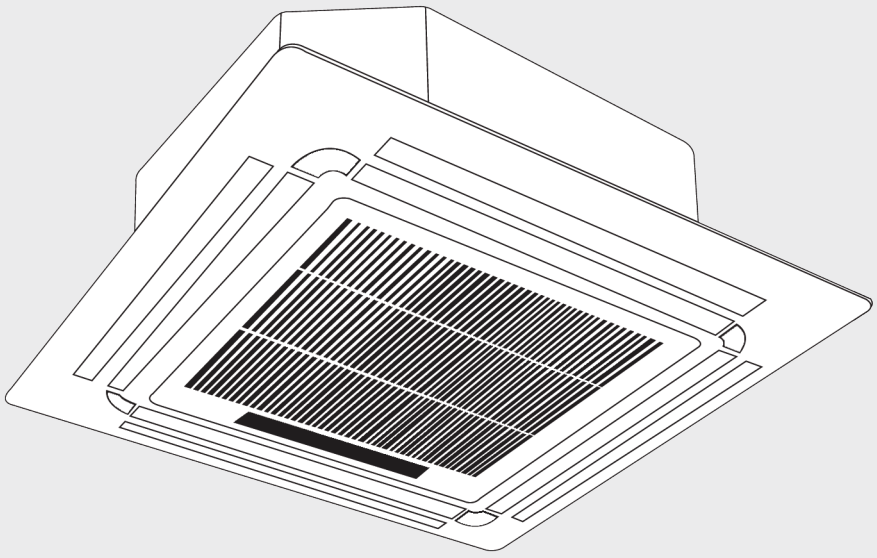
BOSCH

Service Manual

Four Way Cassette Ductless Split Air Conditioner/Heat Pump

Climate 5000 Series - Gen 4



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1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

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

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

Important information

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

1.2 Explanation of Symbols Displayed on the Indoor Unit / Outdoor Unit

Symbol	
	WARNING This symbol shows that this appliance used a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	CAUTION This symbol shows that the operation manual should be read carefully.
 	CAUTION This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION This symbol shows that information is available such as the operating manual or installation manual.

Table 1

1.3 Safety

Please read safety precautions before installation

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

WARNING

Improper or dangerous operation!

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.

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

Contains lead!

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.

NOTICE

Improper operation, product damage!

Generation 4 Mini-Split (R454B) cannot be combined or paired with previous Mini-Split generations (R410A).

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

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.

If connecting power to fixed wiring, an all-pole disconnection device which has at least 3mm clearances in all poles, and have a leakage current that may exceed 10mA, the residual current device(RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

CAUTION

Fire 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.

NOTICE

Product damage!

Fuse specifications: The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection. The specifications of the fuse are printed on the circuit board , for example : T3.15AL/250VAC, T5AL/250VAC, T3.15A/250VAC, T5A/250VAC, T20A/250VAC, T30A/250VAC,etc.

Only blast-proof ceramic fuses can be used.

WARNING

Flammable refrigerant!

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

CAUTION

Fire, personal injury, product damage!

Remove all static electricity before touching units.

1.3.1 For R454B Refrigerant Charge Amount and Minimum Room Area

The indoor and outdoor units are designed to be used together. Please verify the unit you purchased per Table 2.The indoor unit should be installed at least 8.2ft/2.5m above from the floor, and the minimum room area of operating or storage should be as specified in Table 3.

Capacity (Btu/h)	IDU	ODU
9K	BMS500-AAU009-1AHCXD	BMS500-AAS009-1CSXRD, BMS500-AAS009-1CSXHD
	BMS500-AAU012-1AHCXD	
12K	BMS500-AAU012-1AHCXD	BMS500-AAS012-1CSXRD, BMS500-AAS012-1CSXHD
18K	BMS500-AAU018-1AHCXD	BMS500-AAS018-1CSXRD, BMS500-AAS018-1CSXHD
24K	BMS500-AAU024-1AHCXD	BMS500-AAS024-1CSXRD, BMS500-AAS024-1CSXHD
36K	BMS500-AAU036-1AHCXD	BMS500-AAS036-1CSXRD, BMS500-AAS036-1CSXHD
48K	BMS500-AAU048-1AHCXD	BMS500-AAS048-1CSXRD, BMS500-AAS048-1CSXHD

Table 2

WARNING

Fire, property damage, personal injury, or death!

The minimum area for installation must be met. The minimum room area or minimum room area of conditioned space is based on releasable charge and total system refrigerant charge.

Amin [ft /m]	hinst [ft/m]				
mc or mREL [oz/kg]	5.9~7.2 / 1.8~2.2	7.5/2.3	8.2/2.5	8.9/2.7	9.8/3.0
≤62.7/1.776	12/1.10				
63.5/1.8	60/5.53	57/5.29	52/4.86	48/4.50	44/4.05
70.5/2	66/6.14	63/5.88	58/5.41	54/5.01	48/4.50
77.6/2.2	73/6.76	70/6.46	64/5.95	57/5.51	53/4.95
84.6/2.4	79/7.37	76/7.05	70/6.49	65/6.01	58/5.41
91.7/2.6	86/7.99	82/7.64	76/7.03	70/6.51	63/5.86
98.8/2.8	93/8.6	89/8.23	81/7.57	75/7.01	68/6.31
105.8/3	99/9.21	95/8.81	87/8.11	81/7.51	73/6.76
112.9/3.2	106/9.83	101/9.4	93/8.65	86/8.01	78/7.21
119.9/3.4	112/10.44	107/9.99	99/9.19	92/8.51	82/7.66
127/3.6	119/11.06	114/10.58	105/9.73	97/9.01	87/8.11
134/3.8	126/11.67	120/11.16	111/10.27	102/9.51	92/8.56
141.1/4	132/12.29	126/11.75	116/10.81	108/10.01	97/9.01
148.1/4.2	139/12.9	133/12.34	122/11.35	113/10.51	102/9.46
155.2/4.4	145/13.51	139/12.93	128/11.89	119/11.01	107/9.91
162.2/4.6	152/14.13	145/13.51	134/12.43	124/11.51	111/10.36
169.3/4.8	159/14.74	152/14.1	140/12.97	129/12.01	116/10.81
176.4/5	165/15.36	158/14.69	145/13.51	135/12.51	121/11.26

Table 3

***Amin**: the required minimum room area in ft² /m²*

***mc**: the actual refrigerant charge in the system in oz/kg*

***mREL**: the refrigerant releaseable charge in oz/kg*

***hinst**: the height of the bottom of the appliance relative to the floor of the room after installation.*

Installation (where refrigerant pipes are allowed)

- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
- Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
- That the installation of pipe-work shall be kept to a minimum.
- That pipe-work shall be protected from physical damage.
- Where refrigerant pipes shall be compliance with national gas regulations.
- That mechanical connections shall be accessible for maintenance purposes.
- Be more careful that foreign matter (oil, water,etc) does not enter the piping.
  Also, when storing the piping, securely seal the opening by pinching, taping, etc.
- All working procedure that affects safety means shall only be carried by competent persons.
- Appliance shall be stored in a well ventilated area where the room size corresponds to the room area as specifiec for operation.
- Joints shall be tested with detection equipment with a capability of 5 g/ year of refrigerant or better, with the equipment in standstill and under operation or under a pressure of at least these standstill or operation conditions after installation. Detachable joints shall NOT be used in the indoor side of the unit (brazed, welded joint could be used).
- In cases that require mechanical ventilation, ventilation openings shall be kept clear of obstruction.
- LEAK DETECTION SYSTEM installed. Unit must be powered except for service. For the unit with refrigerant sensor, when the refrigerant sensor detects refrigerant leakage, the indoor unit will display a error code (EL0C) and emit a buzzing sound, the compressor of outdoor unit will immediately stop, and the indoor fan will start running. The service life of the refrigerant sensor is 15 years. When the refrigerant sensor malfunctions, the indoor unit will display the error code “FHCC”. The refrigerant sensor can not be repaired and can only be replaced by the manufacture. It shall only be replaced with the sensor specified by the manufacture.

Flammable Refrigerant

When a FLAMMABLE REFRIGERANT is used, the requirements for installation space of appliance and/or ventilation requirements are determined according to:

- the mass charge amount(M) used in the appliance,
- the installation location,
- the type of ventilation of the location or of the appliance.
- piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
- that protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris;
- that piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damaging the system;
- that steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation;
- that precautions shall be taken to avoid excessive vibration or pulsation;
- the minimum floor area of the room shall be mentioned in the form of a table or a single figure without reference to a formula;
- after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:
  a. The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system can not be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
  b. The test pressure after removal of pressure source shall be maintained for at least 1 h with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.
  c. During the evacuation test, after achieving a vacuum level specified in the manual or less, the refrigeration system shall be isolated from the vacuum pump and the pressure shall not rise above 500 microns within 10 min. The vacuum pressure level shall be specified in the manual, and shall be the lessor of 500 microns or the value required for compliance with national and local codes and standards, which may vary between residential, commercial,and industrial buildings. - field-made
- field-made refrigerant joints indoors shall be tightness tested according to the following requirements: The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

Qualification of Workers

Any maintenance, service and repair operations must be required qualification of the working personnel. Every working procedure that aects safety means shall only be carried out by competent persons that joined the training and achieved competence should be documented by a certificate. The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. All training shall follow the ANNEX HH requirements of UL 60335-2-40 4th Edition. Examples for such working procedures are:

- breaking into the refrigerating circuit;
- opening of sealed components;
- opening of ventilated enclosures.

Ventilated area

Ensure that the area is in the open or that it it adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Detection of Flammable Refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerantfree area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

Examples of leak detection fluids are:

- bubble method
- fluorescent method agents

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. See the following instructions of removal of refrigerant.

Removal and Evacuation

When breaking into the refrigerant circuit to make repairs or for any other purpose conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations
- purge the circuit with inert gas (optional for A2L)
- evacuate (optional for A2L)
- continuously flush or purge with inert gas when using flame to open circuit; and open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within thesystem (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed: Works shall be undertaken with appropriate tools only (In case of uncertainty, please consult the manufacturer of the tools for use with flammable refrigerants) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them. Cylinders shall be kept upright. Ensure that the refrigeration system is earthed prior to charging the system with refrigerant. Label the system when charging is complete(if not already). Extreme care shall be taken not to overfill the refrigeration system. Prior to recharging the system it shall be pressure tested with oxygen free nitrogen (OFN). The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated.

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
208-230V	Cassette	9k	BMS500-AAU009-1AHCXD	BMS500-AAS009-1CSXRD	BMS500-AAS009-1CSXHD	
		12k	BMS500-AAU012-1AHCXD	BMS500-AAS012-1CSXRD	BMS500-AAS012-1CSXHD	
		18k	BMS500-AAU018-1AHCXD	BMS500-AAS018-1CSXRD	BMS500-AAS018-1CSXHD	
		24k	BMS500-AAU024-1AHCXD	BMS500-AAS024-1CSXRD	BMS500-AAS024-1CSXHD	
		36k	BMS500-AAU036-1AHCXD	BMS500-AAS036-1CSXRD		BMS500-AAS036-1CSXLD
		48k	BMS500-AAU048-1AHCXD			BMS500-AAS048-1CSXLD

Table 4

3 Dimensions

3.1 9K, 12K & 18K Models

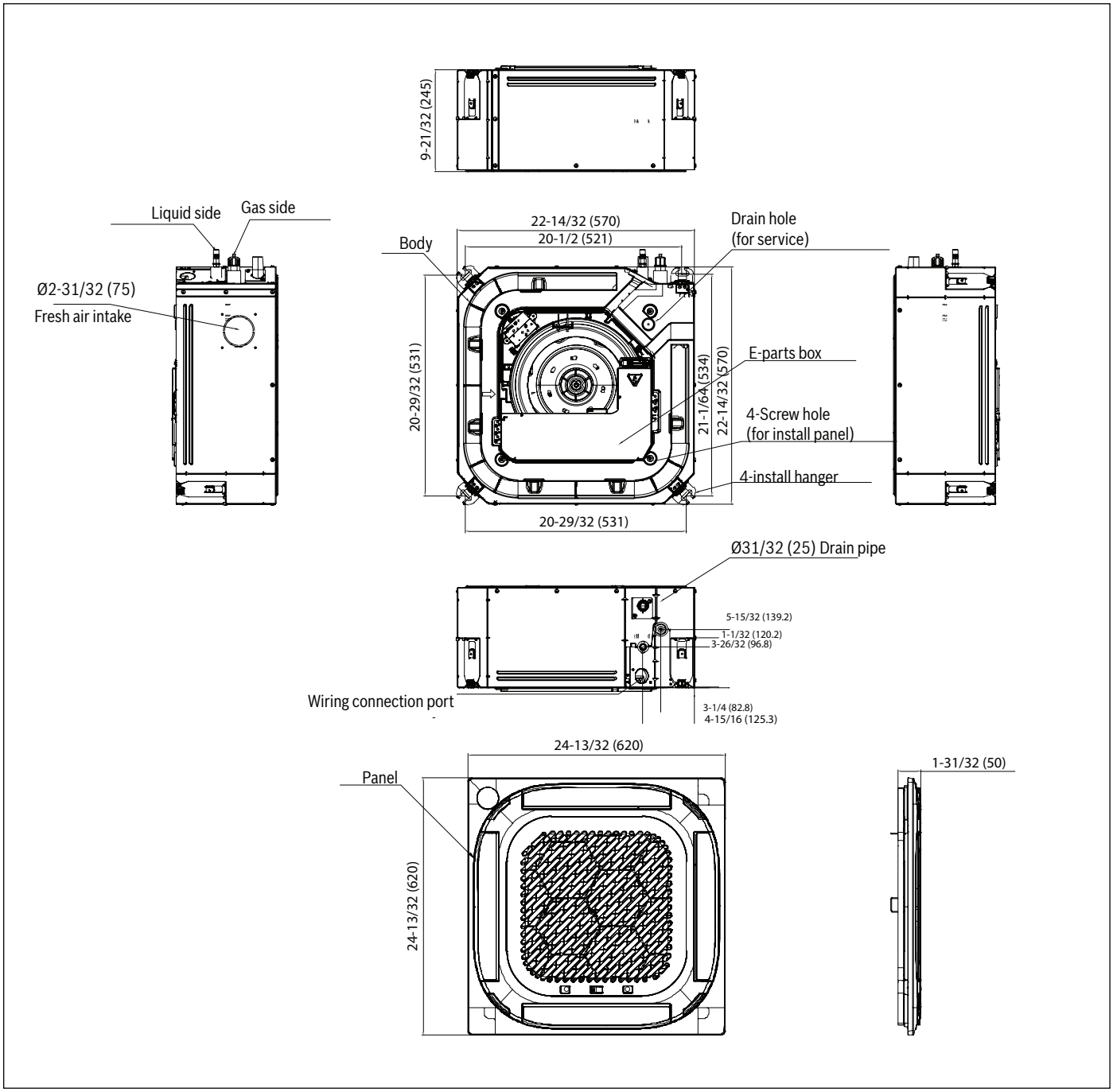


Figure 1 Dimensions in inches (mm)

3.2 24K, 36K, 48K Models

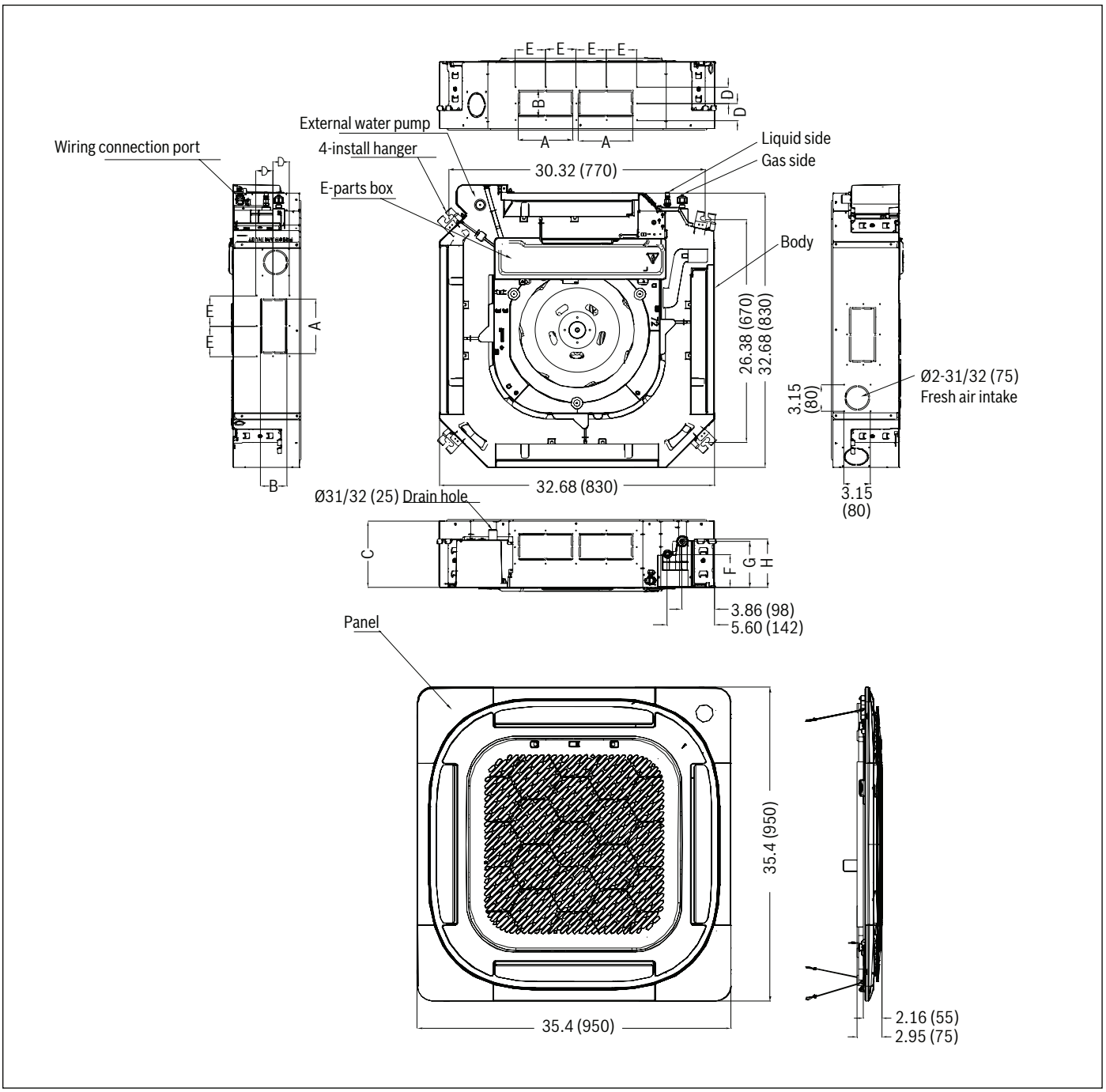


Figure 2 Dimensions in inches (mm)

BTU/h	Unit	A	B	C	D	E	F	G	H
24	mm	165	80	205	50	92	101	139	146
	in	6.5	3.15	8.07	1.97	3.62	4	5.5	5.75
36	mm	165	100	245	60	92	101	139	146
	in	6.5	3.94	9.65	2.36	3.62	4	5.5	5.75
48	mm	165	100	287	60	92	101	139	146
	in	6.5	3.94	11.3	2.36	3.62	4	5.5	5.75

Table 5

3.3 Outdoor Unit

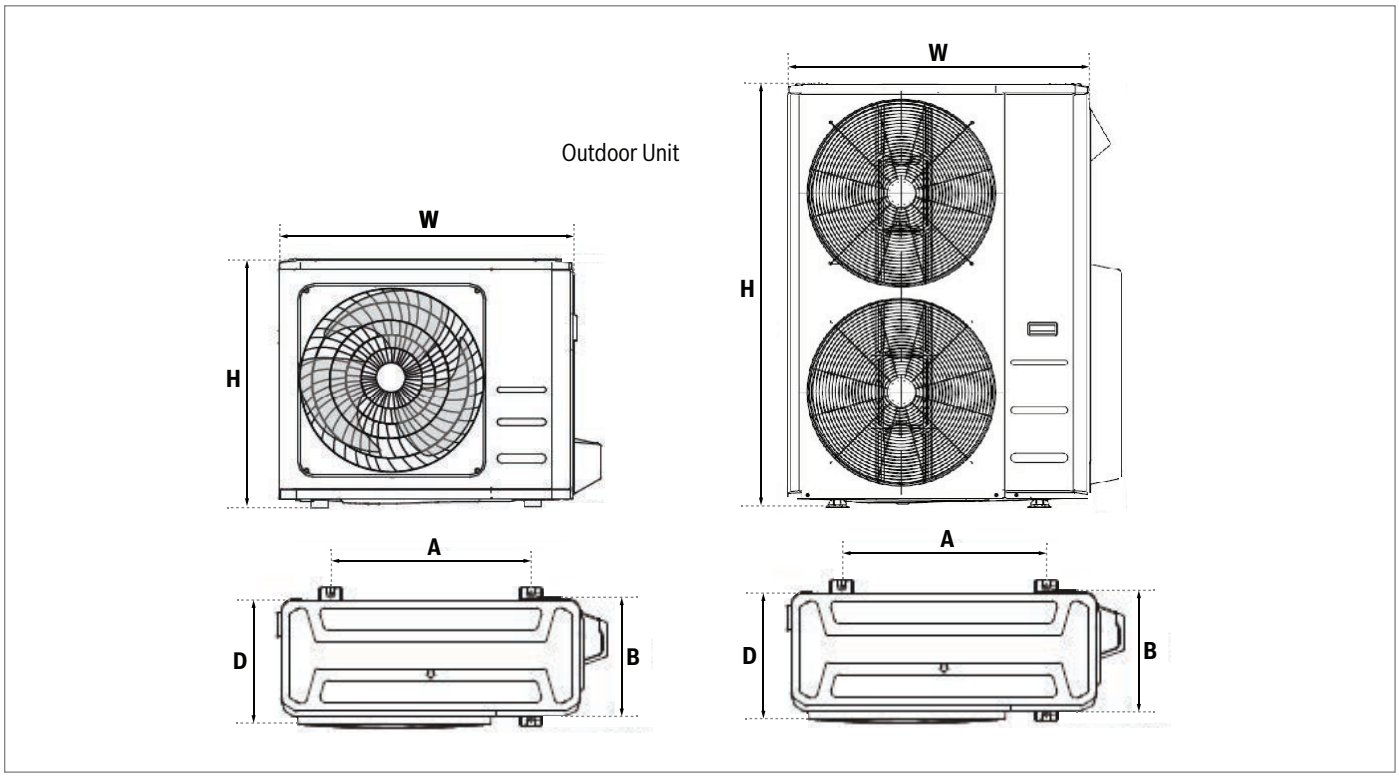


Figure 3

Outdoor Model	Outdoor Unit Dimensions in (mm)	Mounting Dimensions	
	W x H x D	A in (mm)	B in (mm)
BMS500-AAS009-1CSXRD, BMS500-AAS012-1CSXRD	30.1"x 21.8"x 11.9" (765x555x303)	17.8" (454)	11.3" (286)
BMS500-AAS009-1CSXHD, BMS500-AAS012-1CSXHD	31.7"x 21.8"x 13.0" (805x554x330)	20.1" (511)	12.5" (317)
BMS500-AAS018-1CSXRD, BMS500-AAS018-1CSXHD, BMS500-AAM018-1CSXRD	35.0"x 26.5"x 13.5" (890x673x342)	26.1" (663)	13.9" (354)
BMS500-AAS036-1CSXLD, BMS500-AAS036-1CSXRD, BMS500-AAS024-1CSXRD, BMS500-AAS024-1CSXHD, BMS500-AAM027-1CSXRD, BMS500-AAM036-1CSXRD, BMS500-AAM018-1CSXHD, BMS500-AAM027-1CSXHD	37.2"x 31.9"x 16.34" (946x810x420)	673 (26.5")	403 (15.9")
BMS500-AAS048-1CSXLD, BMS500-AAM048-1CSXRD, BMS500-AAM036-1CSXHD, BMS500-AAM048-1CSXHD	37.5"x 52.5"x 16.34" (952x1333x415)	634 (25.0")	404 (15.9")

Table 6

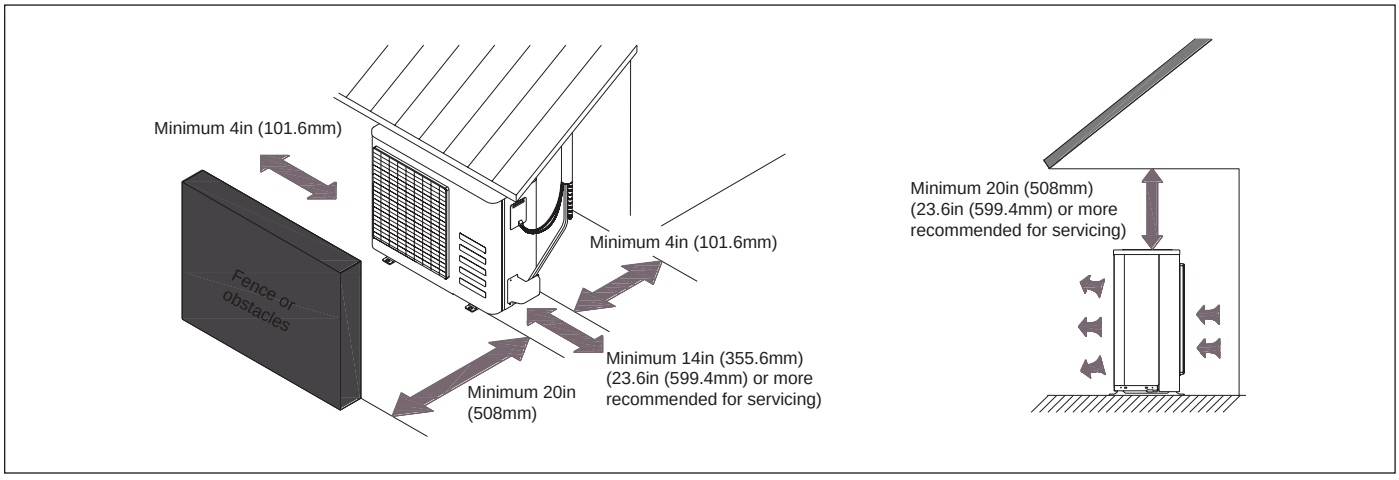


Figure 4

4 Refrigerant Cycle Diagrams

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

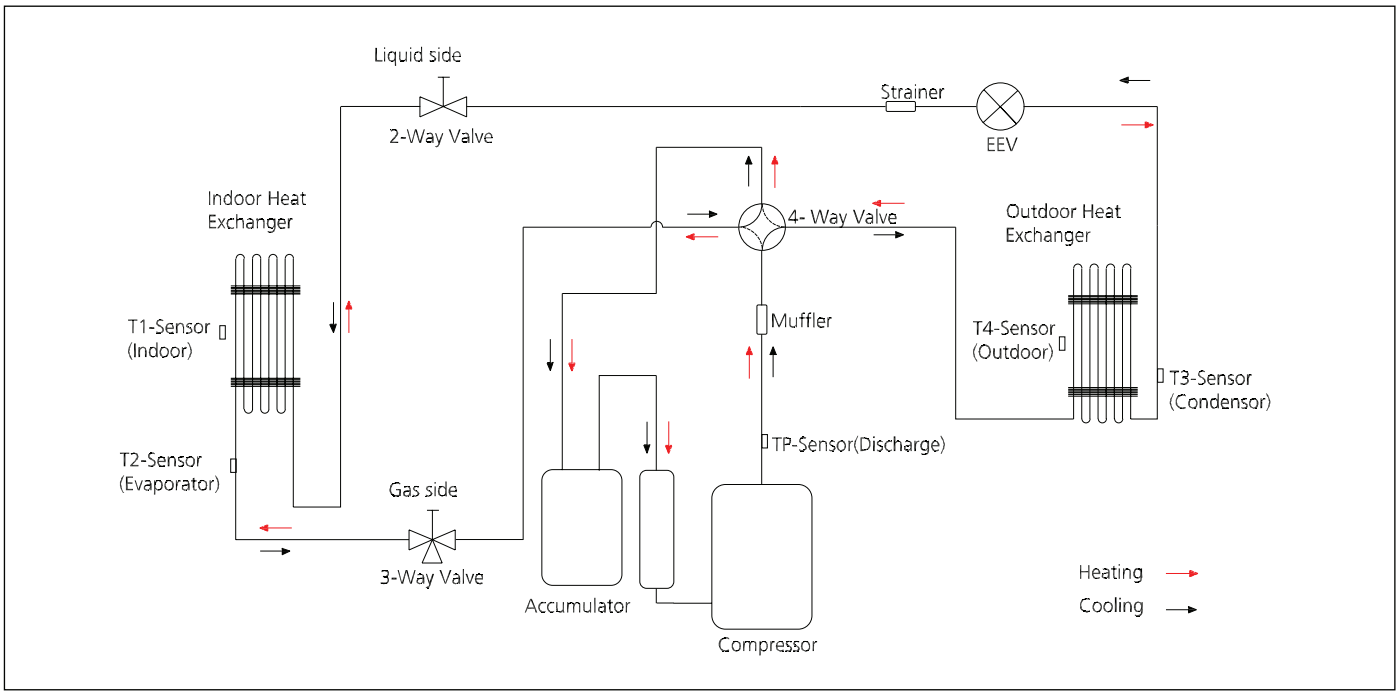


Figure 5

4.2 Regular and Max Performance 18K Systems

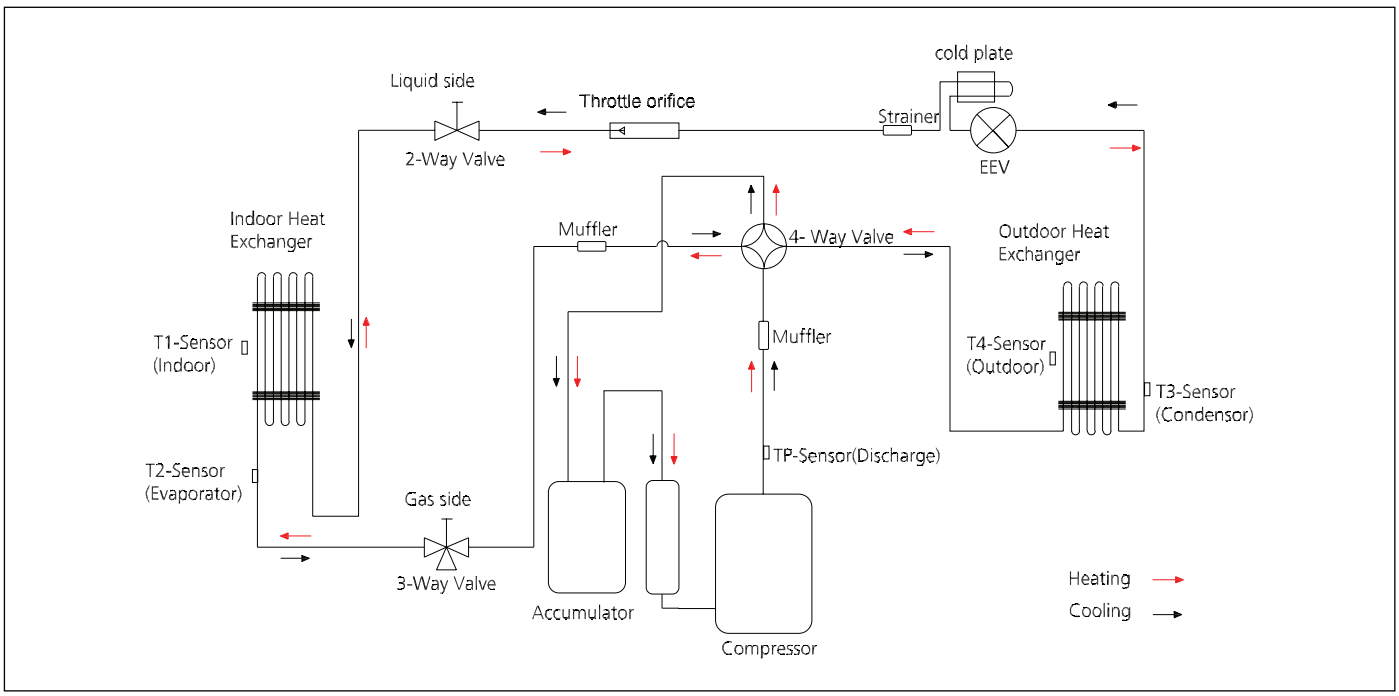


Figure 6

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

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

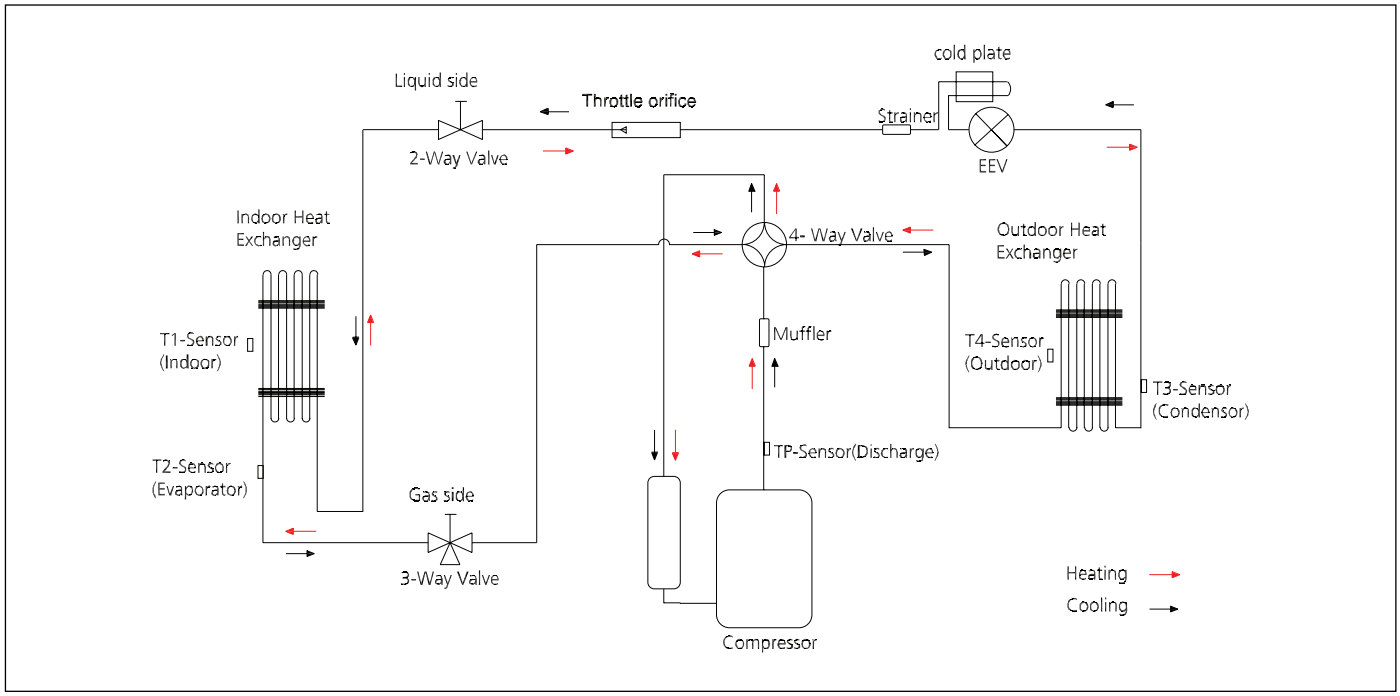


Figure 7

4.4 Regular 36K System

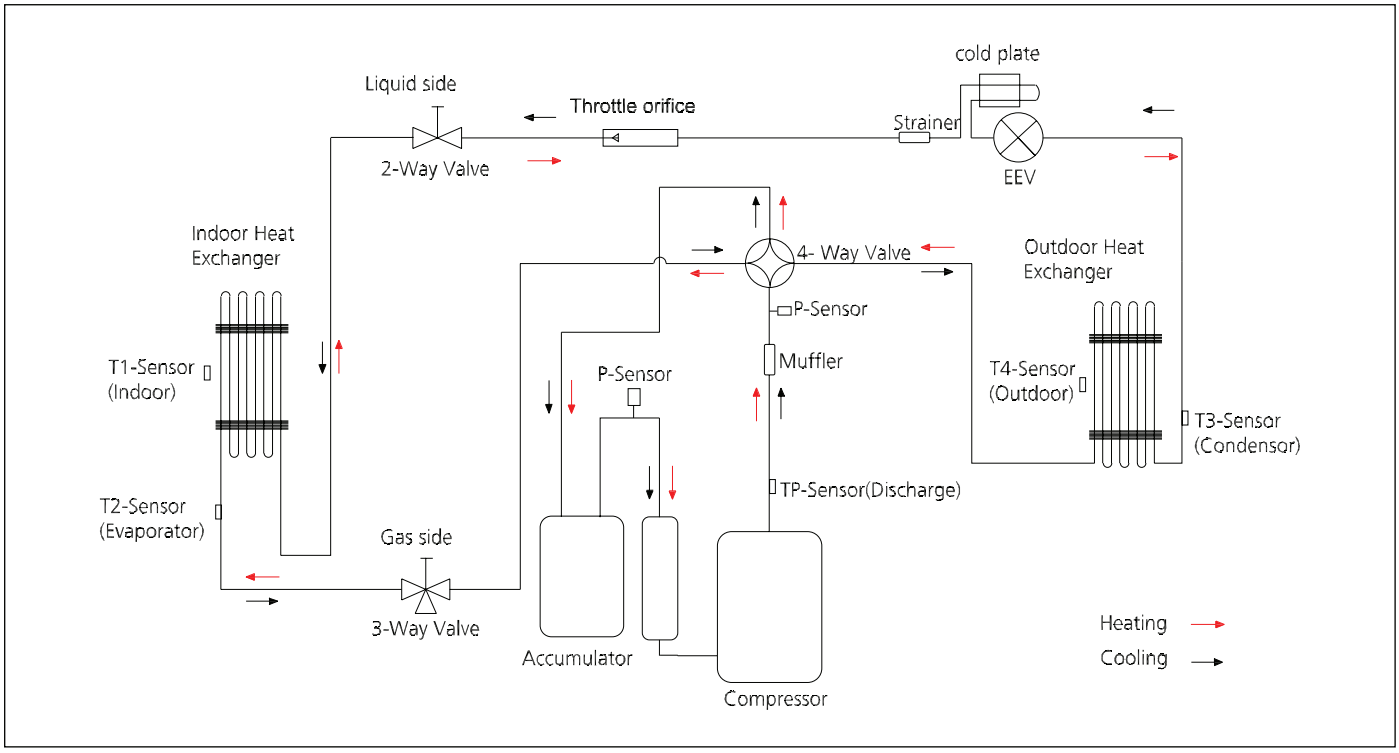


Figure 8

4.5 Light Commercial 36K, 48K, 60K Systems

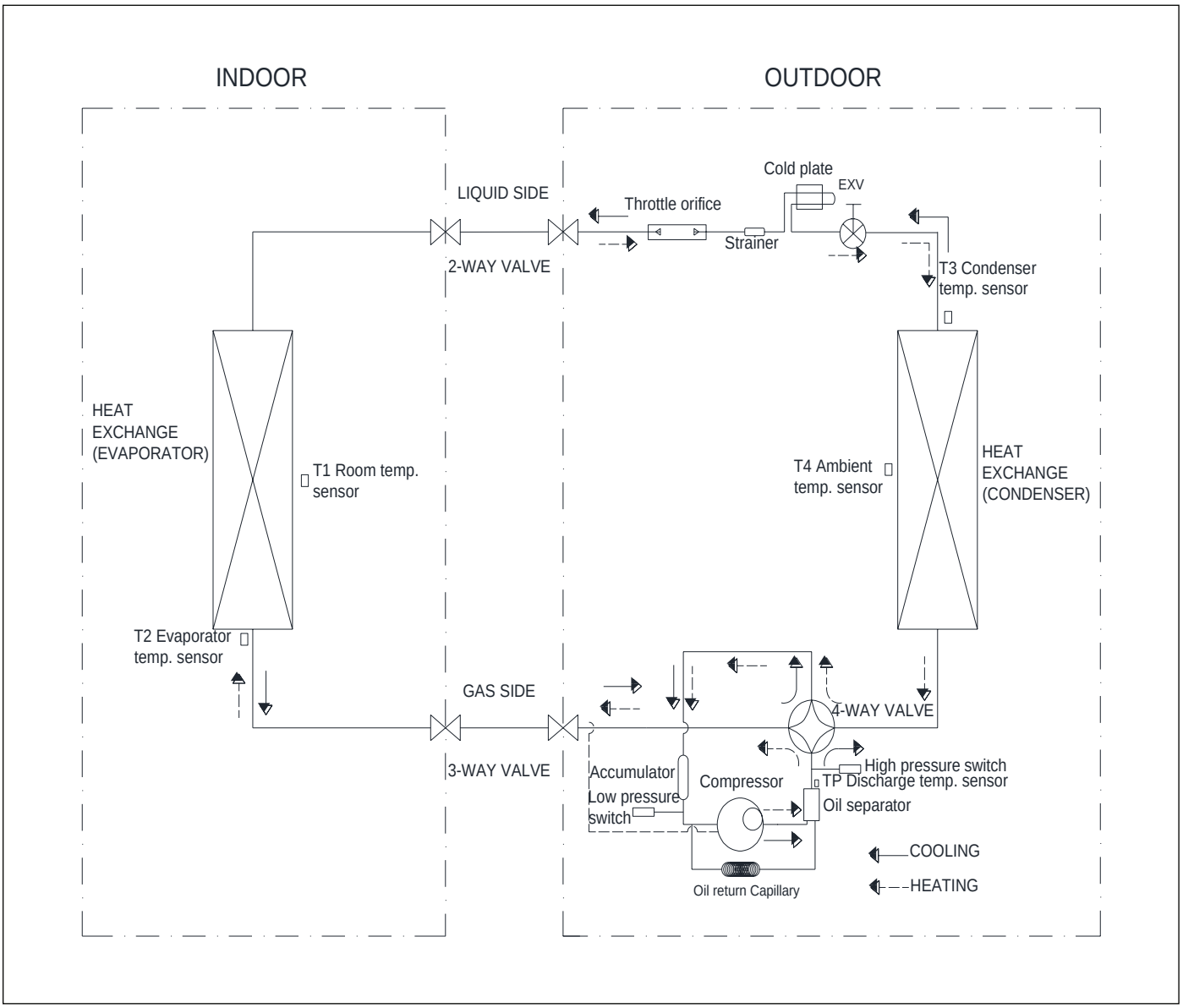


Figure 9

5 Installation Details

5.1 Torque Requirements

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

Table 7

5.2 Connecting the Cables

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

- Cable type: SOOW type

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

Table 8

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

5.3 Pipe Length and Elevation

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

Table 9

Capacity	Precharged length (ft / m)	Max Pipe Length (ft / m)	Max difference in height (ft / m)	Additional charge for each ft (oz)
9K	24.6 / 7.5	82/25	49.2/15	0.16
12K				
18K		98.4/30	65.6/20	0.16
24K		164 / 50	82 / 25	0.32
36K		246/75	98.4/30	
48K				

