



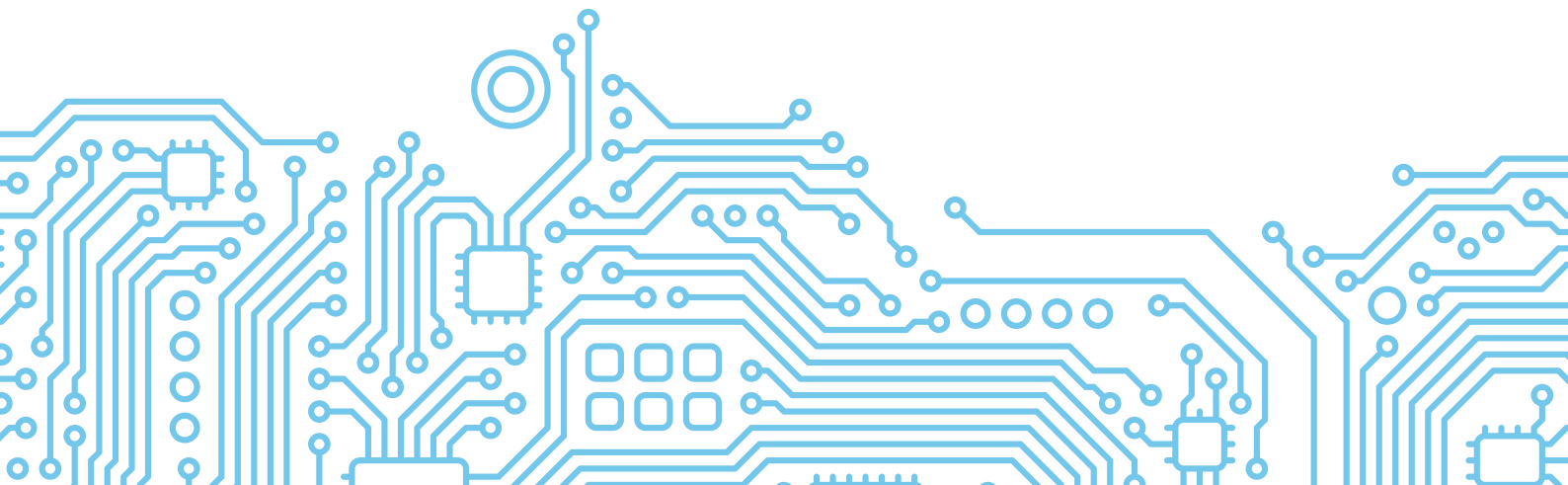
SM\_PA400\_R410A\_ONOFF\_S\_CE\_NA\_1810

## **FLOOR STANDING**

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# **R410A 50HZ ON-OFF CONTROL**

2018 SERVICE MANUAL





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# Safety Precautions


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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. 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 center.
- 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.

## 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 center.


 **CAUTION**

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

## 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.

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# Specifications

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## 1. Model Reference

Refer to the following table to determine the specific indoor and outdoor unit model number of your purchased equipment.

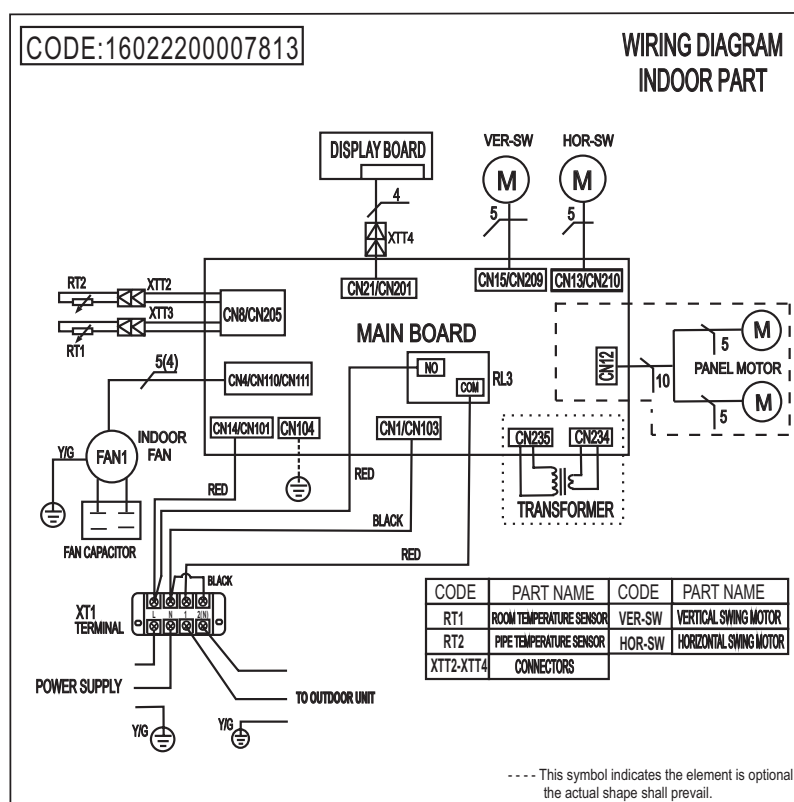
Indoor Unit Model	Outdoor Unit Model	Capacity (Btu/h)	Power Supply
MFPA-18CRN1-QB6	MOBA30U-18CN1-QB6	18k	1ϕ, 220~240V, 50Hz
MFTPA-24CRN1-QB8W	MOCA30U-24CN1-Q	24k	
MFPA400-24ARN1-Q	MOCA30U-24HN1-Q		

## 2. Electrical Wiring Diagrams

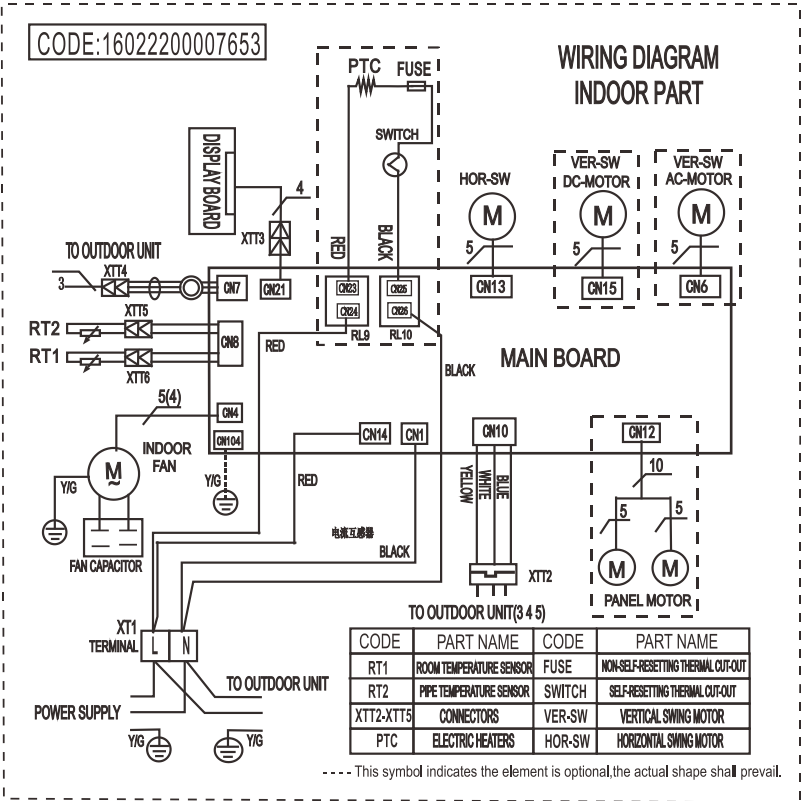
### 2.1 Indoor unit

Abbreviation	Paraphrase
Y/G	Yellow-Green Conductor
HOR-SW	Horizontal Fan
VER-SW	Vertical Fan
L	Live
N	Neutral
RT1	Indoor Room Temperature
RT2	Coil Temperature of Indoor Heat Exchanger
PTC	Electric Heaters
FUSE	On-self-resetting Thermal Cut-out
SWITCH	Self-resetting Thermal Cut-out

MFPA-18CRN1-QB6



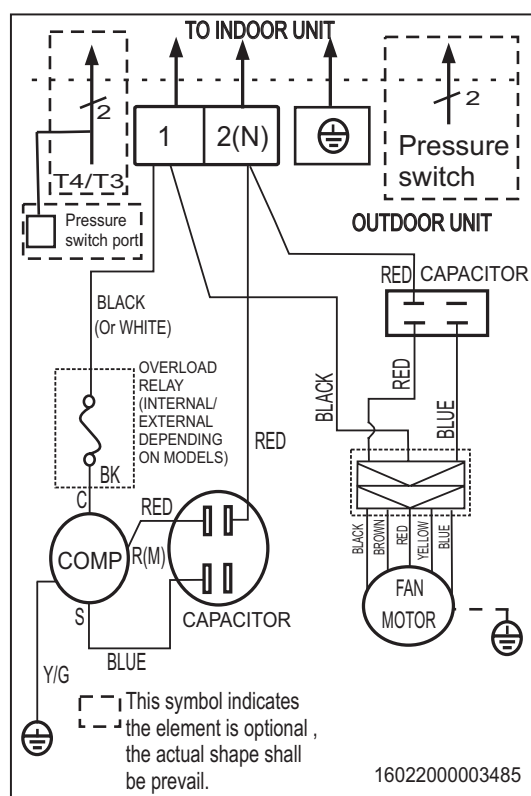
MFTP-24CRN1-QB8W



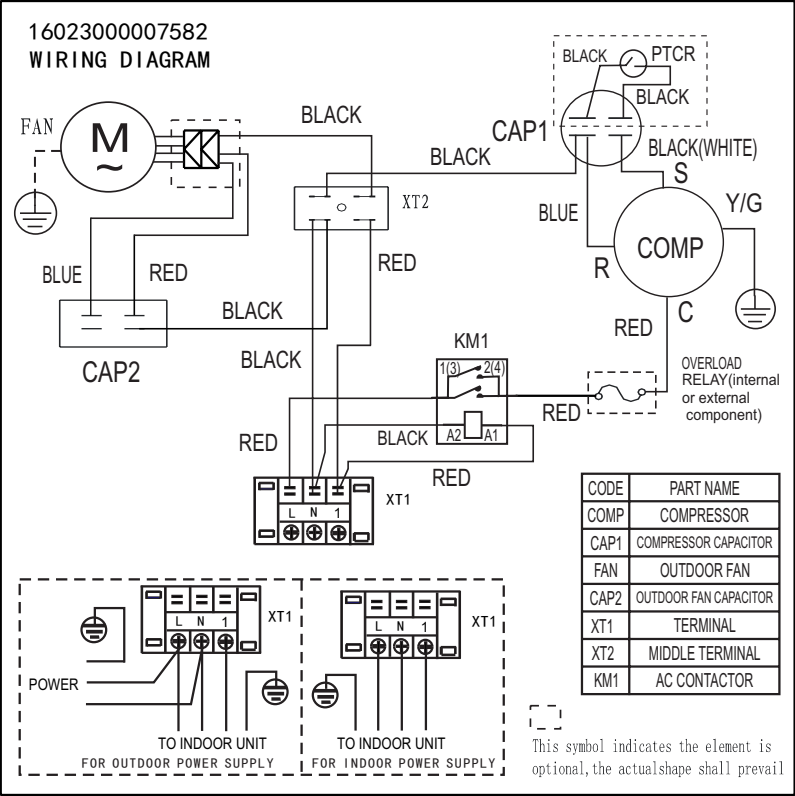
## 2.2 Outdoor Unit

Abbreviation	Paraphrase
CAP1	Compressor Capacitor
FAN2	Outdoor Fan Motor
CAP2	Outdoor Fan Capacitor
CT1	Current Inductor
COMP	Compressor
XT3	Terminal
XT7	Middle Terminal
K1	Temperature Protect Switch/Shorting Stub
VALVE	Reversing Valve
RT3	Coil Temperature of Condenser
KM1	AC Contactor
HEAT	Electric Heating String
XP1,XS1	Connectors

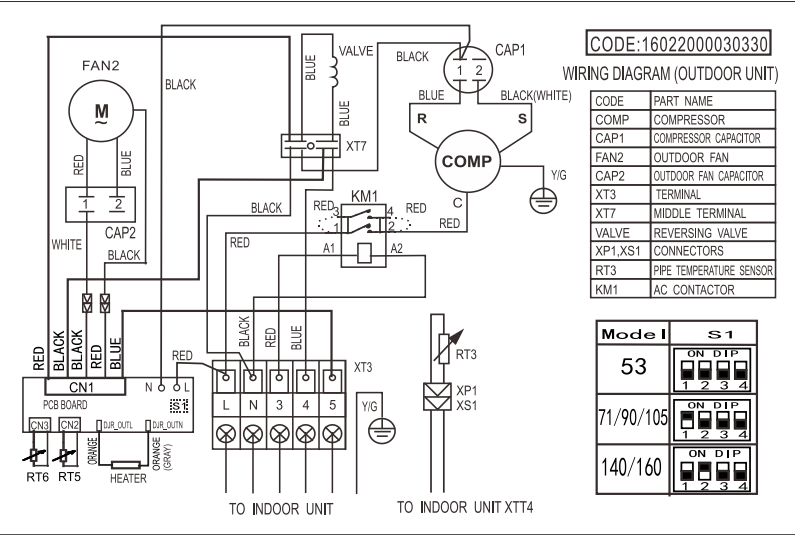
MOBA30U-18CN1-QB6



MOCA30U-24CN1-Q



MOCA30U-24HN1-Q





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# Product Features

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## 1. Operation Modes and Functions

### 1.1 Abbreviation

Unit element abbreviations

Abbreviation	Element
T1	Indoor room temperature
T2	Coil temperature of evaporator
T3	Coil temperature of condenser
T4	Outdoor ambient temperature

### 1.2 Safety Features

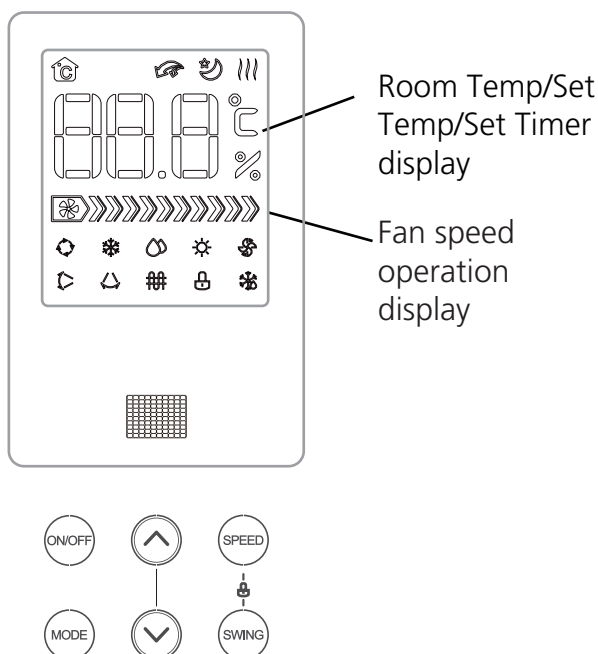
#### Compressor three-minute delay at restart

Compressor functions are delayed for up to 20 seconds upon the first startup of the unit, and are delayed for up to three minutes upon subsequent unit restarts.

#### Open Circuit/Disconnection Sensor Protection

### 1.3 Display Function

Unit display functions



- Auto operation
- Cooling operation
- Dry operation
- Heating operation
- Fan operation
- Vertical airflow (optional)
- Horizontal airflow
- Indoor room temperature
- Electric heating function
- Lock operation
- Defrost operation

### 1.4 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.
- Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 24°C

### 1.5 Cooling Mode

#### 1.5.1 Compressor Control

- When T1-Ts is lower than -1 °C, the compressor ceases operation.
- When T1-Ts is higher than 0 °C, the compressor continues operation.

#### 1.5.2 Indoor Fan Control

- In cooling mode, the indoor fan operates continuously. The fan speed can be set to high, medium, low, or auto.

#### 1.5.3 Outdoor Fan Control

Outdoor units just have one single fan speed. The operation of outdoor fan is consistent with the operation of compressor. Except the following situations:

- Condenser high temperature protection
- Current protection

### 1.5.4 Condenser Temperature Protection(For the units have T3 sensor)

When the condenser temperature exceeds a configured value for some time, the compressor and outdoor fan cease operation.

### 1.5.5 Evaporator Temperature Protection

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

## 1.6 Heating Mode(For heat pump models)

### 1.6.1 Compressor Control

- When  $T1 - T_s - \Delta T$  is higher than  $1^\circ\text{C}$ , the compressor ceases operation.
- When  $T1 - T_s - \Delta T$  is lower than  $0^\circ\text{C}$ , the compressor continues operation.

### 1.6.2 Indoor Fan Control

- When the compressor is on, the indoor fan can be set to high, (medium), low, or auto. And the anti-cold wind function has the priority.
- The indoor fan speed will adjust according to the value of  $T1 - T_s - \Delta T$ .

### 1.6.3 Outdoor Fan Control

Outdoor units just have one 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.

### 1.6.4 Defrosting mode

- The unit enters the defrosting mode according to the value of temperature difference T3 and the value range of temperature change of T3 as well as the compressor runtime
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will cease operation, defrost lamp of the indoor unit will be lighted "df" will be displayed
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - T3 rises above  $15^\circ\text{C}$ .
  - T3 maintained above  $8^\circ\text{C}$  for 80 seconds.
  - Unit runs for 10 minutes consecutively in defrosting mode

### 1.6.5 Evaporator Temperature Protection

When the evaporator temperature exceeds a preset protection value, the compressor and outdoor fan cease operation.

### 1.6.6 Electric Heater(for some models)

- If all following conditions are satisfied, electric heater is on:
  - T1 is lower than  $23^\circ\text{C}$ ;
  - T2 is lower than  $45^\circ\text{C}$ ;
  - $T_s + \Delta T - T1$  is higher than  $3^\circ\text{C}$ ;
  - Indoor fan is on;
  - Compressor is running for 5 seconds.
- If any one of the following conditions is satisfied, electric heater is off:
  - T1 is higher than  $T_s + \Delta T - T1$  or T1 is higher than  $25^\circ\text{C}$ ;
  - T2 is higher than  $54^\circ\text{C}$ ;
  - Indoor fan is off;
  - Compressor is off;
  - For 4-grade indoor fan, fan is running at low.
- When the electric heater ceases operation, the indoor fan will cease operation after a period of 10 seconds.

## 1.7 Auto Mode

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

$\Delta T$	Running mode
$\Delta T > 2^\circ\text{C}$	Cooling
$-3^\circ\text{C} \leq \Delta T \leq 2^\circ\text{C}$	Fan-only
$\Delta T < -3^\circ\text{C}$	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;
  - AC is in fan mode;
  - time on in auto mode;
  - the compressor doesn't start in 20 minutes when a running mode is set in auto.

## 1.8 Drying Mode

- Indoor fan speed is fixed at low and cannot be

changed. The louver angle is the same as in cooling mode.

- All protections are activated and operate the same as they do in cooling mode.

