ACiQ

R32 PTAC AIR CONDITIONER

SERVICE MANUAL

Models Covered:
ACiQ-09PTC-INV
ACiQ-12PTC-INV
ACiQ-15PTC-INV

VERSION DATE: 12-16-24

Table of Contents

1. Summary

Models:

B5 panel (Beige)

Model list:

No.	Model	Product Code
1	ACiQ-09PTC-INV	CC060063700
2	ACiQ-12PTC-INV	CC060063600
3	ACiQ-15PTC-INV	CC060063500

2. Specifications

Model		-	ACiQ-09PTC-INV
Product Code		-	CC060063700
Power Supply	Rated Voltage	V~	208/230
	Rated Frequency	Hz	60
	Phases	-	1
Cooling Capacity		Btu/h	9800/9800
Heating Capacity		Btu/h	9400/9400
Cooling Power Input		W	740/740
Heating Power Input		W	700/700
Cooling Power Current		A	4.7/4.7
Heating Power Current		A	4.1/4.1
Rated Input		W	Cooling: 1050 / Heating: 900 / Electric Heating: 3500
Rated Current		A	Cooling: 6.4 / Heating: 5.2 / Electric Heating: 15.4
EER		(Btu/h)/W	13.2/13.2
SEER		-	/
COP		(Btu/h)/W	13.4/13.4
Air Flow Volume		CFM	312/271/235
Dehumidifying Volume		Pint/h	2.54
Application Area		yd^2	12-18
Permissible Excessive Operating Pressure for the Discharge Side		MPa	4.9
Permissible Excessive Operating Pressure for the Suction Side		MPa	2.5
Maximum Allowable Pressure		MPa	4.9
Throttling Method		-	Capillary
Defrosting Method		-	Automatic Defrosting
Climate Type		-	T1
Isolation		-	I
Moisture Protection (OUTDOOR)		-	IPX4
Dimension (WXHXD)		inch	42 3/32 × 15 63/64 × 21 1/2
Dimension of Carton Box (LXWXH)		inch	45 3/64 × 25 19/32 × 17 7/8
Dimension of Package (LXWXH)		inch	45 5/32 × 25 45/64 × 18 15/32
Net Weight		lb	110.3
Gross Weight		lb	122.4
Refrigerant		-	R32
Refrigerant Charge		oz	28.57

Indoor Side	Electric Heater Power Input	W	2870/3500
	Electric Heater Power Current	A	14/15.4
	Fan Type	-	Cross-flow
	Diameter Length (DXL)	mm	Φ121×706
	Cooling Speed	r/min	1010/890/810
	Heating Speed	r/min	1010/890/810, Electric Heating: 1150/1050/950
	Fan Motor Power Output	W	45
	Fan Motor RLA	A	0.22
	Fan Motor Capacitor	μF	/
	Evaporator Form	-	Aluminum Fin-copper Tube
	Evaporator Pipe Diameter	mm	Φ7
	Evaporator Row-fin Gap	mm	3-1.4
	Evaporator Coil Length (LXDXW)	mm	698 × 242 × 38.1
	Swing Motor Model	-	/
	Swing Motor Power Output	W	/
	Fuse Current	A	15
	Set Temperature Range	ºF	61~86
	Sound Pressure Level	dB (A)	49/48/47
	Sound Power Level	dB (A)	59/58/57
Outdoor Side	Compressor Trademark	-	LANDA
	Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.
	Compressor Model	-	QXF-A102zE190H
	Compressor Oil	-	FW68DA or equivalent
	Compressor Type	-	Rotary
	Compressor LRA.	A	/
	Compressor RLA	A	4.60
	Compressor Overload Protector	-	HPC1115/95U1/KSD115°C
	Fan Type	-	Axial-flow
	Fan Diameter	mm	349
	Fan Motor Speed	rpm	1340/1270/1200/1070
	Fan Motor Power Output	W	30
	Fan Motor RLA	A	0.1
	Fan Motor Capacitor	μF	/
	Outdoor Unit Air Flow Volume	CFM	471
	Condenser Form	-	Aluminum Fin-copper Tube
	Condenser Pipe Diameter	mm	Φ7
	Condenser Rows-fin Gap	mm	3-1.3
	Condenser Coil Length (LXDXW)	mm	780 × 343 × 34.2
	Cooling Operation Ambient Temperature Range	ºF	64.4~115.0
	Heating Operation Ambient Temperature Range	ºF	-19.4~77
	Sound Pressure Level	dB (A)	63
	Sound Power Level	dB (A)	73

The above data is subject to change without notice; please refer to the nameplate of the unit.

Model		-	ACiQ-12PTC-INV
Product Code		-	CC060063600
Power Supply	Rated Voltage	V~	208/230
	Rated Frequency	Hz	60
	Phases	-	1
Cooling Capacity		Btu/h	12000/12000
Heating Capacity		Btu/h	11800/11800
Cooling Power Input		W	970/970
Heating Power Input		W	940/940
Cooling Power Current		A	5.5/5.5
Heating Power Current		A	5.0/5.0
Rated Input		W	Cooling: 1260 / Heating: 1110 / Electric Heating: 3500
Rated Current		A	Cooling: 6.8 / Heating: 5.3 / Electric Heating: 15.4
EER		(Btu/h)/W	12.4/12.4
SEER		-	/
COP		(Btu/h)/W	12.5/12.5
Air Flow Volume		CFM	324/277/247
Dehumidifying Volume		Pint/h	3.17
Application Area		yd^2	16-24
Permissible Excessive Operating Pressure for the Discharge Side		MPa	4.9
Permissible Excessive Operating Pressure for the Suction Side		MPa	2.5
Maximum Allowable Pressure		MPa	4.9
Throttling Method		-	Capillary
Defrosting Method		-	Automatic Defrosting
Climate Type		-	T1
Isolation		-	I
Moisture Protection (OUTDOOR)		-	IPX4
Dimension (WXHXD)		inch	42 3/32 × 15 63/64 × 21 1/2
Dimension of Carton Box (LXWXH)		inch	45 3/64 × 25 19/32 × 17 7/8
Dimension of Package (LXWXH)		inch	45 5/32 × 25 45/64 × 18 15/32
Net Weight		lb	110.3
Gross Weight		lb	122.4
Refrigerant		-	R32
Refrigerant Charge		oz	28.57

Indoor Side	Electric Heater Power Input	W	2870/3500
	Electric Heater Power Current	A	14/15.4
	Fan Type	-	Cross-flow
	Diameter Length (DXL)	mm	Φ121×706
	Cooling Speed	r/min	1080/960/880
	Heating Speed	r/min	1080/960/880, Electric Heating: 1150/1050/950
	Fan Motor Power Output	W	45
	Fan Motor RLA	A	0.22
	Fan Motor Capacitor	μF	/
	Evaporator Form	-	Aluminum Fin-copper Tube
	Evaporator Pipe Diameter	mm	Φ7
	Evaporator Row-fin Gap	mm	3-1.4
	Evaporator Coil Length (LXDXW)	mm	698 × 242 × 38.1
	Swing Motor Model	-	/
	Swing Motor Power Output	W	/
	Fuse Current	A	15
	Set Temperature Range	ºF	61~86
	Sound Pressure Level	dB (A)	51/50/49
	Sound Power Level	dB (A)	63/62/61
Outdoor Side	Compressor Trademark	-	LANDA
	Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.
	Compressor Model	-	QXF-A102zE190H
	Compressor Oil	-	FW68DA or equivalent
	Compressor Type	-	Rotary
	Compressor LRA.	A	/
	Compressor RLA	A	4.60
	Compressor Overload Protector	-	HPC1115/95U1/KSD115°C
	Fan Type	-	Axial-flow
	Fan Diameter	mm	349
	Fan Motor Speed	rpm	1340/1120
	Fan Motor Power Output	W	20
	Fan Motor RLA	A	0.52
	Fan Motor Capacitor	μF	/
	Outdoor Unit Air Flow Volume	CFM	565
	Condenser Form	-	Aluminum Fin-copper Tube
	Condenser Pipe Diameter	mm	Φ7
	Condenser Rows-fin Gap	mm	3-1.3
	Condenser Coil Length (LXDXW)	mm	780 × 343 × 38.1
	Cooling Operation Ambient Temperature Range	ºF	64.4~115.0
	Heating Operation Ambient Temperature Range	ºF	-19.4~77
	Sound Pressure Level	dB (A)	69
	Sound Power Level	dB (A)	79

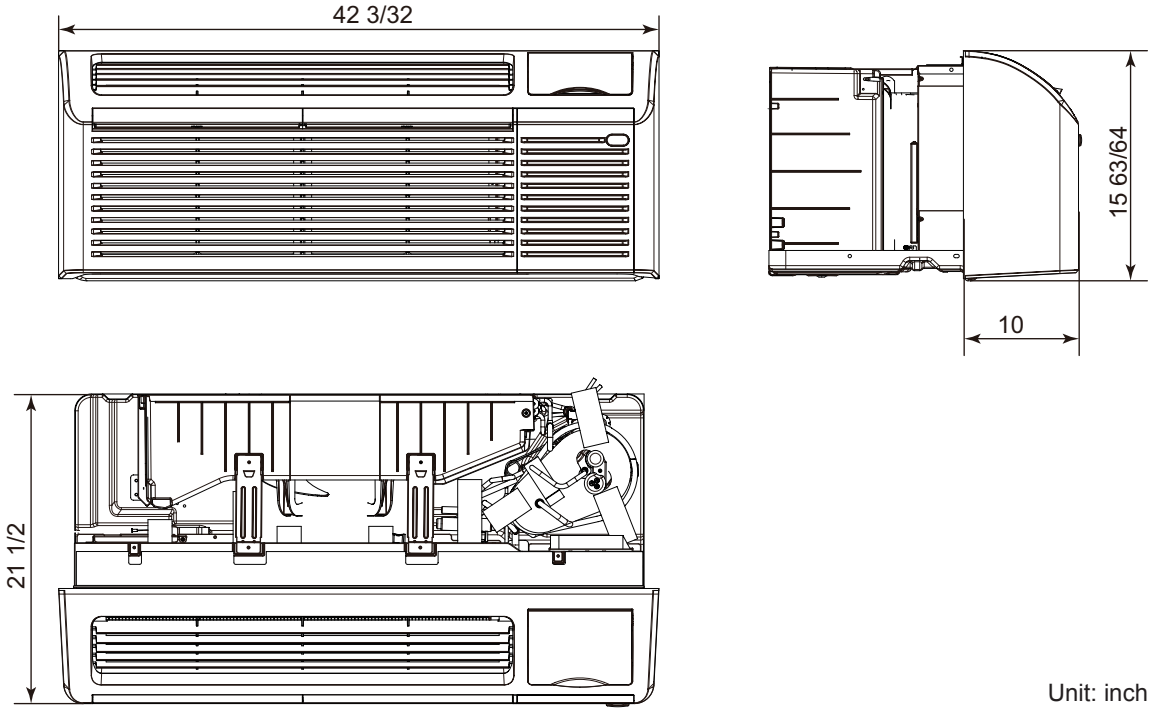
The above data is subject to change without notice; please refer to the nameplate of the unit.

Model		-	ACiQ-15PTC-INV
Product Code		-	CC060063500
Power Supply	Rated Voltage	V~	208/230
	Rated Frequency	Hz	60
	Phases	-	1
Cooling Capacity		Btu/h	15000/15000
Heating Capacity		Btu/h	13500/13500
Cooling Power Input		W	1400/1400
Heating Power Input		W	1160/1160
Cooling Power Current		A	7.5/7.5
Heating Power Current		A	6.0/6.0
Rated Input		W	Cooling: 1730 / Heating: 1420 / Electric Heating: 3500
Rated Current		A	Cooling: 9.0 / Heating: 8.0 / Electric Heating: 15.4
EER		(Btu/h)/W	10.7/10.7
SEER		-	/
COP		(Btu/h)/W	11.6/11.6
Air Flow Volume		CFM	324/277/247
Dehumidifying Volume		Pint/h	3.17
Application Area		yd^2	16-24
Permissible Excessive Operating Pressure for the Discharge Side		MPa	4.9
Permissible Excessive Operating Pressure for the Suction Side		MPa	2.5
Maximum Allowable Pressure		MPa	4.9
Throttling Method		-	Capillary
Defrosting Method		-	Automatic Defrosting
Climate Type		-	T1
Isolation		-	I
Moisture Protection (OUTDOOR)		-	IPX4
Dimension (WXHXD)		inch	42 3/32 × 15 63/64 × 21 1/2
Dimension of Carton Box (LXWXH)		inch	45 3/64 × 25 19/32 × 17 7/8
Dimension of Package (LXWXH)		inch	45 5/32 × 25 45/64 × 18 15/32
Net Weight		lb	112.5
Gross Weight		lb	124.6
Refrigerant		-	R32
Refrigerant Charge		oz	28.92

Indoor Side	Electric Heater Power Input	W	2870/3500
	Electric Heater Power Current	A	14/15.4
	Fan Type	-	Cross-flow
	Diameter Length (DXL)	mm	Φ121×706
	Cooling Speed	r/min	1180/1060/920
	Heating Speed	r/min	1180/1060/920, Electric Heating: 1150/1050/950
	Fan Motor Power Output	W	45
	Fan Motor RLA	A	0.22
	Fan Motor Capacitor	μF	/
	Evaporator Form	-	Aluminum Fin-copper Tube
	Evaporator Pipe Diameter	mm	Φ7
	Evaporator Row-fin Gap	mm	3-1.4
	Evaporator Coil Length (LXDXW)	mm	698 × 242 × 38.1
	Swing Motor Model	-	/
	Swing Motor Power Output	W	/
	Fuse Current	A	15
	Set Temperature Range	ºF	61~86
	Sound Pressure Level	dB (A)	53/52/51
	Sound Power Level	dB (A)	63/62/61
Outdoor Side	Compressor Trademark	-	LANDA
	Compressor Manufacturer	-	ZHUHAI LANDA COMPRESSOR CO., LTD.
	Compressor Model	-	QXF-A120zH190B
	Compressor Oil	-	FW68DA or equivalent
	Compressor Type	-	Rotary
	Compressor LRA.	A	/
	Compressor RLA	A	5.0
	Compressor Overload Protector	-	HPC115/95U1
	Fan Type	-	Axial-flow
	Fan Diameter	mm	349
	Fan Motor Speed	rpm	1340/1120
	Fan Motor Power Output	W	20
	Fan Motor RLA	A	0.52
	Fan Motor Capacitor	μF	/
	Outdoor Unit Air Flow Volume	CFM	565
	Condenser Form	-	Aluminum Fin-copper Tube
	Condenser Pipe Diameter	mm	Φ7
	Condenser Rows-fin Gap	mm	3-1.3
	Condenser Coil Length (LXDXW)	mm	780 × 343 × 38.1
	Cooling Operation Ambient Temperature Range	ºF	64.4~115.0
	Heating Operation Ambient Temperature Range	ºF	-19.4~77
	Sound Pressure Level	dB (A)	69
	Sound Power Level	dB (A)	79

The above data is subject to change without notice; please refer to the nameplate of the unit.

3. Outline Dimension Diagram

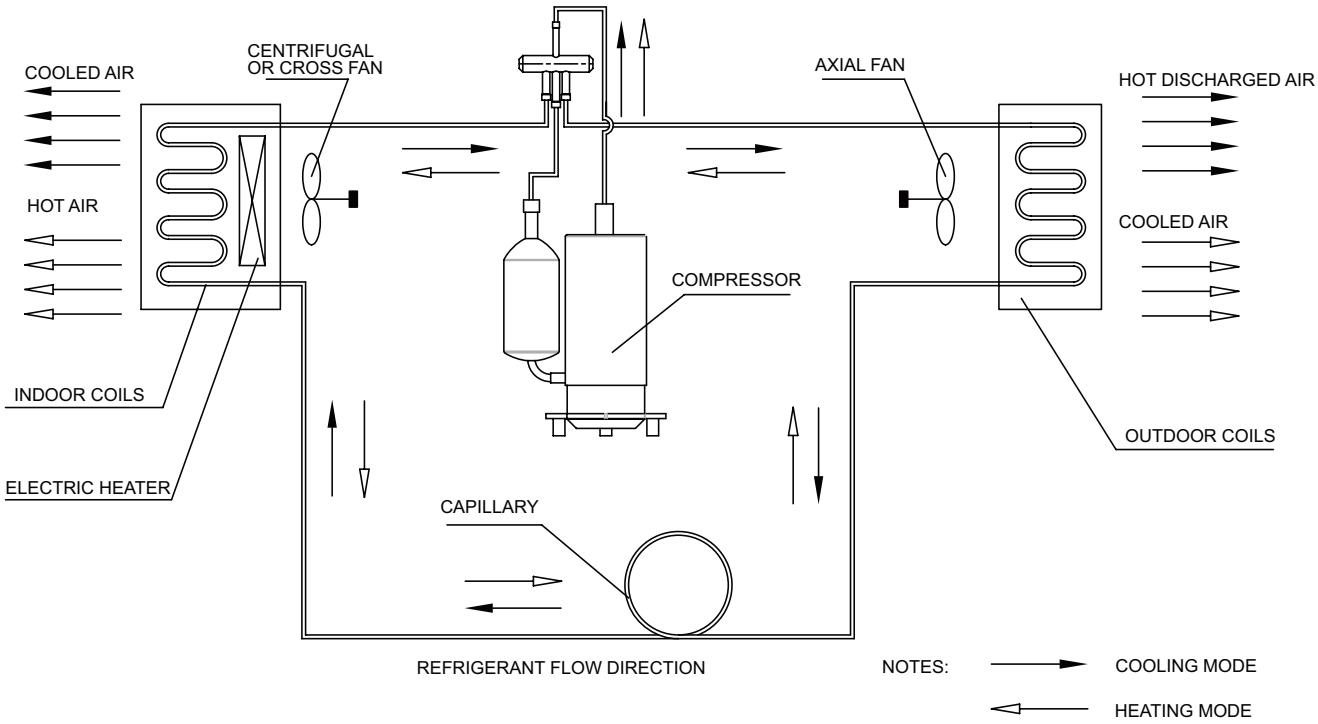


Unit: inch

(NOTE: Take one of appearance for example.)

4. Refrigerant System Diagram

Cooling + Heat Pump + Auxiliary Electric Heater



5. Electrical Part

5.1 Wiring Diagram

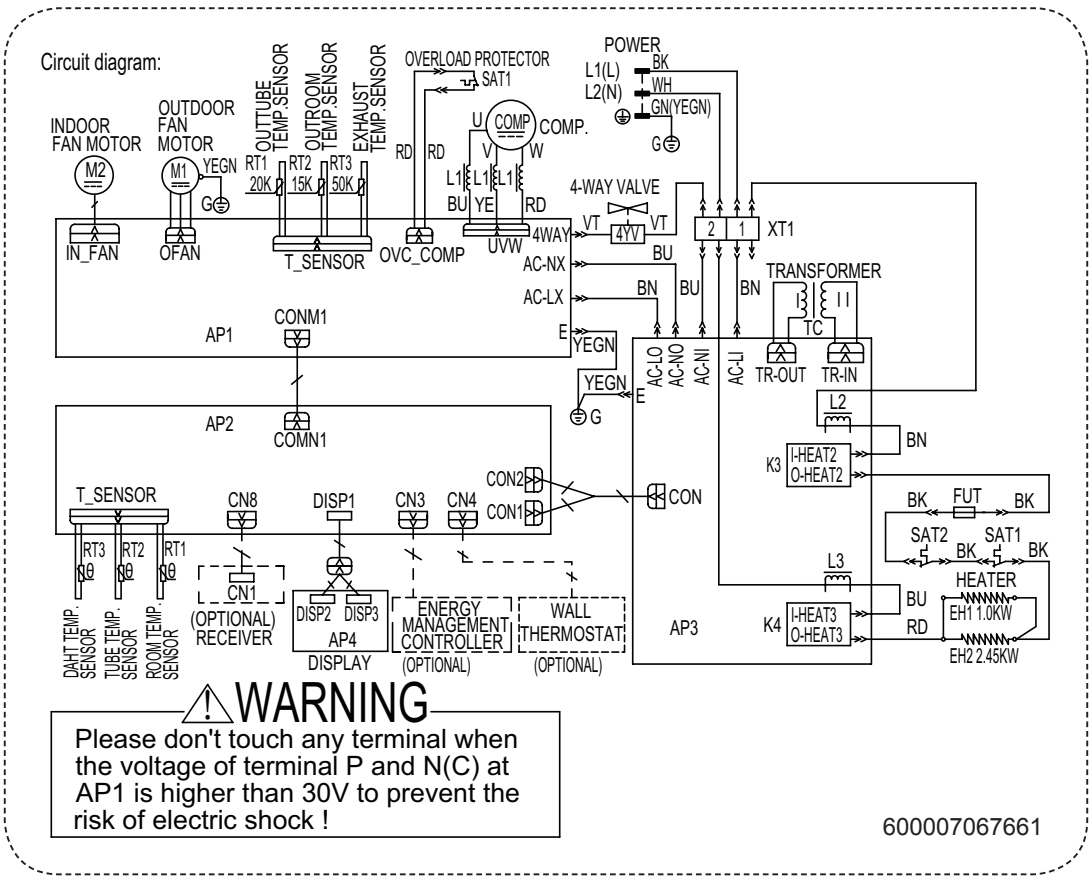
● Instruction

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.

