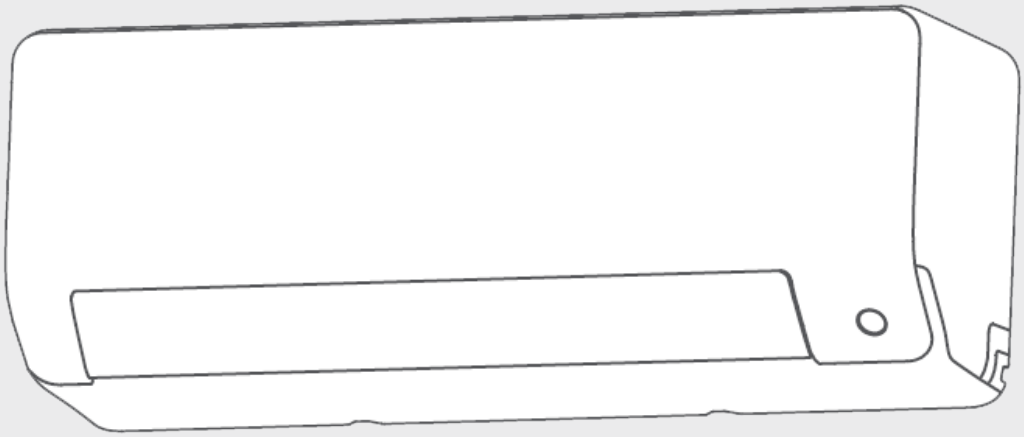
BOSCH

Service Manual

Wall Mounted Ductless Split Air Conditioner/Heat Pump

Climate 5000 Series - Gen 4



BTC 7692023O1A / 05.2025

AHRI CERTIFIED®
www.ahridirectory.org
Unitary Small HP
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

Table of Contents

1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings

WARNING

Warnings in this document are identified by a warning triangle printed against a grey background.
Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.
In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

The following keywords are defined and can be used in this document:

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

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

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

Important information

The info symbol indicates important information where there is no risk to people or property.

1.2 Explanation of Symbols Displayed on the Unit

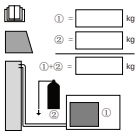
Symbol	
	WARNING This symbol shows that this appliance used a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	WARNING This symbol shows that appliance shall be installed, operated and stored in a room with a floor area not less than the minimum room area.
	CAUTION This symbol shows that the operation manual should be read carefully.
	CAUTION This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION This symbol shows that information is available such as the operating manual or installation manual.
	CAUTION This symbol shows that when addition of charge is required by the manufacturer installation instructions for completing the REFRIGERATING SYSTEM. Recorded the resulting total REFRIGERANT CHARGE for each REFRIGERATING SYSTEM.

Table 1

1.3 Safety

Please read safety precautions before installation

WARNING

Electrical hazard!

- Do not modify the length of the power supply cord or use an extension cord to power the unit.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electrical shock.

WARNING

Installation requirements

- Installation must be performed by a licensed contractor, and per the instructions in the installation manual. Improper installation can cause water leakage, electrical shock, or fire.
- In North America, installation must be performed in accordance with the requirement of NEC (National Electric Code) and CEC (Canadian Electric Code) by licensed and qualified personnel only.
- Only contact a licensed contractor for repair or maintenance of this unit.
- Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and can cause the unit to fail.
- Install the unit in a solid location that can support the unit's weight. If the chosen location cannot support the unit's weight, or the installation is not done properly, the unit may drop and cause serious injury and/or damage.

WARNING

This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

WARNING

Electrical hazard!

- For all electrical work, follow all local and national wiring standards, regulations, and the Installation Manual. The power supply to the outdoor unit requires a service disconnect at the unit. Only use a dedicated circuit. Never share a power source connected to this system. Insufficient electrical capacity or defects in electrical work can cause electrical shock or fire.
- For all electrical work, use the specified cables. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.
- In certain functional environments, such as kitchens, server rooms, etc., the use of specially designed air-conditioning units is highly recommended.
- If the power supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons such as a licensed electrician in order to avoid a hazard.
- The product must be properly grounded at the time of installation, or electrical shock may occur.

CAUTION

Burn hazard!

- For units that have an auxiliary electric heater, do not install the unit within 1 meter (3 feet) of any combustible materials.
- Do not install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause fire.
- Do not operate your air conditioner in a wet room such as a bathroom or laundry room. Too much exposure to water can cause electrical components to short circuit.

NOTICE

Property damage!

Install condensate drainage piping according to the instructions in this manual. Improper condensate drainage may cause water damage to your home and property.

CAUTION

Contains refrigerant!

- This air-conditioning unit contains fluorinated gases. For specific information on the type of gas and the amount, please refer to the relevant label on the outdoor unit itself.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Product removal and recycling must be performed by a certified technician.
- If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months.
- When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

2 Part Names and Model Numbers

2.1 Model Numbers

Voltage	Indoor Type	Capacity	Indoor Units	Regular Outdoor Units	Max Performance Outdoor Units	Light Commercial Outdoor Units
115V	Wall Mounted	12k	BMS500-AAS012-0AHWXD	BMS500-AAS012-0CSXRD		
208-230V	Wall Mounted	6k	BMS500-AAU006-1AHWXD		BMS500-AAS009-1CSXRD	
		9k	BMS500-AAU009-1AHWXD	BMS500-AAS009-1CSXRD	BMS500-AAS009-1CSXHD	
		12k	BMS500-AAU012-1AHWXD	BMS500-AAS012-1CSXRD	BMS500-AAS012-1CSXHD	
		18k	BMS500-AAU018-1AHWXD	BMS500-AAS018-1CSXRD	BMS500-AAS018-1CSXHD	
		24k	BMS500-AAU024-1AHWXD	BMS500-AAS024-1CSXRD	BMS500-AAS024-1CSXHD	
		30k	BMS500-AAS030-1AHWXD			BMS500-AAS030-1CSXRD
		36k	BMS500-AAS036-1AHWXD			BMS500-AAS036-1CSXLD

Table 2

3 Dimensions & Clearances

3.1 Wall Mounted Indoor Unit

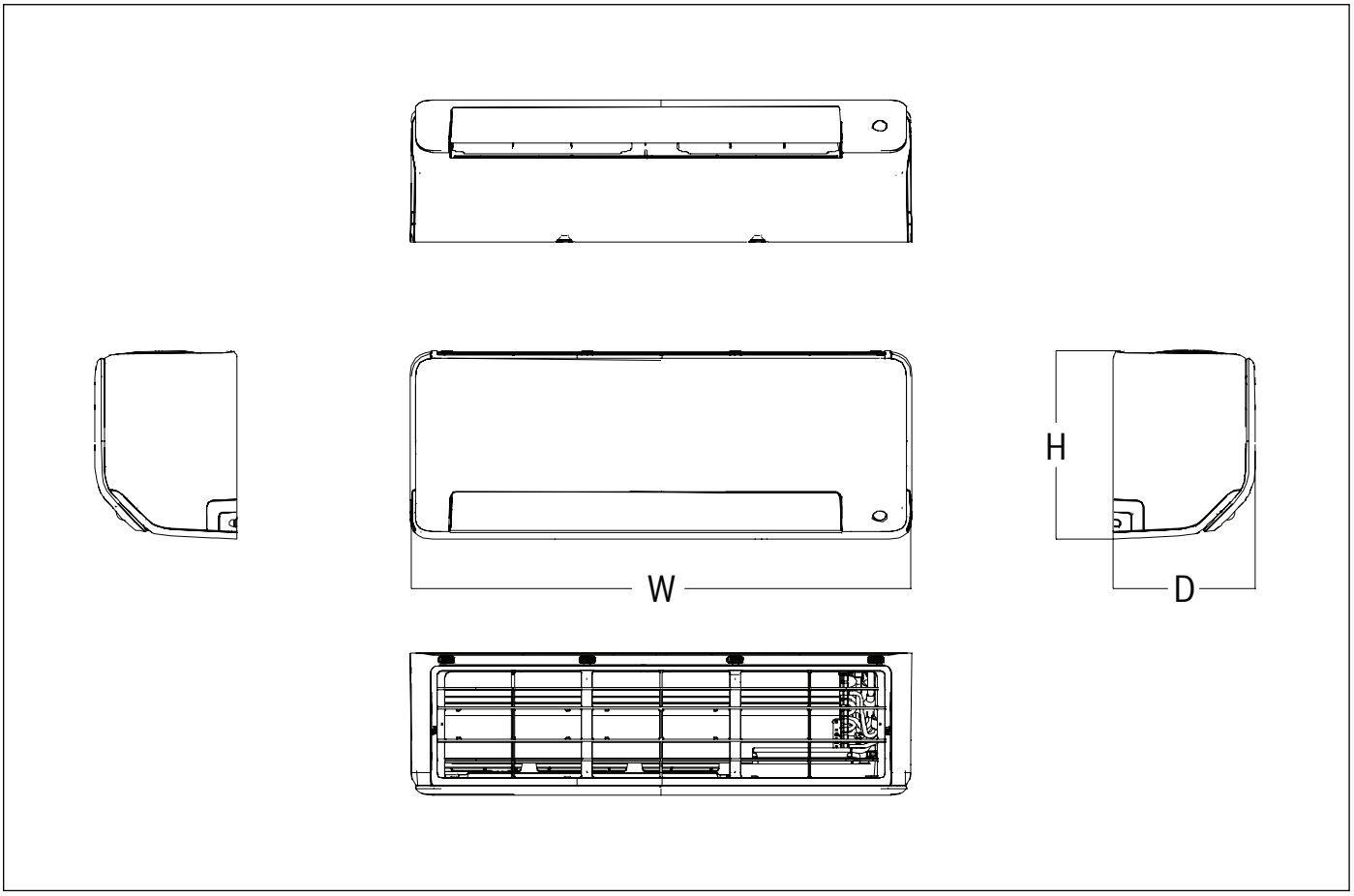


Figure 1

Capacity	Model	W x D x H (in)	W x D x H (mm)
9K	BMS500-AAU009-1AHWXD	33.75 x 9.1 x 11.8	857 x 231 x 300
12k	BMS500-AAS012-0AHWXD, BMS500-AAU012-1AHWXD		
18K	BMS500-AAU018-1AHWXD	40.3 x 9.7 x 12.6	1024 x 246 x 321
24K	BMS500-AAU024-1AHWXD	47.1 x 14.2 x 18	1197 x 280 x 371
30K	BMS500-AAS030-1AHWXD	44.9 x 11.2 x 14.6	1140 x 285 x 371
36K	BMS500-AAS036-1AHWXD		

Table 3

3.1.1 Mounting Plates

6K, 9K & 12K Btuh Models

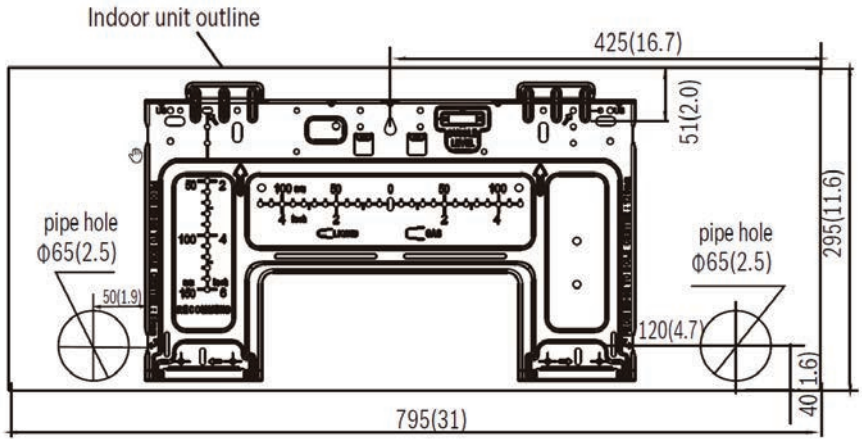


Figure 2

18K Btuh Model

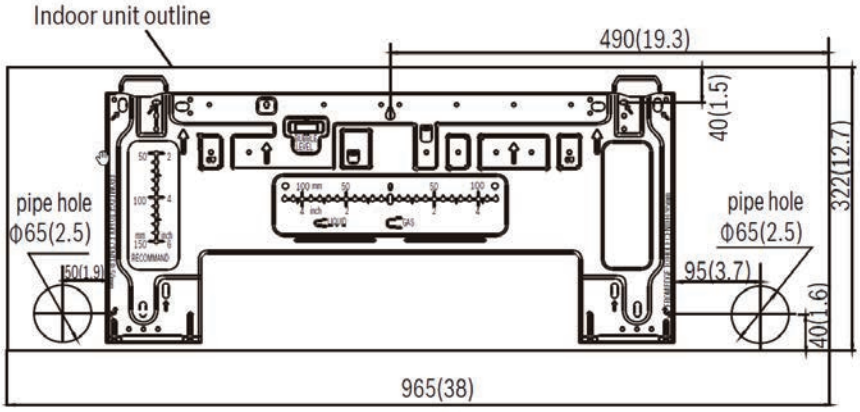


Figure 3

24K, 30K & 36K Btuh Models

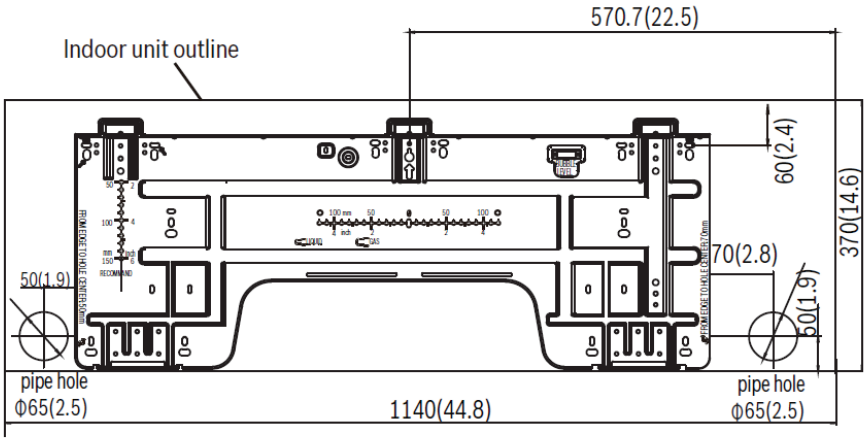


Figure 4

3.2 Outdoor Unit

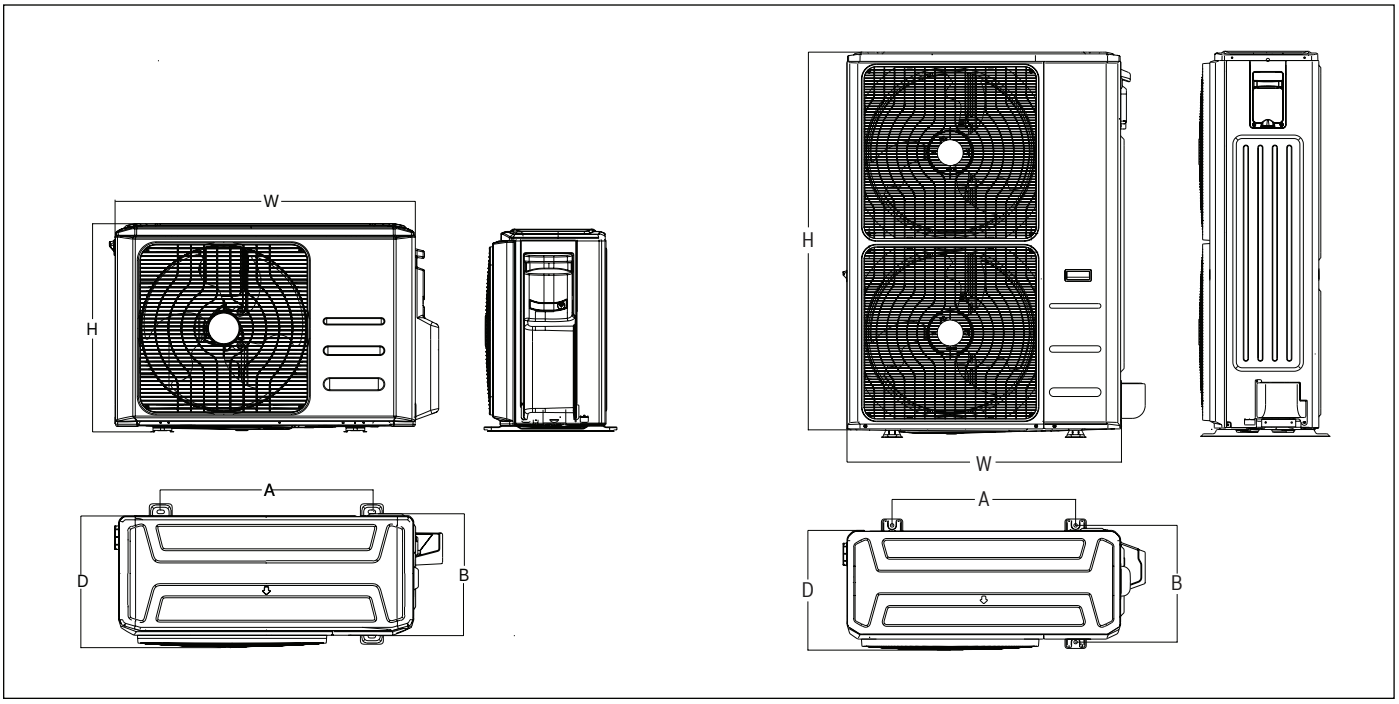


Figure 5

Outdoor Model	Outdoor Unit Dimensions mm (in)	Mounting Dimensions	
	W x H x D	Distance A mm (in)	Distance B mm (in)
BMS500-AAS012-0CSXRD, BMS500-AAS009-1CSXRD, BMS500-AAS012-1CSXRD	765x555x303 (30.1”x 21.8”x 11.9”)	454 (17.8”)	286(11.3”)
BMS500-AAS009-1CSXHD, BMS500-AAS012-1CSXHD	805x554x330 (31.7”x 21.8”x 13.0”)	511 (20.1”)	317(12.5”)
BMS500-AAS018-1CSXRD, BMS500-AAS018-1CSXHD, BMS500-AAM018-1CSXRD	890x673x342 (35.0”x 26.5”x 13.5”)	663 (26.1”)	348 (13.7”)
BMS500-AAS030-1CSXRD, BMS500-AAS036-1CSXLD, BMS500-AAS036-1CSXRD, BMS500-AAS024-1CSXRD, BMS500-AAS024-1CSXHD, BMS500-AAM027-1CSXRD BMS500-AAM036-1CSXRD, BMS500-AAM018-1CSXHD, BMS500-AAM027-1CSXHD	946x810x410 (37.2”x 31.9”x 16.1”)	673 (26.5”)	403 (15.9”)

Table 4

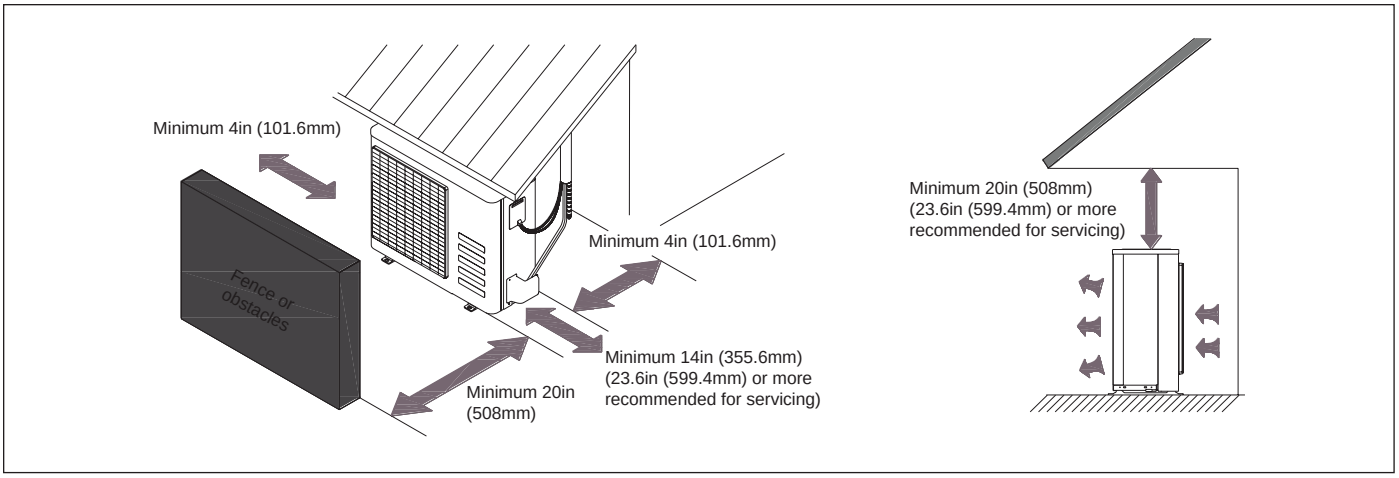


Figure 6 Outdoor Unit Clearances

4 Refrigerant Cycle Diagrams

4.1 115V 12K System, Regular 9K, 12K Systems, Max Performance 9K, 12K Systems

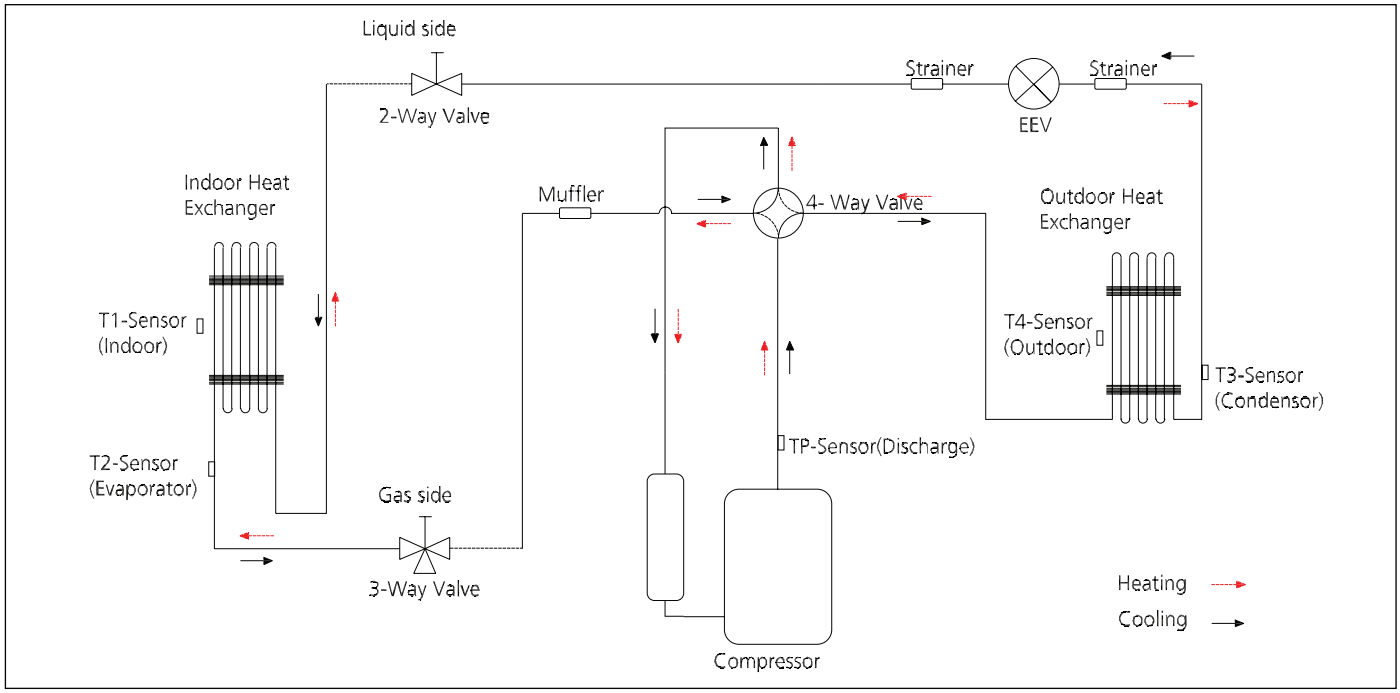


Figure 7

4.2 Regular and Max Performance 18K Systems

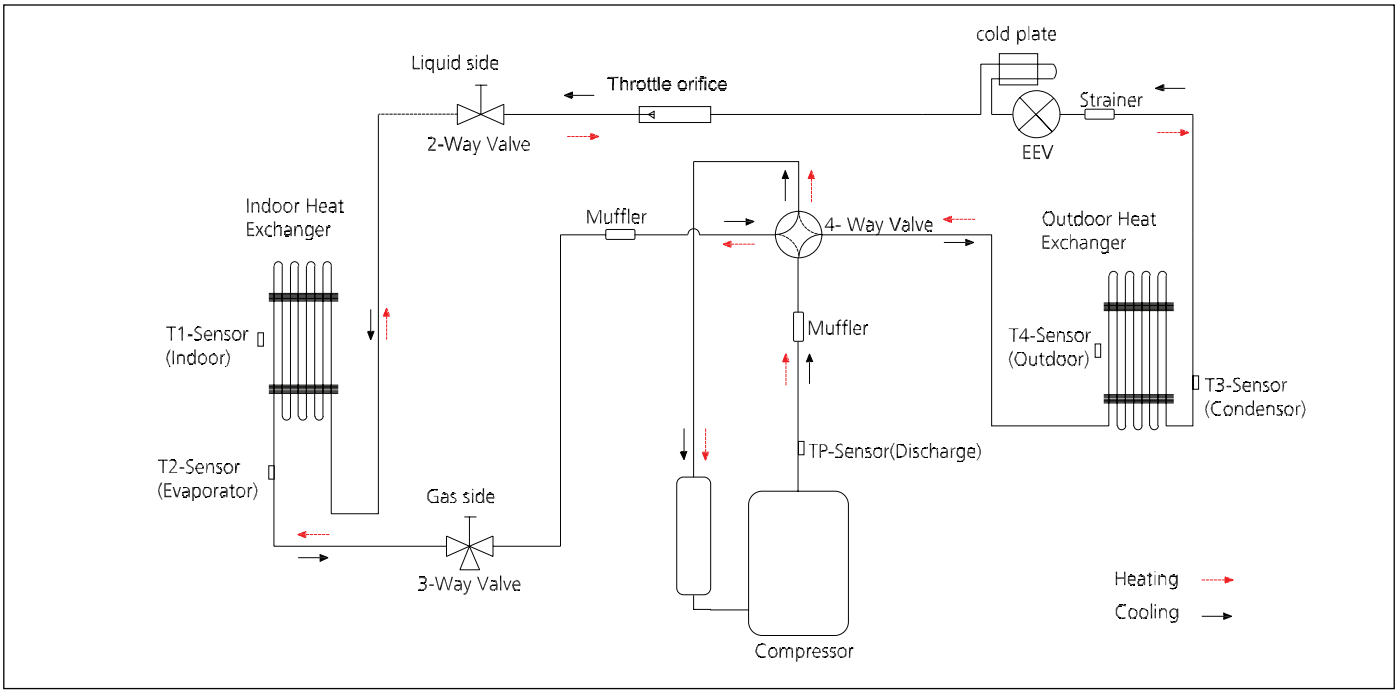


Figure 8

For Max Performance 9K, 12K, 18K System, there is no Accumulator.

4.3 Regular 24K, 30K Systems, Max Performance 24K System

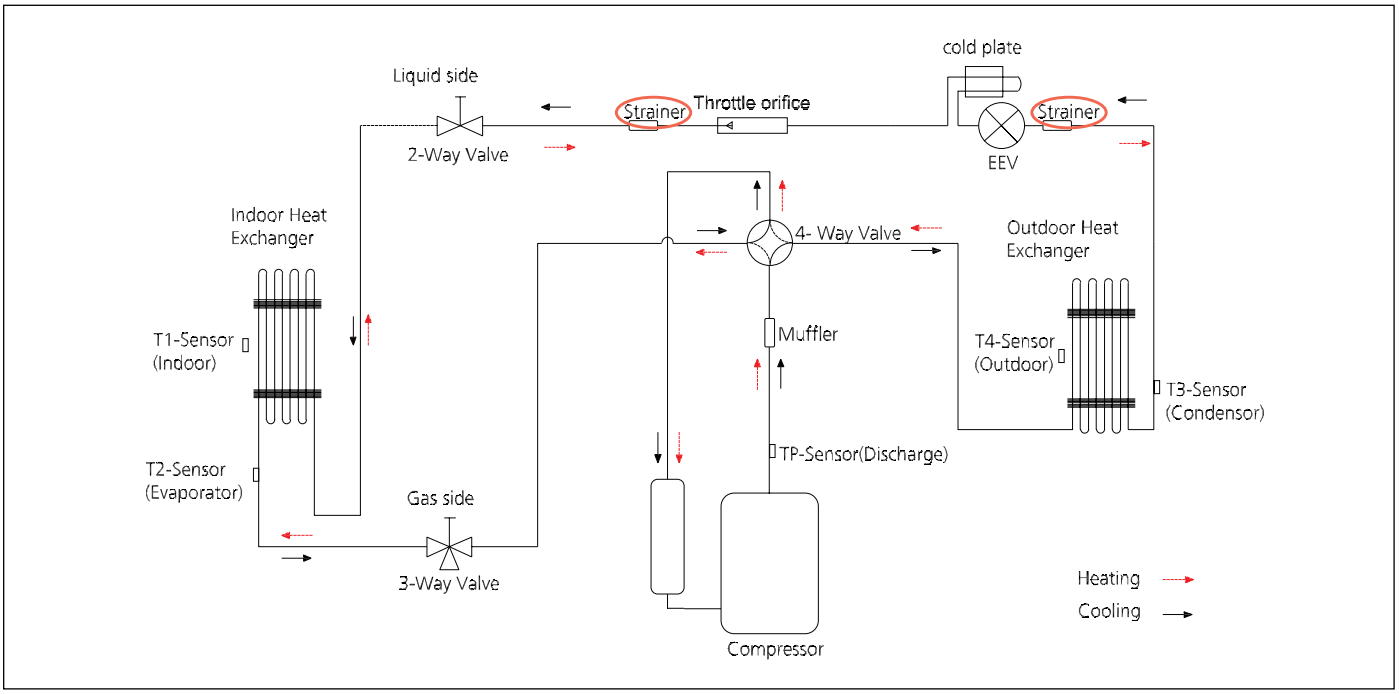


Figure 9

4.4 Regular 36K System

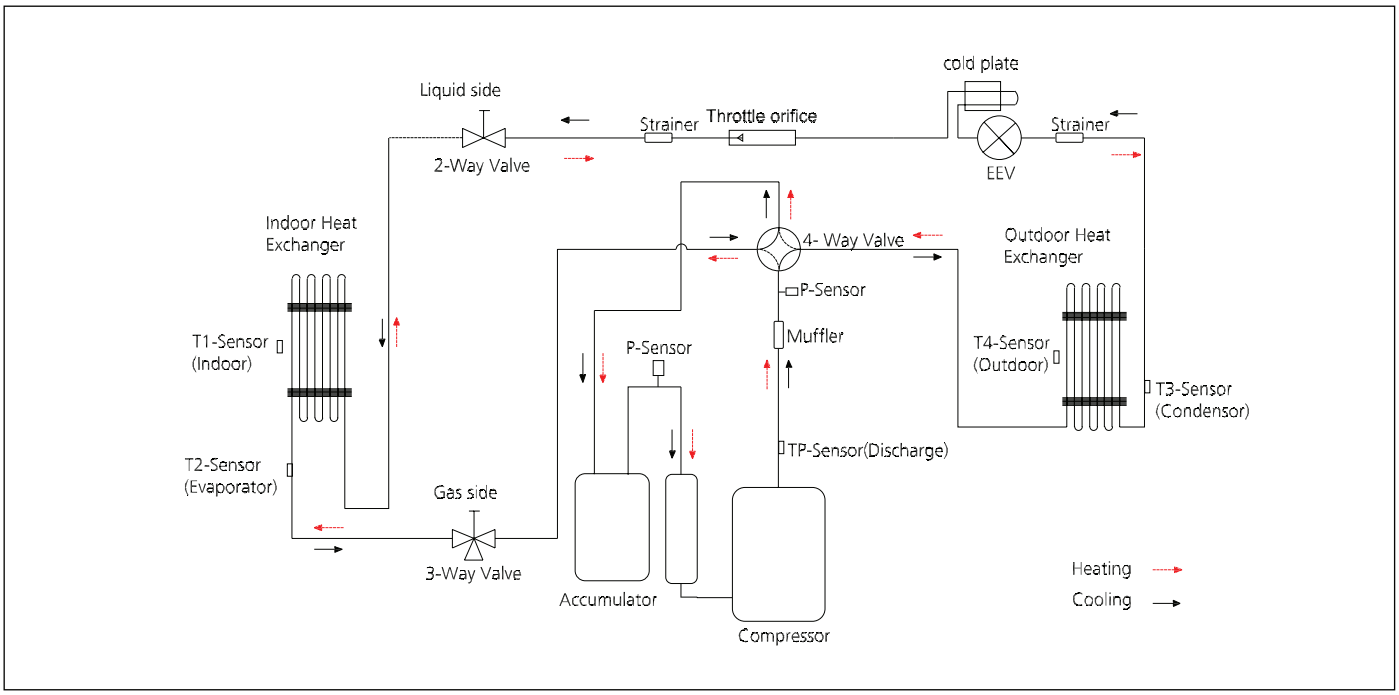


Figure 10

5 Installation Details

5.1 Torque Requirements

Pipe Diameter inch (mm)	Torque lb•ft (N•m)
1/4 (6.35)	13.3~14.8 (18~20)
3/8 (9.52)	23.6~28.8 (32~39)
1/2 (12.7)	36.1~43.5 (49~59)
5/8 (15.9)	42.0~52.4 (57~71)
3/4 (19)	49.4~74.5 (67~101)
7/8 (22)	62.7~81.1 (85~110)

Table 5

5.2 Connecting the Cables

The power cord should be selected according to the following specifications sheet.

- Cable type: SOOW type

Appliance Amps	AWG Wire Size
10	18
13	16
18	14
25	12
30	10

Table 6

The cable size and the current of the fuse or switch are determined by the maximum current indicated on the nameplate which is located on the side panel of the unit. Please refer to the nameplate before selecting the cable, fuse and switch.

Recommended: Follow the local and national electrical codes.

5.3 Pipe Length and Elevation

Capacity	Pipe size	
	Liquid Side Diameter (in / mm)	Gas Side Diameter (in / mm)
6K, 9K	1/4" / 6.35	3/8" / 9.52
12K	1/4" / 6.35	1/2" / 12.7
18K		
24K	3/8" / 9.52	5/8" / 15.9
30K		
36K		
48K		
60K	3/8" / 9.52	3/4" / 19

Table 7

Capacity	Precharged length (ft / m)	Max Pipe Length (ft / m)	Max difference in height (ft / m)	Additional charge for each ft (oz)
6K, 9K, 12K	24.6ft (7.5m)	82.0ft (25m)	49.2ft (15m)	0.16oz/ft (15g/m)
18k		98.4ft (30m)	65.6ft (20m)	
18k 24k/30k		164ft (50m)	82ft (25m)	0.32oz/ft (30g/m)
36k		213ft (65m)	98.4ft (30m)	

Table 8

5.4 First Time Installation

5.4.1 Air Purging With Vacuum Pump

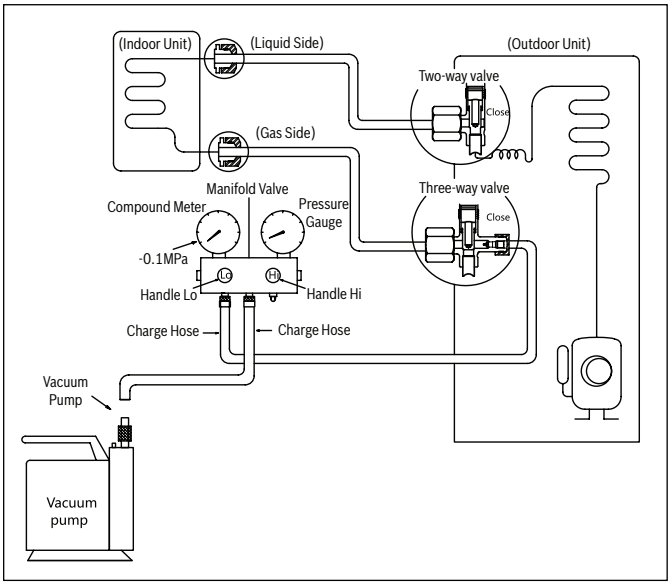


Figure 11

1. Tighten the flare nuts of the indoor and outdoor units, and confirm that both the 2- and 3-way valves are closed.
2. Connect the charge hose with the push pin of Handle Low to the gas service port of the 3-way valve.
3. Connect another charge hose to the vacuum pump.
4. Fully open the Handle Low manifold valve.
5. Evacuate until the micron gauge reads no higher than 350 microns, then close the valve to the vacuum pump.

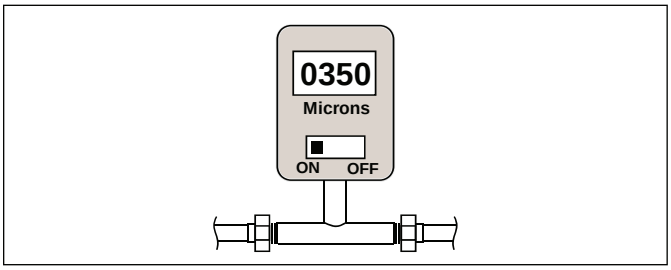


Figure 12

6. Observe the micron gauge. Evacuation is complete if the micron gauge does not rise above 500 microns in one (1) minute.

   Once evacuation is complete, turn off the vacuum pump and micron gauge, and close the valves on the manifold gauge set.

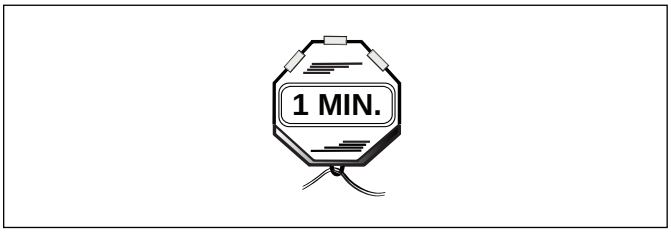


Figure 13

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

Gas leak check (Use soap bubble method):
Apply soapy water or a liquid neutral detergent on the indoor unit connections or outdoor unit connections by a soft brush to check for leakage of the connecting points of the piping. If bubbles come out, the pipes are leaking.

