

# Service Manual

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## SAFETY CONSIDERATIONS

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc.). Only trained, qualified installers and service mechanics should 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 working on the equipment, observe the precautions in the literature and on tags, stickers, and labels attached to the equipment. Follow all safety codes. Wear safety glasses and work gloves. Keep a quenching cloth and fire extinguisher nearby when brazing. Use care in handling, rigging, and setting bulky equipment.

Read this manual thoroughly and follow all warnings or cautions included in the literature and attached to the unit. Consult the local building codes and National Electrical Code (NEC) for special requirements.

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: **DANGER**, **WARNING**, and **CAUTION**.


These words are used with the safety-alert symbol. **DANGER** identifies the most serious hazards which will result in severe personal injury or death. **WARNING** signifies hazards which could result in personal injury or death.


**CAUTION** is used to identify unsafe practices which may result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation.


WARNING


**ELECTRICAL SHOCK HAZARD**  
 Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing the system, the 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.


WARNING



**EXPLOSION HAZARD**  
 Failure to follow this warning could result in death, serious personal injury, and/or property damage. Never use air or gases containing oxygen for leak testing or operating refrigerant compressors. Pressurized mixtures of air or gases containing oxygen can lead to an explosion.


CAUTION

**EQUIPMENT DAMAGE HAZARD**

Failure to follow this caution may result in equipment damage or improper operation.

**Do not** bury more than 36 in. (914 mm) of refrigerant pipe in the ground. If any section of pipe is buried, there must be a 6 in. (152 mm) vertical rise to the valve connections on the outdoor units. If more than the recommended length is buried, refrigerant may migrate to the cooler buried section during extended periods of system shutdown. This causes refrigerant slugging and could possibly damage the compressor at start-up.

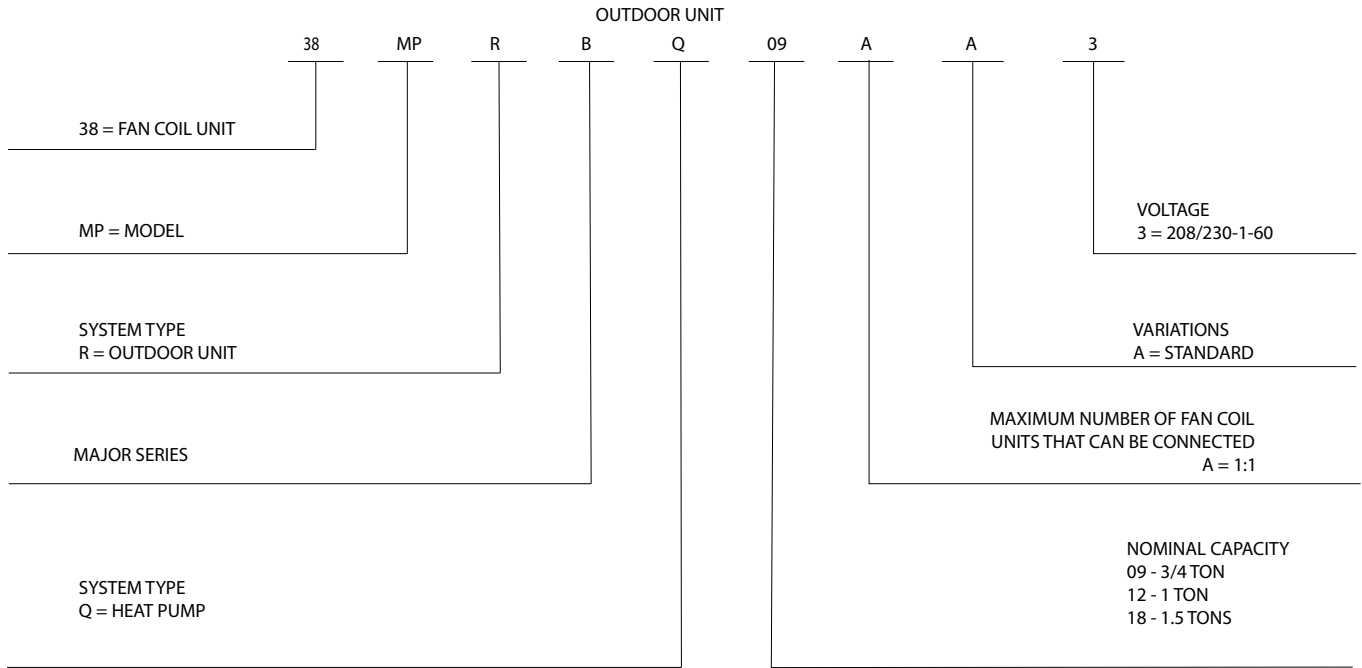
## INTRODUCTION

This service manual provides the necessary information to service, repair, and maintain the indoor units. Section 2 of this manual has an appendix with data required to perform troubleshooting. Use the “TABLE OF CONTENTS” to locate a desired topic.

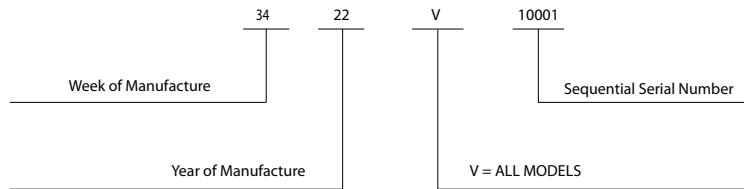
# MODEL NUMBER NOMENCLATURE

**Table 1 —Unit Sizes**

SYSTEMS TONS	KBTUH	VOLTAGE/PH/HZ	OUTDOOR MODEL
0.75	9,000	208-230/1/60	38MPRBQ09AA3
1.00	12,000		38MPRBQ12AA3
1.50	18,000		38MPRBQ18AA3



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Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to [www.ahridirectory.org](http://www.ahridirectory.org).



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## WIRING

All wires must be sized per NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes.

Per the caution note, only stranded copper conductors with a 600 volt insulation rating wire must be used.

### **Recommended Connection Method for Power and Communication Wiring:**

The main power is supplied to the outdoor unit. The field supplied 14/3 stranded wire with ground with a 600 volt insulation rating, power/communication wiring from the outdoor unit to indoor unit consists of four (4) wires and provides the power for the indoor unit. Two wires are line voltage AC power, one is communication wiring (S) and the other is a ground wire. Wiring between the indoor and outdoor unit is polarity sensitive. The use of BX wire is **NOT RECOMMENDED!**

If installed in a high Electromagnetic field (EMF) area and communication issues exists, a 14/2 stranded shielded wire can be used to replace L2 and (S) between the outdoor unit and indoor unit landing the shield onto ground in the outdoor unit only.



## CAUTION

### **EQUIPMENT DAMAGE HAZARD**

Failure to follow this caution may result in equipment damage or improper operation.

Wires should be sized based on NEC and local codes.



## CAUTION

### **EQUIPMENT DAMAGE HAZARD**

Failure to follow this caution may result in equipment damage or improper operation.

Be sure to comply with local codes while running wire from the indoor unit to the outdoor unit.

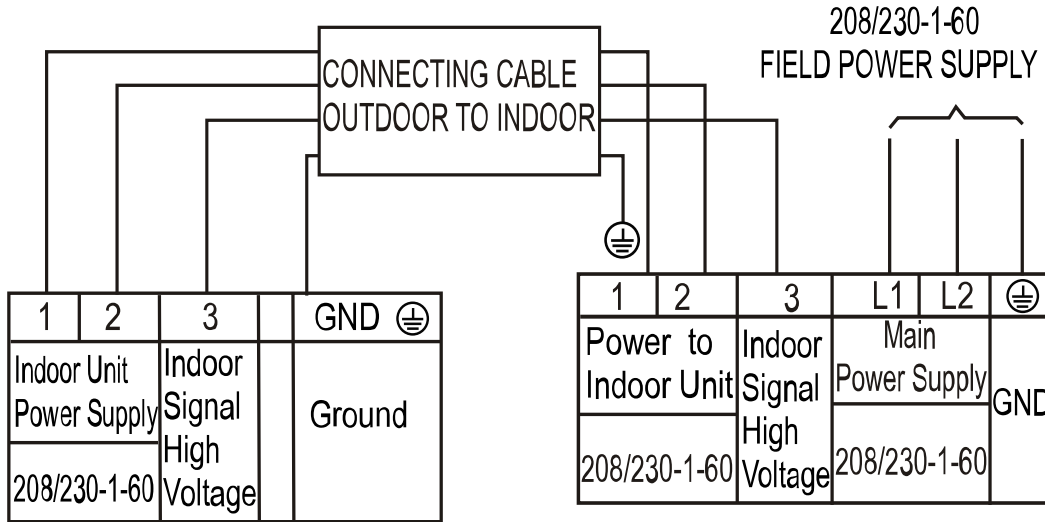
Every wire must be connected firmly. Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Ensure all wiring is tightly connected.

No wire should touch the refrigerant tubing, compressor or any moving parts.

Disconnecting means must be provided and shall be located within sight and readily accessible from the air conditioner.

Connecting cable with conduit shall be routed through the hole in the conduit panel.

# CONNECTION DIAGRAM



**Fig. 1 —Connection Diagram**

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**NOTES:**

1. Do not use thermostat wire for any connection between the indoor and outdoor units.
2. All connections between the indoor and outdoor units must be as shown. The connections are polarity sensitive and improper wiring will result in a fault code (E1). **Double check the control wiring before applying power to the outside unit.**

# WIRING DIAGRAM

Sizes 09K to 12K

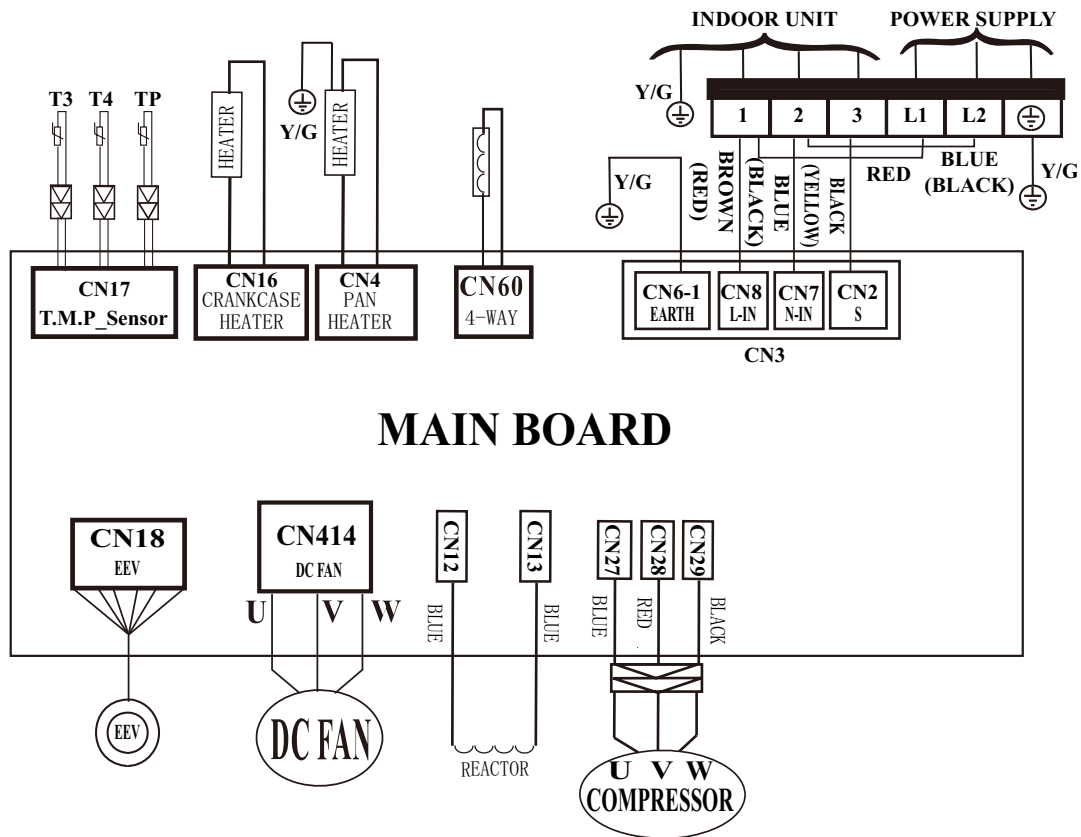


Fig. 2 —Wiring Diagram - Sizes 09K and 12K

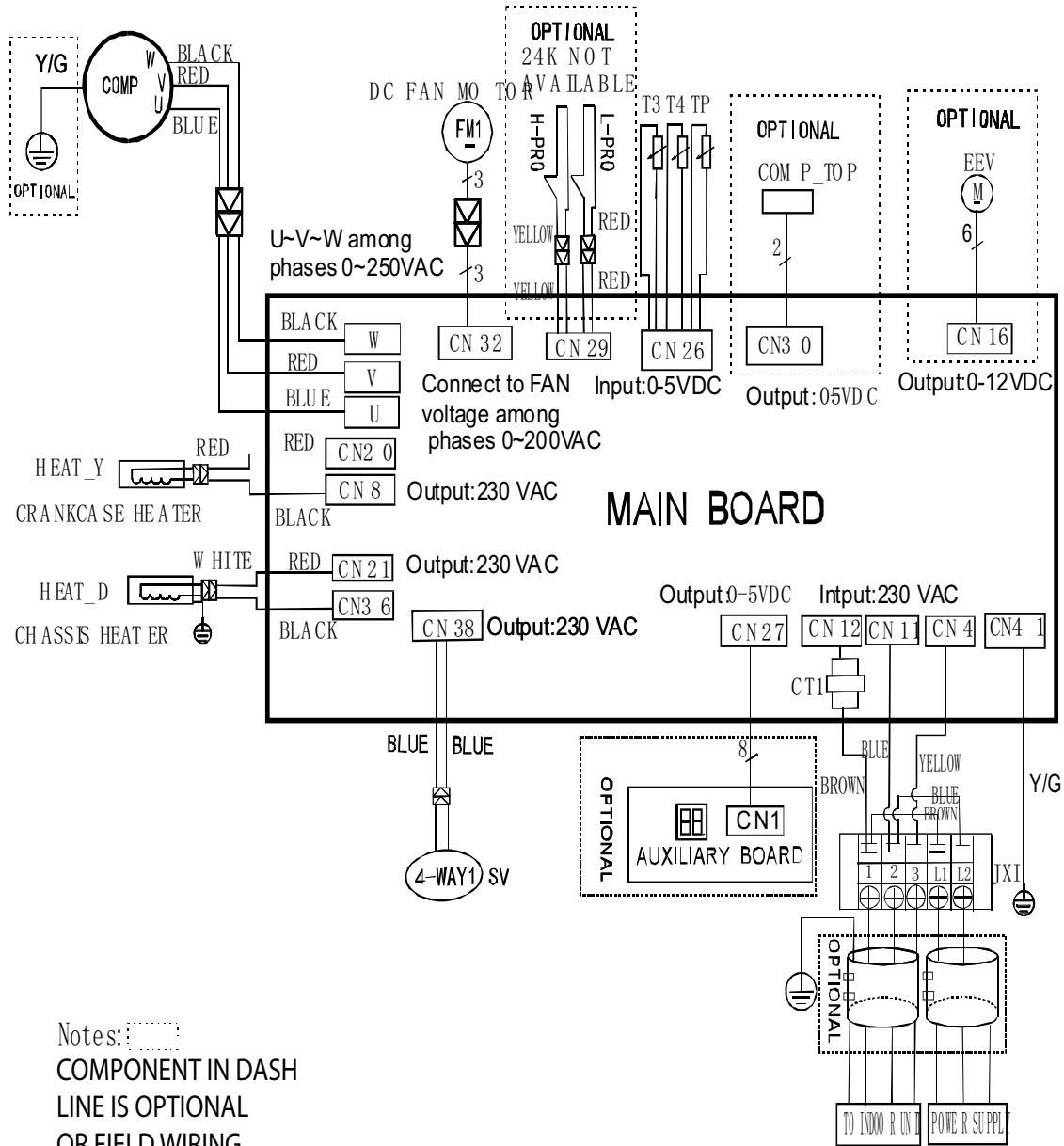
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Table 2 — Wiring Diagram - Sizes 09K and 12K

		CN18	OUTPUT	12V	DC
		CN12/13	INPUT	230V	AC
		CN2/7/8	INPUT	230V	AC
		CN414	OUTPUT	0~310V	AC
		CN60	OUTPUT	230V	AC
<b>T3</b>	Condenser TEMP Sensor	CN17	OUTPUT	0~5V	DC
<b>T4</b>	Ambient TEMP Sensor				
<b>TP</b>	Discharge TEMP Sensor				
		CN16	OUTPUT	230V	AC
		CN4	OUTPUT	230V	AC
		CN27/28/29	OUTPUT	0~310V	AC

**WIRING DIAGRAM (CONT)**

Size 18K

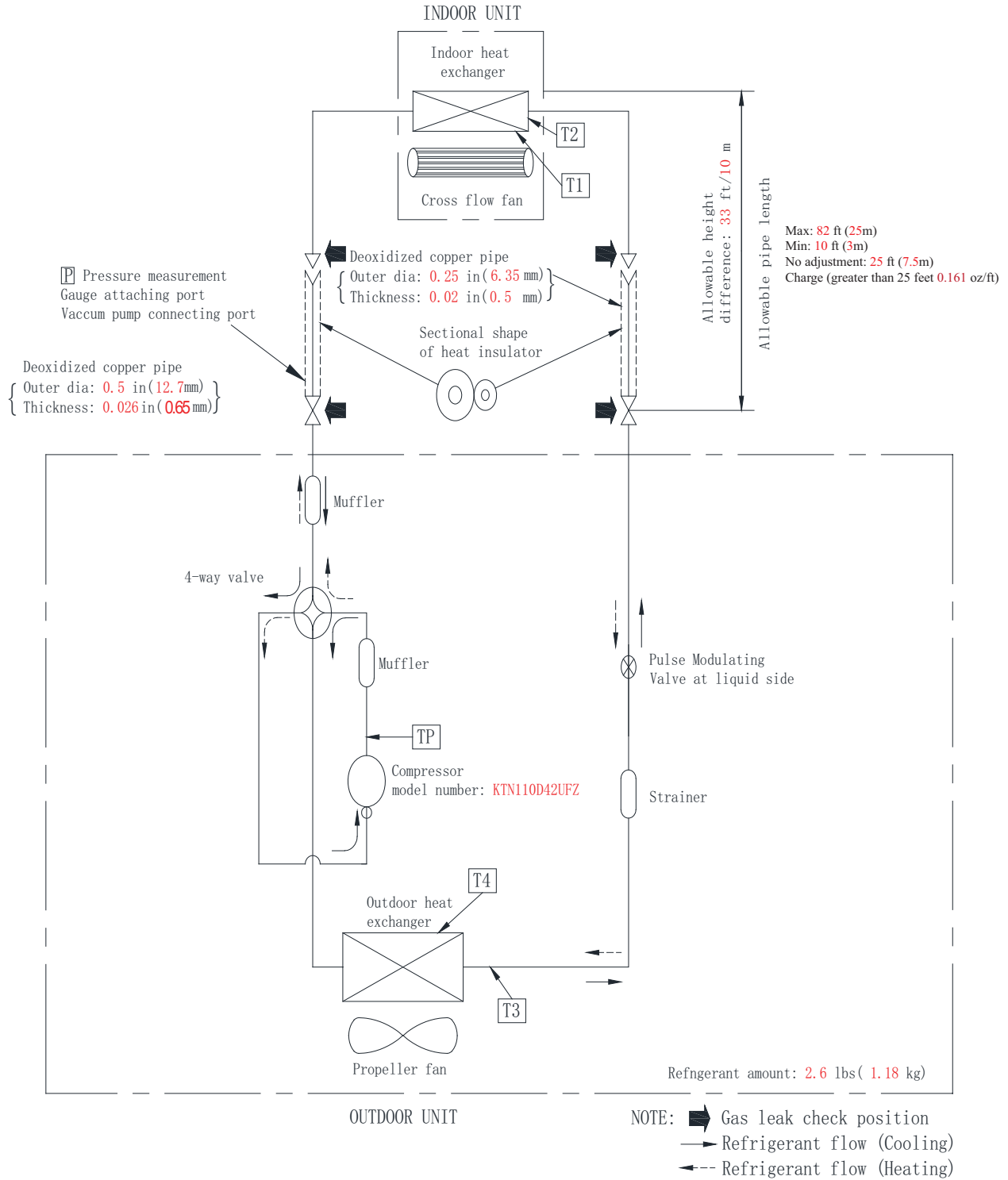


**Fig. 3 —Wiring Diagram - Size 18K**

**Table 3 — Wiring Diagram - Size 18K (208/230V)**

CODE	PART NAME
JX1	Terminal Block
COMP_TOP	Compressor Top OLP Temperature Sensor
EEV	Electronic Expansion Valve
FM1	DC Fan Motor
COMP	Compressor
HEAT_Y	Crankcase Heater
CT1	AC Current Detector
H-PRO	High Pressure Switch
L-PRO	Low Pressure Switch
SV	Reverse Valve
TP	COMP. Discharge Temperature Sensor
T3	Coil Temperature Sensor
T4	Outdoor Ambient Temperature Sensor
HEAT_D	Chassis Heater

# REFRIGERATION CYCLE DIAGRAM SIZES 9-12K



**Fig. 4 —Refrigeration Cycle Diagram Sizes 9 - 12K**

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# REFRIGERATION CYCLE DIAGRAM SIZE 18K

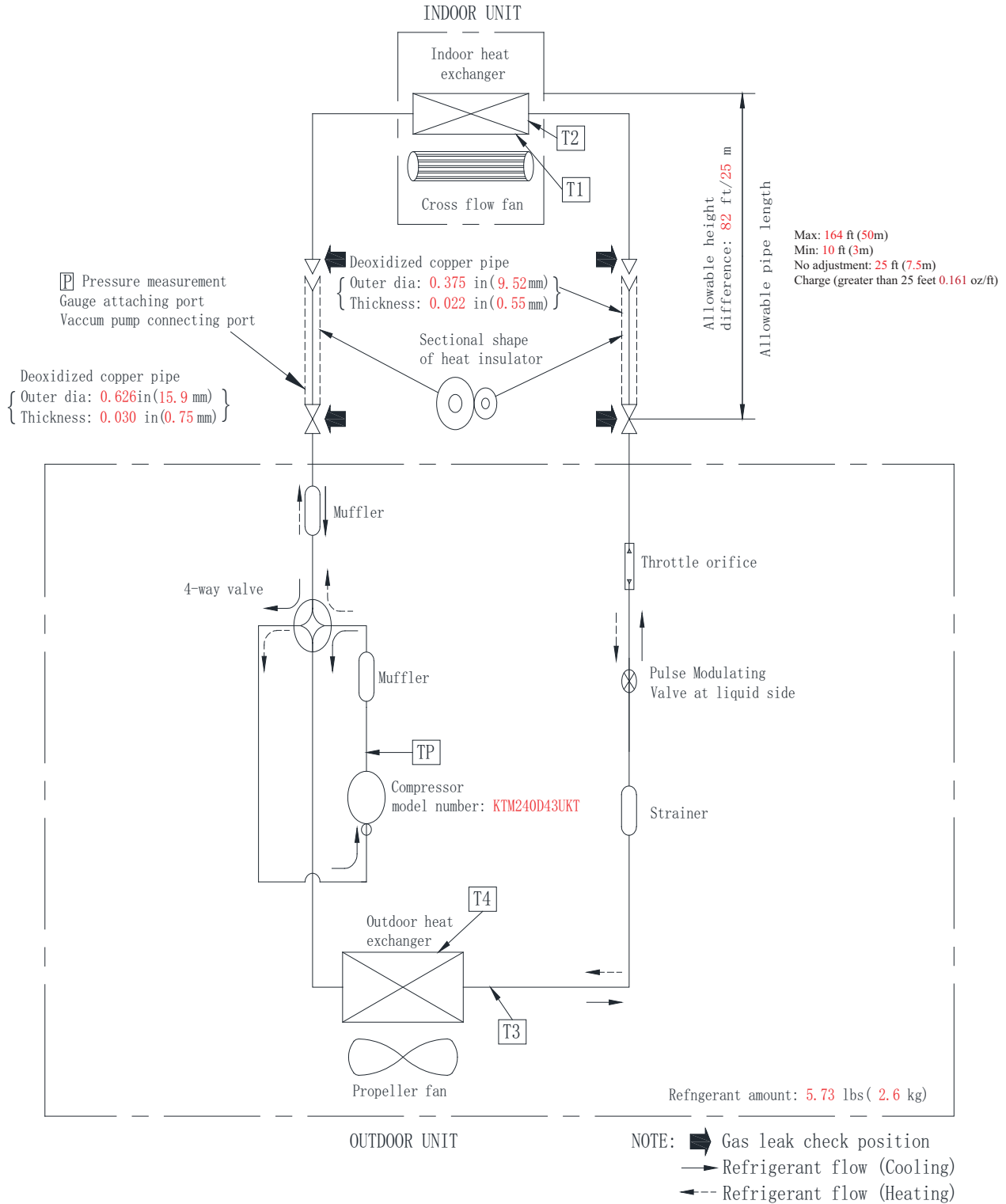


Fig. 5 — Refrigeration Cycle Diagram Size 18K



## REFRIGERANT LINES

### General Refrigerant Line Sizing

1. The outdoor units are shipped with a full charge of R410A refrigerant. All charges, line sizing, and capacities are based on runs of 25 ft. (7.6 m). For runs over 25 ft. (7.6 m), consult “Long Line Applications:” for the proper charge adjustments.
2. The minimum refrigerant line length between the indoor and outdoor units is 10 ft. (3 m).
3. Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, not more than 36 in (914 mm) should be buried. Provide a minimum 6 in (152 mm) vertical rise to the service valves to prevent refrigerant migration.
4. Both lines must be insulated. Use a minimum of 1/2 in. (12.7 mm) thick insulation. Closed-cell insulation is recommended in all long line applications.
5. Special consideration should be given to isolating the interconnecting tubing from the building structure. Isolate the tubing so vibration or noise is not transmitted into the structure.

**IMPORTANT: Both refrigerant lines must be insulated separately.**

Table 4 lists the maximum allowed lengths.

**Table 4 — Piping and Refrigerant Information**

OUTDOOR SYSTEM SIZE			9K	12K	18K
Piping	Min. Piping Length per each indoor unit	ft. (m)	9.8 (3)	9.8 (3)	9.8 (3)
	Standard Piping Length per each indoor unit	ft. (m)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)
	Max. outdoor-indoor height difference (OU higher than IU)	ft. (m)	32.8 (10)	32.8 (10)	82.0 (25)
	Max. outdoor-indoor height difference (IU higher than OU)	ft. (m)	32.8 (10)	32.8 (10)	82.0 (25)
	Max. Piping Length with no additional refrigerant charge per System (Standard Piping length x No. of Zones)	ft. (m)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)
	Total Maximum Piping Length per system	ft. (m)	82 (25)	82 (25)	164(50)
	Additional refrigerant charge (between Standard – Max piping length)	Oz/ft (g/m)	0.161(15)	0.161(15)	0.322 (30)
	Suction Pipe (size - connection type)	in (mm)	ø1/2" (12.7)	ø1/2" (12.7)	Ø5/8" (15.9)
	Liquid Pipe (size - connection type)	in (mm)	ø1/4" (6.35)	ø1/4" (6.35)	Ø3/8" (9.52)
Refrigerant	Refrigerant Type Heat Pump Models Charge Amount		R410A	R410A	R410A
		Lbs (kg)	3.31 (1.5)	3.31 (1.5)	5.73(2.6)

### Long Line Applications:

No change in line-set diameter size is required.

# SYSTEM EVACUATION AND CHARGING

⚠ CAUTION

**UNIT DAMAGE HAZARD**  
 Failure to follow this caution may result in equipment damage or improper operation. Never use the system compressor as a vacuum pump.

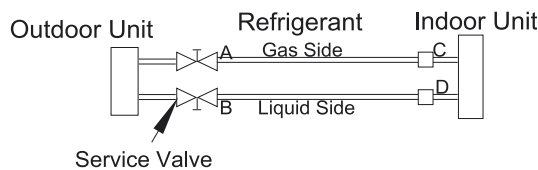
Refrigerant tubes and indoor coil should be evacuated using the recommended deep vacuum method of 500 microns. Always break a vacuum with dry nitrogen.

## System Vacuum and Charge

**NOTE: DO NOT** open the service valves until unit evacuation procedure is complete.

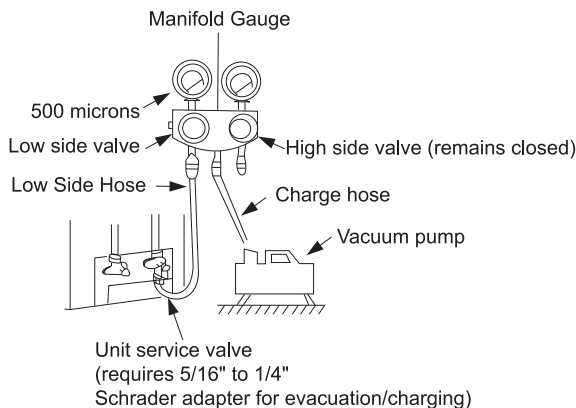
### Using Vacuum Pump

1. Completely tighten all the flare nuts and connect the manifold gage charge hose to a charge port of the low side service valve (see Fig. 6).
2. Connect the charge hose to the vacuum pump.
3. Fully open the low side of the manifold gage (see Fig. 7).
4. Start the vacuum pump.
5. Evacuate using the triple evacuation method.
6. After the evacuation is complete, fully close the low side of manifold gage and stop the vacuum pump operation.
7. The factory charge contained in the outdoor unit is good for up to 25 ft. (8 m) of line length.
8. Disconnect the charge hose from the charge connection of the low side service valve.
9. Fully open the service valves; B and A.
10. Securely tighten the service valve caps.