● Electric Diagram

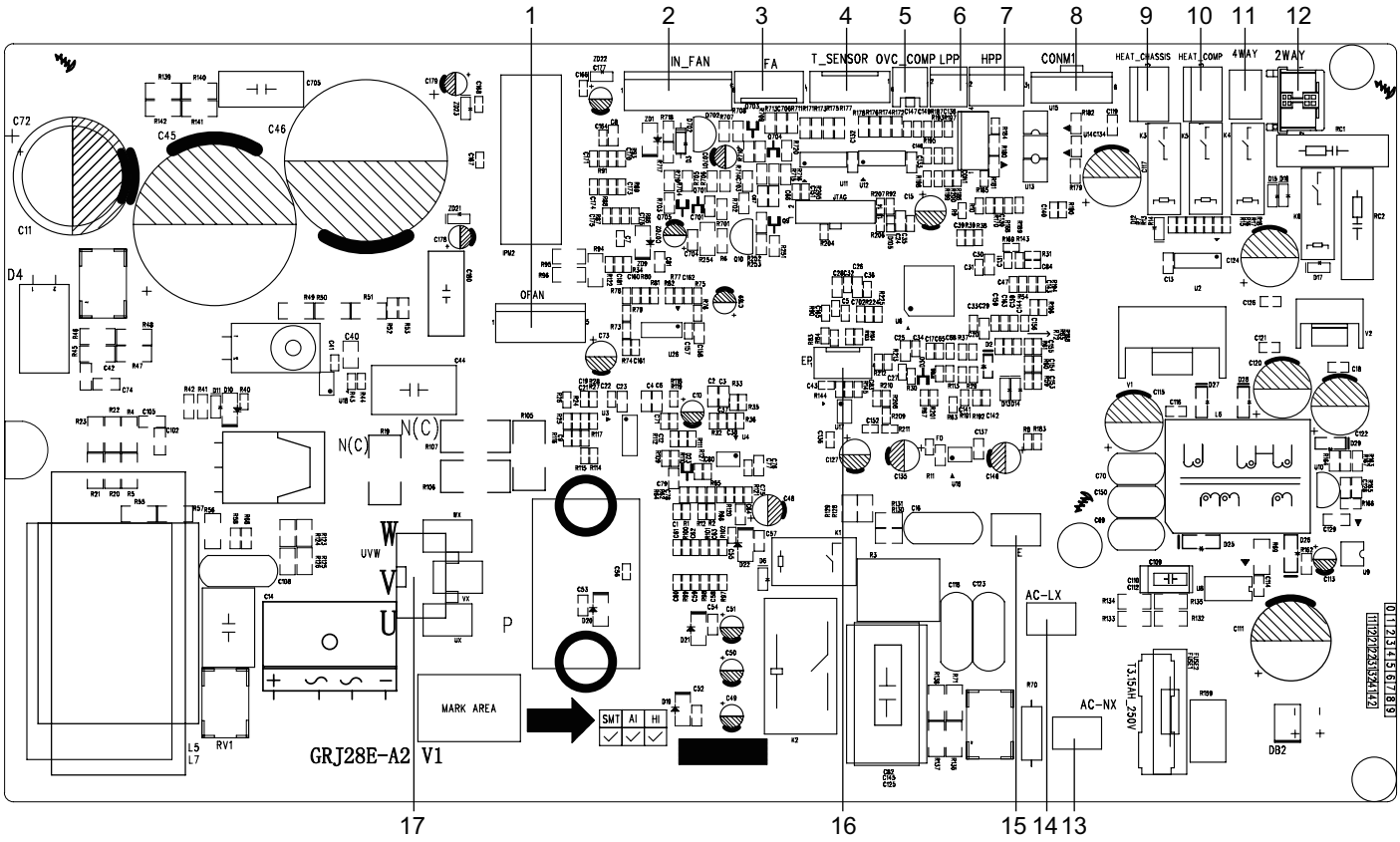
ACiQ-09PTC-INV, ACiQ-12PTC-INV, ACiQ-15PTC-INV



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

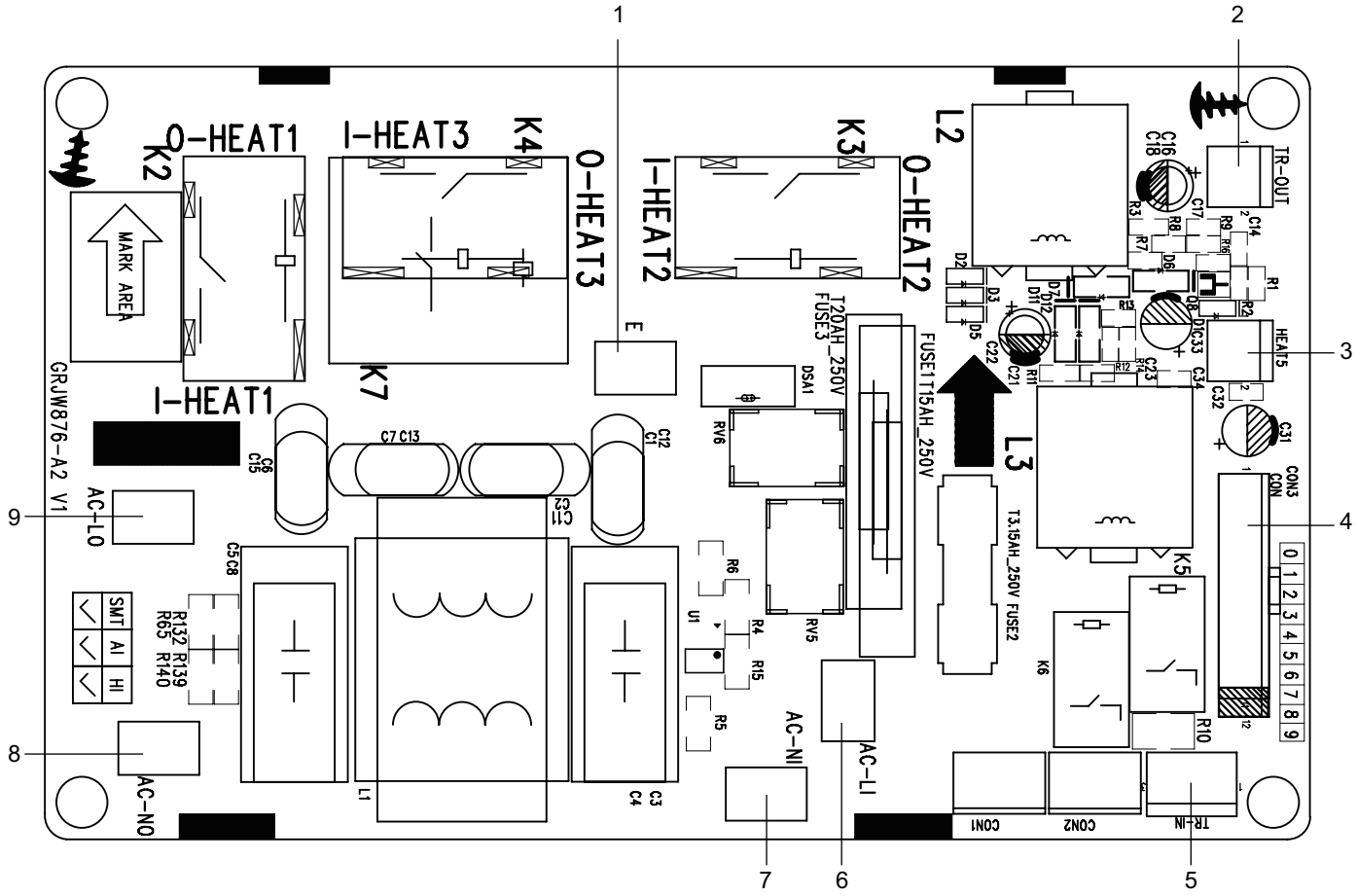
5.2 PCB Printed Diagram

5.2.1 Silk screen on main board 1



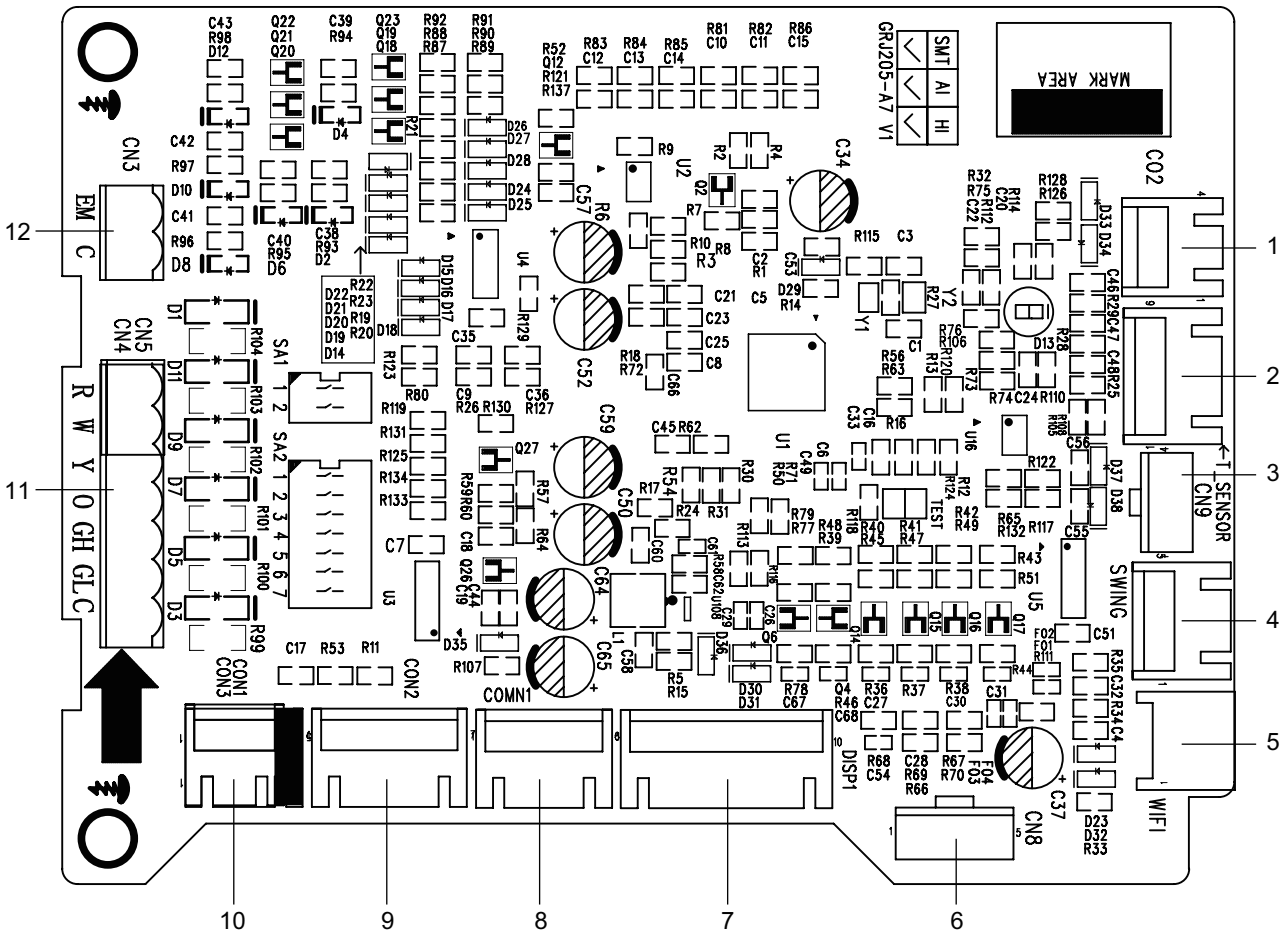
No.	Name	No.	Name
1	Outdoor Fan Needle Stand	10	Compressor Electric Heating Belt Needle Stand (Reserved)
2	Indoor Fan Needle Stand	11	Four-way Valve Needle Stand
3	Electronic Expansion Valve Needle Stand (Reserved)	12	Two-way Valve Needle Stand
4	Temperature Sensor Needle Stand	13	Neutral Wire Output of Rejector Board Insertion
5	Compressor Overload Needle Stand	14	Live Wire Output of Rejector Board Insertion
6	Low Pressure Protection Needle Stand (Reserved)	15	Earthing Wire Insertion
7	High Pressure Protection Needle Stand (Reserved)	16	EEP Flash Drive Needle Stand
8	Weak Current Main Board Needle Stand	17	Compressor Needle Stand
9	Chassis Electric Heating Belt Needle Stand (Reserved)		

5.2.2 Silk screen on main board 2



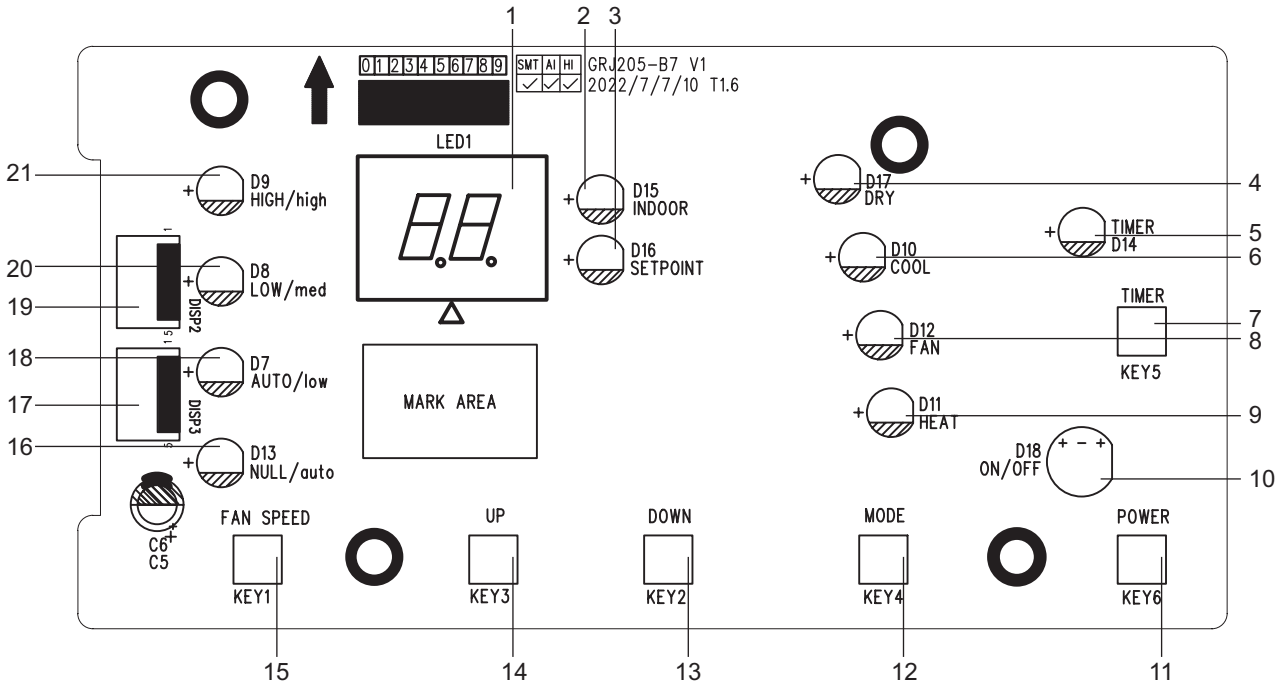
No.	Name	No.	Name
1	Earthing Wire Insertion	6	Input of Live Wire Insertion
2	Output transformer Needle Stand	7	Input of Neutral Wire Insertion
3	External Relay Needle Stand (Reserved)	8	Output of Neutral Wire Insertion
4	Weak Current Main Board Needle Stand	9	Output of Live Wire Insertion
5	Input transformer Needle Stand		

5.2.3 Silk screen on main board 3



No.	Name	No.	Name
1	CO_2 Detecting Needle Stand (Reserved)	7	Display Board Needle Stand
2	Temperature Sensor Needle Stand	8	Outdoor Main Board Needle Stand
3	Wired Controller Needle Stand (Reserved)	9	Rejector Board Insertion
4	Swing Motor Needle Stand (Reserved)	10	Rejector Board Insertion
5	Wi-Fi Needle Stand (Reserved)	11	Temperature Controller Wiring Terminal
6	Remote Controller receiving/Buzzer Needle Stand (Optional)	12	Energy Management Wiring Terminal

5.2.4 Silk screen on display board



No.	Name	No.	Name
1	LED Display Area	12	MODE Button
2	Indoor luminous Diode	13	"▼" (Down) Button
3	Setpoint luminous Diode	14	"▲" (Up) Button
4	DRY Mode luminous Diode	15	FAN SPEED Button
5	TIMER luminous Diode	16	AUTO Speed luminous Diode
6	COOL Mode luminous Diode	17	Display Board Needle Stand 3
7	TIMER Button	18	LOW Speed luminous Diode
8	FAN Mode luminous Diode	19	Display Board Needle Stand 2
9	HEAT Mode luminous Diode	20	MED Speed luminous Diode
10	ON/OFF luminous Diode	21	HIGH Speed luminous Diode
11	POWER Button		

6. Function and Control

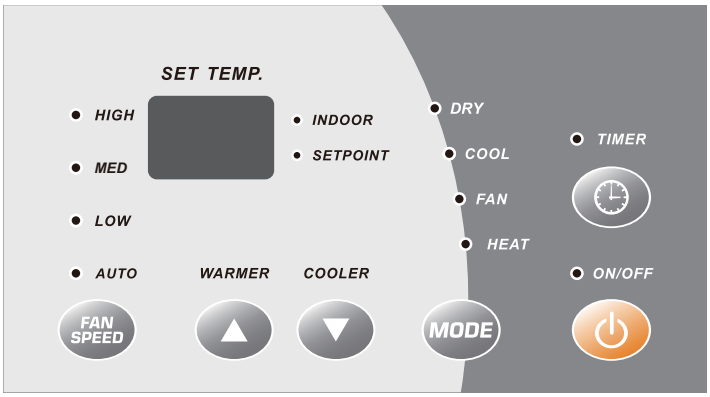
6.1 Introduction of Control Pane

1. Summary

When the unit is turned on, power indicator is displayed in green. In this case, you can operate the unit through control panel.

2. Operation interface and buttons

Button function: (Press the button and then the corresponding function will be started up after 2 seconds) Display will be started up immediately.



About the controls on your unit

There are ON/OFF, WARMER, COOLER, MODE, FAN SPEED and TIMER six buttons in all;

1. Press ON/OFF button under OFF mode to turn on the unit. If press WARMER or COOLER button under OFF mode, the dual 8 nixie tube will display indoor temperature for 15s and then turn off. If press MODE button under OFF mode, the controller will resume to the operation status before power-off.

Operation indicator is in green.

2. Under ON status, every button is in valid

(1) ON/OFF: It is used for turning OFF the system.

(2) MODE: It is used for switching between Cool, Fan, Heat and Dry (optional).

(3) WARMER or COOLER:

a. It is used for increasing temperature or timer setting.

b. It is used for decreasing temperature or timer setting.

(4) FAN: It is used for setting high, med, low or auto fan speed. The corresponding LED will be on.

(5) TIMER: It is used for setting timer function.