5.5 Adding the Refrigerant to an Existing System

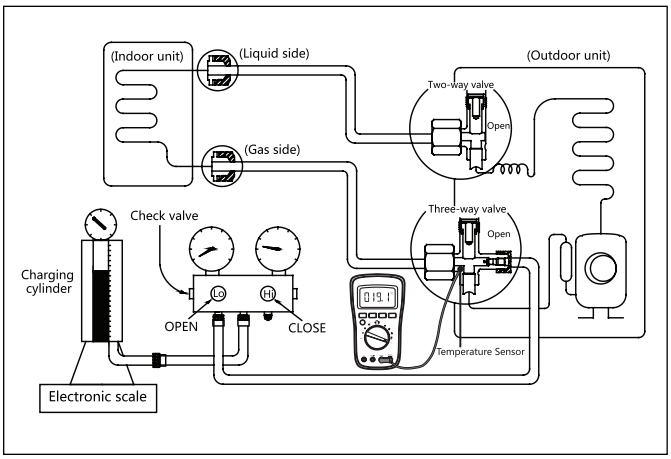


Figure 14

Procedure

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

5.6 Re-Installation While the Outdoor Unit Needs to Be Repaired

Evacuation for the whole system

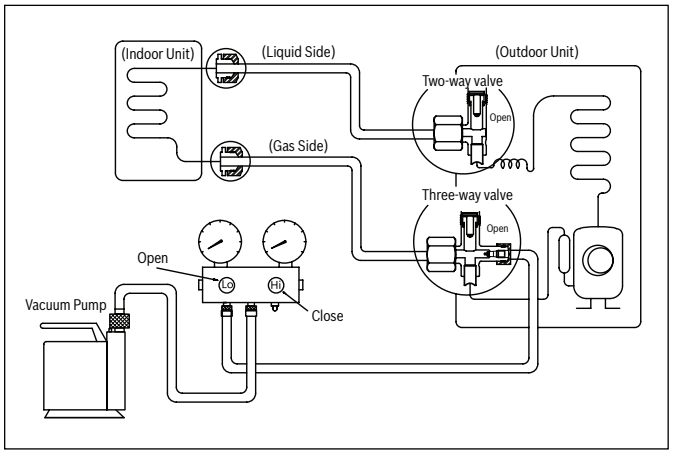


Figure 15

Procedure

1. Confirm that the 2- and 3-way valves are opened.
2. Connect the vacuum pump to the 3-way valve's service port.
3. Evacuate the system at 350 micron or for 1 minute, if it does not rise above 500 micron in 1 minute, it is leak free.
4. Close the valve (Low side) on the charge set and turn off the vacuum pump.
5. Disconnect the charge hose from the vacuum pump.
6. Mount the caps of service port and 2- and 3-way valves.
7. Use a torque wrench to tighten the caps to a torque of 18 N.m.

5.7 Operation Characteristics

			COOL operation	HEAT operation	DRY operation
Room Temperature			63ºF - 90ºF 17ºC - 32ºC	32ºF - 75ºF 0ºC - 24ºC	50ºF - 90ºF 10ºC - 32ºC
Outdoor Temperature	Regular	BMS500-AAS012-0CSXRD BMS500-AAS009-1CSXRD BMS500-AAS012-1CSXRD BMS500-AAS018-1CSXRD BMS500-AAS024-1CSXRD BMS500-AAS030-1CSXRD BMS500-AAS036-1CSXRD	-13ºF - 122ºF -25ºC - 50ºC	-13ºF - 75ºF -25ºC - 24ºC	32ºF - 122ºF 0ºC - 50ºC
	Max Performance	BMS500-AAS006-1CSXHD BMS500-AAS009-1CSXHD BMS500-AAS012-1CSXHD BMS500-AAS018-1CSXHD BMS500-AAS024-1CSXHD	-22ºF - 122ºF -30ºC - 50ºC	-22ºF - 75ºF -30ºC - 24ºC	32ºF - 122ºF 0ºC - 50ºC
	Light Commercial	BMS500-AAS036-1CSXLD BMS500-AAS048-1CSXLD BMS500-AAS060-1CSXLD	-13ºF - 122ºF -25ºC - 50ºC	-13ºF - 75ºF -215ºC - 24ºC	32ºF - 122ºF 0ºC - 50ºC

Table 9

Equation to convert Celsius to Fahrenheit

(°F) = 1.8 x (°C) + 32

NOTICE

- If the system is used beyond the above conditions, certain safety protection features may come into operation and cause the unit to operate abnormally.
- The room relative humidity should be less than 80%. If the system operates beyond this figure, the surface of the air conditioner may attract condensation. Please set the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.
- The optimum performance will be achieved during this operating temperature zone.

6 Electronic Functions

6.1 Abbreviation

Abbreviation	Element
T1	Indoor room temperature
T2	Coil temperature of evaporator
T3	Coil temperature of condenser
T4	Outdoor ambient temperature
Tsc	Adjusted setting temperature
TP	Compressor discharge temperature
CDIFTEMP	Cooling shutdown temperature
HDIFTEMP2	Heating shutdown temperature
TCDI1	Enter defrost temperature
TCDE1	Exit defrost temperature1
TCDE2	Exit defrost temperature2 (maintain for a period of time)
TIMING_ DEFROST_TIME	Enter defrost time

Table 10

In this manual, terms such as CDIFTEMP, HDIFTEMP2, TCDE1, TCDE2, TIMING_ DEFROST_TIME are well- setting parameter of EEPROM.

6.2 Display Function

6.2.1 Icon explanation on indoor display board

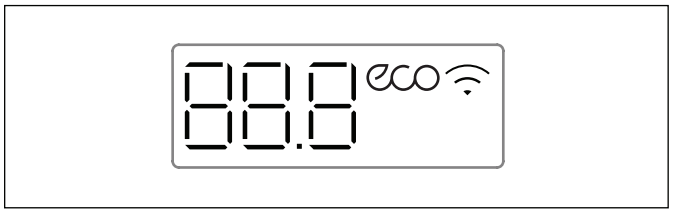


Figure 16

Display		Function
ECO		ECO function (available on select units only)
88.8	Temperature value	Temperature
	ON	Timer ON is set. Activation of , Fresh, Swing, Turbo, ECO, Breeze away, ECO intelligent or Silence
	OF	Timer OFF is set. Cancellation of Fresh, Swing, Turbo, ECO, Breeze away, ECO intelligent or Silent
	dF	Defrost
	CL	Active Clean (For Inverter split type) or self-cleaning(For Fixedspeed type)
	FP	Heating in room temperature under 46.4 ℉ (8℃)

Table 11

6.3 Main Protection

6.3.1 Compressor Three-Minute Delay at Restart

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

6.3.2 Automatic Shutoff Based on Discharge Temperature

If the compressor discharge temperature exceeds a certain level for a period of time, the compressor ceases operation.

6.3.3 Automatic Shutoff Based on Fan Speed

If the indoor fan speed registers below 200RPM or over 2100RPM for an extended period of time, the unit ceases operation and the corresponding error code is displayed on the indoor unit.

6.3.4 Inverter Module Protection

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

6.3.5 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 the louver is in place.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold wind function.

6.3.6 Compressor Preheating

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

6 .3.7 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 is malfunctioning, the air conditioner ceases operation.

6.4 Operation Modes and Functions

6.4.1 Fan Mode

1. Outdoor fan and compressor stop.
2. Temperature setting function is disabled and indoor room temperature is displayed.
3. Indoor fan can be set to 1%~100%, or auto.
4. The louver operates same as in cooling mode.
5. Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 75ºF (Tsc = 75ºF) /24℃.(Tsc =24℃).

6.4.2 Cooling Mode

6.4.2.1 Compressor Running Rules

Reach the configured temperature:

1. When the compressor runs continuously for within 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
   - Calculated frequency(fb) is less than minimum limit frequency (FminC).
     - Compressor runs at FminC more than 10 minutes.
     - T1 is lower than or equal to Tsc-CDIFTEMP-0.5℃).

CDIFTEMP is EEPROM setting parameter. It is 35.6℉ (2℃) usually.

2. When the compressor runs continuously for more than 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
     - Calculated frequency(fb) is less than minimum limit frequency(FminC).
     - Compressor runs at FminC more than 10 minutes.
     - T1 is lower than or equal to (Tsc-CDIFTEMP).

CDIFTEMP is EEPROM setting parameter. It is 35.6℉ (2℃) usually.

3. If one of the following conditions is satisfied, not judge protective time.
   - Compressor running frequency(fr) is more than test frequency (TestFre).
   - Compressor running frequency is equal to test frequency, T4 is more than 59℉ (15℃) or T4 fault.
   - Change setting temperature.
   - Turbo or sleep function on/off.
   - Various frequency limit shutdown occurs.

6.4.2.2 Outdoor Fan Running Rules

The outdoor unit will run at different fan speeds according to T4 and compressor running frequency. For different outdoor units, the fan speeds are different.

6.4.2.3 Indoor Fan Running Rules

1. In cooling mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or auto.
2. Auto fan

For DC fan motor units:

- Descent curve
  - When T1-Tsc is lower than or equal to 38.3 5℉ (3.5℃), fan speed reduces to 80%;
  - When T1-Tsc is lower than or equal to 33.8℉ (1℃), fan speed reduces to 60%;
  - When T1-Tsc is lower than or equal to 32.9℉ (0.5℃), fan speed reduces to 40%;
  - When T1-Tsc is lower than or equal to 32℉ (0℃), fan speed reduces to 20%;
  - When T1-Tsc is lower than or equal to 31.1℉ (-0.5℃), fan speed reduces to 1%.
- Rise curve
  - When T1-Tsc is higher than 32℉ (0℃), fan speed increases to 20%;
  - When T1-Tsc is higher than 32.9℉ (0.5℃), fan speed increases to 40%;
  - When T1-Tsc is higher than 33.8℉ (1℃), fan speed increases to 60%;
  - When T1-Tsc is higher than 34.7℉ (1.5℃), fan speed increases to 80%;
  - When T1-Tsc is higher than 39.2℉ (4℃), fan speed increases to 100%.

6.4.2.4 Condenser Temperature Protection

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

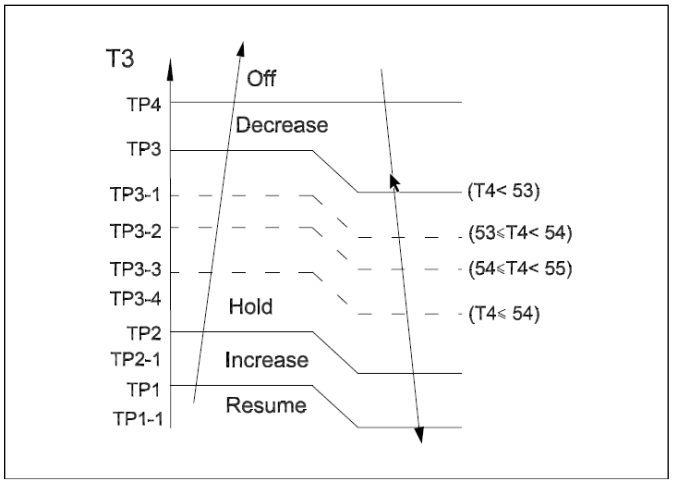


Figure 17

Legend:
TP1 = 129.2°F (54°C)
TP2 = 132.8°F (56°C)
TP3 = 140°F (60°C)
TP4 = 149°F (65°C)

6.4.2.5 Evaporator Temperature Protection

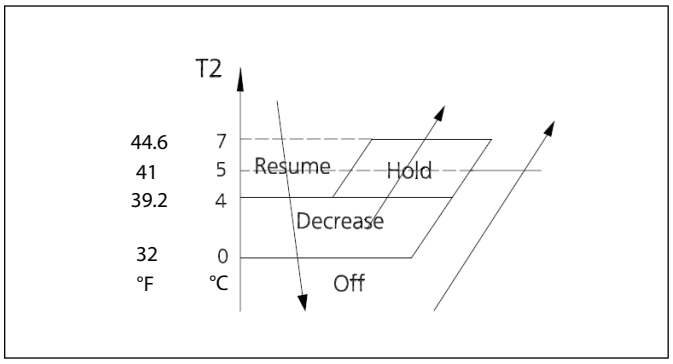


Figure 18

- Off: Compressor stops.
- Decrease: Decrease the running frequency to the lower level per 1 minute.
- Hold: Keep the current frequency.
- Resume: No limitation for frequency.

6.4.3 Heating Mode

6.4.3.1 Compressor Operation

1. Reach the configured temperature.

- If the following conditions are satisfied, the compressor ceases operation.
  - Calculated frequency(fb) is less than minimum limit frequency(FminH).
  - Compressor runs at FminH more than 10 minutes.
  - T1 is higher than or equal to Tsc+ HDIFTEMP2.

HDIFTEMP2 is EEPROM setting parameter. It is 35.6°F (2°C) usually.

- If one of the following conditions is satisfied, not judge protective time.
  - Compressor running frequency(fr) is more than test frequency(TestFre).
  - When compressor running frequency is equal to test frequency, T4 is more than 59°F (15°C) or T4 fault.
  - Change setting temperature.
  - Turbo or sleep function on/off.

2. When the current is higher than the predefined safe value, surge protection is activated, causing the compressor to cease operations.

6.4.3.2 Outdoor Fan Operation

The outdoor unit will be run at different fan speed according to T4 and compressor running frequency.

For different outdoor units, the fan speeds are different.

6.4.3.3 Indoor Fan Operation

1. In heating mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or mute. The anti-cold wind function has the priority.

- Anti-cold function : The indoor fan is controlled by the indoor temperature T1 and indoor unit coil temperature T2.

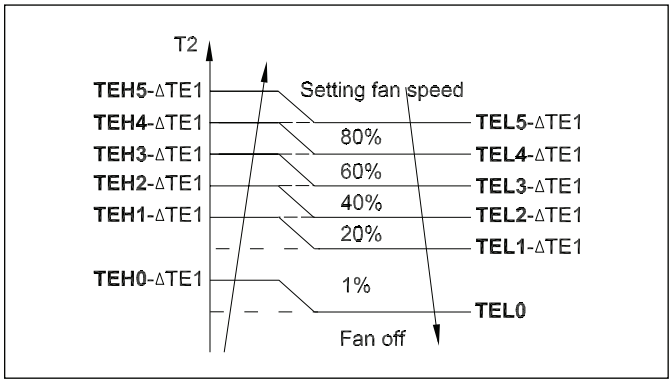


Figure 19

Legend:
TEH0= 77°F (25°C) , *TEH1= 89.6*°F (32°C), *TEH2= 91.4*°F (33°C),

TEH3=34C, TEH4=35C, TEH5=36C

Indoor Room Temp. Condition	Indoor Fan Speed
T1 ≥ 66.2℉ (19℃)	ΔTE1=0
59℉ (15℃) ≤ T1 ≤ 66.2℉ (19℃)	ΔTE1=66.2℉ -T1 (19℃-T1)
T1< 59℉ (15℃)	ΔTE1= 39.2 ℉ (4℃)

Table 12

2. Auto fan

For DC fan motor units:

- Rise curve
  - When T1-Tsc is higher than 29.3℉ (-1.5℃), fan speed reduces to 80%;
  - When T1-Tsc is higher than 32℉ (0℃), fan speed reduces to 60%;
  - When T1-Tsc is higher than 32.9℉ (0.5℃) , fan speed reduces to 40%;
  - When T1-Tsc is higher than 33.8℉ (1℃), fan speed reduces to 20%.
- Descent curve
  - When T1-Tsc is lower than or equal to 32.9℉ (0.5℃), fan speed increases to 40%;
  - When T1-Tsc is lower than or equal to 32℉ (0℃), fan speed increases to 60%;
  - When T1-Tsc is lower than or equal to 29.3℉ (-1.5℃), fan speed increases to 80%;
  - When T1-Tsc is lower than or equal to 26.6℉ (-3℃), fan speed increases to 100%.

6.4.4 Defrost Mode

System will enter the defrost mode according to the value of T3, T4 and also the compressor running time.

During the defrost mode, the compressor will run, indoor and outdoor fan motor will stop and defrost indicator lamp of the indoor unit will be lighted

"dF" will be displayed.

If any one of the following items is satisfied, the defrost cycle will finish and the system will turn to normal heating mode.

- T3 rises to be higher than TCDE 33.8℉ (1℃).
- T3 keeps to be higher than TCDE 35.6℉ (2℃) for 80 seconds.
- The machine has run for 15 minutes in defrosting mode.

If T4 is lower than or equal to -7.6℉ (-22℃) and compressor running time is more than TIMING_DEFROST_TIME, if any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:

- Unit runs for 10 minutes consecutively in defrosting mode.
- T3 rises above 50℉ (10℃).

For some models:

- If T3 is lower than 37.4℉ (3℃) and compressor running time is more than 120 minutes, at this time, if T3 is lower than TCDI1+ 39.2℉ (4℃) for 3 minutes, the unit enters defrosting mode.

For some models:

- If any one of the following conditions is satisfied, the unit enters defrosting mode:
  - If T3 or T4 is lower than 26.6℉ (-3℃) for 30 seconds, Ts-T1 is lower than 41℉ (5℃) and compressor running time is more than EE_TIME_DEFROST7.
  - If T3 or T4 is lower than 26.6℉ (-3℃) for 30 seconds and compressor running time is more than EE_TIME_DEFROST7+30.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - T3 rises above TCDE1+ 39.2℉ (4℃). (TCDE1= 53.6℉ (12℃)).
  - T3 maintained above TCDE2+39.2℉ (4℃) for 80 seconds. (TCDE2=2C)
  - Unit runs for 15 minutes consecutively in defrosting mode.

6.4.4.1 Evaporator Coil Temperature Protection

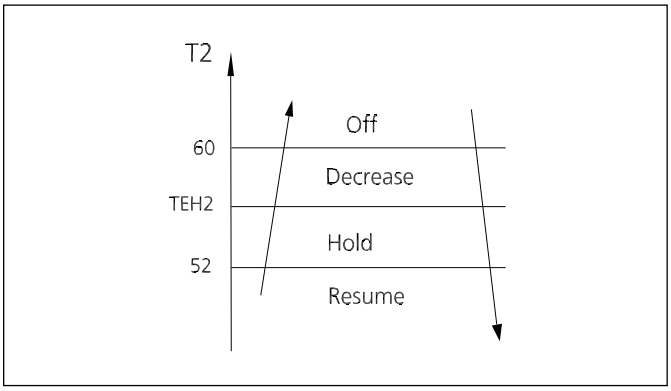


Figure 20

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.

6.4.5 Auto-Mode

This mode can be chosen with the remote controller and the setting temperature can be changed between 61℉~86℉ (16℃~30℃).

In auto mode, the machine will choose cooling, heating or fan-only mode according to T1, Ts, T4 and relative humidity.

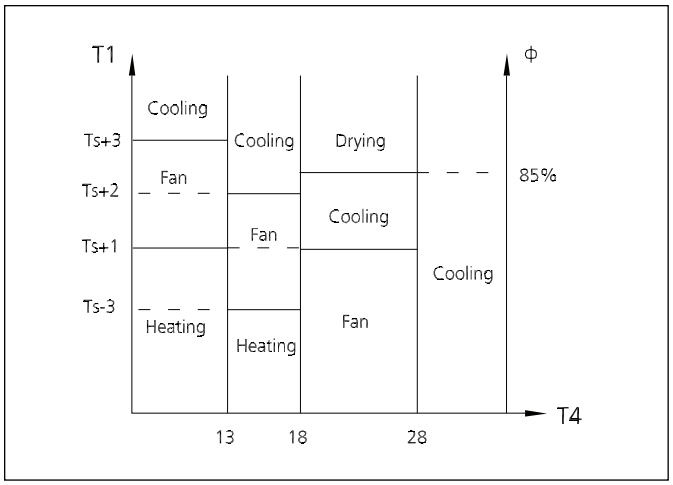


Figure 21

If the setting temperature is modified, the machine selects a new running function.

6.4.6 Dry Mode

- In dry mode, AC operates the same as auto fan in cooling mode.
- All protections are activated and operate the same as they do that in cooling mode.
- Low Room Temperature Protection.

If the room temperature is lower than 50℉ (10℃), the compressor ceases operations and does not resume until room temperature exceeds 53.6℉ (12℃).

6.4.7 Forced Operation Function

- Forced cooling mode: The compressor and outdoor fan continue to run (fixed at rated frequency), and the indoor fan runs at rated speed. After running for 30 minutes, the AC will switch to auto mode with a preset temperature of 76℉ (24℃).
- Forced auto mode: Forced auto mode operates the same as normal auto mode with a preset temperature of 76℉ (24℃).

  When AC receives signals, such as switch on, switch off, timer on, timer off, mode setting, temperature setting, fan speed setting, sleeping mode setting, follow me setting, it will quit the forced operation.
- Forced defrosting mode: Press AUTO/COOL button continuously for 5s under forced cooling mode to enter this mode. Indoor fan will stop, defrosting lamp will light on. Quit this mode and turn off the unit when: either quit normal defrosting, turn off by RC or Press AUTO/COOL button continuously for 5s again.

6.4.8 Timer Function

- Timing range is 24 hours.
- Timer on. The machine will turn on automatically when reaching the setting time.
- Timer off. The machine will turn off automatically when reaching the setting time.
- Timer on/off. The machine will turn on automatically when reaching the setting “on” time, and then turn off automatically when reaching the setting “off” time.
- Timer off/on. The machine will turn off automatically when reaching the setting “off” time, and then turn on automatically when reaching the setting “on” time.
- The timer function will not change the system operation mode.
- The setting time is relative time.
- The system will quit the timer function when it has malfunction.

6.4.9 Sleep Function

- The sleep function is available in cooling, heating or auto mode.
- Operation process in sleep mode is as follows:

  When cooling, the setting temperature rises 33.8℉ (1℃) (be lower than 86℉ (30℃) every one hour, 2 hours later the setting temperature stops rising and the indoor fan is fixed at low speed.

  When heating, the setting temperature decreases 33.8℉ (1℃) (be higher than 62.6℉ (17℃)) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed at low speed. (Anti-cold wind function has the priority).
- Operation time in sleep mode is 8 hours. After 8 hours, after which, the unit exits this mode.
- Timer setting is available.

6.4.10 Auto-Restart Function

The indoor unit has an auto-restart module that allows the unit to restart automatically. The module automatically stores the current settings and, in the case of a sudden power failure, will restore those setting automatically within 3 minutes after power returns.

If there is a power failure while the unit is running, the compressor starts 3 minutes after the unit restarts. If the unit was already off before the power failure, the unit stands by.

6.4.11 Refrigerant Leakage Detection

The indoor unit will automatically display "EL0C" when it detects refrigerant leakage.

6.4.12 Louver Position Memory Function

When turning on your unit, the louver will automatically resume its former angle.

6.4.13 46.4°F (8°C) Heating (Optional)

In heating mode, the temperature can be set to as low as 46.4°F (8°C), preventing the indoor area from freezing if unoccupied during severe cold weather.

6.4.14 Active Clean Function

The Active Clean Technology washes away dust, mold, and grease that may cause odors when it adheres to the heat exchanger by automatically freezing and then rapidly thawing the frost. The internal wind wheel then keeps operating to blow-dry the evaporator, thus preventing the growth of mold and keeping the inside clean.

When this function is turned on, the indoor unit display window appears “CL”, after 20 to 130 minutes, the unit will turn off automatically and cancel Active Clean function.

6.4.15 Follow Me (Optional)

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

6.4.16 Silence Operation (Optional)

Press “Silence” on the remote control to enable the SILENCE function. While this function is active, the indoor unit will run at faint breeze (1% fan speed), which reduces noise to the lowest possible level.

6.4.17 ECO Intelligent (Single Zone Only)

Used to enter the energy efficient mode.

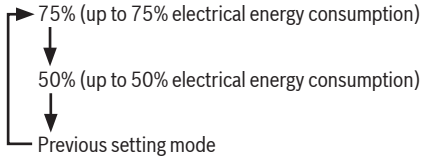
- Under cooling mode, press ECO button, the remote controller will adjust the temperature automatically to 75.2°F/24°C, fan speed of Auto to save energy (but only if the set temperature is less than 75.2°F/24°C). If the set temperature is more than 75.2°F/24°C and 86°F/30°C, press the ECO button, the 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 76°F/24°C it will quit the ECO operation.
- Operation time in ECO mode is 8 hours. After 8 hours the AC quits this mode.
- When there’s any one temperature sensor in malfunction, the AC will quit ECO mode .
- Indoor fan will run at auto fan when enter into the ECO mode. The setting temperature and setting fan speed can be changed through remote controller signal.

6.4.18 Humidity Control (Single Zone Only)

The unit is able to increase the comfortable level by lowering humidity in your home. The unit offers a better temperature and humidity control solution in the dry mode, the room temperature can be maintained accurately as set temperature while the moisture is being removed.

6.4.19 Electrical Energy Consumption Control Function (Optional)

Press the “Gear” button on remote controller to enter the energy efficient mode in a sequence of following:



Turn off the unit or activate ECO, sleep, Super cool, 8°C Heating, Silence or self clean function will quit this function.

6.4.20 Breeze Away Function (Optional)

This feature avoids direct airflow on the user by directing airflow to other areas of the space.

This feature is available under cooling mode, fan-only mode and drying mode.

6.4.21 Wireless Control (Optional)

Wireless control allows you to control your air conditioner using your mobile phone and a wireless connection.

For the USB device access, replacement, maintenance operations must be carried out by professional staff.

6.4.22 Point Check Function (Engineering Troubleshooting Mode)

To enter engineer mode, in power-on or standby mode, and in non-locked state, press the key combination “ON/OFF + Air Speed” for 7seconds.

After entering the engineer mode, the remote control will display icons of “Auto, Cool, Dry, Heat”, and the Battery icon; at the same time, it will also display the numeric code of the current engineer mode (for the initial engineer mode, the numeric code displayed is 0), and all other icons are inactive.

In engineer mode, the value of the current numeric code can be adjusted circularly through the Up/Down key, with the setting range of 0 to 30.

Code	Query Content	Additional Notes
0	Error Code	Refer to error code list
1	Room Temperature	T1 temperature
2	Indoor coil temperature	T2 temperature
3	Outdoor coil temperature	T3 temperature
4	Ambient temperature	T4 temperature
5	Discharge temperature	TP temperature
6	Compressor Target Frequency FT	Targeted Frequency
7	Compressor Running Frequency Fr	Actual Frequency
8	Unit Current dL	N/A
9	Outdoor AC Voltage Uo	N/A
10	Current indoor capacity test state Sn	N/A
11	Reserve	
12	Set Speed Pr of the outdoor fan	Outdoor fan speed=value*8
13	Opening Lr of EEV	EXV opening angle-value*8
14	Actual Running Speed ir of the indoor fan	Indoor fan speed=value*8
15	Indoor Humidity Hu	N/A
16	Set Temperature TT after compensation	N/A
17	Reserve	N/A
18	Reserve	WIFI signal strength
19	DC bus voltage AD value	N/A
20	Indoor Target Frequency oT	N/A
21	Reserve	
22		
23		
24		
25		
26		
27		
28		
29		
30		

Table 13

Exit of engineer mode:

1. In engineer mode, press the key combination of “On/Off + Air speed” for 2s;
2. The engineer mode will be exited if there are no valid key operations for continuous 60s.

When the AC enter into information enquiry status, it will display code value in next 25s, the details are as follows:

Enquiry information	Display value	Meaning	Remark
T1, T2, T3, T4, T2B, TP, TH, Targeted Frequency, Actual Frequency	-1F,-1E,-1d,-1c,- 1b,-1A	-25,-24,-23,-22,-21,-2, 0	All the displaying temperature is actual value. All the temperature is °C no matter what kind of remote controller is used. T1, T2, T3, T4, T2B display range:-25~70, TP display range:-20~130. Frequency display range: 0~159HZ. If the actual value exceeds the range, it will display the maximum value or minimum value.
	-19—99	-19—99	
	A0, A1,...A9	100,101,...109	
	b0, b1,...b9	110,111,...119	
	c0, c1,...c9	120,121,...129	
	d0, d1,...d9	130,131,...139	
	E0, E1,...E9	140,141,...149	
	F0, F1,...F9	150,151,...159	
Indoor fan speed /Outdoor fan speed	0	OFF	
	1,2,3,4	Low speed, Medium speed, High speed, Turbo	For some big capacity motors.
	14-FF	Actual fan speed=Display value turns to decimal value and then multiply 10. The unit is RPM.	For some small capacity motors, display value is from 14-FF(hexadecimal), the corresponding fan speed range is from 200-2550RPM.
EXV opening angle	0-FF	Actual EXV opening value=Display value turns to decimal value and then multiply 2.	The min opening angle for the EXV is 0. The max opening angle for EXV are different for different models.
Compressor continuous running time	0-FF	0-255 minutes	If the actual value exceeds the range, it will display the maximum value or minimum value.
Causes of compressor stop	0-99	For detailed meaning please consult with manufacturer	Decimal display
Reserve	0-FF		

Table 14

0 - FF is a hexidecimal display value. Not OFF.

7 Troubleshooting

Safety

WARNING

Electrical Hazard!

Electricity power is still kept in capacitors even if the power supply is shut off. Do not forget to discharge the electricity power in capacitor before servicing the system.

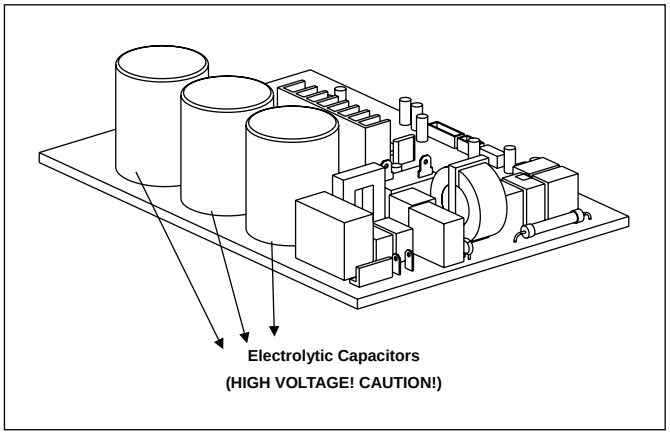


Figure 22

For other models, please connect discharge resistance (approx.100Ω 40W between +, - terminals of the electrolytic capacitor on the opposite side of the outdoor PCB. A screwdriver will also work as a resistive element.

For reference the most common error codes are E1, P0, and P3.

7.1 Error Codes - Wall Mounted Indoor Unit

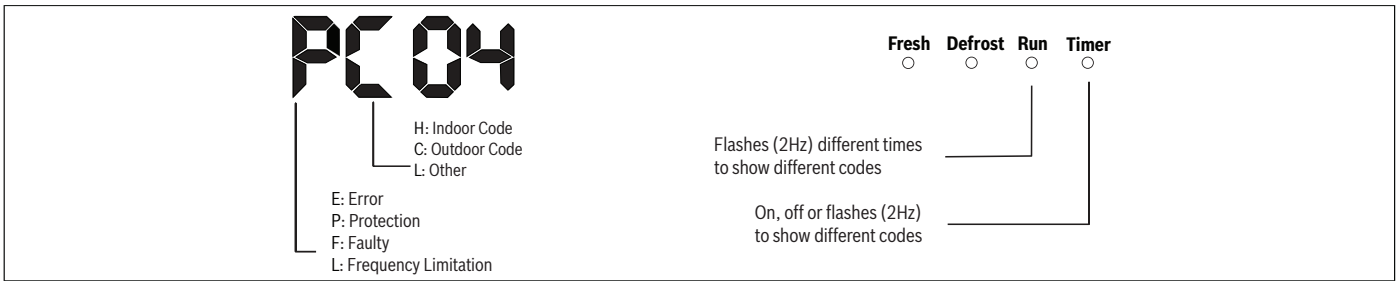


Figure 23

Display	Error Information
EH 00/EH 0A	Indoor unit EEPROM parameter error
EL 01	Indoor / outdoor unit communication error
EH 03	The indoor fan speed is operating outside of the normal range
EH 30	Over low voltage protection of indoor external fan
EH 35	Phase failure of indoor external fan
EH 36	Indoor external fan current sampling bias fault
EH 37	Indoor external fan zero speed failure
EH 38	Indoor external fan stall failure
EH 39	Out of step failure of indoor external fan
EH 60	Indoor room temperature sensor T1 is in open circuit or has short circuited
EH 61	Evaporator coil temperature sensor T2 is in open circuit or has short circuited
EH 0b	Indoor PCB/Display board communication error
EH 3b	Indoor external fan DC bus voltage is too high fault
EH 3E	Indoor external fan overcurrent fault
EH 3F	Indoor external fan module protection/hardware overcurrent protection
EC 51	Outdoor unit EEPROM parameter error
EC 52	Condenser coil temperature sensor T3 is in open circuit or has short circuited
EC 53	Outdoor room temperature sensor T4 is in open circuit or has short circuited
EC 54	Compressor discharge temperature sensor TP is in open circuit or has short circuited
EC 55	ODU IPM module temperature sensor (TH) error
EC 07	The outdoor fan speed is operating outside of the normal range
EC 0d	Outdoor unit malfunction
EC 71	Outdoor external fan overcurrent fault
EC 72	Outdoor external fan phase failure
EC 73	Zero speed failure of outdoor unit DC fan
EC 74	Outdoor external fan current sampling bias fault
EC 75	Outdoor external fan module protection/hardware overcurrent protection
EL 0C	Refrigerant leak detected
PC 00	ODU IPM module protection
PC 0A	Condenser high temperature protection
PC 0F	PFC module malfunction
PC 0L	Outdoor low temperature protection
PC 02	Compressor top high temperature protection (OLP)
PC 03	Pressure protection
PC 06	Compressor discharge temperature protection
PC 08	Outdoor current protection

If you see an error code not displayed in Table 15, contact the manufacturer as the error displayed is for development purpose only.

Display	Error Information
PC 10	Over low voltage protection
PC 11	Over voltage protection
PC 12	DC voltage protection
PC 30	System overpressure protection
PC 31	System pressure is too low protection
PC 40	Communication error between outdoor main chip and compressor driven chip
PC 41	Compressor current sampling circuit failure
PC 42	Compressor start error
PC 43	Lack of phase (3 phase) protection
PC 44	No speed protection
PC 45	ODU IR chip drive failure
PC 46	Compressor speed malfunction
PC 49	Compressor over current failure
--	Indoor units mode conflict(match with multi outdoor unit)
PH 0C	Indoor unit humidity sensor malfunction
PH 09	Anti-cold air in heating mode
PH 90	Evaporator coil temperature over high protection
PH 91	Evaporator coil temperature over low Protection
LC 01	Frequency limit caused by T3
LC 02	Frequency limit caused by TP
LC 03	Frequency limit caused by current
LC 05	Frequency limit caused by voltage
LC 06	IPM module temperature frequency limited
LC 30	High pressure frequency limited
LC 31	Low pressure frequency limited
LH 00	Evaporator temperature frequency limited (L0)
LH 30	Indoor external fan current frequency limited
LH 31	Indoor external fan voltage frequency limited
LH 07	Frequency limit caused by remote controller
nA	No malfuction or protection

Table 15

If you see an error code not displayed in Table 15, contact the manufacturer as the error displayed is for development purpose only.

7.2 Quick Check by Error Code

If you do not have the time to test which specific parts are faulty, you can directly change the required parts according the error code. You can find the parts to replace by error code in the following table.

The table below is applicable for Single Zone system only. For detailed troubleshooting guide, please refer to Diagnosis and Solution section.