## 1.9 Timer Function

- The timing range is 24 hours.
- Timer On. The machine turns on automatically at the preset time.
- Timer Off. The machine turns off automatically at the preset time.
- Timer On/Off. The machine turns on automatically at the preset On Time, and then turns off automatically at the preset Off Time.
- Timer Off/On. The machine turns on automatically at the preset Off Time and then turns off automatically at the preset On Time.
- The timer does not change the unit operation mode. If the unit is off now, it does not start up immediately after the "timer off" function is set. When the setting time is reached, the timer LED switches is off and the unit running mode remains unchanged.
- The timer uses relative time, not clock time

## 1.10 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 (to not higher than 30 °C) every hour. After 2 hours, the temperature stops rising and the indoor fan is fixed to auto speed.
- When heating, the temperature decreases 1 °C (to not lower than 17 °C) every hour. After 2 hours, the temperature stops decreasing and the indoor fan is fixed at auto speed. Anti-cold wind function takes priority.
- Power off, changing mode by display button or setting fan speed, the unit exits this mode.

## 1.11 Refrigerant Leakage Detection

- With this new technology, the display area will show "EC" when the outdoor unit detects refrigerant leakage.
- When compressor is active, the value of the Coil temperature of evaporator T2 has no change or very little change.

## 1.12 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 and in the case of a sudden power failure, will restore those setting automatically within 3 minutes after power returns.
- 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

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# Maintenance and Disassembly

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## 1. Maintenance

### 1.1 First Time Installation Check

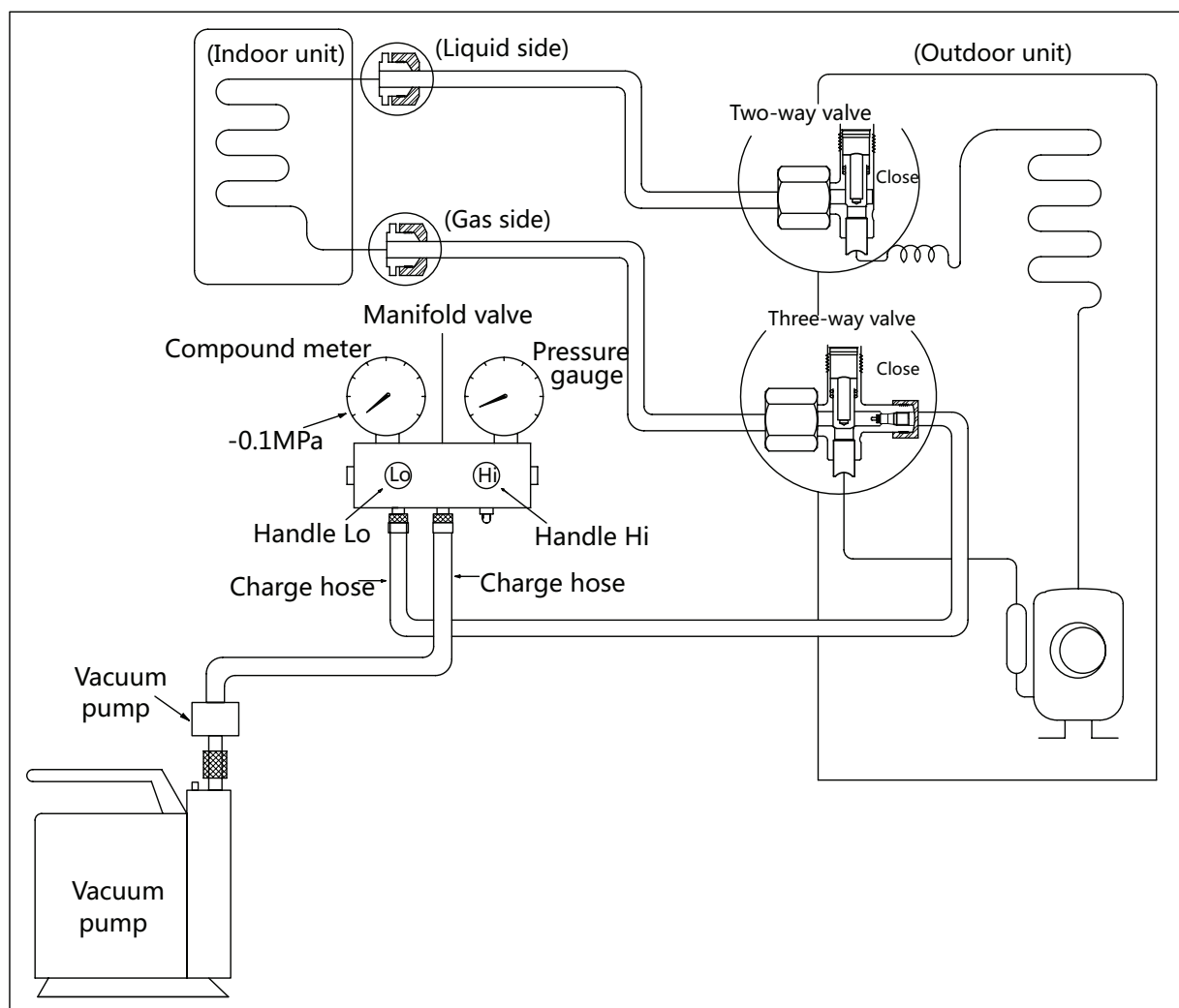
Air and moisture trapped in the refrigerant system affects the performance of the air conditioner by:

- 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.

#### Leak test (soap water method)

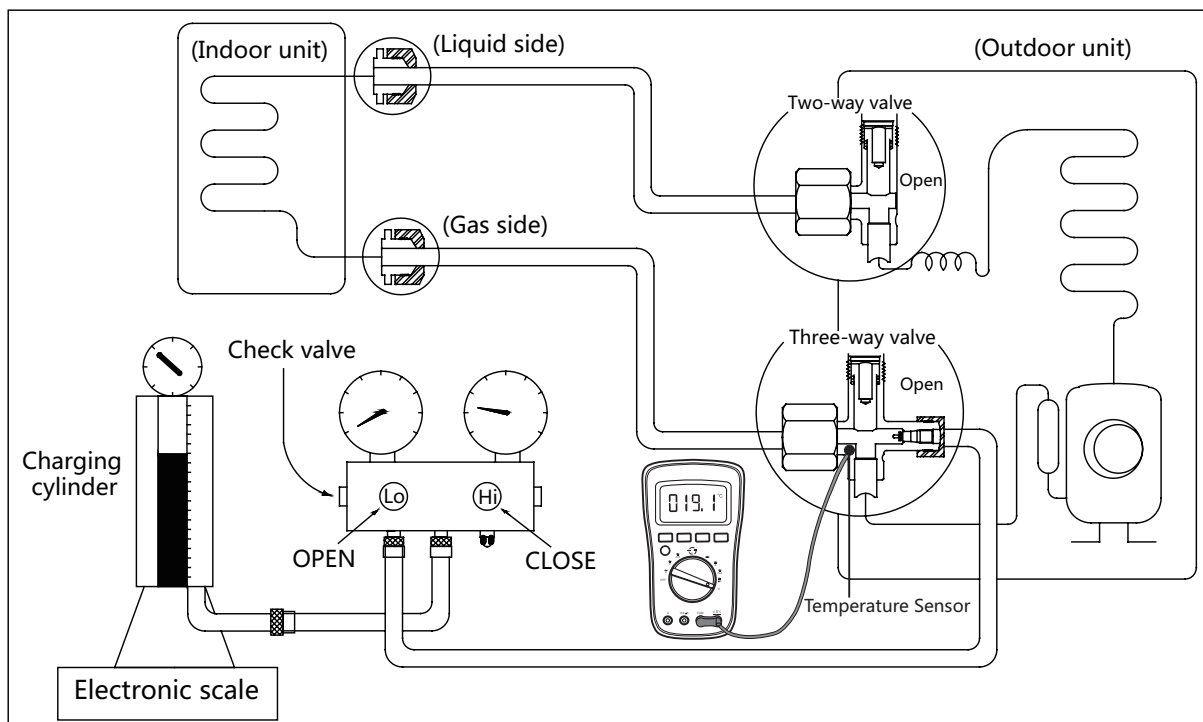
Use a soft brush to apply soapy water or a neutral liquid detergent onto the indoor unit connections and outdoor unit connections. If there is gas leakage, bubbles will form on the connection.



**Procedure:**

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.
  - b. If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then cease vacuum pump operations.
6. 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.

## 1.1 Refrigerant Recharge



Prior to recharging the refrigerant, confirm the additional amount of refrigerant required using the following table:

Models	Standard length	Max. elevation	Max. length	Additional refrigerant
18k	5m (16.4ft)	15m (49.2ft)	25m (82ft)	15g/m (0.16oz/ft)
24k	5m (16.4ft)	15m (49.2ft)	25m (82ft)	30g/m (0.32oz/ft)

### Procedure:

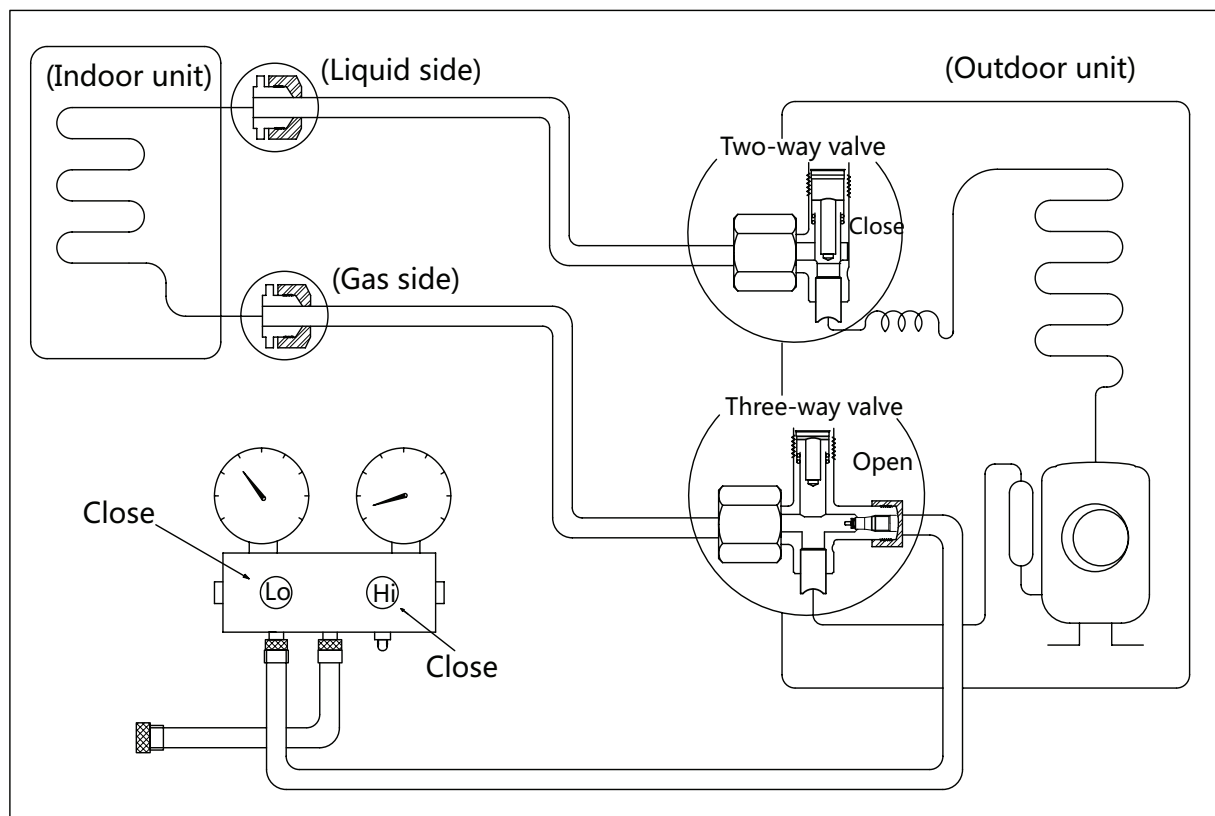
1. Close both 2- and 3-way valves.
2. Slightly connect the Handle Lo charge hose to the 3-way service port.
3. Connect the charge hose to the valve at the bottom of the cylinder.
4. If the refrigerant is R410A, invert the cylinder to ensure a complete liquid charge.
5. Open the valve at the bottom of 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.



## 1.13 Re-Installation

### 1.13.1 Indoor Unit

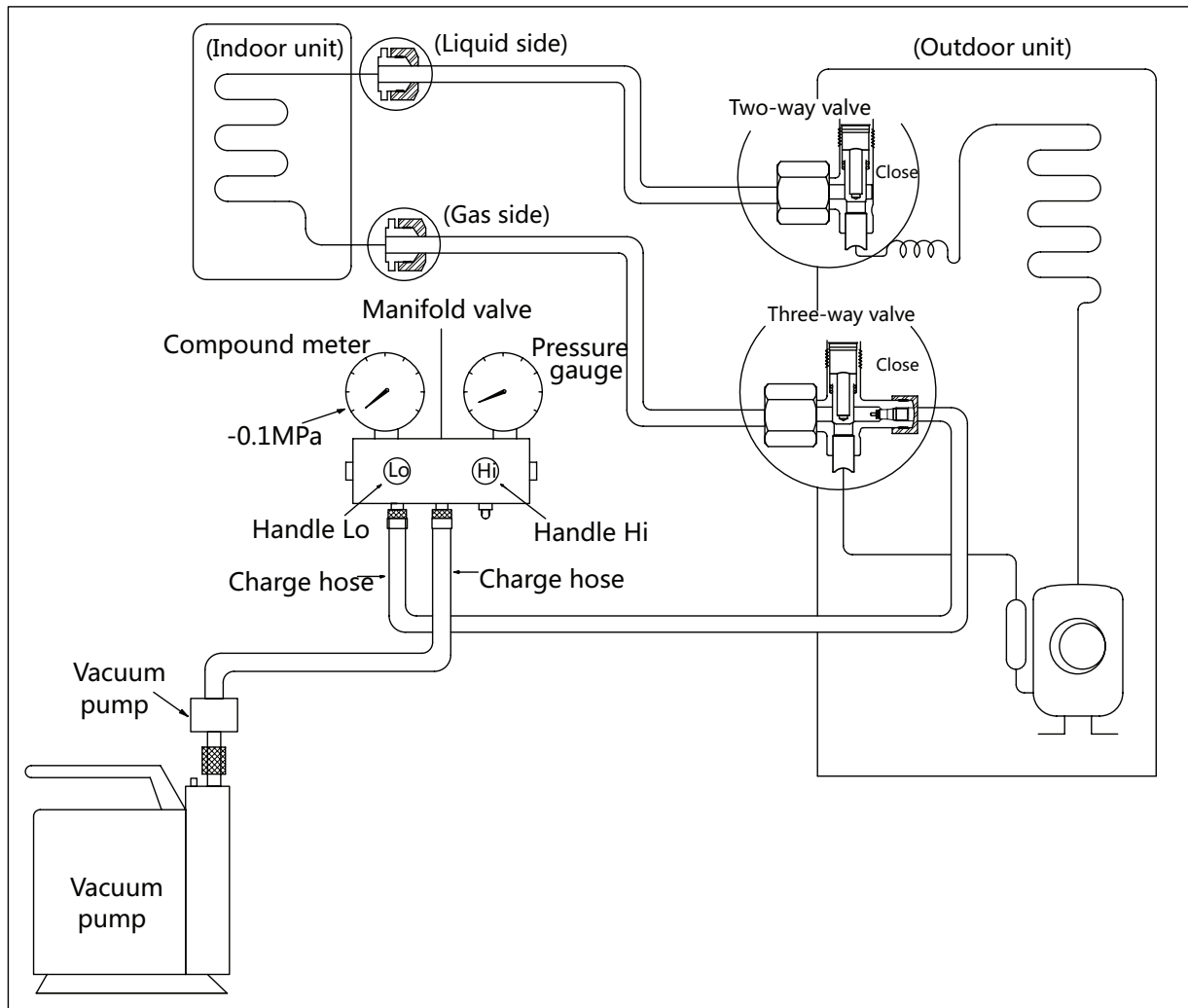
Collecting the refrigerant into the outdoor unit



#### Procedure:

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. Cease 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 to a torque of 18 N.m.
9. Check for gas leakage.

