



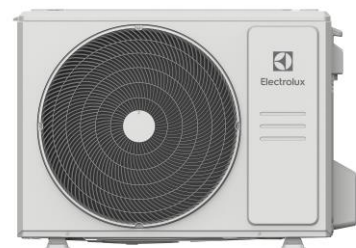
Electrolux

SERVICE MANUAL

Well-Being

SERVICE MANUAL

Air conditioner



- ES36K31BCC ES24K31BCC
- ES30K11BCC ES18K11BCC
- ES30K31BCC ES18K31BCC
- ES24K11BCC

Document Revisions

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[Table of Contents](#)

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2	<u>SAFETY</u>	6
1.1	Precautions	6
1.1.1	In case of Accidents or Emergency	6
1.2	Pre-Installation and Installation	7
1.3	Operation and Maintenance	7
2	<u>INFORMATION SERVICING (FOR FLAMMABLE MATERIALS)</u>	8
2.1	Checks to the area	8
2.2	Work procedure.....	8
2.3	Checking for presence of refrigerant	8
2.4	Presence of fire extinguisher	8
2.5	No ignition sources.....	9
2.6	Ventilated area	9
2.7	Checks to the refrigeration equipment.....	9
2.8	Checks to electrical devices	9
2.9	Repairs to sealed components	10
2.10	Repair to intrinsically safe components	10
2.11	Cabling	10
2.12	Detection of flammable refrigerants	10
2.13	Leak detection methods.....	10
2.14	Removal and evacuation.....	11
2.15	Charging procedures	11
2.16	Decommissioning	11
2.17	Labelling	12
2.18	Recovery	12
3	<u>PRODUCT FEATURE</u>	13
3.1	Appearance	13
3.2	Model list	13
3.3	Display Function.....	14
3.3.1	Display Function for (18-24k)	14
3.3.2	Display Function for (30-36k)	15
3.4	Safety Features	16

3.5	Function & Option.....	17
4	<u>SPECIFICATION</u>	25
4.1	System specification.....	25
4.2	Indoor daimension.....	33
4.3	Outdoor Dimension.....	33
4.3.1	Panel Plate D30: ES30K11BCCO, ES30K11BCCO, ES30K31BCCO, ES36K31BCCO	33
4.3.2	Panel Plate X430: ES24K11BCCO, ES24K31BCCO	34
4.3.3	Panel Plate X330: ES18K11BCCO, ES18K31BCCO	34
5	<u>FUNCTIONS</u>	35
5.1	Operation Mode and Temperature symbol	35
5.1.1	Operation Mode.....	35
5.1.2	Temperature symbol.....	35
5.2	Fan Mode.....	35
5.3	Cooling Mode.....	35
5.3.1	Compressor Control	35
5.3.2	Indoor Fan Control	35
5.3.3	Outdoor Fan Control	35
5.3.4	Condenser Temperature Protection (For the units have T3 sensor)	36
5.3.5	Evaporator Temperature Protection.....	36
5.4	Heating Mode(For Heat pump units only)	36
5.4.1	Compressor Control	36
5.4.2	Indoor Fan Control:	36
5.4.3	Outdoor Fan Control:.....	36
5.4.4	Defrosting mode	36
5.4.5	Evaporator Temperature Protection	37
5.5	Auto-mode	37
5.6	Drying mode	37
5.7	Forced operation function.....	37
5.8	Sleep function	38
5.9	Auto-Restart function.....	38
5.10	Optional Functions	38

5.10.1	8°C Heating	38
5.10.2	Self clean	38
5.10.3	Follow me.....	39
5.10.4	Silence	39
6	<u>INSTALLATION</u>	39
6.1	First Time Installation Check	39
6.2	Pipe Length and Piping difference level.....	39
6.3	Leak test (soap water method)	40
6.4	Vacuum Methode	40
6.5	Re-charge refrigerant.....	41
6.6	Re-Installation for indoor only	42
6.6.1	Refrigerant pump down	42
6.6.2	Vacuum Method.....	43
6.7	Re-Installation for outdoor only.....	44
6.7.1	System vacumme	44
6.7.2	Refrigerant charging.....	45
7	<u>ELECTRICAL WIRING DIAGRAMS</u>	46
7.1	Indoor wiring diagram symbol.....	46
7.2	Outdoor wiring diagram symbol.....	46
7.3	Indoor unit wiring diagram	47
7.3.1	Wiring diagram model: ES36K31BCCI	47
7.3.2	Wiring diagram model: ES24K11BCCI, ES24K31BCCI	48
7.3.3	Wiring diagram model: ES30K11BCCI, ES30K31BCCI.....	49
7.3.4	Wiring diagram model: ES18K11BCCI, ES18K31BCCI.....	50
7.4	Outdoor unit wiring diagram	51
7.4.1	Wiring diagrammodel: ES36K31BCCO	51
7.4.2	Wiring diagram model: ES30K11BCCO, ES30K31BCCO	52
7.4.3	Wiring diagram model: ES24K11BCCO, ES24K31BCCO	53
7.4.4	Wiring diagram model: ES24K11BCCO, ES24K31BCCO	54
8	<u>UNIT DISASSEMBLY</u>	55
8.1	Disassembly indoor unit (18-24 K)	55

8.1.1	Front panel	55
8.1.2	Electrical parts	60
8.1.3	Evaporator	62
8.1.4	Fan motor and fan.....	64
8.1.5	Stepping motor	65
8.1.6	Drain Hose	66
8.2	Disassembly indoor unit (27-36 K)	67
8.2.1	Front panel	67
8.2.2	Electrical parts (Antistatic gloves must be worn.)	71
8.2.3	Electrical parts (Antistatic gloves must be worn.)	73
8.2.4	Fan motor and fan.....	74
8.2.5	Step motor.....	75
8.2.6	Drain Hose	76
8.3	Outdoor Unit Disassembly.....	77
8.3.1	Panel Plate (D30) for 30 -36 K	77
8.3.2	Panel Plate (X430) for 24 K	80
8.3.3	Panel Plate (X330) for 18 K	81
8.3.4	Electrical parts	83
8.3.5	Fan Assembly.....	87
8.3.6	Fan Motor.....	87
8.3.7	Sound blanket.....	88
8.3.8	Four-way valve (for heat pump models).....	88
8.3.9	Compressor	89

9 TROUBLESHOOTING 91

9.1	Safety Caution.....	91
9.2	General Troubleshooting	92
9.2.1	Error Display (Indoor Unit)	92
9.3	Information Inquiry	92
9.4	Error Diagnosis and Troubleshooting Without Error Code.....	93
9.4.1	Troubleshooting list.....	93
9.4.2	Quick Maintenance by Error Code.....	95

7.6 EH 0b (Indoor PCB/display board communication error diagnosis and solution.....	103
9.5 EL 0C (Refrigerant leakage detection diagnosis and solution).....	104
9.6 PC 03 (High pressure protection).....	105
10 CHECK PROCEDURES	106
10.1 Temperature Sensor Check	106
10.2 Fan Motor Check.....	107
10.3 Temperature Sensor Resistance Value Table for T1, T2, T3 and T4 (°C -K).....	108
10.4 Temperature Sensor Resistance Value Table for TP(for some units) (°C -K)	109
10.5 Pressure on Service Port	110
10.5.1 Cooling chart (R410A)	110
10.5.2 Heating chart(R410A).....	111
10.5.3 Cooling chart(R22)	112
10.5.4 Heating chart(R22).....	113
10.5.5 Cooling chart(R32)	114
10.5.6 Heating chart(R32).....	115
10.5.7 System Pressure Table-R22	116
10.5.8 System Pressure Table-R410A	117
10.5.9 System Pressure Table-R32	118

1 PURPOSE OF THIS MANUAL

The purpose of this Service Manual is to provide Service Engineers who are already familiar with the repair procedures with information regarding: **Appliances**

fitted with **NIUX** electronic control systems.

The manual deals with the following topics:

- General characteristics
- Control panel
- Guide to diagnostics
- Technical and functional characteristics
- Access

Document Revisions

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00	06/2021	Document creation	Yannanun Suwannarach

2 SAFETY

1.1 Precautions

To prevent personal injury, or property or unit damage, adhere to all precautionary measures and instructions outlined in this manual. Before servicing a unit, refer to this service manual and its relevant sections. Failure to adhere to all precautionary measures listed in this section may result in personal injury, damage to the unit or to property, or in extreme cases, death.



WARNING indicates a potentially hazardous situation which if not avoided could result in serious personal injury, or death.



CAUTION indicates a potentially hazardous situation which if not avoided could result in minor or moderate personal injury, or unit damage.

1.1.1 In case of Accidents or Emergency



WARNING

- If a gas leak is suspected, immediately turn off the gas and ventilate the area if a gas leak is suspected before turning the unit on.
- If strange sounds or smoke is detected from the unit, turn the breaker off and disconnect the power supply cable.
- If the unit comes into contact with liquid, contact an authorized service centre.
- If liquid from the batteries makes contact with skin or clothing, immediately rinse or wash the area well with clean water.
- Do not insert hands or other objects into the air inlet or outlet while the unit is plugged in.
- Do not operate the unit with wet hands.

- Do not use a remote controller that has previously been exposed to battery damage or battery leakage.



CAUTION

- Clean and ventilate the unit at regular intervals when operating it near a stove or near similar devices.
- Do not use the unit during severe weather conditions. If possible, remove the product from the window before such occurrences.

1.2 Pre-Installation and Installation



WARNING

- Use this unit only on a dedicated circuit.
- Damage to the installation area could cause the unit to fall, potentially resulting in personal injury, property damage, or product failure.
- Only qualified personnel should disassemble, install, remove, or repair the unit.
- Only a qualified electrician should perform electrical work. For more information, contact your dealer, seller, or an authorized service centre.



CAUTION

- While unpacking be careful of sharp edges around the unit as well as the edges of the fins on the con-denser and evaporator.

1.3 Operation and Maintenance



WARNING

Do not use defective or under-rated circuit breakers.

Ensure the unit is properly grounded and that a dedicated circuit and breaker are installed.

Do not modify or extend the power cable. Ensure the power cable is secure and not damaged during operation.

- Do not unplug the power supply plug during operation.
- Do not store or use flammable materials near the unit.
- Do not open the inlet grill of the unit during operation.
- Do not touch the electrostatic filter if the unit is equipped with one.
- Do not block the inlet or outlet of air flow to the unit.
- Do not use harsh detergents, solvents, or similar items to clean the unit. Use a soft cloth for cleaning.
- Do not touch the metal parts of the unit when removing the air filter as they are very sharp.
- Do not step on or place anything on the unit or outdoor units.
- Do not drink water drained from the unit
- Avoid direct skin contact with water drained from the unit.
- Use a firm stool or step ladder according to manufacturer procedures when cleaning or maintaining the unit.



CAUTION

- Do not install or operate the unit for an extended period of time in areas of high humidity or in an environment directly exposing it to sea wind or salt spray.
- Do not install the unit on a defective or damaged installation stand, or in an unsecure location.
- Ensure the unit is installed at a level position
- Do not install the unit where noise or air discharge created by the outdoor unit will negatively impact the environment or nearby residences.
- Do not expose skin directly to the air discharged by the unit for prolonged periods of time.
- Ensure the unit operates in areas water or other liquids.
- Ensure the drain hose is installed correctly to ensure proper water drainage.
- When lifting or transporting the unit, it is recommended that two or more people are used for this task.
- When the unit is not to be used for an extended time, disconnect the power supply or turn off the breaker

2 INFORMATION SERVICING (FOR FLAMMABLE MATERIALS)

2.1 Checks to the area

- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized.
- For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

2.2 Work procedure

- Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.
- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.
- Work in confined spaces shall be avoided.
- The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

2.3 Checking for presence of refrigerant

- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. no sparking, adequately sealed or intrinsically safe.

2.4 Presence of fire extinguisher

- If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
- Have a dry powder or CO₂ fire extinguisher adjacent to the charging area.

2.5 No ignition sources

- No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion.
- All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space.
- Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.
- NO SMOKING signs shall be displayed.

2.6 Ventilated area

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

2.7 Checks to the refrigeration equipment

- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:
- the charge size is in accordance with the room size within which the refrigerant containing parts are installed.
- the ventilation machinery and outlets are operating adequately and are not obstructed.
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant; marking to the equipment continues to be visible and legible.
- markings and signs that are illegible shall be corrected.
- refrigeration pipe or components are installed in
- a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

2.8 Checks to electrical devices

- Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised. Initial safety checks shall include:
- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- That there no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity of earth bonding.

2.9 Repairs to sealed components

- During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
- Ensure that apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

2.10 Repair to intrinsically safe components

- Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
- Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

2.11 Cabling

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

2.12 Detection of flammable refrigerants

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

2.13 Leak detection methods

- The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration.
- (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipework.
- If a leak is suspected, all naked flames shall be removed or extinguished.

- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

2.14 Removal and evacuation

- When breaking into the refrigerant circuit to make repairs or for any other purpose, conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration.
- The following procedure shall be adhered to:
 - Remove refrigerant.
 - Purge the circuit with inert gas.
 - Evacuate.
 - Purge again with inert gas.
 - Open the circuit by cutting or brazing.
- The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be flushed with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task. Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipework are to take place.
- Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

2.15 Charging procedures

- In addition to conventional charging procedures, the following requirements shall be followed:
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system, it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

2.16 Decommissioning

- Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken.
- In case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.
- Become familiar with the equipment and its operation.
- Isolate system electrically.
Before attempting the procedure ensure that:
mechanical handling equipment is available, if required, for handling refrigerant cylinders.

- all personal protective equipment is available and being used correctly.
- the recovery process is supervised at all times by a competent person.
- recovery equipment and cylinders conform to the appropriate standards.
- Pump down refrigerant system, if possible.
- If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Make sure that cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with manufacturer's instructions.
- Do not overfill cylinders. (No more than 80 % volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.
- When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

2.17 Labelling

- Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

2.18 Recovery

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct numbers of cylinders for holding the total system charge are available. All cylinders to be used are designated
- for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.
- Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order.
- Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.
- The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed
- to accelerate this process. When oil is drained from a system, it shall be carried out safely.

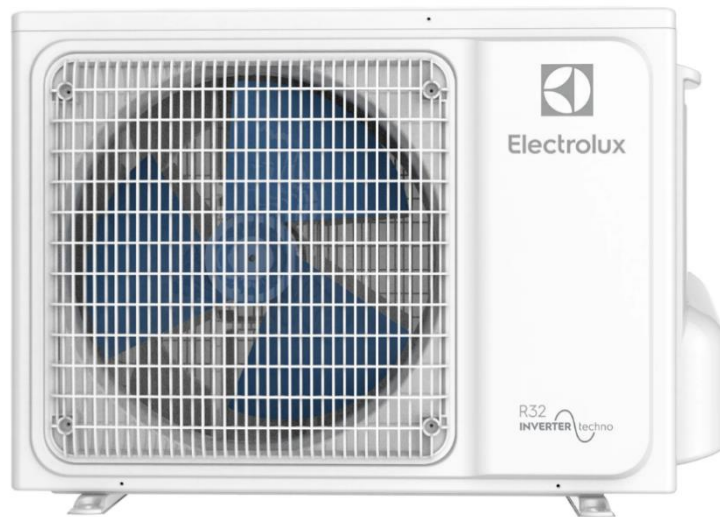
3 PRODUCT FEATURE

3.1 Appearance

Indoor Unit



Outdoor unit

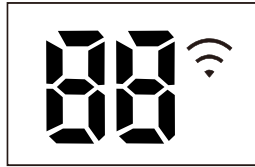


3.2 Model list

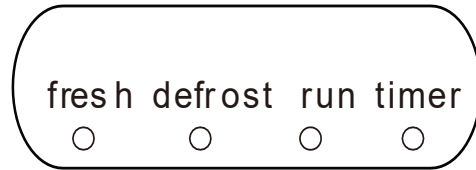
No.	Model	No.	Model
1	ES30K11BCCO	5	ES24K11BCCO
2	ES30K31BCCO	6	ES18K31BCCO
3	ES36K31BCCO	7	ES24K31BCCO
4	ES18K11BCCO		

3.3 Display Function








3.3.1 Display Function for (18-24k)



Display A



Display B

Display		Function
fresh		Fresh (available on select units only)
defrost		Defrost
run		When the unit is on
timer		When TIMER is on
		Wi-Fi control (available on select units only)
	Temperature value	Temperature
	 (3s)	Activation of Timer ON, Fresh, Swing, Turbo, or Silent
	 (3s)	Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent
		Defrost
		Active Clean (For Invertersplit type) or self-cleaning (For Fixed-speed type)
		Heating in room temperature under 8°C

Note: Please select the display function according to your purchase product.

3.3.2 Display Function for (30-36k)



(A)



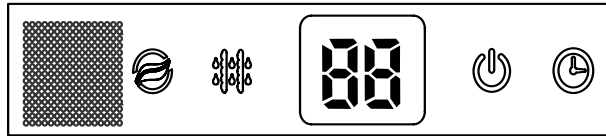
(B)



(C)



(D)



(E)

Display	Function
	Fresh(available on select units only)
	Defrost
	When the unit is on
	When TIMER is on
ECO	ECO function (available on select units only)
°C	Lights up in different colour according to the operation mode(some units) :
	Under COOL and DRY mode, it displays as cool colour.Under
	HEAT mode, it displays as warm colour.
	When Wireless Control feature is activated(some units)
88	Temp. Valve Temperature value Temperature
	(3S) (3s) Activation of Timer ON, Fresh, Swing, Turbo, or Silent
	(3S) (3s) Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent
	Defrost
	Warming in heating mode
	Self-clean (available on select units only)
	Heating in room temperature under 8°C

3.4 Safety Features

Compressor three-minute delay at restart

Compressor functions are delayed for up to one minute upon the first start-up of the unit and are delayed for up to three minutes upon subsequent unit restarts.

Zero crossing detection error protection (Except for DC fan units)

If AC cannot detect zero crossing signal for 4 minutes or the zero-crossing signal time interval is not correct, the unit will stop, and the LED will display the failure. The correct zero crossing signal time interval should be between 6-13ms.

Automatic shutoff based on fan speed

If the indoor fan speed registers below 300RPM for an extended period of time, the unit ceases operation and the corresponding error code is displayed on the indoor unit.

Indoor fan delayed operation

- When the unit starts, the louver is automatically activated, and the indoor fan will operate after a period of 4 seconds.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold wind function. Sensor redundancy and automatic shutoff

If one temperature sensor malfunctions, the air conditioner ceases operation. Refrigerant leakage detection

This function is active only when cooling mode is selected. It will detect if the compressor is being damaged by refrigerant leakage or by compressor overload. This is measured using the coil temperature of evaporator T2 when the compressor is in operation.

3.5 Function & Option

Model Indoor	ES30K11BCCI	ES30K11BCCI	ES30K31BCCI
Model Outdoor	ES30K11BCCO	ES30K11BCCO	ES30K31BCCO
PNC Indoor	956004875	956004887	956004900
PNC Outdoor	956005805	956005817	956005830
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/4/-	4/4/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	Yes(S/W)	Yes(S/W)	No
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	Yes	Yes	Yes
Air Control - Left/Right Swing	Yes	Yes	Yes
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	Yes	Yes	Yes
Indoor 3D Airflow	Yes	Yes	Yes
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

Function & Option

Model Indoor	ES30K31BCCI	ES30K31BCCI	ES36K31BCCI
Model Outdoor	ES30K31BCCO	ES30K31BCCO	ES36K31BCCO
PNC Indoor	956004906	956005791	956004878
PNC Outdoor	956005836	956005844	956005808
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/3/-	4/3/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	No	No	Yes(W)
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	Yes	Yes	Yes
Air Control - Left/Right Swing	Yes	Yes	Yes
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	Yes	Yes	Yes
Indoor 3D Airflow	Yes	Yes	Yes
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

Function & Option

Model Indoor	ES36K31BCCI	ES36K31BCCI	ES36K31BCCI
Model Outdoor	ES36K31BCCO	ES36K31BCCO	ES36K31BCCO
PNC Indoor	956004890	956004901	956004908
PNC Outdoor	956005820	956005831	956005838
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/3/-	4/3/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	Yes(W)	Yes(W)	Yes(W)
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	Yes	Yes	Yes
Air Control - Left/Right Swing	Yes	Yes	Yes
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	Yes	Yes	Yes
Indoor 3D Airflow	Yes	Yes	Yes
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

Function & Option

Model Indoor	ES36K31BCCI	ES18K11BCCI	ES24K11BCCI
Model Outdoor	ES36K31BCCO	ES18K11BCCO	ES24K11BCCO
PNC Indoor	956005793	956004869	956004872
PNC Outdoor	956005846	956005799	956005802
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/3/-	4/3/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	Yes(W)	Yes(W)	Yes(W)
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	Yes	Yes	Yes
Air Control - Left/Right Swing	Yes	Yes	Yes
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	Yes	Yes	Yes
Indoor 3D Airflow	Yes	Yes	Yes
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

Function & Option

Model Indoor	ES18K11BCCI	ES24K11BCCI	ES18K31BCCI
Model Outdoor	ES18K11BCCO	ES24K11BCCO	ES18K31BCCO
PNC Indoor	956004881	956004884	956004898
PNC Outdoor	956005811	956005814	956005828
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/3/-	4/3/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	Yes(W)	Yes(W)	Yes(W)
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	Yes	Yes	Yes
Air Control - Left/Right Swing	Yes	Yes	Yes
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	Yes	Yes	Yes
Indoor 3D Airflow	Yes	Yes	No
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

Function & Option

Model Indoor	ES24K31BCCI	ES18K31BCCI	ES24K31BCCI
Model Outdoor	ES24K31BCCO	ES18K31BCCO	ES24K31BCCO
PNC Indoor	956004899	956004902	956004904
PNC Outdoor	956005829	956005832	956005834
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/3/-	4/3/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	Yes(W)	Yes(W)	Yes(W)
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	Yes	Yes	Yes
Air Control - Left/Right Swing	Yes	Yes	Yes
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	Yes	Yes	Yes
Indoor 3D Airflow	No	No	No
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

Function & Option

Model Indoor	ES18K31BCCI	ES24K31BCCI	ES18K11BCCI
Model Outdoor	ES18K31BCCO	ES24K31BCCO	ES18K11BCCO
PNC Indoor	956005787	956005789	956005852
PNC Outdoor	956005840	956005842	956005866
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/3/-	4/3/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	Yes(W)	Yes(W)	Yes(W)
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	Yes	Yes	No
Air Control - Left/Right Swing	Yes	Yes	No
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	Yes	Yes	No
Indoor 3D Airflow	No	No	No
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

Function & Option

Model Indoor	ES24K11BCCI	ES18K11BCCI	ES24K11BCCI
Model Outdoor	ES24K11BCCO	ES18K11BCCO	ES24K11BCCO
PNC Indoor	956005855	956005860	956005863
PNC Outdoor	956005869	956005874	956005877
1W Standby	No	No	No
24 hr. Timer ON/OFF	Yes	Yes	Yes
Air Direction Control - Up/Down Swing	Yes	Yes	Yes
Auto Mode	Yes	Yes	Yes
Remote model	RG10	RG10	RG10
High-Delicate dust filter	Yes	Yes	Yes
Indoor Speed [Cooling /Fan/Heating]	4/3/-	4/3/-	4/3/-
Indoor Light Switch Off	Yes	Yes	Yes
Low Pressure [Switch / Software]	Yes(W)	Yes(W)	Yes(W)
Main Filter Type	Anti-Bact Mesh	Anti-Bact Mesh	Anti-Bact Mesh
Memory Function	Yes	Yes	Yes
Remote Backlight Display	Yes	Yes	Yes
Self-diagnose	Yes	Yes	Yes
Sleep Mode	Yes	Yes	Yes
Turbo Mode	Yes	Yes	Yes
WIFI(Connectivity)	No	No	No
Active Carbon filter	No	No	No
Air Control - Left/Right Swing	No	No	No
Follow me (I Feel)	Yes	Yes	Yes
HEPA (Bio) filter	No	No	No
Indoor 3D Airflow	No	No	No
Low Temperature Heating	No	No	No
Low Voltage Start-up	No	No	No
Remote Controller Holder	Yes	Yes	Yes
Silence Mode (Quiet)	No	No	No
Silver Ion filter	No	No	No
Indoor Dual drainage holes	Yes	Yes	Yes

4 SPECIFICATION

4.1 System specification

Model Indoor	ES30K11BCCI	ES30K11BCCI	ES30K31BCCI
Model Outdoor	ES30K11BCCO	ES30K11BCCO	ES30K31BCCO
PNC Indoor	956004875	956004887	956004900
PNC Outdoor	956005805	956005817	956005830
Flow Type	Cooling Only	Cooling Only	Cooling Only
Market	UAE	QAT	OMN
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	27140	27140	27920
EER [Btu/h]/W	10.950	10.953	11.841
Dehumidification [l/hour]	3	3	3
Room Temp. setting [°C]	20 ~ 28	17 ~ 30	17 ~ 30
Ambient temp. sensor	T3	T3	T3
Operation Temp - cooling [°C]	18 ~ 54	18 ~ 54	18 ~ 54
Cool area [m ²]	36~53	36~53	36~53
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	10.77	10.77	10.71
Power input - Cooling [W]	2478	2478	2358
Maximum Current [A]	22	22	25
Maximum Power Input [W]	4000	4000	4000
Starting Current	58	58	58
Power Supplied	Outdoor	Outdoor	Outdoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	/
Connection Wiring [mm ²]	4x1.0 (Optional)	4x1.0 (Optional)	4x1.0 (Optional)
Compressor Model	PA291X3CS-7MTM	PA291X3CS-7MTM	PA291X3CS-7MTM
Compressor Type	Rotary	Rotary	Rotary
Indoor Fan Motor Type	AC	AC	
Indoor Fan Motor Model	YKFG-60-4-2	YKFG-60-4-2	YKFG-60-4-2
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	YKT-60-6-40	YKT-60-6-40	YKT-60-6-40
Indoor Motor Fan RPM [C/H]	1180/1080/900	1180/1080/900	1180/1080/900
Indoor Sound Pressure [dB] A	50.6/47.6/41.5	50.6/47.6/41.5	49.5/44.5/39.5
Outdoor Motor Fan [C/H]	870/-/820	870/-/820	870/820
Outdoor Sound Pressure [dB] A	58.6	58.6	58.5
Refrigerant Name	R410A	R410A	R410A
Refrigeration Charge [g]	1900	1900	2400
Design pressure H/L [Mpa]	4.8/1.5	4.8/1.5	4.5/1.5
Piping Liquid /gas [mm]	Φ9.52/Φ15.9 (3/8"/5/8")	Φ9.52/Φ15.9 (3/8"/5/8")	Φ9.52/Φ15.9 (3/8"/5/8")
Indoor Unit Weight [kg]	19.9	19.9	21.8
Outdoor Unit Weight [kg]	61.5	61.5	66.3
Indoor Dimension [mm]	1259x282x362	1259x282x362	1259x282x362
Outdoor Dimension [mm]	946x410x810	946x410x810	946x410x810

System specification

Model Indoor	ES30K31BCCI	ES30K31BCCI	ES36K31BCCI
Model Outdoor	ES30K31BCCO	ES30K31BCCO	ES36K31BCCO
PNC Indoor	956004906	956005791	956004878
PNC Outdoor	956005836	956005844	956005808
Flow_Type	Cooling_Only	Cooling_Only	Cooling_Only
Market	BAH	KWT	UAE
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	27920	27920	31400
EER [Btu/h]/W	11.841	11.841	12.000
Dehumidification [l/hour]	3	3	3.6
Room Temp. setting [°C]	17~30	17~30	20~28
Ambient temp.sensor	T3	T4	T3
Operation Temp - cooling [°C]	18~54	18~54	18~52
Cool area [m ²]	36~53	36~53	43 ~ 63
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	10.71	10.64	12.6
Power input - Cooling [W]	2358	2358	2615
Maximum Current [A]	25	25	20
Maximum Power Input [W]	4000	4000	4000
Starting Current	58	58	67
Annual Energy [Kw.h/y]	/	/	6160
Energy Class	/	/	2
Power Supplied	Outdoor	Outdoor	Outdoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	No
Connection Wiring [mm ²]	4x1.0 (Optional)	4x1.0 (Optional)	4x1.0 (Optional)
Compressor Model	PA291X3CS-7MTM	PA291X3CS-7MTM	ATH325MV-C9EU
Compressor Type	Rotary	Rotary	TWIN-ROTARY
Indoor Fan Motor Type	AC	AC	DC
Indoor Fan Motor Model	YKFG-60-4-2	YKFG-60-4-2	ZKFP-58-8-1-5
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	YKT-60-6-40	YKT-60-6-40	ZKFN-120-8-2
Indoor Motor Fan RPM [C/H]	1180/1080/900	1180/1080/900	1230/1080/980
Indoor Sound Pressure [dB] A	49.5/44.5/39.5	49.5/44.5/39.5	50.5/47/43.5
Outdoor Motor Fan [C/H]	870/820	870/820	940
Outdoor Sound Pressure [dB] A	58.5	58.5	61.5
Refrigerant_Name	R410A	R410A	R410A
Refrigeration Charge [g]	2400	2400	2600
Design pressure H/L [Mpa]	4.5/1.5	4.5/1.5	4.8/1.5
Piping Liquid /gas [mm]	Φ9.52/Φ15.9 (3/8"/5/8")	Φ9.52/Φ15.9 (3/8"/5/8")	Φ9.52/Φ15.9 (3/8"/5/8")
Indoor Unit Weight [kg]	21.8	21.8	19.6
Outdoor Unit Weight [kg]	66.3	66.3	68.5
Indoor Dimension [mm]	1259x282x362	1259x282x362	1259x282x362
Outdoor Dimension [mm]	946x410x810	946x410x810	946x410x810

System specification

Model Indoor	ES36K31BCCI	ES36K31BCCI	ES36K31BCCI
Model Outdoor	ES36K31BCCO	ES36K31BCCO	ES36K31BCCO
PNC Indoor	956004890	956004901	956004908
PNC Outdoor	956005820	956005831	956005838
Flow Type	Cooling Only	Cooling Only	Cooling Only
Market	QAT	OMN	BAH
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	31400	31400	31400
EER [Btu/h]/W	12.000	12.000	12.000
Dehumidification [l/hour]	3.6	3.6	3.6
Room Temp. setting [°C]	17~30	17~30	17~30
Ambient temp. sensor	T3	T3	T3
Operation Temp - cooling [°C]	18~52	18~52	18~52
Cool area [m ²]	43 ~ 63	43 ~ 63	43 ~ 63
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	12.6	12.6	12.6
Power input - Cooling [W]	2615	2615	2615
Maximum Current [A]	20	20	20
Maximum Power Input [W]	4000	4000	4000
Starting Current	67	67	67
Annual Energy [Kw.h/y]	/	/	/
Energy Class	/	/	/
Power Supplied	Outdoor	Outdoor	Outdoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	No
Connection Wiring [mm ²]	4x1.0 (Optional)	4x1.0 (Optional)	4x1.0 (Optional)
Compressor Model	ATH325MV-C9EU	ATH325MV-C9EU	ATH325MV-C9EU
Compressor Type	TWIN-ROTARY	TWIN-ROTARY	TWIN-ROTARY
Indoor Fan Motor Type	DC	DC	DC
Indoor Fan Motor Model	ZKFP-58-8-1-5	ZKFP-58-8-1-5	ZKFP-58-8-1-5
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	ZKFN-120-8-2	ZKFN-120-8-2	ZKFN-120-8-2
Indoor Motor Fan RPM [C/H]	1230/1080/980	1230/1080/980	1230/1080/980
Indoor Sound Pressure [dB] A	50.5/47/43.5	50.5/47/43.5	50.5/47/43.5
Outdoor Motor Fan [C/H]	940	940	940
Outdoor Sound Pressure [dB] A	61.5	61.5	61.5
Refrigerant Name	R410A	R410A	R410A
Refrigeration Charge [g]	2600	2600	2600
Design pressure H/L [Mpa]	4.8/1.5	4.8/1.5	4.8/1.5
Piping Liquid /gas [mm]	Φ9.52/Φ15.9 (3/8"/5/8")	Φ9.52/Φ15.9 (3/8"/5/8")	Φ9.52/Φ15.9 (3/8"/5/8")
Indoor Unit Weight [kg]	19.6	19.6	19.6
Outdoor Unit Weight [kg]	68.5	68.5	68.5
Indoor Dimension [mm]	1259x282x362	1259x282x362	1259x282x362
Outdoor Dimension [mm]	946x410x810	946x410x810	946x410x810

System specification

Model Indoor	ES36K31BCCI	ES18K11BCCI	ES24K11BCCI
Model Outdoor	ES36K31BCCO	ES18K11BCCO	ES24K11BCCO
PNC Indoor	956005793	956004869	956004872
PNC Outdoor	956005846	956005799	956005802
Flow Type	Cooling Only	Cooling Only	Cooling Only
Market	KWT	UAE	UAE
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	31400	18000	22000
EER [Btu/h]/W	11.500	11.765	10.732
Dehumidification [l/hour]	3.6	1.8	2.4
Room Temp. setting [°C]	17~30	20~28	20~28
Ambient temp.sensor	T4	T3	T3
Operation Temp - cooling [°C]	18~52	18~52	18~52
Cool area [m ²]	43 ~ 63	24 ~ 35	31 ~ 46
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	13.6	6.79	8.68
Power input - Cooling [W]	2730	1530	2050
Maximum Current [A]	20	13.5	19
Maximum Power Input [W]	4000	2250	3300
Starting Current	67	42	48
Annual Energy [Kw.h/y]	/	/	/
Energy Class	/	/	/
Power Supplied	Outdoor	Indoor	Indoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	No
Connection Wiring [mm ²]	4x1.0 (Optional)	2.5x3	2.5x4
Compressor Model	ATH325MV-C9EU	PA180G2C-7FTS	ASG240V1SFT
Compressor Type	TWIN-ROTARY	ROTARY	ROTARY
Indoor Fan Motor Type	DC	AC	AC
Indoor Fan Motor Model	ZKFP-58-8-1-5	YKFG-45-4-22-13	YKFG-45-4-22-13
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	ZKFN-120-8-2	YKT-48-6-219-1	YKT-65-6-240L
Indoor Motor Fan RPM [C/H]	1230/1080/980	1230/1120/1040/980	1280/1120/1050/950
Indoor Sound Pressure [dB] A	50.5/47/43.5	48/46/43/40	48.5/45/42/40
Outdoor Motor Fan [C/H]	940	890	825
Outdoor Sound Pressure [dB] A	61.5	56	59
Refrigerant Name	R410A	R410A	R410A
Refrigeration Charge [g]	2600	1040	1550
Design pressure H/L [Mpa]	4.8/1.5	4.8/1.5	4.8/1.5
Piping Liquid /gas [mm]	Φ9.52/Φ15.9 (3/8"/5/8")	Φ6.35/Φ12.7 (1/4"/1/2")	Φ9.52/Φ15.9 (3/8"/5/8")
Indoor Unit Weight [kg]	19.6	14.9	14.8
Outdoor Unit Weight [kg]	68.5	39.5	47
Indoor Dimension [mm]	1259x282x362	1082x234x337	1082x234x337
Outdoor Dimension [mm]	946x410x810	805x330x554	890x342x673

System specification

Model Indoor	ES18K11BCCI	ES24K11BCCI	ES18K31BCCI
Model Outdoor	ES18K11BCCO	ES24K11BCCO	ES18K31BCCO
PNC Indoor	956004881	956004884	956004898
PNC Outdoor	956005811	956005814	956005828
Flow Type	Cooling Only	Cooling Only	Cooling Only
Market	QAT	QAT	OMN
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	18000	22000	18100
EER [Btu/h]/W	11.765	10.732	12.500
Dehumidification [l/hour]	1.8	2.4	1.8
Room Temp. setting [°C]	16~30	16~30	16~30
Ambient temp. sensor	T3	T3	T3
Operation Temp - cooling [°C]	18~52	18~52	18~52
Cool area [m ²]	24 ~ 35	31 ~ 46	24 ~ 35
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	6.79	8.68	6.38
Power input - Cooling [W]	1530	2050	1448
Maximum Current [A]	13.5	19	11
Maximum Power Input [W]	2250	3300	2050
Starting Current	42	48	42
Annual Energy [Kw.h/y]	/	/	/
Energy Class	/	/	/
Power Supplied	Indoor	Indoor	Indoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	No
Connection Wiring [mm ²]	2.5x3	2.5x4	2.5x3
Compressor Model	PA180G2C-7F7S	ASG240V1SFT	PA180G2C-7F7S
Compressor Type	ROTARY	ROTARY	ROTARY
Indoor Fan Motor Type	AC	AC	AC
Indoor Fan Motor Model	YKFG-45-4-22-13	YKFG-45-4-22-13	YKFG-45-4-22-13
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	YKT-48-6-219-1	YKT-65-6-240L	YKT-65-6-240L
Indoor Motor Fan RPM [C/H]	1230/1120/1040/980	1280/1120/1050/950	1230/1120/1040/980
Indoor Sound Pressure [dB] A	48/46/43/40	48.5/45/42/40	49/46/43/41
Outdoor Motor Fan [C/H]	890	825	825
Outdoor Sound Pressure [dB] A	56	59	57
refrigerant Name	R410A	R410A	R410A
Refrigeration Charge [g]	1040	1550	1320
Design pressure H/L [Mpa]	4.8/1.5	4.8/1.5	4.8/1.5
Piping Liquid /gas [mm]	Φ6.35/Φ12.7 (1/4"/1/2")	Φ9.52/Φ15.9 (3/8"/5/8")	Φ6.35/Φ12.7 (1/4"/1/2")
Indoor Unit Weight [kg]	14.9	14.8	14.9
Outdoor Unit Weight [kg]	39.5	47	46.2
Indoor Dimension [mm]	1082x234x337	1082x234x337	1082x234x337
Outdoor Dimension [mm]	805x330x554	890x342x673	890x342x673

System specification

Model Indoor	ES24K31BCCI	ES18K31BCCI	ES24K31BCCI
Model Outdoor	ES24K31BCCO	ES18K31BCCO	ES24K31BCCO
PNC Indoor	956004899	956004902	956004904
PNC Outdoor	956005829	956005832	956005834
Flow Type	Cooling Only	Cooling Only	Cooling Only
Market	OMN	BAH	BAH
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	23200	18100	23200
EER [Btu/h]/W	11.959	12.500	11.959
Dehumidification [l/hour]	2.4	1.8	2.4
Room Temp. setting [°C]	16~30	16~30	16~30
Ambient temp. sensor	T3	T3	T3
Operation Temp - cooling [°C]	18~52	18~52	18~52
Cool area [m ²]	31 ~ 46	24 ~ 35	31 ~ 46
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	8.55	6.38	8.55
Power input - Cooling [W]	1940	1448	1940
Maximum Current [A]	19	11	19
Maximum Power Input [W]	2900	2050	2900
Starting Current	48	42	48
Annual Energy [Kw.h/y]	/	/	/
Energy Class	/	/	/
Power Supplied	Indoor	Indoor	Indoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	No
Connection Wiring [mm ²]	2.5x4	2.5x3	2.5x4
Compressor Model	ASG240V1SFT	PA180G2C-7FTS	ASG240V1SFT
Compressor Type	ROTARY	ROTARY	ROTARY
Indoor Fan Motor Type	DC	AC	DC
Indoor Fan Motor Model	ZKFP-58-8-1-5	YKFG-45-4-22-13	ZKFP-58-8-1-5
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	YKT-65-6-240L	YKT-65-6-240L	YKT-65-6-240L
Indoor Motor Fan RPM [C/H]	1450/1200/1120/1050	1230/1120/1040/980	1450/1200/1120/1050
Indoor Sound Pressure [dB] A	53/47/45/43	49/46/43/41	53/47/45/43
Outdoor Motor Fan [C/H]	825	825	825
Outdoor Sound Pressure [dB] A	60	57	60
Refrigerant Name	R410A	R410A	R410A
Refrigeration Charge [g]	1750	1320	1750
Design pressure H/L [Mpa]	4.8/1.5	4.8/1.5	4.8/1.5
Piping Liquid /gas [mm]	Φ9.52/Φ15.9 (3/8"/5/8")	Φ6.35/Φ12.7 (1/4"/1/2")	Φ9.52/Φ15.9 (3/8"/5/8")
Indoor Unit Weight [kg]	13.8	14.9	13.8
Outdoor Unit Weight [kg]	50.4	46.2	50.4
Indoor Dimension [mm]	1082x234x337	1082x234x337	1082x234x337
Outdoor Dimension [mm]	890x342x673	890x342x673	890x342x673