**Fig. 6 — Service Valve**

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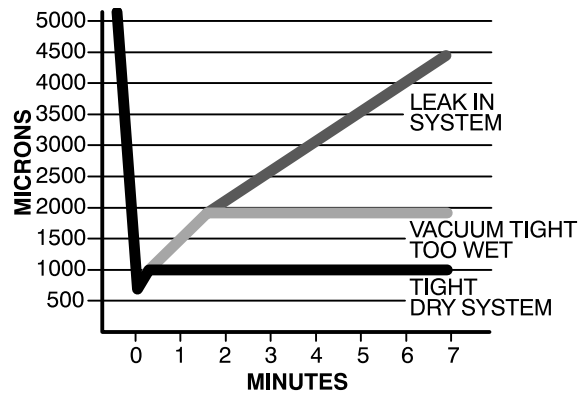


**Fig. 7 —Manifold**

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### Deep Vacuum Method

The deep vacuum method requires a vacuum pump capable of pulling a vacuum of 500 microns and a vacuum gage capable of accurately measuring the vacuum depth. The deep vacuum method is the most positive way of assuring a system is free of air and liquid water (see Fig. 8).



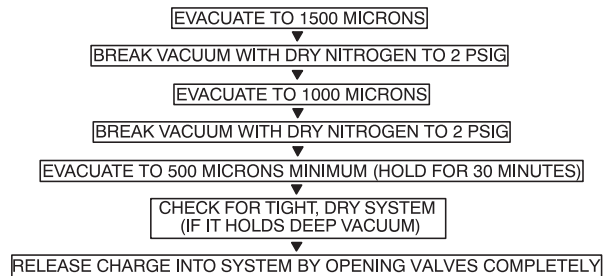
**Fig. 8 — Deep Vacuum Graph**

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### Triple Vacuum Method

The triple evacuation method should be used. Refer to Fig. 9 and proceed as follows:

1. Pump the system down to 1500 microns and allow the pump to continue operating for an additional 15 minutes.
2. Close the service valves and shut off the vacuum pump.
3. Connect a dry nitrogen cylinder and regulator to the system and break the vacuum until the system reaches 2 psig.
4. Close the service valve and allow the system to stand for 1hr. During this time, the dry nitrogen can diffuse throughout the system absorbing moisture.
5. Pump the system down to 1000 microns.
6. Break the vacuum with dry nitrogen (2 psig).
7. Pump the system down to 500 microns.
8. Perform the hold test for 30 minutes.



**Fig. 9 —Triple Evacuation Method**

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### Final Tubing Check

**IMPORTANT:** Ensure that the factory tubing, on both the indoor and outdoor units, has not shifted during shipment. Ensure tubes are not rubbing against each other or any sheet metal. Pay close attention to feeder tubes to ensure the wire ties on the feeder tubes are secure and tight.

## Operation Modes and Functions - 9K-12K

### Abbreviation

**Table 5 — Unit Element Abbreviations**

ABBREVIATION	ELEMENT
T1	Indoor room temperature
T2	Evaporator Coil temperature
T3	Condenser Coil temperature
T4	Outdoor ambient temperature
Tsc	Adjusted setting temperature
TP	Compressor discharge temperature

### Safety Features

#### Compressor Three-Minute Delay at Restart

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

#### Automatic shutoff based on discharge temperature

If the compressor discharge temperature exceeds 226°F (108°C) for nine seconds, the compressor ceases operation.

#### Automatic shutoff based on fan speed

If the indoor fan speed registers below 300RPM or over 1500RPM for an extended period of time, the unit ceases operation and the corresponding error code appears on the indoor unit.

#### Inverter module protection

The inverter module has an automatic shutoff mechanism based on the unit's current, voltage, and temperature. If the automatic shutoff is initiated, the corresponding error code appears on the indoor unit and the unit ceases operation.

#### Indoor fan delayed operation

- When the unit starts, the louver is automatically activated and the indoor fan will operate after a period of setting time or when the louver is in place.
- If the unit is in the **HEATING** mode, the indoor fan is regulated by the anti-cold wind function.

#### Compressor Preheating

Preheating is automatically activated when the T4 sensor is lower than the setting temperature.

#### Sensor redundancy and automatic shutoff

- If one temperature sensor malfunctions, the air conditioner continues operation and displays the corresponding error code, allowing for emergency use.
- When more than one temperature sensor malfunctions, the air conditioner stops.

## Display Function




### Unit Display Functions



**Fig. 10 — Unit Display Functions**

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**Table 6 — Unit Function Displays**

FUNCTION	DISPLAY
Temperature	Set temperature value
Temperature (FAN and DRYING mode)	Room temperature
Activation of Timer ON, Fresh, Swing, Turbo, or Silent	<b>ON</b> <sub>(3S)</sub>
Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent	<b>OF</b> <sub>(3S)</sub>
Defrost	<b>dF</b>
Self-clean	<b>SC</b>
Heating in room temp under 46°F (8°C) or 54°F (12°C)	<b>FP</b>
Fresh ( <b>Not available on these systems</b> )	
ECO function	
Wi-Fi Control	
The current operation power ( <b>Not available on these systems</b> )	<b>kW</b>

## FAN Mode

When the **FAN** mode is activated:

- The outdoor fan and compressor stop.
- Temperature control is disabled and the indoor room temperature is displayed.
- The indoor fan speed can be set to 1%~100%, or **AUTO**.
- The louver operations are identical to those in **COOLING** mode.
- Auto fan: In **FAN-ONLY** mode, the AC operates the same as auto fan in the **COOLING** mode with the temperature set at 75°F (24°C). (Tsc=75°F (24°C)).

## COOLING Mode

### Compressor Control

Reach the configured temperature:

1. When the compressor runs continuously for less than 120 minutes:
  - If the following conditions are satisfied, the compressor ceases operation.
    - While the calculated frequency (fb) is less than the minimum limit frequency (FminC).
    - While the protective time is more than or equal to ten minutes.
    - While T1 is lower than or equal to (Tsc-CDIFTEMP 31°F (-0.5°C))

**NOTE: CDIFTEMP is the EEPROM setting parameter. It is 4°F (2°C).**

2. When the compressor runs continuously for more than 120 minutes:
  - If the following conditions are satisfied, the compressor ceases operation.
    - When the calculated frequency (fb) is less than the minimum limit frequency (FminC).
    - When the protective time is more than or equal to ten minutes.
    - When T1 is lower than or equal to (Tsc-CDIFTEMP).

**NOTE: CDIFTEMP is the EEPROM setting parameter. It is 4°F (2°C).**

3. If one of the following conditions is satisfied, regardless of time:
  - The compressor running frequency is more than the test frequency.
  - When the compressor running frequency is equal to the test frequency, T4 is more than 59°F (15°C) or no T4 or T4 fault.
  - Change setting temperature
  - Turbo or sleep function on/off
  - Various frequency limit shutdown occurs

**NOTE: CDIFTEMP is EEPROM setting parameter. It is 4°F (2°C).**

### Indoor Fan Control

1. In the **COOLING** mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or **AUTO**.
2. **AUTO** fan
  - Descent Curve
    - When T1-Tsc is lower than or equal to 6°F (3.5°C), fan speed reduces to 80%;
    - When T1-Tsc is lower than or equal to 2°F (1°C), fan speed reduces to 60%;
    - When T1-Tsc is lower than or equal to 1°F (0.5°C), fan speed reduces to 40%;
    - When T1-Tsc is lower than or equal to 0°F (0°C), fan speed reduces to 20%;
    - When T1-Tsc is lower than or equal to -1°F (-0.5°C), fan speed reduces to 1%.
  - Rise Curve
    - When T1-Tsc is higher than 0°F (0°C), fan speed increases to 20%;
    - When T1-Tsc is higher than 1°F (0.5°C), fan speed increases to 40%;
    - When T1-Tsc is higher than 2°F (1°C), fan speed increases to 60%;
    - When T1-Tsc is higher than 3°F (1.5°C), fan speed increases to 80%;
    - When T1-Tsc is higher than 7°F (4°C), fan speed increases to 100%.

### Outdoor Fan Control

- The outdoor unit runs at a different fan speed according to T4 and the compressor running frequency.
- For different outdoor units, the fan speeds differ.

### Condenser Temperature Protection

When the condenser temperature exceeds a configured value, the compressor ceases operations.

### Evaporator Temperature Protection

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

## HEATING Mode

### Compressor Control

1. Reach the configured temperature:
  - If the following conditions are satisfied, the compressor stops:
    - While the calculated frequency (fb) is less than the minimum limit frequency (FminC).
    - When the protective time is more than or equal to ten minutes.
    - When T1 is higher than or equal to Tsc+HDIFTEMP2.

**NOTE: HDIFTEMP2 is the EEPROM setting parameter. It is 4°F (2°C).**

- If one of the following conditions is satisfied, regardless of time:
  - Compressor running frequency is more than test frequency.
  - When the compressor running frequency is equal to the test frequency, T4 is more than 59°F (15°C) or no T4 or T4 fault.
  - A change in the setting temperature.
  - **TURBO** or **SLEEP** function **ON** or **OFF**.
- 2. When the current is higher than the predefined safe value, the surge protection is activated, causing the compressor to cease operations.

### Indoor Fan Control

1. In the **HEATING** mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or muted.
2. **AUTO** fan
  - Rise curve
    - When T1-Tsc is higher than -3°F (-1.5°C), fan speed reduces to 80%;
    - When T1-Tsc is higher than 0°F (0°C), fan speed reduces to 60%;
    - When T1-Tsc is higher than 1°F (0.5°C), fan speed reduces to 40%;
    - When T1-Tsc is higher than 2°F (1°C), fan speed reduces to 20%.
  - **Descent curve**
    - When T1-Tsc is lower than or equal to 1°F (0.5°C), fan speed increases to 20%;
    - When T1-Tsc is lower than or equal to 0°F (0°C), fan speed increases to 60%;
    - When T1-Tsc is lower than or equal to -3°F (-1.5°C), fan speed increases to 80%;
    - When T1-Tsc is lower than or equal to -1.5°F (-3°C), fan speed increases to 100%.

### Outdoor Fan Control

- The outdoor unit runs at a different fan speed according to T4 and the compressor running frequency.
- For different outdoor units, the fan speeds differ.

## DEFROSTING Mode

- The unit enters the **DEFROSTING** mode according to changes in the temperature value of T3, T4 as well as the compressor running time.
- In the **DEFROSTING** mode, the compressor continues to run, the indoor and outdoor motor will cease operation, the indoor unit's defrost light turn on, and the **DF** symbol appears.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to the normal **HEATING** mode:
  - T3 rises above TCDE1C.
  - T3 maintained above TCDE2C for 80 seconds.
  - Unit runs for 15 minutes consecutively in the **DEFROSTING** mode.

### Evaporator Temperature Protection

- **Off:** Compressor stops.
- **Decrease:** Decrease the running frequency to the lower level per 20 seconds.
- **Hold:** Keep the current frequency.
- **Resume:** No limitation for frequency.

### AUTO Mode

- This mode can be selected with the remote controller and the setting temperature can be changed between 61°F~86°F (16°C~30°C).
- In the **AUTO** mode, the unit selects the **COOLING**, **HEATING**, **AUTO-DRYING** or **FAN-ONLY** mode on the basis of T1, Ts, T4 and relative humidity.
- If the setting temperature is modified, the unit selects a new running function.

### DRY Mode

In the **DRY** mode, the air conditioner operates the same as auto fan in the **COOLING** mode.

1. Mute function is active.
  - All protections are activated and operate the same as they do that in **COOLING** mode.
2. Low Room Temperature Protection
  - If the room temperature is lower than 10°C, the compressor ceases operations and does not resume until the room temperature exceeds 12°C.

## Forced Operation Function

### • Forced COOLING Mode

The compressor and outdoor fan continue to run and the indoor fan runs at rated speed. After running for 30 minutes, the air conditioner switches to **AUTO** mode with a preset temperature of 24°C.

### • Forced AUTO Mode:

Forced auto mode operates the same as normal **AUTO** mode with a preset temperature of 24°C.

- The unit exits the forced operation when it receives the following signals:
  - Switch on
  - Switch off
  - Timer on
  - Timer off
- Changes in:
  - Mode
  - Fan Speed
  - Setting Temperature

## Timer Function

- The Timing range is 24 hours.
- **Timer on.** The machine turns on automatically when reaching the setting time.
- **Timer off.** The machine turns off automatically when reaching the setting time.
- **Timer on/off.** The machine turns on automatically when reaching the setting “on” time, and then turns off automatically when reaching the setting “off” time.
- **Timer off/on.** The machine turns off automatically when reaching the setting “off” time, and then turns on automatically when reaching the setting “on” time.
- The timer function will not change the AC current operation mode. Suppose the AC is off now, it will not start up first after setting the “timer off” function. And when reaching the setting time, the timer LED will be off and the AC running mode has not been changed.
- The setting time is relative time.
- The AC exits the timer function when it has malfunction.

## SLEEP Function

- The **SLEEP** function is available in **COOLING**, **HEATING**, or **AUTO** modes.
- The operational process for sleep mode is as follows:
  - When cooling, the temperature rises 34°F (1°C) (to not higher than 86°F (30°C) every hour). After 2 hours, the temperature stops rising and the indoor fan is fixed at low speed.
  - When heating, the temperature decreases 34°F (1°C) (to not lower than 61°F (16°C)) every hour.
  - After 2 hours, the temperature stops decreasing and the indoor fan is fixed at low speed. Anti-cold wind function takes priority.
- The operating time for the **SLEEP** mode is 8 hours, after which, the unit exits this mode and turns off.
- The timer setting is available in this mode.

## 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 settings 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 unit stands by.

## 46°F (8°C) Heating

In the **HEATING** mode, the temperature can be set to a temperature as low as 46°F (8°C), preventing the indoor area from freezing if unoccupied during severe cold weather.

## ECO Function

- Used to enter the energy efficient mode.
  - Under the **COOLING** mode, press **ECO**, the remote controller adjusts the temperature automatically to 75°F (24°C), **AUTO** fan speed to save energy (however only if the set temperature is less than 75°F (24°C). If the set temperature is more than 75°F (24°C) and 86°F (30°C), press **ECO**, the fan speed will change to **AUTO**, the set temperature will remain unchanged.
- When AC receives signals, such as switch off, **Turbo** operation, **SILENCE** operation, **Self Clean** operation, **Forced COOLING** operation, mode setting, **SLEEPING** mode, or adjusting the set temperature to less than 75°F (24°C), it will exit the **ECO** operation.
- Operation time in **ECO** mode is 8 hours. After 8 hours the air conditioner exits this mode.
- If there is a malfunctioning temperature sensor in, the air conditioner exits the **ECO** mode.
- The indoor fan runs at auto fan when it enters the **ECO** mode. The setting temperature and setting fan speed can be changed with the remote controller.

## Self Clean

- Press “**Self Clean**” when the unit is in the **COOLING** or **DRYING** mode, the indoor unit runs at the low fan speed for 16 minutes then turn off.
- **Self Clean** keeps the indoor unit dry and prevents mold growth.

## Follow Me

- If you press “**Follow Me**” on the remote controller, the indoor unit will beep. This indicates the “**Follow Me**” function is active.
- Once active, the remote controller sends a signal every 3 minutes, without any audible sounds (beeps). The unit automatically sets the temperature according to the measurements from the remote controller.
- The unit only changes modes if the information from the remote controller makes it necessary, not from the unit’s temperature setting.
- If the unit does not receive a signal for 7 minutes or the user presses “**Follow Me**”, the function turns off. The unit regulates temperature based on its own sensor and settings.

## Silence

Press **SILENCE** on the remote controller to enable the **SILENCE** function. While this function is active, the indoor unit runs at faint breeze (1% fan speed), which reduces noise to the lowest possible level.

## Occupancy Sensor (Sizes 09K-12K)

With the built-in infrared sensor, the indoor unit detects human movement. The compressor operates in a low frequency if you leave the room for 30 minutes. The compressor operates in a lower frequency if you leave the room for 120 minutes, and resumes automatically when you come back, which helps save energy.

## Information Inquiry

To enter information inquiry status, complete the following procedure within ten seconds:

- Press **LED** 3 times.
- Press **SWING** 3 times. If successful, audible sounds (beeps) will sound for two seconds.
- Use **LED** and **SWING** to cycle through the information displayed.
- Press **LED** to display the next code in the sequence.
- Press **SWING** to display the previous code.

Table 7 displays the information codes. The screen displays the code for two seconds, then the information for 25 seconds.

**Table 7 — Information Codes**

DISPLAYED CODE	EXPLANATION	ADDITIONAL NOTES
T1	T1	T1 temperature
T2	T2	T2 temperature
T3	T3	T3 temperature
T4	T4	T4 temperature
TP	TP	TP temperature
Targeted Frequency	FT	Targeted Frequency
Actual Frequency	TR	Actual Frequency
Compressor Current	dL	N/A
Outdoor AC Voltage	UO	N/A
Indoor capacity test	Sn	N/A
Reserve	--	Running mode
Outdoor Fan Speed	Pr	Outdoor fan speed
EXV opening angle	LR	EXV opening angle
Indoor fan speed	IR	Indoor fan speed
Indoor humidity	HU	N/A
Adjusted setting temperature	TT	N/A
Indoor dust concentrations	DT	N/A
Wi-Fi signal strength	IF	N/A
GA algorithm frequency	OT	N/A

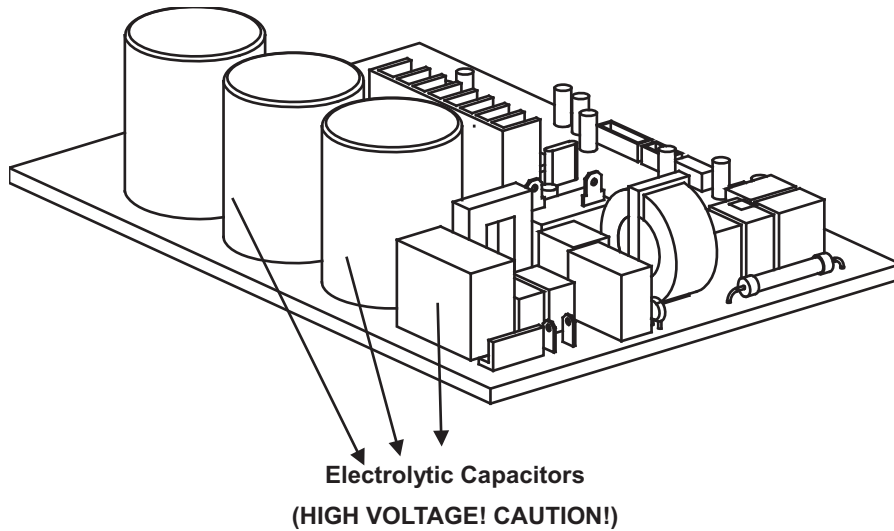
# TROUBLESHOOTING

## Safety

**⚠ WARNING**

**UNIT DAMAGE HAZARD**

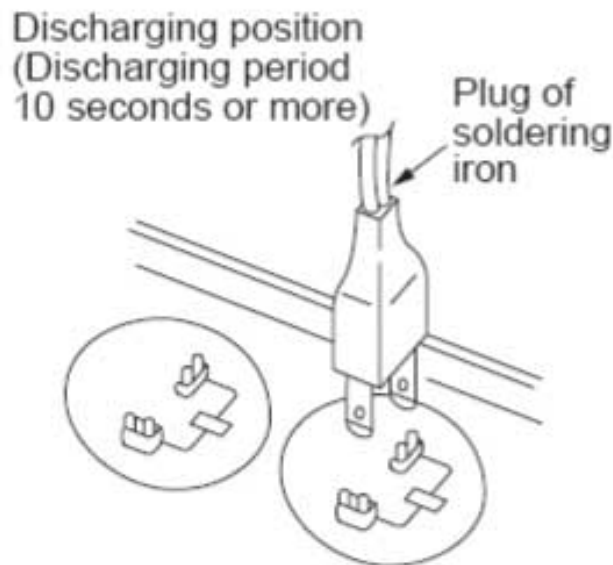
Electricity remains in capacitors even when the power supply is off.  
Ensure the capacitors are fully discharged before troubleshooting.



**Fig. 11 —Electrolytic Capacitors**

A221255

For other models, please connect discharge resistance (approximately 100Ω 40W) or a soldering iron (plug) between the +, - terminals of the electrolytic capacitor on the other side of the outdoor PCB.



**Fig. 12 — Discharge Position**

A221256

**NOTE:** Fig. 12 is for reference only. Actual appearances may vary.



## INDOOR UNIT DIAGNOSTIC GUIDES

**Table 8 — Indoor Unit Diagnostic Guide**

OPERATION LAMP	TIMER LAMP	DISPLAY	LED STATUS	SOLUTION
★ 1 time	X	EH 00/ EH 0A	Indoor unit EEPROM parameter error	--
★ 2 times	X	EL 01	Indoor / outdoor units communication error	Page 19
★ 3 times	X	EH 02	Zero-crossing signal detection error	Page 21
★ 4 times	X	EH 03	The indoor fan speed is operating outside of the normal control	Page 22
★ 5 times	X	EC 51	Outdoor unit EEPROM parameter error	Page 18
★ 5 times	X	EC 52	Condenser coil temperature sensor T3 is an open circuit or has short circuited	--
★ 5 times	X	EC 53	Outdoor room temperature sensor T4 is an open circuit or has short circuited	Page 26
★ 5 times	X	EC 54	Compressor discharge temperature sensor TP is an open circuit or has short circuited	--
★ 5 times	X	EC 56	Evaporator coil outlet temperature sensor T2B is an open circuit or has short circuited (for free-match indoor units)	--
★ 6 times	X	EH 60	Indoor room temperature sensor T1 is an open circuit or has short circuited	Page 25
★ 6 times	X	EH 61	Evaporator coil middle temperature sensor T2 is an open circuit or has short circuited	--
★ 12 times	X	EC 07	The outdoor fan speed is operating outside of the normal range	Page 23
★ 9 times	X	EH 06	Indoor PCB/Display board communication error	Page 28
★ 8 times	X	EL 0C	Refrigerant leakage detection	Page 27
★ 7 times	★	PC 00	IPM malfunction or IGBT over-strong current protection	Page 30
★ 2 times	★	PC 01	Over voltage or over low voltage protection	Page 31
★ 3 times	★	PC 02	Top temperature protection of the compressor or high temperature protection of the IPM module or high pressure protection	Page 32
★ 5 times	★	PC 04	Inverter compressor drive error	Page 34
★ 1 time	★	PC 08	Current overload protection	Page 29
★ 6 times	★	PC 40	Communication error between the outdoor main chip and the compressor driven chip	Page 37
★ 7 times	★	PC 03	Low pressure protection	Page 35
★ 1 time	O	--	Indoor units mode conflict (match with multi outdoor unit)	--

**O (light) X (off) ★ (flash)**

### NOTES:

#### PC03

Low pressure protection switch is open. Check the switch and repair or leak check the unit and recharge.

#### Troubleshooting

Use the remote controller. If the unit does not respond to the remote, the indoor PCB needs to be replaced; if the unit does respond, then the display board needs to be replaced.

## DIAGNOSIS AND SOLUTION

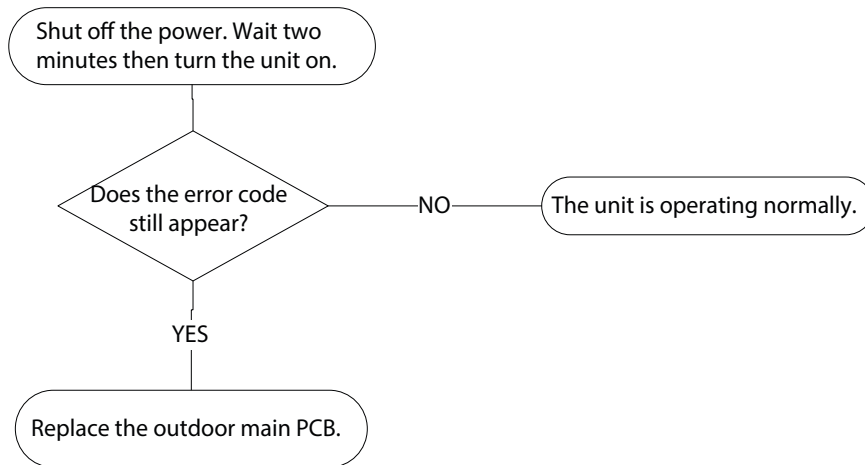
### (EC51) Outdoor EEPROM Parameter Error or Compressor Driven Chip EEPROM Parameter Error

**Description:** Outdoor PCB main chip does not receive feedback from the EEPROM chip or the compressor driven chip.

Recommended parts to repair:

- Outdoor PCB

#### Troubleshooting



# DIAGNOSIS AND SOLUTION (CONT)

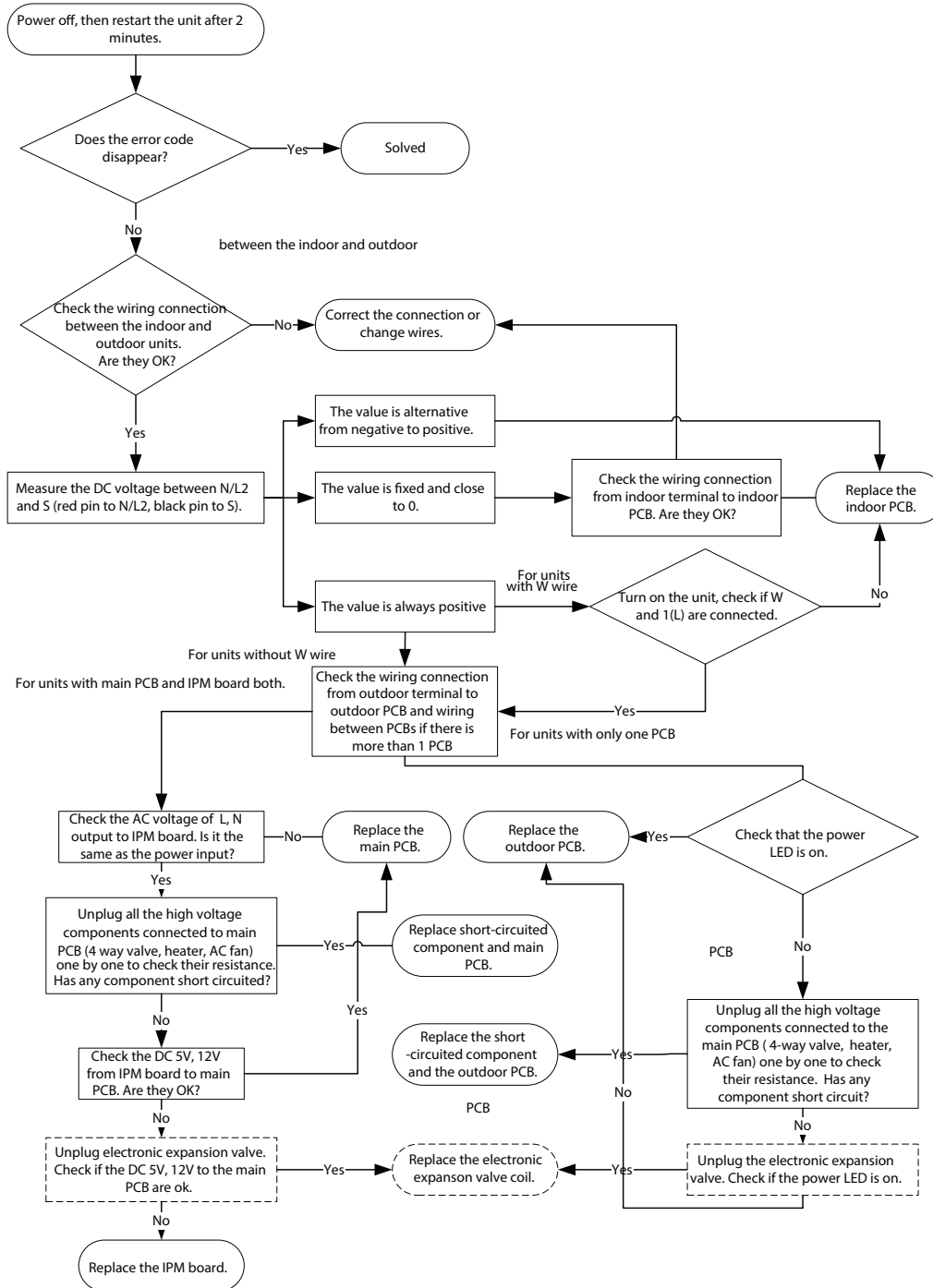
## (EL01) Indoor and Outdoor Unit Communication Error

**Description:** The indoor unit cannot communicate with the outdoor unit

Recommended parts to repair:

- Indoor PCB
- Outdoor PCB
- Short-circuited component

**Troubleshooting**

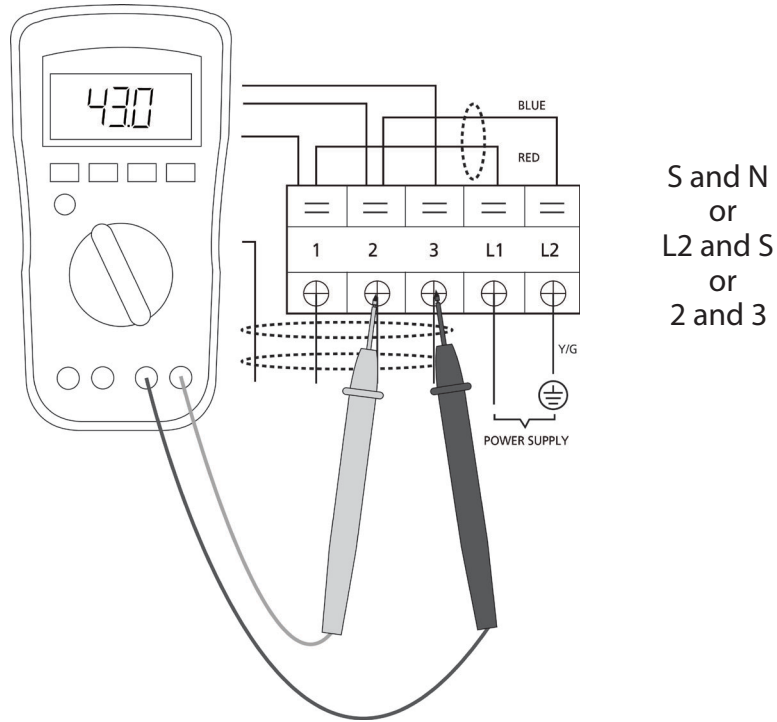


For certain models, the outdoor PCB can not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

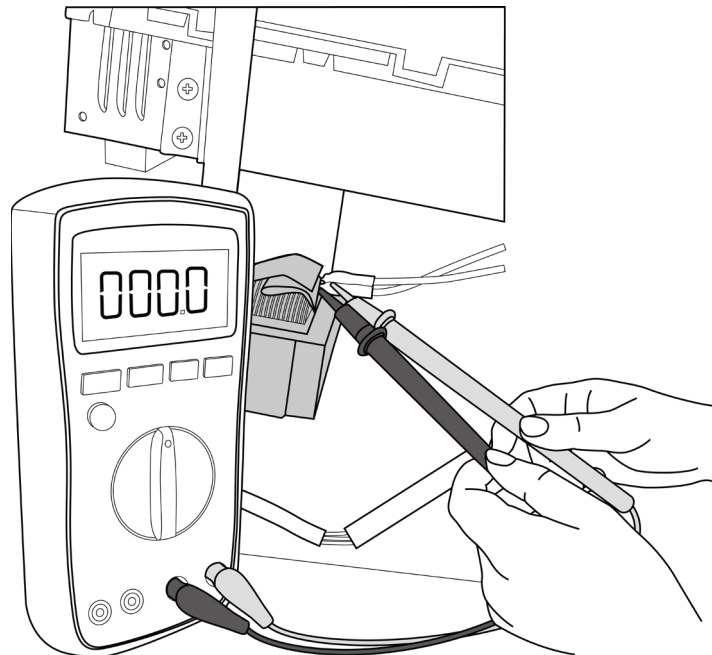
## DIAGNOSIS AND SOLUTION (CONT)

### Remarks:

- Use a multimeter to test the DC voltage between the 2 port (or S or L2 port) and 3 port (or N or S port) of outdoor unit.
- The red pin of multimeter connects with 2 port (or S or L2 port) while the black pin is for 3 port (or N or S port) the unit is normal running, the voltage is moving alternately as positive values and negative values
- If the outdoor unit malfunctions, the voltage remains a narrow positive value.
- If the indoor unit malfunctions, the voltage maintains a fixed value.



