

# Service Manual

## "X" SERIES 18K - 24K - 208/230V INVERTER-DRIVEN AIR CONDITIONING UNITS

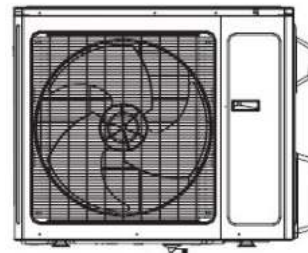
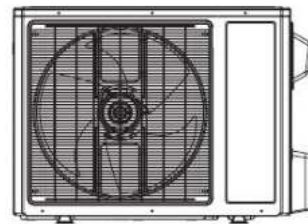
Type	Model
INDOOR UNIT	DHX18NWB21S DCX18NWB21S DHX24NWB21S DCX24NWB21S

Type	Model
OUTDOOR UNIT	DHX18CSB21S DCX18CSB21S DHX24CSB21S DCX24CSB21S

Type	Model
CONTROLLER	DRCPX

### IMPORTANT:

*PLEASE READ AND  
UNDERSTAND THIS MANUAL  
BEFORE USING THIS  
INVERTER-DRIVEN AIR  
CONDITIONING UNIT. KEEP  
THIS MANUAL FOR FUTURE  
REFERENCE.*



## Important Notice

- Johnson Controls, Inc. pursues a policy of continuing improvement in design and performance in its products. As such, Johnson Controls, Inc. reserves the right to make changes at any time without prior notice.
- Johnson Controls, Inc. cannot anticipate every possible circumstance that might involve a potential hazard.
- This inverter air conditioning unit is designed for standard air conditioning applications only. Do not use this unit for anything other than the purposes for which it was intended for.
- The installer and system specialist shall safeguard against leakage in accordance with local pipefitter and electrical codes. The following standards may be applicable, if local regulations are not available. International Organization for Standardization: (ISO 5149 or European Standard, EN 378). No part of this manual may be reproduced in any way without the expressed written consent of Johnson Controls, Inc.
- This inverter-driven (cooling or heat pump) air conditioning unit will be operated and serviced in the United States of America and comes with all required Safety, Danger, and Caution, warnings.
- If you have questions, please contact your distributor or dealer.
- This manual provides common descriptions, basic and advanced information to maintain and service this inverter-driven (cooling or heat pump) air conditioning unit which you operate, as well for other models.
- This inverter-driven (cooling or heat pump) air conditioning unit has been designed for a specific temperature range. For optimum performance and long life, operate this unit within range limits.
- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

## Product Inspection upon Arrival

1. Upon receiving this product, inspect it for any damages incurred in transit. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
2. Check the model number, electrical characteristics (power supply, voltage, and frequency rating), and any accessories to determine if they agree with the purchase order.
3. The standard utilization for this unit is explained in these instructions. Use of this equipment for purposes other than what it designed for is not recommended.
4. Please contact your local agent or contractor as any issues involving installation, performance, or maintenance arise. Liability does not cover defects originating from unauthorized modifications performed by a customer without the written consent of Johnson Controls, Inc. Performing any mechanical alterations on this product without the consent of the manufacturer will render your warranty null and void.

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## 1. Introduction

This manual concentrates on inverter-driven cooling or heat pump air conditioning units. Read this manual carefully before installation.

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

## 2. Important Safety Instructions

### Safety Messages



Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.



Indicates information considered important, but not hazard-related (for example, messages relating to property damage).

### General Precautions



To reduce the risk of serious injury or death, read these instructions thoroughly and follow all warnings or cautions included in all manuals that accompanied the product and are attached to the unit. *Refer back to these safety instructions as needed.*

- This system should be installed by personnel certified by Johnson Controls, Inc. Personnel must be qualified according to local, state and national building and safety codes and regulations. Incorrect installation could cause leaks, electric shock, fire or explosion. In areas where Seismic "Performance requirements are specified, the appropriate measures should be taken during installation to guard against possible damage or injury that might occur in an earthquake if the unit is not installed correctly, injuries may occur due to a falling unit.
- Use appropriate Personal Protective Equipment (PPE), such as gloves and protective goggles and, where appropriate, have a gas mask nearby. Also use electrical protection equipment and tools suited for electrical operation purposes. Keep a quenching cloth and a fire extinguisher nearby during brazing. Use care in handling, rigging, and setting of bulky equipment.
- When transporting, be careful when picking up, moving and mounting these units. Although the unit may be packed using plastic straps, do not use them for transporting the unit from one location to another. Do not stand on or put any material on the unit. Get a partner to help, and bend with your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut fingers, so wear protective gloves.
- Do not touch or adjust any safety devices inside the indoor or outdoor units. All safety features, disengagement, and interlocks must be in place and functioning correctly before the equipment is put into operation. If these devices are improperly adjusted or tampered with in any way, a serious accident can occur. Never bypass or jump-out any safety device or switch.
- Johnson Controls, Inc. will not assume any liability for injuries or damage caused by not following steps outlined or described in this manual. Unauthorized modifications to Johnson Controls products are prohibited as they...
  - May create hazards which could result in death, serious injury or equipment damage.
  - Will void product warranties.
  - May invalidate product regulatory certifications.
  - May violate OSHA standards.



## NOTICE

Take the following precautions to reduce the risk of property damage.

- Be careful that moisture, dust, or variant refrigerant compounds not enter the refrigerant cycle during installation work. Foreign matter could damage internal components or cause blockages.
- If air filters are required on this unit, do not operate the unit without the air filter set in place. If the air filter is not installed, dust may accumulate and breakdown may result.
- Do not install this unit in any place where silicon gases can coalesce. If the silicon gas molecules attach themselves to the surface of the heat exchanger, the finned surfaces will repel water. As a result, any amount of condensate can overflow from the condensate pan and could run inside of the electrical box, possibly causing electrical failures.
- When installing the unit in a hospital or other facility where electromagnetic waves are generated from nearby medical and/or electronic devices, be prepared for noise and electronic interference Electromagnetic Interference (EMI). Do not install where the waves can directly radiate into the electrical box, controller cable, or controller. Inverters, appliances, high-frequency medical equipment, and radio communications equipment may cause the unit to malfunction. The operation of the unit may also adversely affect these same devices. Install the unit at least 10 ft. (approximately 3m) away from such devices.
- When a wireless zone controller is used, locate at a distance of at least 3.3 ft. (approximately 1 meter) between the indoor unit and electric lighting. If not, the receiver part of the unit may have difficulty receiving operation commands.
- Do not install the unit in any location where animals and plants can come into direct contact with the outlet air stream. Exposure could adversely affect the animals and plants.
- Do not install the unit with any downward slope to the side of the drain boss. If you do, you may have water flowing back which may cause leaks.
- Be sure the condensate hose discharges water properly. If connected incorrectly, it may cause leaks.
- Do not install the unit in any place where oil can seep onto the units, such as table or seating areas in restaurants, and so forth. For these locations or social venues, use specialized units with oil-resistant features built into them. In addition, use a specialized ceiling fan designed for restaurant use. These specialized oil-resistant units can be ordered for such applications. However, in places where large quantities of oil can splash onto the unit, such as a factory, even the specialized units cannot be used. These products should not be installed in such locations.

### Installation Precautions

## WARNING

To reduce the risk of serious injury or death, the following installation precautions must be followed.

- When installing the unit into...
  - A wall: Make sure the wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.
  - A room: Properly insulate any refrigerant tubing run inside a room to prevent "sweating" that can cause dripping and water damage to wall and floors.
  - Damp or uneven areas: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
  - An area with high winds: Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.
  - A snowy area (only for heat pump model): Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.
- Do not install the unit in the following places. Doing so can result in an explosion, fire, deformation, corrosion, or product failure.
  - Explosive or flammable atmosphere
  - Where fire, oil, steam, or powder can directly enter the unit, such as in close proximity or directly above a kitchen stove.
  - Where oil (including machinery oil) may be present.
  - Where corrosive gases such as chlorine, bromine, or sulfide can accumulate, such as near a hot tub or hot spring.
  - Where dense, salt-laden airflow is heavy, such as in coastal regions.
  - Where the air quality is of high acidity.
  - Where harmful gases can be generated from decomposition.

- Do not position the condensate pipe for the indoor unit near any sanitary sewers where corrosive gases may be present. If you do, toxic gases can seep into breathable air spaces and can cause respiratory injuries. If the condensate pipe is installed incorrectly, water leakage and damage to the ceiling, floor, furniture, or other possessions may result. If condensate piping becomes clogged, moisture can back up and can drip from the indoor unit. Do not install the indoor unit where such dripping can cause moisture damage or uneven locations: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
- Before performing any brazing work, be sure that there are no flammable materials or open flames nearby.
- Perform a run test to ensure normal operation. Safety guards, shields, barriers, covers, and protective devices must be in place while the compressor/unit is operating. During the test run, keep fingers and clothing away from any moving parts.
- Clean up the site when finished, remembering to check that no metal scraps or bits of wiring have been left inside the unit being installed.
- During transportation, do not allow the backrest of the forklift to make contact with the unit, otherwise, it may cause damage to the heat exchanger and also may cause injury when stopped or started suddenly.
- Remove gas inside the closing pipe when the brazing work is performed. If the brazing filler metal is melted with remaining gas inside, the pipes will be blown off and it may cause injury.
- Be sure to use nitrogen gas for an airtight test. If other gases such as oxygen gas, acetylene gas or fluorocarbon gas are accidentally used, it may cause explosion or gas intoxication.

After installation work for the system has been completed, explain the “Safety Precautions,” the proper use and maintenance of the unit to the customer according to the information in all manuals that came with the system. All manuals and warranty information must be given to the user or left near the Indoor Unit.

### Refrigerant Precautions



To reduce the risk of serious injury or death, the following refrigerant precautions must be followed.

- As originally manufactured, this unit contains refrigerant installed by Johnson Controls. Johnson Controls uses only refrigerants that have been approved for use in the unit’s intended home country or market. Johnson Controls distributors similarly are only authorized to provide refrigerants that have been approved for use in the countries or markets they serve. The refrigerant used in this unit is identified on the unit’s faceplate and/or in the associated manuals. Any additions of refrigerant into this unit must comply with the country’s requirements with regard to refrigerant use and should be obtained from Johnson Controls distributors. Use of any non-approved refrigerant substitutes will void the warranty and will increase the potential risk of injury or death.
- If installed in a small room, take measures to prevent the refrigerant from exceeding the maximum allowable concentration in the event that refrigerant gases should escape. Refrigerant gases can cause asphyxiation (0.42 kg/m<sup>3</sup> based on ISO 5149 for R410A). Consult with your distributor for countermeasures (ventilation system and so on). If refrigerant gas has leaked during the installation work, ventilate the room immediately.
- The design pressure for this product is 601 psi (4.15MPa). The pressure of R410A refrigerant is 1.4 times higher than that of the refrigerant R22. Therefore, the refrigerant piping for R410A shall be thicker than that for R22. Make sure to use the specified refrigerant piping. If not, the refrigerant piping may rupture due to an excessive refrigerant pressure. Besides, pay attention to the piping thickness when using copper refrigerant piping. The thickness of copper refrigerant piping differs depending on its material.
- The refrigerant R410A is adopted. The refrigerant oil tends to be affected by foreign matters such as moisture, oxide film, (or fat). Perform the installation work with care to prevent moisture, dust, or different refrigerant from entering the refrigerant cycle. Foreign matter can be introduced into the cycle from such parts as expansion valve and the operation may be unavailable.
- To avoid the possibility of different refrigerant or refrigerant oil being introduced into the cycle, the sizes of the charging connections have been changed from R407C type and R22 type. It is necessary to prepare the appropriate tools before performing the installation work.
- Use refrigerant pipes and joints which are approved for use with R410A.
- A compressor/unit comprises a pressurized system. Never loosen threaded joints while the system is

under pressure and never open pressurized system parts.

- Before installation is complete, make sure that the refrigerant leak test has been performed. If refrigerant gases escape into the air, turn OFF the main switch, extinguish any open flames and contact your service contractor. Refrigerant (Fluorocarbon) for this unit is odorless. If the refrigerant should leak and come into contact with open flames, toxic gas could be generated. Also, because the fluorocarbons are heavier than air, they settle to the floor, which could cause asphyxiation.
- When installing the unit, and connecting refrigerant piping, keep all piping runs as short as possible, and make sure to securely connect the refrigerant piping before the compressor starts operating. If the refrigerant piping is not connected and the compressor activates with the stop valve opened, the refrigerant cycle will become subjected to extremely high pressure, which can cause an explosion or fire.
- Tighten the flare nut with a torque wrench in the specified manner. Do not apply excessive force to the flare nut when tightening. If you do, the flare nut can crack and refrigerant leakage may occur.
- When maintaining, relocating, and disposing of the unit, dismantle the refrigerant piping after the compressor stops.
- When pipes are removed out from under the piping cover, after the insulation work is completed, cover the gap between the piping cover and pipes by a packing (field-supplied). If the gap is not covered, the unit may be damaged if snow, rain water or small animals enter the unit.
- Do not apply an excessive force to the spindle valve at the end of opening. Otherwise, the spindle valve flies out due to refrigerant pressure. At the run test, fully open the gas and liquid valves, otherwise, these devices will be damaged. (It is closed before shipment.)
- If the arrangement for outdoor units is incorrect, it may cause flowback of the refrigerant and result in failure of the outdoor unit.
- The refrigerant system may be damaged if the slope of the piping connection kit exceeds  $\pm 15^\circ$ .

#### Electrical Precautions



Take the following precautions to reduce the risk of electric shock, fire or explosion resulting in serious injury or death.

- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause serious injury or death.
- Perform all electrical work in strict accordance with this installation and maintenance manual and all the relevant regulatory standards.
- Before servicing, open and tag all disconnect switches. Never assume electrical power is disconnected. Check with meter and equipment.
- Only use electrical protection equipment and tools suited for this installation.
- Use specified cables between units.
- The new air conditioner may not function normally in the following instances:
  - If electrical power for the new air conditioner is supplied from the same transformer as the device\* referred to below.
  - If the power source cables for this device\* and the new air conditioner unit are located in close proximity to each other.

Device\*: (Example): A lift, container crane, rectifier for electric railway, inverter power device, arc furnace, electric furnace, large-sized induction motor and large-sized switch.

Regarding the cases mentioned above, surge voltage may be inducted into the power supply cables for the packaged air conditioner due to a rapid change in power consumption of the device and an activation of a switch.

Check field regulations and standards before performing electrical work in order to protect the power supply for the new air conditioner unit.

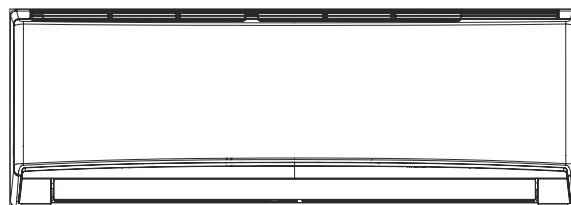
- Communication cabling shall be a minimum of 18-Gauge, 2-Conductor, Stranded Copper. Shielded cable must be considered for applications and routing in areas of high EMI and other sources of potentially excessive electrical noise to reduce the potential for communication errors. When shielded cabling is applied, proper bonding and termination of the cable shield is required as per Johnson Controls guidelines. Plenum and riser ratings for communication cables must be considered per application and local code requirements.
- Use an exclusive power supply for the air conditioner at the unit's rated voltage.
- Be sure to install circuit breakers (ground fault interrupter, isolating switch, molded case circuit breaker and so on), with the specified capacity. Ensure that the wiring terminals are tightened securely to recommended torque specifications.
- Clamp electrical wires securely with a cable clamp after all wiring is connected to the terminal block. In addition, run wires securely through the wiring access channel.
- When installing the power lines, do not apply tension to the cables. Secure the suspended cables at regular intervals, but not too tightly.
- Make sure that the terminals do not come into contact with the surface of the electrical box. If the terminals are too close to the surface, it may lead to failures at the terminal connection.
- Turn OFF and disconnect the unit from the power source when handling the service connector. Do not open the service cover or access panel to the indoor or outdoor units without turning OFF the main power supply.
- After ceasing operation, be sure to wait at least five minutes before turning off the main power switch. Otherwise, water leakage or electrical breakdown may result. Disconnect the power source completely before attempting any maintenance for electrical parts. Check to ensure that no residual voltage is present after disconnecting the power source.
- Do not clean with, or pour water into, the controller as it could cause electric shock and/or damage the unit. Do not use strong detergent such as a solvent. Clean with a soft cloth.
- Check that the ground wire is securely connected. Do not connect ground wiring to gas piping, water piping, lighting conductor, or telephone ground wiring.
- If a circuit breaker or fuse is frequently activated, shut down the system and contact your service contractor.
- Perform all electrical work in accordance with this manual and in compliance with all regulations and safety standards.
- Do not open a service access cover or panel of an indoor or outdoor unit without first turning OFF the power at the main power supply.
- Residual voltage can cause electric shock. At all times, check for residual voltage after disconnecting from the power source before starting work on the unit.
- This equipment can be installed with a Ground Fault Circuit Breaker (GFCI), which is a recognized measure for added protection to a properly grounded unit. Install appropriate sized breakers/fuses/overcurrent protection switches, and wiring in accordance with local, state and NEC codes and requirements. The equipment installer is responsible for understanding and abiding by applicable codes and requirements.

# Features and Technical Information

## 1. Summary

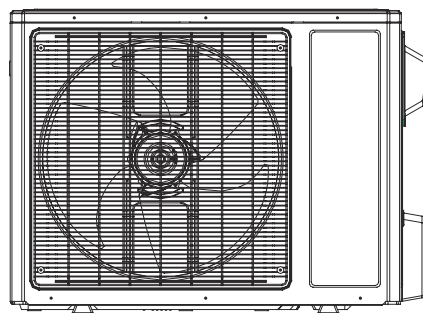
### Indoor Unit:

DHX18NWB21S  
DCX18NWB21S  
DHX24NWB21S  
DCX24NWB21S

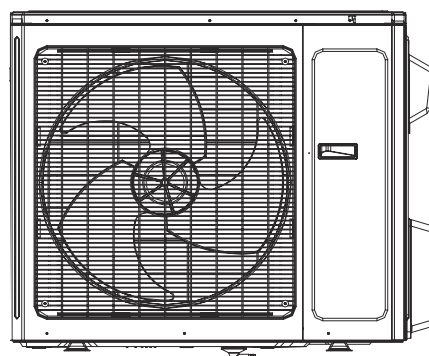


### Outdoor Unit:

DHX18CSB21S  
DCX18CSB21S



DHX24CSB21S  
DCX24CSB21S



### Controller:

DRCPX



## 2. Specifications

### 2.1 Specification Sheet

Model			DCX18NWB21S DCX18CSB21S	DHX18NWB21S DHX18CSB21S
Power Supply	Rated Voltage	V~	208/230	208/230
	Rated Frequency	Hz	60	60
	Phases		1	1
Power Supply Mode			Outdoor	Outdoor
Cooling Capacity(Min~Max)		Btu/h	18000(6800~20000)	18000(6800~20000)
Heating Capacity(Min~Max)		Btu/h	/	19800(7340~23500)
Cooling Power Input(Min~Max)		W	1380(450~2150)	1435(450~2150)
Heating Power Input(Min~Max)		W	/	1730(580~2600)
Cooling Power Current		A	6.12	6.37
Heating Power Current		A	/	7.68
Rated Input		W	2600	3000
Rated Current		A	10.39	10.39
Air Flow Volume(SH/H/M/L)		CFM	559/488/412/335	559/488/412/335
Dehumidifying Volume		Pint/h	1.8	1.8
EER		(Btu/h)/W	13.00	12.50
COP		(Btu/h)/W	/	11.45
SEER			20	20
HSPF			/	10
Application Area		yd <sup>2</sup>	27.51-40.66	27.51-40.66
Indoor Unit	Model of indoor unit		DCX18NWB21S	DHX18NWB21S
	Fan Type		Cross-flow	Cross-flow
	Diameter Length(DXL)	inch	Φ4 1/6X27 13/16	Φ4 1/6X27 13/16
	Fan Motor Cooling Speed(SH/H/M/L)	r/min	1400/1200/1050/800	1400/1200/1050/800
	Fan Motor Heating Speed(SH/H/M/L)	r/min	/	1400/1200/1100/900
	Output of Fan Motor	W	60	60
	Fan Motor RLA	A	0.24	0.24
	Fan Motor Capacitor	μF	/	/
	Evaporator Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	inch	Φ9/32	Φ9/32
	Row-fin Gap	inch	2-1/18	2-1/18
	Coil Length (LXDXW)	inch	28 9/64X1X12	28 9/64X1X12
	Swing Motor Model		MP35CJ	MP35CJ
	Output of Swing Motor	W	2.5	2.5
	Fuse	A	3.15	3.15
	Sound Pressure Level(SH/H/M/L)	dB (A)	47/43/40/39	47/43/40/39
	Sound Power Level(SH/H/M/L)	dB (A)	57/53/50/49	57/53/50/49
	Dimension (WXHXD)	inch	38 13/64X11 13/16X8 5/6	38 13/64X11 13/16X8 5/6
	Dimension of Carton Box (LXWXH)	inch	40 55/64X15X12	40 55/64X15X12
	Dimension of Package (LXWXH)	inch	41X15X12 39/64	41X15X12 39/64
	Net Weight	lb	27.6	27.6
	Gross Weight	lb	34.2	34.2

Outdoor Unit	Model of Outdoor Unit		DCX18CSB21S	DHX18CSB21S
	Compressor Manufacturer/Trademark		ZHUHAI LANDA COMPRESSOR CO.,LTD.	ZHUHAI LANDA COMPRESSOR CO.,LTD.
	Compressor Model		QXA-B141zF030A	QXA-B141zF030A
	Compressor Oil		RB68EP	RB68EP
	Compressor Type		Rotary	Rotary
	Compressor Locked Rotor Amp (L.R.A)	A	25	25
	Compressor RLA	A	12.08	12.08
	Compressor Power Input	W	1440	1440
	Overload Protector		1NT11L-6233 or KSD115°C or HPC115/95U1	1NT11L-6233 or KSD115°C or HPC115/95U1
	Metering Method		Electron expansion valve	Electronic expansion valve
	Operation temp	°F	61~86	61~86
	Ambient temp (cooling)	°F	0~115	0~115
	Ambient temp (heating)	°F	/	-4~75
	Condenser Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	inch	Φ9/32	Φ9/32
	Rows-fin Gap	inch	3-1/18	3-1/18
	Coil Length (LXDXW)	inch	36 13/16X1 1/2X25 63/64	36 13/16X1 1/2X25 63/64
	Fan Motor Speed	rpm	800	800
	Output of Fan Motor	W	60	60
	Fan Motor RLA	A	0.49	0.49
	Fan Motor Capacitor	μF	/	/
	Air Flow Volume of Outdoor Unit	CFM	3200	3200
	Fan Type		Axial-flow	Axial-flow
	Fan Diameter	inch	Φ20 15/32	Φ20 15/32
	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	4.3	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	2.5
	Sound Pressure Level (H/M/L)	dB (A)	55/-/-	55/-/-
	Sound Power Level (H/M/L)	dB (A)	65/-/-	65/-/-
	Dimension (WXHXD)	inch	38X27 9/16X15 19/32	38X27 9/16X15 19/32
	Dimension of Carton Box (LXWXH)	inch	40 25/64X17 29/32X28 15/16	40 25/64X17 29/32X28 15/16
	Dimension of Package (LXWXH)	inch	40 33/64X18 5/16X29 33/64	40 33/64X18 5/16X29 33/64
	Net Weight	lb	102.5	105.8
	Gross Weight	lb	112.5	115.8
	Refrigerant		R410A	R410A
	Refrigerant Charge	oz	56.44	56.44
Connection Pipe	Length	ft	24.6	24.6
	Gas Additional Charge	oz/ft	0.2	0.2
	Outer Diameter Liquid Pipe	inch	Φ1/4	Φ1/4
	Outer Diameter Gas Pipe	inch	Φ5/8	Φ5/8
	Max Distance Height	ft	32.8	32.8
	Max Distance Length	ft	82	82
Note:The connection pipe applies metric diameter.				

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



Model			1.DCX24NWB21S 2.DCX24CSB21S
Power Supply	Rated Voltage	V~	208/230
	Rated Frequency	Hz	60
	Phases		1
Power Supply Mode			Outdoor
Cooling Capacity(Min~Max)		Btu/h	22000(6800-29700)
Heating Capacity(Min~Max)		Btu/h	/
Cooling Power Input(Min~Max)		W	1650(450~3000)
Heating Power Input(Min~Max)		W	/
Cooling Power Current		A	7.21
Heating Power Current		A	/
Rated Input		W	3000
Rated Current		A	14.49
Air Flow Volume(SH/H/M/L)		CFM	706/647/589/530
Dehumidifying Volume		Pint/h	2
EER		(Btu/h)/W	13.30
COP		(Btu/h)/W	/
SEER			20
HSPF			/
Application Area		yd <sup>2</sup>	32.29-50.23
Indoor Unit	Model of indoor unit		DCX24NWB21S
	Fan Type		Cross-flow
	Diameter Length(DXL)	inch	ΦΦ4 1/4X32 7/10
	Fan Motor Cooling Speed(SH/H/M/L)	r/min	1300/1100/900/850
	Fan Motor Heating Speed(SH/H/M/L)	r/min	/
	Output of Fan Motor	W	60
	Fan Motor RLA	A	0.38
	Fan Motor Capacitor	μF	/
	Evaporator Form		Aluminum Fin-copper Tube
	Pipe Diameter	inch	Φ9/32
	Row-fin Gap	inch	2-1/16
	Coil Length (LXDXW)	inch	33 1/4X1X13 1/2
	Swing Motor Model		MP35CJ
	Output of Swing Motor	W	2.5
	Fuse	A	3.15
	Sound Pressure Level(SH/H/M/L)	dB (A)	48/44/40/36
	Sound Power Level(SH/H/M/L)	dB (A)	58/54/50/46
	Dimension (WXHDXD)	inch	42 7/16X12 51/64X9 11/16
	Dimension of Carton Box (LXWXH)	inch	45 5/64X16 9/64X13 3/16
	Dimension of Package (LXWXH)	inch	45 13/64X16 17/64X13 25/32
	Net Weight	lb	34.2
	Gross Weight	lb	41.9

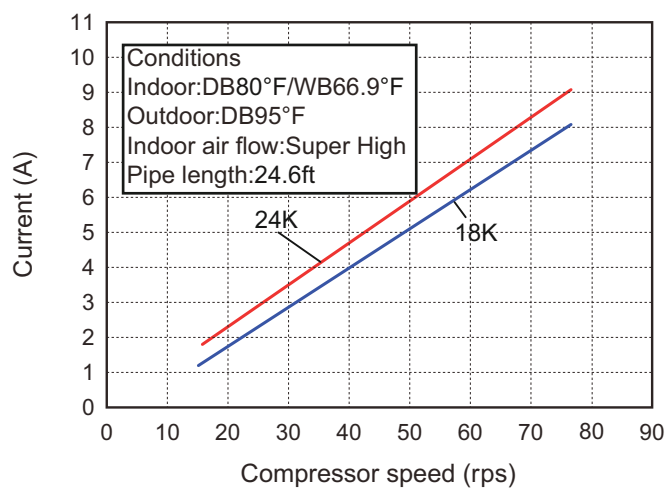


Outdoor Unit	Model of Outdoor Unit		DCX24CSB21S
	Compressor Manufacturer/Trademark		ZHUHAI LANDA COMPRESSOR CO,LTD.
	Compressor Model		QXAS-D23zX090
	Compressor Oil		RB68EP
	Compressor Type		Rotary
	Compressor Locked Rotor Amp (L.R.A)	A	40
	Compressor RLA	A	14.67
	Compressor Power Input	W	2450
	Overload Protector		1NT11L-6233/HPC 115/95 /KSD115°C
	Throttling Method		Electron expansion valve
	Operation temp	°F	61~86
	Ambient temp (cooling)	°F	0~115
	Ambient temp (heating)	°F	/
	Condenser Form		Aluminum Fin-copper Tube
	Pipe Diameter	inch	Φ9/32
	Rows-fin Gap	inch	3-1/18
	Coil Length (LXDXW)	inch	35 9/32X2 1/2X29 7/16
	Fan Motor Speed	rpm	820
	Output of Fan Motor	W	92
	Fan Motor RLA	A	0.65
	Fan Motor Capacitor	μF	/
	Air Flow Volume of Outdoor Unit	CFM	4000
	Fan Type		Axial-flow
	Fan Diameter	inch	Φ21 21/32
	Defrosting Method		Automatic Defrosting
	Climate Type		T1
	Isolation		I
	Moisture Protection		IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5
	Sound Pressure Level (H/M/L)	dB (A)	59/-/-
	Sound Power Level (H/M/L)	dB (A)	69/-/-
	Dimension (WXHDX)	inch	38 37/64X31 7/64X16 13/16
	Dimension of Carton Box (LXWXH)	inch	42 33/64X19X33
	Dimension of Package (LXWXH)	inch	42 41/64X19 7/32X33 21/32
	Net Weight	lb	147.7
	Gross Weight	lb	158.8
	Refrigerant		R410A
	Refrigerant Charge	oz	81.1
	Length	ft	24.6
Connection Pipe	Gas Additional Charge	oz/ft	0.2
	Outer Diameter Liquid Pipe	inch	Φ1/4
	Outer Diameter Gas Pipe	inch	Φ5/8
	Max Distance Height	ft	32.8
	Max Distance Length	ft	82
Note:The connection pipe applies metric diameter.			

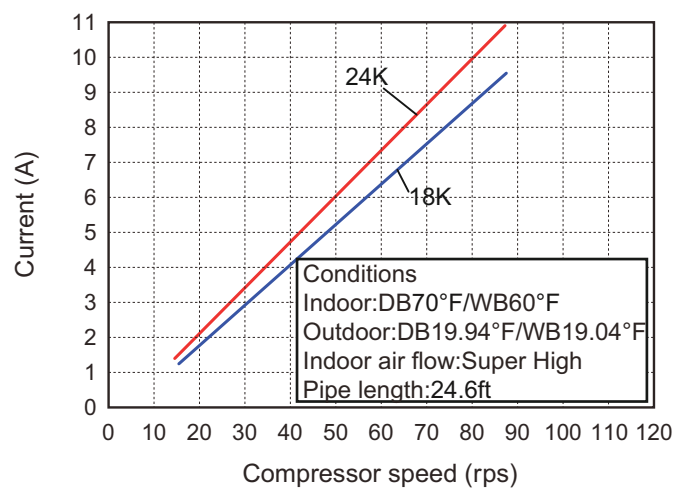
The above data is subject to change without notice; please refer to the nameplate of the unit.

## 2.2 Operation Characteristic Curve

Cooling

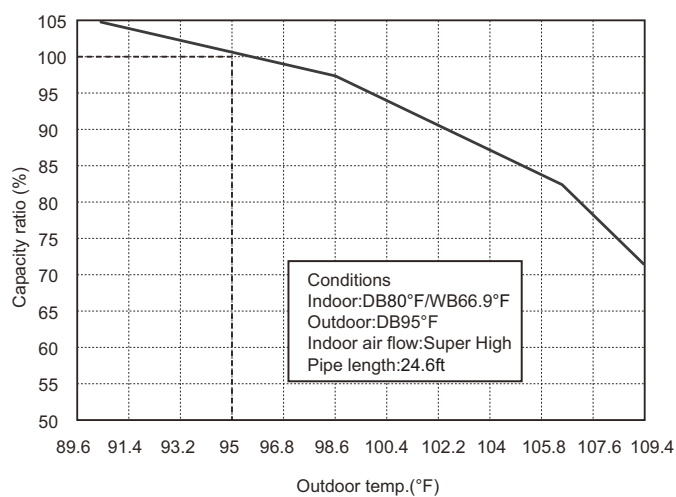


Heating

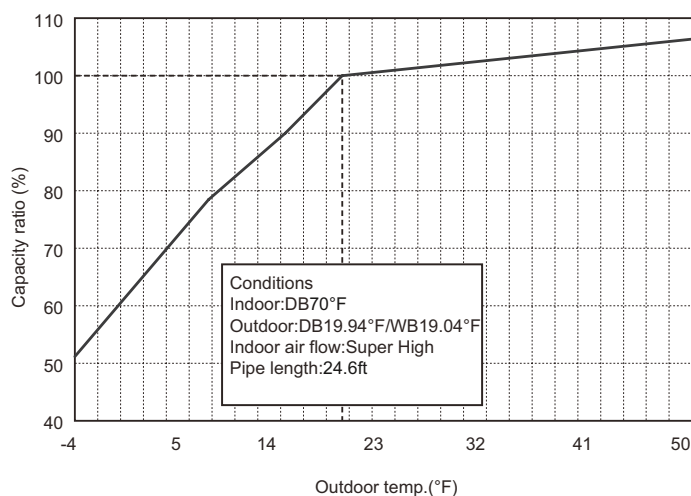


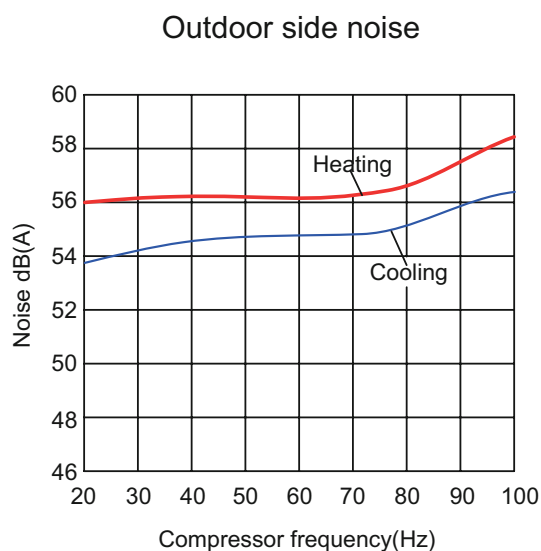
## 2.3 Capacity Variation Ratio According to Temperature

Cooling



Heating





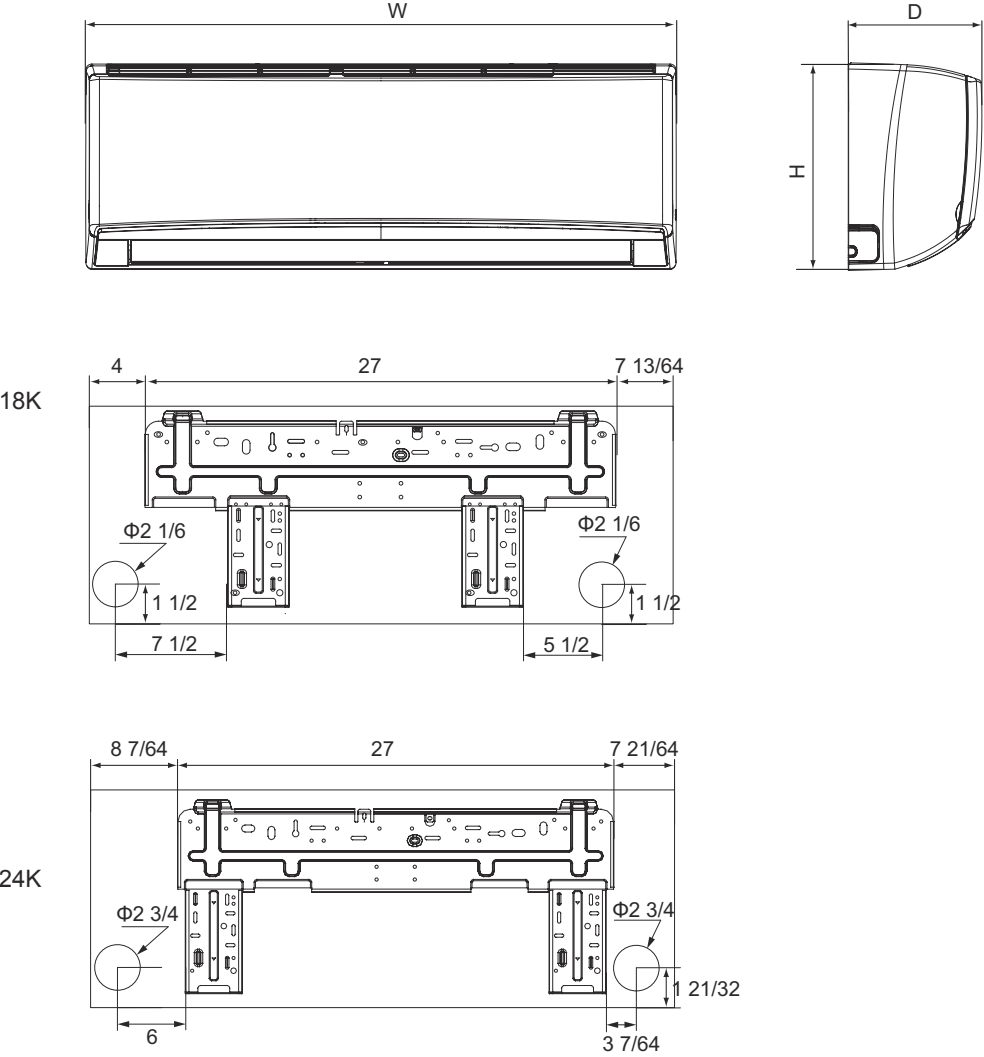
1

1

T1: Inlet and outlet pipe temperature of evaporator  
T2: Inlet and outlet pipe temperature of condenser  
P: Pressure at the side of big valve  
Connection pipe length: 24.6ft.