Part requiring replacement	Error Code									
	EH 00/ EH 0A	EL 01	EH 02	EH 03	EH 60	EH 61	EH 0b	EL 0C	EC 56	FH CC
Indoor PCB	●	●	●	●	●	●	●	●		●
Outdoor PCB		●							●	
Display board							●			
Indoor fan motor				●						
T1 sensor					●					
T2 Sensor						●		●		
T2B Sensor									●	
Refrigerant Sensor										●
Reactor		●								
Compressor										●
Additional refrigerant								●		

Part requiring replacement	Error Code									
	EC 53	EC 52	EC 54	EC 51	EC 07	PC 00	PC 01	PC 02	PC 03	PC 04
Outdoor PCB	●	●	●	●	●	●	●	●	●	●
Indoor fan motor										
Outdoor fan motor					●	●		●		●
T3 Sensor		●								
T4 Sensor	●									
TP Sensor			●							
Reactor							●			
Compressor						●				●
IPM module board						●	●	●		●
High pressure protector								●		
Low pressure protector									●	
Additional refrigerant									●	

Table 16

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

Part requiring replacement	Error Code				
	PC 06	PC 08 / 44 / 49	PC 0A	PC 0F	PC 40
Outdoor PCB	●	●	●	●	●
Outdoor fan motor		●	●		
T3 Sensor			●		
TP Sensor	●				
Pressure Sensor					
Reactor		●		●	
Compressor					
IPM module board					●
High pressure valve assy	●				
High pressure protector					
Low pressure protector					
Additional refrigerant	●		●		
Electric Control box					●

Part requiring replacement	Error Code				
	PC 41	PC 43	PC 10 / 11 / 12	PC 30	PC 31
Outdoor PCB	●	●	●	●	●
Outdoor fan motor				●	
T3 Sensor					
T4 Sensor					
TP Sensor					
Pressure Sensor					
Reactor			●		
Compressor		●			
IPM module board			●		
High pressure valve assy					
High pressure protector				●	
Low pressure protector					●
Additional refrigerant					●

Table 17

7.3 ODU PCB & IPM

7.3.1 PCB: Regular 115V Single Zone 12K

BMS500-AAS012-0CSXRC

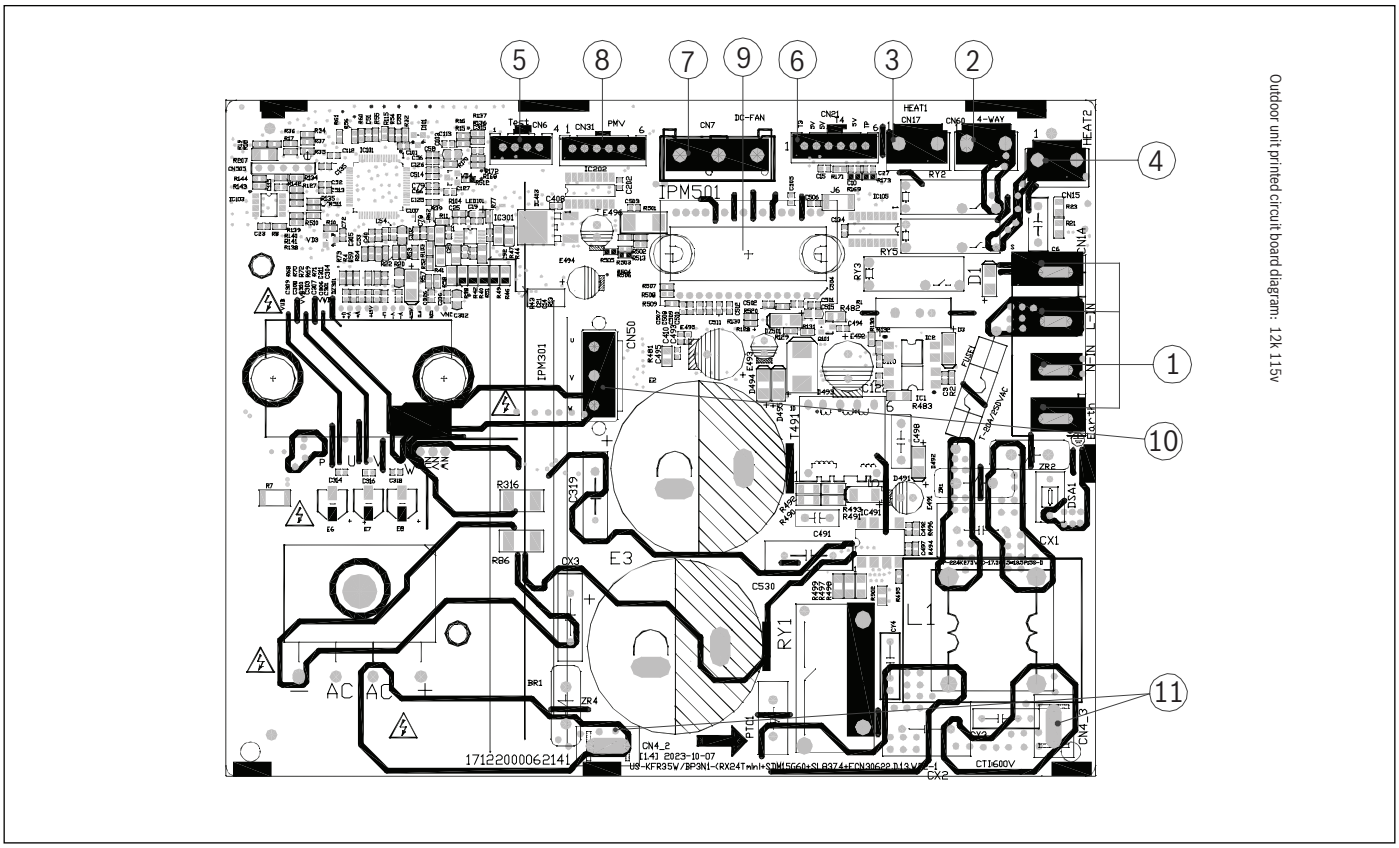


Figure 24

Number	Name	CN#	Description
1	Power Supply	CN3	Earth: connect to Ground
		CN1	N_in: connect to N-line (100-130V AC input)
		CN2	L_in: connect to L-line (100-130V AC input)
		CN16	S: connect to indoor unit communication
2	4-WAY	CN60	Connect to 4 way valve, 100-130V AC when is ON.
3	HEAT1	CN17	Connect to compressor heater, 100-130V AC when is ON
4	HEAT2	CN15	Connect to chassis heater, 100-130V AC when is ON
5	TESTPORT	CN6	Used for testing
6	TP T4 T3	CN21	Connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP
7	DC-FAN	CN7	Connect to DC fan
8	PMV	CN31	Connect to Electric Expansion Valve
9	FAN_IPM	IPM 501	IPM for DC fan
10	W	CN28	Connect to compressor
	V	CN29	0V AC (standby)
	U	CN30	10-230V AC (running)
11	CN4	CN4_2	Connect to transformer
		CN4_3	

Table 18

7.3.2 PCB: Regular and Max Performance Single Zone 9K & 12K

BMS500-AAS009-1CSXRD, BMS500-AAS009-1CSXHD, BMS500-AAS012-1CSXRD, BMS500-AAS012-1CSXHD

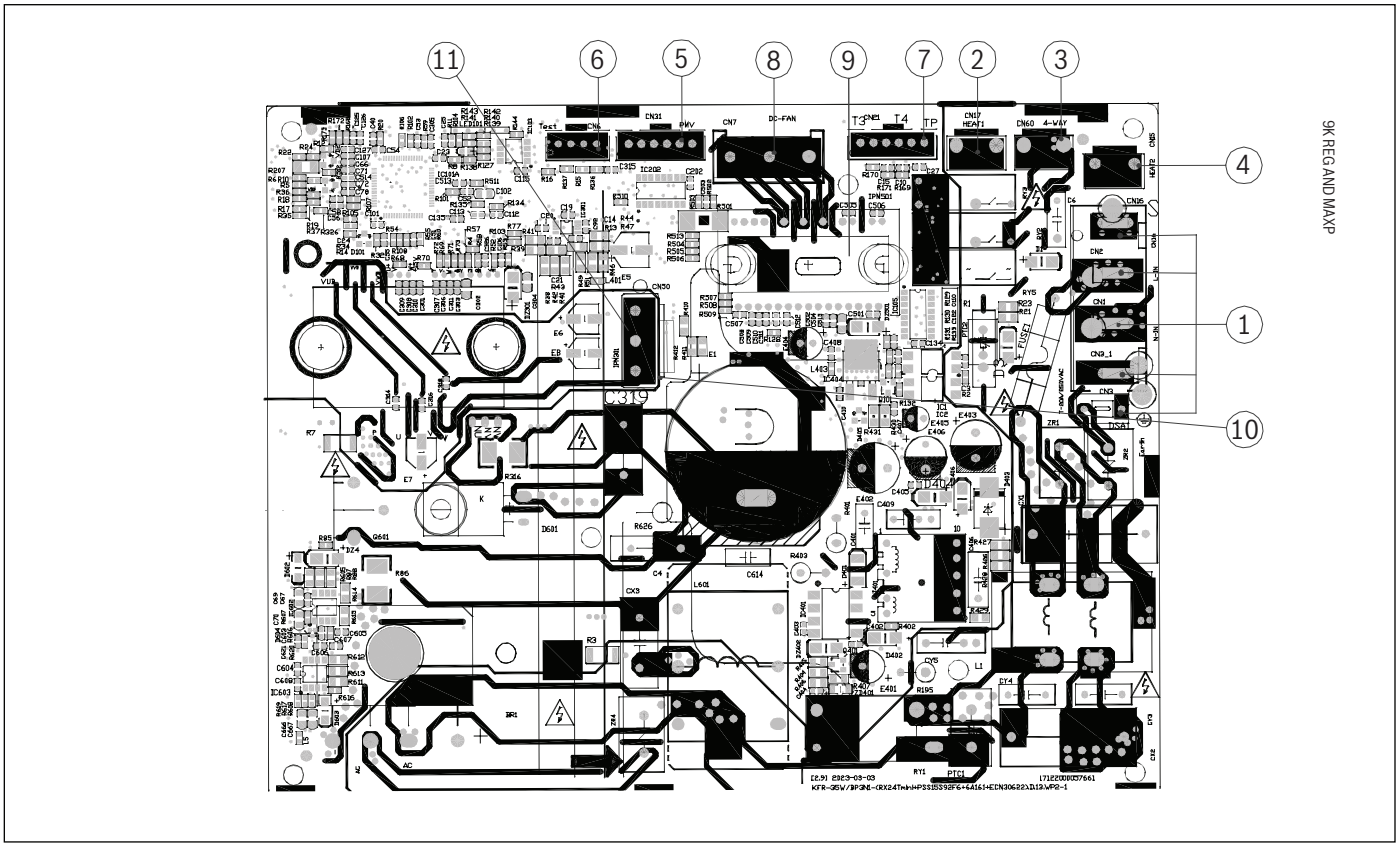


Figure 25

Number	Name	CN#	Description
1	Power Supply (CN1A)	CN3	Earth: connect to Ground
		CN1	N_in: connect to N-line (208-230V AC input)
		CN2	L_in: connect to L-line (208-230V AC input)
		CN16	S: connect to indoor unit communication
2	HEAT1	CN17	Connect to compressor heater, 208-230V AC when is ON
3	4-WAY	CN60	Connect to 4 way valve, 208-230V AC when is ON.
4	HEAT2	CN15	Connect to chassis heater, 208-230V AC when is ON
5	PMV	CN31	Connect to Electric Expansion Valve
6	TESTPORT	CN6	Used for testing
7	T5 T4 T3	CN21/CN22	Connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor T5
8	DC-FAN	CN7	Connect to DC fan
9	FAN_IPM	IPM 501	IPM for DC fan
10	W	CN28	Connect to compressor
	U	CN29	0V AC (standby)
	V	CN30	10-200V AC (running)
11	COMP_IPM	IPM 301	IPM for compressor

Table 19

7.3.3 PCB: Regular & Max Performance Single Zone 18K, Regular Single Zone 24K BMS500-AAS018-1CSXRD, BMS500-AAS018-1CSXHD, BMS500-AAS024-1CSXRD

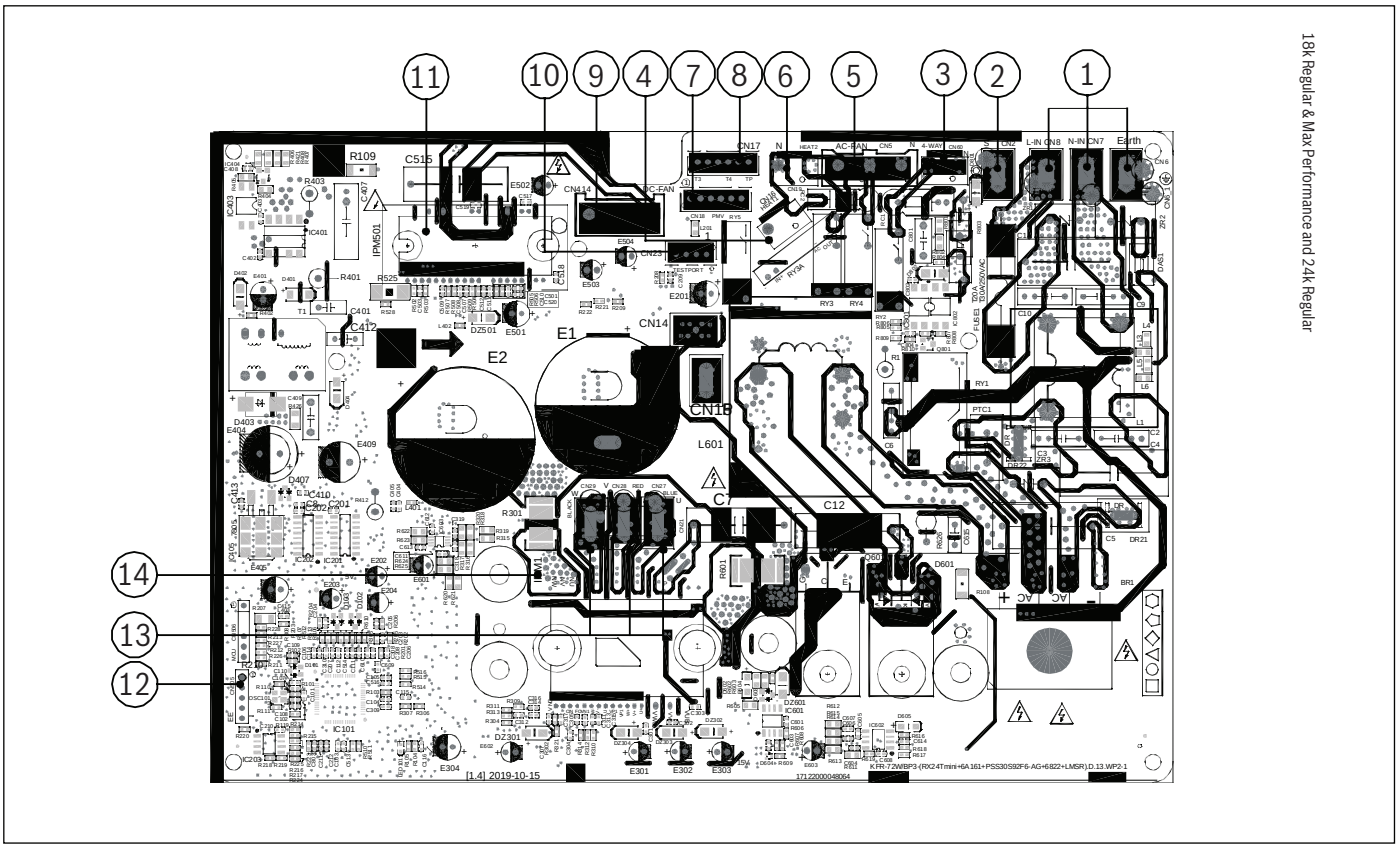


Figure 26

Number	Name	CN#	Description
1	Power Supply (CN3)	CN6	Earth: connect to Ground
		CN7	N_in: connect to N-line (208-230V AC input)
		CN8	L_in: connect to L-line (208-230V AC input)
2	S	CN2	S: connect to indoor unit communication
3	4-WAY	CN60	Connect to 4 way valve, 208-230V AC when is ON.
4	HEAT1	CN16	Connect to compressor heater, 208-230V AC when is ON
5	AC-FAN	CN5	Connect to AC fan
6	HEAT2	CN19	Connect to chassis heater, 208-230V AC when is ON
7	PMV	CN18	Connect to Electric Expansion Valve
8	TP T4 T3	CN17	Connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP
9	DC-FAN	CN414	Connect to DC fan
10	TESTPORT	CN23	Used for testing
11	FAN_IPM	IPM501	IPM for DC fan
12	EE_PORT	CN505	EEPROM programmer port
13	U	CN27	Connect to compressor
	V	CN28	0V AC (standby)
	W	CN29	200-300V AC (running)
14	COMP_IPM	IPM 301	IPM for compressor

Table 20

7.3.4 PCB: Max Performance Single Zone 24K
BMS500-AAS024-1CSXHD
7.3.5 PCB: Regular Single Zone (for Wall Mounted IDU) 30K & 36K
BMS500-AAS030-1CSXRD, BMS500-AAS036-1CSXRD

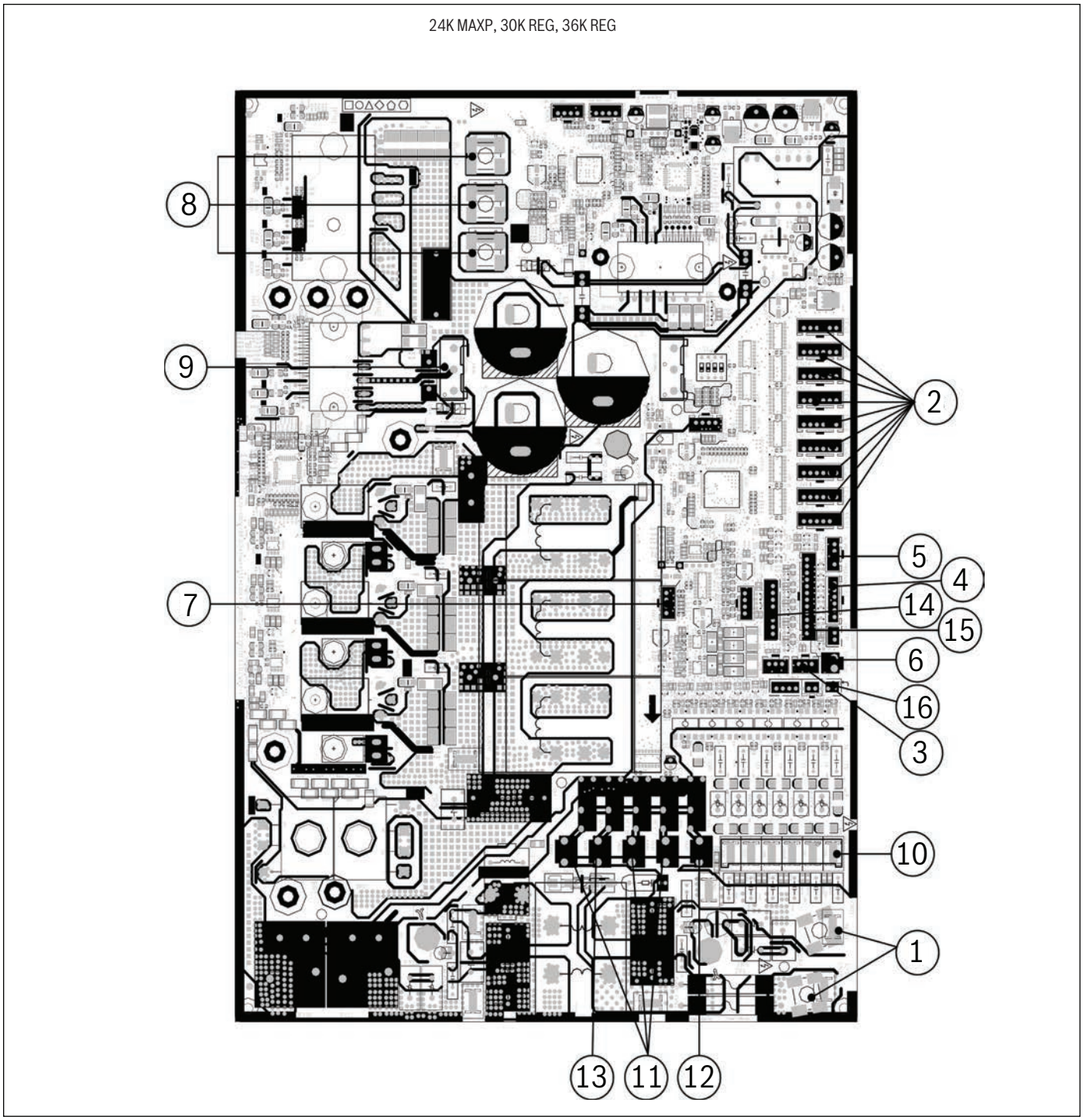


Figure 27

Number	Name	CN#	Description
1	Power Supply	CN11	N_in: connect to N-line (208-230V AC input)
		CN12	L_in: connect to L-line (208-230V AC input)
2	EEV-A	CN17	Connect to 12V electric expansion valve
	EEV-B	CN16	
	EEV-C	CN22	
	EEV-D	CN14	
	EEV-E	CN13	
	EEV-F	CN1	
	EEV1	CN53	
	EEV2	CN44	
	EEV3	CN3	
3	H_YL	CN49	Connect to high pressure sensor
4	T3 T4 TP	CN26	Connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP
5	H-PRO, L-RPO	CN29	Connect to high and low pressure swtich (pin1-pin2&pin3-pin4:5VDC pulse wave)
6	OLP TEMP. SENSOR	CN30	Connect to compressor top temp. sensor (5VDC Pulse wave)
7	TESTPORT	CN45	Used for testing
8	COMPRESSOR	U	Connect to compressor
		V	0V AC (standby)
		W	10-200V AC (running)
9	DC-FAN	CN32	Connect to DC fan
10	S-A	CN43	S: connect to indoor unit communication(pin1-pin2: 24VDC Pulse wave; pin2-pin3: 208 230V AC input)
	S-B		
	S-C		
	S-D		
	S-E		
	S-F		
11	4-WAY	CN37	Connect to 4 way valve 1, 208-230V AC when is ON
		CN25	Connect to 4 way valve 2, 208-230V AC when is ON
		CN42	Connect to 4 way valve 3, 208-230V AC when is ON
12	HEAT_D	CN24	Connect to chassis heater, 208-230V AC when is ON
13	HEAT_Y	CN38	Connect to compressor heater, 208-230V AC when is ON
14	/	CN27	Connect to key board CN1
15	T2B	CN28	Connect to evaporator coil outlet temperature sensor T2B
16	TBH-IN TBH-OUT T3B TF	CN9	Connect to cold plate inlet temperature sensor TBH-IN, cold plate outlet temperature sensor TBH-OUT, condenser coil middle temperature sensor T3B, refrigerant tube inlet temperature sensor TF

Table 21

7.4 Indoor Wiring Diagram

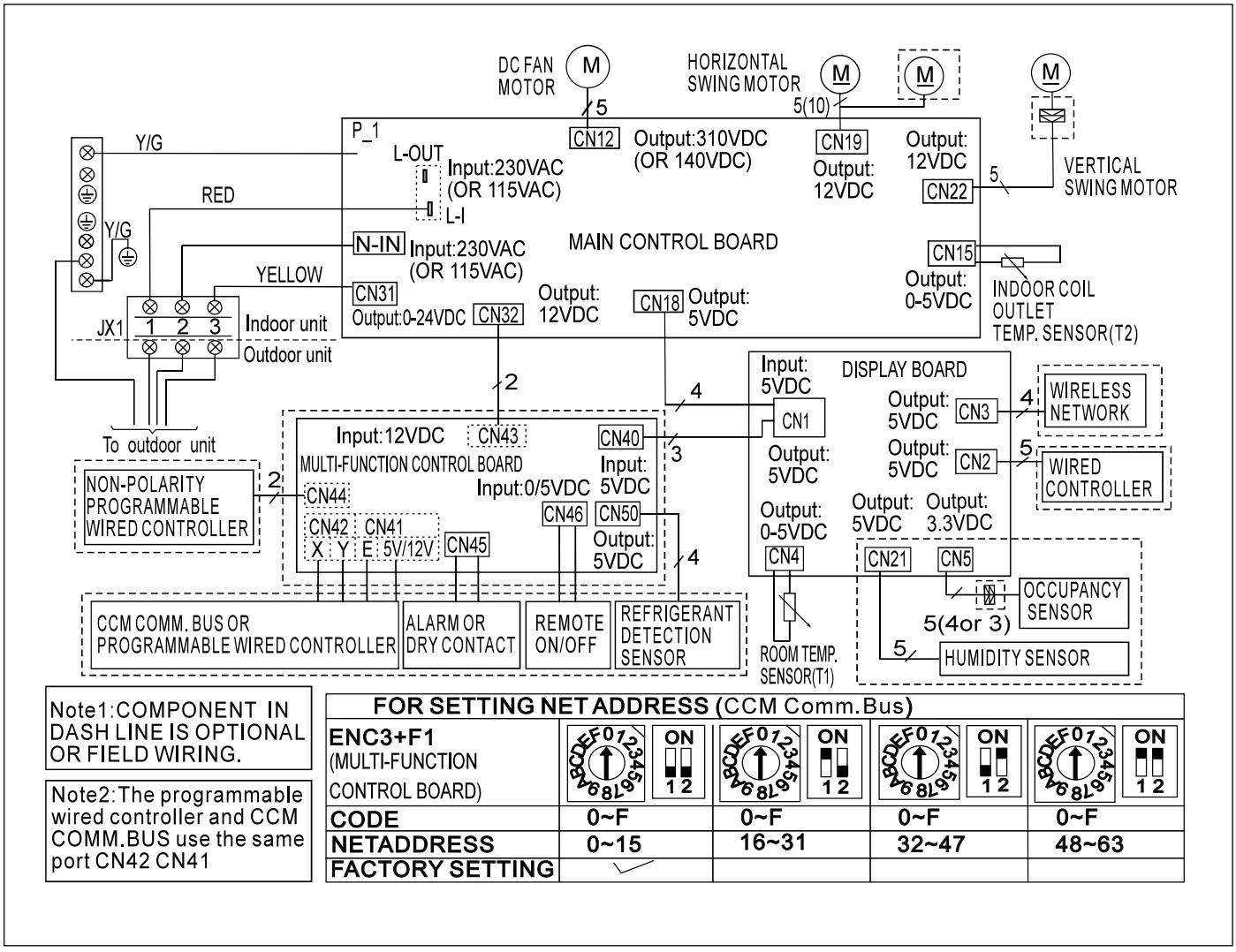


Figure 28 Indoor Wiring Diagram, Wall Mounted Unit

Indoor Unit Abbreviations	
Abbreviation	Paraphrase
Y/G	Yellow-Green Conductor
ION	Positive and Negative Ion Generator
CAP	Capacitor
PLASMA	Electronic Dust Collector
L	LIVE
N	NEUTRAL

Table 22

Outdoor Unit Abbreviations	
Abbreviation	Paraphrase
SV /4-WAY	Gas Valve Assembly/4-Way Valve
AC-FAN	Alternating Current FAN
FM1 or DC-FAN	Direct Current FAN
COMP	Compressor
COMP_TOP	Compressor OLP temperature sensor
EEV	Electronic Expansion Valve
HEAT1, HEAT2	Crankcase Heating
CT1	AC Current Detector
T3	Condenser temperature sensor
T4	Outdoor Ambient temperature sensor
TP	Exhaust temperature sensor
TF	Tube for heatsink temperature sensor
L-PRO	Low Pressure Switch
H-PRO	High Pressure Switch

Table 23

7.5 Outdoor Wiring Diagram

7.5.1 Regular Single Zone (115V 12K)

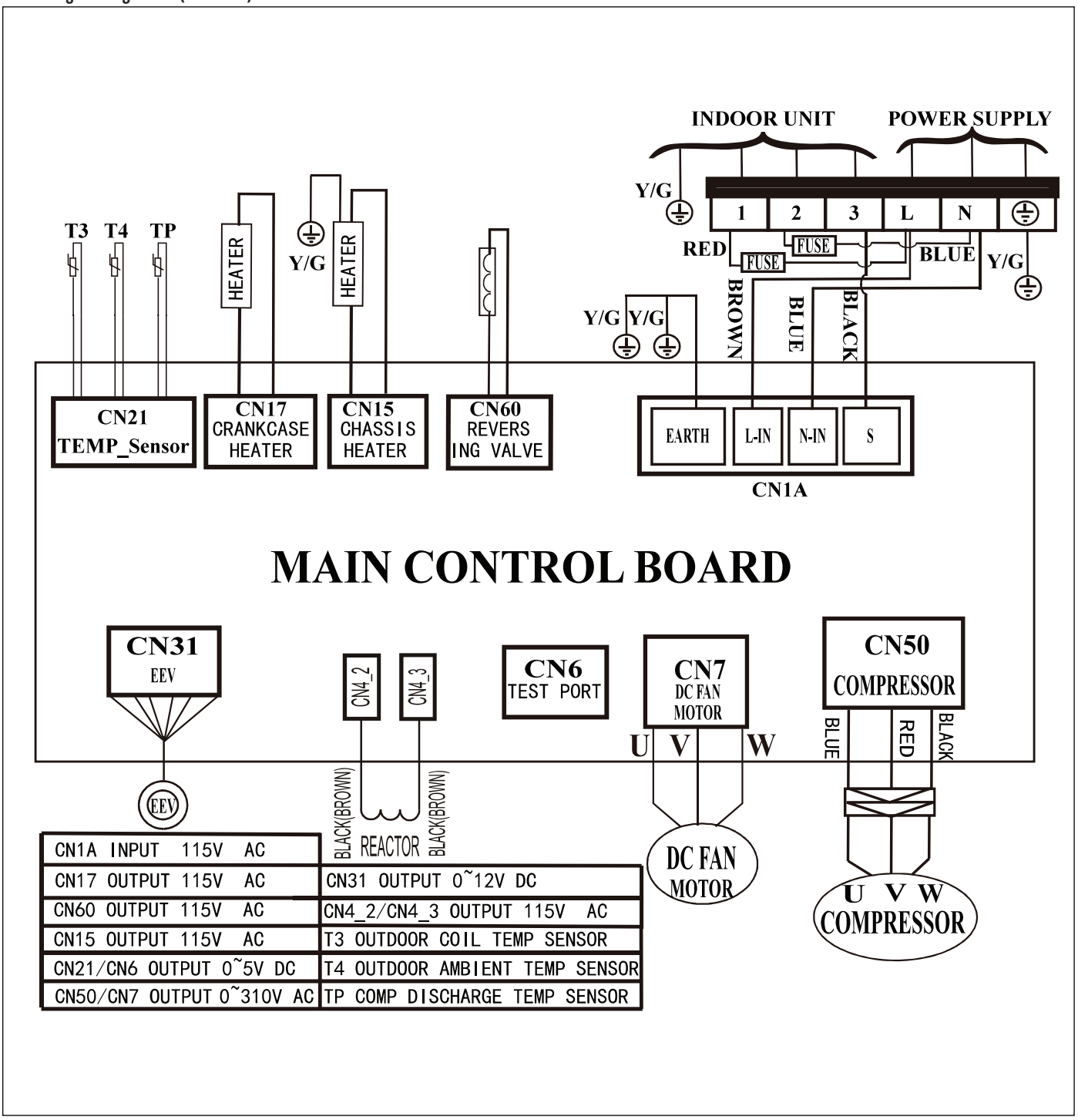


Figure 29

7.5.2 Regular & Max Performance Single Zone (9K & 12K)

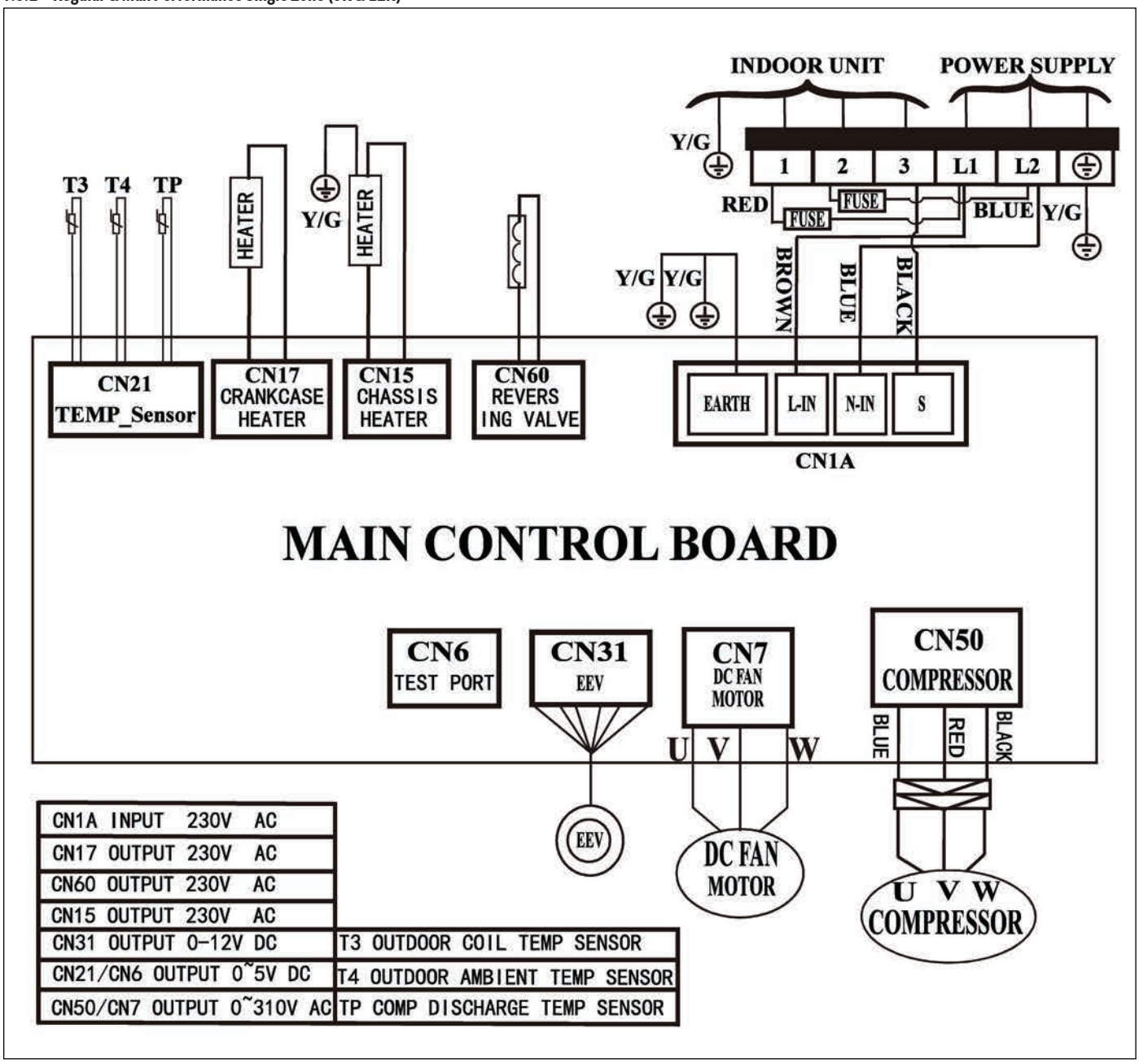


Figure 30

7.5.3 Regular Single Zone (18K & 24K) & Max Performance Single Zone (18K)

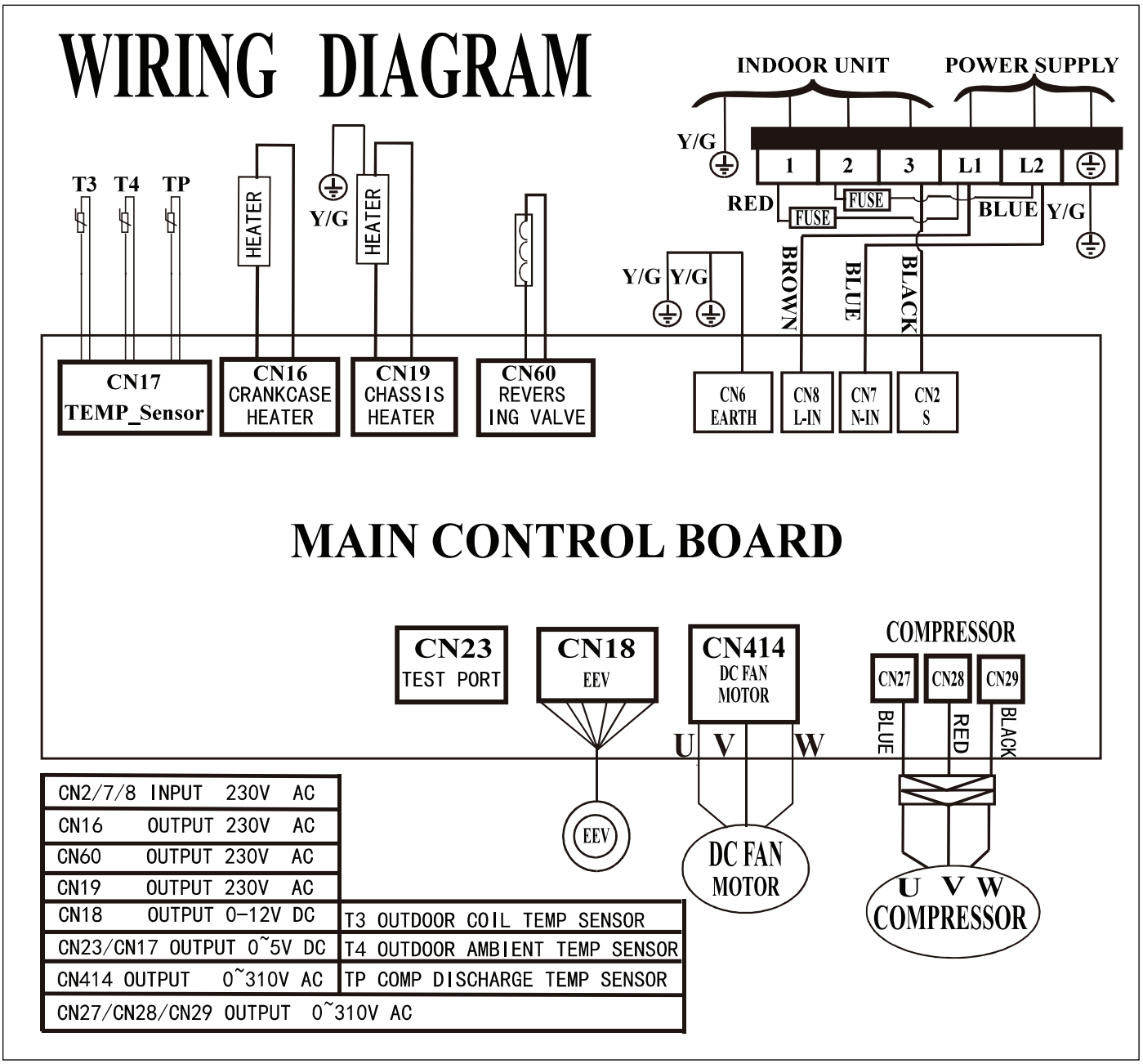
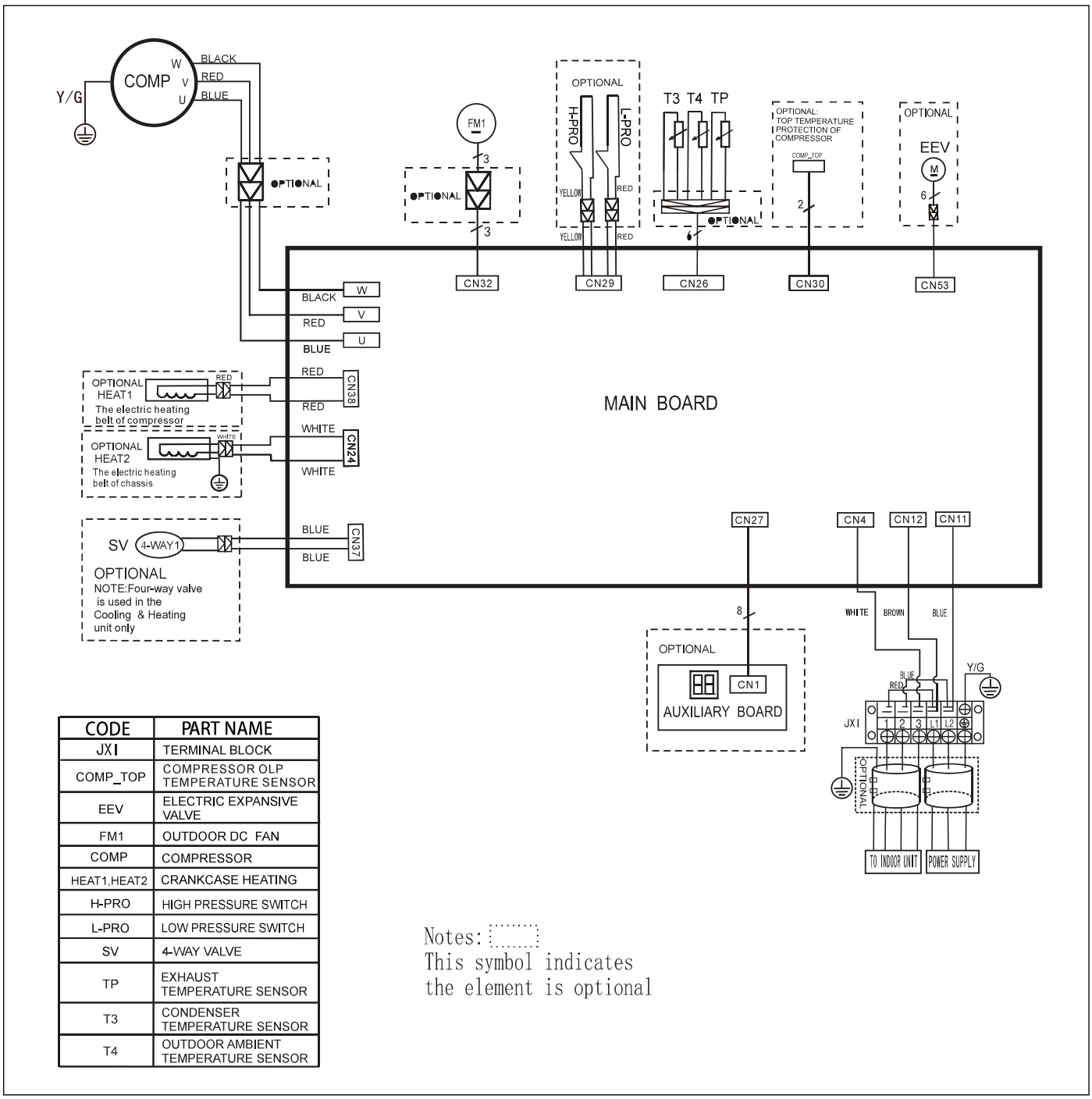


