

Haier SERVICE MANUAL

Wall Mounted Type D-Series

Model No. AS09DCAHRA
AS12DCAHRA
AS20S2SD1FA
AS25S2SD1FA
AS35S2SD1FA
AS42S2SD1FA



WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or Repair the product or products dealt with in this service information by anyone else could result in serious injury or death

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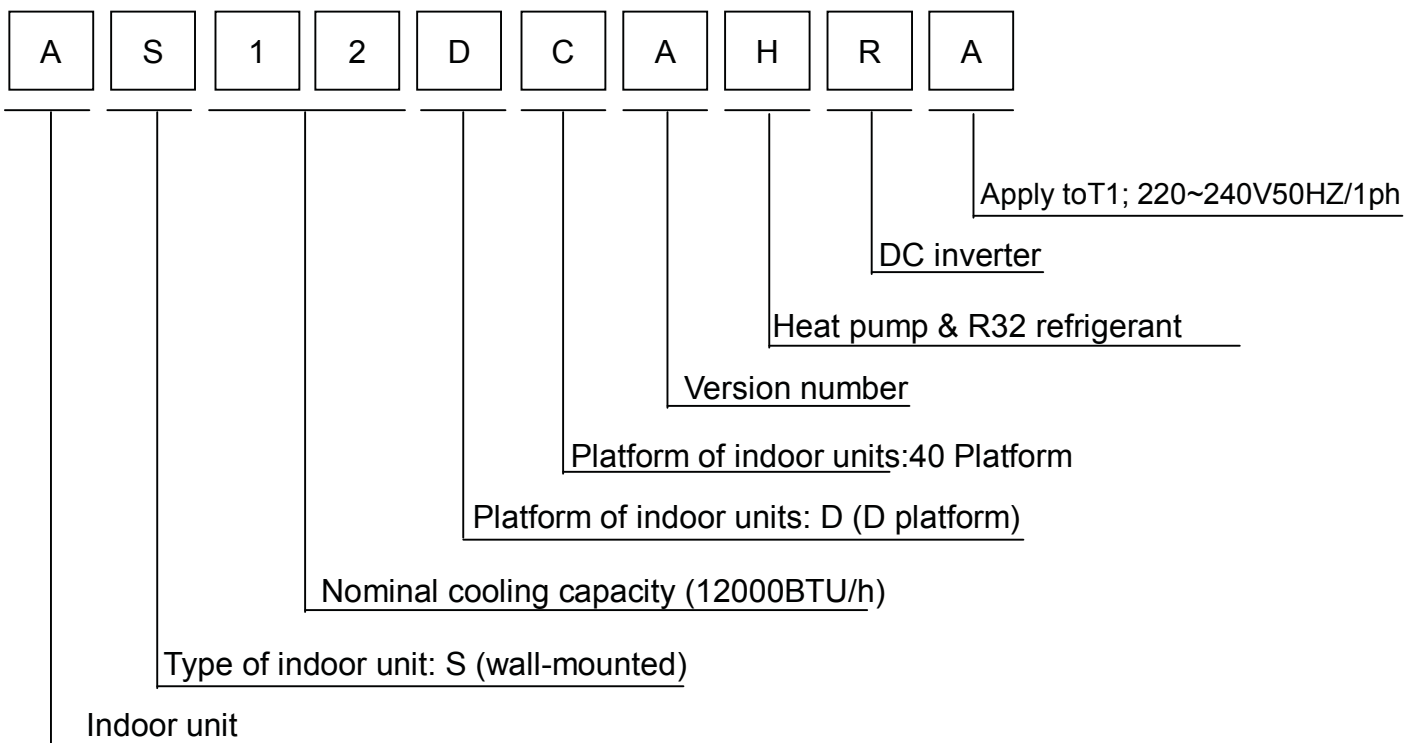
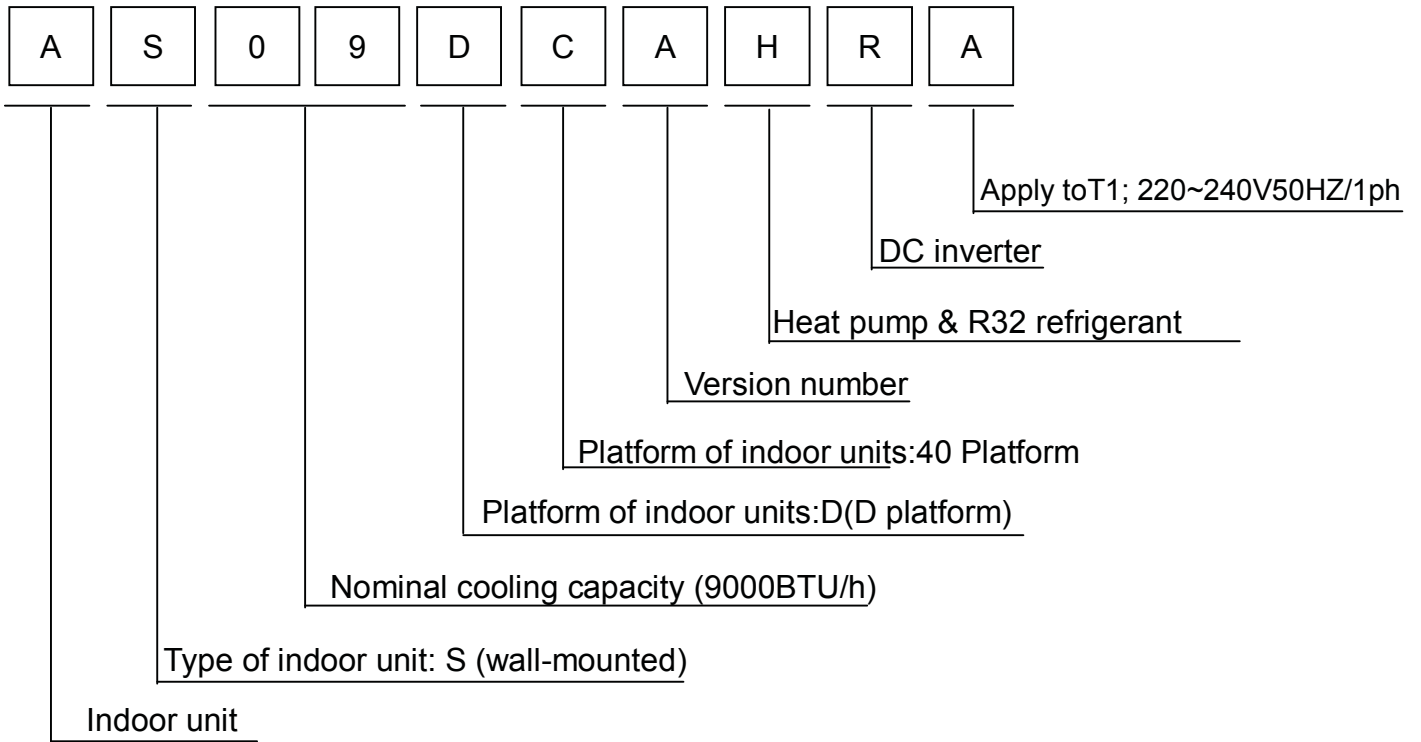
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1.Introduction

1.1 Model name explanation



1.2 Safety Cautions

Be sure to read the following safety cautions before conducting repair work.

The caution items are classified into “Warning” and “Caution”. The “Warning” items are especially important since they can lead to death or serious injury if they are not followed closely. The “Caution” items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.

About the pictograms

△ This symbol indicates an item for which caution must be exercised.

The pictogram shows the item to which attention must be paid.

○ This symbol indicates a prohibited action.






The prohibited item or action is shown inside or near the symbol.







● This symbol indicates an action that must be taken, or an instruction.

The instruction is shown inside or near the symbol.

After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates Normally, and explain the cautions for operating the product to the customer.



1.2.1 Caution in Repair


| Warning | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p>Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair.</p> <p>Working on the equipment that is connected to a power supply can cause an electrical shock.</p> <p>If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.</p> |  |
| <p>If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas. The refrigerant gas can cause frostbite.</p> |  |
| <p>When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first.</p> <p>If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.</p> | |
| <p>If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.</p> |  |
| <p>The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work. A charged capacitor can cause an electrical shock.</p> |  |
| <p>Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.</p> |  |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Warning | |
| Do not repair the electrical components with wet hands . Working on the equipment with wet hands can cause an electrical shock |  |
| Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock. |  |
| Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shock. |  |
| Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury. |  |
| Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor. |  |
| Be sure to check that the refrigerating cycle section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating cycle section is hot can cause burns. | |
| Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency. |  |



1.2.2 Cautions Regarding Products after Repair


| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Warning | |
| Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire. | |
| When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury. | |
| Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury. | For integral units only |
| Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury. | For integral units only |


| Warning | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p>Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work.</p> <p>Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.</p> | |
| <p>Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals.</p> <p>Improper connections can cause excessive heat generation or fire.</p> | |
| <p>When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable.</p> <p>If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.</p> | |
| <p>Do not damage or modify the power cable.</p> <p>Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.</p> |  |
| <p>Do not mix air or gas other than the specified refrigerant (R-410A / R22) in the refrigerant system.</p> <p>If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.</p> | |
| <p>If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak.</p> <p>If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.</p> |  |
| <p>When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it.</p> <p>If a child swallows the coin battery, see a doctor immediately.</p> | |

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Caution | |
| Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks. | |
| Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire. |  |
| Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor. | |

1.2.3 Inspection after Repair

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Warning | |
| Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire. |  |
| If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire. |  |





| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Warning | |
| Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances since it can cause an electrical shock, excessive heat generation or fire. |  |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Caution | |
| Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections can cause excessive heat generation, fire or an electrical shock. | |
| If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can cause the unit to fall, resulting in injury. | |
| Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock. |  |
| Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 M ohm or higher. Faulty insulation can cause an electrical shock. | |
| Be sure to check the drainage of the indoor unit after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor. | |

1.2.4 Using Icons

Icons are used to attract the attention of the reader to specific information. The meaning of each icon is described in the table below:

1.2.5 Using Icons List

| Icon | Type of Information | Description |
|---------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Note | Note | A “note” provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks. |
|  Caution | Caution | A “caution” is used when there is danger that the reader, through incorrect manipulation, may damage equipment, lose data, get an unexpected result or has to restart (part of) a procedure. |
|  Warning | Warning | A “warning” is used when there is danger of personal injury. |
|  | Reference | A “reference” guides the reader to other places in this binder or in this manual, where he/she will find additional information on a specific topic. |

2.Features



Wi-Fi control:Control your air conditioning system with smart phone or tablet which can connect internet.



Human sensor:Automatically adjust operation frequency and modes to save energy,improve comfort and convenience by monitoring human location,movements,absence with 2 human activity sensors.



Light sensor:Sensor control,light sensor can offer comfort and save energy.



on-off card:Control the system with a room card in the remote place through the level signal.It is widely adopted in the building,hotel or other commercial space.Convenient form management.



Wired controller transfer kit:The indoor unit connect the wired controller by wired controller transfer kit.



Super quiet:Optimize the noise control technology,such as frequency adjustment,fan speed control and air flue design decreasing noise level lowest to 15 dB(A).



Comfortable sleep: The setting temperature and the indoor noise can be adjusted to a more comfortable level when you set the “sleep mode”during night sleep.



Long distance air supplying:The indoor units is improved by the optimized motor,fan and air duct so as to provide long distance airflow with 20m+ maximum.



3D air flow: The 3D airflow is able to deliver the airflow horizontally and vertically.



Intelligent air:Airflow automatically upward when cooling or downward when heating to spread air automatically throughout the large room while without blowing directly to human body.



Auto horizontal airflow:With two special step motors to adjust the vertical flaps moving horizontally and automatically,they can realize 5 positions with different directions to offer more comfort airflow.



Auto horizontal airflow: With one special step motor to adjust the vertical flaps moving horizontally and

automatically, it can realize 5 positions with the same directions to offer more comfort airflow.



Auto vertical airflow: With one special step motor to adjust the horizontal flaps moving vertically and automatically, it can realize 5 positions air angle, 2 intelligent air angle and total auto blowing, when the unit is switched off, the flap will close automatically.



DIY auto mode: You can set a temperature value, with which the unit can adjust the operation mode automatically.



Quiet mode: Just press the button "turbo/quiet" on the remote controller, the air conditioner will work in quiet mode.



Precise temp control 0.5°C: Can make the setting temperature by 0.5°C so to achieve more precise comfort and energy saving.



Nano-aqua: Haier unique Aqua generator can ionize water molecules into H⁺ and O²⁻ as well as small cluster of water, which can keep your skin moist and have the effect of air purification.



Evaporator self-cleaning: With a new-generation hydrophilic foil, when the air conditioner in cooling or drying mode, the dust on evaporator will be taken away by condensed water flowing rapidly.



Exquisite filter: Effectively prevent the smaller dust articles, insects and other materials coming into the room.



DRY function: When the unit working in dry mode, it can adjust the indoor fan motor speed automatically according to the temperature gap between setting temperature and room temperature so as to get mild dehumidification or strong dehumidification.



Original 3D-cant lifting panel: The panel could be lifted up when power on and move back when power off.



Integrative structure design: The optimized design integrates the bottom base, drain pan and frame casing together so as to level up product reliability and lower vibration.



Integrative valve cover: This valve cover is designed to cover both wiring terminal block and stop valves so

as to enhance protect effect with nice design.



2-way piping design: The indoor unit offers the possibility of left or right piping direction.



Easy clean design: The indoor front panel is easy to wash and the air flaps are easy to detach without any special tools for quick cleaning.



Blue fin: The hydrophilic aluminum foil makes condensing water flow smoothly so guarantee the better performance with anti-corrosion effect.



A-PAM DC inverter: A-PAM inverter technology is the upgrade of 180° sine wave inverter, it adopts additional momental control to decrease the vibration in the low compressor frequency and also contribute to great energy saving.



-30°C heating: A special design for heating in cold winter even at -30°C with rotary compressor, DC motor, optimized bottom plate, electric heating wire and special defrosting programme etc.



-20°C cooling: Special design for heating even at lowest ambient temperature -15°C with high frequency rotary compressor, optimized refrigerant system and special defrosting programme etc.



10°C heating maintenance: It is possible to set the system to switch on when indoor temp. drop below 10°C, thus avoiding pipes frozen, and provide winter protection for unoccupied summer house, garages and basements.



Wide voltage for inverter: The inverter unit can start up from 150V and operate in a wide voltage range from 150V-264V.



Auto restart: The function permits automatic return to previous operation conditions after a sudden power break.



Electrical deicer: The outdoor bottom plate is equipped with a special designed electrical heating wire to deicer in the cold winter.



24 hours timer: Use the timer function to set on, or off, or from on to off, or from off to on etc, within 24 hours.



DC motor: DC motor ensures more reliable operation with much higher energy saving and lower noise.



Warm start: when the unit start working at heating mode, or change from cooling mode to heating mode, the unit will not blow or blow at super low speed in order to avoid cold air disturbance.



Long life reliable PCB: Haier PCB is tested 96 hours under hard environment temperature 85°C & moisture 85%, this test condition is more or less 10 years under normal condition.



Smart defrosting: Haier smart defrost process is only performed when needed which reduces energy waste by eliminating the unneeded defrosting process. Enjoy maximum comfort in heating operation by reducing defrosting.



Indoor 5 steps fan speed: The indoor can be remote controlled with 5 steps of fan speed: powerful/high/middle/low/quiet, which offer more choice for you to get comfort airflow.



3 minutes protection: The 3 minutes protection of the compressor can avoid some damages to it and makes the compressor have a longer life.



Concealed LED display: Special designed panel and LED display which make it possible to show the working states and functions only when the unit on while the display and frame can not be seen when unit off in order to keep indoor decoration with sense of wholeness. Of course you can cancel the display whenever you want.



Self-diagnosis: The LED display of the indoor units will show the error code in order to make service more easier.

3.Specifications

| NOMINAL DISTRIBUTION SYSTEM VOLTAGE | | |
|-------------------------------------|----|-----|
| Phase | / | 1 |
| Frequency | Hz | 50 |
| Voltage | V | 230 |

| NOMINAL CAPACITY and NOMINAL INPUT | | | |
|------------------------------------|-------------------|---------------------------------------------|---------------------------------|
| | | Cooling(09K/12K) | heating(09K/12K) |
| Capacity rated | KW | 2.60/3.50 | 2.60/4.20 |
| | Btu/h | 8870/11940 | 8870/14330 |
| Power Consumption(Rated) | KW | 0.65/0.87 | 0.64/1.05 |
| SEER/SCOP | W/W | 8.5/A+++ | 5.1/A+++ (09K) 4.6/A++ (12K) |
| Annual energy consumption | KWh | 107/144 | 716/973 |
| Moisture Removal | m ³ /h | 1.2*10 ⁻³ / 1.6*10 ⁻³ | |

| TECHNICAL SPECIFICATIONS | | | |
|--------------------------|---------------------------------|----|--------------------------------------|
| Dimensions | H*W*D | mm | 980×212×318 |
| Packaged Dimensions | H*W*D | mm | 1059×289×407 |
| Weight | / | KG | 11.8 |
| Gross weight | / | KG | 15.2 |
| Color | / | / | White |
| Sound level | Sound pressure(high/medium/low) | dB | 34/29/25/15(09K) 35/30/26/16(12K) |
| | Sound power | dB | 54/56 |

| TECHNICAL SPECIFICATIONS-PARTS | | | | |
|--------------------------------|-----------------------|-------------------|---------------------------------|------------------|
| | | | cooling(09K/12K) | heating(09K/12K) |
| Fan | Type | | Cross flow fan | |
| | Motor output | W | 45 | 45 |
| | Air flow rate(high) | m ³ /h | 650/700 | 650/700 |
| | Speed(super/high/low) | rpm | 1100/1000/600 | 1050/900/600 |
| Heat exchanger | Type | | ML fin- ϕ 7HI-HX tube | |
| | Segment *stage*fitch | | 3*16*1.4 | |
| Air direction control | | | Right,Left,Horizontal,Downward | |
| Air filter | | | Removable/Washable/Mildew Proof | |
| Temperature control | | | Microcomputer Control | |
| Remote controller model | | | YR-HQ01 | |

Note: the data are based on the conditions shown in the table below

| cooling | heating | Piping length |
|-------------------------------------------------|---------------------------------------|---------------|
| Indoor: 27°CDB/19°CWB Outdoor: 35°CDB/24°CWB | Indoor:20°CDB Outdoor: 7°CDB/6°CWB | 5m |

Conversation formulae

Kcal/h= KW×860

Btu/h= KW×3414

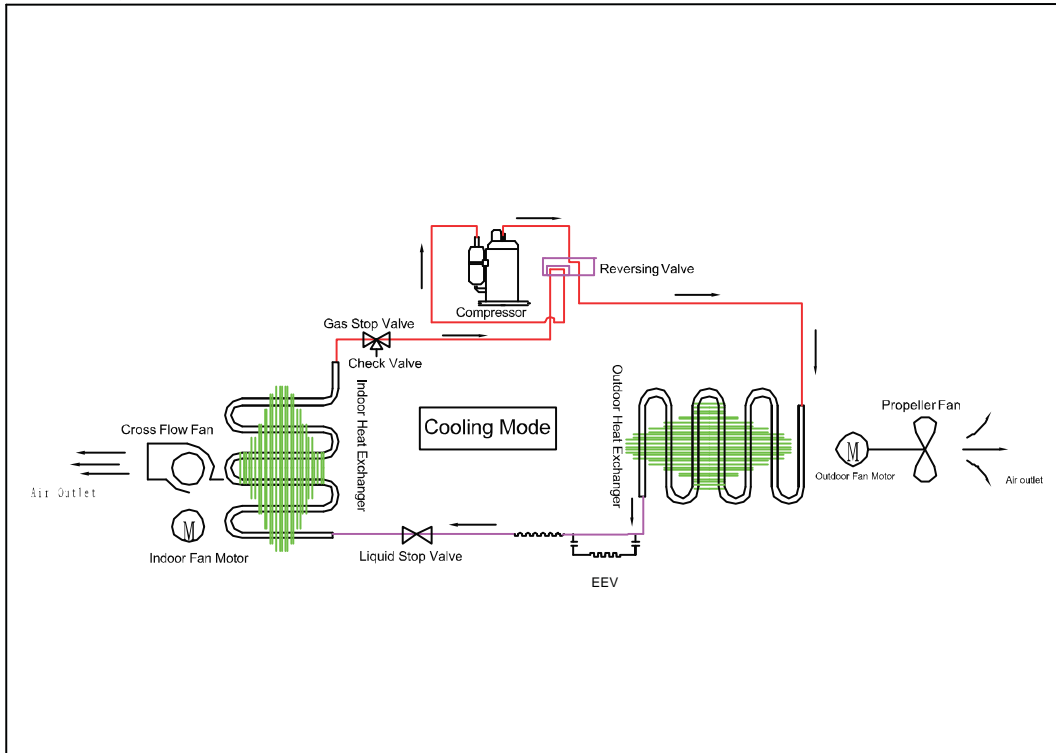
cfm=m³/min×35.3

4.Sensors list

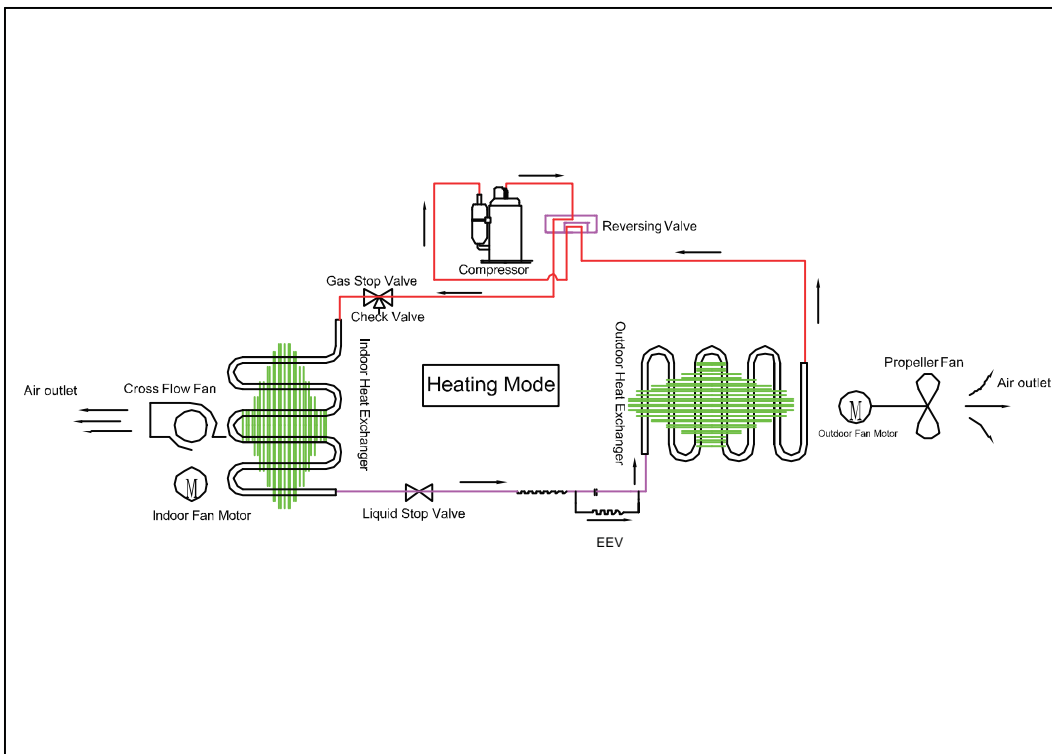
| type | Description | Qty |
|-------------|--------------------------------------------------|-----|
| Room sensor | Its used for detecting room temperature | 1 |
| Pipe sensor | Its used for detecting temperature of evaporator | 1 |

