

40MHH

High Wall Ductless System

Sizes 09 to 24

Service Manual

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SAFETY CONSIDERATIONS

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to unit 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 coil cleaning. All other operations should be performed by trained service personnel **only**.

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 the warnings or cautions included in the literature and attached to the unit. Consult local building codes and the 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 of 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 unit, 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 the extended periods of unit shutdown. This causes refrigerant slugging and could possibly damage the compressor at start-up.

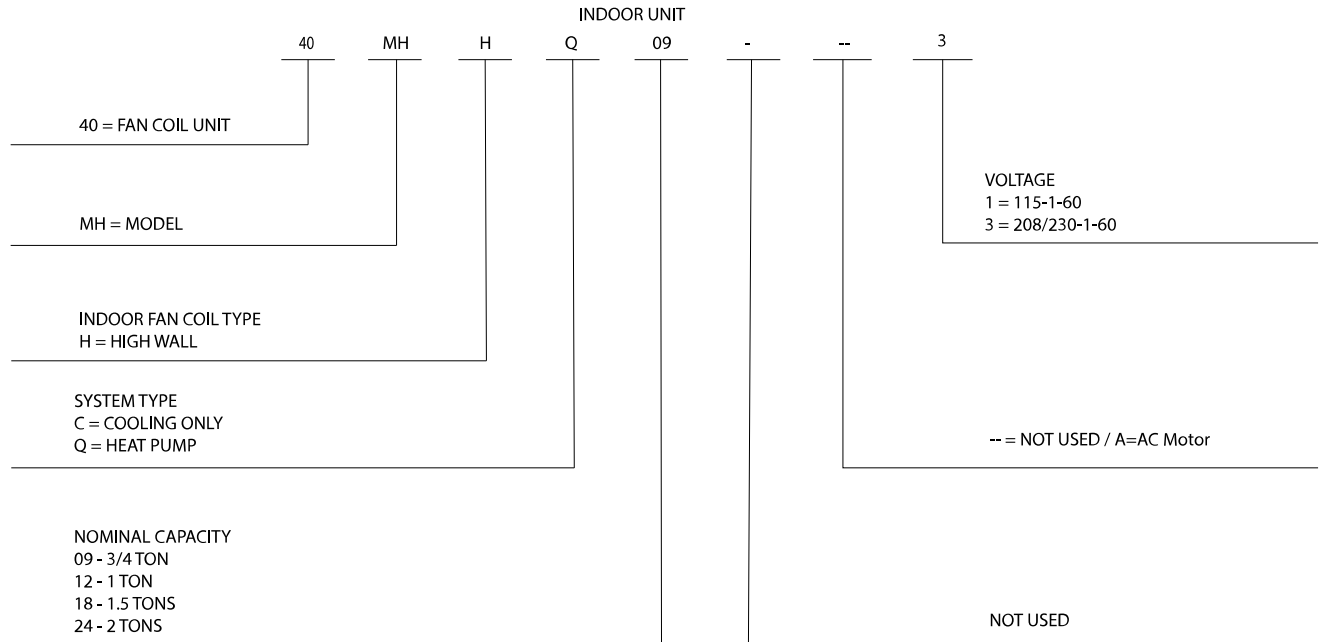
INTRODUCTION

This service manual provides the necessary information to service, repair, and maintain the indoor units. This manual contains "APPENDICES" on page 35 with data required to troubleshoot. Use the "TABLE OF CONTENTS" on page 1 to locate a desired topic.

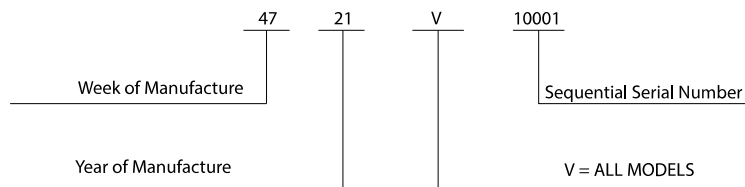
MODEL NUMBER NOMENCLATURE

Table 1 —Indoor Unit Sizes

DESCRIPTION	kBTUh	V-Ph-Hz	ID MODEL No.
HIGH WALL COOLING ONLY	12	115-1-60	40MHHHC12---A1
	12	208/230-1-60	40MHHHC12---A3
	18		40MHHHC18---3
	24		40MHHHC24---3
HIGH WALL HEAT PUMP	12	115-1-60	40MHHQ12---1
	9	208/230-1-60	40MHHQ09---3
	12		40MHHQ12---3
	18		40MHHQ18---3
	24		40MHHQ24---3



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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.



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WIRING

All wires must be sized per NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. Use the Electrical Data table MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and the disconnect fuse or breakers respectively.

Power and Communication Wiring: The main power is supplied to the outdoor unit. The field supplied 14/3 power/communication wiring, from the outdoor unit to the indoor unit, consists of four (4) wires and provides the power for the indoor unit. Two wires are high voltage AC power, one is communication wiring and the other is a ground wire.

To minimize communication interference: If installed in a high Electromagnetic field (EMF) area and communication issues arise, a 14/2 stranded shielded wire can be used to replace 2 (L2/N) and 3 (S) between the outdoor and indoor units - landing the shield onto the ground in the outdoor unit only.

Table 2 — Wiring Sizes

Cable	Cable Size	Remarks
Connection Cable	14AWG	3 wire + Ground 1Φ 208/230 V (Stranded wire is recommended)



CAUTION

EQUIPMENT DAMAGE HAZARD

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



CAUTION

EQUIPMENT DAMAGE HAZARD

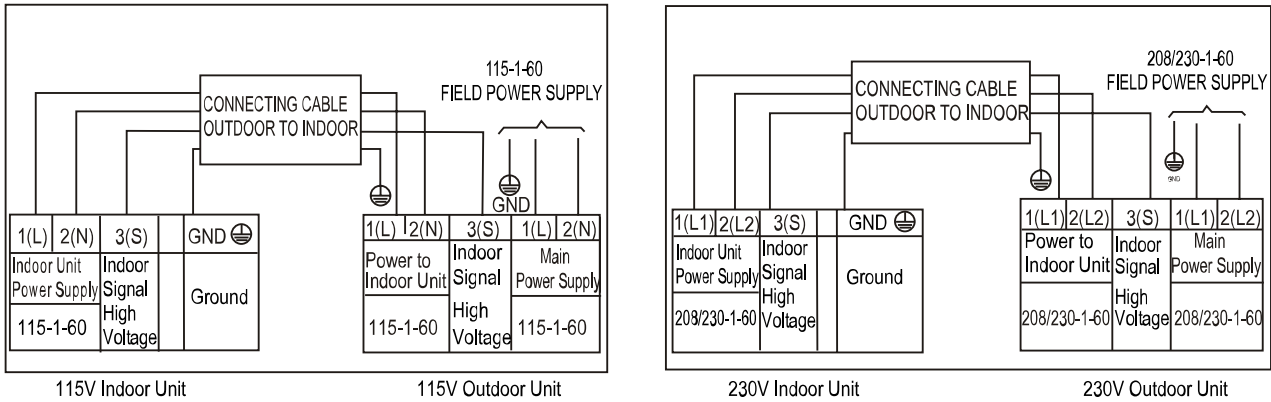
Failure to follow this caution may result in equipment damage or improper operation.

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

CONNECTION DIAGRAMS



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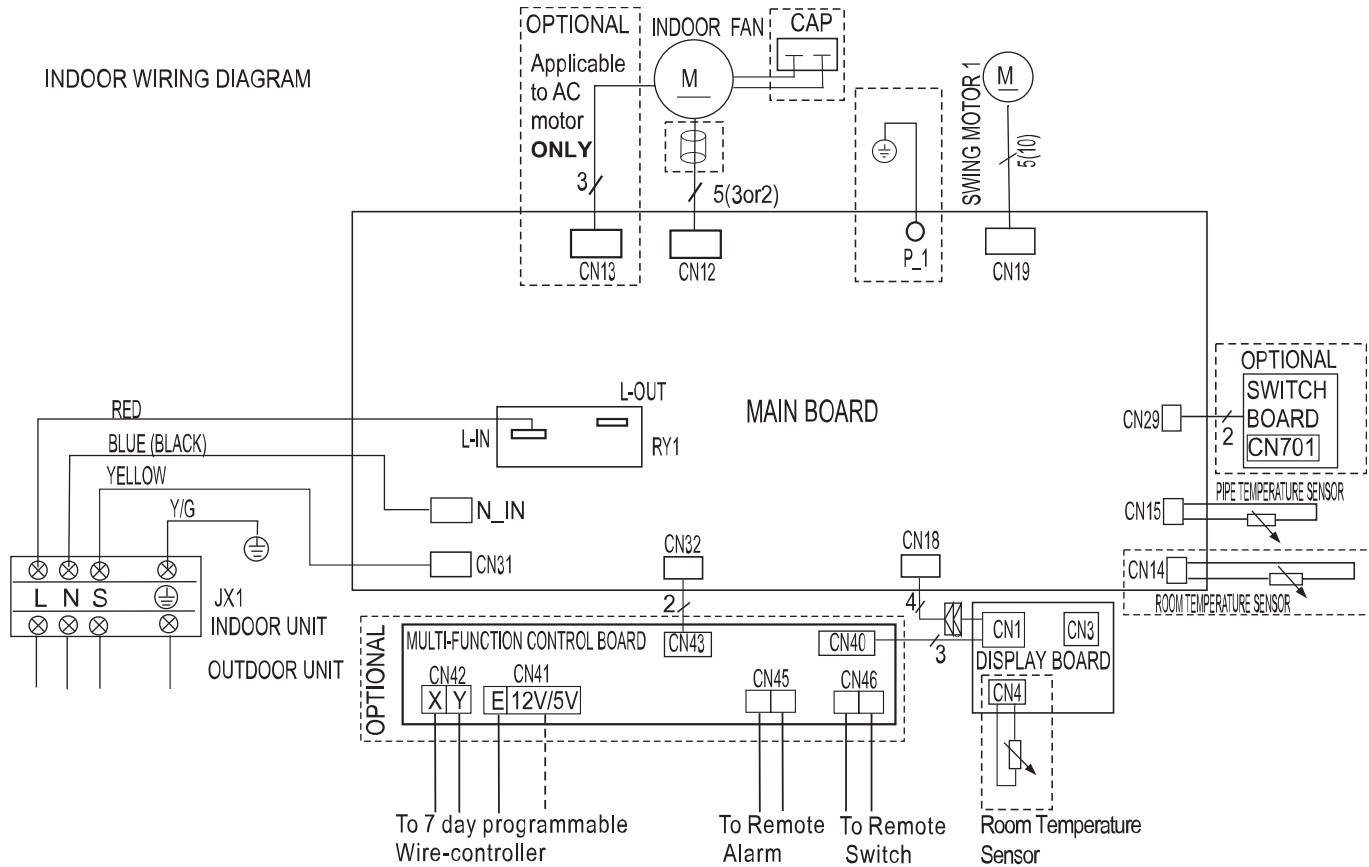
Fig. 1 — Connection Diagrams

NOTES:

1. Do not use a thermostat wire for any connection between the indoor and outdoor units.
2. All connections between the indoor and outdoor units must adhere to the connections shown in Figure 1. The connections are polarity sensitive and **improper wiring will result in a fault code.**

WIRING DIAGRAMS

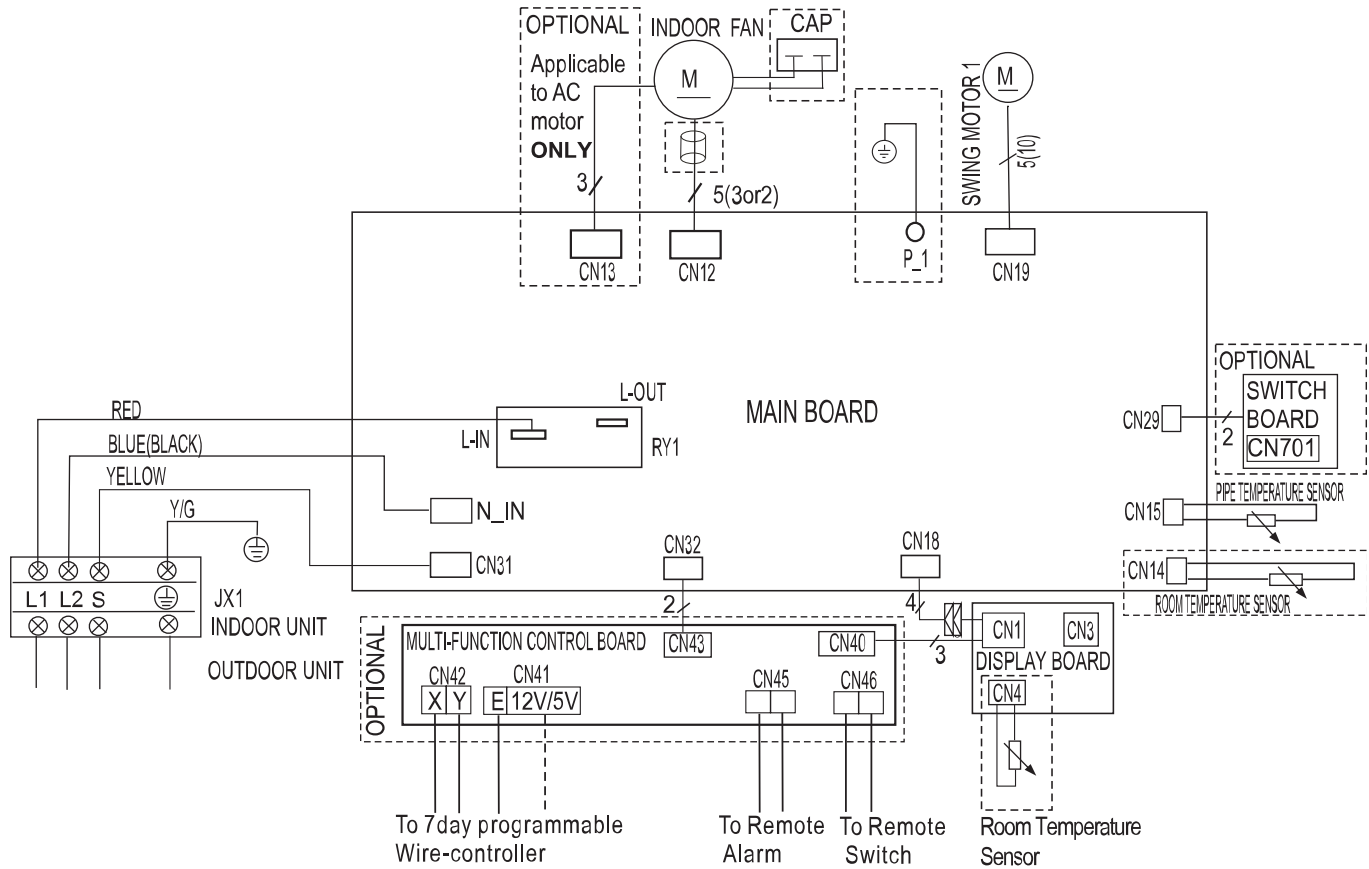
Size 12K 115V (Heat Pump and Cooling Only)



---- This symbol indicates the element is optional.
The actual shape prevails.