3. Timer function: It can be set either by buttons on control panel or by remote controller

(1) Timer ON: When the unit is off, timer ON can be set. Setting range is 0.5~24h. When timer ON time is reached, the system will operate according to the set mode.

(2) Timer OFF: When the unit is on, timer OFF can be set. Setting range is 0.5~24h. When timer OFF time is reached, the system will stop operation.

(3) Timer Setting: Press TIMER button to set timer function and Timer icon will be on. Dual 8 nixie tube will display selected time which can be adjusted by pressing " + " or " - " buttons. The range of timer setting is from " -- " to 24 hours. 5 seconds after timer setting, the timer function will be activated and TIMER LED will be on. If " -- " is displayed, the system will stop timer setting.

(4) Timer Preview: when timer function has been set, press TIMER button to preview the remaining time of timer.

(5) If Time function has been set, turning on/off the unit or power failure will cancel timer setting.

4. Sleep function: This function can be set only by remote controller. This mode will bring a more comfortable sleeping environment. Please contact customer service center or refer to the service manual for more details.

5. DRY function: Without reducing the room temperature, air conditioner can dehumidify and make the room air dry and comfortable.

6. Buzzer: optional

When controller is energized, or valid remote control signal/button signal is received, the buzzer will give out a beep.

7. Auto fan speed

Fan speed can be automatically selected according to different modes or indoor temperature to achieve higher comfort.

8. Emergency cooling operation: Emergency cooling, Subject to your choice – allowed or rejected. When indoor ambient temperature ≥30°C(86°F), the unit will start cooling automatically. When indoor ambient temperature reaches 27°C(81°F), the unit will stop operation.

9. Fcode remote controller: optional

6.2 Function Introduction

1. Basic function of system

Under each mode, once the compressor starts operation, it can stop operation only after it has operated for 7min (the shortest operation time of compressor (Note: stop operation when it has reached to the temperature point is included; the circumstances of fault protection, turn off the unit by remote controller and mode switchover are excluded);

Under each mode: once the compressor has stopped operation, it will delay for 3mins to be restarted up.

1.1 Cooling mode

(1)Once the compressor is under off status and $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$≥$T_{preset}$, turn on the unit and set the cooling mode and then the unit operates under cooling mode;

(2)When the unit is operating, if T_{preset}- 4°F(2°C) ＜ $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$ ＜ T_{preset} , the unit keep original operation status;

(3)When the unit operates under cooling mode, if $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$≤$T_{preset}$ - 4°F(2°C), the unit stops operation when it reaches to the temperature point;

(4)When $T_{outdoor\ amb.}$≤ 36°F(2°C), the complete is not allowed to operate under cooling mode.

Under the mode, the corresponding cooling indicator, set fan speed indicator and dual-8 nixie tube display the ambient temperature or set temperature according to the confirmed display content of “Button Confirmation Mode”. The temperature setting range is 61~86°F(16-30°C). The actual working temperature range of controller can be selected through the DIP switch code (special function ‘Seven-bit DIP Switch Code Configuration’).

1.2 Fan mode

Under this mode, the compressor, the outdoor fan and the 4-way valve are all turned off. The corresponding fan mode indicator, set fan speed indicator are on; Temperature can’t be adjusted (temperature “+” (WARMER) or “-” (COOLER) button are invalid); Dual-8 nixie tube displays the ambient temperature and INDOOR indicator is on.

1.3 Heating mode

a) $T_{outdoor\ amb.}$ ＞ 45°F(7°C). The unit operates under the heat pump heating mode;

b) When $T_{outdoor\ amb.}$≤ 41°F(5°C), the unit operates under the electric heating mode. Indoor unit’s controller sends the stop signal to the outdoor unit’s controller.

c) When 41°F(5°C) ＜ $T_{outdoor\ amb.}$≤ 45°F(7°C), if $T_{indoor\ amb.}$ ≥ 59°F(15°C), the unit operates under heat pump heating; If $T_{indoor\ amb.}$ < 59°F(15°C)，the unit operates under the electric heating mode. Indoor unit’s controller sends the stop signal to the outdoor unit’s controller. Once the compressor has stopped operation, when there’s heating requirement for the compressor, 15s later, the electric heating will conduct the heating instead of compressor until it has satisfied the temperature point for stopping operation.

1.Heat pump heating:

(1)When the compressor is at off status and $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$≤$T_{preset}$, turn on the unit for heating and the compressor will operate under heat pump heating mode.

(2)During heating operation, if T_{preset} ＜ $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$ ＜ T_{preset}+ 4°F(2°C), the unit keeps the heat pump heating operation;

(3)During heating operation, if $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$ ≥T_{preset}+ 4°F(2°C), the unit stops operation when it reached to the temperature point;

(4)When $T_{outdoor\ amb.}$≤ 41°F(5°C), the complete unit is not allowed to operate under heat pump heating mode.

2. Electric heating:

① When$T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$ ≤ T_{preset}-2°F(1°C), the electric starts operation;

② When $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$≥$T_{preset}$+2°F(1°C), the electric heating is turned off;

③ When T_{preset}-2°F(1°C) ＜ $T_{indoor\ amb.}$-$T_{indoor\ amb.\ compensation}$ ＜ T_{preset}+2°F(1°C), the unit keeps original operation status.

Under the mode, the indoor fan operates at the set fan speed. The corresponding heating indicator and set fan speed indicator are on. The dual-8 nixie tube displays the ambient temperature or set temperature according to the confirmed display content of “Button Confirmation Mode”. The temperature setting range is 61~86°F(16-30°C). The actual working temperature range of controller can be selected through the DIP switch code.

1.4 OFF mode

1. If the OFF mode is selected, all the display will be closed except the power indicator and all the output are invalid. (Except the low temperature protection).

2. If press the WARMER or COOLER button, the dual 8 nixie tube will extinguish after it displayed the ambient temperature for 15s and the INDOOR indicator will also go out after brighting for 15s. If repressing the WARMER or COOLER buttonin the process of displaying the ambient temperature, 15s later, it will be calculated again.

1.5 Dry mode

Under the mode, the dry indicator is on. The indoor fan is forced to operate at the low fan speed and the low fan speed indicator is on. The dual-8 nixie tube displays the ambient temperature or set temperature according to the confirmed display content of “Button Confirmation Mode”. The temperature setting range is 61~86°F(16-30°C).

The actual working temperature range of controller can be selected through the DIP switch code.

1.6 Low temperature protection

Under OFF, cool, dry or fan mode, this protection can be operated by wired controller.

Entry condition: if select low temperature protection valid with dial switch (see special function), if it detects that the indoor ambient temperature is lower than 40°F(5°C), air conditioner will enter into

pure electric heating mode; low temperature protection will be started up.

Exit condition: when indoor ambient temperature is increase more than 50°F(10°C), low temperature protection will be stopped;

In the low temperature protection, the dual 8 displays"FP'" and the running LED is in green color (including the off status). During the low temperature resistant protection, the unit won't be controlled by the wall thermostat; after entering the low temperature resistant protection, it won't inspect the wall thermostat signal and the low temperature resistant can't be canceled by button operation, and the priority is only lower than the malfunction of temperature sensor. The low temperature resistant protection display's priority is higher than configuration mode.

1.7 Open-circuit or short-circuit for temperature sensor

When the temperature sensor is short-circuited or open-circuited, under cooling, dry or heating mode, the unit will stop operation. Under fan mode, the unit operates at original status. It can't be resumed automatically. It needs to cut off the power and then de-energized the unit for resume. Once the fault is detected during the self-inspection period, the error code is displayed no matter the unit is at on or off status.

2. Users interface display and button

2.1 Button function:

There are ON/OFF, WARMER, COOLER, MODE, FAN SPEED, TIMER six buttons in all;

2.1.1 In OFF mode, press the ON/OFF button to turn on the unit: In OFF mode, if pressed the WARMER or COOLER button, the "dual 8" will be turned off after displaying the indoor temperature for 15s; If pressing the MODE button in OFF mode, the controller will resume to the running status before turning off the unit. The running LED is displaying in green color.

2.1.2 In ON status, all the buttons are in valid.

1) ON/OFF: After pressing the ON/OFF button, the unit can be switched between ON and OFF mode.

2) MODE: In ON status, after pressing the MODE button, the unit can be switched among cooling, fan, dry and heating mode circularly; In OFF mode, after pressing the MODE button, the controller will run at the running status before turning off the unit.

3) FAN SPEED: In ON status, after pressing the FAN SPEED button, you can select the low, medium, high and auto fan speed. Only low speed is available for dehumidify mode.

4) WARMER, COOLER:

a. In TIMER setting status, the timer can be set within 0-24 hours. In 10 hour timer, the time is adjusted every 0.5 hour by pressing the button. In timer above 10 hour, the time is adjusted every 1 hour by pressing the button.

b. In temperature setting status, the temperature can be adjusted every 2°F (1°C). Temperature setting range is 61-86°F (16-30°C) and you can also select other setting temperature range through configuration.

5) TIMER:

a. In the status without timer, it will enter timer setting by pressing this button.

b. In the status with timer, it can show the residual time by pressing this button.

c. Press this button to cancel timer when showing the time or setting timer.

2.2 Dual 8 Display and LED Display

Two 8 segment nixie tube and 13 LED indicators (they are HIGH, MED, LOW, AUTO, COOL, FAN, HEAT, ON/OFF, SETOPINT (set temperature), INDOOR (ambient temperature), STATUS (status indicator on main board), SLEEP/DRY, TIMER)

2.2.1 Mode LED display: when the A/C is running in a certain kind of mode, the corresponding LED is bight.

2.2.2 Running/power LED: In ON status, the controller is in green color; In OFF status, the controller is red color.

2.2.3 Fan speed display: when the A/C is running at high, medium, low and auto fan speed, the corresponding LED is bright.

2.2.4 Under cool, dry or heat mode, the dual-8 nixie tube displays set temperature (under fan mode, the dual-8 nixie tube displays indoor ambient temperature).

2.2.5 When the display data has three-position, the dual 8 is rolling to display. Display the "decimal"+"units place" at first, and then display "BLANK"+"hundreds place"

2.2.6 Malfunction Display

After energization, STATUS LED is bright, while when theres malfunction or protection, STATUS LED will blink to display in any circumstances.

Once there will multiple faults, there is no priority and they will be displayed circularly. When fault or protection displayed on the wired controller, release the ON/OFF button and send it to the outdoor unit by operating the ON/OFF button.

No.	Error Name	Error code	Indicator display
1	High discharge temperature protection of compressor	E4	
2	Compressor overload protection	E5	
3	Communication fault	E6	
4	Storage chip fault/memory chip fault	EE	
5	Indoor tube temperature sensor is short-circuited	F3	
6	Compressor overload protection	H3	
7	IPM protection	H5	
8	No feedback from indoor unit's motor	H6	
9	Desynchronizing of compressor	H7	
10	PFC protection	HC	
11	Start-up failed	Lc	
12	Lost phase	Ld	
13	DC input voltage is too high	PH	
14	DC input voltage is too low	PL	
15	Charging malfunction of capacitor	PU	
16	Phase current detection circuit malfunction of	U1	
17	Overload	E8	
18	Indoor ambient temperature sensor is short-circuited	F1	STATUS LED flash 1 times and off 3s
19	Indoor tube temperature sensor is short-circuited	F2	STATUS LED flash 2 times and off 3s
20	Outdoor tube temperature sensor is short-circuited	F4	STATUS LED flash 3 times and off 3s

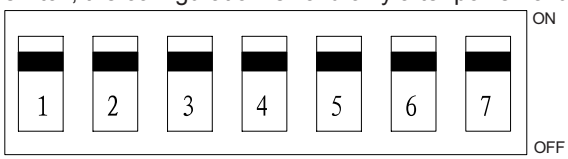
No.	Error Name	Error code	Indicator display
21	Outdoor air discharge temperature is open/short-circuited	F5	
22	4-way valve is abnormal	U7	
23	Malfunction of outdoor fan/ malfunction of DC motor	L3	
24	Wrong hint on wired controller wiring	/	STATUS LED flash 9 times and off 3s
25	Defrosting protection	/	Heat Indicator is on for 10s off 0.5s
26	Compressor is bonded with the relay of electrical heater	A2	
27	Temperature sensor of air outlet is shortcircuited	FJ	

3. Especial Functions

3.1 Energy Management Input (EM interface)

“EM” is used for energy management input. When this terminal has detected 24VAC signal, the unit is turned off. When the unit is at OFF mode, control panel or wired controller control is invalid. When there’s no signal (0VAC)input, the unit can be controlled by the control panel or wired controller, and the control is valid. (24VAC signal range is 18V ～ 28VAC; 0 signal range is 0VAC ～ 5VAC).

3.2 Configuration that is easy for hotel personnel to repair (7 DIP switch, the configuration is valid only after power failure)



(1). EL. HEAT ONLY (only electric heating) (valid in wired control mode, panel and remote controller)

ON-only electric heating; OFF-normal heating mode; default-OFF, this function is only applicable to HEAT PUMP

(2). REMOTE (wired controller control)

ON-wired controller control is valid; OFF-panel control is valid; default-OFF

(3). FAN CYCLE FOR HEAT (This function can be only be controlled by control panel or remote controller)

ON-fan is constantly running; OFF-fan will be stopped according to the loads (HEAT, COMP); default-OFF (After putting through the wired controller, the fan speed is controlled by the wired controller. .Whether it runs or not, which is controlled by the controller.)

(4). FAN CYCLE for COOL (This function can be only be controlled by control panel or remote controller)

ON-fan will be stopped according to the loads (HEAT. COMP); OFF-fan is constantly running; default-OFF (After putting though the wired controller, the fan is controller by the wired controller)

(6&5). SETPOINT (SETPOINT1, SETPOINT2) (valid in panel, remote controller mode and invalid in wired controller mode)

SETPOINT1 （6th place）	SETPOINT2 （6th place）	°F	°C
OFF	OFF	Change the DIP switch code position can adjust the temperature setting range.	
ON	OFF		
OFF	ON		
ON	ON		
Default	Default		

If the display value of dual 8 exceeds the set point temperature limit, the display range is also 61~86°F(16-30°C); The actual working temperature range for the controller is the range of set point temperature limit.

(7). Freeze protection is prohibited (valid in wired controller, panel and remote controller mode)

ON-shield; OFF-valid; default—OFF

3.3 Configuration that isn't needed the hotel maintenance personnel to control (configuration is valid after B dial-up is energized, while configuration is invalid after A dial-up is energized)

A. Heat pump and Heat Cool units for selection. (Heat Pump is electric heating + heat pump; Heat Cool is electric heating + cooling only)

Heat pump—ON;

Heat cool-OFF

Heat pump units should be equipped with Heat pump type wired controller.

Heat Cool units should be equipped with Heat Cool type wired controller.

3.4 Configuration mode

After the unit is turned on for 30s, press the fan speed button and the COOLER button for 5s, the configuration mode will be started up. After turning to the configuration mode, if adjusting the temperature offset by buttons to turn to switching condition, the load will be activated after 3s. While if turning to switching condition due to the change of the ambient temperature, it can be activated only after quitting the configuration mode. In the configuration mode, the five configuration modes as below can be selected by FAN SPEED button.

Mode one: Fahrenheit /Centigrade display mode

Fahrenheit and Centigrade display mode can be switched by pressing WARMER or COOLER button.

F indicates Fahrenheit display mode

C indicated Centigrade display mode

Mode two:Temperature compensation value adjustment mode for dehumidifying

Press WARMER/COOLER button can increase or decreased temperature compensation value for 1°F (or °C). The range for indoor ambient temperature compensation value is -6~+6°F (-3~+3°C) (Dry mode LED is bright).

Mode three: Adjusting mode for cooling temperature offset

WARMER button can increase offset fset temperature 1°F(or °C). while COOLER button can decrease offset temperature 1°F(or °C). The indoor ambient temperature offset adjusting range is -6 to +6°F(-3 to +3°C) (cooling mode LED is bright)

Mode four: Adjusting mode for heating temperature offset

WARMER button can increase offset temperature 1°F(or °C), while COOLER button can decrease offset temperature 1°F(or °C). The indoor ambient temperature offset adjusting range is -6 to +6°F(-3 to +3 °C) (heating mode LED is bright)

The temperature offset is default 0 in dry mode, cooling and heating mode. They can allocate different offset in dry mode, cooling and heating mode respectively. The offset can't be adjusted in fan mode.

Mode five: Display switchover between setting temperature and ambient temperature in heating and cooling mode;

Press the WARMER button or COOLER button to switch the setting temperature and ambient temperature displaying;

Setting temperature displaying: the dual 8 displays SP. After quitting configuration mode, the heating mode, the cooling mode and the dry mode display the set temperature constantly;

Ambient temperature displaying: dual 8 displays AA. After quitting the configuration mode, the heating mode, the cooling mode and the dry mode display the ambient temperature.

As for below circumstances, it will display set temperature for 10s and then turn to display ambient temperature. (Note: if ambient temperature displaying is set, when turn on the unit in cooling mode, heating mode or dry mode, timer will be displayed for 5s, then turn to display set temperature for 5s and then turn to display ambient temperature.)

a. Press mode button

b. Energization after power failure

c. Restart the unit

d. Turn on the unit after EM turn off unit

e. Adjust the set temperature by WARMER OR COOLER button

Mode six: switchover between allowing emergent cooling auto start-up and not allowing emergent cooling auto start-up.

Press WARMER OR COOLING to switchover between allowing emergent cooling auto start-up and not allowing emergent cooling auto start-up.

Allowing emergent cooling auto start-up: dual 8 displays CA.

Not allowing emergent cooling auto start-up: dual 8 displays Cd.

Method for quitting configuration mode: as for the above configuration modes, they will be quitted by pressing the mode button or when there is no action within 30s.

3.5 Defrosting condition and process

For ensusing heating effect, air conditioner will defrost automatically according to defrosting status on outdoor unit. During defrosting, heating icon will be on and off.

3.6 Timer function

Controller has general timer function and clock timer function. When you select the remote controller with general timer function, only Clock timer: The precision of clock timer is 1minute. 24hours circulated timer can be set.

1. Timer ON: If timer ON is set during operation of the unit, the unit will continue to operate. If timer ON is set at unit OFF, upon ON time reaches, the unit will start to run according to previous setting status.

2. Timer OFF: If timer OFF is set at unit OFF, the system will keep standby status. If timer OFF is set at unit ON, upon OFF time reaches, the unit will stop operation.

3. Timer change:

Although timer has been set, the unit still can be turned on/off by pressing ON/OFF button on the remote controller. You can also reset the timer.

If timer ON and timer OFF are set at the same time during operation of the unit, the unit will keep running at current status till OFF time reaches. Upon ON time reached, the system will be turned on automatically. The unit will operate circularly like that every 24hours.

If timer ON and timer OFF are set at unit OFF status, the system keep OFF status till ON time reaches. Upon OFF time reaches, the system will be turned OFF automatically. The unit will operate circularly like that every 24hours.

3.7 Sleep function

In this mode, the system will select proper sleep curve to operate according to different set temperature.

1. If start up sleep function under cooling or drying mode, the system will increase set temperature automatically within a certain range to operate.

2. If start up sleep function under heating mode, the system will decrease set temperature automatically within a certain range to operate.

3.8 Memory function

Energizing after power failure, the controller is running according to the status before power failure.

3.9 Restore factory settings

In standby and OFF status, after pressing “fan speed” + ”WARMER” for 3s and the dual 8 displays “00” for 3s (do not display others), it shows that the factory settings has been restored. Meanwhile, the configuration information is default to display.

Fahrenheit and not allow emergent cooling auto start-up. Heating offset, cooling offset and dry offset is 0 and the set temperature is displayed. T value is 0, the fan speed is high, the set temperature is 71°F and timer is canceled.

The remote controller is invalid when the unit enters into the ex-factory mode.

4. Controls when connecting the wired controllers:

When you have connected the wired controller, the unit will automatically adjust the operation frequency of compressor according to indoor ambient temperature and outdoor ambient temperature.