5. Piping diagrams

Cooling mode



Heating mode



6. Printed Circuit Board Connector Wiring Diagram

Connectors

PCB(1) (Control PCB) For AS09/12DCAHRA

| series | PCB connector | Connect with load |
|--------|---------------|-------------------------------------------------------------|
| 1 | CN21 | Connector for power N and L |
| 2 | CN52 | |
| 3 | CN27 | Connector for ground |
| 4 | CN23 | Connector for communication between indoor and outdoor unit |
| 5 | CN9 | Connector for fan motor |
| 6 | CON1 | Connector for fresh air |
| 7 | CON2 | Ion Generato |
| 8 | CON3 | |
| 9 | CN34 | Connector for wifi-control |
| 10 | CN51 | Connector for room card |
| 11 | CN6 | Connector for thermistors |
| 12 | CN7 | Connector for display |
| 13 | CN14 | Connector for Emergency operation ON / OFF switch |
| 14 | CN11 | Connector for left-right stepmotor |
| 15 | CN5 | Connector for up-down stepmotor |
| 16 | CN57 | Human&Light sensors control |
| 17 | CN2 | Connector for wiring-control |
| 18 | CN36 | Remote controller |
| 19 | CN12 | Stepper motor for the panel which can go up and down |
| 20 | CN13 | |

Note: Other designations

PCB(1) (Indoor Control PCB)

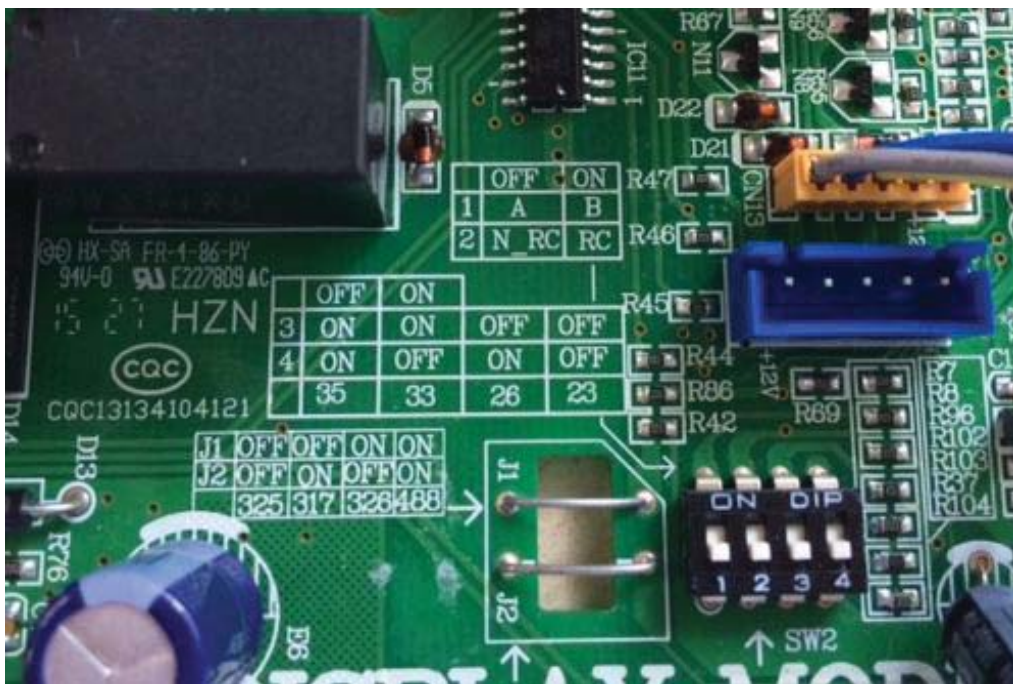
- 1) SW1 Connector for Emergency operation ON / OFF switch
- 2) SW2 1 Select remote code A or B,
2 Select room card able or disable,
3,4 Select eeprom code 23、26、33 and 35 ,
- 3) RV1 Varistor
- 4) FUSE1 Fuse 3.15A/250VAC

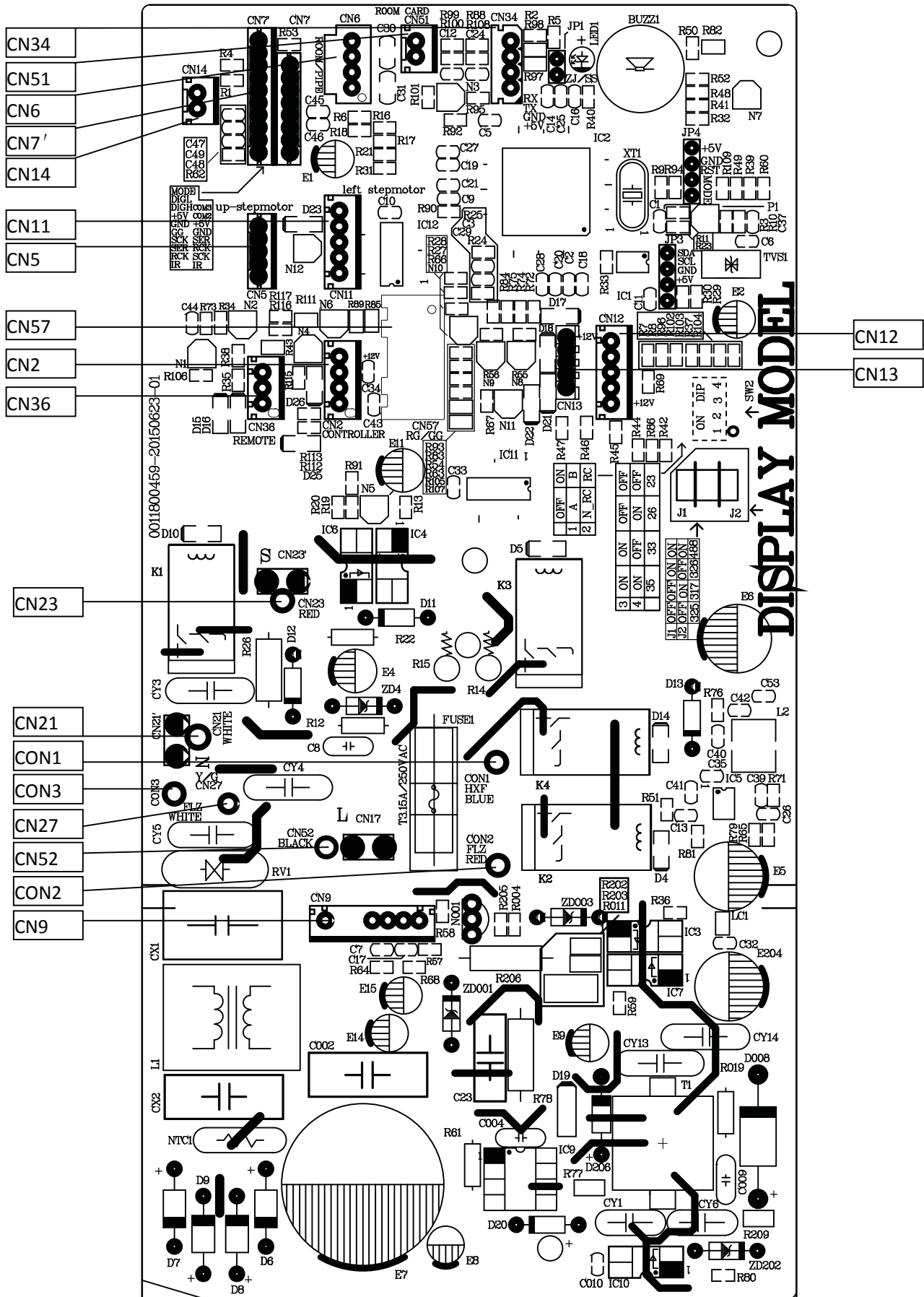
| | | | | |
|---|------|-----|-----|-----|
| | OFF | ON | | |
| 1 | A | B | | |
| 2 | N_RC | RC | | |
| 3 | ON | ON | OFF | OFF |
| 4 | ON | OFF | ON | OFF |
| | 35 | 33 | 26 | 23 |

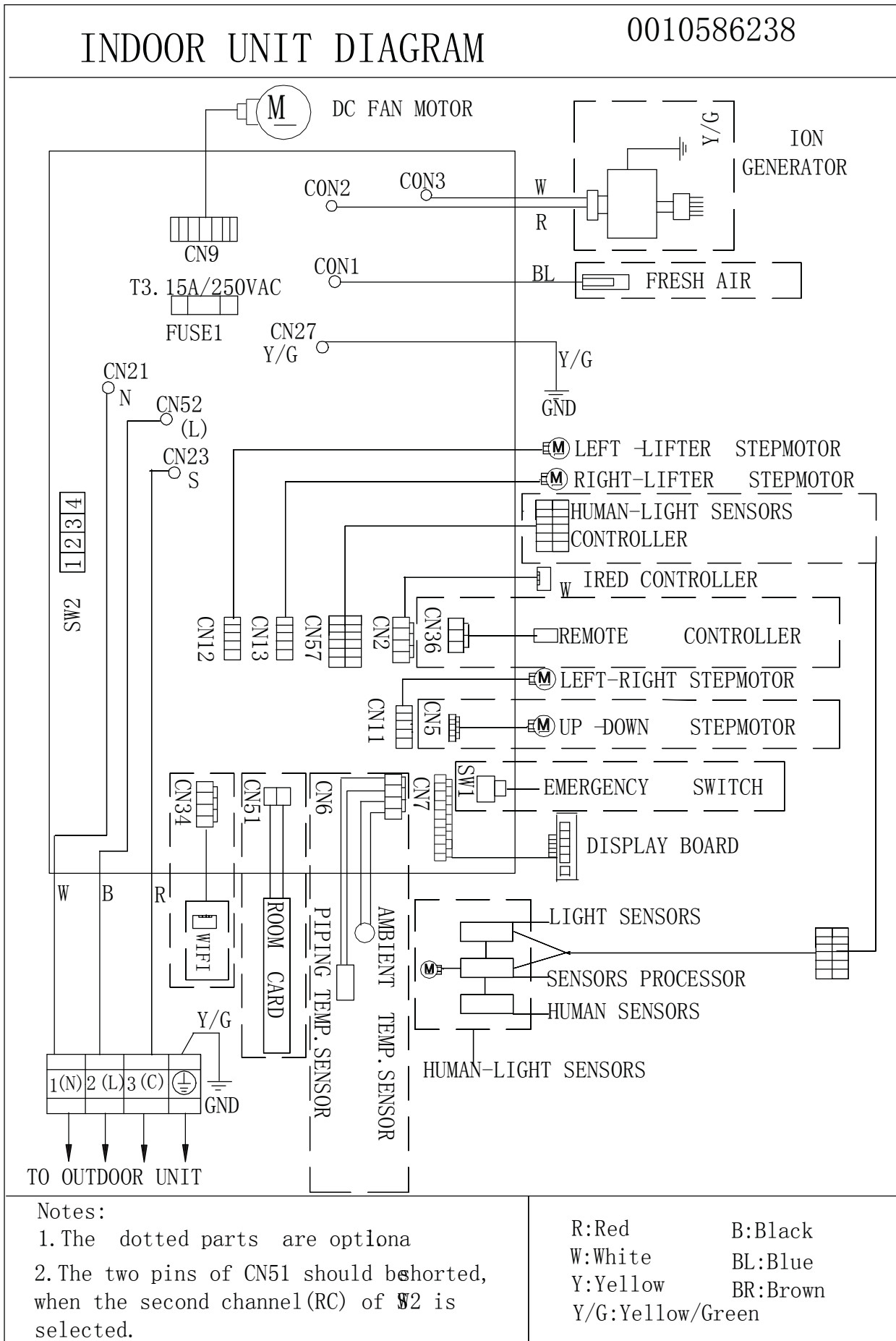
| UNIT MODEL | PCB MODEL |
|------------|-----------------|
| AS09DCAHRA | 0011800459 (26) |
| AS12DCAHRA | 0011800459 (35) |

| | | | | |
|----|-----|-----|-----|-----|
| J1 | OFF | OFF | ON | ON |
| J2 | OFF | ON | OFF | ON |
| | 325 | 317 | 326 | 488 |

| UNIT MODEL | DISPLAY MODEL |
|------------|---------------|
| AS09DCAHRA | 0011800488 |
| AS12DCAHRA | 0011800488 |







7.Functions and Control

7.1 Main functions and control specification

7.1.1 Automatic operation

When the running mode is turned to automation after starting the system, the system will first determine the running mode according to the room temperature and set temperature D-value .Then will run according to the determined mode. Tr in the following selection conditions means room temperature, Ts means setting temperature, Tp means temperature of indoor coil pipe .

$Tr \geq Ts - 3^{\circ}\text{C}$ Choose Cooling Mode

$Tr < Ts - 3^{\circ}\text{C}$ Choose Heating Mode

After turning to the automation mode, the running mode can be switched between cooling mode, fan mode and heating mode according to the change of the indoor ambient temperature. But the automatic conversion between cooling mode and heating mode must be conducted after 15 minutes.

7.1.2 Cooling operation mode

Temperature control range: $16^{\circ}\text{C} \text{---} 30^{\circ}\text{C}$

Temperature difference: $\pm 1^{\circ}\text{C}$

* Control features: When Tr (room temperature) $> Ts$ (set temperature) $^{\circ}\text{C}$, the compressor will be open, the indoor fan will be operated at the set speed and the mode signal will be sent to the outdoor system. When Tr (room temperature) $< Ts$ (set temperature) $^{\circ}\text{C}$, the compressor will be closed, the indoor fan will operate at the set speed and the mode signal will be sent to the outdoor system. The system will keep the original status if $Tr = Ts$.

Airflow speed control: (temperature difference 1°C)

Automatic: When $Tr \leq Ts + 3^{\circ}\text{C}$, high speed.

When $Ts + 1^{\circ}\text{C} \leq Tr < Ts + 3^{\circ}\text{C}$, medium speed

When $Tr < Ts + 1^{\circ}\text{C}$, low speed

When the sensor is off, low speed

When the airflow speed has no delay from the high to low switching, the speed should be delayed for 3 minutes (remain at high speed for 3 minutes.) before the next switch.

Manus: When the system is operating, you can set the high, medium or low speed manually. (When the sensor is on or off, the system will change the speed 2 seconds after receiving the signal.)

*Airgate location control: the location for the airgate can be set according to your needs.

7.1.3 Dehumidification mode.

* temperature control range: $16 \text{---} 30^{\circ}\text{C}$

* temperature difference: $\pm 1^{\circ}\text{C}$

Control feature: send the dehumidifying signal to the outdoor system.

When $Tr > Ts + 2^{\circ}\text{C}$, the compressor will be open, the indoor fan will be operated at the set speed.

When T_r is between the T_s and $T_s+2^\circ\text{C}$, the outdoor system will be operated at the high dehumidifying frequency for 10 minutes and then at the low dehumidifying mode for six minutes. The indoor fan will operate at low speed.

When $T_r < T_s$, the outdoor system will be stopped, the indoor fan will be stopped for 3 minutes and then turned to the low speed option.

All the frequency converses have a $\pm 1^\circ\text{C}$ difference.

* Wind speed control: Automatic:

When $T_r \geq T_s + 5^\circ\text{C}$, high speed.

When $T_s + 3^\circ\text{C} \leq T_r < T_s + 5^\circ\text{C}$, medium speed.

When $T_s + 2^\circ\text{C} \leq T_r < T_s + 3^\circ\text{C}$, low speed.

When $T_r < T_s + 2^\circ\text{C}$, light speed.

If the outdoor fan stopped, the indoor fan will be paused for 3 minutes.

If the outdoor fan stopped for more than 3 minutes and the outdoor system still operates, the system will be changed into light speed mode.

When the airflow speed has no delay from the high to low switching, the speed should be delayed for 3 minutes (remain at high speed for 3 minutes.) before the next switch.

Manual: When the sensor is off or $T_r < T_s + 3^\circ\text{C}$, the manual operation can not be made. (obligatory automatic operation.)

*Airgate location control: the location for the airgate can be set according to your needs.

7.1.4 Heating operation mode.

* temperature control range: $16\text{---}30^\circ\text{C}$

* temperature difference: $\pm 1^\circ\text{C}$

* control feature: the temperature compensation is automatically added and the system will send the heating signals to the outdoor system.

If $T_r \leq T_s$, the outdoor compressor is turned on, the indoor fan will be at the cold air proof mode.

If $T_r > T_s + 1^\circ\text{C}$, the outdoor system is turned off, the indoor fan will be at the heat residue sending mode.

If $T_r < T_s - 1^\circ\text{C}$, the outdoor system will be turned on again, the indoor fan will be at the cold air proof mode.

*Indoor fan control

manual control: You can choose high, medium, low and automatic speed control.

Automatic: When $T_r < T_s$, high speed.

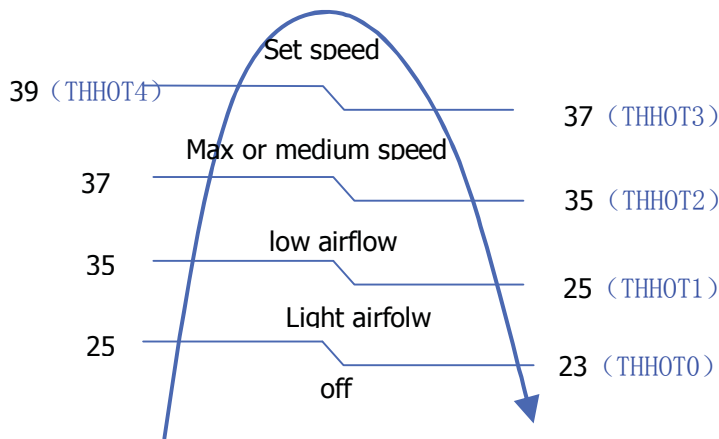
When $T_s \leq T_r \leq T_s + 2^\circ\text{C}$, medium speed.

When $T_r > T_s + 2^\circ\text{C}$, low speed.

When the airflow speed has no delay from the high to low switching, the speed should be delayed for 3 minutes (remain at high speed for 3 minutes.) before the next switch.

*Airgate location control: the location for the airgate can be set according to your needs.

Coldair proof operation



- * Residue heat sending. The indoor fan will send the residue heat at a low speed for 20 seconds. If other conditions are satisfied, when the compressor stops, the indoor system will operate at a light speed. The indoor fan will stop when the coil temperature is below the 'THHOT0'.
- * Defrosting. When the system receives the defrosting signal from outdoors, the indoor fan will stop and the indoor temperature display won't change. At the time, any indoor coil malfunctions will be neglected. When the outdoor defrosting finishes, the coil malfunction will still be neglected until the compressor has been started up for 30 seconds. The indoor temperature display will not change and the system operates at the cold air proof mode.
- * Automatic heating temperature compensation: when the system enters the heating mode, the temperature compensation (4) will be added. When the status is switched off, the compensation will be erased.

7.1.5 Strength operation

The system enters the mode after receiving the 'strength signal'.
 Send strength operation signal to the outdoor system.
 The mode change finishes the strength operation.
 Entering 'mute', you can have normal operation or signal control such as timing to finish the strength operation.
 When the system is at the automatic option with the strength/ mute function, if the system enters the cooling mode, the cooling strength/ mute function will be offered; if the system enters the heating mode, then the heating strength/ mute function will be offered; if the system enters the airflow mode, there will be no strength/ mute function.

7.1.6 Mute operation

The system enters the mode after receiving the 'mute signal'.

- a. Mute heating: the airflow speed is slight, the system sends the mute signal to the outdoor system.
- b. mute cooling: the airflow speed is slight, the system sends the mute signal to the outdoor system.

When the compressor operates, the airflow speed is mute speed. EEPROM is adaptable.
 Mute operation can not work under the dehumidifying and airflow-sending operation.

7.1.7 Timing

You can set 24 hours' on/off timing accordingly. After the setting, the timing indicator will be lightened. Also, the light will be turned off after the timing is finished. The followings are several timing methods.

1.system /on timing: The timing indicator will be lightened and the indoor system is under the waiting mode. The light will be turned off when the timing is finished and the rest of the system will operate under a normal condition. The timing starts since the last reception of the timing signal.

2.system /off timing: When the system is turned on, the timing indicator is lightened, the rest of the system will operated under a normal condition. When set time comes, the indicator light will be turned off and the system will be turned off. If you have set the dormant functions, the order of your settings will be operated according to the timing settings.

3 .system /on and off timing: The settings will be completed according to the orders..

7.1.8 Dormant operation

The dormant timing is an eight hours unadaptable one. The timing signs are shown on the display board.

2.1 Under the cooling/ dehumidifying operation, after the setting of the dormant operation, the set temperature will be raised for 1 centigrade after 1 hour's operation and will be raised for 1 centigrade 1 hour later. The system will keep this status for 6 hours and then close.

2.2 Under the heating mode, after the setting of the dormant operation, the setting temperature will fall 2 centigrade after 1 hour's operation and will fall 2 centigrade 1 hour later. 3 hours after the preceding operations, the set temperature will be raised for 1 centigrade and the system will keep this status for 3 hours and then close down.

2.3 During the dormant time, except the change of the system mode or a new press on the dormant setting keys, the timing of the 8 hours dormancy will take the first timing as the start time, any presses on other keys will not affect the original timing.

2.4 Indoor fan control under the dormant operation.

If the indoor fan is at the high speed before the dormant operation setting, the speed will be turned to medium after the setting. If the fan is at the medium speed before the dormant setting, the speed will be turned to low after the setting. If the fan is at the low speed before the dormant setting, the speed will not change.

7.1.9 Human sensor

Follow function: To detect the area of the person located , adjust the wind direction, blow to the people directly.If detected two people in the area, the wind will be swing between the two position, and stay for 15s at each position.If detected three or more people in the area, the right& left swing will be auto swing.

Evade function: To detect the area of the person located , adjust the wind direction, evade blow to the people directly.If detected three or more people in the area, the right& left swing will be auto swing.

No matter of to setting follow or evade, judging the Area of the people located and then to adjusted wind requires a certain delay time, so the wind direction will not change immediately.

In Follow/Evade mode, if a long time (20 minutes or more) people can not be detected , the unit will be automatically in power-saving mode. The frequency will be reduced gradually, and fan will be in low speed. Once detected people, the unit will be exit the power saving mode.

In Follow/Evade mode, the unit real-time detection of human activity,according to the amount of activity to control the frequency and the fan speed. In heating mode, the greater of amount of activity, the lower frequency and fan speed. And when the activity less, the frequency will be increase and fan speed increasing.

In cooling mode, conversely.

If the human sensor running abnormal, please check that if the structure deformed or installed in place. if OK, then check that if the terminal between human sensor module and the PCB connected well. if OK, using multimeter to test the harness which connect the human sensor and the processing board is normal or not .If OK, then replace the module or PCB.

7.1.10 Light sensor

Entry conditions: after light function turn on, consecutive five minutes detected indoor light intensity is less than the set value, the follow/Evade function automatically turn on, if within 20 minutes of continuous no human activity, the light intensity has been less than the set value, the unit will be automatically enters the Smart sleep mode, according to sleep curve operation

Exit conditions: 20 minutes continuously detects the room light intensity is greater than the set value or smart sleep mode eight hours or turn off the light sensor functions.

7.1.11 Urgent on/off input

Press the urgency button the buzzer will ring. The system will enter the automatic mode if you don't press the button for more than 5 seconds.

Under the system off mode, if you press the urgency key for 5 to 10 seconds, the system will start the test operation.

Under the system off mode, if you press the urgency key for 10 to 15 seconds, the display screen will show the resume of the last malfunction.

If the system is under operation, the press on the urgency key will stop it.

Under the system off mode, the display screen will show automatic running sign.

Under the system off mode, the system will not receive the remote control signal if the press on the urgency key doesn't last for 15 seconds or if the key is loosened.

