ecoclima

Service manual

(ON/OFF 50Hz **R410A**)

Split system:

EC(-W)-07QC
EC(-W)-09QC
EC(-W)-12QC
EC(-W)-18QC
EC(-W)-24QC

CONTENTS

1.Range & Conditions

1.1 Operating Range

Operating Modes	Temperature	Indoor Temperature	Outdoor Temperature
Cooling	Max.	32℃ DB/27℃ WB	43℃ DB/26℃ WB
	Min.	21℃ DB/15℃ WB	21℃ DB
Heating	Max.	27℃ DB	24℃ DB/18℃ WB
	Min.	20℃ DB	-5℃ DB/-6℃ WB

1.2 Operating Conditions

	Rated Operating Conditions	
	Indoor Temperature	Outdoor Temperature
Cooling	27℃ DB/19℃ WB	35℃ DB/24℃ WB
Tubing Length (m)	3	
	Max. Operating Value	
	Indoor Temperature	Outdoor Temperature
Cooling	32℃ DB/23℃ WB	43℃ DB
Tubing Length (m)	3	

DB: Dry-bulb temperature
WB: Wet-bulb temperature

2. Control Specifications

2.1 System source

2.1.1 Signal input

Temperature sensor signal (indoor temperature , indoor coiled temperature, outdoor coiled temperature); remote control signal; key input.

2.1.2 Signal output

LED×4 (SI, SCK, RCK or air refresh, operation, pause, timer); louver motor (a, b, c, d); buzzer, compressor, 4-way reversing valve, indoor fan motor (H,L), outdoor fan motor, AUH, air refresh, and other assistant functions.

2.2 Control functions

2.2.1 Switches input:

Press the Emergency button on the panel when the air conditioner is in the off mode, then the unit will be turned on and work in the “SMART” mode. Press this button again when the unit is running (including test run or in “SMART” mode), the air conditioner will be turned off.

Note:

All the displaying will disappear when turn off the air conditioner by pressing the Emergency button.

2.2.2 Timer

Timing on/off

1. Turn on the air conditioner on timer: The air conditioner will starts operation at the set time. “ time on” function is only effective for once in 24 hours. If user turns on the air condition by pressing on/off button on the remote controller before the set time, then” timing on” function will be cancelled. If user select “timing on” when the air conditioner is in on status, the air conditioner will stop immediately and restart automatically at set time.
2. Timing off: The air conditioner will exit running at set time. ” timing off” function is only effective for once in 24 hours. If user turns off the air condition by pressing on/off button on the remote controller before the set time, then” timing on” function will be cancelled. If user selects “timing off” when the air conditioner is in off status, the air conditioner will run immediately and stop automatically at set time.
3. Program timing control：Air conditioner is turned on/off automatically at set time every day. if user turn off the air conditioner by pressing off button before the set time, then the “timing off” function will be cancelled but the “timing on” function is still effective；If user turns off the air conditioner by pressing on the emergency button before the set time, then the program timing control will be cancelled. If user turn on the air conditioner by pressing on the on button on the remote controller before the set time, then timing on function will be cancelled but the timing off function is still effective; if the user turn of the air conditioner by pressing on emergency button before set time, then the program timing control will be cancelled.

3.2.3 Sleep mode:

When the sleep mode is set by remote, the set temperature will increase 1℃ after running 1 hour in Cooling or Dehumidifying mode. （Note：Display set temperature is unaltered）

When the air conditioner runs in sleep mode, the Max. indoor fan speed is set at medium level.

Note: The fan speed is set to be at low level, but the fan speed will turn into medium level when in freeze-prevention mode.

2.2.4 Unit type and Power

Please refer to PIN function

Note: After changing the unit type, the new unit type should be tested for the relevant function and protection differently according to different unit types.

2.2.5 Operation for dryness enzyme-prevention

When the unit is turned off in cooling mode, the indoor unit will continue run in low fan speed for about 3 minutes to remove the partial moisture in the room.

2.3 Auto-operating Mode

2.3.1 Auto-operating

The unit will judge the operation mode automatically after receiving the Auto signal.

2.3.1.1 After a/c entering auto-operating mode, the unit will run in auto mode. After starting auto mode, the sweeping indicator flashes (on for 1.5 seconds and out for 0.5 seconds), indoor unit will be switched off and the outdoor unit will run at low fan speed level. The system will choose operation mode according to the present ambient temperature after 20 seconds:

when Tr≤20℃，fan only operates

when 20℃＜Tr＜24℃，dehumidification operates

when Tr≥24℃，cooling operates

2.3.1.2 The fan speed is at auto mode and adjustable, the display will change accordingly.

Note: If choosing the airflow mode, the auto airflow is set to be at low level automatically.

2.3.1.3 The airflow direction is swing and adjustable, and the display will change accordingly.

2.3.1.4 All output (air refresh,, air ventilate, etc.) is effective.

2.3.1.5 In cooling mode, the original set temperature is Ts=Tr-5℃ and 22℃≤Ts≤27℃, then the master unit will not change operation mode when the unit enters cooling mode.

If users want to change working condition by remote controller, in case the condition will not conflict with the master unit mode, (such as cooling mode conflicts with AUH mode), the master unit will operate and display in new condition set by remote controller.

2.3.1.6 If users want to change working condition by remote controller, in case the condition will not conflict with the master unit mode, the master unit will operate and display in new condition set by remote controller.

2.3.2 Cooling:

Temperature control range: 16℃-32℃; Original value: 24℃;

Temperature control precision: ±1℃;

Characters on control:

4-way reversing valve closes:

When Tr≥Ts+1℃, compressor runs; When Tr≤Ts-1℃, compressor stops; The control circuit will stop

compressor only after it has run at least 5 minutes. The compressor can be restarted 3 minutes later the turn-off.

Fan speed control:

Auto: When Tr>Ts+2℃, high speed;

When Ts< Tr≤Ts+2℃, medium speed;

When Tr≤T, low speed.

Manual: Users can select the fan speed of high, medium or low level as needed when the air conditioner is in the turn-on status.

Louver adjustment:

Manual (vertical direction): Set the blades position as needed.

2.3.3. Dehumidification:

Temperature control range: 16℃-32℃; Temperature control precision: ±1℃;

Characters on control:

4-way reversing valve closes.

When Tr≥Ts+2℃,the running mode is the same to the cooling operation;

When Ts-1℃< Tr < Ts+2℃, compressor and outdoor fan motor run continuously. And indoor fan motor runs at low fan speed

When 15℃< Tr < Ts-1℃, compressor and outdoor fan motor are working according to 3 minutes working alternating with 9 minutes stopping. Indoor fan motor runs at low fan speed when compressor is running, and it runs at breeze level for 30 seconds later the turn-off of compressor. 30 seconds later, fan motor will turn off.

When Tr≤15℃, indoor and outdoor fan motor will stop running, louver blades (vertical direction) can't be controlled.

2.3.4 Fan sweep

In this mode, compressor, outdoor fan motor all open.

Indoor fan motor can be set at high, medium, low level as needed.

Manual (vertical direction): Set the blades position as needed.

2.4 Protection function

2.4.1 Delay-starting protection for the compressor

Compress will restart working 3 minutes later the turn-off of compressor or power-off to keep the pressure balance of the cooling system.