5. 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 = ($T_{\text{indoor amb.}} - \Delta T_{\text{cooling indoor amb. compensation}}$)

b. In heating mode, the indoor ambient temperature participating in computing control= ($T_{\text{indoor amb.}} - \Delta T_{\text{heating indoor amb. compensation}}$)

(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 ≥ 40Hz, and the rising value Texhaust ($T_{exhaust\ (after\ start\text{-}up\ for\ 10\ minutes)} - T_{exhaust\ (before\ start\text{-}up)}$) <35.6ºF , 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 ($T_{pipe\ temperature} = T_{outdoor\ pipe\ temperature\ in\ cooling\ mode}$, $T_{pipe\ temperature} = T_{indoor\ pipe\ temperature\ in\ heating\ mode}$):

After the compressor starts up and runs for 10 minutes, if the compressor frequency f ≥ 40Hz, and $T_{pipe\ temperature} \geq (T_{exhaust+37.4})$, the outdoor exhaust temperature thermobulb can be judged not to be connected into place (judging once when power is on the first time).

6. 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 3 minutes, the defrosting operation will start.

② Conditions of finishing defrosting

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

③ $T_{outdoor\ pipe\ temperature} \geq T_{temperature\ 1\ of\ finishing\ defrosting}$;

④ The continuous running time of defrosting reaches [tmax. defrosting time].

7 Control Logic

7.1 Compressor Control

Start the compressor after starting cooling, heating, dehumidifying operations, and the outer fans start for 20s; 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.

7.2 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.

7.3 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 40s of entering into the defrosting compressor.

b. Defrosting stops: The 4-way valve will get power after 16s of exiting the defrosting compressor.

7.4 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.

The condition for freeze prevention protection is not detected in the oil return process and it's allowed to detect the condition of freeze prevention protection only after the oil return has finished for 3min.

1. Starting estimation:

After the compressor stopped working for 180s, if $T_{inner\ tube} > [T_{resume}$

temp. of freeze prevention], the complete unit is allowed to be turned on. Otherwise, the unit is not allowed to be turned on and it stops operation according to freeze prevention protection.

2. Power turn-off:

When it' s detected that $T_{inner\ tube} > T_{resume\ temp.\ of\ freeze\ prevention}$ for consecutive 3min, the unit stops operation due to freeze prevention protection. When $T_{resume\ temp.\ of\ freeze\ prevention} > T_{inner\ tube}$, and compressor has stopped operation for 3min, the complete unit is allowed to resume operation.

3. Turn off the unit or switch FAN/HEAT mode to eliminate the fault.

4. Shield anti-freeze protection under fluoride conditions.

7.5 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 outer pipe <[T Cooling overload frequency-limited temperature] (the temperature of hysteresis is 35.6ºF), 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 Cooling overload frequency-limited temperature] ≤[T 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:

If [T Cooling overload frequency reducing temperature at high speed] ≤T outer pipe< [T Cooling overload power turn-off temperature] , you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit;

4. Reducing frequency at high speed:

If [T Cooling overload frequency reducing temperature at high speed]≤T outer pipe [T Cooling overload power turn-off temperature], you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit;

5. Power turn-off:

If the [T Cooling overload power turn-off temperature] ≤T outer pipe, then Cooling overload protects machine stopping; If [T outer pipe]<[T 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 inner pipe T heating overload frequency-limited temperature (the temperature of hysteresis is 35.6ºF), 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 heating overload frequency-limited temperature]≤T inner pipe <[T heating overload frequency reducing temperature at normal speed] , you should limit the frequency raising of compressor.

2. Reducing frequency at normal speed:

If T[heating overload frequency reducing temperature at normal speed]≤T inner pipe<[T heating overload frequency reducing temperature at high speed], you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit;

3. Reducing frequency at high speed:

If [T heating overload frequency reducing temperature at high speed]≤T inner pipe<[T heating overload power turn-off temperature], you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit;

4. Power turn-off:

If the [T heating overload power turn-off temperature] ≤T inner pipe, then overload protects machine stopping; If T inner pipe T 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 Discharge <T Discharge limited temperature (the temperature of hysteresis is 35.6ºF), 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 Limited frequency temperature during discharging] ≤T Discharge<[T frequency reducing temperature at normal speed during discharging] , you should limit the frequency raising of compressor.

3. Reducing frequency at normal speed:

If [T frequency reducing temperature at normal speed during discharging] ≤T Discharge<[T frequency reducing temperature at high speed during discharging], you

should adjust the compressor frequency by reducing 8Hz/90s till the lower limit;

4. Reducing frequency at high speed:

If [$T_{\text{frequency reducing temperature at high speed during discharging}}$] ≤$T_{\text{Discharge}}$ <[$T_{\text{Stop temperature during discharging}}$], you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit;

5. Power turn-off:

If the [$T_{\text{Power turn-off temperature during discharging}}$] ≤$T_{\text{Discharge}}$, you should discharge to protect machine stopping; If [$T_{\text{Discharge}}$]<[$T_{\text{Limited frequency temperature during discharging}}$] and the compressor has been stopped for 3 minutes, the machine should be allowed to operate.

6. If the discharging temperature protection of compressor 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 Protection times clearing of discharge , 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).

Current protection

1. Frequency limited

If [$I_{\text{Limited frequency when overcurrent}}$] ≤$I_{\text{AC Electric current}}$ <[$I_{\text{frequency reducing when overcurrent}}$], you should limit the frequency raising of compressor.

2. Reducing frequency:

If [$I_{\text{Frequency reducing when overcurrent}}$] ≤[$I_{\text{AC Electric current I Power turn-off when overcurrent}}$] , you should reduce the compressor frequency till the lower limit or exit the frequency reducing condition;

3. Power turn-off:

If [$I_{\text{Power turn-off machine when overcurrent}}$] ≤[$I_{\text{AC Electric current}}$] , you should carry out the overcurrent stopping protection; If $I_{\text{AC Electric current}}$<[$T_{\text{Limited frequency when overcurrent}}$] and the compressor has been stopped for 3 minutes, the machine should be allowed to operate.

4. If the overcurrent 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 [$t_{\text{Protection times clearing of over current}}$] , the discharge protection is cleared to recount.

7.6 Voltage sag protection

After start the compressor, if the time of DC link Voltage sag [$U_{\text{Sagging protection voltage}}$] is measured to be less than t Voltage sag protection time , the machine should be stop at once, hand on the voltage sag trouble, reboot automatically after 3 minutes.

7.7 Communication fault

When you have not received any correct signal from the inner machine in three minutes, the machine will stop for communication fault. and the machine will stop for communication fault. If the communication is resumed, the machine will be allowed to operate.

7.8 Module protection

Module protection signal is detected immediately when the unit is turned on. Once this signal has been detected, the unit stops operation at once. Only when module protection is resumed and the compressor has stopped for 3min, the complete unit is allowed to resume operation.

If the unit stops operation because of module protection for 6 times, the unit can't resumes automatically. It needs to press ON/OFF button to resume it. If compressor operates more than the clear time of module protection times, the times of stop operation due to module protection will be cleared and it will calculated again.

7.9 Module overheating protection

1. Starting estimation:

After the compressor stopped working for 180s, if T_{Module}<[$T_{\text{Module frequency limited temperature}}$](the temperature of hysteresis is 35.6ºF), the machine is allowed to start, otherwise it should not be started, and should be stopped to treat according to the module overheating protection: 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 [$T_{\text{Limited frequency temperature of module}}$] ≤$T_{\text{Module}}$ <[$T_{\text{frequency reducing temperature at normal speed of module}}$] , you should limit the frequency raising of compressor.

3. Reducing frequency at normal speed:

If [$T_{\text{frequency reducing temperature at normal speed of module}}$] ≤$T_{\text{Module}}$<[$T_{\text{frequency reducing temperature at high speed of module}}$], you should adjust the compressor frequency by reducing 8Hz/90s till the lower limit;

4. Reducing frequency at high speed:

If [$T_{\text{frequency reducing temperature at high speed of module}}$]≤$T_{\text{Module}}$ <[$T_{\text{Power turn-off temperature of module}}$] you should adjust the compressor frequency by reducing 30Hz/90s till the lower limit;

5. Power turn-off:

If the [$T_{\text{Power turn-off temperature of module}}$] ≤$T_{\text{Module}}$, you should stop the machine for module overheating protection; If T_{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).

7.10 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.

7.11 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 [$I_{\text{Limited frequency phase current}}$] ≤ [$I_{\text{Phase Current}}$]<[$I_{\text{Frequency Reducing Phase Current}}$] , you should limit the frequency raising of compressor.

2. Reducing Frequency

If [$I_{\text{Frequency Reducing Phase Current}}$]≤ [$I_{\text{Phase Current}}$]<[$I_{\text{Power Turn-Off Phase Current}}$], 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 [$I_{\text{Phase Current}}$]≥[$I_{\text{Power Turn-Off Phase Current}}$], the compressor phase current shall stop working for overcurrent protection; if [$I_{\text{Phase Current}}$]≤[$I_{\text{Frequency Reducing Phase Current}}$], 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.

7.12 Compressor startup failure protection

Compressor startup failure protection signal is detected immediately when the compressor is turned on. Once this signal has been detected the signal, the unit stops operation at once. Only when compressor startup failure protection is resumed and the compressor has stopped for 3min, the complete unit is allowed to resume operation.

If the unit stops operation because of compressor startup failure protection for 6 times, the unit can’t resumes automatically. It needs to press ON/OFF button to resume it. Compressor operates for 2min or press ON/OFF button can eliminate the startup failure times.

7.13 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.

7.14 DC bus bar voltage abnormality protection

1.It starts to detect the DC bus bar voltage when the compressor is operating. If PFC is not started up and when the bus bar voltage is less than 【$U_{\text{DC—PFC off—Undervoltage protection}}$】 =180V, the undervoltage protection occurs; If PFC is started up and bus bar voltage is less than 【$U_{\text{DC—PFC off—Undervoltage protection}}$】 =200V, the undervoltage protection occurs. At this time of the undervoltage protection, the compressor stops operation and PFC is turned off. Once the compressor has stopped for 3min, the error code will be eliminated.

2. When the compressor is operating and it’s detected that DC bus bar voltage is more than 【$U_{\text{DC—overvoltage protection}}$】 =425V, the overvoltage protection occurs; compressor stops operation and PFC is turned off. Once the compressor has stopped for 3min, the error code will be eliminated.

7.15 Abnormity Protection for Four-way Valve

Under the model of heating operation in good condition: the compressor is detected [$T_{\text{Inner Tube}}$ <($T_{\text{Inner Ring}}$-$T_{\text{Abnormity Temperature Difference For Four-Way Valve Reversion}}$)], during the running, it should be regarded as four-way valve reversion abnormity. And then it can run if stop the reversion abnormity protection for four-way valve 3 min; and if it still can't run when the reversion abnormity 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 dont clear out the failure when it can't recover to operate).

7.16 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 6 times in succession, it is available if presses ON/OFF; and clear the PFC Protection times when start up PFC for 10min.

7.17 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 neednt 5s avoiding the module over-heated).

(c) Detect the sensor failure at all times in the testing mode.

5. Temperature sensor protection treatment:

(1) It indicates the detected temperature for the temperature sensor is too high (or infinite). Display the corresponding temperature sensor fault and stop operation.

(2) When the open-circuit of sensor is detected within 5s, The protection shall be stopped and it shall show the corresponding sensor failure.

7.18 DC fan Protection

1.Fan current detection circuit fault: (the error code is same as that for DC fan fault)

After getting the command for turning on the fan, it will detect the fan current detection circuit fault. Once the fan current detection circuit fault is detected, this fault will be reported at once. It can't be resumed automatically. It can be eliminated only after power failure and then energization again.

2.When fan startup is failed or it has detected overcurrent protection condition or desynchronizing circumstances during the operation process, the fan stops operation. The counter counts for once. 5s later, if the command for turning on the fan still exists, it controls the operation of fan again. When it occurs for 6 times (when the fan operates for 5min, the times will be eliminated), if the fan can't be started up, it will report the fan fault. All loads will stop operation. Once the fan fault has occurs for 6 times, the fault can't be resumed and indoor unit display the error code. Turn off the unit and then turn on the unit again can eliminate the protection. When compressor's operation time exceeds the time for clearing the fan protection times, the unit stops operation because of fan fault protection and the times will be eliminated.

8 Outdoor indicator display

After energization, it flashes (off 0.2s~0.3s) when the communication is normal; it's always on when there's no communication. When there's fault for other outdoor units, it will be OFF 1s and ON 1s circularly.

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 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 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. If power cord is broken, please get the specialized power cord from the manufacture or distributor.
9. If the power cord is not long enough, please get the specialized power cord from the manufacture or distributor. Prohibit prolong the wire by yourself.
10. Make sure all wires and pipes are connected proprly.
11. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.
12. 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.
13. 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 unit, a suffi-cient fixing bolt must be installed; make sure the installation support is firm.
4. Ware safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

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

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

Safety Precautions for Refrigerant

• To realize the function of the air conditioner unit, a special refrigerant circulates in the system. The used refrigerant is the fluoride R32, which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can lead to explosion under certain conditions. But the flammability of the refrigerant is very low. It can be ignited only by fire.

• Compared to common refrigerants, R32 is a nonpolluting refrigerant with no harm to the ozonosphere. The influence upon the greenhouse effect is also lower. R32 has got very good thermodynamic features which lead to a really high energy efficiency. The units there fore need a less filling.

WARNING:

•Appliance filled with flammable gas R32

•Appliance shall be installed,operated and stored in a room with a floor area larger than 4m^2.

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

•The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.

•The appliance shall be stored so as to prevent mechanical damage from occurring.

•Ducts connected to an appliance shall not contain an ignition source.

•Keep any required ventilation openings clear of obstruction.

•Do not pierce or burn.

•Be aware that refrigerants may not contain an odour.

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

•Servicing shall be performed only as recommended by the manufacturer.

•Should repair be necessary,contact your nearest authorized

•Service Centre. Any repairs carried out by unqualified personnel may be dangerous.

•Compliance with national gas regulations shall be observed.

Read specialist's manual.

Safety Operation of Flammable Refrigerant

Aptitude requirement for maintenance man(repairs should be done only be specialists).

•Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority,which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.

•Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants

Safety preparation work

1. The air conditioner is not allowed to use in a room that has running fire (such as fire source, working coal gas ware, operating heater).

2. The air conditioner must be installed in a room that is larger than the minimum room area. The minimum room area is shown on the nameplate.

3. Leak test is a must after installation.

• Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

• Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

• General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

• Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.

• Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a

dry powder or CO_2 fire extinguisher adjacent to the charging area.

● No ignition sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

● Ventilated area

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

● Checks to the refrigeration equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

– the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;

– the ventilation machinery and outlets are operating adequately and are not obstructed;

– if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

– marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

– refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

● Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

• that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

• that no live electrical components and wiring are exposed while charging, recovering or purging the system;

• that there is continuity of earth bonding.

Repairs to sealed components

● During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

● Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

NOTE: The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

Cabling

Check that cabling will not be subject to wear, corrosion,

excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

NOTE: Examples of leak detection fluids are

– bubble method,

– fluorescent method agents.

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

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Clause Removal and evacuation.

Removal and evacuation

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

- remove refrigerant;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- purge with inert gas (optional for A2L);
- open the circuit by cutting or brazing.

The REFRIGERANT CHARGE shall be recovered into the correct recovery cylinders. For appliances containing FLAMMABLE REFRIGERANTS other than A2L REFRIGERANTS, the system shall be purged with oxygen-free nitrogen to render the appliance safe for FLAMMABLE REFRIGERANTS. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing FLAMMABLE REFRIGERANTS, other than A2L REFRIGERANTS, REFRIGERANTS purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any POTENTIAL IGNITION SOURCES and that ventilation is available.

Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment.

Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.

- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

• mechanical handling equipment is available, if required, for handling refrigerant cylinders;

• all personal protective equipment is available and being used correctly;

• the recovery process is supervised at all times by a competent person;

• recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with instructions.

h) Do not overfill cylinders (no more than 80 % volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

8. Installation

Main Tools for Installation and Maintenance

Electroprobe

Screw driver

Open-end wrench

Inner hexagon spanner

Universal meter

Vacuum pump

Pressure meter

Electronic leakage detector

Soldering appliance

Refrigerant container

Proper installation is the responsibility of the installer.

Product failure due to improper installation is not covered under the Warranty.

CHASSIS INSTALLATION

Units are shipped without a sleeve.In applications where unit is a replacement,it is recommended that a ACiQ,GE or FRIEDRICH sleeve be used.

These units can retrofit General Electric, Friedrich sleeves/grilles (be sure outdoor grille is installed on the sleeve).See Table 3 for details.

For any sleeve retrofit applications,be sure that the foam seals (factory-installed on the tube sheets) provide a good seal between the grille and outdoor coil tube sheets. These foam seals provide a barrier to separate outdoor coil leaving air from mixing with the outdoor incoming air (known as air recirculation).

Table 3—Retrofit Wall Sleeves

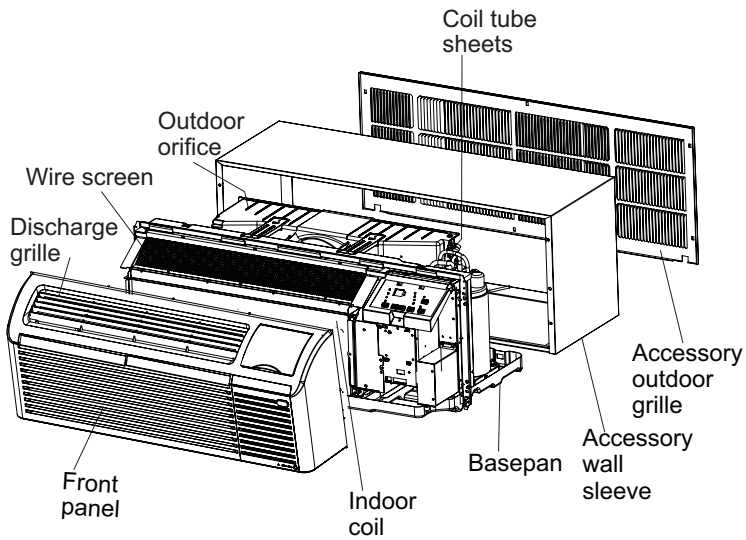
Assembly	Manufacturer	Model Designation	Overal Size
WALL SLEEVE	ACiQ	TL10500030，TL12500210 01431395	16x42x13.75inch
WALL SLEEVE	GE	RAB71A	16x42x13.75inch
WALL SLEEVE	FRIEDRICH	PDXWS	16x42x13.75inch
rear grille	ACiQ	01471013，TL12500180	16x42 inch
rear grille	GE	RAG60	16x42 inch

CAUTION

UNIT DAMAGE AND/OR OPERATION HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

For retrofit applications, foam seals on outdoor coil tube sheets must make a seal between the coil and the grille or loss of performance and premature damage to the major components can result.



RETRO FIT SLEEVE PREPARATION

IMPORTANT:Inspect wall sleeve thoroughly prior to installation. Manufacturer does not assume responsibility for costs or damages due to defects in sleeve or for improper installation.

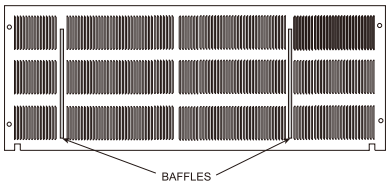
Warnings

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

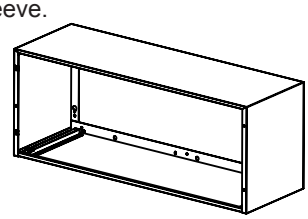
Disconnect all power to unit to avoid possible electrical shock during installation.

Remove any existing foam baffles that are installed on competitive outdoor grille,if present.

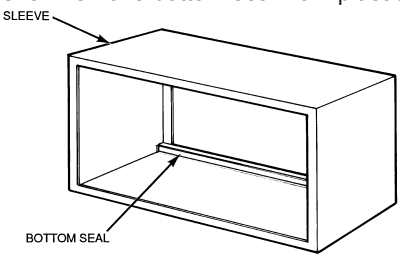


GE Sleeves Only

GE Metal Wall Sleeve-GE metal sleeve is interchangeable with ACiQ wall sleeve.

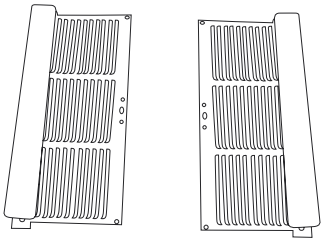


GE Plastic Sleeve--Remove bottom seal from plastic sleeve.



