

# *ecoclima*

## **Service manual**

(FREE MATCH 50Hz **R32**)

Models:

CM2-H16/4DR2

CM3-H22/4DR2

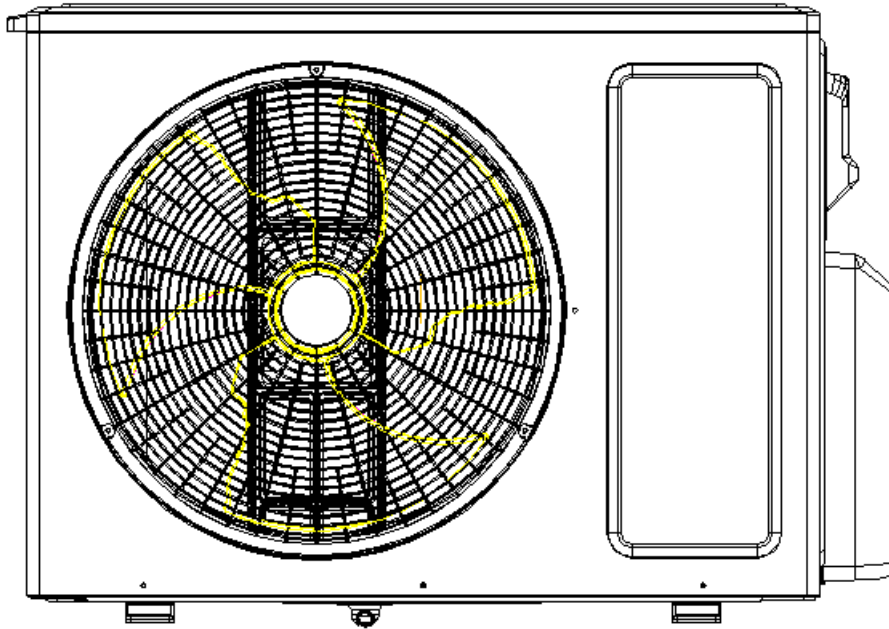
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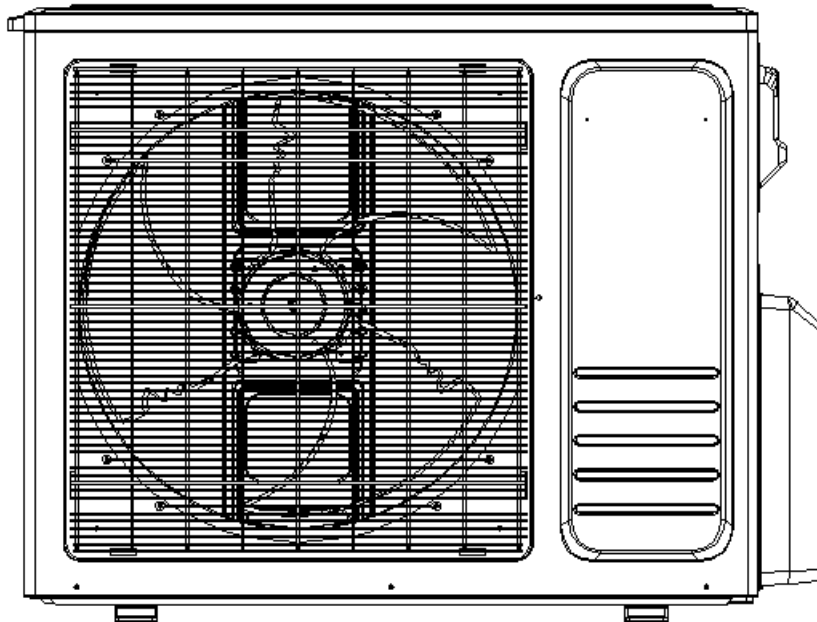
<b>1. Summary and Features .....</b>	<b>1</b>
<b>2. Safety Precautions.....</b>	<b>2</b>
<b>3. Specifications.....</b>	<b>4</b>
3.1 Unit Specifications.....	4
3.2 Operation Characteristic Curve .....	6
3.3 Capacity Variation Ratio According to Temperature.....	6
3.4 Noise Curve .....	7
<b>4. Construction Views .....</b>	<b>8</b>
4.1 Outdoor Unit.....	8
<b>5. Refrigerant System Diagram.....</b>	<b>10</b>
<b>6. Schematic Diagram.....</b>	<b>10</b>
6.1 Electrical Wiring.....	10
<b>7. Installation Manual.....</b>	<b>12</b>
7.1 Standard Accessory Parts.....	12
7.2 Safety operation of flammable refrigerant .....	13
7.3 Installation Location and Matters Needing Attention.....	15
7.4 Test operation.....	23
<b>8. Exploded Views and Parts List.....</b>	<b>24</b>
8.1 Outdoor Unit.....	24
<b>9. Troubleshooting.....</b>	<b>28</b>
9.1 PCB Printed Diagram.....	28
<b>10. Removal Procedure .....</b>	<b>30</b>
10.1 Removal Procedure of Outdoor Unit(16K) .....	30
10.2 Removal Procedure of Outdoor Unit(22K) .....	36

# 1. Summary and Features

## Outdoor Unit



CM2H-1644A23

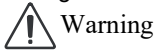


CM3H-2228A23

## 2. Safety Precautions

Installing, starting up, and servicing air conditioner can be hazardous due to system pressure, electrical components, and equipment location, etc. Only trained, qualified installers and service personnel are allowed to install, start-up, and service this equipment. Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel. When handling the equipment, observe precautions in the manual and on tags, stickers, and labels attached to the equipment. Follow all safety codes. Wear safety glasses and work gloves. Keep quenching cloth and fire extinguisher nearby when brazing. Read the instructions thoroughly and follow all warnings or cautions in literature and attached to the unit. Consult local building codes and current editions of national as well as local electrical codes.

Recognize the following safety information:



Warning

Incorrect handling could result in personal injury or death.



Caution

Incorrect handling may result in minor injury, or damage to product or property.

- ◆ Make sure the outdoor unit is installed on a stable, level surface with no accumulation of snow, leaves, or trash beside.
- ◆ Make sure the ceiling/wall is strong enough to bear the weight of the unit.
- ◆ Make sure the noise of the outdoor unit does not disturb neighbors.
- ◆ Follow all the installation instructions to minimize the risk of damage from earth quakes, typhoons or strong winds.
- ◆ Avoid contact between refrigerant and fire as it generates poisonous gas.
- ◆ Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture and other hazards.
- ◆ Make sure no refrigerant gas is leaking out when installation is completed.
- ◆ Should there be refrigerant leakage, the density of refrigerant in the air shall in no way exceed its limited value, or it may lead to explosion.
- ◆ Keep your fingers and clothing away from any moving parts.
- ◆ Clear the site after installation. Make sure no foreign objects are left in the unit.
- ◆ Always ensure effective grounding for the unit.



### Warning

All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

Never supply power to the unit unless all wiring and tubing are completed, reconnected and checked.

This system adopts highly dangerous electrical voltage. Incorrect connection or inadequate grounding can cause personal injury or death. Stick to the wiring diagram and all the instructions when wiring.

Have the unit adequately grounded in accordance with local electrical codes.

Have all wiring connected tightly. Loose connection may lead to overheating and a possible fire hazard.

All installation or repair work shall be performed by your dealer or a specialized subcontractor as there is the risk of fire, electric shock, explosion or injury.



### Caution

Never install the unit in a place where a combustible gas might leak, or it may lead to fire or explosion.

Make a proper provision against noise when the unit is installed at a telecommunication center or hospital.

Provide an electric leak breaker when it is installed in a watery place.

Never wash the unit with water.

Handle unit transportation with care. The unit should not be carried by only one person if it is more than 20kg.

Never touch the heat exchanger fins with bare hands.

Never touch the compressor or refrigerant piping without wearing glove.

Do not have the unit operate without air filter.

Should any emergency occur, stop the unit and disconnect the power immediately.

Properly insulate any tubing running inside the room to prevent the water from damaging the wall.

Please read this operating manual carefully before operating the unit



Appliance filled with flammable gas R32.



Before use the appliance, read the owner's manual first.



Before install the appliance, read the installation manual first.



Before repair the appliance, read the service manual first.

The figures in this manual may be different with the material objects, please refer to the material objects for reference .

## The Refrigerant

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

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

### WARNING:

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. Should repair be necessary, contact your nearest authorized Service Center.

Any repair carried out by unqualified personnel may be dangerous.

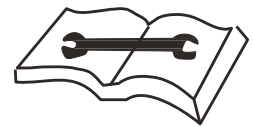
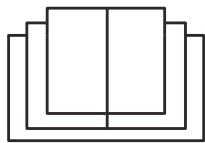
The appliance shall be stored in a room without continuously operating ignition sources. (For example: open flames, an operating gas or an operating electric heater.)

Do not pierce or burn.

Appliance shall be installed, operated and stored in a room with a floor area larger than "X"m<sup>2</sup> (see table 2). (only applies to appliances that are not fixed appliances).

Appliance filled with flammable gas R32. For repairs, strictly follow manufacturer's instructions only. Be aware that refrigerants do not contain odour.

Read specialist's manual.



# 3. Specifications

## 3.1 Unit Specifications

Model	-	16K	22K
Product Code	—	CM2H-1644A23	CM3H-2228A23
Project number	—	LX-2020-KF015	LX-2019-KF113
Detailed number	—	CH1124916	CH1122411
Series Name	—	MULTI	MULTI
Target Country or Area	—	Europe	Europe
Cooling Capacity	—	4.7(1.7~5.64)	6.4(2.05~7.68)
Cooling Capacity	KW	16000(5800~19243)	22000(6995~26204)
Pdesignc	Btu/h	4.70	6.40
Heating Capacity	KW	5.1(2.0~7.0)	7.0(2.25~8.0)
Heating Capacity	KW	17000 (7500~23884)	23880 (7677~27296)
Pdesignh(Average)	Btu/h	4.40	6.15
Pdesignh(Warmer)	KW	4.40	6.15
Pdesignh(Colder)	KW	/	/
EER	KW	3.43	3.45
EER	W/W	11.70	11.77
COP	(Btu/h)/W	3.73	3.76
COP	W/W	12.73	12.83
R	(Btu/h)/W	/	/
SEER	—	6.53	6.60
HSPF	—	/	/
SCOP(Average)	—	4.02	4.03
SCOP(Warmer)	—	5.01	5.03
SCOP(Colder)	—	/	/
Energy Class	—	A++/A+	A++/A+
Air Flow Volume	—	2800	3100
Air Flow Volume	m3/h	1647	1824
Sound Pressure Level	CFM	54	56
Sound Power Level	dB(A)	64	66
Rated Voltage	dB(A)	220-240	220-240
Rated Frequency	V	50	50
Phases	Hz	1	1
Min/Max. Voltage	—	165/264	165/264
Cross-sectional Area of Power Cable Conductor	V~	1.50	2.50
Cross-sectional Area of Power Cable Conductor	mm2	0.0023	0.0039
Recommended Power Cable(Core)	sq.in	3	3
Fuse Current	—	16	25
Max. Over Current Protection	A	16	25
Cooling Power Input	KW	1.37(0.42~1.95)	1.85(0.51~2.65)
Heating Power Input	KW	1.37(0.43~2.0)	1.86(0.51~2.70)
Cooling Rated Power Input	KW	2.30	3.00
Heating Rated Power Input	KW	2.50	3.10
Standby power consumption	W	1.5	/
Cooling Current Input	A	5.95(1.82~8.48)	8.04(2.21~11.52)
Heating Current Input	A	5.95(1.87~8.70)	8.08(2.21~12.74)
Cooling Rated Current Input	A	11.62	15.15
Heating Rated Current Input	A	12.63	15.66
Starting Current	A	/	/
Min. Current (MCA)	A	/	/

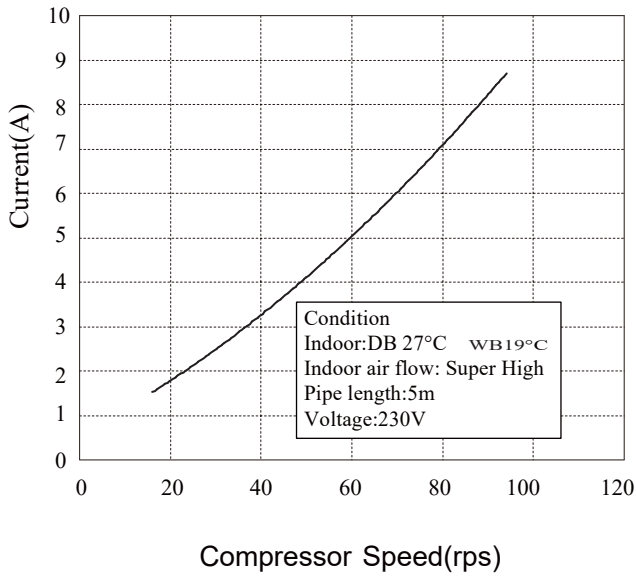
Model	-	16K	22K
Compressor Trademark	—	CRSS	GMCC
Chassis Electrical Heater Power Input	W	/	/
Chassis Electrical Heater Current	A	/	/
Fan Type	—	Axial-flow	Axial-flow
Fan Quantity	—	1	1
Fan Diameter-height	mm	455-151	496-139
Fan Diameter-height	inch	17.9-5.9	19.5-5.47
Motor Model	—	ZKFN-70-8-3	ZKFN-70-8-2
Motor Type	—	DC motor	DC motor
Motor Insulation Class	—	E	E
Cooling Power Input	—	IP44	IP44
Overload Protector	—	/	/
Motor Full Load Amp(FLA)	A	0.62	0.68
Fan Motor Type	—	DC motor	DC motor
Fan Motor Drive Type	—	Direct drive	Direct drive
Fan Motor Speed	rpm	850	850
Fan Motor Power Output	W	70	70
Fan Motor Power Input	W	95	105
Fan Motor Capacitor	μ F	/	/
Condenser Material	—	Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
Condenser Face Area	m2	0.51	0.60
Condenser Face Area	sq.ft	-	-
Condenser Pipe Diameter	mm	φ7	φ7
Condenser Pipe Diameter	inch	0.276	0.276
Condenser Number of Rows	—	2	2
Condenser Tube Pitch(a)×Row Pitch(b)	mm	22×19.05	22×19.05
Condenser Fin Pitch	mm	1.4	1.4
Condenser Fins per Inch(FPI)	—	18	18
Condenser Fin Type	—	wavy fin	wavy fin
Condenser Fin Colour	—	GOLDEN	GOLDEN
Condenser Number of Circuits	—	4in-4out	6in-3out
Condenser Length(L) × Height(H) × Width(W)	mm	854×594×38.1	914×660×38.1
Condenser Max. Allowable Pressure	MPa	12.6	12.6
Outdoor max operating pressure of heat	MPa	4.2	4.2
Permissible Excessive Operating Pressure for the	MPa	4.2	4.2
Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	2.5
Maximum Allowable Pressure	MPa	4.3	4.3
High Presser Overload Protector	MPa	/	/
Low Presser Overload Protector	MPa	/	/
Cooling Operation Ambient Temperature Range	℃	-5~52	-5~52
Heating Operation Ambient Temperature Range	℃	-15~24	-15~24
Maximum drive IDU NO.	unit	2	3
Defrosting Method	—	Automatic Defrosting	Automatic Defrosting
Isolation	—	I	I
Moisture Protection	—	IP24	IP24
Overload Protector	—	/	/
Climate Type	—	T1	T1
Climate Zone	—	Temperate Zone	Temperate Zone
Refrigerant	—	R32	R32
Refrigerant Charge	kg	1.10	1.42