2.4.3 Freeze-prevention: To prevent indoor heat exchanger freezing in cool and dry operation.

When Trc≤3℃, the unit will enter freeze-prevention operation. If indoor fan speed is at low or breeze level, it will turn to medium speed automatically; if indoor fan speed is at medium speed, it will turn to high speed;, The air conditioner will exit Freeze-prevention operation when Trc>10℃, indoor fan motor runs at the set fan speed. Compressor will stop running when it runs at least 10 minutes and Trc≤0℃. If the off-time of compressor is for more than 6 minutes or Trc≥10℃, and the compressor stops running for more than 3 minutes. Compressor and outdoor fan motor will restart working. The air conditioner will exit Freeze-prevention operation, and indoor fan motor is running at the set speed.

2.4.4 Testing codes:

Code 1 is to set test run (Not effective for “SMART” mode and “DEHUMIDIFICATION” mode. After entering testing run, no matter what is the set temperature or indoor temperature, the unit will run as the set cooling or heating mode and will also not detect stopping condition. The max. running time is 60 minutes.)

Code 2 is to set fast testing.

Code 3 is to set auto-diagnosis.

Code 4 is to cancel the above setting.

There only can be one setting each time in the tests above.

2.4.5 Failure code display and protection

A. The defining of code refers to the following:

Code 11: room temperature code 12: indoor coil pipe temperature

Code 13: outdoor coil pipe temperature(Not available)

B. Code 14: abnormal information

E0: Normal operation

P3: Freeze-prevention

F4: The circuit of indoor PG motor is damaged or abnormal

F1: The circuit of room temperature sensor is damaged or abnormal

F2: The circuit of indoor coil pipe temperature sensor is damaged or abnormal

C. The circuit of room temperature sensor is abnormal---Pause light flashes and the unit stops.

D. The circuit of pipe temperature sensor is abnormal---Timer light flashes

E. When outdoor pipe temp. sensor is failure, defrost entry conditions for the unit without outdoor pipe temp. sensor .

F. The circuit of indoor PG motor is damaged or abnormal---The unit can not run, and display “F4” or “Air refresh” light flashes on display PCB.

2.5 Other functions

2.5.1 Auto-diagnosis

The Auto-diagnosis functions are in the following steps:

Buzzer beeps 1s →no output 0.5s→running indicator lights 0.5s→pause indicator lights 0.5s→timer

indicator lights 0.5s→air refresh indicator lights 0.5s →running compressor on 0.5s→outdoor fan motor 0.5s→4-way reversing valve 0.5s→AUH 0.5s→indoor fan motor high level 0.5s→indoor fan motor medium level 0.5s→indoor fan motor low level 0.5s→air refresh indicator lights 0.5s→FLAP-a 0.5s→FLAP-b 0.5s→ FLAP-c 0.5s→FLAP-d 0.5s→no output 0.5s→all output 1s.

2.5.2 Time reducing:

The CPU runs as 60 times as the former speed. (There is no timer reducing function within 1 minute)

2.5.3 Display function:

The central display screen does not display symbols if air conditioner is in off status, but Timer indicator lights when in Timer mode. In the checking and setting conditions, the screen will also display the corresponding state of the unit.

Press the DIAPLAY button,the screen will turn on or turn off immediately;

Press the SLEEP button to enter sleep function,the screen will turn off after 30s,when press the button again,the screen will turn on immediately.

2.5.4 Air refresh function:

Press air refresh button when the unit is in off status, the unit will switch on. Indoor fan motor runs at the set fan speed, air refresh outputs. Press this button again, air refresh function is cancelled and the unit will turn back to the original mode. Press air refresh button if the unit is running, air refresh indicator will light and air refresh output. Press this button again, air refresh function is cancelled and the unit will turn back to the original running mode.

2.5.5 Quiet Operation

Press “QUIET” button when air conditioner is “FAN SWEEP” status, the indoor fan will run at low level.

Press “AIR REFRESH” button when air conditioner is in off status and set fan speed as quite mode, the indoor fan will run at low level.

In other status, the indoor fan runs at low level.

2.5.6Restoration function (optional)

To install E^2PROM, users do not have to program first and then assemble. As long as installing E^2PROM, the unit will have the restoration function after electricity comes again.

2.5.7 Restoration (optional)

Mode
Fan speed
On/Off status
Dew-prevention symbol
Fan sweep symbol
Sleep symbol
Quiet symbol
Air refresh symbol
Set temperature
Louver position

2.5.8 The second function button

The second function for “AIR REFRESH” button:

Press “AIR REFRESH” button and hold on, and finish the test condition after 5 seconds. When entering this mode, the original value is 00 for each entry. The second function is only effective for temperature control button, on/off button, and air refresh button. Other buttons are not effective for the second function.

The second function for “AUH” button:

Press “AUH” button and hold on for 5 seconds, the unit will enter dew-prevention function. At the same time, the unit gives a buzz sound. This button is only effective in Cooling and Dehumidification mode. Users can set or cancel this function by pressing this button. (Y2 model gives tacit consent automatically to start dew-prevention function.)

2.5.9 Demonstration Mode: (Blank unit)

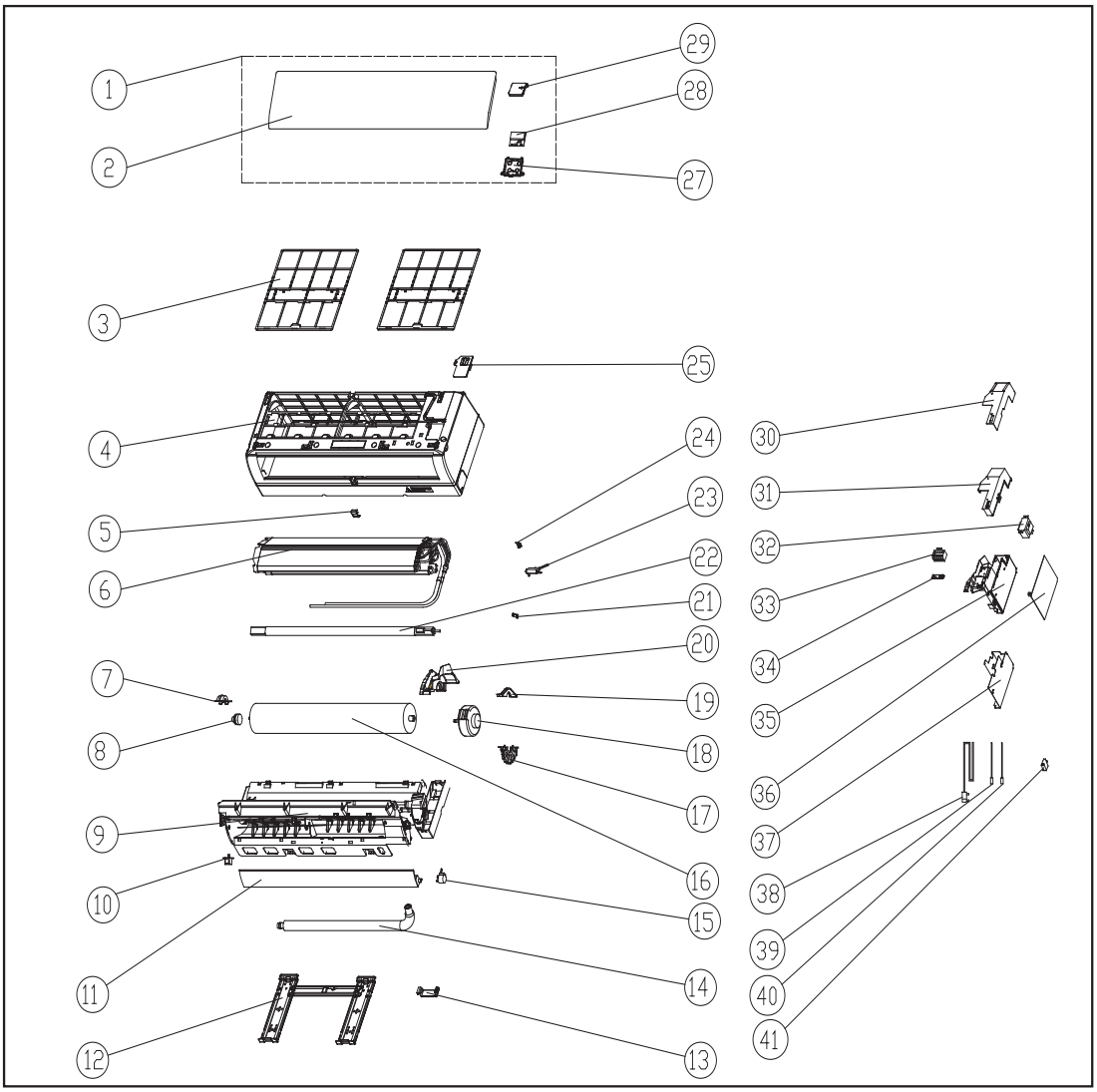
When electrified, the unit runs at medium level if the unit has not received the signal from remote controller. Pause indicator lights 1s→running indicator lights 1s→timer indicator lights 1s→air refresh indicator lights 1s →Pause indicator lights 1s→……; The display screen displays every 11,22,33,44,55,66,77,88,99,00 1s circularly.

