHD(36)NK3JO	GWHD(42)NK3JO
Product Code			CN860W0190	CN860W0200
Power supply	Rated Voltage	V~	220-240	220-240
	Rated Frequency	Hz	50	50
	Phases		1	1
Cooling capacity(max~min)		W	10000(2600~10500)	11400(2600~12000)
Heating capacity(max~min)		W	11200(2600~12000)	12000(2600~13000)
Cooling Power Input		W	3000	3500
Heating Power Input		W	3100	3250
Cooling Current Input		A	12.5	15
Heating Current Input		A	13.5	14
Rated Power Input		W	3800	4000
Rated Current		A	30	30
AEER		W/W	3.30	3.23
ACOP		W/W	3.58	3.65
Outdoor Unit	Compressor Trademark		ZHUHAI LANDA COMPRESSOR CO.,LTD	ZHUHAI LANDA COMPRESSOR CO.,LTD
	Compressor Model		QXAS-D32zX090A	QXAS-D32zX090A
	Compressor Refrigerant Oil Type		FV50S	FV50S
	Compressor Type		Inverter Rotary	Inverter Rotary
	L.R.A	A	/	/
	Compressor Rated Load Amp (RLA)	A	15.6	17.8
	Compressor Power Input	W	4150	4150
	Compressor Thermal Protector		1NT11L-6233	1NT11L-6233
	Throttling Method		Electron expansion valve	Electron expansion valve
	Cooling Operation Ambient Temperature Range	^{O}C	-7~48	-7~48
	Heating Operation Ambient Temperature Range	^{O}C	-15~30	-15~30
	Condenser Material		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Condenser Pipe Diameter	mm	Φ7.94	Φ7.94
	Rows-Fin Gap(mm)	mm	2-1.4	2-1.4
	Coil length (l) X height (H) X coil width (L)	mm	1056X286X776	1056X286X776
	Fan Motor Speed (rpm) (H/M/L)	rpm	880	880
	Output of Fan Motor	W	140	140
	Fan Motor RLA	A	/	/
	Fan Motor Capacitor	μF	/	/
	Air Flow Volume of Outdoor Unit	m^3/h	7700	7700
	Fan Type-Piece		Axial-flow	Axial-flow
	Fan Diameter	mm	Φ570	Φ570
	Defrosting Method		Automatic Defrosting	Automatic Defrosting
	Climate Type		T1	T1
	Isolation		I	I
	Moisture Protection		IP24	IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.2	4.2
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	2.5
	Dimension (WXHXD)	mm	1087X1103X440	1087X1103X440
	Dimension of Package (LXWXH)	mm	1155X480X1115	1155X480X1115
	Dimension of Package(LXWXH)	mm	1158X483X1130	1158X483X1130
	Net Weight	kg	89	90
	Gross Weight	kg	98	98
	efrigerant Charge		R410A	R410A
	Refrigerant Charge	kg	3.65	3.65

Outdoor Unit	Cross-sectional Area of Power Cable Conductor	mm^2	4.0	4.0
	Recommended Power Cable(Core)	N	3	3
	Connection Pipe Connection Method	-	Flare Connection	Flare Connection
	Not Additional Gas Connection Pipe Length	m	40	40
	Connection Pipe Gas Additional Charge	g/m	20	20
	Outer Diameter of Liquid Pipe(GREE Allocation) (Metric)1	mm	Φ6	Φ6
	Outer Diameter of Gas Pipe(GREE Allocation) (Metric)1	mm	Φ9.52	Φ9.52
	Outer Diameter of Liquid Pipe(GREE Allocation) (Metric)2		Φ6	Φ6
	Outer Diameter of Gas Pipe(GREE Allocation) (Metric)2		Φ9.52	Φ9.52
	Outer Diameter of Liquid Pipe(GREE Allocation) (Metric)3		Φ6	Φ6
	Outer Diameter of Gas Pipe(GREE Allocation) (Metric)3		Φ9.52	Φ9.52
	Outer Diameter of Liquid Pipe(GREE Allocation) (Metric)4		Φ6	Φ6
	Outer Diameter of Gas Pipe(GREE Allocation) (Metric)4		Φ9.52	Φ9.52
	Outer Diameter of Liquid Pipe(GREE Allocation) (Metric)5		Φ6	Φ6
	Outer Diameter of Gas Pipe(GREE Allocation) (Metric)5		Φ9.52	Φ9.52
	Connection Pipe Max. Height Distance(indoor and indoor)	m	7.5	7.5
	Max. equivalent connection pipe length(outdoor to last indoor)	m	25	25
	Connection Pipe Max. Length Distance(total lenght)	m	75	75

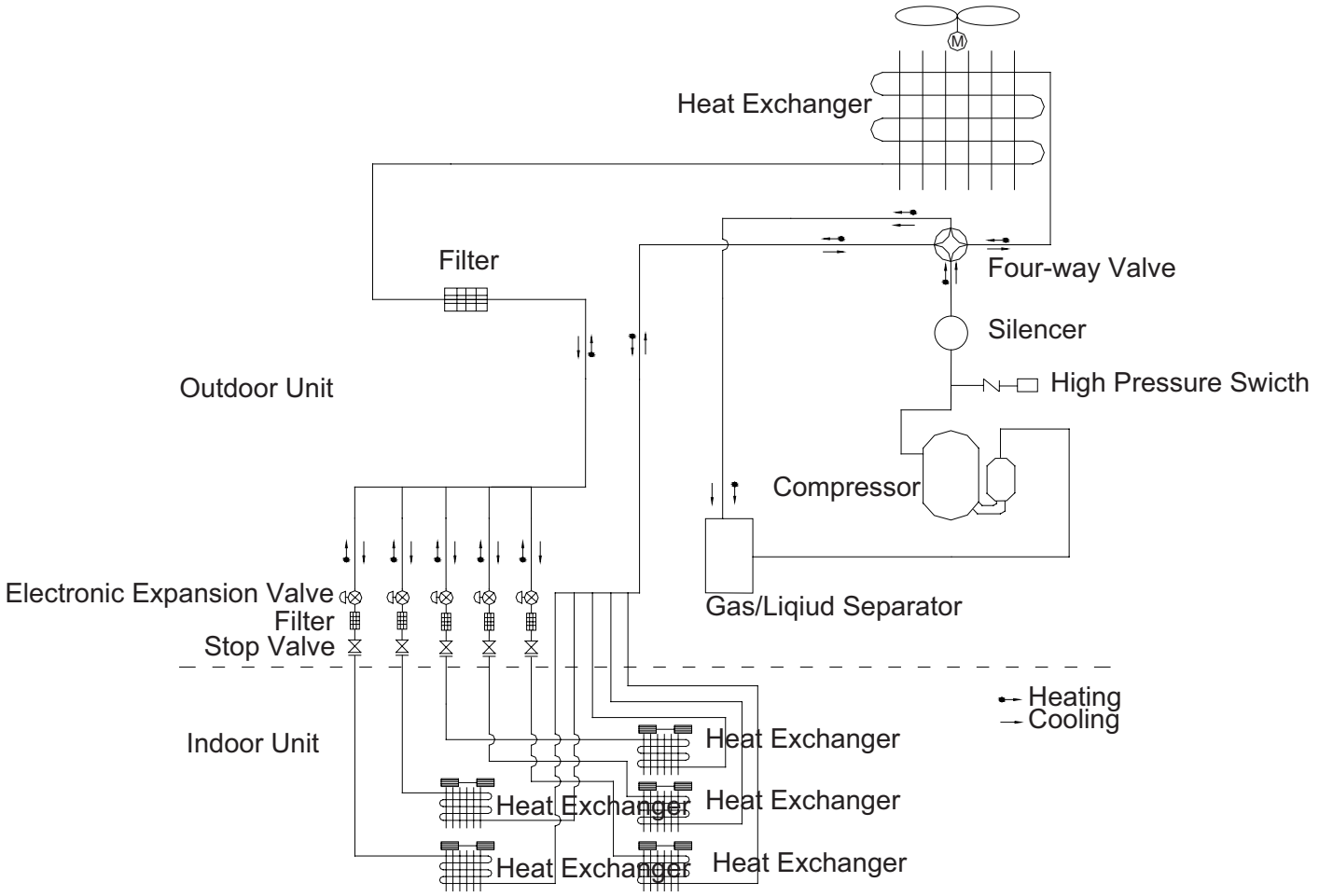
The above data is subject to change without notice. Please refer to the nameplate of the unit.

3. Outline Dimension Diagram



Unit:mm

4. Refrigerant System Diagram



Schematic Diagram of Free Match Series Inverter Heat Pump System

5. Electrical Part

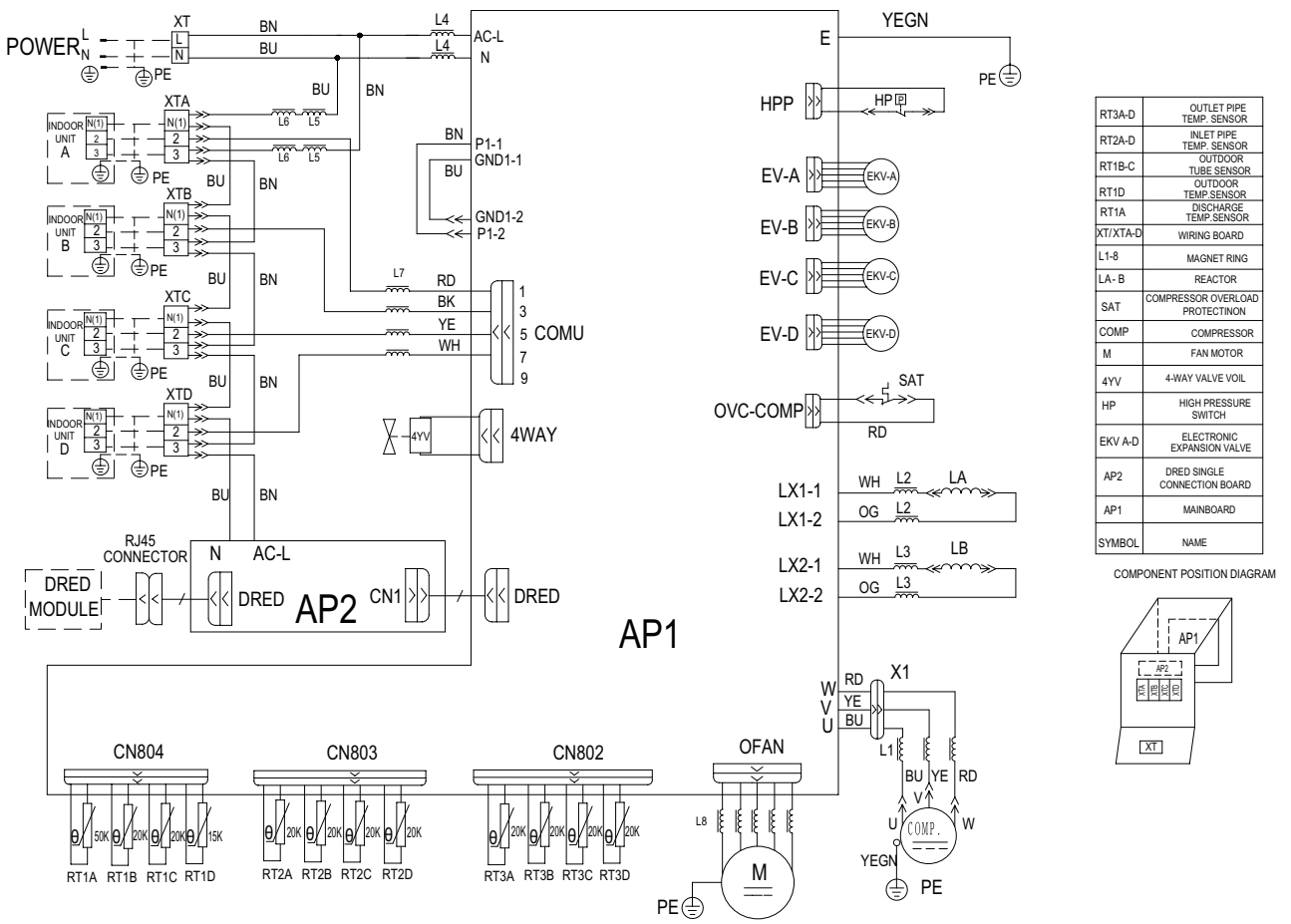
5.1 Wiring Diagram

●Instruction

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	GREEN	COMP	Compressor
YE	Yellow	BN	Brown		Grouding wire
RD	Red	BU	Blue	⏚	
YEGN	Yellow/Green	BK	Black		
VT	Violet	OG	Orange		

• Outdoor Unit

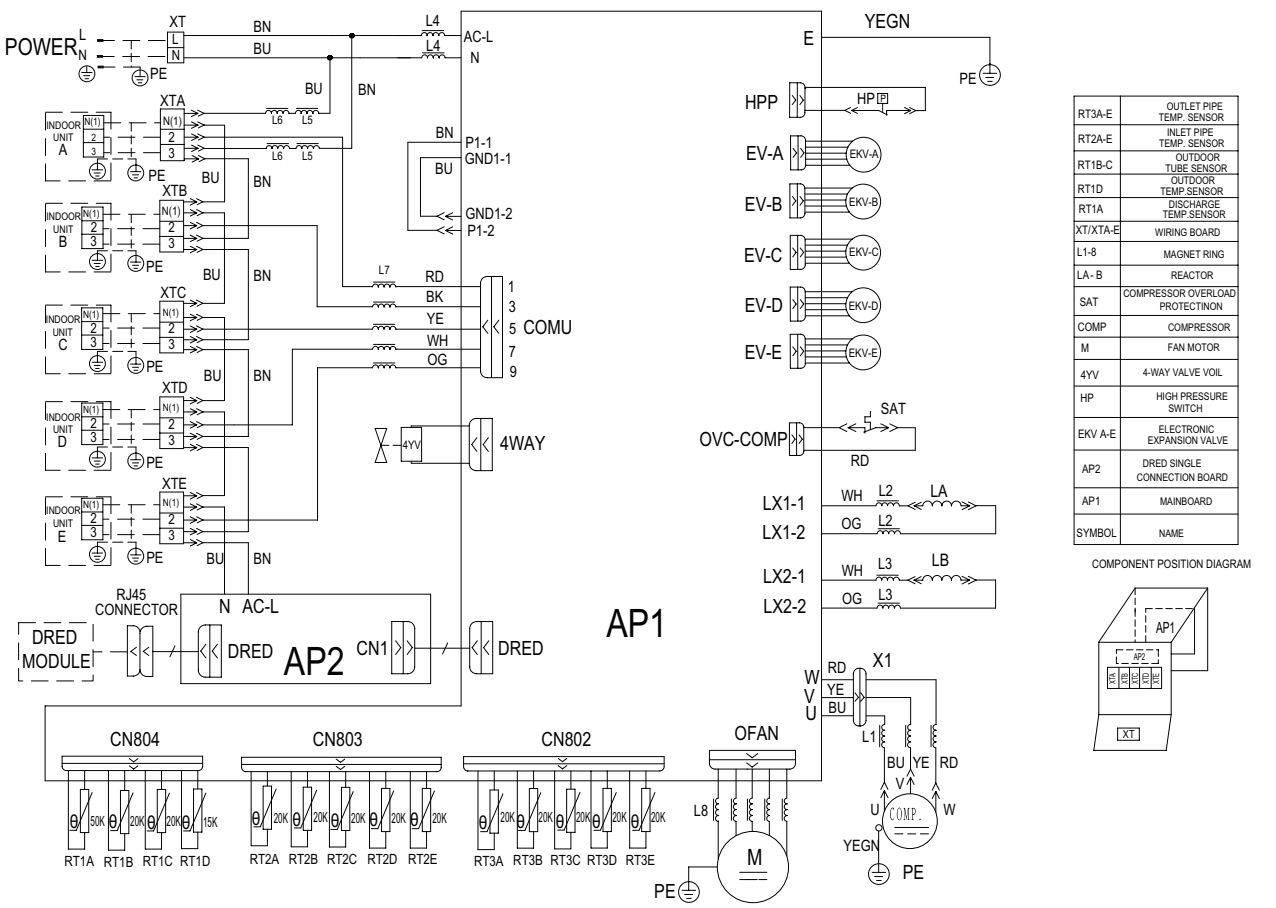
(1)Model:GWHD(36)NK3JO



RT3A-D	OUTLET PIPE TEMP. SENSOR
RT2A-D	INLET PIPE TEMP. SENSOR
RT1B-C	OUTDOOR TUBE SENSOR
RT1D	OUTDOOR TEMP.SENSOR
RT1A	DISCHARGE TEMP.SENSOR
XT/XTA-D	WIRING BOARD
L1-8	MAGNET RING
LA- B	REACTOR
SAT	COMPRESSOR OVERLOAD PROTECTINON
COMP	COMPRESSOR
M	FAN MOTOR
4YV	4-WAY VALVE VOIL
HP	HIGH PRESSURE SWITCH
EKV A-D	ELECTRONIC EXPANSION VALVE
AP2	DRED SINGLE CONNECTION BOARD
AP1	MAINBOARD
SYMBOL	NAME