Figure 31

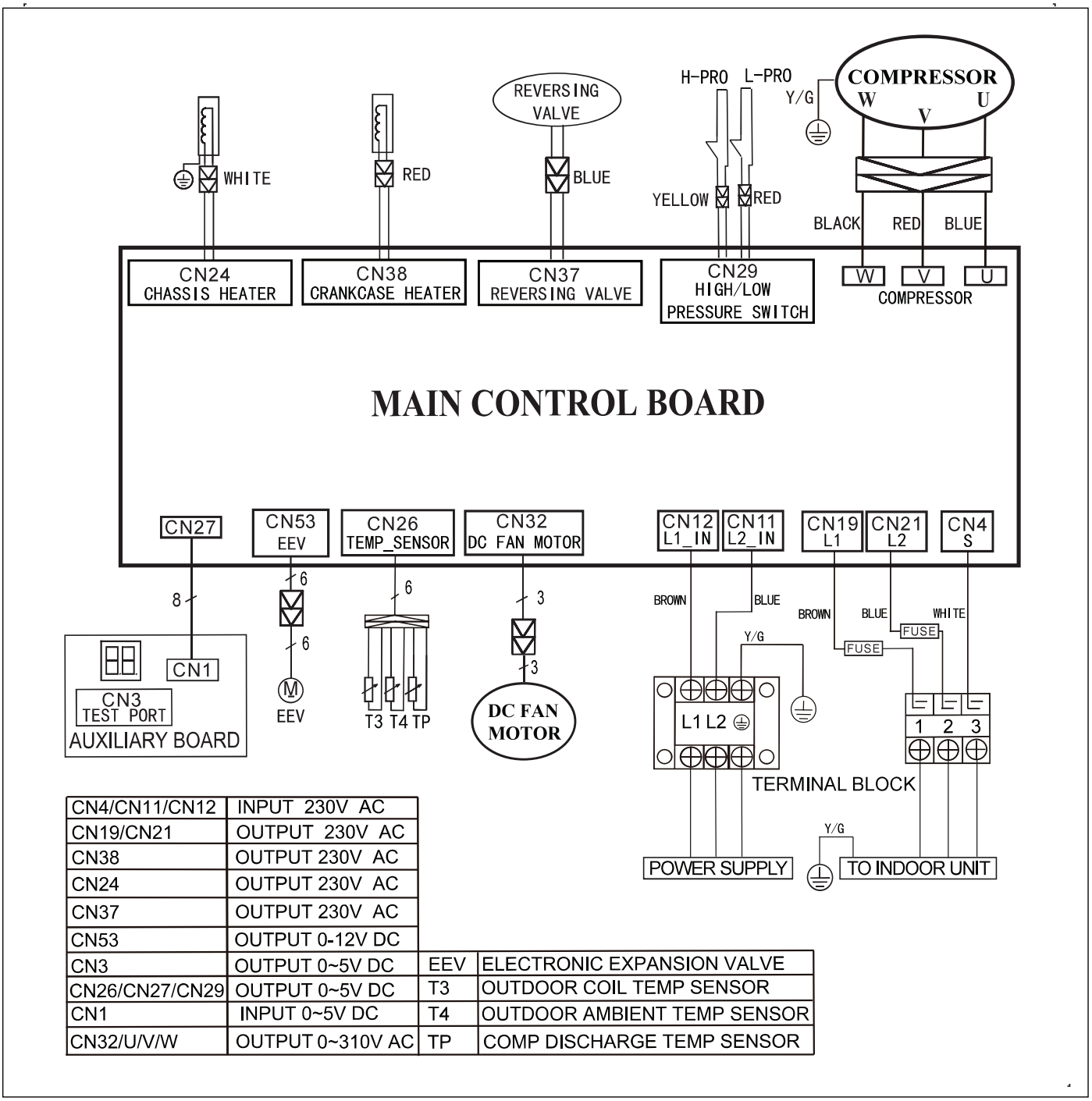
7.5.4 Max Performance Single Zone (24K)
Regular Single Zone (30K)



CODE	PART NAME
JXI	TERMINAL BLOCK
COMP_TOP	COMPRESSOR OLP TEMPERATURE SENSOR
EEV	ELECTRIC EXPANSIVE VALVE
FM1	OUTDOOR DC FAN
COMP	COMPRESSOR
HEAT1,HEAT2	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR

Figure 32

7.5.5 Regular - 36K Single Zone (Wall Mounted Only)



CN4/CN11/CN12	INPUT 230V AC		
CN19/CN21	OUTPUT 230V AC		
CN38	OUTPUT 230V AC		
CN24	OUTPUT 230V AC		
CN37	OUTPUT 230V AC		
CN53	OUTPUT 0-12V DC		
CN3	OUTPUT 0~5V DC	EEV	ELECTRONIC EXPANSION VALVE
CN26/CN27/CN29	OUTPUT 0~5V DC	T3	OUTDOOR COIL TEMP SENSOR
CN1	INPUT 0~5V DC	T4	OUTDOOR AMBIENT TEMP SENSOR
CN32/U/V/W	OUTPUT 0~310V AC	TP	COMP DISCHARGE TEMP SENSOR

Figure 33

7.6 Wall Mounted Unit (IDU & ODU) Error Code Diagnosis and Solution

Display	Information
dF	Defrost
CL	Filter cleaning reminder(power on display for 15 seconds)
CL	Active clean
nF	Filter replacement reminder(power on display for 15 seconds)
FP	Heating in room temperature under 46.4℉ (8℃)
FC	Forced cooling
AP	AP mode of WIFI connection
CP	Remote switched off
EH 00/EH 0A	Indoor unit EEPROM parameter error
EL 01	Indoor/outdoor unit communication error
EH 02	Zero-crossing signal detection error
EH 03	The indoor fan speed is operating outside of the normal range
EC 51	Outdoor unit EEPROM parameter error
EC 52	Condenser coil temperature sensor T3 is in open circuit or has short circuited
EC 53	Outdoor room temperature sensor T4 is in open circuit or has short circuited
EC 54	Compressor discharge temperature sensor TP is in open circuit or has short circuited
EC 56	Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited (Multi-zone)
EH 60	Indoor room temperature sensor T1 is in open circuit or has short circuited
EH 61	Evaporator coil middle temperature sensor T2 is in open circuit or has short circuited
EC 07	The outdoor fan speed is operating outside of the normal range
EH b0	Indoor PCB/Display board communication error
EH C1	Refrigerant sensor detects leakage
EH C2	Refrigerant sensor is out of range and leakage is detected
EH C3	Refrigerant sensor is out of range
EC C1	Other IDU refrigerant sensor detects leakage (multi-zone)
EL 0C	System lacks refrigerant
FH CC	Refrigerant sensor error
PC 00	IPM malfunction or IGBT over-strong current protection
PC 01	Over voltage or over low voltage protection
PC 02	Top temperature protection of compressor or High temperature protection of IPM module or High pressure protection
PC 03	Pressure protection (low or high pressure)
PC 04	Inverter compressor drive error
PC 0L	Low ambient temperature protection
--	Indoor units mode conflict(match with multi outdoor unit)

Table 24

7.6.1 Information Inquiry & Setting

- To enter engineer mode, in power on or standby mode, and in non locked state, press the key combination “ON/OFF + Air Speed” for 7s.
- After entering the engineer mode, the remote control will display icons of “Auto, Cool, Dry, Heat”, and the Battery icon; at the same time, it will also display the numeric code of the current engineer mode (for the initial engineer mode, the numeric code displayed is 0), and all other icons are inactive.
- In engineer mode, the value of the current numeric code can be adjusted circularly through the Up/Down key, with the setting range of 0 to 30. Each time the current numeric code is adjusted, the special code of the engineer mode will be transmitted with a delay of 0.6s. The code can also be transmitted by pressing “OK”, and the special code of the engineer mode sent contains information of the currently displayed numeric code (if the numeric code is 0, the code to enter the engineer mode will be transmitted).
- In engineer mode, other keys or operations are invalid except for the On/Off key, the Up/Down key, the OK key or executing the operation to exit the engineer mode.

Code	Query Content	Advance Function Setting
0	Error code	Press “On/Off” for 2s to enter the Capactity, the code displayed is “Ch”, press “OK” to send the Query Capactity code; press the Up/Down key to select 1 to 100K
1	T1 Temperature	Press "On/Off" for 2s to enter the Power Down Memory Selector, the code displayed is “Ch”, press "OK" to send the Query Power Down Memory Selector code; press the Up/Down key to select 1 or 0 and press “OK” to confirm, 1 indicates that the power down memory exists, and 0 indicates that no power down memory exists; and press "On/Off" for 2s to exit. (Set within1 minute after power on)
2	T2 Temperature	Press "On/Off" for 2s to enter the Internal Fan Control Selector after the pre-set temperature is reaches, the code displayed is “Ch”, press "OK" to send the Query Internal Fan Control Selector code; press the Up/Down key to select 1 to 13: 1 - Stop the fan, 2 - Min. fan speed, 3 - Set the air speed, 4 -Termal stop for 4min running for 1min, 5 - Termal stop for 8min running for1min, 6 - Termal stop for 16min running for 1min, 7 - Termal stop for 24min. running for 1min, 8 - Termal stop for 48min running for 1min, 9 - Termal stop for 15min running for 2.5min, 10 - Termal stop for 30min running for 2.5min, 11 - Termal stop for 60min running for 2.5min, 12- Set fan speed(but stop the fan when the set fan speed is auto fan) and 13- Breeze fan(but stop the fan when the set fan speed is auto fan) press "OK" to confirm, and press "On/Off" for 2s to exit. (Item 5~13 are valid for some models)(Set within 1 minute after power on)
3	T3 Temperature	Press "On/Off" for 2s to enter the Mode Selector, press the Up/Down key to select CH (cool and heat, Auto + Cool + Dry + Heat + Fan), HH (Heat only, Heat only + Fan), CC (Cool only, Auto + Cool + Dry + Fa) or nU (Cool and Heat without Auto, Cool + Dry + Heat + Fan), press "OK" to confirm, and the mode selected can be memorized when the remote control is powered down and powered on; and press "On/Off" for 2s to exit. When the remote control does not burn any parameters, the mode setting will not be memorized. (CC or nU is valid for some models)(Set within 1 minute after power on)
4	T4 Temperature	Press the "On/Off" for 2s to enter the Min. Set Temperature Selector, press the Up/Down key to select "16℃~24℃", press "OK" to confirm, and the Min. Set Temperature can be memorized when the remote control is powered on and power lost; and press "On/Off" for 2s to exit. When the remote control does not burn any parameters, the min. set temperature will not be memorized. (Set within 1 minute after power on)
5	TP Temperature	Press "On/Off" for 2s to enter the Max. Set Temperature Selector, press the Up/Down key to select "25℃~30℃", press "OK" to confirm, and the Max. Set Temperature can be memorized when the remote control is powered on and power lost; and press "On/Off" for 2s to exit. When the remote control does not burn any parameters, the max. set temperature will not be memorized. (Set within 1 minute after power on)
6	Compressor Target Frequency	Press "On/Off" for 2s to enter the Multi-split Cooling and Heating Preference Selector, the code displayed is “Ch”, press "OK" to send the Query Multisplit Cooling and Heating Preference Selector code; press the Up/Down key to select H (heating preferred), C (cooling preferred) or A (master settings), press "OK" to confirm; and press "On/Off" for 2s to exit. (Set within 1 minute after power on)(Only multi models are effective)
7	Compressor Running Frequency Fr	/
8		/
9	Current AC Voltage Uo	/
10		/
11		Press "On/Off" for 2S to enter the Min. Desired Cooling Frequency Selector, the code displayed is Ch, press "OK" to send the Query Min. Desired Cooling Frequency Selector code; press the Up/Down key to select the minimum cooling frequency desired and press "OK" to confirm; press "On/Off" for 2s to exit. (Range:10-50Hz,--;”--” cancels the Settings)(for some models) (Set within 1 minute after power on)
12	Set Speed Pr of the outdoor fan	Press "On/Off" for 2s to enter the Min. Desired Heating Frequency Selector, the code displayed is “Ch”, press "OK" to send the Query Min Desired-Heating Frequency Selector code; press the Up/Down key to select the min. desired heating frequency value, press "OK" to confirm; and press the "On/Off" for 2s to exit.(Range:10-50Hz,--;”--” cancels the Settings) (for some models)(Set within 1 minute after power on)
13	Opening Lr of EEV	Press "On/Off" for 2s to enter the Max. Running Frequency Selector of therestricted area 6 in the cooling mode T4, the code displayed is “Ch”, press "OK" to send the Query Max. Running Frequency Selector code of therestricted area 6 in the cooling mode T4; press the Up/Down key to select the limit, then press "OK" to confirm; and press "On/Off" for 2s to exit. (Range:20-150Hz,--;”--” cancels the Settings)(for some models)
14	Actual Running Speed ir of the indoor fan	Press “On/Off” for 2s to enter the Resonance Point Frequency Selector, the code displayed is “Ch”, press “OK” to send the Resonance Point Frequency Selector code; press the Up/Down key to select the outdoor forced running frequency(“10-250Hz“), then press “OK” to confirm; and press “On/Off” for 2s to exit.(Range:10-250Hz,--;”--” cancels the Settings)(for some models)

Code	Query Content	Advance Function Setting
15	Indoor Humidity Hu	Press "On/Off" for 2s to enter the Outdoor Forced Running Frequency Selector, the code displayed is “Ch”, press "OK" to send the Query Outdoor Forced Running Frequency Selector code; press the Up/Down key to select the outdoor forced running frequency(“10-250Hz“), then press "OK" toconfirm; and press "On/Off" for 2s to exit. (Range:10-250Hz,--;”--” cancels the Settings)(for some models)
16	Set Temperature TT after compensation	Press "On/Off" for 2s to enter One-Key Recovery, the code displayed is “rS”, then press "OK" to send the One-Key Recovery code, the mode selector of the remote control will recover to "Cooling and heating", the min. temperature recovers to 60.8℉ (16℃), and the max. temperature recovers to 86℉ (30℃); and press "On/ Off" for 2s to exit. (for some models)
17	/	/
18	WIFI Signal Strength	Press “On/Off” for 2s to enter Model Selection the code displayed is “Ch”, then press “OK” to send the Model Selection code, press the Up/Down key to select, such as 23,26,32,35,51,72,120 etc; and press “On/Off” for 2s to exit
19	DC bus voltage AD value	Press "On/Off" for 2s to enter the Cooling Frequency Threshold Settings; press the Up/Down key to select the cooling frequency threshold, press "OK" to confirm; and press the "On/Off" for 2s to exit. (Range:40,41.....83,84,--;”--” cancels the Settings)(Set within 1 minute after power on)
20	Indoor target Frequency oT	Press "ON/OFF" for 2s to enter the Heating Frequency Threshold Settings; press the Up/Down key to select the heating frequency threshold, press "OK" to confirm; and press "On/Off" for 2s to exit. (Range:40,41.....83,84,--;”--” cancels the Settings) (Set within 1 minute after power on)
21	Reserve	Press "On/Off" for 2s to enter the Cooling Temperature Compensation Value Settings, the code displayed is “Ch”, then press "OK" to send the Query Cooling Temperature Compensation Value code; press the Up/Down key to select the cooling temperature compensation value, then press "OK"; and press "On/Off" for 2s to exit.(Range:-3.0,-2.5,-2.0...2.0,2.5,3.0,3.5,--;”--” cancels the Settings)
22		Press "On/Off" for 2s to enter the Heating Temperature Compensation Value Settings, the code displayed is “Ch”, press "OK" to send the Query Heating Temperature Compensation Value code; press the Up/Down key to select the heating temperature compensation value, then press "OK"; and press "On/Off" for 2s to exit.(Range:-6.5,-6,...1.0,1.5,2.0...6.0,6.5,7.0,7.5,--;”--” cancels the Settings)
23		Press "On/Off" for 2s to enter the Max. Cooling Air Speed Settings, the code displayed is “Ch”, press "OK" to send the Query Max. Cooling Air Speed code; press the Up/Down key to select the max. cooling air speed, then press "OK"; and press "On/Off" for 2s to exit.(Range: -41,-40,-39...17,18,19,20,--;”--” cancels the Settings)
24		Press "On/Off" for 2S to enter the Min. Cooling Air Speed Settings, the code displayed is "Ch", press "OK" to send the Query Min. Cooling Air Speed code; press the Up/Down key to select the minimum cooling air speed and press "OK" to confirm; press "On/Off" for 2s to exit.(Range: -41,-40,-39... 17,18,19,20,--;”--” cancels the Settings)
25		Press "On/Off" for 2s to enter the Max. Heating Air Speed Settings, the code displayed is "Ch", press "OK" to send the Query Max. Heating Air Speed code; press the Up/Down key to select the maximum heating air speed and press "OK" to confirm; press "On/Off" for 2s to exit.(Range: -41,-40,-39... 17,18,19,20,--;”--” cancels the Settings)
26		Press "On/Off" for 2s to enter the Min. Heating Air Speed Settings, the code displayed is "Ch", press "OK" to send the Query Min. Heating Air Speed code; press the Up/Down key to select the minimum heating air speed and press "OK" to confirm; press "On/Off" for 2s to exit.(Range: -41,-40,-39... 17,18,19,20,--;”--” cancels the Settings)
27		/
28		Press “On/Off” for 2s to enter the The Temperature of Stop Fan, the code displayed is “Ch”, press “OK” to send the The Temperature of Stop Fan code; press the Up/Down key to select 16,17,18...28 and press “OK” to confirm; press “On/Off” for 2s to exit.
29		/
30		/

Table 25

- In Channel 1~30 settings of the engineer mode, long press the On/off key to return the previous engineer mode.
- When the setting is successful, “CS” will be displayed; When the setting fails, “CF “will be displayed.

Exit of engineer mode:

1. In engineer mode, press the key combination of “On/Off + Air speed” for 2s;
2. The engineer mode will be exited if there are no valid key operations for continuous 60s.

Display	Error Information
nA	No fault or protection
EH	IDU EEPROM malfunction
EH 0A	Indoor EEPROM parameter error
EL01	IDU & ODU communication error
EH Ba	Communication error between indoor unit and indoor external fan module
EH 30	Parameters error of indoor external fan
EH 35	Phase failure of indoor external fan
EH 36	Indoor external fan current sampling bias fault
EH 37	Indoor external fan zero speed failure
EH 38	Indoor external fan stall failure
EH 39	Out of step failure of indoor external fan
EH 3A	Low voltage protection of indoor external fan DC bus
EH 3b	Indoor external fan DC bus voltage is too high fault
EH 3E	Indoor external fan overcurrent fault
EH 3F	Indoor external fan module protection/hardware overcurrent protection
EH 03	IDU fan speed out of control
EC 51	ODU EEPROM parameter error
EC 52	ODU coil temp. sensor (T3) error
EC 53	ODU ambient temp. sensor (T4) error
EC 54	COMP. discharge temp. sensor (TP) error
EC 55	ODU IPM module temp.sensor(TH) error
EC 0d	Outdoor unit malfunction
EH 60	IDU room temp. sensor (T1) error
EH 61	Evaporator coil temperature sensor T2 is in open circuit or short circuit
EC 71	Outdoor external fan overcurrent fault
EC 75	Outdoor external fan module protection/hardware overcurrent protection
EC 72	Outdoor external fan phase failure
EC 74	Outdoor external fan current sampling bias fault
EC 73	Zero speed failure of outdoor unit DC fan
EC 07	ODU fan speed out of control(
EL 0C	System lacks refrigerant
PC 00	ODU IPM module protection
PC 10	ODU low AC voltage protection
PC 11	ODU main control board DC bus high voltage protection
PC 12	ODU main control board DC bus low voltage protection/341 MCE error
PC 02	Compressor top (or IPM) temp. protection
PC 40	Communication error between outdoor main chip and compressor driven chip
PC 41	Compressor current sampling circuit failure
PC 42	Compressor start failure of outdoor unit
PC 43	ODU compressor lack phase protection

Display	Error Information
PC 44	ODU zero speed protection
PC 45	ODU IR chip drive failure
PC 46	Compressor speed has been out of control
PC 49	Compressor overcurrent failure
PC 06	Discharge temperature protection of compressor
PC 08	ODU Current protection
PH 09	Anti-cold air in heating mode
PC 0F	PFC module protection
PC 30	System overpressure protection
PC 31	System pressure is too low protection
PC 03	Pressure protection(low or high pressure)
PC 0L	Outdoor low temp. protection
PH 90	High temperature protection of evaporator
PH 91	Low temperature protection of evaporator
PC 0A	High temperature protection of condenser
PH 0C	Indoor unit humidity sensor malfunction
LH 00	Evaporator temp. freq.limited(L0)
LH 30	Indoor external fan current freq. limited
LH 31	Indoor external fan voltage freq. limited
LC 01	Condenser coil temp. (T3) freq. limited
LC 02	ODU exhaust temp. (TP) freq. limited
LC 05	Voltage freq. limited
LC 03	Current freq. limited
LC 06	IPM module temp. freq. limited
LC 30	High pressure freq. limited
LC 31	Low pressure freq. limited
LH 07	Remote control frequency limitation in effect
--	IDUs mode conflict(Multi-zone)

Table 26

7.6.2 EEPROM Parameter Error Diagnosis and Solution (EH 00/EH 0R/EC 51)

Error Code	EH 00/EH 0R (Indoor) EC 51 (Outdoor)
Malfunction decision conditions	Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.
Supposed causes	• Incorrect installation of indoor to outdoor control wire or line voltage wiring • PCB faulty

Table 27

Troubleshooting:

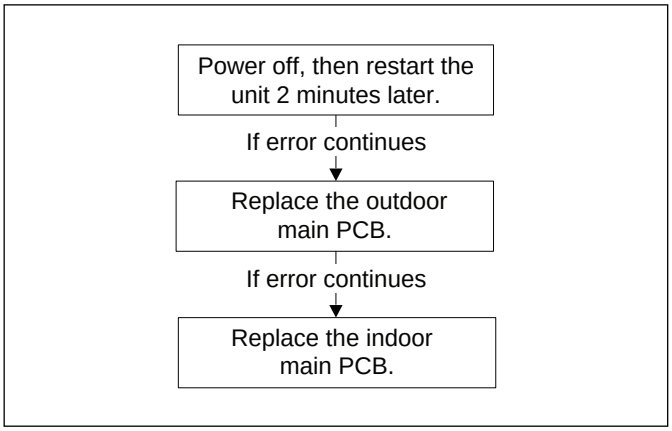


Figure 34

EEPROM: a read-only memory whose contents can be erased and reprogrammed using a pulsed voltage. For the location of EEPROM chip, please refer to the below photos.

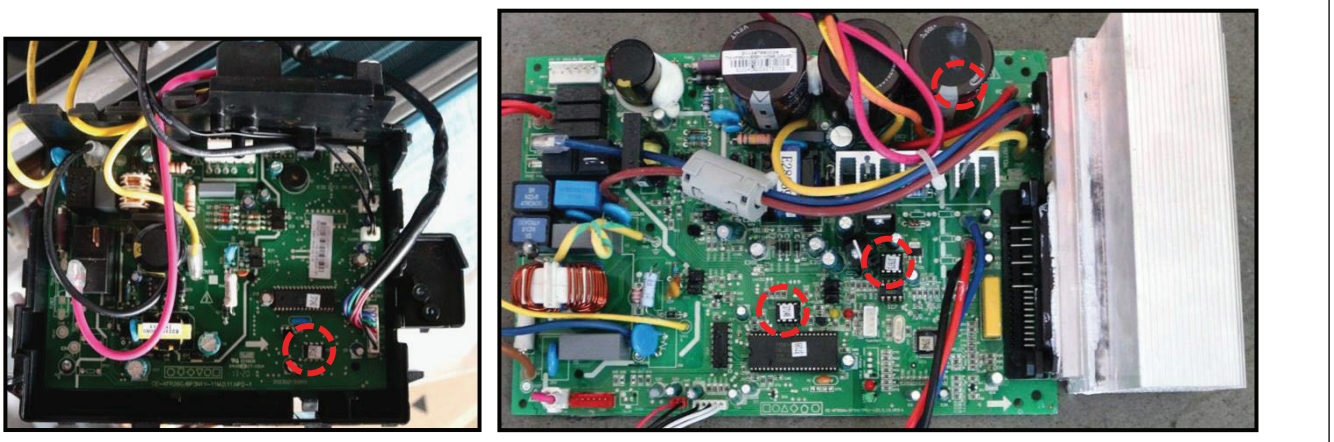


Figure 35

The two photos above are for reference only, they may not be identical to the PCBs shipped with your equipment.

7.6.3 Indoor / Outdoor Unit's Communication Diagnosis and Solution (EL 01)

Error Code	EL 01
Malfunction decision conditions	Indoor unit does not receive the feedback from outdoor unit during 110 seconds and this condition happens four times continuously.
Supposed causes	• Incorrect installation of indoor to outdoor control wire • Electromagnetic interference • Indoor or outdoor PCB faulty

Table 28

Troubleshooting:

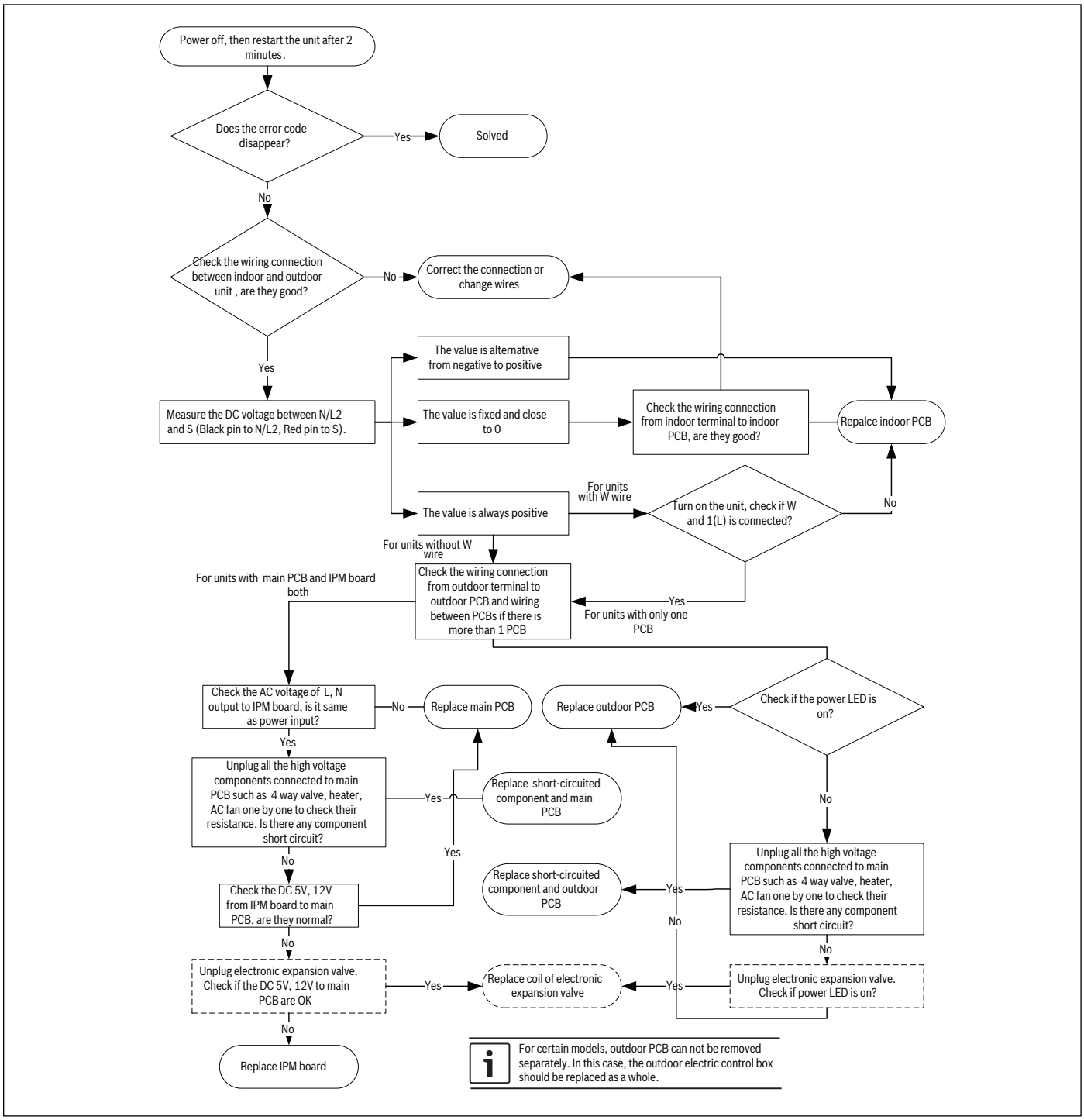


Figure 36

Remark:

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

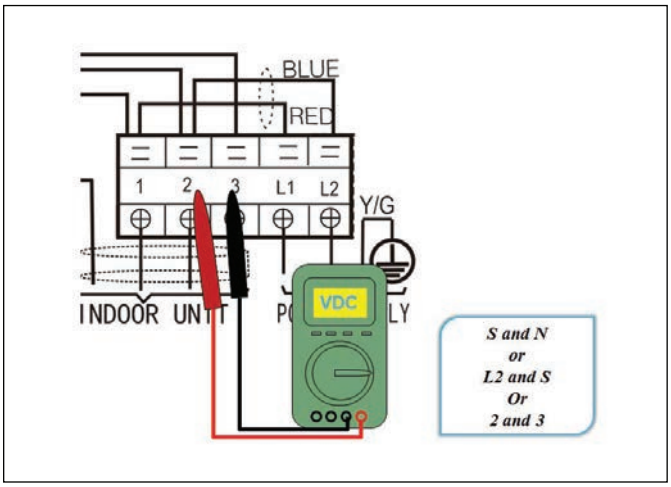


Figure 37

Remark:

- Use a multimeter to test the resistance of the transformer which does not connect with capacitor.
- The normal value should be around zero ohms. Otherwise, the reactor must have malfunctioned and may need to be replaced.

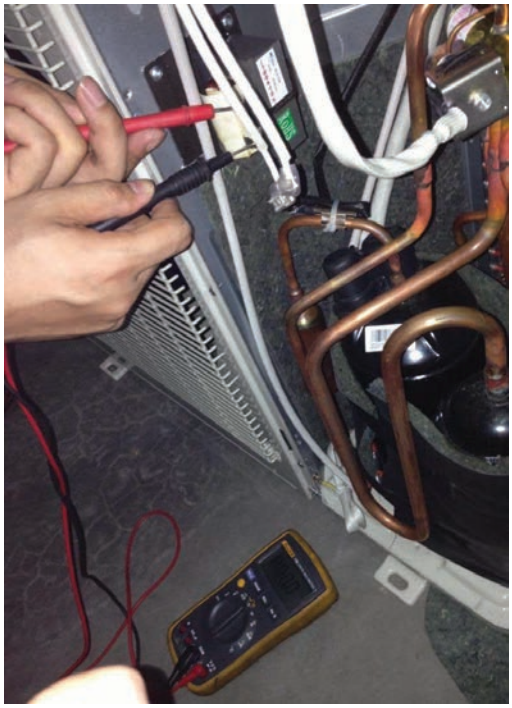


Figure 38

7.6.4 Zero Crossing Detection Error Diagnosis and Solution (EH 02)

Error Code	EH 02
Malfunction decision conditions	When PCB does not receive zero crossing signal feedback for 4 minutes or the zero crossing signal time interval is abnormal.
Supposed causes	• Connection mistake • Indoor PCB faulty

Table 29

Troubleshooting:

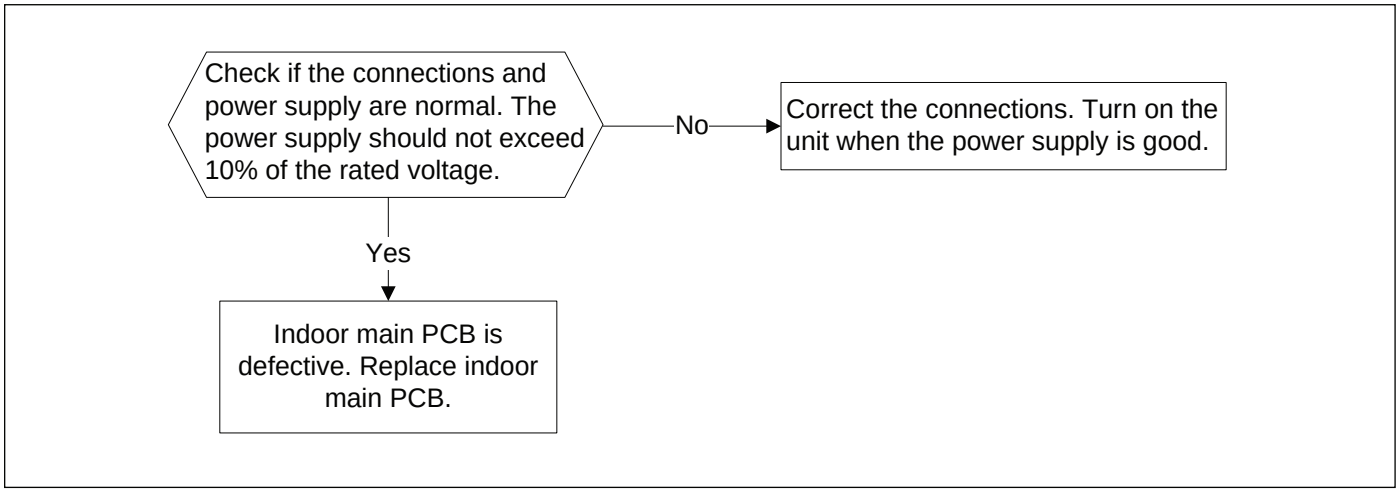


Figure 39

Zero crossing detection error is only valid for the unit with AC fan motor, for other models, this error is invalid.