- Use a multimeter to test the reactor's resistance which does not connect with the capacitor.
- The normal value should be around zero ohm. Otherwise, the reactor has malfunctioned. Check the reactor and ensure it is not shorted to the ground.



## DIAGNOSIS AND SOLUTION (CONT)

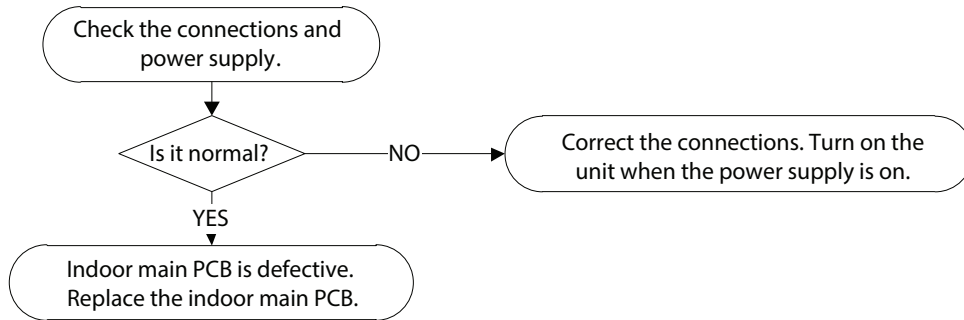
### (EH02) Zero Crossing Detection Error Diagnosis and Solution

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

Recommended parts to repair:

- Connection wires
- Indoor main PCB

#### Troubleshooting



**Note:** Zero crossing detection error is only valid for the unit with an AC fan motor. For other models, this error does not apply.

## DIAGNOSIS AND SOLUTION (CONT)

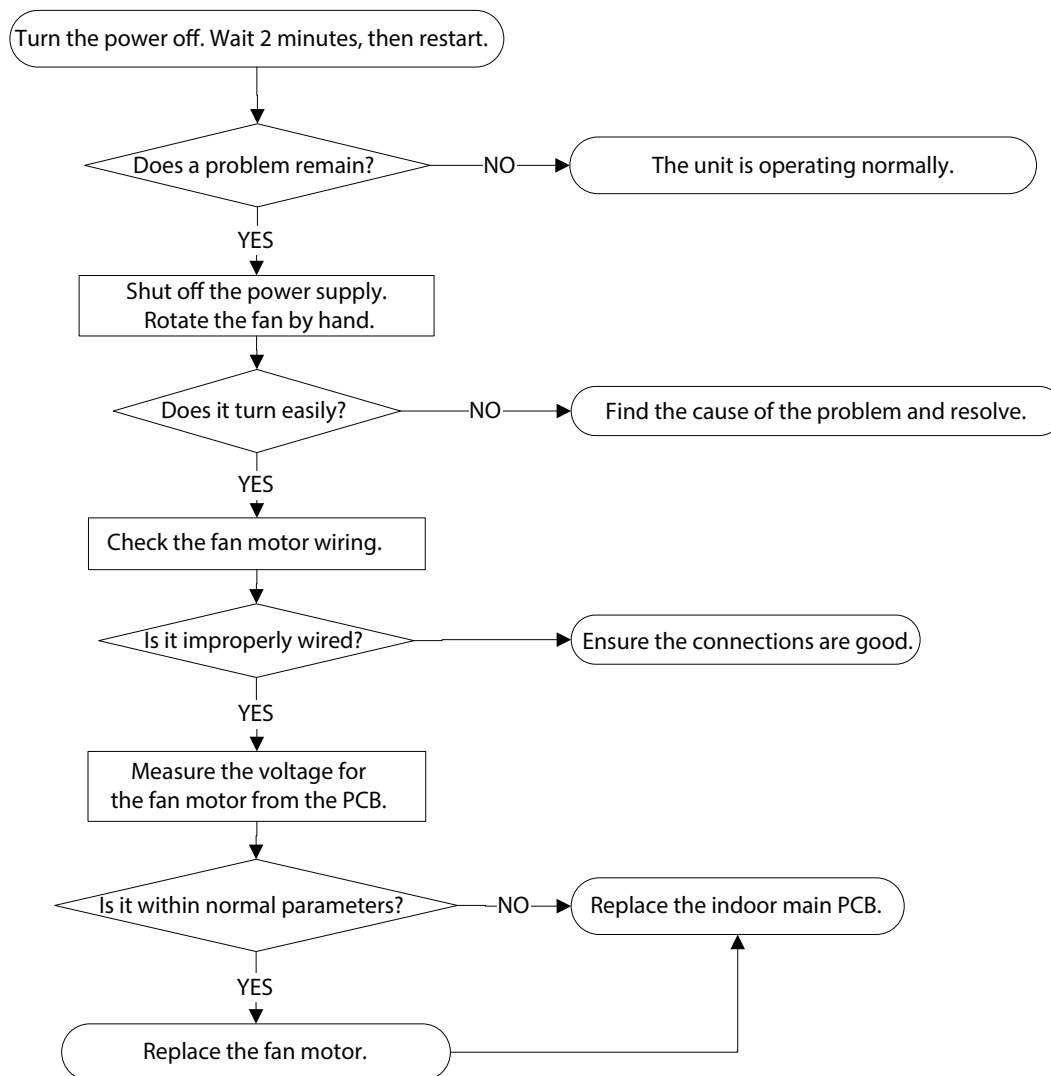
### (EH03) The Indoor Fan Speed is Operating Outside of the Normal Range

**Description:** When the indoor fan speed remains too slow or too fast for an extended period of time, the LED displays a failure code and the unit turns off.

#### Recommended parts to repair:

- Connection wires
- Indoor main PCB
- Fan assembly
- Indoor main PCB

#### Troubleshooting



## DIAGNOSIS AND SOLUTION (CONT)

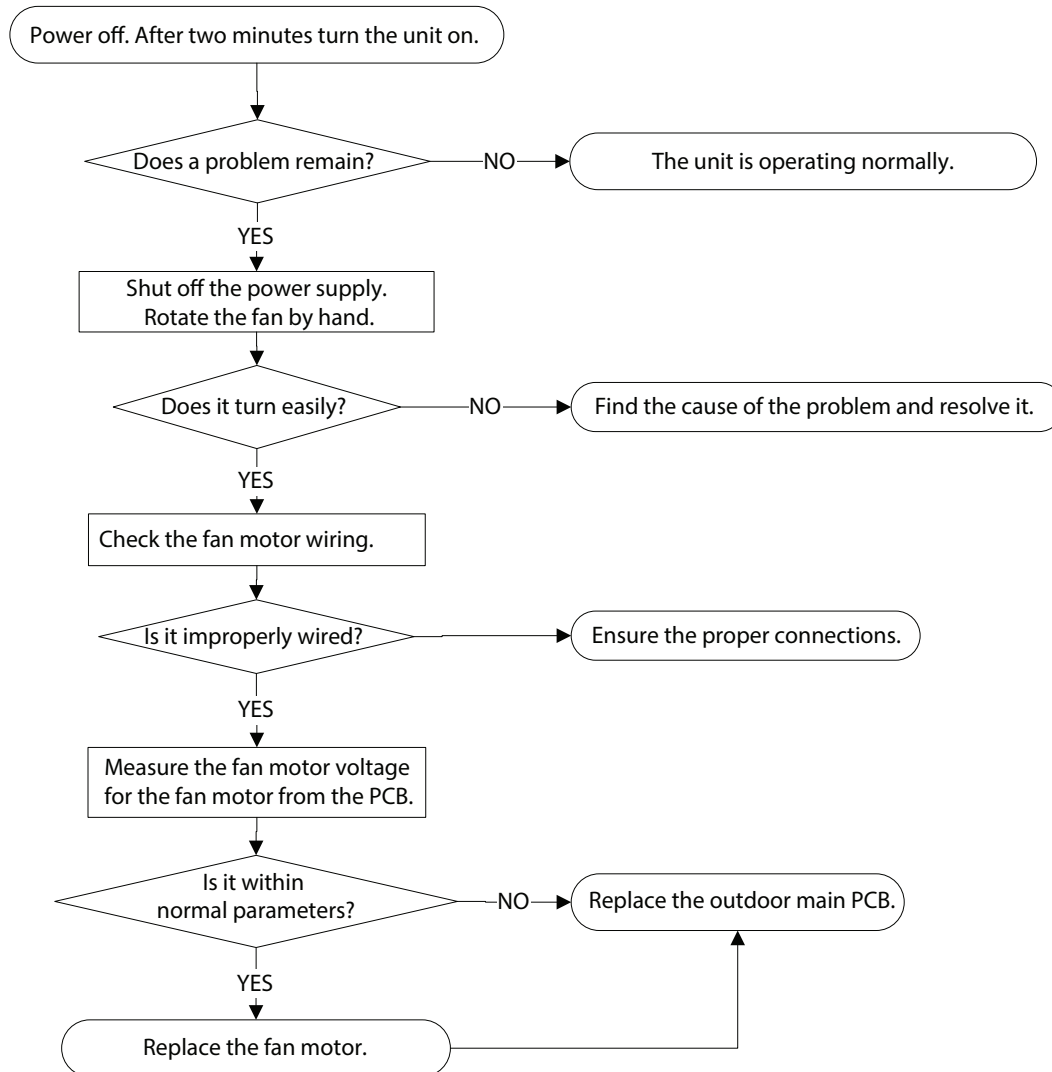
### (EC07) The Outdoor Fan Speed is Operating Outside of Normal Range

**Description:** When the outdoor fan speed remains too low or too high for a certain time, the LED displays the failure code and the AC turns off.

Recommended parts to repair:

- Connection wires
- Fan assembly
- Fan motor
- Outdoor main PCB

#### Troubleshooting

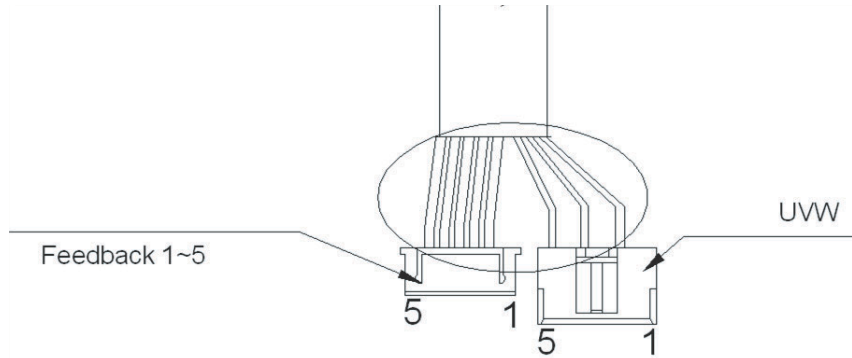


**NOTE:** For certain models, the outdoor PCB can not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

## DIAGNOSIS AND SOLUTION (CONT)

### Outdoor DC Fan Motor (DC motor that controls the chip on the PCB)

1. Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor is faulty and must be replaced. Otherwise, proceed to step 2.
2. Power on the unit and when the unit is in standby, measure the pin4-5 voltage in the feedback signal connector. If the value is not 5V, change the PCB. Otherwise, proceed to step 3.
3. Rotate the fan by hand, measure the pin1-5, pin 2-5 and pin 3-5 voltage levels in the feedback signal connector. If any voltage is not in the positive voltage fluctuation, the fan motor is faulty and needs to be replaced.



**Fig. 13 — Outdoor DC Fan Motor (DC motor that controls the chip on the PCB)**

NO.	1	2	3	4	5
Color	Orange	Grey	White	Pink	Black
Signal	Hu	Hv	Hw	Vcc	GND

Color	Red	Blue	Yellow
Signal	W	V	U



## DIAGNOSIS AND SOLUTION (CONT)

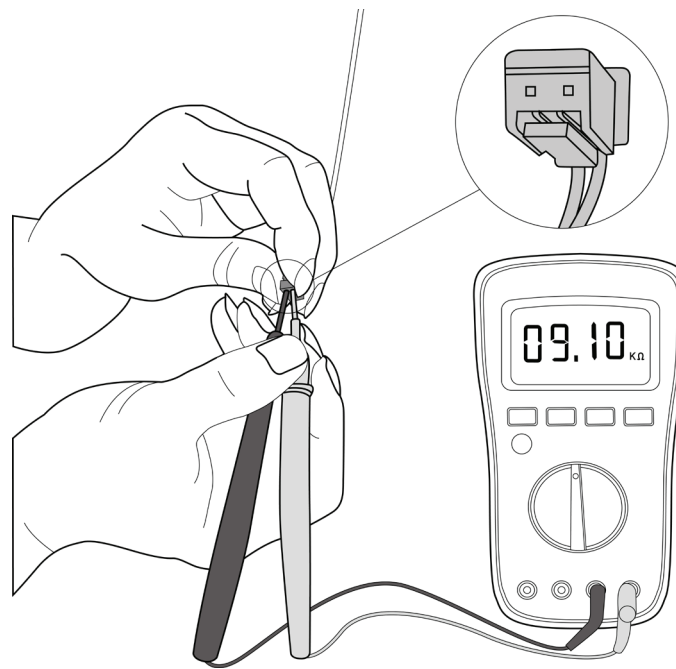
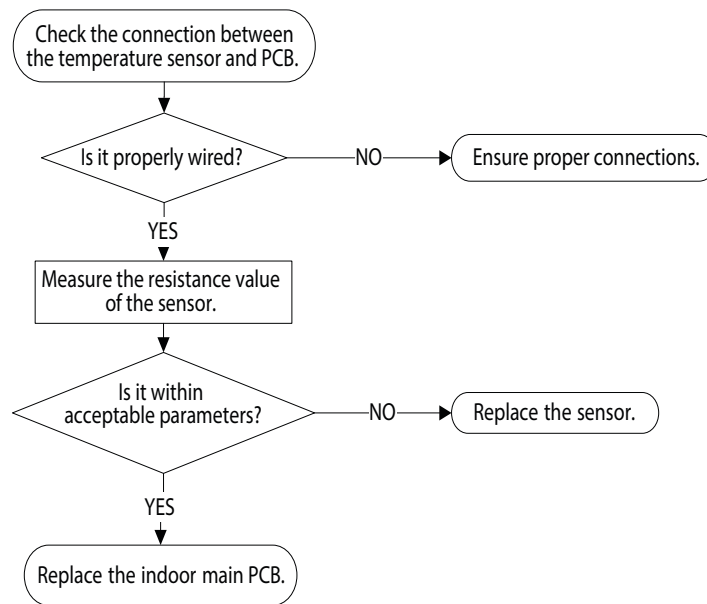
### (EH60) Indoor Temperature Sensor Is an Open Circuit or a Short Circuit (T1, T2)

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

**Recommended parts to repair:**

- Connection wires
- Sensors
- Indoor main PCB

#### Troubleshooting



**Fig. 14 — Test**

**NOTE:** Figure 14 and the value shown within are for reference only.

## DIAGNOSIS AND SOLUTION (CONT)

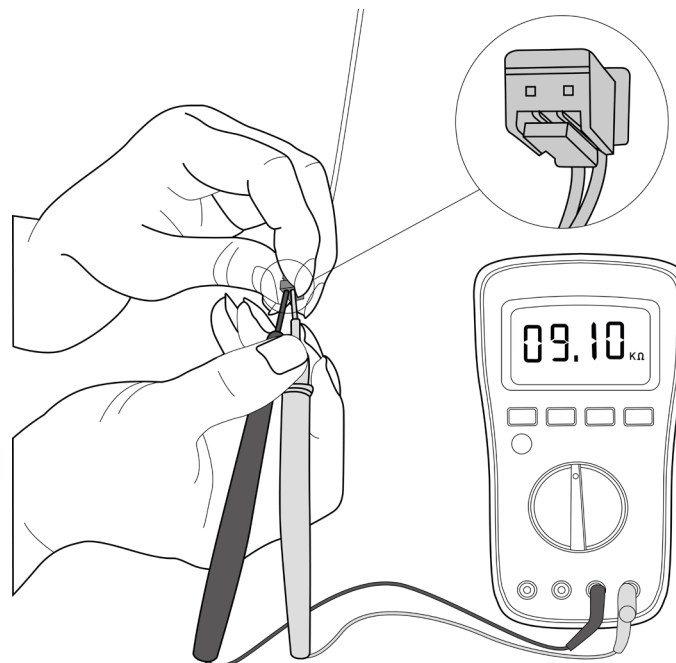
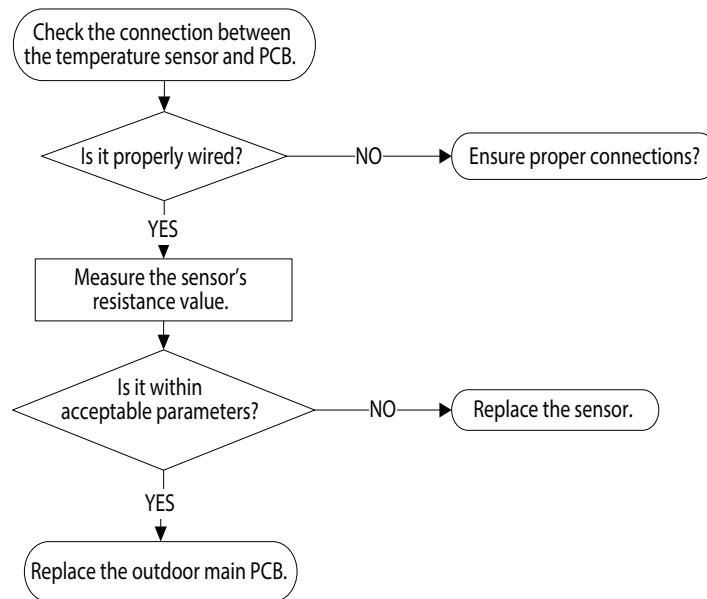
### (EC53) Outdoor Temperature Sensor Is an Open Circuit or Short Circuited (T3, T4, TP, T2B, TH)

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

Recommended parts to repair:

- Connection wires
- Sensors
- outdoor main PCB

#### Troubleshooting



**Fig. 15 — Test**

**NOTE:** For certain models, the outdoor PCB can not be removed separately. In this case, the outdoor electric control box should be replaced as a whole. For certain models, the outdoor unit uses a combination sensor, T3,T4 and TP are the same sensor. Figure 15 and the value are for reference only.

## DIAGNOSIS AND SOLUTION (CONT)

### (EL0C) Refrigerant Leakage Detection

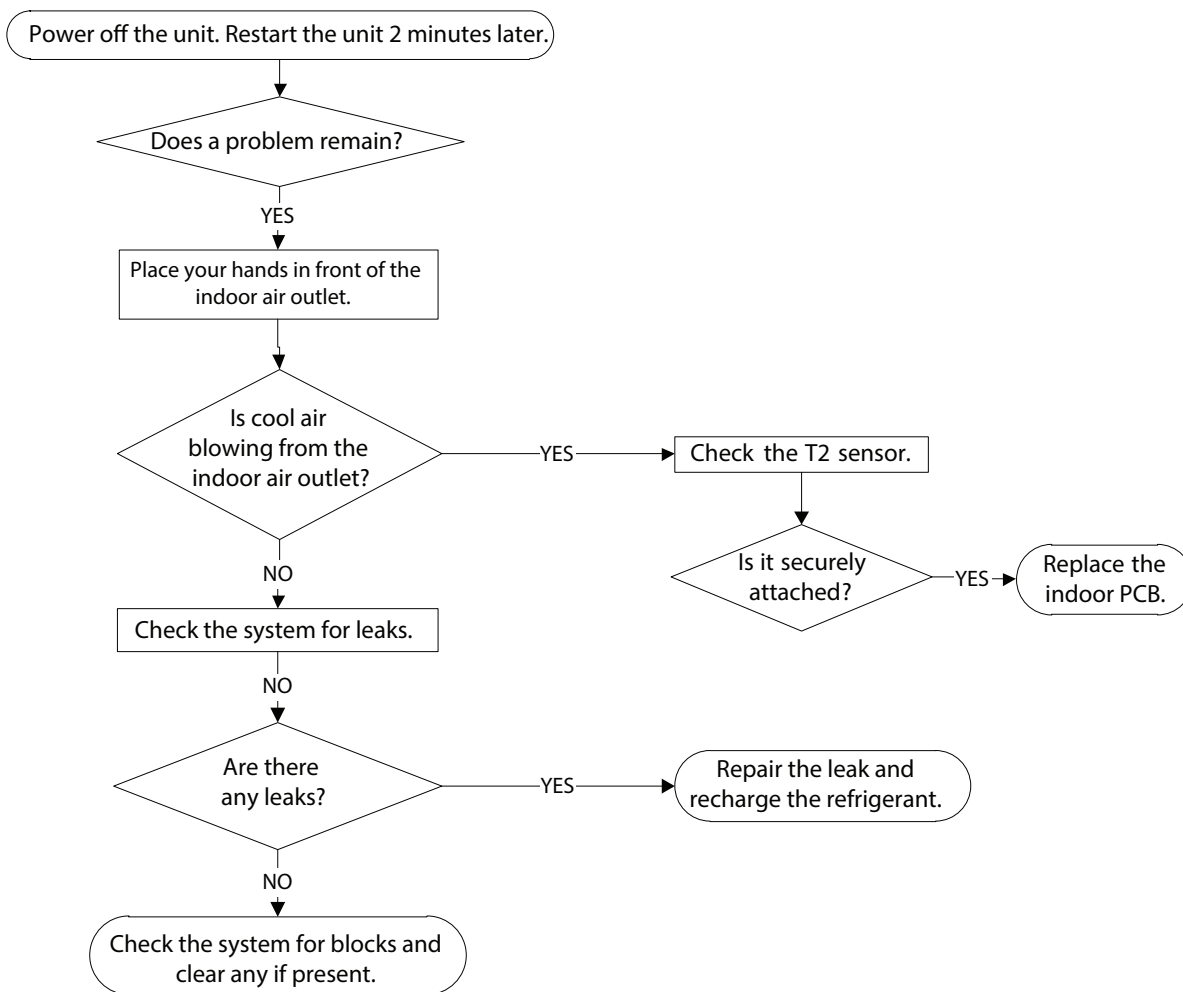
**Description:** Define the compressor's evaporator coil temperature (T2) starts running as Tcool.

In the initial 5 minutes after the compressor starts, if  $T2 < T_{cool} - 1.8^{\circ}\text{F}$  ( $1^{\circ}\text{C}$ ) is not maintained for 4 seconds and the compressor runs at a frequency is higher than 50Hz however it does not maintain for a minimum of three minutes and this issue occurs 3 times, the LED displays the failure code and the unit turns off.

