Service Manual

GNJ-QF Series All Closed Packaged Air-cooled Condensing Unit

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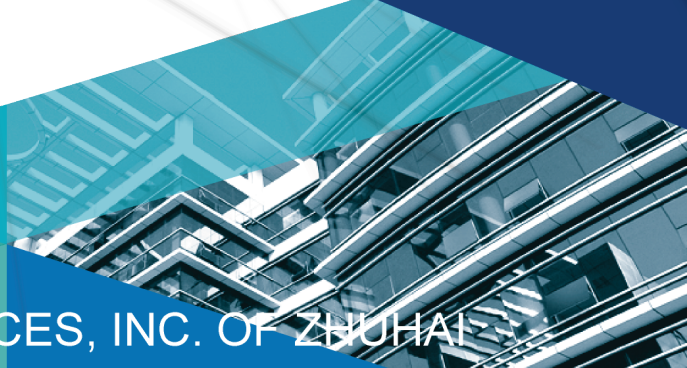


GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI

Contents

Safety Precautions

Warning and Meaning of Symbols

Precautions in this manual are classified according to their seriousness and possibility.


Danger: It means danger. If not avoided, death or serious personal injury will occur.


Warning: It means potential danger. If not avoided, death or serious personal injury may occur.


Caution: It means potential danger. If not avoided, light or medium injury may occur. It is also used to warn against dangerous behavior.


Note: It means equipment or property loss may occur.

Preface

Thank you for purchasing Gree GNJ-QF series all closed packaged air-cooled condensing unit. In order to guide you to correctly install and use our product and achieve expected operating effect, please read this manual carefully.

This manual is applicable for GNJ-QF series all closed packaged air-cooled condensing unit. It specifies safe operation requirements as well as basic principles and implementation methods from perspectives of engineering installation, commissioning, troubleshooting and maintenance. Professional operators must abide by relevant national (local) safety requirements and technical specifications set forth in this manual during operation; otherwise, the refrigeration system may fail to work or be damaged, and personal safety accidents may also occur.

Chapter 1: Product

1. Product Introduction

1.1 List of Products

Model	Nominal Power（HP）	Power Supply	Refrigerant	Appearance
GNJ-QFT3CG/NaD-E	3	220V ～ 50Hz	R410A	
GNJ-QFT5CG/NaD-M	5	380V 3N ～ 50Hz		
GNJ-QFT6CG/NaD-M	6			
GNJ-QFT8CG/NaD-M	8			
GNJ-QFT10CG/NaD-M	10			
GNJ-QFT12CG/NaD-M	12			
GNJ-QFT15SG/NaD-M	15			

1.2 Nomenclature

GNJ	-	□	□	□	□	□	□	□	□	□	□	□	□	/	□	□	-	□
1		2	3	4	5	6	7	8	9	10	11	12	13		14	15		16

No.	Description	Options
1	Model code	GNJ- Compression condensing unit
2	Compressor type	B— semi-closed piston type；BL— semi-closed screw type；Q— all-closed type；L— open type
3	Condenser type	Omit- water cooled；F— air cooled；Y—no (compressor)

4	Compressor working mode	V—variable frequency； Omit- fixed frequency
5	Unit structure	Y—integrated；T—split； Omit-single unit
6	Performance	Compressor and motor nominal power (HP)
7	Structural type	C—side discharge；S—top discharge； Omit- open type or otherwise
8	Operating range	Z—medium temperature；G—high temperature；D—low temperature；Ds—low temperature and two-stage compression
9	Economizer	J—with economizer ； Omit- without economizer
10	Connection type	Parallel connection- P2, P3… (The number indicates the number of units in parallel)； Omit- single unit
11	Control mode	E- strong current control; Omit- with controller
12	Anti-explosion code	Omit- no anti-explosion requirement; E- with anti-explosion requirement
13	Refrigerant	Omit- R22; Nf—R404A；Na—R410A
14	Defrost method	R- hot gas defrost; Omit- others
15	Design number	Arranged in the order of A, B, C……
16	Power supply code	E— 一 220V ～ 50Hz；M— 一 380V 3N ～ 50Hz

Example of model designation:

GNJ-QFT5CG/NaD-M means it is an exported type all-closed packaged air-cooled condensing unit that adopts side discharge. Its operating range is a high-temperature range and the compressor nominal power is 5HP. It uses refrigerant R410A and the power supply is 380V 3N ～ 50Hz.

1.3 Product Features

1.3.1 Overview

Independently developed by Gree, GNJ-QF series all closed packaged air-cooled condensing unit is equipped with a high efficiency compressor and is ingeniously designed to have the advantages of high performance, high reliability, easy maintenance and compact structure. It can satisfy the needs for cooling in industrial and agricultural production as well as commercial circulation. It can be widely used in a variety of freezing and refrigerating places, fruits and vegetables fresh-keeping storehouses, fungus breeding rooms, and other places that have special requirements for refrigeration.

1.3.2 Specific Features

(1) Pump down cycle, safe and reliable

The unit will perform a pump down during shutdown to reduce refrigerant migration and prevent the compressor from starting with liquid.

(2) Wide ambient temperature range

The unit is designed with a high-efficiency condenser to ensure normal operation under harsh working conditions. The outdoor ambient temperature for normal operation can be up to 45℃ .

It also adopts an inverter fan, which can operate reliably at an ambient temperature of -15 ℃ , and meet the minimum pressure difference of the system, to ensure sufficient liquid supply, constant system pressure and reliable operation throughout the year.

(3) Intelligent control, complete functions

The unit adopts microcomputer intelligent control and provides parameter setting, operation parameter query, multiple protection mechanisms, fault viewing, historical fault record, etc. It is easy and convenient to operate and debug the unit, monitor the running state and troubleshoot, so that the unit can maintain the optimal working state.

(4) Completed configuration, no need to debug

The unit offers completed configuration, so there is no need to separately configure the throttle valve, liquid supply valve, and control box, no need for engineering wiring and welding; it comes with refrigerant, so there is no need to add refrigerant on site. The unit can be turned on immediately after connecting the pipes and wires as required, no need for debugging.

(5) Beautiful appearance, simple installation

The unit has a beautiful appearance and occupies a small floor area. During installation, you just need to connect the refrigerant pipeline, which is simple and convenient.

1.3.3 Components

(1) DC inverter fan

The system pressure is kept steady with a 3-dimensional axial fan, which is with long service life and low power consumption.

(2) Electronic expansion valve with accurate micro-computer control

The electronic expansion valve used for this series of condensing units adopts PID self-tuning adjustment to accurately control the suction superheating degree and to avoid starting with liquid.

(3) High-efficiency inner threaded copper pipe heat exchanger

The condensers and evaporators in this series of condensing units are all made of high-efficiency inner threaded copper pipes, which ensure high heat exchange efficiency.

1.3.4 Micro-computer control system

(1) Function control center

① The fully automatic micro-computer control system is independently developed and made by Gree. Together with the pressure sensor and temperature sensor, it can realize accurate auto regulation to keep the unit working at the optimal state.

② The operating parameters of the unit are clearly displayed on the accompanied wired controller. Parameters can be set based on different use requirements and the unit is with power-off memory function.

③ Password protection function is designed so that user can set passwords with different levels of authority. This is to avoid other people from arbitrarily operating the unit or changing the parameters.

(2) Protection functions

① The unit is equipped with multiple protection functions to ensure safe and worry-free operation.

Major protection functions

High pressure protection	Low pressure protection	Discharge temperature protection	Low suction superheating degree protection
Fan malfunction protection	Pressure sensor malfunction protection	Temperature sensor malfunction protection	

② Other safety control measure: in case of high discharge temperature, the main board will control the liquid injection valve to lower the temperature of the gas entering the compressor, so as to expand the unit's operating range and ensure reliable operation.

1.4 Product Operating Range

	Model	Outdoor ambient temperature(℃)	Indoor evaporating temperature(℃)
Operating range	GNJ-QFT_CG/NaD-M(E)	-15 ～ 45	-15 ～ 10
	GNJ-QFT_SG/NaD-M		

2. Product Capacity Correction

2.1 Table of Product Capacity Correction

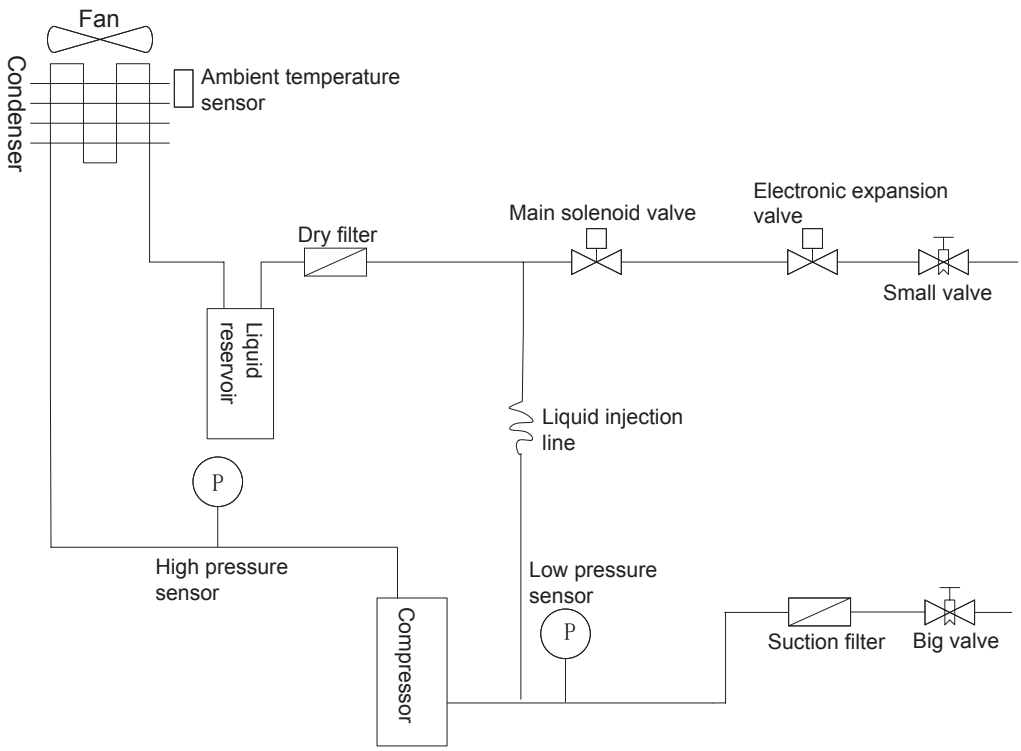
Model	Ambient Temperature (℃)	GNJ-QFT_CG/NaD-M(E) Working Condition Correction Coefficient															
		Evaporating Temperature (℃)															
		-15		-10		-7		-5		0		5		7		10	
		Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input
		(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)
GNJ-QFT3CG/NaD-E	27	3.53	1.89	4.70	1.95	5.29	1.98	5.66	2.01	6.72	2.08	7.92	2.16	8.43	2.20	9.23	2.26
	32	3.39	2.08	4.39	2.14	4.98	2.16	5.33	2.20	6.34	2.27	7.52	2.35	8.10	2.40	8.80	2.45
	38	3.14	2.34	3.96	2.40	4.53	2.42	4.84	2.46	5.83	2.53	6.89	2.61	7.39	2.64	8.16	2.68
	45	2.84	2.69	3.50	2.75	3.93	2.78	4.20	2.83	5.11	2.89	6.11	2.96	6.54	2.98	7.30	3.01
GNJ-QFT5CG/NaD-M	27	5.80	2.99	7.72	3.08	8.69	3.13	9.29	3.19	11.04	3.30	13.00	3.43	13.85	3.48	15.16	3.61
	32	5.56	3.30	7.21	3.38	8.19	3.43	8.75	3.49	10.41	3.59	12.34	3.71	13.30	3.80	14.45	3.92
	38	5.15	3.71	6.51	3.80	7.44	3.83	7.95	3.89	9.58	4.00	11.31	4.13	12.13	4.17	13.40	4.28
	45	4.67	4.25	5.74	4.36	6.45	4.40	6.90	4.47	8.39	4.58	10.04	4.68	10.74	4.73	11.99	4.81
GNJ-QFT6CG/NaD-M	27	7.19	3.94	9.58	4.05	10.78	4.12	11.53	4.19	13.70	4.34	16.13	4.51	17.18	4.58	18.80	4.70
	32	6.90	4.34	8.94	4.45	10.15	4.51	10.85	4.59	12.92	4.72	15.31	4.89	16.50	5.00	17.92	5.11
	38	6.39	4.88	8.07	5.00	9.23	5.04	9.87	5.12	11.88	5.26	14.03	5.44	15.04	5.49	16.63	5.58
	45	5.79	5.59	7.12	5.74	8.00	5.78	8.56	5.89	10.41	6.02	12.46	6.16	13.33	6.22	14.87	6.27
GNJ-QFT8CG/NaD-M	27	8.58	4.57	11.44	4.70	12.88	4.78	13.76	4.86	16.35	5.04	19.26	5.23	20.51	5.32	22.45	5.45
	32	8.23	5.04	10.68	5.16	12.12	5.23	12.96	5.32	15.42	5.48	18.28	5.67	19.50	5.40	21.40	5.93
	38	7.63	5.66	9.64	5.81	11.02	5.84	11.78	5.94	14.19	6.10	16.76	6.31	17.96	6.37	19.85	6.47
	45	6.91	6.49	8.50	6.66	9.56	6.71	10.21	6.83	12.42	6.99	14.87	7.14	15.91	7.21	17.76	7.28
GNJ-QFT10CG/NaD-M	27	14.42	7.49	19.22	7.70	21.63	7.83	23.12	7.97	27.47	8.25	32.36	8.57	34.46	8.71	37.72	8.93
	32	13.84	8.25	17.94	8.46	20.37	8.57	21.77	8.72	25.91	8.97	30.71	9.28	33.10	9.60	35.95	9.71
	38	12.81	9.27	16.20	9.51	18.52	9.57	19.80	9.74	23.84	10.00	28.15	10.33	30.18	10.43	33.36	10.60
	45	11.61	10.63	14.29	10.90	16.06	10.99	17.16	11.18	20.87	11.45	24.99	11.70	26.74	11.81	29.83	11.92
GNJ-QFT12CG/NaD-M	27	15.25	7.96	20.32	8.19	22.87	8.32	24.45	8.47	29.05	8.77	34.22	9.11	36.44	9.26	39.88	9.49
	32	14.63	8.77	18.97	8.99	21.54	9.11	23.02	9.27	27.40	9.54	32.47	9.87	35.00	10.10	38.01	10.32
	38	13.55	9.86	17.13	10.11	19.58	10.17	20.93	10.35	25.20	10.63	29.77	10.98	31.91	11.09	35.27	11.27
	45	12.28	11.30	15.11	11.59	16.98	11.68	18.15	11.89	22.07	12.17	26.42	12.44	28.27	12.56	31.54	12.67

Model	Ambient Temperature (℃)	GNJ-QFT_SG/NaD-M Variable Working Condition Capacity Correction															
		Evaporating Temperature (℃)															
		-15		-10		-7		-5		0		5		7		10	
		Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input
		(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)
GNJ-QFT15SG/NaD-M	27	19.17	10.64	25.55	10.95	28.75	11.12	30.74	11.32	36.52	11.72	43.02	12.17	45.81	12.38	50.14	12.68
	32	18.39	11.72	23.85	12.02	27.08	12.18	28.94	12.39	34.45	12.75	40.82	13.19	44.00	13.50	47.79	13.79
	38	17.03	13.18	21.54	13.52	24.62	13.60	26.31	13.83	31.68	14.21	37.43	14.67	40.12	14.82	44.34	15.06
	45	15.44	15.10	19.00	15.50	21.35	15.62	22.82	15.89	27.75	16.26	33.21	16.62	35.54	16.79	39.66	16.93

3. Working Principle

3.1 System Flowchart

Below is the refrigeration cycle:



System Flowchart of GNJ-QFT_CG/NaD-M(E)、GNJ-QFT_SG/NaD-M

3.2 Description of the System Flowchart

GNJ-QF series all closed packaged air-cooled condensing unit is fully equipped with a compressor, air-cooled condenser, liquid reservoir, dry filter, economizer, liquid supply solenoid valve, electronic expansion valve, and the air cooler. In engineering, you only need to connect the pipeline between the condenser and the fan to set up a complete refrigeration system.

4. Technical Parameters

4.1 Technical Parameters

Item			GNJ-QFT_CG/NaD-M(E)						GNJ-QFT_SG/NaD-M
			3	5	6	8	10	12	15
Evaporating temperature		℃	-15 ～ 10℃						
Cooling capacity		kW	8.1	13.3	16.5	19.5	33.1	35.0	44.0
Input power		kW	2.4	3.8	5.0	5.8	9.6	10.1	13.5
COP		-	3.37	3.50	3.30	3.58	3.45	3.46	3.26
Noise		dB(A)	54	61	60	60	67	66	66
Power supply		-	220V ～ 50Hz	380V 3N ～ 50Hz					
Safety protection		-	System high/low pressure protection, high discharge temperature protection, etc.						
Refrigerant		-	R410A						
Compressor	Type	-	All closed rotary type compressor			All closed scroll type compressor			
	QTY	Set	1						
	Rated power	HP	3	5	6	8	10	12	15
Heat exchanger	Air side	-	Finned type heat exchanger						
Condensing fan motor	Type	-	Brushless DC motor						
	Motor power	W	120	150	250	200×2	200×2	200×2	750
Dimensions	W	mm	1040	944	944	1098	1098	1098	933
	D	mm	412	530	530	427	427	427	778
	H	mm	700	823	823	1584	1584	1584	1694
Connection pipes	Gas pipe	mm	16	19	19	22	28	28	28
	Liquid pipe	mm	9.52	12	12	12	16	16	16
Net weight		kg	72	105	118	159	195	176	251

Note:

1) Cooling capacity, input power and other parameters stated in the above table are all values tested under nominal working condition.
2) Nominal working condition:
   Outdoor ambient temperature (inlet dry bulb): 32℃ ; evaporating temperature: 7℃ ; suction temperature: 18℃
3) perating range: ambient temperatures between -15℃ and 45℃
4) Due to product improvement, specifications of the unit are subject to change without prior notice. Please refer to the nameplate for specific technical parameters.