Fig. 2 —Wiring Diagram Size 12K (115V)

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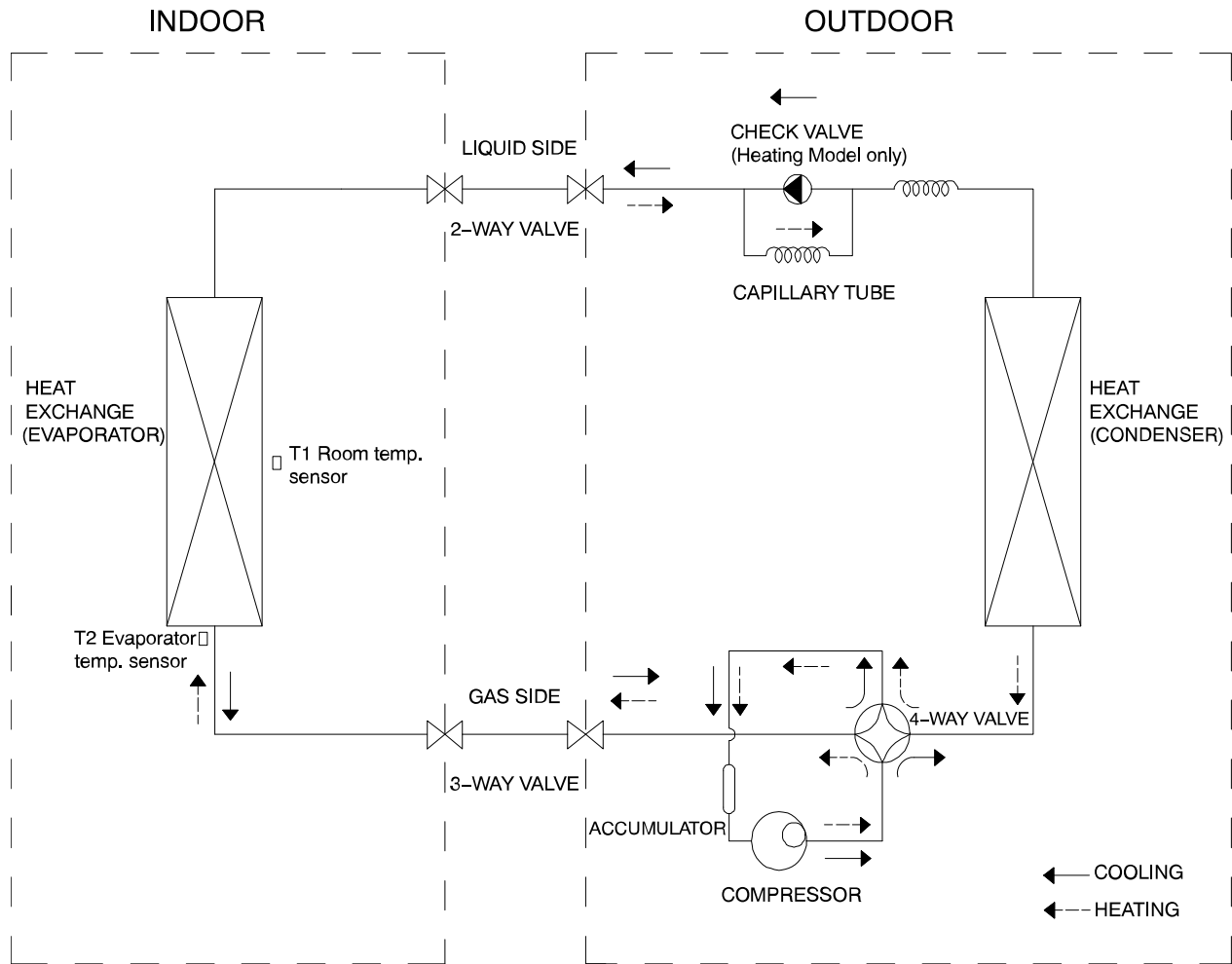
WIRING DIAGRAM (CONT)**Sizes 09K-24K (208-230V) (Heat Pump and Cooling Only)**

--- This symbol indicates the element is optional.
The actual shape prevail.

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Fig. 3 —Wiring Diagram Sizes 09K-24K (208-230V)

REFRIGERATION CYCLE DIAGRAM



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Fig. 4 —Heat Pumps

REFRIGERANT LINES

IMPORTANT: Both refrigerant lines must be insulated separately.

ELECTRONIC FUNCTIONS

Main Protection

Fan Speed is Out of Control

When the indoor fan speed remains too low (300RPM) for a certain amount of time, the unit stops and the LED displays the failure.

Indoor Fan Delayed Open Function

When the unit starts up, the louver becomes active immediately and the indoor fan opens 7 seconds later. If the unit runs in the HEATING mode, the indoor fan falls under the control of the anti-cold wind function.

Zero Crossing Detection Error Protection

If the unit detects that the time interval is not correct for a continuous period of 240s, the unit stops and the LED displays the failure. The correct zero crossing signal time interval should be between 6-13ms.

Sensor Protection at Open Circuit and Breaking Disconnection

When there is only one malfunctioning temperature sensor, the air conditioner keeps working however an error code appears, in the event of emergency use. When there is more than one malfunctioning temperature sensor, the unit stops working.

Operation Modes and Functions

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 the same in the COOLING mode
- 5. Auto fan

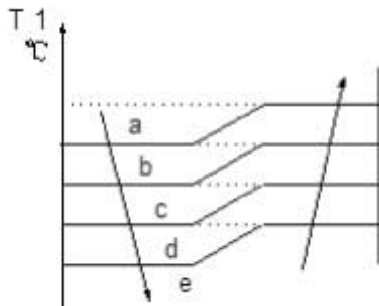


Fig. 5 —Auto Fan

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COOLING Mode

Indoor Fan Running Rules

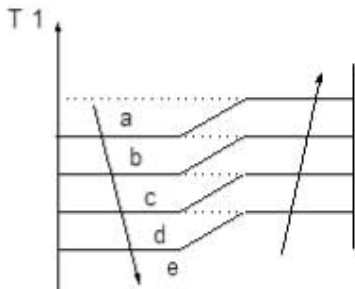
In the COOLING mode, the indoor fan runs constantly and either speed (high, medium, low or auto) can be selected. When the setting temperature is reached, if the compressor stops running, the indoor fan motor runs at the minimum or setting speed. The indoor fan is controlled by the rules shown in Fig. 6.

Setting fan speed	T1-Td °C(°F)	Actual fan speed
H	A	H+ (H+=H+G)
	B	H (=H)
	C	H- (H-=H-G)
M	D	M+ (M+=M+Z)
	E	M (=M)
	F	M- (M-=M-Z)
L	G	L+ (L+=L+D)
	H	L (=L)
	I	L- (L-=L-D)

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Fig. 6 — Indoor Fan Running Rules

The AUTO fan is controlled by the rules shown in Fig. 7.



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Fig. 7 — Indoor Fan Running Rules

Evaporator Temperature Protection

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

HEATING Mode

Indoor Fan Running Rules

When the compressor is on, the indoor fan can be set to 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 a low speed and the speed can not be changed. When the temperature is lower than the setting value, the indoor fan motor stops.

When the indoor temp reaches the setting temperature, the compressor stops and the indoor fan motor runs at the minimum or setting speed (the anti-cold air function is valid). The indoor fan is controlled by the rules shown in Fig. 8.

Setting fan speed	T1-Td℃	Actual fan speed
H		H- (H<H-G)
		H (=H)
		H+(H+=H+G)
M		M-(M=>M-Z)
		M(M=M)
		M+(M+=M+Z)
L		L-(L=>L-D)
		L(L=L)
		L+(L+=L+D)

Fig. 8 — Indoor Fan Running Rules

Auto Fan Action in HEATING Mode

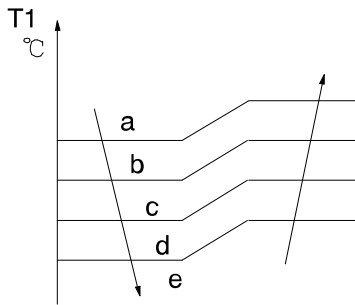


Fig. 9 —Auto Fan Action in HEATING Mode

DEFROST Mode

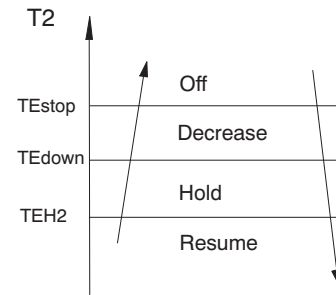
The unit enters the **DEFROST** mode according to the T3 temperature value and the T3 temperature change value range plus the compressor running time.

During the **DEFROST** mode, the compressor continues to runs, the indoor and outdoor motors stop, and the indoor unit displays “df”.

If any one of the following items is satisfied, the defrosting process finishes and the unit reverts to the normal **HEATING** mode.

- T3 rises higher than TCDE1C.
- T3 remains higher than TCDE2C for 80 seconds.
- The unit runs for 15 minutes in **DEFROSTING** mode.

Evaporator Coil Temperature Protection



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Fig. 10 —Evaporator Coil Temperature Protection

NOTE: The following applies to Fig. 10:

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

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

Auto-Mode

This mode can be chosen with the remote control and the setting temperature can be changed between 62°F (17°C)~86°F (30°C).

In **AUTO** mode, the unit chooses the **COOLING**, **HEATING** or **FAN-ONLY** mode according to ΔT ($\Delta T = T1 - Ts$).

Table 3 — Auto Mode

$\Delta T = T1 - Ts$	Running Mode
$\Delta T > 2^{\circ}\text{C}$	Cooling
$-2 \leq \Delta T \leq 2^{\circ}\text{C}$	Fan-Only
$\Delta T < -2^{\circ}\text{C}$	Heating

The indoor fan runs under **AUTO** fan in the relevant mode. The louver operates the same as in the relevant mode. If the unit switches between the **HEATING** and **COOLING** modes, the compressor stops for 15 minutes and then chooses the mode according to $T1 - Ts$. If the setting temperature is modified, the unit chooses the running function again.

DRY Mode

Indoor Fan Speed is Set

The indoor fan speed is set in the **BREEZE** mode and cannot be changed. The louver angle is the same as in the **COOLING** mode.

Low Indoor Room Temperature Protection

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

Evaporator Anti-Freezing Protection

The evaporator anti-freezing protection condenser high temperature protection and outdoor unit frequency limit are active and both are the same when the unit is in the **COOLING** mode.

Outdoor Fan

The outdoor fan operates the same when the unit is in the **COOLING** mode.

FORCED OPERATION Function

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

- **FORCED OPERATION** mode: In the **FORCED OPERATION** mode, all the general protections and the remote control are available.

Operation Rules

- **FORCED COOLING** mode: The compressor runs at the F2 frequency and the indoor fan runs in the **BREEZE** mode. After running for 30 minutes, the unit enters the **AUTO** mode at the 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.

Timer Function

Timing range is 24 hours

Timer on. The unit turns on automatically when reaching the setting time.

Timer off. The unit turns off automatically when reaching the setting time.

Timer on/off. The unit turns on automatically when reaching the setting “on” time, and then turns off automatically when reaching the setting “off” time.

Timer off/on. The unit 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 unit’s current operation mode. Suppose the unit is off now; it will not start up first after setting the “timer off” function. When the setting time is reached, the timer **LED** turns off and the unit’s running mode is the same. The setting time is relative time. The unit exits the timer function if it experiences a malfunction.

Sleep Function

The **SLEEP** function is available in the **COOLING**, **HEATING** or **AUTO** mode.

The Operation process in the **SLEEP** mode is as follows:

- When cooling, the setpoint rises 2°F (1°C) (to a maximum of 86°F (30°C) every one hour. Two (2) hours later, the room temperature stops rising and the indoor fan remains at a low speed.
- When heating, setpoint decreases 2°F (1°C) (to a minimum of 62°F (17°C) every one hour. Two (2) hours later, the setpoint stops decreasing and the indoor fan is set at the low speed.

(Anti-cold wind function has the priority).

Operation time in the **SLEEP** mode is seven (7) hours. After seven (7) hours, the unit exits the **SLEEP** mode and powers off.

AUTO-RESTART Function

The indoor unit is equipped with an **AUTO-RESTART** function, which is carried out through an auto-restart module. In the event of a sudden power failure, the module memorizes the setting conditions prior to the power failure. The unit resumes the previous operation setting (not including the **SWING** function) automatically three (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 switches to the **AUTO** mode at the 75°F (24°C) setpoint. If the unit is off before the power turns off and the unit is required to start up, the compressor delays the start up for 1 minute before powering on. In other instances, the compressor waits three (3) minutes before restarting.

Refrigerant Leak Detection

With this new technology, the display area displays “EC” when the outdoor unit detects a refrigerant leak. This function is only active in the **COOLING** mode. This function helps to prevent the compressor from being damaged by a refrigerant leak or a compressor overload.

- **Open Condition:** When the compressor is running, the value of the T2 coil temperature sensor has no to very little change.

Louver Position Memory Function

When starting the unit again after powering down, the louver returns to the angle originally set by the user, however the precondition is that the angle must be within the allowable range. If the angle exceeds the allowable range, it memorizes the maximum angle of the louver. During operation, if the power fails or if the end user shuts down the unit while in the **TURBO** mode, the louver returns to the default angle.

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.

Silence Operation

Press **SILENCE** on the remote control to initiate the **SILENCE** function. When the **SILENCE** function is activated, the compressor running frequency remains lower than F2 and the indoor unit emits a faint breeze, which reduces the noise to the lowest level and creates a quiet and comfortable space for the user.

Self Clean (For heat pump models which are provided with this function)

After running in the **COOLING** or **DRYING** mode, if the user presses “**Self Clean**” on the remote control, the indoor unit runs in the **FAN ONLY** mode momentarily, then the low heat operation and finally runs in **FAN ONLY** again. This function can keep the inside of the indoor unit dry and prevent mold from growing within the unit.

FOLLOW ME

If the indoor PCB receives the signal, which results from pressing **FOLLOW ME** on the remote control, the buzzer emits a sound which indicates the **FOLLOW ME** function is initiated. However, when the indoor PCB receives a signal from the remote control every 3 minutes, the buzzer will not respond.



When the unit is running with the **FOLLOW ME** function, the PCB controls the unit according to the temperature from the **FOLLOW ME** signal, and the temperature collection function of the room temperature sensor is shielded. However the room temperature sensor’s error detective function remains valid.

When the **FOLLOW ME** function is available, the PCB controls the unit according to the room temperature from the remote control and the setting temperature. The PCB responds to the mode change information received from the remote control signal, however it will not be affected by the setting temperature.

When the unit is in the **FOLLOW ME** mode, if the PCB does not receive a signal from the remote control for 7 minutes or after pressing **FOLLOW ME** again, the **FOLLOW ME** function turns off automatically, and the temperature controls the unit according to the room temperature detected from its own room temperature sensor and setpoint.

INQUIRY MODE

To enter the **Inquiry Mode**:

Press and hold together the **On/Off** and **Fan** buttons   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.

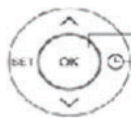




Fig. 11 — Up and Down Arrow

The **Inquiry Information** appears on the high wall indoor unit display in approximately 1 second of accessing the digital code. Press **OK** to send as well.

Table 4 — 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	Setpoint 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 the **On/Off** and **Fan** buttons   for 2 seconds

MULTI-FUNCTION BOARD INSTRUCTION

Function

The multi-function board receives a 4-cored wired controller signal and the CP remote on-off signal (ON-OFF command signal). Next, the board converts the signal to a communication signal and sends the signal to the main control board. The multi-function board can output the alarm signal.

CP Remote ON-OFF

For the CP command, closed indicates the remote on-off control signal is **OFF**. Disconnected indicates the remote on-off control signal is **ON**. The control requires 3 seconds to determine the **ON** or **OFF** status. The CP command is delivered one time (immediately) after powering on. The Dip-switch F2 setting status appears in Table 5.