### 3. Outline Dimension Diagram

#### 3.1 Indoor Unit

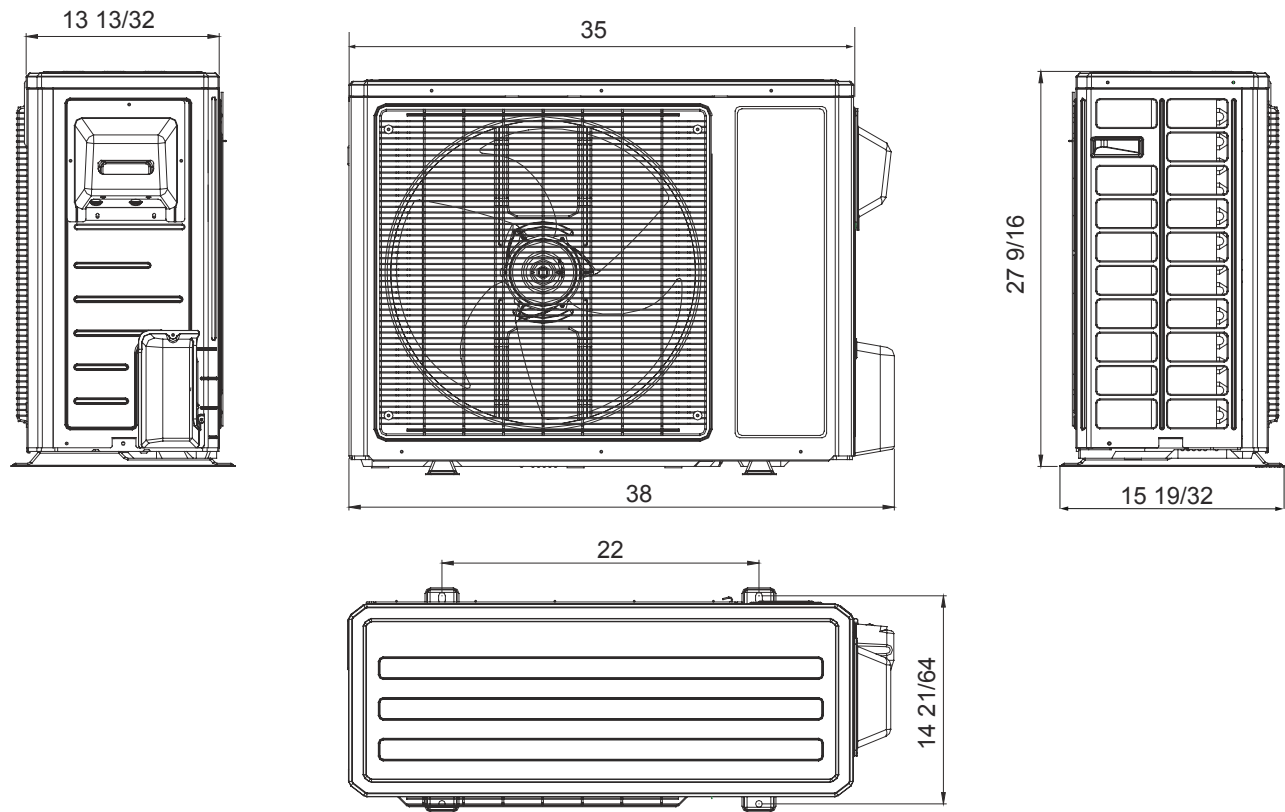


Unit:inch

Models	W	H	D
18K	38 13/64	11 13/16	8 5/6
24K	42 7/16	12 51/64	9 11/16

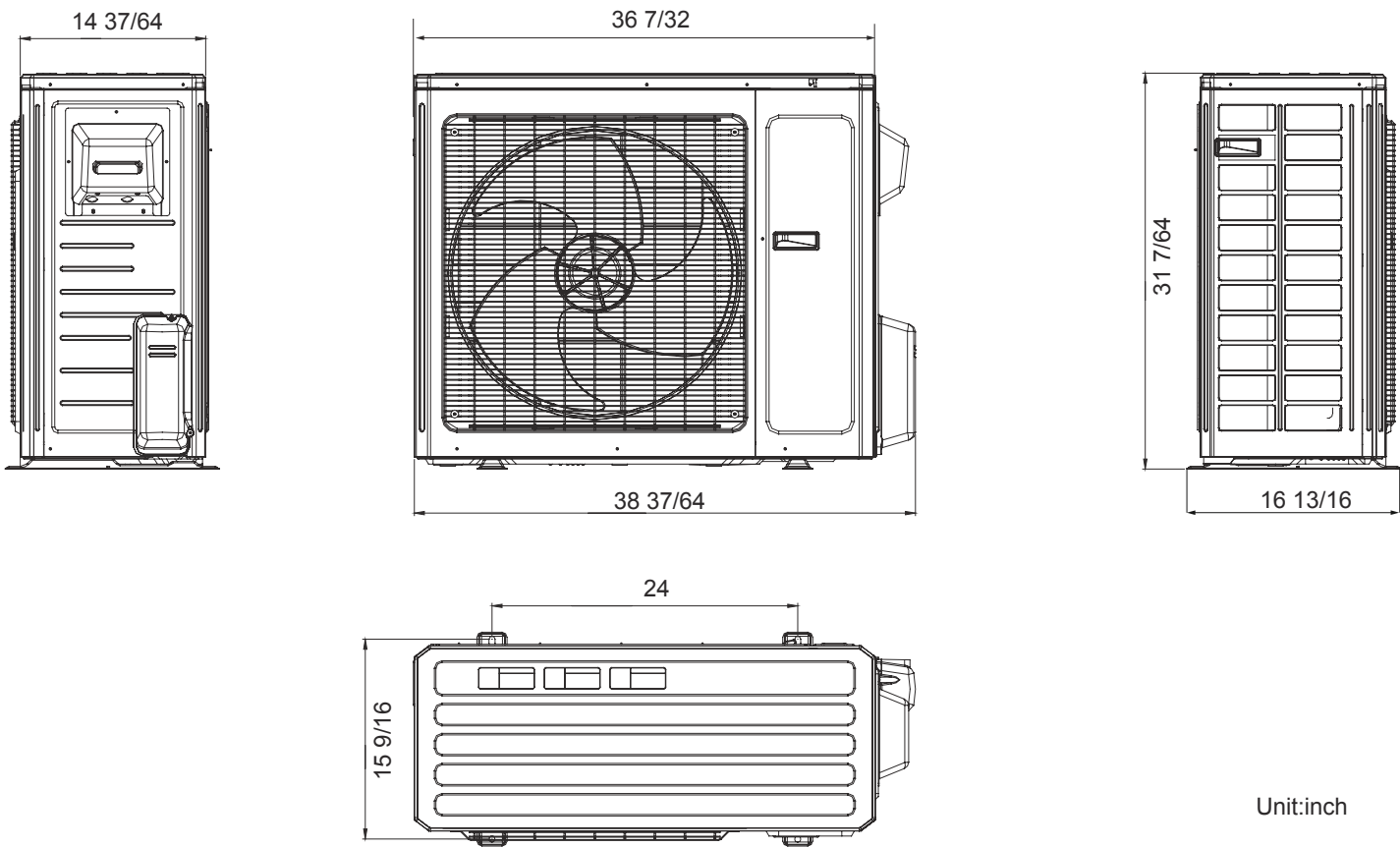
3.2 Outdoor Unit

18K



Unit: inch

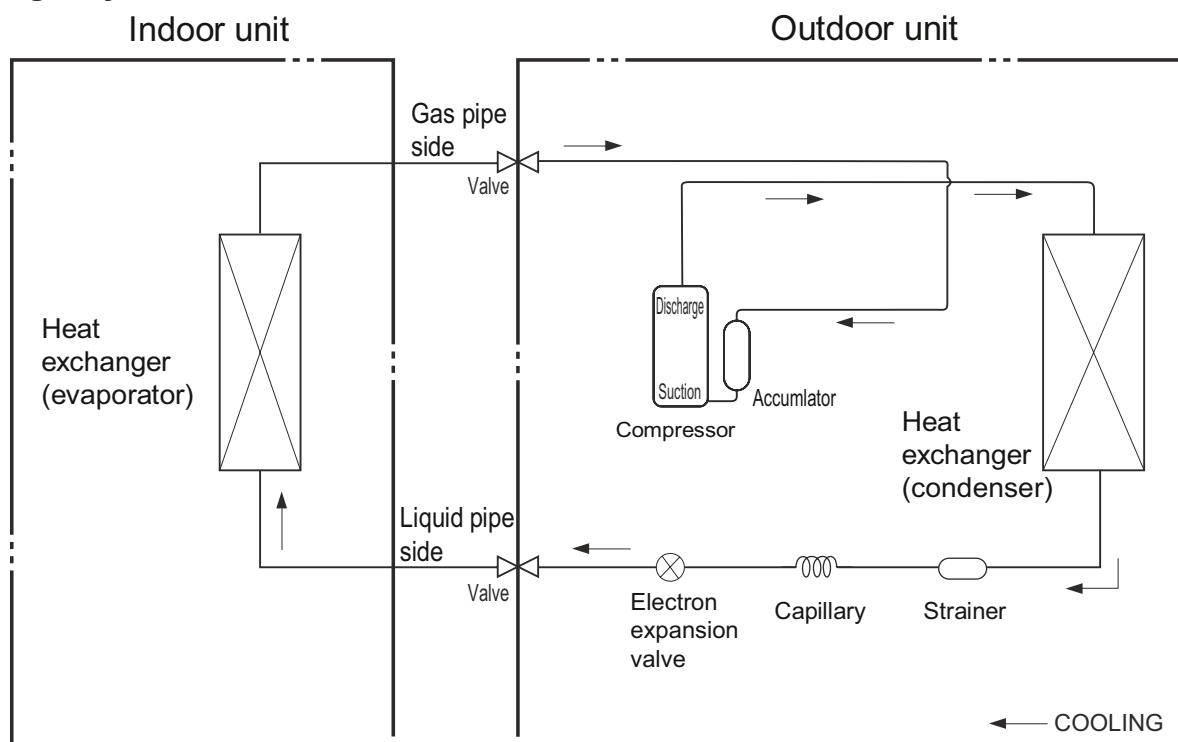
24K



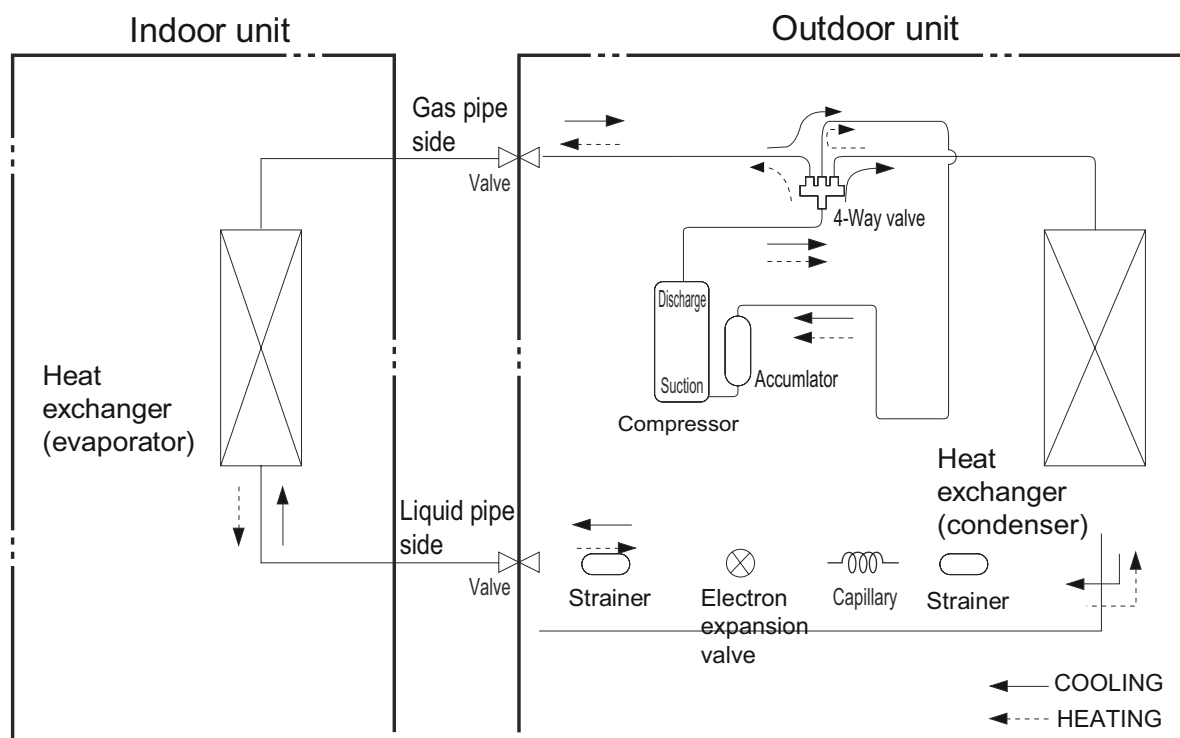
Unit:inch

## 4. Refrigerant System Diagram

### Cooling only model



### Cooling and heating model



Connection pipe specification:

Liquid pipe: 1/4" inch

Gas pipe: 1/2" (for 18K except DCX18CSB21S and DHX18CSB21S)

Gas pipe: 5/8" (for DCX24CSB21S and DHX24CSB21S)

# 5. Electrical Parts

## 5.1 Wiring Diagram

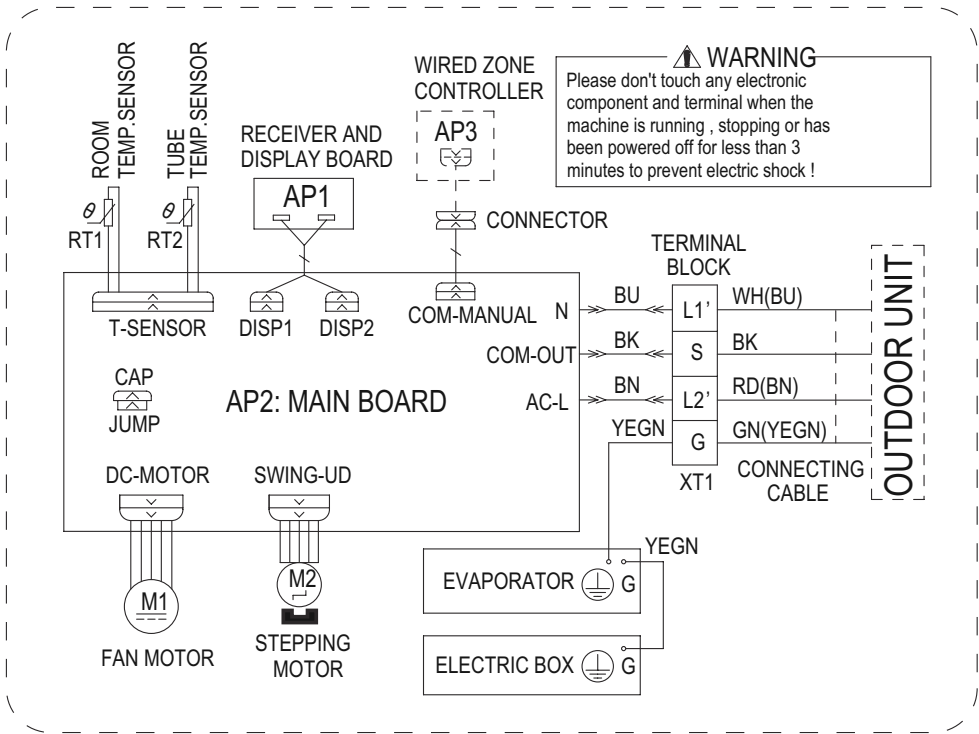
• Description

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	CAP	Jumper cap
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue		Grounding wire
YEGN	Yellow/Green	BK	Black	/	/
VT	Violet	OG	Orange	/	/

Note: Jumper cap is used to determine fan speed and the swing angle of horizontal louver for this model.

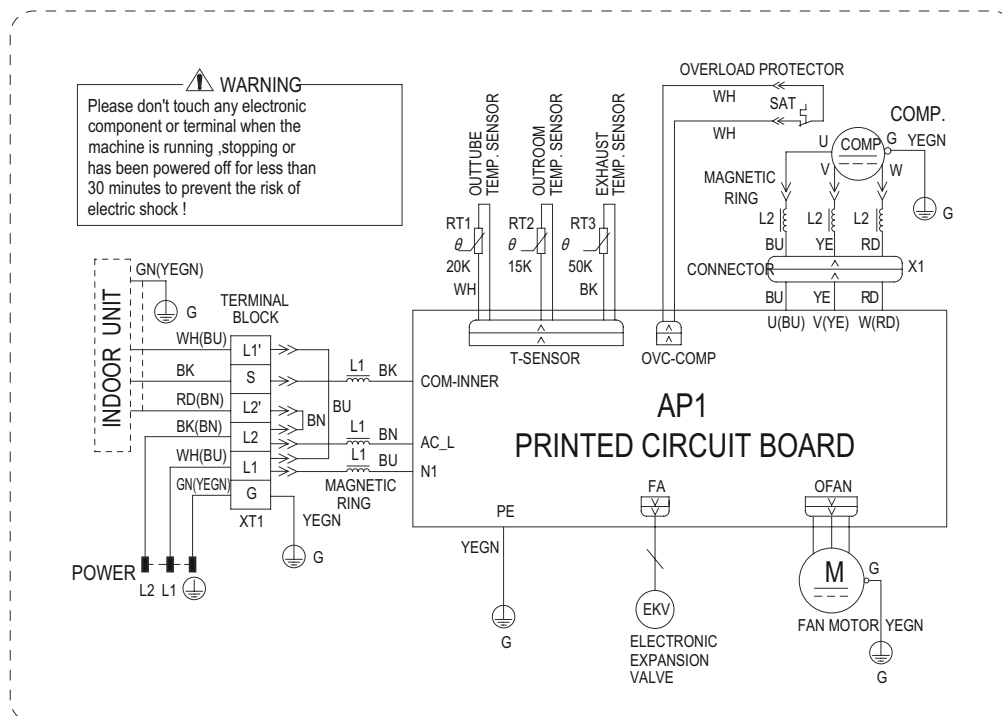
• Indoor Unit

DHX18NWB21S  
DCX18NWB21S  
DHX24NWB21S  
DCX24NWB21S

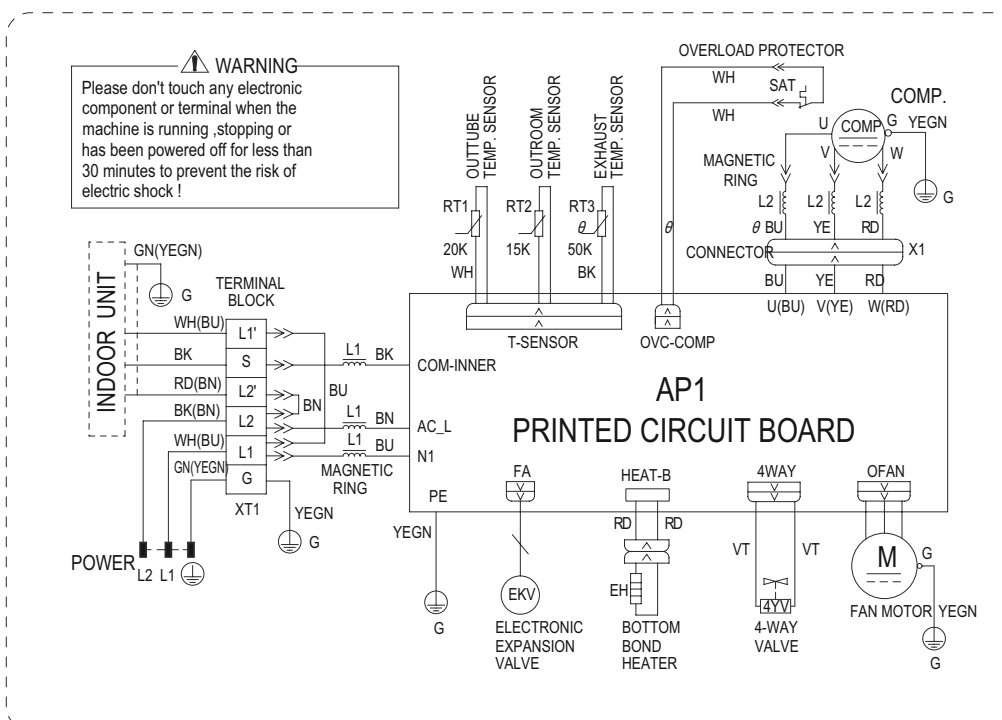


## • Outdoor Unit

DCX18CSB21S

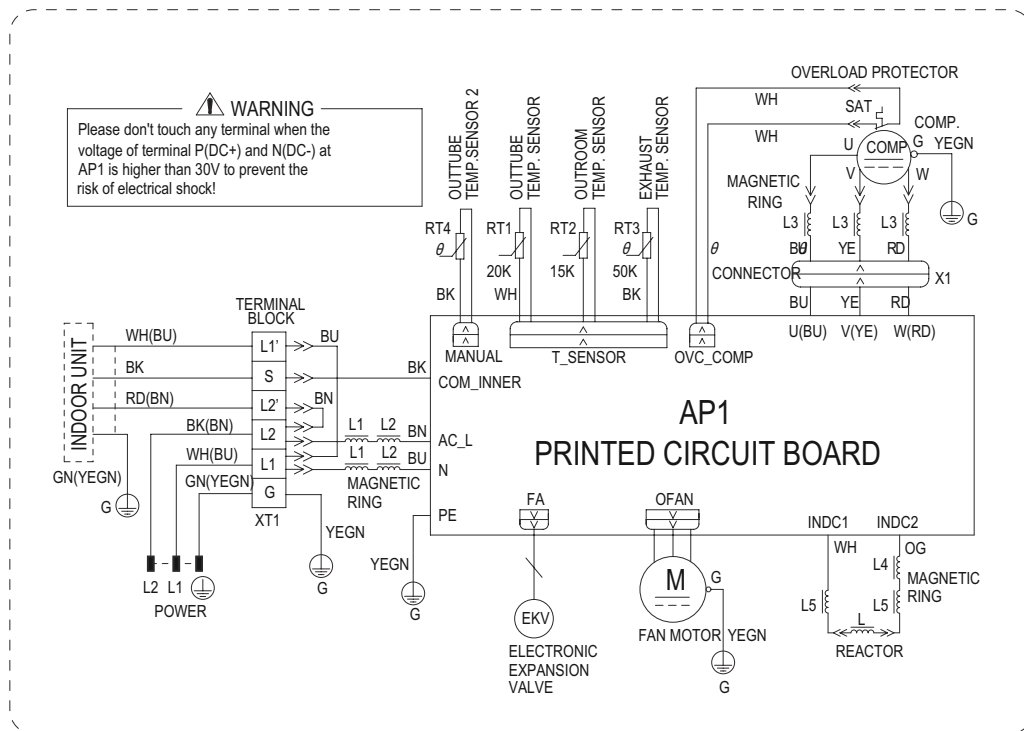


DHX18CSB21S





DCX24CSB21S

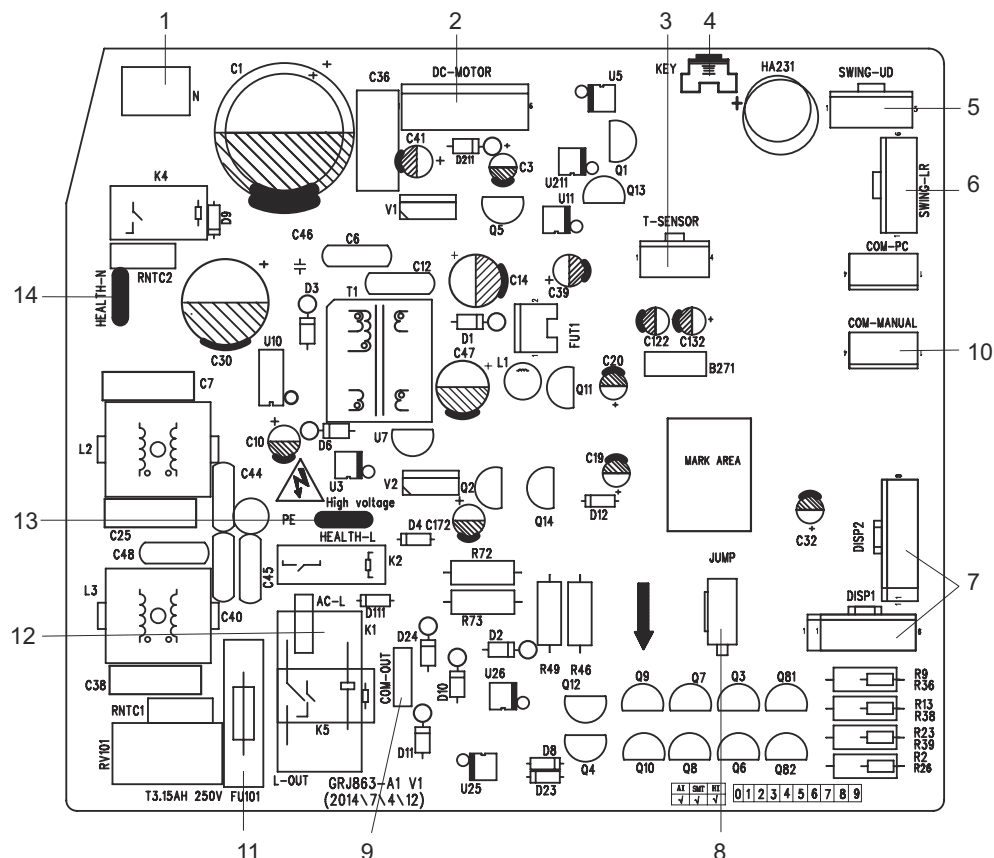


The above data is subject to change without notice. Please refer to the nameplate of the unit.

## 5.2 PCB Printed Diagram

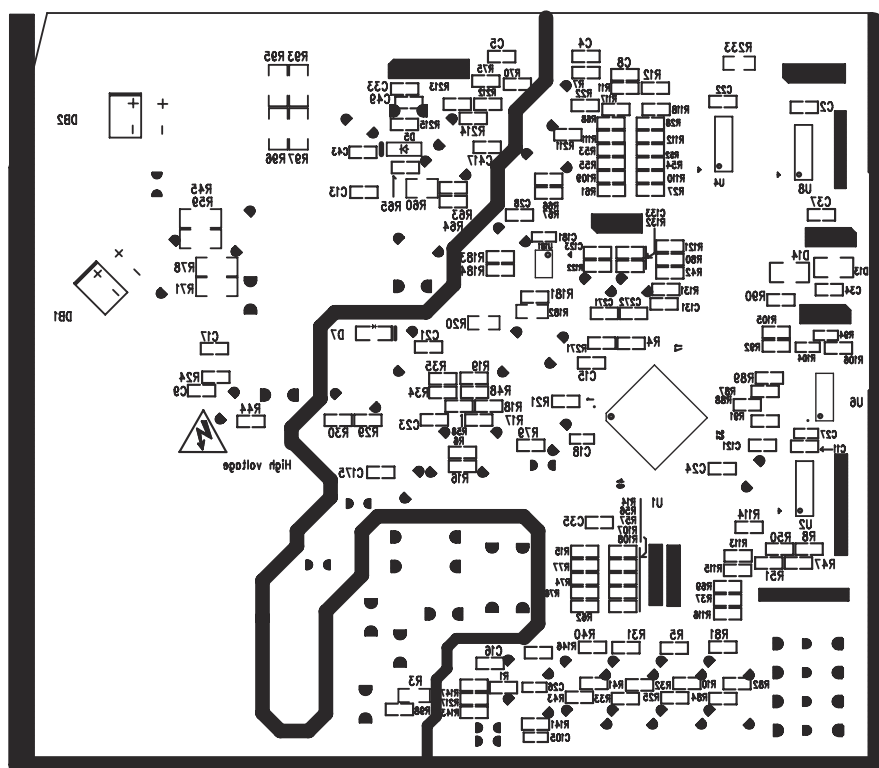
### Indoor Unit

#### • Top view



1	Neutral wire
2	Motor needle stand
3	Interface of temperature sensor
4	Auto button
5	Up and down swing interface
6	Left and right swing interface(only for the mode with this function)
7	Display interface
8	Jumper cap
9	Terminal for communication with mainboard of outdoor unit
10	Terminal of wired controller
11	Fuse </td
12	Live wire
13	Interface of health function live wire(only for the mode with this function)
14	Interface of health function neutral wire(only for the mode with this function)

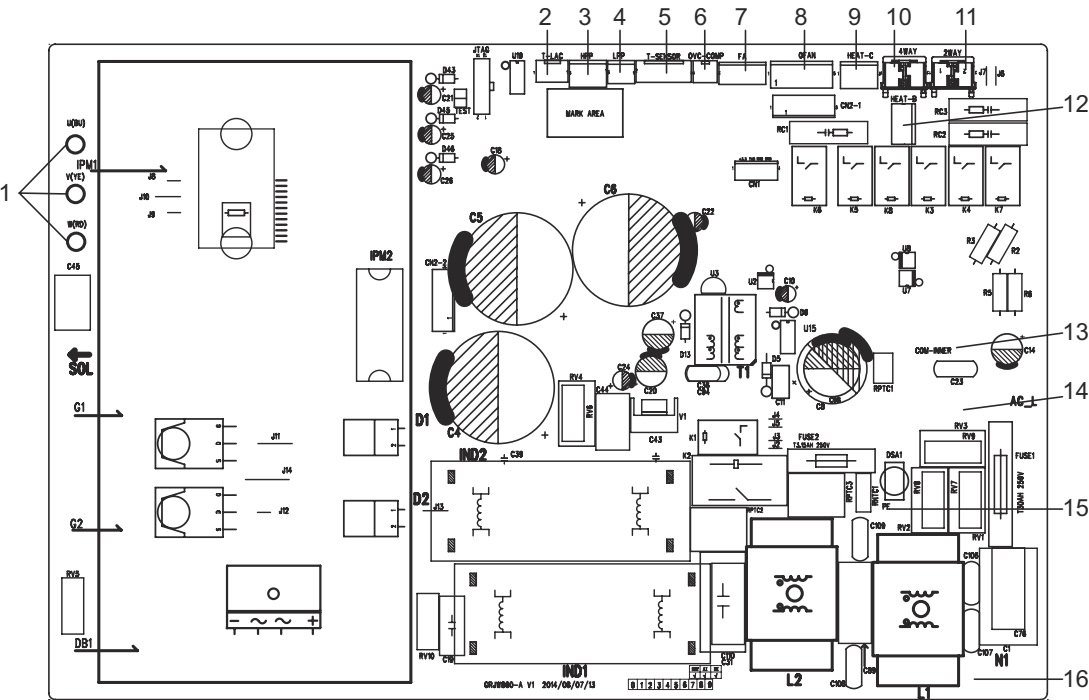
#### • Bottom view



Outdoor Unit

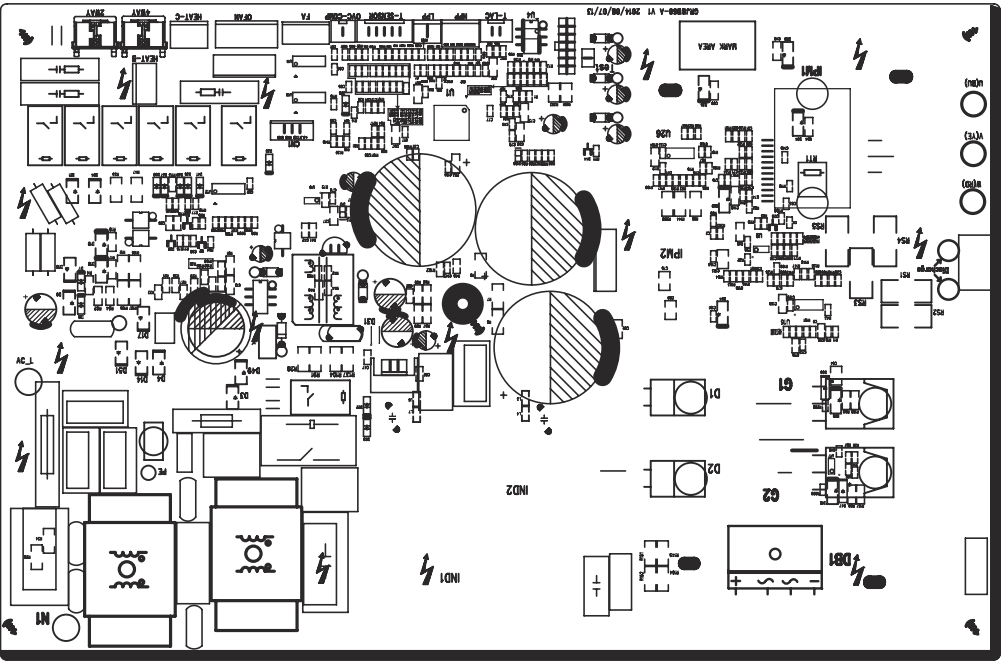
DHX18CSB21S    DCX18CSB21S

• Top view



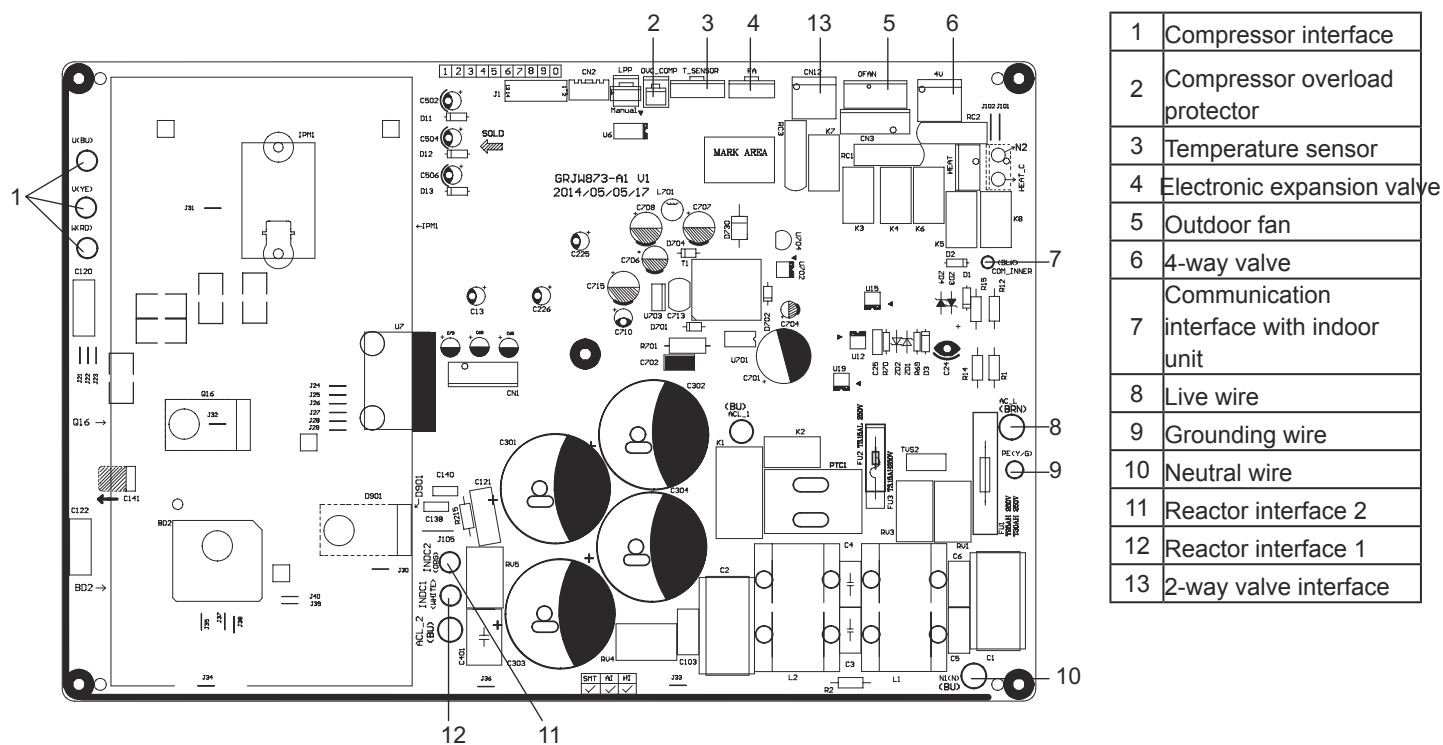
1	Compressor interface
2	Interface of low-temperature cooling temperature sensor
3	High pressure protection
4	Low pressure protection
5	Interface of temperature sensor
6	Overload interface of compressor
7	Electronic expansion valve
8	Interface of DC fan
9	Compressor electric heater interface
10	4-way valve interface
11	2-way valve interface
12	Chassis electric heater interface
13	Communication wire
14	Live wire
15	Grounding wire
16	Neutral wire

• Bottom view

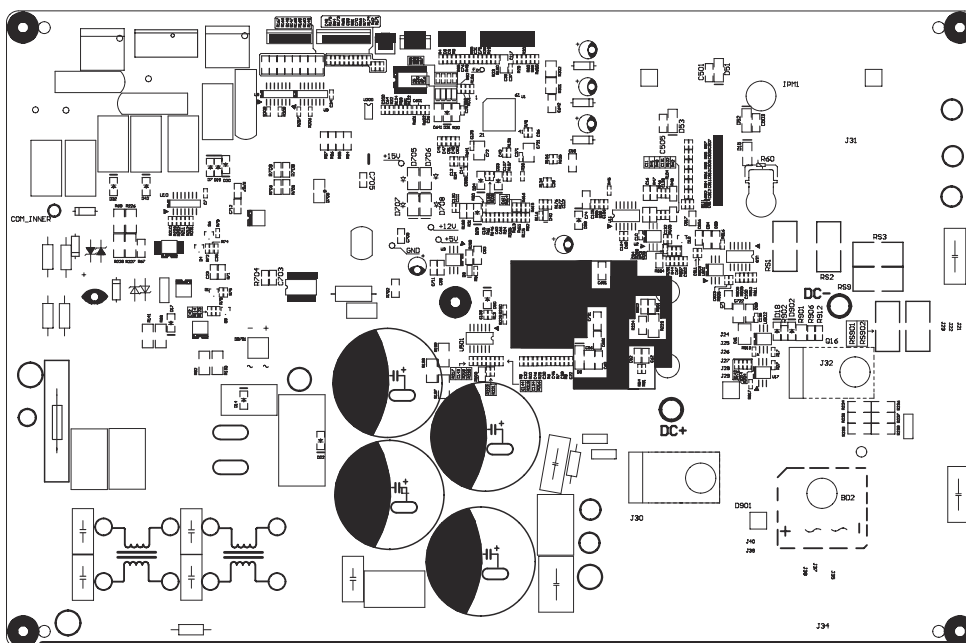


DHX24CSB21S DCXCSB21S

### • Top view



### • Bottom view



## 6. Function and Control

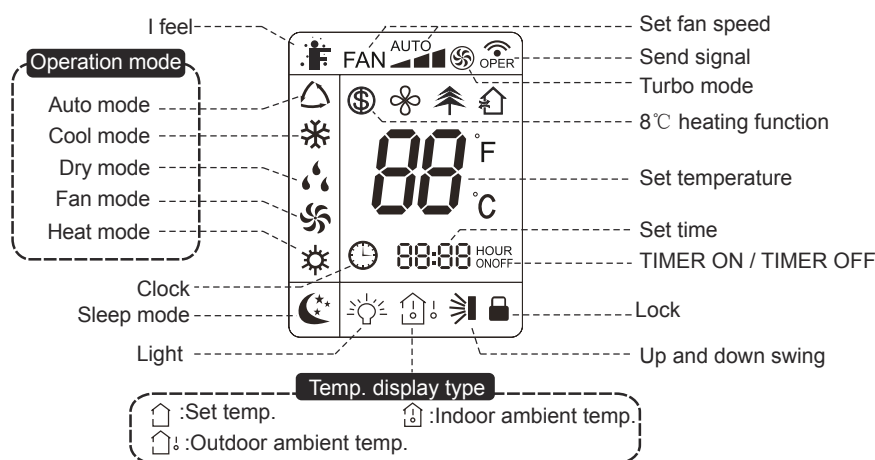
### 6.1 Remote Controller Introduction

#### Buttons on Remote Controller



- 1 ON/OFF button
- 2 MODE button
- 3 FAN button
- 4 SWING button
- 5 TURBO button
- 6 ▲/ ▼button
- 7 SLEEP button
- 8 TEMP button
- 9 I FEEL button
- 10 LIGHT button
- 11 CLOCK button
- 12 TIMER ON / TIMER OFF button

#### Description of icons on display screen




#### Introduction for buttons on remote controller

##### Note:

- After putting through the power, the air conditioner will give out a sound. Operation indicator "⏻" is ON (red indicator). After that, you can operate the air conditioner by using the remote controller.
- Under On status, pressing the button on the remote controller, the signal icon "📶" on the display of remote controller will blink once and the air conditioner will give out a "beep" sound, which means the signal has been sent to the air conditioner.
- Under Off status, set temperature and clock icon will be displayed on the display of remote controller (If timer on, timer off and light functions are set, the corresponding icons will be displayed on the display of the remote controller at the same time). Under On status, the display will show the corresponding set function icons.