Chapter 2: Installation

1. Tools and Devices for Installation and Maintenance

◆ Three-stage distribution box----------Fig.1

◆ Multifunctional measurement gauge----------Fig.2

The measurement gauge shall be able to withstand higher pressure.

◆ Control valve ----------Fig.3

The control valve can avoid refrigerant overflow during moving and enable the instant opening and close of the liquid pipe side and the liquid reservoir.

◆ Charging safety device (gas-liquid separator)---------- Fig.4

Usually, refrigerant must be changed into liquid state. In order to avoid refrigerant flowing back to the compressor in liquid state, this device is used to make sure the refrigerant can get into the compressor safely.

◆ Electronic scale ----------Fig.5

Electronic scale is the recommended device for charging refrigerant. It can ensure the amount of refrigerant charge.

◆ Refrigerant storage tank ----------Fig.6

Confirm the refrigerant type before charging. Usually, R22/R404A/R410A in liquid state can be charged.

◆ Thermal resistor vacuum measurement meter ----------Fig.7

In order to remove the vapor in refrigeration circulation, proper vacuum drying must be applied. For this purpose, you can use this device to check if the system is in vacuum state.

◆ Vacuum pump ----------Fig.8

circulation in vacuum state and to check the vacuum degree of the system.

◆ Welding tool ----------Fig.9

◆ Pipe bender ----------Fig.10

◆ Pipe expander ----------Fig.11

◆ Nitrogen tank ----------Fig.12

The nitrogen is used to drive away oxygen during welding in order to avoid forming oxidation film and oxidation inside the system.

◆ Phillips screwdriver/Slotted screwdriver ----------Fig.13

◆ Clipper ----------Fig.14

◆ Adjustable wrench 8/12----------Fig.15

◆ Torque wrench ----------Fig.16

It is used to tighten flare nuts.

◆ Double-ended pressure gauge ----------Fig.17

◆ Level bar ---------- Fig.18

◆ Impact electric hammer ----------Fig.19

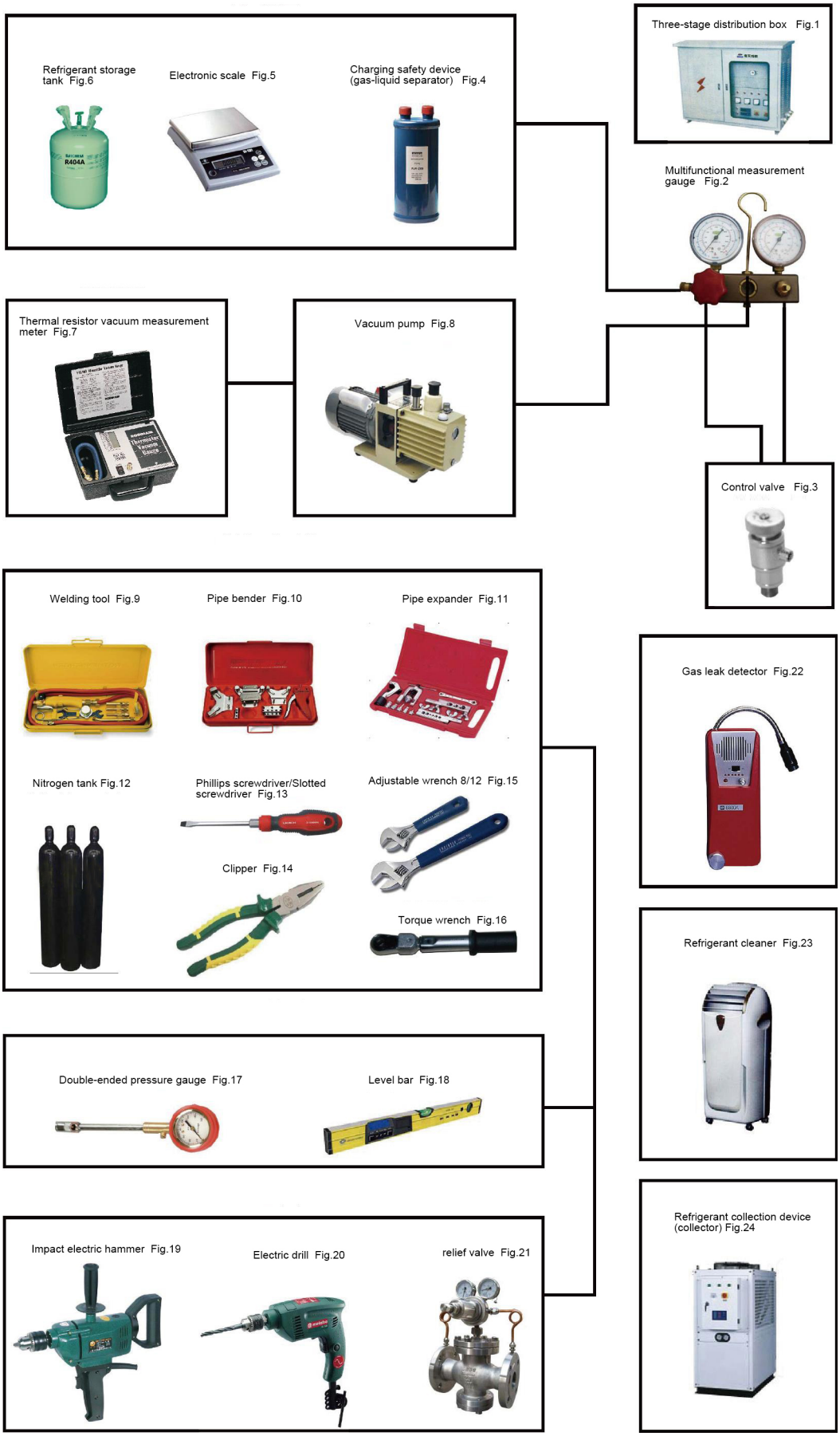
◆ Electric drill----------Fig.20

◆ Oxygen relief valve/Nitrogen relief valve/Acetylene relief valve/ Backfire check valve -----Fig.21

◆ Gas leak detector ----------Fig.22

◆ Refrigerant cleaner ----------Fig.23

◆ Refrigerant collection device (collector)----------Fig.24



Note: All tools must comply with related safety qualification. Do not use counterfeit or shoddy products; otherwise it will affect the quality of the project.

2. Unit Installation

2.1 Installation Precaution

To install the unit, be sure to ask our company's authorized installer or a professional installation and engineering company. Do not install the unit by yourself.

2.1.1 Selection of Installation Position

General precautions: The unit should be located in a place where it is convenient for construction, daily operation and maintenance.

① Each unit should be placed where the piping and wiring are the shortest and it is easy to construct.

② Since daily maintenance is necessary, please locate the unit in a place that is convenient for maintenance.

Daily maintenance includes the inspection of operating pressure, operating temperature, compressor and condenser.

(1) Keep good ventilation: Please locate the unit in a place where the ambient temperature is below 45 ℃ and there is good ventilation and smooth exhaust. The air exhaust of the unit must not affect neighbors.

(2) The installation position should be solid and level: in order to reduce vibration and noise, please place the unit on a solid foundation.

(3) The unit can be installed on the balcony, rooftop, special platform or any other location that is convenient for installation and with reliable load bearing.

(4) There should be no strong heat sources, nor exhaust vents from other equipment, nor strong steam or flammable gas around the unit; when the unit is placed on the roof, pay attention to the wind direction and avoid direct head wind; when installing on the ground, avoid strong air outlet as much as possible.

(5) Select a location to ensure that the unit will not be buried in snow or affected by garbage and oil mist.

(6) The unit cannot be installed in corrosive, flammable or explosive environment; otherwise, the unit will fail to work and the service life of the unit will be shortened; fire or serious injury may also occur.

2.1.2 Installation Connection

(1) Use clean and moisture-free copper pipes according to the unit's piping specifications.

(2) The piping between the condensing unit and the air cooler should be as short and simple as possible. In order to prevent pipeline vibration, the pipes should be well supported and fixed.

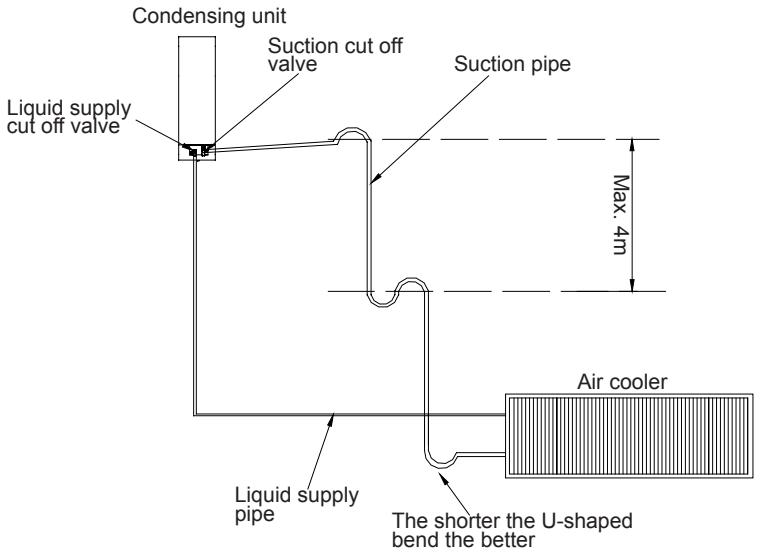
(3) Use dry nitrogen to charge the pipeline for welding to prevent welding scale; after the pipeline is connected, all the pipes should be drained with dry nitrogen to further remove the dust and scale and other impurities in the pipeline to ensure that there are no dirt or foreign objects in the pipeline.

(4) Depending on the position of the air cooler relative to the condensing unit, the recommended piping connections are as follows:

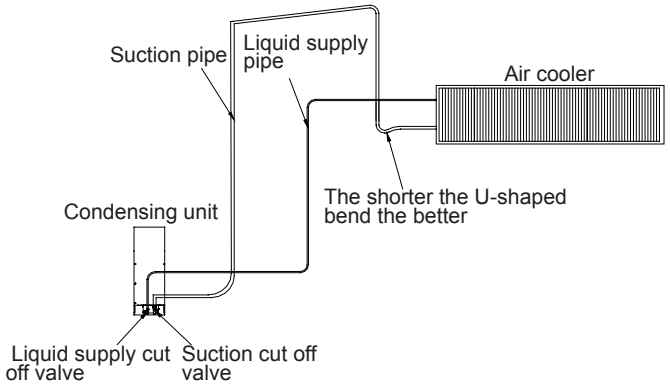
① The suction pipe of the compressor should be set with a slope of 1/200-1/250, and it must be inclined to the compressor to ensure that the lubricating oil can automatically flow back

into the compressor when it is stopped, and can continuously flow back to the compressor with refrigerant gas during operation.

② When the condensing unit is located above the air cooler, the height difference should be within 20m, and a U-shaped oil return bend should be added every 4m of the suction pipe, as shown in the following figure:



③ When the condensing unit is located under the air cooler, the height difference should be controlled within 5m, and the suction pipe should be set with an inverted U-shaped bend that is higher than the top of the air cooler, as shown in the following diagram. This is to prevent liquid from flowing to the compressor when the compressor is stopped and causing liquid slugging.



④ In order to prevent the suction pipe and the liquid supply pipe from condensation and abnormal overheating, they should be insulated with thermal insulating materials.

⑤ In order to ensure that the lubricating oil can smoothly return to the compressor from the evaporator (air cooler), the refrigerant flow rate in the horizontal gas pipe should be above 4m/s, and the refrigerant flow rate in the vertical pipe should be above 8m/s.

(5) When the installation position of the unit is far from the evaporator and the length of the suction pipe exceeds 20 meters, the refrigeration oil must be supplemented according to the length of the excess portion and the diameter of the suction pipe. The amount of supplemented refrigerant oil is shown as below for reference:

Suction pipe size(mm)	φ12.7	φ16	φ19	φ22	φ25	φ28	φ35
Oil supplemented amount(mL/m)	10	20	30	40	50	60	70

(6) It is recommended to install the warehouse temperature sensor at the air inlet side of the air cooler with a distance of 10cm from the fins; as for the air supply temperature sensor, it is recommended to install it at the air outlet side of the air cooler with a distance of 10cm from the fan; it is recommended to install the defrosting temperature sensor in the temperature sensor tube on the U pipe at the side face of the air cooler, or near the wiring box, on the U pipe where the frosted layer is thick and is finally clean in defrosting process, depending on the actual use condition. When fixing the defrosting temperature sensor, make sure to avoid the sensor probe and the wire from touching the electric heating element.

(7) For low-temperature warehouses, the drain pipe should be equipped with a heating belt (applicable to warehouses where the ambient temperature is below 0℃ , and the heating belt needs to extend to the water loop) to prevent the drain pipe and the water loop from freezing and resulting in drainage failure.

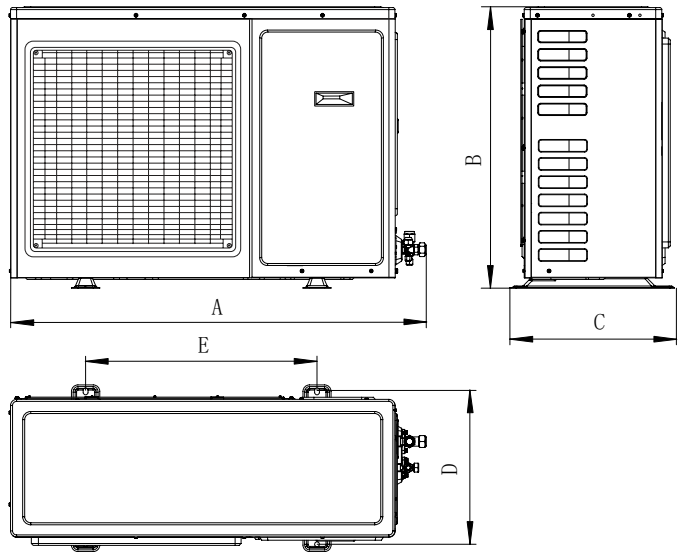
2.1.3 Carrying and Disassembly

(1) When carrying the unit, forklift or crane should be used.

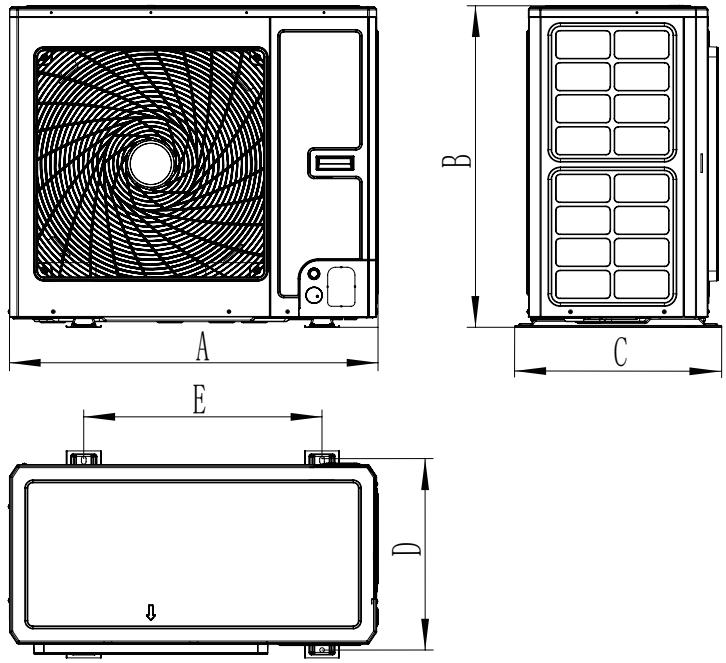
(2) Canvas sling should be used for lifting. Wrap the canvas sling around the base of the unit and tie it tightly. Make sure that the sling does not contact with the heat exchanger.

(3) When moving the unit, keep it vertical and stable. It is forbidden to overturn the unit. In addition, when using a forklift, please make use of the bottom pallet to keep the unit upright.