#### Recommended parts to repair:

- T2 Sensor
- Indoor PCB
- Additional refrigerant

#### Troubleshooting



## DIAGNOSIS AND SOLUTION (CONT)

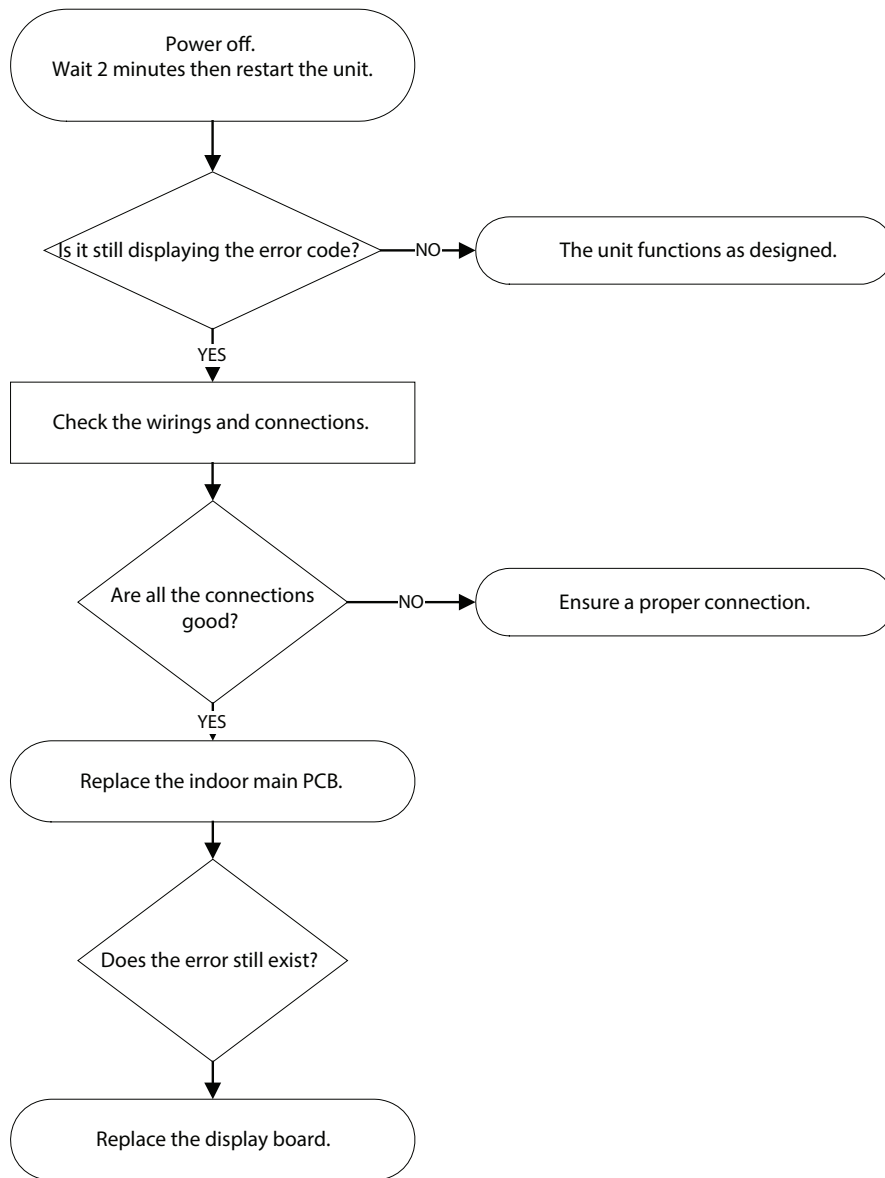
### (EH06) Indoor PCB/Display Board Communication Error

**Description:** The indoor PCB does not receive feedback from the display board.

Recommended parts to repair:

- Communication wire
- Indoor PCB
- Display board

**Troubleshooting**



# DIAGNOSIS AND SOLUTION (CONT)

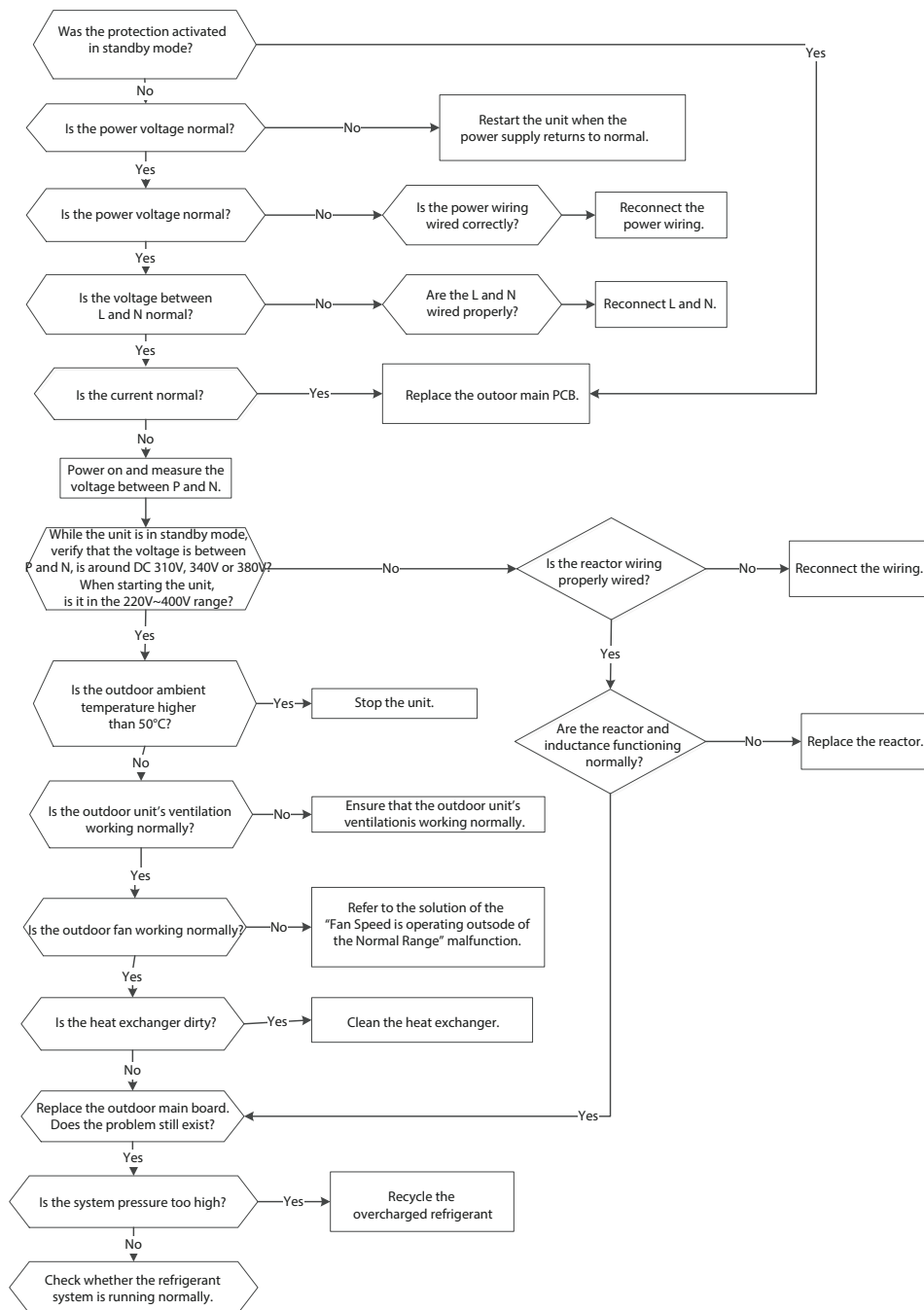
## (PC08) Current Overload Protection

**Description:** An abnormal current rise is detected by checking the specified detection circuit.

Recommended parts to repair:

- Communication wires
- Reactor
- Outdoor fan
- Outdoor PCB

### Troubleshooting



**NOTE:** For certain models, the outdoor PCB can not be removed separately. In the case, the outdoor electric control box should be replaced as a whole.

## DIAGNOSIS AND SOLUTION (CONT)

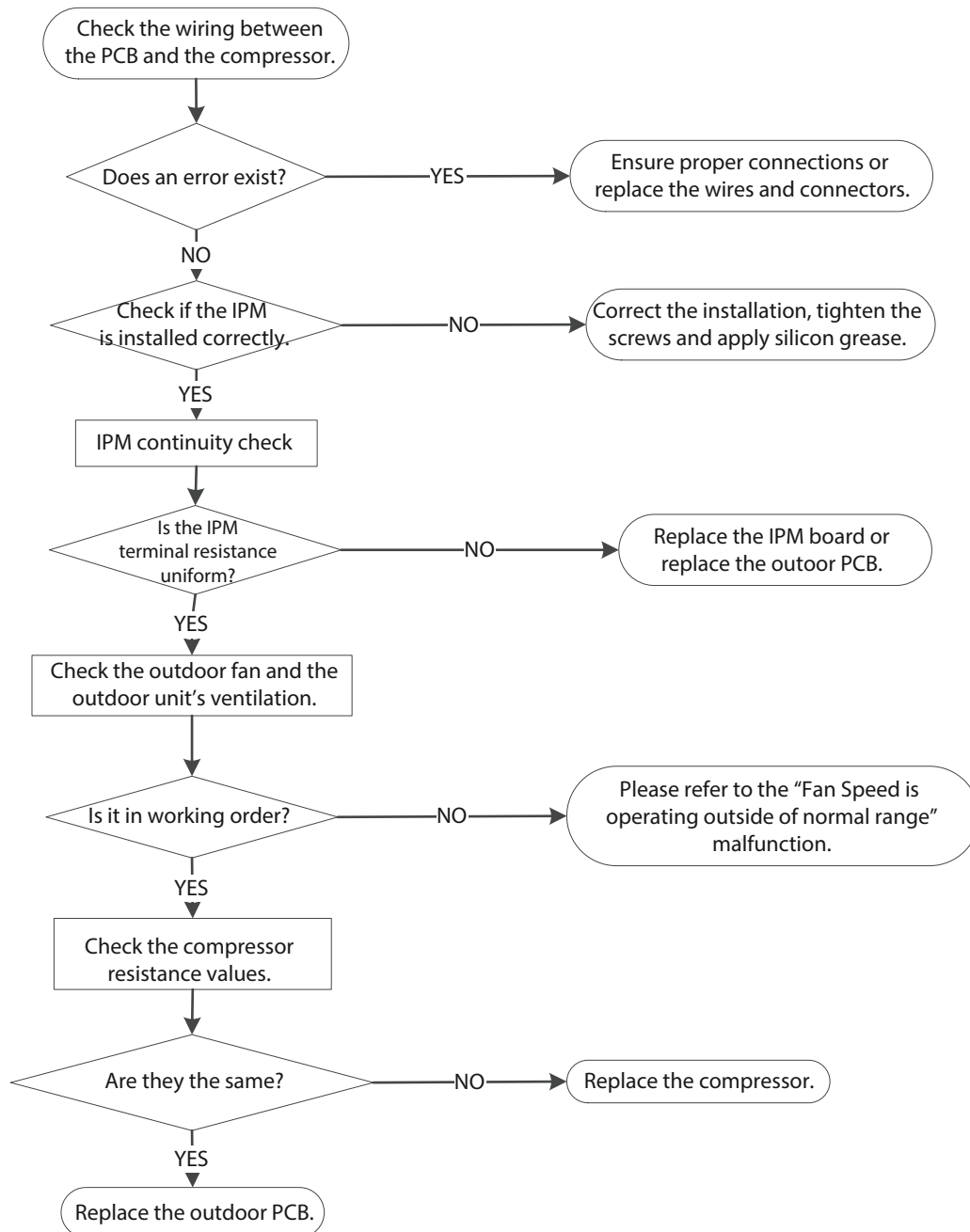
### (PC00) IPM Malfunction or IGBT Over-strong Current Protection

**Description:** If the IPM sends an abnormal voltage signal to the compressor drive chip, the LED displays the failure code and the unit turns off.

#### Recommended parts to repair:

- Communication wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

#### Troubleshooting



## DIAGNOSIS AND SOLUTION (CONT)

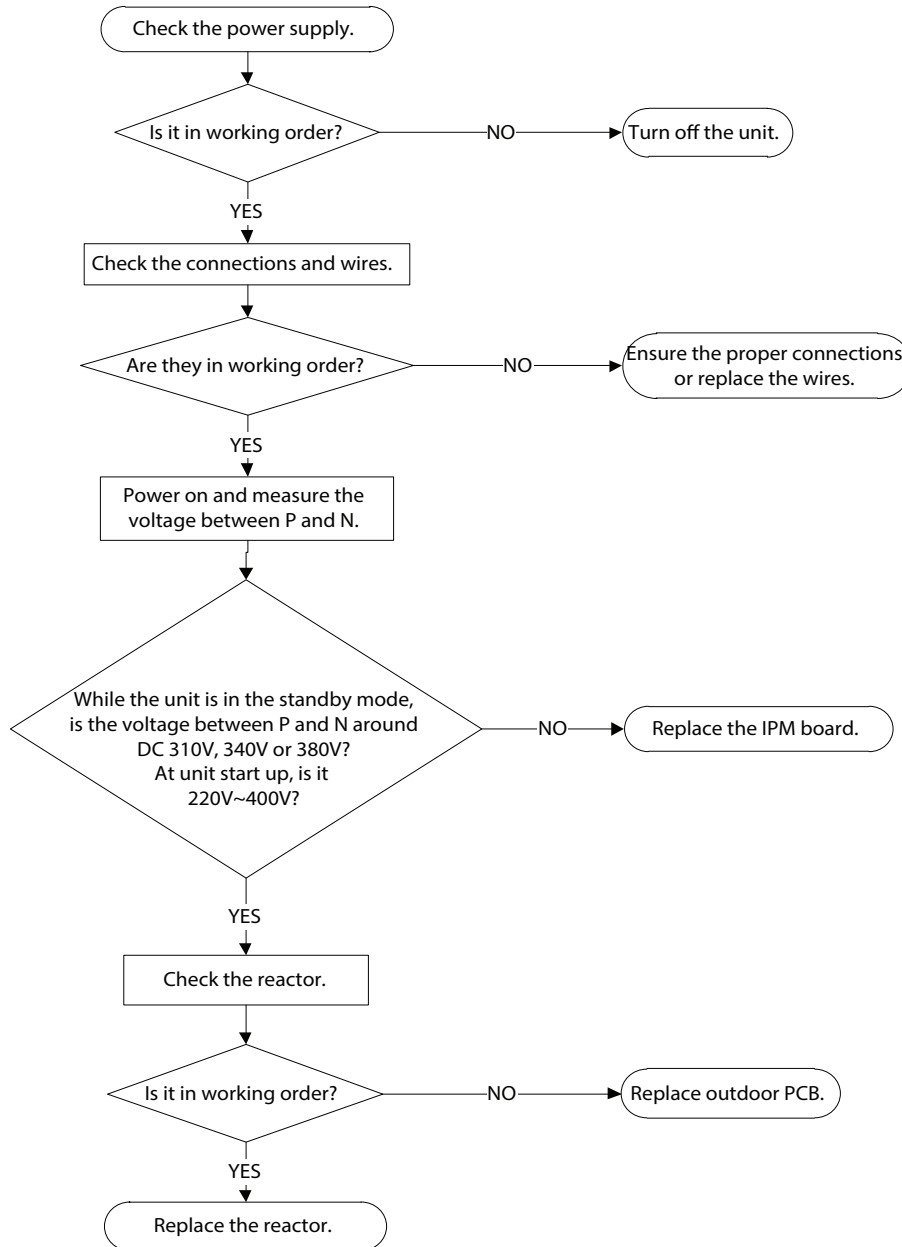
### (PC01) Over Voltage or Low Voltage Protection

**Description:** Abnormal increases or decreases in voltage are detected by checking the specified voltage detection circuit.

#### Recommended parts to repair:

- Power supply wires
- IPM module board
- PCB
- Reactor

#### Troubleshooting



## DIAGNOSIS AND SOLUTION (CONT)

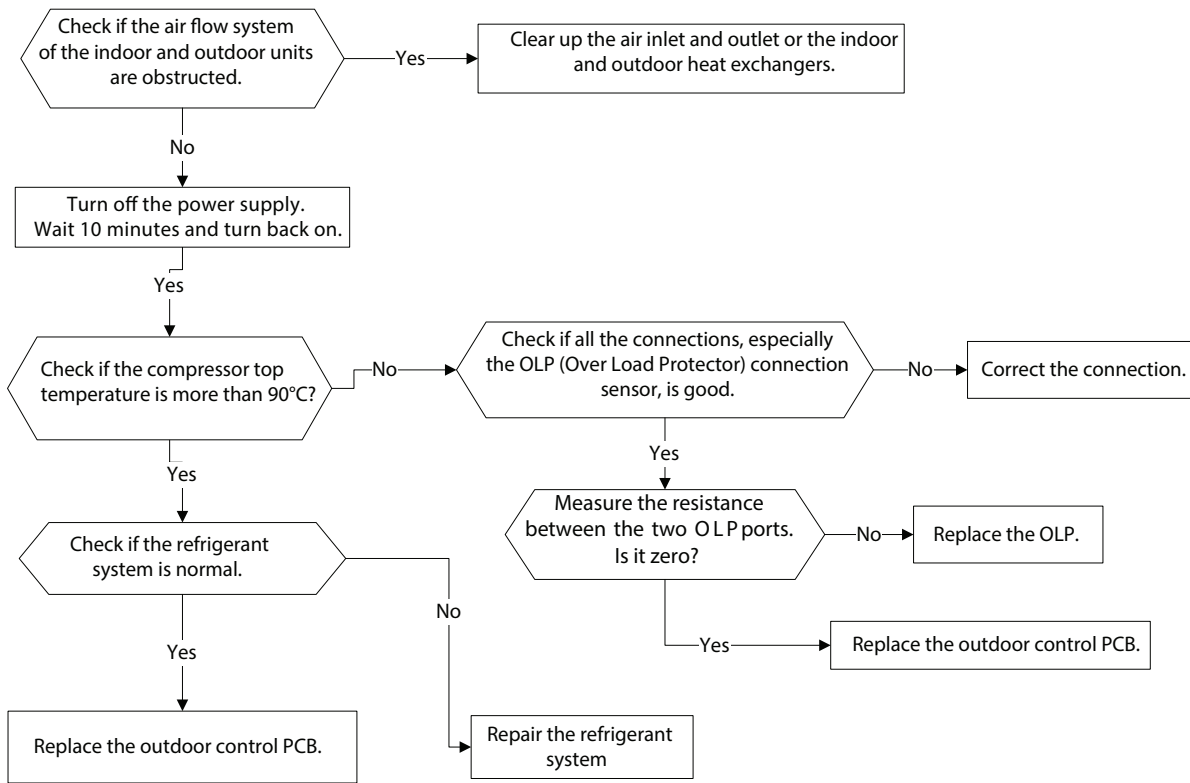
### (PC02) Top Temperature Protection for Compressor or High Temperature or High Pressure Protection of IPM Module

**Description:** For some models with overload protection, if the sampling voltage is not 5V, the LED displays the failure. If the IPM module temperature is higher than a certain value, the LED displays the failure code. For some models with a high pressure switch, the outdoor pressure switch cuts off the system when the pressure is higher than 4.4 MPa and the LED displays the failure code.

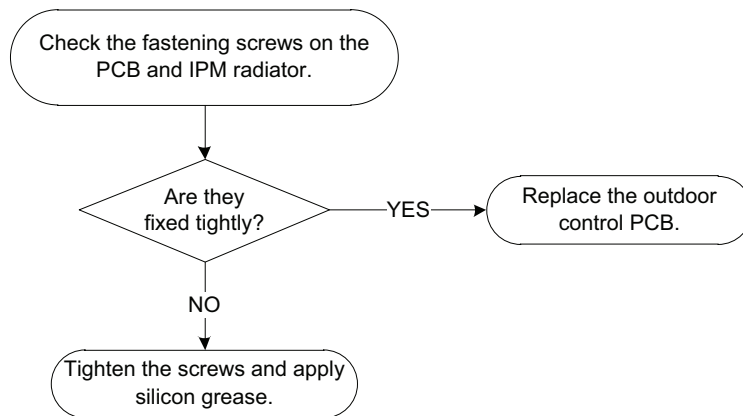
Recommended parts to repair:

- Connection wires
- Outdoor PCB
- IPM module board
- High pressure protector
- System blockages

**Troubleshooting**



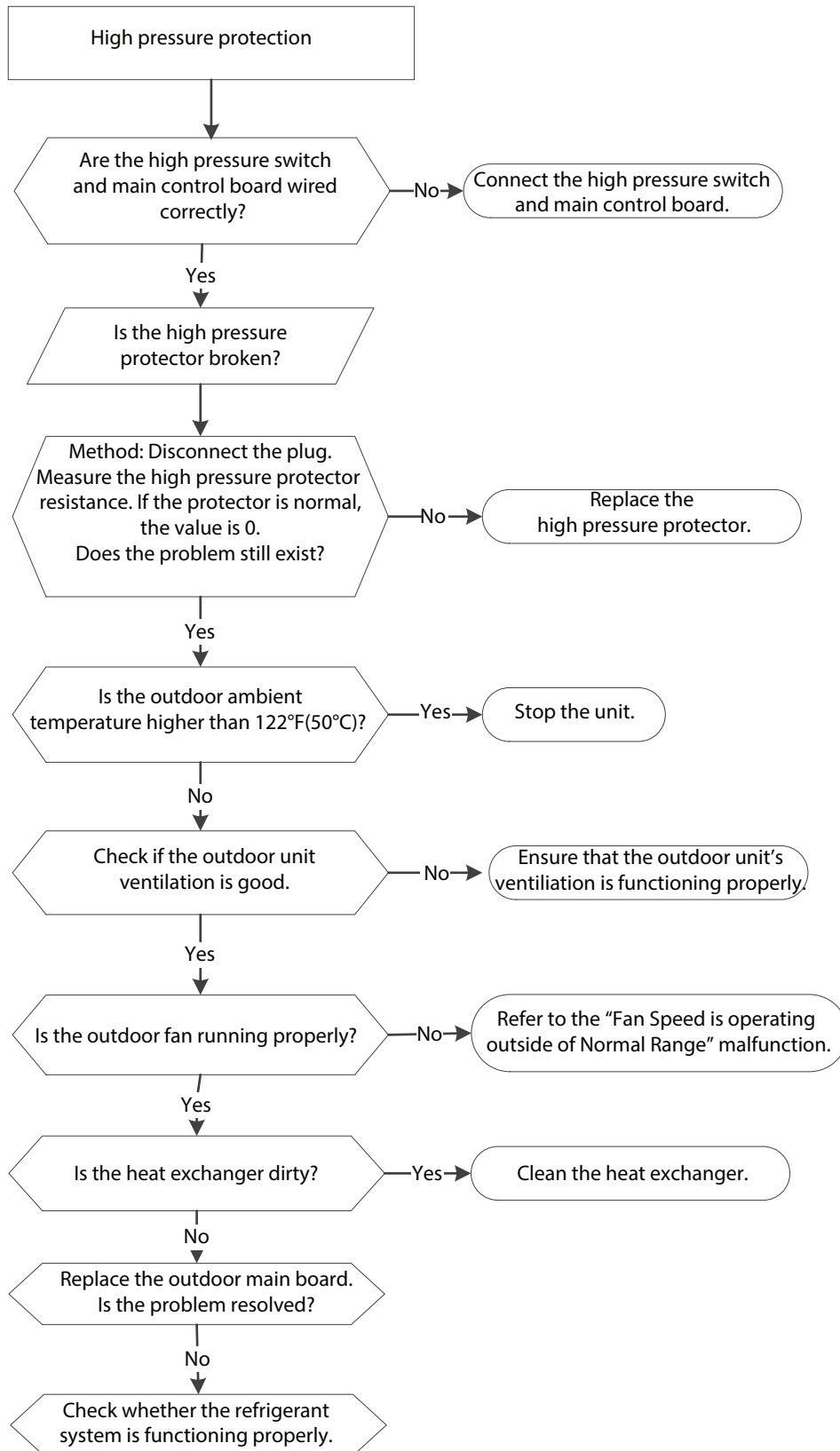
**NOTE:** For certain models, the outdoor PCB can not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.





## DIAGNOSIS AND SOLUTION (CONT)

### (PC02) Top Temperature Protection for Compressor or High Temperature or High Pressure Protection of IPM Module (cont.)



## DIAGNOSIS AND SOLUTION (CONT)

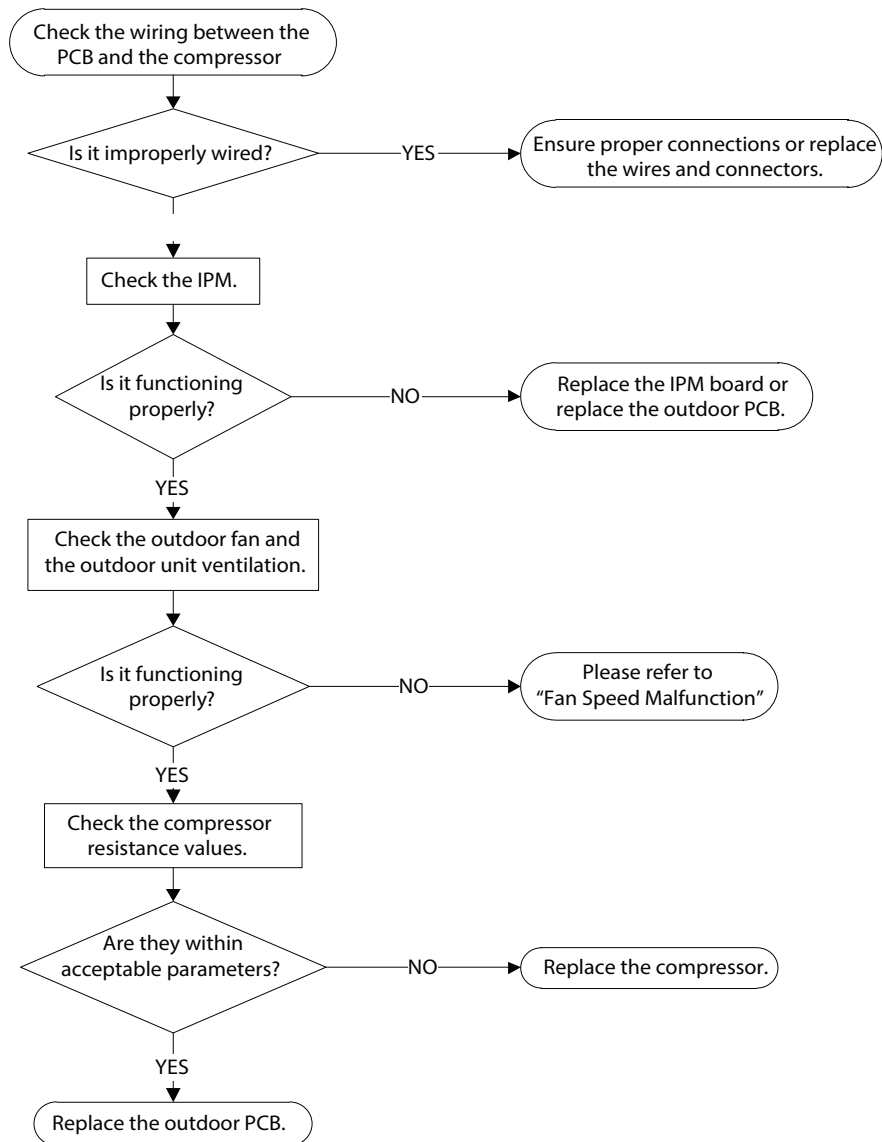
### (PC04) Inverter Compressor Drive Error

**Description:** An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation and speed signal detection.

#### Recommended parts to repair:

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

#### Troubleshooting



# DIAGNOSIS AND SOLUTION (CONT)

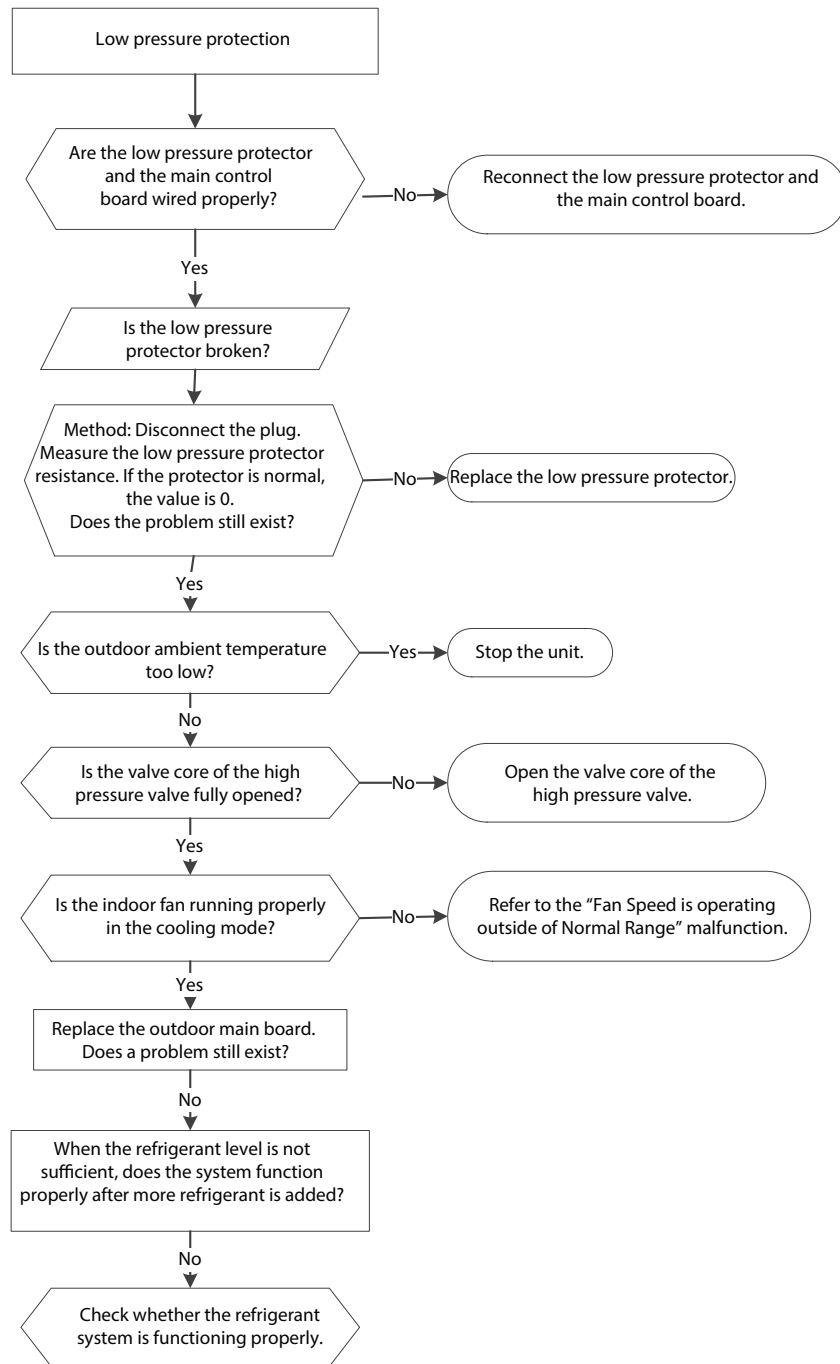
## (PC03) Low Pressure Protection

**Description:** The outdoor pressure switch shuts the unit down because the low pressure is lower than 0.13 MPa and the LED displays the failure code.

Recommended parts to repair:

- Connection wires
- Outdoor PCB
- Low pressure protector
- Refrigerant

**Troubleshooting**



## DIAGNOSIS AND SOLUTION (CONT)

### Indoor Units Mode Conflict (match with multi outdoor unit)

**Description:** The indoor units cannot operate in the **COOLING** mode and **HEATING** mode simultaneously. The **HEATING** mode is the priority.

**Examples:**

- If indoor unit A is operating in the **COOLING** mode or the **FAN** mode, and indoor unit B is set to the **HEATING** mode, unit A power offs and unit B continues to operate in the **HEATING** mode.
- If indoor unit A is operating in the **HEATING** mode and indoor unit B is set to the **COOLING** mode or fan mode, unit B changes to **STANDBY** mode and unit A will not change modes.

