

SERVICE MANUAL

MATRIX SERIE

ASH-18AIM2 PT, ASH-24AIM2 PT



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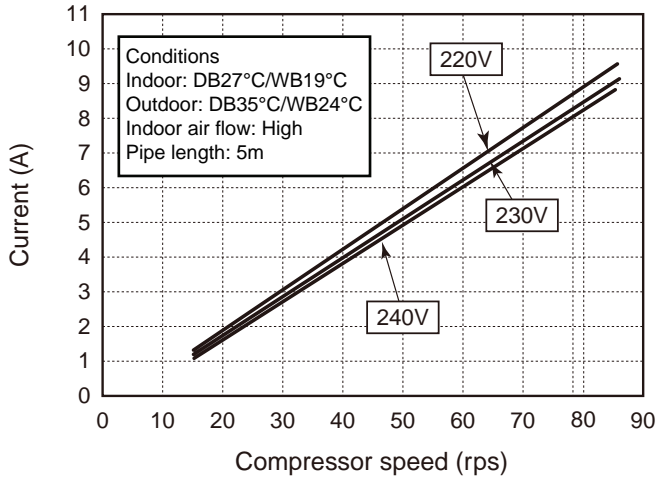
2. Specifications

2.1 Specification Sheet

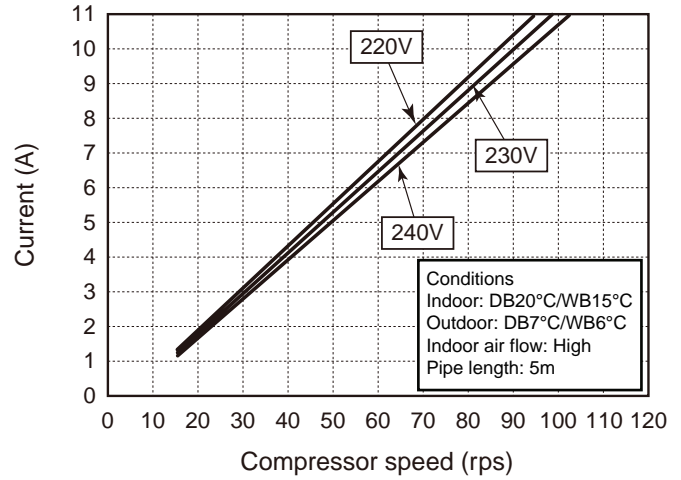
Model			ASH-18AIM2 PT	ASH-24AIM2 PT	
Product Code			CB304002501_L31222	CB304002801_L31222	
Power Supply	Rated Voltage	V~	220-240	220-240	
	Rated Frequency	Hz	50	50	
	Phases		1	1	
Power Supply Mode			outdoor	outdoor	
Cooling Capacity		W	5275(1260~6600)	6450(2530~6800)	
Heating Capacity		W	5800(1120~6800)	7000(2530~7600)	
Cooling Power Input		W	1625(380~2650)	2180(600~2650)	
Heating Power Input		W	1760(350~2650)	2220(600~2800)	
Cooling Power Current		A	7.2	9.7	
Heating Power Current		A	7.8	9.8	
Rated Input		W	2650	2800	
Rated Current		A	11.8	12.4	
Air Flow Volume(SH/H/M/L/SL)		m ³ /h	850/780/650/550/-	1000/800/700/550/-	
Dehumidifying Volume		L/h	1.80	2	
EER		W/W	3.25	2.96	
COP		W/W	3.30	3.15	
SEER		W/W	6.1	6.1	
HSPF		W/W	/	/	
Application Area		m ²	23-34	27-42	
Indoor Unit	Model of indoor unit		ASH-18AIM2 PT	ASH-24AIM2 PT	
	Indoor Unit Product Code		CB304N02500_L31222	CB304N02800_L31222	
	Fan Type		Cross-flow	Cross-flow	
	Diameter Length(DXL)		mm	Φ98X710	Φ100X765
	Fan Motor Cooling Speed(SH/H/M/L/SL)		r/min	1350/1200/1000/800/-	1350/1150/950/850/-
	Fan Motor Heating Speed(SH/H/M/L/SL)		r/min	1420/1250/1100/950/-	1400/1200/1000/900/-
	Output of Fan Motor		W	20	35
	Fan Motor RLA		A	0.31	0.31
	Fan Motor Capacitor		μF	1.5	2.5
	Evaporator Form			Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter		mm	Φ7	Φ7
	Row-fin Gap		mm	2-1.4	2-1.5
	Coil Length (LXDXW)		mm	715X25.4X304.8	765X25.4X342.9
	Swing Motor Model			MP28VB	MP35XX
	Output of Swing Motor		W	2	2.5
	Fuse		A	3.15	3.15
	Sound Pressure Level (SH/H/M/L/SL)		dB (A)	48/43/40/35/-	51/47/42/39/-
	Sound Power Level (SH/H/M/L/SL)		dB (A)	58/53/50/45/-	61/57/52/49/-
	Dimension (WXHXD)		mm	945X298X211	1018X315X230
	Dimension of Carton Box (LXWXH)		mm	1010X380X285	1083X395X313
	Dimension of Package (LXWXH)		mm	1013X383X300	1086X398X328
	Net Weight		kg	12	15
	Gross Weight		kg	15	18.5

2.2 Operation Characteristic Curve

Cooling

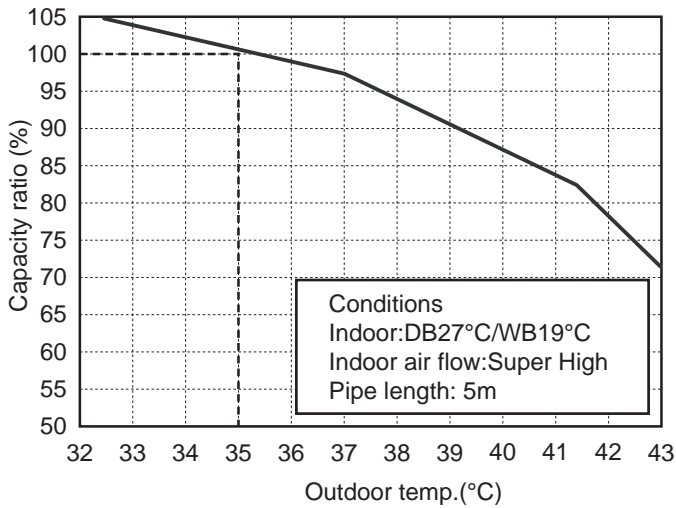


Heating

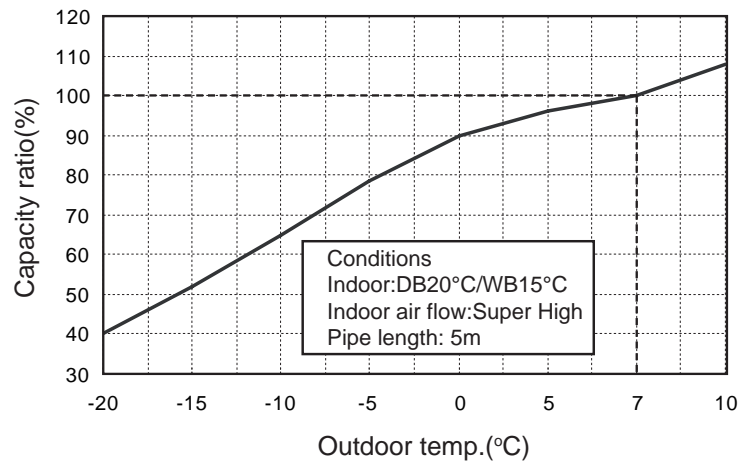


2.3 Capacity Variation Ratio According to Temperature

Cooling



Heating



2.4 Cooling and Heating Data Sheet in Rated Frequency

Cooling:

Rated cooling condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit	Compressor frequency (Hz)
Indoor	Outdoor			T1 (°C)	T2 (°C)			
27/19	35/24	ASH-18AIM2 PT	0.8 to 1.0	12 to 14	80 to 40	Super High	High	70
		ASH-24AIM2 PT	0.9 to 1.1	10 to 12	80 to 40	Super High	High	83

Heating:

Rated heating condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit	Compressor frequency (Hz)
Indoor	Outdoor			T1 (°C)	T2 (°C)			
20/15	7/6	ASH-18AIM2 PT	2.2 to 2.4	70 to 40	1 to 5	Super High	High	70
		ASH-24AIM2 PT	2.5 to 2.7	70 to 40	1 to 5	Super High	High	75

Instruction:

T1: Inlet and outlet pipe temperature of evaporator

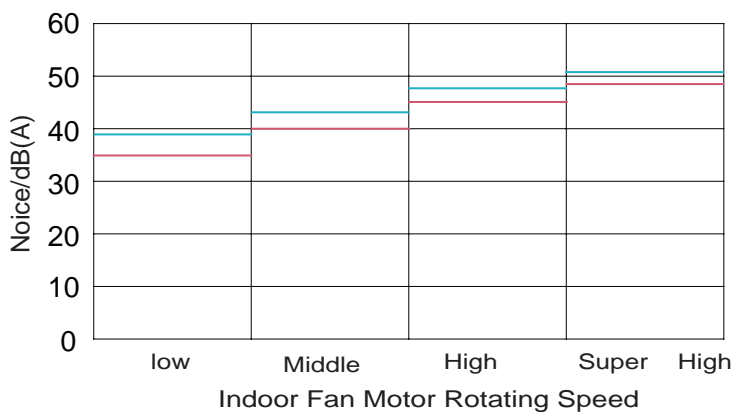
T2: Inlet and outlet pipe temperature of condenser

P: Pressure at the side of big valve

Connection pipe length: 5 m.

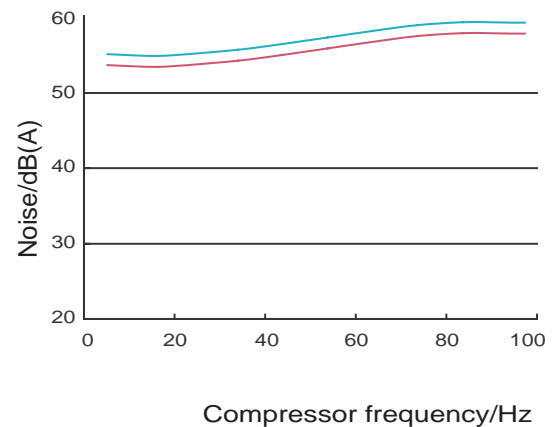
2.5 Noise Curve

Indoor side noise



ASH-18AIM2 PT — ASH-24AIM2 PT —

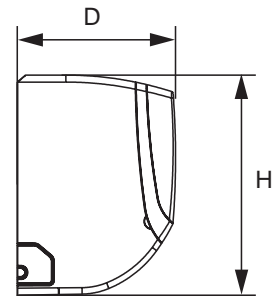
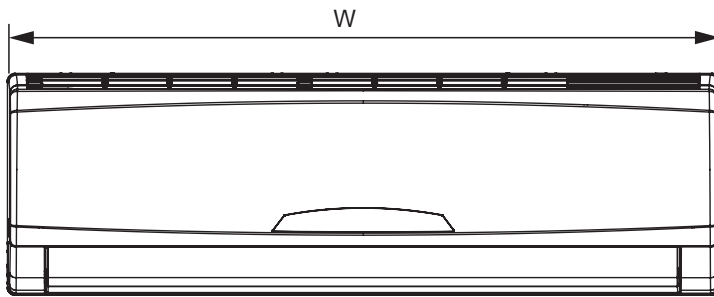
Outdoor side noise



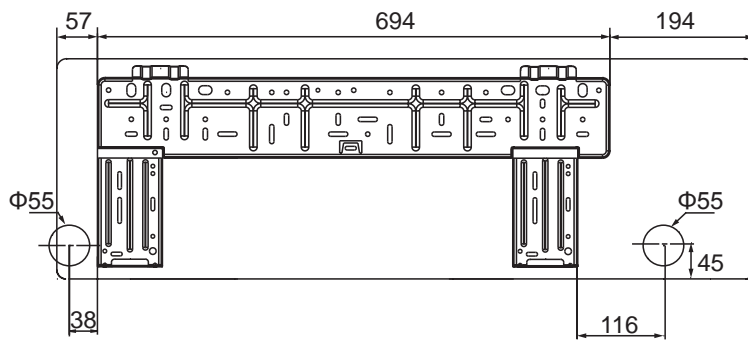
ASH-18AIM2 PT — ASH-24AIM2 PT —

3. Outline Dimension Diagram

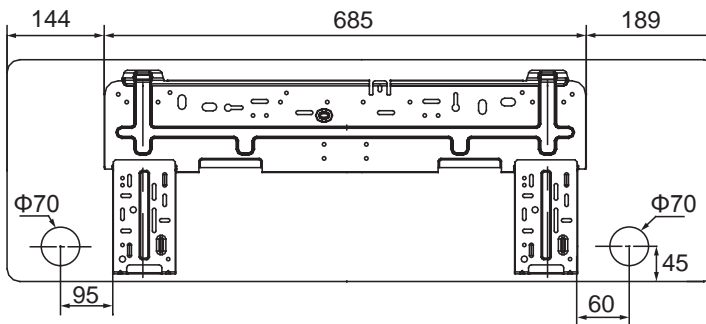
3.1 Indoor Unit



ASH-18AIM2 PT



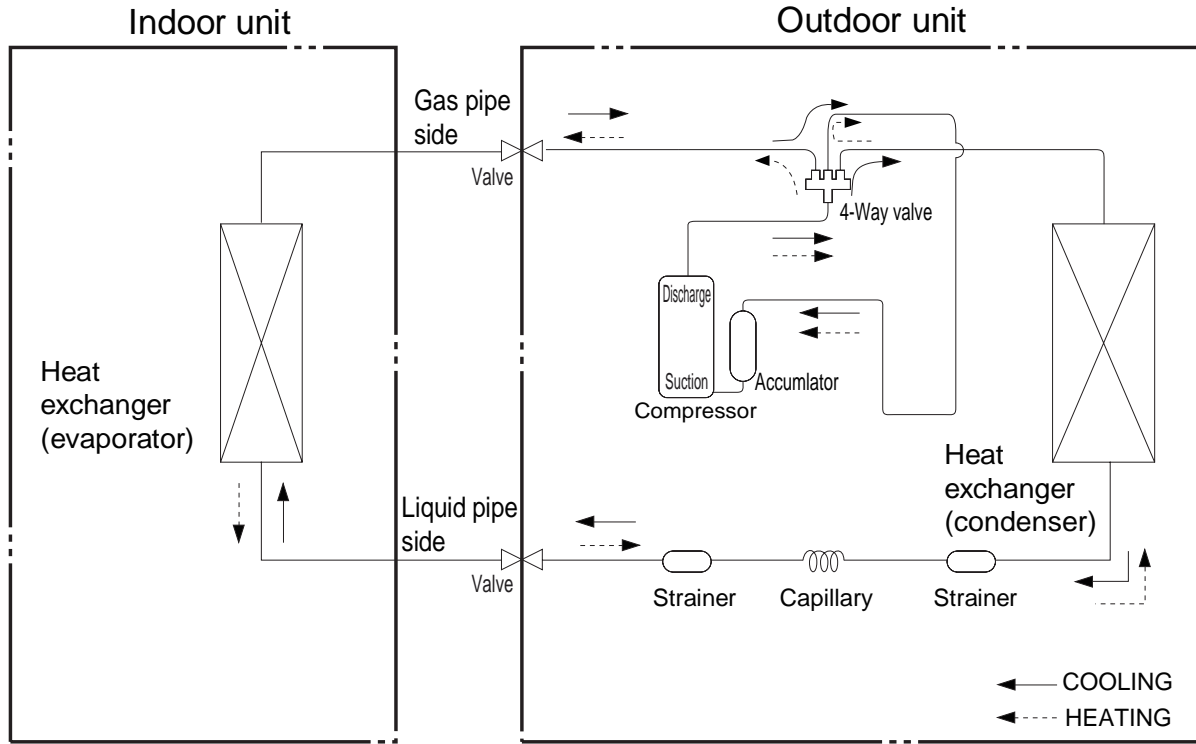
ASH-124AIM2 PT



Models	W	H	D
ASH-18AIM2 PT	945	298	211
ASH-24AIM2 PT	1018	315	230

Unit:mm

4. Refrigerant System Diagram



Connection pipe specification:

Liquid pipe: 1/4" (6mm)

Gas pipe: 1/2" (12mm)(ASH-18AIM2 PT)

Gas pipe: 5/8" (16mm)(ASH-24AIM2 PT)

5. Electrical Part

5.1 Wiring Diagram

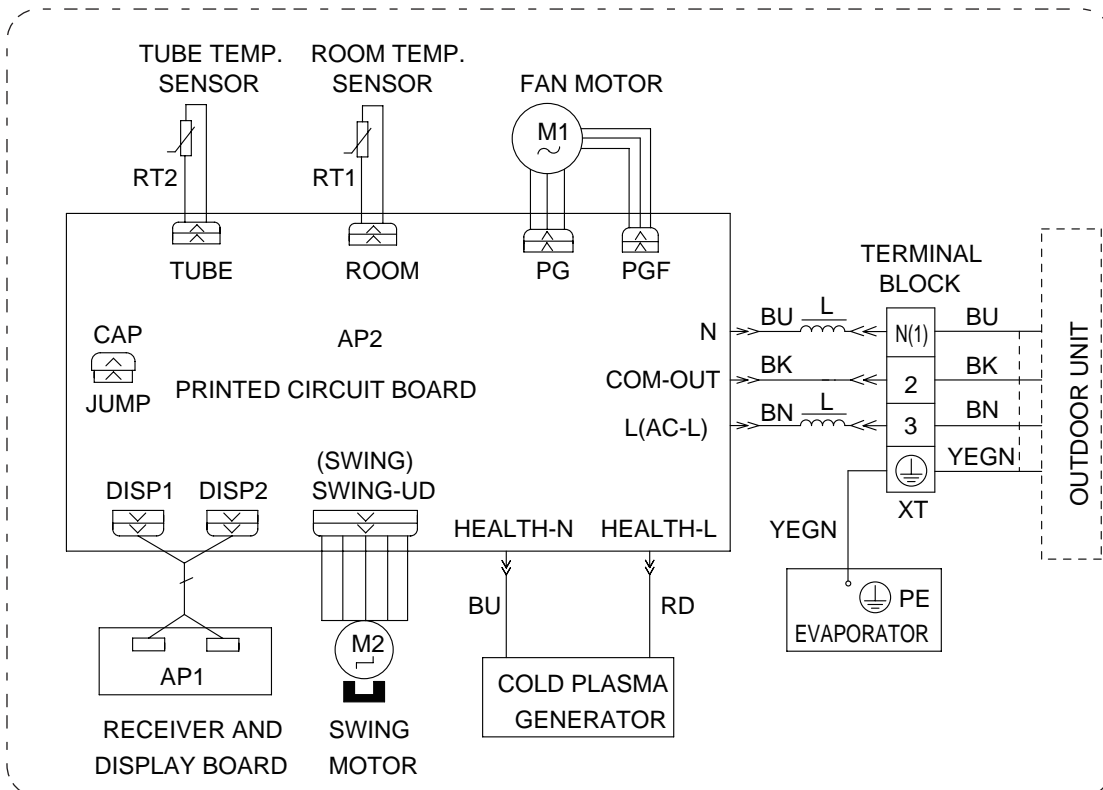
● **Instruction**

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	CAP	Jumper cap
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue	⊕	Grounding wire
YEGN	Yellow/Green	BK	Black	/	/
VT	Violet	OG	Orange	/	/

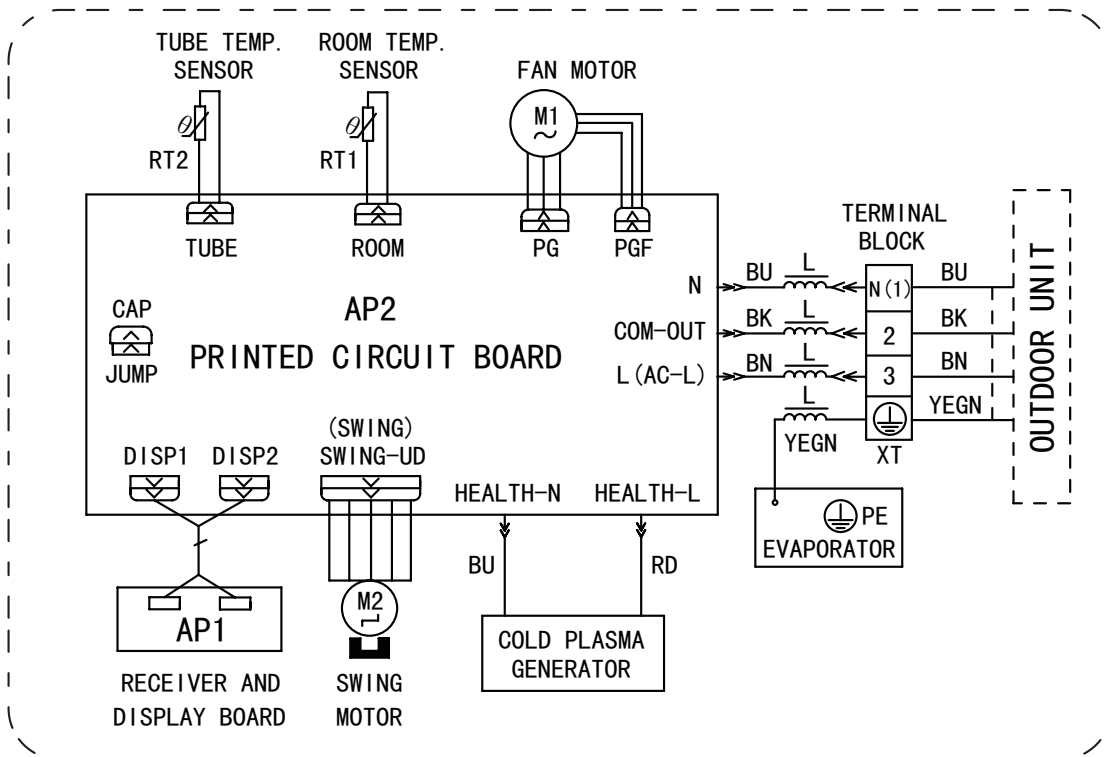
Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

● **Indoor Unit**

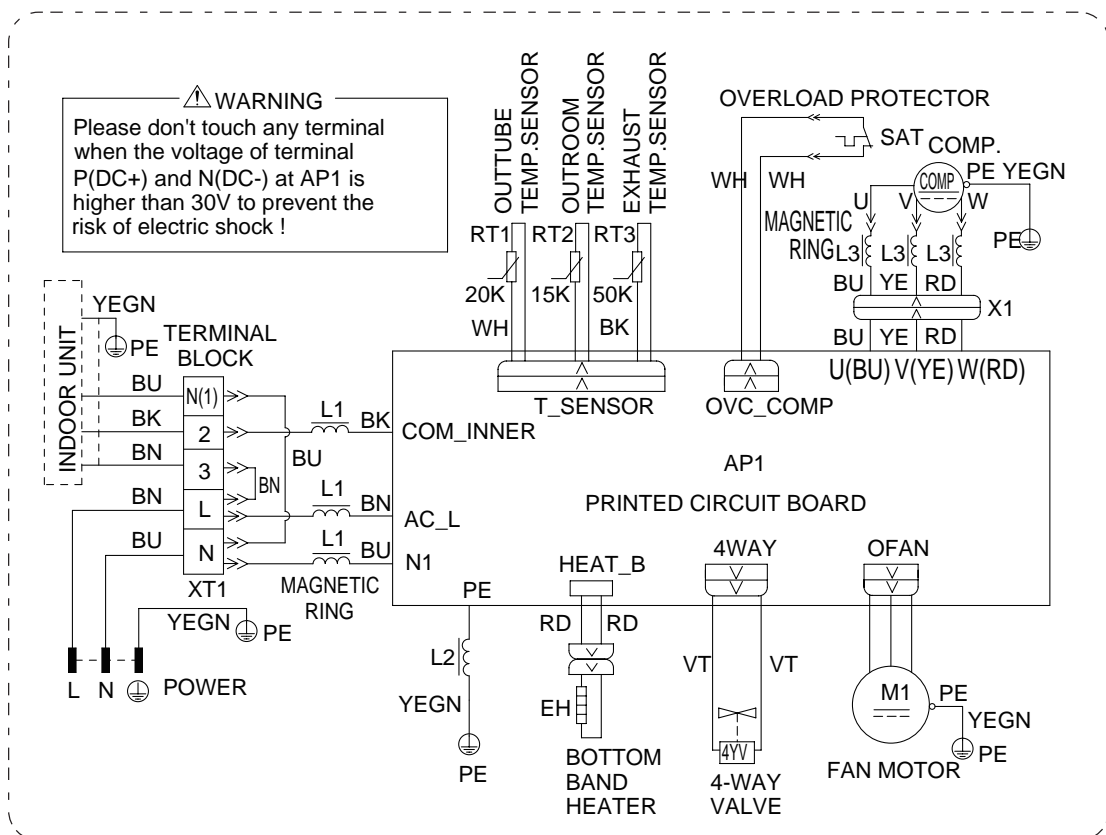
ASH-18AIM2 PT



ASH-24AIM2 PT



● Outdoor Unit

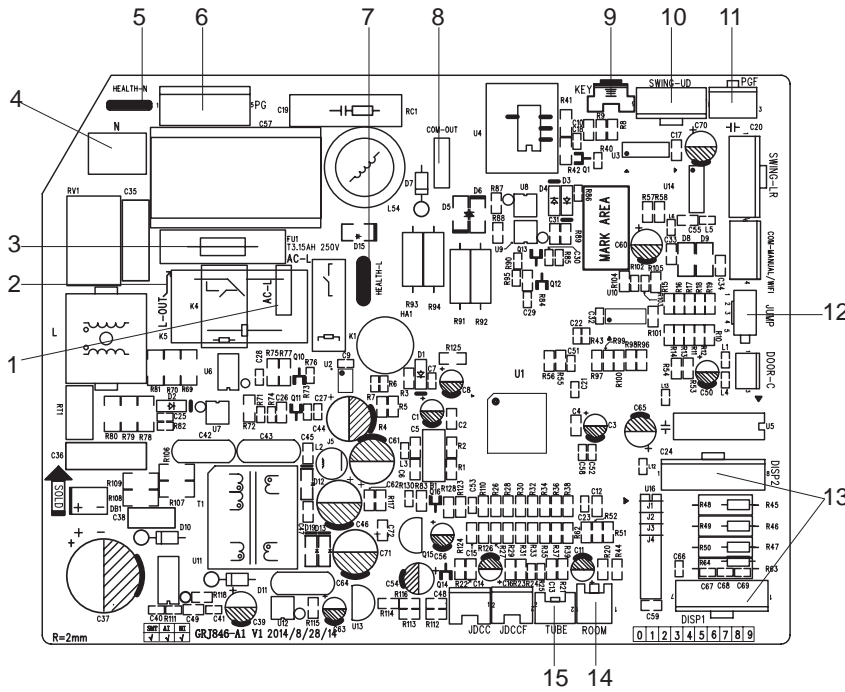


These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

5.2 PCB Printed Diagram

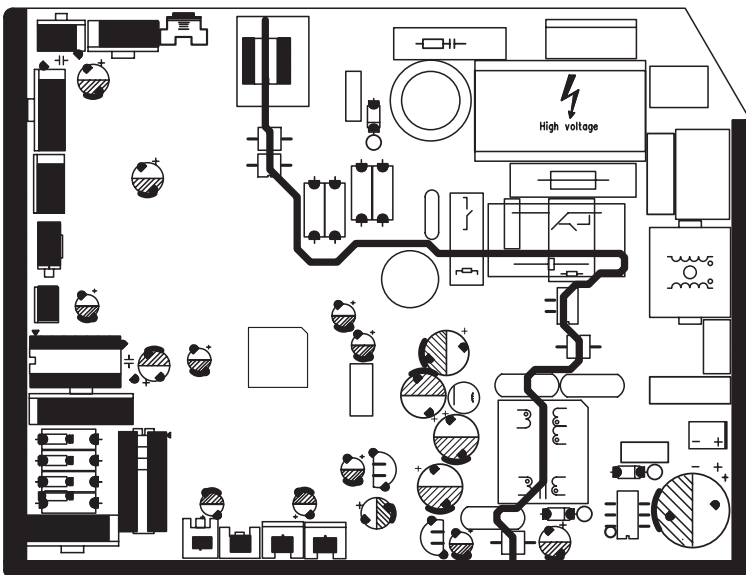
Indoor Unit

● Top view



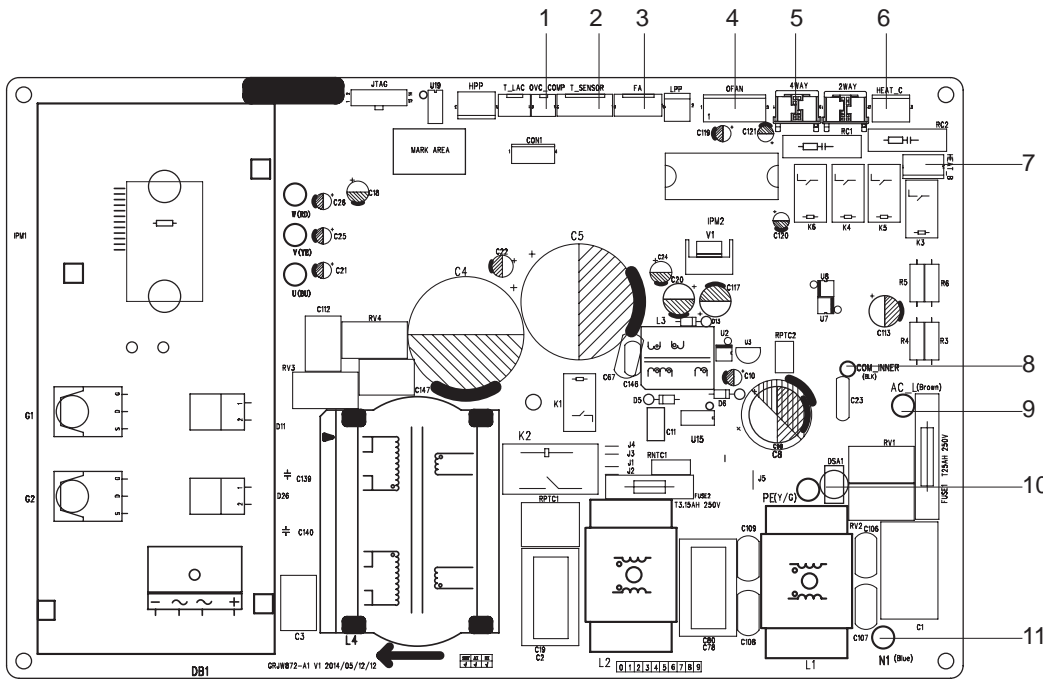
No.	Name
1	Interface of live wire
2	Interface of live wire for outdoor control
3	Fuse
4	Interface of neutral wire
5	Interface of neutral wire for health function
6	Control interface of PG motor
7	Interface of live wire for health function
8	Interface of indoor unit and outdoor unit communication
9	Auto button
10	Up & down swing
11	Feedback interface of indoor fan
12	Jump
13	Interface of display
14	Ambient temperature sensor interface
15	Indoor tube temperature sensor interface