7.6.5 Fan Speed Has Been Out of Control Diagnosis and Solution (EH 03 /EC 07)

Error Code	EH 03 (indoor) / EC 07 (outdoor)
Malfunction decision conditions	When indoor / outdoor fan speed is too low or too high for certain time, the unit will stop and the LED will display the failure.
Supposed causes	• Wiring mistake • Indoor / Outdoor Fan assembly faulty • Indoor / Outdoor Fan motor faulty • Indoor / Outdoor PCB faulty

Table 30

Troubleshooting:

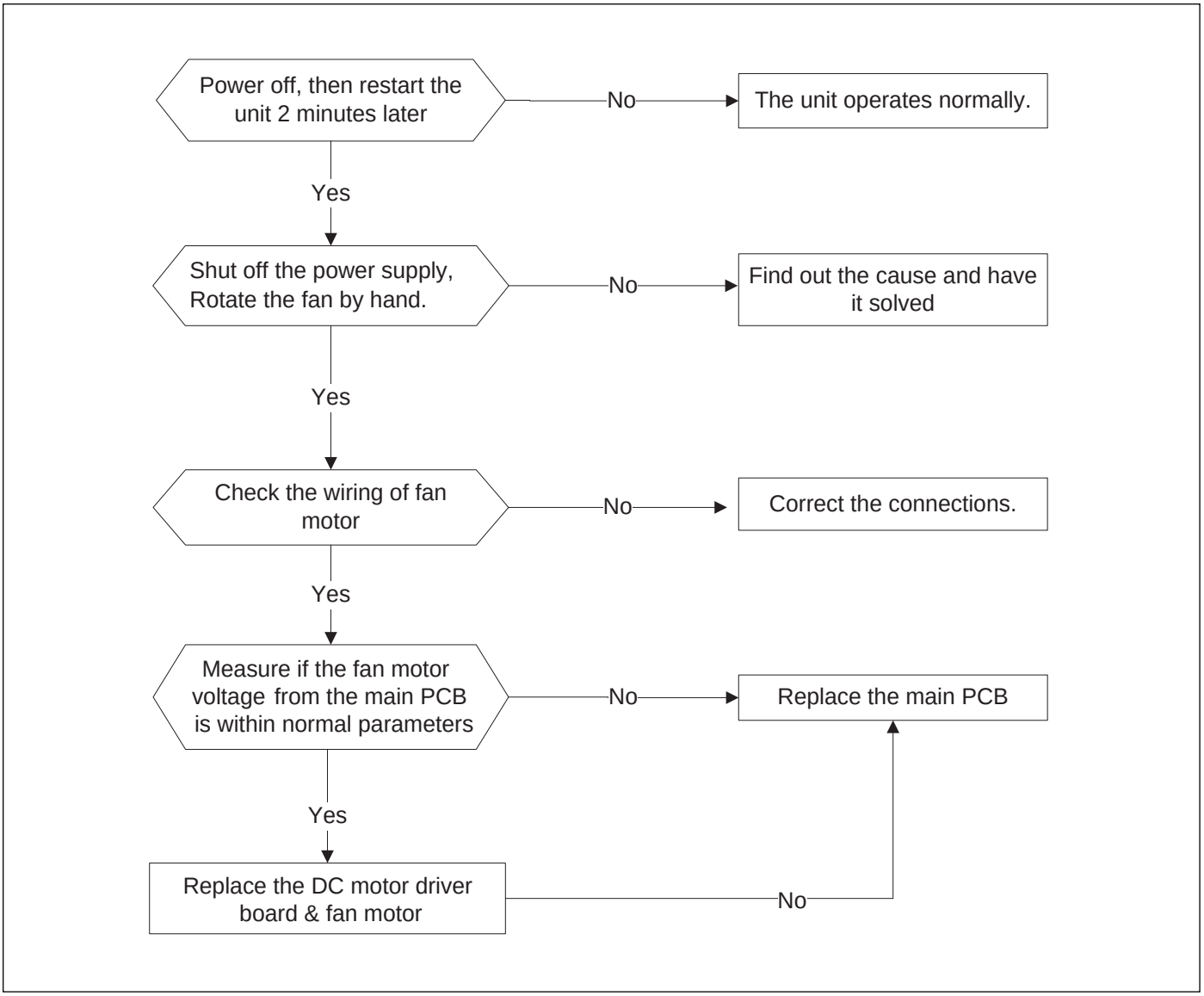


Figure 40

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

Index 1:

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

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

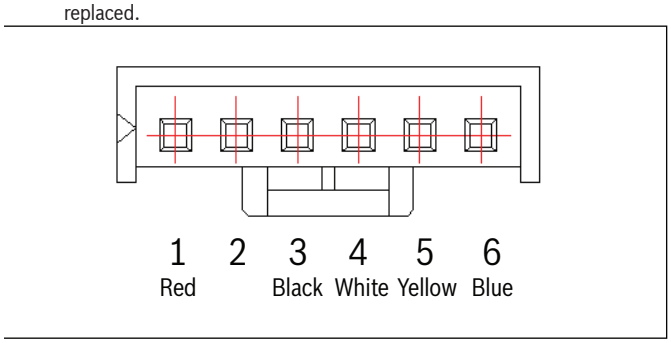


Figure 41

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

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	192V - 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 31

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

Table 32

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

   Release the UVW connector. Measure the resistance of U-V, U-W and V-W. If the three values are not equal, the fan motor has a problem and needs to be replaced.

   Otherwise, replace the ODU PCB.

3. Indoor AC Fan Motor

   a. Power off and disconnect fan motor power cord from PCB. Measure the resistance value of each winding by using the multimeter. The normal value show as follows:

Model	YKFG-13-4-38L YKFG-13-4-38L-4	YKFG-15-4-28-1	YKFG-20-4-1 0L	YKFG-20-4-5-11
Brand	Welling	Welling	Welling	Welling
Black - Red Main	345Ω	75Ω	269Ω	388Ω
Blue - Black AUX	348Ω	150Ω	224Ω	360Ω

Table 33

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

Table 34

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

Table 35

Model	YKFG-45-4-13
Brand	Dongfang
Black - Red Main	450Ω
Blue - Black AUX	442Ω

Table 36

   b. Power on and set the unit running in fan mode at high fan speed. After running for 15 seconds, measure the voltage of pin1 and pin2. If the value of the voltage is less than 1 OOV(208-240V power supply) or 50V (115V power supply), the PCB must has problems and need to be replaced.

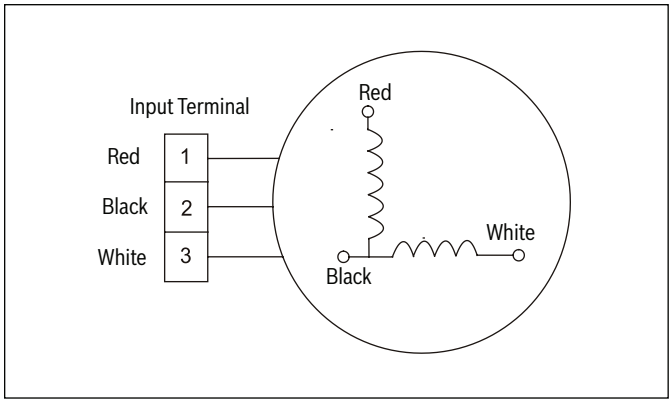


Figure 42

4. DC Fan Motor(for some double fan models)

   Power on and when the unit is in standby, measure the voltage of CON1, pin1-pin2 and pin3-pin2 of CN1 in DC motor driver board. If the value of the voltage is not in the range showing in below tables, the outdoor main PCB must has problems and need to be replaced.

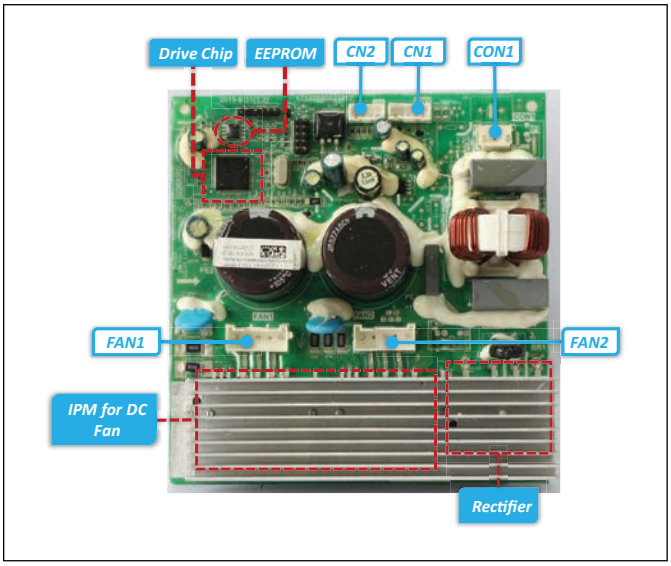


Figure 43

Part	Description	Parameter	Remark
CON1	Power input for the PCB	192-380V/DC	
CN1	Communication with main PCB	DC	
CN2	Test port	5V/DC	For debugging board
FAN1	UVW output for DC fan motor		
FAN2	UVW output for DC fan motor		

Table 37

CN1 Communication with main PCB

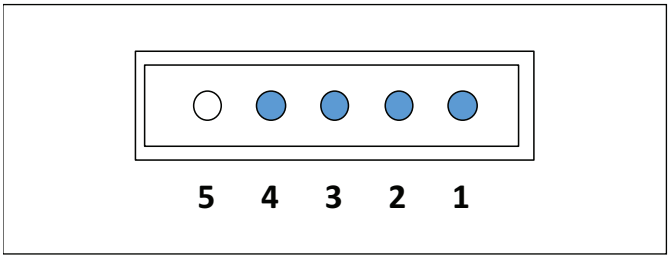


Figure 44

No.	Signal	Voltage
1	Vcc	13.5-16.5V
2	GND	0V
3	Vsp	0~6.5V
4	FG	13.5-16.5V
5	---	---

Table 38

7.6.6 Open Circuit or Short Circuit of Temperature Sensor Diagnosis and Solution (EC 52 "T3 sensor"/ EC 53 "T4 sensor"/ EC 54 "TP sensor"/ EC 56 "T2B sensor"/EH 60 "T1 sensor"/ EH61 "T2 sensor")

Error Code	EC 52/EC 53/EC 54/EC 56/EH 60/EH61
Malfunction decision conditions	If the sampling voltage is lower than 0.06V DC or higher than 4.94V DC, the LED will display the failure.
Supposed causes	• Wiring mistake • Sensor faulty • Indoor / Outdoor PCB faulty

Table 39

Troubleshooting:

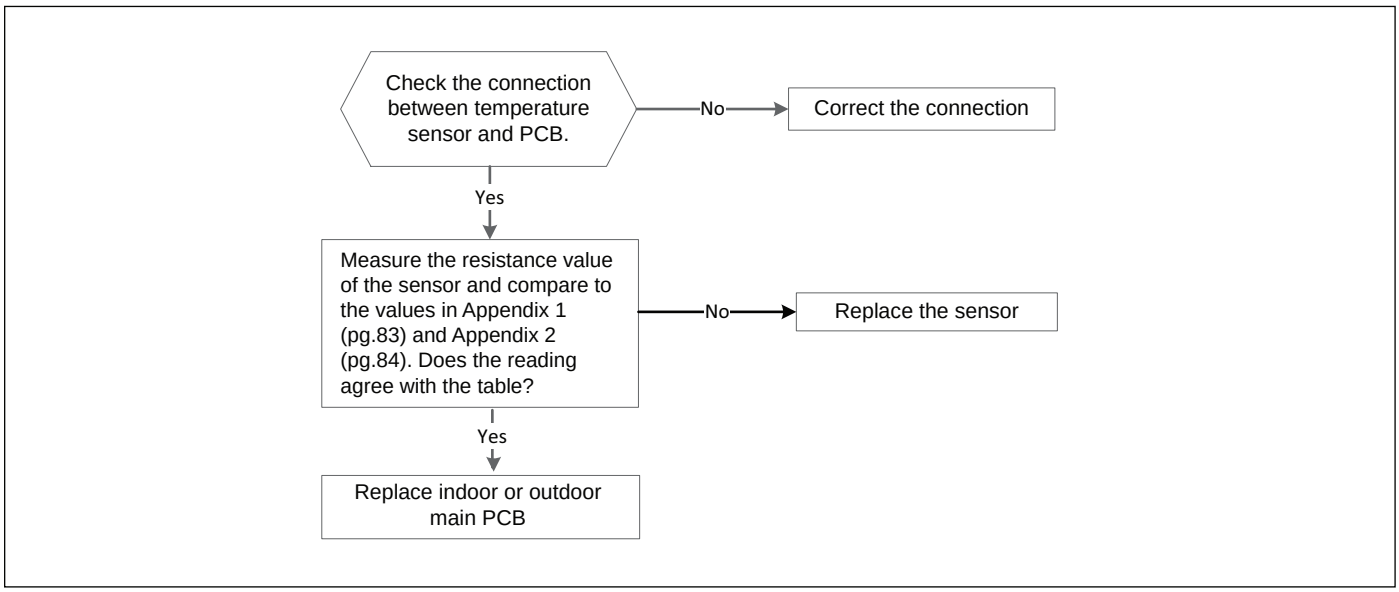


Figure 45

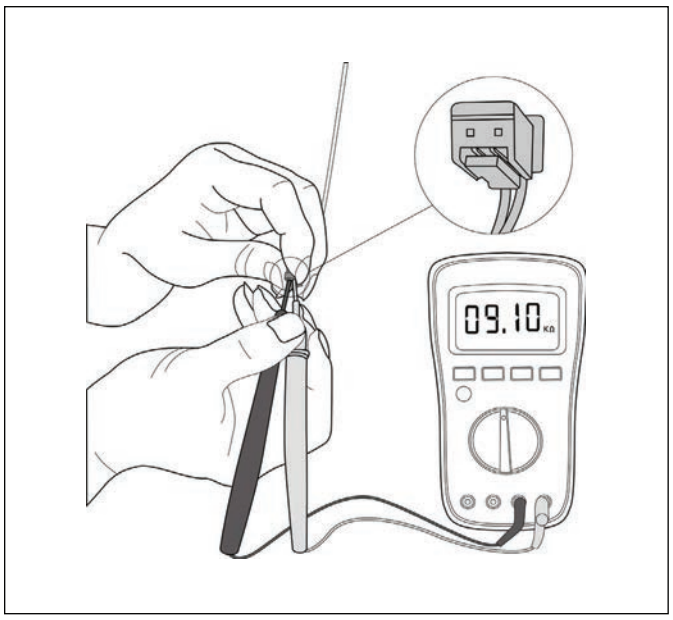


Figure 46

Some models, PCB could not removed separately, then entire outdoor electric control box should be replaced.

For certain models, outdoor unit uses combination sensor, T3, T4 and TP are the same of sensor.

7.6.7 Refrigerant Sensor Error or Refrigerant Sensor Is Out of Range Diagnosis and Solution (Eh C3 / Fh Cc)

Error Code	EH C3 / FH CC
Malfunction decision conditions	Indoor unit receives fault signal for 10s or indoor unit does not receive feedback from refrigerant sensor for 150s.
Supposed causes	• Connection wires • Sensors • Indoor main PCB

Table 40

7.6.8 Refrigerant Sensor Detects Leakage or Refrigerant Sensor Is Out of Range and Leakage Is Detected Diagnosis And Solution

Error Code	EH C1 / EH C2 / EC C1
Malfunction decision conditions	The refrigerant sensor detects a concentration higher than or equal to 10%* LFL (Lower Flammability Limit) for 10 seconds or the refrigerant sensor detects a concentration higher than or equal to 20%*LFL or the multi model receives the refrigerant leakage protection fault sent by the outdoor unit. Multi-zone: Only the buzzer of the indoor unit that detects refrigerant leakage continues to sound the alarm, the shortest sound is 10 seconds, and the longest sound is 5 minutes (you can press any key such as remote control or wire control, APP and so on to eliminate the alarm), and the other non-refrigerant leakage fault indoor unit only displays EC C1, but the buzzer does not sound.
Supposed causes	• Additional refrigerant

Table 41

Troubleshooting:

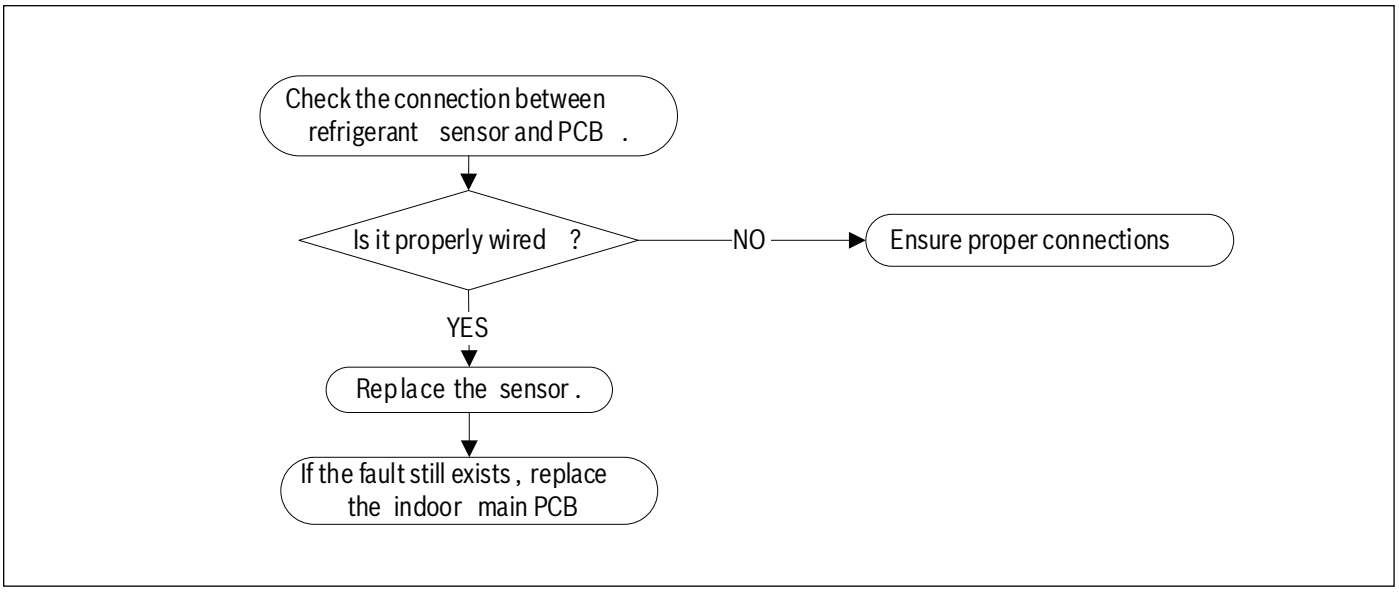


Figure 47

7.6.9 Refrigerant Leakage Detection Diagnosis and Solution (EL 0C)

Error Code	EL 0C
Malfunction decision conditions	Judging the abnormality of the refrigeration system according to the number of compressor stops and the changes in operating parameters caused by excessive exhaust temperature.
Supposed causes	• T1 or T2 sensor faulty • Indoor PCB faulty • System problems, such as leakage or blocking

Table 42

Troubleshooting:

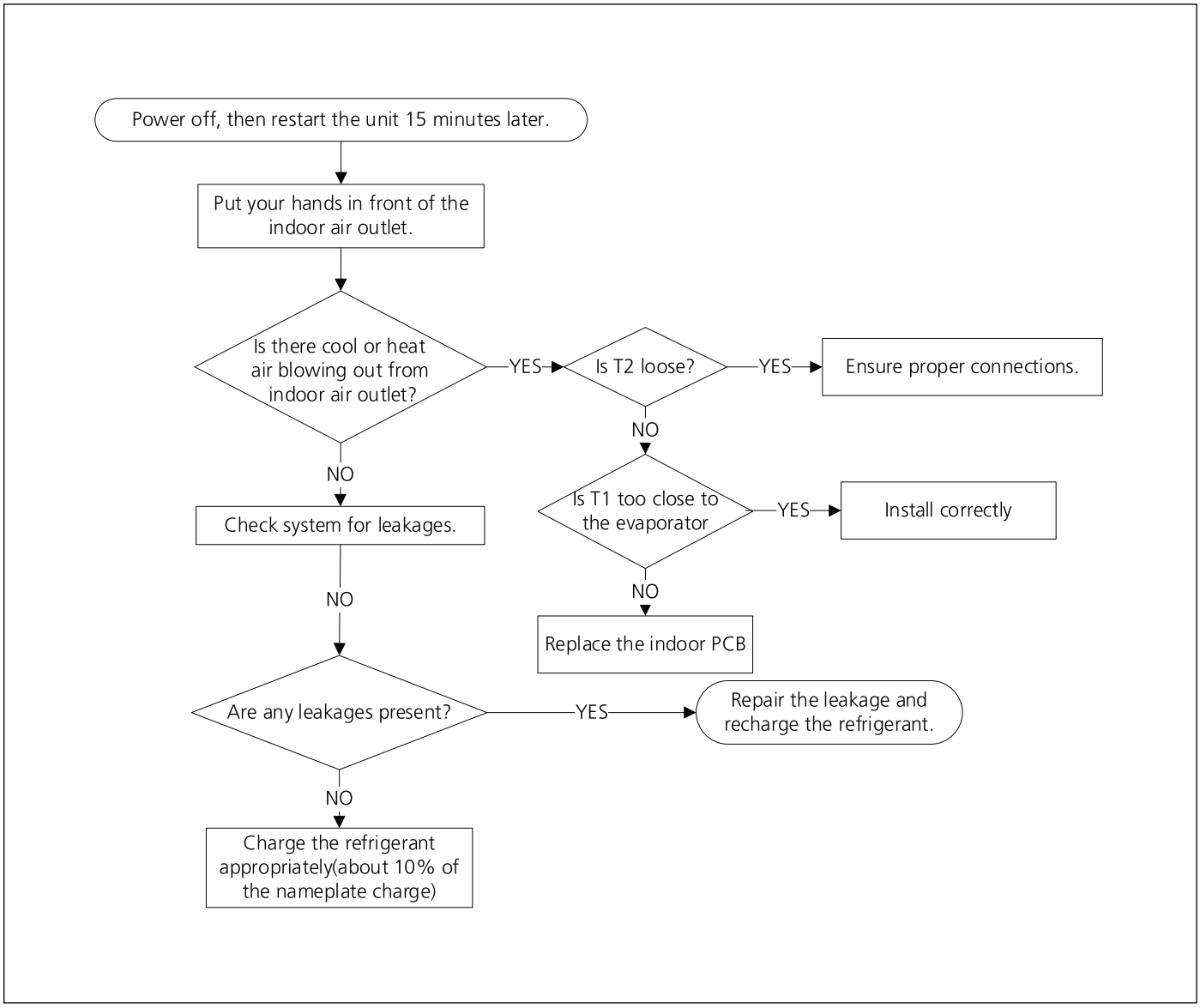


Figure 48

7.6.10 Indoor PCB / Display Board Communication Error Diagnosis and Solution (EH b0)

Error Code	EH b0
Malfunction decision conditions	Indoor PCB does not receive feedback from the display board.
Supposed causes	• Wiring mistake • Display board faulty • Indoor PCB faulty

Table 43

Troubleshooting:

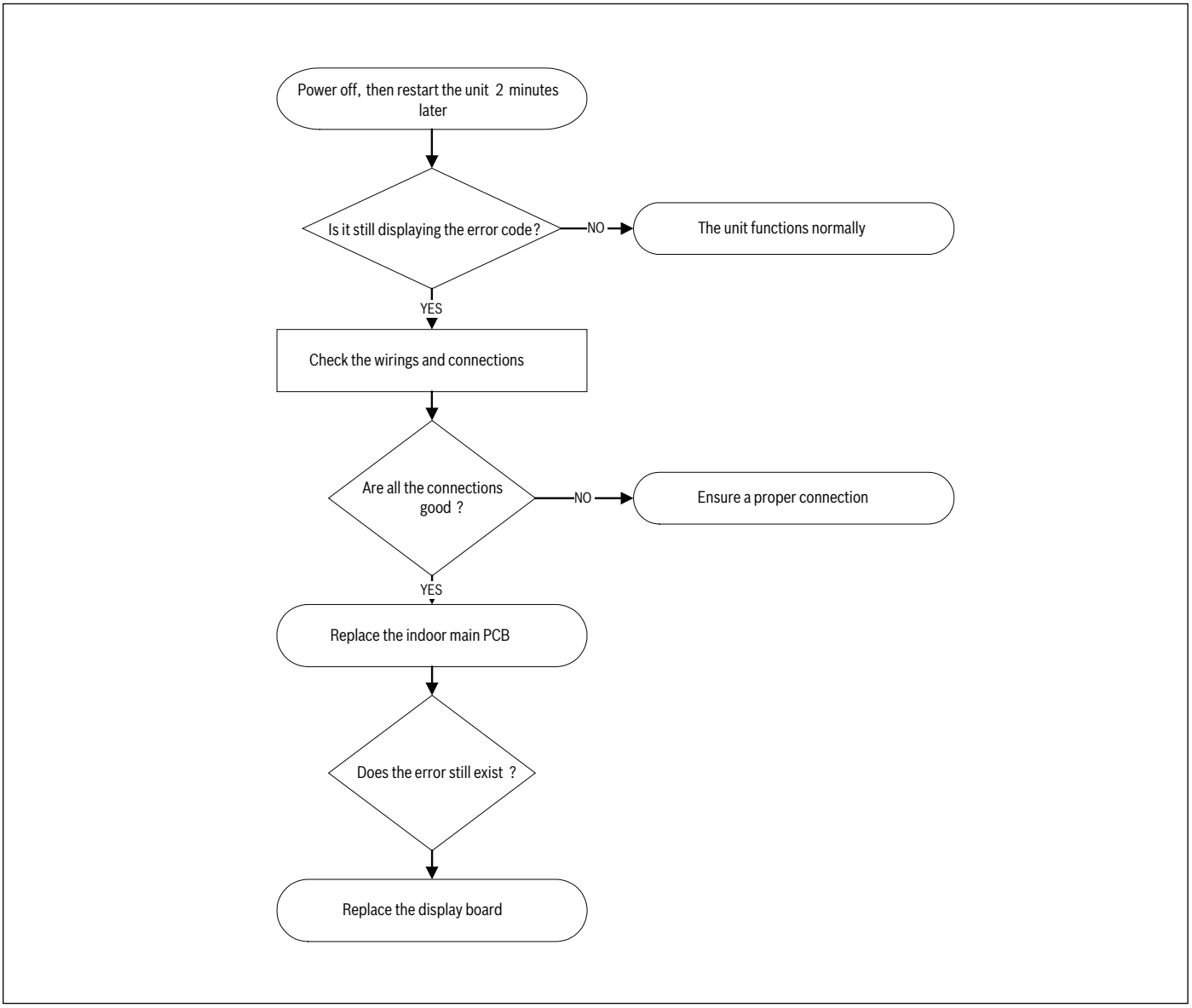


Figure 49

7.6.11 IPM Malfunction or IGBT Over-Strong Current Protection Diagnosis and Solution (Pc 00)

Error Code	PC 00
Malfunction decision conditions	When the voltage signal that IPM send to compressor drive chip is abnormal, the display LED will show the failure code and AC will turn off.
Supposed causes	• Wiring mistake • IPM malfunction • Outdoor fan assembly faulty • Compressor malfunction • Outdoor PCB faulty

Table 44

Troubleshooting:

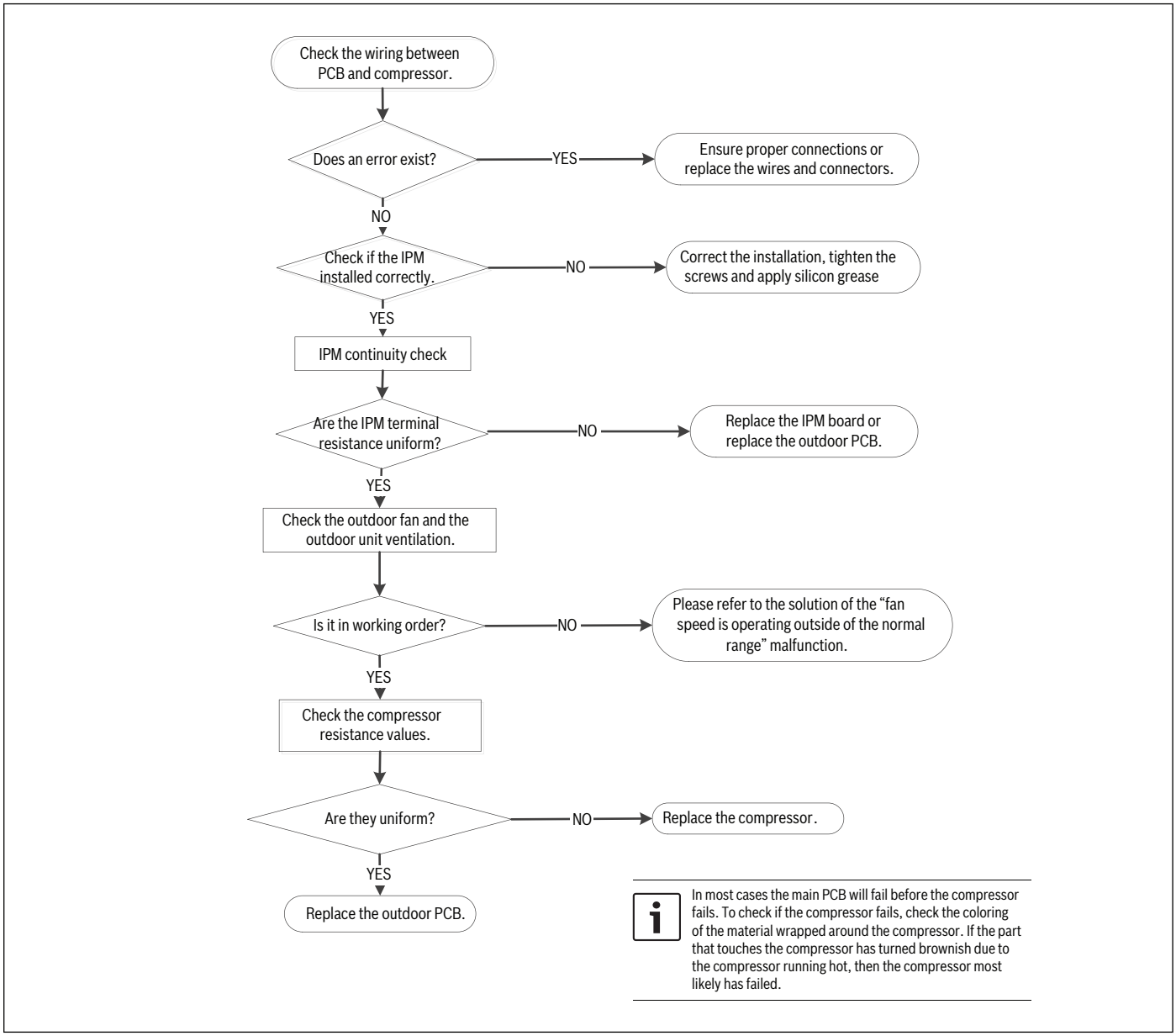


Figure 50

IPM Continuity Check

WARNING

Electrical shock hazard!

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

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

Digital tester		Resistance value	Digital tester		Resistance value
(+)Red	(-)Black		(+)Red	(-)Black	
P	N	∞ (Several MΩ)	U	N	∞ (Several MΩ)
	U		V		
	V		W		
	W		–		

Table 45

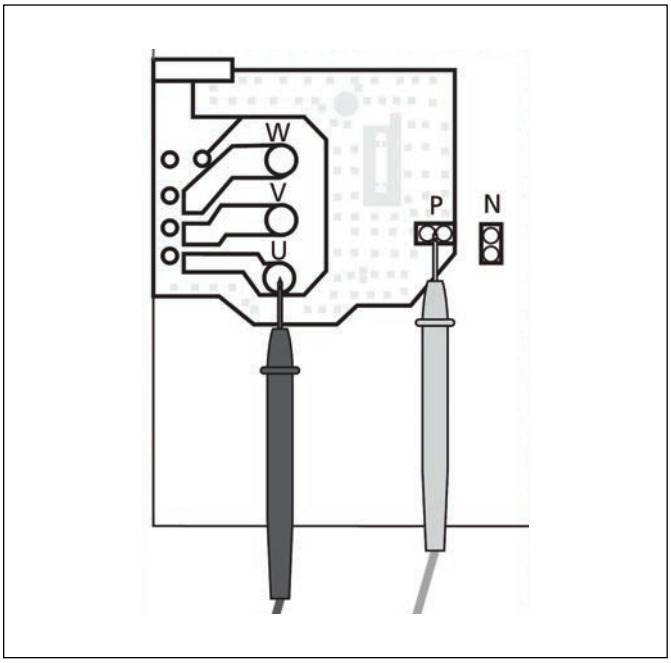


Figure 51

Compressor check

Disconnect the compressor and check the resistance between U-V, V-W and U-W, and all 3 values should be equal. If not, the compressor is faulty and should be replaced.

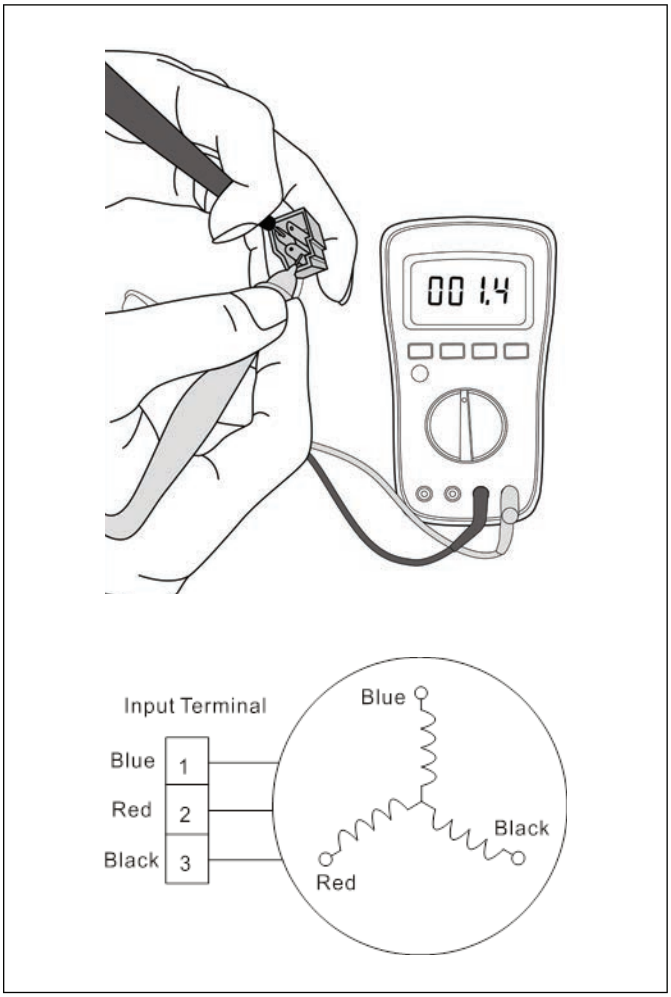


Figure 52

7.6.12 Over Voltage or Too Low Voltage Protection Diagnosis and Solution (PC 01)

Error Code	PC 01
Malfunction decision conditions	An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.
Supposed causes	• Power supply problems • System leakage or block • Outdoor PCB faulty • Transformer

Table 46

Troubleshooting:

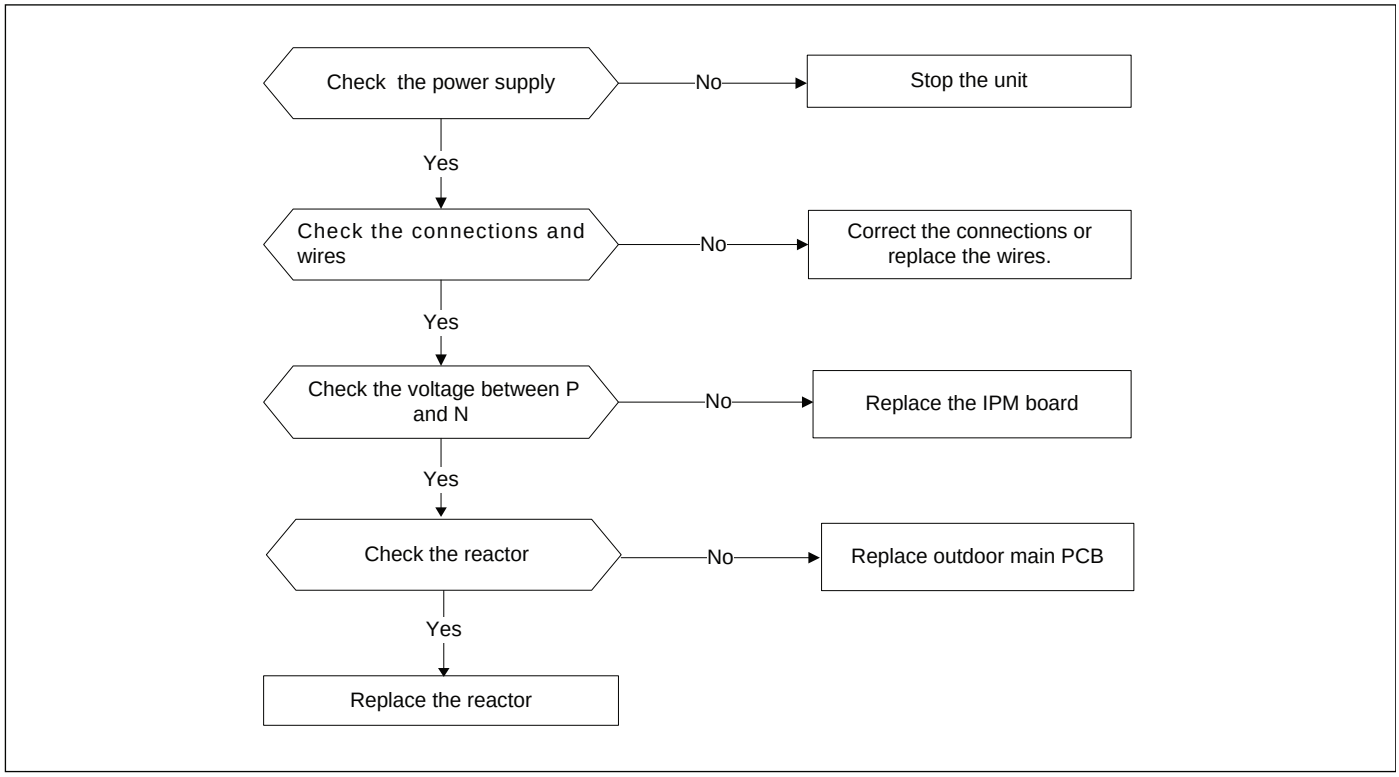


Figure 53

Measure the DC voltage between P and N port (Figure 54). The normal value should be as shown below.

- When starting up the system, it is in 220V ~ 400V.
- When the system is in standby, 310V, 340V or 380V.