**Table 9 — Cooling Mode/Heating Mode**

	<b>COOLING MODE</b>	<b>HEATING MODE</b>	<b>FAN</b>	<b>OFF</b>
<b>Cooling Mode</b>	No	Yes	No	No
<b>Heating Mode</b>	Yes	No	Yes	No
<b>Fan</b>	No	Yes	No	No
<b>Off</b>	No	No	No	No

**NOTE:**

**No:** No mode conflict

**Yes:** Mode conflict

## DIAGNOSIS AND SOLUTION (CONT)

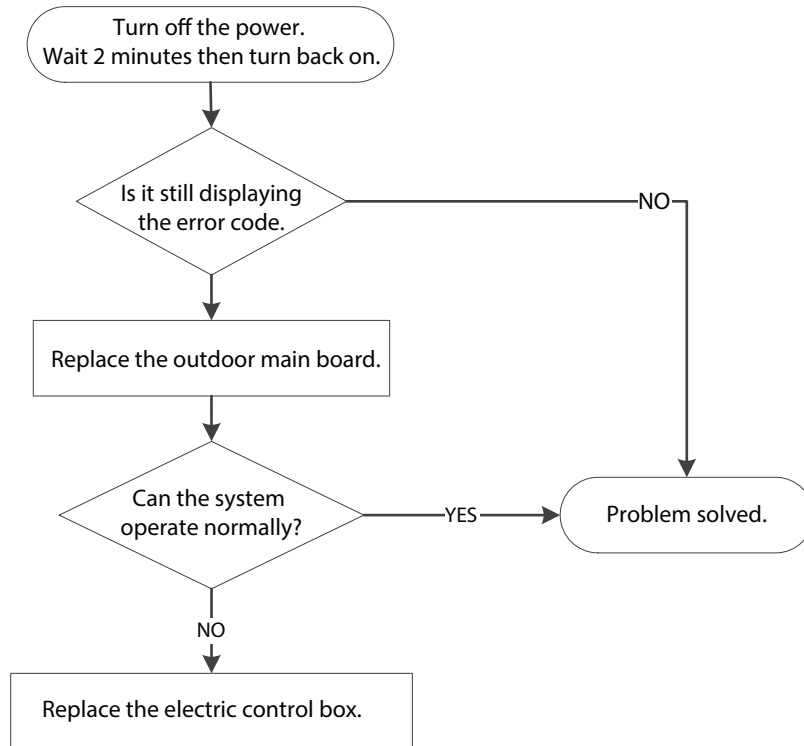
### (PC40) Communication Error Between Outdoor Main Chip and Compressor Driven Chip

**Description:** The main chip cannot detect the compressor driven chip.

Recommended parts to repair:

- Outdoor PCB
- Electric control box

#### Troubleshooting



## Check Procedures

### Temperature Sensor Check



## WARNING

Be sure to turn off all power supplies or disconnect all wires to avoid shock.

Operate after the compressor and coil have returned to a normal temperature in case of injury.

1. Disconnect the temperature sensor from PCB.
2. Measure the sensor's resistance value using a multi-meter.
3. Check the corresponding temperature sensor's resistance value table.

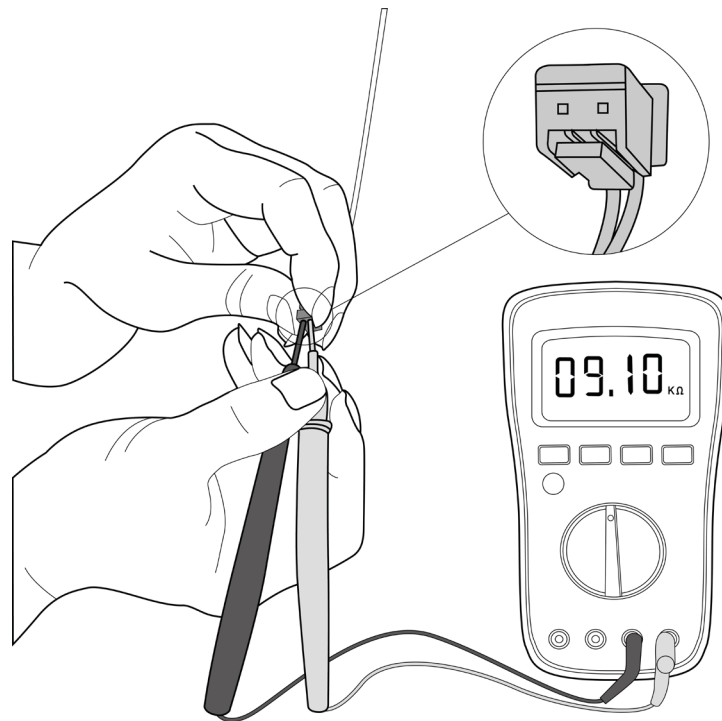
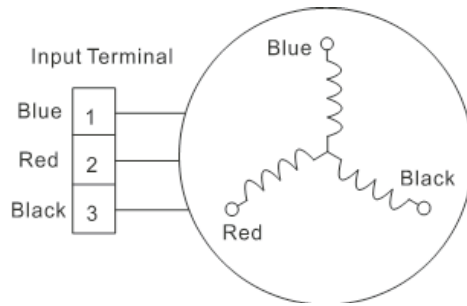


Fig. 16 — Test

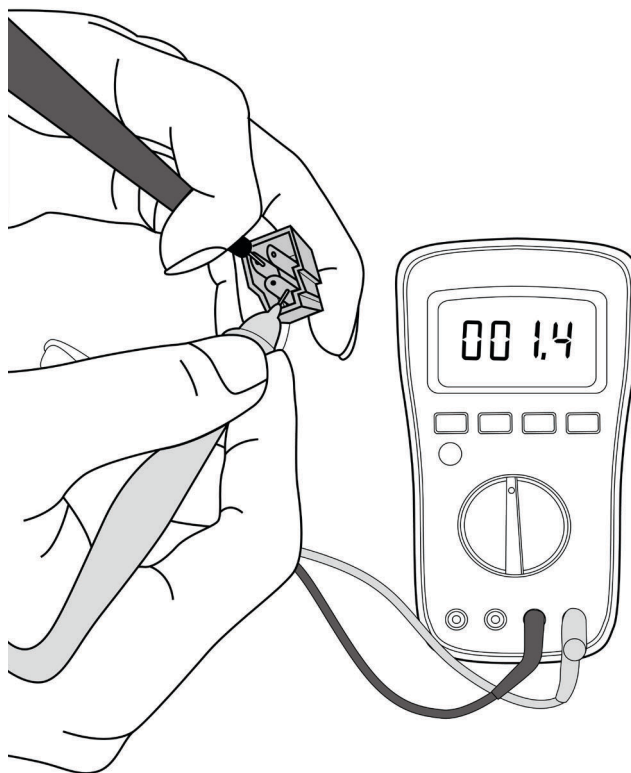
## Compressor Check

1. Disconnect the compressor power cord from the outdoor PCB.
2. Measure the resistance valve of each winding using a multi-meter.
3. Check the resistance valve of each winding in Table 10.



**Table 10 — Resistance Value**

Resistance Value	KSK103D33UEZ3(YJ)	KTM240D43UKT	KTN110D42UFZ	KTF250D22UMT
<b>Blue-Red</b>	2.13W	1.03W	1.82W	0.75W
<b>Blue-Black</b>				
<b>Red-Black</b>				



**Fig. 17 — Testing**

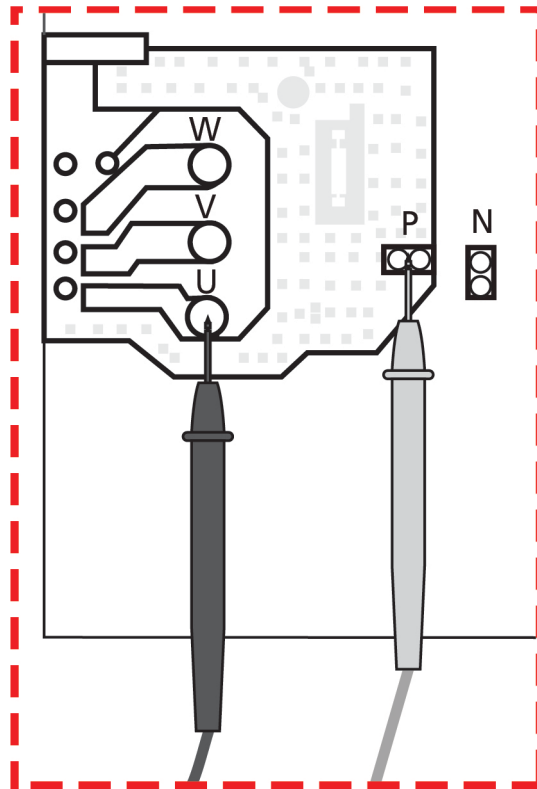
## IPM Continuity Check

⚠ **WARNING**

**ELECTRICAL SHOCK HAZARD**  
 Electricity remains in the capacitors even when the power is off.  
 Ensure the capacitors are fully discharged before troubleshooting.

1. Turn off the outdoor unit and disconnect the power supply.
2. Discharge the electrolytic capacitors and ensure all energy has been discharged.
3. Disassemble the outdoor PCB or disassemble the IPM board.
4. Measure the resistance valve between P and U(V,W,N); U(V,W) and N.

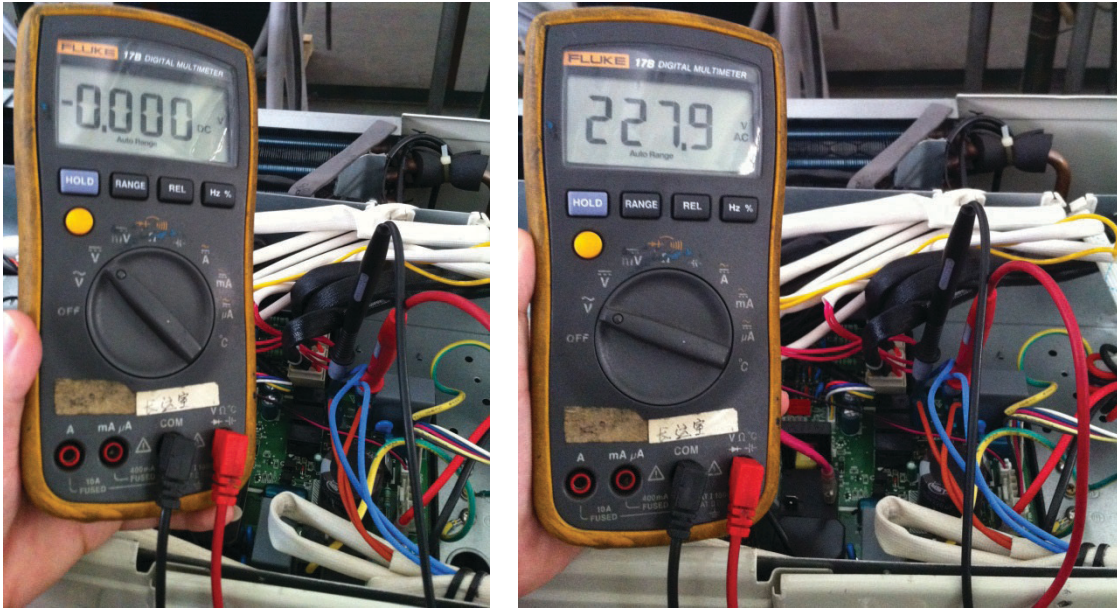
Digital Tester		Resistance Valve	Digital Tester		Resistance Valve
(+) Red	(-) Black		(+) Red	(-) Black	
P	N	Ω (Several ohms)	U	N	Ω (Several ohms)
	U		V		
	V		W		
	W		-		





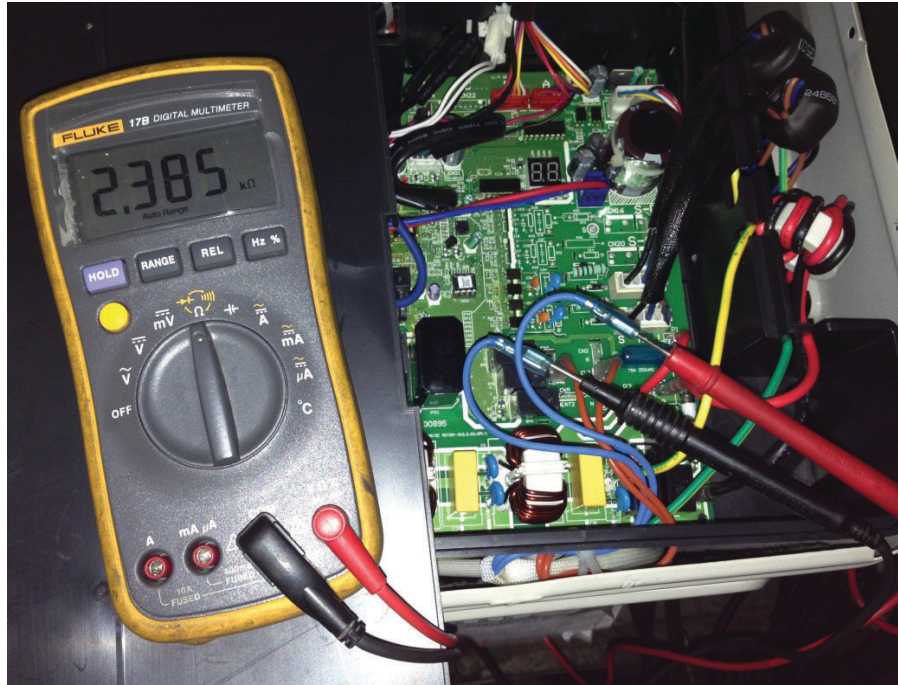
## 4 - Way Valve Check

1. Power on, use a digital tester to measure the voltage; when the unit operates in the **COOLING** mode, the voltage is **0V**. If the voltage value is not in range, the PCB is faulty and needs to be replaced.



**Fig. 18 — Measure the voltage**

2. Turn off the power, use a digital tester to measure the resistance. The value should be 1.8–2.5 KW.



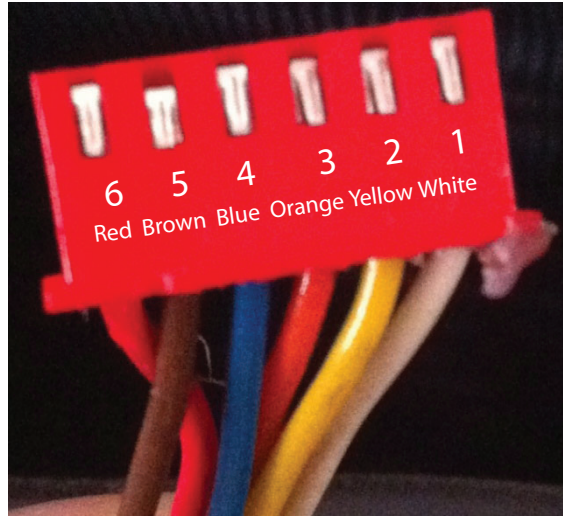
**Fig. 19 — Use a digital tester to measure resistance**

**EXV Check**

⚠
WARNING

**ELECTRICAL SHOCK HAZARD**  
 Electricity remains in the capacitors even when the power is off.  
 Ensure the capacitors are fully discharged before troubleshooting.

1. Disconnect the connector from the outdoor PCB.
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in Table 11.



**Fig. 20 — EXV Check**

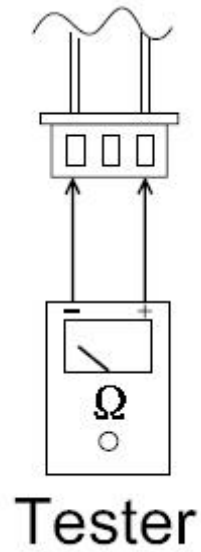
**Table 11 — Winding Colors**

LEAD WINDING COLOR	NORMAL VALUE
Red-Blue	About 50W
Red-Yellow	
Brown-Orange	
Brown-White	

## Main Parts Check

1. Temperature sensor checking

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



**Fig. 21 —Tester**

### Temperature sensors

- Room temp. (T1) sensor,
- Indoor coil temp. (T2) sensor,
- Outdoor coil temp. (T3) sensor,
- Outdoor ambient temp. (T4) sensor,
- Compressor discharge temp. (T5) sensor.
- Measure the resistance value of each winding by using the multi-meter.

## Index

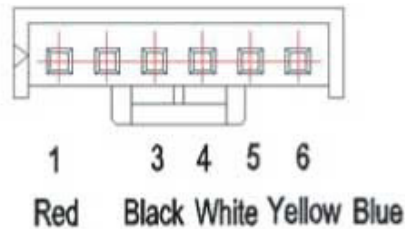
### 1. Indoor or Outdoor DC Fan Motor (control chip is in the fan motor)

Power on and when the unit is in **STANDBY**, measure the voltage of pin1-pin3, pin4-pin3 in the fan motor connector. If the value of the voltage is not in the range shown in Table 12, the PCB has a problem and needs to be replaced.

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

**Table 12 — Voltage**

NO.	COLOR	SIGNAL	VOLTAGE
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-18.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-18.5V

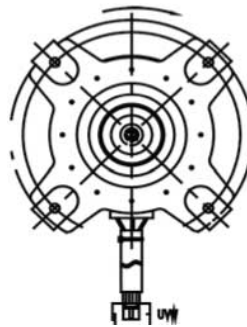


**Fig. 22 —Indoor DC Fan Motor**

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

Power on and check if the fan can run normally. If the fan runs normally, the PCB has a problem and needs to be replaced, If the fan can not run normally, measure the resistance of each pin (two). If the resistance is not equal to each other, the fan motor has a problem and needs to be replaced. Otherwise the PCB has a problem and needs to be replaced.



**Fig. 23 —Outdoor DC Fan Motor**

A221268

## DIAGNOSIS AND SOLUTION (CONT)

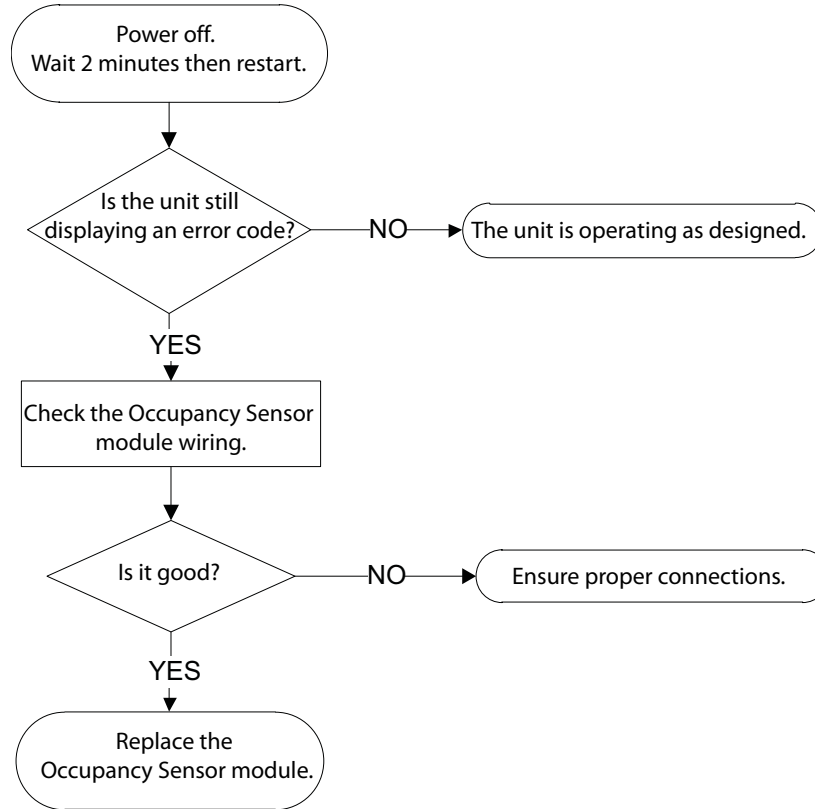
### (EH 0F) Occupancy Sensor Module Error Diagnosis and Solution

**Description:** If the Occupancy Sensor module malfunctions, the LED displays the failure.

**Recommended parts to prepare:**

- Occupancy Sensor

#### Troubleshooting



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## DIAGNOSIS AND SOLUTION (CONT)

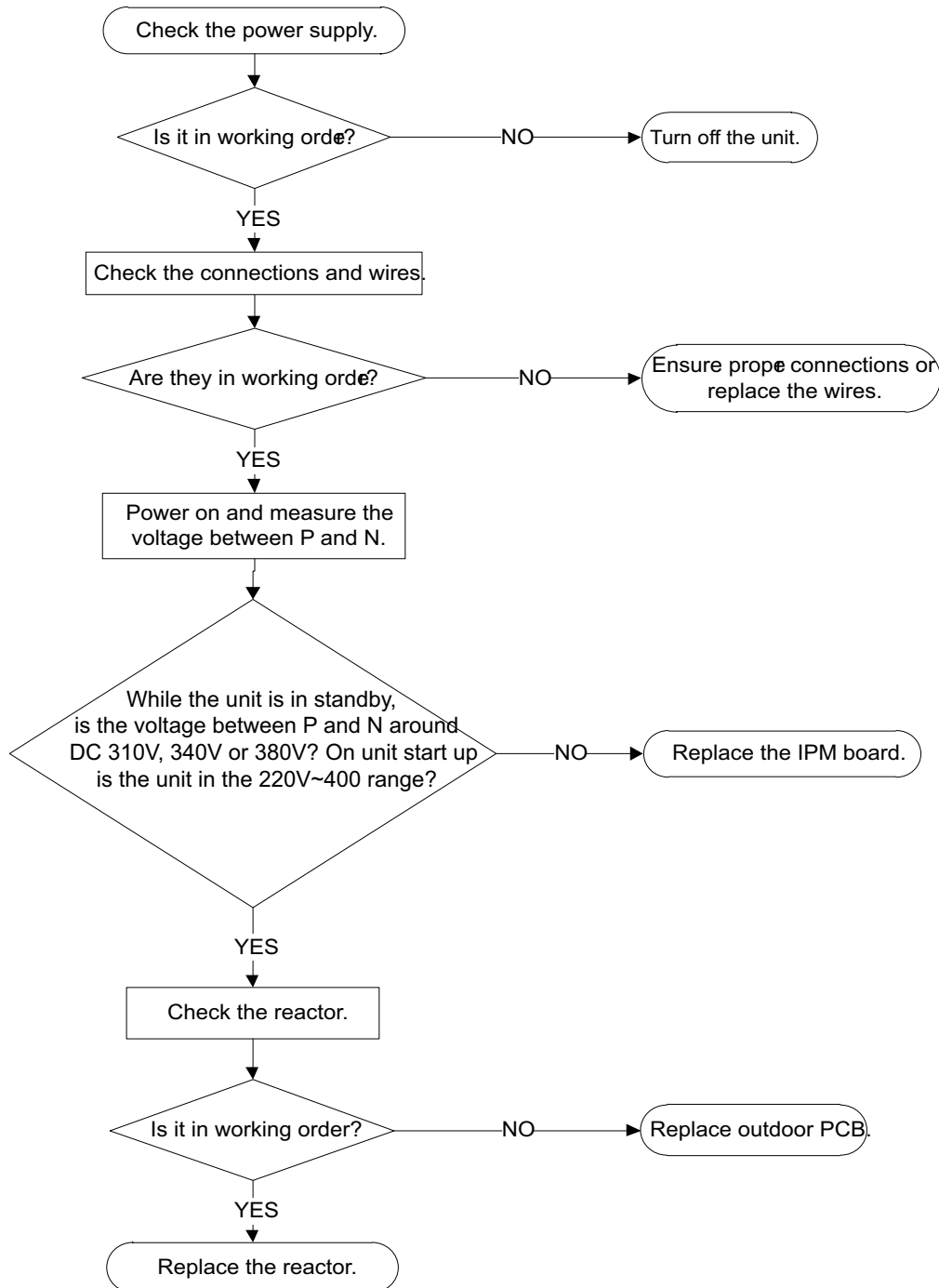
### (P1) Over Voltage or Too Low Voltage Protection Diagnosis and Solution

**Description:** Abnormal increases or decreases in voltage are detected by checking the specified voltage detection circuit.

**Recommended parts to prepare:**

- Power supply issues
- System leakage or blockage
- Faulty PCB

**Troubleshooting**



## DIAGNOSIS AND SOLUTION (CONT)

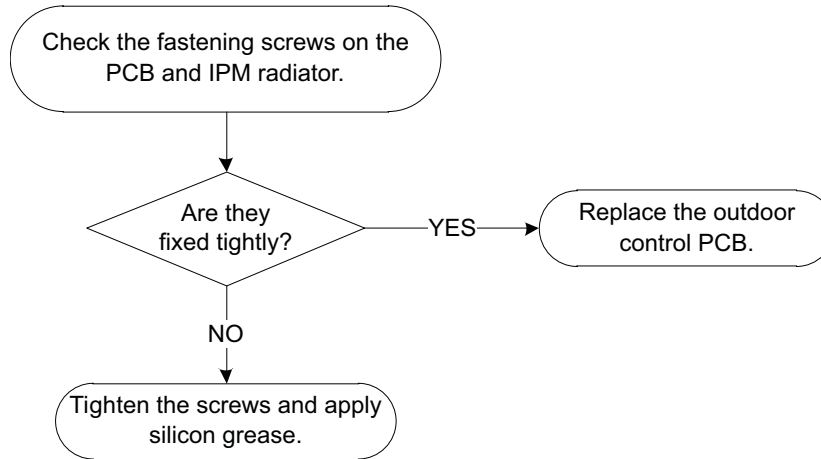
### (P2) High Temperature Protection of IPM Module Diagnosis and Solution

**Description:** If the temperature of IPM module is higher than limited value, the LED displays this failure code.

**Recommended parts to prepare:**

- Faulty PCB
- Connection problems

#### Troubleshooting



A221272

## DIAGNOSIS AND SOLUTION (CONT)

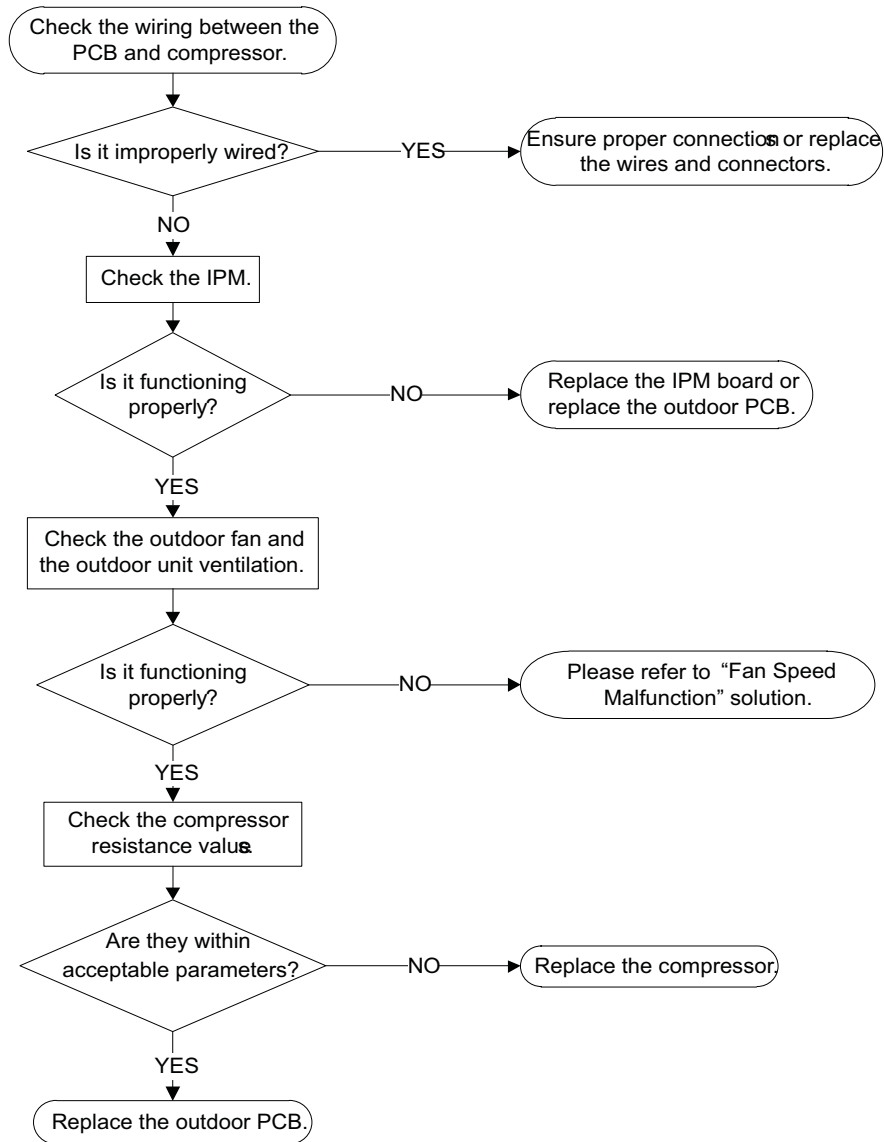
### (P4) Inverter Compressor Drive Error Diagnosis and Solution

**Description:** If the temperature of IPM module is higher than limited value, the LED displays the failure code.

**Recommended parts to prepare:**

- Wiring mistake
- IPM malfunction
- Outdoor fan assembly faulty
- Compressor malfunction
- Outdoor PCB faulty

**Troubleshooting**



A221273



## DIAGNOSIS AND SOLUTION (CONT)

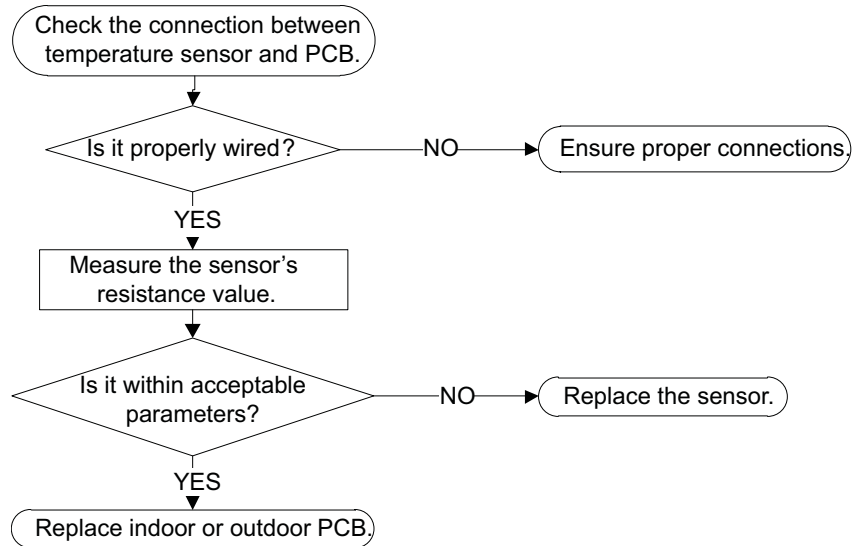
### (E4/E5/F1/F2/F3) Open Circuit or Short Circuit of Temperature Sensor Diagnosis and Solution