## Air purging with vacuum pump

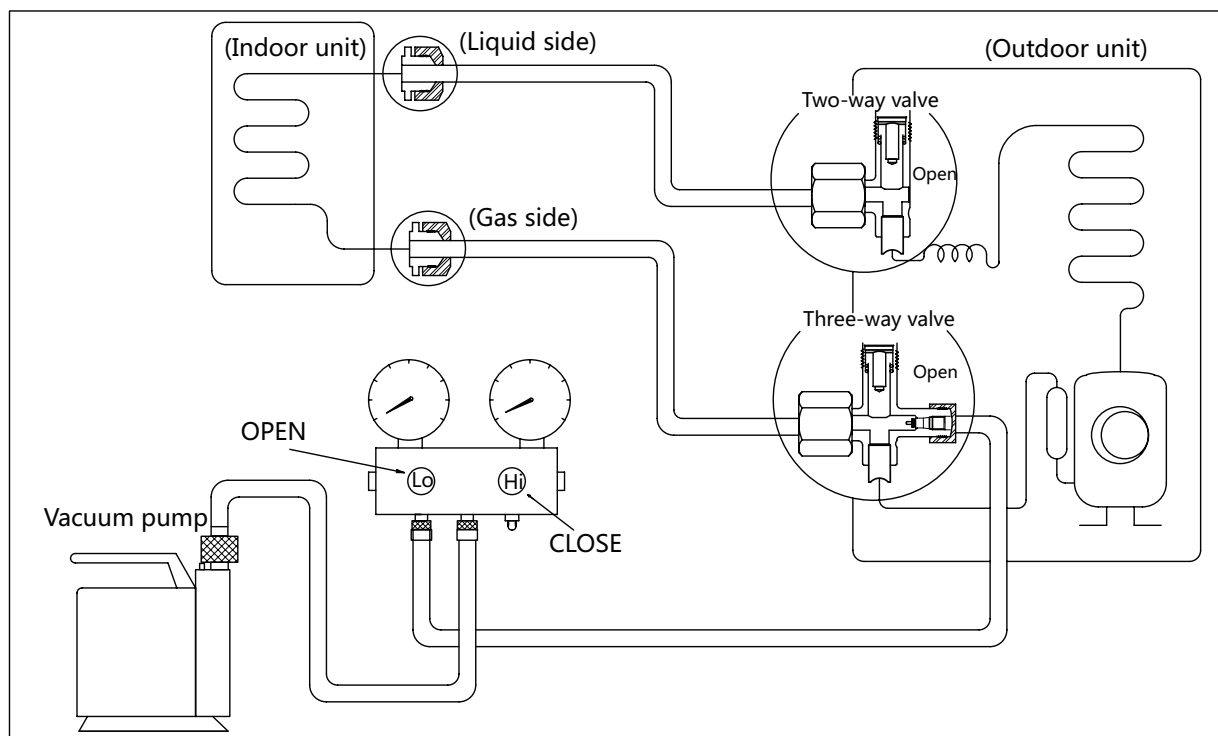


### Procedure:

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

### 1.13.2 Outdoor Unit

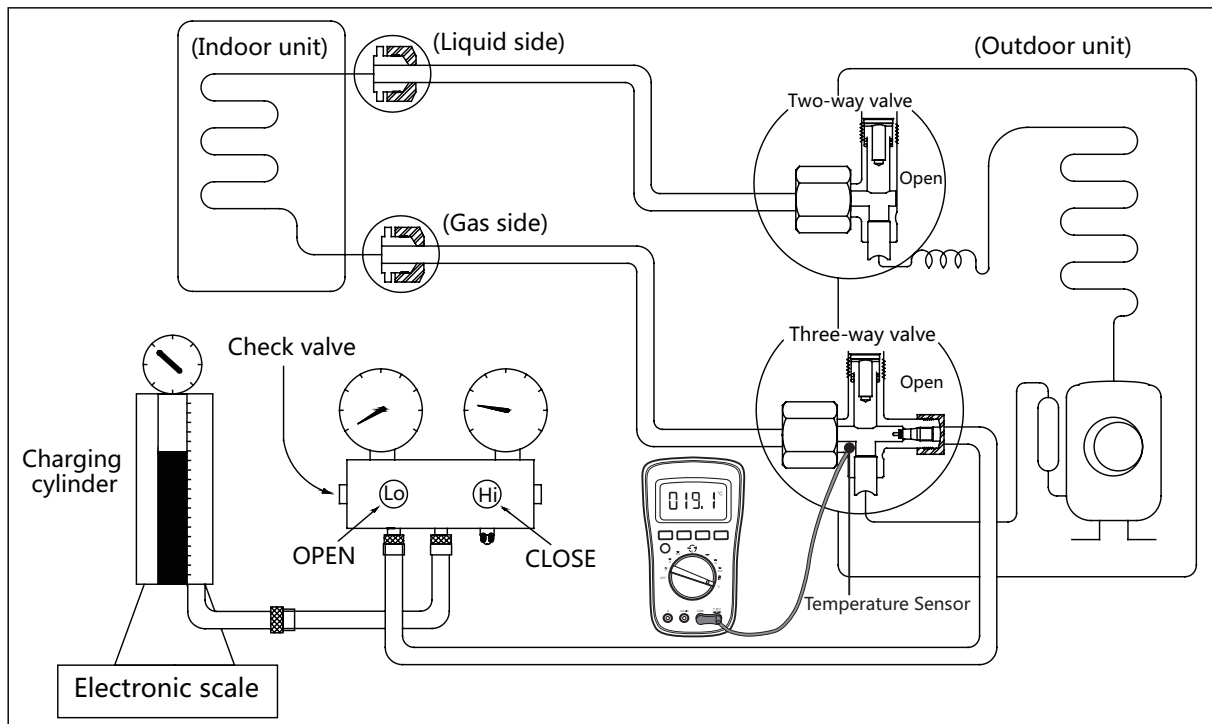
#### Evacuation for the whole system



#### Procedure:

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.

## Refrigerant charging



### Procedure:

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, 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.

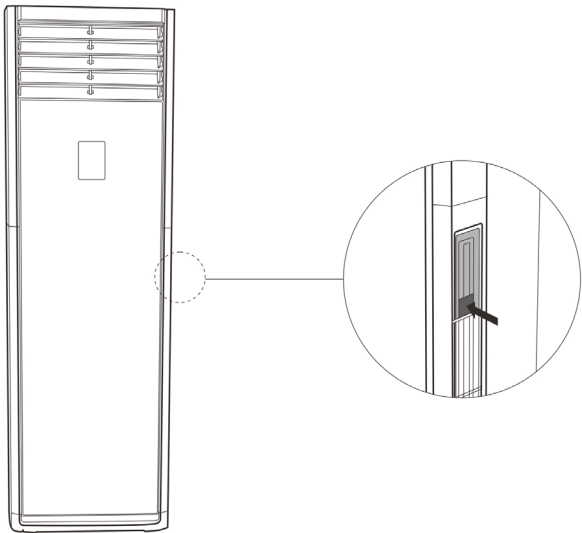
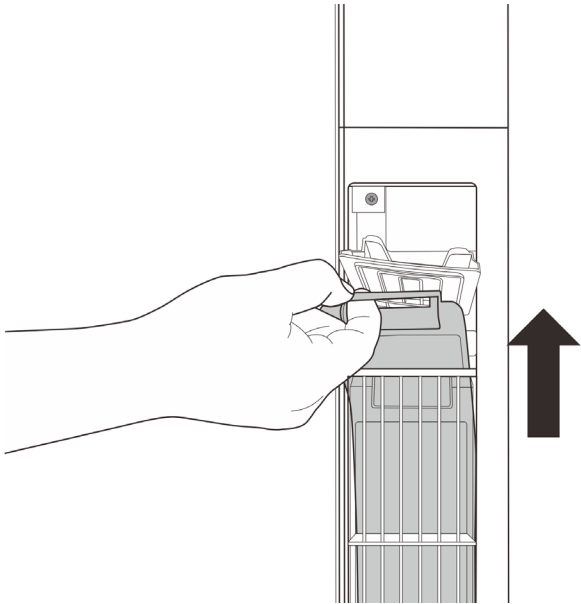
**Note: 1. Mechanical connectors used indoors shall comply with local regulations.**

**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.**

## 2. Disassembly

### 2.1 Indoor unit

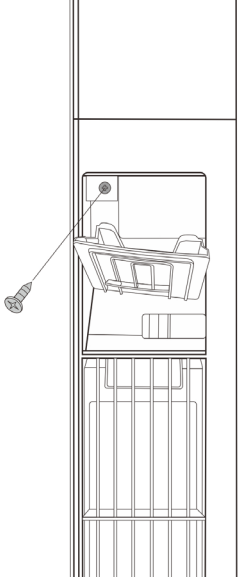
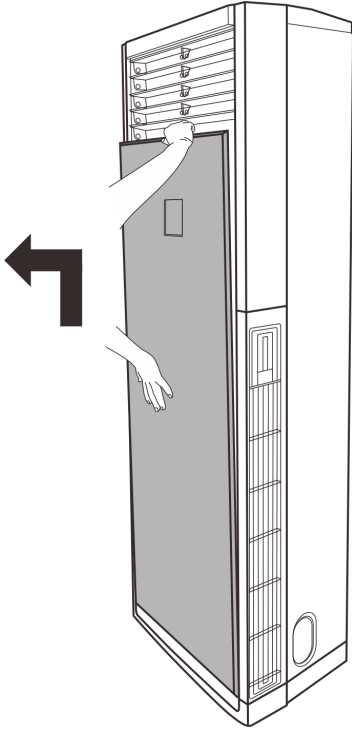
#### 1. Filter

Procedure	Illustration
1) Press down the button of remote controller box cover on the both sides of the front panel and open it. (see CJ_PA400_001)	 <p>CJ_PA400_001</p>
2) Pull 2 air filters on the both sides of the front panel upward to disassemble them. (see CJ_PA400_002)	 <p>CJ_PA400_002</p>

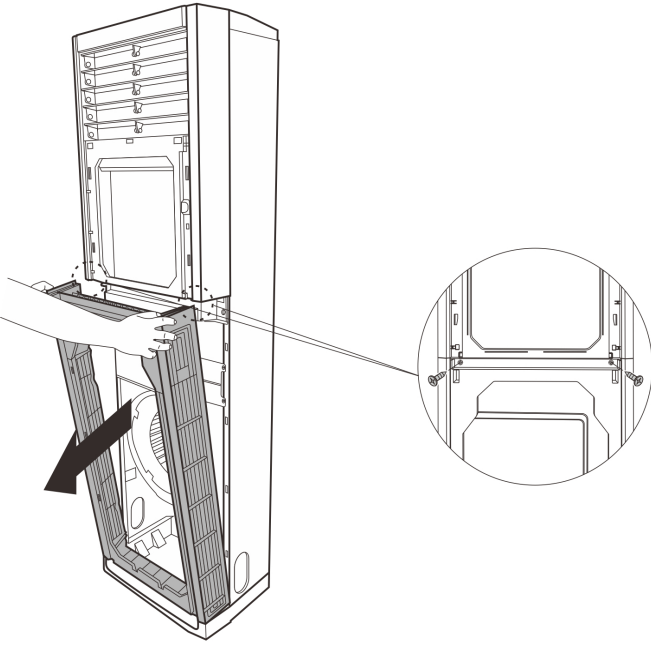
**Note:** This section is for reference only. Actual unit appearance may vary.

2. Air inlet grille assembly

**Note:** Press down the button of remote controller box cover (refer to 1 Filter) before disassembling air inlet grille assembly.

Procedure	Illustration
3) Remove 2 screws in both side of the indoor unit (see CJ_PA400_003)	 <p>CJ_PA400_003</p>
4) Push the front panel upward, and then pull it out to disassemble it. (see CJ_PA400_004)	 <p>CJ_PA400_004</p>

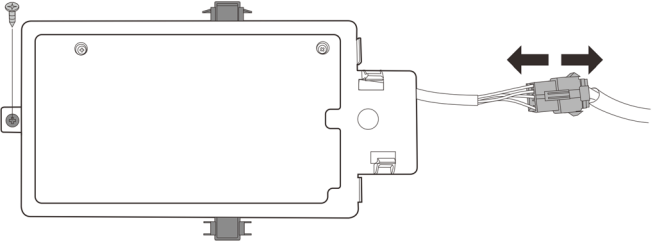
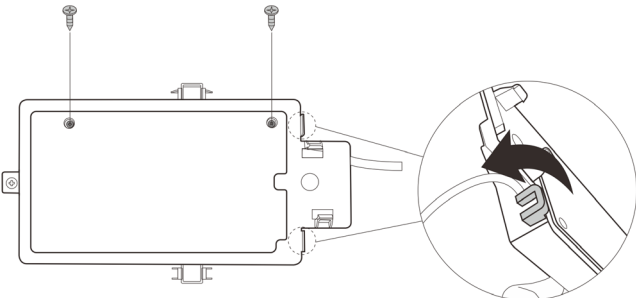
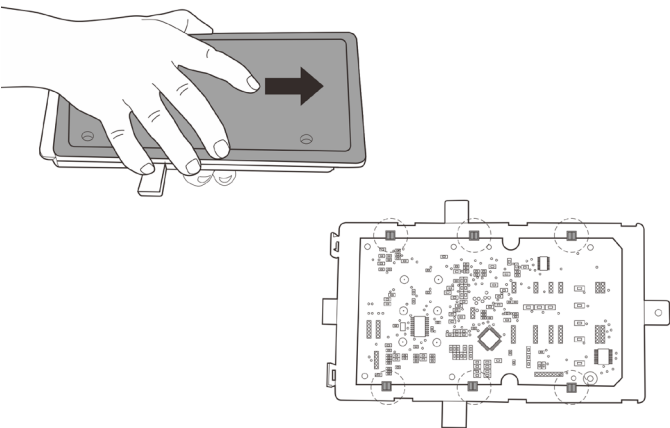
**Note:** This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>1) Hold the air inlet grille with two hands, pull toward the operator to disassemble it. (see PA400_005)</p>	 <p>CJ_PA400_005</p>

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

3. Display board

Note: Remove the front panel (refer to 2 Air inlet grille assembly) before disassembling display board.

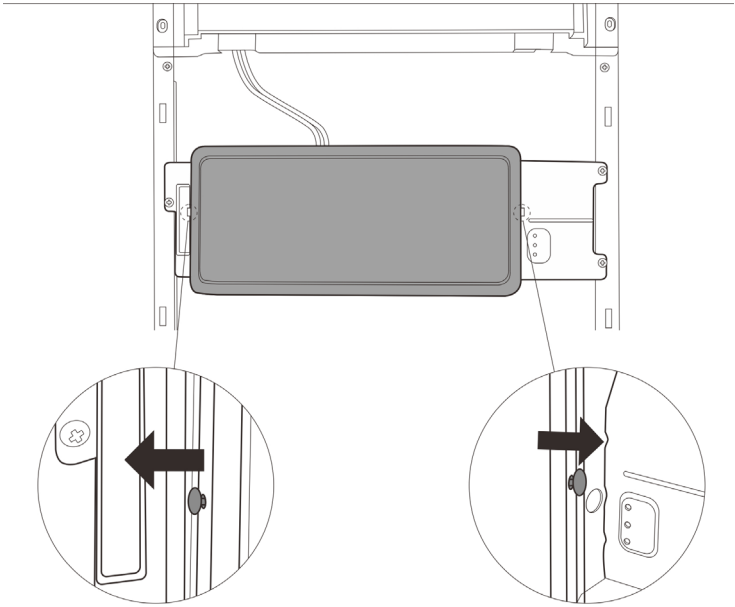
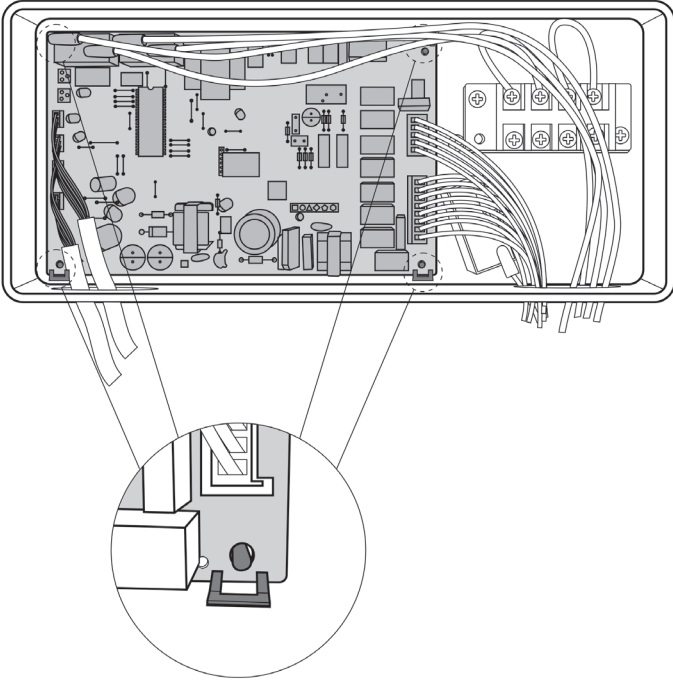
Procedure	Illustration
1) Flip the front panel face down	 <p>CJ_PA400_006</p>  <p>CJ_PA400_007</p>  <p>CJ_PA400_008</p>
2) Remove 1 screw and 2 hooks, unplug the connection of display board, then take down the display board box. (see CJ_PA400_006).	
3) Remove 1 screw and 2 hooks. (see CJ_PA400_007).	
4) Push the cover along the direction shown in the figure, then disassemble the cover of display board. The front view of the display board shows as CJ_PA400_008.	

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



4. Electric parts (Antistatic gloves must be worn)

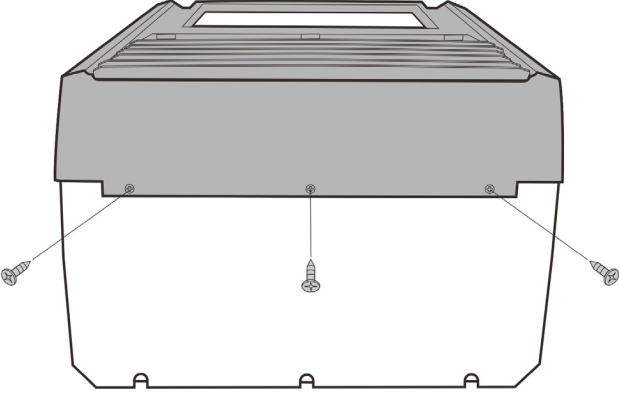
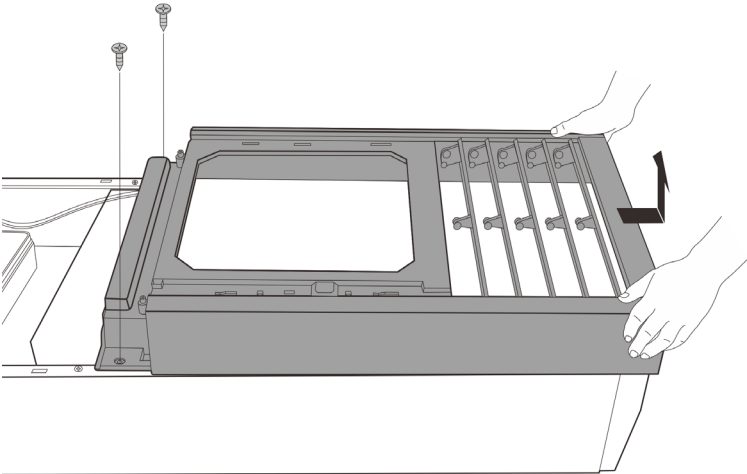
Note: Remove the air inlet grille assembly (refer to 2 Air inlet grille assembly) before disassembling electrical parts.

Procedure	Illustration
<p>1) Remove 2 screws on the both sides of electric control box cover to disassemble the cover. (see CJ_PA400_009)</p> <p>2) Unplug all connections from the main PCB. Then release 4 hooks and take the main PCB out carefully. (see CJ_PA400_010)</p>	 <p>CJ_PA400_009</p>  <p>CJ_PA400_010</p>

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

5. Air outlet grille assembly

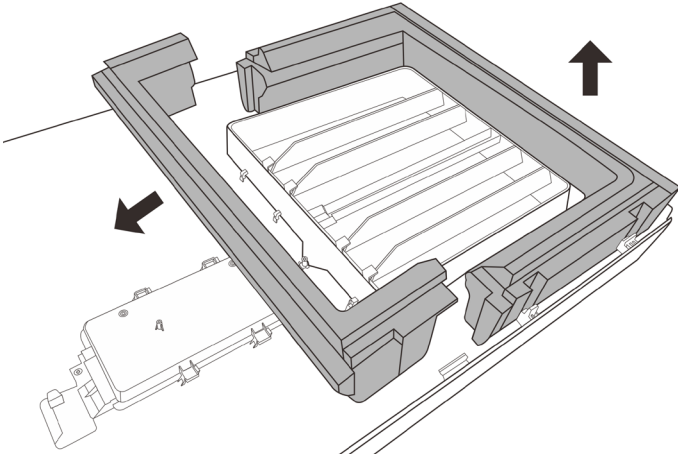
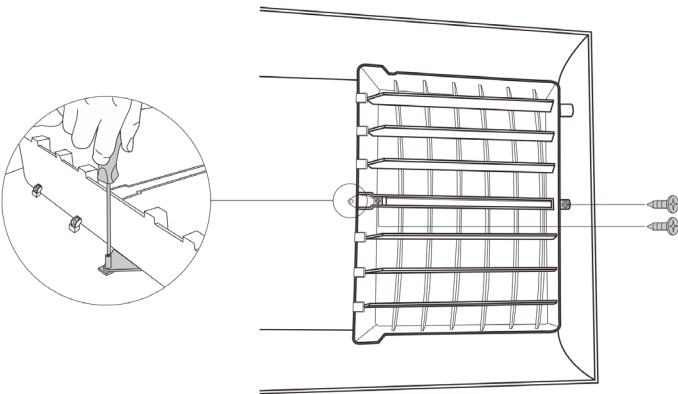
**Note:** Remove the air inlet grille assembly (refer to 2 Air inlet grille assembly) and the electric parts (refer to 4 Electric parts) before disassembling air outlet grille assembly.