COMPONENT POSITION DIAGRAM

(2)Model:GWHD(42)NK3JO



RT3A-E	OUTLET PIPE TEMP. SENSOR
RT2A-E	INLET PIPE TEMP. SENSOR
RT1B-C	OUTDOOR TUBE SENSOR
RT1D	OUTDOOR TEMP.SENSOR
RT1A	DISCHARGE TEMP.SENSOR
XT/XTA-E	WIRING BOARD
L1-8	MAGNET RING
LA - B	REACTOR
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4YV	4-WAY VALVE VOIL
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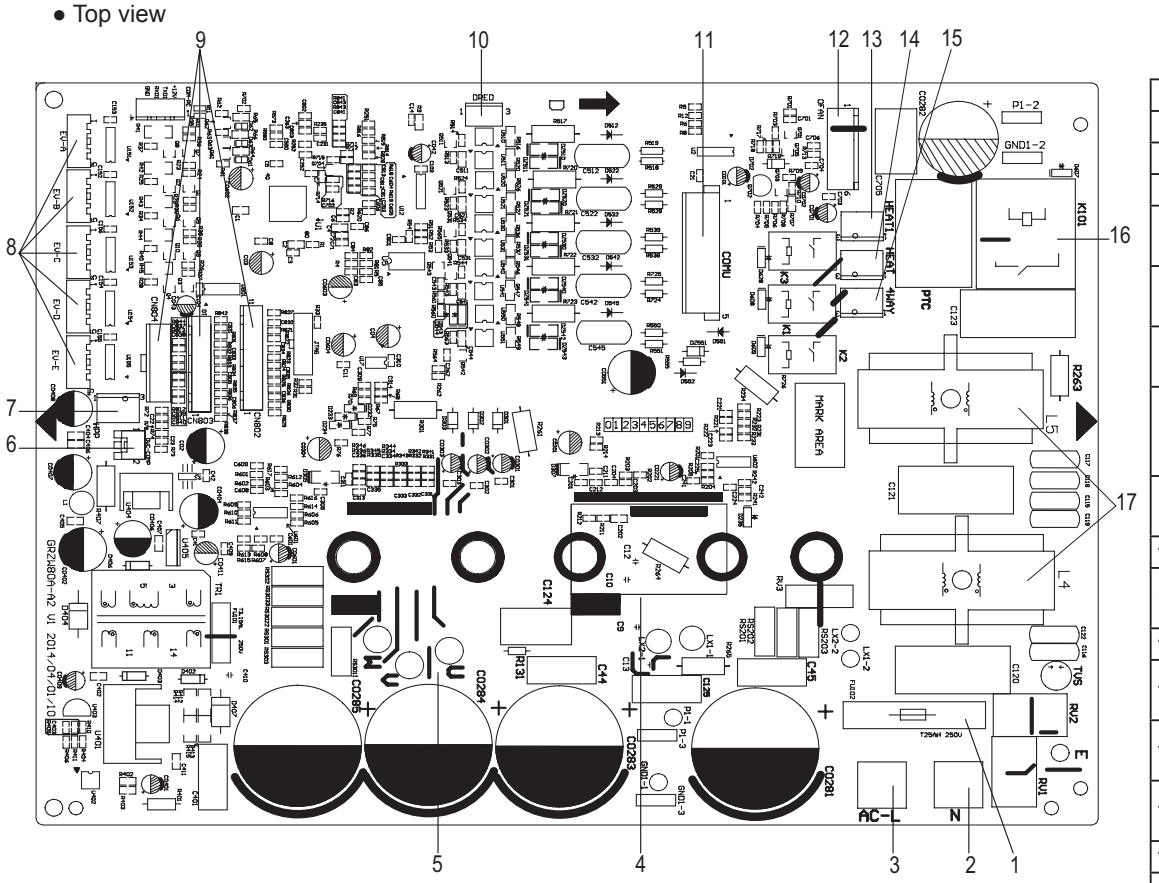
AP2	DRED SINGLE CONNECTION BOARD
AP1	MAINBOARD
SYMBOL	NAME

COMPONENT POSITION DIAGRAM

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

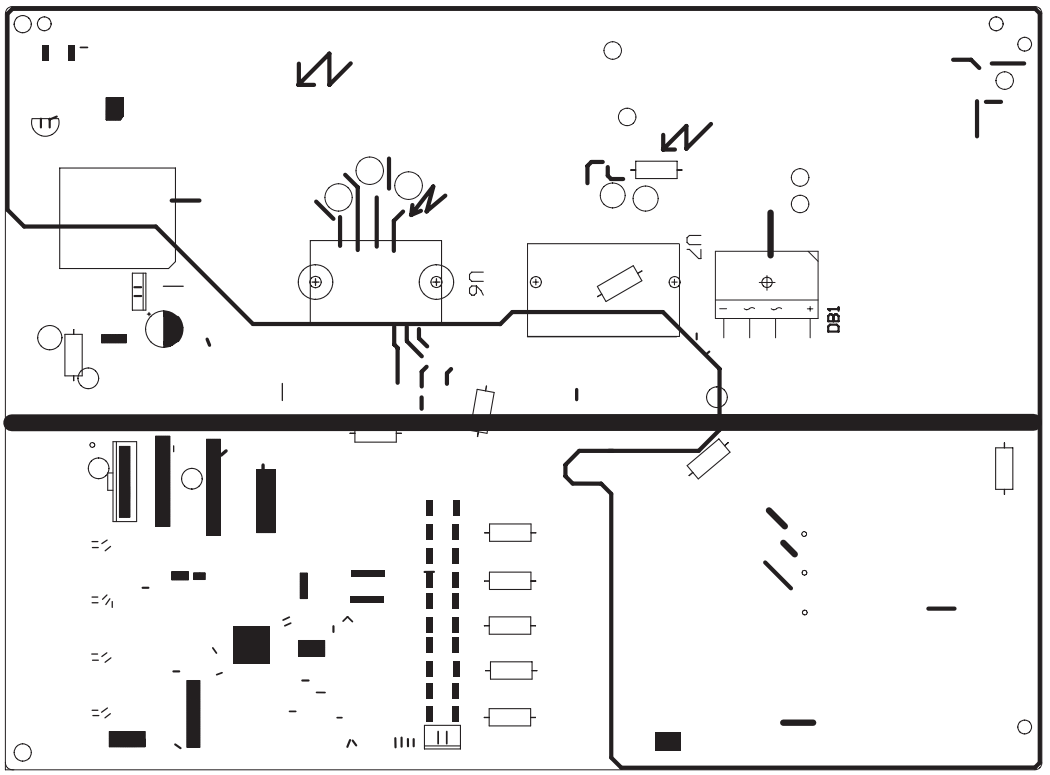
5.2 PCB Printed Diagram

● Top view



1	T25AH 250V: Fuse
2	N: terminals of neureal wire
3	AC-L: terminals of line wire
4	PFC electrocircuit
5	U/V/W: terminals of compressor
6	OVC-COMP: terminals of overload protector
7	HPP: terminals of high pressure switch
8	EVA-EVE: terminals of EXV(electronic expansion valve)
9	CN802-CN803: terminals of temperature sensor
10	Network wire of DRED
11	COMU: terminals of communication
12	OFAN: terminals of fan
13	HEAT1: terminals of bottom band heater
14	HEAT: terminals of compressor band heater
15	4WAY: terminals of 4-way valve
16	K101: Main relay
17	L4-L5: choke

● Bottom view



6. Function and Control

1. Function Control

1) Cooling mode

a. Turning on the unit for cooling operation, and if any one of the indoor units satisfy the cooling operation condition, the system will start for cooling operation; and the electronic expansion valve, the outdoor fan and the compressor start operation.
b. When some of the indoor units satisfy the stop-condition while some indoor units does not satisfy the stop-condition, the compressor does not stop, the compressor adjust the frequency according to demand. For the indoor unit with stop-condition satisfies, the corresponding electronic expansion valve will be closed.
c. Change Cooling mode to heating mode
When change the unit to heating mode from cooling mode, the whole system will stop first. Then the system will restart in heating mode after the compressor stops.
d. 4-way valve
In this mode, the 4-way valve is closed.
e. 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 after starting and then it will run in set speed.

2) Dry mode (dehumidification mode)

this mode is the same as cooling mode;

3) Heating mode

a. Turning on the unit for heating operation, If any one of the indoor unit satisfy the heating condition, the system will start to run in heating mode
b. If all the indoor units satisfy the stop-condition, the compressor stops and the outdoor fan stops after 1min;
c. If only part of the indoor units satisfy the stop-condition, the compressor decrease the frequency immediately and operates according to demand.
d. Change Heating mode to cooling mode or dehumidification mode, the whole system will stop first, then restart under the required mode.
e. Defrosting function
When the defrosting condition is satisfied, the 4-way valve reverses the direction, the outdoor fan stop.After the 4-way valve reverses the direction, the frequency of compressor rises, and the unit
will start defrosting under cooling cycle.

4) Fan mode

Only indoor fan run. Compressor, outdoor fan and 4-way valve are closed .

2. Protection Function

1) Mode conflict protection of indoor units

When the setting mode is different of different indoor unit, the unit runs in below status:
a. The system mode is determined by the first turning on indoor unit except indoor unit is in fan mode. Cooling mode (dry mode) is in conflict with heating mode.
b. If the first turning on unit is fan mode, and the second turning on unit is cooling or heating mode, then the system will run in cooling or heating mode

2) Overload protection

If the tube temperature at the high pressure side is higher than normal, the compressor frequency is restricted or decreased to normal operation frequency.

3) High exhaust temperature protection

If the exhaust temperature is higher than protection value, the compressor stops running.
If the exhaust temperature protection continuously appears for 6 times, the compressor can't resume running. In this case, only by cutting off the power and then reenergize that the compressor can restart. If the running duration of the compressor is longer than 10min, the protection times will be cleared to zero time.

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. If the outdoor unit receives the communication data of that indoor unit later, the communication malfunction will be cleared.

5) System high-pressure protection

a. When the high-pressure switch detects the system pressure higher than limit ,then the high-pressure switch cuts off, the system will stop to run.

b.If high-pressure protection is detected for two times within one hour, only by cutting off the power and then reenergize that the compressor can restart.

6) Compressor overload protection

No matter the compressor is on or off, when the compressor overload switch is detected activated, the system will stop and indoor unit will display H3. If the compressor overload protection appears for more than 6 times, in this case, only by cutting off the power and then reenergize that the compressor can restart. If the running duration of the compressor is longer than 30min, the protection times will be cleared to zero.

7) Antifreeze protection

Under cooling and dry mode, 6minutes after the compressor is started:

When it is detected for 3 minutes successively that Tevap. Is less than -2^{O}C(varying with indoor unit), the antifreeze protection will be activated, in which case the outdoor unit will immediately shut off the indoor electronic expansion valve and the capacity will be set to “0”.

If Tevap. exceed 13^{O}C and the compressor has remained at OFF for at least 3minutes, the compressor will resume its original operation state.

8) IPM Protection

a. 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 10min, 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.

b. IPM module overheating protection

(a) When TIPM $>$ 88^{O}C, prohibit to raise frequency;

(b) When 88^{O}C $<$ TIPM $<$ 95^{O}C, the operation frequency of compressor lows down 1HZ/1s;

(c) When TIPM $>$ 100^{O}C, the compressor stops. After the compressor stops for 3min, if TIPM $<$ 77^{O}C, the compressor and the outdoor fan will resume operation.

9) DRED function

If the power of DRED device is supplied by switching power supply, when different DRED signals are received, the corresponding optocouplers are put through to make the AD sample circuit on the main board detect the different voltages. Different voltages are corresponding to different DRED modes. After entering DRED mode, the indoor unit displays the corresponding operation code of DRED mode.

d1: Outdoor compressor stops;

d2: The electricity consumption of complete unit in 30min is less than or equals to 50% of rated electricity consumption;

d3: The electricity consumption of complete unit in 30min is less than or equals to 75% of rated electricity consumption

Part Ⅱ : Installation and Maintenance

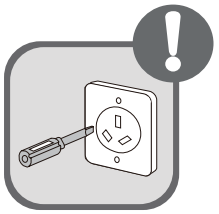
7. Safety Precautions

Forbidden Items! It indicates that improper operation might lead to human casualty or sever injury.

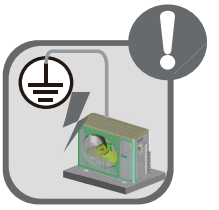
Items need to be followed. It indicates that improper operation might lead to personal injury or property damage.

Follow this instruction to complete the installation work.
Please carefully read this manual before unit startup and service.

Installation should be conducted by dealer or qualified personnel. Please do not attempt to install the unit by yourself. Improper handling may result in water leakage, electric shock or fire disaster etc.



Before installation,please check if the power supply is in accordance with the requirements specified on the nameplate.And also take care of the power safety.

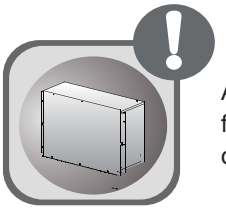


Make sure the unit can be earthed properly and soundly after plugging into the socket so as to avoid electric shock. Please do not connect the groundwire to gas pipe, water pipe, lightning rod or telephone line.

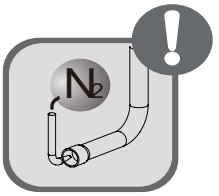
Be sure to use the excluxive accessory and part to prevent the water leakage,electric shock and fire accidents.

If refrigerant leakage happens during installation, please ventilate immediately.Poisonous gas will emerge if the refrigerant gas meets fire.

Wire size of power cord should be large enough The damaged power cord and connection wire should be replaced by exclusive cable.

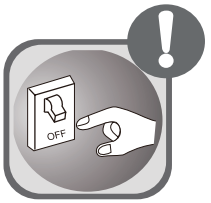


After connecting the power cord, please fix the electric box cover properly in order to avoid accident.



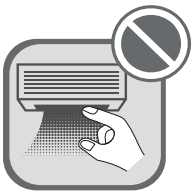
Never fail to comply with the nitrigen charge requirements. Charge nitrogen when welding pipes.

Never short-circuit or cancel the pressure switch to prevent unit damage.



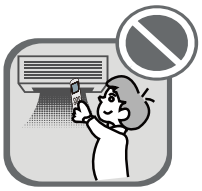
Please firstly connect the wired controller before energization,otherwise wired controller can not be used.

Before using the unit, please. check if the piping and wiring are correct to avoid water leakage, refrigerant leakage,electric shock, or fire etc.

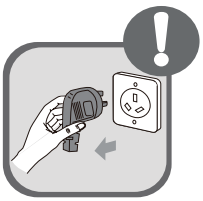


Do not insert fingers or objects into air outlet/inlet grille.

Never start up or shut off the air conditioner by means of directly plug or unplug the power cord.

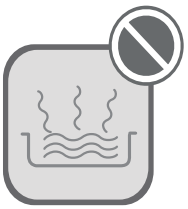


Do not allow children operate this unit.



Turn off the unit or cut off the power supply before cleaning the unit, otherwise electric shock or injury may happen.

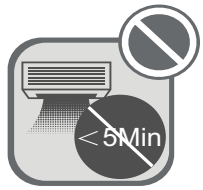
Do not expose the unit to the moist or corrosive circumstances.



Volatile liquid, such as diluent or gas will damage the unit appearance. Only use soft cloth with a little neutral detergent to clean the outer casing of unit.

If anything abnormal happens (such as burning smell), please power off the unit and cut off the main power supply, and then immediately contact Gree appointed service center. If abnormality keeps going, the unit might be damaged and lead to electric shock or fire.

Open the door and window and keep good ventilation in the room to avoid oxygen deficit when the gas/oil supplied heating equipment is used.



Turn off the unit after it runs at least five minutes; otherwise it will influence oil return of the compressor.

Do not operate this unit with wet hands.

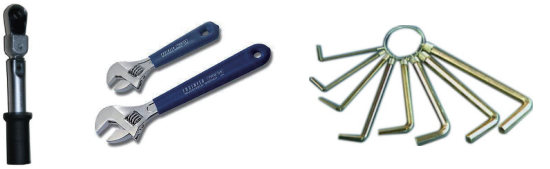
Never spray or flush water towards unit, otherwise malfunction or electric shock may happen.

Electrify the unit 8 hours before operation. Please switch on for 8 hours before operation.Do not cut off the power when 24 hours short-time halting (to protect the compressor).

Under cooling mode, please don't set the room temperature too low and keep the temperature difference between indoor and outdoor unit within 5^{O}C.

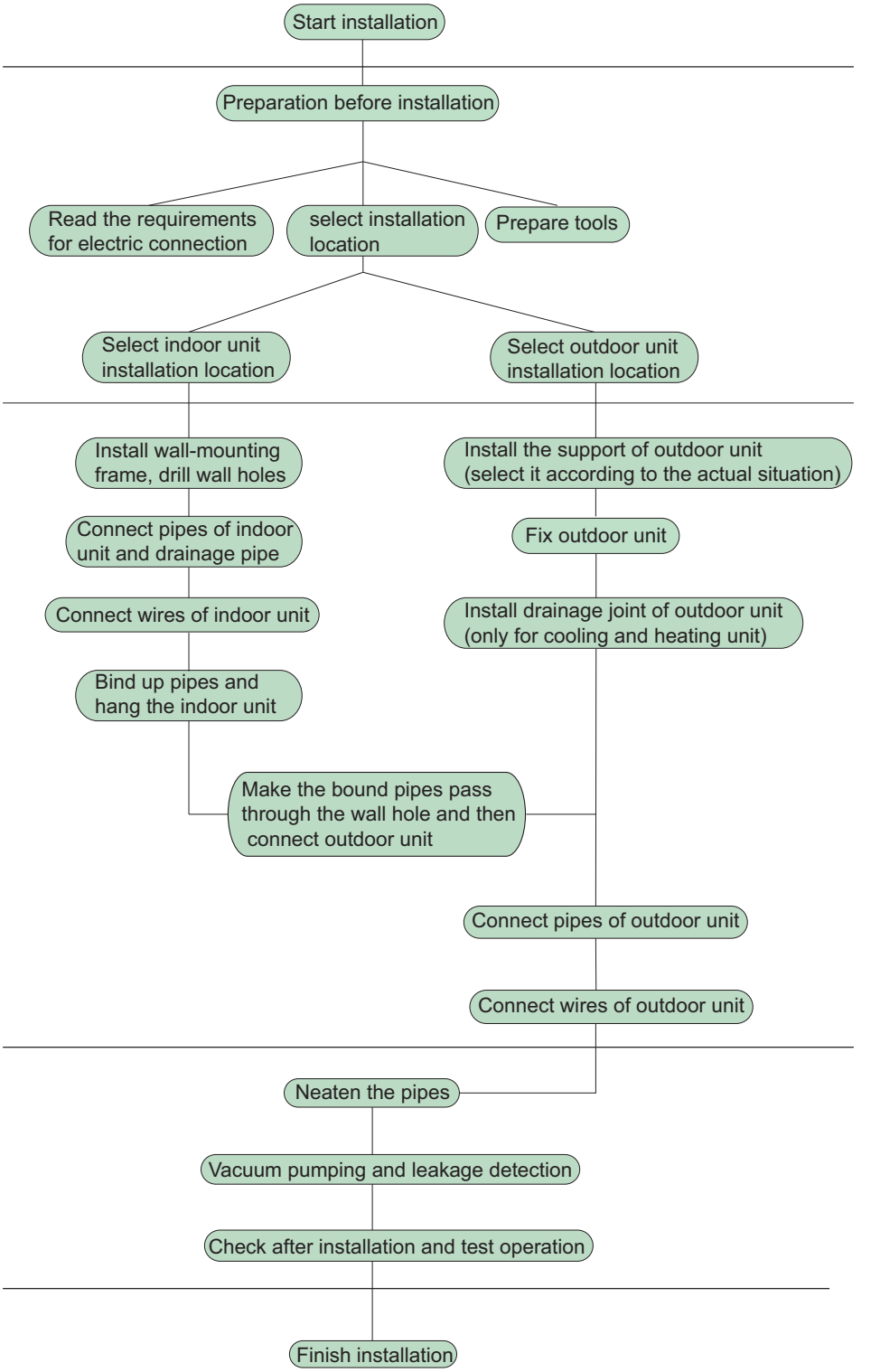
User is not allowed to repair the unit. Fault service may cause electric shock or fire accidents.Please contact Gree appointed service center for help.