After receiving the signal from the remote controller, the unit will operate by the signal.

During the courts of demonstration, all signals of outdoor unit are ineffective.

3. Exploded view

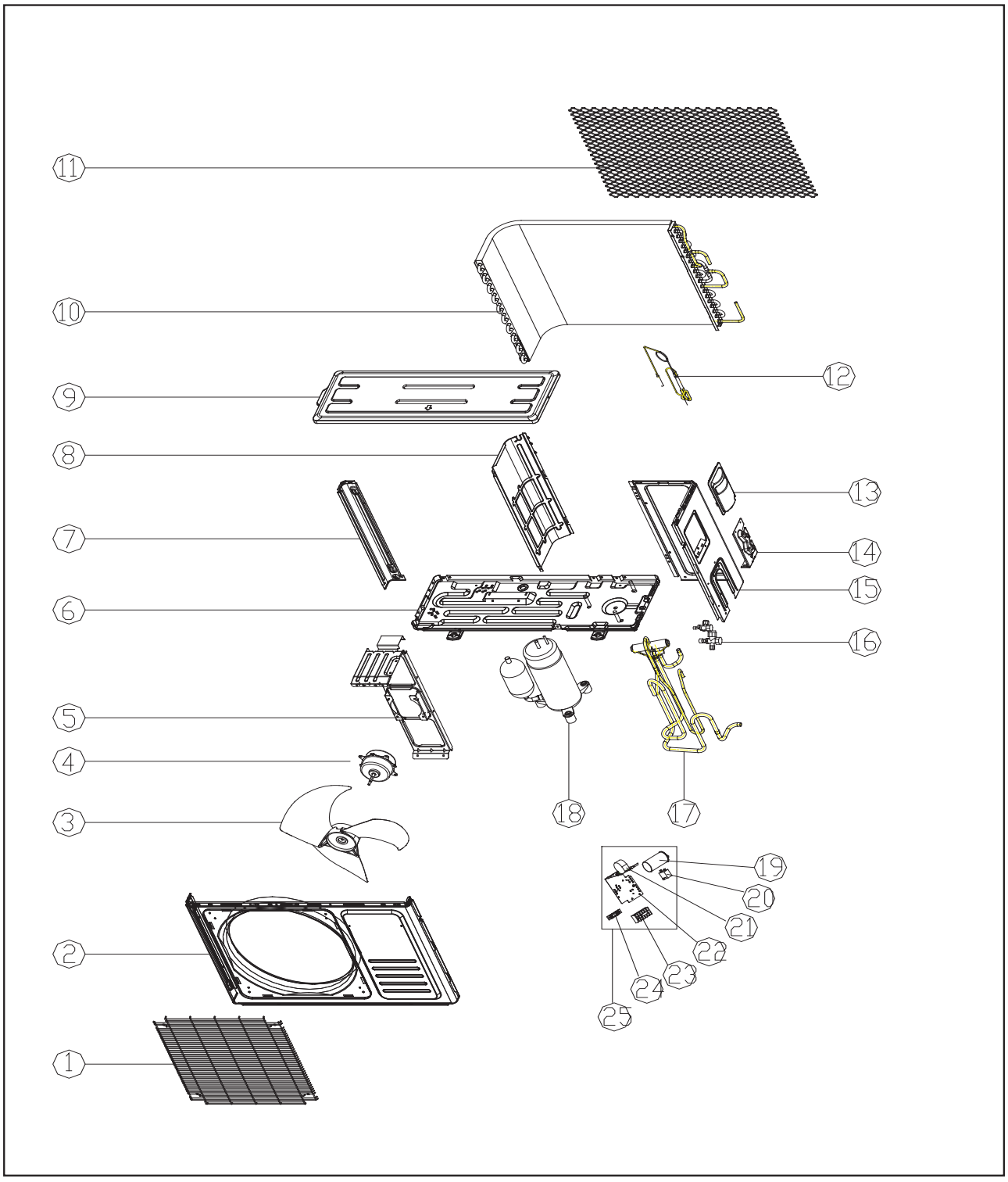
3.1 Exploded view for indoor unit



NO	Materails Description	NO	Materails Description
1	Front panel subassembly	21	Negative ion generator（optional）
2	Front panel	22	electric heating tube（optional）
3	Air filter	23	Positive and negative ion generate（optional）
4	Medium frame subassembly	24	Sensor bracket
5	Screw cover	25	Electric control board
6	Evaporator subassembly	26	Spring
7	pressure plate	27	Display box
8	Bearing	28	Display P.C.B assembly
9	Bottom frame subassembly	29	WIFI subassembly（optional）
10	Stepping motor（optional）	30	Electric control box board(metal)（optional）
11	Blade	31	Cover of electirc control box
12	Wall-Mounting frame	32	Transformer
13	Pipe pressure plate	33	Terminal board
14	Drainage pipe subassembly	34	Wire pressure plate
15	Stepping motor	35	Electirc control box
16	Crossflow fan	36	P.C.B assembly
17	Motor Bracket (bottom)	37	Electric control box(metal shell)（optional）
18	Fan motor	38	Power line
		39	Room temperature sensor
		40	Pipe temperature sensor
19	Motor Bracket（top)	41	Negative ion generator（optional）
20	Motor cover		

NOTE:Actual product may be different from above graphics,please refer to actual products.