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

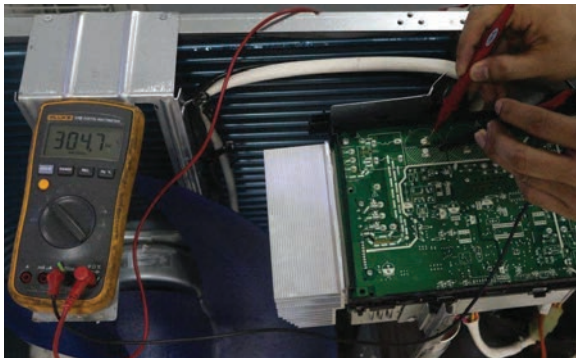


Figure 54

7.6.13 Top Temperature Protection of Compressor or High Temperature Protection of IPM Module or High Pressure Protection Diagnosis and Solution (PC 02)

Error Code	PC 02
Malfunction decision conditions	For some models with overload protection, If the sampling voltage is not 5V, the LED will display the failure. If the temperature of IPM module is higher than a certain value, the LED displays the failure code. For some models with high pressure switch, outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa, the LED displays the failure code.
Supposed causes	• Connection Wires • ODU PCB • IPM Module Board • High Pressure protector • System blockages

Table 47

Troubleshooting:

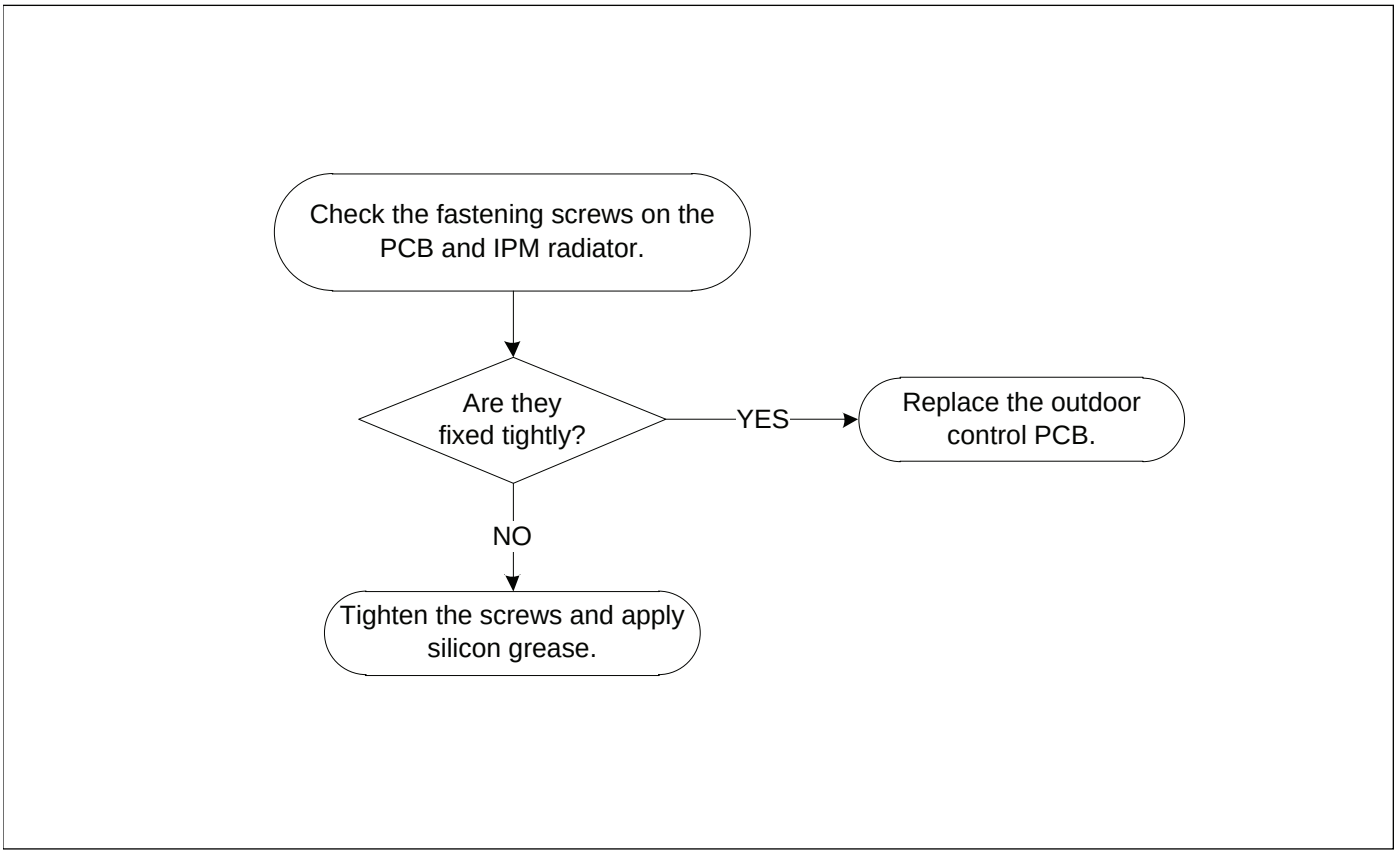


Figure 55

7.6.14 Inverter Compressor Drive Error Diagnosis and Solution (PC 04)

Error Code	PC 04
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 and so on.
Supposed causes	• Wiring mistake • IPM malfunction • Outdoor fan assembly faulty • Compressor malfunction • Outdoor PCB faulty

Table 48

Troubleshooting:

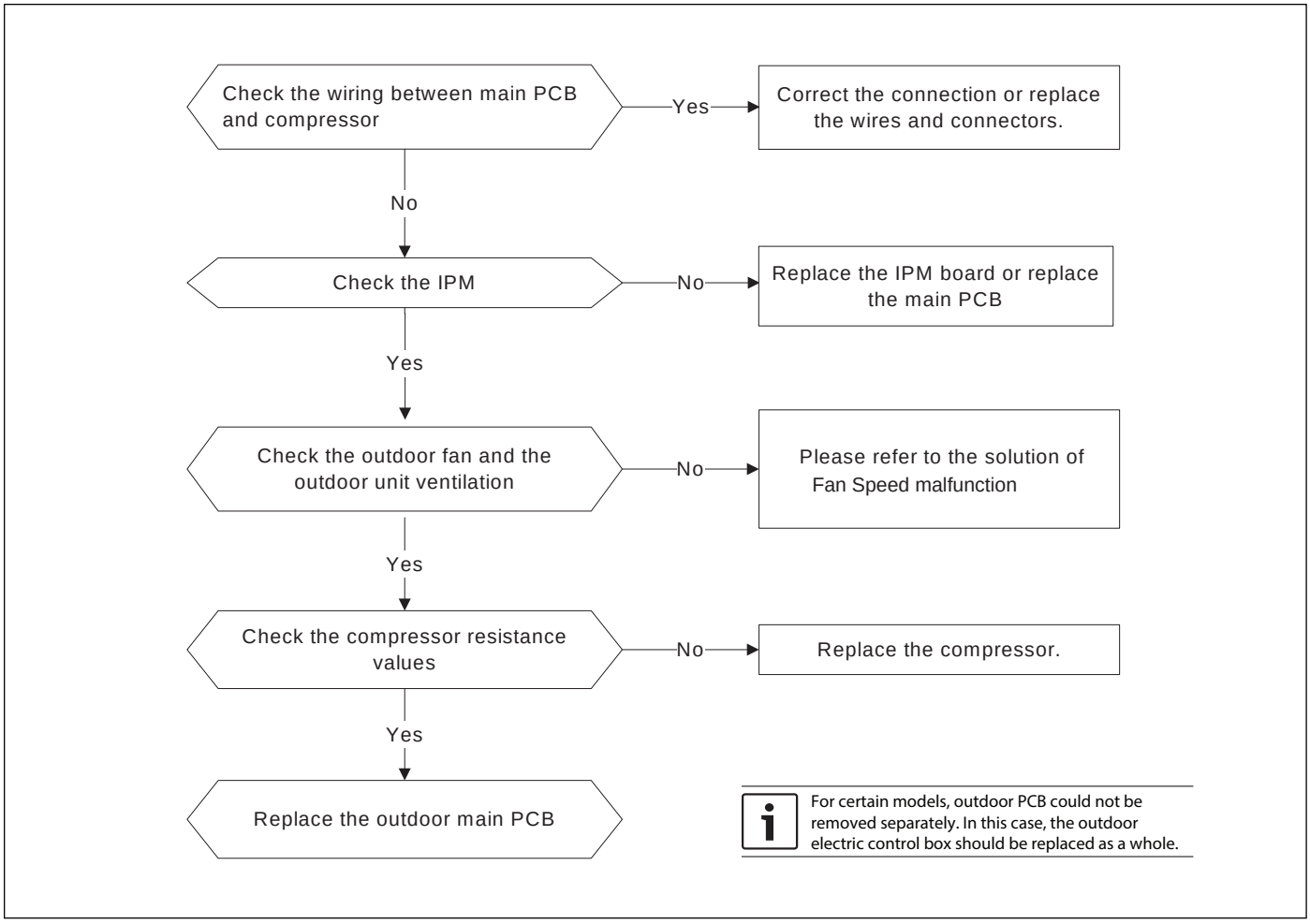


Figure 56

7.6.15 Low Pressure Protection Diagnosis and Solution (PC 03)

Error Code	PC 03
Malfunction decision conditions	Outdoor pressure switch cut off the system because low pressure is lower than 0.13 MPa, the LED displays the failure code.
Supposed causes	• Wiring mistake • Pressure protector faulty • Indoor fan motor faulty • Outdoor PCB faulty • Refrigerant leak

Table 49

Troubleshooting:

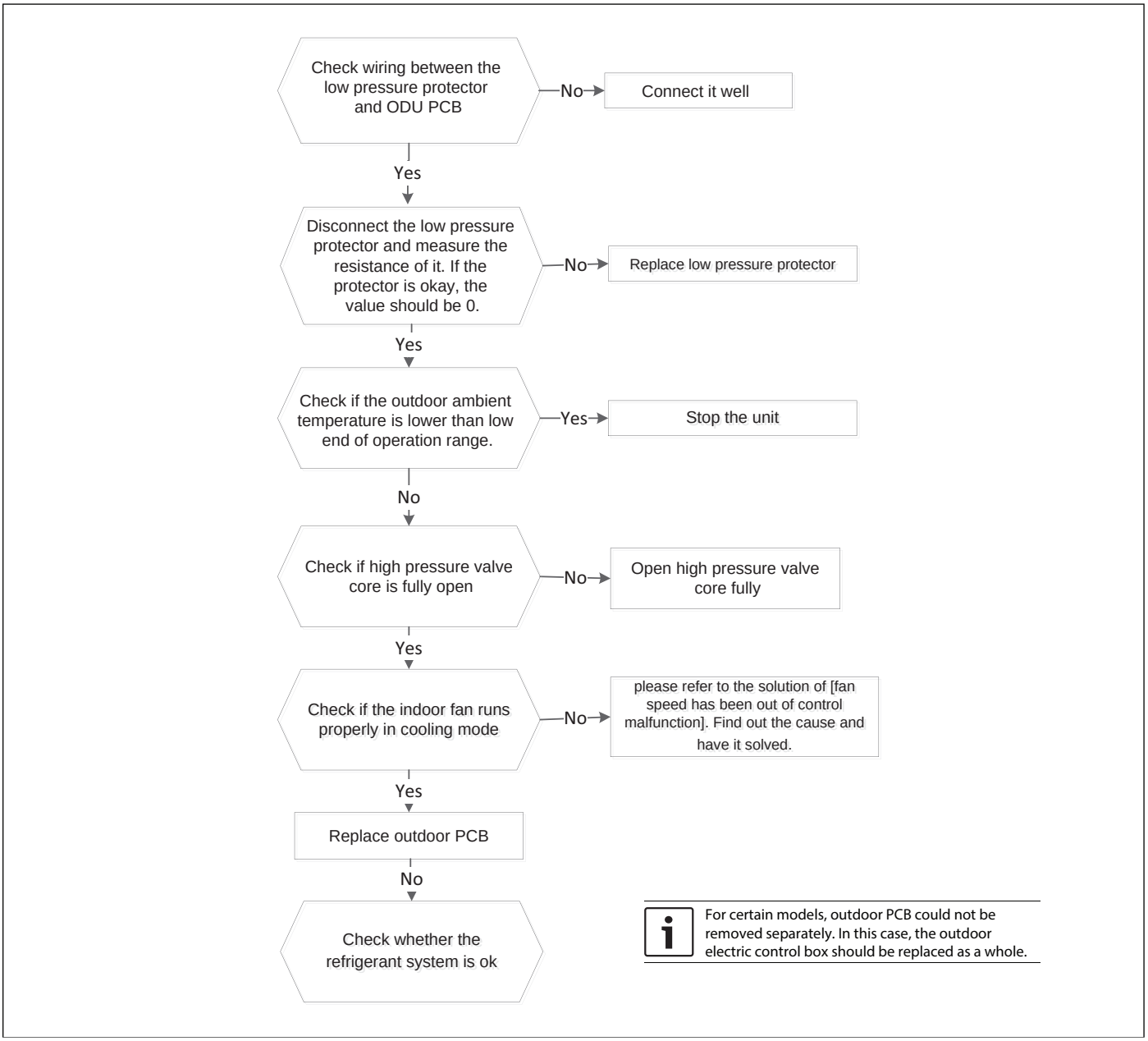


Figure 57

7.6.16 IDU's Mode Conflict (Match with Multi-Zone Units) (--)

Description: The indoor units cannot work in cooling and heating mode at the same time. Heating mode has priority.

- If the Indoor unit A is working in cooling mode or fan mode and indoor unit B is set to heating mode, then unit A will change to off and B will work in heating mode.
- If the Indoor unit A is working in heating mode and indoor unit B is set to cooling mode or fan mode, then unit B will change to standby and A will not change.

	Cooling mode	Heating Mode	Fan	Off
Cooling mode	No	Yes	No	No
Heating Mode	Yes	No	Yes	No
Fan	No	Yes	No	No
Off	No	No	No	No

Table 50

Note:
No: *No mode conflict*
Yes: *Mode conflict*

7.6.17 Low Temperature Protection of ODU (PC0L)

Description: This is a protection function. When the compressor is off and outdoor ambient temperature (T4) is lower than -35°C for 10s, the AC will stop and display the failure code.

When the compressor is on and outdoor ambient temperature (T4) is lower than -40°C for 10s, the AC will stop and display the failure code.

When outdoor ambient temperature (T4) is no lower than -32°C for 10s, the unit will exit protection.

7.6.18 Main Parts Check

Temperature sensor check

WARNING

Electrical hazard!

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

WARNING

Personal injury!

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

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

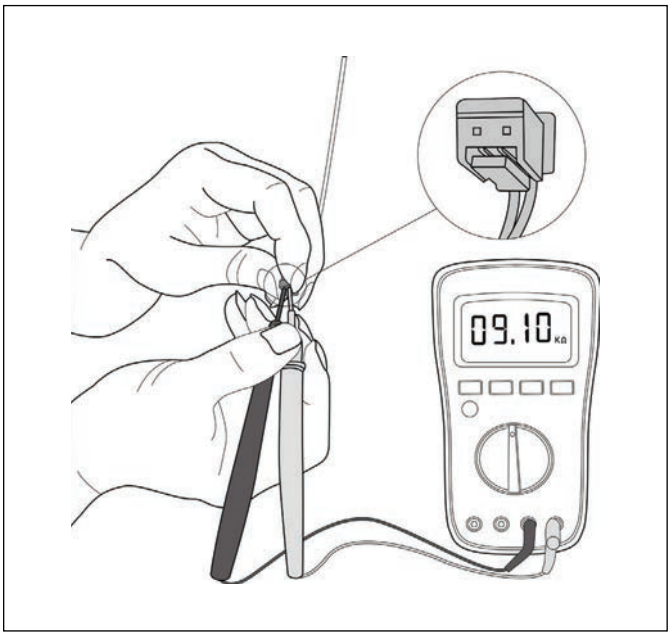


Figure 58

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

Appendix 1 Resistance to Temperature Value Table for Resistive Sensors: T1, T2, T3, T4 (°C/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

Table 51

Appendix 2 Resistance to Temperature Value Table for Resistive Sensors: T5 (°C/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			

Table 52

Compressor check

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

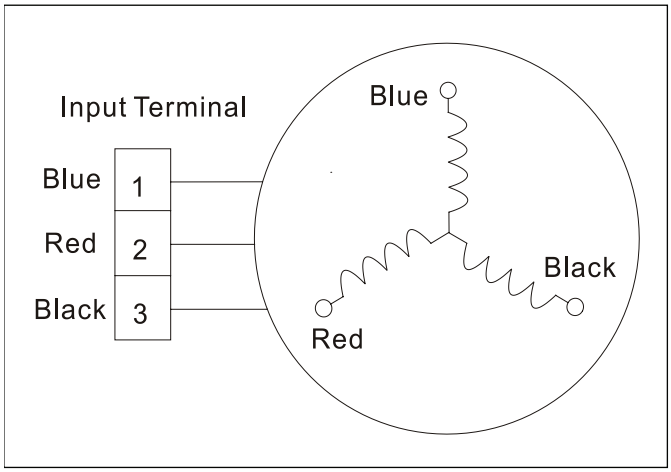


Figure 59

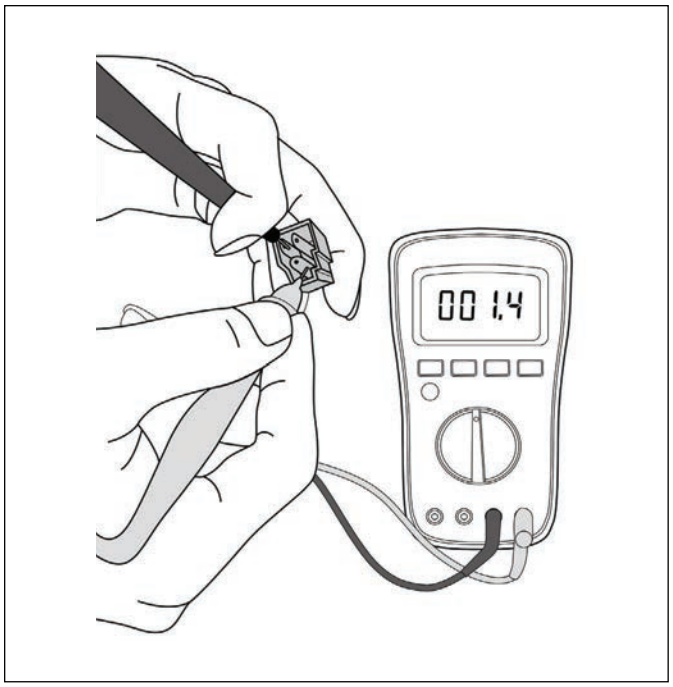


Figure 60

Position	Resistance Value					
	115V - 12K	9K Regular	12K Regular	18K Regular	24K Regular	30K Light Commercial
Blue - Red	2.13Ω	2.13Ω	2.13Ω	1.86Ω	1.04Ω	0.86Ω
Blue - Black						
Red - Black						

Table 53

Position	Resistance Value				
	9K Max Performance	12K Max Performance	18K Max Performance	24K Max Performance	36K Max Performance
Blue - Red	1.82Ω	1.82Ω	1.04Ω	1.04Ω	0.86Ω
Blue - Black					
Red - Black					

Table 54

IPM continuity check

WARNING

Electrical hazard!

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

Turn off the power, let the large capacity electrolytic capacitors discharge completely, and dismount the IPM. Use a digital tester to measure the resistance between P and UVWN; UVW and N.

Digital tester		Normal resistance value	Digital tester		Normal resistance value
(+)Red	(-)Black		(+)Red	(-)Black	
P	N	∞ (Several MΩ)	U	N	∞ (Several MΩ)
	U		V		
	V		W		
	W		-		

Table 55

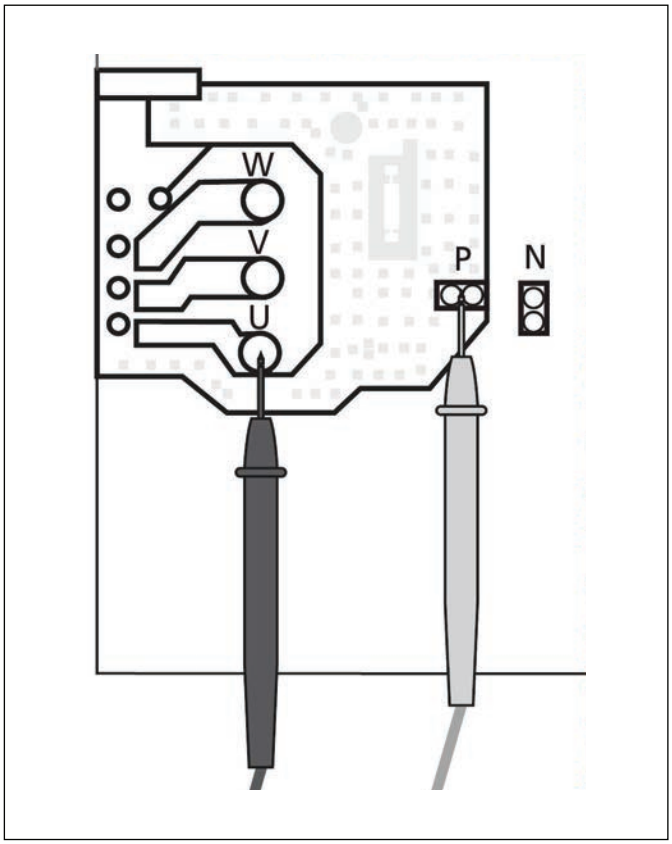


Figure 61

4-way valve check

1. Power on, use a digital tester to measure the voltage, when the unit operates in cooling, it is 0V. When the unit operates in heating, it is about 230VAC.

   If the value of the voltage is not in the range, the PCB must have problems and need to be replaced.

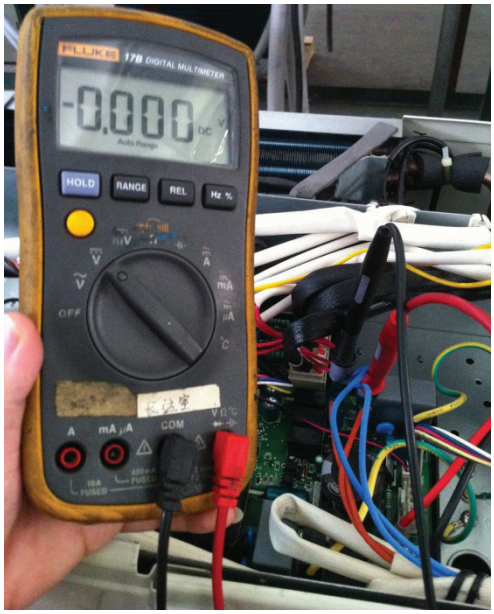


Figure 62

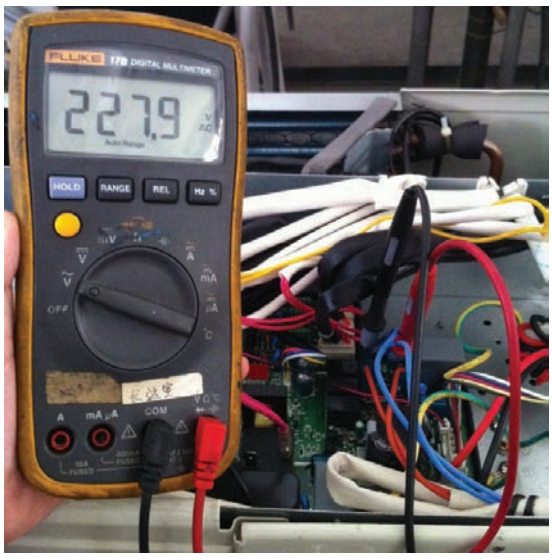


Figure 63

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

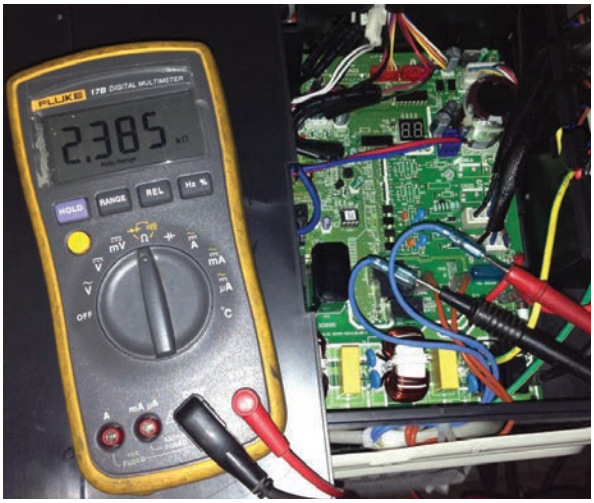


Figure 64

EXV check

WARNING

Electrical shock hazard!

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

1. Disconnect the connector from outdoor PCB.
2. Measure the resistance value of each winding using a multimeter.

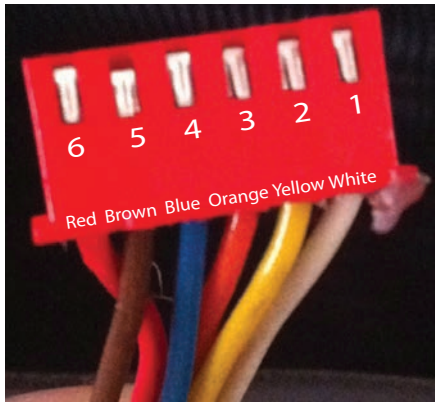


Figure 65

3. Check the resistance value of each winding in the following table.

Color of lead winding	Normal Value
Red - Blue	About 50Ω
Red - Yellow	
Brown - Orange	
Brown - White	

Table 56

8 Disassembly Guide

This part is for reference, the photos may have slight differences with your machine.

8.1 Indoor Unit - Wall Mounted Unit

8.1.1 Front Panel

1. Put your hands at the 2 sides of filter, pull the filter gently along the vertical direction, and then remove it.

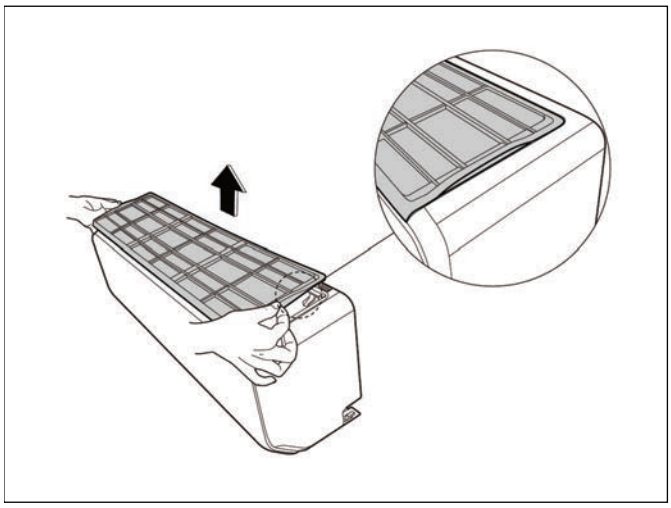


Figure 66

2. Open the horizontal louver and push the locker towards right to open it.
3. Bend the horizontal louver lightly to loosen the hooks, then remove the horizontal louver. (see Figure 67)

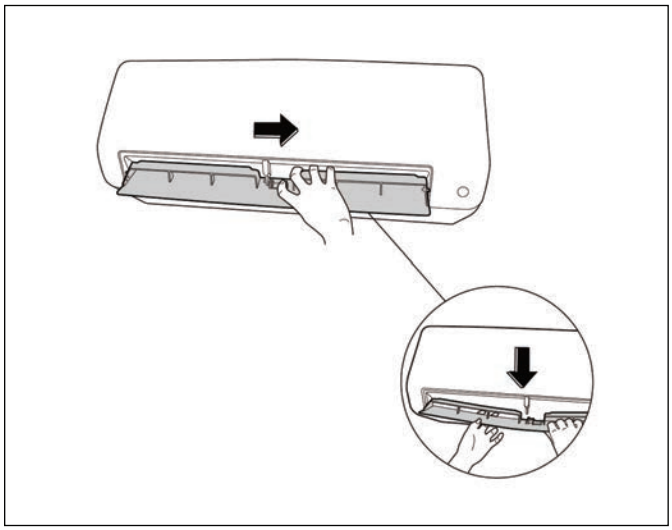


Figure 67

4. Open the panel assembly, move the slider to fix the panel.

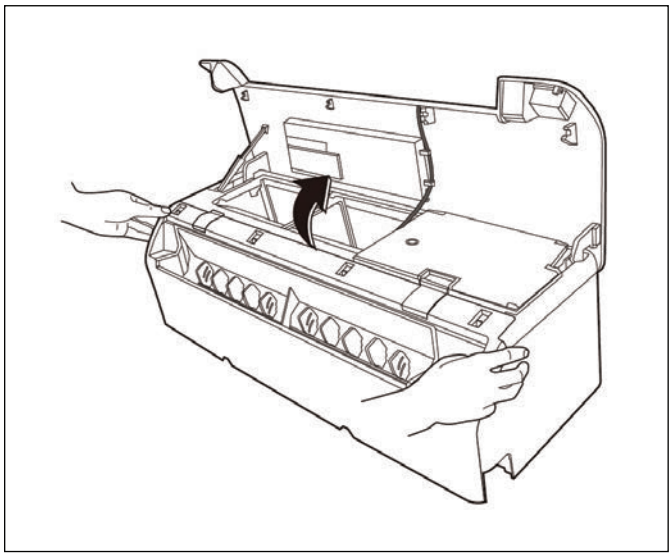


Figure 68

5. Open two stop blocks of panel frame assembly and remove 1 fixing screw in the panel frame.

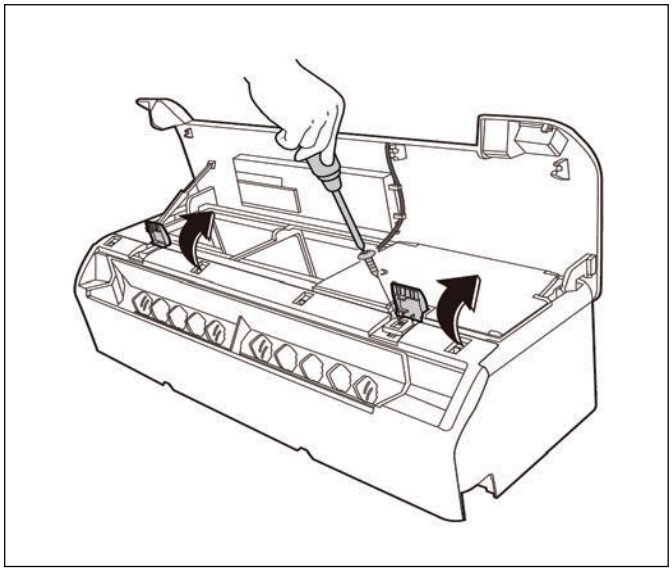


Figure 69

6. Pull two sides of the bottom panel along the direction indicated in the image below to remove it.

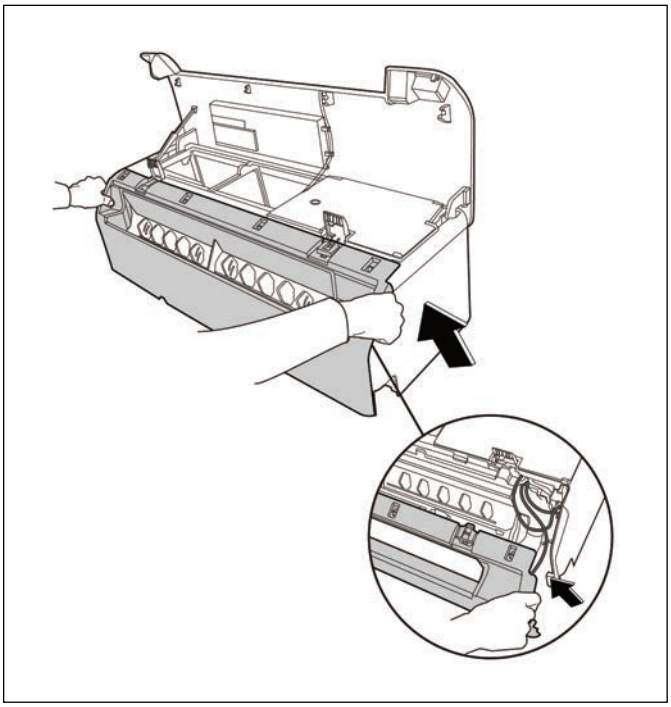


Figure 70

7. Pull the mandril of panel to remove it.
8. Remove the panel assembly.

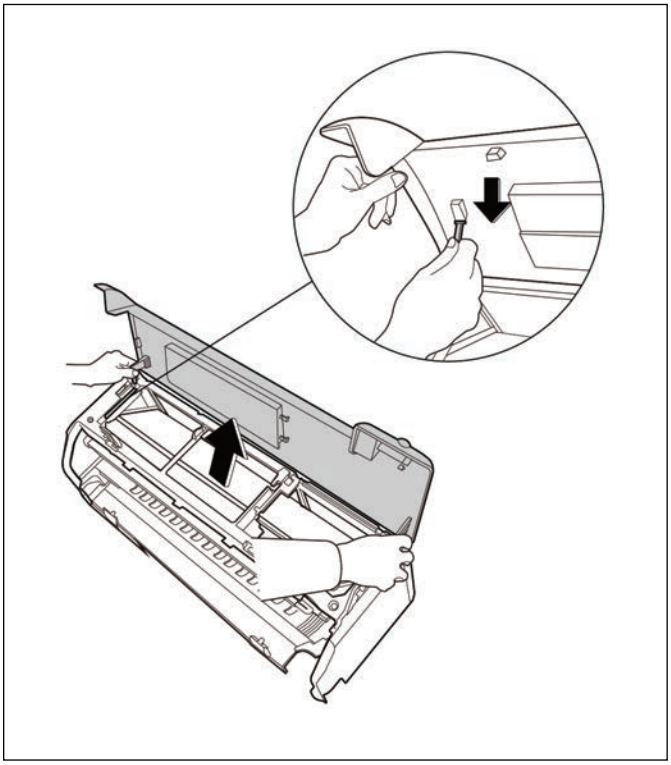


Figure 71

NOTICE

Product damage!

- If you want to close the panel, you must bend the middle of mandril, otherwise it will break.
- For 7k~18k models, mandril is located on the left of the machine. For 24k up models, it is located in the middle of the machine.

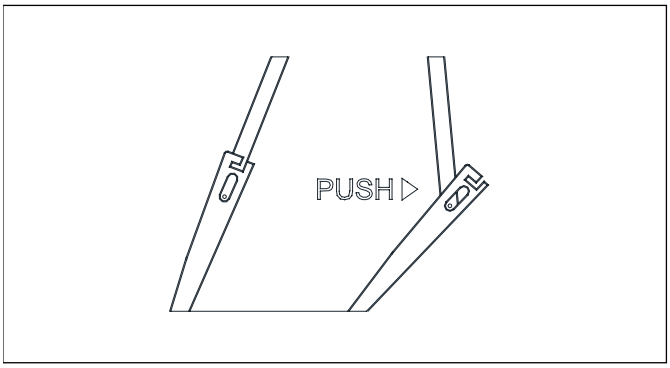


Figure 72

9. Remove 1 screw of the display board.
10. Rotate the display board subassembly in the direction shown in the right picture.
11. Pull the four clips to remove the display board.

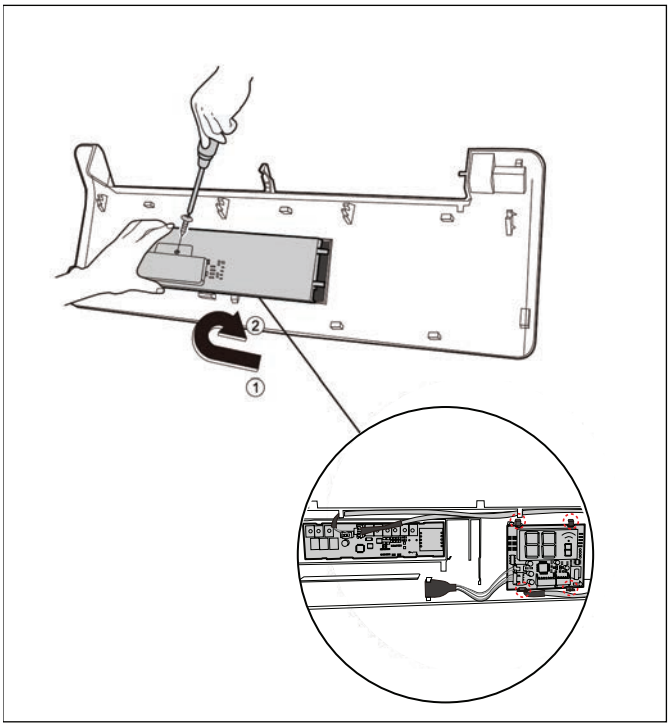


Figure 73

12. Pull the two clips to remove the adapter board subassembly.
13. Remove 1 screw and remove the refrigerant sensor.

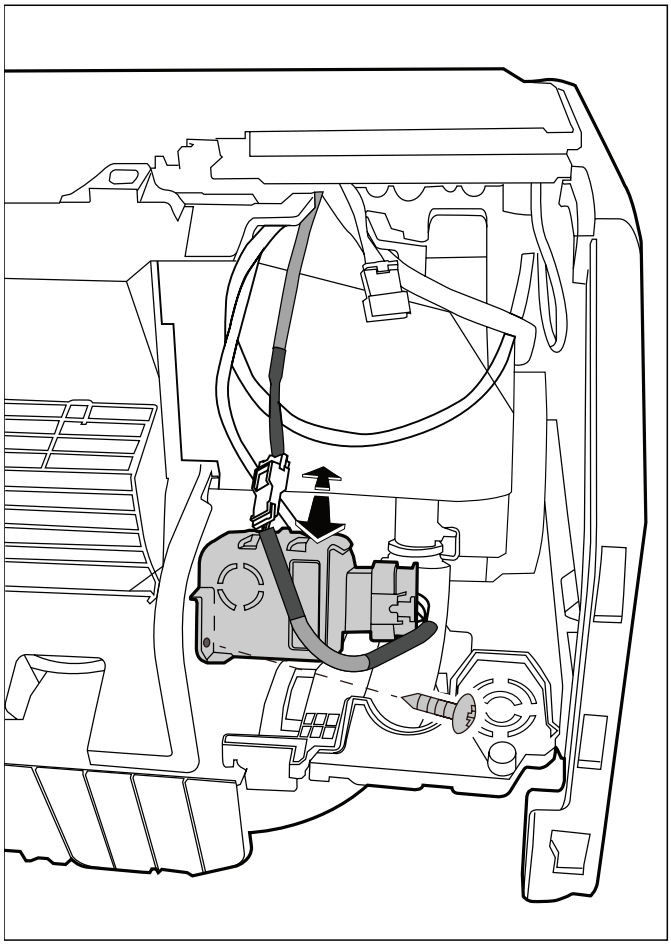


Figure 74

8.1.2 Electrical Parts

NOTICE

Product damage!

Antistatic gloves must be worn.

1. Pull the two lifts of the cover of electronic control box with thumbs and then open it.
2. Raise the mandril to fix the cover.

