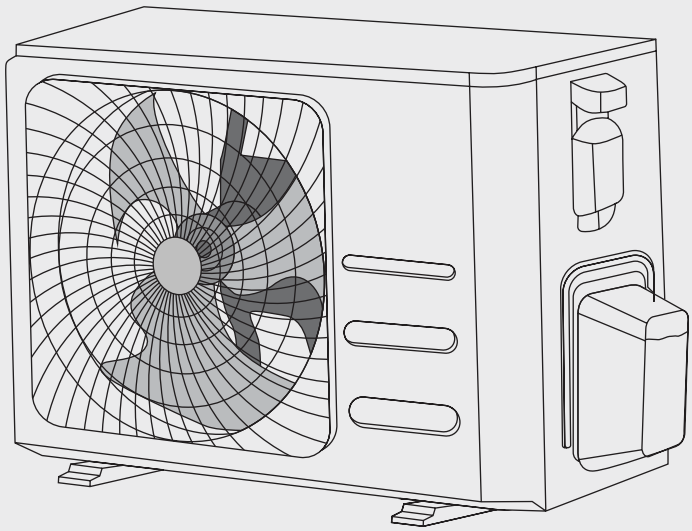

Bosch Ductless Air Conditioner / Heat Pump Outdoor Unit

Climate 5000 Series

Single Zone (Regular, Max Performance, 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.

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Intertek

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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	Max Performance Outdoor Units	Light Commercial 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-AAU060-1AHCXB			BMS500-AAS048-1CSXLB

Table 1

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

3 Dimensions and Clearances

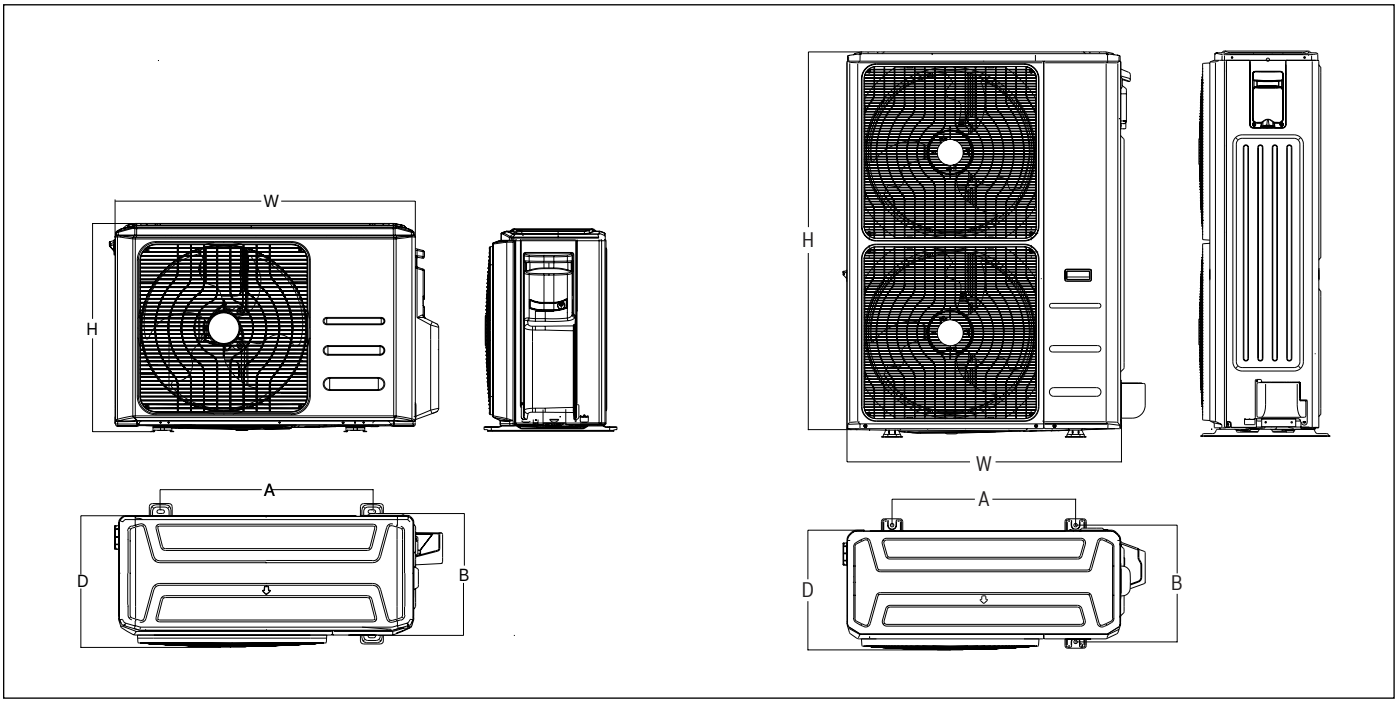


Figure 1

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

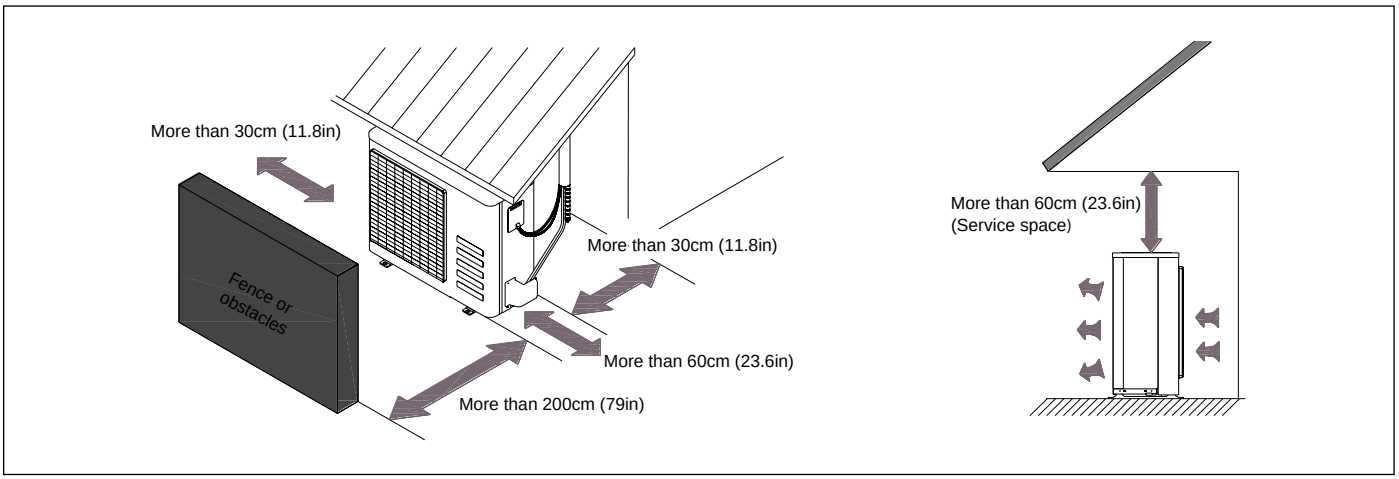


Figure 2 Outdoor Unit Clearances

4 Installation Details

4.1 Torque Requirements

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

Table 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

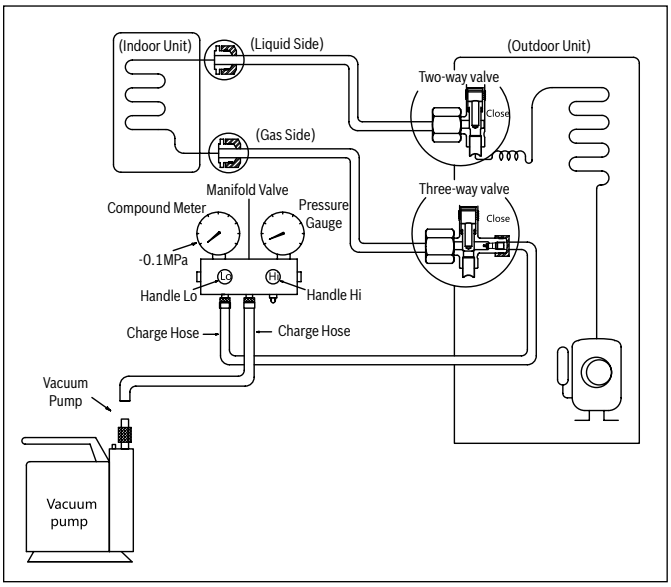


Figure 3

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

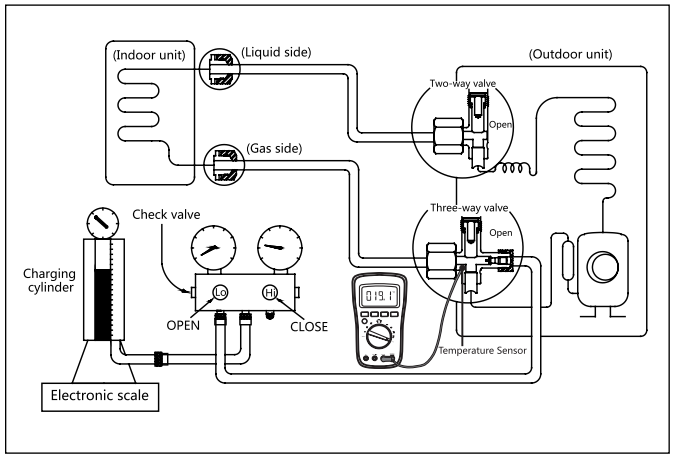


Figure 4

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)

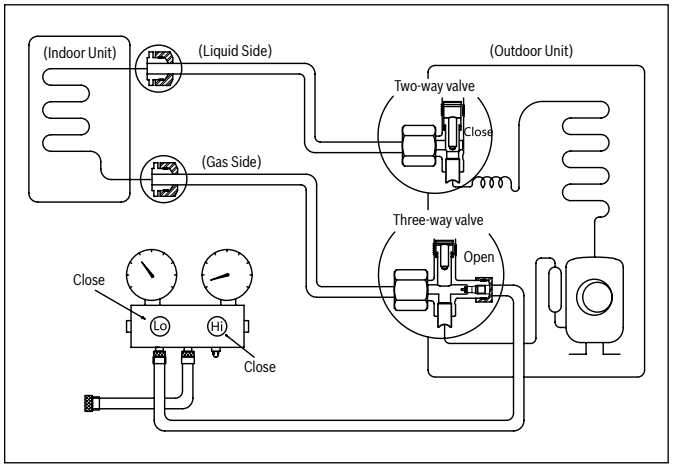


Figure 5

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

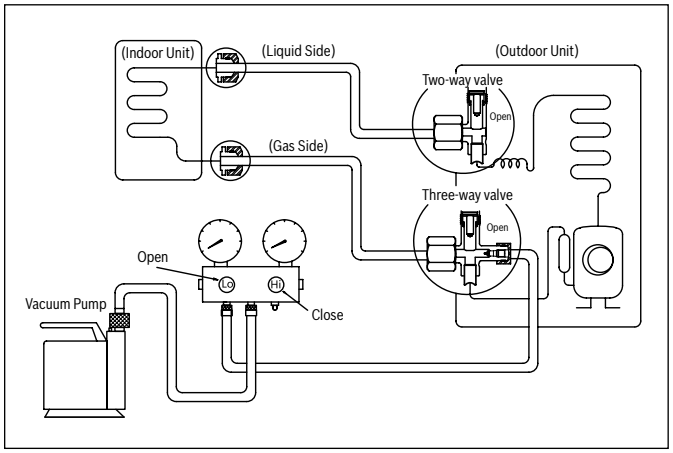


Figure 6

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

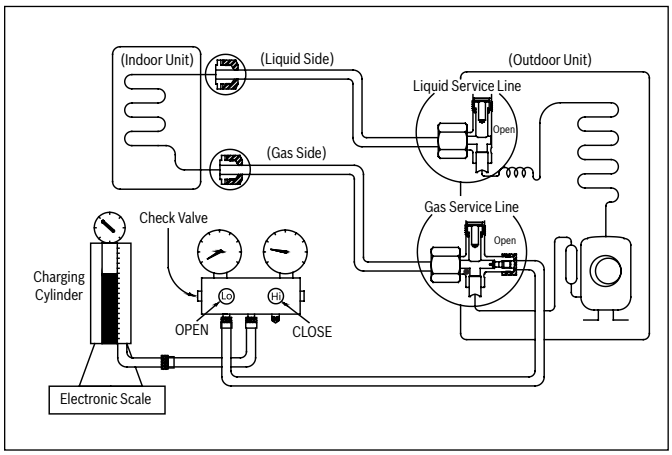


Figure 7

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 17ºC - 32ºC	32ºF - 86ºF 0ºC - 30ºC	50ºF - 90ºF 10ºC - 32ºC
Outdoor Temperature	Regular	BMS500-AAS012-0CSXRB BMS500-AAS009-1CSXRA BMS500-AAS012-1CSXRA BMS500-AAS018-1CSXRA BMS500-AAS024-1CSXRA	-13ºF - 122ºF -25ºC - 50ºC	-13ºF - 86ºF -25ºC - 30ºC	32ºF - 122ºF 0ºC - 50ºC
	Max Performance	BMS500-AAS009-1CSXHB BMS500-AAS012-1CSXHB BMS500-AAS018-1CSXHB BMS500-AAS024-1CSXHB	-22ºF - 122ºF -30ºC - 50ºC	-22ºF - 86ºF -30ºC - 30ºC	32ºF - 122ºF 0ºC - 50ºC
	Light Commercial	BMS500-AAS030-1CSXRB BMS500-AAS036-1CSXRB BMS500-AAS036-1CSXLB BMS500-AAS048-1CSXLB BMS500-AAS060-1CSXLB	5ºF - 122ºF -15ºC - 50ºC	5ºF - 86ºF -15ºC - 30ºC	32ºF - 122ºF 0ºC - 50ºC

Table 7

Equation to convert Celsius to Fahrenheit

(°F) = 1.8 x (°C) + 32

NOTICE:

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

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:

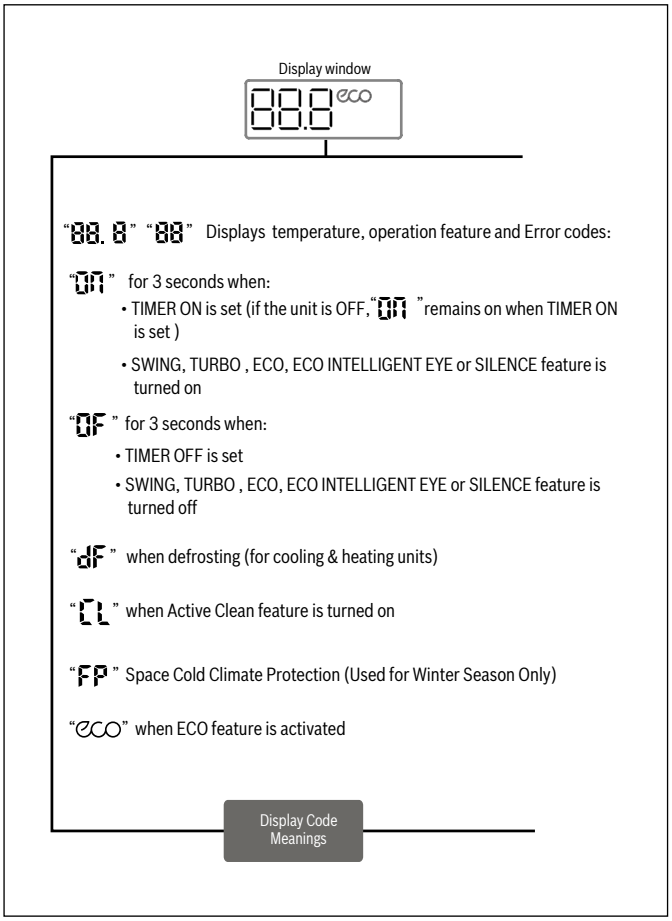


Figure 8

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℉ (2℃), the compressor will stop.
When T1-Ts >ΔT +0.9℉ (0.5℃) 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℉ (1.5℃) 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

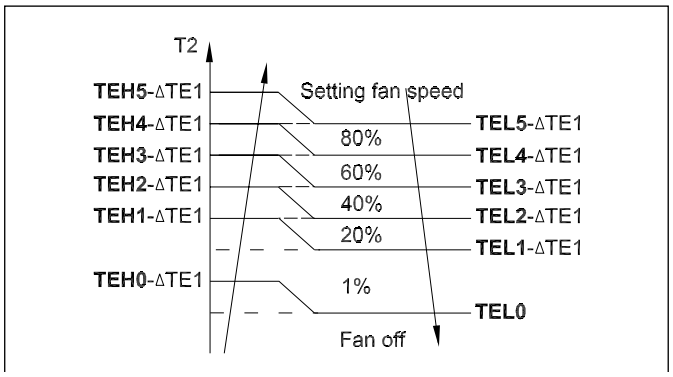


Figure 9

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

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

5.4.3.5 Evaporator coil temperature protection

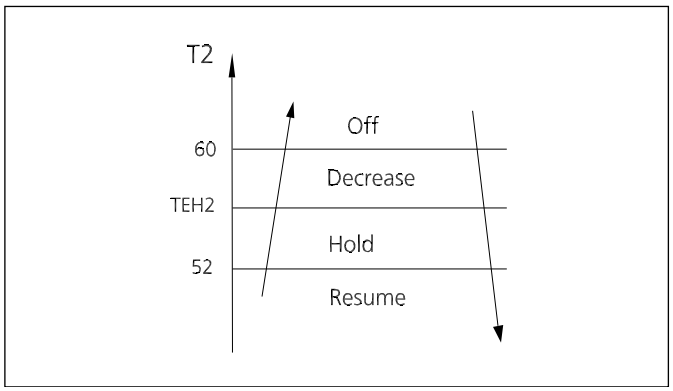


Figure 10

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. 2. All the temperature is °C no matter what kind of remote controller is used. 3. T1,T2,T3,T4,T2B display range:-25~70, TP display range:-20~130. 4. Frequency display range: 0~159HZ. 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.

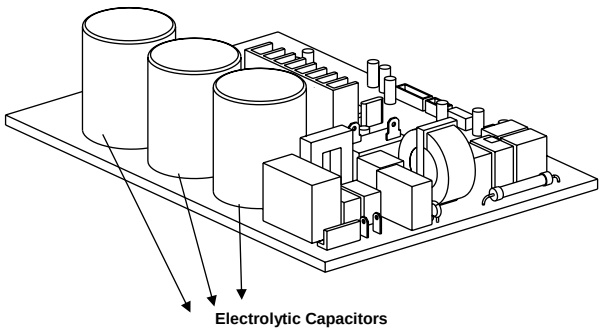


Figure 11

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.

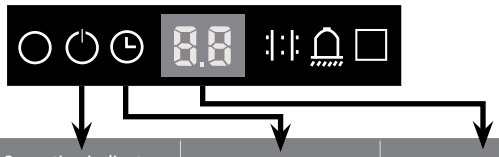
6.1 Error Codes - Wall Mounted Indoor Unit

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

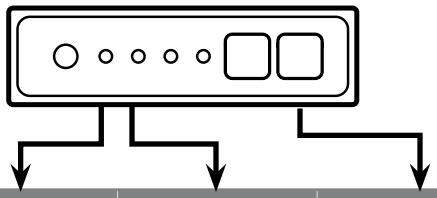
Table 13

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

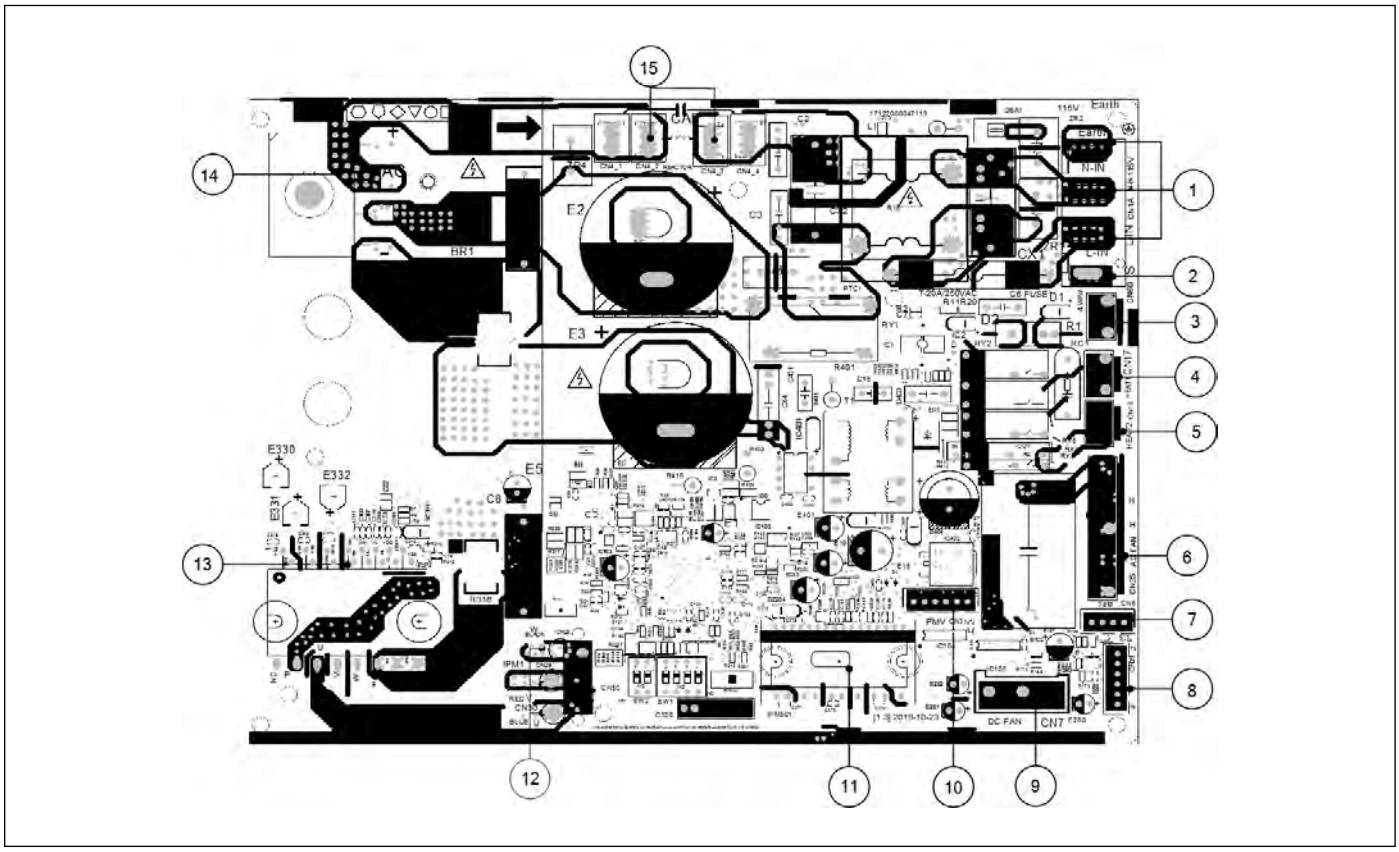


Figure 12

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

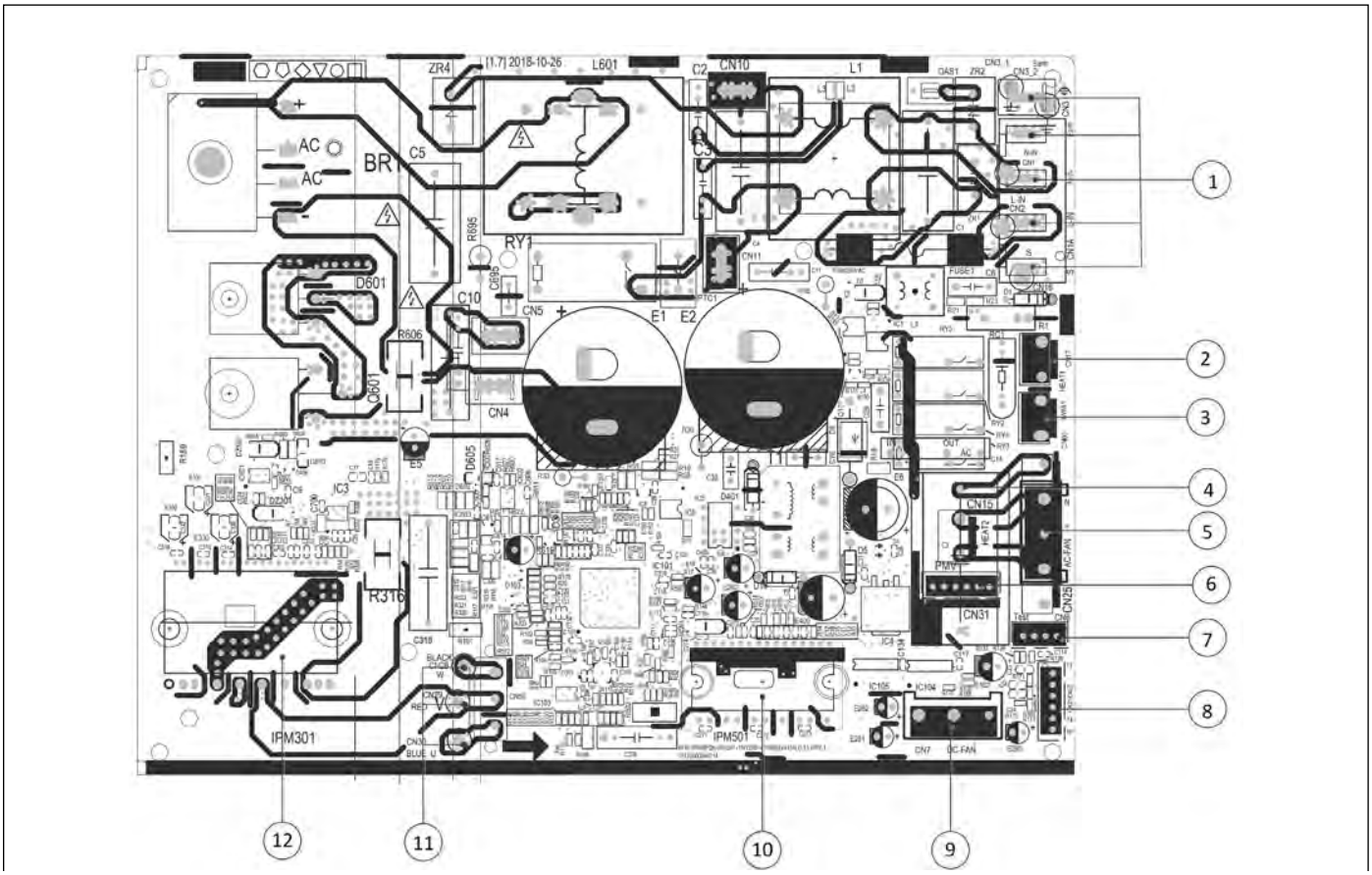


Figure 13

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: Max Performance Single Zone 9K, 12K & 18K

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

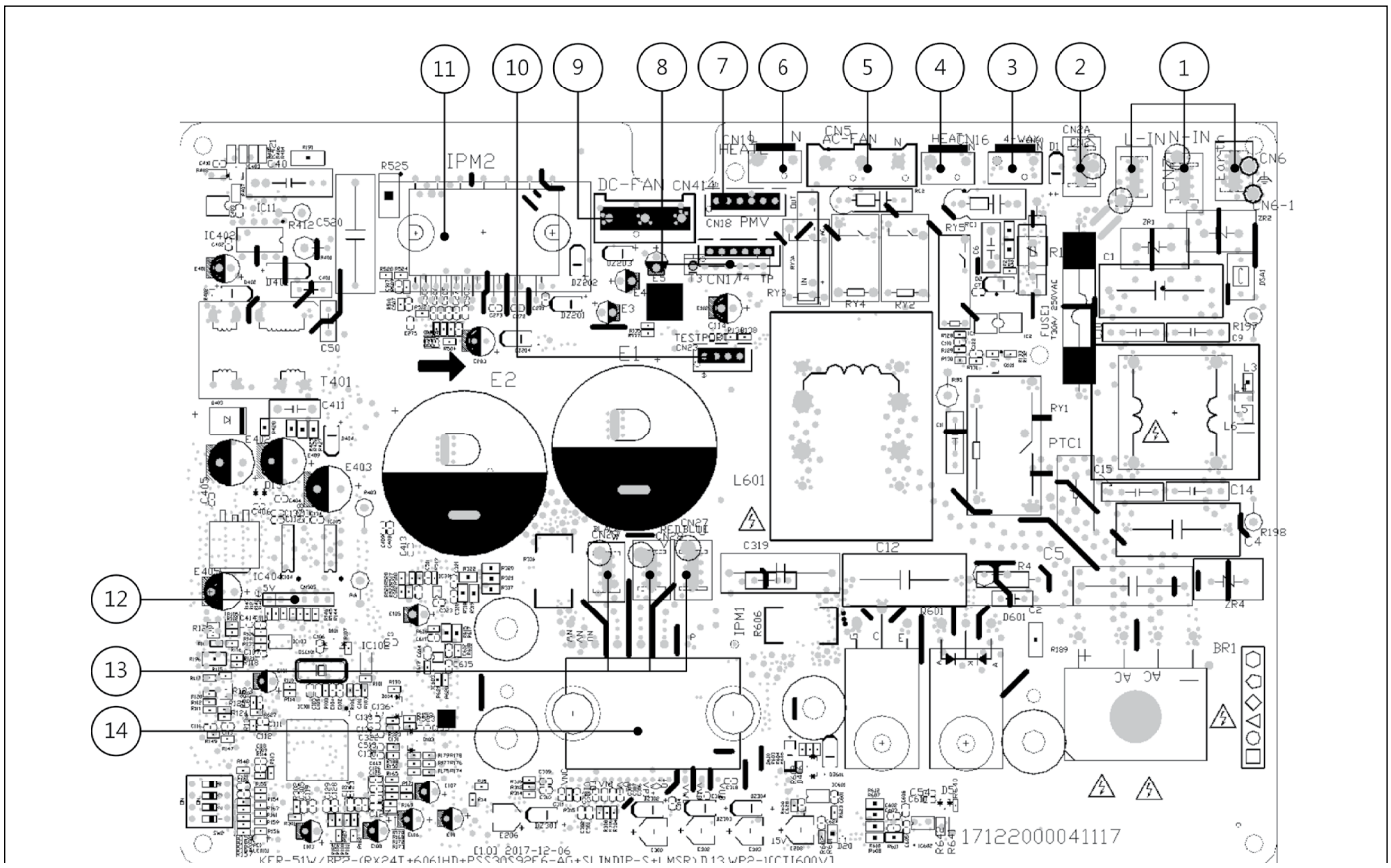


Figure 14

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: Max Performance Single Zone 24K

BMS500-AAS024-1CSXHB

7.1.6 PCB: Light Commercial (for Wall Mounted IDU) 30K & 36K

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

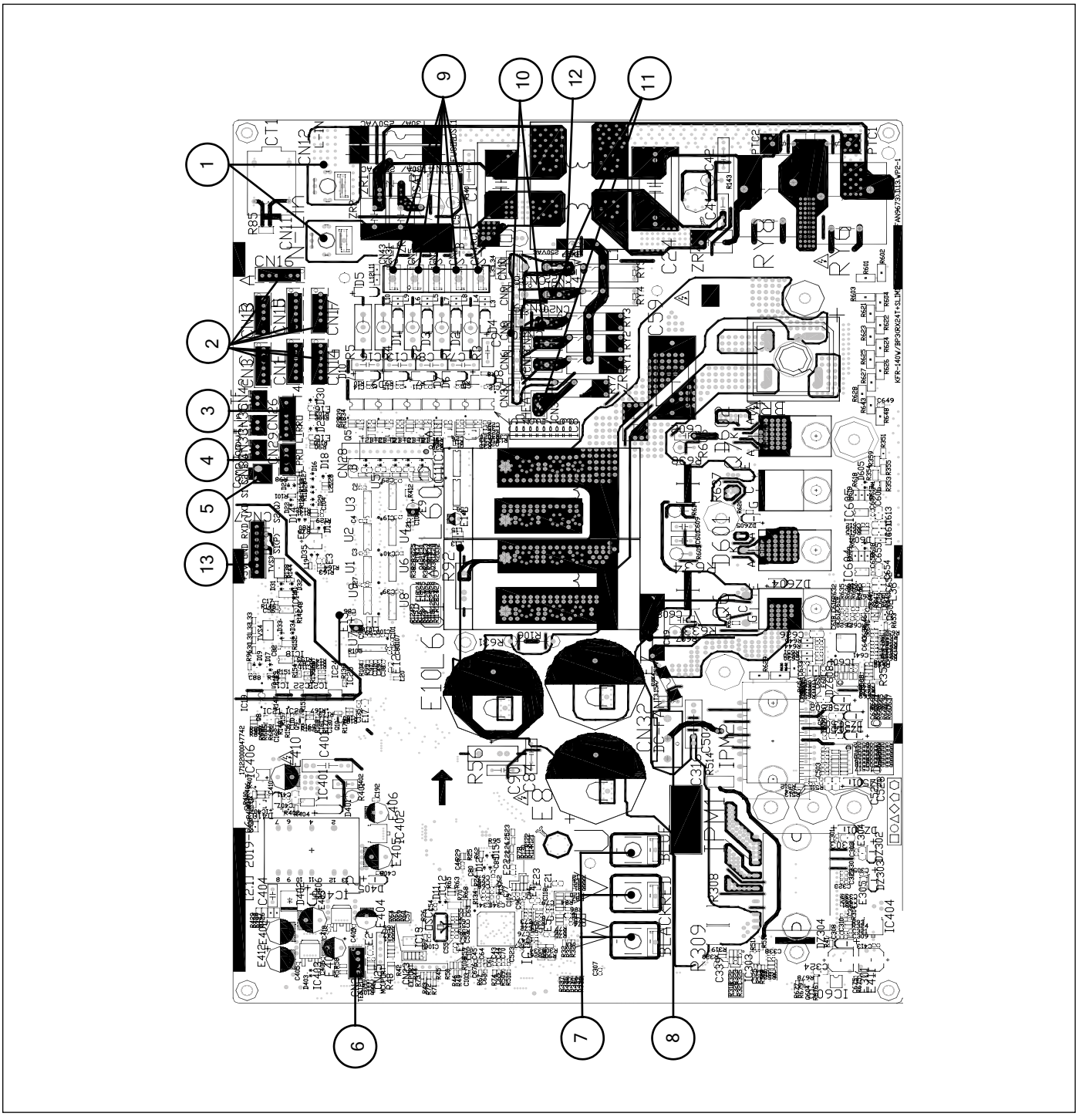


Figure 15

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: Max Performance Single Zone 24K