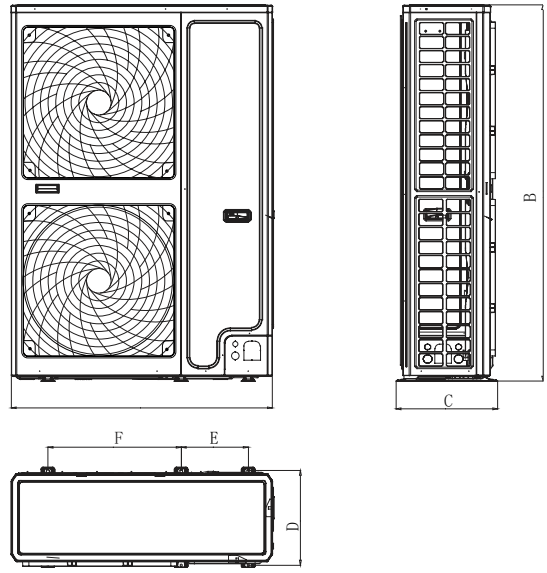
2.1.4 Unit Outline Dimensions



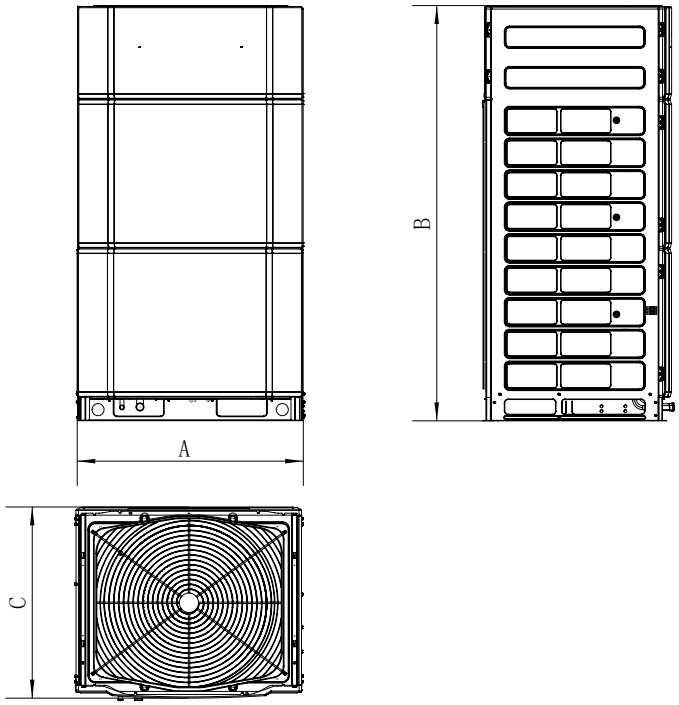
Dimensions (mm) / Model	A	B	C	D	E
GNJ-QFT3CG/NaD-E	1040	700	412	378	572



Dimensions (mm) / Model	A	B	C	D	E
GNJ-QFT5CG/NaD-M	944	823	530	486	610
GNJ-QFT6CG/NaD-M	944	823	530	486	610



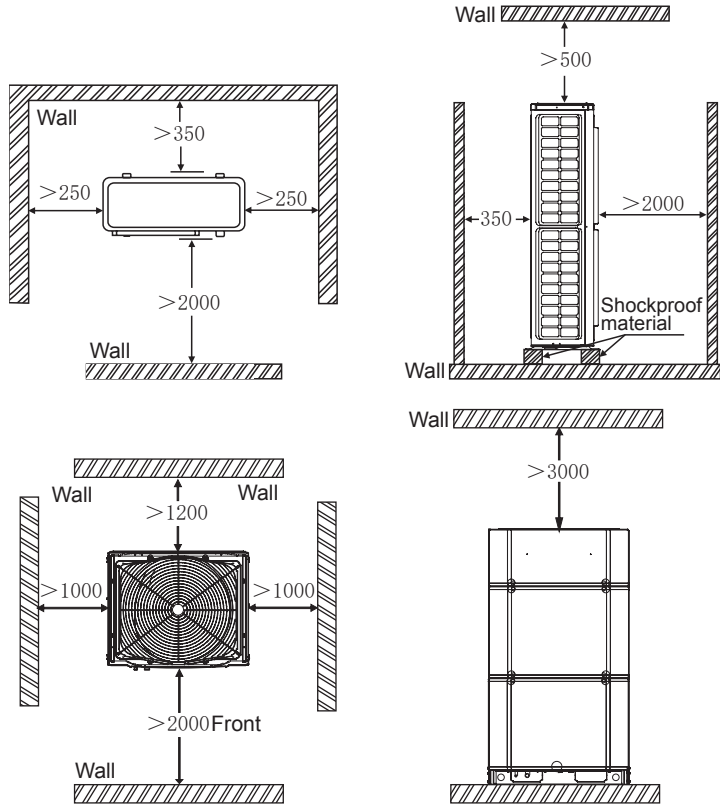
Dimensions (mm) / Model	A	B	C	D	E	F
GNJ-QFT8CG/NaD-M	1098	1584	427	395	282	560
GNJ-QFT10CG/NaD-M	1098	1584	427	395	282	560
GNJ-QFT12CG/NaD-M	1098	1584	427	395	282	560



Dimensions (mm) / Model	A	B	C	D	E
GNJ-QFT15SG/NaD-M	933	1694	778	378	572

2.1.5 Requirement for Installation and Maintenance Space

Installation dimensions (mm):



2.2 Precautions for Electrical Installation

(1) Install according to national wiring standards. All the provided components, materials and

electrical work must comply with local regulations.

(2) Use specialized power supply for the air conditioner and it must be consistent with the rated power supply.

(3) The power cord must be securely fixed to avoid stress onto the terminals. Do not pull the power cord forcibly.

(4) The diameter of the power cord should be large enough. A damaged power cord or connecting wire must be replaced with a special cable.

(5) All electrical installations must be conducted by professionals according to local laws, regulations and the corresponding instruction manual.

(6) The unit must be reliably grounded and meet relevant requirements of local standards.

(7) The unit must be equipped with a circuit breaker and a leakage protection device. The circuit breaker must have both magnetic and thermal trip functions.

(8) Never draw power from the inside of the unit, otherwise, fire accident may occur.

(9) Before any electrical installation, make sure the installation position is not connected to power.

(10) Wiring between indoor and outdoor units must be correct and only the specified wire can be used. Make sure the wiring terminals are well fixed without being stressed. If the wire is not properly connected or fixed, fire accident may occur.

(11) Extension cord is not allowed. If the connecting wire is not long enough, please contact our authorized service outlets to get a specialized cord with sufficient length.

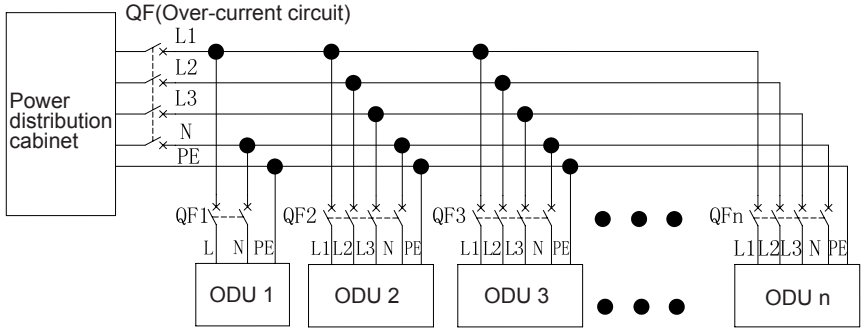
(12) When connecting wires, please refer to the wiring diagram attached to the unit. During electrical installation, do not connect the power (circuit breaker and leakage protection device in the circuit).

(13) After knocking out the wire-cross hole, place the wire-cross rubber ring onto the hole to prevent the power cord from touching the metal sheet. The power cord that enters the electric box of the unit must be protected by rubber or plastic material to avoid being scratched by the edge of the metal sheet.

(14) The wiring circuit inside the unit has been properly connected. Do not change the circuit arbitrarily.

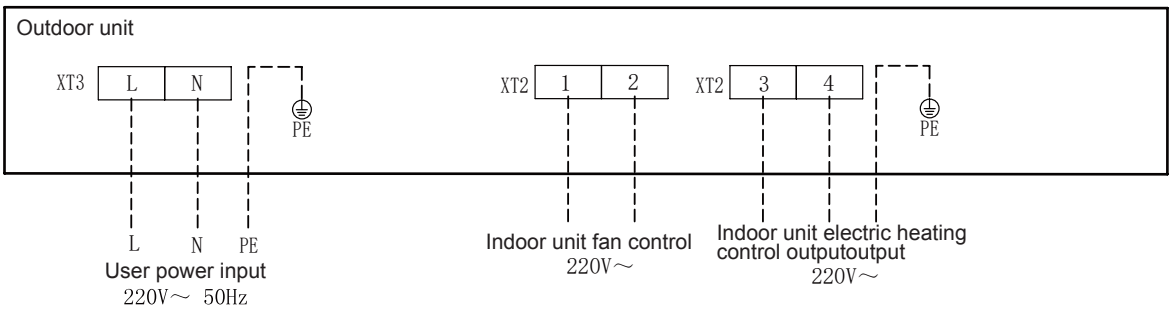
2.3 Electrical Connection

Every outdoor unit must be equipped with a circuit breaker for short circuit and abnormal overload protection. (Generally, for models with built-in circuit breakers, there's no need to add one. If needed, add a circuit breaker separately.) When there are multiple outdoor units, use a main circuit breaker to connect or disconnect the power mains for multiple outdoor units. Normally, circuit breakers are closed.

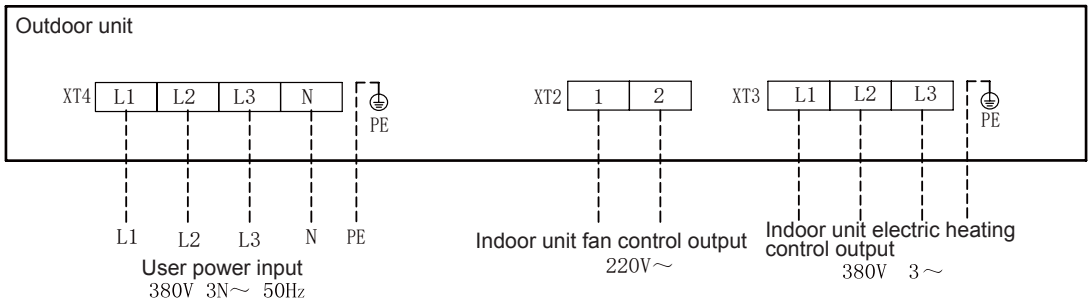


2.4 External Wiring Diagram for Outdoor Unit

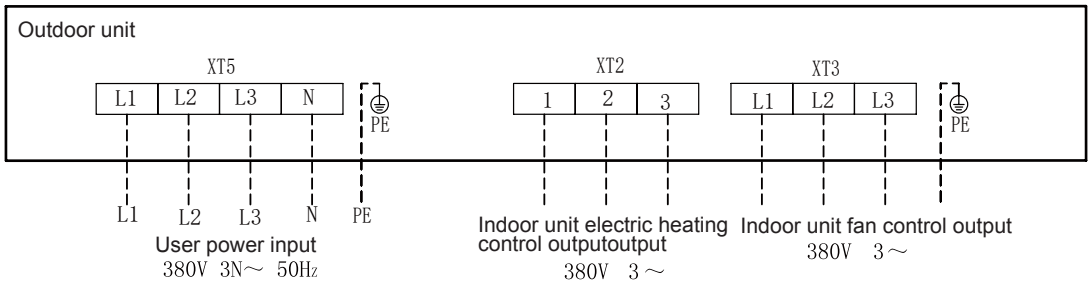
◆ External wiring diagram for GNJ-QFT3CG/NaD-E



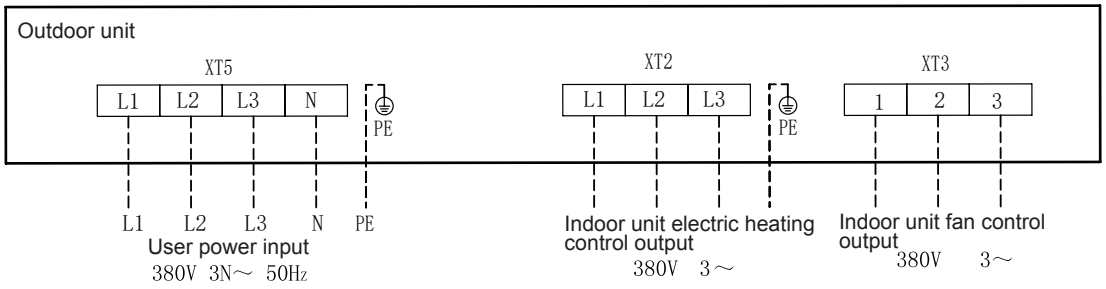
◆ External wiring diagram for GNJ-QFT5CG/NaD-M、GNJ-QFT6CG/NaD-M、GNJ-QFT8CG/NaD-M



◆ External wiring diagram for GNJ-QFT10CG/NaD-M、GNJ-QFT12CG/NaD-M



◆ External wiring diagram for GNJ-QFT15SG/NaD-M



2.5 Power Cord and Circuit Breaker Selection for Outdoor Unit

Model	Power spec.	Circuit breaker capacity (A)	Recommended power cord (number of cores x sectional area mm²)
GNJ-QFT3CG/NaD-E	220V ～ 50Hz	25	3×4.0
GNJ-QFT5CG/NaD-M	380V 3N ～ 50Hz	20	5×2.5
GNJ-QFT6CG/NaD-M	380V 3N ～ 50Hz	20	5×2.5
GNJ-QFT8CG/NaD-M	380V 3N ～ 50Hz	25	5×4.0
GNJ-QFT10CG/NaD-M	380V 3N ～ 50Hz	32	5×4.0
GNJ-QFT12CG/NaD-M	380V 3N ～ 50Hz	40	5×6.0
GNJ-QFT15SG/NaD-M	380V 3N ～ 50Hz	50	5×10.0

(1) Selection of circuit breaker and power cord in the above table is based upon the unit's maximum power (maximum current).

(2) Specification of power cord is based on the working condition where ambient temperature is 45℃ and multi-core copper cable (working temperature is 90℃ , e.g. power cable with YJV cross-linked copper, insulated PE and PVC sheath) is lying on the surface of slot. If working condition changes, please adjust the specification according to national standards.

(3) Copper-core cables that meet national standards must be used.

(4) Specification of circuit breaker is based on the working condition where ambient temperature of circuit breaker is 45℃ . If working condition changes, please adjust the specification according to national standards.

⚠ Warning

(1) The green-yellow wire inside the unit is a ground wire. Do not use it for other purposes. Nor should it be cut off or secured by tapping screws. Otherwise, it may cause electric shock.

(2) The one ground screw in the unit can only be used to fix the one yellow and green wire. Do not use it to fix several ground wires.

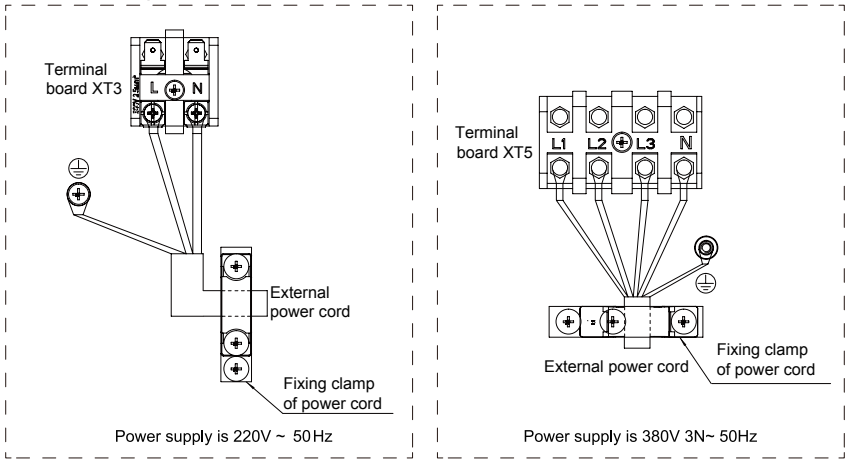
(3) The selected electrical components must meet national and local standards. Make sure each joint is securely attached.

(4) Power supply at user side must have a reliable ground terminal. Do not connect the ground wire to: water pipe; gas pipe; drain pipe; other places that are considered by professionals as unreliable.

2.6 Wiring diagram of outdoor unit's power cord

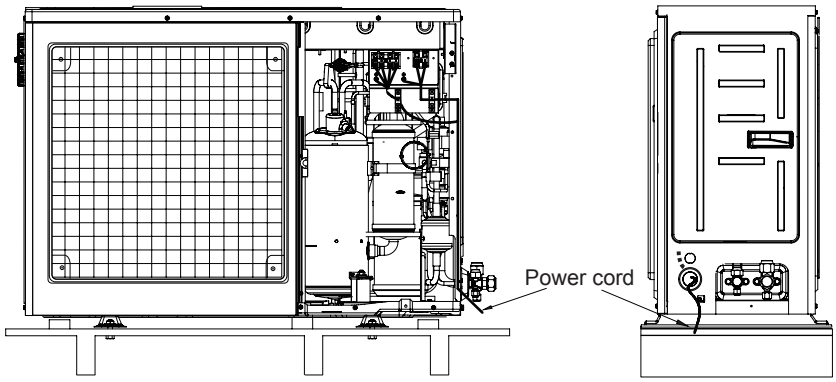
Step 1: Pass the external power cord through the knock-out hole. Please note that the knock-out hole needs to be installed with the rubber ring, and then connect the "L1, L2, L3, N" of power cord and the ground wire to the power connection board marked with "L1, L2, L3, N" and the ground screw next to the power connection board.

Step 2: Remove the fixing clamp of power cord and then fix the power cord;

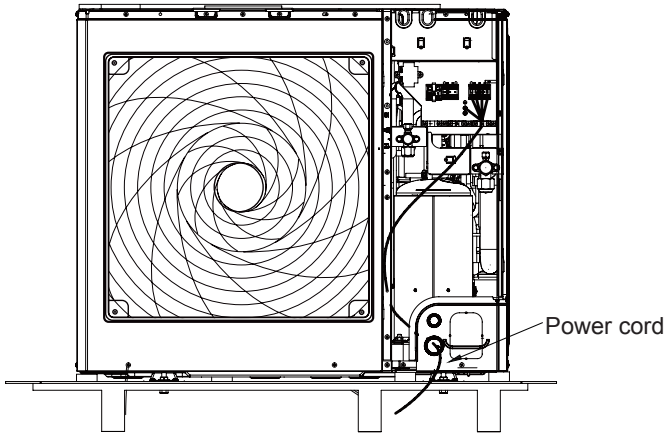


2.7 Engineering connection wire routing

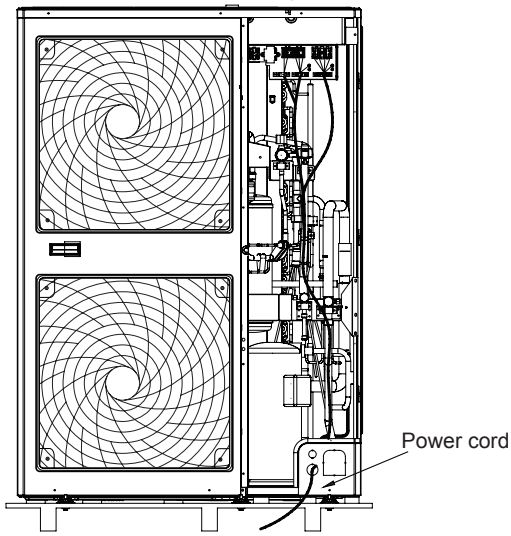
Please refer to the figure as below for engineering connection wire routing of GNJ-QFT3CG/NaD-E. Engineering power cord enters from the wire-passing hole (large hole) under the rear side plate, then comes along with the clamp of side plate, and then fixed with a cable tie. Finally, connect it to the wiring board.