Procedure	Illustration
<div>1) Disconnect all the wires. (see CJ_PA400_011)</div> <div>2) Remove 3 screws at the top of the air outlet grille assembly. (see CJ_PA400_011)</div>	<div></div> <div>CJ_PA400_011</div>
<div>3) Remove 2 screws at the bottom of the air outlet grille assembly. (see CJ_PA400_012)</div> <div>4) Push the air outlet grille assembly forward and pull it upward to disassemble it. (see CJ_PA400_012)</div>	<div></div> <div>CJ_PA400_012</div>

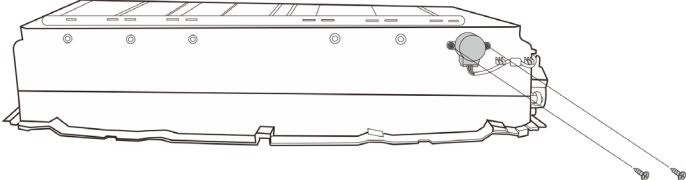
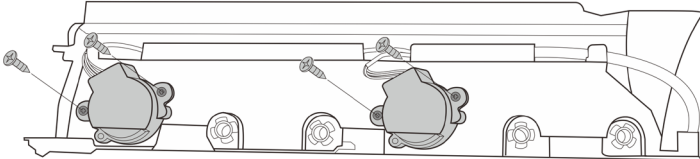
**Note:** This section is for reference only. Actual unit appearance may vary.

## 6. Step motor

**Note:** Remove the air inlet grille assembly (refer to 2 Air inlet grille assembly) and air outlet grille assembly (refer to 5 air outlet grille assembly) before disassembling step motor.

Procedure	Illustration
<p>1) Take out 2 foams carefully along with the direction indicated in the picture (see as CJ_PA400_013)</p>	 <p>CJ_PA400_013</p>
<p>2) Remove 2 screws of the air outlet assembly. (see CJ_PA400_013).</p>	 <p>CJ_PA400_014</p>

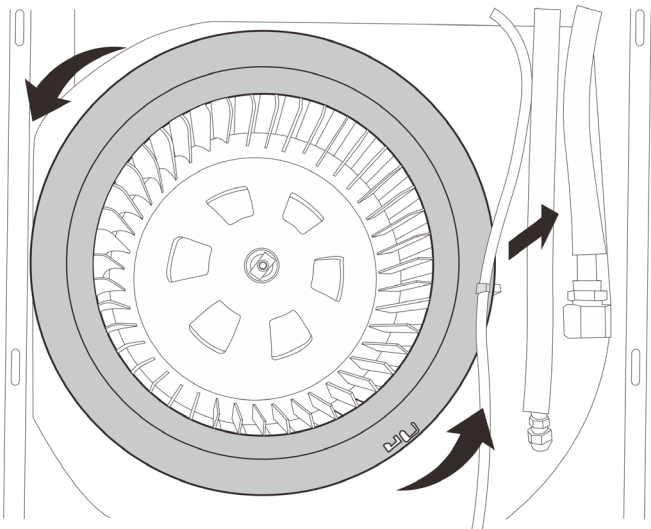
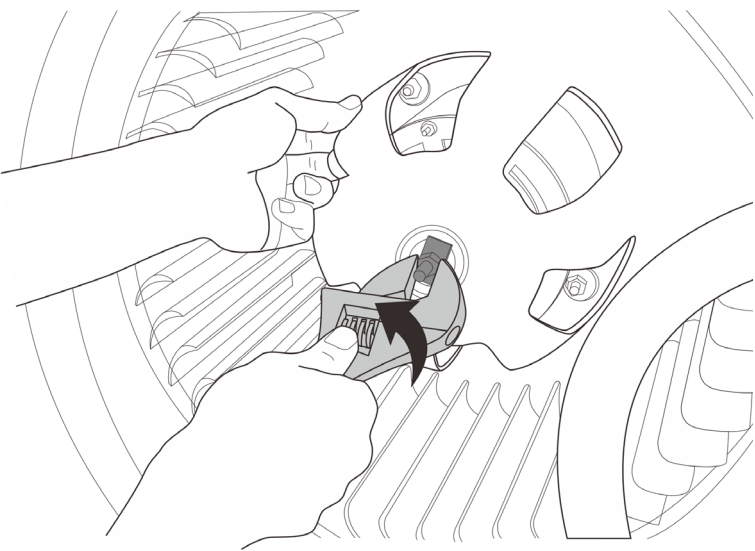
**Note:** This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
3) Remove 2 screws to disassemble the horizontal swing motor. (see CJ_PA400_015)	 <p>CJ_PA400_015</p>  <p>CJ_PA400_016</p>
4) Remove 4 screws to disassemble the 2 vertical swing motors. (see CJ_PA400_016)	

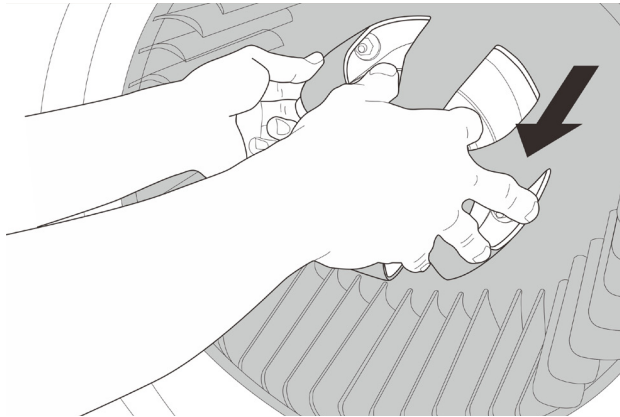
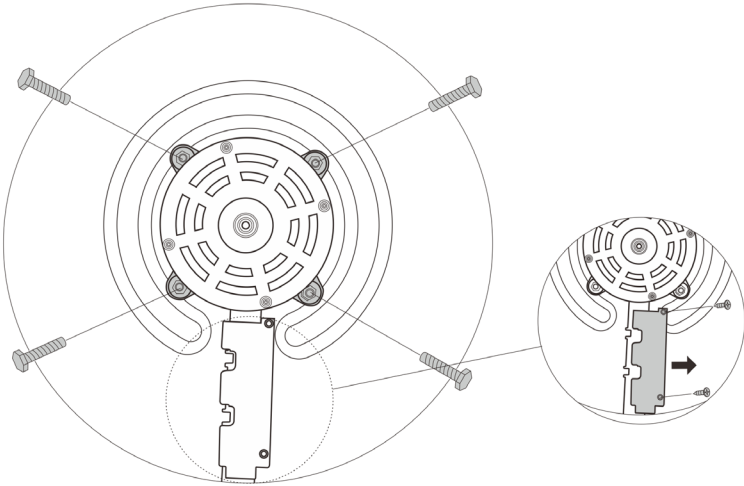
Note: This section is for reference only. Actual unit appearance may vary.

7. Fan motor

**Note:** Remove the air inlet grille assembly (refer to 2 Air inlet grille assembly) and electric parts (refer to 4 Electric parts) before disassembling fan motor.

Procedure	Illustration
<p>1) Rotate the ventilation ring counter-clockwise until all the 4 clips pop out of their holes. (see CJ_PA400_017).</p>	 <p>CJ_PA400_017</p>
<p>2) Remove the affixing nuts on the axis of the fan wheel. (see CJ_PA400_018).</p>	 <p>CJ_PA400_018</p>

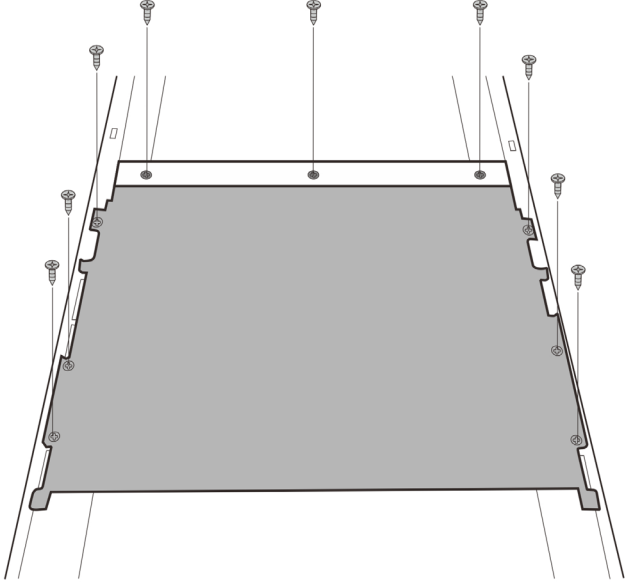
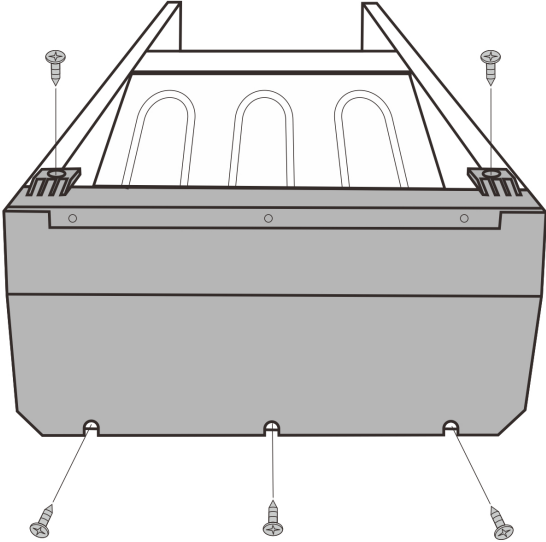
**Note:** This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
3) Take the fan wheel out. (see CJ_PA400_019)	 <p>CJ_PA400_019</p>
4) Remove 4 nuts around of the motor and 2 screws affixing the cover for the wires. (see CJ_PA400_020)	
5) Remove the fan motor. (see CJ_PA400_020)	

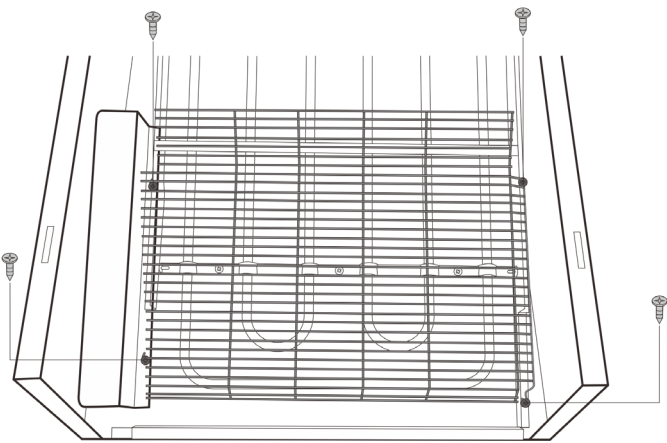
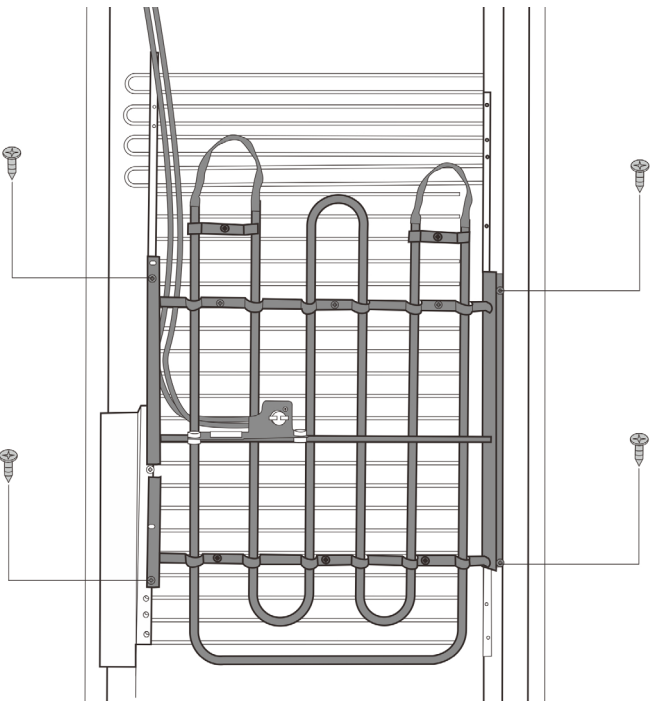
Note: This section is for reference only. Actual unit appearance may vary.

8. Evaporator

**Note:** Remove the air inlet grille assembly (refer to 2 Air inlet grille assembly), electric parts (refer to 4 Electric parts) and air outlet grille assembly (refer to 5 air outlet grille assembly) before disassembling evaporator.

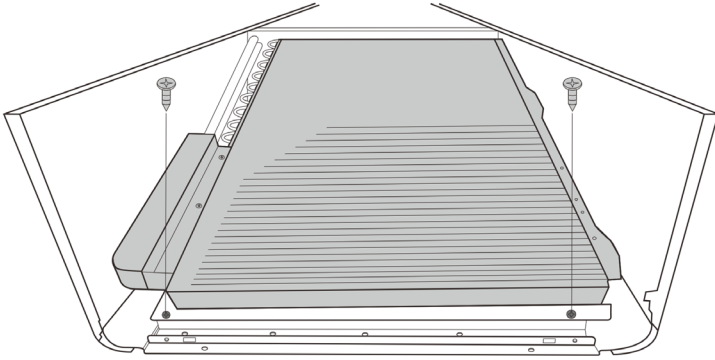
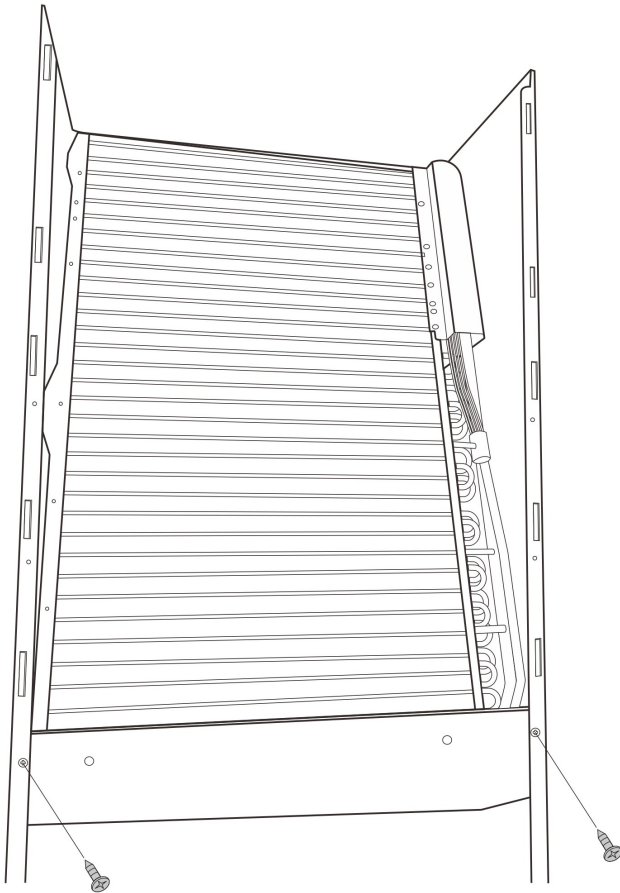
Procedure	Illustration
<div>1) Remove 9 screws on the side of the cover assembly (see CJ_PA400_021).</div> <div>2) Remove the cover assembly (see CJ_PA400_021).</div>	<div></div> <div>CJ_PA400_021</div> <div></div> <div>CJ_PA400_022</div>

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

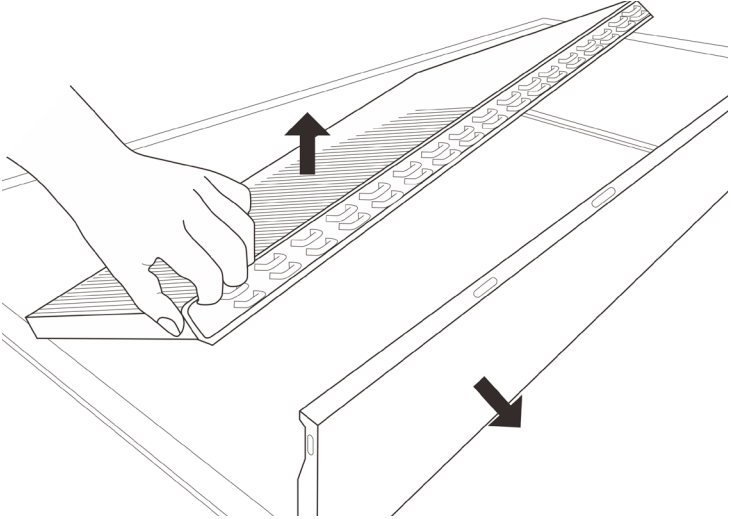
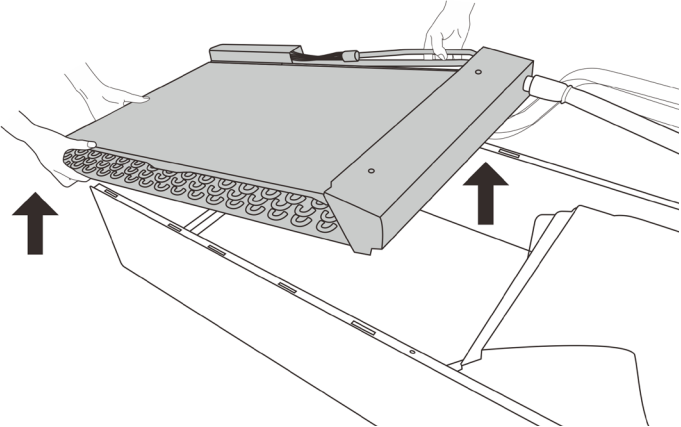
Procedure	Illustration
<p>5) Remove 4 screws on the side of the electric heater grille cover. (see CJ_PA400_023)</p> <p>6) Remove the electric heater grille cover. (see CJ_PA400_023)</p>	 <p style="text-align: center;"><b>CJ_PA400_023</b></p>  <p style="text-align: center;"><b>CJ_PA400_024</b></p>
<p>7) Remove 4 screws on the side of electric heater. (see CJ_PA400_024)</p> <p>8) Remove the electric heater. (see CJ_PA400_024)</p>	

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



Procedure	Illustration
<p>1) Remove 2 screws affixing the inlet/outlet pipes of the evaporator (see CJ_PA400_025).</p> <p>2) Remove 2 screws affixing the water collector subassembly. (see CJ_PA400_026)</p>	 <p data-bbox="948 837 1134 869">CJ_PA400_025</p>  <p data-bbox="948 1868 1134 1899">CJ_PA400_026</p>