BMS500-AAS024-1CSXHB

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

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

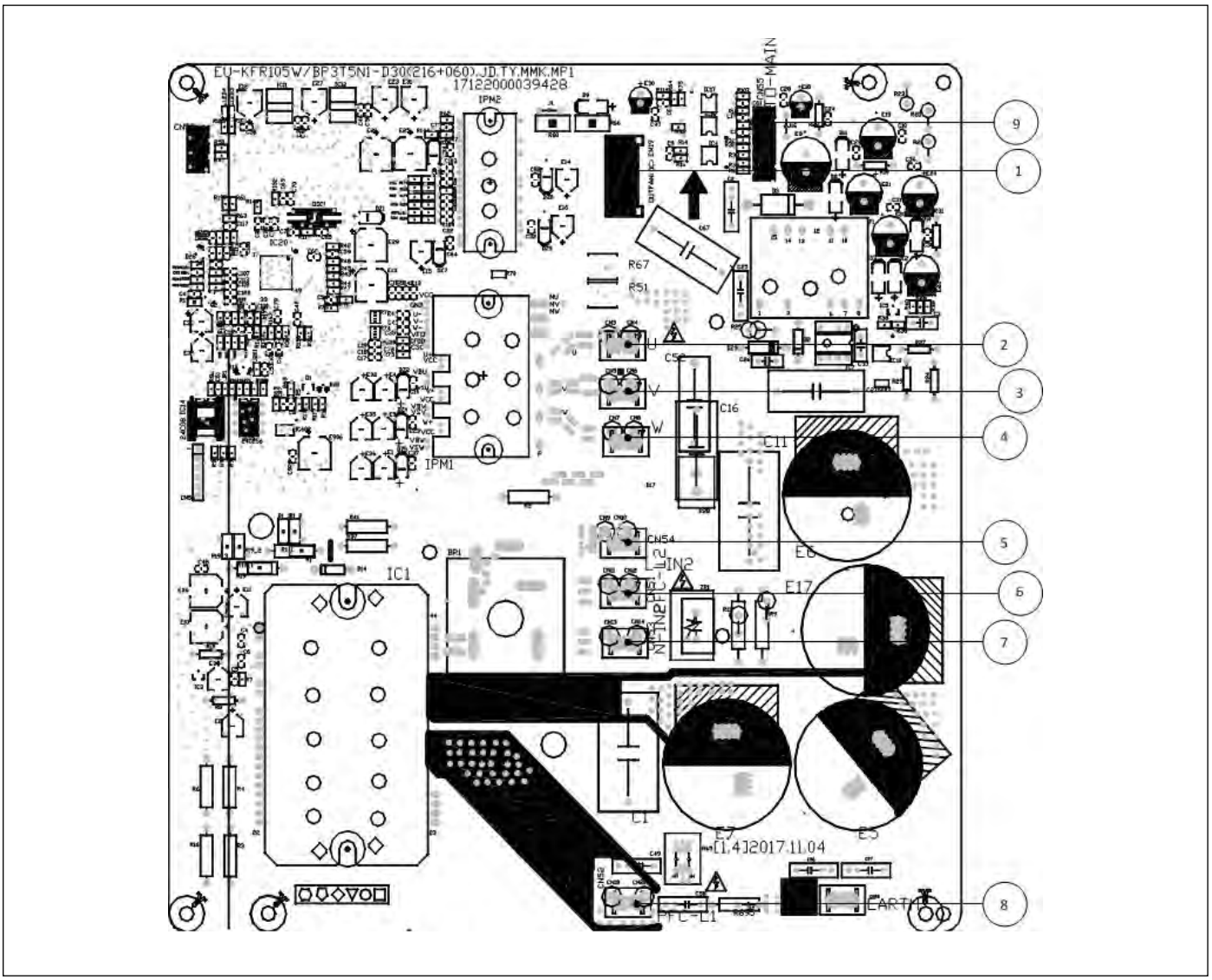


Figure 16

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

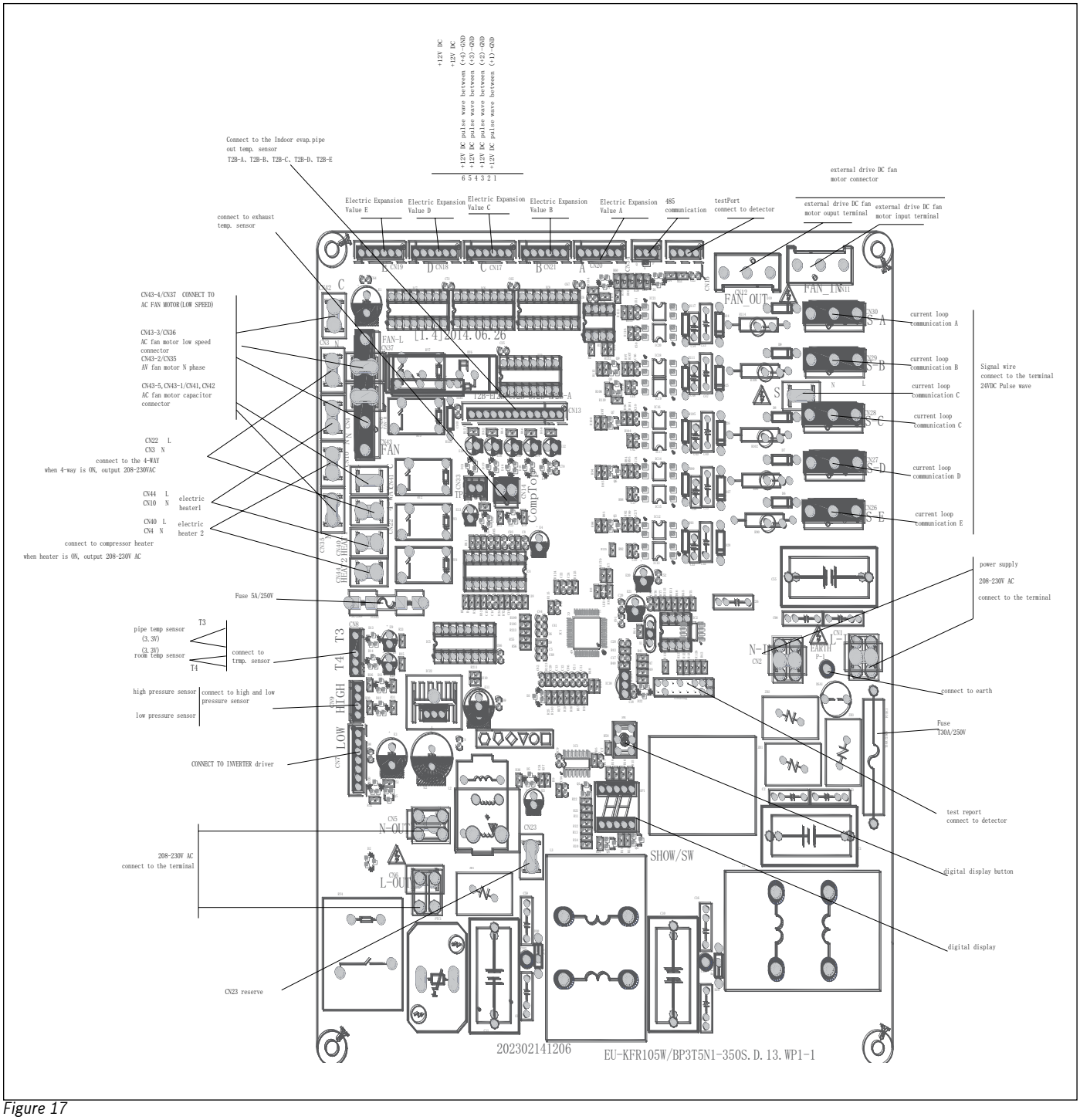


Figure 17

7.1.10 IPM: Light Commercial (for Cassette & Ducted IDU) 36K
BMS500-AAS030-1CSXRB, BMS500-AAS036-1CSXRB

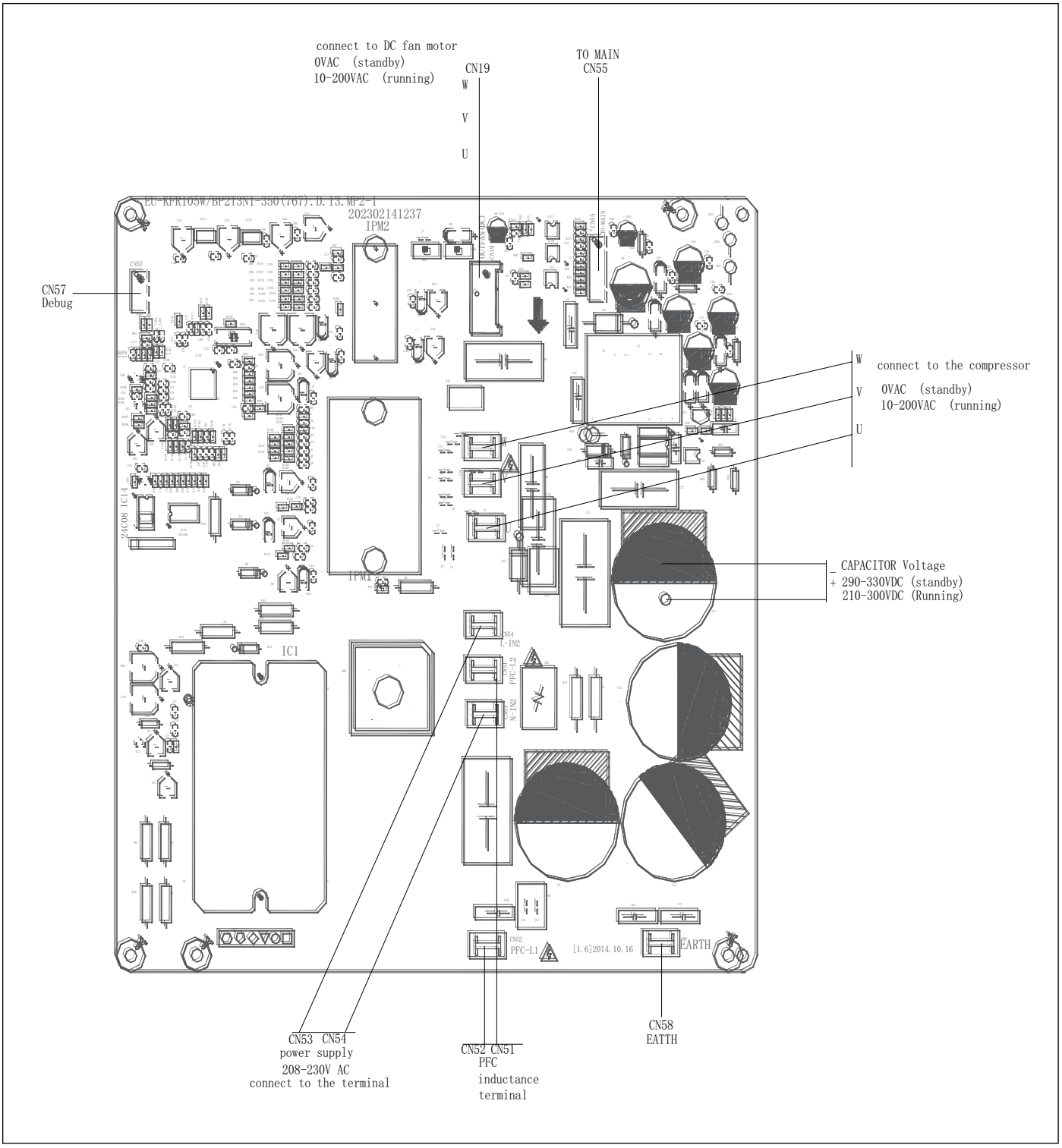


Figure 18

7.1.11 PCB: Light Commercial 48K & 60K

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

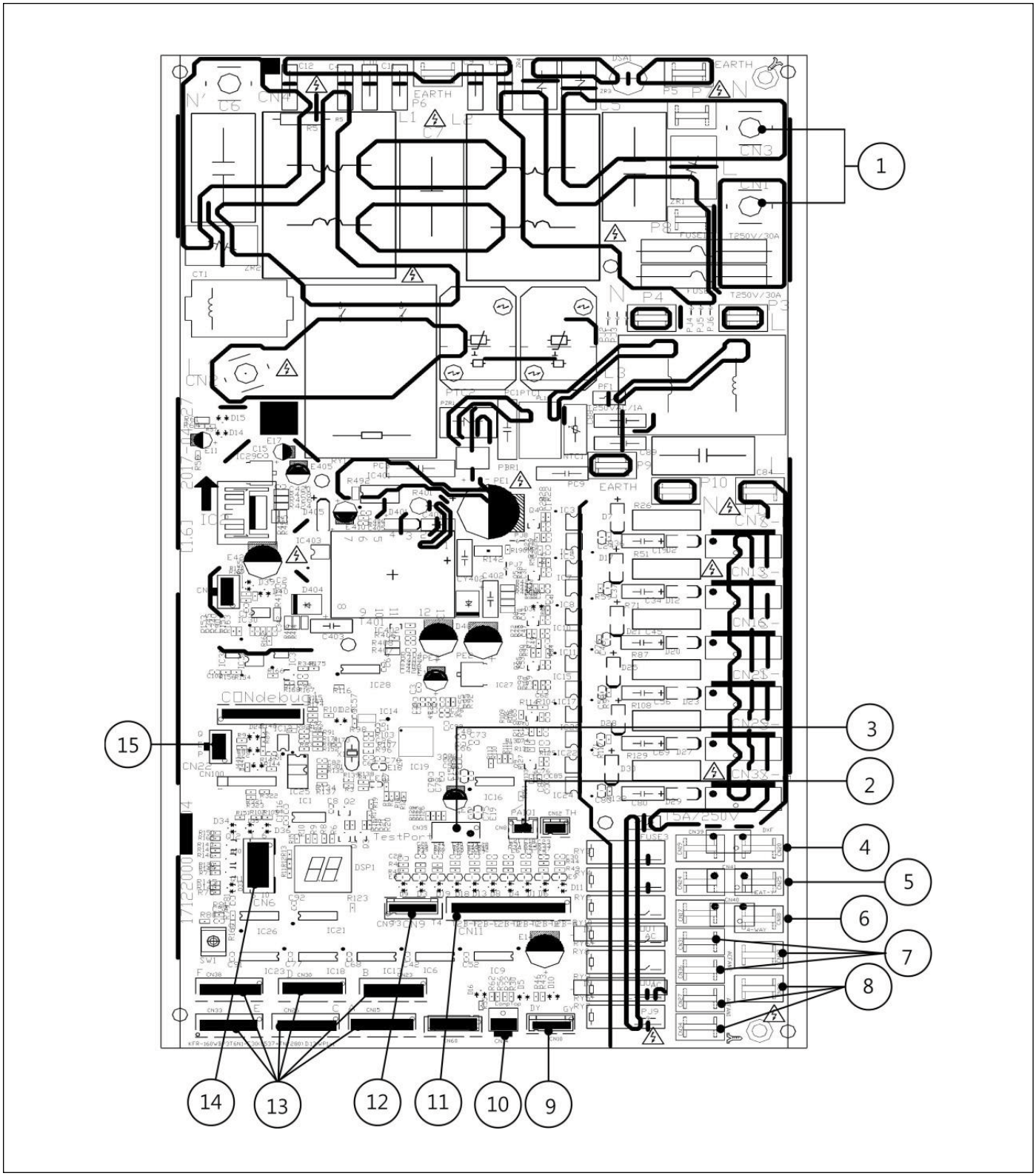


Figure 19

7.1.12 IPM: Light Commercial 48K & 60K
BMS500-AAS048-1CSXLB, BMS500-AAS060-1CSXLB

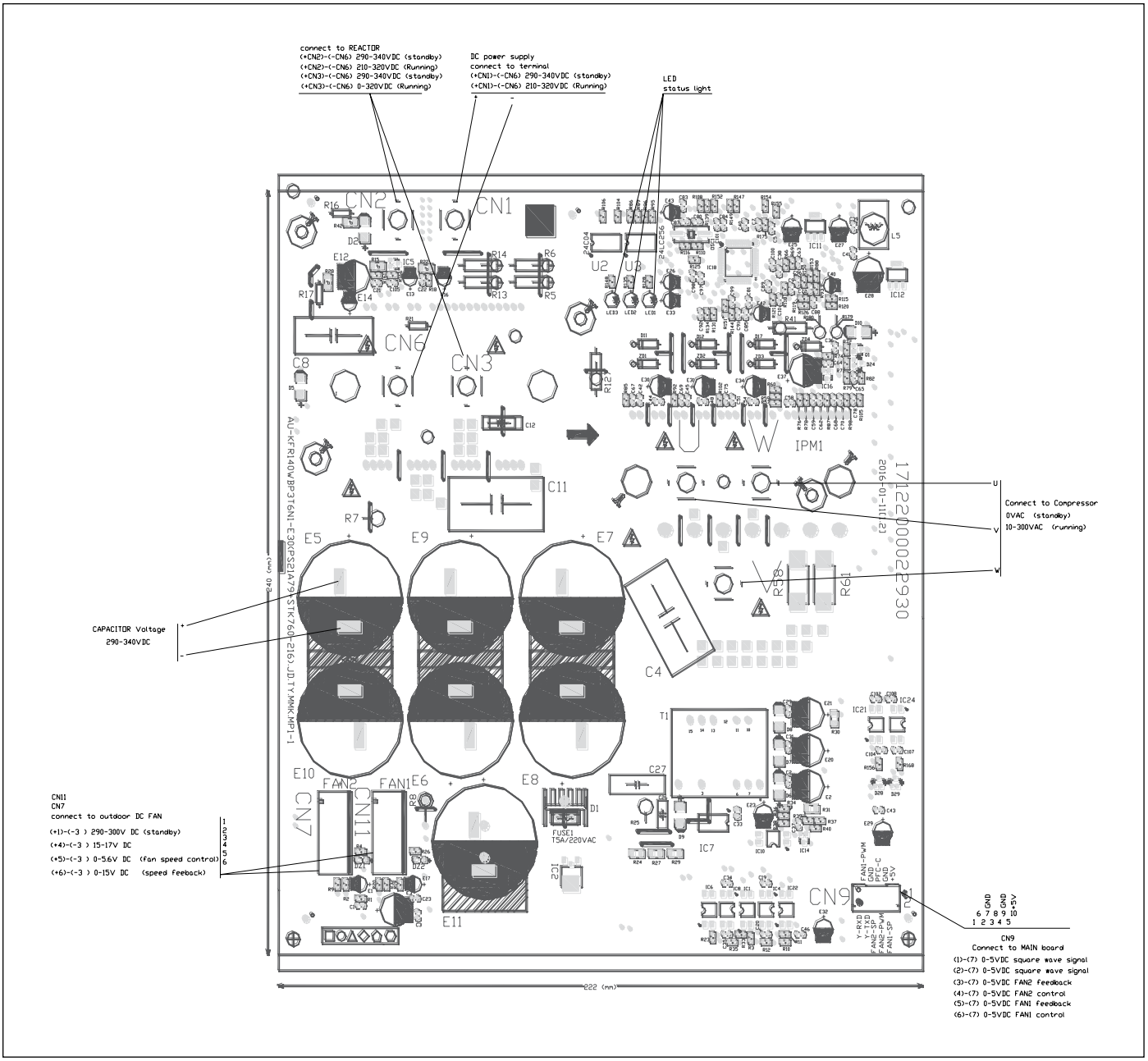


Figure 20

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

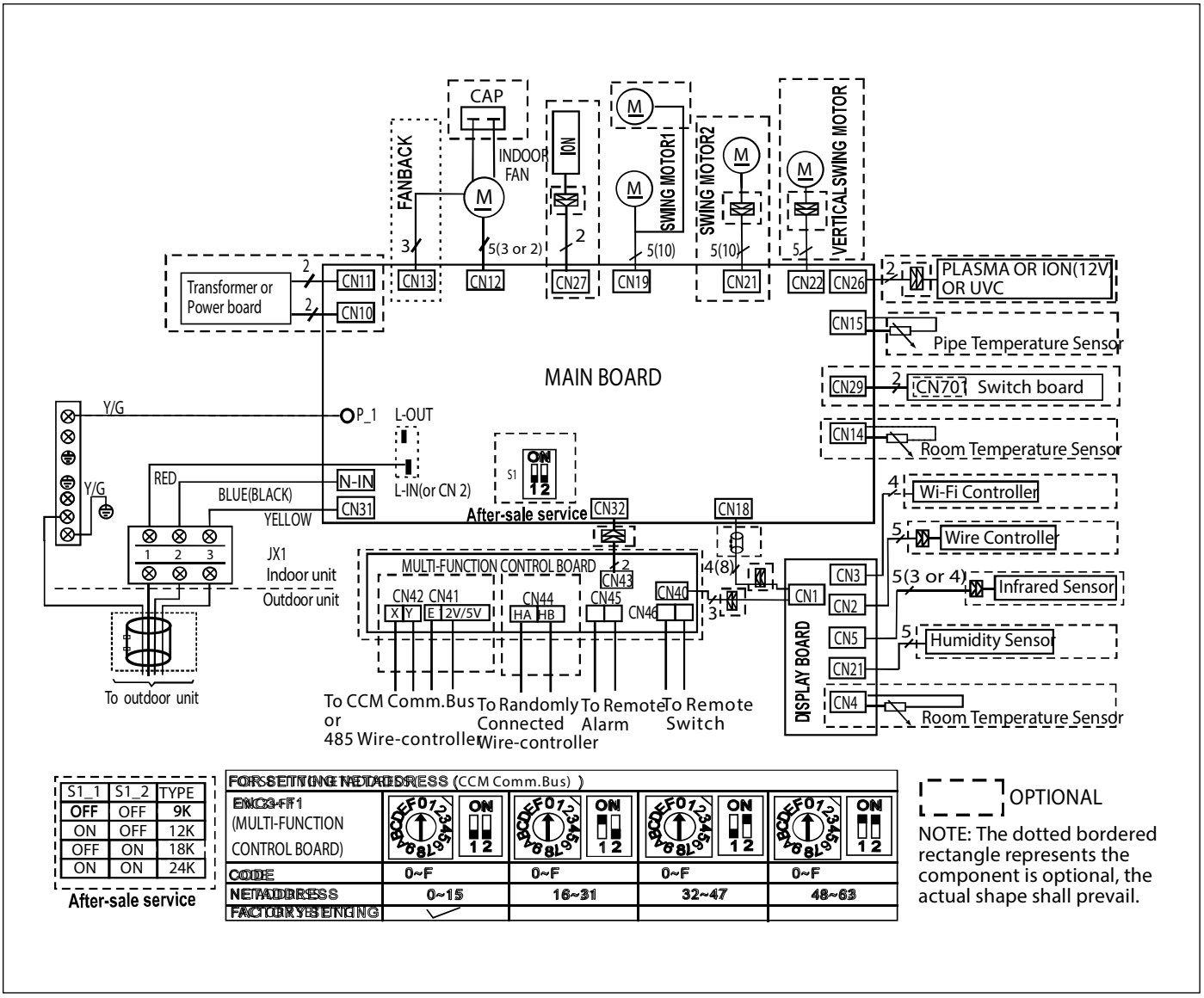


Figure 21

7.2.2 Indoor Wiring Diagram_4-Way Cassette Unit

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

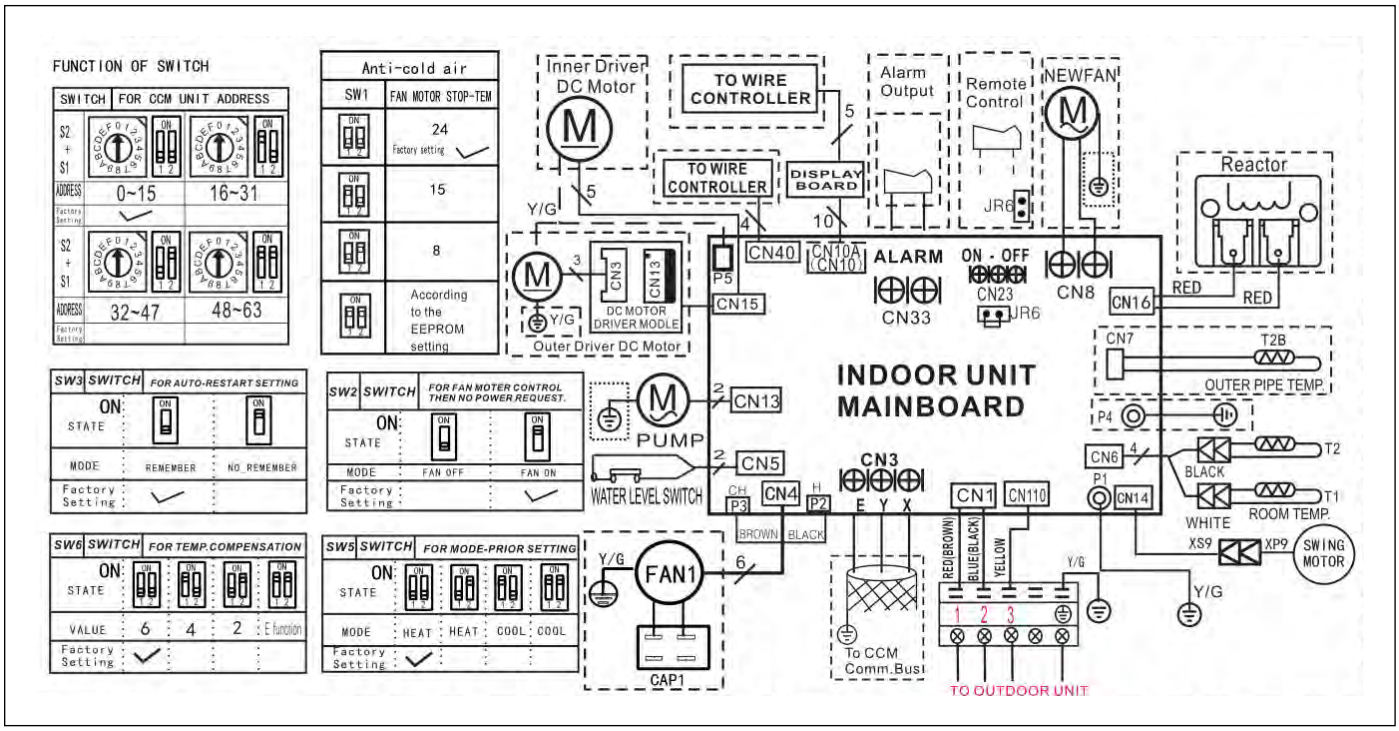


Figure 22

36K & 48K models

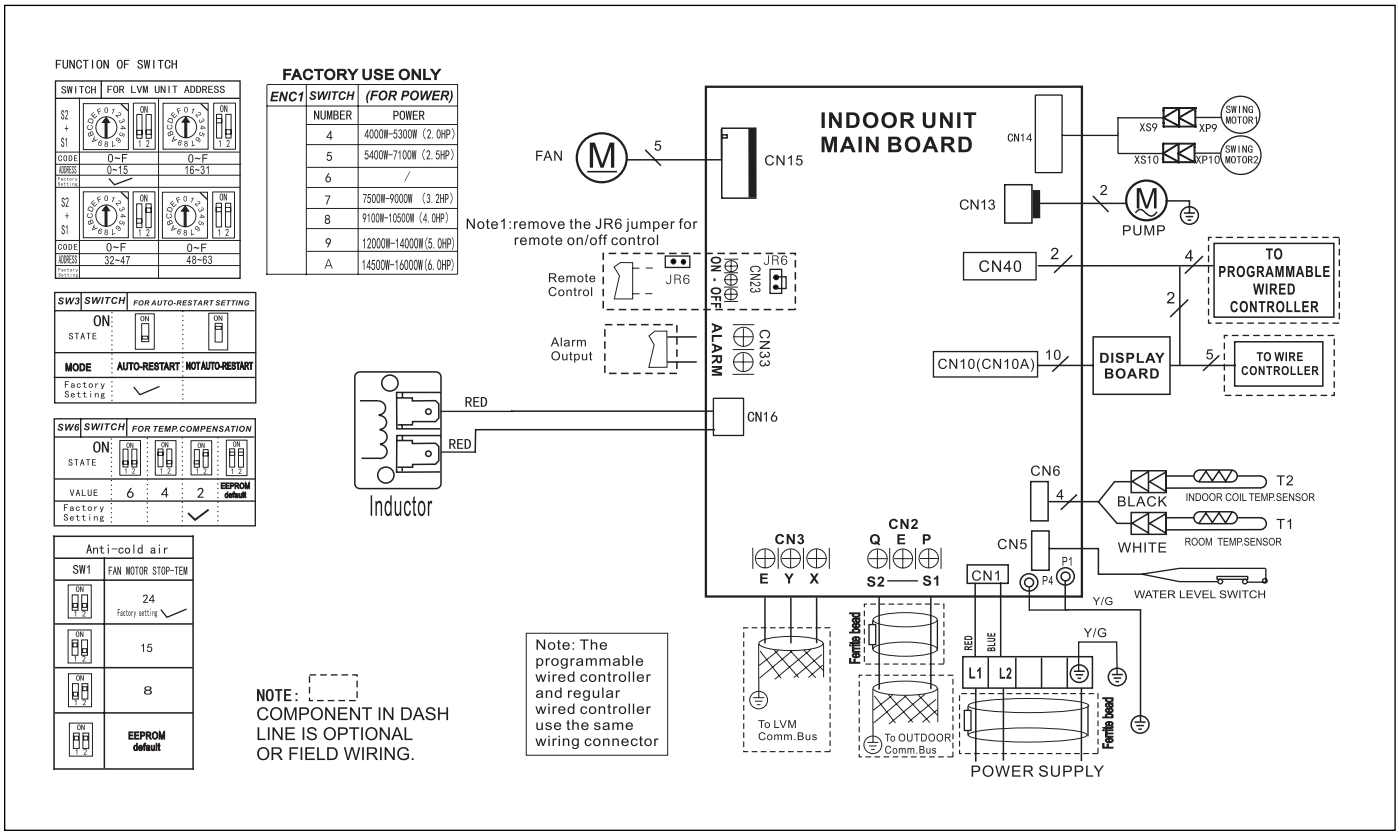


Figure 23

7.2.3 Indoor Wiring Diagram_4-Ducted Unit

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

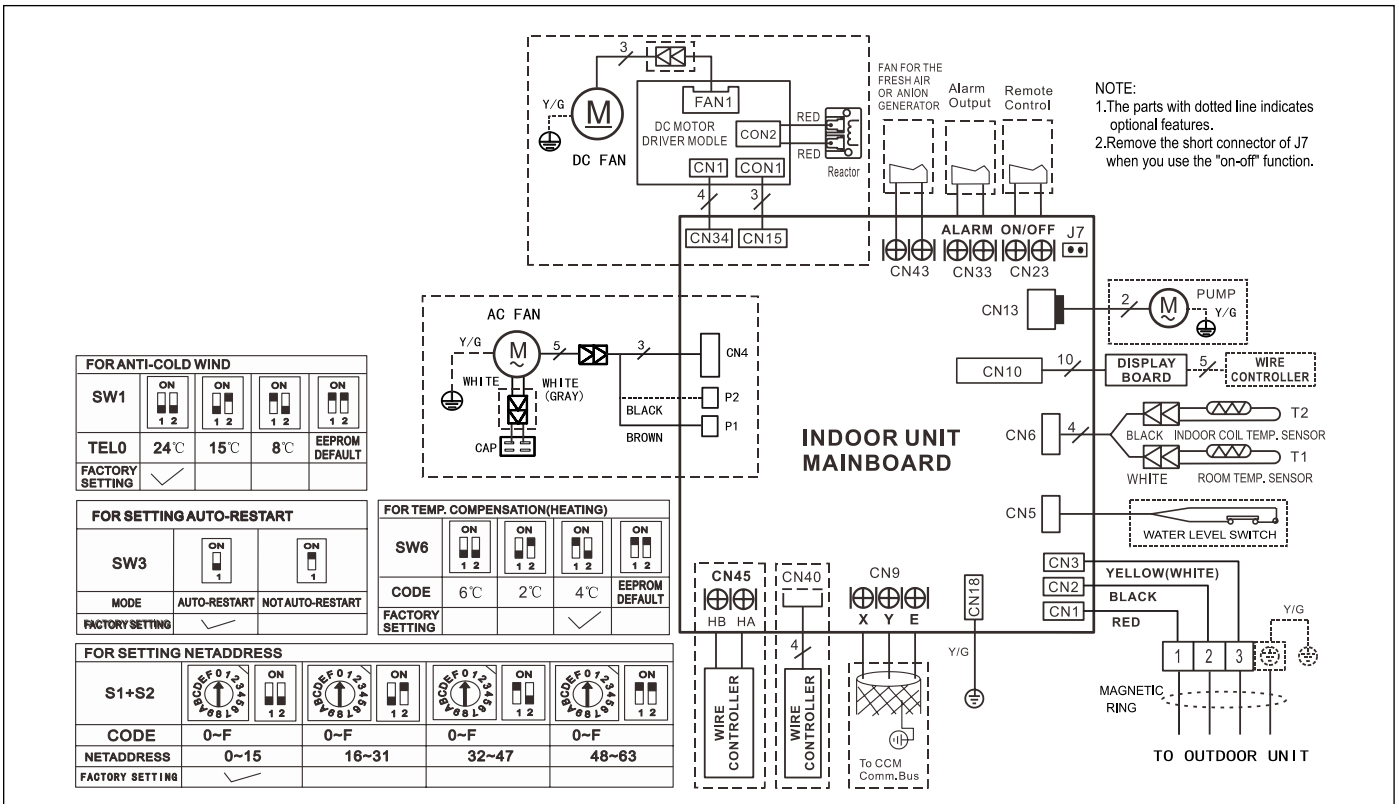


Figure 24

36K & 48K models

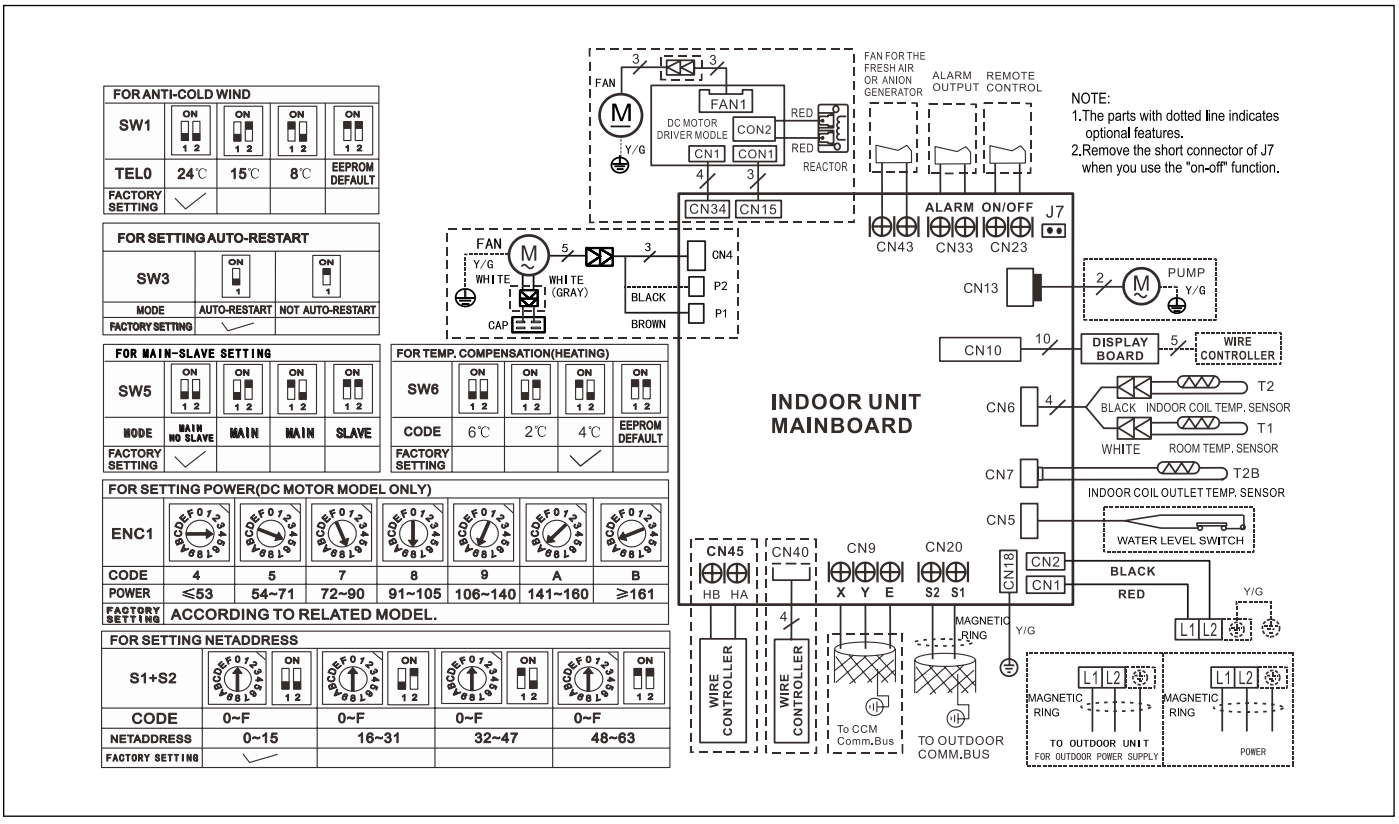


Figure 25

7.4 Outdoor Wiring Diagram

7.4.1 Regular Single Zone (9K & 12K)

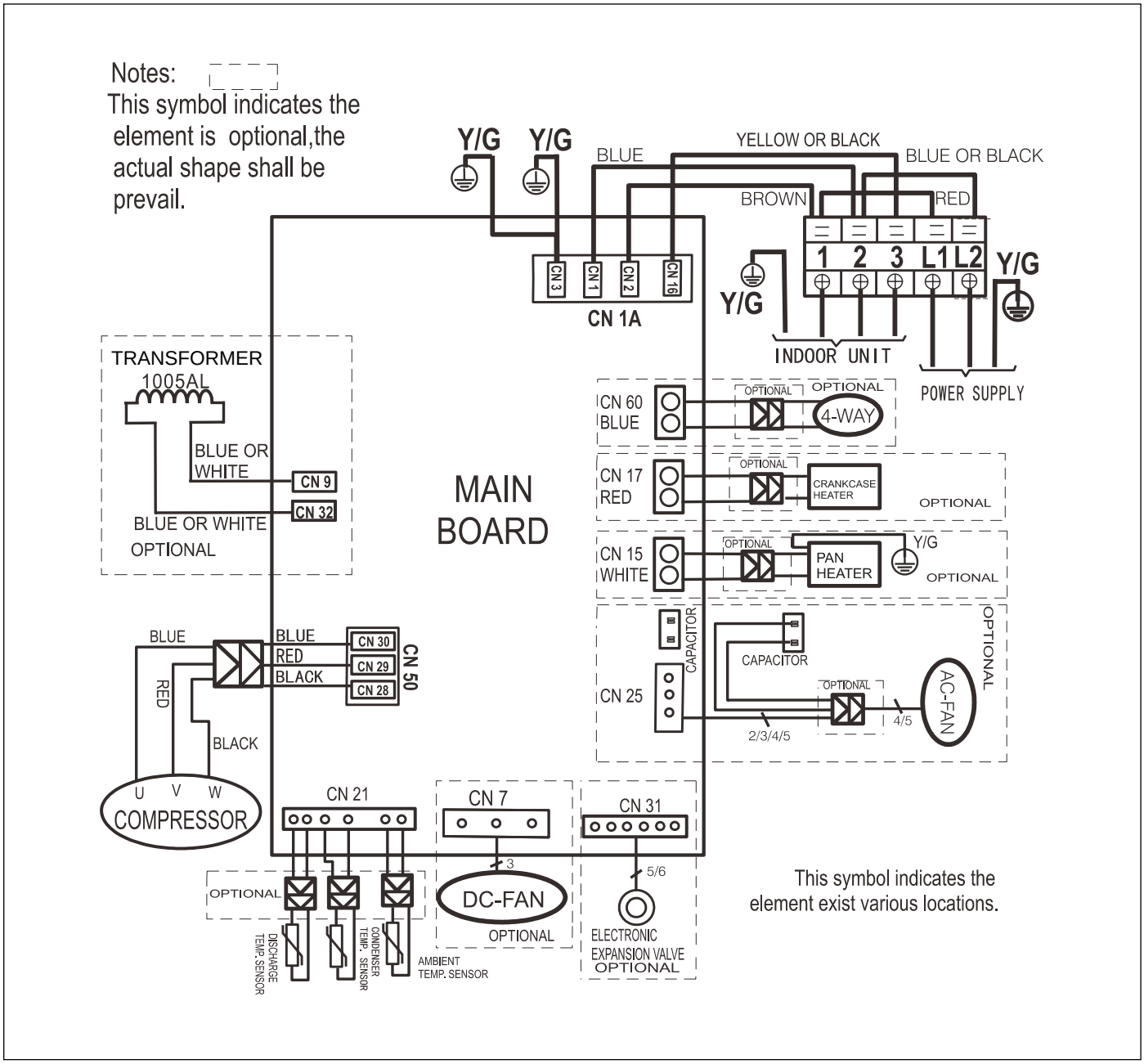


Figure 26

7.4.2 Regular Single Zone (18K & 24K) & Max Performance Single Zone (9K, 12K & 18K)

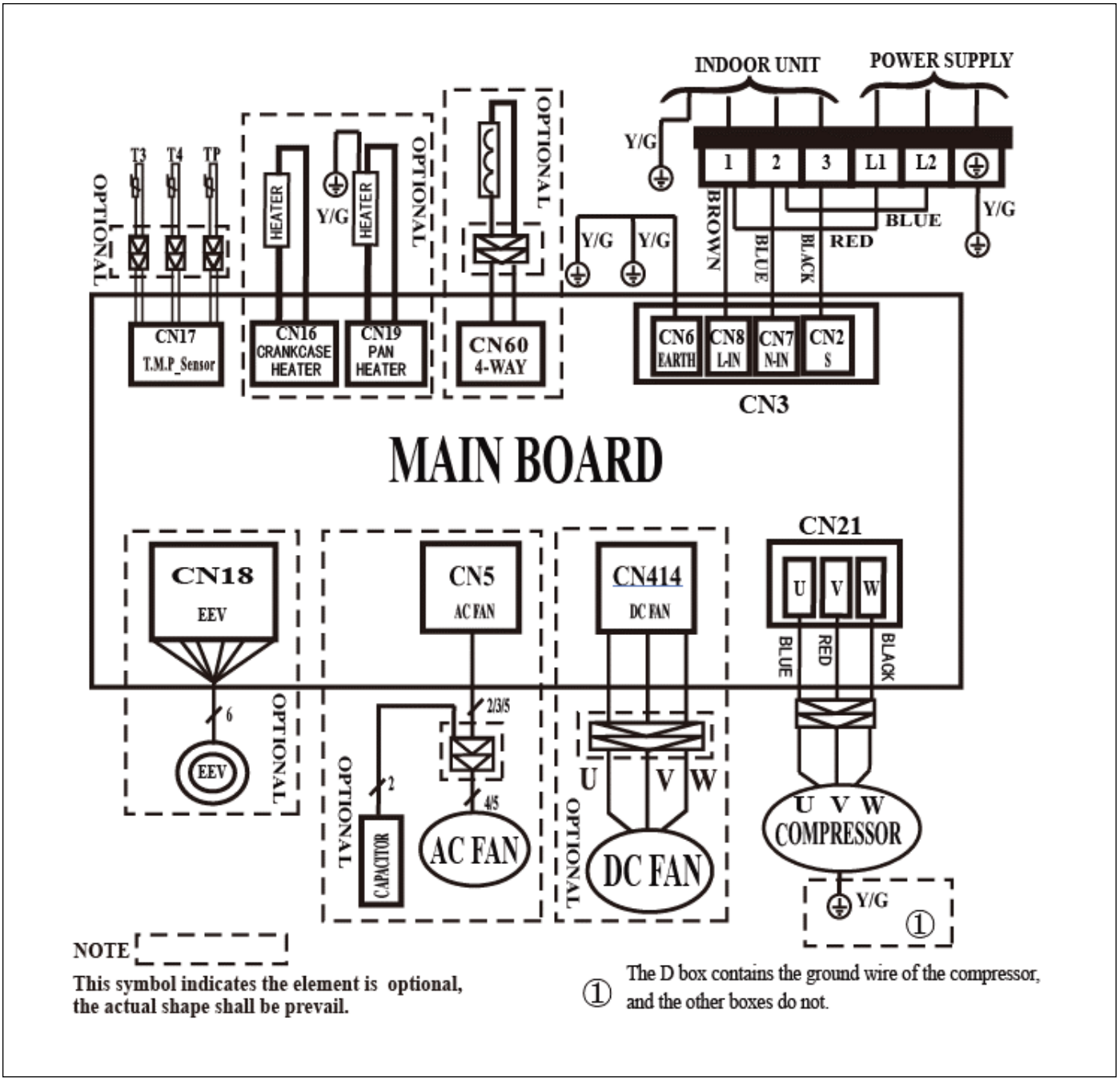
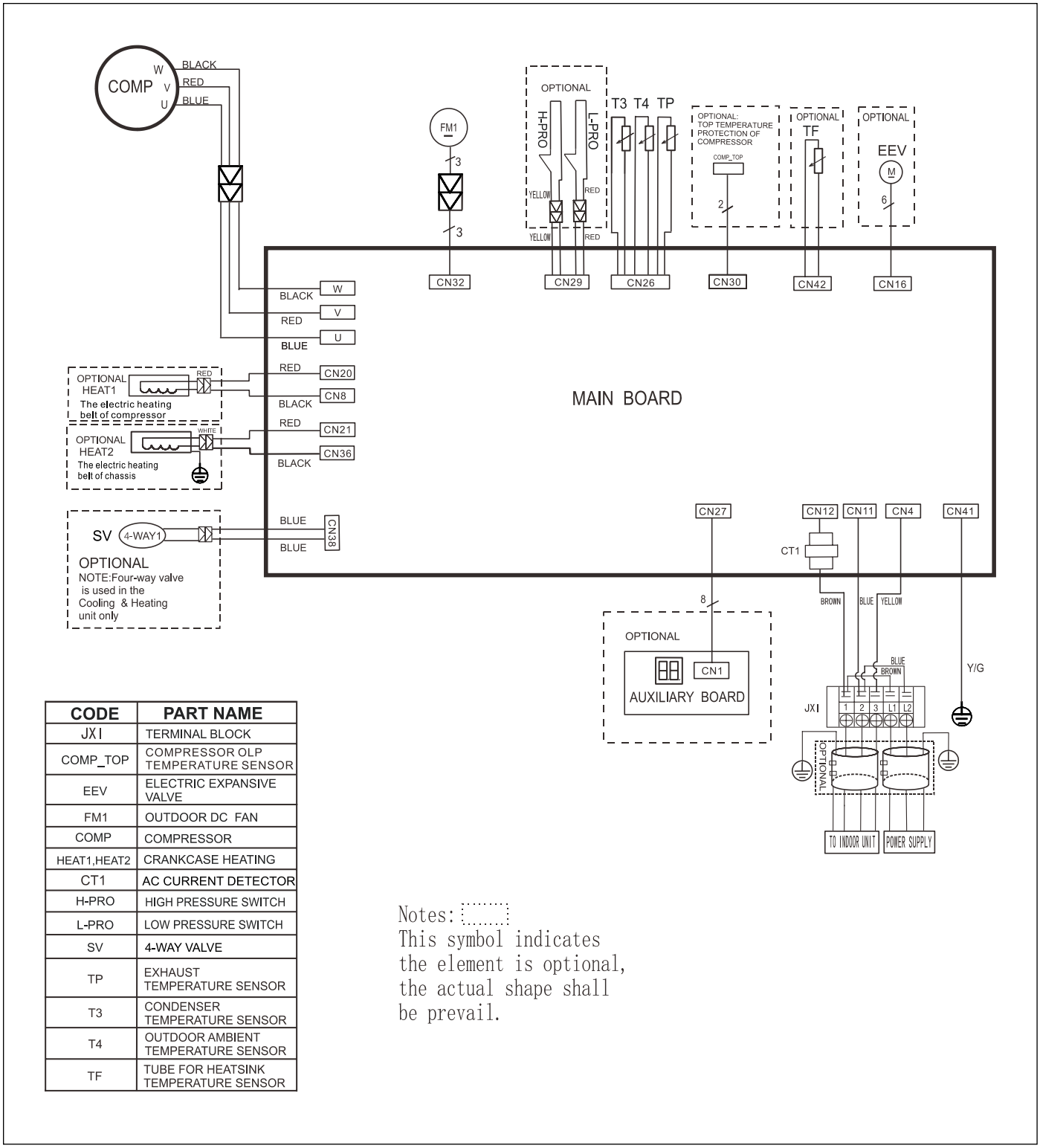


Figure 27

7.4.3 Max Performance Single Zone (24K)
Light Commercial Single Zone (30K & 36K for Wall Mounted IDU)