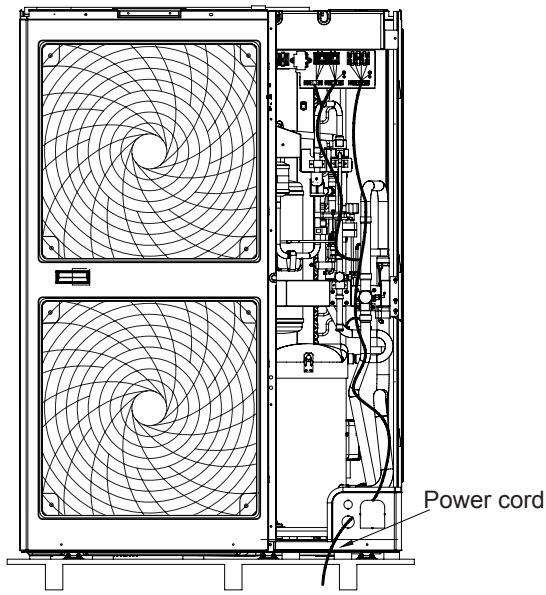
Please refer to the figure as below for engineering connection wire routing of GNJ-QFT5CG/NaD-M and GNJ-QFT6CG/NaD-M. Engineering power cord enters from the wire-passing hole (large hole) under the front side plate, then comes along with two clamps of the insulation plate sub-assy and then fix it with the cable tie. After that, the power cord comes along with the clamp at the middle of valve holder, and then fixed with a cable tie. Finally, connect it to the wiring board.



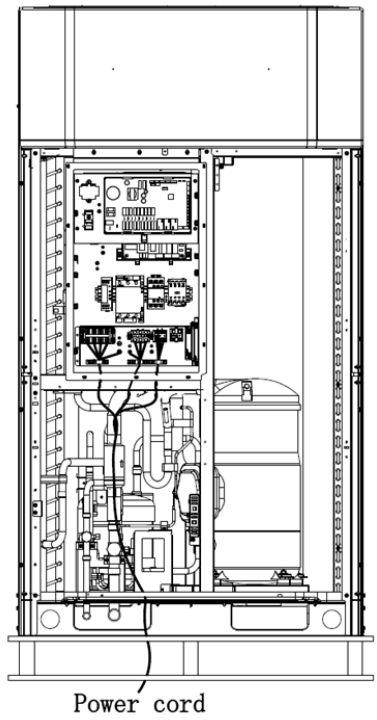
Please refer to the figure as below for engineering connection wire routing of GNJ-QFT8CG/NaD-M. Engineering power cord enters from the wire-passing hole (large hole) under the front side plate, then comes along with the connection pipe (gas valve), and then fixed with a cable tie at the cotton-wrapped part. After that, the power cord comes along the cotton-wrapped part of pipeline of small valve of cut-off valve; finally, connect it to the wiring board.



Please refer to the figure as below for engineering connection wire routing of GNJ-QFT10CG/NaD-M and GNJ-QFT12CG/NaD-M. Engineering power cord enters from the wire-passing hole (large hole) under the front side plate, then comes along with the connection pipe (gas valve), and fix it with a cable tie at the cotton-wrapped part. After that, the power cord comes along the cotton-wrapped part of pipeline of small valve of cut-off valve, and then fixed at the cotton-wrapped part at the U-shape connection pipe under the electric box; finally, connect it to the wiring board.



Please refer to the figure as below for engineering connection wire routing of GNJ-QFT15SG/NaD-M. Engineering power cord enters into the unit from the wire-passing hole (large hole) of sealing board of chassis sub-assy, then comes along with the cotton-wrapped part of suction pipe to the electric box; the internal wire-passing holes from left to right is power cord inlet hole of outdoor unit, electric heating power inlet wire hole of indoor unit and fan's power cord inlet hole of indoor unit in turn. The wires come along the pipeline and then fixed with a cable tie; finally, connect it to the wiring board.



3. Typical Installation Problems and Consequences

No.	Typical Installation Problems	Consequences
1	Dust and foreign matter enter the refrigerant system.	The pipeline will have a higher risk of clogging, which will lead to poor cooling effect; the wear of compressor will increase, which may cause the unit to fail to work and the compressor may even be burned.
2	The vacuum degree of the pipeline is not satisfactory.	The unit will have poor cooling effect; the system may not be able work normally due to frequent protection. In severe case, the compressor or other important components may be damaged.
3	The refrigerant system is mixed with water.	The compressor can easily have copper plating, which will result in lower efficiency and abnormal noise; the system can easily have ice blockage and fail to work properly.
4	The pipes of the unit are not consistent with the requirement.	If pipe dimensions are too small, the pipeline resistance will increase, which will affect the cooling performance; if pipe dimensions are too large, it is a waste for the system. Over-large pipe dimensions may also cause the reduction of the cooling effect.
5	Heat exchange pipes are blocked.	The unit will have poor cooling effect; in severe case, the compressor has to run in overheating condition for a long time.
6	The amount of refrigerant charge is wrong.	The system cannot accurately control the flow distribution; the unit is not able to work stably and suction with liquid will occur to the compressor.
7	Pipeline has leakage.	The circulating refrigerant will become insufficient and the cooling effect will be reduced. After a long time of operation, the compressor will be overheated or even damaged.
8	The unit is not properly installed.	It will cause difficulty in maintenance; if the center of gravity of the unit is slanted, the unit will be unsafe. The heat transfer performance is affected; in severe case, the unit cannot work normally and will generate disturbing noise.
9	The power cord is not correctly connected.	The unit’s components will be damaged; there is potential safety hazard.
10	The control and communication wire is falsely or weakly connected.	The system cannot communicate normally.
11	The control and communication wire is not properly protected.	The communication wire will have short circuit or open circuit and the unit may not be able to start working due to communication failure.

In order to ensure the quality of installation, please confirm whether the unit has any special installation requirements before construction. Installers must have corresponding project construction qualifications; otherwise, they must accept the training from the manufacturer's professional technicians and pass relevant tests before conducting the installation.

Welders, electricians, and cooling workers engaged in special operations in engineering construction must have operational certification and corresponding vocational skills qualification certificates.

Chapter 3: Commissioning

1.Air Tightness Inspection and Refrigerant Charging

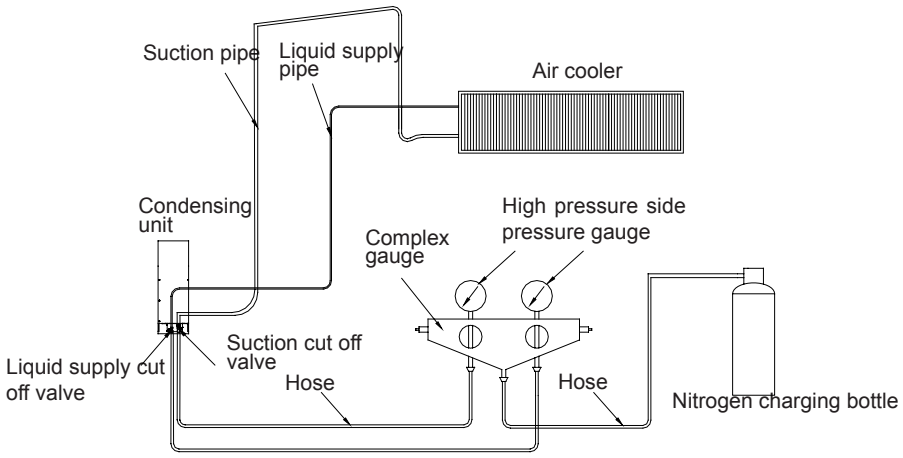
1.1 Air Tightness Inspectio

The unit has completed air tightness inspection before leaving the factory, so please keep the suction cut off valve and liquid supply cut off valve closed when connecting the indoor and outdoor units. After the indoor and outdoor units are installed and connected, check the air tightness of the indoor side evaporation device and the connecting pipes, so as to avoid adverse effects caused by leakage of the unit. The inspection steps are as follows:

(1) Check whether the suction cut off valve and liquid supply cut off valve of the unit are completely closed.

(2) Slowly charge the high-pressure dry nitrogen from the nozzles of the suction cut off valve and liquid supply cut off valve until the pressure gauge reads 10Bar. After charging the nitrogen, regardless of the temperature change, the pressure can be slightly reduced within the first 6 hours, but should remain unchanged for the next 18 hours.

(3) If there is a leak, use soapy water to detect the leak. After releasing the pressure, repair the leak. After repairing, charge with nitrogen again, and use pressure to detect the leak until there is no leak.



⚠ Note

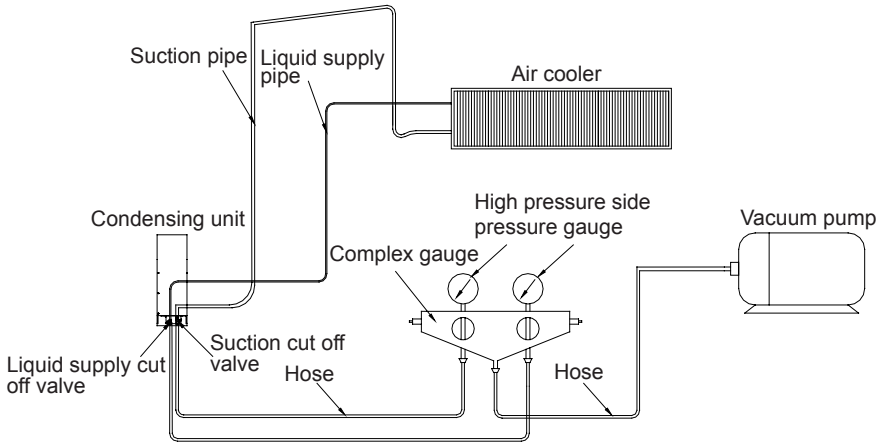
(1) Welding for the leak must be conducted after the pressure is released.

(2) When dryness is ensured, compressed air can be used for pressure test, but oxygen, acetylene and other combustible or toxic gases cannot be used for pressure test.

1.2 Vacuum Pumping

(1) In order to prevent air, water, etc. from entering the refrigerant pipeline, use a vacuum pump to vacuum and dry the indoor side and the connecting pipes before charging the refrigerant.

(2) Vacuum pumping should be done from both the high and low pressure sides of the unit, as shown in the following figure：



(3) Before vacuum pumping, please keep the suction cut off valve and the liquid supply cut off valve closed. (The outdoor unit comes with a certain amount of refrigerant.)

(4) Please use a complex gauge to confirm the pressure value.

(5) Vacuum pumping standard: After the vacuum degree reaches 130Pa, keep the pressure for 2 hours and the rise is less than 250Pa. If the pressure rises quickly, repeat the vacuum pumping several times until the requirement is reached.

1.3 Charging of Refrigerant

After passing the air tightness inspection (vacuum pumping), it's OK to charge refrigerant (R22/ R404A/R410A) into the unit.

GNJ-QF series all closed packaged air-cooled condensing unit has been filled with a certain amount of refrigerant before leaving the factory. If the connecting pipe is within 10m, theoretically, there's no need to charge additional refrigerant.

Considering the loss of oil return and suction pressure of the system, the length of piping between the evaporator and the unit (GNJ-QFT3CG/NaD-E, GNJ-QFT5CG/NaD-M, GNJ-QFT6CG/ NaD-M) should not exceed 20 meters; the length of piping between the evaporator and the unit (GNJ-QFT8CG/NaD-M, GNJ-QFT10CG/NaD-M, GNJ- QFT12CG/NaD-M, GNJ-QFT15SG/NaD-M) should not exceed 30 meters. If the length of the pipeline is more than 10 meters, please add refrigerant for the excess portion according to the following requirements or consult our company.

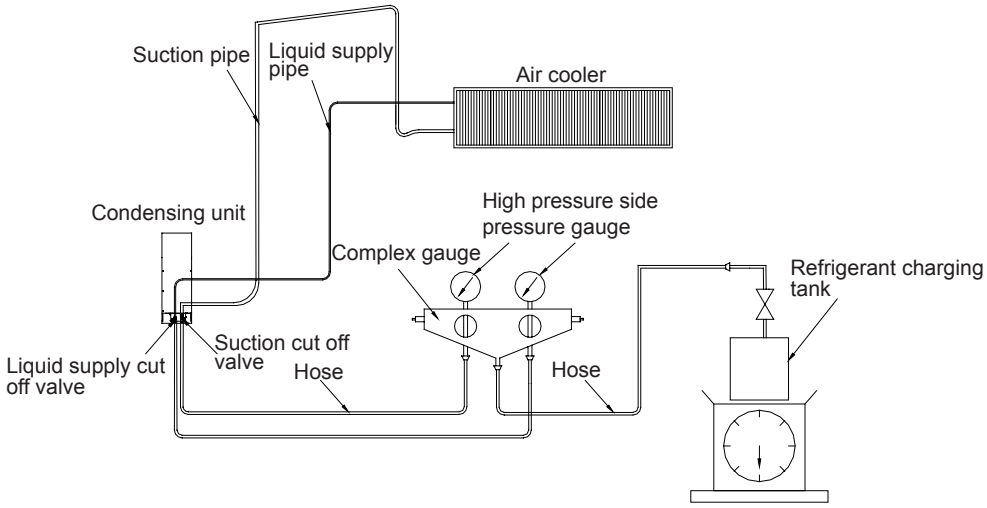
The calculation method of the refrigerant amount (subject to the liquid pipe) and the additional refrigerant amount per meter of liquid pipe is shown in the table below.

Additional refrigerant amount = ∑ length of liquid pipe × additional amount per meter of liquid pipe, additional amount of R22/R404A/R410A based on diameter of liquid pipe

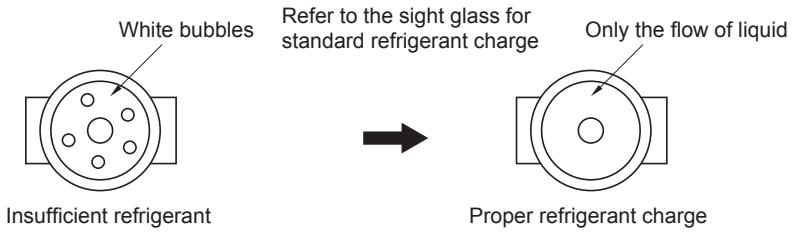
Additional amount of R410A (subject to the length of liquid pipe)

Diameter of liquid pipe（mm）		Φ9.52	Φ12.7	Φ16	Φ19.05	Φ22
Additional refrigerant amount per meter（kg/m）	R410A	0.06	0.1	0.18	0.26	0.35

Method of charging additional refrigerant: Start up the unit and slowly charge the refrigerant in gaseous form from the suction side, as shown in the following figure:



The amount of refrigerant is different depending on the evaporator capacity and operating conditions. To achieve the appropriate amount of charge, add a small amount of refrigerant when the bubbles in the sight glass disappear during stable operation. (Note: This unit does not have a sight glass, which is provided by the engineering part.)



⚠ Notice

(1) When the refrigerant is charged in liquid form, please operate very carefully to avoid the risk of "wet operation". Charge as slowly as possible.

(2) Never use a mixture of refrigerant and air or oxygen to increase the pressure to avoid explosion.

⚠ Warning

(1) Super high pressure may cause explosion of the unit and the pipeline! Never charge too much refrigerant into the system.

(2) When the refrigerant charging process is interrupted or completed, the unit should be re-checked.

2. Check before Test Run

(1) Check the wiring again for errors and looseness.

(2) Use a wrench or other tools to open all interface valves to the maximum.

(3) Check whether the power supply voltage is within ±10% of the rated voltage.

(4) Check whether the insulation resistance is above 1MΩ.

(5) Check whether the fixed bolts around the compressor have been removed.

3. Test Run

Test run must be conducted by professionals under the condition that the unit has passed all the above inspection items.

(1) Power on the unit and turn it on.

(2) After the unit is powered on, the fan and compressor will start up automatically.

(3) If there is abnormal sound after the compressor is started, stop and check the compressor immediately. If there is no abnormal sound, continue with the operation.

4. Inspection of Operating Status

(1) Is there abnormal vibration in the piping of the condensing unit.

(2) Whether the refrigerant is insufficient or excessive. (sight glass, high pressure check).

(3) Check water residues (Look at the sight glass. If it is green, then it's qualified).

(4) Is the direction of the fan of the air-cooled condensing unit consistent with the design direction? (Normally it blows outward).

Chapter 4: Troubleshooting

1. Table of Errors

Code	Parameter	Statement
EC00	No error	If the unit is not faulted, it will display the code.
EC01	High pressure protection	If this error occurred, the unit will display this code.
EC02	Low pressure protection	If this error occurred, the unit will display this code.
EC03	Discharge temperature protection	If this error occurred, the unit will display this code.
EC04	High pressure sensor error	If this error occurred, the unit will display this code.
EC05	Low pressure sensor error	If this error occurred, the unit will display this code.
EC06	Ambient temperature sensor error	If this error occurred, the unit will display this code.
EC07	Discharge temperature sensor 1 error	If this error occurred, the unit will display this code.
EC08	Suction temperature sensor error	If this error occurred, the unit will display this code.
EC11	Contactor pick up error	If this error occurred, the unit will display this code.
EC12	Contactor adhesion error	If this error occurred, the unit will display this code.
EC15	Low suction superheating degree protection	If this error occurred, the unit will display this code.
EC16	Fan error	If this error occurred, the unit will display this code.
EC17	Compressor 1 protection	If this error occurred, the unit will display this code.
EC19	Warehouse temperature sensor error	If this error occurred, the unit will display this code.
EC21	Drive board 1 communication error	If this error occurred, the unit will display this code.
EC23	Condensing temperature sensor error	If this error occurred, the unit will display this code.
EC24	Supply air temperature sensor error	If this error occurred, the unit will display this code.
EC25	Defrosting temperature sensor error	If this error occurred, the unit will display this code.
EC26	Discharge temperature sensor 2 error	If this error occurred, the unit will display this code.
EC27	Wired controller communication error	If this error occurred, the unit will display this code.
EC28	Jumper cap error	If this error occurred, the unit will display this code.
EC29	Ultra-high warehouse temperature alarm	If this error occurred, the unit will display this code.
EC30	Ultra-low warehouse temperature alarm	If this error occurred, the unit will display this code.
EC31	Evaporation fan error protection	If this error occurred, the unit will display this code.

2. Common Errors and Solutions

In case the unit and refrigerant pipeline parts have errors due to certain reasons, please cut off the power to repair.