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

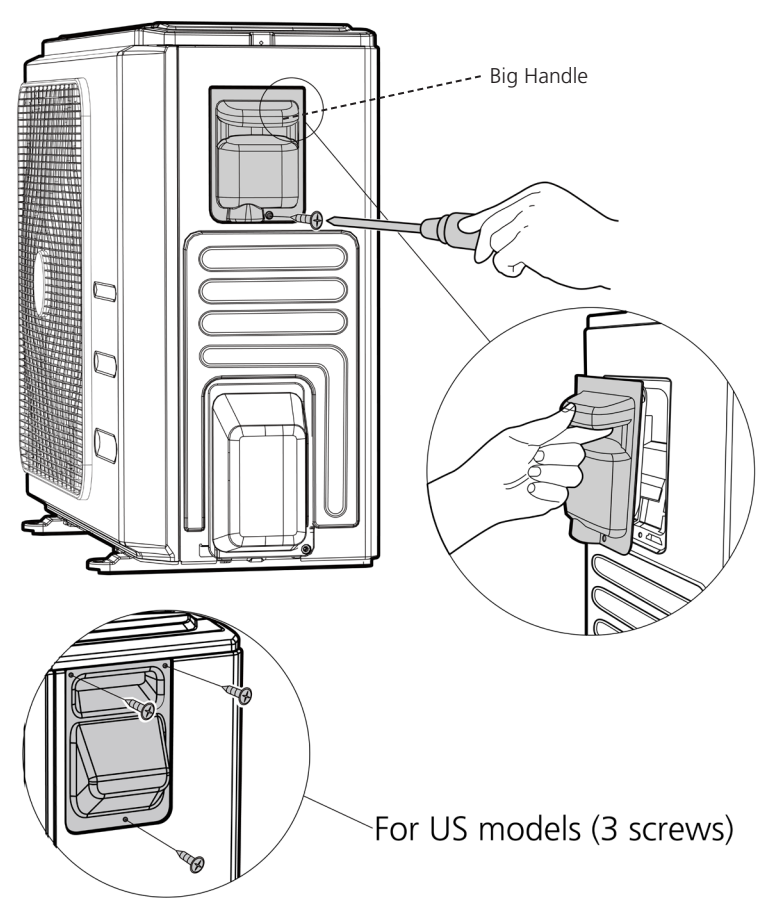
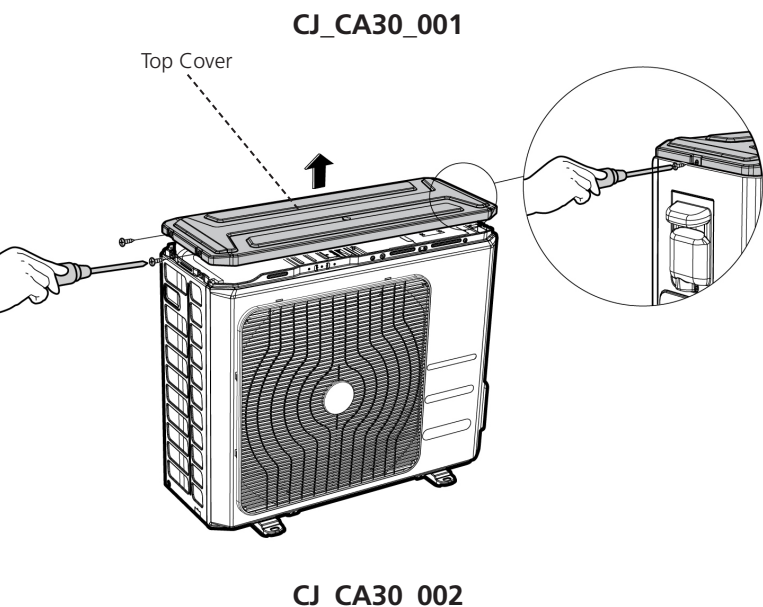
Procedure	Illustration
<p>3) Push the side panel slightly so that you can lift the evaporator. (see CJ_PA400_027).</p> <p>Notice: Be careful about the sharp edge, wear gloves if necessary</p>	 <p>CJ_PA400_027</p>
<p>4) Remove the evaporator. (see CJ_PA400_028)</p>	 <p>CJ_PA400_028</p>

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

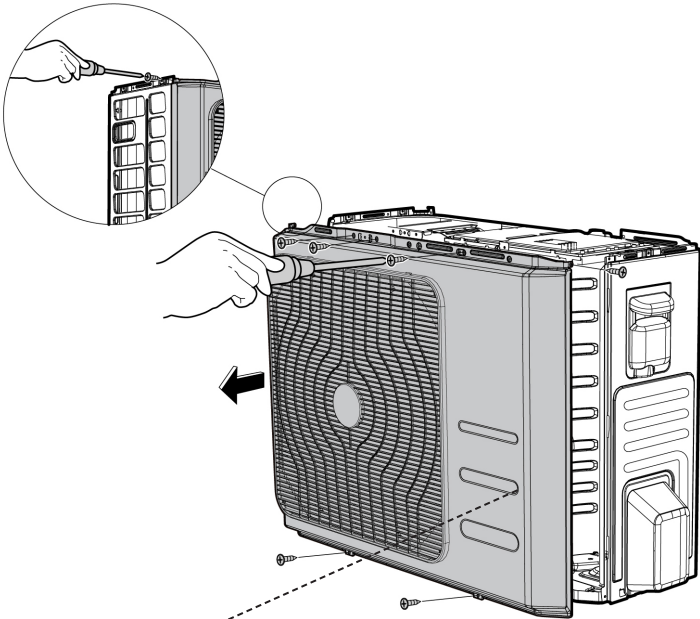
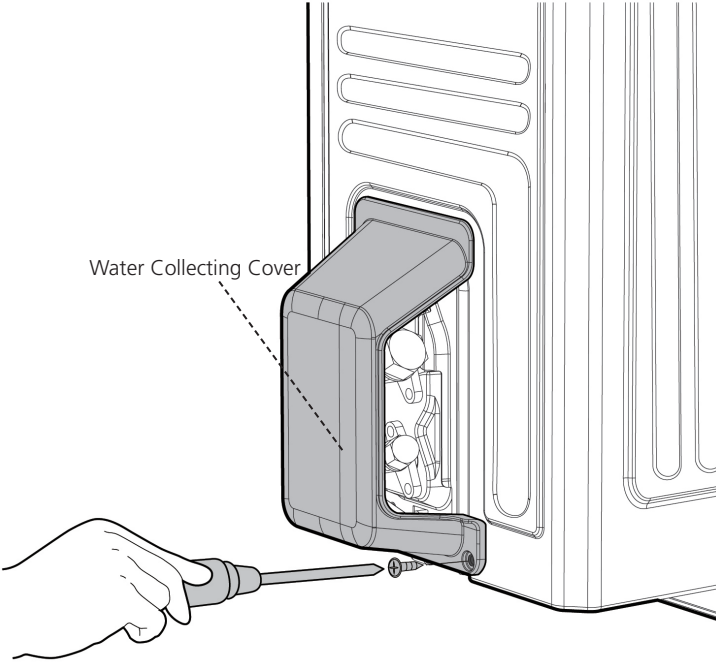
2.2 Outdoor unit

1. Panel Plate

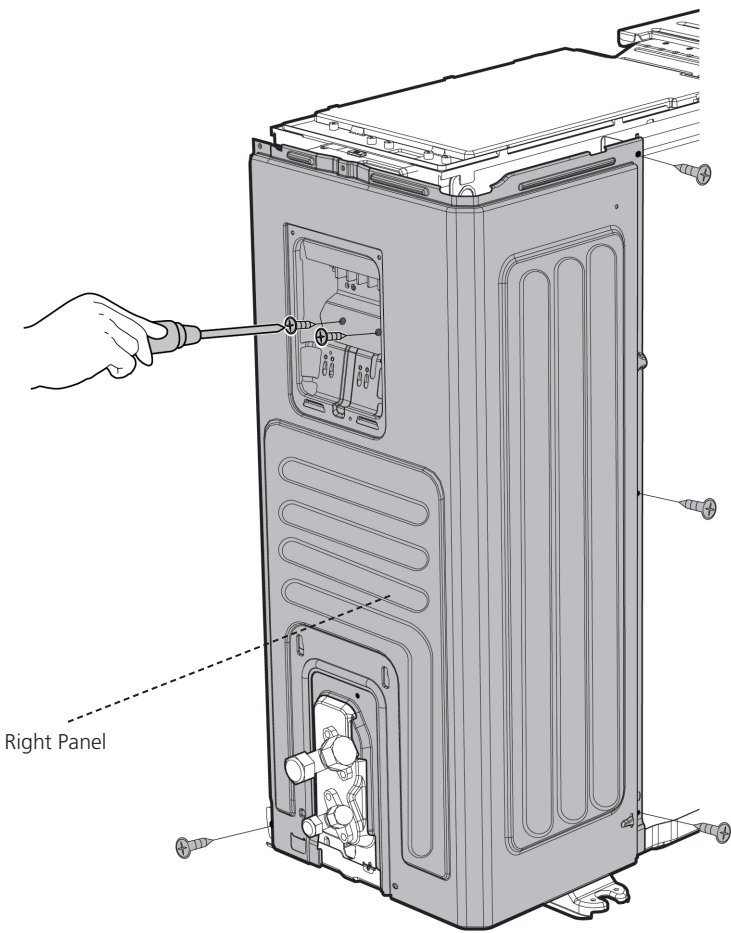
CA30(845x363x702)

Procedure	Illustration
<div>1) Turn off the air conditioner and the power breaker.</div> <div>2) Remove the screws of the big handle and then remove the big handle (1 screws) (see CJ_CA30_001).</div>	 <p>Big Handle</p> <p>For US models (3 screws)</p> <p>CJ_CA30_001</p>
<div>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_CA30_002).</div>	 <p>Top Cover</p> <p>CJ_CA30_002</p>

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

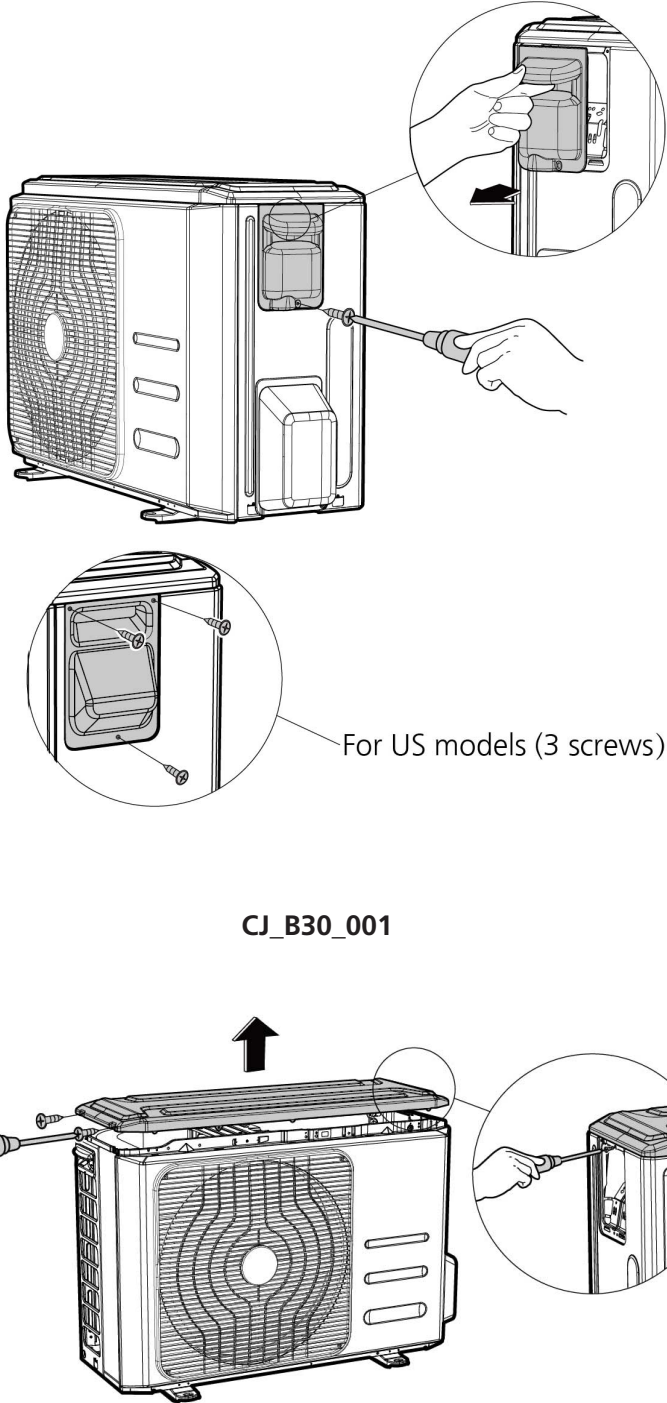
Procedure	Illustration
<p>1) Remove the screws of the front panel and then remove the front panel (7 screws) (see CJ_CA30_003).</p>	 <p>Front Panel</p> <p><b>CJ_CA30_003</b></p>
<p>2) Remove the screws of water collecting cover and then remove the water collecting cover (1 screw) (see CJ_CA30_004).</p>	 <p>Water Collecting Cover</p> <p><b>CJ_CA30_004</b></p>

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

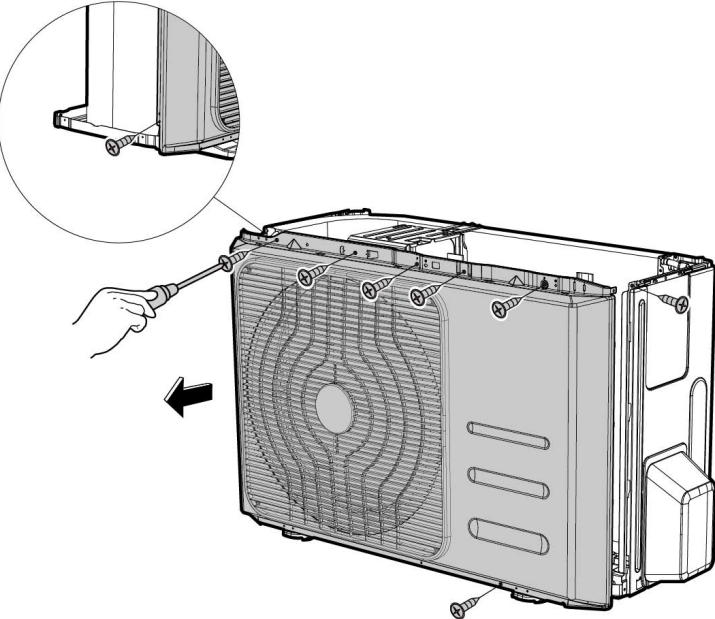
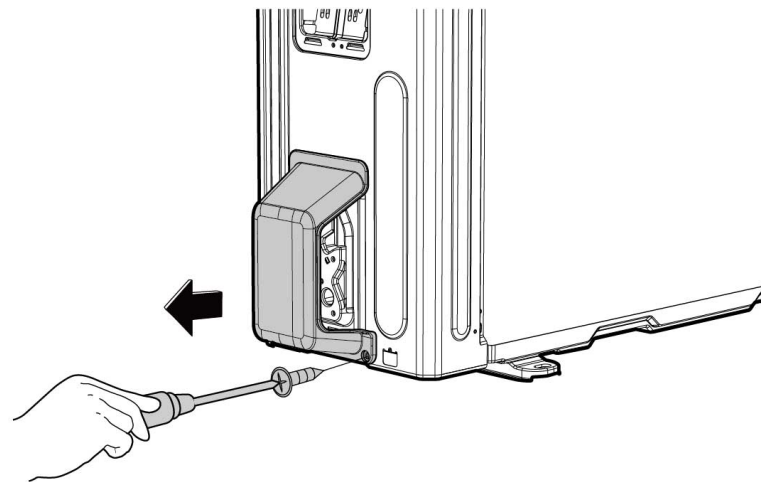
Procedure	Illustration
<p>1) Remove the screws of the right panel and then remove the right panel (6 screws) (see CJ_CA30_005).</p>	 <p>The illustration shows a side view of a tall, grey, rectangular unit. A hand is using a screwdriver to remove screws from the right panel. A dashed line points to the right panel, which is labeled 'Right Panel'. The unit has a control panel on the left side and a large door on the right side. The screws are being removed from the top and bottom of the right panel.</p> <p>CJ_CA30_005</p>

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

## B30(700x300x555)

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_B30_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_B30_002).</p>	 <p>For US models (3 screws)</p> <p>CJ_B30_001</p> <p>CJ_B30_002</p>

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

Procedure	Illustration
<p>4) Remove the screws of the front panel and then remove the front panel (8 screws) (see CJ_B30_003).</p>	 <p>CJ_B30_003</p>
<p>5) Remove the screws of water collecting cover and then remove the water collecting cover (1 screw) (see CJ_B30_004).</p>	 <p>CJ_B30_004</p>

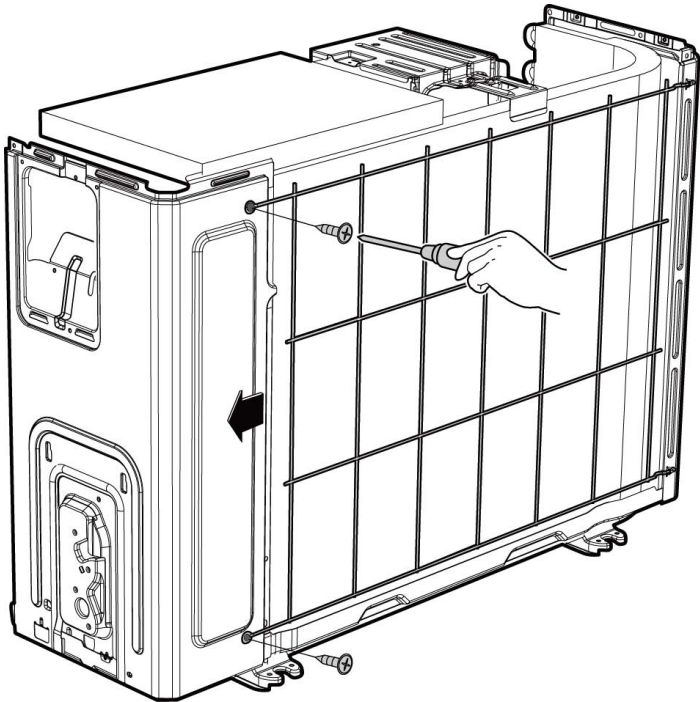
**Note:** This section is for reference only. Actual unit appearance may vary.



