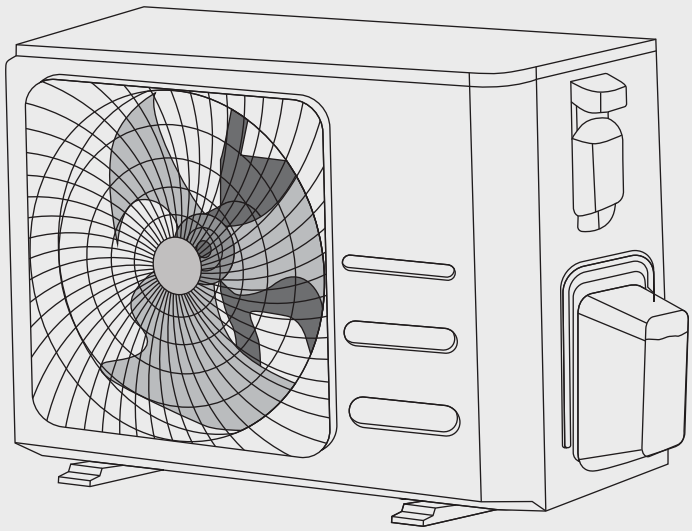


# **Bosch** Ductless Air Conditioner / Heat Pump Outdoor Unit

Climate 5000 Series

Single Zone (Regular, HyperHeat, Light Commercial) ODU

BOSCH

Service Manual

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

C ETL LISTED US
Intertek

## Table of Contents


**1 Key to Symbols and Safety Instructions 4**

1.1 Key to Symbols 4
1.2 Safety 4

**2 Part Names and Model Numbers 6**

2.1 Model Numbers 6

**3 Dimensions and Clearances 7**

**4 Installation Details 8**

4.1 Torque Requirements 8
4.2 Connecting the Cables 8
4.3 Pipe Length and Elevation 8
4.4 First Time Installation 8
4.5 Adding the Refrigerant to an Existing System 9
4.6 Re-Installation / Indoor Unit Needs to be Repaired 9
4.7 Re-Installation While the Outdoor Unit Needs to be Repaired 10
4.8 Operation Characteristics 11

**5 Electronic Functions 12**

5.1 Abbreviation 12
5.2 Display Function 12
5.3 Main Protection 12
5.4 Operation Modes and Functions 13

**6 Error Codes 18**

6.1 Error Codes - Wall Mounted Indoor Unit 18
6.2 Error Codes - 4-Way Cassette Indoor Unit 19
6.3 Error Codes - Ducted Indoor Unit 20
6.4 Quick Check by Error Codes 21

**7 Wiring Diagrams 22**

7.1 ODU PCB & IPM 22
7.2 Indoor Wiring Diagram 33
7.4 Outdoor Wiring Diagram 36

**8 Diagnosis & Solution 41**

8.1 EEPROM parameter error (E0/F4) 41
8.2 Indoor / outdoor unit's communication (E1) 42
8.3 Zero crossing detection error (E2) 45
8.4 Fan speed has been out of control (E3 / F5) 46
8.5 Open circuit or short circuit of temperature sensor 48
(E4 / E5 / F1 / F2 / F3 / P7) 48
8.6 Refrigerant Leakage Detection (EC) 49
8.7 Water-level Alarm Malfunction (EE) 50
8.8 Overload current protection (F0) 51
8.9 IPM malfunction or IGBT over-strong current protection (P0) 52
8.10 Over voltage or too low voltage protection (P1) 55
8.11 High temperature protection of IPM module or compressor top (P2) 56
8.12 Inverter compressor drive error (P4) 57
8.13 Low pressure protection (P6) 58
8.14 High temperature protection of indoor coil in heating mode (J0) 59
8.15 High temperature sensed at outdoor coil (J1) 60
8.16 High temperature sensed at compressor discharge line (J2) 61
8.17 PFC module protection (J3) 62
8.18 Communication error between outdoor unit main PCB and IPM control (J4) 63
8.19 High pressure switch open (J5) 64
8.20 Low pressure switch open (P6/J6) 65
8.21 AC Voltage protection (J8) 66
8.22 Main Parts Check 67

**9 Disassembly Guide 73**

9.1 Models: 9K Regular: BMS500-AAS009-1CSXRA 73
9.2 Models: 12K Regular: BMS500-AAS012-1CSXRA
9K & 12K Hyper Heat: BMS500-AAS009-1CSXHB, BMS500-AAS012-1CSXHB 76
9.3 Models: 18K Regular: BMS500-AAS018-1CSXRA 79
9.4 Models: 18K Hyper Heat: BMS500-AAS018-1CSXHB 82
9.5 Models: 9K, 12K & 18K Hyper Heat: BMS500-AAS009-1CSXHB, BMS500-AAS012-1CSXHB, BMS500-AAS018-1CSXHB 83
9.6 Models: 24K Regular: BMS500-AAS024-1CSXRA
24K Hyper Heat: BMS500-AAS024-1CSXHB
30K & 36K Light Commercial for Wall Mounted IDU: BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB
36K Light Commercial for Ducted & Cassette IDU: BMS500-AAS036-1CSXLB 84
9.7 Models: 48K & 60K Light Commercial: BMS500-AAS048-1CSXLB, BMS500-AAS060-1CSXLB 87
9.8 All Models 90

# 1 Key to Symbols and Safety Instructions

## 1.1 Key to Symbols

### Warnings

Warnings in this document are identified by a warning triangle printed against a gray 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.

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

- **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.
- **NOTICE** is used to address practices not related to personal injury.

### Important information

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

## 1.2 Safety

### Please read safety precautions before installation

Incorrect installation due to ignoring instructions can cause serious damage or injury.

**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 | Hyper Heat Outdoor Units |
|---|---|---|---|---|---|
| 115V | Wall Mounted | 12k | BMS500-AAS012-0AHWXB | BMS500-AAS012-0CSXRB | |
| 208-230V | Wall Mounted | 9k | BMS500-AAU009-1AHWXB | BMS500-AAS009-1CSXRA | BMS500-AAS009-1CSXHB |
| | | 12k | BMS500-AAU012-1AHWXB | BMS500-AAS012-1CSXRA | BMS500-AAS012-1CSXHB |
| | | 18k | BMS500-AAU018-1AHWXB | BMS500-AAS018-1CSXRA | BMS500-AAS018-1CSXHB |
| | | 24k | BMS500-AAU024-1AHWXB | BMS500-AAS024-1CSXRA | BMS500-AAS024-1CSXHB |
| | | 30k | BMS500-AAS030-1AHWXB | BMS500-AAS030-1CSXRB | |
| | | 36k | BMS500-AAS036-1AHWXB | BMS500-AAS036-1CSXRB | |
| 208-230V | Cassette | 9k | BMS500-AAU009-1AHCXB | BMS500-AAS009-1CSXRA | BMS500-AAS009-1CSXHB |
| | | 12k | BMS500-AAU012-1AHCXB | BMS500-AAS012-1CSXRA | BMS500-AAS012-1CSXHB |
| | | 18k | BMS500-AAU018-1AHCXB | BMS500-AAS018-1CSXRA | BMS500-AAS018-1CSXHB |
| | | 24k | BMS500-AAU024-1AHCXB | BMS500-AAS024-1CSXRA | BMS500-AAS024-1CSXHB |
| | | 36k | BMS500-AAU036-1AHCXB | | BMS500-AAS036-1CSXLB |
| | | 48k | BMS500-AAU048-1AHCXB | | BMS500-AAS048-1CSXLB |
| 208-230V | Ducted | 9k | BMS500-AAU009-1AHCXB | BMS500-AAS009-1CSXRA | BMS500-AAS009-1CSXHB |
| | | 12k | BMS500-AAU012-1AHCXB | BMS500-AAS012-1CSXRA | BMS500-AAS012-1CSXHB |
| | | 18k | BMS500-AAU018-1AHCXB | BMS500-AAS018-1CSXRA | BMS500-AAS018-1CSXHB |
| | | 24k | BMS500-AAU024-1AHCXB | BMS500-AAS024-1CSXRA | BMS500-AAS024-1CSXHB |
| | | 36k | BMS500-AAU036-1AHCXB | | BMS500-AAS036-1CSXLB |
| | | 48k | BMS500-AAU048-1AHCXB | | BMS500-AAS048-1CSXLB |
| | | 60k | BMS500-AAU048-1AHCXB | | BMS500-AAS048-1CSXLB |

*Table 1*

For Single Zone Outdoor Units, please refer to Single Zone Outdoor Service Manual.

## 3 Dimensions and Clearances

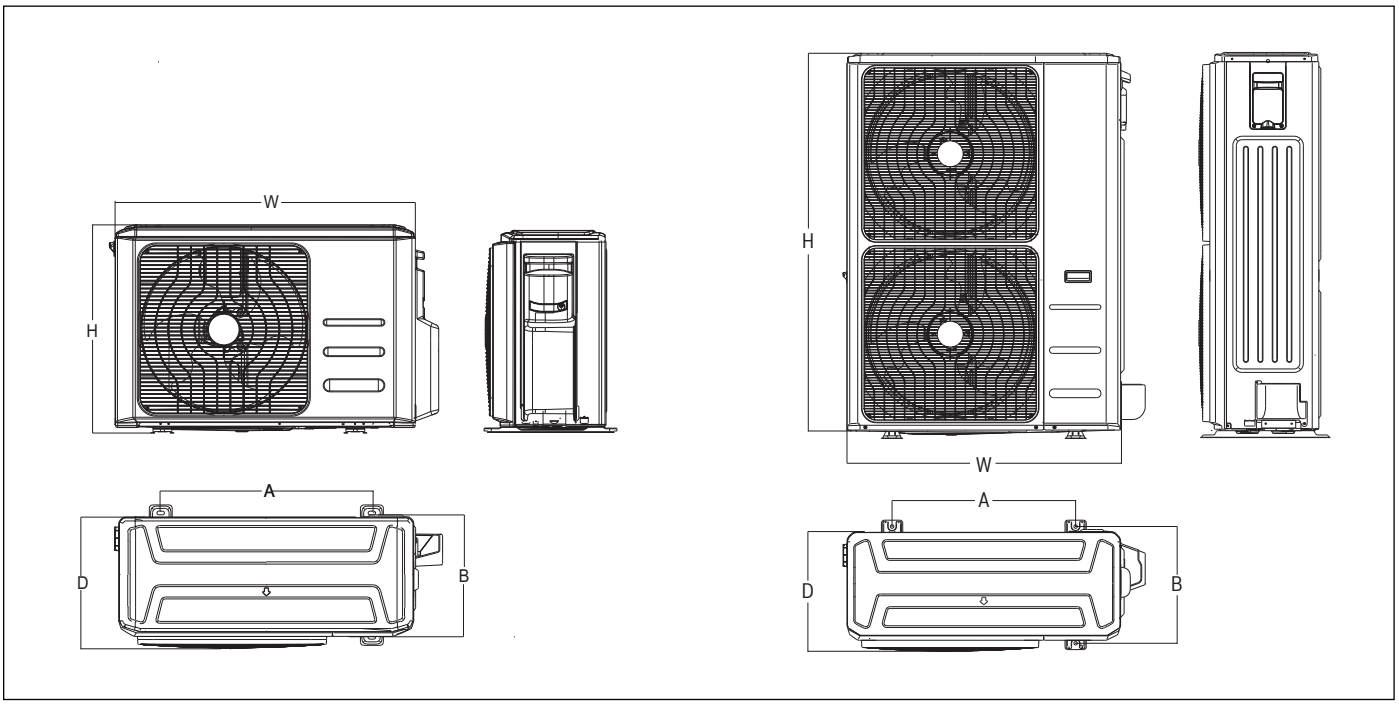



*Figure 1*

| Outdoor Model | Outdoor Unit Dimensions mm (in.) | Mounting Dimensions | |
|---|---|---|---|
| | W x H x D | A mm (in.) | B mm (in.) |
| BMS500-AAS009-1CSXRA | 770x555x300 (30.3x21.85x11.81) | 487 (19.2) | 298 (11.73) |
| BMS500-AAS012-0CSXRB, BMS500-AAS012-1CSXRA, BMS500-AAS009-1CSXHB, BMS500-AAS012-1CSXHB | 800x554x333 (31.5x21.8x13.1) | 514 (20.24) | 340 (13.39) |
| BMS500-AAS018-1CSXRA, BMS500-AAS018-1CSXHB, | 845x702x363 (33.27x27.6x14.3) | 540 (21.26) | 350 (13.8) |
| BMS500-AAS024-1CSXRA, BMS500-AAS024-1CSXHB, BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB, BMS500-AAS036-1CSXLB, | 946x810x410 (37.24x31.9x16.14) | 673 (26.5) | 403 (15.87) |
| BMS500-AAS048-1CSXLB, BMS500-AAS060-1CSXLB | 952x1333x415 (37.5x52.5x16.34) | 634 (24.96) | 404 (15.9) |

*Table 2*

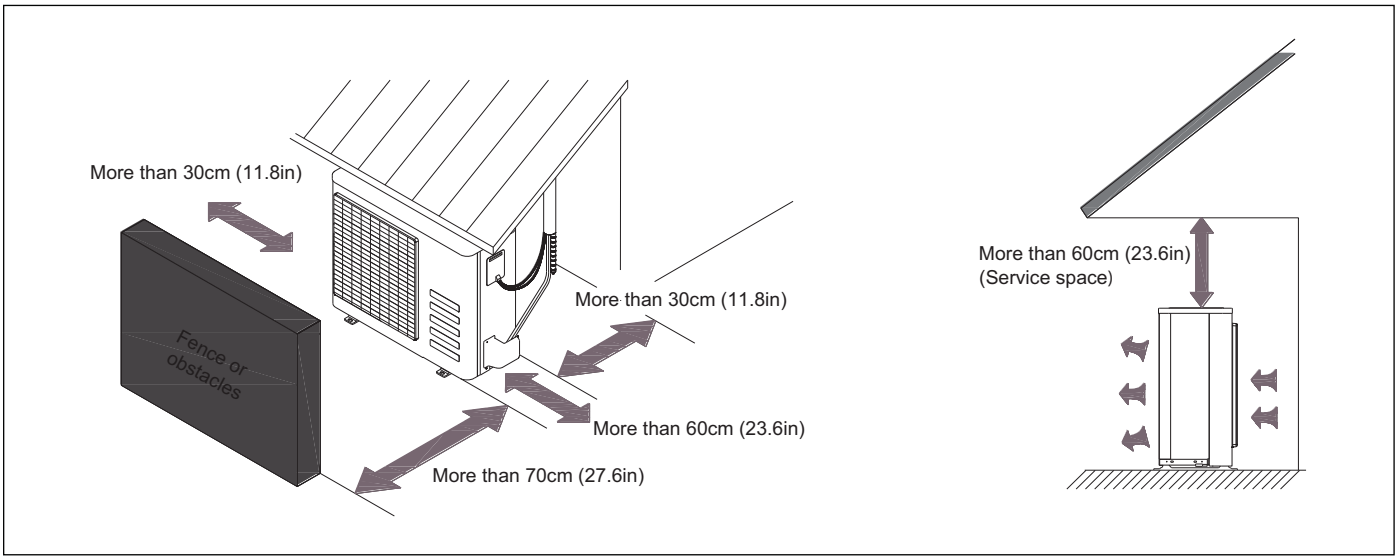



*Figure 2 Outdoor Unit Clearances*

# 4 Installation Details

## 4.1 Torque Requirements

| Outer Diameter of Tube mm (in.) | Tightening Torque N•m (lb ft) | Max. Tightening Torque N•m (lb ft) |
|---|---|---|
| Ø 6.35 (Ø 0.25") | 1,500 (11lb • ft) | 1,600 (11.8lb • ft) |
| Ø 9.52 (Ø 0.375") | 2,500 (18.4lb • ft) | 2,600 (19.18lb • ft) |
| Ø 12.7 ( Ø 0.5") | 3,500 (25.8lb • ft) | 3,600 (26.55lb • ft) |
| Ø 16 ( Ø 0.63") | 4,500 (33.19lb • ft) | 4,700 (34.67lb • ft) |

*Table 3*

## 4.2 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 4*

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: A means of disconnecting the power, should be within 10 feet of the outdoor unit.

## 4.3 Pipe Length and Elevation

| Capacity | Pipe size | |
|---|---|---|
| | Liquid side (in / mm) | Gas side (in / mm) |
| 9K | 1/4" / Φ6.35 | 3/8" / Φ9.52 |
| 12K | 1/4" / Φ6.35 | 1/2" / Φ12.7 |
| 18K | | |
| 24K | 3/8" / Φ9.52 | 5/8" / Φ15.9 |
| 30K | | |
| 36K | | |
| 48K | | |
| 60K | 3/8" / Φ9.52 | 3/4" / Φ19 |

*Table 5*

| Capacity | Precharged length (ft / m) | Max Pipe Length (ft / m) | Max difference in height (ft / m) | Additional charge for each ft (oz) |
|---|---|---|---|---|
| 9K | 25 / 7.6 | 82 / 25 | 33 / 10 | 0.16 |
| 12K | | | | |
| 18K | | 98 / 30 | 66 / 20 | |
| 24K | | 164 / 50 | 82 / 25 | 0.32 |
| 30K | | | | |
| 36K | | 213 / 65 | 98 / 30 | |
| 48K | | | | |
| 60K | | | | |

*Table 6*

## 4.4 First Time Installation

### 4.4.1 Air Purging with Vacuum Pump

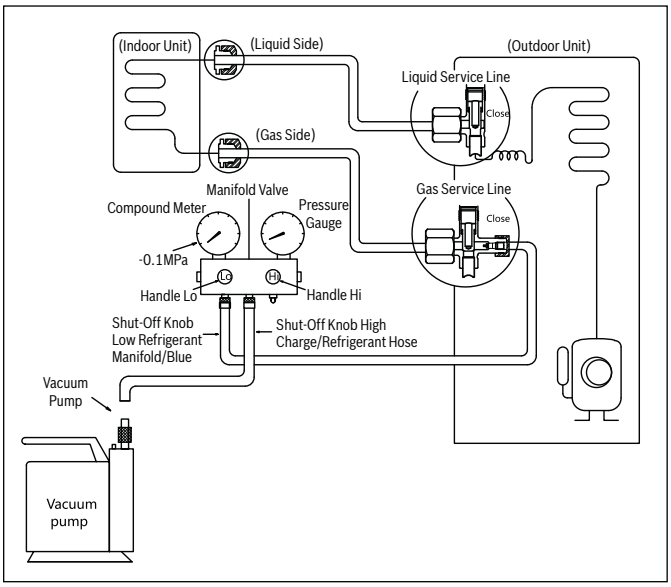



*Figure 3*

1. Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the liquid service and gas service valves are set to the closed position.
2. Connect the refrigerant manifold, blue hose with the push pin of shut-off knob of the low side to the gas service valve port.
3. Connect the refrigerant manifold, yellow hose to the shut-off high side connection to the vacuum pump.
4. Fully open the shut-off knob low side of the manifold valve.
5. Operate the vacuum pump to evacuate.
6. Perform evacuation for 30 minutes and check whether the refrigeration low side pressure gauge indicates -0.1Mpa(14.5Psi). If the meter does not indicate -0.1Mpa(14.5Psi) after evacuating for 30 minutes, it should be evacuated 20 minutes more. If the pressure can't achieve -0.1Mpa(14.5Psi) after evacuating 50 minutes, please check if there are some leakage points. Fully close the shut-off knob low side of the manifold and stop the operation of the vacuum pump. Confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

7. Make sure the pressure display in the pressure indicator is a little higher than the atmospheric pressure. Then remove the charge hose from the gas service valve.
8. Fully open the liquid service valve and gas service valve and securely tighten the cap of the gas service valve. System is now evacuated and charged. (Ensure that the unit is charged per the defined specifications shown either on the name plate of outdoor unit or Engineering Submittal Sheet.).

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.

## 4.5 Adding the Refrigerant to an Existing System

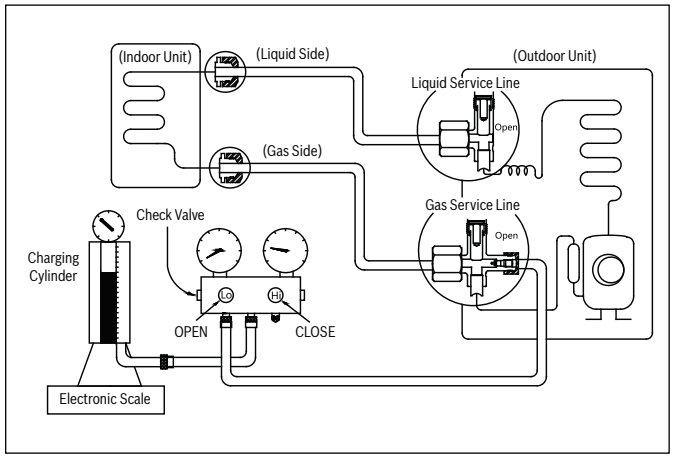



*Figure 4*

**Procedure**

1. Connect the refrigerant manifold, blue suction hose to the gas service valve's service port, open the liquid service valve and the gas service valve. Connect the refrigerant manifold, yellow hose to the valve at the bottom of the cylinder.
2. Purge the air from the refrigerant manifold, yellow hose. Open the valve at the bottom of the cylinder and press the check valve on the refrigerant manifold to purge the air.

**CAUTION: CONTAINS REFRIGERANT**

- Liquid refrigerant can cause frost bite. Handle with care.

3. Put the charging cylinder onto the electronic scale and record the weight.
4. Operate the air conditioner in cooling mode.
5. Open the valves (low side) on the refrigerant manifold and charge the system with liquid refrigerant.
6. When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), turn off the refrigerant low side valve and the refrigerant cylinder valve. Then turn off the unit to remove the hose from the gas service valve.
7. Replace valve stem caps on the service port. Use a torque wrench to tighten the service port cap to a torque of 18N.m. Be sure to check for gas leakage.

## 4.6 Re-Installation / Indoor Unit Needs to be Repaired

**Collecting the refrigerant into the outdoor unit (passive recovery)**

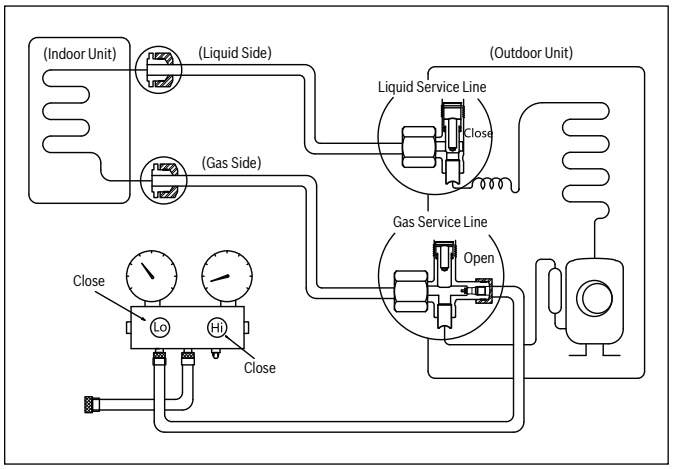



*Figure 5*

**Procedure**

1. Remove the valve stem caps and confirm that both the liquid and gas service valves are set to the opened position. If not opened, use appropriate hex wrench to open the valve stems.
2. Connect refrigerant gauge low side hose (blue) to the gas service valve's service port
3. Air purging of the refrigerant manifold, blue hose: Open the low side valve of manifold slightly to purge air from the hose for 5 seconds and then close it quickly.
4. Set the liquid service valve to the close position.
5. Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1Mpa(14.5Psi).
6. Set the gas service valve to the closed position immediately. Do this quickly so that the gauge ends up indicating 0.3Mpa(43.5Psi) to 0.5 Mpa(72.5Psi). Disconnect the refrigerant manifold, and tighten the liquid and gas service valve's stem nuts. Use a torque wrench to tighten the gas service valve's service port cap to a torque of 18N.m. Be sure to check for gas leakage.

## 4.7 Re-Installation While the Outdoor Unit Needs to be Repaired

### Evacuation for the whole system

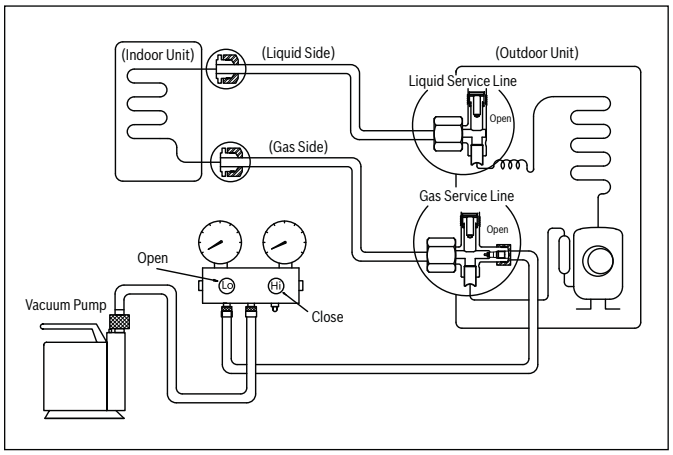



*Figure 6*

**Procedure:**

1. Confirm that both the liquid and gas service valves are set to the opened position.
2. Connect the vacuum pump to gas service valve's service port.
3. Evacuate for approximately one hour. Confirm that the refrigerant manifold low side indicates -0.1Mpa(14.5Psi).
4. Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
5. Disconnect the charge hose from the vacuum pump.

### Refrigerant charging

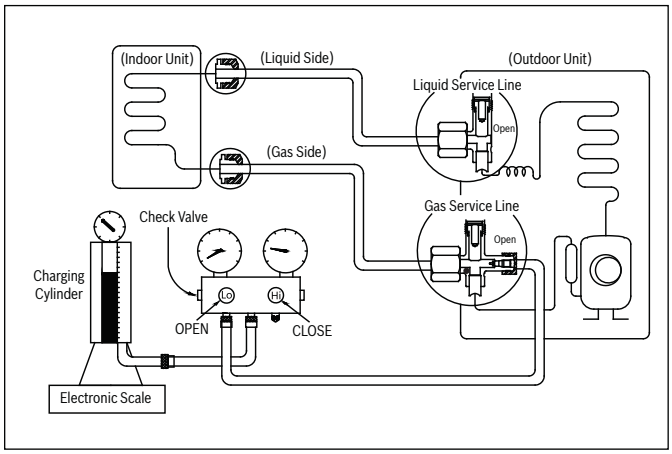



*Figure 7*

**Procedure:**

1. Connect the charge hose to the charging cylinder, open the liquid and the gas service valve. Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder.
2. Purge the air from the charge hose. Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
3. Put the charging cylinder onto the electronic scale and record the weight.
4. Open the valves (Low side) on the refrigerant manifold and charge the system with liquid refrigerant If the system cannot be charge with the specified amount of refrigerant, or can be charged with a little at a time (approximately 150g (5.3 oz) each time), operating the system in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.
5. When the electronic scale displays the proper weight, disconnect the charge hose from the gas service valve's service port immediately. If the system has been charged with liquid refrigerant while operating the system, turn off the system before disconnecting the hose.
6. Mount the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N.m. Be sure to check for gas leakage.

## 4.8 Operation Characteristics

| | | | COOL operation | HEAT operation | DRY operation |
|---|---|---|---|---|---|
| Room Temperature | | | 63ºF - 90ºF<br>17ºC - 32ºC | 32ºF - 86ºF<br>0ºC - 30ºC | 50ºF - 90ºF<br>10ºC - 32ºC |
| Outdoor Temperature | Regular | BMS500-AAS012-0CSXRB<br>BMS500-AAS009-1CSXRA<br>BMS500-AAS012-1CSXRA<br>BMS500-AAS018-1CSXRA<br>BMS500-AAS024-1CSXRA | -13ºF - 122ºF<br>-25ºC - 50ºC | -13ºF - 86ºF<br>-25ºC - 30ºC | 32ºF - 122ºF<br>0ºC - 50ºC |
| | Hyper Heat | BMS500-AAS009-1CSXHB<br>BMS500-AAS012-1CSXHB<br>BMS500-AAS018-1CSXHB<br>BMS500-AAS024-1CSXHB | -22ºF - 122ºF<br>-30ºC - 50ºC | -22ºF - 86ºF<br>-30ºC - 30ºC | 32ºF - 122ºF<br>0ºC - 50ºC |
| | Light Commercial | BMS500-AAS030-1CSXRB<br>BMS500-AAS036-1CSXRB<br>BMS500-AAS036-1CSXLB<br>BMS500-AAS048-1CSXLB<br>BMS500-AAS060-1CSXLB | 5ºF - 122ºF<br>-15ºC - 50ºC | 5ºF - 86ºF<br>-15ºC - 30ºC | 32ºF - 122ºF<br>0ºC - 50ºC |

*Table 7*

**Equation to convert Celsius to Fahrenheit**

$$(°F) = 1.8 \times (°C) + 32$$

**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.

# 5 Electronic Functions

## 5.1 Abbreviation

**T1**: Indoor room temperature

**T2**: Coil temperature of evaporator

**T3**: Coil temperature of condenser

**T4**: Outdoor ambient temperature

**T5**: Compressor discharge temperature

**Ts:** Room temperature setting

**Td:** Off-set value (Td is an advanced feature)

## 5.2 Display Function

### 5.2.1 Icon explanation on indoor display board.

**Digital display:**

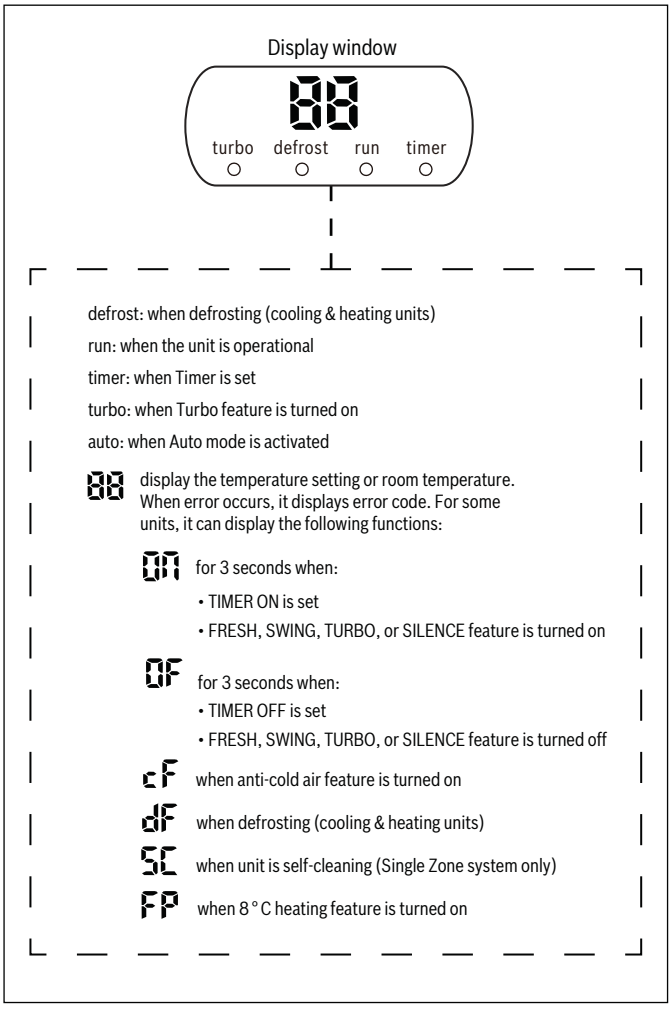



*Figure 8*

A guide on using the infrared remote is not included in this literature package. A separate user guide is available for the remote operations.

- Display may look different depending on IDU type.
- Display is not available with Compact Cassette (9K, 12K & 18k) indoor model.
- Ducted indoor model may have display; however, due to installation set up, it may not be visible.
- Please use Wired Wall Thermostat (optional accessory) to check system information easily.

## 5.3 Main Protection

### 5.3.1 Three minutes delay at restart for compressor

1 minute delay for the 1st time start-up and 3 minutes delay for others.

### 5.3.2 Temperature protection of compressor discharge

Compressor discharge temp. T5> 239 °F (115°C) for 5s, compressor stops.

### 5.3.3 Fan speed is out of control

When indoor fan speed runs too low (300RPM) for certain time, the unit will stop and the LED will display the failure.

### 5.3.4 Inverter module protection

The Inverter module has a protection function for current, voltage and temperature. If these protections happen, the corresponding code will display on indoor unit and the unit will stop working.

### 5.3.5 Indoor fan delay open function

When the unit starts up, the louver will be active immediately and the indoor fan will open 7s later. If the unit is running in heating mode, the indoor fan will be also controlled by anti-cold air function.

### 5.3.6 Compressor preheating functions

Preheating permitting condition:
When T4 (outdoor ambient temperature) 37.4 °F (3°C), the preheating function will be activated.

### 5.3.7 Sensor protection at open circuit and breaking disconnection.

When there's only one temperature sensor malfunction, the system will keep working but show the error code, in case of any emergency use.

When there's more than one temperature sensor malfunctioning, the system will stop working.

## 5.4 Operation Modes and Functions

### 5.4.1 Fan mode

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

### 5.4.2 Cooling mode

#### 5.4.2.1 Compressor running rules

When T1-Ts<ΔT -3.6°F (2°C), the compressor will stop.
When T1-Ts >ΔT +0.9°F (0.5°C) the compressor will be activated.

ΔT5 is the programmed parameter of temperature compensation. This parameter is preset at the factory.

When the AC run in mute mode, the compressor will run with low frequency.

When the current is more than setting value, the current protection function will be activated, and the compressor will stop.

#### 5.4.2.2 Outdoor fan running rules

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

#### 5.4.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, medium, low and auto.

#### 5.4.2.4 Condenser temperature protection

- TP3<T3< TP3+5, the compressor frequency will decrease to the lower level until to F1 and then runs at F1.If TP3-3<T3< TP3, the compressor will keep running at the current frequency.
- T3< TP3-3, the compressor will not limit the frequency and resume to the former frequency.
- T3> TP3+5 for 5 seconds, the compressor will stop until T3< TP3-3.

#### 5.4.2.5 Evaporator temperature protection

When Evaporator temperature is less than setting value, the compressor will stop.

### 5.4.3 Heating mode

#### 5.4.3.1 Compressor operation

When T1-Ts>-ΔT3, the compressor will stop.
When T1-TS<-ΔT3-2.7°F (1.5°C) the compressor will be on.

ΔT3 is the programmed parameter of temperature compensation.

When the AC runs in mute mode, the compressor will run with low frequency.
When the current is more than the setting value, the current protection function will be activated and the compressor will stop.

#### 5.4.3.2 Outdoor fan operation

The outdoor unit will be run at different fan speed according to T4.
For different outdoor units, the fan speeds are different.

#### 5.4.3.3 Indoor fan operation

When the compressor is on, the indoor fan can be set to high/med/low/auto and the anti-cold function has the priority.

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

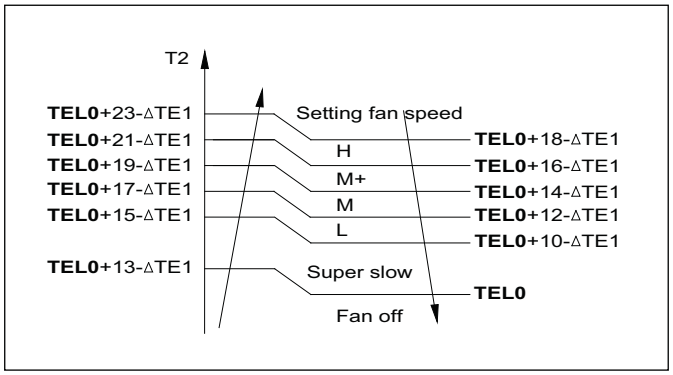



*Figure 9*

| Indoor Room Temp. Condition | Indoor Fan Speed |
|---|---|
| T1 ≥ 19°C (66.2°F) | ΔTE1=0 |
| 15°C (59°F) ≤ T1 ≤ 18°C (64.4°F) | ΔTE1=19°C-T1 (34.2°F-T1) |
| T1<15°C (59°F) | ΔTE1=4°C (7.2°F) |

*Table 8*

#### 5.4.3.4 Defrost mode

System will enter the defrost mode according to the value of T3 and the value range of change in T3 and also the compressor running time.

During the defrost mode, the compressor will run, indoor and outdoor 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°F (1°C).
- T3 keeps to be higher than TCDE 35.6°F (2°C ) for 80 seconds.
- The machine has run for 15 minutes in defrosting mode.

#### 5.4.3.5 Evaporator coil temperature protection

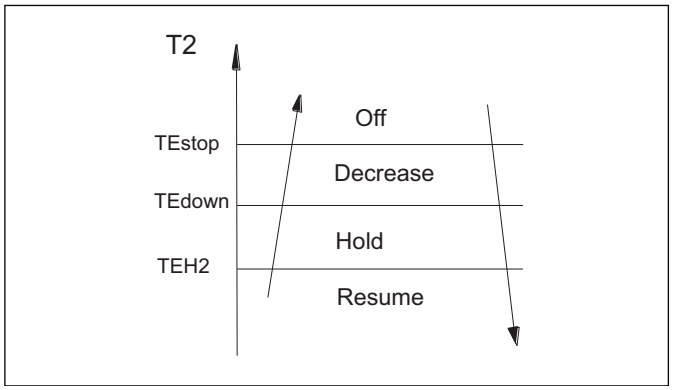



*Figure 10*

**Off:** Compressor stops.

**Decrease:** Decrease the running frequency to the lower level.

**Hold:** Keep the current frequency.

**Resume:** No limitation for frequency.

### 5.4.4 Auto-mode

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

In auto mode, the machine will choose cooling, heating or fan-only mode according to ΔT (ΔT =T1-Ts).

| ΔT=T1-Ts | Running mode |
|---|---|
| ΔT > 3.6°F (2°C) | Cooling |
| -3.6°F (-2°C) ≤ ΔT ≤ 3.6°F (2°C) | Fan-only |
| ΔT < -3.6°F (-2°C) | Heating |

*Table 9*

Indoor fan will run at auto fan of the relevant mode.

The louver operates same as in relevant mode. If the machine switches mode between heating and cooling, the compressor will keep stopping for 15 minutes and then choose mode according to T1-Ts. If the setting temperature is modified, the machine will choose running function again.

### 5.4.5 Drying mode

Indoor fan speed is fixed at breeze (low fan) and can't be changed. The louver angle is the same as in cooling mode. All protections are active and the same as that in cooling mode.

### 5.4.6 Forced operation function

- Forced cooling mode: The compressor and outdoor fan keep running and the indoor fan runs at low speed. After running for 30 minutes, AC will turn to auto mode with 75.2°F (24°C) setting temperature.
- Forced auto mode: The action of forced auto mode is the same as normal auto mode with 75.2°F (24°C) setting temperature.

  When AC receives signals, such as switch on, switch off, timer on, timer off, mode setting, fan speed setting, sleeping mode setting, follow me setting, it will quit the forced operation.

### 5.4.7 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 system will quit the timer function when it has malfunction.

### 5.4.8 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 1.8°F (1°C) (be lower than 86°F (30°C)) 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 1.8°F (1°C) (be higher than 62.6°F (17°C)) 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 7 hours. After 7 hours, the AC will turn off and sleep mode will also be turned off.
- Timer setting is available

### 5.4.9 Auto-restart function

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

If the memorization condition is forced cooling mode, the unit will run in cooling mode for 30 minutes and turn to auto mode as 75.2°F (24°C) setting temp.

If system is off before power off and it is required to start up, the compressor will have 1 minute delay when powered on. In other conditions, the compressor will have 3 minutes delay when restarting.