Meanwhile, to prevent an error from occurring again, please pay attention to the following problems:

(1) To prevent the same errors from occurring again, please conduct error diagnosis practically and repair it after finding out the faulted location and reason.

(2) When repairing the pipeline, evacuate the refrigerant for the welding part. Nitrogen should be charged during welding.

(3) When replacing the compressor, condenser, refrigerant, refrigerant oil and other major components, please replace the dry filter at the same time! Besides, if the internal refrigerant pipeline is dirty and damaged due to the burnt motor of the compressor, please remove the residual refrigerant and refrigerant oil inside the refrigerant pipeline with nitrogen. (Dismantle the expansion valve at this time)

(4) When pumping refrigerant out of repairing, replacing or discarding the unit, please recycle it thoroughly, don’t discharge it to the air.

(5) If the components are faulted, don't replace the whole unit, instead, replace the faulted component.

(6) Replace the faulted components with the same model listed. Please consult us if you have any queries.

(7) To prevent electric leakage, please assemble the components (cover, electrical components, etc.) detached for maintenance back to the original place.

(8) After maintenance, confirm the operation status as pilot run, especially confirm the possibility of re-occurrence of the error.

◆ For any other errors with undefined cause, please contact the after-sales service department after investigating the symptom, model and manufacturing code.

Replace the compressor in the following sequence:

1) Dismantle the terminal of the power.

2) Dismantle the connection pipe.

3) Dismantle the fixed bolts (quantity: 4) of the compressor.

4) Lift and pull the compressor upwards.

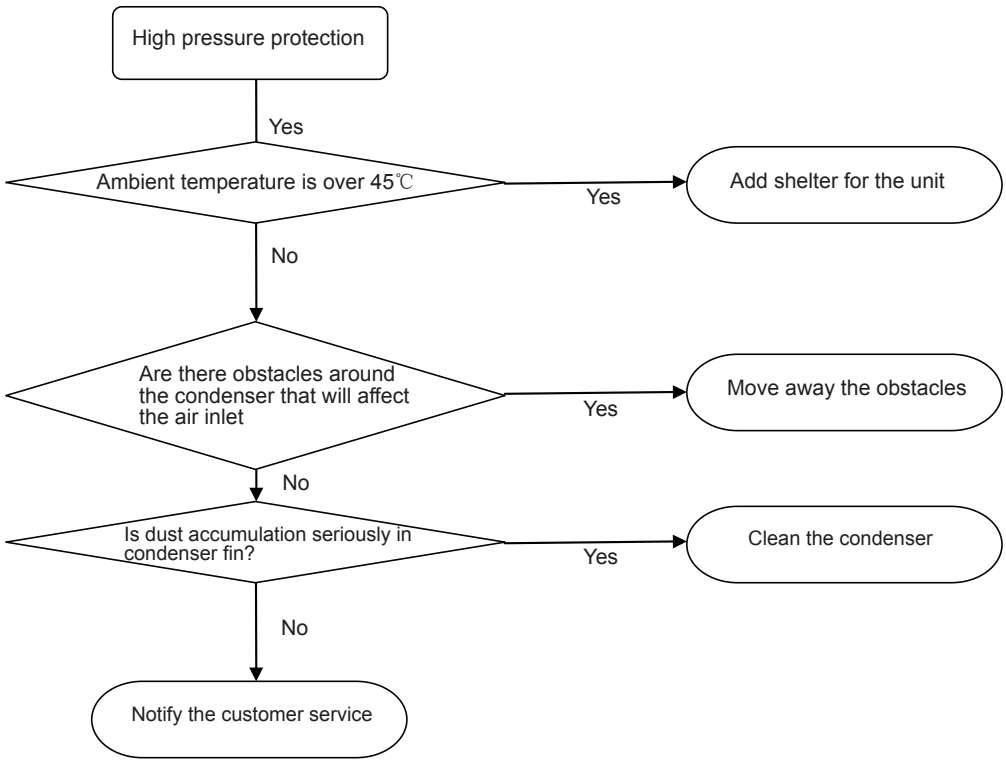
5) Install the compressor in opposite sequence.

If the user found any problems in using, please contact the local distributor or offices nearby.

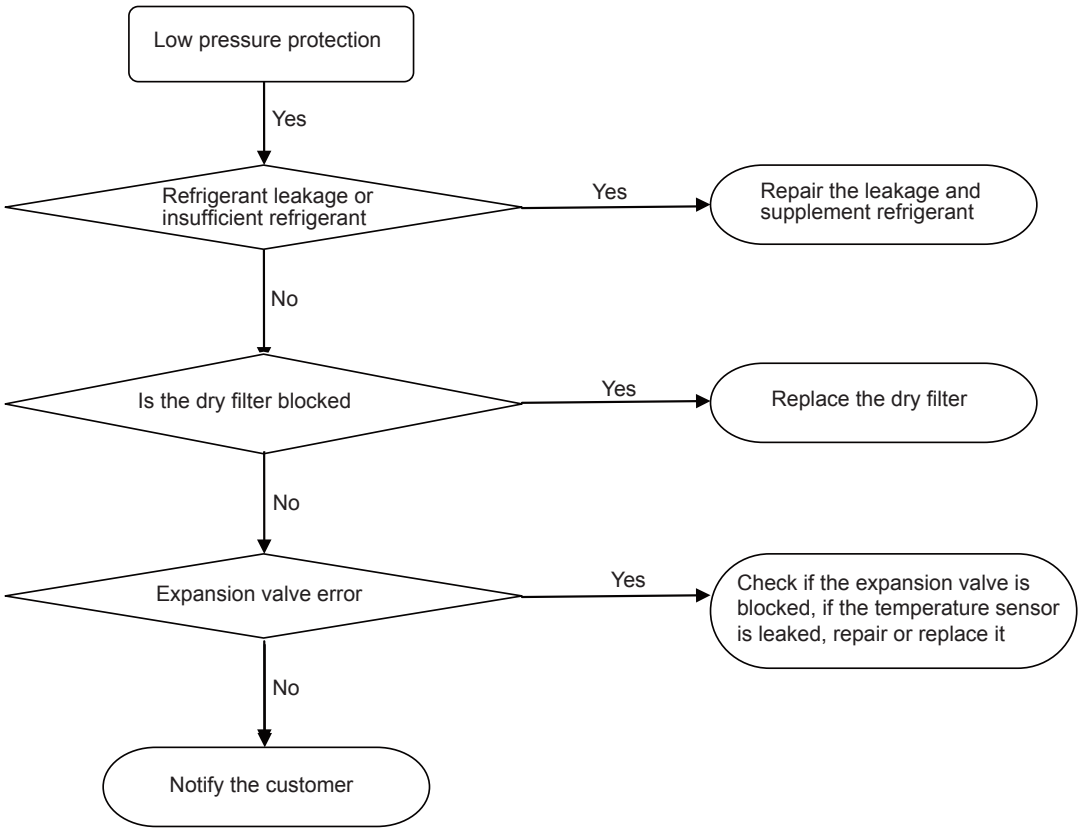
3. Troubleshooting for Typical Errors

The professionals can refer to the following diagrams for troubleshooting:

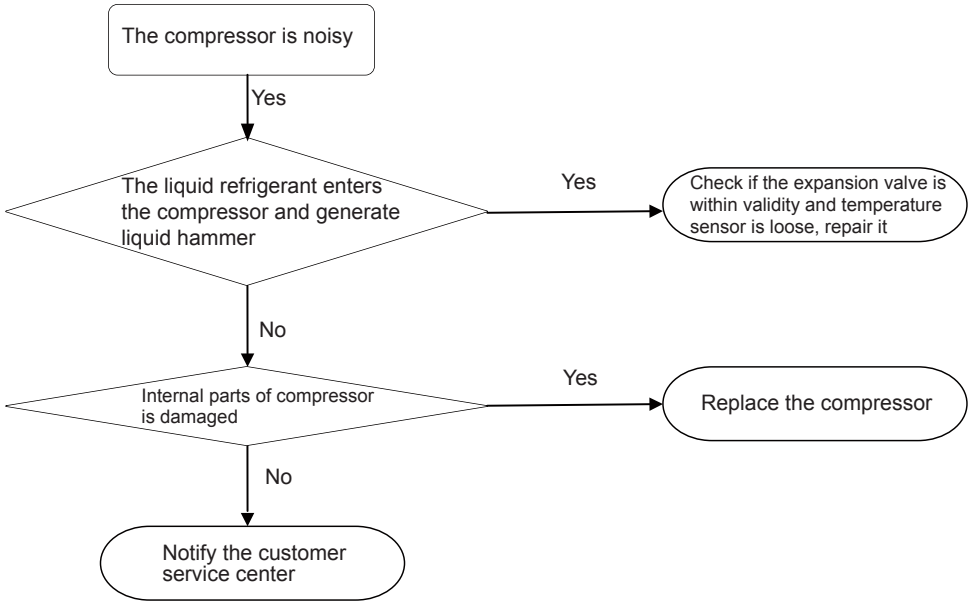
◆ High pressure protection



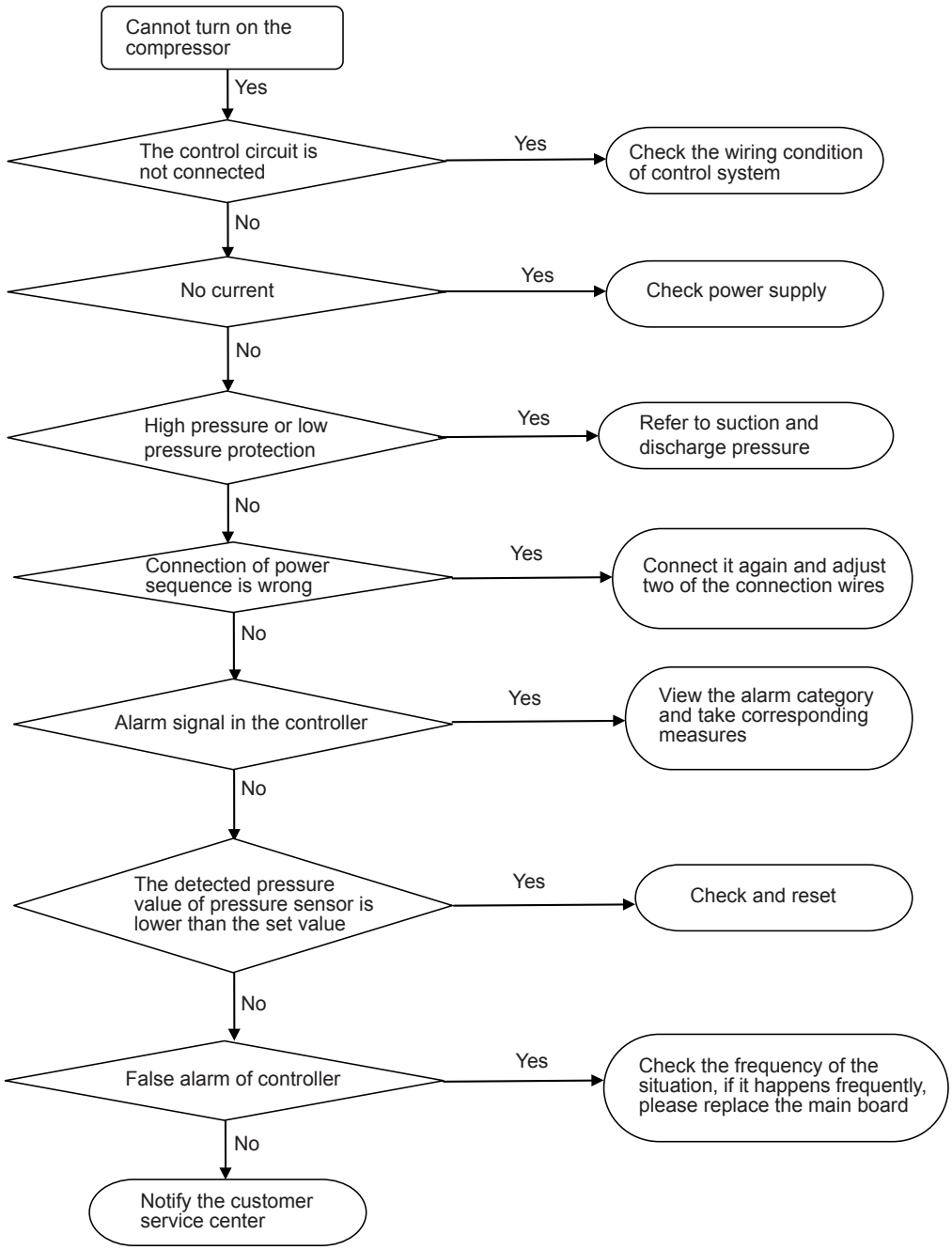
◆ Low pressure protection



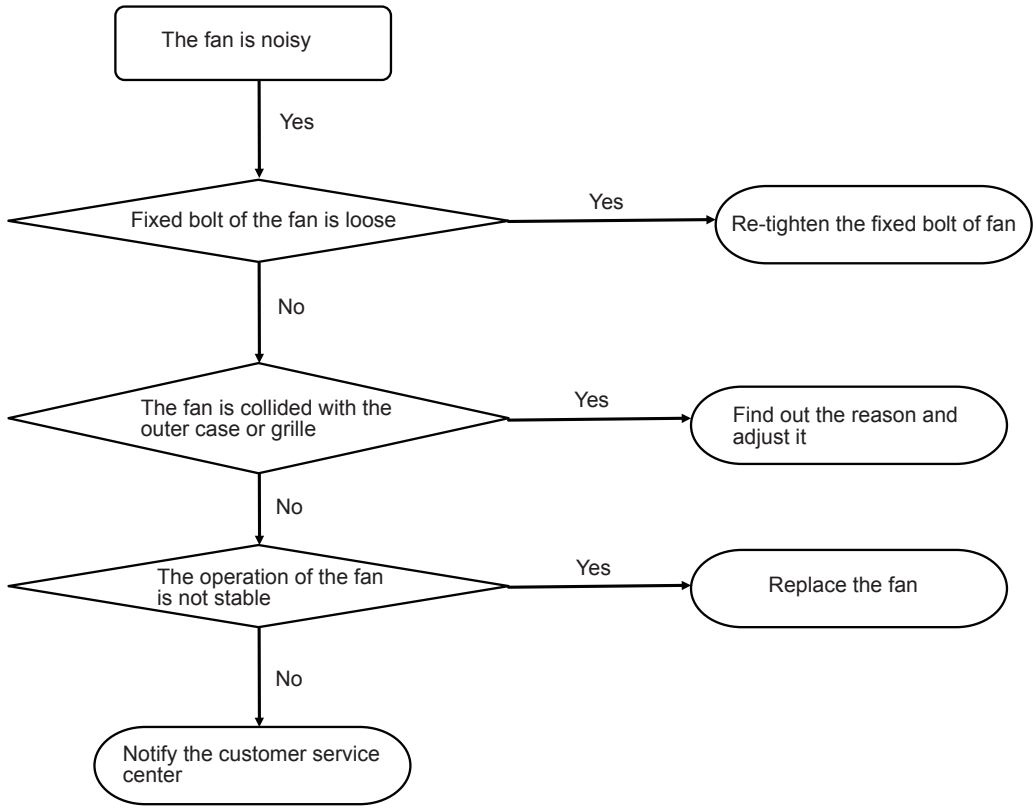
◆ The compressor is noisy



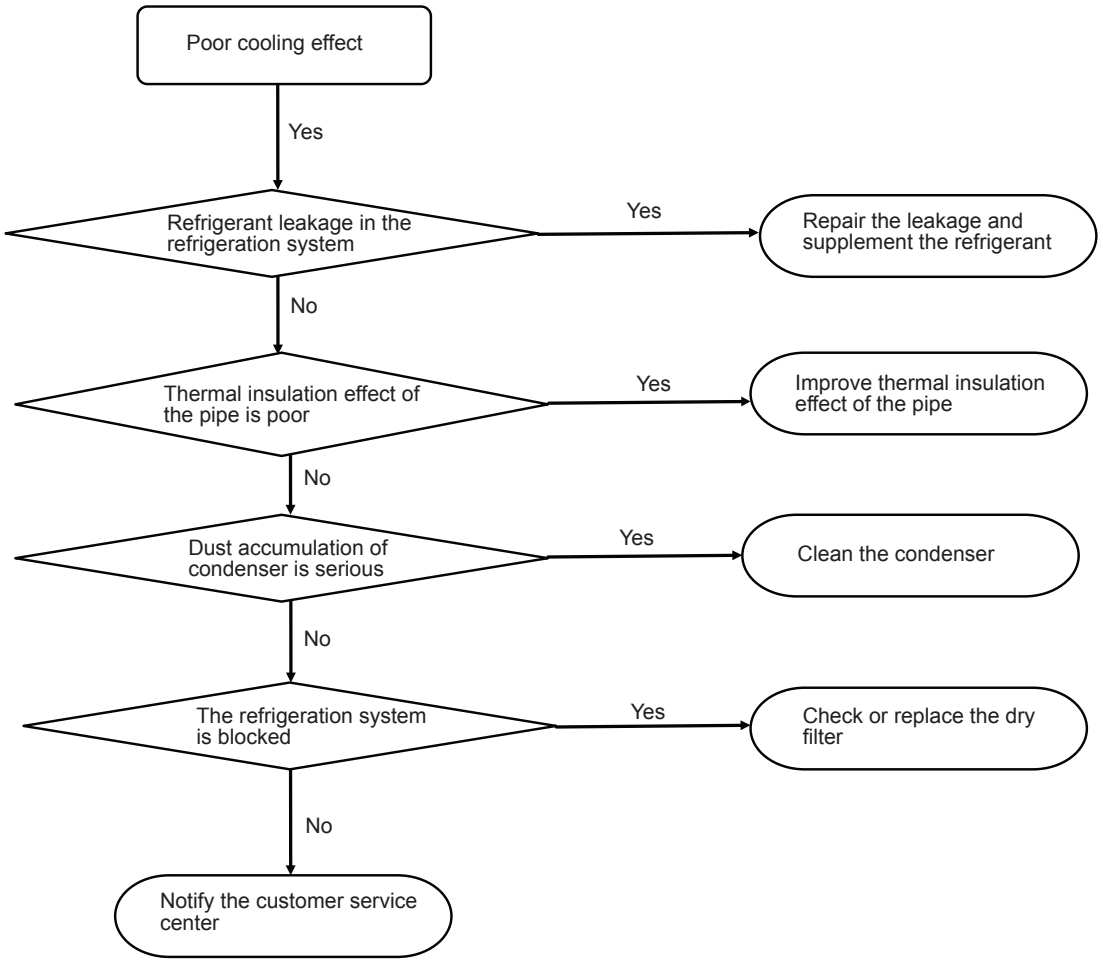
◆ Cannot turn on the compressor



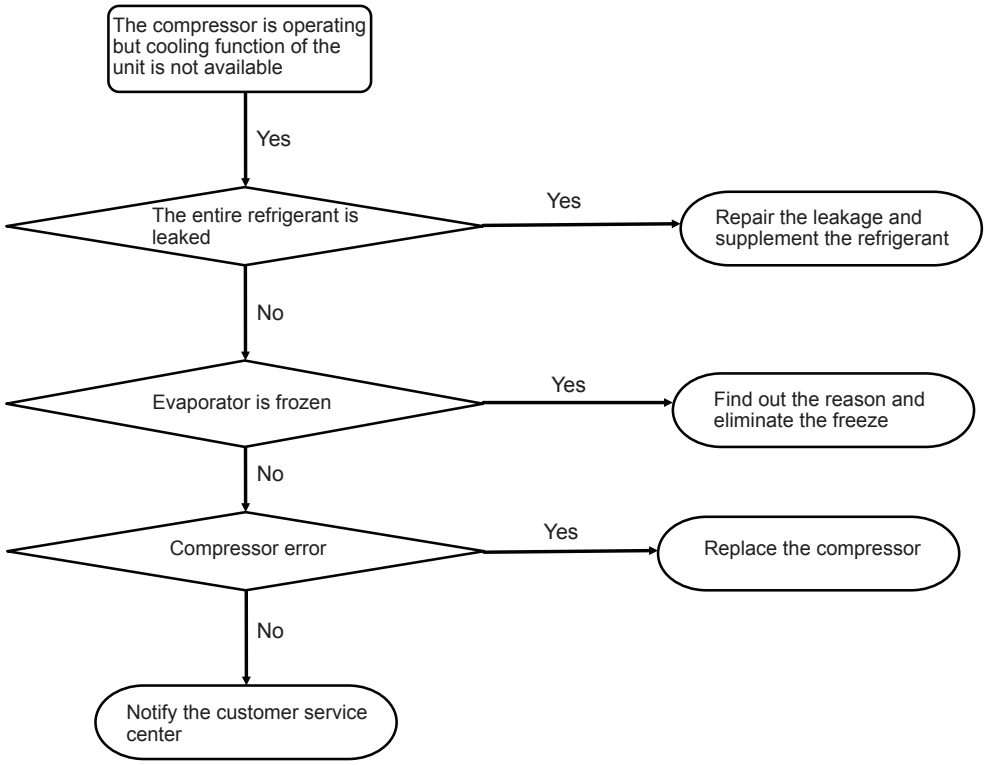
◆ The fan is noisy



◆ Poor cooling effect



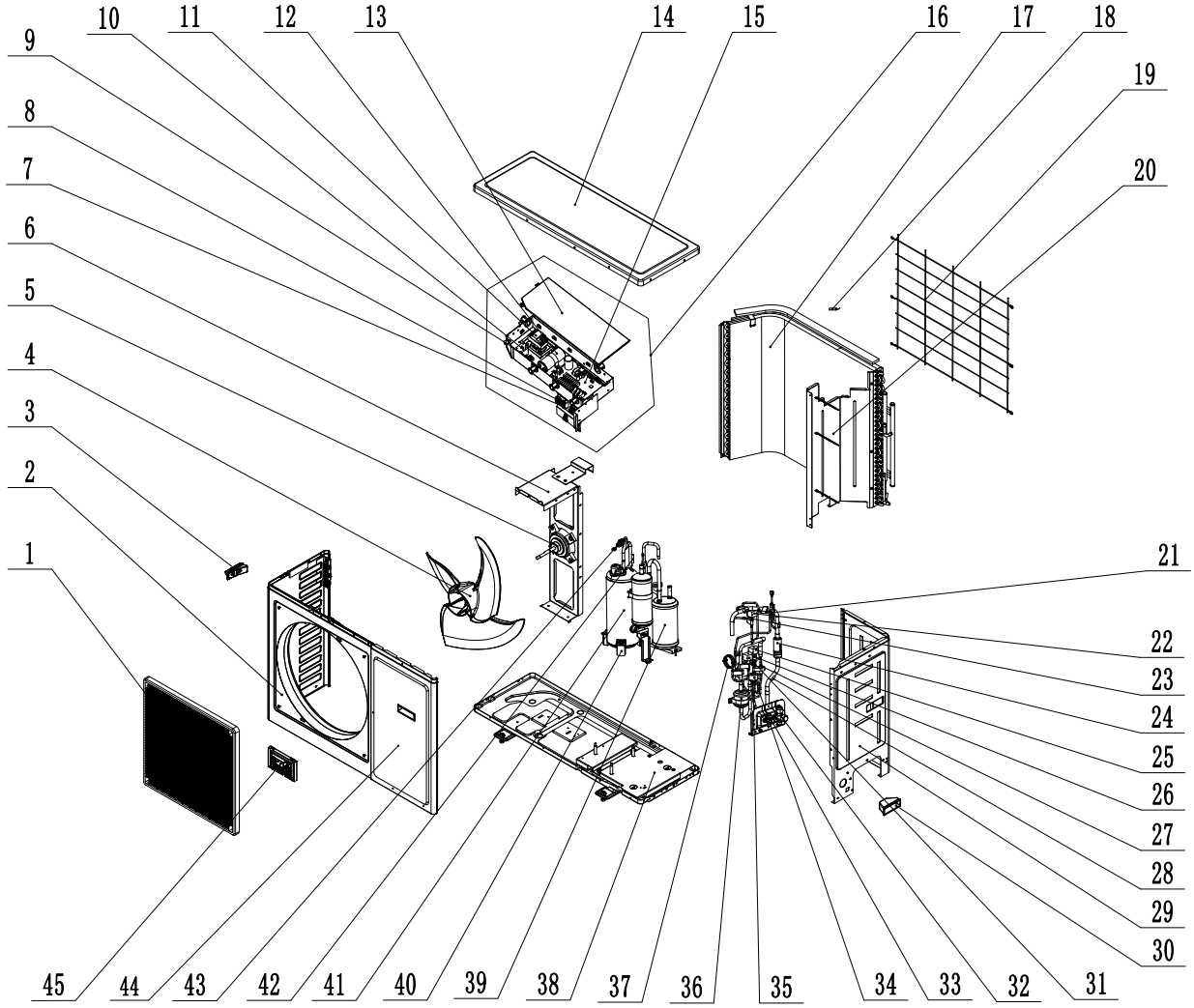
◆ The compressor is operating but cooling function of the unit is not available



4. Exploded View and List of Parts

(1) Unit: GNJ-QFT3CG/NaD-E

Exploded view：



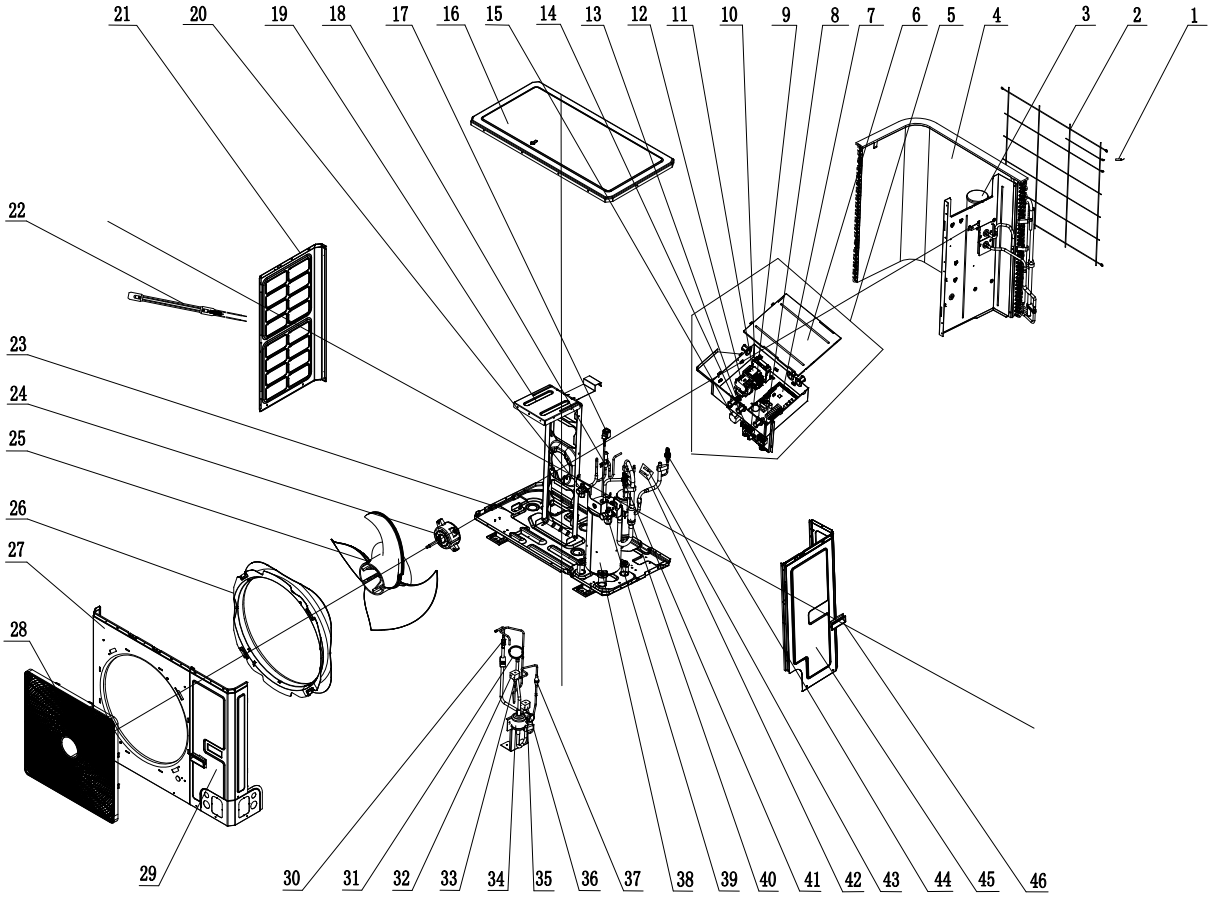
List of parts：

No.	English name	(*)Easy to be damaged	Remark	Material code (reference)	Qty
1	Front Grill			2241410202	1
2	Cabinet Sub-assy			017001000001	1
3	Handle			2623305302	1
4	Axial Flow Fan	*		1043410000301	1
5	Brushless DC Motor	*		1570410001305	1
6	Motor Support Sub-Assy			01803701036	1
7	Terminal Board	*		42000100000101	1
8	Terminal Board	*		420001000003	1
9	Terminal Board	*		42011103	1
10	Inductance	*		43128000014	1
11	AC Contactor	*		441007060009	1
12	Capacitance	*		3300008107	1
13	Electric Box Cover			012020060464	1
14	Coping			01255013	1
15	Main Board	*		300027060996	1
16	Electric Box Sub-Assy			017007061646	1
17	Condenser Assy			011002060980	1

18	Ambient Temperature Sensor	*	15KS-XH-2P-K3(Black)-1000mm	3900012123	1
19	Rear Grill			0147302801	1
20	Clapboard			012051060727	1
21	Pressure Sensor (Low Pressure)	*		322101006	1
22	Magnet Coil	*		07200106002402	1
23	Electromagnetic Valve	*	(FDF2.0/FDF2A24)	43000054	2
24	Bidirection Strainer	*		07210044	1
25	Magnet Coil (electromagnetic valve)	*		4304410023006	1
26	Electromagnetic Valve	*	FDF8A08	43044100224	1
27	Strainer A	*		07210022	1
28	Temperature Sensor	*	20KT-XH-2P(White)-1300mm	390002069	1
29	Rear Side Plate			0130509603	1
30	Handle	*		2623525307	2
31	Magnet Coil	*		4300008328	1
32	Cut off Valve	*		07103030	1
33	Cut off Valve	*		071302391	1
34	Electric Expand Valve Fitting	*		4300034402	1
35	Electronic Expansion Valve	*		072009060033	1
36	Dry Filter	*		07218769	1
37	Capillary Tube			04023700014	1
38	Chassis Sub-assy			01193700053	1
39	Accumulator	*		07422204	1
40	Compressor Gasket	*		00901200008	3
41	Compressor and Fittings	*		009001060051	1
42	Discharge Sensor	*	50KT-EH-2P(yellow)-800mm	3900012122	1
43	Pressure Sensor (High Pressure)	*		322101032	1
44	Front Side Plate			01303309	1
45	Display Board	*		300001000199	1

(2) Unit: GNJ-QFT5CG/NaD-M

Exploded view:



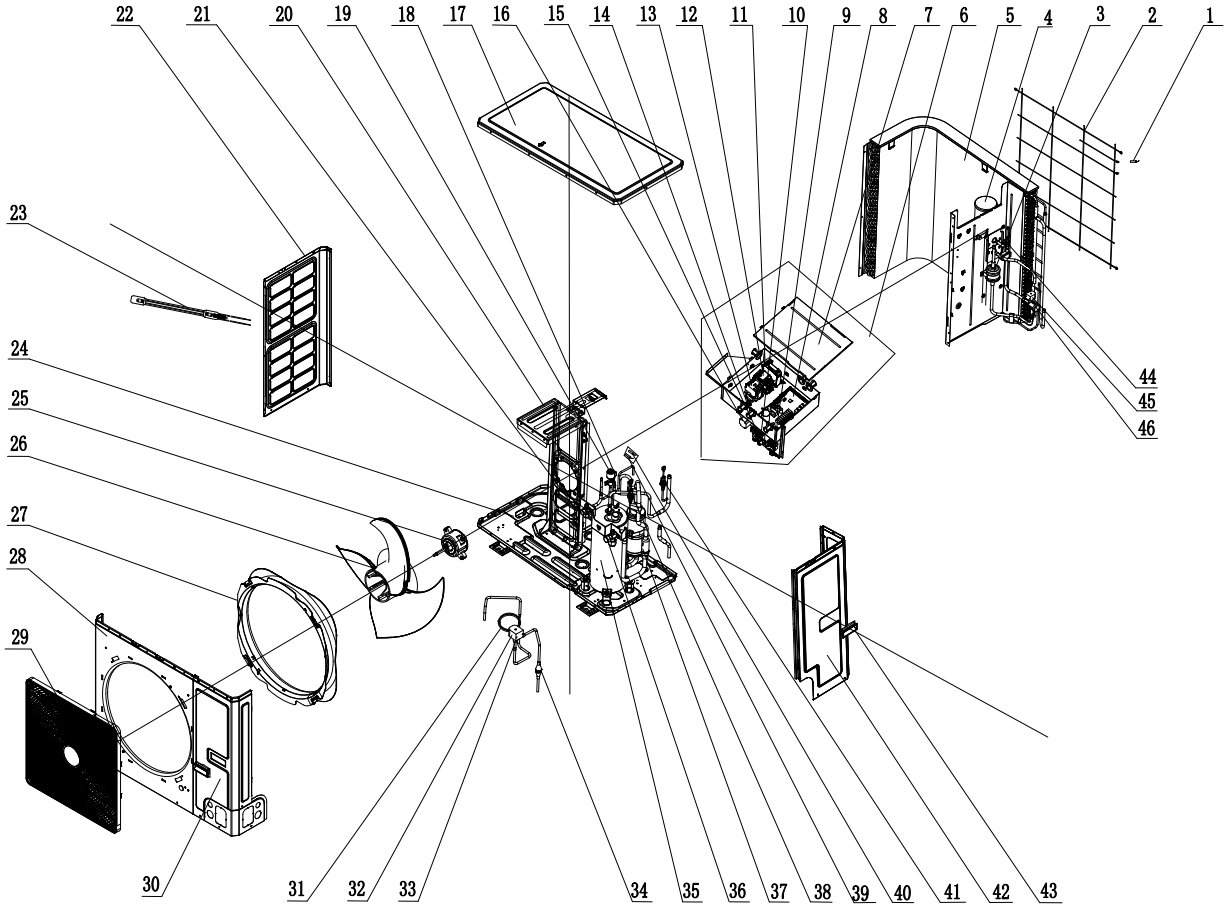
List of parts:

No.	English name	Easy to be damaged(*)	Remark	Material code (reference)	Qty
1	Ambient Temperature Sensor	*	15KS-XH-2P-K3(Black)-1000mm	3900012123	1
2	Rear Grill	*		0157410001402	1
3	Accumulator	*		035029000006	1
4	Condenser Assy			011002060979	1
5	Electric Box Assy			100002067776	1
6	Electric Box Cover			012020060459	1
7	Main Board	*		300027000414	1
8	Terminal Board	*		42200000002404	1
9	Terminal Board	*		42200000001701	1
10	Phase-Sequence Currentprotection	*	ZP201	430055060005	1
11	AC Contactor	*	220V/(50/60HZ)/25A 1NO/1NC	441007060009	1
12	AC Contactor	*	(220~240V)/(50/60Hz)/12A 1NO/1NC	44010287	1
13	Terminal Board	*		42011103	1
14	Terminal Board	*		42000100000105	1
15	Inductance	*	5mH/3A	43128000014	1
16	Coping			01264100052P03	1
17	Electric Expand Valve Fitting	*		4304413236	1
18	Electronic Expansion Valve	*	UKV-18D325	072009000001	1
19	Motor Support Sub-Assy	*		01701206003901	1
20	Cut off Valve	*	1/2(N)	071302392	1
21	Left Side Plate			012055000007P03	1