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

#### Recommended parts to prepare:

- Wiring mistake
- Faulty sensor
- Faulty PCB

#### Troubleshooting



A221274

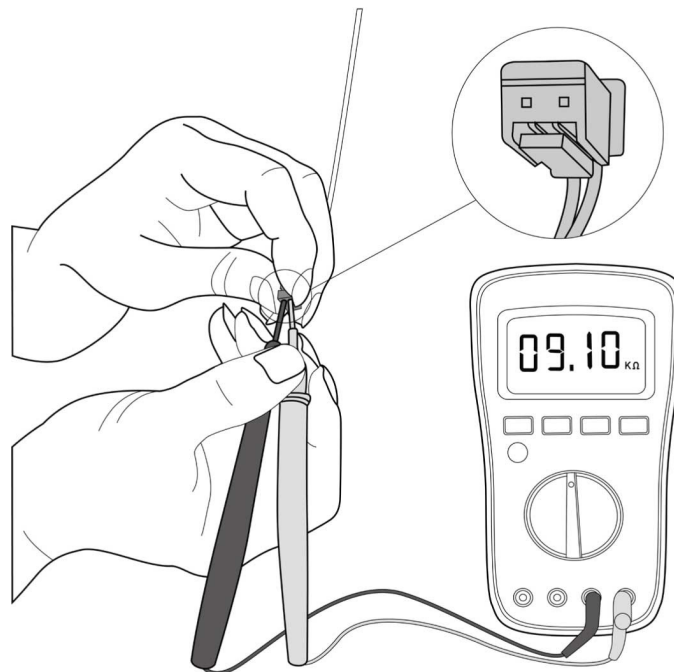


Fig. 24 — Multimeter

A221276

## DIAGNOSIS AND SOLUTION (CONT)

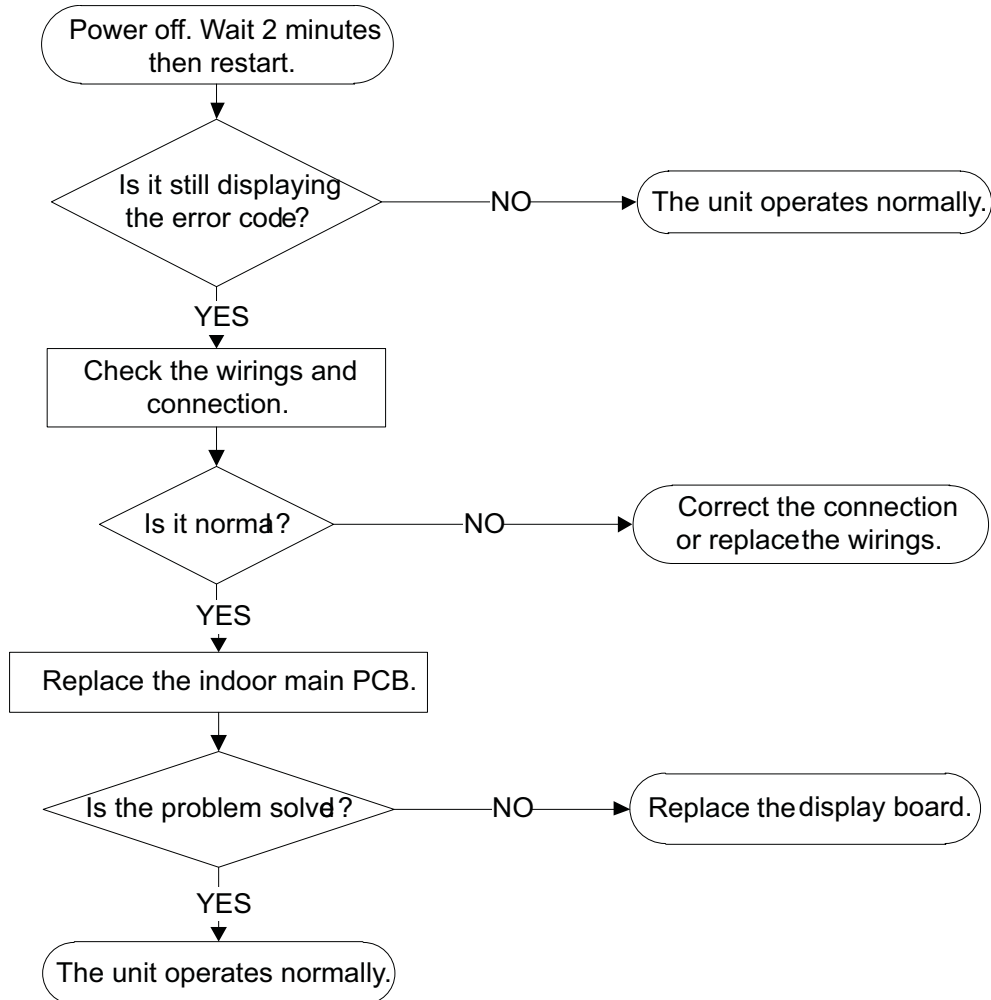
### (Eb) Communication Error Between the Indoor PCB and Display Board

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

**Recommended parts to prepare:**

- Wiring mistake
- PCB faulty
- Display board malfunction

**Troubleshooting**



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## DIAGNOSIS AND SOLUTION (CONT)

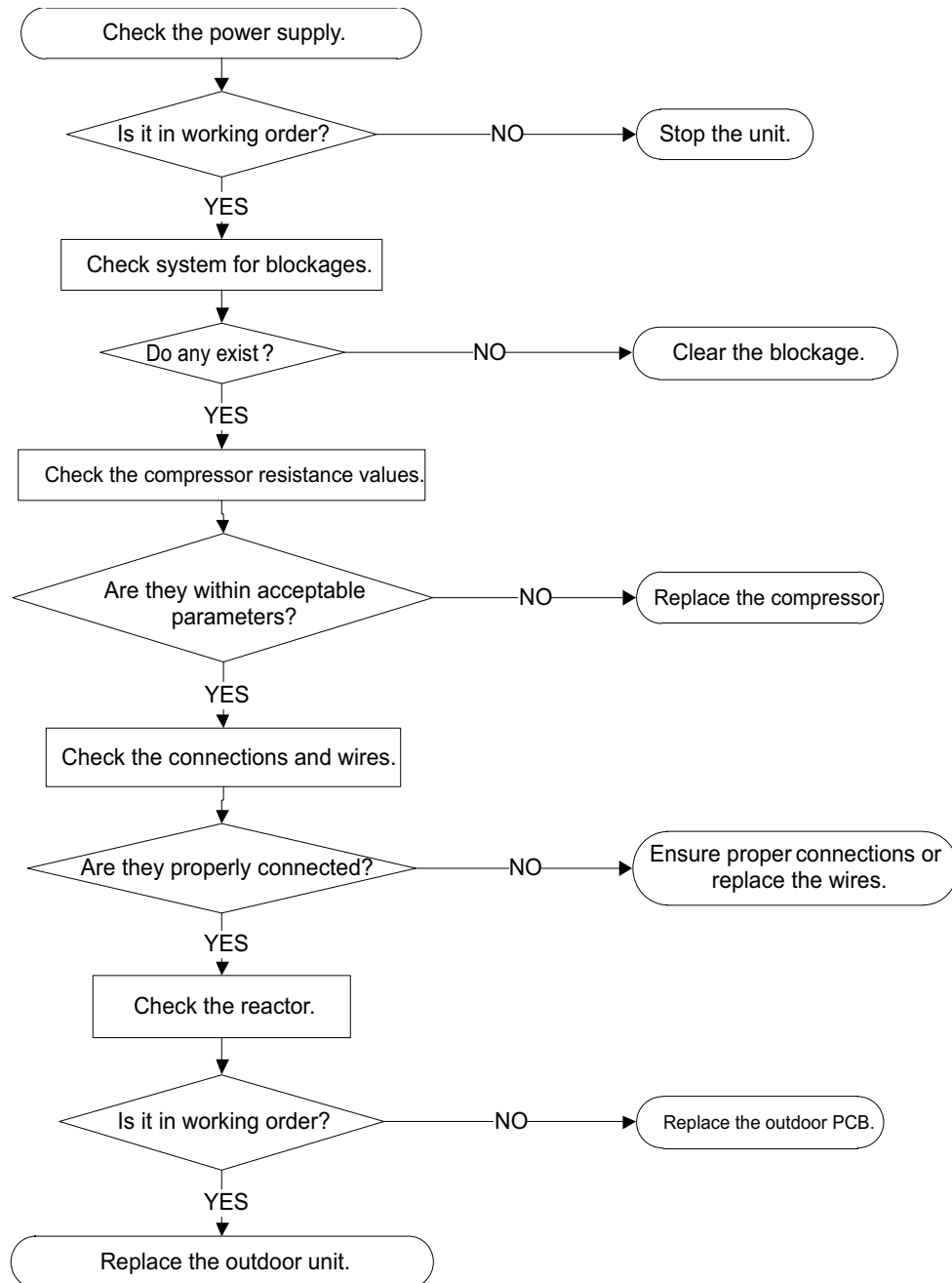
### (F0) Overload Current Protection Diagnosis and Solution

**Description:** An abnormal current rise is detected by checking the specified current detection circuit.

**Recommended parts to prepare:**

- Power supply problems
- System blockage
- Faulty PCB
- Wiring mistake
- Compressor malfunction

**Troubleshooting**



A221278

## DIAGNOSIS AND SOLUTION (CONT)

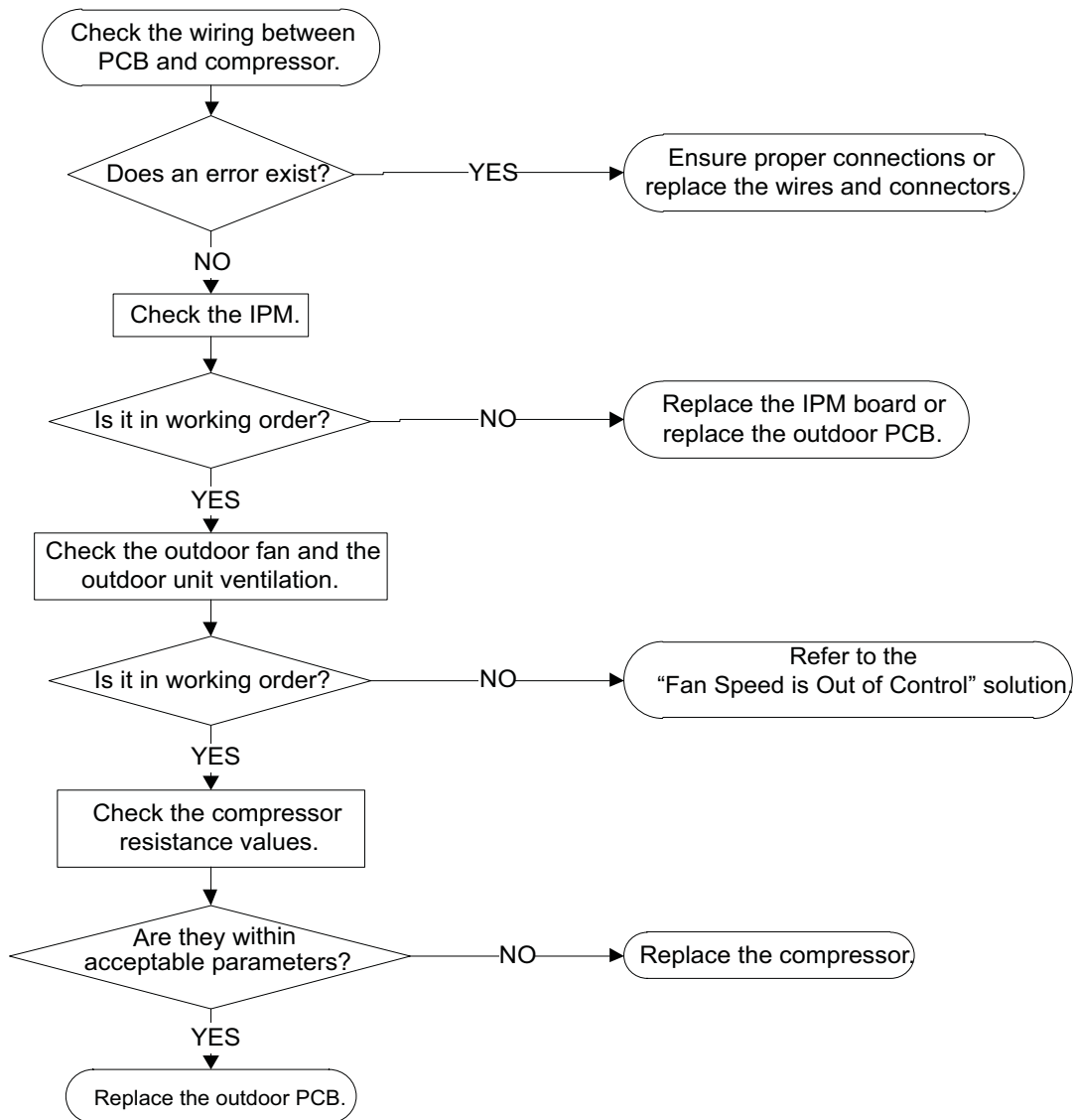
### (P0) IPM Malfunction or IGBT Over-strong Current Protection Diagnosis and Solution

**Description:** When the voltage signal the IPM sends to the compressor drive chip is abnormal, the display LED displays “P0” and the air conditioner turns off.

**Recommended parts to prepare:**

- Wiring mistake
- IPM malfunction
- Faulty outdoor fan assembly
- Compressor malfunction
- Faulty outdoor PCB

**Troubleshooting**



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## Operation Modes and Functions (18K)

### FAN Mode

1. Outdoor fan and compressor stop
2. Temperature setting function is disabled and no setting temperature appears.
3. Indoor fan can be set to high/med/low/auto
4. The louver operates same as in the **COOLING** mode.
5. Auto fan

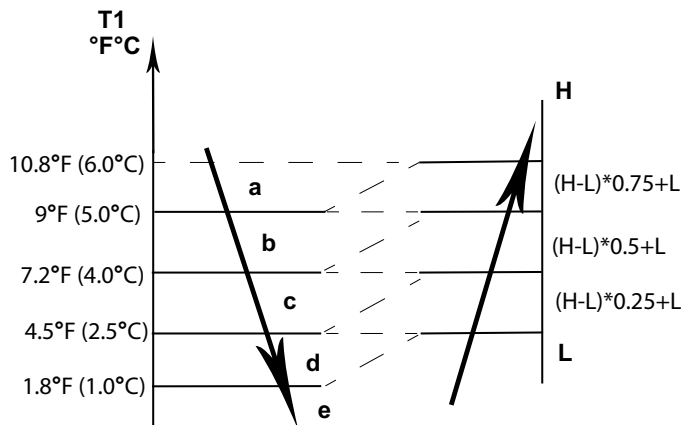


Fig. 25 —AUTO FAN Mode

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### COOLING Mode

#### Compressor Running Rules:

- When  $T1-Ts < -4^{\circ}\text{F}$  ( $-2^{\circ}\text{C}$ ), the compressor stops.
- When  $T1-Ts > -1^{\circ}\text{F}$  ( $-0.5^{\circ}\text{C}$ ), the compressor activates.
- When the AC runs in the mute mode, the compressor runs with low frequency.
- When the current is more than setting value, the current protection function activates, and the compressor stops.

#### Outdoor Fan Running Rules:

The outdoor unit runs at a different fan speed according to  $T4$ . For different outdoor units, the fan speeds differ.

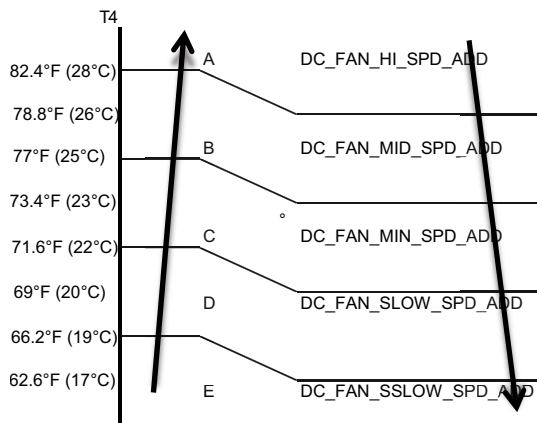


Fig. 26 — Outdoor Fan Running Rules

A221283

**Indoor Fan Running Rules:**

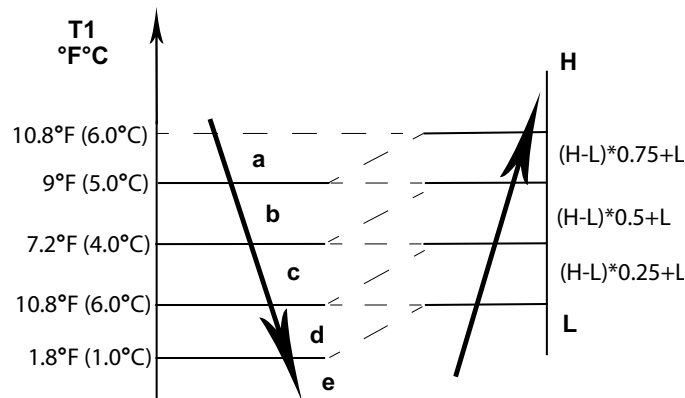
- In the **COOLING** mode, the indoor fan runs continuously and the user can select any of the following speeds: **HIGH, MEDIUM, LOW** and **AUTO**.
- When the setting temperature is reached, if the compressor stops running, the indoor fan motor runs in the minimum or setting speed (see Fig. 27).

Setting Fan Speed	T1-Td °F (°C)		Actual Fan Speed
<b>H</b>	8.1°F (4.5°C)	A	$H + (H+H+G)$
	5.4°F (3.0°C)	B	$H (=H)$
	2.7°F (1.5°C)	C	$H - (H- =H-G)$
<b>M</b>	8.1°F (4.5°C)	D	$M + (M+=M+Z)$
	5.4°F (3.0°C)	E	$M (M=M)$
	2.7°F (1.5°C)	F	$M - (M- =M-Z)$
<b>L</b>	8.1°F (4.5°C)	G	$L + (L+=L+D)$
	5.4°F (3.0°C)	H	$L (L=L)$
	2.7°F (1.5°C)	I	$L - (L- =L-D)$

**Fig. 27 — Indoor Fan Running Rules**

A221284

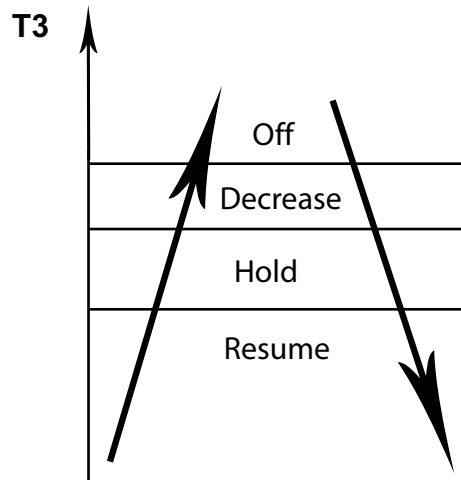
The **AUTO** fan adheres to the following rules (see Fig. 28):



**Fig. 28 — AUTO FAN Running Rules**

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### Compressor Temperature Protection



**Fig. 29 — Compressor Temperature Protection**

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- Off:** Compressor stops
- Decrease:** Decrease the running frequency to the lower level
- Hold:** Keep the current frequency
- Resume:** No limitation for frequency

When the condenser temperature is higher than the setting value, the compressor stops.

### Evaporator Temperature Protection

When the evaporator temperature is lower than the setting value the compressor stops.

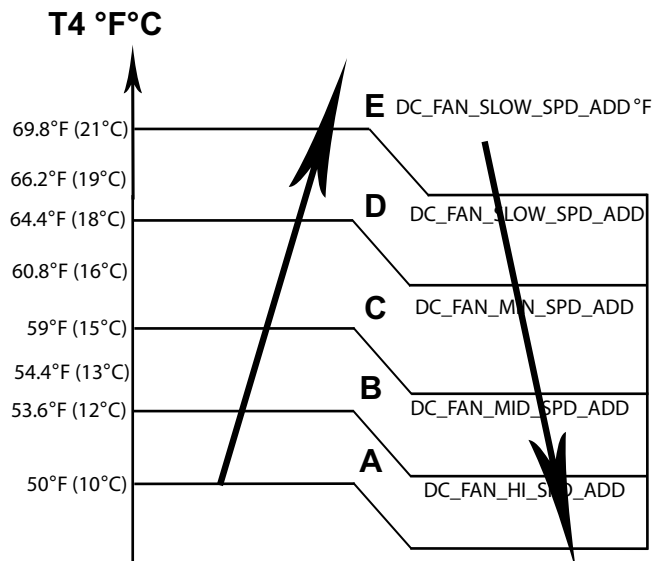
### HEATING Mode

#### Compressor Running Rules:

- When  $T1 - T_s > -\Delta T$ , the compressor stops.
- When  $T1 - T_s < \Delta T - 1.5$ , the compressor is on.  $\Delta T$  is the programmed parameter for temperature compensation.
- When the AC runs in MUTE mode, the compressor runs with a low frequency.
- When the current is more than the setting value, the current protection function activates and the compressor stops.

#### Outdoor Fan Running Rules:

The outdoor unit runs at a different fan speed according to  $T4$ . For different outdoor units, the fan speeds differ.



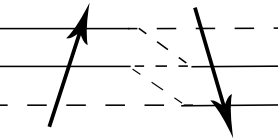
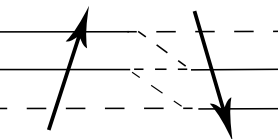
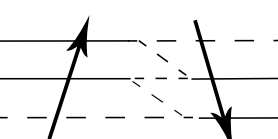
**Fig. 30 — Outdoor Fan Running Rules**

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**Indoor Fan Running Rules:**

When the compressor is on, the user can set the indoor fan to either **HIGH/MED/LOW/AUTO/MUTE**. When the indoor unit coil temperature is low, the anti-cold air function starts and the indoor fan motor runs at the low speed. The speed can not be changed.

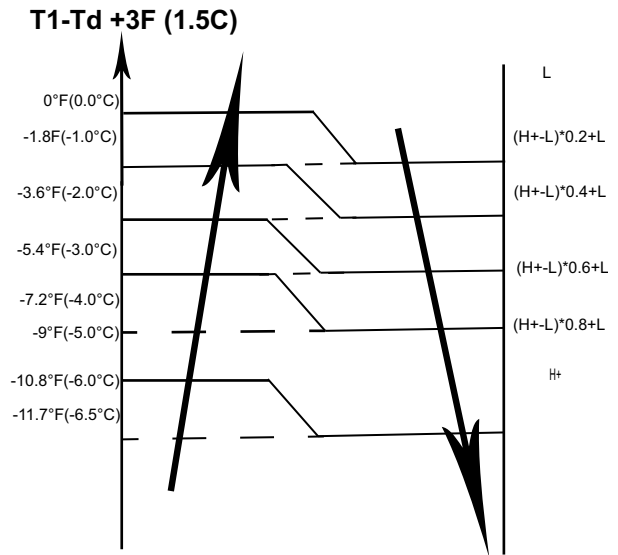
When the temperature is lower than the setting value, the indoor fan motor stops. When the indoor temperature reaches the setting temperature, the compressor stops, the indoor fan motor runs at the minimum speed or setting speed. The anti-cold air function is valid. The indoor fan is controlled as shown in Fig. 31.

Setting Fan Speed	T1-Td+34.7°F (1.5 °C)		Actual Fan Speed
H	-2.7°F(-1.5°C)		H - (H=H-G)
	-5.4°F (-3.0°C)		H (=H)
	-8.1°F(-4.5°C)		H + (H+ =H+G)
M	-2.7°F(-1.5°C)		M - (M=M-Z)
	-5.4°F (-3.0°C)		M (M=M)
	-8.1°F(-4.5°C)		M + (M+ =M+Z)
L	-2.7°F(-1.5°C)		L - (L=L-D)
	-5.4°F (-3.0°C)		L (L=L)
	-8.1°F(-4.5°C)		L + (L+ =L+D)

**Fig. 31 — Indoor Fan Running Rules**

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Auto fan action in the **HEATING** mode.



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**Fig. 32 — Auto Fan Action in HEATING Mode**

**DEFROST Mode**

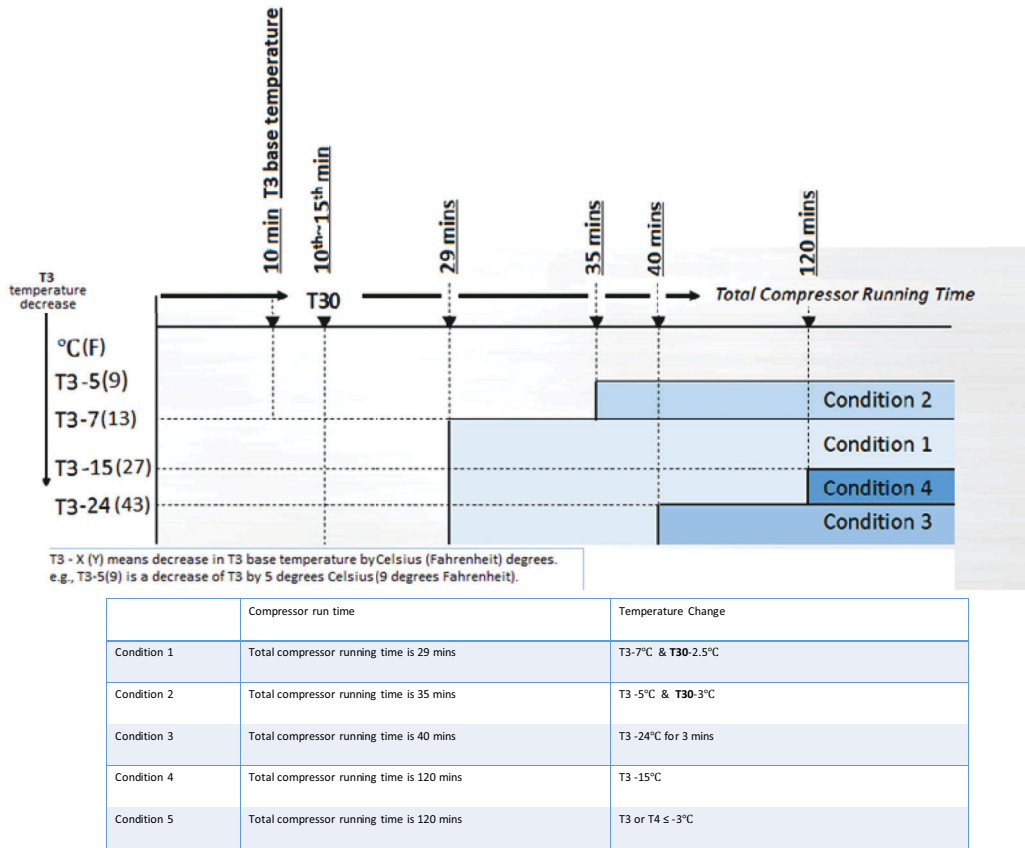
The air conditioning unit enters the **DEFROST** mode according to the value of temperature of T3 and the value range of temperature change of T3 plus the compressor running time (see Fig. 33).

During the **DEFROST** mode, the compressor keeps running however the indoor and outdoor fan motors stop.



**Forced DEFROSTING Mode:**

1. Press and hold **AUTO/COOL** for 5s to enter the mode. The indoor fan stops and the defrosting lamp illuminates. Use the remote control to exit this mode and turn off the unit to stop the normal **DEFROSTING** mode.
2. To exit the **FORCED DEFROSTING** mode, press and hold **AUTO/COOL** for 5s again.



**Fig. 33 — Defrost Chart**

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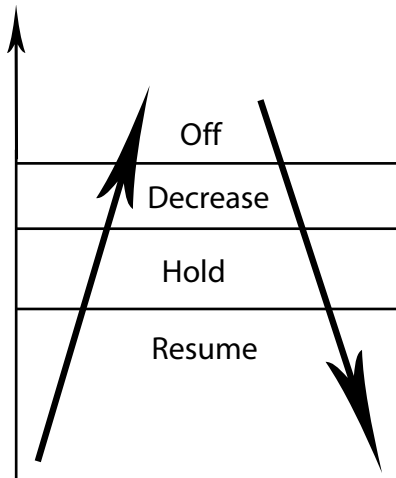
**Defrost Exit Conditions:** Any of the following conditions will cancel the **DEFROST** mode and change the unit to the normal **HEATING** mode:

**NOTE:** T3 temperature refers to the sensor reading at the time when the **DEFROST** mode begins.

- T3 temperature rises above 59°F (15°C).
- T3 temperature remains above 46°F (8°C) for more than 80 seconds.
- The unit has been in the **DEFROST** mode for 10 minutes.

The indoor unit defrost lamp illuminates and the **df** logo appears.