● Bottom view



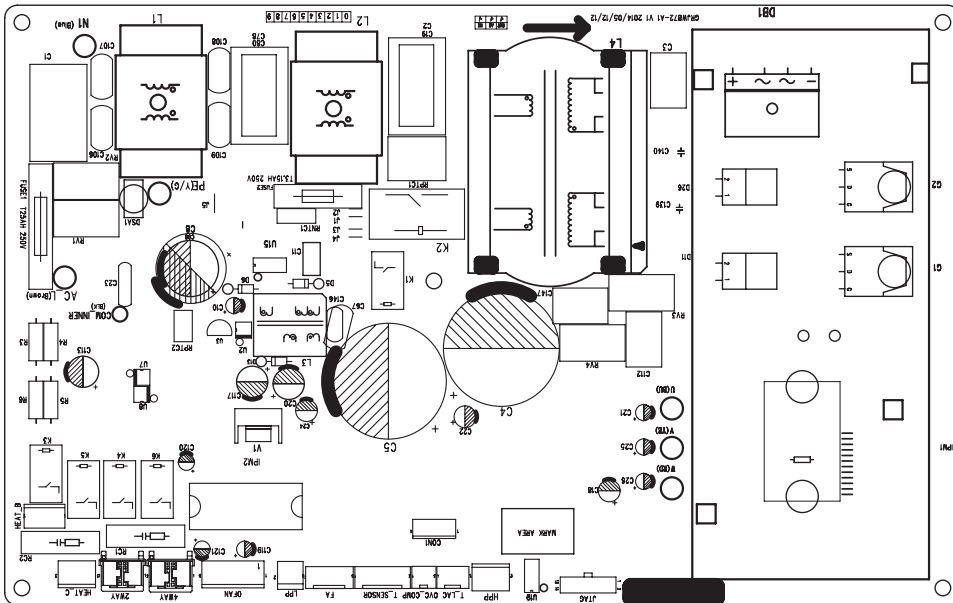
Outdoor Unit

● Top view



No.	Name
1	Terminal of compressor overload protection
2	Terminal of temperature sensor
3	Terminal of electronic expansion valve
4	Terminal of outdoor fan
5	Terminal of 4-way valve
6	Terminal of compressorelectric heating
7	Terminal of chassis electric heating
8	Terminal of indoor unit and outdoor unit communication
9	Power supply live wire
10	Earthing wire
11	Power supply neutral wire

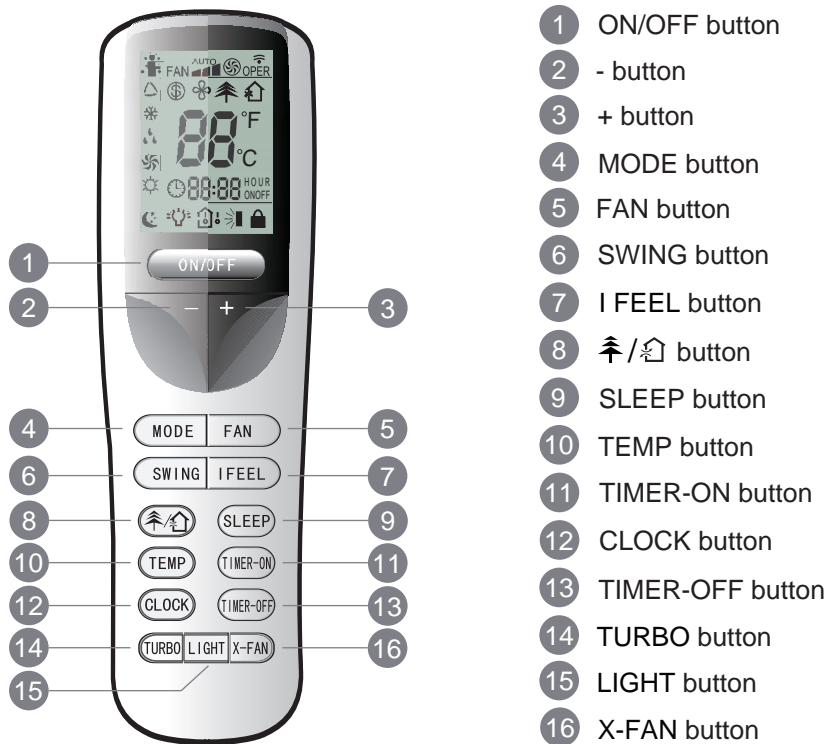
● Bottom view



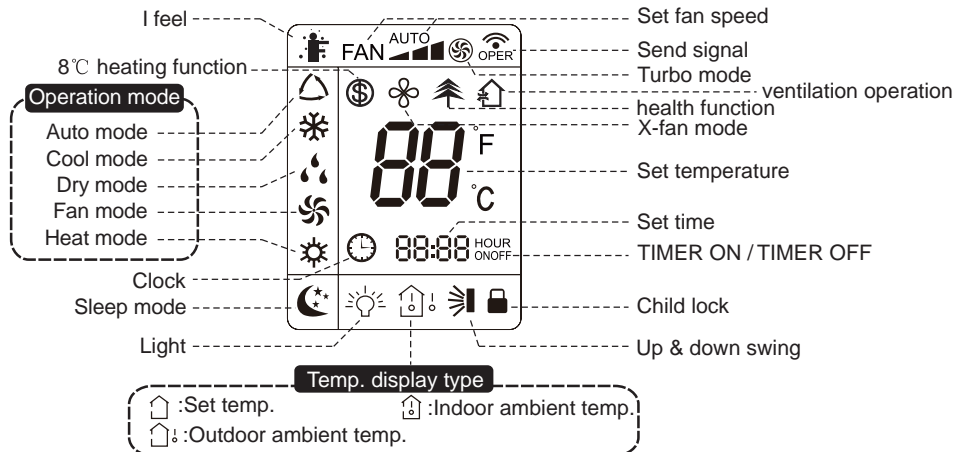
6. Function and Control

6.1 Remote Controller Introduction

Buttons on Remote Controller



Introduction for Icons on Display Screen



Introduction for Buttons on Remote Controller

Note:

- After putting through the power, the air conditioner will give out a sound. Operation indicator " " is ON (red indicator). After that, you can operate the air conditioner by using remote controller.
- Under on status, pressing the button on the remote controller, the signal icon " " on the display of remote controller will blink once and the air conditioner will give out a "de" sound, which means the signal has been sent to the air conditioner.
- Under off status, set temperature and clock icon will be displayed on the display of remote controller (If timer on, timer off and light functions are set, the corresponding icons will be displayed on the display of remote controller at the same time); Under on status, the display will show the corresponding set function icons.

1. ON/OFF Button

Press this button to turn on the unit. Press this button again to turn off the unit.

2. - Button

Press this button to decrease set temperature. Holding it down above 2 seconds rapidly decreases set temperature. In AUTO mode, set temperature is not adjustable.

3. + Button

Press this button to increase set temperature. Holding it down above 2 seconds rapidly increases set temperature. In AUTO mode, set temperature is not adjustable.

4. MODE Button

Each time you press this button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, FAN, and HEAT*, as the following:

AUTO ► COOL ► DRY ► FAN ► HEAT*

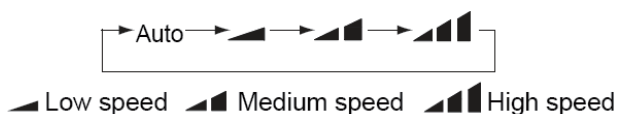


*Note: Only for models with heating function.

After energization, AUTO mode is defaulted. In AUTO mode, the set temperature will not be displayed on the LCD, and the unit will automatically select the suitable operation mode in accordance with the room temperature to make indoor room comfortable. (As for cooling only unit, it won't have any action when it receives the signal of heating operation.)

5. FAN Button

This button is used for setting Fan Speed in the sequence that goes from AUTO, , to , then back to Auto.



6. SWING Button

Press this button to set up &down swing angle, which circularly changes as below:



This remote controller is universal. If any command , or is sent out, the unit will carry out the command as

indicates the guide louver swings as: -> -> -> ->

7. I FEEL Button

Press this button to turn on I FEEL function. The unit automatically adjust temperature according to the sensed temperature. Press this button again to cancel I FEEL function.

8. Button

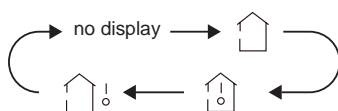
Press this button to achieve the on and off of healthy and scavenging functions in operation status. Press this button for the first time to start scavenging function; LCD displays "". Press the button for the second time to start healthy and scavenging functions simultaneously; LCD displays "" and "". Press this button for the third time to quit healthy and scavenging functions simultaneously. Press the button for the fourth time to start healthy function; LCD display "". Press this button again to repeat the operation above. (This function is applicable to partial of models)

9. SLEEP Button

Press this button to go into the SLEEP operation mode. Press it again to cancel this function. This function is available in COOL, HEAT (Only for models with heating function) mode to maintain the most comfortable temperature for you.

10. TEMP Button


Press this button can see indoor set temperature, indoor ambient temperature or outdoor ambient temperature on indoor unit's display. Temperature is set circularly by remote controller as below:



When selecting "  " by remote controller or no display, temperature indicator on indoor unit displays set temperature.

When selecting "  " by remote controller, temperature indicator on indoor unit displays indoor ambient temperature.


When selecting "  " by remote controller, temperature indicator on indoor unit displays outdoor ambient temperature.

Outdoor ambient temperature display may can't be selected for some models. When indoor unit receives "  " signal, it displays indoor set temperature.



Only for the model whose indoor unit has dual-8 display.

11. TIMER-ON Button

Press this button to initiate the auto-ON timer. To cancel the auto-timer program, simply press this button again.

After press of this button,  disappears and "ON" blinks. 00:00 is displayed for ON time setting. Within 5 seconds, press + or - button to adjust the time value. Every press of either button changes the time setting by 1 minute. Holding down either button rapidly changes the time setting by 1 minute and then 10 minutes. Within 5 Seconds after setting, press TIMER ON button to confirm.

12. CLOCK Button

Press CLOCK button, blinking.  Within 5 seconds, pressing + or - button adjusts the present time. Holding down either button above 2 seconds increases or decreases the time by 1 minute every 0.5 second and then by 10 minutes every 0.5 second. During blinking after setting, press CLOCK button again to confirm the setting, and  then will be constantly displayed.



13. TIMER-OFF Button

Press this button to initiate the auto-off timer. To cancel the auto-timer program, simply press the button again. TIMER OFF setting is the same as TIMER ON.


14. TURBO Button

Press this button to activate / deactivate the Turbo function which enables the unit to reach the preset temperature in the shortest time. In COOL mode, the unit will blow strong cooling air at super high fan speed. In HEAT mode, the unit will blow strong heating air at super high fan speed.

15. LIGHT Button



Press LIGHT button to turn on the display's light and press this button again to turn off the display's light. If the light is turned on,  is displayed. If the light is turned off,  disappears.

16. X-FAN Button

Pressing X-FAN button in COOL or DRY mode, the icon  is displayed and the indoor fan will continue operation for 2 minutes in order to dry the indoor unit even though you have turned off the unit.

After energization, X-FAN OFF is defaulted. X-FAN is not available in AUTO, FAN or HEAT mode.

Combination of "+" and "-" buttons: About lock

Press "+" and "-" buttons simultaneously to lock or unlock the keypad. If the remote controller is locked,  is displayed. In this case, pressing any button,  blinks three times.


Combination of "MODE" and "-" buttons: About switch between Fahrenheit and centigrade

At unit OFF, press "MODE" and "-" buttons simultaneously to switch between °C and °F.

Combination of "TEMP" and "CLOCK" buttons: About Energy-saving Function

Press "TEMP" and "CLOCK" simultaneously in COOL mode to start energy-saving function. Nixie tube on the remote controller displays "SE". Repeat the operation to quit the function.

Combination of "TEMP" and "CLOCK" buttons: About 8°C Heating Function

Press "TEMP" and "CLOCK" simultaneously in HEAT mode to start 8°C Heating Function Nixie tube on the remote controller displays "  " and a selected temperature of "8°C". (46°F if Fahrenheit is adopted). Repeat the operation to quit the function.

About Back-lighting Function

The unit lights for 4s when energizing for the first time, and 3s for later press.

About HEALTH function (COLD PLASMA)

Turn on the unit, start up the fan (Breezing and X-FAN are excluded) and press HEALTH button on remote controller to start health function (If there is not HEALTH button on remote controller, the unit defaults health function ON.)

Operation guide

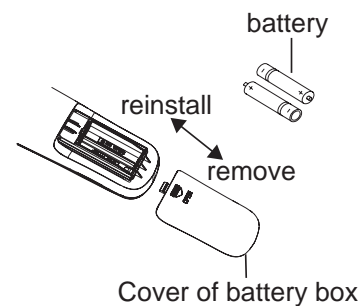
1. After putting through the power, press "ON/OFF" button on remote controller to turn on the air conditioner.
2. Press "MODE" button to select your required mode: AUTO, COOL, DRY, FAN, HEAT.
3. Press "+" or "-" button to set your required temperature. (Temperature can't be adjusted under auto mode).
4. Press "FAN" button to set your required fan speed: auto, low, medium and high speed.
5. Press "SWING" button to select fan blowing angle.

Replacement of Batteries in Remote Controller

1. Press the back side of remote controller marked with "OPEN" as shown in the fig, and then push out the cover of battery box along the arrow direction.
2. Replace two 7# (AAA 1.5V) dry batteries, and make sure the position of "+" polar and "-" polar are correct.
3. Reinstall the cover of battery box.

Note:

- During operation, point the remote control signal sender at the receiving window on indoor unit.
- The distance between signal sender and receiving window should be no more than 8m, and there should be no obstacles between them.
- Signal may be interfered easily in the room where there is fluorescent lamp or wireless telephone; remote controller should be close to indoor unit during operation.
- Replace new batteries of the same model when replacement is required.
- When you don't use remote controller for a long time, please take out the batteries.
- If the display on remote controller is fuzzy or there's no display, please replace batteries.



6.2 Brief Description of Modes and Functions

Indoor Unit

1. Basic function of system

(1) Cooling mode

1. Under this mode, fan motor, swing will work under setting status, the temp. range is 16-30°C (61-86 Fahrenheit scale)
2. Outdoor unit malfunction or unit stop running, indoor unit will keep original running status, malfunction displayed.
3. When $(T_{set} - T_{amb.})$, if indoor fan motor is high speed, that the fan motor is running in middle speed, the middle speed or low speed will be maintained; (this condition should be executed when compressor starts up); the super high speed will not rotate; When $(T_{amb.} - T_{set}) \geq 1^{\circ}\text{C}$, the fan will return to the setting fan speed.

(2) Dehumidifying mode

1. Under this mode, fan motor will run at low speed, swing will work at setting status, setting temp. range is 16-30°C (61-86 Fahrenheit scale)
2. Outdoor unit malfunction or protection, unit will stop, indoor unit will keep original running status, malfunction displayed.

(3) Fan mode

Under this mode, indoor fan motor could be set at high, middle, low or auto speed, compressor, outdoor unit and valve will stop to run. Under this mode, temp. range should be 16-30°C (61-86 Fahrenheit scale)

(4) Heating mode

1. Under this mode, temp. range should be 16-30°C (61-86 Fahrenheit scale)
2. Working condition and procedure of heating mode: When unit turns on and enters into heating mode, indoor unit enters into anti-cool wind mode, when unit stops running, and indoor fan motor turns on, blowing heat will act.
3. Protection function, under heating mode, compressor will stop to run due to malfunction, indoor fan motor will blow surplus heat.
4. Defrosting control: When receiving the defrosting signal from outdoor unit, display will show Heating indicator on indoor display is off for 0.5s and then on for 10s during blinking, 10s later, indoor fan motor will stop to run.
5. Anti-cool wind function
6. Blow heat air function
 - a. If heating temp. meets the compressor stop running condition, compressors, outdoor fan motor will stop to run, the upper and lower guide louver will rotate to horizontal position L, indoor fan motor runs at setting fan speed for 60s, then the indoor fan motor will stop to run.
 - b. Due to PG motor block running, the air guide board will keep the position when it stops. (under each mode), other malfunctions will stop to run, the upper and lower air guide louver will rotate to horizontal position L, indoor fan unit will run at setting fan speed and run for 60s, indoor fan unit will stop to run.

(5) Auto mode:

1. When $T_{amb.} \geq 26$, select the cooling mode, at this time, the setting temp. is 25°C (77 Fahrenheit scale)
2. Cooling and heating units: $T_{amb.} \leq 22^{\circ}\text{C}$, will run at heating mode, at this time, the setting temp. is 20 (68 Fahrenheit scale)
3. Cooling only unit: When $T_{amb.} \leq 22^{\circ}\text{C}$, it will run at Fan mode, the setting temp. is 25°C (77 Fahrenheit scale)
4. When $23^{\circ}\text{C} \leq T_{\text{indoor amb.}} \leq 25^{\circ}\text{C}$, firstly enter into auto mode and run at auto fan speed, other modes will run at auto mode, will keep the previous running mode. (When entering into Dehumidifying mode, it will run at auto fan speed)

(6) Auto fan speed control mode

2. Display state of indoor indicators

(1) State of indoor display board

1. When the unit is powered on, all patterns will be displayed and then only power indicator is on. When the unit is turned on with a remote controller, the operating indicator is on and operation mode which is set currently is displayed.
2. In defrosting mode, heating indicator on indoor display is off for 0.5s and then on for 10s during blinking.
3. Set temperature is displayed on "Double 8".

●Display of operation patterns and mode patterns

When the unit is powered on, all patterns will be displayed and the standby operation indicator will become red. When the unit is turned on through a remote controller, the operation indicator is light. At the same time, operating mode patterns (mode indicators include cooling, heating and dehumidification modes) set currently are displayed, and dynamic display patterns of wind speed are displayed. If the light button is switched off, all display will be turned off.

●Temperature display control mode of separated air conditioner

- ① When user sets the remote controller at set temperature display, currently set temperature will be displayed.
- ② Only when remote signals are converted from other display states into indoor ambient temperature display state, the remote controller will display indoor ambient temperature for 3 seconds and then return to set temperature display.
- ③ Only when remote signals are converted from other display states into outdoor ambient temperature display state, the remote controller will display outdoor ambient temperature for 3 seconds and then return to set temperature display.
- ④ If the controller is lack of outdoor display functions, as the signal is received, set temperature will be displayed.
- ⑤ When the unit is turned off, temperature display will be compulsively set at given temperature by the controller. When the unit is turned on, patterns as set by remote signals will be displayed.
- ⑥ If user does not set up temperature display state, given temperature will be displayed.

(2) Failure display of indoor unit

1. Requirements for failure display

When multiple failures appear at the same time, failure protection codes shall be displayed alternatively.

- ① Hardware failures shall be displayed immediately, referring to requirements in "Failure State Display Table";
- ② Operation states shall be displayed immediately, referring to requirements in "Failure State Display Table";
- ③ Other failures shall be displayed 200s after the compressor stops, referring to requirements in "Failure State Display Table". (Note: in the case that the unit is switched off with the remote controller, or the compressor is switched on again, failure display waiting time (200s) shall be cleared.)
- ④ Frequency limitation and reduction states shall be displayed by means of remote calling.

2. Failure display control

Indicator failure display shall be kept synchronous with Double 8 failure display, that is, during indicator blinking, failure code corresponding to such indicator shall be displayed on Double 8.

3. Method of remote calling of failure display

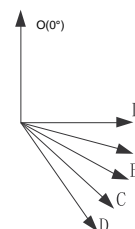
Entering the failure remote calling mode: push the light button six times within 3s to call out relevant failure protection code; Quit the failure remote calling mode: push the light button six times within 3s or call out failure display to enter it for 5 minutes and then quit.

3. Other control targets

(1) Up and down wind blow functions

When the unit is powered on, the up and down wind blow motor will turn a wind deflector anti-clockwise to Position 0 to shut down the air outlet. When the unit is switched on and wind blow function is not preset, under the heating mode, up and down wind blades will turn clockwise to position D; and under other modes, the up and down wind blades will turn clockwise to position L. If wind blow function is set at the same time as the unit is switched on, the wind blades will swing between position L and D. The wind blades can be kept in seven states: position L, position A, position B, position C, position D, swing between position L and D, stop at one position from L to D. When the unit is turned off, the wind deflector will be closed up to position 0. Wind blow action is effective only when wind blow commands are set and the indoor unit is running.

Note: When the wind blades are set at position L to B, position A to C, or position B to D through remote setting, the wind deflector will swing between position L and D. L—A—B—C—D.



(2) Buzzer

When the controller is powered on, signals from a remote controller are received, or the auto button is pushed, a buzzer will give out prompt tone.

(3) Auto button

When the button is pushed, the unit will operate in auto mode and the indoor fan will run in auto state. When the indoor fan is running, the wind blow motor will work. When the button is pushed again, the unit will be switched off. At the same time as the button is pushed, the whole unit will be powered on and enter into fast test mode; when the unit is powered on and detects for continuous 20s (such time shall not be fast tested) that the auto button is pushed, and if the unit is currently at fast test state, the unit will quit the fast test state.

(4) Sleep function

In this mode, the unit will automatically select appropriate sleep curve to operate according to different set temperature.

1. If sleep function is set in cooling, the system will increase set temperature automatically for operation in a certain degree.
2. If sleep function is set in heating mode, the system will decrease set temperature automatically for operation in a certain degree.

(5) Timing function

The main board integrates general timing and moment timing. Such two timing functions can be selected through a remote controller on which different functions are arranged.

1. General timing:

Timing start: timing start can be set when the unit is off. When preset time is reached, the controller will operate in a preset mode. Timing can be set at an interval of 0.5 hour in a scope of 0.5 - 24 hours. **Timing stop:** timing stop can be set when the unit is on. When preset time is reached, the system will be turned off. Timing can be set at an interval of 0.5 hour in a scope of 0.5 - 24 hours.

2. Moment timing

Timing start: if timing start is set when the system is at operation state, the system will continue to operate; if timing start is set when the system is at stop, as the preset time is reached, the system will start to run in preset mode. **Timing stop:** if timing stop is set when the system is at stop state, the system will keep standby; if timing stop is set when the system is in operation, as the preset time is reached, the system will stop running.

Timing change:

When the system is in timing mode, start and stop can be set through the On/Off button on the remote controller; or timing time can be reset and the system will operate according to the latest setting. When the system is in operation and both timing start and stop are set, the system will stay at currently set operation state. When preset timing stop time is reached, the system will stop working. When the system is at stop state and both timing start and stop are set, the system will keep at stop state. When preset timing start time is reached, the system will start operation. From then on, the system will operate in preset mode at a preset start time and stop at a preset stop time everyday. If timing stop time is set as the same as timing start time, a stop command will be executed.

(6) Dry and mildew proof function

Dry and mildew proof function can be set in cooling and dehumidification modes.

(7) Control of indoor fan

Indoor fan can be set at four levels, super-high, high, middle and low, with a remote controller. When one level is set, the fan will thus operate at such level. The fan can also be set at auto state.

(8) Power-failure memory function

What will be memorized includes modes, up and down wind blow, light, preset temperature, preset wind speed, general timing (no memory for moment timing), and Fahrenheit /Celsius degree. When the unit is powered on again after power failure, operation continues according to memorized content. If timing is not set by the last remote control command, the system will memorize the last remote control command and operate in the mode specified in the last remote control command. If timing is set by the last remote control command and power failure happens before the preset time, the system, as powered on again, will memorize the timing function set by the last remote control command. Timing will be re-counted from the time at which the system is powered again. If timing is set by the last remote control command and timing of start or stop is reached before power failure, the system, as powered on again, will memorize operation state before power failure and will not perform timing action. Moment timing is out the range of memory.

(9) Locked Protection of PG Motor

When starting up the fans, if the motor has run at a lower speed continuously for a period, for preventing automatic protection of the motor, stop running, and display the locked operation; if the machine is running at present, the code of the locked fault---H6 of double-eight digital tubes will be displayed; if the machine is shut down at present, the information of the locked fault will not be displayed.

(10) Super Power Function

In cooling and heating modes (automatic, dehumidifying and air-supplying modes are without strong power), press the button of Super Power, the wind speed on the remote controller is displayed as super-high air flow, and the inner fans are also turned to super-high air flow;

(11) Health Function

When the inner fans are running, the remote controller is set at the Health function at this time (if there is no Health button on the remote controller, the Health On order is defaulted), then start the Health function device.

(12) Fault Detection of Thermo-bulb

1. Indoor Environment Thermo-bulb:

Detect the fault of thermo-bulb at any time;

2. Indoor Pipe Temperature Thermo-bulb:

During the defrosting period, the fault of the thermo-bulb will be not detected, which shall be detected in 5 minutes after defrosting is completed; the fault of the thermo-bulb will be detected at other times;

3. Protecting Treatments of Thermo-bulb:

When the thermobulb is detected to be short-circuited continuously for 5 seconds: It is regarded that the temperature detected by the thermo-bulb is over-high (or unlimited), then the whole machine will exert corresponding safety stops according to the over-high temperature sensed by the thermo-bulb, and display corresponding temperature safety stops and faults of the thermo-bulb simultaneously.

When the thermo-bulb is detected in open circuit continuously for 5 seconds: stop the machine in protection, directly display corresponding faults of the thermo-bulb.

(13) Refrigerant recycling function (applicable when changing installation location or in maintenance)

1. Enter refrigerant recycling function

Within 5min after energizing (unit ON or OFF status is ok), continuously press LIGHT button for 3 times within 3s to enter refrigerant recycling mode; Fo is displayed and refrigerant recycling function is started. At this moment, the maintenance people closes liquid valve. After 5min, stick the thimble of maintenance valve with a tool. If there is no refrigerant spraying out, close the gas valve immediately and then turn off the unit to remove the connection pipe.

2. Exit refrigerant recycling function

After entering refrigerant recycling mode, when receive any remote control signal or enter refrigerant recycling mode for 25min, the unit will exit refrigerant recycling mode automatically. If the unit is in standby mode before refrigerant recycling, it will be still in standby mode after finishing refrigerant recycling; if the unit is in ON status before refrigerant recycling, it will still run in original operation mode.

(14) Compulsive Defrosting Function

1. Start up compulsory defrosting function

Under ON status, set heating mode with remote controller and adjust the temperature to 16°C. Press “+, -, +, -, +,-” button successively within 5s and the complete unit will enter into compulsory defrosting status. Meanwhile, heating indicator on indoor unit will ON 10s and OFF 0.5s successively. (Note: If complete unit has malfunction or stops operation due to protection, compulsory defrosting function can be started up after malfunction or protection is resumed.)

2. Exit compulsory defrosting mode

After compulsory defrosting is started up, the complete unit will exit defrosting operation according to the actual defrosting result, and the complete unit will resume normal heating operation.

Outdoor Units

1. Input Parameter Compensation and Calibration

(1) Check the ambient temperature compensation function Indoor ambient temperature compensation function.

a. In cooling mode, the indoor ambient temperature participating in computing control = (T_{indoor ambient temperature} - Δ T_{cooling indoor ambient temperature compensation})

b. In heating mode, the indoor ambient temperature participating in computing control = (T_{indoor ambient temperature} - Δ T_{heating indoor ambient temperature compensation})

(2) Check effective judgment controls of parameters

Effective judgment function of the outdoor exhaust temperature thermo-bulb When conditions a and b are satisfied, the outdoor exhaust temperature thermo-bulb is judged not to be connected into place, the mainboard of outer units will display failure of the outdoor exhaust temperature thermo-bulb (not connected into place), stop the machine for repairing, and resume the machine by remote controls of ON/OFF.

a. Judgment of exhaust detection temperature change:

After the compressor starts up and runs for 10 minutes, if the compressor frequency $f \geq 40\text{Hz}$, and the rising value T_{exhaust} (T_{exhaust} (after start-up for 10 minutes) - T_{exhaust} (before start-up)) $< 2^\circ\text{C}$, the outdoor exhaust temperature thermo-bulb can be judged not to be connected into place (judging once when the power is on the first time).

b. Comparative judgment of exhaust detection temperature and condenser detection temperature ($T_{\text{pipe temperature}} = T_{\text{outdoor pipe temperature in cooling mode}}$, $T_{\text{pipe temperature}} = T_{\text{indoor pipe temperature in heating mode}}$): After the compressor starts up and runs for 10 minutes, if the compressor frequency $f \geq 40\text{Hz}$, and $T_{\text{pipe temperature}} \geq (T_{\text{exhaust}} + 3)$, the outdoor exhaust temperature thermobulb can be judged not to be connected into place (judging once when power is on the first time).

2. Basic Functions

(1) Cooling Mode

1. Conditions and processes of cooling operation:

(1) If the compressor is shut down, and $[T_{\text{setup}} - (T_{\text{indoor ambient temperature}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})] \leq 0.5$, start up the machine for cooling, the cooling operation will start;

(2) During operations of cooling, if $0^\circ\text{C} \leq [T_{\text{setup}} - (T_{\text{indoor ambient temperature}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})] < 2$, the cooling operation will be still running;

(3) During operations of cooling, if $2^\circ\text{C} \leq [T_{\text{setup}} - (T_{\text{indoor ambient temperature}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})]$, the cooling operation will stop after reaching the temperature point.

2. Temperature setting range

- (1) If $T_{\text{outdoor ambient temperature}} \geq [T_{\text{low-temperature cooling temperature}}]$, the temperature can be set at: 16~30°C (Cooling at room temperature);
- (2) If $T_{\text{outdoor ambient temperature}} < [T_{\text{low-temperature cooling temperature}}]$, the temperature can be set at: 25~30°C (Cooling at low temperature), that is, the minimum setting temperature for outer units judgment is 25°C .

(2) Dehumidifying Mode

1. Conditions and processes of dehumidifying operations: Same as the cooling mode;
2. The temperature setting range is: 16~30°C ;

(3) Air-supplying Mode

1. The compressor, outdoor fans and four-way valves are switched off;
2. The temperature setting range is: 16~30°C.

(4) Heating Mode

1. Conditions and processes of heating operations: ($T_{\text{indoor ambient temperature}}$ is the actual detection temperature of indoor environment thermo-bulb, $T_{\text{heating indoor ambient temperature compensation}}$ is the indoor ambient temperature compensation during heating operations)

- (1) If the compressor is shut down, and $[(T_{\text{indoor ambient temperature}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{setup}}] \leq 0.5$, start the machine to enter into heating operations for heating;
- (2) During operations of heating, if $0^{\circ}\text{C} \leq [(T_{\text{indoor ambient temperature}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{setup}}] < 2$, the heating operation will be still running;
- (3) During operations of heating, if $2^{\circ}\text{C} \leq [(T_{\text{indoor ambient temperature}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{setup}}]$, the heating operation will stop after reaching the temperature point.
2. The temperature setting range in this mode is: 16~30°C .