Table 5 — Dip-switch F2 setting status

Dip-switch 2	Dip-switch 1	Remote on-off control status
OFF	OFF	Disconnected send CP, closed cancel CP
ON	OFF	Closed send CP, disconnected cancel CP

ON-OFF Control

The control requires 3 seconds to determine the **ON/OFF** status. The **ON-OFF** command is not sent after powering on. Instead the command is sent only after a change in the status occurs. When the **ON-OFF** control disconnects, it sends the switch-on signal. The unit runs in the **AUTO** mode (**AUTO FAN** speed (75.2°F (24°C)) setting temperature. When the **ON-OFF** control is closed, it sends a switch-off signal. The Dip-switch F2 setting status appears in Table 6.

Table 6 — Dip-switch F2 setting status

Dip-switch 2	Dip-switch 1	Remote on-off control status
OFF	ON	Disconnected send ON, closed send OFF
ON	ON	Closed send OFF, disconnected send ON

Alarm Port Output

- When the unit is **OFF**, the output signal is closed.
- When the unit is in a malfunction state, the output signal is closed.
- When the unit is **ON**, the output signal is disconnected.

WIRING DIAGRAM

Connected to 4-cored wired controller

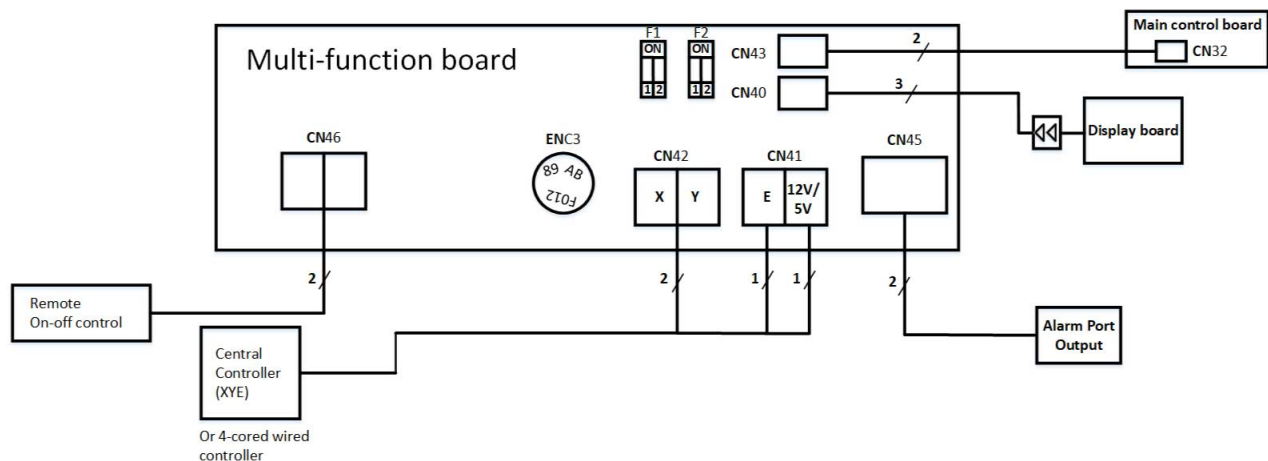
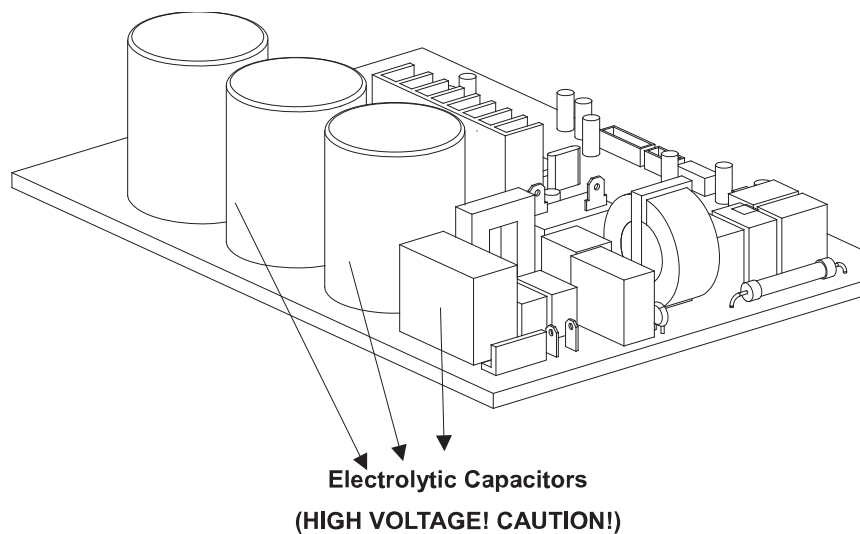


Fig. 12 —Wiring Diagram

NOTE: Use shield cables to connect the 4-cored wired controller. The length should not exceed 164 ft. (50m).

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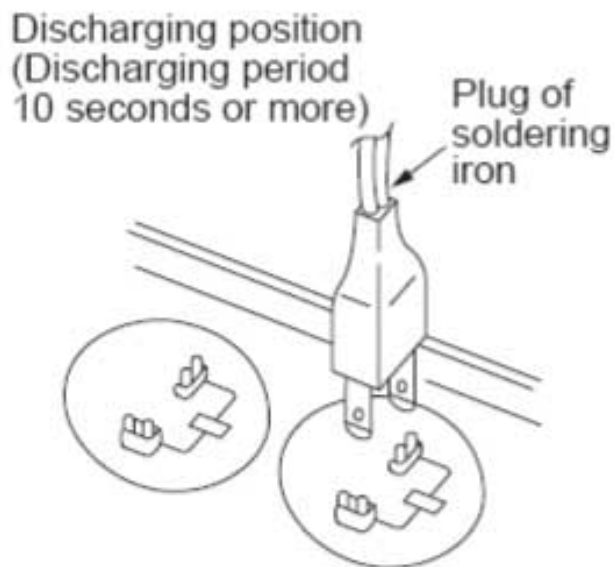
TROUBLESHOOTING



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Fig. 13 —Electrolytic Capacitors

For other models, please connect the 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.



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Fig. 14 — Discharge Position

NOTE: Fig. 14 is for reference only. Actual appearances may vary.

INDOOR UNIT DIAGNOSTIC GUIDE

Table 7 — Indoor Unit Error Display

OPERATION LAMP	TIMER LAMP	DISPLAY	LED STATUS	SOLUTION
★ 1 time	X	E0	Indoor unit EEPROM parameter error	Page 15
★ 2 times	X	E1	Indoor / outdoor units communication error	Page 16
★ 3 times	X	E2	Zero-crossing signal detection error	Page 18
★ 4 times	X	E3	Indoor fan speed is out of control	Page 19
★ 5 times	X	E4	Indoor room temperature sensor T1 open circuit or short circuit	Page 21
★ 6 times	X	E5	Evaporator coil temperature sensor T2 open circuit or short circuit	Page 21
★ 7 times	X	EC	Refrigerant leakage detection	Page 23
	X	EH0b	Indoor display board and indoor main board communication malfunction (appears “EH” first time then “0h” circularly)	
★ 1 time	O	F0	Overload current protection	Page 24
★ 2 times	O	F1	Outdoor ambient temperature sensor T4 open circuit or short circuit	Page 21
★ 3 times	O	F2	Condenser coil temperature sensor T3 open circuit or short circuit	Page 21
★ 4 times	O	F3	Compressor discharge temperature sensor T5 open circuit or short circuit	Page 21
★ 5 times	O	F4	Outdoor unit EEPROM parameter error	Page 15
★ 6 times	O	F5	Outdoor fan speed is out of control	Page 19
	O	F6	T2B Sensor error (Locate in Multi-zone Outdoor for the outlet of evaporator)	
★ 1 time	★	P0	IPM malfunction or IGBT over-strong current protection	Page 25
★ 2 times	★	P1	Over voltage or over low voltage protection	Page 29
★ 3 times	★	P2	High temperature protection of IPM module or compressor top	Page 31
★ 4 times	★	P3★	Outdoor ambient temperature is too low	Page 14
★ 5 times	★	P4	Inverter compressor drive error	Page 33
★ 6 times	★	P5	Indoor units mode conflict (multi-zone ONLY)	
	O	P6	High/Low Pressure protection	
-	O	AP	AP mode	
-	O	CL	Filter clean Reminder	
-	O	nF	Filter replace Reminder	
-	O	FP	46°F Heat Mode	
-	O	FC	Force Cooling	
-	O	LL	Remote or Wire controller Lock	
-	O	dF	Defrost	
-	O	SC	Self Clean	
-	O	On	Time On	
-	O	Off	Time Off	
-	O	cF	Anti-cold Air Flow	
-	O	CP	Remote On/Off	
-	O	--	Model Conflict	
E-C-O	O		ECO Mode	

O (light) X (off) ★ (flash)

NOTE: P3*

- In the **HEATING** mode, if the outdoor temperature is lower than -13°F (-25°C) for 1 hour, the indoor unit displays a **P3** error code.
- If the outdoor temperature is higher than -7.6°F (-22°C) for 10 minutes and the compressor stops for 1 hour or the outdoor temperature is higher than 23°F (-5°C) for 10 minutes, the unit returns to an operating mode.

* **Fault Symptom: The display board shows a distorted code or a code that is not an error code found in the service manual nor a temperature reading.**

Table 8 — Indoor Unit Error Display

No.	Problems	LED3 (Green)	LED2 (Red)	IU display
1	Standby for normal	O	X	
2	Operation normally	X	O	
3	IPM malfunction or IGBT over-strong current protection	★	X	P0
4	Over voltage or too low voltage protection	O	O	P1
5	EEPROM parameter error	O	★	E5
6	Inverter compressor drive error	X	★	P4
7	Inverter compressor drive error	★	O	P4
8	Inverter compressor drive error	★	★	P4

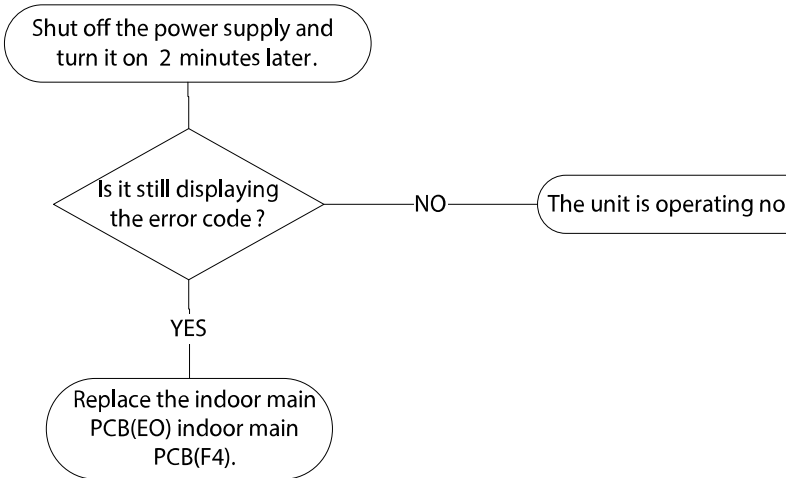
O (light) X (off) ★ (flash)

DIAGNOSIS AND SOLUTION

EEPROM Parameter Error Diagnosis and Solution (E0/F4)

Error Code	E0/F4
Malfunction decision conditions	Indoor or outdoor PCB main chip does not receive feedback from the EEPROM chip
Supposed causes	Installation mistake PCB Faulty

Troubleshooting



A210492

EEPROM: Read-only memory contents can be erased and reprogrammed using pulsed voltage. For the EEPROM chip location, refer to Figures 15 and 16.

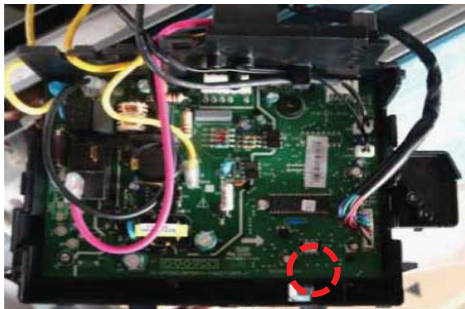


Fig. 15 — Indoor PCB

A210544

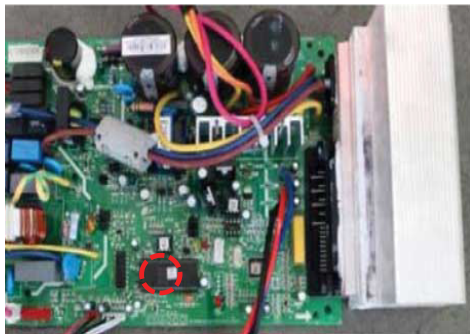


Fig. 16 — Outdoor PCB (18K Model)

A210545

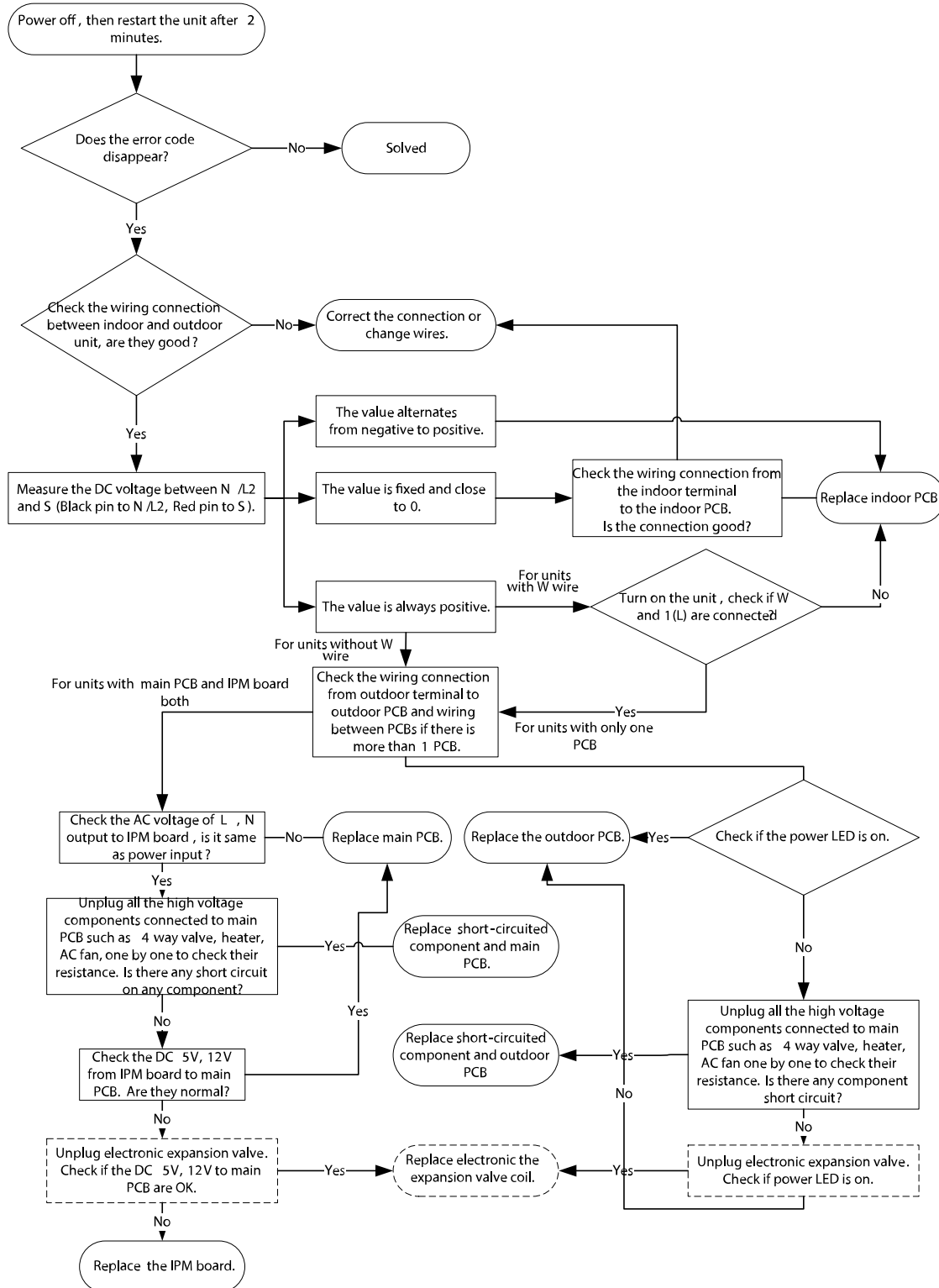
NOTE: Figures 15 and 16 are for reference only and may differ from your actual unit.