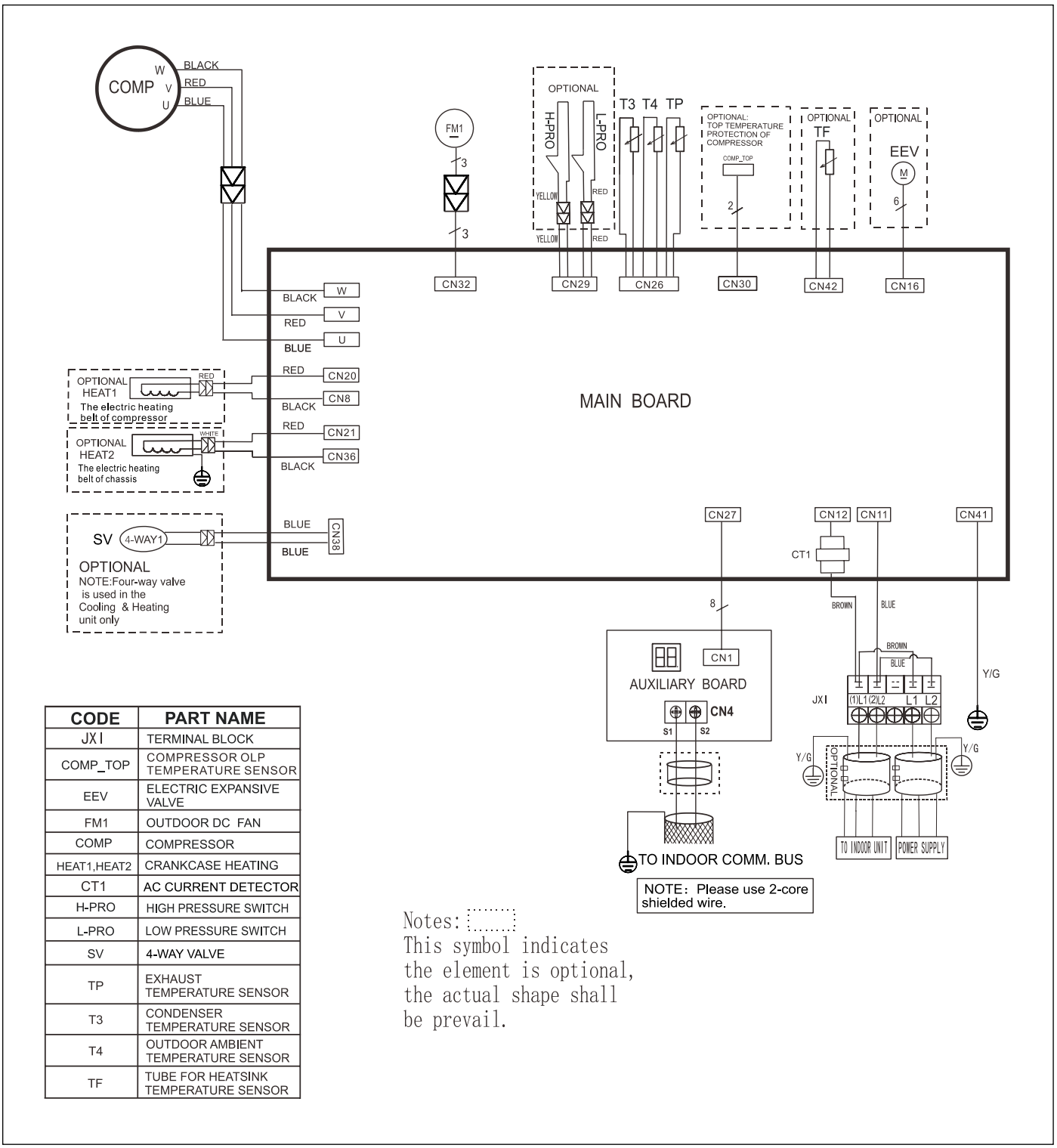


CODE	PART NAME
JXI	TERMINAL BLOCK
COMP_TOP	COMPRESSOR OLP TEMPERATURE SENSOR
EEV	ELECTRIC EXPANSIVE VALVE
FM1	OUTDOOR DC FAN
COMP	COMPRESSOR
HEAT1,HEAT2	CRANKCASE HEATING
CT1	AC CURRENT DETECTOR
H-PRO	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TF	TUBE FOR HEATSINK TEMPERATURE SENSOR

Notes:
This symbol indicates the element is optional, the actual shape shall be prevail.

Figure 28

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

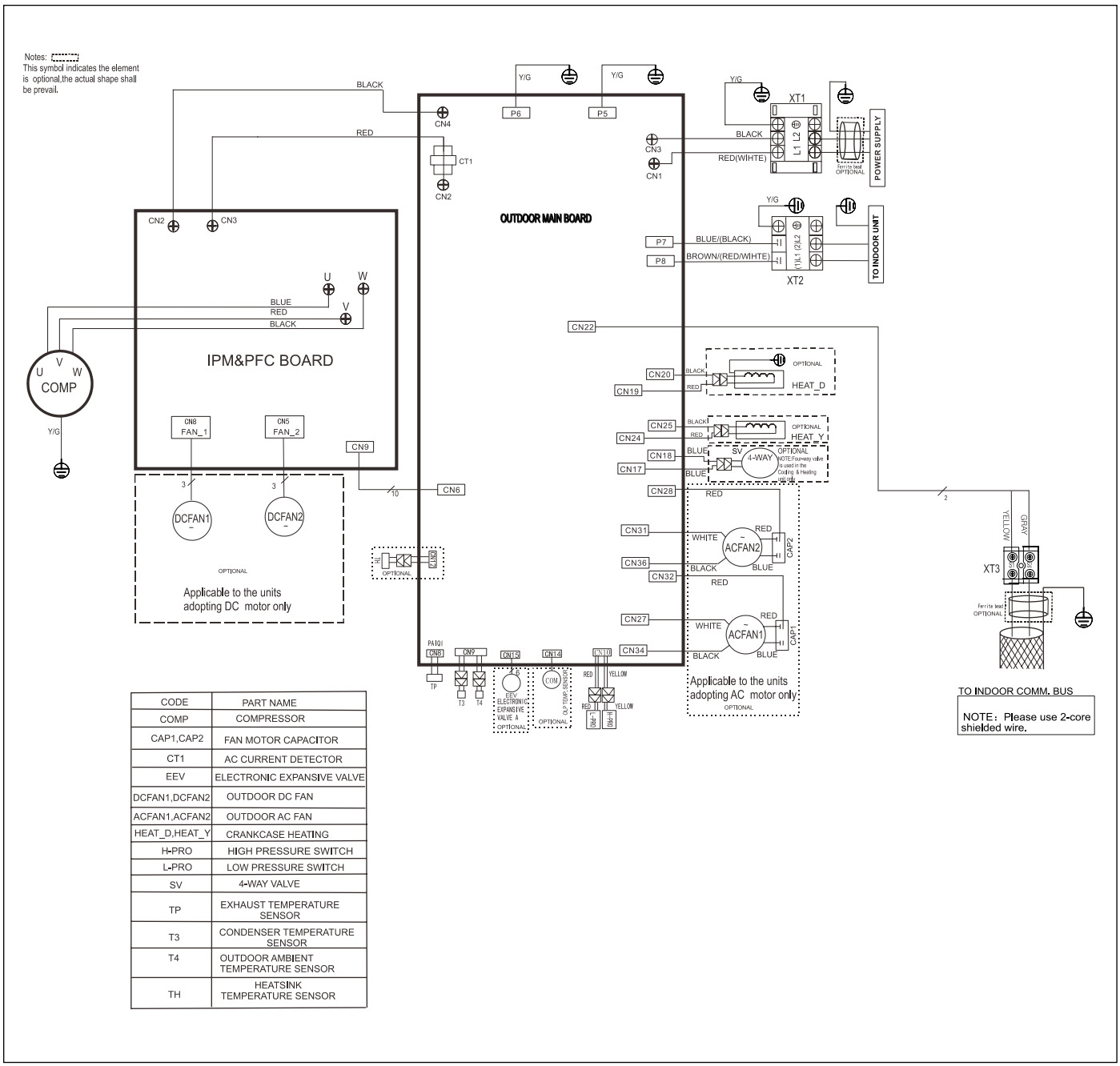


CODE	PART NAME
JX1	TERMINAL BLOCK
COMP_TOP	COMPRESSOR OLP TEMPERATURE SENSOR
EEV	ELECTRIC EXPANSIVE VALVE
FM1	OUTDOOR DC FAN
COMP	COMPRESSOR
HEAT1,HEAT2	CRANKCASE HEATING
CT1	AC CURRENT DETECTOR
H-PRO	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TF	TUBE FOR HEATSINK TEMPERATURE SENSOR

Notes:
This symbol indicates the element is optional, the actual shape shall be prevail.

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
EEV	ELECTRONIC EXPANSIVE VALVE
DCFAN1,DCFAN2	OUTDOOR DC FAN
ACFAN1,ACFAN2	OUTDOOR AC FAN
HEAT_D,HEAT_Y	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
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 ▶ PCB faulty

Table 22

Troubleshooting:

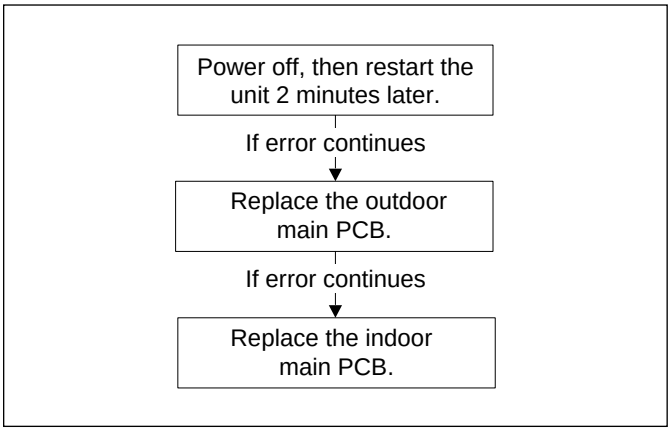


Figure 31

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.

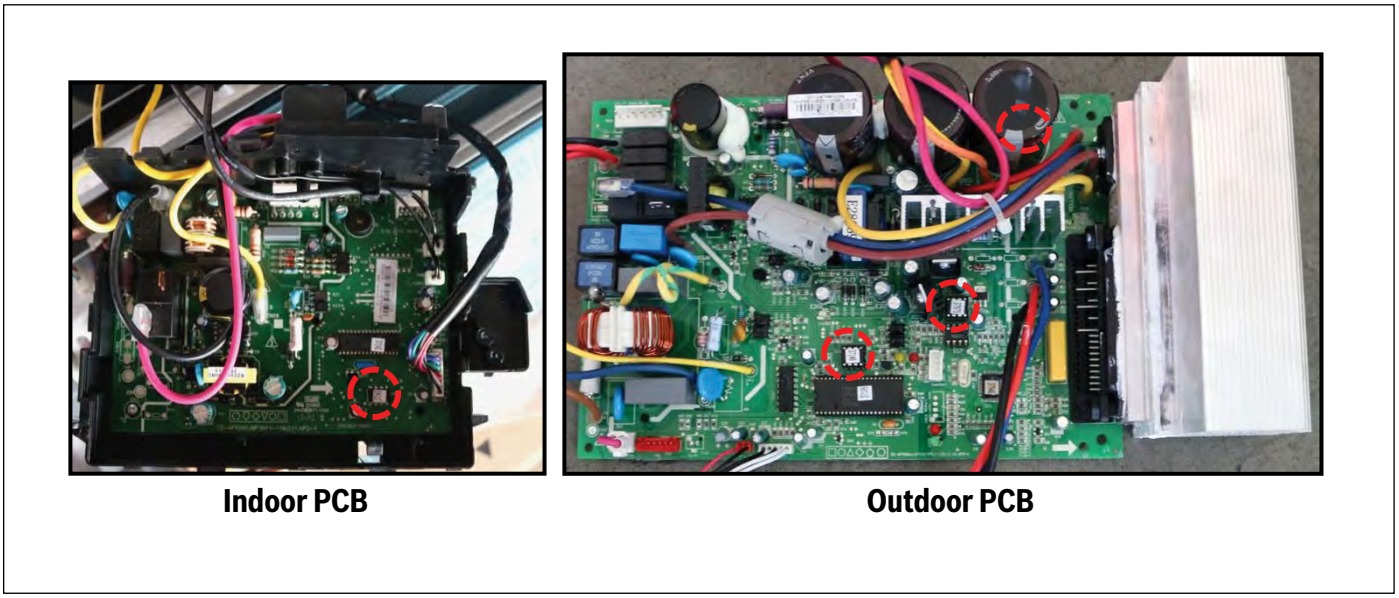


Figure 32

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 ▶ Electromagnetic interference ▶ Indoor or outdoor PCB faulty

Table 23

Troubleshooting:

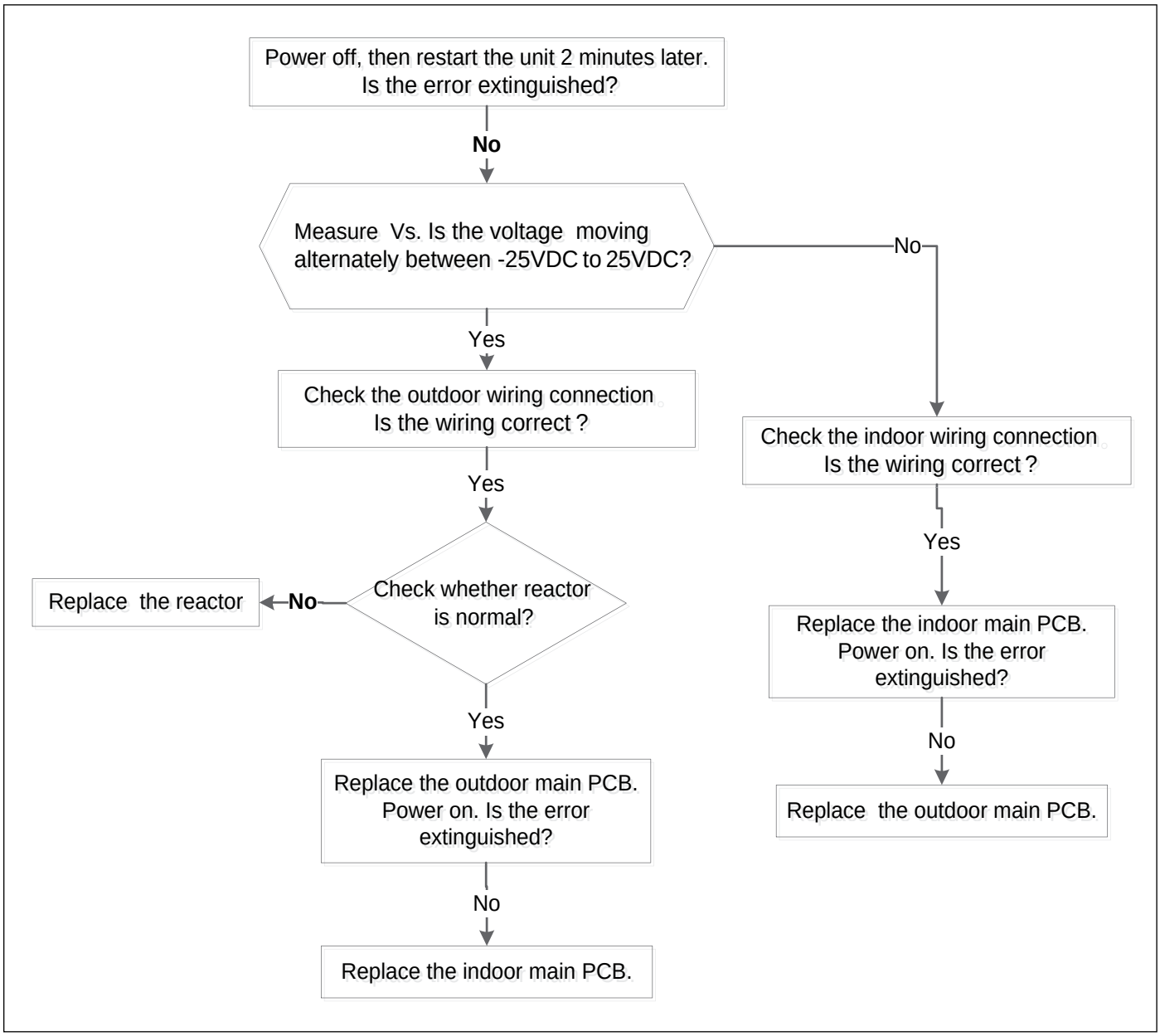


Figure 33

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.