## Procedure

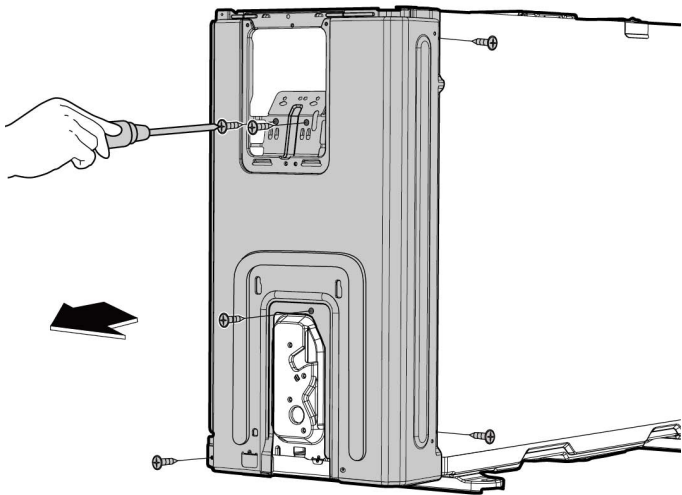
- 1) Remove the screws of the rear net and then remove the rear net (2 screws) (see CJ\_B30\_005). (for some models)

## Illustration



CJ\_B30\_005

- 2) Remove the screws of the right panel and then remove the right panel (5 screws) (see CJ\_B30\_006).



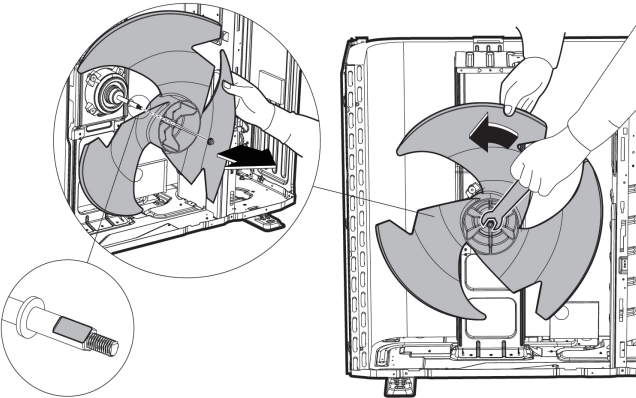
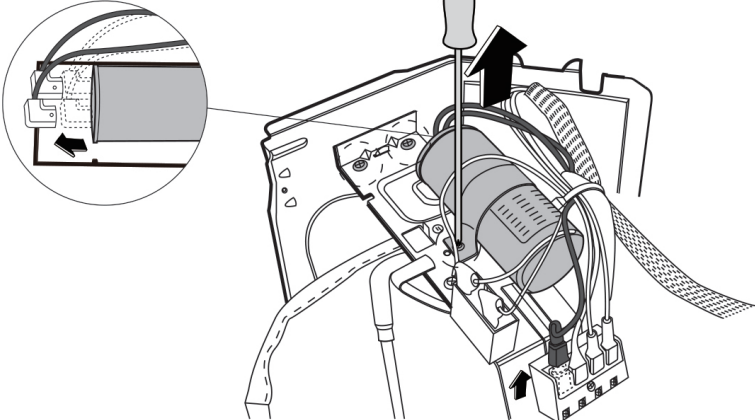
CJ\_B30\_006

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

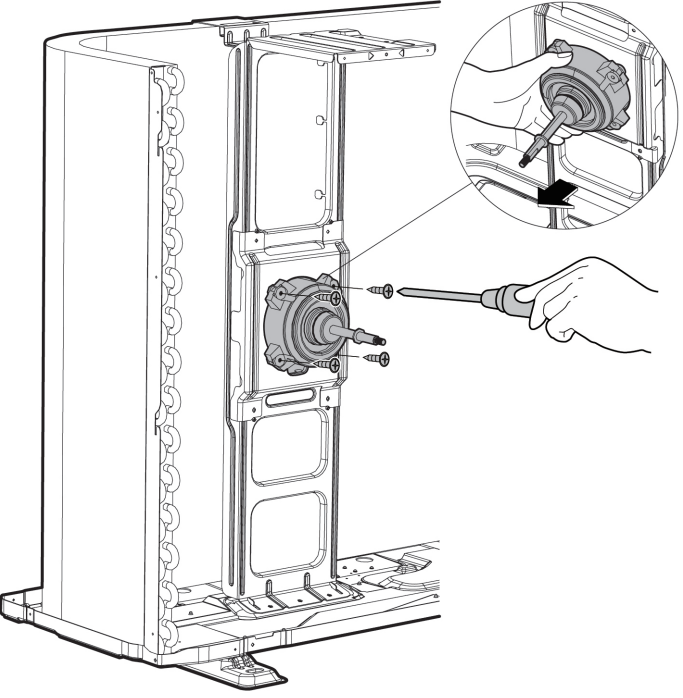


2. Fan disassembly

**Note:** Remove the panel plate and (refer to 1. Panel plate) before disassembling fan.

Procedure	Illustration
<p>1) Remove the nut securing the fan with a spanner (see CJ_ODU_001).</p> <p>2) Remove the fan.</p>	 <p>CJ_ODU_001</p>
<p>3) 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_002)</p>	 <p>CJ_ODU_002</p>

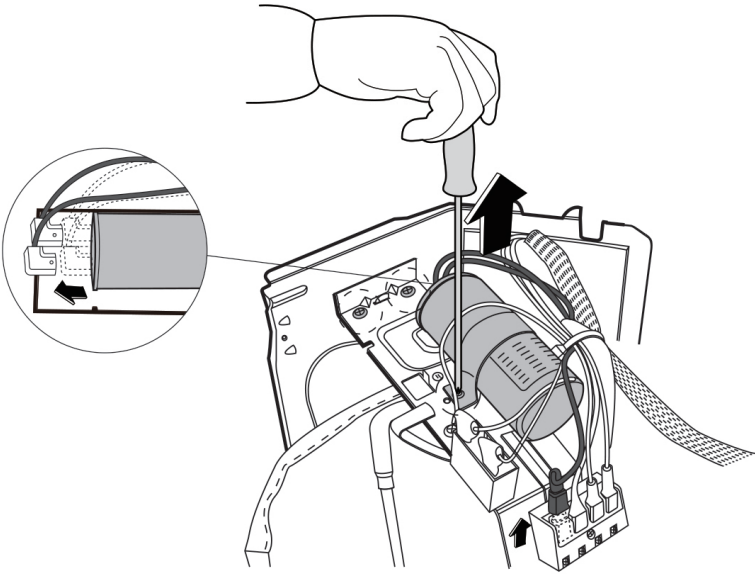
**Note:** This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>1) Remove the fixing screws of the fan motor (4 screws) (see CJ_ODU_003).</p> <p>2) Remove the fan motor.</p>	 <p>CJ_ODU_003</p>

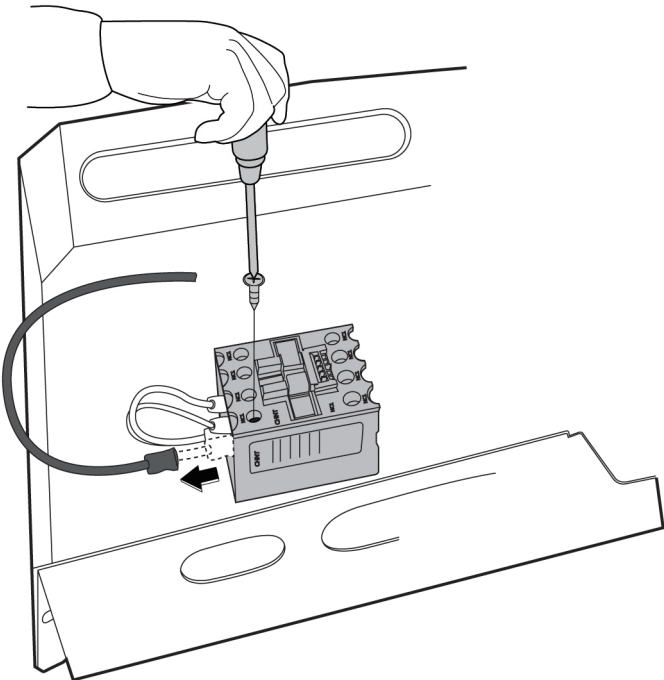
Note: This section is for reference only. Actual unit appearance may vary.

3. Electrical parts

**Note:** Remove the air outlet grille(refer to 1. Panel plate) before disassembling electrical parts.

Procedure	Illustration
<div>1) Remove the two screws fixed the electronic control board (see CJ_ODU_007).</div> <div>2) 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_004)</div> <div>3) Disconnect the wires connected to 4-way valve.(Blue wires on terminal 2&amp;3) (see CJ_ODU_004)</div> <div>4) Remove the fixing screw of the compressor capacitor, then pull it out (see CJ_ODU_004)</div> <div>5) Remove the electrical parts (see CJ_ODU_004)</div>	<div></div> <div>CJ_ODU_004</div>

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

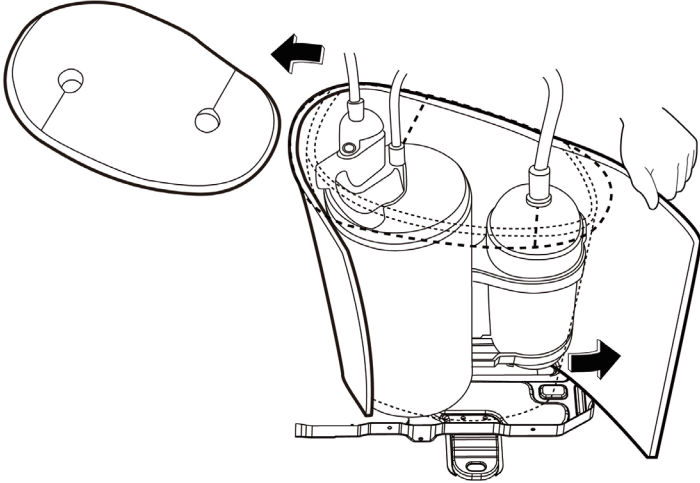
Procedure	Illustration
<p>4) Disconnect the wires and remove the fixing screw of the alternating current contactor. (see CJ_ODU_005)</p>	 <p>CJ_ODU_005</p>

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

4. Sound blanket

**! WARNING:** Recover refrigerant from the refrigerant circuit before remove the compressor.

**Note:** Remove the panel plate, electrical parts, and fan assembly (refer to 1. Panel plate, 2. Electrical parts, and 3. Fan assembly) before disassembling sound blanket.

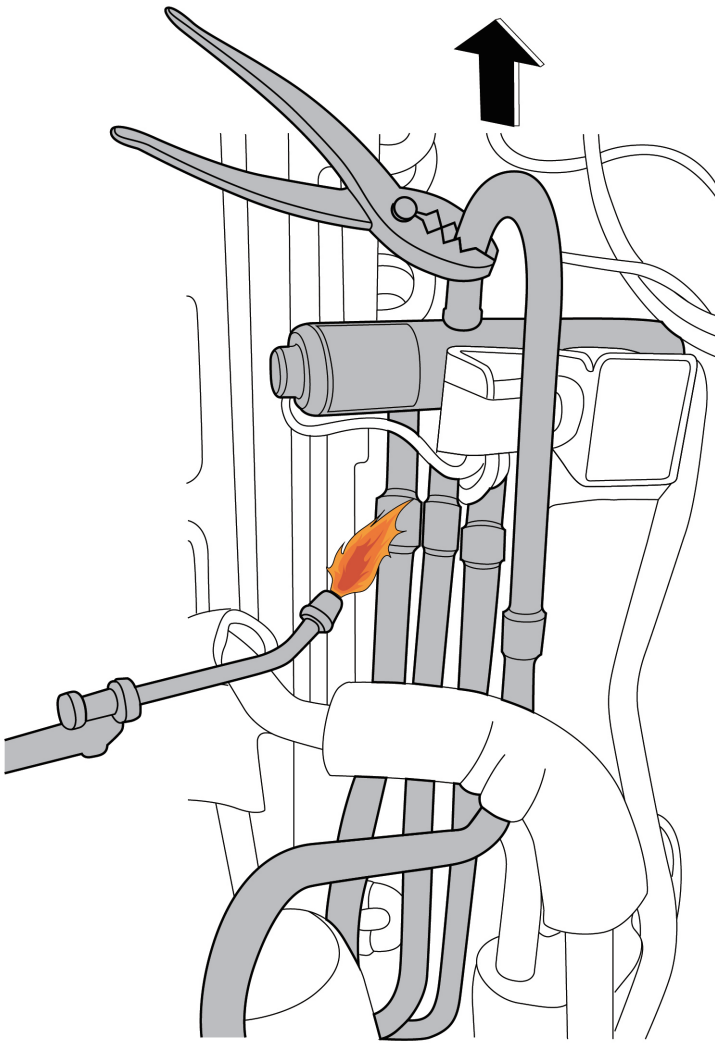
Procedure	Illustration
1) Remove the sound blanket (side and top) (see CJ_ODU_006).	 <p>CJ_ODU_006</p>

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

5. Four-way valve (For heat pump models)

**⚠ WARNING:** Recover refrigerant from the refrigerant circuit before remove the four-way valve.

**Note:** Remove the panel plate, electrical parts, and fan assembly (refer to 1. Panel plate, 2. Electrical parts, and 3. Fan assembly) before disassembling four-way valve.

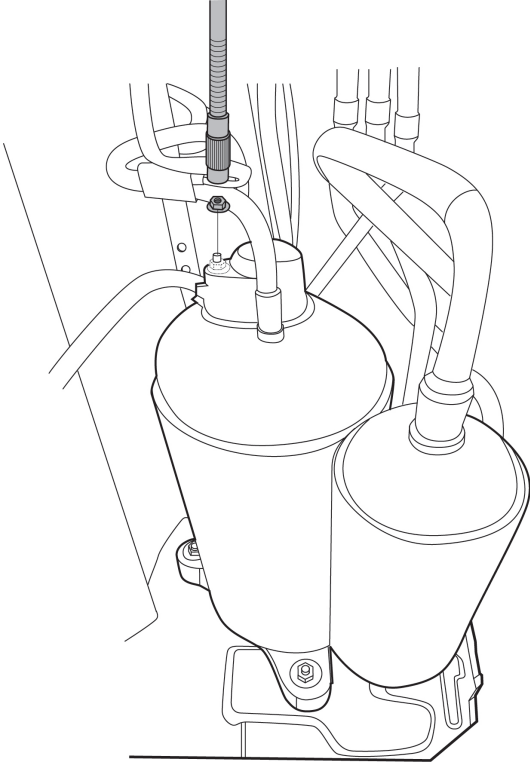
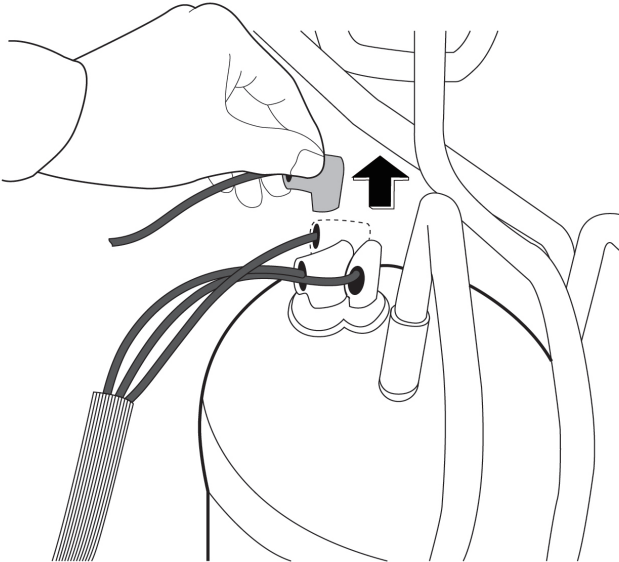
Procedure	Illustration
<div>1) Heat up the brazed parts and then detach the the four-way valve and the pipe (see CJ_ODU_007).</div> <div>2) Remove the four-way valve assembly with pliers.</div>	 <p>CJ_ODU_007</p>

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

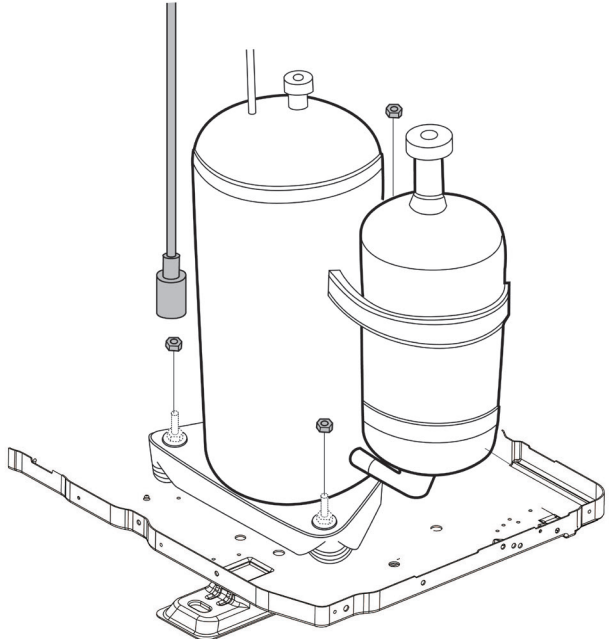
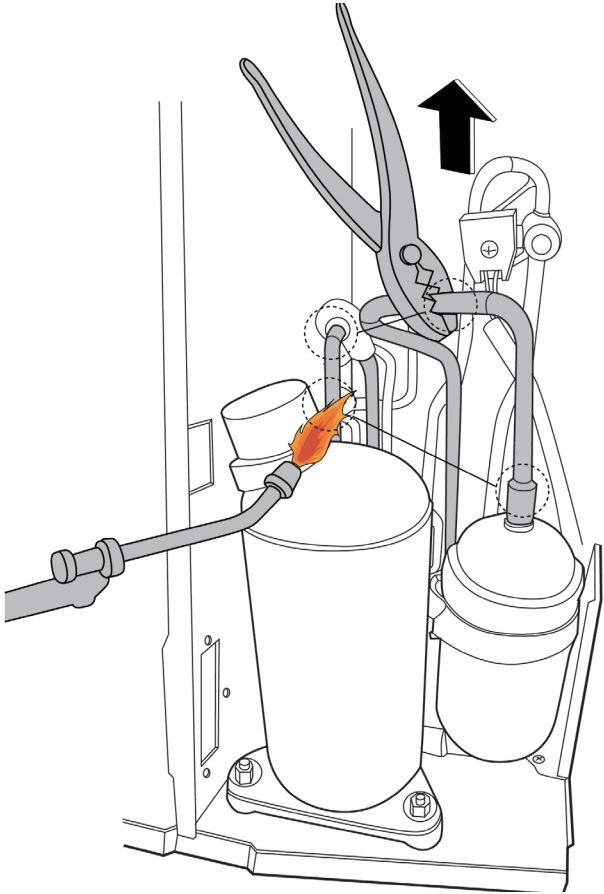
6. Compressor

**!WARNING:** Recover refrigerant from the refrigerant circuit before remove the compressor.

**Note:** Remove the panel plate, electrical parts, and fan assembly (refer to 1. Panel plate, 2. Electrical parts, and 3. Fan assembly) before disassembling compressor.