## 1. ON/OFF button

Pressing this button can turn on or turn off the air conditioner. After turning on the air conditioner, operation indicator "  " on indoor unit's display is ON showing a green indicator and indoor unit will give out a sound. (The color is different for different models.)

## 2. MODE button

Press this button to select your required operation mode.






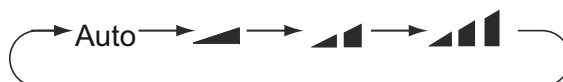
- When selecting auto mode, air conditioner will operate automatically according to the factory setting. Set temperature can't be adjusted and will not be displayed. Press "FAN" button can adjust fan speed. Press "SWING" button can adjust fan blowing angle.
- After selecting cool mode, air conditioner will operate under cool mode. Cool indicator "  " on indoor unit is ON. Press "▲" or "▼" button to adjust set temperature. Press "FAN" button to adjust fan speed. Press "SWING" button to adjust fan blowing angle.
- When selecting dry mode, the air conditioner operates at low speed under dry mode. Dry indicator "  " on indoor unit is ON. Under dry mode, fan speed can't be adjusted. Press "SWING" button to adjust fan blowing angle.
- When selecting fan mode, only the indoor fan will be on to circulate indoor air, no cooling and no heating. All indicators are OFF. Press "FAN" button to adjust fan speed. Press "SWING" button to adjust fan blowing angle.
- When selecting heating mode, the air conditioner operates under heat mode. Heat indicator "  " on indoor unit is ON. Press "▲" or "▼" button to adjust set temperature. Press "FAN" button to adjust fan speed. Press "SWING" button to adjust fan blowing angle. (Cooling only unit won't receive heating mode signal. If setting heat mode with remote controller, pressing ON/OFF button can't start up the unit.)

### Note:

- For preventing cold air, after starting up heating mode, indoor fan will delay until the indoor coil reaches preset factory temperature that is controlled by the inlet pipe sensor. Normal for the preset temp is 92 degrees F.
- Set temperature range from remote controller: 60.8°F~86.°F (16°C~30°C); fan speed: auto, low speed, medium speed, high speed.

## 3. FAN button

Pressing this button can set fan speed sequentially as: auto (AUTO), low(  ), medium (  ), high(  ).

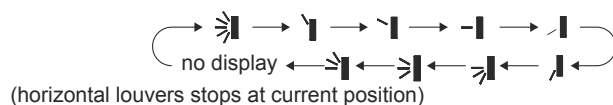












### Caution:

- Under AUTO speed, air conditioner will select proper fan speed automatically according to factory setting.
- Fan speed under dry mode is low speed.

## 4. SWING button

Pressing this button can select up and down swing angle. Fan blow angle can be selected sequentially as below:





- When selecting "  ", air conditioner is blowing fan automatically. Horizontal louver will automatically swing up and down at maximum angle.
- When selecting "  ", "  ", "  ", "  ", air conditioner is blowing fan at fixed position. Horizontal louver will stop at the fixed position.
- When selecting "  ", "  ", "  ", "  ", air conditioner is blowing fan at fixed angle. Horizontal louver will send air at the fixed angle.
- Hold "  " button more than 2s to set your required swing angle. When reaching your required angle, release the button.

### Note:

- "  ", "  ", "  " may not be available. When air conditioner receives this signal, the air conditioner will blow the fan automatically.

## 5. TURBO button

Under COOL or HEAT mode, press this button to turn to quick COOL or quick HEAT mode. "  " icon is displayed on the remote controller. Press this button again to exit turbo function and "  " icon will disappear.

## 6. ▲/▼ button

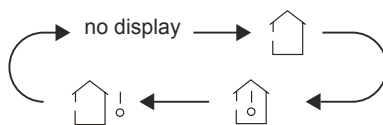
- Press this button once to increase or decrease set temperature 1°F (1°C). Holding either "▲" or "▼" button for 2s, the set temperature on remote controller will change quickly. On releasing button after setting is finished, temperature indicator on indoor unit will change accordingly. (Temperature can't be adjusted under auto mode.)
- When setting TIMER ON, TIMER OFF or CLOCK, press "▲" or "▼" button to adjust time. (Refer to CLOCK, TIMER ON, TIMER OFF buttons) When setting TIMER ON, TIMER OFF or CLOCK, press "▲" or "▼" button to adjust time. (Refer to CLOCK, TIMER ON, TIMER OFF buttons)

## 7. SLEEP button

Under COOL, HEAT or DRY mode, press this button to start up sleep function. "☾" icon is displayed on remote controller. Press this button again to cancel sleep function and "☾" icon will disappear.

## 8. TEMP button

By pressing this button, you can see indoor set temperature, indoor ambient temperature or outdoor ambient temperature on indoor unit's display. The setting on remote controller is selected sequentially as below:



- When selecting "House with Thermometer" or no display, with remote controller, temperature indicator on indoor unit displays set temperature.
- When selecting "House with Thermometer and Circle" with remote controller, temperature indicator on indoor unit displays indoor ambient temperature.
- When selecting "House with Thermometer and Circle with Dot" with remote controller, temperature indicator on indoor unit displays outdoor ambient temperature.

### Note:

- Outdoor temperature display is not available for some models. At that time, indoor unit receives "House with Thermometer" signal, while it displays indoor set temperature.
- It's defaulted to display set temperature when turning on the unit. There is no display in the remote controller.
- **Only for the models whose indoor unit has dual-8 display.**
- When selecting displaying of indoor or outdoor ambient temperature, indoor temperature indicator displays corresponding temperature and automatically turns to display set temperature after 3s or 5s.

## 9. I FEEL button

Press this button to start I FEEL function and "I FEEL" icon will be displayed on the remote controller. After this function is set, the remote controller will send the detected ambient temperature to the controller and the unit will automatically adjust the indoor temperature according to the detected temperature. Press this button again to close I FEEL function and "I FEEL" icon will disappear.

- Do not put the remote controller near an object of high temperature or low temperature in order to avoid detecting inaccurate ambient temperature.

## 10. LIGHT button

Press this button to turn off display light on indoor unit. "Light Off" icon on remote controller disappears. Press this button again to turn on display light. "Light On" icon is displayed.

## 11. CLOCK button

Press this button to set clock time. "Clock" icon on remote controller will blink. Press "▲" or "▼" button within 5s to set clock time. Each pressing of "▲" or "▼" button, clock time will increase or decrease 1 minute. If hold "▲" or "▼" button, 2s later, time will change quickly. Release this button when reaching your required time. Press "CLOCK" button to confirm the time. "Clock" icon stops blinking.

### Note:

- Clock time adopts 24-hour mode.
- The interval between two operations can't exceed 5s. Otherwise, remote controller will quit setting status. Operation for TIMER ON/TIMER OFF is the same.

## 12. TIMER ON / TIMER OFF button

### • TIMER ON button

"TIMER ON" button can set the time for timer on. After pressing this button, "Clock" icon disappears and the word "ON" on remote controller blinks. Press "▲" or "▼" button to adjust TIMER ON setting. After each pressing "▲" or "▼" button, TIMER ON setting will increase or decrease 1min. Hold "▲" or "▼" button, 2s later, the time will change quickly until reaching your required time. Press "TIMER ON" to confirm it. The word "ON" will stop blinking. "Clock" icon resumes displaying. Cancel TIMER ON: Under the condition that TIMER ON is started up, press "TIMER ON" button to cancel it.

### • TIMER OFF button

"TIMER OFF" button can set the time for timer off. After pressing this button, "Clock" icon disappears and the word "OFF" on remote controller blinks. Press "▲" or "▼" button to adjust TIMER OFF setting. After each pressing "▲" or "▼" button, TIMER OFF setting will increase or decrease 1min. Hold "▲" or "▼" button, 2s later, the time will change quickly until reaching your required time. Press "TIMER OFF" word "OFF" will stop blinking. "Clock" icon resumes displaying. Cancel TIMER OFF: Under the condition that TIMER OFF is started up, press "TIMER OFF" button to cancel it.

### Note:

- Under on and off status, you can set TIMER OFF or TIMER ON simultaneously.
- Before setting TIMER ON or TIMER OFF, please adjust the clock time.
- After starting up TIMER ON or TIMER OFF, the air conditioner will be turned on or turned off according to setting time. ON/OFF button has no effect on setting. If you don't need this function, please use remote controller to cancel it.



## Function introduction for combination buttons

### 1. Energy-saving function

Under cooling mode, press "TEMP" and "CLOCK" buttons simultaneously to start up or turn off energy-saving function. When energy-saving function is started up, "SE" will be shown on remote controller, and air conditioner will adjust the set temperature automatically according to factory setting to reach the best energy-saving effect. Press "TEMP" and "CLOCK" buttons simultaneously again to exit energy-saving function.

#### Note:

- Under energy-saving function, fan speed is defaulted at auto speed and it can't be adjusted.
- Under energy-saving function, set temperature can't be adjusted. Press "TURBO" button and the remote controller won't send signal.
- Sleep function and energy-saving function can't operate at the same time. If energy-saving function has been set under cooling mode, pressing sleep button will cancel energy-saving function. If sleep function has been set under cooling mode, starting up the energy-saving function will cancel sleep function.

### 2. 8℃ heating function

Under heating mode, press "TEMP" and "CLOCK" buttons simultaneously to start up or turn off 8℃ heating function. When this function is started up, "8" and "8℃" will be shown on remote controller, and the air conditioner keeps the heating status at 8℃. Press "TEMP" and "CLOCK" buttons simultaneously again to exit 8℃ heating function.

#### Note:

- Under 8℃ heating function, fan speed is defaulted at auto speed and it can't be adjusted.
- Under 8℃ heating function, set temperature can't be adjusted. Press "TURBO" button and the remote controller won't send signal.
- Sleep function and 8℃ heating function can't operate at the same time. If 8℃ heating function has been set under cooling mode, press sleep button will cancel 8℃ heating function. If sleep function has been set under cooling mode, start up the 8℃ heating function will cancel sleep function.
- Under ℉ temperature display, the remote controller will display 46 ℉ heating.

### 3. Lock function

Press "▲" and " " simultaneously to turn on or turn off lock function. When child lock function is on, " " icon is displayed on remote controller. If you operate the remote controller, the " " icon will blink three times without sending signal to the unit.

### 4. Temperature display switchover function

Under OFF status, press "▼" and "MODE" buttons simultaneously to switch temperature display between ℃ and ℉.

## Operation guide

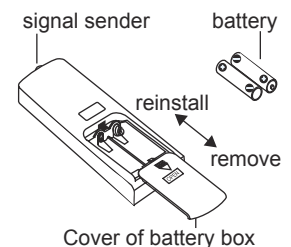
1. After putting through the power, press "ON/OFF" button on remote controller to turn on the air conditioner.
2. Press "MODE" button to select your required mode: AUTO, COOL, DRY, FAN, HEAT.
3. Press "▲" or "▼" button to set your required temperature. (Temperature can't be adjusted under auto mode).
4. Press "FAN" button to set your required fan speed: auto, low, medium and high speed.
5. Press "SWING" button to select fan blowing angle.

## Replacement of batteries in remote controller

1. Press the back side of remote controller marked with "OPEN", as shown in the fig, and then push out the cover of battery box along the arrow direction.
2. Replace two 7# (AAA 1.5V) dry batteries, and make sure the positions of "+" polar and "-" polar are correct.
3. Reinstall the cover of battery box.

#### Note:

- During operation, point the remote control signal sender at the receiving window on indoor unit.
- **Distance between signal sender and receiving window must be no more than 26.4ft (8m), with no obstacles between them.**
- Signal interference is possible in a room where there is fluorescent lamp or wireless telephone; remote controller should be close to indoor unit during operation.
- Replace new batteries of the same model when replacement is required.
- When the remote controller is not in use for a long time, please take out the batteries.
- If the display on remote controller is fuzzy or there's no display, please replace batteries.





## 6.2 Brief Description of Modes and Functions

### 1. Basic function of system

#### (1) Cooling mode

- (1) Under this mode, fan and swing operate at setting status.
- (2) During malfunction of outdoor unit or the unit is stopped because of protection, indoor unit keeps original operation status.

#### (2) Drying mode

- (1) Under this mode, fan operates at low speed and swing operates at setting status.
- (2) During malfunction of outdoor unit or the unit is stopped because of protection, indoor unit keeps original operation status.
- (3) Protection status is the same as that under cooling mode.
- (4) Sleep function is not available for drying mode.

#### (3) Heating mode

- (1) Under this mode, Temperature setting range is 60.8°F~86.0°F.
- (2) Working condition and process for heating mode:  
When turning on the unit under heating mode, the indoor fan will stop until the indoor coil reaches factory preset temperature to prevent cold air start up. (Normally the coil has to reach 92°F before the indoor fan slowly ramps up.)

#### (4) Working method for AUTO mode:

- 1. Working condition and process for AUTO mode:
  - a. Under AUTO mode, standard heating  $T_{\text{preset}}=68.0^{\circ}\text{F}$  and standard cooling  $T_{\text{preset}}=77.0^{\circ}\text{F}$ . The unit will switch from heat to cool automatically with the preset factory settings.
- 2. Protection function
  - a. During cooling operation, protection function is same as that under cooling mode.
  - b. During heating operation, protection function is same as that under heating mode.
- 3. Display: Set temperature is the set value under each condition.
- 4. If there's I FEEL function,  $T_{\text{compensation}}$  is 0. Others are same as above.

#### (5) Fan mode

Under this mode, indoor fan operates at set fan speed. There will be no outdoor unit function in fan mode. This mode is only to circulate the ambient indoor air. Indoor fan can operate at high, medium, low or auto fan speed.

### 2. Other control

#### (1) Buzzer

Upon energization or availably operating the unit or remote controller, the buzzer will give out a beep.

#### (2) Auto button

If pressing this auto button when turning off the unit, the complete unit will operate according to the preset factory temperature (heat /cool) setting for auto mode and can not be changed. Indoor fan operates at auto fan speed and swing function if the unit is in cool mode. If the unit is in heat mode the indoor fan will follow preheating protocol and fan speed can't be adjusted. Press this auto button at ON status to turn off the unit.

#### (3) Auto fan

Heating mode: During auto heating mode or normal heating mode, auto fan speed will adjust the fan speed automatically according to the indoor coil sensor. This is a factory preset temperature that can not be changed. This is to prevent cool air start up (preheating).

#### (4) Sleep

After setting sleep function for a period of time, the system will adjust the set temperature automatically.

#### (5) Timer function:

General timer and clock timer functions are compatible by equipping remote controller with different functions.

#### (6) Memory function

When power has been interrupted, the unit will auto restart in the last mode settings before the power interruption. This is also known as auto restart.

#### (7) Health function

Health function is to dry out the indoor coil to prevent mold and mildew building up on the indoor coil by running the indoor fan after the unit has reach the setpoint in cool mode.

**(8) I feel control mode**

I FEEL Mode is the hand held remote taking over the sensing instead of the indoor air sensor. The indoor remote needs to be in the line of sight of the indoor unit no more than 24ft away. Remember not to put the remote near any type of heat source.

**(9) Compulsory defrosting function****(1) Start up compulsory defrosting function**

Under ON status, set heating mode with remote controller and adjust the temperature to 60.8°F. Press “+, -, +, -, +,-” button successively within 5s and the complete unit will enter into compulsory defrosting status. Meanwhile, the heating indicator on the indoor unit will be ON 10s and OFF 0.5s successively. (Note: If complete unit has malfunction or stops operation due to protection, compulsory defrosting function can be started up after malfunction or protection is resumed.

**(2) Exit compulsory defrosting mode**

After compulsory defrosting is started up, the complete unit will exit defrosting operation according to the actual defrosting result, and the complete unit will resume normal heating operation.

**(10) Refrigerant recovery function:****(1) Enter refrigerant recovery function**

Within 5min after energizing (unit ON or OFF status is ok), continuously press LIGHT button for 3 times within 3s to enter refrigerant recycling mode; Fo will be displayed and refrigerant recycling function is started. At this moment, the liquid valve should be closed. After 5min, make sure there is no refrigerant in the line sets. Also make sure the king valve is closed before removing the line set / copper tubing. This function is also known as pump down.

**(2) Exit refrigerant recycling function**

After entering refrigerant recovery mode, the unit will stay in Refrigerant Recovery Function for 25 minutes. After the 25 minutes have passed the unit will return to the last state of operation before Refrigerant Recovery Function was activated (stand-by, cooling, heating).

**(11) Ambient temperature display control mode**

1. When user sets the controller to display set temperature (corresponding remote control code: 01), current set temperature will be displayed.

2. Only when remote control signal is switched to indoor ambient temperature display status (corresponding remote control code: 10) from other display status (corresponding remote control code: 00, 01, 11), controller will display indoor ambient temperature for 3s and then turn back to display set temperature.

Under this mode, indoor fan operates at set fan speed. Compressor, outdoor fan, 4-way valve and electric heating tube stop operation. Indoor fan can operate at high, medium, low or auto fan speed.

**(12) Off-peak energization function:**

The unit has a 3 minute delay on first start up. After the compressor cycles off, the compressor has a 3 minute 15 second delay if the system has not equalized pressure and gets a call for any mode.

**(13) SE control mode**

The unit operates at SE status.

**(14) X-fan mode**

When X-fan function is turned on, after turn off the unit, indoor fan will still operate at low speed for 2min and then the complete unit will be turned off. When x-fan function is turned off, after turn off the unit, the complete unit will be turned off directly.

**(15) 8° heating function**

This is freeze protection 46°F (8°C). This mode is for heating only. When this mode is selected the unit will heat to maintain a room temperature of 46°F.

**(16) Turbo fan control function**

Set turbo function under cooling or heating mode to enter into turbo fan speed. Press the fan speed button to cancel turbo blowing. No turbo function under auto, dry or fan mode.

## Outdoor Units

### 1. Input Parameter Compensation and Calibration

#### (1) Check the ambient temperature compensation function Indoor ambient temperature compensation function.

- In cooling mode, the indoor ambient temperature participating in computing control =  $(T_{\text{indoor ambient temperature}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})$
- In heating mode, the indoor ambient temperature participating in computing control =  $(T_{\text{indoor ambient temperature}} - \Delta T_{\text{heating indoor ambient temperature compensation}})$

#### (2) Check effective judgment controls of parameters

Effective judgment function of the outdoor exhaust temperature thermo-bulb: When conditions a and b below are satisfied, the outdoor exhaust temperature thermo-bulb is judged not to be connected into place. The mainboard of outdoor units will display failure of the outdoor exhaust temperature thermo-bulb (not connected into place). Stop the machine for repairs and resume operation using ON/OFF of remote control.

##### a. Judgment of exhaust detection temperature change:

After the compressor starts up and runs for 10 minutes, if the compressor frequency  $f \geq 40\text{Hz}$ , and the rising value  $T_{\text{exhaust}}$  ( $T_{\text{exhaust}}$  (after start-up for 10 minutes) -  $T_{\text{exhaust}}$  (before start-up))  $< 35.6^\circ\text{F}$ , the outdoor exhaust temperature thermo-bulb can be judged not to be connected into place (judging once when the power is on the first time).

b. Comparative judgment of exhaust detection temperature and condenser detection temperature ( $T_{\text{pipe temperature}} = T_{\text{outdoor pipe temperature in cooling mode}}$ ,  $T_{\text{pipe temperature}} = T_{\text{indoor pipe temperature in heating mode}}$ ): After the compressor starts up and runs for 10 minutes, if the compressor frequency  $f \geq 40\text{Hz}$ , and  $T_{\text{pipe temperature}} \geq (T_{\text{exhaust}} + 37.4)$ , the outdoor exhaust temperature thermobulb can be judged not to be connected into place (judging once when power is on the first time).

### 2. Basic Functions

#### (1) Cooling Mode

##### 1. Conditions and processes of cooling operation:

- If the compressor is shut down, and  $[T_{\text{setup}} - (T_{\text{indoor ambient temperature}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})] \leq 32.9^\circ\text{F}$ , start up the machine for cooling, and the cooling operation will start.
- During operations of cooling, if  $32^\circ\text{F} \leq [T_{\text{setup}} - (T_{\text{indoor ambient temperature}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})] < 35.6^\circ\text{F}$ , the cooling operation will be still running.
- During operations of cooling, if  $35.6^\circ\text{F} \leq [T_{\text{setup}} - (T_{\text{indoor ambient temperature}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})]$ , the cooling operation will stop after reaching the temperature point.

##### 2. Temperature setting range

- If  $T_{\text{outdoor ambient temperature}} \geq [T_{\text{low-temperature cooling temperature}}]$ , the temperature can be set at:  $60.8 \sim 86^\circ\text{F}$  (Cooling at room temperature).
- If  $T_{\text{outdoor ambient temperature}} < [T_{\text{low-temperature cooling temperature}}]$ , the temperature can be set at:  $77 \sim 86^\circ\text{F}$  (Cooling at low temperature), that is, the minimum setting temperature for outer units judgment is  $77^\circ\text{F}$ .

#### (2) Dehumidifying Mode

- Conditions and processes of dehumidifying operations: Same as the cooling mode.
- The temperature setting range is:  $60.8 \sim 86^\circ\text{F}$ .

#### (3) Fan Mode

- The indoor fan will be the only thing activated.
- The temperature setting range is:  $60.8^\circ\text{F} \sim 86^\circ\text{F}$ .

#### (4) Heating Mode

1. Conditions and processes of heating operations: ( $T_{\text{indoor ambient temperature}}$  is the actual detection temperature of indoor environment thermo-bulb, The heating indoor ambient temperature compensation is the indoor ambient temperature compensation during heating operations).

- If the compressor is shut down, and  $[(T_{\text{indoor ambient temperature}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{setup}}] \leq 32.9^\circ\text{F}$ , start the machine to enter into heating operations for heating.
  - During operations of heating, if  $32^\circ\text{F} \leq [(T_{\text{indoor ambient temperature}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{setup}}] < 35.6^\circ\text{F}$ , the heating operation will be still running.
  - During operations of heating, if  $35.6^\circ\text{F} \leq [(T_{\text{indoor ambient temperature}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{setup}}]$ , the heating operation will stop after reaching the temperature setpoint.
2. The temperature setting range in this mode is:  $60.8^\circ\text{F} \sim 86^\circ\text{F}$ .

### 3. Special Functions

#### Defrosting Control

##### ① Conditions for starting defrosting

After the time for defrosting is judged to be satisfied, if the temperature for defrosting is satisfied after detections for continuous 3 minutes, the defrosting operation will start.

##### ② Conditions of finishing defrosting

The defrosting operation can exit when any of the conditions below is satisfied:

##### ③ $T_{\text{outdoor pipe temperature}} \geq (T_{\text{outdoor ambient temperature}} - [T_{\text{temperature 1 of finishing defrosting}}])$ ;

##### ④ The continuous running time of defrosting reaches [tmax. defrosting time].

### 4. Control Logic

#### (1) Compressor Control

Start the compressor after starting cooling, heating, dehumidifying operations, and the outdoor fans start for 5s. When the machine is shut down, in safety stops and when switching to air-supplying mode, the compressor will stop immediately. In all modes: Once the compressor starts up, it will not be allowed to stop until having run for the [tmin. compressor running time]. (Note: Including cases of shutdown when the temperature point is reached, except the cases requiring stopping the compressor such as fault protection, remote shutdown, mode switching etc.) In all modes: Once the compressor stops, it will restart after a 3-minute delay. (Note: The indoor units have a function of power memory; the machine can be restarted after remote shutdown and powering up again without delay.)

##### 1. Cooling mode

Start the machine to enter into cooling operation for cooling; the compressor is switched on.

##### 2. Dehumidifying mode

Same as the cooling mode.

##### 3. Air-supplying mode

The compressor is switched off.

##### 4. Heating mode

(1) Start the machine to enter into heating operation for heating, the compressor is switched on.

(2) Defrosting:

a. Defrosting starts: The compressor is shut down, and restarts after a 55-second delay.

b. Defrosting ends: The compressor stops, then starts after a 55-second delay.

#### (2) Outer Fans Control

Notes:

Only if the outer fans run for at least 80s in each air flow speed can the air flow be switched.

After the outer fans run compulsively in high speed for 80s when the machine starts up, control the air flow according to the logic.

After remote shutdown, safety stops, and when the machine stops after reaching the temperature point, as well as after the compressor stops, extend 1 minute, the outdoor fans will stop (During the 1-minute period, the air flow of outdoor fans can be changed according to the outdoor ambient temperature changes). When running with force, the outdoor fans shall run in the highest air flow.

#### (3) 4-way valve control

1. The 4-way valve is energized in heat mode.

#### (4) Evaporator freeze-preventing protection function

At the mode of Cooling, dehumidifying:

Evaporator freeze-preventing protection function is allowed to begin after 6 min of starting the compressor.

**1. Starting estimation:**

After the compressor stopped working for 3min, if  $T_{\text{inner pipe}} > [T_{\text{frozen-preventing frequency-limited temperature}}]$  (the temperature of hysteresis is 35.6°F), the machine is only allowed to start for operating, otherwise it should not be started, and should be stopped to treat according to the freeze-preventing protection: Clear the trouble instances under the mode of power turn-off / heating, and the protection times are not counted.

**2. Frequency limited**

$[T_{\text{frozen-preventing normal speed frequency-reducing temperature}}] \leq [T_{\text{inner pipe}} T_{\text{frozen-preventing frequency-limited temperature}}]$ , you should limit the frequency raising of compressor.

**3. Reducing frequency at normal speed:**

If  $[T_{\text{frozen-preventing high speed frequency-reducing temperature}}] \leq [T_{\text{inner pipe}} T_{\text{frozen-preventing normal speed frequency-reducing temperature}}]$ , you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit.

**4. Reducing frequency at high speed:**

If  $[T_{\text{frozen-preventing power turn-off temperature}}] \leq T_{\text{inner pipe}} [T_{\text{frozen-preventing high speed frequency-reducing temperature}}]$  you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit.

**5. Power turn-off:**

If the  $T_{\text{inner pipe}} < [T_{\text{frozen-preventing power turn-off temperature}}]$ , then freeze-preventing protect to stop the machine. If  $T_{\text{freeze-preventing frequency-limited temperature}} < T_{\text{inner pipe}}$ , and the compressor has stopped working for 3 minutes, the whole machine should be allowed to operate.

6. If the freeze-preventing protection power turn-off continuously occurs for six times, it should not be resumed automatically, and you should press the ON/OFF button to resume if the fault continues. During the process of running, if the running time of compressor exceeds the t evaporator freeze-preventing protection times zero clearing time, the times of freeze-preventing power turn-off should be cleared to recount. The mode of stopping the machine or transferring to supply air will clear the problem instances immediately (if the trouble can not be resumed, mode transferring will not clear it).

**(5) Overload protection function**

Overload protection function at the mode of cooling and dehumidifying

**1. Starting estimation:**

After the compressor stopped working for 3min, if  $T_{\text{outer pipe}} < [T_{\text{Cooling overload frequency-limited temperature}}]$  (the temperature of hysteresis is 35.6°F), the machine is allowed to start, otherwise it should not be started, and should be stopped to treat according to the overload protection: Clear the trouble instances at the mode of power turn-off / heating, and the protection times are not counted.

**2. Frequency limited**

If  $[T_{\text{Cooling overload frequency-limited temperature}}] \leq [T_{\text{outer pipe}} T_{\text{Cooling overload frequency reducing temperature at normal speed}}]$ , you should limit the frequency raising of compressor.

**3. Reducing frequency at normal speed and power turn-off:**

If  $[T_{\text{Cooling overload frequency reducing temperature at high speed}}] \leq T_{\text{outer pipe}} < [T_{\text{Cooling overload power turn-off temperature}}]$ , you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit. After it was running 90s at the lower limit, if  $[T_{\text{Cooling overload frequency reducing temperature at normal speed}}] \leq T_{\text{outer pipe}}$ , then Cooling overload protects machine from stopping.

**4. Reducing frequency at high speed and stop machine:**

If  $[T_{\text{Cooling overload frequency reducing temperature at high speed}}] \leq T_{\text{outer pipe}} [T_{\text{Cooling overload power turn-off temperature}}]$ , you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit. After it was running 90s at the lower limit, if  $[T_{\text{Cooling overload frequency reducing temperature at normal speed}}] \leq [T_{\text{outer pipe}}]$ , then Cooling overload protects machine from stopping.

**5. Power turn-off:**

If the  $[T_{\text{Cooling overload power turn-off temperature}}] \leq T_{\text{outer pipe}}$ , then Cooling overload protects machine stopping; If  $[T_{\text{outer pipe}}] < [T_{\text{Cooling overload frequency-limited temperature}}]$  and the compressor has stopped working for 3 minutes, the machine should be allowed to operate.

6. If the cooling overload protection power turn-off continuously occurs for six times, it should not be resumed automatically. Press the ON/OFF button to resume if the fault continues. During the process of running, if the running time of compressor exceeds the t overload protection times zero clearing time, the times of overload protection power turn-off should be cleared in order to recount. The mode of stopping the machine or transferring to supply air will clear the problem instances immediately (if the trouble can not be resumed, transferring mode will not clear it).

**Overload protection function at the mode of heating****Starting estimation:**

After the compressor stops working for 3min, if  $T_{\text{inner pipe}} T_{\text{heating overload frequency-limited temperature}}$  (the temperature of hysteresis is 35.6°F), the machine is allowed to start. Otherwise it should not be started, and should be stopped to treat according to the overload protection:

Clear the trouble instances at the mode of power turn-off / heating, and the protection times are not counted.

## 1. Frequency limited

If  $[T_{\text{heating overload frequency-limited temperature}}] \leq T_{\text{inner pipe}} < [T_{\text{heating overload frequency reducing temperature at normal speed}}]$ , you should limit the frequency raising of compressor.

## 2. Reducing frequency at normal speed and stopping machine:

If  $[T_{\text{heating overload frequency reducing temperature at normal speed}}] \leq T_{\text{inner pipe}} < [T_{\text{heating overload frequency reducing temperature at high speed}}]$ , you should adjust the compressor frequency by reducing 8Hz/90s until the lower limit. After it runs for 90s at the lower limit, if  $T_{\text{heating overload frequency reducing temperature at normal speed}} \leq T_{\text{inner pipe}}$ , then overload protects machine from stopping.

## 3. Reducing frequency at high speed and power turn-off:

If  $[T_{\text{heating overload frequency reducing temperature at high speed}}] \leq T_{\text{inner pipe}} < [T_{\text{heating overload power turn-off temperature}}]$ , you should adjust the compressor frequency by reducing 30Hz/90s until the lower limit. After it runs 90s at the lower limit, if  $T_{\text{heating overload frequency reducing temperature at normal speed}} \leq T_{\text{outer pipe}}$ , then cooling overload protects machine from stopping.

## 4. Power turn-off:

If the  $[T_{\text{heating overload power turn-off temperature}}] \leq T_{\text{inner pipe}}$ , then overload protects machine from stopping. If  $T_{\text{inner pipe}} > T_{\text{heating overload frequency-limited temperature}}$  and the compressor has stopped working for 3 minutes, the machine should operate.

5. If the overload protection power turn-off continuously occurs for six times, it should not be resumed automatically. Press the ON/OFF button to resume if the fault continues. During the process of running, if the running time of compressor exceeds the  $t_{\text{overload protection times zero clearing time}}$ , the times of overload protection power turn-off should be cleared to recount. The mode of stopping the machine or transferring to supply air will clear the trouble instances immediately (if the trouble can not be resumed, transferring mode will not clear it). Protective function for discharge temperature of compressor

## 1. Starting estimation:

After the compressor stops working for 3min, if  $T_{\text{Discharge}} < T_{\text{Discharge limited temperature}}$  (the temperature of hysteresis is 35.6°F), the machine is allowed to start. Otherwise it should not be started, and should be stopped to treat according to the discharge temperature:

The machine should be stopped or transferred to supply air, the trouble instances should be cleared immediately, and the protection times are not counted.