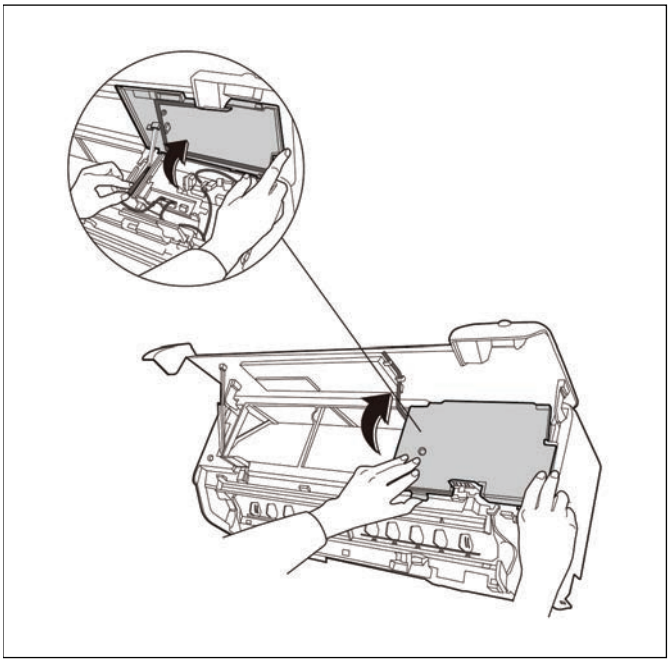


Figure 75

3. Pull the electrical control box holder to remove it.

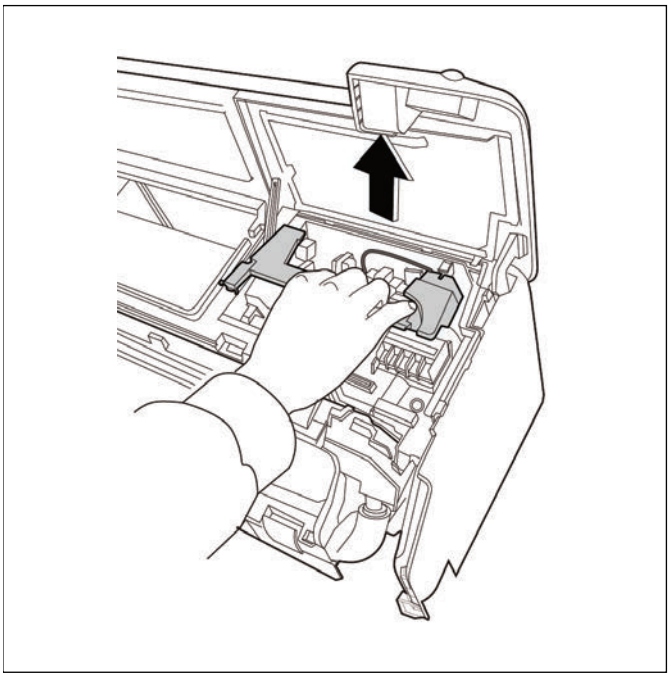


Figure 76

4. Disconnect the wires.

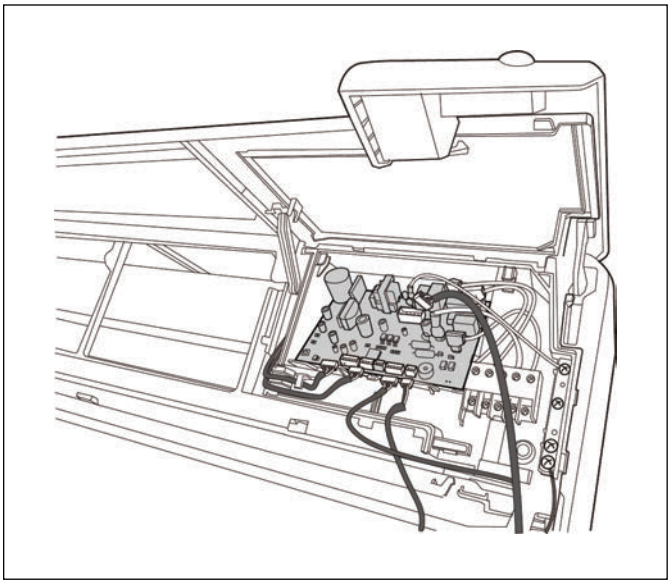


Figure 77

5. Remove one screw used for the ground connection.
6. Pull two clips of the electronic control box along the direction shown in the picture below to remove the main control board.

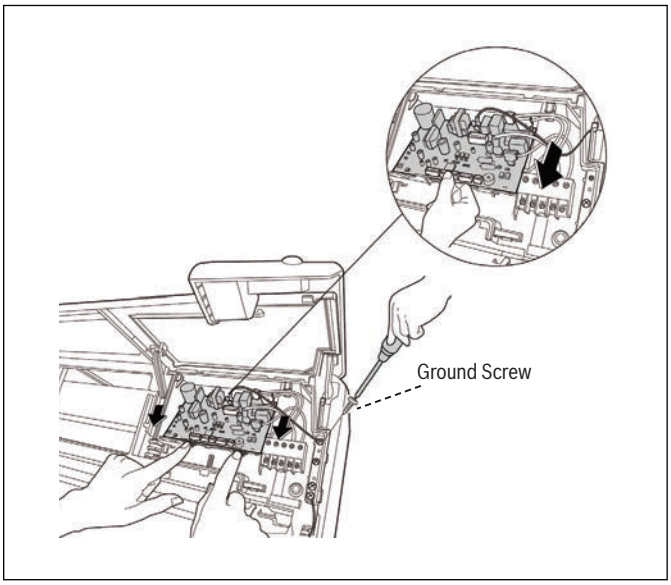


Figure 78

If you want to repair the main control board assembly, perform step 1 to step 6; If you want to repair the electrical control box subassembly, perform the following steps.

7. Remove the other screw used for the ground connection.
8. Collapse the mandril.
9. Pull the cover of electronic control box along the direction indicated below to remove it.

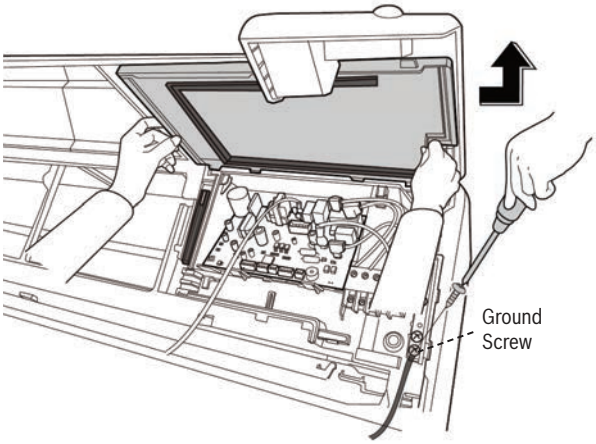


Figure 79

10. Remove one fixing screw then pull out the electronic control box subassembly.

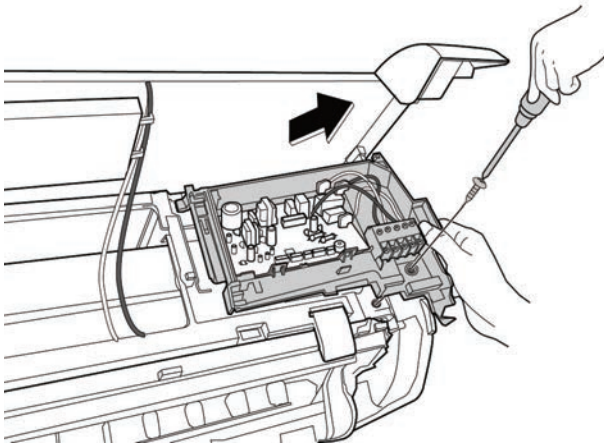


Figure 80

8.1.3 Fan Motor and Fan

Remove the front panel before disassembling fan motor and fan.

1. Open two stop blocks of chassis assembly.
2. Remove chassis assembly along the direction shown below.

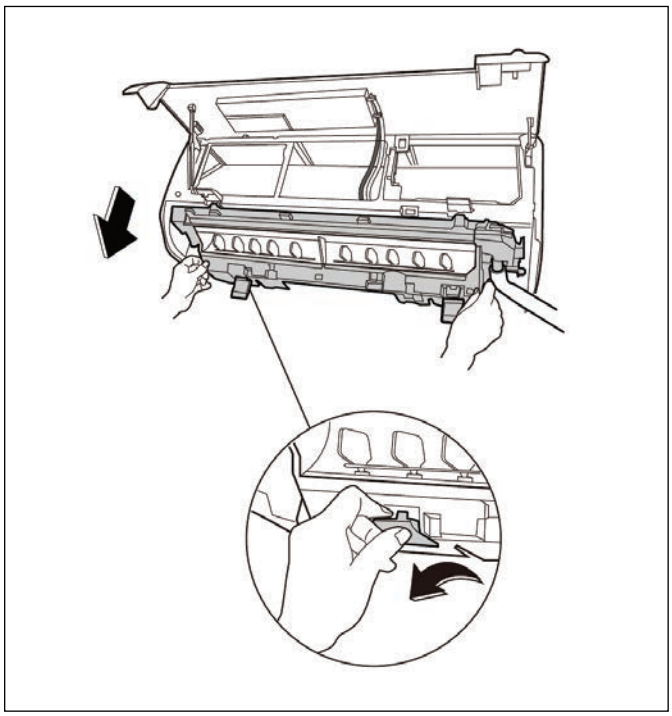


Figure 81

3. Remove the two screws and remove the fixing board of the fan motor.

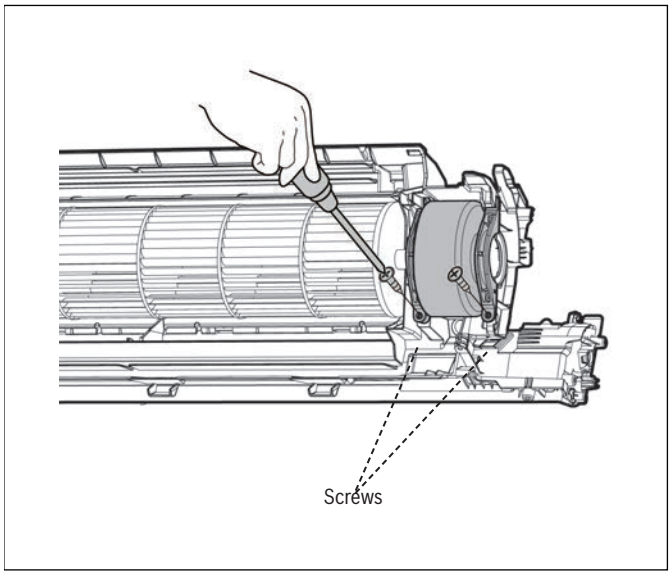


Figure 82

4. Remove the bearing sleeve.

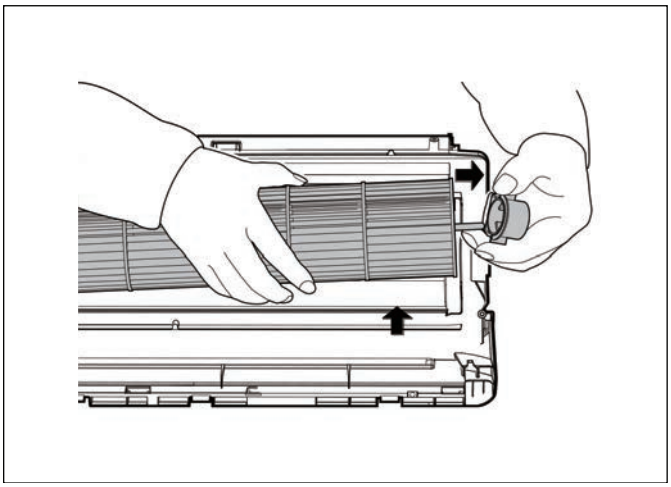


Figure 83

5. Remove the fixing screw.

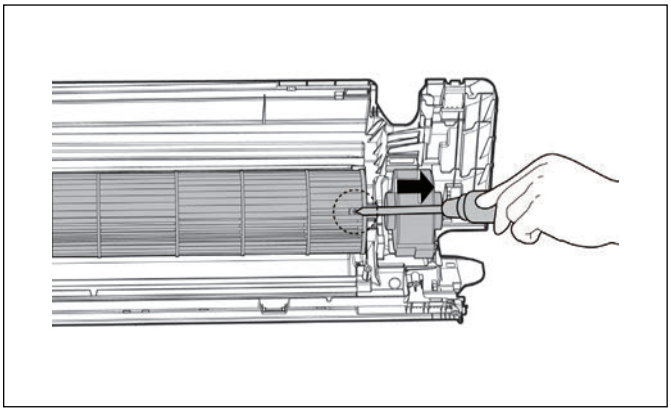


Figure 84

6. Pull out the fan motor and fan assembly from the side.

8.1.4 Step Motor

Remove the front panel and chassis assembly before disassembling step motor.

1. Remove one screw to remove cover of louver motor (for some units).

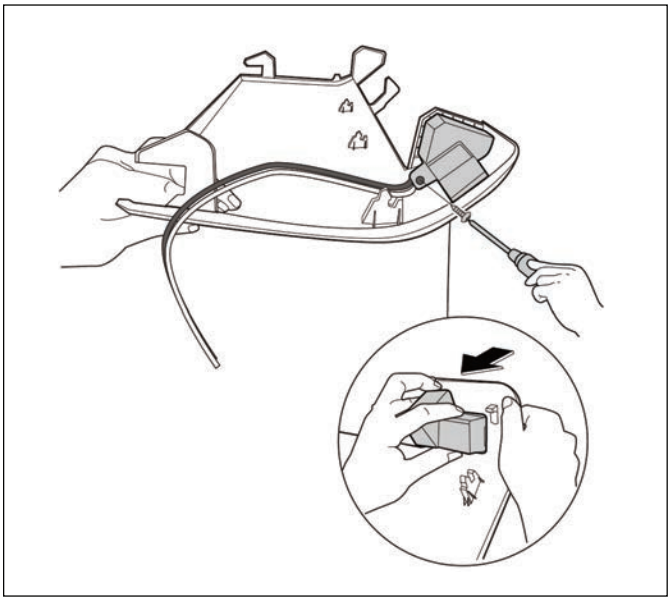


Figure 85

2. Open the cover of louver motor, pull out intelligent eye subassembly.

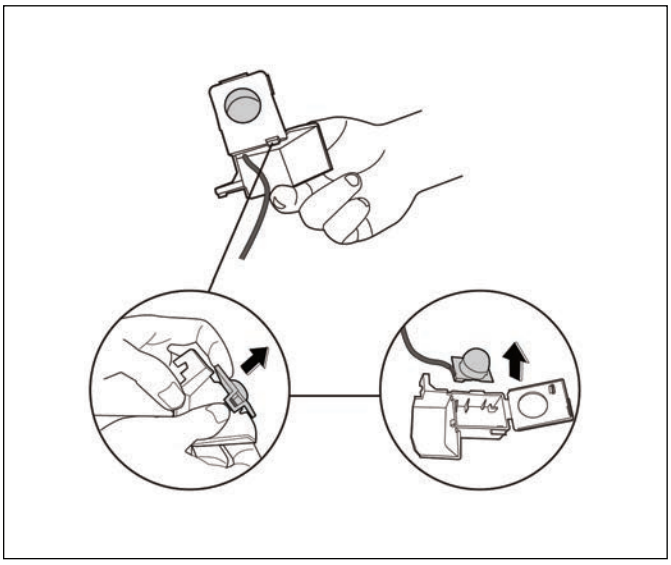


Figure 86

3. Remove the two screws, then remove the horizontal swing motor (see Figure 143).

The horizontal swing motor is located in panel assembly.

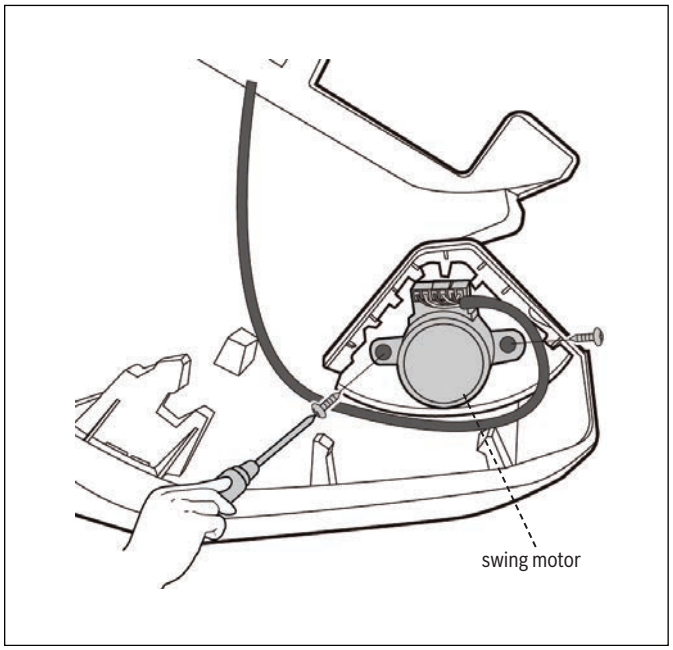


Figure 87

4. Remove 2 screws, then remove the vertical swing motor (for some units).
5. Remove 1 screw, then remove the ionizer generatorfor some units).

The vertical swing motor and ionizer generator are located in chassis assembly.

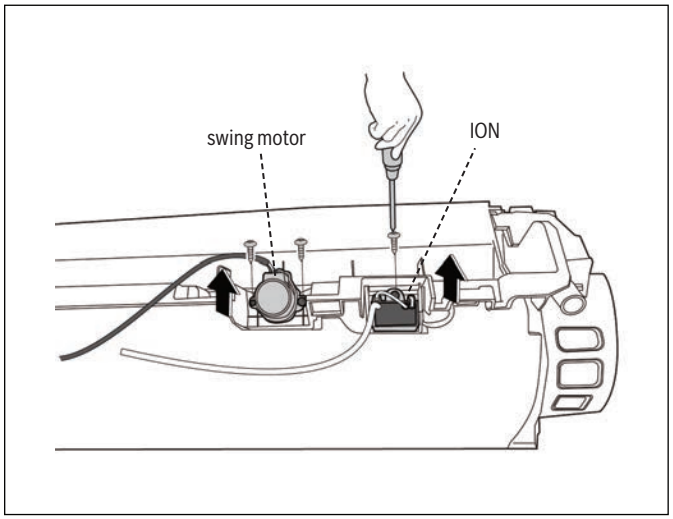


Figure 88

8.1.5 Drain Hose

1. Rotate the fixed wire clockwise indicated in the image below.
2. Pull up the drain hose to remove it.

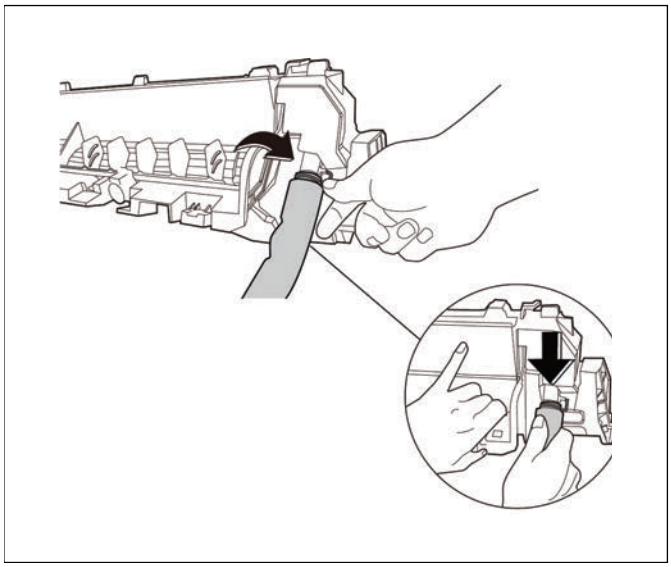


Figure 89

8.1.6 Evaporator

Remove the front panel, electrical parts and fan before disassembling evaporator.

1. Remove the 2 screws then remove the panel frame assembly.

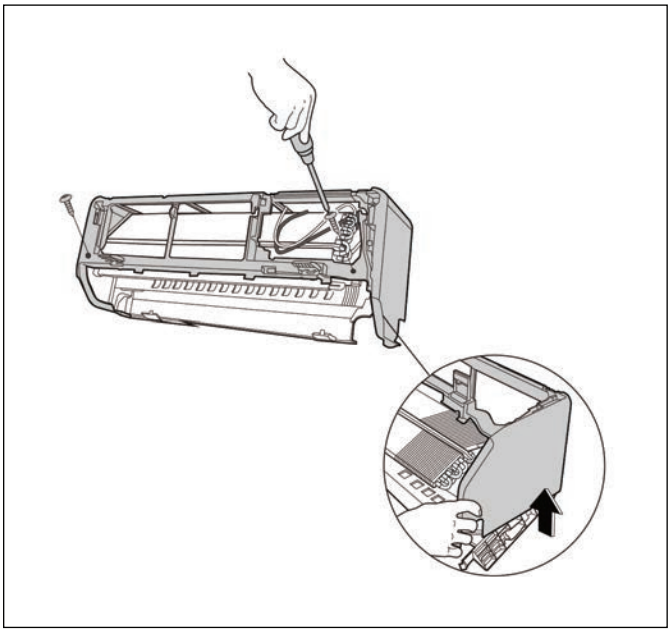


Figure 90

2. Disassemble the pipe clamp board.

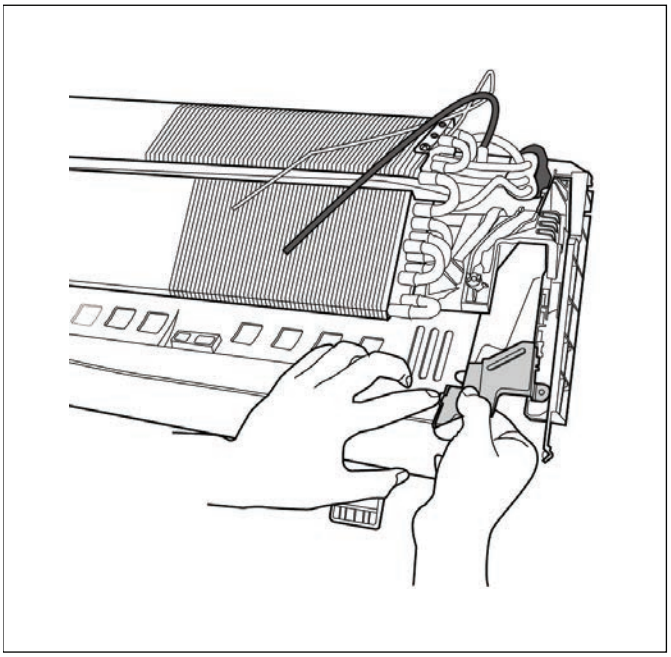


Figure 91

3. Remove the 1 screw on the evaporator located at the left fixed plate.
4. Remove the 1 screw on the evaporator located on the right side.

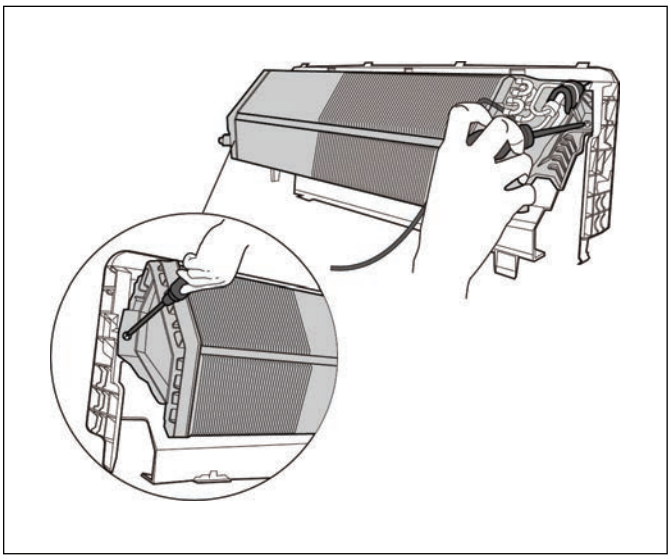


Figure 92

5. Bend the piping carefully, separate the chassis assembly (above) and the evaporator then take the evaporator out.

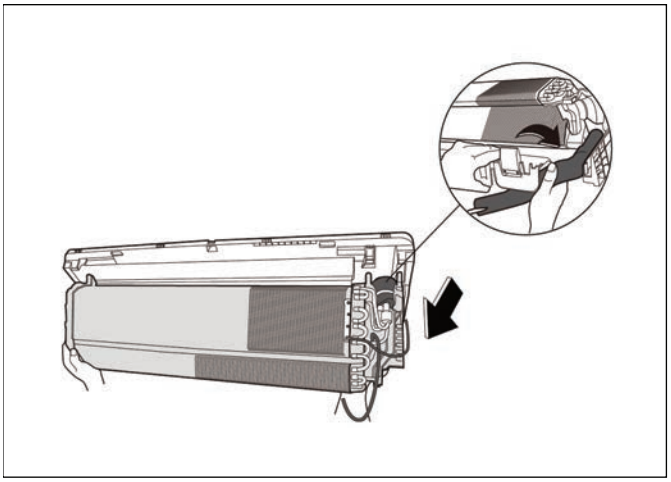


Figure 93

8.2 Outdoor Unit

8.2.1 Panel Plates

Panel Plate 24K (Reg/Max P), 30K, 36K (Reg)

1. Turn off the air conditioner and the power breaker.
2. Remove the screws of the big handle and then remove the big handle.

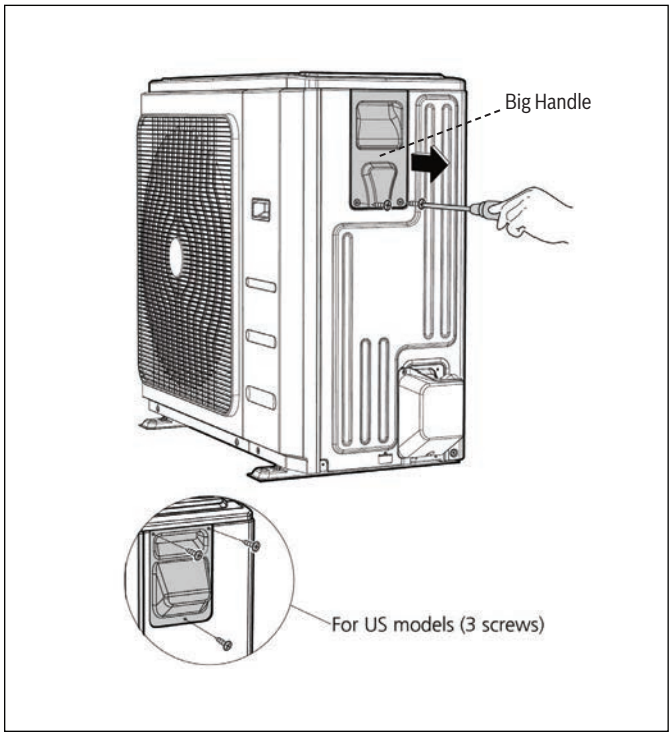


Figure 94

3. Remove the screws of the top cover and then remove the top cover (4 screws). Two of the screws are located underneath the big handle.

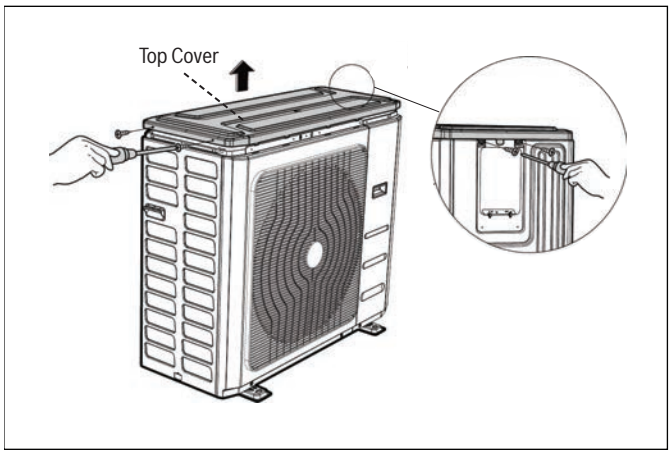


Figure 95

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

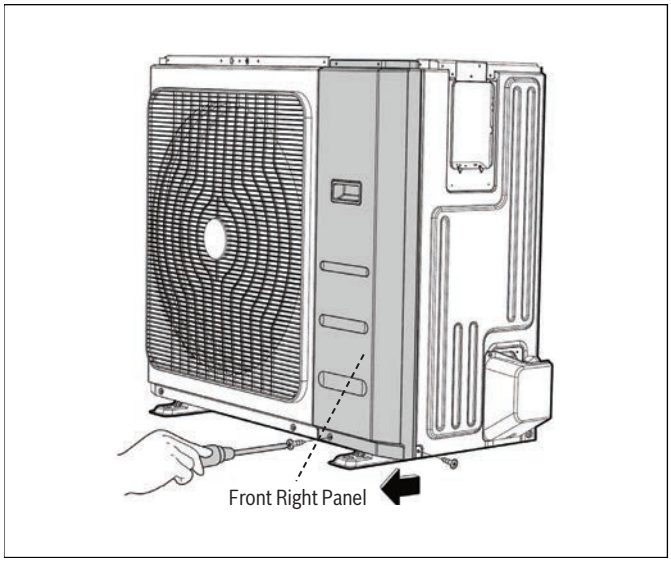


Figure 96

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

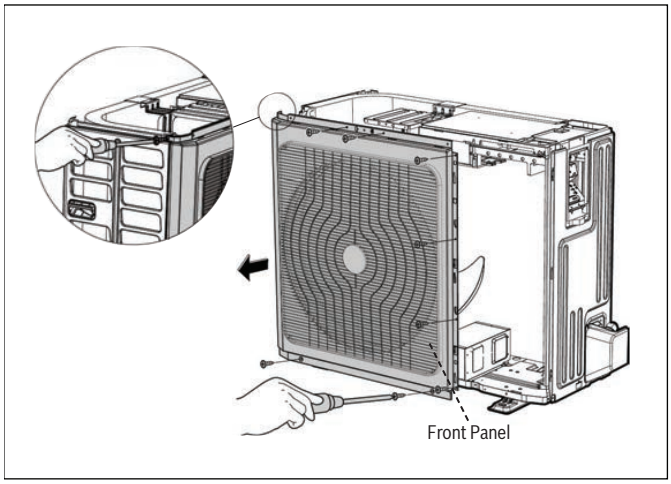


Figure 97

6. Remove the screws of water collecting cover and then remove the water collecting cover.

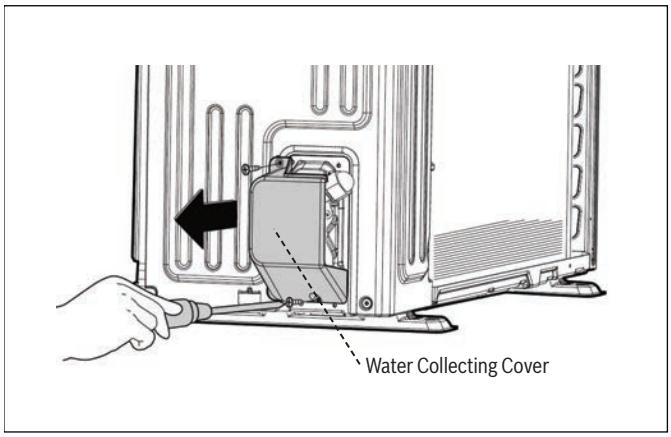


Figure 98

7. Remove the screws of the rear net and then remove the rear net (3 screws).

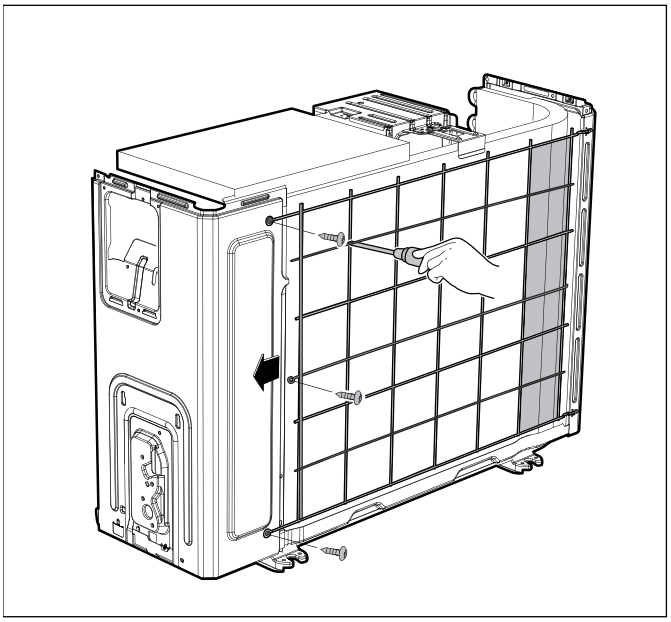


Figure 99

8. Remove the screws of the right panel and then remove the right panel.

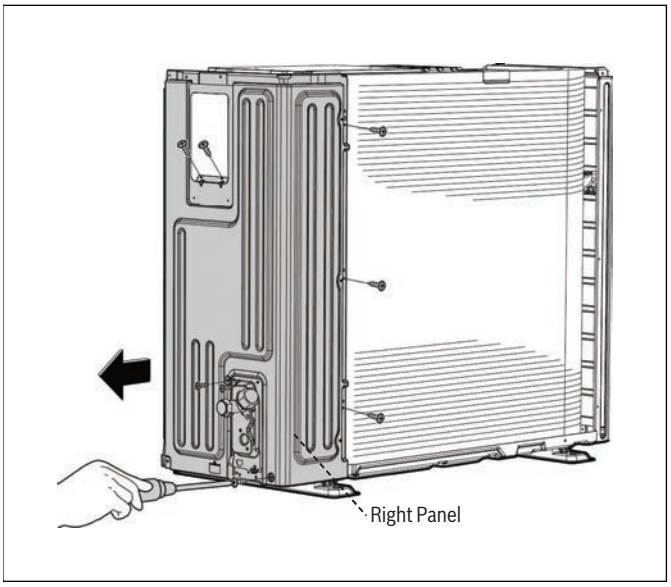


Figure 100

Panel Plate 12K 115V, 9K, 12K, Reg/Max P

1. Turn off the air conditioner and the power breaker.
2. Remove the screw of the big handle and then remove the big handle (1 screws).

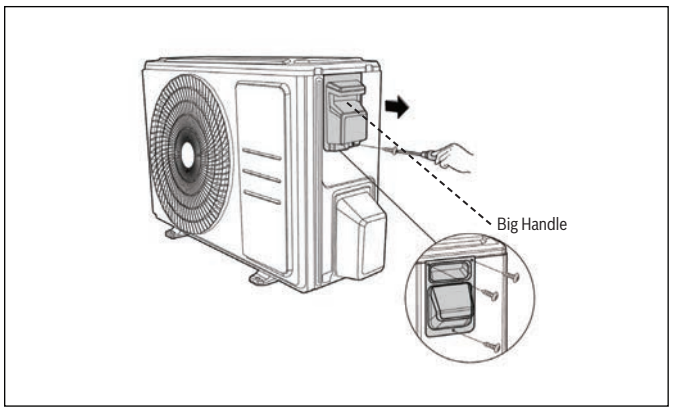


Figure 101

3. Remove the screws of the top cover and then remove the top cover (4 screws). One of the screws is located underneath the big handle.

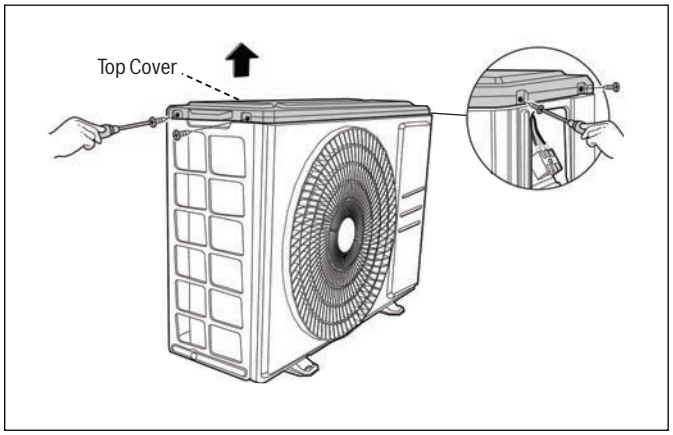


Figure 102

4. Remove the screws of water collecting cover and then remove the water collecting cover (2 screws).

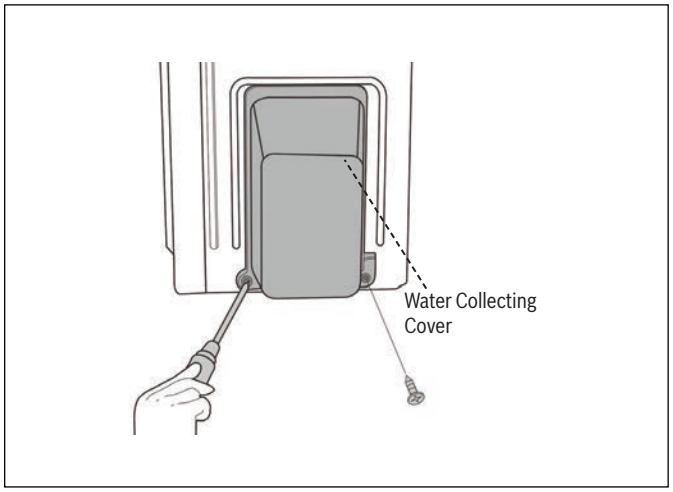


Figure 103

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

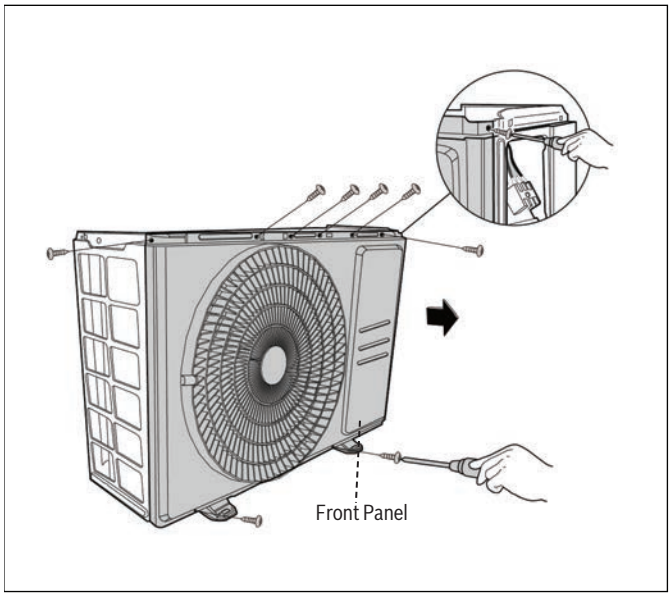


Figure 104

6. Remove the screws of the right panel and then remove the right panel (5 screws).

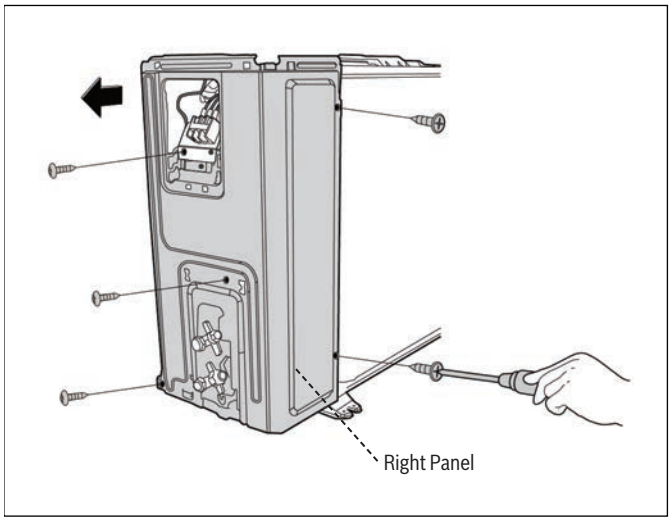


Figure 105

Panel Plate 18K Reg/Max P

1. Turn off the air conditioner and the circuit breaker.
2. Remove the screw of the big handle and then remove the big handle (1 screw).