Refrigerant Charge	oz	38.8	50.1
<b>Model</b>	-	<b>16K</b>	<b>22K</b>
Throttling Method	—	Electron expansion valve	Electron expansion valve
Dimension of Outline(W)	mm	819	860
Dimension of Outline(D)	mm	309	320
Dimension of Outline(H)	mm	638	720
Dimension of Carton Box(L)	mm	972	1015
Dimension of Carton Box(W)	mm	402	445
Dimension of Carton Box(H)	mm	688	775
Dimension of Package(L)	mm	972	1015
Dimension of Package(W)	mm	402	445
Dimension of Package(H)	mm	688	775
Outdoor Unit Stacked Layers	—	4	4
Net Weight	kg	39	48
Gross Weight	kg	42	52
Outdoor Unit Loading Quantity	unit	192	183
Connection Pipe Connection Method	—	Flare Connection	Flare Connection
Not Additional Gas Connection Pipe Length	m	10(Liquid pipe total length)	15(Liquid pipe total length)
Connection Pipe Gas Additional Charge	g/m	12	12
Outer Diameter of Liquid Pipe(Metric)1	mm	φ 6	φ 6
Outer Diameter of Liquid Pipe(Metric)2	mm	φ 6	φ 6
Outer Diameter of Liquid Pipe(Metric)3	mm	/	φ 6
Outer Diameter of Liquid Pipe(Metric)4	mm	/	/
Outer Diameter of Liquid Pipe(Metric)5	mm	/	/
Outer Diameter of Gas Pipe(Metric)1	mm	φ 9.52	φ 9.52
Outer Diameter of Gas Pipe(Metric)2	mm	φ 9.52	φ 9.52
Outer Diameter of Gas Pipe(Metric)3	mm	/	φ 9.52
Outer Diameter of Gas Pipe(Metric)4	mm	/	/
Outer Diameter of Gas Pipe(Metric)5	mm	/	/
Connection Pipe Max. Height Distance(indoor and indoor)	m	5	5
Connection Pipe Max. Height Distance(indoor and outdoor and indoor up)	m	10	10
Connection Pipe Max. Height Distance(indoor and outdoor and outdoor up)	m	10	10
Max. equivalent connection pipe length(outdoor to last indoor)	m	25	25
Connection Pipe Max. Length Distance(total length)	m	45	65
Low Ambient Cooling Function	—	yes	yes
Defrosting Time Set Function	—	no	no
Low Voltage Startup	—	yes	yes
Compressor With Electric Heater	—	optional	optional
Chassis With Electric Heater	—	no	no

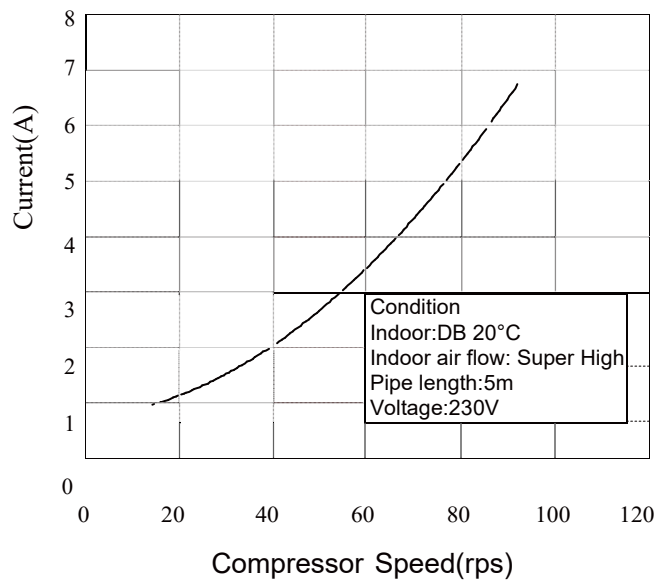


### 3.2 Operation Characteristic Curve

Cooling



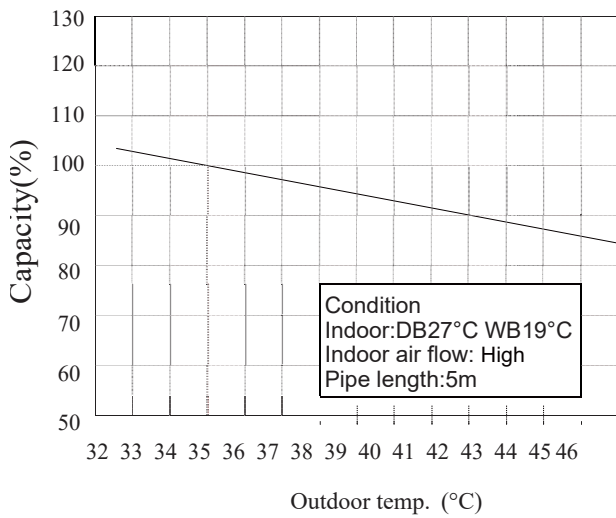
Heating



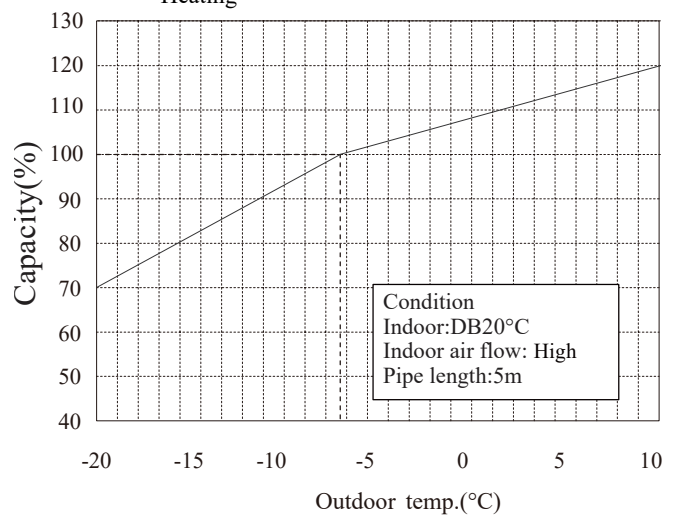
### 3.3 Capacity Variation Ratio According to Temperature