## 2. Frequency limited

If  $[T_{\text{Limited frequency temperature during discharging}}] \leq T_{\text{Discharge}} < [T_{\text{frequency reducing temperature at normal speed during discharging}}]$ , you should limit the frequency raising of compressor.

## 3. Reducing frequency at normal speed and stopping machine:

If  $[T_{\text{frequency reducing temperature at normal speed during discharging}}] \leq T_{\text{Discharge}} < [T_{\text{frequency reducing temperature at high speed during discharging}}]$ , you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit. After it runs 90s at the lower limit, if  $[T_{\text{frequency reducing temperature at normal speed during discharging}}] \leq T_{\text{Discharge}}$ , you should discharge to protect machine from stopping.

## 4. Reducing frequency at high speed and power turn-off:

If  $[T_{\text{frequency reducing temperature at high speed during discharging}}] \leq T_{\text{Discharge}} < [T_{\text{Stop temperature during discharging}}]$ , you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit. After it runs 90s at the lower limit, if  $[T_{\text{frequency reducing temperature at normal speed during discharging}}] \leq T_{\text{Discharge}}$ , you should discharge to protect machine from stopping.

## 5. Power turn-off:

If the  $[T_{\text{Power turn-off temperature during discharging}}] \leq T_{\text{Discharge}}$ , you should discharge to protect machine from stopping. If  $[T_{\text{Discharge}}] < [T_{\text{Limited frequency temperature during discharging}}]$  and the compressor has been stopped for 3 minutes, the machine should be allowed to operate.

6. If the discharging temperature protection of compressor continuously occurs for six times, it should not be resumed automatically. Press the ON/OFF button to resume. During the process of running, if the running time of compressor exceeds the  $t_{\text{Protection times clearing of discharge}}$ , the discharge protection is cleared to recount. Stopped or transferred to supply air mode will clear the trouble instances immediately (if the trouble can not be resumed, mode transferring also will not clear it).

## 7. Frequency limited

If  $[I_{\text{Limited frequency when overcurrent}}] \leq I_{\text{AC Electric current}} < [I_{\text{frequency reducing when overcurrent}}]$ , you should limit the frequency raising of compressor.

## 8. Reducing frequency:

If  $[I_{\text{frequency reducing when overcurrent}}] \leq [I_{\text{AC Electric current}}]$  Power turn-off when overcurrent, you should reduce the compressor frequency till the lower limit or exit the frequency-reducing condition.

## 9. Power turn-off:

If  $[I_{\text{Power turn-off machine when overcurrent}}] \leq [I_{\text{AC Electric current}}]$ , you should carry out the overcurrent stopping protection; If  $I_{\text{AC Electric current}} < [I_{\text{Limited frequency when overcurrent}}]$  and the compressor has been stopped for 3 minutes, the machine should be allowed to operate.

10. If the overcurrent protection continuously occurs for six times, it should not be resumed automatically. Press the ON/OFF button to resume. During the process of running, if the running time of compressor exceeds the  $[t_{\text{Protection times clearing of over current}}]$ , the discharge protection is cleared to recount.



## (6) Voltage sag protection

After starting the compressor, if the time of DC link Voltage sag [ $U_{\text{Sagging protection voltage}}$ ] is measured to be less than  $t$  Voltage sag protection time, the machine should be stopped at once, hand on the voltage sag trouble, reboot automatically after 30 minutes.

## (7) Communication fault

When you have not received any correct signal from the inner machine in 3min, the machine will stop for communication fault. When you have not received any correct signal from driver IC (aim to the controller for the separating of main control IC and driver IC), and the machine will stop for communication fault. If the communication is resumed, the machine will operate.

## (8) Module protection

Testing the module protective signal immediately after started, once the module protective signal is measured, stop the machine with module protection immediately. If the module protection is resumed, the machine will be allowed to operate. If the module protection continuously occurs three times, it should not be resumed automatically. Press the ON/OFF button to resume. If the running time of compressor exceeds the [ $t_{\text{Protection times clearing of module}}$ ], the module protection is cleared to recount.

## (9) Module overheating protection

### 1. Starting estimation:

After the compressor stops working for 3min, if  $T_{\text{Module}} < [T_{\text{Module frequency limited temperature}}]$  (the temperature of hysteresis is 35.6°F), the machine is allowed to start, otherwise it should not be started, and should be stopped to treat according to the module overheating protection: The machine should be stopped or transferred to supply air, the trouble instances should be cleared immediately, and the protection times are not counted.

### 2. Frequency limited

If  $[T_{\text{Limited frequency temperature of module}}] \leq T_{\text{Module}} < [T_{\text{frequency reducing temperature at normal speed of module}}]$ , you should limit the frequency raising of compressor.

### 3. Reducing frequency at normal speed and power turn-off:

If  $[T_{\text{frequency reducing temperature at normal speed of module}}] \leq T_{\text{Module}} < [T_{\text{frequency reducing temperature at high speed of module}}]$ , you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit; After it was running 90s at the lower limit, if  $[T_{\text{frequency reducing temperature at normal speed of module}}] \leq T_{\text{Module}}$ , you should stop the machine for module overheating protection.

### 4. Reducing frequency at high speed and power turn-off:

If  $[T_{\text{frequency reducing temperature at high speed of module}}] \leq T_{\text{Module}} < [T_{\text{Power turn-off temperature of module}}]$  you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit; After it was running 90s at the lower limit, if  $[T_{\text{frequency reducing temperature at normal speed of module}}] \leq T_{\text{Module}}$ , you should stop the machine for module overheating protection.

### 5. Power turn-off:

If the  $[T_{\text{Power turn-off temperature of module}}] \leq T_{\text{Module}}$ , you should stop the machine for module overheating protection. If  $T_{\text{Module}} < [T_{\text{Limited frequency temperature of module}}]$  and the compressor has been stopped for 3 minutes, the machine should operate.

6. If protection continuously occurs for six times, it should not be resumed automatically, and you should press the ON/OFF button to resume. During the process of running, if the running time of compressor exceeds the [ $t_{\text{Protection times clearing of module}}$ ], the discharge protection is cleared to recount. Stopped or transferred to supply air mode will clear the trouble instances immediately (if the trouble can not be resumed, mode transferring also will not clear it).

## (10) Compressor overloads protection

If you measure the compressor overload switch action in 3s, the compressor should be stopped for overloading. The machine should be allowed to operate after overload protection was measured to resume. If the overloading protection continuously occurs for three times, it should not be resumed automatically, and you should press the ON/OFF button to resume. The protection times of compressor is allowed to clear after the compressor run [ $t_{\text{Protection times clearing of compressor overloading}}$ ] 30 minutes.

## (11) Phase current overcurrent protection of compressor

During the running process of compressor, you could measure the phase current of the compressor, and control it according to the following steps:

### 1. Frequency limited

If  $[I_{\text{Limited frequency phase current}}] \leq [I_{\text{Phase current T frequency reducing phase current}}]$ , you should limit the frequency raising of compressor.

### 2. Reducing Frequency

If  $[I_{\text{Frequency Reducing Phase Current}}] \leq I_{\text{Phase Current}} < [I_{\text{Power Turn-Off Phase Current}}]$ , the compressor should continue to reduce frequency till the lowest frequency limit or out of the condition of reducing frequency.

### 3. Power turn-off

If  $[I_{\text{Phase Current}}] \geq [I_{\text{Power Turn-Off Phase Current}}]$ , the compressor phase current stops working for overcurrent protection; if  $[I_{\text{Phase Current}}] \leq [I_{\text{Frequency Reducing Phase Current}}]$ , and the compressor stops working for 3 min, the machine will operate.

4. If the overcurrent protection of compressor phase current continuously occurs for six times, it should not be resumed automatically. Press the ON/OFF button to resume. During the process of running, if the running time of compressor exceeds the [ $t_{\text{Clearing Time of Compressor Phase Current Times}}$ ], the overcurrent protection is cleared to recount.

**(12) Start-up Failure Protection for Compressor**

Stop the compressor after its start-up fails, restart it after 20s if the fault doesn't show, and if they are all failing for the successive starts three times, report it as Start-up Failure, and then restart it after 3min. When it still doesn't operate after carrying out the above process five times, it is available if press ON/OFF. And the compressor should be cleared the times after it runs 2min.

**(13) Out-of-Step Protection for Compressor**

The out-of-step protection signal should be detected immediately after starting up compressor, and once finding the out-of-step protection signal, the out-of-step protection should be stopped. if it can run for lasting power turn-off 3min, the machine should be allowed to operate. If it still can't run automatically when the out-of-step protection for compressor happens to stop working for six times in succession, press ON/OFF to operate. And if the running time is more than 10min, the power turn-off times for out-of-step protection should be cleared and recounted.

**(14) Voltage Abnormality Protection for DC Bus**

To detect voltage abnormality protection for dc bus after completing the pre-charge:

**1.Over-High Voltage Protection for DC Bus:**

If it found the DCbus voltage  $U_{DC} > [UDC_{Jiekuangchun Protection}]$ , turn off PFC and stop the compressor at once. It should show the DC over-high voltage failure; it should clear out the failure when the voltage dropped to  $U_{DC} < [UDC_{Jiekuangchun Recovery}]$  and the compressor stopped for 3min.

**2.Over-Low Voltage Protection for DC Bus:**

If it found the DC bus voltage  $U_{DC} < [U_{DC Wantuochun Protection}]$ , turn off PFC and stop the compressor at once. It should show the DC over-low voltage; and it should clear out the failure when the voltage raised to  $U_{DC} > [U_{DC Wantuochun Recovery}]$  and the compressor stopped for 3min.

**3.To detect voltage abnormality protect for DC bus when getting electricity:**

If it found the DC bus voltage  $U_{DC} > [U_{DC} \text{---Over-High Voltage}]$ , turn off the relay at once, and shows voltage abnormality failure for DC Bus. And the failure can't recover except to break off and get the electricity.

**(15) Abnormality Protection for 4-way Valve**

Under the model of heating operation in good condition: the compressor is detected  $[T_{Inner Tube} < (T_{Inner Ring} - T_{Abnormity Temperature Difference For Four-Way Valve Reversion})]$ , during the running. It should be regarded as 4-way valve reversion abnormality. And then it can run if stopping the reversion

abnormality protection for 4-way valve 3min. If it still can't run when the reversion abnormality protection for 4-way valve happens to stop working for three times in succession, it is available if pressing ON/OFF.

Attention: The protection should be shielded during the testing mode and defrosting process, and it should clear out the failure and its times immediately when turning off or delivering air / cooling / dehumidifying mode conversed (the inverted mode doesn't clear out the failure when it can't recover to operate).

**(16) PFC Protection**

1. After start-up the PFC, it should detect the protection signal of PFC immediately; under the condition of PFC protection, it should turn off PFC and compressor at one time.
2. It shows the failure is cleared out if PFC Protection stopped working 3min and recovers to run automatically.
3. If it still can't run when it occurs PFC protection for three times in succession, it is available if presses ON/OFF; and clear the PFC Protection times when starting up PFC for 10min.

**(17) Failure Detection for Sensor**

1. Outdoor Ambient Sensor: Detect the failure of sensor at all times.
2. Outdoor Tube Sensor: You should not detect the failure of outdoor tube sensor within 10 minutes of heating operation compressor except the defrosting, and you could detect it at another time.
3. Outdoor Exhaust Sensor:
  - (a) The compressor only detects the sensor failure after it runs 3min in normal mode;
  - (b) It should detect the exhaust sensor failure immediately in the testing mode.
4. Module Temperature Sensor:
  - (a) Short-Circuit Detection: The compressor should be detected immediately when the module temperature sensor occurs short-circuits.
  - (b) Open-Circuit Detection: The compressor should be detected on open-circuit when it runs 3min (it doesn't need 30s avoiding the module over-heated).
  - (c) Detect the sensor failure at all times in the testing mode.
5. Disposal for Sensor Protection
  - (1) When the short-circuit of sensor is detected within 30s, it is regarded as the temperature of sensor over-high (or infinitely high), and now according to the over-high sensor, the machine should carry out the corresponding protection to stop working, and show the corresponding temperature shutdown protection and sensor failure at the same time. (For example: the compressor stops immediately when the outdoor tube sensor short-circuits, and the machine shows the overload protection and outdoor tube sensor failure)
  - (2) When the open-circuit of sensor is detected within 30s, the protection shall be stopped and it shall show the corresponding sensor failure.



#### 6. Electric Heating Function of Chassis

- (1) When Toutdoor amb.  $\leq 32^{\circ}\text{F}$  , the electric heating of chassis will operate;
- (2) When Toutdoor amb.  $> 35.6^{\circ}\text{F}$  , the electric heating of chassis will stop operation;
- (3) When  $32^{\circ}\text{F} < \text{Toutdoor amb.} \leq 35.6^{\circ}\text{F}$ , the electric heating of chassis will keep original status.

#### 7. Electric Heating Function of Compressor

- (1) When Toutdoor amb.  $\leq 23^{\circ}\text{F}$  , compressor stops operation, while the electric heating of compressor starts operation;
- (2) When Toutdoor amb.  $> 28.4^{\circ}\text{F}$  , the electric heating of compressor stops operation;
- (3) When  $23^{\circ}\text{F} < \text{Toutdoor amb.} \leq 28.4^{\circ}\text{F}$ , the electric heating of compressor will keep original status.

## 7. Wired Zone Controller

If the product is equipped with a wired zone controller, please refer to the following descriptions of wired zone controller.

### 1. Displaying Part

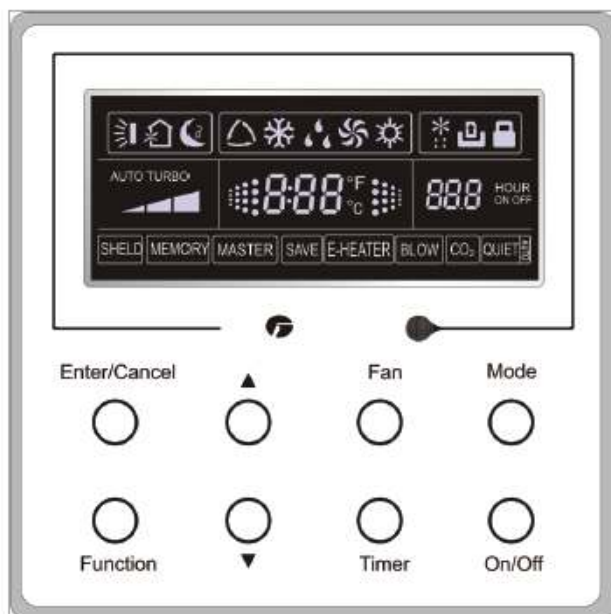


Fig1.1.1 Outline of wired zone controller

### 1.1 LCD Display of Wired Zone Controller

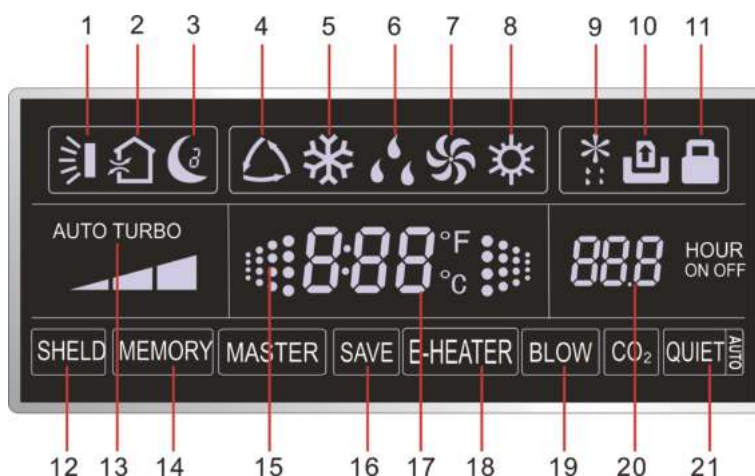






Fig.1.1.2 LCD display

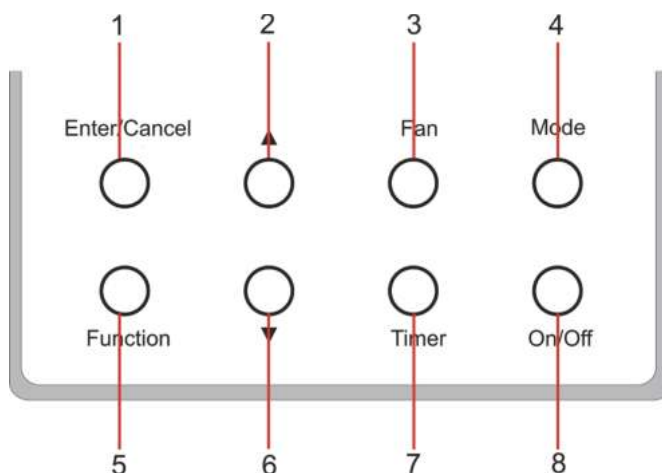
### 1.2 Description of LCD Display

No.	Symbols	Description
1		Swing function
2		Air exchange function (this function is currently unavailable for this unit)
3		Sleep function (Only sleep 1)
4		Each kind of running mode of indoor unit (auto mode)
5		Cooling mode
6		Dry mode
7		Fan mode
8		Heating mode
9		Defrosting function for the outdoor unit
10		Gate-control function (this function is currently unavailable for this unit)



11		Lock function
12	SHIELD	Shield functions (Button operation, temperature setting, On/Off operation, Mode setting are disabled by the remote monitoring system.)
13	TURBO	Turbo function state
14	MEMORY	Memory function (The indoor unit resumes the original setting state after power failure and then power recovery)
15		It blinks under on state of the unit without operation of any button
16	SAVE	Energy-saving function
17		Ambient/setting temperature value
18	E-HEATER	Electric auxiliary heating function (this function is yet unavailable for this unit)
19	BLOW	Blow function
20		Timing value
21	QUIET	Quiet function (two types: quiet and auto quiet) (this function is yet unavailable for this unit).

## 2 Buttons

### 2.1 Layout of Buttons



### 2.2 Functions of Buttons

No.	Name	Function
1	Enter/Cancel	Function selection and cancellation.
2	▲	① Running temperature setting of the indoor unit, range: 16~30°C.
6	▼	② Timer setting, range: 0.5-24 hr.
3	Fan	Setting of the high/middle/low/auto fan speed.
4	Mode	Setting of the Cooling/Heating/Fan/Dry/Auto mode of the indoor unit.
6	Function	Switchover among the functions of Turbo/Save/E-heater/Blow etc.
7	Timer	Timer setting.
8	On/Off	Turn on/off the indoor unit.
4+2	▲+Mode	Press them for 5s under off state of the unit to enter/cancel the Memory function (If memory is set, indoor unit after power failure and then power recovery will resume the original setting state. If not, the indoor unit is defaulted to be off after power recovery. Memory off is default before delivery.).
3+6	Fan+▼	By pressing them at the same time under off state of the unit,  will be displayed on the wired controller for the cooling only unit, while  will be displayed on the wired controller for the cooling and heating unit.
2+6	▲+▼	Upon startup of the unit without malfunction or under off state of the unit, press them at the same time for 5s to enter the lock state, in which case, any other buttons won't respond the press. Repress them for 5s to quit this state.

### 3 Operation Instructions

#### 3.1 On/Off

Press On/Off to turn on the unit and turn it off by another press.

Note: The state shown in Fig.3.1.1 indicates the "Off" state of the unit after power on. The state shown in Fig.3.1.2 indicates the "On" state of the unit after power on.



Fig.3.1.1 "Off" State

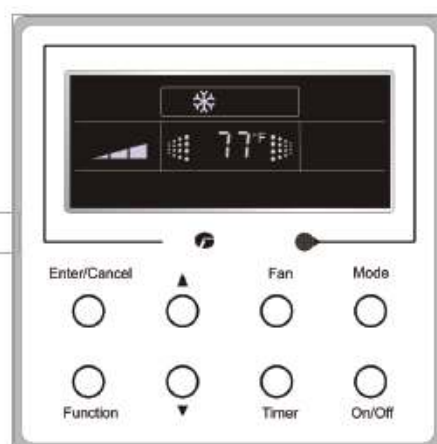
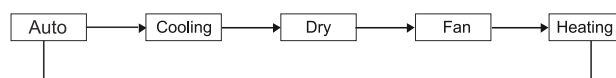


Fig.3.1.2 "On" State

#### 3.2 Mode Setting

Under ON state of the unit, press the Mode to switch the operation modes as the following sequence: Auto–Cooling–Dry–Fan–Heating.



#### 3.3 Temperature Setting

Press ▲ or ▼ to increase/decrease the preset temperature. If pressing either of them continuously, the temperature will be increased or decreased by 1°C every 0.5s, as shown in Fig.3.3.1.

In the Cooling, Dry, Fan or Heating mode, the temperature setting range is 16~30°C(61~86°F).

In the Auto mode, the setting temperature is unadjustable.

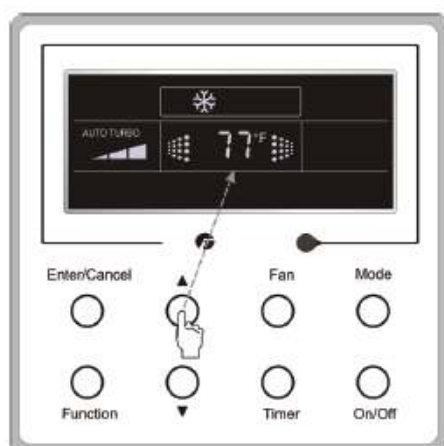


Fig.3.3.1

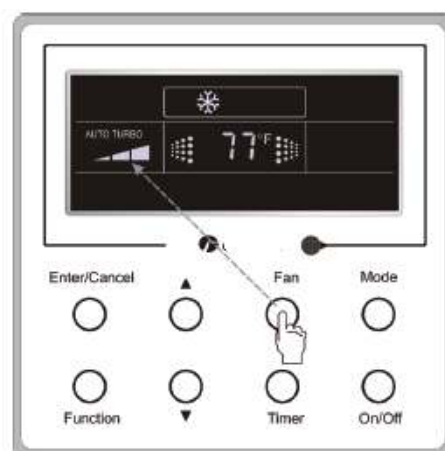
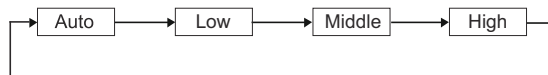


Fig.3.4.1

#### 3.4 Fan Setting

Under the "On" state of the unit, press Fan and then fan speed of the indoor unit will change circularly as shown in Fig.3.4.1.



#### 3.5 Timer Setting

Under on-state of the unit, Press Timer button to set timer off of the unit. Under off-state of the unit, press Timer button to set timer on of the unit in the same way.

• Timer on setting:

Under off-state of the unit without timer setting, if Timer button is pressed, LCD will display xx.Hour, with ON blinking. In this case, press ▲ or ▼ button to adjust timer on and then press Timer to confirm.

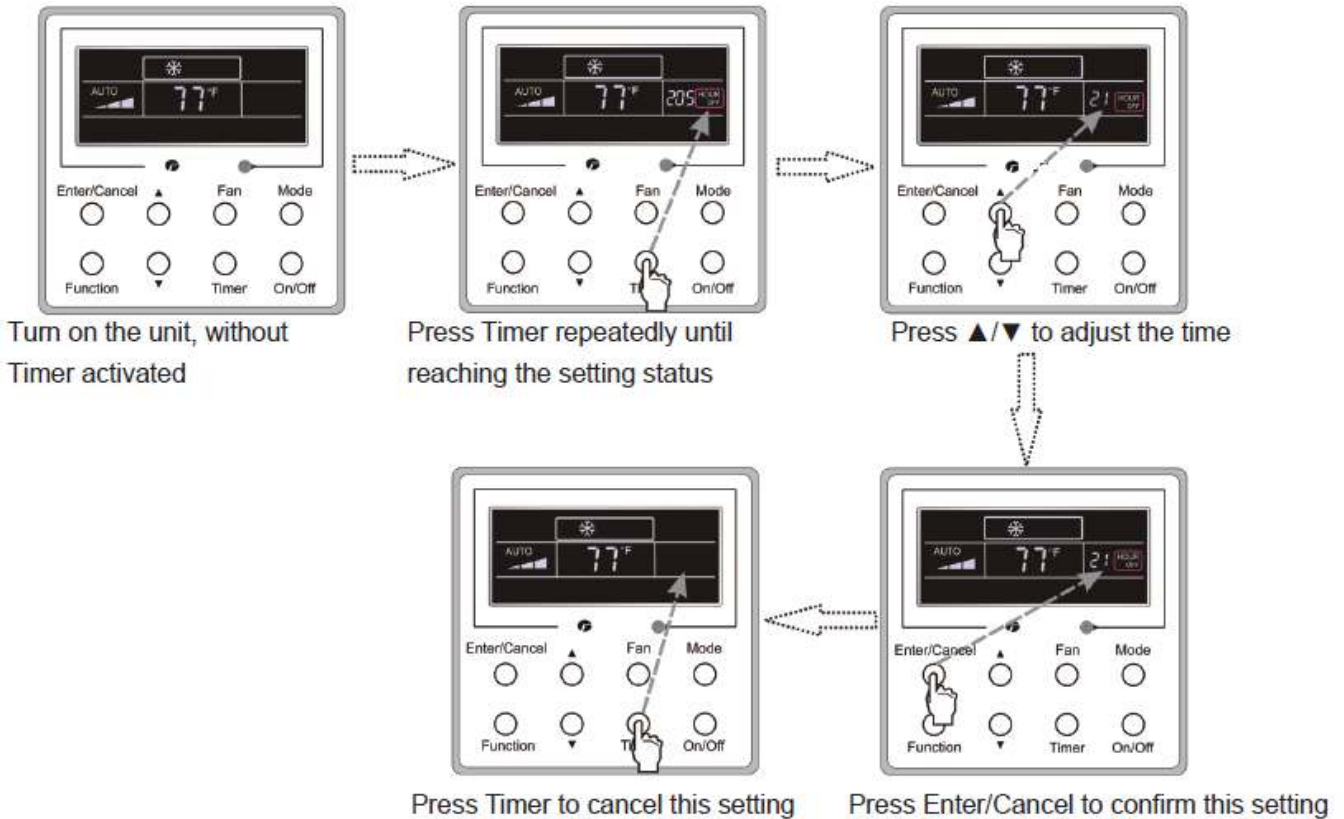
• Timer off setting:

Under on-state of the unit without timer setting, if Timer button is pressed, LCD will display xx. Hour, with OFF blinking. In this case, press ▲ or ▼ button to adjust timer on and then press Timer to confirm.

• Cancel timer:

After setting of timer, if Timer button is pressed, LCD won't display xx. Hour so that timer setting is canceled.

Timer off setting under the "On" state of the unit is shown here in Fig.3.5.1.



Timer on setting under the "Off" state of the unit is shown in Fig.3.5.2.

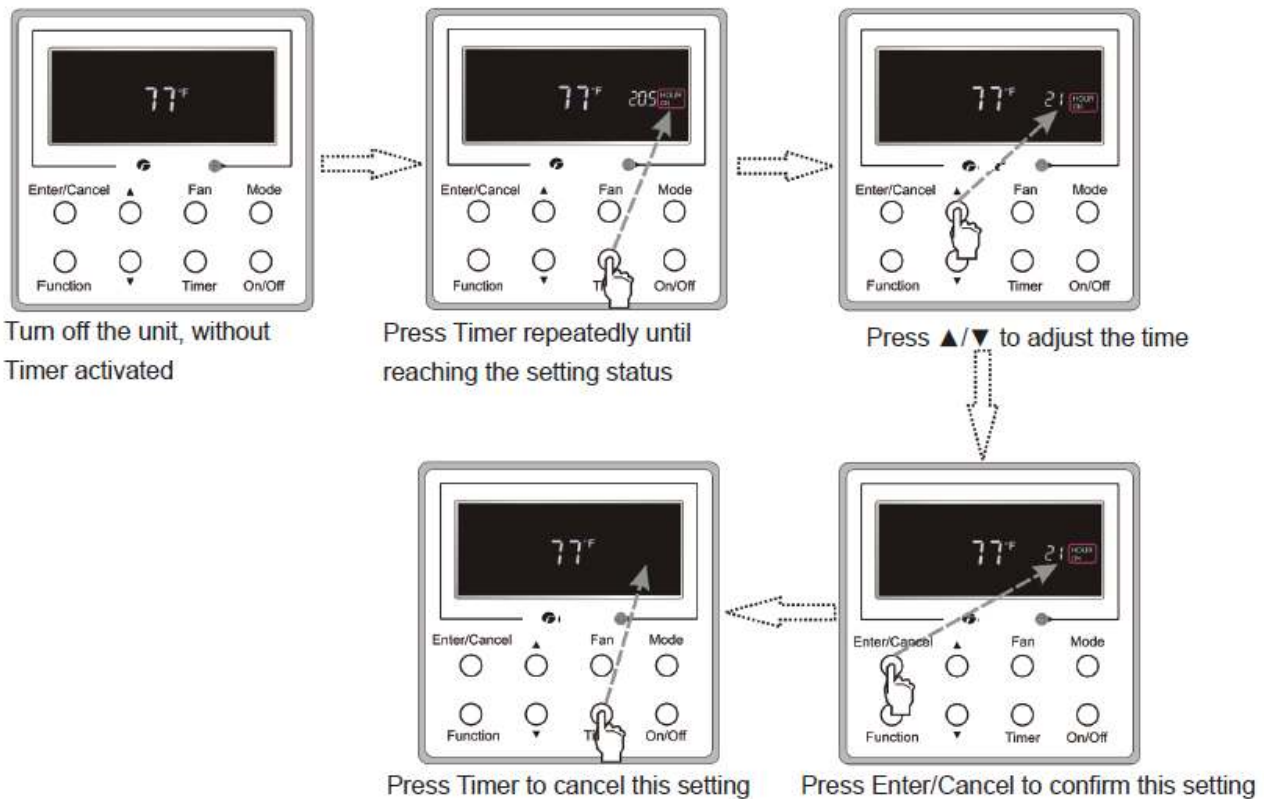




Fig.3.5.2 Timer on Setting under the "Off" State of the Unit

Timer range: 0.5-24hr. Every press of ▲ or ▼ will make the set time increased or decreased by 0.5hr. If either of them is pressed continuously, the set time will increase/ decrease by 0.5hr every 0.5s.

### 3.6 Swing Setting

**Swing On:** Press Function under on state of the unit to activate the swing function. In this case,  will blink. After that, press Enter/Cancel to make a confirmation.

**Swing Off:** When the Swing function is on, press Function to enter the Swing setting interface, with  blinking. After that, press Enter/Cancel to cancel this function. Swing setting is shown below in Fig.3.6.1.

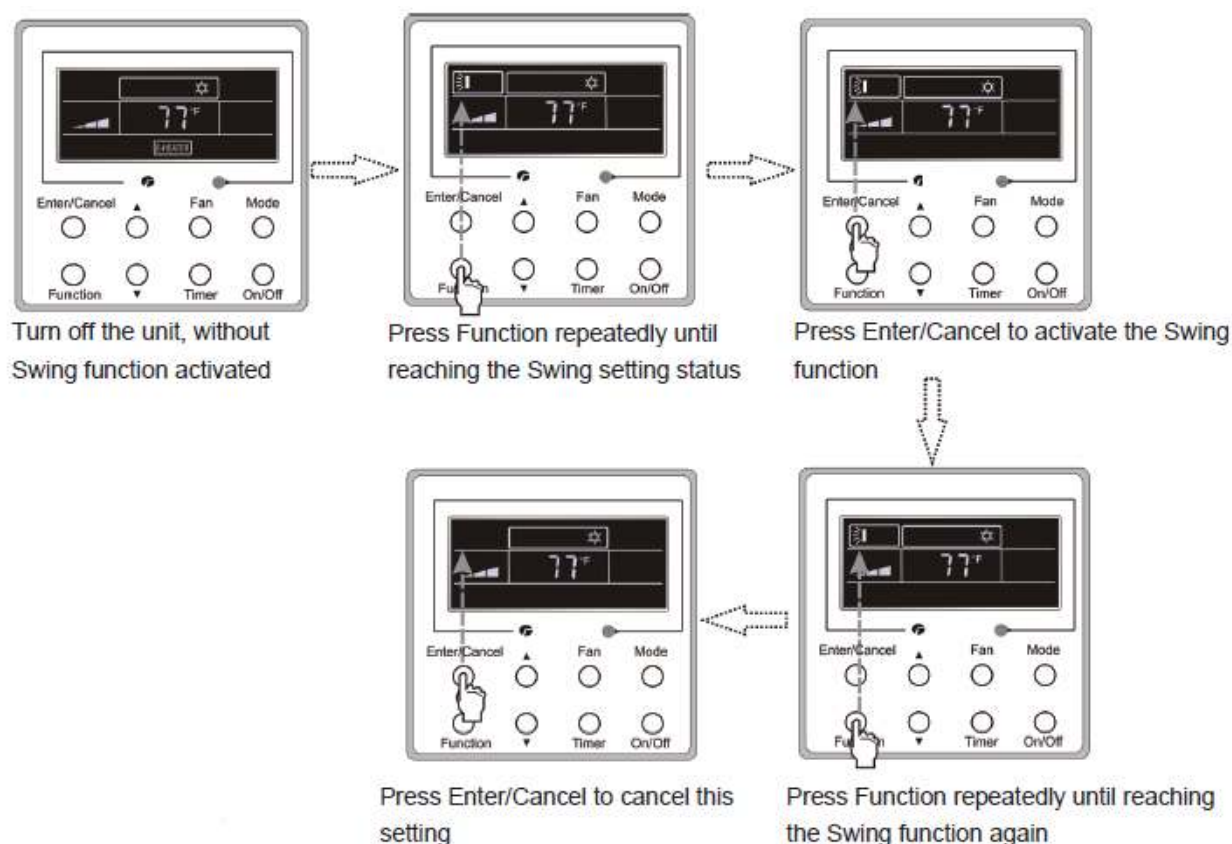


Fig. 3.6.1 Swing Setting

#### Notes:

(1) Sleep, Turbo or Blow setting is the same as the Swing setting.

(2) After the setting has been done, it has to press the key "Enter/Cancel" to back to the setting status or quit automatically five seconds later.

### 3.7 Sleep Setting

**Sleep on:** Press Function under the On state of the unit till the unit enters the Sleep setting state. After that, press Enter/Cancel to confirm this setting.

**Sleep off:** When the Sleep function is activated, press Function to enter the Sleep setting status. After that, press Enter/Cancel to cancel this function.

In the Cooling or Dry mode, the temperature will increase by 1°C(1~2°F) after the unit runs under Sleep1 for 1hr and 1°C(1~2°F) after another 1hr. After that, the unit will run at this temperature.

In the Heating mode, the temperature will decrease by 1°C(1~2°F) after the unit runs under Sleep 1 for 1hr and 1°C(1~2°F) after another 1hr. After that, the unit will run at this temperature.



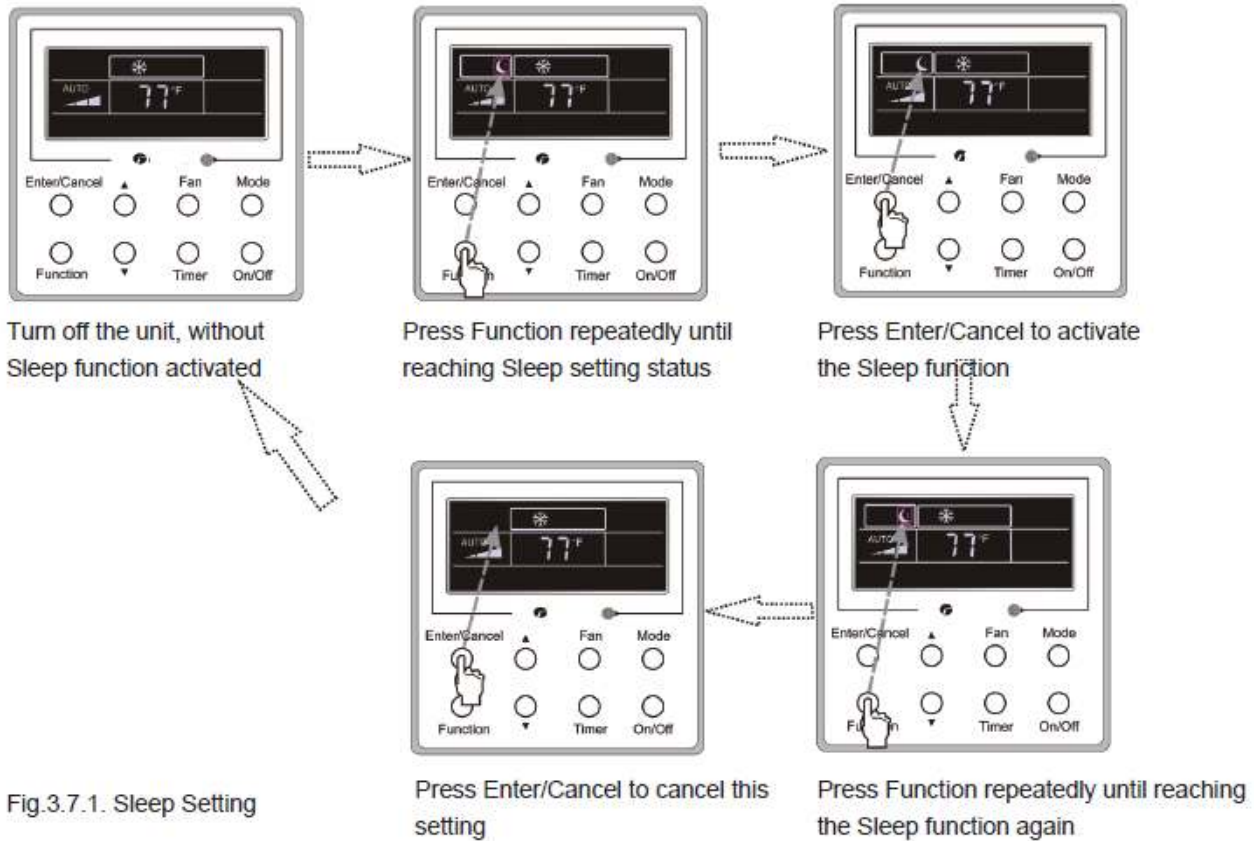


Fig.3.7.1. Sleep Setting

### 3.8 Turbo Setting

**Turbo function:** The unit at the high fan speed can realize quick cooling or heating so that the room temperature can quickly approach the setting value.