Table 10

6 First Time Installation

6.1 Air Purging With Vacuum Pump

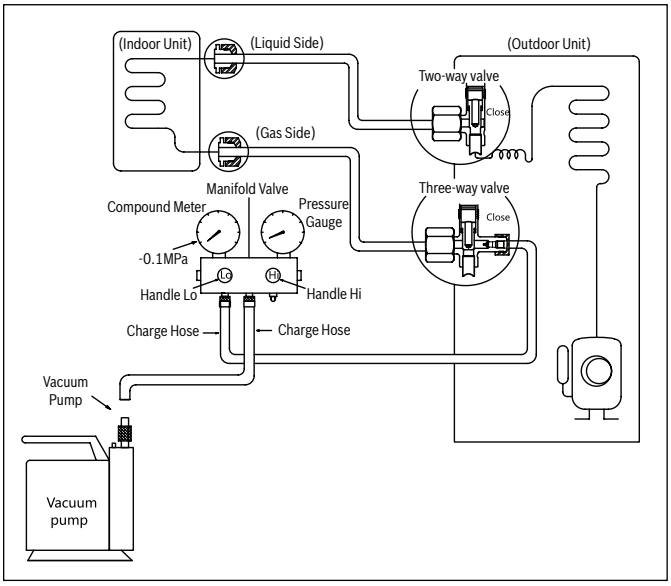


Figure 10

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

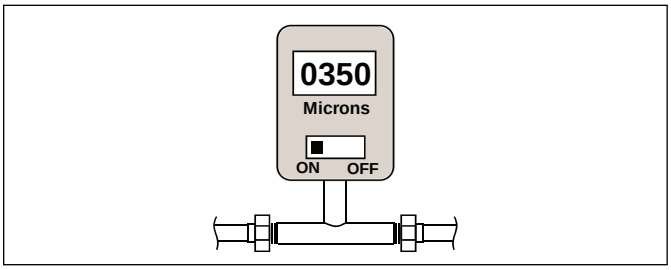


Figure 11

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

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

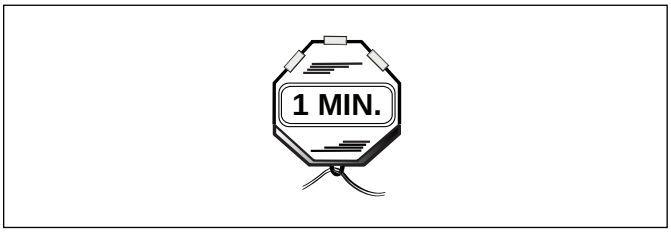


Figure 12

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

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

6.2 Adding the Refrigerant to an Existing System

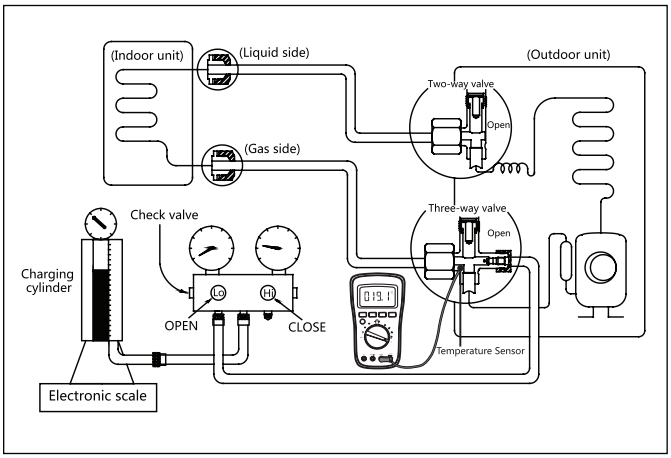


Figure 13

Procedure

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

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

Evacuation for the whole system

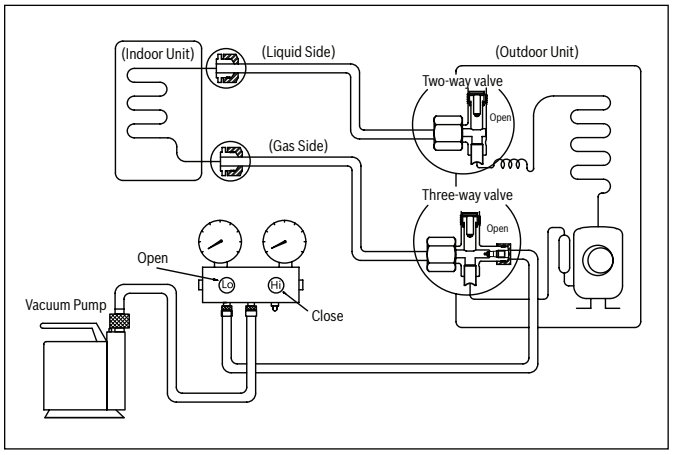


Figure 14

Procedure

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

6.4 Operation Characteristics

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

Table 11

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.

7 Electronic Functions

7.1 Abbreviation

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

7.2 Display Function

7.2.1 Icon Explanation on Indoor Display Board

7.2.1.1 New Cassette Units

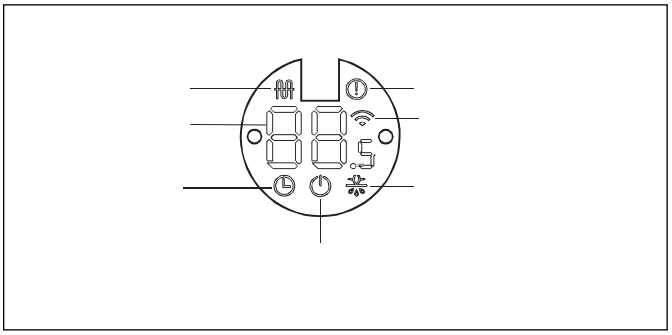


Figure 15

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

Please use Wired Wall Thermostat (optional accessory) to check system information easily.

7.3 Main Protection

7.3.1 Compressor Three-Minute Delay at Restart

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

7.3.2 Automatic Shutoff Based on Discharge Temperature

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

7.3.3 Inverter Module Protection

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

7.3.4 Indoor Fan Delayed Operation

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

7.3.5 Compressor Preheating

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

7.3.6 Sensor Redundancy and Automatic Shutoff

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

7.3.7 Refrigerant Leakage Detection

When the system detects a malfunction of the refrigerant, the indoor unit will automatically display the following error codes:

- ELOC (System lacks refrigerant)
- EHC1 (Refrigerant sensor detects leakage)
- EHC2 (Working condition of the refrigerant sensor is out of range and leakage is detected)
- EHC3 (Working condition of the refrigerant sensor is out of range)
- ECC1 (Other indoor unit refrigerant sensor detects leakage (Multi-zone))

When "EHC1" or "EHC2" error occurs, the buzzer will continue to beep for 5 to 6} minutes before stopping. You can also press any button on the remote controller to stop the buzzer.

7.4 Operation Modes and Functions

7.4.1 Fan Mode

1. Outdoor fan and compressor stop.
2. Temperature setting function is disabled and indoor room temperature is displayed.
3. Indoor fan can be set to 1%~100%, or auto.
4. The louver operates same as in cooling mode.
5. Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 75.2ºF. (Tsc-75.2ºF)/ 24ºC. (Tsc-24ºC)

7.4.2 Cooling Mode

7.4.2.1 Outdoor Fan Running Rules

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

7.4.2.2 Indoor Fan Running Rules

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

For DC fan motor units:

- Descent curve
  - When T1-Tsc is lower than or equal to 38.3 ℉ (3.5℃), fan speed reduces to 80%;
  - When T1-Tsc is lower than or equal to 33.8 ℉ (1℃), fan speed reduces to 60%;
  - When T1-Tsc is lower than or equal to 32.9 ℉ (0.5℃), fan speed reduces to 40%;
  - When T1-Tsc is lower than or equal to 32 ℉ (0℃), fan speed reduces to 20%;
  - When T1-Tsc is lower than or equal to -31.1℉ (-35℃), fan speed reduces to 1%.
- Rise curve
  - When T1-Tsc is higher than 32 ℉ (0℃), fan speed increases to 20%;
  - When T1-Tsc is higher than 32.9 ℉ (0.5℃), fan speed increases to 40%;
  - When T1-Tsc is higher than 33.8 ℉ (1℃), fan speed increases to 60%;
  - When T1-Tsc is higher than 34.7 ℉ (1.5℃), fan speed increases to 80%;
  - When T1-Tsc is higher than 39.2 ℉ (4℃), fan speed increases to 100%

7.4.2.3 Condenser Temperature Protection

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

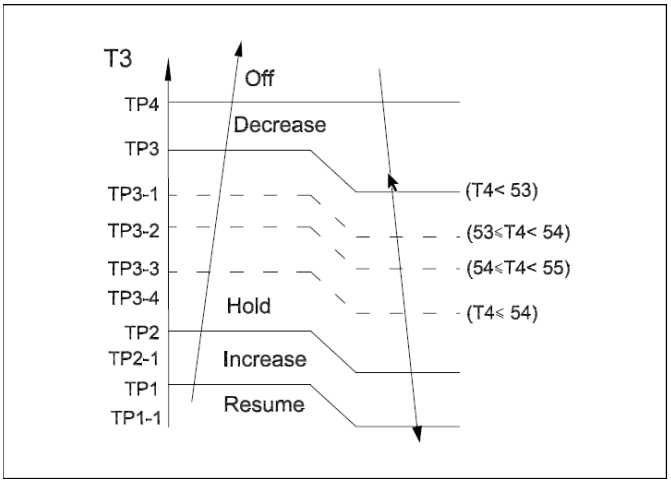


Figure 16

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

7.4.2.4 Evaporator Temperature Protection

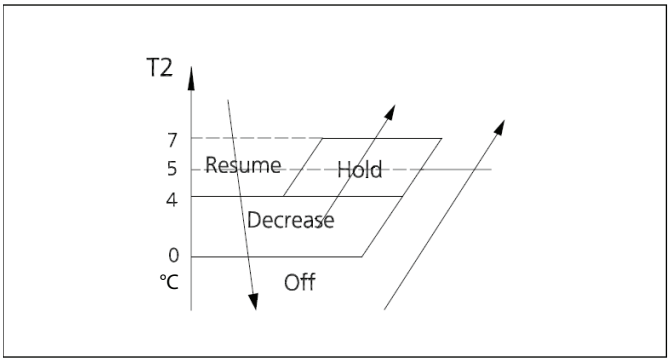


Figure 17

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

7.4.3 Heating Mode

6.4.3.1 Outdoor Fan Operation

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

For different outdoor units, the fan speeds are different.

6.4.3.2 Indoor Fan Operation

1. In heating mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or mute. The anti-cold wind function has the priority.
   - Anti-cold function : The indoor fan is controlled by the indoor temperature T1 and indoor unit coil temperature T2.

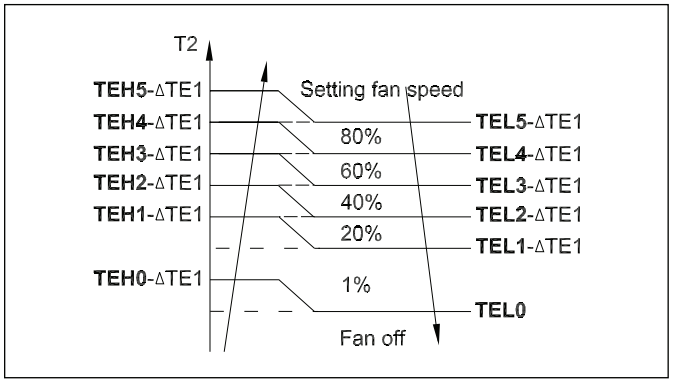


Figure 18

Legend:
TEH0=25C, TEH1=32C, TEH2=33C, TEH3=34C, TEH4=35C, TEH5=36C

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

Table 12

2. Auto fan

For DC fan motor units:

- Rise curve
  - When T1-Tsc is higher than -2.7℉/-1.5℃ fan speed reduces to 80%;
  - When T1-Tsc is higher than 0℉/0℃, fan speed reduces to 60%;
  - When T1-Tsc is higher than 0.9℉/0.5℃, fan speed reduces to 40%;
  - When T1-Tsc is higher than 1.8℉/1℃, fan speed reduces to 20%.
- Descent curve
  - When T1-Tsc is higher than -2.7℉/-1.5℃, fan speed reduces to 80%;
  - When T1-Tsc is higher than 0℉/0℃, fan speed reduces to 60%;
  - When T1-Tsc is higher than 0.9℉/0.5℃, fan speed reduces to 40%;
  - When T1-Tsc is higher than 1.8℉/1℃, fan speed reduces to 20%.

7.4.4 Defrost Mode

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

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

"dF" will be displayed.

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

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

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

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

For some models:

- If any one of the following conditions is satisfied, the unit enters defrosting mode:
  - If T3 or T4 is lower than -3℃ (26.6℉) for 30 seconds,Ts-T1 is lower than 41℉ (5℃) and compressor running time is more than EE_TIME_DEFROST7.
  - If T3 or T4 is lower than -3℃ (26.6℉) for 30 seconds and compressor running time is more than EE_TIME_DEFROST7+30.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - T3 rises above TCDE1+ 39.2℉/ 102.56℃. (TCDE1= 53.6℉ /12℃).
  - T3 maintained above TCDE2+ 39.2℉ / 4℃ for 80 seconds. (TCDE2= 35.6℉ /2℃).
  - Unit runs for 15 minutes consecutively in defrosting mode.

7.4.4.1 Evaporator Coil Temperature Protection

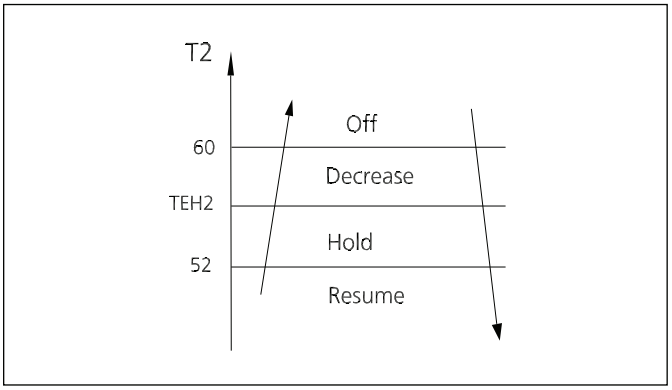


Figure 19

Off: Compressor stops.

Decrease: Decrease the running frequency to the lower level per 20 seconds.

Hold: Keep the current frequency.

Resume: No limitation for frequency.

7.4.5 Auto-Mode

- This mode can be selected with the remote controller and the temperature setting can be adjusted between 60.8℉~86℉ (16℃~30℃).

Case 1:

- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT (ΔT =T1-TS).

ΔT	Running mode
ΔT>2℃(3.6℉)	Cooling
-3℃(-5.4℉)≤ΔT≤2℃(3.6℉)	Fan-only
ΔT<-3℃(-5.4℉)	Heating*

Table 13 Heating: In auto mode, cooling only models run the fan*

- Indoor fan will run at auto fan speed.
- The louver operates same as in relevant mode.
- If the machine switches mode between heating and cooling, the compressor will keep stopping for certain time and then choose mode according to ΔT.

Case 2:

In auto mode, the machine selects cooling, heating or fan-only mode on the basis of T1,Ts and Outdoor ambient temperature(T4).

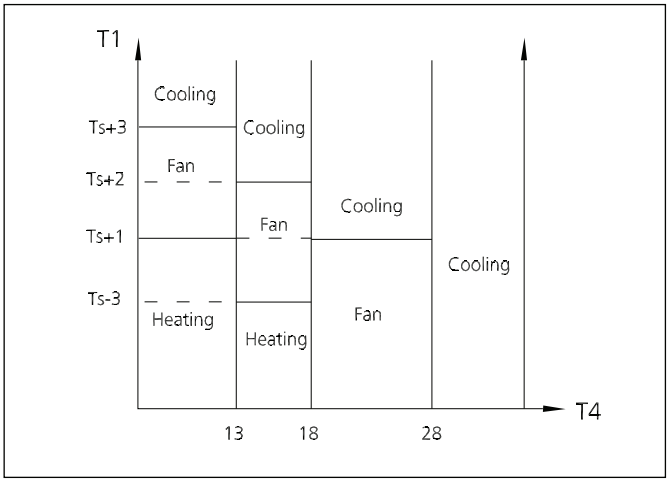


Figure 20

Case 3:

In auto mode, the machine selects cooling, heating or fan-only mode on the basis of T1,Ts, Outdoor ambient temperature(T4) and relative humidity(φ).

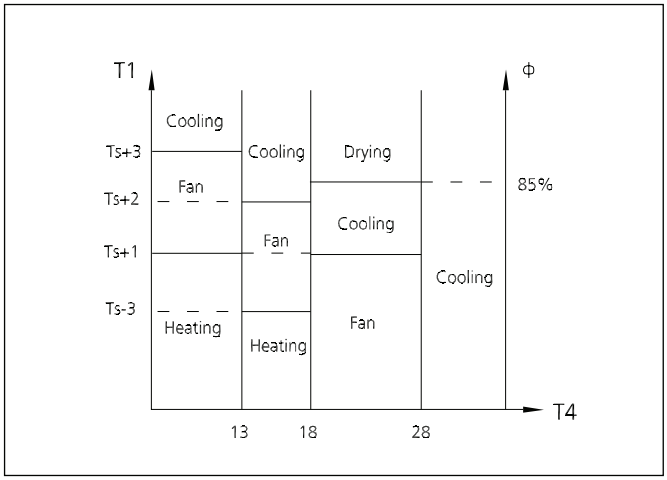


Figure 21

6.4.6 Dry Mode

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

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

7.4.7 Forced Operation Function

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

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

7.4.8 Timer Function

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

7.4.9 Sleep Function

- The sleep function is available in cooling, heating or auto mode.
- Operation process in sleep mode is as follows:
  When cooling, the setting temperature rises 1.8℉ (1℃) (be lower than 86℉ (30℃)) every one hour, 2 hours later the setting temperature stops rising and the indoor fan is fixed at low speed.

  When heating, the setting temperature decreases 1.8℉ (1℃) (be higher than 60.8℉ (16℉)) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed at low speed. (Anti-cold wind function has the priority).
- Operation time in sleep mode is 8 hours. After 8 hours, after which, the unit exits this mode.
- Timer setting is available.

7.4.10 Auto-Restart Function

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

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

7.4.11 Refrigerant Leakage Detection

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

7.4.12 Louver Position Memory Function

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

7.4.13 46.4°F (8°C) Heating (Optional)

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

7.4.14 Active Clean Function

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

When this function is turned on, the indoor unit display window appears “CL”, after 20 to 45 minutes, the unit will turn off automatically and cancel Active Clean function.

7.4.15 Follow Me (Optional)

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

7.4.16 Silence Operation (Optional)

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

7.4.17 ECO Intelligent (Single Zone Only)

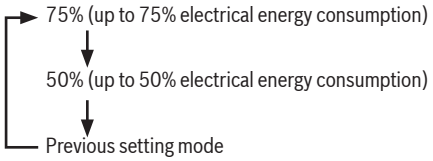
The system is controlled intelligently under Intelligent eye mode. It can detect the people’s activities in the room. In cooling/Heating/Auto mode, when you are away for 30 minutes, the unit will automatically lower the frequency to save energy. And the unit will automatically start and resume operation if sensing human activity again.

7.4.18 Humidity Control (Single Zone Only)

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

7.4.19 Electrical Energy Consumption Control Function (Optional)

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



Turn off the unit or activate ECO, sleep, Super cool, 8℃ (46.4℉) Heating, Silence or self clean function will quit this function.

7.4.20 Breeze Away Function (Optional)

This feature avoids direct airflow blowing on the body and makes you feel indulging in silky coolness.

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

7.4.21 Engineering Mode

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

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

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

Number	Code	Query Content	Additional Notes
0		Error Code	Refer to error code list
1	T1	Room Temperature	T1 temperature
2	T2	Indoor coil temperature	T2 temperature
3	T3	Outdoor coil temperature	T3 temperature
4	T4	Ambient temperature	T4 temperature
5	TP	Discharge temperature	TP temperature
6	FT	Targeted Frequency	Targeted Frequency
7	Fr	Actual Frequency	Actual Frequency
8	dL	Unit Current dL	3.2A = 3
9	Ac	Outdoor AC Voltage Uo	N/A
10	Sn	Reserved	N/A
11	od	Indoor Operating Mode	0-Off ; 1-Cooling; 2-Heating; 3-Fan Only; 4-Drying; 5-Auto; 7-Defrosting; 12-Active Clean
12	Pr	Outdoor Fan Speed	Outdoor fan speed=value/8
13	Lr	EXV Opening Steps	EXV opening angle-value/8
14	Ir	Indoor Fan Speed	Indoor fan speed=value/8
15	Hu	Humidity	Actual Data, %
16	TT	Set Temperature TT including compensation	Actual Data, °C
17	nA	Reserve	N/A
18	nA	Reserve	N/A
19	Uo	Outdoor DC Bus Voltage	N/A
20	oT	Indoor Target Frequency oT	Without limitation
21-30	nA	Reserve	

Table 14

Exit of engineer mode:

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

When the AC enter into information enquiry status, it will display code value in next 30 seconds, the error codes are as follows:

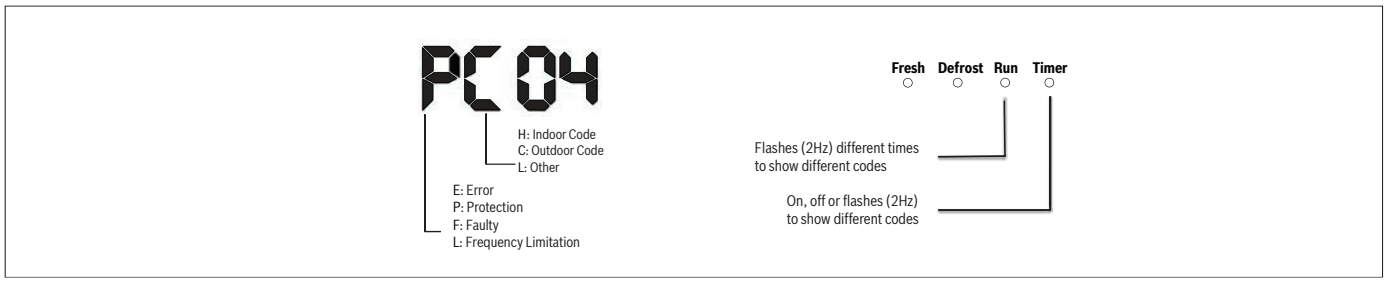


Figure 22

Display	Error Information
EH00	IDU EEPROM malfunction
EH0A	IDU EEPROM parameter error
EL01	IDU & ODU communication error
EH A	Communication error between indoor unit and external fan module
EH30	Parameters error of indoor external fan
EH35	Phase failure of indoor external fan
EH36	Indoor external fan current sampling bias fault
EH37	Indoor external fan zero speed failure
EH38	Indoor external fan stall failure
EH39	Out of step failure of indoor external fan
EH3A	Low voltage protection of indoor external fan DC bus
EH3	Indoor external fan DC bus voltage is too high fault
EH3E	Indoor external fan overcurrent fault
EH3F	Indoor external fan module protection/hardware overcurrent protection
EH03	IDU fan speed out of control
EC51	ODU EEPROM parameter error
EC52	ODU coil temp. sensor(T3) error
EC53	ODU ambient temp. sensor(T4) error
EC54	COMP. discharge temp. sensor(TP) error
EC55	IGBT temperature sensor TH is in open circuit or short circuit
EC0	Outdoor unit malfunction
EH60	IDU room temp. sensor (T1) error
EH61	IDU evaporator coil temp. sensor (T2) error
EC71	Outdoor external fan overcurrent fault
EC75	Outdoor external fan module protection/hardware overcurrent protection
EC72	Outdoor external fan phase failure
EC74	Outdoor external fan current sampling bias fault
EC73	Zero speed failure of outdoor unit DC fan
EC07	ODU fan speed out of control(
EH 5	Intelligent eye communication failure
EL0C	Refrigerant leak detected
EH0E	Water-level alarm malfunction

Display	Error Information
EHOF	Intelligent eye malfunction
FH07	Communication malfunction between indoor unit and auto-lifting panel
PC00	ODU IPM module protection
PC10	Over low voltage protection
PC11	Over voltage protection
PC12	DC voltage protection

Table 15

8 Troubleshooting

Safety

WARNING

Electrical hazard!

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

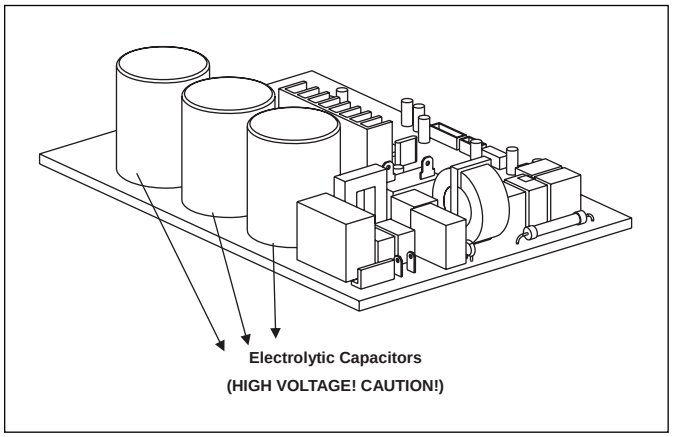


Figure 23

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.

8.1 Error Codes - 9K~18K 4-Way Cassette Indoor Unit

Display	Error Information
FC	Forced cooling(Not an error code)
EC07	ODU fan speed out of control
EC51	ODU EEPROM parameter error
EC52	ODU coil temp. sensor(T3) error
EC53	ODU ambient temp. sensor(T4) error
EC54	COMP. discharge temp. sensor(TP) error
EC56	IDU coil outlet temp. sensor(T2B) error(Multi-zone)
ECC1	Other IDU refrigerant sensor detects leakage (Multi-zone)
EH00	IDU EEPROM malfunction
EH03	IDU fan speed out of control
EH12	Main unit or secondary units malfunction
EH0A	IDU EEPROM parameter error
EH0E	Water-level alarm malfunction
EH3A	External fan DC bus voltage is too low protection
EH3b	External fan DC bus voltage is too high fault
EH60	IDU room temp. sensor (T1) error
EH61	IDU evaporator coil temp. sensor (T2) error
EHbA	Communication error between the indoor unit and the external fan module
EHC1	Refrigerant sensor detects leakage
EHC2	Refrigerant sensor is out of range and leakage is detected
EHC3	Refrigerant sensor is out of range
EL01	IDU & ODU communication error
EL0C	System lacks refrigerant
EL11	Communication malfunction between main unit and secondary units
FHCC	Refrigerant sensor error
PC00	ODU IPM module protection
PC01	ODU voltage protection
PC02	Compressor top (or IPM) temperature protection
PC03	Pressure protection (low or high pressure) (for some models)
PC04	Inverter comprresor drive error
PC0L	Low ambient temperature protection (for some models)
----	IDUs mode conflict (Multi-zone)

Table 16

Remote Maintenance	
No.	Problem
1	Unit will not start
2	The power switch is on but fans will not start
3	The temperature on the display board cannot be set
4	Unit is on but the wind is not cold(hot)
5	Unit runs, but shortly stops
6	The unit starts up and stops frequently
7	Unit runs continously but insufficient cooling (heating)
8	Cool can not change to heat
9	Unit is noisy

Table 17

Field Maintenance	
No.	Problem
1	Unit will not start
2	Compressor will not start but fans run
3	Compressor and Condenser (outdoor) fan will not start
4	Evaporator (indoor) fan will not start
5	Condenser (outdoor) fan will not start
6	Unit runs, but shortly stops
7	Compressor short-cycles due to overload
8	High discharge pressure
9	Low discharge pressure
10	High suction pressure
11	Low suction pressure
12	Unit runs continously but insufficient cooling
13	Too cool
14	Compressor is noisy
15	Horizontal louver cannot revolve

Table 18

8.2 Quick Check by Error Codes

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

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

Part requiring replacement	Error Code									
	EH 00/ EH 0A	EL 01	EH 03	EH60	EH61	EL0C	EHC1/EHC2	EH0E	EC53	EH0b
Indoor PCB	●	●	●	●	●	●		●		●
Outdoor PCB		●							●	
Display board										
Indoor fan motor			●							
T1 sensor				●						
T2 Sensor					●	●		●		
T3 Sensor										
T4 Sensor									●	
Reactor		●								
Compressor										
Additional refrigerant						●	●	●		
Water-level switch								●		
Water pump								●		
Display board										●

Table 19

Part requiring replacement	Error Code										
	EC 54	EC 51	EC 52	EC 56	EC 07	PC 00	PC 01	PC 02	PC03	PC 04	FHCC/EHC3
Outdoor PCB	●	●	●	●	●	●	●	●	●	●	
Indoor PCB											●
Outdoor fan motor					●	●		●		●	
T3 Sensor			●								
TP Sensor	●										
T2B Sensor				●							
Refrigerant Sensor											●
Reactor Sensor							●				
Compressor						●				●	
IPM Module Board						●	●	●		●	
Pressure Protector									●		
Additional refrigerant									●		