Urgency operation: If you press the urgency key for less than 5 seconds, the buzzer will ring when you press the on/off key. The system will enter the urgency operation when the urgency key is loosened. The urgency operation is fully automatic.

Test operation.

The inlet temperature sensor doesn't work, the indoor fan and the indoor air direction board motor works synchronically. High speed airflow, cooling, outdoor system on, etc, will send the ambient temperature 30 centigrade and coil temperature 16 centigrade information to the outdoor system.

Test operation

The defrost protection of the evaporator doesn't work.

The temperature control doesn't work.

The test operation will be finished in 30 minutes.

The test operation can be stopped by the relative commands from the remote control.

7.1.12 Abnormality confirmation approaches

1. indoor temperature sensor abnormality:

Under the operation, the normal temperature ranges from 120 degree to -30 degree. When the temperature goes beyond this range, the abnormality can be confirmed. If the temperature goes back into the range, the

system will automatically resume.

2 .indoor heat interaction sensor abnormality:

Under the operation, the normal temperature ranges from 120 degree to -30 degree. When the temperature goes beyond this range, the abnormality can be confirmed. If the temperature goes back into the range, the system will automatically resume.

3 .indoor malfunction:

Out door malfunction: When the indoor system receives the outdoor malfunction codes, it will store the code into E2 for the malfunction list resume. The indoor system will continue to operate according to the original status, the malfunction code will not be revealed or processed.

4. transmission abnormality:

If the indoor system can't receive the outdoor system for 4 minutes, the communication abnormality can be confirmed and reported and the outdoor system will be stopped.

7.1.13 Power cut compensation

* Entering condition: Press dormant button 10 times within 7 second, the buzzer will ring 4 times and the present system status will be stored into the EEPROM of the indoor system.

* After entering the power cut compensation mode, the processing of the indoor system should be as the followings:

Remote control urgency signal: operate according to the remote control and the urgent conditions, the present status will be stored into the EEPROM of the indoor system.

* Quitting conditions: Press dormant button 10 times within 7 seconds and the buzzer will ring twice.

7.1.14 Time cutting function:

Connect the test program terminal on the mainboard after connecting the system to the power circuit. The CPU of the main control will be 60 times faster.

7.1.15 DRED function:

Receiving the signal of DRED , the corresponding symbol will be displayed.

If receive the DRM1 , "d1" is displayed.

If receive the DRM2 , "d2" is displayed.

If receive the DRM3 , "d3" is displayed.

7.1.16 Low temperature refrigeration function:

Entering condition: outdoor environment temperature below 12 degrees

outdoor environment temperature between 12 and 0 degrees, the indoor fan speed increases a added value (EE); outdoor environment temperature below 0 degrees, the indoor fan speed increases another added value (EE) again.

7.2 Value of thermistor

Room sensor and Pipe Sensor

R25°C=10K Ω \pm 3%B25°C/50°C=3700K \pm 3%

| Temp.(°C) | Max.(K Ω) | Normal(K Ω) | Min.(K Ω) | Tolerance(°C) | |
|-----------|-------------------|---------------------|-------------------|---------------|------|
| -30 | 165.2170 | 147.9497 | 132.3678 | -1.94 | 1.75 |
| -29 | 155.5754 | 139.5600 | 125.0806 | -1.93 | 1.74 |
| -28 | 146.5609 | 131.7022 | 118.2434 | -1.91 | 1.73 |
| -27 | 138.1285 | 124.3392 | 111.8256 | -1.89 | 1.71 |
| -26 | 130.2371 | 117.4366 | 105.7989 | -1.87 | 1.70 |
| -25 | 122.8484 | 110.9627 | 100.1367 | -1.85 | 1.69 |
| -24 | 115.9272 | 104.8882 | 94.8149 | -1.83 | 1.67 |
| -23 | 109.4410 | 99.1858 | 89.8106 | -1.81 | 1.66 |
| -22 | 103.3598 | 93.8305 | 85.1031 | -1.80 | 1.64 |
| -21 | 97.6556 | 88.7989 | 80.6728 | -1.78 | 1.63 |
| -20 | 92.3028 | 84.0695 | 76.5017 | -1.76 | 1.62 |
| -19 | 87.2775 | 79.6222 | 72.5729 | -1.74 | 1.60 |
| -18 | 82.5577 | 75.4384 | 68.8710 | -1.72 | 1.59 |
| -17 | 78.1230 | 71.5010 | 65.3815 | -1.70 | 1.57 |
| -16 | 73.9543 | 67.7939 | 62.0907 | -1.68 | 1.55 |
| -15 | 70.0342 | 64.3023 | 58.9863 | -1.66 | 1.54 |
| -14 | 66.3463 | 61.0123 | 56.0565 | -1.64 | 1.52 |
| -13 | 62.8755 | 57.9110 | 53.2905 | -1.62 | 1.51 |
| -12 | 59.6076 | 54.9866 | 50.6781 | -1.60 | 1.49 |
| -11 | 56.5296 | 52.2278 | 48.2099 | -1.58 | 1.47 |
| -10 | 53.6294 | 49.6244 | 45.8771 | -1.56 | 1.46 |
| -9 | 50.8956 | 47.1666 | 43.6714 | -1.54 | 1.44 |
| -8 | 48.3178 | 44.8454 | 41.5851 | -1.51 | 1.42 |
| -7 | 45.8860 | 42.6525 | 39.6112 | -1.49 | 1.40 |
| -6 | 43.5912 | 40.5800 | 37.7429 | -1.47 | 1.39 |
| -5 | 41.4249 | 38.6207 | 35.9739 | -1.45 | 1.37 |
| -4 | 39.3792 | 36.7676 | 34.2983 | -1.43 | 1.35 |
| -3 | 37.4465 | 35.0144 | 32.7108 | -1.41 | 1.33 |
| -2 | 35.6202 | 33.3552 | 31.2062 | -1.38 | 1.31 |
| -1 | 33.8936 | 31.7844 | 29.7796 | -1.36 | 1.29 |
| 0 | 32.2608 | 30.2968 | 28.4267 | -1.34 | 1.28 |
| 1 | 30.7162 | 28.8875 | 27.1431 | -1.32 | 1.26 |
| 2 | 29.2545 | 27.5519 | 25.9250 | -1.29 | 1.24 |
| 3 | 27.8708 | 26.2858 | 24.7686 | -1.27 | 1.22 |
| 4 | 26.5605 | 25.0851 | 23.6704 | -1.25 | 1.20 |
| 5 | 25.3193 | 23.9462 | 22.6273 | -1.23 | 1.18 |
| 6 | 24.1432 | 22.8656 | 21.6361 | -1.20 | 1.16 |
| 7 | 23.0284 | 21.8398 | 20.6939 | -1.18 | 1.14 |
| 8 | 21.9714 | 20.8659 | 19.7982 | -1.15 | 1.12 |

| | | | | | |
|----|---------|---------|---------|-------|------|
| 9 | 20.9688 | 19.9409 | 18.9463 | -1.13 | 1.09 |
| 10 | 20.0176 | 19.0621 | 18.1358 | -1.11 | 1.07 |
| 11 | 19.1149 | 18.2270 | 17.3646 | -1.08 | 1.05 |
| 12 | 18.2580 | 17.4331 | 16.6305 | -1.06 | 1.03 |
| 13 | 17.4442 | 16.6782 | 15.9315 | -1.03 | 1.01 |
| 14 | 16.6711 | 15.9601 | 15.2657 | -1.01 | 0.99 |
| 15 | 15.9366 | 15.2770 | 14.6315 | -0.98 | 0.96 |
| 16 | 15.2385 | 14.6268 | 14.0271 | -0.96 | 0.94 |
| 17 | 14.5748 | 14.0079 | 13.4510 | -0.93 | 0.92 |
| 18 | 13.9436 | 13.4185 | 12.9017 | -0.91 | 0.90 |
| 19 | 13.3431 | 12.8572 | 12.3778 | -0.88 | 0.87 |
| 20 | 12.7718 | 12.3223 | 11.8780 | -0.86 | 0.85 |
| 21 | 12.2280 | 11.8126 | 11.4011 | -0.83 | 0.83 |
| 22 | 11.7102 | 11.3267 | 10.9459 | -0.81 | 0.80 |
| 23 | 11.2172 | 10.8634 | 10.5114 | -0.78 | 0.78 |
| 24 | 10.7475 | 10.4216 | 10.0964 | -0.75 | 0.75 |
| 25 | 10.3000 | 10.0000 | 9.7000 | -0.75 | 0.75 |
| 26 | 9.8975 | 9.5974 | 9.2980 | -0.76 | 0.76 |
| 27 | 9.5129 | 9.2132 | 8.9148 | -0.80 | 0.80 |
| 28 | 9.1454 | 8.8465 | 8.5496 | -0.84 | 0.83 |
| 29 | 8.7942 | 8.4964 | 8.2013 | -0.87 | 0.86 |
| 30 | 8.4583 | 8.1621 | 7.8691 | -0.91 | 0.90 |
| 31 | 8.1371 | 7.8428 | 7.5522 | -0.95 | 0.93 |
| 32 | 7.8299 | 7.5377 | 7.2498 | -0.98 | 0.97 |
| 33 | 7.5359 | 7.2461 | 6.9611 | -1.02 | 1.00 |
| 34 | 7.2546 | 6.9673 | 6.6854 | -1.06 | 1.04 |
| 35 | 6.9852 | 6.7008 | 6.4222 | -1.10 | 1.07 |
| 36 | 6.7273 | 6.4459 | 6.1707 | -1.13 | 1.11 |
| 37 | 6.4803 | 6.2021 | 5.9304 | -1.17 | 1.14 |
| 38 | 6.2437 | 5.9687 | 5.7007 | -1.21 | 1.18 |
| 39 | 6.0170 | 5.7454 | 5.4812 | -1.25 | 1.22 |
| 40 | 5.7997 | 5.5316 | 5.2712 | -1.29 | 1.25 |
| 41 | 5.5914 | 5.3269 | 5.0704 | -1.33 | 1.29 |
| 42 | 5.3916 | 5.1308 | 4.8783 | -1.37 | 1.33 |
| 43 | 5.2001 | 4.9430 | 4.6944 | -1.41 | 1.36 |
| 44 | 5.0163 | 4.7630 | 4.5185 | -1.45 | 1.40 |
| 45 | 4.8400 | 4.5905 | 4.3500 | -1.49 | 1.44 |
| 46 | 4.6708 | 4.4252 | 4.1887 | -1.53 | 1.47 |
| 47 | 4.5083 | 4.2666 | 4.0342 | -1.57 | 1.51 |
| 48 | 4.3524 | 4.1145 | 3.8862 | -1.61 | 1.55 |
| 49 | 4.2026 | 3.9686 | 3.7443 | -1.65 | 1.59 |
| 50 | 4.0588 | 3.8287 | 3.6084 | -1.70 | 1.62 |
| 51 | 3.9206 | 3.6943 | 3.4780 | -1.74 | 1.66 |

| | | | | | |
|----|--------|--------|--------|-------|------|
| 52 | 3.7878 | 3.5654 | 3.3531 | -1.78 | 1.70 |
| 53 | 3.6601 | 3.4416 | 3.2332 | -1.82 | 1.74 |
| 54 | 3.5374 | 3.3227 | 3.1183 | -1.87 | 1.78 |
| 55 | 3.4195 | 3.2085 | 3.0079 | -1.91 | 1.82 |
| 56 | 3.3060 | 3.0989 | 2.9021 | -1.95 | 1.85 |
| 57 | 3.1969 | 2.9935 | 2.8005 | -2.00 | 1.89 |
| 58 | 3.0919 | 2.8922 | 2.7029 | -2.04 | 1.93 |
| 59 | 2.9909 | 2.7948 | 2.6092 | -2.08 | 1.97 |
| 60 | 2.8936 | 2.7012 | 2.5193 | -2.13 | 2.01 |
| 61 | 2.8000 | 2.6112 | 2.4328 | -2.17 | 2.05 |
| 62 | 2.7099 | 2.5246 | 2.3498 | -2.22 | 2.09 |
| 63 | 2.6232 | 2.4413 | 2.2700 | -2.26 | 2.13 |
| 64 | 2.5396 | 2.3611 | 2.1932 | -2.31 | 2.17 |
| 65 | 2.4591 | 2.2840 | 2.1195 | -2.36 | 2.21 |
| 66 | 2.3815 | 2.2098 | 2.0486 | -2.40 | 2.25 |
| 67 | 2.3068 | 2.1383 | 1.9803 | -2.45 | 2.29 |
| 68 | 2.2347 | 2.0695 | 1.9147 | -2.49 | 2.34 |
| 69 | 2.1652 | 2.0032 | 1.8516 | -2.54 | 2.38 |
| 70 | 2.0983 | 1.9393 | 1.7908 | -2.59 | 2.42 |
| 71 | 2.0337 | 1.8778 | 1.7324 | -2.63 | 2.46 |
| 72 | 1.9714 | 1.8186 | 1.6761 | -2.68 | 2.50 |
| 73 | 1.9113 | 1.7614 | 1.6219 | -2.73 | 2.54 |
| 74 | 1.8533 | 1.7064 | 1.5697 | -2.78 | 2.58 |
| 75 | 1.7974 | 1.6533 | 1.5194 | -2.83 | 2.63 |
| 76 | 1.7434 | 1.6021 | 1.4710 | -2.88 | 2.67 |
| 77 | 1.6913 | 1.5528 | 1.4243 | -2.92 | 2.71 |
| 78 | 1.6409 | 1.5051 | 1.3794 | -2.97 | 2.75 |
| 79 | 1.5923 | 1.4592 | 1.3360 | -3.02 | 2.80 |
| 80 | 1.5454 | 1.4149 | 1.2942 | -3.07 | 2.84 |
| 81 | 1.5000 | 1.3721 | 1.2540 | -3.12 | 2.88 |
| 82 | 1.4562 | 1.3308 | 1.2151 | -3.17 | 2.93 |
| 83 | 1.4139 | 1.2910 | 1.1776 | -3.22 | 2.97 |
| 84 | 1.3730 | 1.2525 | 1.1415 | -3.27 | 3.01 |
| 85 | 1.3335 | 1.2153 | 1.1066 | -3.32 | 3.06 |
| 86 | 1.2953 | 1.1794 | 1.0730 | -3.38 | 3.10 |
| 87 | 1.2583 | 1.1448 | 1.0405 | -3.43 | 3.15 |
| 88 | 1.2226 | 1.1113 | 1.0092 | -3.48 | 3.19 |
| 89 | 1.1880 | 1.0789 | 0.9789 | -3.53 | 3.24 |
| 90 | 1.1546 | 1.0476 | 0.9497 | -3.58 | 3.28 |
| 91 | 1.1223 | 1.0174 | 0.9215 | -3.64 | 3.33 |
| 92 | 1.0910 | 0.9882 | 0.8942 | -3.69 | 3.37 |
| 93 | 1.0607 | 0.9599 | 0.8679 | -3.74 | 3.42 |
| 94 | 1.0314 | 0.9326 | 0.8424 | -3.80 | 3.46 |

| | | | | | |
|-----|--------|--------|--------|-------|------|
| 95 | 1.0030 | 0.9061 | 0.8179 | -3.85 | 3.51 |
| 96 | 0.9756 | 0.8806 | 0.7941 | -3.90 | 3.55 |
| 97 | 0.9490 | 0.8558 | 0.7711 | -3.96 | 3.60 |
| 98 | 0.9232 | 0.8319 | 0.7489 | -4.01 | 3.64 |
| 99 | 0.8983 | 0.8088 | 0.7275 | -4.07 | 3.69 |
| 100 | 0.8741 | 0.7863 | 0.7067 | -4.12 | 3.74 |
| 101 | 0.8507 | 0.7646 | 0.6867 | -4.18 | 3.78 |
| 102 | 0.8281 | 0.7436 | 0.6672 | -4.23 | 3.83 |
| 103 | 0.8061 | 0.7233 | 0.6484 | -4.29 | 3.88 |
| 104 | 0.7848 | 0.7036 | 0.6303 | -4.34 | 3.92 |
| 105 | 0.7641 | 0.6845 | 0.6127 | -4.40 | 3.97 |
| 106 | 0.7441 | 0.6661 | 0.5957 | -4.46 | 4.02 |
| 107 | 0.7247 | 0.6482 | 0.5792 | -4.51 | 4.07 |
| 108 | 0.7059 | 0.6308 | 0.5632 | -4.57 | 4.12 |
| 109 | 0.6877 | 0.6140 | 0.5478 | -4.63 | 4.16 |
| 110 | 0.6700 | 0.5977 | 0.5328 | -4.69 | 4.21 |
| 111 | 0.6528 | 0.5820 | 0.5183 | -4.74 | 4.26 |
| 112 | 0.6361 | 0.5667 | 0.5043 | -4.80 | 4.31 |
| 113 | 0.6200 | 0.5518 | 0.4907 | -4.86 | 4.36 |
| 114 | 0.6043 | 0.5374 | 0.4775 | -4.92 | 4.41 |
| 115 | 0.5891 | 0.5235 | 0.4648 | -4.98 | 4.45 |
| 116 | 0.5743 | 0.5100 | 0.4524 | -5.04 | 4.50 |
| 117 | 0.5600 | 0.4968 | 0.4404 | -5.10 | 4.55 |
| 118 | 0.5460 | 0.4841 | 0.4288 | -5.16 | 4.60 |
| 119 | 0.5325 | 0.4717 | 0.4175 | -5.22 | 4.65 |
| 120 | 0.5194 | 0.4597 | 0.4066 | -5.28 | 4.70 |

Outdoor Unit

Ambient Sensor, Defrosting Sensor, Pipe sensor

R25°C=10KΩ ±3% B25°C/50°C=3700K±3%

| Temp.(°C) | Max.(KΩ) | Normal(KΩ) | Min.(KΩ) | Tolerance(°C) | |
|-----------|----------|------------|----------|---------------|------|
| -30 | 165.2170 | 147.9497 | 132.3678 | -1.94 | 1.75 |
| -29 | 155.5754 | 139.5600 | 125.0806 | -1.93 | 1.74 |
| -28 | 146.5609 | 131.7022 | 118.2434 | -1.91 | 1.73 |
| -27 | 138.1285 | 124.3392 | 111.8256 | -1.89 | 1.71 |
| -26 | 130.2371 | 117.4366 | 105.7989 | -1.87 | 1.70 |
| -25 | 122.8484 | 110.9627 | 100.1367 | -1.85 | 1.69 |
| -24 | 115.9272 | 104.8882 | 94.8149 | -1.83 | 1.67 |
| -23 | 109.4410 | 99.1858 | 89.8106 | -1.81 | 1.66 |
| -22 | 103.3598 | 93.8305 | 85.1031 | -1.80 | 1.64 |
| -21 | 97.6556 | 88.7989 | 80.6728 | -1.78 | 1.63 |
| -20 | 92.3028 | 84.0695 | 76.5017 | -1.76 | 1.62 |
| -19 | 87.2775 | 79.6222 | 72.5729 | -1.74 | 1.60 |

| | | | | | |
|-----|---------|---------|---------|-------|------|
| -18 | 82.5577 | 75.4384 | 68.8710 | -1.72 | 1.59 |
| -17 | 78.1230 | 71.5010 | 65.3815 | -1.70 | 1.57 |
| -16 | 73.9543 | 67.7939 | 62.0907 | -1.68 | 1.55 |
| -15 | 70.0342 | 64.3023 | 58.9863 | -1.66 | 1.54 |
| -14 | 66.3463 | 61.0123 | 56.0565 | -1.64 | 1.52 |
| -13 | 62.8755 | 57.9110 | 53.2905 | -1.62 | 1.51 |
| -12 | 59.6076 | 54.9866 | 50.6781 | -1.60 | 1.49 |
| -11 | 56.5296 | 52.2278 | 48.2099 | -1.58 | 1.47 |
| -10 | 53.6294 | 49.6244 | 45.8771 | -1.56 | 1.46 |
| -9 | 50.8956 | 47.1666 | 43.6714 | -1.54 | 1.44 |
| -8 | 48.3178 | 44.8454 | 41.5851 | -1.51 | 1.42 |
| -7 | 45.8860 | 42.6525 | 39.6112 | -1.49 | 1.40 |
| -6 | 43.5912 | 40.5800 | 37.7429 | -1.47 | 1.39 |
| -5 | 41.4249 | 38.6207 | 35.9739 | -1.45 | 1.37 |
| -4 | 39.3792 | 36.7676 | 34.2983 | -1.43 | 1.35 |
| -3 | 37.4465 | 35.0144 | 32.7108 | -1.41 | 1.33 |
| -2 | 35.6202 | 33.3552 | 31.2062 | -1.38 | 1.31 |
| -1 | 33.8936 | 31.7844 | 29.7796 | -1.36 | 1.29 |
| 0 | 32.2608 | 30.2968 | 28.4267 | -1.34 | 1.28 |
| 1 | 30.7162 | 28.8875 | 27.1431 | -1.32 | 1.26 |
| 2 | 29.2545 | 27.5519 | 25.9250 | -1.29 | 1.24 |
| 3 | 27.8708 | 26.2858 | 24.7686 | -1.27 | 1.22 |
| 4 | 26.5605 | 25.0851 | 23.6704 | -1.25 | 1.20 |
| 5 | 25.3193 | 23.9462 | 22.6273 | -1.23 | 1.18 |
| 6 | 24.1432 | 22.8656 | 21.6361 | -1.20 | 1.16 |
| 7 | 23.0284 | 21.8398 | 20.6939 | -1.18 | 1.14 |
| 8 | 21.9714 | 20.8659 | 19.7982 | -1.15 | 1.12 |
| 9 | 20.9688 | 19.9409 | 18.9463 | -1.13 | 1.09 |
| 10 | 20.0176 | 19.0621 | 18.1358 | -1.11 | 1.07 |
| 11 | 19.1149 | 18.2270 | 17.3646 | -1.08 | 1.05 |
| 12 | 18.2580 | 17.4331 | 16.6305 | -1.06 | 1.03 |
| 13 | 17.4442 | 16.6782 | 15.9315 | -1.03 | 1.01 |
| 14 | 16.6711 | 15.9601 | 15.2657 | -1.01 | 0.99 |
| 15 | 15.9366 | 15.2770 | 14.6315 | -0.98 | 0.96 |
| 16 | 15.2385 | 14.6268 | 14.0271 | -0.96 | 0.94 |
| 17 | 14.5748 | 14.0079 | 13.4510 | -0.93 | 0.92 |
| 18 | 13.9436 | 13.4185 | 12.9017 | -0.91 | 0.90 |
| 19 | 13.3431 | 12.8572 | 12.3778 | -0.88 | 0.87 |
| 20 | 12.7718 | 12.3223 | 11.8780 | -0.86 | 0.85 |
| 21 | 12.2280 | 11.8126 | 11.4011 | -0.83 | 0.83 |
| 22 | 11.7102 | 11.3267 | 10.9459 | -0.81 | 0.80 |
| 23 | 11.2172 | 10.8634 | 10.5114 | -0.78 | 0.78 |
| 24 | 10.7475 | 10.4216 | 10.0964 | -0.75 | 0.75 |