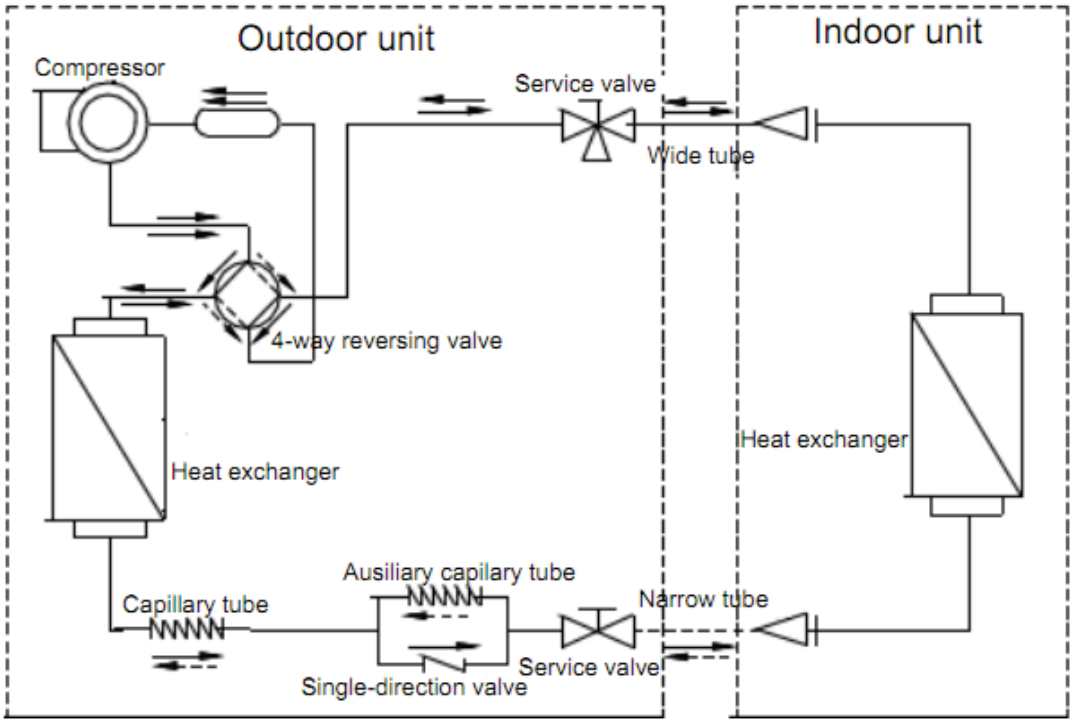
4.2 Exploded view for outdoor unit



NO	Materails Description
1	Fluorine charing pipe
2	front plate subassembly
3	propeller fan
4	fan motor
5	motor bracket subassembly
6	bottom plate subassembly
7	Metal support
8	partition board
9	Top cover assembly
10	condenser subassembly
11	rear net cover
12	capillary subassembly
13	electric cover subassembly
14	Valve mounting plate
15	Lateral plate assembly
16	cut-off valve
17	four-way valve subassembly
18	compressor
19	membrane capacitor(compressor)
20	membrane capacitor(fan motor)
21	capacitor clip
22	electric control installion plate
23	connection terminal block
24	lead assembly
25	electric control assembly

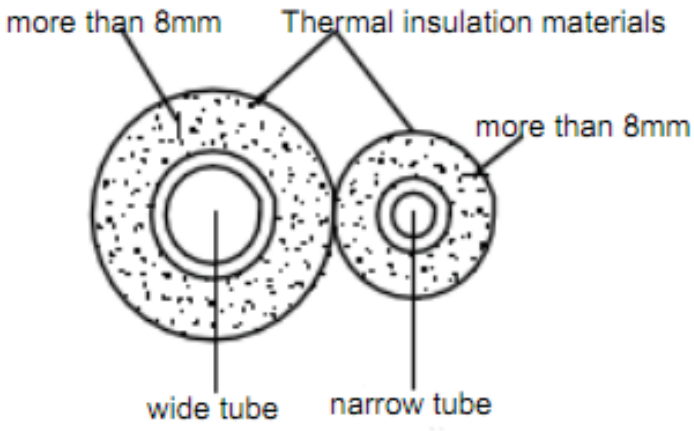
NOTE:Actual product may be different from above graphics,please refer to actual products.

5. Refrigerant Flow Diagram



Thermal insulating of refrigerant pipeline

To prevent heat loss and condensed water from dropping on the floor, the wide and narrow tube of air conditioner should be wrapped with thermal insulating materials. For using capillary tube, and the tubes are in low temperature, the thickness of thermal insulating materials shall be more than 8mm.