Main Tools for Installation and Maintenance

1. Level meter, measuring tape 	**2. Screw driver** 	**3. Impact drill, drill head, electric drill** 
4. Electroprobe 	**5. Universal meter** 	**6. Torque wrench, open-end wrench, inner hexagon spanner** 
7. Electronic leakage detector 	**8. Vacuum pump** 	**9. Pressure meter** 
10. Pipe pliers, pipe cutter   	**11. Pipe expander, pipe bender**  	**12. Soldering appliance, refrigerant container**  

8. Installation Manual

Installation procedures

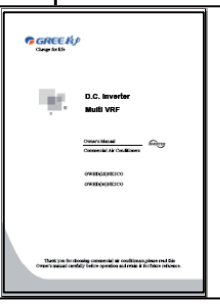
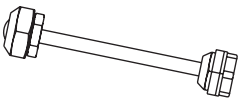


Note: this flow is only for reference; please find the more detailed installation steps in this section.

8.1 Preparation before Installation

8.1.1 Standard parts

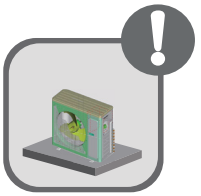
Please use the following standard parts supplied by GREE.

Pars of Outdoor Unit				
Namber	name	picture	Quantity	Remark
1	Owner's manual		1	
2	Tube connector subassy		6	

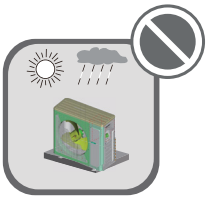
8.1.2 Selecting installation site

Forbidden Items! It indicates that improper operation might lead to human casualty or sever injury.

Items need to be followed. It indicates that improper operation might lead to personal injury or property damage.



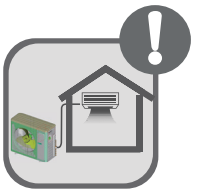
Install the unit at a place where is adequa to withstand the weight of the unit and make sure the unit would not shake or fall off.



Never expose the unit under direct sunshine and rainful. install the unit at a place where is against dust, typhoon and earthquake.

Try to keep the unit away from combustible, inflammable and corrosive gas or exhaust gas.

Leave some space for heat exchanging and servicing so as to guarantee unit normal operation.



Keep the indoor and outdoor units close to each other as much units close to each other as much the pipe length and bends.

Never allow children to approach to the unit and take measures to prevent children touching the unit.

When the outdoor unit is totally surrounded by walls, the installation space of the unit should be as required in Fig.1.

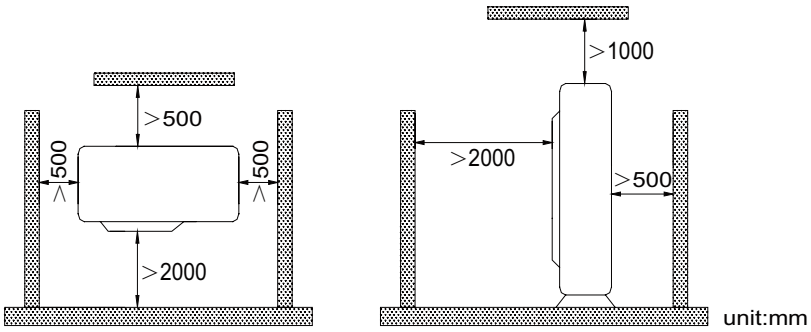


Fig.1

8.1.3 Piping Connection

The maximum pipe length is shown in the following table. When the distance between units (piping length) is out of the range listed below, normal run of the unit can not be guaranteed.

Model	Connecting Pipe (mm)		Max. Pipe length(m)	Max. Height Difference between Indoor Unit and Outdoor Unit (m)
	Liquid	Gas		
GWHD(36)NK3J O	Φ 6.35	Φ 9.52	75	When the outdoor unit is above maximum height difference between indoor and outdoor units is up to 15m; When the indoor unit is above,maximum height difference between indoor and outdoor units is up to 15m.
GWHD(42)NK3J O	Φ 6.35	Φ 9.52	75	

Note:

① **Use water-proof insulating pipe.**

② **Wall thickness of pipe: 0.5-1.0 mm;bearing pressure: 3.0MPa**

③ **The longer the connection pipe is, the more cooling and heating capacity will decrease.**

8.2 Installation Instruction

8.2.1 Outline and dimension of the outdoor unit

GWHD(36)NK3JO

Outline dimension andMounting holes

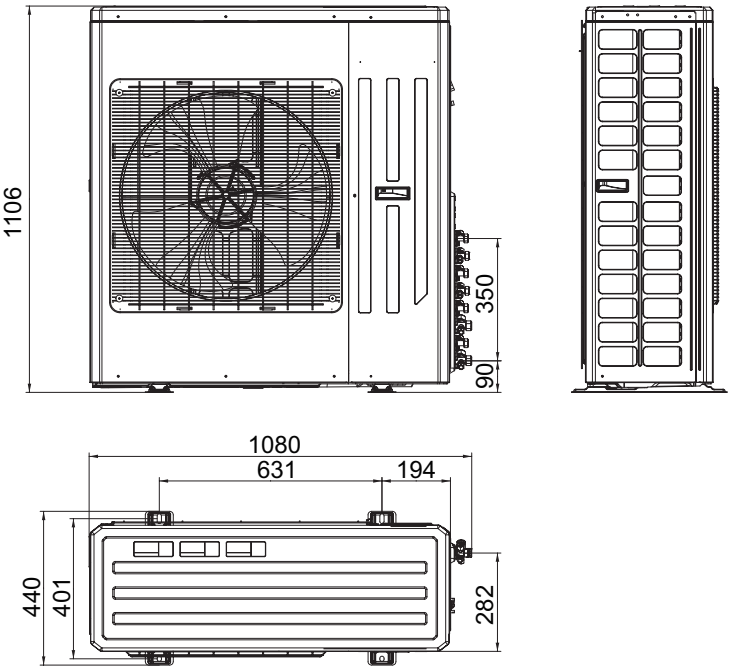


Fig.2

GWHD(42)NK3JO

Outline dimension andMounting holes

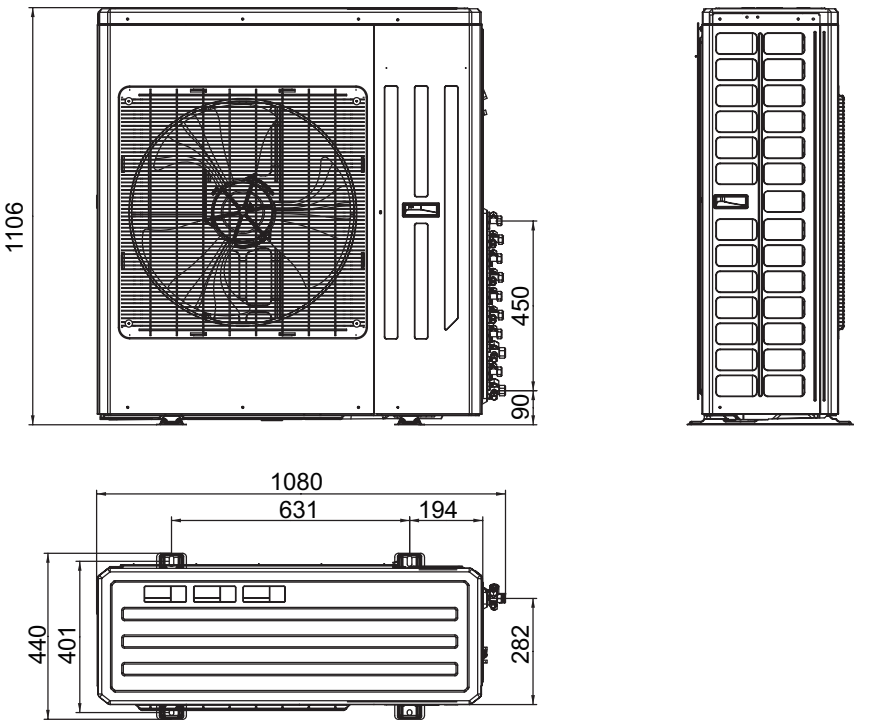


Fig.3

8.2.2 Installation of the Connection Pipe

Connecting piping for indoor unit and outdoor unit are in manifold mode. (As shown below).

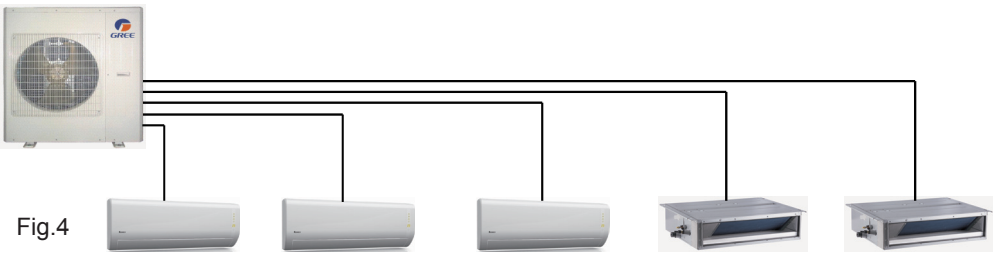


Fig.4

1) Piping between the Indoor and Outdoor Units

● If the liquid and gas stop valves which have the sign of A , B, C, D or E have not been connected to the indoor units, please turn off the screw cap with the spanner airproof.

● Refer to Fig.5 for the moments of torque for tightening screws.

● Let the flare end of the copper pipe point at the screw and then tighten the screw by hand.

● After that, tighten the screw by the torque wrench unit it clatters (as shown in Fig.5).

● The bending degree of the pipe can not be too small; otherwise it will crack. And please use a pipe tube bender to bend the pipe.

● Wrap the exposed refrigerant pipe and the joints by sponge and then tighten them with the plastic tape.

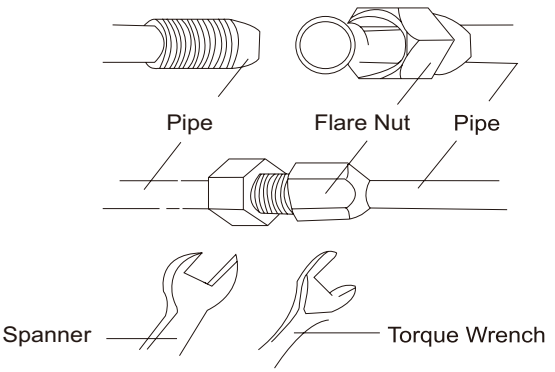


Fig.5

Pipe diameter(inch)	Thickness of copper tube	Tightening torque(ft·lbf)
Φ6.35mm	≥0.8mm	15~30 N·m
Φ9.52mm	≥0.8mm	35~40 N·m
Φ12.7mm	≥0.8mm	45~50 N·m
Φ15.9mm	≥1.0mm	60~65 N·m

⚠ CAUTION!

① . During the connection of the indoor unit and the refrigerant pipe, never pull any joints of the indoor unit by force; otherwise the capillary pipe or other pipe may crack, which then would result in leakage.

② . The refrigerant pipe should be supported by brackets, that is, don't let the unit withstand the weight of it.

③ . If the piping connection size of outdoor unit does not match the piping connection size of indoor unit, use the piping connection dimension of indoor unit. And use different-diameter joints which is installing on the place of the piping connection to connect the indoor unit.

CAUTION!

● For the Free Match system, each pipe should be labeled to tell which system it belongs to avoid mistaken inaccurate piping.

2) Allowable pipe length and drop height among indoor and outdoor units

If the total refrigerant pipe length (liquid pipe) is smaller than that listed in the table below, no additional refrigerant will be charged.

Model	GWHD(36)NK3JO	GWHD(42)NK3JO
Total Liquid Pipe Lenght (a+b+c+d+e)	40	40

Allowable Length and Height Fall of the Refrigerant Pipe

		Allowable Value		Fitting pipe
		GWHD(36)NK3JO	GWHD(42)NK3JO	
Total length(actual length) of fitting pipe		75m	75m	$L_1+L_2+\ldots+L_M(M \leq 5)$
length of farthest fitting pipe(ft)		25m	25m	L_X (X=1，2，3，4,5)
Height difference between outdoor unit and indoor unit	Outdoor unit at upper	15m	15m	H1
	Outdoor unit at lower	15m	15m	H3
Height difference between indoor units(ft)		7.5m	7.5m	H2

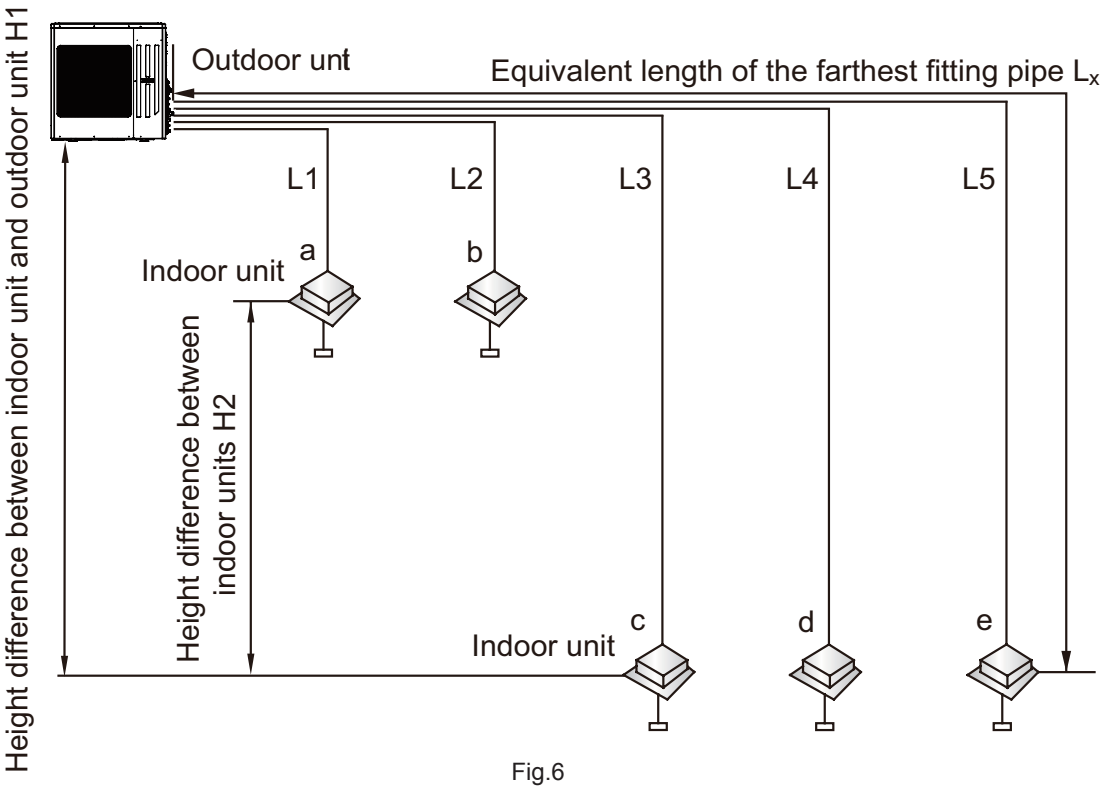


Fig.6

3) Installation of the Protection Layer of the Refrigerant Pipe

a. The refrigerant pipe should be insulated by the insulating material and plastic tape in order to prevent condensation and water leakage.

b. The joints of the indoor unit should be wrapped with the insulating material and no gap is allowed on the joint of the indoor unit, as shown in Fig.7.

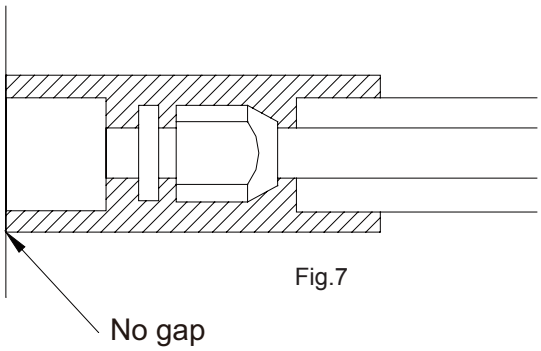


Fig.7

⚠ CAUTION!

After the pipe is protected well enough, never bend it to form a small angle; otherwise it would crack or break.

4)Wrap the Pipe with Tape:

a. Bundle the refrigerant pipe and electric wire together with tape, and separate them from the drain pipe to prevent the condensate water overflowing.

b. Wrap the pipe from the bottom of the outdoor unit to the top of the pipe where it enters the wall. During the wrapping, the later circle should cover half of the former one.

c. Fix the wrapped pipe on the wall with clamps.

⚠ CAUTION!

① . Do not wrap the pipe too tightly; otherwise the insulation effect would be weakened. Additionally, make sure the drain hose is separated from the pipe.

② .After that, fill the hole on the wall with sealing material to prevent wind and rain coming into the room.

(4) Support and protection for pipeline Support should be made for hanging connection pipe. Distance between each support can not be over 1m.

8.2.3 Air Purging and Refrigerant Charge

Air purging

1) The refrigerant has been charged into the outdoor unit before shipment, while additional refrigerant still need be charged into the refrigerant pipe during the field installation.

2) Check if the liquid valve and the gas valve of the outdoor unit are closed fully.

3) As shown in the following figure (Fig.8), expel the gas inside the indoor unit and refrigerant pipe out by the vacuum pump.

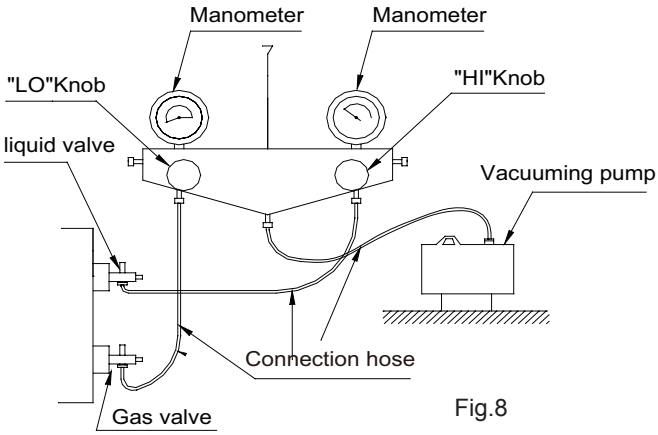


Fig.8

4) When the compressor is not running, charge the R410A refrigerant into the refrigerant pipe from the liquid valve of the outdoor unit (do not do it from the gas valve).

Additional refrigerant charging

a. Refrigerant Charge in the Outdoor Unit before Shipment

Notes:

① **.** Outdoor unit has been charged refrigerant before delivery. The refrigerant charge is not included those charged additionally in the

indoor unit and the refrigerant pipe.

② . The amount of the additional refrigerant charge is dependent on the diameter and length of the liquid refrigerant pipe which is decided by the actual yield installation requirement.