### 5.4.10 Refrigerant leakage detection

With this new technology, the display area will show "EC" when the outdoor unit detects refrigerant leakage. This function is only available in cooling mode.

### 5.4.11 Louver position memory function

When starting the unit again after shutting down, its louver will restore to the angle originally set by the user, but the precondition is that the angle must be within the allowable range. If it exceeds, it will memorize the maximum angle of the louver. During operation, if the power fails or the end user shuts down the unit in the turbo mode, the louver will restore to the default angle.

### 5.4.12 46.4°F (8°C) heating

In heating operation, the preset temperature of the air conditioner can be as low as 46.4°F (8°C), which keeps the room temperature steady at 46.4°F (8°C) and prevents household items from freezing when the house is unoccupied for a long time in severe cold weather. This 46.4°F (8°C) heating mode is activated from the remote controller by pressing the FP button.

### 5.4.13 Self clean (applicable to Single Zone system only)

For heat pump models which are provided with this function, after running in cooling or drying mode, if the user presses the "Self Clean" button on remote controller, firstly, indoor unit runs in fan only mode for a while. Then the unit operates in low heat operation and finally runs in fan only again. This function can keep the inside of indoor unit dry and prevent breeding of mold.

### 5.4.14 Follow me

1. If the indoor PCB receives the signal which results from pressing the FOLLOW ME button on remote controller, the buzzer will emit a sound and this indicates the follow me function is initiated. But when the indoor PCB receives signal which sent from remote controller every 3 minutes, the buzzer will not respond. When the unit is running with follow me function, the PCB will control the unit according to the temperature from follow me signal, and the temperature collection function of room temperature sensor will be inactive, but the error detective function of room temperature sensor will be still valid.
2. When the follow me function is available, the PCB will control the unit according to the room temperature from the remote controller and the setting temperature.
3. The PCB will take action to the mode change information from remote controller signal, but it will not be affected by the setting temperature.
4. When the unit is running with follow me function, if the PCB doesn't receive any signal from remote controller for 7 minutes or pressing FOLLOW ME button again, the follow me function will be turned off automatically, and the temperature will control the unit according to the room temperature detected from its own room temperature sensor and setting temperature.

### 5.4.15 Silence operation

Press the "silence" button on remote controller to initiate SILENCE function. When the Silence function is activated, the compressor running frequency will keep lower than F2 (compressor frequency) and the indoor unit will bring faint breeze, which will reduce the noise to the lowest level and create a quiet and comfortable room for you.

### 5.4.16 Point check function (engineering troubleshooting mode)

Press the LED DISPLAY or LED or MUTE button of the remote controller three times, and then press the AIR DIRECTION or SWING button three times in ten seconds, the buzzer will keep ring for two seconds. The air conditioner will enter into the information enquiry status. You can press the LED DISPLAY or AIR DIRECTION button to check the next or front item's information.

When the AC enter the "information enquiry" status, it will display the code name in 2 seconds, the details are as follows.

| Enquiry information | Displaying code | Meaning |
|---|---|---|
| T1 | T1 | Indoor room temperature |
| T2 | T2 | Coil temperature of evaporator |
| T3 | T3 | Coil temperature of condenser |
| T4 | T4 | Outdoor ambient temperature |
| T2B | Tb | Coil temperature of evaporator |
| TP | TP | Compressor discharge temperature |
| TH | TH | Compressor suction temperature |
| Targeted Frequency | FT | Targeted Frequency |
| Actual Frequency | FR | Actual Frequency |
| Indoor fan speed | IF | Indoor fan speed |
| Outdoor fan speed | OF | Outdoor fan speed |
| EXV opening angle | LA | EXV opening angle |
| Compressor continuous running time | CT | Compressor continuous running time |
| Causes of compressor stop | ST | Causes of compressor stop |
| Reserve | A0 | |
| Reserve | A1 | |
| Reserve | b0 | |
| Reserve | b1 | |
| Reserve | b2 | |
| Reserve | b3 | |
| Reserve | b4 | |
| Reserve | b5 | |
| Reserve | b6 | |
| Reserve | dL | |
| Reserve | AC | |
| Reserve | UO | |
| Reserve | Td | |

*Table 10*

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 | 1. All the displaying temperature is actual value.<br>2. All the temperature is °C no matter what kind of remote controller is used.<br>3. T1,T2,T3,T4,T2B display range:-25~70, TP display range:-20~130.<br>4. Frequency display range: 0~159HZ.<br>5. 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 11*

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

# 6 Error Codes

**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.

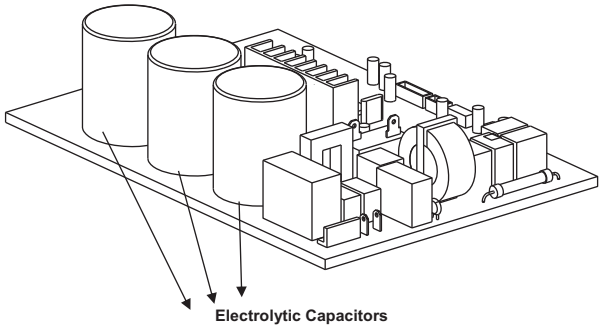



*Figure 11*

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.

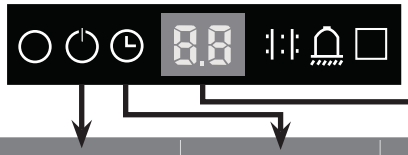
## 6.1 Error Codes - Wall Mounted Indoor Unit

| Number | Cause | RUN Indicator Flashes | TIMER Indicator | Error Code |
|---|---|---|---|---|
| 1 | Indoor unit EEPROM error | 1 | OFF | E0 |
| 2 | Communication error between indoor unit and outdoor units | 2 | OFF | E1 |
| 3 | Indoor fan speed error | 4 | OFF | E3 |
| 4 | Indoor Return air temperature sensor error | 5 | OFF | E4 |
| 5 | Indoor coil temperature sensor error | 6 | OFF | E5 |
| 6 | Low refrigerant | 7 | OFF | EC |
| 7 | Outdoor current overload sensed | 1 | LIT | F0 |
| 8 | Outdoor ambient temperature sensor error | 2 | LIT | F1 |
| 9 | Outdoor coil temperature sensor error | 3 | LIT | F2 |
| 10 | Compressor discharge temperature sensor error | 4 | LIT | F3 |
| 11 | Outdoor unit EEPROM error | 5 | LIT | F4 |
| 12 | Outdoor unit fan speed error | 6 | LIT | F5 |
| 13 | Indoor coil outlet temperature sensor error | 7 | LIT | F6 |
| 14 | Inverter module IPM error | 1 | FLASH | P0 |
| 15 | High or Low voltage protection | 2 | FLASH | P1 |
| 16 | Outdoor unit low temperature lockout | 4 | FLASH | P3 |
| 17 | Compressor drive error | 5 | FLASH | P4 |
| 18 | Mode conflict | 6 | FLASH | P5 |

*Table 12*

If you see an error code not displayed in Table 12, contact the manufacturer as the error displayed is for development purpose only.

## 6.2 Error Codes - 4-Way Cassette Indoor Unit



| Number | Cause | Operation indicator flashes | Timer indicator | Error Code |
|---|---|---|---|---|
| 1 | Indoor EEPROM (Electrically Erasable Programmable Read-Only Memory) error | 1 | Off | E0 |
| 2 | Indoor and outdoor unit communication malfunction | 2 | Off | E 1 |
| 3 | Indoor fan speed malfunction | 4 | Off | E3 |
| 4 | Indoor room temperature sensor error | 5 | Off | E4 |
| 5 | Evaporator coil temperature sensor error | 6 | Off | E5 |
| 6 | Refrigerant leak detection system malfunction | 7 | Off | EC |
| 7 | Water level alarm malfunction | 8 | Off | EE |
| 8 | Dual indoor unit (twin model only) communication malfunction | 9 | Off | E8 |
| 9 | Other twin model malfunction | 10 | Off | E9 |
| 10 | Overload protection | 1 | On | F0 |
| 11 | Outdoor temperature sensor error | 2 | On | F 1 |
| 12 | Outdoor condenser pipe sensor error | 3 | On | F2 |
| 13 | Discharge air temperature sensor error | 4 | On | F3 |
| 14 | Outdoor EEPROM (Electrically Erasable Programmable Read-Only Memory) error | 5 | On | F4 |
| 15 | Outdoor fan speed (DC fan motor only) malfunction | 6 | On | F5 |
| 16 | Auto-lifting panel communication error | 8 | On | F7 |
| 17 | Auto-lifting panel malfunction | 9 | On | F8 |
| 18 | Auto-lifting panel is open | 10 | On | F9 |
| 19 | Inverter module IPM protection | 1 | Flash | P0 |
| 20 | High/Low voltage protection | 2 | Flash | P 1 |
| 21 | Compressor top overheating protection | 3 | Flash | P2 |
| 22 | Outdoor low temperature protection | 4 | Flash | P3 |
| 23 | Compressor drive error | 5 | Flash | P4 |
| 24 | Mode conflict | 6 | Flash | P5 |
| 25 | Compressor low-pressure protection | 7 | Flash | P6 |
| 26 | Outdoor IGBT sensor error | 8 | Flash | P7 |

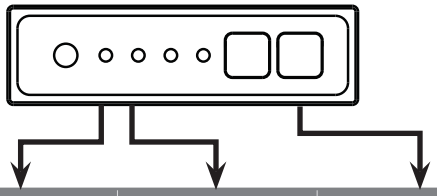
*Table 13*

9k~18k models do not have display to show error codes and Operation and Timer Indicator will turn on / off and or flash according to above table to show system malfunction.

## 6.3 Error Codes - Ducted Indoor Unit

**NOTICE**

- If below error codes appear, please turn off the system and contact an Authorized Service Provider.



| Number | Cause | Operation indicator flashes | Timer indicator | Error Code |
|---|---|---|---|---|
| 1 | Indoor EEPROM (Electrically Erasable Programmable Read-Only Memory) error | 1 | Off | E0 |
| 2 | Indoor and outdoor unit communication malfunction | 2 | Off | E1 |
| 3 | Indoor fan speed malfunction | 4 | Off | E3 |
| 4 | Indoor room temperature sensor error | 5 | Off | E4 |
| 5 | Evaporator coil temperature sensor error | 6 | Off | E5 |
| 6 | Refrigerant leak detection system malfunction | 7 | Off | EC |
| 7 | Water level alarm malfunction | 8 | Off | EE |
| 8 | Dual indoor unit (twin model only) communication malfunction | 9 | Off | E8 |
| 9 | Other twin model malfunction | 10 | Off | E9 |
| 10 | Overload protection | 1 | On | F0 |
| 11 | Outdoor temperature sensor error | 2 | On | F1 |
| 12 | Outdoor condenser pipe sensor error | 3 | On | F2 |
| 13 | Discharge air temperature sensor error | 4 | On | F3 |
| 14 | Outdoor EEPROM (Electrically Erasable Programmable Read-Only Memory) error | 5 | On | F4 |
| 15 | Outdoor fan speed (DC fan motor only) malfunction | 6 | On | F5 |
| 16 | Inverter module IPM protection | 1 | Flash | P0 |
| 17 | High/Low voltage protection | 2 | Flash | P1 |
| 18 | Compressor top overheating protection | 3 | Flash | P2 |
| 19 | Outdoor low temperature protection | 4 | Flash | P3 |
| 20 | Compressor drive error | 5 | Flash | P4 |
| 21 | Mode conflict | 6 | Flash | P5 |
| 22 | Compressor low-pressure protection | 7 | Flash | P6 |
| 23 | Outdoor IGBT sensor error | 8 | Flash | P7 |
| 24 | Indoor unit communication malfunction | 11 | On | FA |

*Table 14*

## 6.4 Quick Check by Error Codes

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

| Cause | E0 | E1 | E2 | E3 | E4 | E5 | E7 | EC | EE | F0 | F1 | F2 | F3 | F4 | F5 | P0 | P1 | P2 | P4 | P6 | J1 | J2 | J3 | J4 | J5 | J6 | J8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IDU PCB | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | | | | | |
| ODU PCB | ● | ● | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| Display Board | | | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| IDU Fan Motor | | | | ● | | | | | | | | | | | | | | | | | | | | | | | |
| ODU Fan Motor | | | | | | | | | | | | | | | ● | ● | | | ● | | | | ● | | | | |
| T1 Sensor | | | | | ● | | | | | | | | | | | | | | | | | | | | | | |
| T2 Sensor | | | | | | ● | | ● | | | | | | | | | | | | | | | | | | | |
| T3 Sensor | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | | |
| T4 Sensor | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| T5 Sensor | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| Water Level Switch | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| Condensate Pump | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| Reactor | | ● | | | | | | | | | | | | | | | ● | | | | | | | | | | |
| Compressor | | | | | | | | | | ● | | | | | | ● | | | ● | | | | ● | | | | |
| IPM Board | | | | | | | | | | | | | | | | ● | ● | | ● | | | | ● | | | | ● |
| Over Load Protector | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | ● | |
| Bridge Rectifier | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wiring Mistake | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | |
| Refrigerant Charge / Leak | | | | | | | | ● | | | | | | | | | | | | | ● | ● | | | ● | ● | |
| System Block | | | | | | | | | | | | | | | | | | ● | | ● | ● | | | | ● | | |
| Power Supply | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

*Table 15*

# 7 Wiring Diagrams

## 7.1 ODU PCB & IPM

### 7.1.1 PCB: Regular 115V Single Zone 12K
**BMS500-AAS012-0CSXRB**

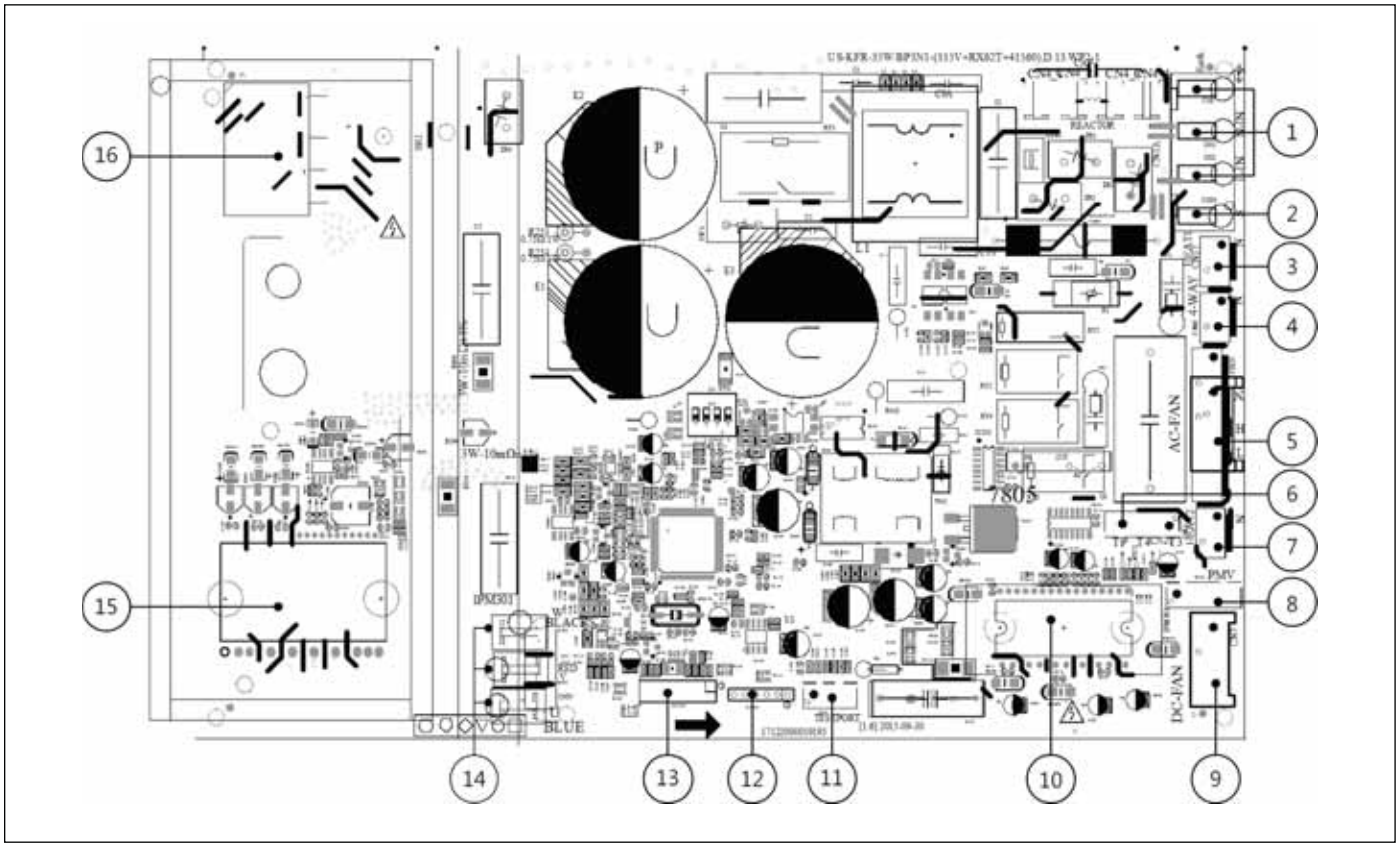



*Figure 12*

| 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) |
| 2 | S | CN16 | S: connect to indoor unit communication |
| 3 | HEAT1 | CN17 | connect to compressor heater, 100-130V AC when is ON |
| 4 | 4-WAY | CN60 | connect to 4 way valve, 100-130V AC when is ON. |
| 5 | AC-FAN | CN25 | connect to AC fan |
| 6 | TP T4 T3 | CN21 | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP |
| 7 | HEAT2 | CN15 | connect to chassis heater, 100-130V AC when is ON |
| 8 | PMV | CN31 | connect to Electric Expansion Valve |
| 9 | DC-FAN | CN7 | connect to DC fan |
| 10 | FAN_IPM | IPM 501 | IPM for DC fan |
| 11 | TESTPORT | CN6 | used for testing |
| 12 | EE_PORT | CN505 | EEPROM programmer port |
| 13 | MCUPORT | CN507 | connect to PC communication |
| 14 | W | CN28 | connect to compressor |
| | V | CN29 | 0V AC (standby) |
| | U | CN30 | 10-230V AC (running) |
| 15 | COMP_IPM | IPM 301 | IPM for compressor |
| 16 | BR1 | BR1 | Bridge |

*Table 16*

### 7.1.2 PCB: Regular Single Zone 9K & 12K

**BMS500-AAS009-1CSXRA, BMS500-AAS009-1CSXXA, BMS500-AAS012-1CSXRA, BMS500-AAS012-1CSXXA**

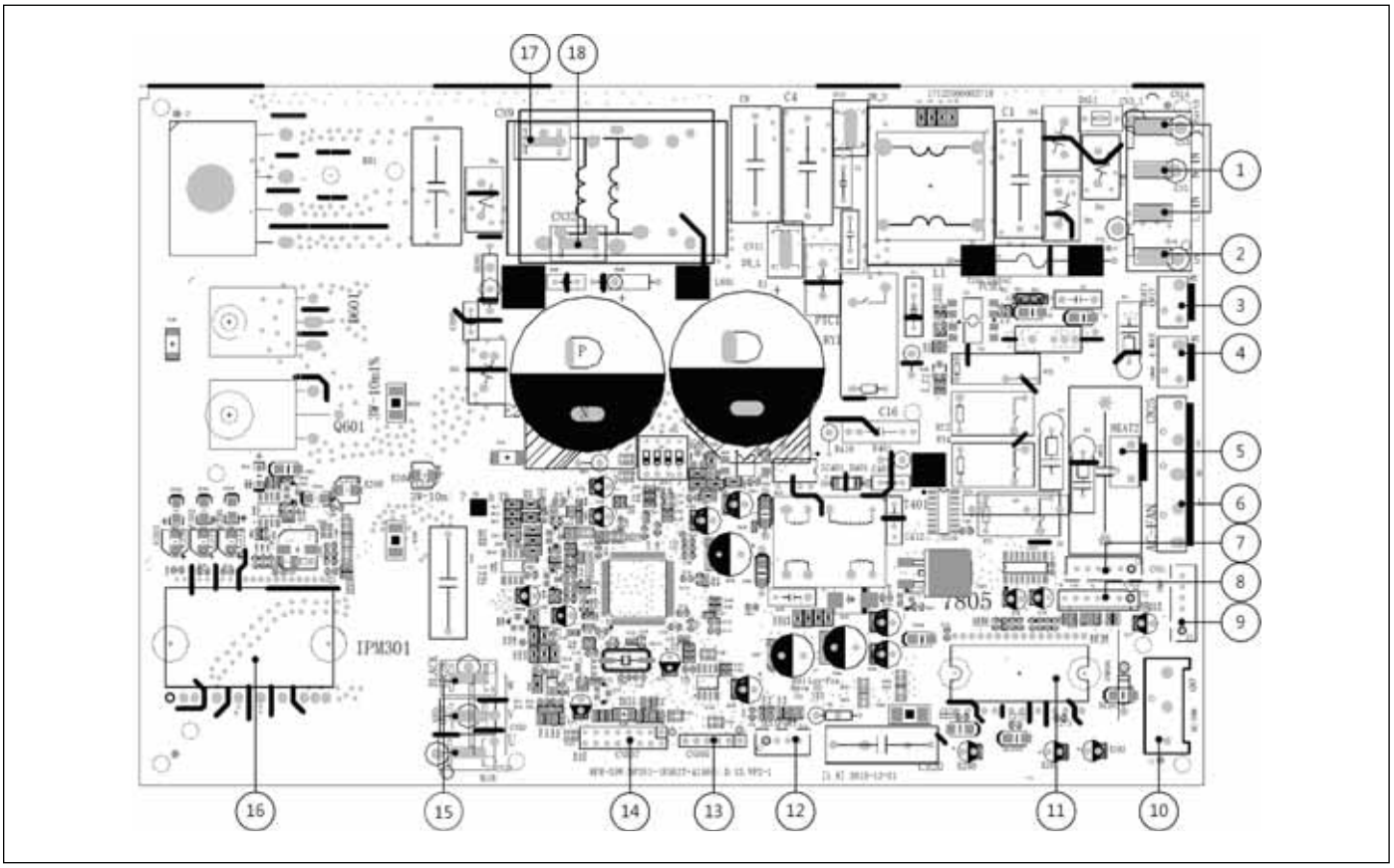



*Figure 13*

| Number | Name | CN# | Description |
|---|---|---|---|
| 1 | Power Supply | 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) |
| 2 | S | CN16 | S: connect to indoor unit communication |
| 3 | HEAT1 | CN17 | connect to compressor heater, 208-230V AC when ON |
| 4 | 4-WAY | CN60 | connect to 4 way valve, 208-230V AC when ON. |
| 5 | HEAT2 | CN15 | connect to chassis heater, 208-230V AC when ON |
| 6 | AC-FAN | CN25 | connect to AC fan |
| 7 | TP T4 T3 | CN22 | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP |
| 8 | TP T4 T3 | CN21 | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP |
| 9 | PMV | CN31 | connect to Electric Expansion Valve |
| 10 | DC-FAN | CN7 | connect to DC fan |
| 11 | FAN_IPM | IPM 501 | IPM for DC fan |
| 12 | TESTPORT | CN6 | used for testing |
| 13 | EE_PORT | CN505 | EEPROM programmer port |
| 14 | MCUPORT | CN507 | connect to PC communication |
| 15 | W | CN28 | connect to compressor |
| | V | CN29 | 0V AC (standby) |
| | U | CN30 | 10-200V AC (running) |
| 16 | COMP_IPM | IPM 301 | IPM for compressor |
| 17 | CN9 | CN9 | connect to reactor |
| 18 | CN32 | CN32 | connect to reactor |

*Table 17*

### 7.1.3 PCB: Regular Single Zone 18K & 24K

**BMS500-AAS018-1CSXRA, BMS500-AAS018-1CSXXA, BMS500-AAS024-1CSXRA, BMS500-AAS024-1CSXXA**

### 7.1.4 PCB: Hyper Heat Single Zone 9K, 12K & 18K

**BMS500-AAS009-1CSXHB, BMS500-AAS012-1CSXHB, BMS500-AAS018-1CSXHB**

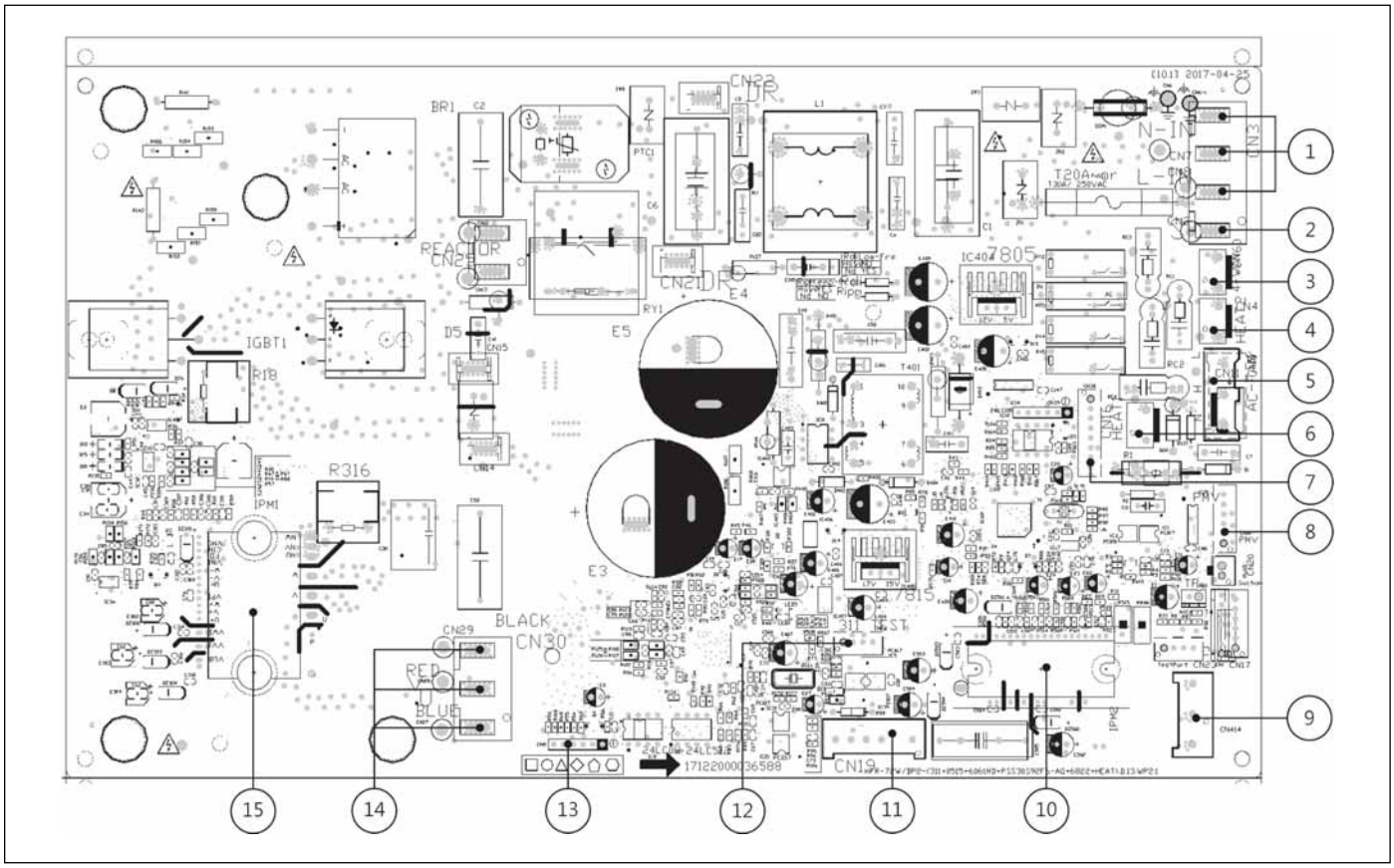



*Figure 14*

| Number | Name | CN# | Description |
|---|---|---|---|
| 1 | Power Supply | CN3 | 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 | CN3 | S: connect to indoor unit communication |
| 3 | 4-WAY | CN60 | connect to 4 way valve, 208-230V AC when is ON. |
| 4 | HEAT1 | CN17 | connect to compressor heater, 208-230V AC when is ON |
| 5 | AC-FAN | CN11 | connect to AC fan |
| 6 | HEAT2 | CN16 | connect to chassis heater, 208-230V AC when is ON |
| 7 | CN38 | CN38 | connect to PC communication |
| 8 | PMV | CN18 | connect to Electric Expansion Valve |
| 9 | DC-FAN | CN414 | connect to DC fan |
| 10 | FAN_IPM | IPM 501 | IPM for DC fan |
| 11 | CN19 | CN19 | internal drive motor |
| 12 | TESTPORT | CN23 | used for testing |
| 13 | CN9 | CN9 | connect to PC communication |
| 14 | U | CN28 | connect to compressor |
| | V | CN29 | 0V AC (standby) |
| | W | CN30 | 10-200V AC (running) |
| 15 | COMP_IPM | IPM 301 | IPM for compressor |

*Table 18*

### 7.1.5 PCB: Hyper Heat Single Zone 24K
**BMS500-AAS024-1CSXHB**

### 7.1.6 PCB: Light Commercial (for Wall Mounted IDU) 30K & 36K
**BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB**

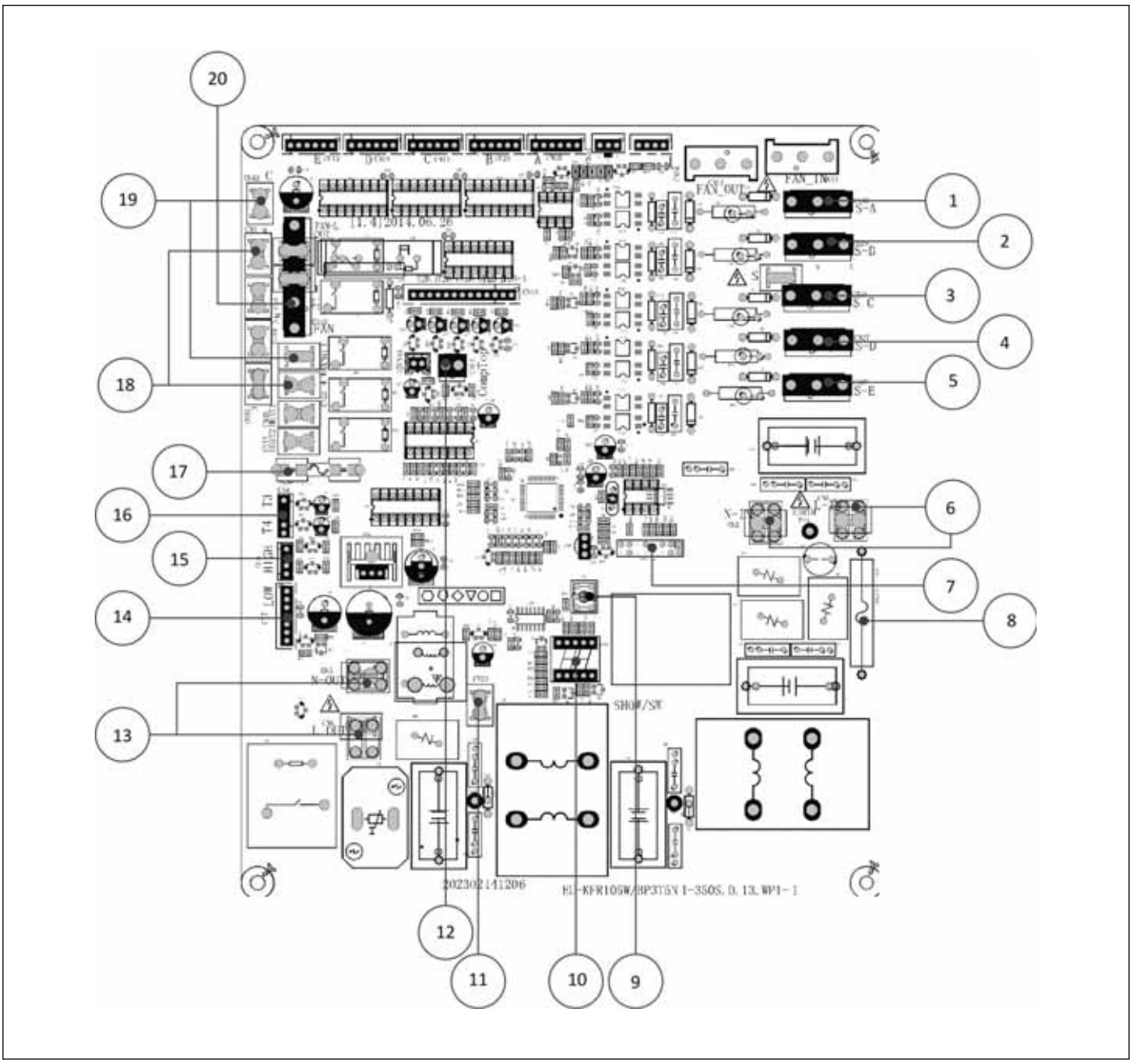



*Figure 15*

| Number | Name | CN# | Description |
|---|---|---|---|
| 1 | S-A | CN30 | Current loop communication A, signal wire, connect to the terminal (24V DC Pulse wave) |
| 2 | S-B | CN29 | Current loop communication B, signal wire, connect to the terminal (24V DC Pulse wave) |
| 3 | S-C | CN28 | Current loop communication C, signal wire, connect to the terminal (24V DC Pulse wave) |
| 4 | S-D | CN30 | Current loop communication D, signal wire, connect to the terminal (24V DC Pulse wave) |
| 5 | S-E | CN30 | Current loop communication E, signal wire, connect to the terminal (24V DC Pulse wave) |
| 6 | L-IN | CN1 | Power supply, connect to the terminal (208-230V AC) |
| | N-IN | CN2 | |
| 7 | Test report | CONdebug | Connect to detector |
| 8 | Fuse | Fuse 1 | Fuse T30A/250V |
| 9 | SW1 | SW1 | Digital display button |
| 10 | DSP1 | DSP1 | Digital display |
| 11 | CN23 | CN23 | CN23 reserve |
| 12 | CN14 | CN14 | Connect to exhaust temperature sensor |
| 13 | N-OUT | CN5 | Connect to the terminal (208-230V AC) |
| | L-OUT | CN6 | |
| 14 | CN7 | CN7 | Connect to inverter driver |
| 15 | LOW / HIGH | CN9 | Connect to high and low pressure sensor |
| 16 | T3 / T4 | CN8 | Connect to T3 / T4 temperature sensor |
| 17 | Fuse | Fuse 2 | Fuse 5A/250V |
| 18 | L | CN22 | Connect to the 4-way valve. When the 4-way is ON, output 208- 230V AC. |
| | N | CN3 | |
| 19 | CN42 | CN42 | Connect to motor capacitor |
| | CN41 | CN41 | |
| 20 | AC Fan | CN43 | Connect to AC fan motor |

*Table 19*

### 7.1.7 IPM: Hyper Heat Single Zone 24K

**BMS500-AAS024-1CSXHB**

### 7.1.8 IPM: Light Commercial (for Wall Mounted IDU) 30K & 36K

**BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB**

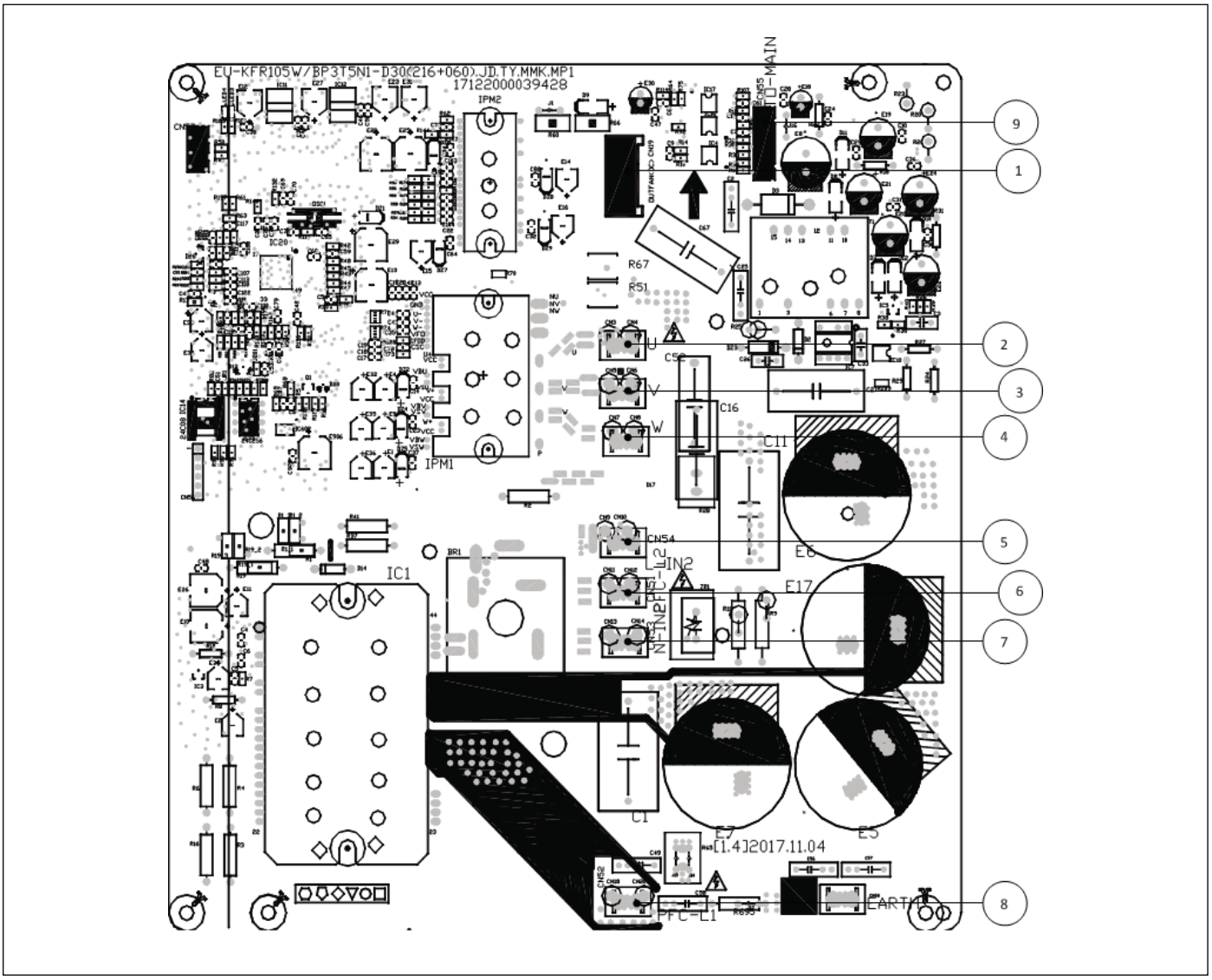



*Figure 16*

| Number | Name | CN# | Description |
|---|---|---|---|
| 1 | OUT FAN (DC) | CN19 | Connect to DC motor |
| 2 | U | CN3/CN4 | Connect to compressor U |
| 3 | V | CN5/CN6 | Connect to compressor V |
| 4 | W | CN7/CN8 | Connect to compressor W |
| 5 | CN54 | CN54 | Connect to main PCB CN6 |
| 6 | CN51 | CN51 | Connect to PFC inductor |
| 7 | CN53 | CN53 | Connect to main PCB CN5 |
| 8 | CN52 | CN52 | Connect to PFC inductor |
| 9 | CN55 | CN55 | Connect to main PCB CN7 |