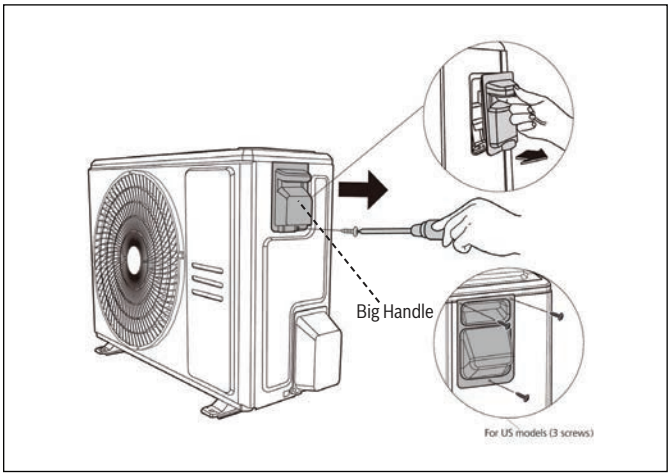


Figure 106

3. Remove the screws of the top cover and then remove the top cover (3 screws). One of the screws is located underneath the big handle.

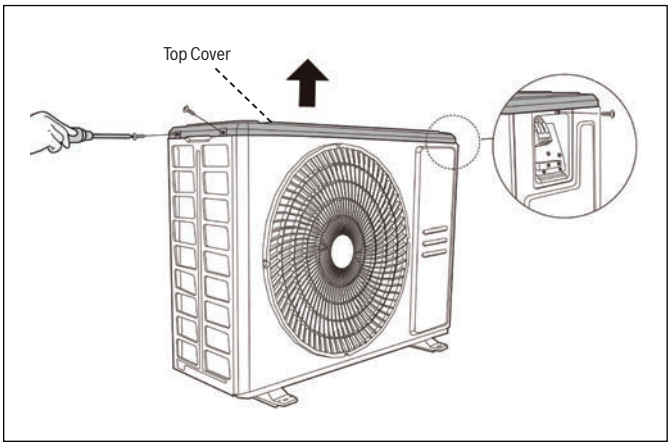


Figure 107

4. Remove the screws of water collecting cover and then remove the water collecting cover (2 screws).

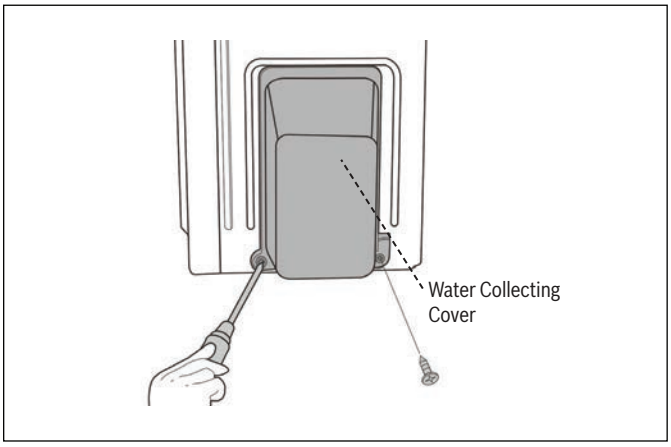


Figure 108

5. Remove the screws of the front panel and then remove the front panel (7 screws).

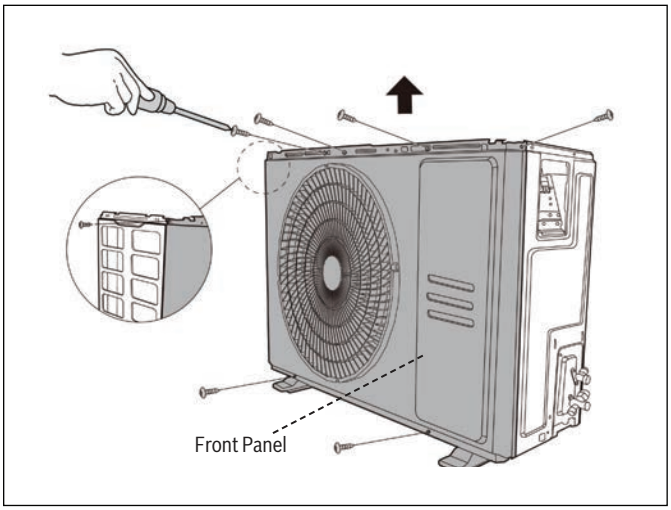


Figure 109

6. Remove the screws of the right panel and then remove the right panel (6 screws).

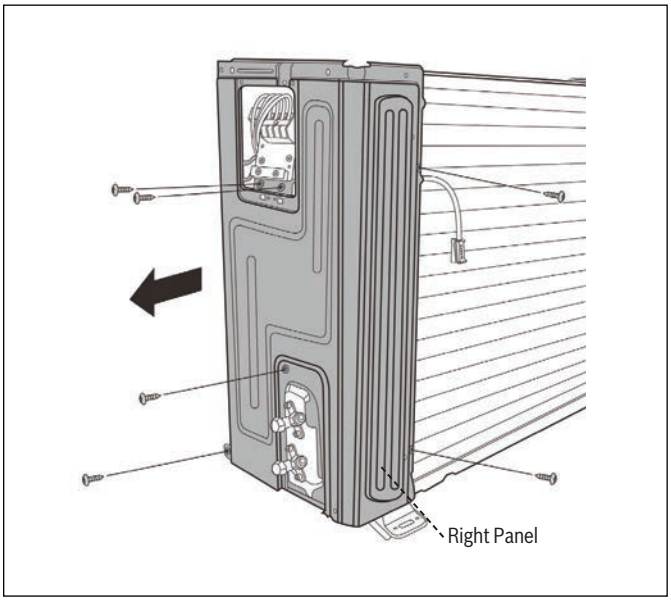


Figure 110

8.2.2 Electrical Parts

PCB Board 18K (Reg/Max P)

1. Remove the screws and unfix the hooks, then open the electronic control box cover (5 screws and 2 hooks).

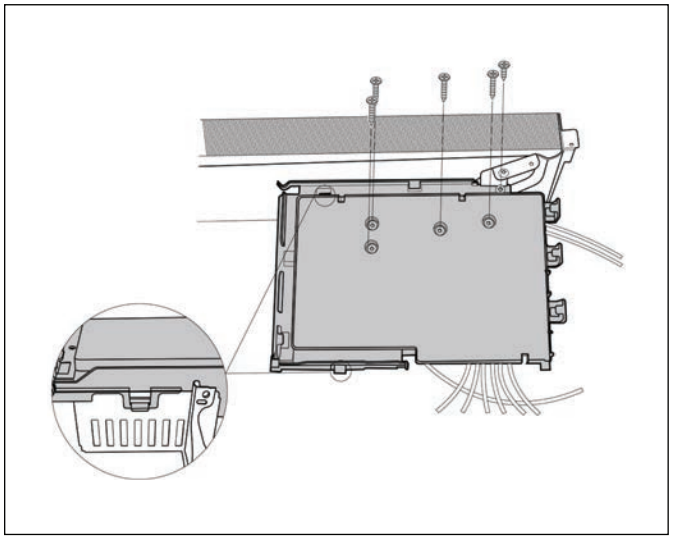


Figure 111

2. Disconnect the connector for fan motor from the electronic control board.
3. Remove the connector for the compressor.
4. Pull out the two blue wires connected with the four way valve.
5. Pull out connectors of the condenser coil temp. sensor (T3), outdoor ambient temp. sensor (T4) and discharge temp. sensor (TP).
6. Disconnect the electronic expansion valve wire.
7. Remove the connector for the DR and reactor.
8. Then remove the electronic control board.

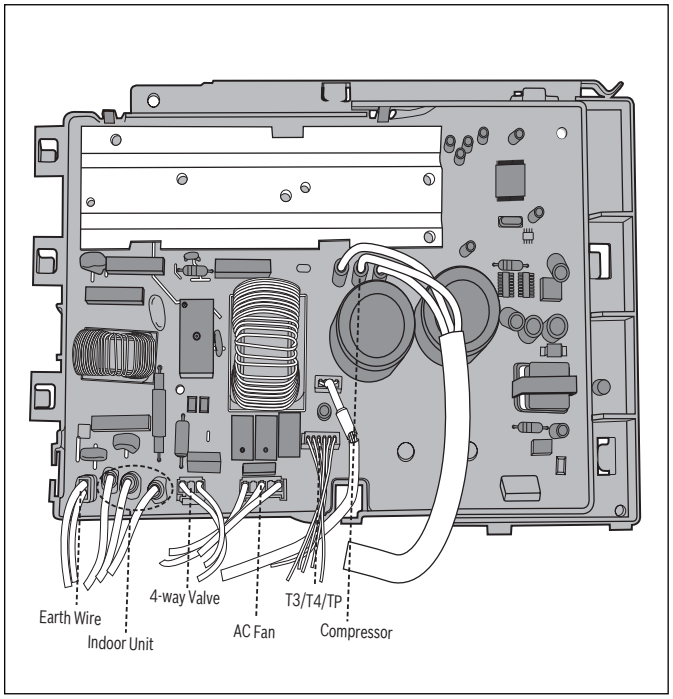


Figure 112

PCB Board 12K 115V (Reg), 9K, 12K (Reg/Max P)

1. Disconnect the connector for compressor and release the ground wire (1 screw).

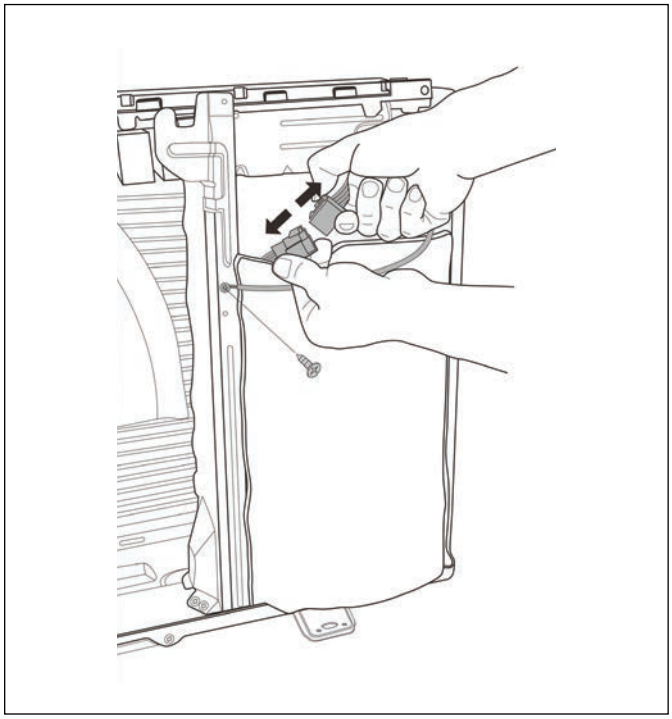


Figure 113

2. Pull out the wires from electrical supporting plate and turn over the electronic control assembly.

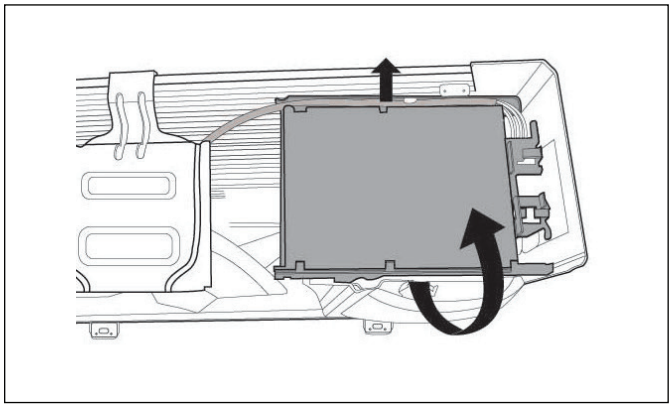


Figure 114

3. Remove the electronic installing box subassembly (4 hooks).

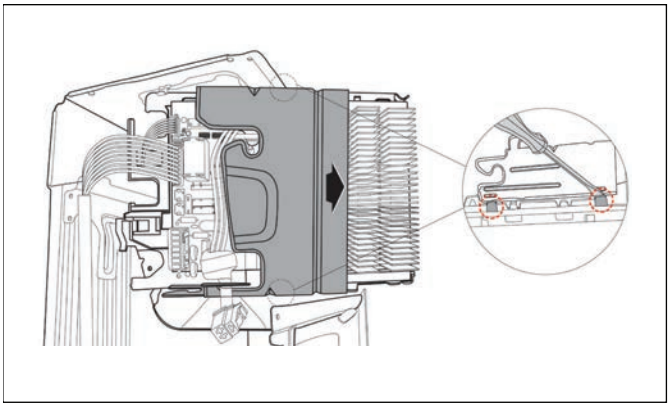


Figure 115

4. Remove the fixing board (2 hooks).

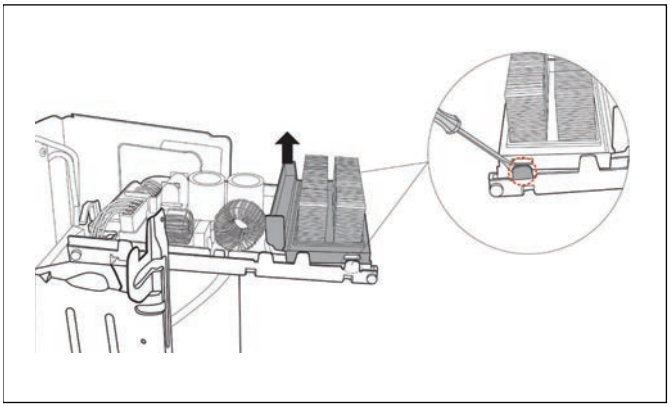


Figure 116

5. Disconnect the connectors from the electronic control board.

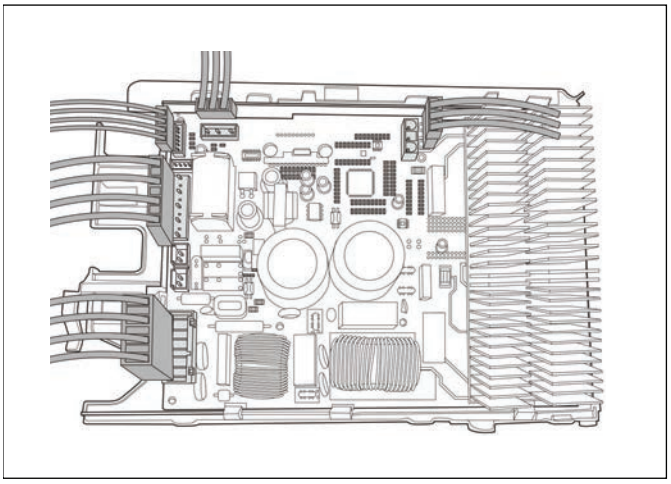


Figure 117

6. Then remove the electronic control board (4 hooks).

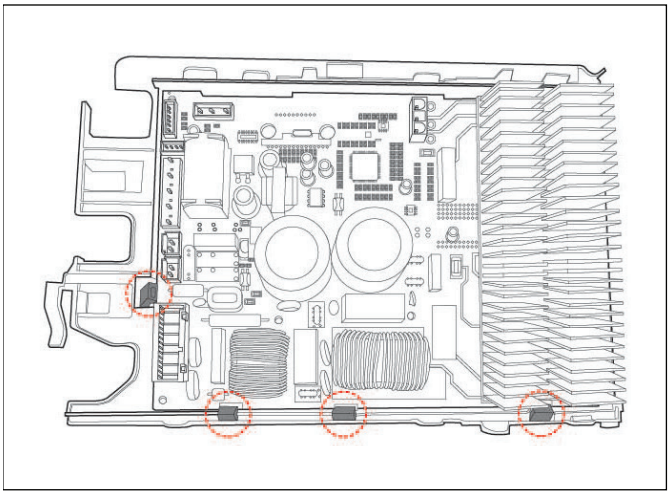


Figure 118

PCB Board 24K (Reg/Max P), 30K and 36K (Reg)

WARNING

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

1. Remove the cover of electrical control box.

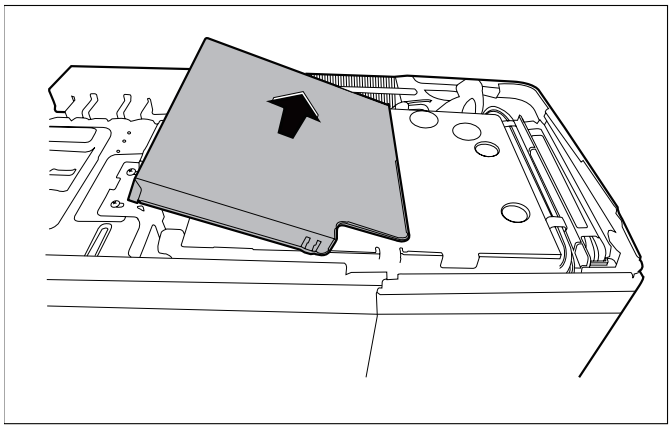


Figure 119

2. Disconnect the fan motor connector.

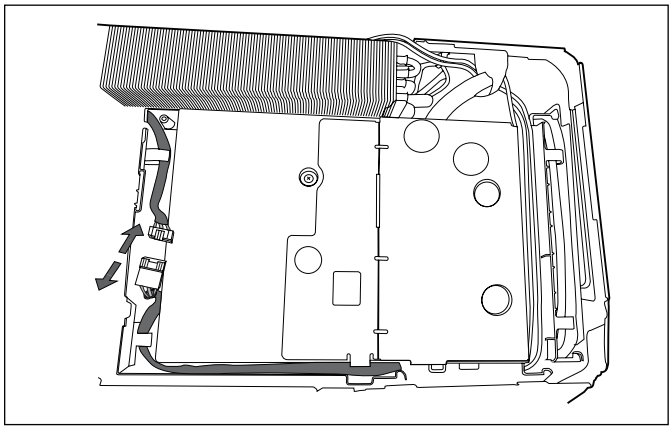


Figure 120

3. Remove eight fixing screws.
4. Turn over the electronic control box subassembly.

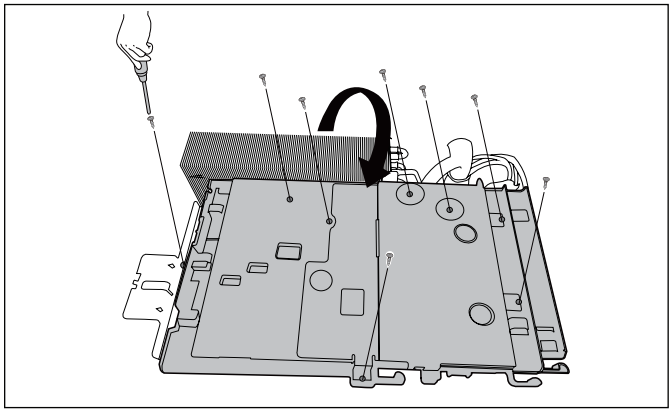


Figure 121

5. Remove 3 screws and then remove the bracket.
6. Disconnect the connectors from the electronic control board.
7. Remove 3 screws and then remove the electronic control board.

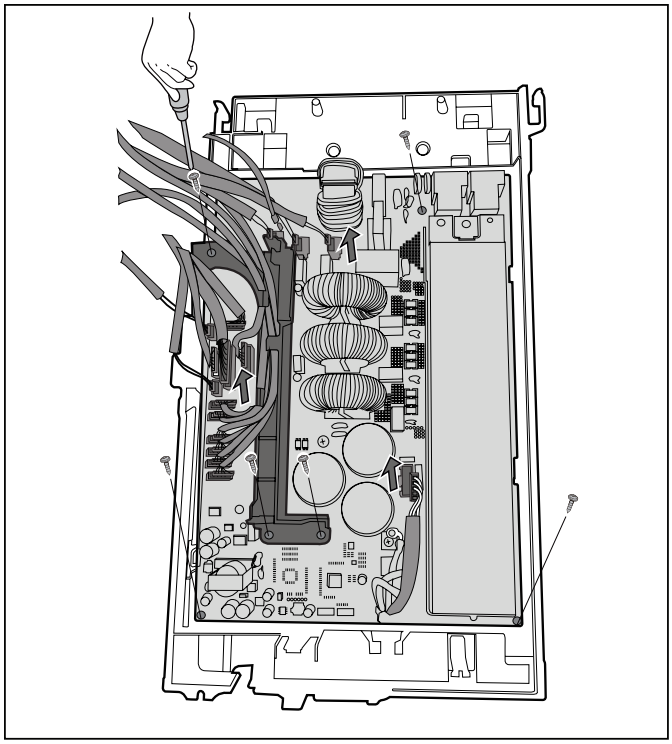


Figure 122

8. Pull out the connector, remove one screw and then remove the keyboard subassembly on terminal board.

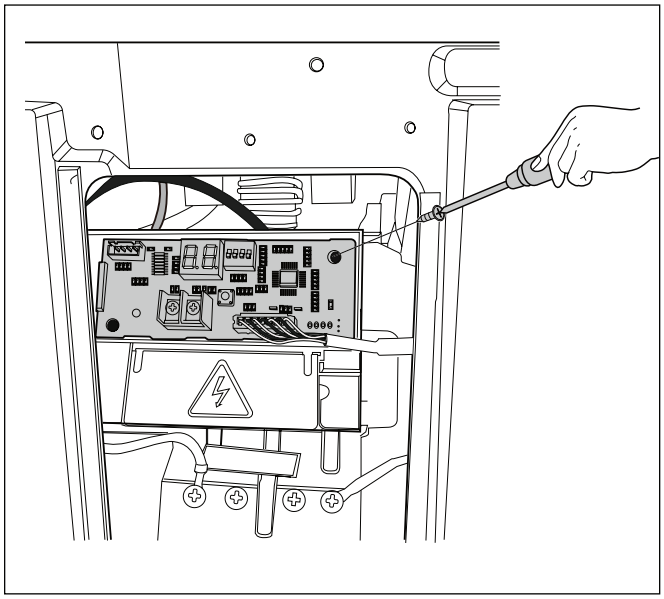


Figure 123

8.2.3 Fan Assembly

Remove the panel plate before disassembling fan.

1. Remove the nut securing the fan with a spanner.
2. Remove the fan.

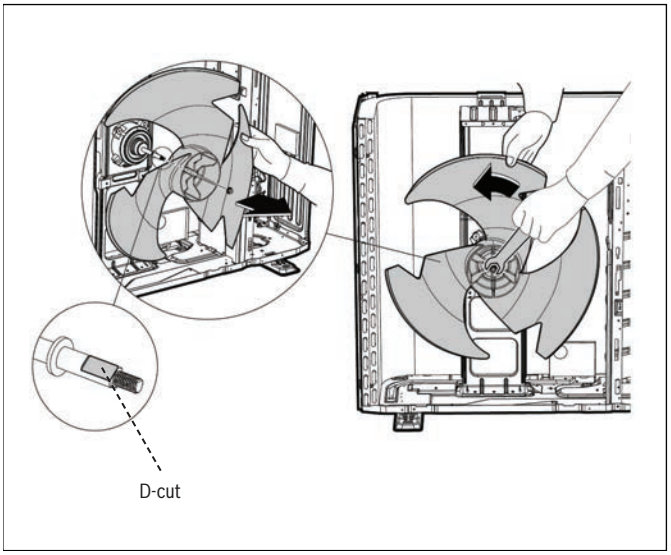


Figure 124

8.2.4 Fan Motor

Remove the panel plate, the connection of fan motor on PCB and fan assembly before disassembling fan motor.

1. Remove the fixing screws of the fan motor (4 screws).
2. Remove the fan motor.

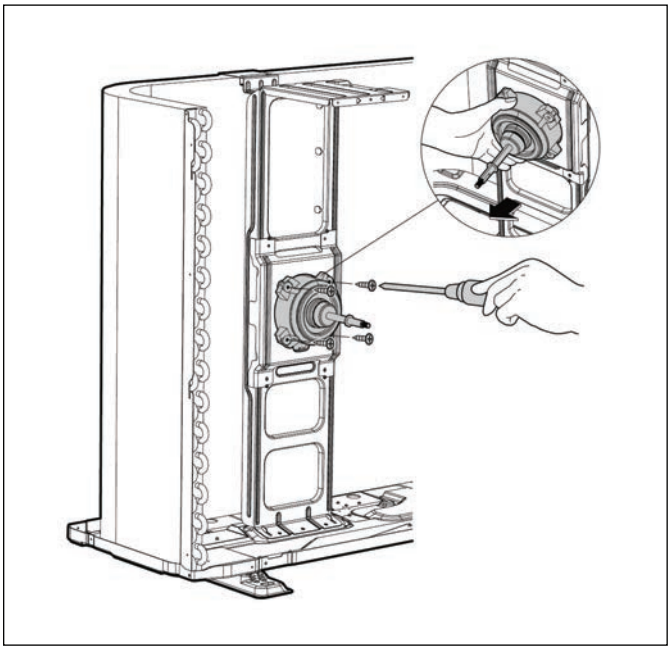


Figure 125

8.2.5 Sound Blanket

Remove the panel plate before disassembling sound blanket.

1. Remove the sound blanket (side and top).

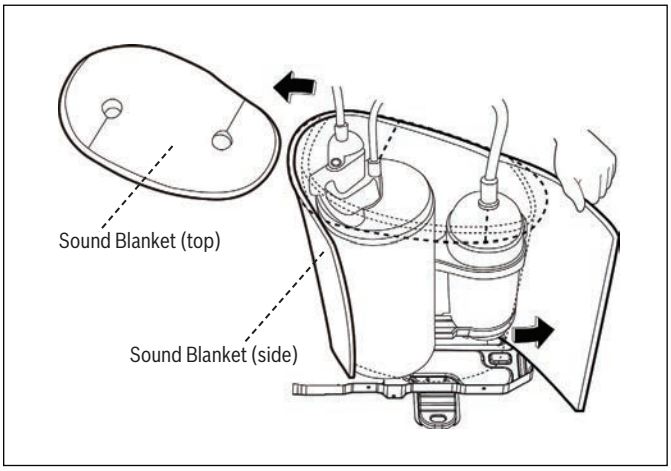


Figure 126

8.2.6 Four-Way Valve

WARNING

Contains refrigerant!

Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. You should evacuate the system with the vacuum pump; flush the system with nitrogen; then repeat the two steps before heating up the brazed parts. The operations above should be implemented by HVAC professionals.

Remove the panel plate, connection of four-way valve on PCB before disassembling sound blanket.

1. Heat up the brazed parts and then detach the the four-way valve and the pipe.
2. Remove the four-way valve assembly with pliers.

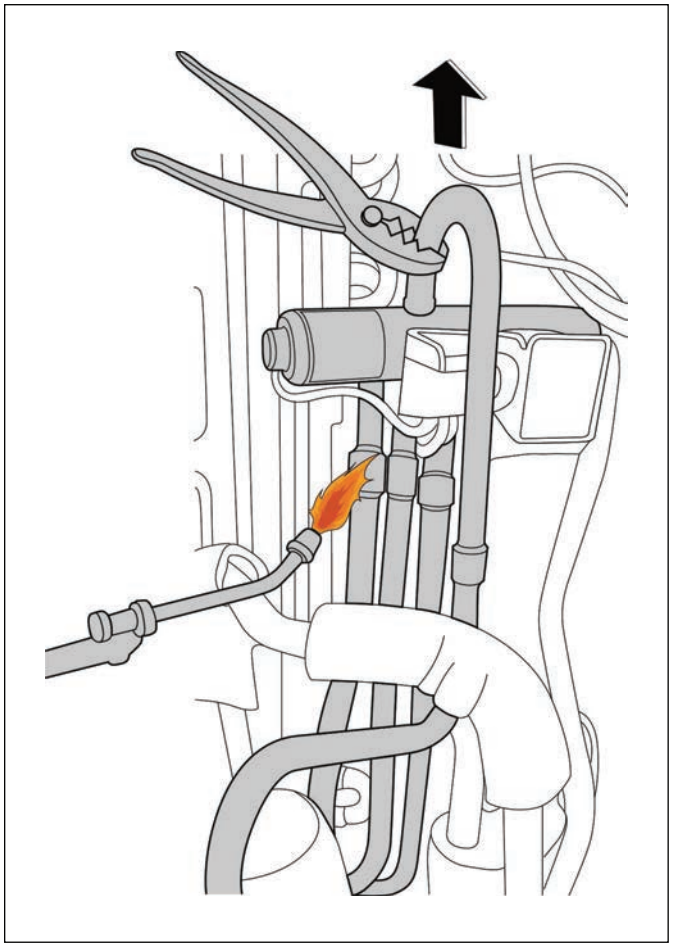


Figure 127

8.2.7 Compressor

WARNING

Contains refrigerant!

Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. You should evacuate the system with the vacuum pump; flush the system with nitrogen; then repeat the two steps before heating up the brazed parts. The operations above should be implemented by HVAC professionals.

Remove the panel plate, connection of compressor on PCB before disassembling sound blanket.

1. Remove the flange nut of terminal cover and remove the terminal cover.

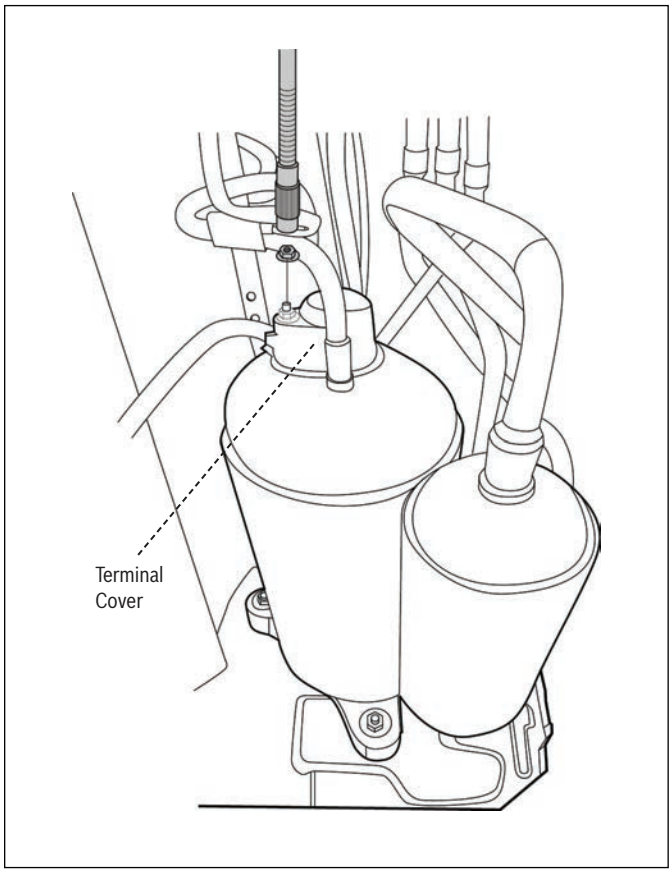


Figure 128

2. Disconnect the connectors.

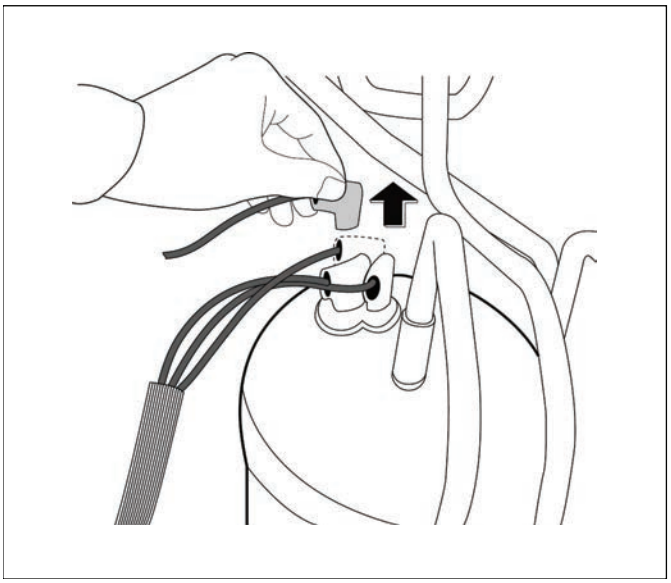


Figure 129

3. Remove the hex nuts and washers securing the compressor, located on the bottom plate.

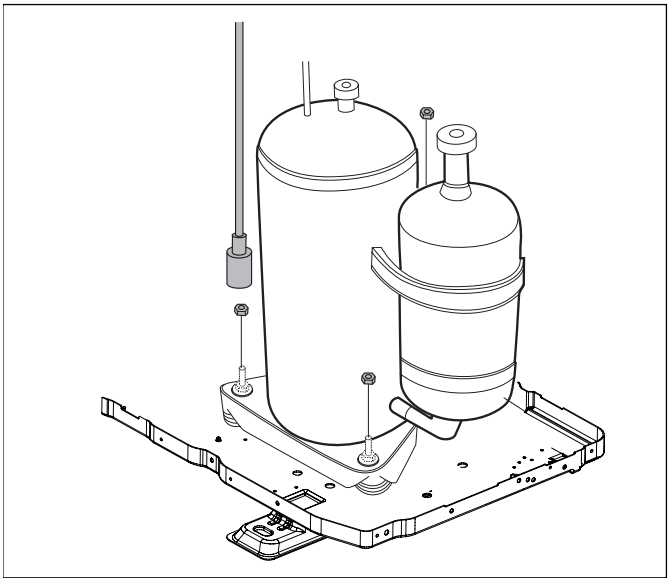


Figure 130

4. Heat up the brazed parts and then remove the discharge pipe and the suction pipe.
5. Lift the compressor from the base pan assembly with pliers.

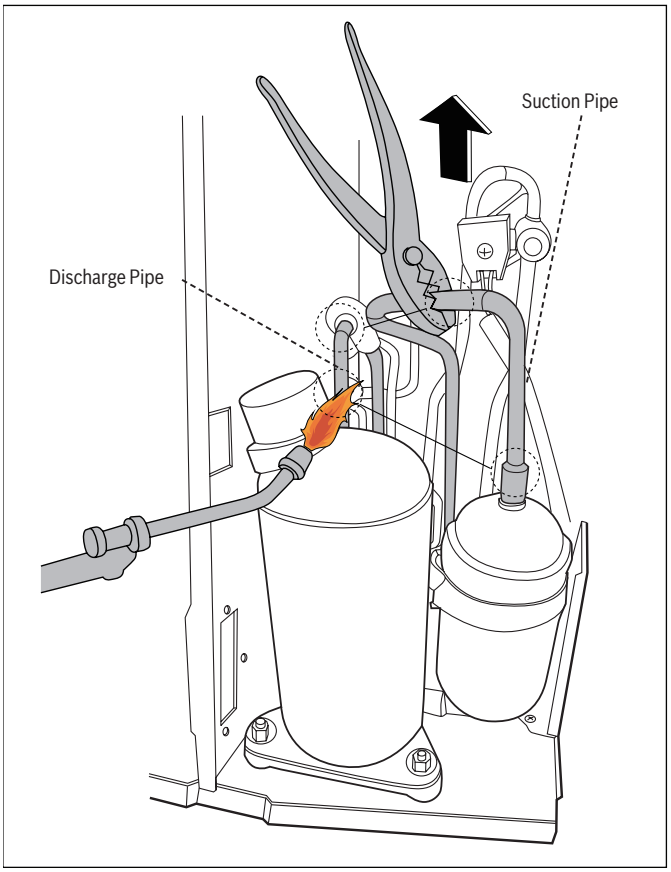


Figure 131

Online Help Resources

Alternatively, please visit our Service & Support webpage to find FAQs, videos, service bulletins, and more; www.boschheatingcooling.com/service or use your cellphone to scan the code below.

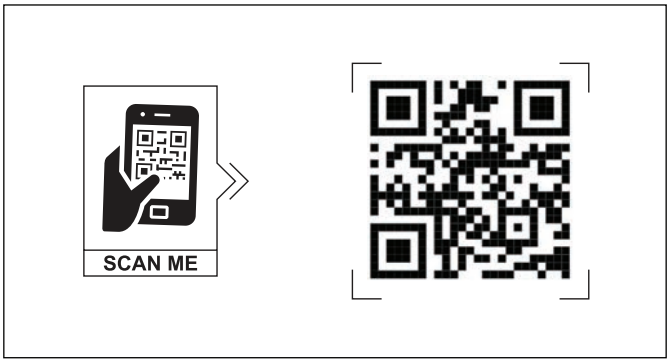


Figure 132

NOTES:

NOTES:

NOTES:

United States and Canada
Bosch Thermotechnology Corp.
65 Grove St.
Watertown, MA 02472

Tel: 800-283-3787
www.bosch-homecomfort.us

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