In the Cooling or Heating mode, press Function till the unit enters the Turbo setting status and then press Enter/Cancel to confirm the setting. When the Turbo function is activated, press Function to enter the Turbo setting status and then press Enter/Cancel to cancel this function.

Turbo function setting is as shown below in Fig.3.8.1.

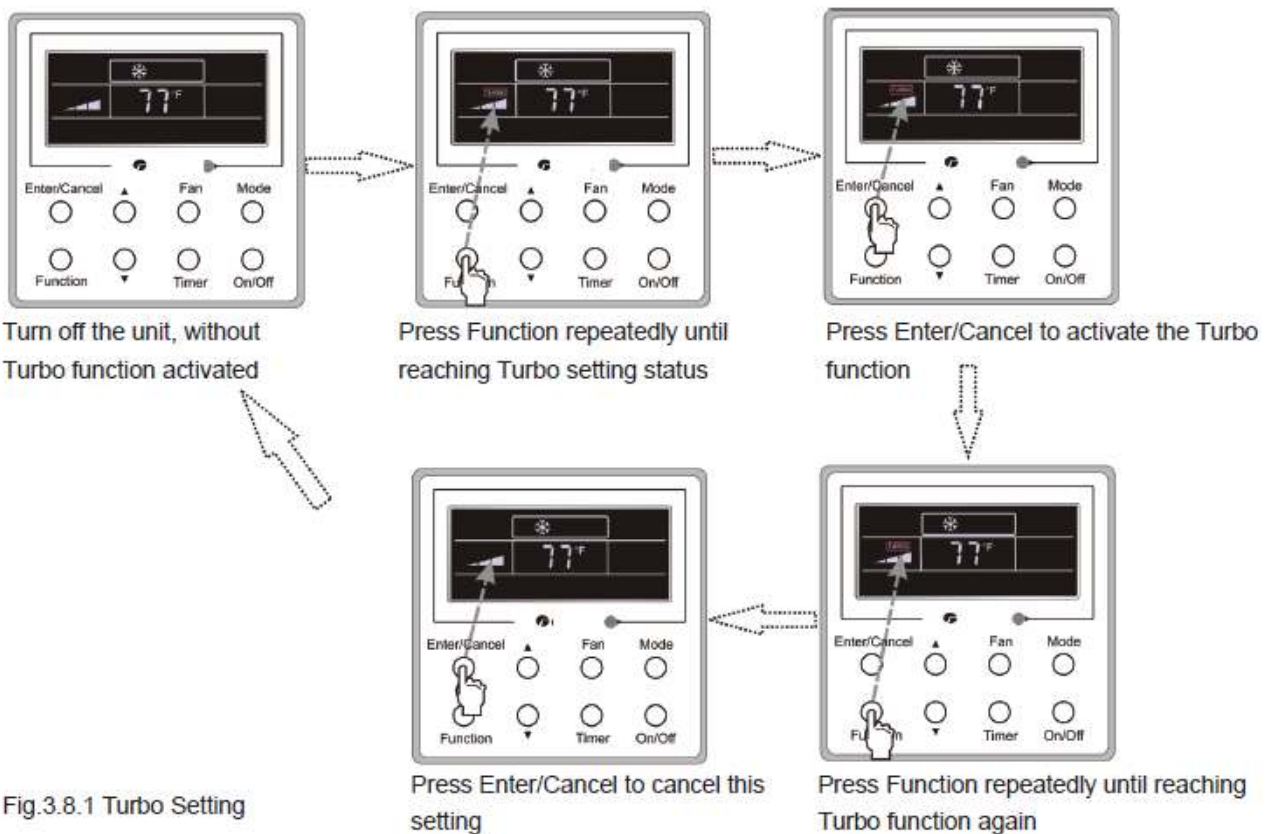
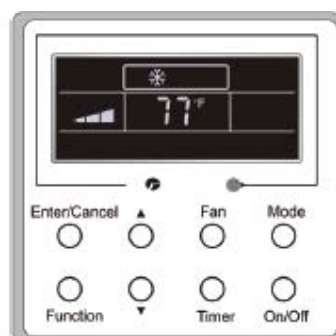


Fig.3.8.1 Turbo Setting

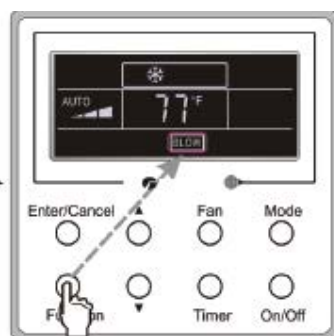


### 3.9 Blow Setting

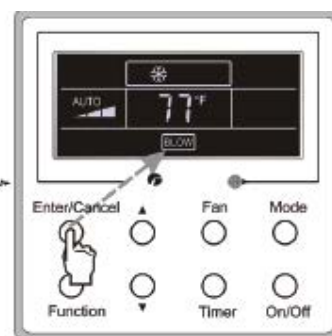
Blow function: After the unit is turned off, the water in evaporator of indoor unit will be automatically evaporated to avoid mildew. In the Cooling or Dry mode, press Function till the unit enters the Blow setting status and then press Enter/Cancel to activate this function. When the Blow function is activated, press Function to the Blow setting status and then press Enter/Cancel to cancel this function. Blow function setting is as shown below.



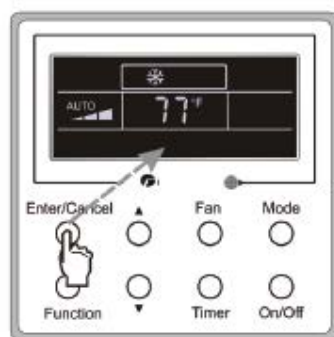
Turn off the unit, without Blow function activated



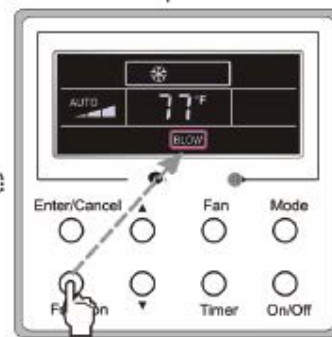
Press Function repeatedly until reaching Blow setting status



Press Enter/Cancel to activate the Blow function



Press Enter/Cancel to cancel this setting




Press Function repeatedly until reaching Blow setting function again

Notes:

- (1)When the Blow function is activated, if turning off the unit by pressing On/Off or by the remote controller, the indoor fan will run at the low fan speed for 2 min, with “BLOW” displayed on the LCD. While, if the Blow function is deactivated, the indoor fan will be turned off directly.
- (2)Blow function is unavailable in the Fan or Heating mode.

3.10 Other Functions

a. Lock

Upon startup of the unit without malfunction or under the “Off” state of the unit, press ▲ and ▼ at the same time for 5s till the wired controller enters the Lock function. In this case, LCD displays . After that, repress these two buttons at the same time for 5s to quit this function. Under the Lock state, any other button press won't get any response.

b. Memory

Memory switchover: Under the “Off” state of the unit, press Mode and ▲ at the same time for 5s to switch memory states between memory on and memory off. When this function is activated, Memory will be displayed. If this function is not set, the unit will be under the “Off” state after power failure and then power recovery.

Memory recovery: If this function has been set for the wired controller, the wired controller after power failure will resume its original running state upon power recovery. Memory contents: On/Off, Mode, set temperature, set fan speed and Lock function.

4. Installation and Dismantlement

4.1 Connection of the Signal Line of the Wired Controller

- Open the cover of the electric control box of the indoor unit.
- Let the single line of the wired zone controller through the rubber ring.
- Connect the signal line of the wired zone controller to the 4-pin socket of the indoor unit PCB.
- Tighten the signal wire with ties.
- The communication distance between the mainboard and the wired zone controller can be up to 20 meters (the standard distance is 8 meters).

4.2 Installation of the Wired Zone Controller

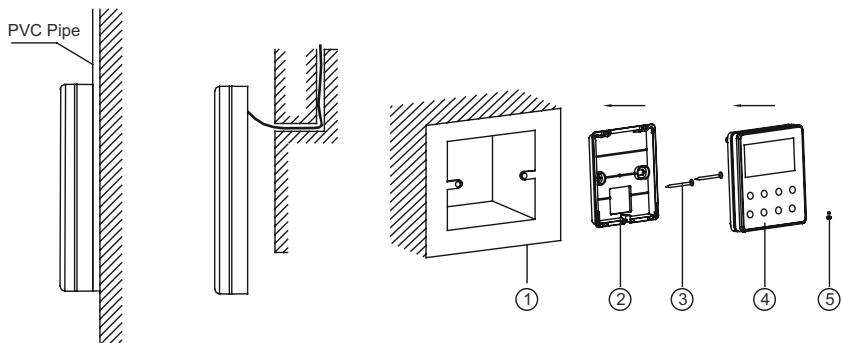


Fig.4.1 Accessories for the Installation of the Wired Zone Controller

No.	1	2	3	4	5
Name	Socket box embedded in the wall	Soleplate of the Wired Zone Controller	Screw M4X25	Front Panel of the Wired Zone Controller	Screw ST 2.9X6

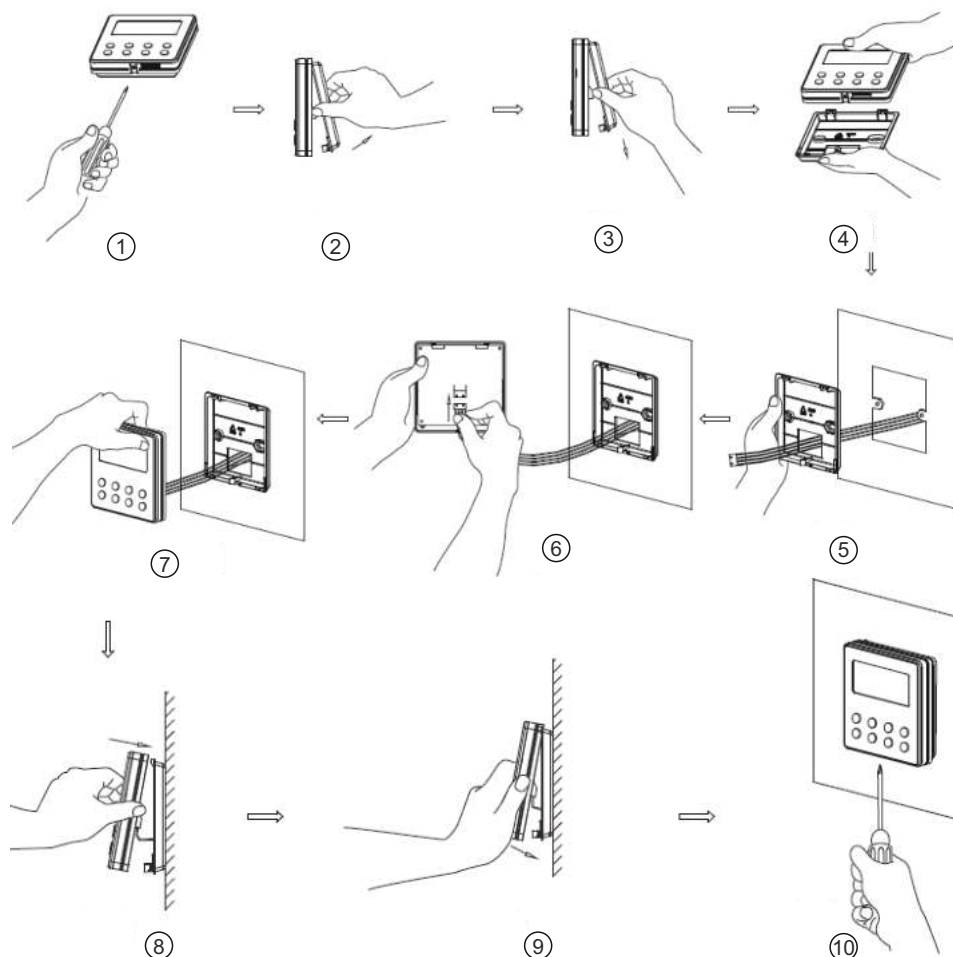


Fig.4.2

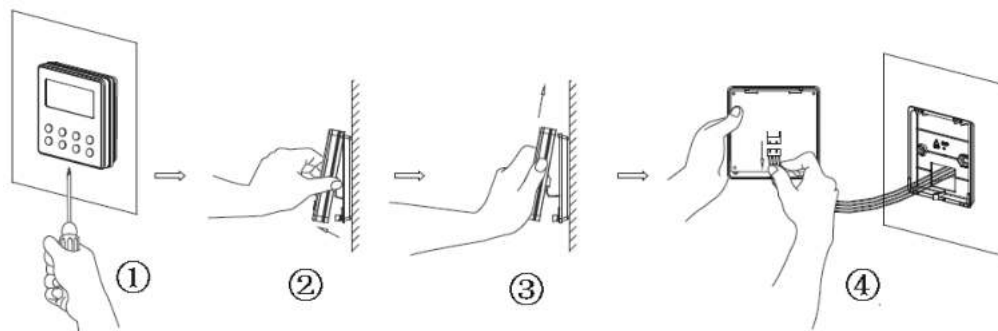
Fig.4.2 shows the installation steps of the wired controller, but there are some issues that need your attention.

- (1) Prior to the installation, please firstly cut off the power supply of the wire buried in the installation hole, that is, no operation is allowed with electricity during the whole installation.
- (2) Pull out the four-core twisted pair line from the installation holes and then let it go through the rectangular hole behind the soleplate of the wired controller.
- (3) Stick the soleplate of the wire controller to the wall over the installation hole and then fix it with screws M4X25.
- (4) Insert the four-core twisted pair line into the slot of the wired zone controller and then buckle the front panel and the soleplate of the wired zone controller together.
- (5) Finally, fix the front panel and the soleplate of the wired zone controller tightly with screws ST2.9X6.

#### ⚠ CAUTION!

Please pay special attention to the followings during the connection to avoid the malfunction of the air conditioning unit due to electromagnetic interference.

- (1) Separate the signal and communication lines of the wired controller from the power cord and connection lines between the indoor and outdoor unit, with a minimum interval of 20cm, otherwise the communication of the unit will probably work abnormally.
- (2) If the air conditioning unit is installed where vulnerable to electromagnetic interference, then the signal and communication lines of the wired zone controller must be shielded communication cable.



## 5 Errors Display

If there is an error occurring during the operation of the system, the error code will be displayed on the LCD, as show in Fig.5.1. If multiple errors occur at the same time, their codes will be displayed sequentially.

Note: In event of any error, please turn off the unit and contact a certified technician.

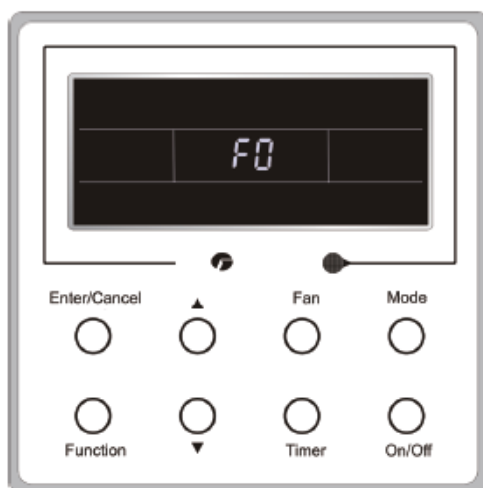


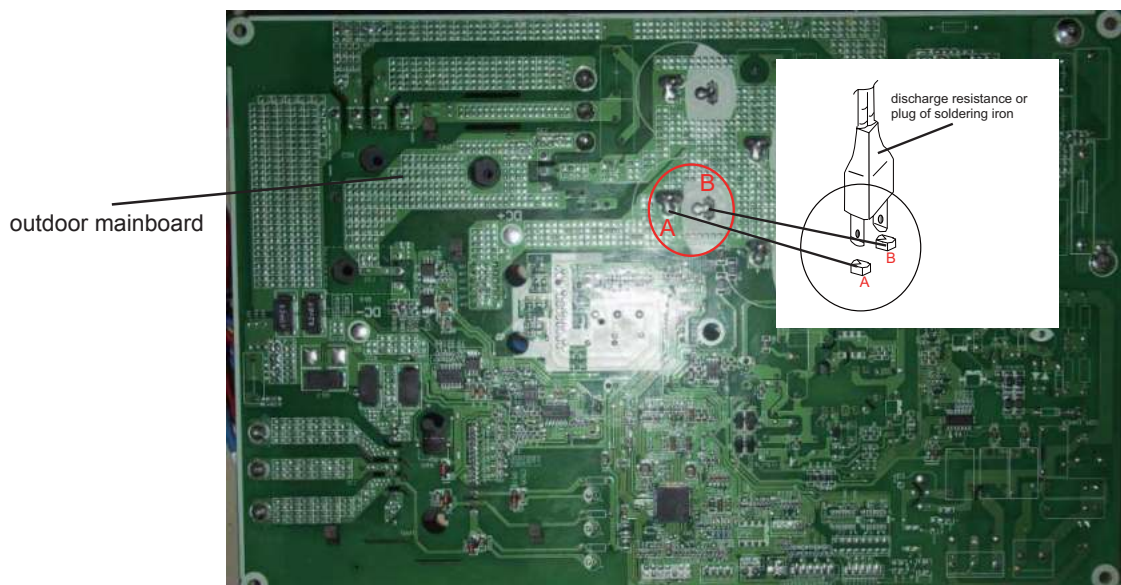
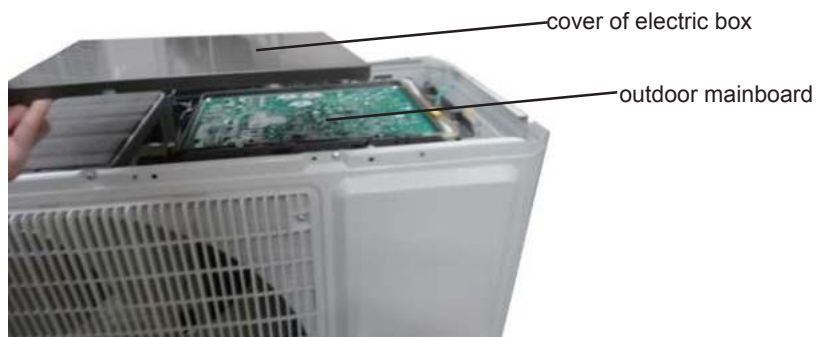
Fig.5.1

## 8. Maintenance

### 8.1 Precautions before Maintenance

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

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



## 8.2 Error Code List

NO.	Name of malfunction	Indoor unit displaying method				Outdoor unit display(LEDs have 3 status)□OFF ■ON ☆ Blinks				AC status	Malfunctions
		Double 8 code display	Indicator display(LED blinks 0.5s-ON/0.5s-OFF)			D40/D5	D41/D6	D42/D16	D43/D30		
			Running LED	Cooling LED	Heating LED						
1	System high pressure protection	E1	3s off blink once							cooling, dehumidifying, except the indoor fan motor is running, others will stop to run; heating; all stop running.	High pressure of system,might be: 1.Refrigerant is too much; 2.Poor heating exchanging for units(including heat exchanger is dirty and unit heating radiating ambient is poor); 3.Ambient temp.is too high.
2	Anti-freezing protection	E2	3s off blink twice			■	□	■	□	cooling,dehumidifying,compressor,outdoor fan motor will stop running,indoor fan motor will keep running.	1.Poor indoor unit air returning; 2.Indoor fan motor rotating speed abnormal; 3.Evaporator is dirty;
3	Compressor air exhaust high temp. protection	E4	3s off blink four times			■	□	■	☆	cooling,dehumidifying,compressor,outdoor fan motor will stop running,indoor fan motor works. heating:all stop running.	Pls refer to trouble shoot (air exhaust protection,overload)
4	AC overload protection	E5	Off 3s blink 5 times			□	■	☆	□	Cooling,dehumidifying,compressor,outdoor fan motor will stop,indoor fan will work. heating:all will stop	1.power supply is stable,fluctuation is too much 2.Power supply is too low,overload is too much.
5	Indoor and outdoor units communication malfunction	E6	Off 3s blink 6 times			□	□	□	☆	Cooling,compressor will stop,indoor fan motor works,Heating:all will stop	Please refer to troubleshooting
6	Anti-high temp. protection	E8	Off 3s blink 8 times			■	□	■	■	Cooling,compressor will stop,indoor fan motor works,Heating:all will stop	Please refer to troubleshooting
7	Indoor unit motor no feedback	H6	Off 3s blink 11 times							Whole unit will stop to run	1.Poor insert for GPF 2.Indoor control board AP1 malfunction 3.Indoor motor M1 malfunction
8	Jump wire cap malfunction protection	C5	Off 3s blink 15 times							Whole unit will stop to run	Indoor control board AP1 jump cap poor connected,please reinsert or replace the jump cap.
9	Indoor ambient sensor open circuit,short circuit	F1		Off 3s blink once						Cooling,dehumidifying;indoor fan motor is runing,other overloads will stop;Heating,whole unit will stop to run.	1.Room temp.sensor is not connected with the control panel AP1 2.Room temp.sensor is damaged
10	Indoor evaporator sensor circuit open,short circuit	F2		Off 3s blink twice						Cooling,dehumidifying;indoor fan motor runing,other overload will stop;Heating,whole unit will stop.	1,Tube temp.sensor is not connected with the control panel AP1 2.Tube tmeq.sensor is damaged
11	Outdoor ambient sensor circuit open,circuit short	F3		Off 3s blinks three times		□	□	☆	■	Cooling,dehumidifying;compressor will stop,indoor fan motor will work.Heat:all will stop	Outdoorroom temp.sensor hasn't connected well,or damaged,please refer to the sensor resistance value for checking.
12	Outdoor condenser sensor open circuit,short circuit	F4		Off 3s blinks 4 times		□	□	☆	□	Cooling,dehumidifying;compressor will stop,indoor fan motor will work.Heat:all will stop	Outdoorroom temp.sensor hasn't connected well,or damaged,please refer to the sensor resistance value for checking.
13	Malfunction of zero-cross direction	U8	Off 3s and blink 17 times							The complete unit stops	1.Power supply is abnormal 2.Detection circuit of indoor control mainboard is abnormal

14	Outdoor air exhaust sensor open circuit, short circuit	F5		Off 3s blinks 5 times	□	□	☆	☆	Cooling, dehumidifying; after running for 3mins later, the compressor will stop to run, indoor fan motor will start to run. heating: after run 3 mins later, all will stop to run.	1.Exhaust temp sensor hasn't connected well, or damaged, please refer to the sensor resistance value for checking. 2.Sensor head hasn't insert into the copper tube.
15	Overload limit/ descending frequency	F6		Off 3s blinks 6 times	■	□	☆	☆	Overload normal operation, compressor is running, frequency descending	Please refer to troubleshooting
16	Over current need frequency descending	F8		Off 3s blinks 8 times	■	■	□	■	Overload normal operation, compressor is running, frequency descending	1.Input power supply is too low 2.System voltage is too high, over is too much
17	Air exhaust over high need frequency descending	F9		Off 3s blinks 9 times	■	■	□	□	Overload normal operation, compressor is running, frequency descending	1.Overload is too much, ambient temp. is too high 2.Refrigerant is short 3.Electric expansion malfunction
18	DC generatrix voltage is too high	PH		Off 3s blink 11 times	□	■	□	☆	Cooling, dehumidifying, compressor not running, fan motor works. Heating: all will stop	1. Testing wire terminal L and N position. If higher than 265VAC, please cut off the power supply and restart until back to normal 2.If input voltage is normal, testing the voltage of electrolytic capacitor on AP1 after turn on the unit. There may be some problem and replace the AP1 if the electrolytic capacitor voltage range at 200-280V
19	Complete unit current detection malfunction	U5		Off 3s and blink 13 times	□	■	☆	■	Cooling, dehumidifying; compressor stops running, indoor fan motor works. Heating: all will stop running	The circuit on AP1 has malfunction, replace the outdoor unit AP1
20	Compressor current overcurrent protection	P5		Off 3s blink 15 times	□	☆	□	□	Cooling, dehumidifying; compressor stops running, indoor fan motor works. Heating: all will stop running	Please refer to troubleshooting (IPM protection, compressor lose steps, compressor current overcurrent protection)
21	Defrosting			Off 3s and blink once (during blinking, ON 10s and Off 05s)					Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop.	It's the normal state
22	Compressor overload protection	H3		Off 3s blink 3 times	□	☆	☆	□	Cooling, dehumidifying; compressor stops running, indoor fan motor works. Heating: all will stop running	1. Wire terminal OVCCOMP loosen or circuit, has problem, the resistance of SAT should be lower than 1 ohm. 2.Please refer to troubleshooting (exhaust/ overload protection)
23	IPM protection	H5		Off 3s blink 5 times	■	□	■	■	Cooling, dehumidifying; compressor stops running, indoor fan motor works. Heating: all will stop running	Pls refer to troubleshooting

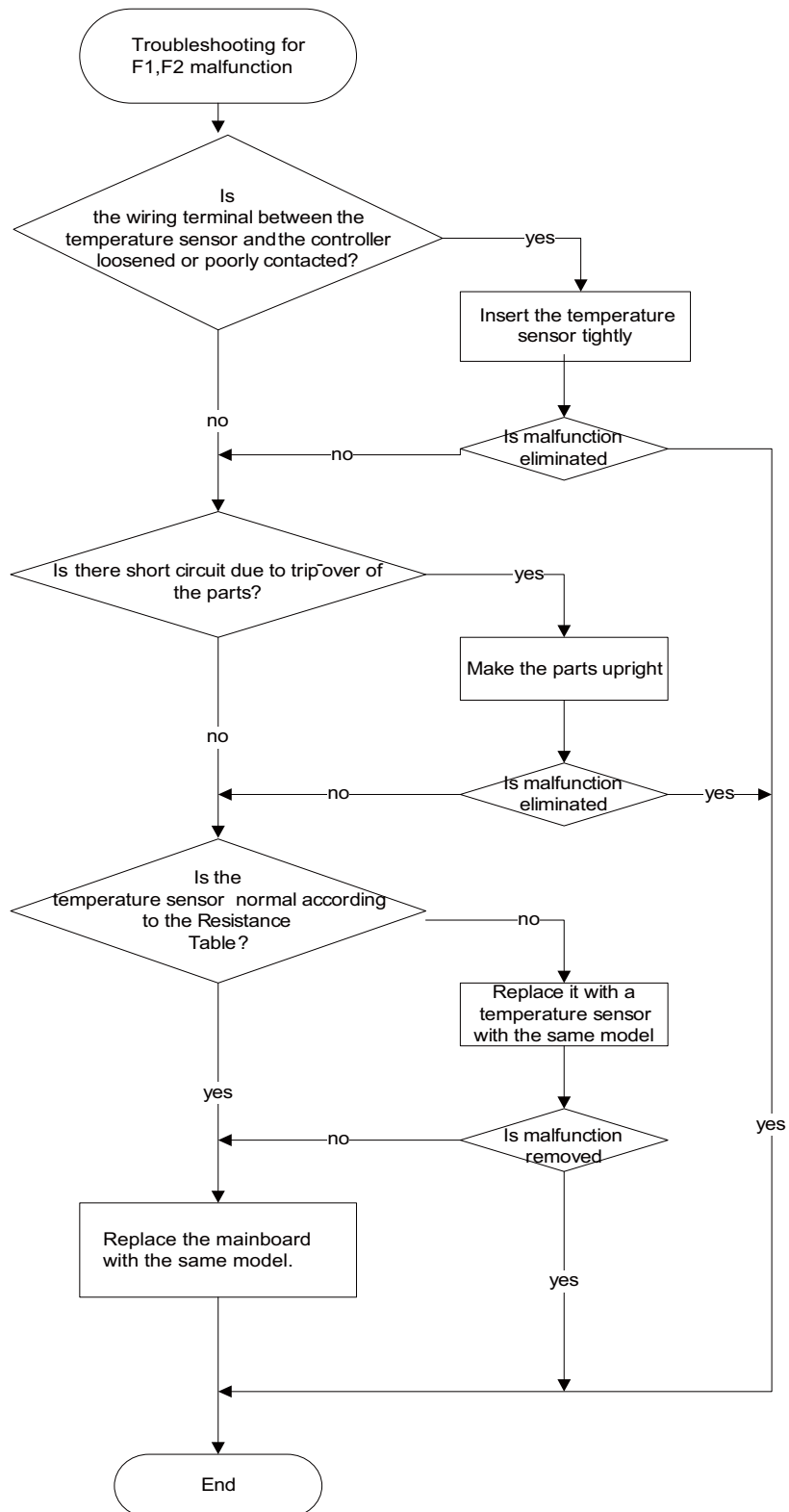


24	PFC protection	HC			Off 3s blink 6 times	□	■	☆	☆	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	Pls refer to troubleshooting
25	Compressor lose steps	H7			Off 3s blink 7 times	□	☆	■	☆	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	Pls refer to troubleshooting
26	Heating, anti- high temp. declines	H0			Off 3s blink 10 times	■	□	☆	☆	Overload normal works,compressor running,frequency declines	Pls refer to troubleshooting
27	Startup fail	Lc			Off 3s blink 11 times	□	☆	□	☆	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	Pls refer to troubleshooting
28	Compressor current testing circuit malfunction	U1			Off 3s blink 13 times	□	☆	■	□		Replace the outdoor control board AP1
29	EEPROM malfunction	EE			Off 3s blink 15 times	□	□	□	■	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	Replace the outdoor control board AP1
30	Capacitor charge malfunction	PU			Off 3s blink 17 times	□	■	□	■	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	Pls refer to Part 3 capacitor charging fault of troubleshooting
31	Module sensor circuit diagram	P7			Off 3s blink 18 times	□	□	■	☆	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	Replace the outdoor control board AP1
32	Module temp. over high protection	P8			Off 3s blink 19 times	■	□	☆	■	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	To check whether the ambient Temp. of IPM is too high or the heat-sin- gling of IPM is dirty else replace the outdoor board AP1
33	DC Bus voltage dips	U3			Off 3s blink 20 times	□	■	■	■	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	Power voltage is not stable
34	Low DC Bus voltage protection	PL			Off 3s blink 21 times	□	■	■	□	Cooling, dehumidifying;compressor stops running,indoor fan motor works. Heating: all will stop running	1.Check the Input voltage if the Voltage is lower than 150VAC,restart the machine when the power supply is normal. 2.Checking the reactor L connection.
35	IPM temp.is too high limit/ decrease frequency	EU				■	■	■	☆	Over load normal works,compressor runing frequency declines	Whole unit break for 20 mins and discharge,to check the outdoor control board AP1's IPM module coolant whether is short,the radiator is tightened. If above phenomenon is not OK,Please improve or replace the control board AP1
36	Four-way valve abnormal	U7				■	□	☆	□	This malfunction happened,only in heating mode,all will stop to run.	1.Power supply voltage is lower than AC175V 2.Wire terminal 4V loosen or wire break 3.4V damaged,replace 4V
37	Outdoor unit zero-cross detecting error					■	■	☆	□	Cooling:compressor will stop,indoor fan motor works. Heating:all will stop.	Replace the outdoor control board AP1

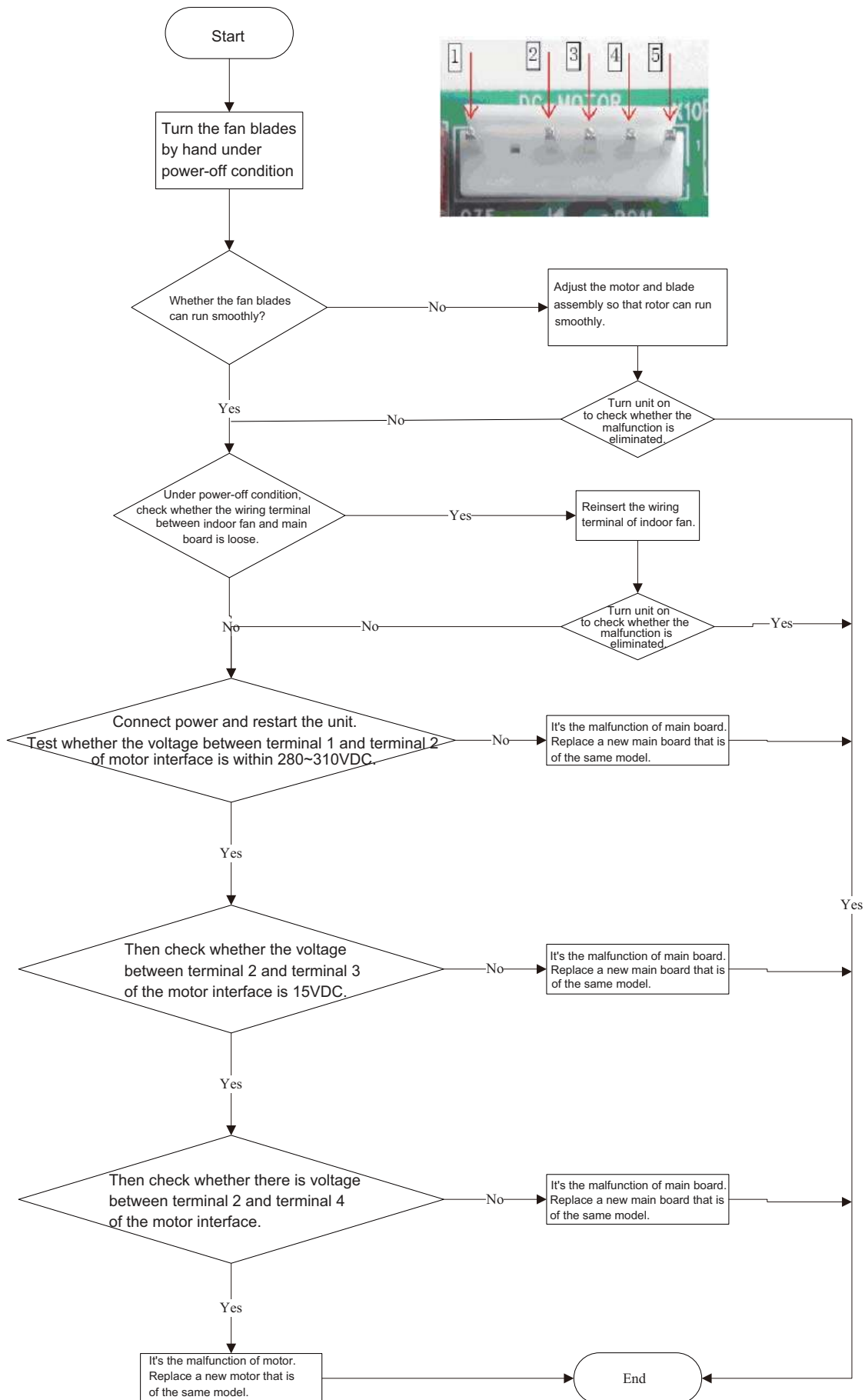
## 8.3 Troubleshooting for Main Malfunction