22	Electrical Heater(Compressor)	*		7651873203	1
23	Chassis Sub-Assy			01700006013501P01	1
24	Brushless DC Motor	*		150104060013	1
25	Axial Flow Fan	*		1043410000801	1
26	Diversion Circle	*		10474100003	1
27	Cabinet	*		012022000003P03	1
28	Front Grill	*		0157410000801	1
29	Front Side Plate			012050000007P03	1
30	Strainer	*		0721200102	1
31	Capillary Tube			04023700028	1
32	Magnet Coil	*	AC220-240V/50/60Hz-1100	4300008328	1
33	Electromagnetic Valve	*	(FDF2.0/FDF2A24)	43000054	1
34	Dry Filter	*		07218769	1
35	Electromagnetic Valve	*		43000073	1
36	Magnet Coil	*	AC220~240v/50/60Hz-1400	07200106002401	1
37	Strainer A	*		07210022	1
38	Compressor and Fittings	*		009001060205	1
39	Cut off Valve	*	3/4(R410A)	07130212	1
40	Strainer	*	φ19	07210030	1
41	Pressure Sensor (Low Pressure)	*	45CP2-5/NSK-BC020I-553	322101006	1
42	Temperature Sensor	*	20KT-XH-2P-K3(White)-750mm	3900028808	1
43	Discharge Sensor	*	50KT-EH-2P(Yellow)-800mm	3900012122	1
44	Pressure Sensor (High Pressure)	*	45CP2-6/NSK-BC042I-541	322101034	1
45	Rear Side Plate			012076000021P03	1
46	Handle	*		2690410001601	2

(3) Unit: GNJ-QFT6CG/NaD-M

Exploded view：



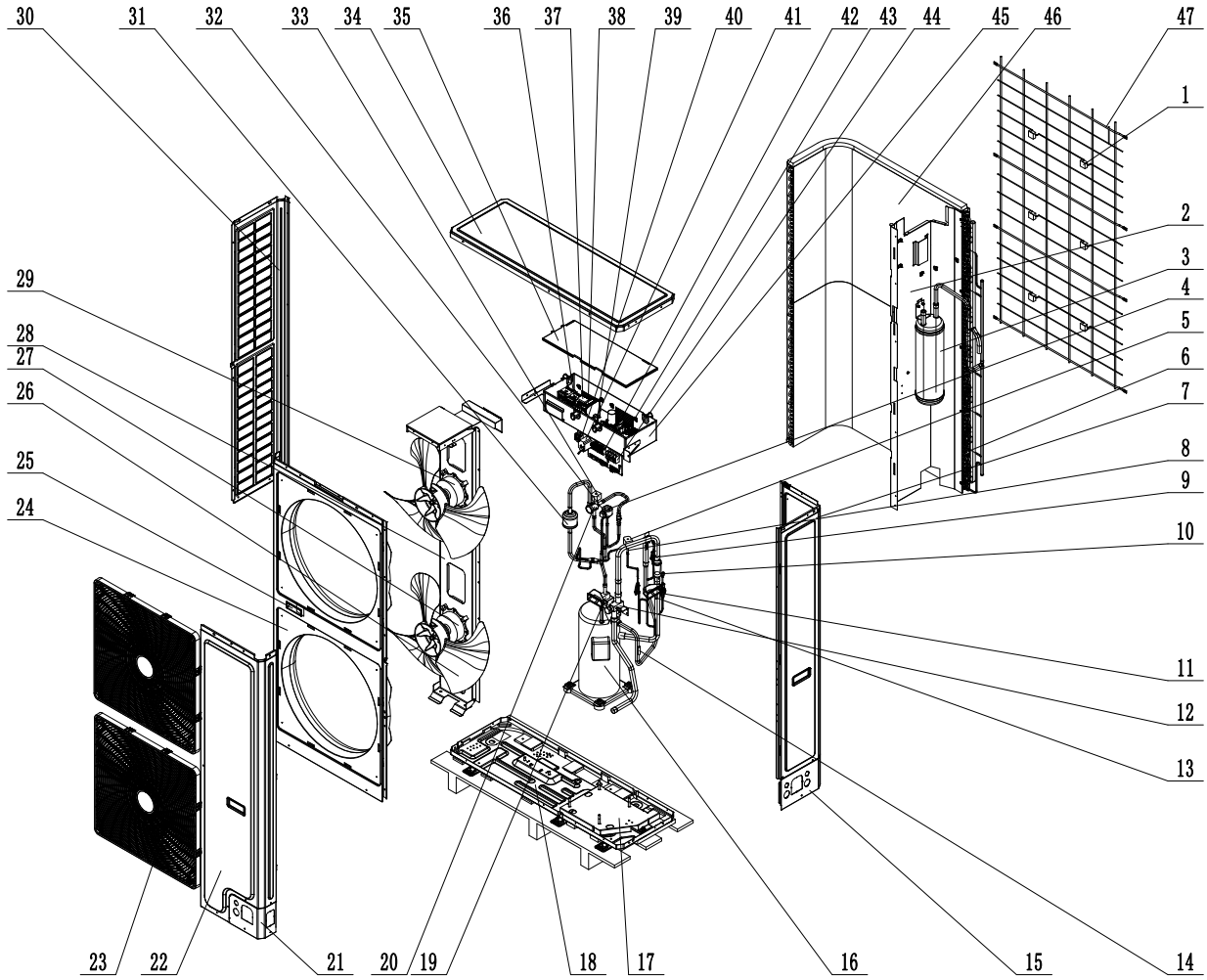
List of parts:

No.	English name	Easy to be damaged(*)	Remark	Material code (reference)	Qty
1	Ambient Temperature Sensor	*	15KS-XH-2P-K3(Black)-1000mm	3900012123	1
2	Rear Grill			0157410001401P	1
3	Dry Filter	*		07218769	1
4	Accumulator	*		035029000006	1
5	Condenser Assy			011002060996	1
6	Electric Box Assy			100002067776	1
7	Electric Box Cover			012020060459	1
8	Main Board	*		300027000414	1
9	Terminal Board	*		42200000002404	1
10	Terminal Board	*		42200000001701	1
11	Phase-Sequence Currentprotection	*	ZP201	430055060005	1
12	AC Contactor	*	220V/(50/60HZ)/25A 1NO/1NC	441007060009	1
13	AC Contactor	*	(220~240V)/(50/60Hz)/12A 1NO/1NC	44010287	1
14	Terminal Board	*		42011103	1
15	Terminal Board	*		42000100000105	1
16	Inductance	*	5mH/3A	43128000014	1
17	Coping			01264100052P03	1
18	Electric Expand Valve Fitting	*	PQ-M10012-000486	4300034412	1
19	Electronic Expansion Valve	*	TS122C06	07135176	1
20	Motor Support Sub-Assy			017012000062	1

21	Cut off Valve	*	1/2(N)	071302392	1
22	Left Side Plate			012055000007P03	1
23	Electrical Heater(Compressor)			7651873203	1
24	Chassis Sub-Assy			01700006013502P01	1
25	Brushless DC Motor	*	SWZ250A	15704100010	1
26	Axial Flow Fan	*		10434100008	1
27	Diversion Circle			10474100003	1
28	Cabinet			012022000003P03	1
29	Front Grill			0157410000801	1
30	Front Side Plate			012050000007P03	1
31	Capillary Tube			04023700028	1
32	Magnet Coil	*	AC220-240V/50/60Hz-1100	4300008328	1
33	Electromagnetic Valve	*	(FDF2.0/FDF2A24)	43000054	1
34	Strainer A	*		07210022	1
35	Compressor and Fittings	*		009001000249	1
36	Cut off Valve	*	3/4(R410A)	07130212	1
37	Strainer	*	φ19	07210030	1
38	Pressure Sensor (Low Pressure)	*	45CP2-5/NSK-BC020I-553	322101006	1
39	Temperature Sensor	*	20KT-XH-2P-K3(White)-750mm	3900028808	1
40	Discharge Sensor	*	50KT-EH-2P(Yellow)-800mm	3900012122	1
41	Pressure Sensor (High Pressure)	*	45CP2-6/NSK-BC042I-541	322101034	1
42	Rear Side Plate			012076000021P03	1
43	Handle			2690410001601	2
44	Strainer	*		0721200102	1
45	Magnet Coil	*	AC220~240v/50/60Hz-1400	07200106002401	1
46	Electromagnetic Valve	*		43000073	1

(4) Unit:GNJ-QFT8CG/NaD-M

Exploded view：



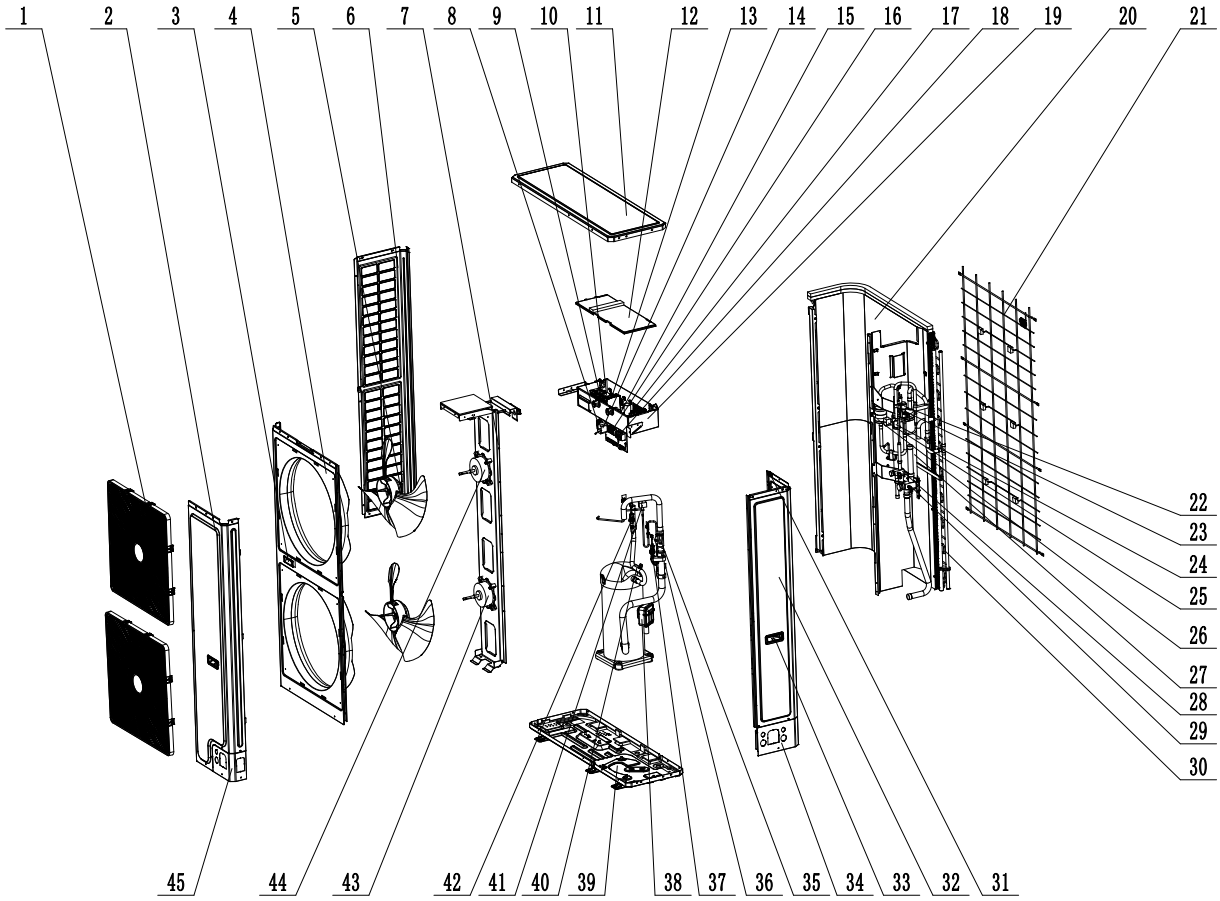
List of parts：

No.	English name	Easy to be damaged(*)	Remark	Material code (reference)	Qty
1	Sponge(Rear Grill)			12204221	6
2	Clapboard Sub-Assy	*		017021060416	1
3	Accumulator			035029000002	1
4	Electronic Expansion Valve			43005018	1
5	Magnet Coil (electromagnetic valve)			07200106002401	1
6	Ambient Temperature Sensor		15KS-XH-2P-K3(Black)-1000mm	3900012123	1
7	Rear Side Plate			01314100025P01	1
8	Electromagnetic Valve			43000054	1
9	Pressure Sensor			322101032	1
10	Gas Tube Filter			07219051	1
11	Pressure Sensor			3221010007	1
12	Square Valve			07331166	1
13	Temperature Sensor	*	20KT-XH-2P(White)-1300mm	390002069	1
14	Tube Sensor		50KT-EH-2P(Yellow)-1600mm	3900012116	1
15	Connection Board			01344100008P01	1
16	Mat Sub-Assy			017131060015	1
17	Chassis Sub-assy			017000000007P01	1
18	Square Valve			07138800	1

19	Electromagnetic Valve			43000073	1
20	Connection Board			01344100009P01	1
21	Front Side Plate			01314100026P01	1
22	Front Grill			2690410007801	2
23	Rear Grill			0157410000601	1
24	Compressor and Fittings			0020223101	1
25	Cabinet			01514100003P01	1
26	Handle	*		2690410001601	1
27	Axial Flow Fan	*		10335010	2
28	Brushless DC Motor			1570410000602	1
29	Motor Support Sub-Assy			017012060011	1
30	Brushless DC Motor			1570410000603	1
31	Left Side Plate			01314100024P01	1
32	Dry Filter			07218769	1
33	Electric Expand Valve Fitting			4300034502	1
34	Magnet Coil			4300008328	1
35	Coping			01264100014P01	1
36	Electric Box Cover			012020060555	1
37	AC Contactor	*		44010287	2
38	AC Contactor	*		441007060008	1
39	Phase Reverse Protector	*		430055060005	1
40	Terminal Board	*		42011103	1
41	Terminal Board	*		42000100000105	1
42	Inductance	*		43128000014	1
43	Terminal Board	*		42200000001701	2
44	Main Board	*		300027000414	1
45	Terminal board	*		42018000593	1
46	Electric Box Sub-Assy			017007061869	1
47	Condenser Assy			000100060286	1

(5) Unit: GNJ-QFT10CG/NaD-M

Exploded view：



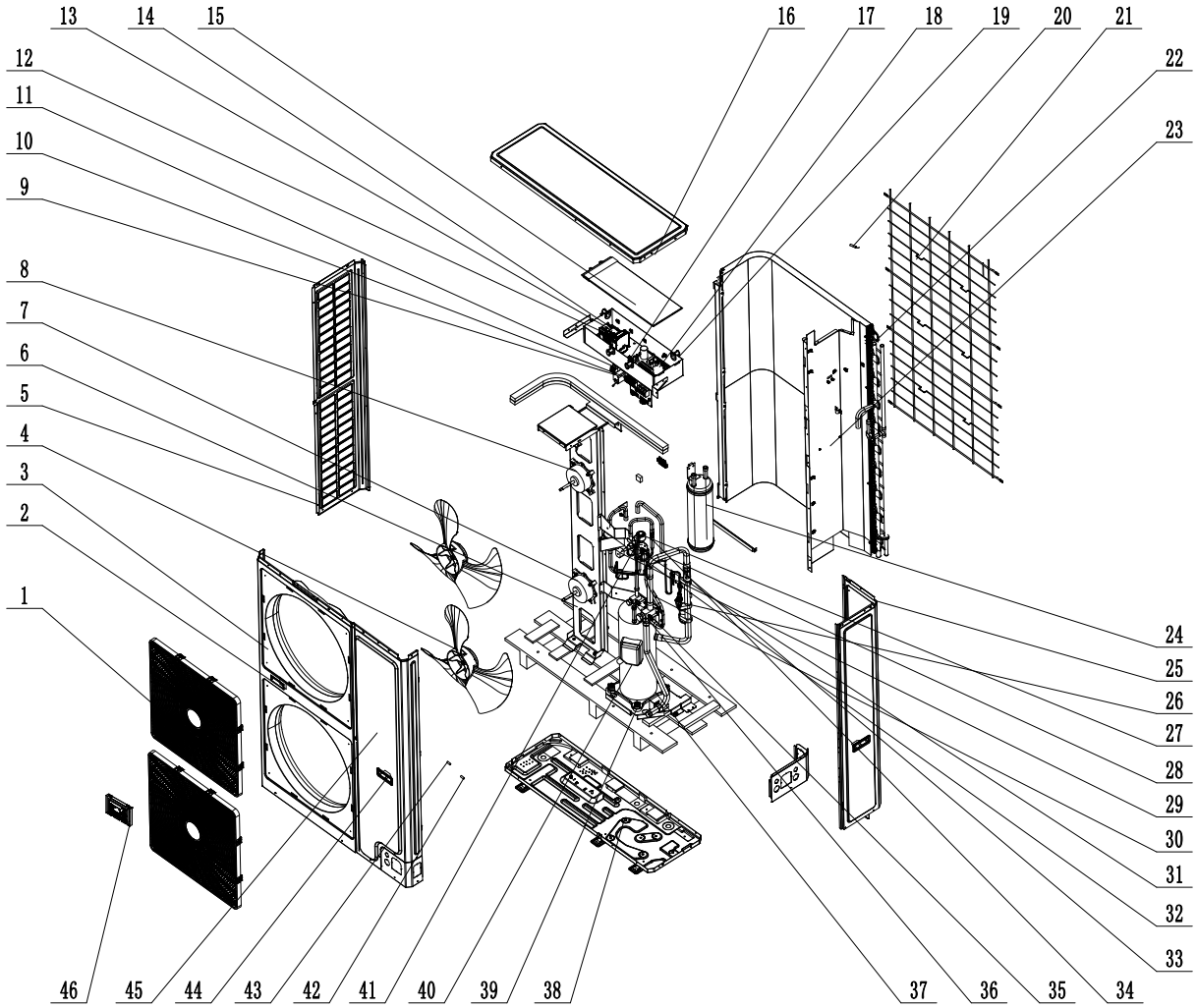
List of parts：

No.	English name	Easy to be damaged(*)	Remark	Material code (reference)	Qty
1	Front Grill			2690410007801	2
2	Front Side Plate			01314100026P01	1
3	Handle	*		2690410001601	1
4	Cabinet			01514100003P01	1
5	Axial Flow Fan	*		10335010	2
6	Left Side Plate			01314100024P01	1
7	Motor Support Sub-Assy			017012060011	1
8	Terminal Board	*		42000100000105	1
9	AC Contactor	*		44010287	2
10	AC Contactor	*		441007060008	1
11	Coping			01264100014P01	1
12	Electric Box Cover			012020060555	1
13	Phase Reverse Protector	*		430055060005	1
14	Inductance	*		43128000014	1
15	Terminal Board	*		42011103	1
16	Terminal Board	*		42200000001701	2
17	Main Board	*		300027000414	1
18	Terminal board	*		42018000593	1
19	Electric Box Sub-Assy			017007061869	1
20	Condenser Assy			000100060261	1
21	Rear Grill			0157410000601	1
22	Electric Expand Valve Fitting	*		4300034502	1