DIAGNOSIS AND SOLUTION (CONT.)

Indoor / outdoor unit's communication diagnosis and solution (E1)

Error Code	E1
Malfunction decision conditions	Indoor unit does not receive feedback from the outdoor unit for 110 seconds and this issue occurs four times continuously
Supposed causes	Wiring mistake Indoor or outdoor PCB Faulty

Troubleshooting



DIAGNOSIS AND SOLUTION (CONT.)



A210547

Fig. 17 —Test the DC Voltage

Use a multimeter to test the DC voltage between the outdoor unit's L2 and S ports. The red pin of the multimeter connects with the L2 port while the black pin connects to the S port. When the unit is running normally, the voltage moves alternately between -50V to 50V. If the outdoor unit malfunctions, the voltage moves alternately with a positive value. If the indoor unit malfunctions, the voltage has a certain value.



A210548

Fig. 18 —Test the Reactor Resistance

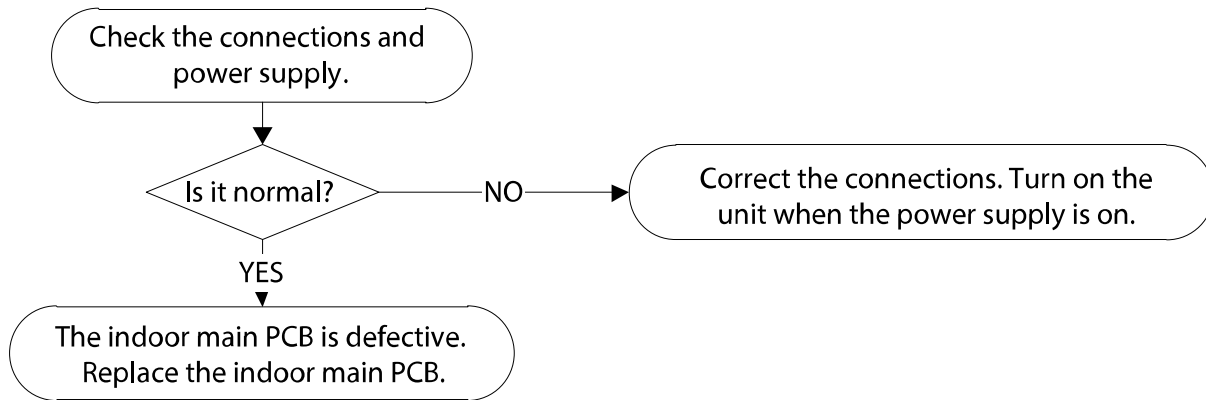
Use a multimeter to test the resistance of the reactor which does not connect with the capacitor (the normal value should be around zero (0) ohm). Otherwise, the reactor is malfunctioning and should be replaced.

DIAGNOSIS AND SOLUTION (CONT.)

Zero crossing detection error diagnosis and solution (E2)

Error Code	E2
Malfunction decision conditions	When the PCB does not receive a zero crossing signal feedback for 4 minutes or the zero crossing signal time interval is abnormal.
Supposed causes	Connection mistake PCB Faulty

Troubleshooting



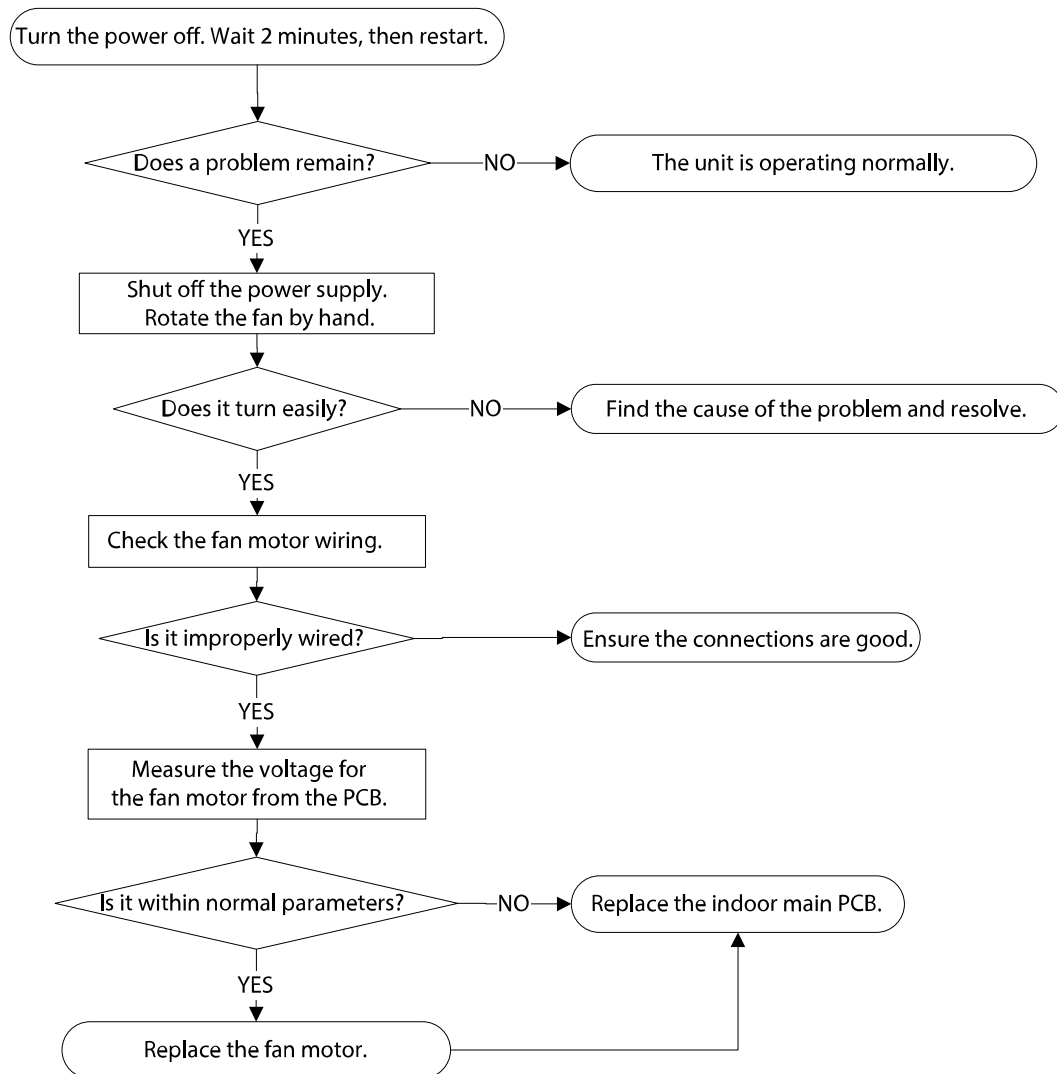
A210597

DIAGNOSIS AND SOLUTION (CONT.)

Fan speed is operating outside of the Normal Range (E3/F5)

Error Code	E3/F5
Malfunction decision conditions	When the indoor fan speed remains too low (300RPM) for a certain period of time, the unit stops and the LED displays the failure.
Supposed causes	Wiring mistake Fan assembly faulty Fan motor faulty PCB faulty

Troubleshooting



A210598

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 voltage value is not within the range shown in Table 9, the PCB has malfunctioned and needs to be replaced.

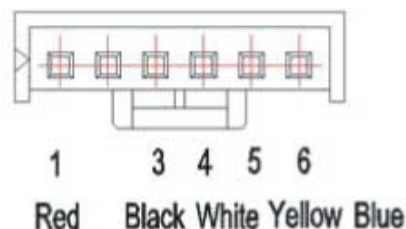


Fig. 19 —Indoor DC Fan Motor

Table 9 — DC motor voltage input and output (voltage: 220-240V~)

NO.	COLOR	SIGNAL	VOLTAGE
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V

Table 10 — DC motor voltage input and output (voltage: 115V~)

NO.	COLOR	SIGNAL	VOLTAGE
1	Red	Vs/Vm	140V~190V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V

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

Power on the unit and check if the fan runs normally. If the fan runs normally, the PCB has malfunctioned and needs to be replaced. If the fan does not run normally, measure the resistance of each of the two pins. If the resistance is not equal to each other, the fan motor has a problem and needs to be replaced, otherwise the PCB has an issue and needs to be replaced.

3. Indoor AC Fan Motor

Power on the unit and place the unit in **FAN** mode at the high fan speed. Run for 15 seconds then measure the voltage of pin1 and pin2. If the voltage value is less than 100V(208~240V power supply) or 50V(115V power supply), the PCB has malfunctioned and needs to be replaced.

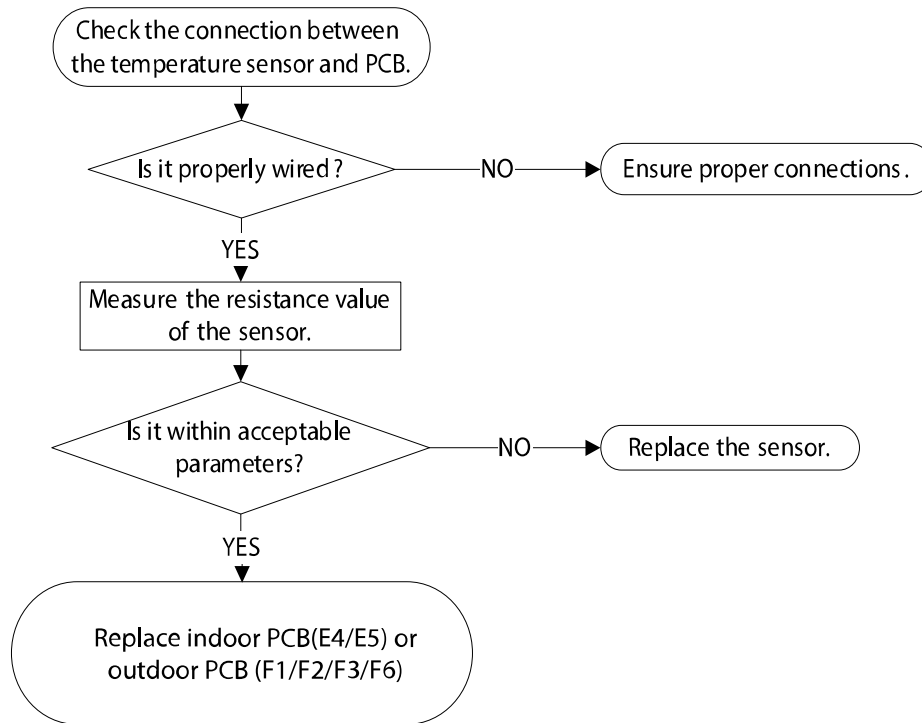
A210551

DIAGNOSIS AND SOLUTION (CONT.)

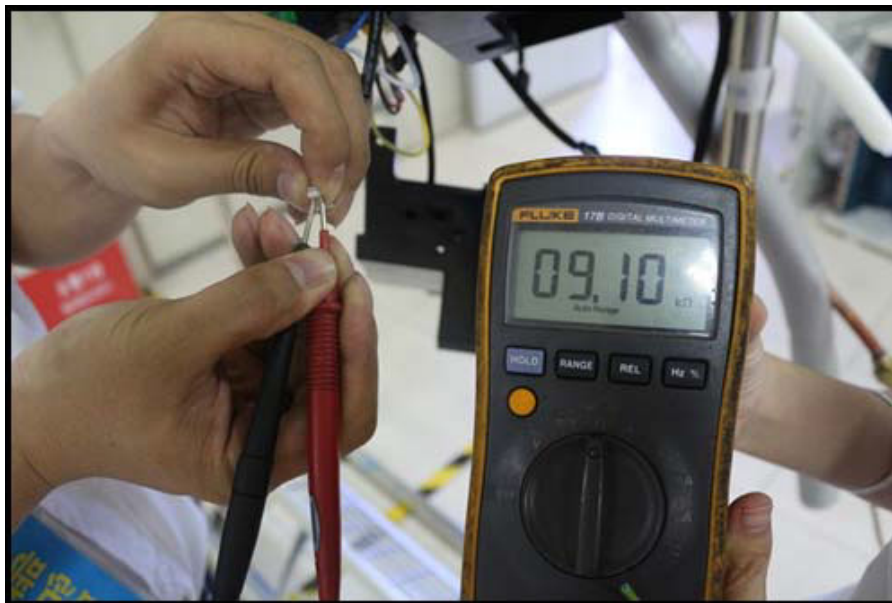
Open circuit or short circuit of temperature sensor diagnosis and solution (E4/E5/F1/F2/F3)

Error Code	E4/E5/F1/F2/F3
Malfunction decision conditions	If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays the failure.
Supposed causes	Wiring mistake Sensor faulty PCB faulty

Troubleshooting



A210599



A210553

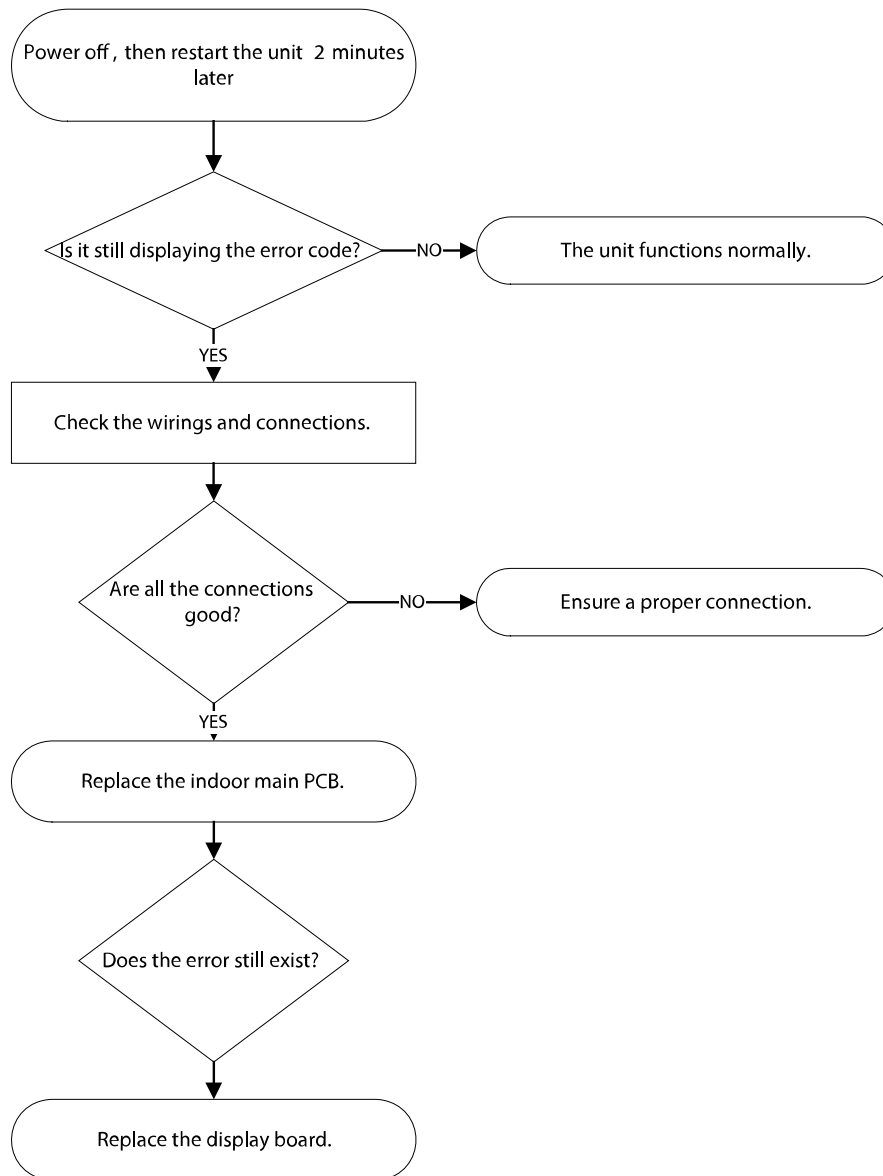
Fig. 20 —Check the connection

DIAGNOSIS AND SOLUTION (CONT.)