| | | | | | |
|----|---------|---------|--------|-------|------|
| 25 | 10.3000 | 10.0000 | 9.7000 | -0.75 | 0.75 |
| 26 | 9.8975 | 9.5974 | 9.2980 | -0.76 | 0.76 |
| 27 | 9.5129 | 9.2132 | 8.9148 | -0.80 | 0.80 |
| 28 | 9.1454 | 8.8465 | 8.5496 | -0.84 | 0.83 |
| 29 | 8.7942 | 8.4964 | 8.2013 | -0.87 | 0.86 |
| 30 | 8.4583 | 8.1621 | 7.8691 | -0.91 | 0.90 |
| 31 | 8.1371 | 7.8428 | 7.5522 | -0.95 | 0.93 |
| 32 | 7.8299 | 7.5377 | 7.2498 | -0.98 | 0.97 |
| 33 | 7.5359 | 7.2461 | 6.9611 | -1.02 | 1.00 |
| 34 | 7.2546 | 6.9673 | 6.6854 | -1.06 | 1.04 |
| 35 | 6.9852 | 6.7008 | 6.4222 | -1.10 | 1.07 |
| 36 | 6.7273 | 6.4459 | 6.1707 | -1.13 | 1.11 |
| 37 | 6.4803 | 6.2021 | 5.9304 | -1.17 | 1.14 |
| 38 | 6.2437 | 5.9687 | 5.7007 | -1.21 | 1.18 |
| 39 | 6.0170 | 5.7454 | 5.4812 | -1.25 | 1.22 |
| 40 | 5.7997 | 5.5316 | 5.2712 | -1.29 | 1.25 |
| 41 | 5.5914 | 5.3269 | 5.0704 | -1.33 | 1.29 |
| 42 | 5.3916 | 5.1308 | 4.8783 | -1.37 | 1.33 |
| 43 | 5.2001 | 4.9430 | 4.6944 | -1.41 | 1.36 |
| 44 | 5.0163 | 4.7630 | 4.5185 | -1.45 | 1.40 |
| 45 | 4.8400 | 4.5905 | 4.3500 | -1.49 | 1.44 |
| 46 | 4.6708 | 4.4252 | 4.1887 | -1.53 | 1.47 |
| 47 | 4.5083 | 4.2666 | 4.0342 | -1.57 | 1.51 |
| 48 | 4.3524 | 4.1145 | 3.8862 | -1.61 | 1.55 |
| 49 | 4.2026 | 3.9686 | 3.7443 | -1.65 | 1.59 |
| 50 | 4.0588 | 3.8287 | 3.6084 | -1.70 | 1.62 |
| 51 | 3.9206 | 3.6943 | 3.4780 | -1.74 | 1.66 |
| 52 | 3.7878 | 3.5654 | 3.3531 | -1.78 | 1.70 |
| 53 | 3.6601 | 3.4416 | 3.2332 | -1.82 | 1.74 |
| 54 | 3.5374 | 3.3227 | 3.1183 | -1.87 | 1.78 |
| 55 | 3.4195 | 3.2085 | 3.0079 | -1.91 | 1.82 |
| 56 | 3.3060 | 3.0989 | 2.9021 | -1.95 | 1.85 |
| 57 | 3.1969 | 2.9935 | 2.8005 | -2.00 | 1.89 |
| 58 | 3.0919 | 2.8922 | 2.7029 | -2.04 | 1.93 |
| 59 | 2.9909 | 2.7948 | 2.6092 | -2.08 | 1.97 |
| 60 | 2.8936 | 2.7012 | 2.5193 | -2.13 | 2.01 |
| 61 | 2.8000 | 2.6112 | 2.4328 | -2.17 | 2.05 |
| 62 | 2.7099 | 2.5246 | 2.3498 | -2.22 | 2.09 |
| 63 | 2.6232 | 2.4413 | 2.2700 | -2.26 | 2.13 |
| 64 | 2.5396 | 2.3611 | 2.1932 | -2.31 | 2.17 |
| 65 | 2.4591 | 2.2840 | 2.1195 | -2.36 | 2.21 |
| 66 | 2.3815 | 2.2098 | 2.0486 | -2.40 | 2.25 |
| 67 | 2.3068 | 2.1383 | 1.9803 | -2.45 | 2.29 |

| | | | | | |
|-----|--------|--------|--------|-------|------|
| 68 | 2.2347 | 2.0695 | 1.9147 | -2.49 | 2.34 |
| 69 | 2.1652 | 2.0032 | 1.8516 | -2.54 | 2.38 |
| 70 | 2.0983 | 1.9393 | 1.7908 | -2.59 | 2.42 |
| 71 | 2.0337 | 1.8778 | 1.7324 | -2.63 | 2.46 |
| 72 | 1.9714 | 1.8186 | 1.6761 | -2.68 | 2.50 |
| 73 | 1.9113 | 1.7614 | 1.6219 | -2.73 | 2.54 |
| 74 | 1.8533 | 1.7064 | 1.5697 | -2.78 | 2.58 |
| 75 | 1.7974 | 1.6533 | 1.5194 | -2.83 | 2.63 |
| 76 | 1.7434 | 1.6021 | 1.4710 | -2.88 | 2.67 |
| 77 | 1.6913 | 1.5528 | 1.4243 | -2.92 | 2.71 |
| 78 | 1.6409 | 1.5051 | 1.3794 | -2.97 | 2.75 |
| 79 | 1.5923 | 1.4592 | 1.3360 | -3.02 | 2.80 |
| 80 | 1.5454 | 1.4149 | 1.2942 | -3.07 | 2.84 |
| 81 | 1.5000 | 1.3721 | 1.2540 | -3.12 | 2.88 |
| 82 | 1.4562 | 1.3308 | 1.2151 | -3.17 | 2.93 |
| 83 | 1.4139 | 1.2910 | 1.1776 | -3.22 | 2.97 |
| 84 | 1.3730 | 1.2525 | 1.1415 | -3.27 | 3.01 |
| 85 | 1.3335 | 1.2153 | 1.1066 | -3.32 | 3.06 |
| 86 | 1.2953 | 1.1794 | 1.0730 | -3.38 | 3.10 |
| 87 | 1.2583 | 1.1448 | 1.0405 | -3.43 | 3.15 |
| 88 | 1.2226 | 1.1113 | 1.0092 | -3.48 | 3.19 |
| 89 | 1.1880 | 1.0789 | 0.9789 | -3.53 | 3.24 |
| 90 | 1.1546 | 1.0476 | 0.9497 | -3.58 | 3.28 |
| 91 | 1.1223 | 1.0174 | 0.9215 | -3.64 | 3.33 |
| 92 | 1.0910 | 0.9882 | 0.8942 | -3.69 | 3.37 |
| 93 | 1.0607 | 0.9599 | 0.8679 | -3.74 | 3.42 |
| 94 | 1.0314 | 0.9326 | 0.8424 | -3.80 | 3.46 |
| 95 | 1.0030 | 0.9061 | 0.8179 | -3.85 | 3.51 |
| 96 | 0.9756 | 0.8806 | 0.7941 | -3.90 | 3.55 |
| 97 | 0.9490 | 0.8558 | 0.7711 | -3.96 | 3.60 |
| 98 | 0.9232 | 0.8319 | 0.7489 | -4.01 | 3.64 |
| 99 | 0.8983 | 0.8088 | 0.7275 | -4.07 | 3.69 |
| 100 | 0.8741 | 0.7863 | 0.7067 | -4.12 | 3.74 |
| 101 | 0.8507 | 0.7646 | 0.6867 | -4.18 | 3.78 |
| 102 | 0.8281 | 0.7436 | 0.6672 | -4.23 | 3.83 |
| 103 | 0.8061 | 0.7233 | 0.6484 | -4.29 | 3.88 |
| 104 | 0.7848 | 0.7036 | 0.6303 | -4.34 | 3.92 |
| 105 | 0.7641 | 0.6845 | 0.6127 | -4.40 | 3.97 |
| 106 | 0.7441 | 0.6661 | 0.5957 | -4.46 | 4.02 |
| 107 | 0.7247 | 0.6482 | 0.5792 | -4.51 | 4.07 |
| 108 | 0.7059 | 0.6308 | 0.5632 | -4.57 | 4.12 |
| 109 | 0.6877 | 0.6140 | 0.5478 | -4.63 | 4.16 |
| 110 | 0.6700 | 0.5977 | 0.5328 | -4.69 | 4.21 |

| | | | | | |
|-----|--------|--------|--------|-------|------|
| 111 | 0.6528 | 0.5820 | 0.5183 | -4.74 | 4.26 |
| 112 | 0.6361 | 0.5667 | 0.5043 | -4.80 | 4.31 |
| 113 | 0.6200 | 0.5518 | 0.4907 | -4.86 | 4.36 |
| 114 | 0.6043 | 0.5374 | 0.4775 | -4.92 | 4.41 |
| 115 | 0.5891 | 0.5235 | 0.4648 | -4.98 | 4.45 |
| 116 | 0.5743 | 0.5100 | 0.4524 | -5.04 | 4.50 |
| 117 | 0.5600 | 0.4968 | 0.4404 | -5.10 | 4.55 |
| 118 | 0.5460 | 0.4841 | 0.4288 | -5.16 | 4.60 |
| 119 | 0.5325 | 0.4717 | 0.4175 | -5.22 | 4.65 |
| 120 | 0.5194 | 0.4597 | 0.4066 | -5.28 | 4.70 |

Discharging Sensor

R80°C=50KΩ ± 3%

B25/80°C=4450K ± 3%

| Temp.(°C) | Max.(KΩ) | Normal(KΩ) | Min.(KΩ) | Tolerance(°C) | |
|-----------|------------|------------|-----------|---------------|------|
| -30 | 14646.0505 | 12061.7438 | 9924.4999 | -2.96 | 2.45 |
| -29 | 13654.1707 | 11267.8730 | 9290.2526 | -2.95 | 2.44 |
| -28 | 12735.8378 | 10531.3695 | 8700.6388 | -2.93 | 2.44 |
| -27 | 11885.1336 | 9847.7240 | 8152.2338 | -2.92 | 2.43 |
| -26 | 11096.6531 | 9212.8101 | 7641.8972 | -2.91 | 2.42 |
| -25 | 10365.4565 | 8622.8491 | 7166.7474 | -2.90 | 2.42 |
| -24 | 9687.0270 | 8074.3787 | 6724.1389 | -2.88 | 2.41 |
| -23 | 9057.2314 | 7564.2244 | 6311.6413 | -2.87 | 2.41 |
| -22 | 8472.2852 | 7089.4741 | 5927.0206 | -2.86 | 2.40 |
| -21 | 7928.7217 | 6647.4547 | 5568.2222 | -2.84 | 2.39 |
| -20 | 7423.3626 | 6235.7109 | 5233.3554 | -2.83 | 2.39 |
| -19 | 6953.2930 | 5851.9864 | 4920.6791 | -2.82 | 2.38 |
| -18 | 6515.8375 | 5494.2064 | 4628.5894 | -2.80 | 2.37 |
| -17 | 6108.5393 | 5160.4621 | 4355.6078 | -2.79 | 2.37 |
| -16 | 5729.1413 | 4848.9963 | 4100.3708 | -2.77 | 2.36 |
| -15 | 5375.5683 | 4558.1906 | 3861.6201 | -2.76 | 2.35 |
| -14 | 5045.9114 | 4286.5535 | 3638.1938 | -2.75 | 2.34 |
| -13 | 4738.4141 | 4032.7098 | 3429.0191 | -2.73 | 2.34 |
| -12 | 4451.4586 | 3795.3910 | 3233.1039 | -2.72 | 2.33 |
| -11 | 4183.5548 | 3573.4260 | 3049.5312 | -2.70 | 2.32 |
| -10 | 3933.3289 | 3365.7336 | 2877.4527 | -2.69 | 2.31 |
| -9 | 3699.5139 | 3171.3148 | 2716.0828 | -2.67 | 2.30 |
| -8 | 3480.9407 | 2989.2460 | 2564.6945 | -2.66 | 2.29 |
| -7 | 3276.5302 | 2818.6731 | 2422.6139 | -2.64 | 2.28 |
| -6 | 3085.2854 | 2658.8058 | 2289.2164 | -2.63 | 2.28 |
| -5 | 2906.2851 | 2508.9126 | 2163.9230 | -2.61 | 2.27 |
| -4 | 2738.6777 | 2368.3158 | 2046.1961 | -2.60 | 2.26 |
| -3 | 2581.6752 | 2236.3876 | 1935.5371 | -2.58 | 2.25 |

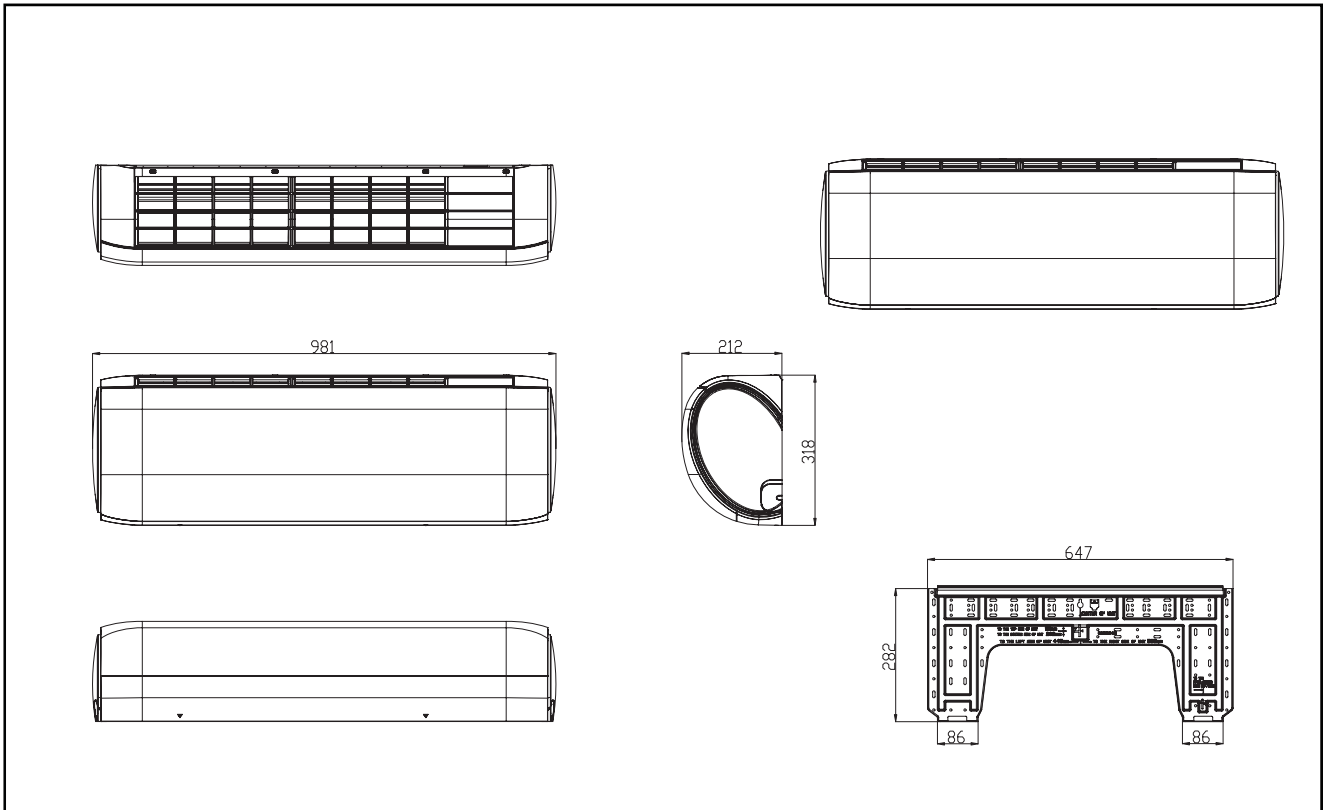
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|----|-----------|-----------|-----------|-------|------|
| -2 | 2434.5487 | 2112.5459 | 1831.4826 | -2.56 | 2.24 |
| -1 | 2296.6230 | 1996.2509 | 1733.6024 | -2.55 | 2.23 |
| 0 | 2167.2730 | 1887.0018 | 1641.4966 | -2.53 | 2.22 |
| 1 | 2045.9191 | 1784.3336 | 1554.7931 | -2.52 | 2.21 |
| 2 | 1932.0242 | 1687.8144 | 1473.1460 | -2.50 | 2.20 |
| 3 | 1825.0899 | 1597.0431 | 1396.2333 | -2.48 | 2.19 |
| 4 | 1724.6540 | 1511.6468 | 1323.7551 | -2.47 | 2.17 |
| 5 | 1630.2870 | 1431.2787 | 1255.4324 | -2.45 | 2.16 |
| 6 | 1541.5904 | 1355.6163 | 1191.0048 | -2.43 | 2.15 |
| 7 | 1458.1938 | 1284.3593 | 1130.2298 | -2.41 | 2.14 |
| 8 | 1379.7528 | 1217.2282 | 1072.8813 | -2.40 | 2.13 |
| 9 | 1305.9472 | 1153.9626 | 1018.7481 | -2.38 | 2.12 |
| 10 | 1236.4792 | 1094.3200 | 967.6334 | -2.36 | 2.11 |
| 11 | 1171.0715 | 1038.0743 | 919.3533 | -2.35 | 2.09 |
| 12 | 1109.4661 | 985.0146 | 873.7359 | -2.33 | 2.08 |
| 13 | 1051.4226 | 934.9440 | 830.6210 | -2.31 | 2.07 |
| 14 | 996.7169 | 887.6792 | 789.8583 | -2.29 | 2.06 |
| 15 | 945.1404 | 843.0486 | 751.3077 | -2.27 | 2.04 |
| 16 | 896.4981 | 800.8922 | 714.8380 | -2.26 | 2.03 |
| 17 | 850.6086 | 761.0603 | 680.3265 | -2.24 | 2.02 |
| 18 | 807.3024 | 723.4134 | 647.6580 | -2.22 | 2.00 |
| 19 | 766.4212 | 687.8205 | 616.7252 | -2.20 | 1.99 |
| 20 | 727.8172 | 654.1596 | 587.4271 | -2.18 | 1.98 |
| 21 | 691.3524 | 622.3161 | 559.6694 | -2.16 | 1.96 |
| 22 | 656.8979 | 592.1831 | 533.3634 | -2.14 | 1.95 |
| 23 | 624.3328 | 563.6604 | 508.4261 | -2.12 | 1.93 |
| 24 | 593.5446 | 536.6540 | 484.7796 | -2.10 | 1.92 |
| 25 | 564.4275 | 511.0760 | 462.3510 | -2.09 | 1.90 |
| 26 | 536.9865 | 486.9352 | 441.1516 | -2.07 | 1.89 |
| 27 | 511.0105 | 464.0500 | 421.0258 | -2.05 | 1.87 |
| 28 | 486.4151 | 442.3499 | 401.9146 | -2.03 | 1.86 |
| 29 | 463.1208 | 421.7683 | 383.7626 | -2.01 | 1.84 |
| 30 | 441.0535 | 402.2430 | 366.5175 | -1.99 | 1.83 |
| 31 | 420.1431 | 383.7151 | 350.1301 | -1.97 | 1.81 |
| 32 | 400.3242 | 366.1295 | 334.5542 | -1.95 | 1.80 |
| 33 | 381.5350 | 349.4341 | 319.7460 | -1.93 | 1.78 |
| 34 | 363.7176 | 333.5801 | 305.6645 | -1.90 | 1.76 |
| 35 | 346.8176 | 318.5216 | 292.2709 | -1.88 | 1.75 |
| 36 | 330.7839 | 304.2151 | 279.5286 | -1.86 | 1.73 |
| 37 | 315.5682 | 290.6199 | 267.4031 | -1.84 | 1.71 |
| 38 | 301.1254 | 277.6976 | 255.8620 | -1.82 | 1.70 |
| 39 | 287.4128 | 265.4119 | 244.8745 | -1.80 | 1.68 |
| 40 | 274.3905 | 253.7288 | 234.4118 | -1.78 | 1.66 |

| | | | | | |
|----|----------|----------|----------|-------|------|
| 41 | 262.0206 | 242.6161 | 224.4465 | -1.76 | 1.64 |
| 42 | 250.2676 | 232.0436 | 214.9529 | -1.74 | 1.63 |
| 43 | 239.0983 | 221.9825 | 205.9065 | -1.71 | 1.61 |
| 44 | 228.4809 | 212.4060 | 197.2844 | -1.69 | 1.59 |
| 45 | 218.3860 | 203.2887 | 189.0648 | -1.67 | 1.57 |
| 46 | 208.7855 | 194.6066 | 181.2273 | -1.65 | 1.55 |
| 47 | 199.6531 | 186.3369 | 173.7524 | -1.63 | 1.54 |
| 48 | 190.9639 | 178.4584 | 166.6217 | -1.60 | 1.52 |
| 49 | 182.6945 | 170.9508 | 159.8181 | -1.58 | 1.50 |
| 50 | 174.8228 | 163.7951 | 153.3249 | -1.56 | 1.48 |
| 51 | 167.3280 | 156.9733 | 147.1268 | -1.53 | 1.46 |
| 52 | 160.1904 | 150.4683 | 141.2090 | -1.51 | 1.44 |
| 53 | 153.3914 | 144.2641 | 135.5577 | -1.49 | 1.42 |
| 54 | 146.9136 | 138.3454 | 130.1598 | -1.47 | 1.40 |
| 55 | 140.7403 | 132.6980 | 125.0027 | -1.44 | 1.38 |
| 56 | 134.8559 | 127.3081 | 120.0746 | -1.42 | 1.36 |
| 57 | 129.2457 | 122.1630 | 115.3645 | -1.40 | 1.34 |
| 58 | 123.8956 | 117.2504 | 110.8618 | -1.37 | 1.32 |
| 59 | 118.7926 | 112.5589 | 106.5564 | -1.35 | 1.30 |
| 60 | 113.9241 | 108.0776 | 102.4388 | -1.32 | 1.28 |
| 61 | 109.2784 | 103.7961 | 98.5000 | -1.30 | 1.26 |
| 62 | 104.8443 | 99.7046 | 94.7315 | -1.28 | 1.23 |
| 63 | 100.6112 | 95.7939 | 91.1253 | -1.25 | 1.21 |
| 64 | 96.5692 | 92.0553 | 87.6735 | -1.23 | 1.19 |
| 65 | 92.7088 | 88.4805 | 84.3690 | -1.20 | 1.17 |
| 66 | 89.0211 | 85.0614 | 81.2048 | -1.18 | 1.15 |
| 67 | 85.4976 | 81.7908 | 78.1744 | -1.15 | 1.12 |
| 68 | 82.1303 | 78.6615 | 75.2715 | -1.13 | 1.10 |
| 69 | 78.9116 | 75.6668 | 72.4902 | -1.10 | 1.08 |
| 70 | 75.8343 | 72.8004 | 69.8249 | -1.08 | 1.06 |
| 71 | 72.8916 | 70.0561 | 67.2703 | -1.05 | 1.03 |
| 72 | 70.0770 | 67.4283 | 64.8213 | -1.03 | 1.01 |
| 73 | 67.3844 | 64.9115 | 62.4731 | -1.00 | 0.99 |
| 74 | 64.8080 | 62.5006 | 60.2211 | -0.98 | 0.96 |
| 75 | 62.3423 | 60.1906 | 58.0609 | -0.95 | 0.94 |
| 76 | 59.9821 | 57.9770 | 55.9885 | -0.92 | 0.92 |
| 77 | 57.7223 | 55.8552 | 53.9998 | -0.90 | 0.89 |
| 78 | 55.5583 | 53.8210 | 52.0912 | -0.87 | 0.87 |
| 79 | 53.4856 | 51.8706 | 50.2591 | -0.85 | 0.84 |
| 80 | 51.5000 | 50.0000 | 48.5000 | -0.85 | 0.84 |
| 81 | 49.7063 | 48.2057 | 46.7083 | -0.85 | 0.85 |
| 82 | 47.9835 | 46.4842 | 44.9911 | -0.89 | 0.89 |
| 83 | 46.3286 | 44.8323 | 43.3452 | -0.93 | 0.92 |

