

NORDIC MULTI LIGHT SERIES

Service manual

Air conditioners

Models:

CHML-U36RK4

CHML-U42RK5

Thank you for choosing Cooper&Hunter air conditioner, please read this service manual carefully before operation and retain it for future reference.

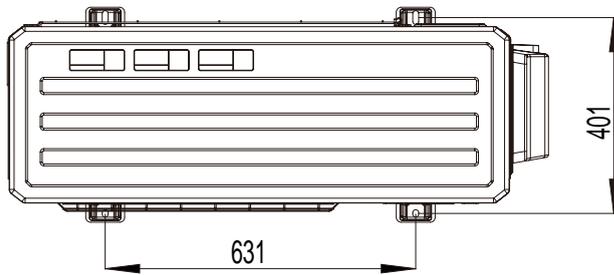
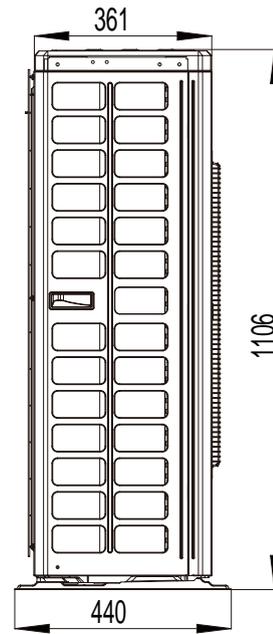
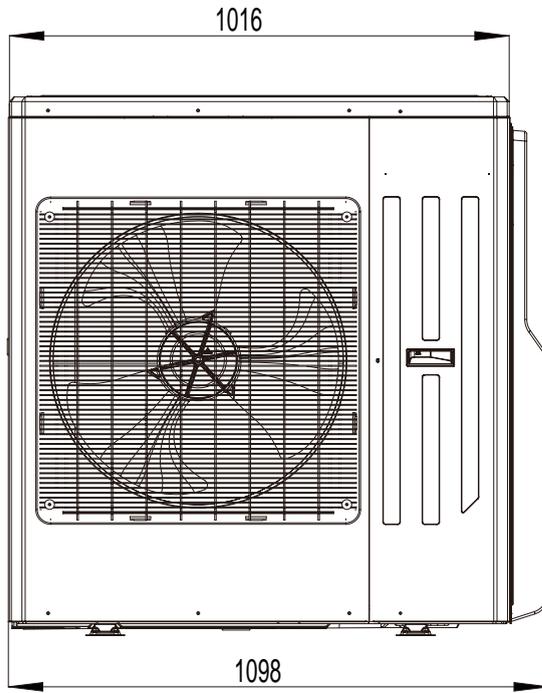
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2. Specifications

| Model | | | CHML-U36RK4 | CHML-U42RK5 |
|-----------------------------|---|-----|------------------------------------|--------------------------------------|
| Power supply | Rated Voltage | V~ | 220-240 | 220-240 |
| | Rated Frequency | Hz | 50 | 50 |
| | Phases | | 1 | 1 |
| Cooling capacity(max~min) | | W | 10500(2600~12000) | 12000(2600~12000) |
| Heating capacity(max~min) | | W | 12000(2600~13500) | 12000(2600~14500) |
| Cooling Power Input | | W | 3100 | 3450 |
| Heating Power Input | | W | 3200 | 3500 |
| Cooling Current Input | | A | 14 | 16 |
| Heating Current Input | | A | 13 | 15 |
| Rated Power Input | | W | 4000 | 4000 |
| Rated Current | | A | 20 | 20 |
| AEER | | W/W | / | / |
| ACOP | | W/W | / | / |
| Outdoor Unit | Compressor Trademark | | ZHUHAI LANDA COMPRESSOR CO.,LTD | ZHUHAI LANDA COMPRESSOR CO.,LTD |
| | Compressor Model | | QXFS-D32zX090D | QXFS-D32zX090D |
| | Compressor Refrigerant Oil Type | | FW68DA | FW68DA |
| | Compressor Type | | Inverter Rotary | Inverter Rotary |
| | L.R.A | | A | / |
| | Compressor Rated Load Amp (RLA) | | A | 17.8 |
| | Compressor Power Input | | W | 3750 |
| | Compressor Thermal Protector | | | 1NT11L-6233/HPC115/95U1/ KSD115 C |
| | Throttling Method | | | Electron expansion valve |
| | Cooling Operation Ambient Temperature Range | | °C | -15~43 |
| | Heating Operation Ambient Temperature Range | | °C | -20~24 |
| | Condenser Material | | | Aluminum Fin-copper Tube |
| | Condenser Pipe Diameter | | mm | Φ7.94 |
| | Rows-Fin Gap(mm) | | mm | 2-1.4 |
| | Coil length (l) X height (H) X coil width (L) | | mm | 1056X286X776 |
| | Fan Motor Speed (rpm) (H/M/L) | | rpm | 820 |
| | Output of Fan Motor | | W | 170 |
| | Fan Motor RLA | | A | / |
| | Fan Motor Capacitor | | μF | / |
| | Air Flow Volume of Outdoor Unit | | m ³ /h | 5500 |
| | Fan Type-Piece | | | Axial-flow |
| | Fan Diameter | | mm | Φ570 |
| | Defrosting Method | | | Automatic Defrosting |
| | Climate Type | | | T1 |
| | Isolation | | | I |
| | Moisture Protection | | | IPX4 |
| | Permissible Excessive Operating Pressure for the Discharge Side | | MPa | 4.3 |
| | Permissible Excessive Operating Pressure for the Suction Side | | MPa | 2.5 |
| | Dimension (WXHXD) | | mm | 1087X1103X440 |
| | Dimension of Package (LXWXH) | | mm | 1155X480X1115 |
| Dimension of Package(LXWXH) | | mm | 1158X483X1130 | |
| Net Weight | | kg | 90 | |
| Gross Weight | | kg | 98 | |
| Refrigerant Charge | | | R32 | |
| Refrigerant Charge | | kg | 2.75 | |

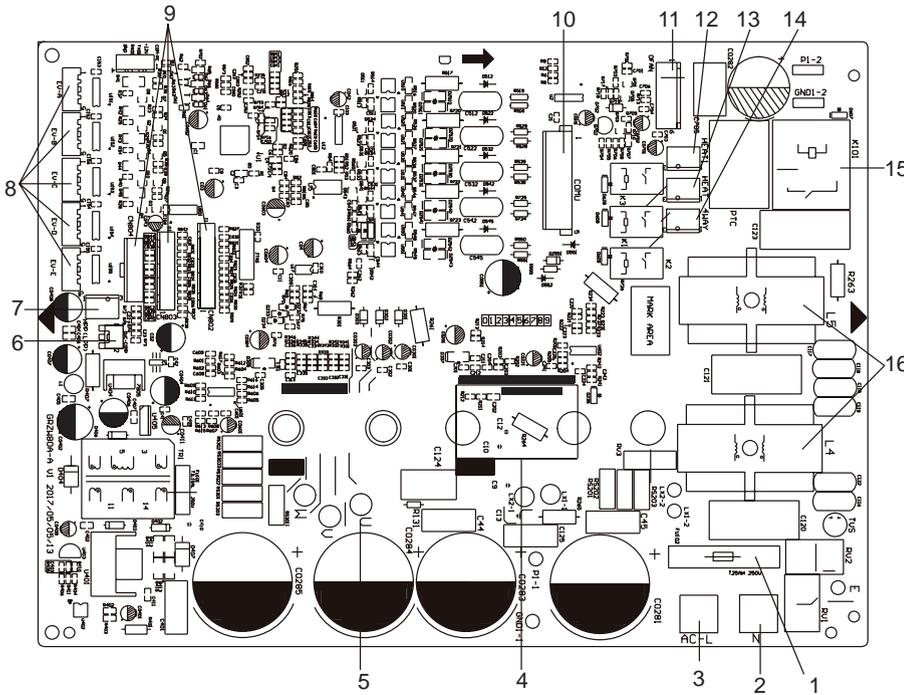
3. Outline Dimension Diagram



Unit:mm

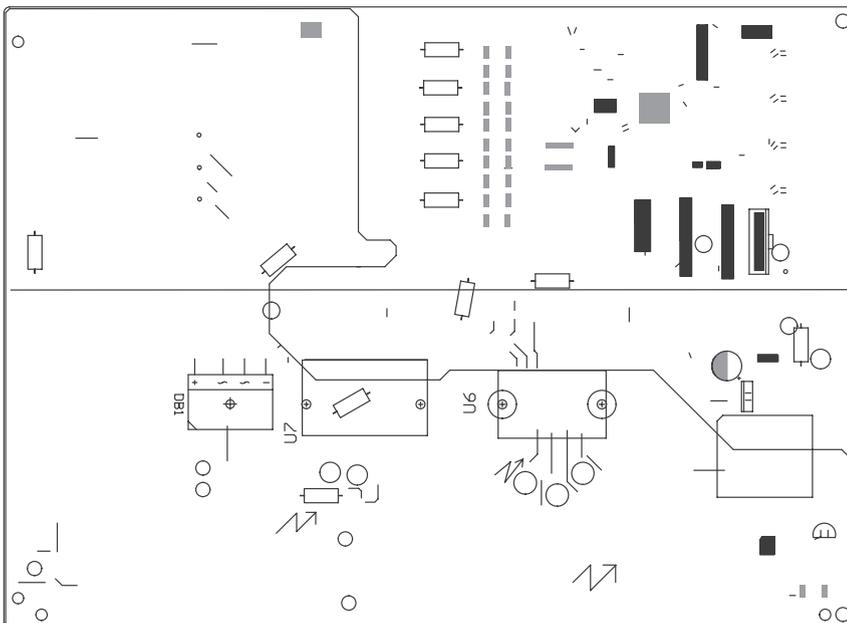
5.2 PCB Printed Diagram

• Top view



| | |
|----|--|
| 1 | T25AH 250V: Fuse |
| 2 | N: terminals of neutral wire |
| 3 | AC-L: terminals of line wire |
| 4 | PFC electrocircuit |
| 5 | U/V/W: terminals of compressor |
| 6 | OVC-COMP: terminals of overload protector |
| 7 | LPP: terminals of high pressure switch |
| 8 | EVA-EVE: terminals of EXV (electronic expansion valve) |
| 9 | CN802-CN803: terminals of temperature sensor |
| 10 | COMU: terminals of communication |
| 11 | OFAN: terminals of fan |
| 12 | HEAT1: terminals of bottom band heater |
| 13 | HEAT: terminals of compressor band heater |
| 14 | 4WAY: terminals of 4-way valve |
| 15 | K101: Main relay |
| 16 | L4-L5: choke |

• Bottom view



6. Function and Control

1. Function Control

1) Cooling mode

a. Turning on the unit for cooling operation, and if any one of the indoor units satisfy the cooling operation condition, the system will start for cooling operation; and the electronic expansion valve, the outdoor fan and the compressor start operation.

b. When some of the indoor units satisfy the stop-condition while some indoor units does not satisfy the stop-condition, the compressor does not stop, the compressor adjust the frequency according to demand. For the indoor unit with stop-condition satisfies, the corresponding electronic expansion valve will be closed.

c. Change Cooling mode to heating mode

When change the unit to heating mode from cooling mode, the whole system will stop first. Then the system will restart in heating mode after the compressor stops.

d. 4-way valve

In this mode, the 4-way valve is closed.

e. Outdoor fan control in cooling mode

The outdoor fan starts before 5s of the starting of compressor. The outdoor fan will run in high speed after starting and then it will run in set speed.

2) Dry mode (dehumidification mode)

This mode is the same as cooling mode;

3) Heating mode

a. Turning on the unit for heating operation, If any one of the indoor unit satisfy the heating condition, the system will start to run in heating mode

b. If all the indoor units satisfy the stop-condition, the compressor stops and the outdoor fan stops after 1min;

c. If only part of the indoor units satisfy the stop-condition, the compressor decrease the frequency immediately and operates according to demand.

d. Change Heating mode to cooling mode or dehumidification mode, the whole system will stop first, then restart under the required mode.

e. Defrosting function

When the defrosting condition is satisfied, the 4-way valve reverses the direction, the outdoor fan stop. After the 4-way valve reverses the direction, the frequency of compressor rises, and the unit will start defrosting under cooling cycle.

4) Fan mode

Only indoor fan run. Compressor, outdoor fan and 4-way valve are closed .

2. Protection Function

1) Mode conflict protection of indoor units

When the setting mode is different of different indoor unit, the unit runs in below status:

a. The system mode is determined by the first turning on indoor unit except indoor unit is in fan mode. Cooling mode (dry mode) is in conflict with heating mode.

b. If the first turning on unit is fan mode, and the second turning on unit is cooling or heating mode, then the system will run in cooling or heating mode

2) Overload protection

If the tube temperature at the high pressure side is higher than normal, the compressor frequency is restricted or decreased to normal operation frequency.

3) High exhaust temperature protection

If the exhaust temperature is higher than protection value, the compressor stops running.

If the exhaust temperature protection continuously appears for 6 times, the compressor can't resume running. In this case, only by cutting off the power and then reenergize that the compressor can restart. If the running duration of the compressor is longer than 10min, the protection times will be cleared to zero time.

4) Communication malfunction

Detection of the quantity of installed indoor units: after 3min of energizing, if the outdoor unit does not receive the communication data of certain indoor unit, the outdoor unit will judge that indoor unit is not installed. If the outdoor unit receives the communication data of that indoor unit later, the communication malfunction will be cleared.

5) System high-pressure protection

- a. When the high-pressure switch detects the system pressure higher than limit, then the high-pressure switch cuts off, the system will stop to run.
- b. If high-pressure protection is detected for two times within one hour, only by cutting off the power and then reenergize that the compressor can restart.

6) Compressor overload protection

No matter the compressor is on or off, when the compressor overload switch is detected activated, the system will stop and indoor unit will display H3. If the compressor overload protection appears for more than 6 times, in this case, only by cutting off the power and then reenergize that the compressor can restart. If the running duration of the compressor is longer than 30min, the protection times will be cleared to zero.

7) Antifreeze protection

Under cooling and dry mode, 6minutes after the compressor is started:

When it is detected for 3 minutes successively that T_{evap} is less than -2°C (varying with indoor unit), the antifreeze protection will be activated, in which case the outdoor unit will immediately shut off the indoor electronic expansion valve and the capacity will be set to "0". If T_{evap} exceed 13°C and the compressor has remained at OFF for at least 3minutes, the compressor will resume its original operation state.

8) IPM Protection

a. When the IPM module protection is detected, the unit will stop as the indoor temperature reaching set temperature, PFC is closed, display IPM protection malfunction. After the compressor stops for 3min, the unit will resume operation status automatically; if the IPM protection is detected for more than 6 times continuously (If the running time of the compressor is longer than 10min, the protection times record will be cleared), the system will stop and send the signal of module protection to indoor unit. The unit can not resume operation status automatically, but can resume running only after cutting off the power and then putting through the power.

b. IPM module overheating protection

(a) When $T_{IPM} > 88^{\circ}\text{C}$, prohibit to raise frequency;

(b) When $88^{\circ}\text{C} < T_{IPM} < 95^{\circ}\text{C}$, the operation frequency of compressor lows down 1HZ/1s;

(c) When $T_{IPM} > 100^{\circ}\text{C}$, the compressor stops. After the compressor stops for 3min, if $T_{IPM} < 77^{\circ}\text{C}$, the compressor and the outdoor fan will resume operation.