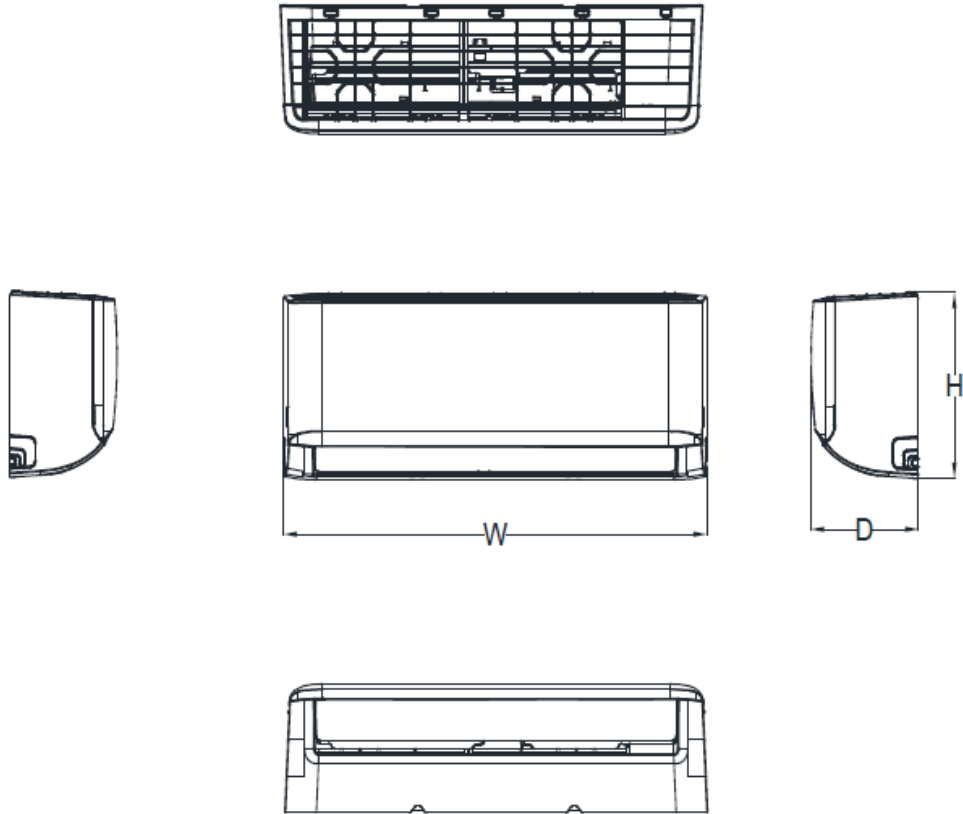
System specification

Model Indoor	ES18K31BCCI	ES24K31BCCI	ES18K11BCCI
Model Outdoor	ES18K31BCCO	ES24K31BCCO	ES18K11BCCO
PNC Indoor	956005787	956005789	956005852
PNC Outdoor	956005840	956005842	956005866
Flow Type	Cooling Only	Cooling Only	Cooling Only
Market	KWT	KWT	GHA
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	18100	23200	18000
EER [Btu/h]/W	12.500	11.959	11.760
Dehumidification [l/hour]	1.8	2.4	1.8
Room Temp. setting [°C]	16~30	16~30	16~30
Ambient temp. sensor	T4	T4	
Operation Temp - cooling [°C]	18~52	18~52	18~52
Cool area [m ²]	24 ~ 35	31 ~ 46	24 ~ 35
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	6.38	8.55	6.79
Power input - Cooling [W]	1448	1940	1530
Maximum Current [A]	11	19	13.5
Maximum Power Input [W]	2050	2900	2250
Starting Current	42	48	42
Annual Energy [Kw.h/y]	/	/	/
Energy Class	/	/	/
Power Supplied	Indoor	Indoor	Indoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	No
Connection Wiring [mm ²]	2.5x3	2.5x4	2.5x3
Compressor Model	PA180G2C-7FTS	ASG240V1SFT	PA180G2C-7FTS
Compressor Type	ROTARY	ROTARY	ROTARY
Indoor Fan Motor Type	AC	DC	AC
Indoor Fan Motor Model	YKFG-45-4-22-13	ZKFP-58-8-1-5	YKFG-45-4-22-13
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	YKT-65-6-240L	YKT-65-6-240L	YKT-48-6-219-1
Indoor Motor Fan RPM [C/H]	1230/1120/1040/980	1450/1200/1120/1050	1230/1120/1040/980
Indoor Sound Pressure [dB] A	49/46/43/41	53/47/45/43	48/46/43/40
Outdoor Motor Fan [C/H]	825	825	890
Outdoor Sound Pressure [dB] A	57	60	56
Refrigerant Name	R410A	R410A	R410A
Refrigeration Charge [g]	1320	1750	1040
Design pressure H/L [Mpa]	4.8/1.5	4.8/1.5	4.8/1.5
Piping Liquid /gas [mm]	Φ6.35/Φ12.7 (1/4"/1/2")	Φ9.52/Φ15.9 (3/8"/5/8")	Φ6.35/Φ12.7 (1/4"/1/2")
Indoor Unit Weight [kg]	14.9	13.8	14.9
Outdoor Unit Weight [kg]	46.2	50.4	39.5
Indoor Dimension [mm]	1082x234x337	1082x234x337	1082x234x337
Outdoor Dimension [mm]	890x342x673	890x342x673	805x330x554

System specification

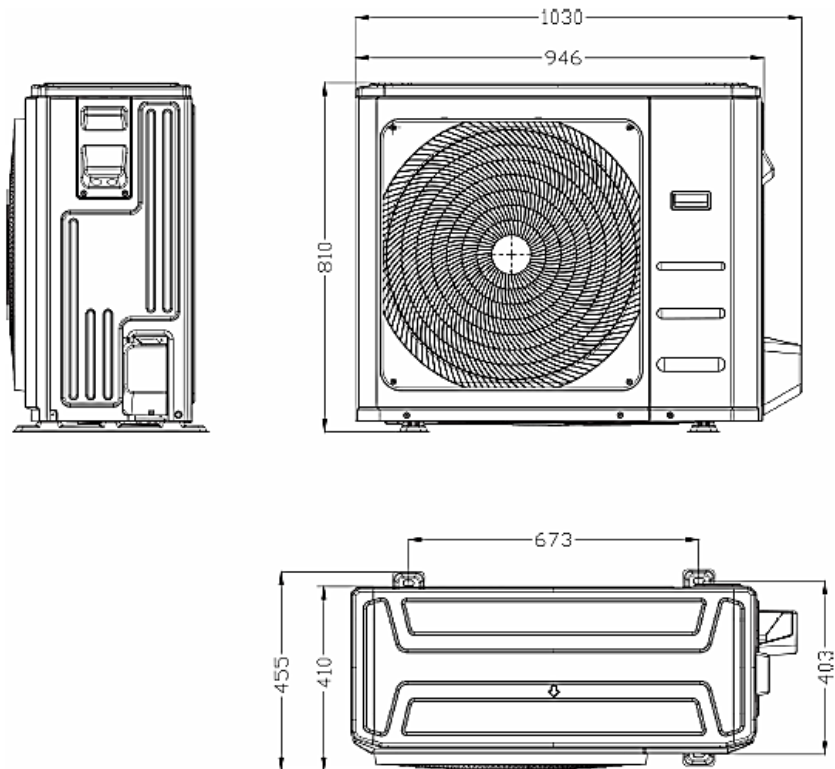
Model Indoor	ES24K11BCCI	ES18K11BCCI	ES24K11BCCI
Model Outdoor	ES24K11BCCO	ES18K11BCCO	ES24K11BCCO
PNC Indoor	956005855	956005860	956005863
PNC Outdoor	956005869	956005874	956005877
Flow Type	Cooling Only	Cooling Only	Cooling Only
Market	GHA	AFR	AFR
Brand	ELX	ELX	ELX
Rated Cooling Capacity [Btu/h]	22000	18000	22000
EER [Btu/h]/W	10.732	11.760	10.732
Dehumidification [l/hour]	2.4	1.8	2.4
Room Temp. setting [°C]	16~30	16~30	16~30
Ambient temp. sensor	T3	T3	T3
Operation Temp - cooling [°C]	18~52	18~52	18~52
Cool area [m ²]	31 ~ 46	24 ~ 35	31 ~ 46
Power supply	220-240V/50Hz	220-240V/50Hz	220-240V/50Hz
Rate current - Cooling [A]	8.68	6.79	8.68
Power input - Cooling [W]	2050	1530	2050
Maximum Current [A]	19	13.5	19
Maximum Power Input [W]	3300	2250	3300
Starting Current	48	42	48
Annual Energy [Kw.h/y]	/	/	/
Energy Class	/	/	/
Power Supplied	Indoor	Indoor	Indoor
Power Cord Gauge Min (Size x Number) [mm ²]	2.5x3	2.5x3	2.5x3
Power Cord Plug	No	No	No
Connection Wiring [mm ²]	2.5x4	2.5x3	2.5x4
Compressor Model	ASG240V1SFT	PA180G2C-7FTS	ASG240V1SFT
Compressor Type	ROTARY	ROTARY	ROTARY
Indoor Fan Motor Type	AC	AC	AC
Indoor Fan Motor Model	YKFG-45-4-22-13	YKFG-45-4-22-13	YKFG-45-4-22-13
Outdoor Fan Motor Type	AC	AC	AC
Outdoor Fan Motor Model	YKT-65-6-240L	YKT-48-6-219-1	YKT-65-6-240L
Indoor Motor Fan RPM [C/H]	1280/1120/1050/950	1230/1120/1040/980	1280/1120/1050/950
Indoor Sound Pressure [dB] A	48.5/45/42/40	48/46/43/40	48.5/45/42/40
Outdoor Motor Fan [C/H]	825	890	825
Outdoor Sound Pressure [dB] A	59	56	59
Refrigerant Name	R410A	R410A	R410A
Refrigeration Charge [g]	1550	1040	1550
Design pressure H/L [Mpa]	4.8/1.5	4.8/1.5	4.8/1.5
Piping Liquid /gas [mm]	Φ9.52/Φ15.9 (3/8"/5/8")	Φ6.35/Φ12.7 (1/4"/1/2")	Φ9.52/Φ15.9 (3/8"/5/8")
Indoor Unit Weight [kg]	14.8	14.9	14.8
Outdoor Unit Weight [kg]	47	39.5	47
Indoor Dimension (WxDxH) [mm]	1082x234x337	1082x234x337	1082x234x337
Outdoor Dimension [mm]	890x342x673	805x330x554	890x342x673

4.2 Indoor daimension

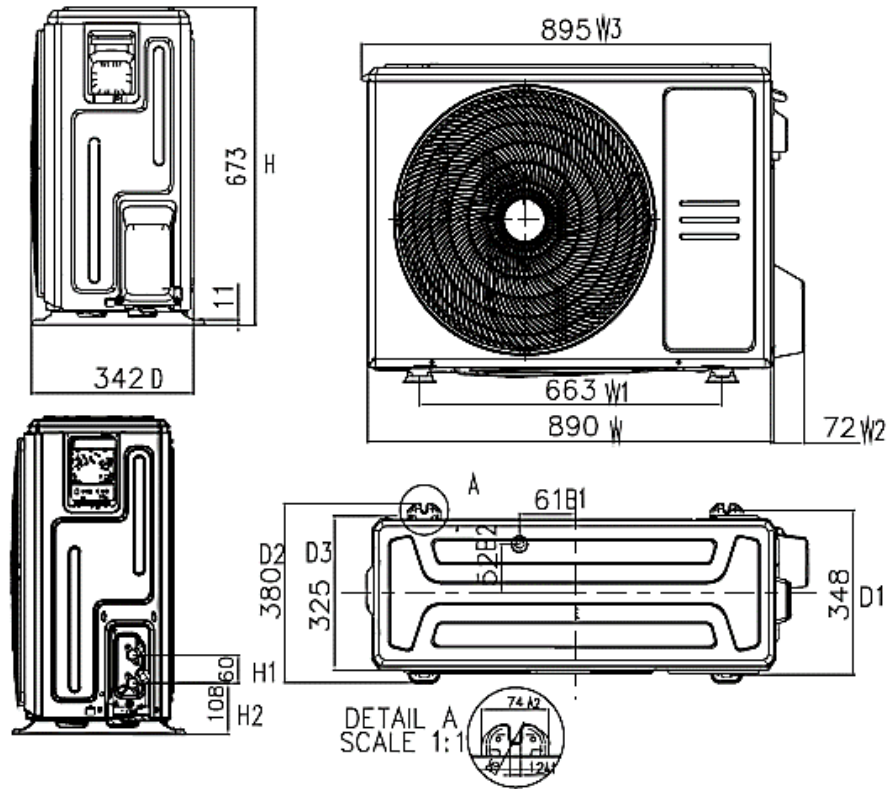


4.3 Outdoor Diimension

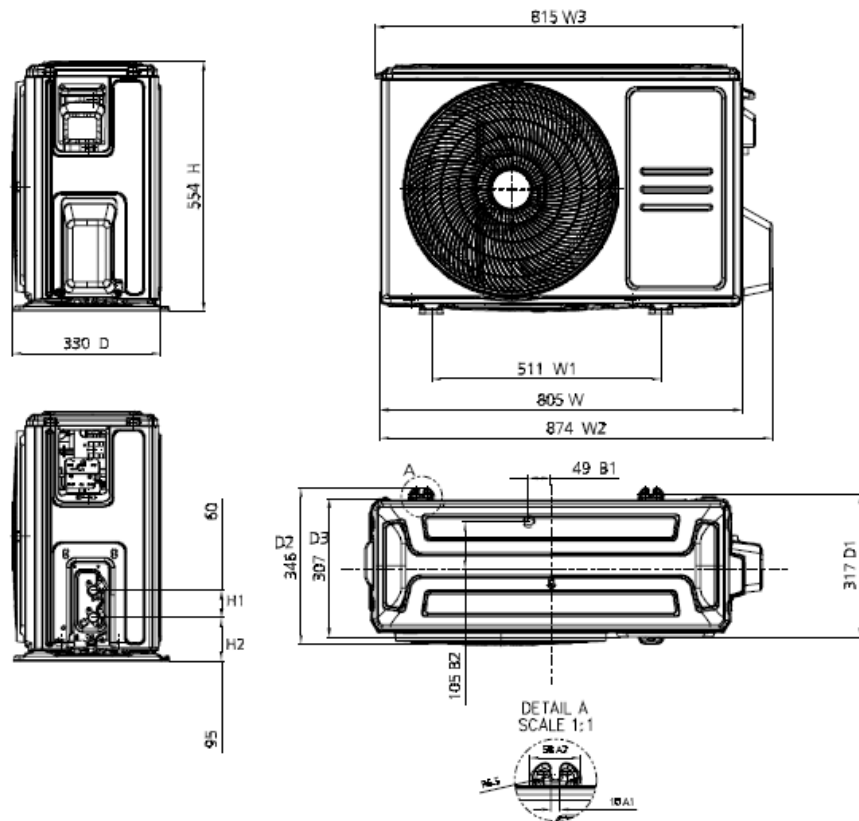
4.3.1 Panel Plate D30: Apply to 30 ~ 36 K



4.3.2 Panel Plate X430: Apply to 24K



4.3.3 Panel Plate X330: apply 18 K



5.1 Operation Mode and Temperature symbol

5.1.1 Operation Mode

Functions		Heating Mode		Auto Mode
		Defrosting Mode		
Cases		Case1:T1 and T2	Case 2: T3	A=2°C (3.6°F) B=3°C (-5.4°F)
Models	12k~32k cooling only			✓
	12k~18k heat pump	✓		✓
	12k~18k heat pump	✓		✓
	23k heat pump		✓	✓

Note: The detailed description of case 1 or case 2 is shown in the following Defrosting mode function.

5.1.2 Temperature symbol

Symbol	Description
T1	Indoor room temperature
T2	Coil temperature of evaporator
T3	Coil temperature of condenser
T4	Outdoor ambient temperature
TS	Remote Setting temperature

In this manual, such as I_{defrost}, TE1, TE2...etc., they are well- setting parameter of EEPROM.

5.2 Fan Mode

When fan mode is activated:

- The outdoor fan and compressor are stopped.
- Temperature control is disabled, and no temperature setting is displayed.
- The indoor fan speed can be set to high, medium, low, or auto.
- The louver operations are identical to those in cooling mode.
- Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 24°C(75.2°F).

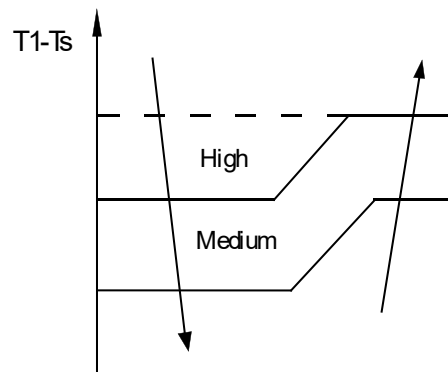
5.3 Cooling Mode

5.3.1 Compressor Control

- When indoor room temperature T1 is lower than setting value, the compressor and outdoor fan stop operation.

5.3.2 Indoor Fan Control

- In cooling mode, the indoor fan operates continuously. The fan speed can be set to high, medium, low, turbo or auto.
- The auto fan operation as below rules:



5.3.3 Outdoor Fan Control

Outdoor units just have one fan speed. The operation of compressor.

Except the following situations:

- Condenser high temperature protection
- Current protection

5.3.4 Condenser Temperature Protection (For the units have T3 sensor)

When condenser temperature is more than setting value, the compressor stop operation.

5.3.5 Evaporator Temperature Protection

When evaporator temperature drops below a configured value, the compressor and outdoor fan stop operation.

5.4 Heating Mode(For Heat pump units only)

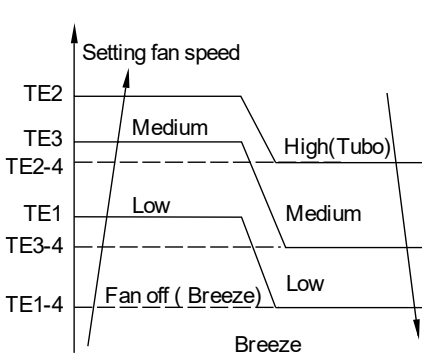
5.4.1 Compressor Control

Once the compressor starts up, it will keep running for 7 minutes, then indoor room temperature T1 is higher than setting value, the compressor and outdoor fan cease operation.

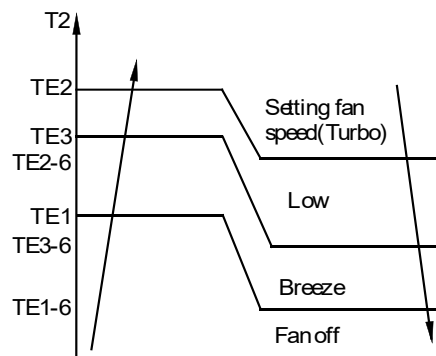
5.4.2 Indoor Fan Control:

When the compressor is on, the indoor fan speed can be set to high, medium, low, or auto. And the anti-cold wind function has the priority. Anti-cold air function When indoor unit coil temperature T2 is low, the anti-cold air function will start, and the indoor fan is controlled by indoor unit coil temperature T2.

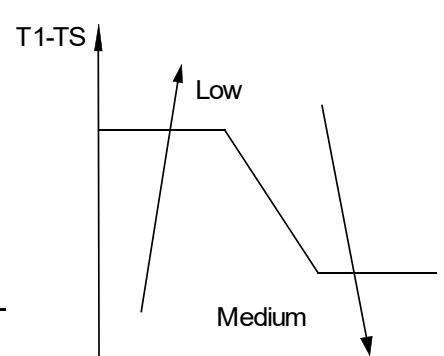
For Model capacity lower than 18K:



For above 18K models:



Auto fan action in heating mode:



NOTE: During temperature rise, medium speed changeover has no requirement of forced running time. But during temperature drop, the high speed must be forced to run for 2 minutes before judging whether to directly turn to the low speed.

5.4.3 Outdoor Fan Control:

Outdoor units just have single fan speed. The operation of outdoor fan is consistent with the operation of compressor.

Except the following situations:

- Evaporator high temperature protection
- Defrosting
- Current protection.

5.4.4 Defrosting mode

Case 1:

- The unit enters defrosting mode according to the temperature difference between T2 and T1, as well as the compressor runtime.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will stop operation, the defrost light of the indoor unit will turn on, and the “**df**” symbol is displayed.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal

heating mode:

- Compressor current is over than Idefrost and lasts for 7s
- The defrosting time has reached the setting value.
- $T2 \geq 2^{\circ}\text{C}$ (3.6°F) after entering defrosting mode for 3 minutes.
- After entering defrosting mode for 2 minutes, check the value of T2. The minimum temperature of T2 is marked as T2 min. If $T2 - T2\text{min} \geq 2^{\circ}\text{C}$ (3.6°F) during the following 4 minutes, AC will exit defrosting mode (If $T2 \leq -15^{\circ}\text{C}$ (5°F), considers it as -15°C (5°F)).

Case 2:

- The unit enters defrosting mode according to the value of temperature of T3 and the value range of temperature change of T3 as well as the compressor run time.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will stop operation, the defrost light of the indoor unit will turn on, and the “**DF**” symbol is displayed.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode: T3 rises above TC2. Unit runs for 10 minutes consecutively in defrosting mode.

5.4.5 Evaporator Temperature Protection

When the evaporator temperature exceeds a preset protection value, the compressor stop operation.

5.5 Auto-mode

- This mode can be selected with the remote controller and the setting temperature can be changed between $17^{\circ}\text{C} \sim 30^{\circ}\text{C}$ ($62^{\circ}\text{F} \sim 86^{\circ}\text{F}$).
- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT ($\Delta T = T1 - T5$).

ΔT	Running mode
$\Delta T > A$	Cooling
$B \leq \Delta T \leq A$	Fan-only
$\Delta T < B$	Heating*

Heating*: In auto mode, cooling only models run the fan

- Indoor fan will run at auto fan speed.
- The unit will choose running mode, when received the auto signal from the remote controller; forced-auto mode by pressing manual button;
- time on to auto mode; the compressor doesn't start in 20 minutes when a running mode is set in auto.

5.6 Drying mode

- Compressor will run for 10 minutes and be off in 5 minutes and loop continuously.
- Indoor fan speed is operate at low and can't be changed. The louver angle is the same as in cooling mode.
- All protections are active and the same as that in cooling mode.
- Low indoor room temperature protection
- If $T1 < 10^{\circ}\text{C}$ (50°F), the compressor ceases operation until $T1 > 13^{\circ}\text{C}$ (55.4°F).

5.7 Forced operation function

Press the AUTO/COOL button, the AC will run as below sequence:



Forced cooling mode: The compressor and outdoor fan continue to run and the indoor fan runs at low speed. After running for 30 minutes, the AC will switch to auto mode with a preset temperature of 24°C (76°F).

Forced auto mode: Forced auto mode operates the same as normal auto mode with a preset temperature of 24°C(76°F). The unit exits forced operation when it receives the following signals:

- Switch on
- Switch off
- Timer on
- Timer off
- Changes in mode fan speed/sleep mode/Follow me

5.8 Sleep function

- The sleep function is available in cooling, heating, or auto mode.
- The operational process for sleep mode is as follows:
 - When cooling, the temperature rises 1°C(2°F) (to not higher than 30°C(86°F)) every hour. After 2 hours, the temperature stops rising and the indoor fan is fixed at low speed.
 - When heating, the temperature decreases 1°C(2°F) (to not lower than 17°C(62.6°F)) every hour. After 2 hours, the temperature stops decreasing and the indoor fan is fixed at low speed. Anti-cold wind function takes priority.
- The operating time for sleep mode is 8 hours, after which, the unit exits this mode but does not switch off.

5.9 Auto-Restart function

- The indoor unit has an auto-restart module that allows the unit to restart automatically. The module automatically stores the current settings (not including the swing setting) and, in the case of a sudden power failure, will restore those settings automatically within 3 minutes after power returns.
- If the unit was in forced cooling mode, it will run in this mode for 30 minutes and turn to auto mode with temperature set to 24°C(76°F). If there is a power failure while the unit is running, the compressor starts 3 minutes after the unit restarts. If the unit was already off before the power failure, the compressor starts 1 minute after the unit restarts.
- Refrigerant Leakage Detection
With this new technology, the display area will show “EC” when the outdoor unit detects refrigerant leakage.
- Ionizer/Plasma (for some models)
When AC powers on and indoor fan is on, press “Fresh” on the remote control to enable the IONIZER function. While this function is active, the Ionizer/Plasma Dust Collector (depending on models) is energized and will help to remove pollen and impurities from the air.

5.10 Optional Functions

5.10.1 8°C Heating

In heating mode, the temperature can be set to as low as 8°C, preventing the indoor area from freezing if unoccupied during severe cold weather.

5.10.2 Self clean

when the unit is in cooling or drying mode:

- For cooling models, the indoor unit will run in low fan mode for a certain time, then stop operation.
- For heat pump models, the indoor unit will run in fan-only mode, then low heat, and finally in fan-only mode.
- Self Clean keeps the indoor unit dry and prevents mold growth.
- When match with multi outdoor unit, this function is disabled.

5.10.3 Follow me

- If you press “Follow Me” on the remote, the indoor unit will beep. This indicates the follow me function is active.
- Once active, the remote control will send a signal every 3 minutes, with no beeps. The unit automatically sets the temperature according to the measurements from the remote control.
- The unit will only change modes if the information from the remote control makes it necessary, not from the unit’s temperature setting.
- If the unit does not receive a signal for 7 minutes or you press “Follow Me,” the function turns off. The unit regulates temperature based on its own sensor and settings.

5.10.4 Silence

- Press “Silence” on the remote control to enable the SILENCE function. While this function is active, the indoor unit will run in low speed, which reduces noise to the lowest possible level.
- This function is only active in cooling mode

6 INSTALLATION

6.1 First Time Installation Check

Air and moisture trapped in the refrigerant system affects the performance of the air conditioner by:

- Increasing pressure in the system.
- Increasing the operating current.
- Decreasing the cooling or heating efficiency.
- Congesting the capillary tubing due to ice build-up in the refrigerant circuit.
- Corroding the refrigerant system.

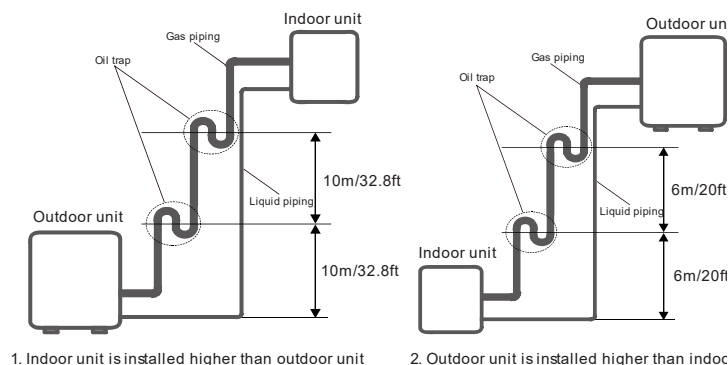
To prevent air and moisture from affecting the air conditioner’s performance, the indoor unit, as well as the pipes between the indoor and outdoor unit, must be leak tested and evacuated.

6.2 Pipe Length and Piping difference level

The length and elevation of connection pipe are shown in the table below. If the pipe length exceeds max pipe length, additional refrigerant should be charged to ensure nominal cooling/heating capacity.

Capacity (Btu)	Standard Length	Max Pipe Length	Max Level	Additional Refrigerant
<18 k	5m	20m	8m	15g/m
18 k	5m	25m	10m	15g/m
22k ~ 30k	5m	25m	10m	30g/m

If oil flows back into the outdoor unit’s compressor, this might cause liquid compression or deterioration of oil return. Oil traps in the rising gas pipe can prevent this.



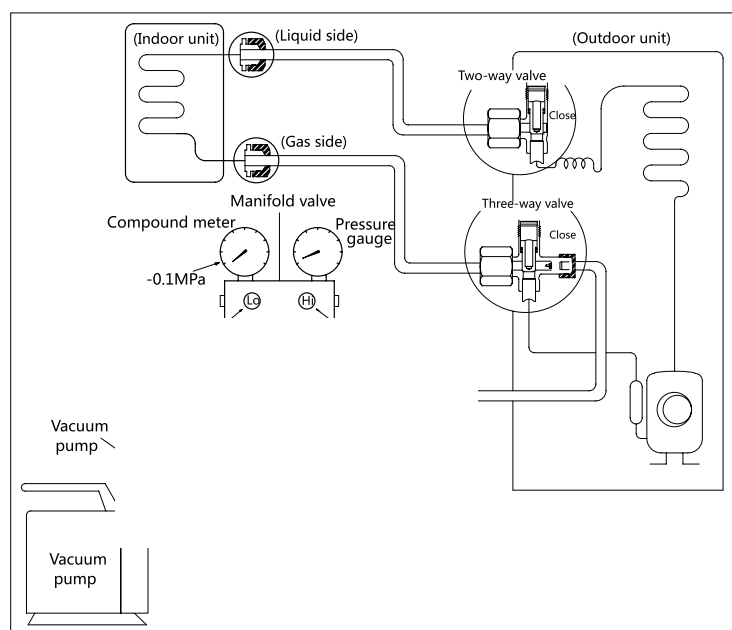
If indoor unit is installed higher than outdoor unit, oil trap should be set every 10m(32.8ft) of vertical distance. If the outdoor unit is installed higher than the indoor unit, proper oil should return to the compressor along with the suction of refrigerant to keep lubrication of compressor. If the suction flow velocity drops below 7.62m/s (1500fpm) (fpm is feet per minute)), oil won't return to the compressor. An oil trap should be installed every 6m(20ft) of vertical distance.

6.3 Leak test (soap water method)

Use a soft brush to apply soapy water or a neutral liquid detergent onto the indoor unit connections and outdoor unit connections. If there is gas leakage, bubbles will form on the connection.

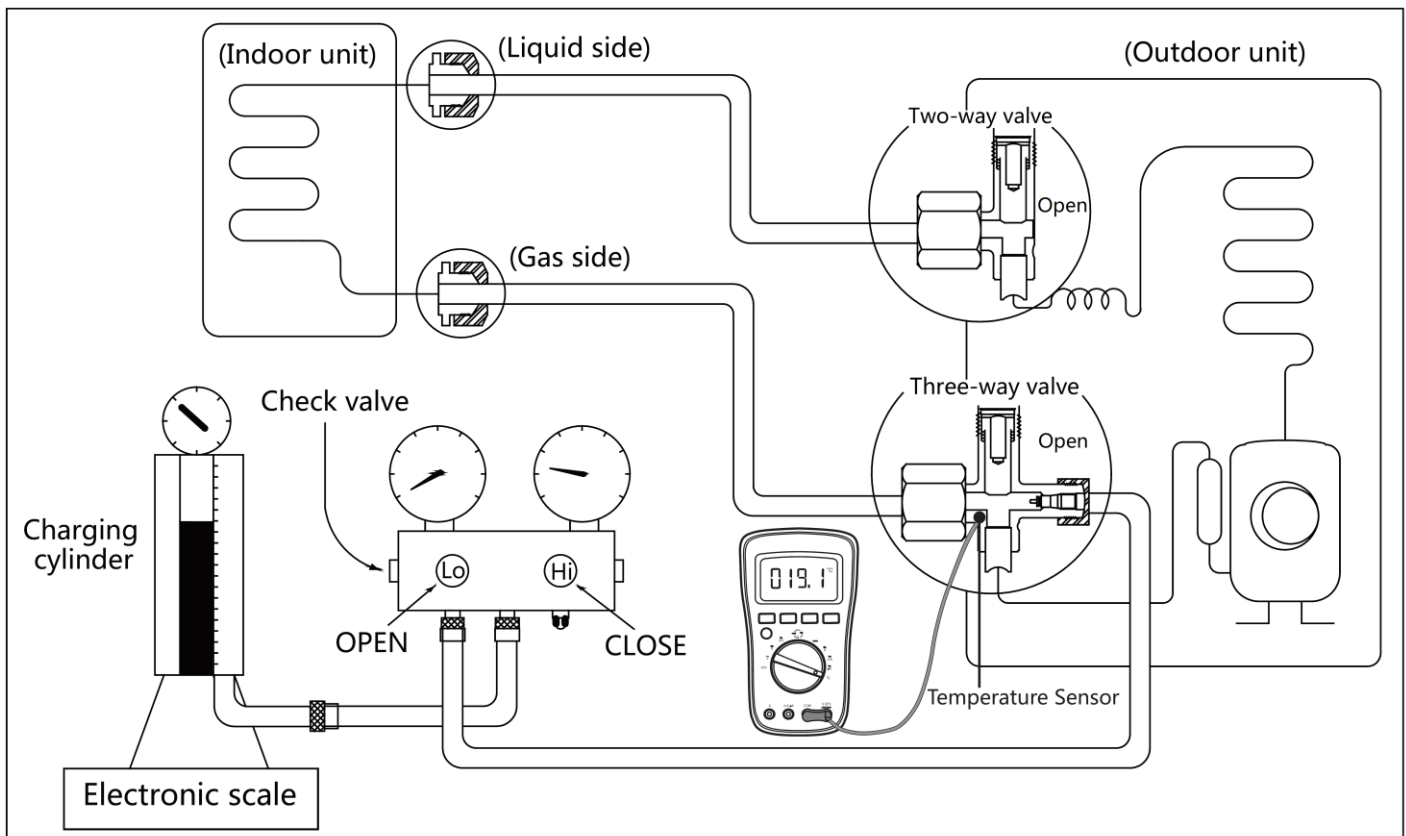
6.4 Vacuum Methode

1. Tighten the flare nuts of the indoor and outdoor units and confirm that both the 2- and 3-way valves are closed.
 2. Connect the charge hose with the push pin of Handle Lo to the gas service port of the 3-way valve.
 3. Connect another charge hose to the vacuum pump.
 4. Fully open the Handle Lo manifold valve.
 5. Using the vacuum pump, evacuate the system for 30 minutes.
 - a. Check whether the compound meter indicates -0.1 MPa (14.5 Psi).
 - If the meter does not indicate -0.1 MPa (14.5 Psi) after 30 minutes, continue evacuating for an additional 20 minutes.
 - If the pressure does not achieve -0.1 MPa (14.5 Psi) after 50 minutes, check for leakage.
 - If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then stop vacuum pump operations.
 - b. Wait for 5 minutes then check whether the gauge needle moves after turning off the vacuum pump.
- If the gauge needle moves backward, check whether there is gas leakage.
6. Loosen the flare nut of the 3-way valve for 6 or 7 seconds and then tighten the flare nut again.
 - a. Confirm the pressure display in the pressure indicator is slightly higher than the atmospheric pressure.
 - b. Remove the charge hose from the 3-way valve.
 7. Fully open the 2- and 3-way valves and tighten the cap of the 2- and 3-way valves.



6.5 Re-charge refrigerant

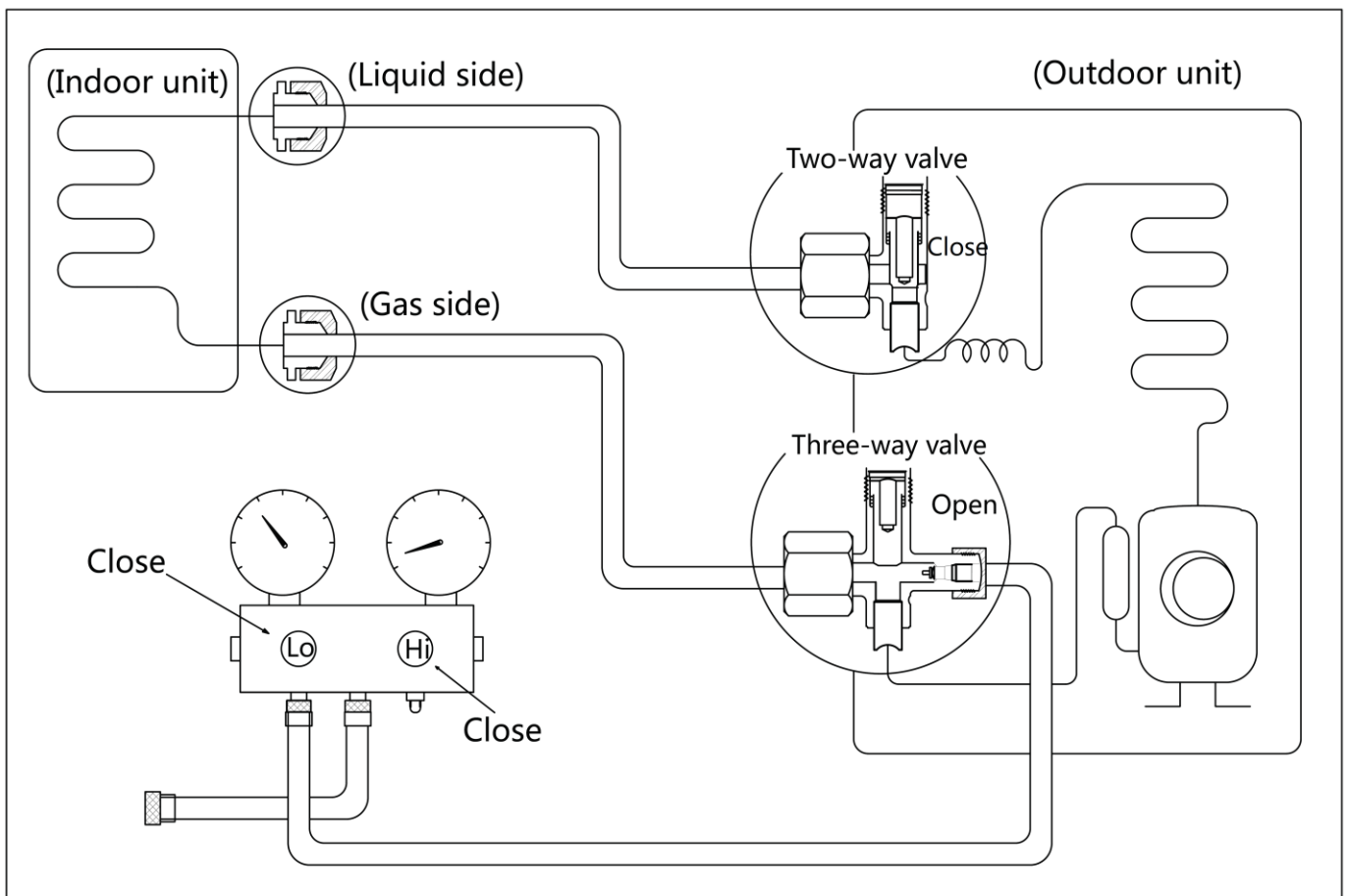
1. Close both 2- and 3-way valves.
2. Slightly connect the Handle Lo charge hose to the 3-way service port.
3. Connect the charge hose to the valve at the bottom of the cylinder.
4. If the refrigerant is R410A/R32, invert the cylinder to ensure a complete liquid charge.
5. Open the valve at the bottom of the cylinder for 5 seconds to purge the air in the charge hose, then fully tighten the charge hose with push pin Handle Lo to the service port of 3-way valve.
6. Place the charging cylinder onto an electronic scale and record the starting weight.
7. Fully open the Handle Lo manifold valve, 2- and 3-way valves.
8. Operate the air conditioner in cooling mode to charge the system with liquid refrigerant.
9. When the electronic scale displays the correct weight (refer to the gauge and the pressure of the low side to confirm, the value of pressure refers to chapter Appendix), turn off the air conditioner, then disconnect the charge hose from the 3-way service port immediately..
10. Mount the caps of service port and 2- and 3-way valves.
11. Use a torque wrench to tighten the caps to a torque of 18 N.m.
12. Check for gas leakage.



6.6 Re-Installation for indoor only

6.6.1 Refrigerant pump down

1. Confirm that the 2- and 3-way valves are opened.
2. Connect the charge hose with the push pin of Handle Lo to the 3-way valve's gas service port.
3. Open the Handle Lo manifold valve to purge air from the charge hose for 5 seconds and then close it quickly.
4. Close the 2-way valve.
5. Operate the air conditioner in cooling mode. Stop operations when the gauge reaches 0.1 MPa (14.5 Psi).
6. Close the 3-way valve so that the gauge rests between 0.3 MPa (43.5 Psi) and 0.5 MPa (72.5 Psi).
7. Disconnect the charge set and mount the caps of service port and 2- and 3-way valves.
8. Use a torque wrench to tighten the caps (torque 18 N.m.)
9. Check for gas leakage.



6.6.2 Vacuum Method

1. Tighten the flare nuts of the indoor and outdoor units and confirm that both the 2- and 3-way valves are closed.
2. Connect the charge hose with the push pin of Handle Lo to the gas service port of the 3-way valve.
3. Connect another charge hose to the vacuum pump.
4. Fully open the Handle Lo manifold valve.
5. Using the vacuum pump, evacuate the system for 30 minutes.
 - a. Check whether the compound meter indicates -0.1 MPa (14.5 Psi).

If the meter does not indicate -0.1 MPa (14.5 Psi) after 30 minutes, continue evacuating for an additional 20 minutes.

If the pressure does not achieve -0.1 MPa (14.5 Psi) after 50 minutes, check for leakage.

If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then stop vacuum pump operations.

- b. Wait for 5 minutes then check whether the gauge needle moves after turning off the vacuum pump.

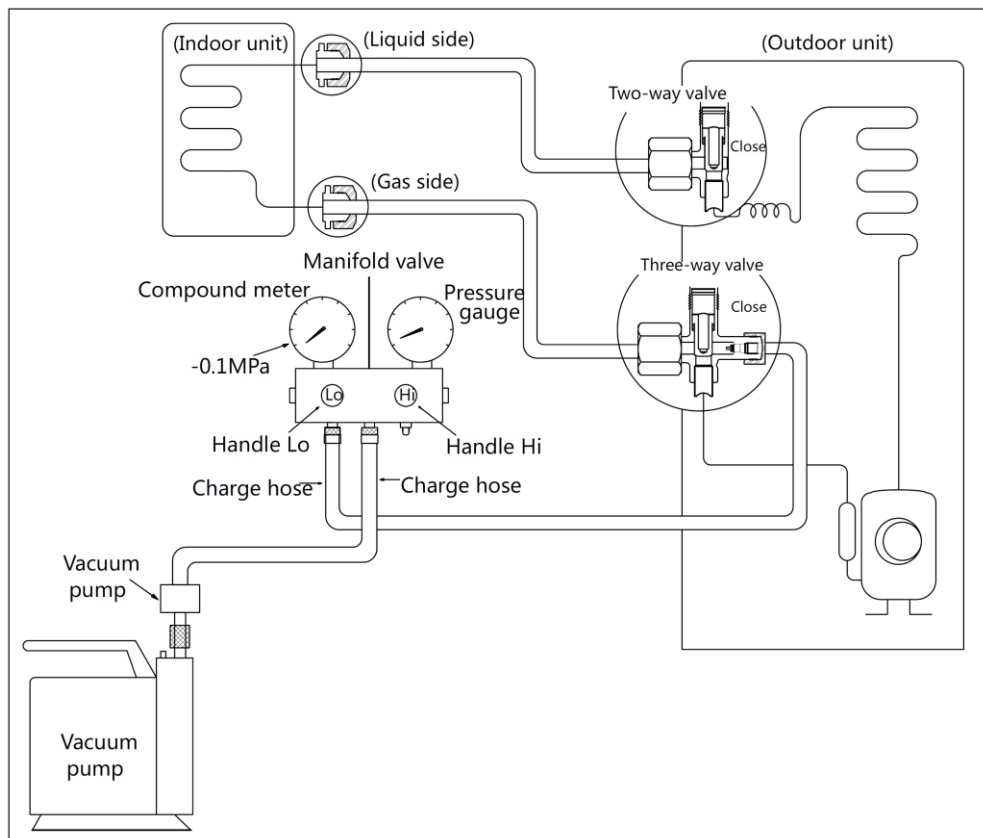
If the gauge needle moves backward, check whether there is gas leakage.

6. Loosen the flare nut of the 3-way valve for 6 or 7 seconds and then tighten the flare nut again.

- a. Confirm the pressure display in the pressure indicator is slightly higher than the atmospheric pressure.

- b. Remove the charge hose from the 3-way valve.