Procedure	Illustration
1) Remove the flange nut of terminal cover and remove the terminal cover (see CJ_ODU_008).	 <p>CJ_ODU_008</p>
2) Disconnect the connectors (see CJ_ODU_009).	 <p>CJ_ODU_009</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 the bottom plate (see CJ_ODU_010).</p>	 <p style="text-align: center;"><b>CJ_ODU_010</b></p>  <p style="text-align: center;"><b>CJ_ODU_011</b></p>

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



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# Troubleshooting

## Contents

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## 1. Safety Caution

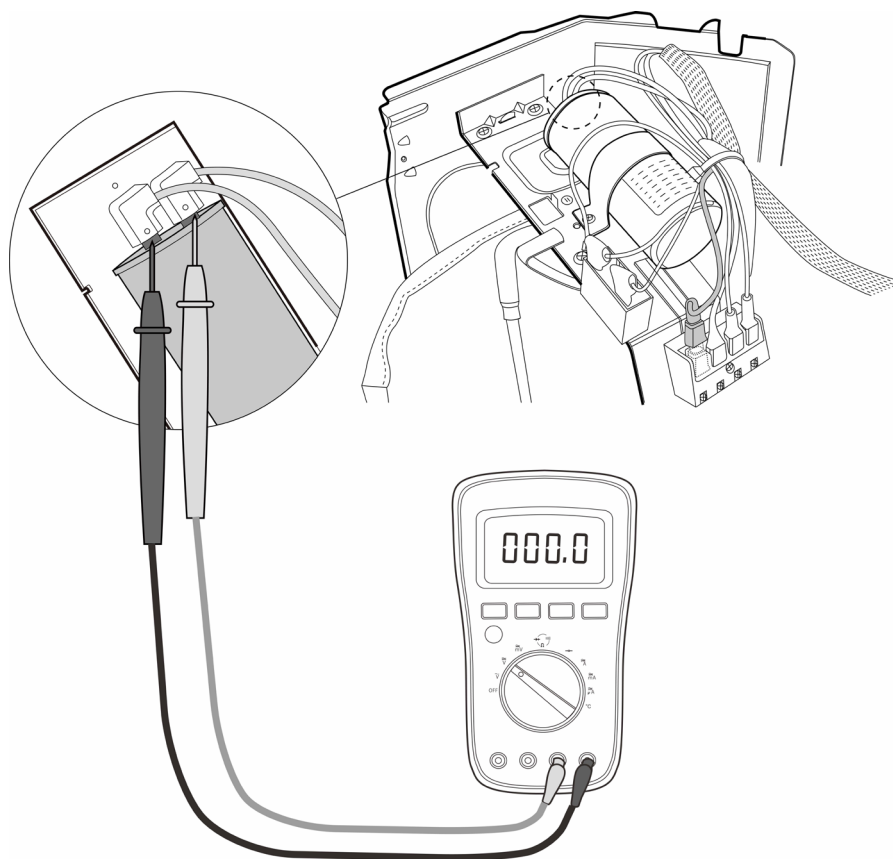
### WARNING

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 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.

## 2. General Troubleshooting

### 2.1 Error Display (Indoor Unit)

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

Display	Error Information	Solution
E0	Indoor unit EEPROM parameter error	Page 60
E4	Indoor room temperature sensor T1 is in open circuit or has short circuited	Page 61
E5	Evaporator coil temperature sensor T2 is in open circuit or has short circuited	Page 61
Eb	Indoor PCB /Display board communication error	Page 63
EC	Refrigerant leak detected(for some models)	Page 64
F1	Outdoor ambient temperature sensor T4 open circuit or short circuit(for some models)	Page 62
F2	Condenser coil temperature sensor T3 is in open circuit or has short circuited(for some models)	Page 62

#### 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.

### 3. Error Diagnosis and Troubleshooting Without Error Code



#### WARNING

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

#### 3.1 Remote maintenance

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

	Problem	Solution
1	Unit will not start	Page 54-55
2	The power switch is on but fans will not start	Page 54-55
3	The temperature on the display board cannot be set	Page 54-55
4	Unit is on but the wind is not cold(hot)	Page 54-55
5	Unit runs, but shortly stops	Page 54-55
6	The unit starts up and stops frequently	Page 54-55
7	Unit runs continuously but insufficient cooling(heating)	Page 54-55
8	Cool can not change to heat	Page 54-55
9	Unit is noisy	Page 54-55

## 3.2 Field maintenance

	Problem	Solution
1	Unit will not start	Page 56-57
2	Compressor will not start but fans run	Page 56-57
3	Compressor and condenser (outdoor) fan will not start	Page 56-57
4	Evaporator (indoor) fan will not start	Page 56-57
5	Condenser (Outdoor) fan will not start	Page 56-57
6	Unit runs, but shortly stops	Page 56-57
7	Compressor short-cycles due to overload	Page 56-57
8	High discharge pressure	Page 56-57
9	Low discharge pressure	Page 56-57
10	High suction pressure	Page 56-57
11	Low suction pressure	Page 56-57
12	Unit runs continuously but insufficient cooling	Page 56-57
13	Too cool	Page 56-57
14	Compressor is noisy	Page 56-57
15	Horizontal louver can not revolve	Page 56-57

1.Remote Maintenance	Electrical Circuit							Refrigerant Circuit						
Possible causes of trouble	Power failure	The main power tripped	Loose connections	Faulty transformer	The voltage is too high or too low	The remote control is powered off	Broken remote control	Dirty air filter	Dirty condenser fins	The setting temperature is higher/lower than the room's (cooling/heating)	The ambient temperature is too high/low when the mode is cooling/heating	Fan mode	SILENCE function is activated (optional function)	Frosting and defrosting frequently
Unit will not start	☆	☆	☆	☆										
The power switch is on but fans will not start			☆	☆	☆									
The temperature on the display board cannot be set						☆	☆							
Unit is on but the wind is not cold(hot)										☆	☆	☆		
Unit runs, but shortly stops					☆					☆	☆			
The unit starts up and stops frequently					☆						☆			☆
Unit runs continuously but insufficient cooling(heating)								☆	☆	☆	☆		☆	
Cool can not change to heat														
Unit is noisy														
Test method / remedy	Test voltage	Close the power switch	Inspect connections - tighten	Change the transformer	Test voltage	Replace the battery of the remote control	Replace the remote control	Clean or replace	Clean	Adjust the setting temperature	Turn the AC later	Adjust to cool mode	Turn off SILENCE function.	Turn the AC later

Others									
Check heat load	☆		☆						Heavy load condition
Tighten bolts or screws	☆								Loosen hold down bolts and / or screws
Close all the windows and doors			☆						Bad airproof
Remove the obstacles			☆						The air inlet or outlet of either unit is blocked
Reconnect the power or press <b>ON/OFF</b> button on remote control to restart								☆	Interference from cell phone towers and remote boosters
Remove them	☆								Shipping plates remain attached

2.Field Maintenance	Electrical Circuit															
Possible causes of trouble	Power failure	Blown fuse or varistor	Loose connections	Shorted or broken wires	Safety device opens	Faulty thermostat / room temperature sensor	Wrong setting place of temperature sensor	Faulty transformer	Shorted or open capacitor	Faulty magnetic contactor for compressor	Faulty magnetic contactor for fan	Low voltage	Faulty stepping motor	Shorted or grounded compressor	Shorted or grounded fan moto	
	☆	☆	☆	☆	☆			☆								
	Unit will not start	☆	☆	☆	☆	☆			☆	☆				☆		
	Compressor will not start but fans run				☆	☆			☆	☆				☆		
	Compressor and condenser (outdoor) fan will not start				☆	☆				☆						
	Evaporator (indoor) fan will not start				☆				☆		☆				☆	
	Condenser (Outdoor) fan will not start				☆	☆			☆		☆				☆	
	Unit runs, but shortly stops									☆		☆				
	Compressor short-cycles due to overload									☆		☆				
	High discharge pressure															
	Low discharge pressure															
	High suction pressure															
	Low suction pressure															
	Unit runs continuously but insufficient cooling															
	Too cool					☆	☆									
	Compressor is noisy															
	Horizontal louver can not revolve			☆	☆									☆		
	Test method / remedy	Test voltage	Inspect fuse type & size	Inspect connections - tighten	Test circuits with tester	Test continuity of safety device	Test continuity of thermostat / sensor & wiring	Place the temperature sensor at the central of the air inlet grille	Check control circuit with tester	Check capacitor with tester	Test continuity of coil & contacts	Test continuity of coil & contacts	Test voltage	Replace the stepping motor	Check resistance with multimeter	Check resistance with multimeter



Refrigerant Circuit														Others	
Replace the compressor														Compressor stuck	
Leak test														☆	Shortage of refrigerant
Replace restricted part															Restricted liquid line
Clean or replace															Dirty air filter
Clean coil															Dirty evaporator coil
Check fan															Insufficient air through evaporator coil
Change charged refrigerant volume															Overcharge of refrigerant
Clean condenser or remove obstacle															Dirty or partially blocked condenser
Purge, evacuate and recharge															Air or incompressible gas in refrigerant cycle
Remove obstruction to air flow															Short cycling of condensing air
Remove obstruction in air or water flow															High temperature condensing medium
Remove obstruction in air or water flow															Insufficient condensing medium
Replace compressor															Broken compressor internal parts
Test compressor efficiency															Inefficient compressor
Replace valve															Expansion valve obstructed
Replace valve															Expansion valve or capillary tube closed completely
Replace valve															Leaking power element on expansion valve
Fix feeler bulb															Poor installation of feeler bulb
Check heat load															Heavy load condition
Tighten bolts or screws															Loosen hold down bolts and / or screws
Remove them															Shipping plates remain attached
Choose AC of larger capacity or add the number of AC															Poor choices of capacity
Rectify piping so as not to contact each other or with external plate															Contact of piping with other piping or external plate

## 4. Quick Maintenance by Error Code

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

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

Part requiring replacement	Error Code						
	E0	E4	E5	Eb	EC	F1	F2
Indoor PCB	✓	✓	✓	✓	✓	x	x
Outdoor PCB	x	x	x	x	x	✓	✓
T1 sensor	x	✓	x	x	x	x	x
T2 Sensor	x	x	✓	x	✓	x	x
T3 Sensor	x	x	x	x	x	x	✓
T4 Sensor	x	x	x	x	x	✓	x
Additional refrigerant	x	x	x	x	✓	x	x
Capacitor of compressor	x	x	x	x	✓	x	x
Compressor	x	x	x	x	✓	x	x
Capacitor of fan motor	x	x	x	x	✓	x	x
Outdoor fan	x	x	x	x	✓	x	x
Display board	x	x	x	✓	x	x	x

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## 5. Troubleshooting by Error Code

### 5.1 Common Check Procedures

#### 5.1.1 Temperature Sensor Check

Disconnect the temperature sensor from PCB, measure the resistance value with a tester.

Temperature Sensors.

Room temp.(T1) sensor,

Indoor coil temp.(T2) sensor,

Outdoor coil temp.(T3) sensor,

Outdoor ambient temp.(T4) sensor,

Measure the resistance value of each winding by using the multi-meter.

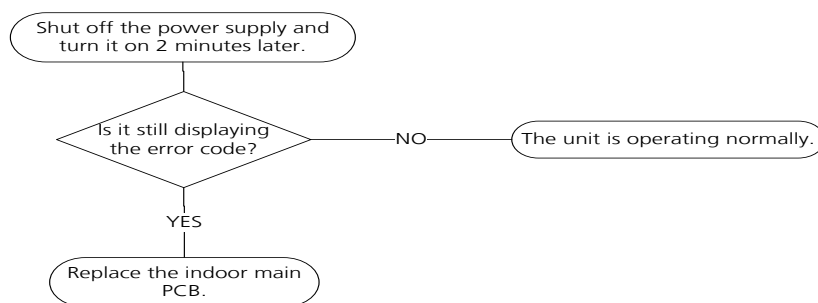
## 5.2 E0 (EEPROM parameter error)

**Description:** Indoor PCB main chip does not receive feedback from EEPROM chip.

**Recommended parts to prepare:**

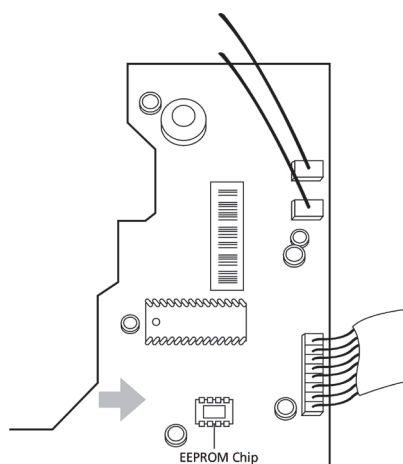
- Indoor PCB

**Troubleshooting and repair:**



**Remarks:**

The location of the EEPROM chip on the indoor PCB is shown in the following image:



**Note:** These images are for reference only.

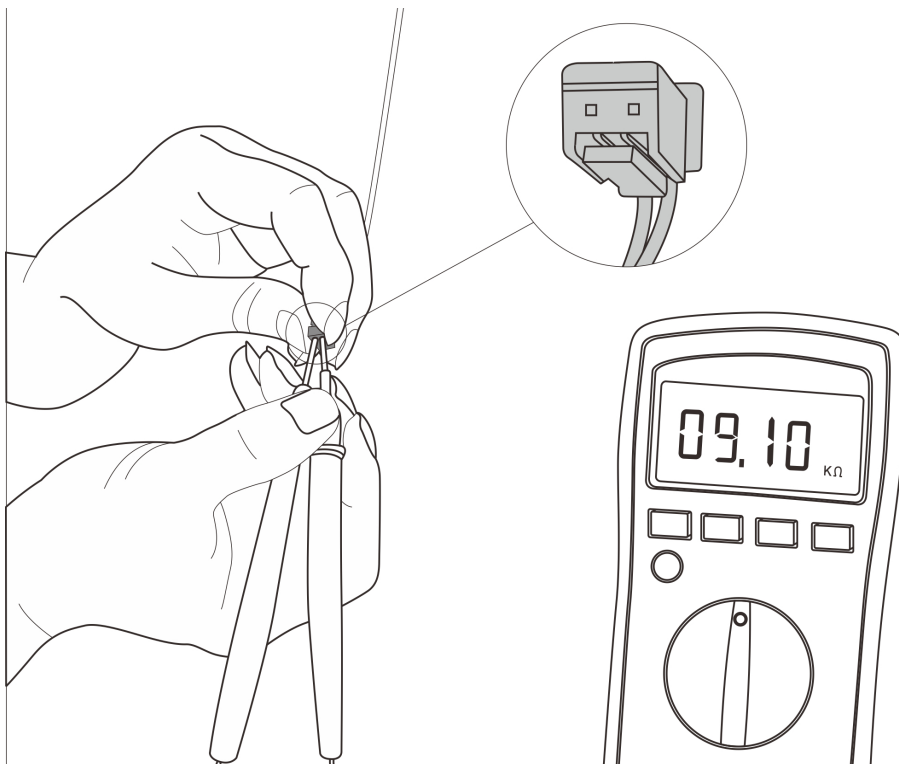
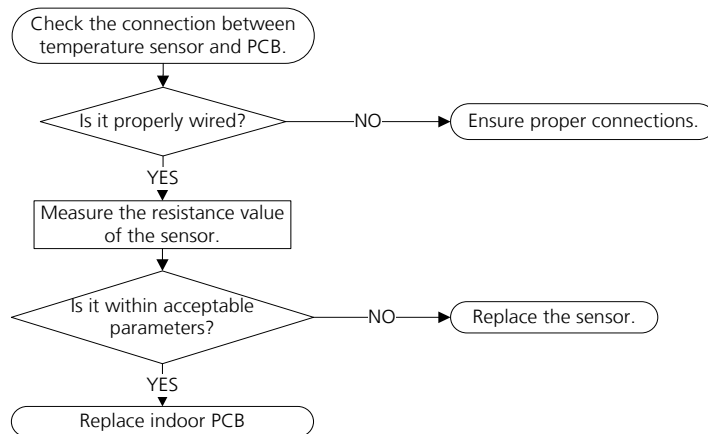
### 5.3 E4/E5(Open circuit or T1 or T2 short circuit of temperature sensor diagnosis and solution)

**Description:** If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the failure.

**Recommended parts to prepare:**

- Wiring mistake
- Sensor
- PCB

**Troubleshooting and repair:**



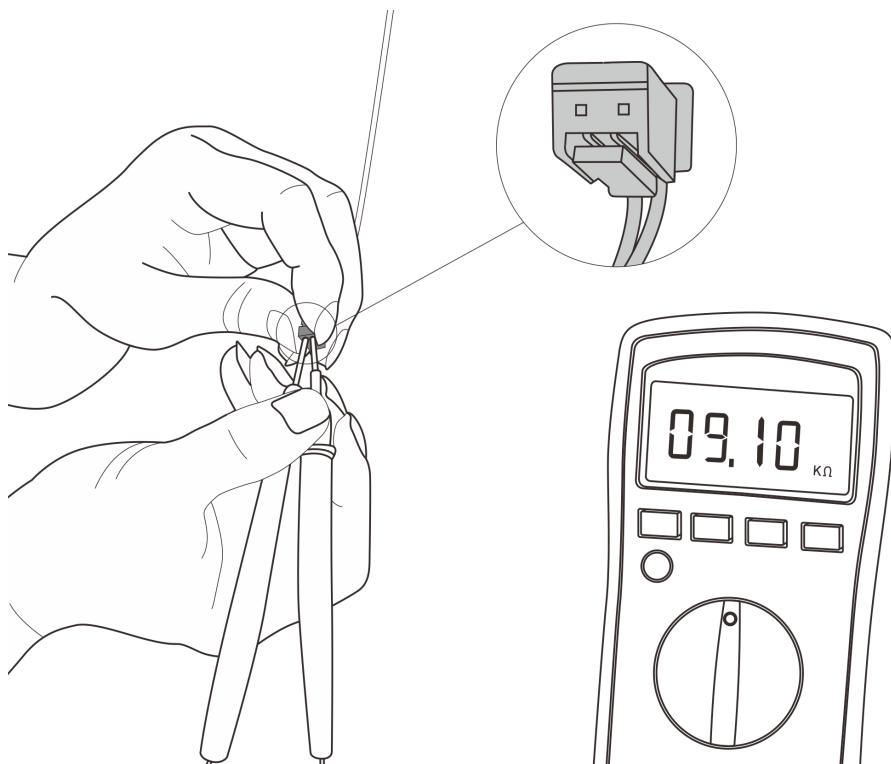
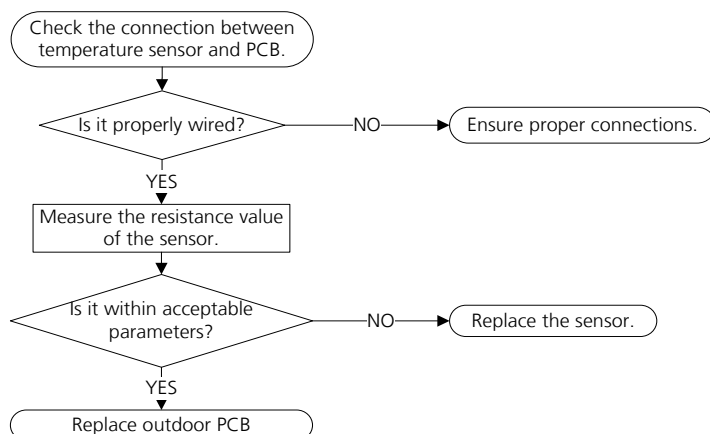
## 5.4 F2/F1(Open circuit or short circuit of T3 or T4 diagnosis and solution)(for some models)