**Evaporator Coil Temperature Protection**



A221291

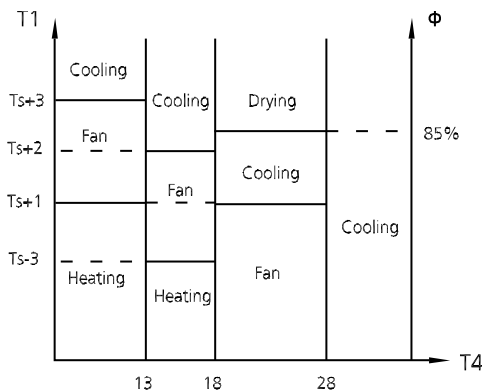
**Fig. 34 — Evaporator Coil Temperature Protection**

When the evaporator temperature is higher than the setting protection value, the compressor stops.

**AUTO Mode**

**AUTO** mode can be selected with the remote controller and the setting temperature can be changed between 60.0°F~86°F (16°C~30°C).

In the **AUTO** mode, the unit chooses either **COOLING**, **HEATING** or the **FAN-ONLY** mode accT2, T4 and relative humidity.



A221292

**Fig. 35 — AUTO Mode**

**Heating\*:** **COOLING ONLY** models run at fan speed. The indoor fan runs in the **AUTO** fan speed for the relevant mode. The louver operates the same as in the relevant mode.

If the unit switches mode between **HEATING** and **COOLING**, the compressor repeatedly stops for a certain time and then chooses the mode according to T1-Ts. If the setting temperature is modified, the unit selects a running function again.

**DRYING mode**

The indoor fan speed is fixed at **BREEZE** and can not be changed. The louver angle is the same as in the **COOLING** mode.

**Low Indoor Room Temperature Protection**

In the **DRYING** mode, if the room temperature is lower than 50°F(10°C), the compressor stops and does not resume until the room temperature exceeds 53.6°F (12°C).

Evaporator anti-freezing protection, condenser high temperature protection and outdoor unit frequency limit are active and are the same as that in the **COOLING** mode. The outdoor fan operates the same as in **COOLING** mode.

**FORCED OPERATION Function**

**Enter FORCED OPERATION function:**

When the machine is off, press **TOUCH** to engage the **Forced Auto Mode**. Press **TOUCH** again, within 5 seconds, to engage the **FORCED COOLING** mode. In **FORCED AUTO**, **FORCED COOLING** or any other operation mode, press **TOUCH** to turn off the unit.

In the **FORCED OPERATION** mode, all general protections and the remote controller are available.

**Operation Rules:**

**FORCED COOLING mode:**

The compressor runs at the F2 frequency and the indoor fan runs as a **BREEZE**. After running for 30 minutes, the unit enters the **AUTO** mode at a 75.2°F (24°C) setting temperature.

**FORCED AUTO mode:**

The **FORCED AUTO** mode is the same as the normal **AUTO** mode with a 75.2°F (24°C) setting temperature.

**AUTO-RESTART function**

The indoor unit is equipped with an **AUTO-RESTART** function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit resumes the previous operation setting (not including the **SWING** function) automatically 3 minutes after the power returns.

If the memorization condition is the **FORCED COOLING** mode, the unit runs in the **COOLING** mode for 30 minutes and enters the **AUTO** mode as 75.2°F (24°C) setting temp.

If the air conditioner turns off before the unit powers off and the air conditioner is required to restart immediately, the compressor delays for 1 minute when the power is on. Under other conditions, the compressor has a 3 minute delay once it restarts.

**Refrigerant Leakage Detection**



With this new technology, the display area displays **EC** when the outdoor unit detects a refrigerant leak.

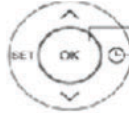
**46°F (8°C) Heating**

When the compressor is running, the indoor fan motor runs without the anti-cold air function. When the compressor is off, the indoor fan motor is off.

## Inquiry Mode

To enter the **Inquiry Mode**:

Press and hold together **On/Off** and **Fan**   for 8 seconds. The remote control remains in **Inquiry Mode** for 1 minute if no button is pressed. In the **Inquiry Mode**, the remote display cancels all icons except **AUTO**, **COOL**, **DRY**, **HEAT** and battery strength. The digital display defaults to “0” upon entering the **Inquiry Mode**. In **Inquiry Mode**, each digital code (from 0 to 30) is accessed by pressing the **UP** or **DOWN** arrow.



**Fig. 36 —Up and Down Arrow**



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The Inquiry information displays on the high wall indoor unit display in approximately 1 second of accessing the digital code. Press “OK” to send as well.

**Table 13 — Inquiry Codes and Symbols**

CODE	INQUIRY SYMBOL	DESCRIPTION
Code 0		None
Code 1	T1	Indoor ambient
Code 2	T2	Indoor pipe
Code 3	T3	Outdoor pipe
Code 4	T4	Outdoor air
Code 5	TP (T5)	Compressor discharge
Code 6	FT	Compressor target frequency
Code 7	Fr	Compressor run frequency
Code 8	dL	Unit amperage
Code 9	Uo	Unit voltage
Code 10	Sn	Capacity test (special usage)
Code 11	----	N/A
Code 12	Pr	Indoor fan speed
Code 13	Lr	Electronic Expansion Valve (EEV) opening
Code 14	ir	Indoor fan speed
Code 15	HU	Humidity
Code 16	TT	Set point compensation temperature
Code 17	dT	Dust concentration (not used)
Code 18	WIFI	Wi-Fi signal strength
Code 19	----	N/A
Code 20	oT	Indoor fan target frequency
Code 21	----	N/A
Code 22	----	N/A
Code 23	----	N/A
Code 24	----	N/A
Code 25	----	N/A
Code 26	----	N/A
Code 27	----	N/A
Code 28	----	N/A
Code 29	----	N/A
Code 30	----	N/A

To exit the **Inquiry Mode**:

Press and hold together **On/Off** and **Fan**   for 2 seconds.

Pressure on Service Port

Table 14 — 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)	
<b>BAR</b>	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
<b>PSI</b>	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
<b>MPa</b>	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

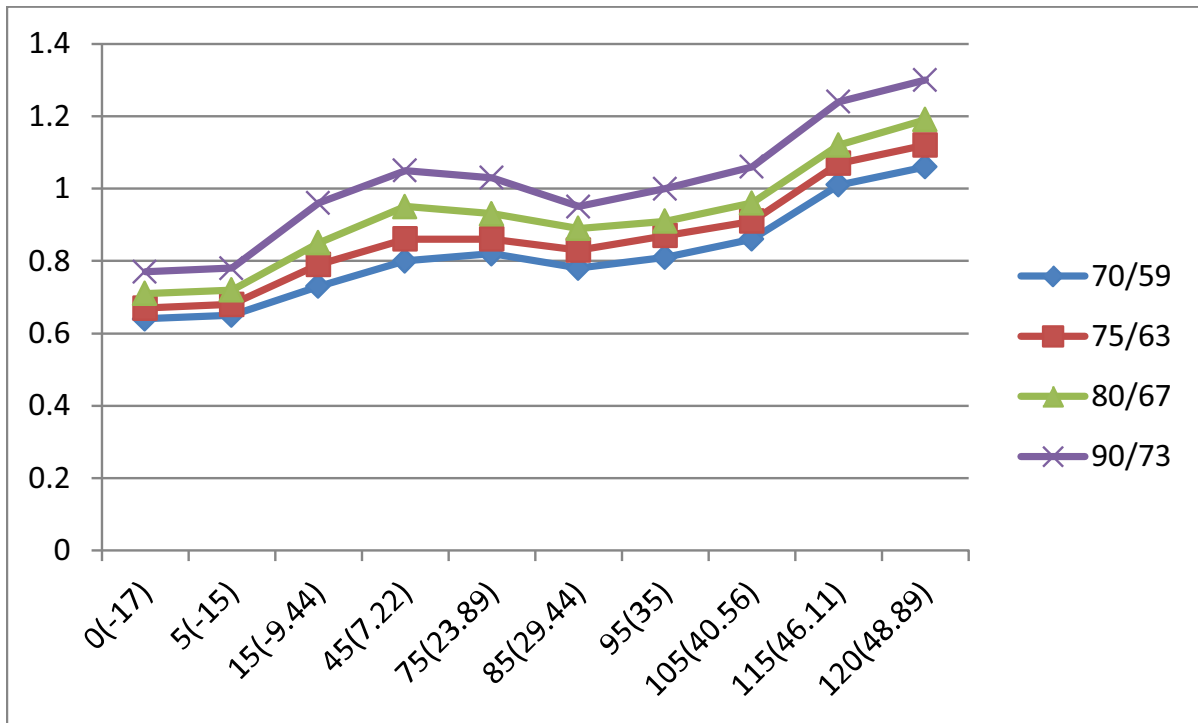


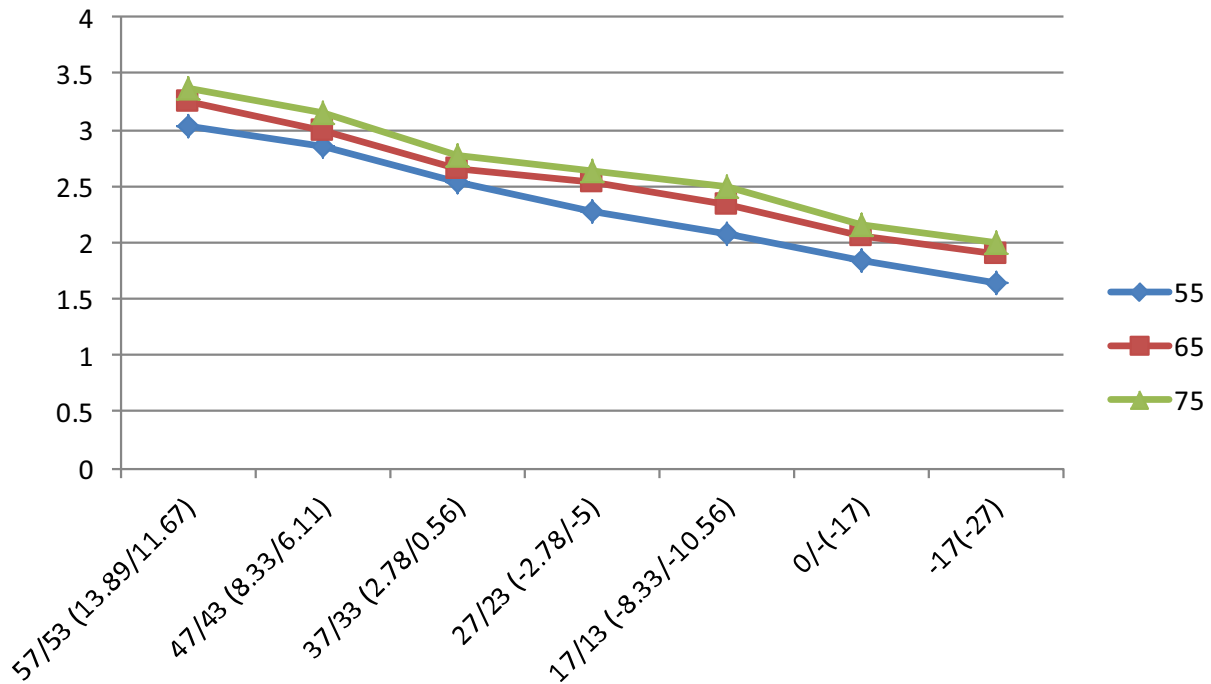
Fig. 37 — Cooling Chart

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**Pressure on Service Port (Cont)**

**Table 15 — Heating Chart (R410A)**

°F(°C)	ODU(DB/WB)	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)
	IDU(DB)							
<b>BAR</b>	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
<b>PSI</b>	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
<b>MPa</b>	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

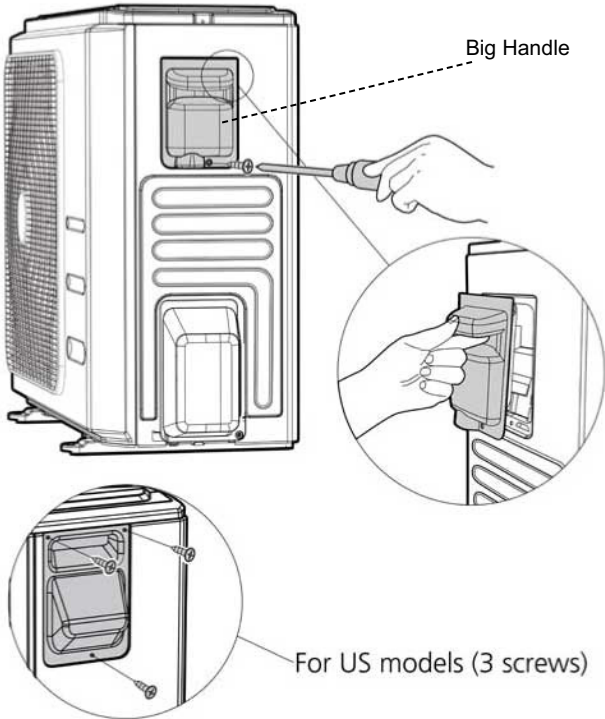
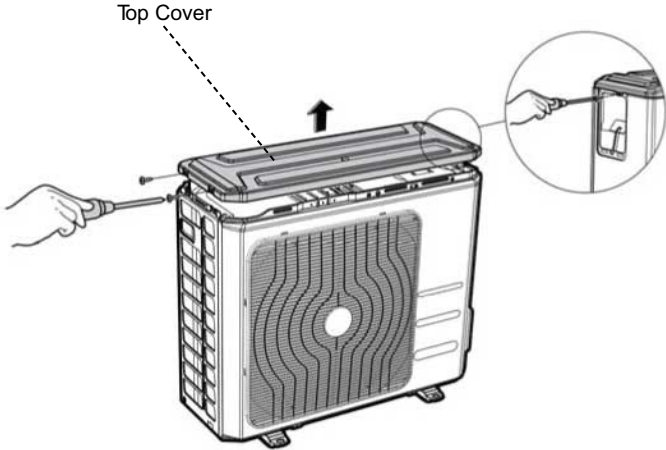


A221328

# DISASSEMBLY INSTRUCTIONS

Outdoor Unit Sizes 9K-12K (208-230V)

## Panel Plate

Procedure	Illustration
<ol style="list-style-type: none"> <li>1) Turn off the air conditioner and the power breaker.</li> <li>2) Remove the big handle screws (3) then remove the big handle.</li> </ol>	 <p>Big Handle</p> <p>For US models (3 screws)</p>
<ol style="list-style-type: none"> <li>3) Remove the top cover screws and remove the top cover (3 screws). One of the screws is located under the big handle.</li> </ol>	 <p>Top Cover</p>

A221329

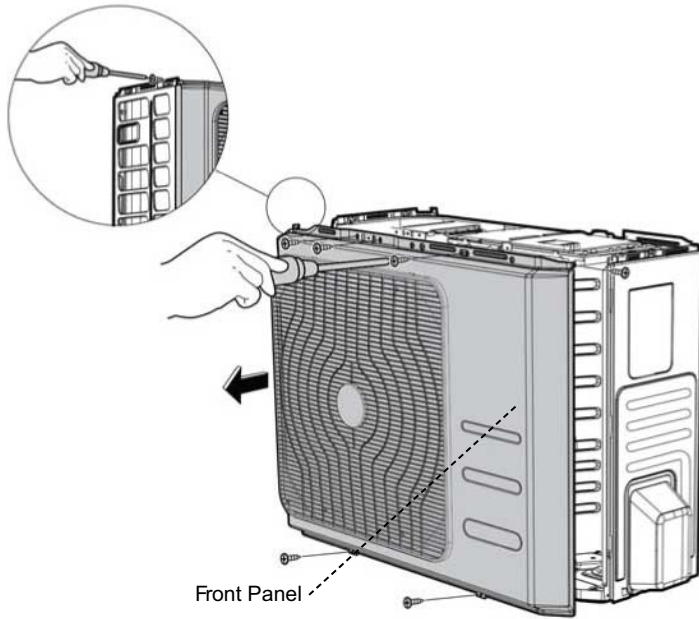
## Outdoor Unit Sizes 9K-12K (208-230V) (continued)

### Panel Plate

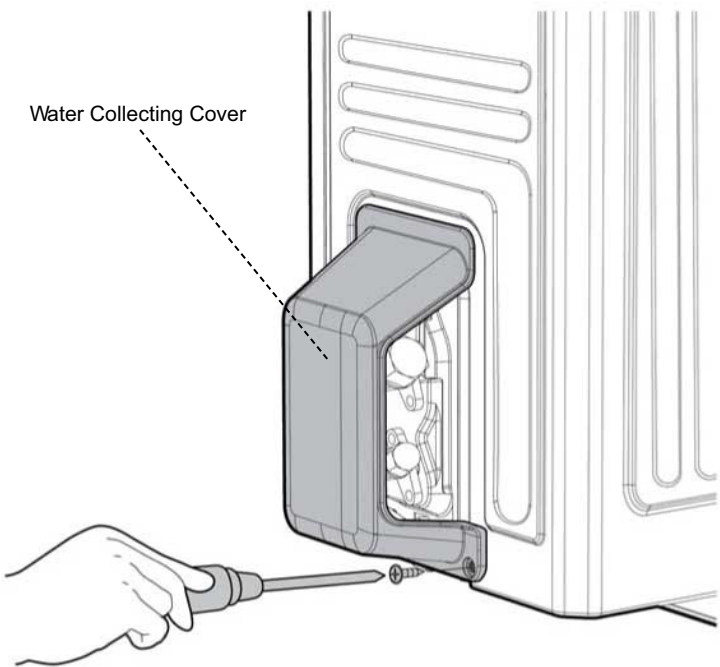
#### Procedure

- 4) Remove the front panel screws (7) and remove the front panel.

#### Illustration

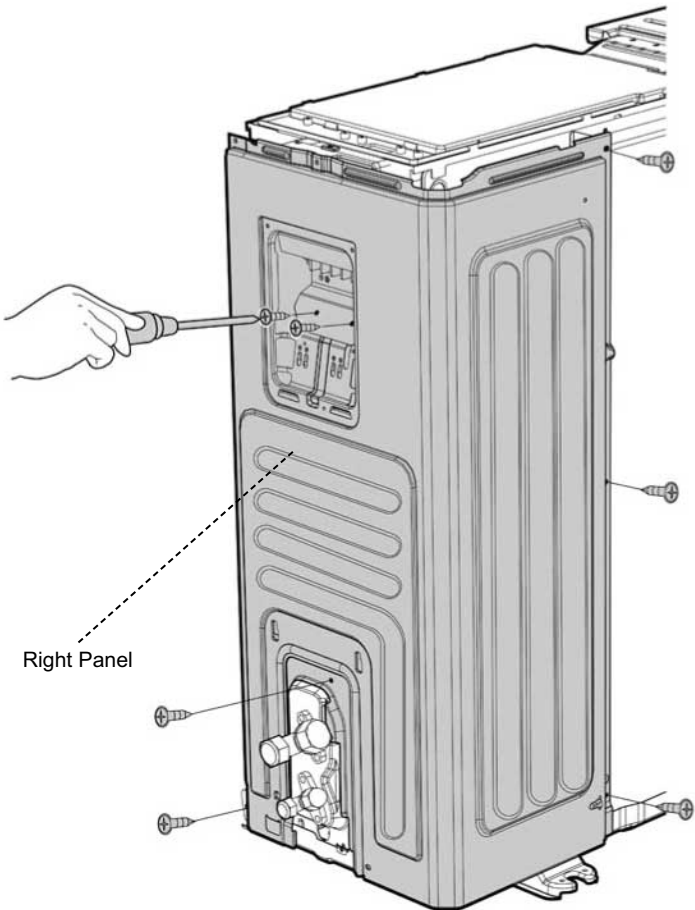


- 5) Remove the water collecting cover screw (1) and remove the water collecting cover.



## Outdoor Unit Sizes 9K-12K (208-230V) (continued)

### Panel Plate

Procedure	Illustration
<p>6) Remove the screws (6) from the right panel then remove the right panel.</p>	 <p>The illustration shows a hand using a screwdriver to remove a screw from the right panel of an outdoor unit. The unit is shown in a three-quarter view, with the right panel being the focus. A dashed line points to the right panel, which is labeled "Right Panel". The unit has a control panel at the top and a service panel at the bottom. Several screws are shown being removed from the right panel. The unit is mounted on a base with feet.</p>

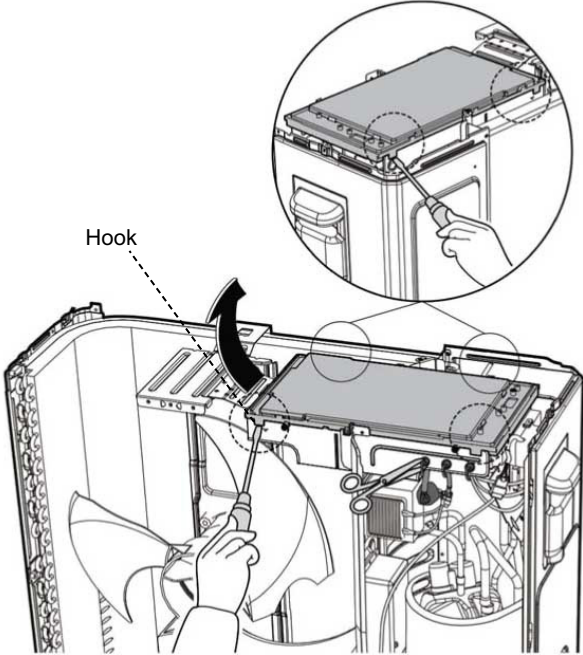
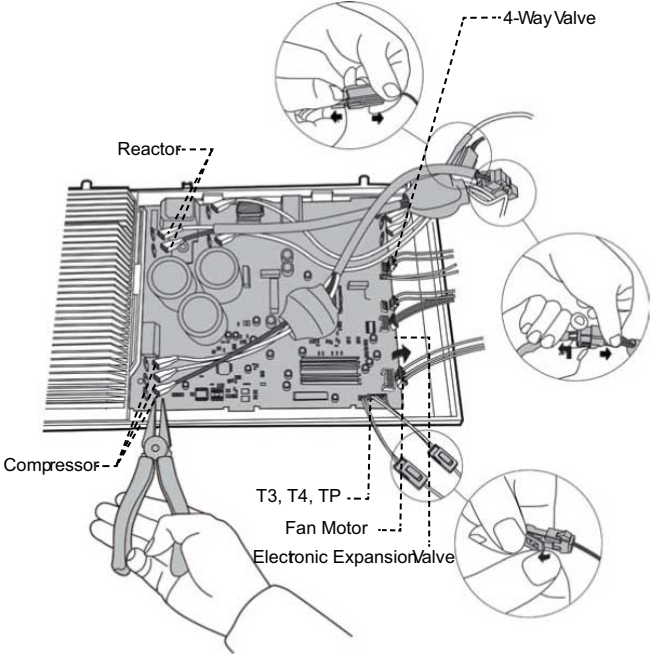
A221331



## Outdoor Unit Sizes 9K-12K (208-230V) (continued)

### Electrical Parts / PCB Board

**NOTE:** Remove the panel plate. Refer to the Panel Plate removal steps before disassembling electrical parts.

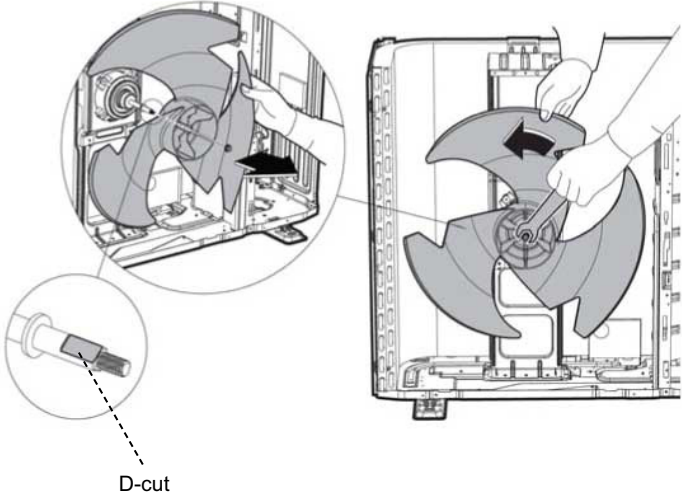
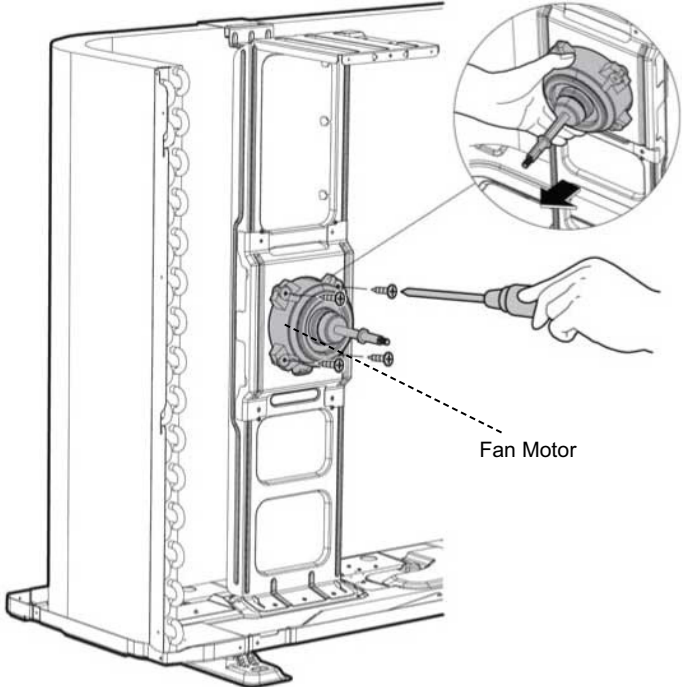
Procedure	Illustration
<ol style="list-style-type: none"> <li>1) Loosen the hooks then open the electronic control box cover (4 hooks).</li> <li>2) Remove the compressor connector.</li> <li>3) Remove the two blue wires connected to the four-way valve.</li> </ol>	 <p>Hook</p>
<ol style="list-style-type: none"> <li>4) Remove the condenser coil temp. sensor(T3), outdoor ambient temp. sensor(T4) and discharge temp. sensor(T5) connectors.</li> <li>5) Disconnect the electronic expansion valve wire.</li> <li>6) Remove the connector for the electric heaters.</li> <li>7) Remove the reactor connector for the reactor.</li> <li>8) Then remove the electronic control box.</li> </ol>	 <p>Reactor</p> <p>4-Way Valve</p> <p>Compressor</p> <p>T3, T4, TP</p> <p>Fan Motor</p> <p>Electronic Expansion Valve</p>

A221332

## Outdoor Unit Sizes 9K-12K (208-230V) (continued)

### Fan Disassembly

**NOTE:** Remove the panel plate and the connection of fan motor on PCB (refer to Panel Plate and Electrical Parts) before disassembling the fan motor.

Procedure	Illustration
<ol style="list-style-type: none"> <li>1) Remove the nut securing the fan with a spanner.</li> <li>2) Remove the fan.</li> </ol>	
<ol style="list-style-type: none"> <li>3) Remove the fan motor screws (4).</li> <li>4) Remove the fan motor.</li> </ol>	

A221333

## Outdoor Unit Sizes 9K-12K (208-230V) (continued)

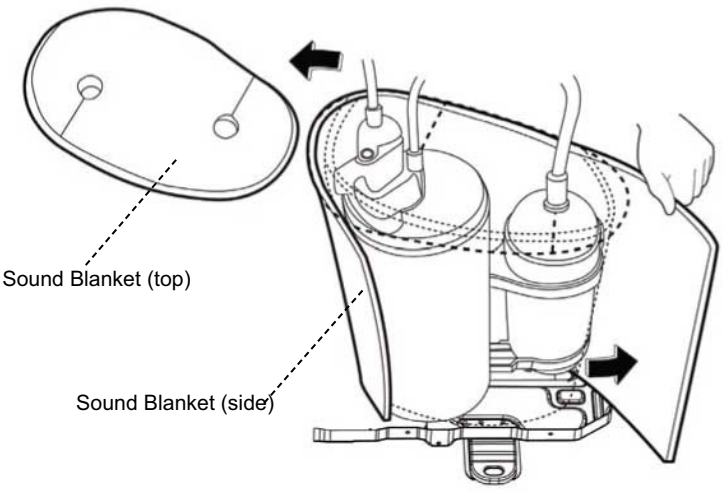
### Sound Blanket



## WARNING

Recover refrigerant from the refrigerant circuit before removing the compressor.