9) DRED function

If the power of DRED device is supplied by switching power supply, when different DRED signals are received, the corresponding optocouplers are put through to make the AD sample circuit on the main board detect the different voltages. Different voltages are corresponding to different DRED modes. After entering DRED mode, the indoor unit displays the corresponding operation code of DRED mode.

d1: Outdoor compressor stops;

d2: The electricity consumption of complete unit in 30min is less than or equals to 50% of rated electricity consumption;

d3: The electricity consumption of complete unit in 30min is less than or equals to 75% of rated electricity consumption

Part II : Installation and Maintenance

7. Notes for Installation and Maintenance

Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.

The following contents are very important for installation and maintenance.

Please follow the instructions below.

- The installation or maintenance must accord with the instructions.
- Comply with all national electrical codes and local electrical codes.
- Pay attention to the warnings and cautions in this manual.
- All installation and maintenance shall be performed by distributor or qualified person.
- All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.
- Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.



Warnings

Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.
2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.
3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.
4. Make sure each wiring terminal is connected firmly during installation and maintenance.
5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.
6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
8. The power cord and power connection wires can't be pressed by hard objects.
9. If power cord or connection wire is broken, it must be replaced by a qualified person.

10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.

11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3m.

12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.

13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.

14. Replace the fuse with a new one of the same specification if it is burnt down; don't replace it with a cooper wire or conducting wire.

15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Ware safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
3. Make sure no refrigerant gas is leaking out when installation is completed.
4. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.
5. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

Improper installation may lead to fire hazard, explosion, electric shock or injury.

Safety Operation of Flammable Refrigerant

Qualification requirement for installation and maintenance man

- All the work men who are engaging in the refrigeration system should bear the valid certification awarded by the authoritative organization and the qualification for dealing with the refrigeration system recognized by this industry. If it needs other technician to maintain and repair the appliance, they should be supervised by the person who bears the qualification for using the flammable refrigerant.
- It can only be repaired by the method suggested by the equipment's manufacturer.

Installation notes

- The air conditioner is not allowed to use in a room that has running fire (such as fire source, working coal gas ware, operating heater).
- It is not allowed to drill hole or burn the connection pipe.
- The air conditioner must be installed in a room that is larger than the minimum room area. The minimum room area is shown on the nameplate or following table a.
- Leak test is a must after installation.

table a - Minimum room area(m²)

| Minimum room area(m ²) | Charge amount (kg) | ≤1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 |
|------------------------------------|--------------------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|
| | floor location | / | 14.5 | 16.8 | 19.3 | 22 | 24.8 | 27.8 | 31 | 34.3 | 37.8 | 41.5 | 45.4 | 49.4 | 53.6 |
| wall mounted | / | 5.2 | 6.1 | 7 | 7.9 | 8.9 | 10 | 11.2 | 12.4 | 13.6 | 15 | 16.3 | 17.8 | 19.3 | |
| window mounted | / | 1.6 | 1.9 | 2.1 | 2.4 | 2.8 | 3.1 | 3.4 | 3.8 | 4.2 | 4.6 | 5 | 5.5 | 6 | |
| ceiling mounted | / | 1.1 | 1.3 | 1.4 | 1.6 | 1.8 | 2.1 | 2.3 | 2.6 | 2.8 | 3.1 | 3.4 | 3.7 | 4 | |

Maintenance notes

- Check whether the maintenance area or the room area meet the requirement of the nameplate.
 - It's only allowed to be operated in the rooms that meet the requirement of the nameplate.
- Check whether the maintenance area is well-ventilated.
 - The continuous ventilation status should be kept during the operation process.
- Check whether there is fire source or potential fire source in the maintenance area.
 - The naked flame is prohibited in the maintenance area; and the "no smoking" warning board should be hanged.
- Check whether the appliance mark is in good condition.
 - Replace the vague or damaged warning mark.

Welding

- If you should cut or weld the refrigerant system pipes in the process of maintaining, please follow the steps as below:
 - a. Shut down the unit and cut power supply
 - b. Eliminate the refrigerant
 - c. Vacuuming
 - d. Clean it with N2 gas
 - e. Cutting or welding
 - f. Carry back to the service spot for welding
- Make sure that there isn't any naked flame near the outlet of the vacuum pump and it's well-ventilated.
- The refrigerant should be recycled into the specialized storage tank.

Filling the refrigerant

- Use the refrigerant filling appliances specialized for R32. Make sure that different kinds of refrigerant won't contaminate with each other.
- The refrigerant tank should be kept upright at the time of filling refrigerant.
- Stick the label on the system after filling is finished (or haven't finished).
- Don't overfilling.
- After filling is finished, please do the leakage detection before test running; another time of leak detection should be done when it's removed.

Safety instructions for transportation and storage

- Please use the flammable gas detector to check before unload and open the container.
- No fire source and smoking.
- According to the local rules and laws.

Safety Precautions for Installing and Relocating the Unit:

To ensure safety, please be mindful of the following precautions.



Warnings

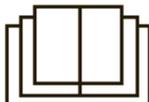
- 1. When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.**
Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.
- 2. When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.**
Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.
- 3. When refrigerant needs to be recovered during relocating or repairing the unit, be sure that the unit is running in cooling mode. Then, fully close the valve at high pressure side (liquid valve). About 30-40 seconds later, fully close the valve at low pressure side (gas valve), immediately stop the unit and disconnect power. Please note that the time for refrigerant recovery should not exceed 1 minute.**
If refrigerant recovery takes too much time, air may be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- 4. During refrigerant recovery, make sure that liquid valve and gas valve are fully closed and power is disconnected before detaching the connection pipe.**
If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- 5. When installing the unit, make sure that connection pipe is securely connected before the compressor starts running.**
If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- 6. Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.**
If there leaked gas around the unit, it may cause explosion and other accidents.
- 7. Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.**
Poor connections may lead to electric shock or fire.
- 8. Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.**
Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.

Safety Precautions for Refrigerant

- To realize the function of the air conditioner unit, a special refrigerant circulates in the system. The used refrigerant is the fluoride R32, which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can lead to explosion under certain conditions. But the flammability of the refrigerant is very low. It can be ignited only by fire.
- Compared to common refrigerants, R32 is a nonpolluting refrigerant with no harm to the ozoneosphere. The influence upon the greenhouse effect is also lower. R32 has got very good thermodynamic features which lead to a really high energy efficiency. The units therefore need a less filling.

WARNING:

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacture. Should repair be necessary, contact your nearest authorized Service Centre. Any repairs carried out by unqualified personnel may be dangerous. The appliance shall be stored in a room without continuously operating ignition sources. (for example: open flames, an operating gas appliance or an operating electric heater.)
- Do not pierce or burn.
- Appliance shall be installed, operated and stored in a room with a floor area larger than 4m (or 6m).
- Appliance filled with flammable gas R32. For repairs, strictly follow manufacturer's instructions only. Be aware that refrigerants not contain odour.
- Read specialist's manual.



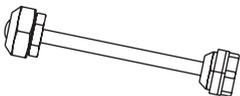
Main Tools for Installation and Maintenance

| | | |
|--|---|--|
| <p>1. Level meter, measuring tape</p>  | <p>2. Screw driver</p>  | <p>3. Impact drill, drill head, electric drill</p>  |
| <p>4. Electroprobe</p>  | <p>5. Universal meter</p>  | <p>6. Torque wrench, open-end wrench, inner hexagon spanner</p>  |
| <p>7. Electronic leakage detector</p>  | <p>8. Vacuum pump</p>  | <p>9. Pressure meter</p>  |
| <p>10. Pipe pliers, pipe cutter</p>  | <p>11. Pipe expander, pipe bender</p>  | <p>12. Soldering appliance, refrigerant container</p>  |

8.1 Preparation before Installation

8.1.1 Standard parts

Please use the following standard parts supplied by Cooper&Hunter.

| Pars of Outdoor Unit | | | | |
|----------------------|------------------------|---|----------|--------|
| Number | Name | Picture | Quantity | Remark |
| 1 | Owner's manual |  | 1 | |
| 2 | Tube connector subassy |  | 6 | |

8.1.2 Selecting installation site



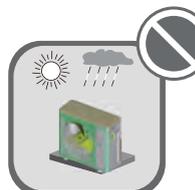
Forbidden Items! It indicates that improper operation might lead to human casualty or sever injury.



Items need to be followed. It indicates that improper operation might lead to personal injury or property damage.



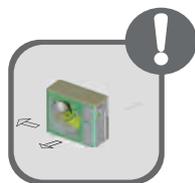
Install the unit at a place where is adequa to withstand the weight of the unit and make sure the unit would not shake or fall off.



Never expose the unit under direct sunshine and rainfull. install the unit at a place where is against dust, typhoon and earthquake.



Try to keep the unit away from combustibile, inflammable and corrosive gas or exhaust gas.



Leave some space for heat exchanging and servicing so as to guarantee unit normal operation.



Keep the indoor and outdoor units close to each other as much units close to each other as much the pipe length and bends.



Never allow children to approach to the unit and take measures to prevent children touching the unit.

8.2 Installation Instruction

8.2.1 Outline and dimension of the outdoor unit

CHML-U36RK4

Outline dimension and Mounting holes

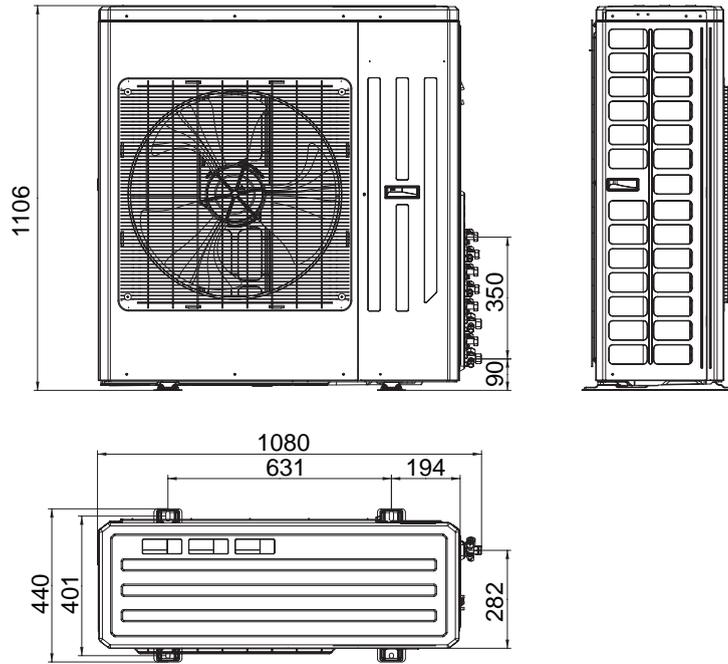


Fig.2

CHML-U42RK5

Outline dimension and Mounting holes

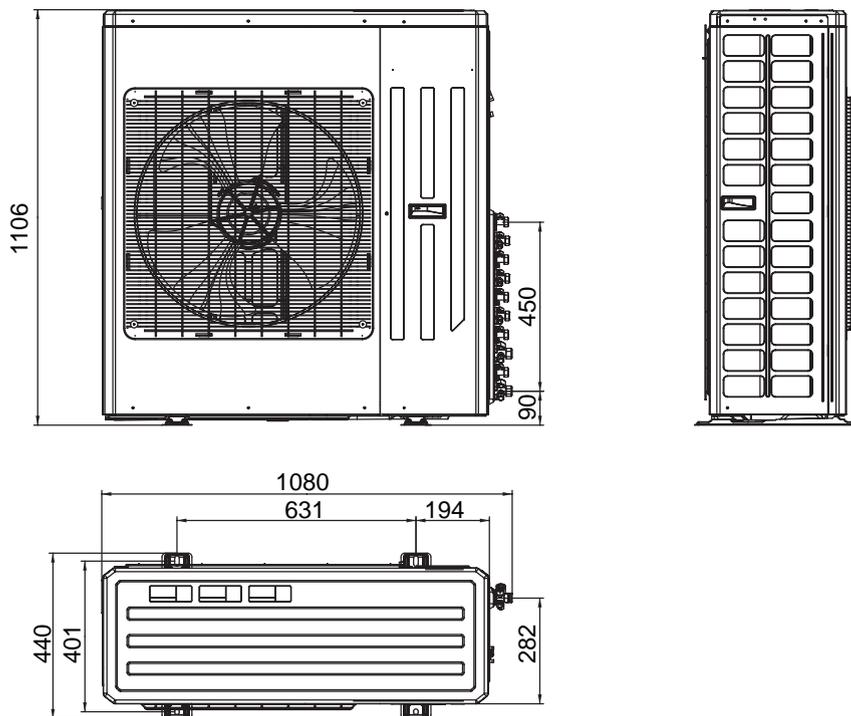
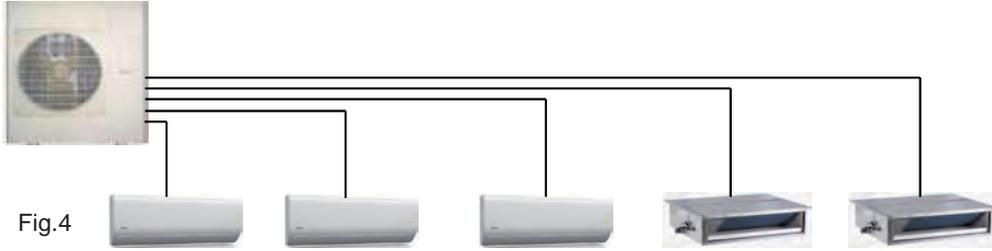


Fig.3

8.2.2 Installation of the Connection Pipe

Connecting piping for indoor unit and outdoor unit are in manifold mode. (As shown below).



1) Piping between the Indoor and Outdoor Units

- If the liquid and gas stop valves which have the sign of A , B, C, D or E have not been connected to the indoor units, please turn off the screw cap with the spanner airproof.
- Refer to Fig.5 for the moments of torque for tightening screws.
- Let the flare end of the copper pipe point at the screw and then tighten the screw by hand.
- After that, tighten the screw by the torque wrench unit it clatters (as shown in Fig.5).
- The bending degree of the pipe can not be too small; otherwise it will crack. And please use a pipe tube bender to bend the pipe.
- Wrap the exposed refrigerant pipe and the joints by sponge and then tighten them with the plastic tape.

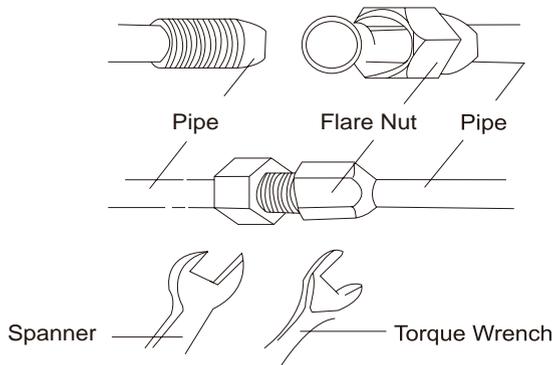


Fig.5

| Pipe diameter(inch) | Thickness of copper tube | Tightening torque(ft·lbf) |
|---------------------|--------------------------|---------------------------|
| Φ6.35mm | ≥0.8mm | 15~30 N·m |
| Φ9.52mm | ≥0.8mm | 35~40 N·m |
| Φ12.7mm | ≥0.8mm | 45~50 N·m |
| Φ15.9mm | ≥1.0mm | 60~65 N·m |

⚠ CAUTION!