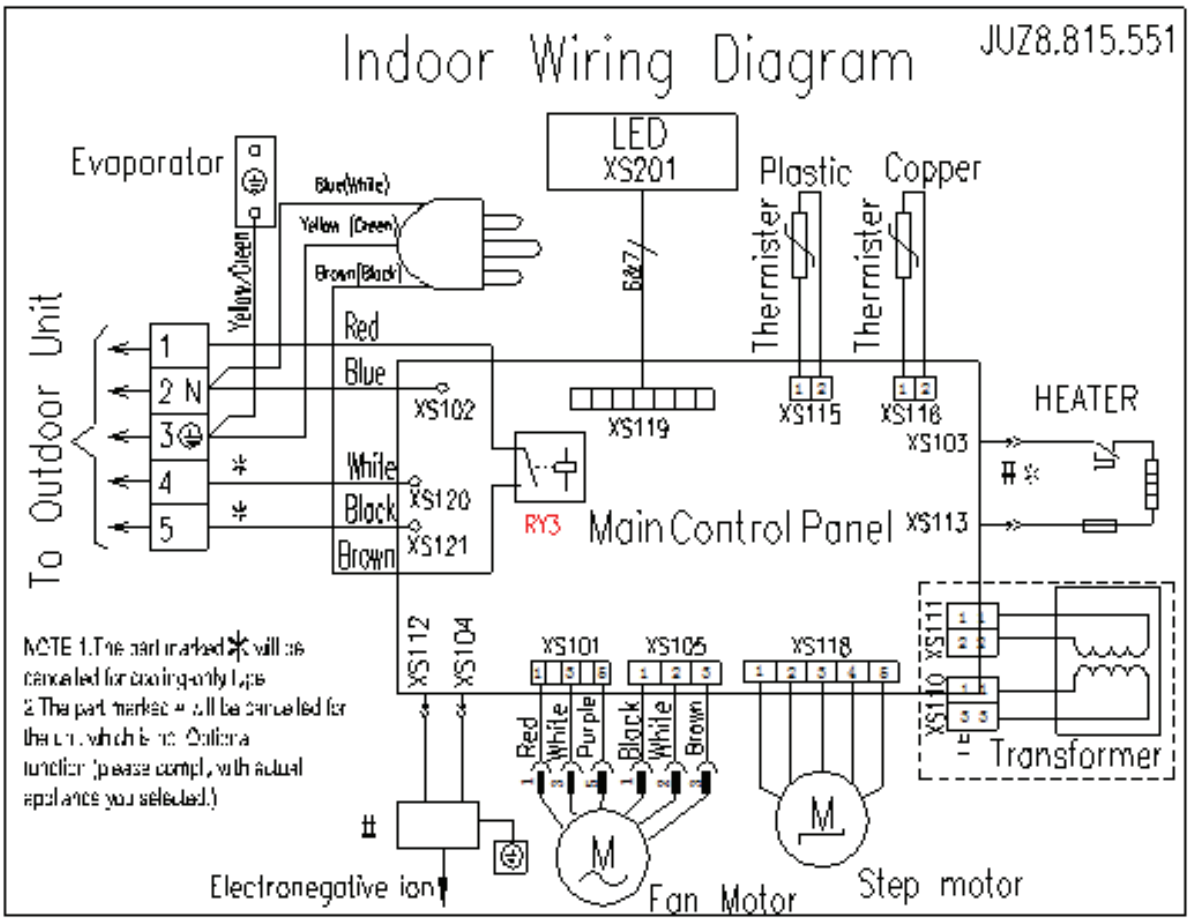


6. Circuit Diagram

6.1 Electrical wiring diagram for indoor unit

Warning

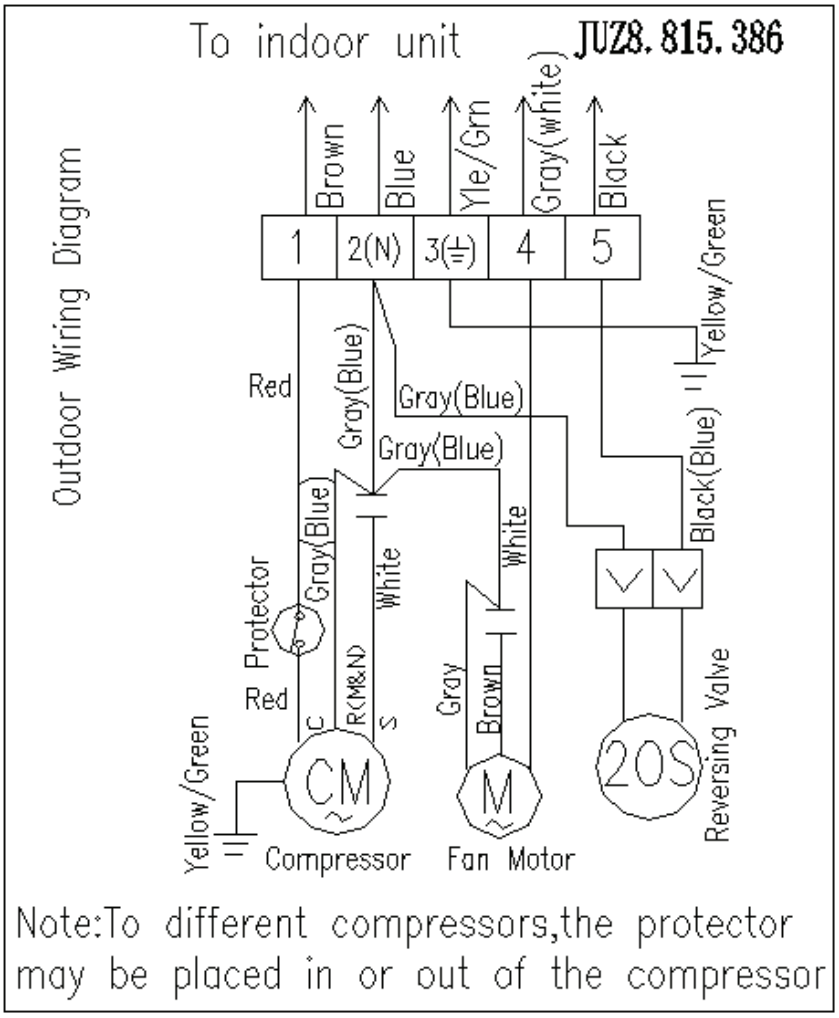
To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.



6.2 Electrical wiring diagram for outdoor unit

Warning

To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.



7 Troubleshooting

7.1 Check before troubleshooting

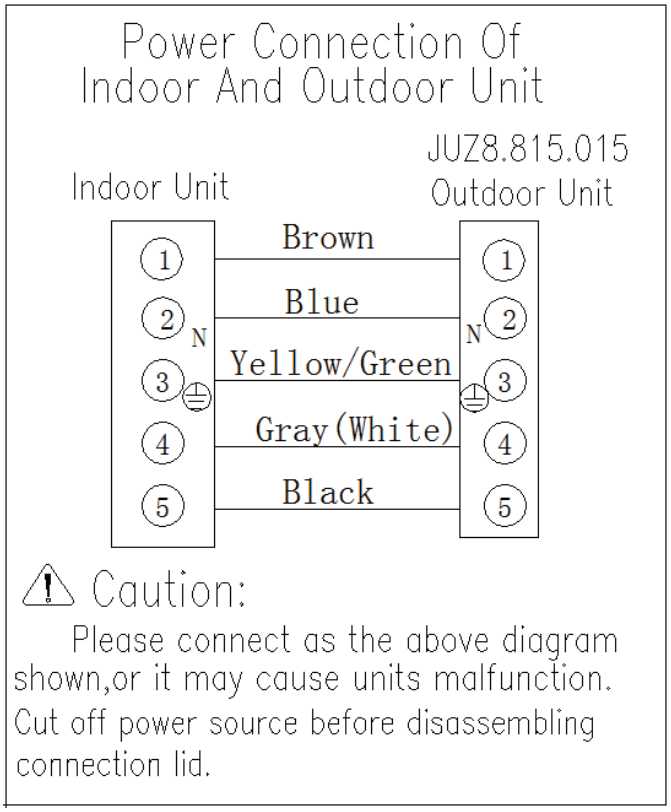
Warning:

High-voltage will result in electric shock or death.

Always cut off the power before checking and maintaining.

7.1.1 Check power line

To check whether the power line is connected correctly to the terminal No 1 which is on the terminal block of the indoor unit



7.1.2 Check unit wiring

To check whether the inter-unit wires are connected correctly.

7.1.3 Check power supply

To check whether the power supply is in the specified range (220-240V).

7.1.4 Check connector and lead wire of indoor and outdoor units.

To check whether the insulating cover of the lead wire is damaged.

To check whether the lead wire and the connector are connected well

To check wires.

7.2 The air conditioner does not work

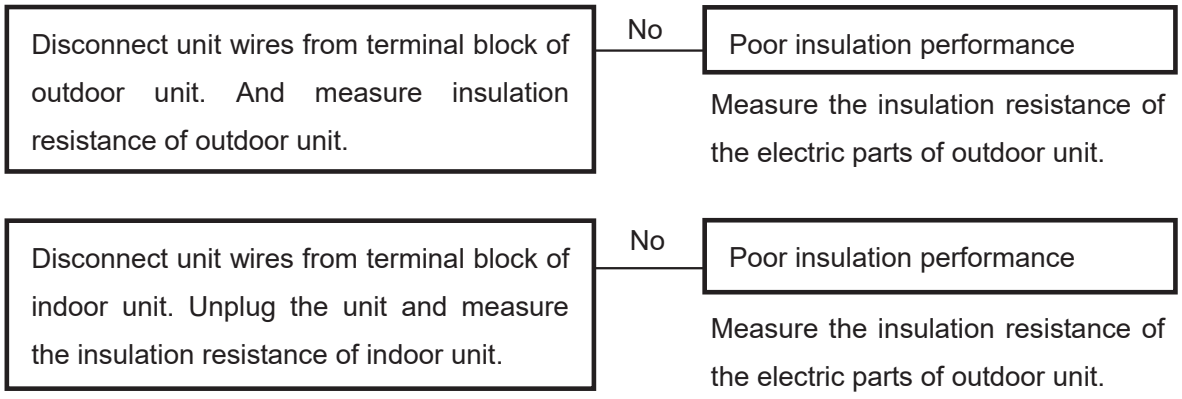
7.2.1 Leakage protector is open or fuse is burnt.

A. Setting leakage protector to “ON”, it opens immediately (can not reset).

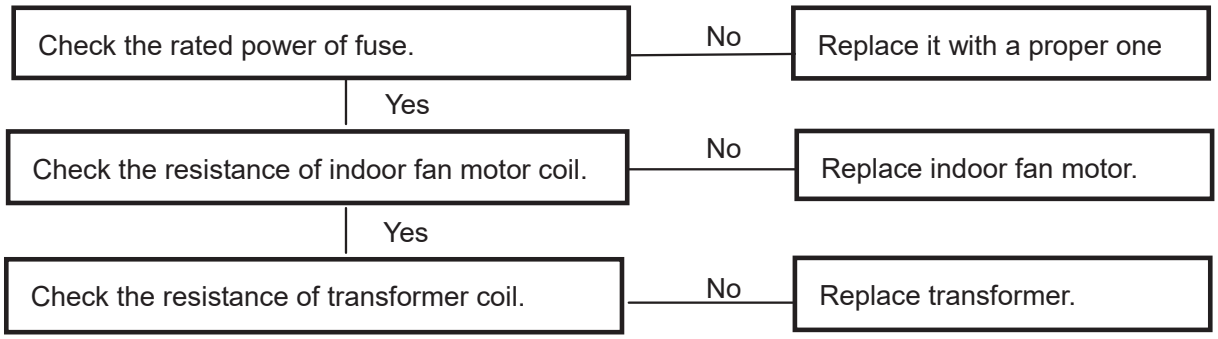
There is possibility of ground fault.