INSTALLATION OF A ACiQ OR CARRIER WALL SLEEVE USING A NON-GE GRILLE

This application has become more common due to pre-manufactured windows with built-in grilles or renovations where a ACiQ or Carrier sleeve is used with an existing non-GE grille. Use of a ACiQ or Carrier wall sleeve with a non-GE grille requires installation of an Accessory Baffle Kit,which ensures a good seal between the unit and exterior grille to prevent air recirculation. Air recirculation is a large contributor to performance loss and premature damage to major components.



Note: contact your units supplier to get the kit and it may be different from the shape showed above.

INSTALL UNIT INTO WALL SLEEVE

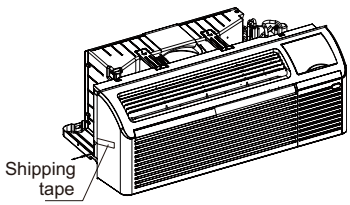
CAUTION

UNIT DAMAGE HAZARD

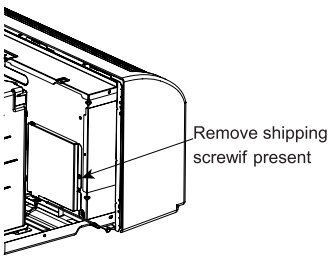
Failure to follow this caution may result in equipment damage or improper operation.

Failure to remove shipping tape and screw will prevent fresh air vent door from opening and may result in damage to vent door cable

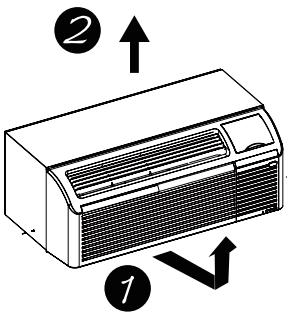
1.Carefully remove shipping tape from the front panel and vent door.



2.Remove shipping screw from the vent door,if present.



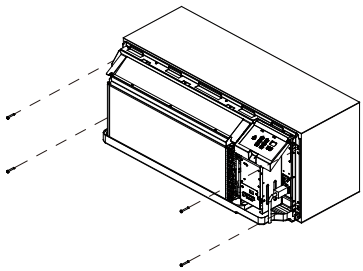
3.Remove front panel.



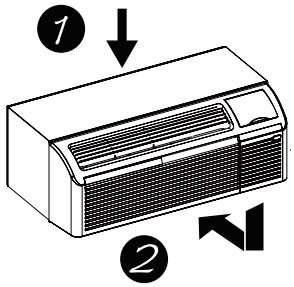
Pull out at the bottom to release it from the tabs(1).Then lift up (2).

4.Lift unit level and slide unit into wall sleeve until foam seal rests firmly against front of wall sleeve.

5.Secure with four screws (supplied) through the unit flange holes.



6.Reinstall front panel.



Place tabs over top rail(1). Push Inward at bottom until panel snaps into place(2).

9. Maintenance

9.1 Error Code

Display method of indoor unit			Malfunction name	AC status	Possible causes
Error code	Indicator display				
	Status LED	Heat indicator			
E6			Communication error of indoor and outdoor unit	Cool, fan and dry: compressor and outdoor unit stops operation, while the indoor fan operates. Heating: all loads stop operation.	1. The connection wire of indoor and outdoor unit is poor; 2. Wiring inside the unit is abnormal and damaged; 3. Communication circuit of control panel of indoor or outdoor unit is abnormal;
EE			Malfunction of EEPROM	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	Main board of outdoor unit is damaged.
F1	Flash 1 times		Indoor ambient temperature sensor is short-circuited	Cool, fan and dry: compressor and outdoor fan stops operation, while indoor fan operates; Heating: All loads stop.	1. Temperature sensor is not well connected; 2. The connection wire is short circuit or open circuit, and the temperature sensor is damaged. (refer to “Table 1”)
F2	Flash 2 times		Indoor tube temperature sensor is short-circuited	Cool, fan and dry: compressor and outdoor fan stops operation, while indoor fan operates; Heating: All loads stop.	1. Temperature sensor is not well connected; 2. The connection wire is short circuit or open circuit, and the temperature sensor is damaged. (refer to “Table 2”)
F3			Outdoor ambient temperature sensor is short-circuited	Cool, fan and dry: compressor and outdoor fan stops operation, while indoor fan operates; Heating: All loads stop.	1. Temperature sensor is not well connected; 2. The connection wire is short circuit or open circuit, and the temperature sensor is damaged. (refer to “Table 1”)
F4	Flash 4 times		Outdoor tube temperature sensor is short-circuited	Cool, fan and dry: compressor and outdoor fan stops operation, while indoor fan operates; Heating: All loads stop.	1. Temperature sensor is not well connected; 2. The connection wire is short circuit or open circuit, and the temperature sensor is damaged. (refer to “Table 2”)
F5			Outdoor air discharge temperature is open/ short-circuited	Complete unit stops operation; motor of sliding door is cut off power.	1. The exhaust temperature sensor is not connected well or damaged. (rrefer to “Table 3”) 2.Temperature sensor wire of outdoor unit is damaged; short circuit between the temperature sensor and copper pipe or outer case 3.Main board of outdoor unit is damaged;
H6			No feedback from indoor unit’s motor	The complete unit stops operation	1. Is the fan blocked? 2. Is the motor terminal loose? 3. Is the connection wire of motor damaged? 4. Is the motor damaged? 5. Is the main board of indoor unit damaged?
PU			Charging malfunction of capacitor	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	Refer to Procedure of Troubleshooting
U1			Phase current detection circuit malfunction of	Cool: compressor and outdoor fan stops operation, while indoor fan operates; Heat: compressor, outdoor fan and indoor fan stops operation.	The control board is damaged

Display method of indoor unit			Malfunction name	AC status	Possible causes
Error code	Indicator display				
	Status LED	Heat indicator			
L3			Malfunction of outdoor fan/malfunction of DC motor	Cool/Dry: all loads stops operation except indoor fan. Heat: all loads stops operation.	1. Outdoor condenser, air inlet and air outlet are blocked by filth or dirt; 2. Fan is blocked or loosened; 3. Motor or connection wire of motor is damaged; 4. Main board of outdoor unit is damaged;
A2			Compressor is bonded with the relay of electrical heater	Other loads stop operation, while the indoor unit operates.	Relay adhesion; Refer to Procedure of Troubleshooting
FJ			Temperature sensor of air outlet is short-circuited	Cool, fan and dry: compressor and outdoor fan stops operation, while indoor fan operates; Heating: All loads stop.	1. Temperature sensor is not well connected; 2. The connection wire is short circuit or open circuit, and the temperature sensor is damaged. (refer to “Table 1”)
E4			High discharge temperature protection of compressor	Cool/Dry: compressor and outdoor fan stops operation, while indoor fan operates; Heat: all loads stops operation.	Refer to Procedure of Troubleshooting
E5			Compressor overload protection	Compressor, electrical heater and outdoor fan stops operation, while indoor fan operates.	1. Voltage of unit operation is too low; 2. Start-up current of compressor is too high; 3. Compressor is blocked;
H3			Compressor is overloaded	Cool and dry: compressor and outdoor fan stops operation, while indoor fan operates;	1. Heat exchanger is too dirty/blocks the air inlet/outlet; 2. The rotate speed of fan is abnormal, rotate speed is too low or the fan is not functioning; 3. Compressor operation is abnormal; 4. The internal system is blocked; 5. Refrigerant leakage, resulting in overheating protection of compressor; 6. Applied in poor condition of high temperature and high humidity. Refer to Procedure of Troubleshooting
H5			IPM protection	Cool/Dry: compressor stops operation, while indoor fan operates. Heat: all loads stops operation.	Refer to Procedure of Troubleshooting
H7			Desynchronizing of compressor	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	Refer to Procedure of Troubleshooting
HC			PFC protection	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	1. The power grid quality is bad; AC input voltage fluctuates sharply; 2. Power plug of air conditioner or wiring board or reactor is not connected reliably; 3. Indoor and outdoor heat exchanger is too dirty, or air inlet/outlet is blocked; 4. Main board of outdoor unit is damaged.
Lc			Start-up failed	Cool/Dry: compressor stops, while indoor fan operates; Heat: all loads stops operation.	Refer to Procedure of Troubleshooting

Display method of indoor unit			Malfunction name	AC status	Possible causes
Error code	Indicator display				
	Status LED	Heat indicator			
Ld			Lost phase	Cool: compressor and outdoor fan stop operation; Heat: compressor and outdoor fan stop operation at first; about 1min later, indoor fan stops operation.	1. The main board of outdoor unit is damaged; 2. The compressor is damaged; 3. The connection wire of compressor is not connected well.
PH		Flash 11 times	DC bus voltage is too high	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	1. Measure the voltage between position L and position N on the wiring board (XT). If it's higher than 265 VAC, please turn on the unit until the power voltage is decreased to the normal range; 2. If the AC input is normal, please replace the outdoor control board.
PL			Low voltage protection	All loads stop operation	1. Voltage of the unit is less than 184V; 2. The detected circuit is damaged.
E8			Overload	Cool and dry: compressor and outdoor fan stops operation, while indoor fan operates;	1. Operation environment is bad; (Applied in poor condition of high temperature and high humidity) 2. Heat exchanger is too dirty/blocks the air inlet/outlet; 3. The rotate speed of fan is abnormal, rotate speed is too low or the fan is not functioning; 4. Compressor operation is abnormal; 5. The internal system is blocked; 6. If the outer tube temperature sensor on main board normal. Refer to Procedure of Troubleshooting
		Flash 10S Destroy 0.5S	Defrosting protection	Under heating mode, the unit will stop operation, while the compressor will operate normally	Not error code, it is the status code in cooling process
	Flash 9 times		Wrong hint on wired controller wiring	The unit will judge operation according to the signal of wired controller	Wired controller wiring is wrong
U7			4-way valve is abnormal	This malfunction occurs when the unit is heating. All loads stops operation.	1. Power voltage is lower than AC175V; 2. Wiring terminal of 4-way valve is loose or broken;3. 4-way valve is damaged. Replace the 4-way valve.

9.2 Procedure of Troubleshooting

1. Communication malfunction E6

1.1 Communication error of indoor and outdoor unit

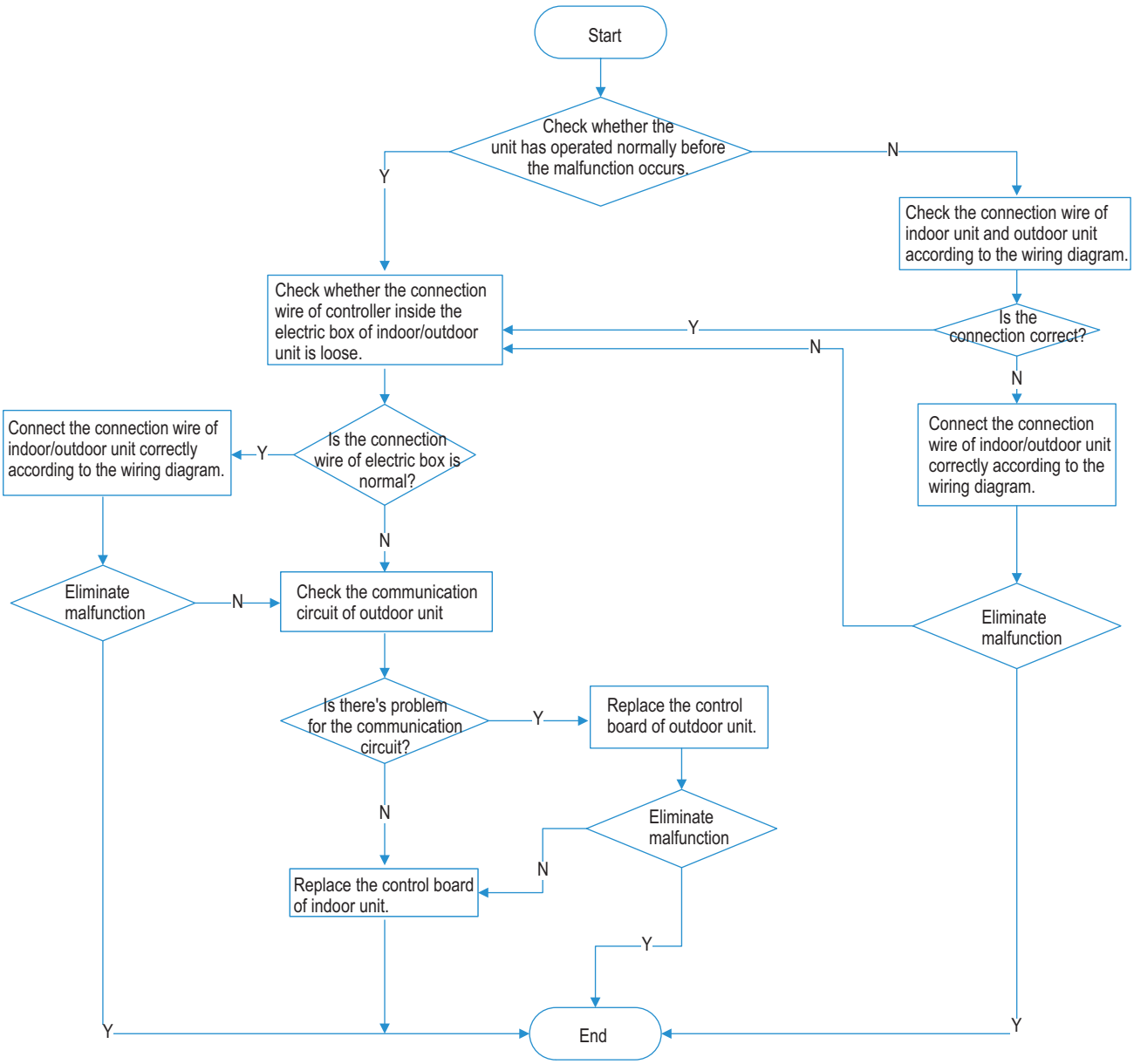
Main check points:

(1) Connection wire between indoor unit and outdoor unit

(2) Wiring inside the unit

(3) Communication circuit of control board of indoor unit

(4) Communication circuit of control board of outdoor unit

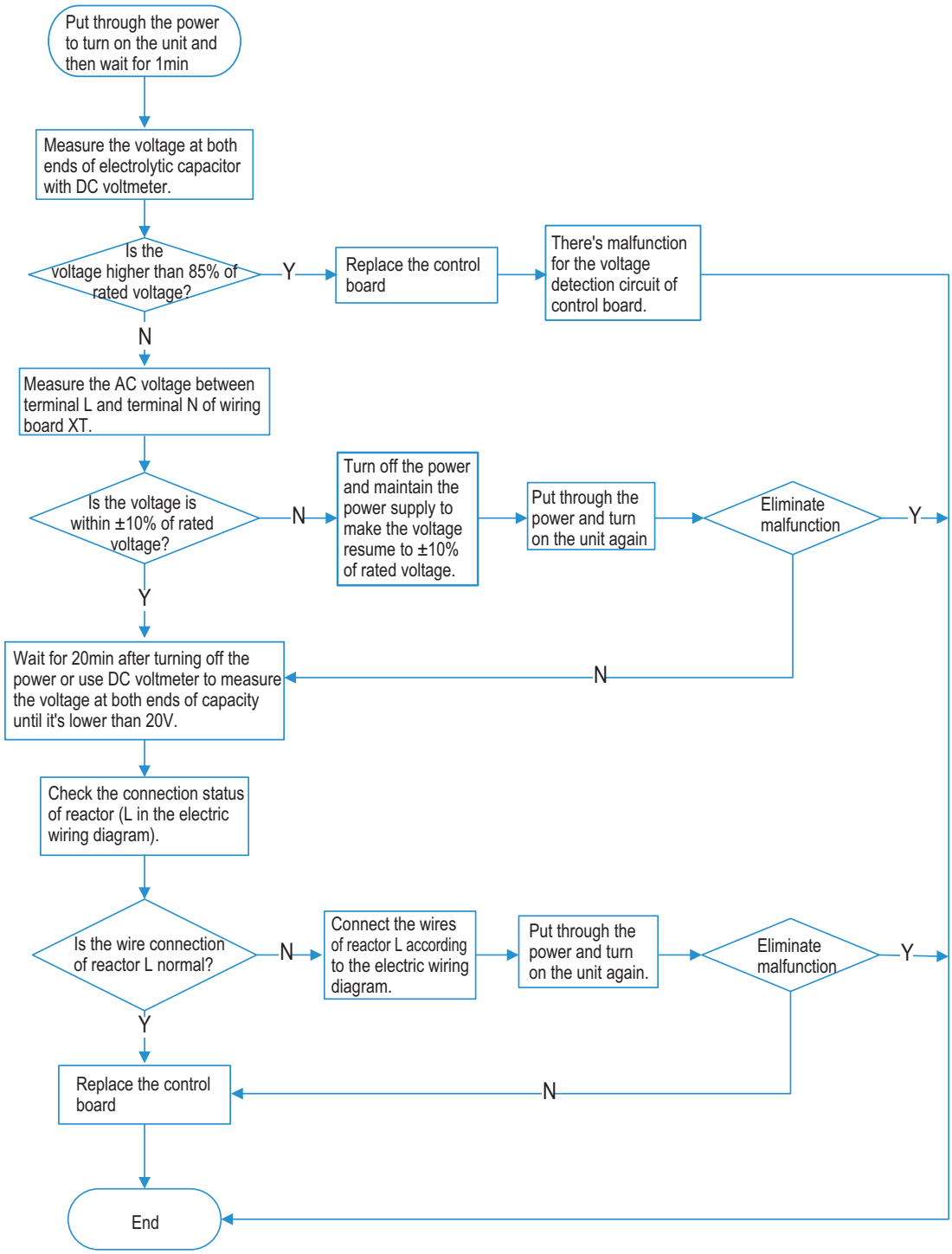


2. Charging malfunction of capacitor PU

Main check points:

(1) wiring board XT (2) reactor

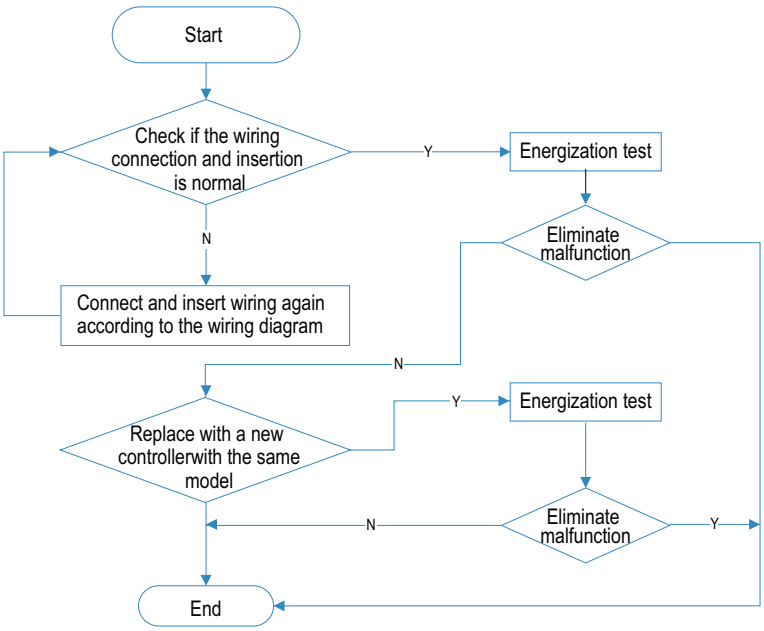
NOTE:The control board as below means the control board of outdoor unit.