*Table 20*

### 7.1.9 PCB: Light Commercial (for Cassette & Ducted IDU) 36K

**BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB**

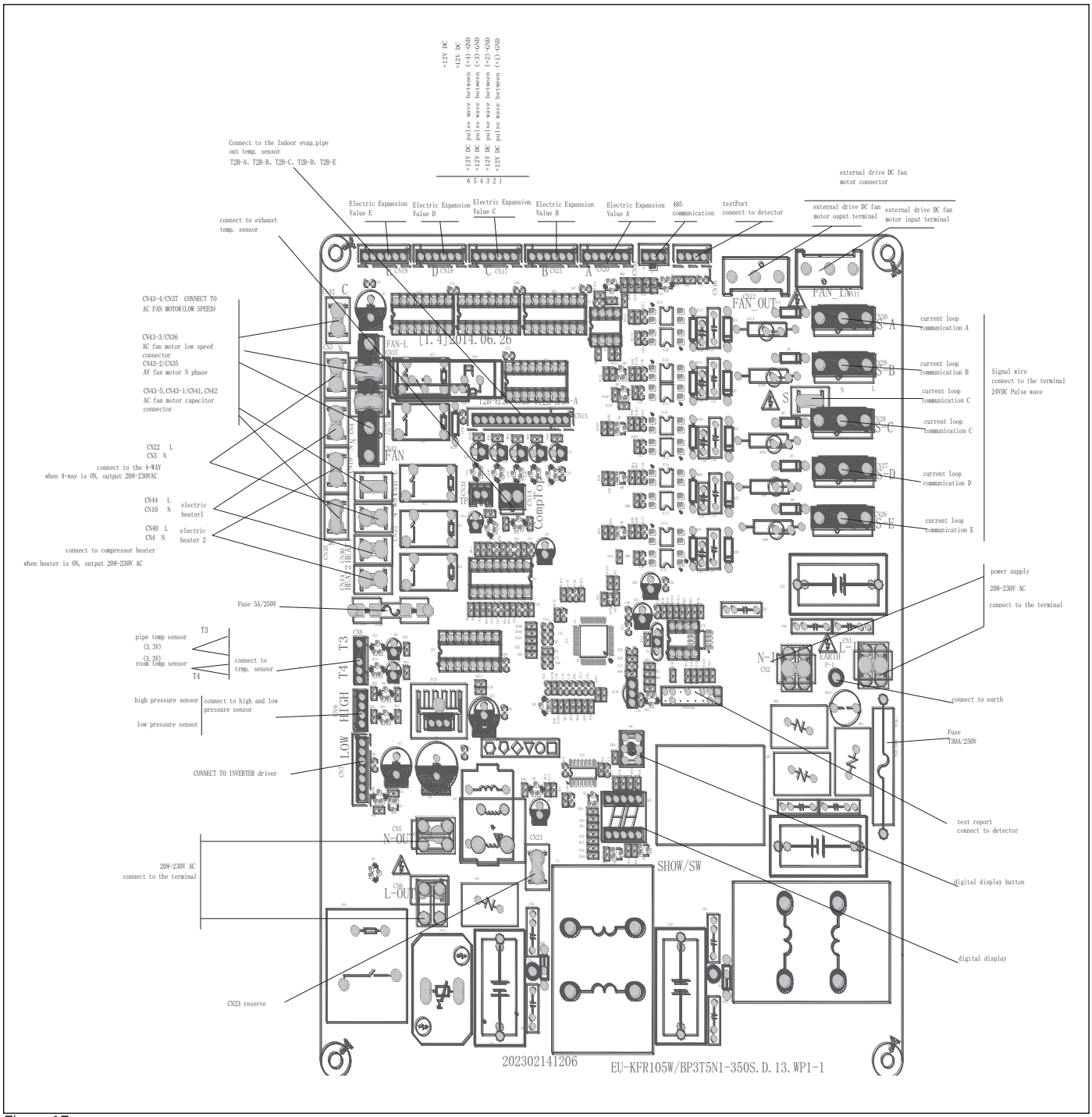



*Figure 17*

### 7.1.10 IPM: Light Commercial (for Cassette & Ducted IDU) 36K

**BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB**

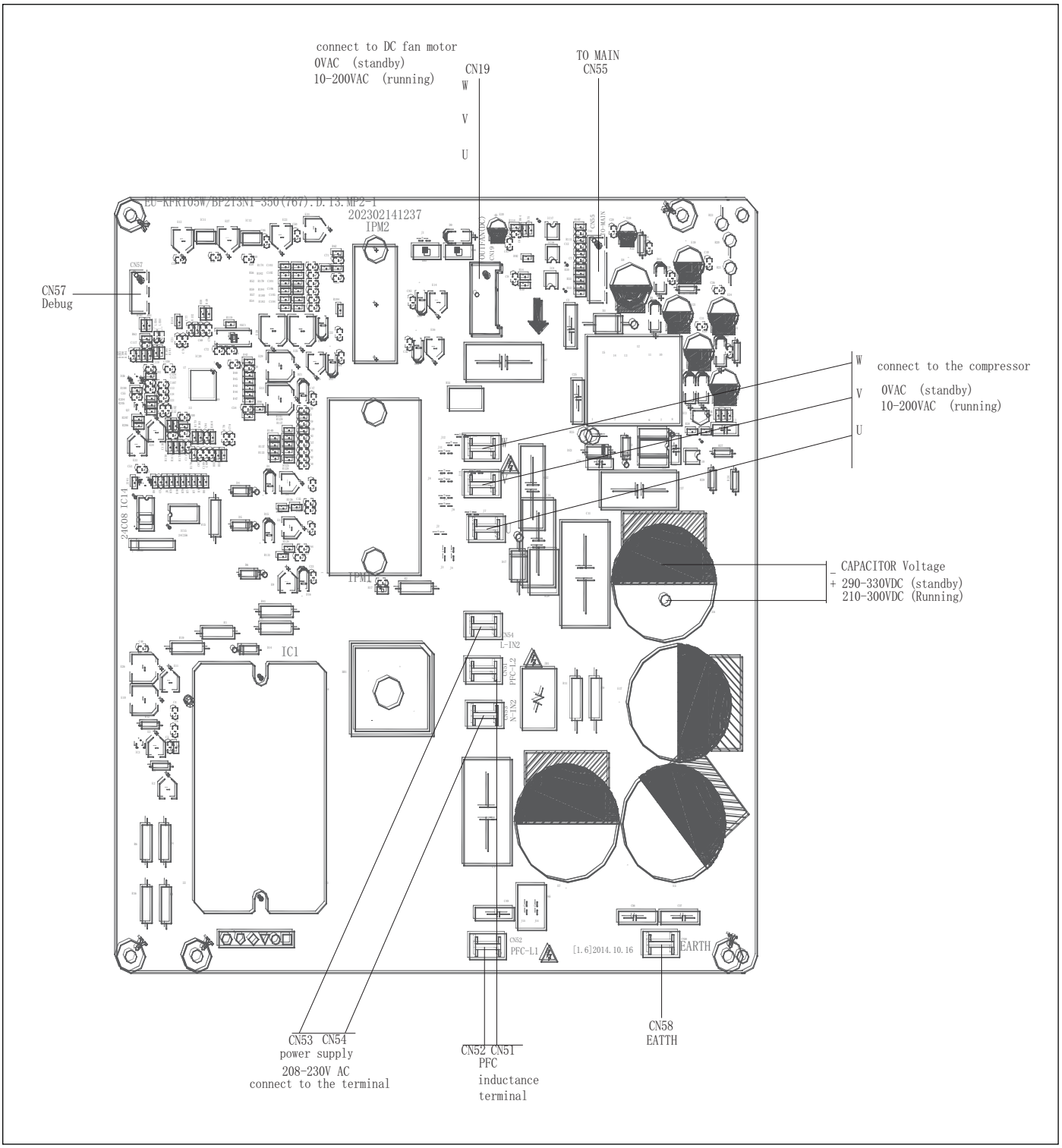



*Figure 18*

### 7.1.11 PCB: Light Commercial 48K & 60K

**BMS500-AAS048-1CSXLB, BMS500-AAS060-1CSXLB**

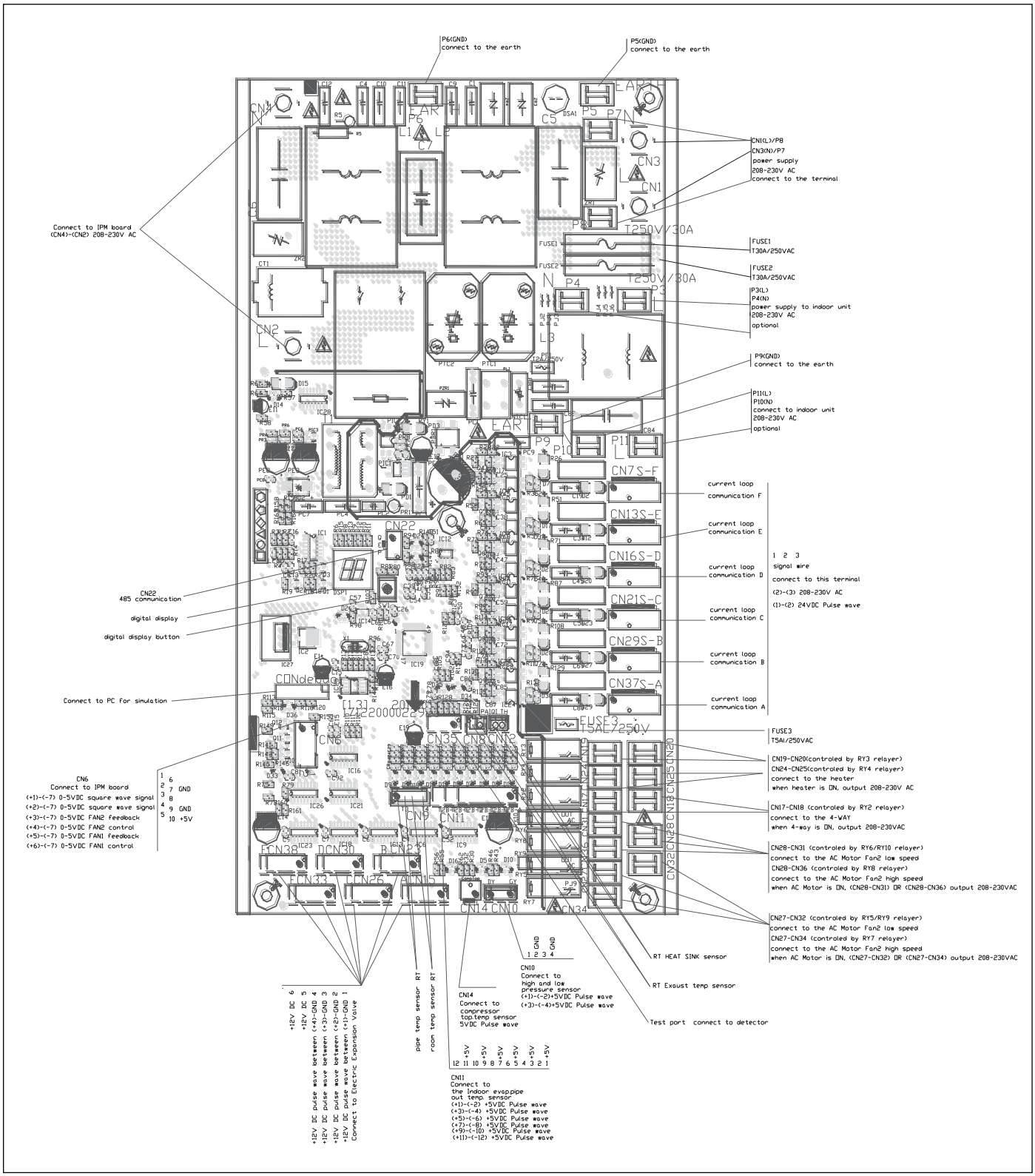



*Figure 19*

### 7.1.12 IPM: Light Commercial 48K & 60K

**BMS500-AAS048-1CSXLB, BMS500-AAS060-1CSXLB**

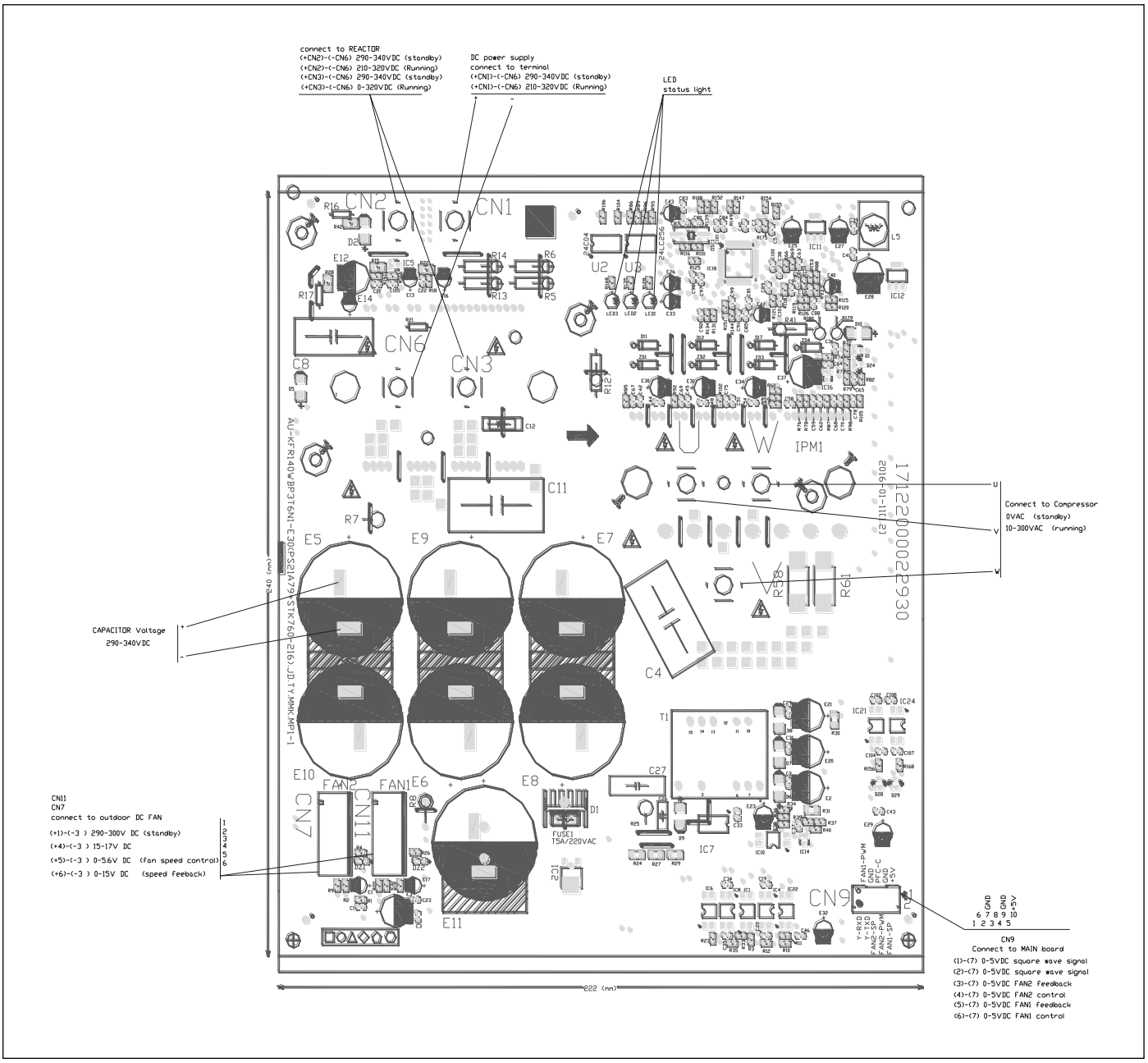



*Figure 20*

After power on, LED3 (Green color) and LED2 (Red color) will be flashing if the unit has some problems.

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

*Table 21*

O - light

X - off

☆ - LED flashes at 2.5 Hz (5 flashes every 2 seconds)