③ . Record the additional refrigerant charge for future maintenance.

b. Calculation of the Additional Refrigerant Charge

Additional Refrigerant Charge=（ΣLength of Liquid Pipe Φ9.52X54+ΣLength of Liquid PipeΦ6.35X22)-880

The biggest additional refrigerant charge value is 800g. It means that if the calculated value exceed 800g, the additional refrigerant charge takes 800g, while the calculated value less than 800g, the additional refrigerant charge takes the calculated value.

8.2.4 Electric Wiring

1) Wiring precautions

● The installation must be done in accordance with the national wiring regulations.

● Only the power cord with the rated voltage and exclusive circuit for the air conditioning can be used.

● Do not pull the power cord by force.

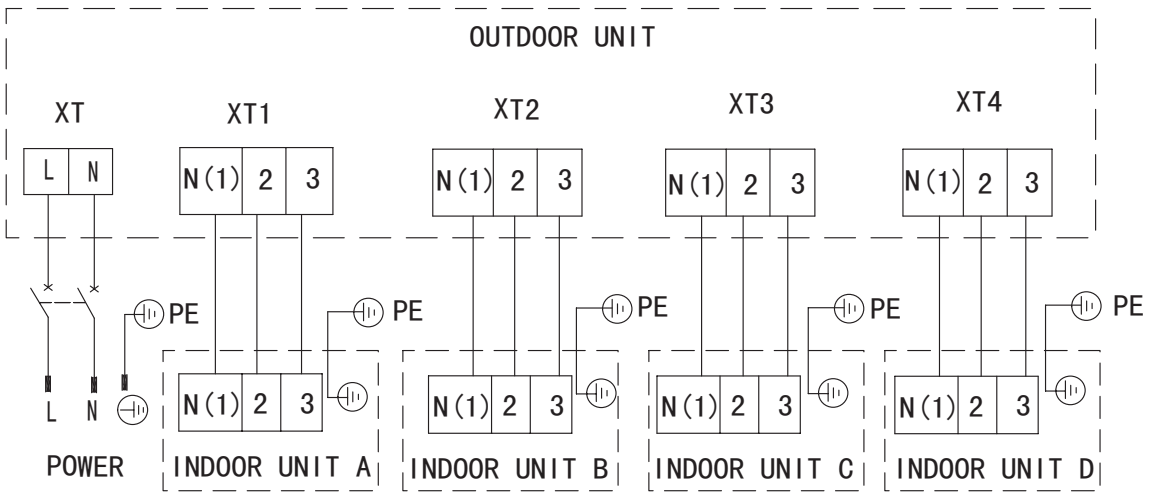
● The electric installation should be carried out by the technician as instructed by the loc al laws, regulations and also this manual.

● The diameter of the power cord should be large enough and once it is damaged it must be replaced by the dedicated one.

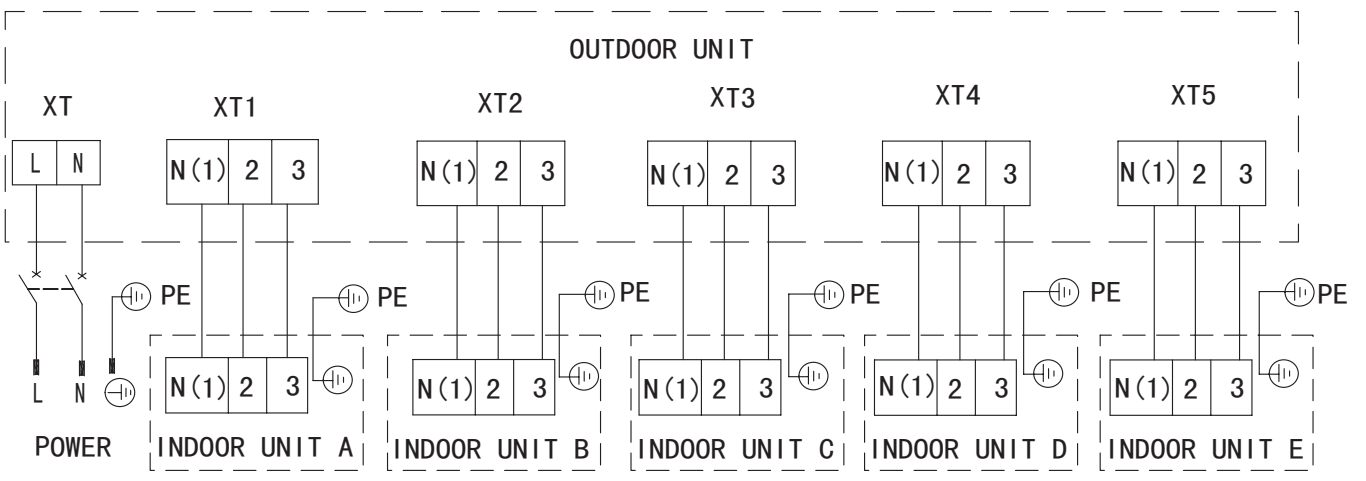
● The earthing should be reliable and the earth wire should be connected to the dedicated device of the building by the technician. Besides, the air switch coupled with the leakage current protection switch must be equipped, which is of enough capacity and of both magnetic and thermal tripping functions in case of the short circuit and overload.

Models	Power Supply	Capacity of the air Switch(A)	Recommended Cord(piecesx sectional area)
GWHD(36)NK3JO	220-240V~,50Hz	32	3 x 4mm^2
GWHD(42)NK3JO	220-240V~,50Hz	32	3 x 4mm^2

GWHD(36)NK3JO



GWHD(42)NK3JO



2) Earthing Requirements

● The air conditioner is classified into the Class I appliances, so its earthing must be reliable.

● The yellow-green line of the air conditioner is the earth line and can not be used for other purpose, cut off or fixed by the tapping screw; otherwise it would cause the hazard of electric shock.

● The reliable earth terminal should be provided and the earth wire can not be connected to any of the following places.

① Running water pipe; ② Coal gas pipe; ③ Sewage pipe; ④ Other places where the professional personnel think unreliable.

3) Electrical Cable Connection Cautions!

① . The mistake connecting line will result in malfunction. After the electrical wiring working, ensure the wire between the connection place and the fixed place has a certain freedom degree.

② . The connection piping and connection line of each indoor unit should connect well according to the instruction.

③ . The electric installation should be carried out by the technician as instructed by the local laws, regulations and also this manual.

④ . The installation location should be dry, and can't be expose in direct sunlight or strong breeze.

⑤ . Have to install a breaker in the circuit that can shut off the main power supply of the system. Besides, the air switch coupled with the leakage current protection switch must be equipped.

4) Wiring of the Power Cord

① . Open the side plate.

② . Connect the power card to the terminals “L1”, “L2” and also the earthing bolt, and then connect the wiring terminals “N(1),2,3” of the indoor unit to those of the outdoor unit correspondingly.

③ . Fix the power cord with wire clips.

④ . Let the power cord go through the rubber ring.

⑤ .Supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord(code designation 60245 IEC 57).

⚠ CAUTIONS!

If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

9. Troubleshooting

9.1 Malfunction Indicator

The error code will be displayed on the wired controller and the main board of the outdoor unit.

The meaning of each error, as shown in table 13.

Name of malfunction	The indicator display			Indoor display
	Yellow light	Red light	Green light	
Compressor runs	Flash once			
Defrost	Flash twice			H1
Anti-freezing protection	Flash 3 times			E2
IPM protection	Flash 4 times			H5
AC over-current protection	Flash 5 times			E5
Over-burden protection	Flash 6 times			H4
Compressor exhaust high temperature protection	Flash 7 times			E4
Compressor overload protection	Flash 8 times			H3
Power protection	Flash 9 times			L9
EEPROM reads and write protection	Flash 11 times			
Low PN voltage protection	Flash 12 times			PL
Over voltage protection for PN	Flash 13 times			PH
PFC protection	Flash 14 times			HC
PFC module temperature protection	Flash 15 times			oE
Low pressure protection	Flash 17 times			E3
High pressure protection	Flash 18 times			E1
Limit/decline frequency(electric current)		Flash 1 times		
Frequency limit(exhaust)		Flash 2 times		
Frequency limit(Over-burden)		Flash 3 times		
Outdoor ambient sensor malfunction		Flash 6 times		F3
Outdoor tube sensor malfunction		Flash 5 times		F4
Exhaust sensor malfunction		Flash 7 times		F5
Attain the temperature of switch on		Flash 8 times		
Frequency limit(power)		Flash 13 times		
Outdoor fan malfunction		Flash 14 times		
Frequency limit(PFC module temperature)		Flash 15 times		
PFC module sensor malfunction		Flash 16 times		oE
Liquid pipe temperature sensor malfunction of A		Flash 17 times		

Gas pipe temperature sensor malfunction of A		Flash 18 times		
Liquid pipe temperature sensor malfunction of B		Flash 19 times		
Gas pipe temperature sensor malfunction of B		Flash 20 times		
Liquid pipe temperature sensor malfunction of C		Flash 21 times		
Gas pipe temperature sensor malfunction of C		Flash 22 times		
Liquid pipe temperature sensor malfunction of D		Flash 23 times		
Gas pipe temperature sensor malfunction of D		Flash 24 times		
Liquid pipe temperature sensor malfunction of E		Flash 25 times		
Gas pipe temperature sensor malfunction of E		Flash 26 times		
Exit of the condenser tube sensor malfunction		Flash 27 times		
Correspondence is normal			Flash 7 times(n=indoor unit number)	
Communication failure between indoor unit and outdoor unit			Often bright (indoor unit all Communication failure)	
Indoor ambient sensor malfunction				F1
Indoor evaporate sensor malfunction				F2
Mode conflict				E7
Accept fluorine mode				Fo
Jumper cap malfunction protection				C5
Anti-freezing protection				FH

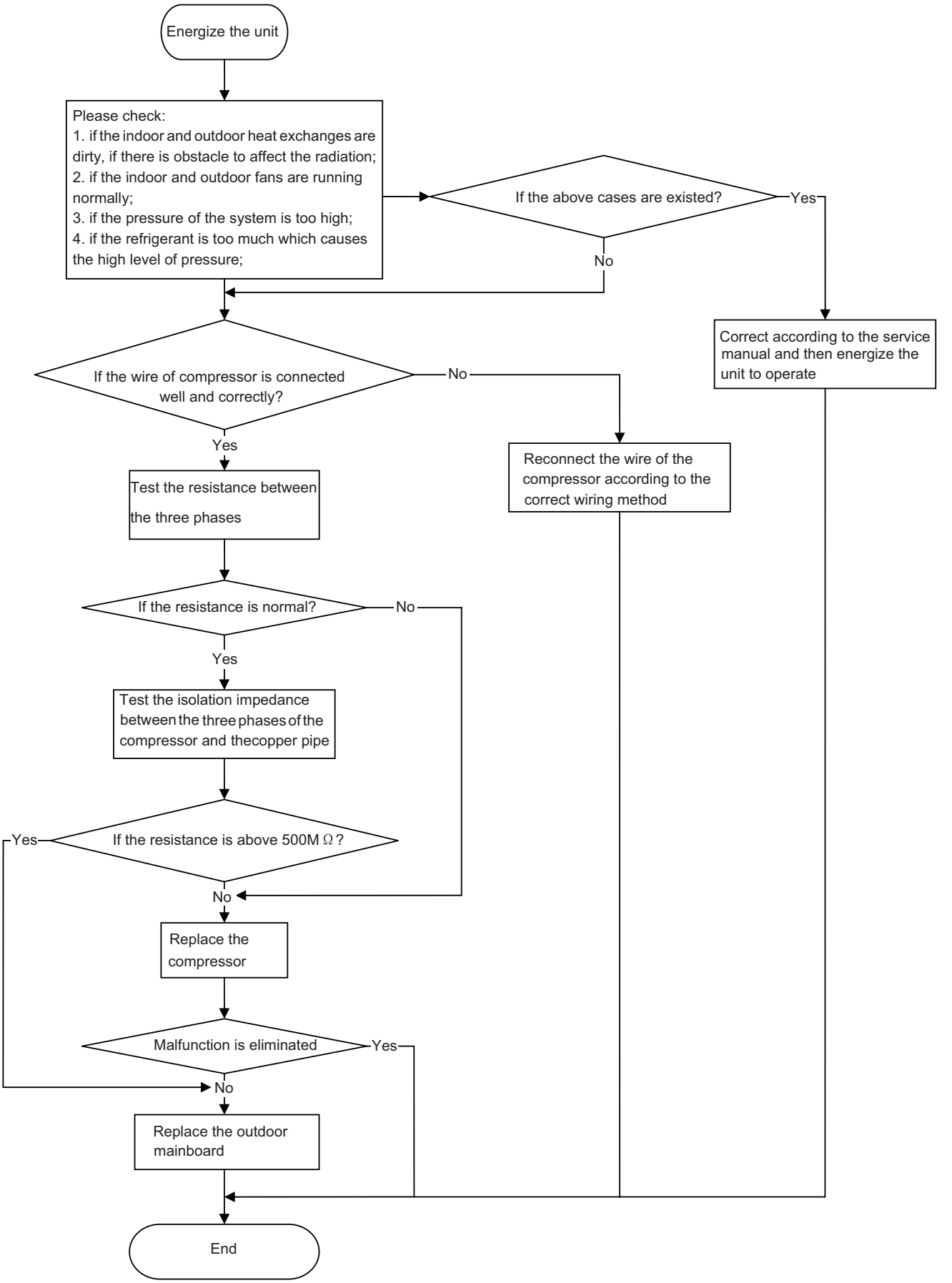
9.2 Malfunction Checking and Elimination

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:

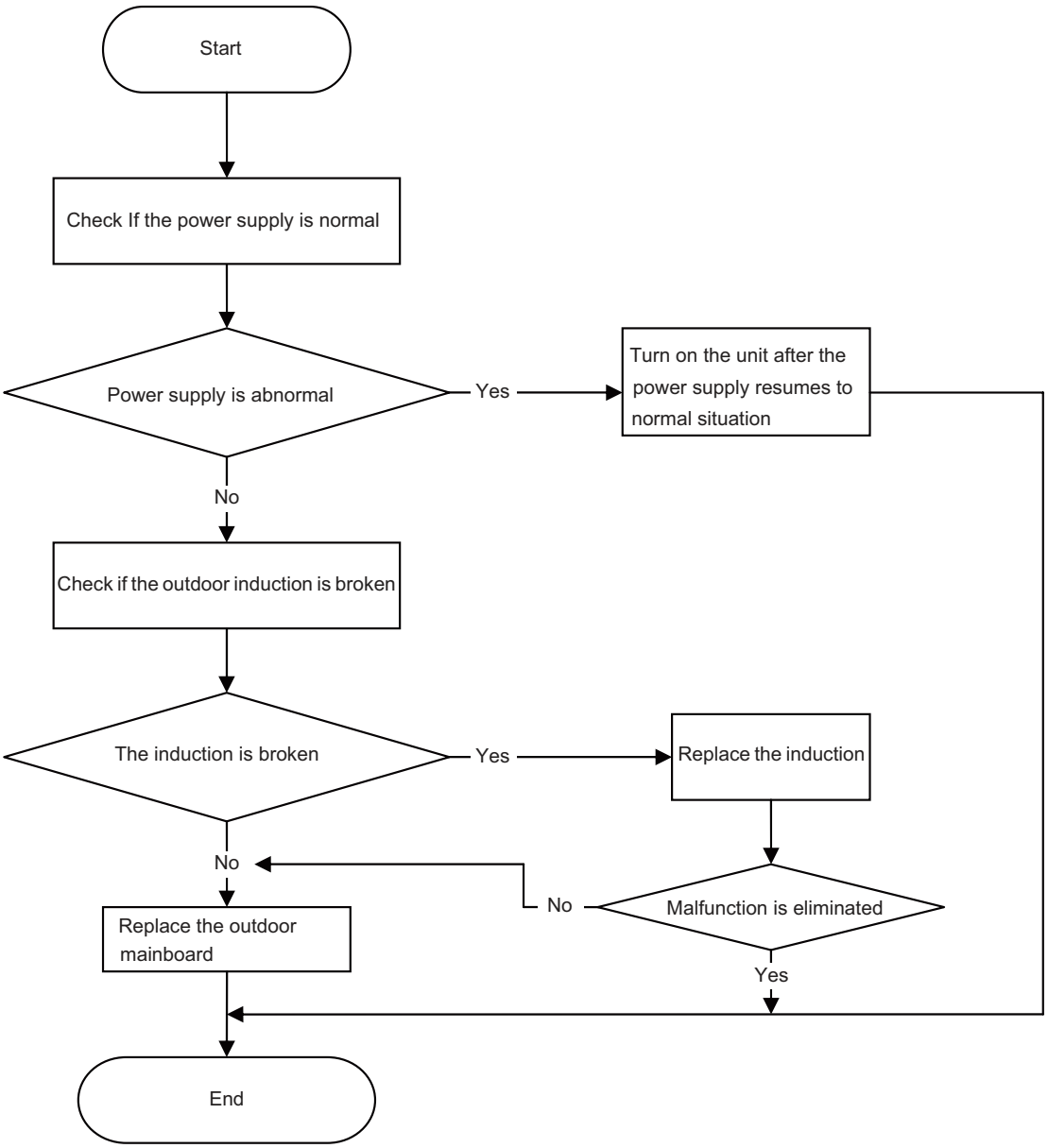

Energize the unit
Please check:
1. if the indoor and outdoor heat exchanges are dirty, if there is obstacle to affect the radiation;
2. if the indoor and outdoor fans are running normally;
3. if the pressure of the system is too high;
4. if the refrigerant is too much which causes the high level of pressure;
If the above cases are existed?
Yes
No
Correct according to the service manual and then energize the unit to operate
If the wire of compressor is connected well and correctly?
No
Yes
Reconnect the wire of the compressor according to the correct wiring method
Test the resistance between the three phases
If the resistance is normal?
No
Yes
Test the isolation impedance between the three phases of the compressor and thecopper pipe
If the resistance is above 500M Ω ?
Yes
No
Replace the compressor
Malfunction is eliminated
Yes
No
Replace the outdoor mainboard
End

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:

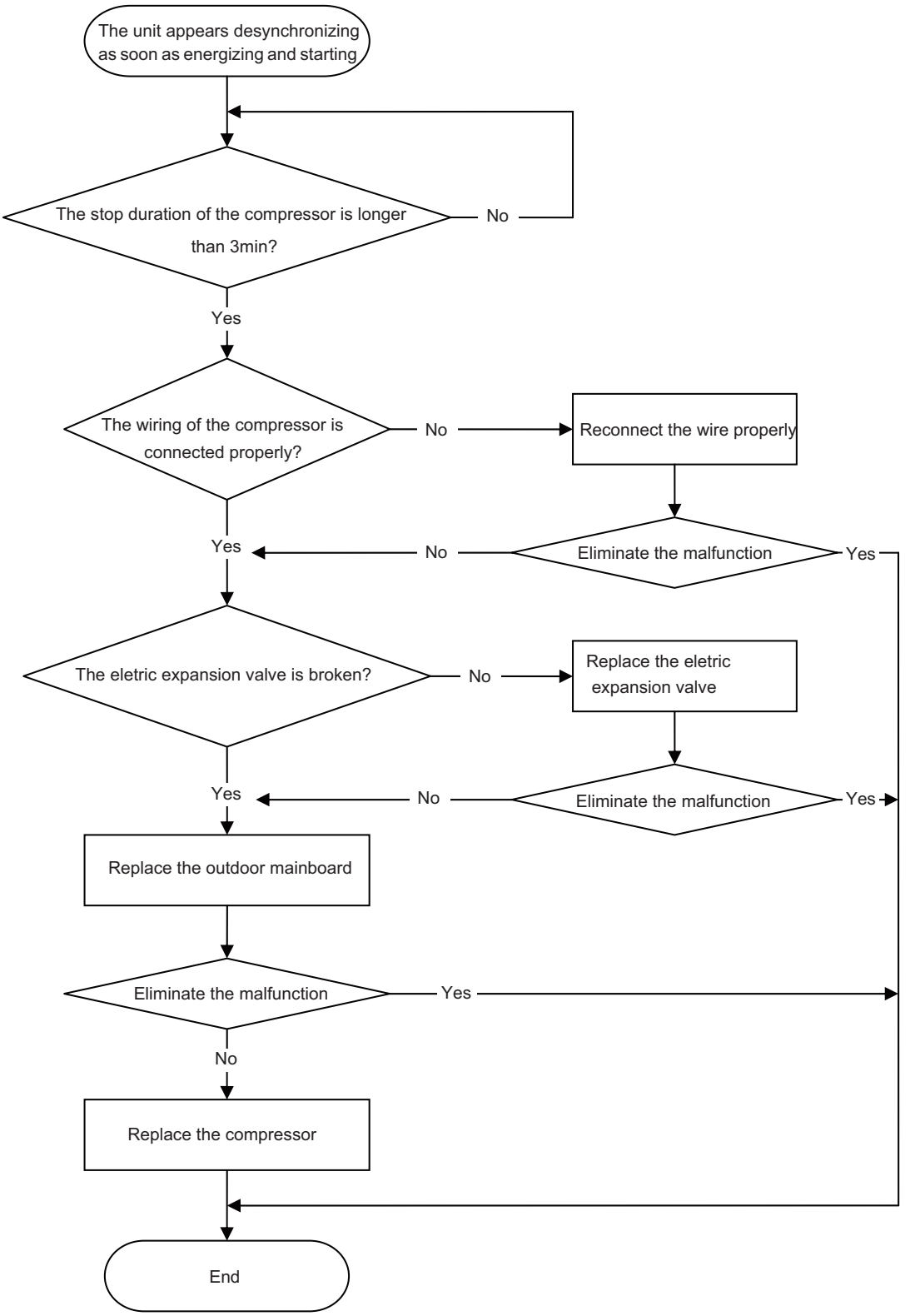


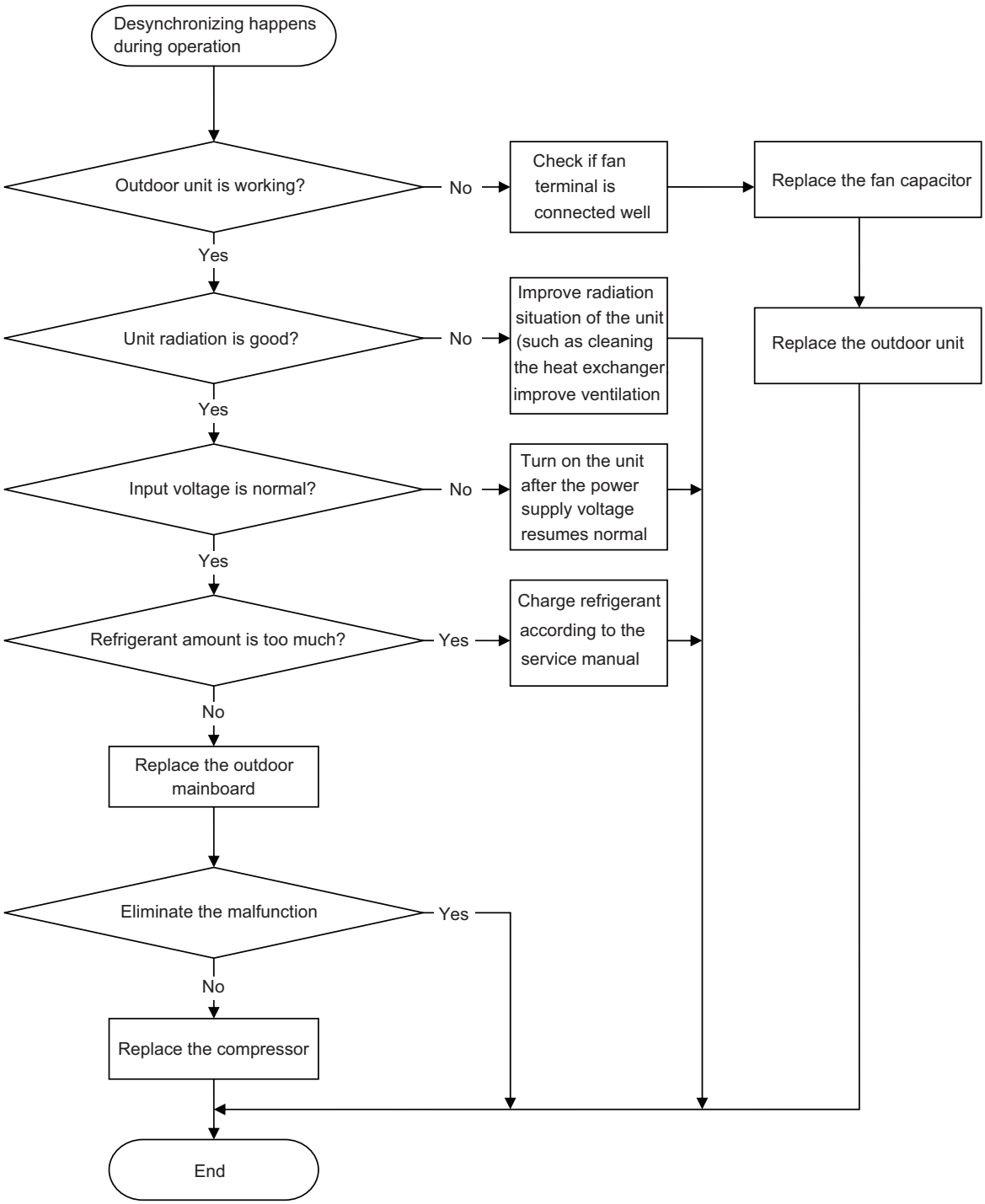
3. Compressor desynchronizing malfunction

Main checking points:

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

Flow chart:



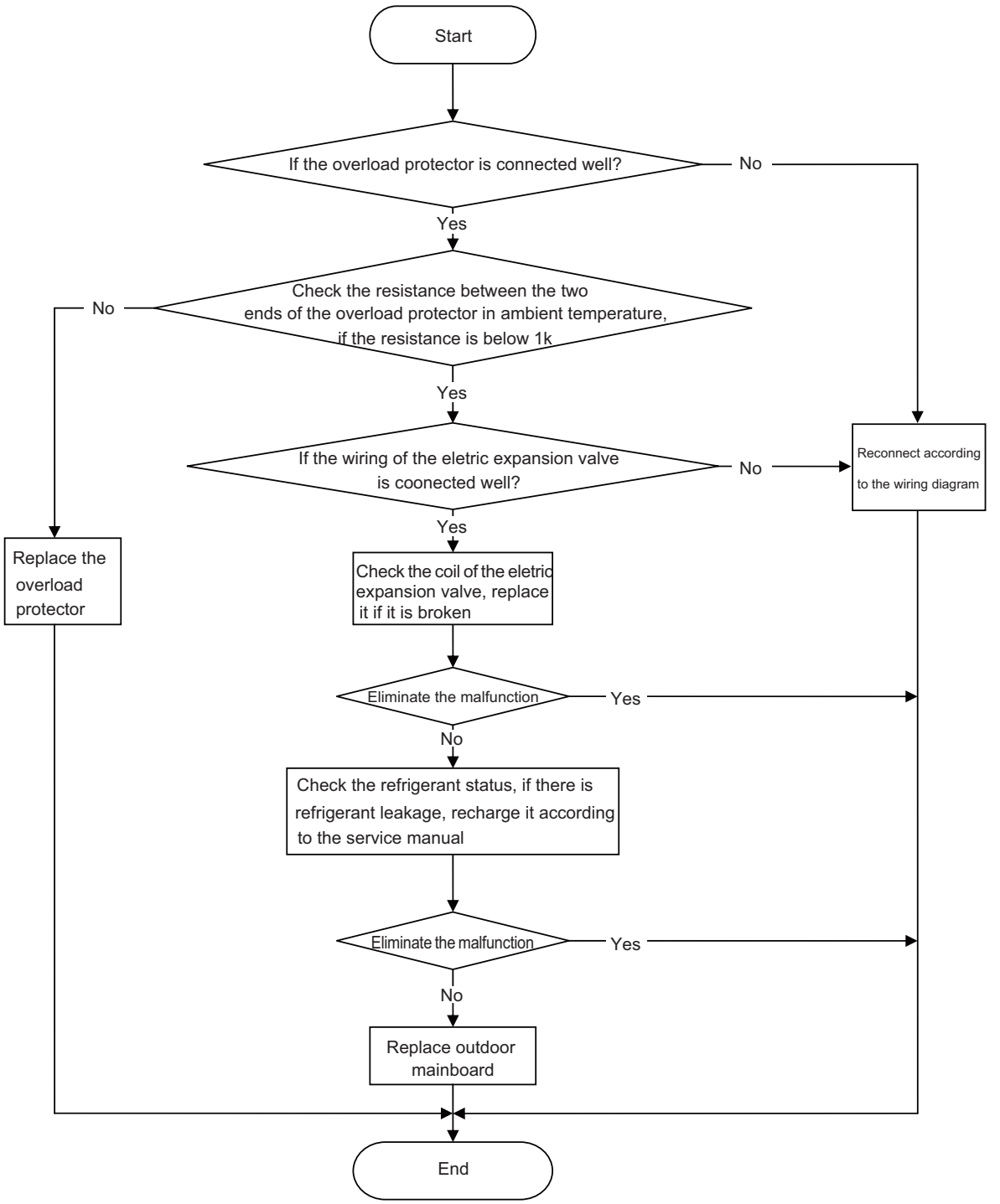

Desynchronizing happens during operation
Outdoor unit is working?
No
Check if fan terminal is connected well
Replace the fan capacitor
Yes
Unit radiation is good?
No
Improve radiation situation of the unit (such as cleaning the heat exchanger improve ventilation
Replace the outdoor unit
Yes
Input voltage is normal?
No
Turn on the unit after the power supply voltage resumes normal
Yes
Refrigerant amount is too much?
Yes
Charge refrigerant according to the service manual
No
Replace the outdoor mainboard
Eliminate the malfunction
Yes
No
Replace the compressor
End

4. Compressor overload, diacharge protectionmalfunction

Main checking points:

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

Flow chart:



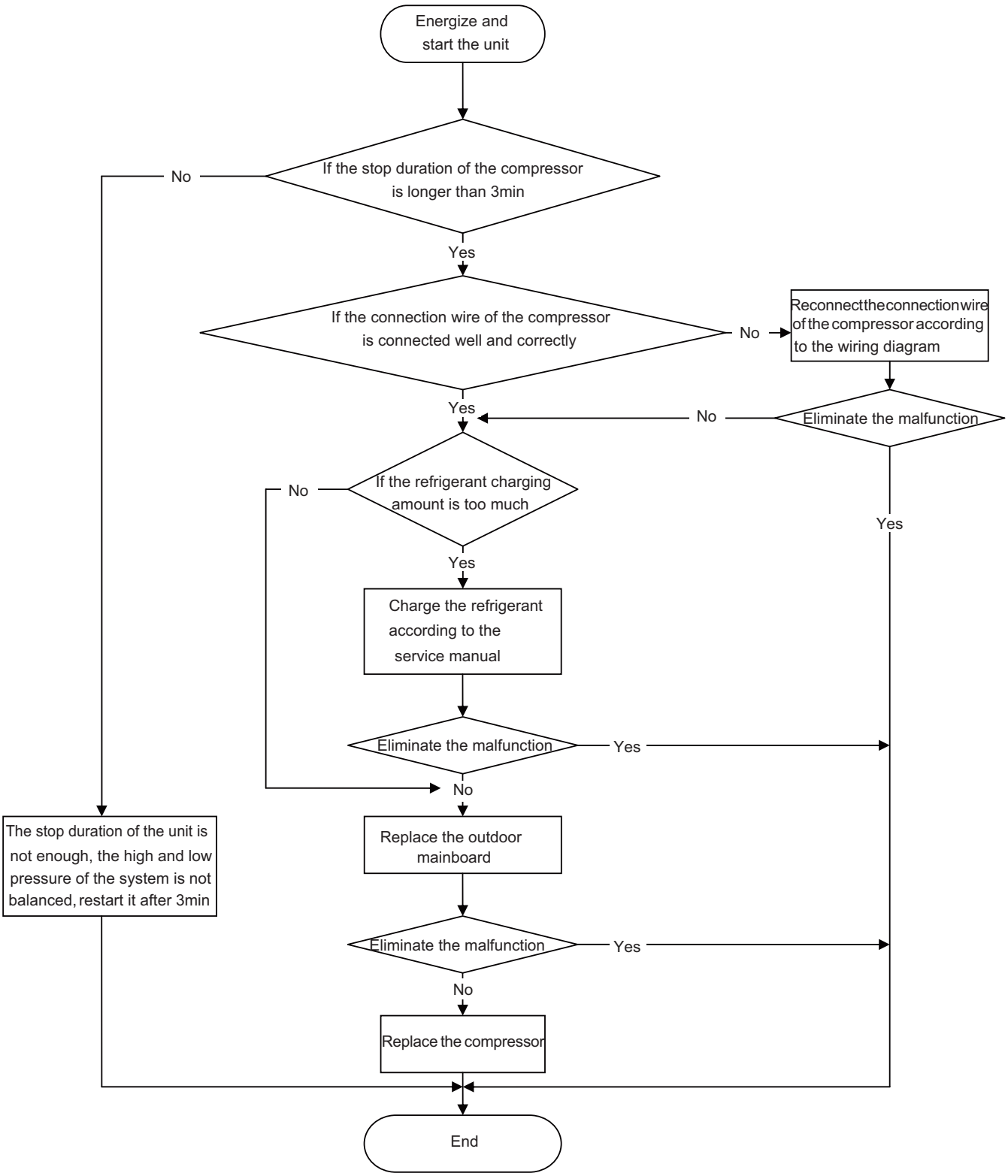
Note: the detection method of the coil of the eletric expansion valve: there is five pieces of coil of the eletric expansion valve, the resistance of one of them (the leftmost or the rightmost one) is almost the same as the resistance of other terminal (within 100 Ω). Judge the condition of the electronic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

5. Start failuremalfunction

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:

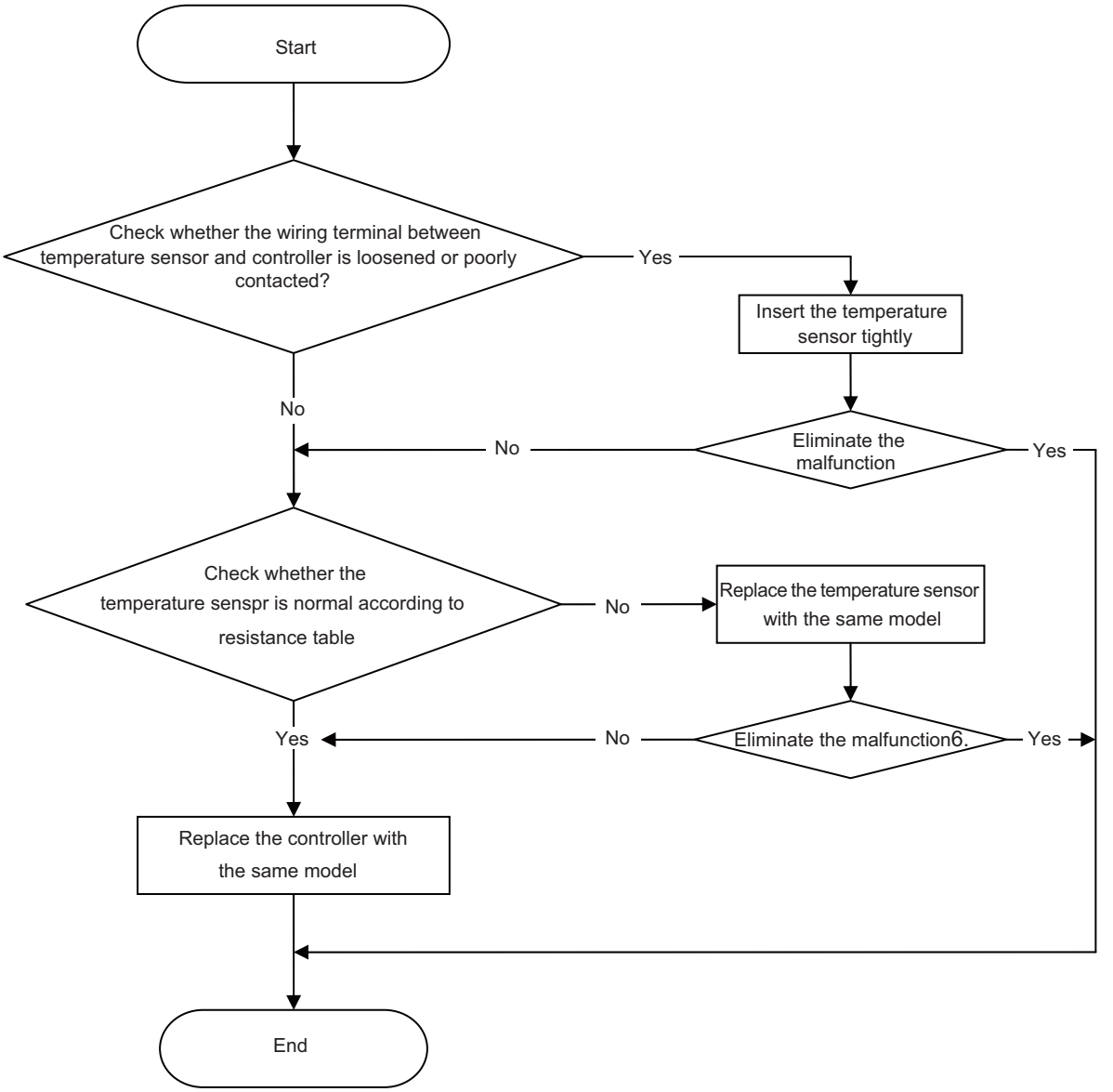


6. Temperature sensor malfunction

Main checking points:

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

Flow chart:

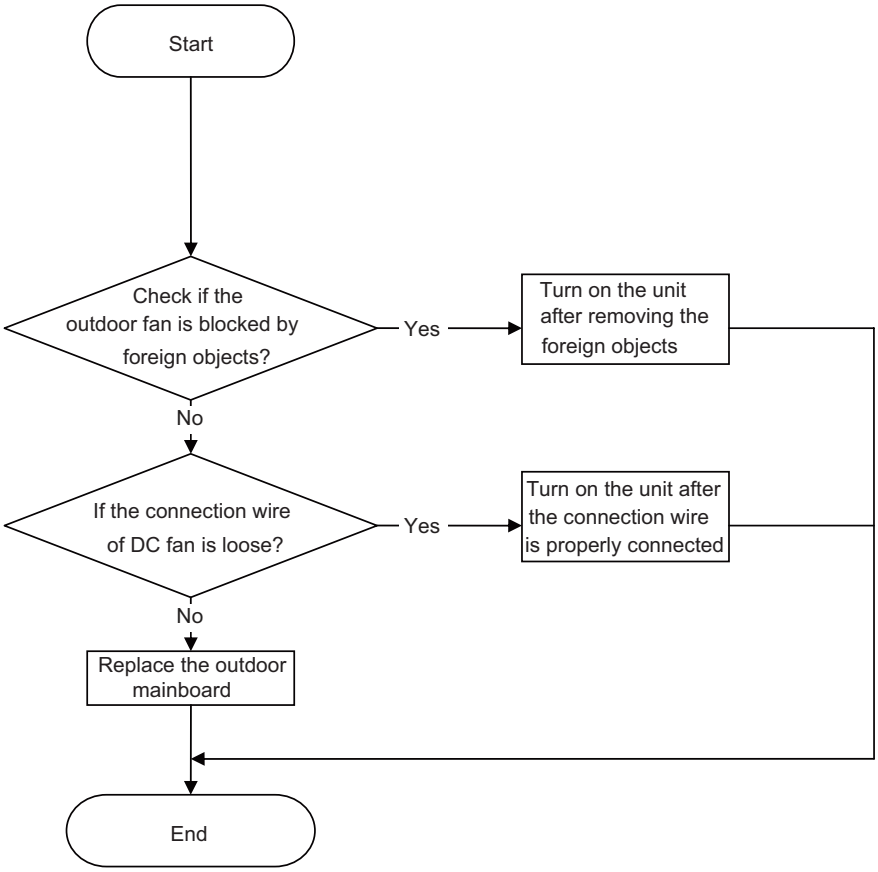


7. DC fan malfunction

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:

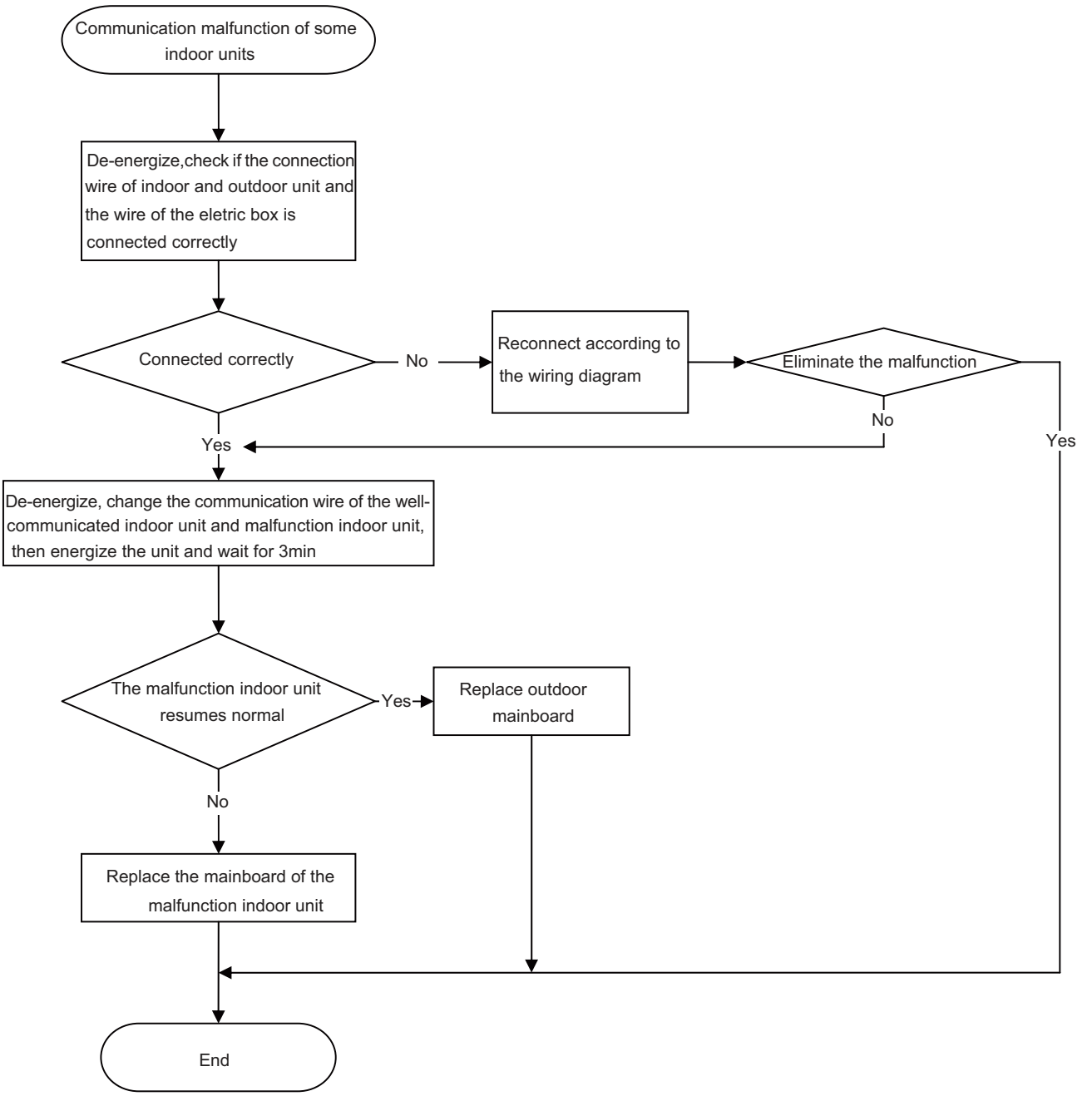


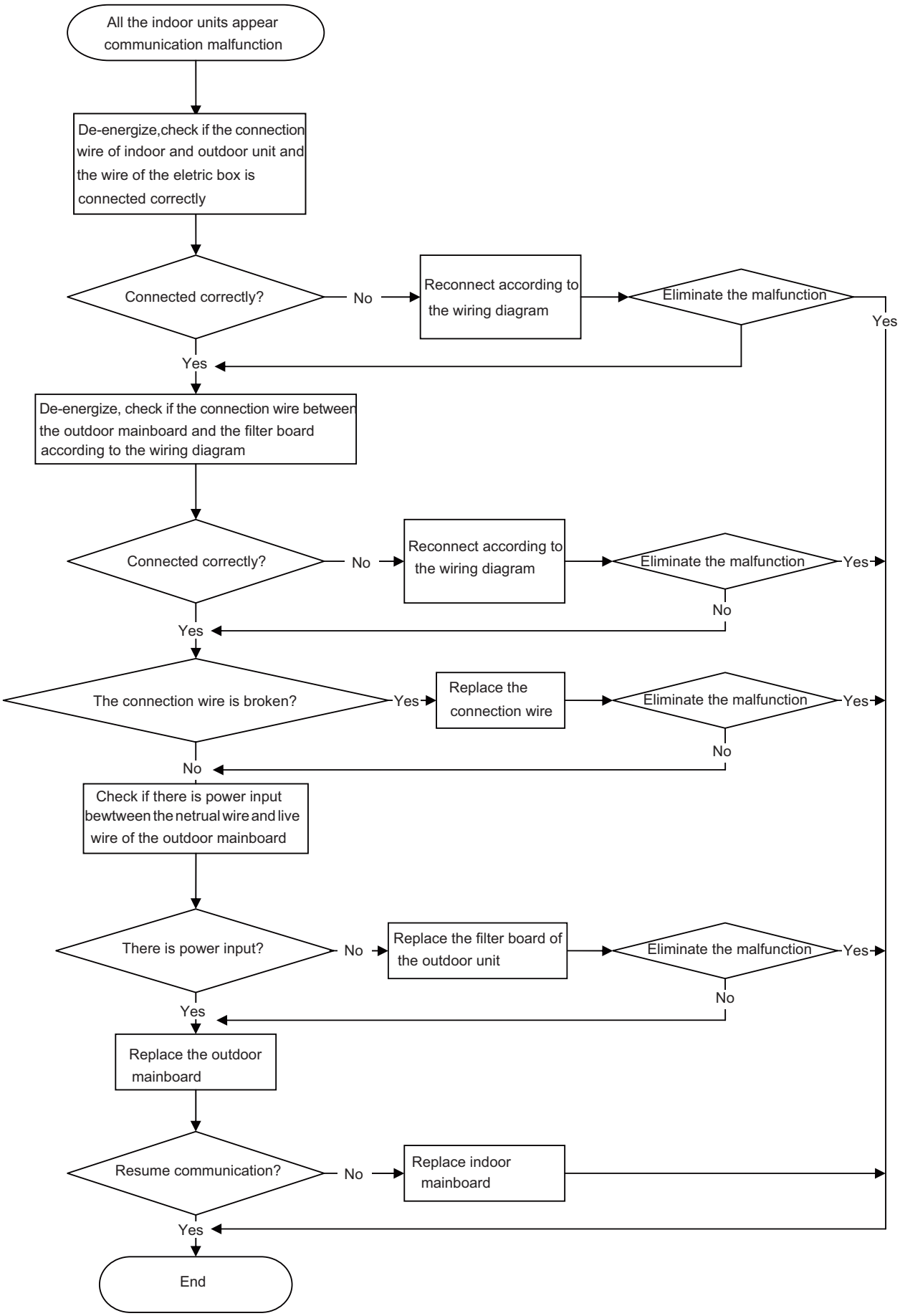
8. Communication malfunction

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:



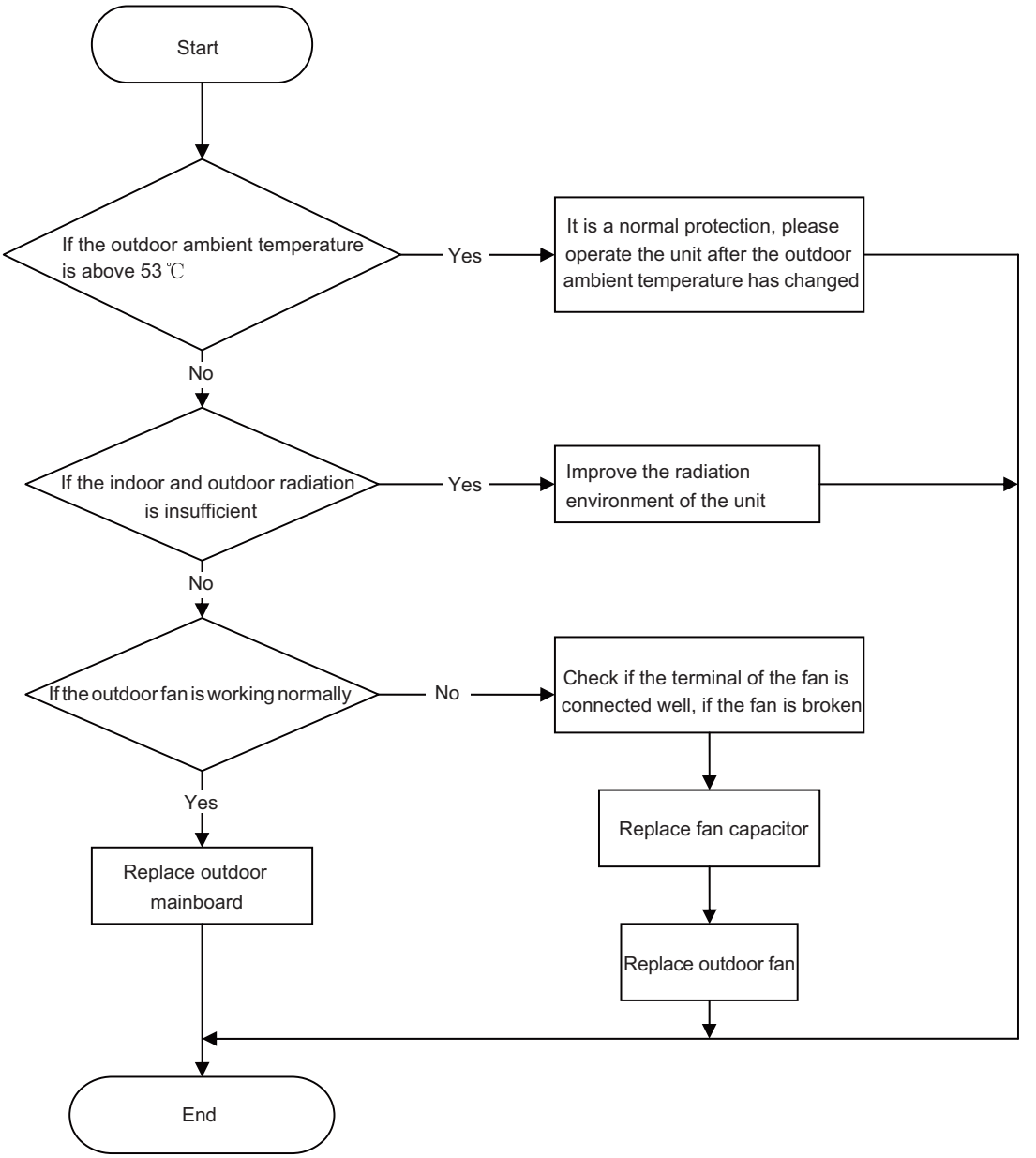

All the indoor units appear communication malfunction
De-energize,check if the connection wire of indoor and outdoor unit and the wire of the eletric box is connected correctly
Connected correctly?
No
Reconnect according to the wiring diagram
Eliminate the malfunction
Yes
Yes
De-energize, check if the connection wire between the outdoor mainboard and the filter board according to the wiring diagram
Connected correctly?
No
Reconnect according to the wiring diagram
Eliminate the malfunction
Yes
No
Yes
The connection wire is broken?
Yes
Replace the connection wire
Eliminate the malfunction
Yes
No
No
Check if there is power input bewtween the netrual wire and live wire of the outdoor mainboard
There is power input?
No
Replace the filter board of the outdoor unit
Eliminate the malfunction
Yes
No
Yes
Replace the outdoor mainboard
Resume communication?
No
Replace indoor mainboard
Yes
End

9. Anti-high temperatureand 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:



9.3 Maintenance Method 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 it's 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 it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation postion 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; Unit's 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't 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

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 it's 0	Repair or replace compressor
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor

6. Air Conditioner is Leaking

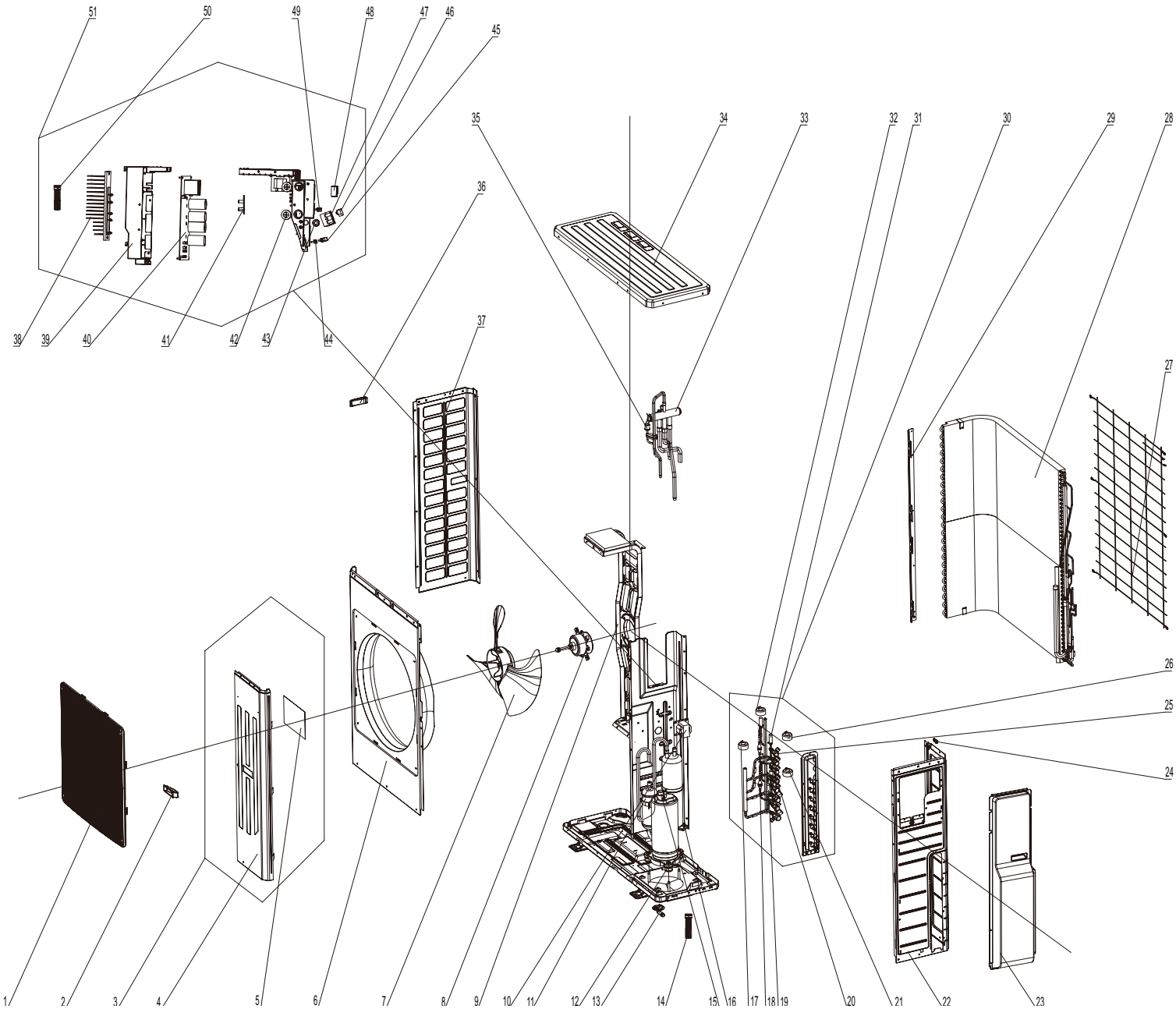
Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken	Water leaking from drain pipe	Replace drain pipe
Wrapping is not tight	Water leaking from the pipe 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 there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's 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 there're parts touching together inside the indoor unit	There's 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 there're parts touching together inside the outdoor unit	There's 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