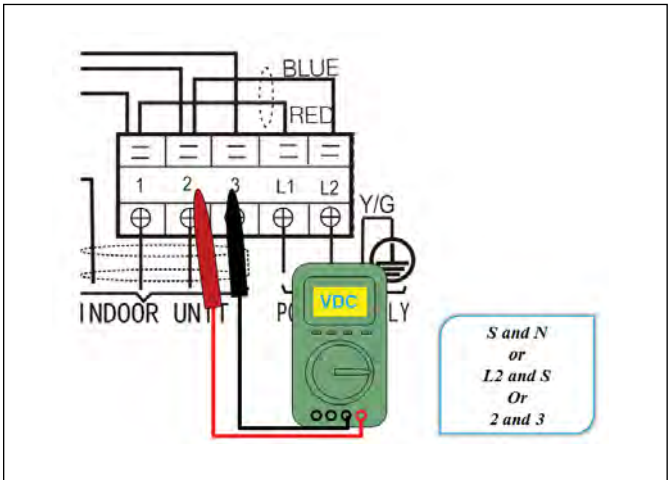


Figure 34

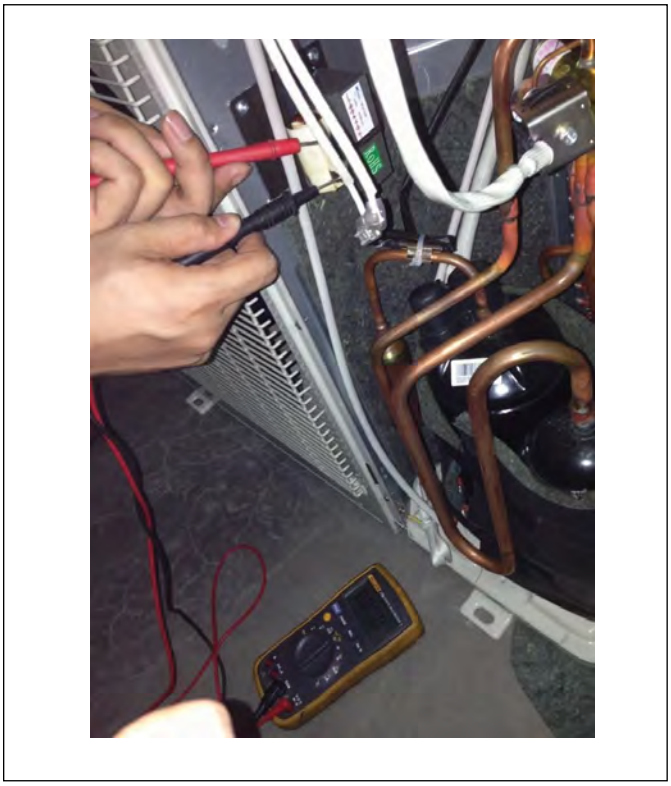


Figure 35

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 ▶ Electromagnetic interference ▶ Indoor or outdoor PCB faulty

Figure 36

Troubleshooting:

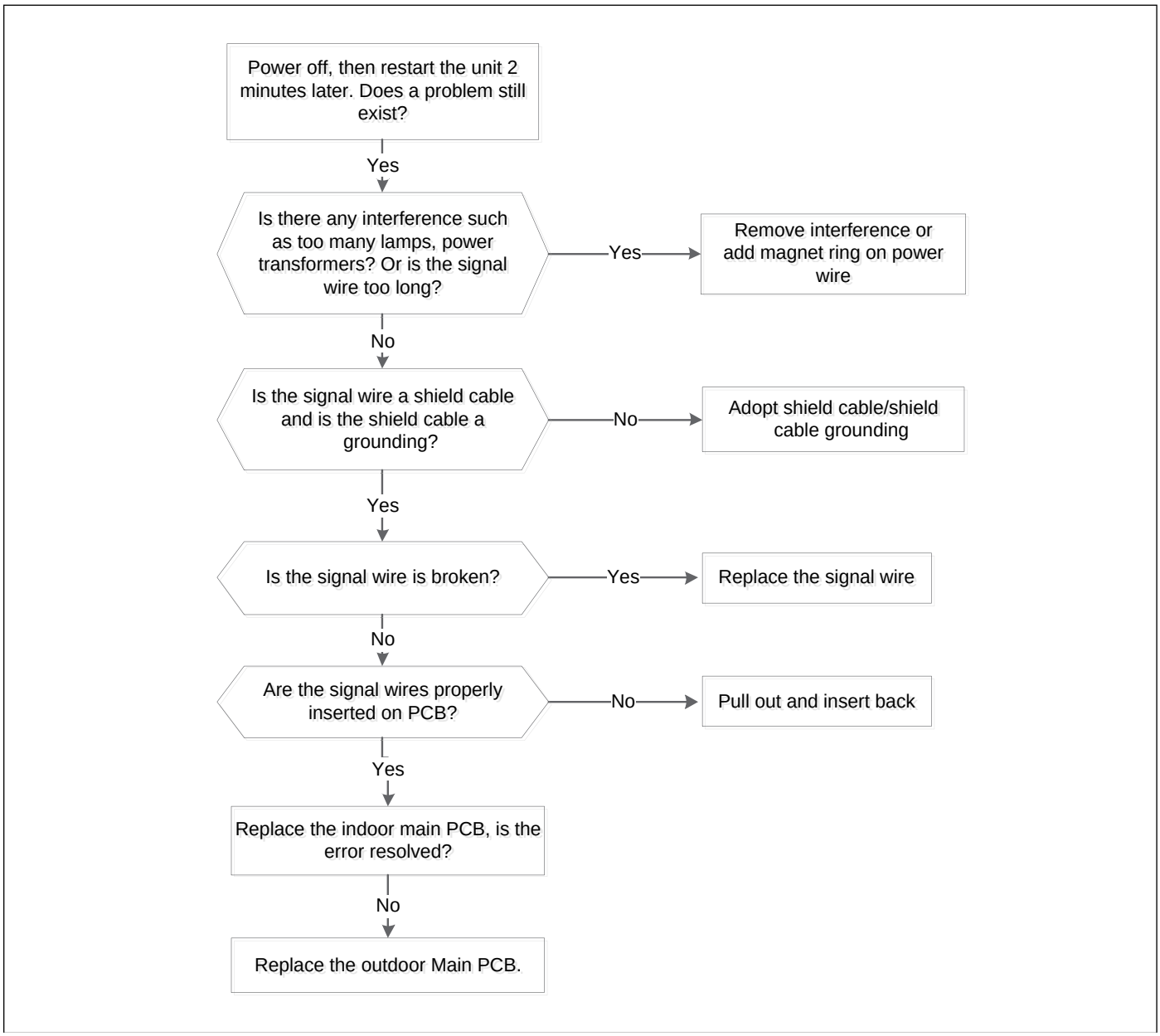


Figure 37

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 ► Indoor PCB faulty

Table 24

Troubleshooting:

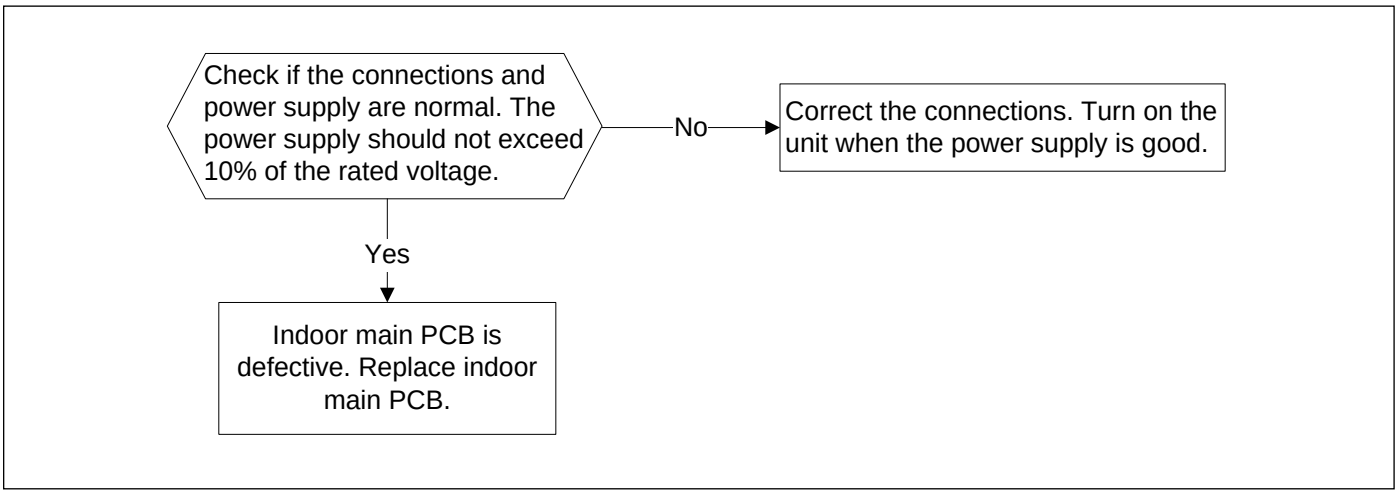


Figure 38

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 ▶ Indoor / Outdoor Fan assembly faulty ▶ Indoor / Outdoor Fan motor faulty ▶ Indoor / Outdoor PCB faulty

Table 25

Troubleshooting:

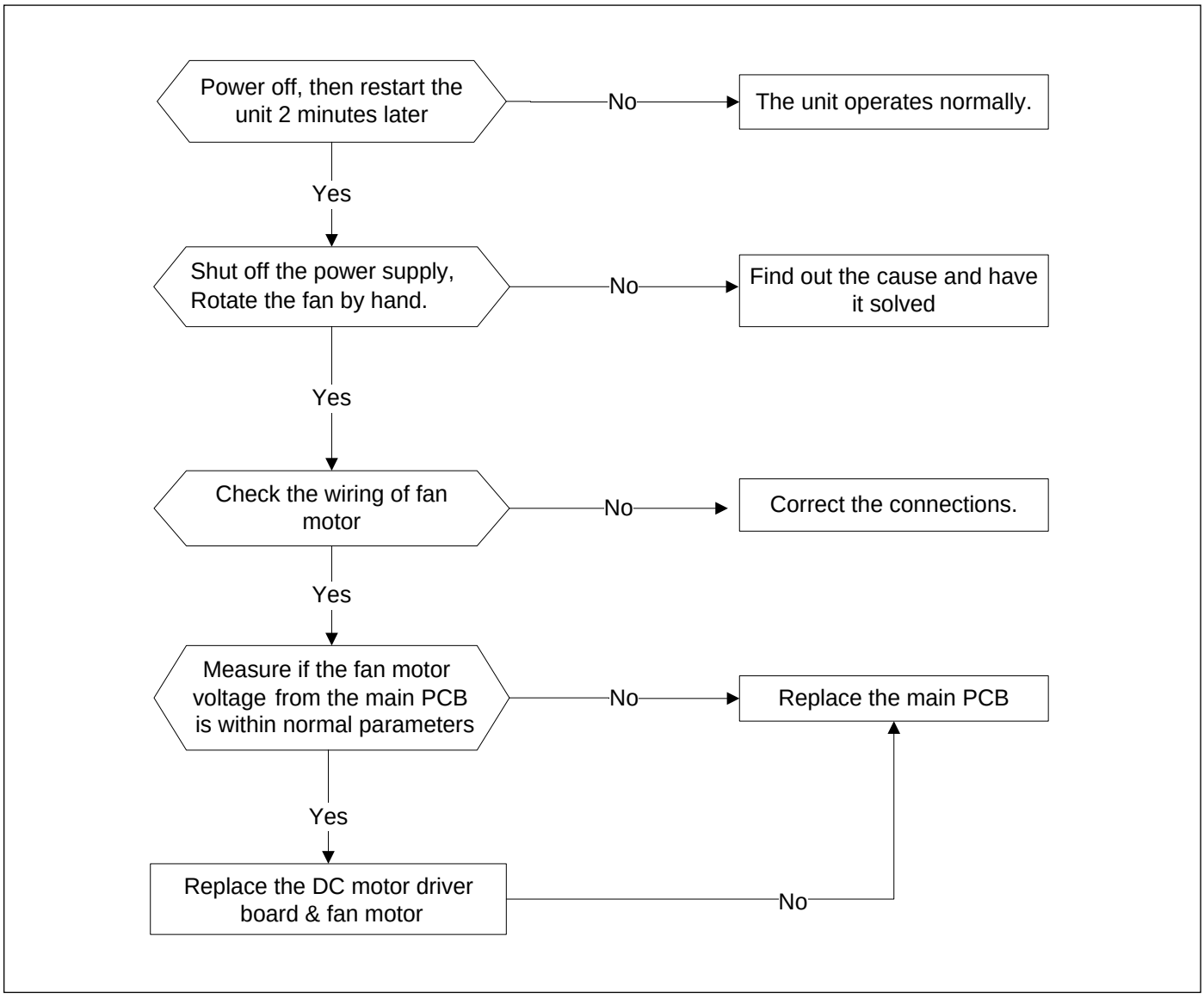


Figure 39

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.

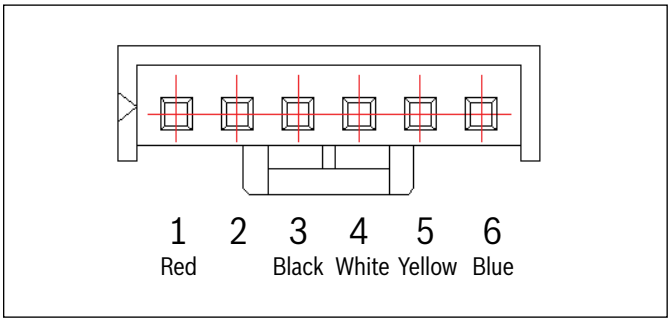


Figure 40

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.

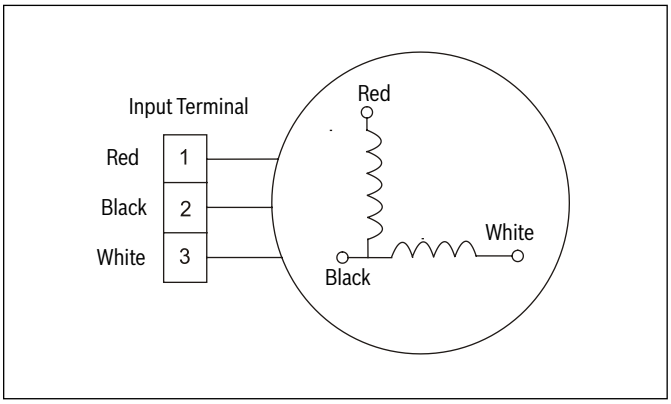


Figure 41

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 ▶ Sensor faulty ▶ Indoor / Outdoor PCB faulty

Table 28

Troubleshooting:

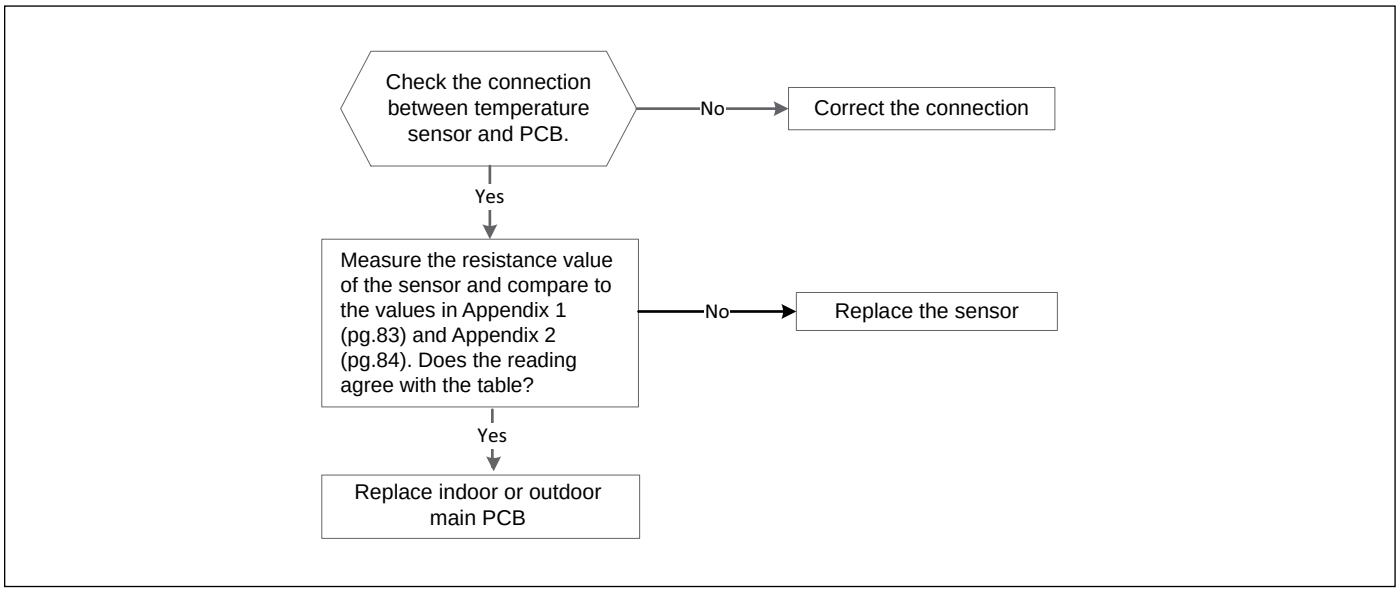


Figure 42

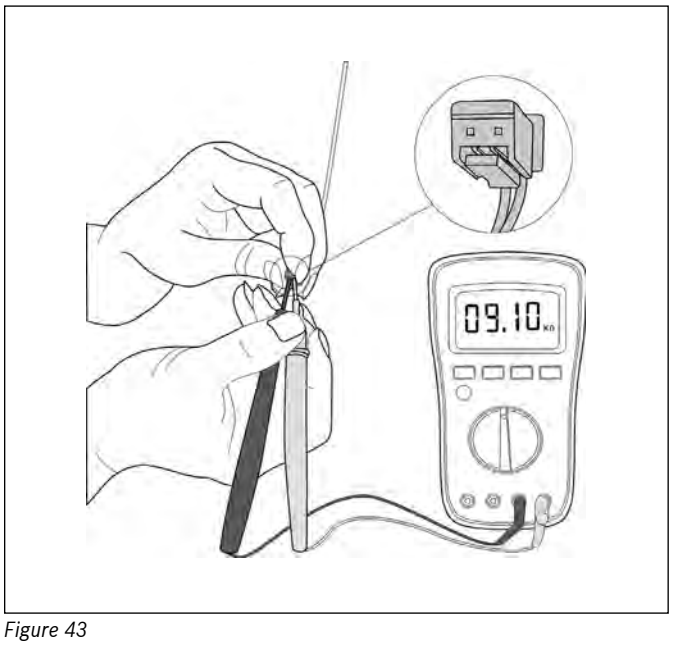


Figure 43

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. 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 ► Indoor PCB faulty ► System problems, such as leakage or blocking

Table 29

Troubleshooting:

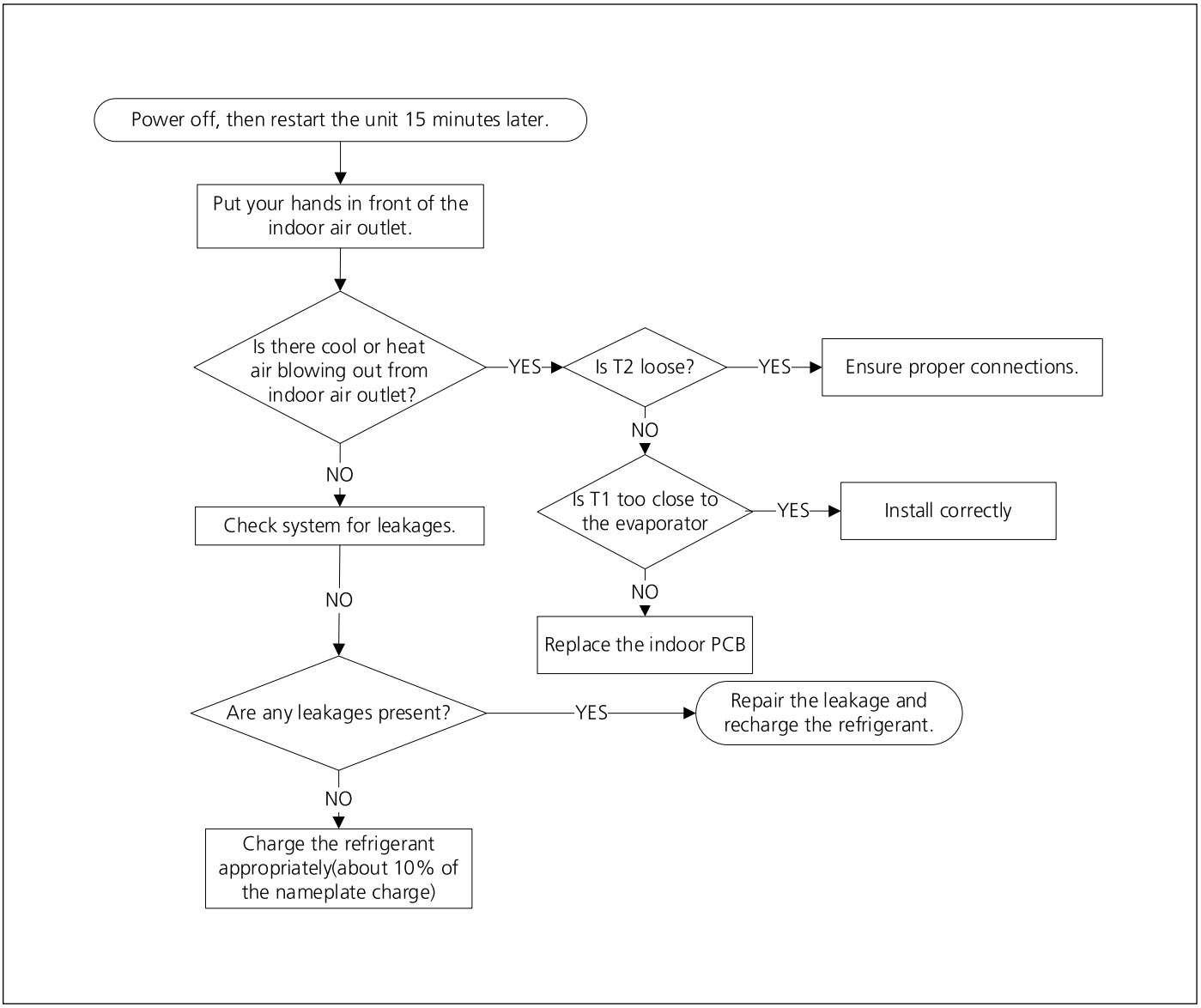


Figure 44

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 ▶ Faulty water-level switch ▶ Faulty condensate pump ▶ Indoor PCB faulty

Table 30

Troubleshooting:

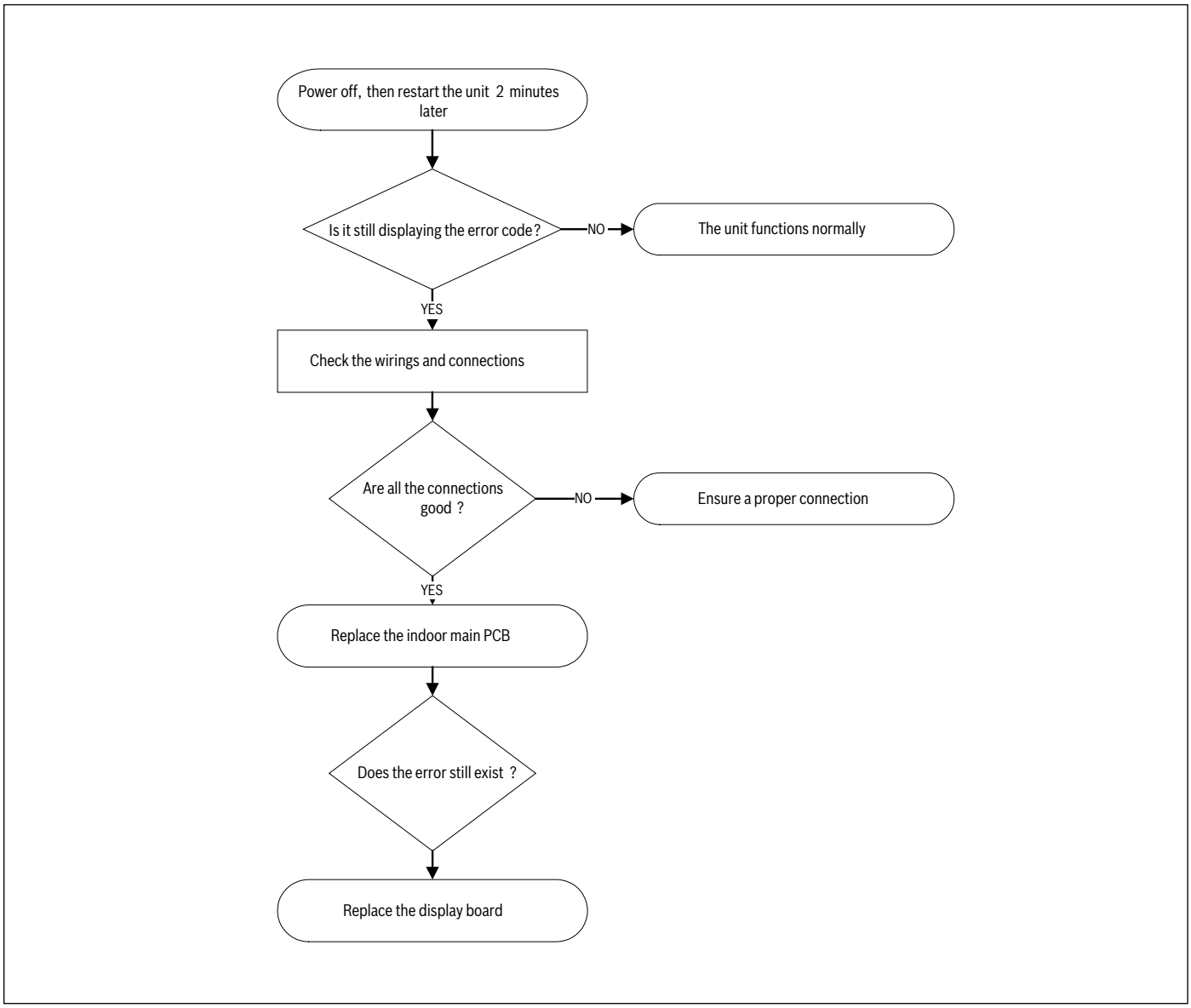


Figure 45

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 ► System blockage ► Outdoor PCB faulty ► Wiring mistake ► Compressor malfunction

Table 31

Troubleshooting:

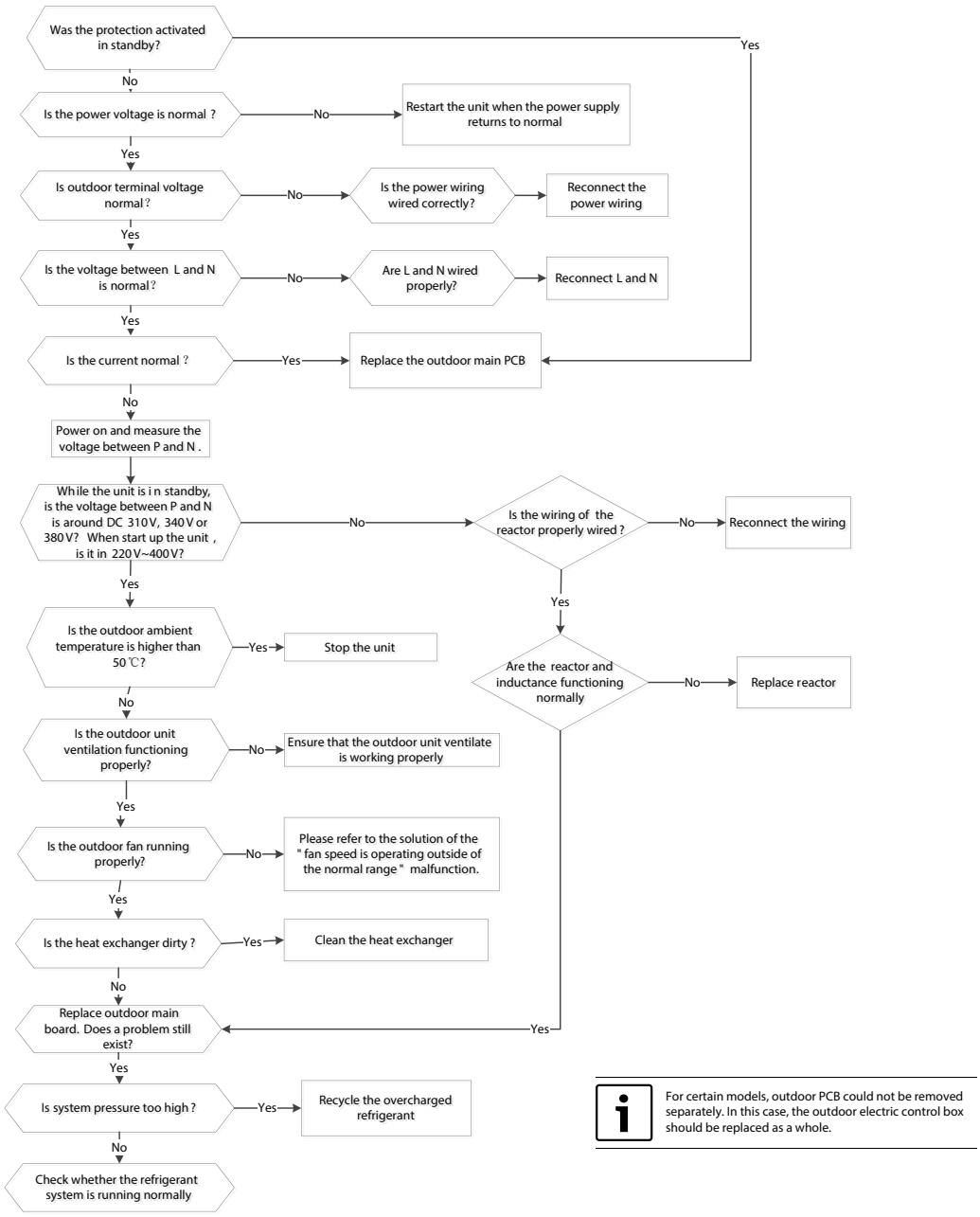


Figure 46

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 ▶ IPM malfunction ▶ Outdoor fan assembly faulty ▶ Compressor malfunction ▶ Outdoor PCB faulty

Table 32

Troubleshooting:

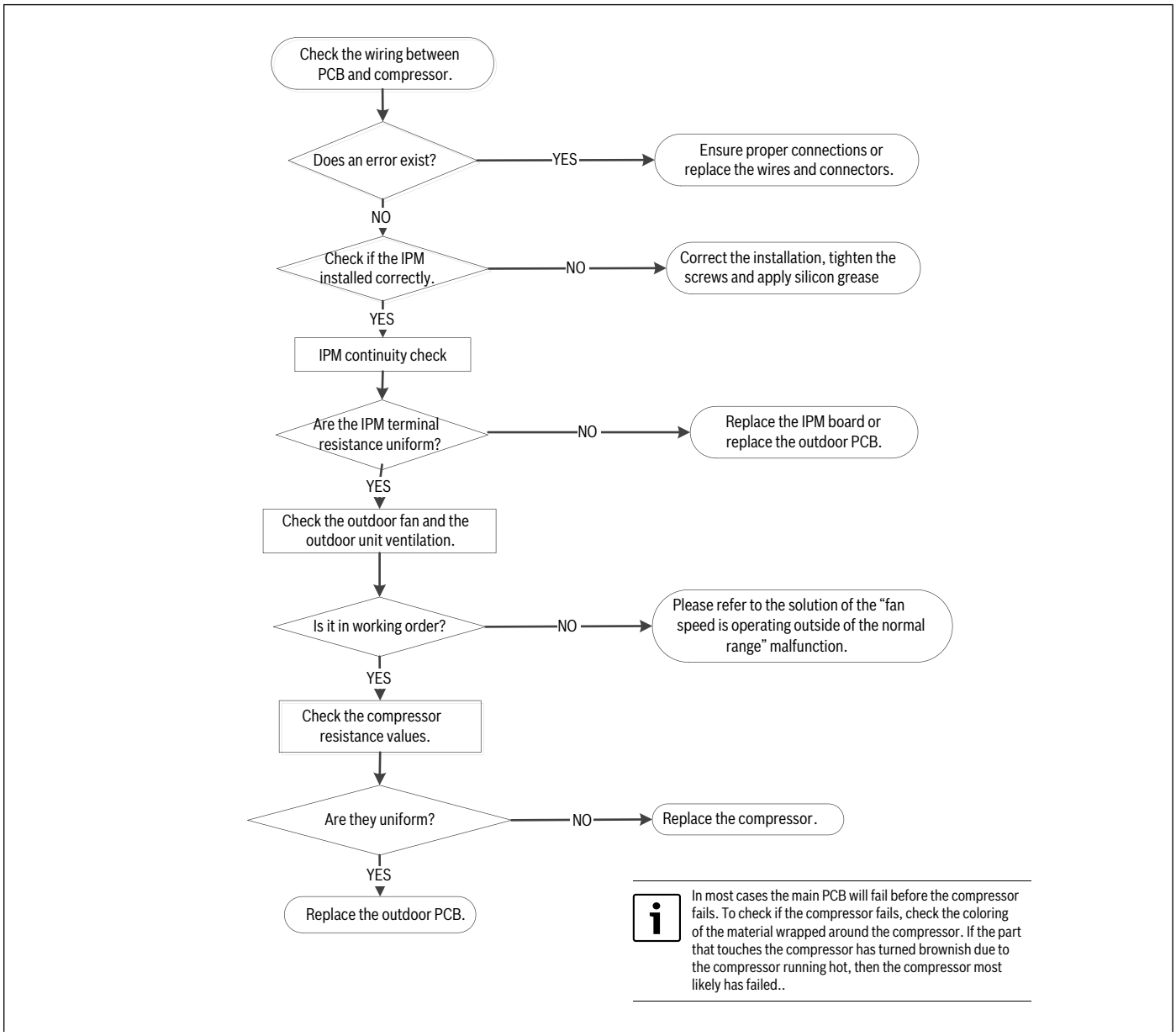


Figure 47

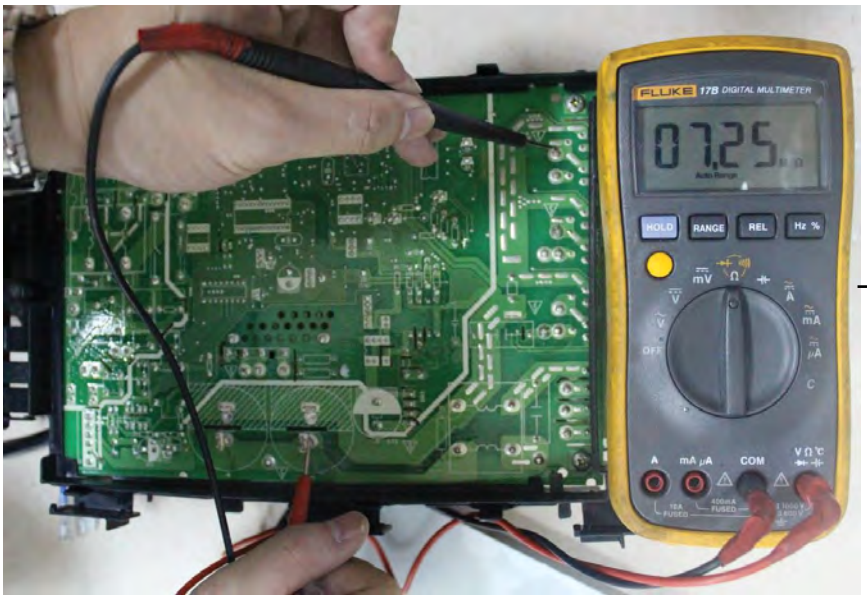


Figure 48

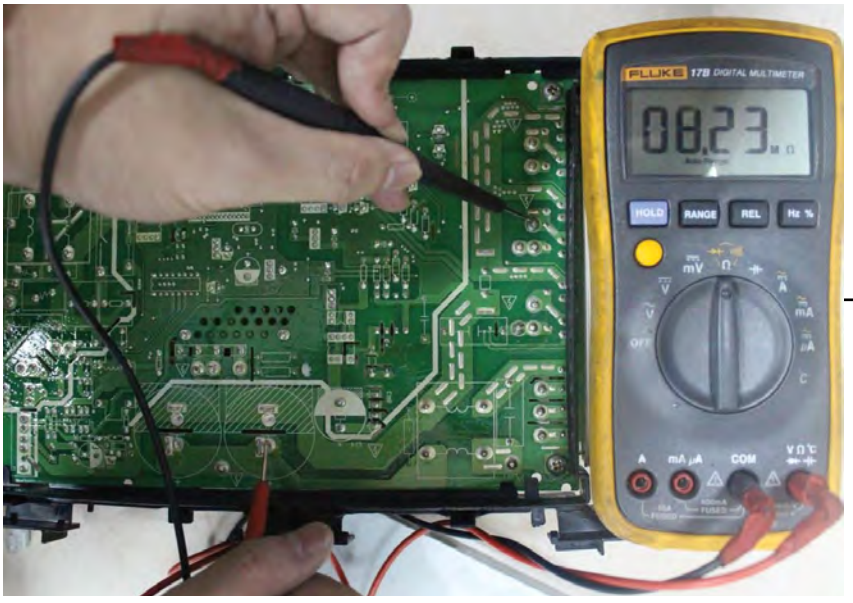


Figure 49

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 ► System leakage or block ► Outdoor PCB faulty ► Reactor

Table 33

Troubleshooting:

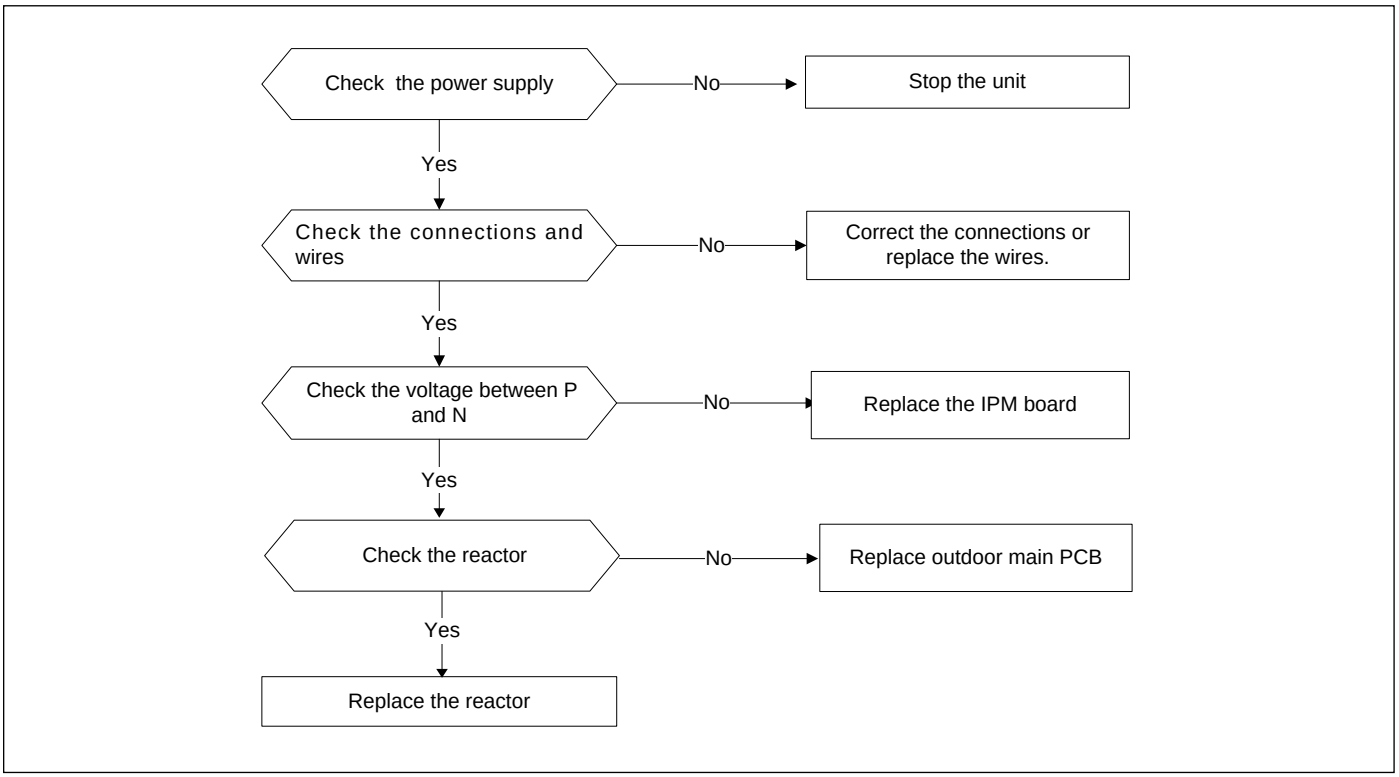


Figure 52

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.

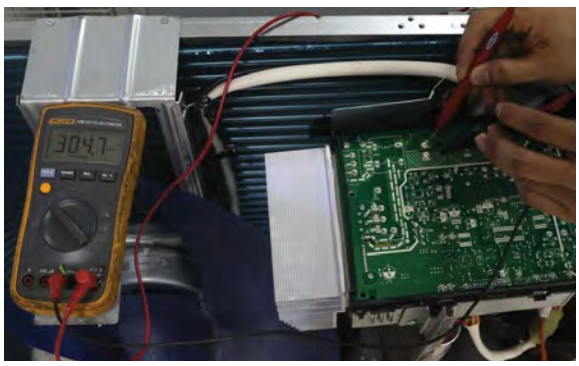


Figure 53

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 ▶ Power supply problems ▶ System leakage or block ▶ Outdoor PCB faulty

Table 34

Troubleshooting:

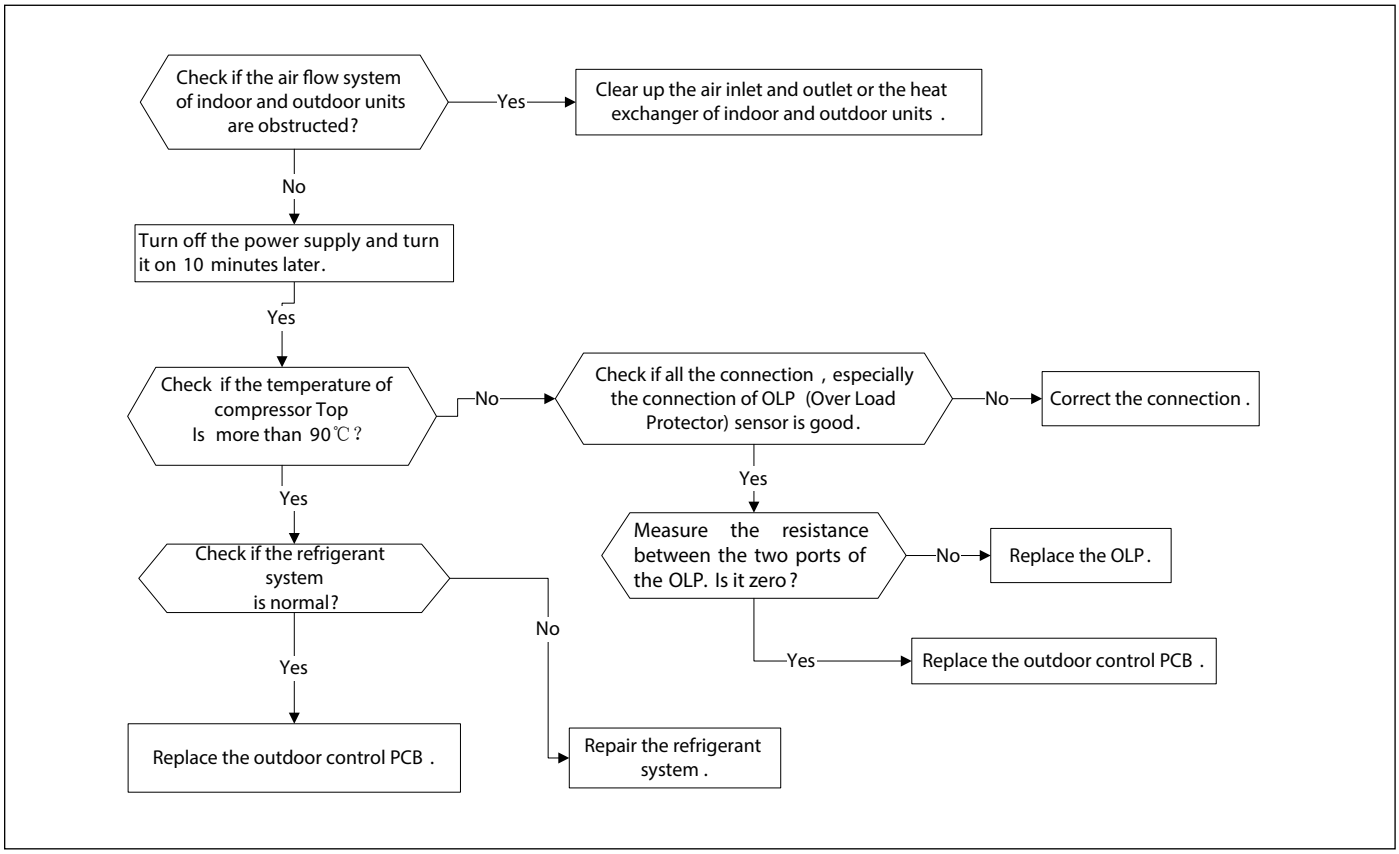


Figure 54

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 ► IPM malfunction ► Outdoor fan assembly faulty ► Compressor malfunction ► Outdoor PCB faulty

Table 35

Troubleshooting:

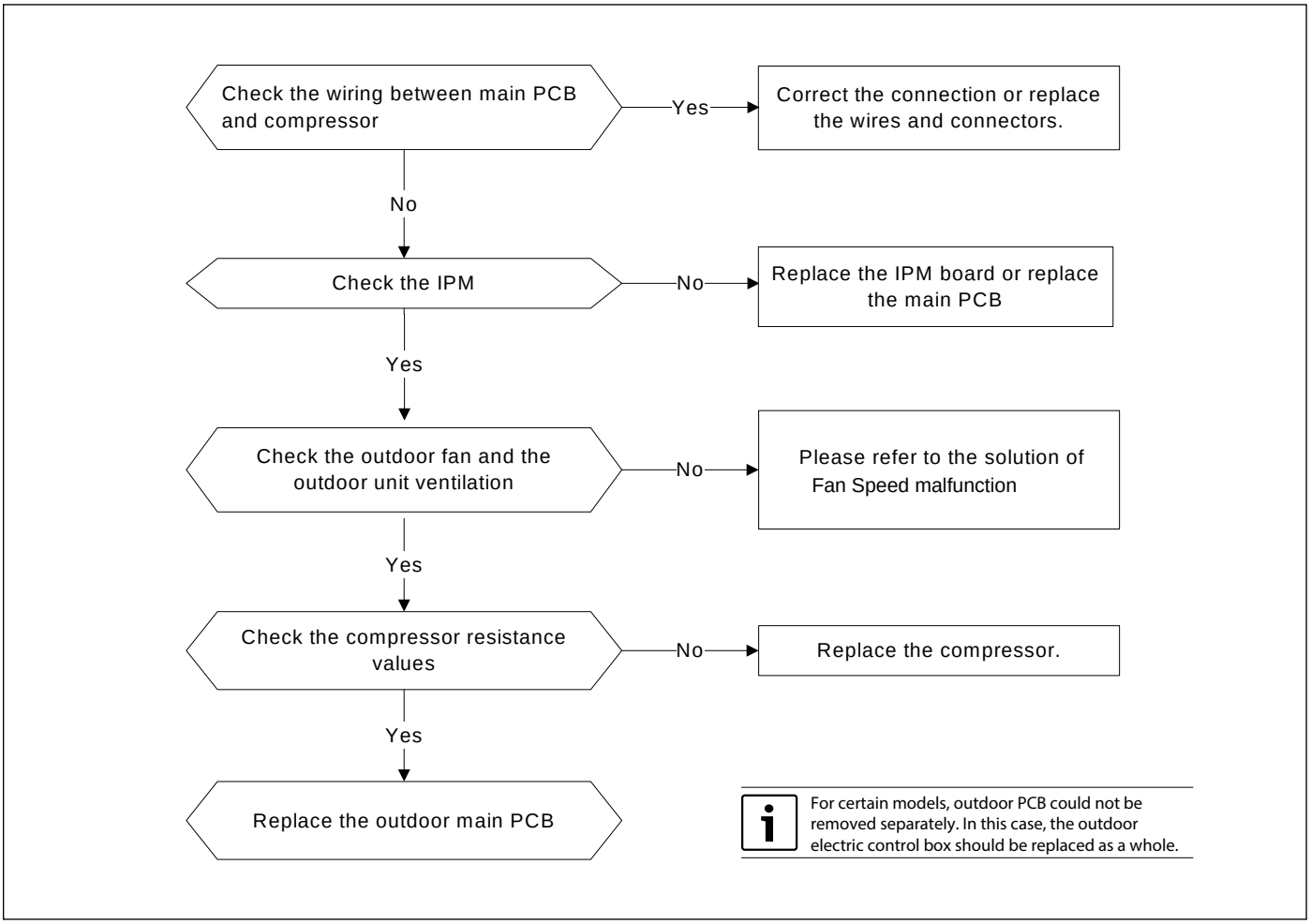


Figure 55

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 ▶ Pressure protector faulty ▶ Indoor fan motor faulty ▶ Outdoor PCB faulty ▶ Refrigerant leak

Table 36

Troubleshooting:

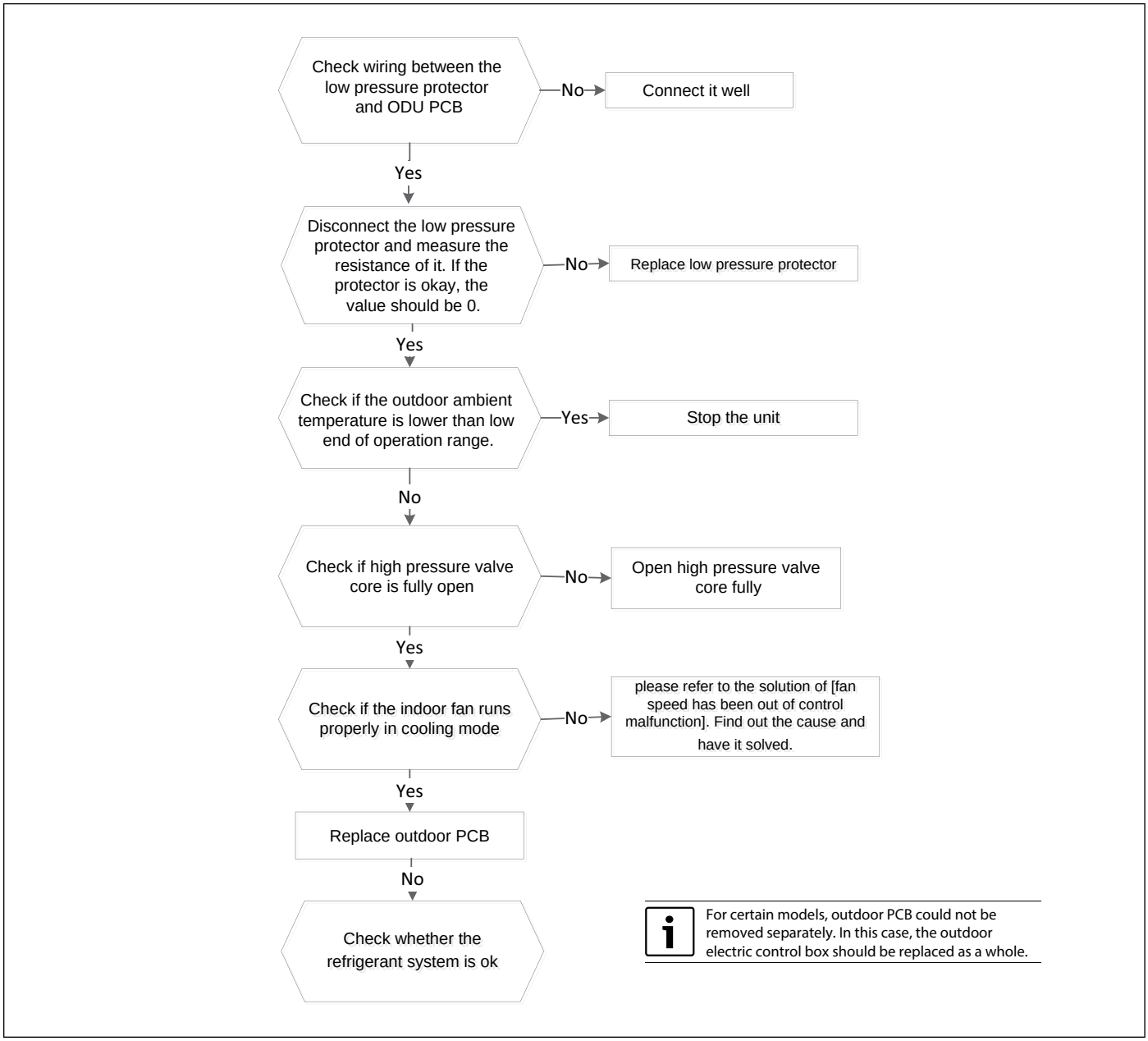


Figure 56

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 ► Dirty heat exchanger ► Faulty fan ► Indoor PCB Faulty

Table 37

Troubleshooting:

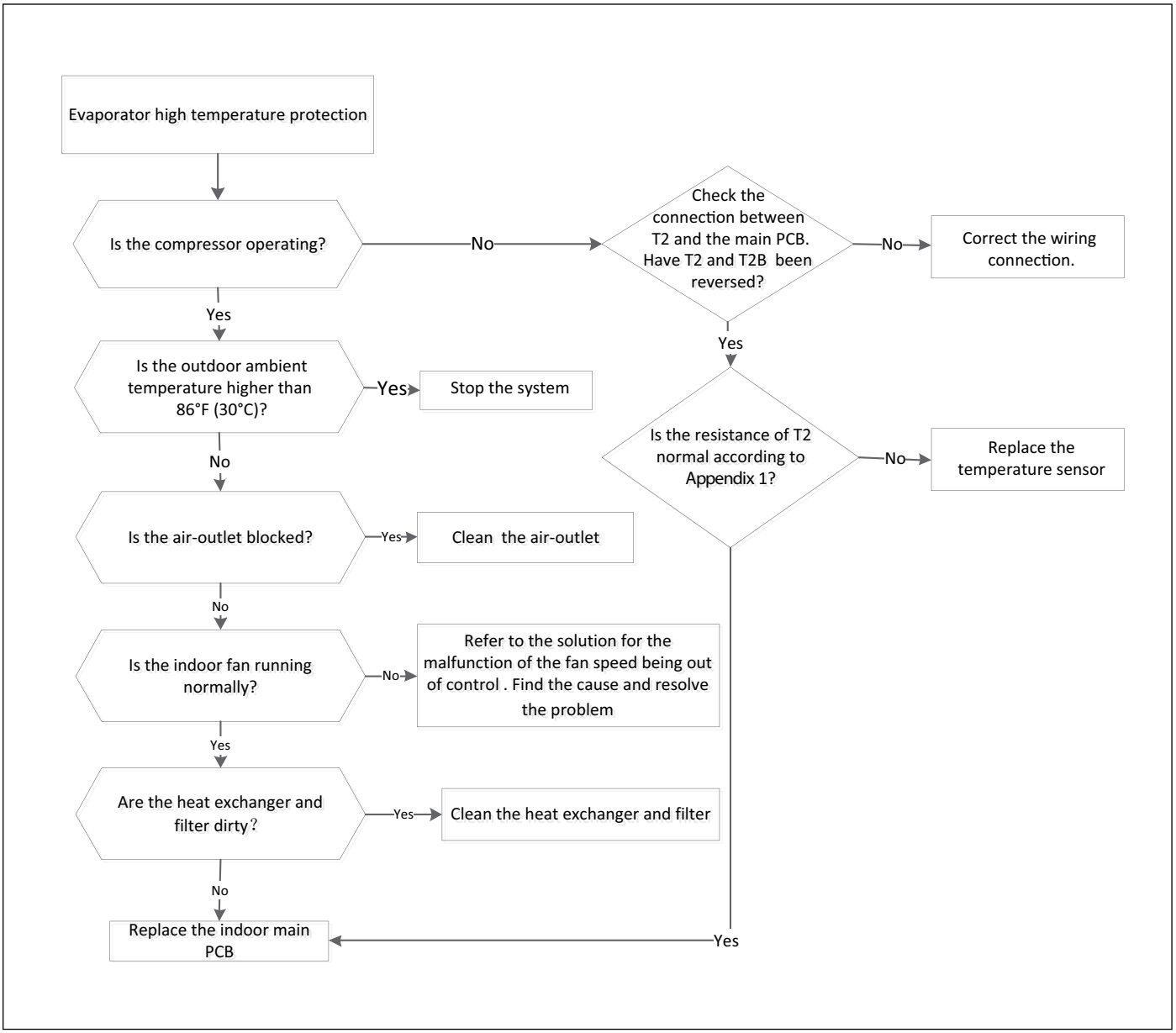


Figure 57

8.15 High temperature sensed at outdoor coil (J1)

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

Table 38

Troubleshooting:

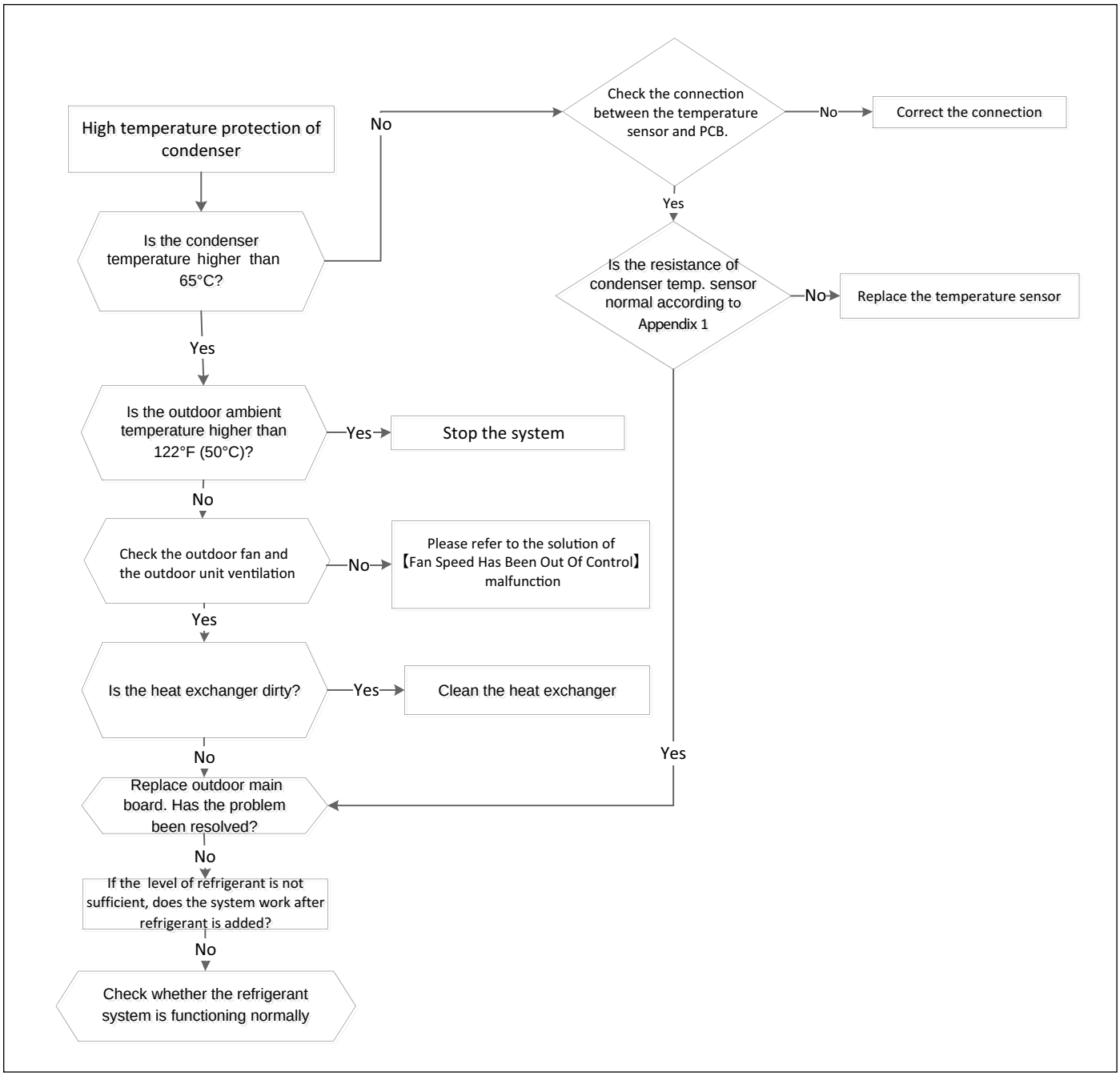


Figure 58

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 ► Wiring mistake ► Faulty discharge temperature sensor ► Outdoor PCB faulty

Table 39

Troubleshooting:

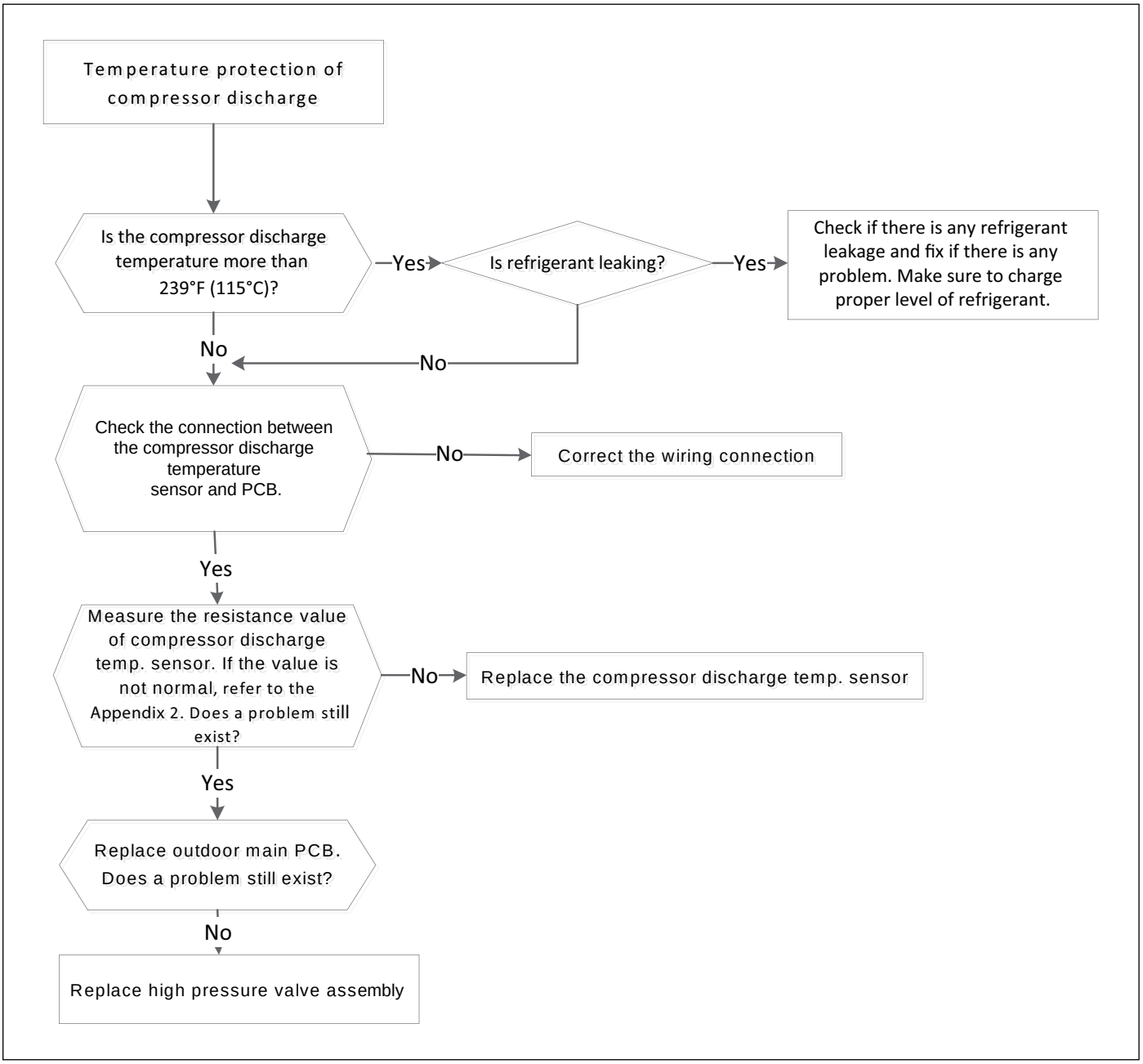


Figure 59

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 ▶ IPM malfunction ▶ Outdoor fan assembly faulty ▶ Compressor malfunction ▶ 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.