## 7.2 Indoor Wiring Diagram

### 7.2.1 Indoor Wiring Diagram_Wall Mounted Unit

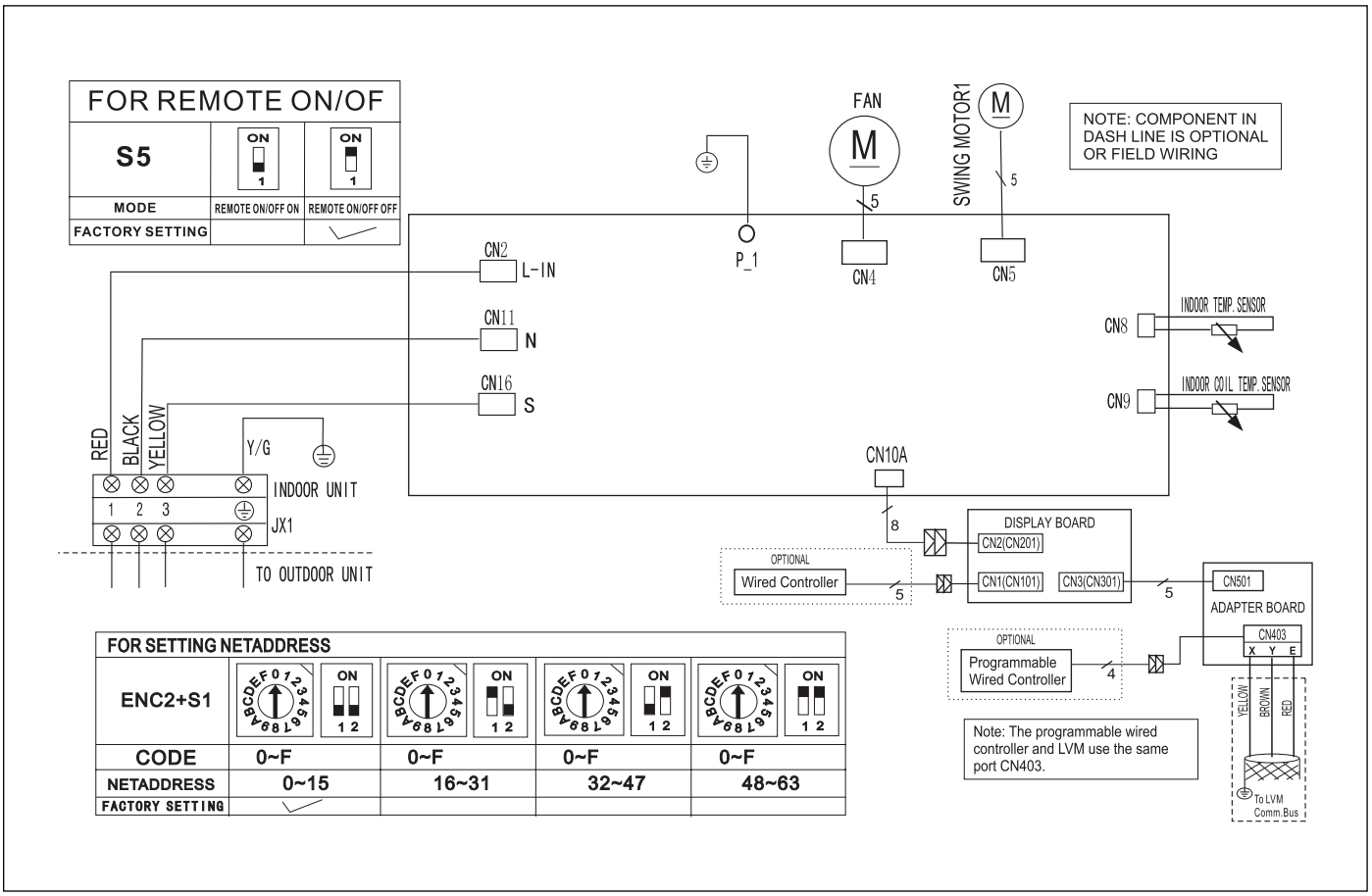



*Figure 21*

### 7.2.2 Indoor Wiring Diagram_4-Way Cassette Unit

**9K, 12K, 18K & 24K models**

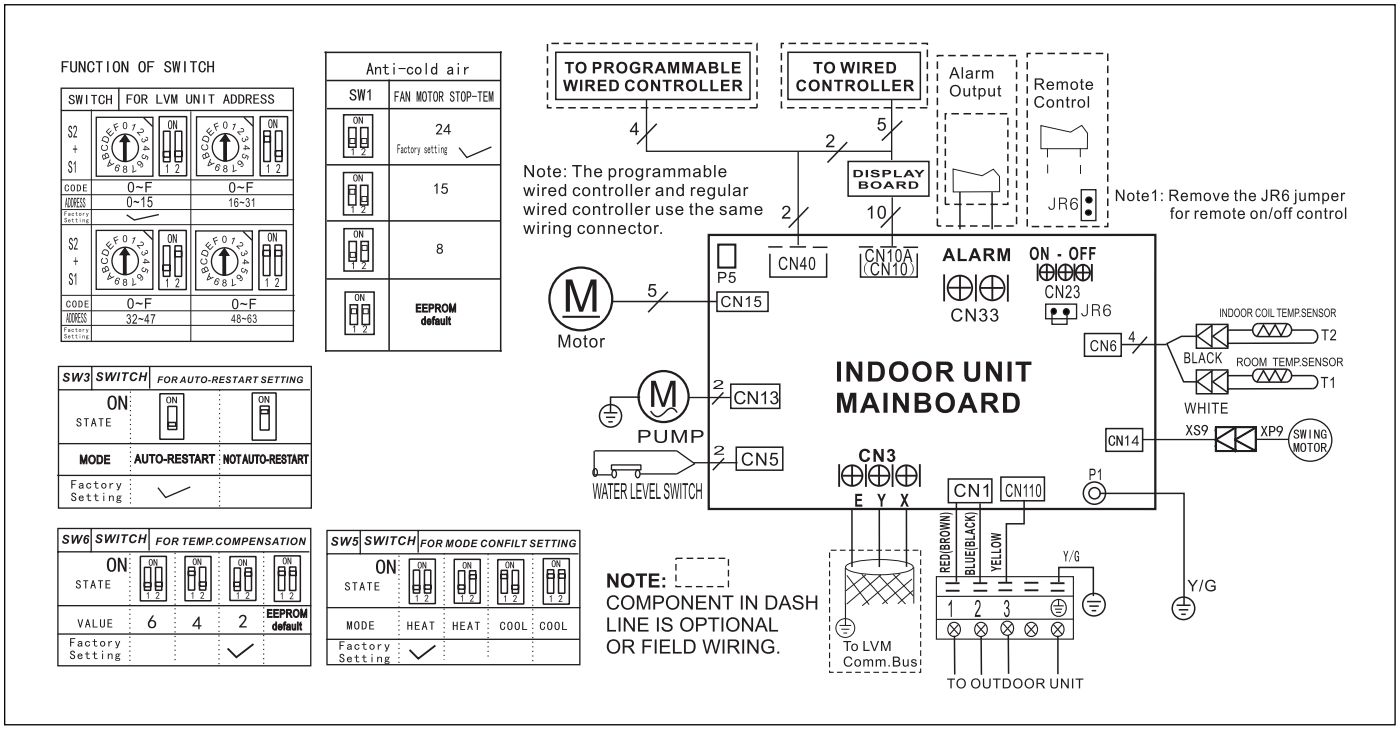



*Figure 22*

**36K & 48K models**

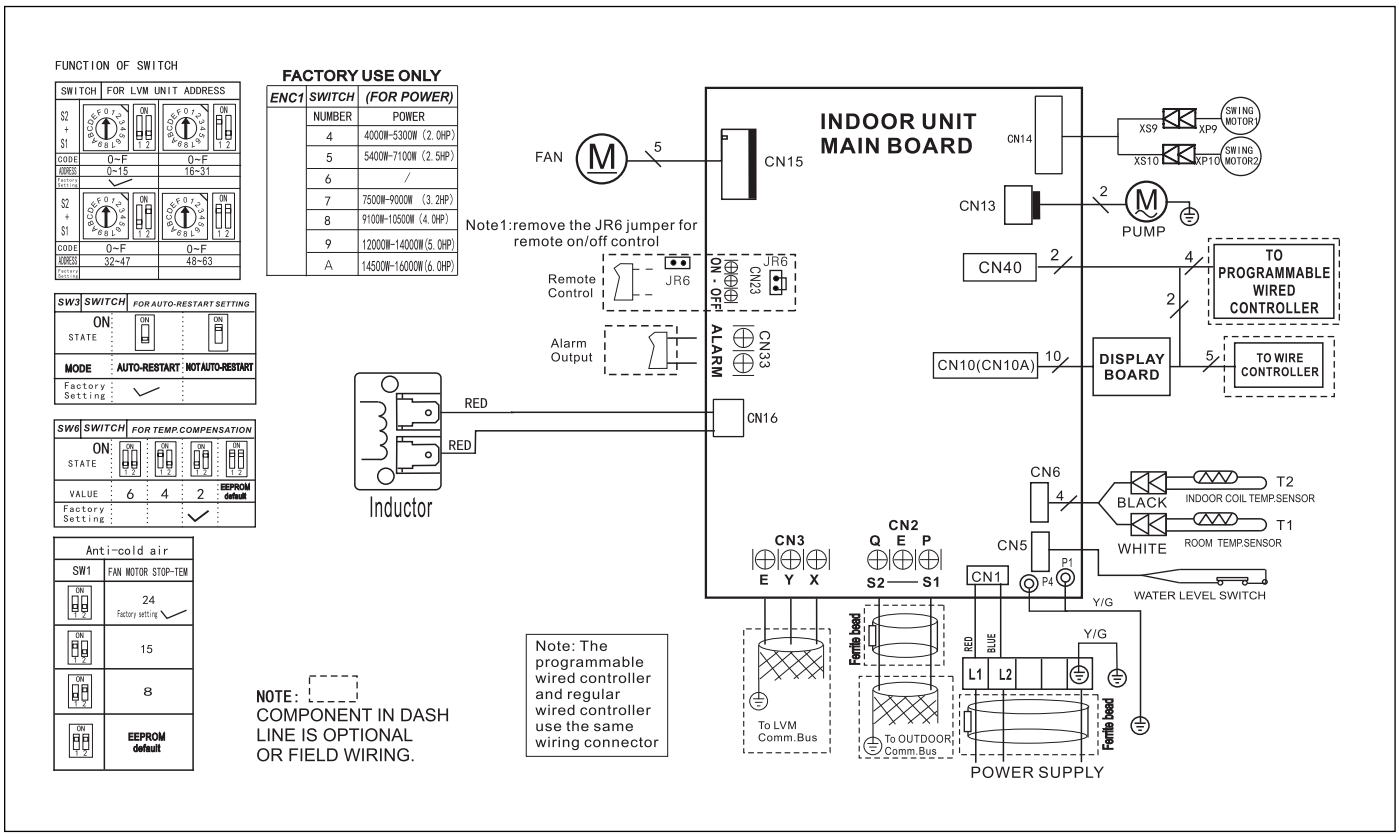



*Figure 23*

### 7.2.3 Indoor Wiring Diagram_4-Ducted Unit

**9K, 12K, 18K & 24K models**

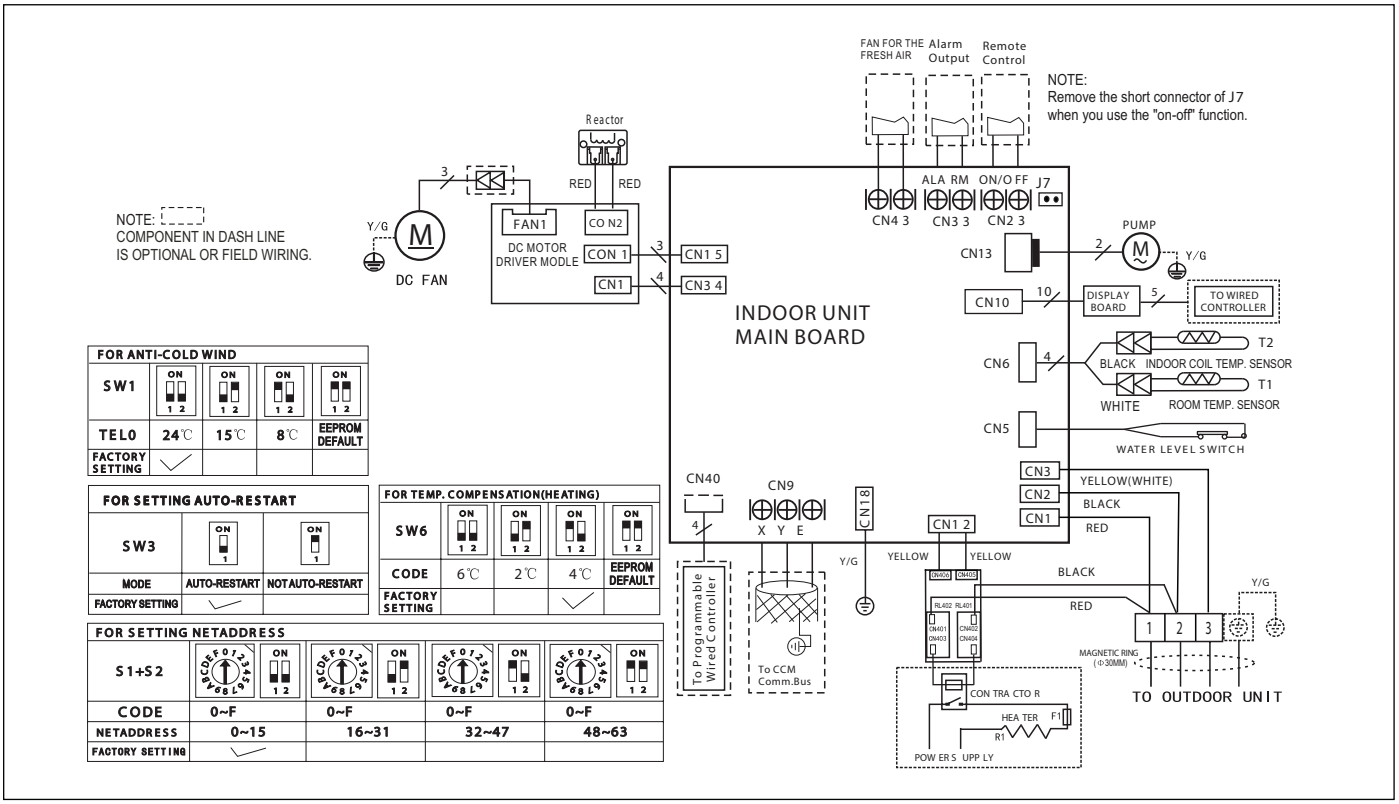



*Figure 24*

**36K & 48K models**

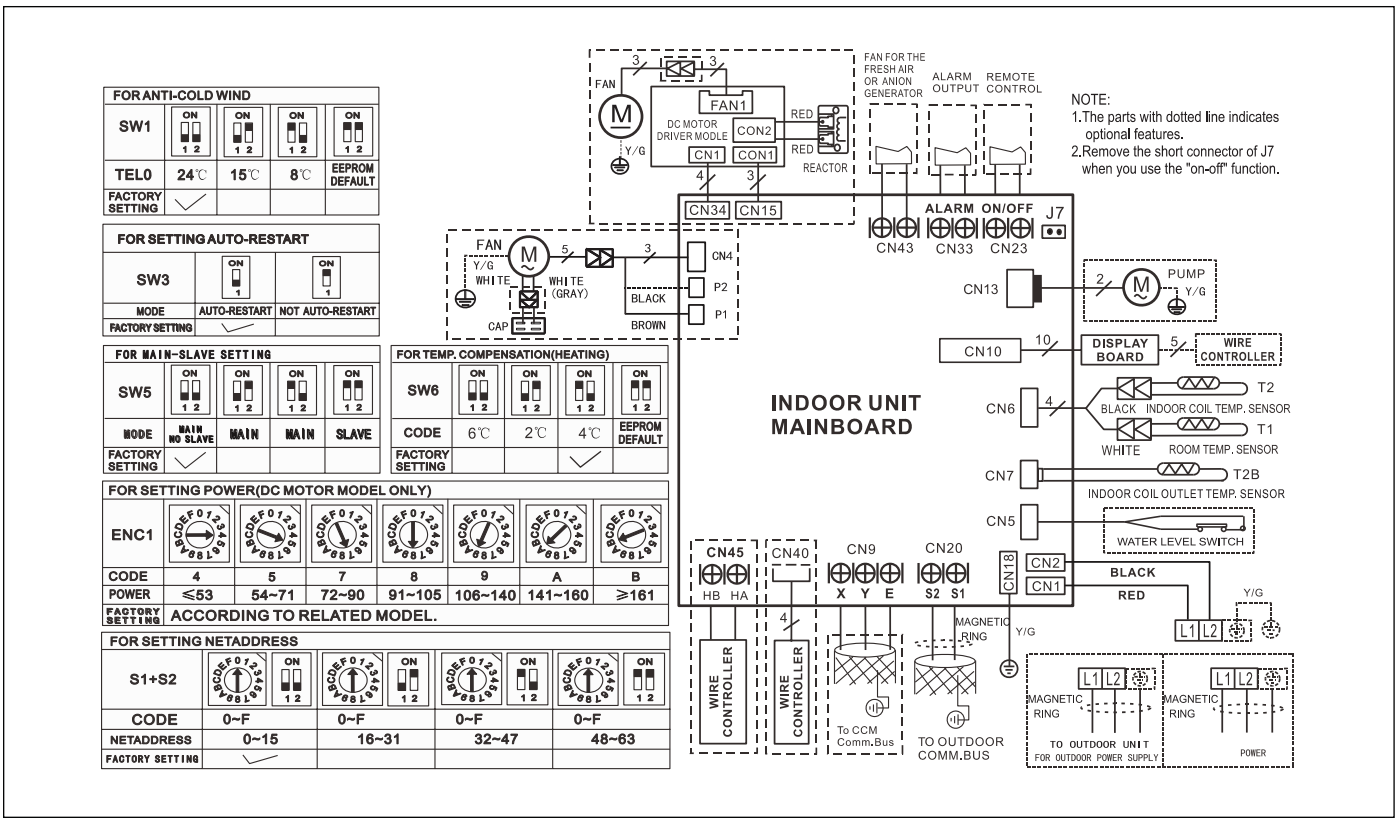



*Figure 25*

## 7.4 Outdoor Wiring Diagram

### 7.4.1 Regular Single Zone (9K & 12K)

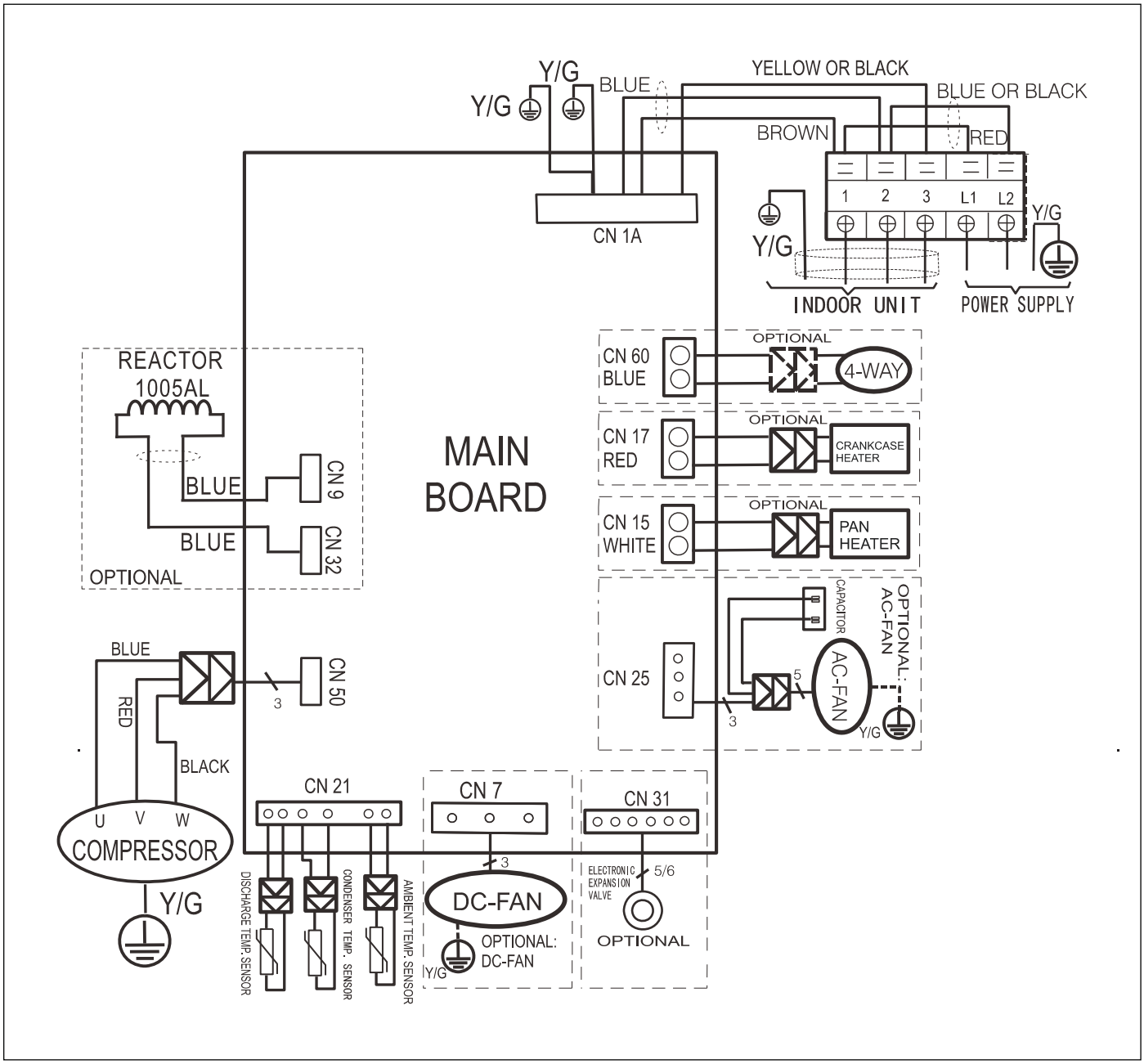



*Figure 26*

### 7.4.2 Regular Single Zone (18K & 24K) & Hyper Heat Single Zone (9K, 12K & 18K)

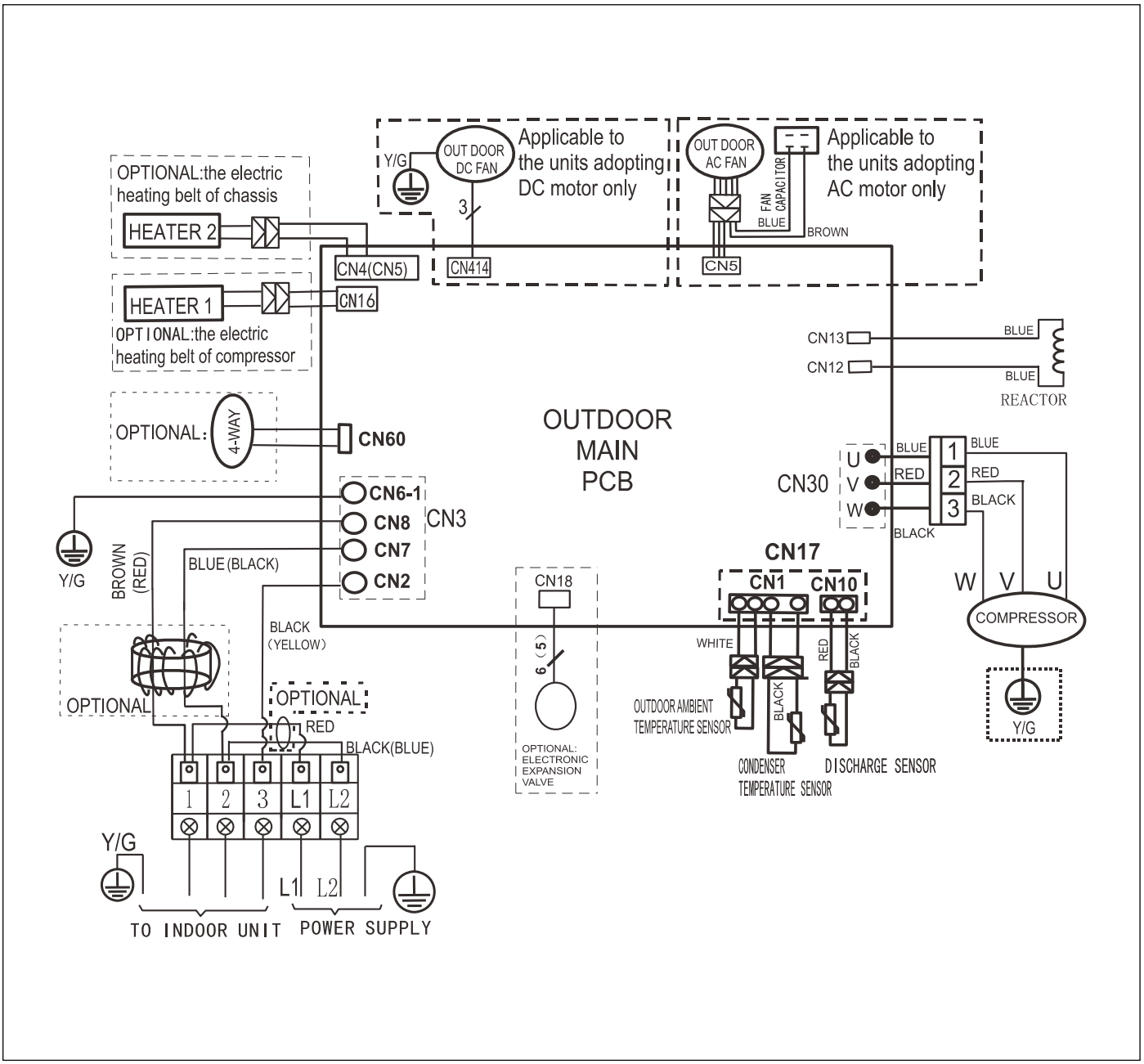
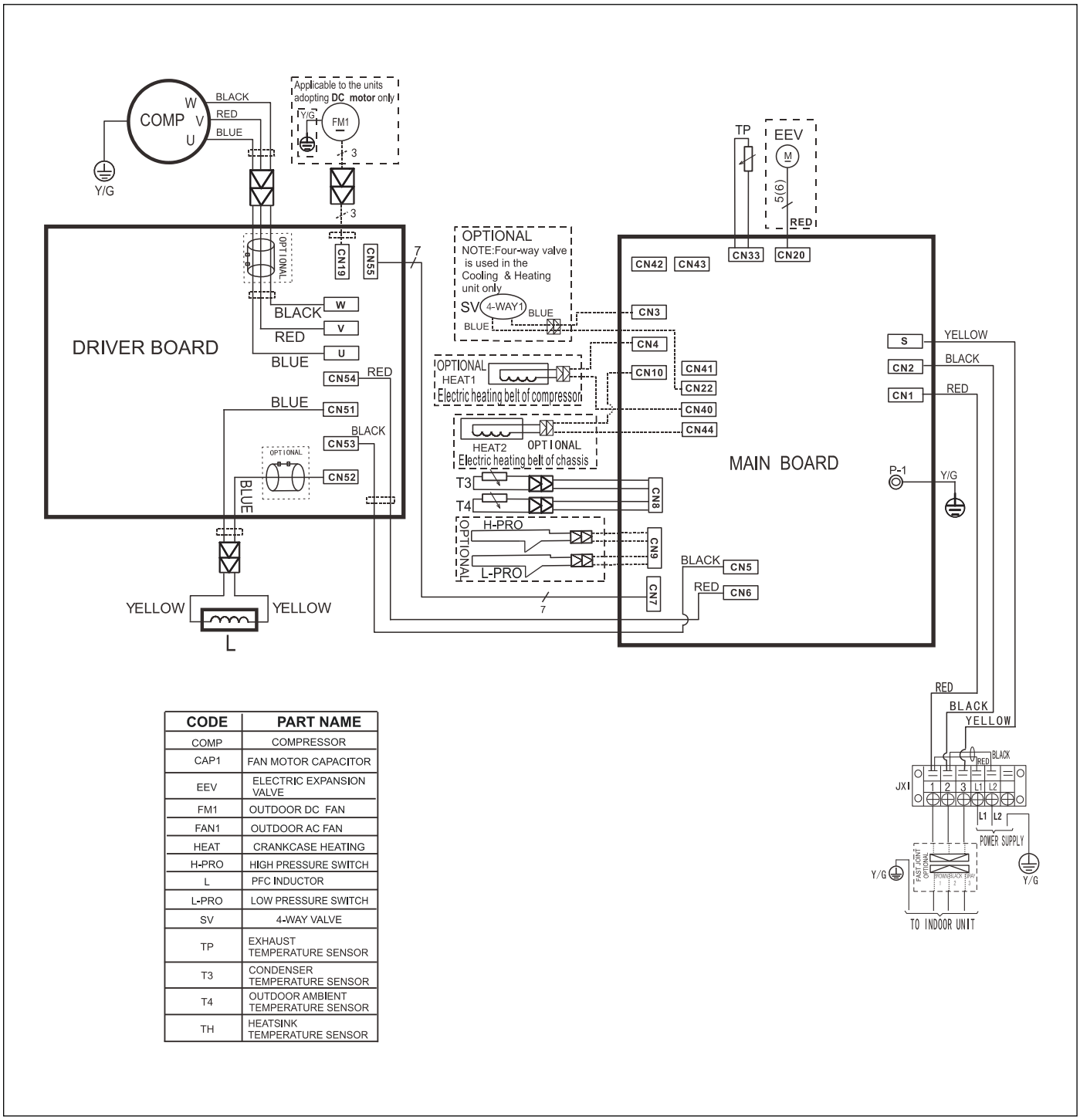



*Figure 27*

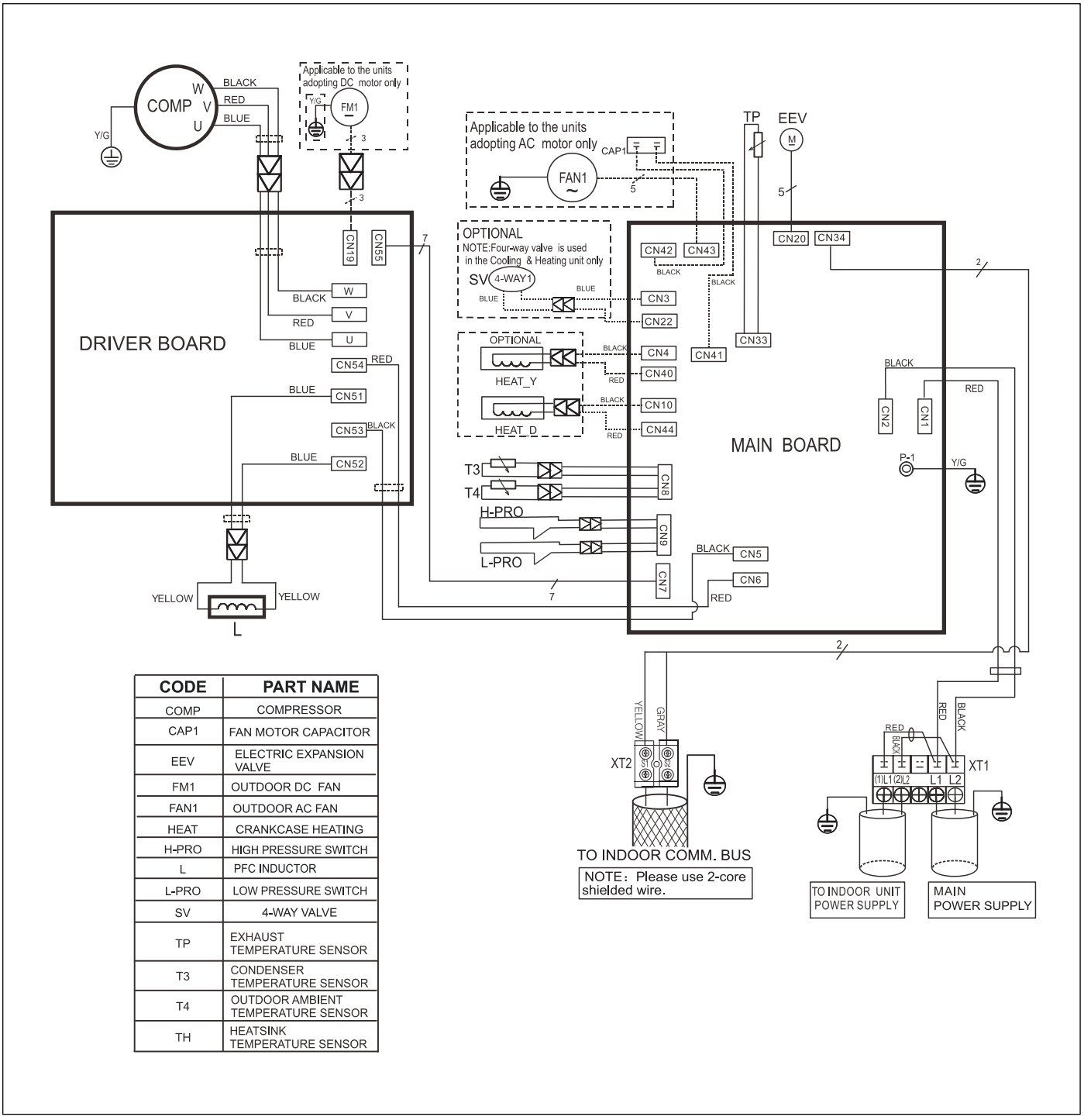
### 7.4.3 Hyper Heat Single Zone (24K)
### Light Commercial Single Zone (30K & 36K for Wall Mounted IDU)




| CODE | PART NAME |
|---|---|
| COMP | COMPRESSOR |
| CAP1 | FAN MOTOR CAPACITOR |
| EEV | ELECTRIC EXPANSION VALVE |
| FM1 | OUTDOOR DC FAN |
| FAN1 | OUTDOOR AC FAN |
| HEAT | CRANKCASE HEATING |
| H-PRO | HIGH PRESSURE SWITCH |
| L | PFC INDUCTOR |
| L-PRO | LOW PRESSURE SWITCH |
| SV | 4-WAY VALVE |
| TP | EXHAUST TEMPERATURE SENSOR |
| T3 | CONDENSER TEMPERATURE SENSOR |
| T4 | OUTDOOR AMBIENT TEMPERATURE SENSOR |
| TH | HEATSINK TEMPERATURE SENSOR |

*Figure 28*

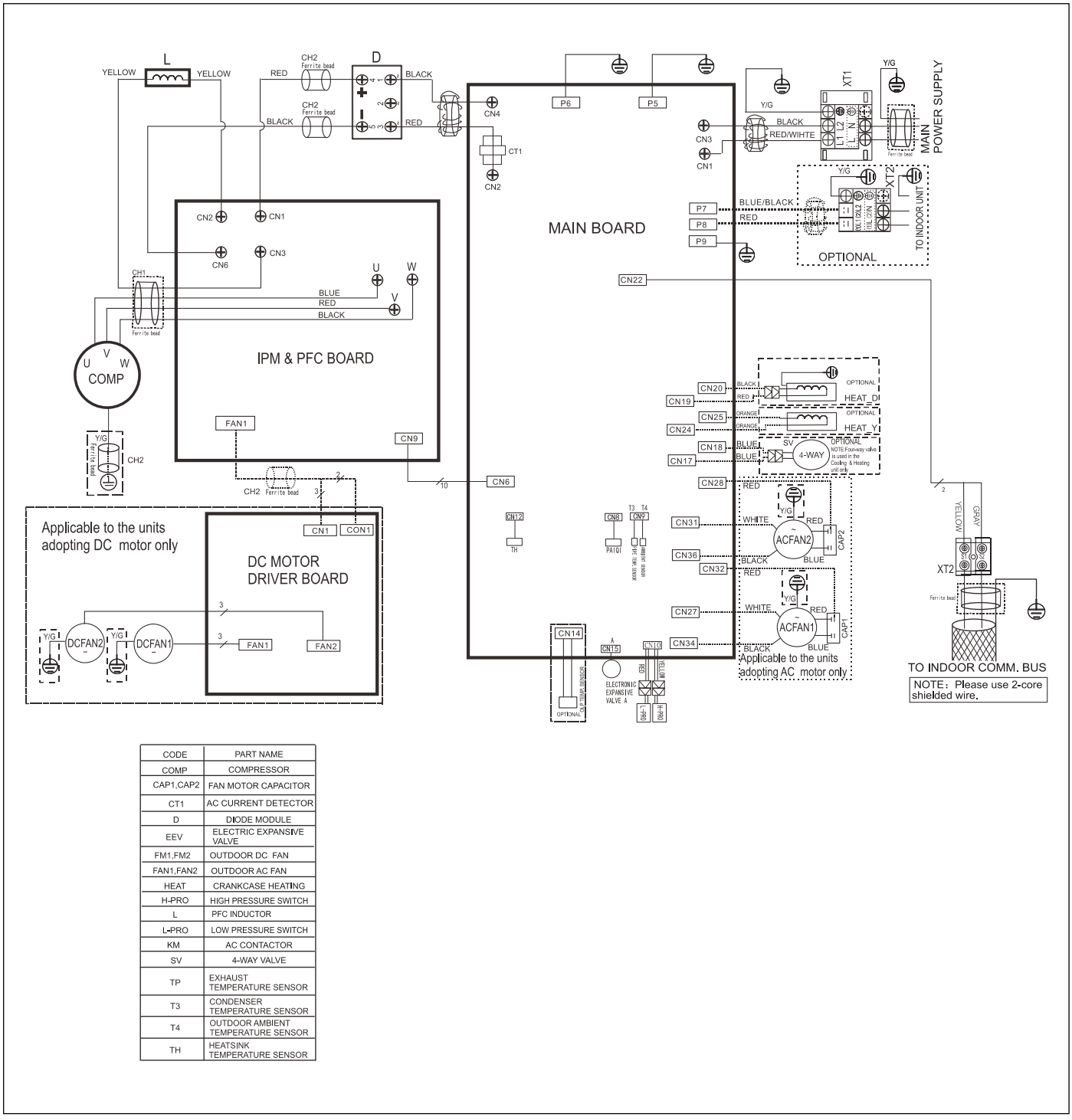
### 7.4.4 Light Commercial Single Zone (36K for Cassette and Ducted IDU)




| CODE | PART NAME |
|---|---|
| COMP | COMPRESSOR |
| CAP1 | FAN MOTOR CAPACITOR |
| EEV | ELECTRIC EXPANSION VALVE |
| FM1 | OUTDOOR DC FAN |
| FAN1 | OUTDOOR AC FAN |
| HEAT | CRANKCASE HEATING |
| H-PRO | HIGH PRESSURE SWITCH |
| L | PFC INDUCTOR |
| L-PRO | LOW PRESSURE SWITCH |
| SV | 4-WAY VALVE |
| TP | EXHAUST TEMPERATURE SENSOR |
| T3 | CONDENSER TEMPERATURE SENSOR |
| T4 | OUTDOOR AMBIENT TEMPERATURE SENSOR |
| TH | HEATSINK TEMPERATURE SENSOR |

*Figure 29*

### 7.4.5 Light Commercial Single Zone (48K & 60K)




| CODE | PART NAME |
|---|---|
| COMP | COMPRESSOR |
| CAP1,CAP2 | FAN MOTOR CAPACITOR |
| CT1 | AC CURRENT DETECTOR |
| D | DIODE MODULE |
| EEV | ELECTRIC EXPANSIVE VALVE |
| FM1,FM2 | OUTDOOR DC FAN |
| FAN1,FAN2 | OUTDOOR AC FAN |
| HEAT | CRANKCASE HEATING |
| H-PRO | HIGH PRESSURE SWITCH |
| L | PFC INDUCTOR |
| L-PRO | LOW PRESSURE SWITCH |
| KM | AC CONTACTOR |
| SV | 4-WAY VALVE |
| TP | EXHAUST TEMPERATURE SENSOR |
| T3 | CONDENSER TEMPERATURE SENSOR |
| T4 | OUTDOOR AMBIENT TEMPERATURE SENSOR |
| TH | HEATSINK TEMPERATURE SENSOR |

*Figure 30*

# 8 Diagnosis & Solution

## 8.1 EEPROM parameter error (E0/F4)

| | |
|---|---|
| Error Code | E0 (indoor) / F4 (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<br>▶ PCB faulty |

*Table 22*

**Troubleshooting:**

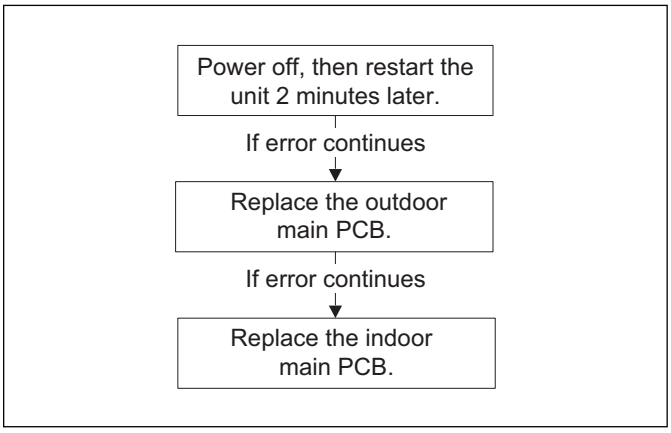



*Figure 31*

**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.

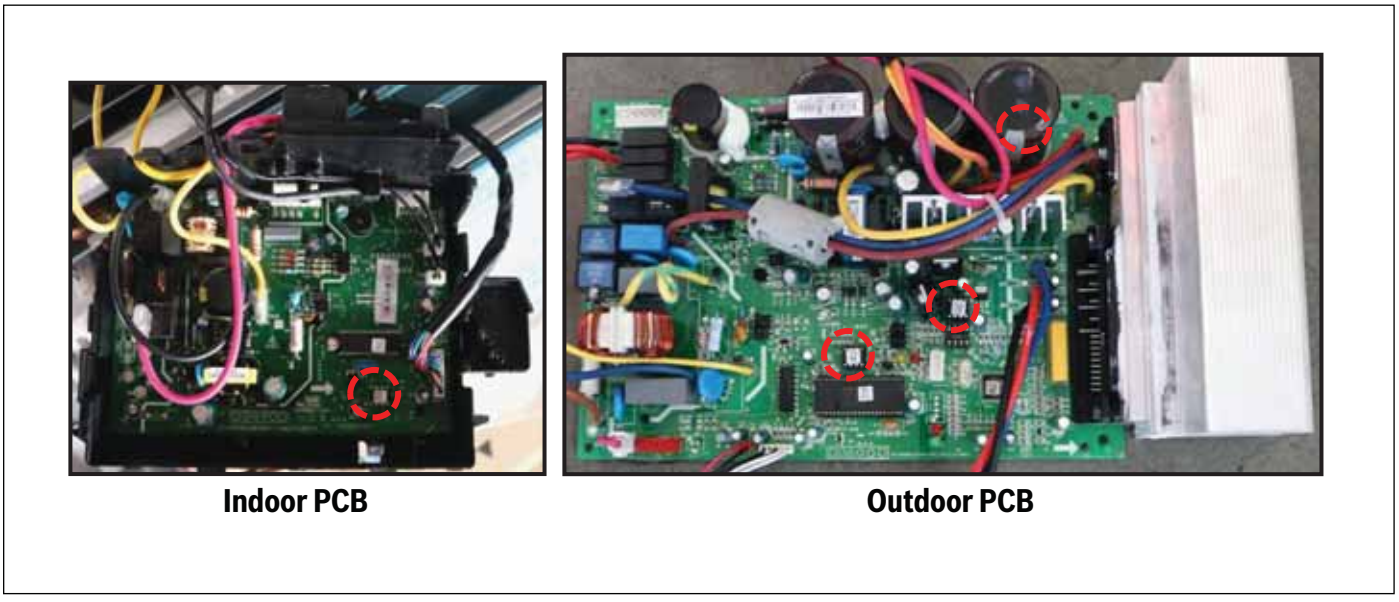



*Figure 32*

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

## 8.2 Indoor / outdoor unit's communication (E1)

**Applicable models:**

- Wall Mounted IDU System: 9K ~ 36K
- Cassette IDU System: 9K ~ 24K
- Ducted IDU System: 9K ~ 24K

| | |
|---|---|
| Error Code | E1 |
| 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<br>▶ Electromagnetic interference<br>▶ Indoor or outdoor PCB faulty |

*Table 23*

**Troubleshooting:**

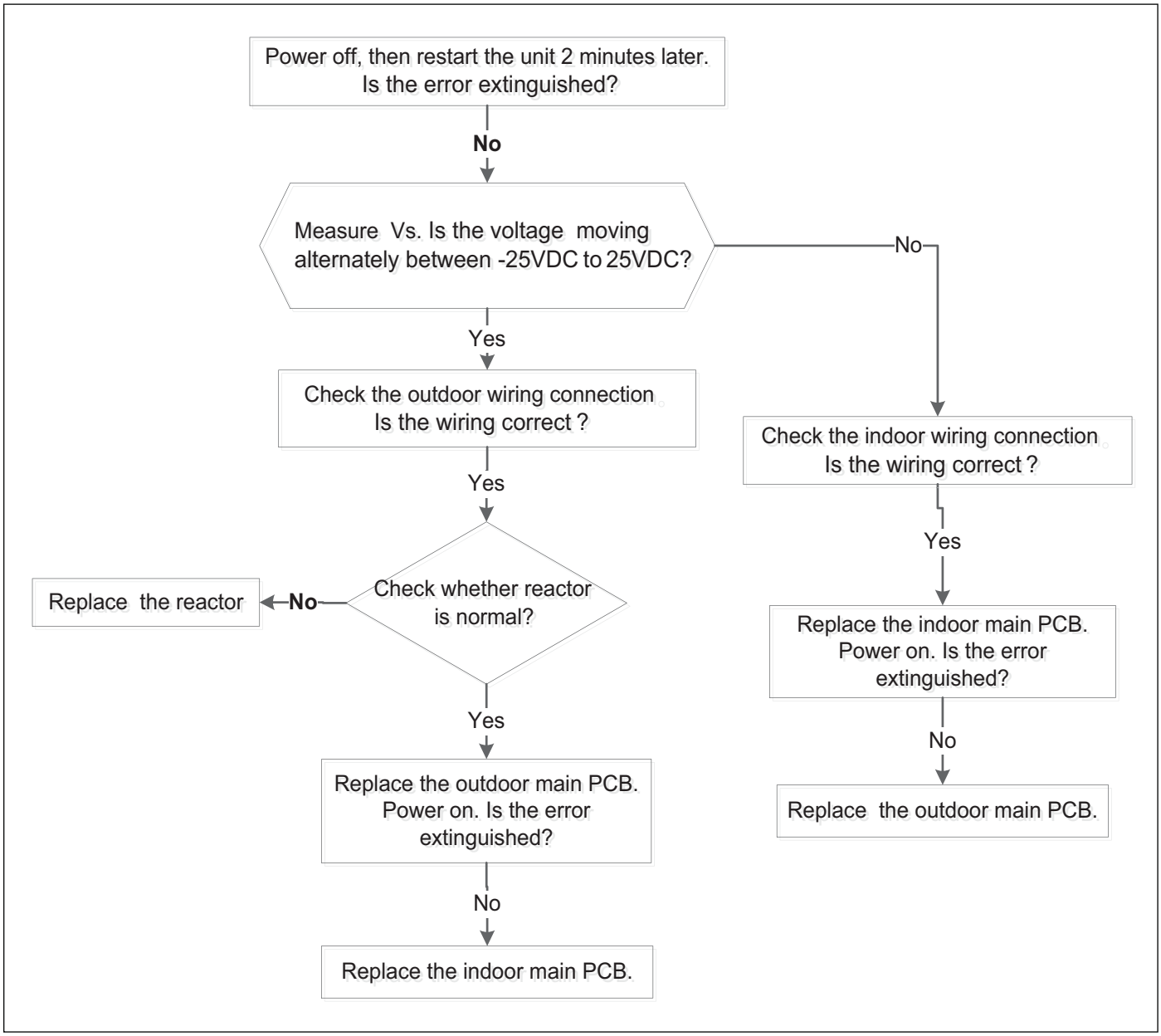



*Figure 33*

**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.

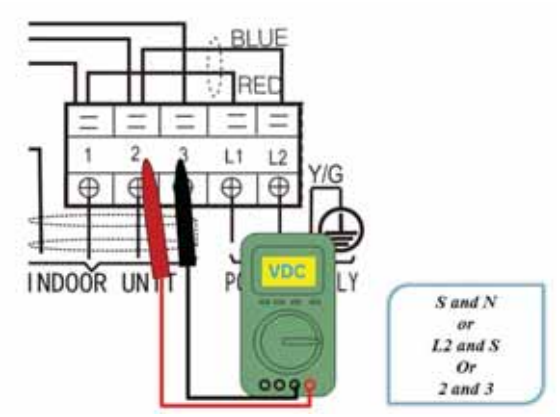



*Figure 34*



*Figure 35*

**Remark:**

- Use a multimeter to test the resistance of the reactor 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.

**Applicable models:**

- Cassette IDU System: 36K ~ 48K
- Ducted IDU System: 36K ~ 60K

| | |
|---|---|
| Error Code | E1 |
| Malfunction decision conditions | Indoor unit does not receive the feedback from outdoor unit for 60 seconds or outdoor unit does not receive feedback from indoor unit for 120 seconds. |
| Supposed causes | ▶ Incorrect installation of indoor to outdoor control wire<br>▶ Electromagnetic interference<br>▶ Indoor or outdoor PCB faulty |

*Figure 36*

**Troubleshooting:**

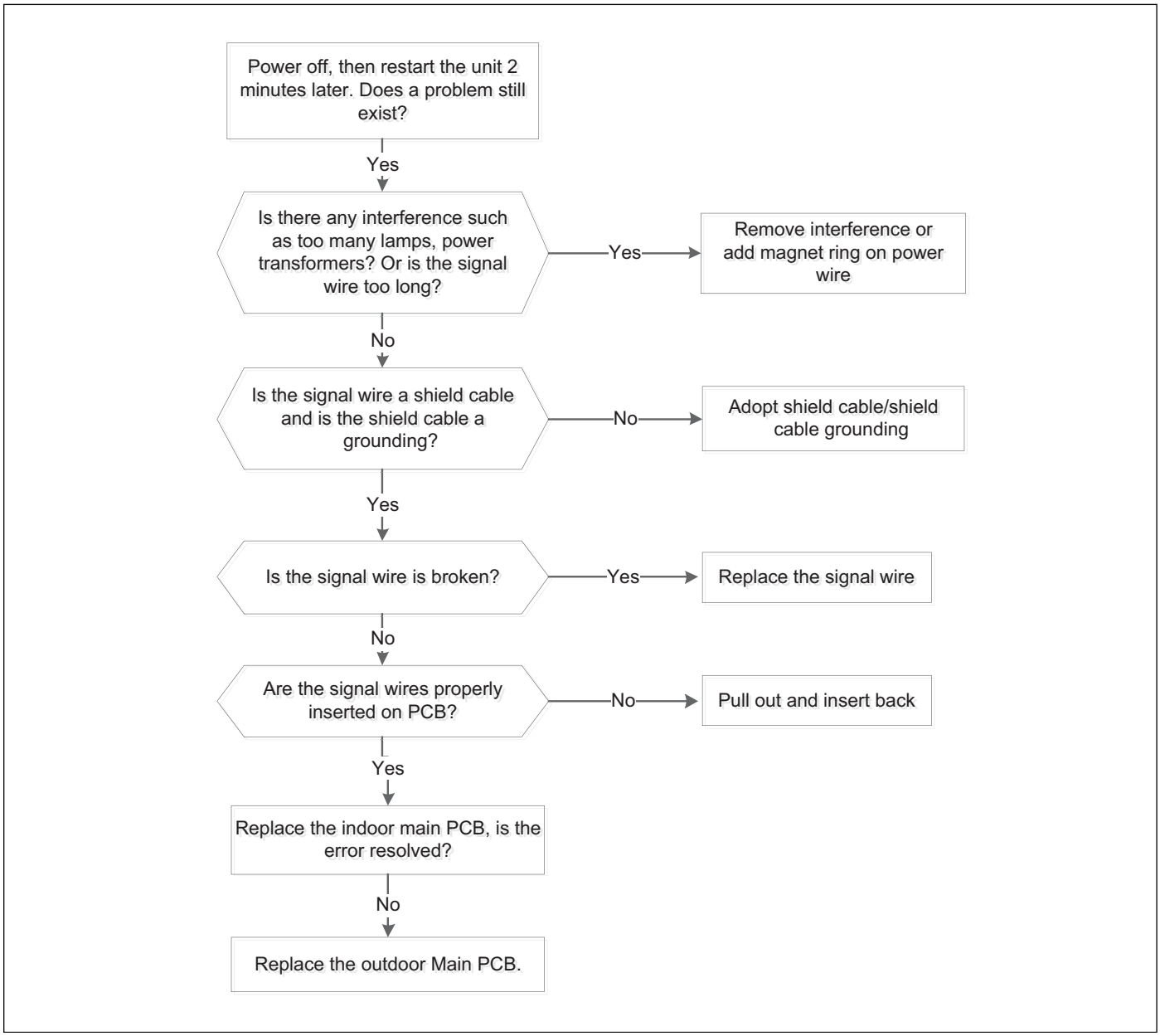



*Figure 37*

## 8.3 Zero crossing detection error (E2)

| | |
|---|---|
| Error Code | E2 |
| 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<br>► Indoor PCB faulty |

*Table 24*

**Troubleshooting:**

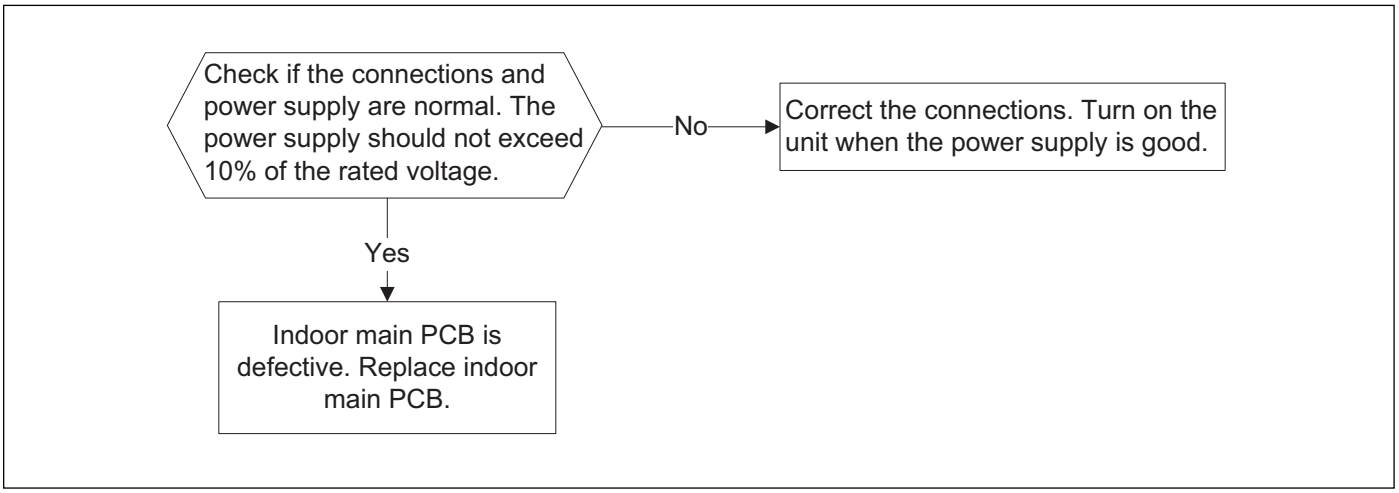



*Figure 38*

## 8.4 Fan speed has been out of control (E3 / F5)

| | |
|---|---|
| Error Code | E3 (indoor) / F5 (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<br>▶ Indoor / Outdoor Fan assembly faulty<br>▶ Indoor / Outdoor Fan motor faulty<br>▶ Indoor / Outdoor PCB faulty |

*Table 25*

**Troubleshooting:**

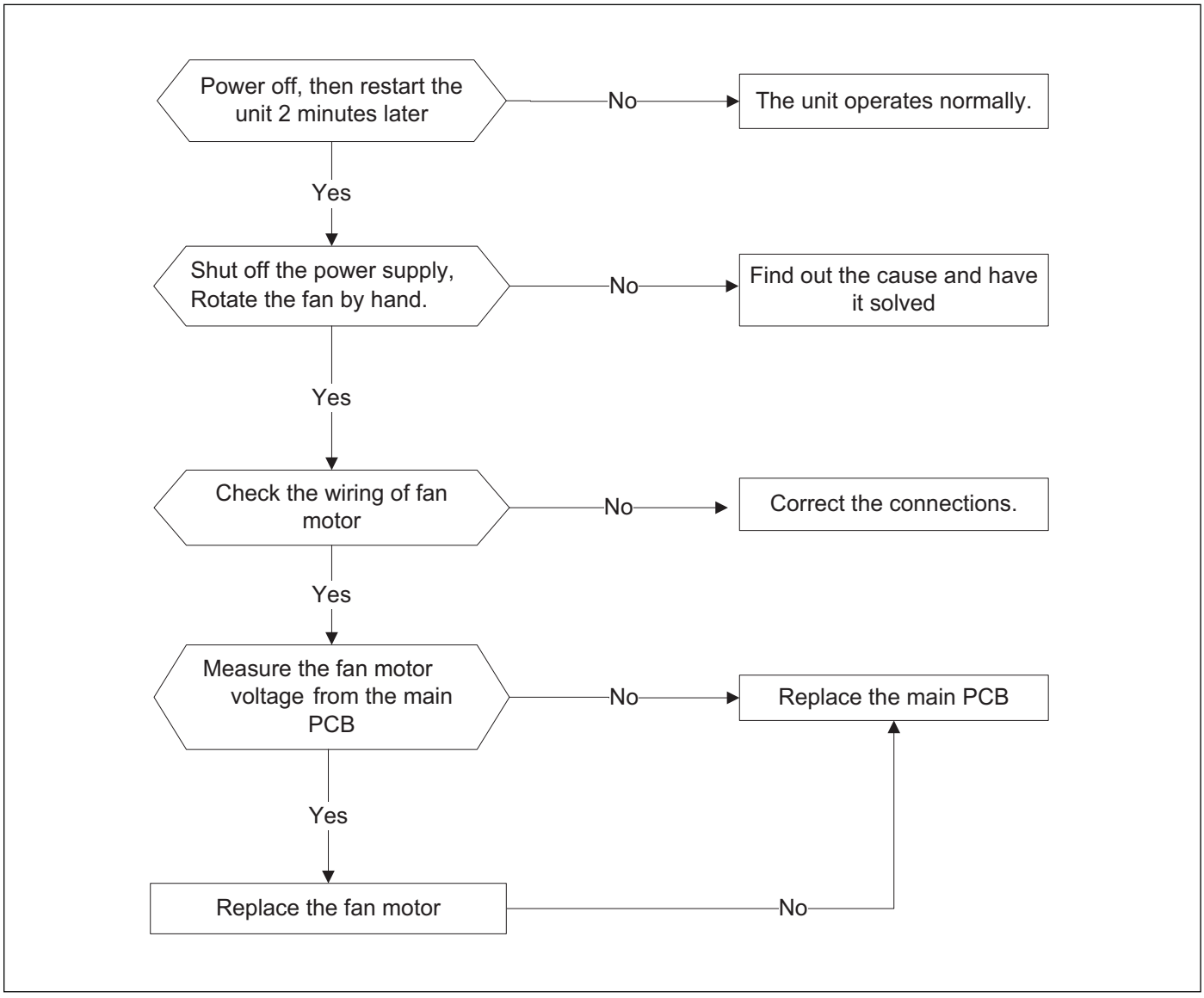



*Figure 39*

**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.

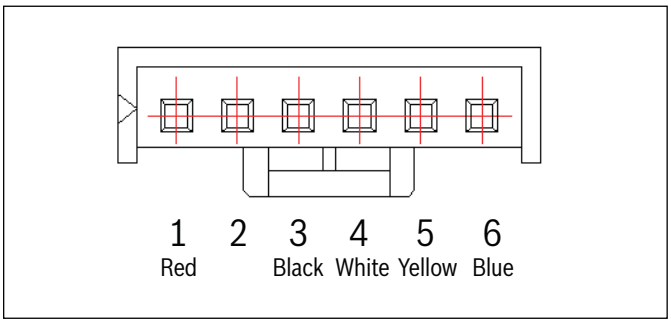



*Figure 40*

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

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

*Table 26*

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 27*

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

   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 100V (208~240V power supply)or 50V (115V power supply), the Indoor unit PCB must have problems and needs to be replaced.