(1) Model:GWHD(36)NK3JO

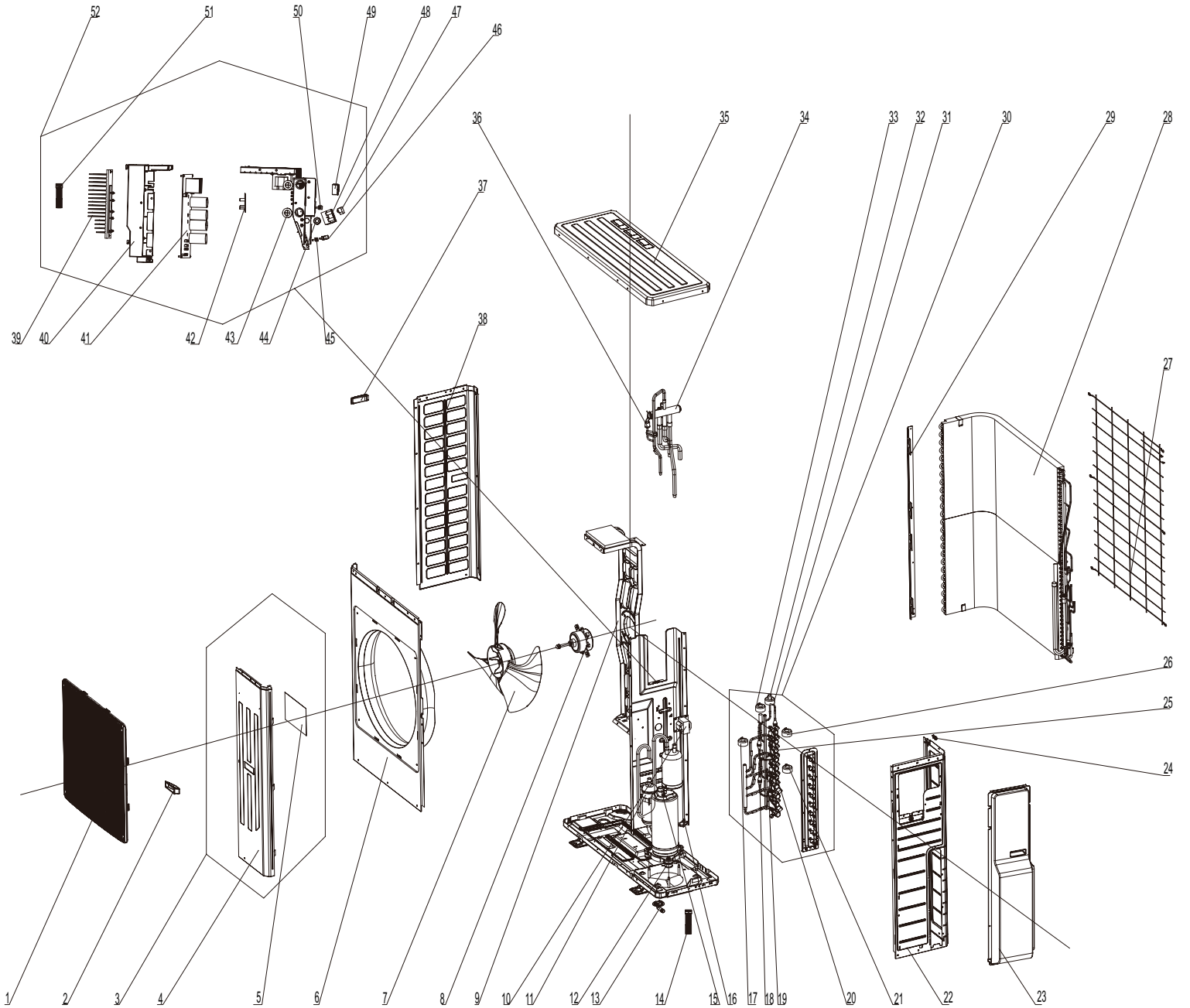


No.	Description	Part Code	Qty
		GWHD(36)NK3JO	
	Product Code	CN860W0190	
1	Front Grill	22415005	1
2	Handle	26235253	1
3	Front Side Plate Sub-Assy	01305508	1
4	Front Side Plate	01305065P	1
5	Insulated Board (Cover of Electric Box)	20113003	1
6	Cabinet	01435007P	1
7	Axial Flow Fan	10335010	1

8	Fan Motor	1570280201	1
9	Motor Support Assy	01805200256	1
10	Reactor	43130186	2
11	Compressor	00205200003	1
12	Compressor Gasket	76713066	3
13	Drainage Joint	26113009	1
14	Sensor Sub-assy	39004100007G	1
15	Compressor Overload Protector(External)	00180030	1
16	Bolt	70210051	2
17	Electric Expand Valve Fitting	4300876720	1
18	Strainer	0721304401	4
19	Bidirection Strainer	07220016	1
20	Cut off Valve	071302391	4
21	Electric Expand Valve Fitting	4300876704	1
22	Right Side Plate	0131410002701P	1
23	Valve Cover	26904100053	1
24	Wiring Clamp	26115004	1
25	Cut off Valve	07130239	4
26	Electric Expand Valve Fitting	4300876719	1
27	Rear Grill	01574100007	1
28	Condenser Assy	01163780	1
29	Condenser support plate	01895309	1
30	Valve Support Assy	07133814	1
31	Electronic Expansion Valve	07135228	4
32	Electric Expand Valve Fitting	4300876718	1
33	4-way Valve	43000338	1
34	Top Cover	0125500901P	1
35	Pressure Protect Switch	4602000902	1
36	Left Handle	26235401	1
37	Left Side Plate	01305064P	1
38	Radiator	49018000077	1
39	Electric Box	26904100013	1
40	Main Board	30228000033	1
41	communication Interface Board	30110103	1
42	Cable Cross Loop	76510021	2
43	Magnetic Ring	49010109	4
44	Insulation Gasket	70410006	1
45	Wire Clamp	71010005	1
46	Socket	42030033	1
47	Terminal Board	42018094	1
48	Terminal Board	420111041	4
49	Wire Clamp	71010003	4
50	Sensor Sub-assy	39004100006G	1
51	Electric Box Assy	01394100358	1

Above data is subject to change without notice.

(2) Model:GWHD(42)NK3JO



No.	Description	Part Code	Qty
		GWHD(42)NK3JO	
	Product Code	CN860W0200	
1	Front Grill	22415005	1
2	Handle	26235253	1
3	Front Side Plate Sub-Assy	01305508	1
4	Front Side Plate	01305065P	1
5	Insulated Board (Cover of Electric Box)	20113003	1
6	Cabinet	01435007P	1
7	Axial Flow Fan	10335010	1

8	Fan Motor	1570280201	1
9	Motor Support Assy	01805200256	1
10	Reactor	43130186	2
11	Compressor	00205200003	1
12	Compressor Gasket	76713066	3
13	Drainage Joint	26113009	1
14	Sensor Sub-assy	39004100007G	1
15	Compressor Overload Protector(External)	00180030	1
16	Bolt	70210051	2
17	Electric Expand Valve Fitting	4300876720	1
18	Strainer	0721304401	5
19	Bidirection Strainer	07220016	1
20	Cut off Valve	071302391	5
21	Electric Expand Valve Fitting	4300876704	1
22	Right Side Plate	0131410002701P	1
23	Valve Cover	26904100053	1
24	Wiring Clamp	26115004	1
25	Cut off Valve	07130239	5
26	Electric Expand Valve Fitting	4300876719	1
27	Rear Grill	01574100007	1
28	Condenser Assy	01163780	1
29	Condenser support plate	01895309	1
30	Valve Support Assy	07133814	1
31	Electric Expand Valve Fitting	4300876717	1
32	Electronic Expansion Valve	07135228	5
33	Electric Expand Valve Fitting	4300876718	1
34	4-way Valve	43000338	1
35	Top Cover	0125500901P	1
36	Pressure Protect Switch	4602000902	1
37	Left Handle	26235401	1
38	Left Side Plate	01305064P	1
39	Radiator	49018000077	1
40	Electric Box	26904100013	1
41	Main Board	30228000033	1
42	communication Interface Board	30110103	1
43	Cable Cross Loop	76510021	2
44	Magnetic Ring	49010109	4
45	Insulation Gasket	70410006	1
46	Wire Clamp	71010005	1
47	Socket	42030033	1
48	Terminal Board	42018094	1
49	Terminal Board	420111041	5
50	Wire Clamp	71010003	5
51	Sensor Sub-assy	39004100006G	1
52	Electric Box Assy	01394100358	1

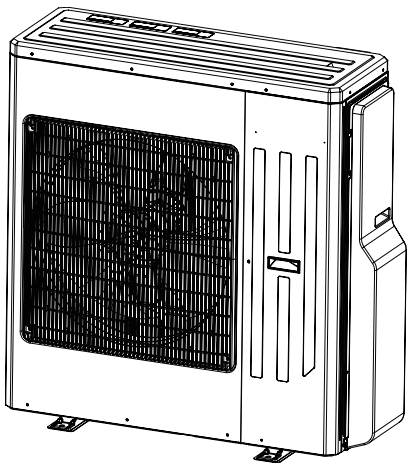
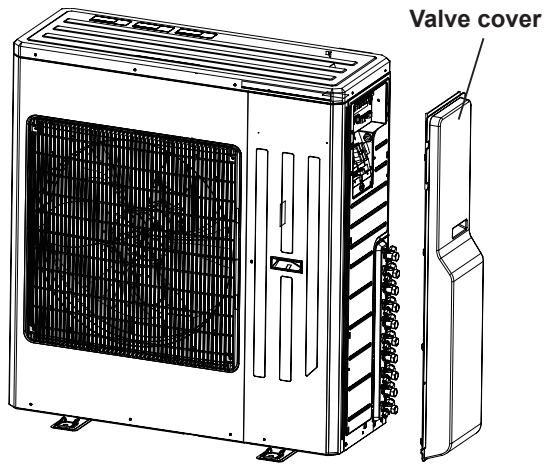
Above data is subject to change without notice.

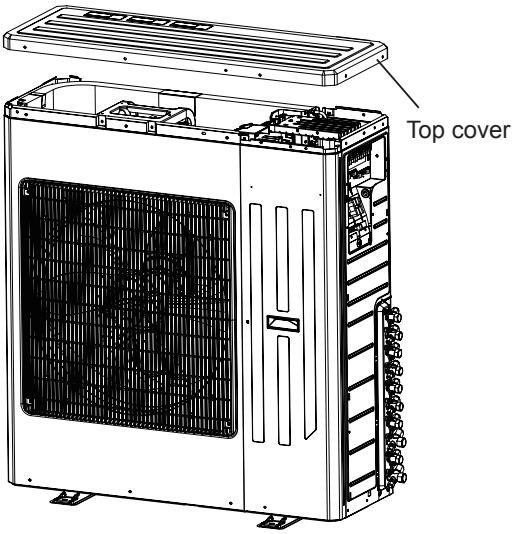
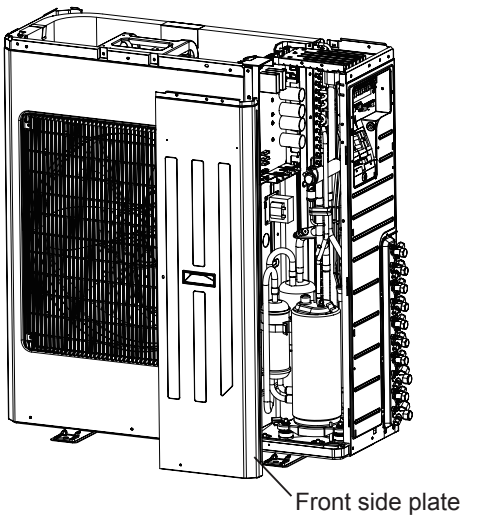
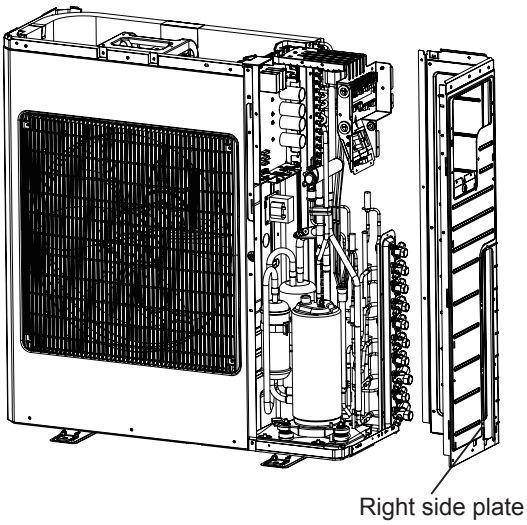
11. Removal Procedure

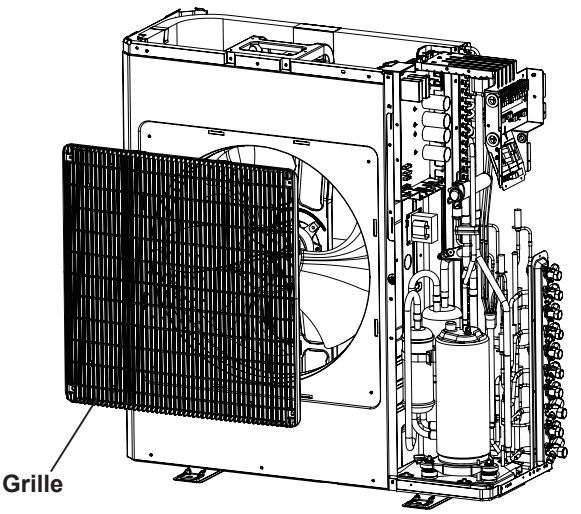
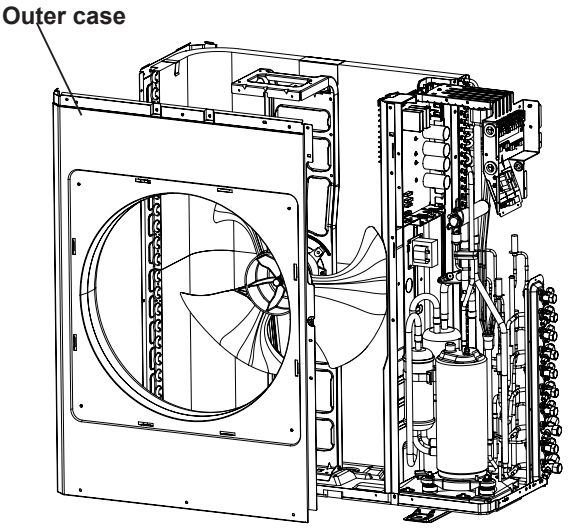
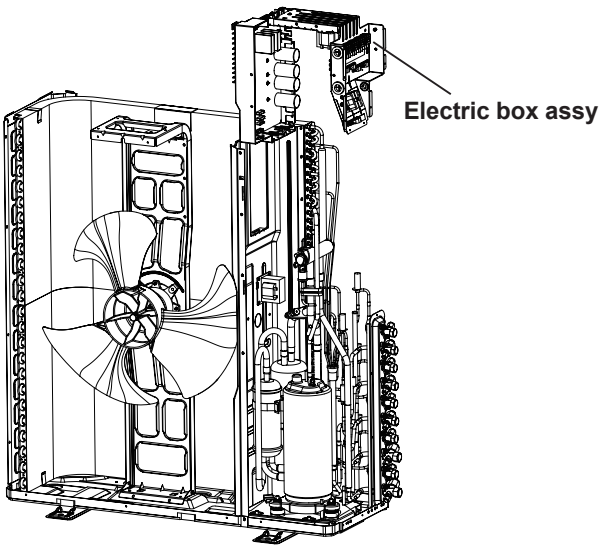
⚠ Warning: Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

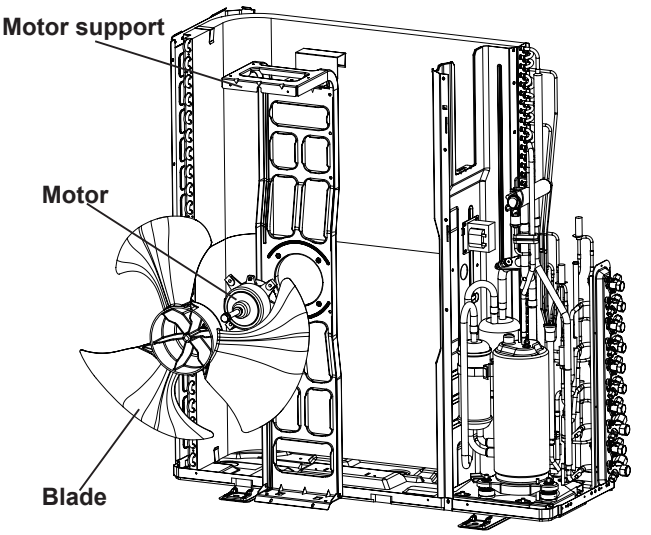
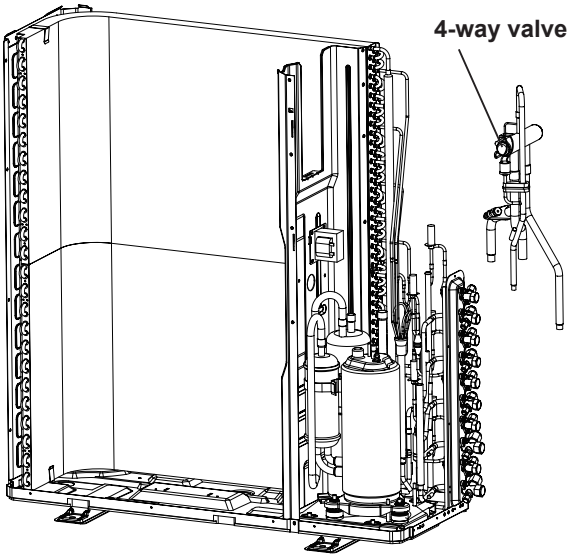
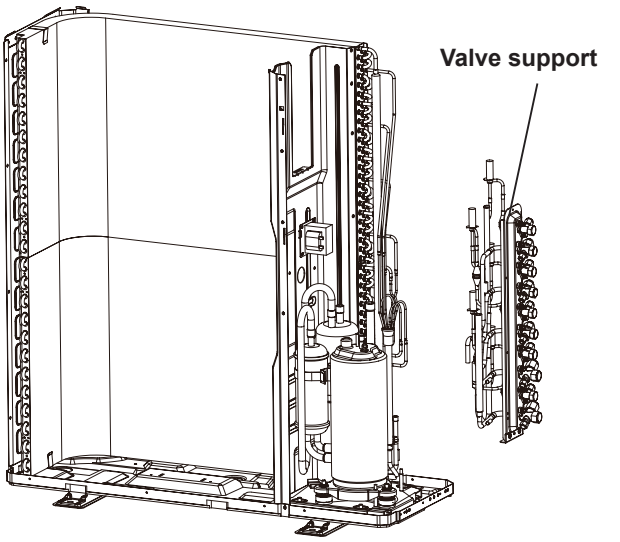
GWHD(36)NK3JO GWHD(42)NK3JO