Heating operation ambient temperature range is -20°C~24°C

Cooling

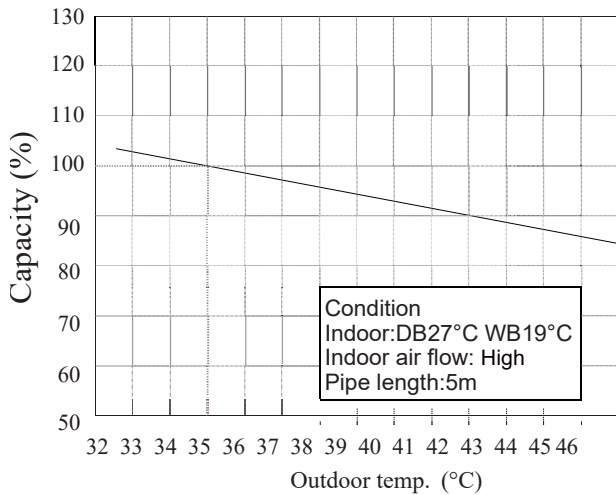


Heating

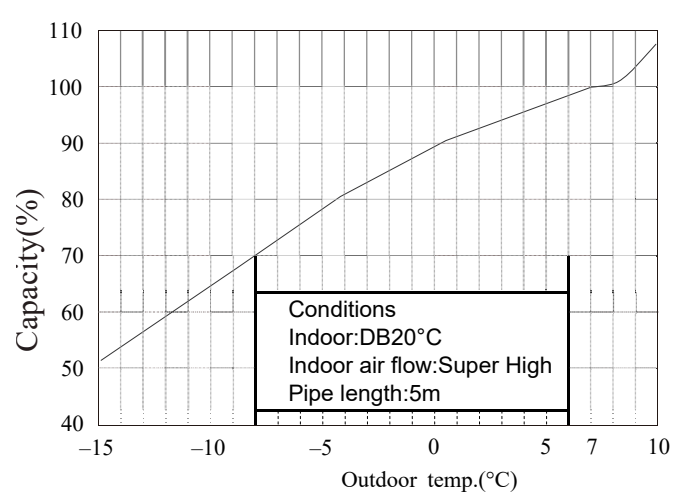


Heating operation ambient temperature range is -15°C~24°C

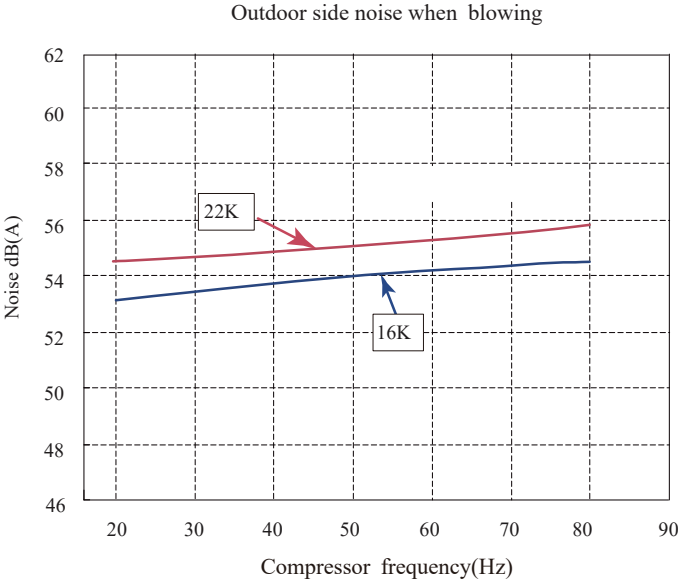
Cooling



Heating



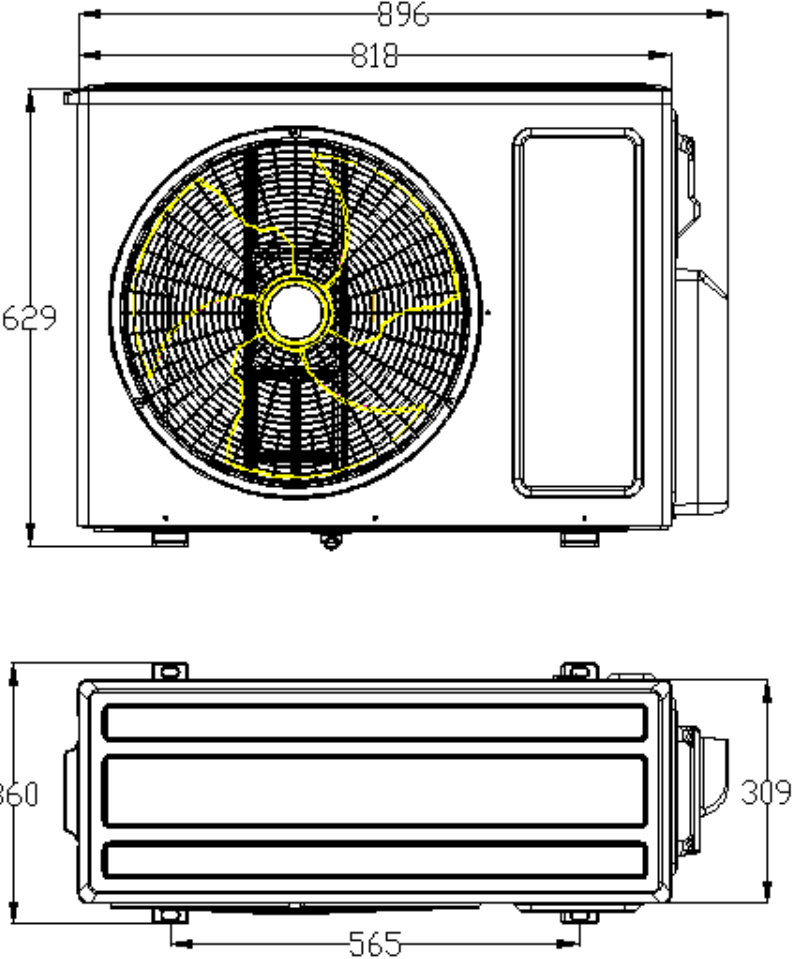
### 3.4 Noise Curve



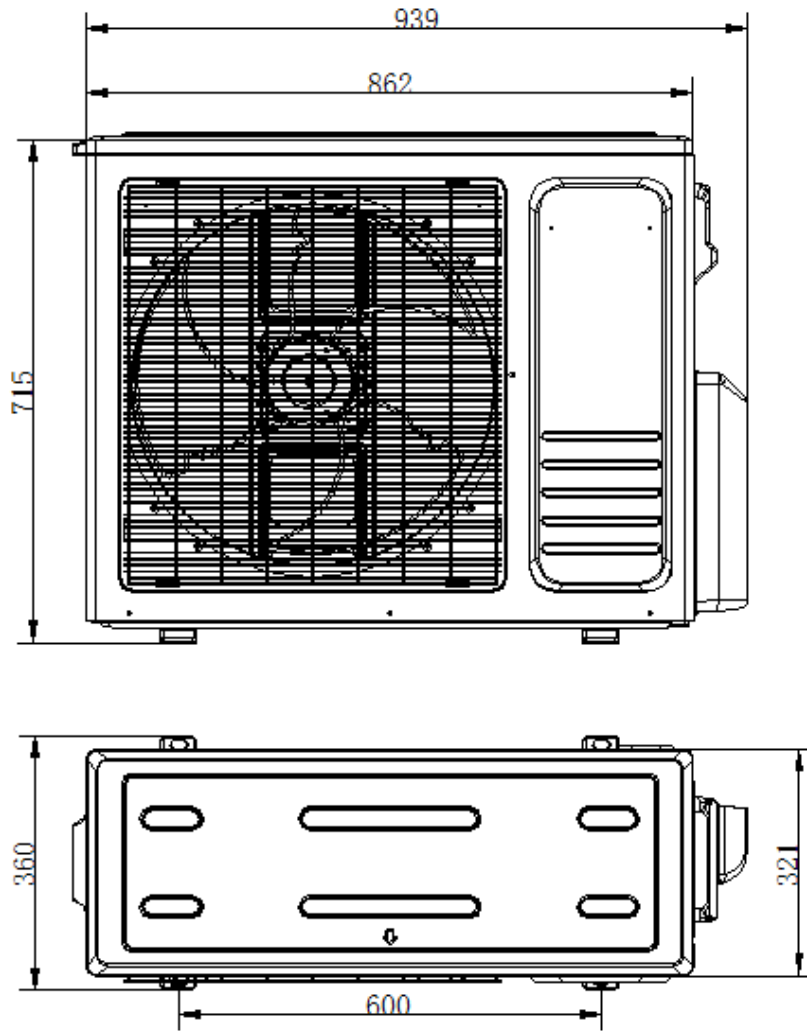
# 4. Construction Views

## 4.1 Outdoor Unit

CM2H-1644A23

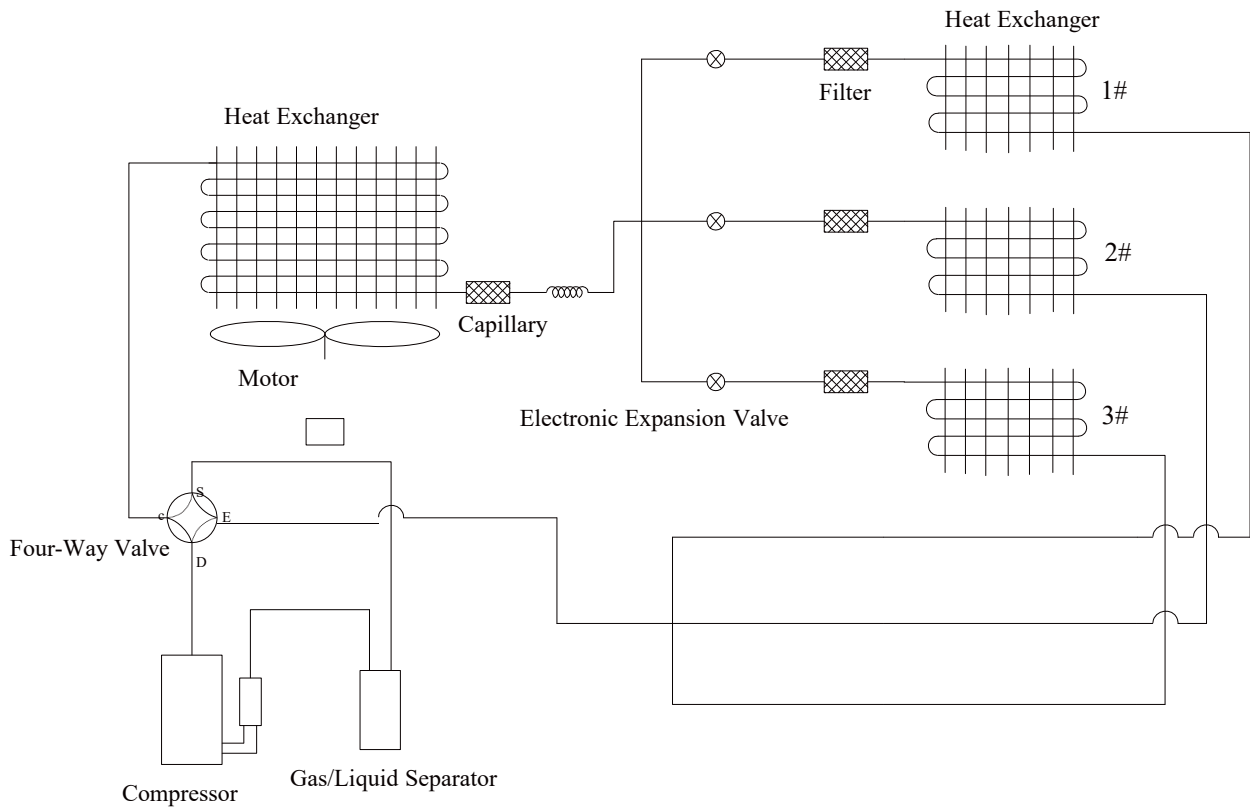


Unit:mm



Unit:mm

# 5. Refrigerant System Diagram



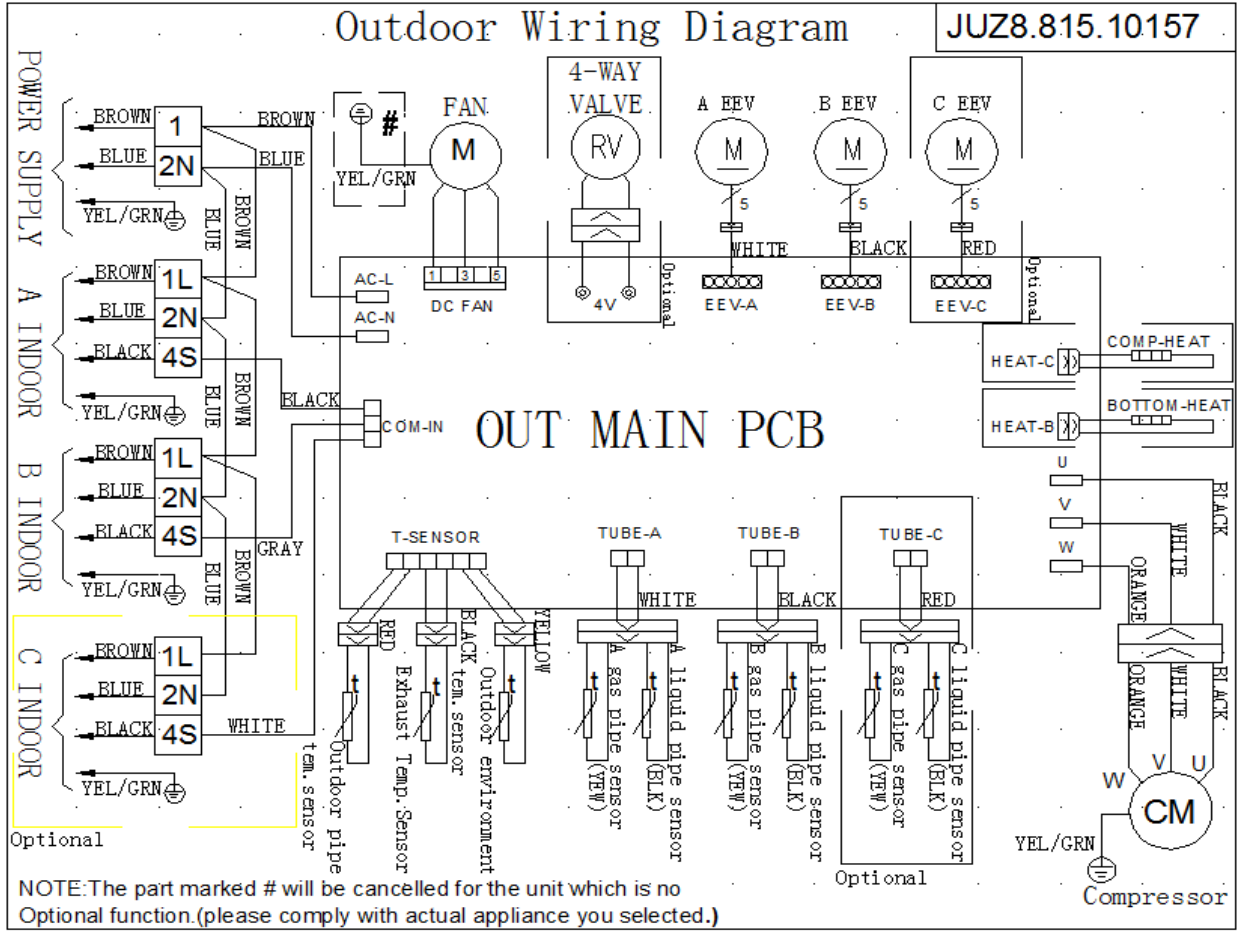
The outdoor and indoor units start to work once the power is switched on. During the cooling operation, the low temperature, low pressure refrigerant gas from the heat exchanger of each indoor unit gets together and then is taken into the compressor to be compressed into high temperature, high pressure gas, which will soon go to the heat exchanger of the outdoor unit to exchange heat with the outdoor air and then is turned into refrigerant liquid. After passing through the throttling device, the temperature and pressure of the refrigerant liquid will further decrease and then go the main valve. After that, it will be divided and go to the heat exchanger of each indoor unit to exchange heat with the air which needs to be conditioned. Consequently, the refrigerant liquid become low temperature, low pressure refrigerant gas again. Such a refrigerant cycle goes round and round to achieve the desired cooling purpose. During the heating operation, the four-way valve is involved to make the refrigerant cycle reversely. The refrigerant radiates heat in the heat exchanger of the indoor unit(so do the electric heating devices)and absorb heat in the heat exchanger of the outdoor unit for a heat pump heating cycle so as to achieve the desired heating purpose.

# 6. Schematic Diagram

## 6.1 Electrical Wiring

### Meaning of marks

Symbol	OGE	WHT	YEW	RD	YEGN	BLN	BLU	BLK	VT
Color symbol	ORANGE	WHITE	YELLOW	RED	YELLOW GREEN	BROWN	BLUE	BLACK	VIOLET
Symbol	CM/COMP		CT1,2		4V	XT		⊕	
Parts name	COMPRESSOR		OVERLOAD		4-WAY VALVE	TERMINAL BLOCK		PROTECTIVE EARTH	



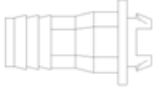

**These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.**

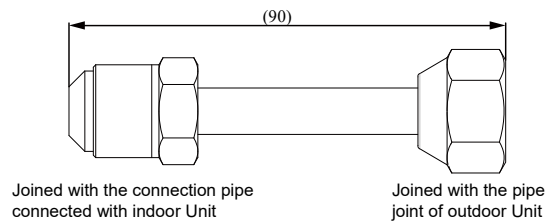
# 7. Installation Instructions

## 7.1 Standard Accessory Parts

The standard accessory parts listed below are furnished and should be used as required.

Table 1

Name	Appearance	Q'ty	Usage
Drainage Connector		1	To connect with the hard PVC drain pipe
Pipe Joint Subassembly		1	One for 18K unit
Others	Instructions , bar code		



Pipe Joint Subassembly

Table 1

NO.	Joined with the connection pipe connected with indoor Unit	Joined with the pipe joint of outdoor Unit	Usage
1	Φ12.7	Φ9.52	one for 18K unit

## 7.2 Safety operation of flammable refrigerant

### Qualification requirement for installation and maintenance man

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

### Installation notes

1. The air conditioner is not allowed to use in a room that has running fire (such as fire source, working coal gas ware, operating heater).
2. It is not allowed to drill hole or burn the connection pipe.
3. The air conditioner must be installed in a room that is larger than the minimum room area. The minimum room area is shown on the nameplate or following table 2.
4. Leak test is a must after installation.

Table 2: Minimum room area (m<sup>2</sup>)

Minimum room area (m <sup>2</sup> )	Charge amount (kg)	≤1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5
	Floor location	/	14.5	16.8	19.3	22.0	24.8	27.8	31.0	34.4	37.8	41.5	45.4	49.4	53.6
	Window mounted	/	5.2	6.1	7.0	7.9	8.9	10.0	11.2	12.4	13.6	15.0	16.3	17.8	19.3
	Wall mounted	/	1.6	1.9	2.1	2.4	2.8	3.1	3.4	3.8	4.2	4.6	5.0	5.5	6.0
	Ceiling mounted	/	1.1	1.3	1.4	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.7	4.0

### Maintenance notes

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

—It's only allowed to be operated in the rooms that meet the requirement of the nameplate.

#### Check whether the maintenance area is well-ventilated.

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

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

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

#### Check whether the appliance mark is in good condition.

—Replace the vague or damaged warning mark.

### Welding

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

1. Shut down the unit and cut power supply.
2. Eliminate the refrigerant.
3. Vacuuming.
4. Clean it with N<sub>2</sub> gas.
5. Cutting or welding.
6. Carry back to the service spot for welding.

The refrigerant should be recycled into the specialized storage tank. Make sure that there isn't any naked flame near the outlet of the vacuum pump and it's well-ventilated.

### Filling the refrigerant

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

### Safety instructions for transportation and storage

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



## Installation prepare

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



### WARNING

- 1. When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.**
  - Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.
- 2. When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.**
  - Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.
- 3. When refrigerant needs to be recovered during relocating or repairing the unit, be sure that the unit is running in cooling mode. Then, fully close the valve at high pressure side (liquid valve). About 30-40 seconds later, fully close the valve at low pressure side (gas valve), immediately stop the unit and disconnect power. Please note that the time for refrigerant recovery should not exceed 1 minute.**
  - If refrigerant recovery takes too much time, air may be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- 4. During refrigerant recovery, make sure that liquid valve and gas valve are fully closed and power is disconnected before detaching the connection pipe.**
  - If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- 5. When installing the unit, make sure that connection pipe is securely connected before the compressor starts running.**
  - If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- 6. Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.**
  - If there leaked gas around the unit, it may cause explosion and other accidents.
- 7. Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.**
  - Poor connections may lead to electric shock or fire.
- 8. Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.**
  - Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.

## Notice for installion



### Caution

1. The unit should be installed only by authorized service center according to local or government regulations and in compliance with this manual.
2. Before installing, please contact with local authorized maintenance center. If the unit is not installed by the authorized service center, the malfunction may not be solved due to inconvenient contact between the user and the service personnel.
3. When removing the unit to the other place, please firstly contact with the local authorized service center.
4. Warning: Before obtaining access to terminals, all supply circuits must be disconnected.
5. For appliances with type Y attachment, the instructions shall contain the substance of the following. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
6. The appliance must be positioned so that the plug is accessible.
7. The temperature of refrigerant line will be high; please keep the interconnection cable away from the copper tube.
8. The instructions shall state the substance of the following: This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
9. Appliance shall be installed, operated and stored in a room with a floor area larger than "X" m<sup>2</sup> (see table 2).



Please notice that the unit is filled with flammable gas R32. Inappropriate treatment of the unit involves the risk of severe damages of people and material. Details to this refrigerant are found in chapter "refrigerant".

### 7.3 Installation Location and Matters Needing Attention

The installation of the unit must comply with the national and local safety regulations. The installation quality directly affects the normal use, so the user should not carry out the installation personally, instead, the installation and debugging should be done by technician according to this manual. Only after that, can the unit be energized.

#### ● How to select the installation location for the outdoor unit

1. The outdoor unit must be installed where the bearing surface is stable and secure enough.
2. The outdoor unit and indoor unit should be placed as close as possible to minimize the length and bends of the refrigerant pipe.
3. Do not install the outdoor unit under the window or between the buildings to prevent the normal running noise entering the room.
4. Where the flow of the air inlet/outlet is not blocked.
5. The outside unit should be installed where ventilation is in good condition so that the unit can take in and discharge enough air.
6. Do not install the unit where there are inflammable and explosive substances and where there is heavy dust, salt fog and other severely polluted air.

No air guiding pipe is allowed to be installed at the air inlet/outlet of the outdoor unit.

Under the heating mode, the condensate water would drip down from the base frame and would be frozen when the outdoor ambient temperature is lower than 0°C (32°F). Besides, the installation of the outdoor unit should not affect the heat radiation of the unit.



#### CAUTION!

The unit installed in the following places is likely to run abnormally. If unavoidable, please contact the professional personnel at the appointed service center.

- Where is full of oil.
- Alkaline soil off the sea.
- Where there is sulfur gas (like sulfur hot spring).
- Where there are devices with high frequency (like wireless devices, electric welding devices, or medical equipment).
- Special circumstances.

#### ● Electric wiring

1. The installation must be done in accordance with the national wiring regulations.
2. Only the power cord with the rated voltage and exclusive circuit for the air conditioning can be used.
3. Do not pull power cord by force.
4. The electric installation should be carried out by the professional personnel as instructed by the local laws, regulations and also this manual.
5. The diameter of the power cord should be large enough and once it is damaged it must be replaced by dedicated one.
6. The earthing should be reliable and the earth wire should be connected to the dedicated device of the building by the professional personnel. Besides, the air switch coupled with the leakage current protection switch must be equipped, which is of enough capacity and of both magnetic and thermal tripping functions in case of the short circuit and overload.

Table 3

Models	Power Supply	Capacity of the Air Switch	Recommended Cord (pieces×sectional area)
CM2H-1644A23	220-240V~,50Hz	16A	3×1.5mm <sup>2</sup>
CM3H-2228A23	220-240V~,50Hz	25A	3×2.5mm <sup>2</sup>

**Notes:**

1. The specifications of the breaker and power cable listed in the table above are determined based on the maximum power (maximum amps) of the unit.
2. The specifications of the power cable listed in the table above are applied to the conduit-guarded multi-wire copper cable (like, YJV copper cable, consisting of PE insulated wires and a PVC cable jacket) used at 40°C and resistible to 90°C (see IEC 60364-5-562). If the working condition changes, they should be modified according to the related national standard.
3. The specifications of the breaker listed in the table above are applied to the breaker with the working temperature at 40°C. If the working condition changes, they should be modified according to the related national standard.

**• Earthing Requirements**

1. The air conditioner is classified into the class I appliances, so its earthing must be reliable.
2. The yellow-green line of the air conditioner is the earth line and cannot be used for other purpose, cut off or fixed by the tapping screw, otherwise it would cause the hazard of the electric shock.
3. The reliable earth terminal should be provided and the earth wire cannot be connected to any of the following places.
  - (1) Running water pipe
  - (2) Coal gas pipe
  - (3) Sewage pipe
  - (4) Other places where the professional personnel think unreliable.

**• Noise precautions**

1. The air conditioning unit should be installed where ventilation is in good condition, otherwise the working capability of the unit would be reduced or working noise would be increased.
2. The air conditioning unit should be installed on the base frame which is stable and secure uncouth to withstand the weight of the unit, otherwise it would incur vibration and noise.
3. During the installation, a consideration should be taken that the produced hot air or noise should not affect neighbors or surroundings.
4. Do not stack obstacles near the air outlet of the outdoor unit, otherwise it would reduce the working capability of the unit or increase the working noise.
5. In the event of the occurrence of abnormal noise, please contact the sales agent as soon as possible.
6. Accessories for installation

Refer to the packing list for the accessories of the indoor and outdoor units respectively.