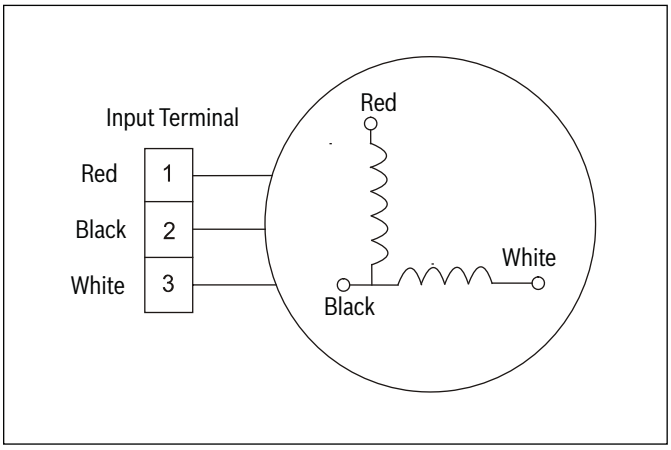



*Figure 41*

## 8.5 Open circuit or short circuit of temperature sensor (E4 / E5 / F1 / F2 / F3 / P7)

| | |
|---|---|
| Error Code | E4/E5/F1/F2/F3 |
| Malfunction decision conditions | If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the failure. |
| Supposed causes | ▶ Wiring mistake<br>▶ Sensor faulty<br>▶ Indoor / Outdoor PCB faulty |

*Table 28*

**Troubleshooting:**

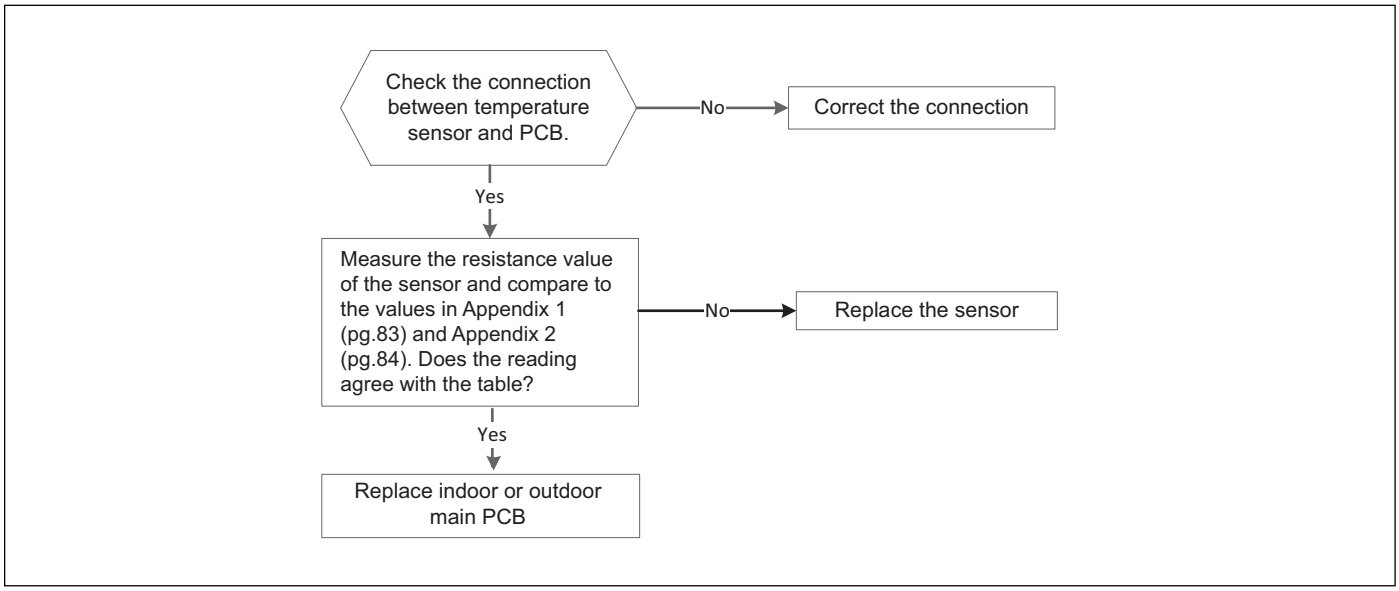



*Figure 42*

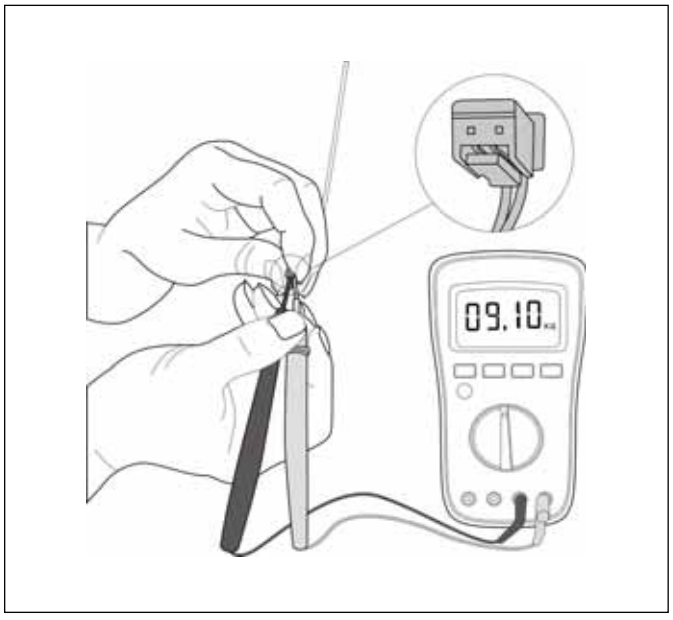



*Figure 43*

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

## 8.6 Refrigerant Leakage Detection (EC)

| | |
|---|---|
| Error Code | EC |
| Malfunction decision conditions | Define the initial evaporator coil temperature T2 when the compressor just starts running as Tcool.<br>In the first 5 minutes after the compressor starts up in cooling mode, if T2<Tcool -1.8ºF (1ºC) does not keep continuous 4 seconds and this situation happens 3 times, the display area will show "EC" and the unit will turn off. |
| Supposed causes | ► T2 sensor faulty<br>► Indoor PCB faulty<br>► System problems, such as leakage or blocking |

*Table 29*

**Troubleshooting:**

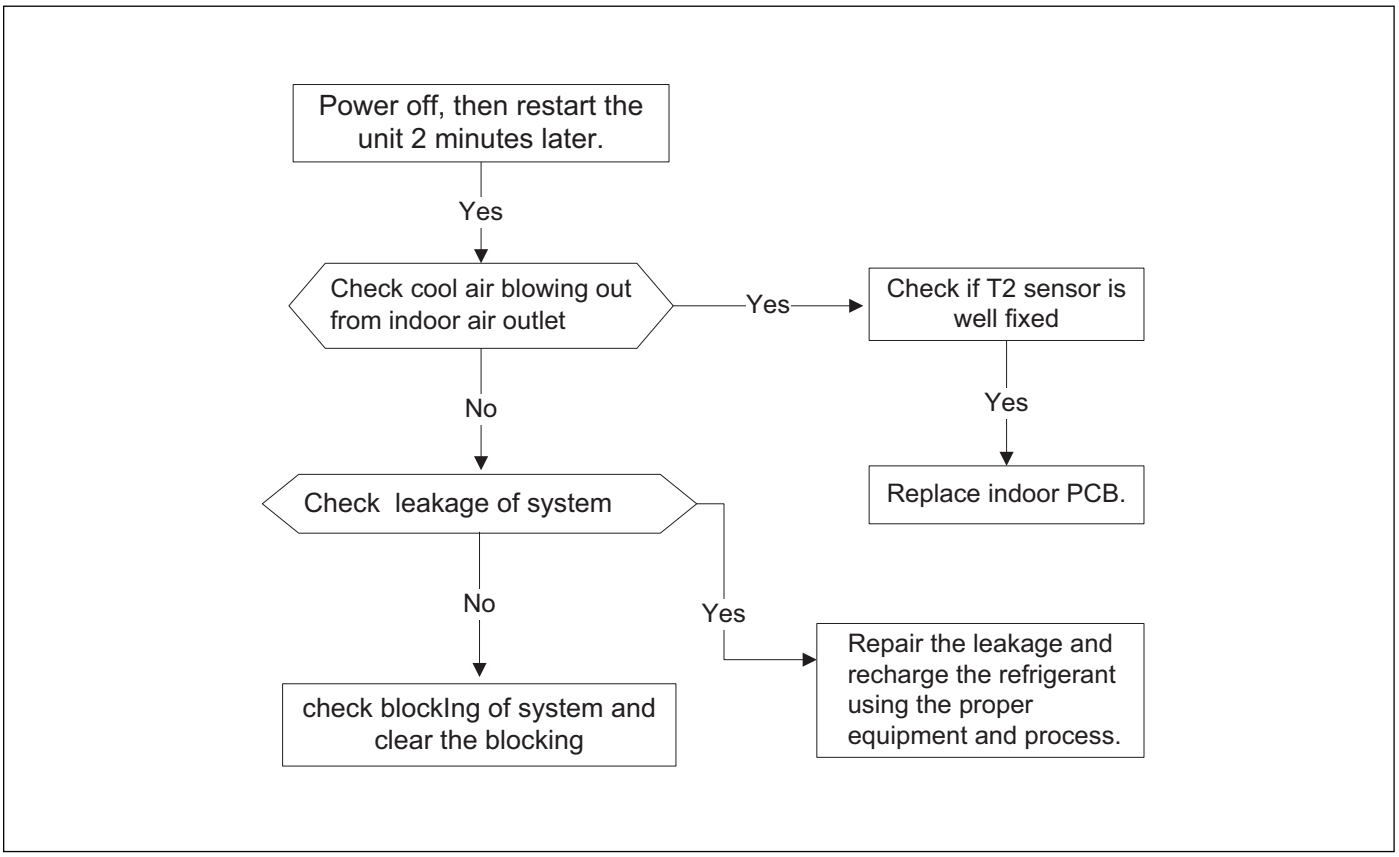



*Figure 44*

## 8.7 Water-level Alarm Malfunction (EE)

| | |
|---|---|
| Error Code | EE |
| Malfunction decision conditions | If the sampling voltage is not 5V, the LED will display the failure code. |
| Supposed causes | ▶ Wiring mistake<br>▶ Faulty water-level switch<br>▶ Faulty condensate pump<br>▶ Indoor PCB faulty |

*Table 30*

**Troubleshooting:**

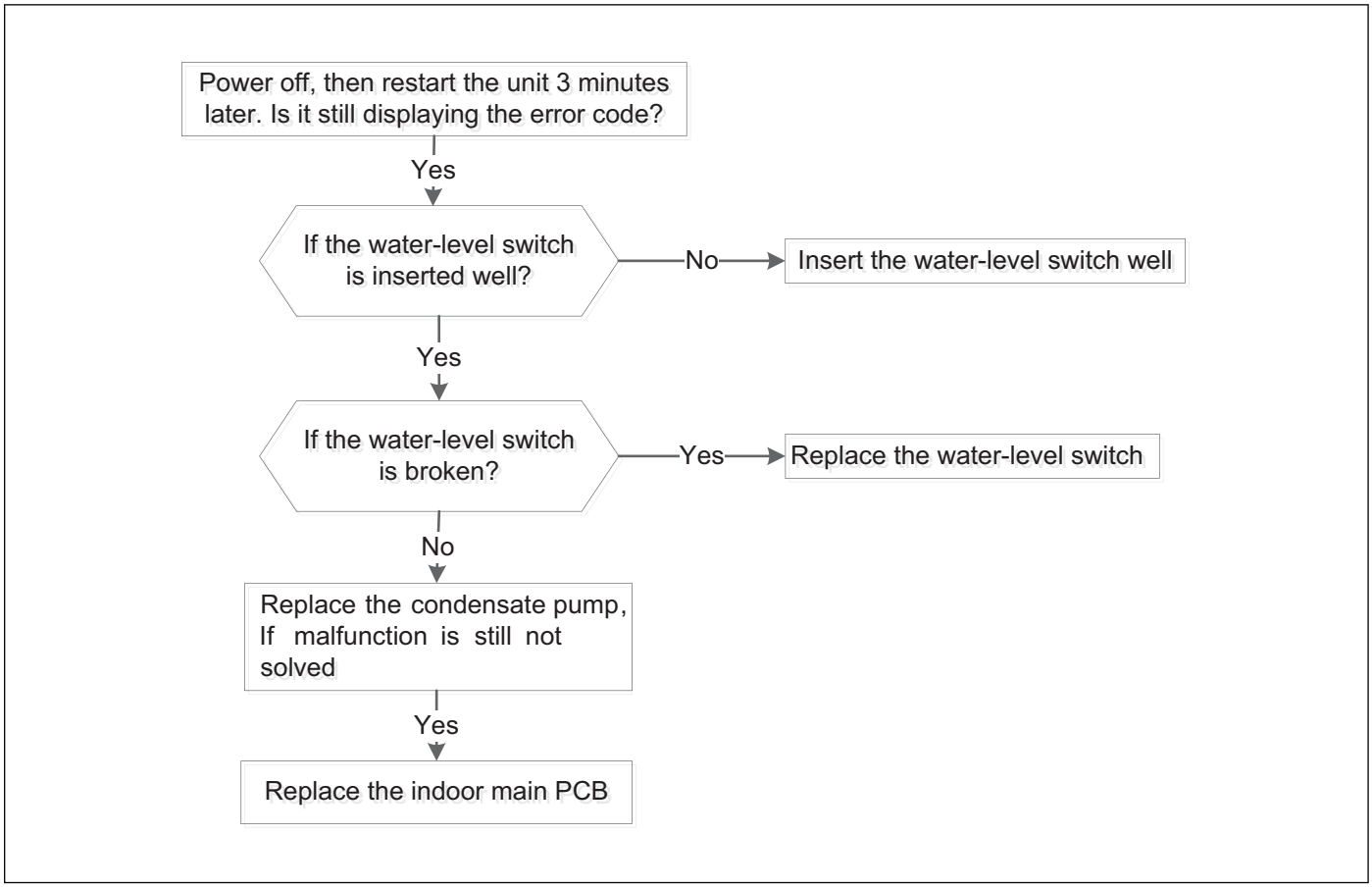



*Figure 45*

## 8.8 Overload current protection (F0)

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

*Table 31*

**Troubleshooting:**

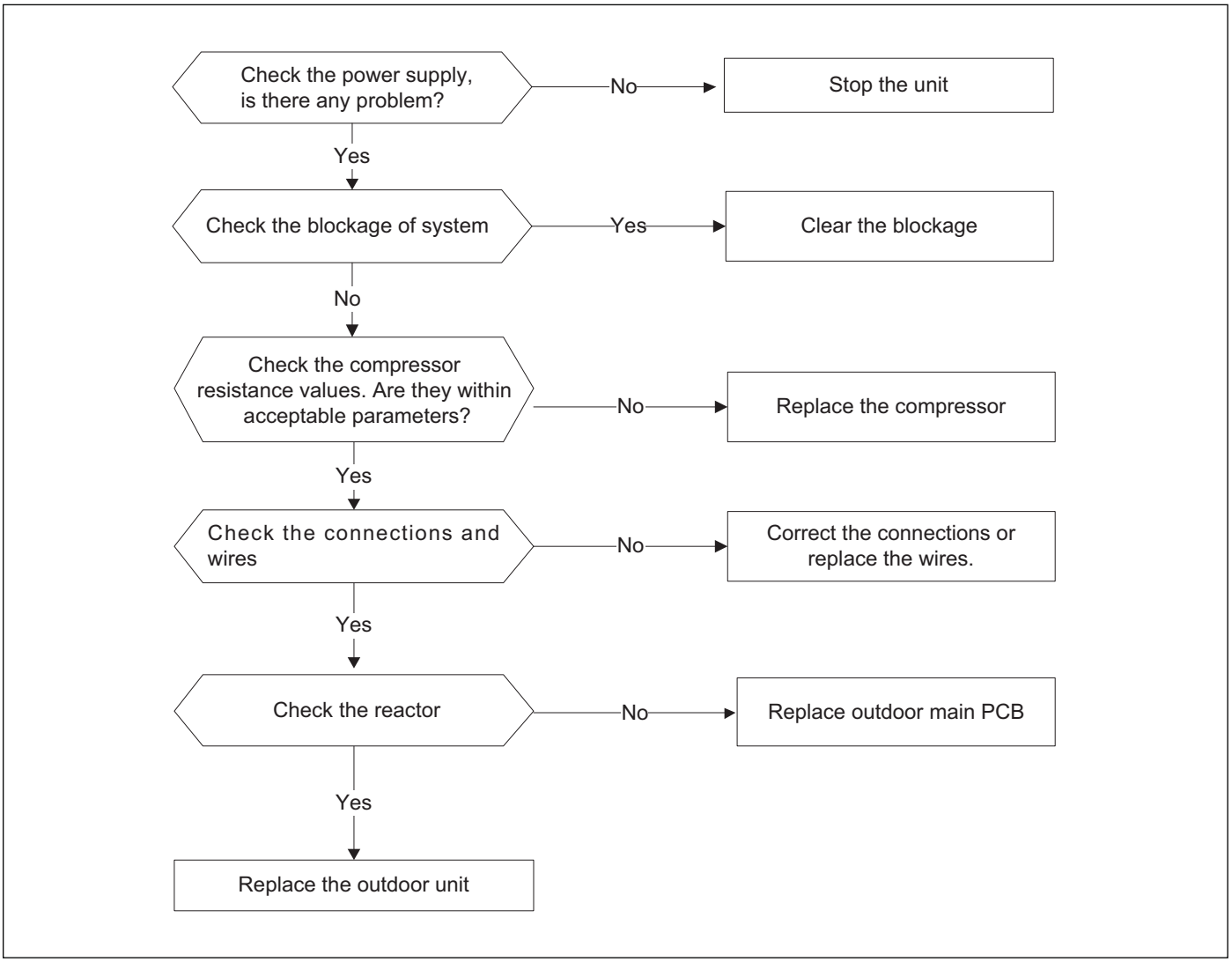



*Figure 46*

## 8.9 IPM malfunction or IGBT over-strong current protection (P0)

| | |
|---|---|
| Error Code | P0 |
| Malfunction decision conditions | When the voltage signal that IPM send to compressor drive chip is abnormal, the display LED will show "P0" and AC will turn off. |
| Supposed causes | ▶ Wiring mistake<br>▶ IPM malfunction<br>▶ Outdoor fan assembly faulty<br>▶ Compressor malfunction<br>▶ Outdoor PCB faulty |

*Table 32*

**Troubleshooting:**

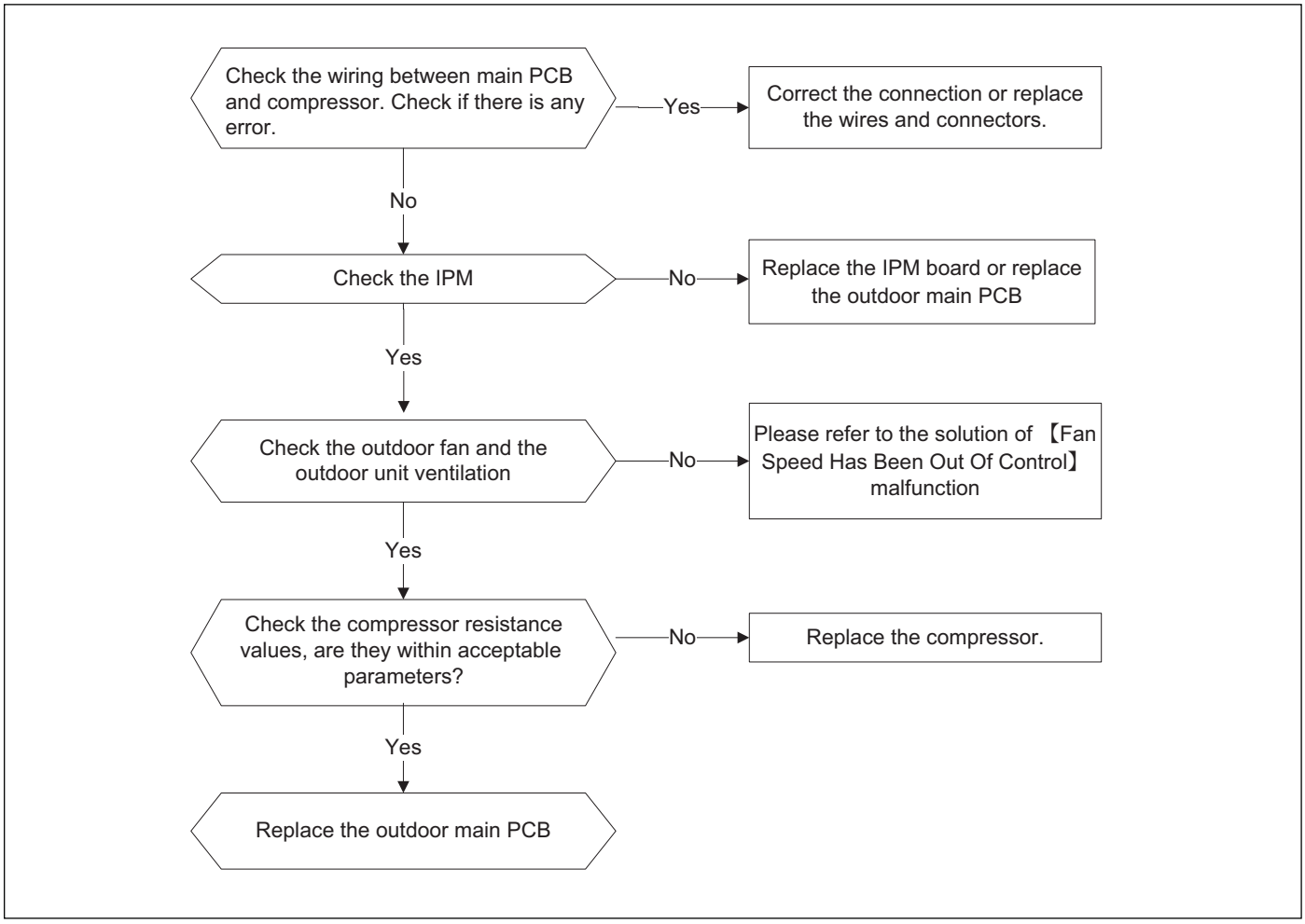



*Figure 47*

In most cases the main PCB will fail before the compressor fails. To check if the compressor fails, check the coloring of the material wrapped around the compressor. If the part that touches the compressor has turned brownish due to the compressor running hot, then the compressor most likely has failed.

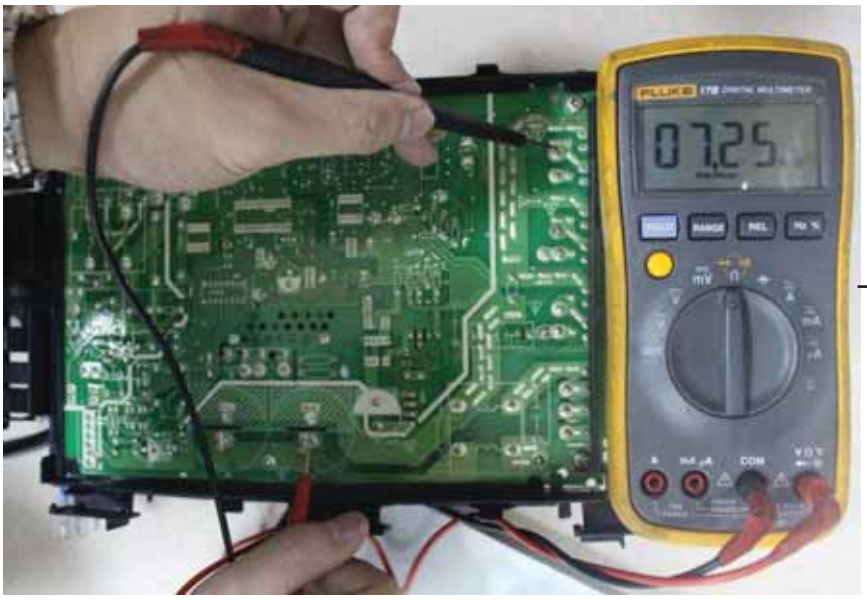



*Figure 48*




*Figure 49*




*Figure 50*




*Figure 51*

## 8.10 Over voltage or too low voltage protection (P1)

| | |
|---|---|
| Error Code | P1 |
| Malfunction decision conditions | An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit. |
| Supposed causes | ► Power supply problems<br>► System leakage or block<br>► Outdoor PCB faulty<br>► Reactor |

*Table 33*

**Troubleshooting:**

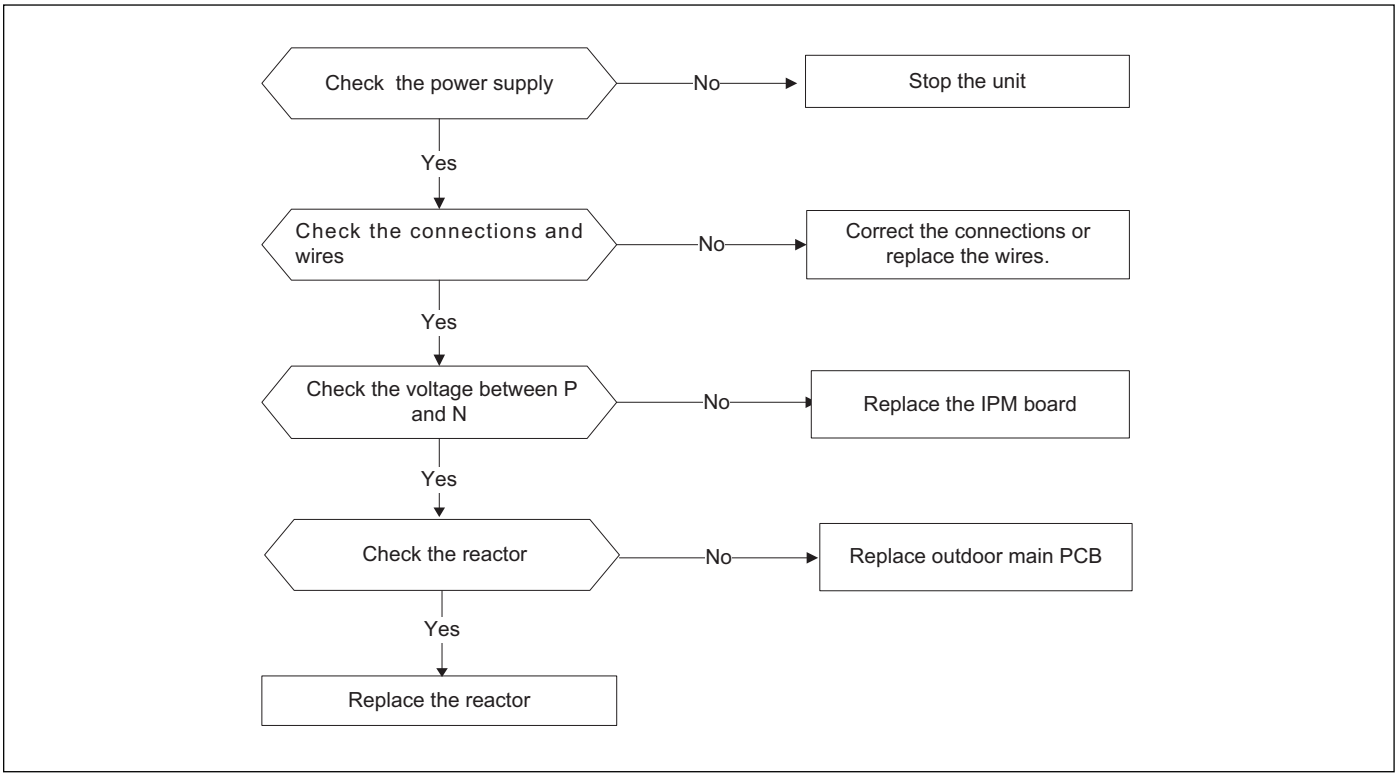



*Figure 52*

Measure the DC voltage between P and N port (Fig. 99). 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.



*Figure 53*

## 8.11 High temperature protection of IPM module or compressor top (P2)

| | |
|---|---|
| Error Code | P2 |
| Malfunction decision conditions | If the sampling voltage is not 5V, the LED will display the failure. |
| Supposed causes | ▶ Installation mistake<br>▶ Power supply problems<br>▶ System leakage or block<br>▶ Outdoor PCB faulty |

*Table 34*

**Troubleshooting:**

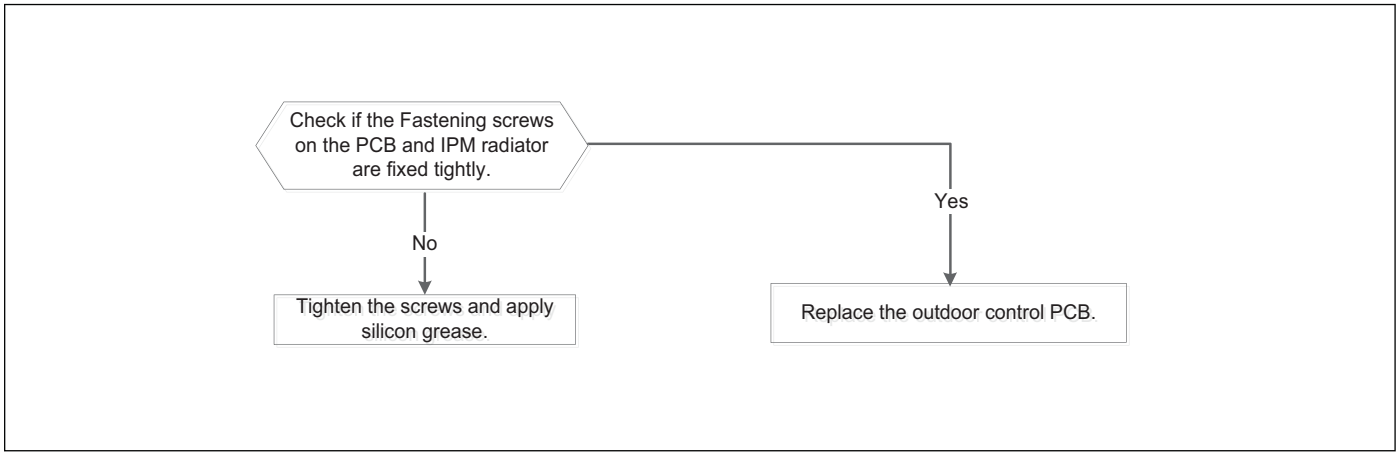



*Figure 54*

## 8.12 Inverter compressor drive error (P4)

| | |
|---|---|
| Error Code | P4 |
| Malfunction decision conditions | An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on. |
| Supposed causes | ► Wiring mistake<br>► IPM malfunction<br>► Outdoor fan assembly faulty<br>► Compressor malfunction<br>► Outdoor PCB faulty |

*Table 35*

**Troubleshooting:**

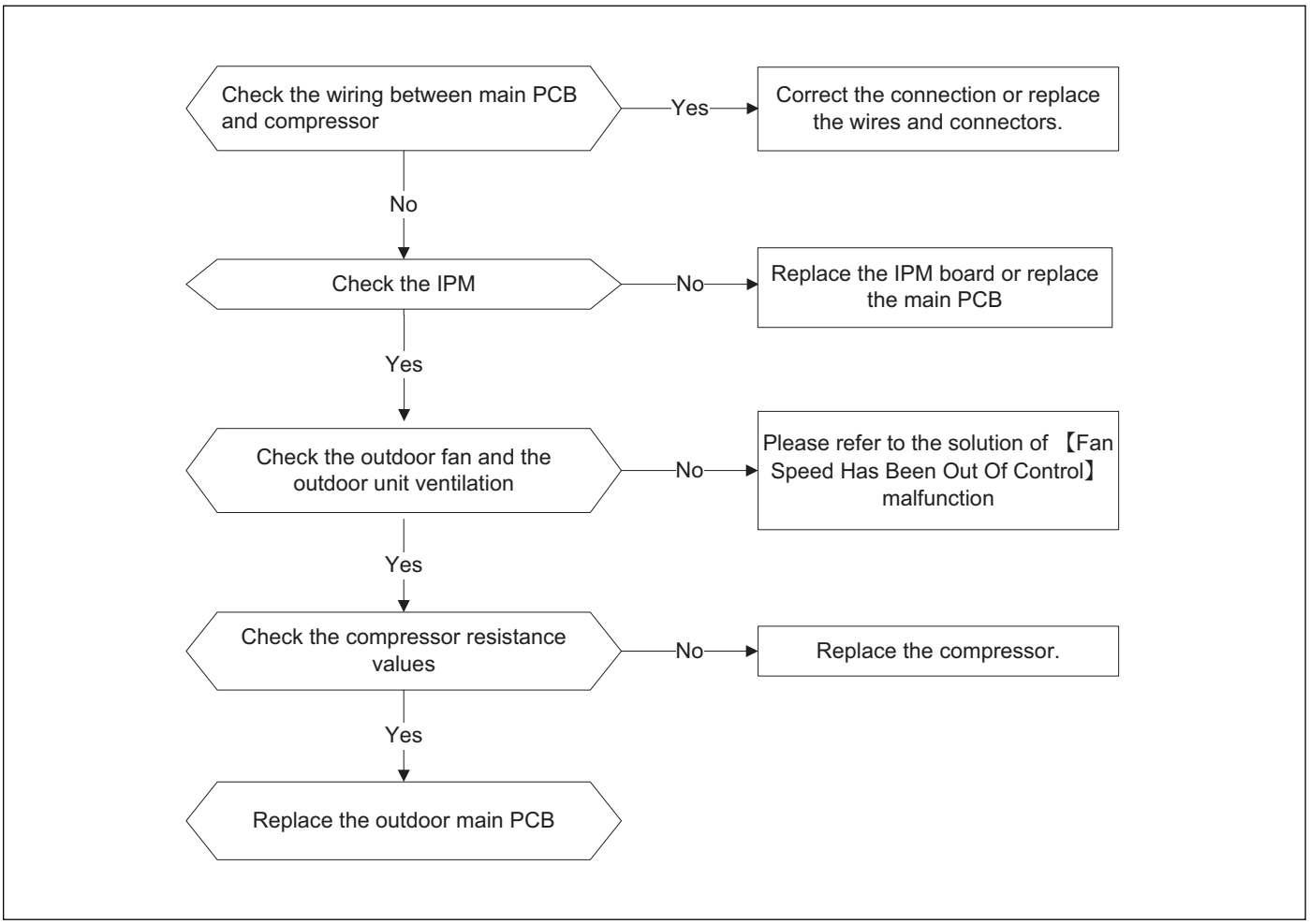



*Figure 55*

## 8.13 Low pressure protection (P6)

| | |
|---|---|
| Error Code | P6 |
| Malfunction decision conditions | When the pressure of the system reaches a certain value, the low pressure protector will switch off. After the pressure resume to normal, the protection code will disappear. |
| Supposed causes | ▶ Wiring mistake<br>▶ Pressure protector faulty<br>▶ Indoor fan motor faulty<br>▶ Outdoor PCB faulty<br>▶ Refrigerant leak |

*Table 36*

**Troubleshooting:**

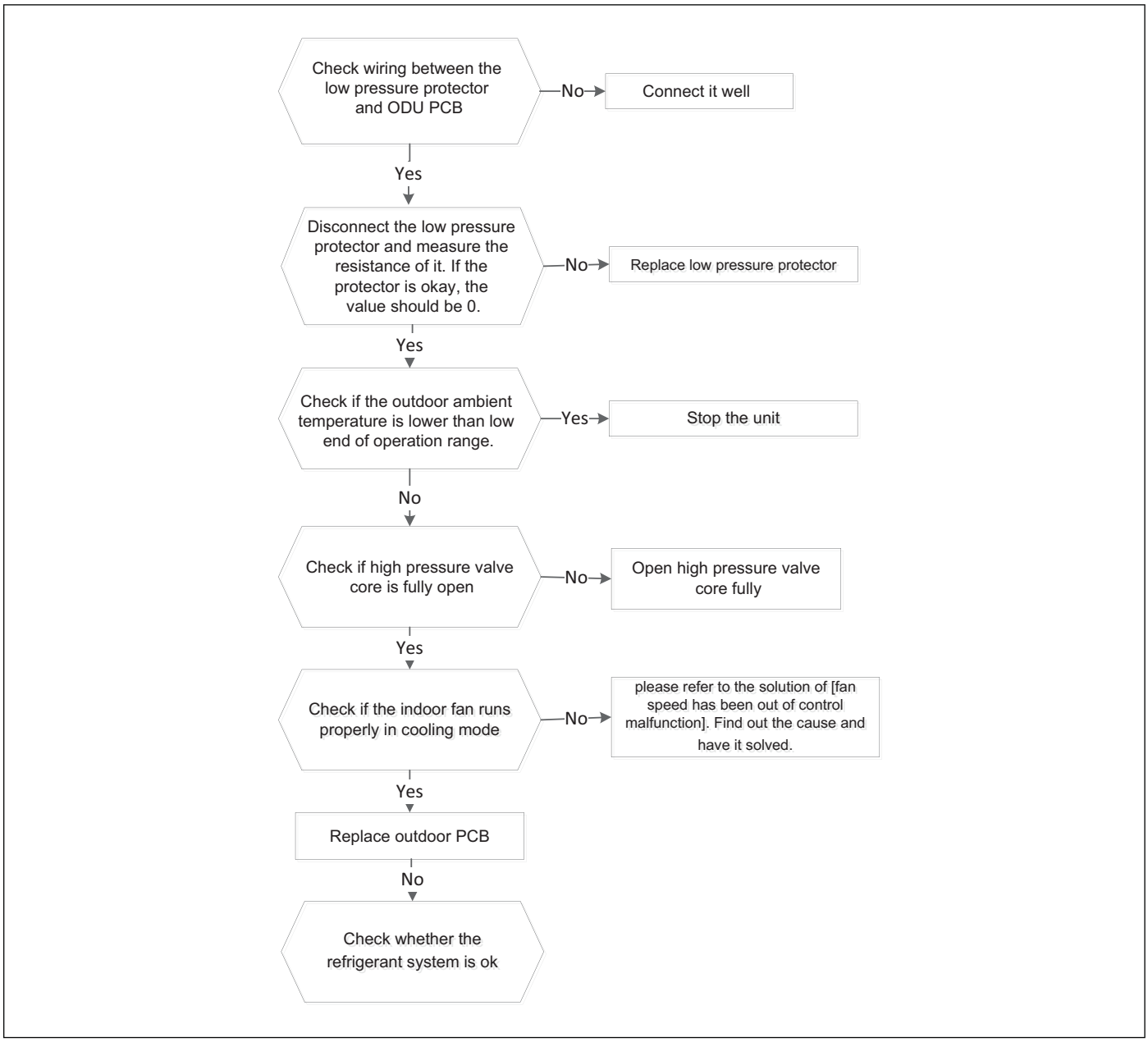



*Figure 56*

## 8.14 High temperature protection of indoor coil in heating mode (J0)

| | |
|---|---|
| Error Code | J0 |
| Malfunction decision conditions | When evaporator coil temperature is more than 140°F (60°C), the unit stops. It starts again only when the evaporator coil temperature is less than 129°F (54°C). |
| Supposed causes | ► Faulty evaporator coil temperature sensor<br>► Dirty heat exchanger<br>► Faulty fan<br>► Indoor PCB Faulty |

*Table 37*

**Troubleshooting:**

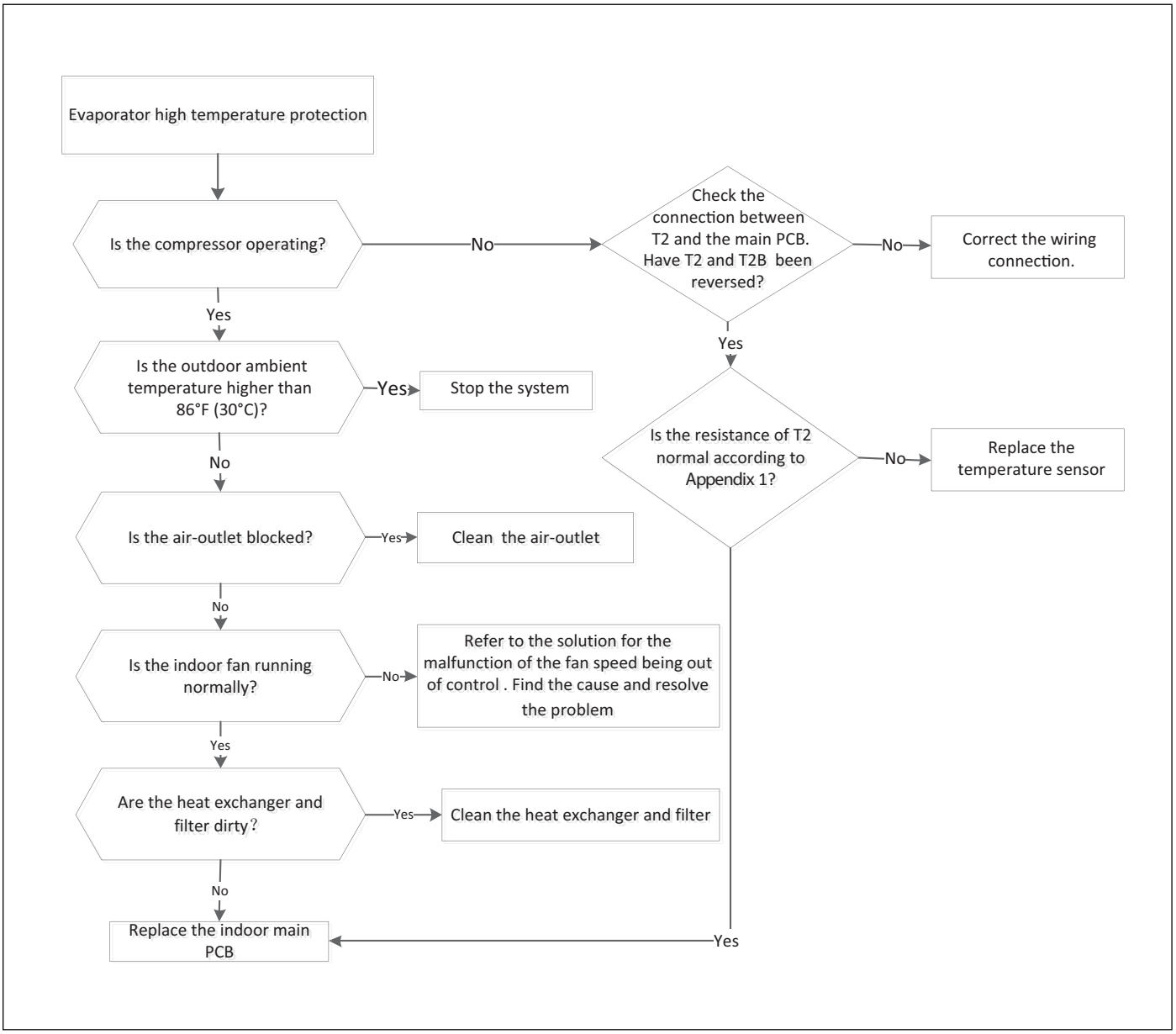



*Figure 57*

## 8.15 High temperature sensed at outdoor coil (J1)

| | |
|---|---|
| Error Code | J1 |
| Malfunction decision conditions | When the outdoor pipe temperature is more than 149°F (65°C), the unit stops. It starts again only when the outdoor pipe temperature is less than 126°F (52°C). |
| Supposed causes | ▶ Faulty condenser temperature sensor<br>▶ Dirty heat exchanger<br>▶ System leakage or blockages |