3. Special Functions

Defrosting Control

① Conditions for starting defrosting

After the time for defrosting is judged to be satisfied, if the temperature for defrosting is satisfied after detections for continuous 3minutes, the defrosting operation will start.

② Conditions of finishing defrosting

The defrosting operation can exit when any of the conditions below is satisfied:

- ③ $T_{\text{outdoor pipe temperature}} \geq (T_{\text{outdoor ambient temperature}} - [T_{\text{temperature 1 of finishing defrosting}}])$;
- ④ The continuous running time of defrosting reaches [tmax. defrosting time].

4. Control Logic

(1) Compressor Control

Start the compressor after starting cooling, heating, dehumidifying operations, and the outer fans start for 5s; When the machine is shutdown, in safety stops and when switching to air-supplying mode, the compressor will stop immediately. In all modes: once the compressor starts up, it will not be allowed to stop until having run for the [tmin. compressor running time] (Note: including cases of shutdown when the temperature point is reached; except the cases requiring stopping the compressor such as fault protection, remote shutdown, mode switching etc.); In all modes: once the compressor stops, it will be allowed be restart after 3-minute delay (Note: The indoor units have a function of power memory, the machine can be restarted after remote shutdown and powering up again without delay).

1. Cooling mode

Start the machine to enter into cooling operation for cooling, the compressor is switched on.

2. Dehumidifying mode

Same as the cooling mode.

3. Air-supplying mode

The compressor is switched off.

4. Heating mode

- (1) Start the machine to enter into heating operation for heating, the compressor is switched on.
- (2) Defrosting:
 - a. Defrosting starts: the compressor is shut down, and restarts it after 55-second delay.
 - b. Defrosting ends: the compressor stops, then starts it after 55-second delay.

(2) Outer Fans Control

Notes:

Only the outer fans run for at least 80s in each air flow speed can the air flow be switched;

After the outer fans run compulsively in high speed for 80s when the machine starts up, control the air flow according to the logic.

After remote shutdown, safety stops, and when the machine stops after reaching the temperature point, as well as after the compressor stops,

extend 1 minute, the outer fans will stop (During the period in the 1 minute, the air flow of outer fans can be changed according to the outdoor ambient temperature changes); When running with force, the outdoor fans shall run in the highest air flow.

(3) 4-way valve control

1. The 4-way valve control under the modes of Cooling, dehumidification and supplying air: closing;

2. The status of 4-way valve control under the heating mode: getting power;

(1) 4-way valve power control under heating mode

a. Starts the machine under heating mode, the 4-way valve will get power immediately.

(2) 4-way valve power turn-off control under heating mode

a. When you should turn off the power or switch to other mode under heating mode, the power of 4-way valve will be cut after 2 minutes of the compressor stopped.

b. When all kinds of protection stops, the power of 4-way valve will be cut after delaying 4 minutes.

(3) Defrosting control under heating mode:

a. Defrosting begins: The power of 4-way valve will be cut after 50s of entering into the defrosting compressor.

b. Defrosting stops: The 4-way valve will get power after 50s of exiting the defrosting compressor.

(4) Evaporator frozen-preventing protection function

At the mode of Cooling, dehumidifying:

Evaporator frozen-preventing protection function is allowed to begin after 6 min of starting the compressor.

1. Starting estimation:

After the compressor stopped working for 180s, if $T_{\text{inner pipe}} > [T_{\text{frozen-preventing frequency-limited temperature (the temperature of hysteresis is 2)}]$, the machine is only allowed to start for operating, otherwise it should not be started, and should be stopped to treat according to the frozen-preventing protection: Clear the trouble under the mode of power turn-off / heating, and the protection times are not counted.

2. Frequency limited

If $[T_{\text{frozen-preventing normal speed frequency-reducing temperature}}] \leq [T_{\text{inner pipe T frozen-preventing frequency-limited temperature}}]$, you should limit the frequency raising of compressor.

3. Reducing frequency at normal speed:

If $[T_{\text{frozen-preventing high speed frequency-reducing temperature}}] \leq [T_{\text{inner pipe T frozen-preventing normal speed frequency-reducing temperature}}]$, you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit;

4. Reducing frequency at high speed:

If $[T_{\text{frozen-preventing power turn-off temperature}}] \leq T_{\text{inner pipe}} [T_{\text{frozen-preventing high speed frequency-reducing temperature}}]$ you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit;

5. Power turn-off:

If the $T_{\text{inner pipe}} < [T_{\text{frozen-preventing power turn-off temperature}}]$, then frozen-preventing protect to stop the machine; If $T_{\text{frozen-preventing frequency-limited temperature}} < T_{\text{inner pipe}}$, and the compressor has stopped working for 3 minutes, the whole machine should be allowed to operate.

6. If the frozen-preventing protection power turn-off continuously occurs for six times, it should not be resumed automatically, and you should press the ON/OFF button to resume if the fault keeps on. During the process of running, if the running time of compressor exceeds the t evaporator frozen-preventing protection times zero clearing time, the times of frozen-preventing power turn-off should be cleared to recount. The mode of stopping the machine or transferring to supply air will clear the trouble times immediately (if the trouble can not be resumed, mode transferring will not clear it).

(5) Overload protection function

Overload protection function at the mode of Cooling and dehumidifying

1. Starting estimation:

After the compressor stopped working for 180s, if $T_{\text{outer pipe}} < [T_{\text{Cooling overload frequency-limited temperature}}]$ (the temperature of hysteresis is 2°C), the machine is allowed to start, otherwise it should not be started, and should be stopped to treat according to the overload protection: Clear the trouble at the mode of power turn-off / heating, and the protection times are not counted.

2. Frequency limited

If $[T_{\text{Cooling overload frequency-limited temperature}}] \leq [T_{\text{outer pipe T Cooling overload frequency reducing temperature at normal speed}}]$, you should limit the frequency raising of compressor.

3. Reducing frequency at normal speed and power turn-off:

If $[T_{\text{Cooling overload frequency reducing temperature at high speed}}] \leq T_{\text{outer pipe}} < [T_{\text{Cooling overload power turn-off temperature}}]$, you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit; After it was running 90s at the lower limit, if $[T_{\text{Cooling overload frequency reducing temperature at normal speed}}] \leq T_{\text{outer pipe}}$, then Cooling overload protects machine stopping;

4. Reducing frequency at high speed and stop machine:

If $[T_{\text{Cooling overload frequency reducing temperature at high speed}}] \leq T_{\text{outer pipe}}$ $[T_{\text{Cooling overload power turn-off temperature}}]$, you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit; After it was running 90s at the lower limit, if $[T_{\text{Cooling overload frequency reducing temperature at normal speed}}] \leq [T_{\text{outer pipe}}]$, then Cooling overload protects machine stopping;

5. Power turn-off:

If the $[T_{\text{Cooling overload power turn-off temperature}}] \leq T_{\text{outer pipe}}$, then Cooling overload protects machine stopping; If $[T_{\text{outer pipe}}] < [T_{\text{Cooling overload frequency-limited temperature}}]$ and the compressor has been stopped working for 3 minutes, the machine should be allowed to operate.

6. If the Cooling overload protection power turn-off continuously occurs for six times, it should not be resumed automatically, and you should press the ON/OFF button to resume if the fault keeps on. During the process of running, if the running time of compressor exceeds the t overload protection times zero clearing time, the times of overload protection power turn-off should be cleared to recount. The mode of stopping the machine or transferring to supply air will clear the trouble times immediately (if the trouble can not be resumed, transferring mode will not clear it).

Overload protection function at the mode of heating

Starting estimation :

After the compressor stopped working for 180s, if $T_{\text{inner pipe}} > T_{\text{heating overload frequency-limited temperature}}$ (the temperature of hysteresis is 2), the machine is allowed to start, otherwise it should not be started, and should be stopped to treat according to the overload protection:

Clear the trouble at the mode of power turn-off / heating, and the protection times are not counted.

1. Frequency limited

If $[T_{\text{heating overload frequency-limited temperature}}] \leq T_{\text{inner pipe}} < [T_{\text{heating overload frequency reducing temperature at normal speed}}]$, you should limit the frequency raising of compressor.

2. Reducing frequency at normal speed and stopping machine:

If $T_{\text{heating overload frequency reducing temperature at normal speed}} \leq T_{\text{inner pipe}} < [T_{\text{heating overload frequency reducing temperature at high speed}}]$, you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit; After it was running 90s at the lower limit, if $T_{\text{heating overload frequency reducing temperature at normal speed}} \leq T_{\text{inner pipe}}$, then overload protects machine stopping;

3. Reducing frequency at high speed and power turn-off:

If $[T_{\text{heating overload frequency reducing temperature at high speed}}] \leq T_{\text{inner pipe}} < [T_{\text{heating overload power turn-off temperature}}]$, you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit; After it was running 90s at the lower limit, if $T_{\text{heating overload frequency reducing temperature at normal speed}} \leq T_{\text{outer pipe}}$, then Cooling overload protects machine stopping;

4. Power turn-off:

If the $[T_{\text{heating overload power turn-off temperature}}] \leq T_{\text{inner pipe}}$, then overload protects machine stopping; If $T_{\text{inner pipe}} > T_{\text{heating overload frequency-limited temperature}}$ and the compressor has been stopped working for 3 minutes, the machine should be allowed to operate.

5. If the overload protection power turn-off continuously occurs for six times, it should not be resumed automatically, and you should press the ON/OFF button to resume if the fault keeps on. During the process of running, if the running time of compressor exceeds the t overload protection times zero clearing time, the times of overload protection power turn-off should be cleared to recount. The mode of stopping the machine or transferring to supply air will clear the trouble times immediately (if the trouble can not be resumed, transferring mode will not clear it). Protective function for discharge temperature of compressor

1. Starting estimation:

After the compressor stopped working for 180s, if $T_{\text{Discharge}} < T_{\text{Discharge limited temperature}}$ (the temperature of hysteresis is 2°C), the machine is allowed to start, otherwise it should not be started, and should be stopped to treat according to the discharge temperature:

The machine should be stopped or transferred to supply air, the trouble should be cleared immediately, and the protection times are not counted.

2. Frequency limited

If $[T_{\text{Limited frequency temperature during discharging}}] \leq T_{\text{Discharge}} < [T_{\text{frequency reducing temperature at normal speed during discharging}}]$, you should limit the frequency raising of compressor.

3. Reducing frequency at normal speed and stopping machine:

If $[T_{\text{frequency reducing temperature at normal speed during discharging}}] \leq T_{\text{Discharge}} < [T_{\text{frequency reducing temperature at high speed during discharging}}]$, you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit; After it was running 90s at the lower limit, if $[T_{\text{frequency reducing temperature at normal speed during discharging}}] \leq T_{\text{Discharge}}$, you should discharge to protect machine stopping;

4. Reducing frequency at high speed and power turn-off:

If $[T_{\text{frequency reducing temperature at high speed of module}}] \leq T_{\text{Module}} < [T_{\text{Power turn-off temperature of module}}]$ you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit; After it was running 90s at the lower limit, if $[T_{\text{frequency reducing temperature at normal speed of module}}] \leq T_{\text{Module}}$, you should stop the machine for module overheating protection;

5. Power turn-off:

If the $[T_{\text{Power turn-off temperature of module}}] \leq T_{\text{Module}}$, you should stop the machine for module overheating protection; If $T_{\text{Module}} < [T_{\text{Limited frequency temperature of module}}]$ and the compressor has been stopped for 3 minutes, the machine should be allowed to operate.

6. If protection continuously occurs for six times, it should not be resumed automatically, and you should press the ON/OFF button to resume. During the process of running, if the running time of compressor exceeds the $[t_{\text{Protection times clearing of module}}]$, the discharge protection is cleared to recount. Stopped or transferred to supply air mode will clear the trouble times immediately (if the trouble can not be resumed, mode transferring also will not clear it).

(10) Compressor overloads protection

If you measure the compressor overload switch action in 3s, the compressor should be stopped for overloading. The machine should be allowed to operate after overload protection was measured to resume. If the overloading protection continuously occurs for three times, it should not be resumed automatically, and you should press the ON/OFF button to resume. The protection times of compressor is allowed to clear after the compressor run $[t_{\text{Protection times clearing of compressor overloading}}]$ 30 minutes.

(11) Phase current overcurrent protection of compressor

During the running process of compressor, you could measure the phase current of the compressor, and control it according to the following steps:

1. Frequency limited

If $[I_{\text{Limited frequency phase current}}] \leq [I_{\text{Phase current T frequency reducing phase current}}]$, you should limit the frequency raising of compressor.

2. Reducing Frequency

If $[I_{\text{Frequency Reducing Phase Current}}] \leq I_{\text{Phase Current}} < [I_{\text{Power Turn-Off Phase Current}}]$, the compressor shall continue to reduce frequency till the lowest frequency limit or out of the condition of reducing frequency;

3. Power turn-off

If $[I_{\text{Phase Current}}] \geq [I_{\text{Power Turn-Off Phase Current}}]$, the compressor phase current shall stop working for overcurrent protection; if $[I_{\text{Phase Current}}] \leq [I_{\text{Frequency Reducing Phase Current}}]$, and the compressor have stopped working for 3 min, the machine shall be allowed to operate;

4. If the overcurrent protection of compressor phase current continuously occurs for six times, it should not be resumed automatically, and you should press the ON/OFF button to resume. During the process of running, if the running time of compressor exceeds the $[t_{\text{Clearing Time of Compressor Phase Current Times}}]$, the overcurrent protection is cleared to recount.

(12) Starting-up Failure Protection for Compressor

Stop the compressor after its starting-up fails, restart it after 20s if the fault doesn't shows, and if they are all failing for the successive start 3 times, it shall be reported as Starting-up Failure, and then restart up it after 3 min. When it still not be able to operate through carry out the above process for 5 times, it is available if press ON/OFF. And the compressor should be cleared the times after it run 2 min.

(13) Out-of-Step Protection for Compressor

The out-of-step protection signal should be detected immediately after starting-up compressor, and once find the out-of-step protection signal, the out-of-step protection shall be stopped; if it can run for lasting power turn-off 3 min, the machine shall be allowed to operate. If it still can't run automatically when the out-of-step protection for compressor happens to stop working for 6 times in succession, it needs to press ON/OFF to operate. And if the running time is more than 10 min, the power turn-off times for out-of-step protection shall be cleared and recounted.

(14) Voltage Abnormity Protection for DC Bus

To detect voltage abnormity protection for dc bus after completing the pre-charge:

1. Over-High Voltage Protection for DC Bus:

If it found the DCbus voltage $U_{\text{DC}} > [U_{\text{DC Jiekuangchun Protection}}]$, turn off PFC and stop the compressor at once, and it shall show the DC over-high voltage failure; it should clear out the failure when the voltage dropped to $U_{\text{DC}} < [U_{\text{DC Jiekuangchun Recovery}}]$ and the compressor stopped for 3 min.

2. Over-Low Voltage Protection for DC Bus:

If it found the DC bus voltage $U_{\text{DC}} < [U_{\text{DC Wantuochun Protection}}]$, turn off PFC and stop the compressor at once, and it shall show the DC over-low voltage; and it should clear out the failure when the voltage raised to $U_{\text{DC}} > [U_{\text{DC Wantuochun Recovery}}]$ and the compressor stopped for 3 min.

3.To detect voltage abnormality protect for DC bus when getting electricity:

If it found the DC bus voltage $U_{DC} > [U_{DC} \text{---Over-High Voltage}]$, turn off the relay at once, and shows voltage abnormality failure for DC Bus. And the failure can't recover except to break off and get the electricity.

(15)Abnormity Protection for Four-way Valve

Under the model of heating operation in good condition: the compressor is detected $[T_{Inner Tube} < (T_{Inner Ring} - T_{Abnormity Temperature Difference For Four-Way Valve Reversion})]$, during the running, it should be regarded as four-way valve reversion abnormality. And then it can run if stop the reversion abnormality protection for four-way valve 3 min; and if it still can't run when the reversion abnormality protection for four-way valve happens to stop working for 3 times in succession, it is available if presses ON/OFF.

Attention: the protection shall be shielded during the testing mode and defrosting process, and it shall be cleared out the failure and its times immediately when turning off or delivering wind / cooling / dehumidifying mode conversed (the inverted mode don't clear out the failure when it can't recover to operate).

(16) PFC Protection

1. After start up the PFC, it should detect the protection signal of PFC immediately; under the condition of PFC protection, it should turn off the PFC and compressor at one time;
2. It shows the failure is cleared out if PFC Protection stopped working 3 min and recovers to run automatically;
3. If it still can't run when it occurs PFC protection for 3 times in succession, it is available if presses ON/OFF; and clear the PFC Protection times when start up PFC for 10min.

(17) Failure Detection for Sensor

1. Outdoor Ambient Sensor: detect the failure of sensor at all times.
2. Outdoor Tube Sensor: You should not detect the failure of outdoor tube sensor within 10 minutes heating operation compressor except the defrosting, and you could detect it at other time.
3. Outdoor Exhaust Sensor:
 - (a) The compressor only detect the sensor failure after it start up 3 min in normal mode;
 - (b) It should detect the exhaust sensor failure immediately in the testing mode.
4. Module Temperature Sensor:
 - (a) Short-Circuit Detection: the compressor should be detected immediately when the module temperature sensor occurs short-circuits;
 - (b) Open-Circuit Detection: the compressor should be detected on open-circuit when it runs 3min (it needn't 30s avoiding the module over-heated).
 - (c) Detect the sensor failure at all times in the testing mode.
5. Disposal for Sensor Protection
 - (1) When the short-circuit of sensor is detected within 30s, It is regarded as the temperature of sensor over-high (or infinitely high), and now according to the over-high sensor, the machine should carry out the corresponding protection to stop working, and show the corresponding temperature shutdown protection and sensor failure at the same time (for example: the compressor stops immediately when the outdoor tube sensor short-circuit, and the machine shall show the overload protection and outdoor tube sensor failure).
 - (2) When the open-circuit of sensor is detected within 30s, The protection shall be stopped and it shall show the corresponding sensor failure.
6. Electric Heating Function of Chassis
 - (1) When $T_{outdoor\ amb.} \leq 0^{\circ}C$, the electric heating of chassis will operate;
 - (2) When $T_{outdoor\ amb.} > 2^{\circ}C$, the electric heating of chassis will stop operation;
 - (3)When $0^{\circ}C < T_{outdoor\ amb.} \leq 2^{\circ}C$, the electric heating of chassis will keep original status.
7. Electric Heating Function of Compressor
 - (1) When $T_{outdoor\ amb.} \leq -5^{\circ}C$, compressor stops operation, while the electric heating of compressor starts operation;
 - (2) When $T_{outdoor\ amb.} > -2^{\circ}C$, the electric heating of compressor stops operation;
 - (3) When $-5^{\circ}C < T_{outdoor\ amb.} \leq -2^{\circ}C$, the electric heating of compressor will keep original status.

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 3mm.

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.

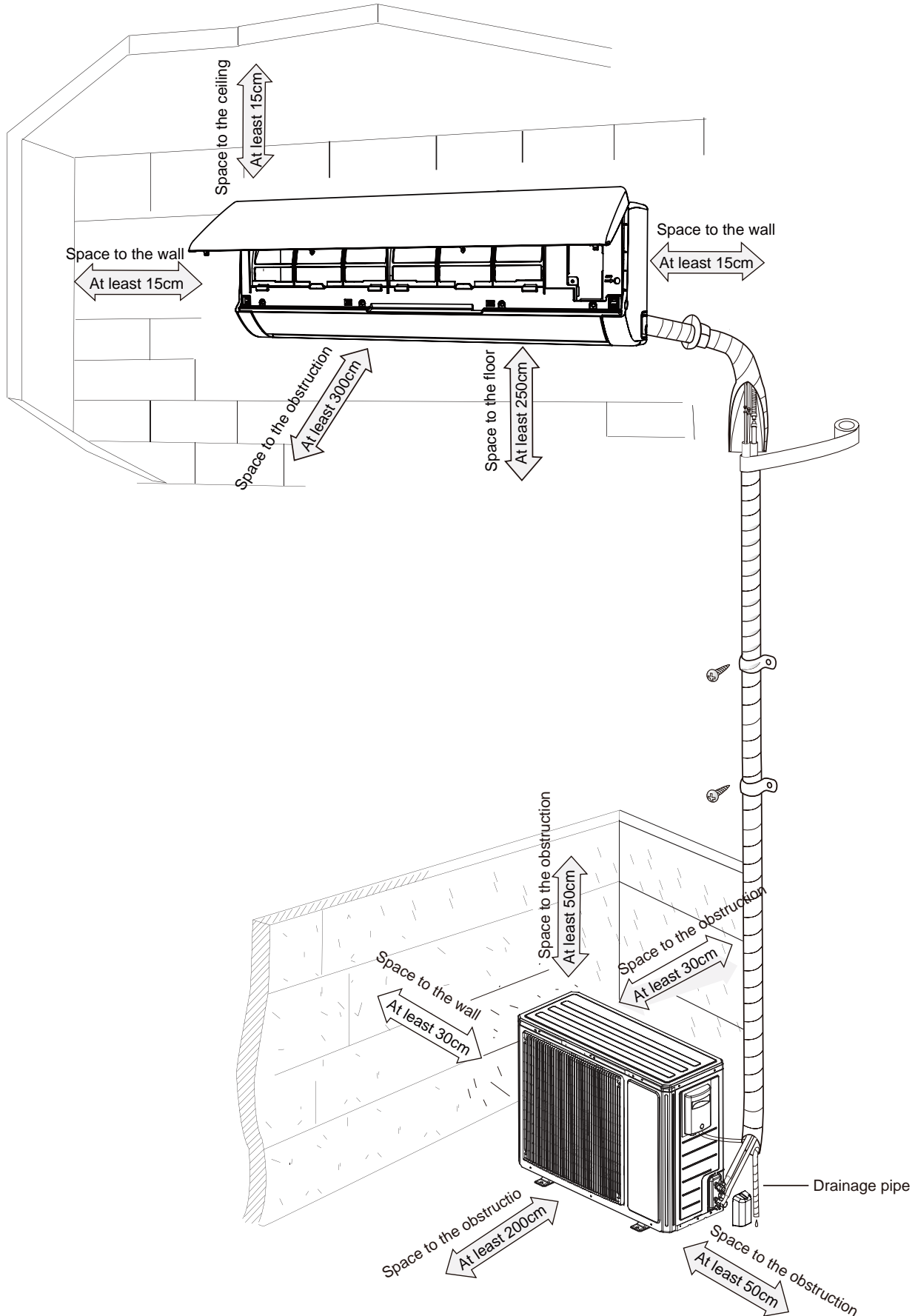
Improper installation may lead to fire hazard, explosion, electric shock or injury.

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. Installation

8.1 Installation Dimension Diagram



8.2 Installation Parts-checking

No.	Name	No.	Name
1	Indoor unit	8	Sealing gum
2	Outdoor unit	9	Wrapping tape
3	Connection pipe	10	Support of outdoor unit
4	Drainage pipe	11	Fixing screw
5	Wall-mounting frame	12	Drainage plug(cooling and heating unit)
6	Connecting cable(power cord)	13	Owner's manual, remote controller
7	Wall pipe		

⚠ Note:

- 1.Please contact the local agent for installation.
- 2.Don't use unqualified power cord.

8.3 Selection of Installation Location

1. Basic Requirement:

Installing the unit in the following places may cause malfunction. If it is unavoidable, please consult the local dealer:

- (1) The place with strong heat sources, vapors, flammable or explosive gas, or volatile objects spread in the air.
- (2) The place with high-frequency devices (such as welding machine, medical equipment).
- (3) The place near coast area.
- (4) The place with oil or fumes in the air.
- (5) The place with sulfureted gas.
- (6) Other places with special circumstances.

2. Indoor Unit:

- (1) There should be no obstruction near air inlet and air outlet.
- (2) Select a location where the condensation water can be dispersed easily and won't affect other people.
- (3) Select a location which is convenient to connect the outdoor unit and near the power socket.
- (4) Select a location which is out of reach for children.
- (5) The location should be able to withstand the weight of indoor unit and won't increase noise and vibration.
- (6) The appliance must be installed 2.5m above floor.
- (7) Don't install the indoor unit right above the electric appliance.
- (8) The appliance shall not be installed in the laundry.

3. Outdoor Unit:

- (1) Select a location where the noise and outflow air emitted by the outdoor unit will not affect neighborhood.
- (2) The location should be well ventilated and dry, in which the outdoor unit won't be exposed directly to sunlight or strong wind.
- (3) The location should be able to withstand the weight of outdoor unit.
- (4) Make sure that the installation follows the requirement of installation dimension diagram.
- (5) Select a location which is out of reach for children and far away from animals or plants.If it is unavoidable, please add fence for safety purpose.

8.4 Electric Connection Requirement

1. Safety Precaution

- (1) Must follow the electric safety regulations when installing the unit.
- (2) According to the local safety regulations, use qualified power supply circuit and air switch.
- (3) Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring may result in electric shock,fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.

Air-conditioner	Air switch capacity
ASH-18AIM2 PT	16A
ASH-24AIM2 PT	

- (4) Properly connect the live wire, neutral wire and grounding wire of power socket.
- (5) Be sure to cut off the power supply before proceeding any work related to electricity and safety.
- (6) Do not put through the power before finishing installation.
- (7) For appliances with type Y attachment,the instructions shall contain the substance of thefollowing.If the supply cord is damaged,it must be replaced by the manufacturer,its service agent or similarly qualified persons in order to avoid a hazard.
- (8) The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

2. Grounding Requirement:

- (1) The air conditioner is first class electric appliance. It must be properly grounding with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
- (2) The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.
- (3) The grounding resistance should comply with national electric safety regulations.
- (4) The appliance must be positioned so that the plug is accessible.
- (5) An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
- (6) Including an air switch with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only for protect the circuit)

8.5 Installation of Indoor Unit

1. Choosing Installation location

Recommend the installation location to the client and then confirm it with the client.

2. Install Wall-mounting Frame

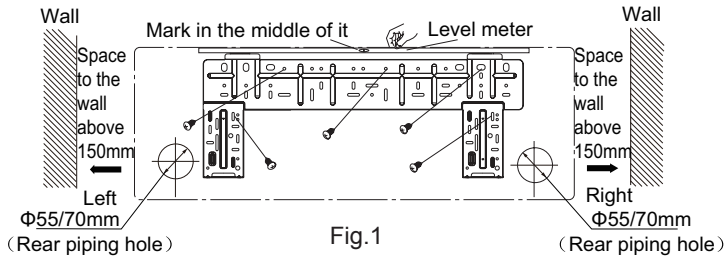
- (1) Hang the wall-mounting frame on the wall; adjust it in horizontal position with the level meter and then point out the screw fixing holes on the wall.
- (2) Drill the screw fixing holes on the wall with impact drill (the specification of drill head should be the same as the plastic expansion particle) and then fill the plastic expansion particles

in the holes.

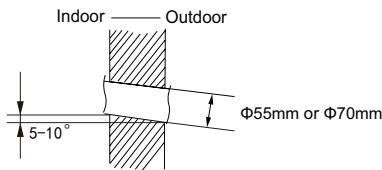
(3) Fix the wall-mounting frame on the wall with tapping screws (ST4.2X25TA) and then check if the frame is firmly installed by pulling the frame. If the plastic expansion particle is loose, please drill another fixing hole nearby.

3. Install Wall-mounting Frame

(1) Choose the position of piping hole according to the direction of outlet pipe. The position of piping hole should be a little lower than the wall-mounted frame.(As show in Fig.1)



(2) Open a piping hole with the diameter of Φ55mm or Φ70mm on the selected outlet pipe position. In order to drain smoothly, slant the piping hole on the wall slightly downward to the outdoor side with the gradient of 5-10°. (As show in Fig.2)



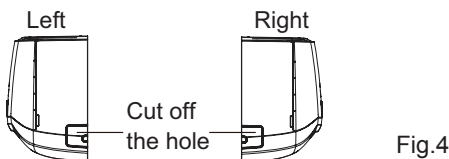
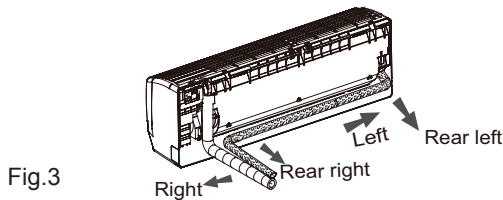
⚠ Note:

- (1) Pay attention to dust prevention and take relevant safety measures when opening the hole.
- (2) The plastic expansion particles are not provided and should be bought locally.

4. Outlet Pipe

(1) The pipe can be led out in the direction of right, rear right, left or rear left. (As show in Fig.3)

(2) When selecting leading out the pipe from left or right, please cut off the corresponding hole on the bottom case. (As show in Fig.4)



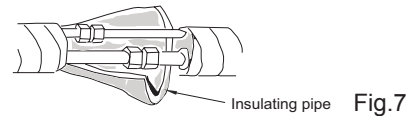
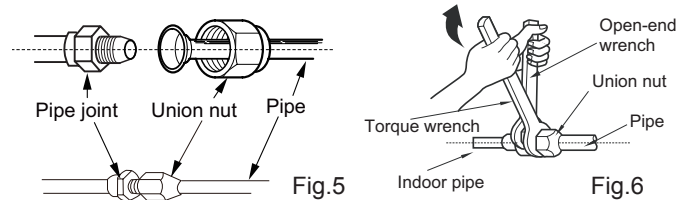
5. Connect the Pipe of Indoor Unit

(1) Aim the pipe joint at the corresponding bellmouth. (As show in Fig.5)

(2) Pretightening the union nut with hand.