Table 20

8.3 ODU PCB & IPM

8.3.1 PCB: Regular 115V Single Zone 12K

BMS500-AAS012-0CSXRC

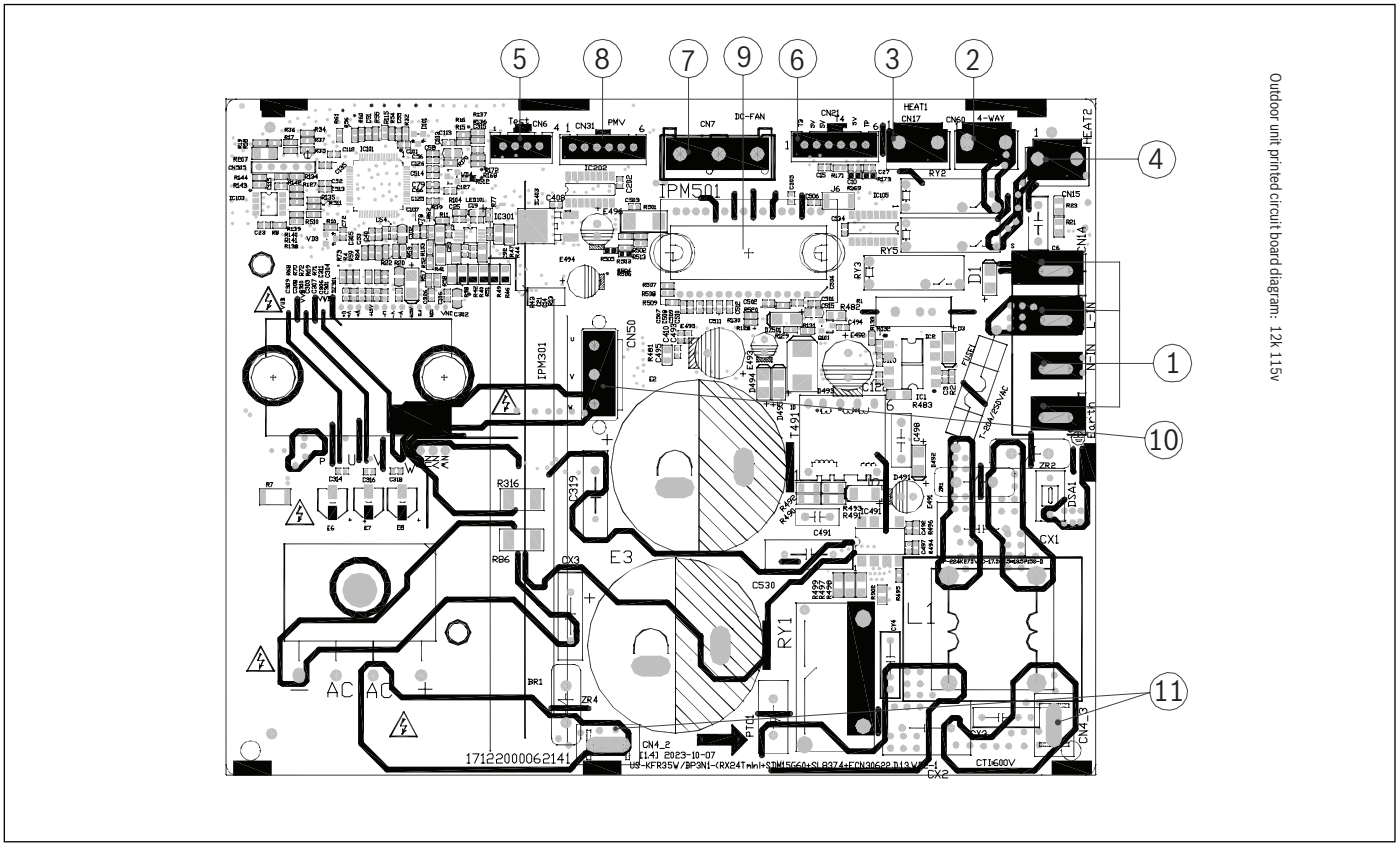


Figure 24

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

Table 21

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

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

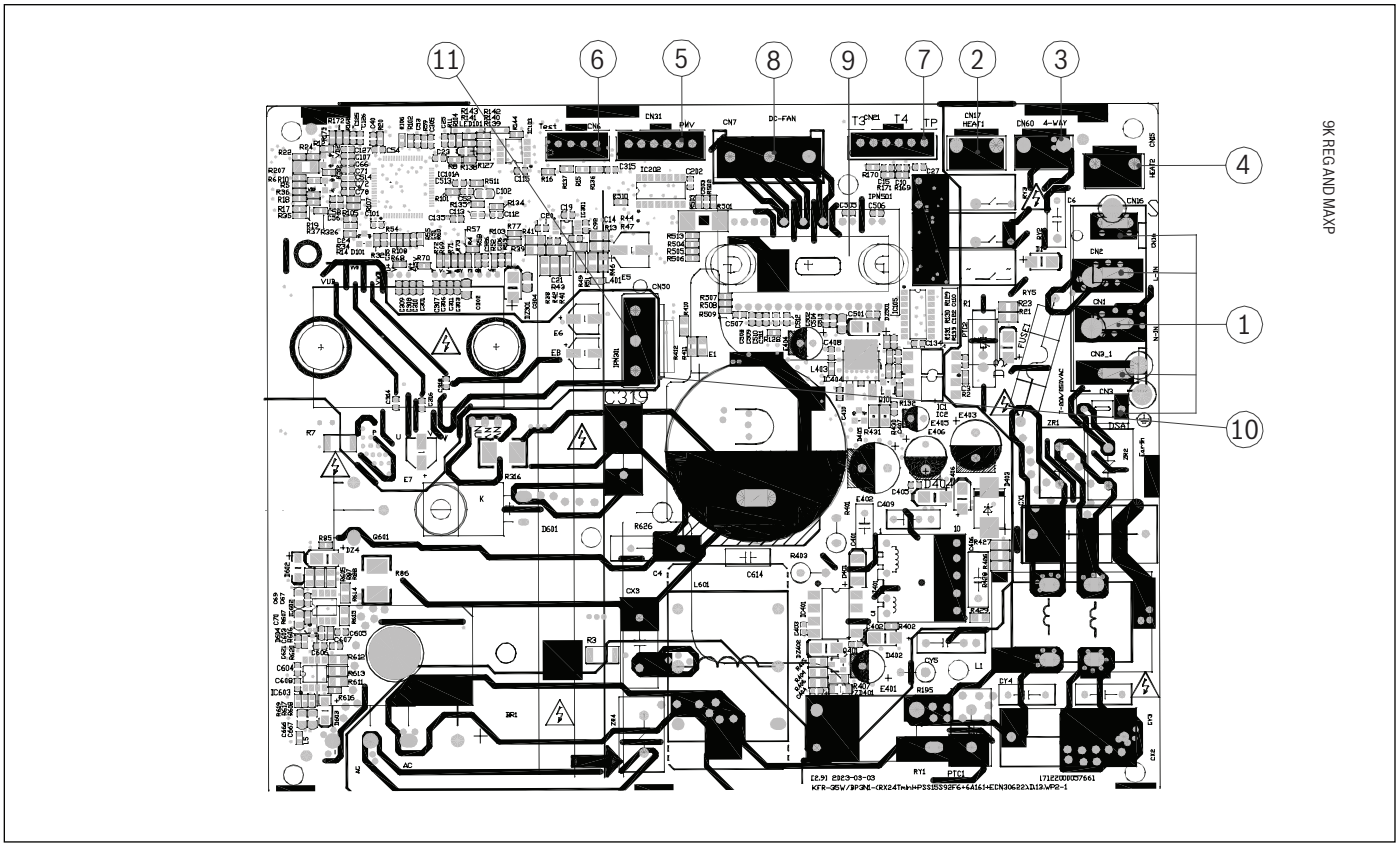


Figure 25

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

Table 22

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

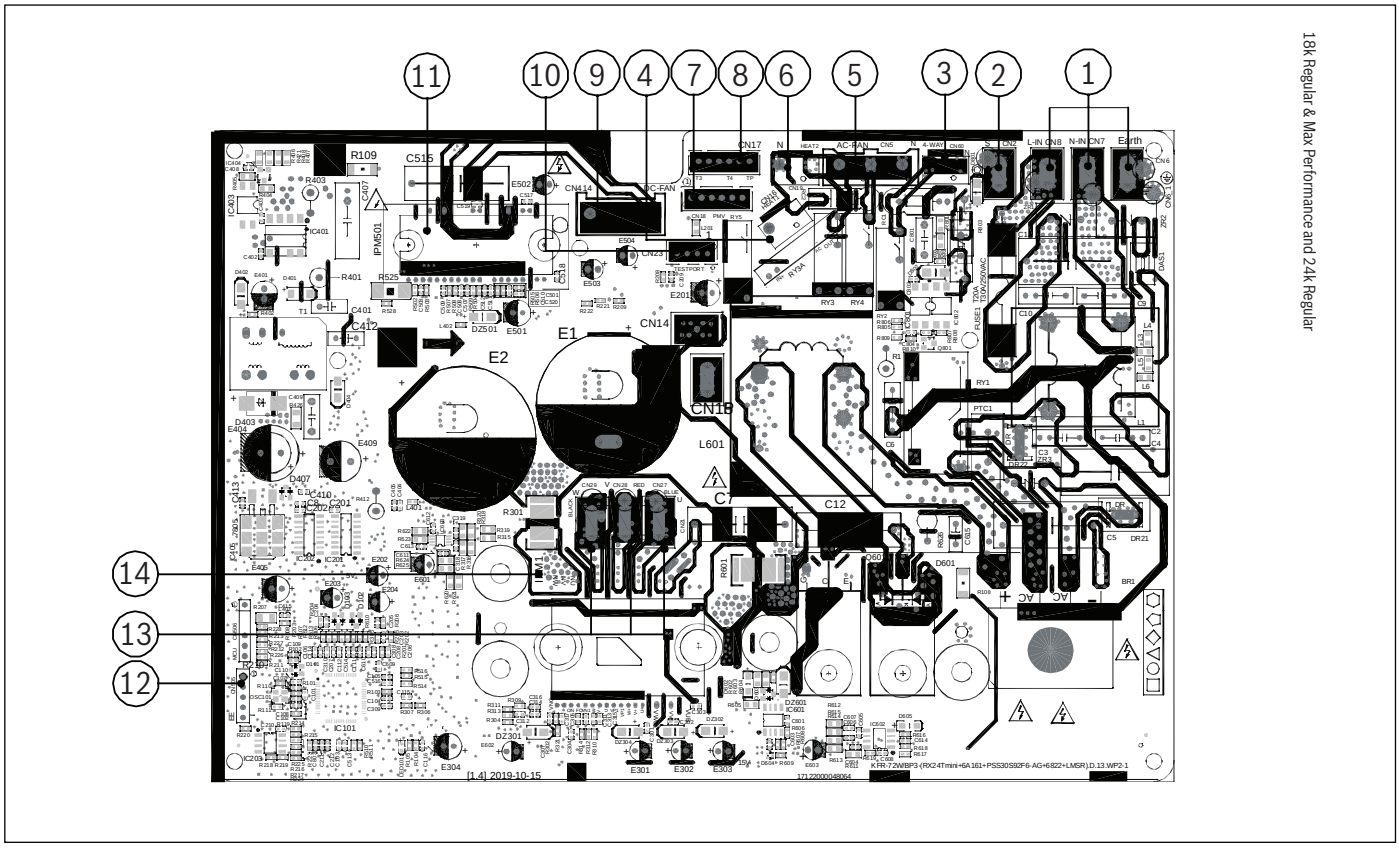


Figure 26

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

Table 23

8.3.4 PCB: Max Performance Single Zone 24K

BMS500-AAS024-1CSXHD

8.3.5 PCB: Regular Single Zone (for Wall Mounted IDU) 30K & 36K

BMS500-AAS030-1CSXRD, BMS500-AAS036-1CSXRD

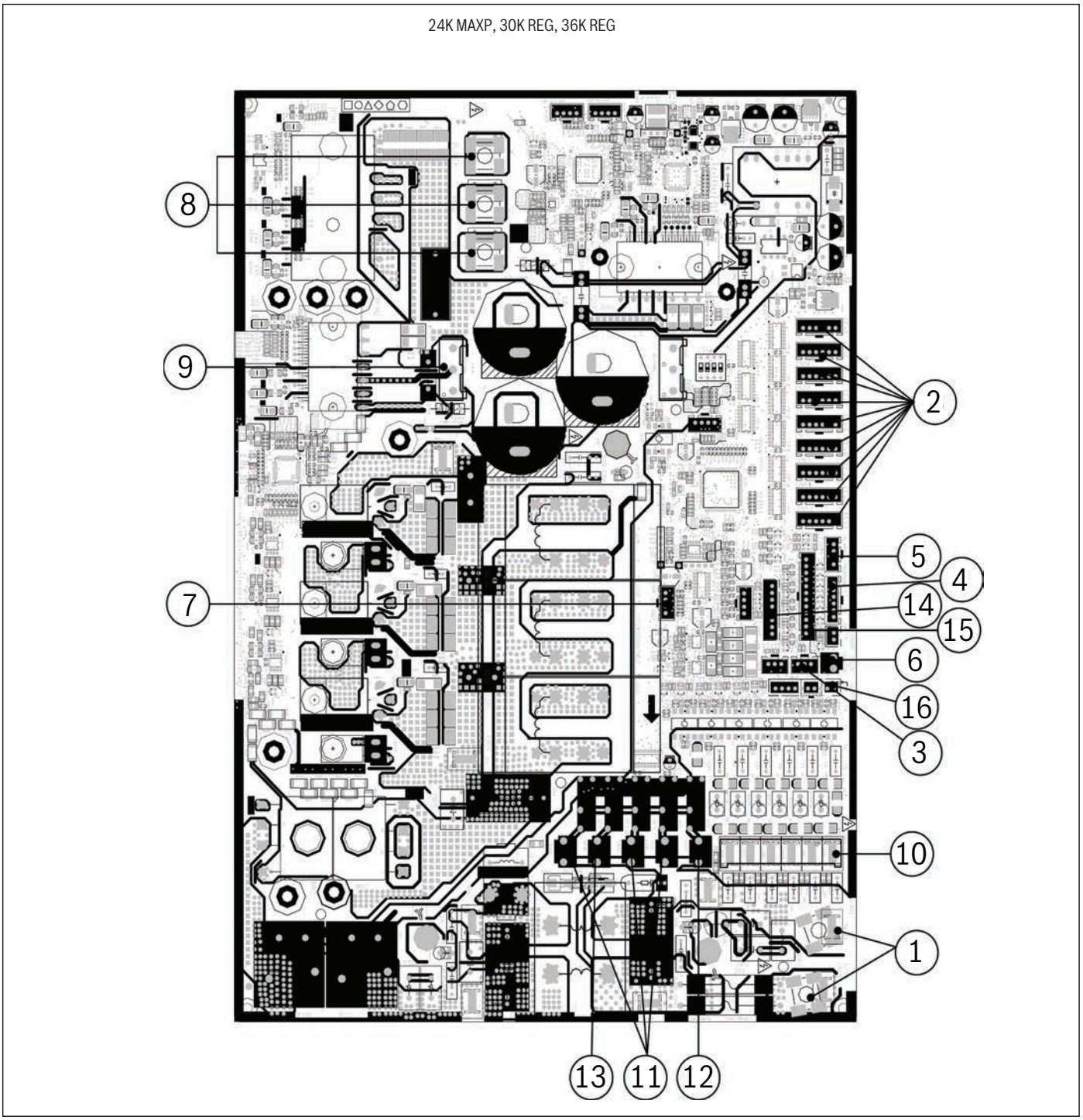


Figure 27

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

Table 24

8.4 Indoor Wiring Diagram

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

Table 25 Indoor Unit Abbreviations

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

Table 26

8.4.1 Indoor Wiring Diagram 4-Way Cassette Unit 9K, 12K & 18K models

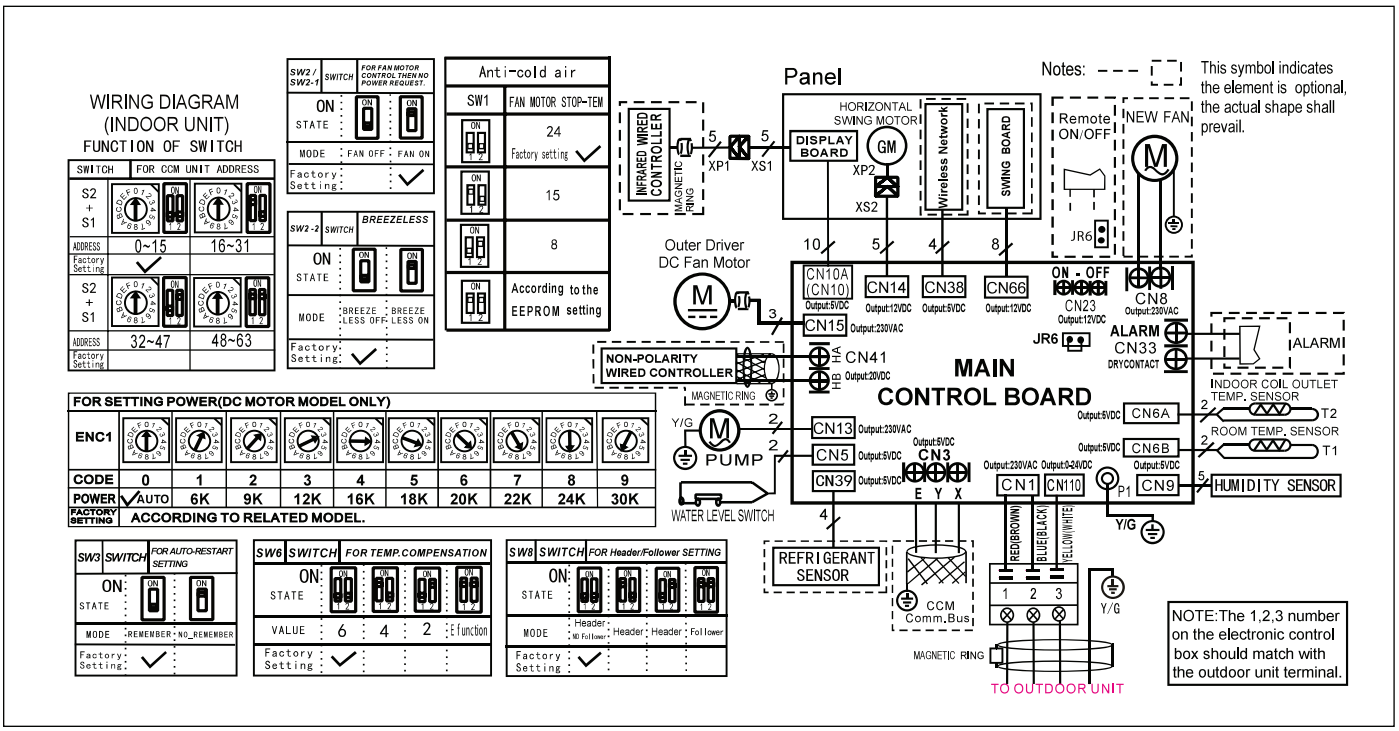


Figure 28

24K model

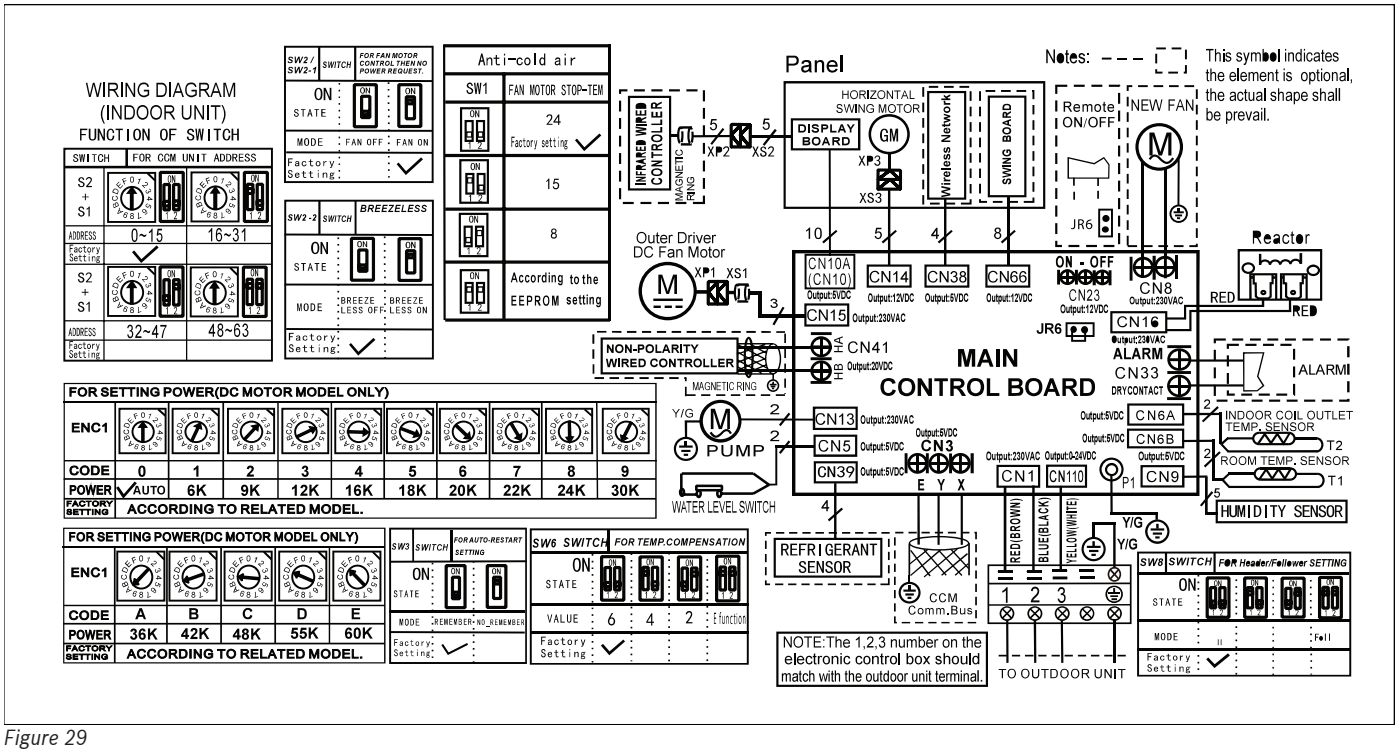


Figure 29

36K & 48K models

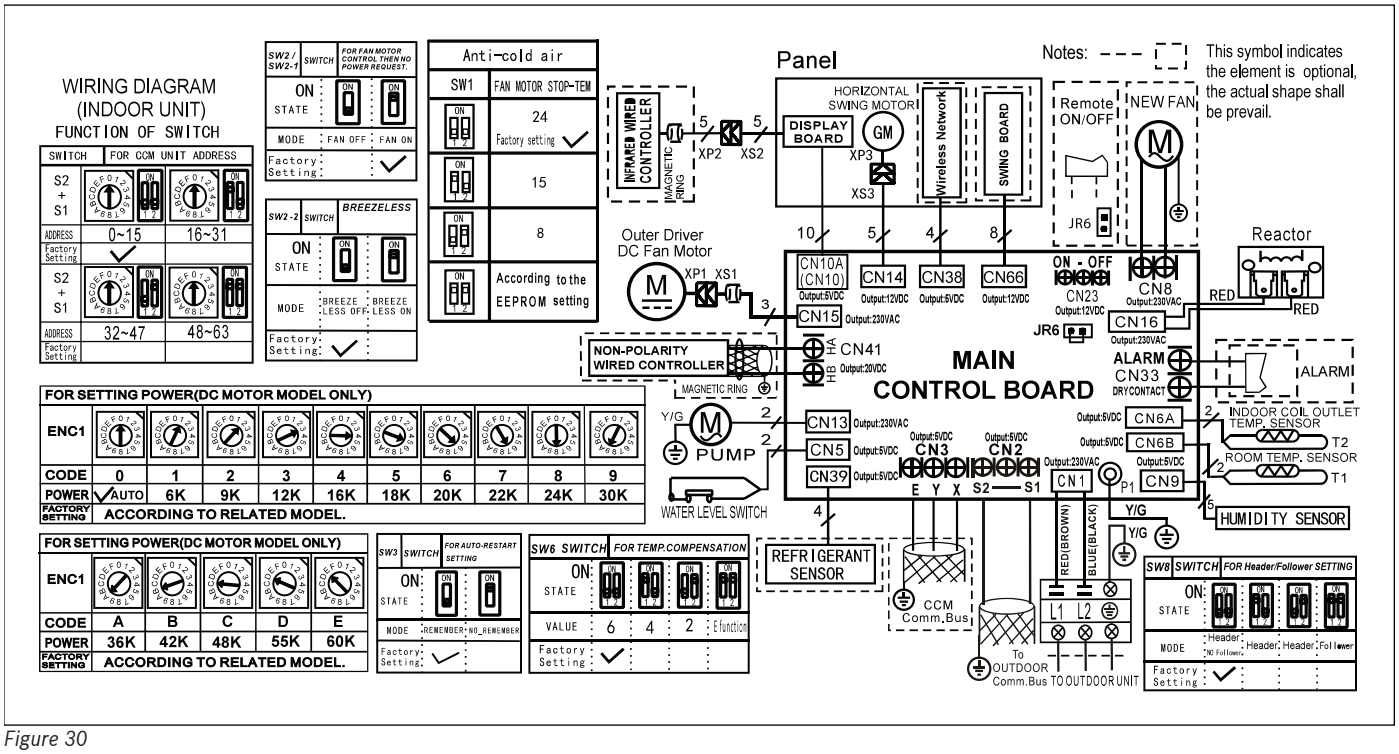


Figure 30

8.4.2 4-Way Cassette & Ducted IDU Connector & Dip-Switch Introduction

4-Way Cassette Unit Connector (9K ~ 48K)

For remote control (ON-OFF) terminal port CN23 and short connector of JR6:

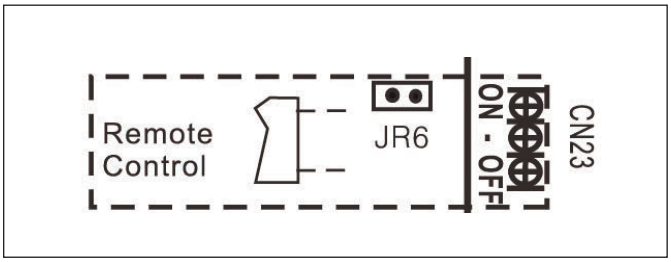


Figure 31

1. Remove the short connector of JR6 when you use ON-OFF function;
2. When remote switch is off (OPEN), the unit would be off;
3. When remote switch is on (CLOSE), the unit would be on;
4. When the remote switch is closed/open, the unit would respond to the demand within 2 seconds;
5. When the remote switches on, use remote controller/ wire controller to select the mode that you want; when the remote switches off, the unit will not respond to the demand from remote controller/wire controller. When the remote switch off, but the remote controller / wire controller are on, CP code will be shown on the display board.
6. The voltage of the port is 12V DC, design Max. current is 5mA.

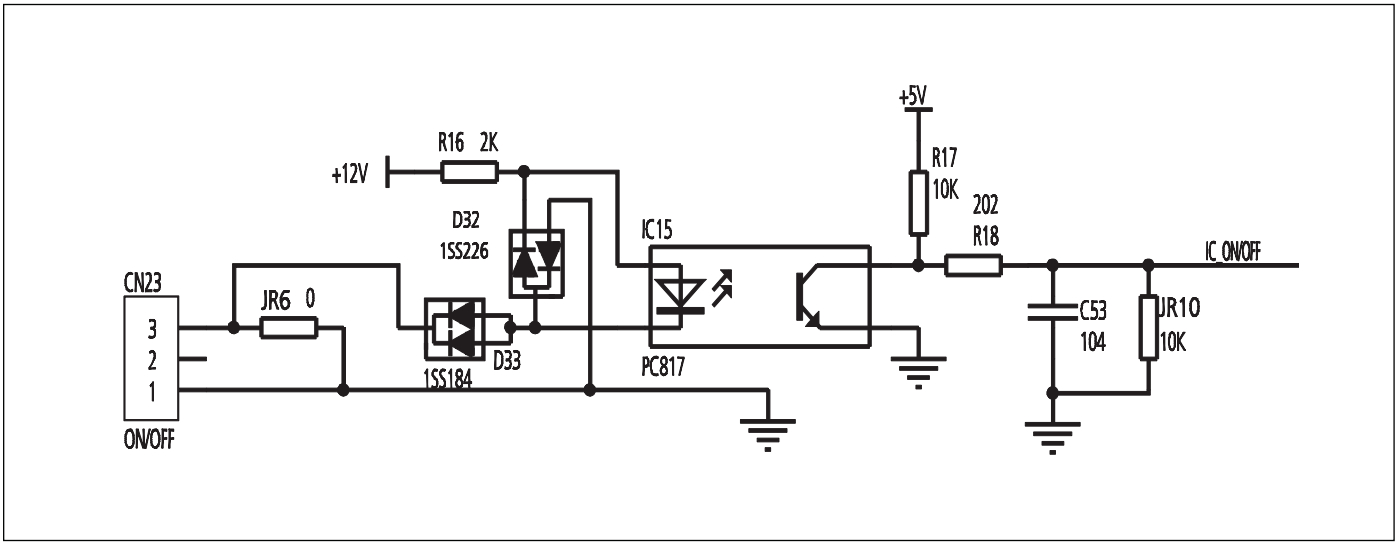


Figure 32

For ALARM terminal port CN33:

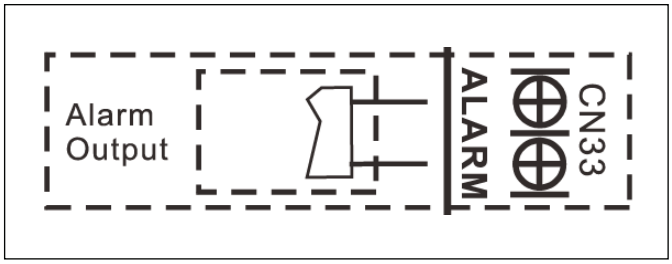


Figure 33

1. The terminal port is available to connect ALARM, but power supply is not from the Indoor Unit (Fig. 38).
2. Although design voltage can support higher voltage, it is strongly recommended to connect the power less than 24V, current less than 0.5A.
3. When there is a problem, the relay will close and ALARM will be activated.

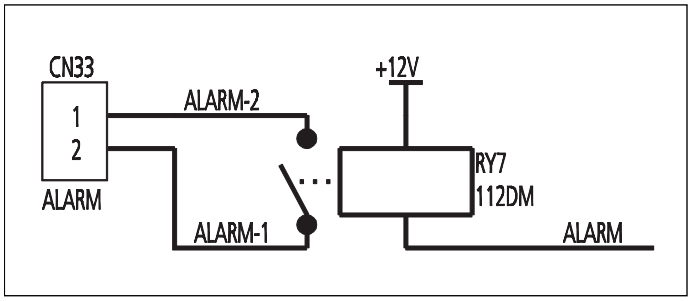


Figure 34

For fresh air intake motor (NEWFAN) terminal port CN8:

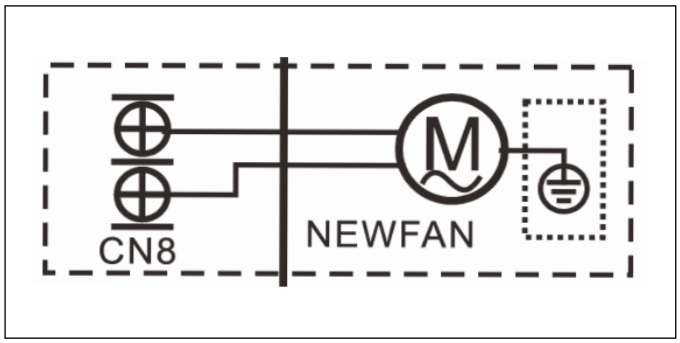


Figure 35

1. Connect the fan motor to the port;
2. The output voltage is the power supply;
3. The fresh air intake motor cannot exceed 200W or 1A, follow the smaller one;
4. The fresh air intake motor will only work with the indoor fan motor is in operation;
5. When the system is in force cooling or capacity testing mode, the fresh air intake motor will not work.

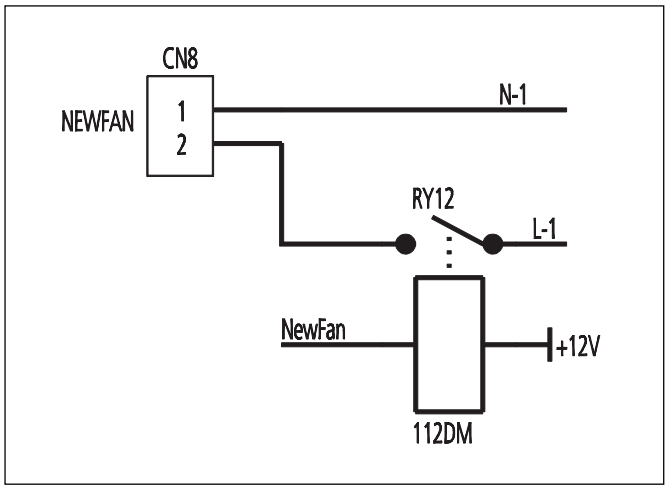


Figure 36

4-Way Cassette Unit Dip-Switch (9K ~ 24K)

Micro-switch SW1 is for selection of indoor fan stop temperature (TEL0) when it is in anti-cold wind action in heating mode.

- Range: 75.2℉(24℃), 59℉(15℃), 46.4℉(8℃), according to EEROM setting (reserved for special customizing).

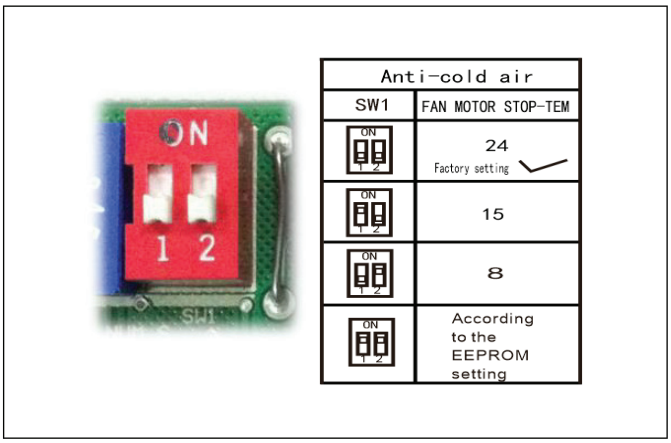


Figure 37

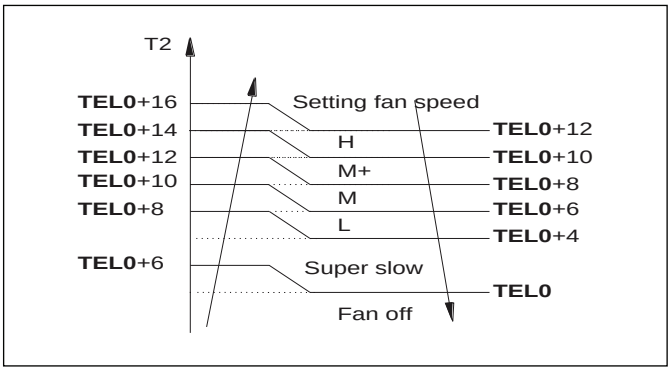


Figure 38

Legend:
TELO = fan stop temperature

Micro-switch SW2/SW2-1 is for selection of indoor FAN ACTION if room temperature reaches the set point and the compressor stops.

- Range: OFF (anti-cold wind is available in heating mode), Keep running (No anti-cold wind function).

Note: SW2 dip switch is only reserved physical part but without mode modification function, if want to make change on the factory setting, should use remote controller or wire controller to reset (depend on model).

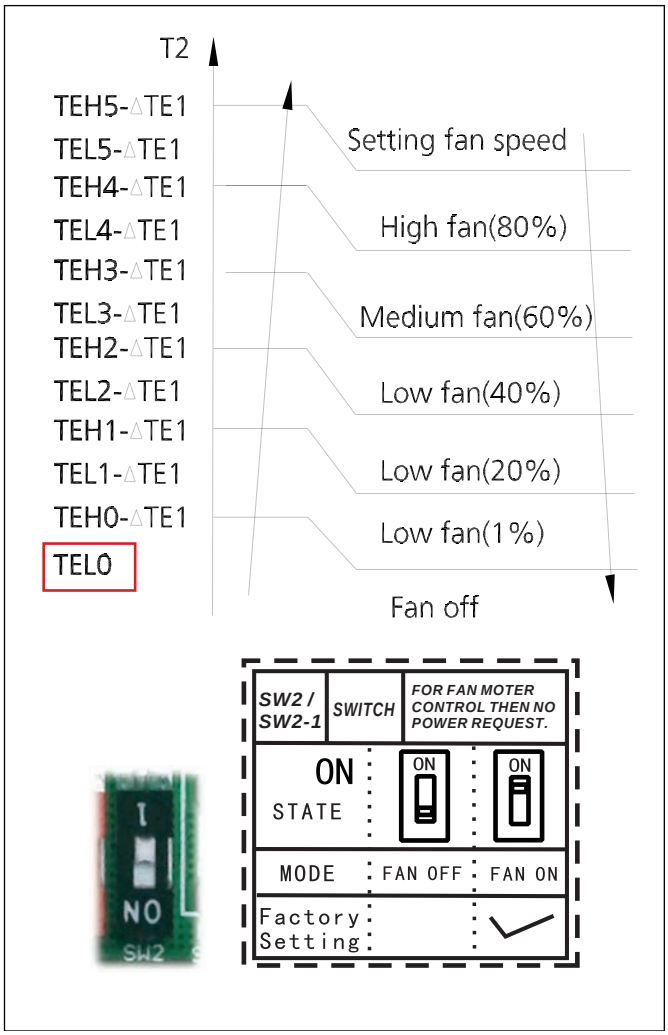


Figure 39

Micro-switch SW2-2 is for selection of Breezeless function.

- Range: OFF, ON.

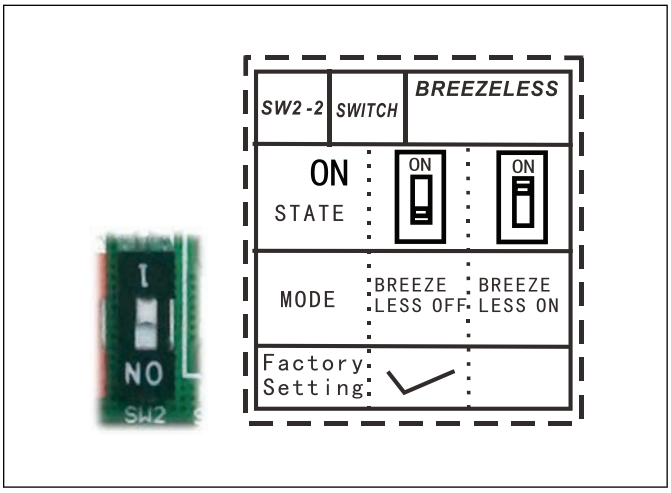


Figure 40

Micro-switch SW3 is for selection of auto-restart function.

- Range: Active, inactive

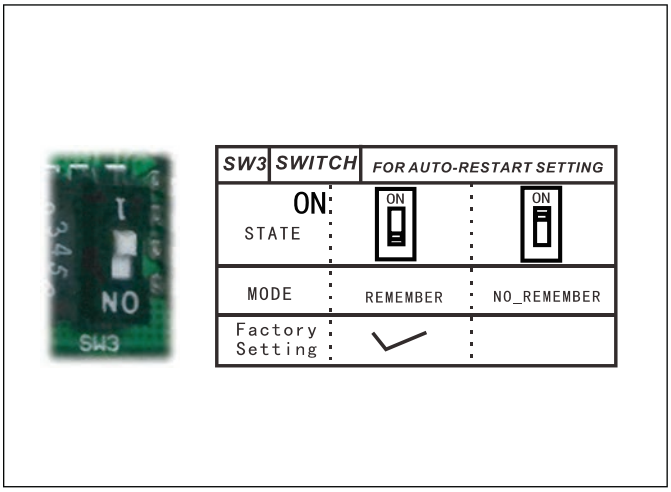


Figure 41

Micro-switch SW6 is for selection of temperature compensation in heating mode. This helps to reduce the real temperature difference between ceiling and floor so that the unit could run properly. If the height of installation is lower, smaller value could be chosen.

- Range: 42.8℉(6 ℃), 39.2℉(4 ℃), 35.6℉(2 ℃), E function (reserved for special customizing)

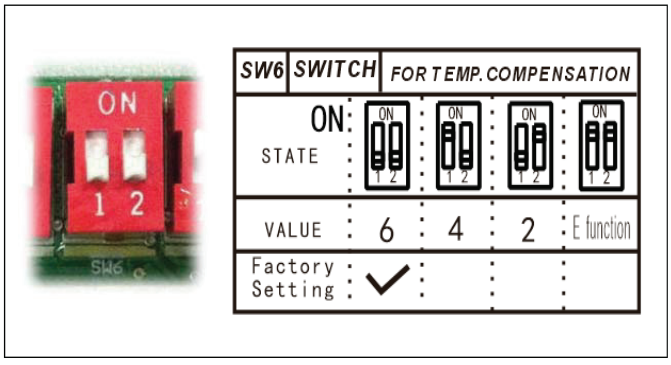


Figure 42

Micro-switch SW8 is for setting main or slave.(For some models)

- Range: No slave, main & slave.

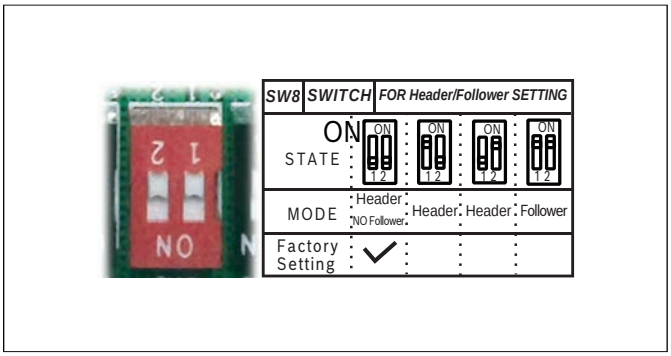


Figure 43

Micro-switch S1 and dial-switch S2 are for address setting when you want to control this unit by a central controller.

- Range: 00-63

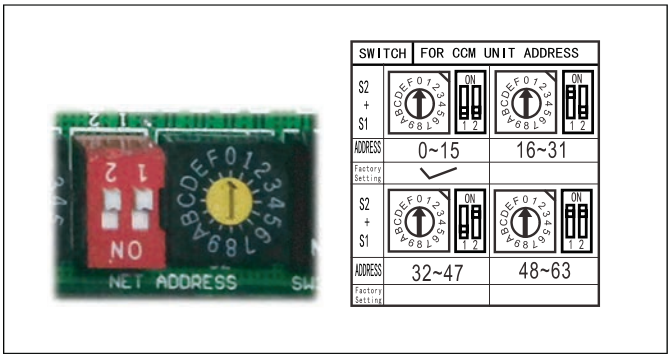


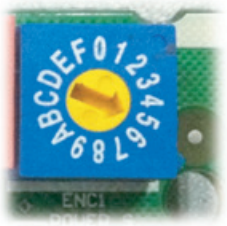
Figure 44

Dial-switch ENC1: The indoor PCB is universal designed for whole series units from 6K to 60K. This ENC1 setting will tell the main program what size the unit is.

- Range: AUTO, 6K,9K,.....,60K

NOTE: AUTO means the indoor unit is equipped with different outdoor units, which can automatically identify the capacity of the outdoor unit, model, mono or multi-zone and match the indoor unit parameters.

Usually there is glue on it because the switch position cannot be changed at random unless you want to use this PCB as a spare part to use in another unit. Then you have to select the right position to match the size of the unit.



FOR SETTING POWER(DC MOTOR MODEL ONLY)										
ENC1										
CODE	0	1	2	3	4	5	6	7	8	9
POWER	✓AUTO	6K	9K	12K	16K	18K	20K	22K	24K	30K
FACTORY SETTING	ACCORDING TO RELATED MODEL.									

FOR SETTING POWER(DC MOTOR MODEL ONLY)					
ENC1					
CODE	A	B	C	D	E
POWER	36K	42K	48K	55K	60K
FACTORY SETTING	ACCORDING TO RELATED MODEL.				