**Installation of the Outdoor Unit****• Precautions for the installation of the outdoor unit**

The following rules should be followed when the installation location is being considered so as to let the unit run well enough.

1. The discharged air from the outdoor unit won't return back and enough space should be left for maintenance around the unit.
2. The installation location should be in good condition so that the unit is able to take in and discharge enough air. Besides, make sure there is no obstacle at the air inlet/outlet of the unit. If there is, remove it.
3. The unit must be installed where it is secure enough to support the weight of the unit and capable of reducing to some extent noise and vibration to make sure they do not bother your neighbors.
4. The designated lifting hole must be used for lifting the unit and protect the unit carefully during lifting to prevent damaging the metal sheet which would result in rusting in future.
5. The unit should be installed where there is as little as direct sunlight.
6. The unit must be installed where the rain water and defrosting water can be drained.
7. The unit must be installed where the unit won't be covered by the snow and won't be affected by rubbish and oil fog.
8. Rubber or spring shock absorbers should be used during the installation of the outdoor unit to meet the noise and vibration requirements.
9. The installation dimensions should meet the requirement covered in this manual and the outdoor unit must be fixed securely.
10. The installation should be carried out by the professionally skilled personnel.

● **Installation of the Outdoor Unit**

1. During the transportation of the outdoor unit, two lifting ropes long enough must be used in four directions and the separation included angle must be less than 40° prevent the center of unit deviating.
2. During the installation, M10 screws should be used to fix the support leg and base frame of the unit.
3. The unit should be installed on a concrete base frame with a height of 10cm.
4. The installation space of the unit should be as required in Fig.1.

Installation Space Requirements of the Outdoor Unit:

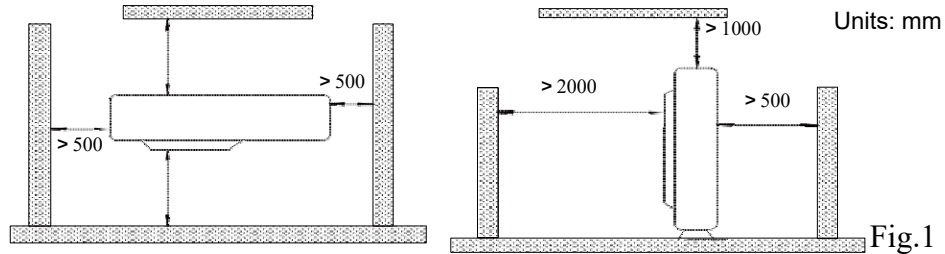


Fig.1

**Connection between Indoor and Outdoor Units**

● **Energy level and Capacity Code of the Indoor and Outdoor Units**

Table 4

	Energy Level	Capacity Code
Indoor Unit	09	26
	12	35
	18	52
Outdoor Unit	16	47
	22	64

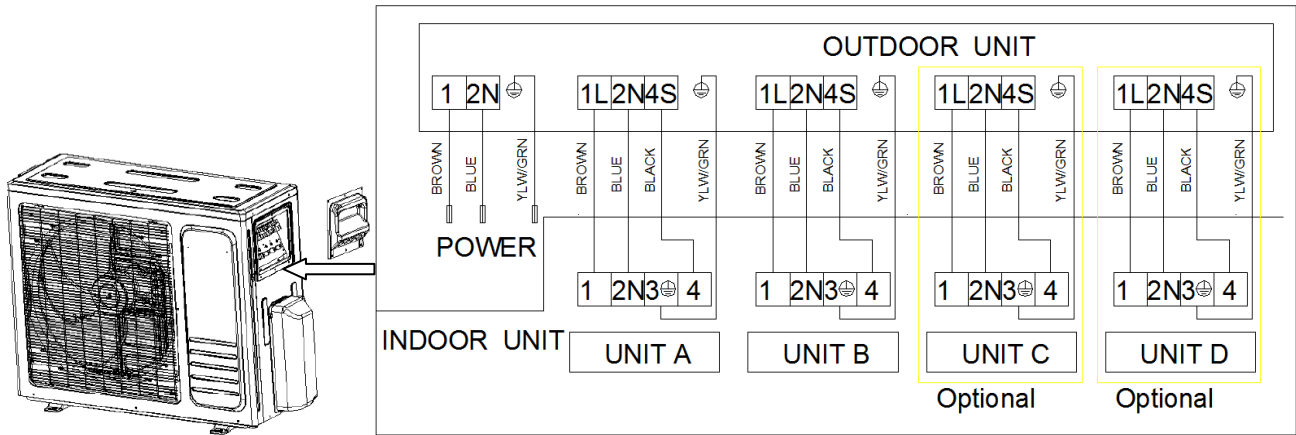
1. The outdoor unit with energy level 16 can drive up to two sets of indoor units, the outdoor unit 22 can drive up to three.
2. The sum of the capacity codes of the indoor units should be among 50%-150% of that of the outdoor unit.

● **Wiring of the Power Cord**



A breaker must be installed, capable of cutting off the power supply for the whole system.

1. Remove the handle(front board) of the outdoor.
2. Remove the wire clip; connect the power connection wire and signal control wire (only for cooling and heating unit) to the wiring terminal according to the color,fix them with screws.
3. Fix the power connection wire and signal control wire with wire clip (only for cooling and heating unit).
4. Reinstall the handle(front board).



• Allowable Length and Height Fall of the Refrigerant Pipe

Table 5

		Allowable Length		Refrigerant Pipe	
		16K	22K	16K	22K
Total Length(m)		45	65	L1+L2	L1+L2+L3
Max. Length for Single Unit(m)		25	25	LX	
Max. installation altitude	Outdoor unit and indoor unit	10	10	H1	
	Indoor unit and indoor unit	5	5	H2	

Table 6 Dimension of the Refrigerant Pipe of the Indoor Unit

Capacity Level of the Indoor Unit	Gas Pipe (mm)	Liquid pipe (mm)
09、12	Φ9.52	Φ6.35
18	Φ12.7	Φ6.35

● **Piping between the Indoor and Outdoor units**

1. Refer to Table 7 for the moments of torque for tightening screws.
2. Let the flare end of the copper pipe point at the screw and then tighten the screw by hand.
3. After that, tighten the screw by the torque wrench unit it clatters (as shown in Fig.3).
4. The bending degree of the pipe cannot be too small, otherwise it will crack. And please use a pipe tube bender to bend the pipe.
5. Wrap the exposed refrigerant pipe and the joints by sponge and then tighten them with the plastic tape.

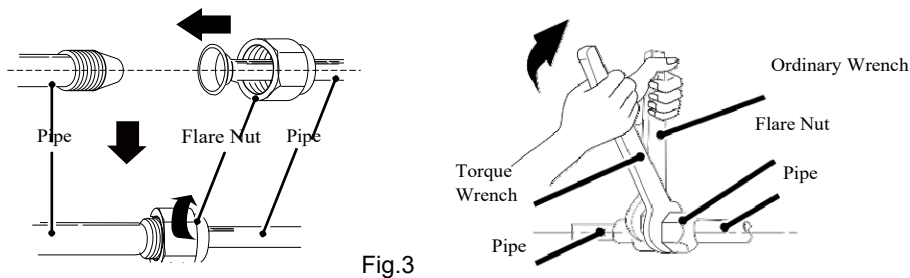


Fig.3

Table 7 Moments of Torque for Tightening Screws

Diameter (mm)	Wall Thickness (mm)	Moment of Torque (N·m)
Φ6.35	≥0.5	15-30
Φ9.52	≥0.71	30-40
Φ12.7	≥1	45-50
Φ15.9	≥1	60-65

**CAUTION!**

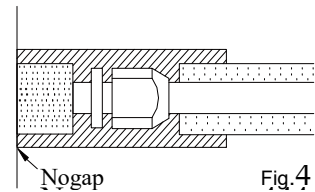
1. During the connection of the indoor unit and the refrigerant pipe, never pull any joints of the indoor unit by force, otherwise the capillary pipe or other pipe may crack, which then would result in leakage.
2. The refrigerant pipe should be supported by brackets, that is, don't let the unit withstand the weight of it.

**CAUTION!**

For the MULTI-S inverter air conditioner unit, each pipe should be labeled to tell which system it belongs to avoid mistaken inaccurate piping.

● **Installation of the Protection Layer of the Refrigerant Pipe**

1. The refrigerant pipe should be insulated by the insulating material and plastic tape in order to prevent condensation and water leakage.
2. The joints of the indoor unit should be wrapped with the insulating material and no gap is allowed on the joint of the indoor unit, as shown in Fig.4.



**CAUTION!**

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

● **Wrap the Pipe with Tape**

1. Bundle the refrigerant pipe and electric wire together with tape, and separate them from the drain pipe to prevent the condensate water overflowing.
2. Wrap the pipe from the bottom of the outdoor unit to the top of the pipe where it enters the wall. During the wrapping, the later circle should cover half the former one.
3. Fix the wrapped pipe on the wall with clamps.

**CAUTION!**

1. Do not wrap the pipe too tightly, otherwise the insulation effect would be weakened. Additionally, make sure the drain hose is separated from the pipe.
2. After that, fill the hole on the wall with sealing material to prevent wind and rain coming into the room.

## Refrigerant Charging and Trial Running

### ● Refrigerant Charging

1. The refrigerant has been charged into the outdoor unit before shipment, while additional refrigerant still need be charged into the refrigerant pipe during the field installation.
2. Check if the liquid valve and the gas valve of the outdoor unit are closed fully.
3. As shown in the following figure (Fig.5), expel the gas inside the indoor unit and refrigerant pipe out by the vacuum pump.
4. When the compressor is not running, charge the R32 refrigerant into the refrigerant pipe from the liquid valve of the outdoor unit (do not do it from the gas valve).

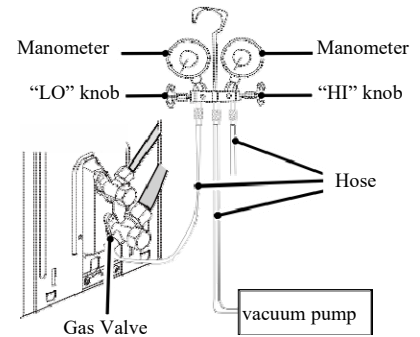


Fig.5

### ● Calculation of the Additional Refrigerant Charging

1. Refrigerant Charge in the Outdoor Unit before Shipment

Table 8

Model	Refrigerant Charge (kg)
CM2H-1644A23	1.10
CM3H-2228A23	1.42

#### Notes:

- (1). The refrigerant charge mentioned in the table above is not include those charged additionally in the indoor unit and the refrigerant pipe.
- (2). The amount of the additional refrigerant charge is dependent on the diameter and length of the liquid refrigerant pipe which is decided by the actual yield installation requirement.
- (3). Record the additional refrigerant charge for future maintenance.

2. Calculation of the Additional Refrigerant Charge

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

Table 9

Model	Total Liquid Pipe Length (a+b+c)
CM2H-1644A23	≤10m
CM3H-2228A23	≤15m

Additional refrigerant charge=  $\sum$  Extra Liquid Pipe Length $\times$ 12g/m (liquid pipe  $\Phi$ 6.35mm)

#### Notes:

If the total refrigerant pipe length is larger than that listed in the table above, the additional refrigerant for the extra length of the pipe needs to be charged as per 12g/m.

3. Example: CM3H-2228A23

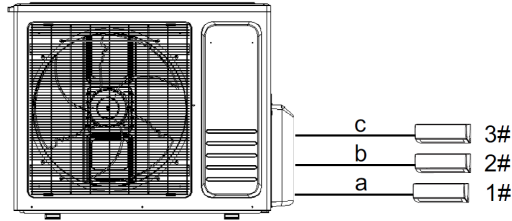


Fig.6

Table 10 Indoor Unit

Serial No.	Model
Indoor Unit 1	CMSH-12QB
Indoor Unit 2	CMSH-12QB
Indoor Unit 3	CMSH-12QB

Table 11 Liquid Refrigerant Pipe

Serial No.	a	b	c
Diameter	Φ6.35	Φ6.35	Φ6.35
Length	20	15	15

The total length of each liquid refrigerant pipe is:  $a+b+c=20+15+15=50\text{m}$   
 Thus, the minimum additional refrigerant charge= $(50-15)\times 0.012=0.42\text{kg}$   
 (Note: no additional refrigerant is needed for the liquid pipe within 15m)

4. Additional Refrigerant Charge Record

Table 12 Indoor Unit

No.	Indoor Unit Model	Additional Refrigerant Refrigerant (kg)
1		
2		
3		
.....		
N		
Total		

Table 13 Refrigerant Pipe

Diameter	Total Length (m)	Additional Refrigerant Refrigerant (kg)
Φ15.9		
Φ12.7		
Φ9.52		
Φ6.35		
Total		



● **Items to be checked after the installation**

Table 14

Items to be Checked	Possible Errors	Check Results
Has each part and component of the unit been installed securely?	The unit may fall off ,vibrate or generate noise.	
Has the gas leakage test been taken?	The cooling (heating) capacity may be poor.	
Is the thermal insulation sufficient?	Dews and water drops may be generated.	
Does the drainage go well?	Dews and water drops may be generated.	
Is the actual power voltage in line with the value marked on the nameplate?	The unit may break down or some components may be burnt out.	
Are the wiring and piping correct?	The unit may break down or some components may be burnt out.	
Has the unit been earthed reliably?	There may be a danger of electric shock.	
Does the wire meet the regulated requirement?	The unit may break down or the components may be burnt out.	
Is there any obstacle at the air inlet/outlet of the indoor/ outdoor unit?	The cooling (heating) capacity may be poor.	
Have the length of the refrigerant pipe and the refrigerant charge been recorded?	It may be hard to know the exact refrigerant charge.	

● **Trial Running**

1. Check before the Trial Running

- (1) Check if the appearance of the unit and the piping system are damaged during the transportation.
- (2) Check if the wiring terminals of the electronic component are secure.
- (3) Check if the rotation direction of the fan motor is right.
- (4) Check if all valves in the system are fully opened.

2. Trial Running

- (1) The trial running should be carried out by the professionally skilled personnel on the premise that all items above are in normal conditions.
- (2) Let the unit energized and switch the wired controller or the remoter controller to "ON".
- (3) The fan motor and compressor of the outdoor unit will run automatically in one minute.
- (4) If there is some unusual sound after the compressor is started, turn off the unit for an immediate check.

## **7.4 Test operation**

### **1. Preparation of test operation**

- The client approves the air conditioner.
- Specify the important notes for air conditioner to the client.