(3) Adjust the torque force by referring to the following sheet. Place the open-end wrench on the pipe joint and place the torque wrench on the union nut. Tighten the union nut with torque wrench. (As show in Fig.6)

(4) Wrap the indoor pipe and joint of connection pipe with insulating pipe, and then wrap it with tape. (As show in Fig.7)



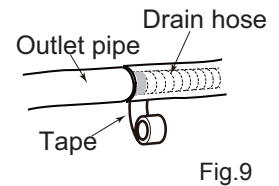
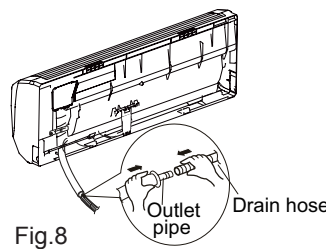
Refer to the following table for wrench moment of force:

Hex nut diameter(mm)	Tightening torque(N·m)
Φ6	15~20
Φ9.52	30~40
Φ12	45~55
Φ16	60~65
Φ19	70~75

6. Install Drain Hose

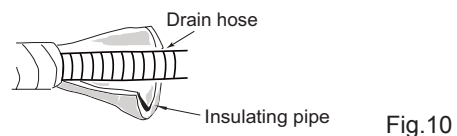
(1) Connect the drain hose to the outlet pipe of indoor unit. (As show in Fig.8)

(2) Bind the joint with tape. (As show in Fig.9)



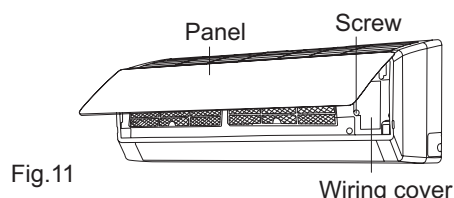
⚠ Note:

- (1) Add insulating pipe in the indoor drain hose in order to prevent condensation.
- (2) The plastic expansion particles are not provided. (As show in Fig.10)



7. Connect Wire of Indoor Unit

(1) Open the panel, remove the screw on the wiring cover and then take down the cover.(As show in Fig.11)



(2) Make the power connection wire go through the cable-cross hole at the back of indoor unit and then pull it out from the front side.(As show in Fig.12)

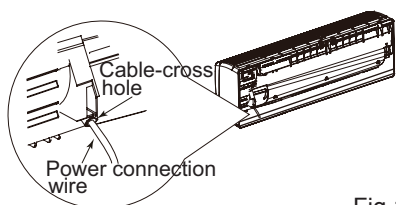
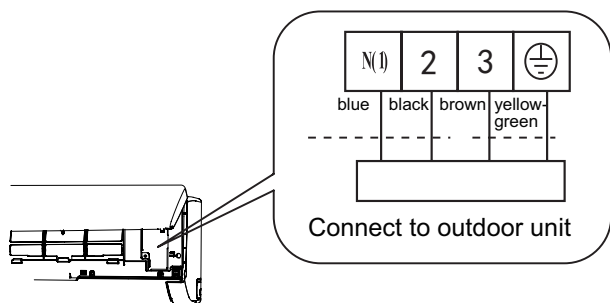


Fig.12

(3) Remove the wire clip; connect the power connection wire to the wiring terminal according to the color; tighten the screw and then fix the power connection wire with wire clip.(As show in Fig.13)



Note: The wiring connect is for reference only, please refer to the actual one.

Fig.13

(4) Put wiring cover back and then tighten the screw.

(5) Close the panel.

⚠ Note:

(1) All wires of indoor unit and outdoor unit should be connected by a professional.

(2) If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.

(3) For the air conditioner with plug, the plug should be reachable after finishing installation.

(4) For the air conditioner without plug, an air switch must be installed in the line. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

8. Bind up Pipe

(1) Bind up the connection pipe, power cord and drain hose with the band.(As show in Fig.14)

(2) Reserve a certain length of drain hose and power cord for installation when binding them. When binding to a certain degree, separate the indoor power and then separate the drain hose.(As show in Fig.15)

(3) Bind them evenly.

(4) The liquid pipe and gas pipe should be bound separately at the end.

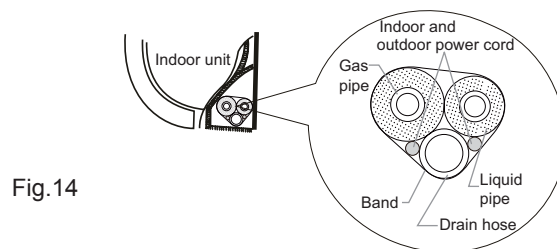


Fig.14

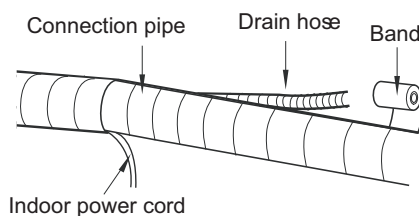


Fig.15

⚠ Note:

(1) The power cord and control wire can't be crossed or winding.

(2) The drain hose should be bound at the bottom.

9. Hang the Indoor Unit

(1) Put the bound pipes in the wall pipe and then make them pass through the wall hole.

(2) Hang the indoor unit on the wall-mounting frame.

(3) Stuff the gap between pipes and wall hole with sealing gum.

(4) Fix the wall pipe. (As show in Fig.16)

(5) Check if the indoor unit is installed firmly and closed to the wall.(As show in Fig.17)

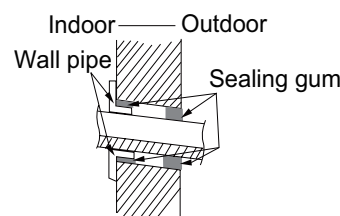


Fig.16

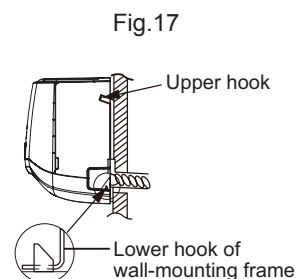


Fig.17

⚠ Note:

Do not bend the drain hose too excessively in order to prevent blocking.

8.6 Installation of Outdoor Unit

1. Fix the support of outdoor unit(select it according to the actual installation situation)

- (1) Select installation location according to the house structure.
- (2) Fix the support of outdoor unit on the selected location with expansion screws.

⚠ Note:

- (1) Take sufficient protective measures when installing the outdoor unit.
- (2) Make sure the support can withstand at least four times the unit weight.
- (3) The outdoor unit should be installed at least 3cm above the floor in order to install drain joint.(As show in Fig.18)
- (4) For the unit with cooling capacity of 2300W~5000W, 6 expansion screws are needed; for the unit with cooling capacity of 6000W~8000W, 8 expansion screws are needed; for the unit with cooling capacity of 10000W~16000W, 10 expansion screws are needed.

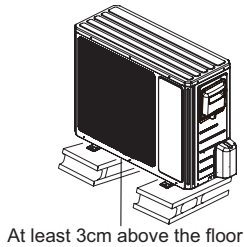


Fig.18

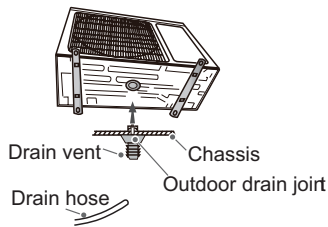


Fig.19

2. Install Drain Joint(Only for cooling and heating unit)

- (1) Connect the outdoor drain joint into the hole on the chassis.
 - (2) Connect the drain hose into the drain vent.
- (As show in Fig.19)

3. Fix Outdoor Unit

- (1) Place the outdoor unit on the support.
 - (2) Fix the foot holes of outdoor unit with bolts.
- (As show in Fig.20)

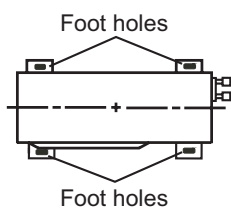


Fig.20

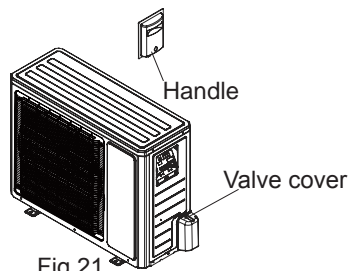


Fig.21

4. Connect Indoor and Outdoor Pipes

- (1) Remove the screw on the right handle and valve cover of outdoor unit and then remove the handle and valve cover.(As show in Fig.21)
- (2) Remove the screw cap of valve and aim the pipe joint at the bellmouth of pipe.(As show in Fig.22)

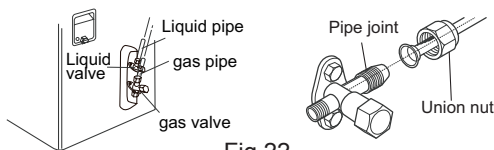


Fig.22

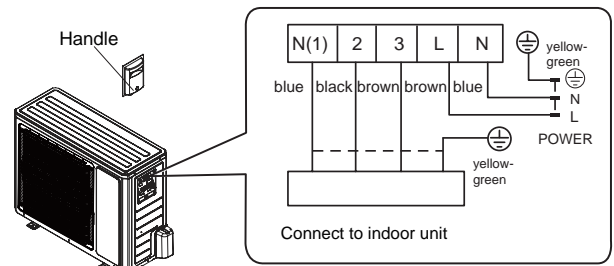
- (3) Pretightening the union nut with hand.
- (4) Tighten the union nut with torque wrench .

Refer to the following table for wrench moment of force :

Hex nut diameter(mm)	Tightening torque(N·m)
Φ6	15~20
Φ9.52	30~40
Φ12	45~55
Φ16	60~65
Φ19	70~75

5. Connect Outdoor Electric Wire

- (1) Remove the wire clip; connect the power connection wire and power cord to the wiring terminal according to the color; fix them with screws.(As show in Fig.23)



Note: the wiring connect is for reference only, please refer to the actual one.

Fig.23

- (2) Fix the power connection wire with wire clip.

⚠ Note:

- (1) After tightening the screw, pull the power cord slightly to check if it is firm.
- (2) Never cut the power connection wire to prolong or shorten the distance.

6. Neaten the Pipes

- (1) The pipes should be placed along the wall, bent reasonably and hidden possibly. Min. semidiameter of bending the pipe is 10cm.
- (2) If the outdoor unit is higher than the wall hole, you must set a U-shaped curve in the pipe before pipe goes into the room, in order to prevent rain from getting into the room.(As show in Fig.24)

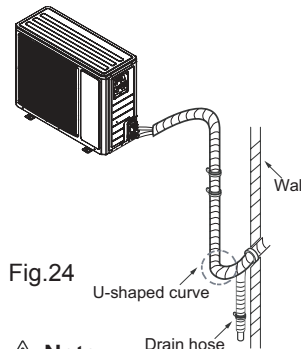


Fig.24

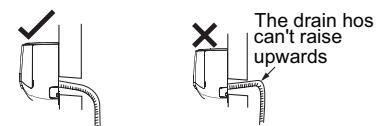
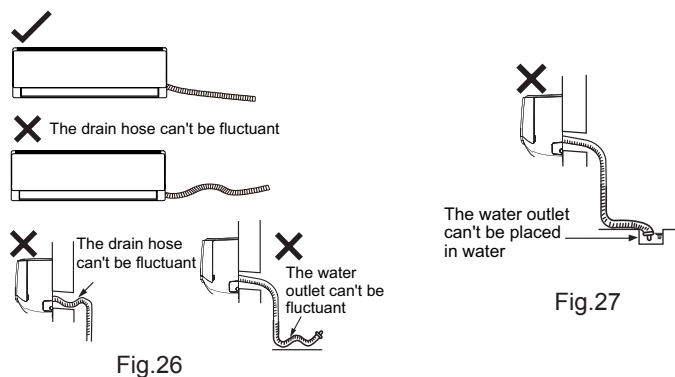


Fig.25

⚠ Note:

- (1) The through-wall height of drain hose shouldn't be higher than the outlet pipe hole of indoor unit.(As show in Fig.25)
- (2) Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc.(As show in Fig.26)

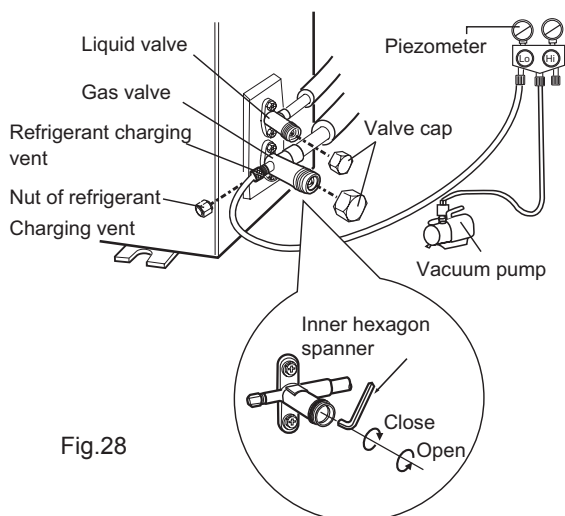
(3) The water outlet can't be placed in water in order to drain smoothly.(As show in Fig.27)



8.7 Vacuum Pumping and Leak Detection

1. Use Vacuum Pump

- (1) Remove the valve caps on the liquid valve and gas valve and the nut of refrigerant charging vent.
- (2) Connect the charging hose of piezometer to the refrigerant charging vent of gas valve and then connect the other charging hose to the vacuum pump.
- (3) Open the piezometer completely and operate for 10-15min to check if the pressure of piezometer remains in -0.1MPa.
- (4) Close the vacuum pump and maintain this status for 1-2min to check if the pressure of piezometer remains in -0.1MPa. If the pressure decreases, there may be leakage.
- (5) Remove the piezometer, open the valve core of liquid valve and gas valve completely with inner hexagon spanner.
- (6) Tighten the screw caps of valves and refrigerant charging vent. (As show in Fig.28)



2. Leakage Detection

- (1) With leakage detector:
Check if there is leakage with leakage detector.
- (2) With soap water:
If leakage detector is not available, please use soap water for leakage detection. Apply soap water at the suspected position and keep the soap water for more than 3min. If there are air bubbles coming out of this position, there's a leakage.

8.8 Check after Installation and Test Operation

1. Check after Installation

Check according to the following requirement after finishing installation.

NO.	Items to be checked	Possible malfunction
1	Has the unit been installed firmly?	The unit may drop, shake or emit noise.
2	Have you done the refrigerant leakage test?	It may cause insufficient cooling (heating) capacity.
3	Is heat insulation of pipeline sufficient?	It may cause condensation and water dripping.
4	Is water drained well?	It may cause condensation and water dripping.
5	Is the voltage of power supply according to the voltage marked on the nameplate?	It may cause malfunction or damage the parts.
6	Is electric wiring and pipeline installed correctly?	It may cause malfunction or damage the parts.
7	Is the unit grounded securely?	It may cause electric leakage.
8	Does the power cord follow the specification?	It may cause malfunction or damage the parts.
9	Is there any obstruction in air inlet and air outlet?	It may cause insufficient cooling (heating).
10	The dust and sundries caused during installation are removed?	It may cause malfunction or damaging the parts.
11	The gas valve and liquid valve of connection pipe are open completely?	It may cause insufficient cooling (heating) capacity.

2. Test Operation

- (1) Preparation of test operation
 - The client approves the air conditioner installation.
 - Specify the important notes for air conditioner to the client.
- (2) Method of test operation
 - Put through the power, press ON/OFF button on the remote controller to start operation.
 - Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.
 - If the ambient temperature is lower than 16°C , the air conditioner can't start cooling.

9. Maintenance

9.1 Malfunction Display of Indoor Unit

1. Malfunction display requirement

When there are several malfunctions, they will be displayed circularly.

2. Malfunction display method

- (1) Hardware malfunction: immediate display; refer to "malfunction display table";
- (2) Operation state: immediate display; refer to "malfunction display table";
- (3) Other malfunctions: it is displayed after the compressor stops for 200s; refer to "malfunction display table".

Note: when the compressor is restarted, the malfunction display delay time (200s) is cleared.

- (4) When the unit is under limit frequency or frequency drop state, the display can be controlled via remote controller.

3. Display control via remote controller

Enter display control: press light button successively for 6 times within 3s to display the corresponding malfunction code;

Exit display control: pressing light button successively for 6 times within 3s or after display is shown for 5min, the display will terminate.

4. Display under test state

Dual 8 nixie tube display: minimum cooling (heating)-P0; middle cooling (heating)-P3

Nominal cooling (heating) -P1; maximum cooling (heating) -P2;

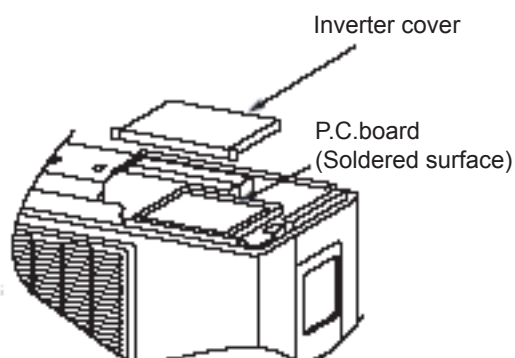
●Error Code List

Malfunction Name	Dual-8 Nixie Tube
Malfunction of jumper cap	C5
No feedback from indoor unit's motor	H6
Circuit malfunction of zero crossing detection	U8
Indoor ambient temperature sensor is open/short-circuited	F1
Indoor evaporator temperature sensor is open/short-circuited	F2
Module temperature sensor is open/short-circuited	P7
Outdoor ambient temperature sensor is open/short-circuited	F3
Outdoor condenser tube temperature sensor is open/short-circuited	F4
Outdoor discharge temperature sensor is open/short-circuited	F5
Communication malfunction between indoor and outdoor units	E6
Malfunction of phase current circuit detection for compressor	U1
Module temperature protection	P8
Charging malfunction of capacitor	PU
Overload protection of compressor	H3
Freon recovery mode	Fo
Failure start-up of compressor	LC
Discharge high-temperature protection of compressor	E4
Overload protection	E8
Overcurrent protection of the complete unit	E5
Overcurrent protection of phase current	P5
Desynchronizing of compressor	H7
Module current protection (IPM protection)	H5
Low voltage protection of DC bus bar	PL
High voltage protection of DC bus bar	PH
PFC protection	HC
Limit/decrease frequency due to current protection of the complete unit	F8
Limit/decrease frequency due to module current protection (phase current)	En
Limit/decrease frequency due to discharge	F9
Limit/decrease frequency due to freeze protection	FH
Limit/decrease frequency due to overload	F6
Limit/decrease frequency due to module temperature protection	EU
Cold air prevention protection	E9
Freeze protection	E2
Malfunction of ODU DC fan	L3

Note: Please refer to service manual for the troubleshooting procedure for outdoor unit.

- Discharging method

(1) remove the inverter cover(Outdoor Unit)



(2)As shown below,connect the discharge resistance(approx.100Ω20W)or plug of the sold ering iron to voltage between + - terminals of the electrolytic capacitor on PC Board for 30s, and then peformedischarging.

NOTE:

A large-capacity electrolytic capacitor is used in the outdoor unit controller(inverter).Therefore,if the power supply is turned off,charge(charging voltage DC280V to 380V)remains and disc harging takes a lot of time.. After turning off the power source,if touching the charging section before discharging, an electrical shock may be caused. Discharge the electrol ytic capacitor completely by using soldering iron,etc.

9.2 Procedure of Troubleshooting

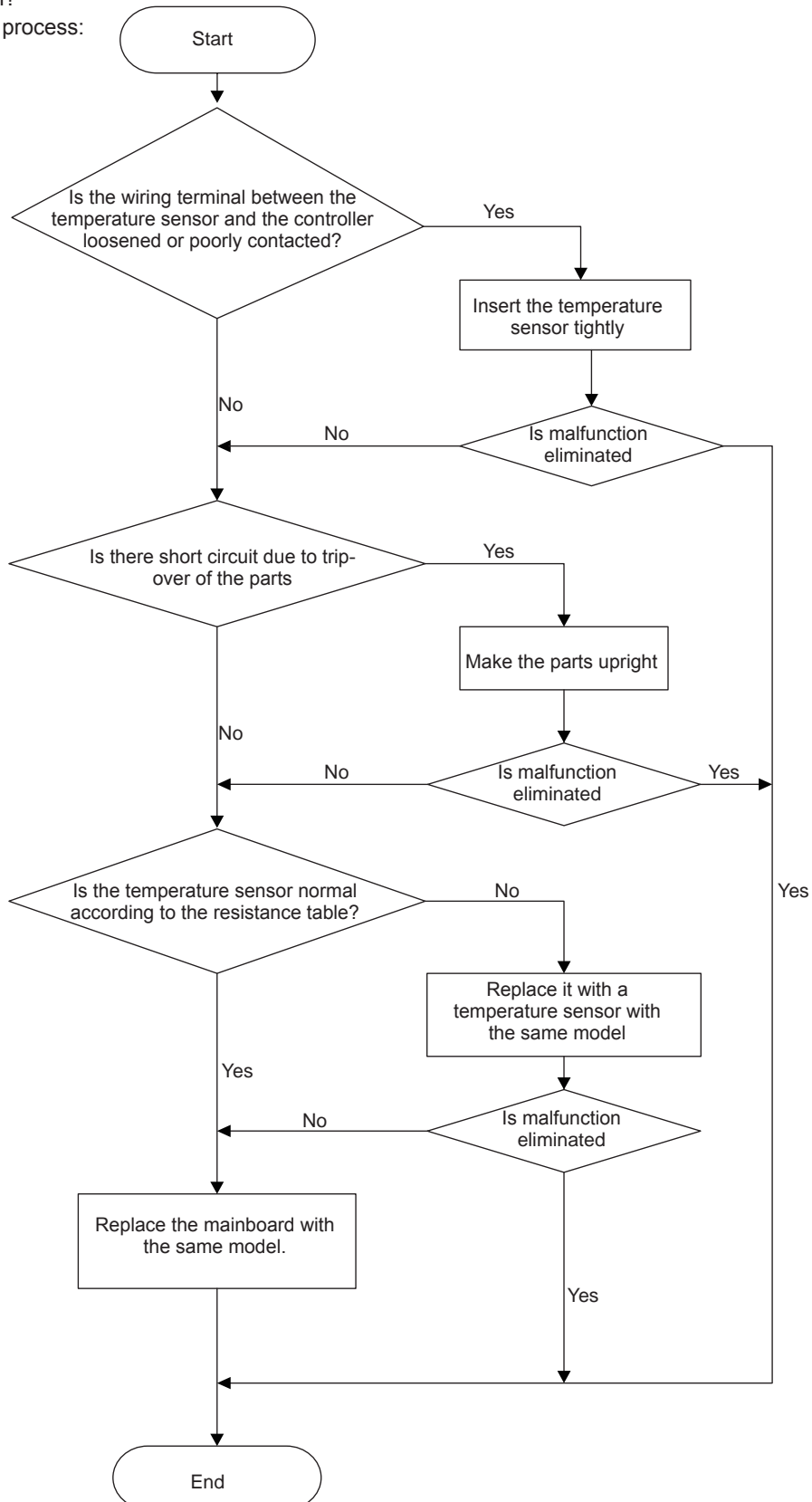
Indoot Unit

(1) Malfunction of Temperature Sensor F1, F2

Main detection points:

- Is the wiring terminal between the temperature sensor and the controller loosened or poorly contacted?
- Is there short circuit due to trip-over of the parts?
- Is the temperature sensor broken?
- Is mainboard broken?

Malfunction diagnosis process:

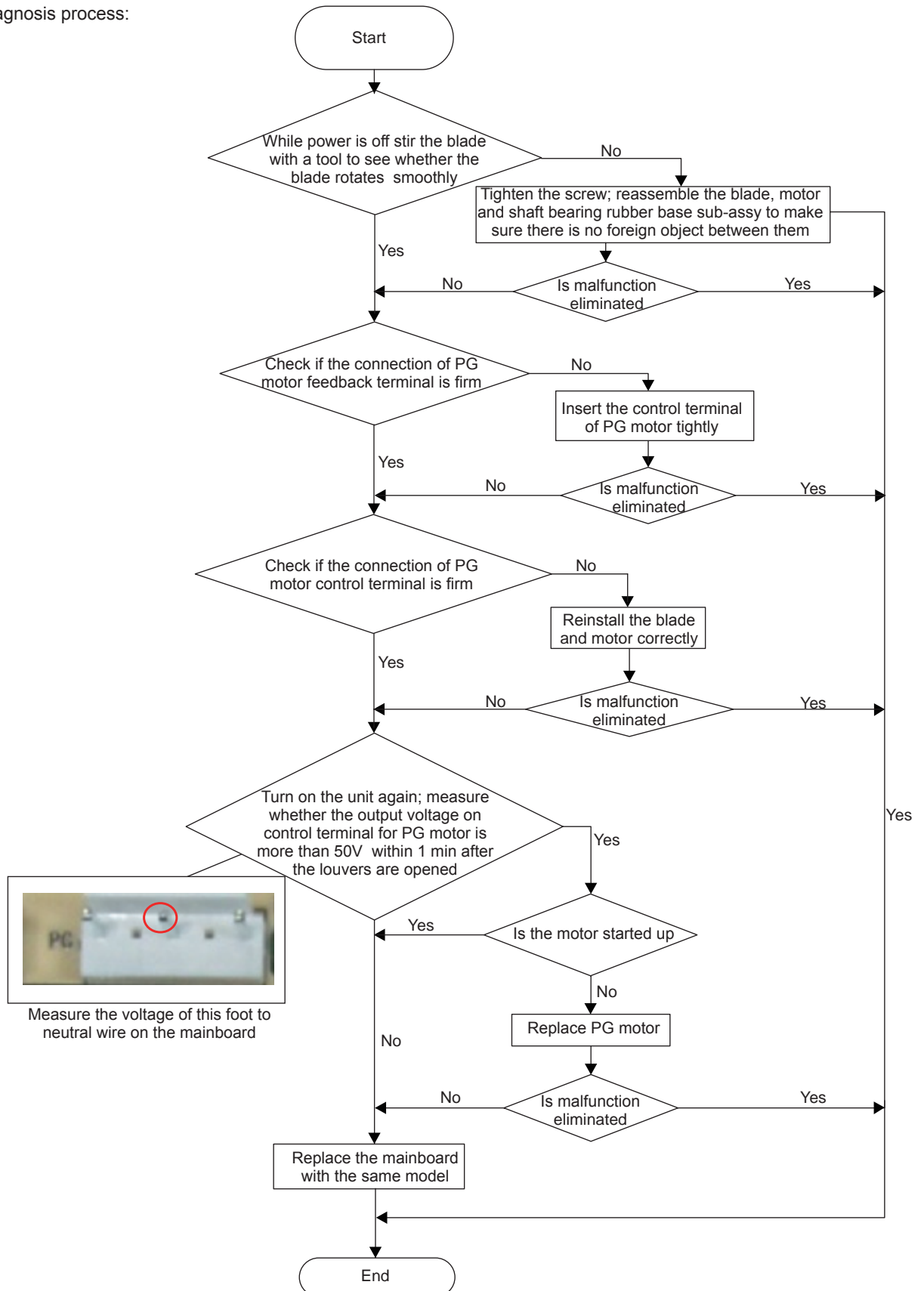


(2) Malfunction of Blocked Protection of IDU Fan Motor H6

Main detection points:

- Smoothly the control terminal of PG motor connected tightly?
- Smoothly the feedback interface of PG motor connected tightly?
- The fan motor can't operate?
- The motor is broken?
- Detection circuit of the mainboard is defined abnormal?

Malfunction diagnosis process:

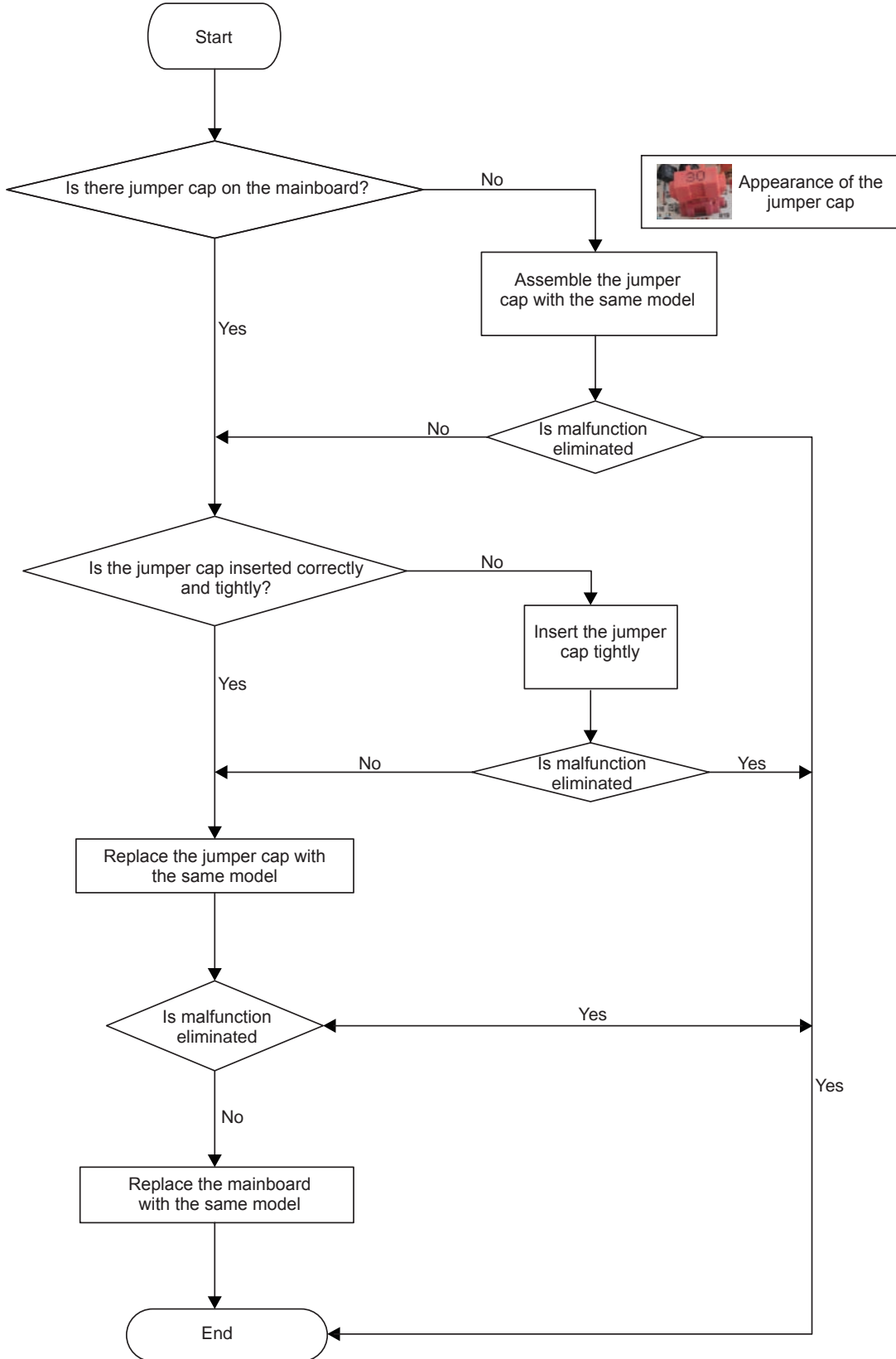


(3) Malfunction of Protection of Jumper Cap C5

Main detection points:

- Is there jumper cap on the mainboard?
- Is the jumper cap inserted correctly and tightly?
- The jumper is broken?
- The motor is broken?
- Detection circuit of the mainboard is defined abnormal?