*Table 38*

**Troubleshooting:**

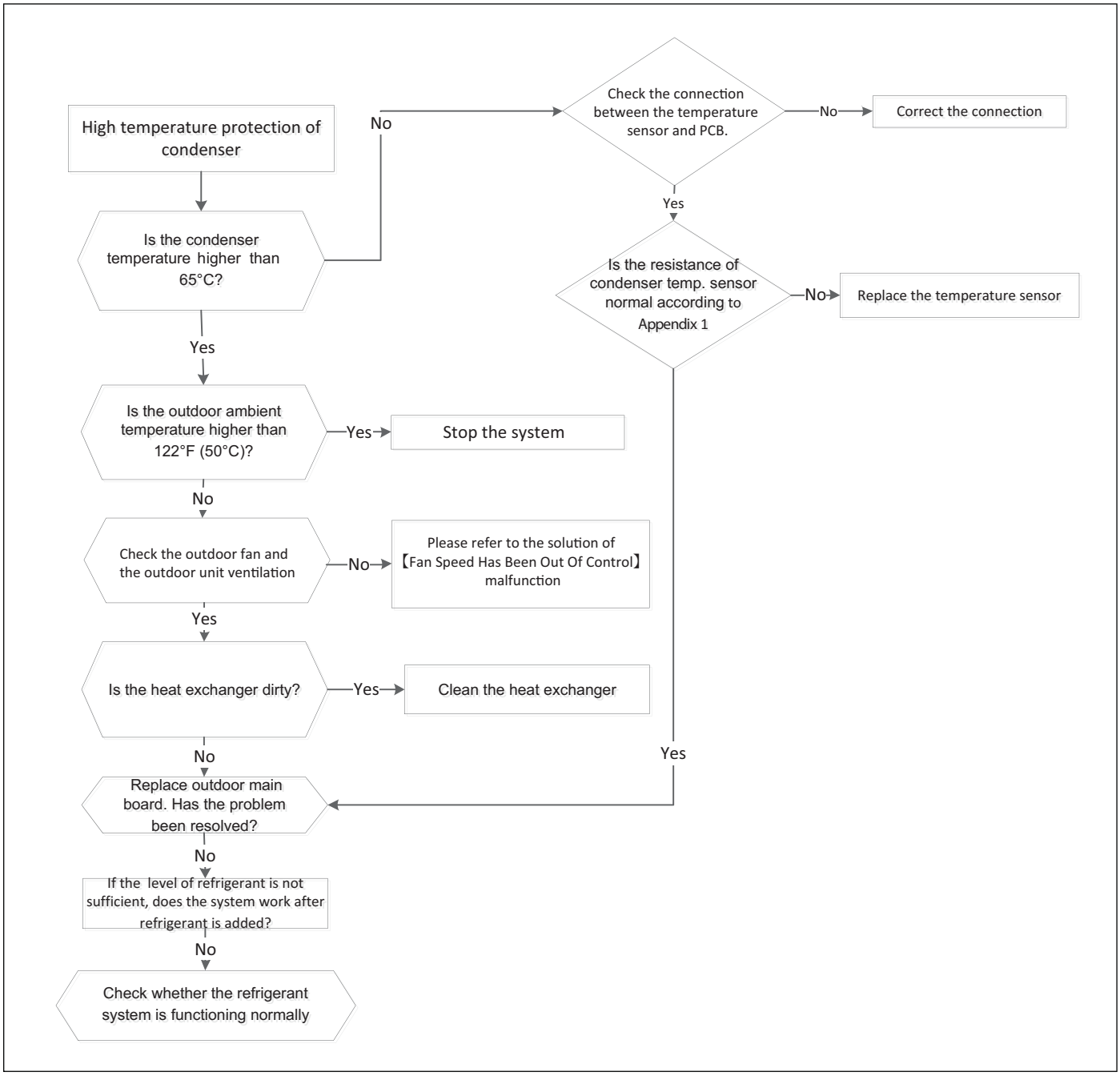



*Figure 58*

## 8.16 High temperature sensed at compressor discharge line (J2)

| | |
|---|---|
| Error Code | J2 |
| Malfunction decision conditions | When the compressor discharge temperature (T5) is more than 239°F (115°C) for 10 seconds, the compressor will stop and not restart until T5 is less than 194°F (90°C). |
| Supposed causes | ► System leakage<br>► Wiring mistake<br>► Faulty discharge temperature sensor<br>► Outdoor PCB faulty |

*Table 39*

**Troubleshooting:**

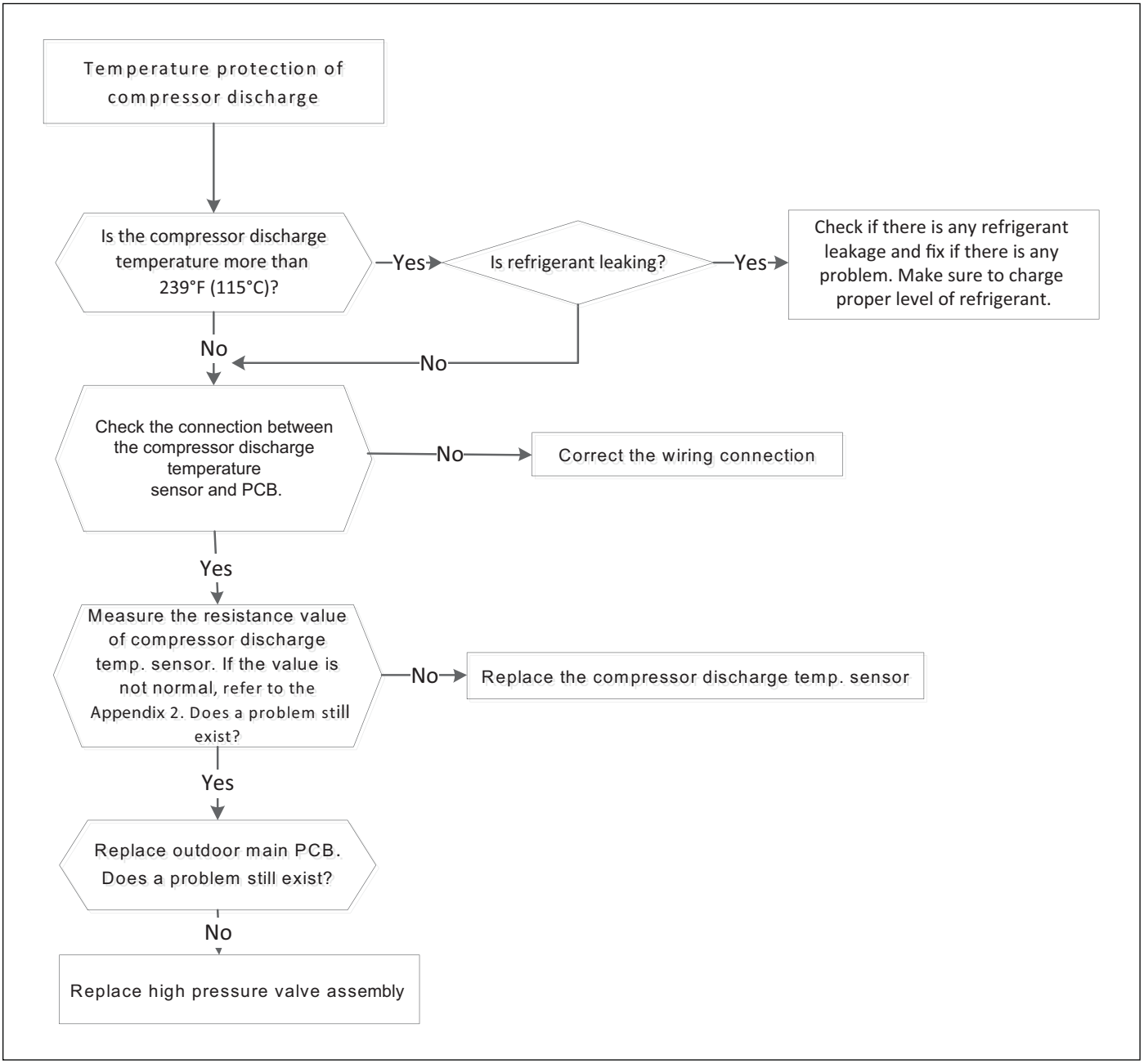



*Figure 59*

## 8.17 PFC module protection (J3)

| | |
|---|---|
| Error Code | J3 |
| Malfunction decision conditions | IPM sends abnormal voltage signal to compressor driver chip, the display will show error code "J3" and system will stop operation. |
| Supposed causes | ▶ Wiring mistake<br>▶ IPM malfunction<br>▶ Outdoor fan assembly faulty<br>▶ Compressor malfunction<br>▶ Outdoor PCB faulty |

*Table 40*

**Troubleshooting:**

Make sure to test the resistance between every two ports of U, V, W of IPM and P, N. If any results of them is 0 or close to 0, the IPM is defective. Otherwise, please follow the procedure below.

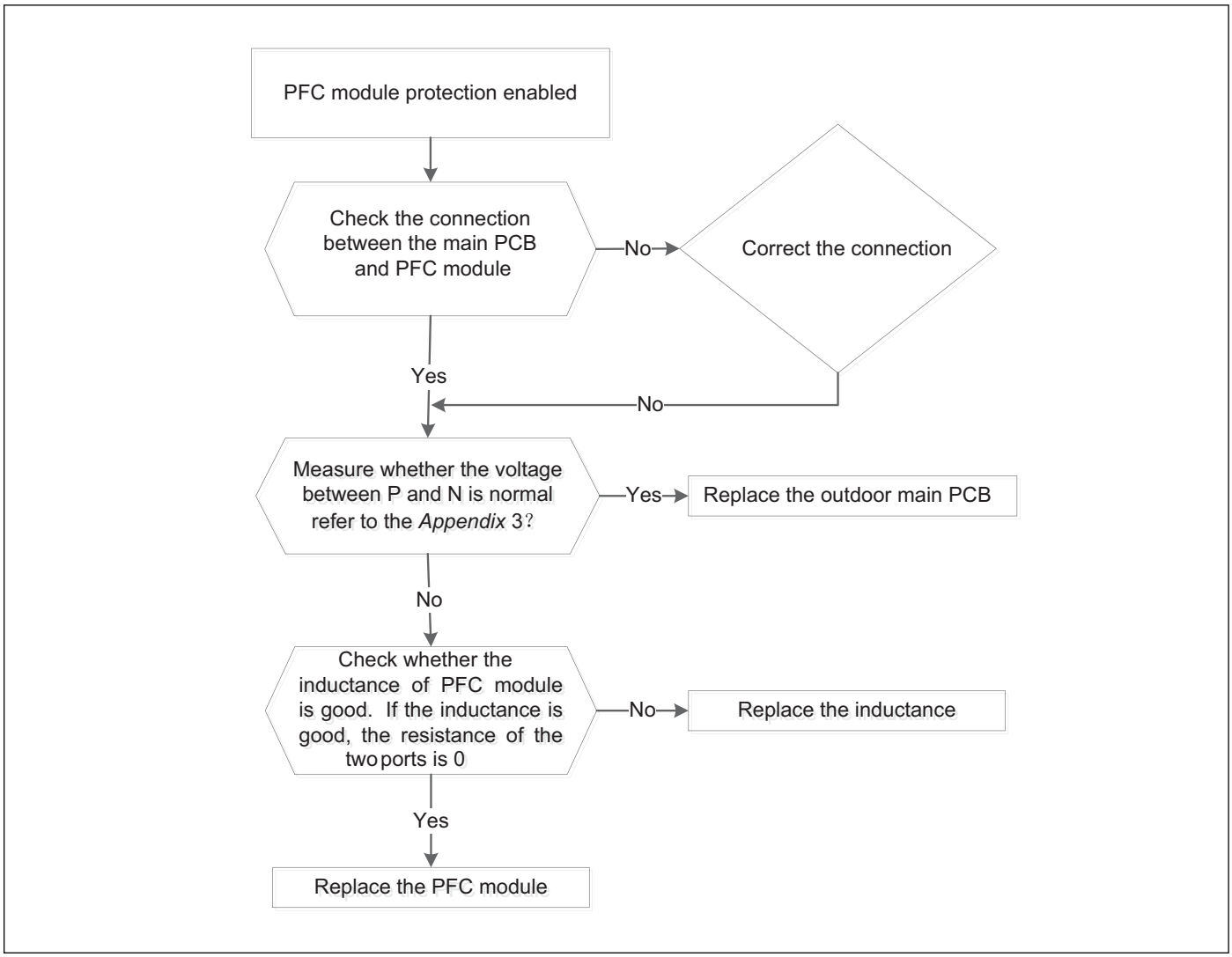



*Figure 60*

## 8.18 Communication error between outdoor unit main PCB and IPM control (J4)

| | |
|---|---|
| Error Code | J4 |
| Malfunction decision conditions | Communication error between outdoor PCB chip and compressor driven chip |
| Supposed causes | ► Wiring Mistake<br>► Outdoor PCB faulty<br>► Outdoor electric control box faulty |

*Table 41*

**Troubleshooting:**

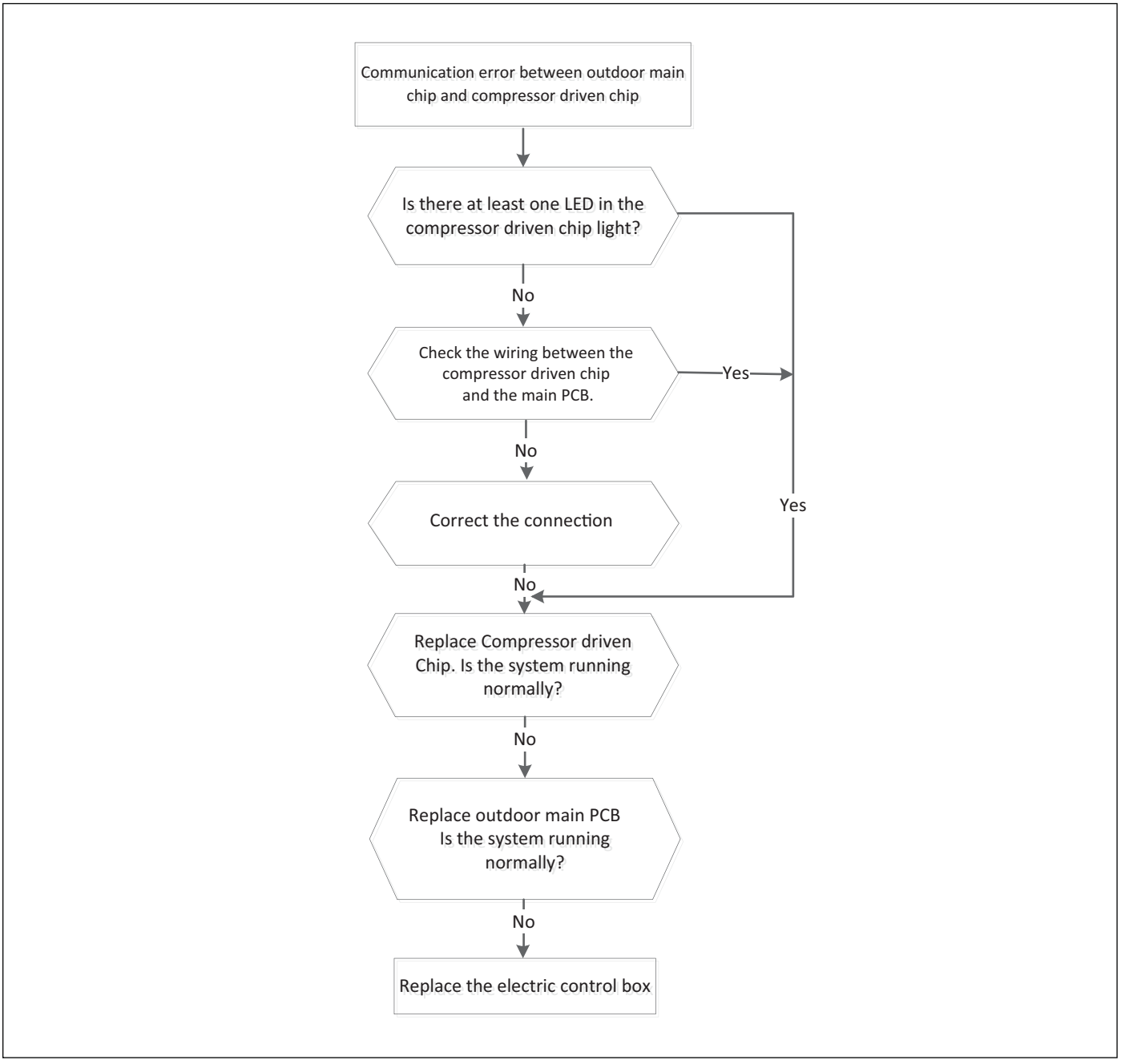



*Figure 61*

## 8.19 High pressure switch open (J5)

| | |
|---|---|
| Error Code | J5 |
| Malfunction decision conditions | If the sampling voltage is not 5V, the LED displays a failure code. |
| Supposed causes | ▶ Wiring mistake<br>▶ Overload protector faulty<br>▶ System block<br>▶ Outdoor PCB faulty |

*Table 42*

**Troubleshooting:**

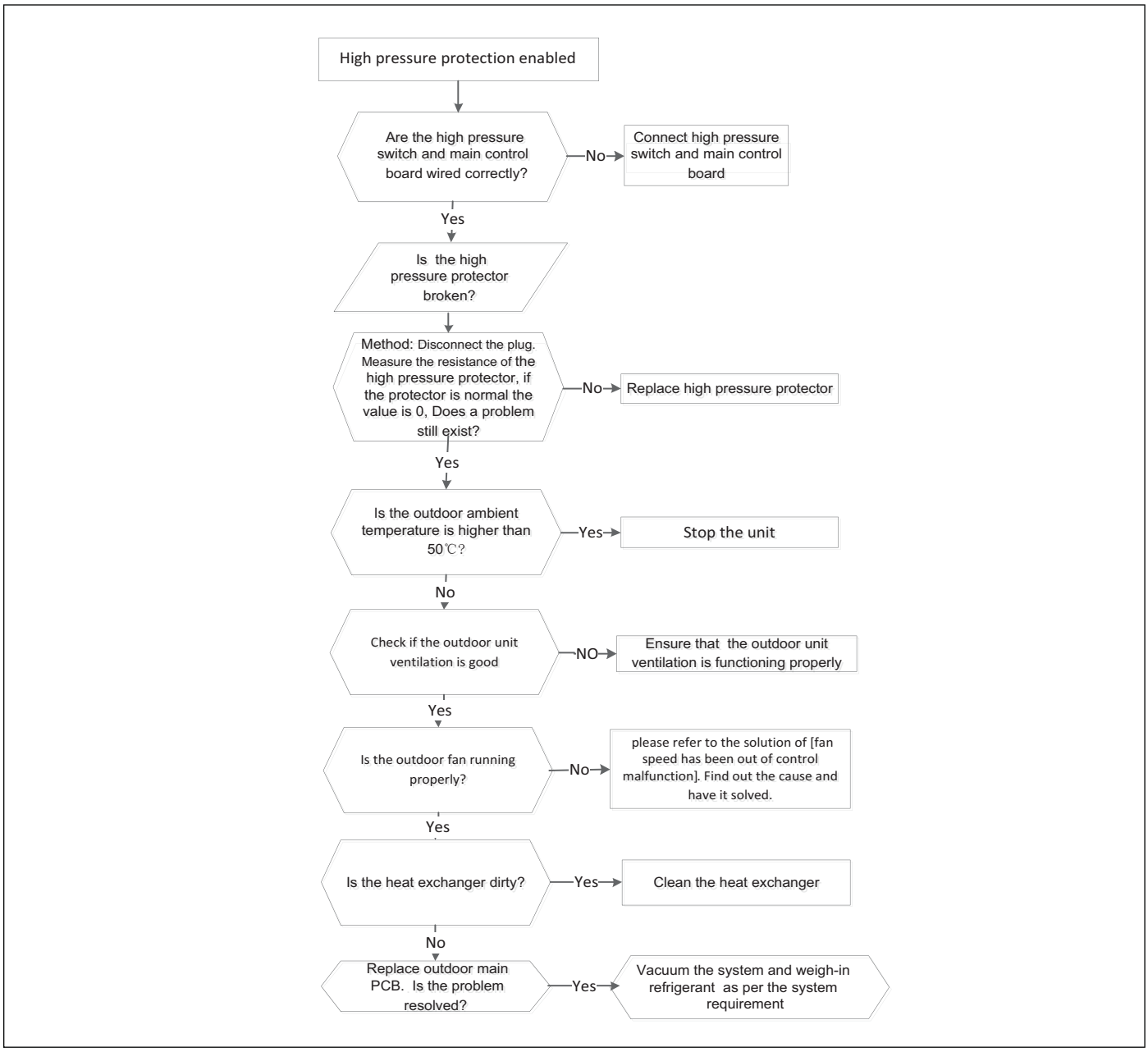



*Figure 62*

## 8.20 Low pressure switch open (P6/J6)

| | |
|---|---|
| Error Code | J6/P6 |
| Malfunction decision conditions | If the sampling voltage is not 5V, the LED displays a failure code. |
| Supposed causes | ► Wiring mistake<br>► Overload protector faulty<br>► System block<br>► Outdoor PCB faulty |

*Table 43*

**Troubleshooting:**

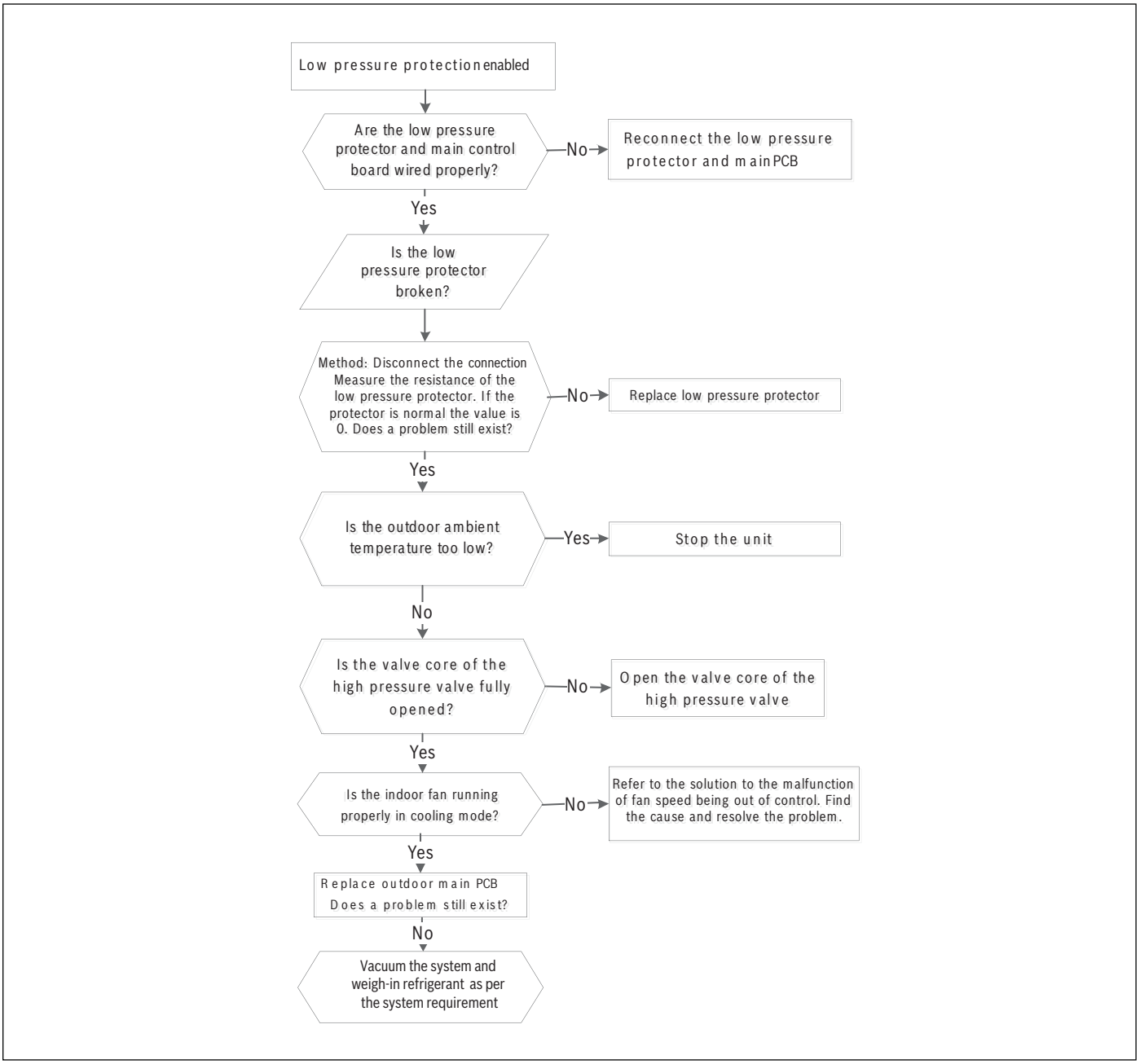



*Figure 63*

## 8.21 AC Voltage protection (J8)

| | |
|---|---|
| Error Code | J8 |
| Malfunction decision conditions | An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit. |
| Supposed causes | ▶ Abnormal power supply<br>▶ Wiring mistake<br>▶ Bridge rectifier faulty<br>▶ IPM board faulty |

*Table 44*

**Troubleshooting:**

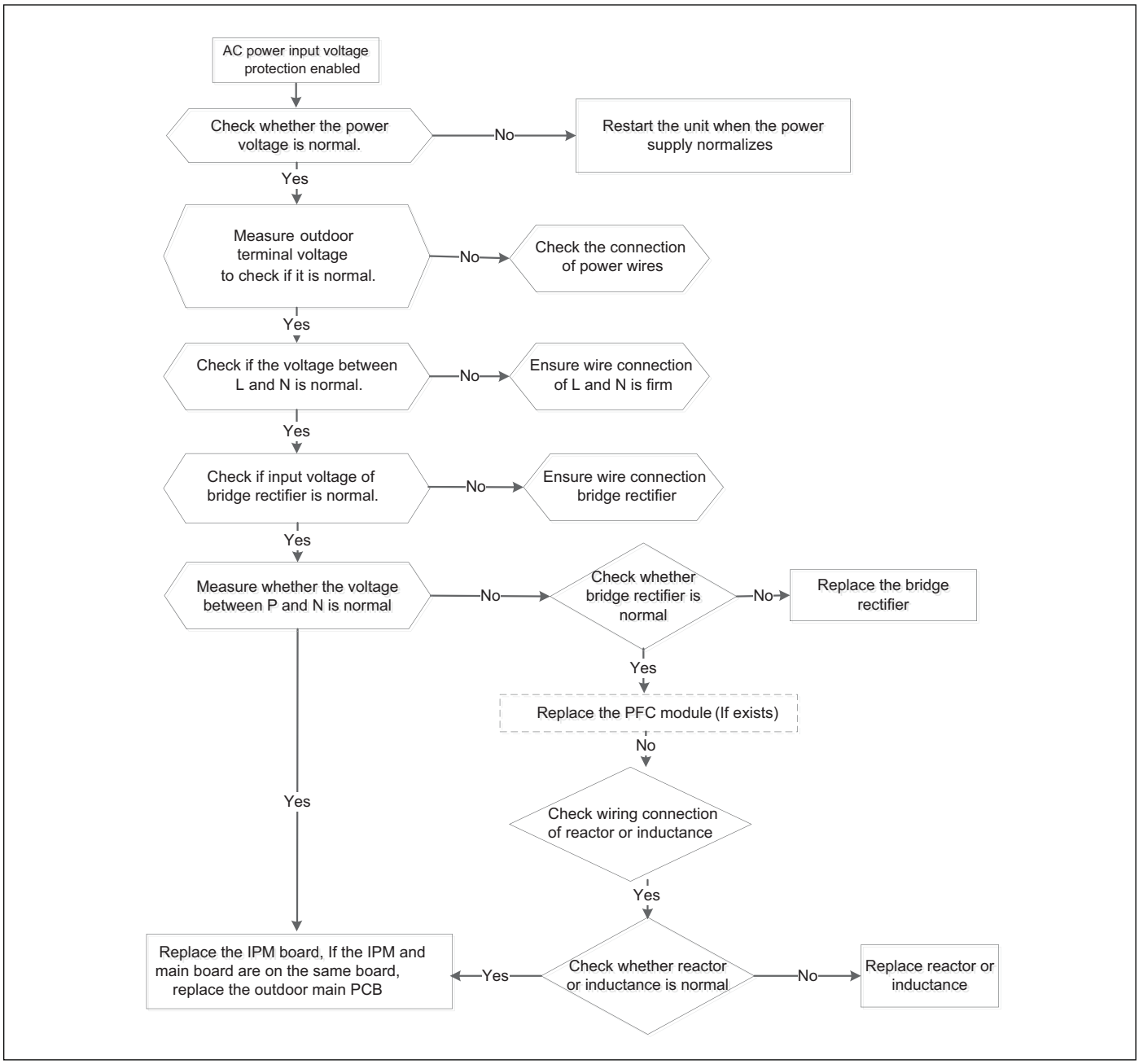



*Figure 64*

## 8.22 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 65*

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 45*

**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 46*

**Compressor check**

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

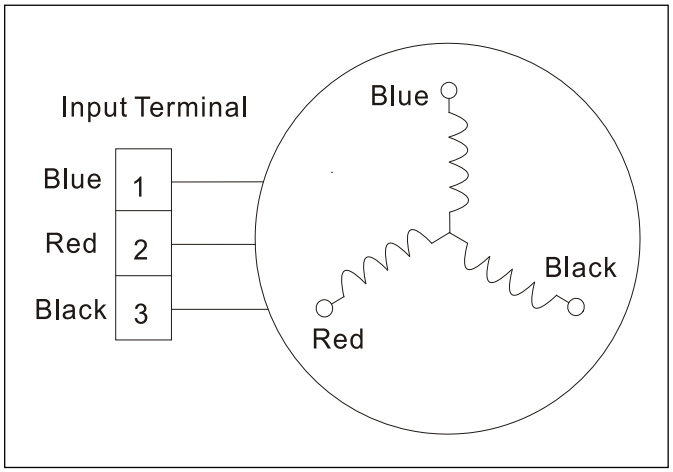



*Figure 66*




*Figure 67*

| Position | Resistance Value | | | | | | |
|---|---|---|---|---|---|---|---|
| | 115V - 12K | 9K Regular | 12K Regular | 18K Regular | 24K Regular | 30K Light Commercial | 36K Light Commercial Wall Mounted |
| Blue - Red | 2.25Ω | 1.57Ω | 2.25Ω | 1.75Ω | 0.75Ω | 0.75Ω | 0.75Ω |
| Blue - Black | | | | | | | |
| Red - Black | | | | | | | |

*Table 47*

| Position | Resistance Value | | | | | | |
|---|---|---|---|---|---|---|---|
| | 36K Light Commercial Cassette & Ducted | 48K Light Commercial | 60K Light Commercial | 9K Hyper Heat | 12K Hyper Heat | 18K Hyper Heat | 24K Hyper Heat |
| Blue - Red | 0.65Ω | 0.38Ω | 0.38Ω | 1.87Ω | 1.87Ω | 0.75Ω | 0.75Ω |
| Blue - Black | | | | | | | |
| Red - Black | | | | | | | |

*Table 48*

**IPM continuity check**

**WARNING: ELECTRICAL HAZARD**

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

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 | | (+)Red | | |

*Table 49*

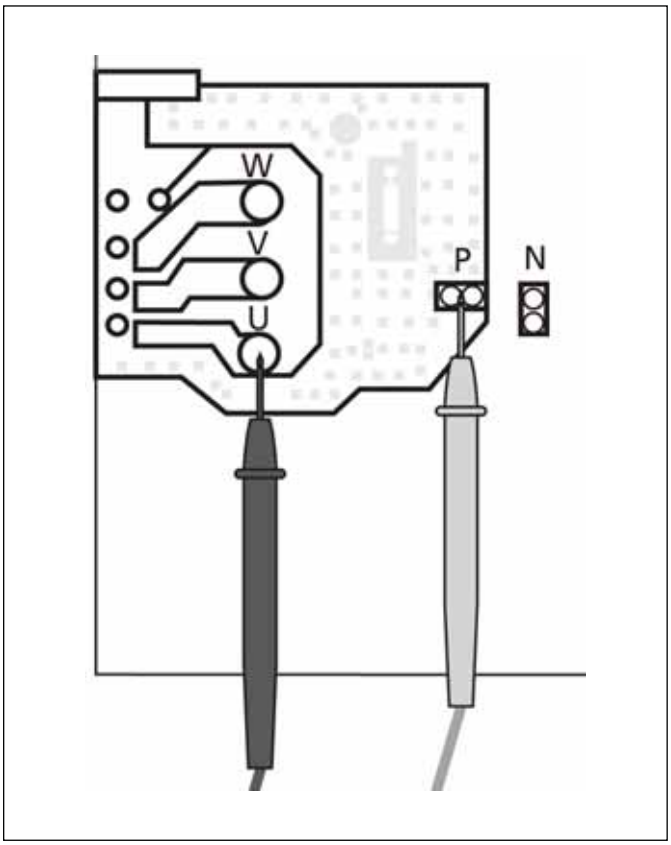



*Figure 68*

**Suction pressure at the service port**

**Cooling chart:**

| °F (°C) | IDT / ODT | 75 (23.89) | 85 (29.44) | 95 (35) | 105 (40.56) | 115 (46.11) |
|---|---|---|---|---|---|---|
| BAR | 70/59 | 8.2 | 7.8 | 8.1 | 8.6 | 10.1 |
| BAR | 75/63 | 8.6 | 8.3 | 8.7 | 9.1 | 10.7 |
| BAR | 80/67 | 9.3 | 8.9 | 9.1 | 9.6 | 11.2 |
| | | | | | | |
| PSI | 70/59 | 119 | 113 | 117 | 125 | 147 |
| PSI | 75/63 | 124 | 120 | 126 | 132 | 155 |
| PSI | 80/67 | 135 | 129 | 132 | 140 | 162 |
| | | | | | | |
| MPA | 70/59 | 0.82 | 0.78 | 0.81 | 0.86 | 1.01 |
| MPA | 75/63 | 0.86 | 0.83 | 0.87 | 0.91 | 1.07 |
| MPA | 80/67 | 0.93 | 0.89 | 0.91 | 0.96 | 1.12 |

*Table 50*

**Heating chart:**

| °F (°C) | IDT / ODT | 57/53 (13.89/11.67) | 47/43 (8.33/6.11) | 37/33 (2.78/0.56) | 27/23 (-2.78/-5) | 17/13 (-8.33/-10.56) |
|---|---|---|---|---|---|---|
| BAR | 55 | 30.3 | 28.5 | 25.3 | 22.8 | 20.8 |
| BAR | 65 | 32.5 | 30.0 | 26.6 | 25.4 | 23.3 |
| BAR | 75 | 33.8 | 31.5 | 27.8 | 26.3 | 24.9 |
| | | | | | | |
| PSI | 55 | 439 | 413 | 367 | 330 | 302 |
| PSI | 65 | 471 | 435 | 386 | 368 | 339 |
| PSI | 75 | 489 | 457 | 403 | 381 | 362 |
| | | | | | | |
| MPA | 55 | 3.03 | 2.85 | 2.53 | 2.28 | 2.08 |
| MPA | 65 | 3.25 | 3.00 | 2.66 | 2.54 | 2.33 |
| MPA | 75 | 3.38 | 3.15 | 2.78 | 2.63 | 2.49 |

*Table 51*

# 9 Disassembly Guide

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

## 9.1 Models: 9K Regular: BMS500-AAS009-1CSXRA

### 9.1.1 Removing the panel plate

1. Stop operation of the system and turn “OFF” the power breaker.
2. Remove the big handle first, then remove the top cover (3 screws).
3. Remove the screws of front panel (7 screws).