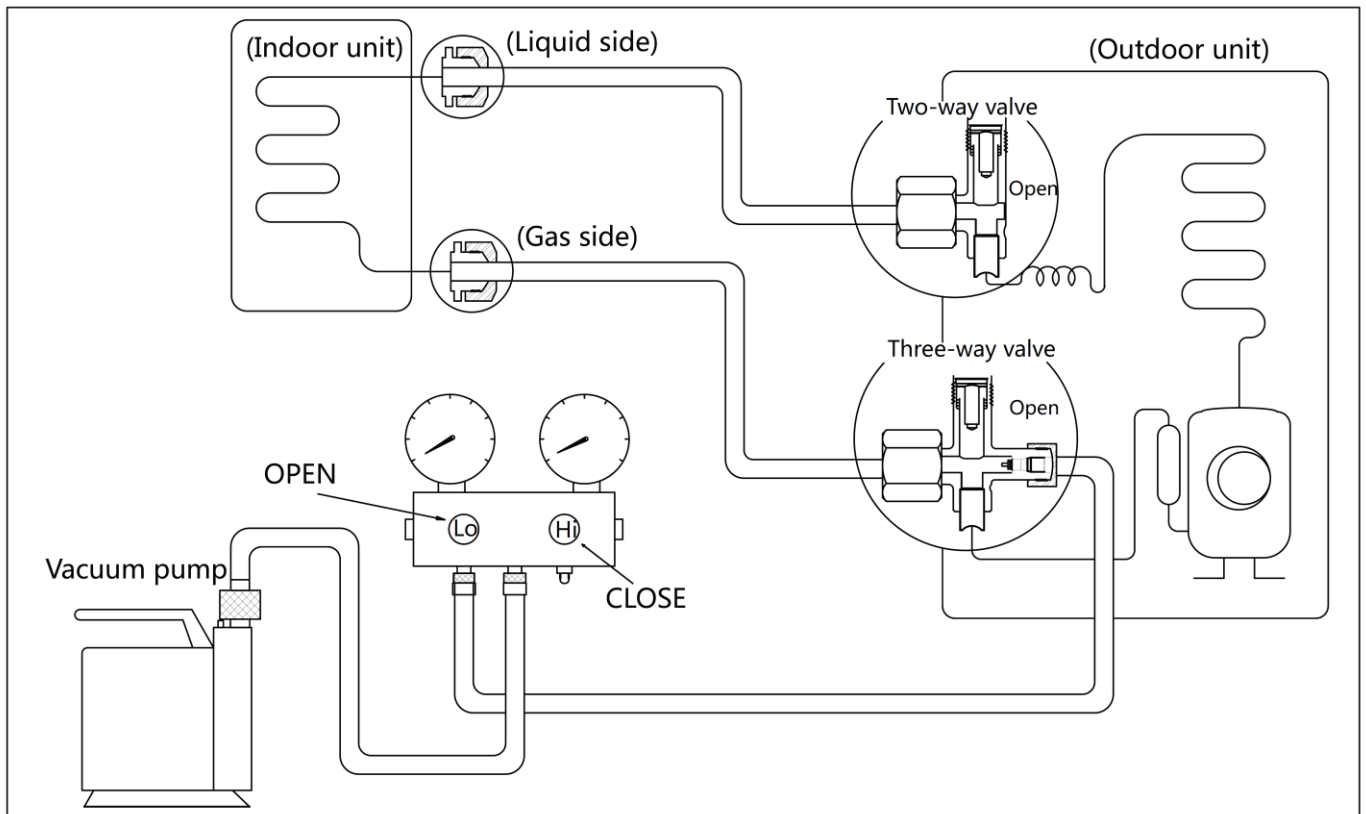
7. Fully open the 2- and 3-way valves and tighten the cap of the 2- and 3-way valves.



6.7 Re-Installation for outdoor only

6.7.1 System vacumme

1. Confirm that the 2- and 3-way valves are opened.
2. Connect the vacuum pump to the 3-way valve's service port.
3. Evacuate the system for approximately one hour. Confirm that the compound meter indicates -0.1 MPa (14.5Psi).
4. Close the valve (Low side) on the charge set and turn off the vacuum pump.
5. Wait for 5 minutes then check whether the gauge needle moves after turning off the vacuum pump. If the gauge needle moves backward, check whether there is gas leakage.
6. Disconnect the charge hose from the vacuum pump.
7. Mount the caps of service port and 2- and 3-way valves.
8. Use a torque wrench to tighten the caps to a torque of 18 N.m.



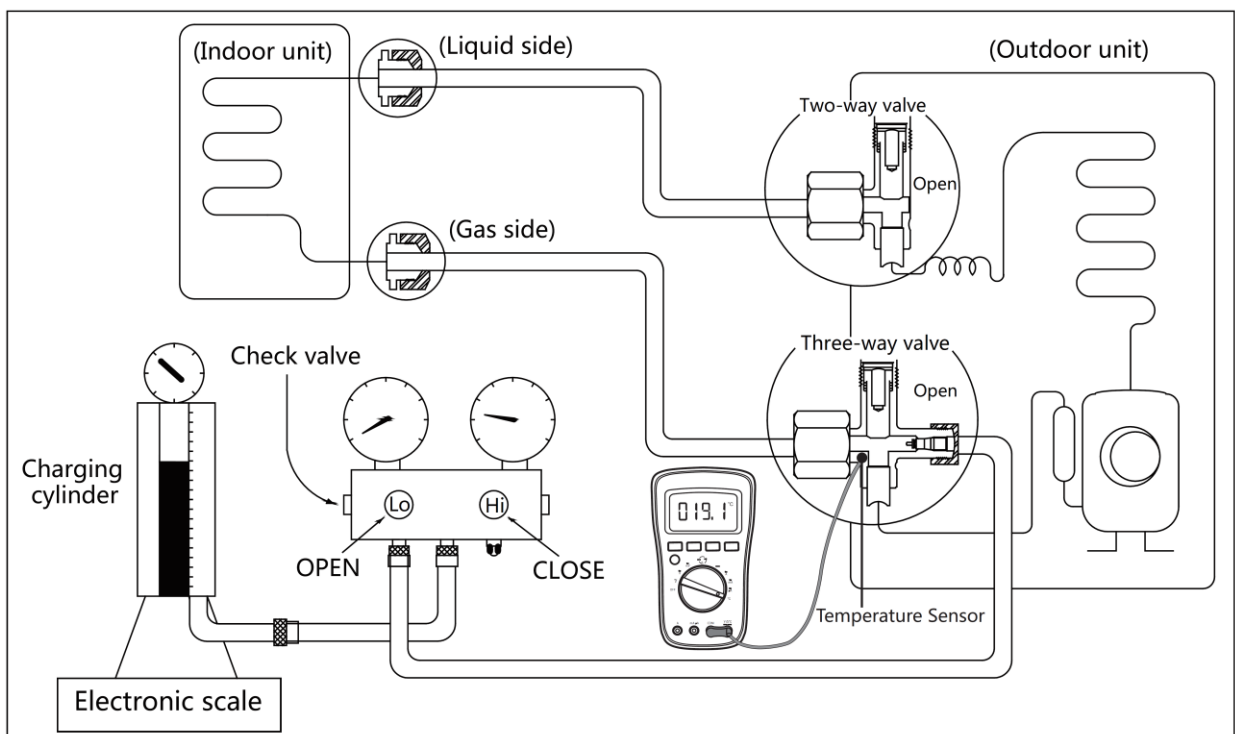
6.7.2 Refrigerant charging

1. Close both 2- and 3-way valves.
2. Slightly connect the Handle Lo charge hose to the 3-way service port.
3. Connect the charge hose to the valve at the bottom of the cylinder.
4. If the refrigerant is R410A/R32, invert the cylinder to ensure a complete liquid charge.
5. Open the valve at the bottom of the cylinder for 5 seconds to purge the air in the charge hose, then fully tighten the charge hose with push pin Handle Lo to the service port of 3-way valve..
6. Place the charging cylinder onto an electronic scale and record the starting weight.
7. Fully open the Handle Lo manifold valve, 2- and 3-way valves.
8. Operate the air conditioner in cooling mode to charge the system with liquid refrigerant.
9. When the electronic scale displays the correct weight (refer to the gauge and the pressure of the low side to confirm, the value of pressure refers to chapter Appendix), turn off the air conditioner, then disconnect the charge hose from the 3-way service port immediately..
10. Mount the caps of service port and 2- and 3-way valves.
11. Use a torque wrench to tighten the caps to a torque of 18 N.m.
12. Check for gas leakage.

Note: 1. Mechanical connectors used indoors shall comply with local regulations.

2. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints

are reused indoors, the flare part shall be re-fabricated.



7 ELECTRICAL WIRING DIAGRAMS

7.1 Indoor wiring diagram symbol

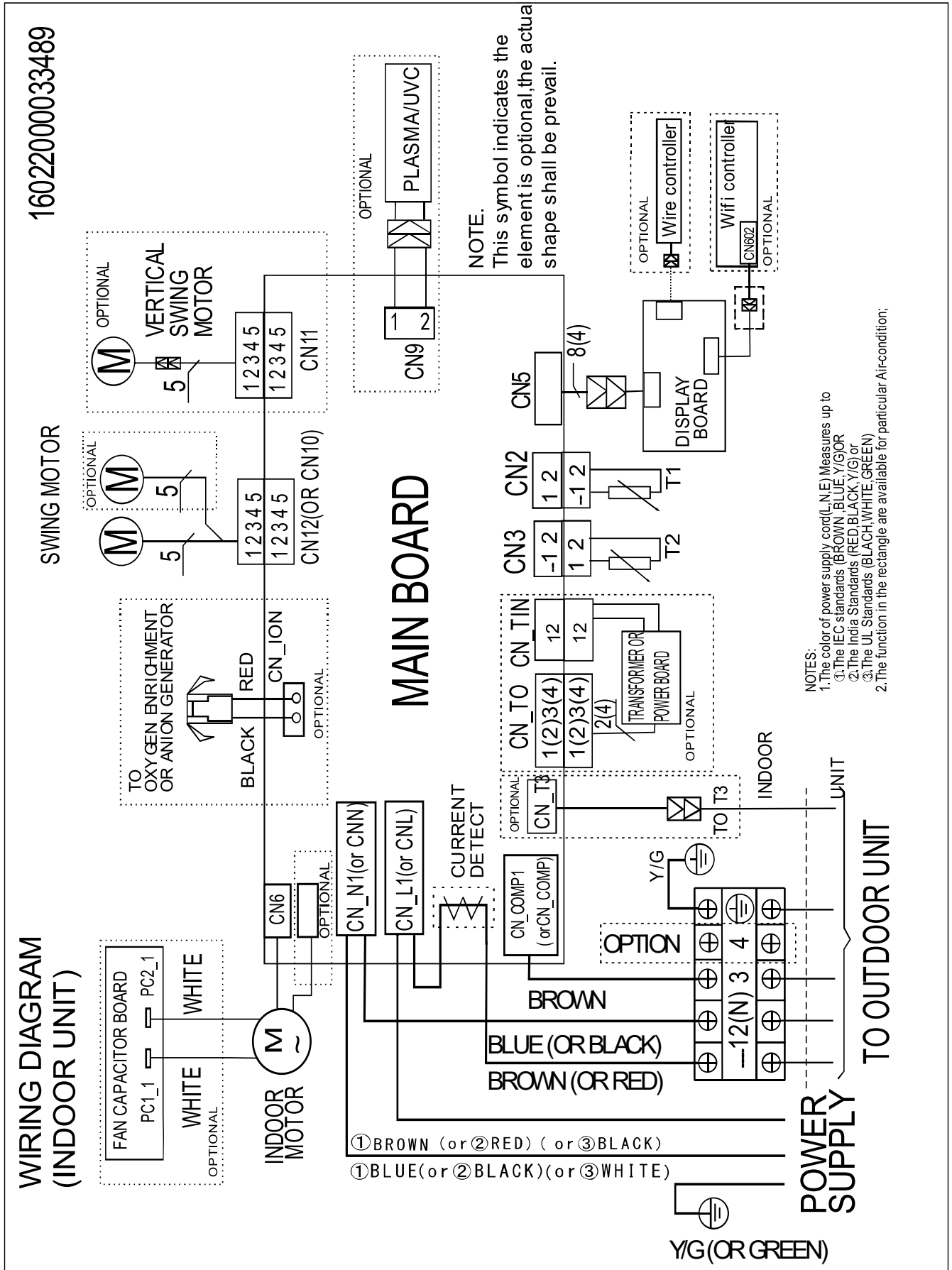
Symbol	Description
Y/G	Yellow-Green Conductor
ION	Positive and Negative Ion Generator
CAP	Capacitor
PLASMA	Electronic Dust Collector
L	Line
N	Neutron
T1	Indoor Room Temperature
T2	Coil Temperature of Indoor Heat Exchanger

7.2 Outdoor wiring diagram symbol

Symbol	Description
4-WAY	Gas Valve Assembly/4-WAY VALVE
AC-FAN	Alternating Current FAN
DC-FAN	Direct Current FAN
COMP	AC Current Detector
T3	Coil Temperature of Condenser
T4	Outdoor Ambient Temperature
L-PRO	Low Pressure Switch
H-PRO	High Pressure Switch

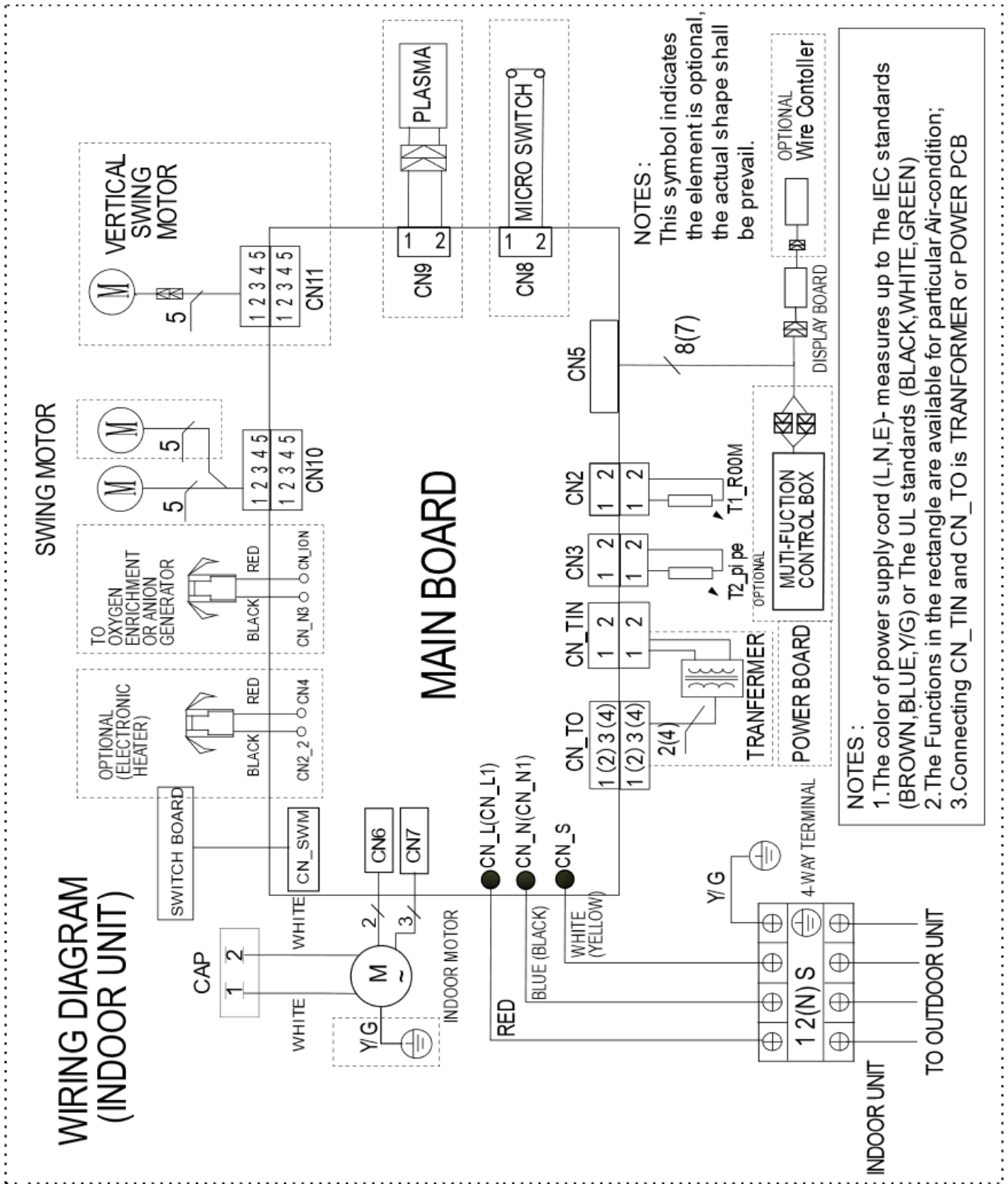
7.3.2 Wiring diagram model: 24K

Indoor unit wiring diagram: 16022000033489



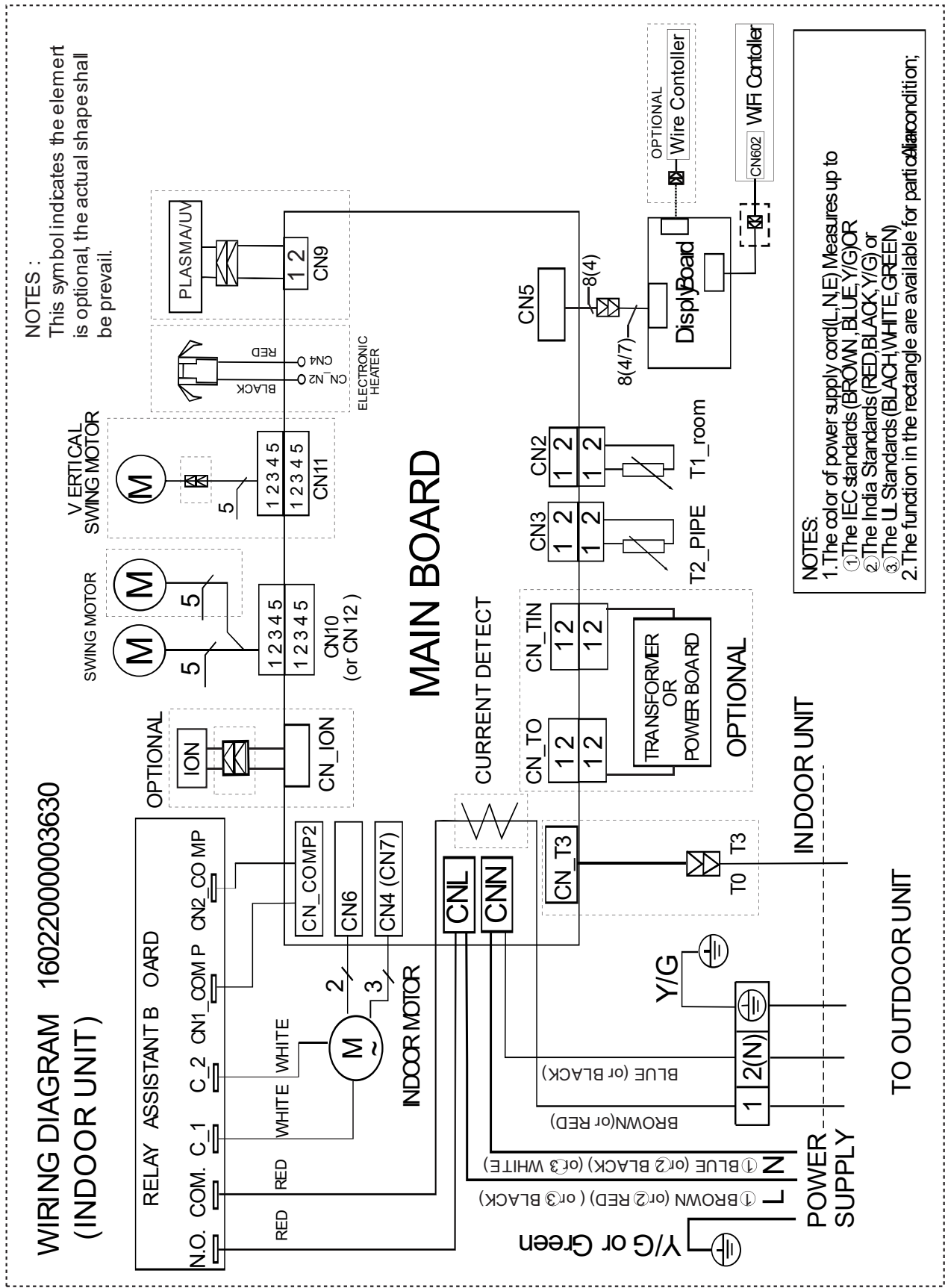
7.3.3 Wiring diagram model: 30K

Indoor unit wiring diagram: 16022000003525



7.3.4 Wiring diagram model: 18 K

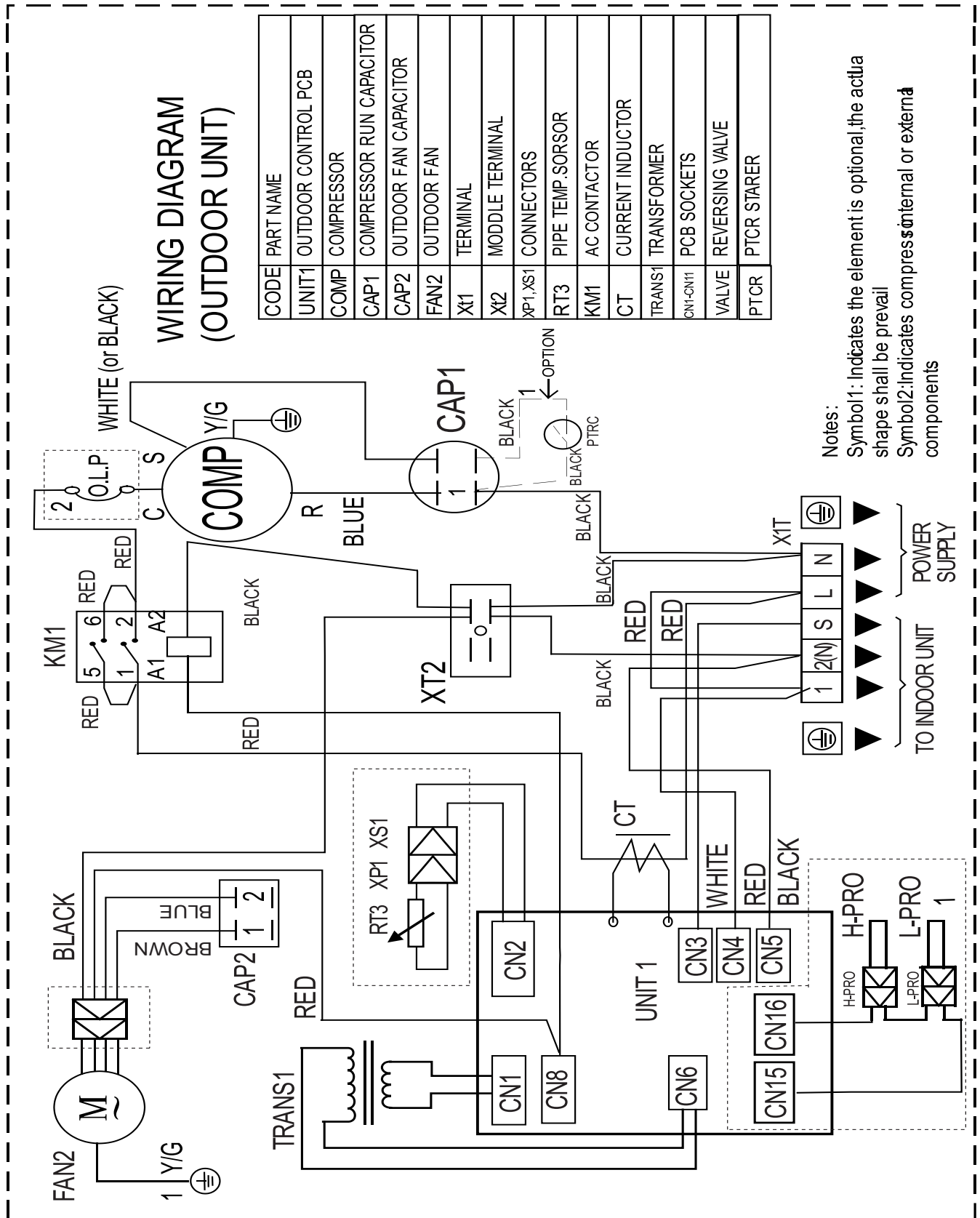
Indoor unit wiring diagram: 16022000003630



7.4 Outdoor unit wiring diagram

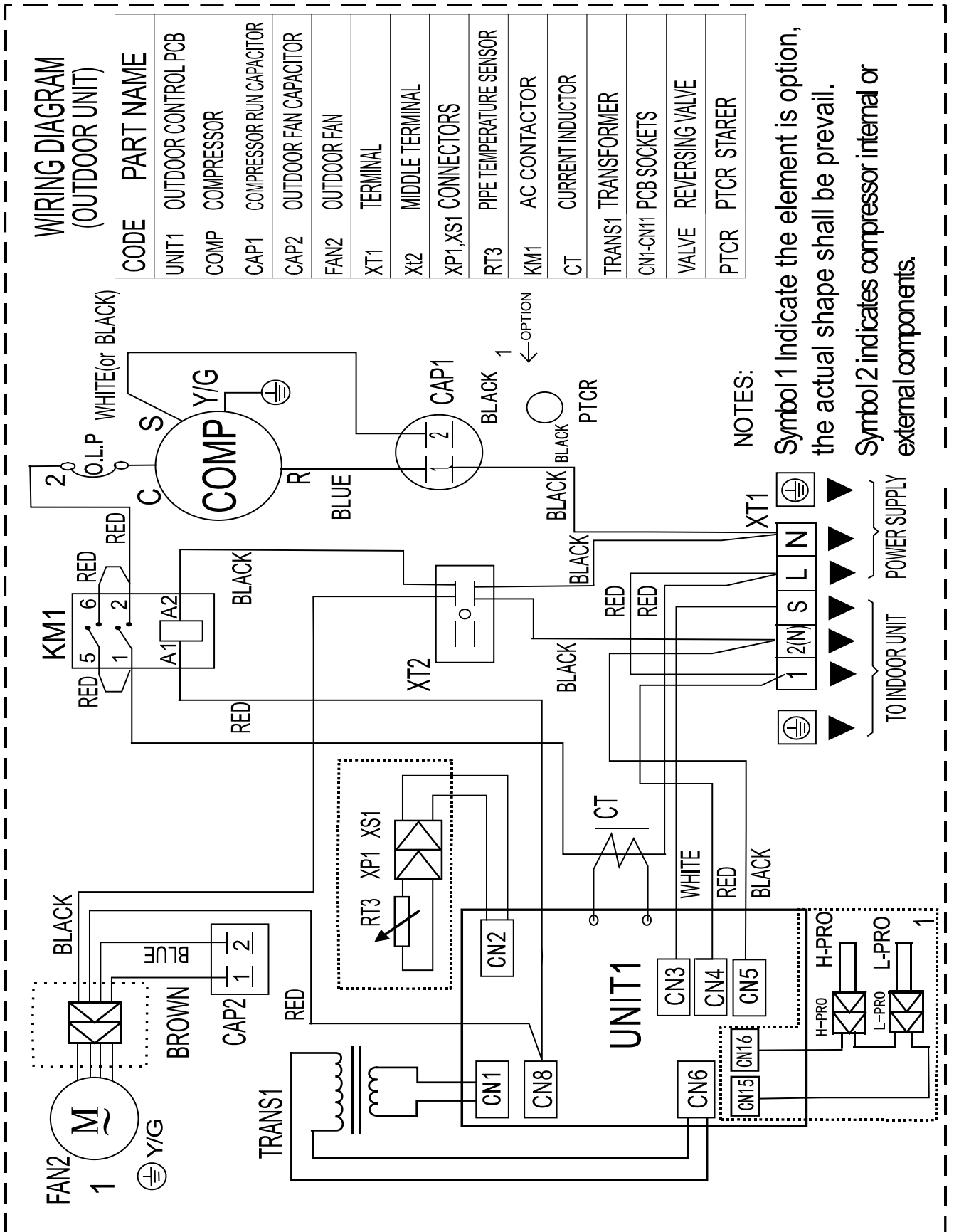
7.4.1 Wiring diagram model: 36 K

Outdoor unit wiring diagram: 16022000028849



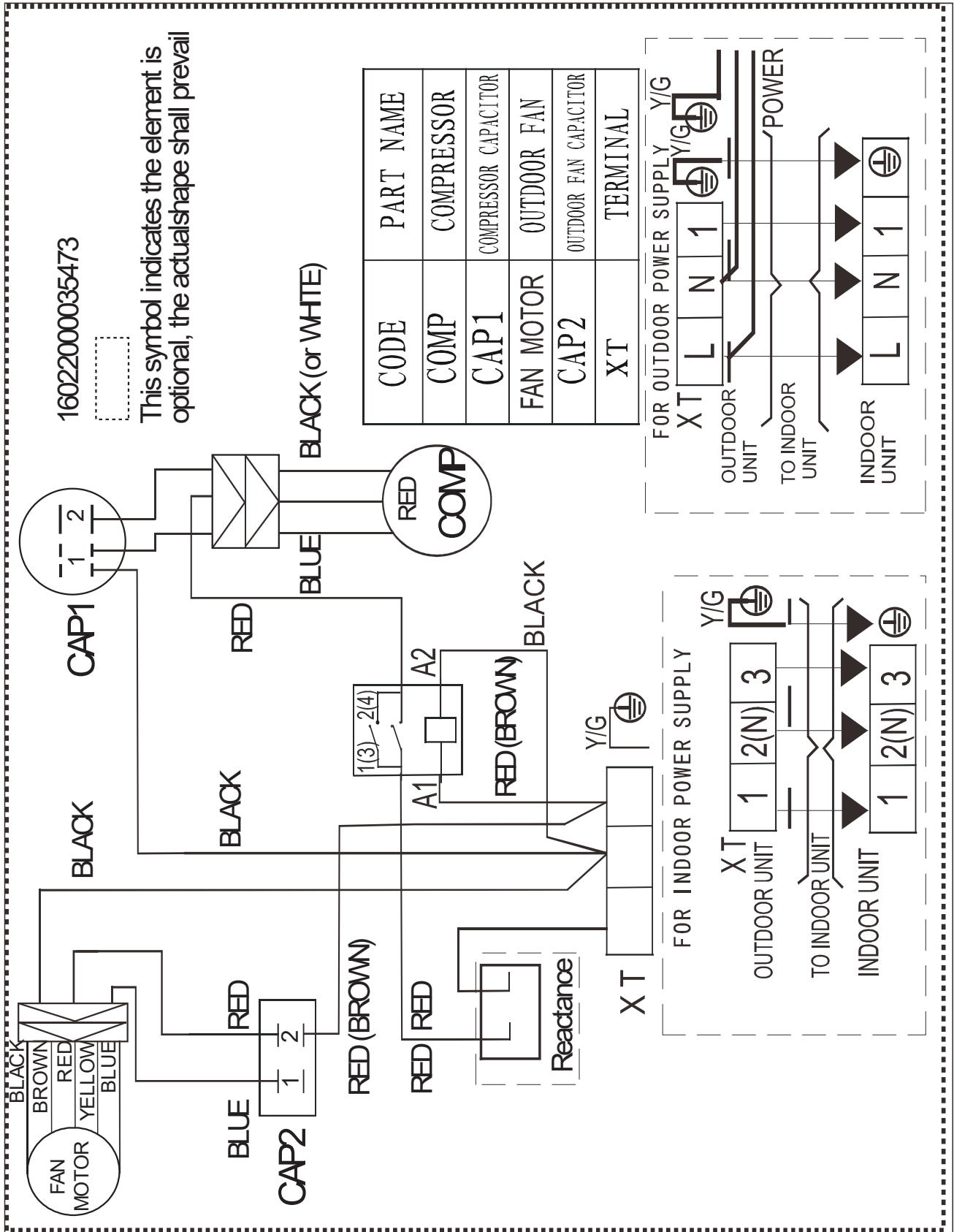
7.4.2 Wiring diagram model: 30 K

Outdoor unit wiring diagram: 16022000002253



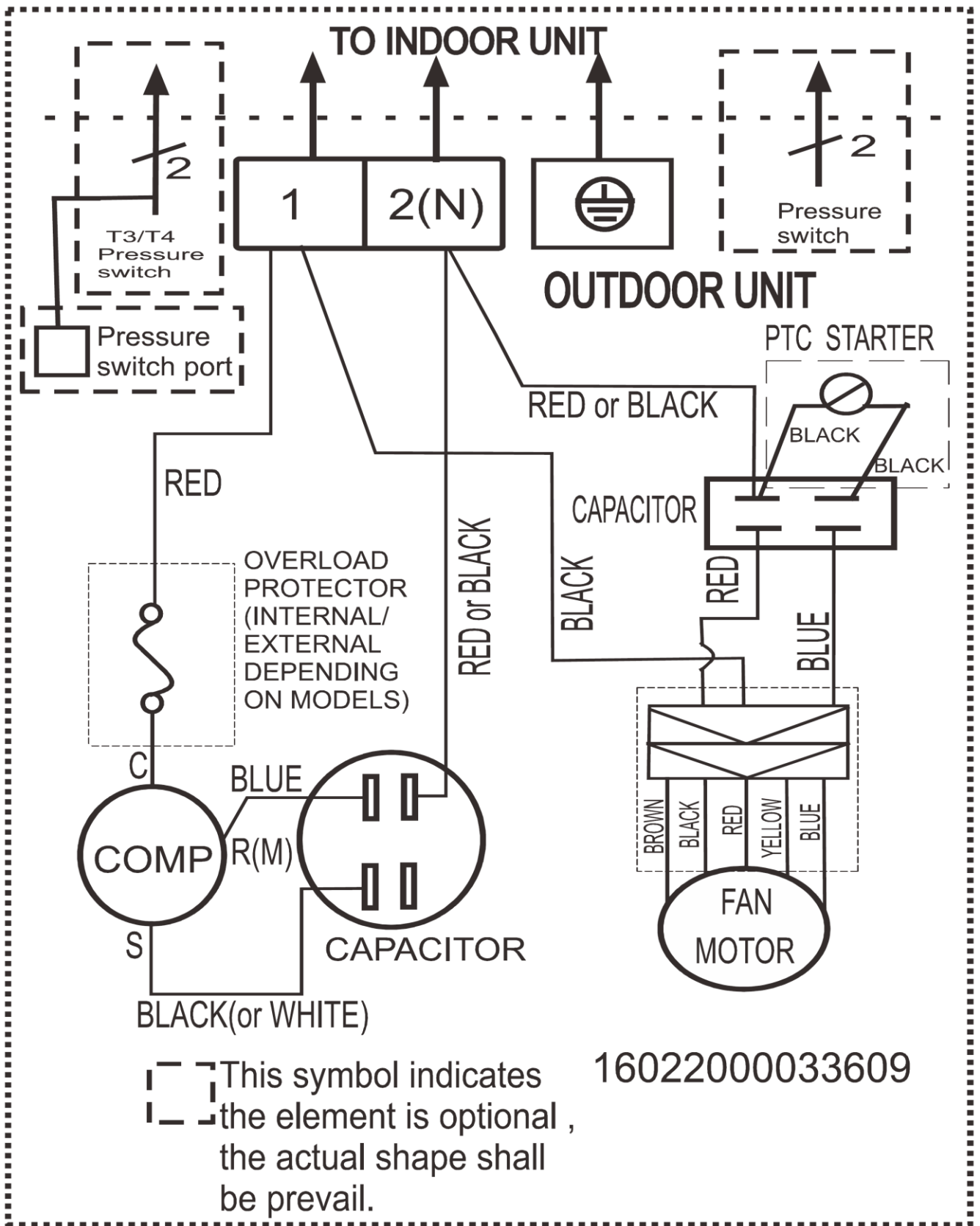
7.4.3 Wiring diagram model: 24 K

Outdoor unit wiring diagram: 16022000035473



7.4.4 Wiring diagram model: 24 K

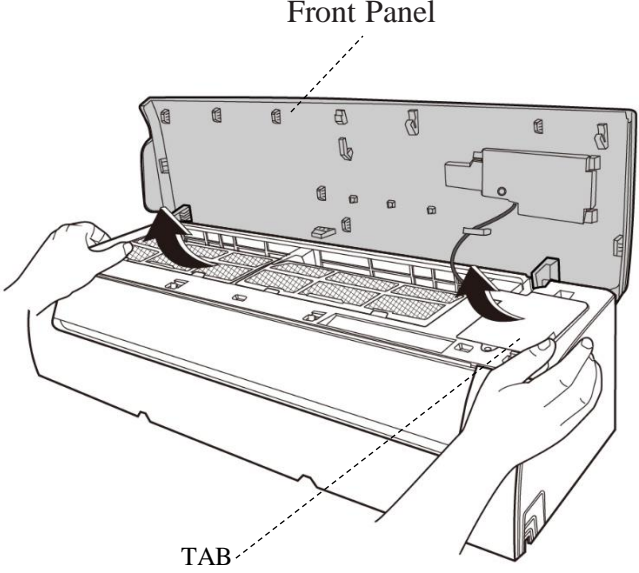
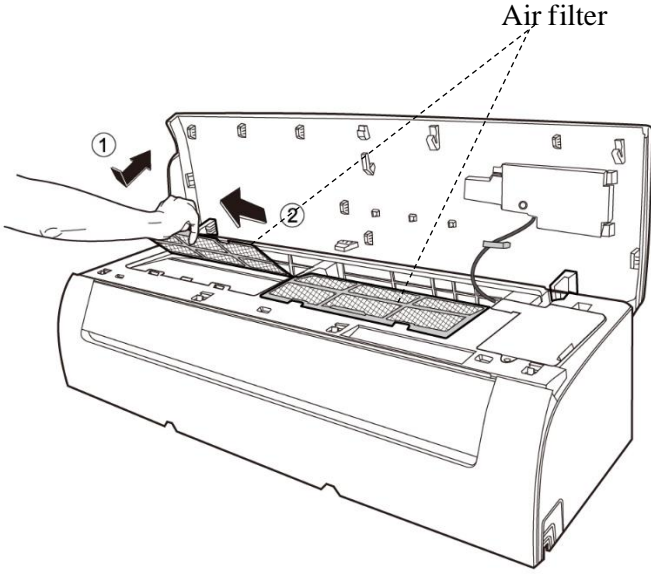
Outdoor unit wiring diagram: 16022000033609



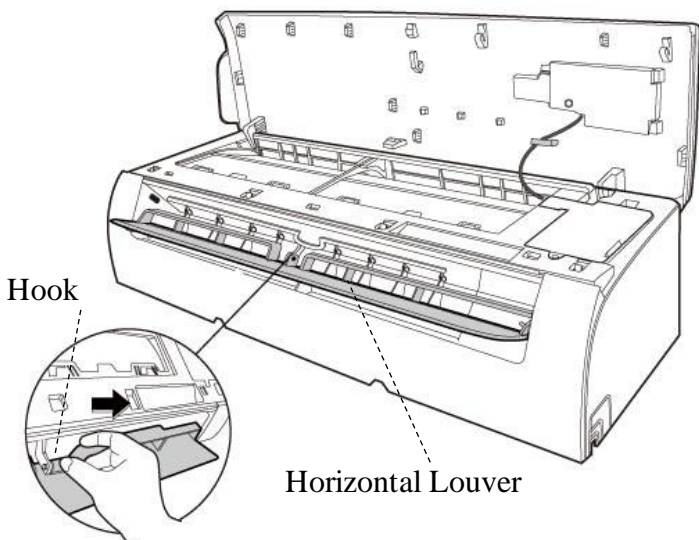
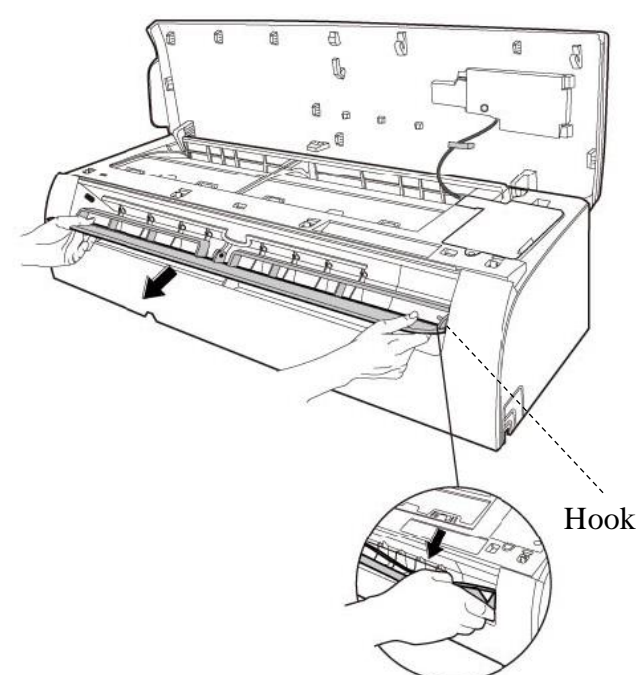
8 UNIT DISASSEMBLY

8.1 Disassembly indoor unit (18-24 K)

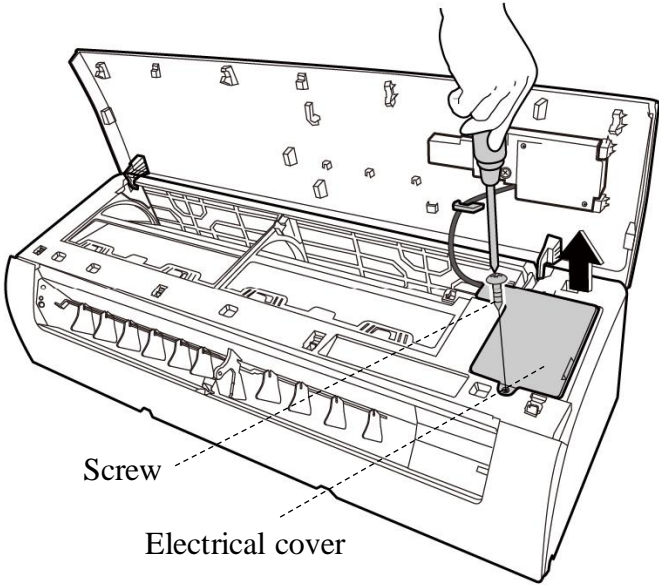
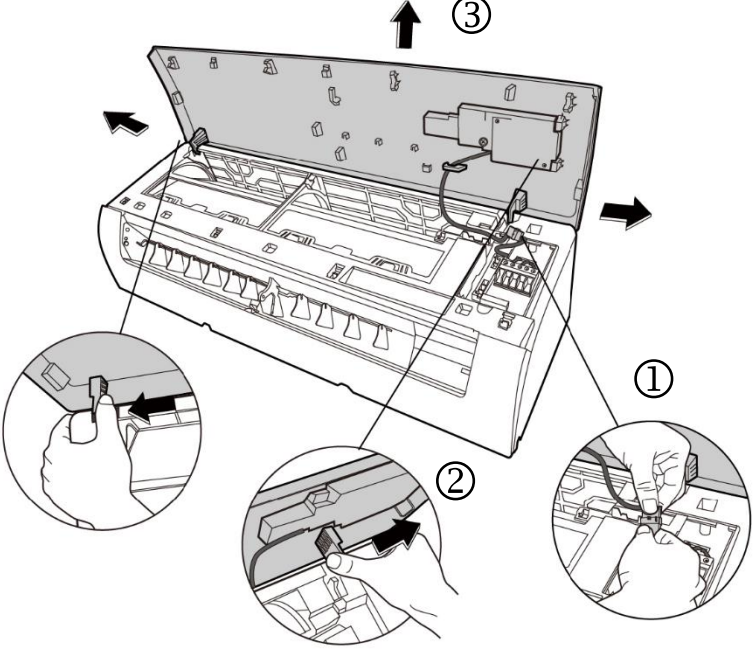
8.1.1 Front panel