Check insulation resistance (The insulation resistance shall be more than 2MΩ).

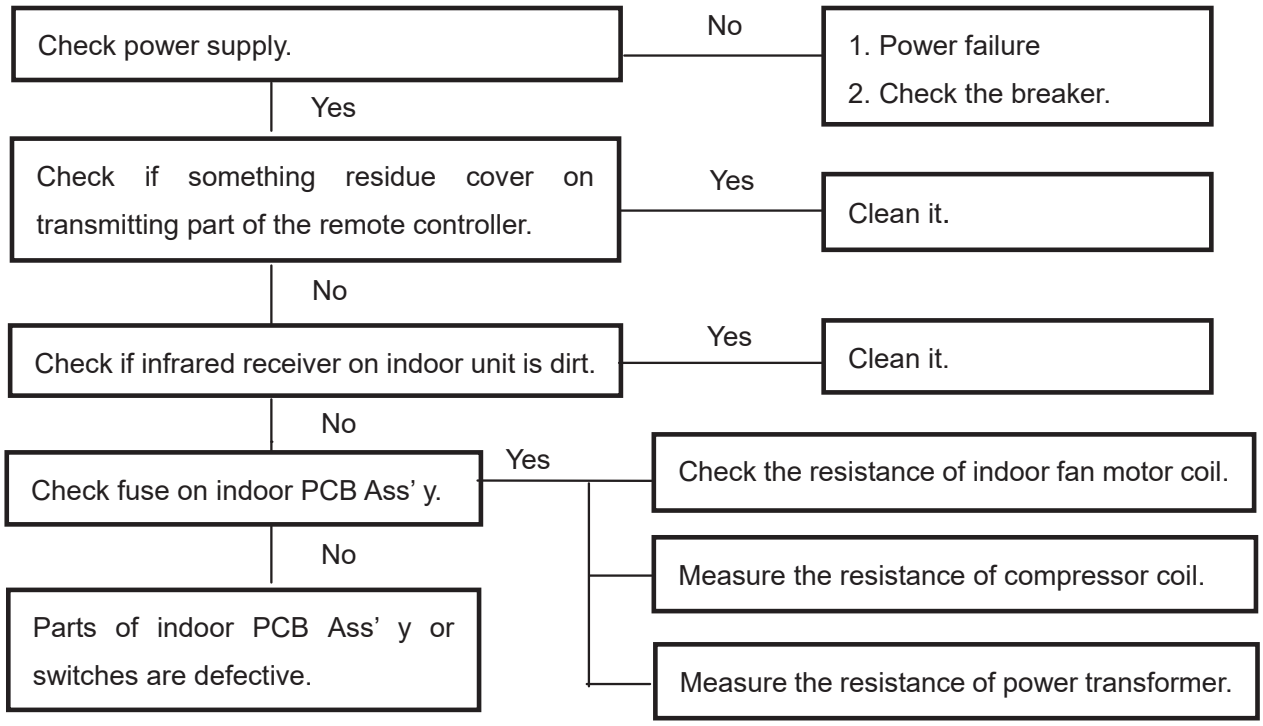
B.. Leakage protector is **OFF.**



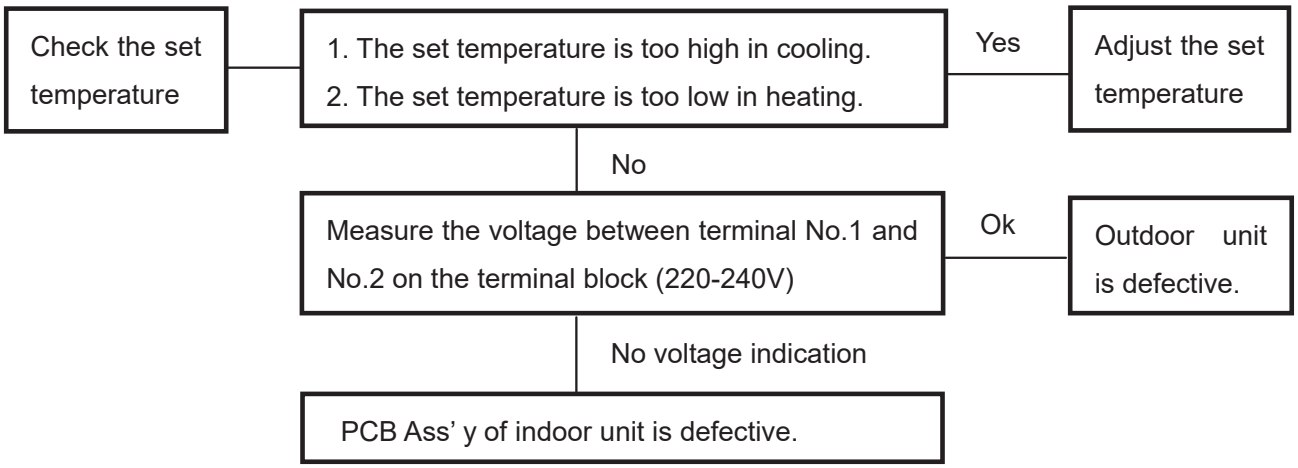
C. The fuse is open in several minutes after turning air conditioner on.



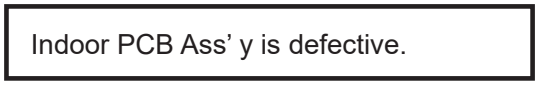
7.2.2 The indoor and outdoor units do not work.