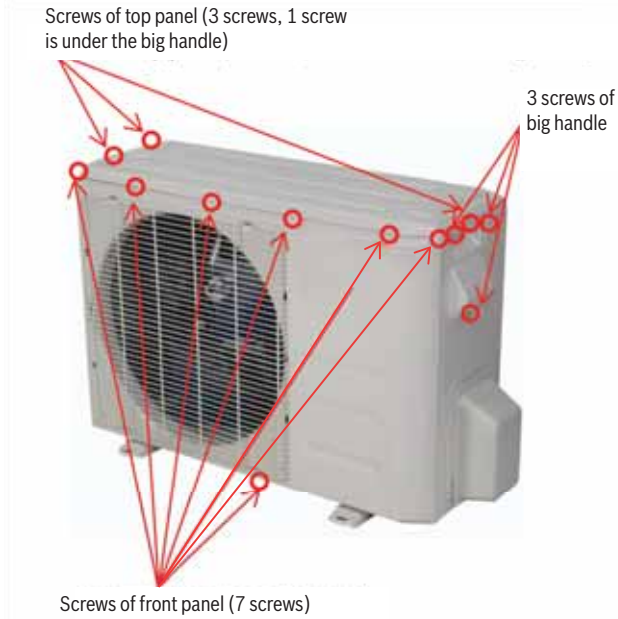



*Figure 69*

4. Remove the screws of the right side panel (11 screws).

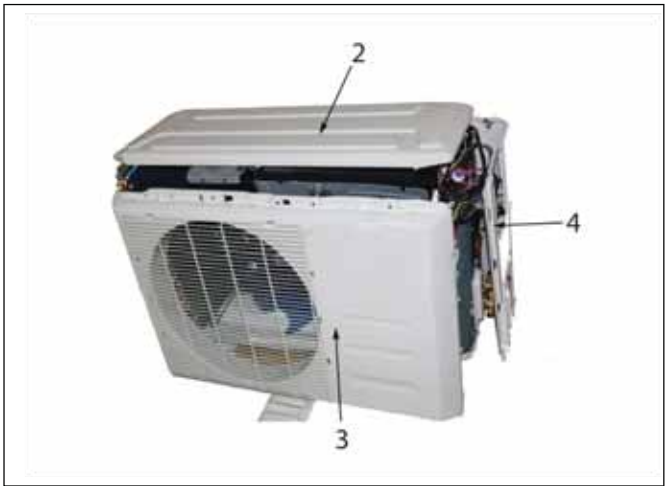



*Figure 70*

### 9.1.2 Removing the fan assembly

1. Remove the panel plate.
2. Remove the nut affixing the fan, and remove the fan.



*Figure 71*

3. After removing the top cover, unfix the hooks and then open the electronic control box cover.

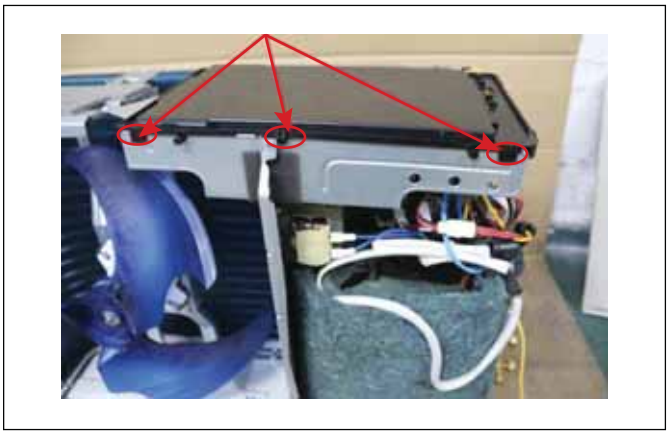


*Figure 72*

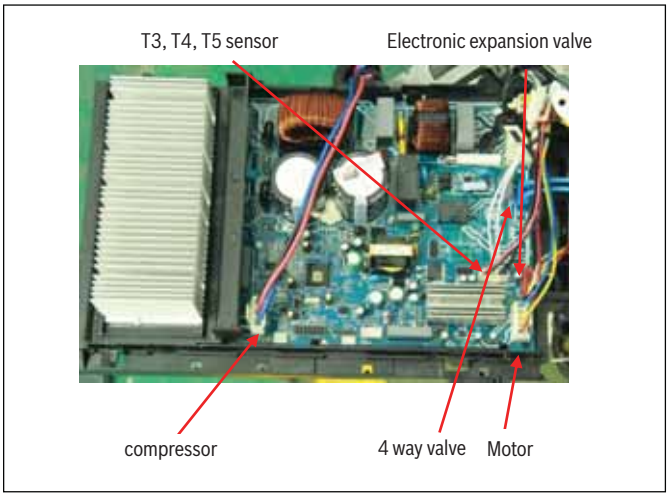



*Figure 73*

4. Disconnect the connector for fan motor from the electronic control board.

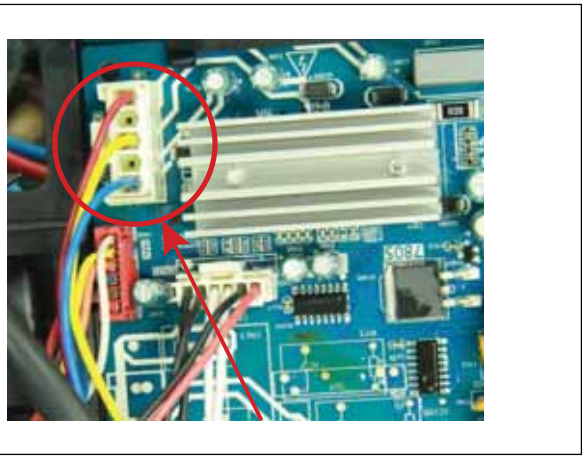


*Figure 74*

5. Remove the four affixing screws of the fan motor, then remove the motor.

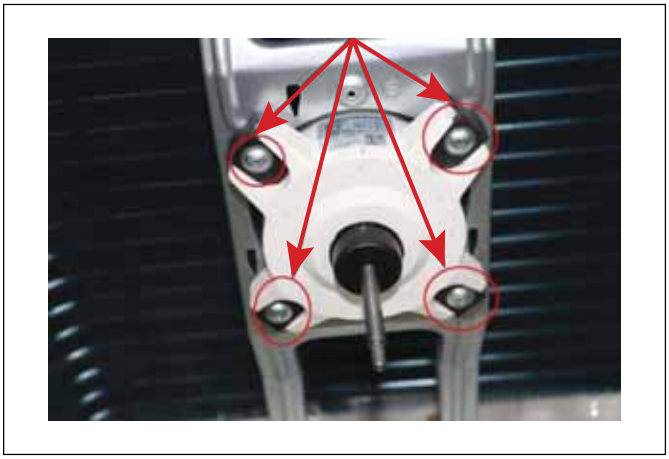


*Figure 75*

### 9.1.3 Removing the electrical parts

1. After removing the panel plate and fan assembly, remove the connector for the compressor.

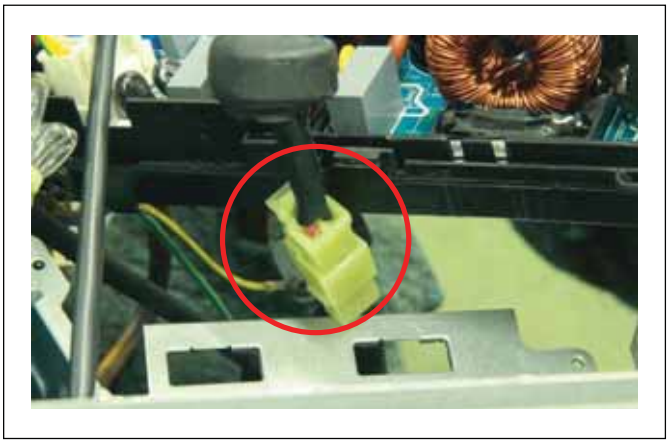


*Figure 76*

2. Pull out the two blue wires connected with the four way valve.

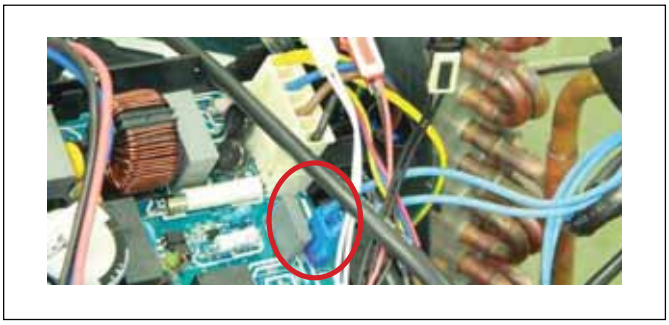


*Figure 77*

3. Pull out connectors of the condenser coil temp. sensor (T3), outdoor ambient temp. sensor (T4) and discharge temp. sensor (T5).

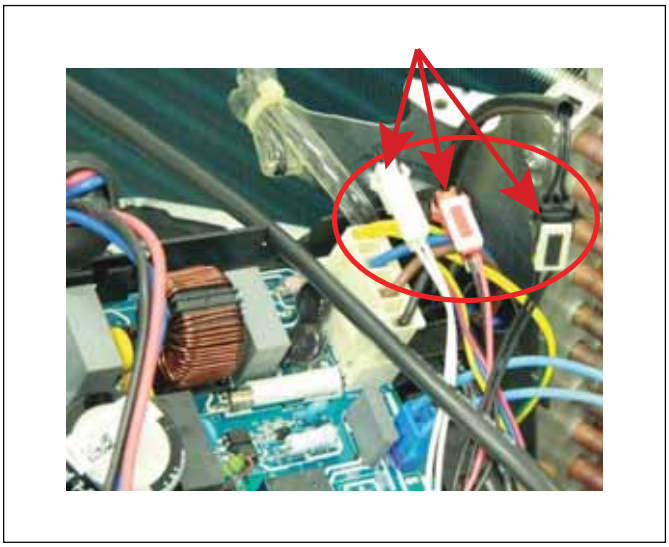


*Figure 78*

4. Disconnect the electronic expansion valve wire (Fig. 85, pos. 4) from the control board

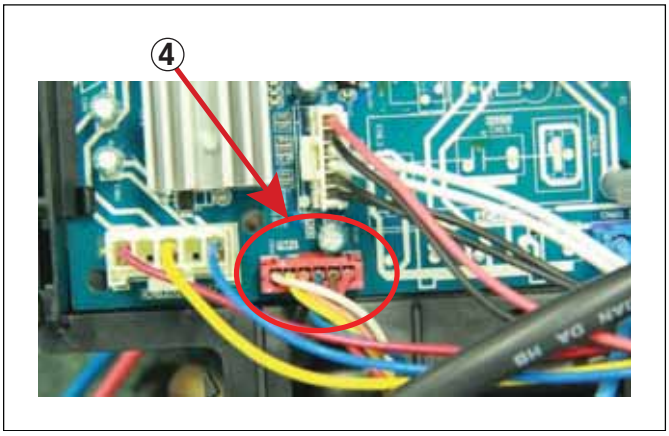



*Figure 79*

5. Remove the ground wires (Fig. 86, pos. 5).
6. Remove the wires 1,2,3 (Fig. 86, pos. 6).

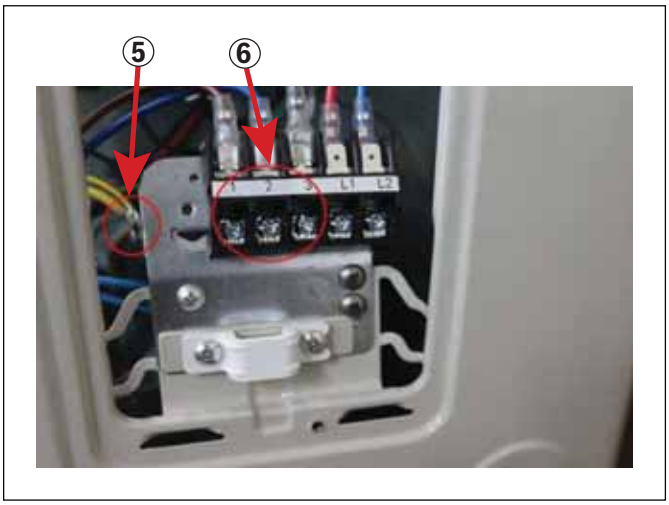



*Figure 80*

7. Then remove the electronic control box.

### 9.1.4 Removing the reversing valve

1. First remove the panel plates and electrical parts.
2. Recover refrigerant from the refrigerant circuit.
3. Remove the screw of the coil (Fig. 87, pos.3) and then remove the coil.
4. Detach the welded parts (Fig. 87, pos.4) of reversing valve and pipe.

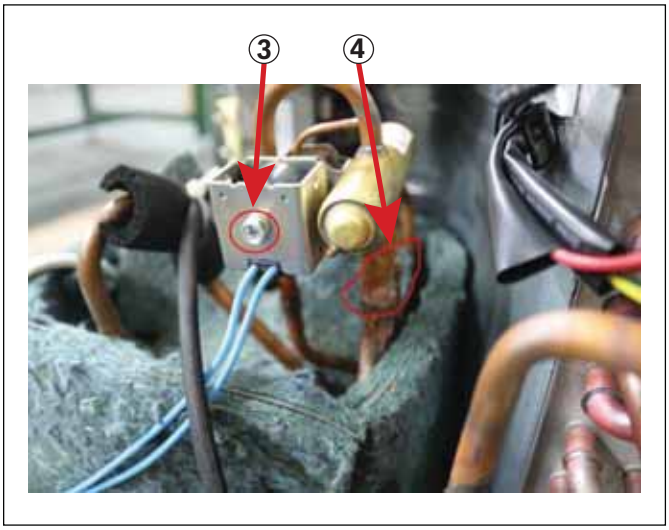



*Figure 81*

Take care to protect internal components when removing copper piping.

5. Then the reversing valve assembly can be removed

## 9.2 Models: 12K Regular: BMS500-AAS012-1CSXRA 9K & 12K Hyper Heat: BMS500-AAS009-1CSXHB, BMS500-AAS012-1CSXHB

### 9.2.1 Removing the panel plate

1. Stop operation of the system and turn "OFF" the power breaker.
2. Remove the big handle first, then remove the top panel (3 screws).
3. Remove the screws of front panel (6 screws)

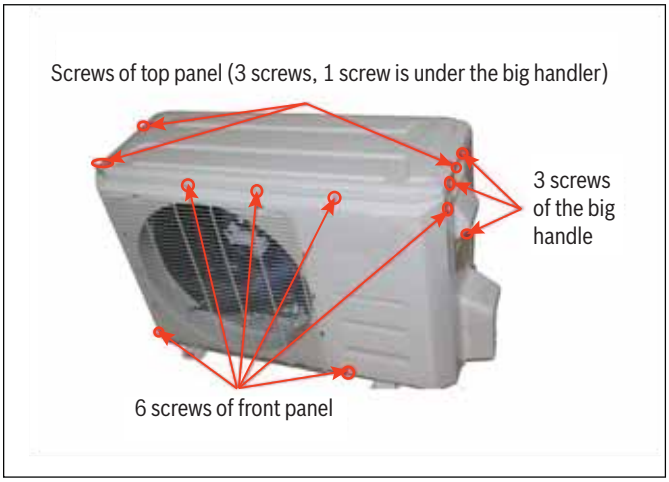



*Figure 82*

4. Remove the screws of the right side panel (8 screws)

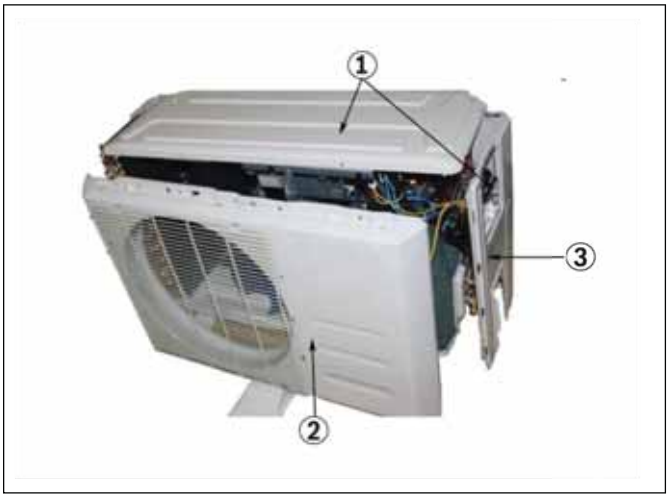



*Figure 83*

### 9.2.2 Removing the fan assembly

1. Remove the panel plate.
2. Remove the hex nut affixing the fan, and then remove the fan.



*Figure 84*

3. Unfix the hooks and then open the electronic control box cover.

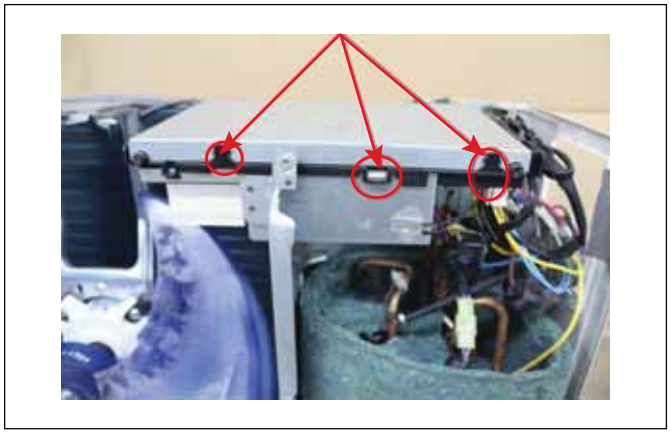


*Figure 85*

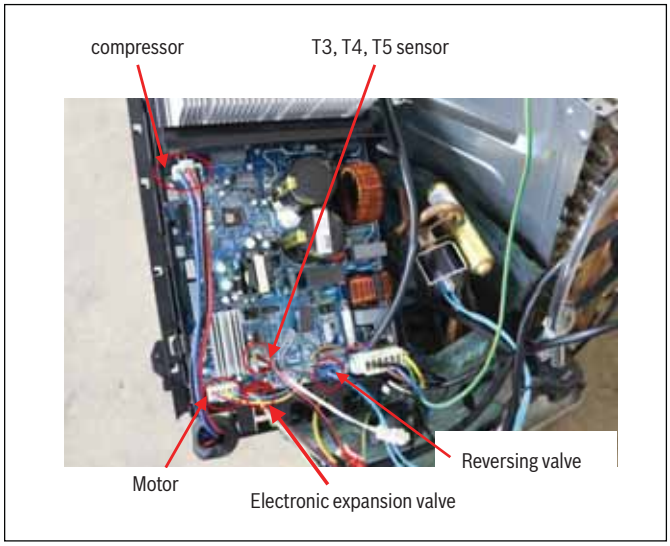



*Figure 86*

4. Disconnect the connector for fan motor from the electronic control board.



*Figure 87*

5. Remove the four affixing screws of the fan motor. Then remove the fan motor.

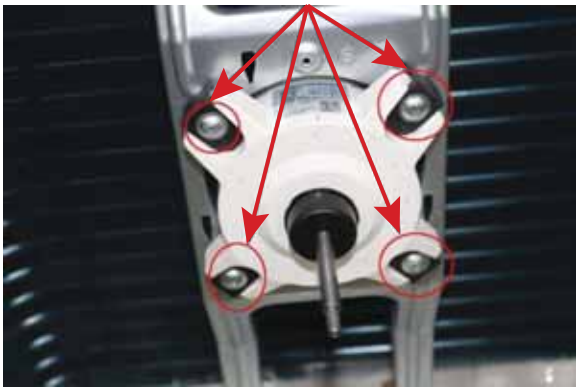


*Figure 88*

### 9.2.3 Removing the electrical parts

1. After removing the panel plate and fan assembly, remove the connectors for the compressor.



*Figure 89*

2. Pull out the two blue wires connected with the reversing valve.



*Figure 90*

3. Pull out connectors of the condenser coil temp. sensor (T3), outdoor ambient temp. sensor (T4) and discharge temp. sensor (T5).

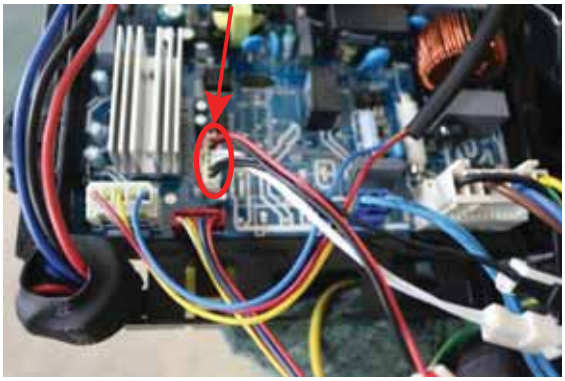


*Figure 91*

4. Disconnect the electronic expansion valve wire.

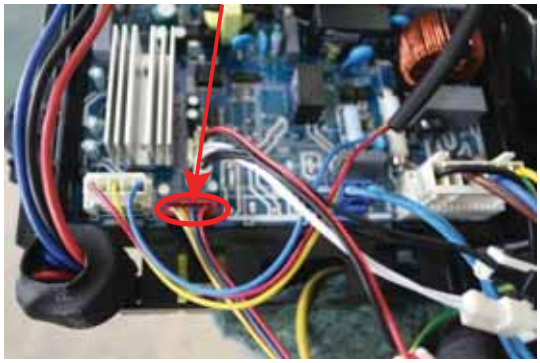


*Figure 92*

5. Remove the grounding screw (Fig.101, pos.1).
6. Remove the wires 1,2,3 (Fig.101, pos.2). Then remove the electronic control box.

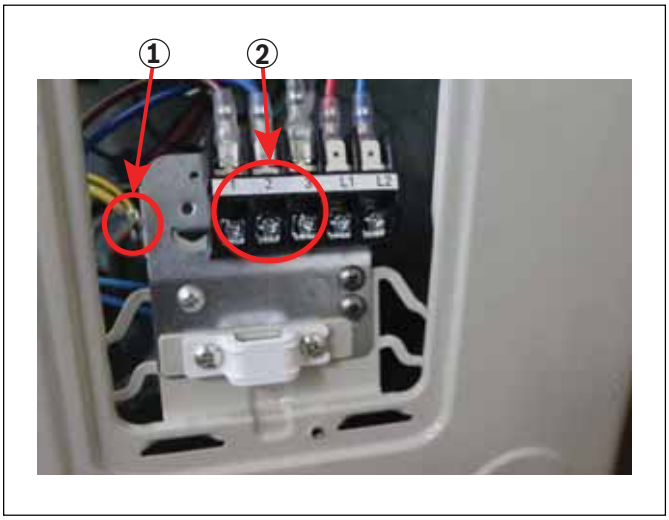



*Figure 93*

### 9.2.4 Removing the reversing valve

1. First remove the panel plates and electrical parts.
2. Recover refrigerant from the refrigerant circuit.
3. Remove the screw of the coil (Fig.102, pos.1) and then remove the coil.
4. Detach the welded parts (Fig.102, pos.2) of reversing valve and pipe.

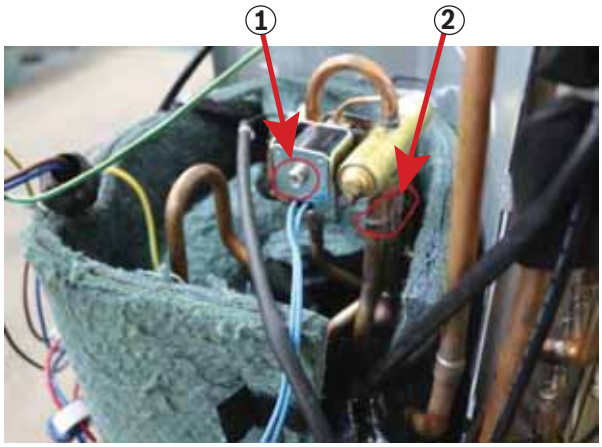



*Figure 94*

Take care to protect internal components when removing copper piping.

5. Then the reversing valve assembly can be removed.

## 9.3 Models: 18K Regular: BMS500-AAS018-1CSXRA

### 9.3.1 Removing the panel plate

1. Stop operation of the system and turn “OFF” the power breaker.
2. Remove the top panel (3 screws).
3. Remove the screws of front panel (9 screws)

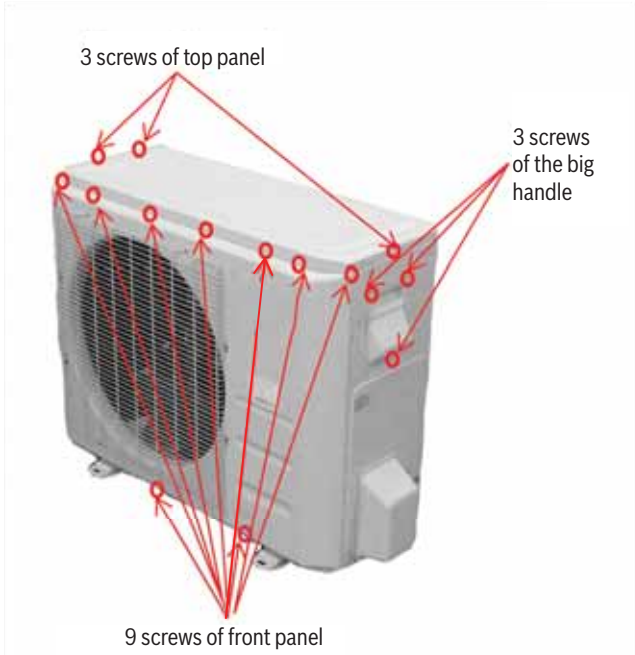



*Figure 95*

4. Remove the screws of the right side panel (8 screws)

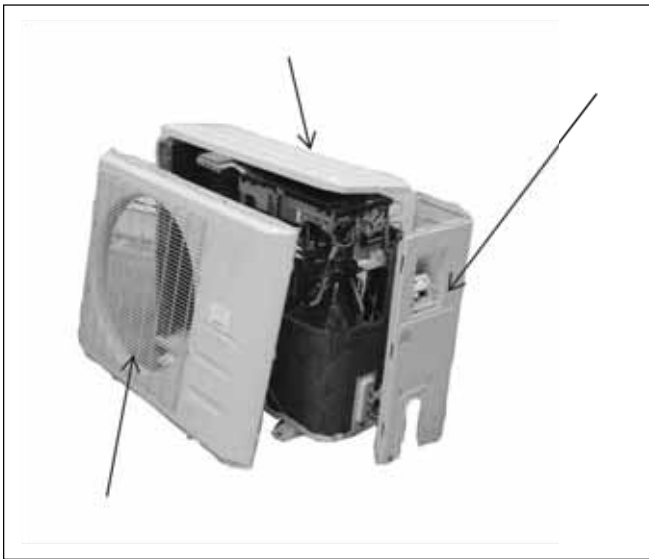


*Figure 96*

### 9.3.2 Removing the fan assembly

1. Remove the panel plate.
2. Remove the hex nut fixing the fan, and then remove the fan.

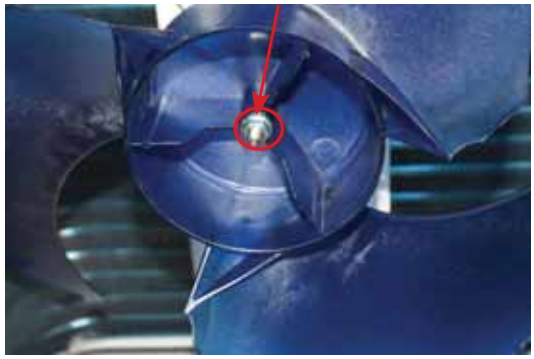


*Figure 97*

3. Unfix the hooks and then open the electronic control box cover.

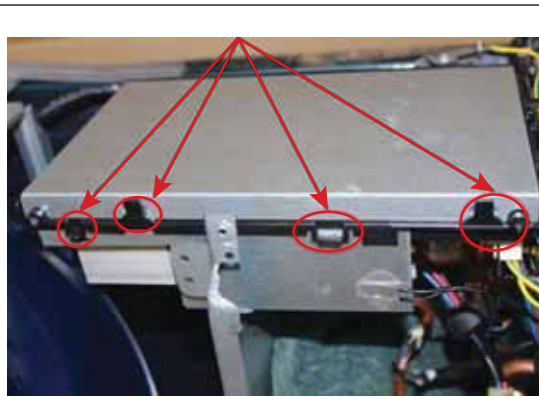


*Figure 98*

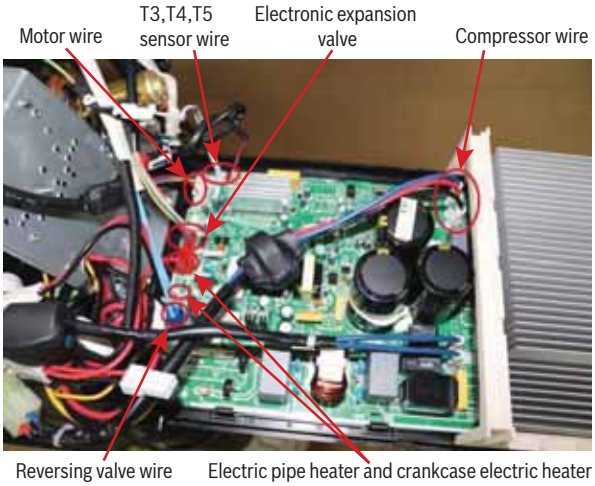



*Figure 99*

4. Disconnect the connector for fan motor from the electronic control board.

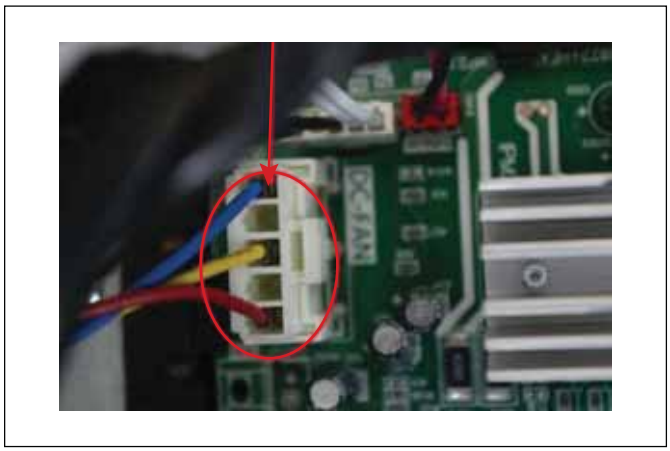


*Figure 100*

5. Remove the four fixing screws of the fan motor. Then remove the fan motor.

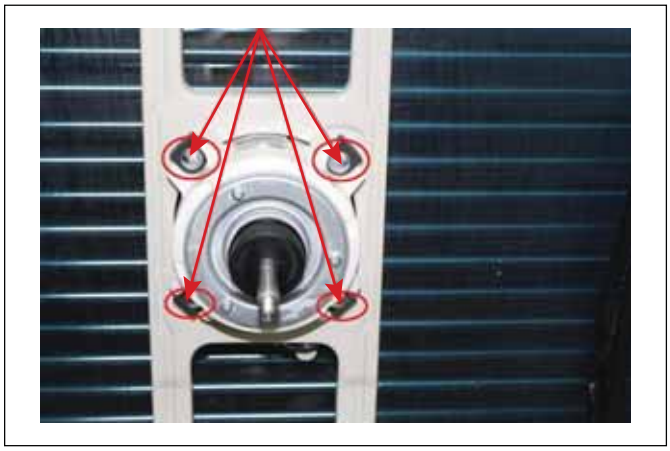


*Figure 101*

### 9.3.3 Removing the electrical parts

1. After removing the panel plate and fan assembly, remove the connectors for the compressor and reactor.

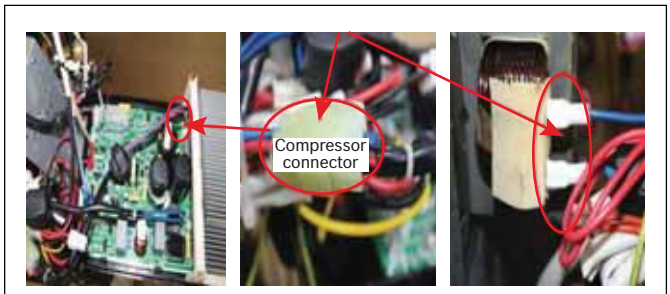



*Figure 102*

2. Pull out the two blue wires connected with the reversing valve.



*Figure 103*

3. Pull out connectors of the condenser coil temp. sensor (T3), outdoor ambient temp. sensor (T4) and discharge temp. sensor (T5).

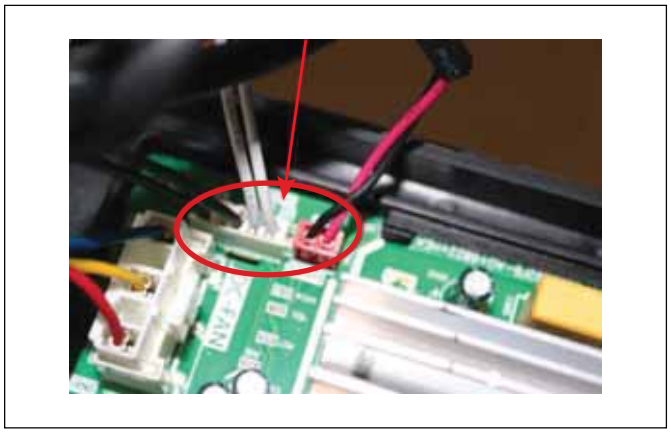


*Figure 104*

4. Disconnect the electronic expansion valve wire.

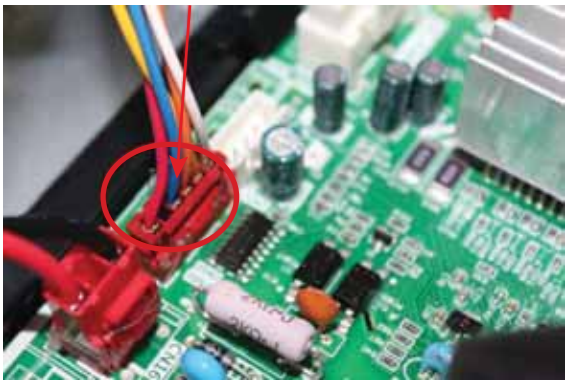


*Figure 105*

5. Remove the electric heaters.

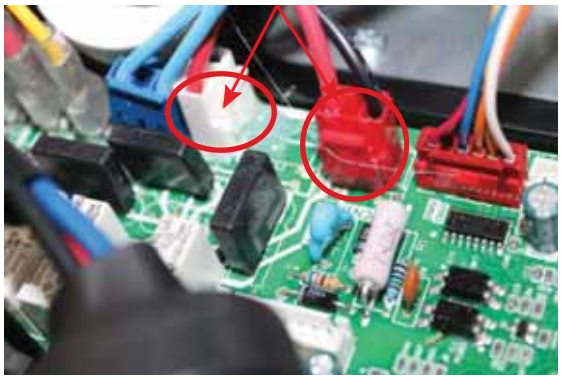


*Figure 106*

6. Remove the grounding screws.
7. Remove the wires (1,2,3 or L1,L2,S).Then remove the electronic control box.

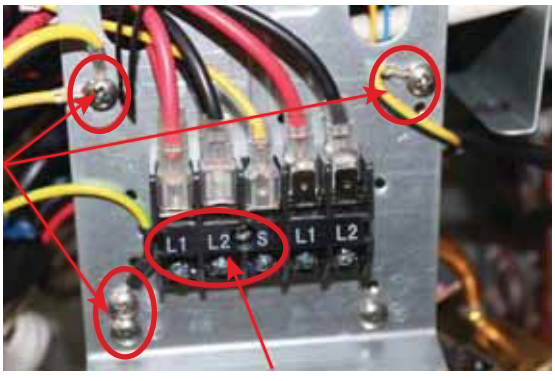



*Figure 107*

### 9.3.4 Removing the reversing valve

1. First remove the panel plates and electrical parts.
2. Recover refrigerant from the refrigerant circuit.
3. Remove the screw of the coil (Fig.118, pos.1) and then remove the coil.
4. Detach the welded parts (Fig.118, pos.2) of reversing valve and pipe.

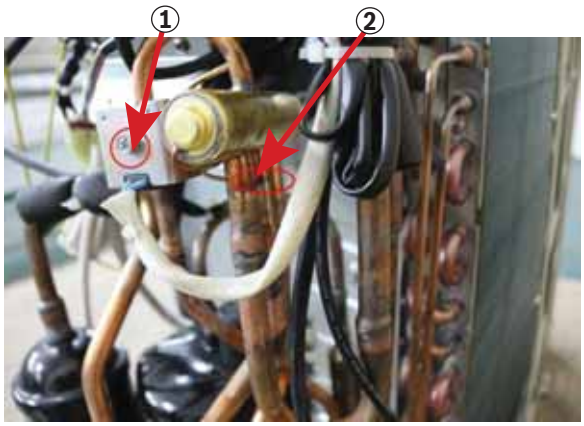



*Figure 108*

Take care to protect internal components when removing copper piping.