- ① . During the connection of the indoor unit and the refrigerant pipe, never pull any joints of the indoor unit by force; otherwise the capillary pipe or other pipe may crack, which then would result in leakage.
- ② . The refrigerant pipe should be supported by brackets, that is, don't let the unit withstand the weight of it.
- ③ . If the piping connection size of outdoor unit does not match the piping connection size of indoor unit, use the piping connection dimension of indoor unit. And use different-diameter joints which is installing on the place of the piping connection to connect the indoor unit.

CAUTION!

- For the Free Match system, each pipe should be labeled to tell which system it belongs to avoid mistaken inaccurate piping. Never refit the unit and contact the sales agent or the professional installation personnel for the repair
- Do not use or place any inflammable or explosive substance near the unit.
- Keep good ventilation in the room to avoid oxygen deficit.
- Never insert your finger or any other object into the air outlet/inlet grille.

2) Allowable pipe length and drop height among indoor and outdoor units

If the total refrigerant pipe length (liquid pipe) is smaller than that listed in the table below, no additional refrigerant will be charged.

| Model | CHML-U36RK4 | CHML-U42RK5 |
|--------------------------------------|-------------|-------------|
| Total Liquid Pipe Length (a+b+c+d+e) | 40 | 40 |

Allowable Length and Height Fall of the Refrigerant Pipe

| | | Allowable Value | | Fitting pipe |
|--|-----------------------|-----------------|-------------|--------------------------------|
| | | CHML-U36RK4 | CHML-U42RK5 | |
| Total length(actual length) of fitting pipe | | 75m | 75m | $L_1+L_2+\dots+L_M (M \leq 5)$ |
| length of farthest fitting pipe(ft) | | 25m | 25m | $L_x (X=1, 2, 3, 4, 5)$ |
| Height difference between outdoor unit and indoor unit | Outdoor unit at upper | 15m | 15m | H1 |
| | Outdoor unit at lower | 15m | 15m | H3 |
| Height difference between indoor units(ft) | | 7.5m | 7.5m | H2 |

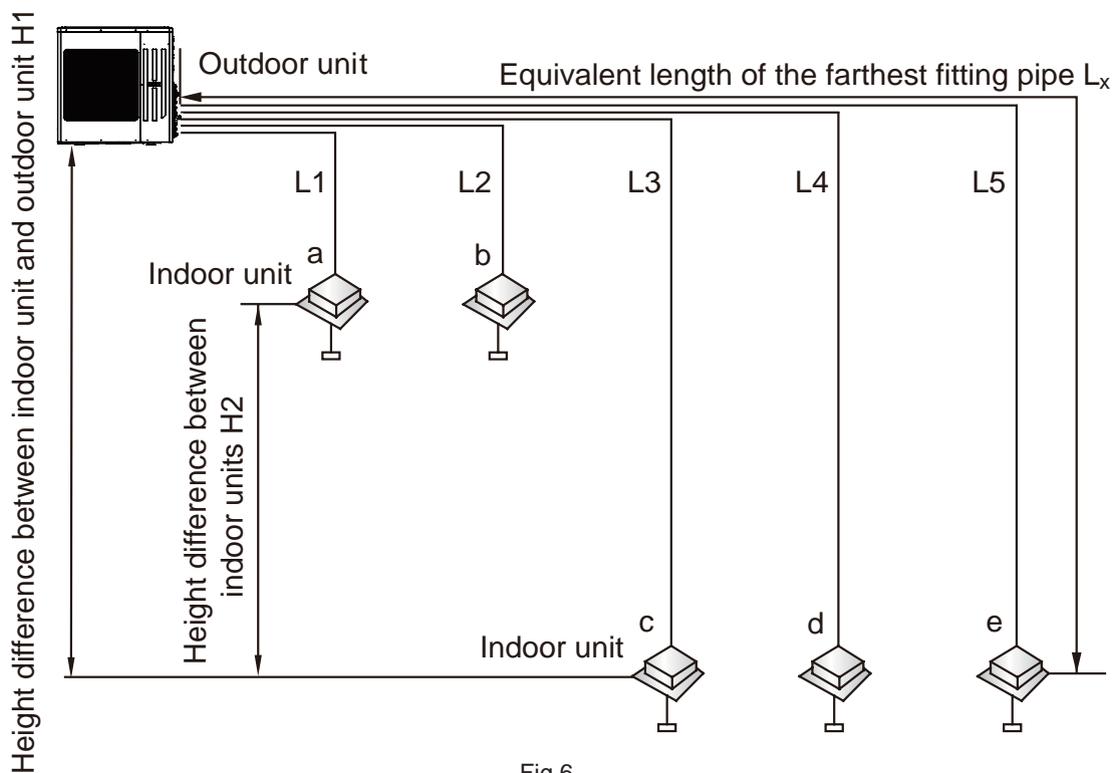
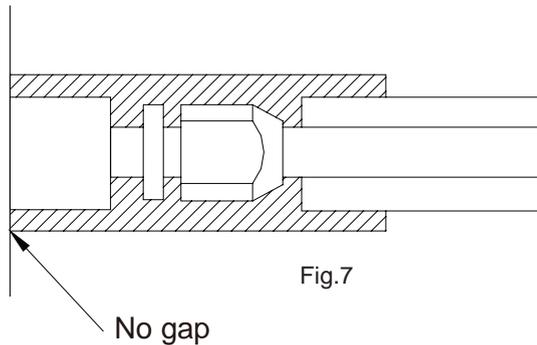


Fig.6

3) Installation of the Protection Layer of the Refrigerant Pipe

- a. The refrigerant pipe should be insulated by the insulating material and plastic tape in order to prevent condensation and water leakage.
- b. The joints of the indoor unit should be wrapped with the insulating material and no gap is allowed on the joint of the indoor unit, as shown in Fig.7.



⚠ CAUTION!

After the pipe is protected well enough, never bend it to form a small angle; otherwise it would crack or break.

4) Wrap the Pipe with Tape:

- a. Bundle the refrigerant pipe and electric wire together with tape, and separate them from the drain pipe to prevent the condensate water overflowing.
- b. Wrap the pipe from the bottom of the outdoor unit to the top of the pipe where it enters the wall. During the wrapping, the later circle should cover half of the former one.
- c. Fix the wrapped pipe on the wall with clamps.

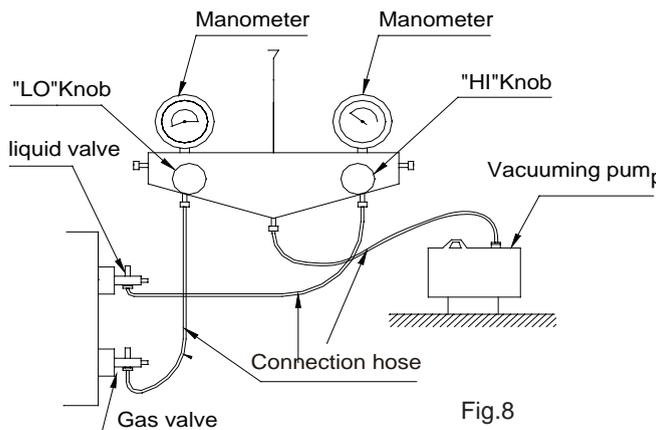
⚠ CAUTION!

- ① . Do not wrap the pipe too tightly; otherwise the insulation effect would be weakened. Additionally, make sure the drain hose is separated from the pipe.
 - ② .After that, fill the hole on the wall with sealing material to prevent wind and rain coming into the room.
- (4) Support and protection for pipeline Support should be made for hanging connection pipe. Distance between each support can not be over 1m.

8.2.3 Air Purging and Refrigerant Charge

Air purging

- 1) The refrigerant has been charged into the outdoor unit before shipment, while additional refrigerant still need be charged into the refrigerant pipe during the field installation.
- 2) Check if the liquid valve and the gas valve of the outdoor unit are closed fully.
- 3) As shown in the following figure (Fig.8), expel the gas inside the indoor unit and refrigerant pipe out by the vacuum pump.



- 4) When the compressor is not running, charge the R32 refrigerant into the refrigerant pipe from the liquid valve of the outdoor unit (do not do it from the gas valve).

Additional refrigerant charging

- a. Refrigerant Charge in the Outdoor Unit before Shipment

- Notes:
- ① . Outdoor unit has been charged refrigerant before delivery. The refrigerant charge is not included those charged additionally in the

indoor unit and the refrigerant pipe.

② . The amount of the additional refrigerant charge is dependent on the diameter and length of the liquid refrigerant pipe which is decided by the actual yield installation requirement.

③ . Record the additional refrigerant charge for future maintenance.

b. Calculation of the Additional Refrigerant Charge

$$\text{Additional Refrigerant Charge} = (\Sigma \text{Length of Liquid Pipe } \Phi 9.52 \times 54 + \Sigma \text{Length of Liquid Pipe } \Phi 6.35 \times 22) - 880$$

The biggest additional refrigerant charge value is 800g. It means that if the calculated value exceed 800g, the additional refrigerant charge takes 800g, while the calculated value less than 800g, the additional refrigerant charge takes the calculated value.

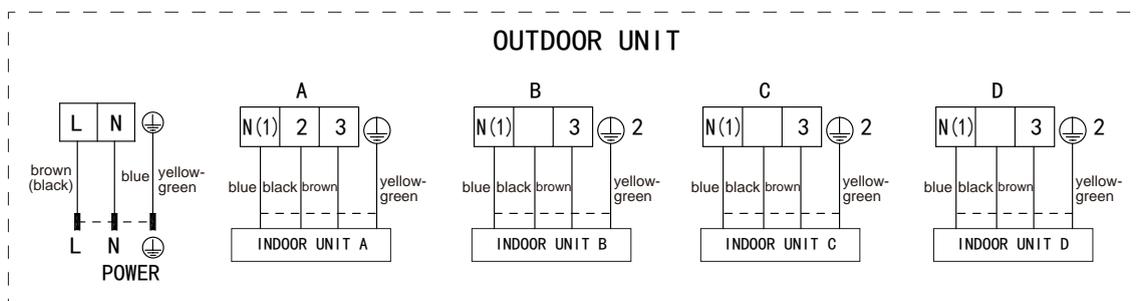
8.2.4 Electric Wiring

1) Wiring precautions

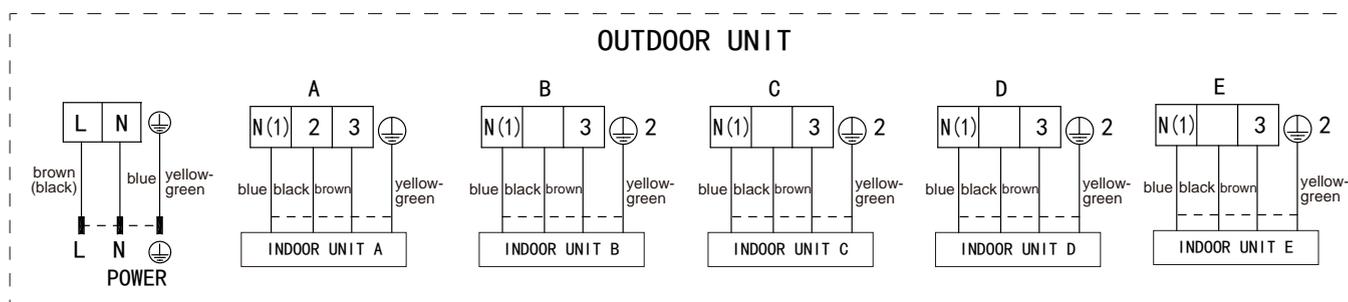
- The installation must be done in accordance with the national wiring regulations.
- Only the power cord with the rated voltage and exclusive circuit for the air conditioning can be used.
- Do not pull the power cord by force.
- The electric installation should be carried out by the technician as instructed by the local laws, regulations and also this manual.
- The diameter of the power cord should be large enough and once it is damaged it must be replaced by the dedicated one.
- The earthing should be reliable and the earth wire should be connected to the dedicated device of the building by the technician. Besides, the air switch coupled with the leakage current protection switch must be equipped, which is of enough capacity and of both magnetic and thermal tripping functions in case of the short circuit and overload.

| Models | Power Supply | Capacity of the air Switch(A) | Recommended Cord(pieces sectional area) |
|-------------|----------------|-------------------------------|---|
| CHML-U36RK4 | 220-240V~,50Hz | 32 | 3x4mm ² |
| CHML-U42RK5 | 220-240V~,50Hz | 32 | 3x4mm ² |

CHML-U36RK4



CHML-U42RK5



2) Earthing Requirements

- The air conditioner is classified into the Class I appliances, so its earthing must be reliable.
- The yellow-green line of the air conditioner is the earth line and can not be used for other purpose, cut off or fixed by the tapping screw; otherwise it would cause the hazard of electric shock.
- The reliable earth terminal should be provided and the earth wire can not be connected to any of the following places.
① Running water pipe; ② Coal gas pipe; ③ Sewage pipe; ④ Other places where the professional personnel think unreliable.

3) Electrical Cable Connection Cautions!

- ① . The mistake connecting line will result in malfunction. After the electrical wiring working, ensure the wire between the connection place and the fixed place has a certain freedom degree.
- ② . The connection piping and connection line of each indoor unit should connect well according to the instruction.
- ③ . The electric installation should be carried out by the technician as instructed by the local laws, regulations and also this manual.
- ④ . The installation location should be dry, and can't be expose in direct sunlight or strong breeze.
- ⑤ . Have to install a breaker in the circuit that can shut off the main power supply of the system. Besides, the air switch coupled with the leakage current protection switch must be equipped.

4) Wiring of the Power Cord

- ① . Open the side plate.
- ② . Connect the power card to the terminals "L1", "L2" and also the earthing bolt, and then connect the wiring terminals "N(1),2,3" of the indoor unit to those of the outdoor unit correspondingly.
- ③ . Fix the power cord with wire clips.
- ④ . Let the power cord go through the rubber ring.
- ⑤ . Supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord(code designation 60245 IEC 57).

CAUTIONS!

If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

9. Troubleshooting

9.1 Malfunction Indicator

The error code will be displayed on the wired controller and the main board of the outdoor unit.