Procedure	Illustration
<p>1) Hold the front panel by the tabs on the both sides and lift it (see CJ_ AG_001).</p>	 <p style="text-align: center;">CJ_AG_001</p>
<p>2) Push up the bottom of an air filter, and then pull it out downwards (see CJ_ AG_002).</p>	 <p style="text-align: center;">CJ_AG_002</p>

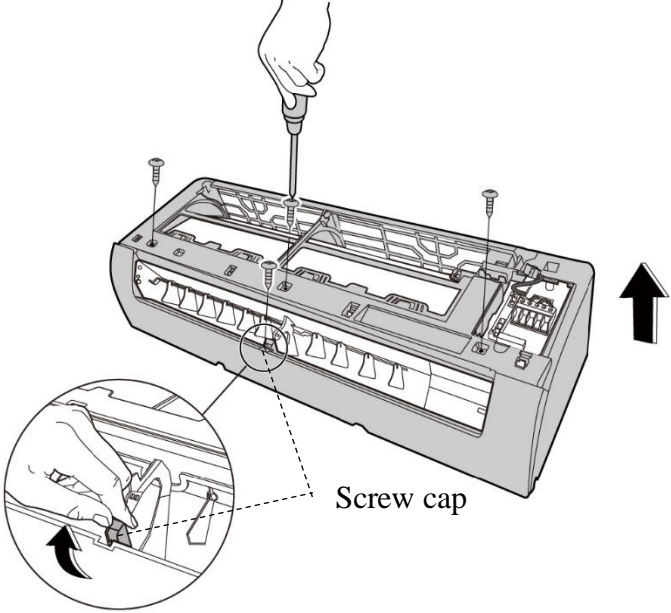
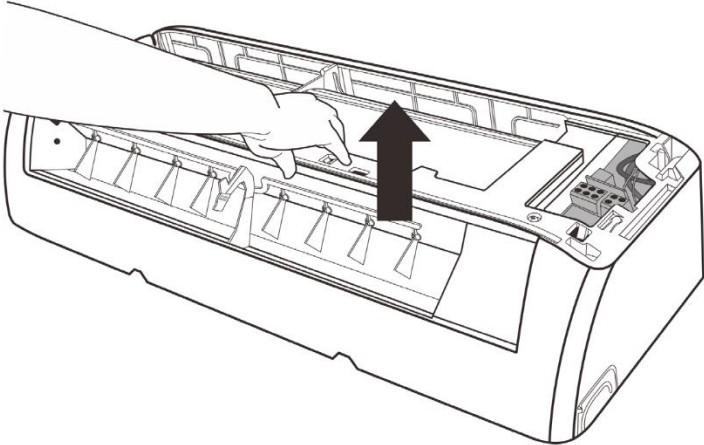
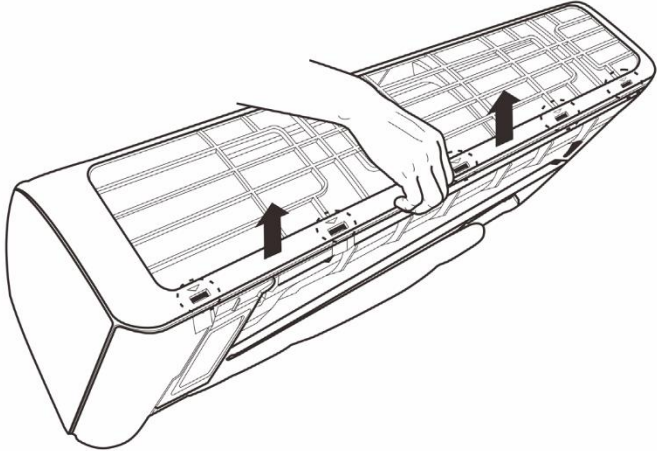
Note: This section is for reference only. Actual unit appearance may vary

Procedure	Illustration
<p>3) Open the horizontal louver and push the hook towards left to open it (see CJ_AG_003).</p>	 <p style="text-align: center;">CJ_AG_003</p>
<p>4) Bend the horizontal louver lightly by both hands to loosen the hooks, then remove the horizontal louver (see CJ_AG_004).</p>	 <p style="text-align: center;">CJ_AG_004</p>

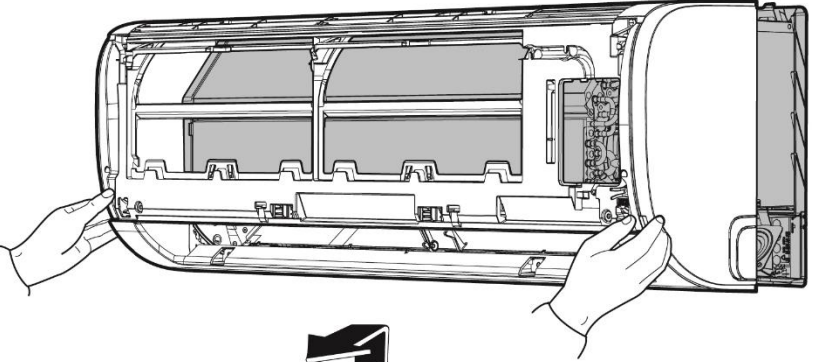
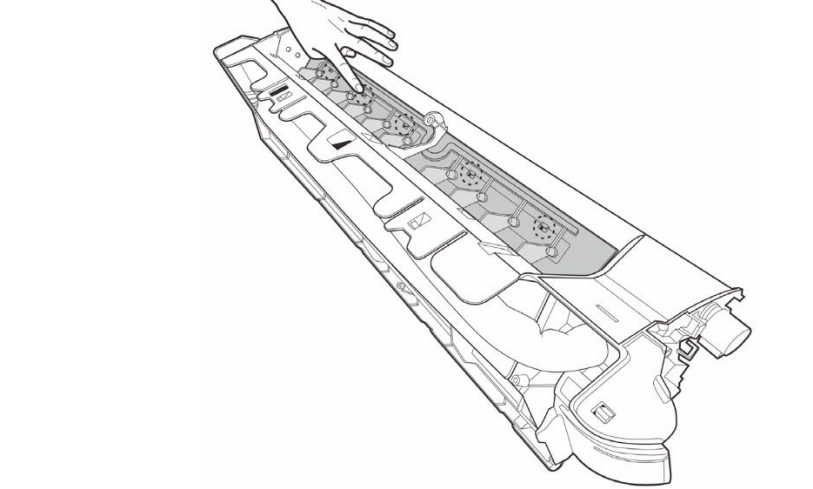
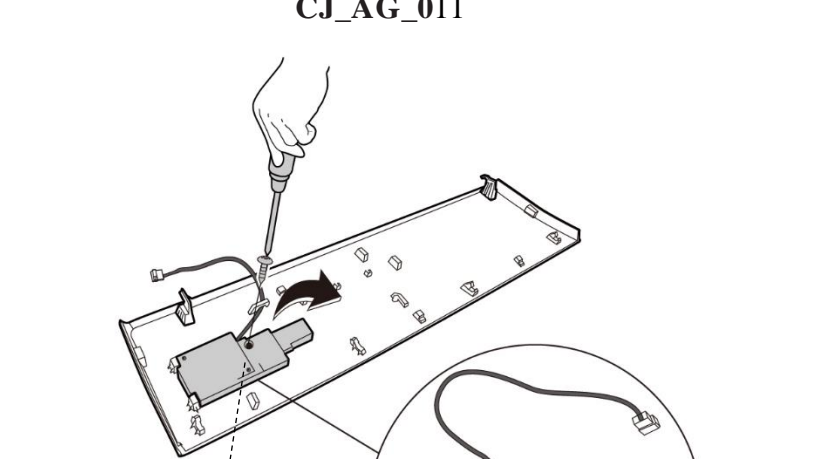
Note: This section is for reference only. Actual unit appearance may vary

Procedure	Illustration
<p>5) Remove 1 screw and then remove the Electrical cover (see CJ_AG_005).</p>	 <p style="text-align: center;">CJ_AG_005</p>
<p>6) ① Disconnect the connector for display boards (see CJ_AG_006).</p>	 <p style="text-align: center;">CJ_AG_006</p>
<p>7) ② Slid the front panel side to side to release each axis (see CJ_AG_006)</p>	

Note: This section is for reference only. Actual unit appearance may vary

Procedure	Illustration
<p>8) Open the screw caps and the remove the screws x 4 pcs. (see CJ_AF_007).</p>	 <p style="text-align: center;">CJ_AG_007</p>
<p>9) Release the 7 hooks in the back (see CJ_AG_008).</p>	 <p style="text-align: center;">CJ_AG_008</p>
<p>10) Release the 5 hooks in the back (see CJ_AG_009)</p>	 <p style="text-align: center;">CJ_AG_009</p>

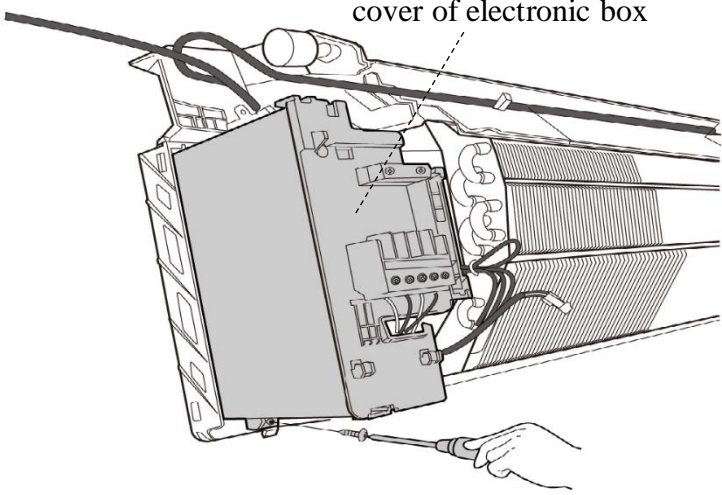
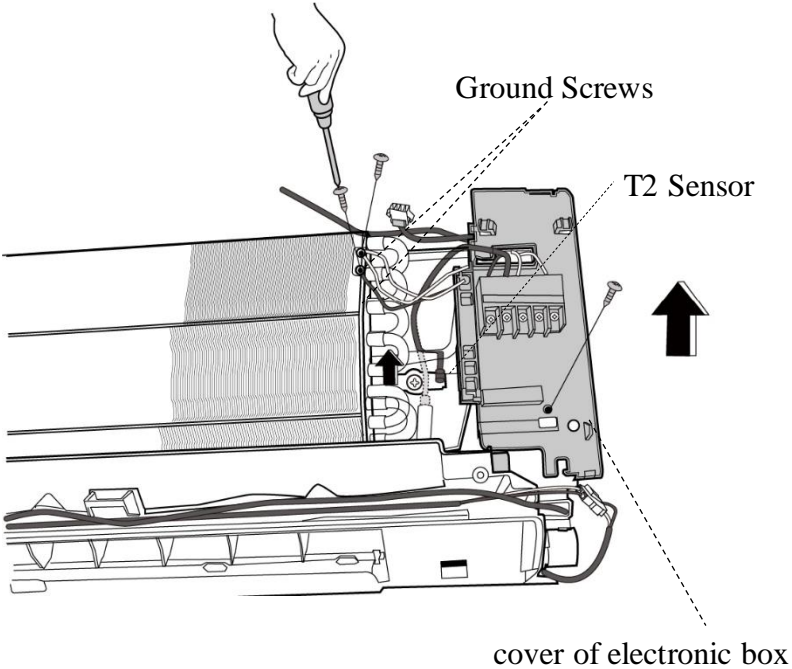
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>11) Pull out the panel frame while pushing the hook through a clearance between the panel frame and the heat exchanger. (see CJ_AG_010)</p>	 <p style="text-align: center;">CJ_AG_010</p>
<p>12) Release the 5 hooks of the vertical blades, then pull the vertical blades rightward and remove it (see CJ_AG_011).</p>	 <p style="text-align: center;">CJ_AG_011</p>
<p>13) Remove 1 screw of the display board. (see CJ_AG_012).</p>	 <p style="text-align: center;">CJ_AG_012</p>
<p>14) Rotate the display board in the direction shown in the right picture. (see CJ_AG_012).</p>	<p style="text-align: center;">Display board</p> <p style="text-align: center;">CJ_AG_012</p>

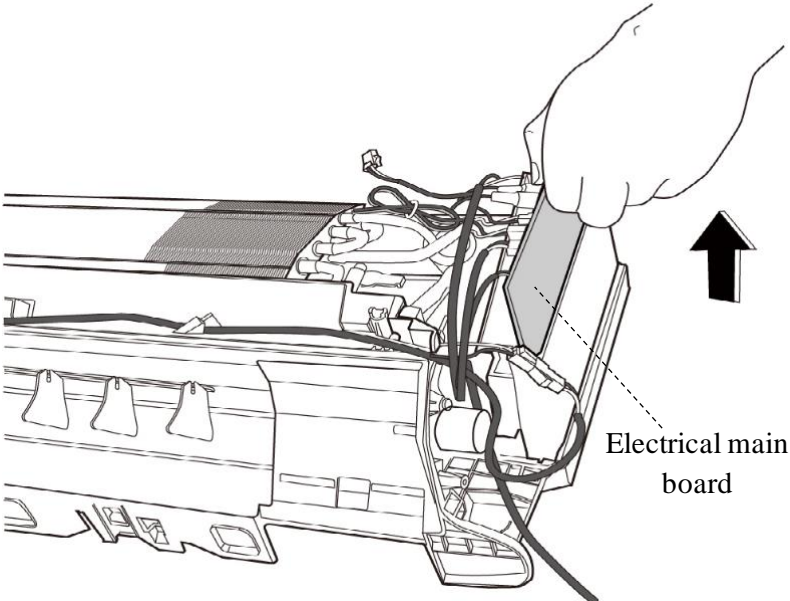
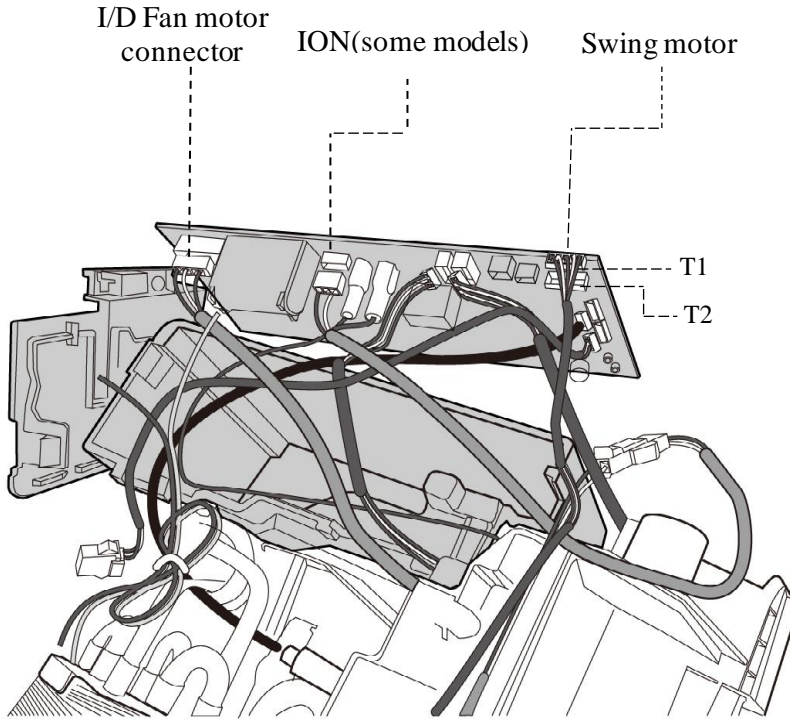
Note: This section is for reference only. Actual unit appearance may vary.

8.1.2 Electrical parts

Note: Remove the front panel (refer to 1. Front panel) before disassembling electrical parts

Procedure	Illustration
<p>1) Remove the fixing screw and then remove the cover of electronic box and the terminal cover (see CJ_AG_013).</p>	 <p>CJ_AG_013</p>
<p>2) Cut the ribbon by a shear, then pull out the coil temperature sensor (T2) (see CJ_AG_014).</p> <p>3) Remove one fixing screw of the electronic control box and two screws used for the ground connection (see CJ_AG_014).</p>	 <p>CJ_AG_014</p>

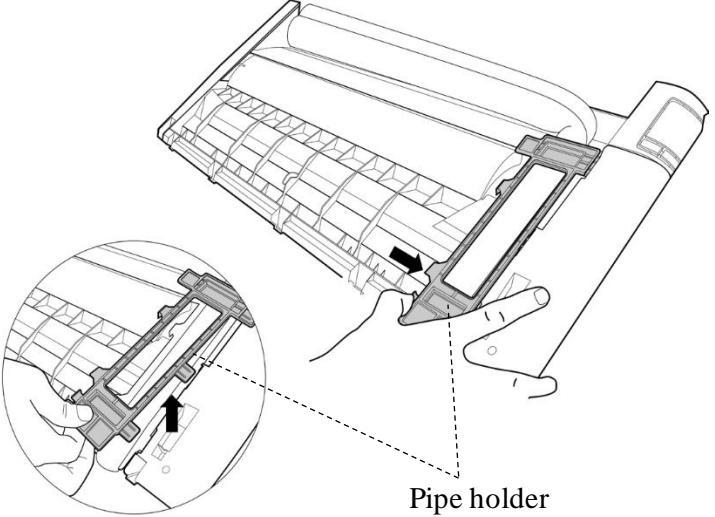
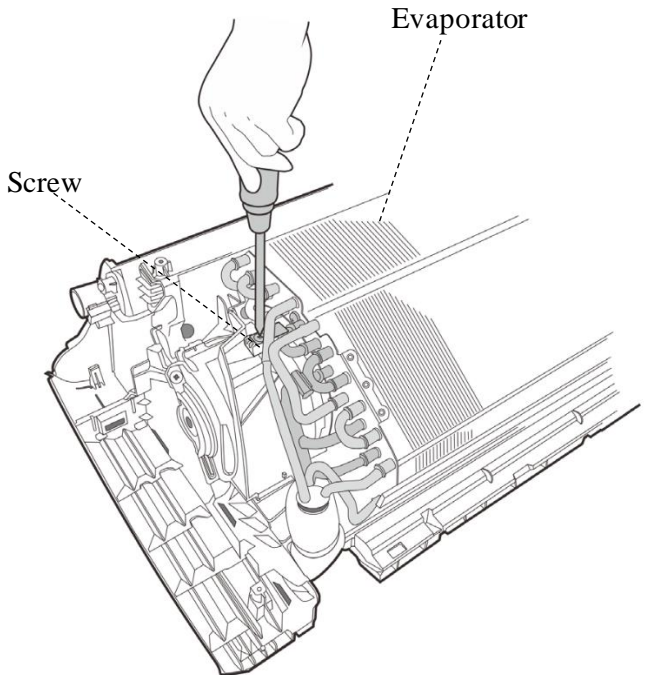
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>4) Pull out the electrical main board along the direction indicated in right image. (see CJ_AG_015).</p>	 <p style="text-align: center;">CJ_AG_015</p>
<p>5) Pull out the Electrical control box along the direction indicated in right image. to remove it (CJ_AG_016).</p>	 <p style="text-align: center;">CJ_AG_016</p>

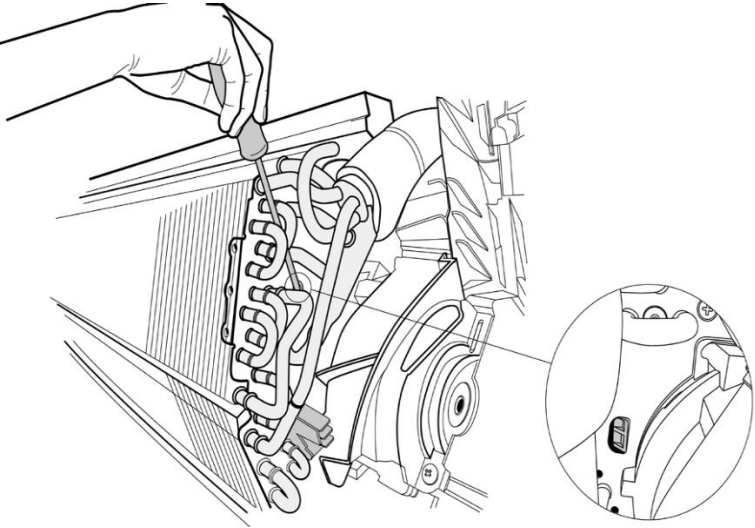
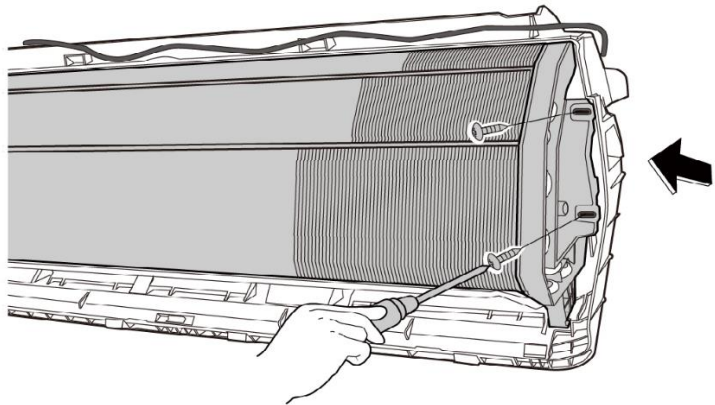
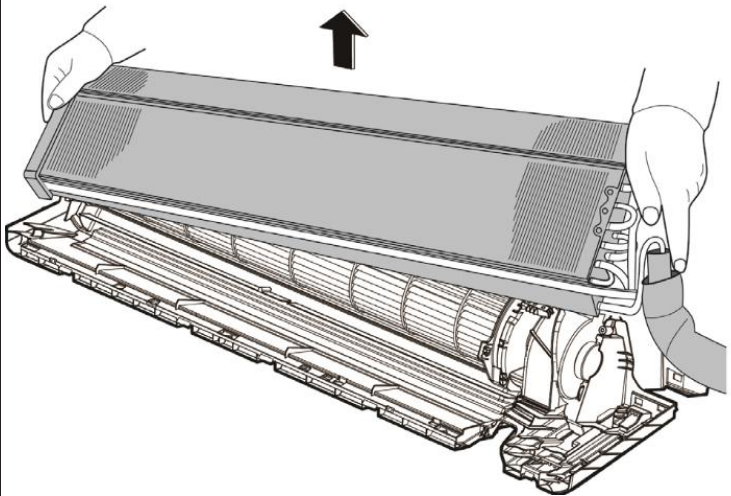
Note: This section is for reference only. Actual unit appearance may vary.

8.1.3 Evaporator

Note: Remove the front panel and electrical parts (refer to 1. Front panel and 2. Electrical parts) before disassembling evaporator

Procedure	Illustration
<p>1) Disassemble the pipe holder located at the rear of the unit (see CJ_AG_017).</p>	 <p>Pipe holder</p> <p>CJ_AG_017</p>
<p>2) Remove the 1 screw on the evaporator located at the fixed plate (see CJ_AG_018).</p>	 <p>Screw</p> <p>Evaporator</p> <p>CJ_AG_018</p>

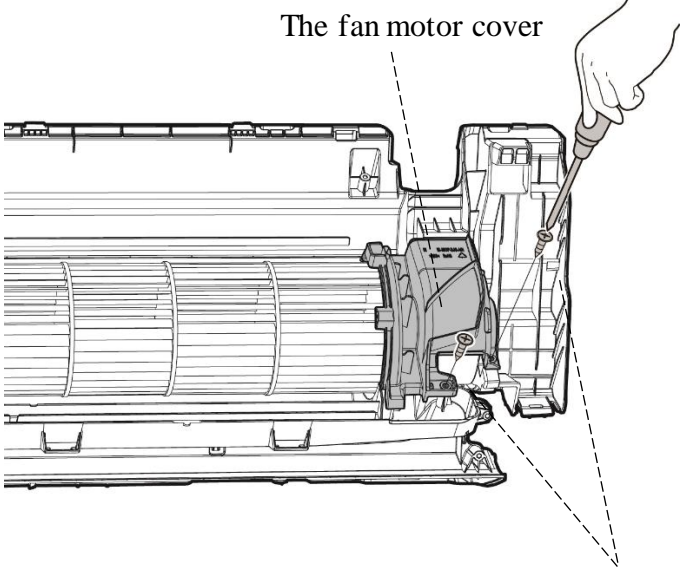
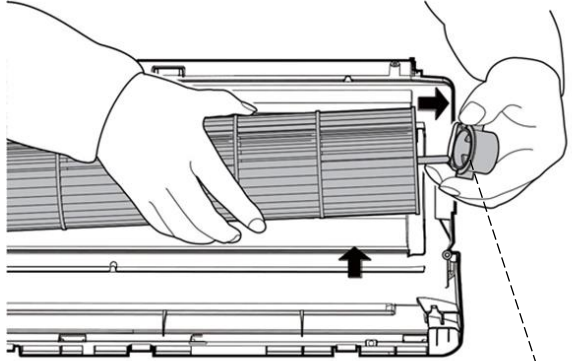
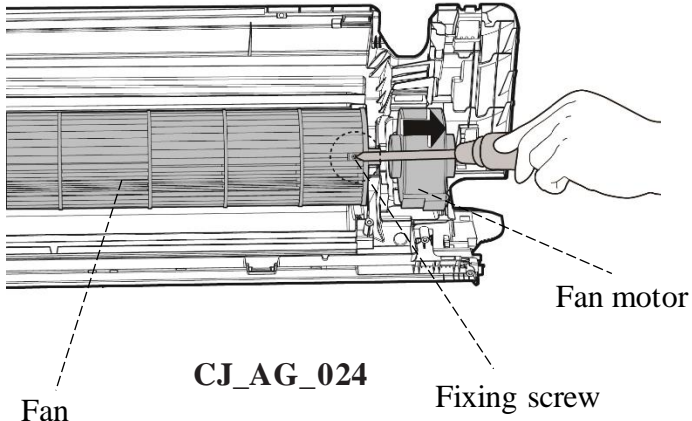
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>3) Remove 1 screw and release the hook on the evaporator (see CJ_AG_019).</p>	 <p style="text-align: center;">CJ_AG_019</p>
<p>4) Remove the 2 screws on the fixed plate located at the evaporator (see CJ_AG_020).</p>	 <p style="text-align: center;">CJ_AG_020</p>
<p>5) Pull out the evaporator (see CJ_AF_021).</p>	 <p style="text-align: center;">CJ_AF_021</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.1.4 Fan motor and fan

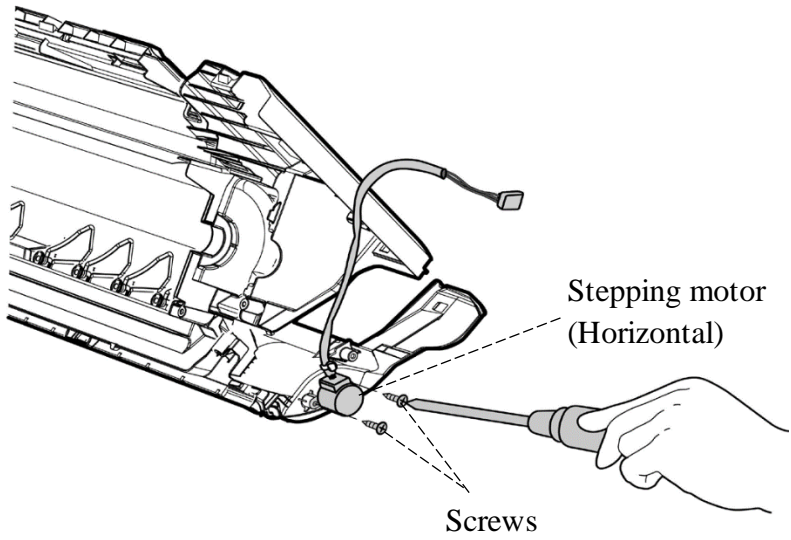
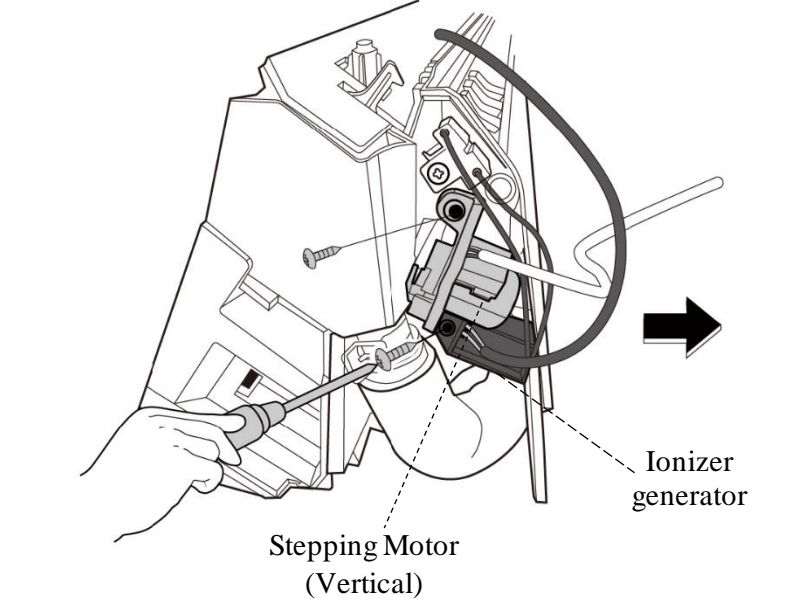
Note: Remove the front panel, electrical parts, and evaporator (refer to 1. Front panel, 2. Electrical parts, and 3. Evaporator). before disassembling fan motor and fan.

Procedure	Illustration
<p>1) Remove the two screws and remove the fan motor cover (see CJ_AG_022).</p>	 <p style="text-align: center;">CJ_AG_022</p>
<p>2) Remove the Bearing sleeve (see CJ_AF_023).</p>	 <p style="text-align: center;">CJ_AG_023</p>
<p>3) Remove the fixing screw (see CJ_AG_024).</p> <p>4) Pull out the fan motor and fan assembly from the side.</p>	 <p style="text-align: center;">CJ_AG_024</p>

Note: This section is for reference only. Actual unit appearance may vary.

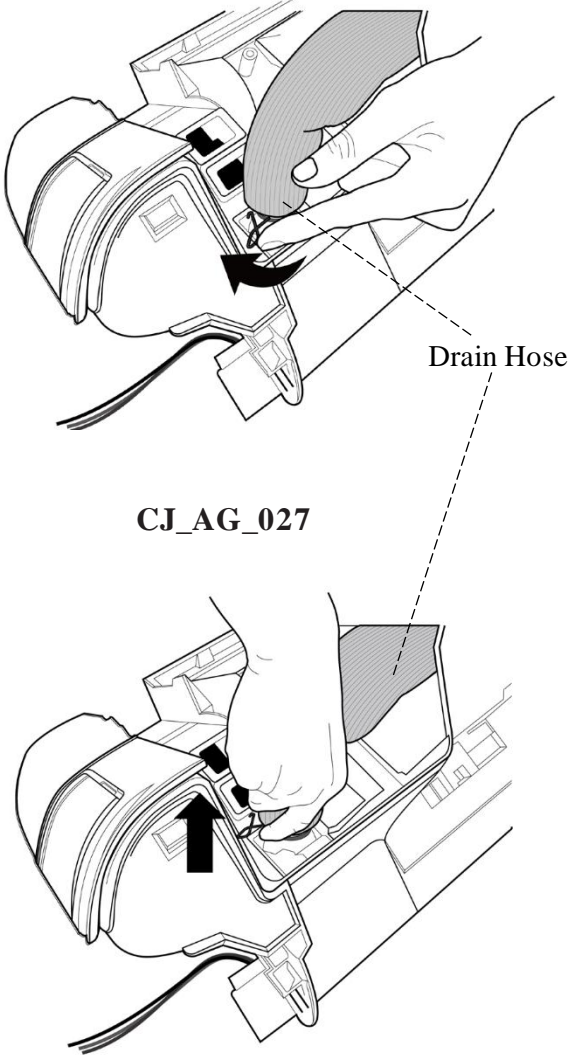
8.1.5 Stepping motor

Note: Remove the front panel and electrical parts (refer to 1. Front panel, 2. Electrical parts) before disassembling step motor.

Procedure	Illustration
<p>1) Remove the two screws, then remove the stepping motor (see CJ_AG_025).</p>	 <p>Stepping motor (Horizontal)</p> <p>Screws</p> <p>CJ_AG_025</p>
<p>2) Remove 1 screw, then remove the vertical swing motor (see CJ_AG_026). (for some units)</p>	 <p>Stepping Motor (Vertical)</p> <p>Ionizer generator</p> <p>CJ_AG_026</p>

Note: This section is for reference only. Actual unit appearance may vary.

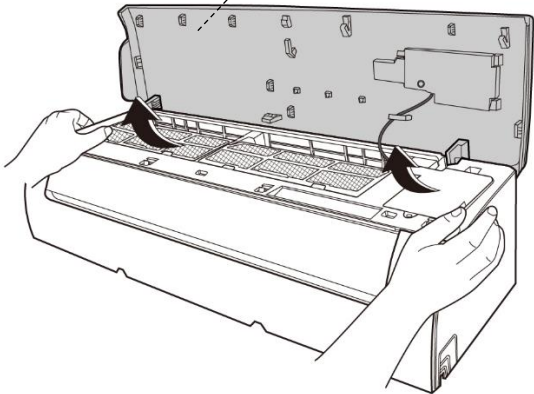
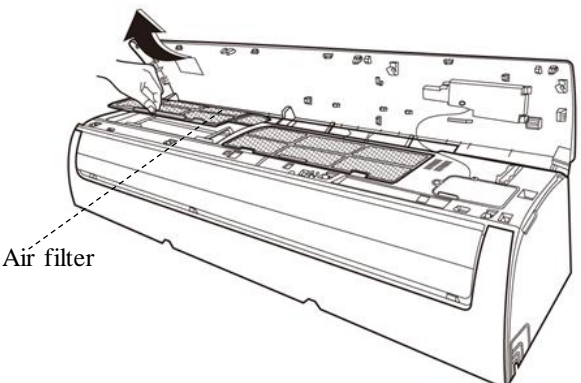
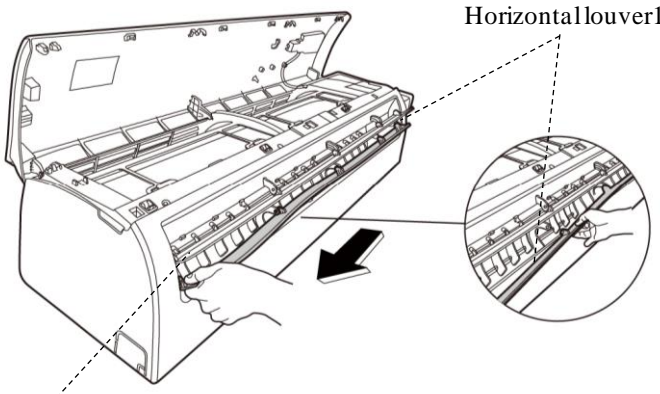
8.1.6 Drain Hose

Procedure	Illustration
<p>1) Rotate the fixed wire clockwise indicated in right image (see CJ_AG_027).</p> <p>2) Pull up the drain hose to remove it (see CJ_AG_028).</p>	 <p data-bbox="1007 842 1182 875">CJ_AG_027</p> <p data-bbox="1007 1435 1182 1469">CJ_AG_028</p> <p data-bbox="1302 680 1445 714">Drain Hose</p>

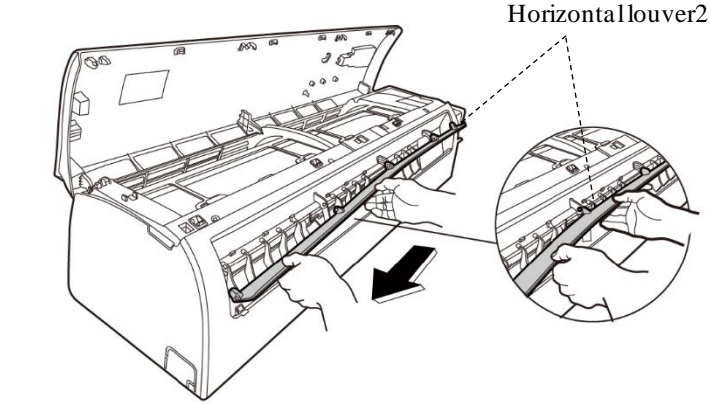
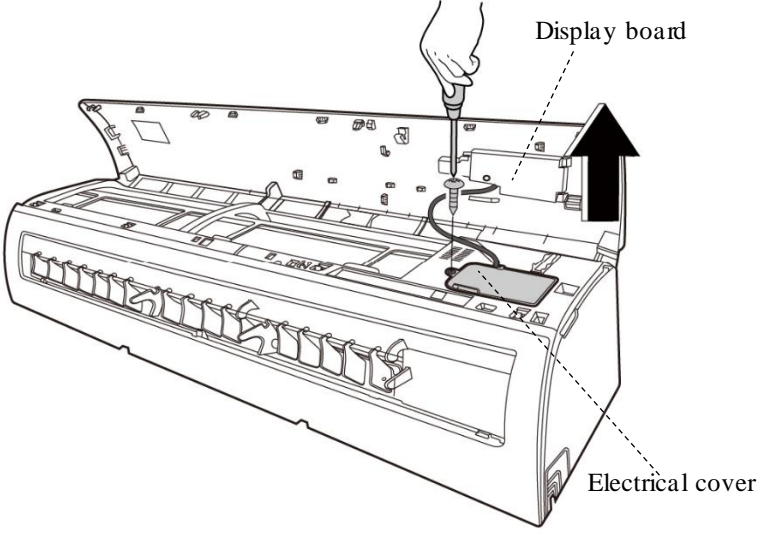
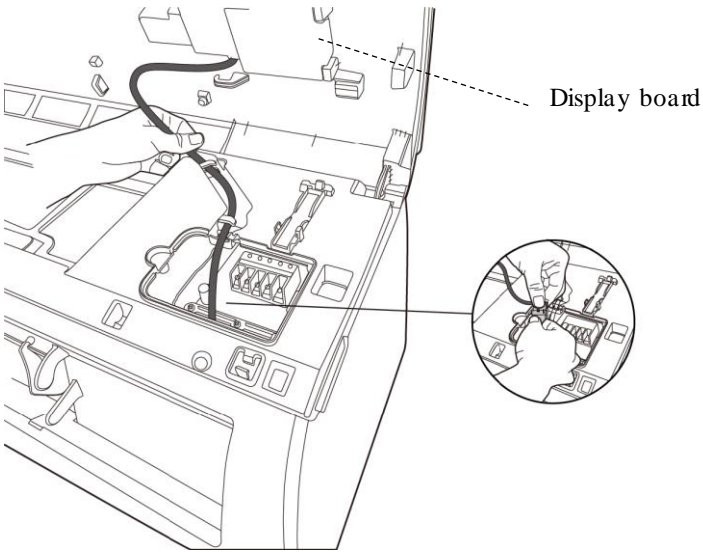
Note: This section is for reference only. Actual unit appearance may vary.