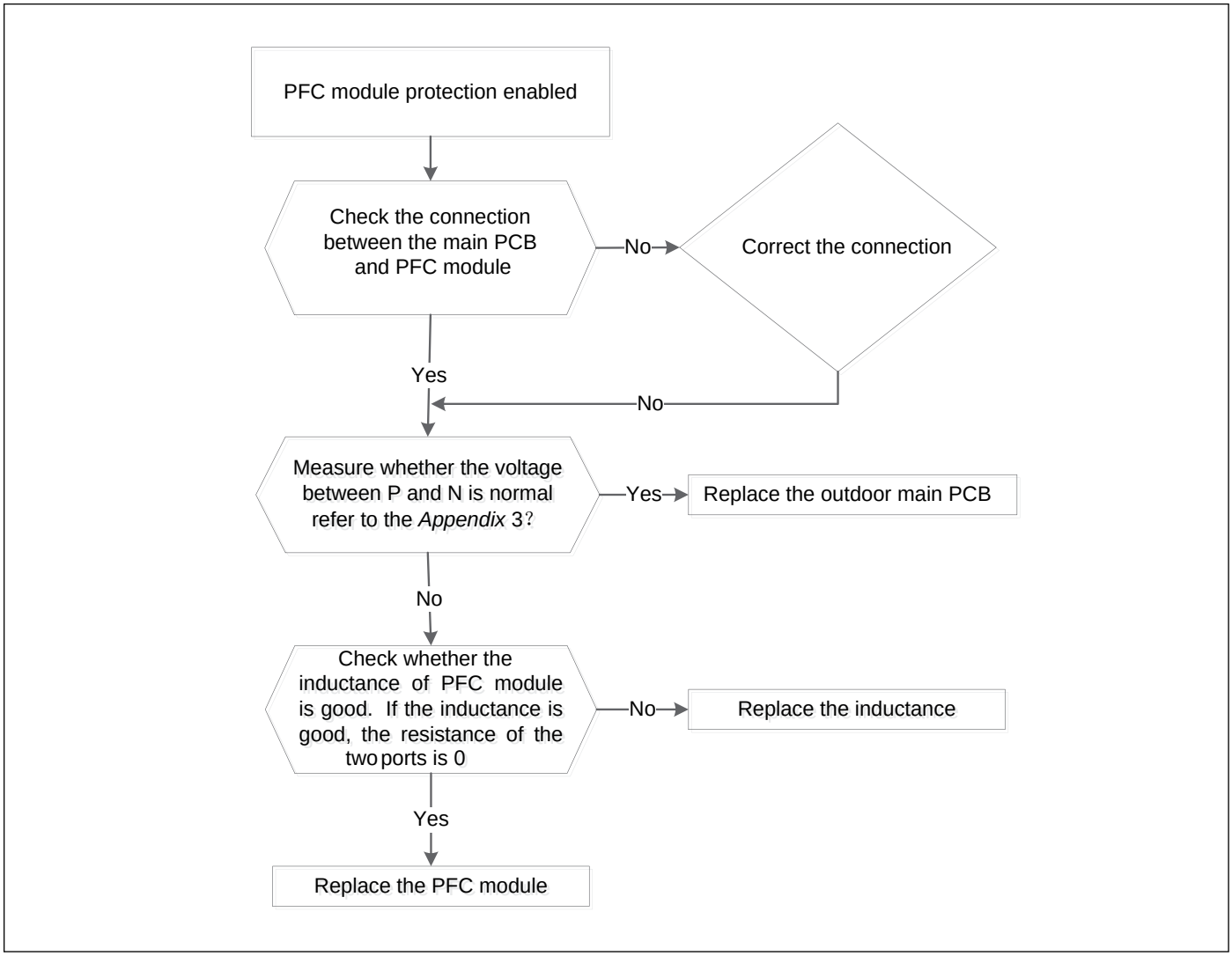


Figure 60

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 ► Outdoor PCB faulty ► Outdoor electric control box faulty

Table 41

Troubleshooting:

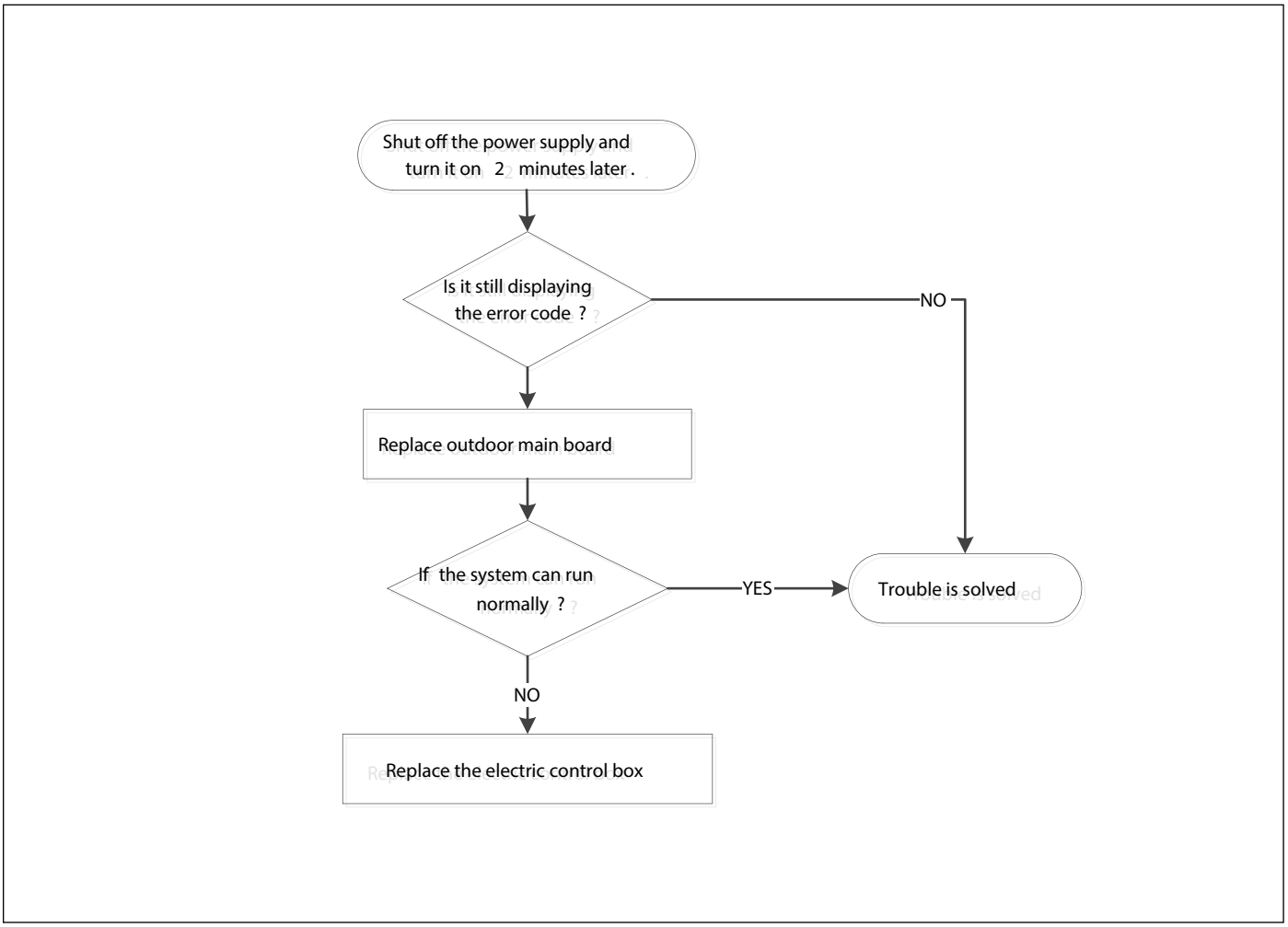


Figure 61

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 ▶ Overload protector faulty ▶ System block ▶ Outdoor PCB faulty

Table 42

Troubleshooting:

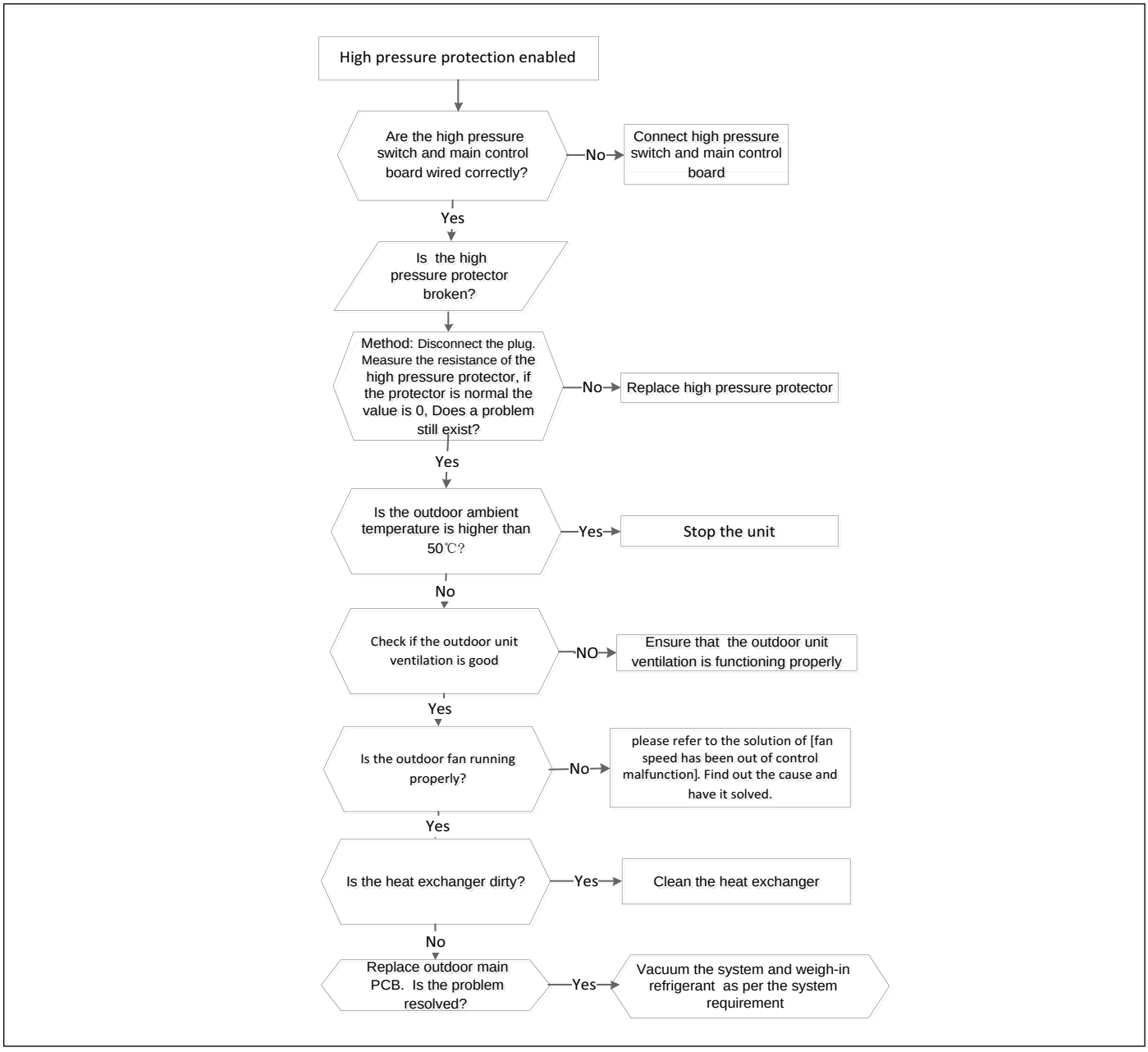


Figure 62

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 ► Overload protector faulty ► System block ► Outdoor PCB faulty

Table 43

Troubleshooting:

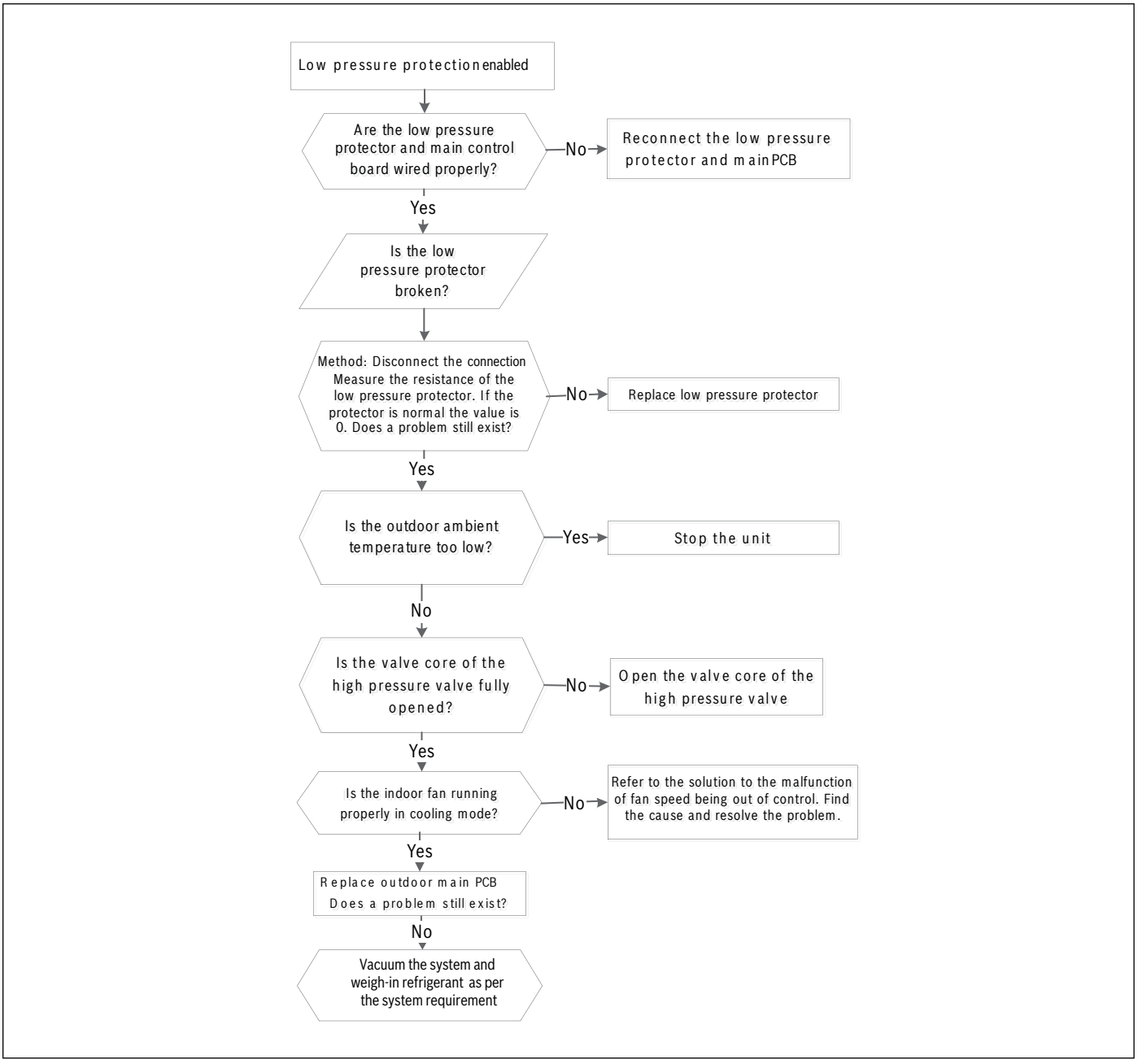


Figure 63

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 ▶ Wiring mistake ▶ Bridge rectifier faulty ▶ IPM board faulty

Table 44

Troubleshooting:

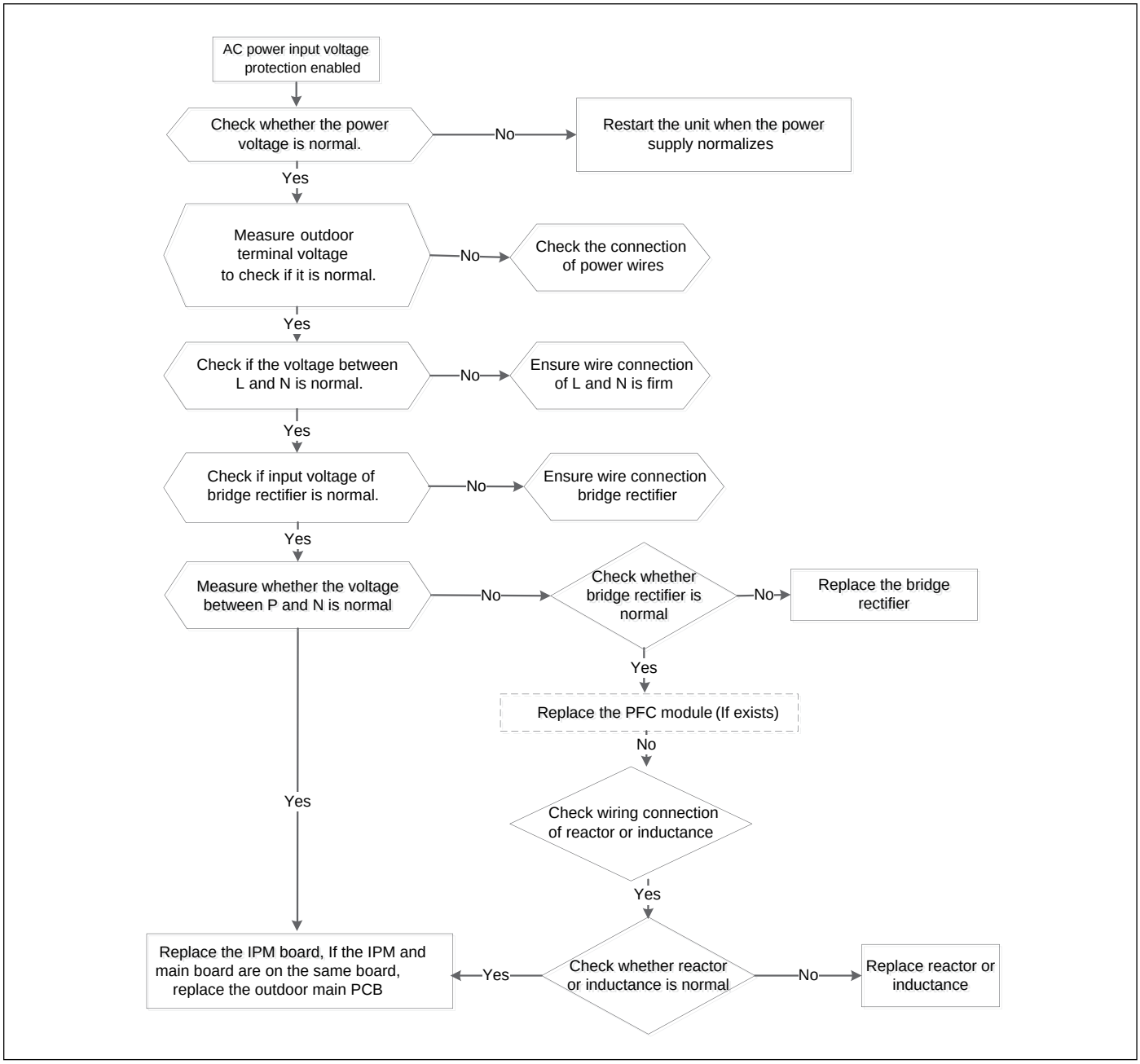


Figure 64

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.

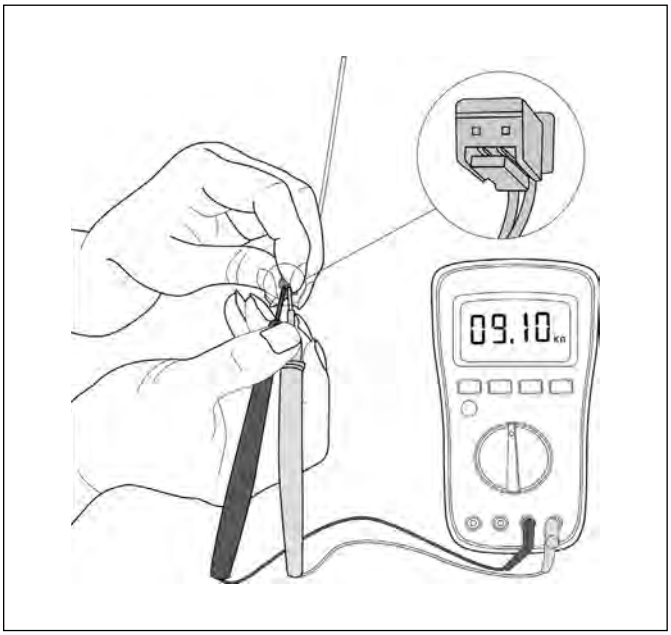


Figure 65

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)

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	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)

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	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.

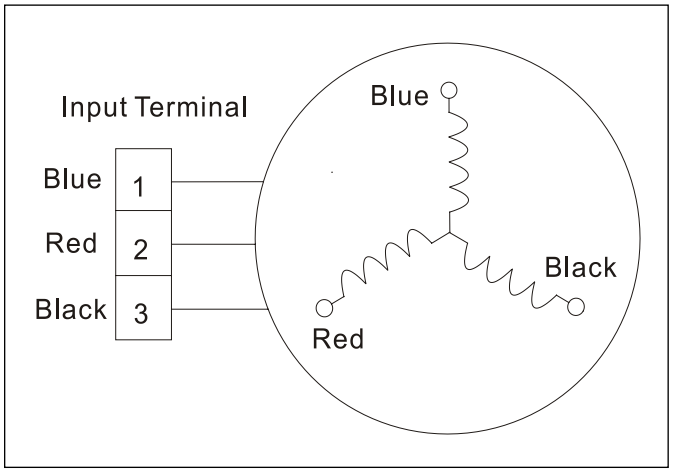


Figure 66

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 Max Performance	12K Max Performance	18K Max Performance	24K Max Performance
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

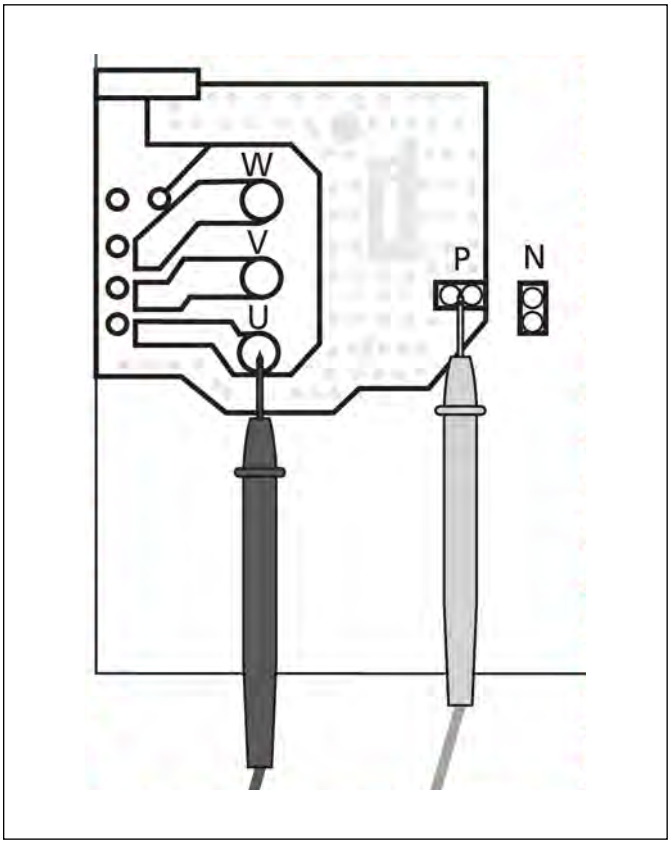


Figure 68

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).

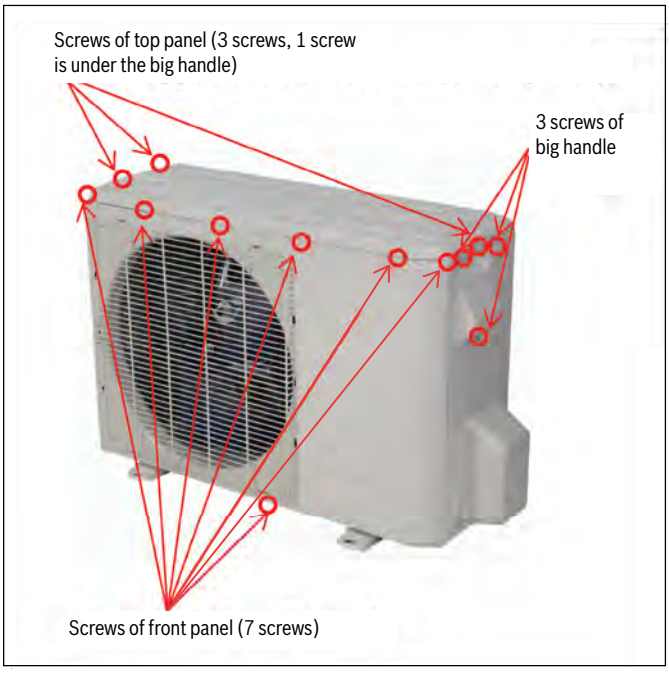


Figure 69

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

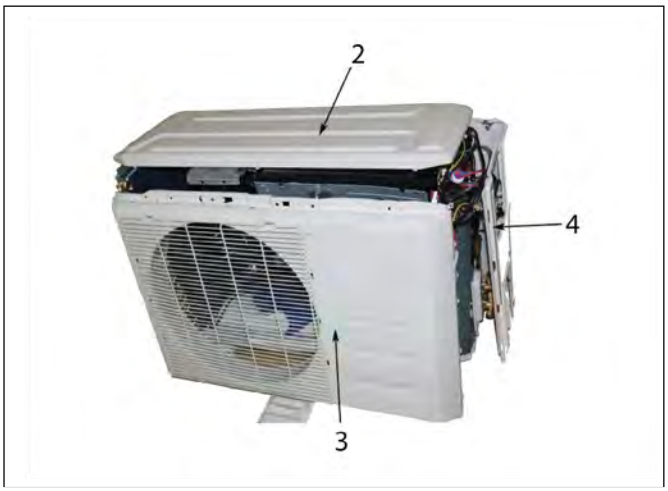


Figure 70

9.1.2 Removing the fan assembly

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

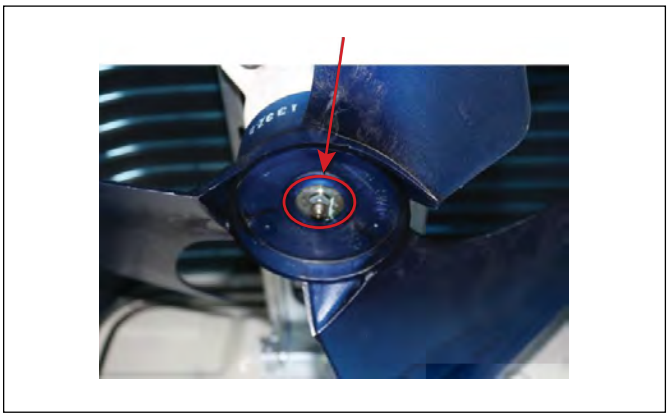


Figure 71

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

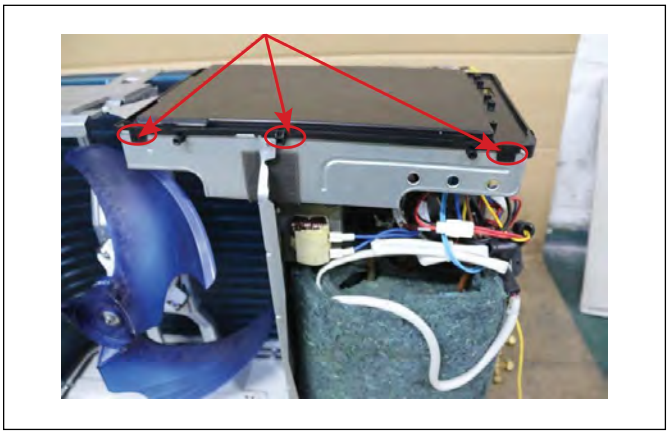


Figure 72

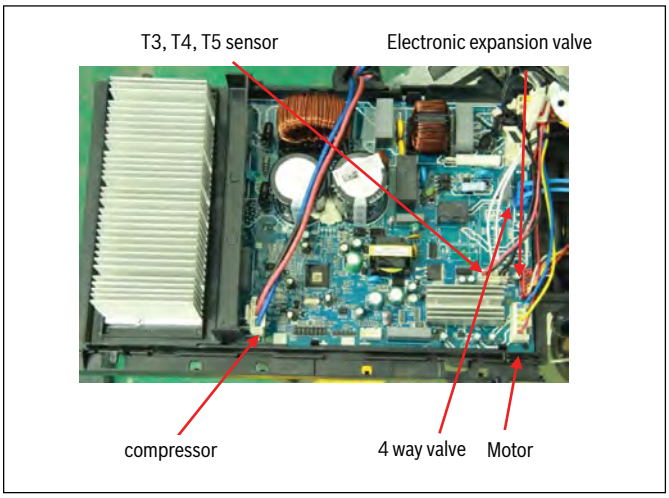


Figure 73

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

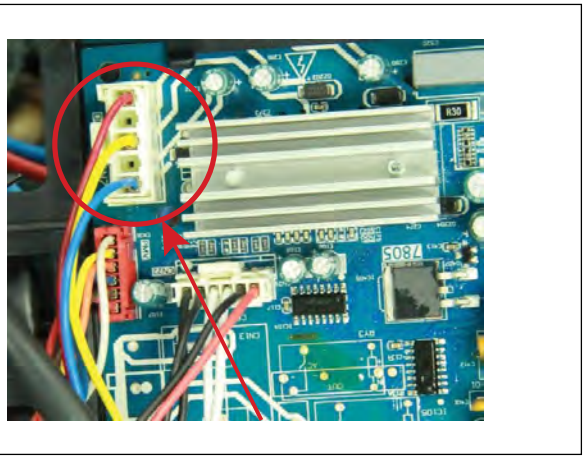


Figure 74

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

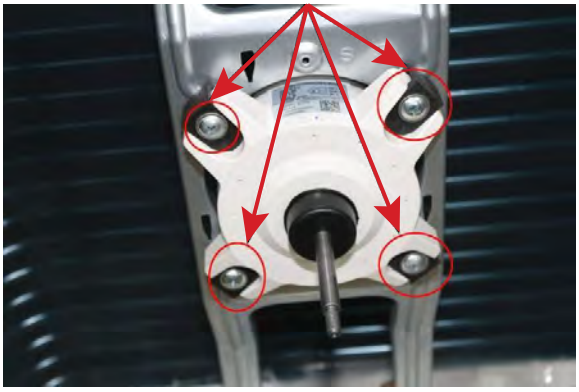


Figure 75

9.1.3 Removing the electrical parts

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

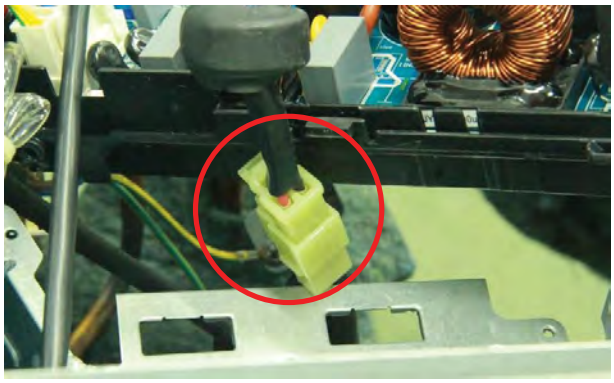


Figure 76

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

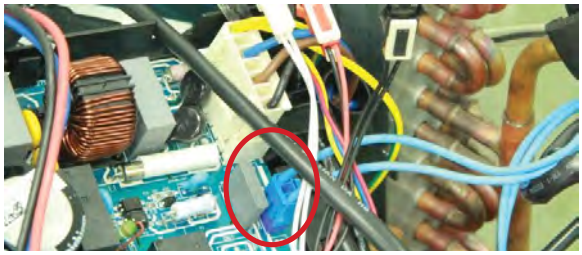


Figure 77

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

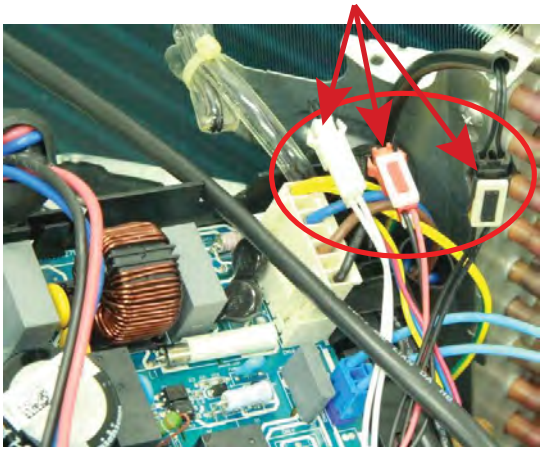


Figure 78

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

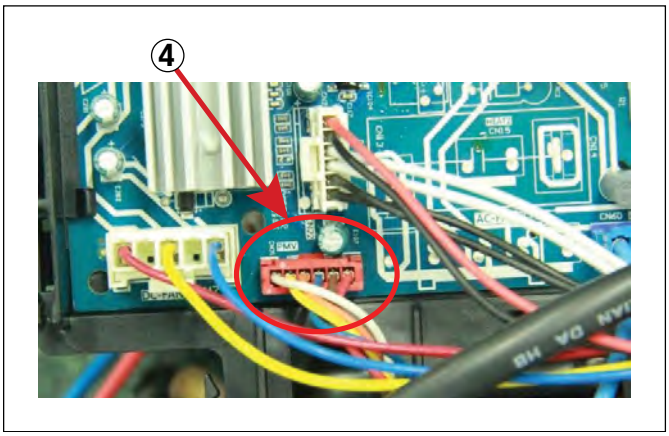


Figure 79

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

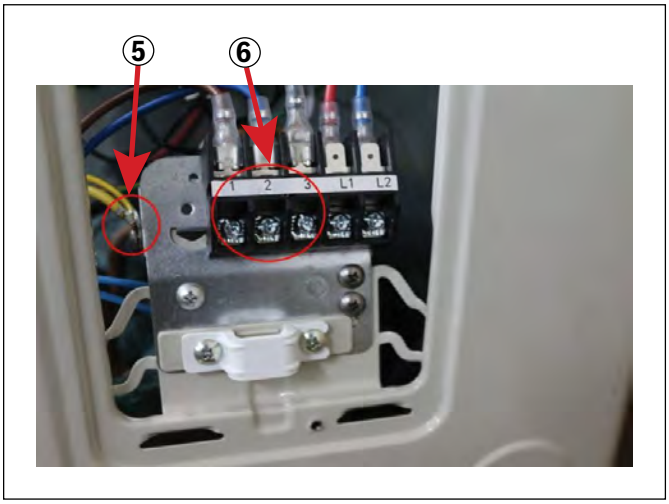


Figure 80

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.