5. Then the reversing valve assembly can be removed.

## 9.4 Models: 18K Hyper Heat: BMS500-AAS018-1CSXHB

### 9.4.1 Removing the panel plate

1. Stop operation of the system and turn “OFF” the power breaker.
2. Remove the big handle (3 screws).

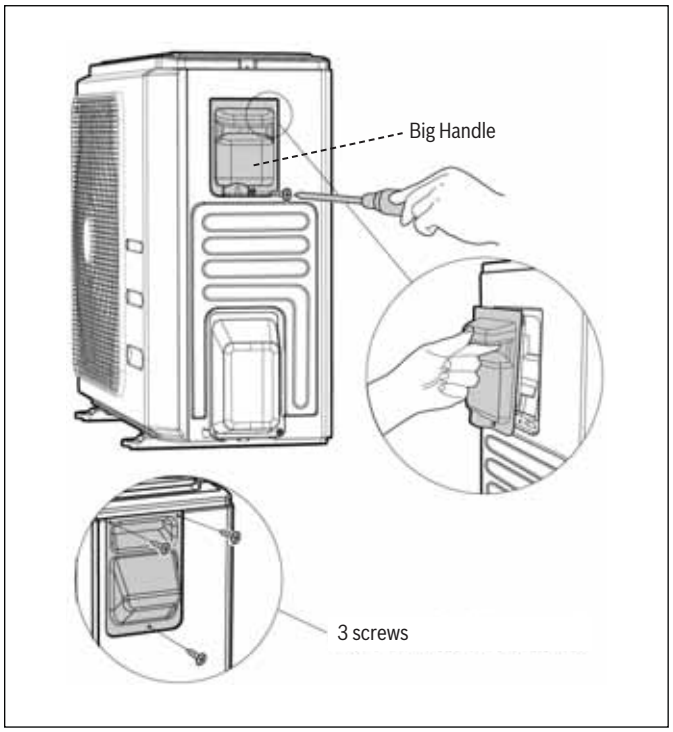



*Figure 109*

3. Remove top cover. One screw is located underneath the big handle (3 screws).

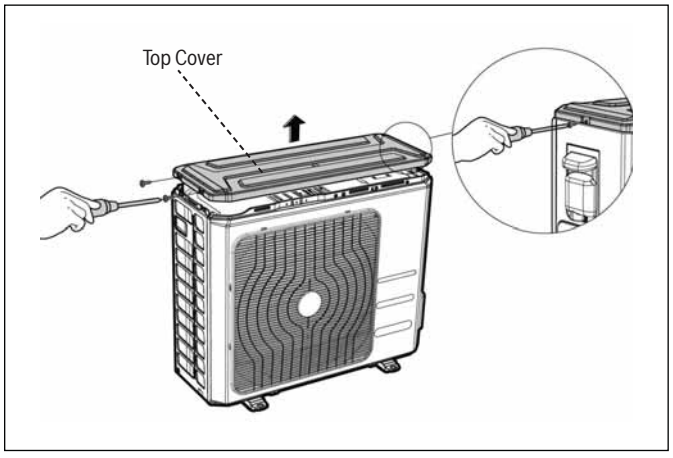



*Figure 110*

4. Remove front panel (7 screws).

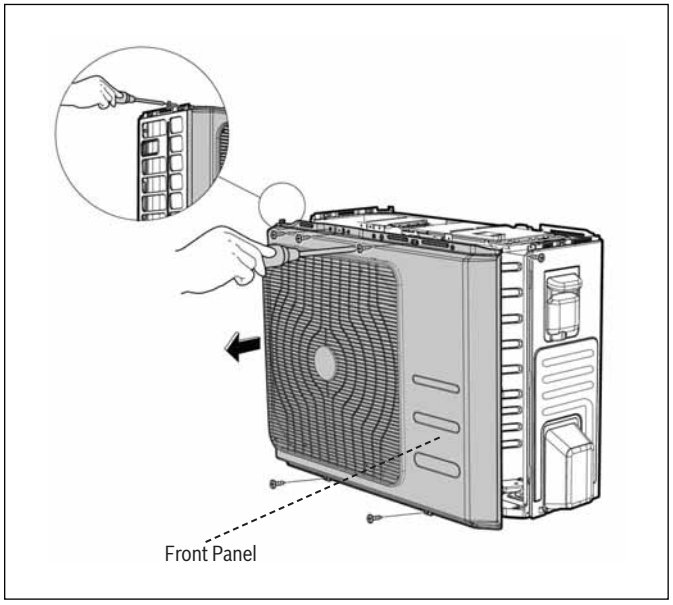



*Figure 111*

5. Remove the water collecting cover (1 screw).

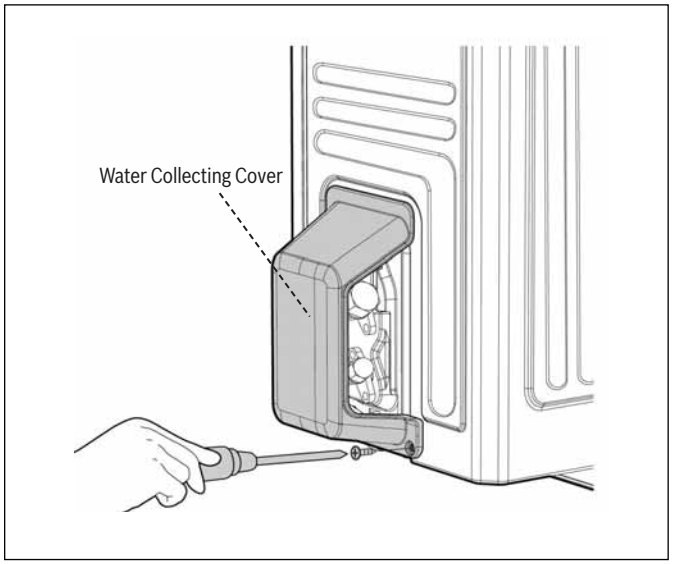



*Figure 112*

6. Remove the rear net (2 screw).

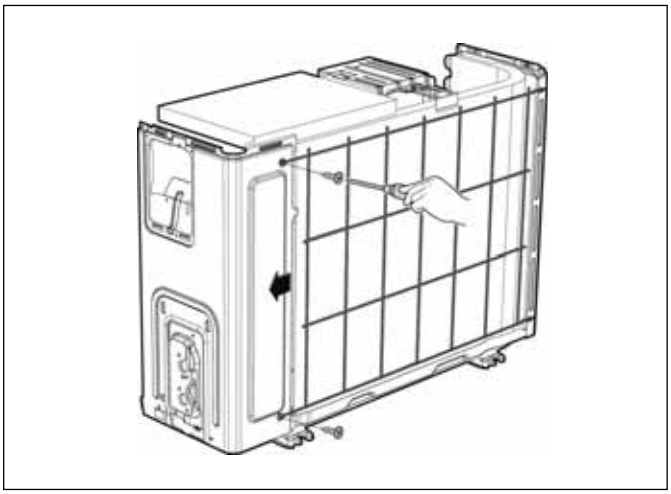


*Figure 113*

7. Remove the right panel (5 screws).

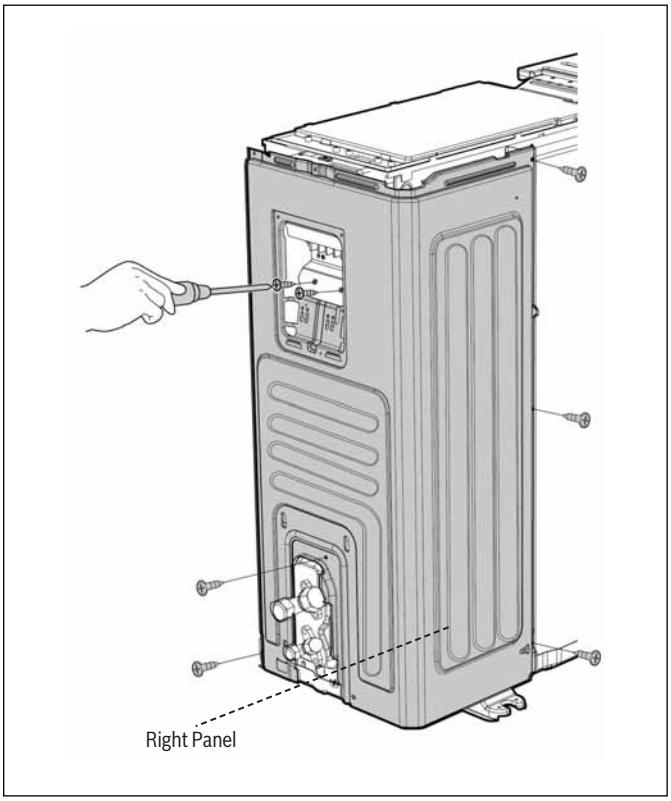



*Figure 114*

## 9.5 Models: 9K, 12K & 18K Hyper Heat: BMS500-AAS009-1CSXHB, BMS500-AAS012-1CSXHB, BMS500-AAS018-1CSXHB

### 9.5.1 Removing the electrical parts

1. After removing the panel plate, open the control box cover (4 hooks).

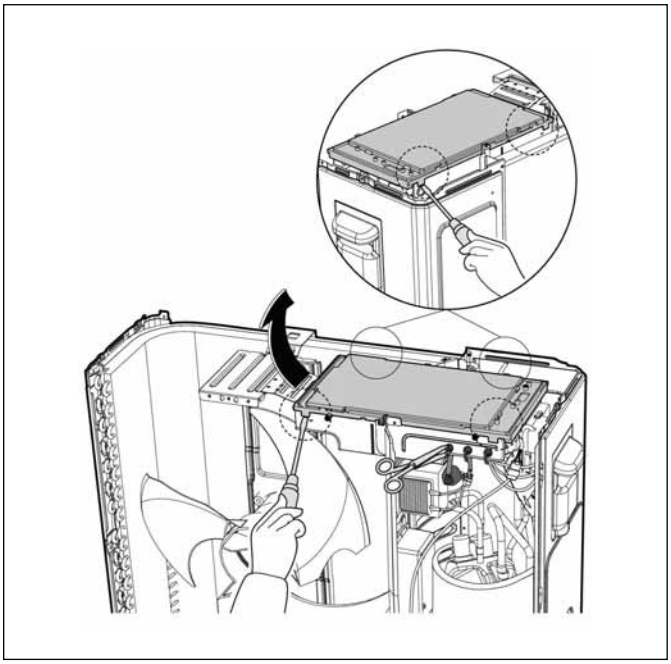


*Figure 115*

2. Disconnect below connectors from the control board and replace the control board:
   - Fan motor
   - Compressor
   - 4-Way valve (two blue wires)
   - T3 (Condenser coil temperature sensor)
   - T4 (Outdoor ambient temperature sensor)
   - TP (Discharge temperature sensor)

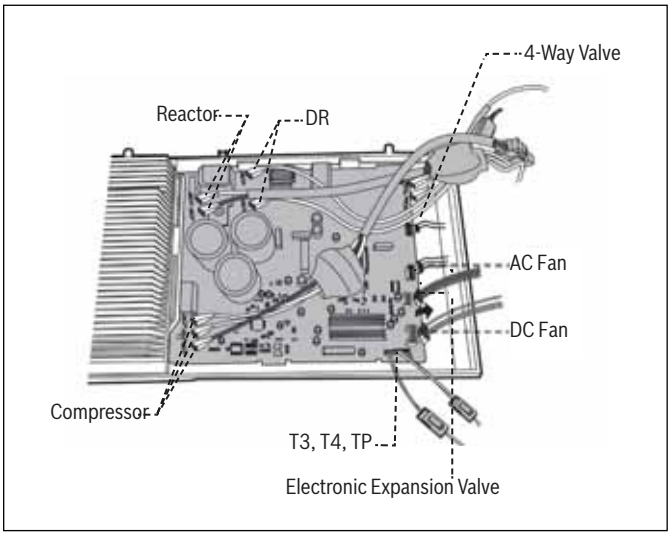



*Figure 116*

## 9.6 Models: 24K Regular: BMS500-AAS024-1CSXRA 24K Hyper Heat: BMS500-AAS024-1CSXHB 30K & 36K Light Commercial for Wall Mounted IDU: BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB 36K Light Commercial for Ducted & Cassette IDU: BMS500-AAS036-1CSXLB

### 9.6.1 Removing the panel plate

1. Stop operation of the system and turn “OFF” the power breaker.
2. Remove the big handle first,then remove the top cover (7 screws).
3. Remove the screws of front panel (11 screws)




*Figure 117*

4. Remove the screws of the right side panel (13 screws)



*Figure 118*

### 9.6.2 Removing the fan assembly

1. Remove the panel plates.
2. Remove the hex nut fixing the fan, and then remove the fan.

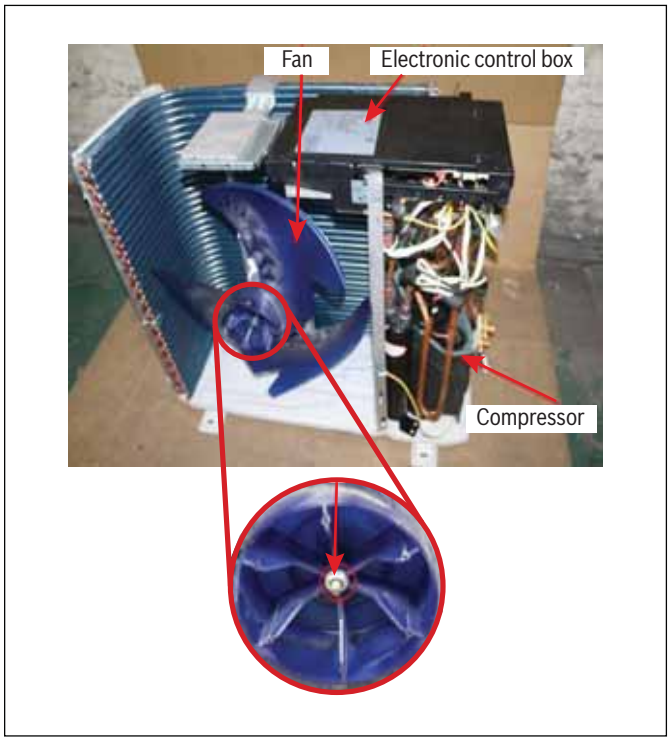



*Figure 119*

3. Unfix the hooks and then open the electronic control box cover.

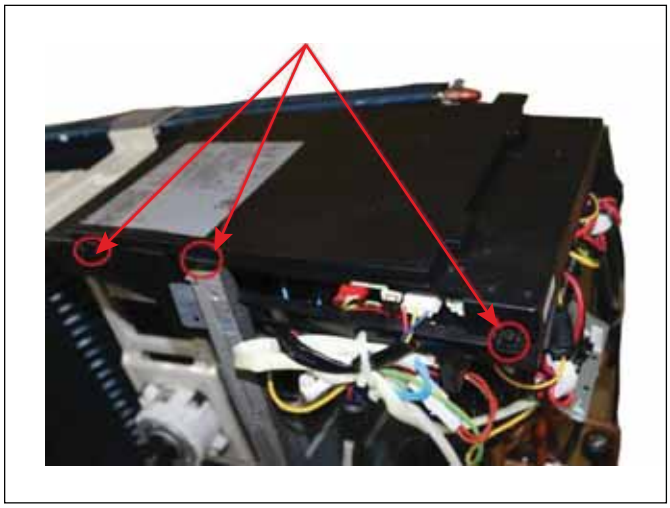


*Figure 120*

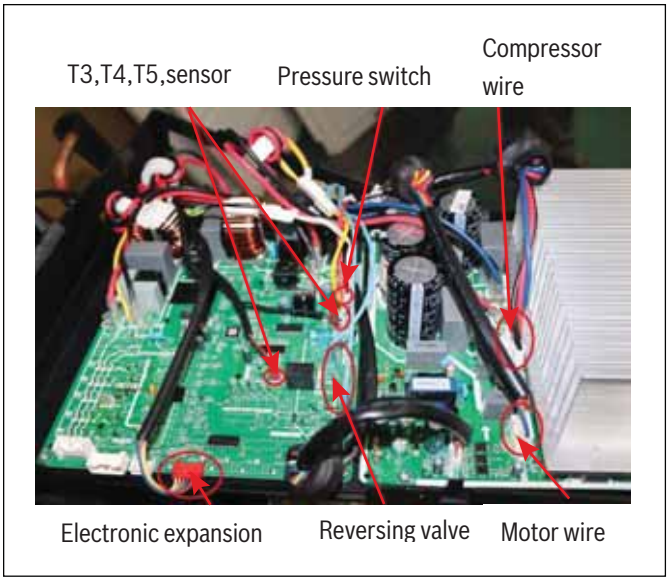



*Figure 121*

4. Disconnect the connector for the fan motor from the electronic control board.



*Figure 122*

5. Remove the four affixing screws of the fan motor. Then remove the fan motor.



*Figure 123*

### 9.6.3 Removing the electrical parts

1. After removing the panel plate and fan assembly, remove the connector for the compressor.

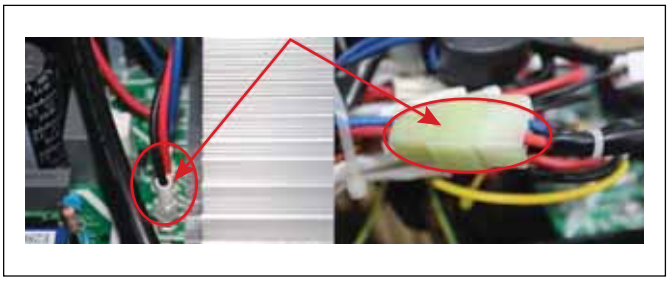


*Figure 124*

2. Pull out the two blue wires connected with the reversing valve.

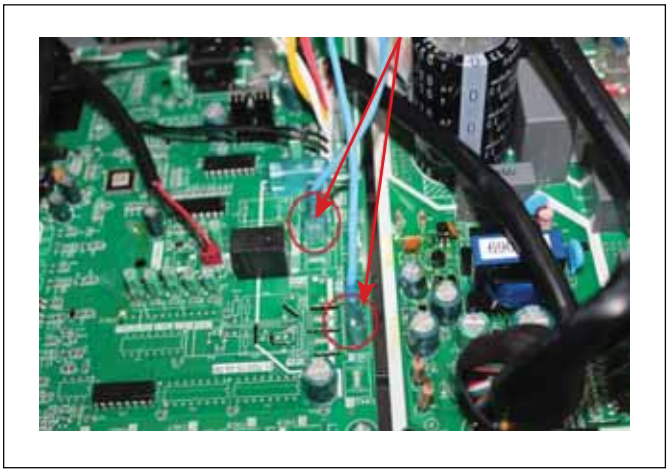


*Figure 125*

3. Pull out connectors of the condenser coil temp. sensor (T3), outdoor ambient temp. sensor (T4) and discharge temp. sensor (T5).

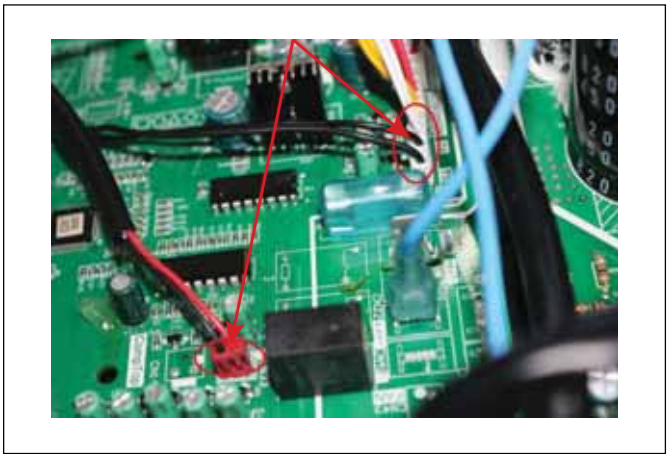


*Figure 126*

4. Disconnect the pressure switch connector.

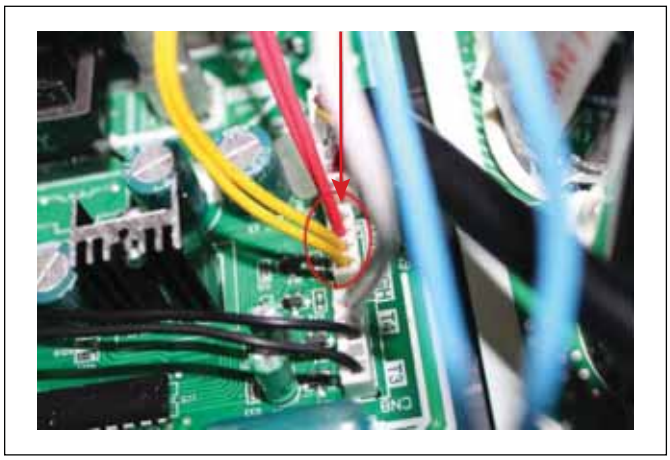


*Figure 127*

5. Disconnect the electronic expansion valve wire from the control board



*Figure 128*

6. Remove the grounding wires (Fig.67, pos.1).
7. Remove the wires 1,2,3 or L1,L2,S (Fig.67, pos.2).Then remove the electronic control box.

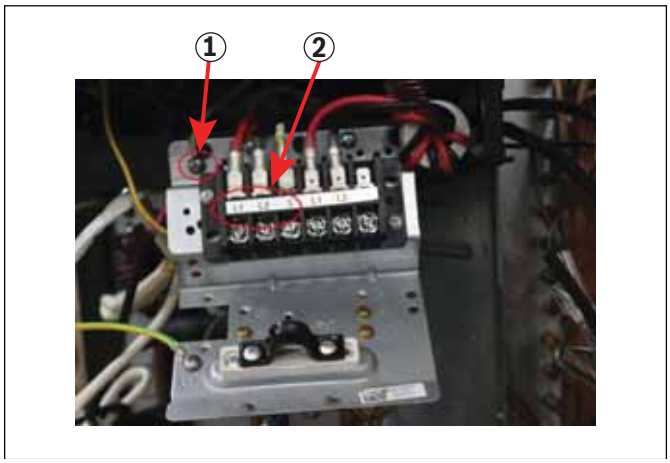



*Figure 129*

### 9.6.4 Removing the reversing valve

1. First remove the panel plates and electrical parts.
2. Recover refrigerant from the refrigerant circuit.
3. Remove the screw of the coil (Fig.68, pos.1) and then remove the coil.
4. Detach the welded parts (Fig.68, pos.2) of reversing valve and pipe.

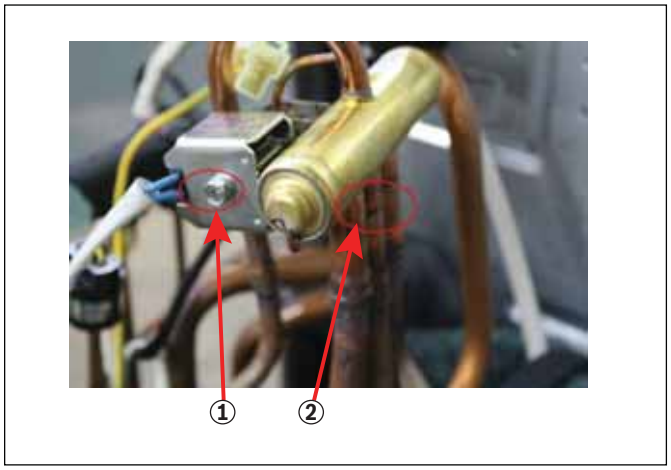



*Figure 130*

Take care to protect internal components when removing copper piping.

5. Then the reversing valve assembly can be removed.

## 9.7 Models: 48K & 60K Light Commercial: BMS500-AAS048-1CSXLB, BMS500-AAS060-1CSXLB

### 9.7.1 Removing the fan assembly

1. Stop operation of the system and turn “OFF” the power breaker.
2. Remove 8 screws to disassemble 2 air outlet grilles.




*Figure 131*

3. Remove 2 hex nuts to disassemble the fans.




*Figure 132*

4. Remove 4 screws to disassemble top cover.



*Figure 133*

5. Remove 1 screw to disassemble front right panel.



*Figure 134*

6. Remove the 2 fan motor connectors from DC motor driver board.



*Figure 135*

7. Remove 4 screws and disassemble fan motor.



*Figure 136*

### 9.7.2 Removing the panel plate

1. Remove 2 screws to disassemble the big handle and 2 screws to disassemble the water collector.

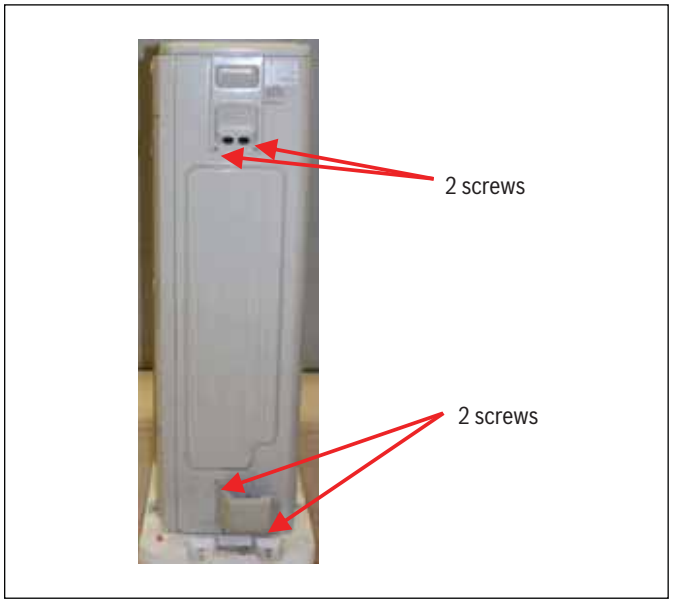



*Figure 137*

2. Remove 2 screws from the terminal board and 15 screws from the right rear panel.

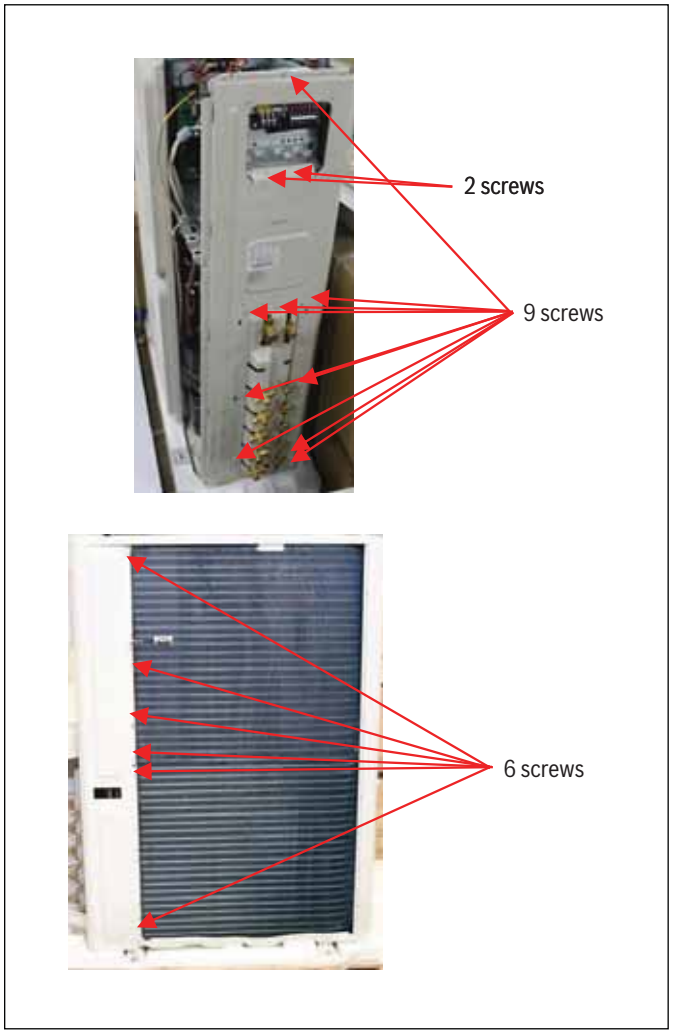



*Figure 138*

### 9.7.3 Removing the electrical parts

1. After removing the panel plate and fan assembly, remove the connector for the compressor.

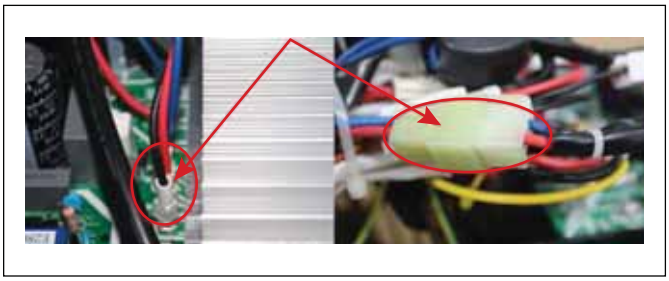


*Figure 139*

2. Pull out the two blue wires connected with the reversing valve.

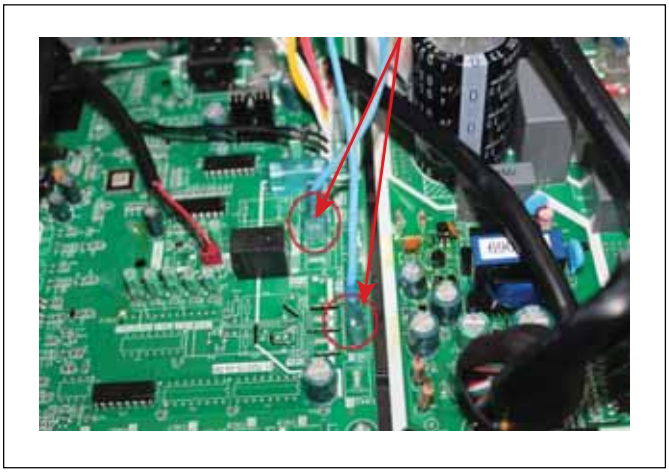


*Figure 140*

3. Pull out connectors of the condenser coil temp. sensor (T3), outdoor ambient temp. sensor (T4) and discharge temp. sensor (T5).

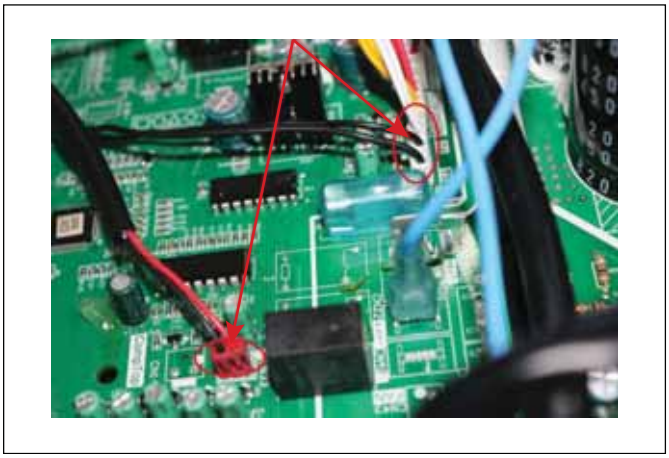


*Figure 141*

4. Disconnect the pressure switch connector.

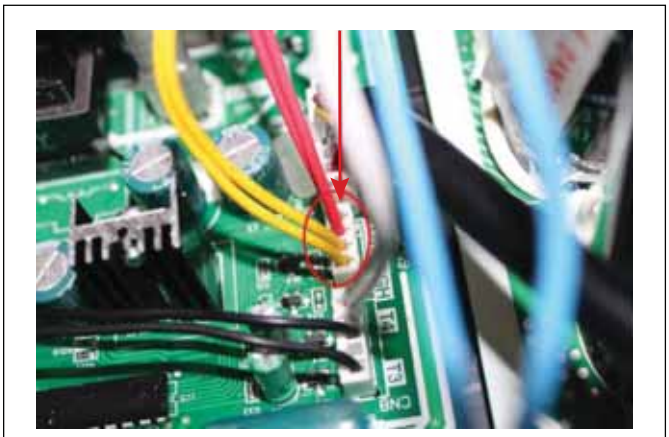


*Figure 142*

5. Disconnect the electronic expansion valve wire from the control board

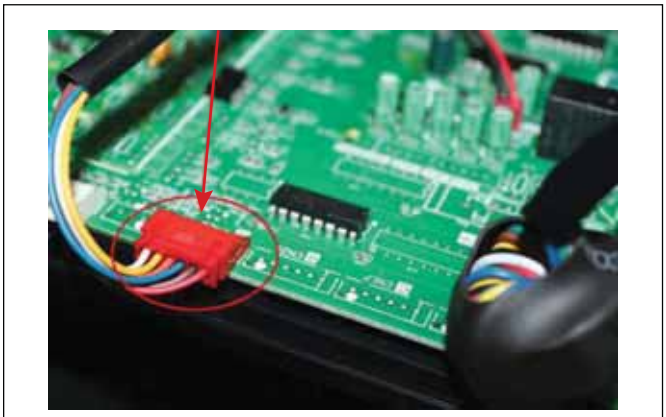


*Figure 143*

6. Remove the grounding wires (Fig.84, pos.1).
7. Remove the wires 1,2,3 or L1,L2,S (Fig.84, pos.2).Then remove the electronic control box.

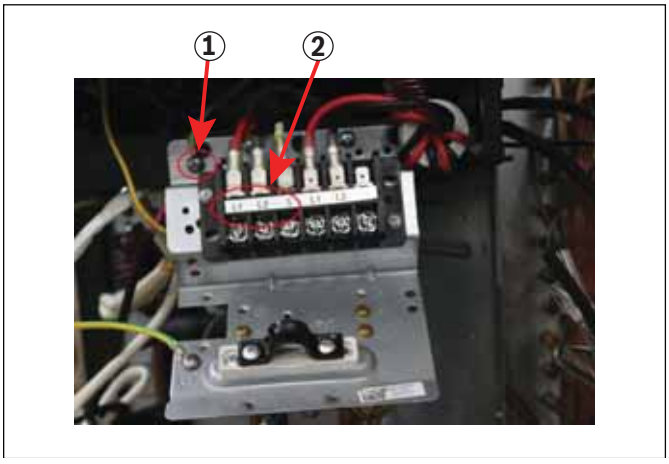



*Figure 144*

## 9.8 All Models

### 9.8.1 Removing the sound blanket

1. Remove the panel plates.
2. Remove the sound blanket.

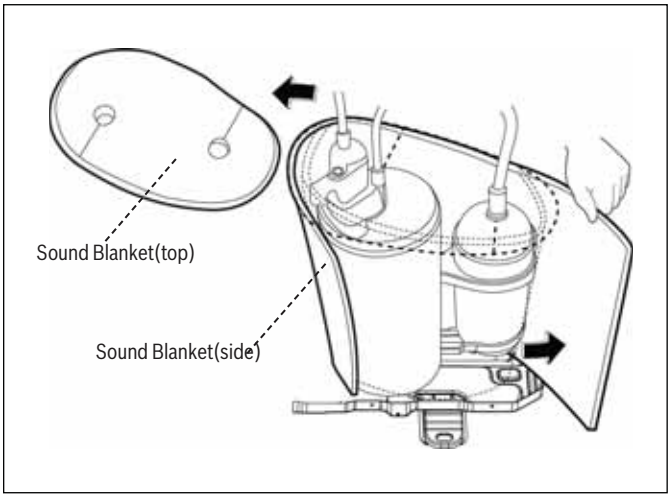



*Figure 145*

### 9.8.2 Removing the reversing valve

1. First, remove panel plate and connection of 4-Way valve on PCB.
2. Heat up the brazed parts and then detach the 4-way valve assembly with pliers.

Take care to protect internal components when removing copper piping.

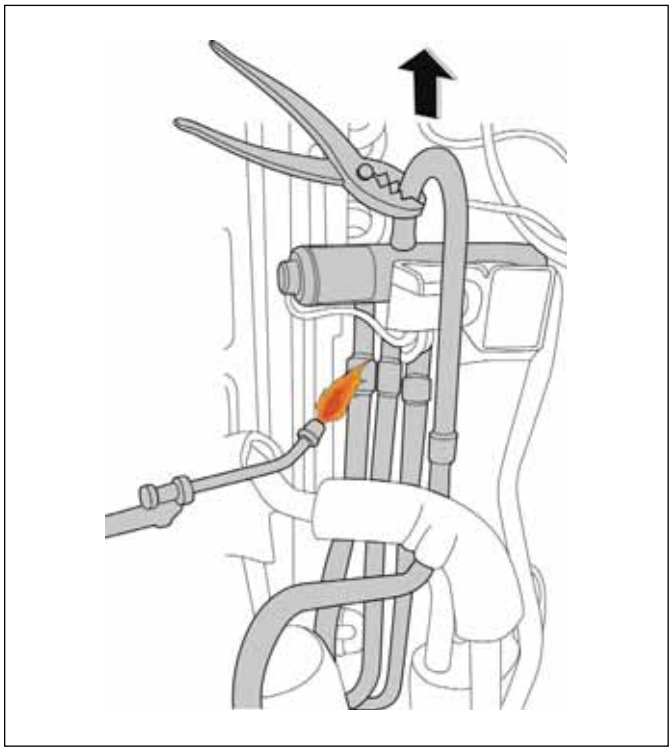


*Figure 146*

### 9.8.3 Removing the compressor

1. First, the remove the panel plate, connection of compressor on PCB.
2. Remove refrigerant from the the system.
3. Remove the flange nut and terminal cover.

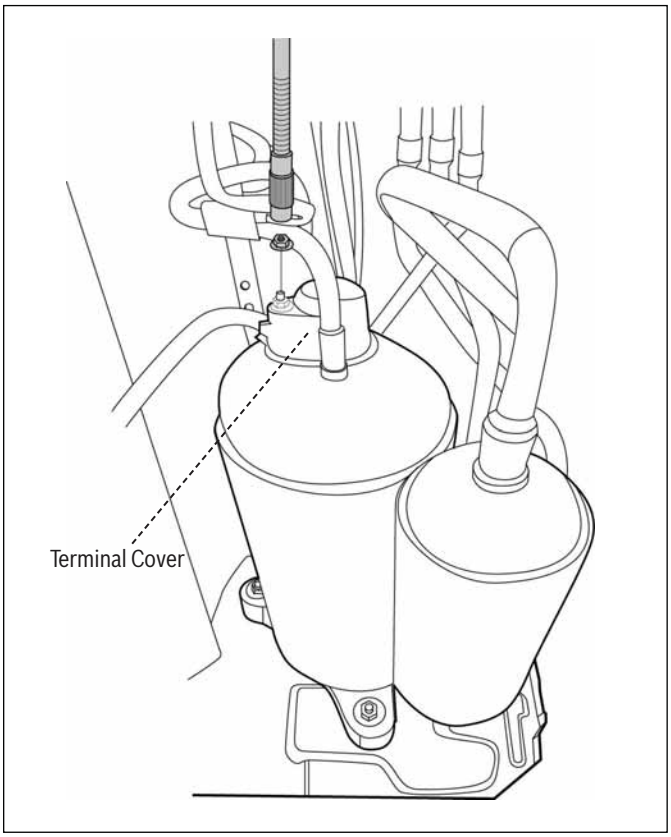



*Figure 147*

4. Disconnect the connectors.

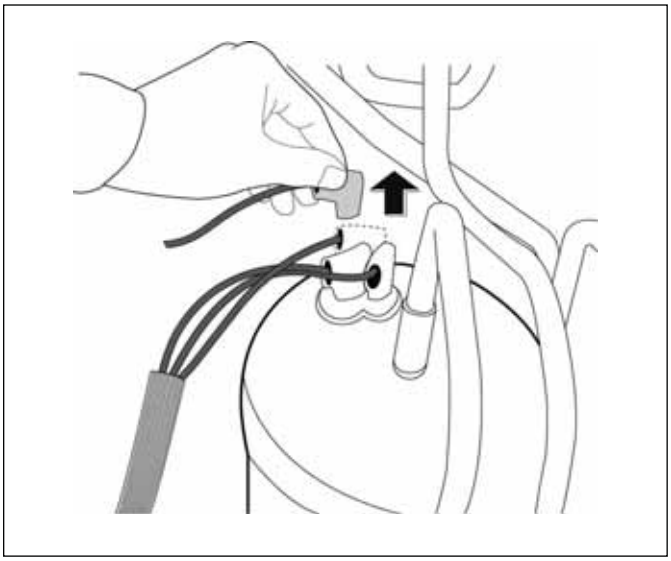


*Figure 148*

5. Remove the hex nuts and washer fixing the compressor on the bottom plate.

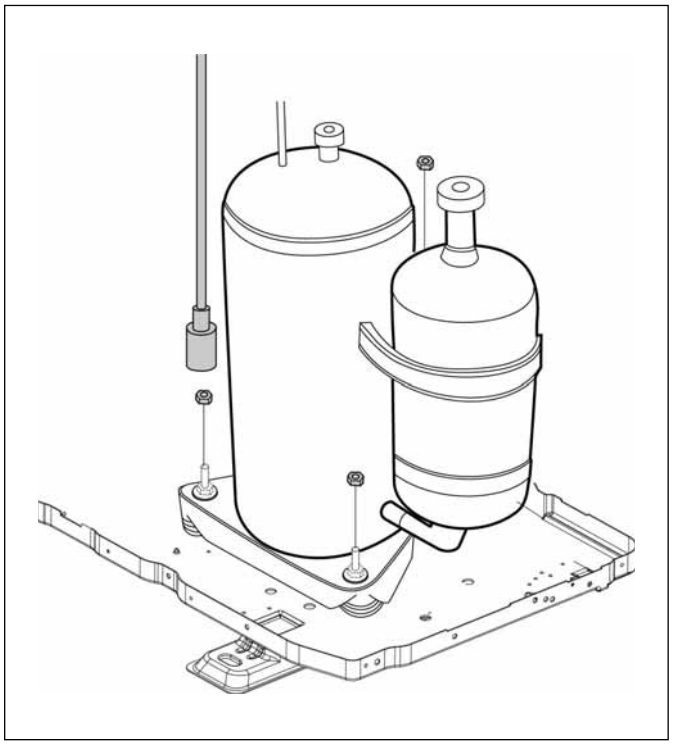


*Figure 149*

6. Heat up the brazed parts and then remove the discharge and suction pipes.

Take care to protect internal components when removing copper piping.

7. Lift the compressor with pilers.

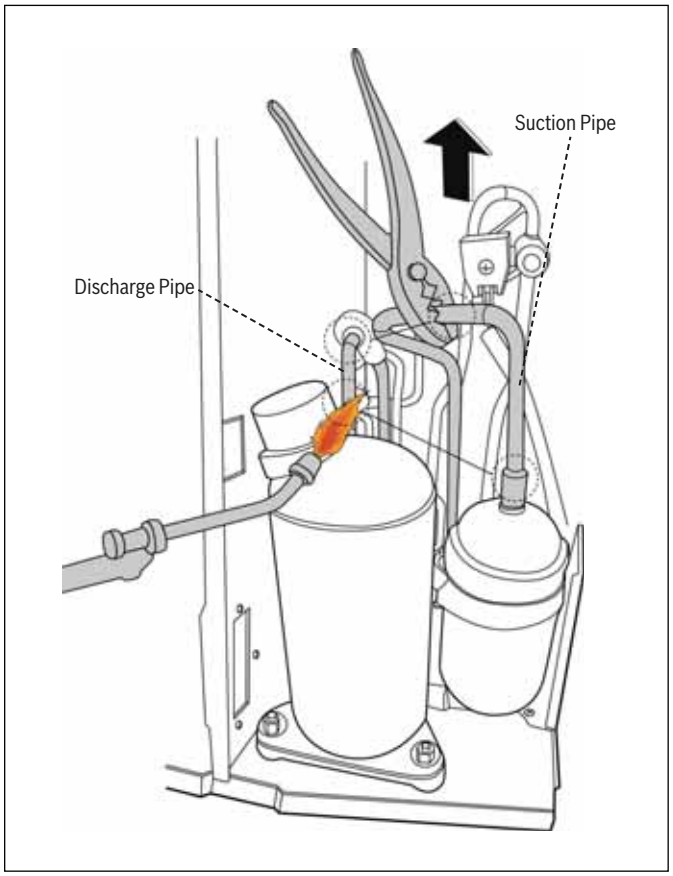



*Figure 150*

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