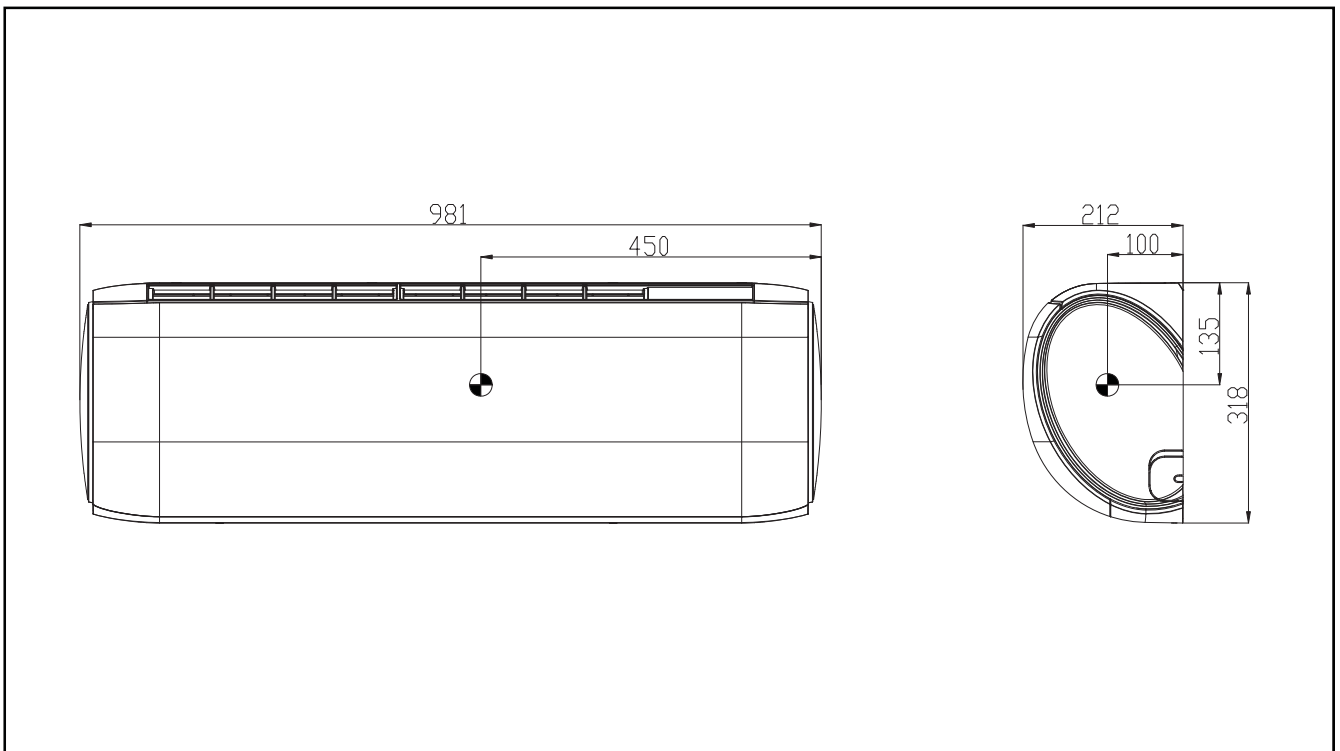
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|-----|---------|---------|---------|-------|------|
| 84 | 44.7385 | 43.2468 | 41.7672 | -0.96 | 0.95 |
| 85 | 43.2105 | 41.7248 | 40.2540 | -1.00 | 0.99 |
| 86 | 41.7386 | 40.2604 | 38.7996 | -1.03 | 1.02 |
| 87 | 40.3241 | 38.8545 | 37.4048 | -1.07 | 1.06 |
| 88 | 38.9643 | 37.5045 | 36.0668 | -1.11 | 1.09 |
| 89 | 37.6569 | 36.2078 | 34.7831 | -1.14 | 1.13 |
| 90 | 36.3996 | 34.9622 | 33.5513 | -1.18 | 1.16 |
| 91 | 35.1903 | 33.7653 | 32.3689 | -1.22 | 1.19 |
| 92 | 34.0269 | 32.6151 | 31.2338 | -1.26 | 1.23 |
| 93 | 32.9075 | 31.5096 | 30.1438 | -1.30 | 1.27 |
| 94 | 31.8302 | 30.4467 | 29.0970 | -1.33 | 1.30 |
| 95 | 30.7933 | 29.4246 | 28.0915 | -1.37 | 1.34 |
| 96 | 29.7950 | 28.4417 | 27.1254 | -1.41 | 1.37 |
| 97 | 28.8337 | 27.4961 | 26.1970 | -1.45 | 1.41 |
| 98 | 27.9078 | 26.5864 | 25.3048 | -1.49 | 1.44 |
| 99 | 27.0160 | 25.7110 | 24.4470 | -1.53 | 1.48 |
| 100 | 26.1569 | 24.8685 | 23.6222 | -1.57 | 1.52 |
| 101 | 25.3290 | 24.0574 | 22.8291 | -1.61 | 1.55 |
| 102 | 24.5311 | 23.2765 | 22.0662 | -1.65 | 1.59 |
| 103 | 23.7620 | 22.5245 | 21.3323 | -1.69 | 1.63 |
| 104 | 23.0205 | 21.8002 | 20.6261 | -1.73 | 1.66 |
| 105 | 22.3055 | 21.1025 | 19.9465 | -1.77 | 1.70 |
| 106 | 21.6159 | 20.4303 | 19.2924 | -1.81 | 1.74 |
| 107 | 20.9508 | 19.7825 | 18.6626 | -1.85 | 1.77 |
| 108 | 20.3091 | 19.1582 | 18.0563 | -1.89 | 1.81 |
| 109 | 19.6899 | 18.5564 | 17.4723 | -1.93 | 1.85 |
| 110 | 19.0924 | 17.9761 | 16.9098 | -1.98 | 1.89 |
| 111 | 18.5157 | 17.4166 | 16.3680 | -2.02 | 1.93 |
| 112 | 17.9590 | 16.8769 | 15.8458 | -2.06 | 1.96 |
| 113 | 17.4214 | 16.3564 | 15.3427 | -2.10 | 2.00 |
| 114 | 16.9023 | 15.8542 | 14.8577 | -2.15 | 2.04 |
| 115 | 16.4010 | 15.3696 | 14.3902 | -2.19 | 2.08 |
| 116 | 15.9167 | 14.9020 | 13.9394 | -2.23 | 2.12 |
| 117 | 15.4489 | 14.4506 | 13.5047 | -2.27 | 2.16 |
| 118 | 14.9968 | 14.0149 | 13.0855 | -2.32 | 2.19 |
| 119 | 14.5599 | 13.5942 | 12.6811 | -2.36 | 2.23 |
| 120 | 14.1376 | 13.1879 | 12.2909 | -2.41 | 2.27 |
| 121 | 13.7294 | 12.7955 | 11.9144 | -2.45 | 2.31 |
| 122 | 13.3347 | 12.4165 | 11.5510 | -2.50 | 2.35 |
| 123 | 12.9531 | 12.0503 | 11.2003 | -2.54 | 2.39 |
| 124 | 12.5840 | 11.6965 | 10.8617 | -2.58 | 2.43 |
| 125 | 12.2270 | 11.3545 | 10.5348 | -2.63 | 2.47 |
| 126 | 11.8817 | 11.0240 | 10.2191 | -2.68 | 2.51 |

| | | | | | |
|-----|---------|---------|--------|-------|------|
| 127 | 11.5475 | 10.7046 | 9.9142 | -2.72 | 2.55 |
| 128 | 11.2242 | 10.3957 | 9.6197 | -2.77 | 2.59 |
| 129 | 10.9112 | 10.0970 | 9.3352 | -2.81 | 2.63 |
| 130 | 10.6084 | 9.8082 | 9.0602 | -2.86 | 2.67 |
| 131 | 10.3151 | 9.5288 | 8.7945 | -2.91 | 2.71 |
| 132 | 10.0312 | 9.2586 | 8.5378 | -2.95 | 2.75 |
| 133 | 9.7563 | 8.9971 | 8.2895 | -3.00 | 2.80 |
| 134 | 9.4901 | 8.7441 | 8.0495 | -3.05 | 2.84 |
| 135 | 9.2322 | 8.4993 | 7.8175 | -3.09 | 2.88 |
| 136 | 8.9824 | 8.2623 | 7.5931 | -3.14 | 2.92 |
| 137 | 8.7404 | 8.0329 | 7.3760 | -3.19 | 2.96 |
| 138 | 8.5059 | 7.8108 | 7.1660 | -3.24 | 3.00 |
| 139 | 8.2787 | 7.5958 | 6.9629 | -3.29 | 3.04 |
| 140 | 8.0584 | 7.3875 | 6.7664 | -3.33 | 3.09 |

8. Dimensional drawings



9. Center of gravity




10. Service Diagnosis

10.1 Caution for Diagnosis

The operation lamp flashes when any of the following errors is detected.

1. When a protection device of the indoor or outdoor unit is activated or when the thermistor malfunctions, disabling equipment operation.
2. When a signal transmission error occurs between the indoor and outdoor units. In either case, conduct the diagnostic procedure described in the following pages.

10.2 Parameter of primary electronic appliance

| name | | Parameter | Picture |
|-------------|-------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Indoor unit | 1.fan motor | Rated voltage: 310v Rated current: 0.15A Rated frequency: 50/60HZ |  |

10.3 Problem Symptoms and Measures

| Symptom | Check Item | Details of Measure |
|-----------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| None of the units operates | Check the power supply. | Check to make sure that the rated voltage is supplied. |
| | Check the indoor PCB | Check to make sure that the indoor PCB is broken |
| Operation sometimes stops. | Check the power supply. | A power failure of 2 to 10 cycles can stop air conditioner operation. |
| Equipment operates but does not cool, or does not heat (only for heat pump) | Check for faulty operation of the electronic expansion valve. | Set the units to cooling operation, and compare the temperatures of the liquid side connection pipes of the connection section among rooms to check the opening and closing operation of the electronic expansion valves of the individual units. |
| | Diagnosis by service port pressure and operating current. | Check for insufficient gas. |
| Large operating noise and vibrations | Check the installation condition. | Check to make sure that the required spaces for installation (specified in the Technical Guide, etc.) are provided. |

10.4 Error codes and Description indoor display

| | Code indication | | fault description | Reference Page |
|---------------------|-----------------------------------------|----------------------------|----------------------------------------------------------------|----------------|
| | Indoor displaying panel code indication | Outdoor (LED1 flash times) | | |
| Indoor and Outdoor | E7 | 15 | Communication fault between indoor and outdoor units | Page .46 |
| Indoor Malfunction | E1 | -- | Room temperature sensor failure | Page .36 |
| | E2 | -- | Heat-exchange sensor failure | Page .36 |
| | E4 | -- | Indoor EEPROM error | Page .37 |
| | E14 | -- | Indoor fan motor malfunction | Page .38 |
| Outdoor Malfunction | F12 | 1 | Outdoor EEPROM error | Page .37 |
| | F1 | 2 | The protection of IPM | Page .41 |
| | F22 | 3 | Overcurrent protection of AC electricity for the outdoor model | Page . 42 |
| | F3 | 4 | Communication fault between the IPM and outdoor PCB | Page.43 |
| | F19 | 6 | Power voltage is too high or low | Page .44 |
| | F4 | 8 | Overheat protection for Discharge temperature | Page .45 |
| | F21 | 10 | Defrost temperature sensor failure | Page .36 |
| | F7 | 11 | Suction temperature sensor failure | Page .36 |
| | F6 | 12 | Ambient temperature sensor failure | Page .36 |
| | F25 | 13 | Discharge temperature sensor failure | Page .36 |
| | F11 | 18 | deviate from the normal for the compressor | Page .48 |
| | F28 | 19 | Loop of the station detect error | Page .48 |
| | F2 | 24 | Overcurrent of the compressor | Page . 42 |
| | F23 | 25 | Overcurrent protection for single-phase of the compressor | Page . 42 |

10.4.1 Thermistor or Related Abnormality

Indoor Display

E1: Room temperature sensor failure

E2: Heat-exchange sensor failure

Outdoor display

LED1 flash 10 times: Defrost temperature sensor failure

LED1 flash 11 times: Suction temperature sensor failure

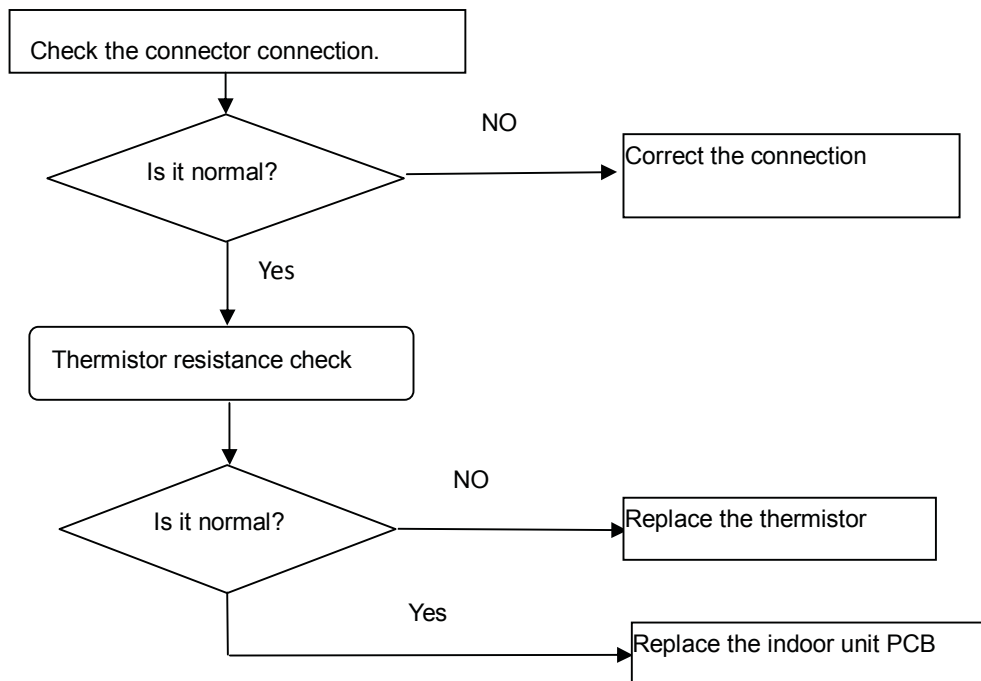
LED1 flash 12 times: Ambient temperature sensor failure

LED1 flash 13 times: Discharge temperature sensor failure

Method of Malfunction Detection

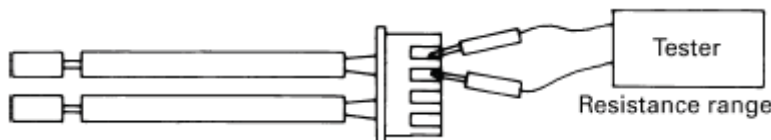
The temperatures detected by the thermistors are used to determine thermistor errors

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Malfunction Detection Conditions | When the thermistor input is more than 4.92V or less than 0.08V during compressor operation. Note: The values vary slightly in some models |
| Supposed Causes | <ul style="list-style-type: none"> ■ Faulty connector connection ■ Faulty thermistor ■ Faulty PCB |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |



Thermistor resistance check method:

Remove the connector of the thermistor on the PCB, and measure the resistance of thermistor using tester. The relationship between normal temperature and resistance is shown in the value of indoor thermistor.



10.4.2 EEPROM abnormal

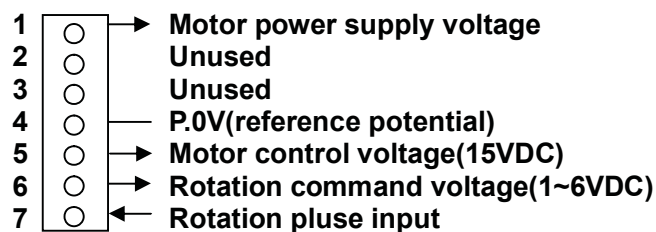
| | |
|----------------|-------------------------------------------------------|
| Indoor Display | E4: Indoor EEPROM error |
| Indoor display | F12: Outdoor EEPROM error; Outdoor LED1 flash 1 times |

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Method of Malfunction Detection | The Data detected by the EEPROM are used to determine MCU |
| Malfunction Detection Conditions | When the data of EEPROM is error or the EEPROM is damaged |
| Supposed Causes | <ul style="list-style-type: none"> ■ Faulty EEPROM data ■ Faulty EEPROM ■ Faulty PCB |

| | |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Troubleshooting | * Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred. |
| | Replace the indoor or outdoor mainboard. |
| 10.4.3 Indoor DC fan motor fault | |
| Indoor Display | E14 |
| Method of Malfunction Detection | The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor operation |
| Malfunction Detection Conditions | when the detected rotation feedback signal don't received in 2 minutes |
| Supposed Causes | <ul style="list-style-type: none"> ■ Operation halt due to breaking of wire inside the fan motor . ■ Fan motor overheat protection ■ Operation halt due to breaking of the fan motor lead wires ■ Detection error due to faulty indoor unit PCB |
| Troubleshooting | * Caution be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |

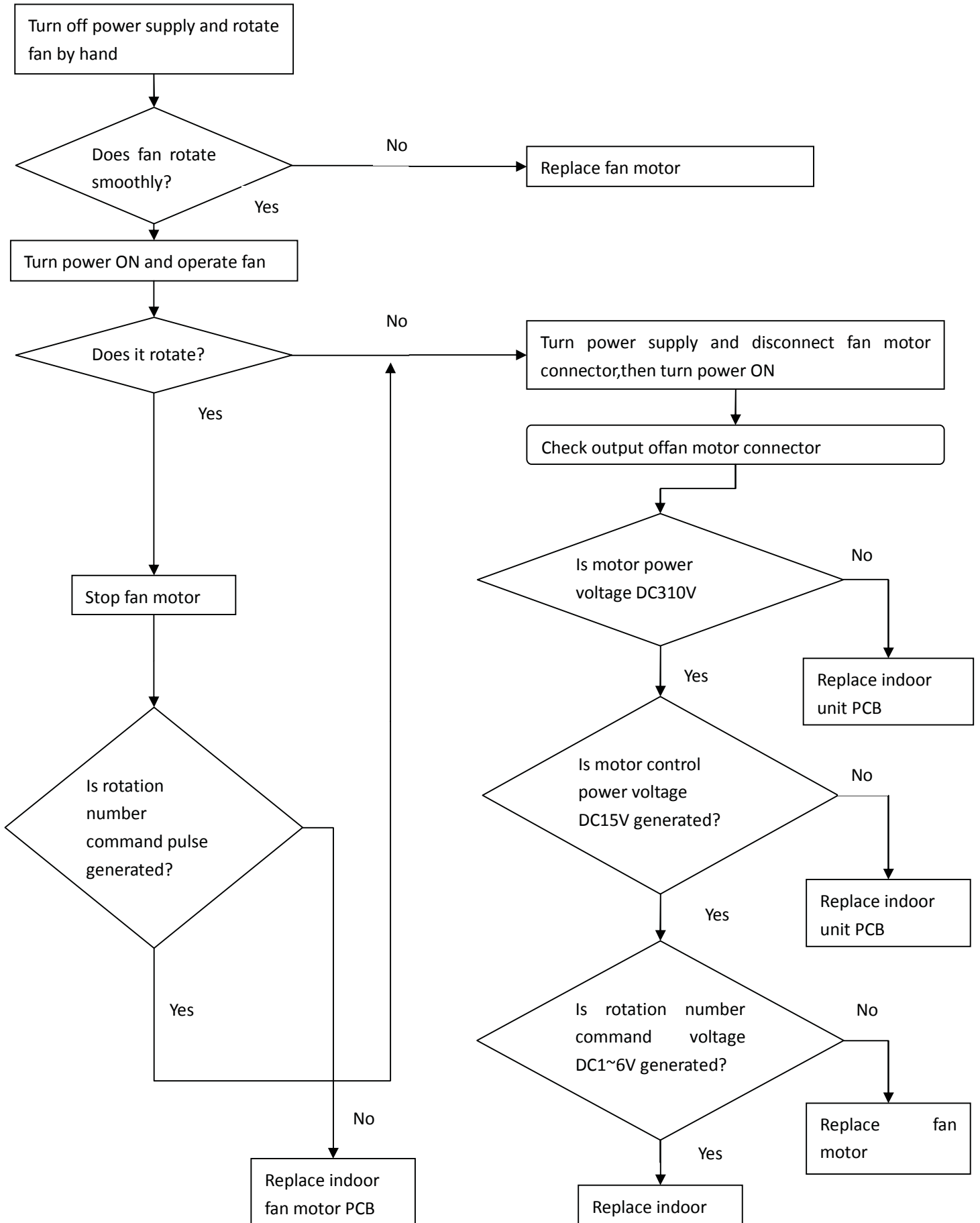
How to check Fan Motor (DC)

1. Check connector connection.
2. Check motor power supply voltage output (pins 1-4).
3. Check motor control voltage (pins 4-5).
4. Check rotation command voltage output (pins 4-6).
5. Check rotation pulse input (pins 4-7).



Notes: the a/c is electrifying, don't pull out or insert the terminals of the motor, else the motor would be damaged.