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

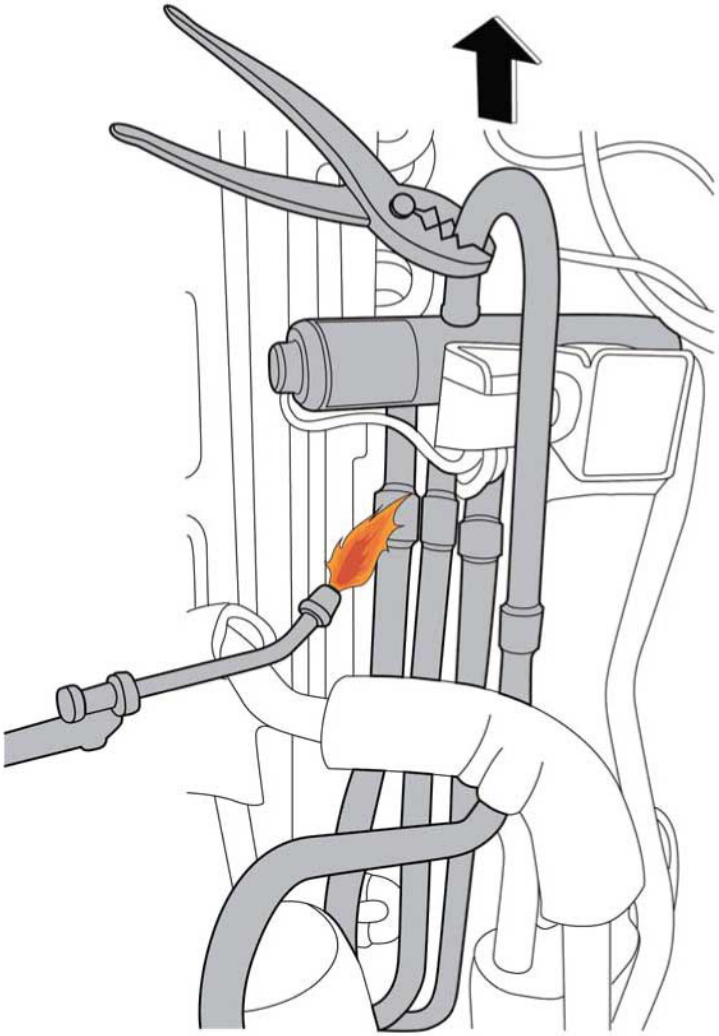
Procedure	Illustration
1) Remove the sound blanket (side and top).	 <p>The illustration shows a cross-section of the outdoor unit's sound blanket. A hand is shown lifting the side panel, which is indicated by a black arrow. A separate diagram shows the top of the sound blanket with two screws. Labels 'Sound Blanket (top)' and 'Sound Blanket (side)' point to the respective parts.</p>

A221334

## Outdoor Unit Sizes 9K-12K (208-230V) (continued)

### Four-way valve


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

Procedure	Illustration
<ol style="list-style-type: none"><li>1) Heat up the brazed parts then detach the four-way valve and the pipe.</li><li>2) Remove the four-way valve assembly with pliers.</li></ol>	

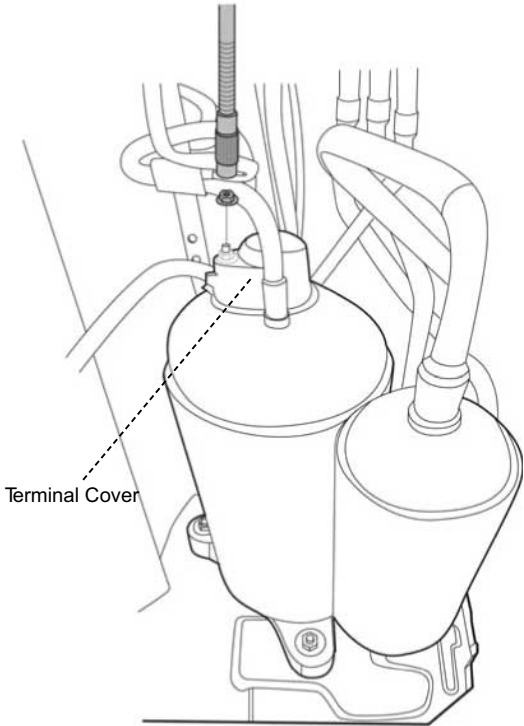
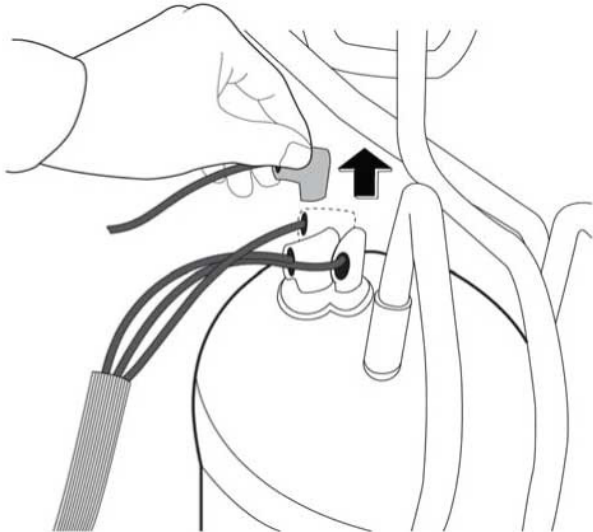
A221335

## Outdoor Unit Sizes 9K-12K (208-230V) (continued)

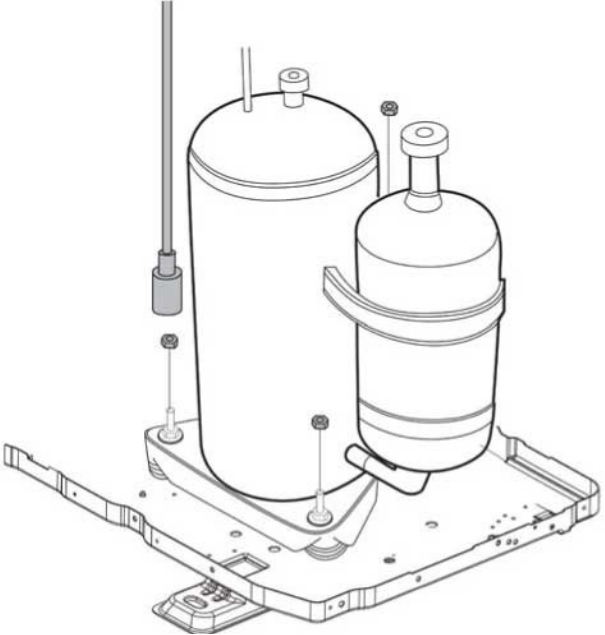
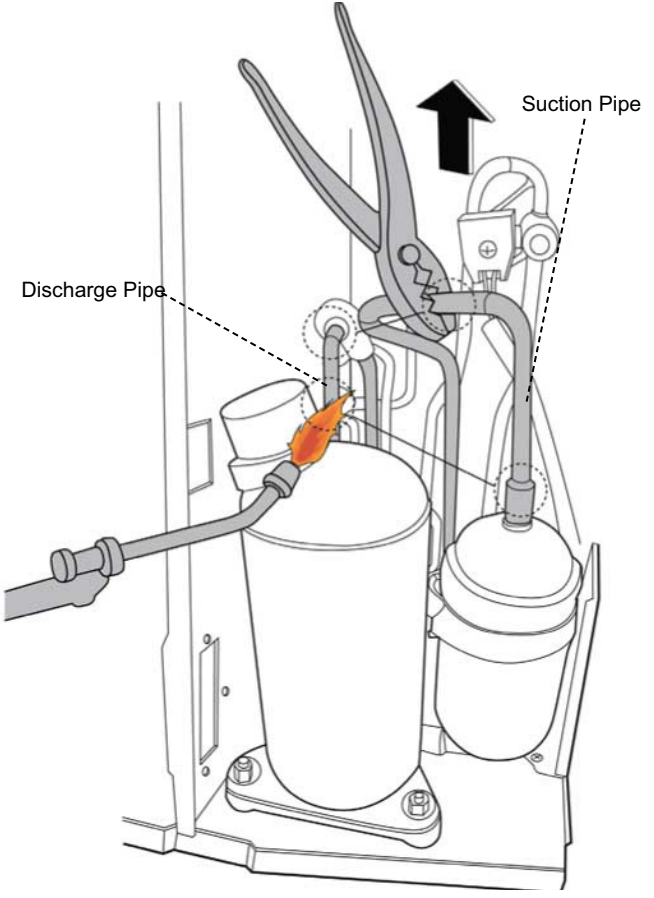
### Compressor

 <b>WARNING</b>
Recover refrigerant from the refrigerant circuit before removing the compressor.

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

Procedure	Illustration
1) Remove the terminal cover flange nut and the terminal cover.	 <p>Terminal Cover</p>
2) Disconnect the connectors.	

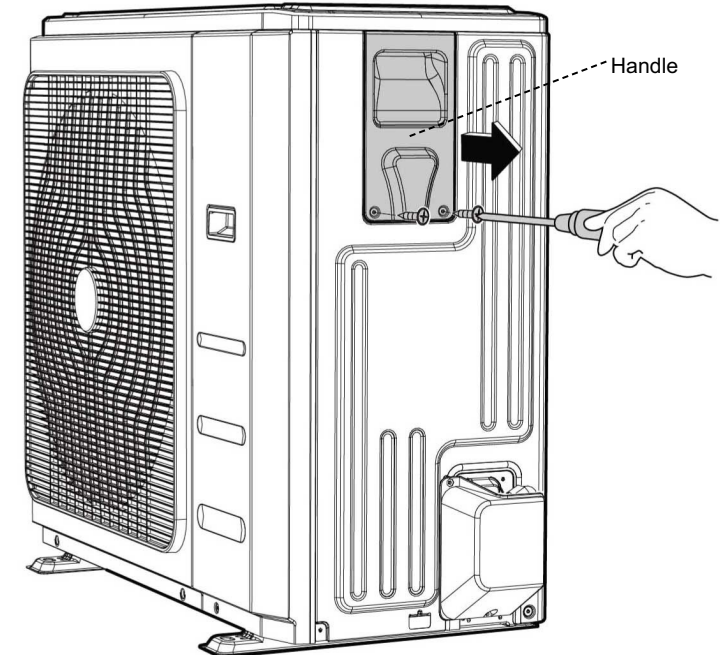
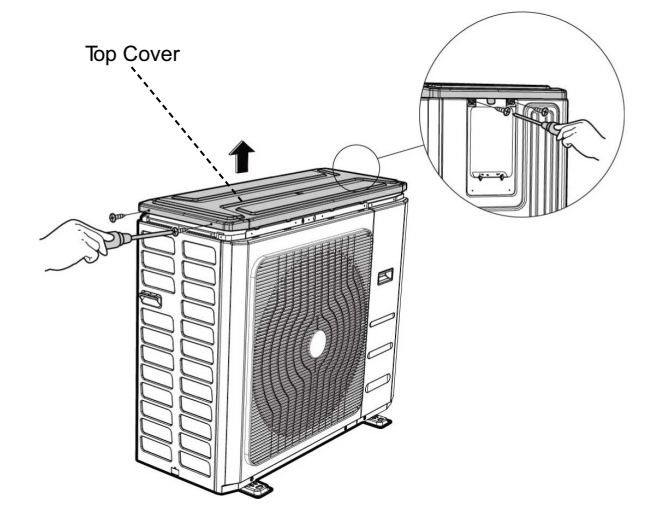
**Outdoor Unit Sizes 9K-12K (208-230V) (continued)**  
**Compressor**

Procedure	Illustration
<p>3) Remove the hex nuts and washers securing the compressor, located on the bottom plate.</p>	 <p>This illustration shows the compressor assembly mounted on a base pan. Several hex nuts and washers are shown being removed from the bottom of the compressor. The base pan has a control panel on the right side.</p>
<p>4) Heat up the brazed parts then remove the discharge pipe and the suction pipe.</p> <p>5) Lift the compressor from the base pan assembly with pliers.</p>	 <p>This illustration shows the compressor being heated with a torch. The discharge pipe and suction pipe are being removed with pliers. Labels indicate the Discharge Pipe and Suction Pipe. An arrow points upwards from the suction pipe area.</p>

## Outdoor Unit Sizes 18K (208/230V)

### Panel Plate

**NOTE:** This part is for reference only and the photos may differ from your actual unit.

Procedure	Illustration
<p>1) Turn off the air conditioner and the power breaker.</p> <p>2) Remove the handle screws (2) then remove the handle.</p>	 <p>Handle</p> <p>For US models (3 screws)</p>
<p>3) Remove the top cover screws (4) then remove the top cover. Two of the screws are located under the handle.</p>	 <p>Top Cover</p>



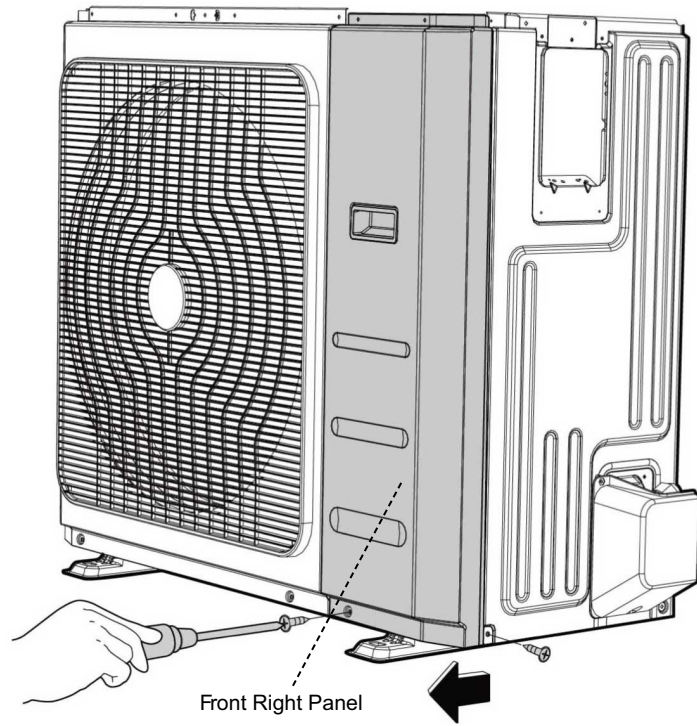
## Outdoor Unit Sizes 24-36K (208/230V) (CONT)

### Panel Plate

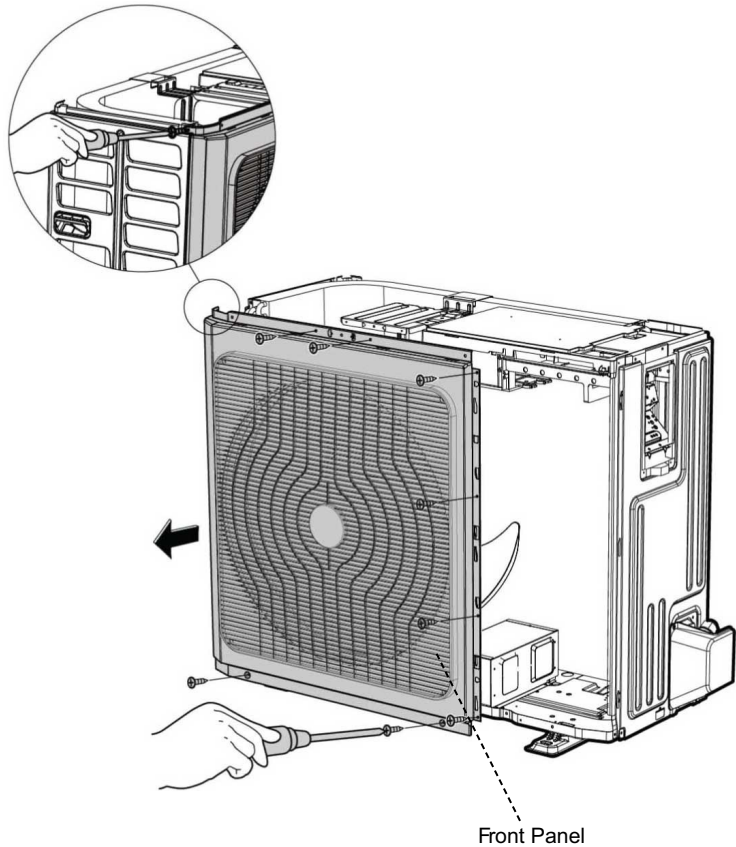
#### Procedure

- 4) Remove the front right panel screws (2) and then remove the front right panel.

#### Illustration



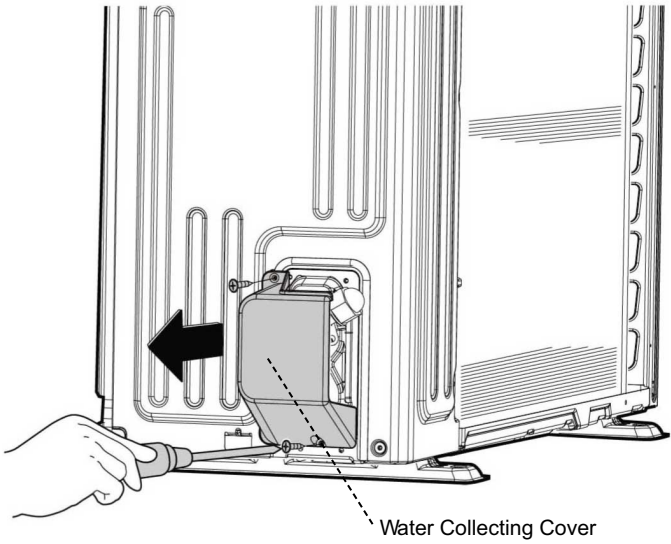
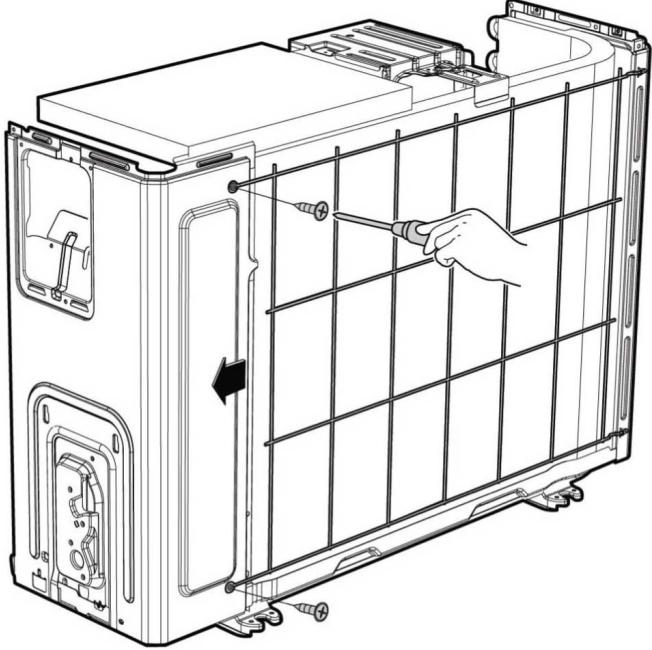
- 5) Remove the front panel screws (9) then remove the front panel.





## Outdoor Unit Sizes 24-36K (208/230V) (CONT)

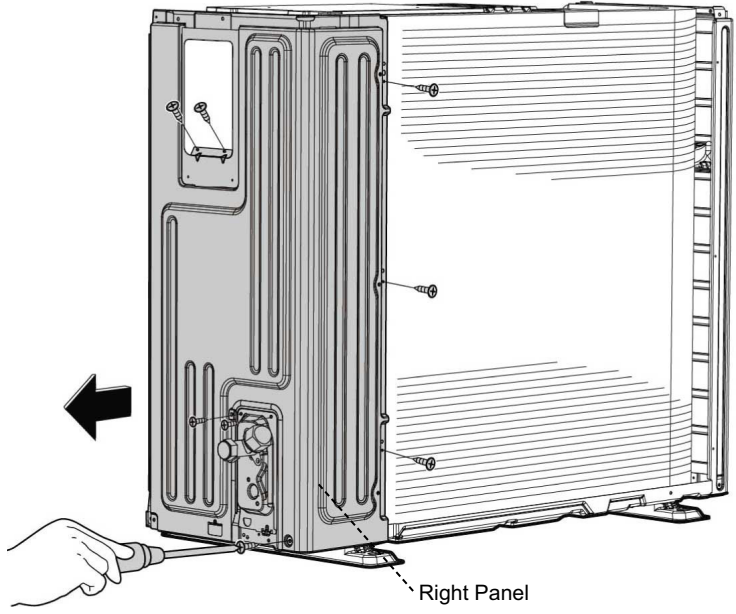
### Panel Plate

Procedure	Illustration
<p>6) Remove the water collecting cover screws (2) then remove the water collecting cover.</p>	 <p>Water Collecting Cover</p>
<p>7) Remove the rear net screws (2) then remove the rear net.</p>	

A221340

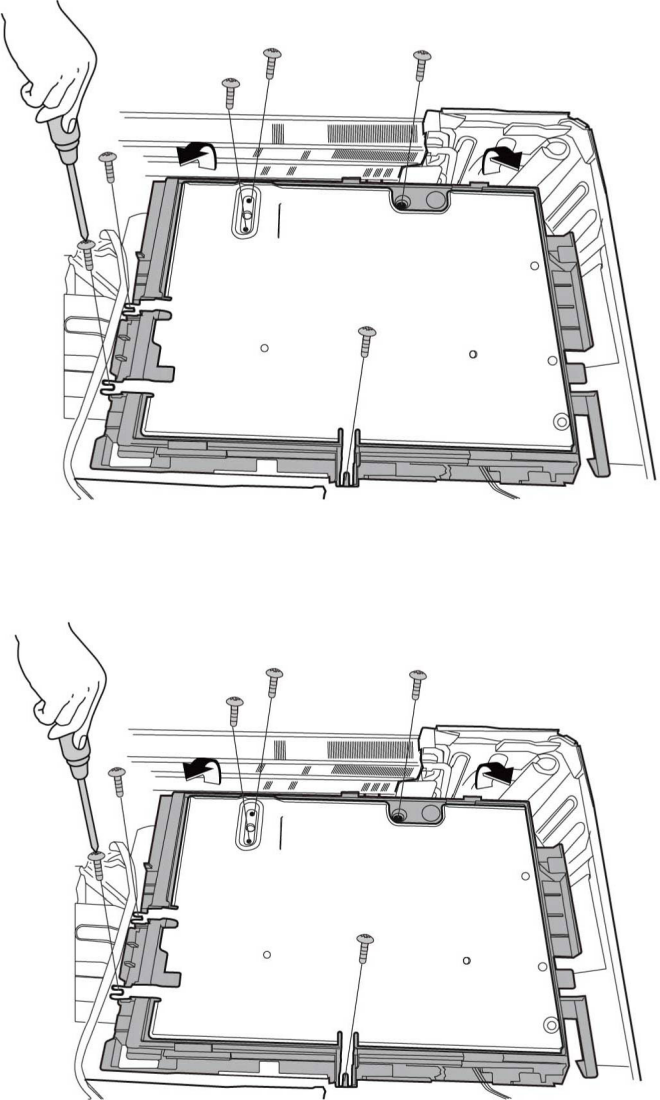
## Outdoor Unit Sizes 24-36K (208/230V) (CONT)

### Panel Plate

Procedure	Illustration
<p>8) Remove the right panel screws (8) then remove the right panel.</p>	 <p>The illustration shows a hand using a screwdriver to remove screws from the right panel of an outdoor unit. A large black arrow points to the left, indicating the direction of panel removal. A dashed line points to the right panel, which is labeled "Right Panel".</p>

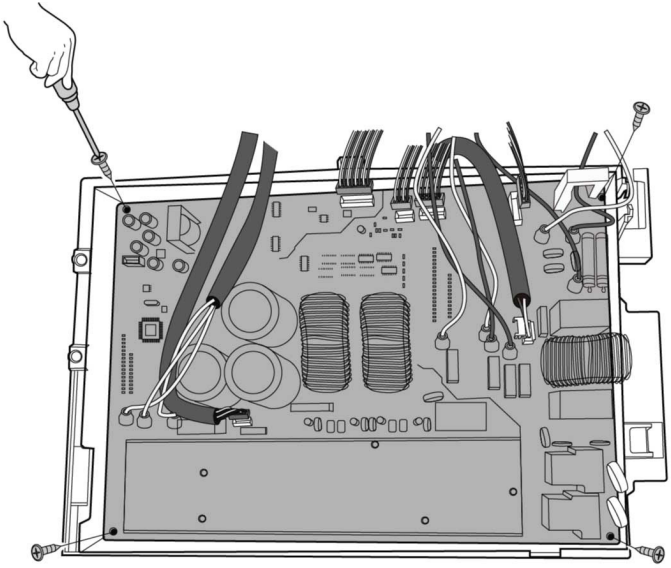
A221341

### PCB Board 24K-36K (208/230V)

Procedure	Illustration
<p>1) Loosen the hooks (4), then open the electronic control box cover.</p>          <p>2) Remove the screws (6) on the electronic control board then turn over the electronic control board.</p>	 <p>The illustration consists of two line drawings of an electronic control box. In the top drawing, a hand is shown using a screwdriver to loosen hooks (4) on the cover. In the bottom drawing, a hand is shown using a screwdriver to remove screws (6) from the electronic control board. Arrows indicate the direction of movement for the cover and the board.</p>

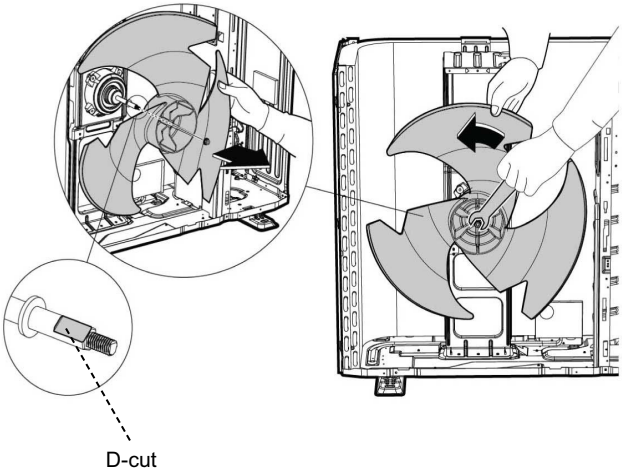
A221342

## PCB Board 24K-36K (208/230V (CONT))

Procedure	Illustration
<p>3) Pull out the connectors</p> <p>4) Remove the 4 screws then remove the electronic control board.</p>	 <p>The illustration shows a top-down view of the PCB board within a metal chassis. A hand is using a screwdriver to remove one of the four screws that secure the board to the chassis. The board is populated with various components, including two large cylindrical capacitors, several integrated circuits, and a network of ribbon cables and wires connected to various ports and connectors. The chassis has a rectangular cutout where the board is mounted, and the screws are located at the corners of this cutout.</p>

A221343

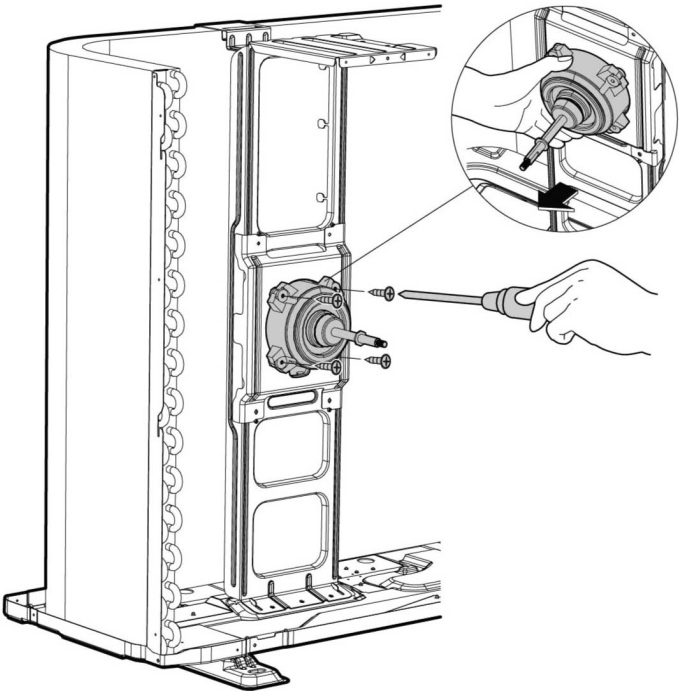
## Fan Assembly

Procedure	Illustration
<ol style="list-style-type: none"> <li>1) Remove the nut securing the fan with a spanner.</li> <li>2) Remove the fan.</li> </ol>	 <p>The illustration shows two views of the fan assembly process. On the left, a circular inset shows a hand using a spanner to turn a nut on the fan's central shaft. A callout shows a close-up of the nut with a 'D-cut' on its side. On the right, a larger view shows the fan being pulled out of the chassis, with an arrow indicating the direction of removal.</p>

A221344

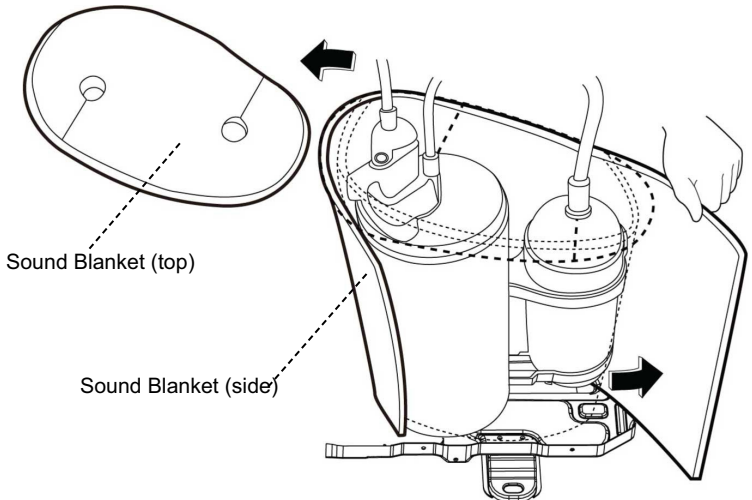
## Fan Motor

**NOTE:** Remove the panel plate and the connection of fan motor on PCB before disassembling fan motor.

Procedure	Illustration
<ol style="list-style-type: none"> <li>1) Remove the fan motor screws (4).</li> <li>2) Remove the fan motor.</li> </ol>	 <p>The illustration shows a hand using a screwdriver to remove four screws from the fan motor's mounting plate. A circular inset provides a magnified view of the screws being removed from the motor housing.</p>


A221345

## Sound Blanket

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

A221346

## Four Way Valve


WARNING

Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. This operation should be implemented by an authorized technician.

Procedure	Illustration
<p>1) Heat up the brazed parts then detach the 4-way valve and the pipe.</p> <p>2) Remove the 4-way valve assembly with pliers.</p>	