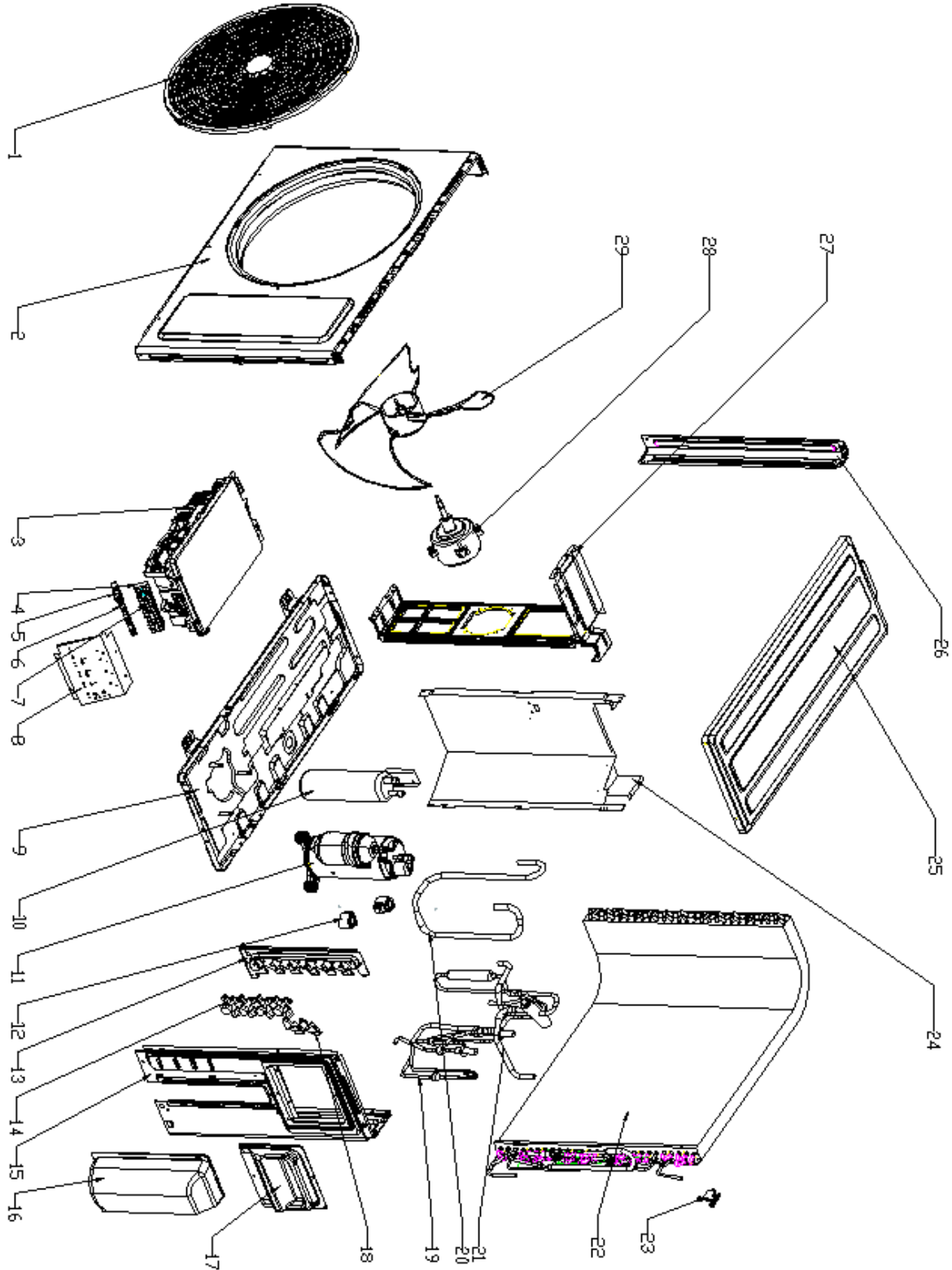
### **2. Method of test operation**

- Put through the power, press ON/OFF button on the remote controller to start operation.
- Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.
- If the ambient temperature is lower than 16°C , the air conditioner can't start cooling.

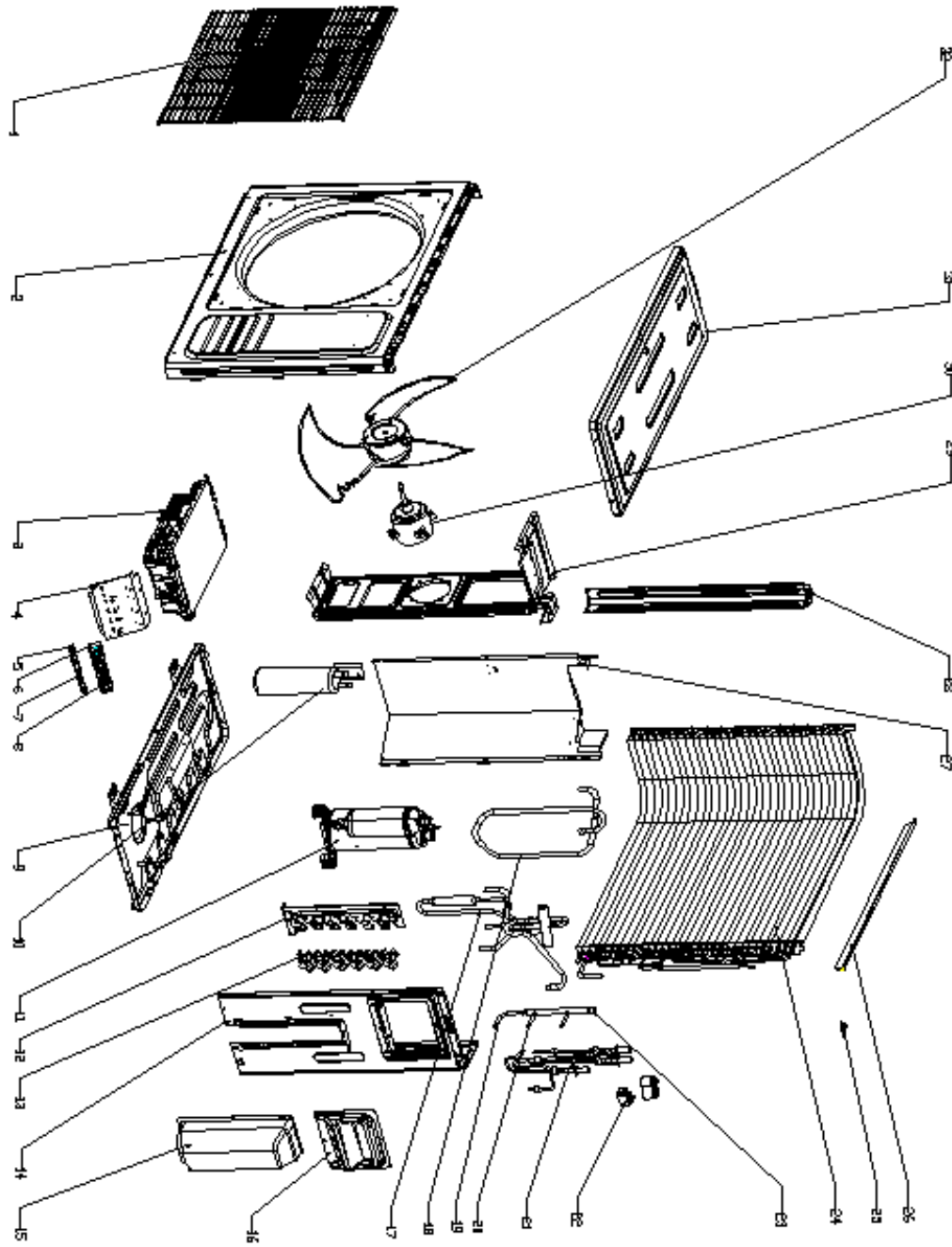
# 8. Exploded Views and Parts List

## 8.1 Outdoor Unit

Model: CM2H-1644A23



	Description	Part Code	Qty
		CM2H-1644A23	
		Product Code	
		CH1124916	
1	front net cover	810951003	1
2	front plate subassembly	810950499	1
3	outdoor electric control subassembly	811156815	1
4	Platen	811070398	1
5	Electrical inseallation board	88610069700	1
	Electrical inseallation board	810536134	1
6	clamp	8866700330K9	2
7	Platen	810950338	2
8	Terminal seat	811127702	1
9	bottom plate subassembly	811176784	1
10	gas-liquid separator	811132764	1
11	compressor	810974791	1
12	EEV coil	811064402	1
13	Valve mounting plate	811127703	1
14	cut-off valve 3/8	810638811	2
	cut-off valve 1/4	810638805	2
15	Lateral plate assembly	811127711	1
16	Valve cover	811127693	1
17	electric cover subassembly	811150205	1
18	Decorative cover	811127692	2
19	Electronic expansion valve assembly	811155562	1
20	Suction pipe	811109151	1
21	four-way valve subassembly	811134078	1
22	condenser subassembly	811146163	1
23	Sensor holder	811025553	1
24	partition board	811127695	1
25	Top cover assembly	810950495	1
26	Metal support	810950505	1
27	motor bracket subassembly	810950507	1
28	fan motor	811133315	1
29	propeller fan	810985432	1

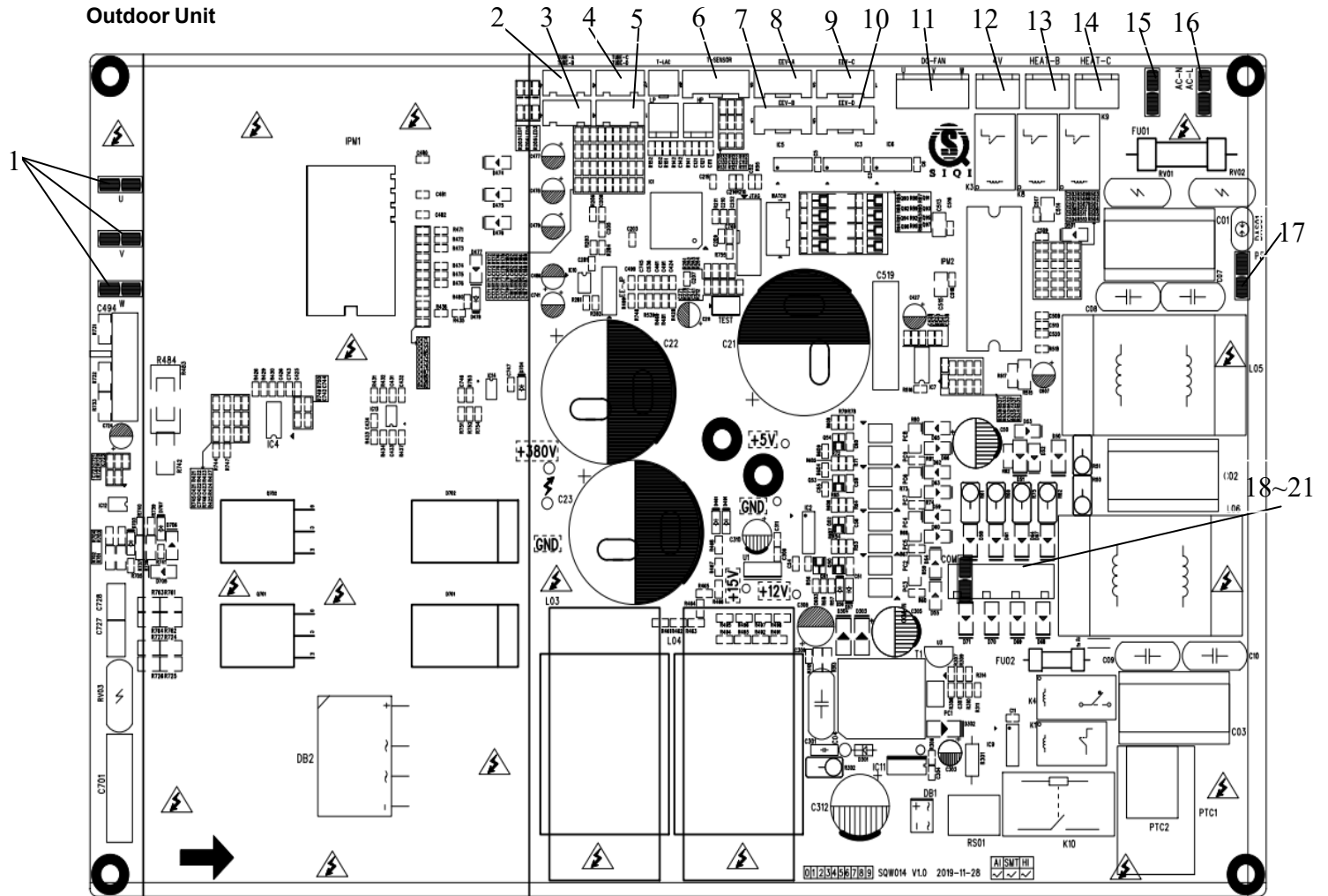


No.	Description	Part Code		Qty
		CM3H-2228A23		
		Product Code		
		CH1122411		
1	front net cover	810736969		1
2	front plate subassembly	810865538		1
3	outdoor electric control subassembly	811122023		1
4	Terminal seat	811127702		1
5	Electrical inseallation board	88610069700		1
	Electrical inseallation board	810536134		1
6	Platen	811070398		1
7	clamp	8866700330K9		3
8	Platen	810950338		3
9	bottom plate subassembly	811124733		1
10	gas-liquid separator	811132764		1
11	compressor	811012586		1
12	Valve mounting plate	811127703		1
13	cut-off valve 3/8	810638811		3
	cut-off valve 1/4	810638805		3
14	Lateral plate assembly	811127709		1
15	Valve cover	811127693		1
16	electric cover subassembly	811150205		1
17	four-way valve subassembly	811121253		1
18	Suction pipe	811121249		1
19	3/8 Connecting pipe	811121233		1
20	3/8 Connecting pipe	811121232		2
21	Electronic expansion valve assembly	811121262		1
22	EEV coil	811064402		3
23	5/8 Connecting pipe	811121234		1
24	condenser subassembly	811121259		1
25	Sensor holder	810082892		1
26	reinforcing plate	811075457		1
27	partition board	811127694		1
28	metal support	810706630		1
29	motor bracket	810721116		1
30	fan motor	811133320		1
31	top cover subassembly	810748611		1
32	propeller fan subassembly	810728882		1

# 9. Troubleshooting

## 9.1 PCB Printed Diagram

Outdoor Unit



No.	Silk screen name	Connector	Function note
1	U,V,W	Compressor power line interface	Connect compressor U(BLK) connect blue (WHT) connect yellow W(ORE) connect red
2	TUBE-A	Pipe&gas temp testing interface	Connect No.A system pipe&gas temp sensor
3	TUBE-B	Pipe&gas temp testing interface	Connect No.B system pipe&gas temp sensor
4	TUBE-C	Pipe&gas temp testing interface	Connect No.C system pipe&gas temp sensor
5	TUBE-D	Pipe&gas temp testing interface	Connect No.D system pipe&gas temp sensor
6	T-SENSOR	Temp sensor interface	Connect temp sensor
7	EEV-B	Electronic expansion valve	Connect No.B system electronic expansion
8	EEV-A	Electronic expansion valve	Connect No.A system electronic expansion
9	EEV-C	Electronic expansion valve	Connect No.C system electronic expansion
10	EEV-D	Electronic expansion valve	Connect No.D system electronic expansion
11	DC-FAN	Fan interface	Connect outdoor fan interface
12	4V	4-way-valve interface	Connect 4-way-valve
13	HEAT-B	Chassis electrical heater interface	Connect chassis electrical heater belt
14	HEAT-C	Compressor electrical heater interface	Connect compressor electrical heater belt
15	AC-N	Power naught wire	Connect power naught wire
16	AC-L	Power live wire	Connect power live wire
17	PE	Earth wire interface	Connect earth wire

18	COM-IN	Communication interface	No.A system communication interface black
19	COM-IN	Communication interface	No.B system communication interface gray
20	COM-IN	Communication interface	No.C system communication interface white
21	COM-IN	Communication interface	No.D system communication interface

Display code table		
Display Board		Error Item
F1	0	Failure of indoor temperature sensor
F3	1	Fault Sensor for Indoor Coil
F6	3	Communication Failure of Indoor and External Machine
E9	6	Failure wifi internal machinery
E1	7	Abnormal detection of indoor fan over zero
F0	9	Indoor fan failure
EE	10	Failure EE indoor units
EH	11	jumper cap fault
EP	14	Automatic keystroking failure
F4	17	Outdoor coil temperature sensor malfunction
F2	18	Outdoor environment temperature sensor malfunction
F5	19	Exhaust Temperature Sensor Fault
PH	21	Overpower protection
P5	22	Refrigerating internal disk protection
P9	23	IPM protection shutdown
F9	24	IPM module failure
P2	25	Outdoor AC current protection shutdown
P6	26	Overheat protection of refrigeration outer coil
P4		Overheat protection of inner coil unit
P1	27	Exhaust Temperature Overheat Protection Shutdown
E0	28	Compressor shell top failure/protection
E6	31	Conflict Failure of Indoor Machine Mode
L1	33	Drive bus under voltage fault
L2	34	Drive Bus Overload voltage Fault
E7	35	PFC protection function
E4	36	Abnormal start of compressor
E2	38	Fault of Outdoor DC Fan
EF	43	Outdoor ee failures
L3	44	Overflow of compressor
E3	45	Failure of compressor
L4	46	Phase current acquisition fault
EA	47	Capacitor charging fault
Eb	49	DC bus voltage drop protection
PU	50	High press protect
Pd	51	Low press protect
L8	56	overspeed
P7	61	Excessive ac voltage protection for outdoor units
P0	62	Compressor phase current protection shutdown
F8	63	Communication Failure of Main Board and Drive Board of Outdoor Unit
Ed	66	Liquid valve sensor fault
EC	67	Gas valve sensor fault
CL		Filter filth blockage aler



## 1. Communication failure of indoor unit

### 1. Overview of faults

In case of communication failure, the indoor unit displays "F6" communication failure, and if the communication returns to normal, the internal unit will be turned on.