### •Indoor unit:

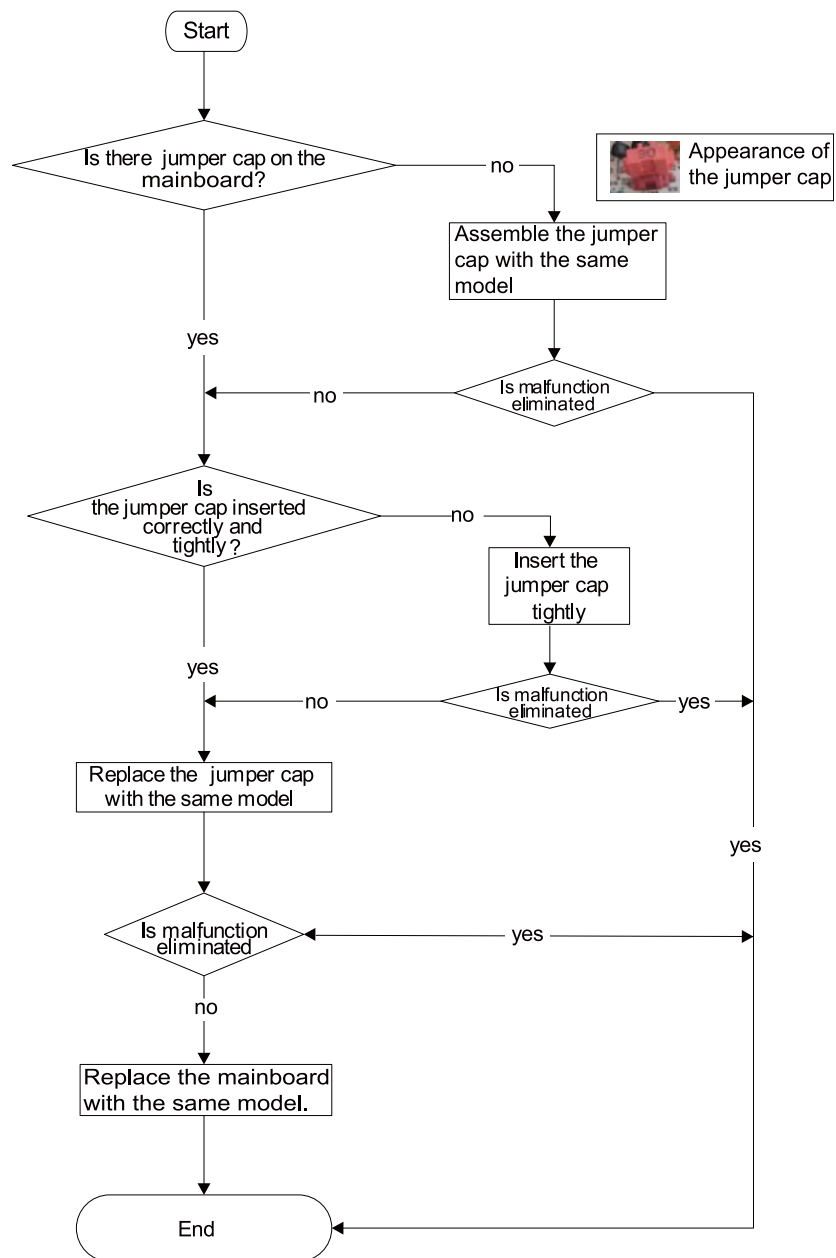
#### 1. Malfunction of Temperature Sensor F1, F2



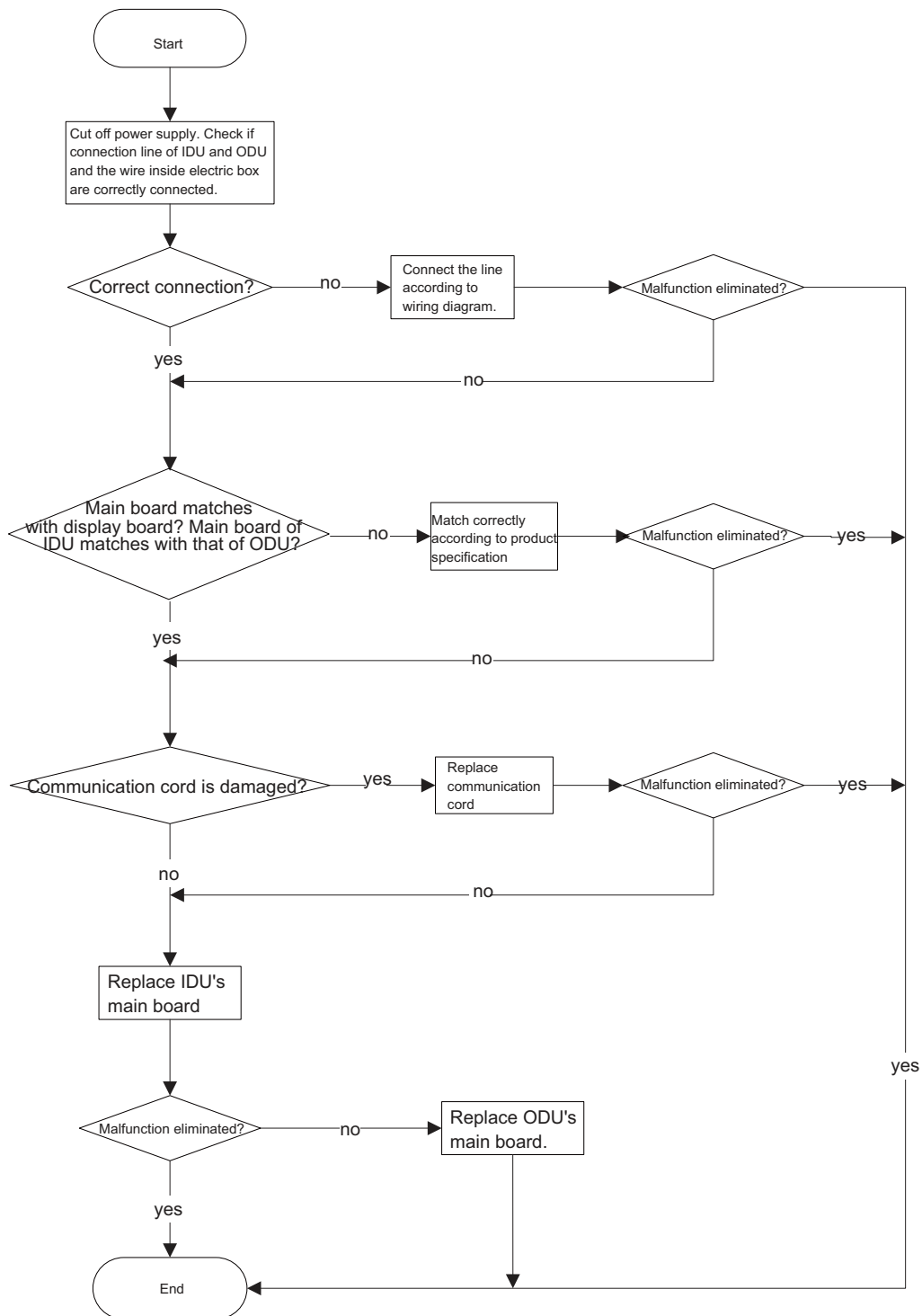
## 2. Malfunction of Blocked Protection of IDU Fan Motor H6



### 3. Malfunction of Protection of Jumper Cap C5

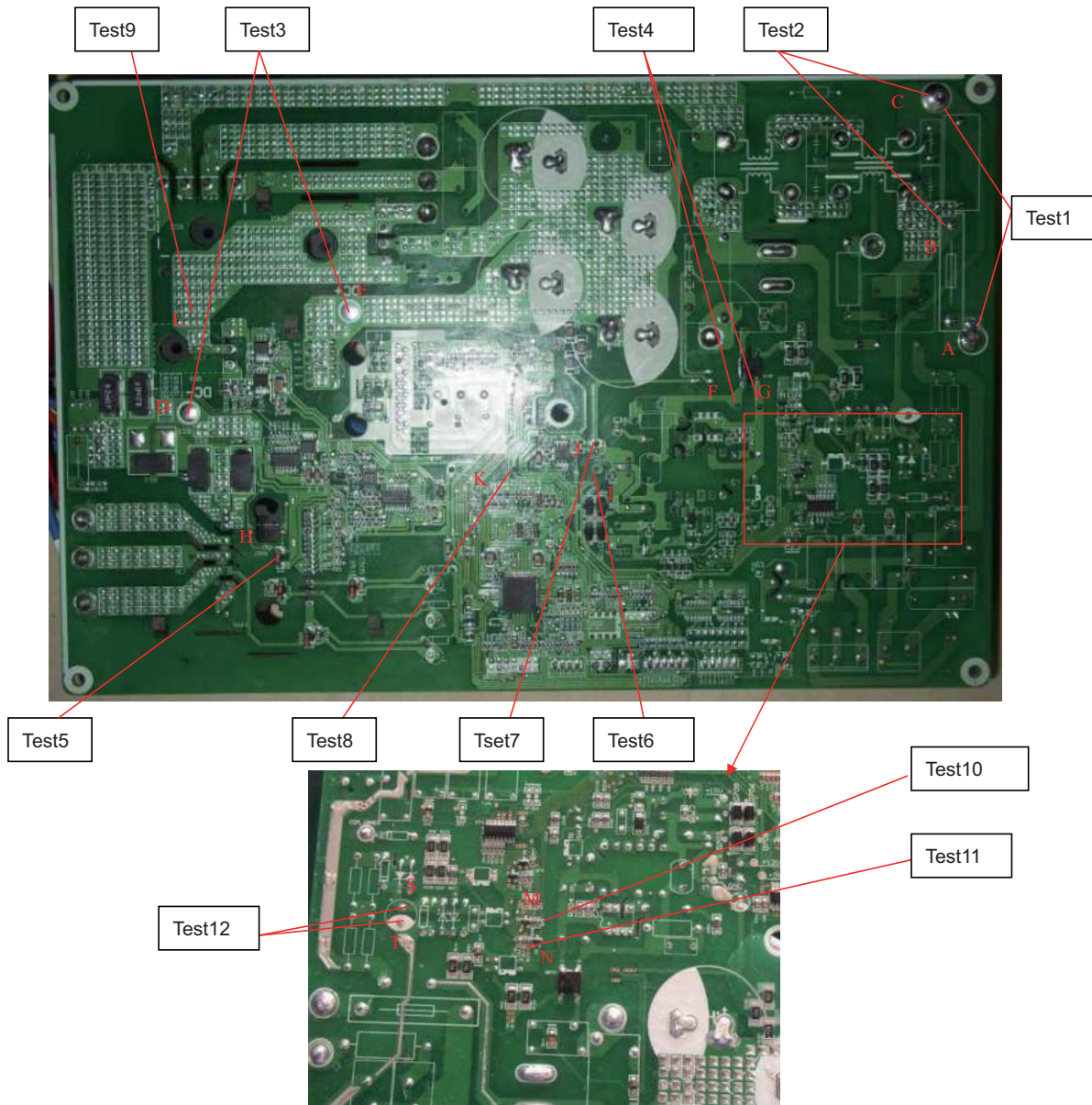


#### 4. Communication Malfunction E6



●Outdoor unit:

1.Key Detection Point



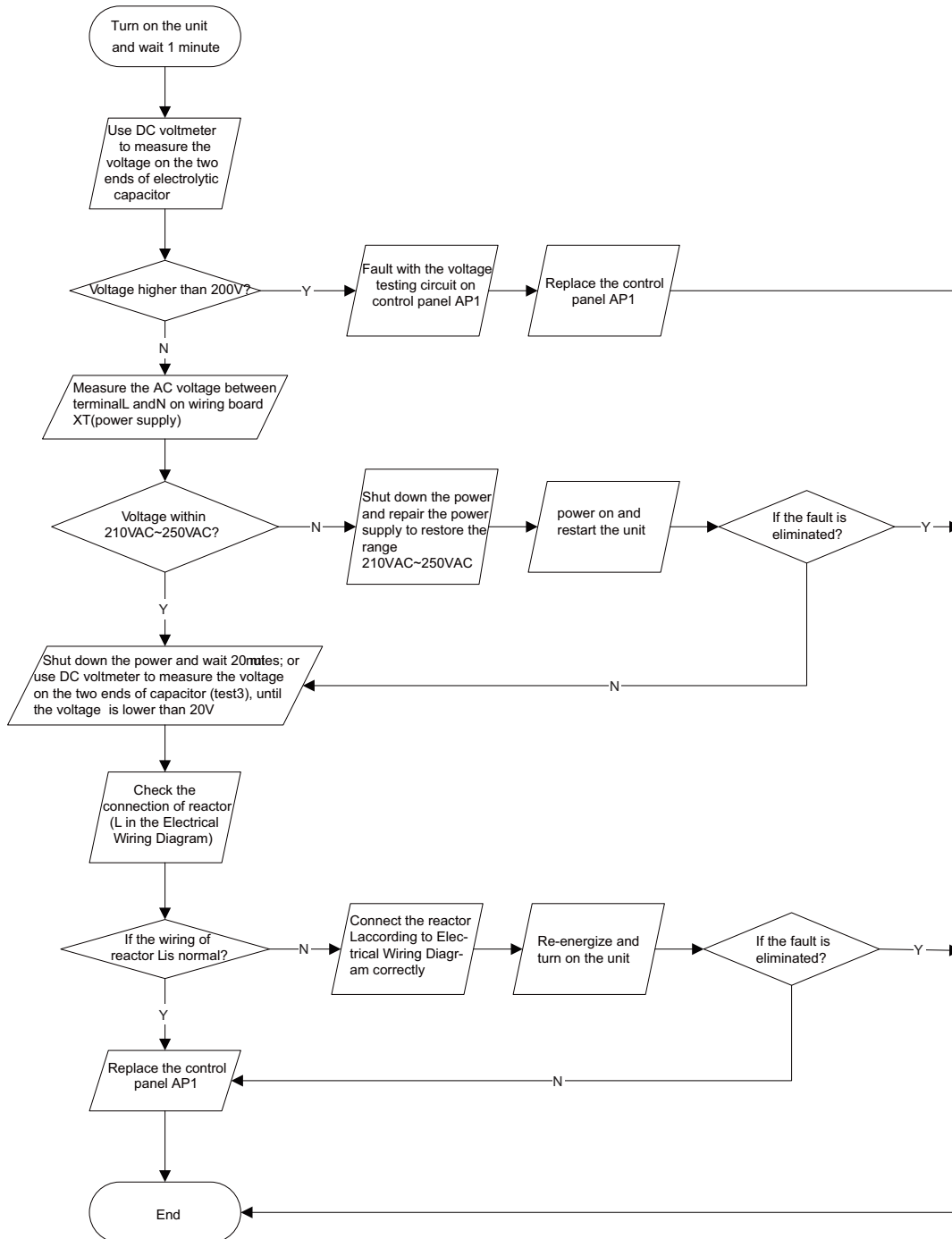
Test NO	Test point	Corresponding component	Test value under normal condition
Test 1	Between A and C	Neutral and live wires	160V~265V
Test 2	Between B and C	Neutral and live wires	160V~265V
Test 3	Between D and E	DC busbar electrolytic capacitor	DC 180V~380V
Test 4	Between F and G	Electrolytic capacitor of power	DC 180V~380V
Test 5	Two ends of diode D15	D15(IPM modular +15V power supply)	DC 14.5V~15.6V
Test 6	Two ends of electrolytic capacitor C715	C715(+12V power supply)	DC 12V~13V
Test 7	Two ends of electrolytic capacitor C710	C710(+5V power supply)	DC 5V
Test 8	Two ends of electrolytic capacitor C226	C226(+3.3V power supply)	DC 3.3V
Test 9	Two ends of chip capacitor C912	C912(+17V power supply)	DC 15V~18V
Test 10	Between M to GND	Point M of R75 to ground (signal sending port of ODU)	Fluctuate between 0~3.3V
Test 11	Between N to GND	Point N of R123 to ground (signal receiving port of ODU)	Fluctuate between 0~3.3V
Test 12	Between S and T	Power supply of communication ring	DC 56V

## 2.Capacity charging malfunction (outdoor unit malfunction) (AP1 below is control board of outdoor unit)

Main detection point:

- Detect if the voltage of L and N terminal of wiring board is between 210AC-240AC by alternating voltage meter;
- Is reactor (L) well connected? Is connection wire loosened or pull-out? Is reactor (L) damaged?

Malfunction diagnosis process:





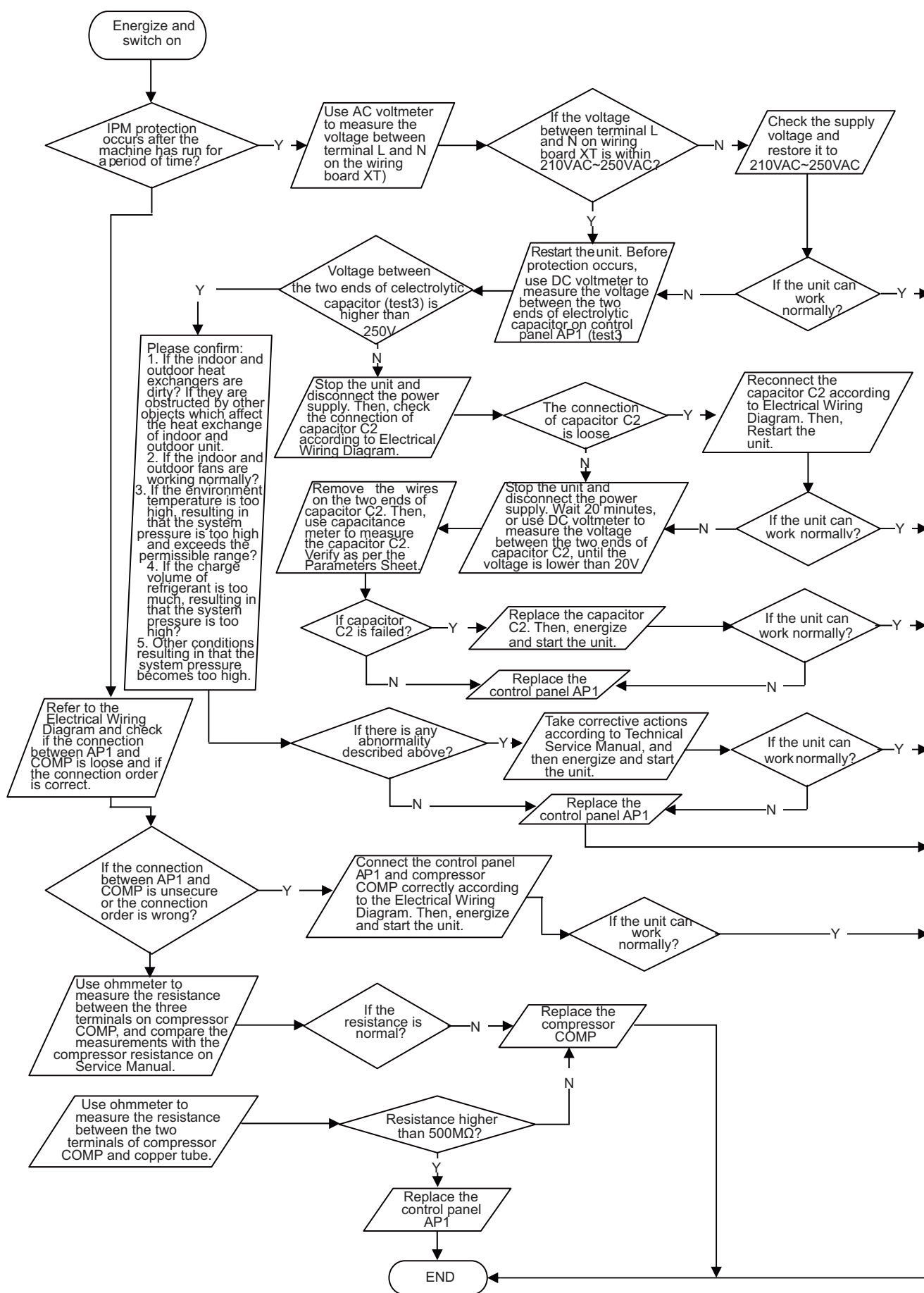
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### 3. IPM protection, desynchronizing malfunction, phase current of compressor is overcurrent (AP1 below is control board of outdoor unit)

Main detection point:

- If control board AP1 and compressor COMP is well connected? If they are loosened? If the connection sequence is correct?
- Is voltage input in the normal range (Test the voltage between L, N of wiring board XT by DC voltage meter)?
- If coil resistance of compressor is normal? Is compressor coil insulating to copper pipe well?
- If the work load of unit is heavy? If radiating of unit is well?
- If the refrigerant charging is appropriate?

Malfunction diagnosis process:

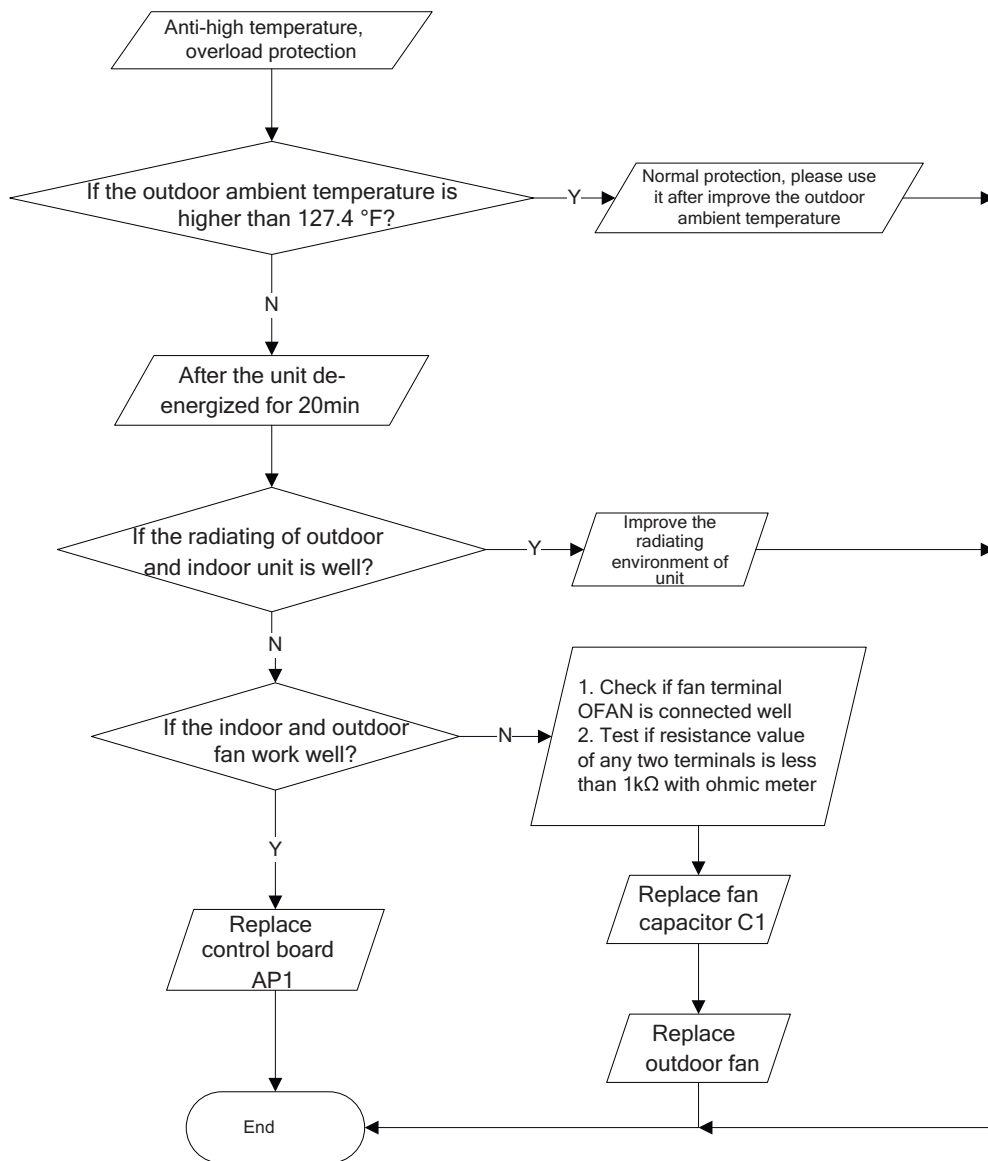


#### 4. Diagnosis for anti-high temperature, overload protection (AP1 below is control board of outdoor unit)

Main detection point:

- If the outdoor ambient temperature is in normal range;
- If the indoor and outdoor fan is running normal;
- If the radiating environment of indoor and outdoor unit is well.

Malfunction diagnosis process:

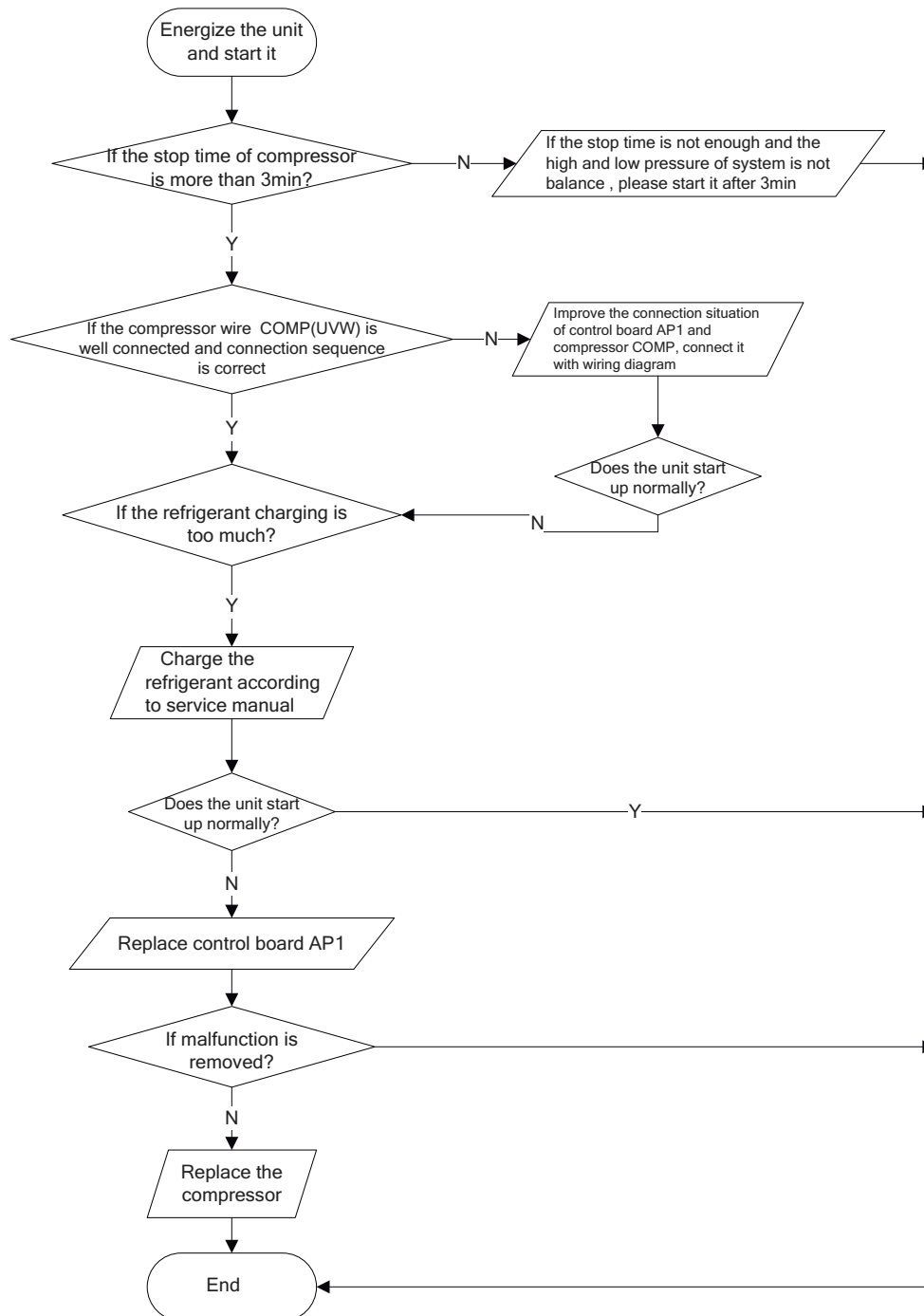


## 5.Diagnosis for failure start up malfunction (AP1 below is control board of outdoor unit)

Main detection point:

- If the compressor wiring is correct?
- If the stop time of compressor is enough?
- If the compressor is damaged?
- If the refrigerant charging is too much?

Malfunction diagnosis process:

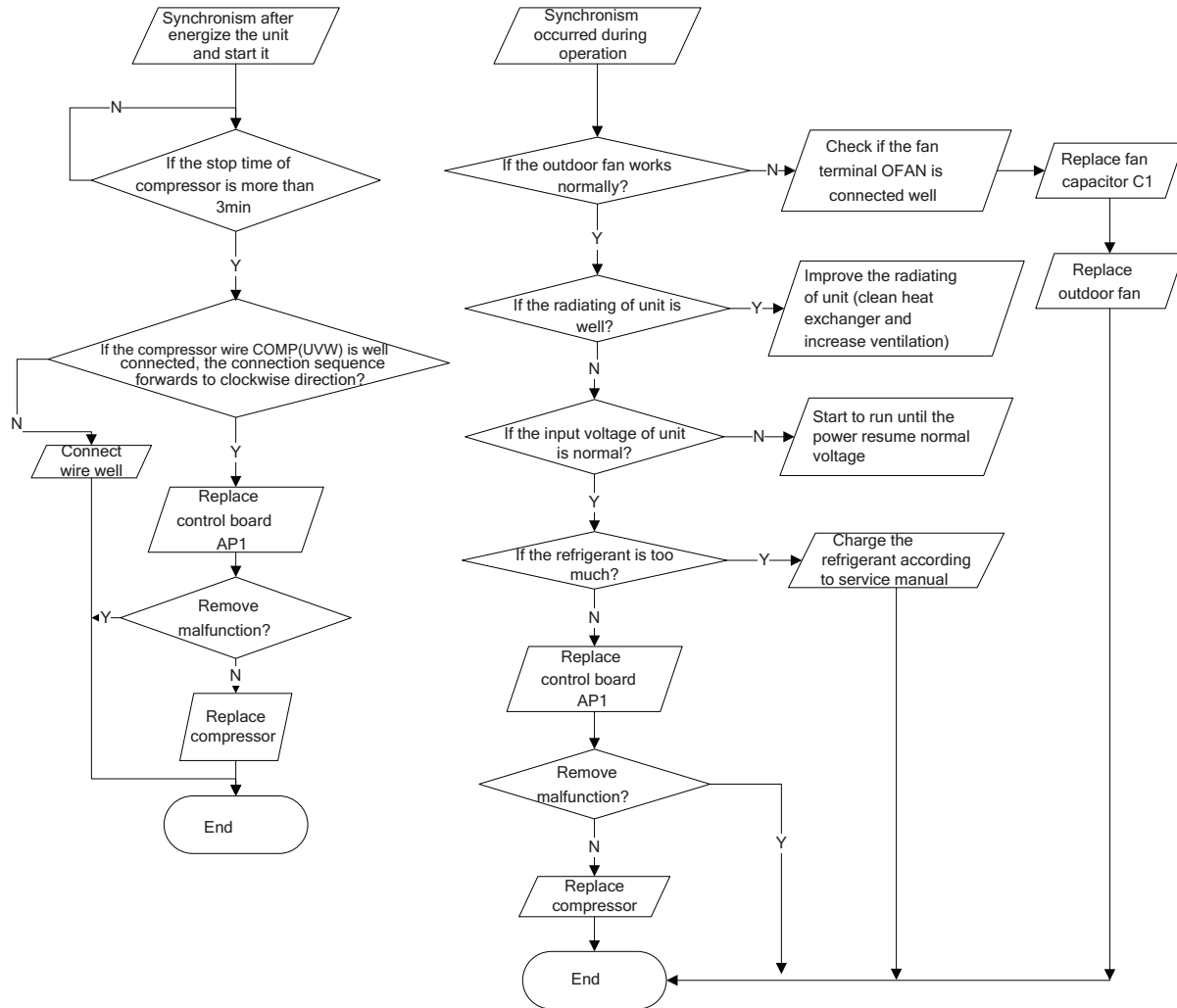


## 6. Diagnosis for compressor synchronism (AP1 below is control board of outdoor unit)

Main detection point:

- If the system pressure is too high?
- If the work voltage is too low?

Malfunction diagnosis process:

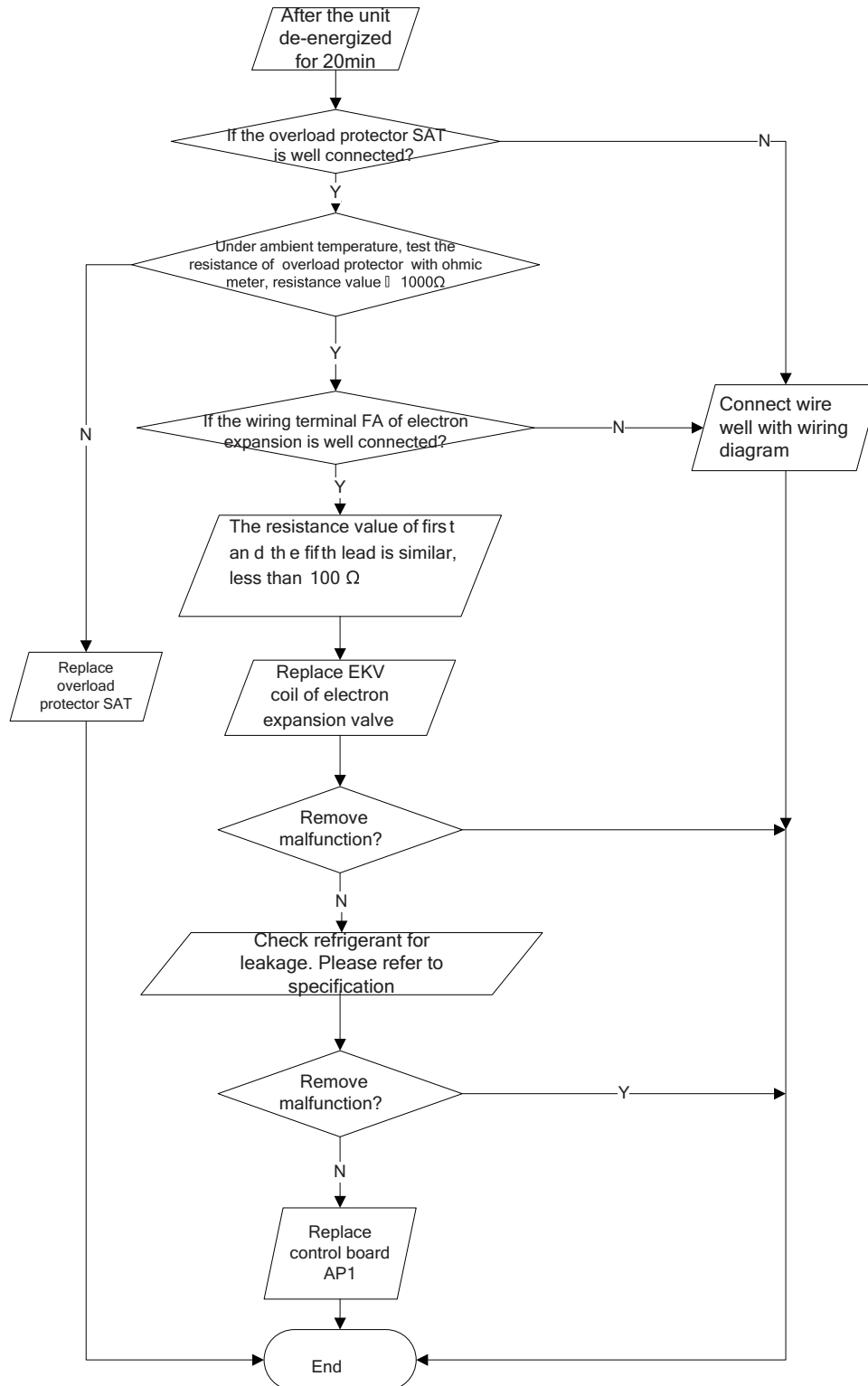


## 7. Diagnosis for overload and discharge malfunction (AP1 below is control board of outdoor unit)

Main detection point:

- If the electronic expansion valve is connected well? Is the expansion valve damaged?
- If the refrigerant is leaking?
- If the overload protector is damaged?