**Description:** If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the failure.

**Recommended parts to prepare:**

- Wiring
- Sensor
- Outdoor PCB

**Troubleshooting and repair:**



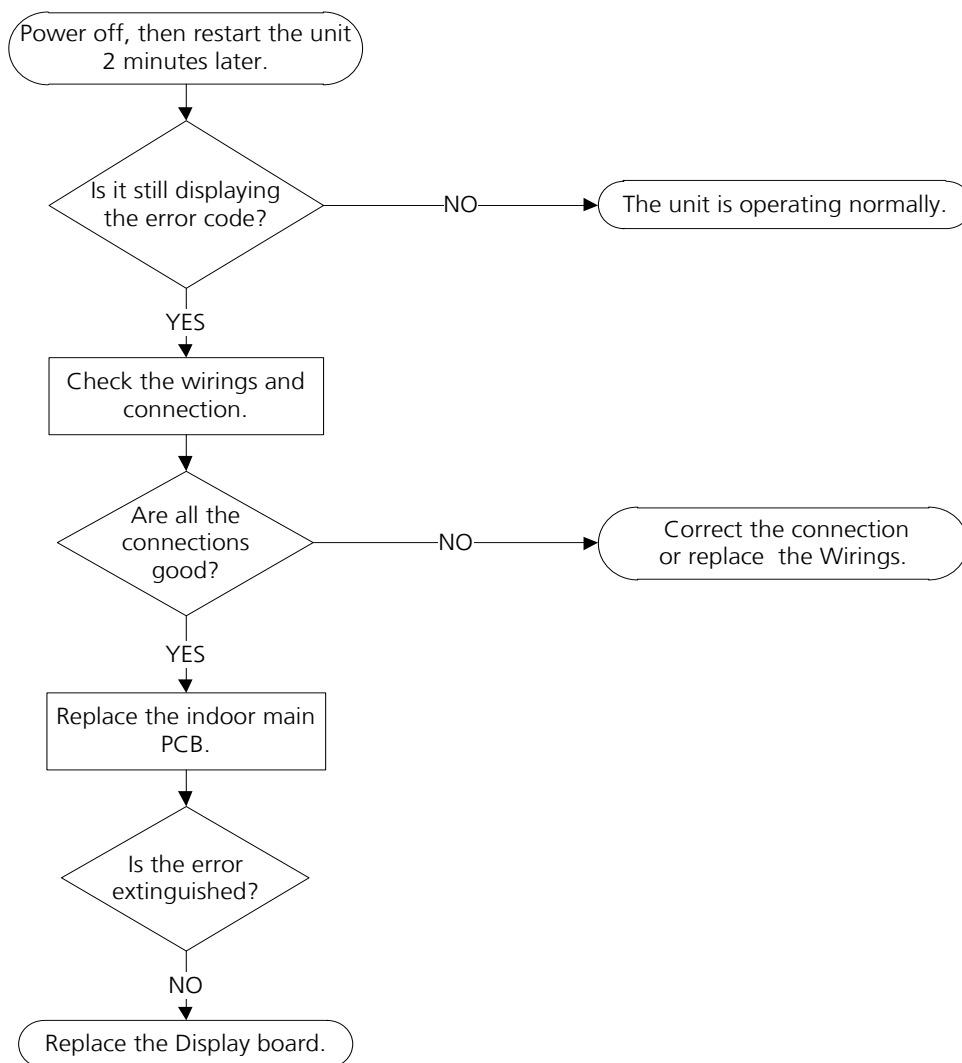
## 5.5 Eb( (Indoor PCB /Display board communication error)

**Description:** Indoor PCB does not receive feedback from Display board.

**Recommended parts to prepare:**

- Wiring
- Indoor PCB
- Display board

**Troubleshooting and repair:**



## 5.6 EC (Refrigerant Leakage Detection diagnosis and solution)(for some models)

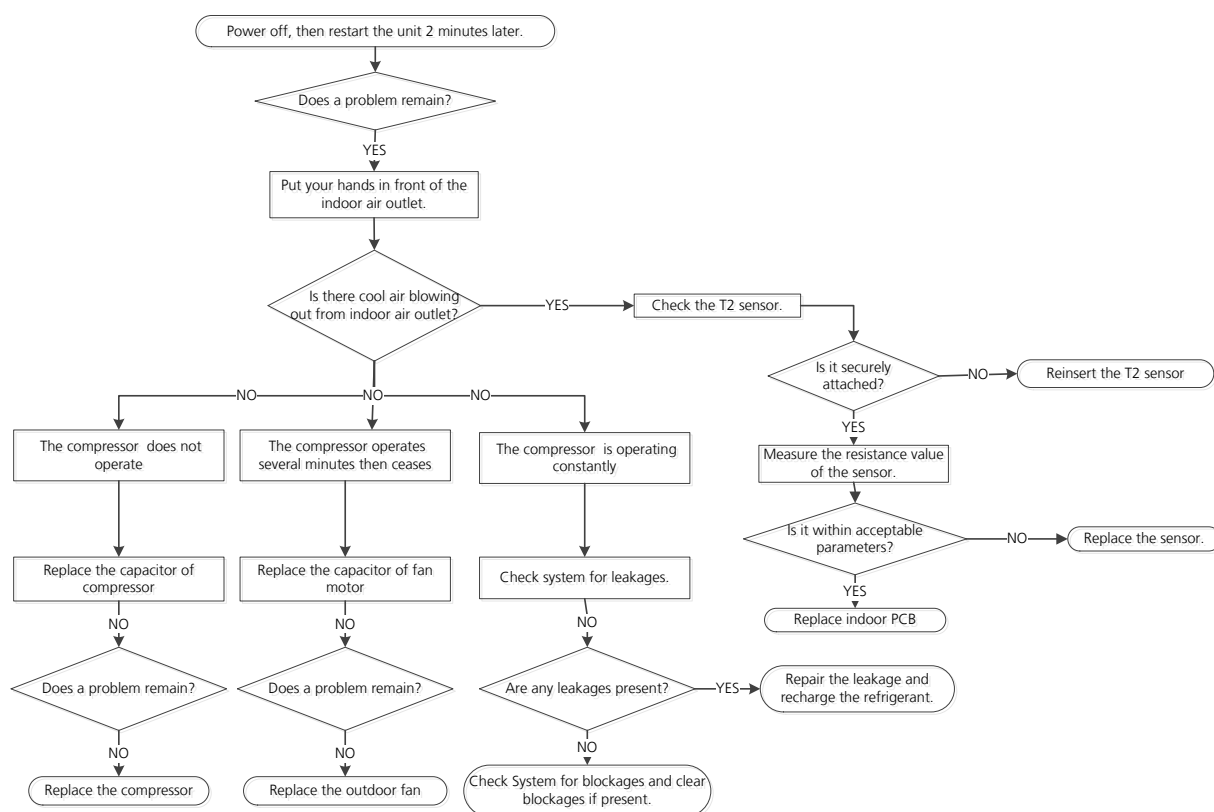
**Description:** Define the evaporator coil temp.T2 of the compressor just starts running as Tcool.

In the beginning 8 minutes after the compressor starts up, if  $T2 < T_{cool} - 1^{\circ}\text{C}$  does not keep continuous 4 seconds and compressor running frequency higher than 50Hz does not keep continuous 3 minutes, and this situation happens 3 times, the display area will show "EC" and AC will turn 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:





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# Appendix

## Contents

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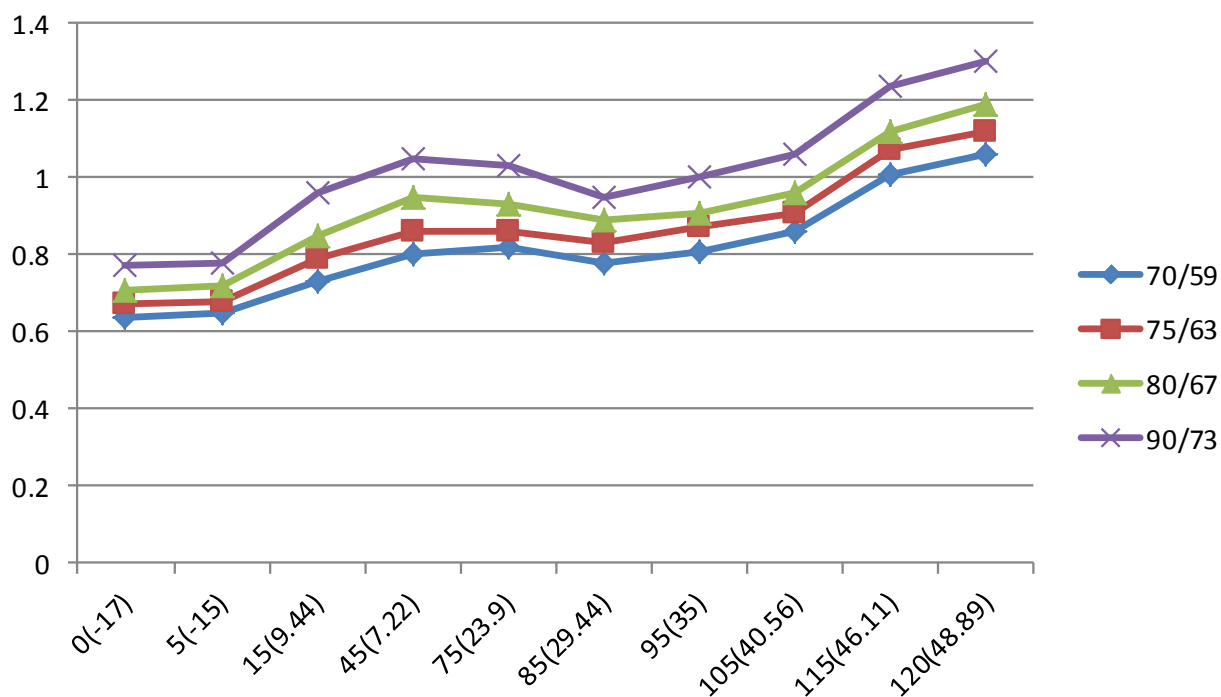
## i) Temperature Sensor Resistance Value Table for T1,T2,T3 and T4 (°C – K)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	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	84.219	25	77	10	65	149	1.96532	105	221	0.54448
-14	7	79.311	26	79	9.55074	66	151	1.89627	106	223	0.52912
-13	9	74.536	27	81	9.12445	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.33566	69	156	1.70547	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.38703	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.34105	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.39689	79	174	1.2133	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.09958	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.03069	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.8795	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.85248	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.63682	97	207	0.68844	137	279	0.23338
18	64	13.918	58	136	2.53973	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.44677	99	210	0.64862	139	282	0.22231

## ii) Pressure On Service Port

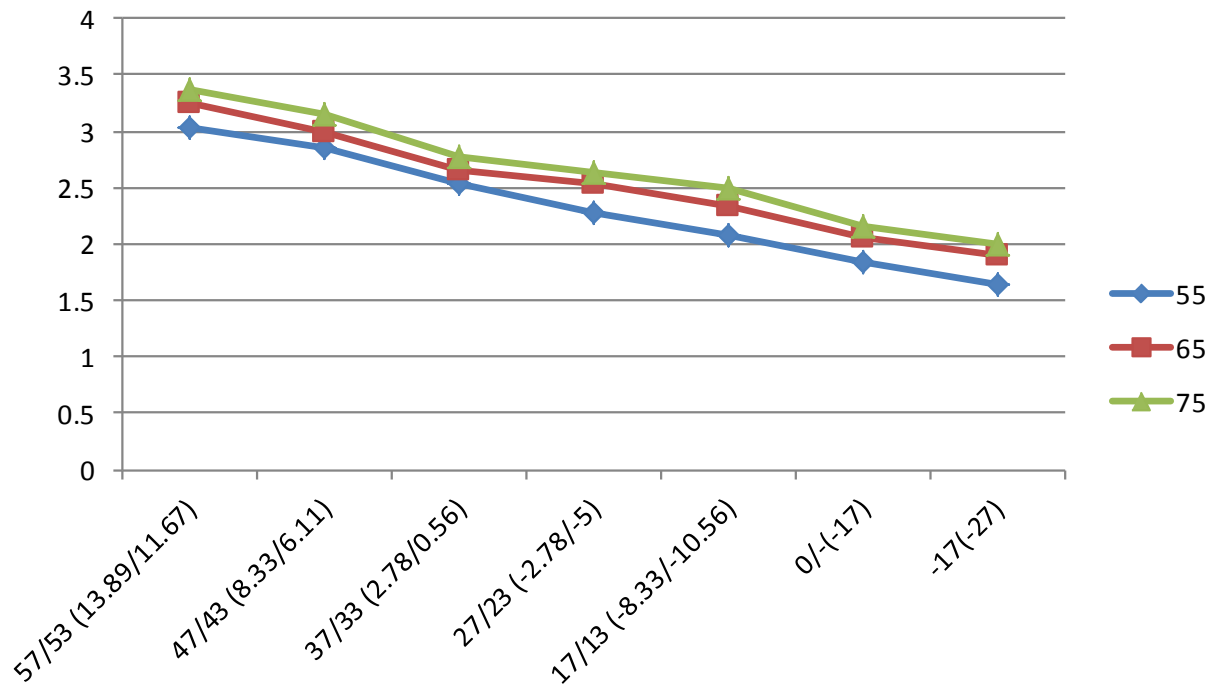
### Cooling chart(R410A):

°F(°C)	ODU(DB) IDU(DB/WB)	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)
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	94	106	116	119	113	117	125	147	154
	75/63 (23.89/17.22)	97	99	115	125	124	120	126	132	155	162
	80/67 (26.67/19.44)	103	104	123	138	135	129	132	140	162	173
	90/73 (32.22/22.78)	112	113	139	152	149	138	145	154	180	189
MPa	70/59 (21.11/15)	0.64	0.65	0.73	0.8	0.82	0.78	0.81	0.86	1.01	1.06
	75/63 (23.89/17.22)	0.67	0.68	0.79	0.86	0.86	0.83	0.87	0.91	1.07	1.12
	80/67 (26.67/19.44)	0.71	0.72	0.85	0.95	0.93	0.89	0.91	0.96	1.12	1.19
	90/73 (32.22/22.78)	0.77	0.78	0.96	1.05	1.03	0.95	1	1.06	1.24	1.3



## Heating chart(R410A):

°F(°C)	ODU(DB/WB) IDU(DB)	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/- 10.56)	0/-2 (-17/-19)	-17/-18 (-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	413	367	330	302	268	239
	65(18.33)	471	435	386	368	339	297	276
	75(23.89)	489	457	403	381	362	312	290
MPa	55(12.78)	3.03	2.85	2.53	2.28	2.08	1.85	1.65
	65(18.33)	3.25	3.00	2.66	2.54	2.33	2.05	1.90
	75(23.89)	3.38	3.15	2.78	2.63	2.49	2.15	2.00



## System Static Pressure Table-R410A

Pressure			Temperature		Pressure			Temperature	
Kpa	bar	PSI	°C	°F	Kpa	bar	PSI	°C	°F
100	1	14.5	-51.623	-60.921	2350	23.5	340.75	38.817	101.871
150	1.5	21.75	-43.327	-45.989	2400	24	348	39.68	103.424
200	2	29	-36.992	-34.586	2450	24.5	355.25	40.531	104.956
250	2.5	36.25	-31.795	-25.231	2500	25	362.5	41.368	106.462
300	3	43.5	-27.351	-17.232	2550	25.5	369.75	42.192	107.946
350	3.5	50.75	-23.448	-10.206	2600	26	377	43.004	109.407
400	4	58	-19.953	-3.915	2650	26.5	384.25	43.804	110.847
450	4.5	65.25	-16.779	1.798	2700	27	391.5	44.592	112.266
500	5	72.5	-13.863	7.047	2750	27.5	398.75	45.37	113.666
550	5.5	79.75	-11.162	11.908	2800	28	406	46.136	115.045
600	6	87	-8.643	16.444	2850	28.5	413.25	46.892	116.406
650	6.5	94.25	-6.277	20.701	2900	29	420.5	47.638	117.748
700	7	101.5	-4.046	24.716	2950	29.5	427.75	48.374	119.073
750	7.5	108.75	-1.933	28.521	3000	30	435	49.101	120.382
800	8	116	0.076	32.137	3050	30.5	442.25	49.818	121.672
850	8.5	123.25	1.993	35.587	3100	31	449.5	50.525	122.945
900	9	130.5	3.826	38.888	3150	31.5	456.75	51.224	124.203
950	9.5	137.75	5.584	42.052	3200	32	464	51.914	125.445
1000	10	145	7.274	45.093	3250	32.5	471.25	52.596	126.673
1050	10.5	152.25	8.901	48.022	3300	33	478.5	53.27	127.886
1100	11	159.5	10.471	50.848	3350	33.5	485.75	53.935	129.083
1150	11.5	166.75	11.988	53.578	3400	34	493	54.593	130.267
1200	12	174	13.457	56.223	3450	34.5	500.25	55.243	131.437
1250	12.5	181.25	14.879	58.782	3500	35	507.5	55.885	132.593
1300	13	188.5	16.26	61.268	3550	35.5	514.75	56.52	133.736
1350	13.5	195.75	17.602	63.684	3600	36	522	57.148	134.866
1400	14	203	18.906	66.031	3650	36.5	529.25	57.769	135.984
1450	14.5	210.25	20.176	68.317	3700	37	536.5	58.383	137.089
1500	15	217.5	21.414	70.545	3750	37.5	543.75	58.99	138.182
1550	15.5	224.75	22.621	72.718	3800	38	551	59.591	139.264
1600	16	232	23.799	74.838	3850	38.5	558.25	60.185	140.333
1650	16.5	239.25	24.949	76.908	3900	39	565.5	60.773	141.391
1700	17	246.5	26.074	78.933	3950	39.5	572.75	61.355	142.439
1750	17.5	253.75	27.174	80.913	4000	40	580	61.93	143.474
1800	18	261	28.251	82.852	4050	40.5	587.25	62.499	144.498
1850	18.5	268.25	29.305	84.749	4100	41	594.5	63.063	145.513
1900	19	275.5	30.338	86.608	4150	41.5	601.75	63.62	146.516
1950	19.5	282.75	31.351	88.432	4200	42	609	64.172	147.510
2000	20	290	32.344	90.219	4250	42.5	616.25	64.719	148.494
2050	20.5	297.25	33.319	91.974	4300	43	623.5	65.259	149.466
2100	21	304.5	34.276	93.697	4350	43.5	630.75	65.795	150.431
2150	21.5	311.75	35.215	95.387	4400	44	638	66.324	151.383
2200	22	319	36.139	97.050	4450	44.5	645.25	66.849	152.328
2250	22.5	326.25	37.047	98.685	4500	45	652.5	67.368	153.262
2300	23	333.5	37.939	100.290					