Figure 45

8.5 Outdoor Wiring Diagram

8.5.1 Regular Single Zone (115V 12K)

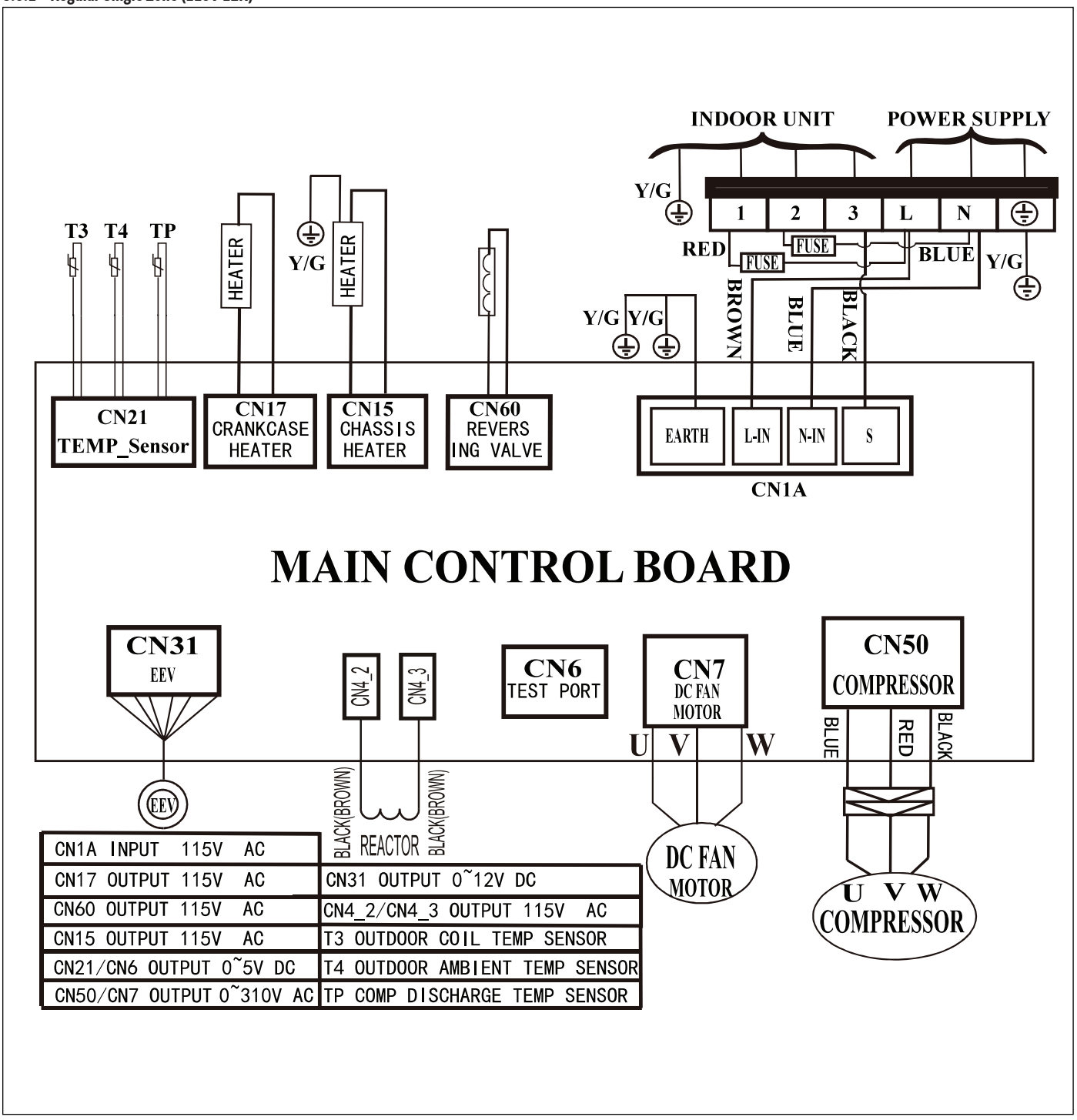


Figure 46

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

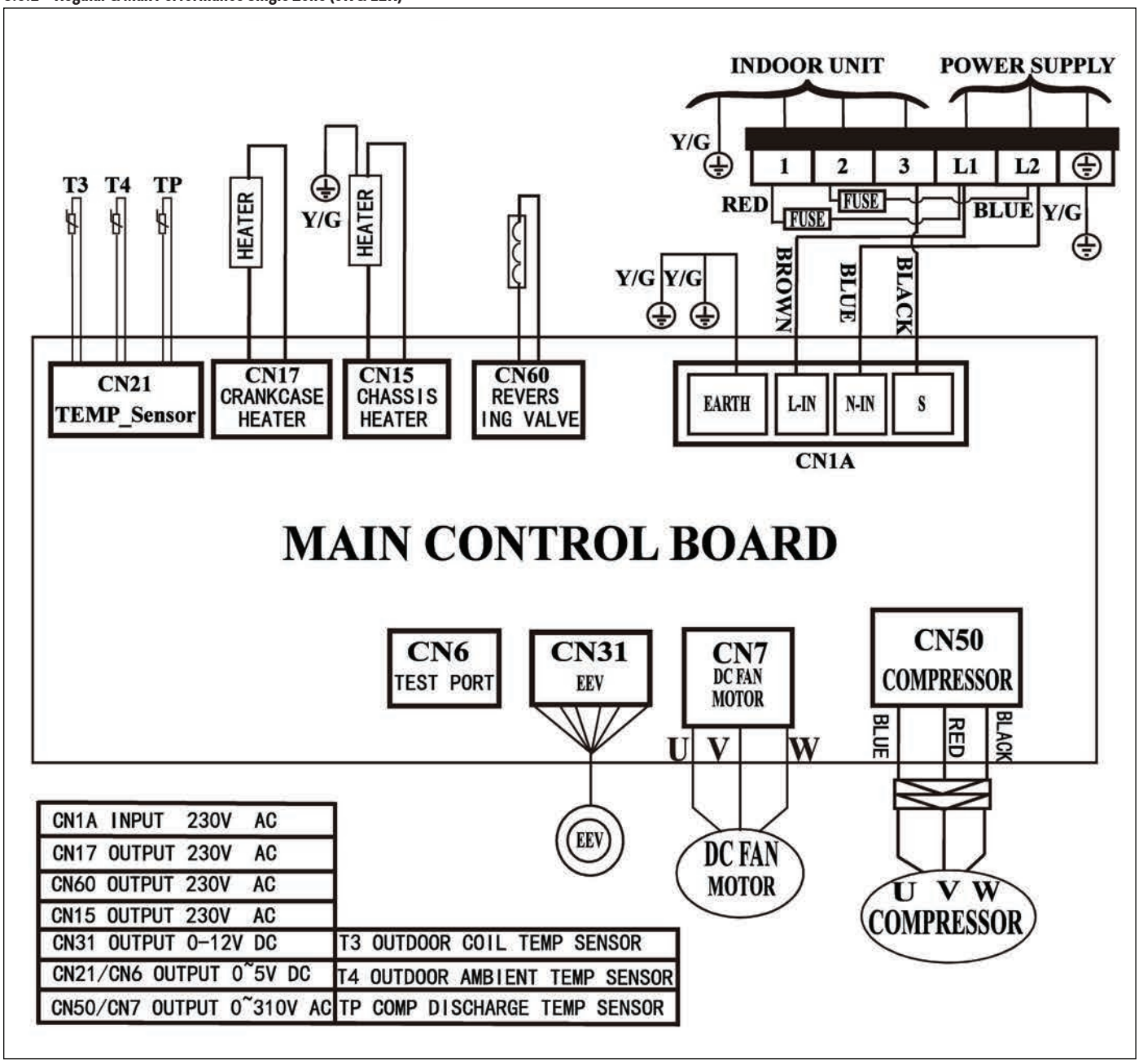


Figure 47

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

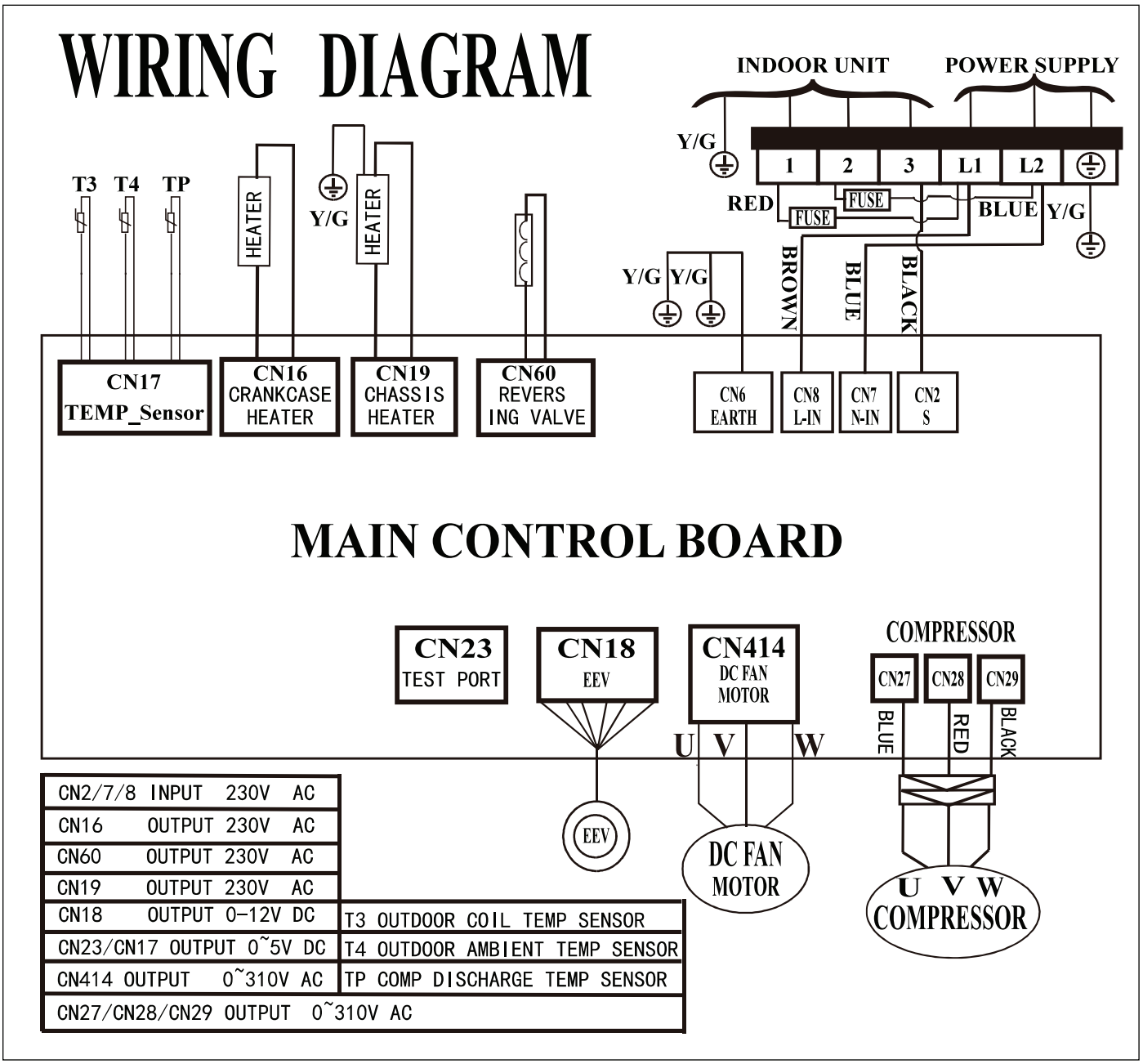
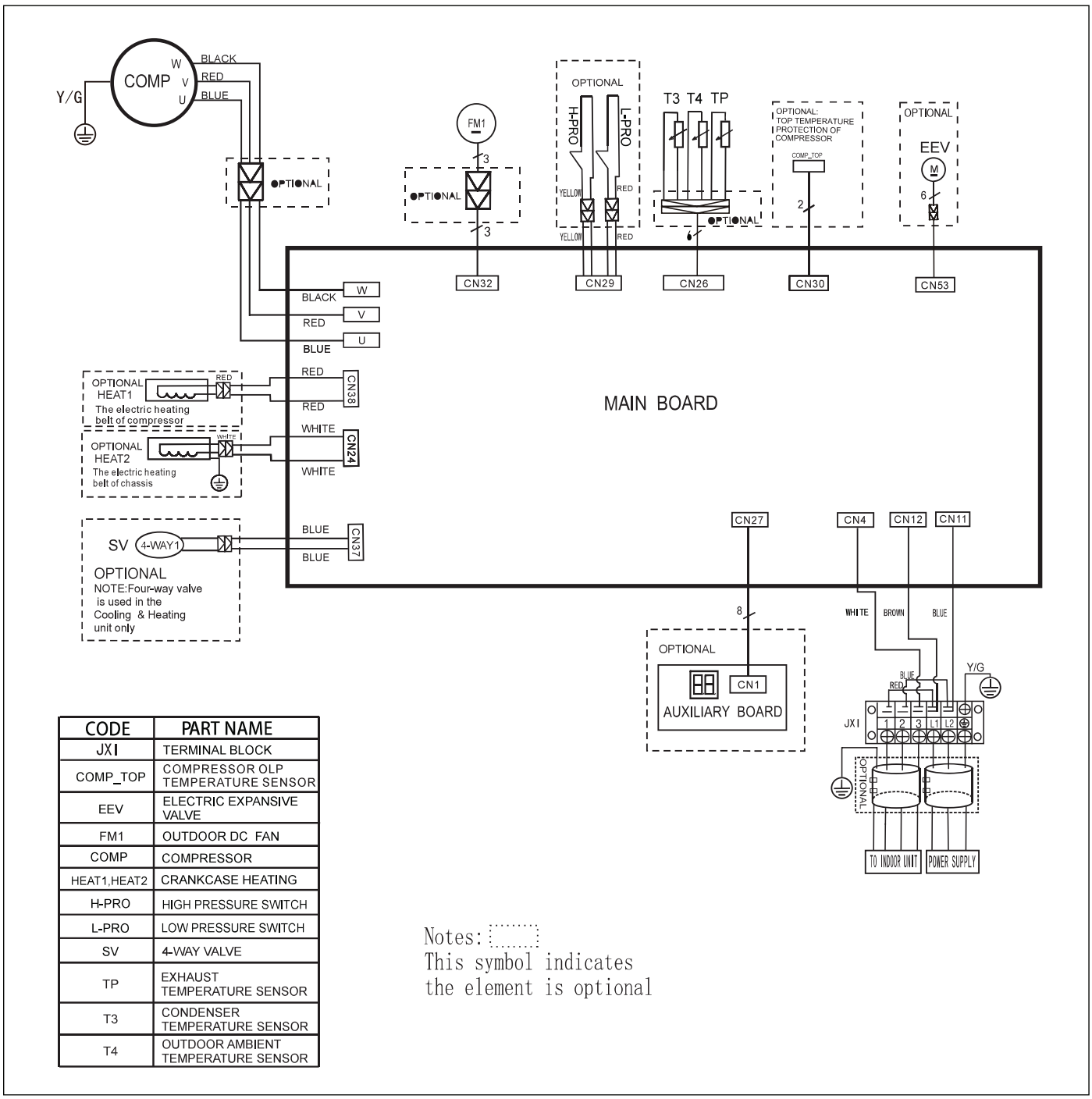


Figure 48

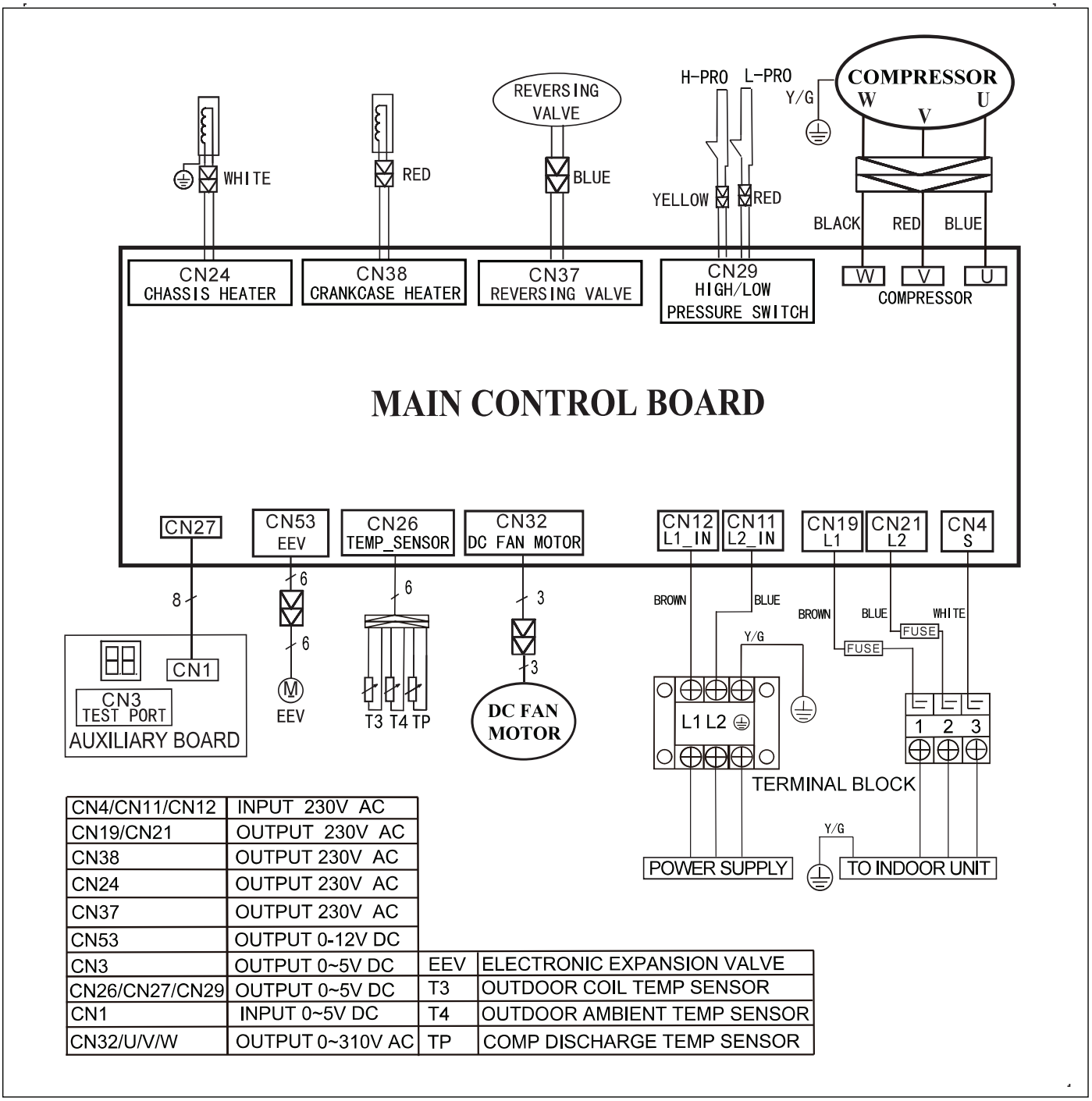
8.5.4 Max Performance Single Zone (24K)
Regular Single Zone (30K)



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

Figure 49

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



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

Figure 50

8.6 4-Way Cassette (IDU & ODU) Error Code Diagnosis and Solution

Display	Information
dF	Defrost
CL	Filter cleaning reminder(power on display for 15 seconds)
CL	Active clean
F	Filter replacement reminder(power on display for 15 seconds)
FP	Heating in room temperature under 8°C
FC	Forced cooling
AP	AP mode of WIFI connection
CP	Remote switched o
EH 00/EH 0A/ EC51	Indoor unit EEPROM parameter error
EL 01	Indoor/outdoor unit communication error
EH 03 / EC07	The indoor fan speed is operating outside of the normal range
EH 12	Main unit or secondary units malfunction (Multi-zone)
EC 52	Condenser coil temperature sensor T3 is in open circuit or has short circuited
EC 53	Outdoor room temperature sensor T4 is in open circuit or has short circuited
EC 54	Compressor discharge temperature sensor TP is in open circuit or has short circuited
EC 56	Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited (for free-match indoor units)
EH 60	Indoor room temperature sensor T1 is in open circuit or has short circuited
EH 61	Evaporator coil middle temperature sensor T2 is in open circuit or has short circuited
EH0E	Water -Level Alarm Malfunction
EH b3	Communication malfunction between wire and master control
EH bA / Eh3A / Eh3b	Communication error between the indoor unit and the external fan module / External Fan DC Bus is too low/high
EH C1 / EH C2	Refrigerant Sensor detects leakage
EL 0C	System lacks refrigerant
EL 11	Communication malfunction between main unit and secondary units (Multi-zone)
FH CC / EH C3	Refrigerant sensor error
PC 00	IPM malfunction or IGBT over-strong current protection
PC 01	Over voltage or over low voltage protection
PC 02	Top temperature protection of compressor or High temperature protection of IPM module or High pressure protection
PC 03	Low pressure protection
PC 04	Inverter compressor drive error
--	Indoor units mode conflict(match with multi outdoor unit)

Table 27

8.6.1 EEPROM parameter error diagnosis and solution (EH 00/EH 0R/EC 51)

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

Table 28

Troubleshooting:

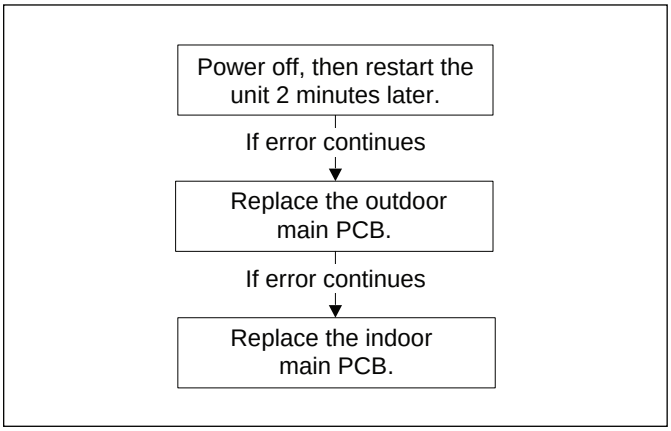


Figure 51

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.

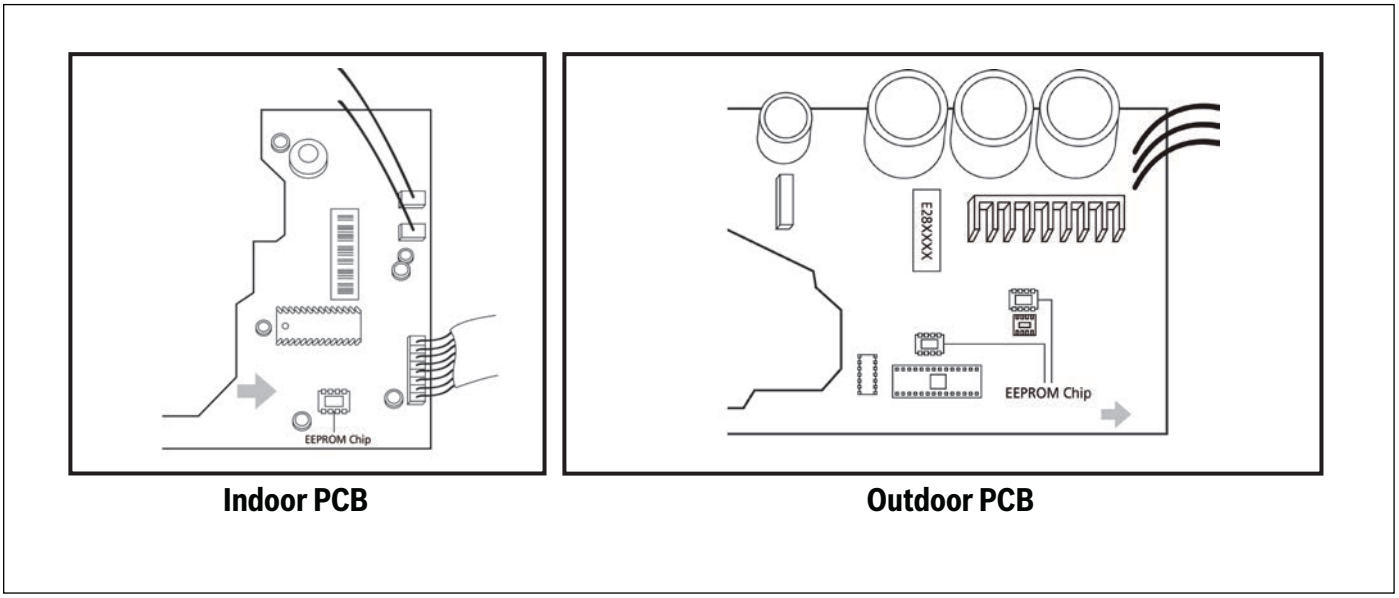


Figure 52

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

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

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

Table 29

Troubleshooting:

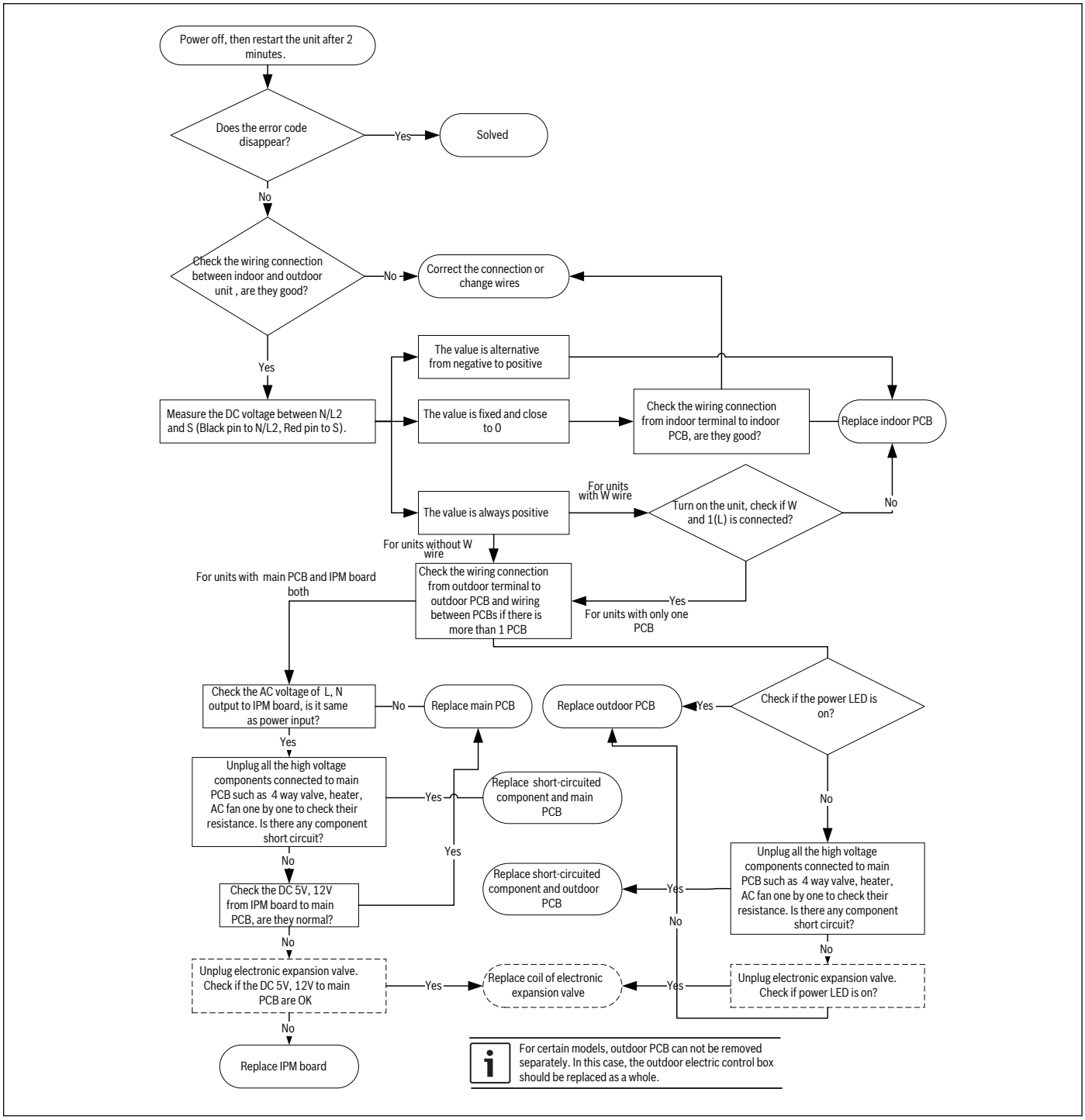


Figure 53

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.

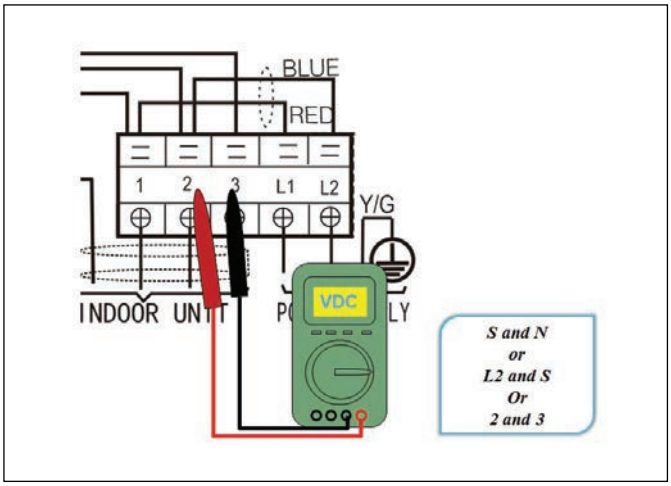


Figure 54

Remark:

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

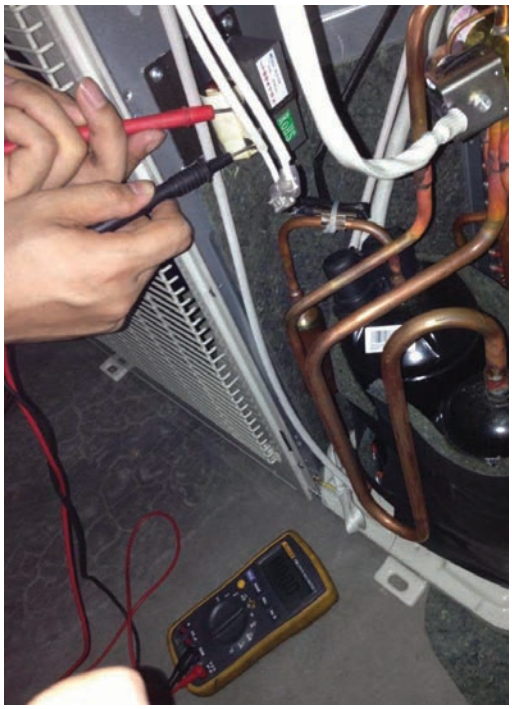


Figure 55

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

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

Table 30

Troubleshooting:

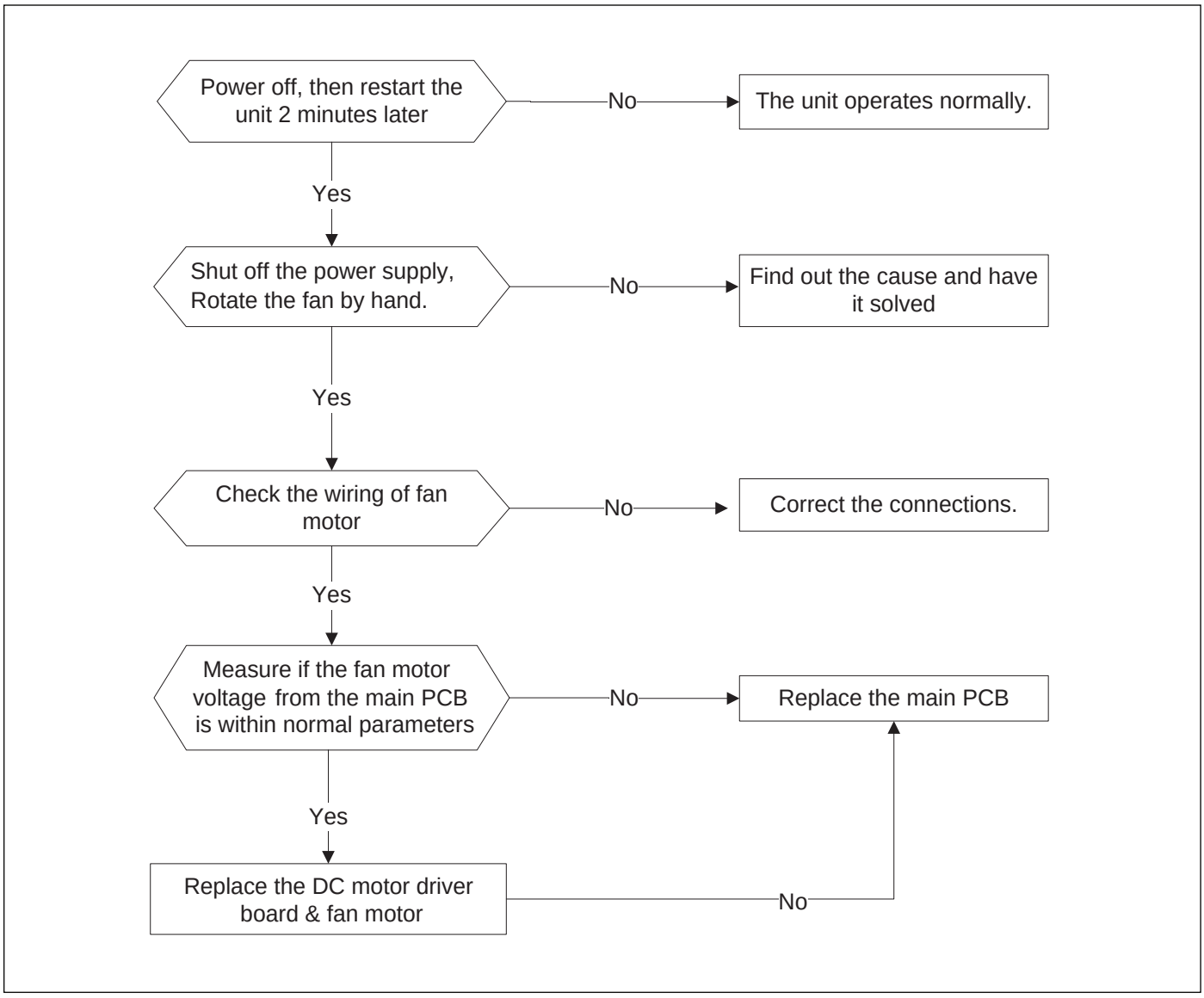


Figure 56

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

Index 1:

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

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

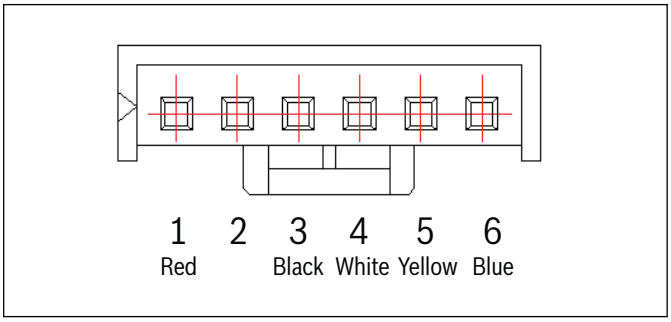


Figure 57

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

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	192V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5-16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5-16.5V

Table 31

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.

8.6.4 Open Circuit or Short Circuit of Temperature Sensor Diagnosis and Solution (EC 52/EC 53/EC 54/EC 56/EH 60/EH61)

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

Table 32

Troubleshooting:

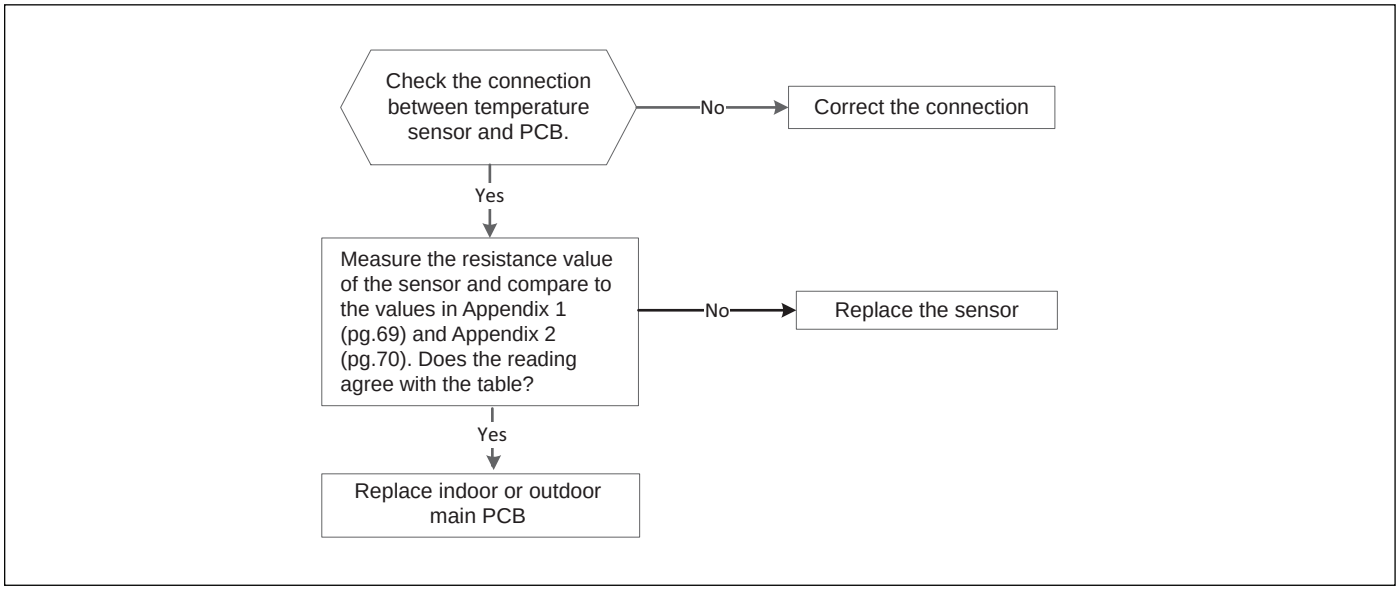


Figure 58

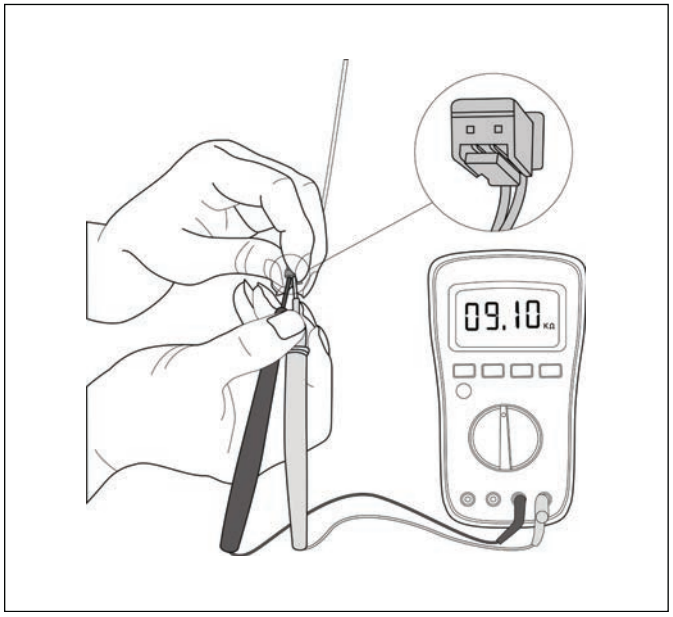


Figure 59

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

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

This picture and the value are only for reference. Actual appearance and value may vary.