The meaning of each error, as shown in table 13.

| Name of malfunction | The indicator display | | | Indoor display |
|---|-----------------------|----------------|-------------|----------------|
| | Yellow light | Red light | Green light | |
| Compressor runs | Flash once | | | |
| Defrost | Flash twice | | | H1 |
| Anti-freezing protection | Flash 3 times | | | E2 |
| IPM protection | Flash 4 times | | | H5 |
| AC over-current protection | Flash 5 times | | | E5 |
| Over-burden protection | Flash 6 times | | | H4 |
| Compressor exhaust high temperature protection | Flash 7 times | | | E4 |
| Compressor overload protection | Flash 8 times | | | H3 |
| Power protection | Flash 9 times | | | L9 |
| EEPROM reads and write protection | Flash 11 times | | | |
| Low PN voltage protection | Flash 12 times | | | PL |
| Over voltage protection for PN | Flash 13 times | | | PH |
| PFC protection | Flash 14 times | | | HC |
| PFC module temperature protection | Flash 15 times | | | oE |
| Low pressure protection | Flash 17 times | | | E3 |
| High pressure protection | Flash 18 times | | | E1 |
| Limit/decline frequency(electric current) | | Flash 1 times | | |
| Frequency limit(exhaust) | | Flash 2 times | | |
| Frequency limit(Over-burden) | | Flash 3 times | | |
| Outdoor ambient sensor malfunction | | Flash 6 times | | F3 |
| Outdoor tube sensor malfunction | | Flash 5 times | | F4 |
| Exhaust sensor malfunction | | Flash 7 times | | F5 |
| Attain the temperature of switch on | | Flash 8 times | | |
| Frequency limit(power) | | Flash 13 times | | |
| Outdoor fan malfunction | | Flash 14 times | | |
| Frequency limit(PFC module temperature) | | Flash 15 times | | |
| PFC module sensor malfunction | | Flash 16 times | | oE |
| Liquid pipe temperature sensor malfunction of A | | Flash 17 times | | |

| | | | | |
|--|--|----------------|--|----|
| Gas pipe temperature sensor malfunction of A | | Flash 18 times | | |
| Liquid pipe temperature sensor malfunction of B | | Flash 19 times | | |
| Gas pipe temperature sensor malfunction of B | | Flash 20 times | | |
| Liquid pipe temperature sensor malfunction of C | | Flash 21 times | | |
| Gas pipe temperature sensor malfunction of C | | Flash 22 times | | |
| Liquid pipe temperature sensor malfunction of D | | Flash 23 times | | |
| Gas pipe temperature sensor malfunction of D | | Flash 24 times | | |
| Liquid pipe temperature sensor malfunction of E | | Flash 25 times | | |
| Gas pipe temperature sensor malfunction of E | | Flash 26 times | | |
| Exit of the condenser tube sensor malfunction | | Flash 27 times | | |
| Correspondence is normal | | | Flash 7 times(n=indoor unit number) | |
| Communication failure between indoor unit and outdoor unit | | | Often bright (indoor unit all Communication failure) | |
| Indoor ambient sensor malfunction | | | | F1 |
| Indoor evaporate sensor malfunction | | | | F2 |
| Mode conflict | | | | E7 |
| Accept fluorine mode | | | | Fo |
| Jumper cap malfunction protection | | | | C5 |
| Anti-freezing protection | | | | FH |

9.2 Malfunction Checking and Elimination

1 IPM protection malfunction:

Main checking point:

If the input voltage of the unit is within normal range?

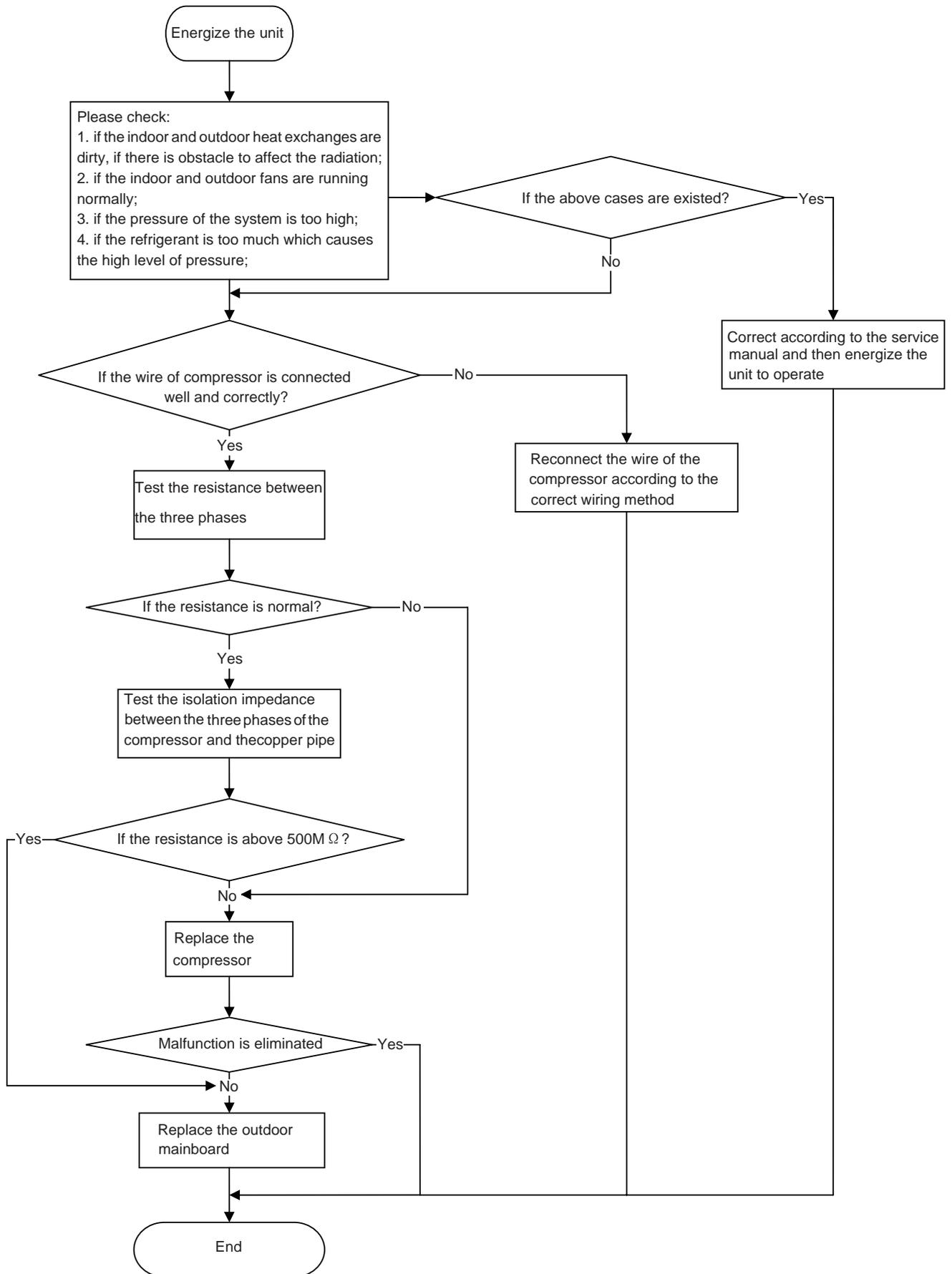
If the connection wire of compressor is connected well? Is it loose? If the connection sequence is correct?

If the resistance of compressor coil is normal? If the isolation of compressor coil with copper pipe is good?

If the unit is overloaded? If the heat radiation of the unit is good?

If the refrigerant charge is suitable?

Flow chart:

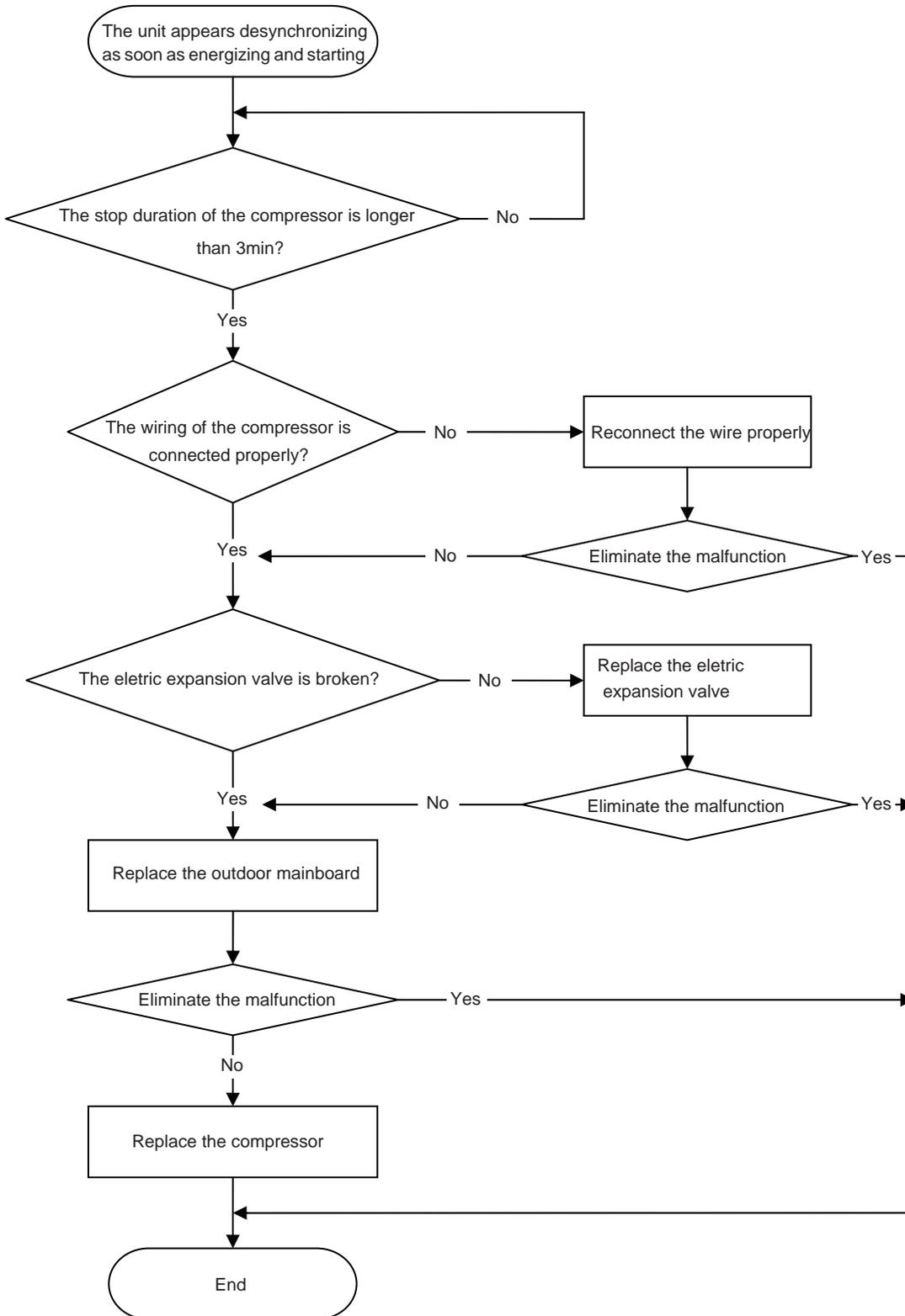


3. Compressor desynchronizing malfunction

Main checking points:

- If the pressure of the system is too high;
- If the electric expansion valve is working normally or it is broken;
- If the radiation of the unit is good;

Flow chart:

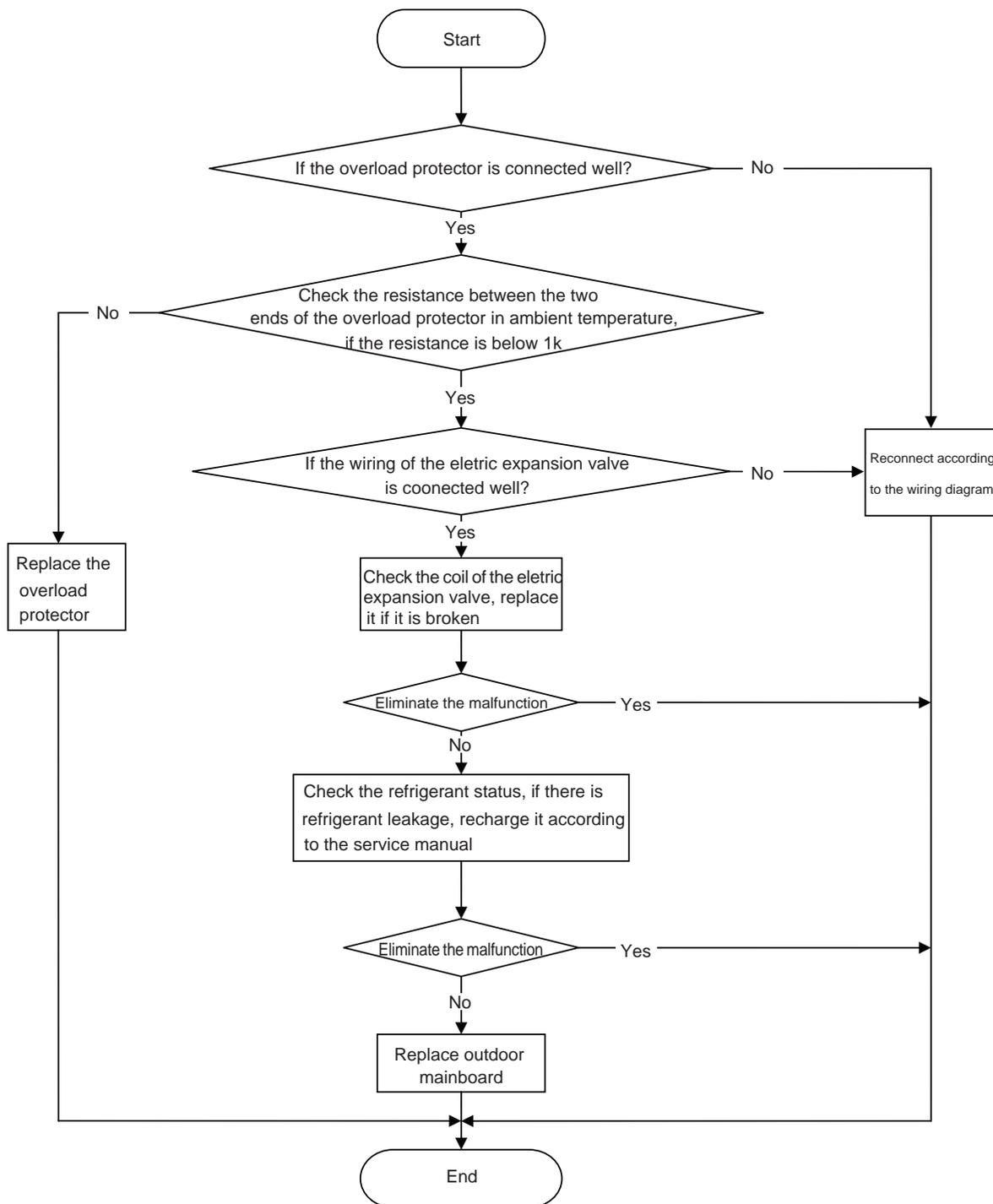


4. Compressor overload, discharge protectionmalfunction

Main checking points:

- If the eletric expansion valve is connected well or it is broken;
- If there is refrigerant leakage;
- If the overload protector is broken;

Flow chart:



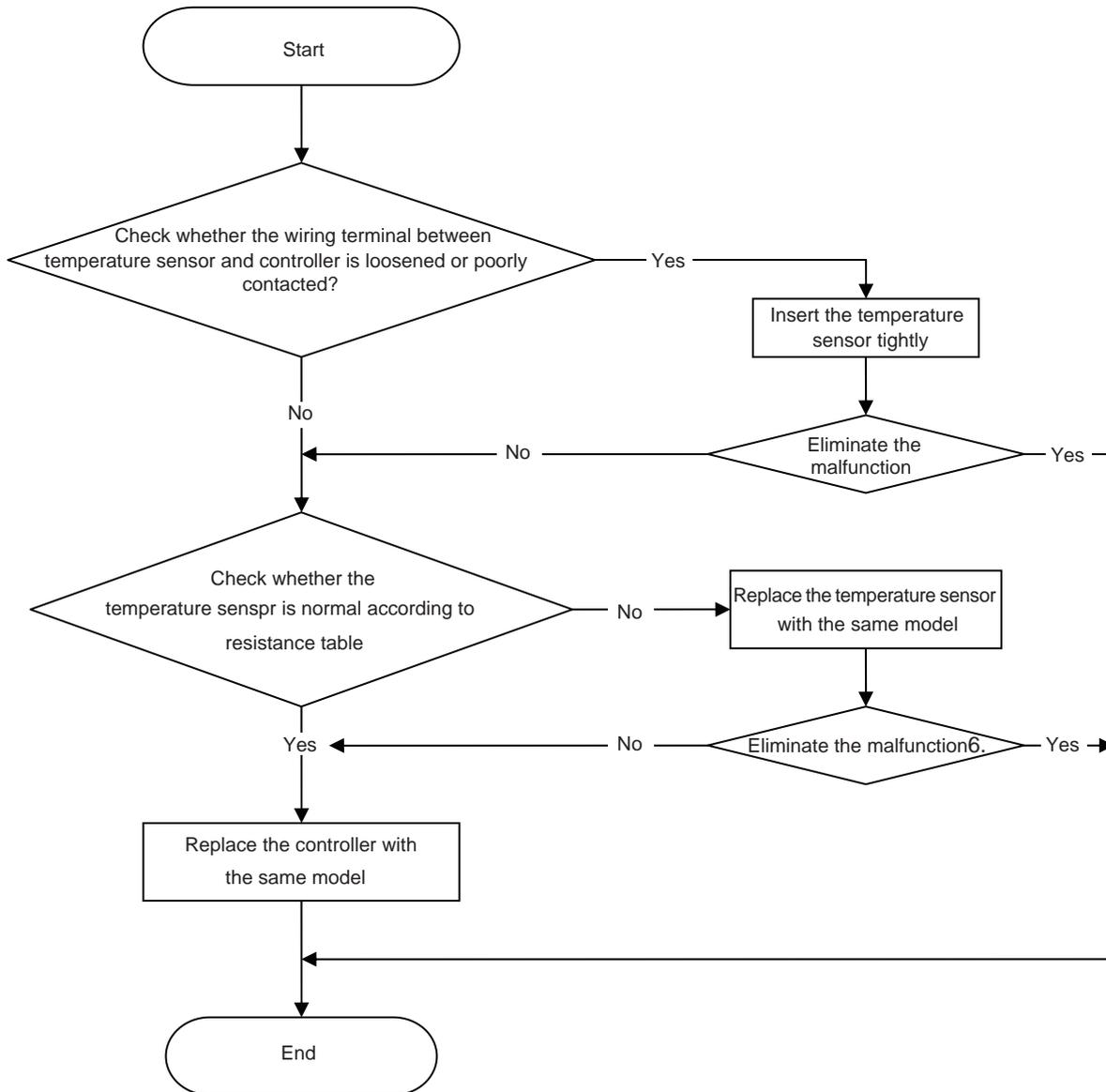
Note: the detection method of the coil of the eletric expansion valve: there is five pieces of coil of the eletric expansion valve, the resistance of one of them (the leftmost or the rightmost one) is almost the same as the resistance of other terminal (within 100 Ω). Judge the condition of the electronic expansion valve through detecting these resistance.

6. Temperature sensor malfunction

Main checking points:

- If the temperature sensor is damaged or broken
- If the terminal of the temperature sensor is loosened or not connected;
- If the mainboard is broken;

Flow chart:

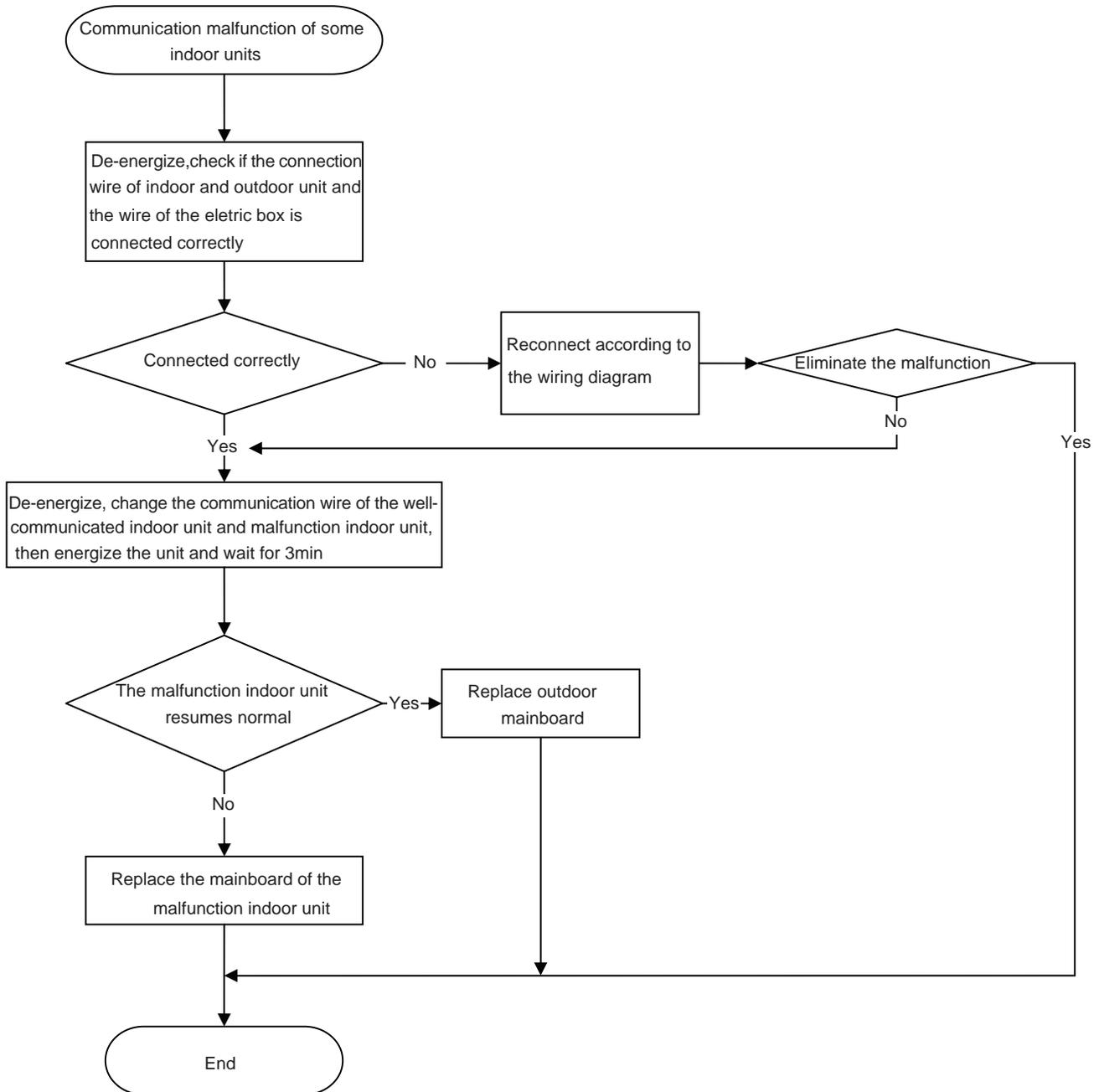


8. Communication malfunction

Main checking points:

- If the connection wire between the indoor unit and outdoor unit is connected well, if the wires inside the unit is connected well;
- If the indoor mainboard or outdoor main board is broken;

Flow chart:

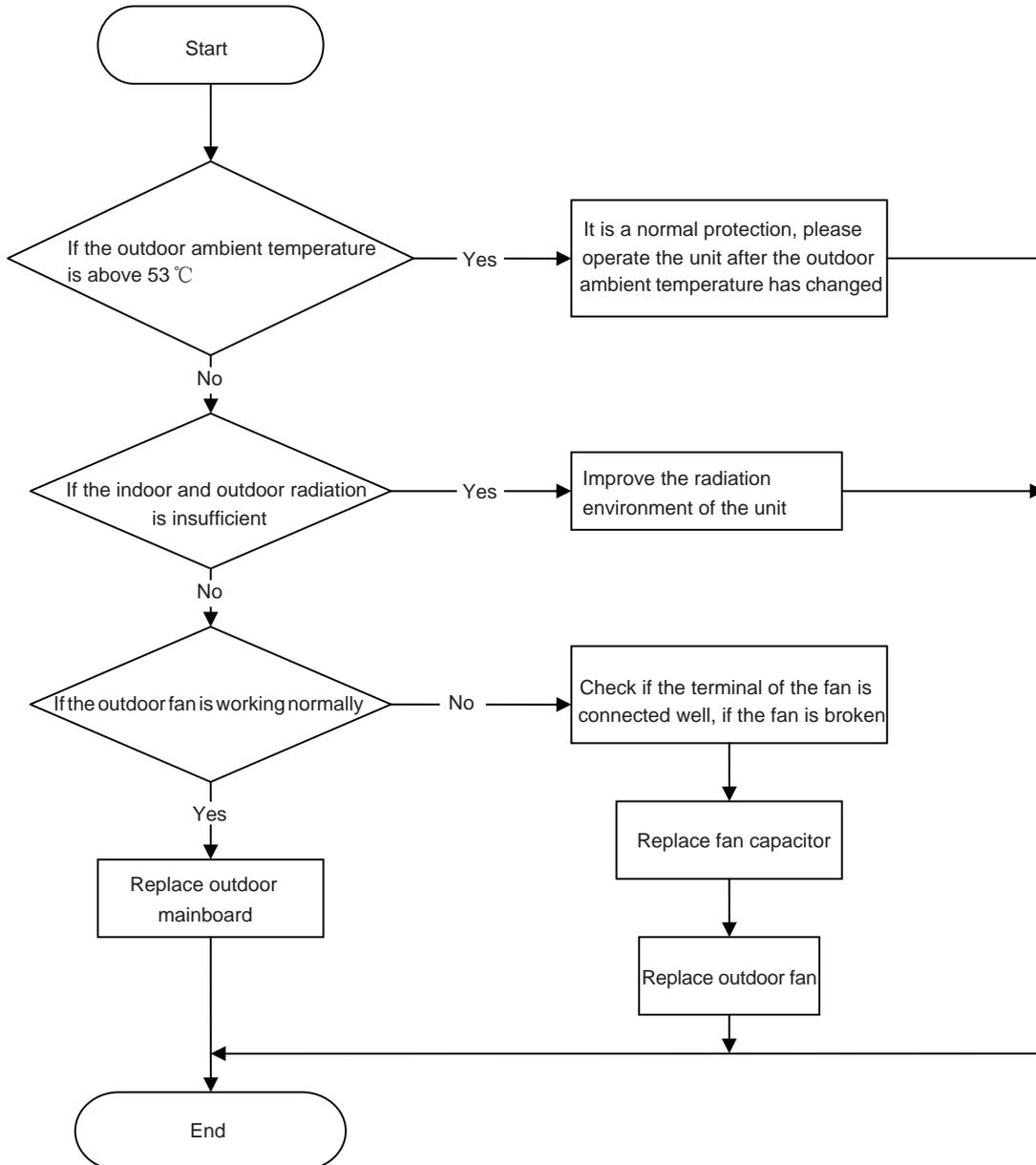


9. Anti-high temperature and overload malfunction

Main checking points:

- If the outdoor ambient temperature is within the normal range;
- If the indoor fan and outdoor fan are running normally;
- If the indoor and outdoor radiation environment is good;

Flow chart:



9.3 Maintenance Method for Normal Malfunction

1. Air Conditioner Can't be Started Up

| Possible Causes | Discriminating Method (Air conditioner Status) | Troubleshooting |
|---|--|--|
| No power supply, or poor connection for power plug | After energization, operation indicator isn't bright and the buzzer can't give out sound | Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well. |
| Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals | Under normal power supply circumstances, operation indicator isn't bright after energization | Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly |
| Electric leakage for air conditioner | After energization, room circuit breaker trips off at once | Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord. |
| Model selection for air switch is improper | After energization, air switch trips off | Select proper air switch |

2. Poor Cooling (Heating) for Air Conditioner

| Possible Causes | Discriminating Method (Air conditioner Status) | Troubleshooting |
|--|---|---|
| Set temperature is improper | Observe the set temperature on remote controller | Adjust the set temperature |
| Rotation speed of the IDU fan motor is set too low | Small wind blow | Set the fan speed at high or medium |
| Filter of indoor unit is blocked | Check the filter to see it's blocked | Clean the filter |
| Installation position for indoor unit and outdoor unit is improper | Check whether the installation position is proper according to installation requirement for air conditioner | Adjust the installation position, and install the rainproof and sunproof for outdoor unit |
| Refrigerant is leaking | Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range | Find out the leakage causes and deal with it. Add refrigerant. |
| Malfunction of 4-way valve | Blow cold wind during heating | Replace the 4-way valve |
| Malfunction of capillary | Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked | Replace the capillary |
| Flow volume of valve is insufficient | The pressure of valves is much lower than that stated in the specification | Open the valve completely |
| Malfunction of horizontal louver | Horizontal louver can't swing | Refer to point 3 of maintenance method for details |
| Malfunction of the IDU fan motor | The IDU fan motor can't operate | Refer to troubleshooting for H6 for maintenance method in details |
| Malfunction of the ODU fan motor | The ODU fan motor can't operate | Refer to point 4 of maintenance method for details |
| Malfunction of compressor | Compressor can't operate | Refer to point 5 of maintenance method for details |

3. Horizontal Louver Can't Swing

| Possible Causes | Discriminating Method (Air conditioner Status) | Troubleshooting |
|---|--|--|
| Wrong wire connection, or poor connection | Check the wiring status according to circuit diagram | Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly |
| Stepping motor is damaged | Stepping motor can't operate | Repair or replace stepping motor |
| Main board is damaged | Others are all normal, while horizontal louver can't operate | Replace the main board with the same model |

4. ODU Fan Motor Can't Operate

| Possible causes | Discriminating method (air conditioner status) | Troubleshooting |
|---|---|--|
| Wrong wire connection, or poor connection | Check the wiring status according to circuit diagram | Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly |
| Capacity of the ODU fan motor is damaged | Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor. | Replace the capacity of fan |
| Power voltage is a little low or high | Use universal meter to measure the power supply voltage. The voltage is a little high or low | Suggest to equip with voltage regulator |
| Motor of outdoor unit is damaged | When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat. | Change compressor oil and refrigerant. If no better, replace the compressor with a new one |

5. Compressor Can't Operate

| Possible causes | Discriminating method (air conditioner status) | Troubleshooting |
|---|---|--|
| Wrong wire connection, or poor connection | Check the wiring status according to circuit diagram | Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly |
| Capacity of compressor is damaged | Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor. | Replace the compressor capacitor |
| Power voltage is a little low or high | Use universal meter to measure the power supply voltage. The voltage is a little high or low | Suggest to equip with voltage regulator |
| Coil of compressor is burnt out | Use universal meter to measure the resistance between compressor terminals and it's 0 | Repair or replace compressor |
| Cylinder of compressor is blocked | Compressor can't operate | Repair or replace compressor |