### 2. Cause of failure

Communication fault "F6" is generated.

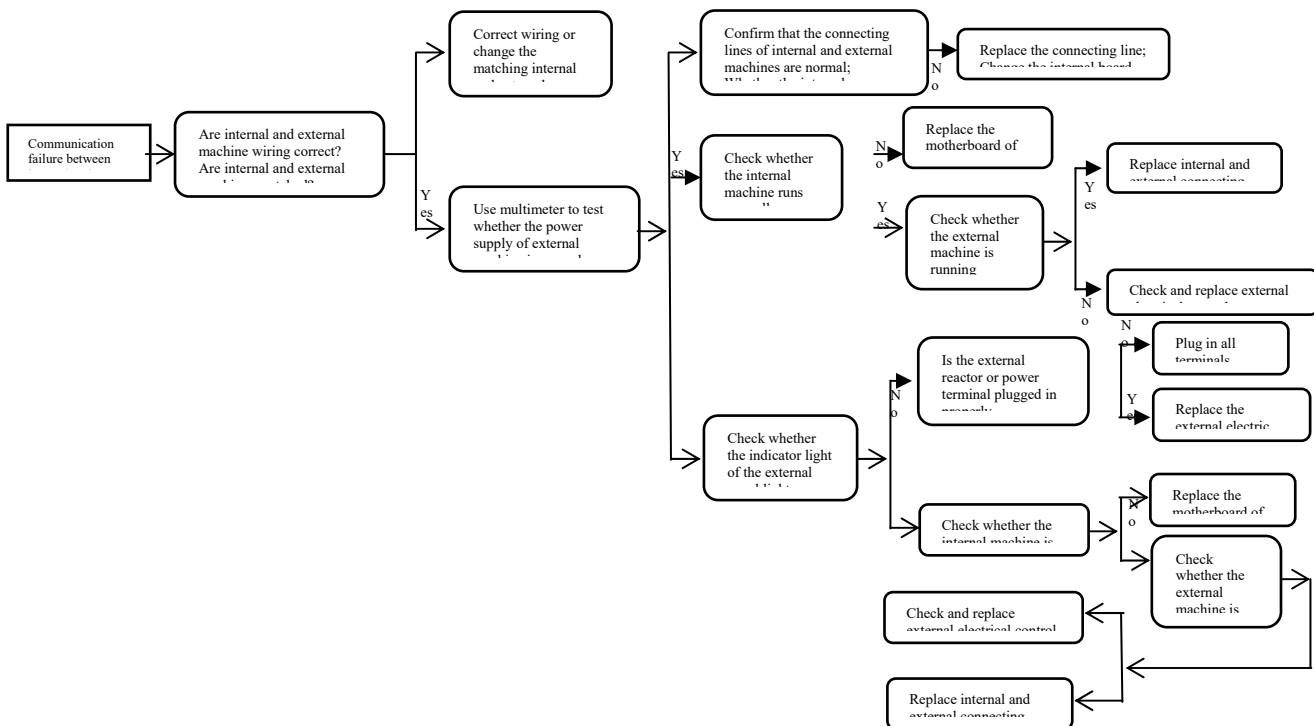
3. It is possible that the fault point machine can not receive the data sent by the external machine, or the machine can not receive the data sent by the external machine for 3 consecutive minutes during operation

SN.	Content	Maintenance measures
1	Are the internal and external machine link lines connected correctly, and are the internal and external machines matched?	Correct wiring or replacement of matching internal machine or external machine
2	There is no voltage input from the external machine after startup, or the input is incorrect?	Check the inner motherboard, link line
3	Disconnect the connecting line between internal and external machines (internal machine side), and test the communication with "frequency conversion tooling" to judge whether the internal machine is normal.	If the internal machine communication is OK, conduct the external machine test
4	Disconnect the connecting line between internal and external machine (external machine side), test the communication with "frequency conversion tooling", and judge whether the external machine is normal.	If the external machine communication is OK, check and replace the internal and external machine connecting wires
5	Check the connecting wires of internal and external machines (damaged, aged, misconnected, and the resistance between wires decreases below $m\ \omega$ )	Replace the connecting lines of internal and external machines. Generally, communication failures after a period of operation are caused by connecting lines.

Take off the connecting wires of internal and external machines, and test whether the impedance of each wire is correct by multimeter, generally the maximum is several  $\omega$  ;

Test whether the impedance between lines is correct, between l and s, between n and s, the impedance is above  $50M\ \Omega$  or infinite under normal circumstances, and the impedance is several  $m\ \omega$  or lower in case of failure.

### 4. Fault handling flow



Two: sensor and its related faults

1. Overview of faults

Short-circuit and open circuit of the temperature sensing bag, all of which have fault code display.

Indoor: environmental sensor failure, pipe temperature sensor failure.

Outdoor: the environmental sensor, outdoor pipe temperature sensor and exhaust temperature sensor are faulty.

Sensor resistance is abnormal

If the sensor resistance is abnormal or the sensor with wrong specification is replaced during maintenance, the fault code of the sensor is generally not displayed, but it may cause abnormal protection frequency limiting, abnormal protection shutdown and other related codes to be displayed. Faults caused by abnormal sensor resistance are invisible and complicated to deal with. Whether the sensor resistance is normal or not can be rechecked in case of abnormal phenomena.

2. Cause of failure

When the sensor is open or short-circuited, the detection circuit voltage is close to the power supply voltage or 0V. The power supply voltage of outdoor unit is 3.3V or 5V, and that of indoor unit is 5V.

3. Possible failure point

Poor contact and looseness of sensor terminal

Sensor circuit components loose, open circuit, virtual welding

Sensor resistance offset

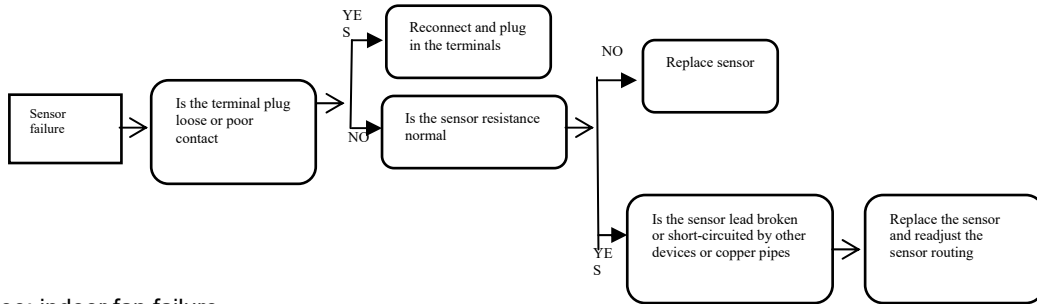
Sensor circuit resistance offset, capacitor leakage

The sensor specification is wrong, for example, 10K is used as 50K

Abnormal controller chip

The sensor bulb is short-circuited with the shell or copper pipe

4. Fault handling flow



Three: indoor fan failure

1. Overview of faults

"F0" is displayed indoors, and F0 fault is mainly to prevent abnormal rotating speed from turning into fault of electronic control and refrigerant circulation system.

2. Cause of failure

When the fan is turned on, the indoor main chip detects that the motor speed is lower than 300 rpm for 1 minute continuously (through the fan feedback circuit), and the controller reports the fault of the internal fan.

3. Possible failure point

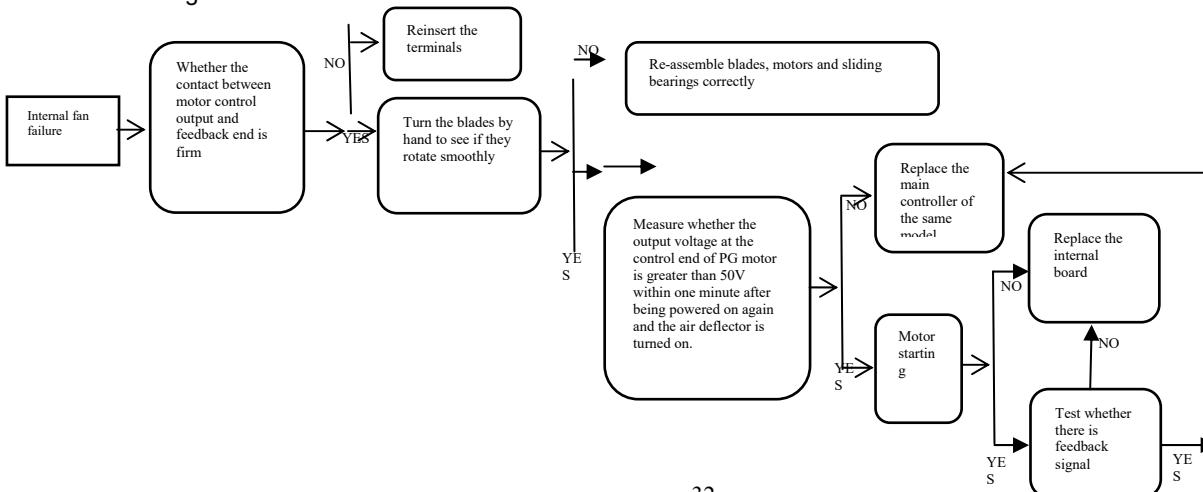
Whether the motor is installed correctly, whether the terminals are plugged firmly, whether the blades are stuck, whether the eccentric tuyere of the sliding bearing in the rubber ring is blocked and the wind speed is too slow.

Fan starting capacitor is damaged

The internal controller is abnormal

The motor body is stuck and damaged (peculiar smell, open or short circuit of windings are abnormal. When measuring the winding resistance, pay attention to distinguish whether the thermal protector acts due to the high temperature of the motor casing). Note: If there is an "FO" fault in case of uncertainty, please check the fan blades and motor equipment and add proper lubricating oil.

4. Fault handling flow



#### Four: compressor drive module protection failure

##### 1. Overview of faults

The indoor machine displays protection faults of compressor driving module, such as "E4", "F9", "P9" and other faults related to compressor operation and module driving.

##### 2. Cause of failure

Compressor phase current is too large, module driving voltage is too low, or IPM module temperature is too high.

##### 3. Possible failure point

Compressor wiring is reversed, and the driving software parameters of outdoor electronic control components do not match the compressor;

The power supply is unstable and the voltage changes suddenly;

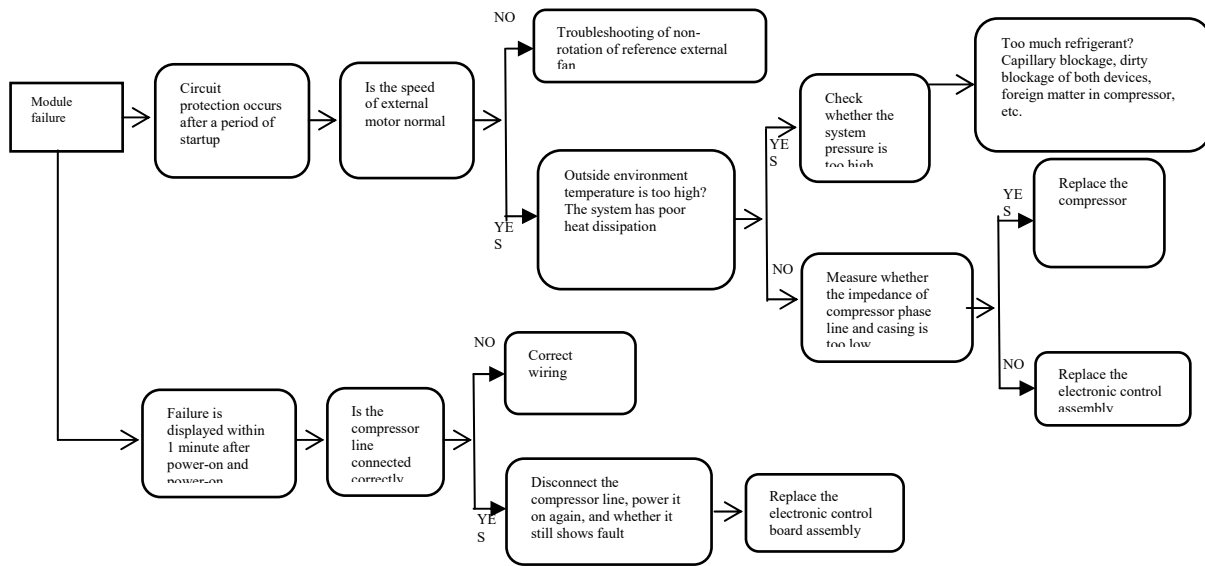
Poor contact between IPM module and radiator, and failure of thermal conductive silica gel;

Normal protection under high load (abnormal system, such as excessive refrigerant filling, pipeline blockage, dirty blockage of both devices, etc.);

External controller failure, such as compressor phase current sampling circuit failure, IPM module failure;

Compressor failure, such as short circuit of coil, demagnetization of motor, poor centering of upper and lower flanges, wear of parts, etc.

##### 4. Fault handling flow



#### V: Fault of DC fan of external machine

##### 1. Overview of faults

The indoor unit displays "E2", and the failure of the external DC fan is mainly to ensure the normal operation of the external fan and prevent the abnormal rotating speed from causing poor heat dissipation effect and overheating of the system.

##### 2. Cause of failure

The controller detects that the speed of the external DC fan is abnormal, which is caused by poor contact of fan wires, damage of fan or damage of electronic control components.

##### 3. Possible failure point

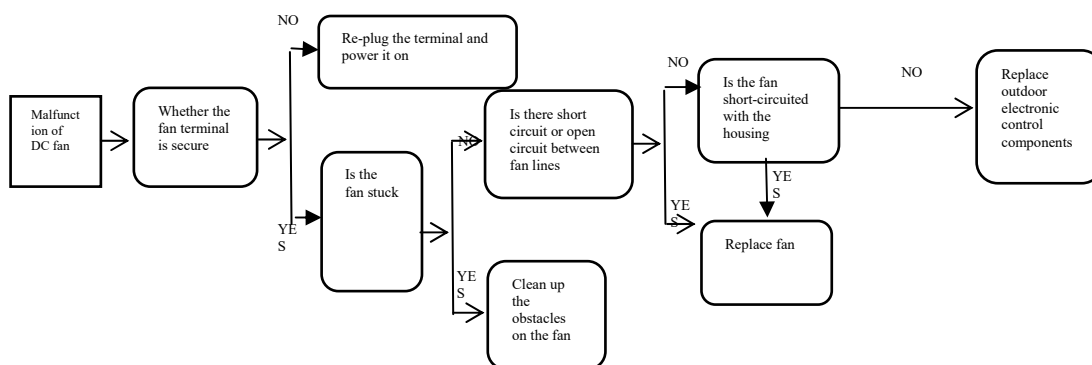
Unstable connection of DC motor;

The coil of DC fan is burnt out;

The fan blade is stuck by foreign matter;

Outdoor controller failure

##### 4. Fault handling flow



#### VI. Over-current protection fault

##### 1. Overview of faults

The indoor unit shows overcurrent protection fault, and the compressor stops during protection. Over-current protection mainly

protects electronic components, power modules and compressors, etc. to prevent excessive heat accumulation and burn out. This fault includes outdoor unit input current protection and compressor phase current protection.

2. Cause of failure

2.1 outdoor unit input current protection

Outdoor unit controller detects AC current of external unit. When input current exceeds a certain threshold value, the controller limits frequency, reduces frequency or stops compressor according to detected current, and if it reaches stop current value, it reports input current protection of outdoor unit.