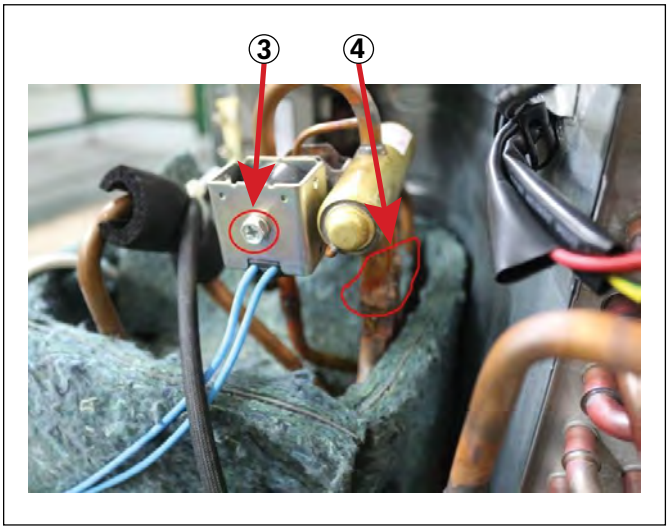


Figure 81

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 Max Performance: 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)

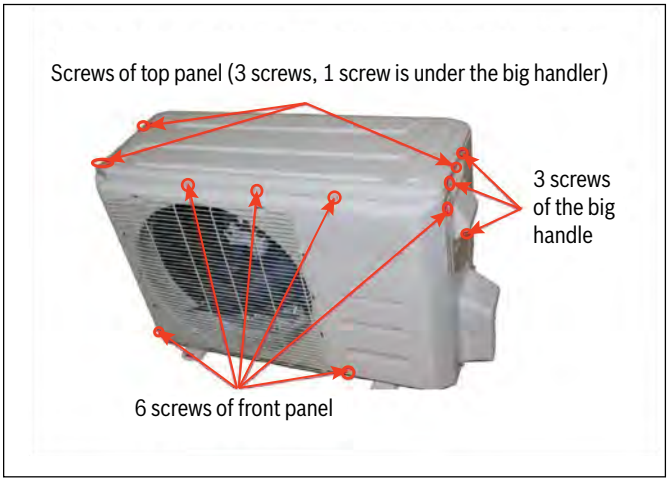


Figure 82

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

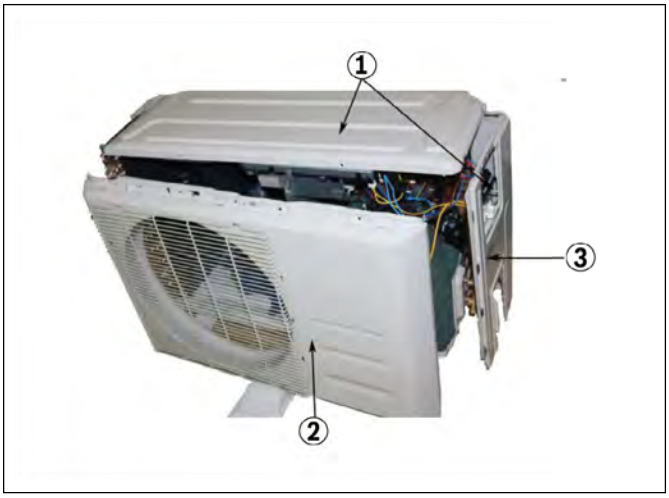


Figure 83

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.

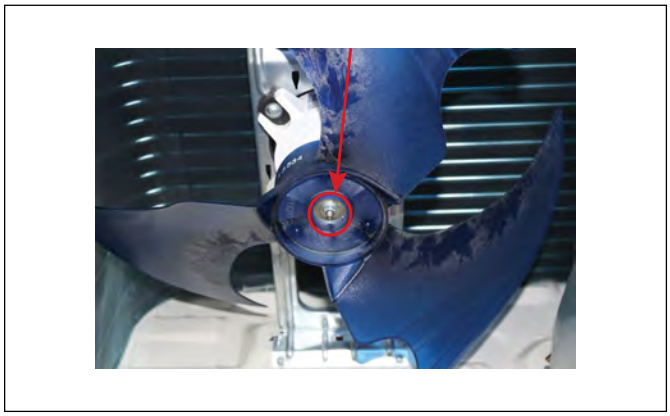


Figure 84

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

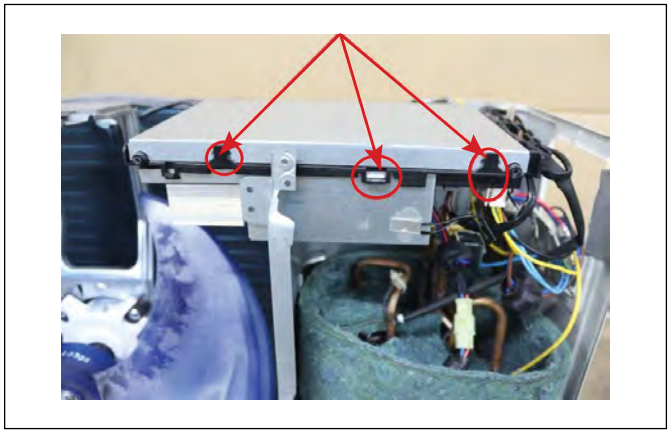


Figure 85

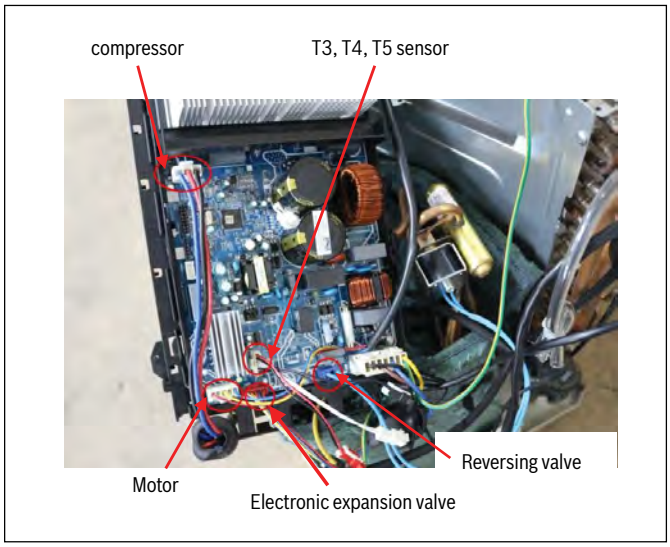


Figure 86

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

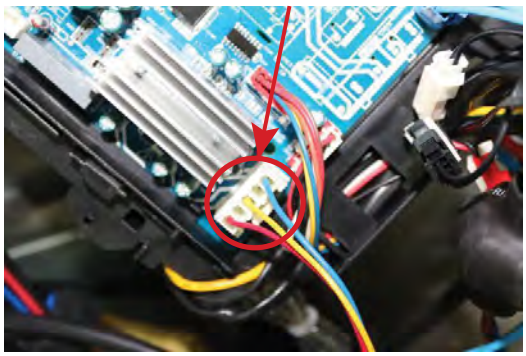


Figure 87

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

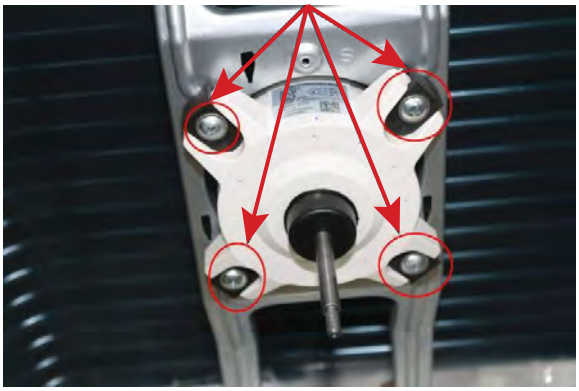


Figure 88

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.

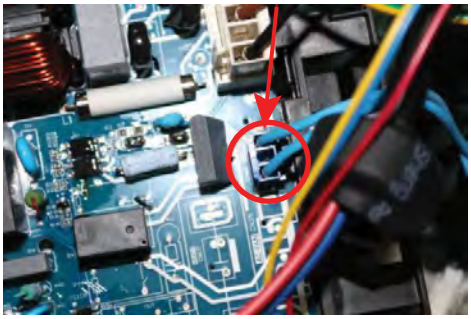


Figure 90

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

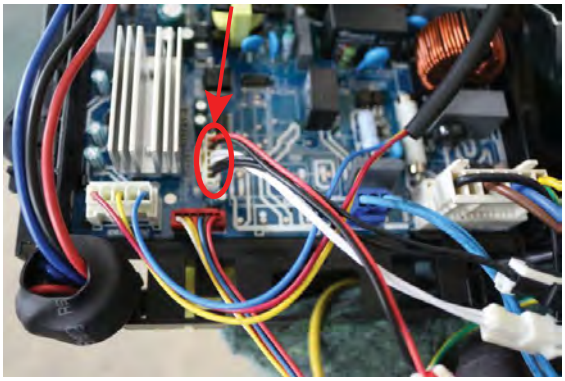


Figure 91

4. Disconnect the electronic expansion valve wire.

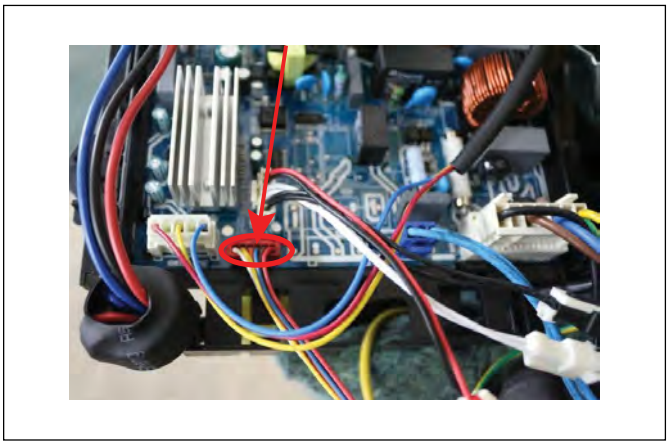


Figure 92

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.

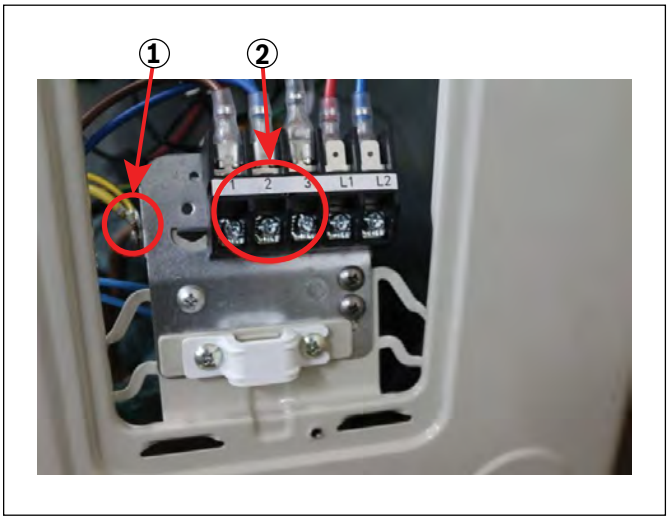


Figure 93

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.

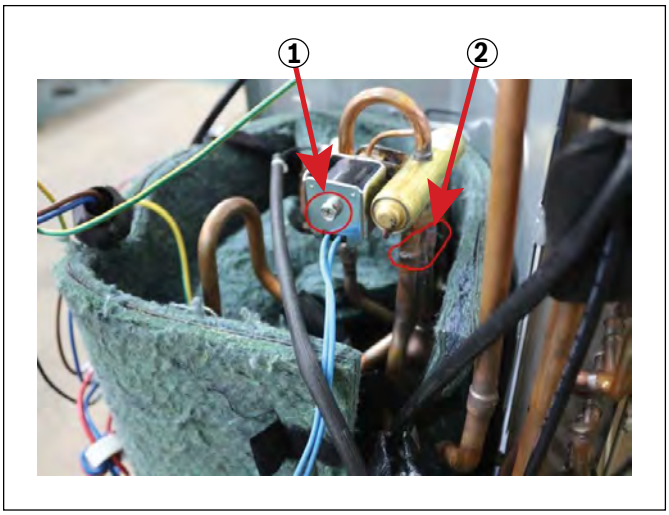


Figure 94

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)

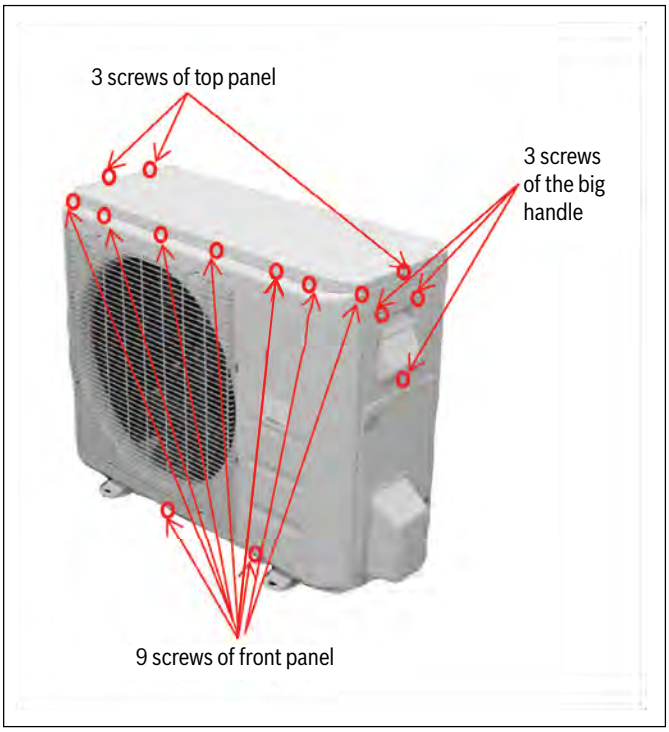


Figure 95

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

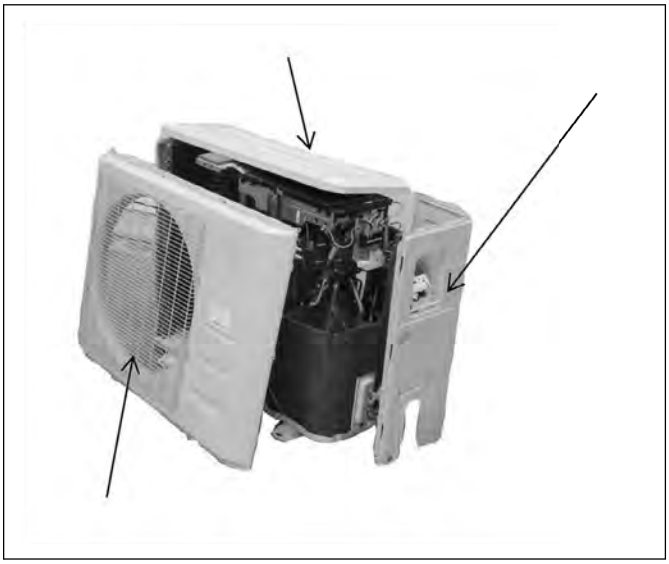


Figure 96

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.

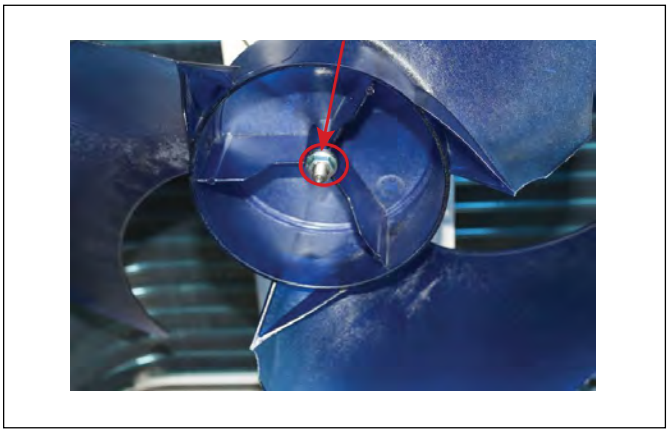


Figure 97

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

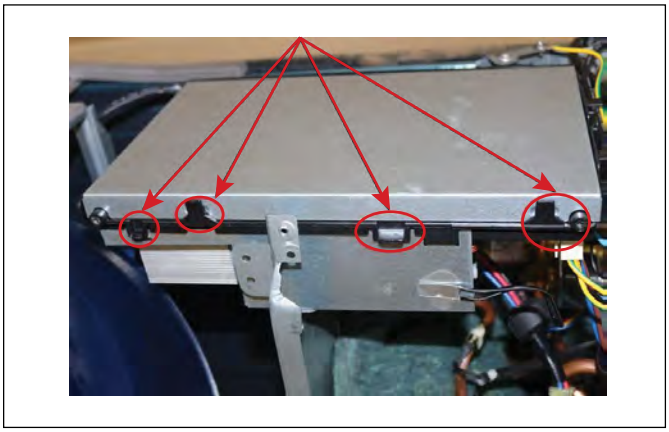


Figure 98

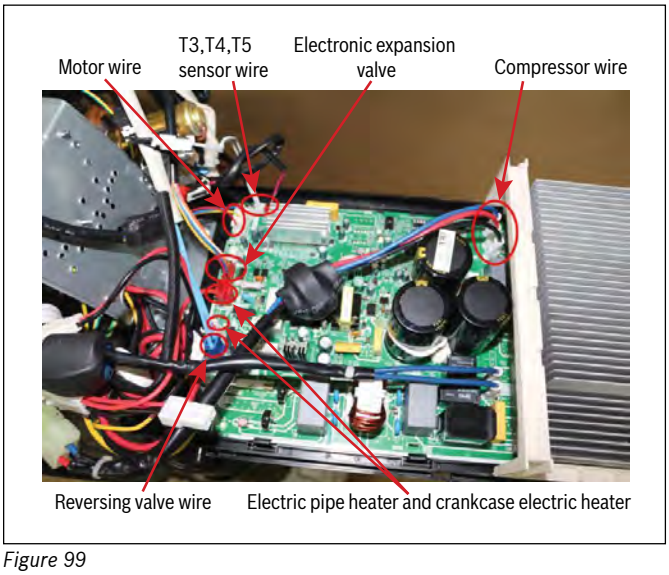


Figure 99

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

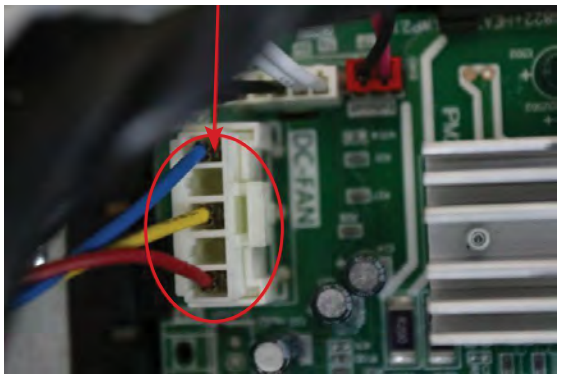


Figure 100

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

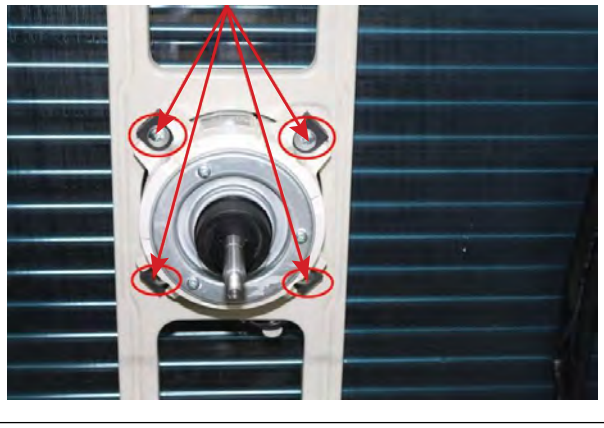


Figure 101

9.3.3 Removing the electrical parts

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

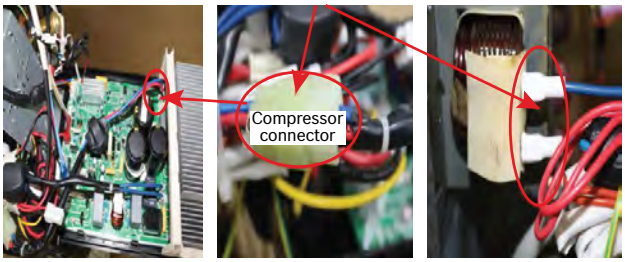


Figure 102

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

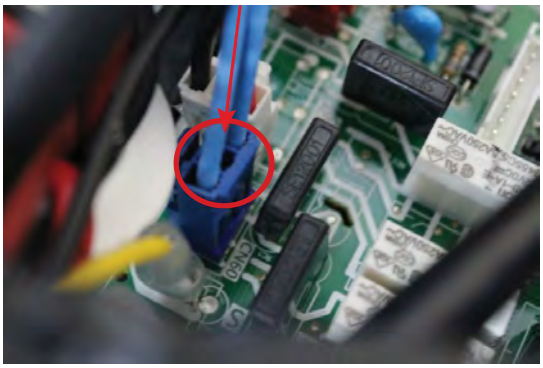


Figure 103

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

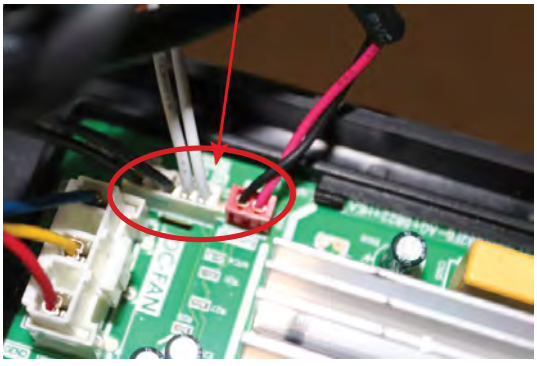


Figure 104

4. Disconnect the electronic expansion valve wire.

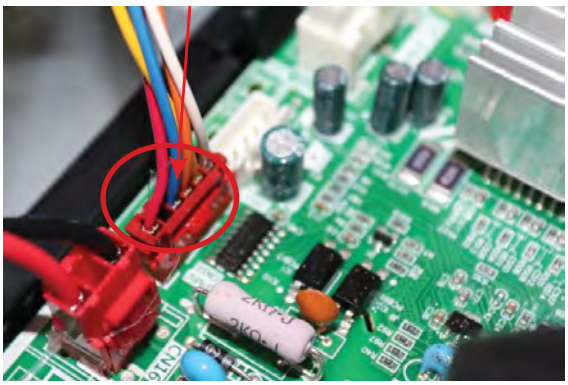


Figure 105

5. Remove the electric heaters.

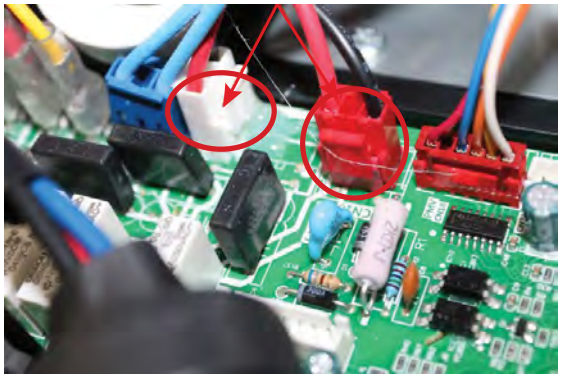


Figure 106

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

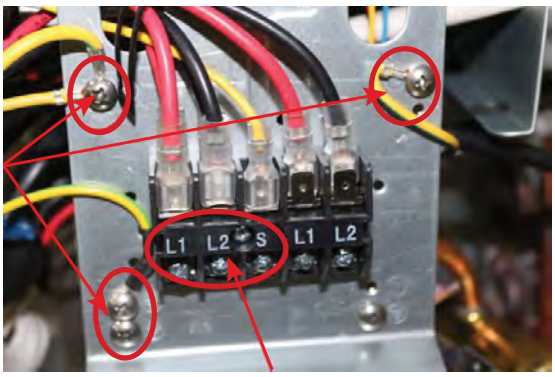


Figure 107

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.

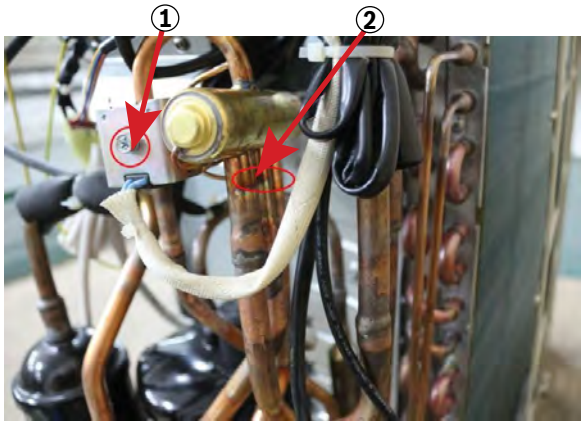


Figure 108

Take care to protect internal components when removing copper piping.

5. Then the reversing valve assembly can be removed.

9.4 Models: 18K Max Performance: 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).

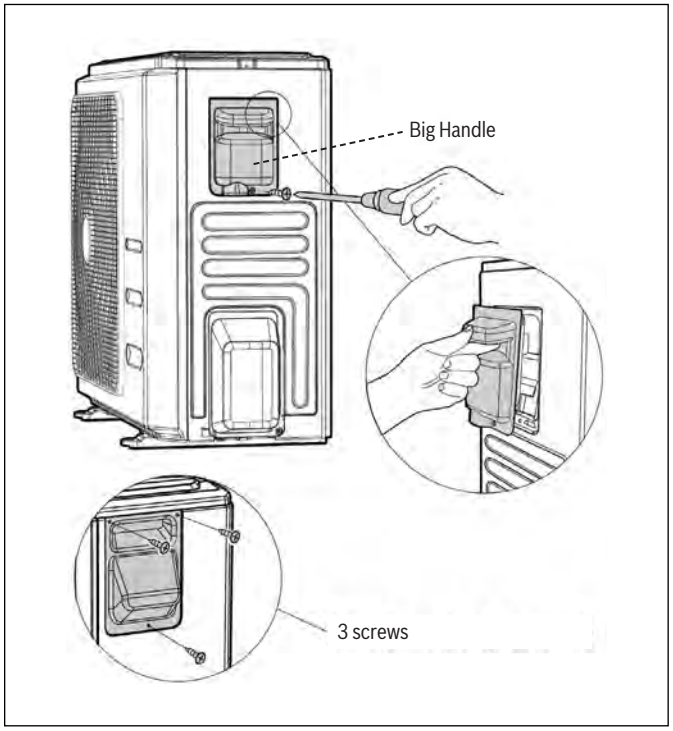


Figure 109

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

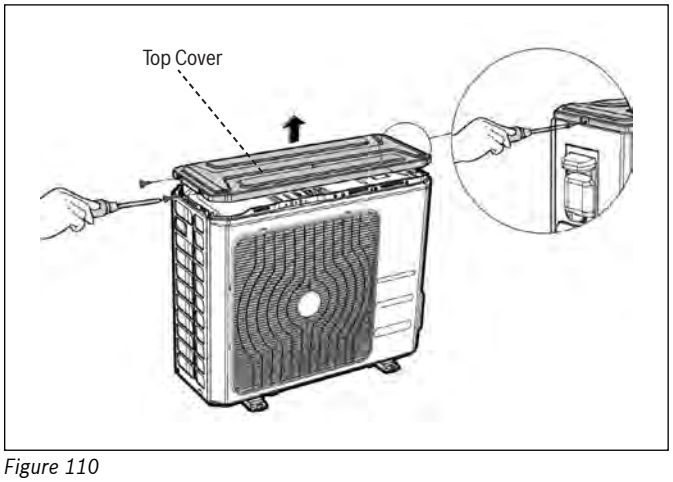


Figure 110

4. Remove front panel (7 screws).

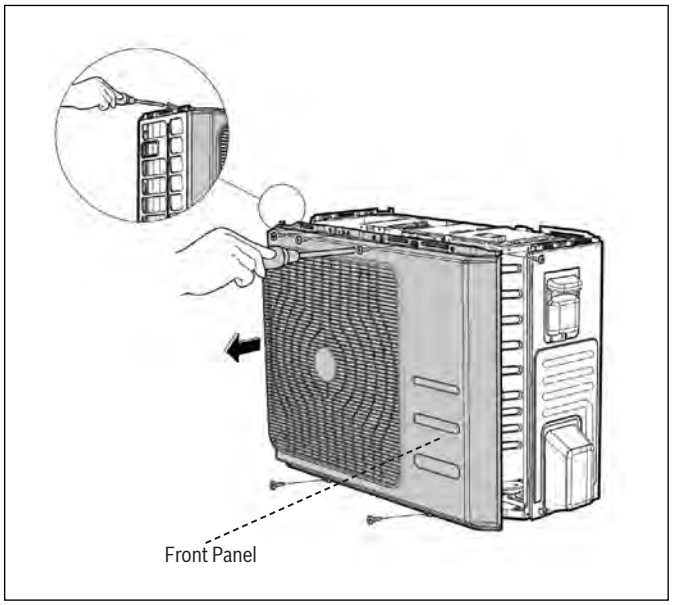


Figure 111

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

Figure 112

6. Remove the rear net (2 screw).

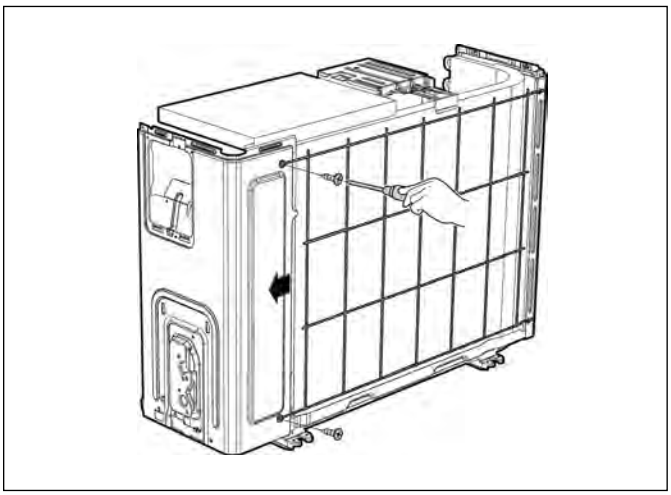


Figure 113

7. Remove the right panel (5 screws).

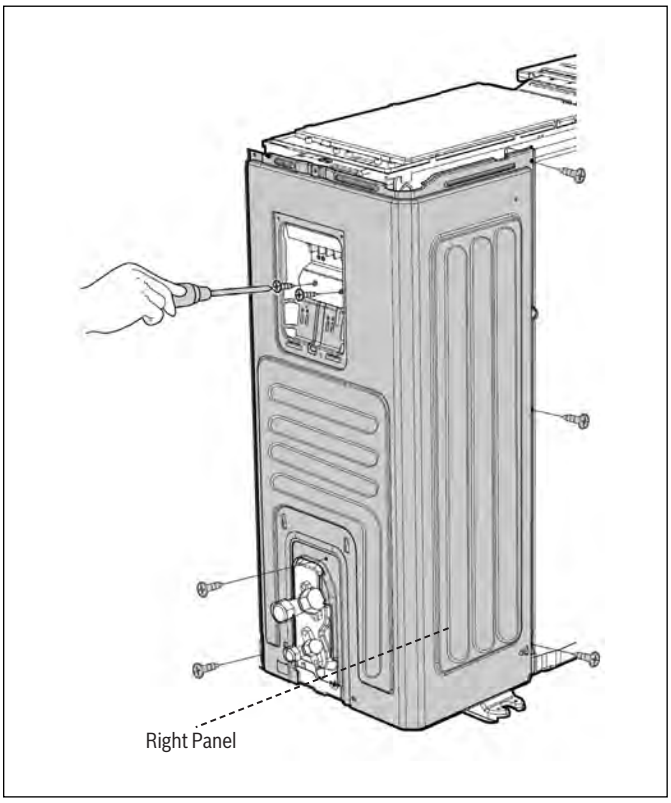


Figure 114

9.5 Models: 9K, 12K & 18K Max Performance: 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).

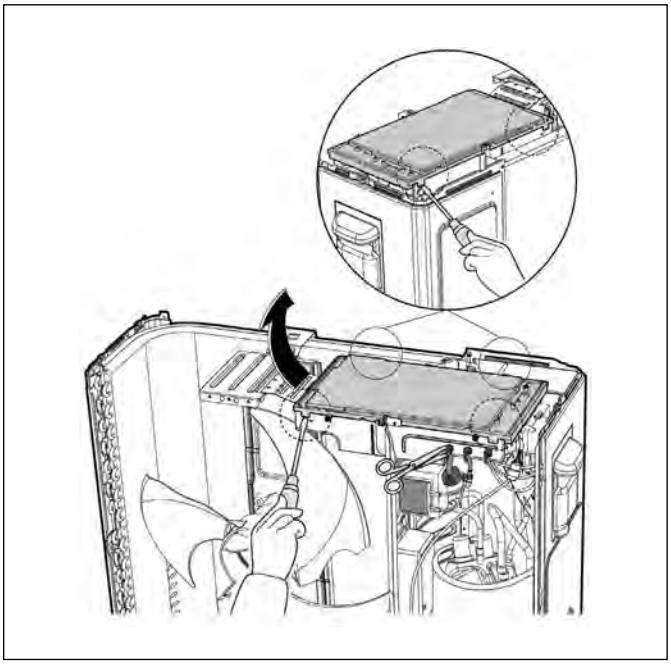


Figure 115

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)

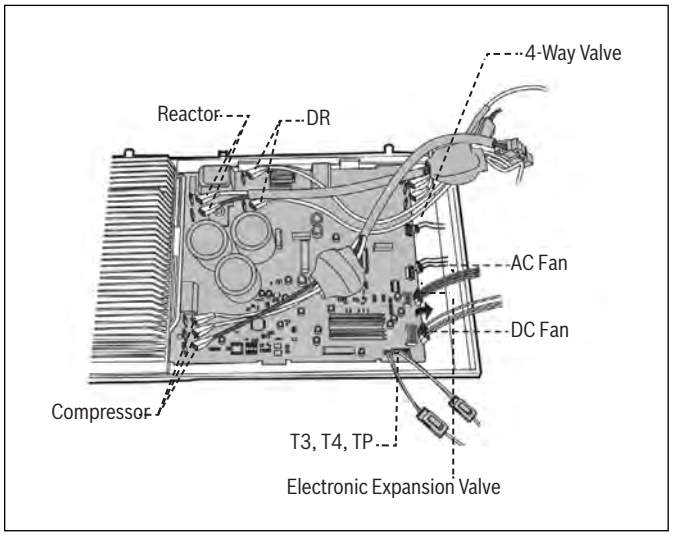


Figure 116

9.6 Models: 24K Regular: BMS500-AAS024-1CSXRA 24K Max Performance: 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)

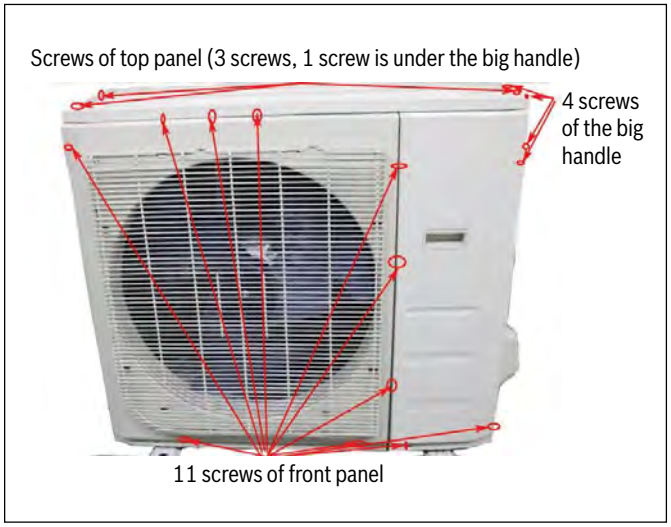


Figure 117

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

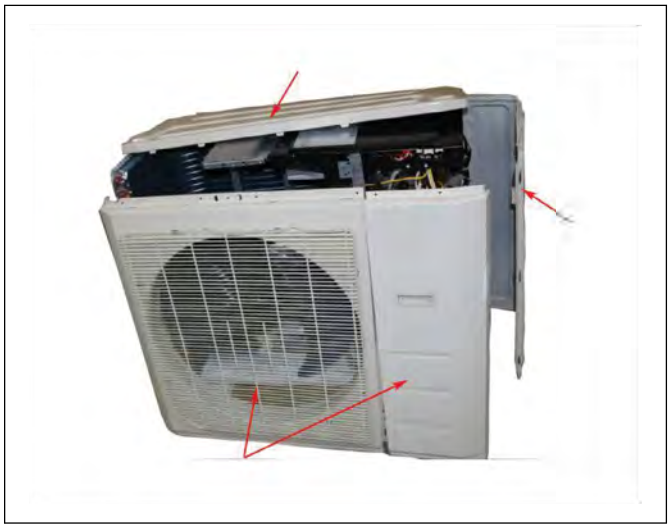


Figure 118

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.