6. Air Conditioner is Leaking

| Possible causes | Discriminating method (air conditioner status) | Troubleshooting |
|-----------------------|---|---|
| Drain pipe is blocked | Water leaking from indoor unit | Eliminate the foreign objects inside the drain pipe |
| Drain pipe is broken | Water leaking from drain pipe | Replace drain pipe |
| Wrapping is not tight | Water leaking from the pipe connection place of indoor unit | Wrap it again and bundle it tightly |

7. Abnormal Sound and Vibration

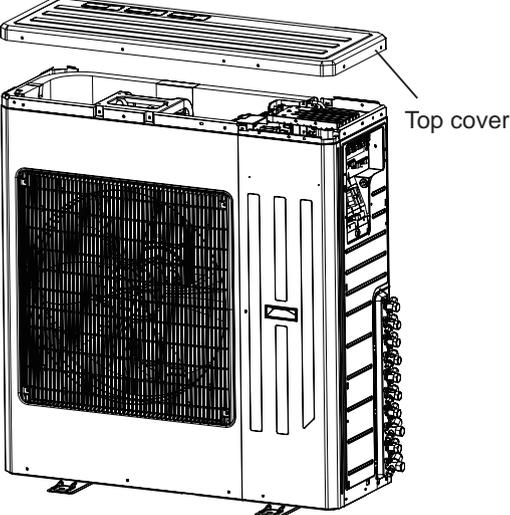
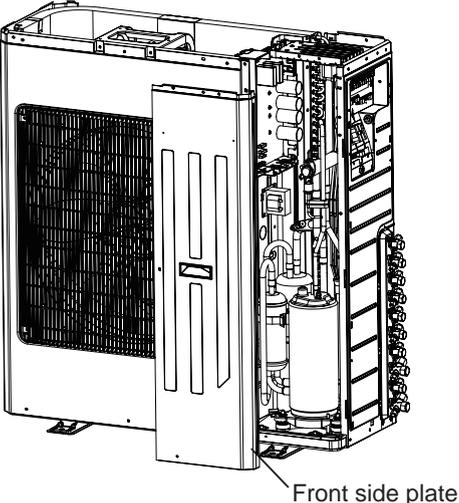
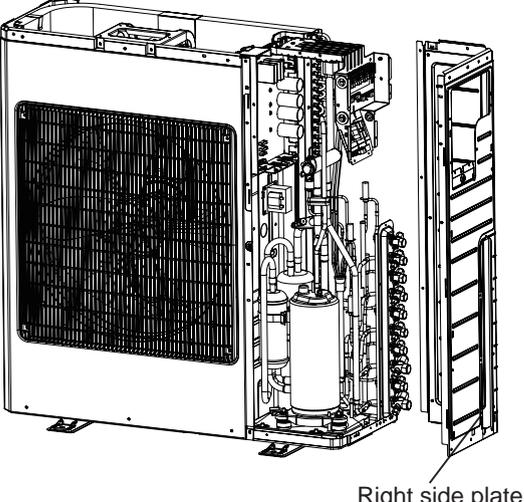
| Possible causes | Discriminating method (air conditioner status) | Troubleshooting |
|---|--|--|
| When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound | There's the sound of "PAPA" | Normal phenomenon. Abnormal sound will disappear after a few minutes. |
| When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner | Water-running sound can be heard | Normal phenomenon. Abnormal sound will disappear after a few minutes. |
| Foreign objects inside the indoor unit or there're parts touching together inside the indoor unit | There's abnormal sound fro indoor unit | Remove foreign objects. Adjust all parts' position of indoor unit, tighten screws and stick damping plaster between connected parts |
| Foreign objects inside the outdoor unit or there're parts touching together inside the outdoor unit | There's abnormal sound fro outdoor unit | Remove foreign objects. Adjust all parts' position of outdoor unit, tighten screws and stick damping plaster between connected parts |
| Short circuit inside the magnetic coil | During heating, the way valve has abnormal electromagnetic sound | Replace magnetic coil |
| Abnormal shake of compressor | Outdoor unit gives out abnormal sound | Adjust the support foot mat of compressor, tighten the bolts |
| Abnormal sound inside the compressor | Abnormal sound inside the compressor | If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances. |

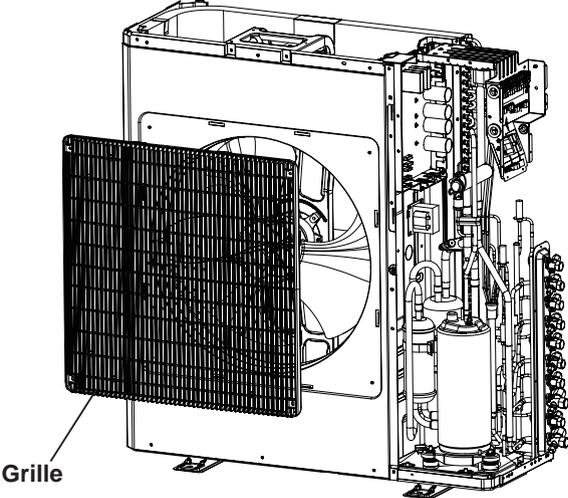
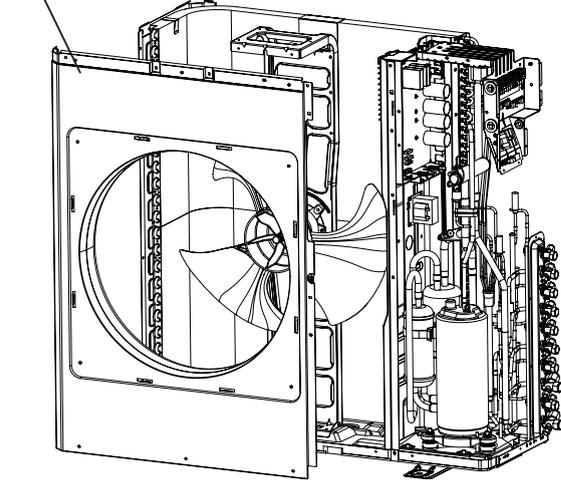
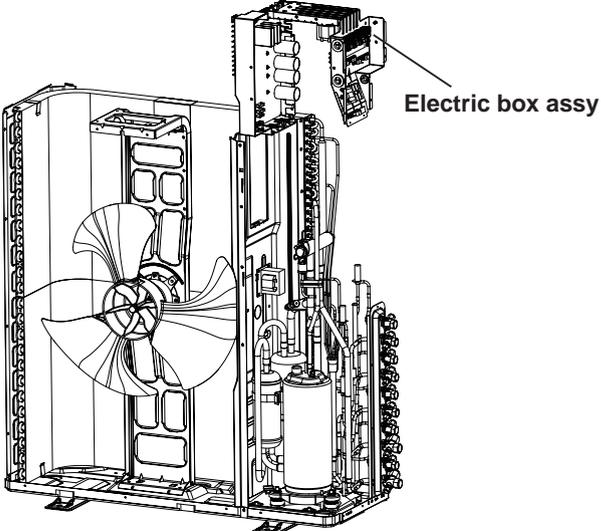
| | | | |
|----|---|--------------|----|
| 8 | Fan Motor | 1570280201 | 1 |
| 9 | Motor Support Assy | 000046000051 | 1 |
| 10 | Reactor | 43130186 | 2 |
| 11 | Compressor and Fittings | 009001000231 | 1 |
| 12 | Compressor Gasket | 009012000004 | 3 |
| 13 | Drainage Joint | 26113009 | 1 |
| 14 | Sensor Sub-assy | 39004100006G | 1 |
| 15 | Compressor Overload Protector(External) | 00180030 | 1 |
| 16 | Bolt | 70210051 | 2 |
| 17 | Electric Expand Valve Fitting | 4304413234 | 1 |
| 18 | Strainer | 07210022 | 4 |
| 19 | Bidirection Strainer | 07220016 | 1 |
| 20 | Cut off Valve | 07130239 | 4 |
| 21 | Electric Expand Valve Fitting | 4304413234 | 1 |
| 22 | Right Side Plate | 01314100027P | 1 |
| 23 | Valve Cover | 26904100053 | 1 |
| 24 | Wiring Clamp | 26115004 | 1 |
| 25 | Cut off Valve | 07130239 | 4 |
| 26 | Electric Expand Valve Fitting | 4304413234 | 1 |
| 27 | Rear Grill | 01574100007 | 1 |
| 28 | Condenser Assy | 01163780 | 1 |
| 29 | Condenser support plate | 01895309 | 1 |
| 30 | Valve Support Assy | 030163000007 | 1 |
| 31 | Electronic Expansion Valve | 07334447 | 4 |
| 32 | Electric Expand Valve Fitting | 4304413234 | 1 |
| 33 | 4-way Valve | 43000338 | 1 |
| 34 | Top Cover | 0125500901P | 1 |
| 35 | Pressure Protect Switch | 4602001539 | 1 |
| 36 | Left Handle | 26233053 | 1 |
| 37 | Left Side Plate | 01305064P | 1 |
| 38 | Radiator | 49018000077 | 1 |
| 39 | Electric Box | 26904100013 | 1 |
| 40 | Main Board | 300027000527 | 1 |
| 41 | communication Interface Board | / | / |
| 42 | Cable Cross Loop | 76510021 | 2 |
| 43 | Magnetic Ring | 49010109 | 4 |
| 44 | Insulation Gasket | 70410503 | 1 |
| 45 | Wire Clamp | 71010102 | 1 |
| 46 | Socket | / | 1/ |
| 47 | Terminal Board | 420111041 | 1 |
| 48 | Terminal Board | 42018094 | 4 |
| 49 | Wire Clamp | 71010103 | 4 |
| 50 | Sensor Sub-assy | 39004100005G | 1 |
| 51 | Electric Box Assy | 100002003334 | 1 |

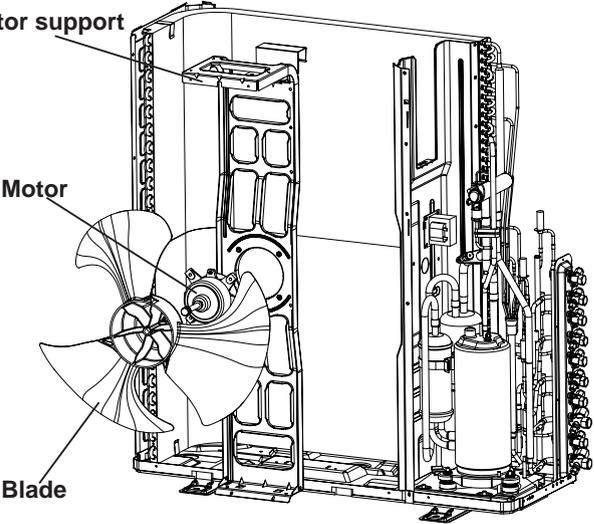
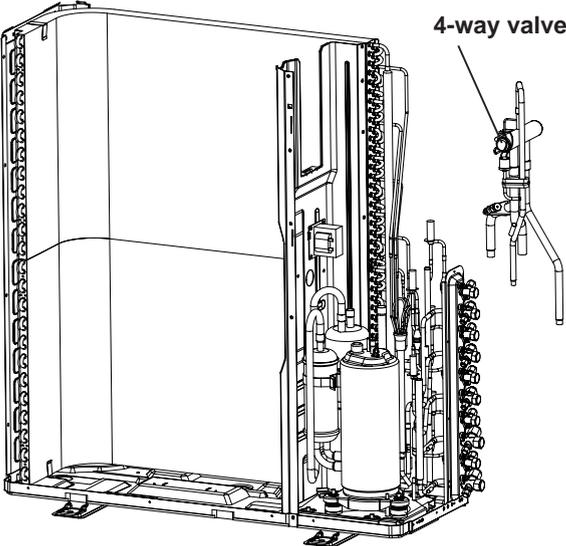
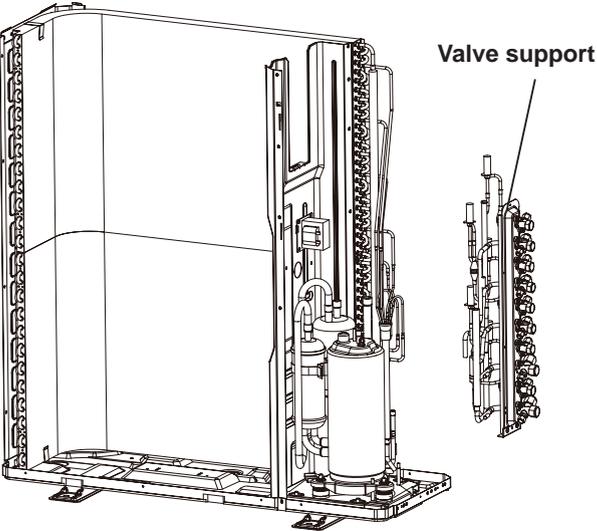
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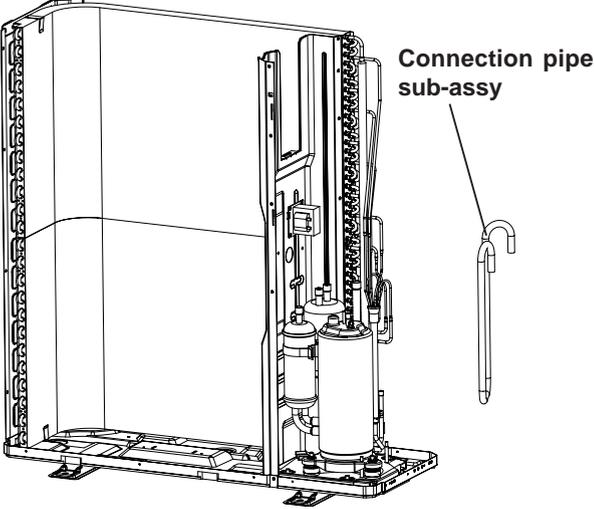
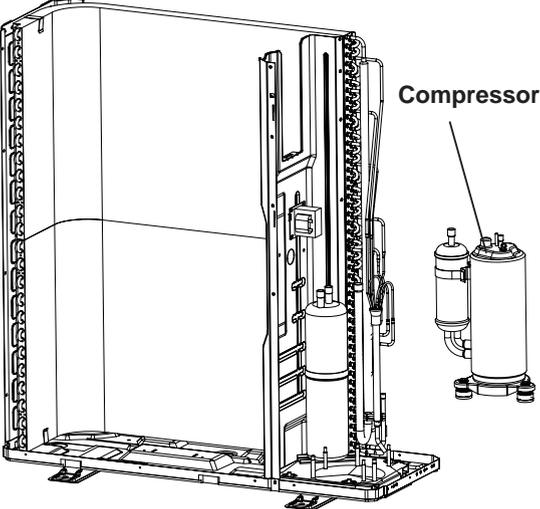
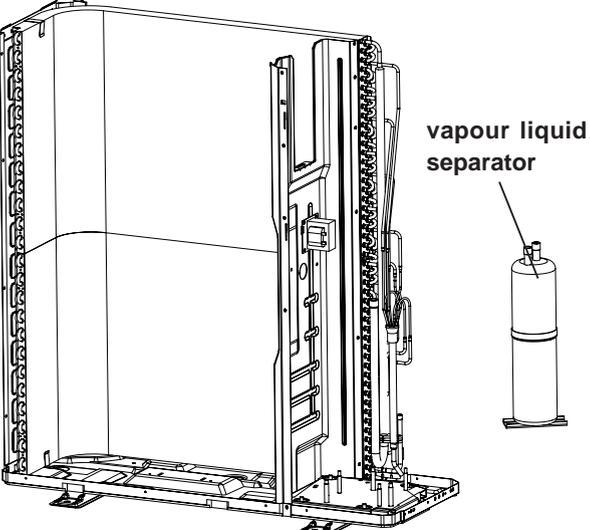
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| 9 | Motor Support Assy | 00046000051 | 1 |
| 10 | Reactor | 43130186 | 2 |
| 11 | Compressor and Fittings | 009001000231 | 1 |
| 12 | Compressor Gasket | 009012000004 | 3 |
| 13 | Drainage Joint | 26113009 | 1 |
| 14 | Sensor Sub-assy | 39004100006G | 1 |
| 15 | Compressor Overload Protector(External) | 00180030 | 1 |
| 16 | Bolt | 70210051 | 2 |
| 17 | Electric Expand Valve Fitting | 4304413222 | 1 |
| 18 | Strainer | 07210022 | 5 |
| 19 | Bidirection Strainer | 07220016 | 1 |
| 20 | Cut off Valve | 07130239 | 5 |
| 21 | Electric Expand Valve Fitting | 4304413222 | 1 |
| 22 | Right Side Plate | 01314100027P | 1 |
| 23 | Valve Cover | 26904100053 | 1 |
| 24 | Wiring Clamp | 26115004 | 1 |
| 25 | Cut off Valve | 07130239 | 5 |
| 26 | Electric Expand Valve Fitting | 4304413222 | 1 |
| 27 | Rear Grill | 01574100007 | 1 |
| 28 | Condenser Assy | 01163780 | 1 |
| 29 | Condenser support plate | 01895309 | 1 |
| 30 | Valve Support Assy | 030163000002 | 1 |
| 31 | Electric Expand Valve Fitting | 4304413222 | 1 |
| 32 | Electronic Expansion Valve | 07334447 | 5 |
| 33 | Electric Expand Valve Fitting | 4304413222 | 1 |
| 34 | 4-way Valve | 43000338 | 1 |
| 35 | Top Cover | 0125500901P | 1 |
| 36 | Pressure Protect Switch | 4602001539 | 1 |
| 37 | Left Handle | 26233053 | 1 |
| 38 | Left Side Plate | 01305064P | 1 |
| 39 | Radiator | 49018000077 | 1 |
| 40 | Electric Box | 26904100013 | 1 |
| 41 | Main Board | 300027000528 | 1 |
| 42 | communication Interface Board | / | / |
| 43 | Cable Cross Loop | 76510021 | 2 |
| 44 | Magnetic Ring | 49010109 | 4 |
| 45 | Insulation Gasket | 70410503 | 1 |
| 46 | Wire Clamp | 71010103 | 1 |
| 47 | Socket | / | / |
| 48 | Terminal Board | 42018094 | 1 |
| 49 | Terminal Board | 420111041 | 5 |
| 50 | Wire Clamp | 71010102 | 5 |
| 51 | Sensor Sub-assy | 39004100007G | 1 |
| 52 | Electric Box Assy | 100002003335 | 1 |