2.2 compressor phase current protection

Outdoor unit controller detects compressor phase current for frequency limitation, frequency reduction and shutdown of compressor. When the compressor phase current exceeds the set value, it starts to reduce the frequency; when the frequency is reduced to the lowest, the current is still greater than the set value, so the compressor stops.

3. Possible failure point

In case of overcurrent protection, the possibility of input current protection is high in general, while the possibility of compressor phase current protection is relatively small. Therefore, after-sales maintenance should first confirm whether it is input current protection through the current clamp meter. The specific possible faults are as follows:

Outdoor unit input current protection:

Distortion or abrupt change of input voltage of power grid.

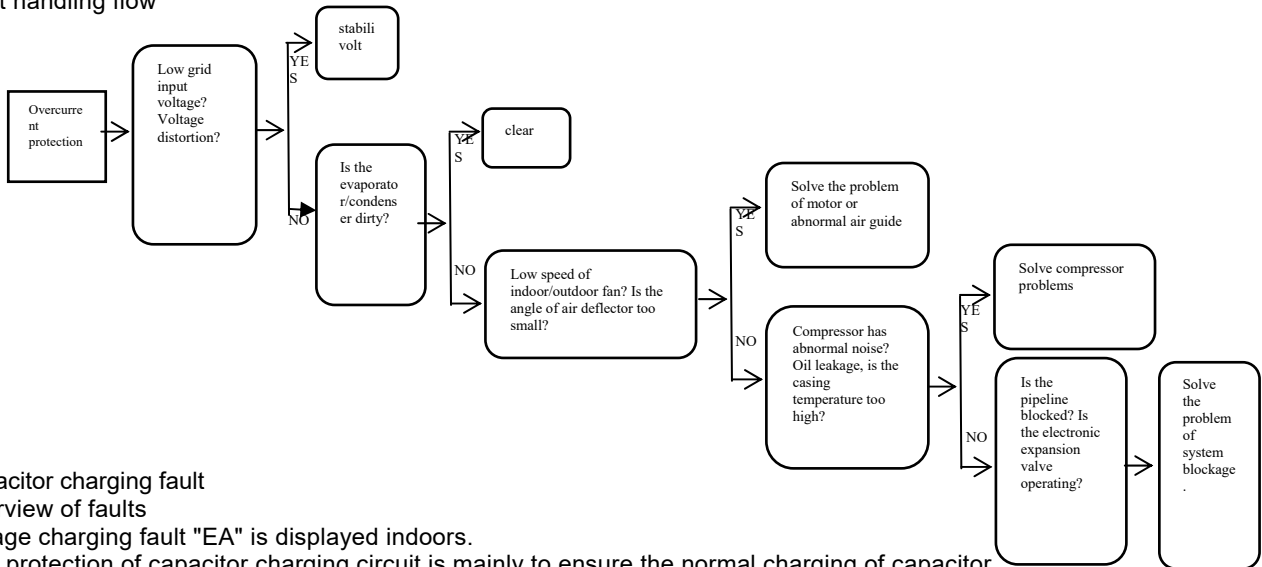
Abnormal system heat transfer:

Malfunction during refrigeration: the condenser of outdoor unit is dirty and blocked, the fan motor is faulty, and the ambient temperature is too high.

Trouble during heating: the indoor evaporator is dirty and blocked, the fan motor is faulty, and the internal air deflector is not turned on.

Compressor phase current protection (process reference module overcurrent protection)

4. Fault handling flow



Seven: capacitor charging fault

1. Overview of faults

The voltage charging fault "EA" is displayed indoors.

The fault protection of capacitor charging circuit is mainly to ensure the normal charging of capacitor.

2. Cause of failure

Outdoor unit controller detected abnormal voltage of large electrolytic capacitor.

3. Possible failure point

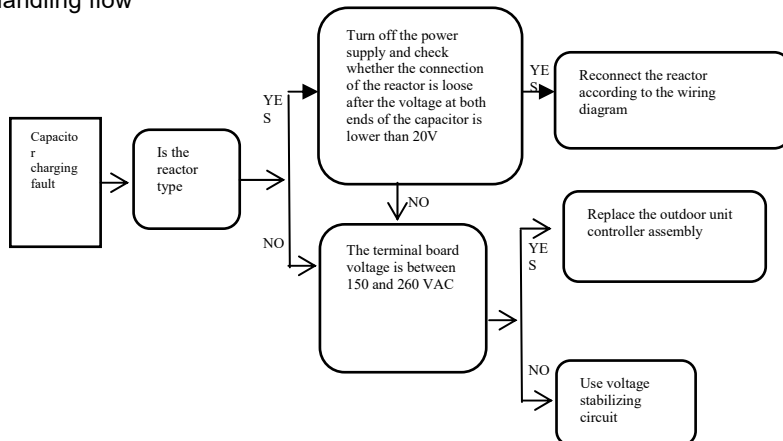
Loose reactor lines (models using reactors), such as L03 and L04 reactors;

The voltage input voltage is too low;

PFC circuit is abnormal, such as fast recovery diode (D701, D702) open circuit;

Sudden change of grid voltage (such as power supply with air conditioner or large load in power supply, the load switch will instantly cause grid fluctuation and sudden change of voltage)

4. Fault handling flow

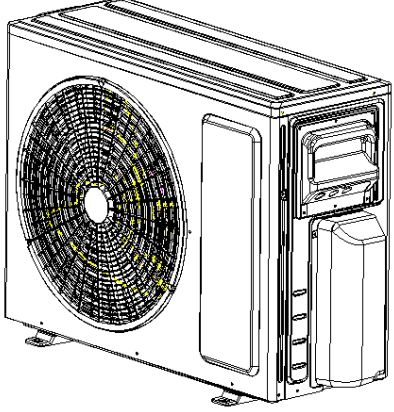
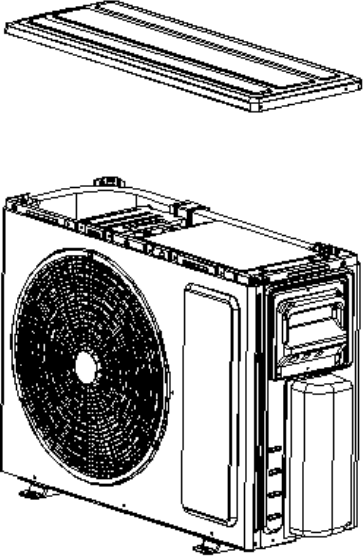
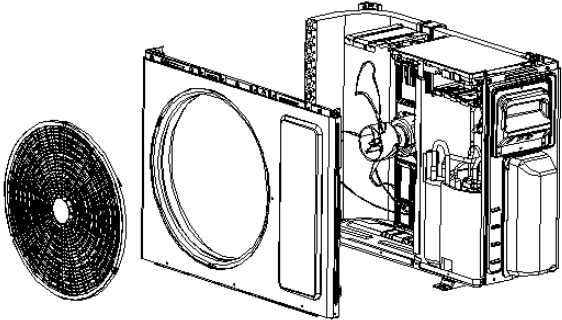


# 10. Removal Procedure

## 10.1 Removal Procedure of Outdoor Unit(16K)



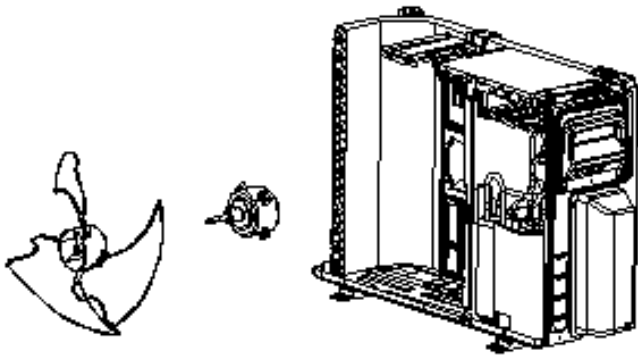
**Warning** Be sure to wait for a minimum of 10 minutes after turning off all power supplies before disassembly.

Procedure	Note
	<p><b>1. Before disassembly</b></p>
	<p><b>2. Remove top cover</b></p> <p>Remove connection screws connecting the top cover plate with the front panel and the right side plate, and then remove the top panel.</p>
	<p><b>3. Remove grille and panel</b></p> <p>A: Remove connection screws between the front grille and the front panel. Then remove the front grille.</p> <p>B: Remove connection screws connecting the front panel with the chassis and the motor support, and then remove the front panel.</p>

Procedure

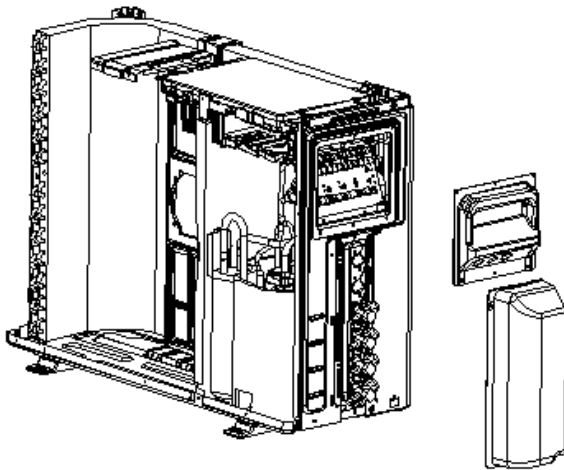
Note

**4. Remove axial flow blad and Motor**



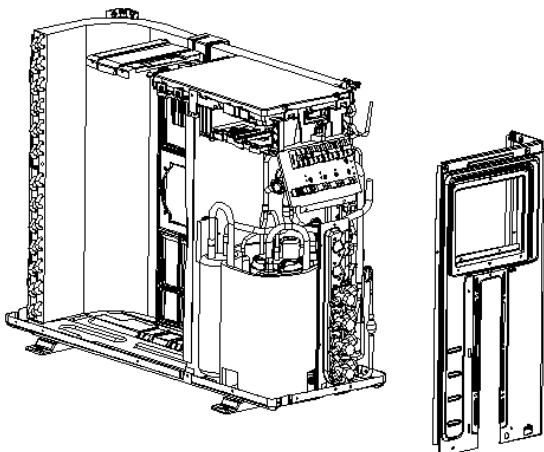
Remove the nut fixing the blade and then remove the axial flow blade.  
Remove tapping screws fixing the motor and disconnect the leading wire insert of the motor. Then remove the motor.

**5. Remove big handle valve cover**



Remove the connection screw fixing the big handle and then remove the handle.  
Use a screwdriver to fixed valve cover screwdrive, pull up to remove the valve cover.

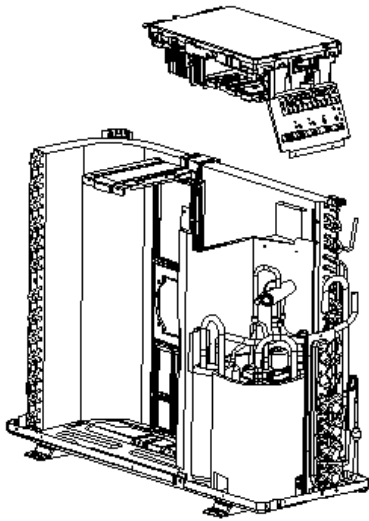
**6. Remove right side plate**



Remove connection screws connecting the right side plate with the valve support and the electric box.  
Then remove the right side plate.

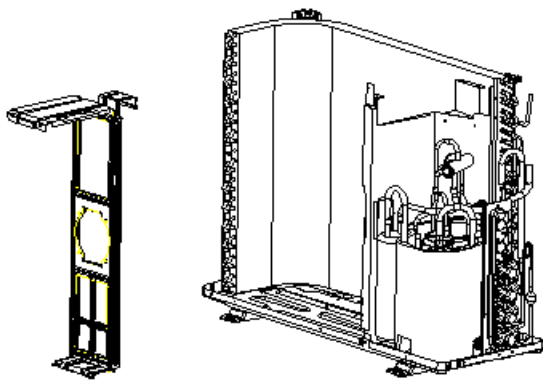
Procedure

Note



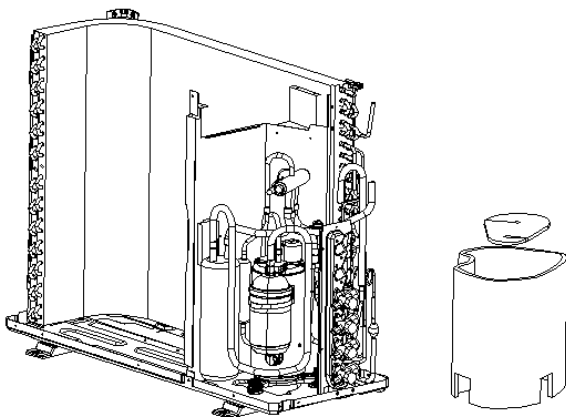
**7. Remove electric box assy**

Remove screws fixing the electric box assy; loosen the wire bundle and unplug the wiring terminals. Then lift the electric box to remove it.



**8. Remove motor support**

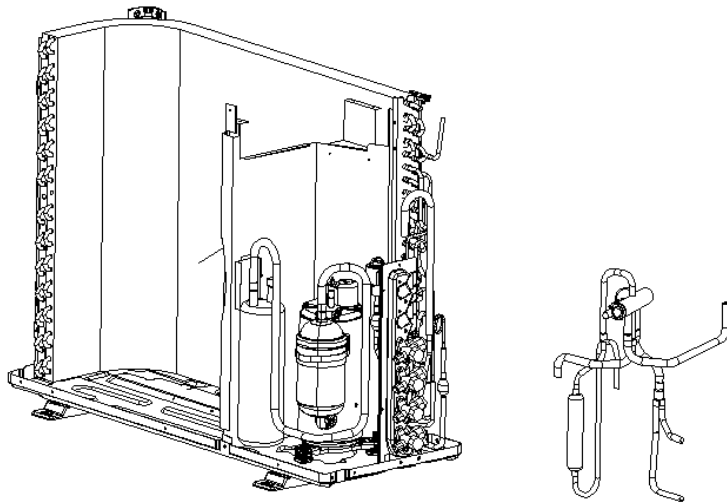
Unscrewed the chassis and the motor bracket fixed screw, motor bracket is desirable.



**9. Remove acoustic cotton**

Split the acoustic cotton lock, and take out 3 pcs slowly.  
NOTE: Do not damage the pipe.

## Procedure



## Note

### 10. Remove 4-way valve assy

Unsolder the spot weld of 4-way valve assy, compressor and condenser, and then remove the 4-way valve assy .

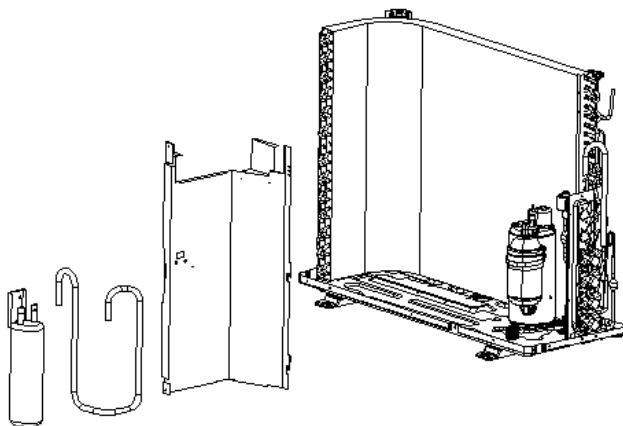
#### **Warning**

Discharge the refrigerant completely before unsoldering, when unsoldering, wrap the gas valve with a wet cloth completely to avoid damage to the valve caused by high temperature.

When unsoldering the spot weld, wrap the 4-way valve with wet cloth completely to avoid damaging the valve due to high temperature.