8.2 Disassembly indoor unit (27-36 K)

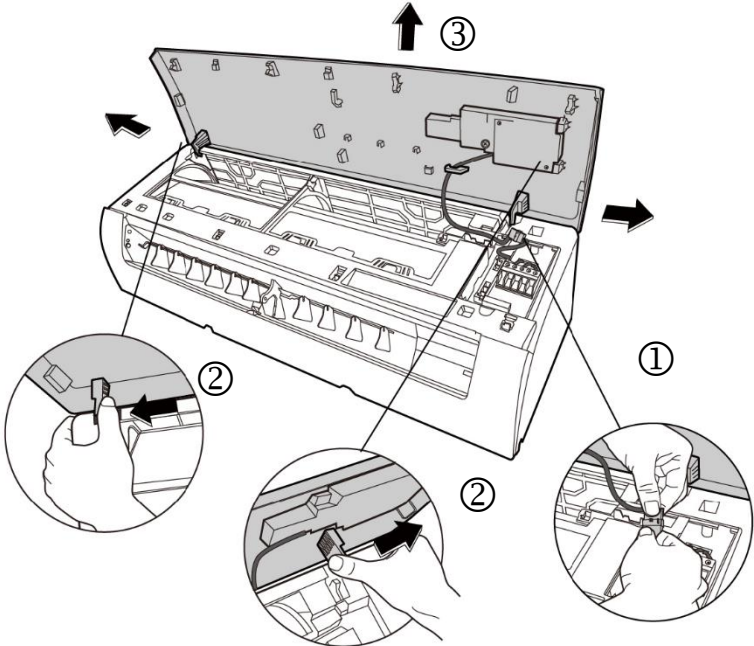
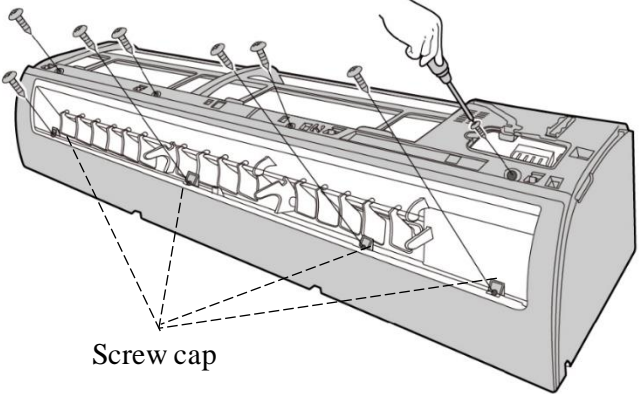
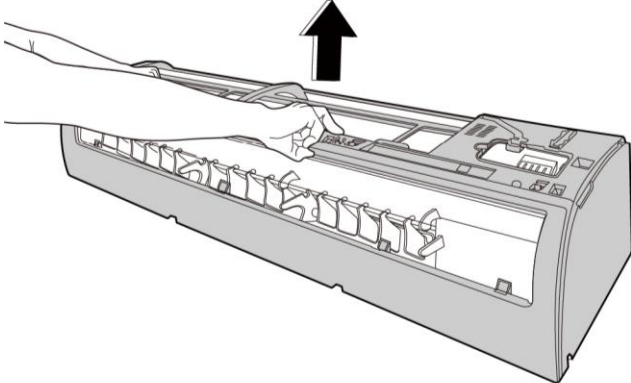
8.2.1 Front panel

Procedure	Illustration
<p>1) Hold the front panel by the tabs on the both sides and lift it (see CJ_AG (36) _001).</p>	<p style="text-align: center;">Front Panel</p>  <p style="text-align: center;">CJ_AG (36) _001</p>
<p>2) Push up the bottom of an air filter (step 1), and then pull it out downwards (step 2) (see CJ_AG (36) _002).</p>	 <p style="text-align: center;">CJ_AG (36) _002</p>
<p>3) Open the horizontal louver(below) and bend the louver lightly to loosen the leftmost hook, then push the hook towards right to loosen the second hook. (see CJ_AG (36) _003).</p> <p>4) Remove the horizontal louver(below) towards left. (see CJ_AG (36) _003).</p>	 <p style="text-align: center;">CJ_AG (36) _003</p>

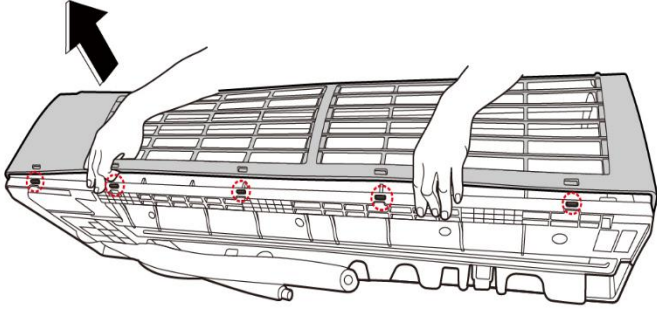
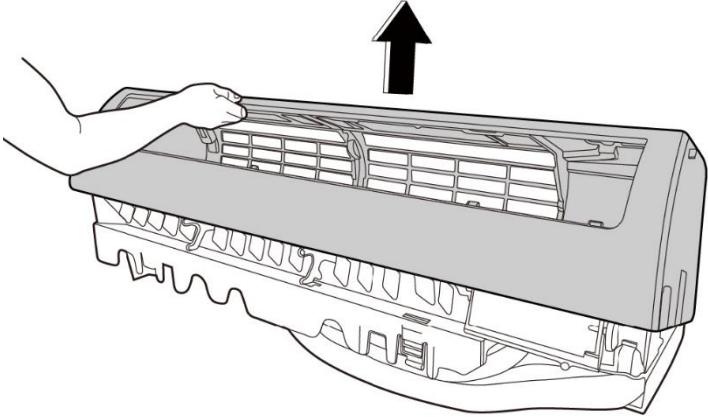
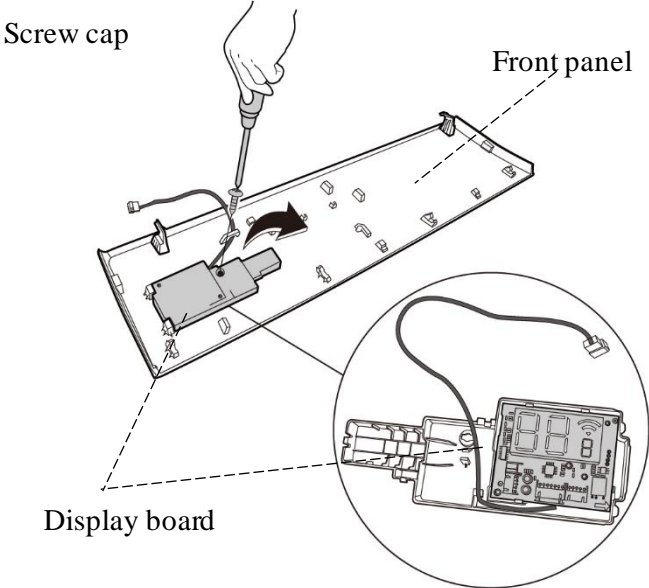
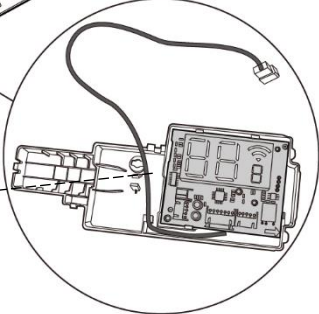
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>5) Remove the horizontal louver(above) with the same way. (see CJ_ AG (36) _004).</p>	 <p style="text-align: center;">CJ_AG (36)_004</p>
<p>6) Push up the electrical cover by loosen a screw (see CJ_ AG (36) _005).</p>	 <p style="text-align: center;">CJ_AG (36) _005</p>
<p>7) Pull out the connector wire, and then disconnect the connector for display board. (see CJ_ AG (36) _006).</p>	 <p style="text-align: center;">CJ_AG (36) _006</p>

Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>8) Slide up the front panel side to side to release each axis (see CJ_AG (36)_007)</p>	 <p style="text-align: center;">CJ_AG (36)_007</p>
<p>9) Open the screw cap and then remove the 4 screws. (see CJ_AG (36)_008).</p>	 <p style="text-align: center;">CJ_AG (36)_008</p>
<p>10) Remove the 4 screws fixing the panel frame. (see CJ_AG (36)_008).</p> <p>11) Release the hooks with hands. (see CJ_AG (36)_009)</p>	 <p style="text-align: center;">CJ_AG (36)_009</p>

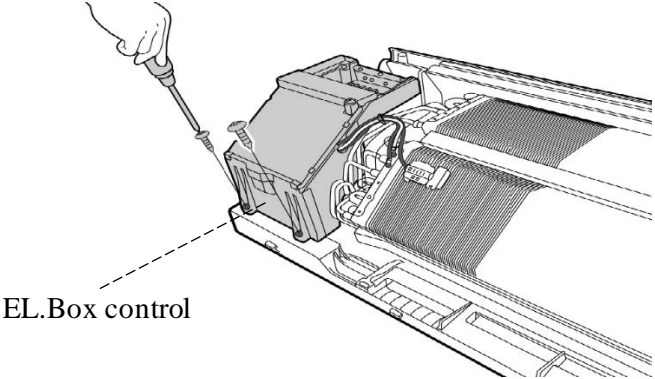
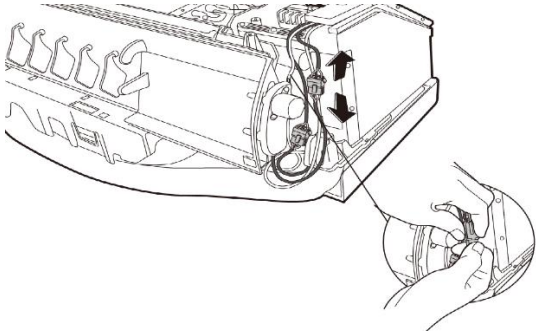
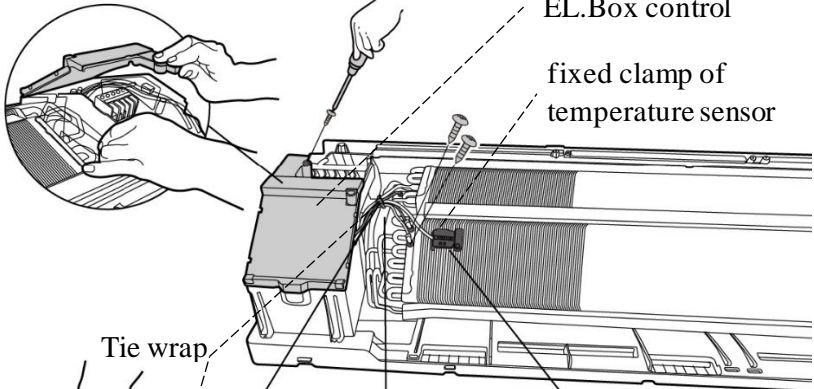
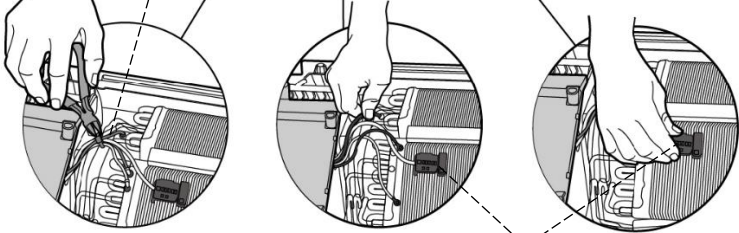
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>12) Release the 5 hooks in the back (see CJ_AG (36) _010).</p>	 <p style="text-align: center;">CJ_AG_010</p>
<p>13) Pull out the panel frame while pushing the hook through a clearance between the panel frame and the heat exchanger. (see CJ_AG (36) _011)</p>	 <p style="text-align: center;">CJ_AG_011</p>
<p>14) Remove 1 screw of the display board. (see CJ_AG (36) _012).</p>	 <p style="text-align: center;">CJ_AG_012</p>
<p>15) Rotate the display board in the direction shown in the right picture. (see CJ_AG (36) _012).</p>	 <p style="text-align: center;">CJ_AG_012</p>

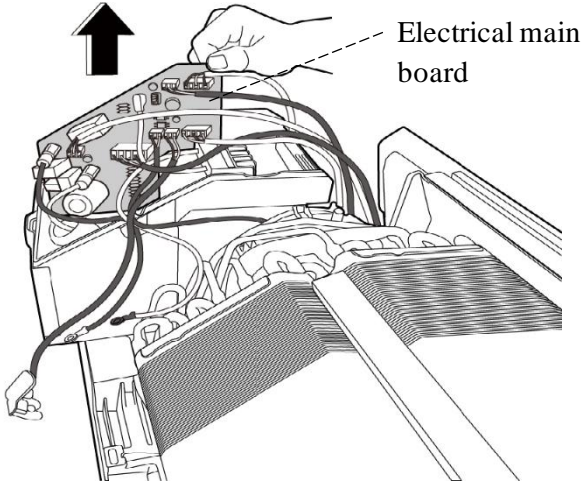
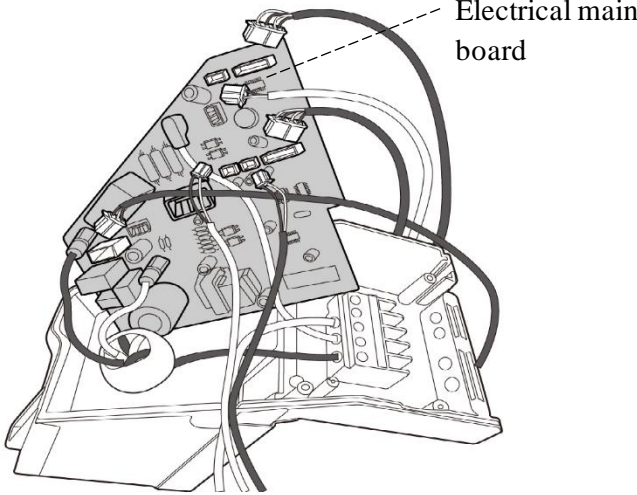
Note: This section is for reference only. Actual unit appearance may vary.

8.2.2 Electrical parts (Antistatic gloves must be worn.)

Note: Remove the front panel (refer to 1. Front panel) before disassembling electrical parts.

Procedure	Illustration
<p>1) Remove 2 fixing screws of electrical control box subassembly. (see CJ_AG (36) _013).</p> <p>2) Disconnect the connectors. (see CJ_AG (36) _014). (If you want to repair the electrical control box components, perform the step1& step 2; If you want to repair the main control board assembly, perform steps 3 to 7 below.)</p> <p>3) Cut the tie wrap by a shear, then pull out the coil temperature sensor (T2) (see CJ_AG (36) _015).</p> <p>4) Remove one fixing screw of the electronic control box and two screws used for the ground connection (see CJ_AG (36) _015).</p> <p>5) Remove fixed clamp of temperature sensor (see CJ_AG (36) _015).</p>	 <p>EL.Box control</p> <p>CJ_AG (36) _013</p>  <p>CJ_AG (36) _014</p>  <p>EL.Box control</p> <p>fixed clamp of temperature sensor</p> <p>Tie wrap</p>  <p>fixed clamp of temperature sensor</p> <p>CJ_AG (36) _015</p>

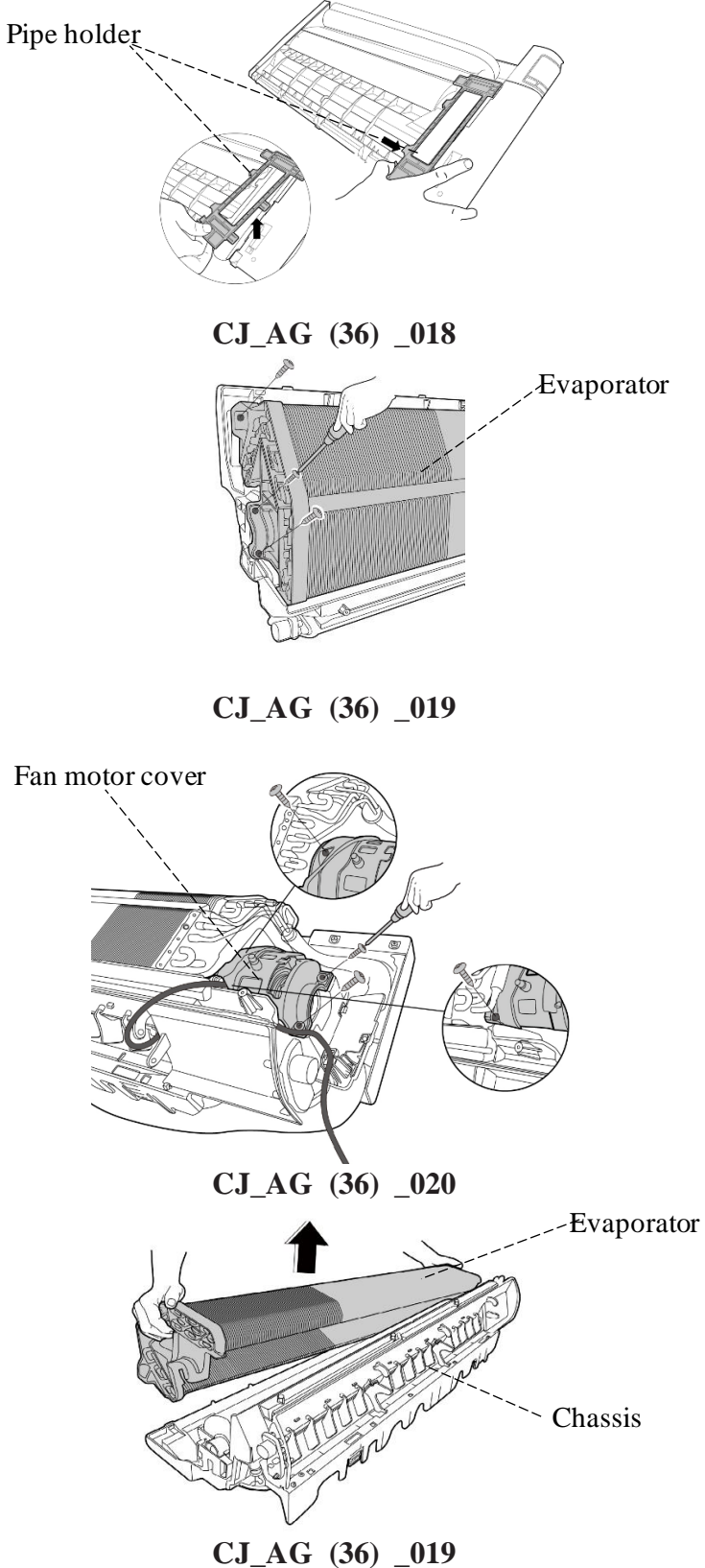
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>6) Pull out the electrical main board along the direction indicated in right image. (see CJ_AG (36)_016).</p>	 <p style="text-align: center;">CJ_AG (36) _016</p>
<p>7) Disconnect the connectors and remove main control board. (see CJ_AG (36) _017).</p>	 <p style="text-align: center;">CJ_AG (36) _017</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.2.3 Electrical parts (Antistatic gloves must be worn.)

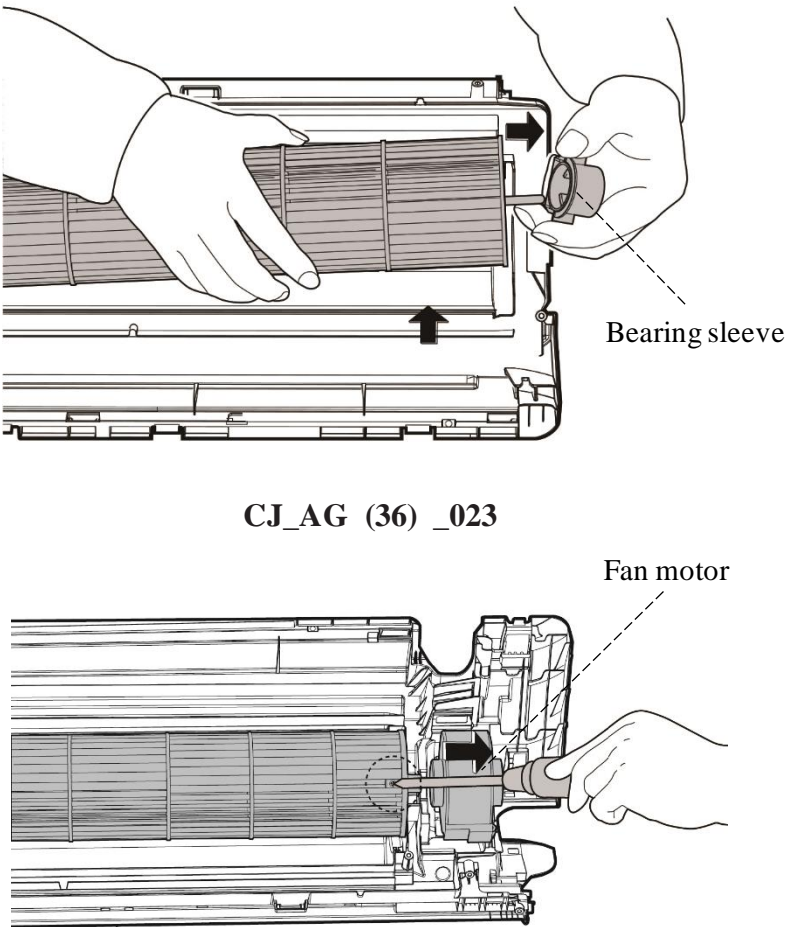
Note: Remove the front panel and electrical parts (refer to 1. Front panel and 2. Electrical parts) before disassembling evaporator

Procedure	Illustration
<p>1) Disassemble the pipe holder located at the rear of the unit (see CJ_AG (36) _018).</p> <p>2) Remove the 3 screws on the evaporator located at the fixed plate (see CJ_ AG (36) _019).</p> <p>3) Remote the 4 screws fixing the fan motor cover (see CJ_AG (36) _020)</p> <p>4) Pull out the evaporator (see CJ_ AG (36) _021).</p>	 <p>Pipe holder</p> <p>CJ_AG (36) _018</p> <p>Evaporator</p> <p>CJ_AG (36) _019</p> <p>Fan motor cover</p> <p>CJ_AG (36) _020</p> <p>Evaporator</p> <p>Chassis</p> <p>CJ_AG (36) _019</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.2.4 Fan motor and fan

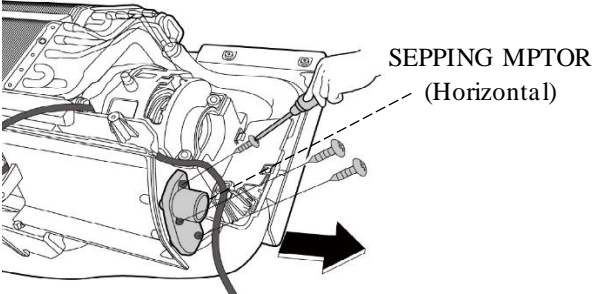
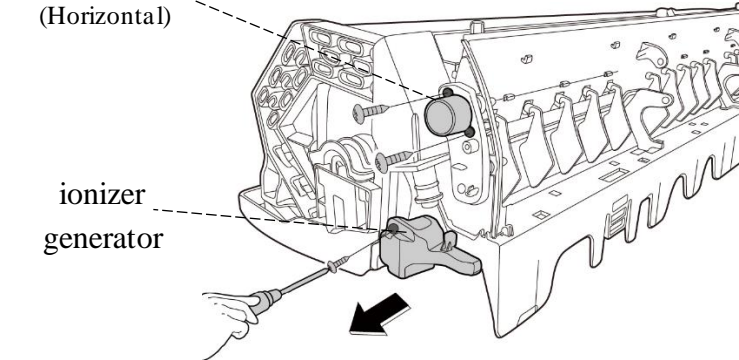
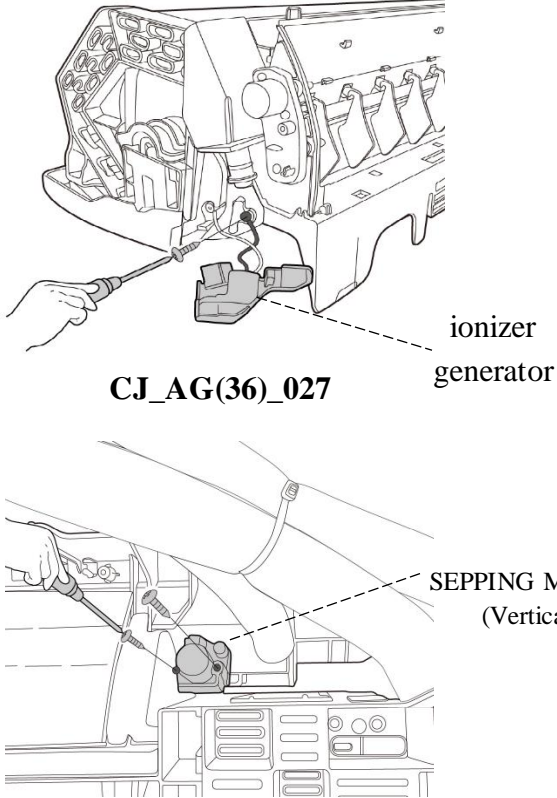
Note: Remove the front panel, electrical parts and evaporator (refer to 1. Front panel, 2. Electrical parts, and 3. Evaporator). before disassembling fan motor and fan.

Procedure	Illustration
<p>1) Remove the bearing sleeve (see CJ_AG (36) _023).</p> <p>2) Remove the fixing screw (see CJ_AG (36) _024).</p> <p>3) Pull out the fan motor and fan assembly from the side.</p>	 <p>The top illustration, labeled CJ_AG (36) _023, shows a hand pulling a bearing sleeve off the fan motor. A dashed line points to the bearing sleeve with the label "Bearing sleeve".</p> <p>The bottom illustration, labeled CJ_AG(36)_024, shows a hand using a screwdriver to remove a screw from the fan motor assembly. A dashed line points to the fan motor with the label "Fan motor".</p>

Note: This section is for reference only. Actual unit appearance may vary.

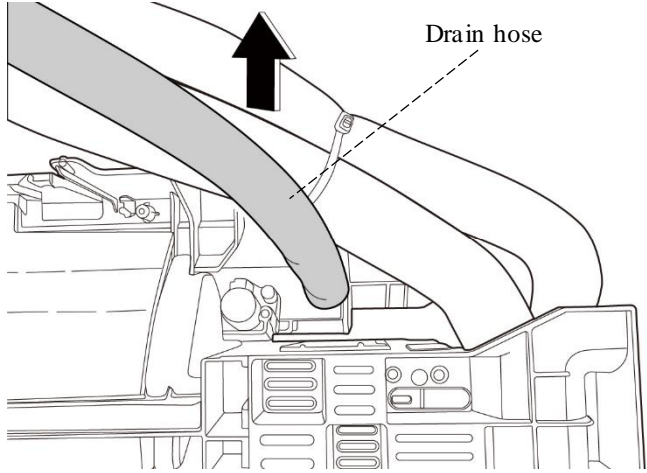
8.2.5 Step motor

Note: Remove the front panel and electrical parts (refer to 1. Front panel, 2. Electrical parts) before disassembling step motor.

Procedure	Illustration
<p>1) Remove the 3 screws, then remove the horizontal swing motor(above) (see CJ_ AG (36) _025).</p>	 <p style="text-align: center;">CJ_ AG (36) _025</p>
<p>2) Remove the 2 screws, then remove the horizontal swing motor(below) (see CJ_ AG (36) _026)</p> <p>3) Remove 1 screw, then remove the ionizer generator (see CJ_ AG(36)_026).(for some units)</p>	 <p style="text-align: center;">CJ_ AG (36)_026</p>
<p>4) Remove 1 screw, then remove the Positive and negative ion generator. (for some units)' (see CJ_ AG (36) _027)</p>	 <p style="text-align: center;">CJ_ AG(36)_027</p>

Note: This section is for reference only. Actual unit appearance may vary.

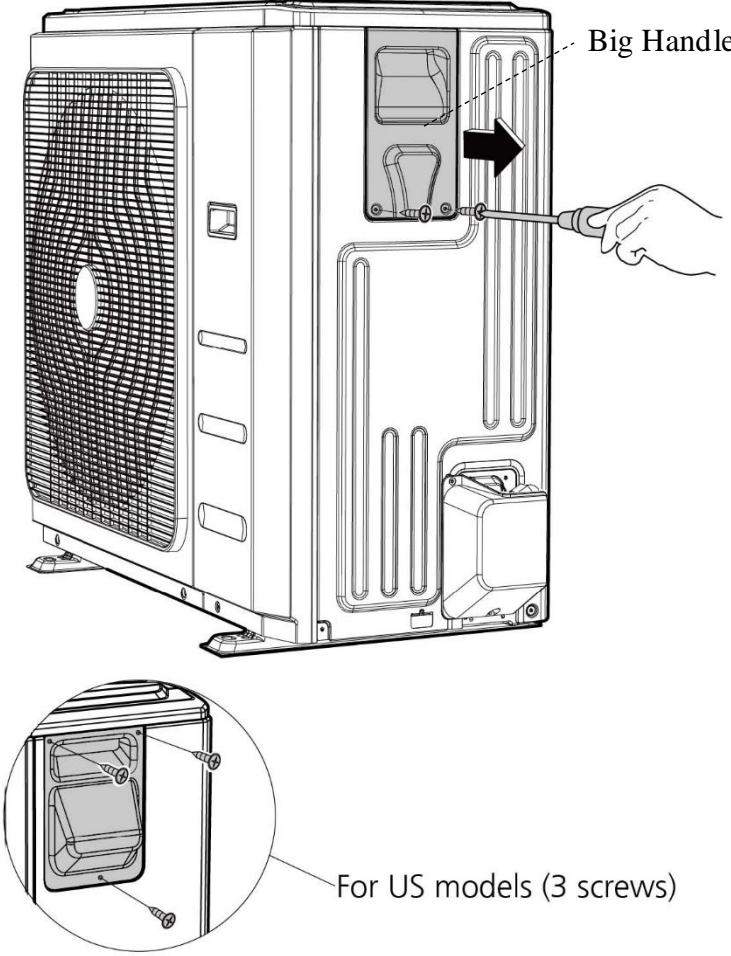
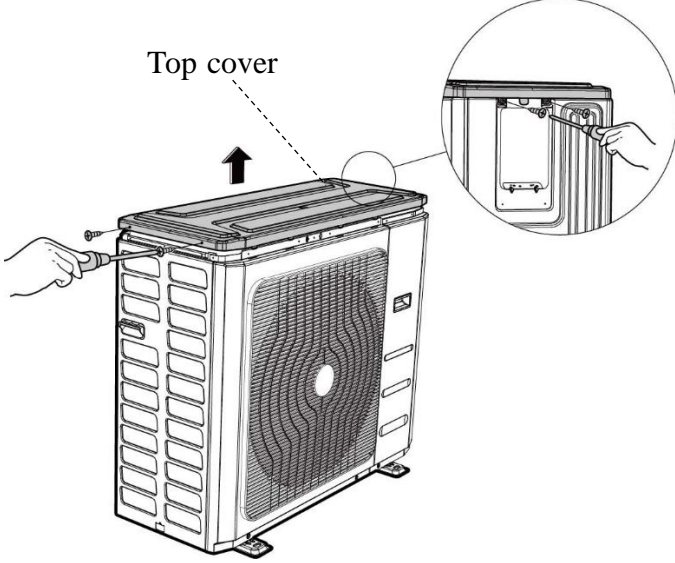
8.2.6 Drain Hose

Procedure	Illustration
1) Pull up the drain hose to remove it (see CJ_AG (36) _029).	 <p>The illustration shows a side view of a unit with a drain hose. A thick grey arrow points upwards from the hose, indicating the direction to pull it. A dashed line points to the hose with the label 'Drain hose'. Below the illustration is the reference code 'CJ_AG (36) _025'.</p>

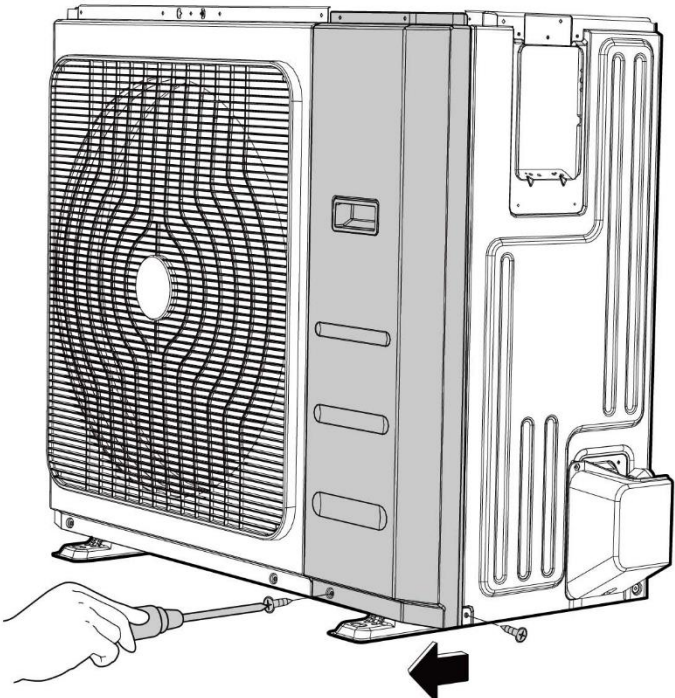
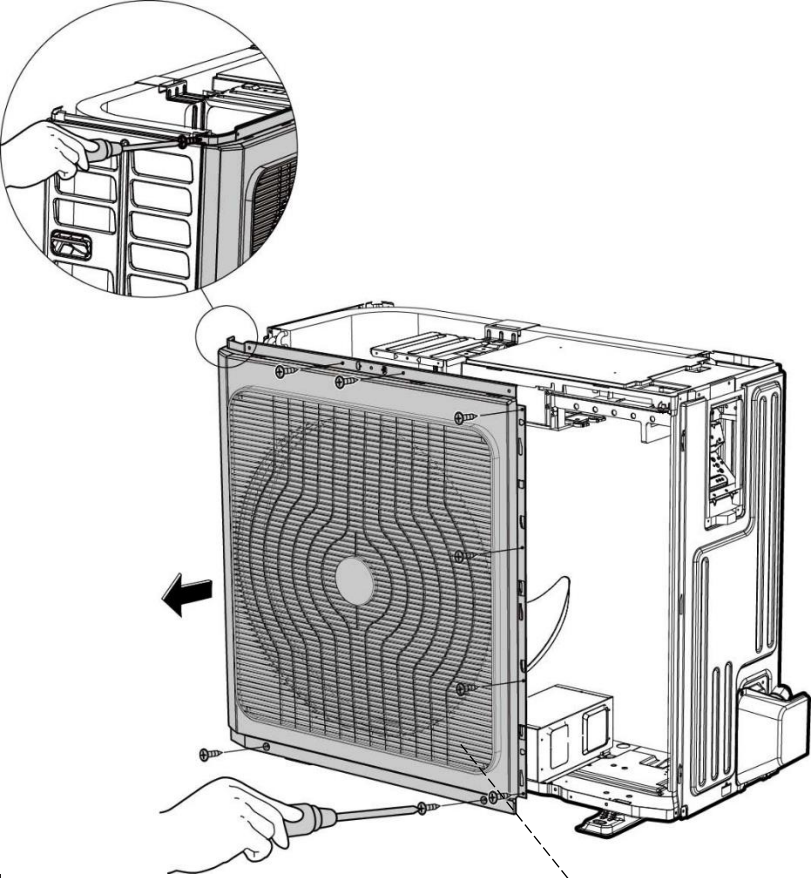
Note: This section is for reference only. Actual unit appearance may vary.

8.3 Outdoor Unit Disassembly

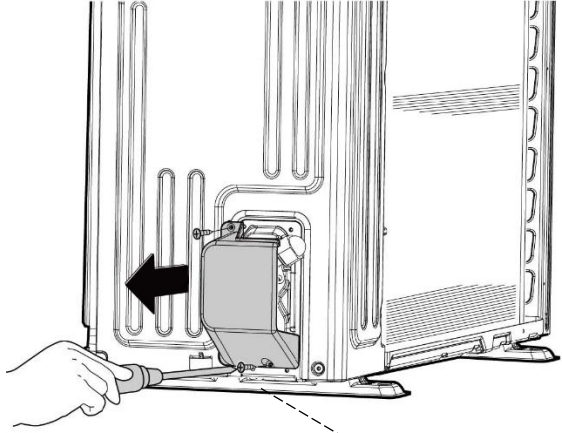
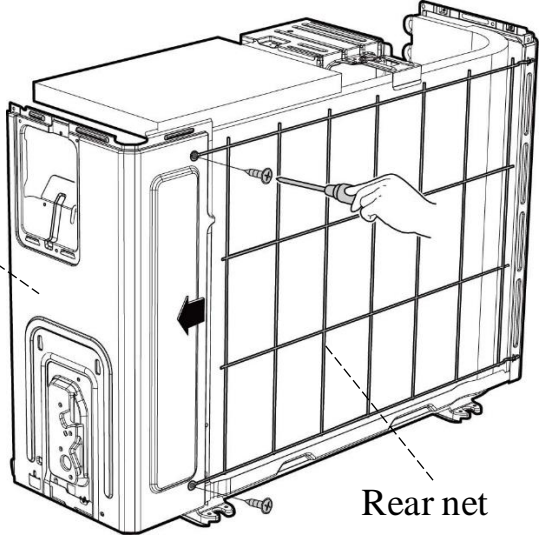
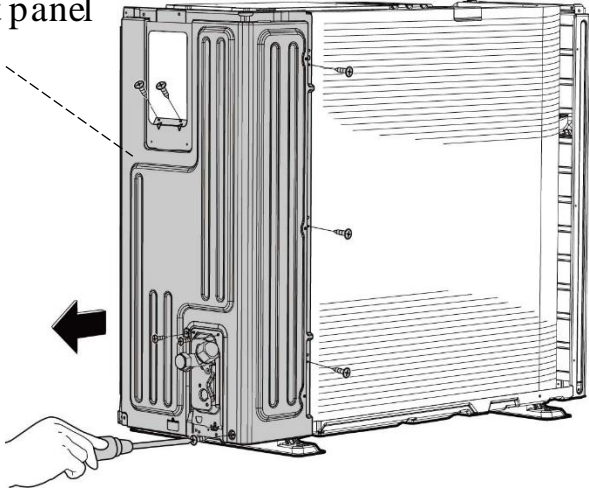
8.3.1 Panel Plate (D30) for 30 -36 K

Procedure	Illustration
<p>1) Turn off the air conditioner and the power breaker.</p> <p>2) Remove the screws of the big handle and then remove the big handle (2 screws) (see CJ_D30_001).</p>	 <p>Big Handle</p> <p>For US models (3 screws)</p> <p>CJ_D30_001</p>
<p>3) Remove the screws of the top cover and then remove the top cover (4 screws). Two of the screws is located underneath the big handle (see CJ_D30_002)</p>	 <p>Top cover</p> <p>CJ_D30_002</p>

Note: This section is for reference only. Actual unit appearance may vary.

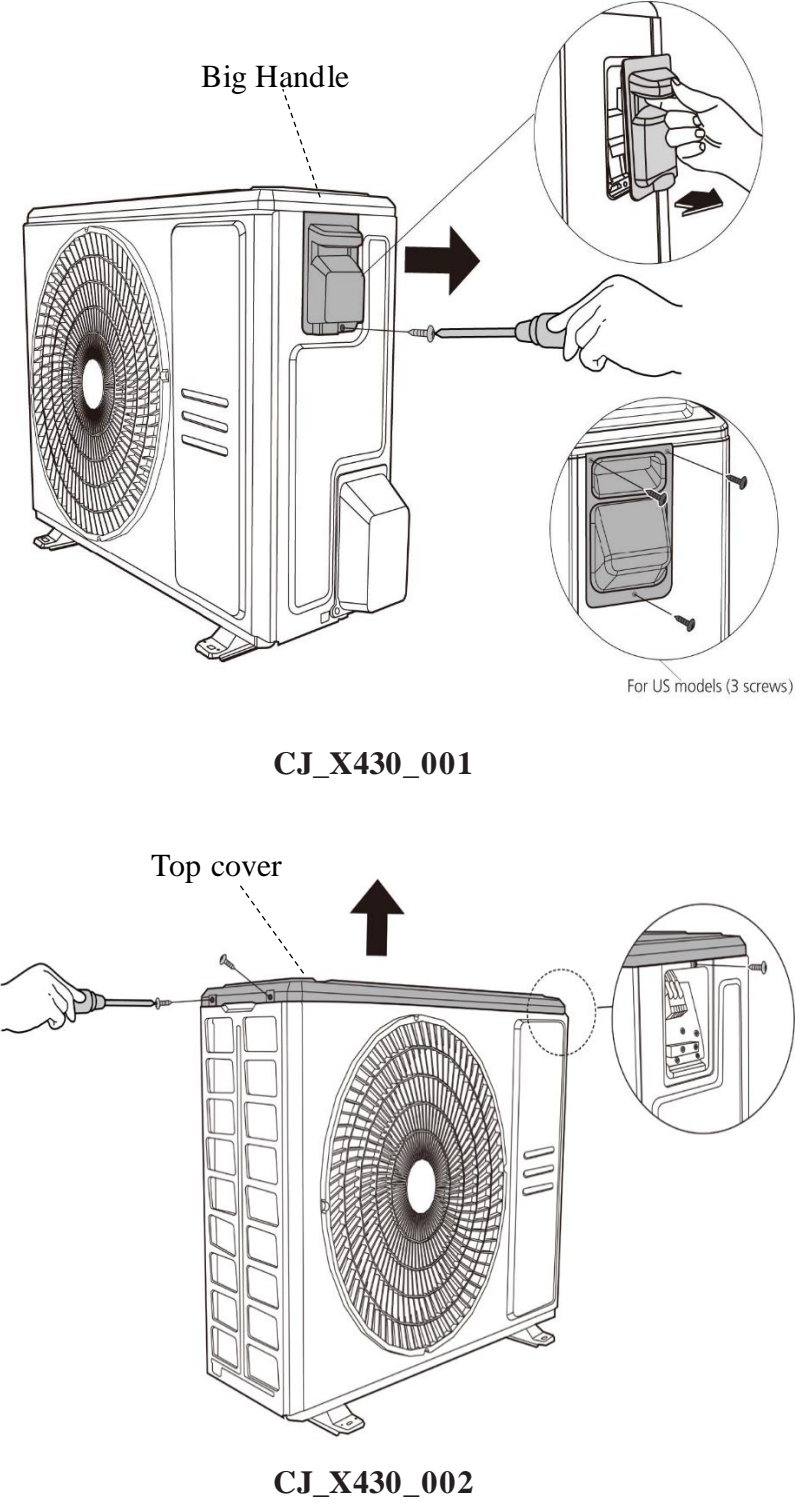
Procedure	Illustration
<p>4) Remove the screws of the front right panel and then remove the front right panel (2 screws) (see CJ_D30_003).</p>	 <p style="text-align: center;">CJ_D30_003</p>
<p>5) Remove the screws of the front panel and then remove the front panel (9 screws) (see CJ_D30_004).</p>	 <p style="text-align: center;">CJ_AA30_004</p> <p style="text-align: right;">Front panel</p>

Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>6) Remove the screws of water collecting cover and then remove the water collecting cover (2 screw). (see CJ_D30_005)</p>	 <p>Water Collecting Cover</p> <p>CJ_D30_005</p>
<p>7) Remove the screws of the front panel and then remove the front panel (9 screws) (see CJ_D30_004).</p>	 <p>Right panel</p> <p>Rear net</p> <p>CJ_D30_006</p>
<p>8)) Remove the screws of the right panel and then remove the right panel (8 screws) (see CJ_D30_007).</p>	 <p>Right panel</p> <p>CJ_D30_006</p>

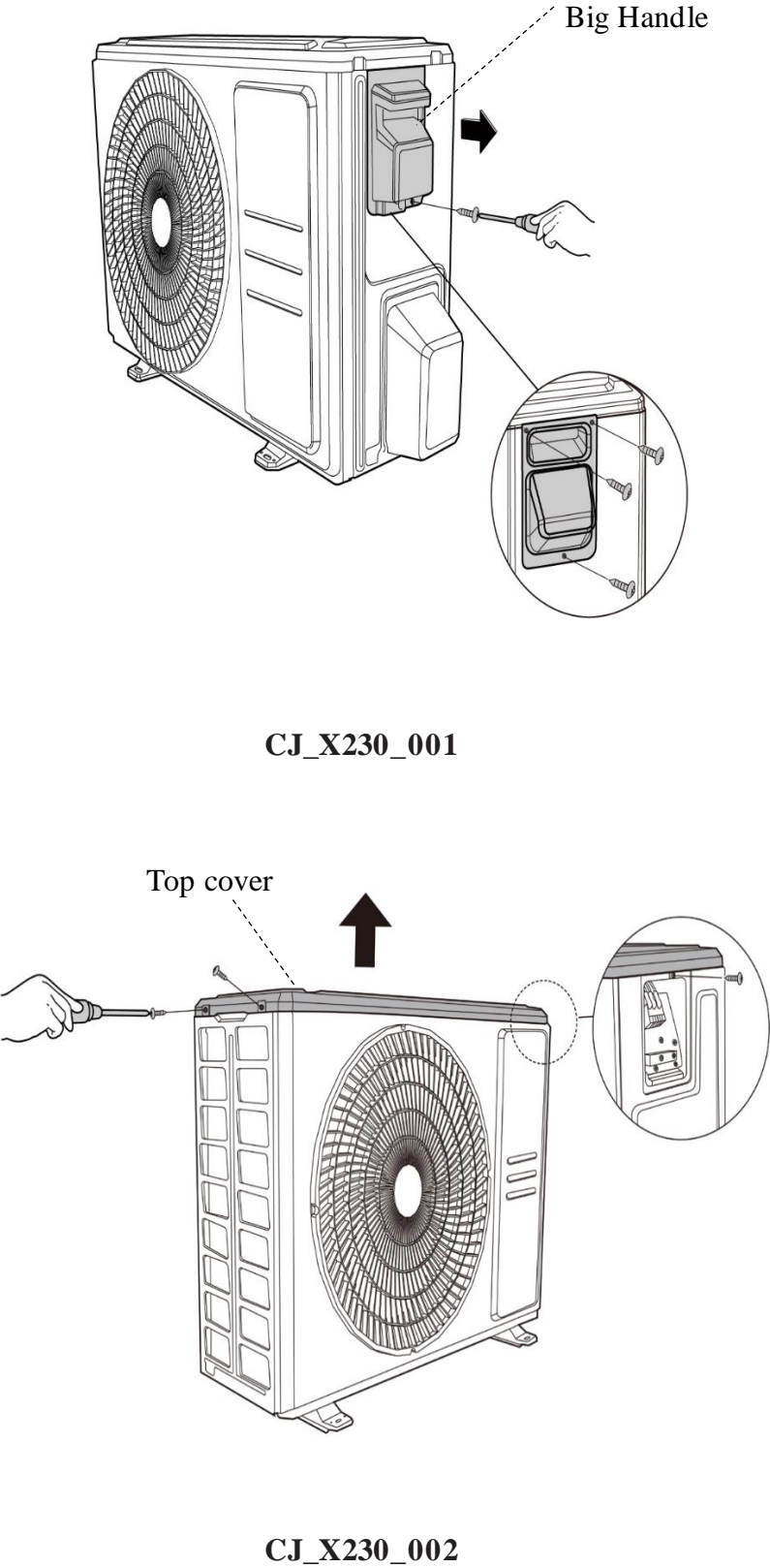
Note: This section is for reference only. Actual unit appearance may vary.