Malfunction diagnosis process:

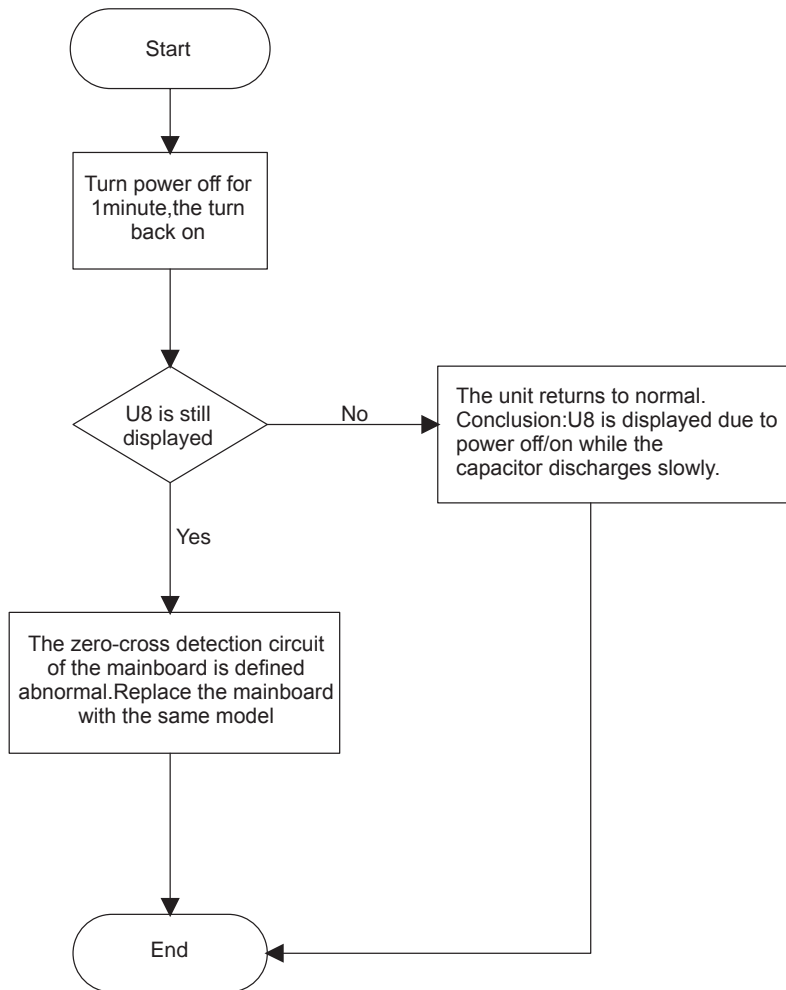


(4) Malfunction of Zero-crossing Inspection Circuit Malfunction of the IDU Fan Motor U8

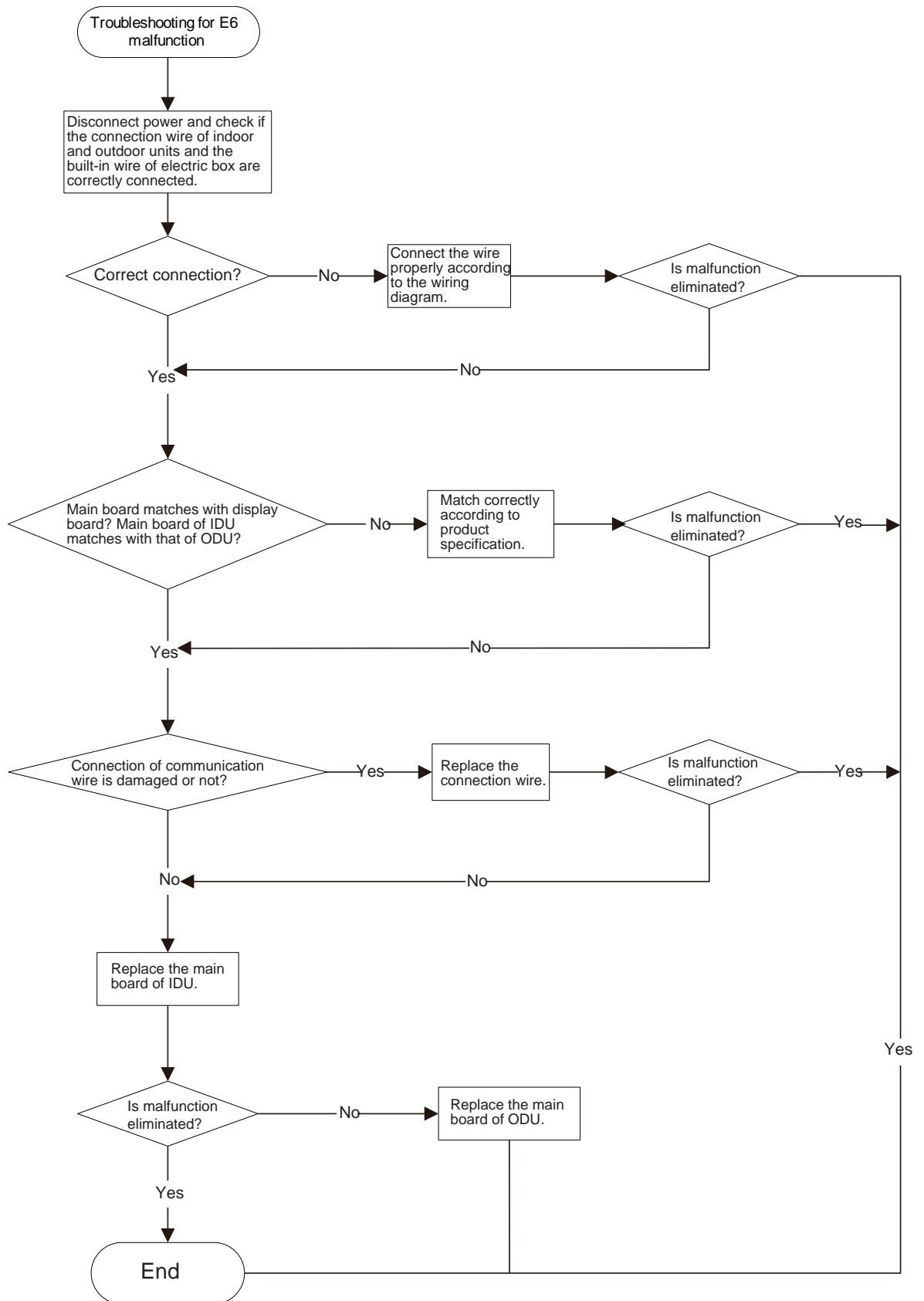
Main detection points:

- Instant energization after de-energization while the capacitor discharges slowly?
- The zero-cross detection circuit of the mainboard is defined abnormal?

Malfunction diagnosis process:



(5) Communication malfunction (E6)



Outdoor Unit

(1) Malfunction of Desynchronizing of Compressor (H7)

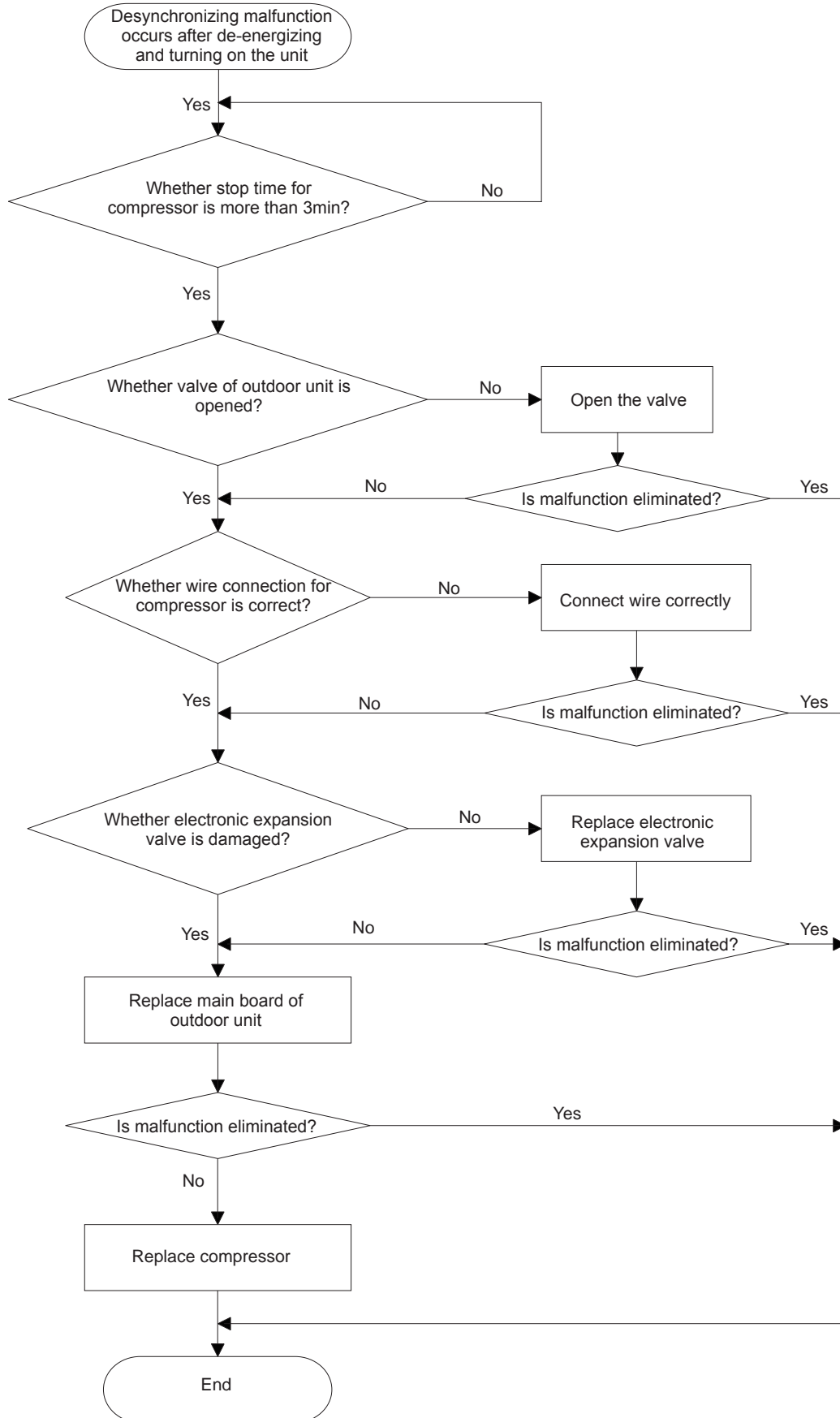
Main check point:

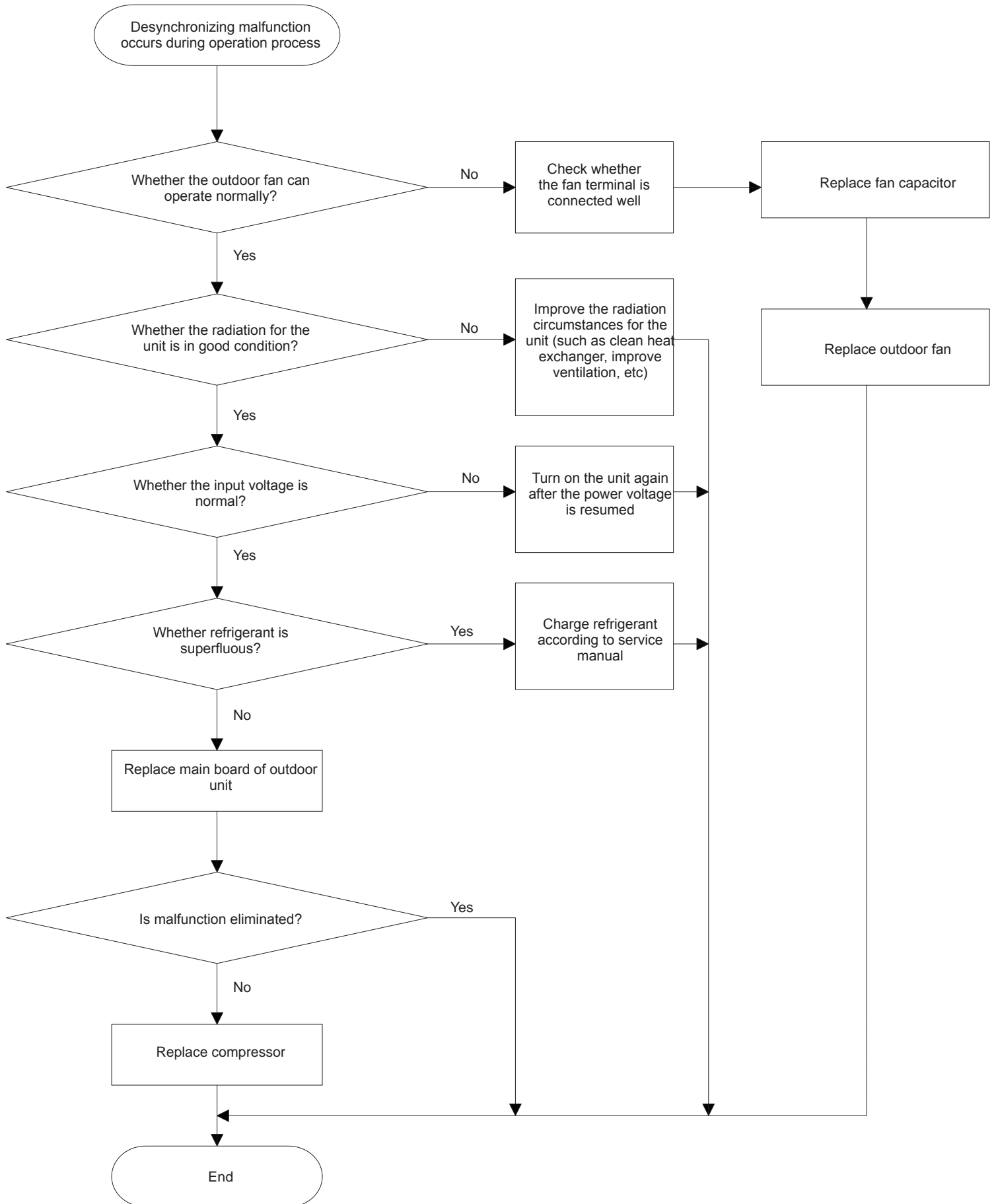
Whether the system pressure is too high?

Whether the electronic expansion valve can work normally?

Whether the radiation for the unit is in good condition?

Check flow chart:



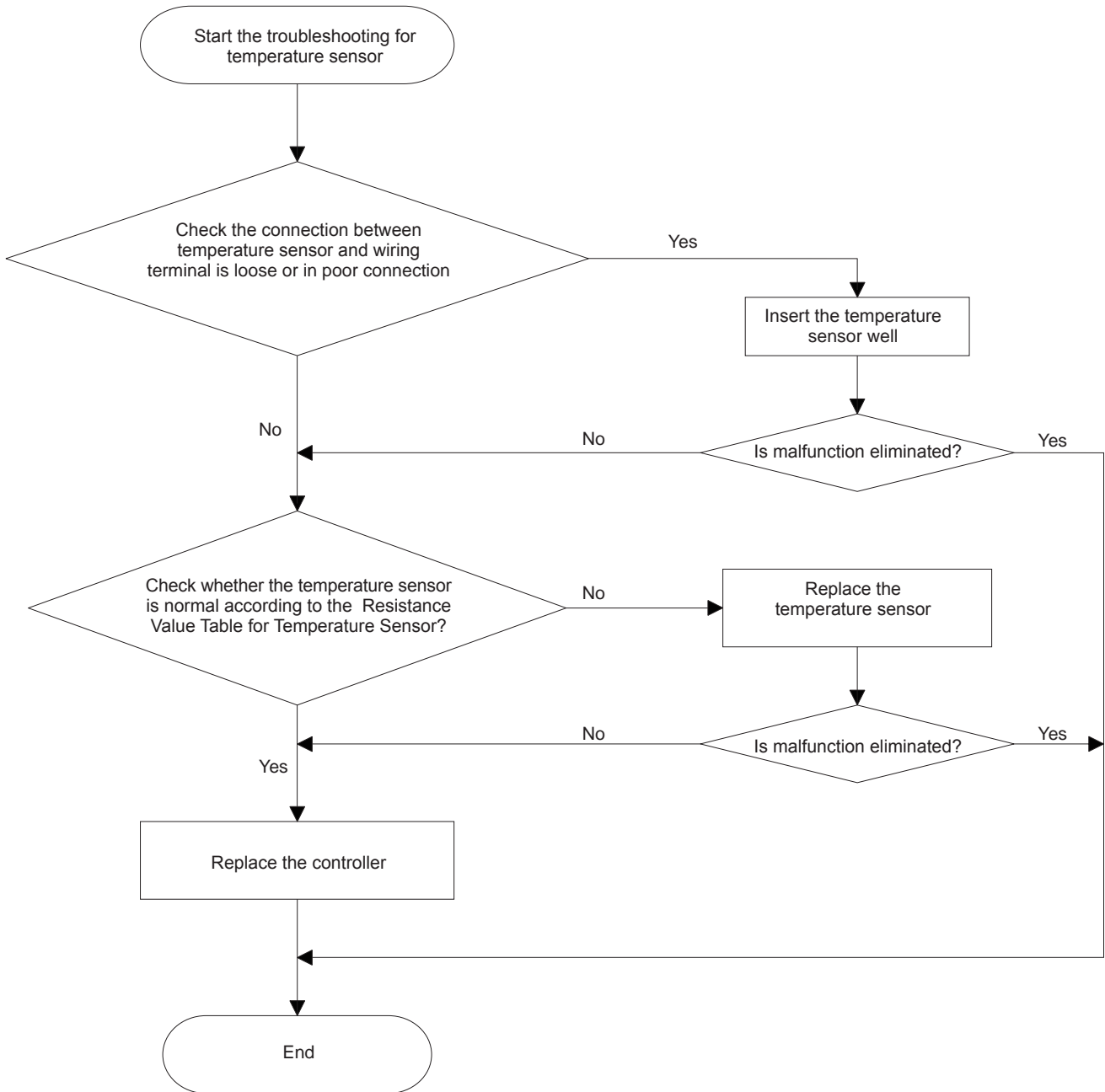


(2) Malfunction of Temperature Sensor (F3/F4/F5)

Main check point:

- Whether the temperature sensor is damaged?
- Whether the terminal of temperature sensor is loose or not connected?
- Whether the main board is damaged?

Check flow chart:



(3) Malfunction of Overload Protection of Compressor (H3) and Discharge High-temperature Protection of Compressor (E4)

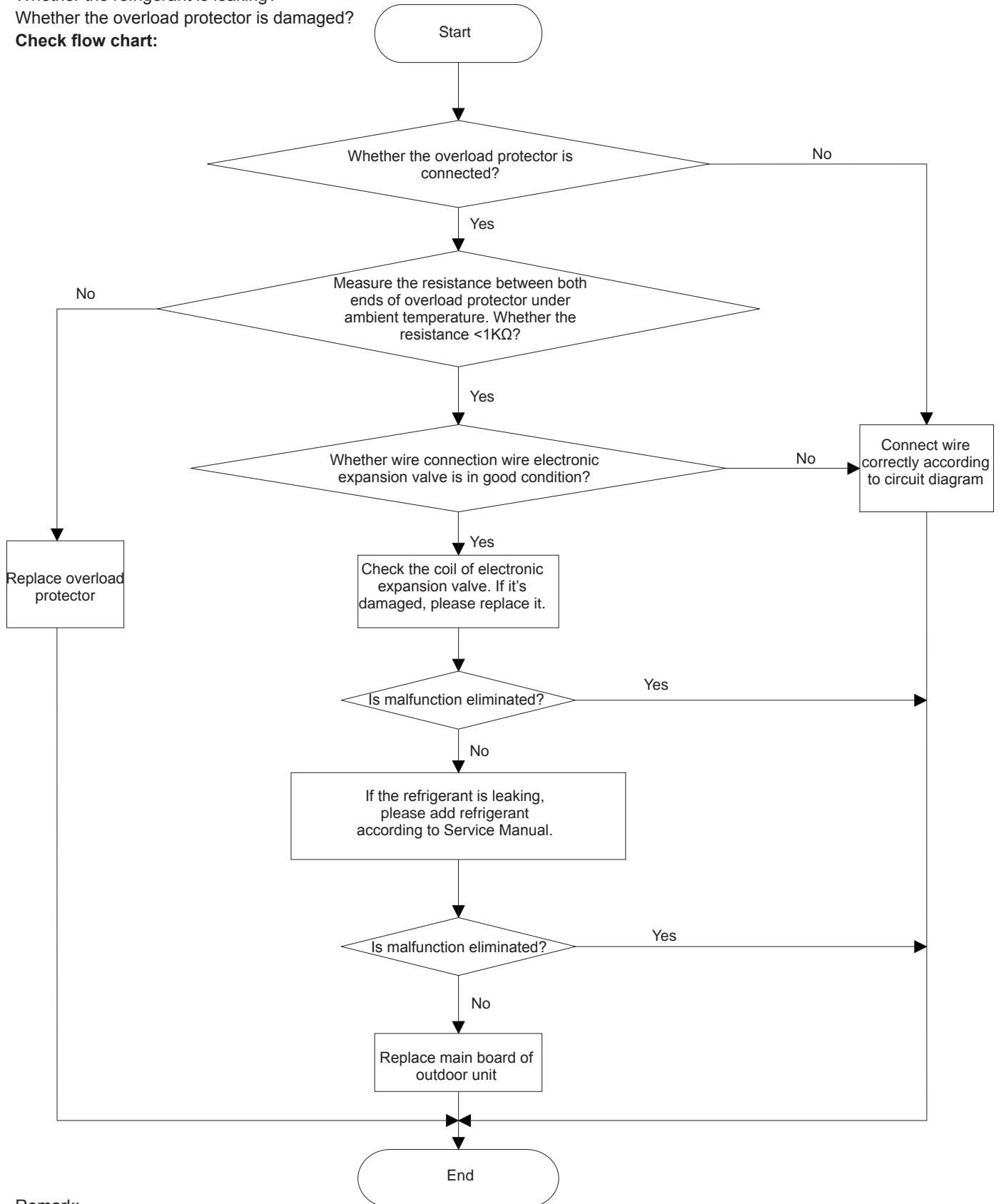
Main check point:

Whether the electronic expansion valve is connected well and whether it's damaged?

Whether the refrigerant is leaking?

Whether the overload protector is damaged?

Check flow chart:



Remark:

Detection method for electronic expansion valve: There are 5 wires for the coil of electronic expansion valve and one of them are common port (the left or the right wire) .The resistance for other terminals are all most the same (about 100Ω). You can measure those resistance values to judge whether the electronic expansion valve is damaged or not.

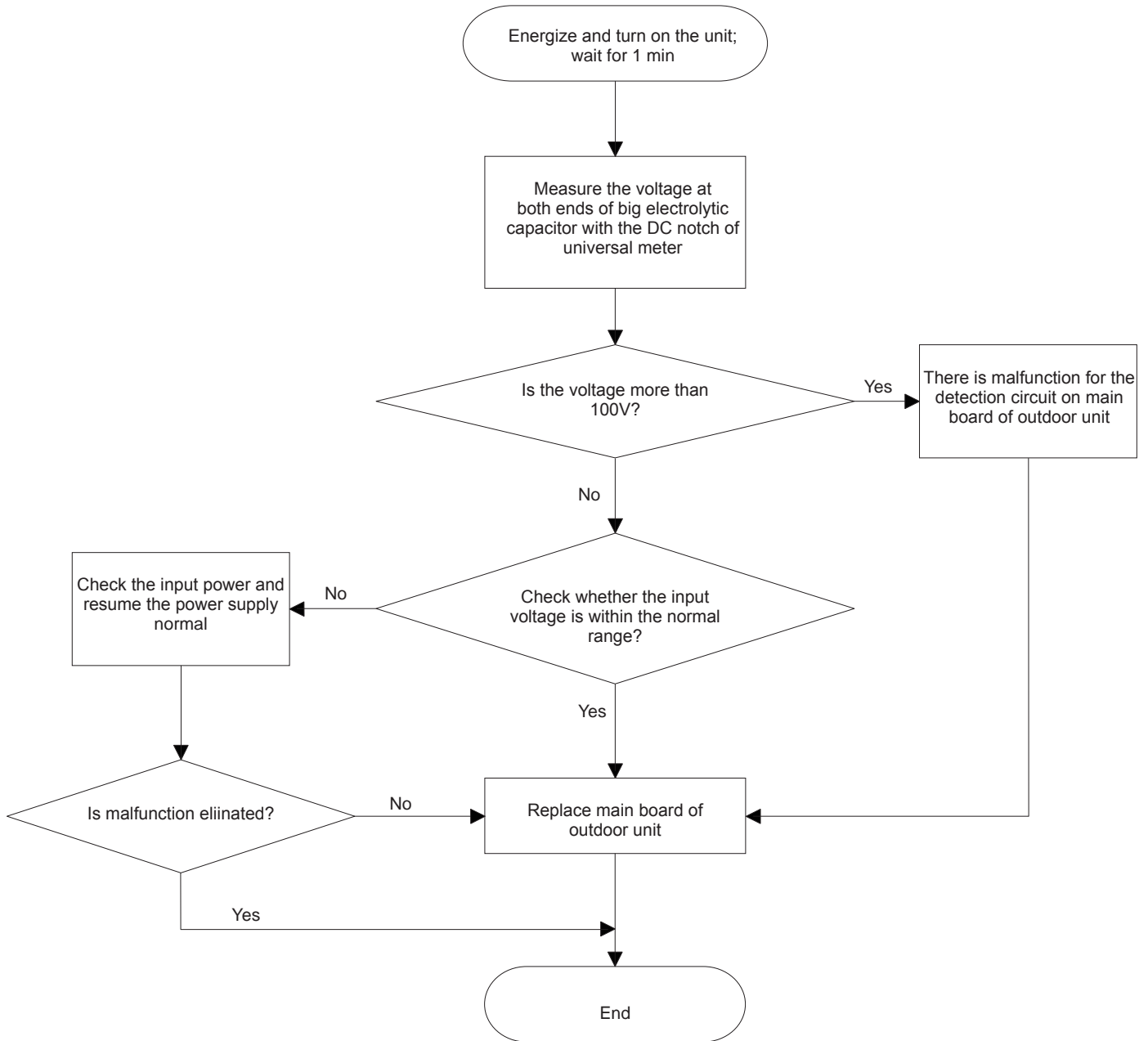
(4) Charging Malfunction of Capacitor (PU)

Main check point:

Whether input power is normal?

Main board is damaged.

Check flow chart:

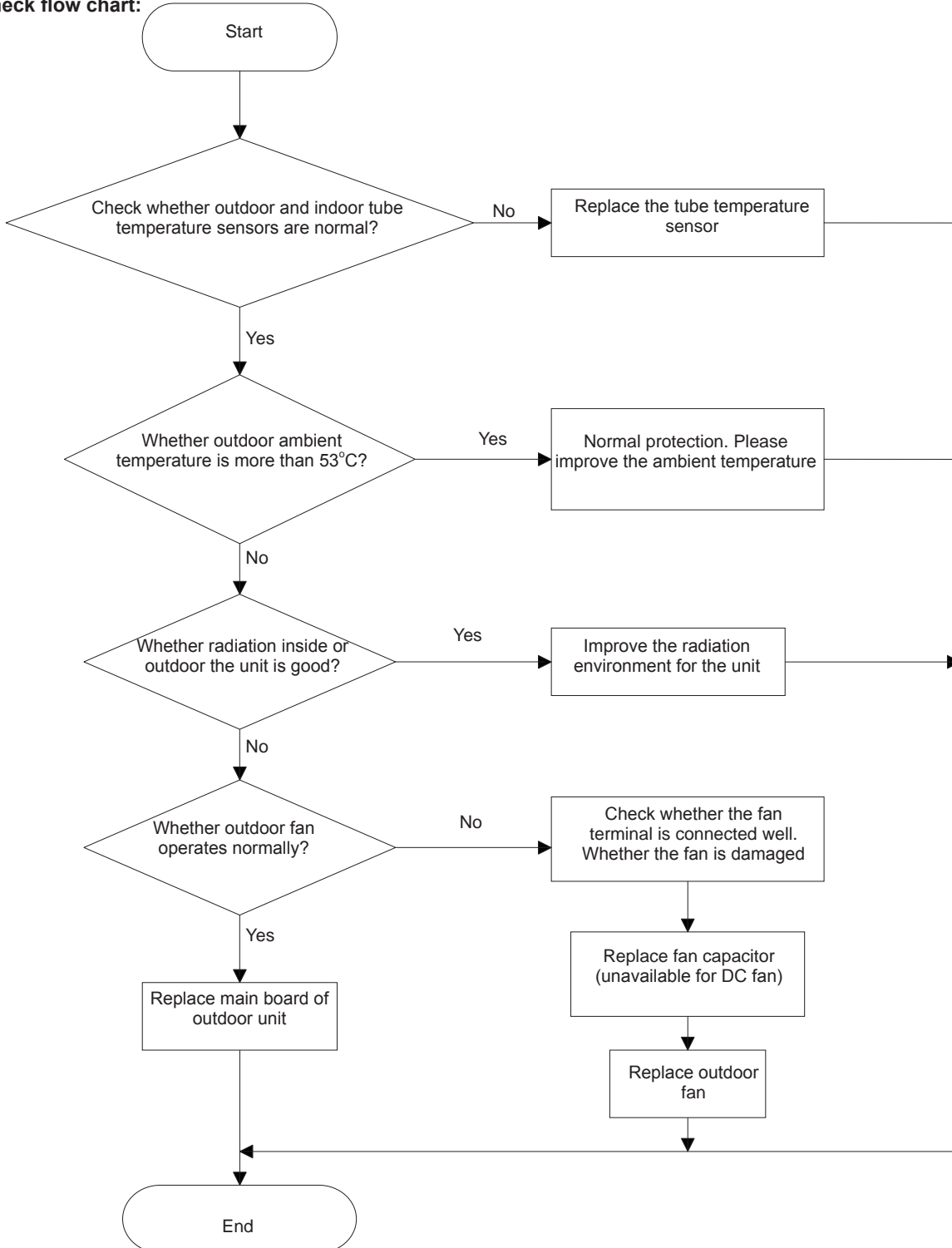


(5) Malfunction of Overload Protection (E8)

Main check point:

- Whether the tube temperature sensor is normal?
- Whether the outdoor ambient temperature is within the normal range?
- Whether indoor fan and outdoor fan can operate normally?
- Whether radiation environment inside or outside the unit is good?