8.6.5 EH0E (Water-Level Alarm Malfunction Diagnosis and Solution)

Error Code	EH 0E
Malfunction decision conditions	If the sampling voltage is not 5V, the LED displays the failure code.
Supposed causes	• Wiring mistake • Water-level switch faulty • Water pump faulty • Indoor PCB faulty

Table 33

Troubleshooting:

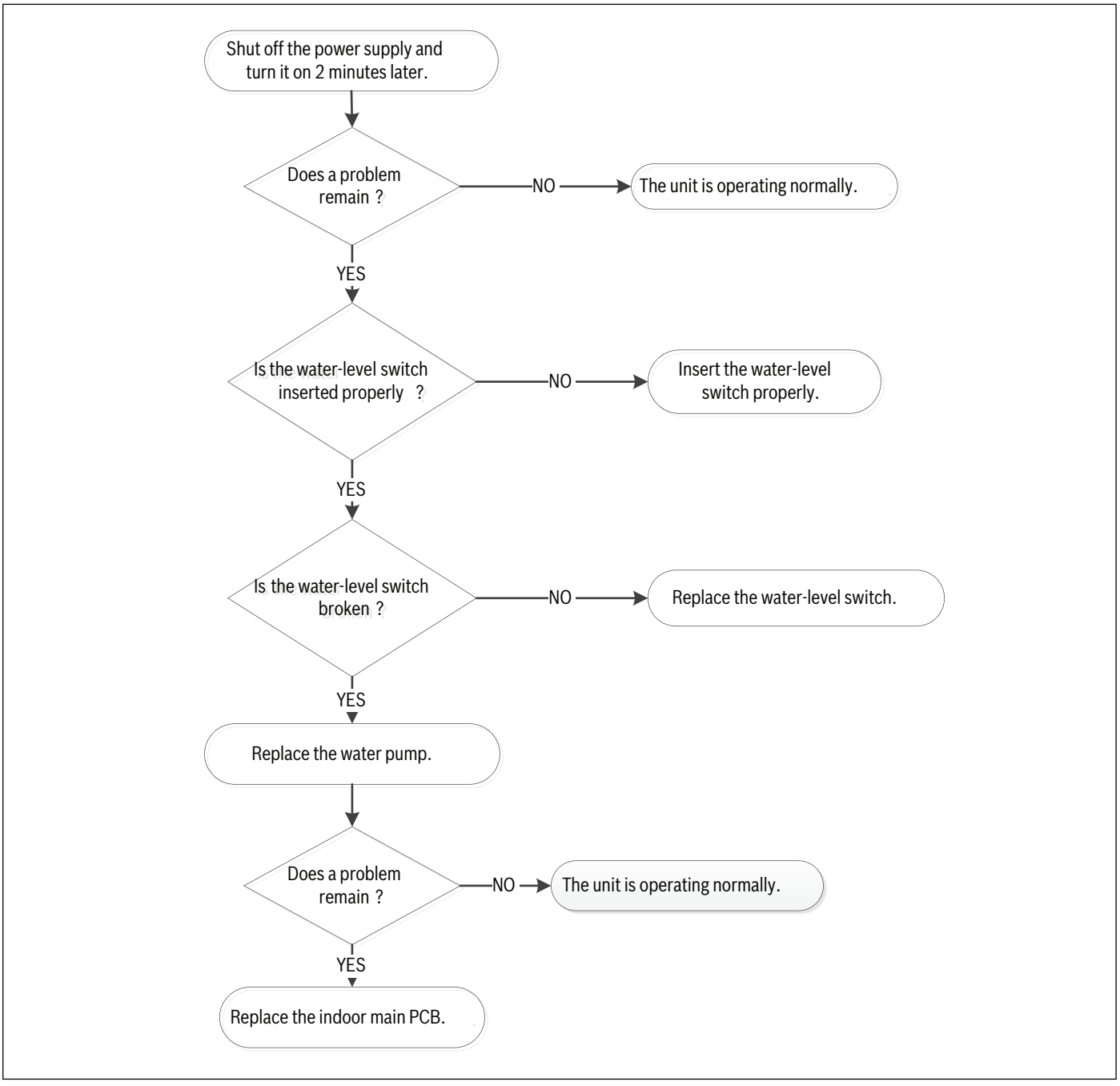


Figure 60

8.6.6 EH b3 (Communication Malfunction Between Wire and Master Control) Diagnosis and Solution

Error Code	EH b3
Malfunction decision conditions	If the indoor PCB does not receive feedback from the wired controller, the error displays on the wired controller
Supposed causes	• Faulty Wiring • Indoor PCB faulty • Wired controller faulty

Table 34

Troubleshooting:

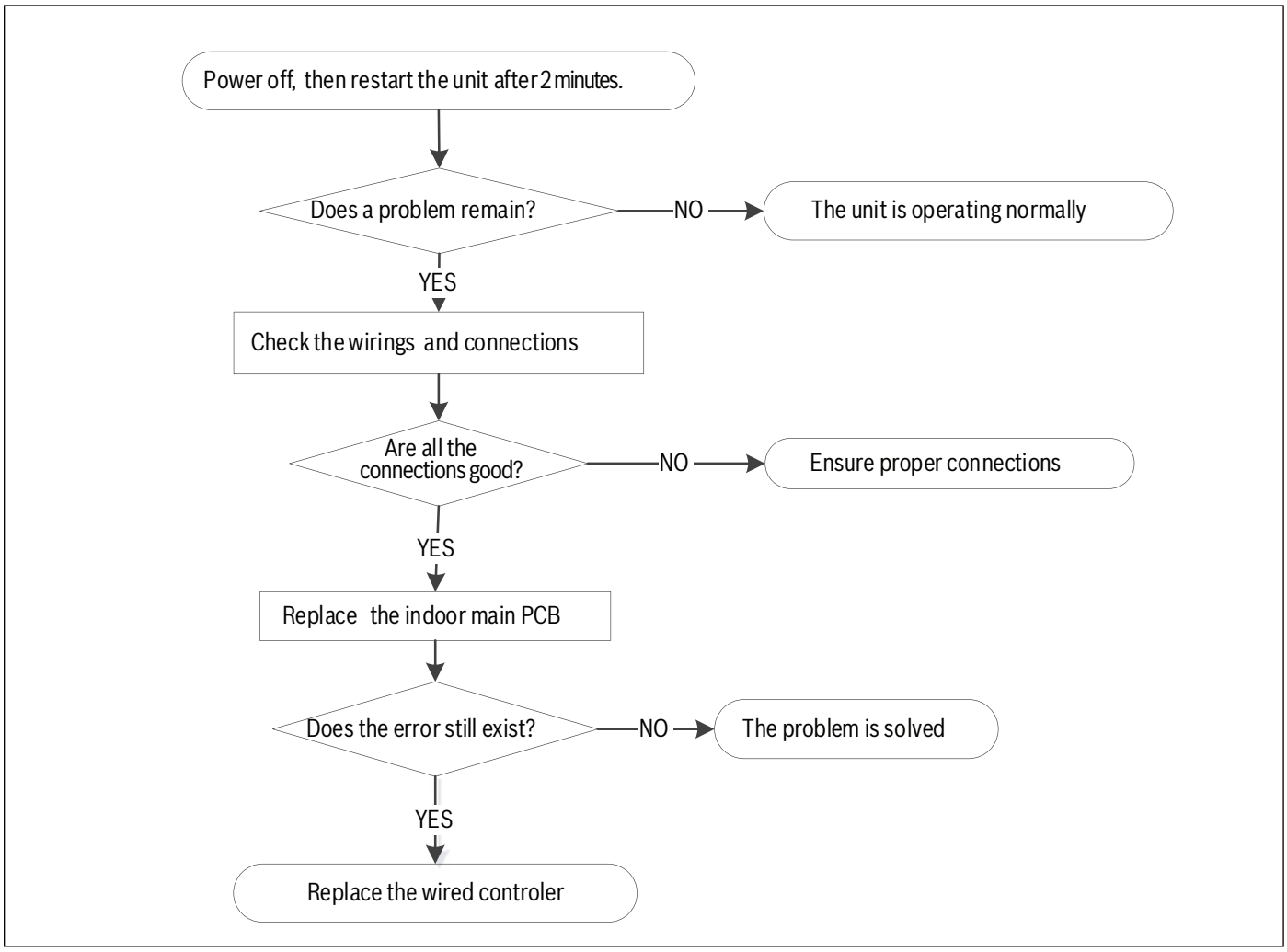


Figure 61

8.6.7 Communication Error Between the IDU and External Fan Module Diagnosis and Solution (EHbA/EH3A/EH3b)

Error Code	EHbA / EH3A / EH3b
Malfunction decision conditions	Indoor unit does not receive the feedback from external fan module during 150 seconds, or Indoor unit receives abnormal incresease or decreases in voltage from external fan module.
Supposed causes	• Indoor PCB faulty

Table 35

Troubleshooting:

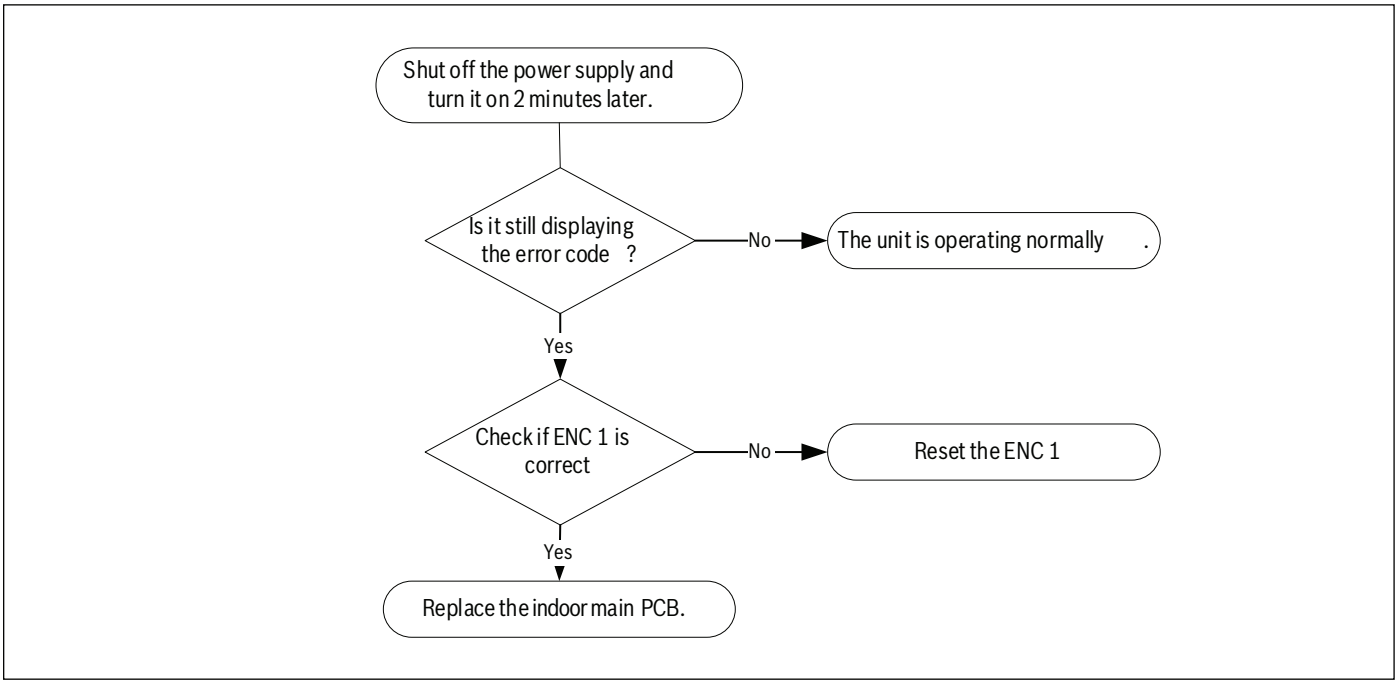


Figure 62

8.6.8 Refrigerant Sensor Detects Leakage or Is Out Of Range Diagnosis and Solution (EHC1 / EHC2)

Error Code	EH C1 / EH C2
Malfunction decision conditions	The refrigerant sensor detects a concentration higher than or equal to 10%*LFL for 10 seconds or the refrigerant sensor detects a concentration higher than or equal to 20%*LFL or the multi model receives the refrigerant leakage protection fault sent by the outdoor unit. Multi-zone: Only the buzzer of the indoor unit that detects refrigerant leakage continues to sound the alarm, the shortest sound is 10 seconds, and the longest sound is 5 minutes (you can press any key such as remote control or wire control, APP and so on to eliminate the alarm), and the other non-refrigerant leakage fault indoor unit only displays “ECC1”, but the buzzer does not sound.
Supposed causes	• Lacks refrigerant

Table 36

Troubleshooting:

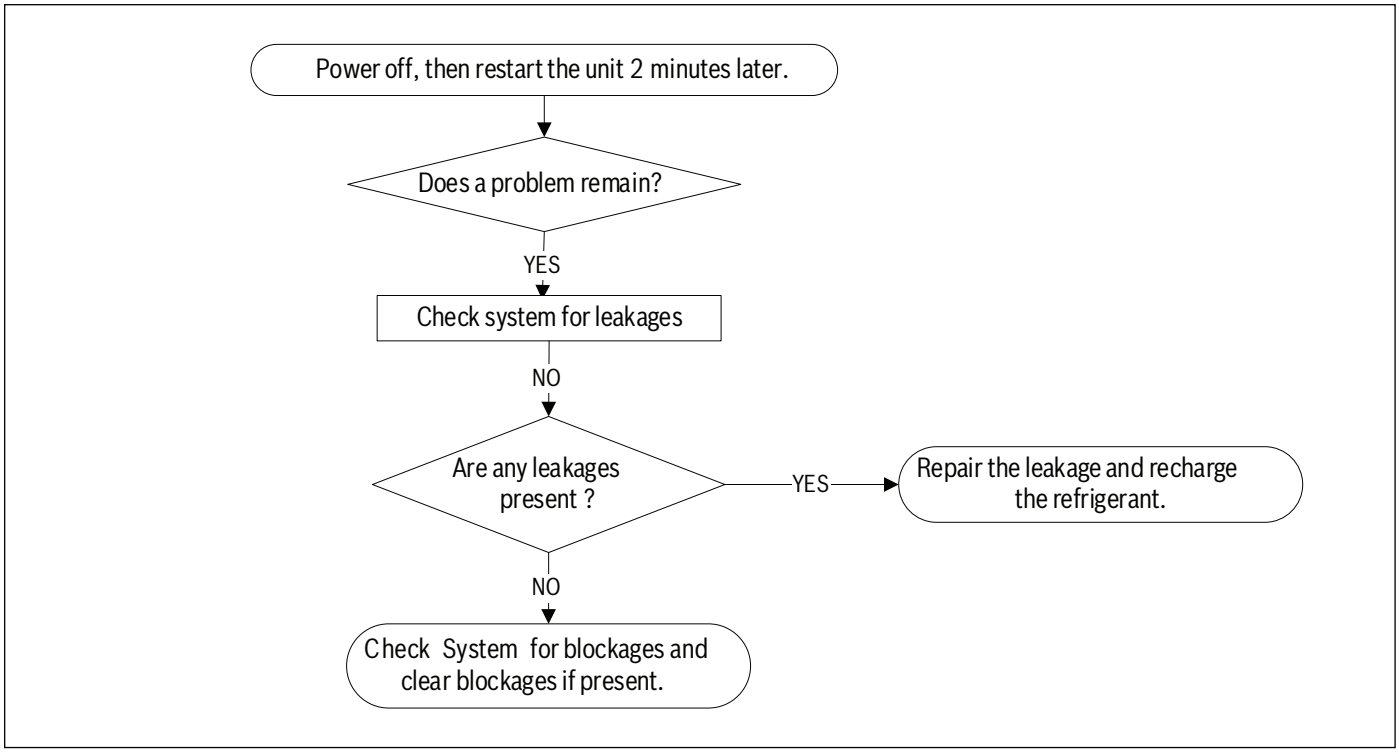


Figure 63

8.6.9 Refrigerant Leakage Detection diagnosis and solution (EL 0C)

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

Table 37

Troubleshooting:

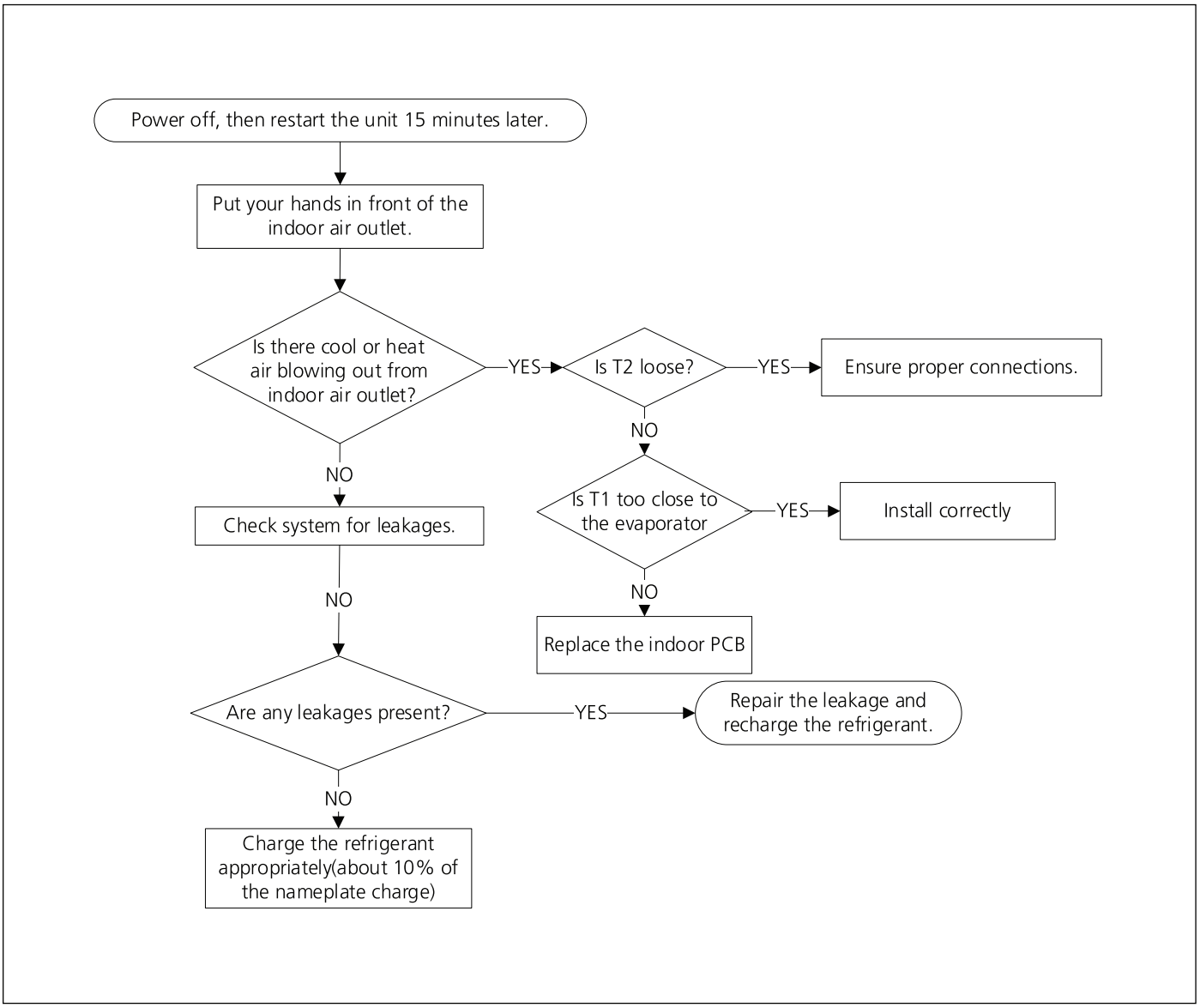


Figure 64

8.6.10 Refrigerant Sensor Error or Out of Range Diagnosis And Solution (FH CC / EH C3)

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

Table 38

Troubleshooting:

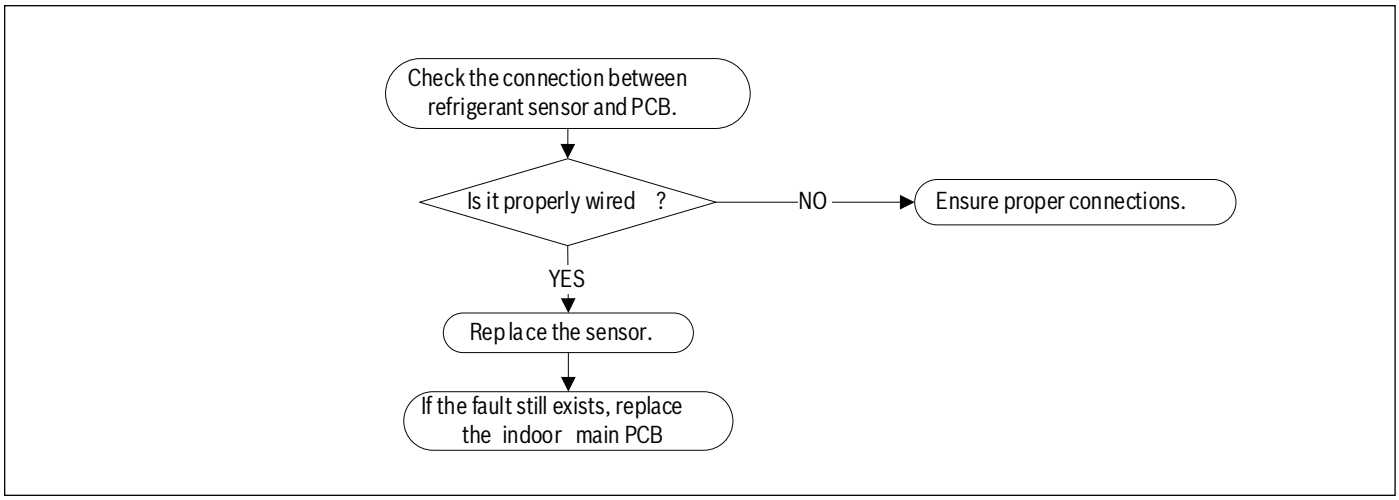


Figure 65

8.6.11 Ipm Malfunction or Igbt Over-Strong Current Protection Diagnosis and Solution (PC 00)

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

Table 39

Troubleshooting:

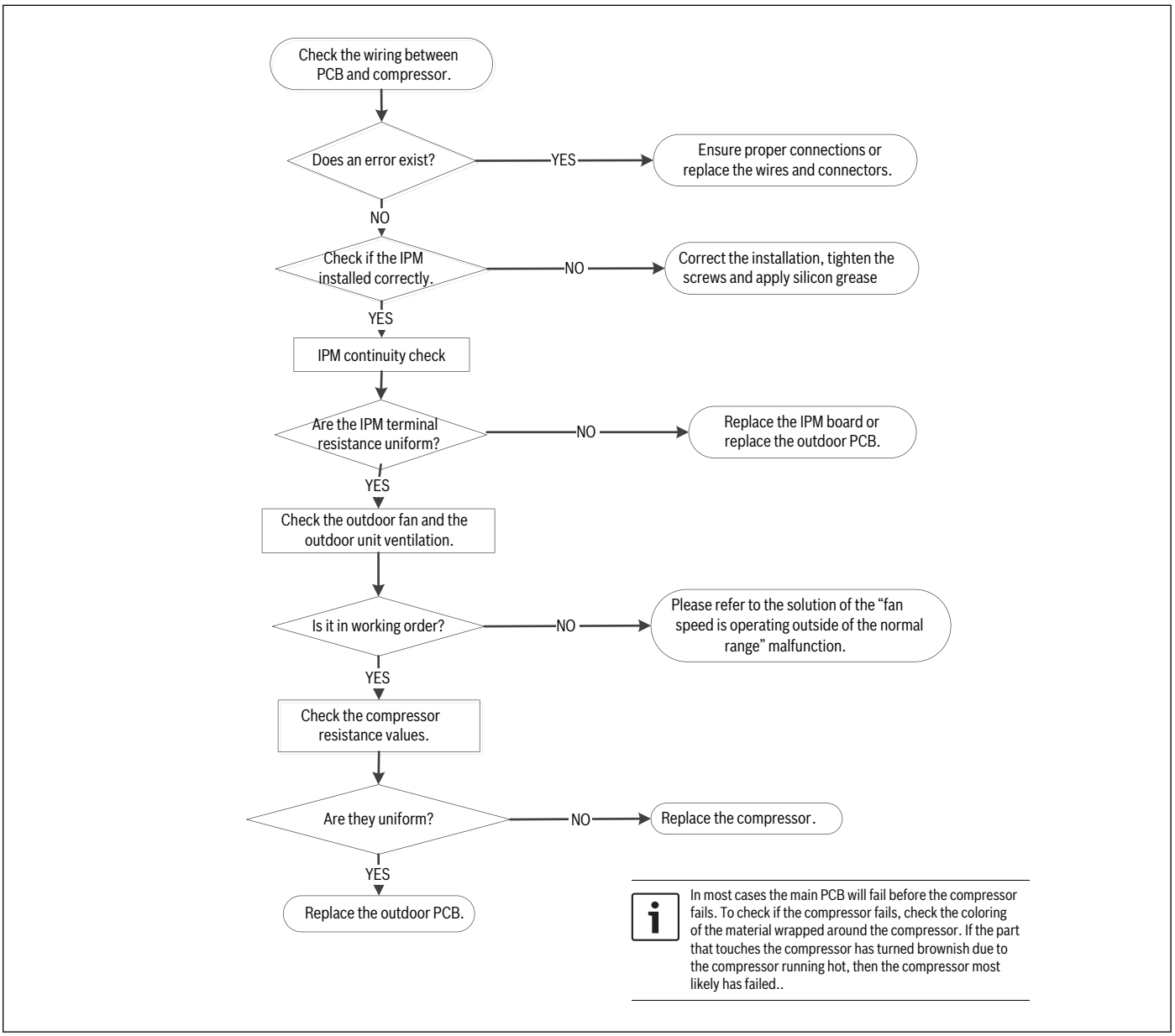


Figure 66

IPM Continuity Check

WARNING

Electrical shock hazard!

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

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

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

Table 40

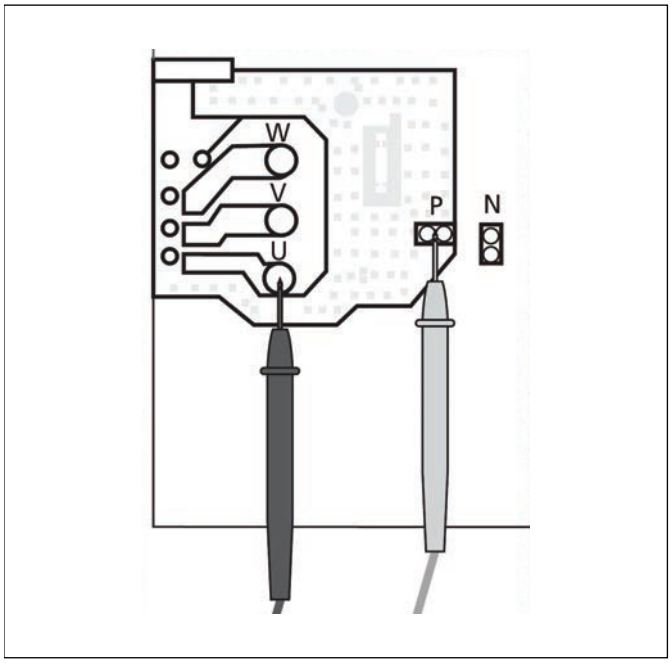


Figure 67

Compressor check

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

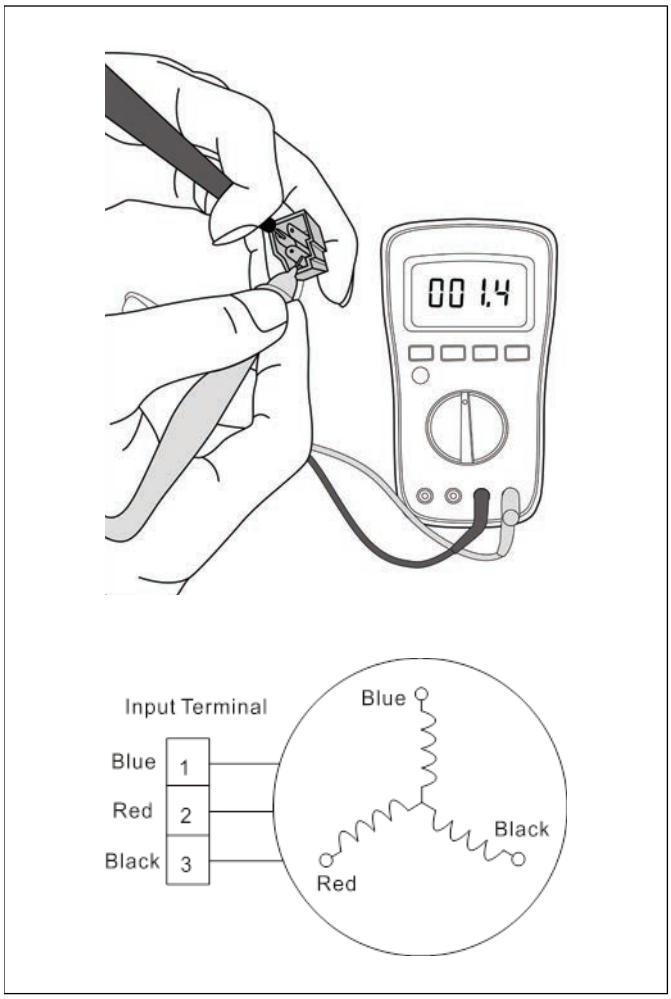


Figure 68

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

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

Table 41

Troubleshooting:

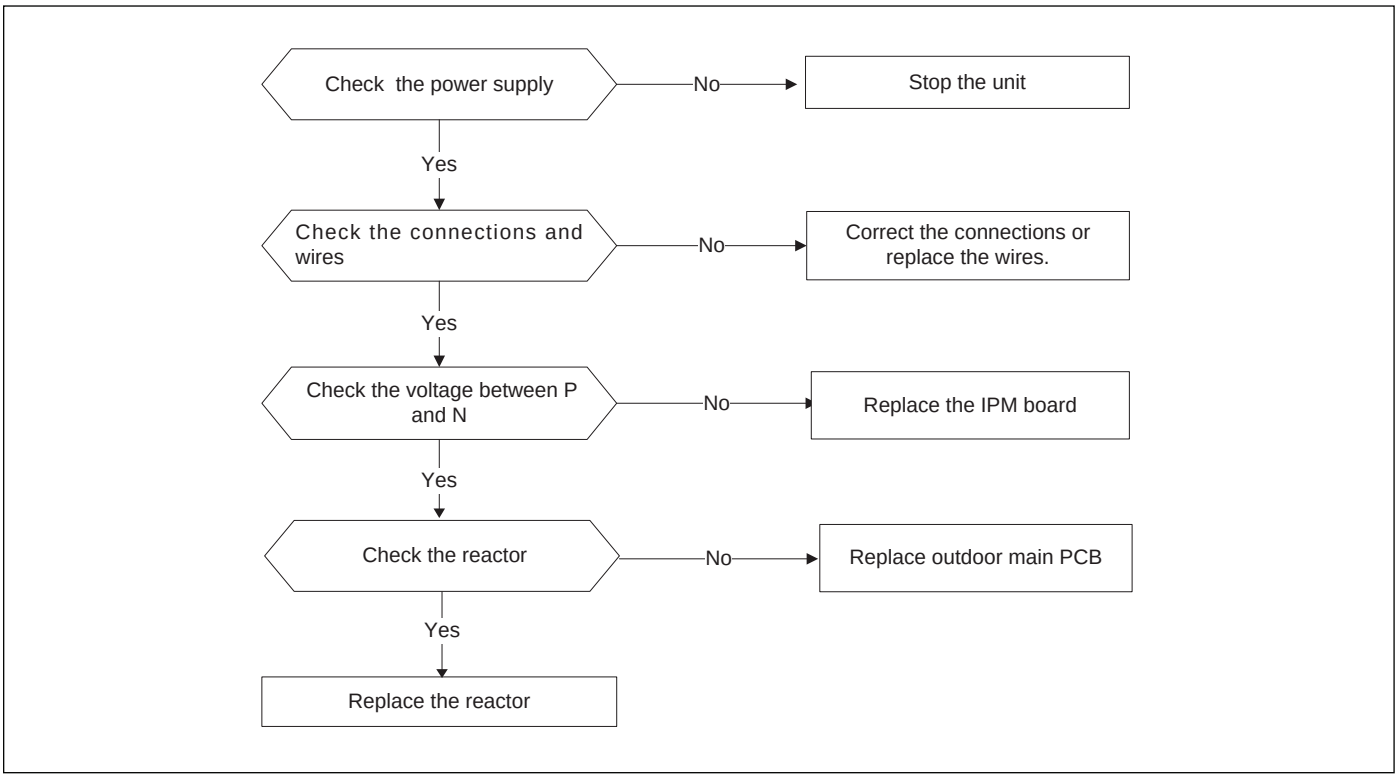


Figure 69

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.

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

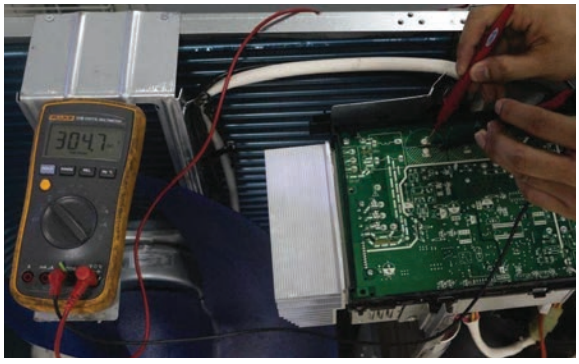


Figure 70

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

Error Code	PC 02
Malfunction decision conditions	For some models with overload protection, If the sampling voltage is not 5V, the LED will display the failure. If the temperature of IPM module is higher than a certain value, the LED displays the failure code. For some models with high pressure switch, outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa, the LED displays the failure code.
Supposed causes	• Installation mistake • Power supply problems • System leakage or block • Outdoor PCB faulty • Over load protector (OLP) faulty

Table 42

Troubleshooting:

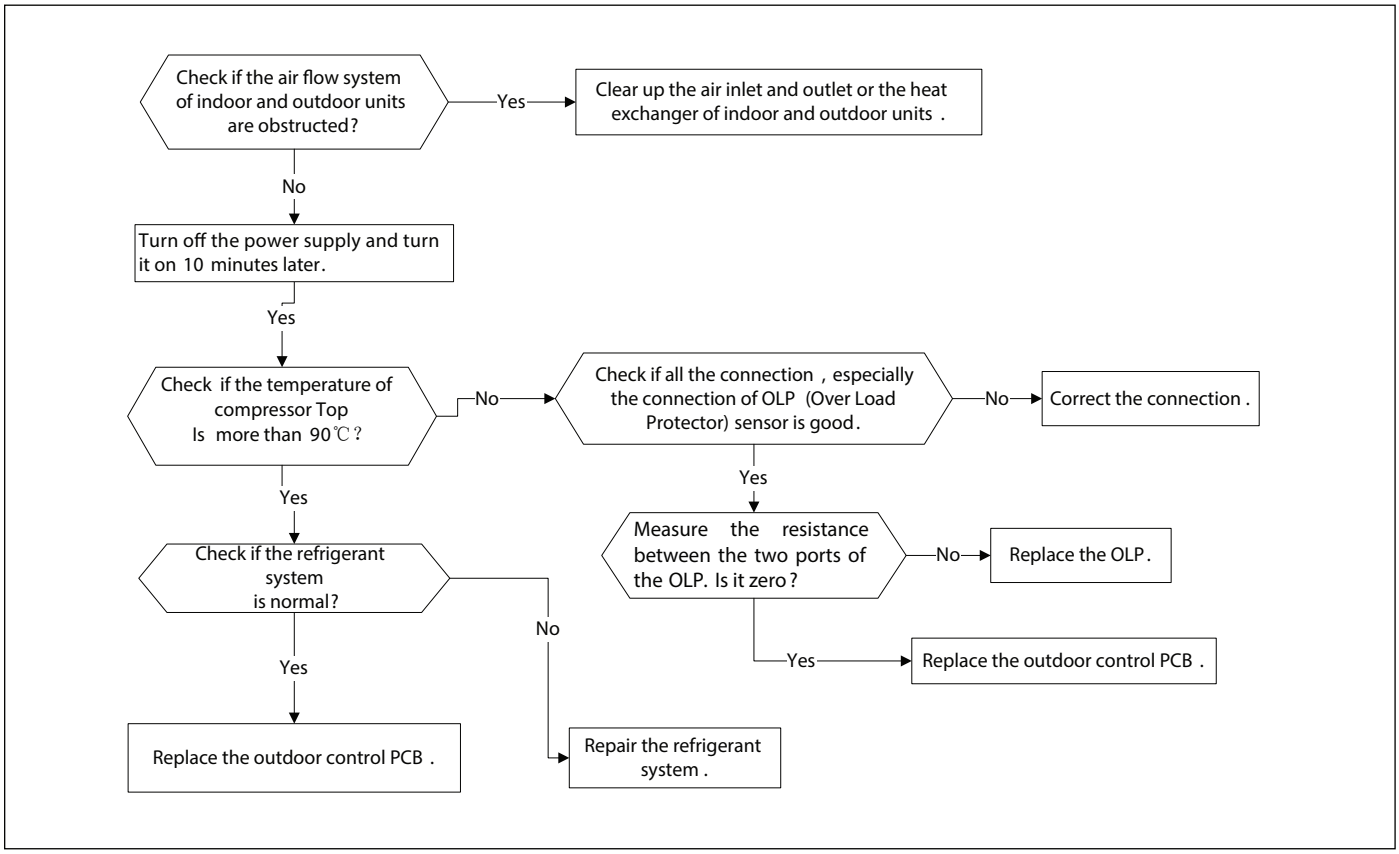


Figure 71

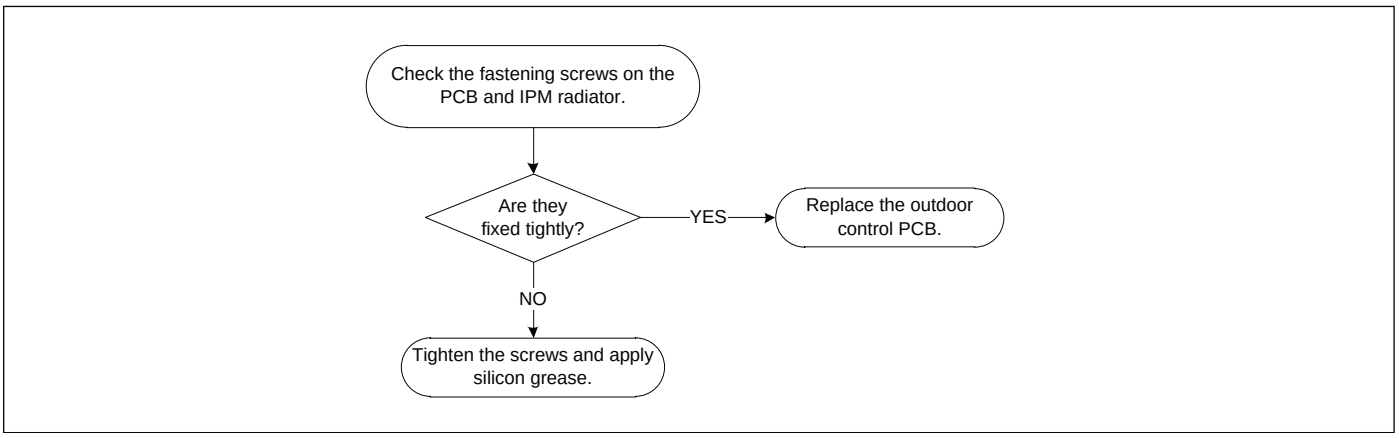


Figure 72

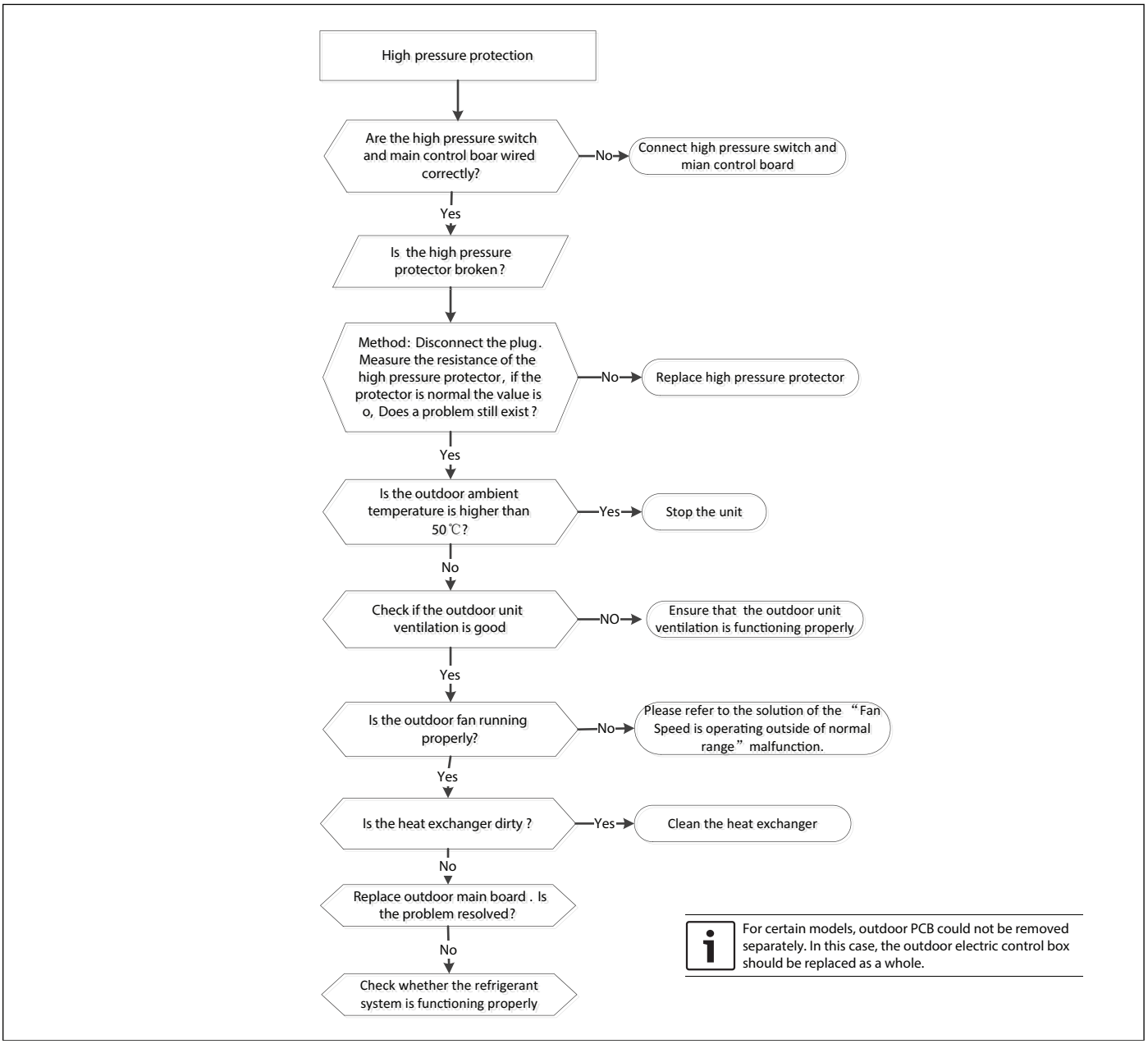


Figure 73

8.6.14 Low Pressure Protection Diagnosis and Solution (PC 03)

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

Table 43

Troubleshooting:

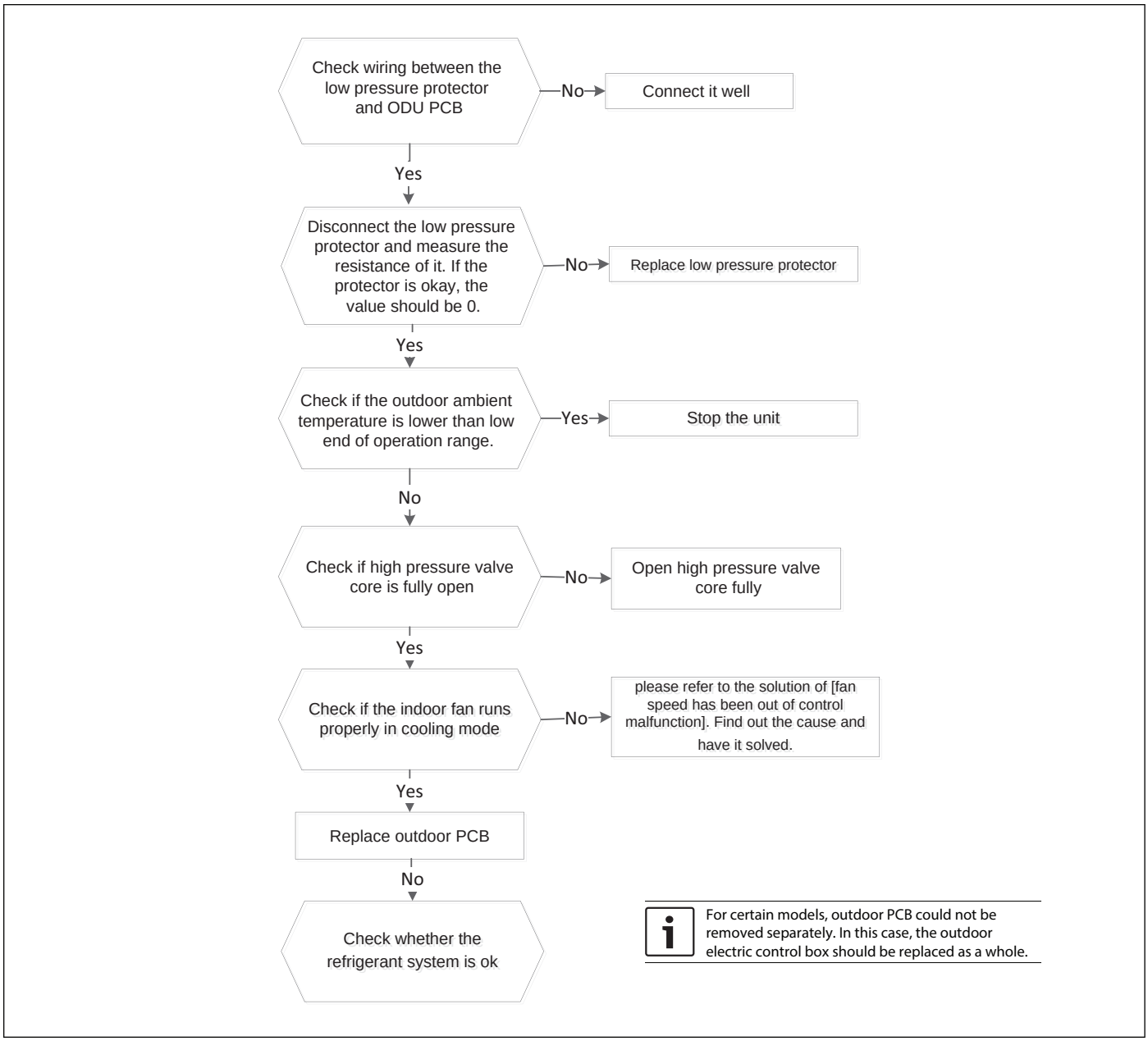


Figure 74

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

Error Code	PC 04
Malfunction decision conditions	An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.
Supposed causes	• Wiring mistake • IPM malfunction • Outdoor fan assembly faulty • Compressor malfunction • Outdoor PCB faulty

Table 44

Troubleshooting:

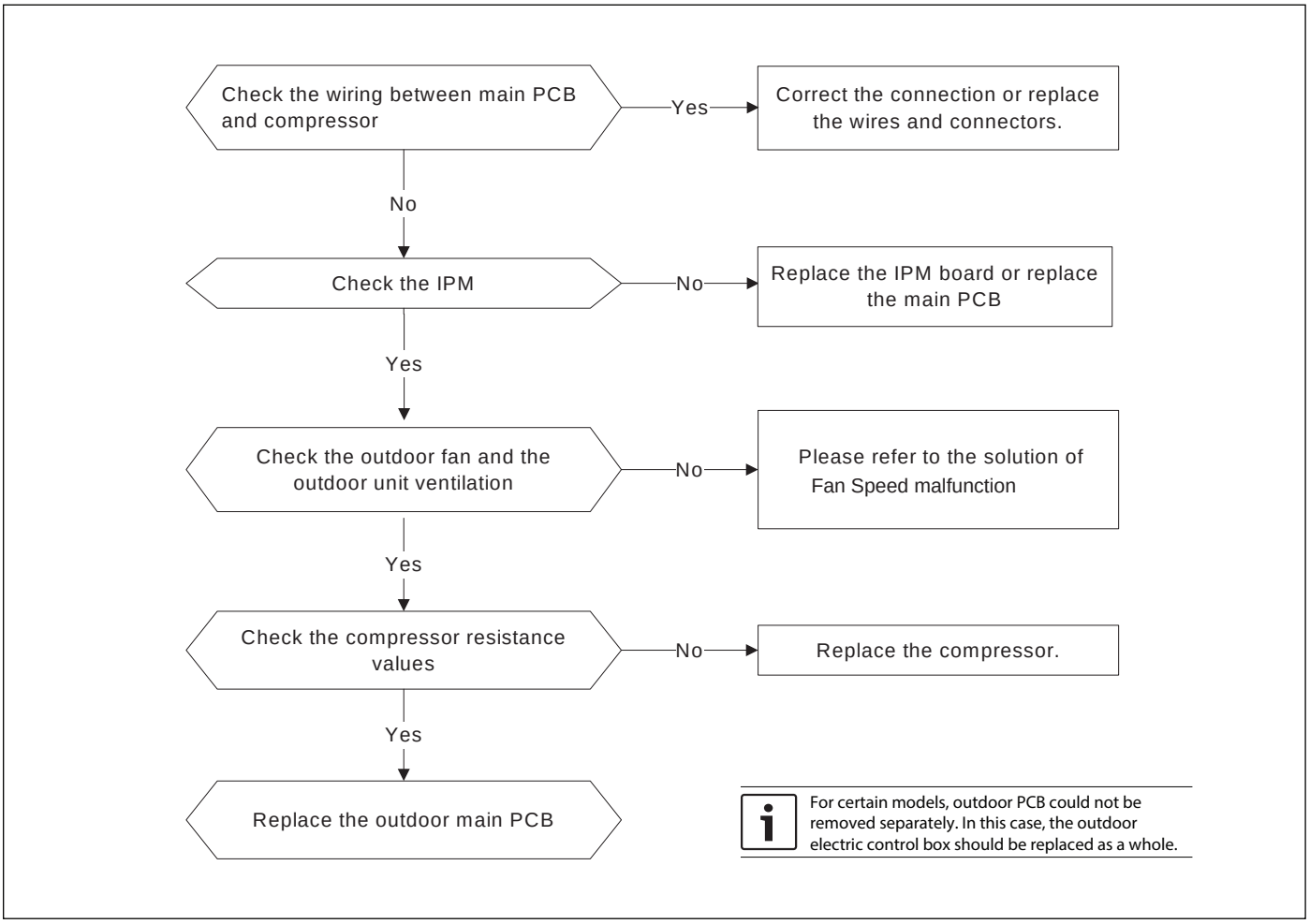


Figure 75

8.6.16 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.

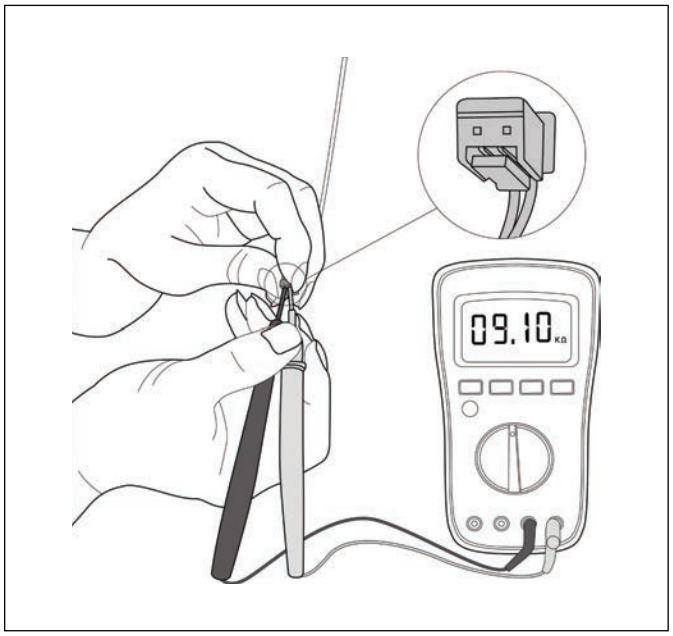


Figure 76

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)

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

Table 46

Pressure			Temperature		Pressure			Temperature	
Kpa	Bar	PSI	℃	℉	Kpa	Bar	PSI	℃	℉
58	1	8.4	-60	-76	935.23	9	136	8	46
62	1	8.9	-59	-74	963.75	10	140	9	48
65	1	9	-58	-72	992.93	10	144	10	50
69	1	10.0	-57	-71	1022.80	10	148	11	52
72	1	10.5	-56	-69	1053.30	11	153	12	54
76	1	11.1	-55	-67	1084.50	11	157	13	55
80	1	11.7	-54	-65	1116.40	11	162	14	57
85	1	12.3	-53	-63	1149.00	11	167	15	59
89	1	13.0	-52	-62	1182.30	12	171	16	61
94	1	13.6	-51	-60	1216.30	12	176	17	63
99	1	14.3	-50	-58	1251.10	13	181	18	64
104	1	15.1	-49	-56	1286.60	13	187	19	66
109	1	15.8	-48	-54	1322.80	13	192	20	68
115	1	16.6	-47	-53	1359.90	14	197	21	70
120	1	17.4	-46	-51	1397.7	14	203	22	72
126	1	18.3	-45	-49	1436.30	14	208	23	73
132	1	19.2	-44	-47	1475.70	15	214	24	75
139	1	20.1	-43	-45	1515.90	15	220	25	77
145	1	21.1	-42	-44	1557.00	16	226	26	79
152	2	22.1	-41	-42	1598.90	16	232	27	81
159	2	23.1	-40	-40	1641.60	16	238	28	82
167	2	24.2	-39	-38	1685	17	244	29	84
174	2	25.3	-38	-36	1729.7	17	251	30	86
182	2	26.4	-37	-35	1775.00	18	257	31	88
190	2	27.6	-36	-33	1821.30	18	264	32	90
199	2	28.8	-35	-31	1868.40	19	271	33	91
207	2	30.1	-34	-29	1916.50	19	278	34	93
216	2	31.4	-33	-27	1965.6	20	285	35	95
226	2	33	-32	-26	2015.50	20	292	36	97
235	2	34.1	-31	-24	2066.50	21	300	37	99
245	2	35.6	-30	-22	2118.40	21	307	38	100
256	3	37.1	-29	-20	2171.30	22	315	39	102
266	3	38.6	-28	-18	2225.20	22	323	40	104
277	3	40.2	-27	-17	2280.20	23	331	41	106
289	3	41.9	-26	-15	2336.10	23	339	42	108
300	3	43.5	-25	-13	2393.20	24	347	43	109
312	3	45.3	-24	-11	2451.30	25	356	44	111
325	3	47.1	-23	-9	2510.40	25	364	45	113
337	3	48.9	-22	-8	2570.70	26	373	46	115
351	4	50.8	-21	-6	2632.10	26	382	47	117
364	4	52.8	-20	-4	2694.70	27	391	48	118
378	4	54.8	-19	-2	2758.30	28	400	49	120
392	4	56.9	-18	0	2823.20	28	409	50	122
407	4	59.1	-17	1	2889.30	29	419	51	124
422	4	61.3	-16	3	2956.50	30	429	52	126
438	4	63.5	-15	5	3025.00	30	439	53	127
454	5	65.8	-14	7	3094.70	31	449	54	129
470	5	68.2	-13	9	3165.70	32	459	55	131
487	5	70.7	-12	10	3238.10	32	470	56	133
505	5	73.2	-11	12	3311.70	33	480	57	135
523	5	75.8	-10	14	3386.70	34	491	58	136
541	5	78.5	-9	16	3463.00	35	502	59	138
560	6	81.2	-8	18	3540.70	35	514	60	140
579	6	84.0	-7	19	3619.90	36	525	61	142
599	6	86.9	-6	21	3700.50	37	537	62	144
620	6	89.9	-5	23	3782.70	38	549	63	145
640	6	92.9	-4	25	3866.30	39	561	64	147
662	7	96.0	-3	27	3951.50	40	573	65	149
684	7	99.2	-2	28	4038.30	40	586	66	151
706	7	102.4	-1	30	4126.80	41	599	67	153
729	7	105.8	0	32	4217.00	42	612	68	154
753	8	109.2	1	34	4309.00	43	625	69	156
777	8	112.7	2	36	4402.90	44	639	70	158
802	8	116.3	3	37	4498.70	45	652	71	160
827	8	120.0	4	39	4596.50	46	667	72	162
853	9	123.8	5	41	4696.50	47	681	73	163
880	9	127.6	6	43	4798.90	48	696	74	165
907	9	131.6	7	45	4904.10	49	711	75	167

Table 47

Compressor check

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

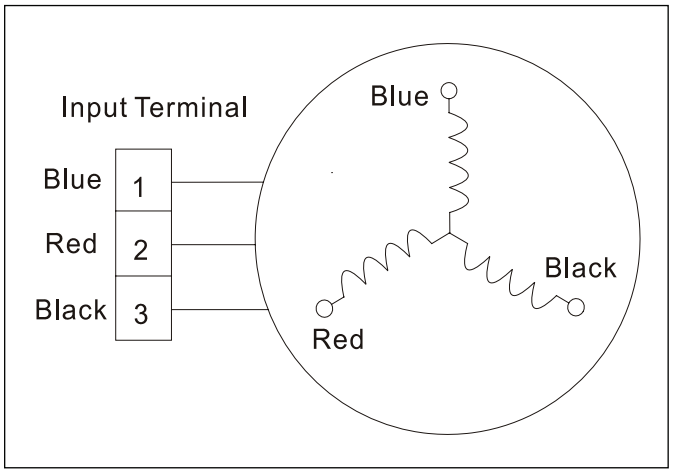


Figure 77

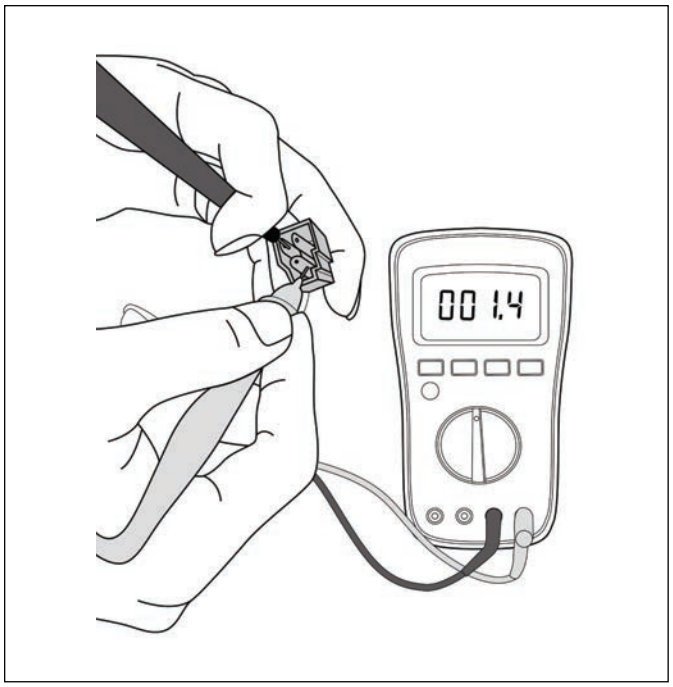


Figure 78

Position	Resistance Value					
	9K Regular	12K Regular	18K Regular	24K Regular	36K Regular	48K Light Commercial
Blue - Red	2.13Ω	2.13Ω	1.86Ω	1.04Ω	0.65Ω	0.37Ω
Blue - Black						
Red - Black						

Table 48

Position	Resistance Value					
	9K Max Performance	12K Max Performance	18K Max Performance	24K Max Performance	36K Max Performance	48K Max Performance
Blue - Red	1.82Ω	1.82Ω	1.04Ω	1.04Ω	0.37Ω	0.37Ω
Blue - Black						
Red - Black						

Table 49

IPM continuity check

WARNING

Electrical hazard!

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

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

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

Table 50

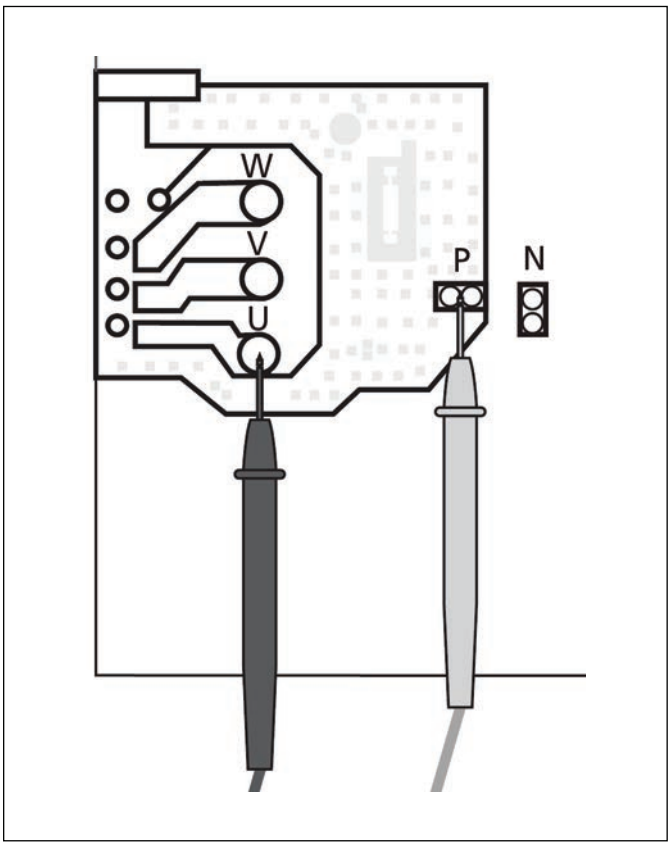


Figure 79

4-way Valve Check

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

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

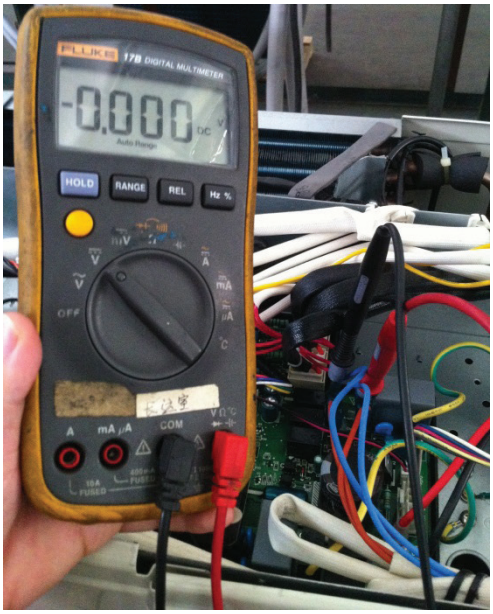


Figure 80

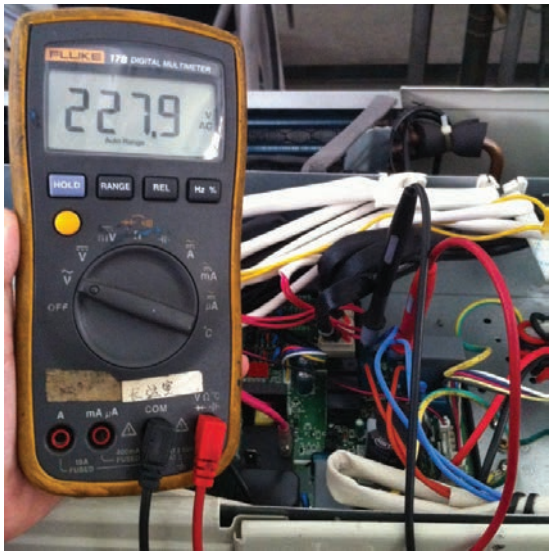


Figure 81

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

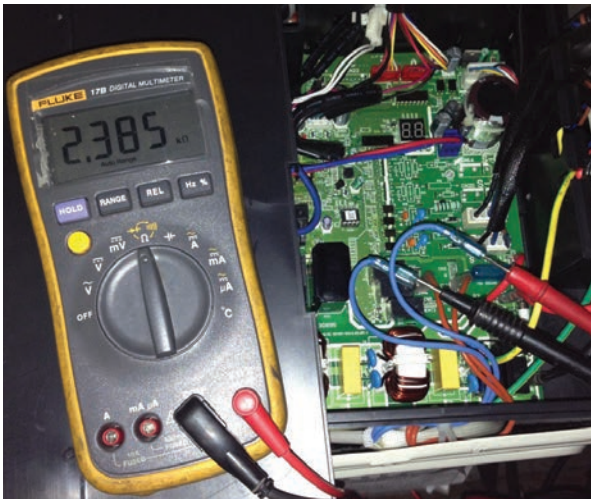


Figure 82

EXV Check

WARNING

Electrical hazard!

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

1. Turn off Outdoor Unit and disconnect power supply.
2. Disconnect the connector from outdoor PCB.
3. Measure the resistance value of each winding using a multi-meter.

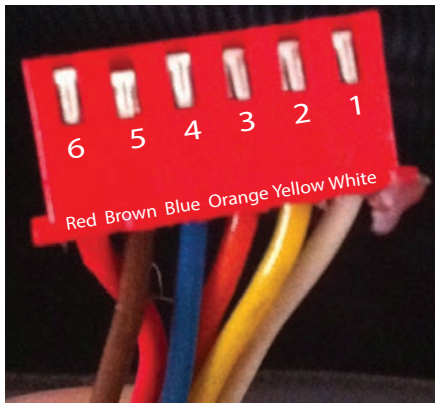


Figure 83

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

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

Table 51

9 Disassembly Guide

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

9.1 Indoor Unit - 9K, 12K, 18K Cassette Units

9.1.1 Filter and Panel

1. Push one side of the grille clamp.

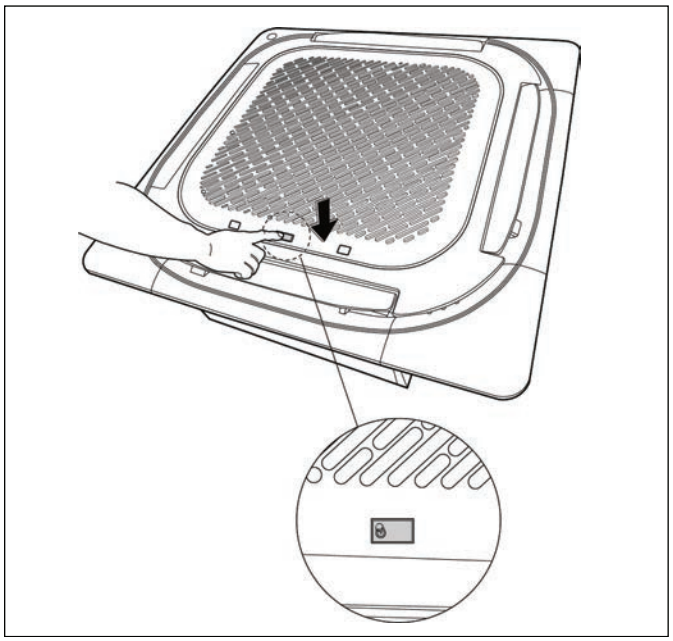


Figure 84

2. Remove one screw then push two grille clamps to remove the air inlet grille assembly.

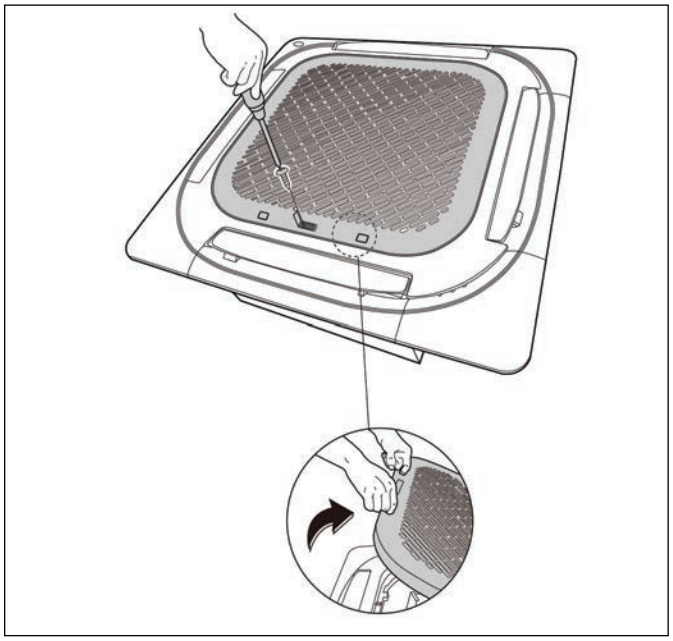


Figure 85

3. Turn over the air inlet grille assembly, then pull up the filter.

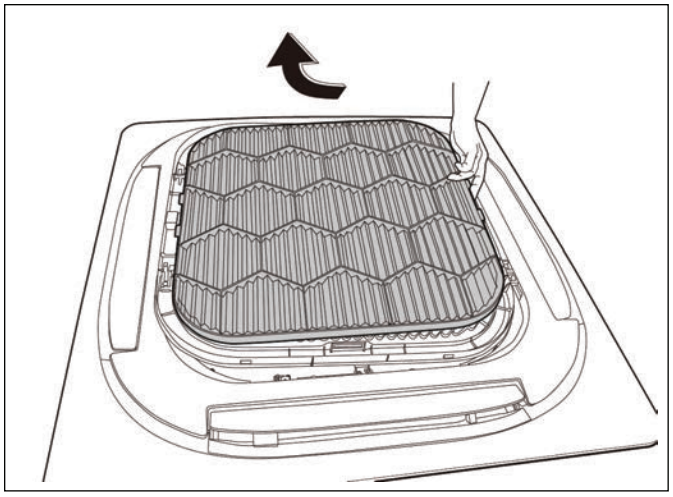


Figure 86

4. Remove 3 screws and remove the cover of electronic control box.
5. Remove 4 screws of the panel.

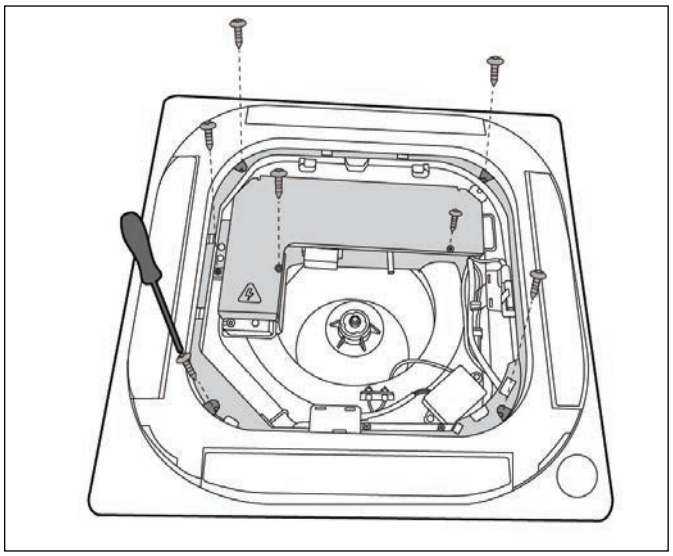


Figure 87

6. Disconnect the connectors of display board and stepper motor.
7. Loosen two clasps with index finger and thumb and then remove the panel.

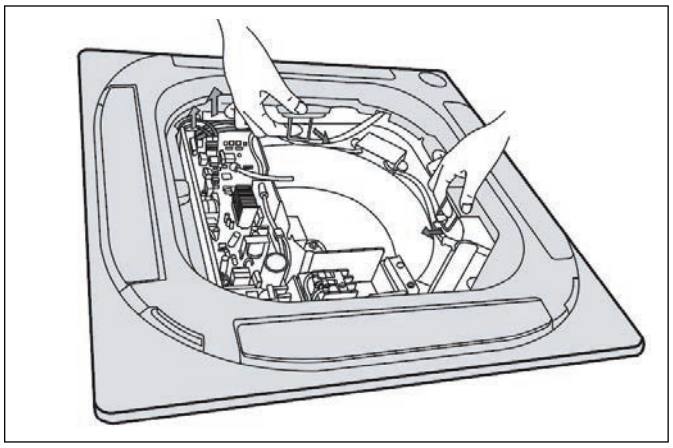


Figure 88

9.1.2 Indoor Unit Display

1. Remove 2 screws and then remove the installing cover

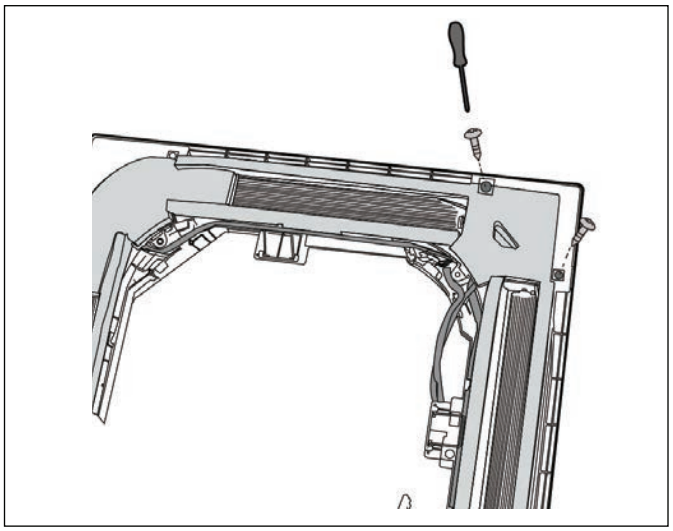


Figure 89

2. Remove the display board subassembly.

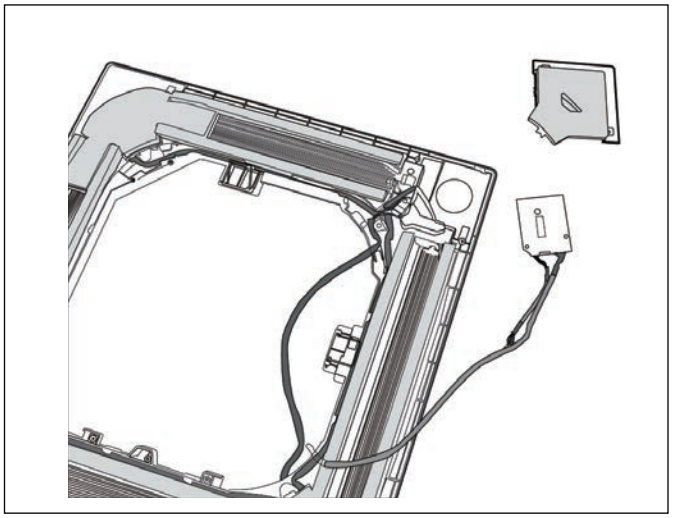


Figure 90

9.1.3 Electrical Parts

1. Remove 2 screws of electronic control box and 2 screws of earth wire.
2. Disconnect the connectors of temperature sensor, pump, motor and water level.
3. Remove the electronic control box subassembly.

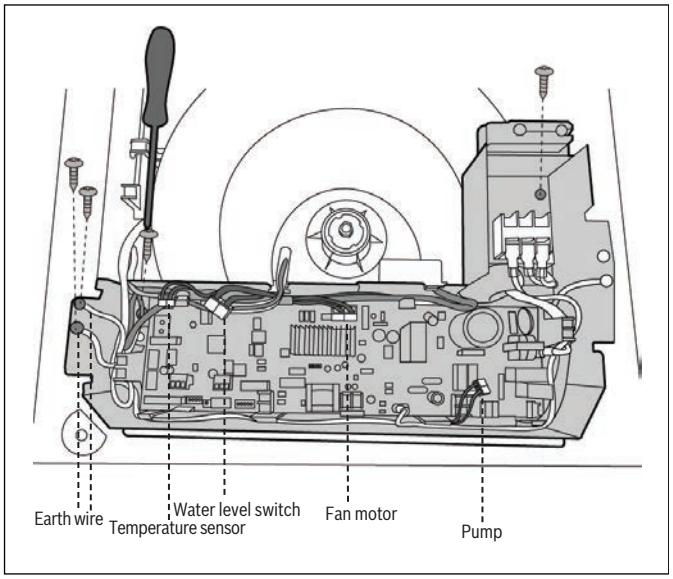


Figure 91

4. Release 3 clasps of the main control board and 1 screw of earth wire.
5. Remove the main control board subassembly.

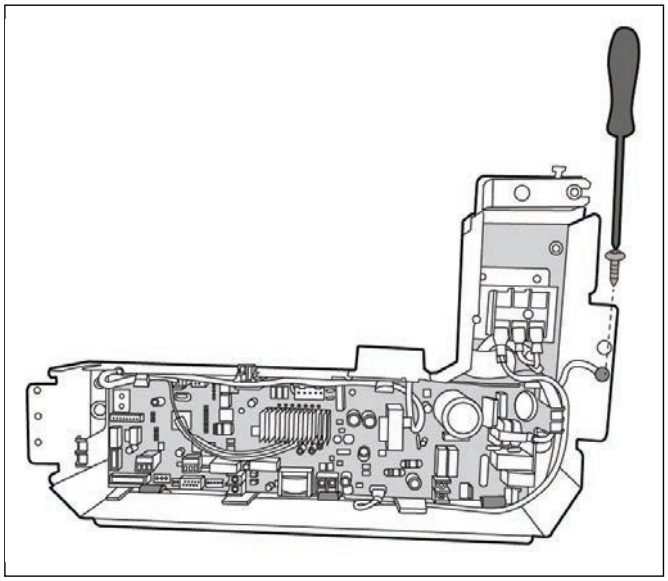


Figure 92

9.1.4 Fan Motor and Fan Wheel

1. Rotate the nut anticlockwise and then pull up the fan wheel.

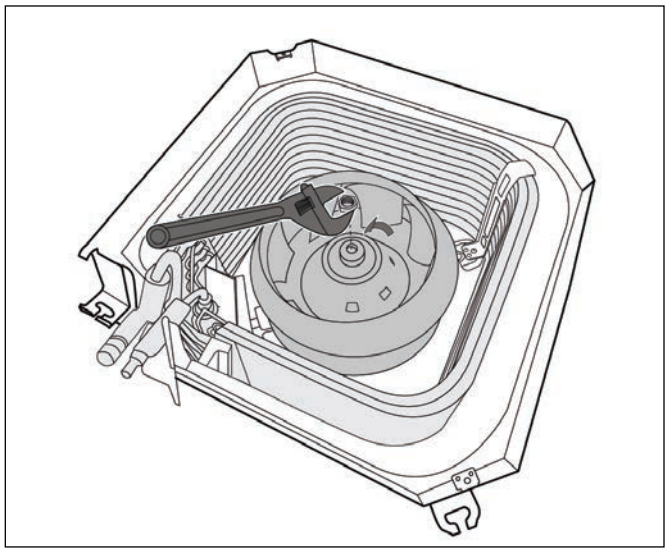


Figure 93

2. Remove 1 screw of fixing board and rotate three nuts anticlockwise. Then remove the fan motor.

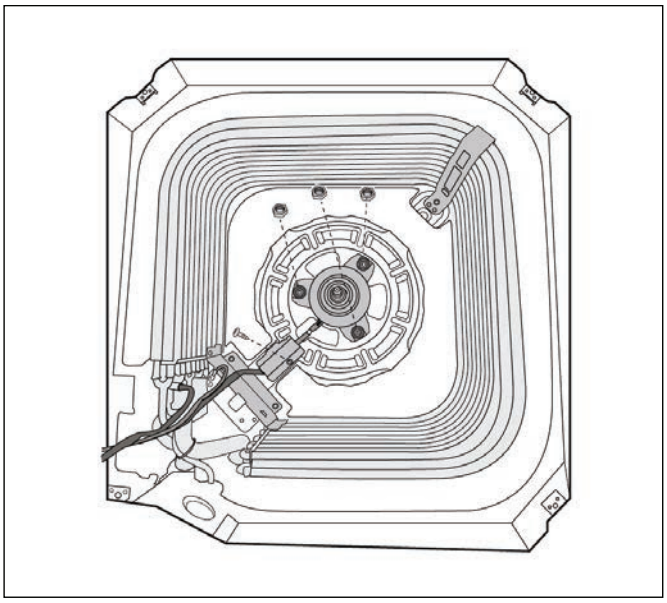


Figure 94

9.1.5 Water Collecting Assembly

1. Remove the 1 screw of the ventilation ring.
2. Remove the 2 screws of positive and negative ion generator (optional).

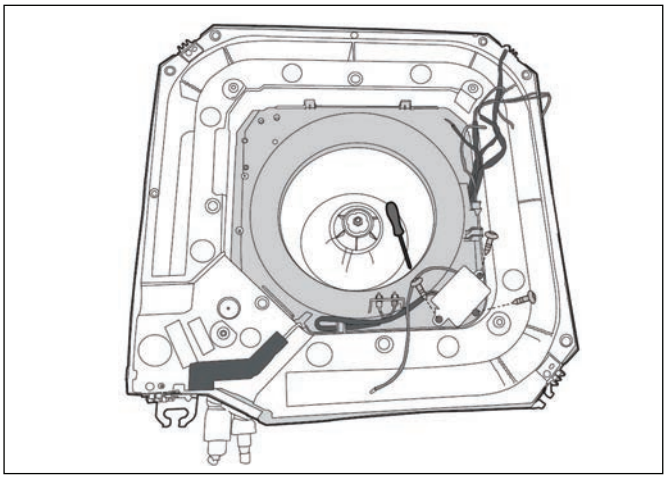


Figure 95

3. Remove the 4 screws of the water collector subassembly.

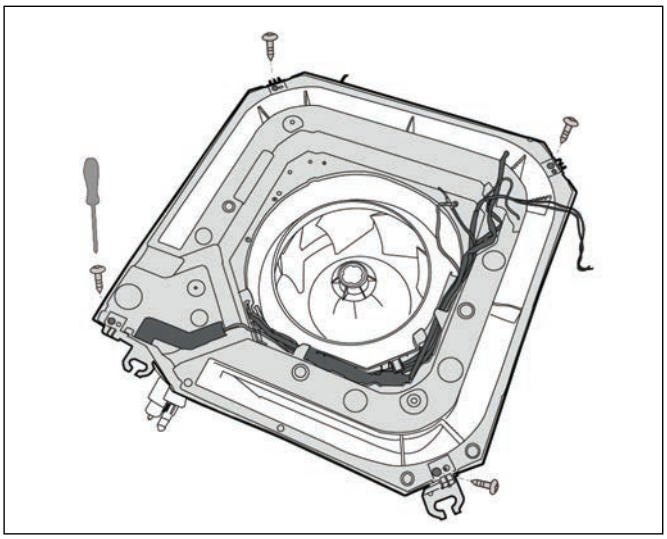


Figure 96

4. Turn over the water collector subassembly and remove the water level switch.

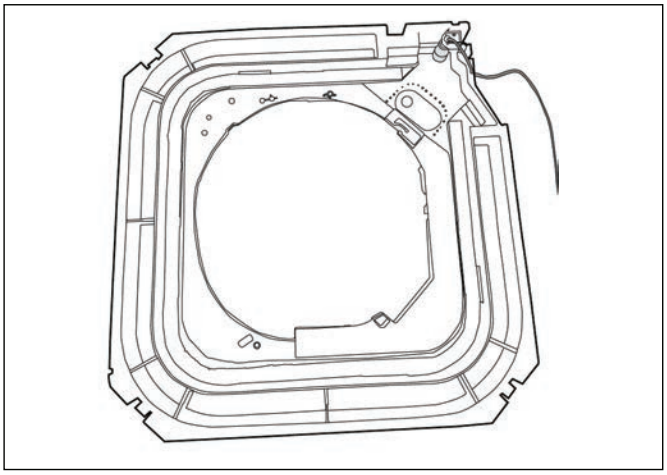


Figure 97

9.1.6 Condensate Pump

1. Pinch the metal wire in the direction shown in the figure to release it.

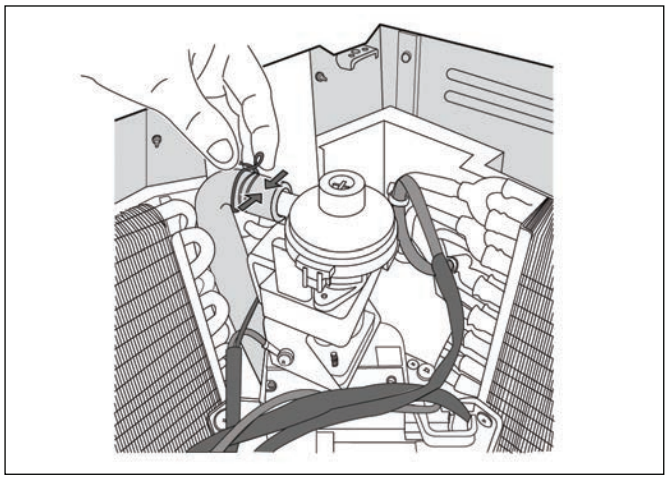


Figure 98

2. Pull out the drain pipe.

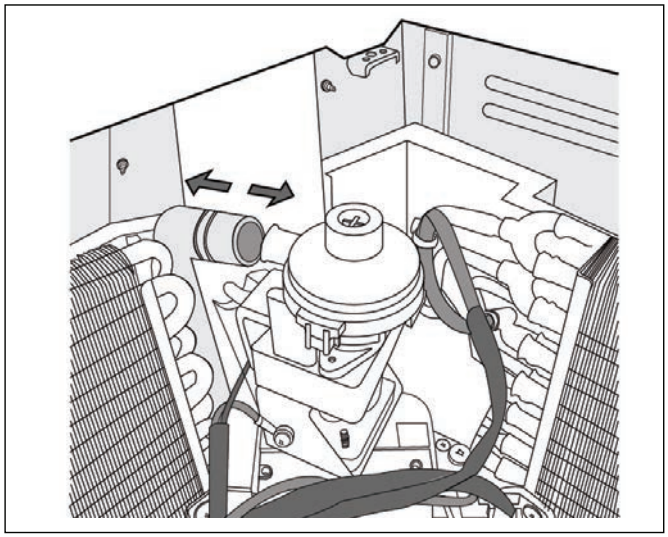


Figure 99

3. Remove 2 screws fixing water pump assembly

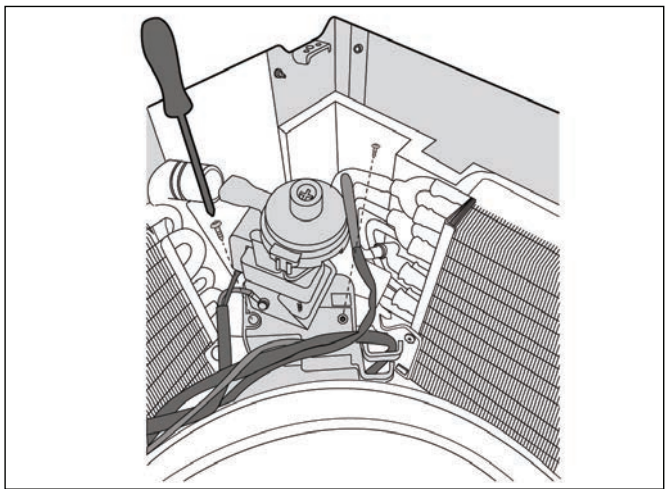


Figure 100

9.1.7 Evaporator

1. Remove 2 screws of pipe clamp board.

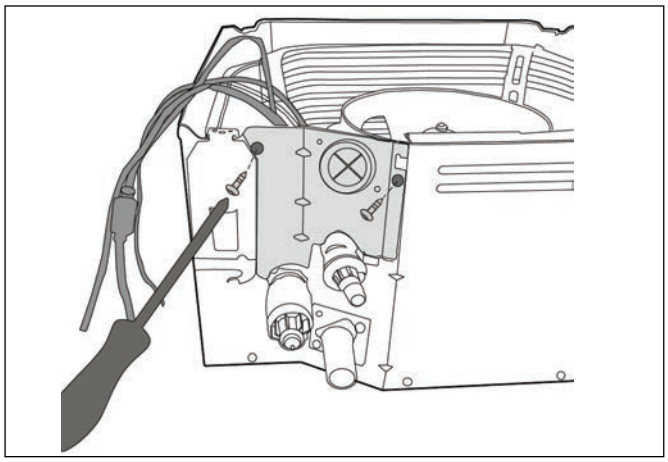


Figure 101

2. Remove 4 screws of the evaporator connecting board and then remove it.
3. Remove 1 screw of the evaporator fixing hanger and then remove it.