Indoor PCB / Display board communication error diagnosis and solution E7/EH 0b

Error Code	E7/EH 0b
Malfunction decision conditions	Indoor PCB does not receive feedback from the display board
Supposed causes	Communication wire Indoor PCB Display Board

Troubleshooting



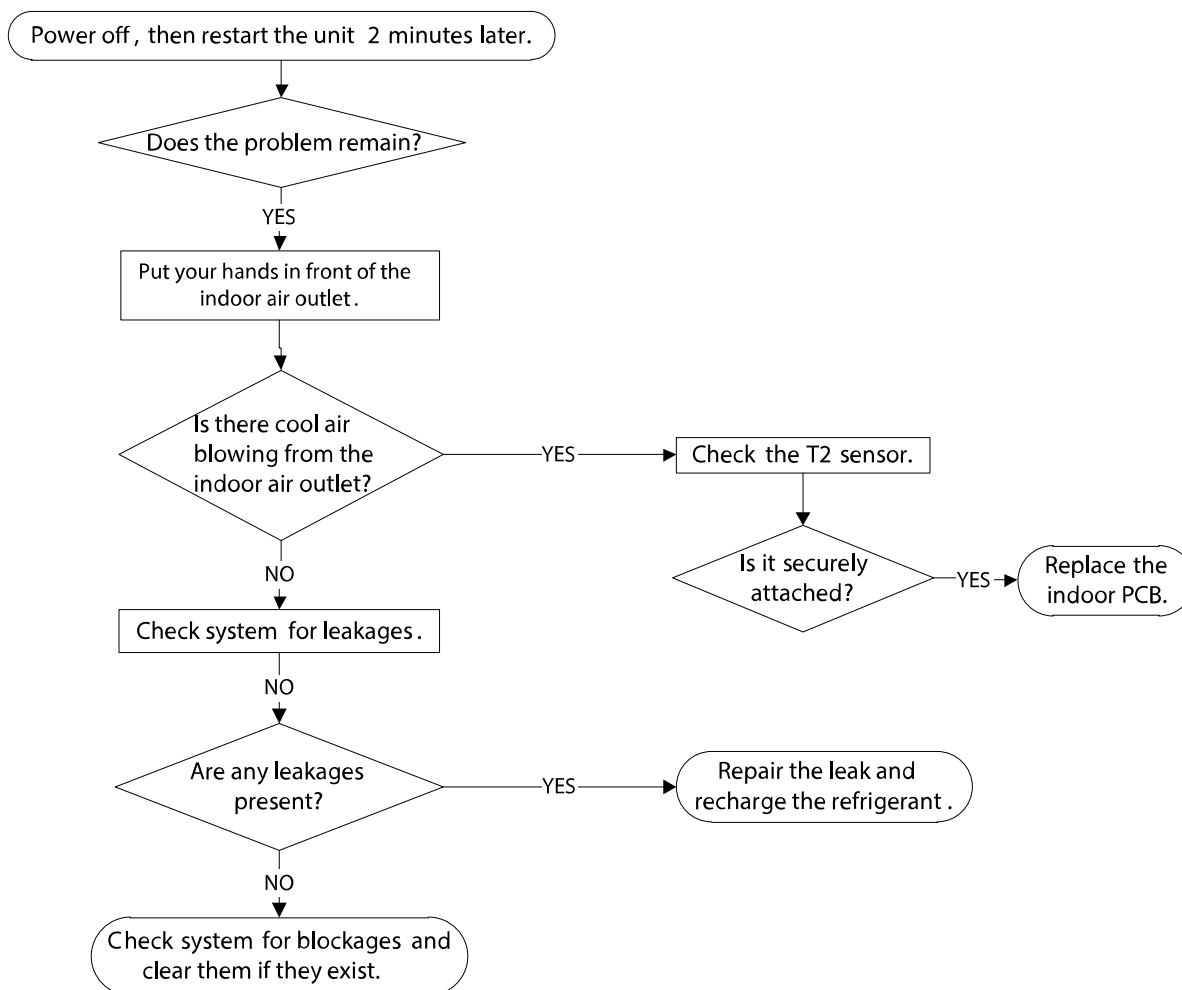
A210649

DIAGNOSIS AND SOLUTION (CONT.)

Refrigerant Leakage Detection diagnosis and solution (EC)

Error Code	EC
Malfunction decision conditions	Define the evaporator coil temp. T2 of the compressor. It starts running in Tcool. At first, 5 minutes after the compressor starts up, if $T2 < T_{cool} - 35.6^{\circ}\text{F}$ ($T_{cool} - 2^{\circ}\text{C}$) does not run for 4 seconds and this situation occurs three times, the display area displays "EC" and the unit turns off.
Supposed causes	Wiring mistake Sensor faulty PCB faulty

Troubleshooting



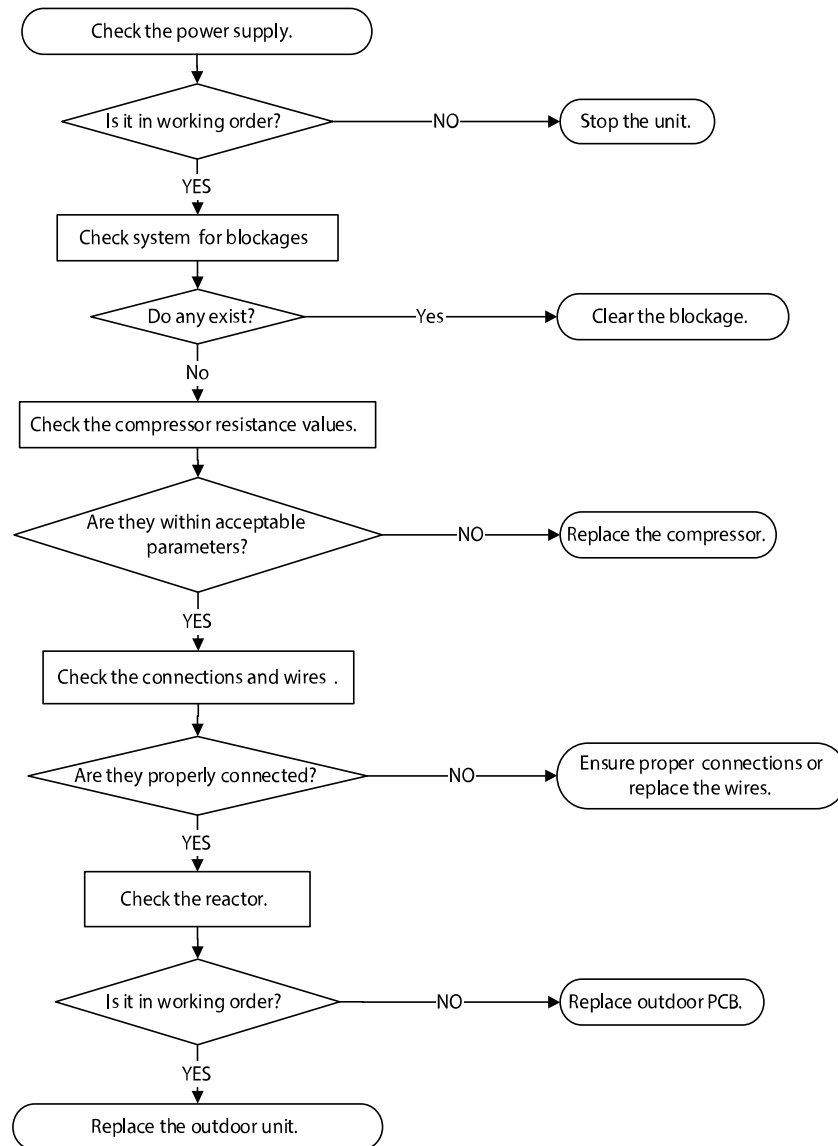
A210601

DIAGNOSIS AND SOLUTION (CONT.)

Overload current protection diagnosis and solution (F0)

Error Code	F0
Malfunction decision conditions	An abnormal current rise is detected by checking the specified current detection circuit.
Supposed causes	Power supply problems System blockage PCB faulty Wiring mistake Compressor malfunction

Troubleshooting

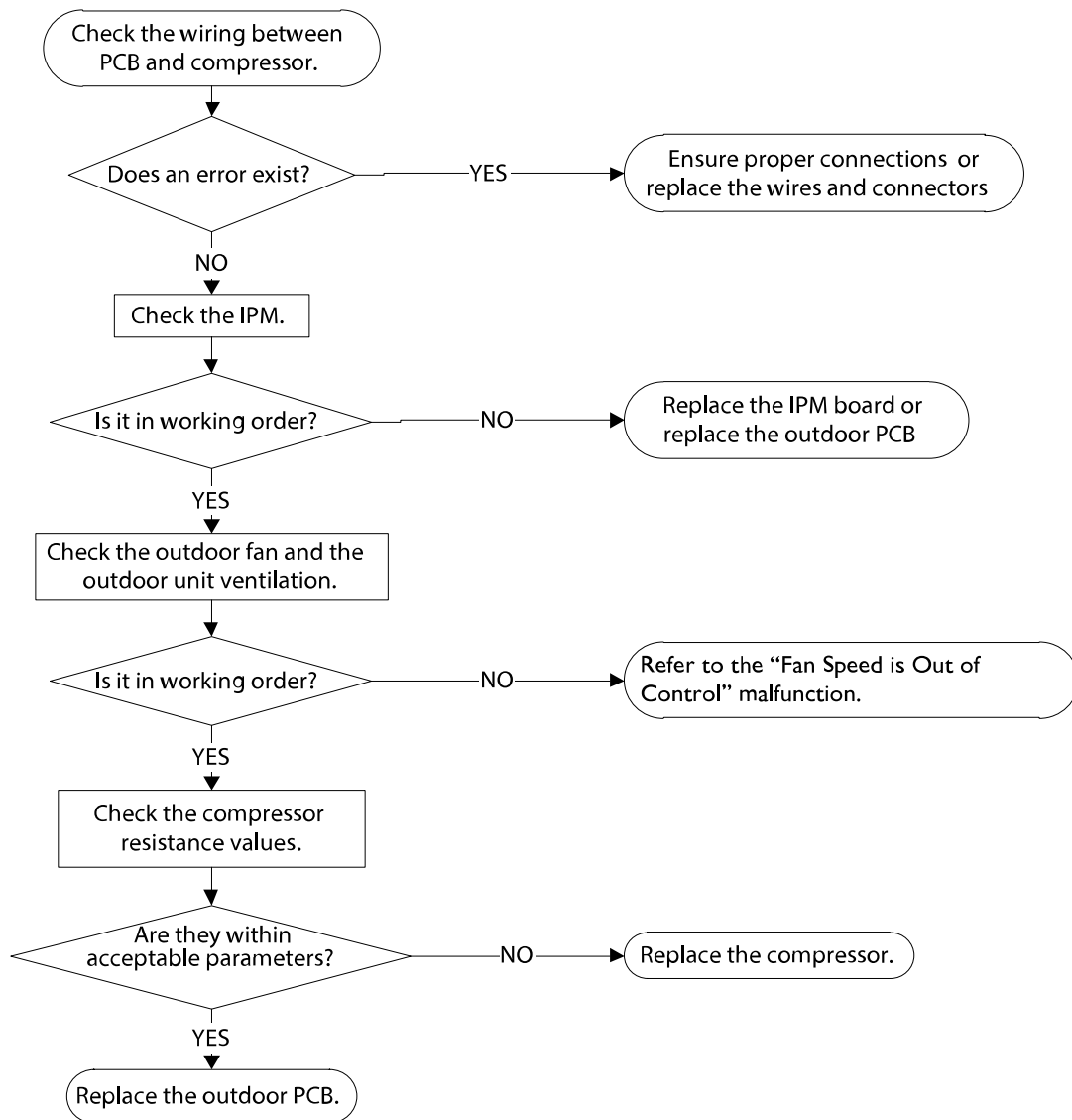


DIAGNOSIS AND SOLUTION (CONT.)