Check flow chart:



Remark:

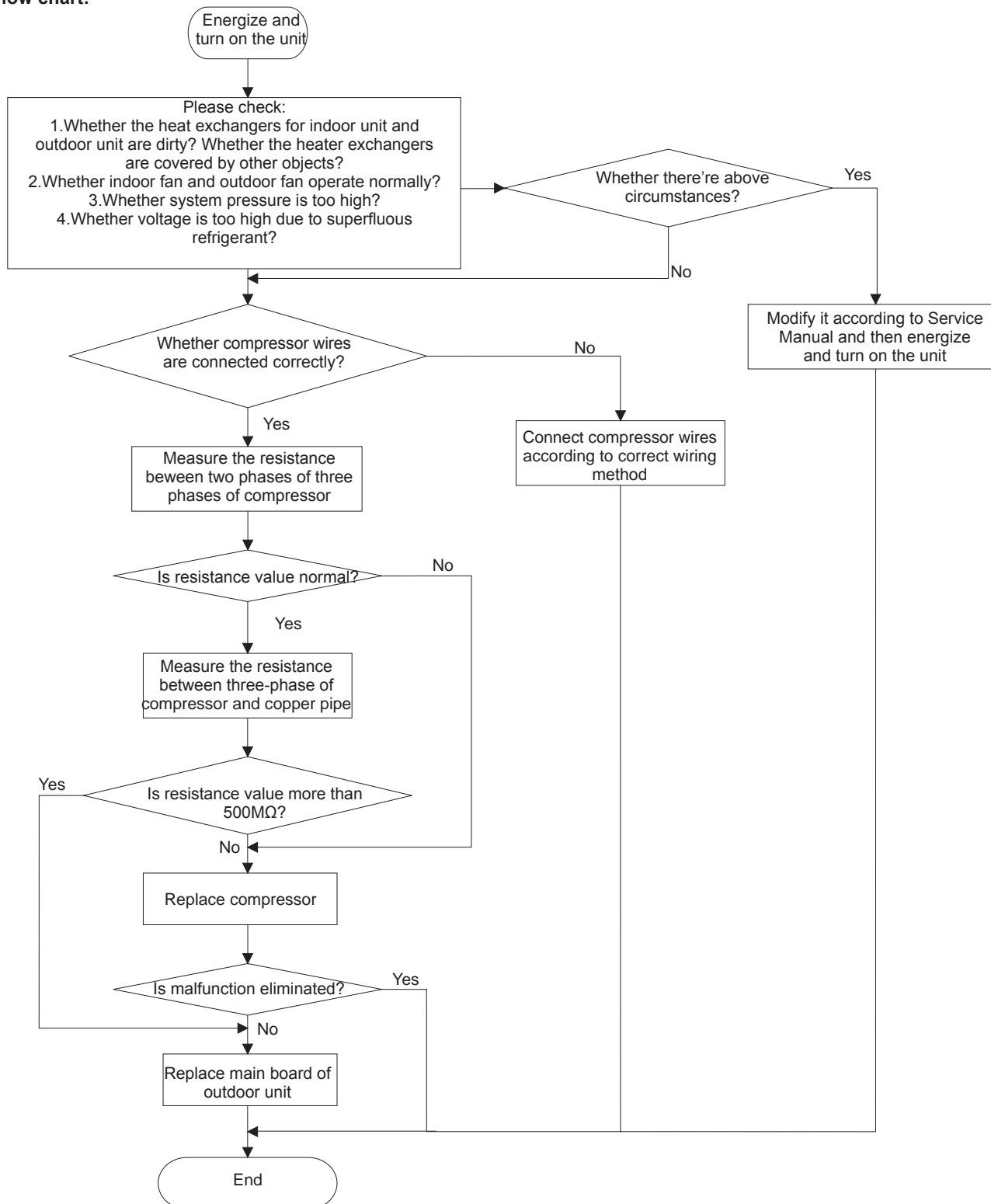
When overload protection occurs under cooling mode, it's because the main board detected the outdoor tube temperature sensor exceeds limited temperature and then the unit stops operation. Please check outdoor tube temperature sensor;
 When overload protection occurs under heating mode, it's because the main board detected the indoor tube temperature sensor exceeds limited temperature and then the unit stops operation. Please check indoor tube temperature sensor;

(6) Malfunction of IPM Protection (H5)

Main check point:

- Whether input voltage is within the normal range?
- Whether wires of compressor are connected reliably, tightly or correctly?
- Whether the resistance of compressor coil is normal? Whether the insulation between compressor coil and copper pipe is in good condition?
- Whether the unit is overloading? Whether the radiation for the unit is in good condition?
- Whether the volume of charged refrigerant is proper?

Check flow chart:

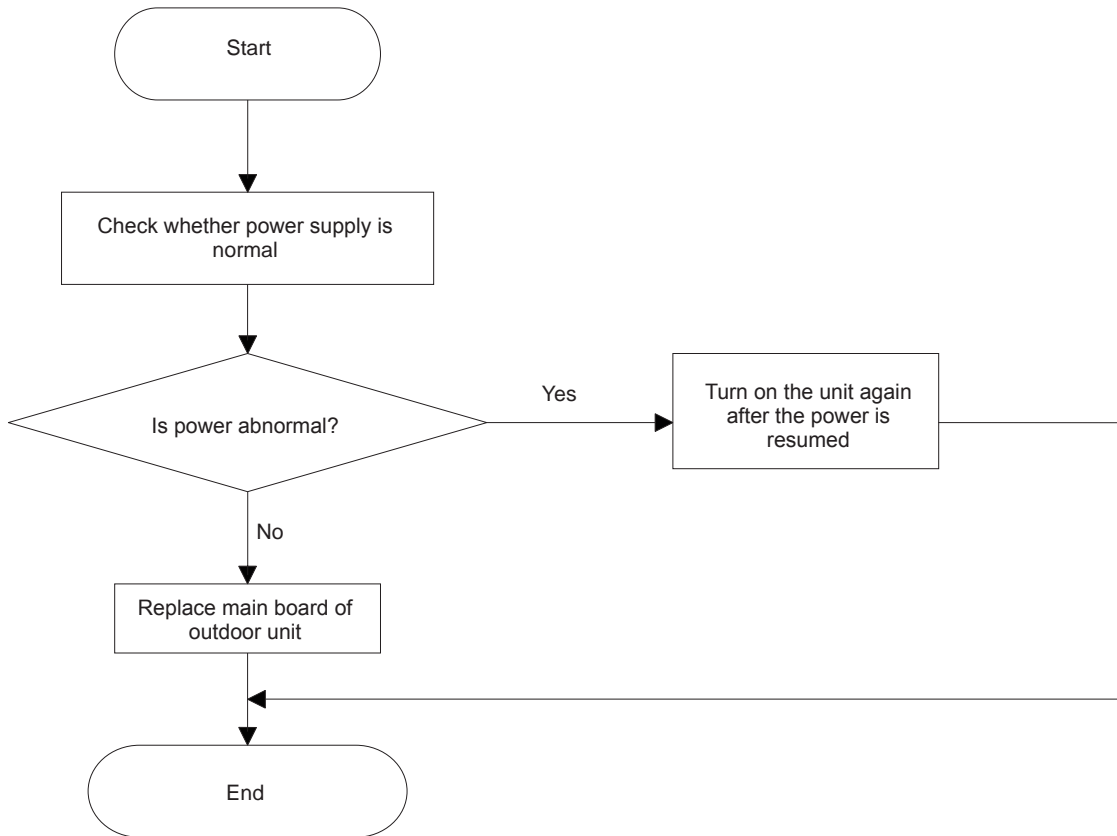


(7) Malfunction of PFC Protection (HC)

Main check point:

Whether power supply is normal?

Check flow chart:

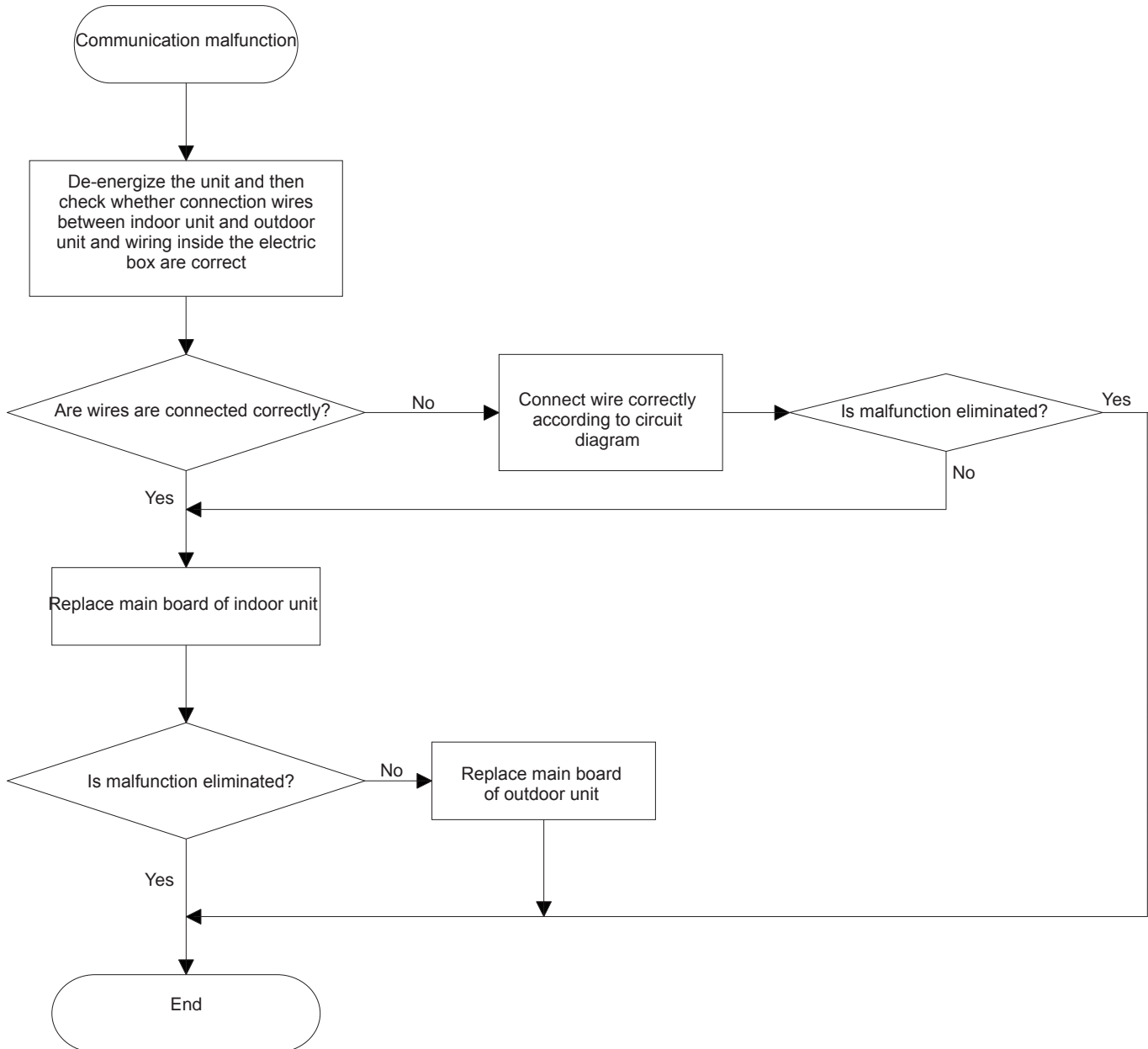


(8) Malfunction of Communication (E6)

Main check point:

Check whether connection wires between indoor unit and outdoor unit and wiring inside the unit are connected well?
 Check the main board of indoor unit or main board of outdoor unit is damaged?

Check flow chart:

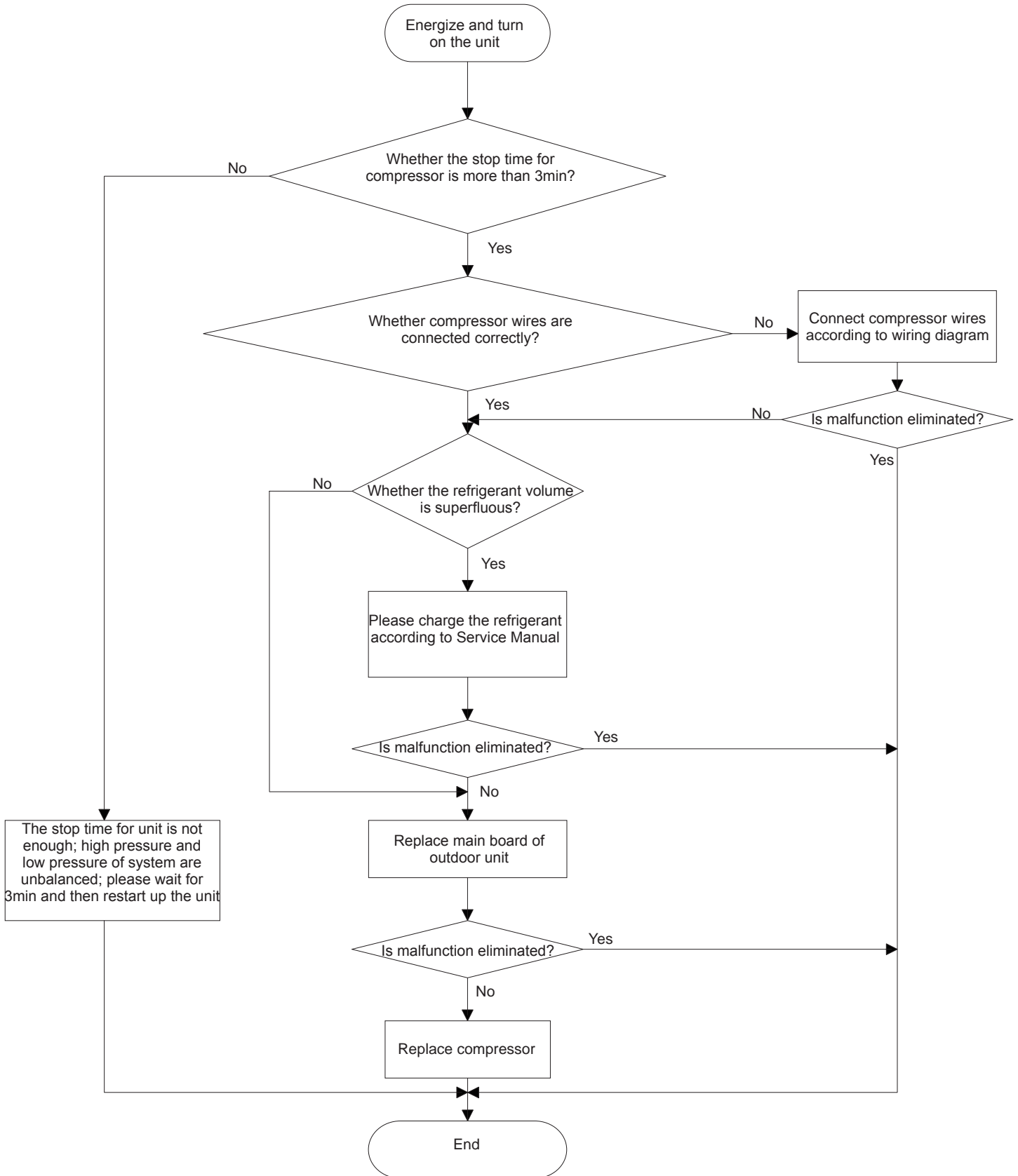


(9) Malfunction of Failure Start-up of Compressor (LC)

Main check point:

- Whether the compressor wires are connected correctly?
- Whether the stop time for compressor is enough?
- Whether compressor is damaged?
- Whether the refrigerant-charging volume is superfluous?

Check flow chart:

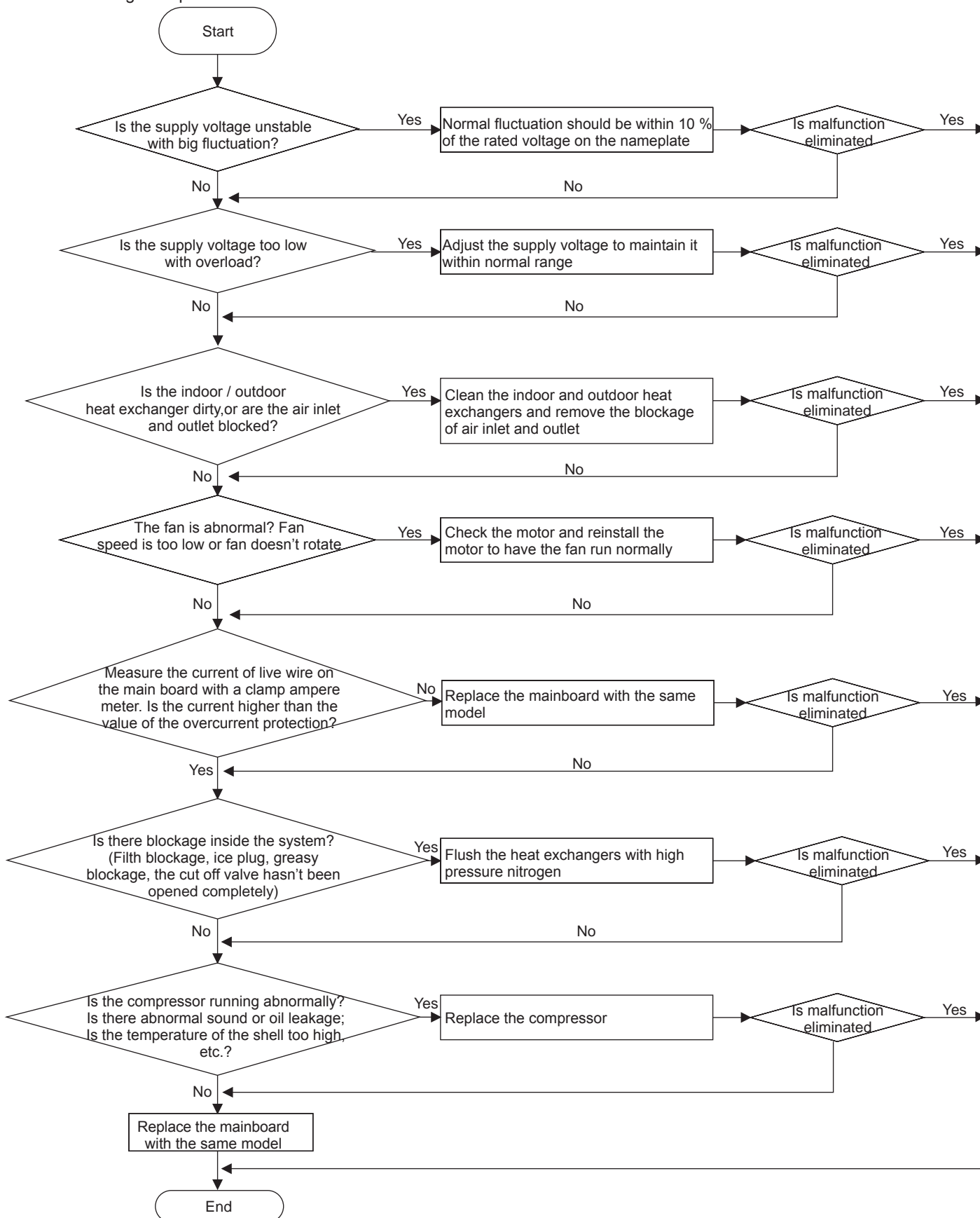


(10) Malfunction of Overcurrent Protection E5

Main detection points:

- Is the supply voltage unstable with big fluctuation?
- Is the supply voltage too low with overload?
- Hardware trouble?

Malfunction diagnosis process:



(9) Other Malfunction

1.IPM module temperature sensor is open-circuited(P7)

Hardware of main board is damaged. Please replace main board.

2.Overheating protection of IPM module(P8)

- ① Poor radiation because the module radiator is dirty;
- ② IPM module is damaged;
- ③ Malfunction of outdoor fan, etc;

3.Detection circuit malfunctions of phase-current of compressor (U1)

Hardware of main board is damaged. Please replace main board.

4.DC busbar voltage is too high (PH)

- ① Input voltage is too high or unstable;
- ② Hardware of main board is damaged;

5.DC busbar voltage is too low (PL)

- ① Input voltage is too low or unstable;
- ② Hardware of main board is damaged;

6.Malfunction of ODU DC fan (L3)

- ① The wire terminal of outdoor fan motor is loosed, fix the terminal.
- ② Motor damaged, replace the motor.
- ③ Fan motor module on mainboard is damaged, replace the main board AP1

9.3 Troubleshooting 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
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller Repair or replace remote controller

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. 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

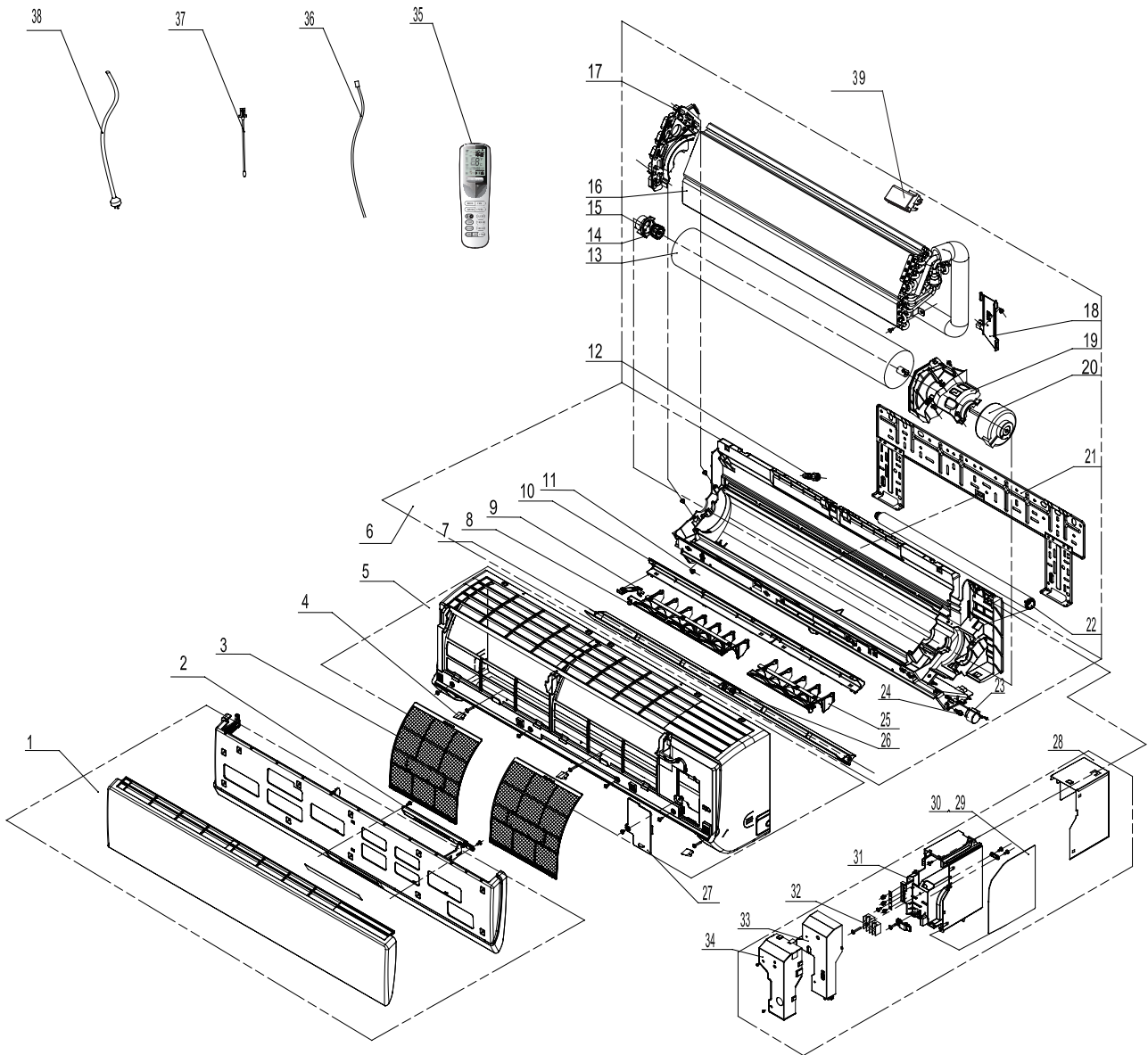
5. Abnormal Sound and Vibration

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.

10. Exploded View and Parts List

10.1 Indoor Unit

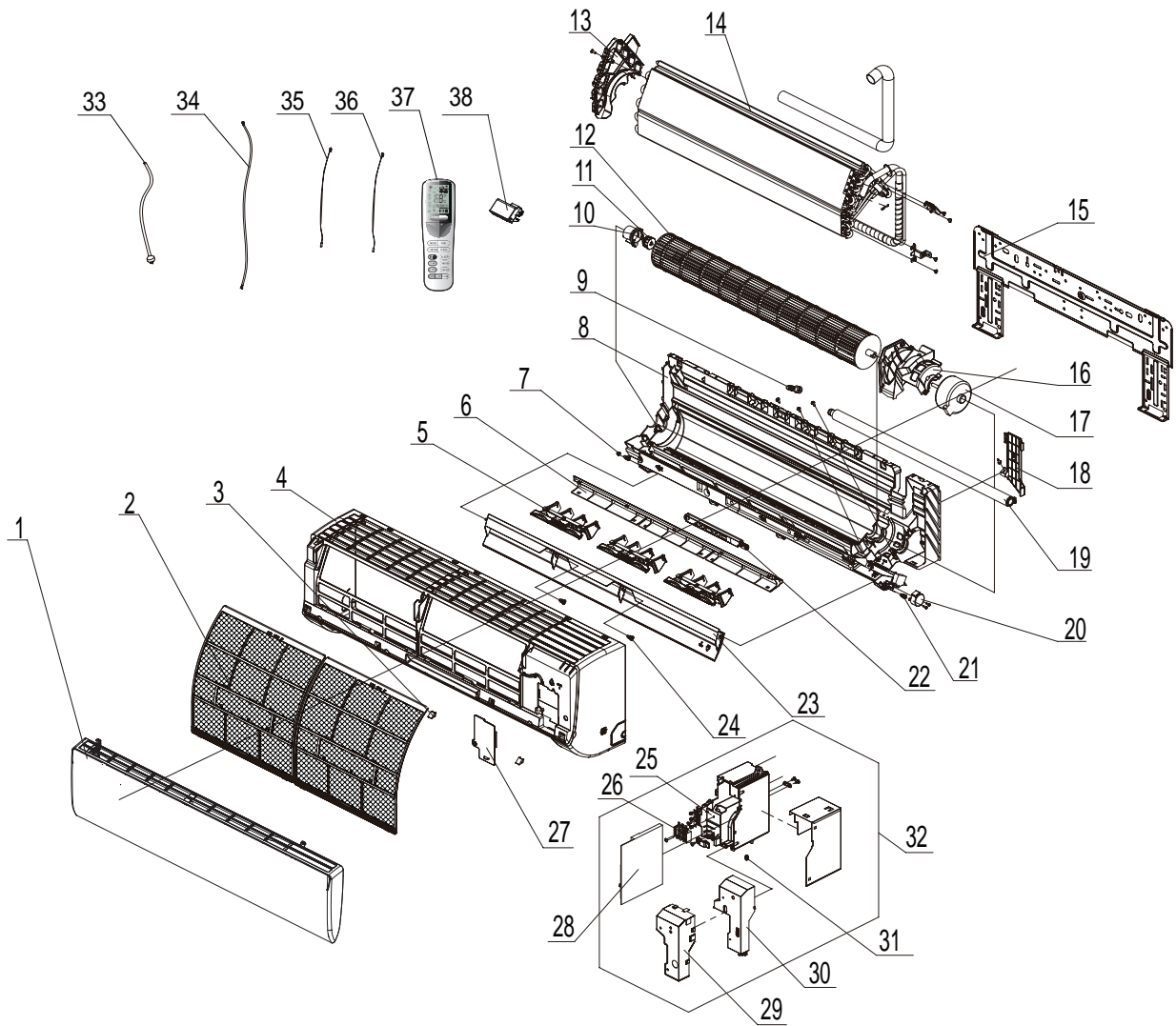
ASH-18AIM2 PT



NO.	Description	Part Code	Qty
		ASH-18AIM2 PT	
		Product Code	
		CB304N02500_L31222	
1	Front Panel Assy	20012914_L31222	1
2	Display Board	30565139	1
3	Filter Sub-Assy	1112208901	2
4	Screw Cover	242520179	3
5	Front Case Sub-Assy	2001266701	1
6	Rear Case assy	22202193	1
7	Guide Louver	1051220501	1
8	Air Louver 1	1051211602	1
9	Baffle Plate	2611222802	1
10	Helicoid Tongue	2611223802	1
11	Left Axile Bush	10512037	1
12	Rubber Plug (Water Tray)	76712012	1
13	Cross Flow Fan	10352019	1
14	O-Gasket sub-assy of Bearing	7651205102	1
15	Ring of Bearing	26152022	1
16	Evaporator Assy	01002575	1
17	Evaporator Support	24212133	1
18	Connecting pipe clamp	2611216402	1
19	Motor Press Plate	26112494	1
20	Fan Motor	15012146	1
21	Wall Mounting Frame	01252218	1
22	Drainage hose	05230014	1
23	Step Motor	15012086	1
24	Crank	10582070	1
25	Air Louver 2	1051211702	1
26	Axile Bush	10542036	1
27	Electric Box Cover2	2012214204	1
28	Electric Box Assy	10000201610	1
29	Main Board	30138000785	1
30	Jumper	4202300121	1
31	Electric Box	2011210801	1
32	Terminal Board	42011233	1
33	Electric Box Cover1	20122154	1
34	Shield Cover of Electric Box	01592092	1
35	Remote Controller	30510125_L31222	1
36	Ambient Temperature Sensor	390000453	1
37	Tube Sensor	390000591	1
38	Power Cord	4002052317	1
39	Cold Plasma Generator	1114001602	1

Above data is subject to change without notice.