7.2.3 Only outdoor unit does not work.

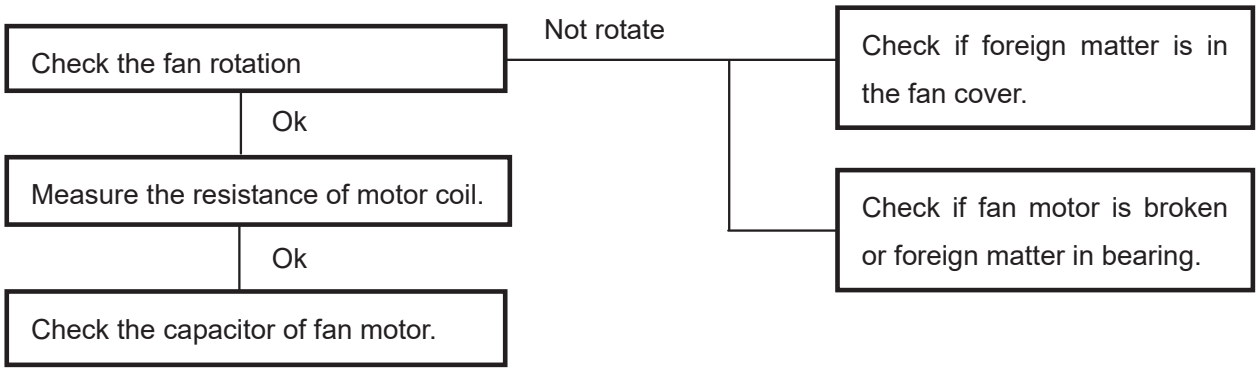


7.2.4 Indoor unit does not work.

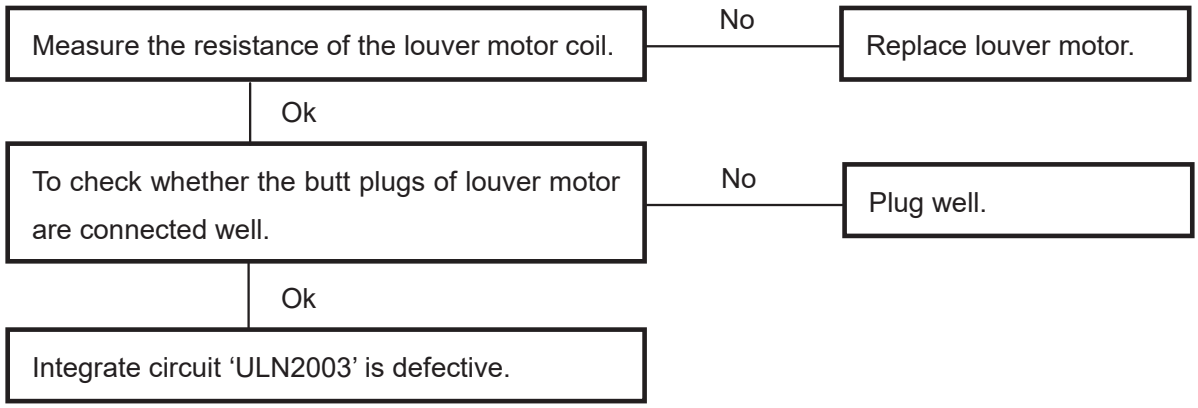


7.3 Some parts of the air conditioner do not work

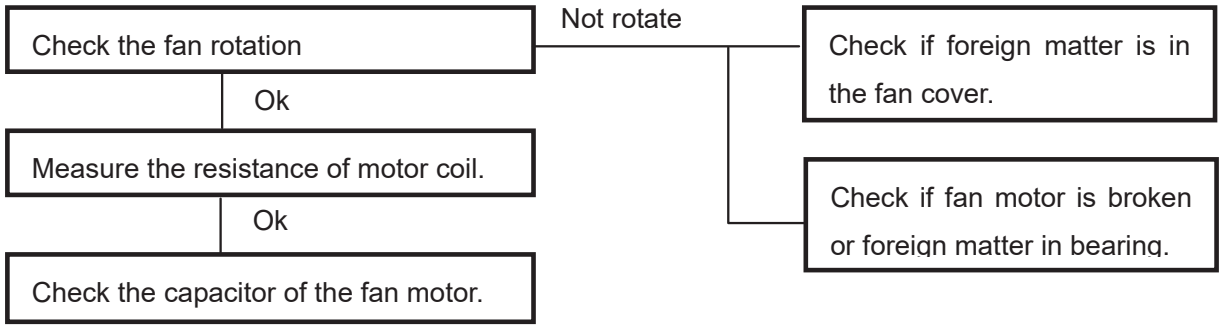
7.3.1 Only indoor fan does not work.



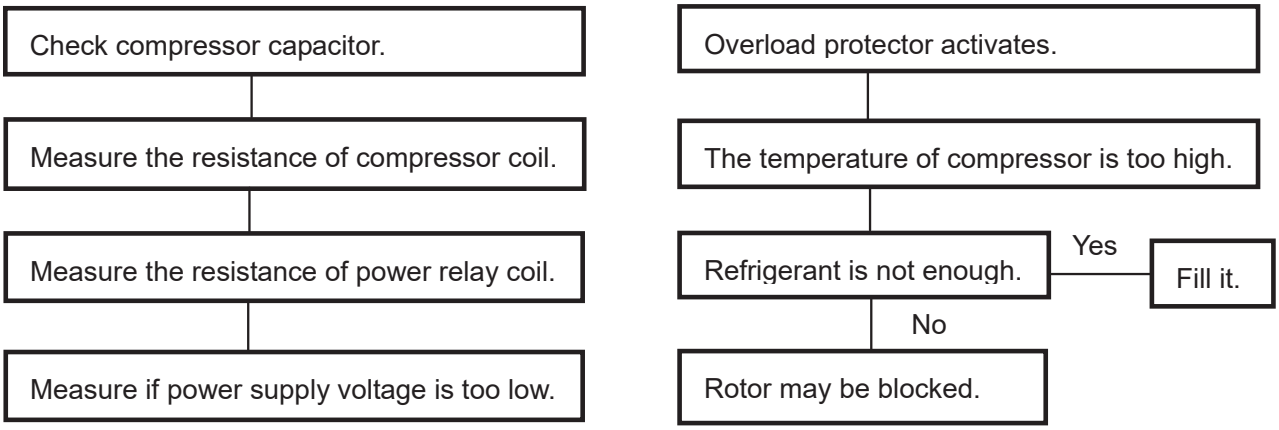
7.3.2 Only louver motor does not run.