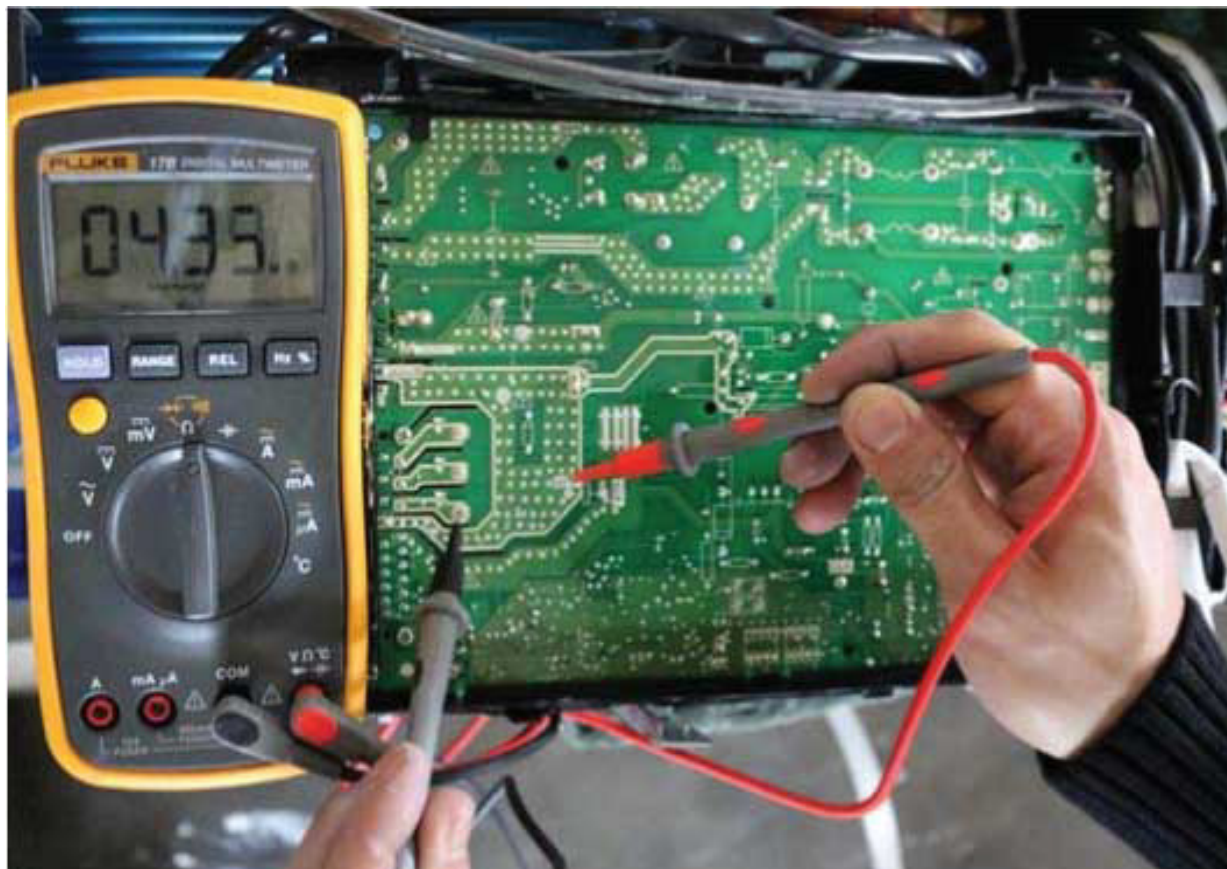
IPM malfunction or IGBT over-strong current protection diagnosis and solution (P0)

Error Code	P0
Malfunction decision conditions	When the voltage signal, that the IPM sends to the compressor drive chip is abnormal, the display LED displays P0 and the unit turns off.
Supposed causes	Wiring mistake IPM malfunction Outdoor fan assembly faulty Compressor malfunction Outdoor PCB faulty

Troubleshooting

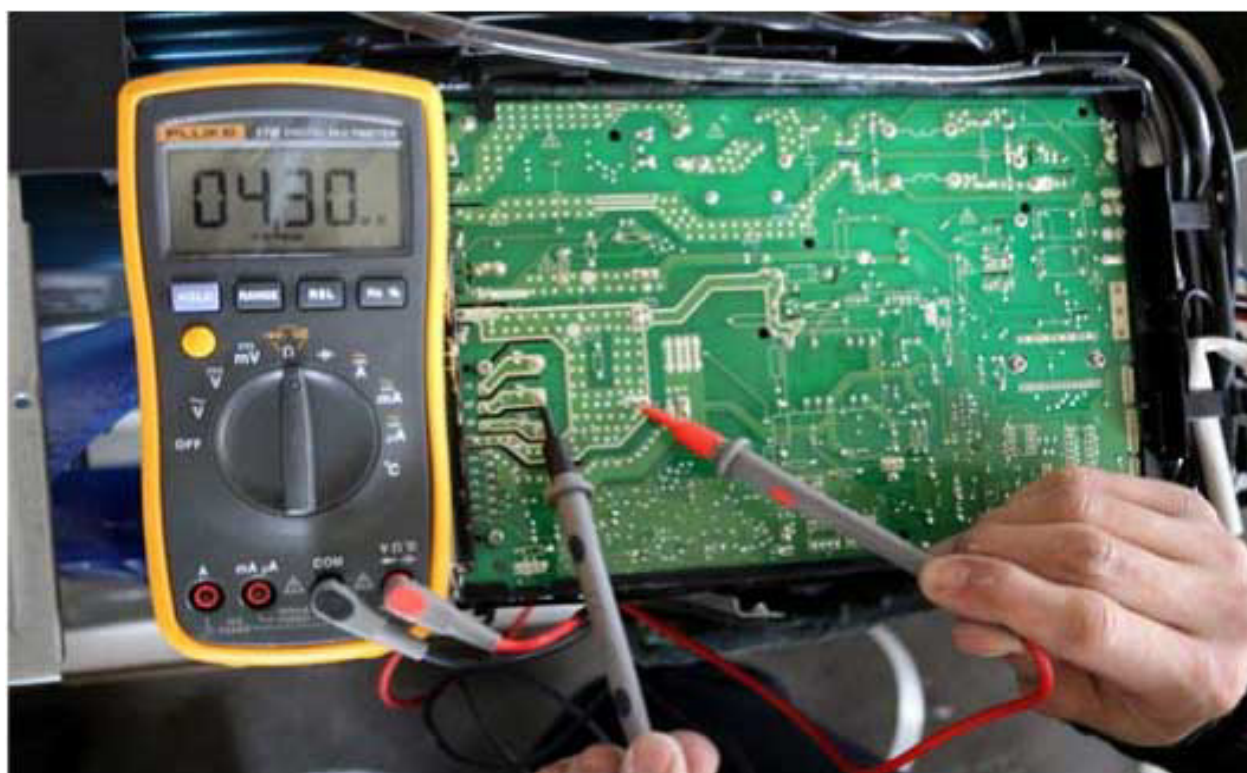


A210567



A210568

Fig. 21 —P-U



A210569

Fig. 22 — P-V

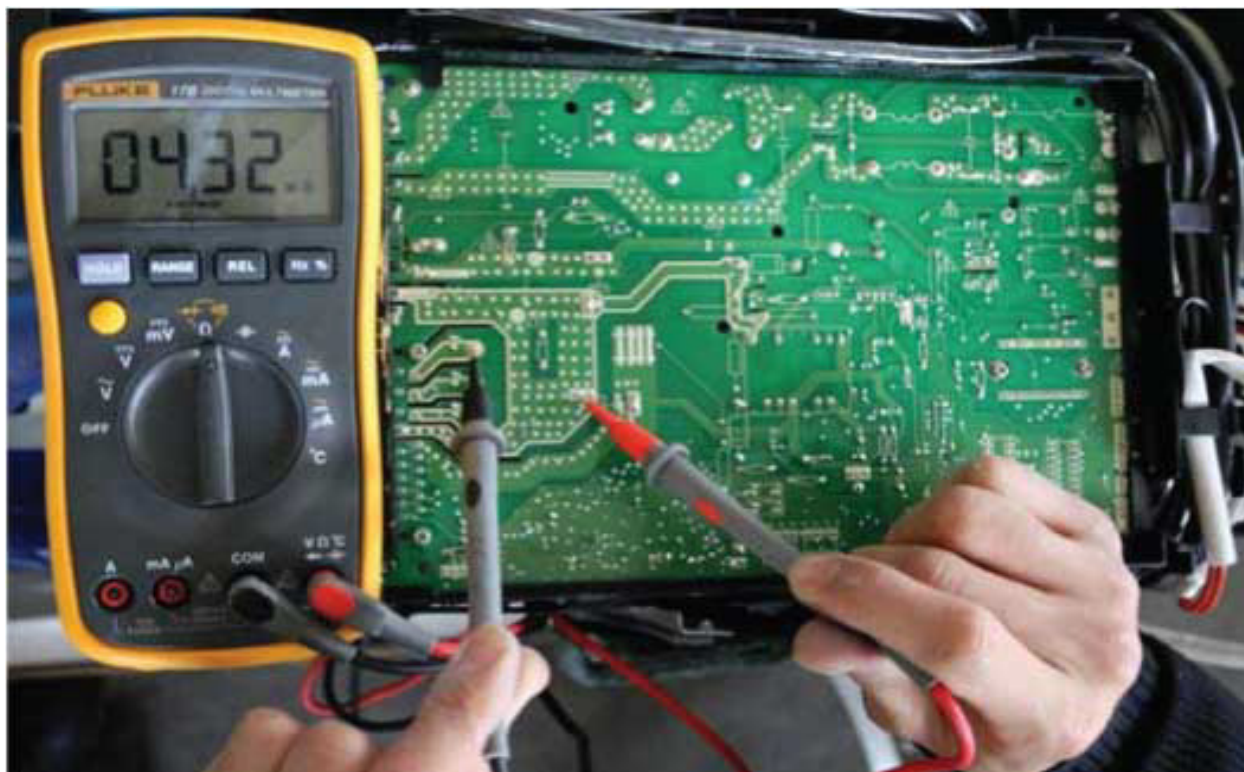


Fig. 23 —P-W

A210570

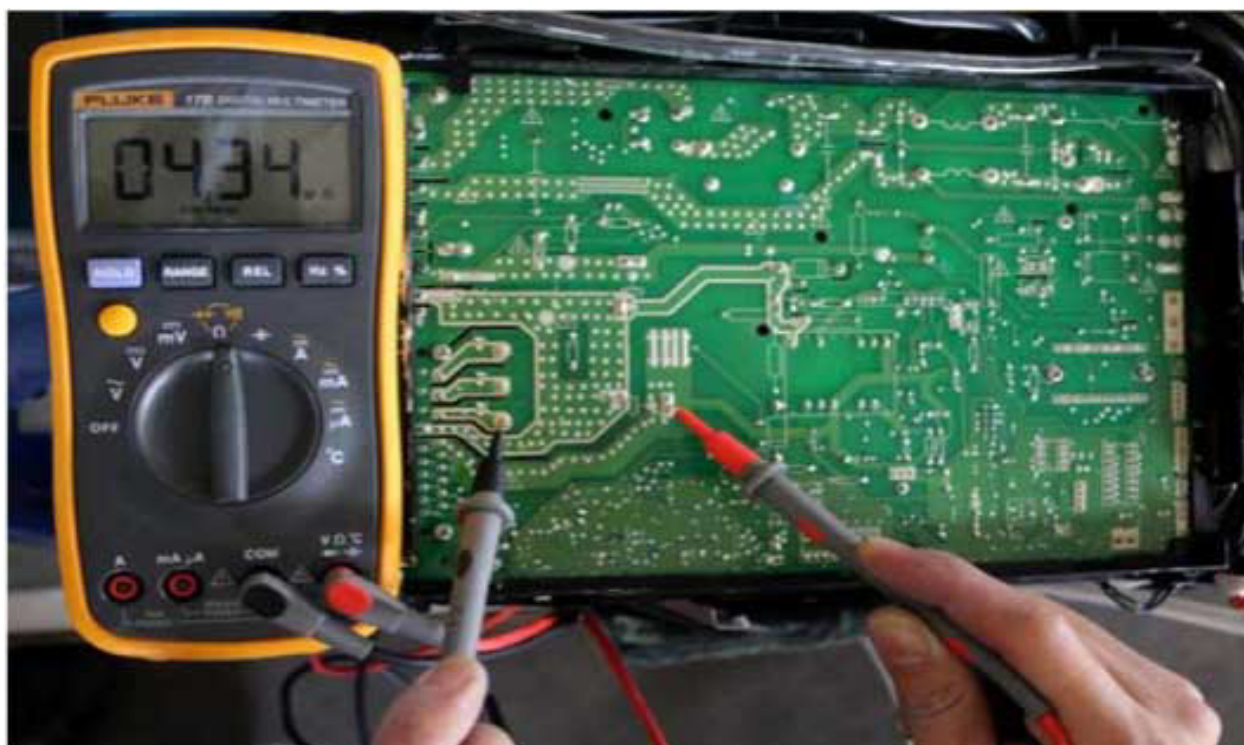
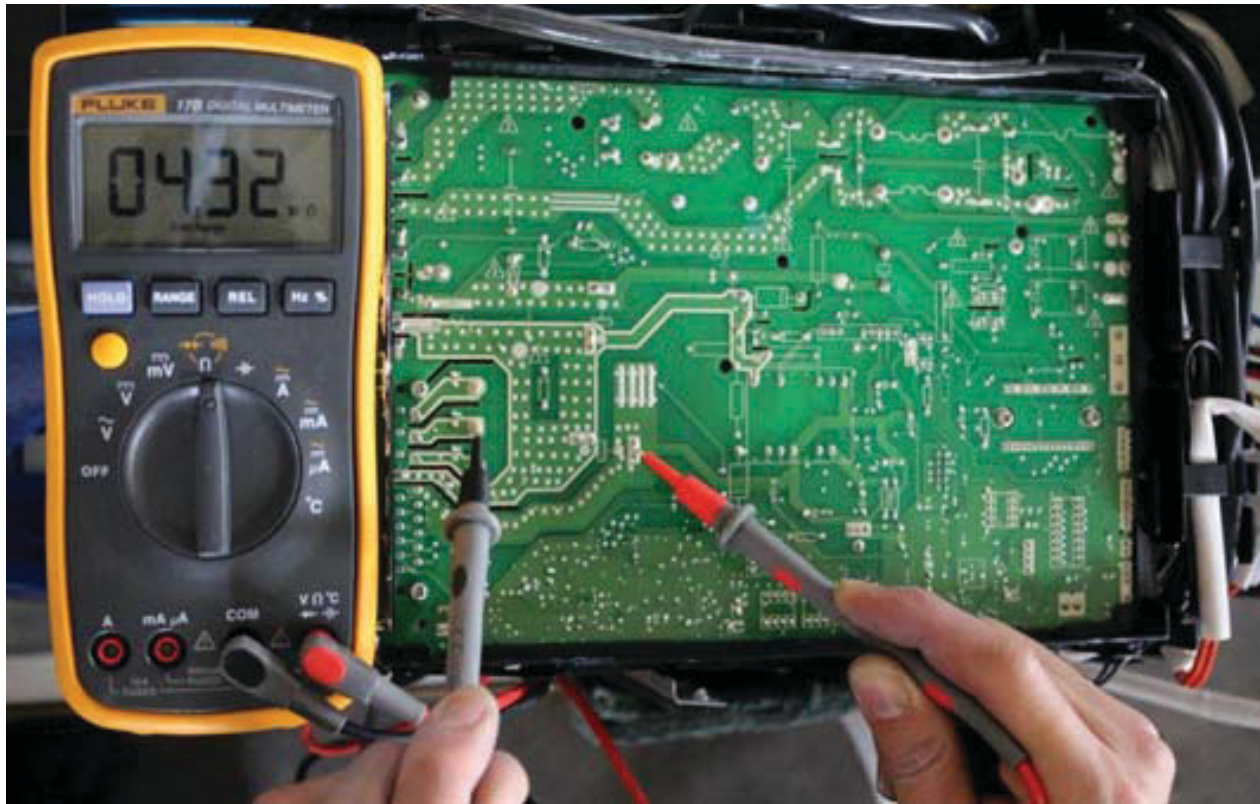