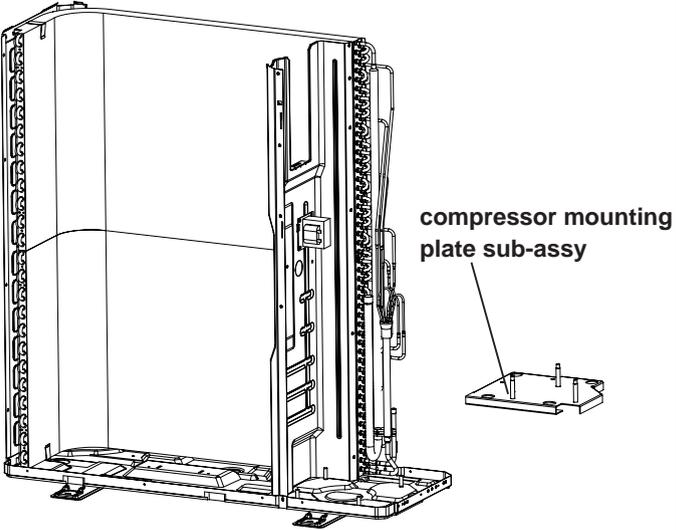
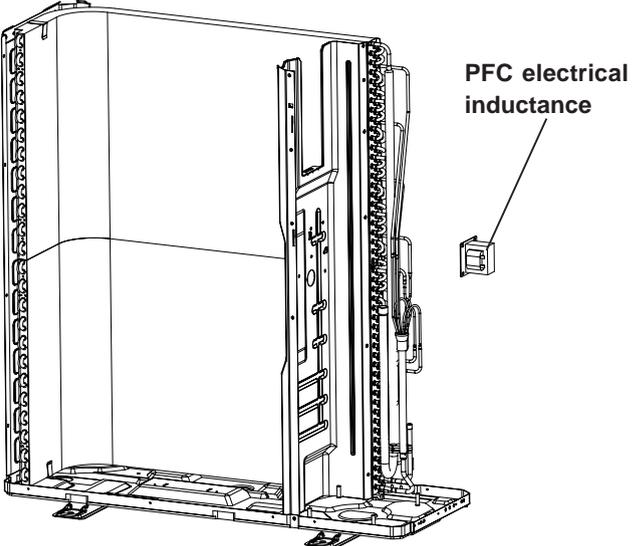
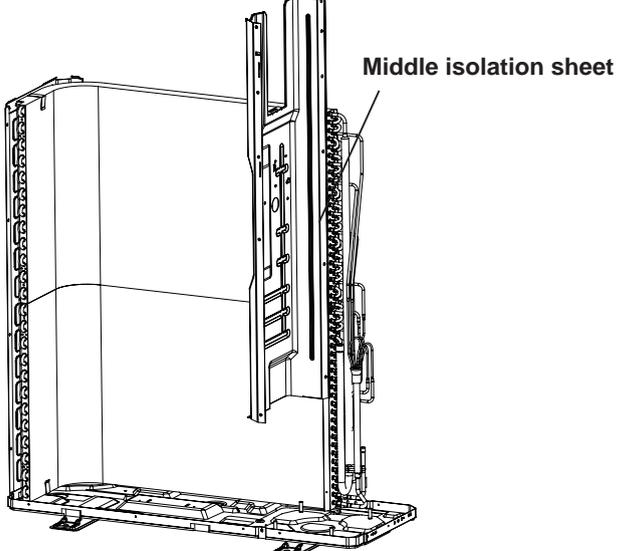
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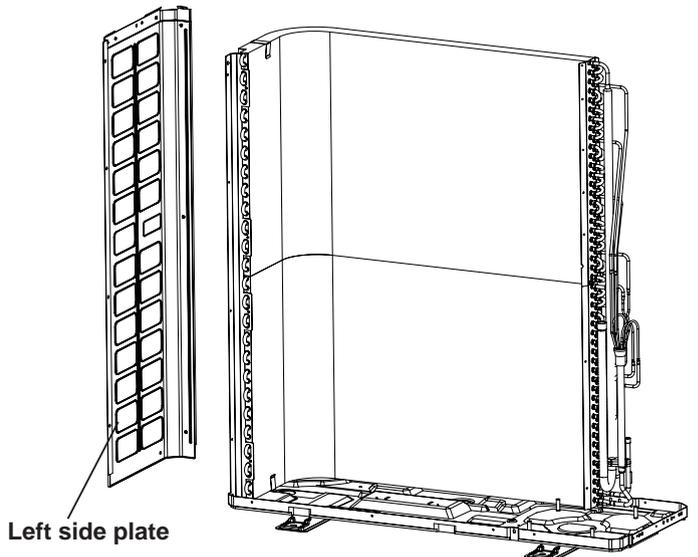
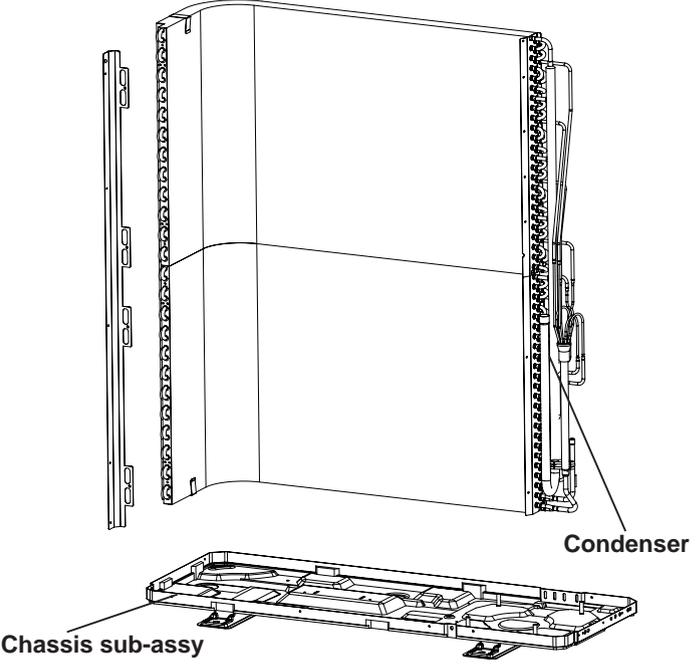
| Steps | Procedure |
|----------------------------|--|
| 3. Remove top cover | <p>Remove the screws connecting the top cover with outer case, right side plate and left side plate; lift the top cover upwards to remove it.</p>  |
| 4. Remove front side plate | <p>Remove the screws connecting the front side plate with chassis and middle isolation sheet, and then remove the front side plate.</p>  |
| 5. Remove right side plate | <p>Remove the screws connecting the right side plate with electric box assy, valve support, chassis and condenser side plate, and then remove the right side plate.</p>  |

| Steps | Procedure |
|---|--|
| <p>6. Remove grille</p> | <p>Remove the 4 screws connecting the grille and outer case, and then remove the panel grille.</p>  |
| <p>7. Remove outer case</p> | <p>Remove screws connecting outer case and motor support, middle isolation sheet and chassis, pull the outer case upwards slightly, loosen clasps between outer case and left side plate, and then remove the outer case.</p>  |
| <p>8. Remove electric box assy</p> | <p>a. Remove the grounding wire screw on the electric box assy and then remove the grounding wire.</p> <p>b. Disconnect the wiring terminals of compressor, high pressure switch, compressor overload protector, temperature sensor, outdoor fan motor and 4-way valve.</p> <p>Note: keep pressing the circlip when disconnecting the wiring terminal of reactor; keep pressing the retainer when disconnecting other wiring terminals.</p> <p>c. Remove the wire inside the wiring groove.</p>  |

| Steps | Procedure |
|---|--|
| <p>9. Remove blade, motor, motor support</p> | <p>a. Remove nuts fixing axial flow blade with wrench, and then remove the axial flow blade.</p> <p>b. Remove screws connecting motor support and chassis, loosen damper block and then remove the motor support.</p> <p>c. Remove screws fixing motor, and then remove the motor</p>  |
| <p>10. Remove 4-way valve</p> | <p>Unsolder the spot weld between 4-way valve and vapour liquid separator, compressor cut-off valve sub-assy and condenser, and then remove the 4-way valve.</p> <p>Note: When unsoldering the spot weld, wrap the 4-way valve with wet cloth completely to avoid damage to valve due to high temperature.</p>  |
| <p>11. Remove valve support</p> | <p>Unsolder all spot welds connected with valve support and then remove the valve support.</p> <p>Note: When unsoldering the spot weld, wrap the gas valve and liquid valve with wet cloth completely to avoid damage to valve due to high temperature.</p>  |

| Steps | Procedure |
|---|---|
| <p>12. Remove connection pipe sub-assy</p> | <p>Remove all spot welds connected with connection pipe, and then remove the connection pipe sub-assy.</p>  |
| <p>13. Remove compressor</p> | <p>Remove the 3 foot nuts fixing compressor and then lift the compressor upwards to remove the compressor and damping cushion.</p> <p>Note: Keep the ports of discharge pipe and suction pipe from foreign objects.</p>  |
| <p>14. Remove vapour liquid separator</p> | <p>Unsolder spot welds connected with vapour liquid separator, remove screws connected vapour liquid separator and middle isolation sheet, and then remove the vapour liquid separator.</p>  |

| Steps | Procedure |
|---|---|
| <p>15. Remove compressor mounting plate sub-assy</p> | <p>Remove the 4 foot nuts fixing compressor mounting plate sub-assy and chassis, to remove the compressor mounting plate sub-assy.</p>  <p>compressor mounting plate sub-assy</p> |
| <p>16. Remove PFC electrical inductance</p> | <p>Remove the screws fixing PFC electrical inductance and isolation sheet, to remove the PFC electrical inductance.</p>  <p>PFC electrical inductance</p> |
| <p>17. Remove middle isolation sheet</p> | <p>Remove screws connecting middle isolation sheet and support plate of condenser, chassis, and then remove the middle isolation sheet.</p>  <p>Middle isolation sheet</p> |

| Steps | Procedure |
|--|--|
| <p>18. Remove left side plate</p> | <p>Remove screws connecting left side plate and support plate of condenser, chassis, and then remove the left side plate.</p>  |
| <p>19. Remove condenser</p> | <p>Remove screws connecting condenser and chassis, and then remove the condenser. Remove screws connecting support plate of condenser and condenser, and then remove the support plate of condenser.</p>  |

Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: $T_f = T_c \times 1.8 + 32$

Set temperature

| Fahrenheit display temperature (°F) | Fahrenheit (°F) | Celsius (°C) | Fahrenheit display temperature (°F) | Fahrenheit (°F) | Celsius (°C) | Fahrenheit display temperature (°F) | Fahrenheit (°F) | Celsius (°C) |
|-------------------------------------|-----------------|--------------|-------------------------------------|-----------------|--------------|-------------------------------------|-----------------|--------------|
| 61 | 60.8 | 16 | 69/70 | 69.8 | 21 | 78/79 | 78.8 | 26 |
| 62/63 | 62.6 | 17 | 71/72 | 71.6 | 22 | 80/81 | 80.6 | 27 |
| 64/65 | 64.4 | 18 | 73/74 | 73.4 | 23 | 82/83 | 82.4 | 28 |
| 66/67 | 66.2 | 19 | 75/76 | 75.2 | 24 | 84/85 | 84.2 | 29 |
| 68 | 68 | 20 | 77 | 77 | 25 | 86 | 86 | 30 |

Ambient temperature

| Fahrenheit display temperature (°F) | Fahrenheit (°F) | Celsius (°C) | Fahrenheit display temperature (°F) | Fahrenheit (°F) | Celsius (°C) | Fahrenheit display temperature (°F) | Fahrenheit (°F) | Celsius (°C) |
|-------------------------------------|-----------------|--------------|-------------------------------------|-----------------|--------------|-------------------------------------|-----------------|--------------|
| 32/33 | 32 | 0 | 55/56 | 55.4 | 13 | 79/80 | 78.8 | 26 |
| 34/35 | 33.8 | 1 | 57/58 | 57.2 | 14 | 81 | 80.6 | 27 |
| 36 | 35.6 | 2 | 59/60 | 59 | 15 | 82/83 | 82.4 | 28 |
| 37/38 | 37.4 | 3 | 61/62 | 60.8 | 16 | 84/85 | 84.2 | 29 |
| 39/40 | 39.2 | 4 | 63 | 62.6 | 17 | 86/87 | 86 | 30 |
| 41/42 | 41 | 5 | 64/65 | 64.4 | 18 | 88/89 | 87.8 | 31 |
| 43/44 | 42.8 | 6 | 66/67 | 66.2 | 19 | 90 | 89.6 | 32 |
| 45 | 44.6 | 7 | 68/69 | 68 | 20 | 91/92 | 91.4 | 33 |
| 46/47 | 46.4 | 8 | 70/71 | 69.8 | 21 | 93/94 | 93.2 | 34 |
| 48/49 | 48.2 | 9 | 72 | 71.6 | 22 | 95/96 | 95 | 35 |
| 50/51 | 50 | 10 | 73/74 | 73.4 | 23 | 97/98 | 96.8 | 36 |
| 52/53 | 51.8 | 11 | 75/76 | 75.2 | 24 | 99 | 98.6 | 37 |
| 54 | 53.6 | 12 | 77/78 | 77 | 25 | | | |

Appendix 2: Configuration of Connection Pipe

1. Standard length of connection pipe

- 16.4ft, 24.6ft, 26.2ft.