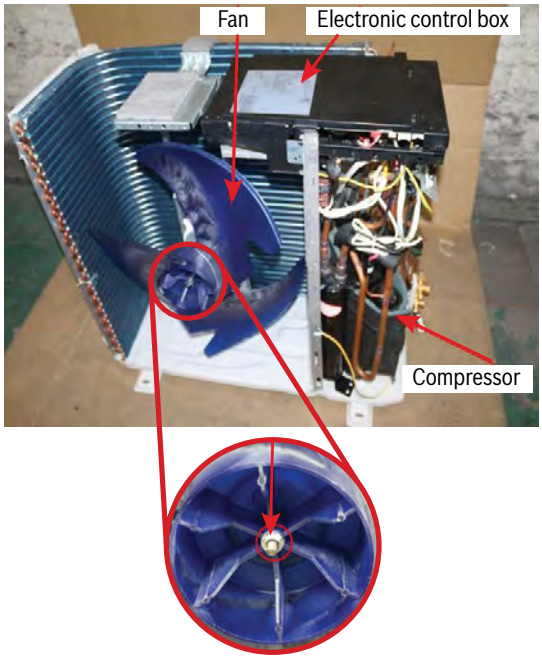


Figure 119

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

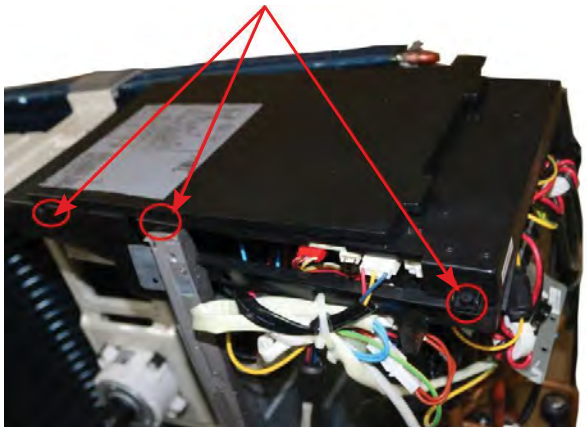


Figure 120

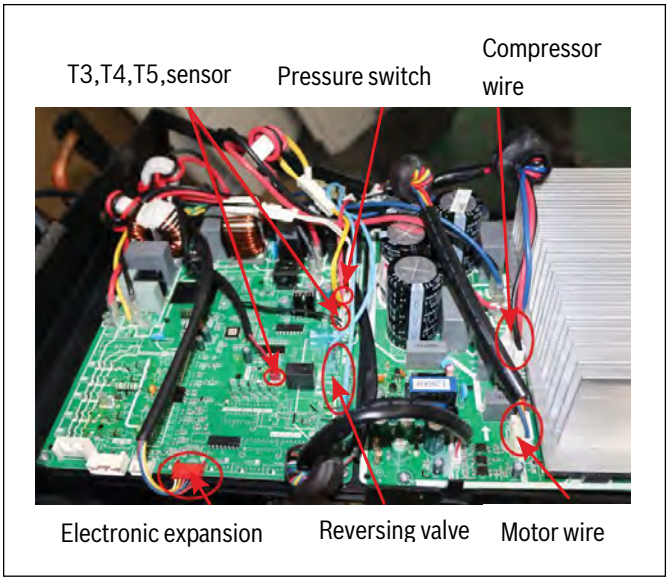


Figure 121

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.

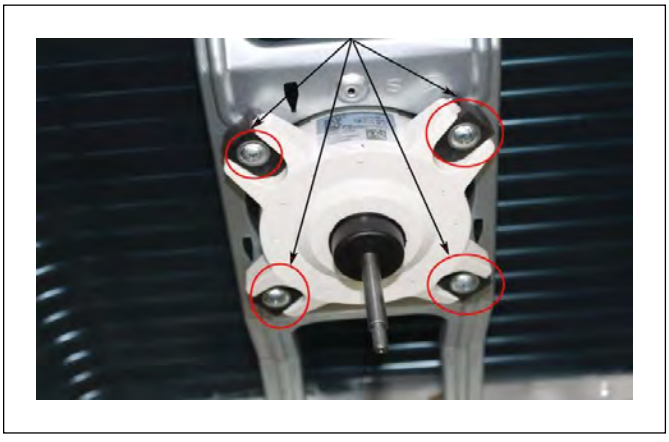


Figure 123

9.6.3 Removing the electrical parts

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

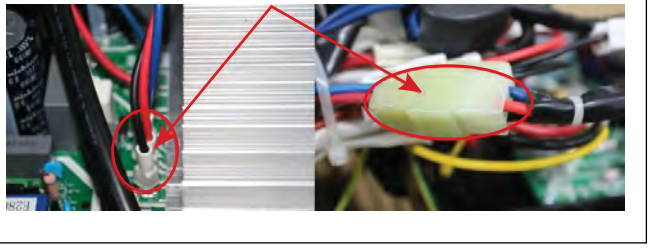


Figure 124

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

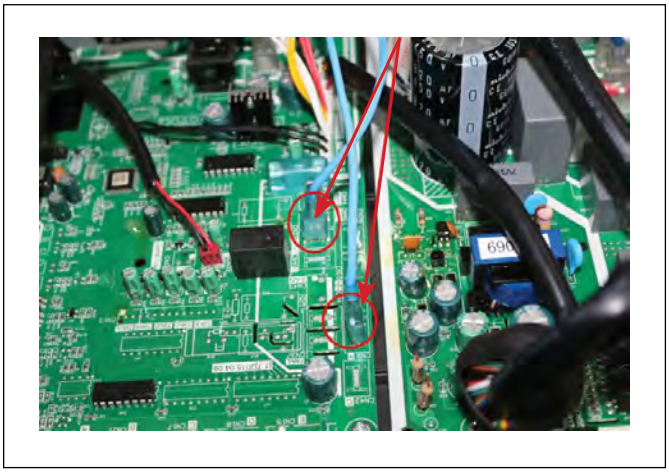


Figure 125

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

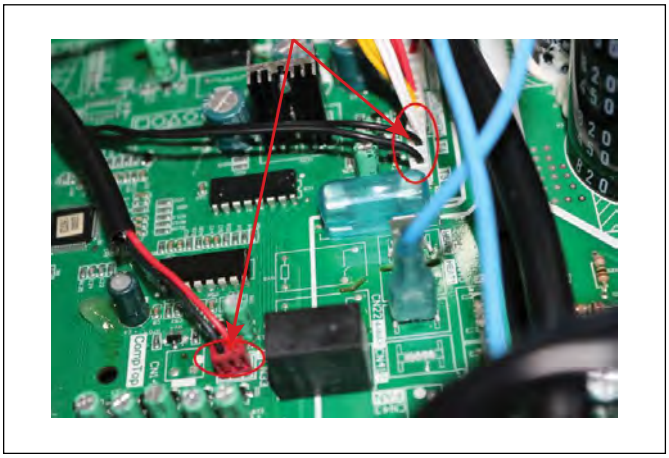


Figure 126

4. Disconnect the pressure switch connector.

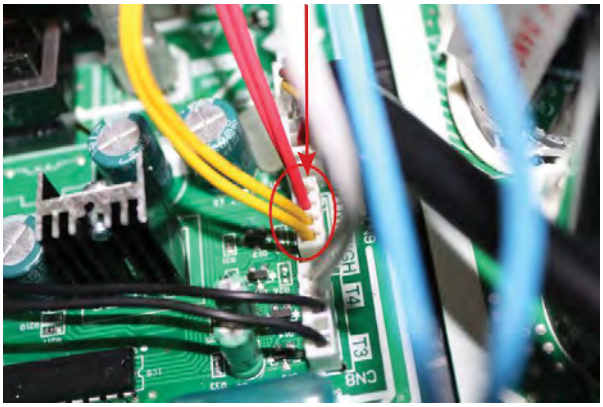


Figure 127

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

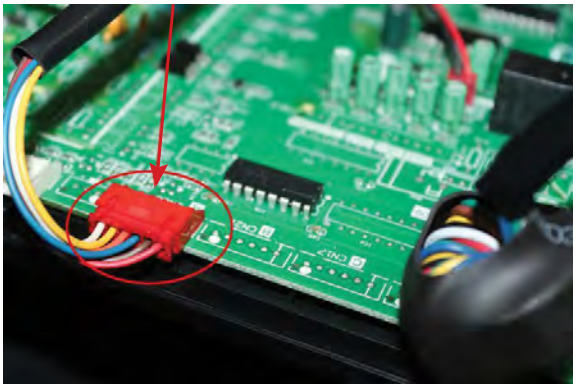


Figure 128

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.

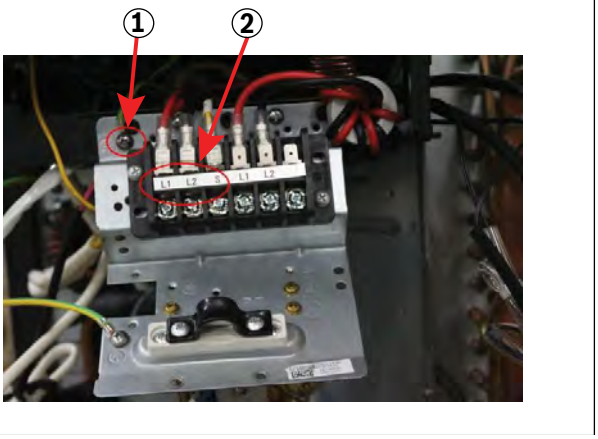


Figure 129

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.

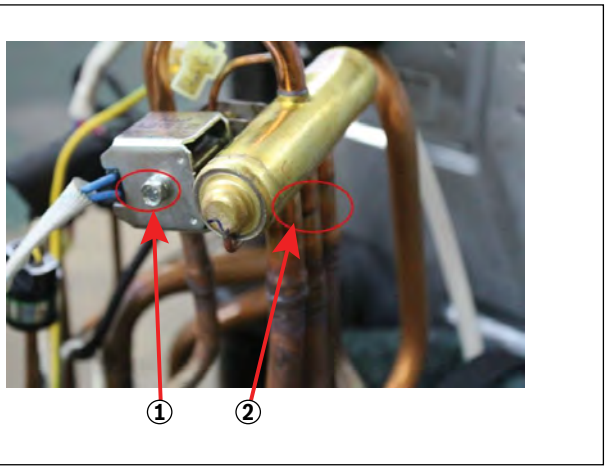


Figure 130

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.

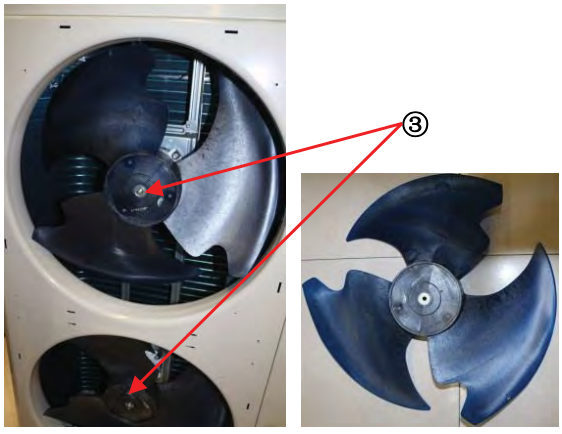


Figure 132

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.

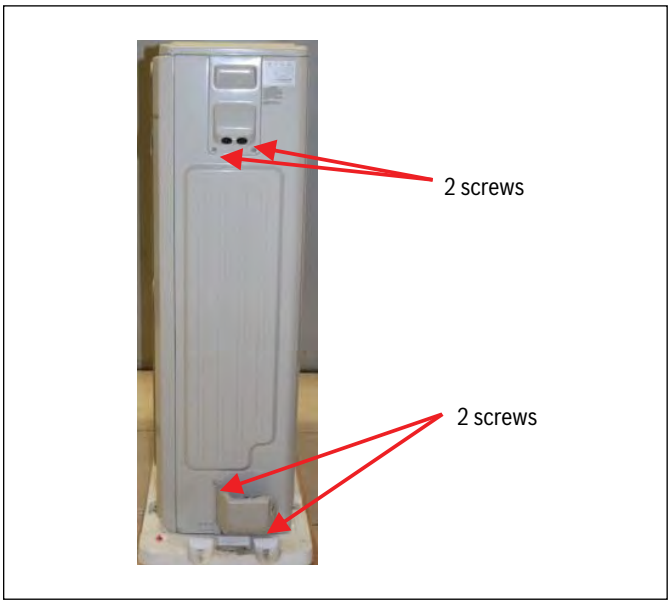


Figure 137

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

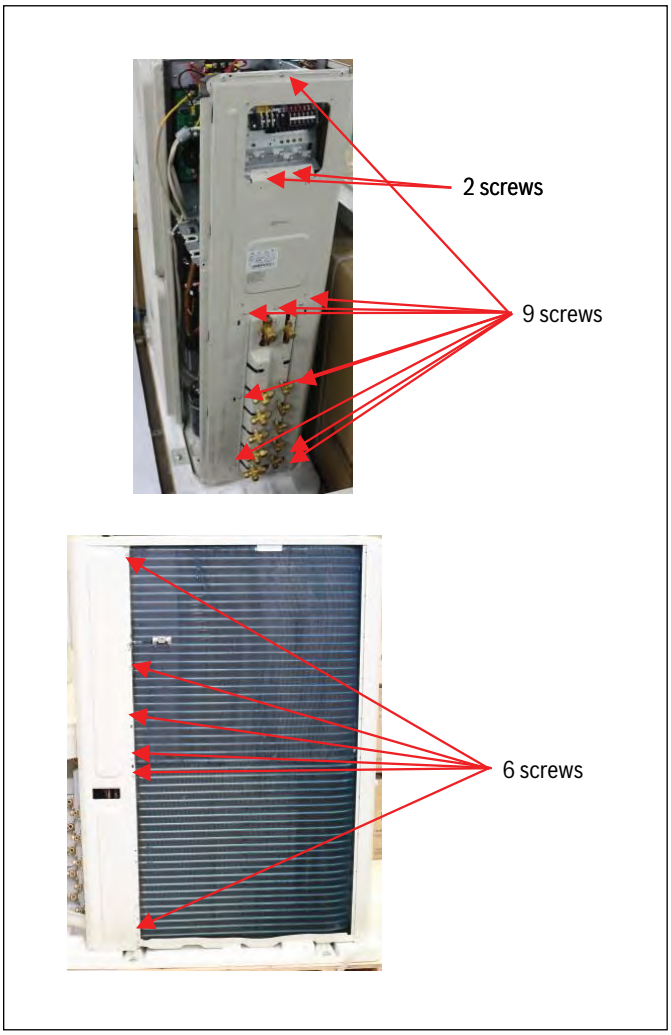


Figure 138

9.7.3 Removing the electrical parts

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

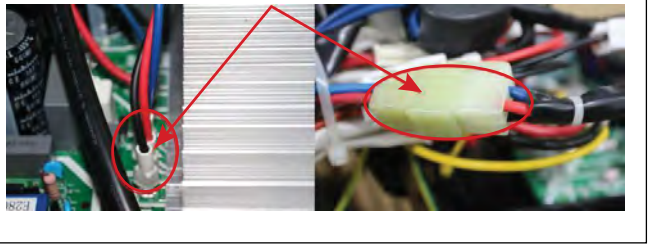


Figure 139

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

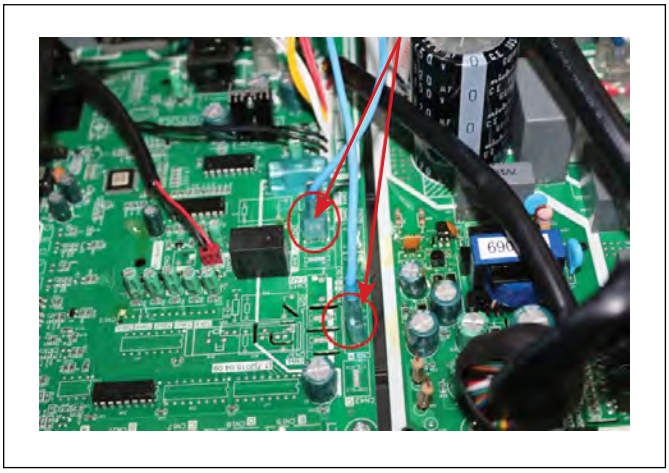


Figure 140

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

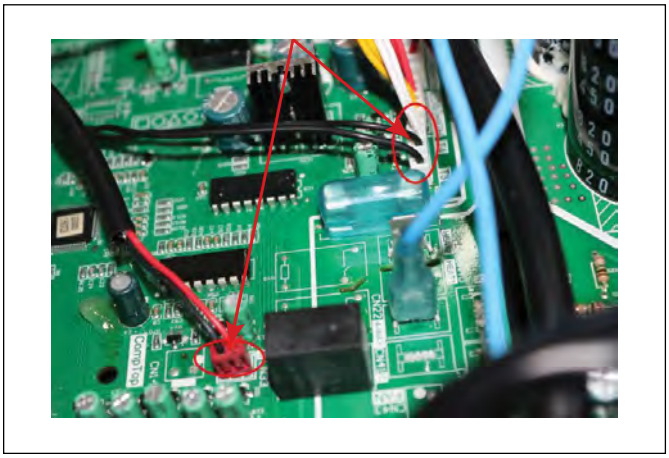


Figure 141

4. Disconnect the pressure switch connector.

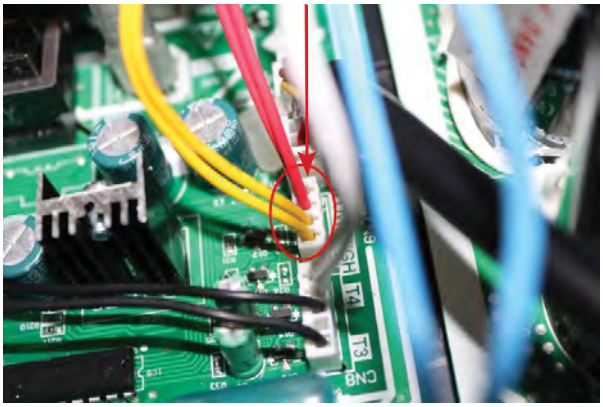


Figure 142

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

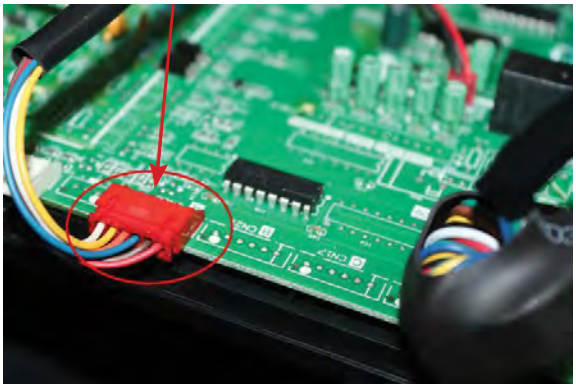


Figure 143

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.

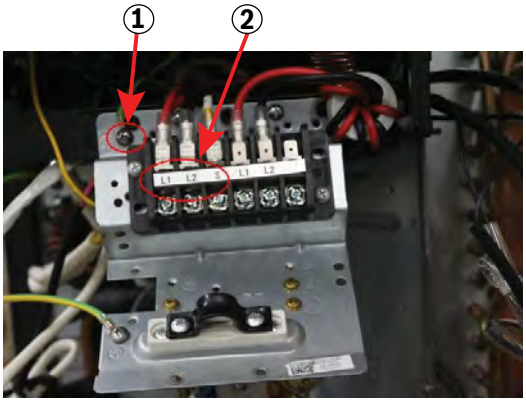


Figure 144

9.8 All Models

9.8.1 Removing the sound blanket

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

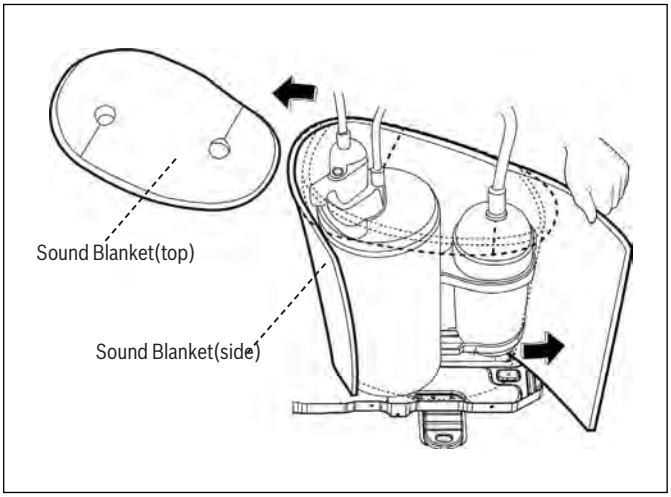


Figure 145

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.

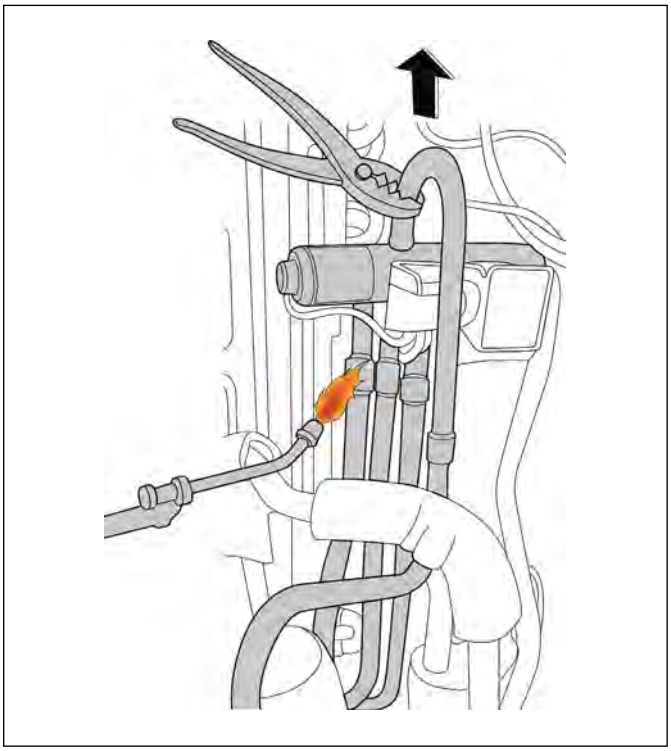


Figure 146

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.

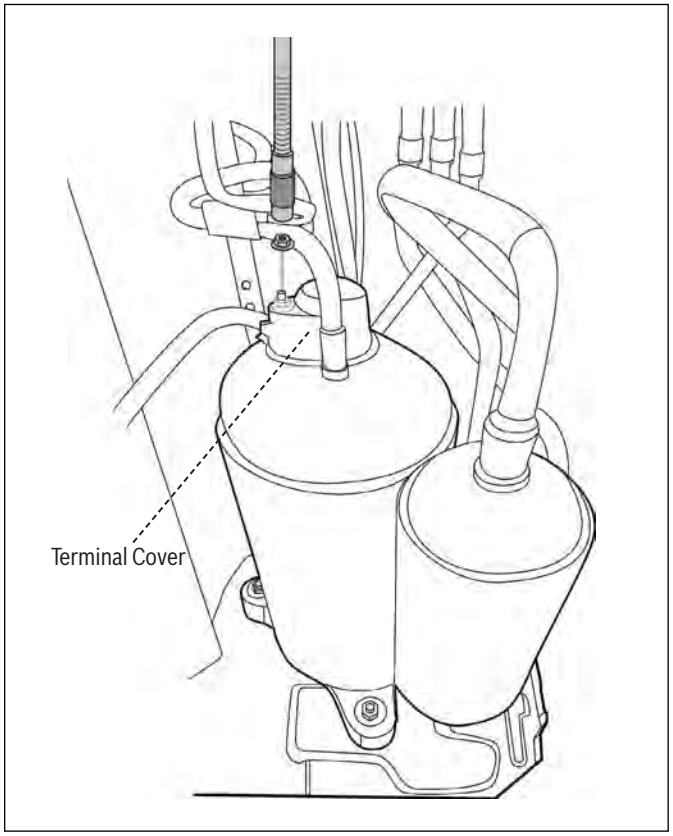


Figure 147

4. Disconnect the connectors.

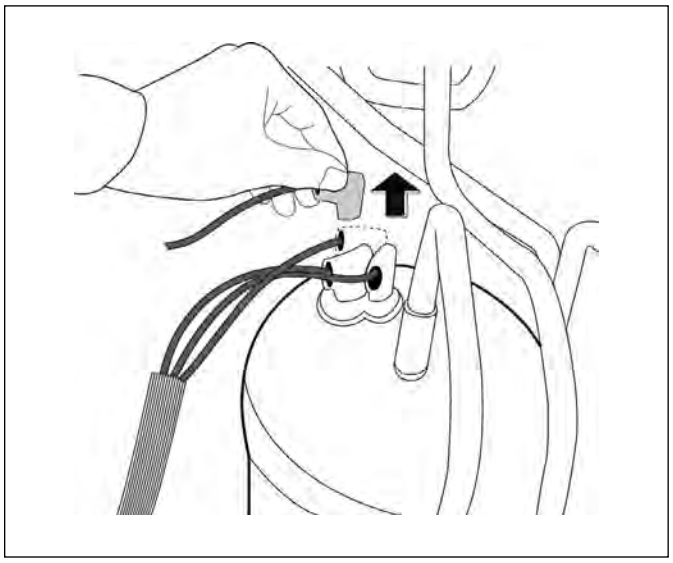


Figure 148

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

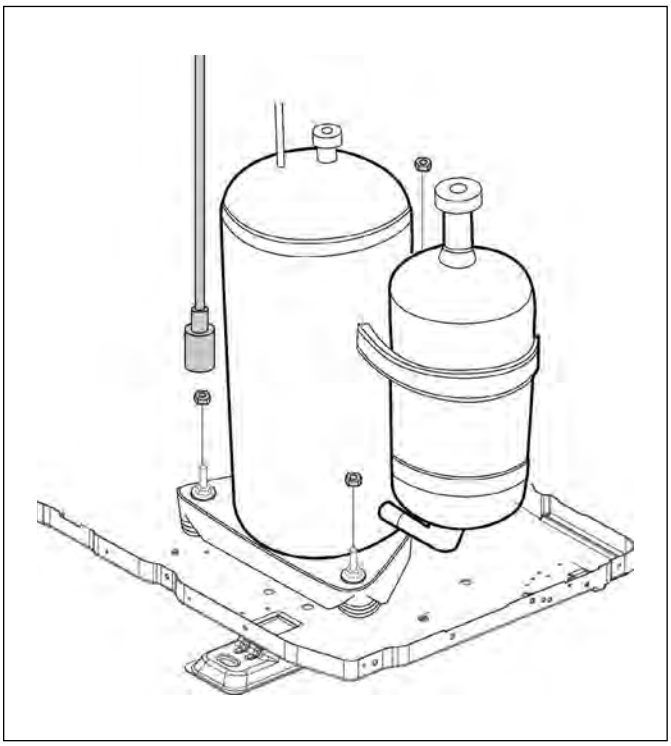


Figure 149

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.

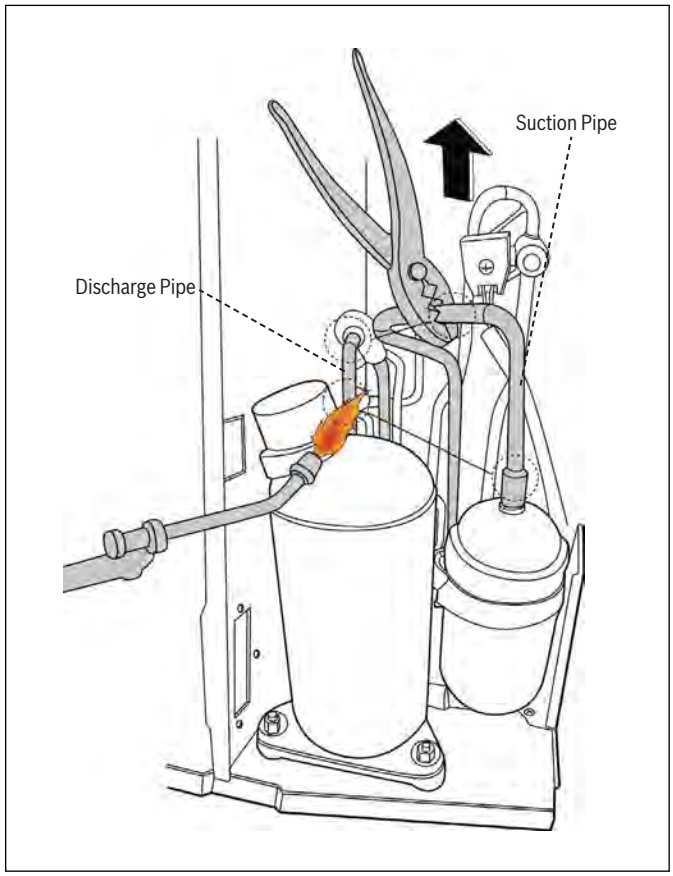


Figure 151

Online Help Resources

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

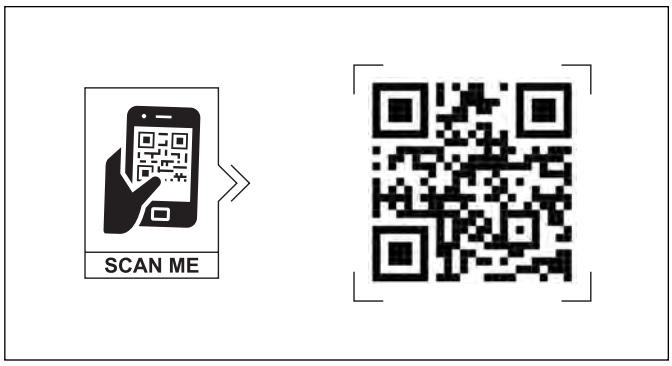


Figure 150

United States and Canada

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BTC 769002302 C / 05.2025