ASH-24AIM2 PT

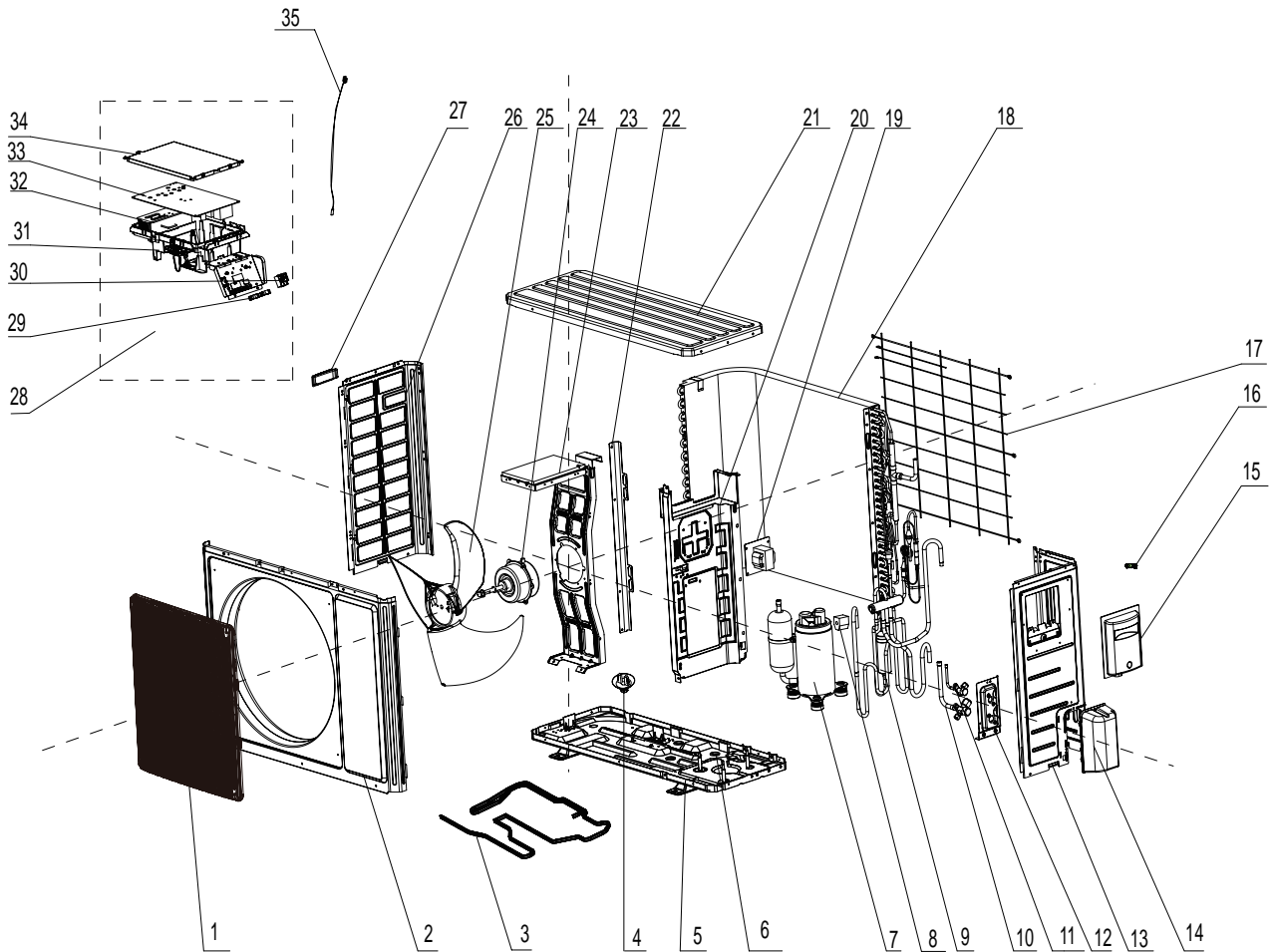


NO.	Description	Part Code	Qty
		ASH-24AIM2 PT	
		Product Code	
		CB304N02800_L31222	
1	Front Panel Assy	20012957_L31222	1
2	Filter Sub-Assy	11122091	2
3	Screw Cover	242520179	3
4	Front Case	2001297401	1
5	Air Louver 1	1051215901	3
6	Helicoid Tongue	2611218702	1
7	Left Axile Bush	10512037	1
8	Rear Case assy	20022555	1
9	Rubber Plug (Water Tray)	76712012	1
10	Ring of Bearing	26152025	1
11	O-Gasket sub-assy of Bearing	7651205102	1
12	Cross Flow Fan	10352045	1
13	Evaporator Support	24212139	1
14	Evaporator Assy	01100100032	1
15	Wall Mounting Frame	01252032	1
16	Motor Press Plate	26112330	1
17	Fan Motor	15012098	1
18	Pipe Clamp	2611218801	1
19	Drainage hose	0523001405	1
20	Step Motor	1521300101	1
21	Crank	10582070	1
22	Display Board	30565139	1
23	Guide Louver	1051220801	1
24	Axile Bush	10542036	2
25	Electric Box	2011210801	1
26	Terminal Board	42011233	1
27	Electric Box Cover2	2012214204	1
28	Main Board	30138000783	1
29	Shield cover of Electric Box	01592092	1
30	Electric Box Cover1	20122154	1
31	Jumper	4202300124	1
32	Electric Box Assy	10000202204	1
33	Power Cord	/	/
34	Connecting Cable	4002052317	1
35	Tube Sensor	390000591	1
36	Ambient Temperature Sensor	390000453	1
37	Remote Controller	30510125_L31222	1
38	Cold Plasma Generator	1114001602	1

Above data is subject to change without notice.

10.2 Outdoor Unit

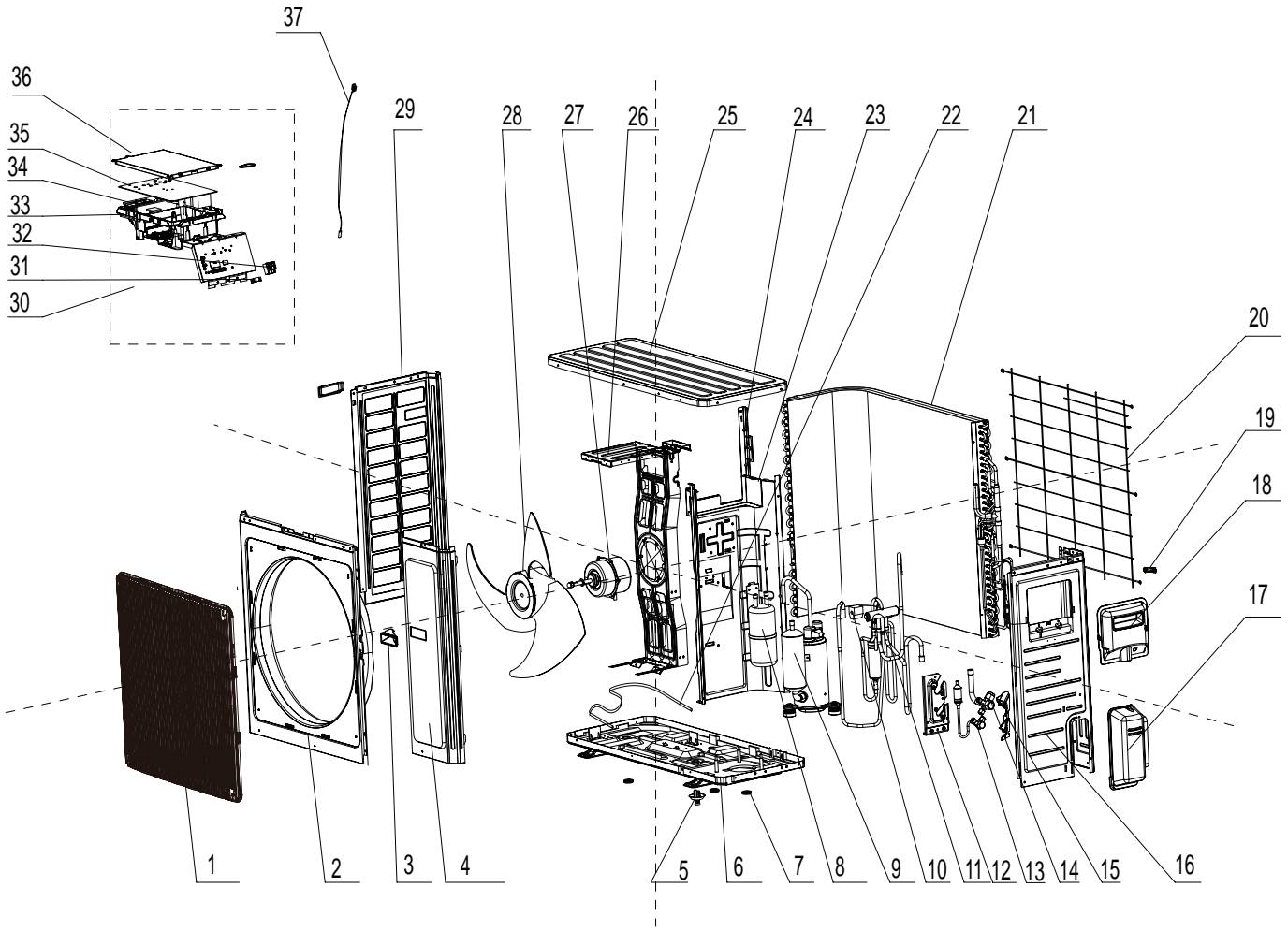
ASH-18AIM2 PT



NO.	Description	Part Code	Qty
		ASH-18AIM2 PT	
		Product Code	
		CB404W03401_L31222	
1	Front Grill	22415010	1
2	Front Panel	01535013P	1
3	Electrical Heater (Chassis)	765100045	1
4	Drainage Connector	06123401	1
5	Chassis Sub-assy	02803270P	1
6	Drainage hole Cap	06813401	1
7	Compressor and fittings	00105249G	1
8	Magnet Coil	4300040045	1
9	4-Way Valve Assy	03073203	1
10	Cut off Valve Assy 1/2	07133774	1
11	Cut off Valve Sub-Assy	07133204	1
12	Valve support assy	01715010P	1
13	Right Side Plate	0130509402P	1
14	Valve cover	22245002	1
15	Handle	26233053	1
16	Wiring Clamp	26115004	1
17	Rear Grill	01473043	1
18	Condenser Assy	01163865	1
19	Reactor	/	/
20	Clapboard Assy	01233153	1
21	Coping	01255005P	1
22	Supporting Board(Condenser)	01795010	1
23	Motor Support Sub-Assy	01705036	1
24	Fan Motor	1501506402	1
25	Axial Flow Fan	10335008	1
26	Left Side Plate	01305093P	1
27	left handle	26233053	1
28	Electric Box Assy	10000100111	1
29	Wire Clamp	71010003	1
30	Terminal Board	420101943	1
31	Electric Box	20113027	1
32	Radiator	49010252	1
33	Main Board	30138000415	1
34	Insulated Board (Cover of Electric Box)	20113003	1
35	Temperature Sensor	3900030901	1

Above data is subject to change without notice.

ASH-24AIM2 PT



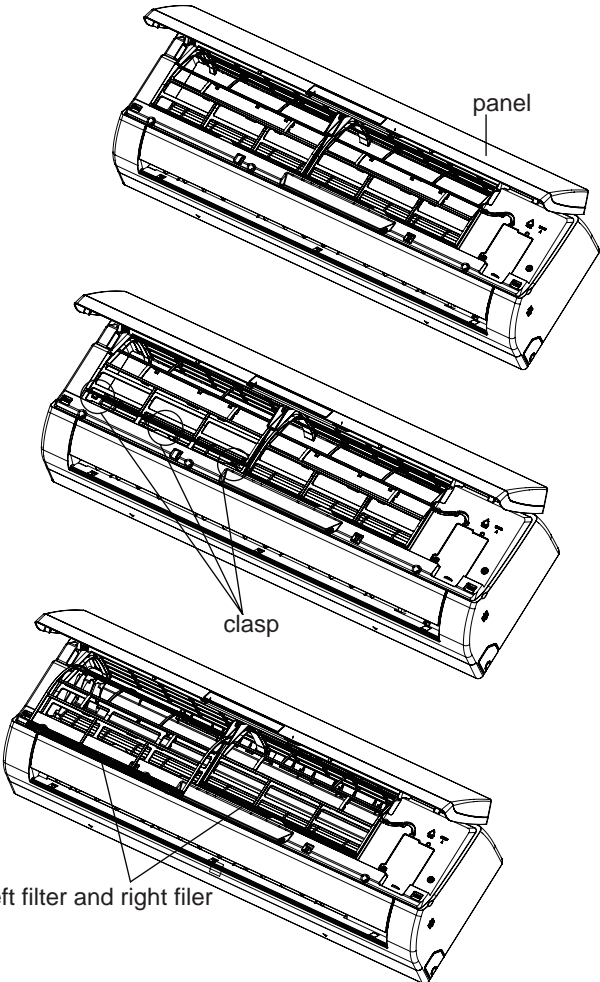
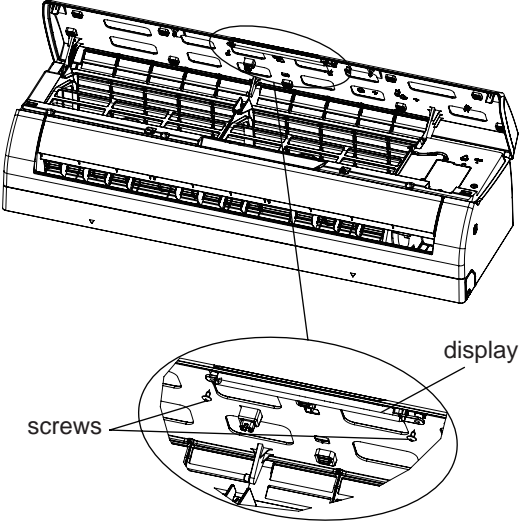
NO.	Description	Part Code	Qty
		ASH-24AIM2 PT	
		Product Code CB404W03801_L31222	
1	Front Grill	22415011	1
2	Cabinet	01435004P	1
3	Left Handle	26233053	1
4	Front Side Plate	01305086P	1
5	Drainage Connector	06123401	1
6	Chassis Sub-assy	0280325501P	1
7	Drainage hole Cap	06813401	1
8	Gas-liquid Separator Assy	07225017	1
9	Compressor and Fittings	00105249G	1
10	Magnet Coil	4300040045	1
11	4-Way Valve Assy	03073144	1
12	Valve Support Sub-Assy	0171501201P	1
13	Cut off Valve Sub-Assy	07135072	1
14	Cut off Valve	07133157	1
15	Baffle(Valve Support)	01365435P	1
16	Right Side Plate	0130504401P	1
17	Valve Cover	22245003	1
18	Big Handle	26235001	1
19	Wiring Clamp	26115004	1
20	Rear Grill	01475013	1
21	Condenser Assy	01163917	1
22	Electrical Heater (Chassis)	7651000411	1
23	Clapboard Assy	01233164	1
24	Condenser Support Plate	01175092	1
25	Coping	01255006P	1
26	Motor Support Sub-Assy	01705025	1
27	Fan Motor	1501403402	1
28	Axial Flow Fan	10335014	1
29	Left Side Plate	01305043P	1
30	Electric Box Assy	10000100103	1
31	Wire Clamp	71010003	1
32	Terminal Board	420101943	1
33	Electric Box	20113027	1
34	Radiator	49010252	1
35	Main Board	30138000420	1
36	Insulated Board (Cover of Electric Box)	20113003	1
37	Temperature Sensor	3900030901	1

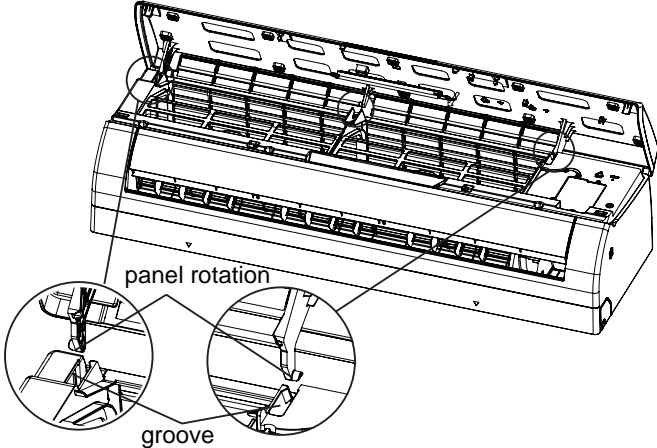
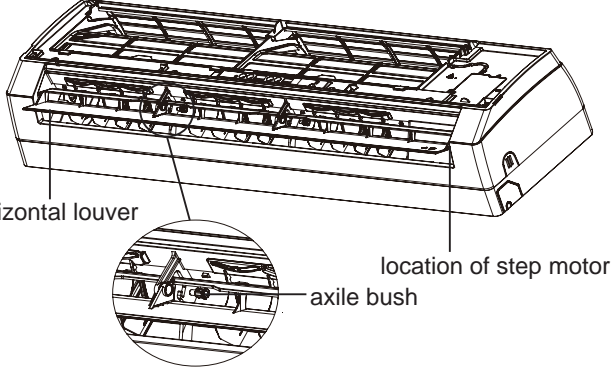
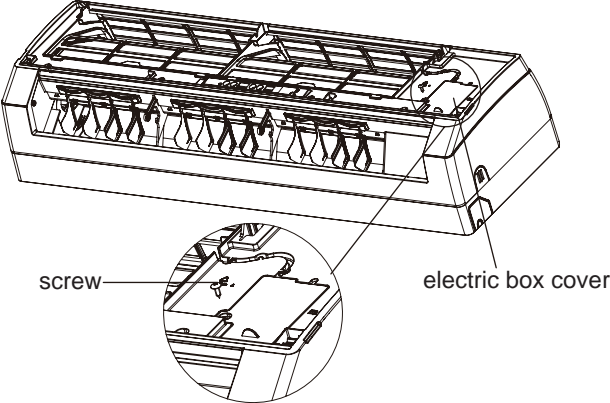
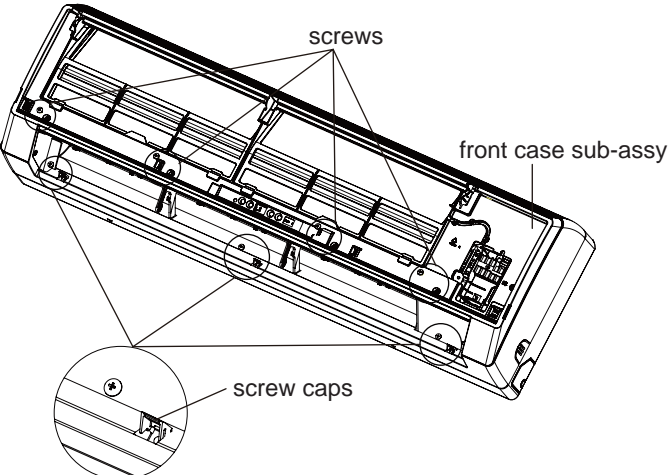
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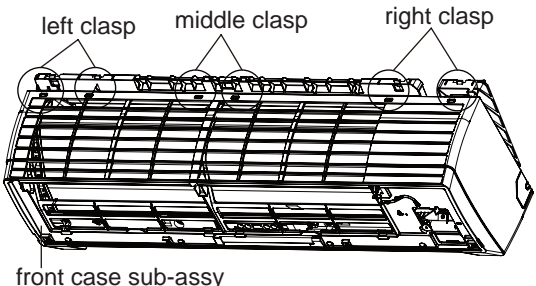
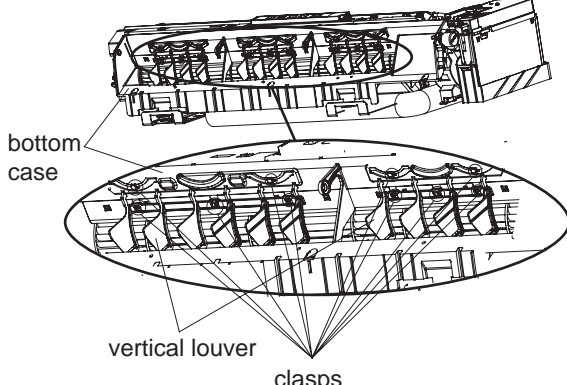
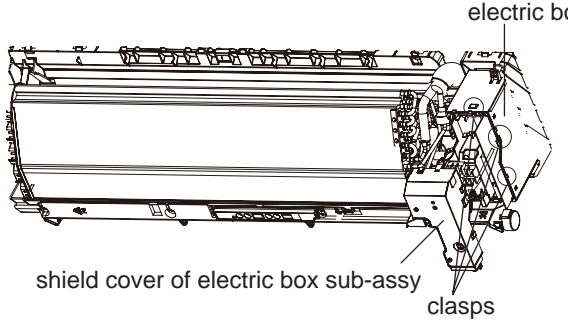
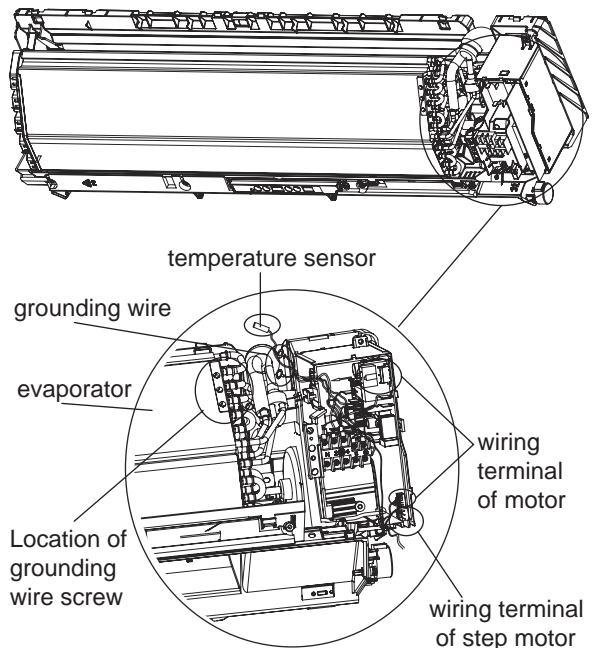
11. Removal Procedure

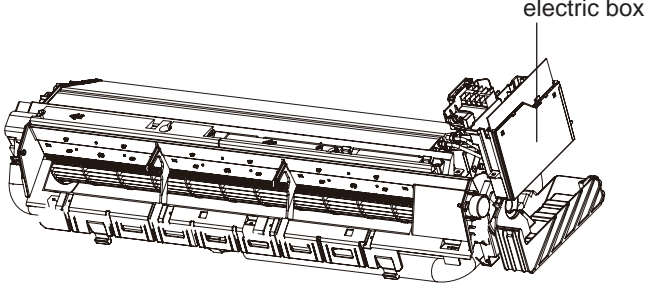
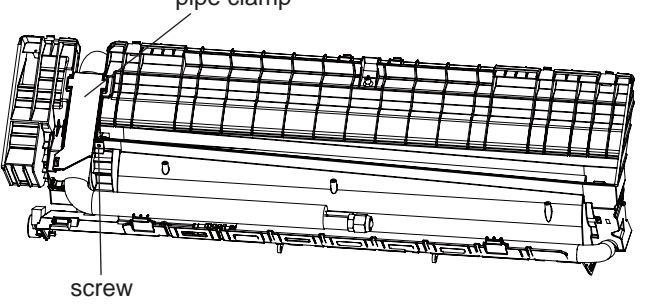
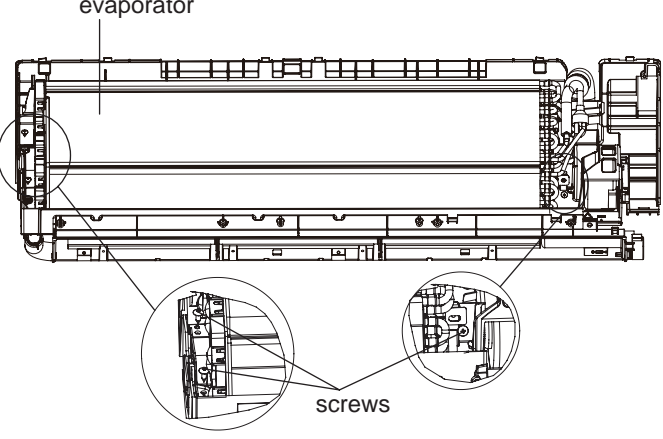
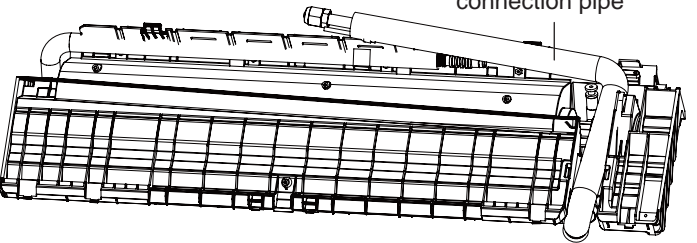
⚠ Warning: Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

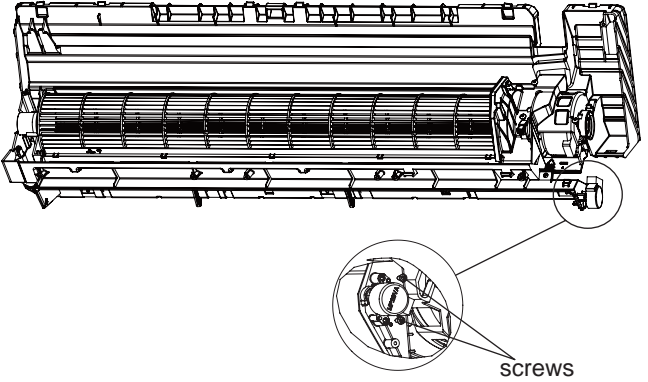
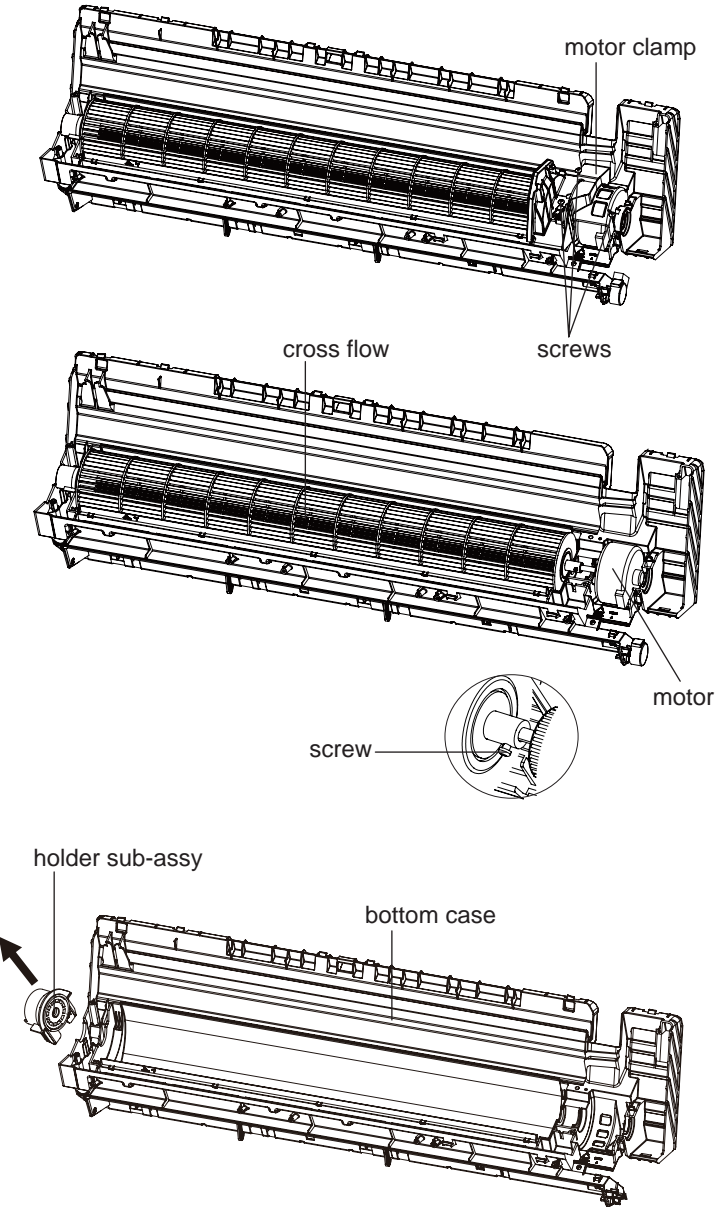
11.1 Removal Procedure of Indoor Unit

Steps	Procedure	Procedure
1. Remove filter	<p>a Open the panel.</p> <p>b Loosen the clasp shown in the fig and then pull the left filter and right filter outwards to remove them.</p>	 <p>panel</p> <p>clasp</p> <p>left filter and right filter</p>
2. Remove panel	<p>a Remove two screws fixing display and then remove it.</p>	 <p>display</p> <p>screws</p>

Steps	Procedure	
b	<p>Separate the panel rotation shaft from the groove fixing the front panel and then removes the front panel.</p>	
3. Remove horizontal louver		
	<p>Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crankshaft of step motor to remove it.</p>	
4. Remove electric box cover		
	<p>Remove the screws on the electric box cover to remove the electric box cover.</p>	
5. Remove front case sub-assy		
a	<p>Remove the screws fixing front case.</p> <p>Note: 1. Open the screw caps before removing the screws around the air outlet. 2. The quantity of screws fixing the front case sub-assy is different for different models.</p>	

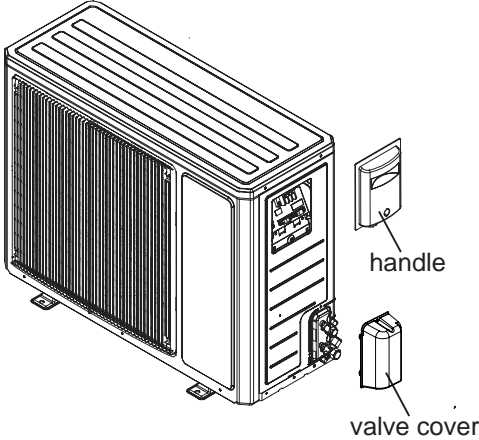
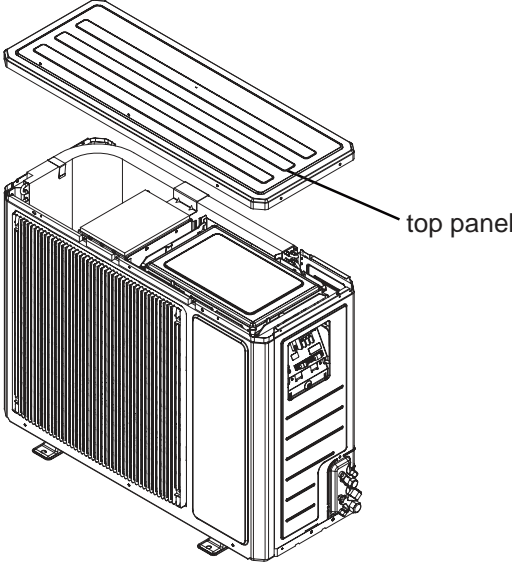
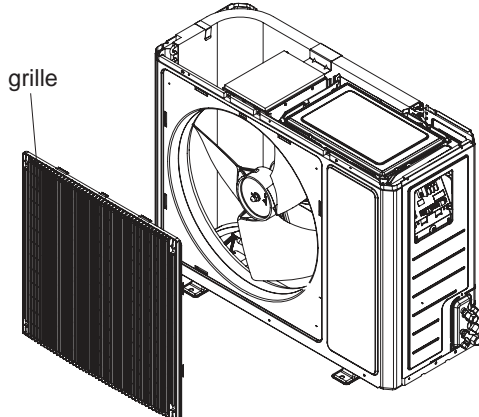
Steps	Procedure	
b	<p>Loosen the clasps at left, middle and right sides of front case. Lift the front case sub-assy upwards to remove it.</p>	 <p>left clasp middle clasp right clasp</p> <p>front case sub-assy</p>
6. Remove vertical louver		 <p>bottom case</p> <p>vertical louver</p> <p>clasps</p>
	<p>Loosen the connection clasps between vertical louver and bottom case to remove vertical louver.</p>	
7. Remove electric box assy		 <p>electric box</p> <p>shield cover of electric box sub-assy</p> <p>clasps</p>  <p>temperature sensor</p> <p>grounding wire</p> <p>evaporator</p> <p>Location of grounding wire screw</p> <p>wiring terminal of motor</p> <p>wiring terminal of step motor</p>
a	<p>Loosen the connection clasps between shield cover of electric box sub-assy and electric box, and then remove the shield cover of electric box sub-assy.</p>	
b	<p>Cut off the tieline which binding the temperature sensor and grounding wire on the evaporator, and then pull out the indoor tube temperature sensor from the evaporator.</p> <p>Remove the screws at the connection place between grounding wire and evaporator. Pull out the wiring terminal of motor and wiring terminal of step motor from the mainboard.</p> <p>Note: 1. Location of tube temperature sensor and tieline on the evaporator is different for different models. 2. When pulling out the wiring terminal, pay attention to loose the clasp and don't pull it so hard.</p>	