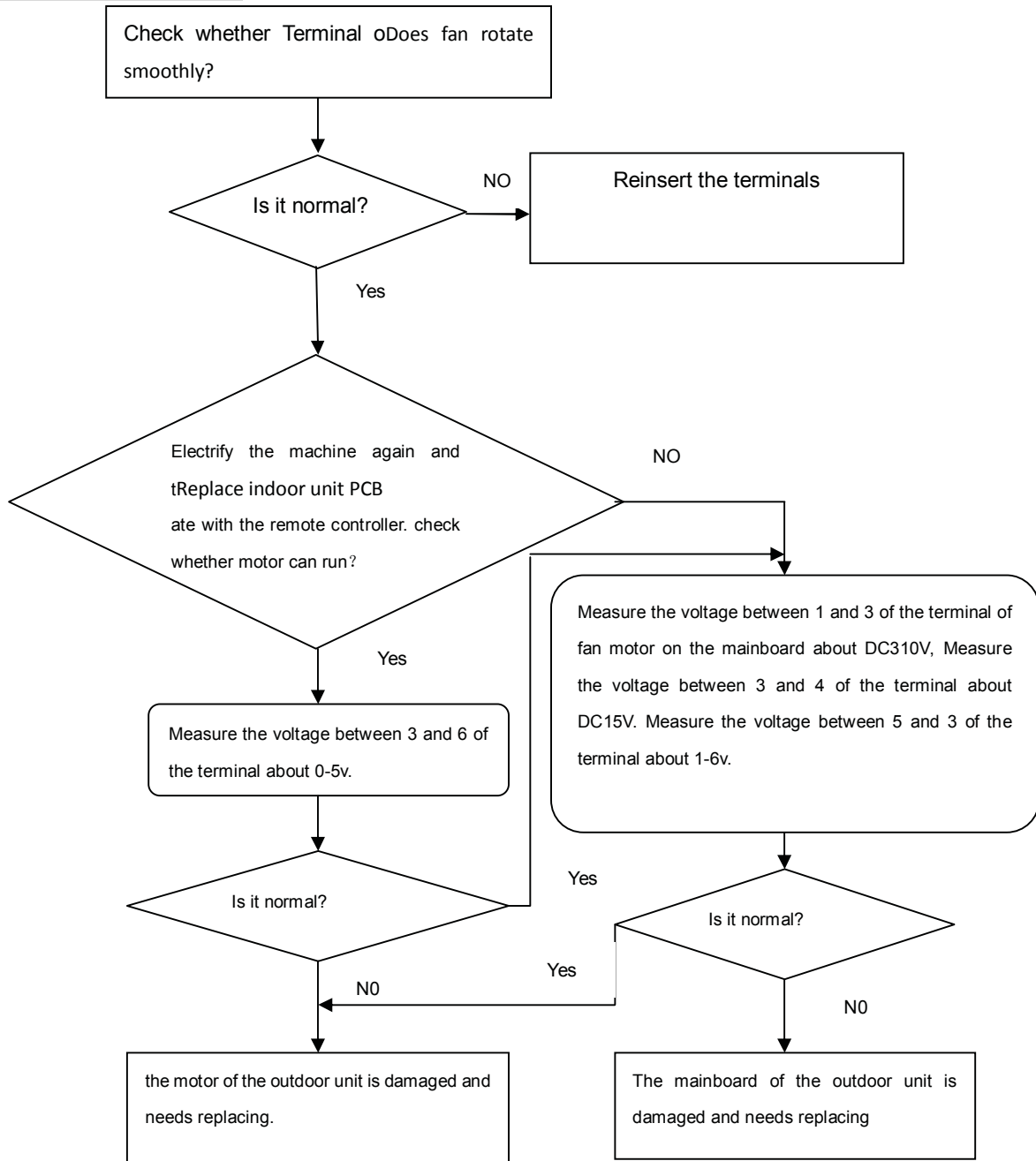
| | |
|-----------------|-------------------------------------------------------------------------------------------------------------------------|
| Troubleshooting | *Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |
|-----------------|-------------------------------------------------------------------------------------------------------------------------|



10.4.4 Outdoor DC fan motor fault

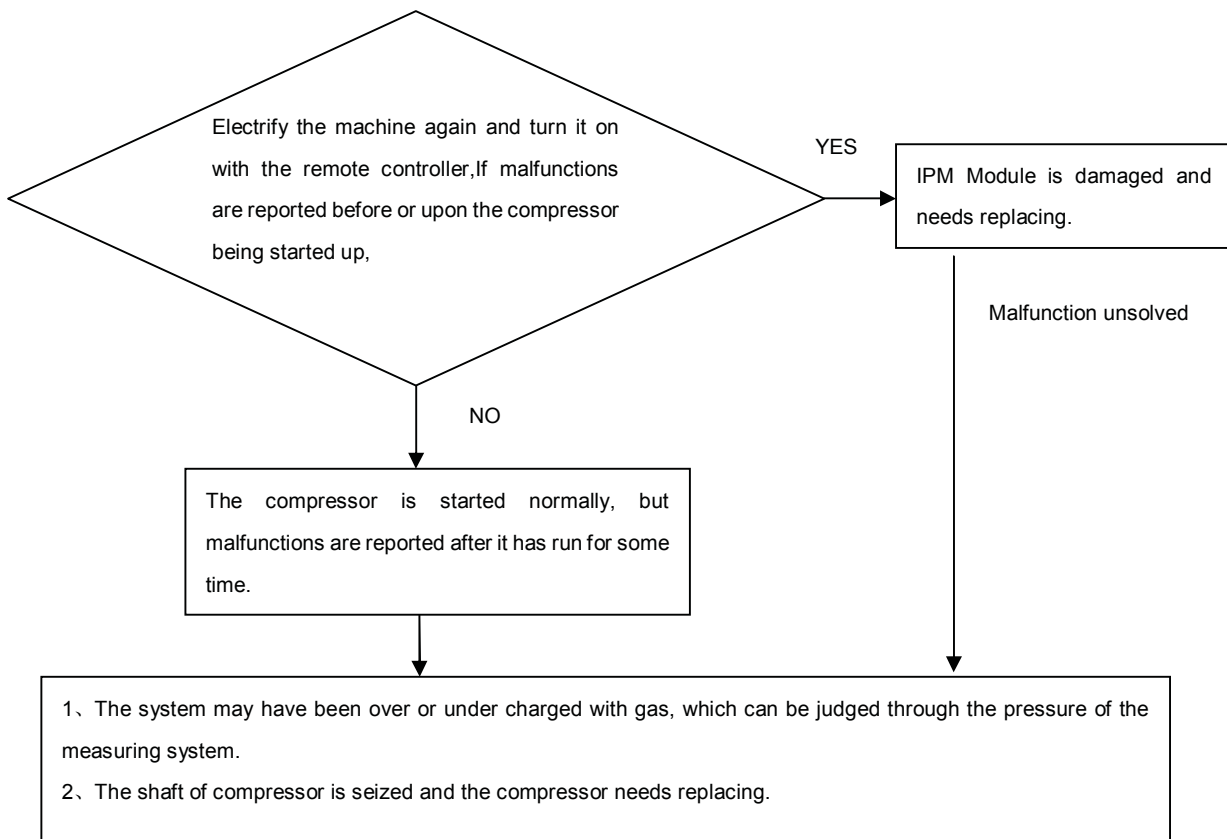
Outdoor display LED1 flash 9 times

| | |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Method of Malfunction Detection | DC fan motor is detected by checking the fan running condition and so on |
| Malfunction Detection Conditions | when the data of EEPROM is error or the EEPROM is damaged |
| Supposed Causes | <ul style="list-style-type: none"> ■ DC fan motor protection dues to the DC fan motor faulty ■ DC fan motor protection dues to faulty PCB |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred. |



10.4.5 IPM protection

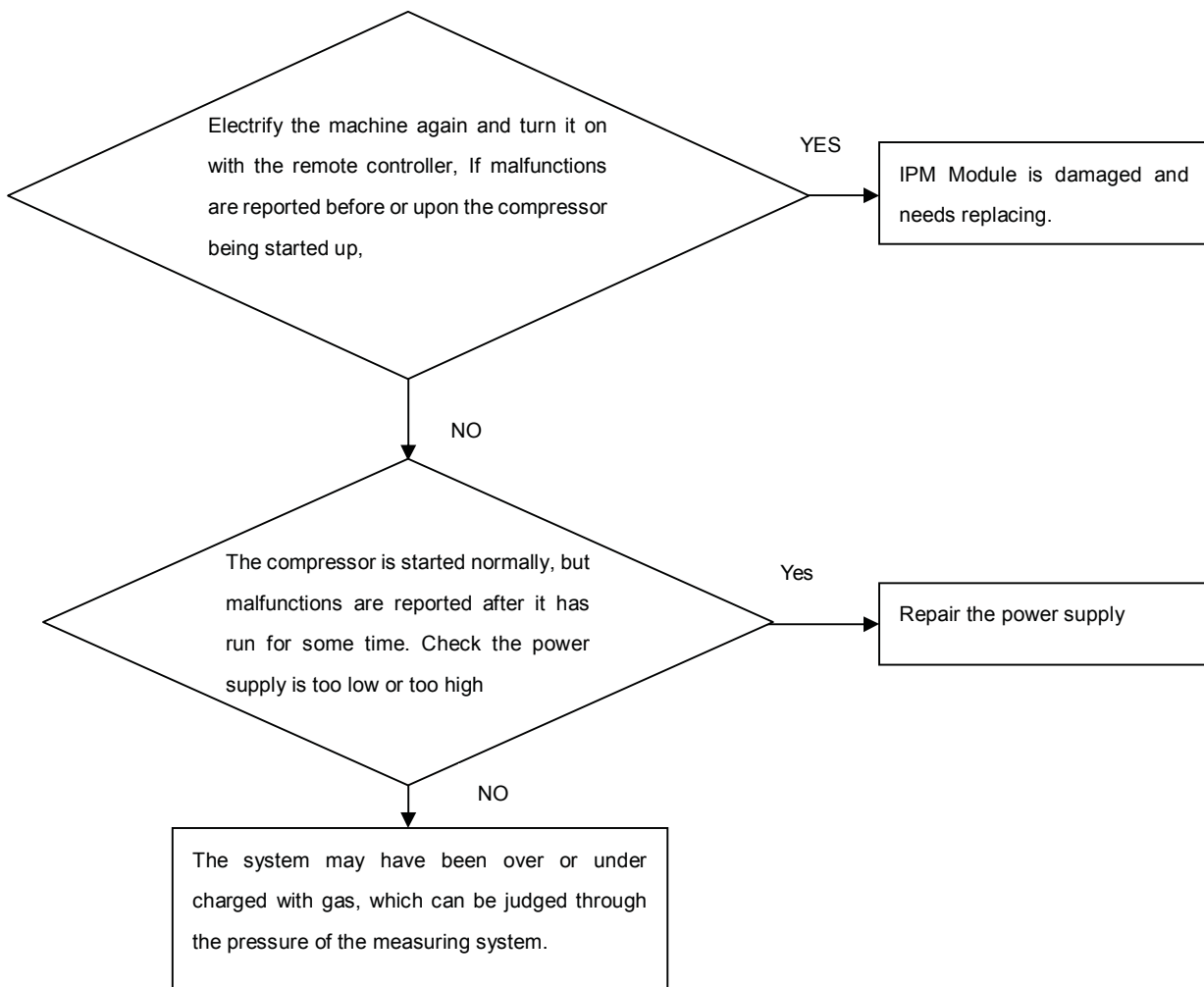
| | |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outdoor display | LED1 flash 2 times |
| Method of Malfunction Detection | IPM protection is detected by checking the compressor running condition and so on |
| Malfunction Detection Conditions | <ul style="list-style-type: none"> ■ The system leads to IPM protection due to over current ■ The compressor faulty leads to IPM protection ■ circuit component of IPM is broken and led to IPM protection |
| Supposed Causes | <ul style="list-style-type: none"> ■ IPM protection dues to the compressor faulty ■ IPM protection dues to faulty PCB of IPM module ■ Compressor wiring disconnected |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |



10.4.6 Over-current of the compressor

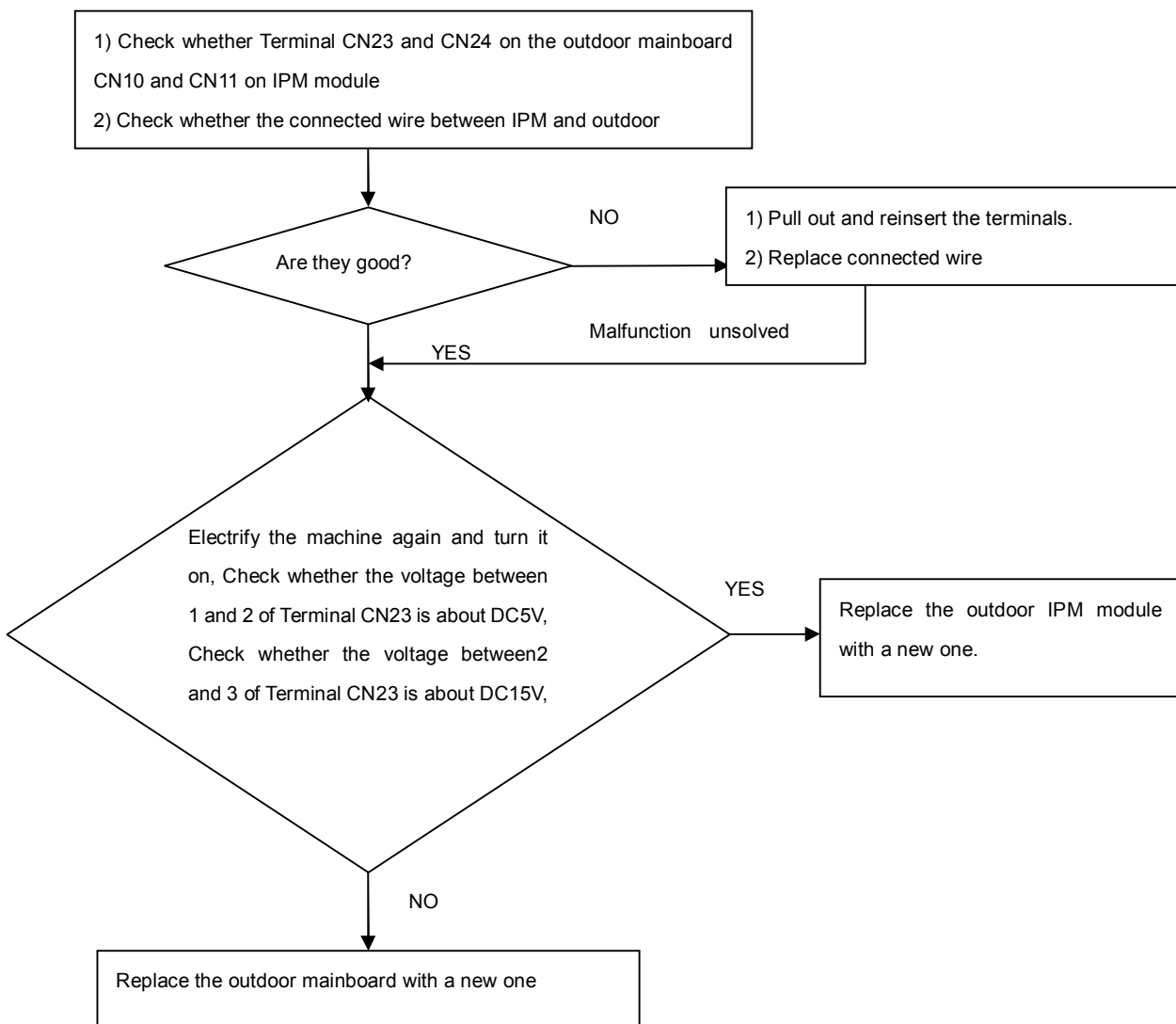
Outdoor Display LED1 flash 3 or 24 or 25 times

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Method of Malfunction Detection | The current of the compressor is too high |
| Malfunction Detection Conditions | when the IPM Module is damaged or the compressor is damaged. power supply voltage is too low or too high |
| Supposed Causes | <ul style="list-style-type: none"> ■ Faulty IPM Module ■ Faulty compressor ■ Faulty power supply |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred. |



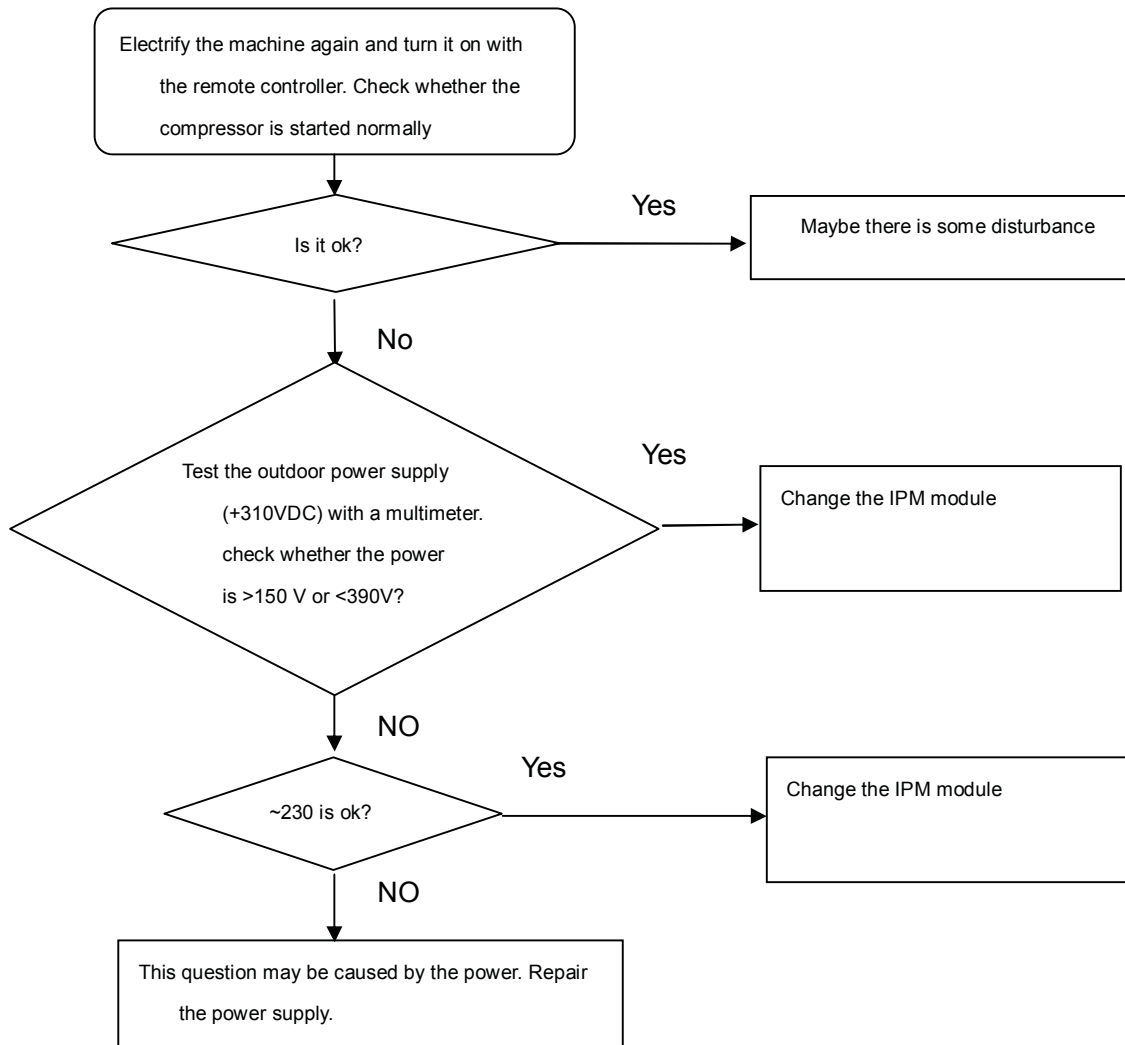
10.4.7 The communication fault between IPM and outdoor PCB

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outdoor display: | LED1 flash 4 times |
| Method of Malfunction Detection | Communication is detected by checking the IPM module and the outdoor PCB |
| Malfunction Detection Conditions | <ul style="list-style-type: none"> ■ The outdoor PCB broken leads to communication fault ■ The IPM module broken leads to communication fault |
| Supposed Causes | <ul style="list-style-type: none"> ■ The outdoor PCB is broken ■ The IPM module is broken ■ Communication wiring disconnected |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |



10.4.8 Power Supply Over or under voltage fault

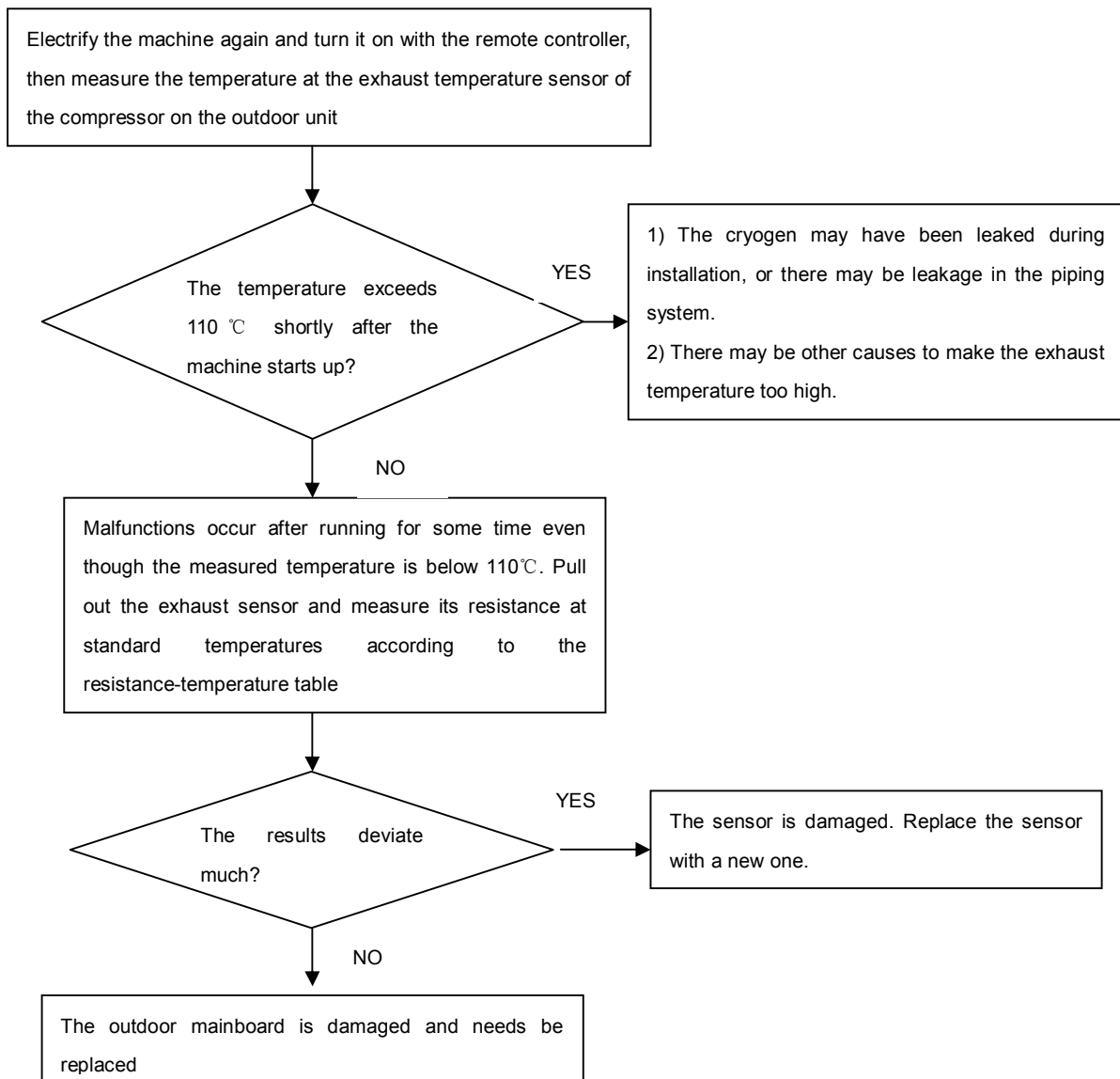
| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outdoor display: | LED1 flash 6 times The power supply is over voltage |
| Method of Malfunction Detection | An abnormal voltage rise or fall is detected by checking the specified voltage detection circuit. |
| Malfunction Detection Conditions | An voltage signal is fed from the voltage detection circuit to the microcomputer |
| Supposed Causes | <ul style="list-style-type: none"> ■ Supply voltage not as specified ■ the IPM module is broken ■ the outdoor PCB is broken |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |



10.4.9 Overheat Protection For Discharge Temperature

Outdoor display: LED1 flash 8 times

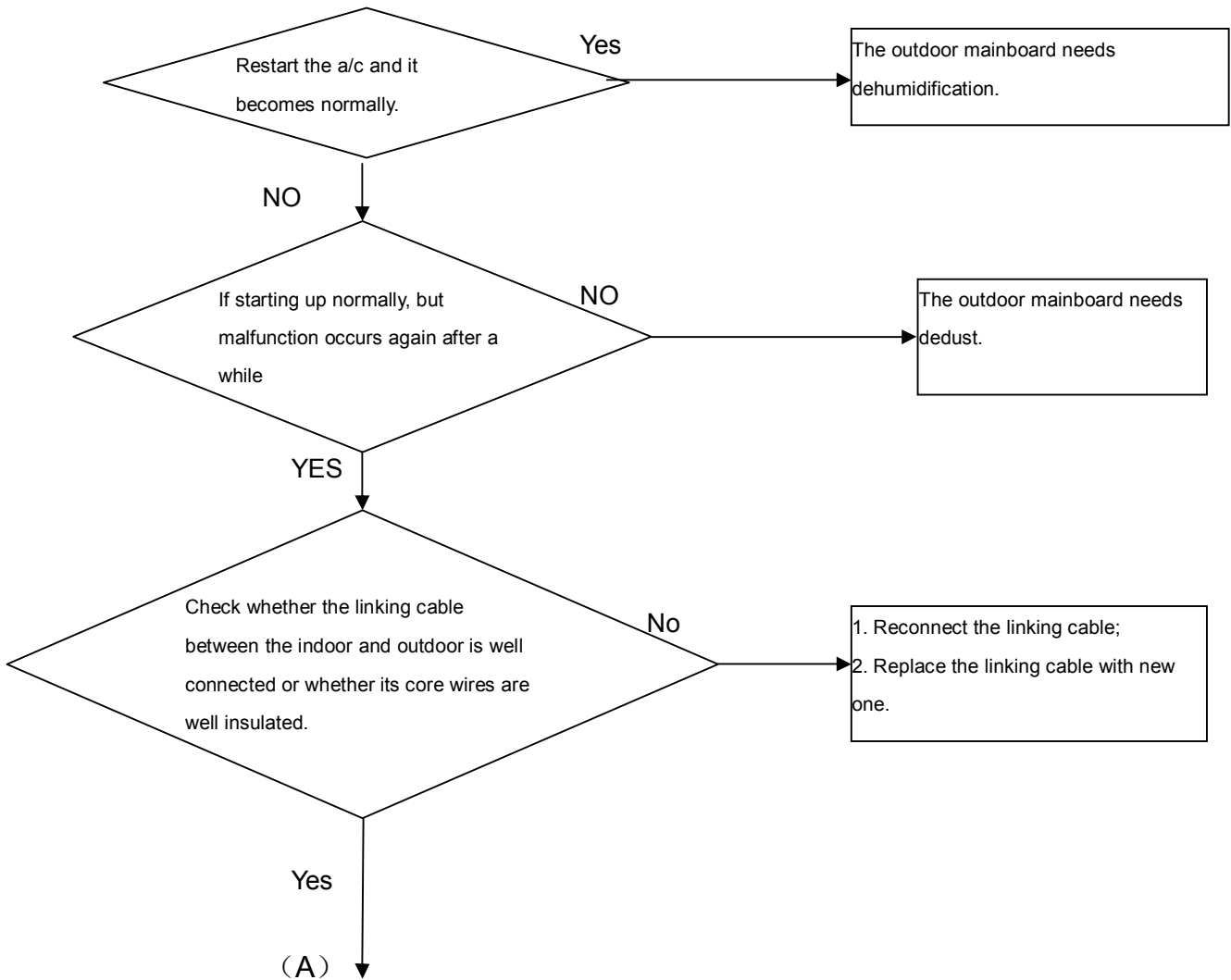
| | |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Method of Malfunction Detection | The Discharge temperature control is checked with the temperature being detected by the Discharge pipe thermistor |
| Malfunction Detection Conditions | when the compressor discharge temperature is above 110°C |
| Supposed Causes | <ul style="list-style-type: none"> ■ Electronic expansion valve defective ■ Faulty thermistor ■ Faulty PCB |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |

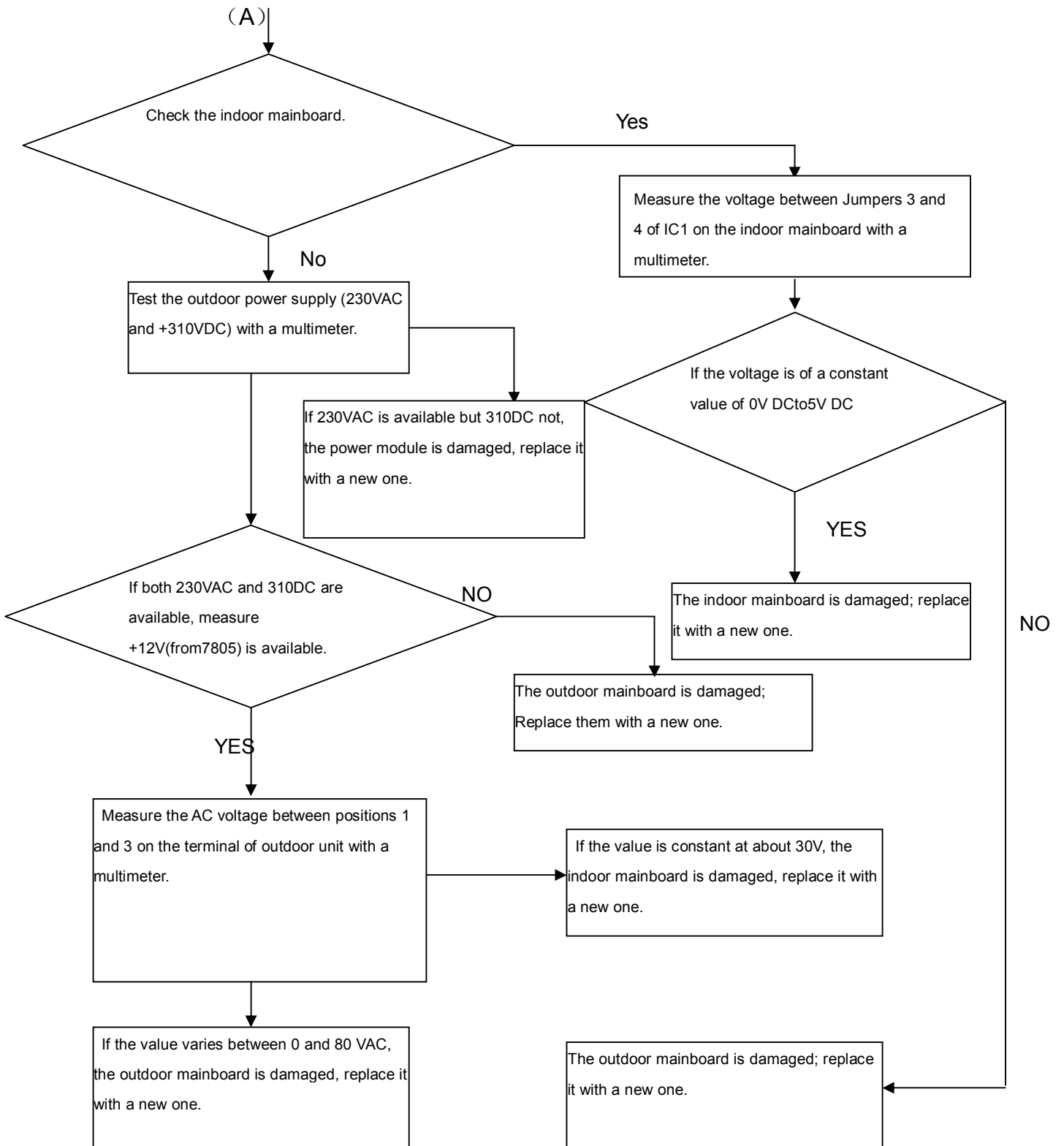


10.4.10 The communication fault between indoor and outdoor

Indoor display E7
 outdoor display LED1 flash 15 times

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Method of Malfunction Detection | Communication is detected by checking the indoor PCB and the outdoor PCB. |
| Malfunction Detection Conditions | <ul style="list-style-type: none"> ■ The outdoor PCB broken leads to communication fault. ■ The indoor PCB broken leads to communication fault. |
| Supposed Causes | <ul style="list-style-type: none"> ■ Communication wiring disconnected. ■ The indoor PCB is broken. ■ The outdoor PCB is broken. ■ The Module PCB is broken. |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage maybe occurred. |

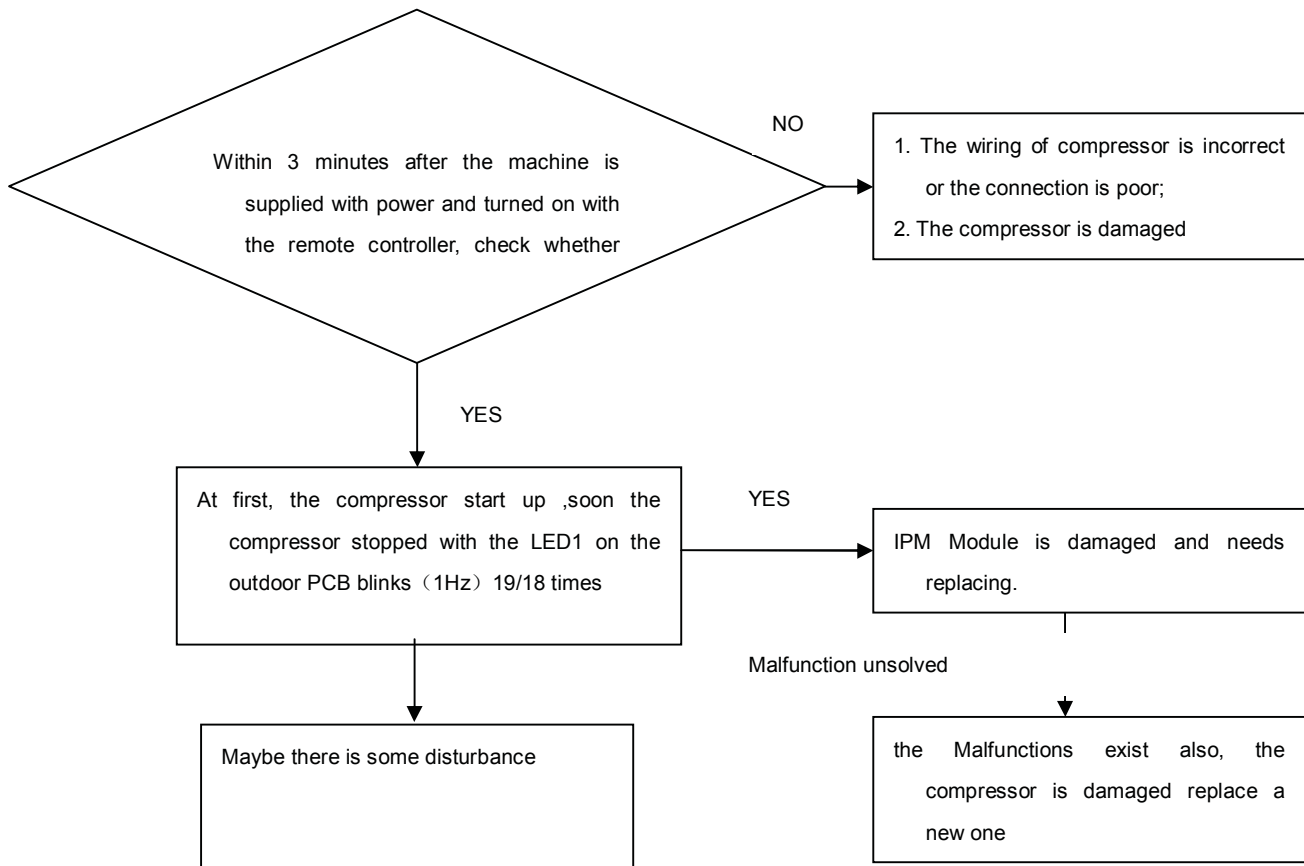




10.4.11 Loss of synchronism detection

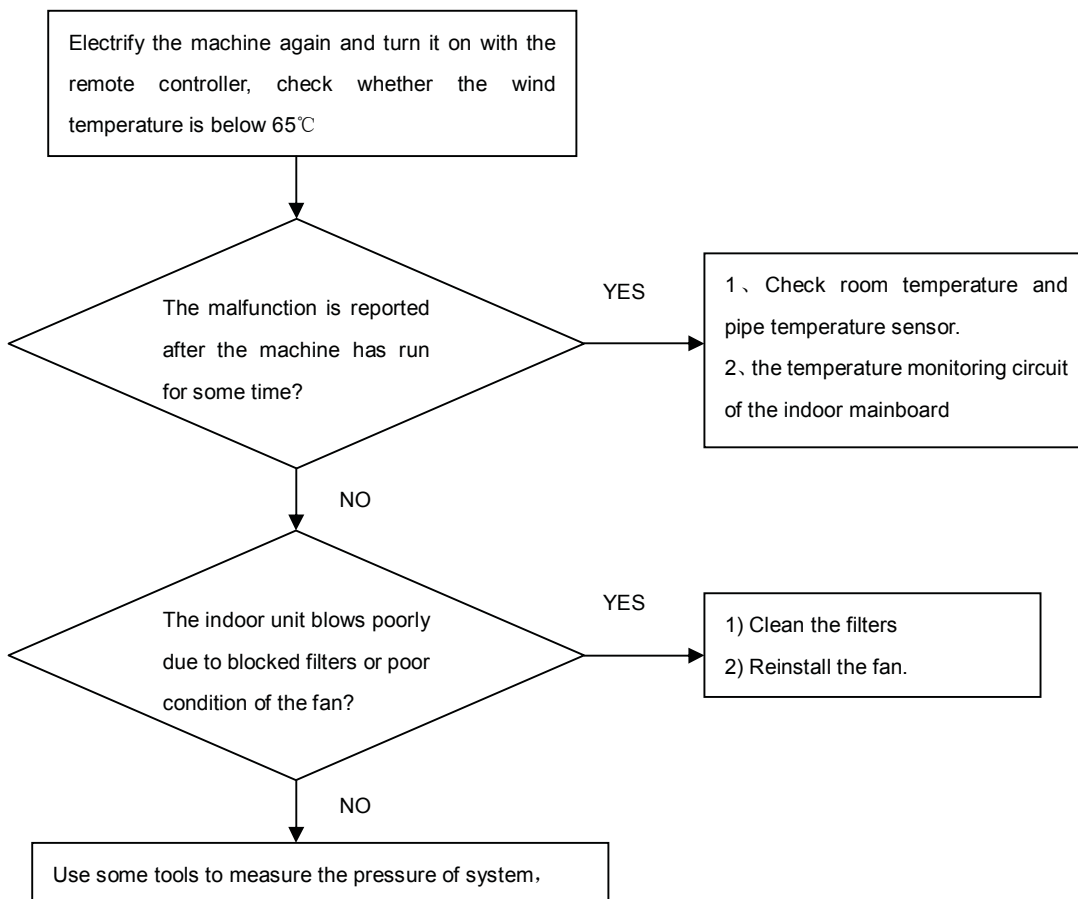
Inverter side current detection is abnormal

| | |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Outdoor Display | LED1 flash 18 times LED1 flash 19 times |
| Method of Malfunction Detection | The position of the compressor rotor can not detected normally |
| Malfunction Detection Conditions | when the wiring of compressor is wrong or the connection is poor; or the compressor is damaged |
| Supposed Causes | <ul style="list-style-type: none"> ■ Faulty The wiring of compressor ■ Faulty compressor ■ Faulty PCB |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred. |

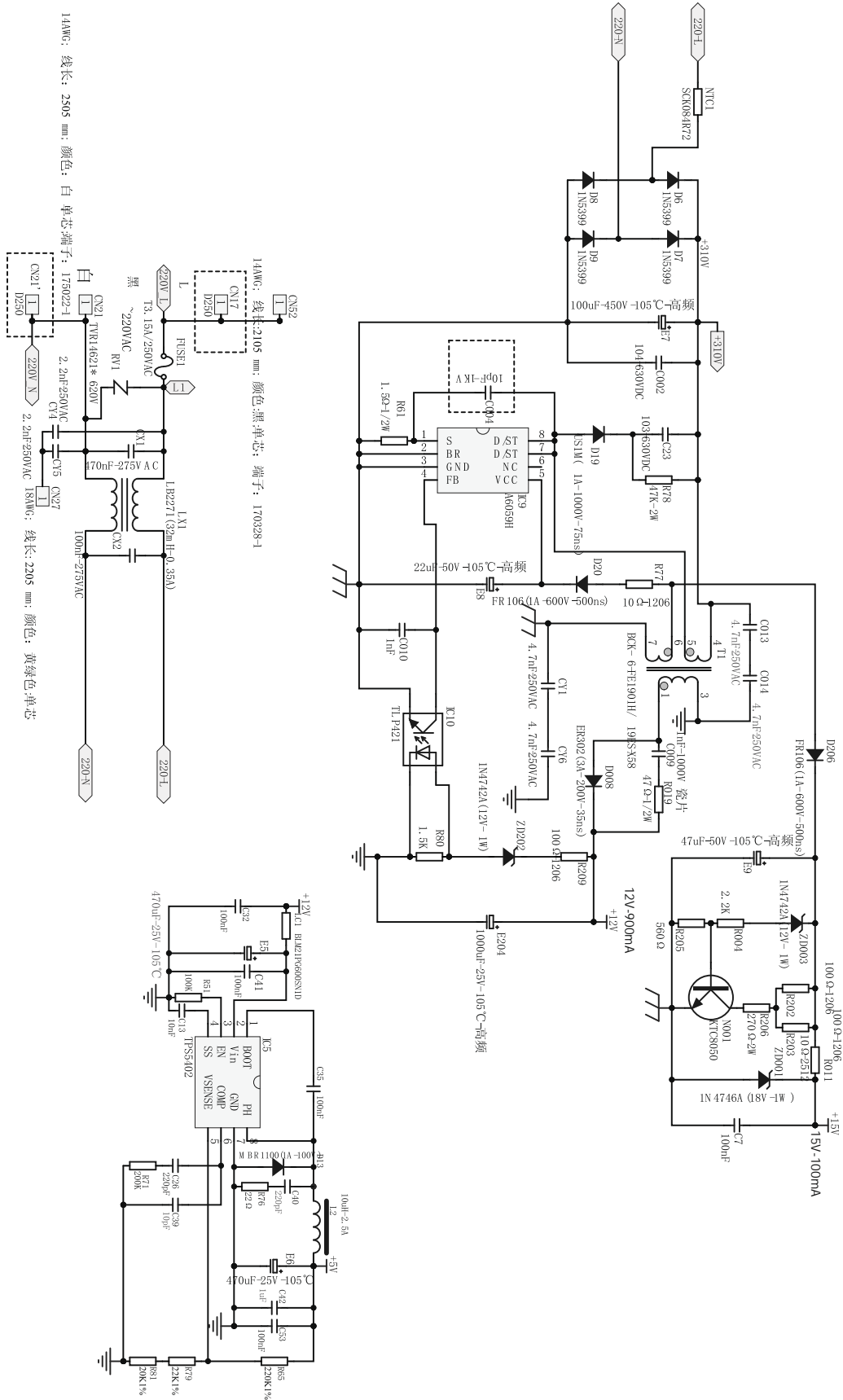


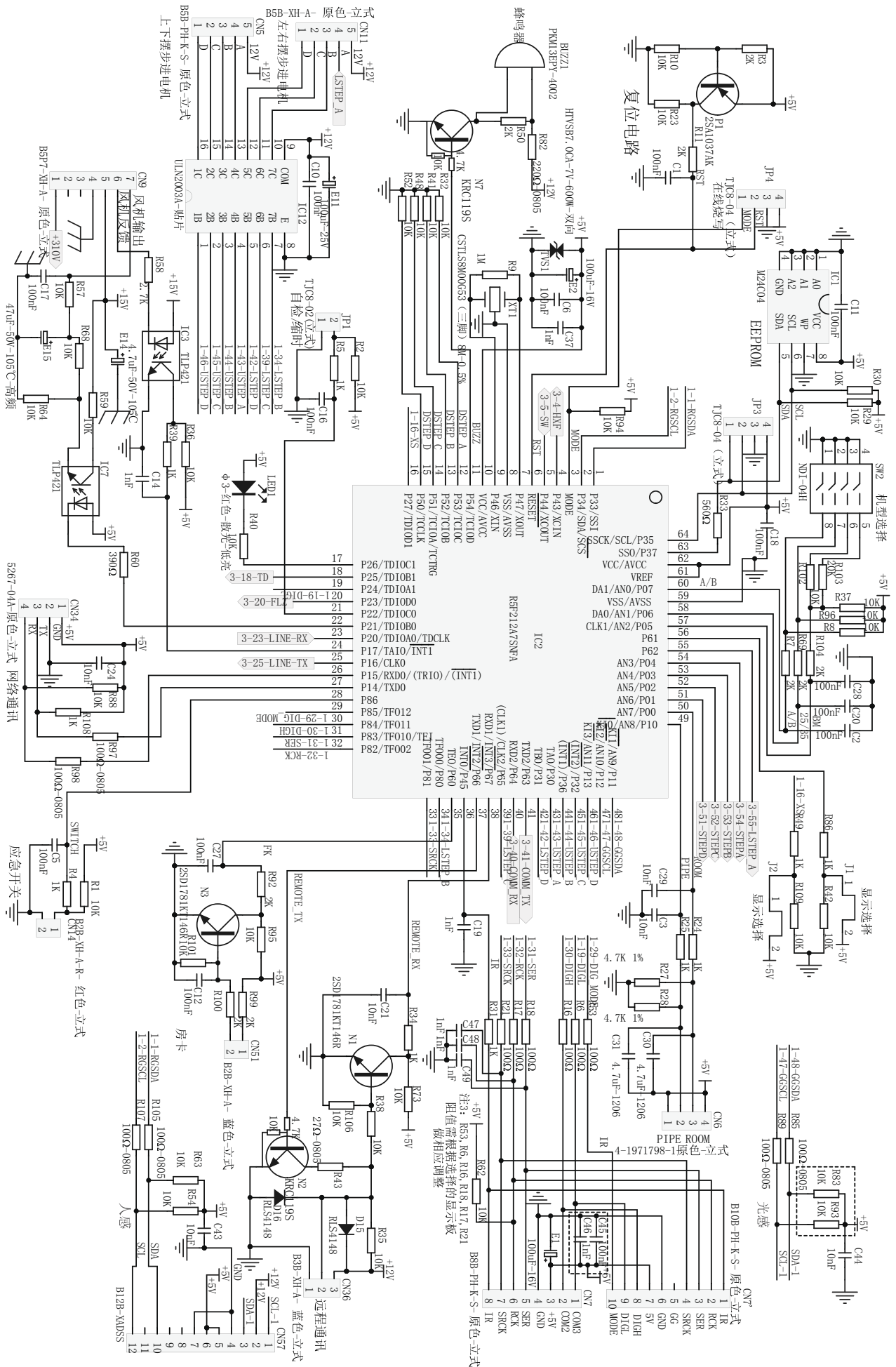
10.4.12 High work-intense protection

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outdoor display | LED1 flash 21 times |
| Method of Malfunction Detection | High work-intense control is activated in the heating mode if the temperature being sensed by the heat exchanger thermistor exceeds the limit. |
| Malfunction Detection Conditions | Activated when the temperature being sensed by the heat exchanger rises above 65°C twice in 30 minutes. |
| Supposed Causes | <ul style="list-style-type: none"> ■ Faulty electronic expansion valve ■ Dirty heat exchanger ■ Faulty heat-exchange sensor ■ Insufficient gas |
| Troubleshooting | * Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred. |



11.Circuit diagrams





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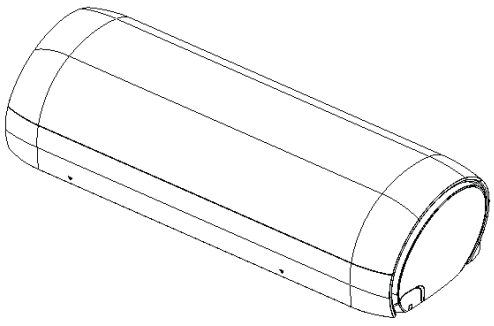
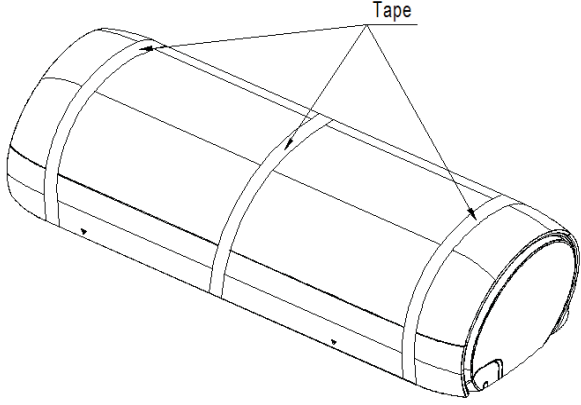
REMOVAL PROCEDURE