### 11. Gas liquid separator and diaphragm

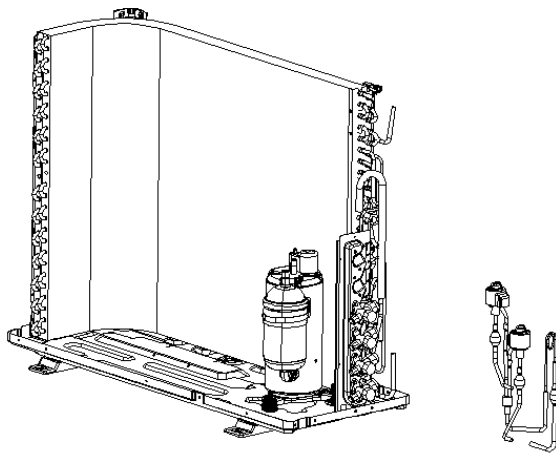
Open the suction of spot welding, remove the suction pipe. Use a screwdriver unscrewed the fixed screw of gas-liquid separator, the upward gas-liquid separator, remove the gas-liquid separator . Use screw knife clapboard and chassis have fixed screw drive, remove the partition .





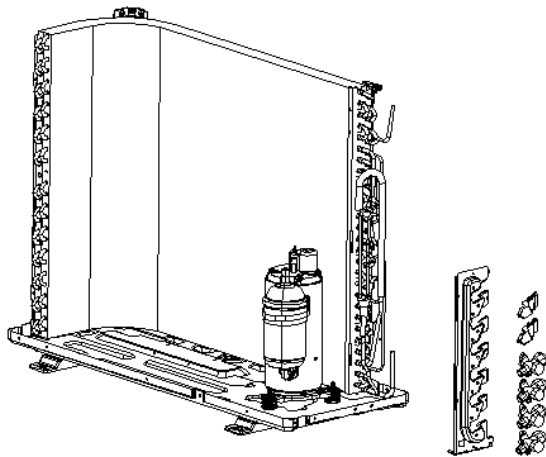
Procedure

Note



**12. Remove Expansion valve Assy**

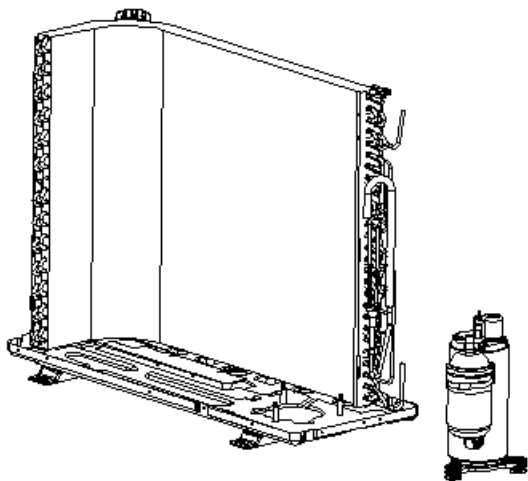
Unsolder the spot weld of expansion valve assy, liquid valve and condenser, and then remove the expansion valve assy .



**13. Remove the compressor**

A: Remove the 2 screws fixing the gas valve and unsolder the welding joint between the gas valve and the air-return pipe to remove the gas valve.

B: Remove the foot nuts on the compressor and then remove the compressor.



## 10.2 Removal Procedure of Outdoor Unit(22K)

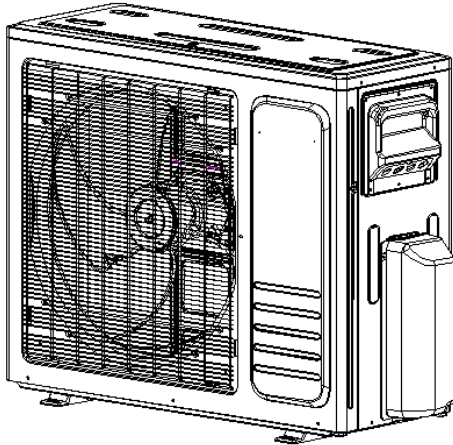


**Warning**

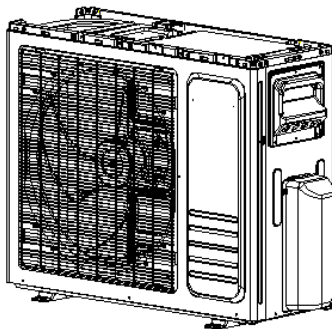
Be sure to wait for a minimum of 10 minutes after turning off all power supplies before disassembly.

### Procedure

### Note

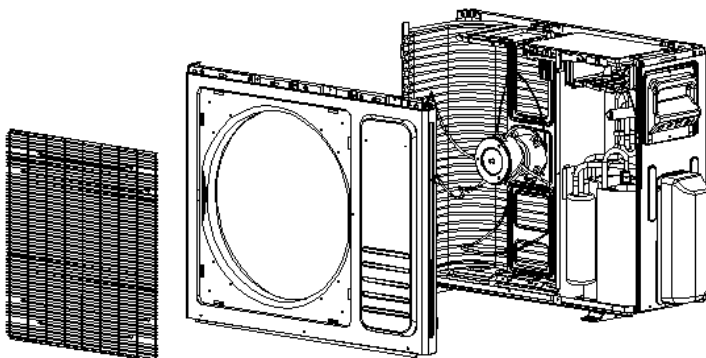


#### 1. Before disassembly



#### 2. Remove top cover

Remove connection screws connecting the top cover plate with the front panel and the right side plate, and then remove the top panel.



#### 3. Remove grille and panel

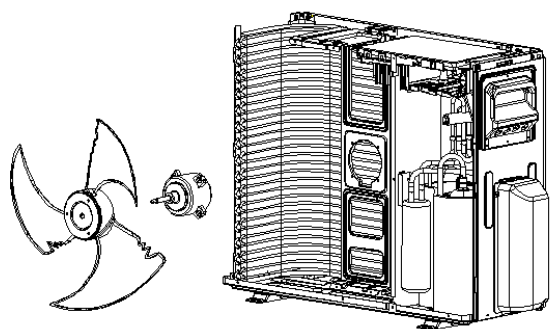
A: Remove connection screws between the front grille and the front panel. Then remove the front grille.

B: Remove connection screws connecting the front panel with the chassis and the motor support, and then remove the front panel.

Procedure

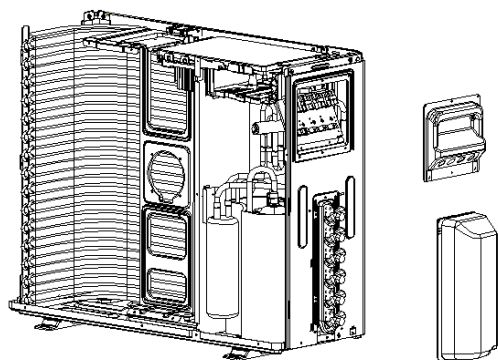
Note

**4. Remove axial flow blad and Motor**



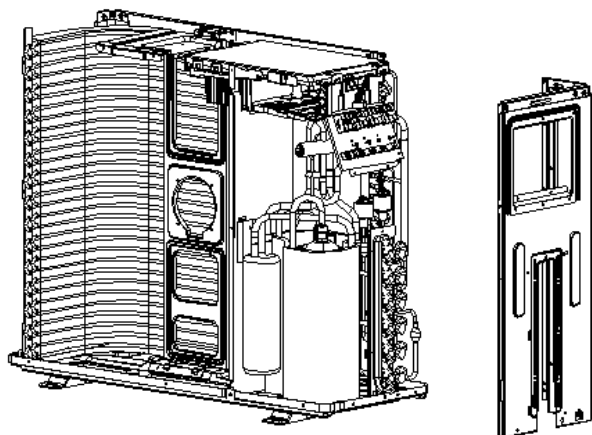
Remove the nut fixing the blade and then remove the axial flow blade.  
Remove tapping screws fixing the motor and disconnect the leading wire insert of the motor. Then remove the motor.

**5. Remove big handle valve cover**



Remove the connection screw fixing the big handle and then remove the handle.  
Use a screwdriver to fixed valve cover screwdrive, pull up to remove the valve cover.

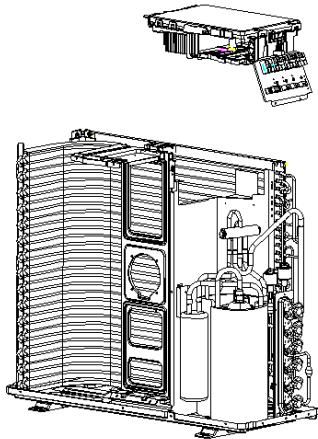
**6. Remove right side plate**



Remove connection screws connecting the right side plate with the valve support and the electric box.  
Then remove the right side plate.

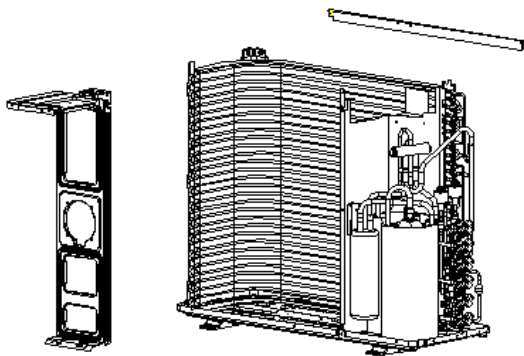
Procedure

Note



**7. Remove electric box assy**

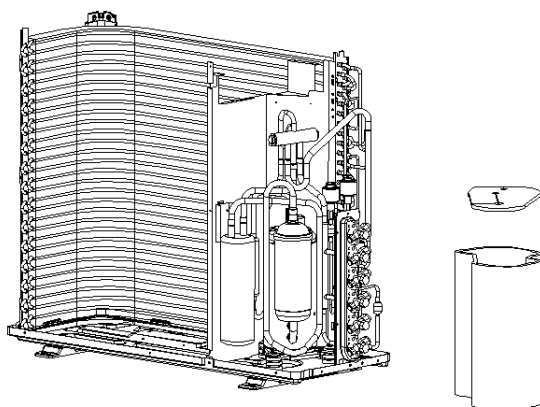
Remove screws fixing the electric box assy; loosen the wire bundle and unplug the wiring terminals. Then lift the electric box to remove it.



**8. Remove motor support and reinforcing plate**

Unscrewed the chassis and the motor bracket fixed screw, motor bracket is desirable.

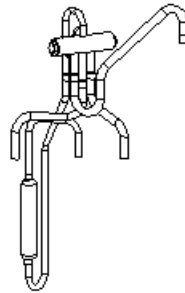
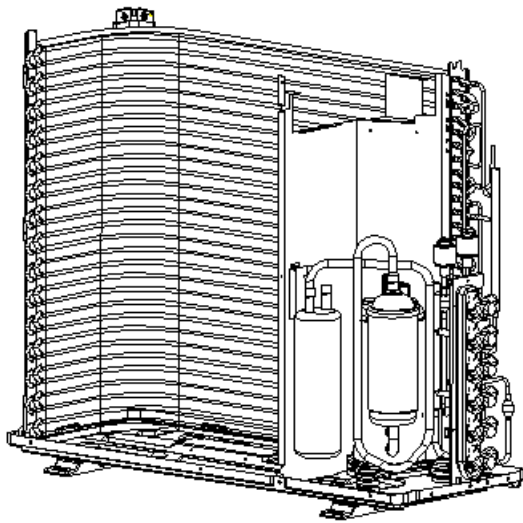
Remove the reinforcement plate by unscrewing the screws



**9. Remove acoustic cotton**

Split the acoustic cotton lock, and take out 3 pcs slowly.  
NOTE: Do not damage the pipe.

## Procedure



## Note

### 10. Remove 4-way valve assy

Unsolder the spot weld of 4-way valve assy, compressor and condenser, and then remove the 4-way valve assy .

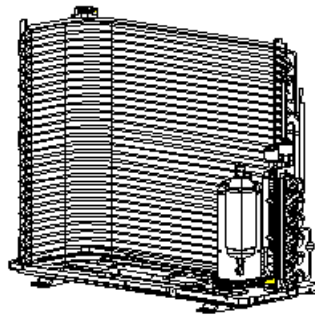
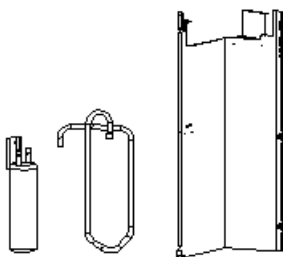
#### **Warning**

Discharge the refrigerant completely before unsoldering, when unsoldering, wrap the gas valve with a wet cloth completely to avoid damage to the valve caused by high temperature.

When unsoldering the spot weld, wrap the 4-way valve with wet cloth completely to avoid damaging the valve due to high temperature.

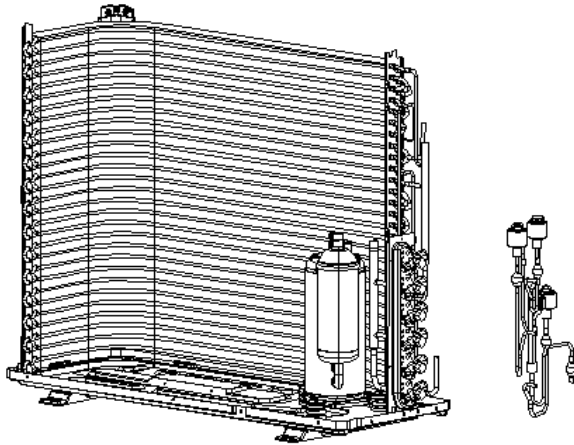
### 11. Gas liquid separator and diaphragm

Open the suction of spot welding, remove the suction pipe. Use a screwdriver unscrewed the fixed screw of gas-liquid separator, the upward gas-liquid separator, remove the gas-liquid separator . Use screw knife clapboard and chassis have fixed screw drive, remove the partition .



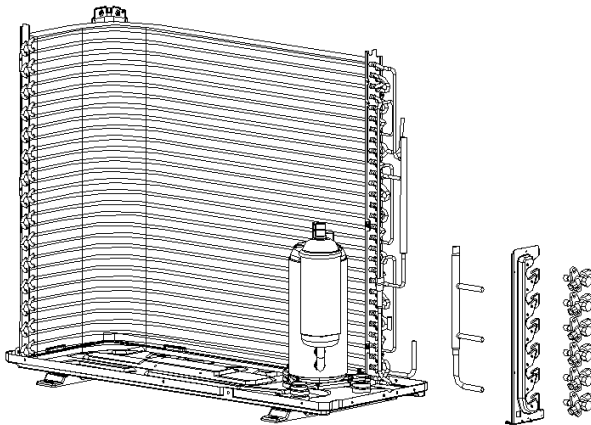
## Procedure

## Note



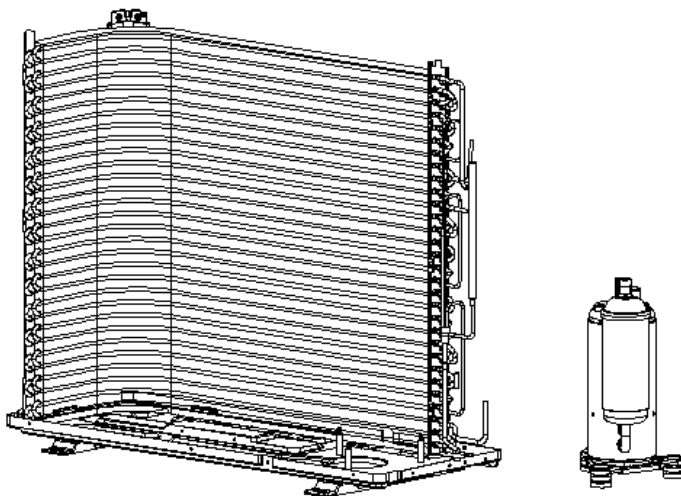
### 12. Remove Expansion valve Assy

Unsolder the spot weld of expansion valve assy, liquid valve and condenser, and then remove the expansion valve assy .



### 13. Split the valve and valve support

Screwdriver unscrew the valve and valve bracket set screw, remove the air valve subassembly and hydraulic valve. (open air valve subassembly of spot welding, take down the various valve) Screwdriver unscrew the valve bracket and the chassis of the fixed screw, take down the valve support.



### 14. Remove Compressor

Remove the foot nuts on the compressor and then remove the compressor.