Malfunction diagnosis process:

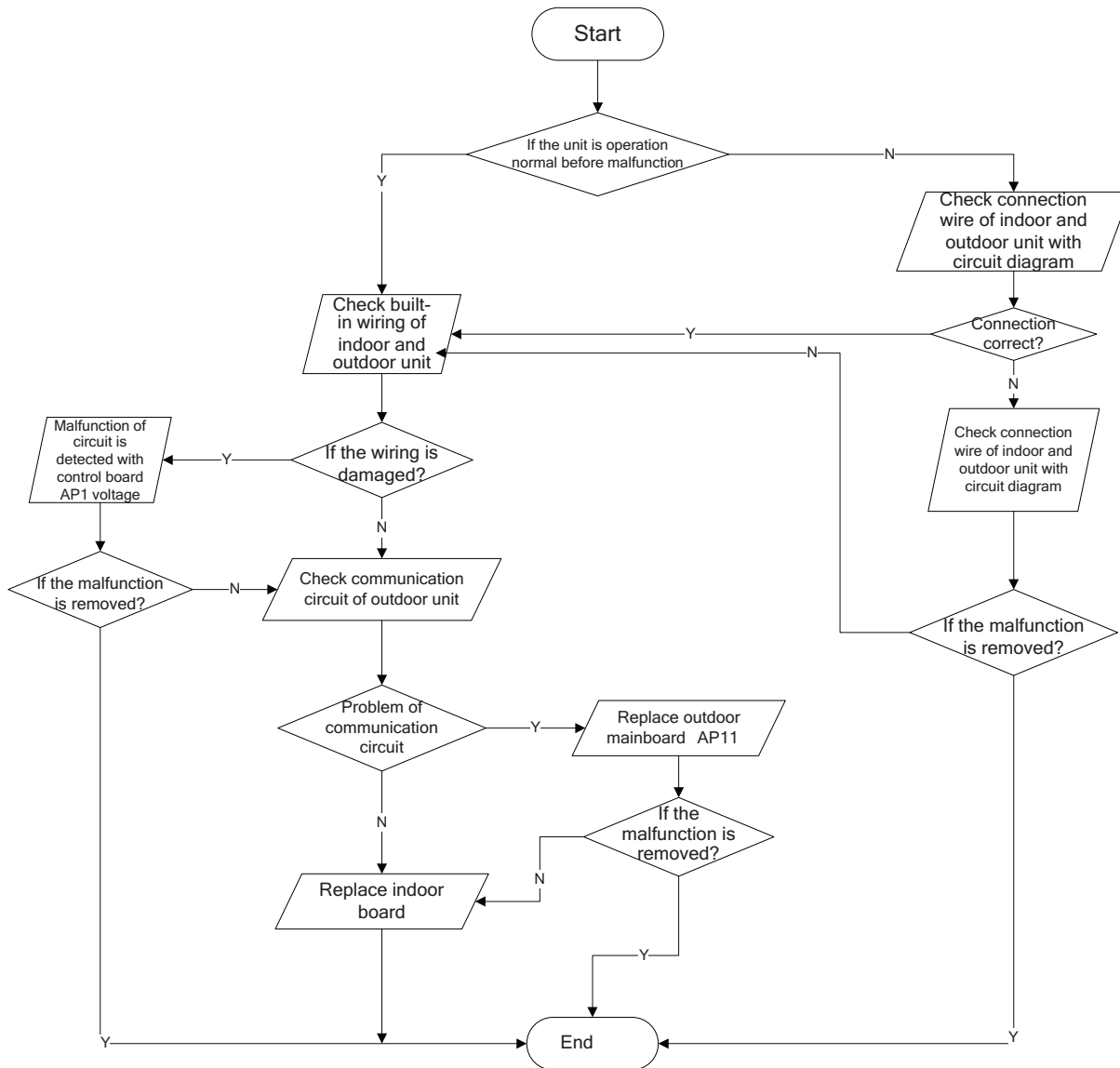


## 8.Communication malfunction (AP1 below is control board of outdoor unit)

Main detection point:

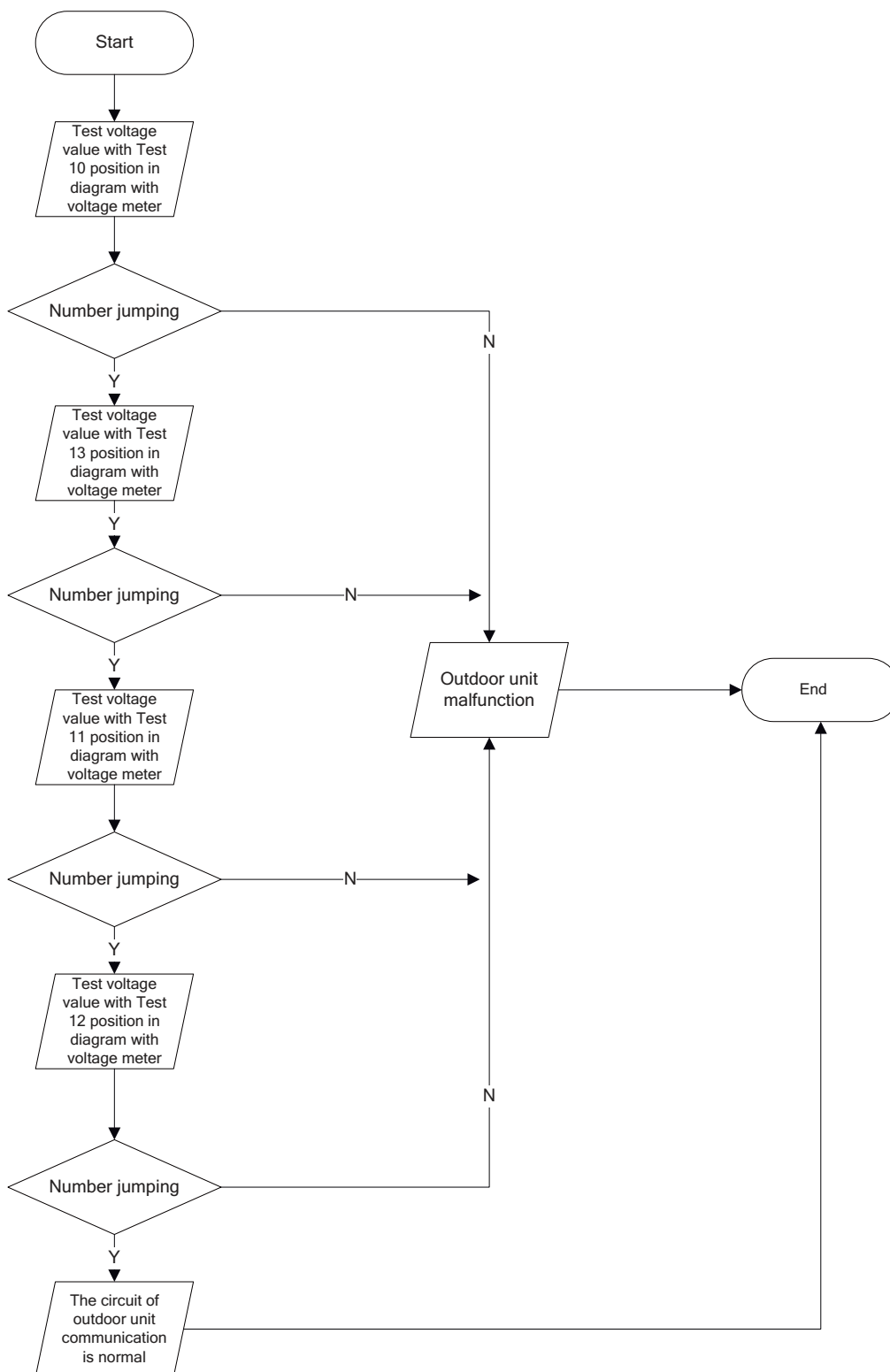
- Check if the connection wire and the built-in wiring of indoor and outdoor unit is connected well and not damaged;
- If the communication circuit of indoor mainboard is damaged? If the communication circuit of outdoor mainboard (AP1) is damaged?

Malfunction diagnosis process:





## 9.Diagnosis Process for Outdoor Communication Circuit



## 8.4 Troubleshooting for Normal Malfunction

### 1. Air conditioner doesn't start

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 unit are connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, replace 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 controller Repair or replace controller

### 2. Poor cooling (heating) for air conditioning unit

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	Light fan speed	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see if it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation position is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged air temperature; Discharged air temperature during heating is lower than normal discharged air 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	Blows cold during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged air temperature; Discharged air temperature during heating is lower than normal discharged air temperature; Unit pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

### 3. Horizontal louver doesn'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
Actuator is damaged	Actuator can't operate	Repair or replace actuator
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 doesn'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 a 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 doesn'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 doesn't operate	Repair or replace compressor

#### 6. Air conditioner is leaking

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Condensate pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Condensate pipe is broken	Water leaking from condensate pipe	Replace condensate 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 turning on or 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 turning on or 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 for 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 too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

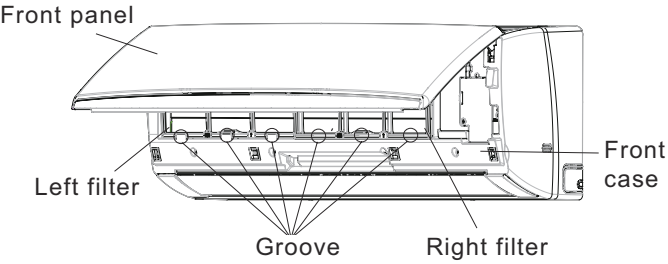
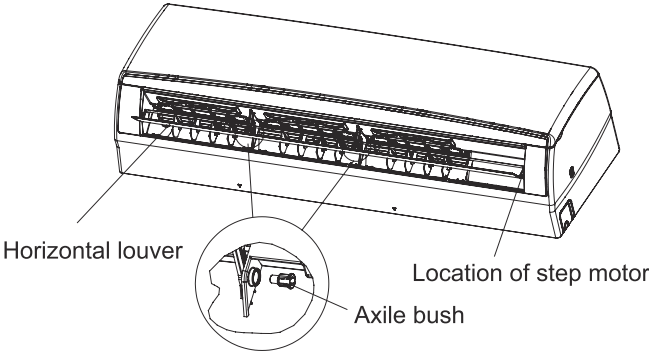
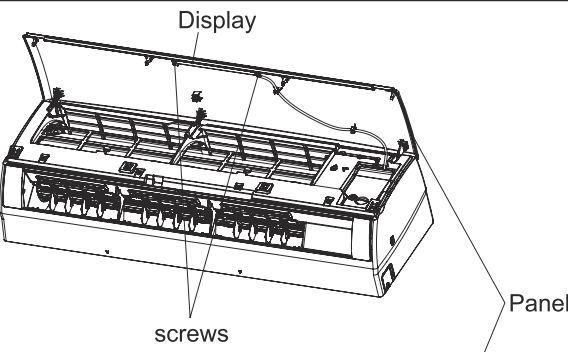
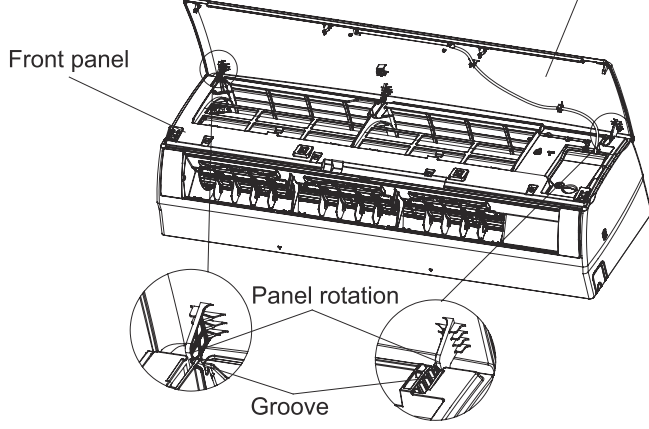
## 9. Removal Procedures

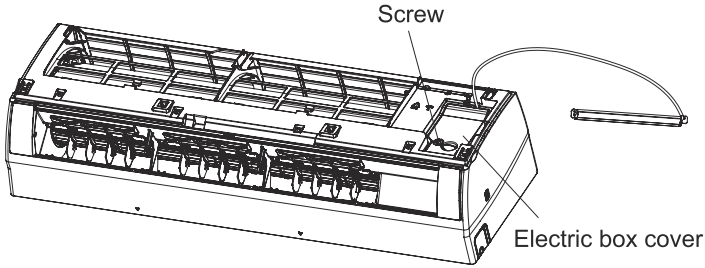
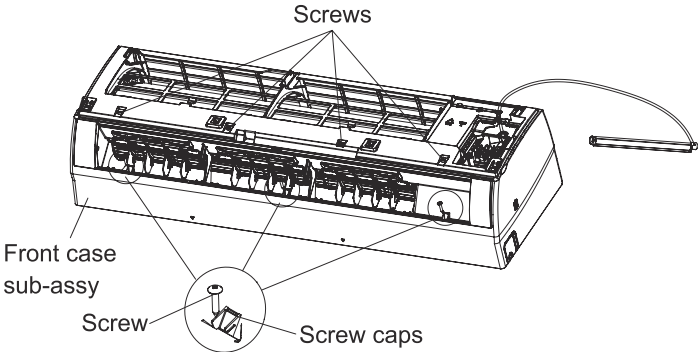
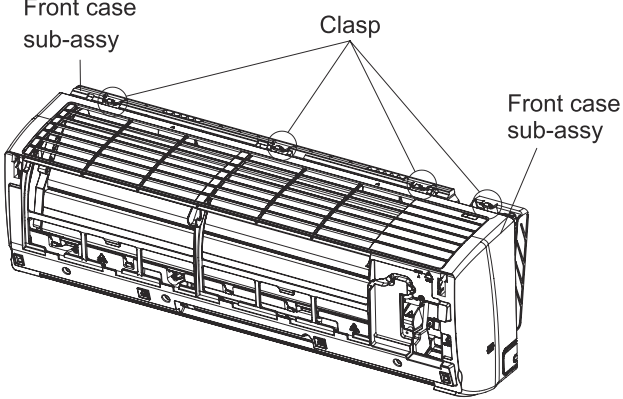
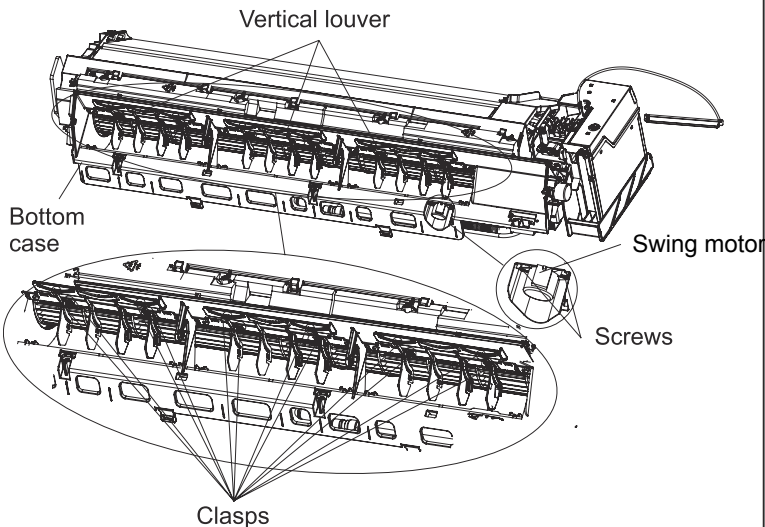
### 9.1 Removal Procedures for Indoor Unit

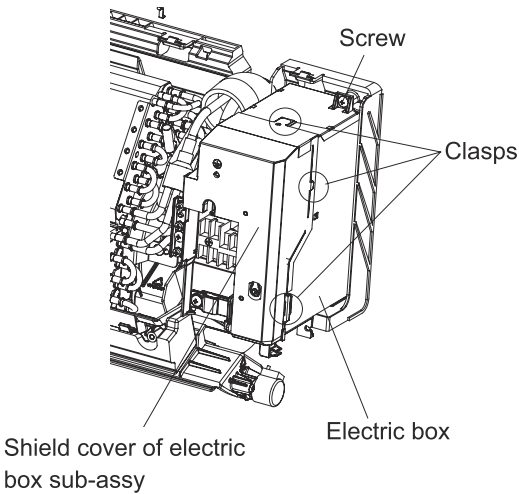
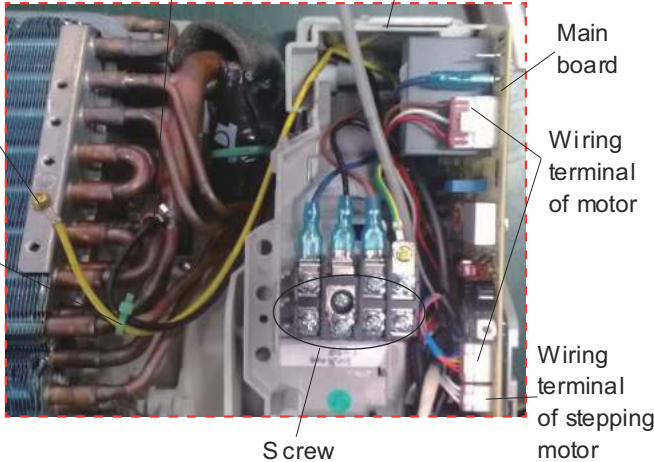
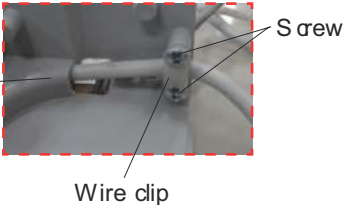
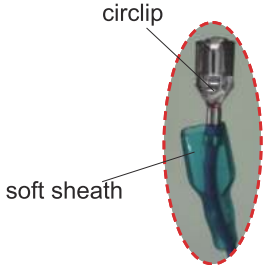
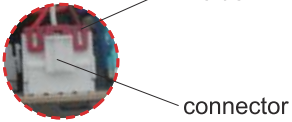


**Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

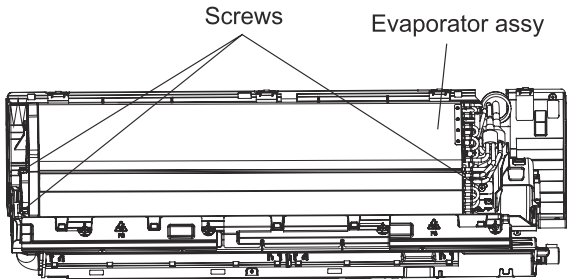
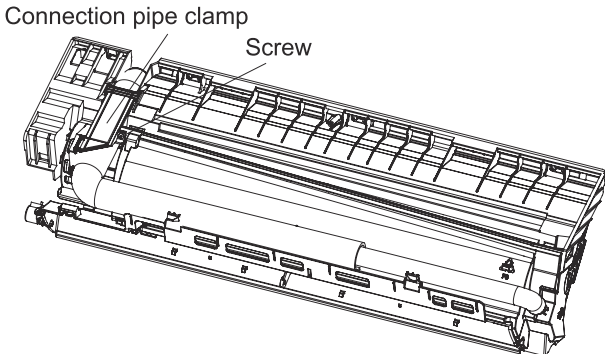
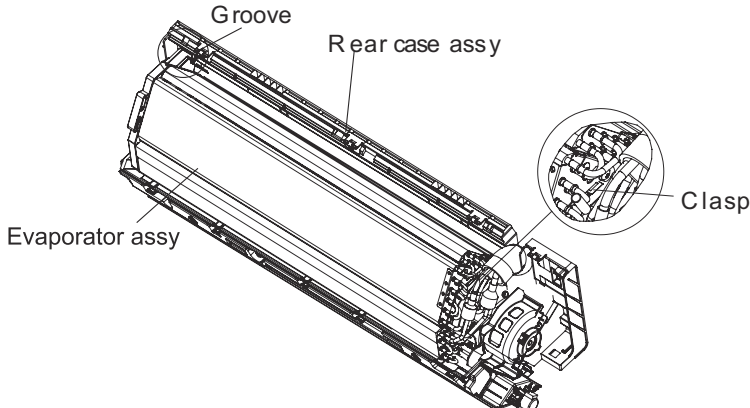
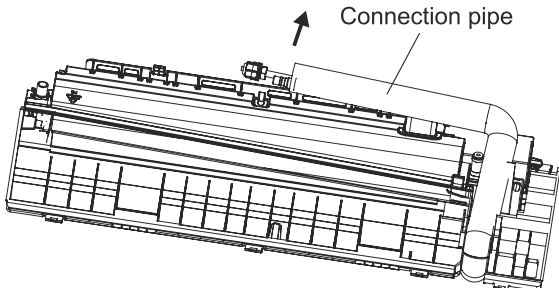
Take A1 panel for example

Step	Procedure
1. Remove filter assy	
	<p>Open the front panel. Push the left and right filters to make them break away from the groove on the front case. Then remove the left and right filters one by one.</p> 
2. Remove horizontal louver	
	<p>Push out the axle bush on horizontal louver. Bend the horizontal louver by hand and then separate the horizontal louver from the crankshaft of step motor to remove it.</p> 
3. Remove panel	
a	<p>Screw off the two screws that are locking the display board. Separate the display board from the front panel.</p> 
b	<p>Separate the panel rotation shaft from the groove fixing the front panel and then remove the front panel.</p> 

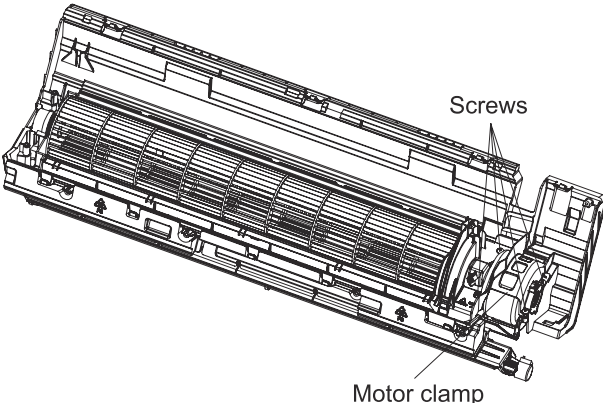
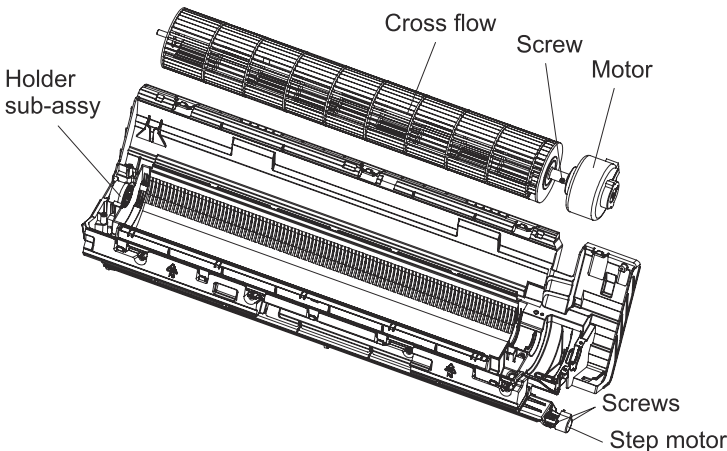
Step	Procedure	
4. Remove electric box cover		
	Remove the screws on the electric box cover to remove the electric box cover.	
5. Remove front case sub-assy		
a	Remove the screws fixing front case.  Note: 1.Open the screw caps before removing the screws around the air outlet. 2.The quantity of screws fixing the front case sub-assy is different for different models.	
b	Loosen the connection clasps between front case sub-assy and bottom case. Lift up the front case sub-assy and take it out.	
6. Remove vertical louver		
	Loosen the connection clasps between vertical louver and bottom case to remove vertical louver.  Remove the screws that are locking the swing motor and take the motor off.	

Step	Procedure	
7. Remove electric box assy		
a	Loosen the connection clasps between shield cover of electric box sub-assy and electric box, and then remove the shield cover of electric box sub-assy. Remove the screw fixing electric box assy .	
b	<ul style="list-style-type: none"><li>① Cut off the wire binder and pull out the indoor tube temperature sensor.</li><li>② Screw off one grounding screw.</li><li>③ Remove the wiring terminals of motor and stepping motor.</li><li>④ Remove the electric box assy.</li><li>⑤ Remove the screws that are locking each lead wire.</li></ul>	
c	Rotate the electric box assy. Twist off the screws that are locking the wire clip and loosen the power cord. Remove the wiring terminal of power cord. Lift up the main board and take it off.	
<p>Instructions: Some wiring terminals of this product are with a lock catch and other devices.</p> <p>The pulling method is as below:</p> <ul style="list-style-type: none"><li>1.Remove the soft sheath for some terminals at first, hold the circlip and then pull out the terminals.</li><li>2.Pull out the holder for some terminals at first (holder is not available for some wiring terminal), hold the connector and then pull the terminal.</li></ul>		 



Step	Procedure	
8. Remove evaporator assy		
a	Remove 3 screws fixing evaporator assy.	 <p>This diagram shows the evaporator assembly being removed from the rear case. Three screws are highlighted with leader lines, indicating they are to be removed. The label 'Evaporator assy' points to the main component.</p>
b	At the back of the unit, remove the screw fixing connection pipe clamp and then remove the connection pipe clamp.	 <p>This diagram shows the rear of the unit. A screw is shown being removed from a bracket that holds a connection pipe clamp. Labels include 'Connection pipe clamp' and 'Screw'.</p>
c	First remove the left side of evaporator from the groove on the rear case assy. Then remove the right side from the clasp on the rear case assy.	 <p>This diagram shows the evaporator assembly being lifted out of the rear case. A 'Groove' on the rear case is shown where the left side of the evaporator was seated. A circular inset shows a close-up of the 'Clasp' on the rear case. Labels include 'Groove', 'Rear case assy', 'Evaporator assy', and 'Clasp'.</p>
d	Adjust the position of connection pipe on evaporator slightly and then lift the evaporator upwards to remove it.	 <p>This diagram shows the evaporator assembly being lifted upwards, away from the rear case. An arrow points to the 'Connection pipe' on the evaporator. Labels include 'Connection pipe'.</p>



Step	Procedure	
9. Remove motor and cross flow blade		
a	Remove the screws fixing motor clamp and then remove the motor clamp.	
b	Remove the screws at the connection place of cross flow blade and motor; lift the motor and cross flow blade upwards to remove them. Remove the bearing holder sub-assy. Remove the screw fixing step motor and then remove the step motor.	



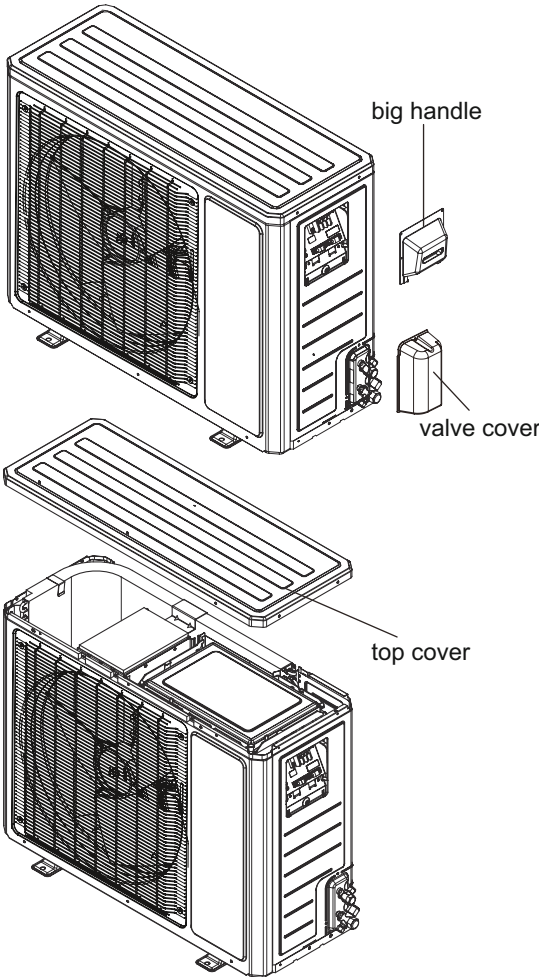
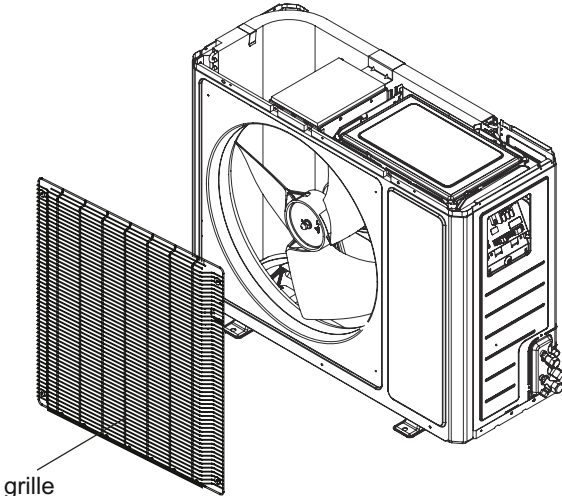
9.2 Removal Procedures for Outdoor Unit

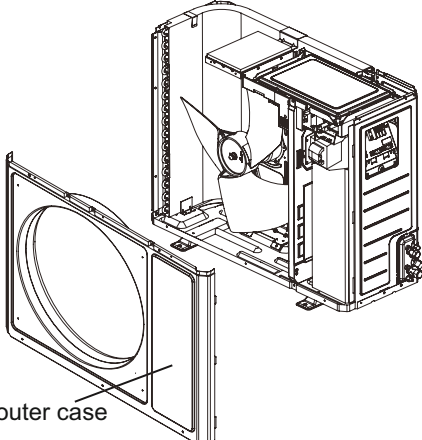
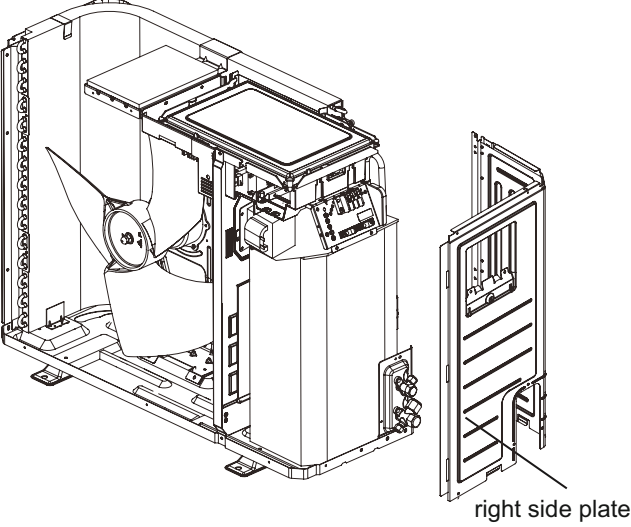
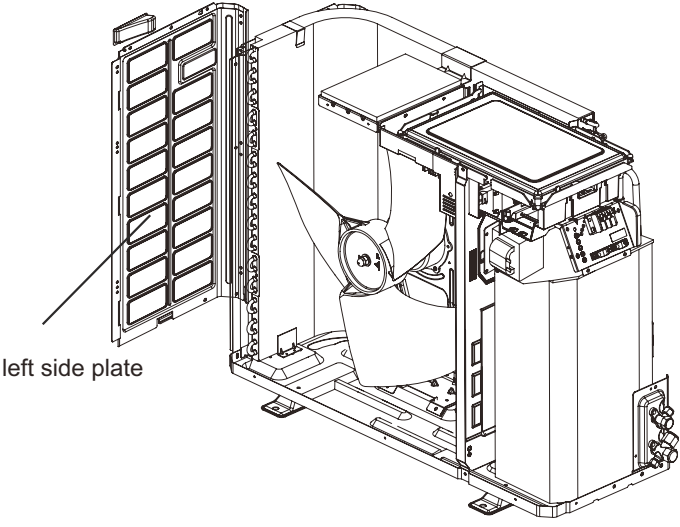


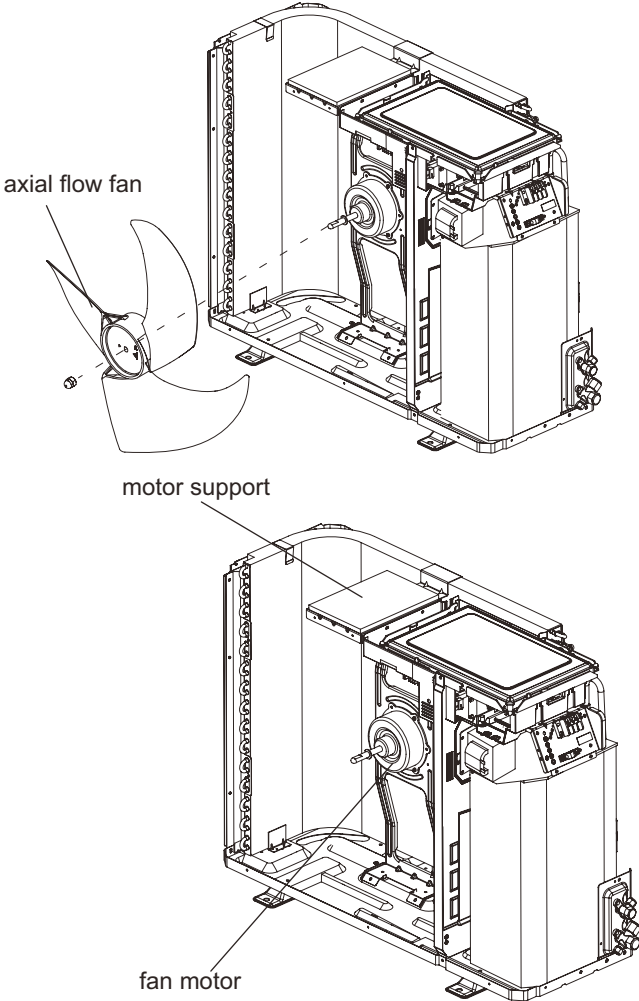
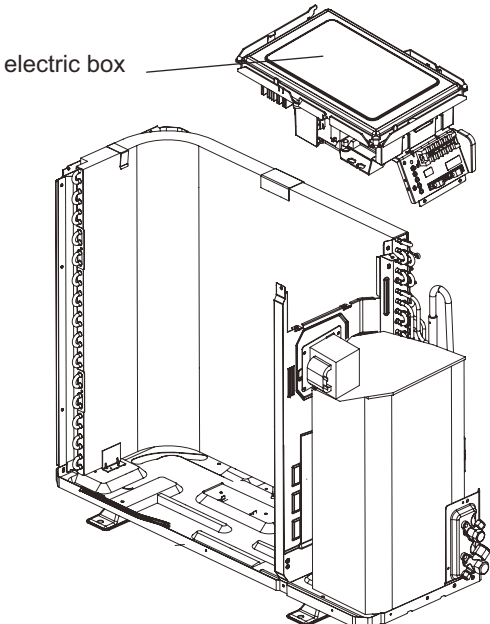
**Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

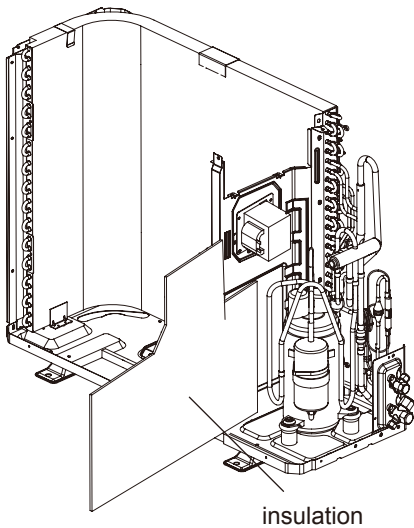
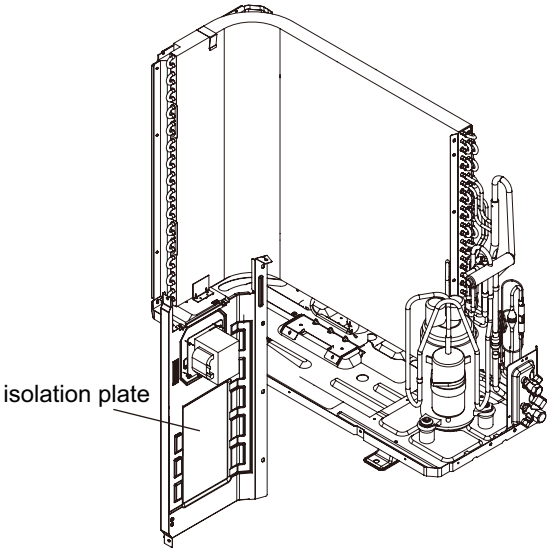
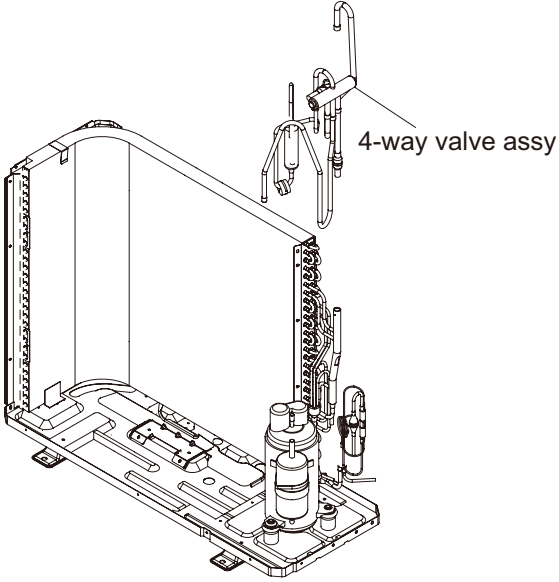
18K

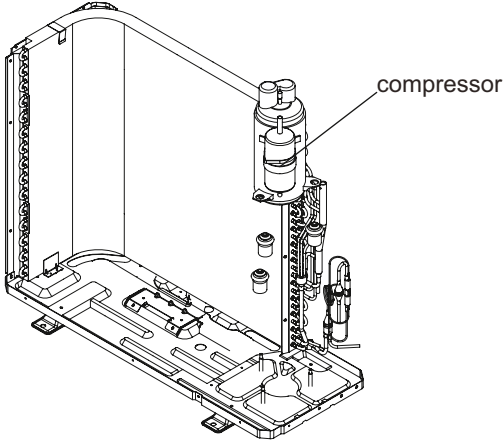
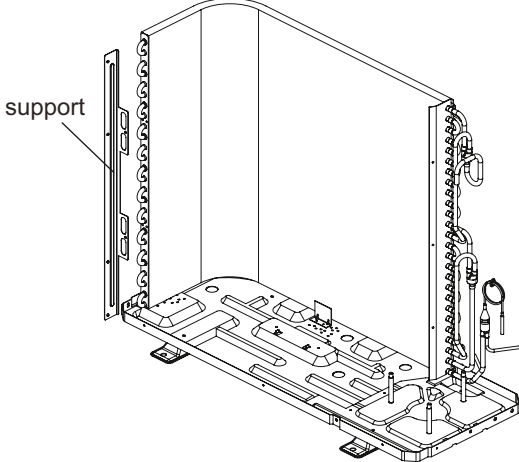
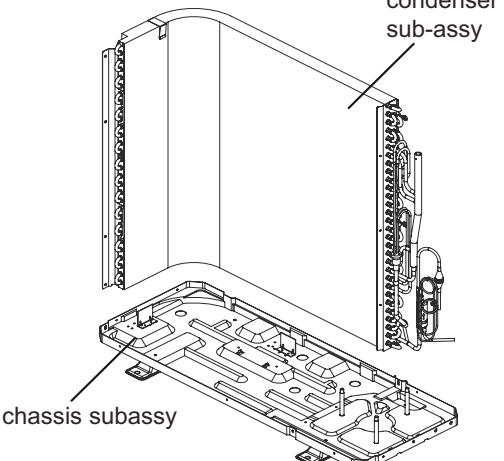
NOTE: Take heat pump for example.