23	Electronic Expansion Valve	*	Solenoid valve sub-assy (electronic expansion valve)	072009060004	1
24	Electromagnetic Valve	*	Solenoid valve sub-assy (electronic expansion valve)	43044107	1
25	Magnet Coil (electromagnetic valve)	*		07200106002402	1
26	Filter	*	Dry filter	07210021	1
27	Accumulator			035029000002	1
28	Square Valve	*	Cut off valve (small valve)	07130128	1
29	Square Valve	*	Cut off valve (big valve)	07138799	1
30	Ambient Temperature Sensor		15KS-XH-2P-K3(Black)-1000mm	3900012123	1
31	Wiring Clamp			26115004	1
32	Rear Side Plate			01314100025P01	1
33	Handle	*		2623525307	2
34	Connection Board			01344100008P01	1
35	Filter		Suction pipe	07218603	1
36	Temperature Sensor	*	20KT-XH-2P(White)-1600mm	3900020610	1
37	Pressure Sensor	*		322101002	1
38	Compressor and Fittings	*		009001060063	1
39	Chassis Sub-assy			017000000007P01	1
40	Tube Sensor		50KT-EH-2P(yellow)-1600mm	3900012116	1
41	Magnet Coil (electromagnetic valve)	*		07200106002401	1
42	Pressure Sensor	*		322101032	1
43	Brushless DC Motor			1570410000602	1
44	Brushless DC Motor			1570410000603	1
45	Connection Board			01344100009P01	1

(6) Unit: GNJ-QFT12CG/NaD-M

Exploded view:



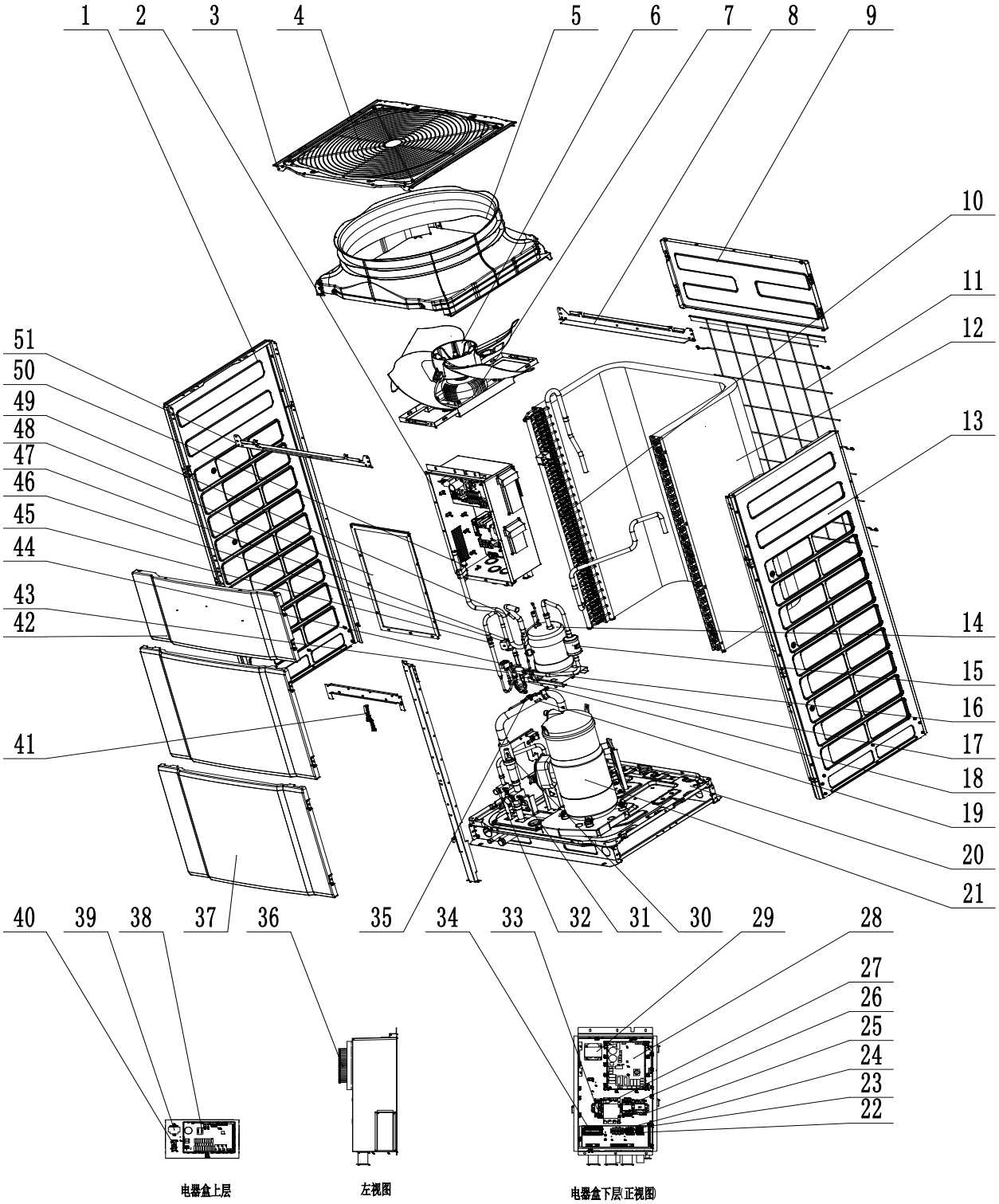
List of parts:

No.	English name	Easy to be damaged(*)	Remark	Material code (reference)	Qty
1	Front Grill			2690410007801	2
2	Handle	*		2690410001601	1
3	Cabinet			01514100003P01	1
4	Axial Flow Fan	*		10335010	2
5	Left Side Plate			01314100024P01	1
6	Motor Support Sub-Assy			017012060011	1
7	Brushless DC Motor			1570410000602	1
8	Brushless DC Motor			1570410000603	1
9	Inductance	*		43128000014	1
10	Terminal Board			42200000001701	2
11	Terminal Board	*		42000100000105	1
12	Phase Reverse Protector	*		430055060005	1
13	AC Contactor	*		441007060008	1
14	AC Contactor	*		44010287	2
15	Electric Box Cover			012020060555	1
16	Coping			01264100014P01	1
17	Terminal Board	*		42011103	1
18	Main Board	*		300027060996	1
19	Electric Box Assy			100002067774	1
20	Ambient Temperature Sensor	*	20KT-XH-2P(White)-1300mm	390002069	1

21	Rear Grill			0157410000601	1
22	Condenser Assy			000100060282	1
23	Clapboard Sub-Assy			017021060407	1
24	Accumulator			035029000002	1
25	Rear Side Plate			01314100025P01	1
26	Sensor	*		322101002	1
27	Electronic Expansion Valve	*		4300034502	1
28	Magnet Coil	*		07200106002402	1
29	Magnet Coil	*		07200106002401	1
30	Pressure Sensor(High Pressure)	*		322101032	1
31	Electromagnetic Valve	*	Solenoid valve sub-assy (electronic expansion valve)	43044107	1
32	Filter	*	Dry filter	07210021	1
33	Strainer	*	Suction pipe	07218603	1
34	Strainer A	*		07210022	1
35	Cut-off Valve	*	Cut off valve (big valve)	07138799	1
36	Cut-off Valve	*	Cut off valve (small valve)	07130128	1
37	Electrical Heater	*		7651240210	2
38	Chassis Sub-assy			017000000007P01	1
39	Compressor Gasket	*		02118049	3
40	Compressor and fittings	*		00201100015	1
41	Electric Expand Valve Fitting	*		4300034502	1
42	Tube Sensor	*	50KT-EH-2P(Yellow)-1600mm	3900012116	1
43	Temperature Sensor	*	15KS-XH-2P-K3(Black)-1000mm	3900012123	1
44	Handle	*		2623525307	2
45	Front Side Plate			01314100026P01	1
46	Display Board	*		300001000199	1

(7) Unit: GNJ-QFT15SG/NaD-M

Exploded view:



List of parts:

No.	English name	Easy to be damaged(*)	Remark	Material code (reference)	Qty
1	Left Side Plate Sub-Assy			017037060016P02	1
2	Electric Box Sub-Assy			017007062449	1
3	Coping			012049000050P02	1
4	Rear Grill			01600106000703	1
5	Diversion Circle	*		200150060002	1

6	Axial Flow Fan	*		103002000007	1
7	Brushless DC Motor	*	SWZ750D	1570412406	1
8	Upper Cross Beam			012075060012P02	1
9	Cover Plate			012035000236P02	1
10	Temperature Sensor	*	50KT-EH-2P(Blue)-1300mm	3900028308G	1
11	Rear Grill			01600106000603	
12	Condenser Assy			011002061263	1
13	Right Side Plate Sub-Assy			017038060017P02	1
14	Accumulator			035029000013	1
15	Filter	*		07210021	1
16	Magnet Coil (electromagnetic valve)	*	AC220~240v/50/60Hz-1400	07200106002401	1
17	Electromagnetic Valve	*	(FDF2.0/FDF2A24)	43000054	1
18	Strainer A		A	07210022	1
19	Temperature Sensor	*	20KT-XH-2P(White)-1300mm	390002069	1
20	Chassis Sub-assy			017000060592P	1
21	Compressor and Fittings	*	SH184A4GLC	00205244	1
22	Terminal Board	*		42000100000105	1
23	Terminal Board	*		42200000001701	1
24	Terminal Board	*		42200000001503	1
25	AC Contactor	*	(220~240V)/(50/60Hz)/12A 1NO/1NC	44010287	1
26	AC Contactor	*	220V/(50/60HZ)/25A 1NO/1NC	441007060009	1
27	AC Contactor	*	(220V/230V)/(50/60HZ)/50A 1NO/1NC	441007060002	1
28	Drive Board		ZS3306E	300078060141	1
29	Reactor	*	L18mH/9A	43130189	1
30	Strainer			07414118	1
31	Square Valve	*	1-1/8(R410A)	07138799	1
32	Square Valve	*	5/8 (R410A)	07130128	1
33	Phase Reverse Protector	*	ZP201	430055060005	1
34	Terminal Board	*		422000000016	1
35	Pressure Sensor	*	45CP2-5	3221010007	1
36	Radiator	*		49018000013	1
37	Front Panel			012073000245P02	2
38	Main Board	*	WZL01023J	300027000414	1
39	Inductance	*	5mH/3A	43128000014	1
40	Terminal Board	*	3-12	42011251	1
41	Temperature Sensor	*	15KS-XH-2P(Black)-1200MM	39000208	1
42	Cover Plate			012035000237P02	1
43	Electronic Expansion Valve	*	DPF(B)3.2C-015	072009060008	1
44	Electric Expand Valve Fitting	*	PQ-M10012-000235	4300034402	1
45	Filter	*	(small tube filter)	07224803	1
46	Magnet Coil	*	AC220V-240V/50Hz/60Hz-1400	4300008302	1
47	Electromagnetic Valve	*		43044107	1
48	Electric Box Cover			012020060608	1
49	Tube Sensor	*	50KT-EH-2P(Yellow)-1600mm	3900012116	1
50	Pressure Protect Switch	*	YKB-4.5/3.8-C	4602001594	1
51	Upper Cross Beam			012075060011P02	1

Chapter 5: Maintenance

1. Importance of Maintenance

To ensure long-term reliable operation of the unit, the debugging shall be conducted by our professionals or under the guidance of the professionals with certain air conditioning knowledge. Routine operation and maintenance must be carried out by professionally-trained staffs.

To ensure long-term safe and reliable operation, extension of service life in long-term usage and reduce operation cost, it's important to conduct maintenance for the unit regularly and scientifically.

Routine maintenance and care in the operation and overhaul process is called preventive maintenance and care. The customer should formulate pointed, yearly and monthly maintenance and care plan regularly for the unit according to the actual operation, and carry out daily care and regular maintenance.

2. Common Maintenance Items

2.1Daily Startup/Shutdown

Unit startup and shutdown can be controlled by the wired controller connected to the unit externally. The GNJ-QF series all closed air-cooled condensing unit will start up or shut down according to the warehouse temperature or the suction pressure of the unit. Inspect the unit regularly to see if startup and shutdown is normal as this can help to confirm whether the unit is in normal operation status and whether the wired controller can be used normally.

2.2 Maintenance of Major Parts

(1) During operation, please pay close attention to the discharge and suction pressure of the system, find out the reason in time and eliminate the error if there's any abnormality.

(2) Don't adjust the setting point for control and protection component arbitrarily.。

(3) Inspect if electrical wiring is loose periodically, if yes, tighten it in time.

(4) Inspect the reliability of electrical components periodically, if they have lost efficacy or are not reliable, please replace them in time.

2.3 Remove Deposits of Scale

After long-term operation, the surface of condenser will accumulate too much dust and sundries of small volume, which will affect heat transfer performance, thus increasing electric energy and discharge pressure. Use clean water to wash the condenser.

Restart the unit after long-term shutdown:

To turn on the unit after long-term shutdown, please make the following preparations:

(1) Inspect and clean the unit thoroughly.

(2) Tighten the connector of all circuits.

Energize the unit as required. Please turn on the unit after the oil heater of compressor has been working for 12 hours.

2.4 Component Replacement

Gree accessories shall be used for replacing the components, don't use the similar accessories of other companies as the substitute.

2.5 Refrigerant Leakage and Supplement

Confirm the charging condition of refrigerant by checking the suction and discharge pressure, if there's leakage, please find out the leakage point and supplement refrigerant after solving the problem. When charging refrigerant, please classify the following two situations:

(1) The refrigerant is completely leaked

If the situation occurs, please conduct leakage test for the system with high pressure nitrogen or refrigerant; if repair welding is required, please conduct welding after discharging the gas in the system. Before charging refrigerant, the entire refrigeration system must be dry, and carry out vacuum-pumping. Please take the following steps:

① Ensure all the cut off valves of the unit are open and connect the vacuum-pumping pipe to the nozzles of the suction pipe of the compressor and the cut off valve of the condenser outlet pipe.

② Conduct vacuum-pumping for the pipeline of the system with a vacuum pump.

③ After reaching the required vacuum degree, use the refrigerant bottle to charge refrigerant into the refrigeration system through the nozzle on the cut off valve of the condenser outlet pipe. The required amount of refrigerant charge is stated on the nameplate.

(2) Supplement refrigerant

① Connect the refrigerant charging bottle to the nozzle of the suction pipe of the compressor.

② Turn on the air cooler or freezer first, and then turn on the condensing unit.

③ Charge refrigerant for the system slowly and inspect the suction and discharge pressure.

Note: when conducting leakage and gas tightness test, don't charge oxygen, acetylene and other combustible and poisonous gas to the refrigeration system, only high pressure nitrogen can be used.

① Charge the refrigerant with the same model on the nameplate only.

② Don't charge too much refrigerant. The excessive refrigerant charged might enhance the condensing pressure of the unit, reduce the cooling capacity, increase power consumption of compressor or even damage the compressor.

2.6 Other Precautions

(1) Maintain the unit periodically as per the requirements in the specification to ensure good operation condition.

(2) In case of fire hazard, please turn off the main power supply immediately and put the fire out with fire extinguisher。

(3) Working environment of the unit shall be away from gasoline, alcohol and other combustible objects to prevent explosion.

(4) If the unit is faulted and turned off, find out the cause, then restart it after eliminating the errors. Don't turn on the unit compulsorily without eliminating the error. If there's refrigerant leakage, turn off the switch to disconnect power supply for the unit before repairing.

(5) The circuit protecting the device shall not be short-circuited, otherwise, errors might occur.

(6) There are several auto protection mechanisms for the unit, which have been set before ex-factory. User shall not alter the settings arbitrarily.

(7) The unit must be used in a dry, clean and well-ventilated environment.

(8) During debugging and operation, it's forbidden to perform startup/shutdown operation for any cut off valves.

The components of the condensing unit are impermanent and can be worn after a period

of use. To prevent the accident from happening, it's necessary to inspect and replace the components periodically. The construction company shall sign the maintenance management contract with the client for periodic inspection.

Inspection and replacement standard for the major components of condensing unit are as follow. Please replace them in time if any abnormalities are found in inspection and consult us for technical details during inspection and replacement.

Inspection and replacement standards are different depending on the operating rate, operating status, the surrounding environment and components, so they cannot be specified. Please be sure to conduct careful maintenance and inspection on occasions of (1) test run; (2) regular inspection; and (3) system repair.

Inspection item and component replacement		Inspection content and the replaced standard
Compressor	Oil	(1) No metal powder or other sundries entering (2) The oil changes color (light brown) – replace it if meeting the color standard of 4-5 (3) Replace it when the oxidation degree is 0.05mg/g
	Abnormal sound and vibration	No abnormal sound and vibration
Condenser	Fin hole is blocked	If the fin of condenser is block and clean it periodically
	Rotation of fan	If the rotation status is normal
	Dry filter	(1) Replace it when the color of sight glass turned yellow (2) Replace it when the dry filter is blocked, and the temperature difference in air inlet/outlet of condensing side and the pressure is high
Pipe connections		No refrigerant leakage, oil leakage, deformation, abnormal vibration and poor thermal insulation material.
Electrical component	Electromagnetic switch	Replace in case of contact wear, deformation and adhesion.

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