3. Relay adhesion error A2

Main check points:

(1) wiring diagram (2) main board

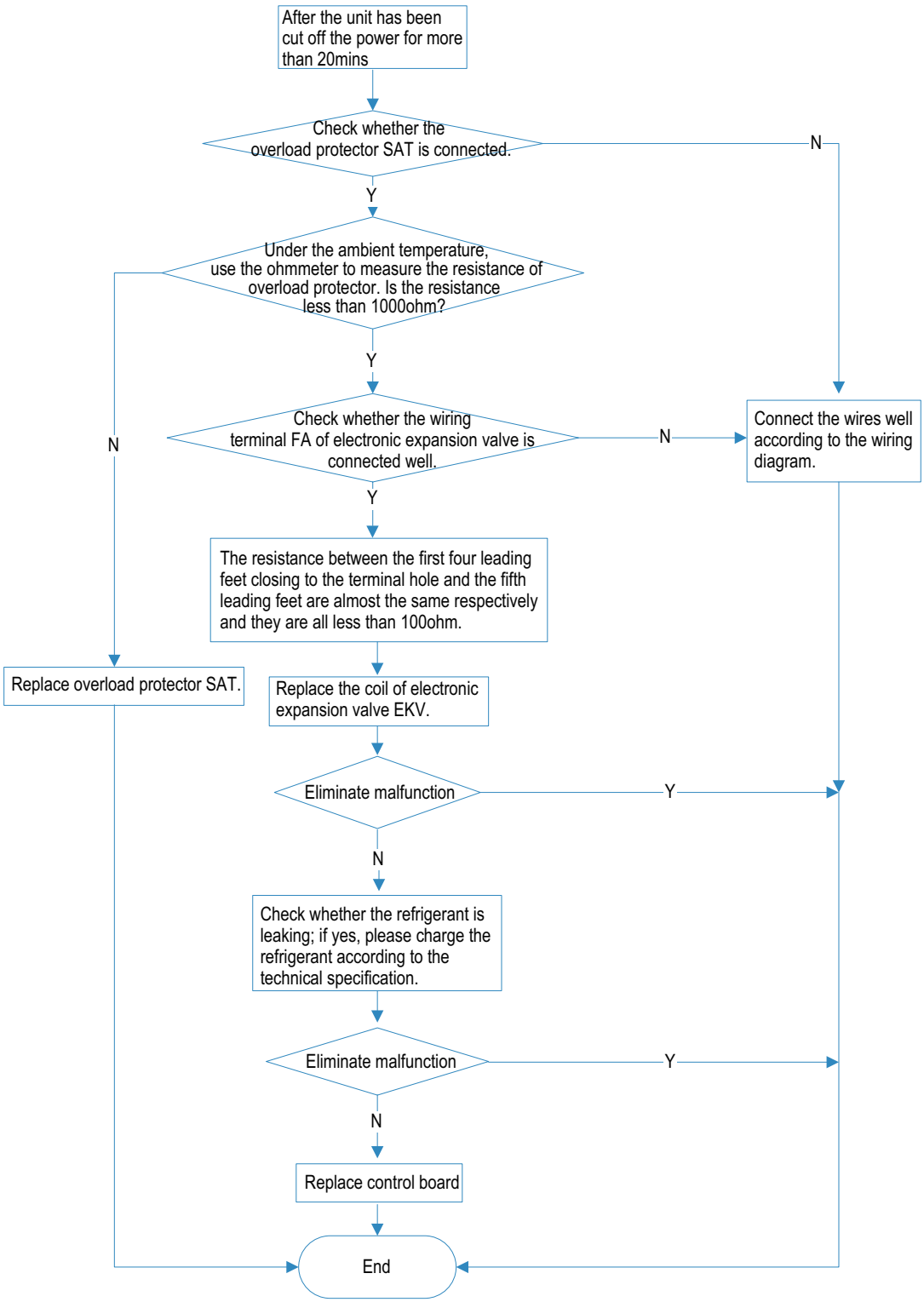


4. Overload protection of compressor H3, high discharge temperature protection of compressor E4

Main check points:

(1) electronic expansion valve (2) expansion valve terminal

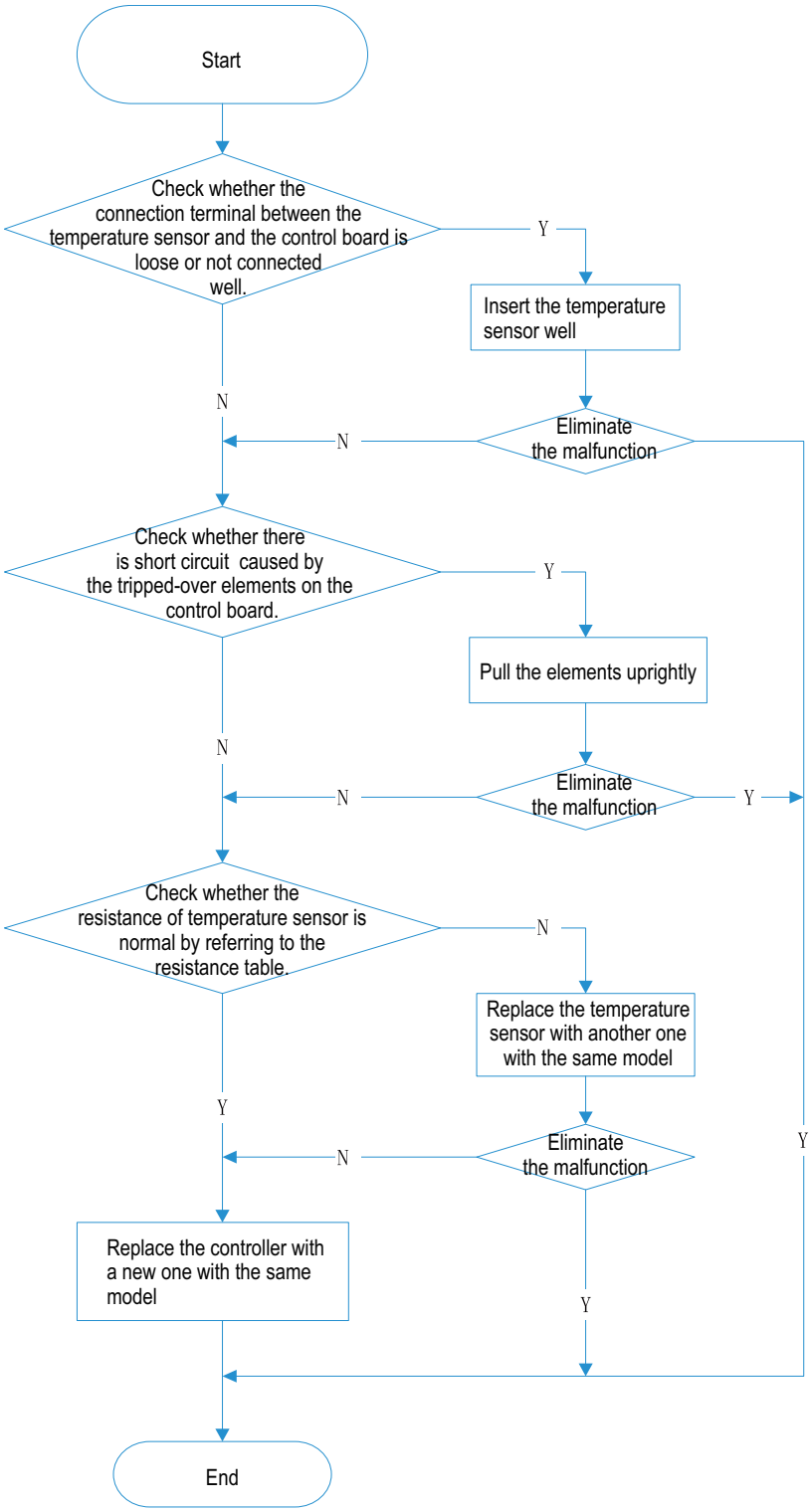
(3) charging amount of refrigerant (4) overload protector



5. Troubleshooting for temperature sensor F 1, F2, F3, F4, F5

Main check points:

(1) connection terminal (2) temperature sensor (3) main board

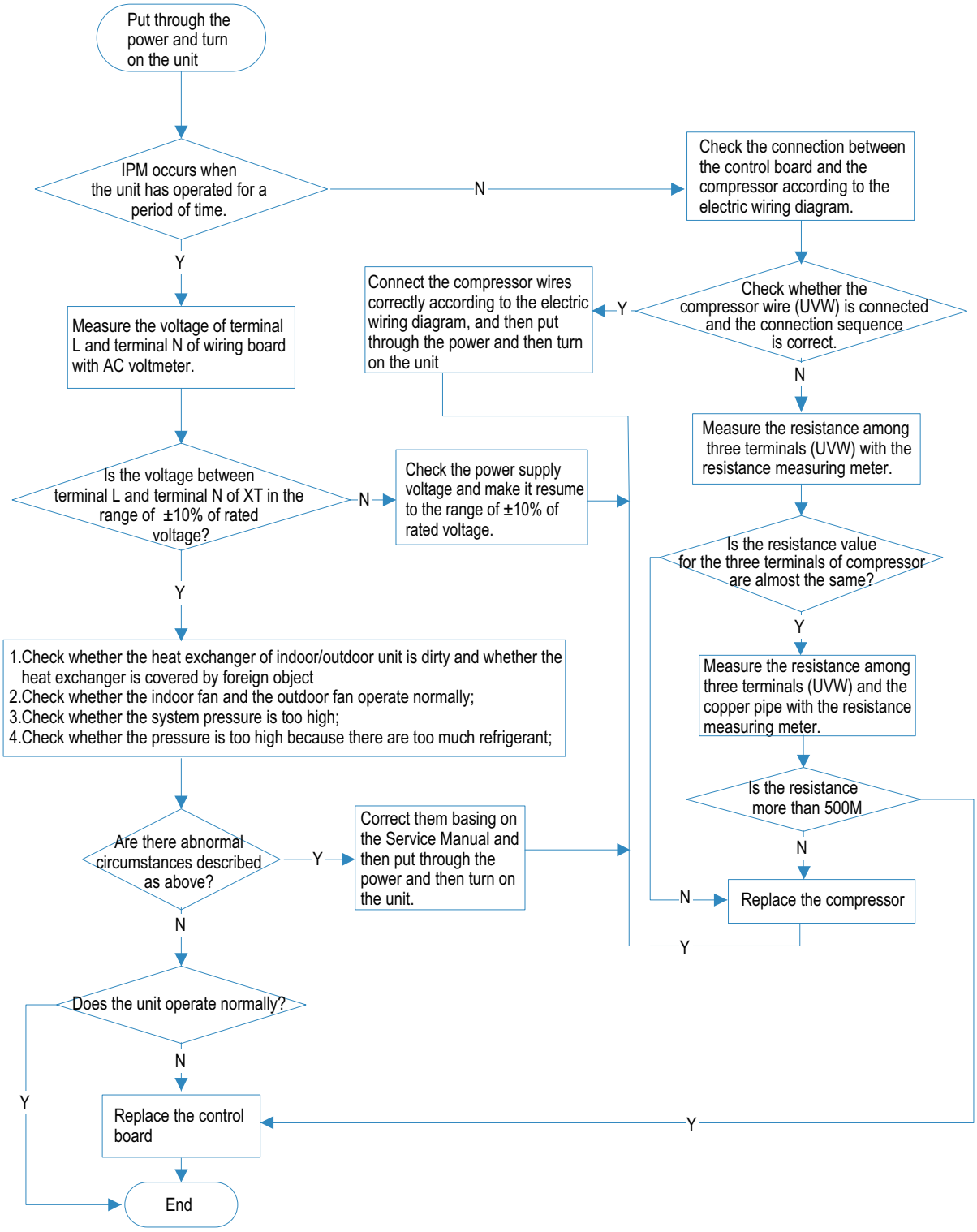


6. IPM protection H5

Main check points:

(1) compressor COMP terminal (2) power supply voltage (3) compressor

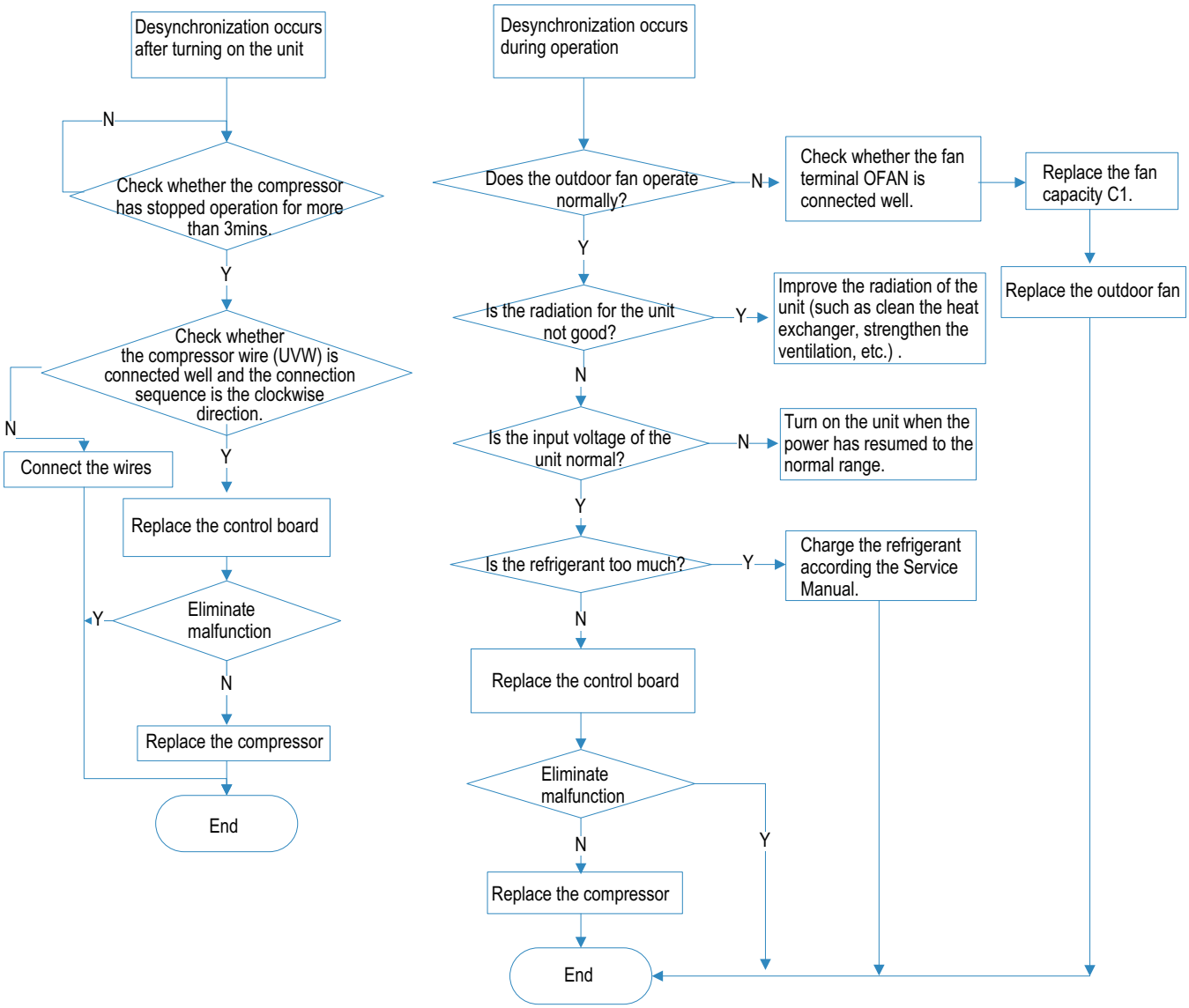
(4) charging amount of refrigerant (5) air inlet and air outlet of indoor/outdoor unit



7. Desynchronization diagnosis for compressor H7

Main check point:

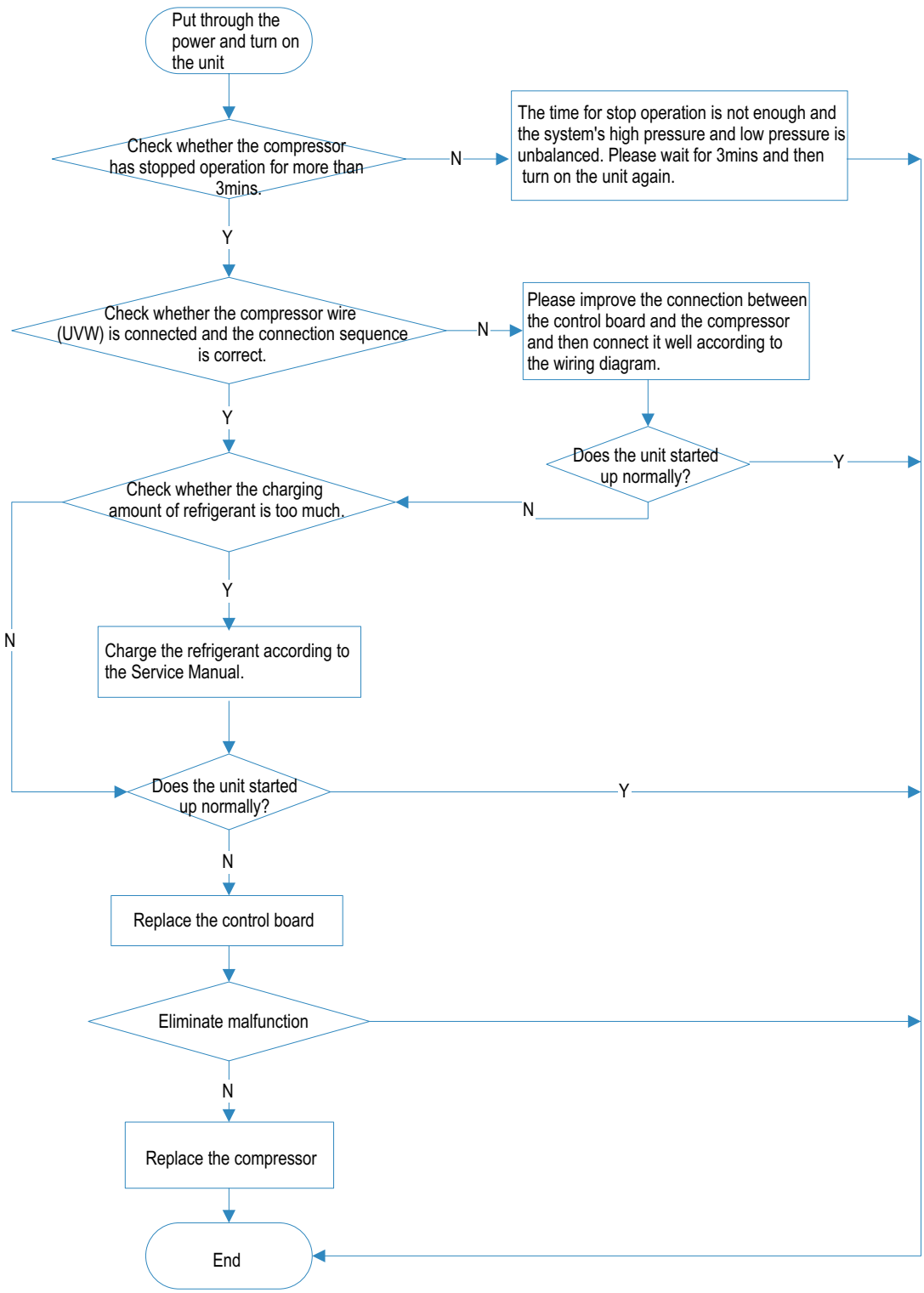
(1) system pressure (2) power supply voltage



8. Malfunction diagnosis for failure startup Lc

Main check points:

(1) compressor wire (2) compressor (3) charging amount of refrigerant

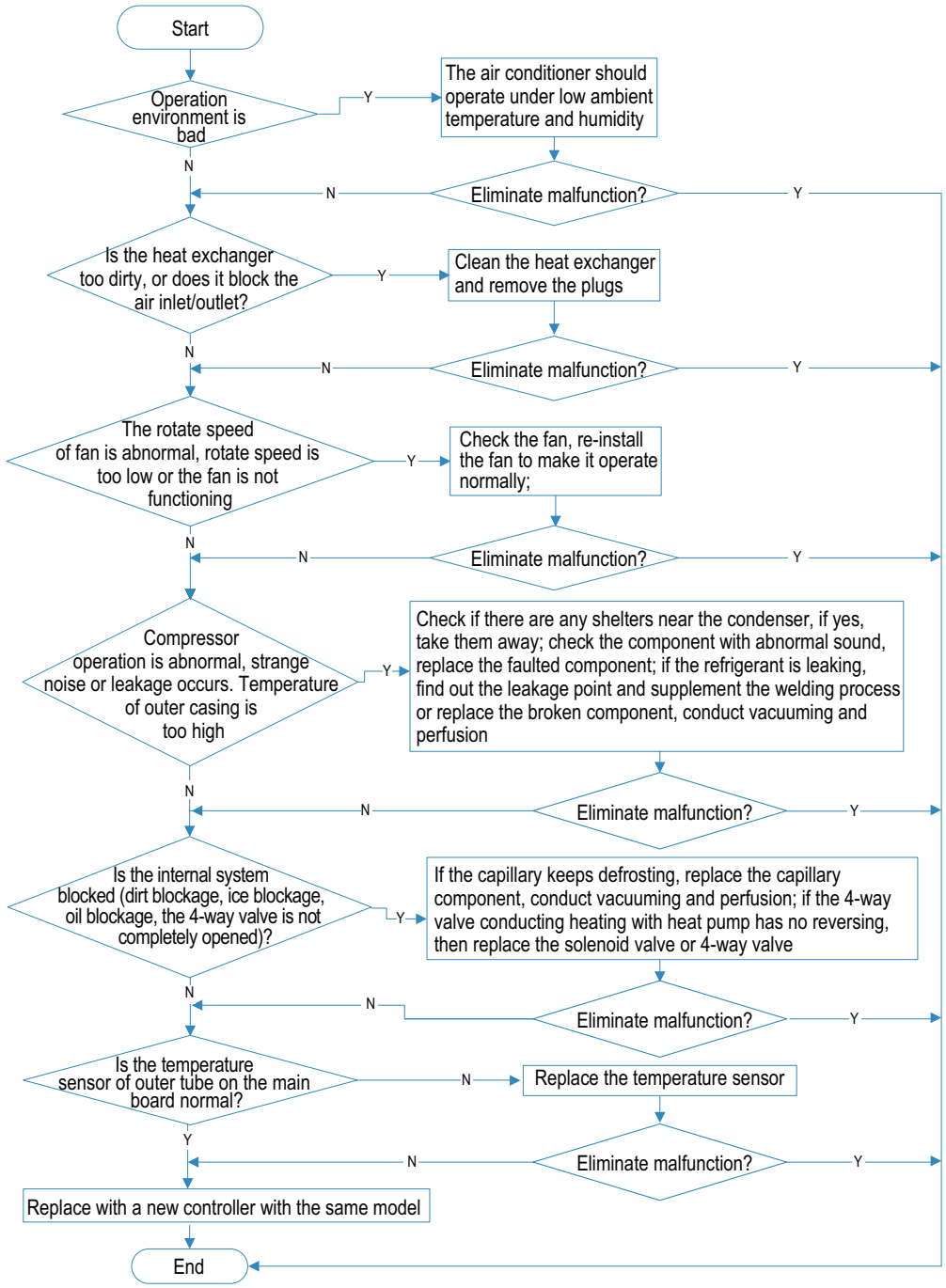


9. Overload E8

Main check points:

(1) compressor (2) refrigerant (3) air inlet/outlet, heat exchanger and internal system is dirty and blocked

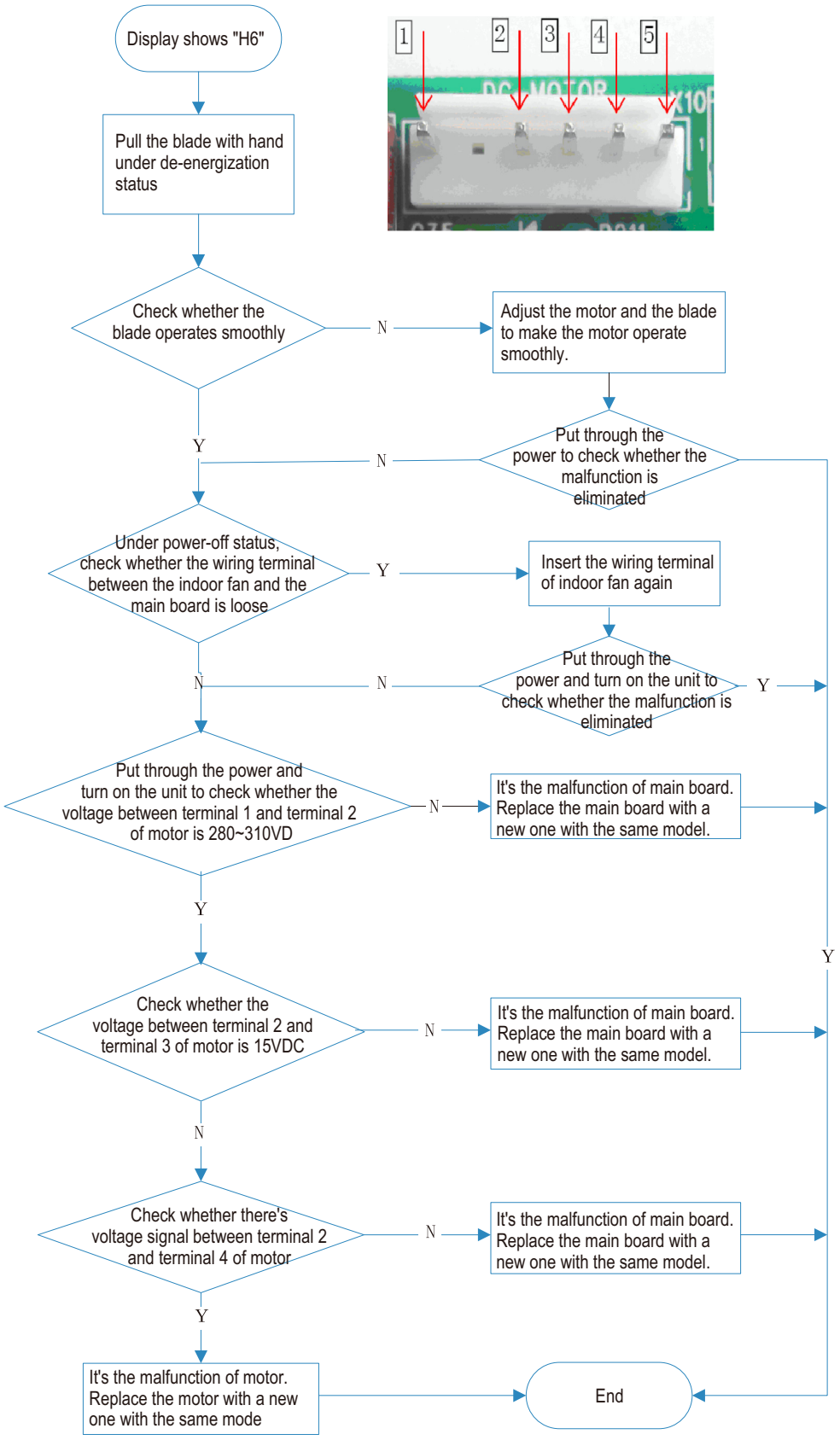
(4) fan (5) operation environment



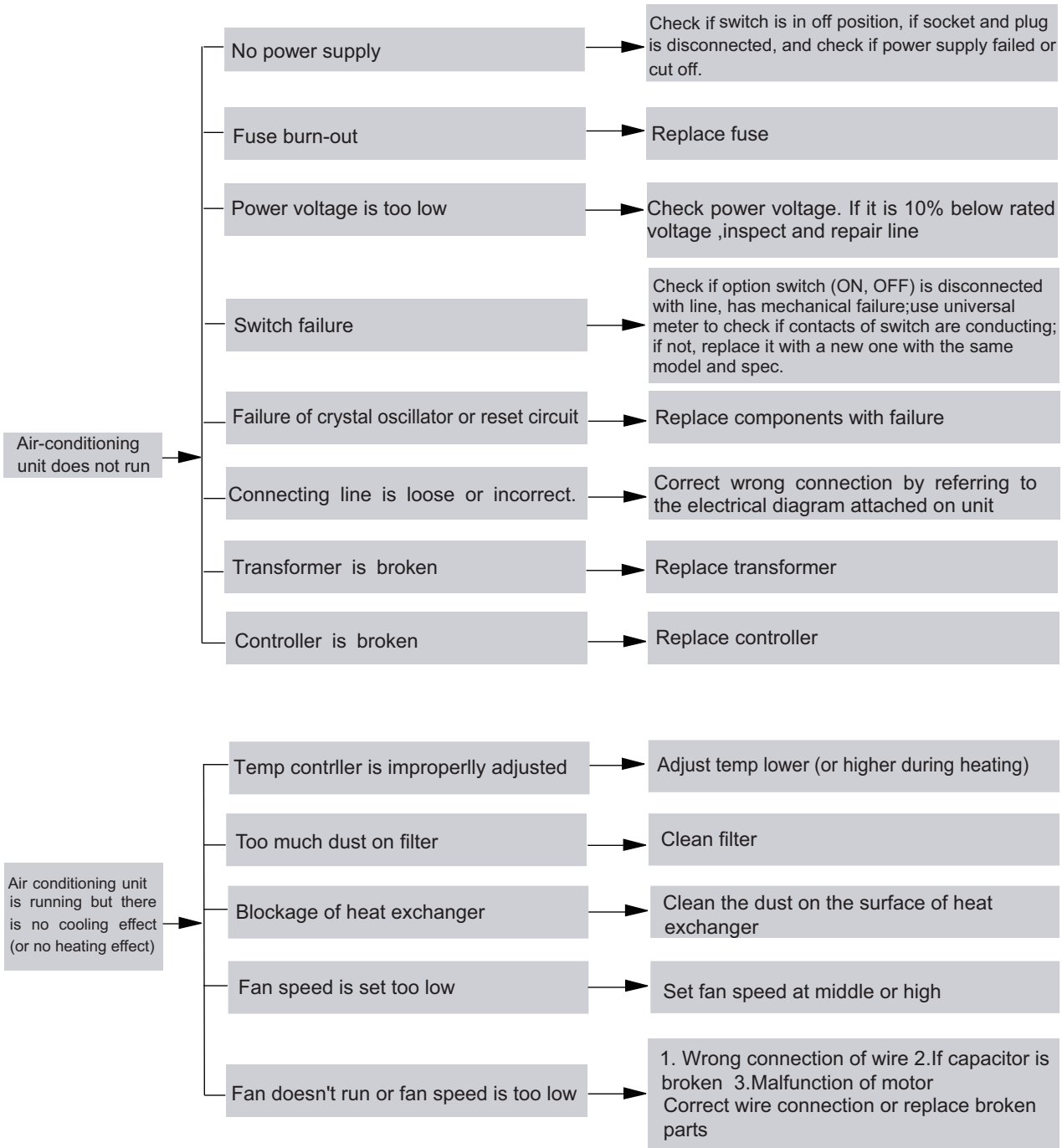
10. Troubleshooting-motor(indoor fan) doesn't operate H6

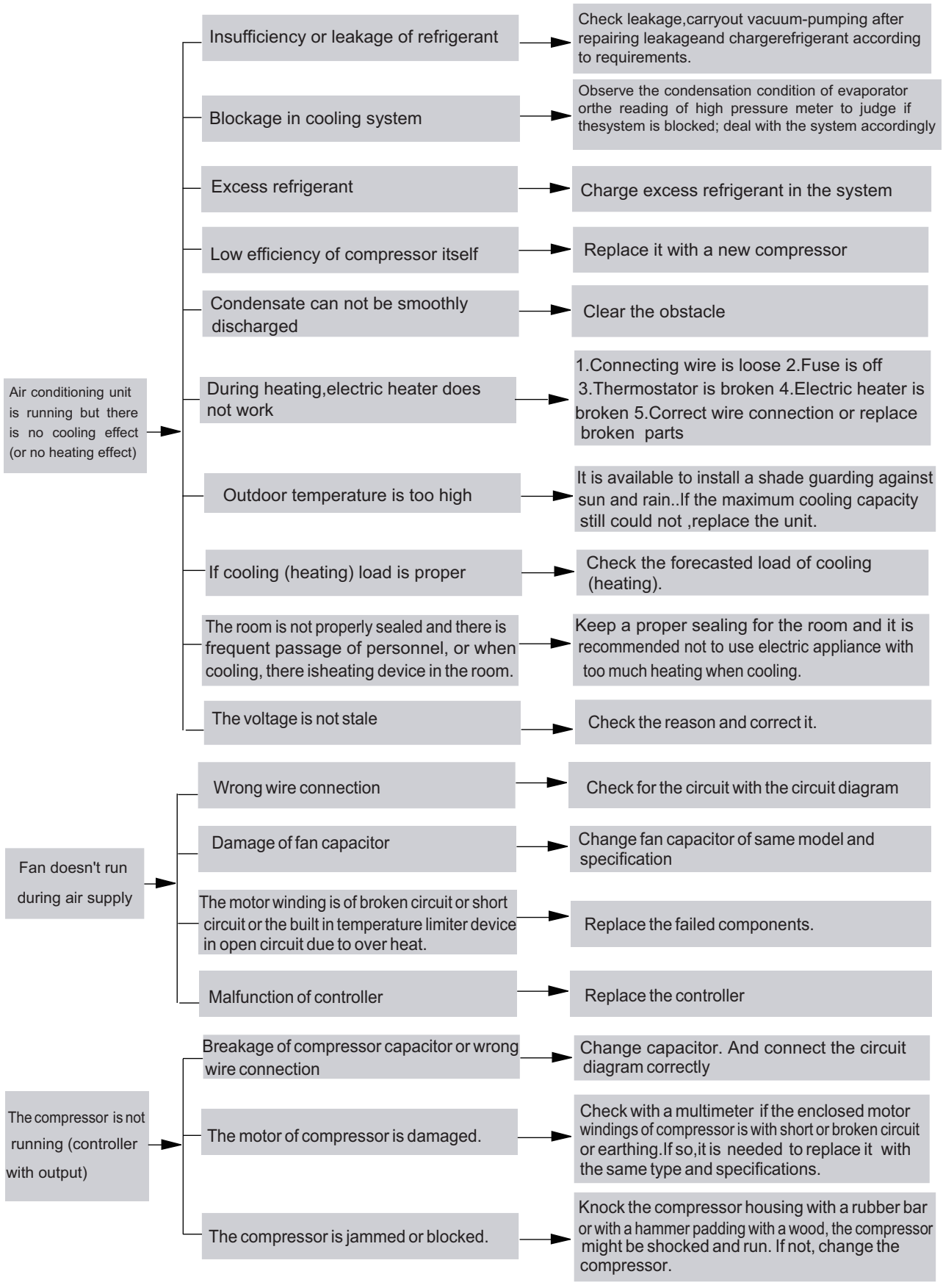
Main check points:

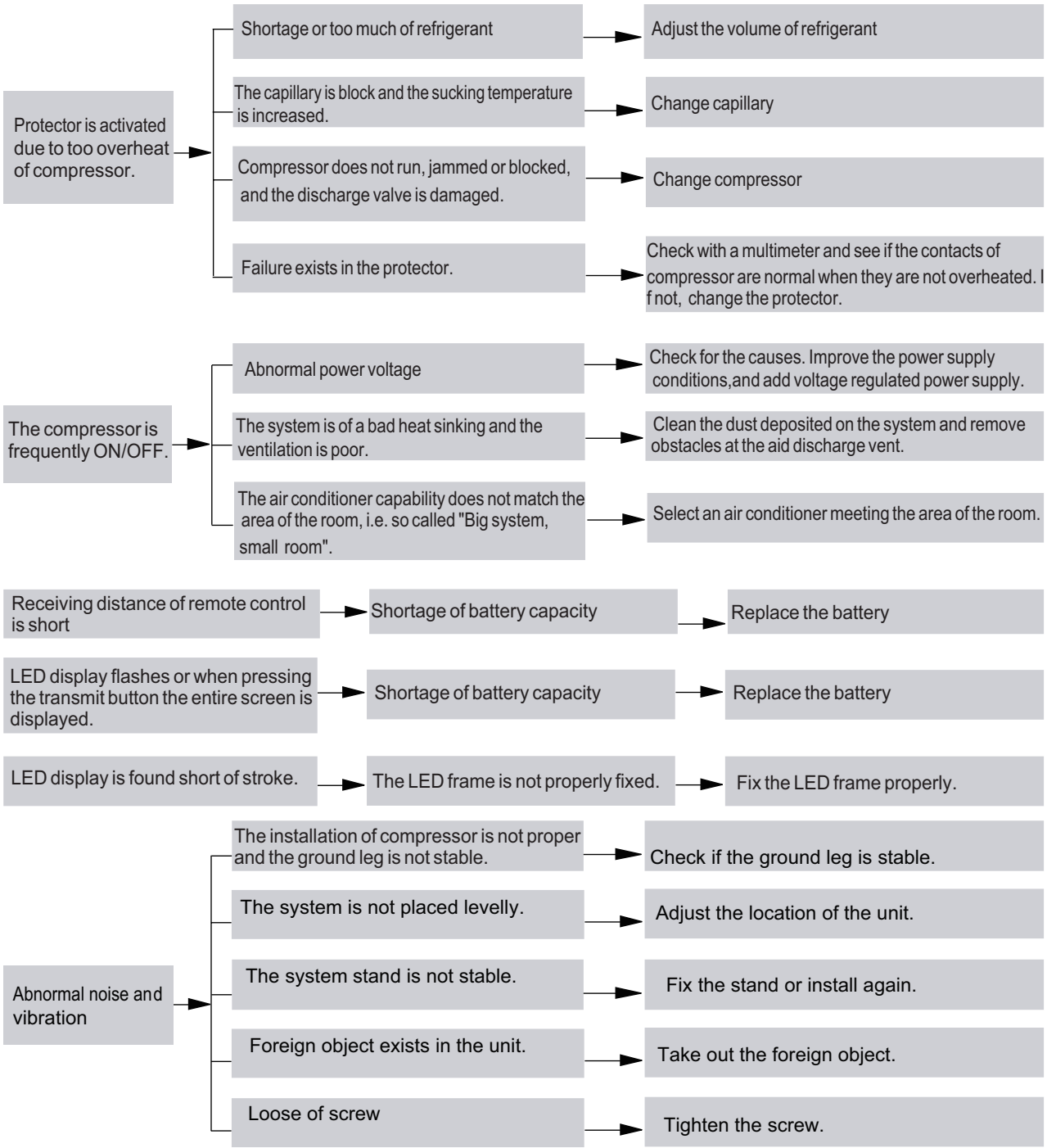
(1) connection terminal (2) motor (3) control board AP1 of indoor unit (4) blade



9.3 Malfunction Analysis




Air conditioning unit is running but there is no cooling effect (or no heating effect)
Insufficiency or leakage of refrigerant
Check leakage,carryout vacuum-pumping after repairing leakageand chargerefrigerant according to requirements.
Blockage in cooling system
Observe the condensation condition of evaporator orthe reading of high pressure meter to judge if thesystem is blocked; deal with the system accordingly
Excess refrigerant
Charge excess refrigerant in the system
Low efficiency of compressor itself
Replace it with a new compressor
Condensate can not be smoothly discharged
Clear the obstacle
During heating,electric heater does not work
1.Connecting wire is loose 2.Fuse is off 3.Thermostator is broken 4.Electric heater is broken 5.Correct wire connection or replace broken parts
Outdoor temperature is too high
It is available to install a shade guarding against sun and rain..If the maximum cooling capacity still could not ,replace the unit.
If cooling (heating) load is proper
Check the forecasted load of cooling (heating).
The room is not properly sealed and there is frequent passage of personnel, or when cooling, there isheating device in the room.
Keep a proper sealing for the room and it is recommended not to use electric appliance with too much heating when cooling.
The voltage is not stale
Check the reason and correct it.
Fan doesn't run during air supply
Wrong wire connection
Check for the circuit with the circuit diagram
Damage of fan capacitor
Change fan capacitor of same model and specification
The motor winding is of broken circuit or short circuit or the built in temperature limiter device in open circuit due to over heat.
Replace the failed components.
Malfunction of controller
Replace the controller
The compressor is not running (controller with output)
Breakage of compressor capacitor or wrong wire connection
Change capacitor. And connect the circuit diagram correctly
The motor of compressor is damaged.
Check with a multimeter if the enclosed motor windings of compressor is with short or broken circuit or earthing.If so,it is needed to replace it with the same type and specifications.
The compressor is jammed or blocked.
Knock the compressor housing with a rubber bar or with a hammer padding with a wood, the compressor might be shocked and run. If not, change the compressor.



Notice: The above malfunction analysis is only for reference. There is no malfunction related to heaitng for cooling only unit.