Steps		Procedure	
1. Remove big handle, valve cover and top cover			
a	Remove the screw connecting the big handle and right side plate, and then remove the big handle. Remove the screw connecting the valve cover and right side plate, and then remove the valve cover.		
b	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.		
2. Remove grille and outer case			
	Remove the four screws connecting the grille and outer case, and then remove the panel grille.	grille	

Steps	Procedure	
	<p>Remove the screws connecting the outer case with the motor support, isolation plate and chassis; lift the outer case upwards; loosen the clasps of outer case with right side plate and left side plate, and then remove the outer case.</p>	 <p>outer case</p>
3. Remove right and left side plate		
a	<p>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.</p>	 <p>right side plate</p>
b	<p>Remove the screws connecting the left side plate with the chassis, and then remove the left side plate.</p>	 <p>left side plate</p>

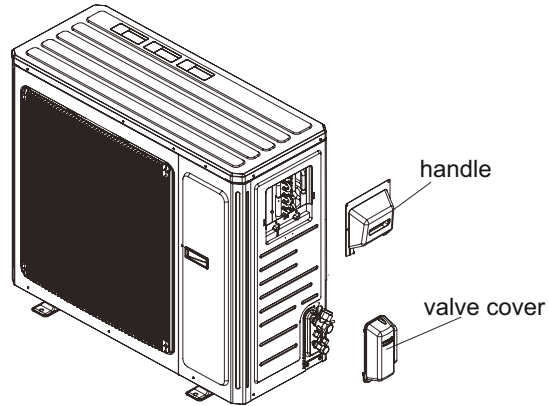
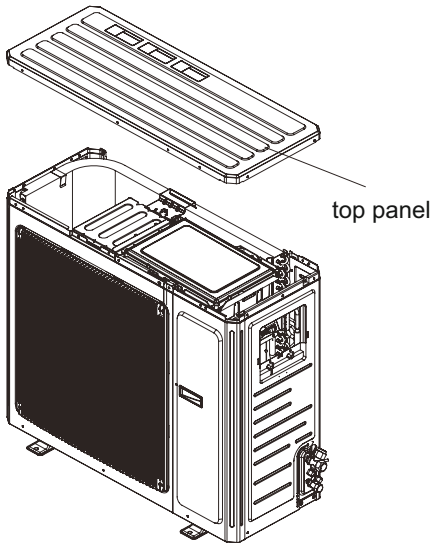
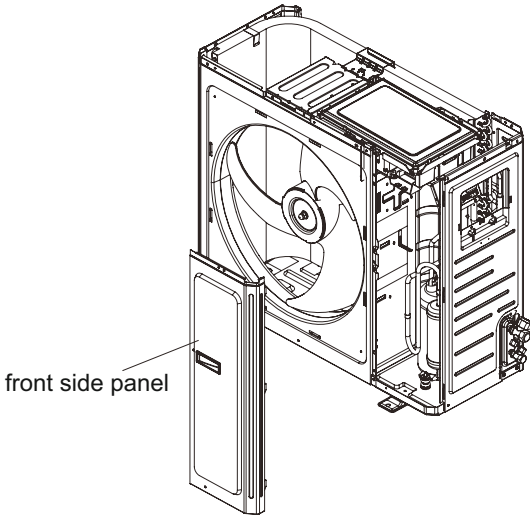
Steps	Procedure	
4. Remove axial flow blade		
a	Remove the nut securing axial flow blade and then remove the blade.	 <p>axial flow fan</p> <p>motor support</p> <p>fan motor</p>
b	Remove the six screws securing the motor and then remove the motor. Remove the two screws connecting the motor support and chassis, and then loosen the stopper to remove the motor support.	
5. Remove electric box		
	Remove the screws fixing the electric box sub-assy; loosen the wire bundle; pull out the wiring terminals and then pull the electric box upwards to remove it.	 <p>electric box</p>

Steps	Procedure
6. Remove the insulation	<div data-bbox="191 366 646 428">Tear off the adhesive and then remove the insulation.</div> <div data-bbox="943 235 1357 760">  <p>insulation</p> </div>
7. Remove isolation plate	<div data-bbox="191 1028 732 1153">Remove the two screws connecting the isolation plate and condenser side plate; remove the three screws connecting the isolation plate and chassis, and then remove the isolation plate.</div> <div data-bbox="833 843 1382 1389">  <p>isolation plate</p> </div>
8. Remove 4-way valve assy	<div data-bbox="191 1535 760 1753"> <p>Unsolder the welding joints connecting the 4-way valve assy with capillary sub-assy, compressor and condenser; remove the 4-way valve.</p> <p>Note:</p> <p><b>Before unsoldering the welding joint, wrap the 4-way valve with a wet cloth completely to avoid damage to the valve caused by high temperature.</b></p> </div> <div data-bbox="943 1410 1503 1989">  <p>4-way valve assy</p> </div>

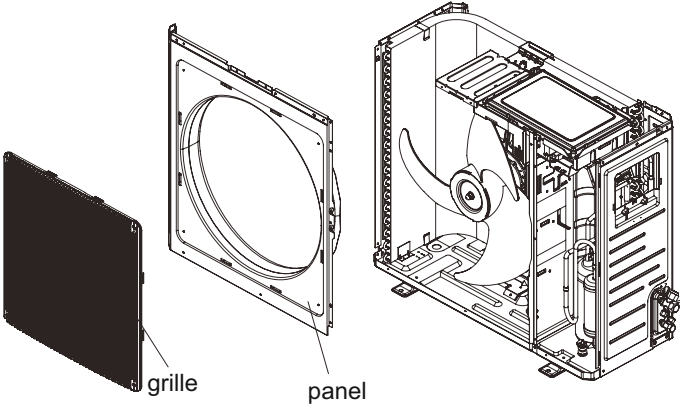
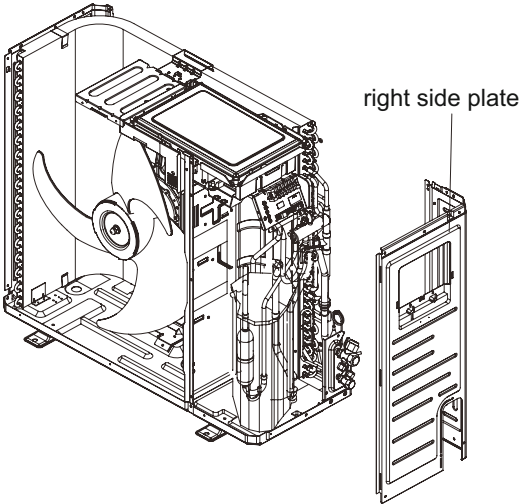
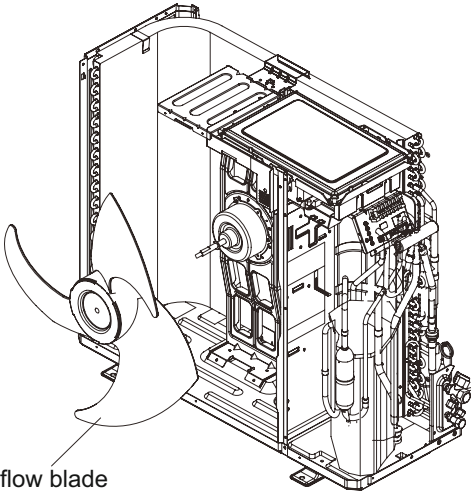
Steps	Procedure	
9. Remove compressor		
	<p>Remove the three foot nuts fixing compressor and then lift the compressor upwards to remove the compressor and damping cushion.</p> <p>Note: Keep the ports of discharge pipe and suction pipe from foreign objects.</p>	
10. Remove condenser sub-assy		
a	<p>Remove the screws connecting the support (condenser) and condenser assy, and then remove the support (condenser).</p>	
b	<p>Remove the two screws securing the condenser and chassis, and then lift the condenser upwards to remove it.</p>	

24K

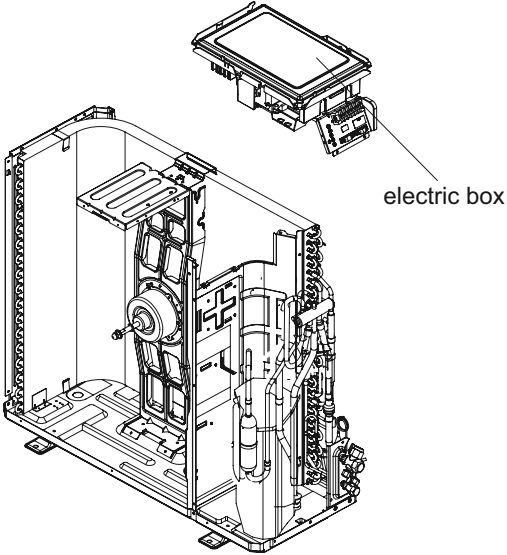
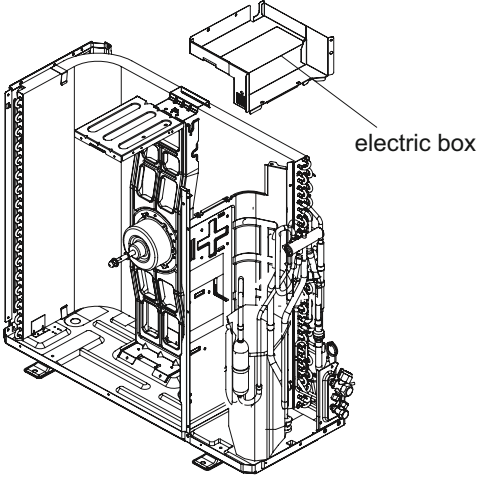
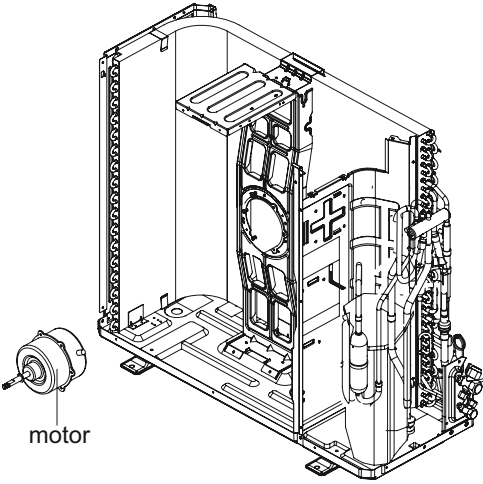
NOTE: This model doesn't have a 4-way valve assy.

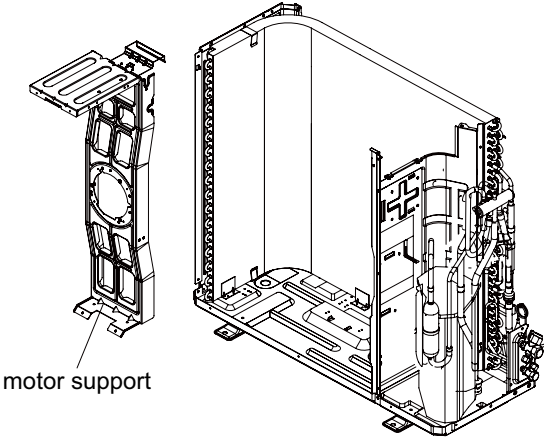
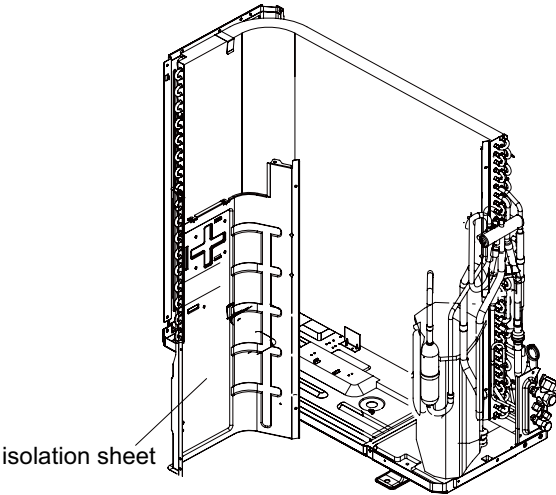
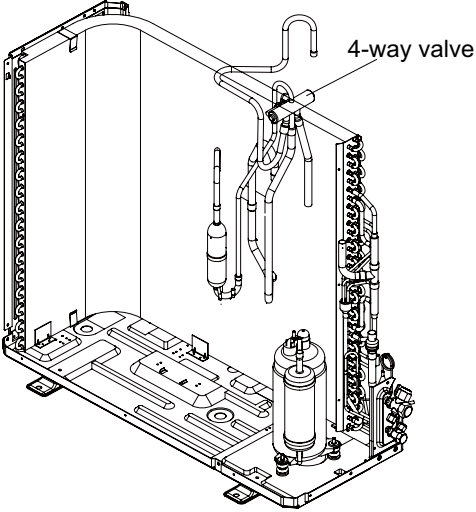
Steps	Procedure	
1. Remove big handle, valve cover and top cover		
	<p>Remove the screw connecting the big handle and right side plate, and then remove the big handle. Remove the screw connecting the valve cover and right side plate, and then remove the valve cover.</p>	 <p>handle</p> <p>valve cover</p>
2.Remove top panel		
	<p>Remove the screws connecting the top panel with the front panel and left and right side plate, and then remove the top panel.</p>	 <p>top panel</p>
3.Remove front side panel		
	<p>Loosen the screws connecting the front side panel and chassis. Remove the front side panel.</p>	 <p>front side panel</p>

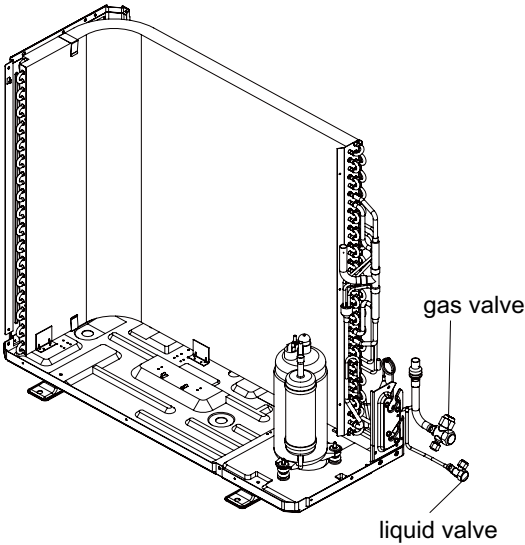
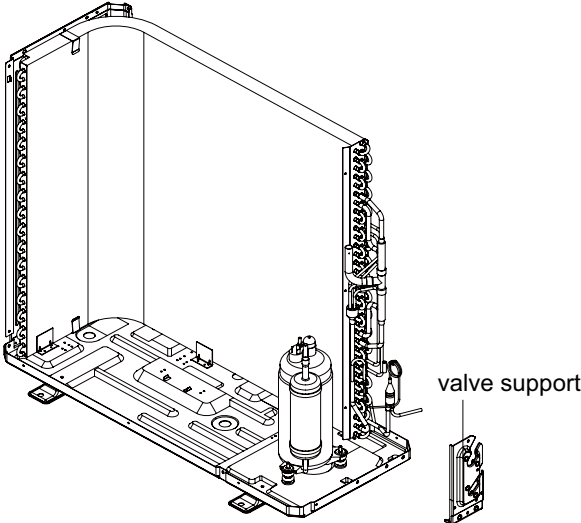
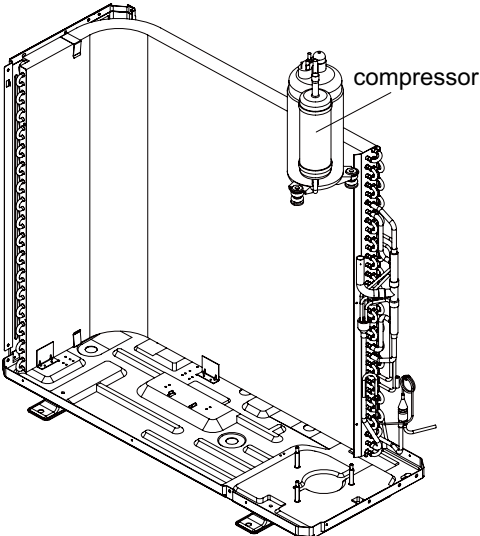


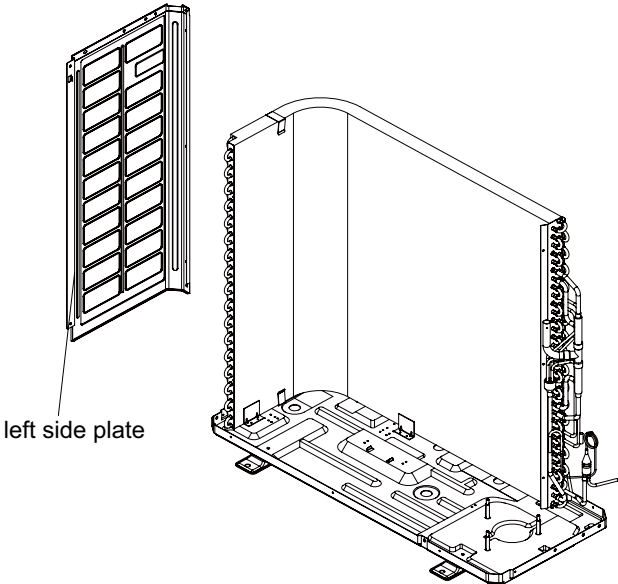
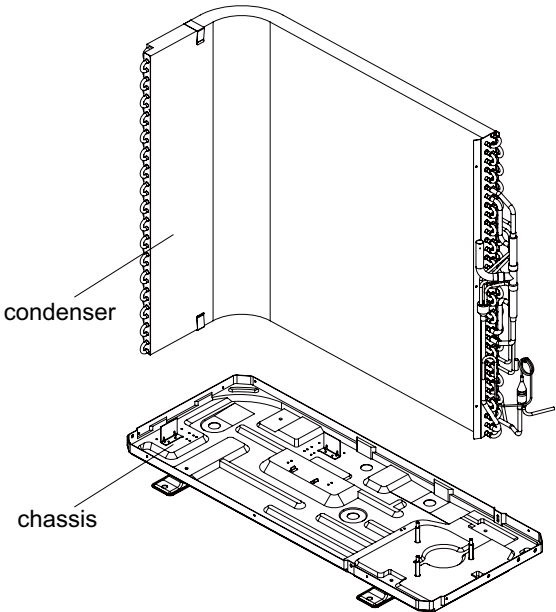
Steps	Procedure	
4.Remove grille and panel		 <p>grille</p> <p>panel</p>
a	Twist off the screws connecting the grille and panel, and then remove the grille.	
b	Twist off the screws connecting the panel, chassis and motor support with screwdriver, and then remove the panel.	
5.Remove right side plate		 <p>right side plate</p>
	Twist off the screws connecting the right side plate and chassis, valve support and condenser, and then remove the right side plate.	
6.Remove axial flow blade		 <p>axial flow blade</p>
	Twist off the nuts on blade with a wrench and then remove the axial flow blade.	



Steps	Procedure
7.Remove electric box	
a	<p data-bbox="199 526 699 646">Twist off the screws on electric box, cut off the tieline with scissors or pliers, pull out the wiring terminal, pull it upwards to remove the electric box.</p> 
b	<p data-bbox="199 978 691 1035">Twist off the screws on electric box with a screwdriver, and then remove the electric box.</p> 
8.Remove motor	
	<p data-bbox="199 1596 716 1686">Twist off the tapping screws fixing the motor, pull out the pin of leading wire for motor and then remove the motor.</p> 

Steps	Procedure
9.Remove motor support	
	<p>Twist off the tapping screws securing the motor support, pull it upwards and then remove the motor support.</p>  <p>motor support</p>
10.Remove isolation sheet	
	<p>Twist off the screws connecting isolation sheet and end plate of condenser and chassis, and then remove the isolation sheet.</p>  <p>isolation sheet</p>
11.Remove 4-way valve	
	<p>Unsolder the pipeline between compressor, condenser, gas and liquid valve, and then remove the 4-way valve. <b>(Note: Release all refrigerant before unsoldering.)</b></p>  <p>4-way valve</p>

Steps	Procedure
12.Remove gas valve and liquid valve	<p data-bbox="201 399 716 711">Twist off the two bolts fixing the valve sub-assy. Unsolder the soldering joint between gas valve and air-return pipe and then remove the gas valve. <b>(Note: When unsoldering the soldering joint, wrap the gas valve with wet cloth completely to avoid the damage to valve, and release all refrigerant completely first.)</b> Unsolder the soldering joint between liquid valve and connection pipe of liquid valve, and then remove the liquid valve.</p> 
13.Remove valve support	<p data-bbox="201 1048 732 1105">Twist off the screws connecting valve support and chassis, and then remove the valve support.</p> 
14.Remove compressor	<p data-bbox="201 1583 708 1640">Twist off the three foot nuts on compressor and then remove the compressor.</p> 

Steps	Procedure	
15.Remove left side plate	<p>Twist off the screws connecting the left side plate and chassis with a screwdriver, and then remove the left side plate.</p>	
16.Remove chassis and condenser		
	<p>Pull it upwards to separate the chassis and condenser.</p>	

# Appendix:

## Appendix 1: Reference Sheet of Celsius and Fahrenheit

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

Set temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
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 (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
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

- 16.40ft, 24.61ft, 26.25ft.

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 32.81ft at the basis of standard length, you should add 5ml of refrigerant oil for each additional 16.40ft 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)	49.21ft	16.40ft
7000 Btu/h(2051 W)	49.21ft	16.40ft
9000 Btu/h(2637 W)	49.21ft	32.81ft
12000 Btu/h(3516 W)	65.62ft	32.81ft
18000 Btu/h(5274 W)	80.02ft	32.81ft
24000 Btu/h(7032 W)	80.02ft	32.81ft
28000 Btu/h(8204 W)	98.43ft	32.81ft
36000 Btu/h(10548 W)	98.43ft	65.62ft
42000 Btu/h(12306 W)	98.43ft	65.62ft
48000 Btu/h(14064 W)	98.43ft	65.62ft

- When the length of connection pipe is above 16.40ft, 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.)
Φ1/4	Φ3/8 or Φ1/2	0.2	0.2
Φ1/4 or Φ3/8	Φ5/8 or Φ3/4	0.2	0.2
Φ1/2	Φ3/4 or Φ7/8	0.3	1.3
Φ5/8	Φ1 or Φ1 1/4	0.7	1.3
Φ3/4	/	2.7	2.7
Φ7/8	/	3.8	3.8

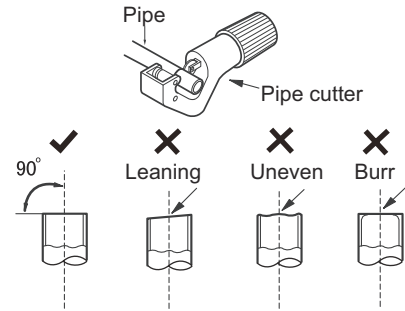
### Appendix 3: Pipe Flaring Method

**⚠ Note:**

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

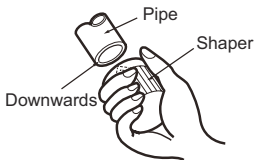
A: Cut the pipe

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



B: Remove the burrs

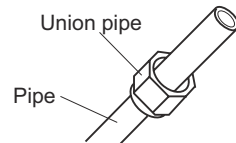
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.



C: Put on suitable insulating pipe

D: Put on the union nut

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



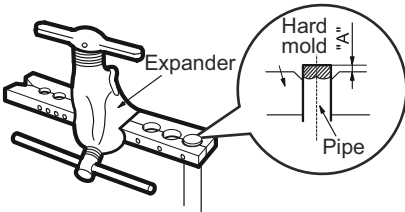
E: Flare the pipe

- Flare the pipe with expander.

**⚠ Note:**

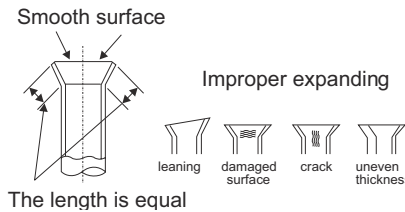
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(inch)	A(inch)	
	Max	Min
Φ1/4	2/39	1/36
Φ3/8	1/16	1/51
Φ1/2	1/14	1/51
Φ5/8	5/53	2/23



F: Inspection

- Check the quality of flaring port. If there is any blemish, flare 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.(°F)	Resistance(kΩ)	Temp.(°F)	Resistance(kΩ)	Temp.(°F)	Resistance(kΩ)	Temp.(°F)	Resistance(kΩ)
-2.2	138.1	68	18.75	138.2	3.848	208.4	1.071
-0.4	128.6	69.8	17.93	140	3.711	210.2	1.039
1.4	121.6	71.6	17.14	141.8	3.579	212	1.009
3.2	115	73.4	16.39	143.6	3.454	213.8	0.98
5	108.7	75.2	15.68	145.4	3.333	215.6	0.952
6.8	102.9	77	15	147.2	3.217	217.4	0.925
8.6	97.4	78.8	14.36	149	3.105	219.2	0.898
10.4	92.22	80.6	13.74	150.8	2.998	221	0.873
12.2	87.35	82.4	13.16	152.6	2.896	222.8	0.848
14	82.75	84.2	12.6	154.4	2.797	224.6	0.825
15.8	78.43	86	12.07	156.2	2.702	226.4	0.802
17.6	74.35	87.8	11.57	158	2.611	228.2	0.779
19.4	70.5	89.6	11.09	159.8	2.523	230	0.758
21.2	66.88	91.4	10.63	161.6	2.439	231.8	0.737
23	63.46	93.2	10.2	163.4	2.358	233.6	0.717
24.8	60.23	95	9.779	165.2	2.28	235.4	0.697
26.6	57.18	96.8	9.382	167	2.206	237.2	0.678
28.4	54.31	98.6	9.003	168.8	2.133	239	0.66
30.2	51.59	100.4	8.642	170.6	2.064	240.8	0.642
32	49.02	102.2	8.297	172.4	1.997	242.6	0.625
33.8	46.6	104	7.967	174.2	1.933	244.4	0.608
35.6	44.31	105.8	7.653	176	1.871	246.2	0.592
37.4	42.14	107.6	7.352	177.8	1.811	248	0.577
39.2	40.09	109.4	7.065	179.6	1.754	249.8	0.561
41	38.15	111.2	6.791	181.4	1.699	251.6	0.547
42.8	36.32	113	6.529	183.2	1.645	253.4	0.532
44.6	34.58	114.8	6.278	185	1.594	255.2	0.519
46.4	32.94	116.6	6.038	186.8	1.544	257	0.505
48.2	31.38	118.4	5.809	188.6	1.497	258.8	0.492
50	29.9	120.2	5.589	190.4	1.451	260.6	0.48
51.8	28.51	122	5.379	192.2	1.408	262.4	0.467
53.6	27.18	123.8	5.197	194	1.363	264.2	0.456
55.4	25.92	125.6	4.986	195.8	1.322	266	0.444
57.2	24.73	127.4	4.802	197.6	1.282	267.8	0.433
59	23.6	129.2	4.625	199.4	1.244	269.6	0.422
60.8	22.53	131	4.456	201.2	1.207	271.4	0.412
62.6	21.51	132.8	4.294	203	1.171	273.2	0.401
64.4	20.54	134.6	4.139	204.8	1.136	275	0.391
66.2	19.63	136.4	3.99	206.6	1.103	276.8	0.382

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

Temp.(°F)	Resistance(kΩ)		Temp.(°F)	Resistance(kΩ)		Temp.(°F)	Resistance(kΩ)		Temp.(°F)	Resistance(kΩ)
-2.2	181.4		68	25.01		138.2	5.13		208.4	1.427
-0.4	171.4		69.8	23.9		140	4.948		210.2	1.386
1.4	162.1		71.6	22.85		141.8	4.773		212	1.346
3.2	153.3		73.4	21.85		143.6	4.605		213.8	1.307
5	145		75.2	20.9		145.4	4.443		215.6	1.269
6.8	137.2		77	20		147.2	4.289		217.4	1.233
8.6	129.9		78.8	19.14		149	4.14		219.2	1.198
10.4	123		80.6	18.13		150.8	3.998		221	1.164
12.2	116.5		82.4	17.55		152.6	3.861		222.8	1.131
14	110.3		84.2	16.8		154.4	3.729		224.6	1.099
15.8	104.6		86	16.1		156.2	3.603		226.4	1.069
17.6	99.13		87.8	15.43		158	3.481		228.2	1.039
19.4	94		89.6	14.79		159.8	3.364		230	1.01
21.2	89.17		91.4	14.18		161.6	3.252		231.8	0.983
23	84.61		93.2	13.59		163.4	3.144		233.6	0.956
24.8	80.31		95	13.04		165.2	3.04		235.4	0.93
26.6	76.24		96.8	12.51		167	2.94		237.2	0.904
28.4	72.41		98.6	12		168.8	2.844		239	0.88
30.2	68.79		100.4	11.52		170.6	2.752		240.8	0.856
32	65.37		102.2	11.06		172.4	2.663		242.6	0.833
33.8	62.13		104	10.62		174.2	2.577		244.4	0.811
35.6	59.08		105.8	10.2		176	2.495		246.2	0.77
37.4	56.19		107.6	9.803		177.8	2.415		248	0.769
39.2	53.46		109.4	9.42		179.6	2.339		249.8	0.746
41	50.87		111.2	9.054		181.4	2.265		251.6	0.729
42.8	48.42		113	8.705		183.2	2.194		253.4	0.71
44.6	46.11		114.8	8.37		185	2.125		255.2	0.692
46.4	43.92		116.6	8.051		186.8	2.059		257	0.674
48.2	41.84		118.4	7.745		188.6	1.996		258.8	0.658
50	39.87		120.2	7.453		190.4	1.934		260.6	0.64
51.8	38.01		122	7.173		192.2	1.875		262.4	0.623
53.6	36.24		123.8	6.905		194	1.818		264.2	0.607
55.4	34.57		125.6	6.648		195.8	1.736		266	0.592
57.2	32.98		127.4	6.403		197.6	1.71		267.8	0.577
59	31.47		129.2	6.167		199.4	1.658		269.6	0.563
60.8	30.04		131	5.942		201.2	1.609		271.4	0.549
62.6	28.68		132.8	5.726		203	1.561		273.2	0.535
64.4	27.39		134.6	5.519		204.8	1.515		275	0.521
66.2	26.17		136.4	5.32		206.6	1.47		276.8	0.509



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

Temp.(°F)	Resistance(kΩ)	Temp.(°F)	Resistance(kΩ)	Temp.(°F)	Resistance(kΩ)	Temp.(°F)	Resistance(kΩ)
-20.2	853.5	50	98	120.2	18.34	190.4	4.754
-18.4	799.8	51.8	93.42	122	17.65	192.2	4.609
-16.6	750	53.6	89.07	123.8	16.99	194	4.469
-14.8	703.8	55.4	84.95	125.6	16.36	195.8	4.334
-13	660.8	57.2	81.05	127.4	15.75	197.6	4.204
-11.2	620.8	59	77.35	129.2	15.17	199.4	4.079
-9.4	580.6	60.8	73.83	131	14.62	201.2	3.958
-7.6	548.9	62.6	70.5	132.8	14.09	203	3.841
-5.8	516.6	64.4	67.34	134.6	13.58	204.8	3.728
-4	486.5	66.2	64.33	136.4	13.09	206.6	3.619
-2.2	458.3	68	61.48	138.2	12.62	208.4	3.514
-0.4	432	69.8	58.77	140	12.17	210.2	3.413
1.4	407.4	71.6	56.19	141.8	11.74	212	3.315
3.2	384.5	73.4	53.74	143.6	11.32	213.8	3.22
5	362.9	75.2	51.41	145.4	10.93	215.6	3.129
6.8	342.8	77	49.19	147.2	10.54	217.4	3.04
8.6	323.9	78.8	47.08	149	10.18	219.2	2.955
10.4	306.2	80.6	45.07	150.8	9.827	221	2.872
12.2	289.6	82.4	43.16	152.6	9.489	222.8	2.792
14	274	84.2	41.34	154.4	9.165	224.6	2.715
15.8	259.3	86	39.61	156.2	8.854	226.4	2.64
17.6	245.6	87.8	37.96	158	8.555	228.2	2.568
19.4	232.6	89.6	36.38	159.8	8.268	230	2.498
21.2	220.5	91.4	34.88	161.6	7.991	231.8	2.431
23	209	93.2	33.45	163.4	7.726	233.6	2.365
24.8	198.3	95	32.09	165.2	7.47	235.4	2.302
26.6	199.1	96.8	30.79	167	7.224	237.2	2.241
28.4	178.5	98.6	29.54	168.8	6.998	239	2.182
30.2	169.5	100.4	28.36	170.6	6.761	240.8	2.124
32	161	102.2	27.23	172.4	6.542	242.6	2.069
33.8	153	104	26.15	174.2	6.331	244.4	2.015
35.6	145.4	105.8	25.11	176	6.129	246.2	1.963
37.4	138.3	107.6	24.13	177.8	5.933	248	1.912
39.2	131.5	109.4	23.19	179.6	5.746	249.8	1.863
41	125.1	111.2	22.29	181.4	5.565	251.6	1.816
42.8	119.1	113	21.43	183.2	5.39	253.4	1.77
44.6	113.4	114.8	20.6	185	5.222	255.2	1.725
46.4	108	116.6	19.81	186.8	5.06	257	1.682
48.2	102.8	118.4	19.06	188.6	4.904	258.8	1.64

## Support Contact Information:

	Phone	Email
<b>Technical Support</b> Support during installation, commissioning, service and troubleshooting	1(844) 873-4443	<a href="mailto:BE-VRFTechSupport@jci.com">BE-VRFTechSupport@jci.com</a>
<b>Applications and Design</b> Presale assistance with equip applications and design support, as well as use of selection tool	1(844) 873-6755	<a href="mailto:BE-VRFApplicationDesign@jci.com">BE-VRFApplicationDesign@jci.com</a>
<b>Customer Service</b> Assistance ordering equipment, parts and accessories	1(844) 873-4445	<a href="mailto:BE-VRFCustomerService@jci.com">BE-VRFCustomerService@jci.com</a>
<b>Warranty</b> Assistance with warranty registration, warranty claims, etc.	1(844) 873-9768	<a href="mailto:BE-VRFWarranty@jci.com">BE-VRFWarranty@jci.com</a>
<b>Parts</b> Equipment and parts pre- and post-sale support	1(844) 873-4445	<a href="mailto:BE-VRFParts@jci.com">BE-VRFParts@jci.com</a>

Product improvement, specifications and appearance in this manual are subject to change without prior notice.