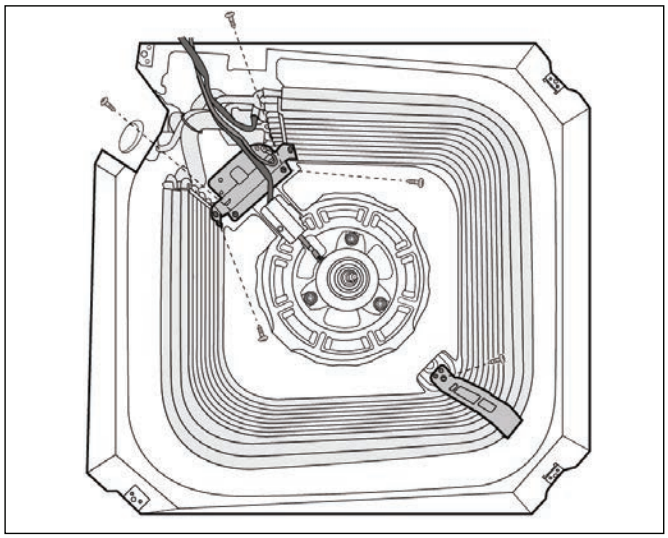


Figure 102

4. Remove 4 screws and remove the refrigerant sensor.

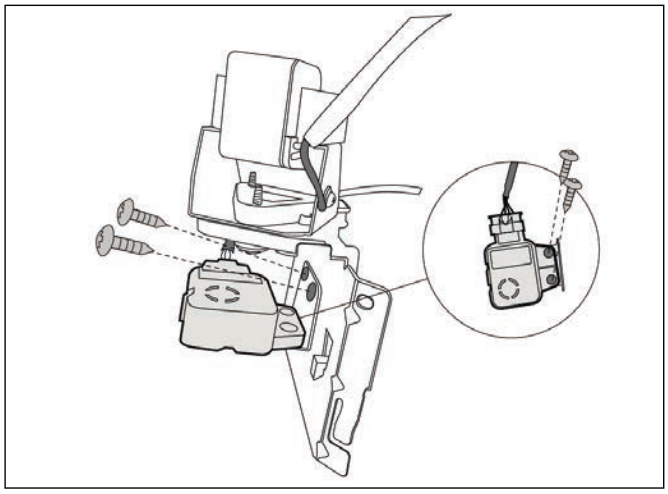


Figure 103

9.2 Indoor Unit - 24K, 36K, 48K Cassette Units

9.2.1 Front Panel & Filter

1. Push one side of the grille clamp.

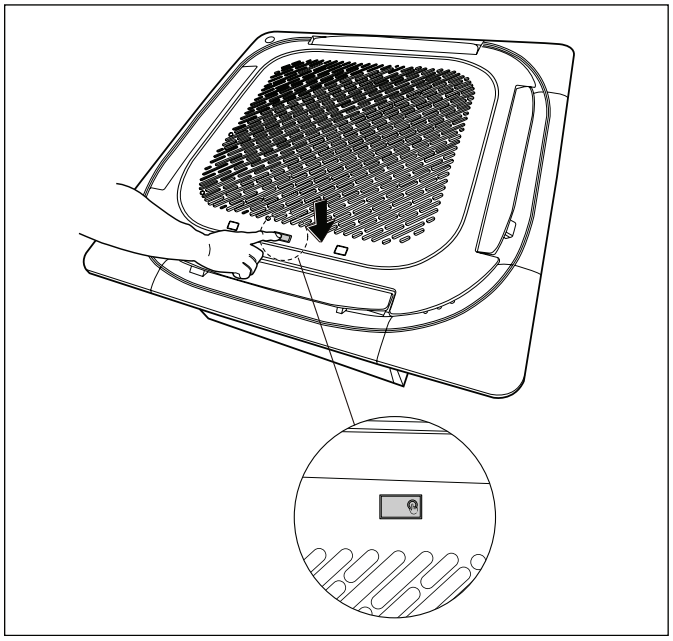


Figure 104

2. Remove one screw then push two grille clamps to remove the air inlet grille assembly.

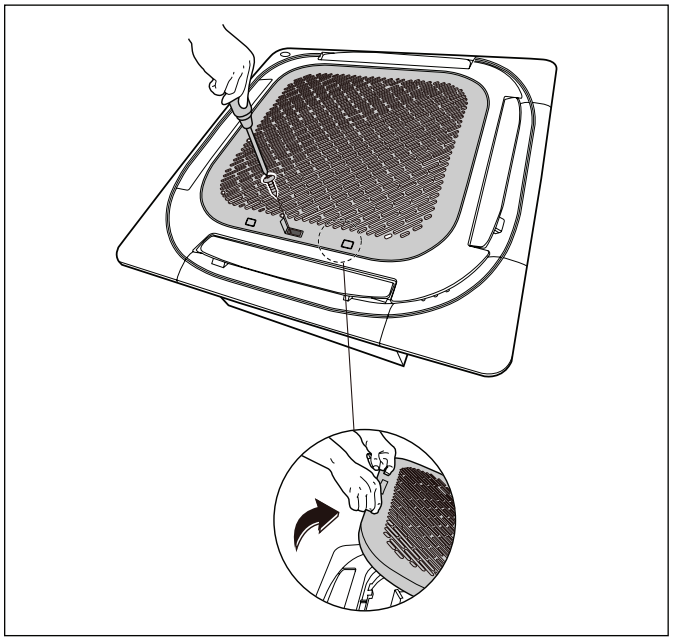


Figure 105

3. Turn over the air inlet grille assembly then pull up the filter.

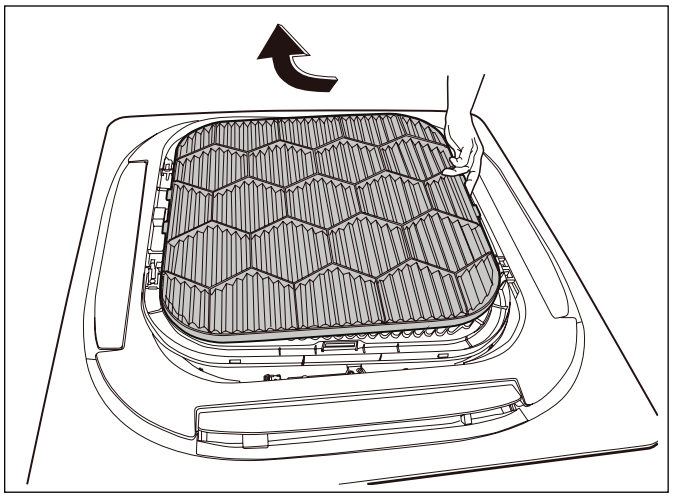


Figure 106

4. Remove 2 screws and remove the cover of electronic control box.

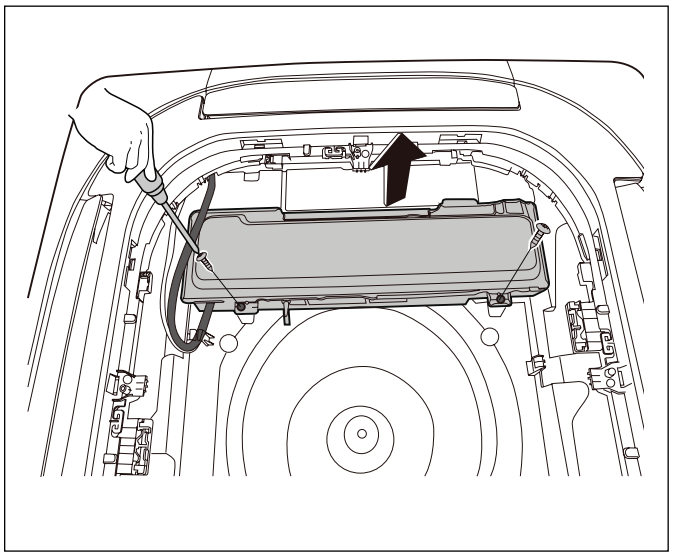


Figure 107

5. Disconnect the connectors of display board and stepper motor and release the panel.

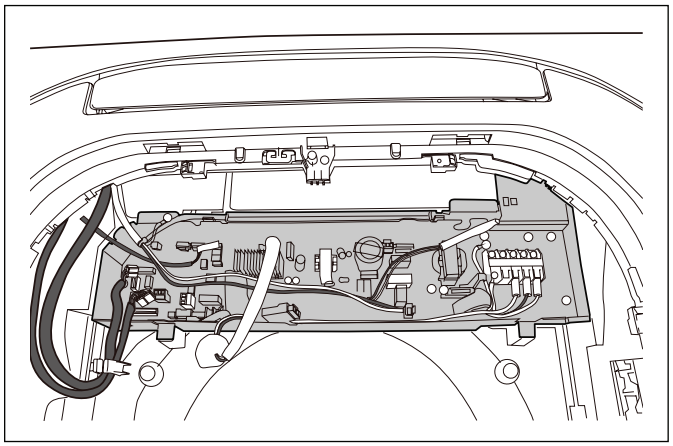


Figure 108

9.2.2: Electrical Parts

1. Remove 3 screws of electronic control box and 1 screw of earth wire.
2. Disconnect the connectors of temperature sensor, pump, motor and water level switch.
3. Remove the electronic control box subassembly.

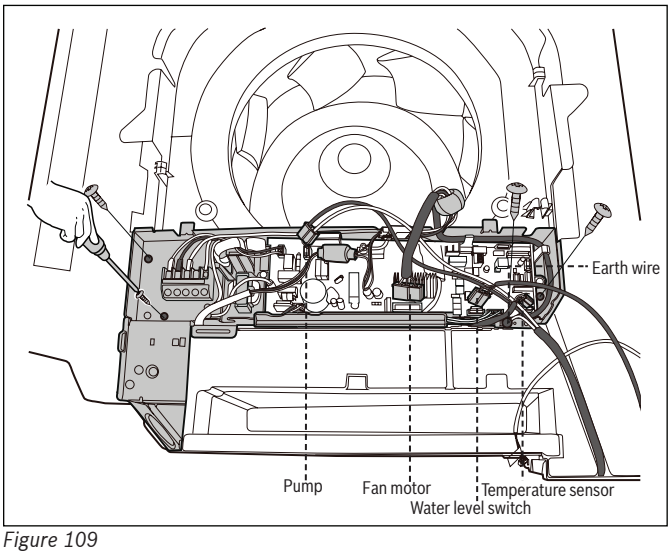


Figure 109

4. Remove 2 screws of the main control board and 2 screws of earth wire.
5. Disconnect connectors and then remove the main control board.

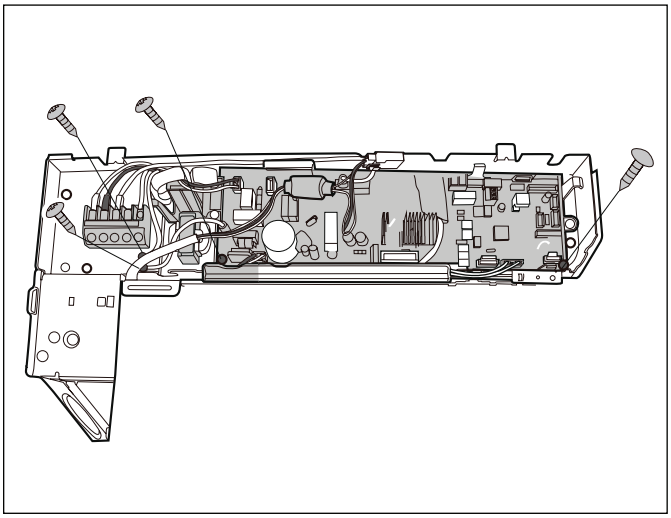


Figure 110

9.2.3: Display Board

1. Open the install cover assembly (with display board)

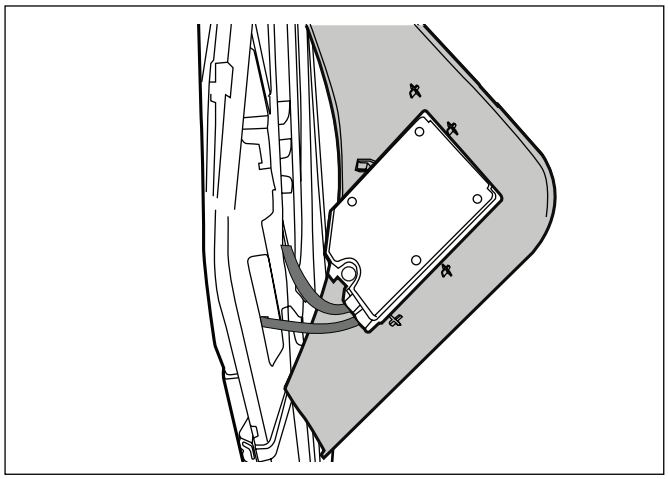


Figure 111

2. Remove 1 screw of display window board.

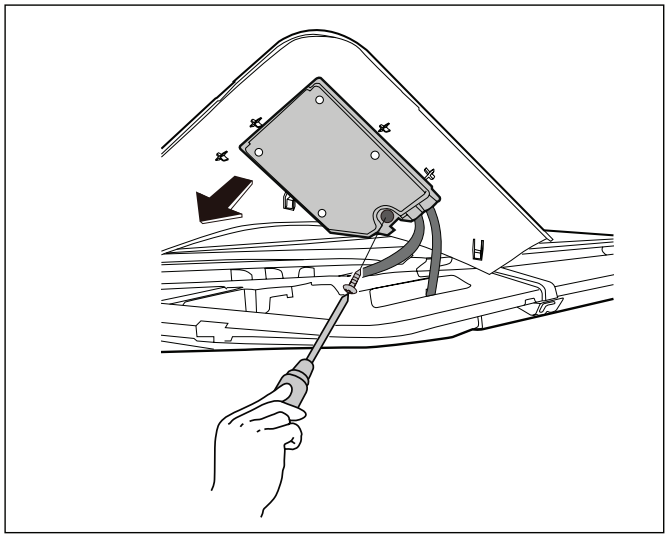


Figure 112

3. Turn over the display board, push the swtich to remove the display board.

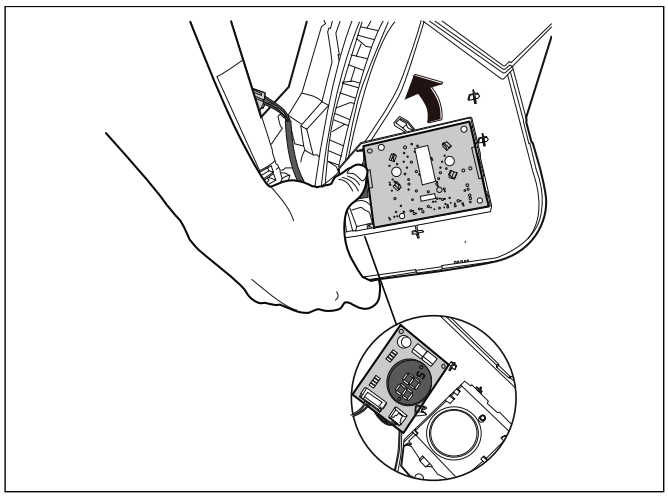


Figure 113

9.2.4 Fan Motor and Wheel

1. Remove the nut of the fan and then pull up the fan.

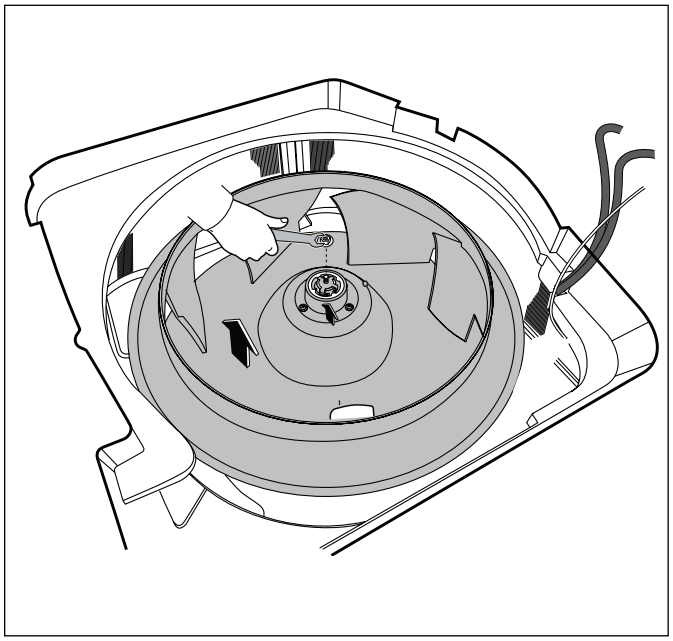


Figure 114

2. Remove 2 screws of fixing board and 3 nuts of fan motor.

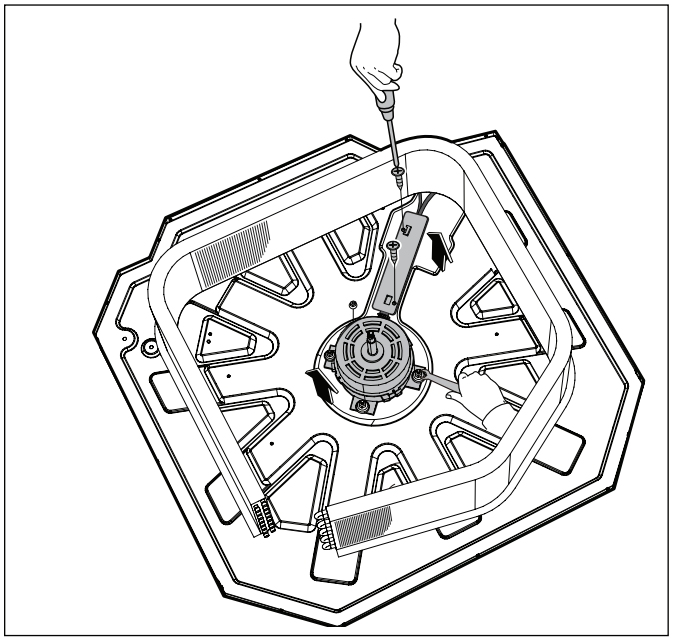


Figure 115

9.2.5 Drain Pump

1. Remove 5 screws fixing external water pump box assembly.

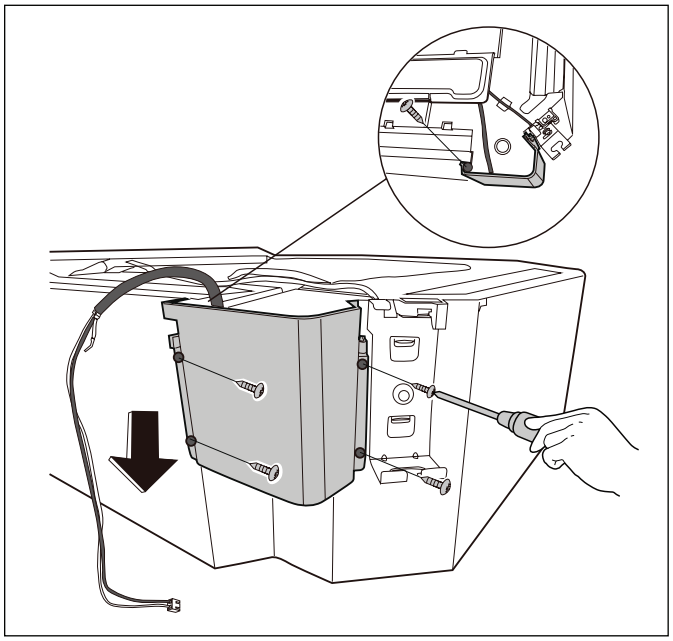


Figure 116

2. Remove the water pump box assembly.

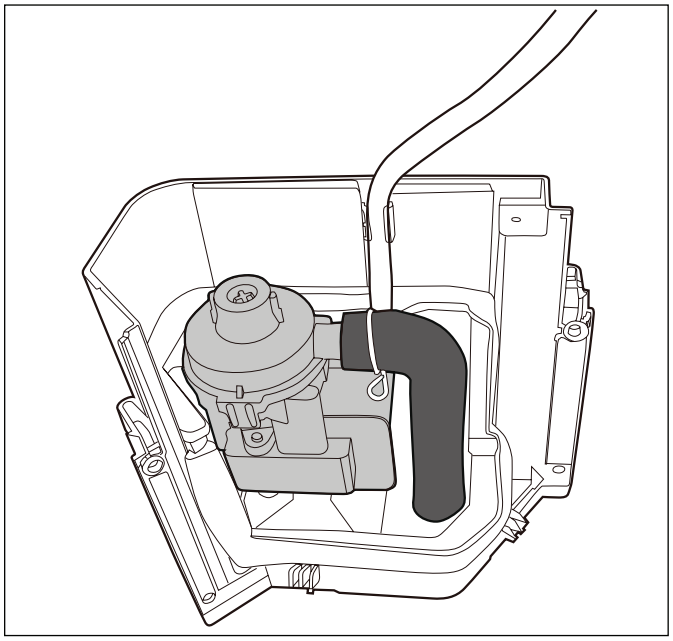


Figure 117

9.2.6 Evaporator

1. Remove 2 screws of pipe clamp board.

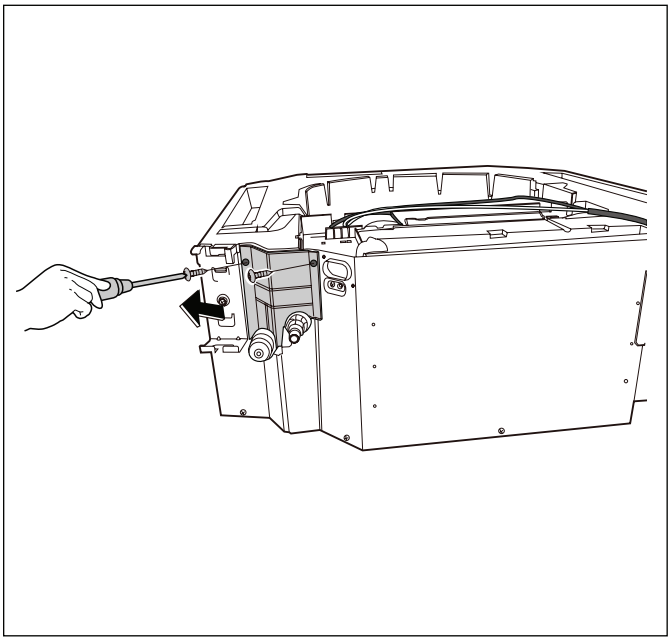


Figure 118

2. Remove 2 screws and remove the refrigerant sensor.
3. Remove 2 screws of the evaporator fixing board and then remove it.
4. Remove 2 screws of the evaporator fixing hangers and then remove them.