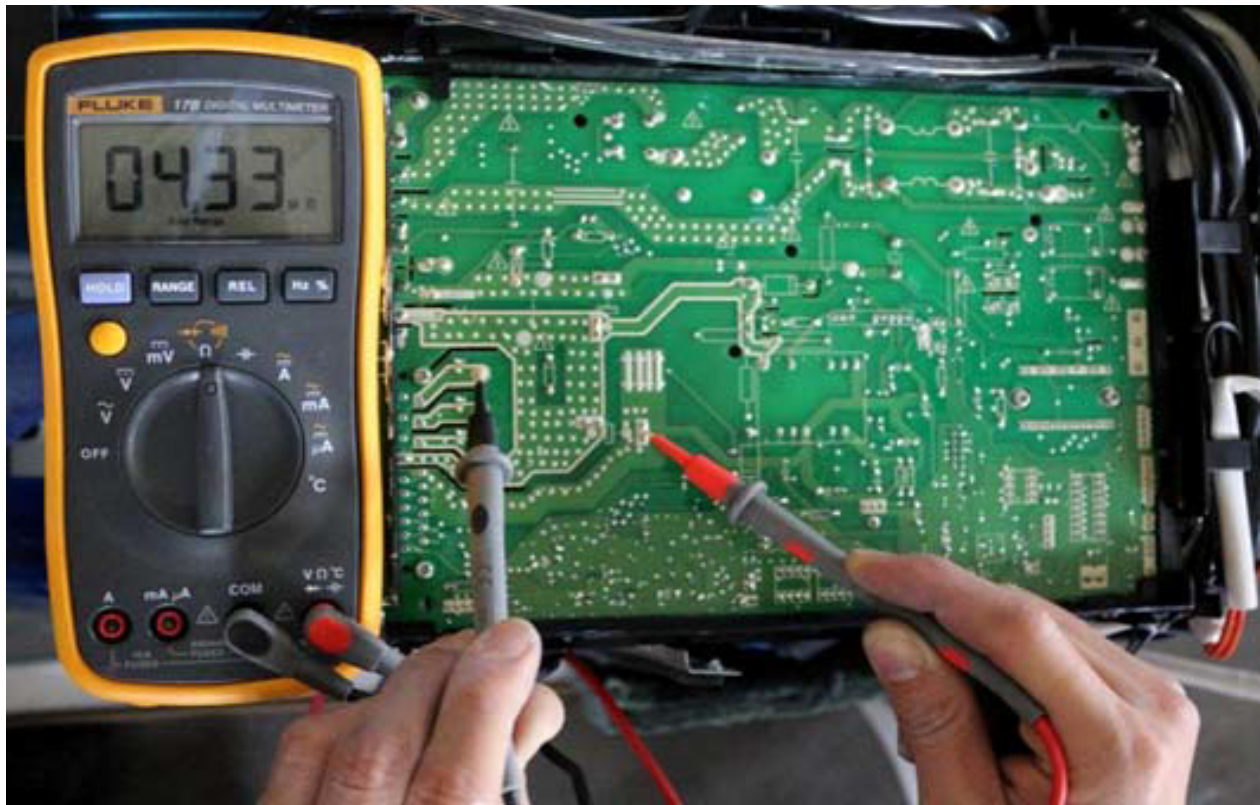
Fig. 24 —N-U

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A210572

Fig. 25 —N-V



A210573

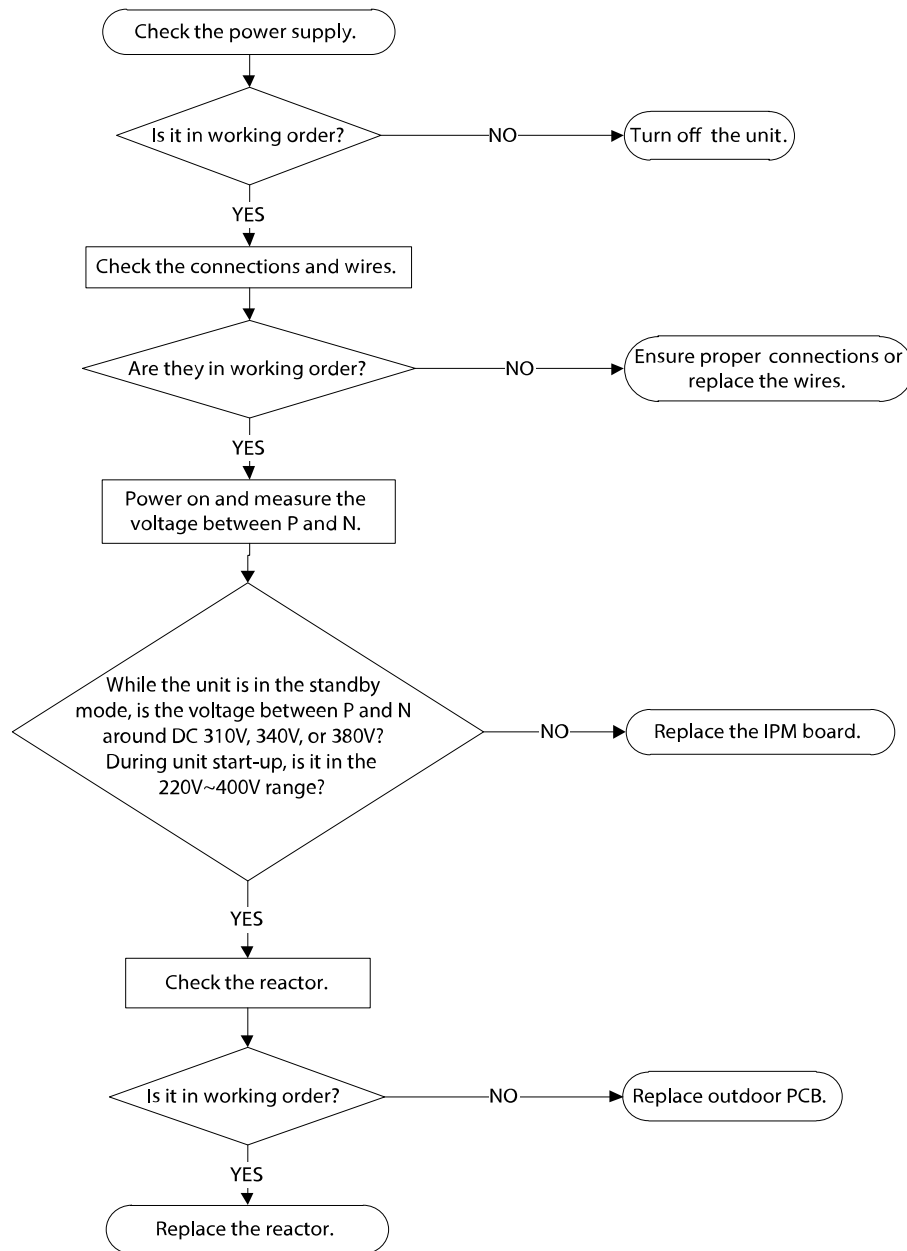
Fig. 26 —N-W

DIAGNOSIS AND SOLUTION (CONT.)

Over voltage or too low voltage protection diagnosis and solution (P1)

Error Code	P1
Malfunction decision conditions	An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.
Supposed causes	Power supply functions System leakage or block PCB faulty

Troubleshooting



A210574

DIAGNOSIS AND SOLUTION (CONT.)

Over voltage or too low voltage protection diagnosis and solution (P1)

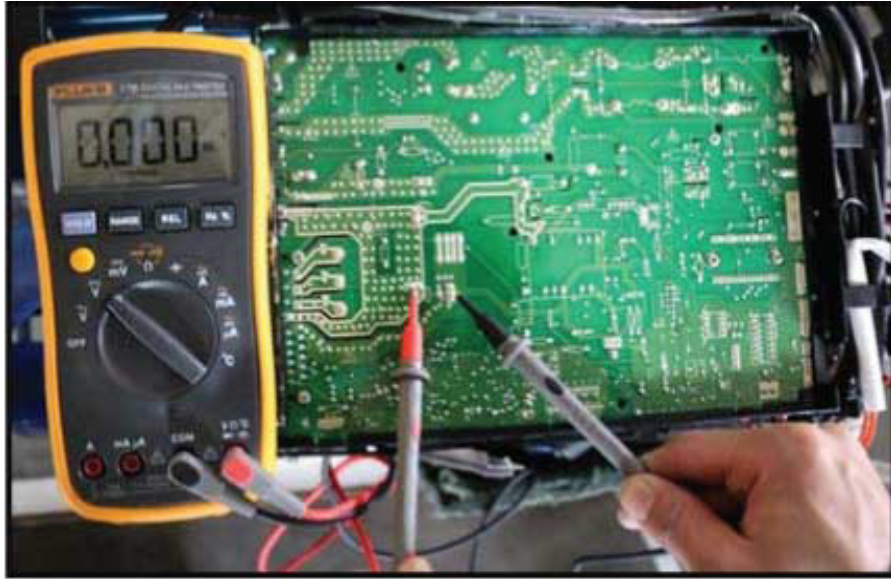


Fig. 27 —Test

A210575

DIAGNOSIS AND SOLUTION (CONT.)

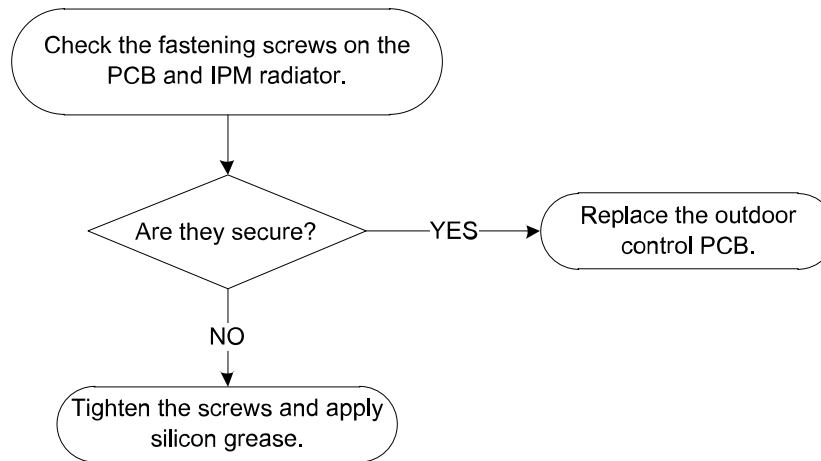
NOTE: Measure the DC voltage between ports P and N (the normal value should be around 310V).

High temperature protection of compressor top diagnosis and solution (P2)

Error Code	P2
Malfunction decision conditions	If the sampling voltage is not 5V, the LED displays the failure.
Supposed causes	Power supply functions System leakage or block PCB faulty

Troubleshooting

For sizes 18-24:

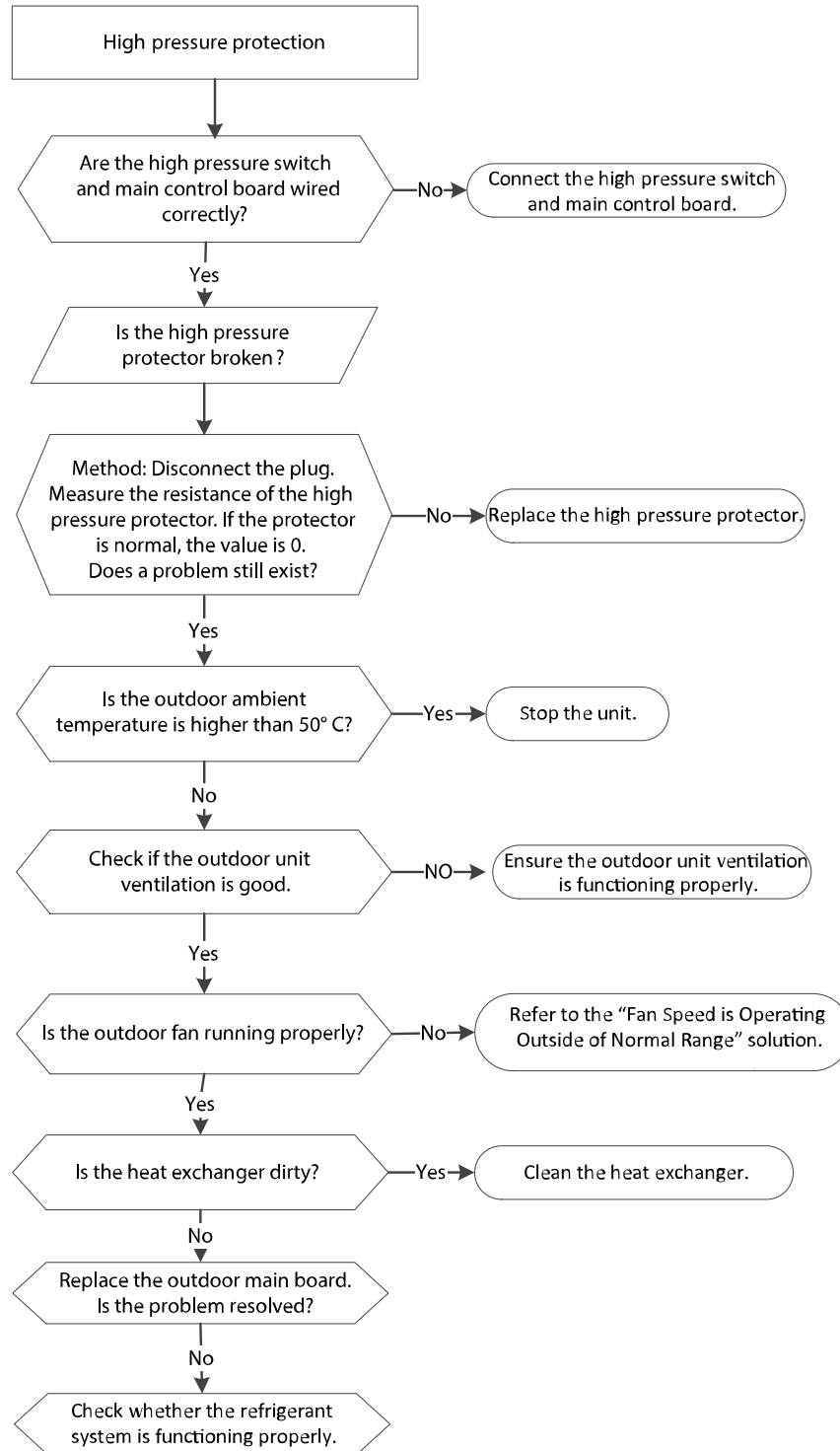


A210605

DIAGNOSIS AND SOLUTION (CONT.)

NOTE: Measure the DC voltage between ports P and N (the normal value should be around 310V).
High temperature protection of compressor top diagnosis and solution (P2) (CONT)

For all other models (sizes):



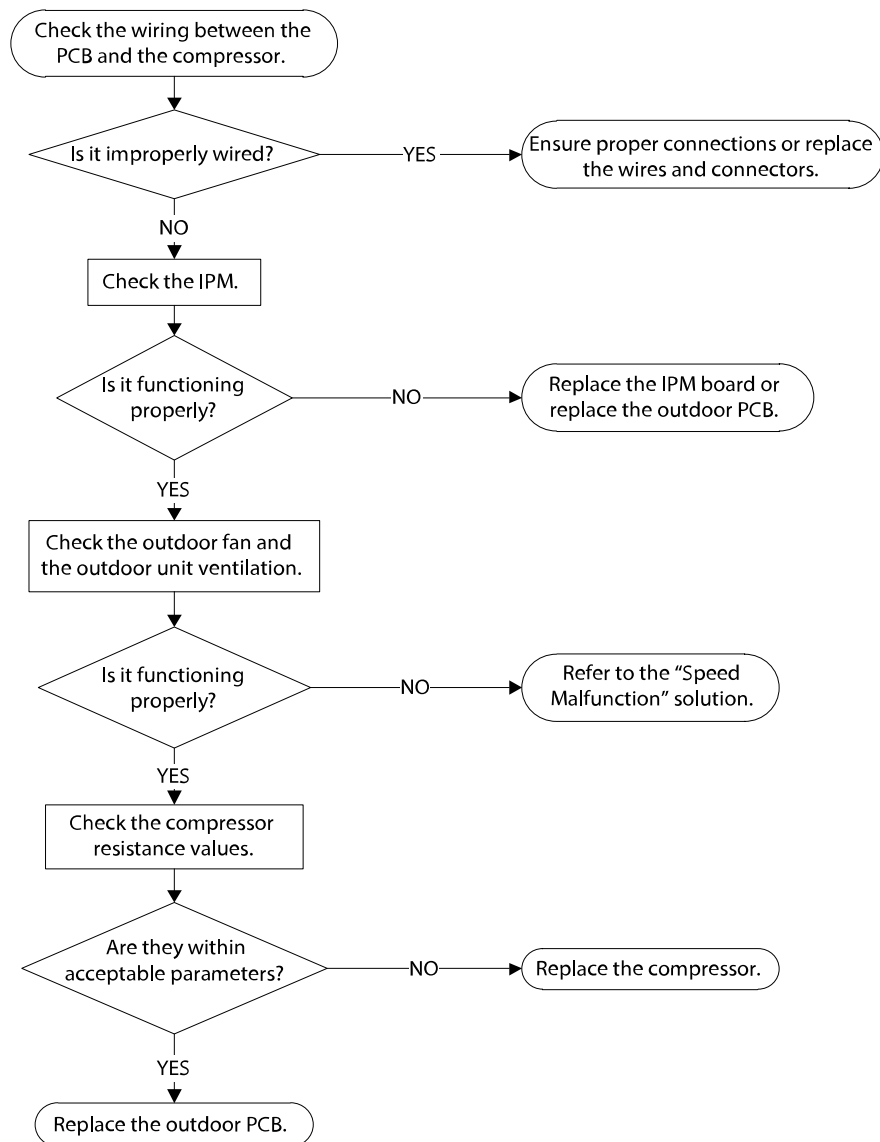
A210606

DIAGNOSIS AND SOLUTION (CONT.)