2. Min. length of connection pipe is 9.84ft.

3. Max. length of connection pipe and max. high difference. (More details please refer to the specifications.)

4. The additional refrigerant oil and refrigerant charging required after prolonging connection pipe

- After the length of connection pipe is prolonged for 32.8ft at the basis of standard length, you should add 5ml of refrigerant oil for each additional 16.4ft of connection pipe.
- The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):
- When the length of connection pipe is above 16.4ft, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.
- Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

| Additional refrigerant charging amount for R32 | | | | |
|--|----------------|--|----------------------|---------------------------|
| Diameter of connection pipe | | Outdoor unit throttle | | |
| Liquid pipe(mm) | Gas pipe(mm) | Cooling only, cooling and heating(g / m) | Cooling only (g / m) | Cooling and heating (g/m) |
| Φ6 | Φ9.5 or Φ12 | 16 | 12 | 16 |
| Φ6 or Φ9.5 | Φ16 or Φ19 | 40 | 12 | 40 |
| Φ12 | Φ19 or Φ22.2 | 80 | 24 | 96 |
| Φ16 | Φ25.4 or Φ31.8 | 136 | 48 | 96 |
| Φ19 | / | 200 | 200 | 200 |
| Φ22.2 | / | 280 | 280 | 280 |

Note: The additional refrigerant charging amount in Sheet 2 is recommended value, not compulsory.

Appendix 4: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units(15K)

| Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) |
|----------|----------------|----------|----------------|----------|----------------|----------|----------------|
| -19 | 138.1 | 20 | 18.75 | 59 | 3.848 | 98 | 1.071 |
| -18 | 128.6 | 21 | 17.93 | 60 | 3.711 | 99 | 1.039 |
| -17 | 121.6 | 22 | 17.14 | 61 | 3.579 | 100 | 1.009 |
| -16 | 115 | 23 | 16.39 | 62 | 3.454 | 101 | 0.98 |
| -15 | 108.7 | 24 | 15.68 | 63 | 3.333 | 102 | 0.952 |
| -14 | 102.9 | 25 | 15 | 64 | 3.217 | 103 | 0.925 |
| -13 | 97.4 | 26 | 14.36 | 65 | 3.105 | 104 | 0.898 |
| -12 | 92.22 | 27 | 13.74 | 66 | 2.998 | 105 | 0.873 |
| -11 | 87.35 | 28 | 13.16 | 67 | 2.896 | 106 | 0.848 |
| -10 | 82.75 | 29 | 12.6 | 68 | 2.797 | 107 | 0.825 |
| -9 | 78.43 | 30 | 12.07 | 69 | 2.702 | 108 | 0.802 |
| -8 | 74.35 | 31 | 11.57 | 70 | 2.611 | 109 | 0.779 |
| -7 | 70.5 | 32 | 11.09 | 71 | 2.523 | 110 | 0.758 |
| -6 | 66.88 | 33 | 10.63 | 72 | 2.439 | 111 | 0.737 |
| -5 | 63.46 | 34 | 10.2 | 73 | 2.358 | 112 | 0.717 |
| -4 | 60.23 | 35 | 9.779 | 74 | 2.28 | 113 | 0.697 |
| -3 | 57.18 | 36 | 9.382 | 75 | 2.206 | 114 | 0.678 |
| -2 | 54.31 | 37 | 9.003 | 76 | 2.133 | 115 | 0.66 |
| -1 | 51.59 | 38 | 8.642 | 77 | 2.064 | 116 | 0.642 |
| 0 | 49.02 | 39 | 8.297 | 78 | 1.997 | 117 | 0.625 |
| 1 | 46.6 | 40 | 7.967 | 79 | 1.933 | 118 | 0.608 |
| 2 | 44.31 | 41 | 7.653 | 80 | 1.871 | 119 | 0.592 |
| 3 | 42.14 | 42 | 7.352 | 81 | 1.811 | 120 | 0.577 |
| 4 | 40.09 | 43 | 7.065 | 82 | 1.754 | 121 | 0.561 |
| 5 | 38.15 | 44 | 6.791 | 83 | 1.699 | 122 | 0.547 |
| 6 | 36.32 | 45 | 6.529 | 84 | 1.645 | 123 | 0.532 |
| 7 | 34.58 | 46 | 6.278 | 85 | 1.594 | 124 | 0.519 |
| 8 | 32.94 | 47 | 6.038 | 86 | 1.544 | 125 | 0.505 |
| 9 | 31.38 | 48 | 5.809 | 87 | 1.497 | 126 | 0.492 |
| 10 | 29.9 | 49 | 5.589 | 88 | 1.451 | 127 | 0.48 |
| 11 | 28.51 | 50 | 5.379 | 89 | 1.408 | 128 | 0.467 |
| 12 | 27.18 | 51 | 5.197 | 90 | 1.363 | 129 | 0.456 |
| 13 | 25.92 | 52 | 4.986 | 91 | 1.322 | 130 | 0.444 |
| 14 | 24.73 | 53 | 4.802 | 92 | 1.282 | 131 | 0.433 |
| 15 | 23.6 | 54 | 4.625 | 93 | 1.244 | 132 | 0.422 |
| 16 | 22.53 | 55 | 4.456 | 94 | 1.207 | 133 | 0.412 |
| 17 | 21.51 | 56 | 4.294 | 95 | 1.171 | 134 | 0.401 |
| 18 | 20.54 | 57 | 4.139 | 96 | 1.136 | 135 | 0.391 |
| 19 | 19.63 | 58 | 3.99 | 97 | 1.103 | 136 | 0.382 |

Resistance Table of Tube Temperature Sensors for Indoor and Outdoor (20K)

| Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) |
|----------|----------------|----------|----------------|----------|----------------|----------|----------------|
| -19 | 181.4 | 20 | 25.01 | 59 | 5.13 | 98 | 1.427 |
| -18 | 171.4 | 21 | 23.9 | 60 | 4.948 | 99 | 1.386 |
| -17 | 162.1 | 22 | 22.85 | 61 | 4.773 | 100 | 1.346 |
| -16 | 153.3 | 23 | 21.85 | 62 | 4.605 | 101 | 1.307 |
| -15 | 145 | 24 | 20.9 | 63 | 4.443 | 102 | 1.269 |
| -14 | 137.2 | 25 | 20 | 64 | 4.289 | 103 | 1.233 |
| -13 | 129.9 | 26 | 19.14 | 65 | 4.14 | 104 | 1.198 |
| -12 | 123 | 27 | 18.13 | 66 | 3.998 | 105 | 1.164 |
| -11 | 116.5 | 28 | 17.55 | 67 | 3.861 | 106 | 1.131 |
| -10 | 110.3 | 29 | 16.8 | 68 | 3.729 | 107 | 1.099 |
| -9 | 104.6 | 30 | 16.1 | 69 | 3.603 | 108 | 1.069 |
| -8 | 99.13 | 31 | 15.43 | 70 | 3.481 | 109 | 1.039 |
| -7 | 94 | 32 | 14.79 | 71 | 3.364 | 110 | 1.01 |
| -6 | 89.17 | 33 | 14.18 | 72 | 3.252 | 111 | 0.983 |
| -5 | 84.61 | 34 | 13.59 | 73 | 3.144 | 112 | 0.956 |
| -4 | 80.31 | 35 | 13.04 | 74 | 3.04 | 113 | 0.93 |
| -3 | 76.24 | 36 | 12.51 | 75 | 2.94 | 114 | 0.904 |
| -2 | 72.41 | 37 | 12 | 76 | 2.844 | 115 | 0.88 |
| -1 | 68.79 | 38 | 11.52 | 77 | 2.752 | 116 | 0.856 |
| 0 | 65.37 | 39 | 11.06 | 78 | 2.663 | 117 | 0.833 |
| 1 | 62.13 | 40 | 10.62 | 79 | 2.577 | 118 | 0.811 |
| 2 | 59.08 | 41 | 10.2 | 80 | 2.495 | 119 | 0.777 |
| 3 | 56.19 | 42 | 9.803 | 81 | 2.415 | 120 | 0.769 |
| 4 | 53.46 | 43 | 9.42 | 82 | 2.339 | 121 | 0.746 |
| 5 | 50.87 | 44 | 9.054 | 83 | 2.265 | 122 | 0.729 |
| 6 | 48.42 | 45 | 8.705 | 84 | 2.194 | 123 | 0.71 |
| 7 | 46.11 | 46 | 8.37 | 85 | 2.125 | 124 | 0.692 |
| 8 | 43.92 | 47 | 8.051 | 86 | 2.059 | 125 | 0.674 |
| 9 | 41.84 | 48 | 7.745 | 87 | 1.996 | 126 | 0.658 |
| 10 | 39.87 | 49 | 7.453 | 88 | 1.934 | 127 | 0.64 |
| 11 | 38.01 | 50 | 7.173 | 89 | 1.875 | 128 | 0.623 |
| 12 | 36.24 | 51 | 6.905 | 90 | 1.818 | 129 | 0.607 |
| 13 | 34.57 | 52 | 6.648 | 91 | 1.736 | 130 | 0.592 |
| 14 | 32.98 | 53 | 6.403 | 92 | 1.71 | 131 | 0.577 |
| 15 | 31.47 | 54 | 6.167 | 93 | 1.658 | 132 | 0.563 |
| 16 | 30.04 | 55 | 5.942 | 94 | 1.609 | 133 | 0.549 |
| 17 | 28.68 | 56 | 5.726 | 95 | 1.561 | 134 | 0.535 |
| 18 | 27.39 | 57 | 5.519 | 96 | 1.515 | 135 | 0.521 |
| 19 | 26.17 | 58 | 5.32 | 97 | 1.47 | 136 | 0.509 |

Resistance Table of Discharge Temperature Sensor for Outdoor(50K)

| Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) | Temp(°C) | Resistance(kΩ) |
|----------|----------------|----------|----------------|----------|----------------|----------|----------------|
| -29 | 853.5 | 10 | 98 | 49 | 18.34 | 88 | 4.75 |
| -28 | 799.8 | 11 | 93.42 | 50 | 17.65 | 89 | 4.61 |
| -27 | 750 | 12 | 89.07 | 51 | 16.99 | 90 | 4.47 |
| -26 | 703.8 | 13 | 84.95 | 52 | 16.36 | 91 | 4.33 |
| -25 | 660.8 | 14 | 81.05 | 53 | 15.75 | 92 | 4.20 |
| -24 | 620.8 | 15 | 77.35 | 54 | 15.17 | 93 | 4.08 |
| -23 | 580.6 | 16 | 73.83 | 55 | 14.62 | 94 | 3.96 |
| -22 | 548.9 | 17 | 70.5 | 56 | 14.09 | 95 | 3.84 |
| -21 | 516.6 | 18 | 67.34 | 57 | 13.58 | 96 | 3.73 |
| -20 | 486.5 | 19 | 64.33 | 58 | 13.09 | 97 | 3.62 |
| -19 | 458.3 | 20 | 61.48 | 59 | 12.62 | 98 | 3.51 |
| -18 | 432 | 21 | 58.77 | 60 | 12.17 | 99 | 3.41 |
| -17 | 407.4 | 22 | 56.19 | 61 | 11.74 | 100 | 3.32 |
| -16 | 384.5 | 23 | 53.74 | 62 | 11.32 | 101 | 3.22 |
| -15 | 362.9 | 24 | 51.41 | 63 | 10.93 | 102 | 3.13 |
| -14 | 342.8 | 25 | 49.19 | 64 | 10.54 | 103 | 3.04 |
| -13 | 323.9 | 26 | 47.08 | 65 | 10.18 | 104 | 2.96 |
| -12 | 306.2 | 27 | 45.07 | 66 | 9.83 | 105 | 2.87 |
| -11 | 289.6 | 28 | 43.16 | 67 | 9.49 | 106 | 2.79 |
| -10 | 274 | 29 | 41.34 | 68 | 9.17 | 107 | 2.72 |
| -9 | 259.3 | 30 | 39.61 | 69 | 8.85 | 108 | 2.64 |
| -8 | 245.6 | 31 | 37.96 | 70 | 8.56 | 109 | 2.57 |
| -7 | 232.6 | 32 | 36.38 | 71 | 8.27 | 110 | 2.50 |
| -6 | 220.5 | 33 | 34.88 | 72 | 7.99 | 111 | 2.43 |
| -5 | 209 | 34 | 33.45 | 73 | 7.73 | 112 | 2.37 |
| -4 | 198.3 | 35 | 32.09 | 74 | 7.47 | 113 | 2.30 |
| -3 | 199.1 | 36 | 30.79 | 75 | 7.22 | 114 | 2.24 |
| -2 | 178.5 | 37 | 29.54 | 76 | 7.00 | 115 | 2.18 |
| -1 | 169.5 | 38 | 28.36 | 77 | 6.76 | 116 | 2.12 |
| 0 | 161 | 39 | 27.23 | 78 | 6.54 | 117 | 2.07 |
| 1 | 153 | 40 | 26.15 | 79 | 6.33 | 118 | 2.02 |
| 2 | 145.4 | 41 | 25.11 | 80 | 6.13 | 119 | 1.96 |
| 3 | 138.3 | 42 | 24.13 | 81 | 5.93 | 120 | 1.91 |
| 4 | 131.5 | 43 | 23.19 | 82 | 5.75 | 121 | 1.86 |
| 5 | 125.1 | 44 | 22.29 | 83 | 5.57 | 122 | 1.82 |
| 6 | 119.1 | 45 | 21.43 | 84 | 5.39 | 123 | 1.77 |
| 7 | 113.4 | 46 | 20.6 | 85 | 5.22 | 124 | 1.73 |
| 8 | 108 | 47 | 19.81 | 86 | 5.06 | 125 | 1.68 |
| 9 | 102.8 | 48 | 19.06 | 87 | 4.90 | 126 | 1.64 |

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