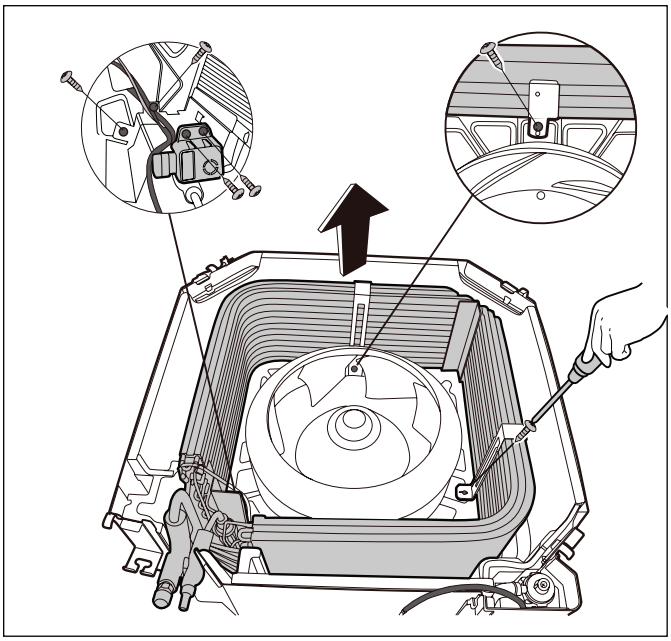


Figure 119

9.2.7 Water Collector & Water Level Switch

1. Remove the 2 screws of the ventilation ring.

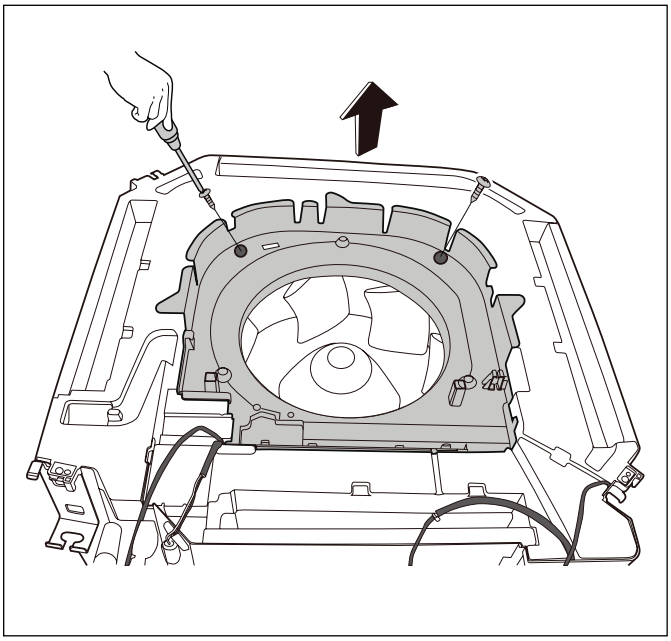


Figure 120

2. Remove the 2 screws fixing the water collector.

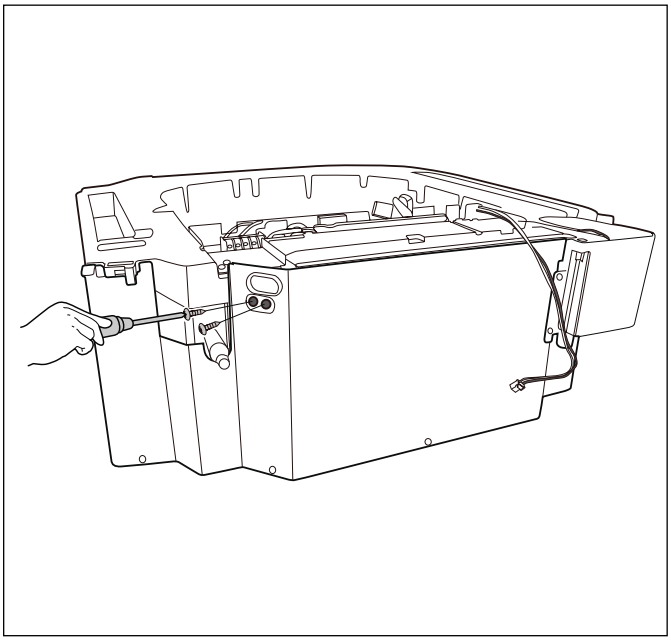


Figure 121

3. Remove the 5 screws of the water collector subassembly.

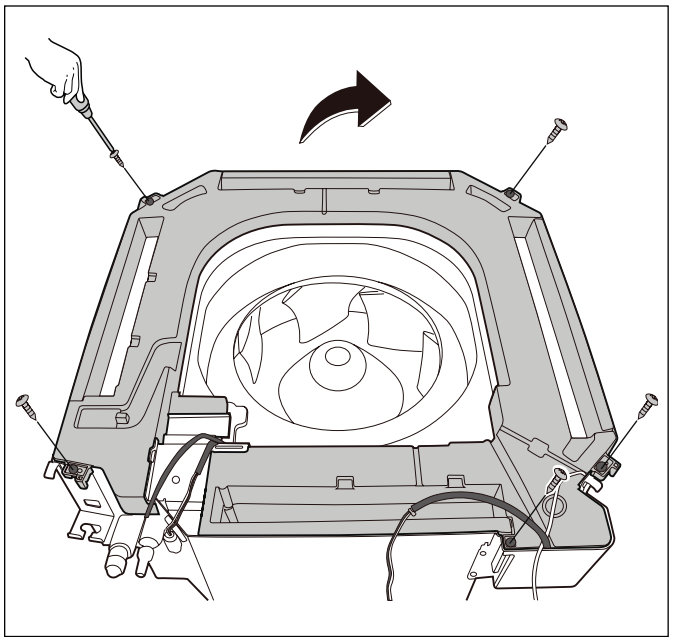


Figure 122

4. Turn over the water collector subassembly and remove the water level switch.

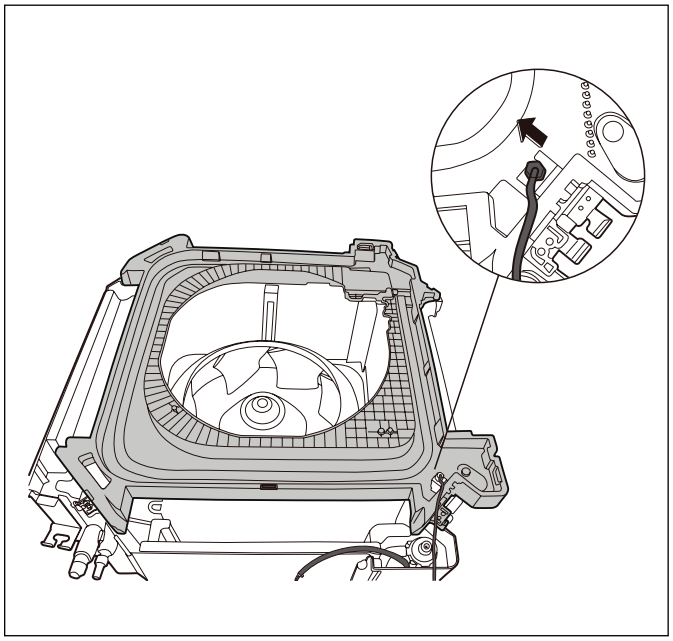


Figure 123

9.3 Outdoor Unit

9.3.1 Panel Plates

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

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

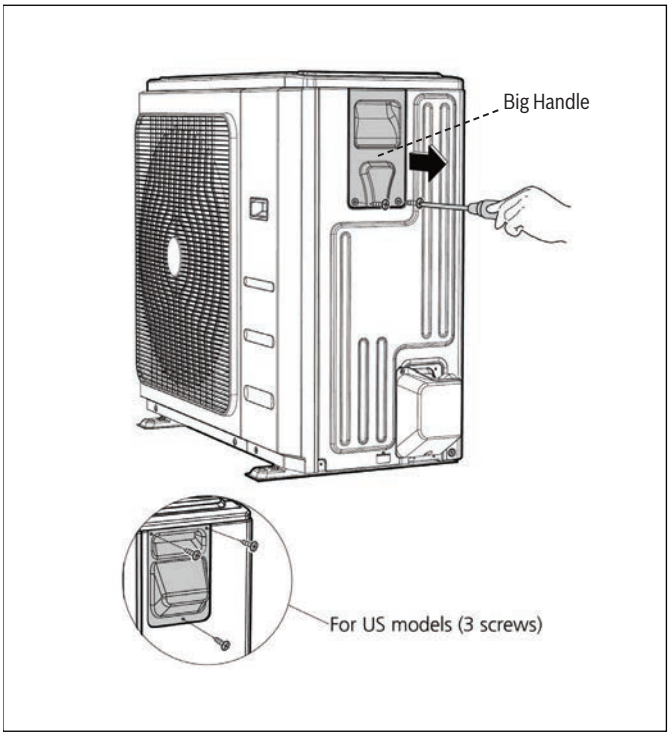


Figure 124

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

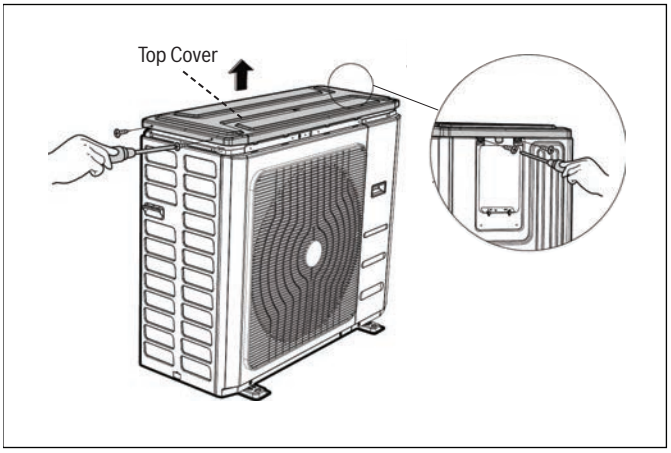


Figure 125

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

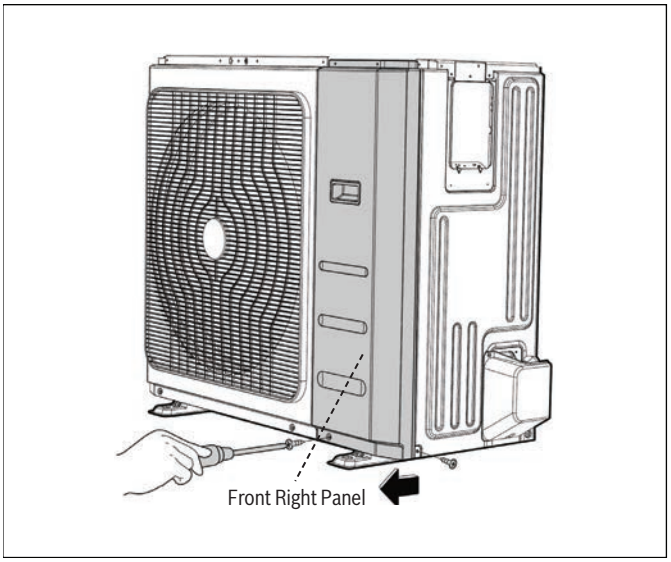


Figure 126

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

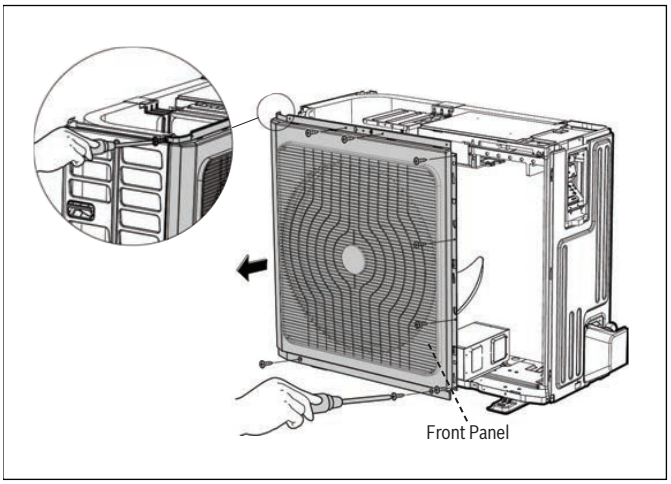


Figure 127

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

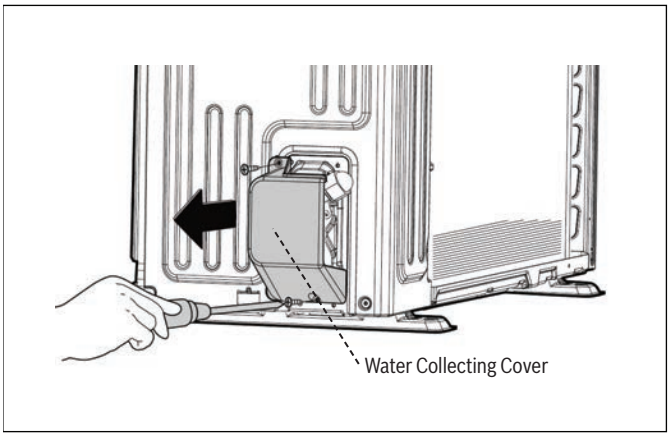


Figure 128

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

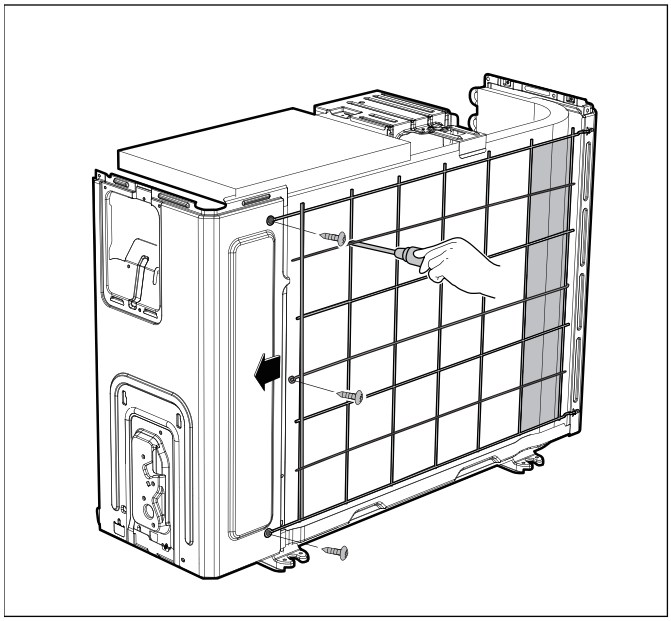


Figure 129

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

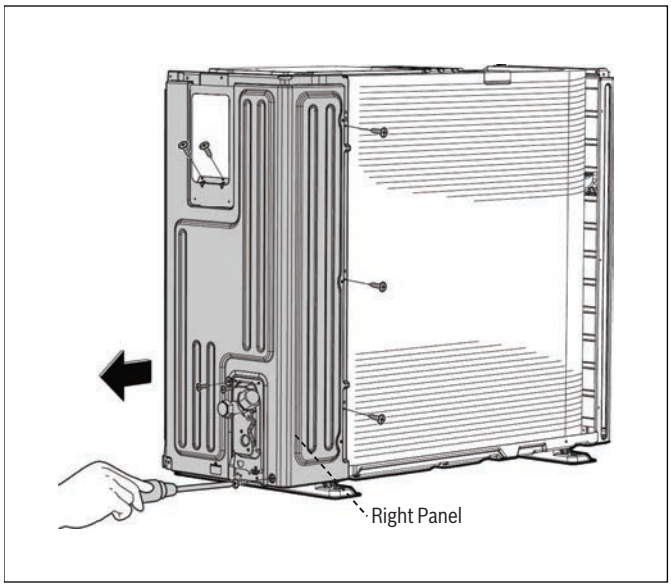


Figure 130

Panel Plate12K 115V, 9K, 12K, Reg/Max P

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

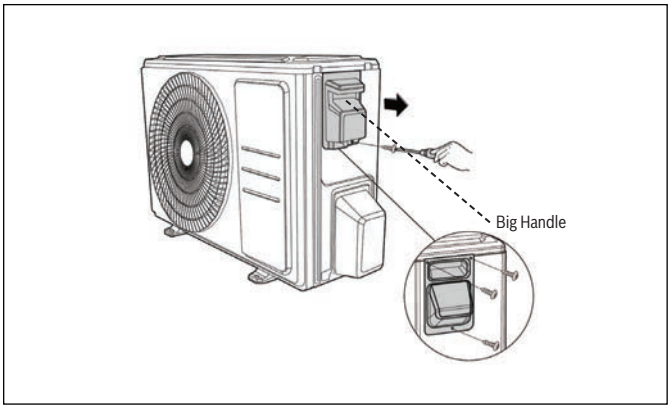


Figure 131

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

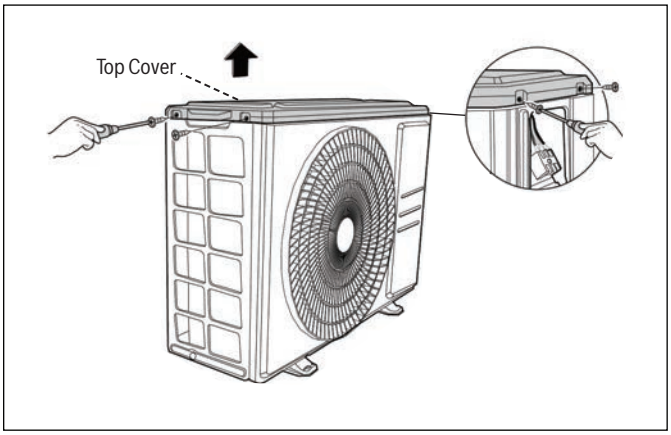


Figure 132

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

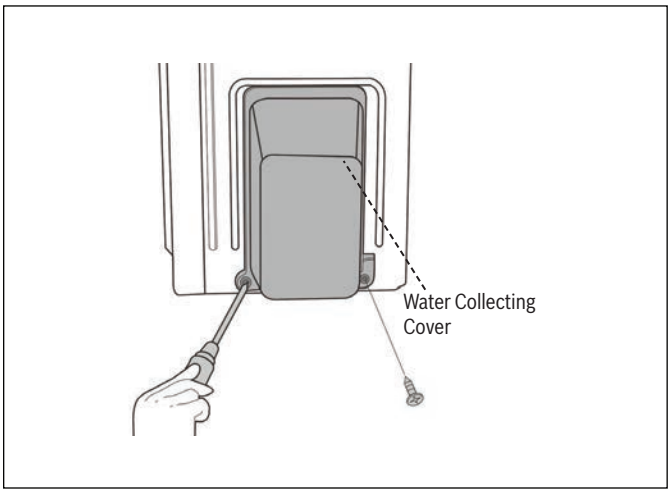


Figure 133

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

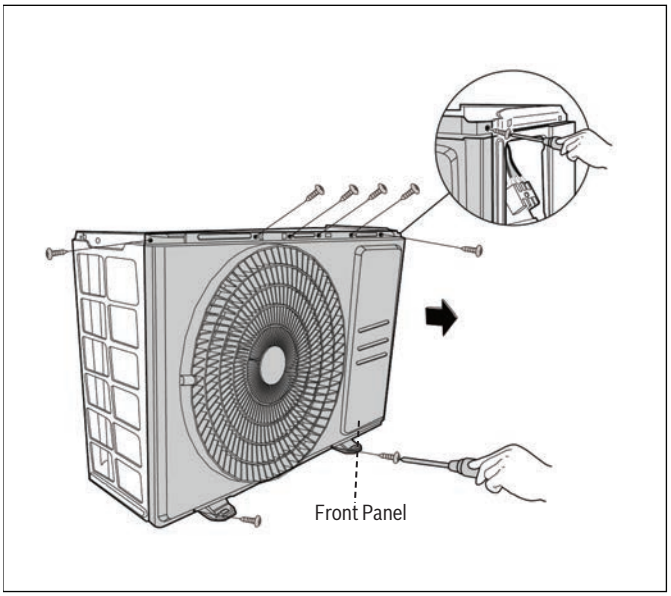


Figure 134

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

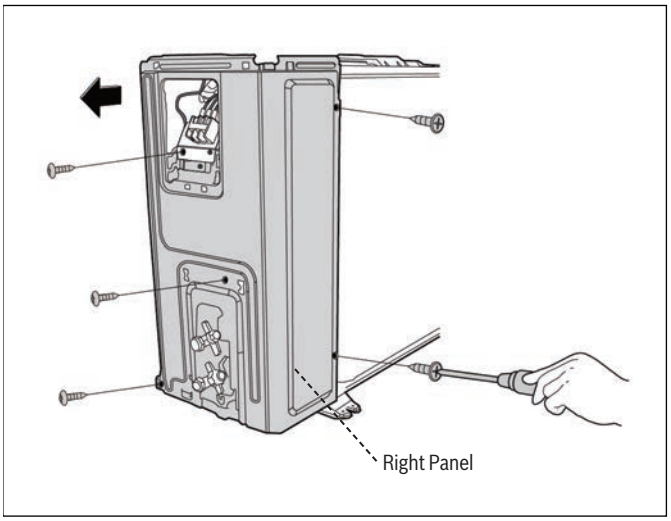


Figure 135

Panel Plate 18K Reg/Max P

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

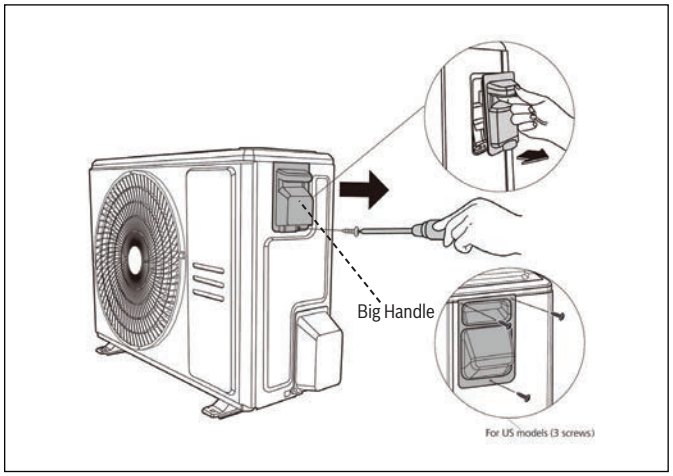


Figure 136

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

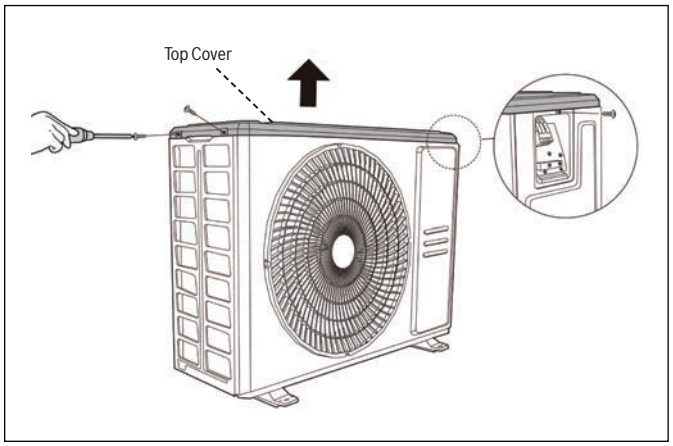


Figure 137

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

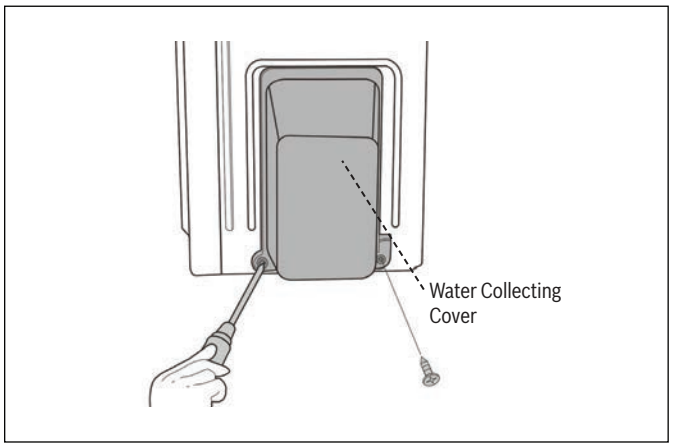


Figure 138

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

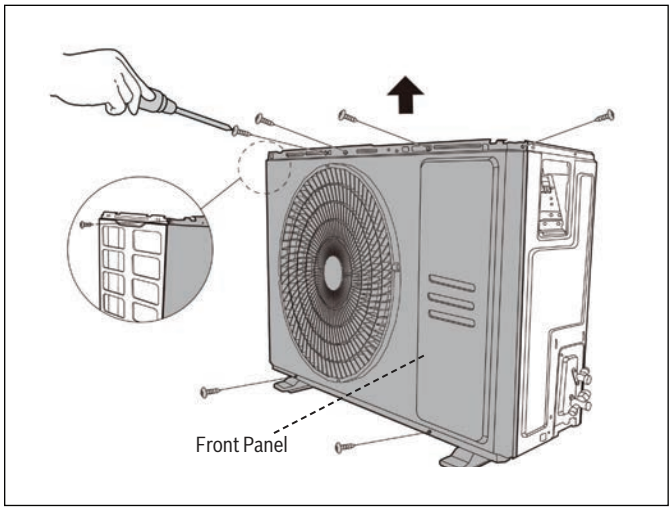


Figure 139

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

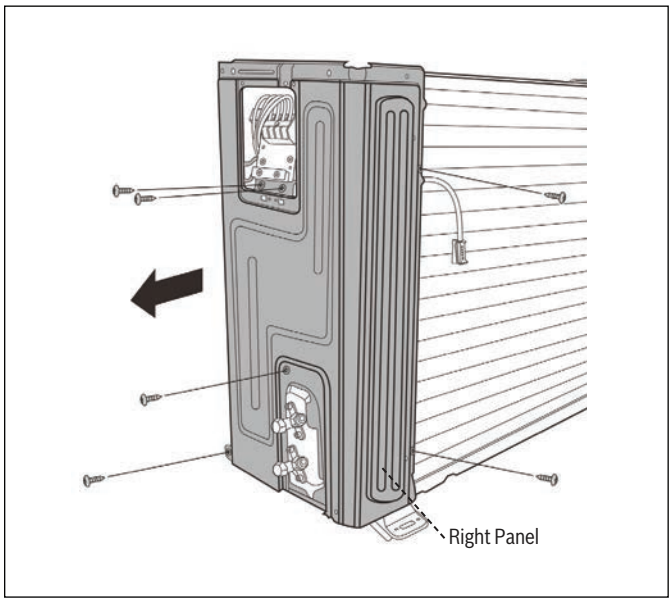


Figure 140

9.3.2 Electrical Parts

PCB Board 18K (Reg/Max P)

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

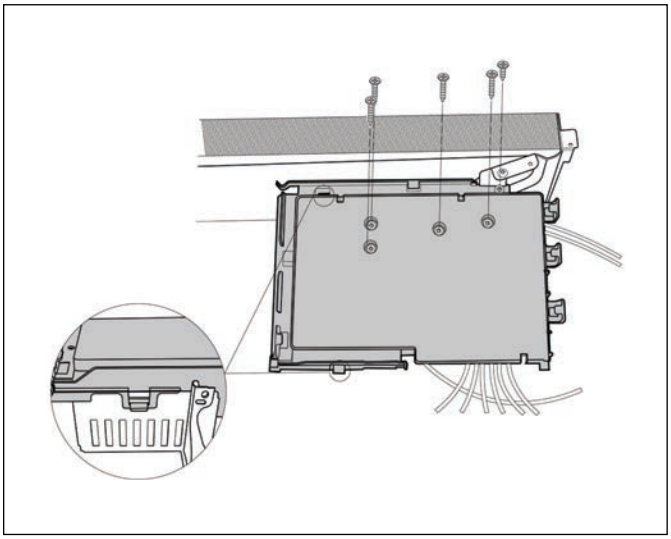


Figure 141

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

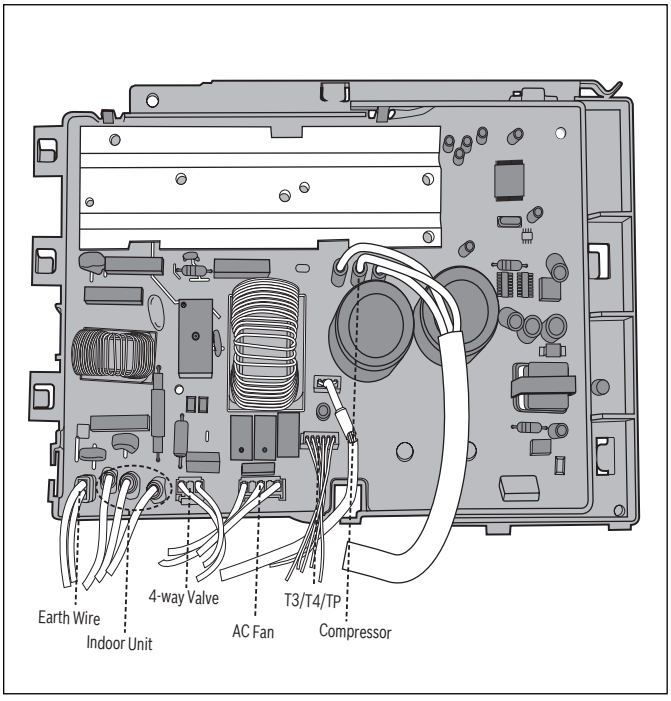


Figure 142

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

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

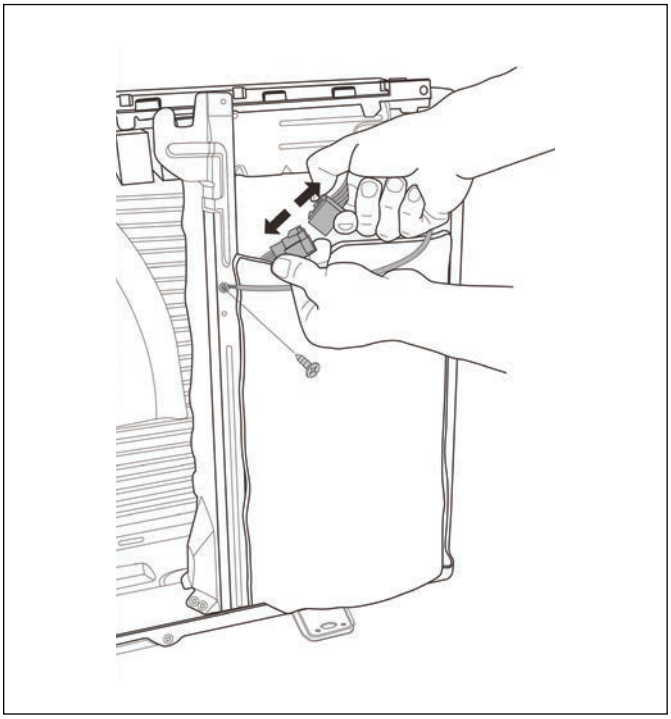


Figure 143

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

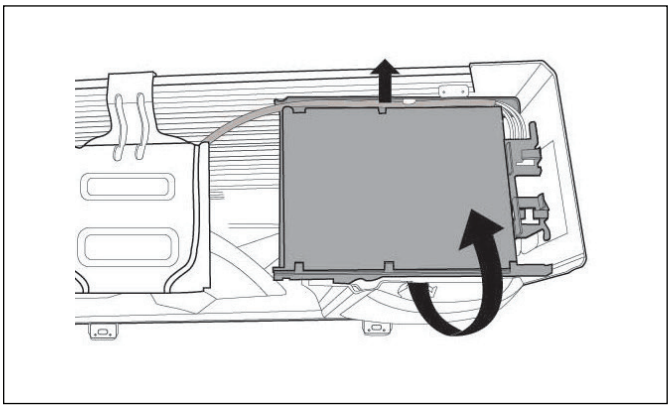


Figure 144

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

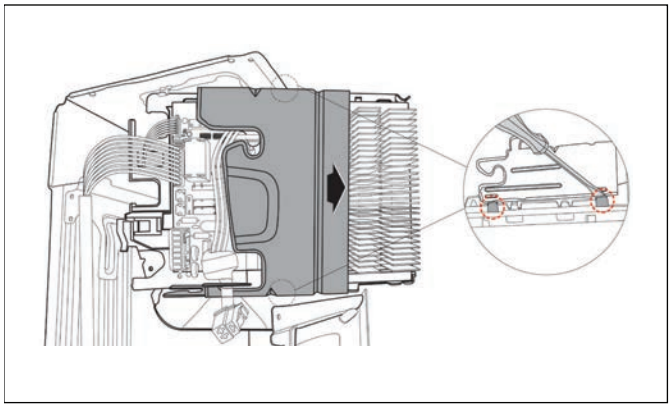


Figure 145

4. Remove the fixing board (2 hooks).

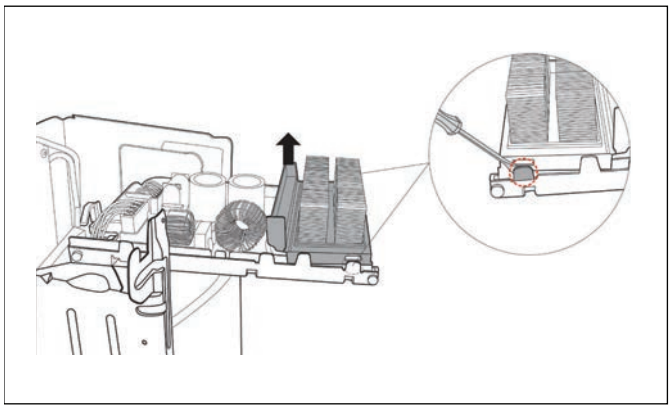


Figure 146

5. Disconnect the connectors from the electronic control board.

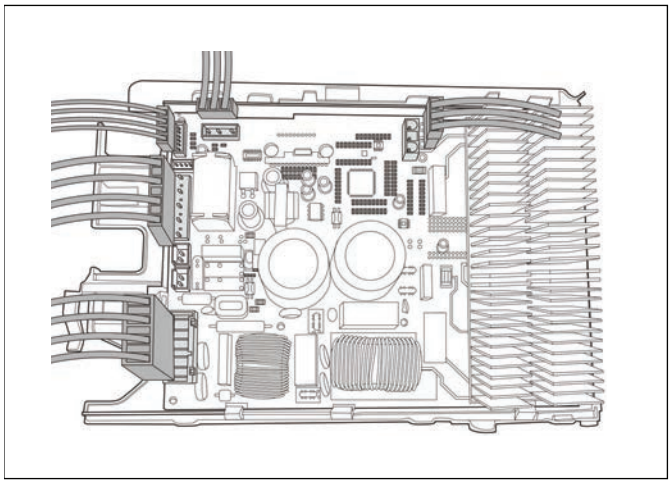


Figure 147

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

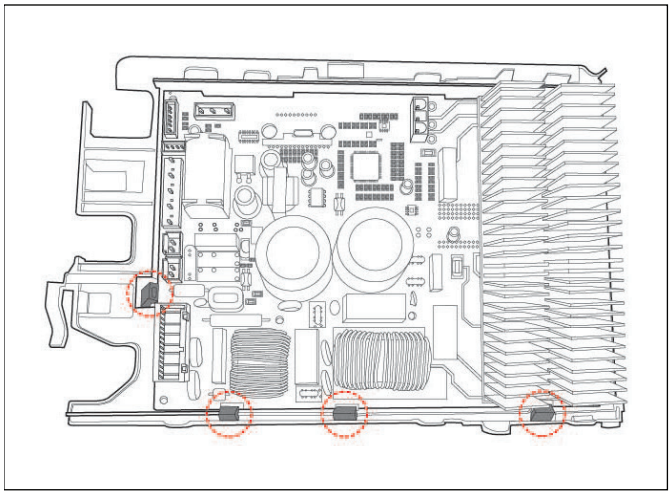


Figure 148

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

WARNING

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

1. Remove the cover of electrical control box.

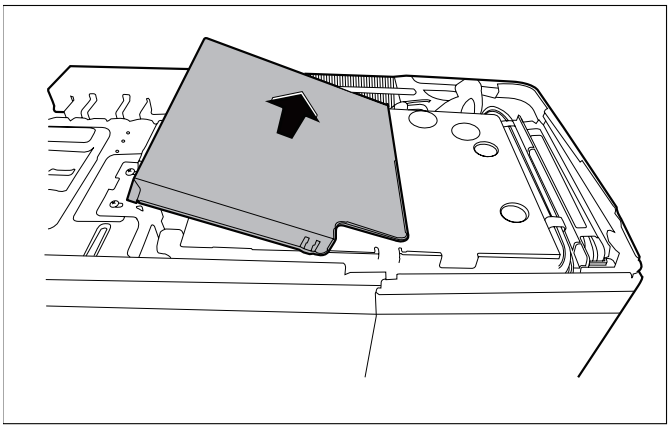


Figure 149

2. Disconnect the fan motor connector.

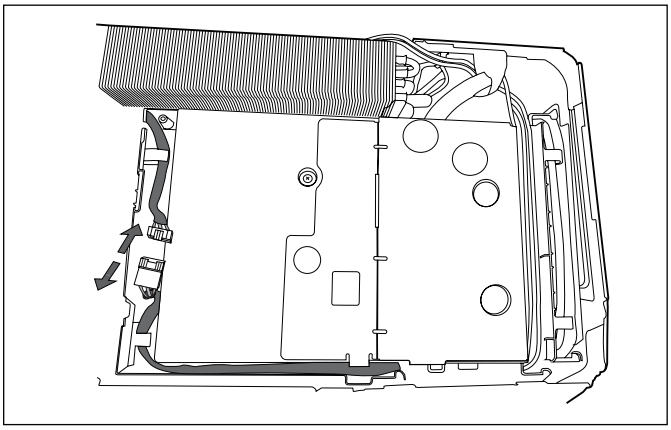


Figure 150

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

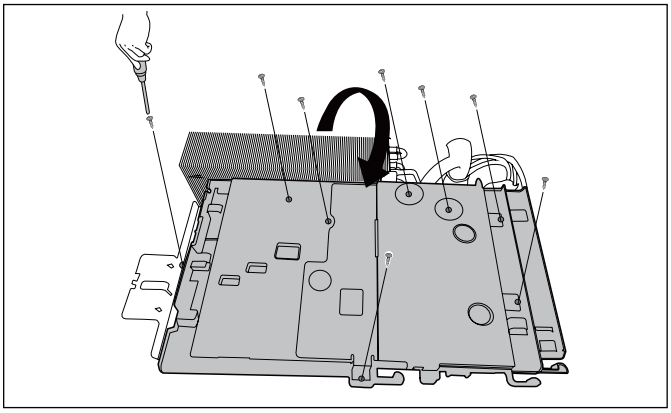


Figure 151

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

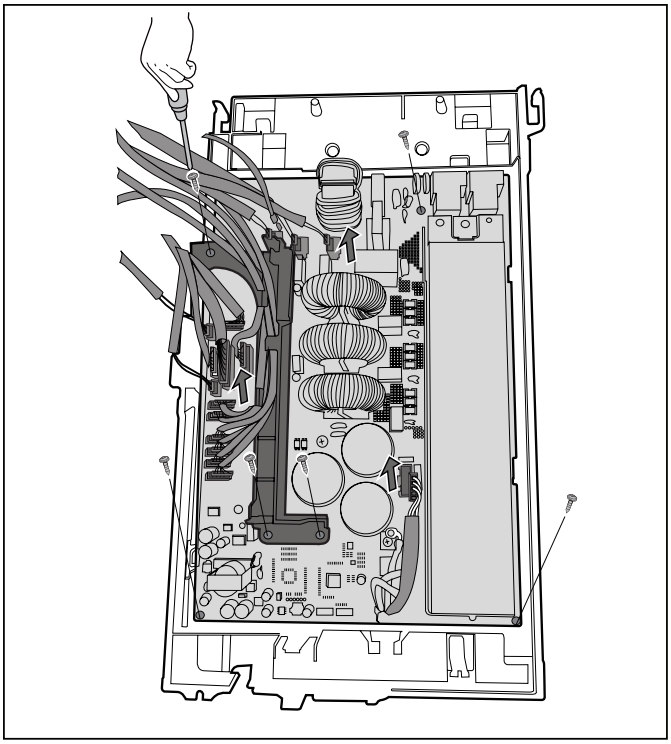


Figure 152

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

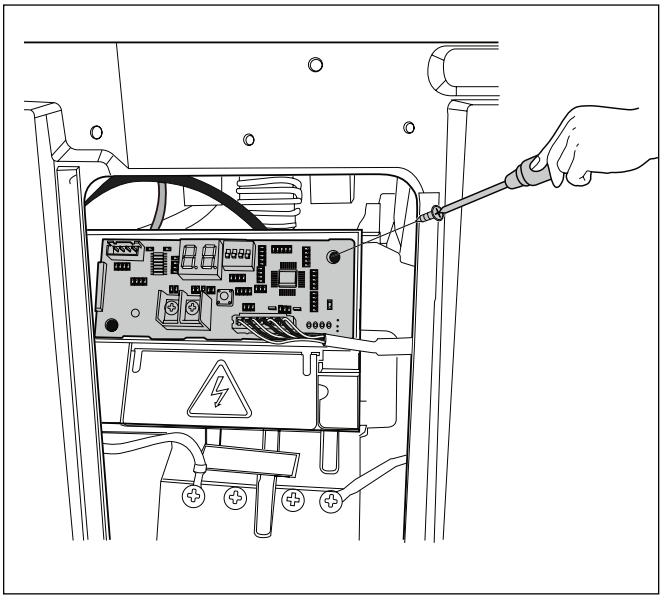


Figure 153

9.3.3 Fan Assembly

Remove the panel plate before disassembling fan.

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

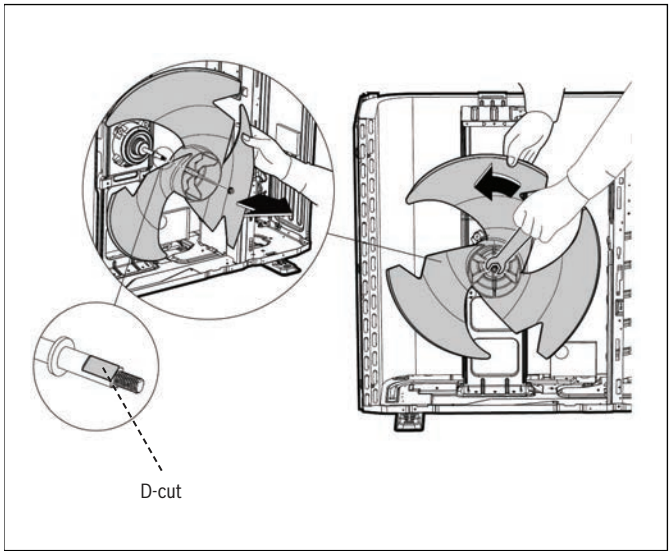


Figure 154

9.3.4 Fan Motor

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

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

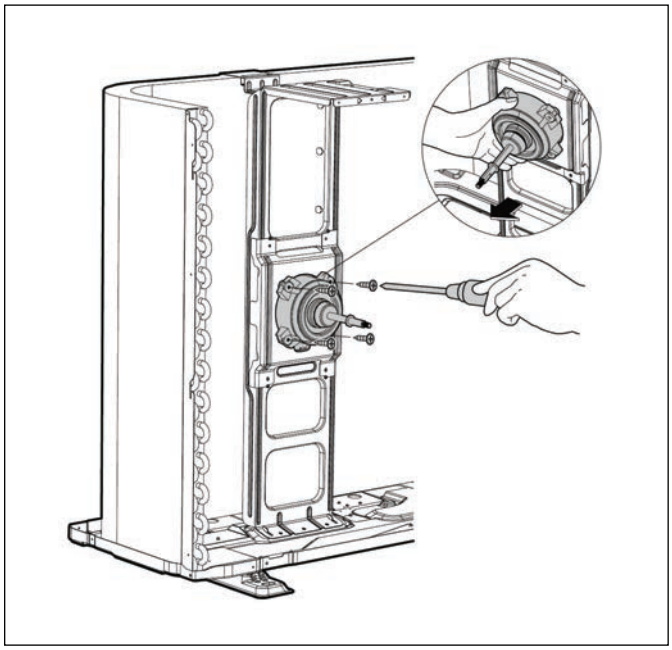


Figure 155

8.3.5 Sound Blanket

Remove the panel plate before disassembling sound blanket.

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

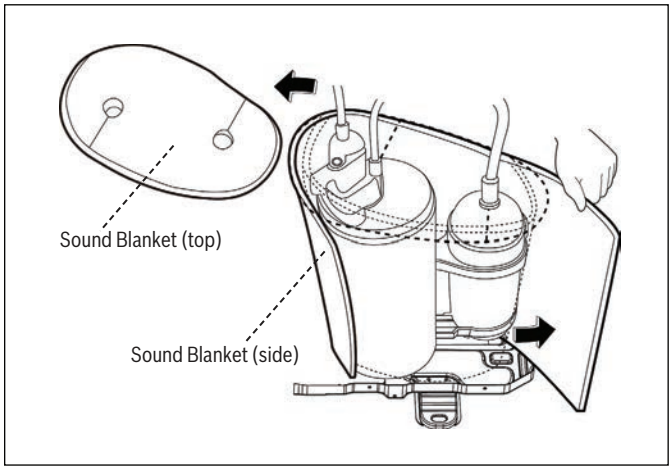


Figure 156

9.3.6 Four-Way Valve

WARNING

Contains refrigerant!

Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. You should evacuate the system with the vacuum pump; flush the system with nitrogen; then repeat the two steps before heating up the brazed parts. The operations above should be implemented by HVAC professionals. Refer to page 18 (first time installation)

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

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

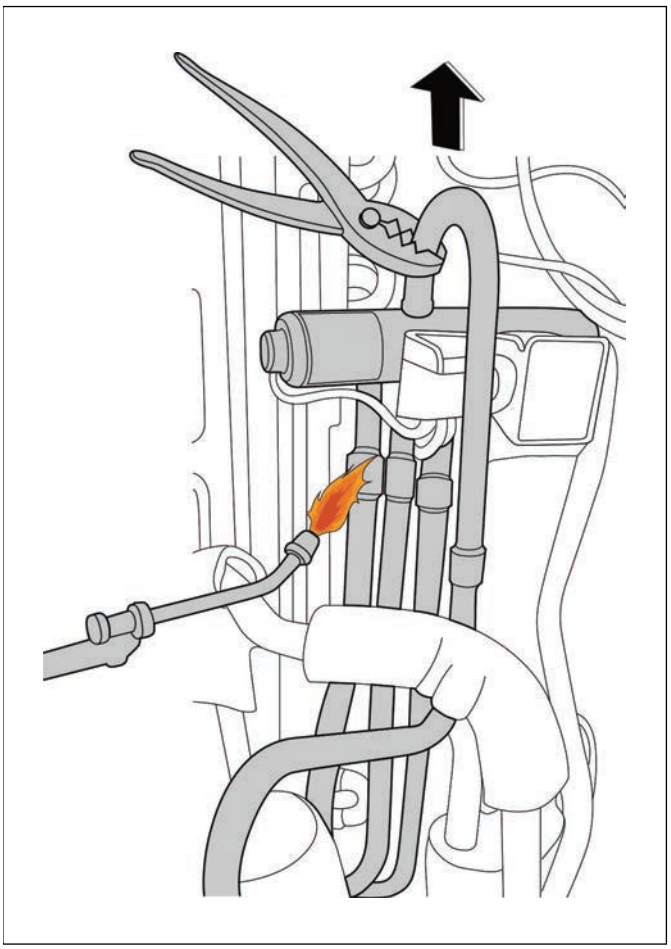


Figure 157

9.3.7 Compressor

WARNING

Contains refrigerant!

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

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

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

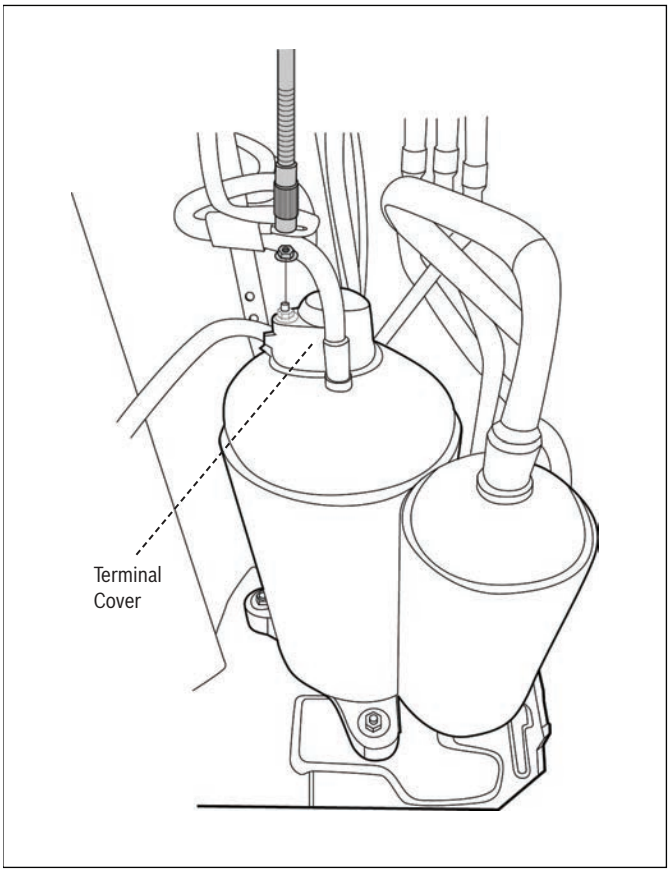


Figure 158

2. Disconnect the connectors.

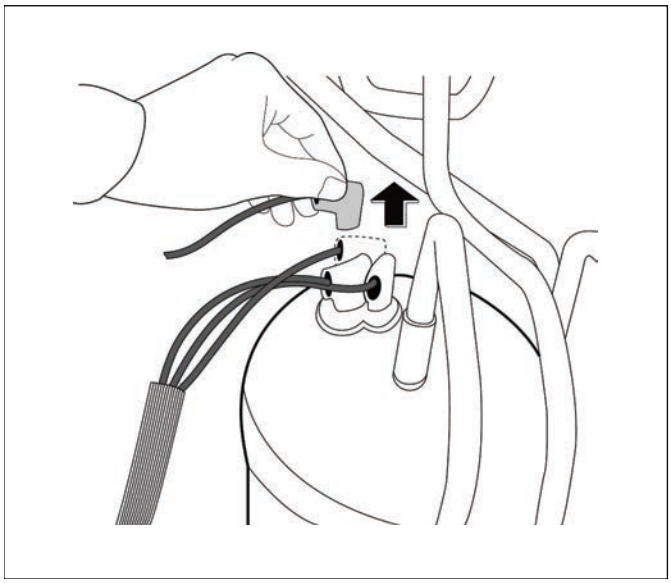


Figure 159

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

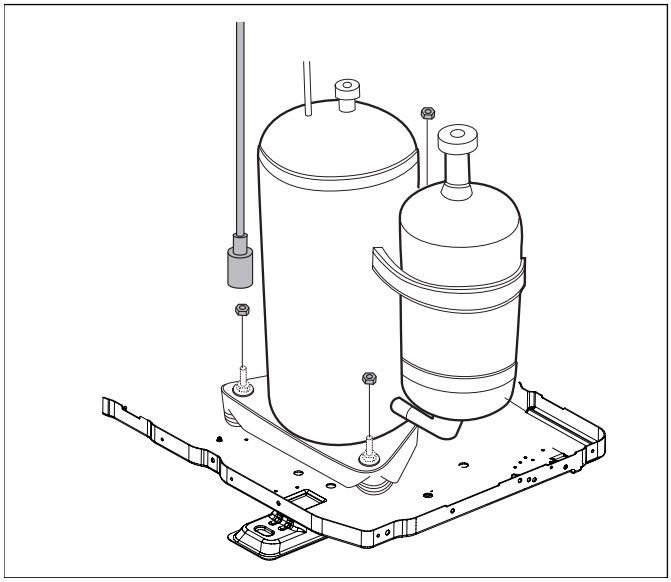


Figure 160

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

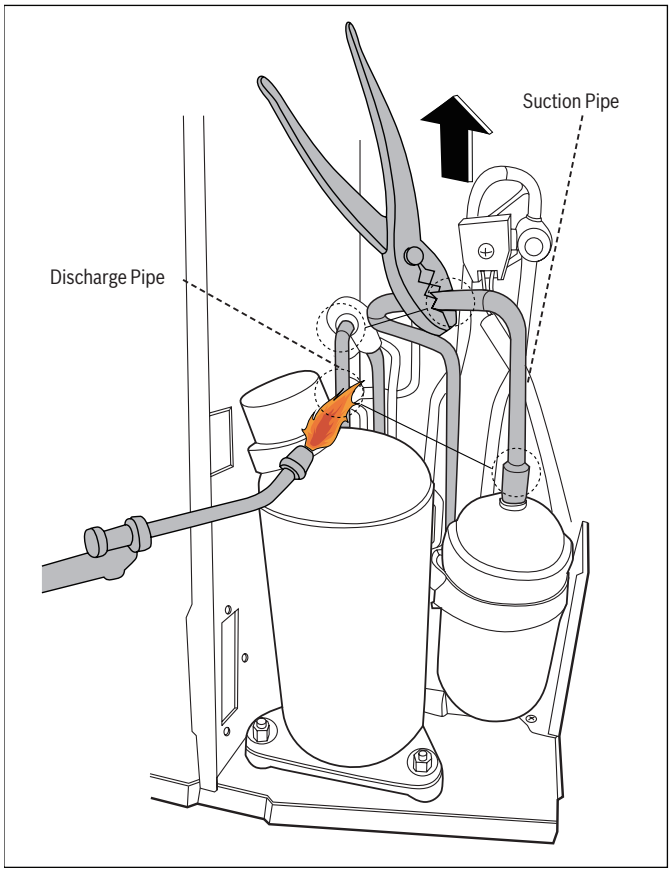


Figure 161

Online Help Resources

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

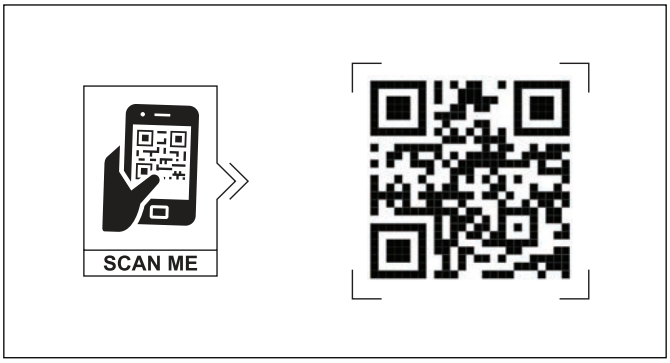


Figure 162

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

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

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