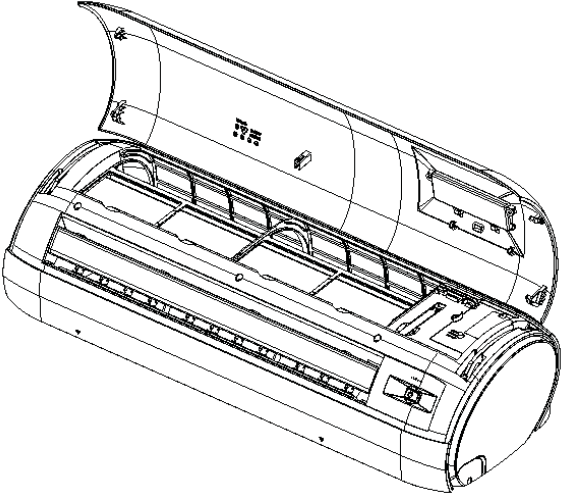
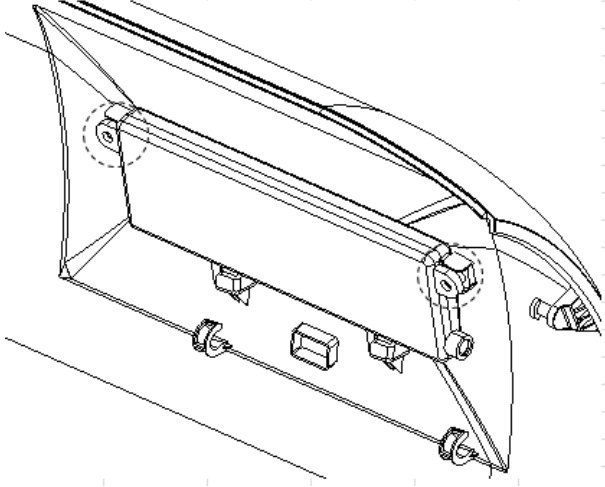
**Wall Mounted Type
DC Inverter FREE MATCH D-Series
SERIES:40D**



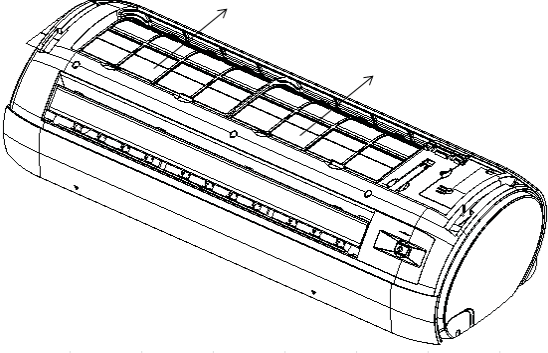
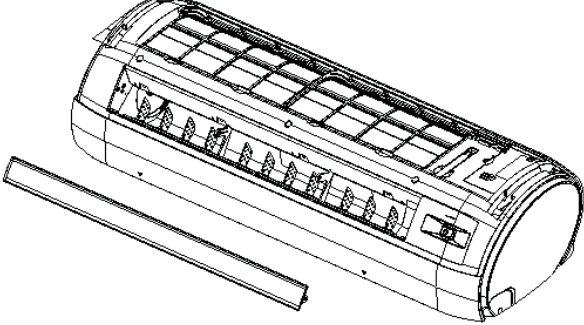
Remove of front panel

Indoor unit

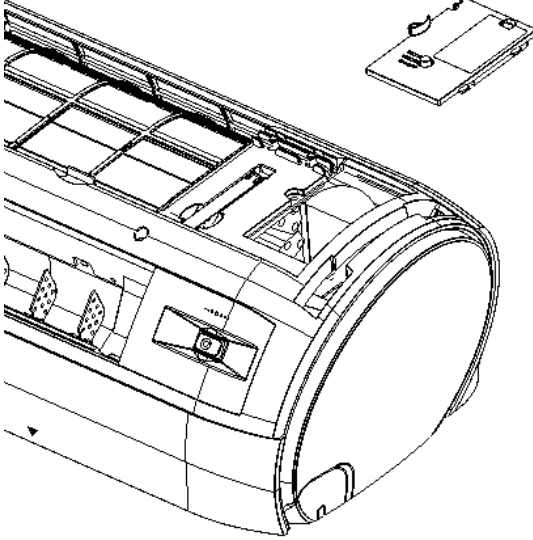
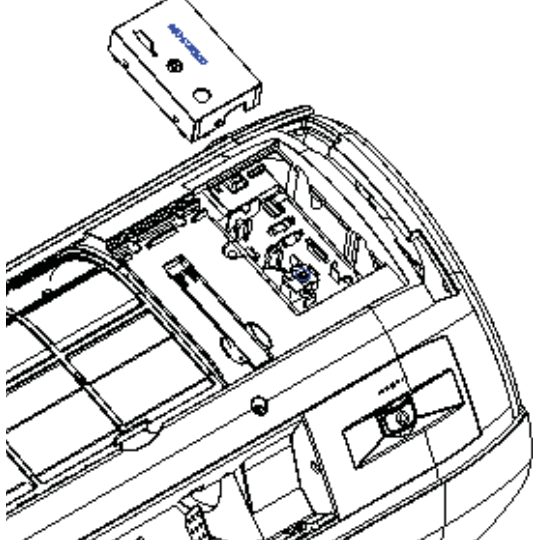
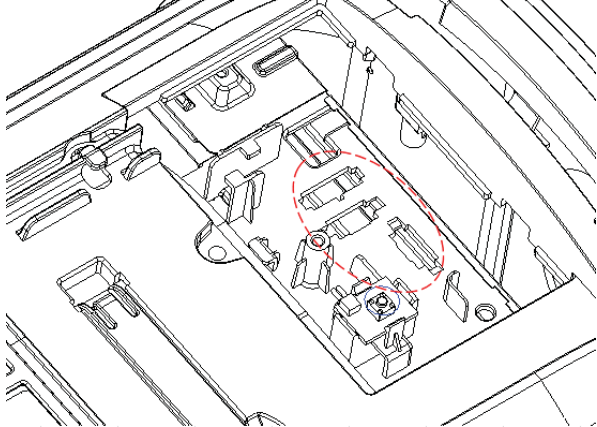
| Step | | Procedure | Points |
|--------------------------|----------------------------------|--------------------------------------------------------------------------------------|--------|
| 1.Features | | | |
| | |  | |
| 2.Remove the front panel | | | |
| 1 | Release the three pieces of tape |  | |

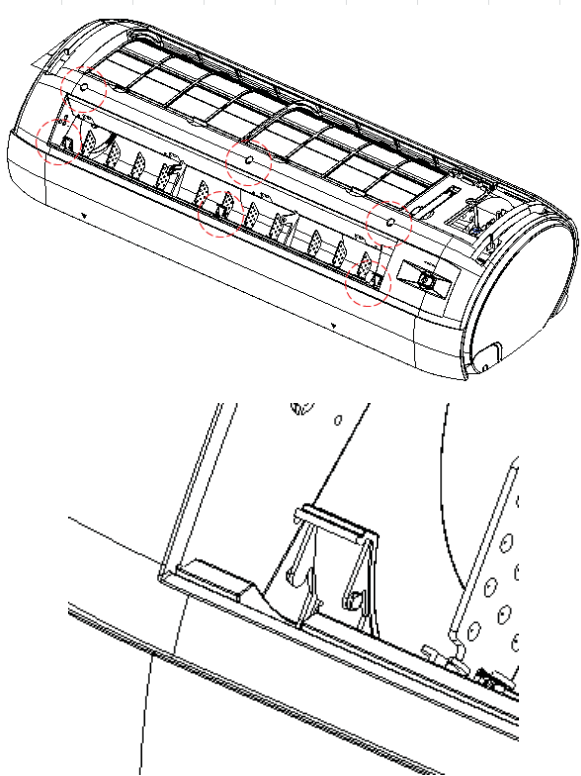
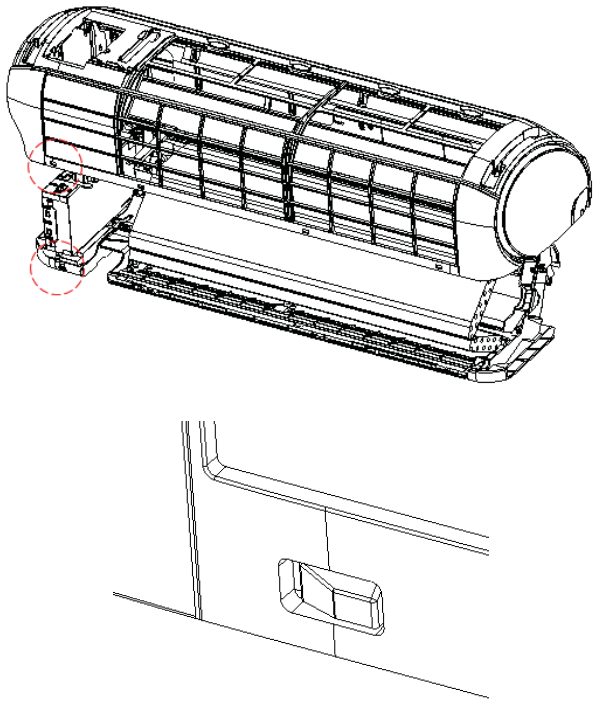
| Step | | Procedure | Points |
|------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
| 2 | Hold the bottom side of front panel and lift it |  | |
| 3 | Loosen two 3*8 screw and release the display module and remove the front panel |  | |

Remove the air filters and horizontal flap

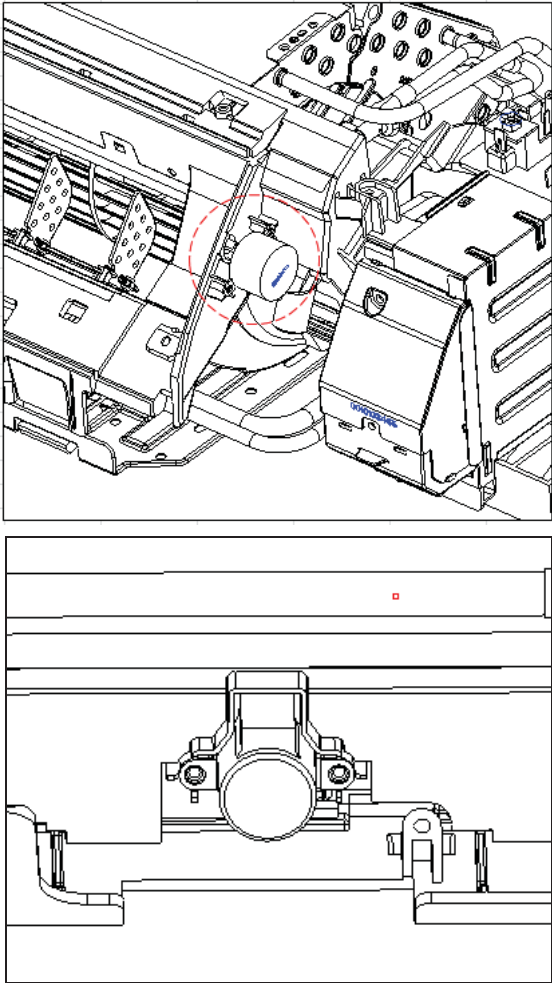
| Step | | Procedure | Points |
|------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
| 1 | Lift the right and left air filter upwards slightly and then pull it out downwards |  | |
| Remove the horizontal blade | | | |
| 1 | Release the horizontal blade slightly and remove it. |  | |

Remove the casing

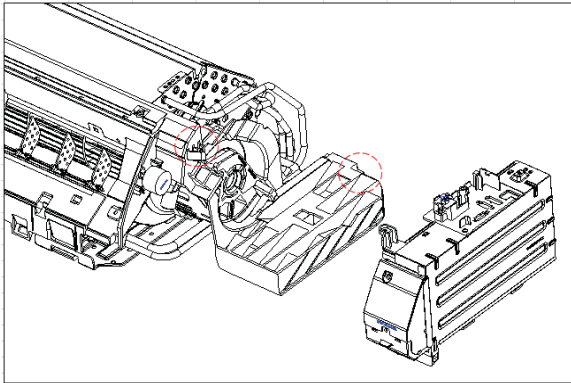
| Step | | Procedure | Points |
|------|------------------------------------------------|--------------------------------------------------------------------------------------|--------|
| 1 | Loosen one screw and remove the cover |  | |
| 2 | Loosen one screw and remove the cover |  | |
| 3 | Release three connect terminals at marked area |  | |

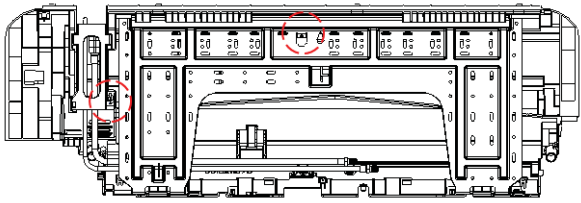
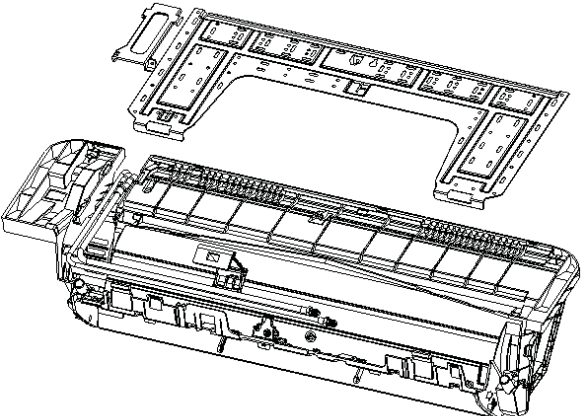
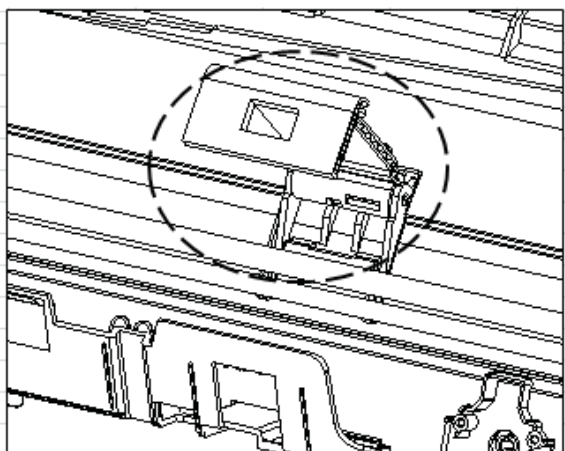
| | | | |
|----------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4</p> | <p>Lift up the three screw covers and then loosen the marked seven screws</p> |  | |
| <p>5</p> | <p>Release the marked hooks (4EA) on the top side of unit and then pull the front grille out horizontally and remove it</p> |  | <ul style="list-style-type: none"> ■ When assembling, install the front grille horizontally so as not to stuff the flap inside. ■ When assembling, make sure the four hooks are caught properly. |

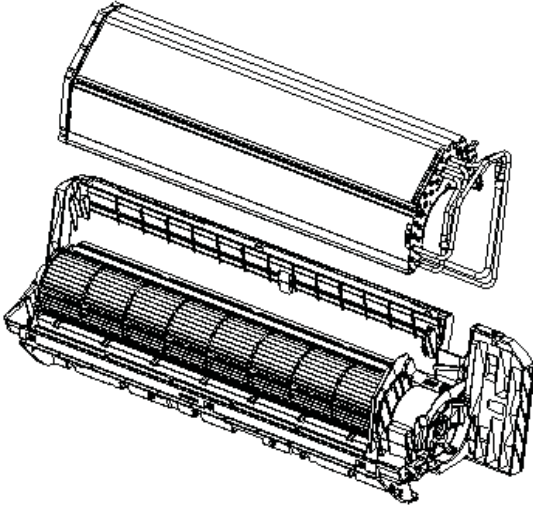
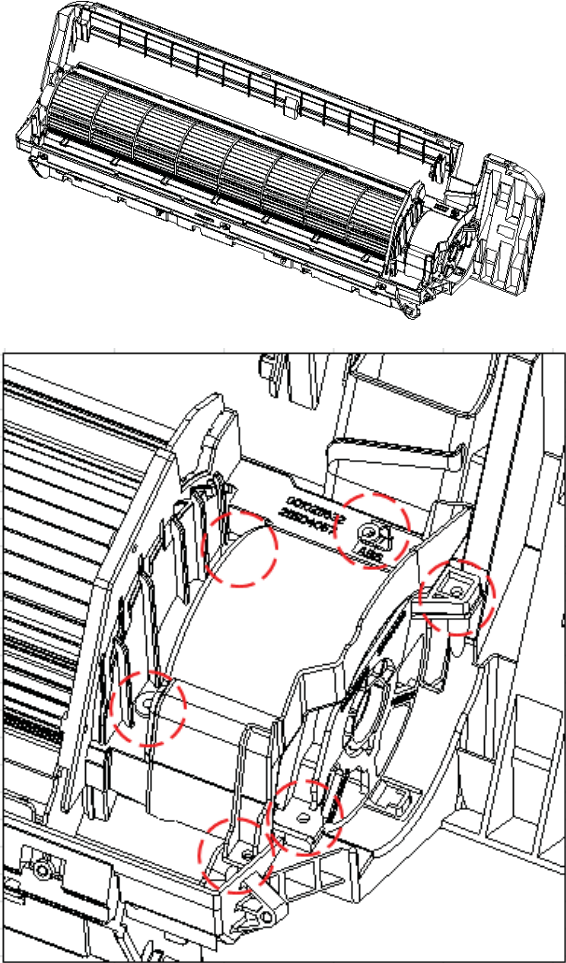
Release stepping motor (2type)

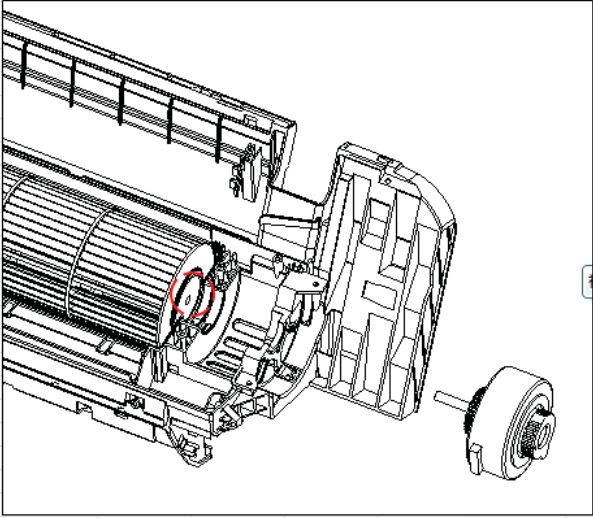
| Step | | Procedure | Points |
|------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
| 1 | Loosen the stepping motor screws (4EA) and then release the stepping motor |  | |

Removal of Control Box

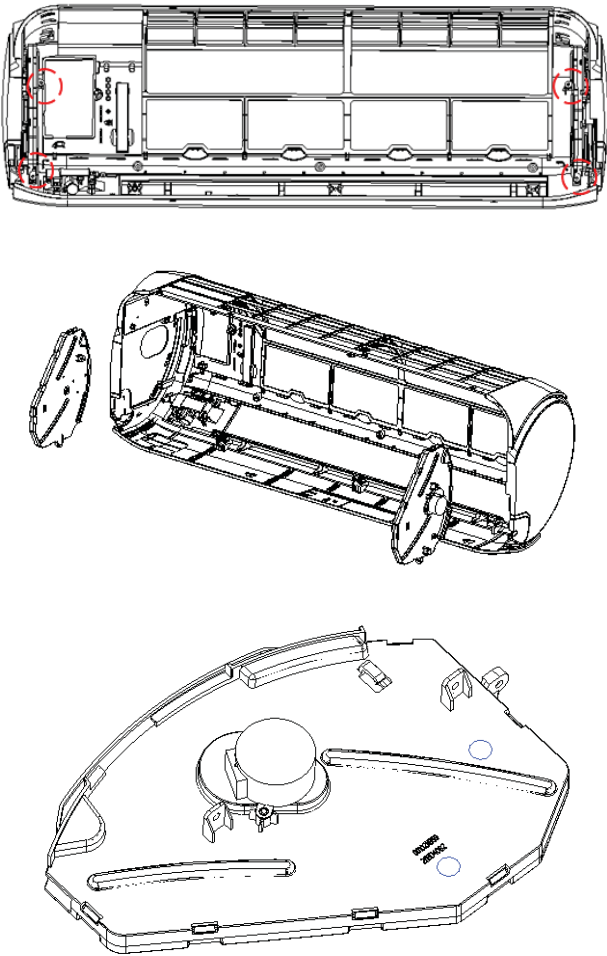
| Step | | Procedure | Points |
|------|-------------------------------------------------------|--------------------------------------------------------------------------------------|--------|
| 1 | Loosen the control Box screws (2EA) And then pull it. |  | |

| Removal of Heat Exchanger | | | |
|---------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------|--|
| 1 | Loosen the marked screws(2EA) |  | |
| 2 | Pull mounting plate and heat exchanger bracket and then release them. |  | |
| 3 | Release the fixture plate from the base frame hook and rotate it |  | |

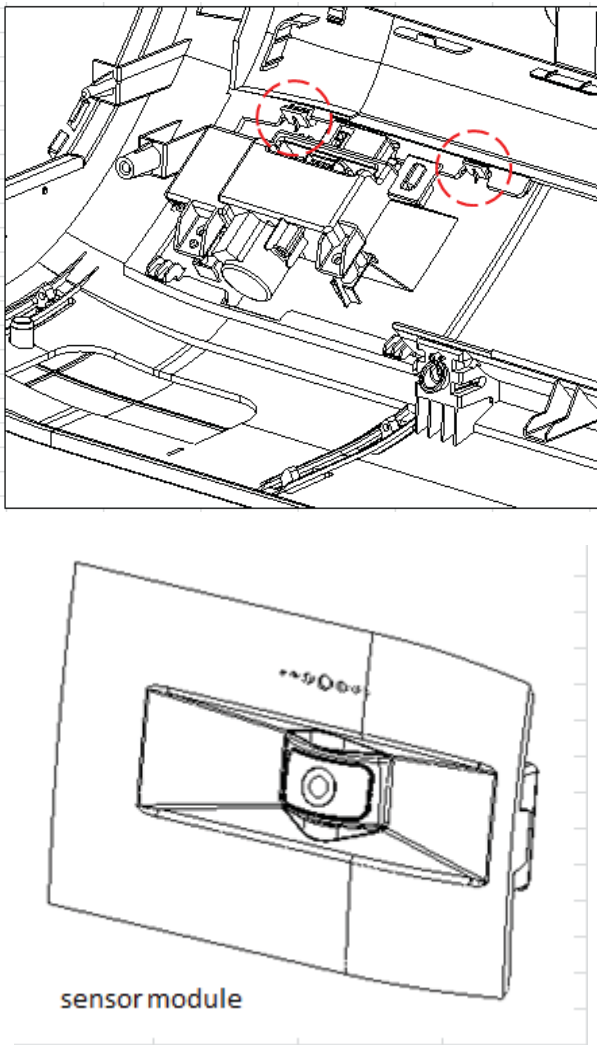
| Step | | Procedure | Points |
|--------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
| 4 | Loosen the marked screws (5EA) and remove the heat exchanger |  | |
| Remove Fan rotor and Fan | | | |
| 1 | Loosen the marked screws(6EA) and release the cover and bracket of fan motor |  | |

| Step | | Procedure | Points |
|------|------------------------------------------------------------|------------------------------------------------------------------------------------|--------|
| 2 | Loosen the marked screw (1EA) and remove fan motor and fan |  | |

Removal of mechanism modules of front panel

| Step | | Procedure | Points |
|------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
| 1 | Loosen the marked screws(4EA) and remove the mechanism modules of front panel |  | |

Removal of sensor modules

| Step | | Procedure | Points |
|------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------|
| 1 | Release the hook of cover and remove the module |  <p>sensor module</p> | |