7.3.3 Only outdoor fan motor dos not run.

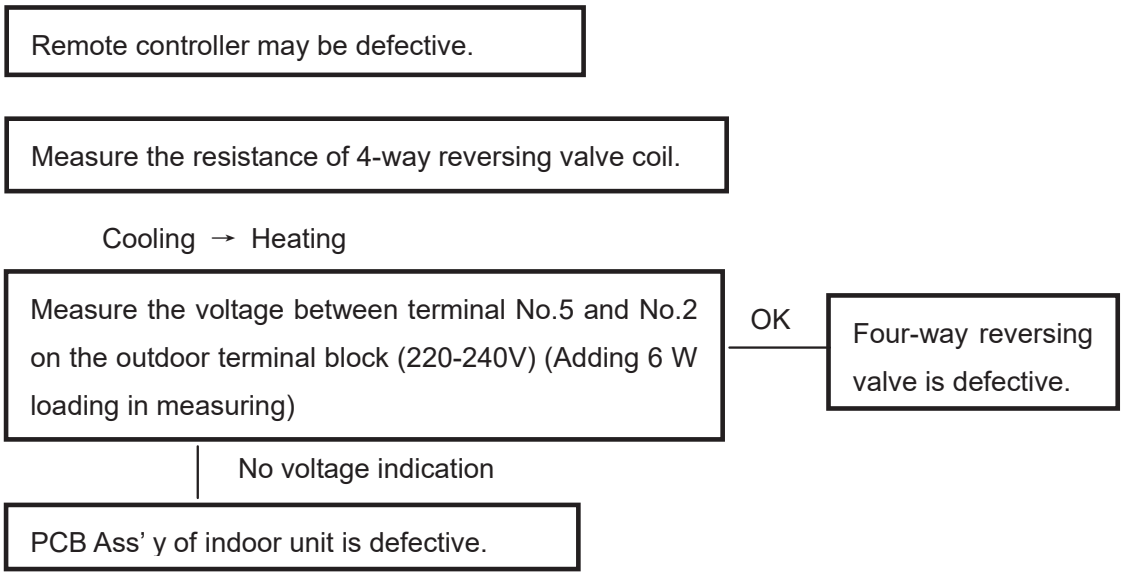


7.3.4 Compressor does not run.

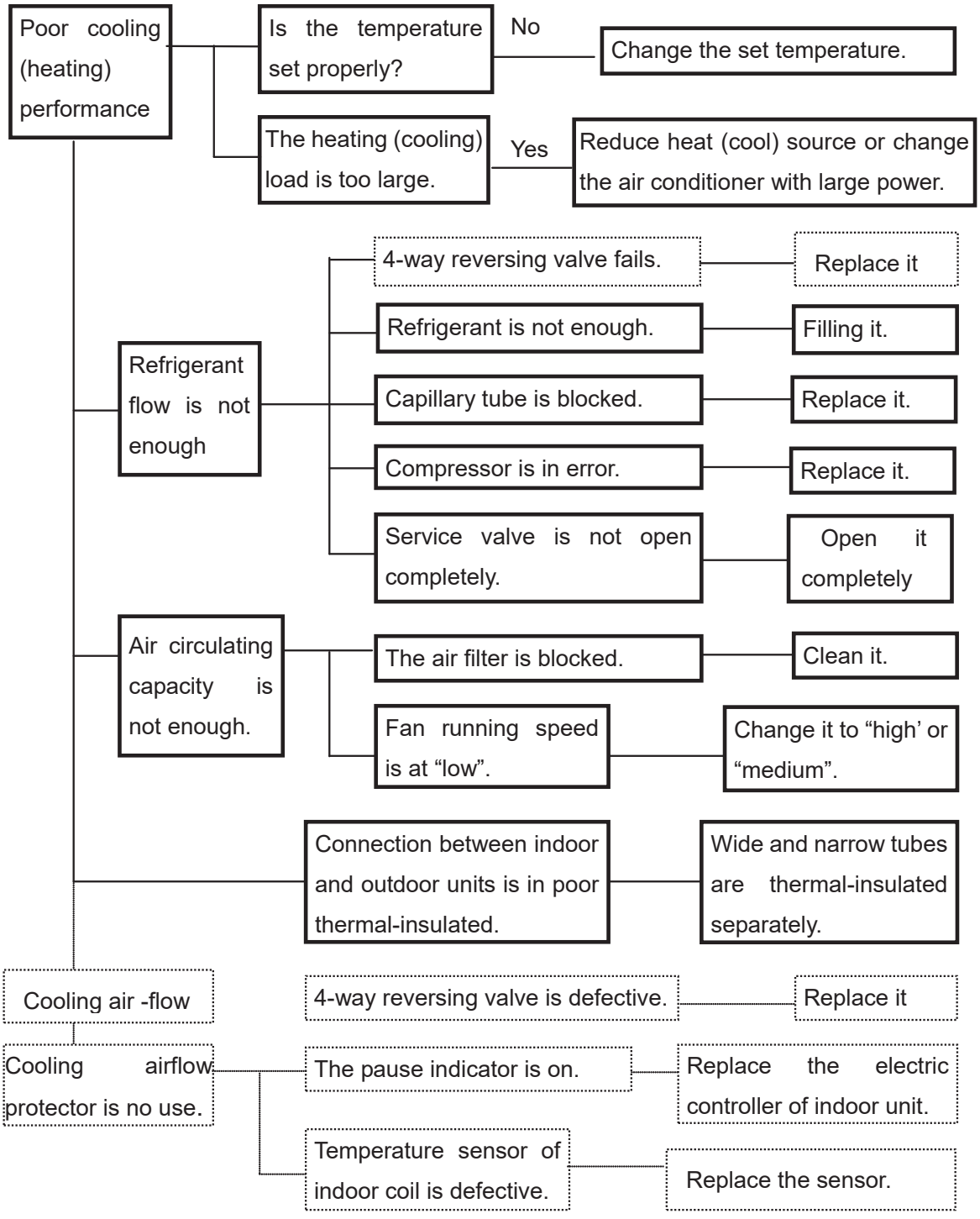


7.4 Air conditioner operates, but abnormalities are observed

7.4.1 Poor shifting between cooling and heating. (Inapplicable for cooling-only type)



7.4.2 Poor cooling or heating phenomena.



NOTE: “ ——— ” Inapplicable for cooling-only type.

7.4.3 Over cooling or heating.

7.5 Sensor is defective (Check reference 3.4.9)

8. Checking Electrical Components

8.1 Measure insulation resistance

The insulation is in good condition if the resistance exceeds 2 MΩ.

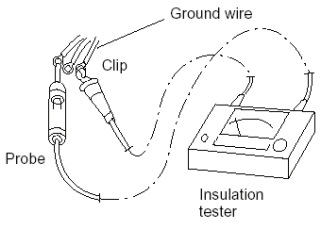


Fig. 1

8.1.1 Power supply wires

Clamp the ground pins of the power plug with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the power wires. (Fig. 1)

Then measure the resistance between the ground wire and the other power wire. (Fig. 1)

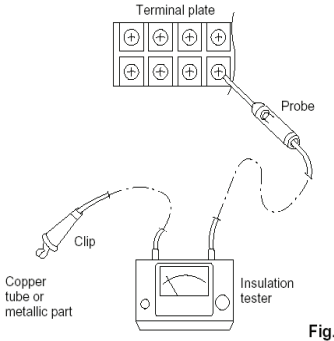


Fig. 2

8.1.2 Indoor unit

Clamp an aluminum plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw on the terminal plate. (Fig. 2)

Note that the ground line terminal should be skipped for the check.

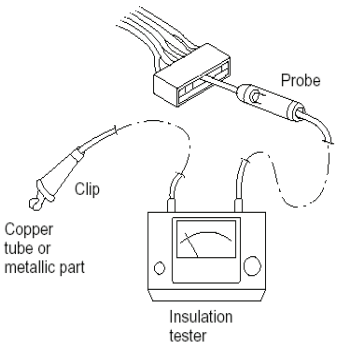


Fig. 3

8.1.3 Outdoor unit

Clamp a metallic part of the unit with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw where power supply lines are connected on the terminal plate. (Fig. 2)

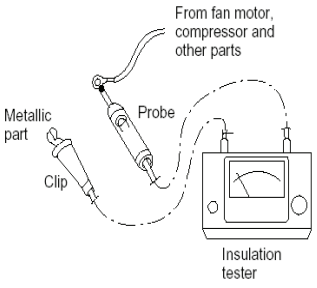


Fig. 4

Note:

Refer to electric wiring diagram.

If the probe can't enter the poles because the hole is too narrow then use a probe with a thinner pin.

8.1.4 Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the desired electric part from terminal plate, capacitor, etc. Similarly disconnect the connector. Then measure the insulation resistance. (Fig. 3 and 4)

8.2 Checking continuity of fuse on PCB Ass'y

Remove the PCB ass' y from the electrical component box. Then pull out the fuse from the PCB ass' y. (Fig. 5)

Check for continuity using a multimeter as shown in Fig. 6

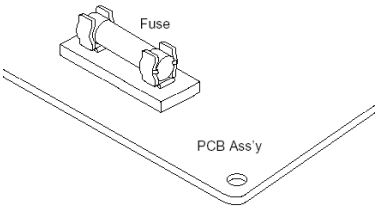


Fig. 5

8.3 Checking motor capacitor

Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in Fig. 7. Observe the deflection of the pointer setting the resistance measuring range of the multimeter to the maximum value.

The capacitor is "good" if the pointer bounces to a great extent and then gradually returns to its original position.

The range of deflection and deflection time differ according to the capacity of the capacitor.

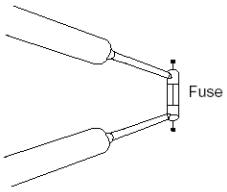


Fig. 6

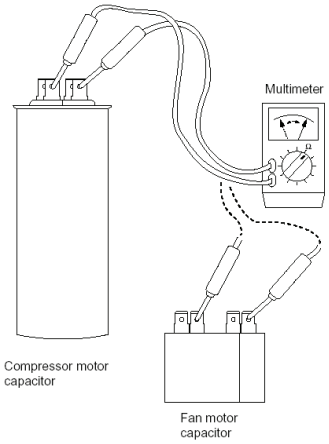


Fig. 7