9.4 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 its 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; Units 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 pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

3. Horizontal Louver can't Swing

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

4. ODU Fan Motor can't Operate

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

5. Compressor can't Operate

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

6. Air Conditioner is Leaking

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

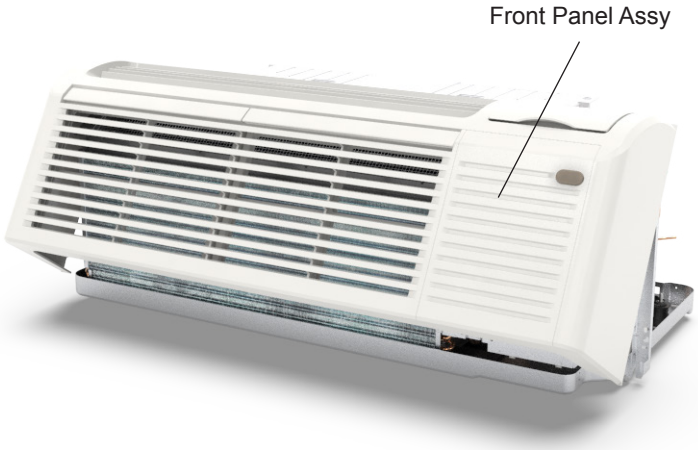
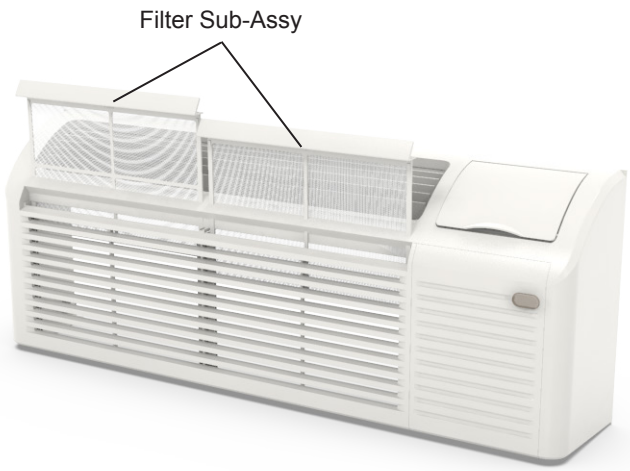
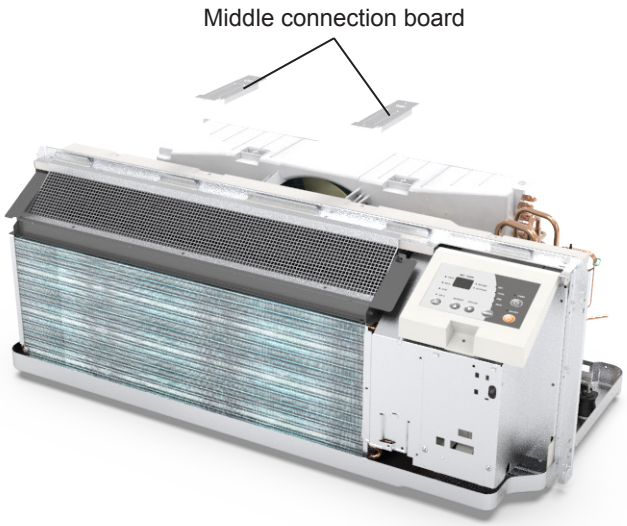
7. Abnormal Sound and Vibration

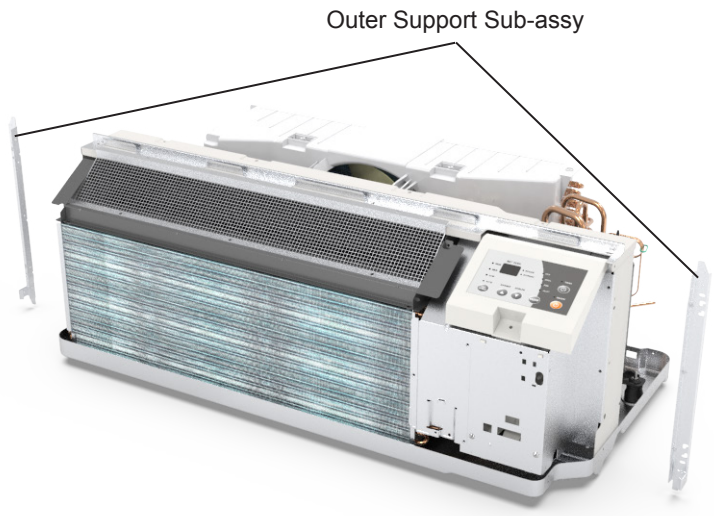
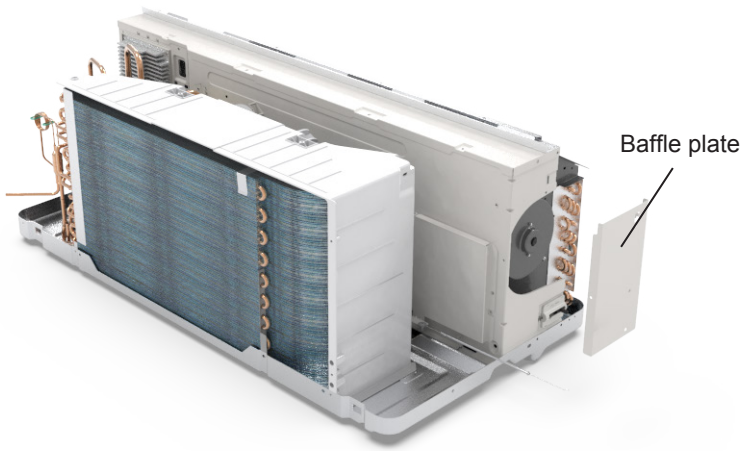
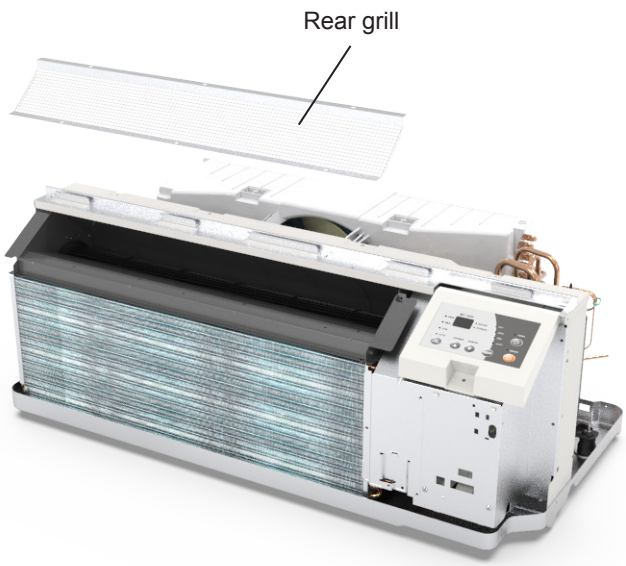
Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or there are 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 are 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.

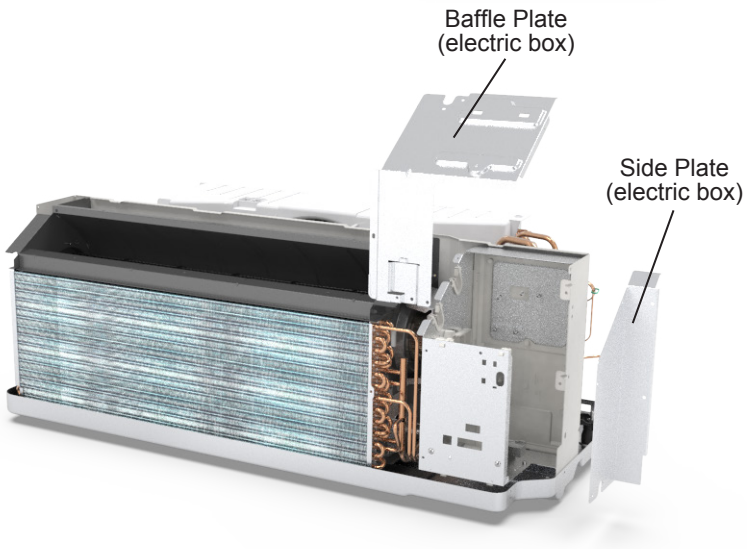
10. Removal Procedure

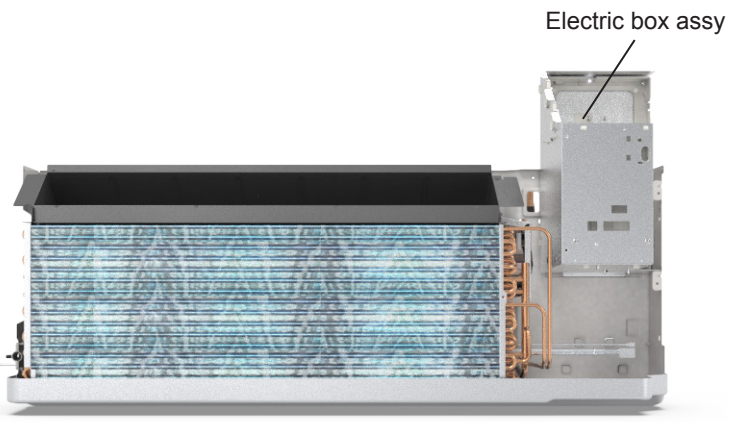
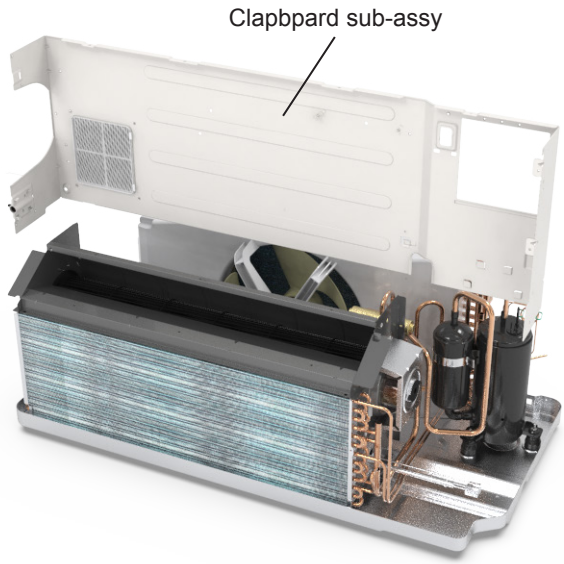
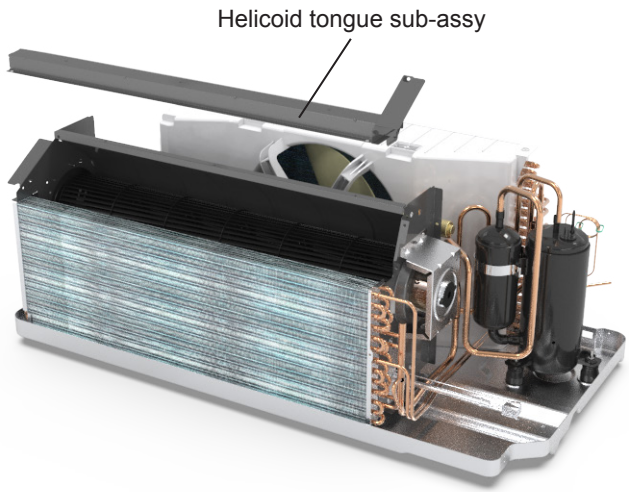
(NOTE: Take one of appearance for example.)

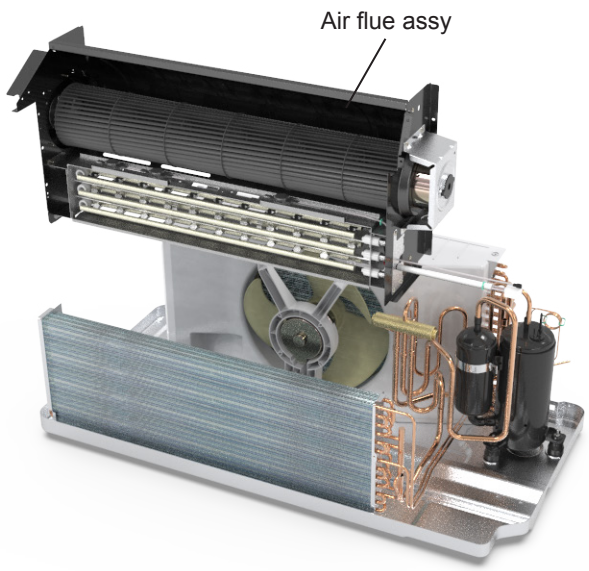
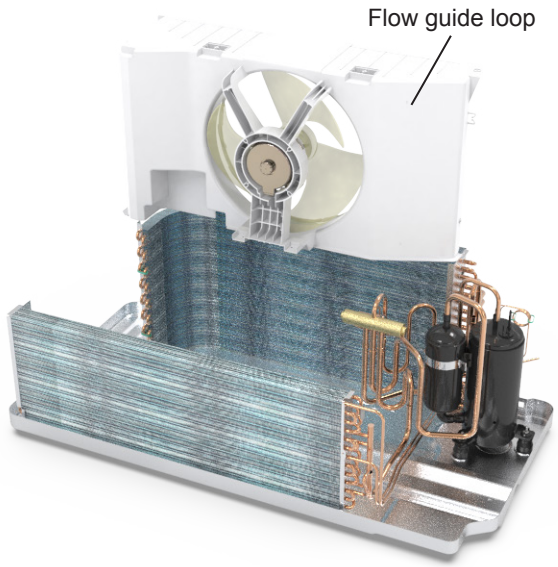
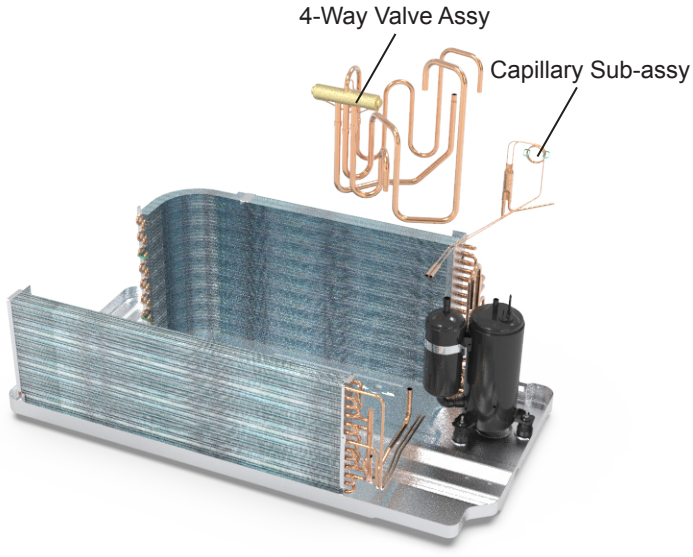
Caution: pull out the power,discharge the refrigerant completely before removal.

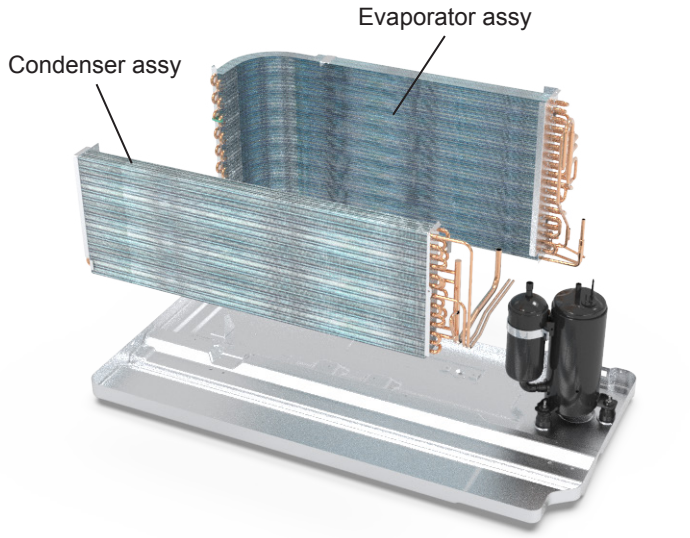
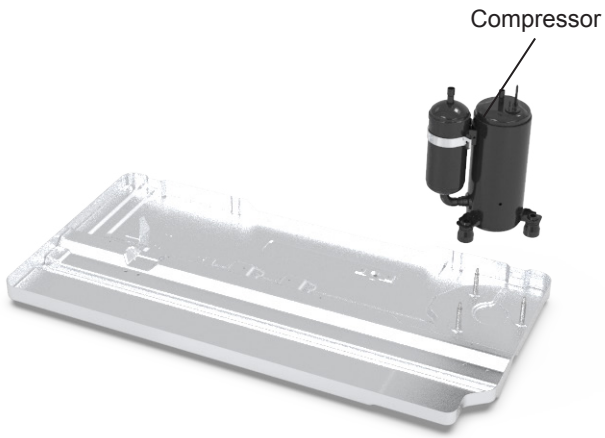
Step	Procedure
1. Remove Front Panel Assy	
Drag the lower part of front panel assy, pull it outwards and upwards to left separate from clasps, and then remove the front panel assy.	
2. Remove Filter Sub-Assy	
Hold front end of filter with hand and then pull the filter upwards to remove it.	
3. Remove Middle Connection Board	
Remove 4 screws fixing the middle connection board and then remove the middle connection board.	

Step	Procedure
4. Remove Outer Support Sub-assy	
Remove 3 screws fixing left outer support sub-assy and then remove it. Remove 3 screws fixing right outer support sub-assy and then remove it.	
5. Remove Baffle Plate	
Remove 1 screw fixing baffle plate and then remove it.	
6. Remove Rear Grill	
Remove 6 screws fixing the rear grill and then remove it.	

Step	Procedure
7. Remove Top Cover Sub-assy	
Remove 4 screws fixing top cover sub-assy and then remove it.	
8. Remove LCD Cover Sub-assy	
Remove 1 screw fixing LCD cover sub-assy and then remove it.	
9. Remove Baffle Plate and Side Plate (Electric Box)	
Remove 4 screws fixing the baffle plate (electric box) and side plate (electric box) and then remove them.	

Step	Procedure
10. Remove Electric Box Assy	
Remove 1 screw on electric box assy, take off the clasp under the electrical box and remove the wiring according to the circuit diagram, and remove the electrical box assy.	
11. Remove Clapboard Sub-assy	
Remove 4 screws on clapbpard sub-assy and chassis sub-assy, and 3 screws on clapbpard sub-assy and air flue Assy, and then remove the clapbpard sub-assy.	
12. Remove Helicoid Tongue Sub-assy	
Remove 3 screws on helicoid tongue sub-assy, loosen the clasps on helicoid tongue, and remove the helicoid tongue sub-assy.	

Step	Procedure
13. Remove Air Flue Assy	
Remove 4 screws fixing air flue assy and then remove it.	
14. Remove Flow Guide Loop	
Remove 3 screws on flow guide loop and chassis, and 3 screws on condenser, and then remove flow guide loop.	
15. Remove 4-Way Valve Assy and Capillary Sub-assy	
Unsolder the welding joints connecting capillary sub-assy, condenser and evaporator, and then remove capillary sub-assy. Unsolder the welding joints connecting 4-way valve assy, condenser, evaporator and compressor, and then remove 4-way valve assy. Note: Before unsoldering the welding joint, discharge the refrigerant in the pipeline completely, and then wrap the 4-way valve assy with a wet cloth completely to avoid damage to the valve caused by high temperature.	

Step	Procedure
16. Remove Condenser Assy and Evaporator Assy	
	Remove the 3 screws fixing evaporator assy and then remove condenser assy and evaporator assy.
	
17. Remove Compressor	
	Remove the 3 foot nuts of compressor and then remove compressor.
	

Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

Fahrenheit display temperature（˚F）	Fahrenheit（˚F）	Celsius（℃）	Fahrenheit display temperature（˚F）	Fahrenheit（˚F）	Celsius（℃）	Fahrenheit display temperature（˚F）	Fahrenheit（˚F）	Celsius（℃）
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（℃）	Fahrenheit display temperature（˚F）	Fahrenheit（˚F）	Celsius（℃）	Fahrenheit display temperature（˚F）	Fahrenheit（˚F）	Celsius（℃）
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: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor (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 Ambient Temperature Sensor (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 Ambient Temperature Sensor (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	4.2
-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	2.5
-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	2.3
-3	199.1	36	30.79	75	7.22	114	2.24
-2	178.5	37	29.54	76	7	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	4.9	126	1.64

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