Inverter compressor drive error diagnosis and solution (P4)

Error Code	P4
Malfunction decision conditions	An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection, etc.
Supposed causes	Wiring mistake IPM malfunction Outdoor fan assembly faulty Compressor malfunction Outdoor PCB faulty

Troubleshooting



A210607

Main Parts Check

Temperature Sensor Checking

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

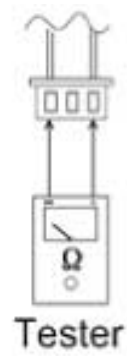


Fig. 28 —Tester

A210579

Temperature Sensors

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

Indoor Fan Motor

Measure the resistance value of each winding by using the tester.

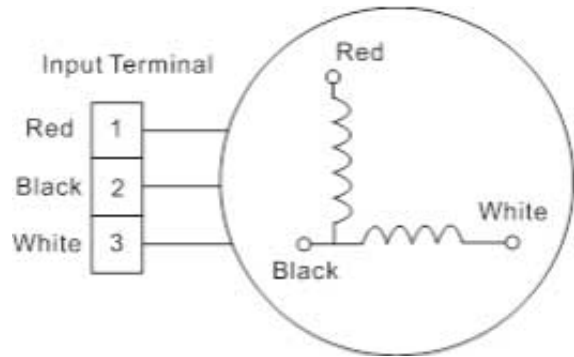


Fig. 29 —Indoor AC Fan Motor

A210580

Table 11 — Resistance Value

Digital Tester		Normal Resistance Value	Digital Tester		Normal Resistance Value
(+) Red	(-) Black	∞ (Several MΩ)	(+) Red	(-) Black	∞ (Several MΩ)
P	N		U	N	
	U		V		
	V		W		
	W		(+) Red		

APPENDICES

Appendix 1

Table 12 — Temperature Sensor Resistance Value Table for T1, T2, T3, T4 (°C - relative to K Ohm)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	10.4736	64	147	2.03732	104	219	0.56038
-15	5	84.219	25	77	10	65	149	1.96532	105	221	0.54448
-14	7	79.311	26	79	9.55074	66	151	1.89627	106	223	0.52912
-13	9	74.536	27	81	9.12445	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.33566	69	156	1.70547	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.38703	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.34105	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.39689	79	174	1.2133	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.09958	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.03069	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.8795	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.85248	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.63682	97	207	0.68844	137	279	0.23338
18	64	13.918	58	136	2.53973	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.44677	99	210	0.64862	139	282	0.22231

Appendix 2

Table 13 — Temperature Sensor Resistance Value Table for TP (T5) (°C-relative to K Ohm)

° C	° F	K Ohm	° C	° F	K Ohm	° C	° F	K Ohm	° C	° F	K Ohm
-20	-4	542.7	20	68	68.66	60	140	13.59	100	212	3.702
-19	-2	511.9	21	70	65.62	61	142	13.11	101	214	3.595
-18	0	483	22	72	62.73	62	144	12.65	102	216	3.492
-17	1	455.9	23	73	59.98	63	145	12.21	103	217	3.392
-16	3	430.5	24	75	57.37	64	147	11.79	104	219	3.296
-15	5	406.7	25	77	54.89	65	149	11.38	105	221	3.203
-14	7	384.3	26	79	52.53	66	151	10.99	106	223	3.113
-13	9	363.3	27	81	50.28	67	153	10.61	107	225	3.025
-12	10	343.6	28	82	48.14	68	154	10.25	108	226	2.941
-11	12	325.1	29	84	46.11	69	156	9.902	109	228	2.86
-10	14	307.7	30	86	44.17	70	158	9.569	110	230	2.781
-9	16	291.3	31	88	42.33	71	160	9.248	111	232	2.704
-8	18	275.9	32	90	40.57	72	162	8.94	112	234	2.63
-7	19	261.4	33	91	38.89	73	163	8.643	113	235	2.559
-6	21	247.8	34	93	37.3	74	165	8.358	114	237	2.489
-5	23	234.9	35	95	35.78	75	167	8.084	115	239	2.422
-4	25	222.8	36	97	34.32	76	169	7.82	116	241	2.357
-3	27	211.4	37	99	32.94	77	171	7.566	117	243	2.294
-2	28	200.7	38	100	31.62	78	172	7.321	118	244	2.233
-1	30	190.5	39	102	30.36	79	174	7.086	119	246	2.174
0	32	180.9	40	104	29.15	80	176	6.859	120	248	2.117
1	34	171.9	41	106	28	81	178	6.641	121	250	2.061
2	36	163.3	42	108	26.9	82	180	6.43	122	252	2.007
3	37	155.2	43	109	25.86	83	181	6.228	123	253	1.955
4	39	147.6	44	111	24.85	84	183	6.033	124	255	1.905
5	41	140.4	45	113	23.89	85	185	5.844	125	257	1.856
6	43	133.5	46	115	22.89	86	187	5.663	126	259	1.808
7	45	127.1	47	117	22.1	87	189	5.488	127	261	1.762
8	46	121	48	118	21.26	88	190	5.32	128	262	1.717
9	48	115.2	49	120	20.46	89	192	5.157	129	264	1.674
10	50	109.8	50	122	19.69	90	194	5	130	266	1.632
11	52	104.6	51	124	18.96	91	196	4.849			
12	54	99.69	52	126	18.26	92	198	4.703			
13	55	95.05	53	127	17.58	93	199	4.562			
14	57	90.66	54	129	16.94	94	201	4.426			
15	59	86.49	55	131	16.32	95	203	4.294			
16	61	82.54	56	133	15.73	96	205	4.167			
17	63	78.79	57	135	15.16	97	207	4.045			
18	64	75.24	58	136	14.62	98	208	3.927			
19	66	71.86	59	138	14.09	99	210	3.812			


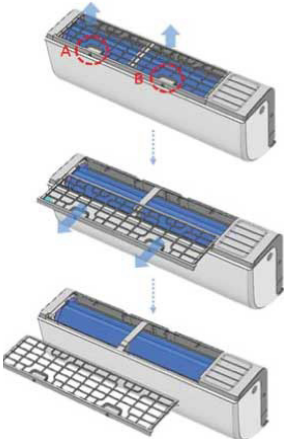
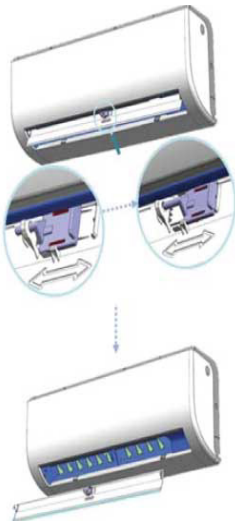
Appendix 3

Table 14 — Celsius to Fahrenheit


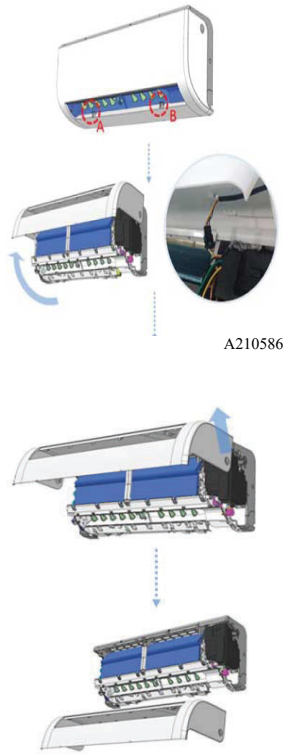
°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-5	23	21	69.8	51	123.8	82	179.6	113	235.4
-4	24.8	22	71.6	52	125.6	83	181.4	114	237.2
-3	26.6	23	73.4	53	127.4	84	183.2	115	239
-2	28.4	24	75.2	54	129.2	85	185	116	240.8
-1	30.2	25	77	55	131	86	186.8	117	242.6
0	32	25.5	77.9	56	132.8	87	188.6	118	244.4
0.5	32.9	26	78.8	57	134.6	88	190.4	119	246.2
1	33.8	27	80.6	58	136.4	89	192.2	120	248
1.5	34.7	28	82.4	59	138.2	90	194	121	249.8
2	35.6	29	84.2	60	140	91	195.8	122	251.6
2.5	36.5	30	86	61	141.8	92	197.6	123	253.4
3	37.4	31	87.8	62	143.6	93	199.4	124	255.2
3.5	38.3	32	89.6	63	145.4	94	201.2	125	257
4	39.2	33	91.4	64	147.2	95	203	126	258.8
4.5	40.1	34	93.2	65	149	96	204.8	127	260.6
5	41	35	95	66	150.8	97	206.6	128	262.4
6	42.8	36	96.8	67	152.6	98	208.4	129	264.2
7	44.6	37	98.6	68	154.4	99	210.2	130	266
8	46.4	38	100.4	69	156.2	100	212	131	267.8
9	48.2	39	102.2	70	158	101	213.8	132	269.6
10	50	40	104	71	159.8	102	215.6	133	271.4
11	51.8	41	105.8	72	161.6	103	217.4	134	273.2
12	53.6	42	107.6	73	163.4	104	219.2	135	275
13	55.4	43	109.4	74	165.2	105	221	136	276.8
14	57.2	44	111.2	75	167	106	222.8	137	278.6
15	59	45	113	76	168.8	107	224.6	138	280.4
16	60.8	46	114.8	77	170.6	108	226.4	139	282.2
17	62.6	47	116.6	78	172.4	109	228.2	140	284
18	64.4	48	118.4	79	174.2	110	230	141	285.8
19	66.2	49	120.2	80	176	111	231.8	142	287.6
20	68	50	122	81	177.8	112	233.6	143	289.4

DISASSEMBLY INSTRUCTIONS

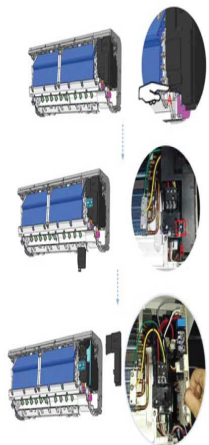
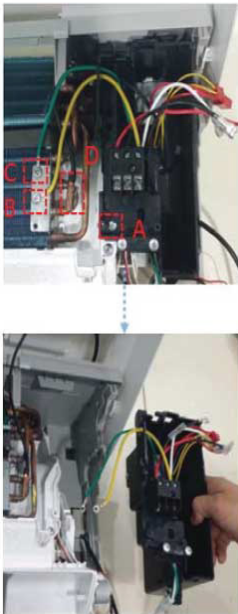
NOTE: This section is for reference, the photos may differ slightly from the actual unit.

No.	Parts Name	Procedures	Remarks
1	Front Panel	<p align="center">Remove the filter</p> <ol style="list-style-type: none"> Place your hands at A and B, lift the filter to loosen the fastener. Pull the filter gently along the horizontal direction. Pull out the filter. 	 <p align="right">A210581</p>  <p align="right">A210582</p>
2	FRONT PANEL	<p align="center">Remove the horizontal louver</p> <ol style="list-style-type: none"> Open the horizontal louver, push the locker toward the right side to open. Bend the horizontal louver gently then remove it from the indoor unit. 	 <p align="right">A210583</p>

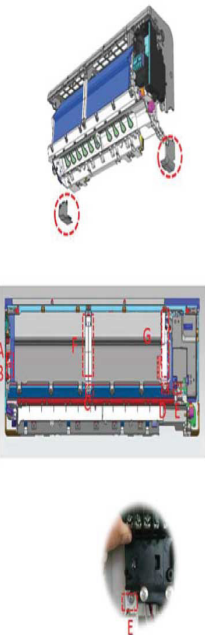

DISASSEMBLY INSTRUCTIONS (CONT.)

<p>3</p>	<p>Front Panel</p>	<p>Hold the indoor unit to connect the piping</p> <ol style="list-style-type: none"> 1. Open the screw caps (A and B) then remove the screws (2). 2. Open the panel assembly, then move the slider to secure the panel. 3. Press locker A and B, to loosen the unit from the installation plate. 4. Unfold the installation plate supporter and allow it to hold the indoor unit (this is useful for connecting the pipe in the back of the unit). 	 <p>A210584</p> <p>A210585</p>
<p>4</p>	<p>Front Panel</p>	<p>Remove the panel assembly</p> <ol style="list-style-type: none"> 1. Open the screw caps (A and B), then remove the two screws. 2. Open the panel assembly, then loosen the display board connector. 3. Pull the panel assembly along the direction indicated in image (on the right) to remove. 	 <p>A210586</p> <p>A210587</p>

DISASSEMBLY INSTRUCTIONS (CONT.)

5	Front Panel	remove the PCB	
		<ol style="list-style-type: none"> 1. Press A to remove the terminal cover. 2. Remove screw B to remove the electronic control box cover. 3. Remove the PCB. <p>NOTE: It is not necessary to remove the panel to remove the PCB. The panel was only removed (see images) to make it easier to see inside the unit.</p>	 <p>A210588</p>
6	FRONT PANEL	Remove the Electronic CONTROL BOX	
		<ol style="list-style-type: none"> 1. Remove screws (A,B,C), then pull out the coil temperature sensor D from the sensor holders. 2. Pull out the electrical control box. <p>NOTE: It is not necessary to remove the panel to remove the electronic control box. The panel was only removed (see images) to make it easier to see inside the unit.</p>	 <p>A210589</p>

DISASSEMBLY INSTRUCTIONS (CONT.)

7	FRONT PANEL	<p>How to remove the chassis assembly</p> <p>CAUTION: Due to the 24K indoor unit's size and weight, a minimum of two persons are required to implement the following steps.</p> <ol style="list-style-type: none"> 1. Remove the left and right pipe cover. 2. Remove the screws (5) (A,B,C,D,E) then remove the support parts F and G. 3. Open the E-box, to unhook the fan motor and louver motor connectors from the PCB. 4. Press the locker H and I, to remove the indoor unit from the installation plate. 5. Lift the unit slightly and pull it out along the direction indicated in the image. 	 <p>A210590</p>
8	FRONT PANEL	<p>REMOVE THE EVAPORATOR ASSEMBLY</p> <p>CAUTION: Due to the 24K indoor unit's size and weight, a minimum of two persons are required to implement the following steps.</p> <ol style="list-style-type: none"> 1. Remove the electric control box. 2. Remove the chassis assembly. 3. Unfold the pipe clamp board (C), remove screws A and B. 4. Pull out the evaporator. 	 <p>A210591</p> <p>A210592</p>