8.3.2 Panel Plate (X430) for 24 K

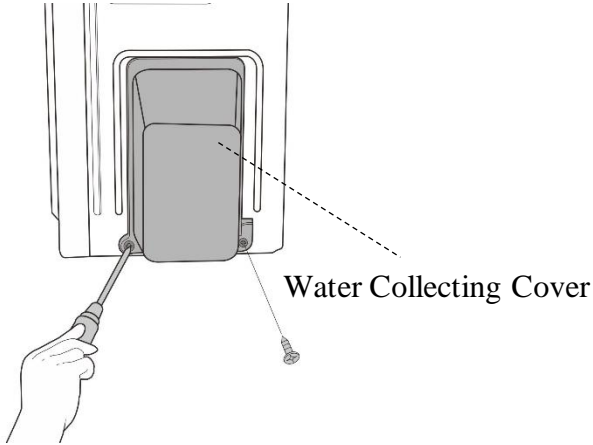
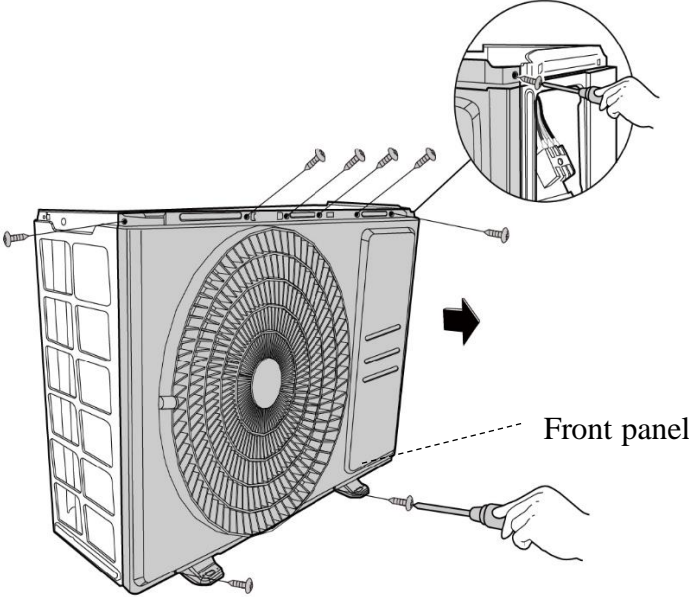
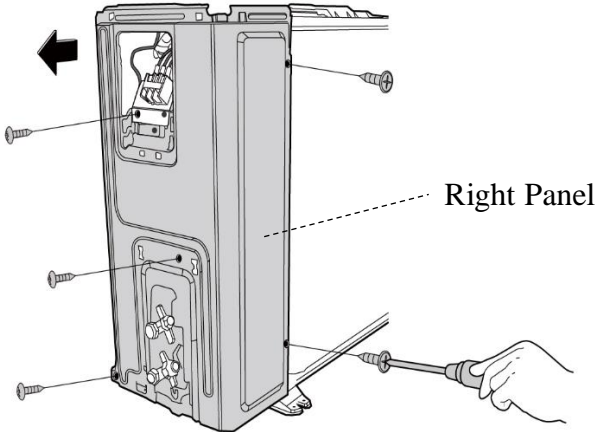
Procedure	Illustration
<p>1) Turn off the air conditioner and the power breaker.</p> <p>2) Remove the screws of the big handle and then remove the big handle (1 screws) (see CJ_X430_001).</p> <p>3) Remove the screws of the top cover and then remove the top cover (3 screws). One of the screws is located underneath the big handle (see CJ_X430_002)</p>	 <p>The illustration is divided into two parts, CJ_X430_001 and CJ_X430_002. CJ_X430_001 shows the removal of the 'Big Handle' from the side of the air conditioner unit. A hand is shown using a screwdriver to remove a screw from the handle. An inset shows a close-up of the handle being pulled away from the unit. A second inset shows the handle being removed from the top of the unit, with a note 'For US models (3 screws)'. CJ_X430_002 shows the removal of the 'Top cover'. A hand is shown using a screwdriver to remove a screw from the top edge of the unit. An inset shows a close-up of the top cover being lifted off the unit.</p> <p>CJ_X430_001</p> <p>CJ_X430_002</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.3.3 Panel Plate (X330) for 18 K

Procedure	Illustration
<p>1) Turn off the air conditioner and the power breaker.</p> <p>2) Remove the screw of the big handle and then remove the big handle (1 screws) (see CJ_X230_001).</p> <p>3) Remove the screws of the top cover and then remove the top cover (4 screws). One of the screws is located underneath the big handle (see CJ_X230_002).</p>	 <p>The illustration is divided into two parts. The top part, labeled 'CJ_X230_001', shows a side view of the air conditioner unit. A hand is using a screwdriver to remove a screw from the 'Big Handle' on the right side. A dashed line points to the handle, and an arrow indicates the direction of removal. A circular inset provides a magnified view of the handle's attachment point, showing two screws. The bottom part, labeled 'CJ_X230_002', shows a front view of the unit. A hand is using a screwdriver to remove a screw from the top cover. A dashed line points to the screw, and an upward-pointing arrow indicates the cover's removal. A circular inset shows a magnified view of the top cover's attachment point, showing four screws.</p>

Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>4) Remove the screws of water collecting cover and then remove the water collecting cover (2 screws) (see CJ_X430_003).</p>	 <p style="text-align: right;">Water Collecting Cover</p> <p style="text-align: center;">CJ_X230_003</p>
<p>5) Remove the screws of the front panel and then remove the front panel (7 screws (on-off models) or 9 screws (inverter models)) (see CJ_X430_004).</p>	 <p style="text-align: right;">Front panel</p> <p style="text-align: center;">CJ_X230_004</p>
<p>6) Remove the screws of the right panel right panel and then and then remove the right panel (5 screws) (see CJ_X230_005).</p>	 <p style="text-align: right;">Right Panel</p> <p style="text-align: center;">CJ_X230_005</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.3.4 Electrical parts

! WARNING: Antistatic gloves must be worn when you disassemble the electronic box.

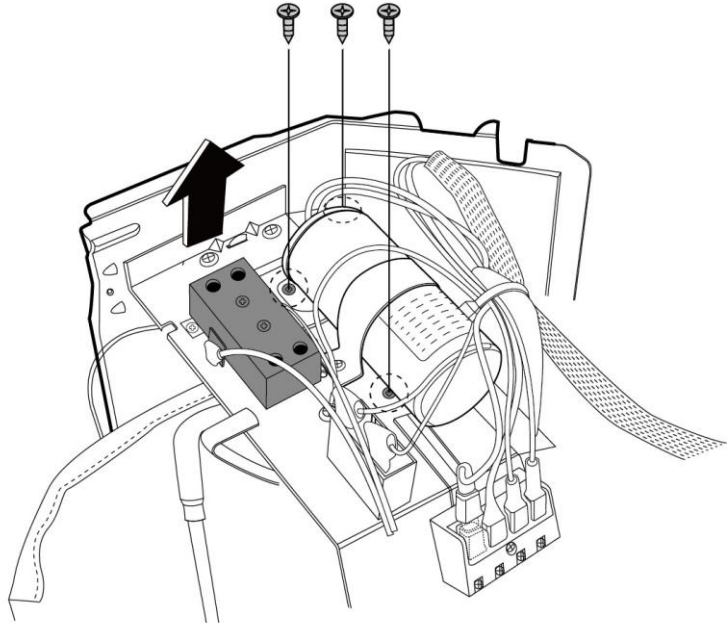
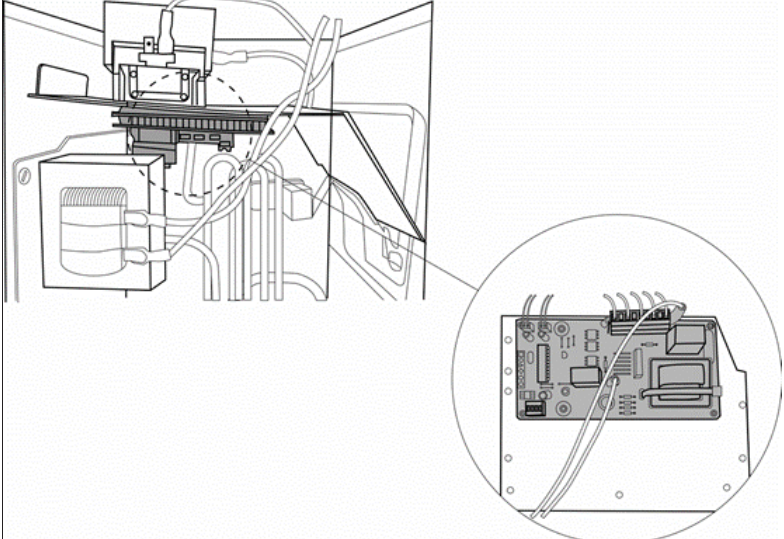
Note: Remove the air outlet grille (refer to Panel Plate) before disassembling electrical parts.

8.3.4.1 PCB FOR NON-INVERTER MODEL

1. PCB board 1 (Non-inverter) for Model 18 ~ 24 k

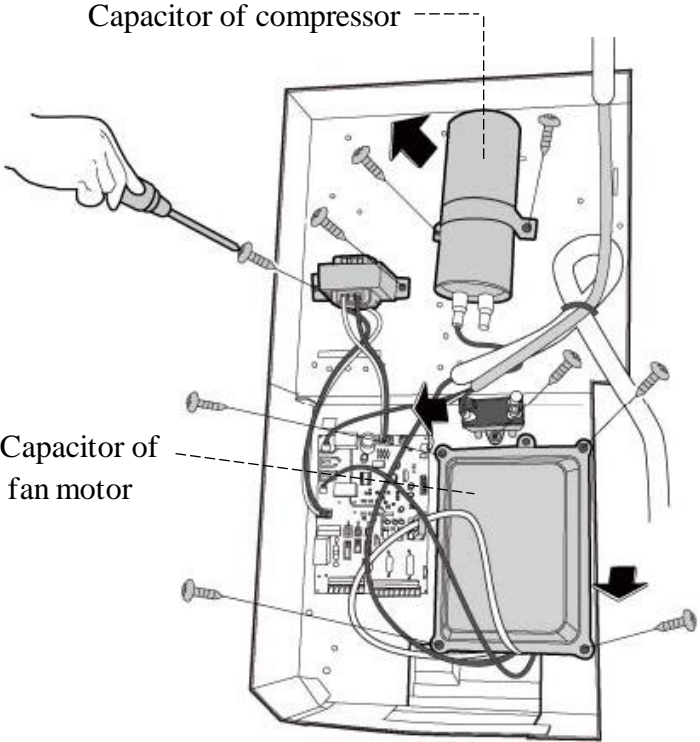
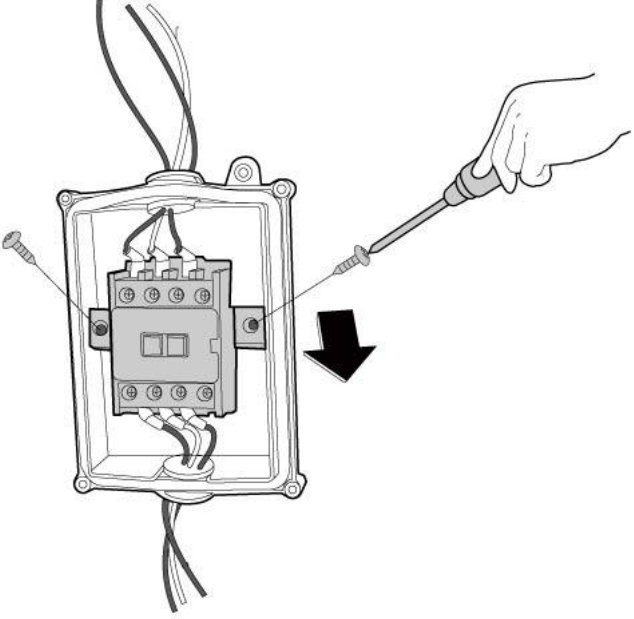
Procedure	Illustration
<ol style="list-style-type: none"> 1) Remove the two screws fixed the electronic control board (see CJ_ODU_PCB_001). 2) Disconnect the connectors for fan motor. (Blue wire, yellow wire, red wire, brown wire and black wire. The blue wire and red wire are on the capacitor. The black wire connects with terminal 4.) (see CJ_ODU_PCB_001) 3) Disconnect the wires connected to the compressor. (Black wire connects with terminal 1, blue wire and red wire connect with the compressor capacitor) (see CJ_ODU_PCB_001) 4) Disconnect the wires connected to 4-way valve. (Blue wires on terminal 2&3) (see CJ_ODU_PCB_001) 5) Remove the fixing screw of the compressor capacitor, then pull it out (see CJ_ODU_PCB_001) 6) Remove the electrical parts (see CJ_ODU_PCB_001) 7) For models with AC conductor, remove 2 screws of it showed in the figure. 	<p style="text-align: center;">CJ_ODU_PCB_001-01</p> <p style="text-align: center;">CJ_ODU_PCB_001-02</p>

Note: This section is for reference only. Actual unit appearance may vary.

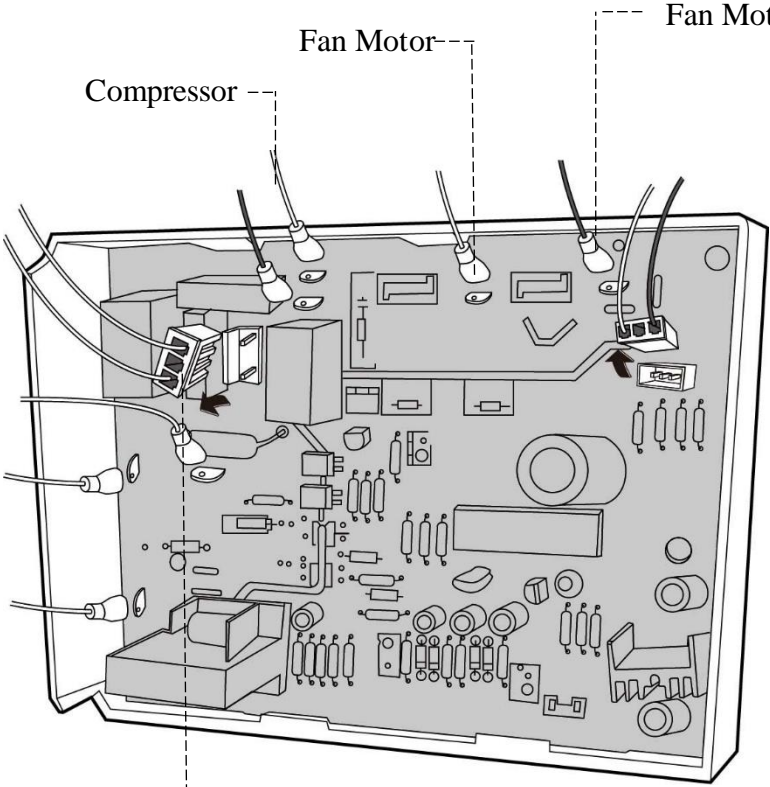
Procedure	Illustration
<p>8) For models with subzero refrigeration control board, remove 3 screws of it showed in the figure.</p>	 <p style="text-align: center;">CJ_ODU_PCB_001-03</p>
<p>9) The subzero refrigeration control board is in the back of the medal sheet.</p>	 <p style="text-align: center;">CJ_ODU_PCB_001-04</p>

Note: This section is for reference only. Actual unit appearance may vary.

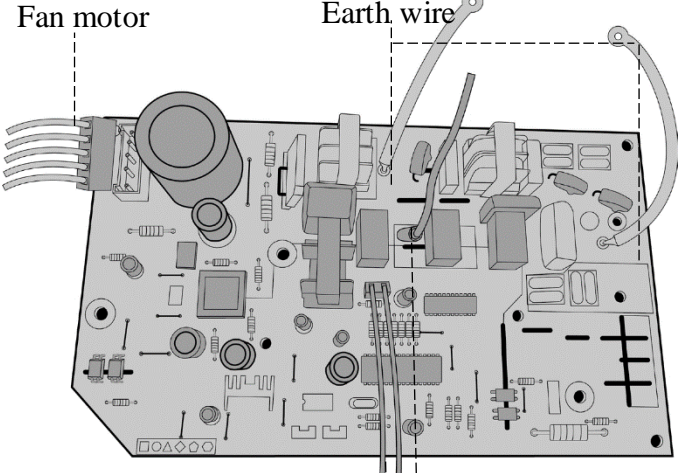
2. PCB board 2 (Non-inverter) for Model 30 k

Procedure	Illustration
<ol style="list-style-type: none"> 1) Remove the fixing screws of the compressor capacitor, then pull it out (see CJ_ODU_PCB_002-1) 2) Remove 2 screws of the transformer and then remove it. (see CJ_ODU_PCB_002-1) 3) Remove the fixing screws of the fan motor capacitor, then remove it. (see CJ_ODU_PCB_002-1) 4) Remove the 4 screws of the electronic installing box and then remove it. (see CJ_ODU_PCB_002-1) (for some models) 	 <p style="text-align: center;">CJ_ODU_PCB_002-1</p>
<ol style="list-style-type: none"> 5) Remove the 2 screws of the AC contactor and then remove it. (see CJ_ODU_PCB_002-2) 	 <p style="text-align: center;">CJ_ODU_PCB_002-2</p>

Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<ol style="list-style-type: none"> 6) Disconnect the wires connected to the compressor. (Red wire connects with PCB board, others connect with terminals) (see CJ_ODU_PCB_002-3) (For some models) 7) Disconnect the connectors for fan motor. (Blue wire, red wire, brown wire and black wire. The blue wire and brown wire are on the capacitor. The black wire connects with a terminal. And the red wire is on the board.) (see CJ_ODU_PCB_002-3) (For some models) 8) Disconnect the wires connected to 4-way valve. (see CJ_ODU_PCB_002-3) (For some models) 9) Disconnect the wires connected to the transformer. (see CJ_ODU_PCB_002-3) (For some models) 10) Disconnect the other wires connected to terminals. (see CJ_ODU_PCB_002-3) (For some models) 11) Remove the PCB board. (see CJ_ODU_PCB_002-3) (For some models) 	 <p style="text-align: center;">CJ_ODU_PCB_002-3</p>

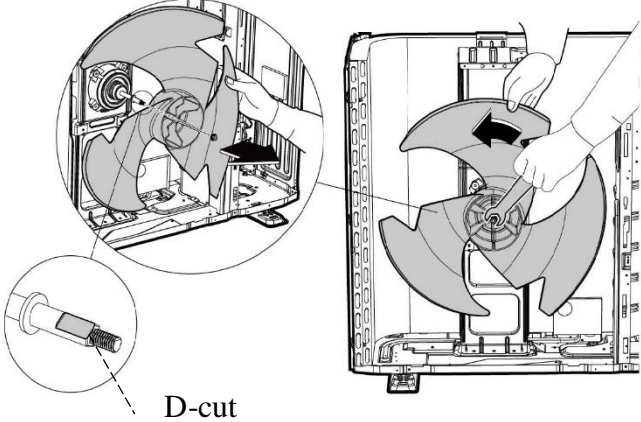
3. PCB board 2 (Non-inverter) for Model 36 k

Procedure	Illustration
<ol style="list-style-type: none"> 1) Disconnect the connectors for fan motor (see CJ_ODU_PCB_003). 2) Disconnect the wires connected to the compressor (see CJ_ODU_PCB_003). 3) Disconnect the wires connected to Pipe temperature sensor (see CJ_ODU_PCB_003). 4) Disconnect the earth wire (see CJ_ODU_PCB_003). 5) Remove the PCB board (see CJ_ODU_PCB_003). 	 <p style="text-align: center;">CJ_ODU_PCB_002-3</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.3.5 Fan Assembly

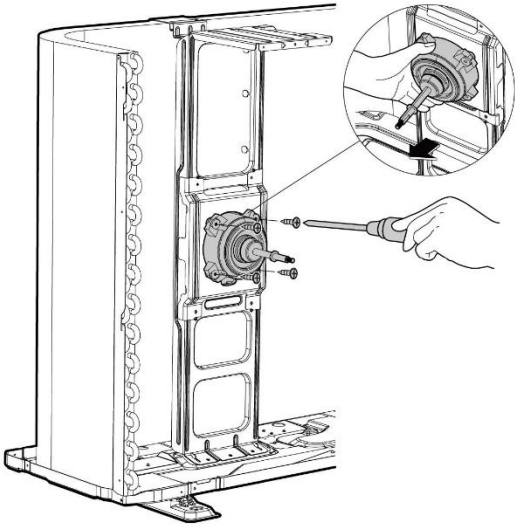
Note: Remove the panel plate (refer to 9.2.1 Panel Plate) before disassembling fan.

Procedure	Illustration
<p>1) Remove the nut securing the fan with a spanner (see CJ_ODU_FAN_001).</p> <p>2) Remove the fan.</p>	 <p style="text-align: center;">CJ_ODU_FAN_001</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.3.6 Fan Motor

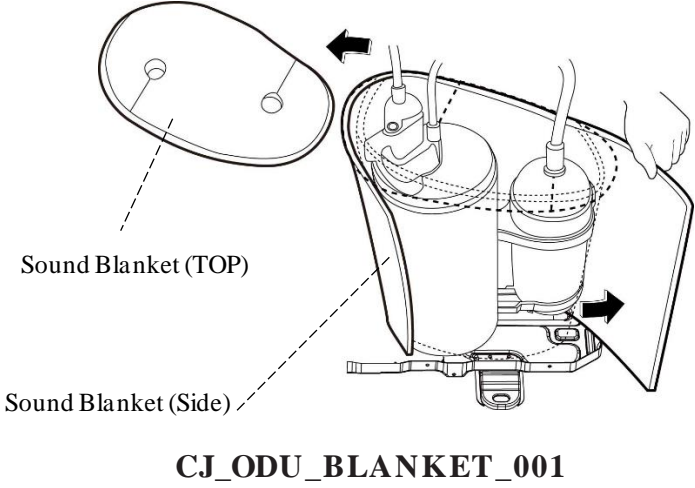
Note: Remove the panel plate and the connection of fan motor on PCB (refer to 9.2.1 Panel Plate and 9.2.2 Electrical parts) before disassembling fan motor.

Procedure	Illustration
<p>1) Remove the fixing screws of the fan motor (4 screws) (see CJ_ODU_MOTOR_001).</p> <p>2) Remove the fan motor.</p>	 <p style="text-align: center;">CJ_ODU_MOTOR_001</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.3.7 Sound blanket

Note: Remove the panel plate (refer to 9.2.1 Panel plate) before disassembling sound blanket.

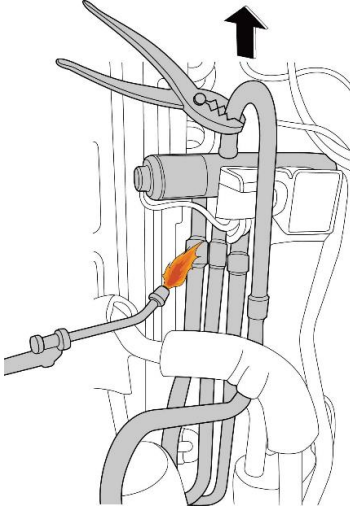
Procedure	Illustration
<p>1) Remove the sound blanket (side and top) (see CJ_ODU_BLANKET_001).</p>	 <p style="text-align: center;">CJ_ODU_BLANKET_001</p>

Note: This section is for reference only. Actual unit appearance may vary.

8.3.8 Four-way valve (for heat pump models)

! **WARNING: Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. (For R32 & R290, you should evacuate the system with the vacuum pump; Clean the system with nitrogen; then repeat the two steps before heating up the brazed parts. The operations above should be implemented by professionals.)**

Note: Remove the panel plate, connection of four-way valve on PCB (refer to 3.1 Panel plate and 3.2 Electrical parts) before disassembling sound blanket.

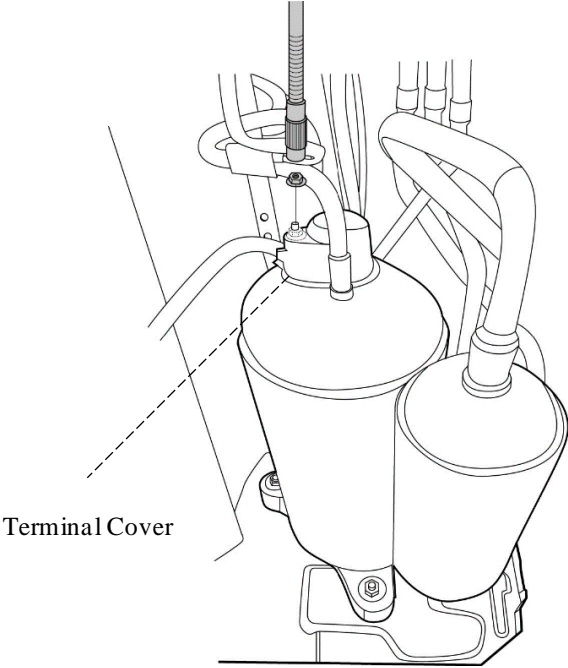
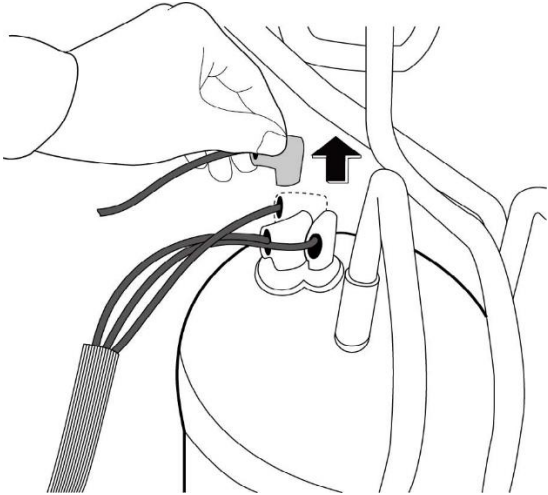
Procedure	Illustration
<p>1) Heat up the brazed parts and then detach the the four-way valve and the pipe (see CJ_ODU_VALVE_001).</p> <p>2) Remove the four-way valve assembly with pliers.</p>	 <p style="text-align: center;">CJ_ODU_VALVE_001</p>

Note: This section is for reference only. Actual unit appearance may vary.

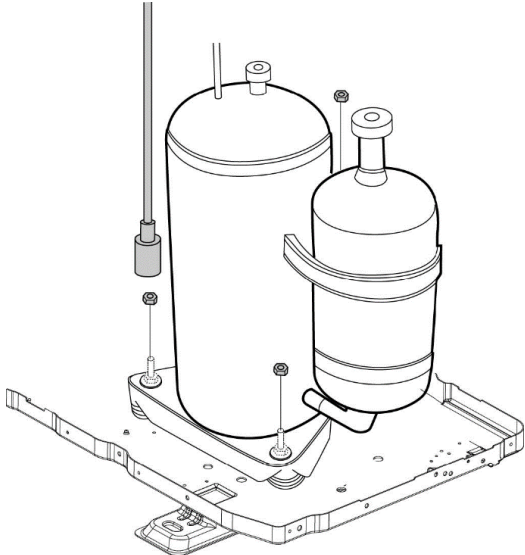
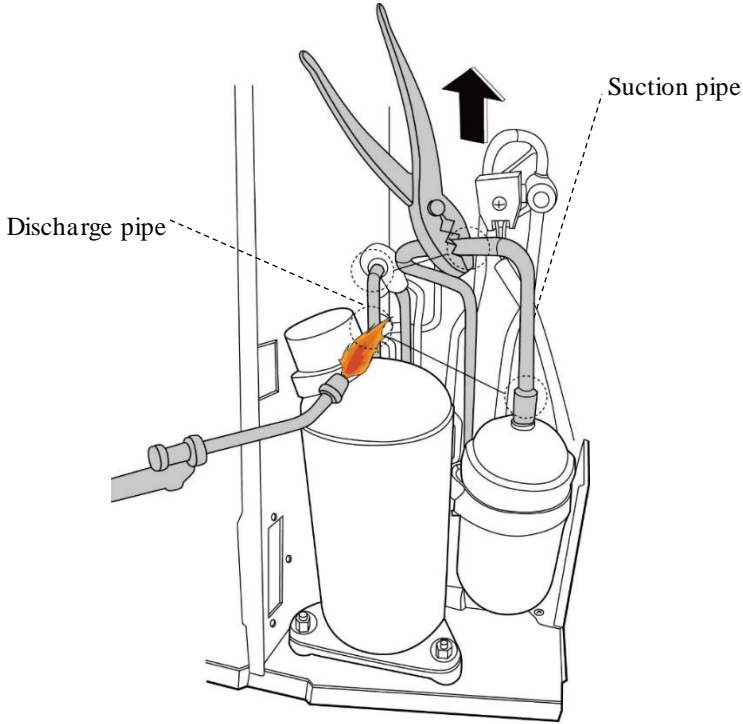
8.3.9 Compressor

! **WARNING:** Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. (For R32 & R290, you should evacuate the system with the vacuum pump; flush the system with nitrogen; then repeat the two steps before heating up the brazed parts. The operations above should be implemented by professionals.)

Note: Remove the panel plate, connection of four-way valve on PCB (refer to 3.1 Panel plate and 3.2 Electrical parts) before disassembling sound blanket.

Procedure	Illustration
<p>1) Remove the flange nut of terminal cover and remove the terminal cover (see CJ_ODU_COMP_001).</p>	 <p style="text-align: center;">CJ_ODU_COMP_001</p>
<p>2) Disconnect the connectors (see CJ_ODU_COMP_002).</p>	 <p style="text-align: center;">CJ_ODU_COMP_002</p>

Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>3) Remove the hex nuts and washers securing the compressor, located on plate (see CJ_ODU_COMP_003).</p> <p>4) Heat up the brazed parts and then remove the discharge pipe and the suction pipe (see CJ_ODU_COMP_004).</p> <p>5) Lift the compressor from the base pan assembly with pliers.</p>	 <p>CJ_ODU_COMP_003</p>  <p>Discharge pipe</p> <p>Suction pipe</p> <p>CJ_ODU_COMP_002</p>

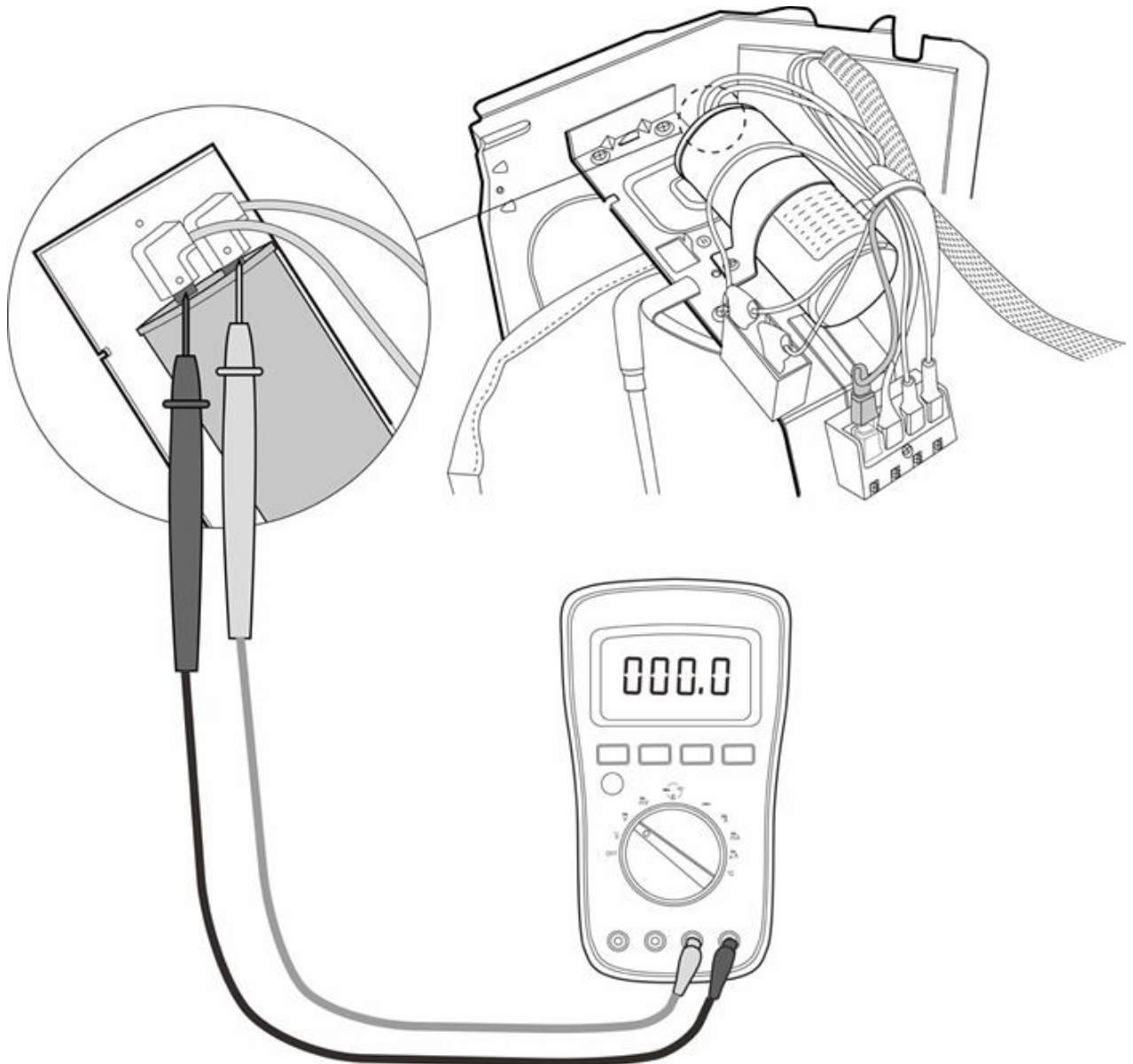
Note: This section is for reference only. Actual unit appearance may vary

9 TROUBLESHOOTING

9.1 Safety Caution

- ! WARNING!** Be sure to turn off all power supplies or disconnect all wires to avoid electric shock. While checking indoor/outdoor PCB, please equip oneself with antistatic gloves or wrist strap to avoid damage to the PCB board.
- ! WARNING!** Electricity remains in capacitors even when the power supply is off. Ensure the capacitors are fully discharged before troubleshooting.

Test the voltage between the two pins of the compressor capacitor. If the voltage is zero, the capacitors are fully discharged.



Note: This picture is for reference only. Actual appearance may vary.

9.2 General Troubleshooting

9.2.1 Error Display (Indoor Unit)

When the indoor unit encounters a recognized error, the operation lamp will flash in a corresponding series, the timer lamp may turn on or begin flashing, and an error code will be displayed. These error codes are described in the following tables:

Operation	Timer Lamp	Display	Error Information	Solution
1 time	OFF	E1	Indoor unit EEPROM parameter error	TS14
2 time	OFF	E2	Zero-crossing signal detection error	TS15
3 time	OFF	E3	The indoor fan speed is operating outside of the normal range	TS16
5 time	OFF	E5	Indoor room temperature sensor T1 is in open circuit or has short circuited	TS19
6 time	OFF	E6	Evaporator coil temperature sensor T2 is in open circuit or has short circuited	TS19
7 time	OFF	E7	Condenser coil temperature sensor T3 or Outdoor room temperature sensor T4 is in open circuit or has short circuited(for some models)	TS19
2 time	ON	EC	Refrigerant leak detected	TS20
8 time	OFF	E8	The outdoor fan speed is operating outside of the normal range (for some models)	TS16
9 time	OFF	E9	Indoor / outdoor unit communication error(for some models)	TS21
7 time	FLASH	P6	High pressure protection(for some models)	TS23

For other errors:

The display board may show a garbled code or a code undefined by the service manual. Ensure that this code is not a temperature reading.

Troubleshooting:

Test the unit using the remote control. If the unit does not respond to the remote, the indoor PCB requires replacement. If the unit responds, the display board requires replacement.

9.3 Information Inquiry

- To enter information inquiry status, complete the following procedure within ten seconds:
 - Press LED (or DO NOT DISTURB) 3 times.
 - Press SWING (or AIR DIRECTION) 3 times.
- Finish 1 and 2 within 10 seconds, you will hear beeps for two seconds, which means the unit goes into parameter checking mode.
- Use the LED (or DO NOT DISTURB) and SWING (or AIR DIRECTION) buttons to cycle through information displayed.
- Pressing LED (or DO NOT DISTURB) will display the next code in the sequence. Pressing SWING (or AIR DIRECTION) will show the previous.
- The following table shows information codes. The screen will display this code for two seconds, then the information for 25 seconds.

Displayed code	Explanation	Displayed value	Meaning	Additional Notes
T1	Room temperature	-14-70	-14-70	1. All displayed temperatures use actual values. 2. All temperatures are displayed in °C regardless of remote used. 3. If the actual value exceeds the range, it will display the maximum value or minimum value.
T2	Indoor coil temperature			
T3	Outdoor coil temperature			

9.4 Error Diagnosis and Troubleshooting Without Error Code

Warning! Be sure to turn off unit before any maintenance to prevent damage or injury

9.4.1 Troubleshooting list

SUGGESTION: When troubles occur, please check the following points with customers before field maintenance.

No.	Problems	Causes
1	Unit does not start operation	<ul style="list-style-type: none"> - Power supply failure. -The circuit breaker tripped. -The wiring connections are loosening. -The transformer is broken. - Blown fuse or varistor - The wires shorted or broken. - Safety device protection
2	Unit power on but fans not operation.	<ul style="list-style-type: none"> -The wiring connections are loosening. -The transformer is broken. -The unit is over voltage or low voltages. -Interference from cell phone towers and remote boosters.
3	Fan operate but compressor doesn't operate.	<ul style="list-style-type: none"> - The wires shorted or broken. - Faulty on thermostat / room temperature sensor -Shorted or open capacitor -Faulty magnetic contactor for compressor -Shorted or grounded compressor -Compressor struck by system dirty
4	Outdoor unit doesn't start (Compressor and fan)	<ul style="list-style-type: none"> - The wires shorted or broken. - Faulty on thermostat / room temperature sensor -Faulty magnetic contactor for compressor
5	The temperature on the indoor display but it cannot set.	<ul style="list-style-type: none"> -The remote control is powered off. -The remote control is broken.

Troubleshooting list

No.	Problems	Causes
4	Unit is operating but Air not cool or hot.	<ul style="list-style-type: none"> -The setting temperature is higher/lower than the room's temperature. (cooling/heating) -The ambient temperature is too high/low when the mode is cooling/heating. -Unit operate on fan mode. -Faulty thermostat / room temperature sensor - Wrong install temperature sensor position.
5	Unit is operating shortly and stops	<ul style="list-style-type: none"> -The unit is over voltage- or low voltage. -The setting temperature is higher/lower than the room's temperature. (cooling/heating) -The ambient temperature is too high/low when the mode is cooling/heating. - Faulty magnetic contactor for compressor
6	The unit start and stop continuously.	<ul style="list-style-type: none"> -The unit is over voltage or low voltage. -The setting temperature is higher/lower than the room's temperature .(cooling/heating) -The unit get frosting and have to defrost operating. -The air inlet or outlet of either unit is blocked (Move the obstruct from airflow direction)
7	Unit runs continuously but insufficient cooling(heating)	<ul style="list-style-type: none"> -The room is overload condition. (Too many people, Room size over capacity, another appliance generates heat) -The air inlet or outlet of either unit is blocked (Move the obstruct from airflow direction) -Interference from cell phone towers and remote boosters
8	Outdoor fan does not start. (Condensers side)	<ul style="list-style-type: none"> - The wires shorted or broken. - Faulty on thermostat / room temperature sensor -Shorted or open capacitor -Faulty magnetic contactor for compressor -Shorted or grounded compressor
9	Compressor short-cycles due to overload	<ul style="list-style-type: none"> - Faulty magnetic contactor for compressor -The unit is low voltage.

Troubleshooting list

No.	Problems	Causes
10	Indoor fan does not start. (Evaporator side)	- The wires shorted or broken. - Shorted or open capacitor - Faulty magnetic contactor for fan - Shorted or grounded fan motor
11	Louver cannot swing	-The links of louver loose connect with stepping motor. -The stepping motor shorted or broken. -The wires of stepping motor shorted or broken.
12	Unit is noisy	-Some screw or bolts are Loosen. (Check and tighten). -The Shipping plates remain installation. (Remove it) -Unit is install on weak foundation. -Overcharge of refrigerant -Broken compressor internal parts -Shipping plates remain attached -Contact of piping with other piping or external plate

9.4.2 Quick Maintenance by Error Code

If you do not have the time to test which specific parts are faulty, you can directly change the required parts according the error code.

You can find the parts to replace by error code in the following table.