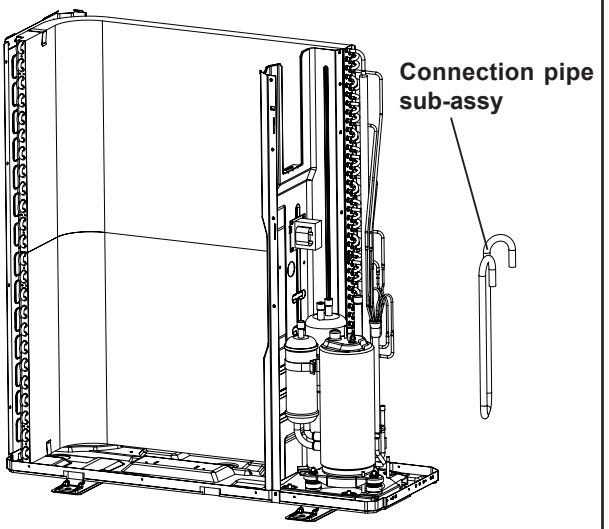
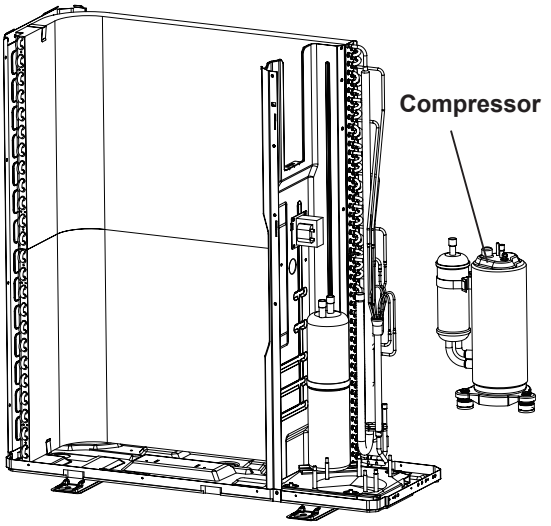
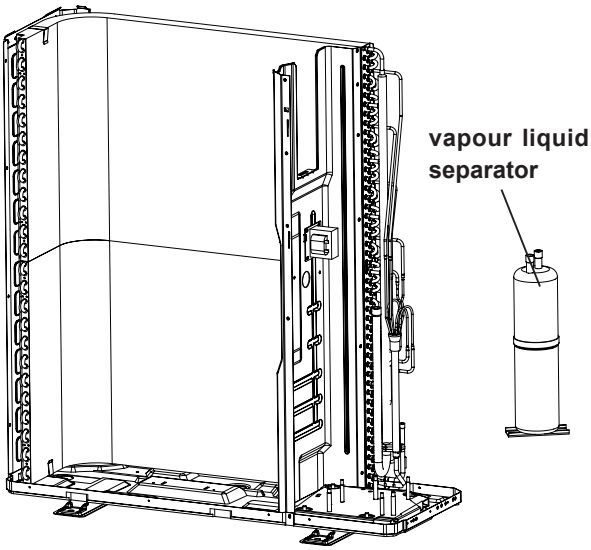
NOTE: Take GWHD(42)NK3JO for example.

Steps	Procedure	
1. Before disassembly		
	Complete axonometric drawing.	
2. Remove valve cover		
	Remove the connection screw fixing the valve cover and then remove the valve cover.	

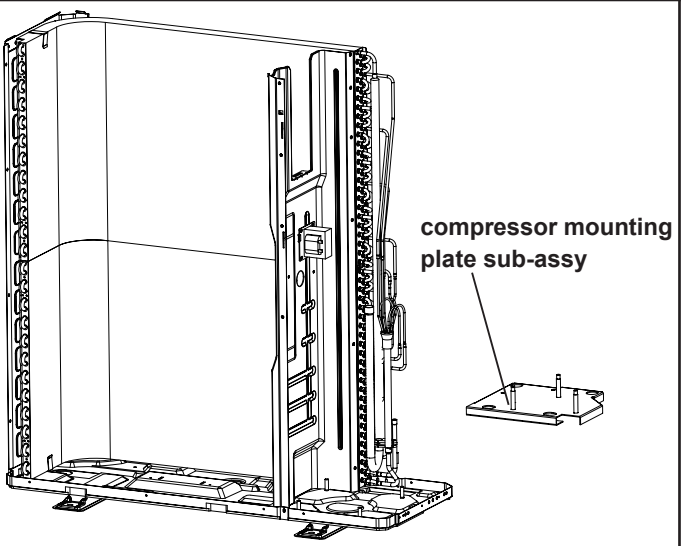
Steps	Procedure	
3. Remove top cover		
	Remove the screws connecting the top cover with outer case, right side plate and left side plate; lift the top cover upwards to remove it.	
4. Remove front side plate		
	Remove the screws connecting the front side plate with chassis and middle isolation sheet, and then remove the front side plate.	
5. Remove right side plate		
	Remove the screws connecting the right side plate with electric box assy, valve support, chassis and condenser side plate, and then remove the right side plate.	

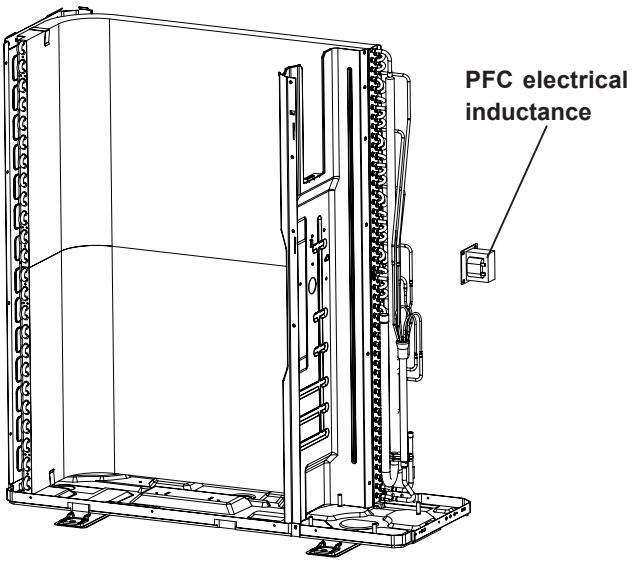
Steps	Procedure
6. Remove grille	
Remove the 4 screws connecting the grille and outer case, and then remove the panel grille.	
7. Remove outer case	
Remove screws connecting outer case and motor support, middle isolation sheet and chassis, pull the outer case upwards slightly, loosen clasps between outer case and left side plate, and then remove the outer case.	
8. Remove electric box assy	
a.Remove the grounding wire screw on the electric box assy and then remove the grounding wire. b.Disconnect the wiring terminals of compressor, high pressure switch, compressor overload protector, temperature sensor, outdoor fan motor and 4-way valve. Note: keep pressing the circlip when disconnecting the wiring terminal of reactor; keep pressing the retainer when disconnecting other wiring terminals. c.Remove the wire inside the wiring groove.	

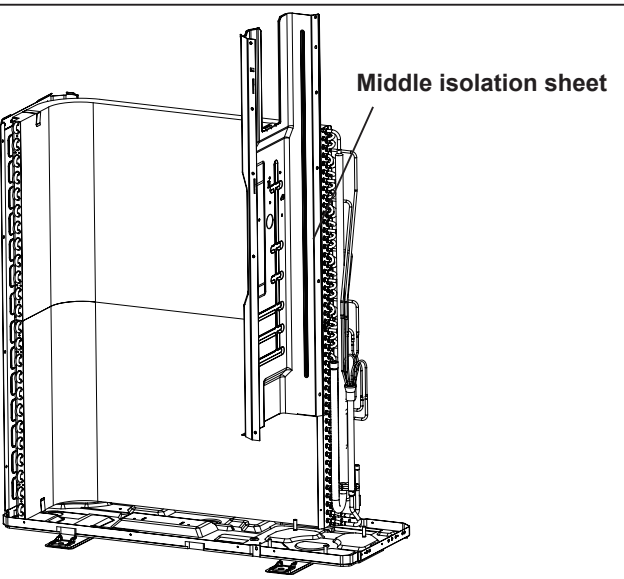
Steps	Procedure
9. Remove blade, motor, motor support	
a.Remove nuts fixing axial flow blade with wrench, and then remove the axial flow blade. b.Remove screws connecting motor support and chassis, loosen damper block and then remove the motor support. c.Remove screws fixing motor, and then remove the motor	
10. Remove 4-way valve	
Unsolder the spot weld between 4-way valve and vapour liquid separator, compressor cut-off valve sub-assy and condenser, and then remove the 4-way valve. Note: When unsoldering the spot weld, wrap the 4-way valve with wet cloth completely to avoid damage to valve due to high temperature.	
11. Remove valve support	
Unsolder all spot welds connected with valve support and then remove the valve support. Note: When unsoldering the spot weld, wrap the gas valve and liquid valve with wet cloth completely to avoid damage to valve due to high temperature.	

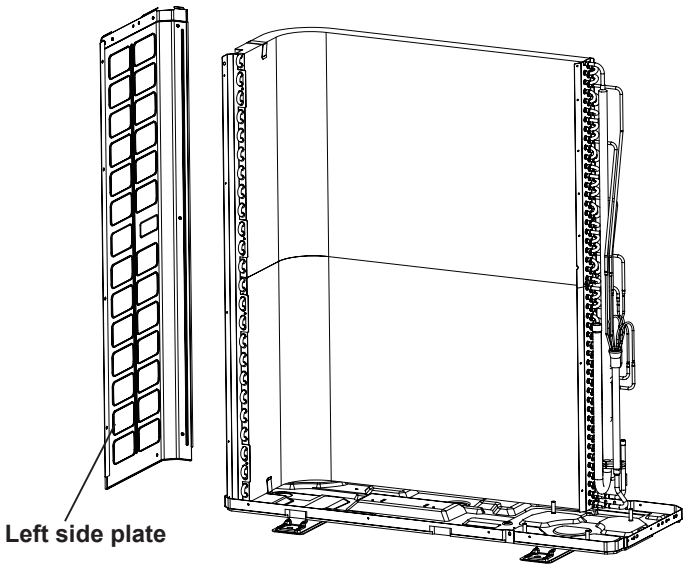
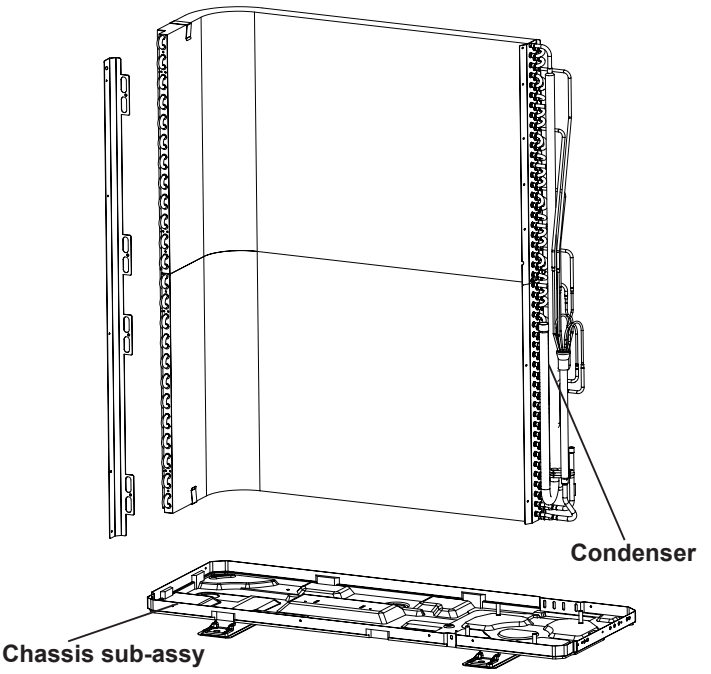
Steps	Procedure	
12. Remove connection pipe sub-assy		
	Remove all spot welds connected with connection pipe, and then remove the connection pipe sub-assy.	
13. Remove compressor		
	Remove the 3 foot nuts fixing compressor and then lift the compressor upwards to remove the compressor and damping cushion. Note: Keep the ports of discharge pipe and suction pipe from foreign objects.	
14. Remove vapour liquid separator		
	Unsolder spot welds connected with vapour liquid separator, remove screws connected vapour liquid separator and middle isolation sheet, and then remove the vapour liquid separator.	

Steps	Procedure
15. Remove compressor mounting plate sub-assy	
	Remove the 4 foot nuts fixing compressor mounting plate sub-assy and chassis, to remove the compressor mounting plate sub-assy.
16. Remove PFC electrical inductance	
	Remove the screws fixing PFC electrical inductance and isolation sheet, to remove the PFC electrical inductance.
17. Remove middle isolation sheet	
	Remove screws connecting middle isolation sheet and support plate of condenser, chassis, and then remove the middle isolation sheet.







Steps	Procedure
18. Remove left side plate	
Remove screws connecting left side plate and support plate of condenser, chassis, and then remove the left side plate.	
19. Remove condenser	
Remove screws connecting condenser and chassis, and then remove the condenser. Remove screws connecting support plate of condenser and condenser, and then remove the support plate of condenser.	

Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)
61	60.8	16	69/70	69.8	21	78/79	78.8	26
62/63	62.6	17	71/72	71.6	22	80/81	80.6	27
64/65	64.4	18	73/74	73.4	23	82/83	82.4	28
66/67	66.2	19	75/76	75.2	24	84/85	84.2	29
68	68	20	77	77	25	86	86	30

Ambient temperature

Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)
32/33	32	0	55/56	55.4	13	79/80	78.8	26
34/35	33.8	1	57/58	57.2	14	81	80.6	27
36	35.6	2	59/60	59	15	82/83	82.4	28
37/38	37.4	3	61/62	60.8	16	84/85	84.2	29
39/40	39.2	4	63	62.6	17	86/87	86	30
41/42	41	5	64/65	64.4	18	88/89	87.8	31
43/44	42.8	6	66/67	66.2	19	90	89.6	32
45	44.6	7	68/69	68	20	91/92	91.4	33
46/47	46.4	8	70/71	69.8	21	93/94	93.2	34
48/49	48.2	9	72	71.6	22	95/96	95	35
50/51	50	10	73/74	73.4	23	97/98	96.8	36
52/53	51.8	11	75/76	75.2	24	99	98.6	37
54	53.6	12	77/78	77	25			

Appendix 2: Configuration of Connection Pipe

1.Standard length of connection pipe

● 16.4ft,24.6ft, 26.2ft.

2.Min. length of connection pipe is 9.84ft.

3.Max. length of connection pipe and max. high difference.

4.The additional refrigerant oil and refrigerant charging required after prolonging connection pipe

● After the length of connection pipe is prolonged for 32.8ft at the basis of standard length, you should add 5ml of refrigerant oil for each additional 16.4ft of connection pipe.

● The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	49.2 ft	16.4 ft
7000 Btu/h(2051 W)	49.2 ft	16.4 ft
9000 Btu/h(2637 W)	49.2 ft	32.8 ft
12000 Btu/h(3516 W)	65.6 ft	32.8 ft
18000 Btu/h(5274 W)	82.0 ft	32.8 ft
24000 Btu/h(7032 W)	82.0 ft	32.8 ft
28000 Btu/h(8204 W)	98.4 ft	32.8 ft
36000 Btu/h(10548 W)	98.4 ft	65.6 ft
42000 Btu/h(12306 W)	98.4 ft	65.6 ft
48000 Btu/h(14064 W)	98.4 ft	65.6 ft

● When the length of connection pipe is above 16.4ft, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.

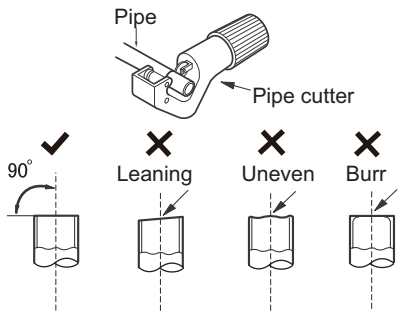
● Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refrigerant charging amount for R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(inch)	Gas pipe(inch)	Cooling only(oz/ft)	Cooling and heating(oz/ft)
Φ0.23	Φ0.37 or Φ0.47	0.53	0.71
Φ0.23 or Φ0.37	Φ0.63 or Φ0.75	0.53	0.71
Φ0.47	Φ0.75 or Φ0.84	1.06	4.23
Φ0.63	Φ1.0 or Φ1.25	2.12	4.23
Φ0.75	/	8.82	8.11
Φ0.84	/	12.34	12.34

Appendix 3: Pipe Expanding Method

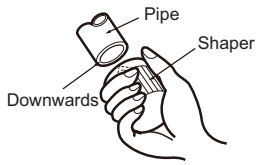
⚠ **Note:**

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



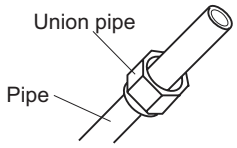
A:Cut the pip
- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.

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



C:Put on suitable insulating pipe

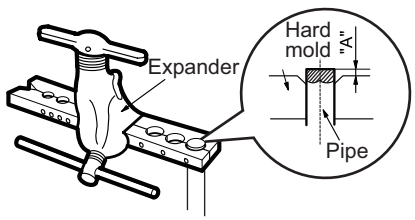
D:Put on the union nut
- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



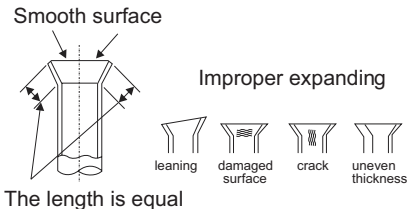
E:Expand the port
- Expand the port with expander.

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

Outer diameter(inch)	A(inch)	
	Max	Min
Φ0.23 - 0.25 (1/4")	0.051	0.028
Φ9.52 (3/8")	0.063	0.039
Φ0.37 - 0.5 (1/2")	0.071	0.039
Φ0.63 (5/8")	0.095	0.087



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



Appendix 4: 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

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

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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