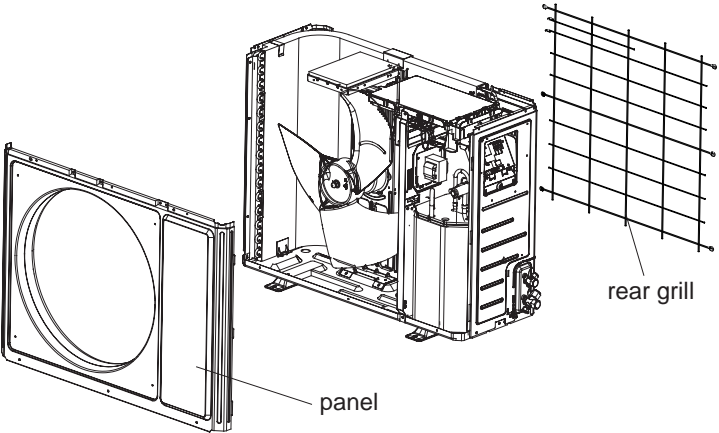
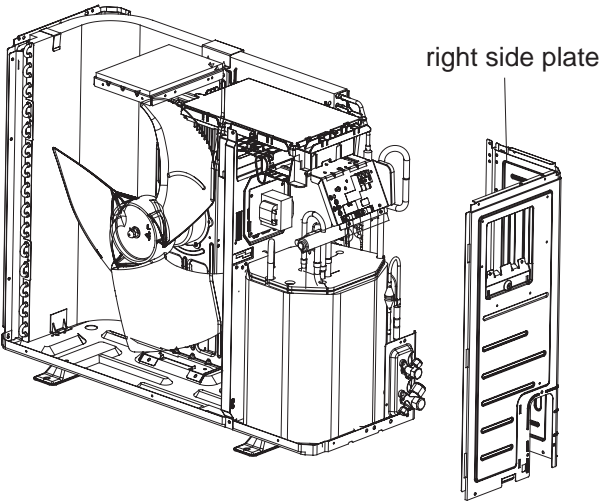
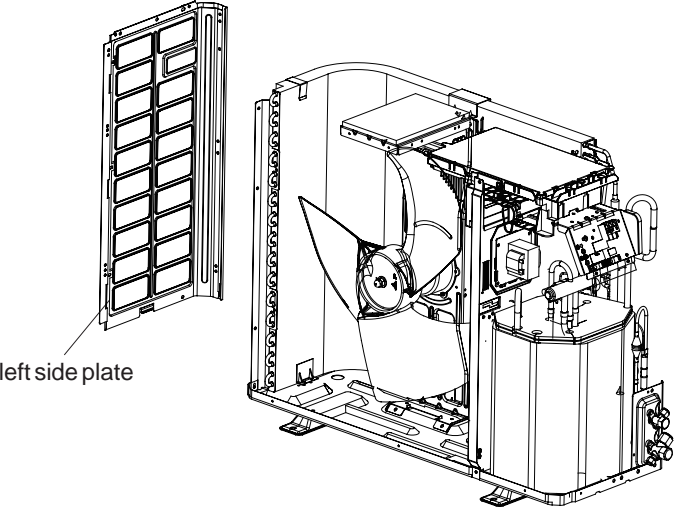
Steps	Procedure	
c	Remove the screw fixing electric box assy and then remove the electric box assy.	
8. Remove evaporator assy		
a	At the back of the unit, remove the screw fixing connection pipe clamp and then remove the connection pipe clamp.	
b	Remove 3 screws fixing evaporator assy.	
c	Adjust the position of connection pipe on evaporator slightly and then lift the evaporator upwards to remove it.	

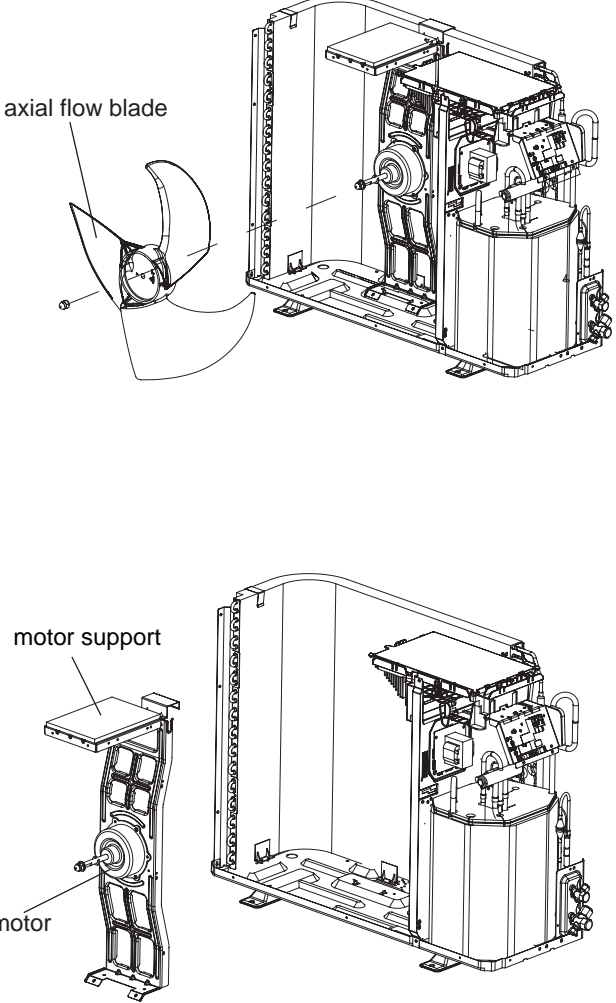
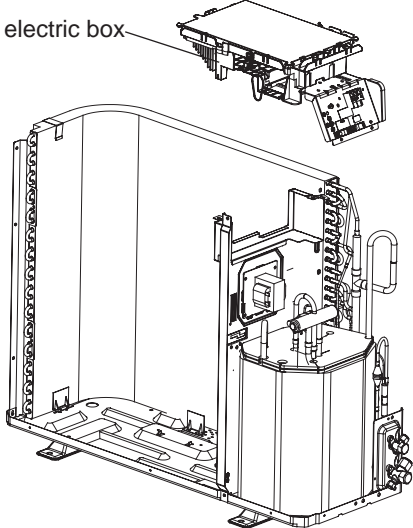
Steps	Procedure
<p>9. Remove stepping motor</p> <p>Remove the screw fixing step motor and then remove the step motor.</p>	 <p>screws</p>
<p>10. Remove motor and cross flow blade</p> <p>a Remove the screws fixing motor clamp and then remove the motor clamp.</p> <p>b Remove the screws at the connection place of cross flow blade and motor; lift the motor and cross flow blade upwards to remove them.</p> <p>c Remove the bearing holder sub-assy.</p>	 <p>motor clamp</p> <p>screws</p> <p>cross flow</p> <p>motor</p> <p>screw</p> <p>holder sub-assy</p> <p>bottom case</p>

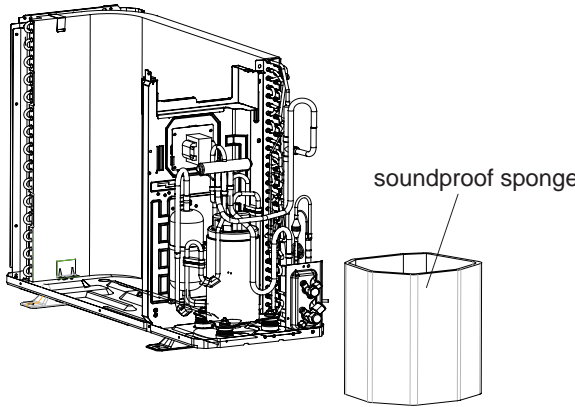
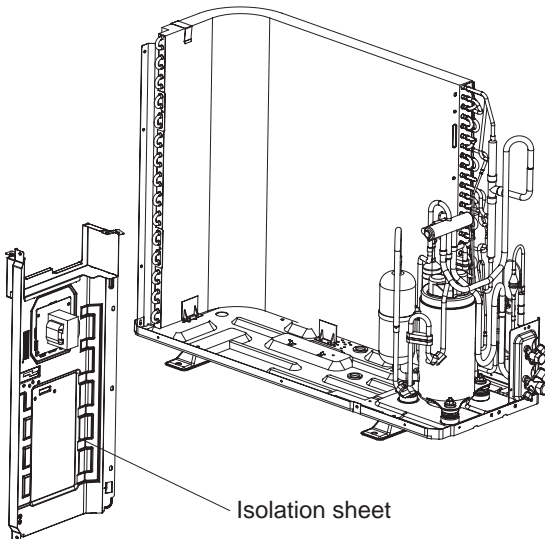
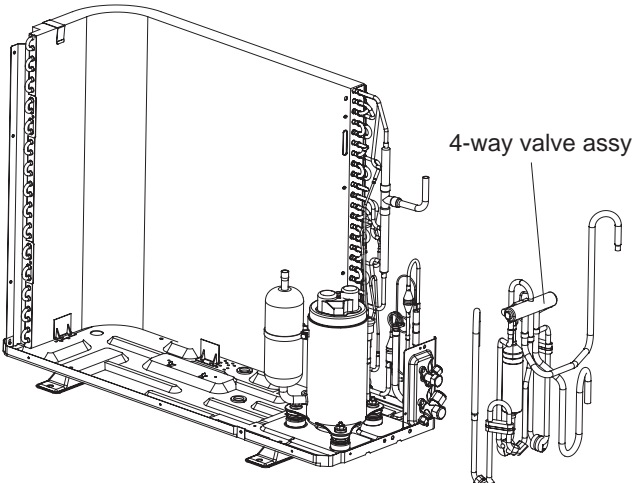
11.2 Removal Procedure of Outdoor Unit

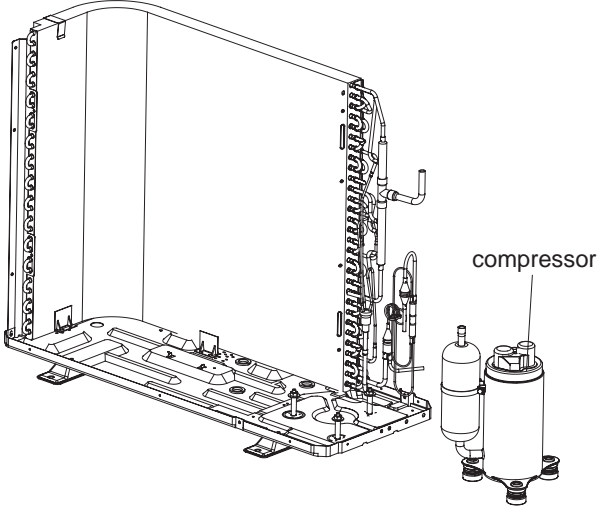
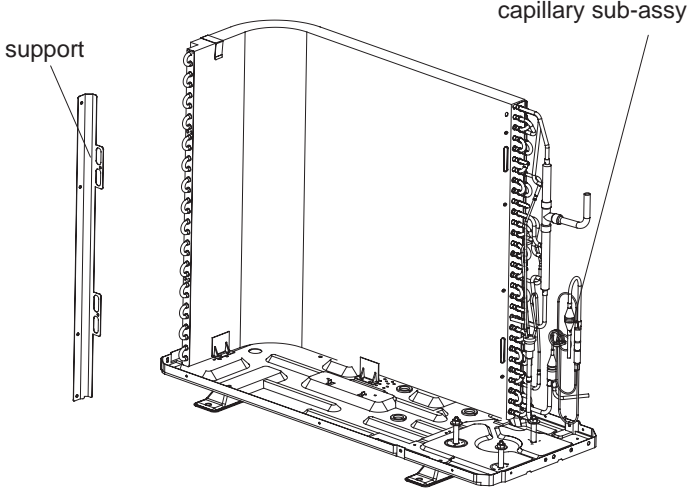
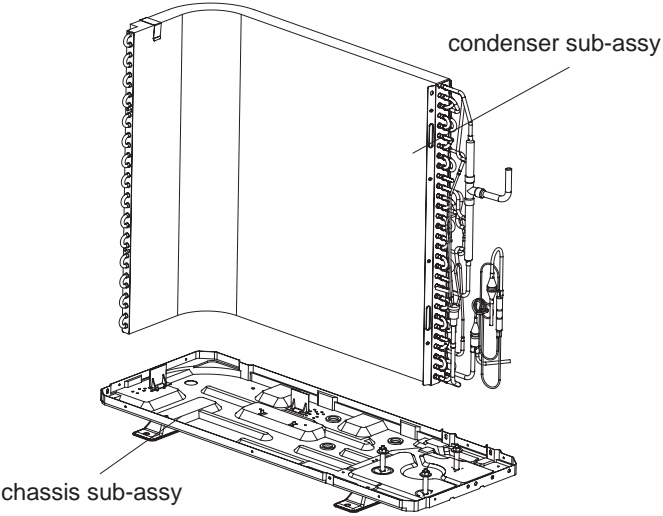
ASH-18AIM2 PT

Steps	Procedure
1. Remove top panel	
a	<p data-bbox="207 487 727 563">Twist off the screws used for fixing the handle and valve cover, pull the handle and valve cover upward to remove it.</p>  <p data-bbox="1250 633 1347 666">handle</p> <p data-bbox="1250 797 1380 829">valve cover</p>
b	<p data-bbox="207 995 662 1105">Remove the 3 screws connecting the top panel with the front panel and the right side plate, and then remove the top panel.</p>  <p data-bbox="1266 1048 1380 1081">top panel</p>
2. Remove grille, panel and rear grill	
a	<p data-bbox="207 1633 662 1710">Remove the 2 screws connecting the grille and the panel, and then remove the grille.</p>  <p data-bbox="901 1594 958 1627">grille</p>

Steps	Procedure	
<p>b</p>	<p>Remove the 5 screws connecting the panel with the chassis and the motor support, and then remove the panel.</p> <p>Remove the 6 screws connecting the left side plate and right side plate and then remove rear grill</p>	 <p>Diagram illustrating the removal of the front panel and rear grill. The front panel is shown detached on the left, and the rear grill is shown detached on the right. The main unit is shown in the center with the panel and grill removed.</p>
<p>3. Remove left side plate and right side plate</p>		
<p>a</p>	<p>Remove the screws connecting the right side plate with the chassis, the valve support and the electric box, and then remove the right side plate assy.</p>	 <p>Diagram illustrating the removal of the right side plate. The right side plate is shown detached on the right. The main unit is shown in the center with the right side plate removed.</p>
<p>b</p>	<p>Remove the screws connecting the left side plate and the chassis, and then remove the left side plate assy.</p>	 <p>Diagram illustrating the removal of the left side plate. The left side plate is shown detached on the left. The main unit is shown in the center with the left side plate removed.</p>

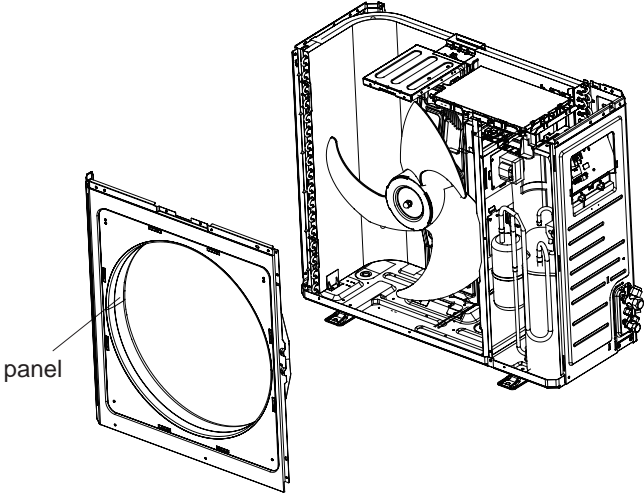
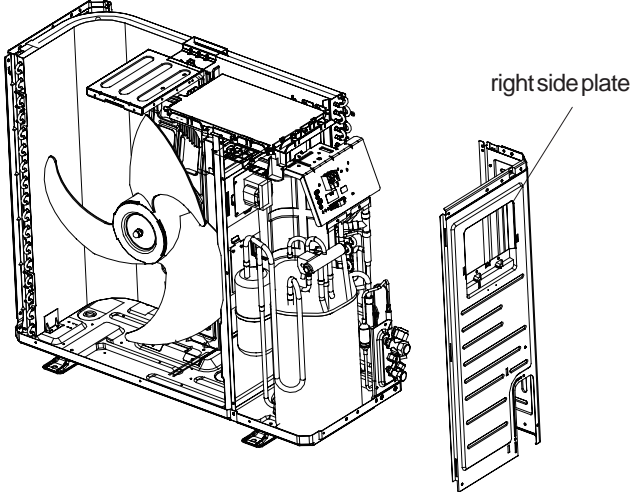
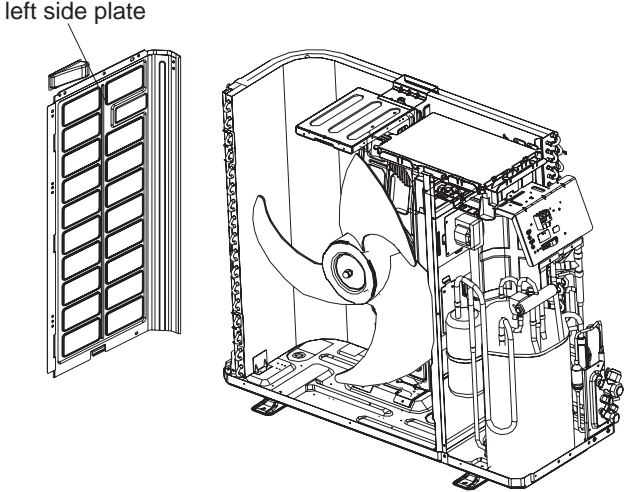
Steps	Procedure
<p>4. Remove fan motor</p> <p>a</p> <p>b</p>	<p>Remove the nuts fixing the blade and then remove the axial flow blade.</p> <p>Remove the 4 tapping screws fixing the motor; disconnect the leading wire insert of the motor and then remove the motor. Remove the 2 tapping screws fixing the motor support and then pull the motor support upwards to remove it.</p>  <p>The diagram illustrates the removal of the fan motor in two stages. In the first stage, labeled 'a', an 'axial flow blade' is shown being detached from the fan assembly. In the second stage, labeled 'b', the 'motor support' is shown being pulled upwards away from the 'motor' which remains in the unit's chassis.</p>
<p>5. Remove electric box</p>	<p>Remove the screws fixing the electric box sub-assy; loosen the wire bundle; pull out the wiring terminals and then pull the electric box upwards to remove it.</p>  <p>The diagram shows the 'electric box' sub-assembly being lifted upwards and away from the main fan unit, indicating its removal from the chassis.</p>

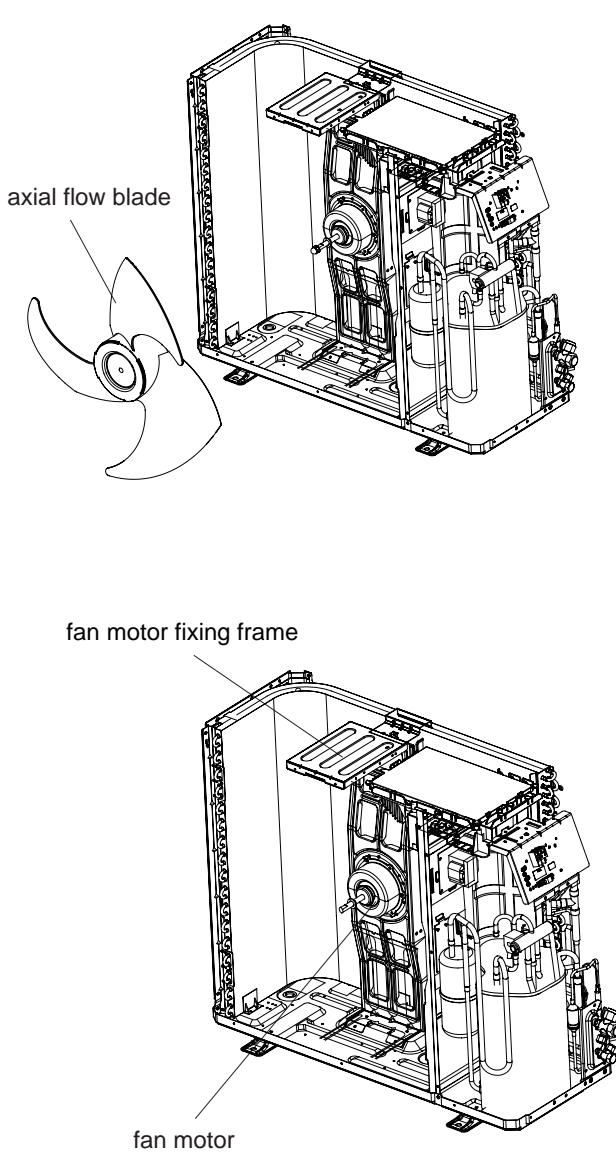
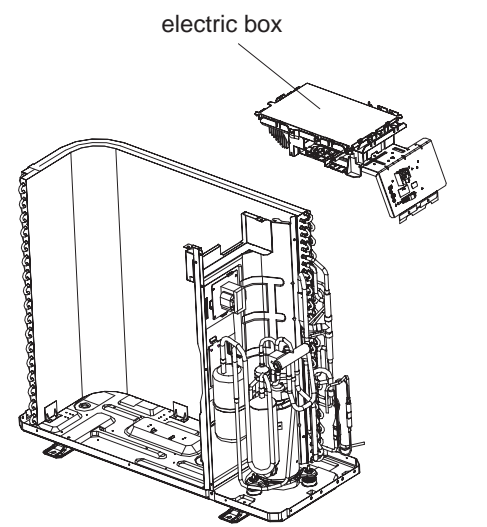
Steps	Procedure	
6. Remove soundproof sponge	<p>Since the piping ports on the soundproof sponge are torn easily, remove the soundproof sponge carefully</p>	
7. Remove Isolation sheet	<p>Remove the 3 screws fixing the isolation sheet and then remove the Isolation sheet.</p>	
8. Remove 4-way valve assy	<p>Discharge the refrigerant completely; unsolder the pipelines connecting the compressor and the condenser assy, and then remove the 4-way valve assy.</p>	

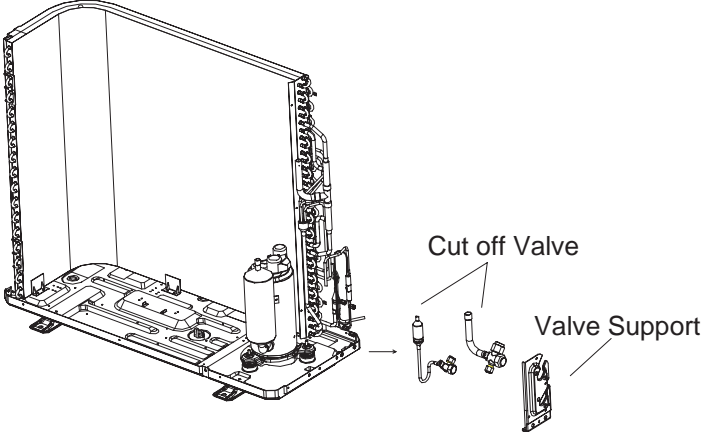
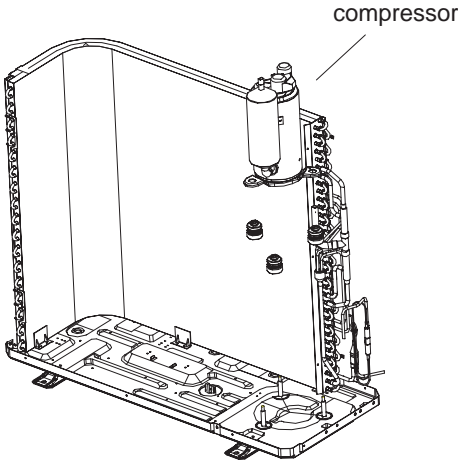
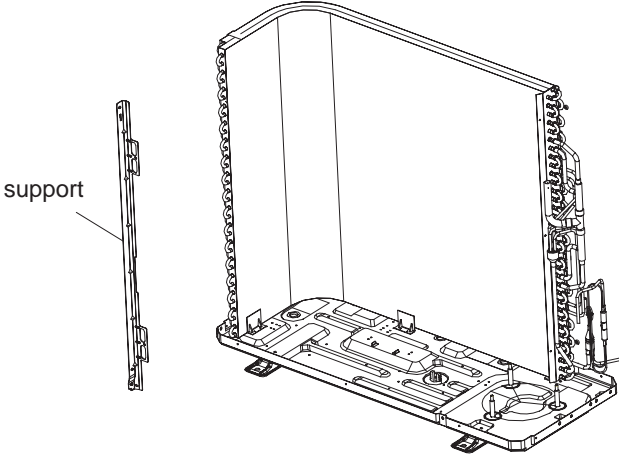
Steps	Procedure
9. Remove compressor	<p data-bbox="246 476 734 530">Remove the 3 foot nuts fixing the compressor and then remove the compressor.</p> 
10. Remove condenser sub-assy	<p data-bbox="246 989 711 1076">a Remove the screws connecting the support (condenser) and condenser assy, and then remove the support (condenser).</p>  <p data-bbox="246 1487 729 1541">b Remove the chassis sub-assy and condenser sub-assy.</p> 

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Steps	Procedure
<p>1. Remove top panel</p>	<div data-bbox="922 235 1421 1118"> <p>handle</p> <p>valve cover</p> <p>top panel</p> </div> <p>a Twist off the screws used for fixing the handle and valve cover, pull the handle and valve cover upward to remove it.</p> <p>b Remove the 3 screws connecting the top panel with the front panel and the right side plate, and then remove the top panel.</p>
<p>2. Remove grille, front side plate and panel.</p>	<div data-bbox="885 1174 1372 2070"> <p>grille</p> <p>front side plate</p> </div> <p>a Remove the 2 screws connecting the grille and the panel, and then remove the grille.</p> <p>b Remove the 1 screw connecting the front side plate and the panel, and then remove the front side plate.</p>

Steps	Procedure	
c	<p>Remove the 5 screws connecting the panel with the chassis and the motor support, and then remove the panel.</p>	
3. Remove right side plate and left side plate		
a	<p>Remove the screws connecting the right side plate with the chassis, the valve support and the electric box, and then remove the right side plate assy.</p>	 
b	<p>Remove the screws connecting the left side plate and the chassis, and then remove the left side plate assy.</p>	

Steps	Procedure	
<p>4. Remove fan motor and axial flow blade</p> <p>a</p> <p>b</p>	<p>Remove the nuts fixing the blade and then remove the axial flow blade.</p> <p>Remove the 4 tapping screws fixing the motor; disconnect the leading wire insert of the motor and then remove the motor. Remove the 2 tapping screws fixing the motor support and then pull the motor support upwards to remove it.</p>	 <p>The diagram illustrates the removal of the fan motor and axial flow blade. It shows two views of the engine assembly. In the first view, the axial flow blade is shown being removed from the fan motor. In the second view, the fan motor is shown being removed from the fan motor fixing frame. Labels include 'axial flow blade', 'fan motor fixing frame', and 'fan motor'.</p>
<p>5. Remove electric box</p>	<p>Remove the screws fixing the electric box sub-assy; loosen the wire bundle; pull out the wiring terminals and then pull the electric box upwards to remove it.</p>	 <p>The diagram illustrates the removal of the electric box. It shows the electric box being pulled upwards from the engine assembly. A label 'electric box' points to the component.</p>

Steps	Procedure
<p>8. Remove Cut off Valve and Valve Support</p>	<p>Remove the 2 bolts fixing the valve subassemblies. Unsolder the welding joint connecting the gas valve and the return air pipe. Remove the gas valve. (Note: When unsoldering the soldering joint, wrap the gas valve with wet cloth completely to avoid damage to the valve caused by high temperature.) Unsolder the welding joint connecting the liquid valve and the connecting pipe. Remove the liquid valve. Remove screws fixing valve support and then remove the valve support; remove the screw fixing the condenser and then pull the condenser upwards to remove it.</p> 
<p>9. Remove compressor</p>	<p>Remove the 3 foot nuts fixing the compressor and then remove the compressor.</p> 
<p>10. Remove support</p>	<p>Remove the screws connecting the support and condenser assy, and then remove the support.</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

- 5m, 7.5m, 8m.

2. Min. length of connection pipe is 3m.

3. Max. length of connection pipe and max. high difference.

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

- After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.

- The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	15 m	5 m
7000 Btu/h(2051 W)	15 m	5 m
9000 Btu/h(2637 W)	15 m	10 m
12000 Btu/h(3516 W)	20 m	10 m
18000 Btu/h(5274 W)	25 m	10 m
24000 Btu/h(7032 W)	25 m	10 m
28000 Btu/h(8204 W)	30 m	10 m
36000 Btu/h(10548 W)	30 m	20 m
42000 Btu/h(12306 W)	30 m	20 m
48000 Btu/h(14064 W)	30 m	20 m

- When the length of connection pipe is above 5m, 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 R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(mm)	Gas pipe(mm)	Cooling only(g/m)	Cooling and heating(g/m)
Φ6	Φ9.5 or Φ12	15	20
Φ6 or Φ9.5	Φ16 or Φ19	15	20
Φ12	Φ19 or Φ22.2	30	120
Φ16	Φ25.4 or Φ31.8	60	120
Φ19	/	250	250
Φ22.2	/	350	350

Appendix 4: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor(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	0.77
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