Part requiring replacement	E1	E2	E3	E5	E6	E7	EC	E8	E9	P6
Indoor PCB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Outdoor PCB	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗
Indoor fan motor	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
Outdoor fan motor	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗
T1 sensor	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
T2 Sensor	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
T3 Sensor	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗
T4 Sensor	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗
Display Board	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Additional refrigerant	✗	✗	✗	✗	✗	✗	✓	✗	✗	✓
Compressor	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
Capacitor of compressor	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
Capacitor of fan motor	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
System blockages	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Dirty condenser	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓

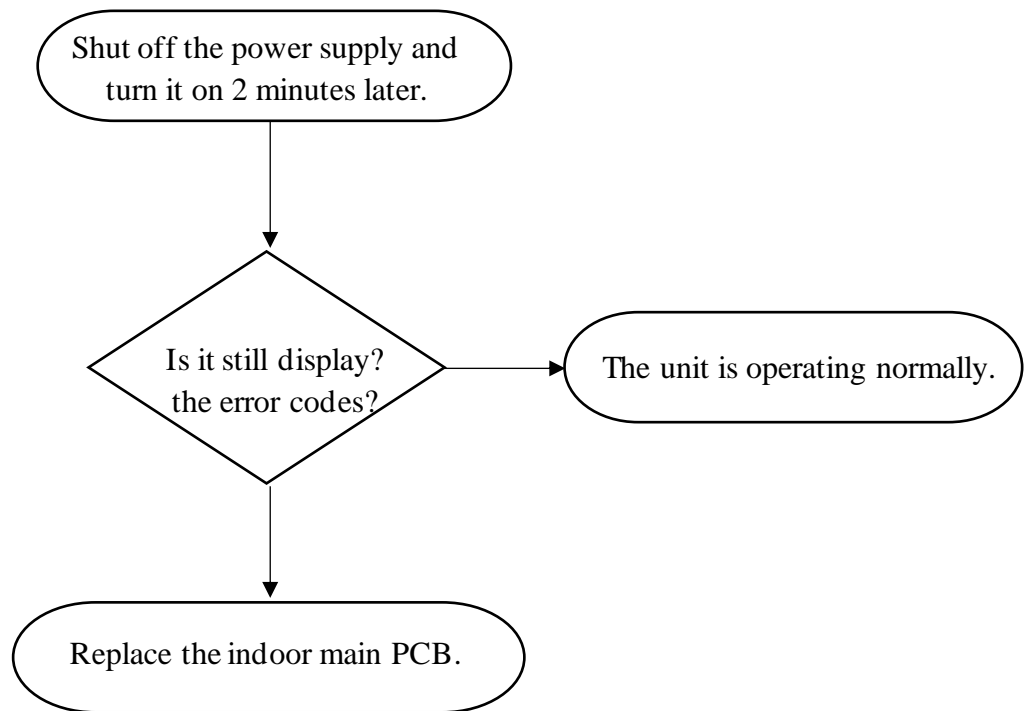
7. Troubleshooting by Error Code

7.1 EH 00 (Indoor EEPROM parameter error diagnosis and solution)

Description: Indoor PCB main chip does not receive feedback from EEPROM chip. Recommended parts to prepare:

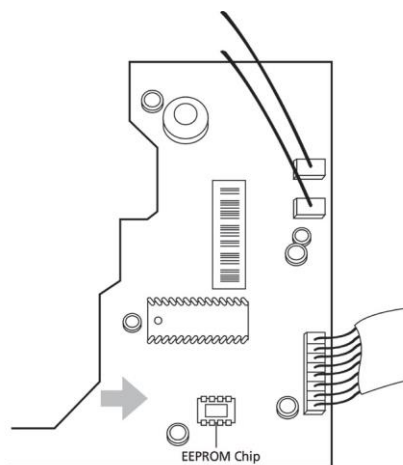
- Indoor PCB

Troubleshooting and repair:



Remarks:

EEPROM: A read-only memory whose contents can be erased and reprogrammed using a pulsed voltage. The location of the EEPROM chip on the indoor PCB is shown in the following image:



Note: The picture and the value are only for reference, actual condition and specific value may vary.

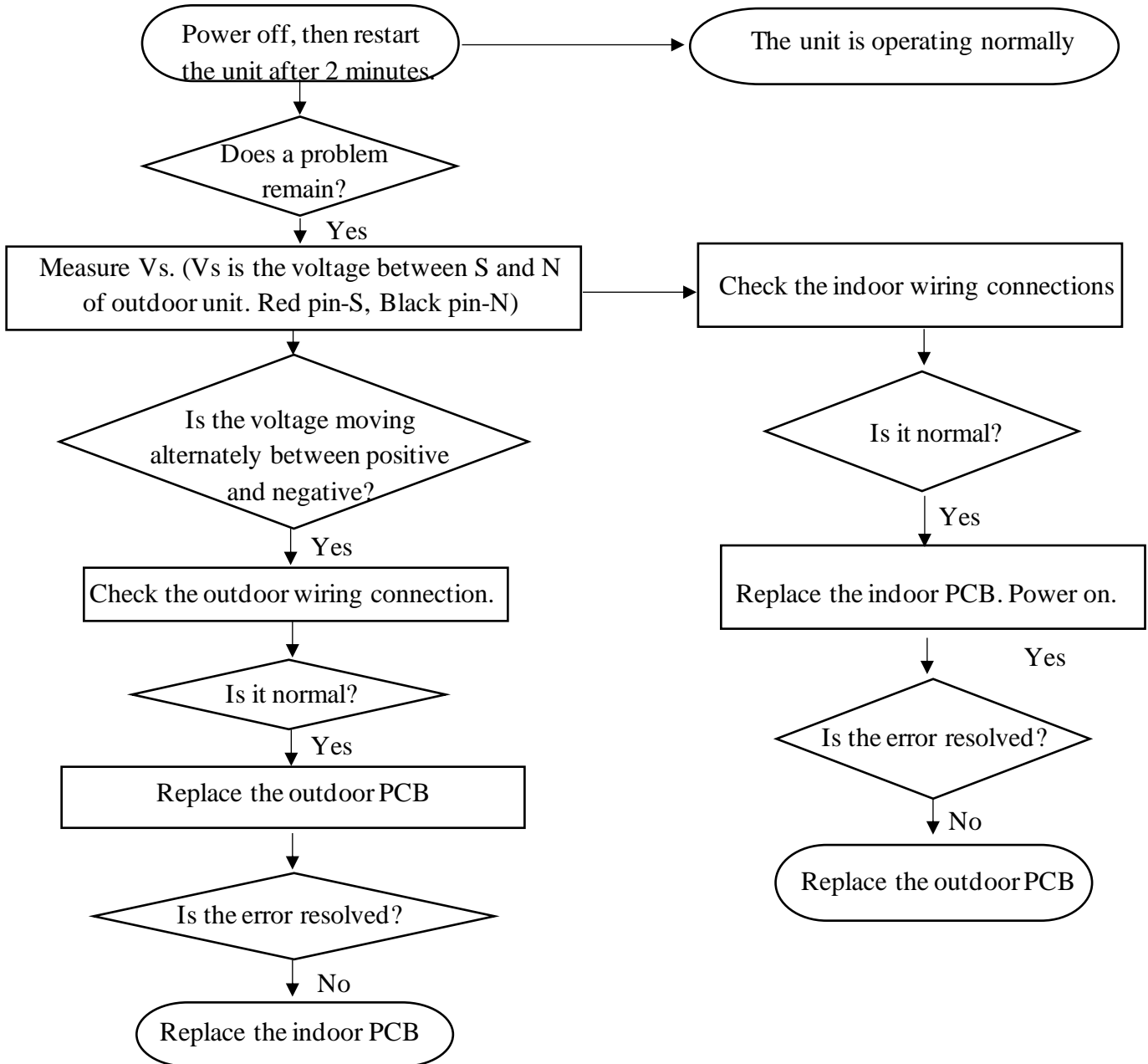
7.2 EL 01 (Indoor / outdoor unit communication error diagnosis and solution)

Description: The indoor unit has not received feedback from the outdoor unit for 110 seconds, four consecutive times

Recommended parts to prepare:

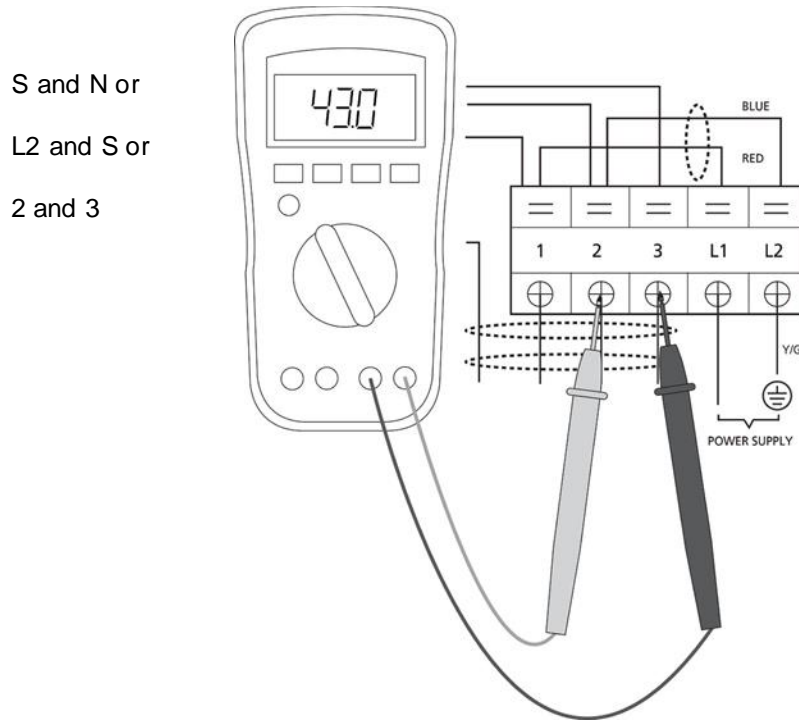
- Indoor PCB
- Outdoor PCB
- Reactor

Troubleshooting and repair:



Remarks:

- Use a multimeter to test the DC voltage between 2 port (or S or L2 port) and 3 port (or N or S port) of outdoor unit. The red pin of multimeter connects with 2 port (or S or L2 port) while the black pin is for 3 port (or N or S port). When AC is normal running, the voltage will move alternately between -25V to 25V.
- If the outdoor unit has malfunction, the voltage will move alternately with positive value.
- While if the indoor unit has malfunction, the voltage will be a certain value.



Note: The picture and the value are only for reference, actual condition and specific value may vary.

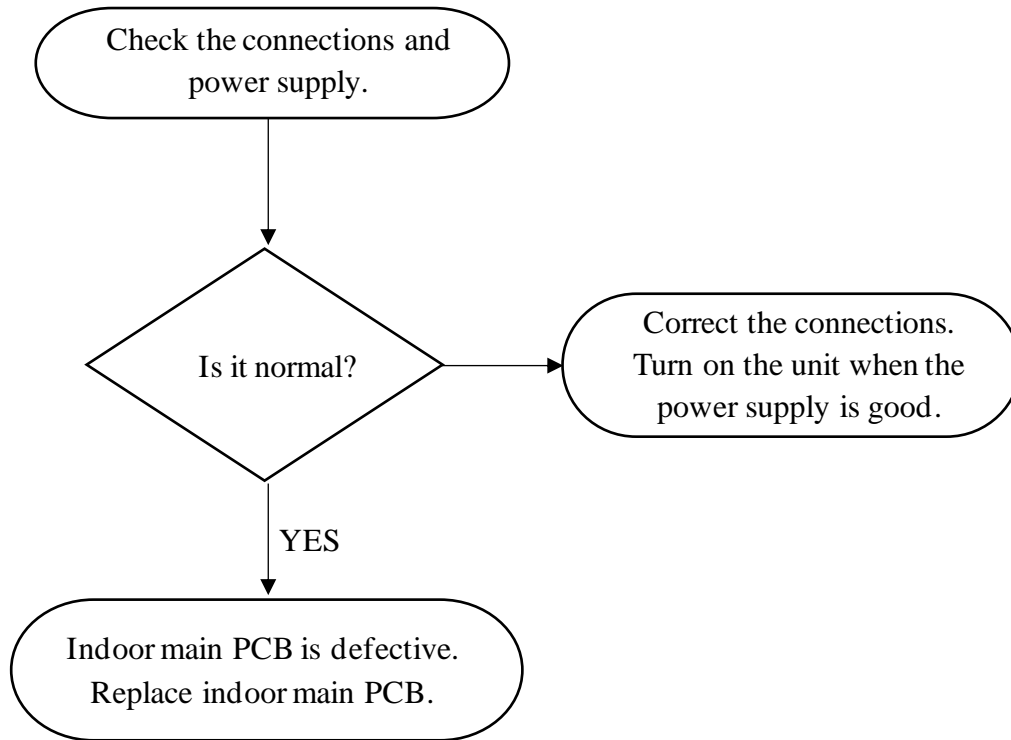
7.3 EH 02 (Zero crossing detection error diagnosis and solution)

Description: When PCB does not receive zero crossing signal feedback for 4 minutes or the zero-crossing signal time interval is abnormal.

Recommended parts to prepare:

- Connection wires
- Indoor PCB

Troubleshooting and repair:



Note: EH 02 zero crossing detection error is only valid for the unit with AC fan motor, for other models, this error is invalid.

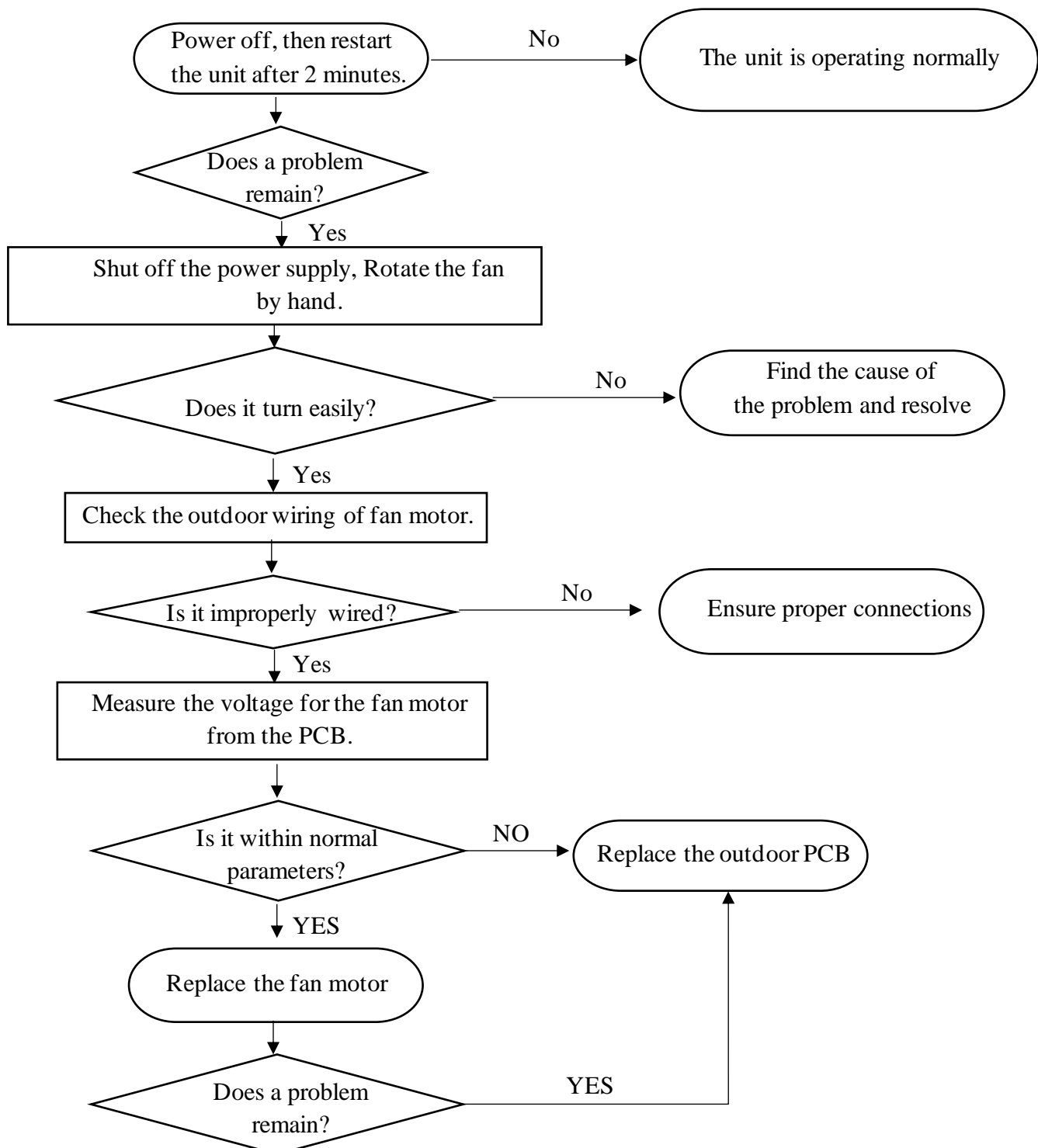
7.4 EH 03 / EC 07 (Fan speed is operating outside of the normal range diagnosis and solution)

Description: When indoor fan speed keeps too low (300RPM) for certain time, the LED displays the failure code and AC turns off.

Recommended parts to prepare:

- Connection wires
- Fan assembly
- Fan motor
- PCB

Troubleshooting and repair:



Index:

1.Indoor or Outdoor DC Fan Motor (control chip is in fan motor)

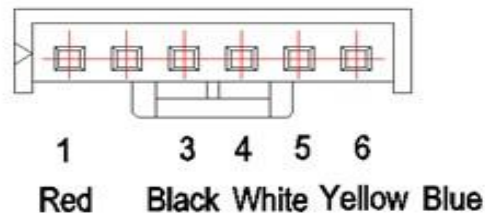
Power on and when the unit is in standby, measure the voltage of pin1 -pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must have problems and need to be replaced.

- DC motor voltage input and output (voltage: 220-240V~):

No.	Color	Signal	Voltage
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V

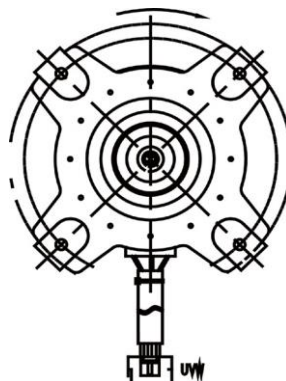
- DC motor voltage input and output (voltage: 115V~):

No.	Color	Signal	Voltage
1	Red	Vs/Vm	140V~190V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V



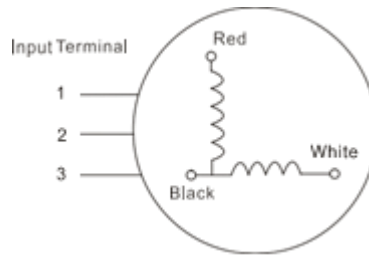
2.Outdoor DC Fan Motor (control chip is in outdoor PCB)

Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal, the fan motor must have problems and need to be replaced. otherwise the PCB must have problems and need to be replaced.



3. Indoor AC Fan Motor

Power on and set the unit running in fan mode at high fan speed. After running for 15 seconds, measure the voltage of pin1 and pin2. If the value of the voltage is less than 100V (208~240V power supply) or 50V (115V power supply), the PCB must have problems and need to be replaced.



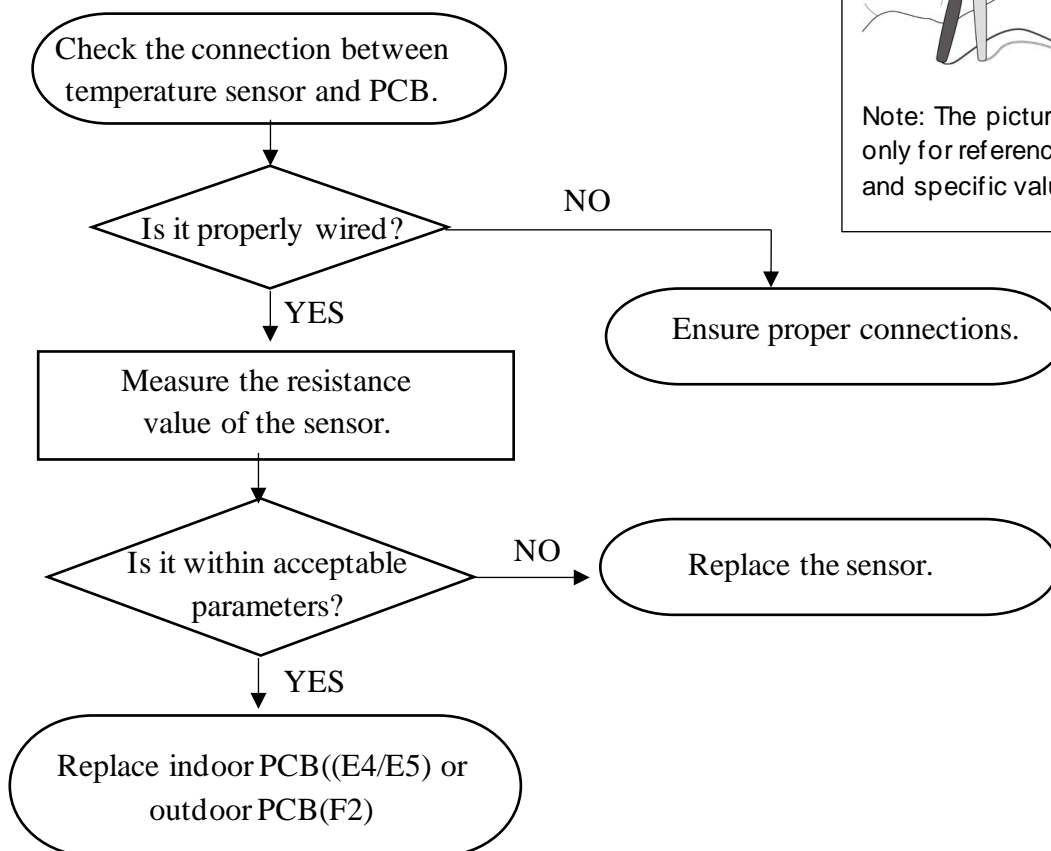
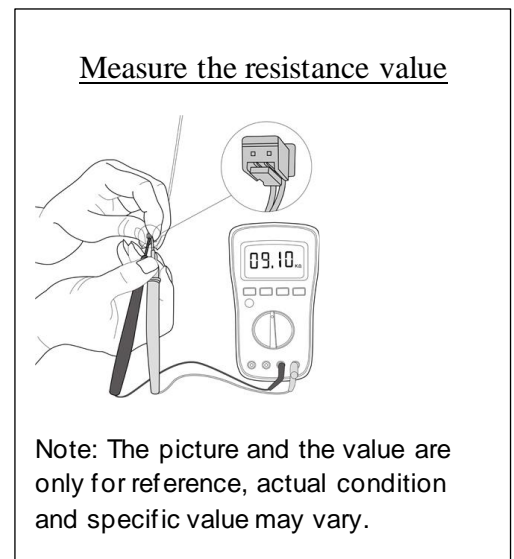
7.5 EH 60/EH 61/EC 52 (Open or short circuit of temperature sensor diagnosis and solution)

Description: If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Sensors
- PCB

Troubleshooting and repair:



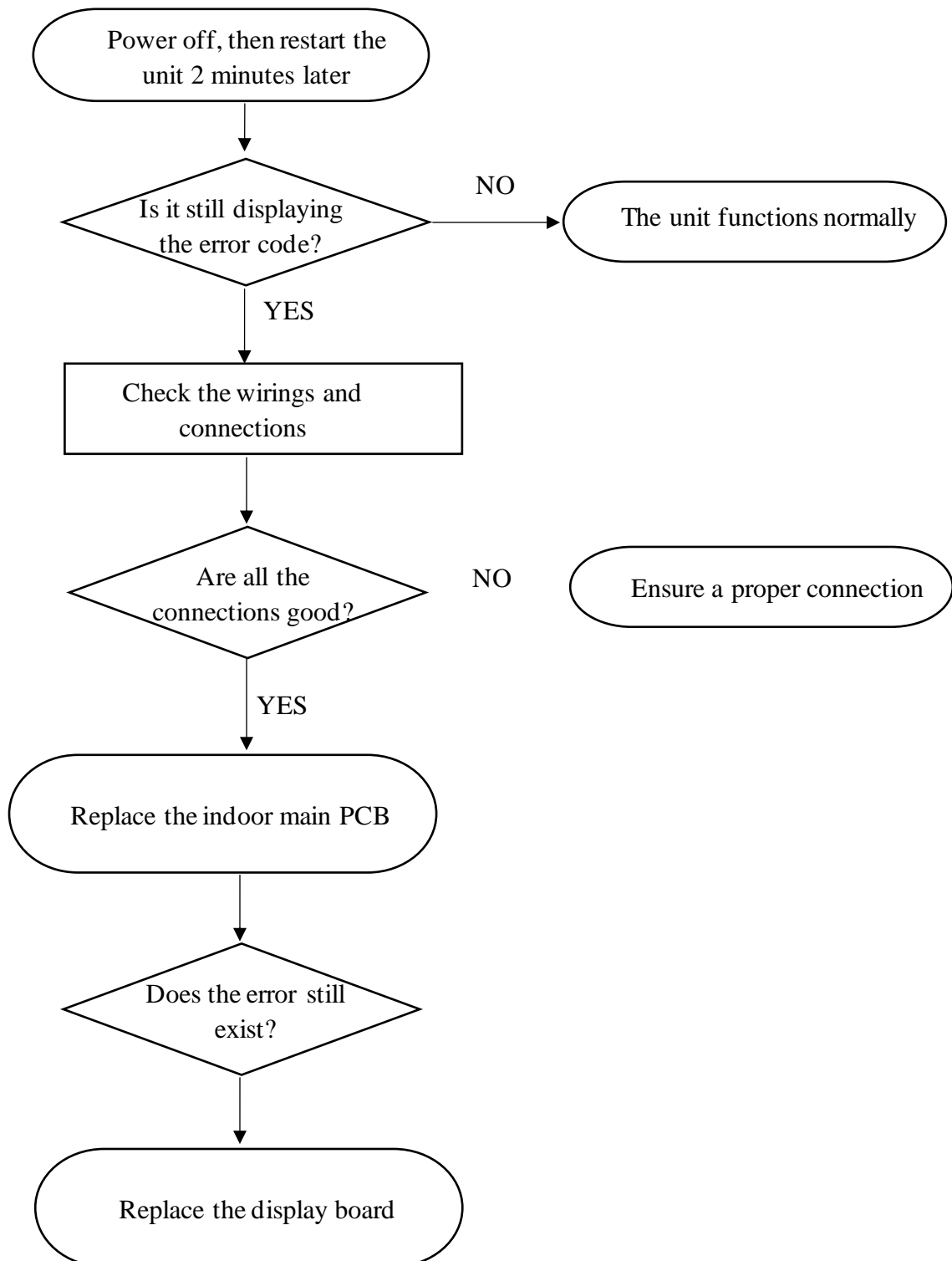
7.6 EH 0b (Indoor PCB/display board communication error diagnosis and solution)

Description: The display board cannot communicate with the indoor PCB.

Recommended parts to prepare:

- Communication wire
- Indoor PCB
- Display board

Troubleshooting and repair:



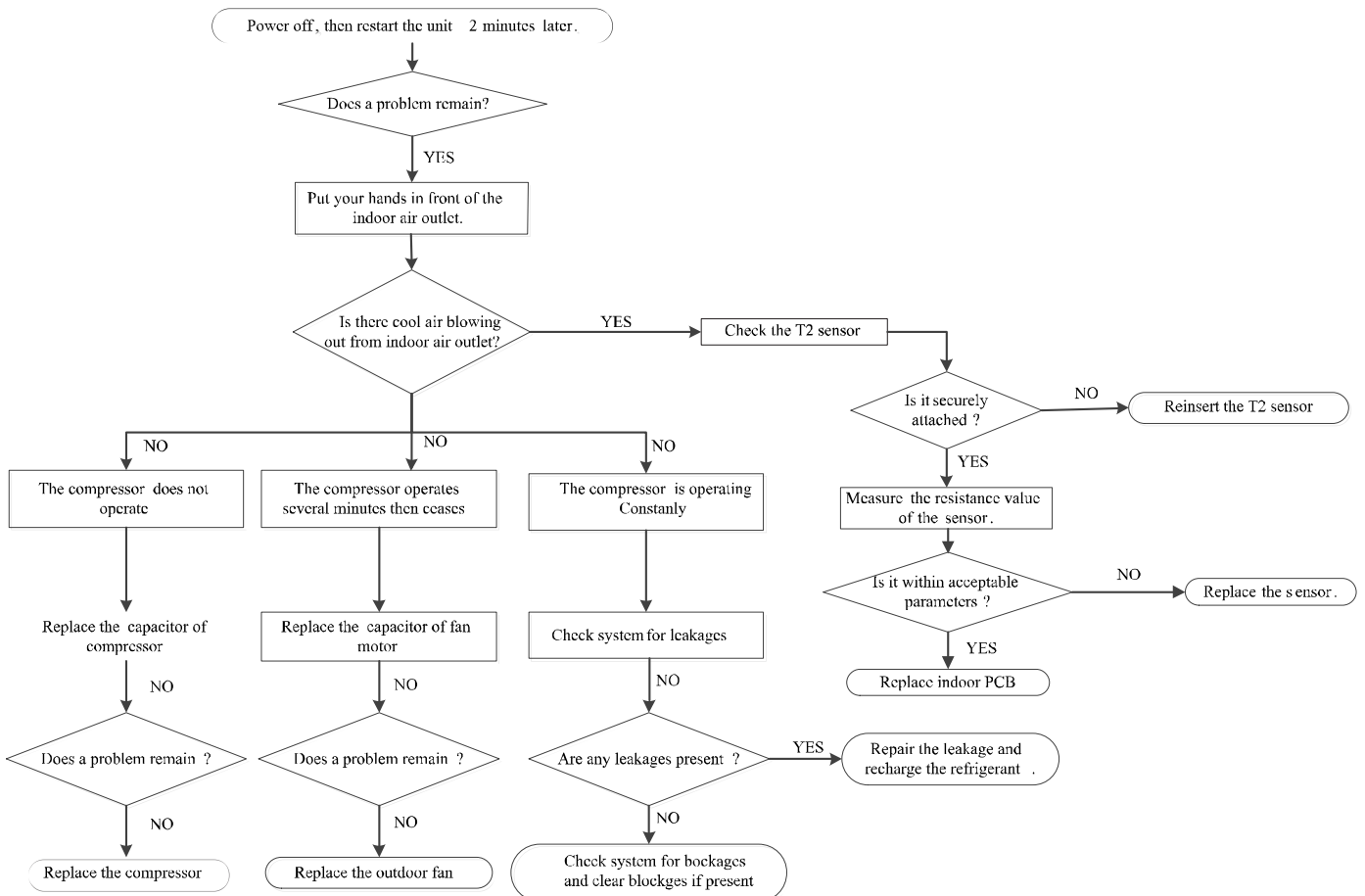
9.5 EL 0C (Refrigerant leakage detection diagnosis and solution)

Description: Define the evaporator coil temperature T2 of the compressor just starts running as Tcool. In the beginning 5 minutes after the compressor starts up, if $T2 < T_{cool} - 2^{\circ}\text{C}$ does not keep continuous 4 seconds and this situation happens 3 times, the LED displays the failure code and AC turns off.

Recommended parts to prepare:

- T2 sensor
- Compressor
- Capacitor of compressor
- Indoor PCB
- System problems, such as leakage or blockages
- Capacitor of fan motor
- Outdoor fan

Troubleshooting and repair



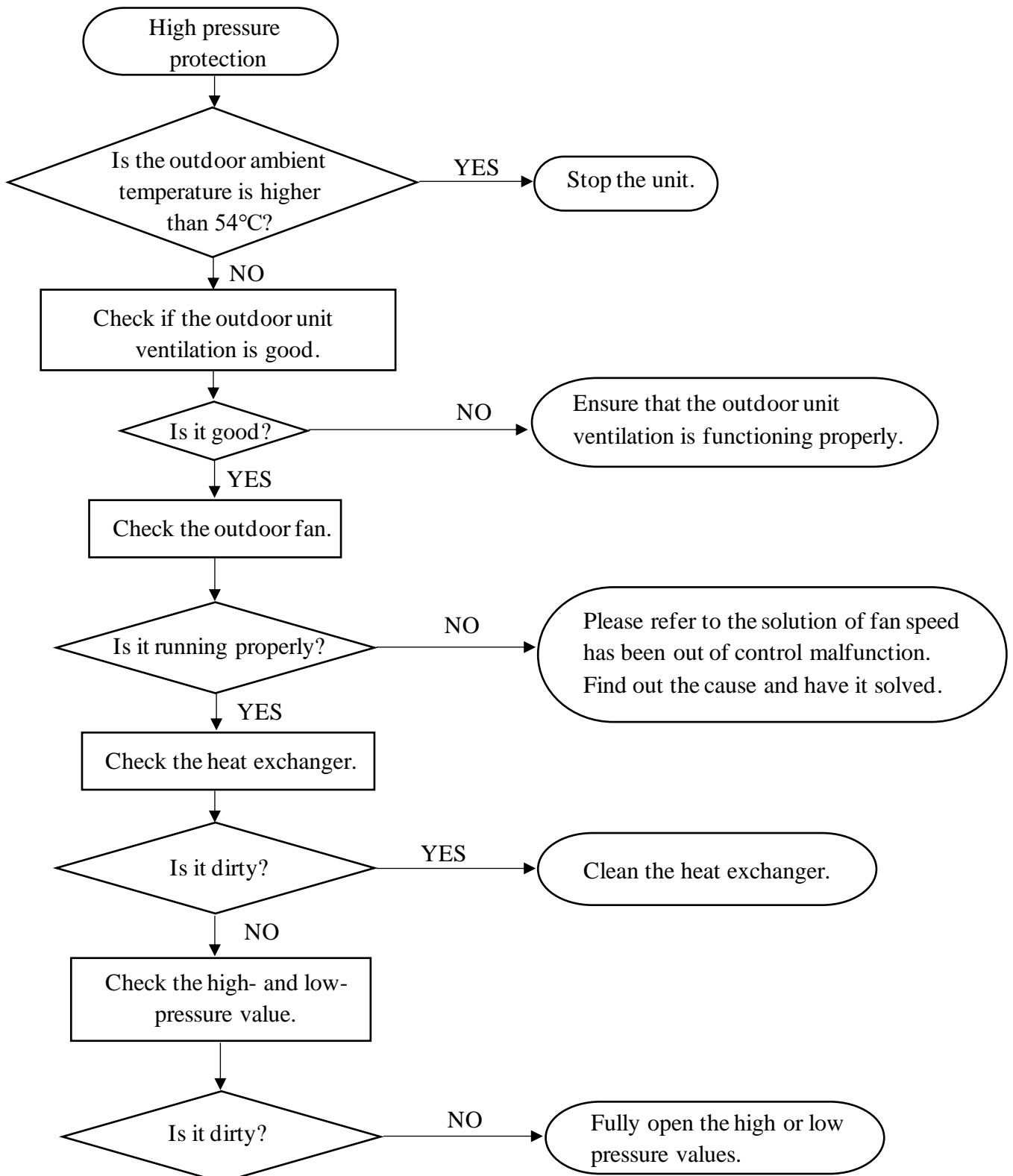
9.6 PC 03 (High pressure protection)

Description: If the current is less than setting value for 4 seconds, AC shuts off and restarts after 3 minutes in cooling mode or after 4 minutes in heating mode. If this happens 8 times, the LED displays the failure code and AC turns off.

Recommended parts to prepare:

- System blockages
- Dirty condenser

Troubleshooting and repair:



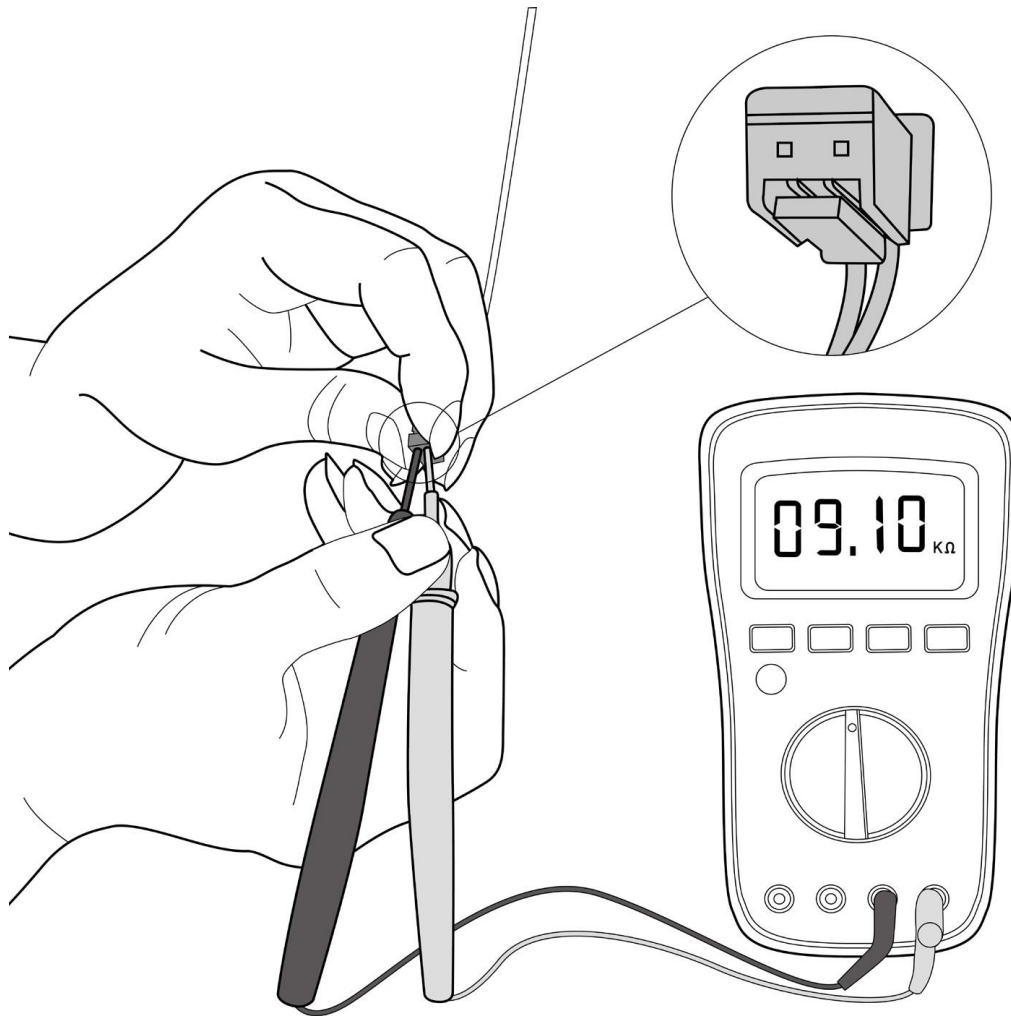
10 Check Procedures

10.1 Temperature Sensor Check

WARNING

Be sure to turn off all power supplies or disconnect all wires to avoid electric shock.
Operate after compressor and coil have returned to normal temperature in case of injury.

1. Disconnect temperature sensor from PCB
(Refer to Chapter 5. Indoor Disassembly and Chapter 6. Outdoor Disassembly).
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table (Refer to Chapter 8. Appendix).



Note: The picture and the value are only for reference, actual condition and specific value may vary.

10.2 Fan Motor Check

1. Turn off outdoor unit and disconnect power supply
2. Disconnect outdoor fan motor power cord from outdoor PCB
3. Measure the resistance value between each winding.

The normal value of different motor show as follows:

Model	YKFG-13-4-38L-4 YKFG-13-4-38L	YKFG-15-4-28-1	YKFG-20-4-10L	YKFG-20-4-5-11
Brand	Welling	Welling	Welling	Welling
Black – Red Main	345 \wedge	75 \wedge	269 \wedge	388 \wedge
Blue – Black AUX	348 \wedge	150 \wedge	224 \wedge	360 \wedge

Model	YKFG-20-4-5-19	YKFG-25-4-6-14	YKFG-28-4-3-7 YKFG-28-4-3-14	YKFG-28-4-6-5
Brand	Welling	Welling	Welling	Welling
Black – Red Main	444 \wedge	287 \wedge	231 \wedge	183.6 \wedge
Blue – Black AUX	470 \wedge	409 \wedge	414 \wedge	206 \wedge

Model	YKFG-45-4-13	YKFG-45-4-22 YKFG-45-4-22-13	YKFG-60-4-1	YKFG-60-4-2-6
Brand	Dongfeng	Welling	Welling	Welling
Black – Red Main	125.2 \wedge	168 \wedge	68 \wedge	96 \wedge
Blue – Black AUX	83.8 \wedge	141 \wedge	53 \wedge	96 \wedge

Model	YKFG-20-4-5-21	YKFG-20-4-123	YKFG-28-4-46
Brand	Welling	Welling	Welling
Black – Red Main	450 \wedge	267 \wedge	210 \wedge
Blue – Black AUX	442 \wedge	266 \wedge	288 \wedge

10.3 Temperature Sensor Resistance Value Table for T1, T2,T3 and T4 (°C-K)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	115.2660	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.1460	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.5170	22	72	11.5000	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	10.4736	64	147	2.03732	104	219	0.56038
-15	5	84.2190	25	77	10.0000	65	149	1.96532	105	221	0.54448
-14	7	79.3110	26	79	9.5507	66	151	1.89627	106	223	0.52912
-13	9	74.5360	27	81	9.1245	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.7198	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.3357	69	156	1.70547	109	228	0.48600
-10	14	62.2756	30	86	7.9708	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.6241	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.2946	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.9814	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.6836	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.4002	75	167	1.38703	115	239	0.41164
-4	25	44.0000	36	97	6.1306	76	169	1.34105	116	241	0.40060
-3	27	41.5878	37	99	5.8736	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.6296	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.3969	79	174	1.21330	119	246	0.36954
0	32	35.2024	40	104	5.1752	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.9639	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.7625	82	180	1.09958	122	252	0.34130
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.3874	84	183	1.03069	124	255	0.32390
5	41	26.8778	45	113	4.2126	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.0459	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.8867	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.7348	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.5896	89	192	0.87950	129	264	0.28482
10	50	20.7184	50	122	3.4510	90	194	0.85248	130	266	0.27770
11	52	19.6891	51	124	3.3185	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.1918	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.0708	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.9590	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.8442	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.7382	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.6368	97	207	0.68844	137	279	0.23338
18	64	13.9180	58	136	2.5397	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.4468	99	210	0.64862	139	282	0.22231

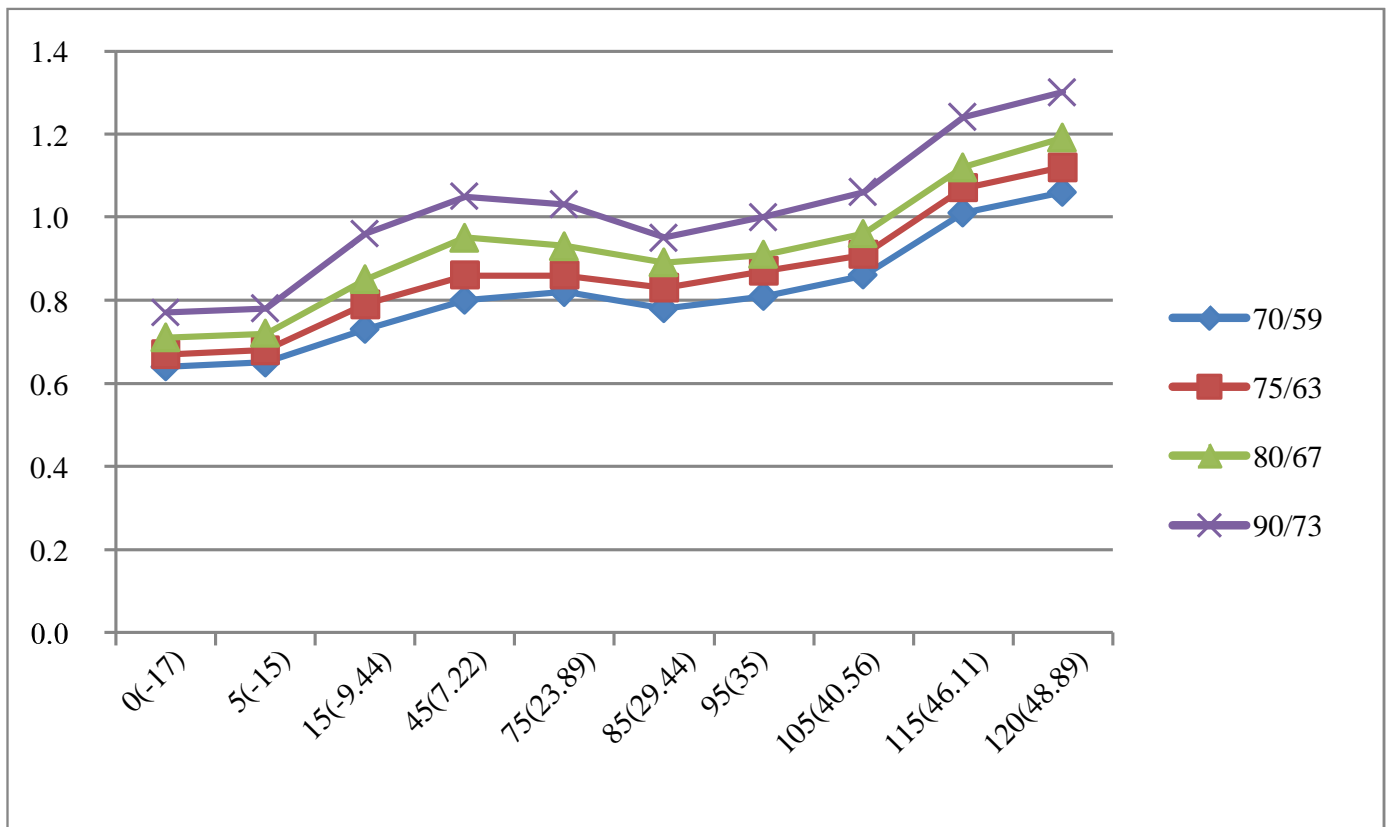
10.4 Temperature Sensor Resistance Value Table for TP(for some units) (°C -K)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	542.7000	20	68	68.6600	60	140	13.59000	100	212	3.70200
-19	-2	511.9000	21	70	65.6200	61	142	13.11000	101	214	3.59500
-18	0	483.0000	22	72	62.7300	62	144	12.65000	102	216	3.49200
-17	1	455.9000	23	73	59.9800	63	145	12.21000	103	217	3.39200
-16	3	430.5000	24	75	57.3700	64	147	11.79000	104	219	3.29600
-15	5	406.7000	25	77	54.8900	65	149	11.38000	105	221	3.20300
-14	7	384.3000	26	79	52.5300	66	151	10.99000	106	223	3.11300
-13	9	363.3000	27	81	50.2800	67	153	10.61000	107	225	3.02500
-12	10	343.6000	28	82	48.1400	68	154	10.25000	108	226	2.94100
-11	12	325.1000	29	84	46.1100	69	156	9.90200	109	228	2.86000
-10	14	307.7000	30	86	44.1700	70	158	9.56900	110	230	2.78100
-9	16	291.3000	31	88	42.3300	71	160	9.24800	111	232	2.70400
-8	18	275.9000	32	90	40.5700	72	162	8.94000	112	234	2.63000
-7	19	261.4000	33	91	38.8900	73	163	8.64300	113	235	2.55900
-6	21	247.8000	34	93	37.3000	74	165	8.35800	114	237	2.48900
-5	23	234.9000	35	95	35.7800	75	167	8.08400	115	239	2.42200
-4	25	222.8000	36	97	34.3200	76	169	7.82000	116	241	2.35700
-3	27	211.4000	37	99	32.9400	77	171	7.56600	117	243	2.29400
-2	28	200.7000	38	100	31.6200	78	172	7.32100	118	244	2.23300
-1	30	190.5000	39	102	30.3600	79	174	7.08600	119	246	2.17400
0	32	180.9000	40	104	29.1500	80	176	6.85900	120	248	2.11700
1	34	171.9000	41	106	28.0000	81	178	6.64100	121	250	2.06100
2	36	163.3000	42	108	26.9000	82	180	6.43000	122	252	2.00700
3	37	155.2000	43	109	25.8600	83	181	6.22800	123	253	1.95500
4	39	147.6000	44	111	24.8500	84	183	6.03300	124	255	1.90500
5	41	140.4000	45	113	23.8900	85	185	5.84400	125	257	1.85600
6	43	133.5000	46	115	22.8900	86	187	5.66300	126	259	1.80800
7	45	127.1000	47	117	22.1000	87	189	5.48800	127	261	1.76200
8	46	121.0000	48	118	21.2600	88	190	5.32000	128	262	1.71700
9	48	115.2000	49	120	20.4600	89	192	5.15700	129	264	1.67400
10	50	109.8000	50	122	19.6900	90	194	5.00000	130	266	1.63200
11	52	104.6000	51	124	18.9600	91	196	4.84900			
12	54	99.6900	52	126	18.2600	92	198	4.70300			
13	55	95.0500	53	127	17.5800	93	199	4.56200			
14	57	90.6600	54	129	16.9400	94	201	4.42600			
15	59	86.4900	55	131	16.3200	95	203	4.29400			
16	61	82.5400	56	133	15.7300	96	205	4.16700			
17	63	78.7900	57	135	15.1600	97	207	4.04500			
18	64	75.2400	58	136	14.6200	98	208	3.92700			
19	66	71.8600	59	138	14.0900	99	210	3.81200			

10.5 Pressure on Service Port

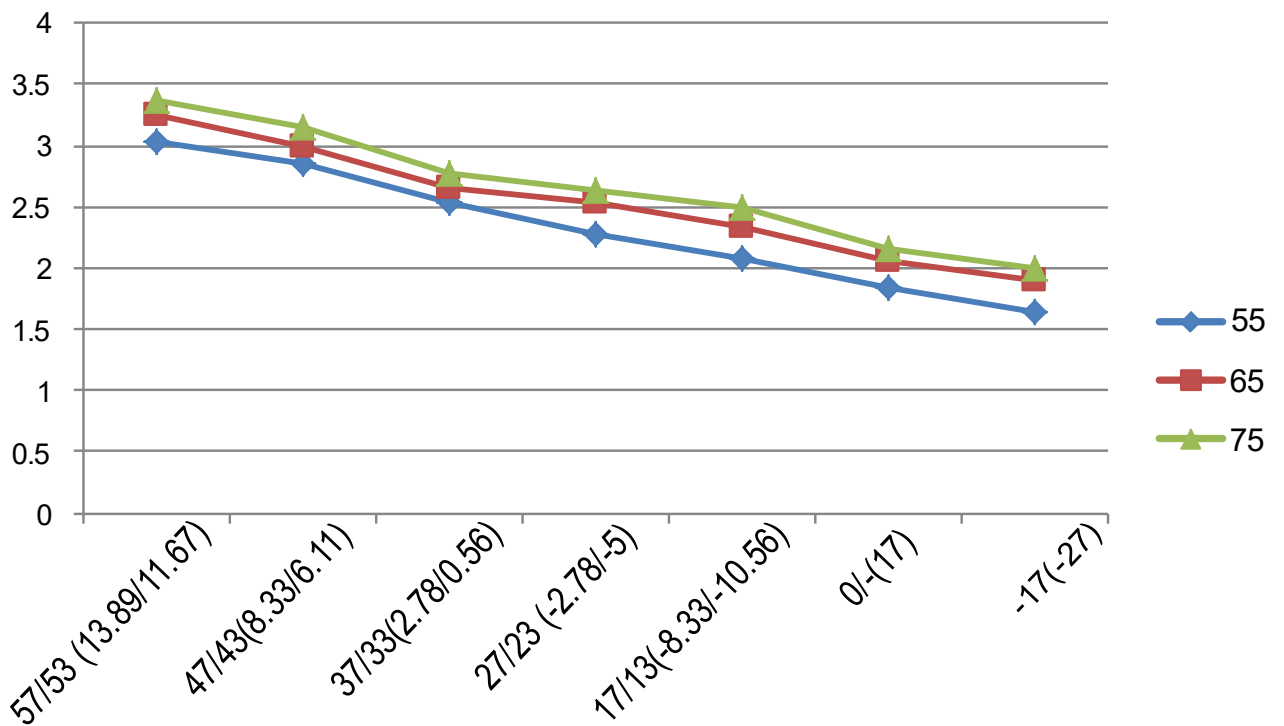
10.5.1 Cooling chart (R410A)

°F(°C)	ODU(DB)	0(-17)	5(-15)	15	45	75	85	95 (35)	105	115	120
	IDU(DB/WB)										
BAR	70/59 (21.11/15)	6.4	6.5	7.3	8.0	8.2	7.8	8.1	8.6	10.1	10.6
	75/63 (23.89/17.22)	6.7	6.8	7.9	8.6	8.6	8.3	8.7	9.1	10.7	11.2
	80/67 (26.67/19.44)	7.1	7.2	8.5	9.5	9.3	8.9	9.1	9.6	11.2	11.9
	90/73 (32.22/22.78)	7.7	7.8	9.6	10.5	10.3	9.5	10.0	10.6	12.4	13.0
PSI	70/59 (21.11/15)	93.0	94.0	106.0	116.0	119.0	113.0	117.0	125.0	147.0	154.0
	75/63 (23.89/17.22)	97.0	99.0	115.0	125.0	124.0	120.0	126.0	132.0	155.0	162.0
	80/67 (26.67/19.44)	103.0	104.0	123.0	138.0	135.0	129.0	132.0	140.0	162.0	173.0
	90/73 (32.22/22.78)	112.0	113.0	139.0	152.0	149.0	138.0	145.0	154.0	180.0	189.0
MPa	70/59 (21.11/15)	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.9	1.0	1.1
	75/63 (23.89/17.22)	0.7	0.7	0.8	0.9	0.9	0.8	0.9	0.9	1.1	1.1
	80/67 (26.67/19.44)	0.7	0.7	0.9	1.0	0.9	0.9	0.9	1.0	1.1	1.2
	90/73 (32.22/22.78)	0.8	0.8	1.0	1.1	1.0	1.0	1.0	1.1	1.2	1.3



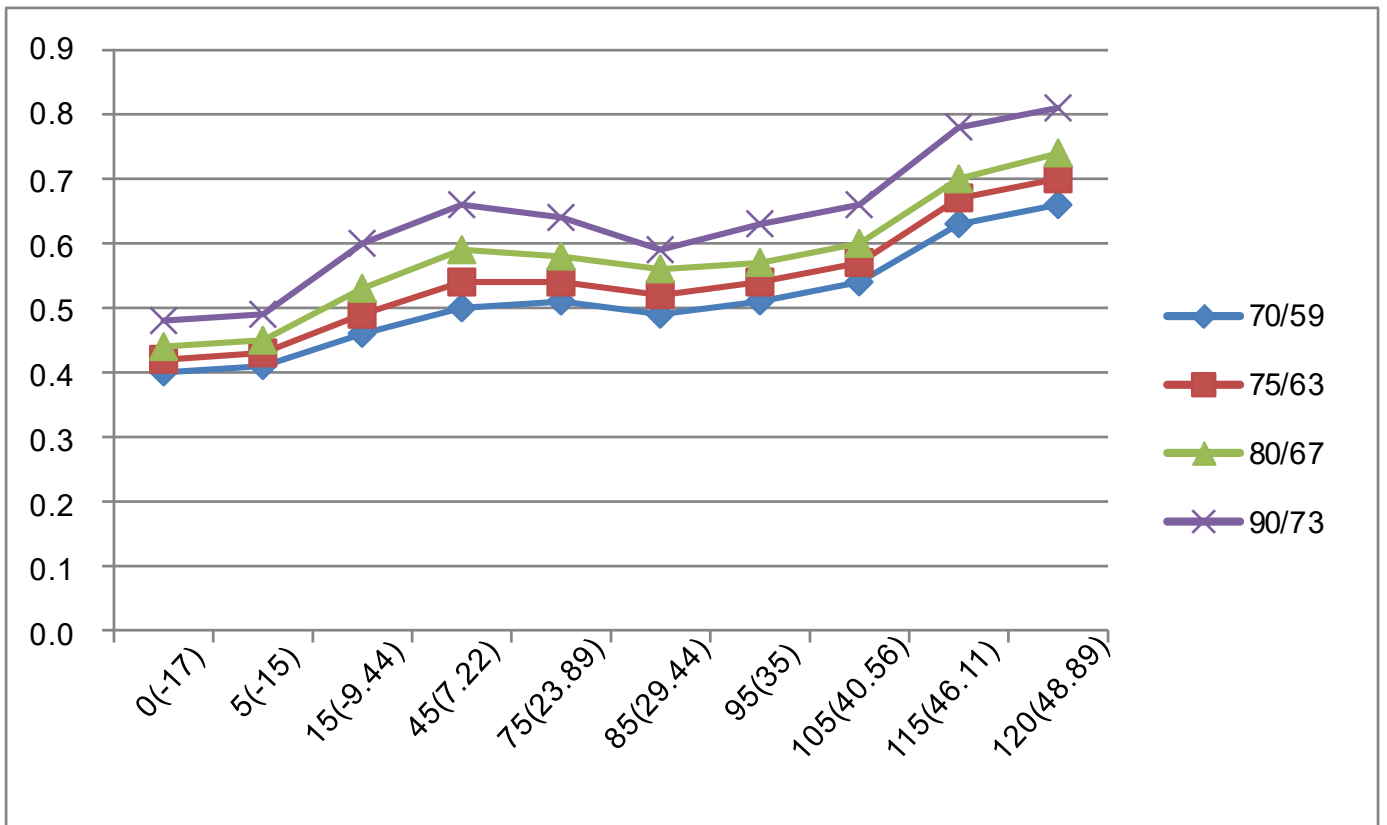
10.5.2 Heating chart(R410A)

°F(°C)	ODU(DB/WB)	57/53	47/43	37/33	27/23	17/13	0/-2	-17/-18
	IDU(DB)	(13.89/11.67)	(8.33/6.11)	(2.78/0.56)	(-2.78/-5)	(-8.33/-10.56)	(-17/-19)	(-27/-28)
BAR	55(12.78)	30.3	28.5	25.3	22.8	20.8	18.5	16.5
	65(18.33)	32.5	30.0	26.6	25.4	23.3	20.5	19.0
	75(23.89)	33.8	31.5	27.8	26.3	24.9	21.5	20.0
PSI	55(12.78)	439.0	413.0	367.0	330.0	302.0	268.0	239.0
	65(18.33)	471.0	435.0	386.0	368.0	339.0	297.0	276.0
	75(23.89)	489.0	457.0	403.0	381.0	362.0	312.0	290.0
MPa	55(12.78)	3.0	2.9	2.5	2.3	2.1	1.9	1.7
	65(18.33)	3.3	3.0	2.7	2.5	2.3	2.1	1.9
	75(23.89)	3.4	3.2	2.8	2.6	2.5	2.2	2.0



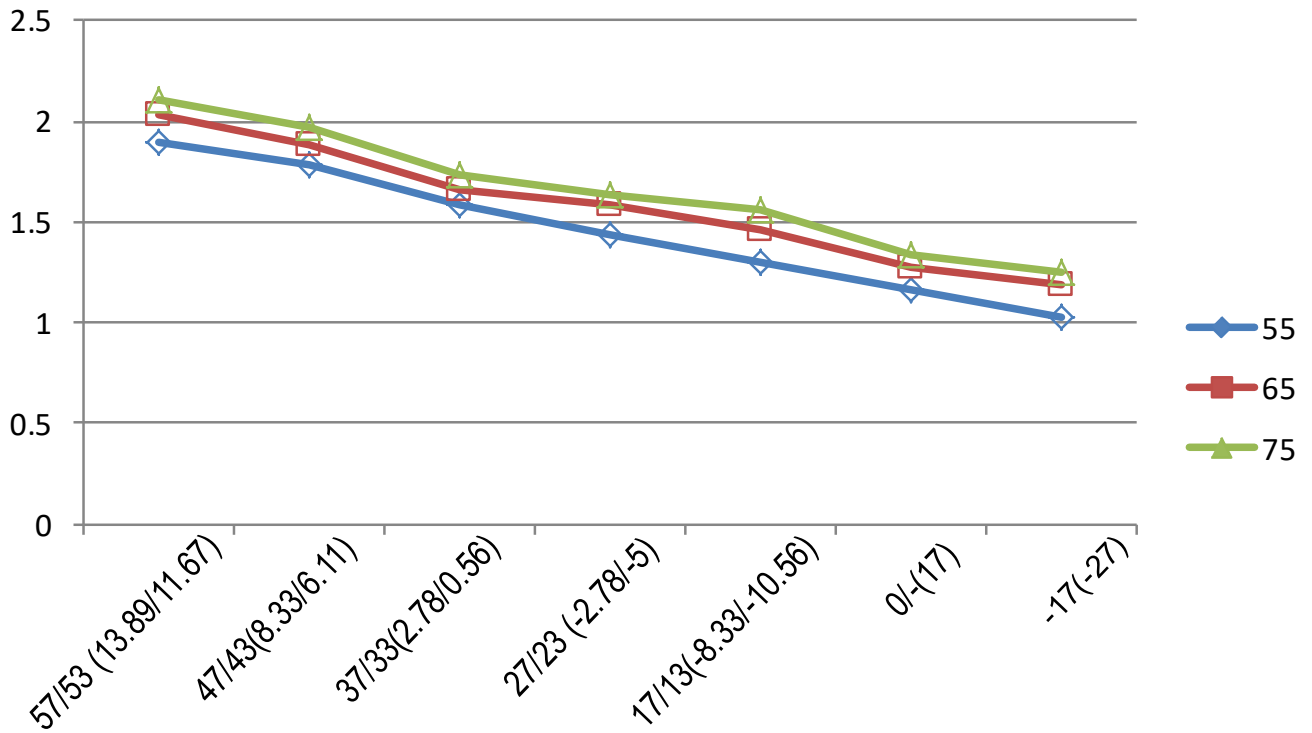
10.5.3 Cooling chart(R22)

°F (°C)	ODU(DB)	0(-17)	5(-15)	15 (-9.44)	45 -7.22	75 -23.89	85 -29.44	95 (35)	105 -40.56	115 -46.11	120 -48.89
	IDU(DB/WB)										
BAR	70/59 (21.11/15)	4.0	4.1	4.6	5.0	5.1	4.9	5.1	5.4	6.3	6.6
	75/63 (23.89/17.22)	4.2	4.3	4.9	5.4	5.4	5.2	5.4	5.7	6.7	7.0
	80/67 (26.67/19.44)	4.4	4.5	5.3	5.9	5.8	5.6	5.7	6.0	7.0	7.4
	90/73 (32.22/22.78)	4.8	4.9	6.0	6.6	6.4	5.9	6.3	6.6	7.8	8.1
PSI	70/59 (21.11/15)	58.0	59.0	67.0	73.0	74.0	71.0	74.0	78.0	91.0	96.0
	75/63 (23.89/17.22)	61.0	62.0	71.0	78.0	78.0	75.0	78.0	83.0	97.0	102.0
	80/67 (26.67/19.44)	64.0	65.0	77.0	86.0	84.0	81.0	83.0	87.0	102.0	107.0
	90/73 (32.22/22.78)	70.0	71.0	87.0	96.0	93.0	86.0	91.0	96.0	113.0	117.0
MPa	70/59 (21.11/15)	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7
	75/63 (23.89/17.22)	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7
	80/67 (26.67/19.44)	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7
	90/73 (32.22/22.78)	0.5	0.5	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.8



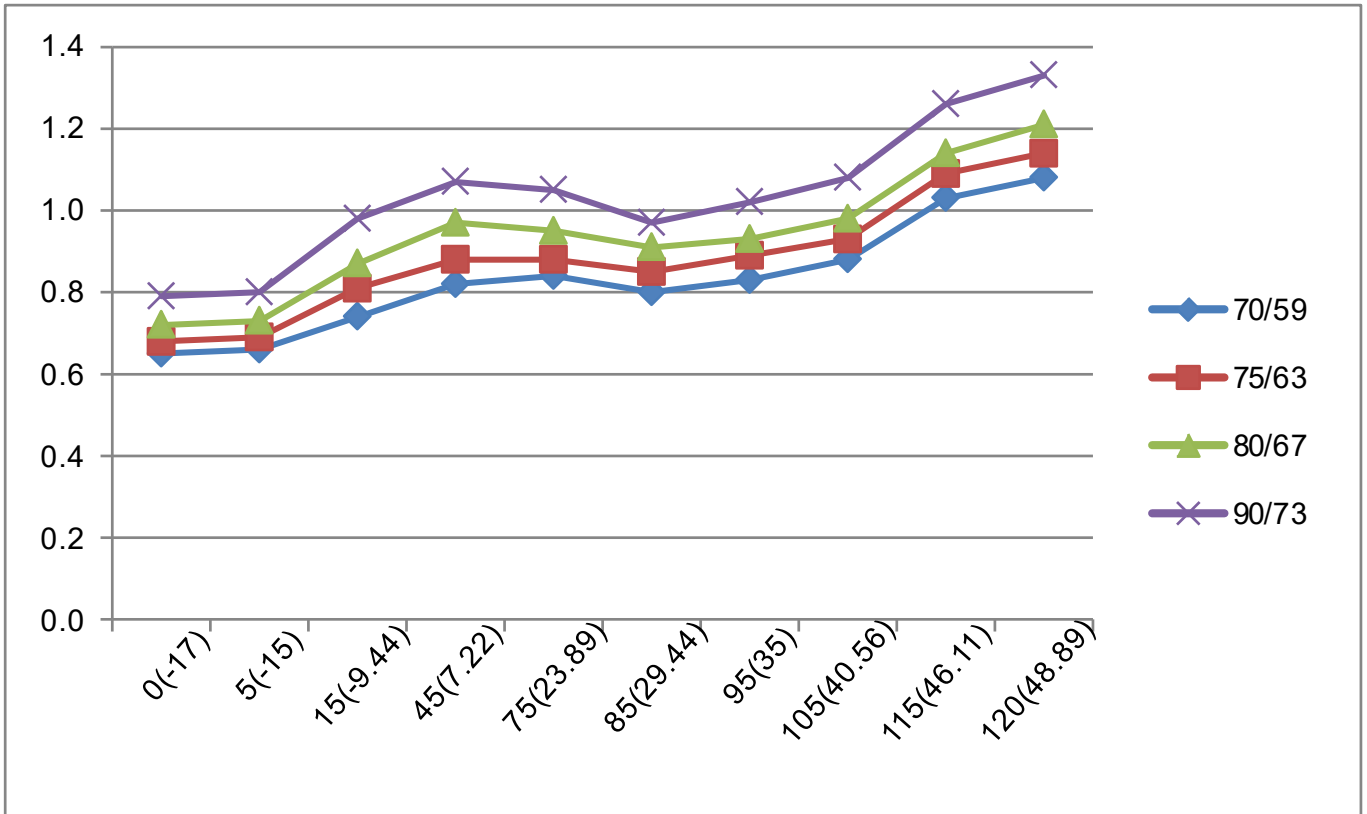
10.5.4 Heating chart(R22)

°F(°C)	ODU(DB/WB)	57/53	47/43	37/33	27/23	17/13	0/-2	17/-18
	IDU(DB)	(13.89/11.67)	(8.33/6.11)	(2.78/0.56)	(-2.78/-5)	(-8.33/-10.56)	(-17/-19)	(-27/-28)
BAR	55(12.78)	18.9	17.8	15.8	14.3	13.0	11.6	10.3
	65(18.33)	20.3	18.8	16.6	15.9	14.6	12.8	11.9
	75(23.89)	21.1	19.7	17.3	16.4	15.6	13.4	12.5
PSI	55(12.78)	274.0	258.0	229.0	207.0	189.0	168.0	149.0
	65(18.33)	294.0	273.0	241.0	231.0	212.0	186.0	172.6
	75(23.89)	306.0	286.0	251.0	238.0	226.0	194.0	181.0
MPa	55(12.78)	1.9	1.8	1.6	1.4	1.3	1.2	1.0
	65(18.33)	2.0	1.9	1.7	1.6	1.5	1.3	1.2
	75(23.89)	2.1	2.0	1.7	1.6	1.6	1.3	1.3



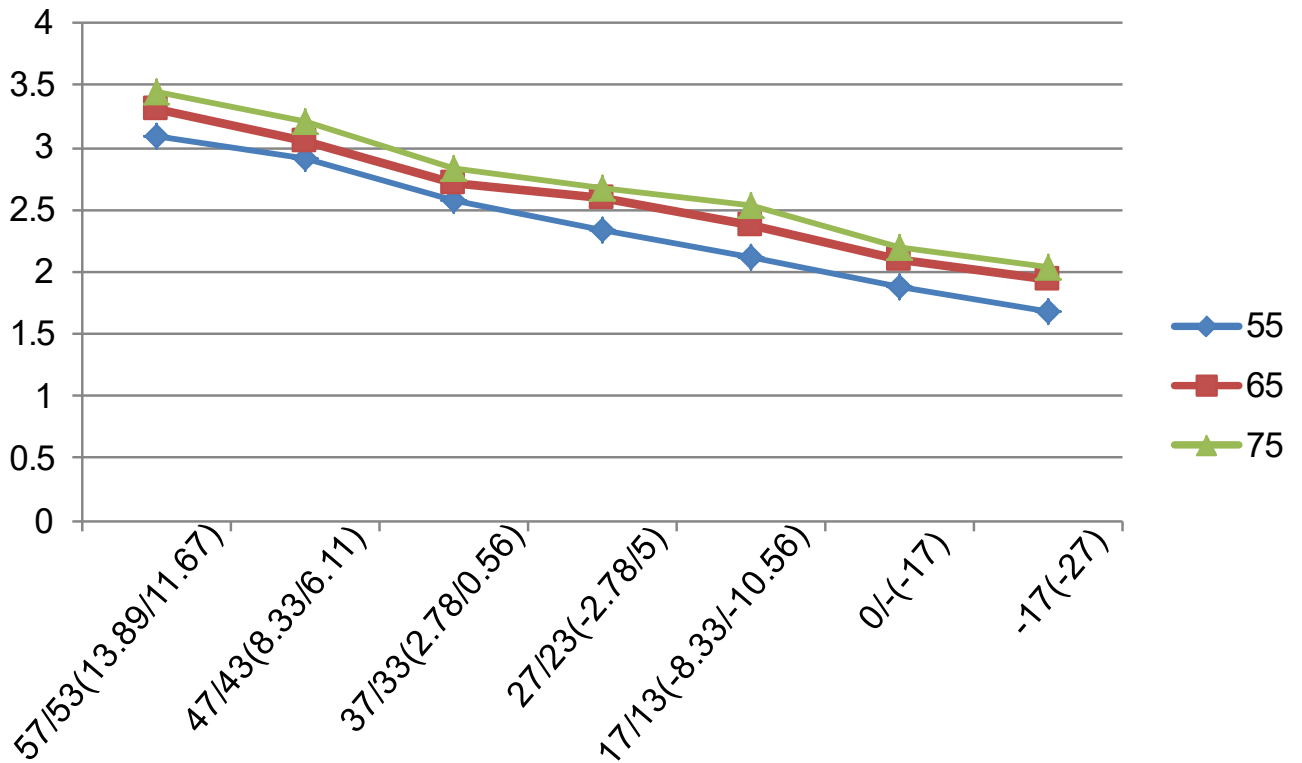
10.5.5 Cooling chart(R32)

°F(°C)	ODU(DB)	0(-17)	5(-15)	15(-9.44)	45(-7.22)	75(-23.89)	85(-29.44)	95(35)	105(-40.56)	115(-46.11)	120(-48.89)
	IDU(DB/WB)										
BAR	70/59 (21.11/15)	6.5	6.6	7.4	8.2	8.4	8.0	8.3	8.8	10.3	10.8
	75/63 (23.89/17.22)	6.8	6.9	8.1	8.8	8.8	8.5	8.9	9.3	10.9	11.4
	80/67 (26.67/19.44)	7.2	7.3	8.7	9.7	9.5	9.1	9.3	9.8	11.4	12.1
	90/73 (32.22/22.78)	7.9	8.0	9.8	10.7	10.5	9.7	10.2	10.8	12.6	13.3
PSI	70/59 (21.11/15)	95.0	96.0	108.0	118.0	121.0	115.0	119.0	128.0	150.0	157.0
	75/63 (23.89/17.22)	99.0	101.0	117.0	128.0	126.0	122.0	129.0	135.0	158.0	165.0
	80/67 (26.67/19.44)	105.0	106.0	125.0	141.0	138.0	132.0	135.0	143.0	165.0	176.0
	90/73 (32.22/22.78)	114.0	115.0	142.0	155.0	152.0	141.0	148.0	157.0	184.0	193.0
MPa	70/59 (21.11/15)	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	1.0	1.1
	75/63 (23.89/17.22)	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	1.1	1.1
	80/67 (26.67/19.44)	0.7	0.7	0.9	1.0	1.0	0.9	0.9	1.0	1.1	1.2
	90/73 (32.22/22.78)	0.8	0.8	1.0	1.1	1.1	1.0	1.0	1.1	1.3	1.3



10.5.6 Heating chart(R32)

°F(°C)	ODU(DB/WB)	57/53	47/43	37/33	27/23	17/13	0/-2	-17/-18
	IDU(DB)	(13.89/11.67)	(8.33/6.11)	(2.78/0.56)	(-2.78/-5)	(-8.33/-10.56)	(-17/-19)	(-27/-28)
BAR	55(12.78)	30.9	29.1	25.8	23.3	21.2	18.9	16.8
	65(18.33)	33.2	30.6	27.1	25.9	23.8	20.9	19.4
	75(23.89)	34.5	32.1	28.4	26.8	25.4	21.9	20.4
PSI	55(12.78)	448.0	421.0	374.0	337.0	308.0	273.0	244.0
	65(18.33)	480.0	444.0	394.0	375.0	346.0	303.0	282.0
	75(23.89)	499.0	466.0	411.0	389.0	369.0	318.0	296.0
MPa	55(12.78)	3.1	2.9	2.6	2.3	2.1	1.9	1.7
	65(18.33)	3.3	3.1	2.7	2.6	2.4	2.1	1.9
	75(23.89)	3.5	3.2	2.8	2.7	2.5	2.2	2.0



10.5.7 System Pressure Table-R22

Pressure			Temperature		Pressure			Temperature	
Kpa	bar	PSI	°C	°F	Kpa	bar	PSI	°C	°F
100	1.0	14.5	-41.1	-42.0	1600.0	16.0	232.000	41.748	107.146
150	1.5	21.8	-32.1	-25.7	1650.0	16.5	239.250	43.029	109.452
200	2.0	29.0	-25.2	-13.3	1700.0	17.0	246.500	44.281	111.706
250	2.5	36.3	-19.5	-3.1	1750.0	17.5	253.750	45.506	113.911
300	3.0	43.5	-14.7	5.6	1800.0	18.0	261.000	46.706	116.071
350	3.5	50.8	-10.4	13.3	1850.0	18.5	268.250	47.882	118.188
400	4.0	58.0	-6.6	20.2	1900.0	19.0	275.500	49.034	120.261
450	4.5	65.3	-3.1	26.5	1950.0	19.5	282.750	50.164	122.295
500	5.0	72.5	0.1	32.2	2000.0	20.0	290.000	51.273	124.291
550	5.5	79.8	3.1	37.6	2050.0	20.5	297.250	52.361	126.250
600	6.0	87.0	5.9	42.6	2100.0	21.0	304.500	53.430	128.174
650	6.5	94.3	8.5	47.2	2150.0	21.5	311.750	54.480	130.064
700	7.0	101.5	10.9	51.7	2200.0	22.0	319.000	55.512	131.922
750	7.5	108.8	13.2	55.8	2250.0	22.5	326.250	56.527	133.749
800	8.0	116.0	15.5	59.8	2300.0	23.0	333.500	57.526	135.547
850	8.5	123.3	17.6	63.6	2350.0	23.5	340.750	58.508	137.314
900	9.0	130.5	19.6	67.3	2400.0	24.0	348.000	59.475	139.055
950	9.5	137.8	21.5	70.8	2450.0	24.5	355.250	60.427	140.769
1000	10.0	145.0	23.4	74.1	2500.0	25.0	362.500	61.364	142.455
1050	10.5	152.3	25.2	77.4	2550.0	25.5	369.750	62.288	144.118
1100	11.0	159.5	27.0	80.5	2600.0	26.0	377.000	63.198	145.756
1150	11.5	166.8	28.6	83.5	2650.0	26.5	384.250	64.095	147.371
1200	12.0	174.0	30.3	86.5	2700.0	27.0	391.500	64.980	148.964
1250	12.5	181.3	31.8	89.3	2750.0	27.5	398.750	65.852	150.534
1300	13.0	188.5	33.4	92.1	2800.0	28.0	406.000	66.712	152.082
1350	13.5	195.8	34.9	94.7	2850.0	28.5	413.250	67.561	153.610
1400	14.0	203.0	36.3	97.4	2900.0	29.0	420.500	68.399	155.118
1450	14.5	210.3	37.7	99.9	2950.0	29.5	427.750	69.226	156.607
1500	15.0	217.5	39.1	102.4	3000.0	30.0	435.000	70.042	158.076
1550	15.5	224.8	40.4	104.8					

10.5.8 System Pressure Table-R410A

Pressure			Temperature		Pressure			Temperature	
Kpa	bar	PSI	°C	°F	Kpa	bar	PSI	°C	°F
100	1.0	14.5	-51.6	-60.9	2350.0	23.5	340.750	38.817	101.871
150	1.5	21.8	-43.3	-46.0	2400.0	24.0	348.000	39.680	103.424
200	2.0	29.0	-37.0	-34.6	2450.0	24.5	355.250	40.531	104.956
250	2.5	36.3	-31.8	-25.2	2500.0	25.0	362.500	41.368	106.462
300	3.0	43.5	-27.4	-17.2	2550.0	25.5	369.750	42.192	107.946
350	3.5	50.8	-23.4	-10.2	2600.0	26.0	377.000	43.004	109.407
400	4.0	58.0	-20.0	-3.9	2650.0	26.5	384.250	43.804	110.847
450	4.5	65.3	-16.8	1.8	2700.0	27.0	391.500	44.592	112.266
500	5.0	72.5	-13.9	7.0	2750.0	27.5	398.750	45.370	113.666
550	5.5	79.8	-11.2	11.9	2800.0	28.0	406.000	46.136	115.045
600	6.0	87.0	-8.6	16.4	2850.0	28.5	413.250	46.892	116.406
650	6.5	94.3	-6.3	20.7	2900.0	29.0	420.500	47.638	117.748
700	7.0	101.5	-4.0	24.7	2950.0	29.5	427.750	48.374	119.073
750	7.5	108.8	-1.9	28.5	3000.0	30.0	435.000	49.101	120.382
800	8.0	116.0	0.1	32.1	3050.0	30.5	442.250	49.818	121.672
850	8.5	123.3	2.0	35.6	3100.0	31.0	449.500	50.525	122.945
900	9.0	130.5	3.8	38.9	3150.0	31.5	456.750	51.224	124.203
950	9.5	137.8	5.6	42.1	3200.0	32.0	464.000	51.914	125.445
1000	10.0	145.0	7.3	45.1	3250.0	32.5	471.250	52.596	126.673
1050	10.5	152.3	8.9	48.0	3300.0	33.0	478.500	53.270	127.886
1100	11.0	159.5	10.5	50.8	3350.0	33.5	485.750	53.935	129.083
1150	11.5	166.8	12.0	53.6	3400.0	34.0	493.000	54.593	130.267
1200	12.0	174.0	13.5	56.2	3450.0	34.5	500.250	55.243	131.437
1250	12.5	181.3	14.9	58.8	3500.0	35.0	507.500	55.885	132.593
1300	13.0	188.5	16.3	61.3	3550.0	35.5	514.750	56.520	133.736
1350	13.5	195.8	17.6	63.7	3600.0	36.0	522.000	57.148	134.866
1400	14.0	203.0	18.9	66.0	3650.0	36.5	529.250	57.769	135.984
1450	14.5	210.3	20.2	68.3	3700.0	37.0	536.500	58.383	137.089
1500	15.0	217.5	21.4	70.5	3750.0	37.5	543.750	58.990	138.182
1550	15.5	224.8	22.6	72.7	3800.0	38.0	551.000	59.591	139.264
1600	16.0	232.0	23.8	74.8	3850.0	38.5	558.250	60.185	140.333
1650	16.5	239.3	24.9	76.9	3900.0	39.0	565.500	60.773	141.391
1700	17.0	246.5	26.1	78.9	3950.0	39.5	572.750	61.355	142.439
1750	17.5	253.8	27.2	80.9	4000.0	40.0	580.000	61.930	143.474
1800	18.0	261.0	28.3	82.9	4050.0	40.5	587.250	62.499	144.498
1850	18.5	268.3	29.3	84.7	4100.0	41.0	594.500	63.063	145.513
1900	19.0	275.5	30.3	86.6	4150.0	41.5	601.750	63.620	146.516
1950	19.5	282.8	31.4	88.4	4200.0	42.0	609.000	64.172	147.510
2000	20.0	290.0	32.3	90.2	4250.0	42.5	616.250	64.719	148.494
2050	20.5	297.3	33.3	92.0	4300.0	43.0	623.500	65.259	149.466
2100	21.0	304.5	34.3	93.7	4350.0	43.5	630.750	65.795	150.431
2150	21.5	311.8	35.2	95.4	4400.0	44.0	638.000	66.324	151.383
2200	22.0	319.0	36.1	97.1	4450.0	44.5	645.250	66.849	152.328
2250	22.5	326.3	37.0	98.7	4500.0	45.0	652.500	67.368	153.262
2300	23.0	333.5	37.9	100.3					

10.5.9 System Pressure Table-R32

Pressure			Temperature		Pressure			Temperature	
Kpa	bar	PSI	°C	°F	Kpa	bar	PSI	°C	°F
100	1.0	14.5	-51.9	-61.4	1850	18.5	268.3	28.43	83.2
150	1.5	21.8	-43.6	-46.5	1900	19.0	275.5	29.45	85.0
200	2.0	29.0	-37.3	-35.2	1950	19.5	282.8	30.45	86.8
250	2.5	36.3	-32.2	-25.9	2000	20.0	290.0	31.43	88.6
300	3.0	43.5	-27.7	-17.9	2050	20.5	297.3	32.40	90.3
350	3.5	50.8	-23.9	-10.9	2100	21.0	304.5	33.34	92.0
400	4.0	58.0	-20.4	-4.7	2150	21.5	311.8	34.27	93.7
450	4.5	65.3	-17.2	1.0	2200	22.0	319.0	35.18	95.3
500	5.0	72.5	-14.3	6.2	2250	22.5	326.3	36.08	96.9
550	5.5	79.8	-11.7	11.0	2300	23.0	333.5	36.97	98.5
600	6.0	87.0	-9.2	15.5	2350	23.5	340.8	37.83	100.1
650	6.5	94.3	-6.8	19.8	2400	24.0	348.0	38.69	101.6
700	7.0	101.5	-4.6	23.7	2450	24.5	355.3	39.53	103.2
750	7.5	108.8	-2.5	27.5	2500	25.0	362.5	40.36	104.6
800	8.0	116.0	-0.5	31.1	2550	25.5	369.8	41.17	106.1
850	8.5	123.3	1.4	34.5	2600	26.0	377.0	41.98	107.6
900	9.0	130.5	3.2	37.8	2650	26.5	384.3	42.77	109.0
950	9.5	137.8	5.0	40.9	2700	27.0	391.5	43.55	110.4
1000	10.0	145.0	6.6	43.9	2750	27.5	398.8	44.32	111.8
1050	10.5	152.3	8.2	46.8	2800	28.0	406.0	45.08	113.1
1100	11.0	159.5	9.8	49.6	2850	28.5	413.3	45.83	114.5
1150	11.5	166.8	11.3	52.3	2900	29.0	420.5	46.57	115.8
1200	12.0	174.0	12.7	54.9	2950	29.5	427.8	47.30	117.1
1250	12.5	181.3	14.2	57.5	3000	30.0	435.0	48.02	118.4
1300	13.0	188.5	15.5	59.9	3050	30.5	442.3	48.73	119.7
1350	13.5	195.8	16.8	62.3	3100	31.0	449.5	49.43	121.0
1400	14.0	203.0	18.1	64.6	3150	31.5	456.8	50.12	122.2
1450	14.5	210.3	19.4	66.9	3200	32.0	464.0	50.81	123.5
1500	15.0	217.5	20.6	69.1	3250	32.5	471.3	51.48	124.7
1550	15.5	224.8	21.8	71.3	3300	33.0	478.5	52.15	125.9
1600	16.0	232.0	23.0	73.4	3350	33.5	485.8	52.81	127.1
1650	16.5	239.3	24.1	75.4	3400	34.0	493.0	53.46	128.2
1700	17.0	246.5	25.2	77.4	3450	34.5	500.3	54.11	129.4
1750	17.5	253.8	26.3	79.4	3500	35.0	507.5	54.75	130.5
1800	18.0	261.0	27.4	81.3					